

NATIONAL INSTITUTE FOR FUSION SCIENCE

Bibliography on Electron Transfer Processes in Ion-ion / Atom / Molecule Collisions -Updated 1997 -

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BIBLIOGRAPHY ON ELECTRON TRANSFER PROCESSES
IN ION-ION/ATOM/MOLECULE COLLISIONS
-UPDATED 1997-

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Abstract

Following our previous compilations [IPPJ-AM-45 (1986), NIFS-DATA-7 (1990), NIFS-DATA-20 (1993)], bibliographic information on experimental and theoretical studies on electron transfer processes in ion-ion/atom/molecule collisions is up-dated. The references published through 1954-1996 are listed in the order of the publication year. For easy finding of the references for a combination of collision partners, a simple list is provided.

[keywords : bibliography, atomic ions, molecular ions,
electron transfer, charge changing]

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J. Phys. B 2 954 1969 E
A measurement of the cross section for charge exchange in H⁺-H collisions.
H⁺ + H⁺ $\rightarrow$ H + H
0.25 - 10 keV (rel.)
- 70E5 Aberth, W.H. Peterson, J.R.
Phys. Rev. A 1 158 1970 E
Ion-ion mutual neutralization cross sections measured by a superimposed beam technique.
 $N^+ + O^- \rightarrow N + O$; $N_2^+ + D_2^- \rightarrow N_2 + D_2$; $O_2^+ + O_2^- \rightarrow O_2 + O_2$
0.1 - 98 eV (rel.)
- 70E1 Cobic, B. Vujovic, M. Matic, M.
J. Phys. B 3 660-666 1970 E
A study of charge-changing collisions involving Mg⁺, Fe⁺ and Cu⁺ in the energy range 5-30 keV
 $A^+ + Ne, Kr, N_2 \rightarrow A^{2+}, A, A^-$ (A=Mg, Fe, Cu)
0.08 - 1.25 keV/amu
- 70E6 Datz, S. Lutz, H.O. Bridwell, L.B. Moak, C.D. Betz, H.D. Ellsworth, L.D.
Phys. Rev. A 2 430 1970 E
Electron capture and loss cross sections of fast bromine ions in gases.

- 70E7 Gailly, T.D. Harrison, M.F.A.
J. Phys. B 3 1098 1970 E
A measurement of the charge exchange cross section in $\text{He}^+ - \text{H}^+$ collisions.
 $\text{He}^+ + \text{H}^+ \rightarrow \text{He} + \text{H}$
0.2 - 8.0 keV (rel.)
- 70E8 Gailly, T.D. Harrison, M.F.A.
J. Phys. B 3 125 1970 E
A remeasurement of the cross section for charge exchange in $\text{H}^+ - \text{H}^+$ collisions.
 $\text{H}^+ + \text{H}^+ \rightarrow \text{H} + \text{H}$
0.6 - 4.0 keV (rel.)
- 70E9 Kaupilla, W.E. Teubner, P.J.O. Fire, W.L. Girnius, R.J.
Phys. Rev. A 2 1759 1970 E
Polarization of Lyman- α radiation produced by direct excitation of hydrogen atoms by proton impact.
- 70E2 Lockwood, G.J.
Phys. Rev. A 2 1406-1410 1970 E
Total cross sections for charge transfer of noble-gas ions in N_2
 $\text{A}^+ + \text{N}_2 \rightarrow \text{A} \text{ (A=He, Ne, Ar, Kr, Xe)}$
0.07-20 keV/amu
- 70E10 Moseley, J. Aberth, W. Peterson, J.R.
Phys. Rev. Letters 24 435 1970 E
 $\text{H}^+ - \text{H}^+$ mutual neutralization cross section obtained with superimposed beams.
 $\text{H}^+ + \text{H}^+ \rightarrow \text{H} + \text{H}$
0.15 - 300 eV (rel.)
- 70E11 Olson, R.E. Peterson, J.R. Moseley, J.
J. Chem. Phys. 53 3391 1970 E
Ion-ion recombination total cross sections-atomic species.
 $\text{O}^+ + \text{O}^+ \rightarrow \text{O} + \text{O}$; $\text{He}^+ + \text{D}^+ \rightarrow \text{He} + \text{D}$; $\text{H}^+ + \text{H}^+ \rightarrow \text{H} + \text{H}$;
 $\text{N}^+ + \text{O}^+ \rightarrow \text{N} + \text{O}$; $\text{He}^+ + \text{H}^+ \rightarrow \text{He} + \text{H}$
0.1 - 10,000 eV (rel.)
- 70E12 Ryding, G. Betz, H.D. Witkower, A.
Phys. Rev. Letters 24 123 1970 E
Influence on ionic excitation in heavy-ion charge-changing cross sections.
- 70E3 Winter, G.J.M. Bieman, D.J. van der Weg, W.F.
Phys. Letters 31A 170-171 1970 E
Electron capture by multiply charged ions
 $\text{Ne}^{q+} + \text{Ar} \rightarrow \text{Ne}^{(q-1)+}$, Ne^{q+2+} ($q=1-4$)
3 keV/amu
- 70E4 Zwally, H.J. Koopman, D.W.
Phys. Rev. A 2 1851-1861 1970 E
Single-electron capture by C^{4+} in helium, neon and argon below 40 keV
 $\text{C}^{4+} + \text{He, Ne, Ar} \rightarrow \text{C}^{3+}$
0.03-3.3 keV/amu
- 71E2 Betz, H.D. Ryding, G. Witkower, A.B.
Phys. Rev. A 3 197 1971 E
Cross sections for electron capture and loss by fast bromine and iodine ions traversing light gases.
- 71E3 Peterson, J.R. Aberth, W.H. Moseley, J.T.
Phys. Rev. A 3 1651 1971 E
Ion-ion mutual neutralization cross sections measured by a superimposed beam technique. II. $\text{O}_2^+ - \text{O}_2^+$; $\text{O}_2^+ - \text{NO}_2^+$ and $\text{NO}^+ - \text{NO}_2^+$.
 $\text{O}_2^+ + \text{O}_2^+ \rightarrow \text{O}_2 + \text{O}_2$; $\text{O}_2^+ + \text{NO}_2^+ \rightarrow \text{O}_2 + \text{NO}_2$
 $\text{NO}^+ + \text{NO}_2^+ \rightarrow \text{NO} + \text{NO}_2$
0.15 - 200 eV (rel.)
- 71E4 Pivovarov, L.I. Levchenko, Y.Z. Krivosov, G.A.
Sov. Phys. JETP (Engl. Transl.) 32 11 1971 E
Ionizing collisions and charge exchange for Li^+ , Li^{2+} and Li^{3+} ions in gases (0.2-2 MeV)

71E5	Weiner,J.M Peatman,B. Berry,R.S. Phys. Rev. A 4 1824 1971 E Charge transfer in Na ⁺ - O ⁻ collisions at low relative energy Na ⁺ + O ⁻ → Na (3d → 3p; 3p → 3s; 4p → 3s) 0.1 - 7 eV (rel.)	72T1	Olson,R.E. J. Chem. Phys. 56 2979 1972 T Absorbing-sphere model for calculating ion-ion recombination total cross sections. H ⁺ + He ⁺ → H ⁺ + He ⁺ + D → He + D; H ₂ ⁺ + D → H ₂ + D; Na ⁺ + O ⁻ → Na + O; O ⁻ + O → O + O; N ⁺ + O → N + O; O ₂ ⁺ + O ⁻ → O ₂ + O; N ₂ ⁺ + O → N ₂ + O; NO ⁺ + O → NO + O 10 ⁻² - 10 ² eV, rate coefficients ; ASM-LZ
71E6	Wittkower,A.B. Beitz,H.D. J. Phys. B 4 1173 1971 E Charge changing cross-sections for heavy ions in complex molecules: the failure of an additive rule.	73E1	Kienle,P. Kleber,M. Povh,B. Diamond,R.M. Steijens,f.S. Grosse,E. Maier,M.r. Proetel,D. Phys. Rev. Letters 31 1099-1102 1973 E Radiative capture and bremsstrahlung of bound electrons induced by heavy ions A ^{q+} + B → A ^{(q-1)+} (1s) + hv + B ⁺ (A=N,N ₂ ,Ar ; B=He,Ne) (X-ray spectroscopy) 7.2x10 ⁻¹ -1.8x10 ⁻⁴ keV/amu
71E1	Zwally,H.J. Cable,P.G. Phys. Rev. A 4 2301-2304 1971 E Comparison of the Landau-Zener theory with measurements of electron capture in B ³⁺ + He collisions B ³⁺ + He → B ²⁺ (nl) (energy-gain spectroscopy) 0.03-0.46 keV/amu	73E2	Lockwood,G.J. Phys. Rev. A 7 125-129 1973 E Total cross sections for charge transfer and stripping of Al, Cr and Er ions in He and N ₂ Al ⁺ , Cr ⁺ , Er ⁺ , Er ²⁺ + He, N ₂ → Al ⁰ , Cr ⁰ , Er ⁰ , Er ²⁺ , Er ⁺ 0.12-3.6 keV/amu
71T1	Olson,R.E. Smith,F.T. Bauer,E. Appl. Optics 10 1848-1855 1971 T Estimation of the coupling matrix elements for one-electron transfer systems Landau-Zener model	73E3	Morgan,T.F. Geddes,J. Gilbody,H.B. J. Phys. B 6 2118 1973 E Formation of H(2p) and H(2s) atoms in collisions of 2-26 keV protons with hydrogen atoms.
72E1	Beitz,H.D. Wittkower,A.B. Phys. Rev. A 6 1485 1972 E Charge-changing cross sections of 5-25 Mev iodine ions in hydrogen and oxygen.	73E4	Tonuma,T. Kohno,Y. Miyazawa,I. Yoshida,F. Karasawa,T. Takahashi.T. Konno,S. J. Phys. Soc.Japan 34 146 1973 E Charge changing of energetic heavy ions in gases.
72E2	Houwer,J.Ch. Fayetteon,J. Abignoli,M. Barat,M. Phys. Rev. Letters 28 1433 1972 E Measurement of the differential cross section for H(n=2) direct excitation in H ⁺ -on-H collisions.	73T2	Gayet,R. Janev,R.K. Salin,A. J. Phys. B 6 993 1973 T Electron detachment from negative ions by charged particle collisions I. proton impact. H ⁺ + H ⁻ → H + H 1.56 - 400 keV ; CB

- 73T1 Halpern, A.M. Law, J.
Phys. Rev. Letters 31 4-6 1973 α'
K-vacancy creation by high Z heavy ion impact
 $A^{q+} + Ar \rightarrow A^{(q-1)+} + Ar^+(1s^+)$ (A=H, C, N, O, F)
- 73T3 Roy, K. Mukherjee, S.C.
Phys. Rev. A 7 130 1973 T
Charge transfer in $H^+ - H$ collisions.
 $H^+ + H \rightarrow H(2s, 2p, 2p_{11})$
0.5 - 8 keV; AE
- 74E3 Bayfield, J.E. Khayrallah, G.A. Koch, P.M.
Phys. Rev. A 9 209 1974 E
Production of fast highly excited atoms in proton collisions with atomic hydrogen and argon.
- 74E4 Houver, J.C. Fayetteon, J. Barat, M.
J. Phys. B 7 1358 1974 E
Elastic and inelastic differential measurements for H^+ on H collisions in the 250 eV-2000 eV energy range.
- 74E5 Kondow, T. Girmius, R.J. Chang, Y.P. Fite, W.L.
Phys. Rev. A 10 1167 1974 E
Production of Lyman- α radiation in collisions of protons and hydrogen atoms.
- 74E6 Lockwood, G.J.
Phys. Rev. A 9 1916 1974 E
Total cross sections for charge transfer for F^+ in H_2, N_2, He, Ne and Ar.
- 74E1 Macdonald, J.R. Cocke, C.L. Eidson, W.W.
Phys. Rev. Letters 32 648-651 1974 E
Capture of argon K-shell electrons by 2.5 to 12 MeV protons
 $H^+ + Ar \rightarrow H^0 + Ar^+(1s^+)$
(X-ray-projectile coincidence)
2500-12000 keV/amu
- 74E2 Meyer, F.W. Anderson, L.W.
Phys. Rev. A 9 1909-1915 1974 E
Charge-exchange cross sections for Ne^+ and Ar^+ incident on Cs
 $Ne^+, Ar^+ + Cs \rightarrow Ne^0, Ar^0$
0.09-2.0 keV/amu
- 74E7 Shah, M.B. Gilbody, H.B.
J. Phys. B 7 630 1974 E
Charge transfer in $He^{2+} - H$ collisions in the energy range 6 - 60 keV.
- 74T1 Brigg, J.S. Dettmann, K.
Phys. Rev. Letters 33 1123-1125 1974 T
Radiative charge transfer from H atoms by fast ions
 $H^+ + H(1s) \rightarrow H(1s) + h\nu + H^+$
- 74T2 Piancetti, R.D. Salin, A.
J. Phys. B 7 1666-1678 1974 T
Molecular treatment of the $He^{2+} + H$ collisions
 $He^{2+} + H \rightarrow He^+ + H^+ : He^+(2s)$ (PSS)
0.25-12.5 keV/amu
- 75E1 Afrosimov, V.V. Leiko, G.A. Manev, Yu.A. Panov, M.N.
Sov. Phys.-JETP 40 551-666 1975 E
Elementary processes of variation of particle charge states in $He^{2+} + He$ collisions
 $He^{2+} + He \rightarrow He^0 + He^{2+}; He^+ + He^+; He^{2+} + He^+ + e; He^{2+} + He^{2+} + 2e; He^+ + He^{2+} + e$
0.25-25 keV/amu
- 75E7 Bayfield, J.E. Khayrallah, G.A.
Phys. Rev. A 12 869-875 1975 E
Electron transfer in keV energy He^{2+} collisions. III Experimental tests of the close-coupling calculation for $He^{2+} + H(1s)$ collisions
 $He^{2+} + H(1s) \rightarrow He^+(2s) + H^+$
1.75-36 keV/amu

75E3	Chen, Y.H. Johnson, R.E. Humphris, R.R. Siegel, M.W. Boring, J.W. J. Phys. B 8 1527-1543 1975 E Differential scattering of He^{2+} from He $\text{He}^{2+} + \text{He} \rightarrow \text{He}^{2+} + \text{He} ; \text{He}^+ + \text{He}^+$ $5 \times 10^{-2} - 1.5 \times 10^{-1} \text{ keV/amu}$	75T2	Kleber, M. Jakubassa, D.H. Z. Phys. A 252 152-162 1975 T Radiative electron capture in heavy ion collisions $\text{A}^{q+} + \text{B}^{(q')\pm} \rightarrow \text{A}^{(q-1)\pm} + \text{B}^{q*} + h\nu$ (1A)
75E4	Klinger, H. Muller, A. Salzborn, E. J. Phys. B 8 230-238 1975 E Electron capture processes of multiply charged argon ions in argon at energies from 10 to 90 keV $\text{Ar}^{q+} + \text{Ar} \rightarrow \text{Ar}^{(q-1)+} (q=2-7 ; i=1-4)$ $0.25-2.25 \text{ keV/amu}$	75T3	McCarroll, R. Valiron, P. Astron. & Astrophys. 44 465-467 1975 T Electron capture by C^{2+} from interstellar atomic hydrogen $\text{C}^{2+} + \text{H} \rightarrow \text{C}^+ + \text{H}^+$ model potential method
75E8	Koch, P.M. Bayfield, J.E. Phys. Rev. Letters 34 448 1975 E Electron loss in low energy $\text{H}^+ - \text{H}$ (high n) merged beam collisions.	.75T4	Omidvar, K. Phys. Rev. A 12 911-926 1975 T Asymptotic form of the charge-exchange cross section in three-body rearrangement collisions $\text{H}^+ + \text{H} \rightarrow \text{H}(n) + \text{H}^+$ first Born approx. Z-scaling
75E5	Meyer, F.W. Anderson, L.W. Phys. Rev. A 11 586-588 1975 E Charge-exchange cross sections for Kr^+ and Xe^+ incident on Cs $\text{Kr}^+, \text{Xe}^+ + \text{Cs} \rightarrow \text{Kr}^0, \text{Xe}^0$ $0.012-0.34 \text{ keV/amu}$	75T5	Presnyakov, L.P. Ullantsev, A.D. Sov. Phys.- Quantum Electron. 4 1320-1324 1975 T Charge exchange between multiply charged ions and atoms $10^{-3}-10^2 \text{ keV/amu}$
75E6	Muller, A. Klinger, H. Salzborn, E. Phys. Letters 55 11-12 1975 E Multiple-electron transfer to highly charged noble gas ions in single ion-atom collisions $\text{Ar}^{6+} + \text{Ne}, \text{N}_2, \text{Ar}, \text{Kr}, \text{Xe} \rightarrow \text{Ar}^{2+}$ $0.2-1.8 \text{ keV/amu}$	76E16	Alvarez, I. Cisneros, C. Barnett, C.F. Ray, J.A. Phys. Rev. A 13 1728 1976 E Electron capture and stripping cross sections for Tl and K ions and atoms in H_2 .
75T1	Halpern, A.M. Law, J. Phys. Rev. A 12 1776-1780 1975 T Full first Born approximation for inner-shell pickup in heavy ion collisions $\text{A}^{q+} + \text{AR} \rightarrow \text{A}^{(q-1)+} + \text{Ar}(1s^{-1}) (\text{A}=\text{H}, \text{C}, \text{N}, \text{O}, \text{F})$ $2.5-12 \text{ MeV/amu (H)} ; 1.05-1.8 \text{ MeV/amu (C, N, O, F)}$	76E1	Crandall, D.H. Olson, R.E. Shipsey, E.J. Browne, J.C. Phys. Rev. Letters 36 858-860 1976 E Single and double charge transfer in $\text{C}^{4+} - \text{He}$ collisions $\text{C}^{4+} + \text{He} \rightarrow \text{C}^{3+}, \text{C}^{2+}$ $0.21-7.5 \text{ keV/amu}$

76E2	Eisele, F.L., Nagy, S.W. J. Chem. Phys. 65 752-756 1976 E Attenuation and single electron charge exchange cross sections of He ⁺ on He in the energy range 500-5000 eV He ⁺ + He → He ⁰ 0.125-1.25 keV/amu	76E7	Latypov, Z.Z., Shaporenko, A.A. Sov. Phys. - JETP 42 986-988 1976 E Ionization and capture of electrons in collisions of Na ⁺ ions with Ne atoms Na ⁺ + Ne → Na ⁰ + Ne ⁺ ; Na ⁺ + Ne ⁺ + e < 0.02 keV/amu
76E3	Goldbar, J., Mariella, R., Javan, A. Appl. Phys. Letters 29 96-98 1976 E Observation of one- and two-electron transfer from noble-gas to highly stripped carbon ions C ^{q+} + He, Ne, Ar → C ^{(q-1)+} , C ^{(q-2)+} (q=3-5) laser source	76E8	Lindskog, J., Phil, J., Sjodin, R., Marelus, A., Sharma, K., Hallin, R. Phys. Scripta 14 100-104 1976 E Radiative electron capture by multiply ionized chlorine atoms Cl ^{q+} + C → Cl ^{(q-1)+} + hv (q=z,z-1) 857-1714 keV/amu
76E4	Hird, B., Suk, H.C. Phys. Rev. A 14 928-936 1976 E Single-electron stripping cross sections of N ⁺ in Ne, Ar and Kr between 35-140 keV N ⁺ + Ne, Ar, Kr → N ⁰ 2.5-10 keV/amu	76E15	Makhadis, Y.Y., Birkinshaw, K., Hasted, J.B. J. Phys. B 9 111-121 1976 E Curve crossing spectroscopy of systems involving Coulomb repulsion of products C ²⁺ + He, Ne → C ⁺ ; O ²⁺ + He → O ⁺ (translational spectroscopy) 0.1-0.2 keV/amu
76E17	Hopkins, F., Little, A., Cue, N. Phys. Rev. A 14 1634 1976 E Innershell Coulomb excitation in the collisions of few electron F with H ₂ and He.	76E9	Muller, A., Klinger, H., Salzborn, E. J. Phys. B 9 291-293 1976 E Role of metastable argon ions in Ar ⁴⁺ + Ar charge exchange collisions Ar ³⁺ + Ar → Ar ⁺ ; Ar ⁺ + Ar → Ar ²⁺ 0.53, 0.9 keV/amu
76E5	Hvelplund, P. J. Phys. B 9 1555-1565 1976 E Electron capture and loss by ground state and metastable Li ⁺ in helium and argon targets Li ⁺ (1s ²) + He, Ar → Li ⁰ ; Li ⁺ *(1s2s) + He, Ne → Li ²⁺ , Li ¹⁰⁺ 5.7-12.9 keV/amu	76E10	Muller, A., Salzborn, E. Phys. Letters 59A 19-20 1976 E Single and double electron transfer in Ar ⁴⁺ - He collisions Ar ⁴⁺ + He → Ar ^{(q-1)+} (q=3-8; i=1,2) 0.075-1.75 keV/amu
76E6	Klinger, H., Muller, A., Salzborn, E. J. Chem. Phys. 65 3427-2430 1976 E Electron capture cross sections for multiply charge argon ions passing through nitrogen and krypton targets at energies from 10 to 110 keV Ar ^{q+} + N ₂ , Kr → Ar ^{(q-1)+} (q=2-7; i=1-4) 0.25-2.75 keV/amu	76E18	Pearl, B., Grey, R., Dolder, K.T. J. Phys. B 9 3047 1976 E Measurements of cross sections for electron detachment from H ⁺ ions by proton impact. H ⁺ + H → H ⁺ + H + e 1.49 - 35.2 keV (rel.)

76E20	Peart,B. Grey,R. Dolder,K.T. J. Phys. B 9 L373 1976 E Measurements of cross sections for the mutual neutralization of He ⁺ and H ⁺ ions. He ⁺ + H ⁺ → He + H 35 - 4550 eV (rel.)	76T1	Blint,R.J. Watson,W.D. Christensen,,B. Astrophys. J. 205 634-637 1976 T Calculation of the cross section for C IV - H charge exchange : significance for interstellar X-rays and cosmic-ray particles C ³⁺ + H ⁺ → C ²⁺ + H ⁺ (1Z model) 10 ⁻⁴ -1.75x10 ⁻³ keV/amu
76E19	Peart,B. Grey,R. Dolder,K.T. J. Phys. B 9 L369 1976 E Measurements of cross sections for the mutual neutralization of H ⁺ and H ⁺ ions. H ⁺ + H ⁺ → H + H 20 - 3000 eV (rel.)	76T2	Chibisov,M.I. JETP Letters 24 46-49 1976 T Charge exchange and ionization in the collision of atoms and multiply charged ions
76E11	Shah,M.B. Gilbody,H.B. J. Phys. B 9 1933-1941 1976 E Redetermination of cross sections for formation of metastable He ⁺ (2s) ions in fast collisions using an improved calibration procedure He ²⁺ + B → He ⁺ (2s) (B=H,H ₂ ,He,N ₂ ,O ₂ ,Ar,Kr,K) ; He ⁺ (1s) + B → He ⁺ (2s) (B=H ₂ ,He,N ₂ ,O ₂ ,Ar,Kr) 2-20 keV/amu	76T9	Fujiwara,K. J. Phys. Soc. Japan 41 1350 1976 T Coulomb-Born calculation of charge transfer cross sections of highly-ionized atoms. Erratum; J. Phys. Soc. Japan 45, 1053 (1978) H ⁺ + Cl ¹⁺⁻³⁺ ; O ¹⁺⁻⁷⁺ ; Fe ⁷⁺ ; Fe ¹⁶⁺ ; Fe ²³⁺ ; Mo ¹³⁺ → H ⁰ 1 keV - 100 MeV ; CB
76E12	Shah,M.B. Gilbody,H.B. J. Phys. B 9 2685-2692 1976 E Electron capture, loss and de-excitation in collisions involving fast metastable He ⁺ (2s) ions He ⁺ (2s) + B → He ⁰ , He ²⁺ (B=H ₂ ,He,N ₂ ,O ₂ ,Ar,Kr) 5-18.3 keV/amu	76T7	McCarroll,R. Valiron,P. Astron. Astrophys. 53 83-88 1976 T Charge transfer of Si ²⁺ ions with atomic hydrogen in the interstellar medium Si ²⁺ + H → Si ⁺ + H ⁺ (MO) 3-3x10 ⁴ K
76E13	Sohval,A.R. Delvaillie,J.P. Kalata,K. Kirby-Docken,K. Schnopper,H.W. J. Phys. B 9 L25-29 1976 E Model for radiative electron capture : an interpretation of the line width O ⁸⁺ + B → O ⁷⁺ (1s) + hv (B=H ₂ ,He,N ₂ ,O ₂ ,C ₃ H ₈) (X-ray spectroscopy) 1875-4062 keV/amu	76T3	Olson,R.E. Salop,A. Phys. Rev. A 14 579-585 1976 T Electron transfer between multicharged ions and neutral species A ⁺ + B → A ⁽ⁿ⁻¹⁾⁺ (A=5-50 ; B=H,H ₂ ,He,Ne,Kr,Xe) (absorbing sphere model) <0.2 keV/amu
76E14	Sohval,A.R. Delvaillie,J.P. Kalata,K. Schnopper,H.W. J. Phys. B 9 L47-51 1976 E Cross section ratio for radiative electron capture to inner and outer atomic shells O ⁸⁺ + B → O ⁷⁺ (1s) + hv (B=H ₂ ,He,N ₂ ,O ₂ ,C ₃ H ₈) (X-ray spectroscopy) 1875-4062 keV/amu	76T4	Omidvar,K. Golden,J.E. McGuire,J.H. Phys. Rev. A 13 500-503 1976 T Single electron Born approximations for charge transfer from multielectron atoms to protons H ⁺ + He, Ar → H + He ⁺ (1s ⁻¹), Ar ⁺ (1s ⁻¹) 1-12 MeV/amu

76T6	Salop, A. Phys. Rev. A 13 1312-1320 1976 T Charge exchange between H(1s) and fully stripped heavy ions at low-keV impact energies $A^{z+} + H(1s) \rightarrow A^{(z-1)+}$ (A=C, N, O, Ne, Si, Ar)	77E15	Chong, Y.P. Fite, W.L. Phys. Rev. A 16 933 1977 E Cross section for the metastable H(2s) state in proton collisions with atomic hydrogen.
76T5	Salop, A. Phys. Rev. A 13 1321-1325 1976 T Charge exchange between H(2s) and fully stripped carbon and nitrogen ions at low-keV impact energies $C^{6+}, N^{7+} + H(2s) \rightarrow C^{5+}, N^{6+}$ (multichannel LZ) 0.014-3.3 keV/amu	77E1	Cocke, C.L., Gardner, R.K. Curnutte, B. Bratton, T. Saylor, K.T. Phys. Rev. A 16 2248-2255 1977 E K-shell capture by protons from O ₂ , N ₂ and Ne $H^+ + B \rightarrow H + B^+(1s^{-1})$ (B=O ₂ , N ₂ and Ne) 750-5000 keV/amu
76T8	Sinha, S. Bardsley, J.N. Phys. Rev. A 14 104-113 1976 T Symmetric charge transfer in low-energy ion-atom collisions $A^+ + A \rightarrow A + A^+$ (A=Li, Na, K, Ca, Rb, Cs) $10^{-2}-10^{-3}$ keV/amu	77E2	Crandall, D.H. Phys. Rev. A 16 958-963 1977 E Electron transfer between He-like ions and He $B^{z+} + He \rightarrow B^{z+}, B^+; C^{z+} + He \rightarrow C^{z+}, C^+; N^{z+} + He \rightarrow N^{z+}, N^+;$ $O^{z+} + He \rightarrow O^{z+}, O^+$ 1.3-7.5 keV/amu
76T10	Zhdanov, V.P. Sov. J. Tech. Phys. 21 117 1976 T Resonance charge exchange in ion-ion collisions $He^{2+} + He^+ \rightarrow He^+ + He^{2+}; Li^{2+} + Li^{2+} \rightarrow Li^{2+} + Li^{2+}; Be^{3+} + Be^{3+} \rightarrow Be^{3+} + Be^{3+};$ $B^{3+} + B^{3+} \rightarrow B^{3+} + B^{3+}; C^{4+} + C^{4+} \rightarrow C^{4+} + C^{4+}; N^{5+} + N^{5+} \rightarrow N^{5+} + N^{5+}$ 0.01 - 10 ⁴ eV; IP	77E16	Crandall, D.H. Mallory, M.L. Kocher, D.C. Phys. Rev. A 15 61 1977 E Charge exchange between multicharged ions of C, N and O and molecular hydrogen.
77E13	Berkner, K.H. Graham, W.G. Pyle, R.V. Schlachter, A.S. Stearns, J.W. Phys. Letters 62A 407 1977 E Single electron capture and loss cross sections for highly stripped Fe ions in hydrogen at 3.4 MeV/nucleon.	77E3	Eisele, F.L. Nagy, S.W. J. Chem. Phys. 66 883-885 1977 E Attenuation and single electron charge exchange cross sections of He ⁺ on Ne and Ar in the 500-5000 eV energy range $He^+ + Ne, Ar \rightarrow He^0$ 0.125-1.25 keV/amu
77E14	Burniaux, M. Brouillard, F. Jognaux, A. Govers, T.R. Szucs, S. J. Phys. B 10 2421 1977 E Merged-beams study of the charge exchange between He ²⁺ ions and highly excited hydrogen atoms.	77E17	Gardner, L.D. Bayfield, J.E. Koch, P.M. Kim, H.J. Stelson, P.H. Phys. Rev. A 16 1415 1977 E Experimental study of electron transfer in multiply charged iron ion collisions with atomic hydrogen.

77E4	Guffey,J.A. Ellsworth,L.D. Macdonald,J.R. Phys. Rev. A 15 1863-1870 1977 E X-ray cross sections in helium for electron capture to excited states by bare nuclei with $5 \leq Z \leq 9$ $A^+ + He \rightarrow A^{(q-1)+} + x\text{-rays}$ ($A=B, C, N, O, F$) 250-2300 keV/amu	77E20	Pearl,B. Gee,D.M. Dolder,K.T. J. Phys. B 10 2683 1977 E Measurements of cross sections for the formation of Mg^{2+} ions by collisions between protons and Mg^+ . $H^+ + Mg^+ \rightarrow Mg^{2+}$ 0.98 - 44.5 keV (rel.)
77E12	Harnois,M. Falk,R.A. Geballe,R. Risley,J. Phys. Rev. A 16 2256-2263 1977 E Excitation of low lying excited states of hydrogen in 1-5 keV collisions of H with He, Ar, Xe and N_2 $H^+ + He, Ar, Xe, N_2 \rightarrow H(3s, 3d, 4s, 5s)$ 1-5 keV/amu	77E21	Pearl,B. Grey,R. Dolder,K.T. J. Phys. B 10 2675 1977 E Measurements of cross sections for the formation of He^{2+} ions by collisions between protons and He^+ . $H^+ + He^+ \rightarrow He^{2+}$ 2.98 - 28.5 keV (rel.)
77E5	Meyer,F.W. Anderson,C.J. Anderson,L.W. Phys. Rev. A 15 455-462 1977 E Total charge transfer cross sections for $H^+, H_2^+, H_3^+, He^+, N^+, N_2^+, Ne^+, Ar^+, Kr^+$, and Xe^+ incident on C_8 $H^+, H_2^+, H_3^+, He^+, N^+, N_2^+, Ne^+, Ar^+, Kr^+, Xe^+ + C_8 \rightarrow H^0, H_2^0, H_3^0, He^0, N^0, N_2^0, Ne^0, Ar^0, Kr^0, Xe^0$ 0.23-160 keV/amu	77E22	Phaneuf, R.A. Meyer,F.W. McKnight,R.H. Olson,R.E. Salop,A. J. Phys. B 10 L425 1977 E Electron capture and impact ionization cross sections of N^+ in atomic hydrogen.
77E18	Mitchell,J.B.A. Dunn,K.F. Angel,G.C. Browning,R. Gilbody,H.B. J. Phys. B 10 2897 1977 E Ionization and charge transfer in fast $H^+ - He^+$ collisions using an intersecting beam technique. $H^+ + He^+ \rightarrow H + He^{2+}$ (coincidence) ; $H^+ + He^{2+} + e$ 72 - 402 keV (c.m.)	77E23	Schuch,R. Schmidt-Bocking,H. Tseruya,I. J. Phys. B 10 889-898 1977 E Radiative electron capture by ^{35}S ions $S^{+}(q=15,16) + B \rightarrow S^{(q-1)+} + hv$ ($B=Be, C, Ni$) (X-ray spectroscopy) 156-3594 keV/amu
77E6	Muller,A. Salzborn,E. Phys. Letters 62A 391-394 1977 E Scaling of cross sections for multiple electron transfer to highly charged ions colliding with atoms and molecules scaling law < 25 keV/amu	77E24	Shah,M.B. Goffe,T.V. Gilbody,H.B. J. Phys. B 10 L723 1977 E Electron loss by 35 -1000 keV He^+ ions in collisions with atomic and molecular hydrogen.
77E19	Park,J.T. Aldag,J.E. George,J.M. Peacher,J.L. Phys. Rev. A 15 508 1977 E Differential energy-loss cross sections for ionization of atomic hydrogen by 25-200 keV protons.	77E8	Spindler,E. Betz,H.D. Bell,F. J. Phys. B 10 L561-564 1977 E Radiative electron capture and momentum distributions of target electrons $Cu^{q+} + Al \rightarrow Cu^{(q-1)+} + hv$ ($q=28, 29$: X-ray spectroscopy) 7031 keV/amu

77E9	Suk,H.C. Guilband,A. Hird,B. Can. J. Phys. 55 1594-1600 1977 E Single electron capture by Ar^{2+} in Ne,Ar and Kr gases $Ar^{2+} + Ne, Ar, Kr \rightarrow Ar^+$ 1.27-4.8 keV	77T4	Belkic,Dz. McCarroll,R. J. Phys. B 10 1933-1943 1977 T Projectile charge dependence of electron capture cross sections $A^+ + H \rightarrow A^{(q-1)+}$ (A=H,He,Be,C,O,Ne,Ca,Zn) ; $F^{8+} + H \rightarrow F^{6+}(nl)$ (CDW) 500-5x10 ³ keV/amu
77E25	Winter,H. Bloemen,E. de Heer,F.J. J. Phys. B 10 L453-457 1977 E Electron capture into excited projectile states in collisions of 100 keV Ne^{8+} (z=1, 2, 3, 4) with He, H ₂ and Ar. $Ne^{8+}(q=1,2,3,4) + He, H_2, Ar \rightarrow Ne^{(q-1)+}$ (photon spectroscopy) 5 keV/amu	77T5	Bottcher,C. J. Phys. B 10 L213-217 1977 T Charge transfer to highly stripped ions from hydrogen atoms $A^+ + H(1s) \rightarrow A^{(q-1)+}(nl)$ (A=2-18) <225 keV/amu
77E11	Winter,H. Bloemen,R. de Heer,F.J. J. Phys. B 10 L599-605 1977 E VUV radiation, slow ions and electrons produced in collisions of multiply charged Ne ions with He and Ar $Ne^{q+} + He, Ar \rightarrow Ne^{(q-1)+}$ (q=1-4) (photon spectroscopy) 1.24-39.6 keV/amu	77T6	Butler,S.E. Guberman,S.L. Dalgarno,A. Phys. Rev. A 16 500-507 1977 T Radiative charge transfer between H and C^{2+} , C^{3+} and N^{2+} $C^{2+}, C^{3+}, N^{2+} + H \rightarrow C^+, C^{2+}, N^+ + hv$ 10-10 ⁴ K
77T1	Belkic,Dz. J. Phys. B 10 3491 1977 T High-energy behavior of the transition probabilities and total cross sections for charge exchange $H^+ + H(1s) \rightarrow H(nl) + H^+$ (continuum intermediate state approx.) 25-10000 keV/amu	77T7	Christensen,R.B. Watson,W.D. Blint,R.J. Astrophys. J. 213 712-715 1977 T Calculation of the cross section for N IV - H charge exchange : significance for the intercloud gas $N^{3+} + H \rightarrow N^{2+}$ (OBK,LZ) 10 ⁻⁶ -5x10 ⁻⁴ keV/amu
77T2	Belkic,Dz. Gayet,R. J. Phys. B 10 1911-1921 1977 T Electron capture from atomic hydrogen by fast protons and alpha particles	77T8	Dewangan,D.P. J. Phys. B 19 1083- 1977 T Electron capture in high energy approximation $H^+ + H(1s) \rightarrow H(1s,2s,2p) + H^+$ (elkonal approx.) 40-5000 keV/amu
77T3	Belkic,Dz. Gayet,R. J. Phys. B 10 1923-1932 1977 T Charge exchange in fast collisions of H^+ and He^{2+} with helium $H^+ + He(1s^2) \rightarrow H(1s,2l,3l,4s) + He^+$; $He^{2+} + He(1s^2) \rightarrow He^+ + He^+(1s)$ 25-10x10 ³ keV/amu	77T9	Harel,C. Salin,A. J. Phys. B 10 3511-3522 1977 T Charge exchange in collisions of highly ionized ions and atoms $A^+ + H \rightarrow A^{(q-1)+}(nl)$ (A=Be, B, O) (impact parameter) 0.25-25 keV/amu

77T10	Koyama, K. Ohisuki, Y.H. Phys. Rev. B 15 61-63 1977 T Theory of radiative electron capture by channeled ions $O^{8+} + Ag \rightarrow O^{7+}(1s) + h\nu$ (statistical model) 100-4000 keV/amu	77T15	Salop, A. Olson, R.E. Phys. Rev. A 16 1811-1816 1977 T Electron removal from atomic hydrogen by collisions with fully stripped carbon $C^{6+} + H \rightarrow C^{5+} + H^+$; $C^{6+} + H^+ + e$ (PSS, CTMC) 0.05-500 keV/amu
77T11	Lapicki, G. Losonsky, W. Phys. Rev. A 15 896-905 1977 T Electron capture from inner shell by fully stripped ions $A^{n+} + B \rightarrow A^{(n-1)+} + B^+(1s^{n-1})$ scaling law	77T16	Shipsey, E.J. Brown, J.C. Olson, R.E. Phys. Rev. A 15 2166-2172 1977 T Theoretical charge exchange total cross sections for $B^{3+} + He$ and $C^{4+} + He$ collisions $B^{3+} + He \rightarrow B^{2+} + He^+$; $C^{4+} + He \rightarrow C^{3+} + He^+$ (IP classical-coupled equation) 0.25-25 keV/amu
77T12	Msezane, A.Z. Phys. Letters 59A 435-437 1977 T Electron capture by completely stripped positive ions in collisions with atomic hydrogen $A^{n+} + H \rightarrow A^{(n-1)+}$ (semiclassical IP)	77T17	Vaaben, J. Briggs, J.S. J. Phys. B 10 L521-526 1977 T Charge transfer in $C^{6+} - H(1s)$ collisions at low velocity $C^{6+} + H(1s) \rightarrow C^{5+} + H^+$ (MC) 0.05-5 keV/amu
77T13	Olson, R.E. Salop, A. Phys. Rev. A 16 531-541 1977 T Charge transfer and impact ionization cross sections for fully and partially stripped positive ions colliding with atomic hydrogen $A^{q+} + H \rightarrow A^{(q-1)+} + H^+$; $A^{q+} + H^+ + e$ ($A^{q+} = H^+, He^{2+}, Li^{3+}, Be^{4+}, B^{3+-5+}, C^{3+-6+}, N^{3+-7+}, O^{3+-8+}, Ne^{10+}, Si^{14+}, Ar^{18+}, Fe^{26+}, Kr^{36+}$) (CTMC) 37.5-200 keV/amu	77T19	Zhdanov, V.P. Chibisov, M.I. Sov. J. - Plasma Phys. 3 406 1977 T Charge exchange between protons and singly ionized metal atoms. $H^+ + A^+ \rightarrow H(1s) + A^{2+}$ ($A = Mg, Fe, Zn, Mo, Cd, W$) $1 - 10^4$ eV; LZ
77T18	Olson, R.E. Salop, A. Phaneuf, R.A. Meyer, F.W. Phys. Rev. A 16 1867 1977 T Electron loss by atomic and molecular hydrogen in collisions with $^3He^{2+}$ and $^4He^+$.	78E1	Afrosimov, V.V. Basalae, A.A. Panov, M.N. Leiko, G.A. JETP Letters 26 537-539 1978 E Electron capture in different electronic states by multiply charged Ar^{n+} ions in He atoms $Ar^{q+} + He \rightarrow Ar^{(q-1)+}$ ($q=3-7$); $Ar^{6+} + He \rightarrow Ar^{5+}(nl)$; $Ar^{3+} + He \rightarrow Ar^{2+}(nl)$ (energy gain spectroscopy) 0.1-0.5 keV/amu
77T14	Piancetini, R.D. Salin, A. J. Phys. B 10 1515-1522 1977 T Molecular treatment of $He^{2+} - H$ collisions II $He^{2+} + H \rightarrow He^+, He^+(2s)$ (MC) 0.25-12.5 keV/amu	78E18	Angel, G.C. Dunn, K.F. Sewell, E.C. Gilbody, H.B. J. Phys. B 11 L49 1978 E Ionization and charge transfer in fast $H^+ - He^+$ collisions: further measurements of improved accuracy. $H^+ + He^+ \rightarrow He^{2+}$ 40 - 386 keV (c.m.)

78E17	Angel,G.C. Sewell,E.C. Dunn,K.F. Gilbody,H.B. J. Phys. B 11 L297 1978 E Charge transfer and ionization in fast $H^+ - He^+$ collision : further measurements using coincidence technique. $H^+ + He^+ \rightarrow H + He^{2+}$; $H^+ + He^{2+} + e$ 60 - 182 keV (c.m.)	78E22	Kim,K.J. Phaneuf,R.A. Meyer,F.W. Stelson,P.H. Phys. Rev. A 17 854 1978 E Single electron capture by multiply charged Si^{28} ions in atomic and molecular hydrogen.
78E19	Berkner,K.H. Graham,W.G. Pyle,R.V. Schlachter,A.S. Stearns,J.W. Olson,R.E. J. Phys. B 11 875-885 1978 E Electron capture and impact-ionization cross sections for partially stripped iron ions colliding with atomic and molecular hydrogen. $Fe^{q+} (q=9-25) + H, H_2 \rightarrow Fe^{(q-1)+}$ (growth, CTMC) 50-1200 keV/amu	78E23	Lockwood,G.J. Miller,G.H. Hoffmann,J.M. Phys. Rev. A 18 935 1978 E Charge transfer of C^+ , N^+ and O^+ in N_2 and H_2 .
77E2	Berkner,K.H. Graham,W.G. Pyle,R.V. Schlachter,A.S. Stearns,J.W. Olson,R.E. J. Phys. B 11 875-885 1978 E Electron capture and impact ionization cross sections for partially stripped iron ions colliding with atomic and molecular hydrogen $Fe^{q+} (q=9-25) + H, H_2 \rightarrow Fe^{(q-1)+}$ (growth, CTMC) 50-1200 keV/amu	78E14	Maier,II,W.B. J. Chem. Phys. 69 3077-3092 1978 E Electron transfer in collisions between atomic ions and rare gas atoms for primary ion energies below 200 eV II $A^+ + B \rightarrow A + B^+$ (A=H, He, Ne, Ar, Kr : B=He, Ne, Ar, Kr, Xe)
78E3	Hinds,E.A. Novik,R. J. Phys. B 11 2201-2207 1978 E Precise resonant charge-transfer cross sections for $He-He^+$ between 2 and 100 keV $He^+ + He \rightarrow He + He^+$ (attenuation method) $5 \times 10^{-4} - 2.5 \times 10^{-3}$ keV/amu	78E4	Maier,II, W.B. Stewart,B. J. Chem. Phys. 68 4228-4232 1978 E Electron transfer in collisions of doubly charged atomic ions with rare gas atoms for primary-ion energies below 100 eV $A^{2+} + He \rightarrow A^+ (A=He, N, O, Ne, Ar) : Ar^{2+} + He \rightarrow Ar^{2+} ;$ $Ne^{2+} + He \rightarrow Ne^+ ; Ar^{2+} + Ar \rightarrow Ar^+ ; A^{2+} + Kr \rightarrow Ar^+$ 1×10^{-3} keV/amu
78E20	Jognaux,A. Brouillard,F. Szucs,S. J. Phys. B 11 L669 1978 E Charge exchange on low energy $He^+ - He^{2+}$ collisions. $^3He^{2+} + ^4He^+ \rightarrow ^3He^+ + ^4He^{2+}$ 10-1700 eV (rel.)	78E16	Moran,T.F. Wilcox,J.B. J. Chem. Phys. 68 2855 1978 E Charge transfer reactions of ground $C(^3P)$ and excited $C(^4P)$ state ions with neutral molecules $C(^3P, ^4P) + B \rightarrow C^+ (B=Ar, H_2, N_2, O_2, CO, NO, CO_2)$ $6 \times 10^{-2} - 2 \times 10^{-1}$ keV/amu
78E21	Kim,H.J. Hvelplund,P. Meyer,F.W. Phaneuf,R.A. Stelson,P.H. Botcher,C. Phys. Rev. Letters 40 1635 1978 E Observation of oscillations in the charge dependence of total electron capture cross sections.	78E15	Moran,T.F. Wilcox,J.B. J. Chem. Phys. 69 1397-1405 1978 E Charge transfer reactions of ground $O(^4S)$ and excited $O(^2D)$ state ions with neutral molecules $O(^4S, ^2D) + B \rightarrow O^+ (B=Ar, H_2, N_2, O_2, CO, NO, CO_2)$ $2 \times 10^{-2} - 2 \times 10^{-1}$ keV/amu

78E26	Nutt, W.L. McCullough, R.W. Brady, K. Shah, M.B. Gilbody, H.B. J. Phys. B 11 1457-1462 1978 E Electron capture by He^{2+} ions in collisions with H and H_2 at impact energies below 10 keV. $\text{He}^{2+} + \text{H}, \text{H}_2 \rightarrow \text{He}^+ + \text{H}^+, \text{H}_2^+$ (furnace technique) 0.1-2.5 keV/amu	78E29	Shah, M.B. Gilbody, H.B. J. Phys. B 11 121-131 1978 E Electron capture and $\text{He}^+(2s)$ formation in fast He^{2+} -H and He^{2+} -H collisions. $\text{He}^{2+} + \text{H}, \text{H}_2 \rightarrow \text{He}^+(2s, \text{total}) : \text{He}^+ + \text{H} \rightarrow \text{He}^+(2s) + \text{H}$ 1-100 keV/amu
78E24	Nutt, W.L. McCullough, R.W. Gilbody, H.B. J. Phys. B 11 1181 1978 E Electron capture by C^{2+} and Ti^{2+} ions in H and H_2	78E30	Shah, M.B. Goffe, T.V. Gilbody, H.B. J. Phys. B 11 1233 1978 E Electron capture and loss by fast lithium ions in H and H_2
78E6	Okuno, K. Koizumi, T. Kaneko, Y. Phys. Rev. Letters 40 1708-1710 1978 E Symmetric resonant double charge transfer in $\text{Kr}^{2+} + \text{Kr}$ and $\text{Xe}^{2+} + \text{Xe}$ systems $\text{Kr}^{2+} + \text{Kr} \rightarrow \text{Kr} + \text{Kr}^{2+} : \text{Xe}^{2+} + \text{Xe} \rightarrow \text{Xe} + \text{Xe}^{2+}$ (drift tube technique) 5×10^{-7} to 2×10^{-4} keV/amu	78E9	Suk, H.C. Guilband, A. Hird, B. J. Phys. B 11 1463-1474 1978 E Cross sections for electron capture by Ne^{2+} in He, Ne, Kr and Xe $\text{Ne}^{2+} + \text{He}, \text{Ne}, \text{Kr}, \text{Xe} \rightarrow \text{Ne}^+$ 2-10 keV/amu
78E7	Pedersen, E.H. Mikkelsen, J.V. Vaaben, J. Taulbjerg, K. Phys. Rev. Letters 41 1541-1544 1978 E Interference effect in resonant double charge transfer $\text{Mg}^+ + \text{Mg} \rightarrow \text{Mg} : \text{Mg}^{2+} + \text{Mg} \rightarrow \text{Mg}^+, \text{Mg}$ (growth, LZ) 0.05-42 keV/amu	78E10	Tanis, J.A. Shafroth, S.M. Phys. Rev. Letters 40 1174-1177 1978 E Target thickness dependence of radiative electron capture in heavy ion collisions $\text{Cl}^{16+} (q=16, 17) + \text{Cu} \rightarrow \text{Cl}^{(q-1)+} + h\nu$ (x-ray spectroscopy) 2285 keV/amu
78E27	Phaneuf, R.A. Meyer, F.W. McKnight, R.H. Phys. Rev. A 17 534 1978 E Single electron capture by multiply charged ions of carbon, nitrogen and oxygen in atomic and molecular hydrogen.	78E11	Tawara, H. Richard, P. Gray, T.J. Newcomb, J. Jamison, K.A. Schmiedeknecht, C. Hall, J.M. Phys. Rev. A 18 1373-1380 1978 E Si K-shell ionization and electron transfer cross sections : solid targets $\text{F}^{8+} + \text{Si} \rightarrow \text{F}^{8+}(1s) + \text{Si}^+(1s^{-1})$ (x-ray spectroscopy) 400-2200 keV/amu
78E28	Poulaert, G. Brouillard, F. Claeys, W. J. Phys. B 11 1671 1978 E H_1 formation in low energy $\text{H}^+ - \text{H}^+$ collisions. $\text{H}^+ + \text{H}^+ \rightarrow \text{H}_2 + e$ 0.001 - 3 eV (rel.)	78E12	Tawara, H. Richard, P. Jamison, K.A. Gray, T.J. J. Phys. B 11 1615-620 1978 E Experimental differentiation between electron excitation and electron capture by one-electron (F^{8+}) ions in He $\text{F}^{8+} + \text{He} \rightarrow \text{F}^{7+}$ (X-ray spectroscopy) 395-1840 keV/amu

78E13	Winter, H. El-Sherbini, Th. M. Bloemen, E. de Heer, F. J. Salop, A. Phys. Letters 68A 211-214 1978 E A comparison between radiative and non-radiative de-excitation after electron capture by multiply charged ions $\text{Ne}^{q+}(q=1-4), \text{Ar}^{q+}(q=1-8) + \text{B} \rightarrow \text{Ne}^{(q-1)+}, \text{Ar}^{(q-1)+}$ (B=He, Ne, Ar, Kr, Xe) (photon spectroscopy) 5 keV/amu	78T20	Dalgarno, A. Butler, S.E. Comm. At. Mol. Phys. 7 129-135 1978 T Charge transfer of multiply ionized species $\text{A}^{2+} + \text{H} \rightarrow \text{A}^+ (\text{A}=\text{C}, \text{Mg}, \text{Si}) ; \text{A}^{3+} + \text{H} \rightarrow \text{A}^{2+} (\text{A}=\text{C}, \text{N}) ;$ $\text{A}^{3+} + \text{He} \rightarrow \text{A}^{2+} (\text{A}=\text{Li}, \text{Be}, \text{B}, \text{C}, \text{Mg}, \text{Al})$ review
78T1	Abramov, U.A. Baryshniko, F.F. Lisita, V.S. JETP Letters 27 464-467 1978 T Change of intensity of spectral lines of multiply charged ions as a result of charge exchange with atomic hydrogen $\text{O}^{8+} + \text{H} \rightarrow \text{O}^{7+}(\text{nl})$	78T3	Golden, J.E. McGuire, J.H. Omidvar, K. Phys. Rev. A 18 2373-1978 T Electron capture from atomic hydrogen into excited (n,l) levels of projectiles with Z ₁ I. $\text{H}^+ + \text{H} \rightarrow \text{H}(\text{nlm}) + \text{H}^+ ; \text{He}^{2+} + \text{H} \rightarrow \text{He}^+(\text{nlm}) ; \text{Be}^{4+} + \text{H} \rightarrow \text{Be}^{3+}(\text{nlm}) ;$ $\text{O}^{8+} + \text{H} \rightarrow \text{O}^{7+}(\text{nlm})$ (full Born : Jackson-Schiff) 100,200 keV/amu
78T2	Banyard, K.E. Moore, J.C. J. Phys. B 11 3899-1978 T Electron capture from H by fast alpha particles. $\text{He}^{2+} + \text{H} \rightarrow \text{He}^+(\text{1s}, 2s, 2p) + \text{H}(\text{1s}, 2s)$ 500 - 8000 keV ; CDW	78T22	Greenland, P.T. J. Phys. B 11 3563-3571 1978 T Highly stripped ions on hydrogen atoms : the adiabatic approach I. Energy gap and coupling at pseudocrossing
78T19	Belkic, Dz. Salin, A. J. Phys. B 11 3905-3911 1978 T Differential cross sections for charge exchange at high energies $\text{H}^+ + \text{H} \rightarrow \text{H} ; \text{H}^+ + \text{Ar} \rightarrow \text{H} + \text{Ar}^+(\text{1s}^{-1})$ 293 keV (He) : 6×10^3 keV/amu (Ar)	78T23	Greenland, P.T. J. Phys. B 11 3573-3585 1978 T Highly stripped ions on hydrogen atoms : the adiabatic approach II. Energy gap and coupling at pseudocrossing
78T25	Bell, K.L. Kingston, A.E. Madden, P.J. J. Phys. B 11 3977 1978 T Electron detachment from H- ions by proton impact. $\text{H}^+ + \text{H}^- \rightarrow \text{H}^+ + \text{H}(\text{1s}) + e$ 1.5 - 1000 keV ; FB	78T21	Greenland, P.T. J. Phys. B 11 1191-1193 1978 T Low velocity $\text{C}^{6+} + \text{H}(\text{1s})$ charge transfer : the two state approximation $\text{C}^{6+} + \text{H}(\text{1s}) \rightarrow \text{C}^{5+}$ (S-matrix) 0.06-25 keV/amu
78T26	Crothers, D.S.F. Todd, N.R. J. Phys. B 11 L663 1978 T Response to Nikitin and Reznikov: Total cross sections for proton-Be ⁺ charge transfer. $\text{H}^+ + \text{Be}^+ \rightarrow \text{H} + \text{Be}^{2+}$ $10^2 - 10^7$ eV ; IP	78T4	Grozdanov, T.P. Janev, R.K. Phys. Letters 66A 191-194 1978 T One-center capture in slow collisions of highly charged ions with atoms $\text{Ar}^{6+,7+} + \text{He}, \text{Ar} \rightarrow \text{Ar}^{5+,6+}$

- 78T5 Grozdanov, T.P. Janev, R.K.
Phys. Rev. A 17 880-888 1978 T
Charge exchange collisions of multiply charged ions with atoms
 $A^+ + B \rightarrow A^{(q-1)+} + B^+$ ($A=5-40$; $B=H, Li, Na, K, Rb, Cs$)
(tunnelling model)
0.002-500 keV/amu
- 78T27 Janev, R.K. Radulovic, Z.M.
Phys. Rev. A 17 889 1978 T
Ion-ion recombination and ion-pair formation processes in alkali-hydrogen diatomic systems.
 $Na^+ + H \rightarrow Na(3s, 3p, 4s, 4p) + H$, $E=10^2 - 5 \times 10^3$ eV (rel.)
 $Cs^+ + H \rightarrow Cs(6s, 6p, 7s, 7p) + H$, $E=10^2 - 5 \times 10^3$ eV (rel.)
 $M^+ + H \rightarrow M + H$ ($M=Li, K, Rb$), $E=10^1 - 10^3$ eV (rel.)
rate coefficient. (LZ)
- 78T28 Lal, M. Tripathi, A.N. Srivastava, M.K.
J. Phys. B 11 4249 1978 T
Charge transfer cross sections for protons colliding with hydrogenic ions I.
 $H^+ + He^+ \rightarrow H + He^+$, $E=20-10000$ keV $H^+ + Li^{2+} \rightarrow H + Li^+$, $E=50-10000$ keV
 $H^+ + Be^{3+} \rightarrow H + Be^+$, $E=100-10000$ keV $H^+ + B^{4+} \rightarrow H + B^+$, $E=200-10000$ keV
 $H^+ + C^{5+} \rightarrow H + C^+$, $E=200-10000$ keV $H^+ + N^{6+} \rightarrow H + N^+$, $E=200-10000$ keV
 $H^+ + O^{7+} \rightarrow H + O^+$, $E=200-10000$ keV $H^+ + Fe^{24+} \rightarrow H + Fe^{23+}$, $E=1000-100000$ keV
- CPB
- 78T6 Lee, C.M.
Phys. Rev. A 17 56-569 1978 T
Radiative charge exchange process in high energy ion-atom collisions
 $U^{36+} + B \rightarrow U^{35+} + hv + B^+$ ($B=N, Ne, Ar, Kr$):
 $U^{94+}(q=2, 91) + Ne \rightarrow U^{93+} + hv + Ne^+$:
(IP)
 $1 \times 10^{-4} - 3 \times 10^{-3}$ keV/amu
- 78T7 Lin, C.D.
J. Phys. B 11 L185-190 1978 T
Electron capture for ion-atom collisions at intermediate energies
 $A^+ + B \rightarrow A^{(q-1)+} + B^+(1s^1)$ ($A=C, N, O, F, Cl$; $B=Ne, Ar, Kr$)
(two-state two-center AO)
1-4.5 MeV/amu
- 78T8 Lin, C.D. Soong, S.C. Tunnel, L.N.
Phys. Rev. A 17 1646-1654 1978 T
Two-state atomic expansion methods for electron capture from multielectron atoms by fast protons
 $H^+ + B \rightarrow H + B^+$ ($B=C, N, O, Ne, Ar$)
- 78T9 Moore, J.C. Banyard, K.E.
J. Phys. B 11 1613 1978 T
Continuum-distorted-wave calculation for electron capture from hydrogen negative ions by fast protons.
 $H^+ + H^- \rightarrow H(1s, 2s, 2p) + H(1s, 2s)$
5 - 2000 keV; CDW
- 78T10 Morrison, H.G. Oplik, U.
J. Phys. B 11 473-492 1978 T
An impact-parameter method for heavy particle collisions involving one electron I. Theory and sample results on $H^+ - H$ and $He^{2+} - H$ collisions
 $H^+ + H \rightarrow H(2s, 2p) + H^+$; $He^{2+} + H \rightarrow He^+$
(close-coupling)
8-60 keV/amu (H); 10-18 keV/amu (He)
- 78T30 Mukherjee, S. Bhadra, K. Sil, N.C. Basu, D.
Phys. Letters 65A 285 1978 T
Capture in proton-He collisions.
 $H^+ + He^+ \rightarrow H(1s) + He^{2+}$
40 - 100 keV; CB
- 78T31 Olson, R.E.
J. Phys. B 11 L227 1978 T
Ionization and charge transfer cross sections for H^+ , He^{2+} + He^+ .
 $H^+ + He^+ \rightarrow H^+ + He^{2+} + e$; $H + He^{2+}$;
 $He^{2+} + He^+ \rightarrow He^{2+} + He^{2+} + e$; $He^+ + He^{2+}$
100 - 500 keV/amu; CTMC

- 78T11 Olson, R.E.
Phys. Rev. A 18 2464-2469 1978 T
Electron capture and impact ionization cross sections for multiply charged ions colliding with helium
 $A^+ + He \rightarrow A^{(q-1)+}$ (A=H, He, Li, Be, B, C, N, O)
(CTMC)
100-500 keV/amu
- 78T12 Olson, R.E., Shipsey, E.J., Browne, J.C.
J. Phys. B 11 699-708 1978 T
Charge transfer cross sections for B^{3+} , C^{4+} + H collisions
 $B^{3+}, C^{4+} + H \rightarrow B^{3+}, C^{3+}$
(PSS)
0.05-5 keV/amu
- 78T13 Ryufuku, H., Watanabe, T.
Phys. Rev. A 18 2005-2015 1978 T
Charge transfer in collisions of atomic hydrogen with O^{8+} , He^{2+} and H^+
 $H^+, He^{2+}, O^{8+} + H \rightarrow H, He^+, O^{7+}$ (UDWA, absorption model, DWBA)
0.025-200 keV/amu
- 78T14 Shakeshaft, R., Spruch, L.
J. Phys. B 11 L457-463 1978 T
Possibility of observing the second Born contribution to electron capture at high impact velocities
 $A^{2+} + B^{(q-1)+} \rightarrow A^{(q-1)+}$
(second Born)
 $2.5 \times 10^{-4} - 8 \times 10^{-4}$ keV/amu
- 78T16 Shipsey, E.J., Redman, L.T., Bowne, J.C., Olson, R.E.
Phys. Rev. A 18 1961-1966 1978 T
Electron capture and ionization cross sections for collisions of He^{2+} with Li: production of $He^+(3l)$ at low velocities
 $He^{2+} + Li \rightarrow He^+(3l)$
(PSS, CTMC)
0.05-500 keV/amu
- 78T17 Sidis, V., Kubach, C.
J. Phys. B 11 2687-2703 1978 T
Theoretical study of the elastic and charge exchange processes in $H^+ + Cs$ collisions
 $H^+ + Cs \rightarrow H^0$ (total, $2s$, $2p$)
(close-coupling)
0.05-4 keV/amu
- 78T18 Winter, T.G., Lane, N.F.
Phys. Rev. A 17 66-79 1978 T
Electron transfer in collisions of He^{++} ions with H atoms at He^{++} impact energies of 0.1-20.0 keV
 $He^{++} + H \rightarrow He^+$
(PSS+MO)
 $2.5 \times 10^{-2} - 5$ keV/amu
- 78T32 Zhdanov, V.P., Chibisov, M.I.
Sov. Phys. -Tech. Phys. 23 532 1978 T
Effect of level degeneracy on charge exchange at a term pseudointersection.
 $H^+ + H \rightarrow H + H$
0.01 - 2519 eV; LZ
- 79E1 Adams, N.G., Smith, D., Grief, D.
J. Phys. B 12 1791-800 1979 E
Single charge transfer reactions of the ground and metastable states of Xe^{2+} at 300 K
 $Xe^{2+} (^3P_1, ^1D_2, ^1S_0) + B \rightarrow Xe^+$ (B= H_2 , N_2 , O_2 , CO_2 , Ar, Xe)
(selected ion drift tube technique)
300 K
- 79E2 Beuhler, R.J., Friedman, L., Porter, R.F.
Phys. Rev. A 19 486-494 1979 E
Electron-transfer reactions of fast Xe^{n+} ions with Xe in the energy range 15 keV - 1.6 MeV
 $Xe^{n+} + Xe \rightarrow Xe^{(q-1)+}, Xe^{(q-2)+}, Xe^{(q-3)+}, Xe^{(q-4)+}, Xe^{(q-5)+}$
0.1-15 keV/amu
- 79E26 Brouillard, F., Claeys, W., Poulaert, G., Rahmat, G., Van Wassenhove, G.
J. Phys. B 12 1253 1979 E
Double charge transfer in $H^+ - H$ collisions.
 $H^+ + H \rightarrow H^+ + H^+$
30 - 200 eV (c.m.)

- 79E27 Crandall, D.H., Phaneuf, R.A., Meyer, f.W.
Phys. Rev. A 19 504 1979 E
Electron capture by slow multiply charged ions in atomic and molecular hydrogen.
- 79E28 Dunn, K.F., Angel, G.C., Gilbody, H.B.
J. Phys. B 12 L623 1979 E
An experimental study of charge transfer and ionization in $\text{Cs}^+ - \text{Cs}^+$ collisions.
 $\text{Cs}^+ + \text{Cs}^+ \rightarrow \text{Cs}^{2+}$
40 - 280 keV (c.m.)
- 79E29 El-Sherbini, T.M., Salop, A., Bloemen, E., de Heer, F.J.
J. Phys. B 12 L579-582 1979 E
Target dependence of excitation resulting from electron capture in collisions of 200 keV Ar^{6+} ions with noble gases
 $\text{Ar}^{6+} + \text{B} \rightarrow \text{Ar}^{5+} + \text{B}^+$ (B=He, Ne, Ar, Kr, Xe)
(Photon spectroscopy)
5 keV/amu
- 79E30 Hill, J., Geddes, J., Gilbody, H.B.
J. Phys. B 12 L341 1979 E
Improved measurements of cross sections for $\text{H}(2s)$ formation in electron capture by 1.5-25 keV protons in H and H_2 .
- 79E31 Dowek, D., Krut'ain, J., Thielmann, V., Barat, M.
J. Phys. B 12 2553-2563 1979 E
Collisional spectroscopy of open-shell systems I. $\text{C}^+ + \text{Ne}$ collisions
 $\text{C}^+ + \text{Ne} \rightarrow \text{C}^0$
(energy loss spectroscopy)
0.04-0.17 keV/amu
- 79E32 Goffe, T.V., Shah, M.B., Gilbody, H.B.
J. Phys. B 12 3763 1979 E
One electron capture and loss by fast multiply charged boron and carbon ions in H and H_2 .
- 79E33 Gray, T.J., Richard, P., Gealy, G., Newcomb, J., Tawara, H.
IEEE NS-26 1127-1129 1979 E
X-ray production and electron transfer cross sections for 0.4-2.2 MeV/amu N, O and F ions on Al
 N^{7+} , O^{8+} , $\text{F}^{9+} + \text{Al} \rightarrow \text{N}^{6+}$, O^{7+} , $\text{F}^{8+} + \text{h}\nu$
0.4-2.3 MeV/amu
- 79E34 Jones, J.D.C., Lister, D.G., Twiddy, N.D.
J. Phys. B 12 2723-2726 1979 E
Charge transfer reaction rate coefficients for He^+ and Ne^+ with Ar at 300 K
 He^+ , $\text{Ne}^+ + \text{Ar} \rightarrow \text{He}^0$, Ne^0
300 K
- 79E35 Kita, S., Inoue, H.
J. Phys. B 12 2338-2349 1979 E
Charge exchange reactions in collisions of $\text{Li}^+ - \text{Li}$
 $\text{Li}^+ + \text{Li} \rightarrow \text{Li}(2s, 2p) + \text{Li}^+$
(TOF)
0.07-0.14 keV/amu
- 79E36 Hill, J., Geddes, J., Gilbody, H.B.
J. Phys. B 12 L653-656 1979 E
H formation in electron capture by 4-25 keV metastable hydrogen atoms in the inert gases
 $\text{H}(2s) + \text{B} \rightarrow \text{H}^+ + \text{B}^+$ (B=He, Ne, Ar, Kr)
4-25 keV
- 79E37 Johnsen, R., Biondi, M.A.
Phys. Rev. A 20 87-97 1979 E
Thermal energy charge transfer quenching and association reactions of doubly charged ions in the rare gases
 $\text{A}^{2+} + \text{B} \rightarrow \text{A}^+ + \text{B}^+$ (A,B=He, Ne, Ar, Kr, Xe)
300 K
- 79E38 Loyd, D.H., Dawson, H.R.
Phys. Rev. A 19 948-952 1979 E
Electron capture into the n=3 states of hydrogen by proton impact on CO, CO_2 and N_2O
 $\text{H}^+ + \text{B} \rightarrow \text{H}(3s, 3p, 3d)$ (B=CO, CO_2 and N_2O)
(photon spectroscopy)
2.2-8.2 keV/amu

79E31	McCullough, R.W. Nutt, W.L. Gilbody, H.B. J. Phys. B 12 4159 1979 E One electron capture by slow doubly charged ions in H and H ₂ .	79E15	Nagata, T. J. Phys. Soc. Japan 46 1302-1306 1979 E Charge changing collisions of atomic beams in alkali-metal vapors II. total cross sections for one-electron capture by C ⁺ , O ⁺ , S ⁺ ions and C, O, S atoms H ⁺ , C ⁺ , O ⁺ , S ⁺ + B → H, C, O, S; H ⁺ , C ⁺ , O ⁺ , S ⁺ (B=Na, K, Cs) 0.5-5 keV/amu (H); 0.01500-15 keV/amu (S)
79E32	Meyer, F.W. Phaneuf, R.a. Kim, H.J. Hvelplund, P. Stelson, P.H. Phys. Rev. A 19 515 1979 E Single-electron-capture cross sections for multiply charged O, Fe, Mo, Ta, W, and Au ions incident on H and H ₂ at intermediate velocities.	79E33	Nutt, W.L. McCullough, R.W. Gilbody, H/B. J. Phys. B 12 L157 1979 E Electron capture by 0.1-13 keV C ⁺ , N ⁺ and O ⁺ ions in H and H ₂ .
79E12	Morgan, T.J. Eriksen, F. Phys. Rev. A 19 2185-2191 1979 E Formation of metastable hydrogen atoms by charge exchange of fast protons in magnesium and barium H ⁺ + B → H ⁰ (2s) (B = Mg, Ar, Ba) 1.5-100 keV/amu	79E16	Olsen, J.O. Andersen, T. Barat, M. Gausorgues, Ch. C. Sidis, V. Pommier, J. Agusti, J. Andersen, N. Russek, A. Phys. Rev. A 19 1457-1484 1979 E Excitation and charge transfer in low energy Na ⁺ - Ne collisions Na ⁺ + Ne → Na - Ne ⁺ (energy gain spectroscopy + photon spectroscopy) 0.01-0.5 keV/amu
79E11	Morgan, T.J. Eriksen, F.J. Phys. Rev. A 19 1448-1456 1979 E Single- and double-electron capture by 1-100 keV protons in collisions with magnesium and barium H ⁺ + B → H ⁰ , H ⁺ (B = Mg, Ar, Ba) 1-100 keV/amu	79E17	Olsen, J.O. Vedel, K. Dahl, P. J. Phys. B 12 929-944 1979 E Differential cross sections for charge transfer and excitation in low energy Be ⁺ - He, Ne collisions Be ⁺ + He, Ne → Be ⁰ (energy-gain spectroscopy) 0.22-0.55 keV/amu
79E13	Morgan, T.J. Stone, J. Mayo, M. Kurose, J. Phys. Rev. A 20 54-57 1979 E D ⁺ production by multiple electron transfer collisions in alkaline-earth metal vapors D ⁺ + B → D ⁺ (B = Mg, Ca, Sr, Ba) (equilibrium charge distributions) 1.25-100 keV/amu	79T34	Peart, B. Dolder, K.T. J. Phys. B 12 4155 1979 E Measurements of cross sections for charge exchange between ⁴ He ⁺ and ³ He ²⁺ ions. ³ He ²⁺ + ⁴ He ⁺ → ⁺ He ⁺ + ⁺ He ²⁺ 0.1 - 20 keV (rel.)
79E14	Muller, A. Achenbach, C. Salzborn, E. Phys. Letters 70A 410-412 1979 E Dependence of the charge transfer between atoms and highly charged ions on the ionization potential of the atoms Xe ¹⁰⁺ + B → Xe ⁹⁺ (B=He, Na, Ne, Ar, Kr, Cd, Xe, Cs) 0.75 keV/amu	79E35	Peart, B. Forrest, R.A. J. Phys. B 12 L23 1979 E Measurements of cross sections for double charge transfer in collisions between H ⁺ and H ⁻ ions. H ⁺ + H ⁻ → H ⁺ + H ⁺ 44 - 570 eV (rel.)

79E18	Pradel, P., Spiess, G., Sidis, V., Kubach, C. J. Phys. B 12 1485-1505 1979 E Differential cross sections for the near-resonant charge transfer process $H^+ + Cs \rightarrow H(2s) + Cs^+$ at low energies $H^+ + Cs \rightarrow H(2s) + Cs^+$ (Lyman spectroscopy : close-coupling) 0.025-0.1 keV/amu	79T1	Abramov, V.A. Baryshnikov, F.F. Lisita, V.S. Sov. Phys. -JETP 47 469-477 1979 T Charge transfer between hydrogen atoms and the nuclei of multicharged ions with allowance for the degeneracy of the final states $C^{6+}, O^{8+} + H \rightarrow C^{5+}, O^{7+}$ (LZ)
79E19	Rodbro, R., Persersen, E.H., Cocke, C.L., Macdonald, J.R. Phys. Rev. A 19 1936-1947 1979 E Innershell electron capture by H^+ , He^+ and Li^{2+} projectiles from CH_4 , Ne and Ar $H^+, He^{2+}, Li^{3+} + CH_4, Ne, Ar \rightarrow H^0, He^+, Li^{2+} + C^+(1s^{-1}), Ne^+(1s^{-1}), Ar^+(1s^{-1})$ 400-3000 keV/amu	79T2	Banyard, K.E., Shirtcliffe, G.W. J. Phys. B 12 3247-3256 1979 T Electron capture from lithium and its ions by high-energy protons $H^+ + Li \rightarrow H(nl) + Li^+(1^1S, 2^1S, 2^3S)$ (CDW) 200-10000 keV/amu
79E20	Rundel, R.D., Nitz, D.E., Smith, K.A., Geis, M.W., Stebbings, R.F. Phys. Rev. A 19 33-42 1979 E Resonant charge transfer in He^+ - He collisions studied with the merging beam technique $He^+ + He \rightarrow He + He^+$ (merging beam technique) $2.5 \times 10^{-3} - 4.7 \times 10^{-2}$ keV/amu	79T40	Banyard, K.E., Shirtcliffe, G.W. J. Phys. B 12 3247 1979 T Electron capture from lithium and its ions by high-energy protons. $H^+ + Li^+ \rightarrow H(nl) + Li^{2+}$; $H^+ + Li^{2+} \rightarrow H(nl) + Li^{3+}$ ($n=1s, 2s, 2p$) 200-10000 keV ; CDW
79E21	Sato, Y., Moore, J.H. Phys. Rev. A 19 495-503 1979 E Electron capture in N^{2+} - He and N^{2+} - Ne collisions $N^{2+} + He, Ne \rightarrow N^+$ (energy loss spectroscopy) 0.014-0.17 keV/amu	79T3	Bardsley, J.N., Cohen, J.S., Wadner, I.M. Phys. Rev. A 19 2129-2130 1979 T Resonant contributions to single charge transfer between He^{2+} and He $He^{2+} + He \rightarrow He^+ + He^+$ (quantal and JWKB) $10^{-2} - 10^{-2}$ keV/amu
79E22	Sharma, S., Awool, G.L., Hasted, J.B., Mathur, D. J. Phys. B 12 L163-166 1979 E Energy loss spectra of production ions in electron capture $N^{2+} + He, Ne, Ar \rightarrow N^+$ (energy loss spectroscopy) 0.1 keV/amu	79T41	Bazylev, V.A., Chibisov, M.I. Sov. J. -Plasma Phys. 5 327 1979 T Charge exchange in collisions of multiply charged ions $C^{6+} + O^+ \rightarrow C^{5+} + O^{2+}$; $N^{7+} + C^+ \rightarrow N^{6+} + C^{2+}$; $N^{7+} + N^+ \rightarrow N^{6+} + N^{2+}$; $N^{7+} + O^{2+} \rightarrow N^{6+} + O^{3+}$; $O^{8+} + C^+ \rightarrow O^{7+} + C^{2+}$; $O^{8+} + N^{3+} \rightarrow O^{7+} + N^{4+}$; $O^{8+} + O^+ \rightarrow O^{7+} + O^{2+}$; $O^{8+} + O^{3+} \rightarrow O^{7+} + O^{4+}$ 1 - 5 keV ; LZ
79E23	Tawara, H. Phys. Letters 71A 208-210 1979 E On a scaling of electron capture by fully ionized heavy ions in light gas targets at low energies scaling law at MeV		

- 79T4 Becker, R.L., Mackellar, A.D.
J. Phys. B 12 L345-350 1979 T
Classical four-body calculations of $\text{He}^+ + \text{H}$ and $\text{H} + \text{H}$ collisions
 $\text{He}^+ + \text{H} \rightarrow \text{He}^0$
(four-body CTMC)
9-250 keV/amu
- 79T42 Belkic, Dz., Gayet, G., Salin, A.
Phys. Report 56 279 1979 T
Electron capture in high-energy ion-atom collisions
 $\text{H}^+ + \text{He}^+ \rightarrow \text{H}^+ + \text{He}^{2+}$
30 - 450 keV; CDW
- 79T5 Briggs, J.S., Taulbjerg, K.
J. Phys. B 12 2565-2573 1979 T
Charge transfer by a double scattering mechanism involving target electrons
 $\text{H}^+ + \text{He} \rightarrow \text{H}(1s) + \text{He}^{2+} + e$
(quantum description of Thomas peak)
asymptotic form (v^{-11} au)
- 79T6 Butler, S.E., Bender, C.F., Dalgarno, A.
Astrophys. J. 234 L59-61 1979 T
Charge transfer of O^{2+} and Ne^{2+} with H
 $\text{O}^{2+}, \text{Ne}^{2+} + \text{H} \rightarrow \text{O}^+, \text{Ne}^+$
(LZ)
thermal energy
- 79T7 Butler, S.E., Dalgarno, A.
Astrophys. J. 234 765-767 1979 T
Charge transfer between N^+ and H
 $\text{N}^+ + \text{H} \rightarrow \text{N} + \text{H}^+$
(DWA)
 10^{-5} - 10^{-2} keV/amu
- 79T10 Chan, F.T., Eichler, J.
J. Phys. B 12 L305-308 1979 T
Charge exchange between $\text{H}(2s)$ and energetic projectiles
 $\text{A}^{n+} + \text{H}(2s) \rightarrow \text{A}^{(n-1)+} + \text{H}^+$
(elkonal approx.)
10-1000 keV/amu
- 79T9 Chan, F.T., Eichler, J.
Phys. Rev. A 20 1841-1847 1979 T
Electron capture into arbitrary (n,l) levels of fast projectiles
 $\text{H}^+ + \text{H}(1s), \text{He} \rightarrow \text{H}(nl); \text{O}^{8+} + \text{H}, \text{He} \rightarrow \text{O}^{7+}(nl);$
100-1000 keV/amu
- 79T8 Chan, F.T., Eichler, J.
Phys. Rev. Letters 42 58-61 1979 T
Approximation scheme for electron capture into arbitrary principal shells of energetic bare projectiles
 $\text{A}^{n+} + \text{H} \rightarrow \text{A}^{(n-1)+}(n)$
(elkonal approx.)
500-5000 keV/amu
- 79T43 Choi, B.H., Poe, R.T., Tang, T.K.
ANL-Report 79-41 201 1979 T
Charge exchange between singly ionized helium ions.
 $\text{He}^+ + \text{He}^+ \rightarrow \text{He}^{2+} + \text{He}$
10 - 100 keV; PWBA
- 79T44 Das, G., Raffanetti, R.C., Kim, Y.K.
ANL-Report 79-41 195 1979 T
Low-lying state of $(\text{Cs}_2)^{++}$.
 $\text{Cs}^+ + \text{Cs}^+ \rightarrow \text{Cs} + \text{Cs}^{2+}; \text{Cs}^+ + \text{Cs}^{2+} + e$
MO
- 79T45 Dickinson, A.S., Hardie, D.J.W.
J. Phys. B 12 4147 1979 T
Symmetric resonance charge transfer in $\text{He}^+(1s) - \text{He}^{2+}$ collisions.
 $\text{He}^{2+} + \text{He}^+(1s) \rightarrow \text{He}^+ + \text{He}^{2+}$
0.02 - 20 keV; PSS
- 79T12 Duman, E.L., Menshikov, L.I., Smirnov, B.M.
Sov. Phys.-JETP 49 260-266 1979 T
Destruction of hydrogen atoms by collisions with multiply charged ions
 $\text{A}^{n+} + \text{H} \rightarrow \text{A}^{(n-1)+}(nl); \text{A}^{n+} + \text{H}^+ + e$
(PSS)
analytic expression for electron capture and ionization

79T11	Duman,E.L. Marsshikov,L.I. Sov. Phys.-Dokl. 24 116-117 1979 T Radiative capture of an electron of a target atoms by multiply charged ions analytical expressions	79T17	Kumar,A. Roy,B.N. J. Phys. B 12 2025-2030 1979 T Modified binray encounter calculations or electron capture from noble gas atom by He ⁺ ions II. He ⁺ + B -> He ⁰ (B=He,Ne,Ar,Kr,Xe) (modified BEA) 20-250 keV/amu
79T13	Duman,E.L. Smirnov,B.M. Sov. Phys. - J. Plasma Phys. 4 650-652 1979 T Charge exchange of hydrogen atoms with multiply charged ions A ^{z+} + H -> A ^{(z-1)+} (z=4-30) (tunneling model) 1-100 keV/amu	79T18	Lin,C.D. Phys. Rev. A 19 1510-1516 1979 T Double K-shell electron capture for ion-atom collisions at intermediate energies H ⁺ + He -> H ⁺ + He ²⁺ ; He ²⁺ + He -> He + He ²⁺ ; A ^{z+} + Ne -> A ^{(z-2)+} + Ne ²⁺ (1s ⁻²) (two-state two-centered AO) 10-200 keV/amu (H); 50-250 keV/amu (He); 500-4000 keV/amu (F)
79T14	Eichler,J. Chan,F.T. Phys. Rev. A 20 104-112 1979 T Approach to electron capture into arbitrary principal shells of energetic projectiles C ⁶⁺ + H -> C ⁵⁺ (nl) (eikonal approx.) analytic expression scaled to OBK 50-500 keV/amu	79T19	Lin,C.D. Tunnell,L.N. J. Phys. B 12 L485-490 1979 T Subshell electron capture cross sections of argon atoms by protons H ⁺ + Ar -> H + Ar ⁿ (nl ⁻¹) (n=2,3) (two-state AO) 2-1000 keV/amu
79T15	Ford,A.L. Reading,J.F. Becker,R.L. J. Phys. B 12 2905-2912 1979 T Charge transfer and ionization in collisions of 2.5 to 9 Mev protons with argon H ⁺ + Ar -> H + Ar ⁺ ; H ⁺ + Ar ⁺ + e (target-centered expansion method) 2.5-9 MeV/amu	79T47	Macek,J. ANL-Report 79-41 191 1979 T Charge exchange cross sections for the reaction Xe ⁸⁺ + Xe ⁸⁺ -> Xe ⁹⁺ + Xe ⁷⁺ . Xe ⁸⁺ + Xe ⁸⁺ -> Xe ⁹⁺ + Xe ⁷⁺ 150 keV; MO
79T16	Hatton,G.J. Lane,N.F. Winter,T.G. J. Phys. B 12 L571-577 1979 T Charge transfer for He ²⁺ on H using molecular bases with plane-wave translational factors He ²⁺ + H -> He ⁺ (2s) MO close-coupling with ETF) 0.25-25 keV/amu	79T20	McCarroll,R. Valiron,P. Astron. Astroph. 78 177-180 1979 T Charge exchange of N ³⁺ ions with atomic hydrogen in the interstellar gas N ³⁺ + H -> N ²⁺ + H ⁺ (MO/AZ) 10 ⁻⁷ -2x10 ⁻³ keV/amu
79T46	Hickman,A.P. J. Chem. Phys. 70 4872 1979 T Approximate scaling formula for ion-ion mutual neutralization rates. chemical reactions, rate constant; LZ		

- 79T21 Moisewitsch, B.L., Stockman, S.G.
J. Phys. B 12 L591-595 1979 T
Electron capture at relativistic energies
 $H^+ + H(1s) \rightarrow H(1s) + H^+$
(OBK with Dirac wave function)
 10^3 - 10^4 keV/amu
- 79T22 Moisewitsch, B.L., Stockman, S.G.
J. Phys. B 12 L695-698 1979 T
Relativistic classical theory of electron capture
 $H^+ + H \rightarrow H + H^+$
(relativistic classical theory)
 10^3 - 10^7 keV/amu
- 79T23 Morrison, H.G., Opik, U.
J. Phys. B 12 L685-688 1979 T
Excitation and charge transfer to the 2s and 2p states in $H^+ - H$ collisions in the energy range 49-125 keV
 $H^+ + H \rightarrow H(2s, 2p) + H^+$
(modified close-coupling)
49-125 keV/amu
- 79T24 Mukherjee, S., Sil, N.C., Basu, D.
J. Phys. B 12 1259-1265 1979 T
Electron capture by protons from some hydrogen-like ions
 $H^+ + He^+, Li^{2+} \rightarrow H + He^{2+}, Li^{3+}$
(Coulomb-Born)
5-1000 keV/amu
- 79T48 Mukherjee, S., Sil, N.C., Basu, D.
J. Phys. B 12 1259 1979 T
Electron capture by protons from some hydrogen-like ions.
 $H^+ + He^+, Li^{2+} \rightarrow H(1s, 2s) + He^{2+}, Li^{3+}$
5 - 1000 keV ; CB
- 79T49 Olson, R.E.
ANL-Report 79-41 171 1979 T
Charge changing cross sections for $Cs^+ + Cs^+$ collisions.
 $Cs^+ + Cs^+ \rightarrow Cs + Cs^{2+}$; $Cs^+ + Cs^{2+} + e$
100 keV ; MO
- 79T50 Olson, R.E.
Phys. Letters 71A 341 1979 T
Cross sections for alpha particles colliding with oxygen ions : Loss of alpha heating in Tokamak plasmas.
 $He^{2+} + O^{3+} \rightarrow He^{2+} + O^{4+} + e$; $He^{2+} + O^{4+} \rightarrow He^{2+} + O^{5+} + e$; $He^+ + O^{5+}$
 $He^{2+} + O^{3+} \rightarrow He^{2+} + O^{4+} + e$; $He^+ + O^{4+}$
0.25 - 1.0 MeV/amu ; CTMC
- 79T25 Omidvar, K.
Phys. Rev. A 19 65-71 1979 T
Scaling of cross sections for K-shell capture by high energy protons and alpha particles from the multi-electron atoms
 $H^+, He^{2+} + B \rightarrow H^0, He^+ + B^+(1s^{-1})$ (B=H, He, Ar)
scaling
- 79T27 Reading, J.F., Ford, A.L., Swafford, G.L., Fritchard, A.
Phys. Rev. A 20 130-144 1979 T
Innershell charge transfer in asymmetric ion-atom collisions
 $A^+ + Cu \rightarrow A^{(q-1)+} + Cu^+(1s^{-1}, 2l^{-1})$ (A=He, C, O)
6000 keV/amu
- 79T28 Roy, A., Ghosh, A.S.
J. Phys. B 12 99-104 1979 T
The capture of electrons by fast protons from hydrogen atoms
 $H^+ + H \rightarrow H(1s, 2s, 2p) + H^+$
(frozen target-second Born)
30-2000 keV/amu
- 79T29 Roy, B.N., Rai, D.K.
J. Phys. B 12 2015-2030 1979 T
Modified binary-encounter calculations for electron capture from noble-gas atoms by protons I
 $H^+ + B \rightarrow H^0$ (B=He, Ne, Ar, Kr, Xe)
10-500 keV/amu
- 79T26 Roy, P.P., Saha, B.C.
Phys. Letters 71A 415-419 1979 T
Electron capture in $H^+ - H_2$ collisions
 $H^+ + H_2 \rightarrow H^0$
(first Born)
50-5000 keV/amu

- 79T30 Ryufuku,H. Watanabe,T.
Phys. Rev. A 19 1538-1549 1979 T
Charge transfer cross sections for collisions of Li^{3+} , Be^{4+} , B^{5+} and C^{6+} ions with atomic hydrogen
 Li^{3+} , Be^{4+} , B^{5+} , C^{6+} + $\text{H} \rightarrow \text{Li}^{2+}$, Be^{3+} , B^{4+} , C^{5+} (UDWA)
0.025-2000 keV/amu
- 79T31 Ryufuku,H. Watanabe,T.
Phys. Rev. A 20 1828-1837 1979 T
Total and partial cross sections for charge transfer in collisions of multicharged ions with atomic hydrogen
 $\text{A}^{n+} + \text{H} \rightarrow \text{A}^{(n-1)+}$ ($\text{A}=\text{C}, \text{Ne}, \text{Si}, \text{Ca}$) (UDWA)
0.025-2000 keV/amu
- 79T32 Salop,A.
J. Phys. B 12 919-928 1979 T
The distribution of excitation resulting from electron capture in stripped-ion-hydrogen-atom collisions
 $\text{A}^{n+} + \text{H} \rightarrow \text{A}^{(n-1)+}(\text{n})$ ($\text{A}=\text{B}, \text{C}, \text{O}$) (CTMC)
2-72 keV/amu
- 79T33 Salop,A. Olson,R.E.
Phys. Letters 71A 407-410 1979 T
Electron removal from hydrogen by collisions with fully stripped iron ions
 $\text{Fe}^{26+} + \text{H} \rightarrow \text{Fe}^{25+} + \text{H}^+$; $\text{Fe}^{26+} + \text{H}^+ + \text{e}$ (PSS + CTMC)
0.35-535 keV/amu
- 79T34 Salop,A. Olson,R.E.
Phys. Rev. A 19 1921-1929 1979 T
Electron removal from hydrogen by collisions with fully stripped oxygen ions
 $\text{O}^{8+} + \text{H} \rightarrow \text{O}^{7+} + \text{H}^+$; $\text{O}^{8+} + \text{H}^+ + \text{e}$ (PSS + CTMC)
0.06-300 keV/amu
- 79T35 Shakeshaft,R.
Phys. Rev. A 20 779-786 1979 T
Relativistic effects in electron capture from hydrogen-like atom by a fast-moving bare ion
 $\text{H}^+, \text{Ne}^{10+} + \text{H} \rightarrow \text{H}(1s), \text{Ne}^{9+}(1s)$
(first Born with relativistic correction, Thomas model at relativistic energy)
 10^{-10^4} MeV/amu
- 79T52 Sinha,C. Mukherjee,S. Sil,N.C.
J. Phys. B 12 1391 1979 T
Electron capture in an arbitrary excited state by protons passing through hydrogenic ions.
 $\text{H}^+ + \text{A}^{(z-1)+} \rightarrow \text{H}(\text{n}) + \text{A}^{z+}$ ($\text{A}=\text{He}, \text{Li}, \text{C}$; $\text{n}=2 \sim \infty$)
50 - 400keV ; CB
- 79T36 Sinha,C. Mukherjee,S. Sil,N.C.
J. Phys. B 12 1391-1397 1979 T
Electron capture in an arbitrary excited S state by protons passing through hydrogenic ions
 $\text{H}^+ + \text{B}^{(z-1)+} \rightarrow \text{H}^0 + \text{B}^{z+}$ ($\text{B}=\text{He}, \text{Li}, \text{C}$; $\text{n}=2, 3, 4, 6, 00$)
(Coulomb-Born)
50-400 keV/amu
- 79T51 Sinha,C. Sil,N.C.
Phys. Letters 71A 201 1979 T
Charge transfer in proton-positive-ion collisions producing hydrogen atoms in any arbitrary p state.
 $\text{H}^+ + \text{He}^+ \rightarrow \text{H} + \text{He}^{2+}$
50 - 400 keV ; CB
- 79T38 Spruch,L. Shakeshaft,R.
Phys. Rev. A 19 1023-1028 1979 T
Classical cross section for charge transfer via "knock-on" capture from high Rydberg states at asymptotically high impact velocities
 $\text{A}^{n+} + \text{B}^{(z-1)+} \rightarrow \text{A}^{(z-1)+} + \text{B}^{n+}$

- 79T53 Sramek, S. Gallup, G. Macek, J.
ANL Report 79-41 183 1979 T
Preliminary estimate of heavy ion electron transfer cross sections.

 $\text{Ba}^+ + \text{Ba}^+ \rightarrow \text{Ba} + \text{Ba}^{2+}$
100 - 300 keV ; CC-MO
- 79T38 Theisen, T.C. McGuire, J.H.
Phys. Rev. A 20 1406-1408 1979 T
Single and double electron capture in the independent electron approximation at high velocities
 $\text{He}^{2+} + \text{He} \rightarrow \text{He}^+ \cdot \text{He}^0$
(independent electron model with Bates-Born approx.)
25-250 keV/amu
- 79T39 Watson, W.D. Christensen, R.B.
Astrophys. J. 231 627-631 1979 T
Quantal calculations for charge transfer in collisions of C^{3+} and N^{3+} with H atoms
 $\text{C}^{3+}, \text{N}^{3+} + \text{H} \rightarrow \text{C}^{2+}, \text{N}^{2+}$
(quantal calculation/LZ)
 10^{-4} - 10^4 eV/amu

80E25	Afrosimov, V.V. Basalov, A.A. Donets, E.D. Panov, N.N. Electron capture by multiply charged ions and nuclei of hydrogen molecule atoms. JETP Letters 31 600 1980 E H ⁺ , He ⁺ , C ⁴⁺ , N ⁷⁺ , O ⁸⁺ , Ne ⁹⁺ , Ar ¹⁶⁺ , Kr ²⁴⁺ , Xe ³²⁺ + H ₂ 1*keV	80E 4	Bayfield, J.E. Gardner, L.D. Gulkok, Y.Z. Saylor, T.K. Sharma, S.D. Charge exchange measurements in helium using a double tandem accelerator-decelerator source of low energy highly stripped oxygen ions Rev. Sci. Instr. 51 65-654 1980 E O ⁹⁺ + He -> O ^{(q-1)+} + He ⁺ (q=5-8) 15 - 100 keV/amu deceleration with two tandems
80E 1	Agagu, A. Oluwole, A.F. K - K ⁺ charge exchange cross section J. Phys. B 13 1429-1432 1980 E K ⁺ + K -> K ⁰ + K ⁺ polarized K target 3x10 ⁻⁵ keV/amu	80E27	Crandall, D.H. R.A. Phaneuf, R.A. Meyer, F.W. Electron capture by heavy multicharged ions from atomic hydrogen at low velocities. Phys. Rev. A 22 379 1980 E Ar ^{q+} (q=2-9) + H ₂ -> Ar ^{(q-1)+} ; Fe ^{q+} (q=5,6) + H ₂ -> Fe ^{(q-1)+} ; Xe ^{q+} (q=2-12) + H ₂ -> Xe ^{(q-1)+} . 6.3*q keV
80E 2	Andersen, T. Bisgaard, P. Pedersen, E.H. Formation of excited Mg ⁺ states in Mg ⁺⁺ - Mg collisions (20 - 500 keV) Phys. Rev. A 22 818-821 1980 E Mg ²⁺ + Mg -> Mg ⁺ (3p) + Mg ⁺ (3p) photon spectroscopy 0.8 - 21 keV/amu	80E 5	El-Sherbini, T.M. Salop, A. Bloemen, E. de Heer, F.J. Excitation and ionization resulting from electron capture in Ar ^{q+} + H ₂ collisions at ion projectile energies of 200 - 1200 keV J. Phys. B 13 1433-1449 1980 E Ar ^{q+} + H ₂ -> Ar ^{(q-1)+} + H ₂ ⁺ , Ar ^{q+} + H ⁺ + H, Ar ^{q+} + H ₂ ⁺ + e photon emission spectroscopy 5 - 30 keV/amu
80E26	Angel, G.C. Dunn, K.F. Neil, P.A. Gilbody, G.B. Charge transfer and ionization in Xe ⁺ - Xe ⁺ collisions. J. Phys. B 13 L391 1980 E Xe ⁺ + Xe ⁺ -> Xe ²⁺ 38 - 303 keV (c.m.)	80E28	Franzke, B Charge change cross sections for 1.4 MeV/u uranium in H ₂ and N ₂ . GSI Report 80-3 225 1980 E
80E 3	Aubert, J. Bliman, S. Geller, R. Jacquot, B. van Houtte, D. Charge-changing collisions of argon ions on argon gas. one-electron capture Phys. Rev. A 22 2403-2407 1980 E Ar ^{q+} (q=2-12) + Ar -> Ar ^{(q-1)+} growth method (1-10)xq keV ECR ion source	80E29	Gardner, L.D. Bayfield, J.E. Koch, P.M. Sellin, I.A. Pegg, D.J. Peterson, R.S. Crandall, D.H. Electron collisions at keV energies of boron and other multiply charged ions with atoms and molecules. III. Atomic hydrogen. Phys. Rev. A 21 1397 1980 E B ^{q+} (q=2-4), C ^{q+} (q=2-4), N ^{q+} (q=2-5), O ^{q+} (q=2-5) + H -> (6-23)q*keV
		80E30	Geddes, J. Hill, J. Shah, M.B. Goffe, T.V. Gilbody, H.B. Electron loss by 1-300 keV H ions H and H ₂ . J. Phys. B 13 319 1980 E H + H ₂ -> H ⁺ 1-300 keV

- 80E 6 Huber,B.A.
Charge transfer of Ar^{2+} in He, Ne and Ar
J. Phys. B 13 809-818 1980 E
 $\text{Ar}^{2+} + \text{He}, \text{Ne}, \text{Ar} \rightarrow \text{Ar}^+, \text{Ar}^0$
translational spectroscopy
0.06 - 0.1 keV/amu
cross sections for exothermic and endothermic channels
- 80E31 Huber,B.A. Kahlert,H.J.
Electron transfer from molecular hydrogen to multiply charged Ar and Kr ions.
J. Phys. B 13 L159 1980 E
 $\text{Ar}^{n+}(q=2-6) + \text{H}_2; \text{Kr}^{n+}(q=2-7) + \text{H}_2$
- 80E 7 Jones,J.D. Lister,D.G. Birkinshaw,K. Twiddy,N.D.
Quasi-resonant charge transfer at thermal energies in the rare gases
J. Phys. B 13 799-808 1980 E
 $\text{A}^+ + \text{A} \rightarrow \text{A} + \text{A}^+ (\text{A} = \text{Ne}, \text{Ar}, \text{Kr}, \text{Xe})$
selected ion flow tube method
 3×10^{-5} keV/amu
rate constant
- 80E32 Kim,H.J. Meyer,F.W.
Electron loss from highly excited states of H^0 in collisions with N^{3+} .
Phys. Rev. Letters 44 1047 1980 E
 $\text{N}^{3+} + \text{H}(n=8-24) \rightarrow \text{N}^{2+}$
- 80E33 Lichtenberg,W.J. Bethge,K. Schmidt-Bocking,H.
Electron-loss cross sections for negative ions at high energies.
J. Phys. B 13 343 1980 E
 $\text{H}^-, \text{F}^-, \text{S}^-, \text{Cl}^-, \text{Se}^-, \text{Br}^-, \text{I}^- + \text{H}_0, \text{He}, \text{Ar}, \text{O}_0, \text{N}_0$
20-200 keV
- 80E 8 Matic,M. Sidis,V. Vujovic,M. Cobic,B.
Near-resonant charge transfer in collisions of N^+ and O^+ ions with inert gases
J. Phys. B 13 3665-3676 1980 E
 $\text{A}^+, \text{A}^{2+} + \text{B} \rightarrow \text{A}^0, \text{A}^{0+} (\text{A} = \text{O}, \text{N}; \text{B} = \text{He}, \text{Ne}, \text{Ar}, \text{Kr}, \text{Xe})$
E: growth; T: Demkov model
0.14 - 2.1 keV/amu
- 80E10 Matsumoto,A. Tsurubuchi,S. Iwai,T. Ohtani,S. Okuno,K. Kaneko,Y.
Single-electron capture into Ar^r excited states in $\text{Ar}^{2+} + \text{Na}$ collisions below 12 keV
II. Relative population distribution in Ar^r excited states
J. Phys. Soc. Japan 48 575-582 1980 E
 $\text{Ar}^{2+} + \text{Na} \rightarrow \text{Ar}^r(\text{nl}) + \text{Na}^+ (\text{nl}=4p, 4p', 4d)$
E: photon emission spectroscopy; T: LZ
 $5 \times 10^{-3} - 0.3$ keV/amu
- 80E 9 Matsumoto,A. Tsurubuchi,S. Iwai,T. Ohtani,S. Okuno,K. Kaneko,Y.
Single-electron capture into Ar^r excited states in $\text{Ar}^{2+} + \text{Na}$ collision below 12 keV I.
Absolute measurement of emission cross-sections
J. Phys. Soc. Japan 48 567-574 1980 E
 $\text{Ar}^{2+} + \text{Na} \rightarrow \text{Ar}^r(\text{nl}) + \text{Na}^+$
photon emission spectroscopy
 $5 \times 10^{-3} - 0.3$ keV/amu
- 80E11 McAfee,K.B. Hozack,R.S. Johnson,R.E.
 Σ -oscillation and spin change during charge exchange in Ar^r on Ar
Phys. Rev. Letters 44 1247-1250 1980 E
 $\text{Ar}^r + \text{Ar} \rightarrow \text{Ar} + \text{Ar}^r$
crossed beam
0.005 keV/amu
- 80E12 Meyer,F.W.
Single electron capture and loss by H^r, H^0 and H in Cs vapor in the energy range 0.1 - 2.0 keV
J. Phys. B 13 3823-3828 1980 E
 $\text{H}^r + \text{Cs} \rightarrow \text{H}^0$
growth
0.1 - 2.0 keV/amu
- 80E34 Moran,T.F. Mathur,B.P.
Charge transfer reactions of C^+, N^+ and O^+ ions with H_2 and N_2 .
Phys. Rev. A 21 1051 1980 E
 $\text{C}^+, \text{N}^+, \text{O}^+ + \text{H}_2, \text{N}_2$
0.6-3 keV

80E35	Morgan,T.J. Stone,J. Mayo,R. H(2s) formation in H ⁺ -H and H-H collisions. Phys. Rev. A 22 1460 1980 E H ⁺ -H → H(2s) ; H-H → H(2s)	80E17	Schlachter,A.S. Stalder,K.R. Stearns,J.W. D ⁺ production by charge transfer of 0.3 - 10 keV D ⁺ , D ⁰ , and D ⁻ in cesium, rubidium and sodium vapor targets Phys. Rev. A 22 2494-2509 1980 E D ⁰ + Cs → D growth 1.25 - 5 keV/amu charge equilibrium fractions for Cs, Rb, Na
80E13	Morgenstern,R. Niehaus,A. Zimmermann,G. Autoionizing states formed by electron capture in collisions of multiply charged Ne ions with He, H ₂ and Xe J. Phys. B 13 4811-4831 1980 E Ne ²⁺ , Ne ²⁺ , Ne ²⁺ + He, H ₂ , Xe → Ne, Ne ⁺ , Ne ²⁺ + He ²⁺ , H ₂ ²⁺ , Xe ²⁺ + e ⁻ electron emission spectroscopy 5x10 ⁻² - 5x10 ⁻¹ keV/amu	80E37	Seim,W. Muller,A. Salzborn,E. Electron capture from atomic hydrogen by slow fully stripped lithium ions. Phys. Letters 80A 20 1980 E Li ³⁺ + H → Li ²⁺ 9-42 keV
80E14	Nagata,T. Charge changing collisions of atomic beams in alkali-metal vapors. IV. Total cross sections for single electron capture by H ⁺ ion and H(1s) atom J. Phys. Soc. Japan 48 2068-2075 1980 E H ⁺ + B → H ⁺ ; H ⁰ (1s) + B → H (B = Cs, Rb, K, Na) growth 0.4 - 5 keV/amu total cross sections	80E38	Sewell,E.C. Angel,S.C. Dunn,K.F. Gilbody,H.B. Ionization and charge transfer in fast H ⁺ - Li ⁺ collisions. J. Phys. B 13 2269 1980 E H ⁺ + Li ⁺ → Li ²⁺ ; H + Li ²⁺ ; deduce H ⁺ + Li ²⁺ + e ⁻ 62 - 350 keV (c.m.)
80E15	Panov,M.N. Electron capture into different excited states of multiply charged ions Electronic and Atomic Collisions (North-Holland, Amsterdam) Ar ²⁺ + He → Ar ²⁺ (nl) + He ⁺	80E18	Shah,M.B. Geddes,J. Gilbody,H.B. Absolute cross sections for H(2s) formation in electron capture by protons in gases J. Phys. B 13 4049-4058 1980 E H ⁺ + B → H ⁰ (2s) + B ⁺ (B = He, Ne, N ₂ , O ₂ , Ar, H ₂) photon counting 12 - 18 keV/amu
80E36	Park,J.T. Aldag,J.E. Peacher,J.L.George,J.M. Angular differential cross sections for excitation of atomic hydrogen to the n=2 level by proton impact. Phys. Rev. A 21 751 1980 E H ⁺ + H → H ⁺ + H(n-2)	80E19	Smith,D. Adams,N.G. Alge,E. Villingner,H. Lindinger,W. Reactions of Ne ²⁺ , Ar ²⁺ , Kr ²⁺ and Xe ²⁺ with the rare gases at low energies J. Phys. B 13 2787-2799 1980 E A ²⁺ + B → A ⁺ + B ⁺ (A = Ne, Ar, Kr, Xe; B = He, Ne, Ar, Kr, Xe) selected ion-flow tube method 3x10 ⁻⁵ eV
80E16	Rille,E. Winter,H. Excitation in electron capture collisions of Ne ²⁺ (15-20 keV) with Xe J. Phys. B 13 1531-536 1980 E Ne ²⁺ + Xe → Ne ⁺ (nl) + Xe ⁺ (nl) photon emission spectroscopy 0.74 - 2.5 keV/amu		

- 80E20 Sofield,C.J. Cowern,N.E.B. Praper,J. Bridwell,L. Freeman,J.M. Woods,C.J. Spencer-Harper,M.
Charge-exchange cross sections of nearly fully stripped ^{16}O ions in solid targets
Nucl. Instr. Meth. 170 257-260 1980 E
 $\text{O}^{q+} + \text{B}(\text{solid}) \rightarrow \text{O}^{(q-1)+} (q=7,8) ; \text{O}^{(q-1)+} (q=6,7) (B = C, Al)$
foil thickness dependence
2500 keV/amu
- 80E21 Tanis,J.A. Jacobs,W.W. Shafroth,S.M.
Systematics of target and projectile K x-ray production and radiative capture for 20 - 80 MeV Cl^{q+} ions incident on 25 - 200 $\mu\text{g}/\text{cm}^2$ Cu targets
Phys. Rev. A 22 483-495 1980 E
 $\text{Cl}^{q+} + \text{Cu} \rightarrow \text{Cl}^{(q-1)+} + \text{hv} + \text{Cu}^+$
x-ray spectroscopy
571 - 2285 keV/amu
- 80E22 Thielmann,U. Krutain,J. Barat,M.
Collisions spectroscopy of open-shell systems II. $\text{N}^+ - \text{Ne}$ collisions
J. Phys. B 13 4217-4232 1980 E
 $\text{N}^+ + \text{Ne} \rightarrow \text{N}^0$
TOF-energy loss spectroscopy
0.036 - 0.14 keV/amu
energy loss spectra
- 80E24 Van Zyl,B. Rothwell,H.L. Neumann,H.
Balmer-alpha and Balmer-beta emission cross sections for $\text{H}^+ + \text{Ar}$ collisions
Phys. Rev. A 21 730-737 1980 E
 $\text{H}^+ + \text{Ar} \rightarrow \text{H}^0(3l, 4l)$
photon spectroscopy
0.05 - 2.5 keV/amu
- 80E23 Varghese,S.L. Bissinger,G. Joyce,J.M. Laubert,R.
The electron capture cross section of 1.5 - 3 MeV protons from carbon
Nucl. Instr. Meth. 170 269-273 1980 E
 $\text{H}^+ + \text{B} \rightarrow \text{H}^0 (B = \text{CH}_4, \text{C}_2\text{H}_2, \text{C}_2\text{H}_4, \text{C}_2\text{H}_6, \text{C}_3\text{H}_8, \text{C}_4\text{H}_{10})$
growth
1500 - 3000 keV/amu
- 80T 1 Amundsen,P.A. Jakubassa,D.H.
Charge transfer in asymmetric heavy ion collisions
J. Phys. B 13 L467-472 1980 T
 $\text{H}^+ + \text{B} \rightarrow \text{H}^0 + \text{B}^+(1s^{-1}) (B = C, Ne, Ar)$
1A
200 - 6000 keV/amu
Impact parameter dependence of capture probabilities.
- 80T34 Baliunas,S.L. Butler,S.E.
Silicon lines spectral diagnostics : the effect of charge transfer.
Astrophys. J. 235 L45 - 48 1980 T
 $\text{Si}^+ + \text{H}^+ \rightarrow \text{Si}^{2+} + \text{H} ; \text{Si}^{2+} + \text{H}^+ \rightarrow \text{Si}^{3+} + \text{He}$
modeling
- 80T 2 Banyard,K.E. Shirtcliffe,G.W.
Charge exchange between simple structured projectiles in high energy collisions
Phys. Rev. A 22 1452-1454 1980 T
 $\text{H}(1s) + \text{H}(1s) \rightarrow \text{H} + \text{H}^+$
continuum-intermediate-state approximation
2 - 90 keV/amu
- 80T 3 Becker,R.L. Ford,A.L. Reading,J.F.
Contributions of multi-electron processes to inner-shell charge transfer and vacancy production; projectile charge dependence in collisions of bare nuclei with argon
J. Phys. B 13 4059-4077 1980 T
 $\text{He}^{2+}, \text{C}^{4+} + \text{Ar} \rightarrow \text{He}^+, \text{C}^{3+} + \text{Ar}^+(1s^{-1})$
CC
1000 - 5000 keV/amu
 Z_p -scaling
- 80T36 Balkic,Dz.
Charge dependence of ionization cross sections.
J. Phys. B 13 L589 1980 T
 $\text{H}^+ + \text{He}^+ \rightarrow \text{H}^+ + \text{He}^{2+} + e$
40 - 500keV ; CDW

80T 4	Bransden, B.H. Newby, C.W. Noble, C.J. Electron capture by fully stripped ions of helium, lithium, beryllium and boron from atomic hydrogen J. Phys. B 13 42450-4255 1980 T He ²⁺ , Li ³⁺ , Be ⁴⁺ , B ⁵⁺ + H -> He ⁺ , Li ²⁺ , Be ³⁺ , B ⁴⁺ (nl) + H ⁺ CC (2-AO) 5 - 200 keV/amu	80T10	Crothers, D.S.F. Todd, N.R. One-electron capture by fast multiply charged ions in H; q ³ scaling J. Phys. B 13 2277-2294 1980 T A ^{q+} + H -> A ^{(q-1)+} + H ⁺ OBK, eikonal, CDW, CIS 1.3 - 250 keV/amu q ³ scaling low
80T 5	Briggs, J.S. Dube, L. The second Born approximation to the electron transfer cross section J. Phys. B 13 771-784 1980 T A ^{q1+} + B ^{(q2-1)+} (n'l'm') -> A ^{(q1-1)+} (nlm) + B ^{q2+} second Born approximation	80T 9	Crothers, D.S.F. Todd, N.R. Electron capture by slow Zn ²⁺ , Cd ²⁺ , B ²⁺ , Mg ²⁺ and C ⁶⁺ ions in H J. Phys. B 13 547-563 1980 T Zn ²⁺ , Cd ²⁺ , B ²⁺ , Mg ²⁺ , C ⁶⁺ + H Phase-integral interpretation of the two-state exponential model within IP 2.5x10 ⁻³ - 25 (Zn ²⁺ , Cd ²⁺), 0.25 - 2.5x10 ²⁺ (B ²⁺), 400 - 1225 (Mg), 0 - 25 (C ⁶⁺)
80T 7	Butler, S.E. Dalgarno, A. Charge transfer of multiply charged ions with hydrogen and helium; Landau-Zener calculations Astrophys. J. 241 838-843 1980 T A ^{q1+} + B -> A ^{(q1-1)+} + B ⁺ (A = C ³⁺ , C ⁴⁺ , N ²⁺ , N ⁴⁺ , O ³⁺ , O ⁴⁺ , Ne ²⁺ - Ne ⁴⁺ , Mg ²⁺ - Mg ⁴⁺ , Si ³⁺ , Si ⁴⁺ , S ²⁺ - S ⁴⁺ , Ar ²⁺ - Ar ⁴⁺ ; B = H, He) Landau-Zener model 10 ⁻² - 4x10 ⁻³ keV/amu rate coefficients	80T35	Dalgarno, A. Butler, S.E. Heil, T.G. Charge transfer of doubly charged oxygen ions in helium. J. Geophys. Res. 85 6047 - 6048 1980 T O ²⁺ + He -> O ⁺ + He ⁺ LZ rate coefficient at 300 K
80T 6	Butler, S.E. Heil, T.G. Dalgarno, A. Charge transfer of multiply charged ions with hydrogen and helium; quantal calculations Astrophys. J. 241 442-447 1980 T A ²⁺ , A ³⁺ + H, He -> A ⁺ , A ²⁺ + H ⁺ , He ⁺ (A = C, N, O, Ne) quantal calculation 5x10 ³ - 5x10 ⁴ K rate coefficient	80T11	Datta, S. Mukherjee, S.C. Charge transfer in He ²⁺ -H(1s) collisions J. Phys. B 13 539-546 1980 T He ²⁺ + H(1s) -> He ⁺ (1s, 2s, 2p) + H ⁺ Coulomb-Born 25 - 2500 keV/amu
80T 8	Chambaud, G. Launay, J.M. Levy, B. Mille, P. Roueff, E. Minh, F.T. Charge exchange and fine structure excitation in O - H ⁺ collisions J. Phys. B 13 4205-4216 1980 T O ⁺ + H -> O + H ⁺ ; H ⁺ + O(³ P ₂) -> H ⁰ + O ⁺ (⁴ S _{3/2}) CC 10 - 1000 K	80T12	Eichler, J. Narumi, H. On the classical-trajectory eikonal approximation for electron capture into multicharged ions Z. Phys. A 295 209-214 1980 T He ²⁺ + H(1s) -> H ⁺ (1s) + H ⁺ Eikonal approximation 200 - 50000 keV/amu General expression for 1s-1s transfer for any projectile-target combination, normalized to OBK.

- 80T15 Grozdanov, T.P.
Classical model for electron capture in collisions of highly charged, fully stripped ions with hydrogen atoms
J. Phys. B 13 3835-3847 1980 T
 $A^{z+} + H \rightarrow A^{(z-1)+} + H^+$ ($z = 8, 10, 14, 18, 26, 36$)
classical over-barrier model
0.5 - 100 keV/amu
total cross sections
- 80T16 Harel, C. Salin, A.
Application of OEDM orbitals to many-electron systems ; He^{2+} -He collisions
J. Phys. B 13 785-789 1980 T
 $He^{2+} + He \rightarrow He^+(n) + He^+(1s)$, $He + He^{++}(n = 1, 2)$
MO close-coupling
3.3 - 33 keV/amu
- 80T17 Jakubassa-Amundsen, D.H. Amundsen, P.A.
On the semiclassical impulse approximation for electron capture in asymmetric ion-atom collisions
Z. Phys. A 297 203-214 1980 T
 $H^+ + B \rightarrow H(1s) + B^+(1s^{-1})$ ($B = C, N, O, Ne, Ar$)
semiclassical impulse approximation
400 - 20000 keV/amu
angular distribution
- 80T18 Jakubassa-Amundsen, D.H. Amundsen, P.A.
Charge transfer in heavy ion collisions at relativistic velocities
Z. Phys. A 298 13-19 1980 T
impulse approximation
- 80T19 Lapicki, G. McDaniel, F.D.
Electron capture from K shell by fully stripped ions
Phys. Rev. A 22 1896-1905 1980 T
modified OBK with corrections
scaling law
- 80T20 Lin, C.D. Tunnell, L.N.
Improved atomic model for charge transfer in multielectron ion-atom collisions at intermediate energies
Phys. Rev. A 22 76-85 1980 T
 $H^+ + Ar \rightarrow H^0(1s) + Ar^+(1s^{-1})$; $H^+ + Ne, Kr \rightarrow H(1s) + Ne^+(2s^{-1}, 2p^{-1})$, $Kr^+(4s^{-1}, 4p^{-1})$; $F^{9+} + Ar \rightarrow F^{8+}(1s) + Ar^+(1s^{-1})$
Two-center AO expansion method
1 - 200 keV/amu (H); 1000 - 24000 keV/amu (F)
- 80T21 Macek, J.H. Shakeshaft, R.
Second Born approximation with the Coulomb Green's function; electron capture from hydrogen-like ions by a bare ion
Phys. Rev. A 22 1441-1446 1980 T
 $H^+ + B^{(z-1)+}(1s) \rightarrow H(1s)$ ($B = Ne, Ca$)
second Born approximation
2500 - 10000 keV/amu
- 80T22 McCarroll, R. Valiron, P.
Thermal charge exchange reaction with multicharged ions of astrophysical interest; application to the N^{3+} -H system
Electric and Atomic Collisions 453-456 1980 T
(North-Holland)
 $N^{3+} + H \rightarrow N^{2+} + H^+$
quantal calculation/Landau-Zener model
 $10^7 - 10^3$ keV/amu
- 80T23 Grozdanov, T.P. Janev, R.K.
Electron capture in slow collisions of multiply charged ions with hydrogen molecules
J. Phys. B 13 L69-72 1980 T
 $Kr^{4+ \rightarrow 7+} + H_2 \rightarrow Kr^{3+ \rightarrow 6+}$
tunnelling model
0.012 - 0.24 keV/amu
total cross section
- 80T24 Grozdanov, T.P. Janev, R.K.
Two-electron capture in slow ion-atom collisions
J. Phys. B 13 3431-3442 1980 T
 $He^{2+}, C^{4+} + He \rightarrow He^0, C^{2+} + He^{2+}$
asymptotic Landau-Herring method
0.5 - 12 keV/amu
total cross section

- 80T37 McGuire, J.H., Simony, P.R.
Calculation of cross sections for 2s-2p excitation of one-electron ions by He^{2+} and He^0 .
Phys. Rev. A 22 2270 1980 T
 $\text{F}^{7+}(1s^2 2s) + \text{He}^{2+} \rightarrow \text{F}^{7+}(1s^2 2p) + \text{He}^{2+}$; $\text{Si}^{12+}(1s^2 2s) + \text{He}^{2+} \rightarrow \text{Si}^{12+}(1s^2 2p) + \text{He}^{2+}$
- 80T28 Rivarola, R.D., Piantetini, R.D., Salin, A., Belkic, D.Z.
The influence of the static potential in high energy K-shell electron capture collisions
J. Phys. B 13 2601-2609 1980 T
 $\text{H}^+ + \text{He}(1s^2) \rightarrow \text{H}(1s) + \text{He}^+(1s)$
CDW
293 keV/amu
- 80T29 Roy, P.K., Saha, B.C., Sil, N.C.
Formation of hydrogen atoms in arbitrary excited states by electron capture in p-H collision
J. Phys. B 13 3401-3420 1980 T
 $\text{H}^+ + \text{H}(1s) \rightarrow \text{H}(nlm) + \text{H}^+$
Born approx.; distorted-wave (Bassel-Gerjuoy) approx.; time-dependent two-state (Band) approx.
25 - 4000 keV/amu
- 80T30 Ryufuku, H., Sasaki, K., Watanabe, T.
Oscillatory behavior of charge transfer cross sections as a function of the charge of projectiles in low energy collisions
Phys. Rev. A 21 745-750 1980 T
 $\text{A}^{Z+} + \text{H} \rightarrow \text{A}^{(Z-1)+} + \text{H}^+$ ($\text{A}^{Z+} = \text{B}^{2+}, \text{B}^{3+}, \text{C}^{3+}, \text{C}^{5+}, \text{N}^{3+}, \text{N}^{6+}, \text{O}^{3+}, \text{O}^{6+}$)
UDWA, classical barrier model
1 - 25 keV/amu
oscillation of cross sections at low energies
- 80T31 Saha, H.P., Maji, N., Sil, N.C.
Electron capture in the 3s level by proton and alpha-particle from atomic hydrogen
J. Phys. B 13 327-342 1980 T
 $\text{H}^+ + \text{H} \rightarrow \text{H}(3s) + \text{H}^+$, $\text{He}^{++} + \text{H} \rightarrow \text{He}^+(3s) + \text{H}^+$
Bates formula
25 - 800 (H^+), 6.25 - 200 (He^{++}) keV/amu
- 80T32 Shakeshaft, R.
Innershell electron capture by a swift bare ion; second Born effects
Phys. Rev. Letters 44 442-444 1980 T
 $\text{A}^{Z+} + \text{B}^{(Z-1)+} \rightarrow \text{A}^{(Z-1)+} + \text{B}^{Z+}$
second Born approximation
Second and higher-order Born terms needed for innershell electron capture.
- 80T23 Moiseiwitsch, B.L., Stockman, S.G.
Electron capture by charged particles at relativistic energies
J. Phys. B 13 2975-2981 1980 T
 $\text{H}^+, \text{Ne}^{10+} + \text{H}(1s) \rightarrow \text{H}(1s), \text{Ne}^{9+}(1s) + \text{H}^+$
OBK with Dirac wave function
10000 - 10000000 keV/amu
analytic expression
- 80T24 Moiseiwitsch, B.L., Stockman, S.G.
Non-orthogonality of atomic wave functions in electron capture at relativistic energies
J. Phys. B 13 4031-4037 1980 T
 $\text{A}^{Z+} + \text{B}^{(Z-1)+}(1s) \rightarrow \text{A}^{(Z-1)+}(1s)$ ($\text{A} = \text{H}, \text{Ne}, \text{Ar}; \text{B} = \text{H}, \text{Cu}$)
relativistic OBK
 $1 \times 10^6 - 1 \times 10^{17}$ keV/amu
- 80T25 Mukherjee, S., Sil, N.C.
Ion-ion capture collisions in continuum distorted-wave approximation
J. Phys. B 13 3421-3430 1980 T
 $\text{H}^+ + \text{He}^+, \text{Li}^{2+}, \text{Be}^{3+}, \text{C}^{4+} \rightarrow \text{H}(1s, 2s) + \text{He}^+, \text{Li}^{1+}, \text{Be}^{2+}, \text{C}^{3+}$
CDW
400 - 2000 keV/amu
- 80T26 Olson, R.E.
Ion-Rydberg atom collisions cross sections
J. Phys. B 13 483-492 1980 T
 $\text{A}^{q+} + \text{B}^{(q-1)+}(n) \rightarrow \text{A}^{(q-1)+}(n) + \text{B}^{Z+}$ ($q = 1, 2, 5, 10; n = 1, 2, 5, 10, 20$)
CTMC
- 80T27 Reading, J.F., Ford, A.L.
K-shell hole production, multiple hole production, charge transfer and antisymmetry
Phys. Rev. A 21 124 1980 T

- 80T38 Sramel, S.J., Macek, J.H., Gallup, G.A.
Computed cross sections for electron transfer in $\text{Ba}^+ + \text{Ba}^+$ collisions.
Phys. Rev. A 22 1467 1980 T
 $\text{Ba}^+ + \text{Ba}^+ \rightarrow \text{Ba} + \text{Ba}^{++}$
25 - 500 keV ; SLCT
- 80T33 Winter, T.G., Hatton, G.
Plane-wave-factor, molecular-state treatment of electron transfer in collisions of He^{2+} ions with H atoms
Phys. Rev. A 21 793-807 1980 T
 $\text{He}^{2+} + \text{H} \rightarrow \text{He}^+(\text{nl}) + \text{H}^+$
CC (3,4,10 MO) with ETF
0.25 - 17.5
- 80T39 Winter, T.G., J.Hatton, G.J., Lane, N.F.
Molecular-state treatment of collisions between protons and He^+ ions.
Phys. Rev. A 22 930 1980 T
 $\text{H}^+ + \text{He}^+ \rightarrow \text{H} + \text{He}^{2+}$; $\text{H}^+ + \text{He}^+ \rightarrow \text{H}^+ + \text{He}^+$ (2s, 2p, 2p₁)
1.6 - 14 keV (c.m.) ; MO
- 81E26 Afrosimov, V.V., Basalaev, A.A., Donets, E.D., Lozhkin, K.O., Panov, M.N.
Processes involving the capture of an electron by the nuclei of atoms near helium atoms and hydrogen molecules at low energies.
Sov. Phys. - JETP Letters 34 171 1981 E
 $\text{C}^+, \text{N}^+, \text{O}^+, \text{Ne}^{10+}, \text{Ar}^{18+} + \text{H}_2$
0.5-8 keV/amu
- 81E1 Afrosimov, V.V., Basalaev, A.A., Gordeev, Yu.S., Donets, E.D., Zinov'ev, A.N., Ovchinnikov, S.Yu., Panov, M.N.
X radiation accompanying electron capture by oxygen and carbon nuclei in molecular hydrogen.
Sov. Phys. - JETP Letters 34 316 - 318 1981 E
 $\text{C}^{6+}, \text{O}^{8+} + \text{H}_2 \rightarrow \text{C}^{5+}, \text{O}^{7+}$
photon emission spectroscopy
0.6 - 8 keV/amu
- 81E27 Aldag, J.E., Peacher, J.L., Martin, P.J., Sutcliffe, V., George, J., Redd, E., Kvate, T.J., Blankenship, D.M., Park, J.T.
Angular differential and total cross sections for the excitation of atomic hydrogen to n=2 state by helium ions.
Phys. Rev. A 23 1062 1981 E
 $\text{He}^+ + \text{H} \rightarrow \text{He}^+(\text{theta}) + \text{H}^*$
15-100 keV
- 81E28 Alton, G.D., Bridwell, L.B., Lucas, M., Moak, C.D., Miller, P.D., Jones, C.M., Kessel, Q.C., Aniar, A.A., Brown, M.D.
Single and multiple electron loss cross section measurements from 20 MeV Fe^{4+} on thin gaseous targets.
Phys. Rev. A 23 1073 1981 E
 $\text{Fe}^{4+} + \text{He}, \text{Ne}, \text{Ar}, \text{Kr}, \text{Xe}, \text{H}_2, \text{N}_2, \text{O}_2, \text{CH}_4, \text{CO}_2, \text{CHF}_3, \text{CF}_4, \text{SF}_6$
- 81E2 Barret, J.L., Leventhal, J.J.
Selective formation of $\text{He}^+(n=3)$ in $\text{He}^{2+} - \text{Li}$ collisions.
Phys. Rev. A 23 485 - 490 1981 E
 $\text{He}^{2+} + \text{Li} \rightarrow \text{He}^+(n=3)$
photon spectroscopy
0.125 - 1.75 keV/amu
emission cross section
- 81E29 Berkner, K.H., Graham, W.G., Pyle, R.V., Schlachter, A.S., Stearns, J.W.
Electron capture, electron loss and impact ionization cross sections for 103- to 3400-keV/amu multicharged iron ions colliding with molecular hydrogen.
Phys. Rev. A 23 2891 1981 E
 $\text{Fe}^{8+}(q=3, 7, 9, 10-16, 18, 20-25) + \text{H}_2$
103-3400 keV/amu
- 81E3 Beyer, H.F., Mann, R., Folkmann, F.
High-charge-low-velocity electron capture studied by x-ray line quenching.
J. Phys. B 14 L377 - 381 1981 E
 $\text{Ne}^{8+}(1s2p^3p_1) + \text{Ne} \rightarrow \text{Ne}^{7+}$
K α -x-ray observation
 5.1×10^{-4} keV/amu
recoil ions

- 81E30 Bliman, S. Aubert, J. Geller, R. acquot, B. van Houtte, D.
Electron capture collisions at keV energies of multiply charged ions of carbon and argon with molecular deuterium.
Phys. Rev. A 23 1703 1981 E
 $C^{4+}(q=2-6), Ar^{q+}(q=2-12) + D_2$
2-10 keV
- 81E4 Bloemen, E.W.P. Winter, H. Mark, T.D. Dijkkamp, D. Barcands, D. de Heer, F.J.
Absolute emission cross sections at 30.4 nm for e - He collisions and at 20.8 nm for Ne^{4+} - He collisions.
J. Phys. B 14 717 - 725 1981 E
 $e + He \rightarrow 2e + He^+ + hv$; $Ne^{4+} + He \rightarrow Ne^{3+} + He^+ + hv + He^+$
photon emission spectroscopy
9.9 (Ne^{4+} -He) keV/amu
- 81E5 Campbell, F.M. Browning, R. Latimer, C.J.
Symmetric charge transfer in argon, krypton and xenon: the effect of spin-orbit coupling studied using photoelectron-photoion coincidence spectroscopy.
J. Phys. B 14 1183 - 1195 1981 E
 $A^{+}(^2P_{3/2,1/2}) + A \rightarrow A(^1S_0) + A^{+}(^2P_{3/2,1/2})$
photon-photoelectron coincidence
 $1.25 \times 10^{-4} - 2.5 \times 10^{-2}$ keV/amu
cross section ratios for initial states ($^2P_{3/2}$ and $^2P_{1/2}$)
- 81E6 Chetoui, A. Rozet, J.P. Briand, J.P. Stephan, C.
K excitation and K-K transfer cross sections for intermediate-velocity nearly symmetric collisions.
J. Phys. B 14 1625 - 1638 1981 E
 $Kr^{36+} + B \rightarrow Kr^{35+}(1s) + B^{+}(1s^{-1})$ (B = Ti, Mn, Ni, Cu, Zr, Ag)
x-ray spectroscopy
3614 keV/amu
- 81E7 Cocke, C.L. DuBois, R. Gray, T.J. Justiniano, E.
Capture by highly-charged low-energy ions studied with a secondary recoil ion source.
IEEE NS-28 1032 - 1035 1981 E
 $Ne^{q+}(q=2-6), Ar^{q+}(q=2-10), Kr^{q+}(q=2-10) + He \rightarrow Ne^{(q-1)+}, Ar^{(q-1)+}, Kr^{(q-1)+}$
TOF
(0.1-1.1)xq keV
oscillation of cross section over q
- 81E8 Cocke, C.L. DuBois, R. Gray, T.J. Justiniano, E. Can, C.
Coincidence measurements of electron capture and ionization in low-energy $Ar^{q+} + (He, Ne, Ar, Xe)$ collisions.
Phys. Rev. Letters 26 1671 - 1674 1981 E
 $Ar^{q+} + A \rightarrow Ar^{(q-1)+}, Ar^{q+2+} + A^{+1}$ (A = He, Ne, Ar, Xe; i = 1 - 2)
coincidence technique
(0.25-0.66)xq keV
recoil ion source; total cross section
- 81E9 Dillingham, T.R. McDonald, J.R. Richard, P.
Ionization of one-electron ions and capture by bare and one-electron ions of C, N, O and F on He.
Phys. Rev. A 24 1237 - 1248 1981 E
 $A^{2+} + He \rightarrow A^{(2-1)+}; A^{(2-1)+} + He \rightarrow A^{(2-2)+}$ (A = C, N, O, F)
growth
500 - 2500 keV/amu
- 81E21 Geddes, J. Hill, J. Gilbody, H.B.
Formation of excited hydrogen atoms in electron detachment collisions by 3 - 25 keV H^{-} ions.
J. Phys. B 14 4837 - 4846 1981 E
 $H^{-} + B \rightarrow H(2s, 2p, 3s, 3p, 3d)$ (B = He, Ne, Ar, N_2); $H^{-} + H, H_2 \rightarrow H(2s, Ly-\alpha, 3s, B-\alpha)$
photon spectroscopy
3 - 25 keV/amu
- 81E10 Hall, J. Richard, P. Gray, T.J. Lin, C.D.
Double K-shell-to-K-shell electron transfer in ion-atom collisions.
Phys. Rev. A 24 2416 - 2419 1981 E
 $A^{Z+} + Ti \rightarrow A^{(Z-1)+}(1s), A^{(Z-2)+}(1s^2) + Ti^{+}(1s^{-1}), Ti^{2+}(1s^{-2})$ (A = N, P, Mg, Al, Si, S)
x-ray yields
1500 - 6500 keV/amu (Si); 5000 keV/amu (others)
- 81E11 Hird, B. Ali, S.P.
Electron transfer to Ar^{2+} from rare gas atoms.
J. Phys. B 14 267 - 280 1981 E
 $Ar^{2+} + He, Xe \rightarrow Ar^{+}$
1.5 - 5 keV

81E22	Holzschäfer, H.M. Church, D.A. Near thermal charge transfer between Ar^{2+} and N_2 J. Appl. Phys. 74 2313-2318 1981 E $\text{Ar}^{2+} + \text{N}_2 \rightarrow \text{Ar}^+$ trapping technique - 10^{-3} keV/amu rate coefficient	81E13	Justiniano, E. Cocke, C.L. Gray, T.J. DuBois, R.D. Can, C. Charge transfer and ionization in low energy $\text{Ar}^{q+} + \text{Ne}$ collisions. Phys. Rev. A 24 2953 - 2962 1981 E $\text{Ar}^{q+}(q=2-9) + \text{Ne} \rightarrow \text{Ar}^{(q-1)+}, \text{Ar}^{(q-2)+}, \text{Ar}^{(q-3)+} + \text{Ne}^{q+} (i = 1 - 3)$ coincidence technique (0.1-1.1)xq keV recoil ion source ; total cross section
81E23	Holzschäfer, H.M. Church, D.A. Charge transfer reaction of multi-charged ions with O_2 Phys. Letters 86A 25-28 1981 E $\text{O}^{q+} + \text{O}_2 \rightarrow \text{O}^{(q-1)+} (q = 2,3)$ trapped ion source - 2×10^{-3} keV/amu rate coefficient	81E14	Knudsen, H. Haugen, H.K. Hvelplund, P. Single-electron capture cross sections for medium- and high-charged ions colliding with atoms. Phys. Rev. A 23 597 - 610 1981 E $\text{Au}^{q+}(q=2-24), \text{O}^{q+}(q=1-8) + \text{He} \rightarrow \text{Au}^{(q-1)+}, \text{O}^{(q-1)+}$ growth 16.8 - 102 keV/amu (Au) ; 125 - 1000 keV/amu (O) scaling law
81E24	Howald, A.M. Anderson, L.W. Lin, C.C. Charge-changing cross sections for H^+ ions incident on a Na vapor target. Phys. Rev. A 24 44-47 1981 E $\text{H}^+ + \text{Na} \rightarrow \text{H}, \text{H}^+$ growth 1 - 25 keV/amu	81E32	Knudsen, H. Haugen, H.K. Hvelplund, P. Single electron capture by highly charged ions colliding with atomic and molecular hydrogen. Phy. Rev. A 24 2287 1981 E scaling
81E31	Huber, B.A. Electron capture by slow multiply charged Ar and Ne ions from atomic hydrogen. Z. Phys. A A299 307 1981 E $\text{Ar}^{q+}(q=2-6), \text{Ne}^{q+}(q=2-4) + \text{H}$ 1.4-15 keV	81E15	Mann, R. Folkmann, F. Beyer, H.F. Selective electron capture into highly stripped Ne and N target atoms after heavy ion impact. J. Phys. B 14 1161 - 1181 1981 E $\text{A}^{q+} + \text{B} \rightarrow \text{A}^{(q-1)+}(n) + \text{B}^+$ (A = $\text{Ne}^{q+}, \text{Ne}^{10+}, \text{N}^{5+}$; B = $\text{He}, \text{Ne}, \text{Ar}, \text{H}_2, \text{CH}_4, \text{NH}_3$) x-ray spectroscopy 10^{-4} keV/amu recoil ions ; no cross section
81E12	Hvelplund, P. Høgen, H.K. Knudsen, H. Andersen, L. Damsgaard, H. Fukusawa, F. Electron capture into highly-lying Rydberg states in collisions between multiply charged ions and H_2 Phys. Scripta 24 40 - 42 1981 E $\text{Au}^{13+,15+} + \text{H}_2 \rightarrow \text{Au}^{12+,14+}$ optical measurement 100 keV/amu An=1; dominant transitions ; no cross section given	81E33	Martin, P.J. Blankenship, D.M. Kvale, T.J. Redd, E. Peacher, J.L. Park, J.T. Electron capture at very small scattering angles from atomic hydrogen by 25-125 keV protons. Phys. Rev. A 23 3357 1981 E $\text{H}^+ + \text{H}$ 25-125 keV

81E16	Nagata, T. Okamura, Y. Katoh, E. Mukoyama, Y. Single-electron capture cross sections for 0.4-5.0 keV He ⁺ ions incident on alkali-vapor targets. Phys. Letters 81A 265 - 267 1981 E He ⁺ + B → He ⁰ (B = Cs,Rb,K,Na) growth 0.1 - 1.25 keV/amu	81E38	Phaneuf,R.A. Electron capture in very slow C ⁹⁺ + H collisions. Phys. Rev. A 24 1138 1981 E C ⁹⁺ (q=3,4,5,6) + H → 1-e capture 1111-387 eV/amu
81E34	Pearl,B. Forrest,R.A. Dolder,K. Measurements of cross sections for charge transfer between Cs ⁺ ions. J. Phys. B 14 L383 1981 E Cs ⁺ + Cs ⁺ → Cs + Cs ²⁺ 28 - 68 keV (c.m.)	81E40	Schery,H. Huber,B.A. Electron capture by slow multiply charged Mg, Al, Cs, Pb and Bi ions from He, Ne, Kr and H ₂ . J. Phys. B 14 3197 1981 E Mg ^q (q=2-5) + H ₂ ,He ; Al ^q (q=2-5) + H ₂ ,He ; Cs ^q (q=2-5) + He,Ne,Kr,H ₂ ; Pb ^q (q=2-7) + H ₂ ,He ; Bi ^q (q=2-7) + He 0.6-5 keV
81E36	Pearl,B. Forrest,R.A. Dolder,K. Measurements of inelastic collisions between homonuclear ions: Na ⁺ , K ⁺ and Rb ⁺ . J. Phys. B 14 L603 1981 E Na ⁺ + Na ⁺ → Na ²⁺ ; K ⁺ + K ⁺ → K ²⁺ ; Rb ⁺ + Rb ⁺ → Rb ²⁺ E=19.3 - 87.6 keV (c.m.)	81E41	Schlachter,A.S. Collisions of highly stripped ions at MeV energies in gas targets: charge transfer and ionization. IEEE NS-28 1039 1981 E
81E37	Pearl,B. Forrest,R.A. Dolder,K. Measurements of inelastic collisions between Cs ⁺ ions. J. Phys. B 14 1655 1981 E Cs ⁺ + Cs ⁺ → Cs ²⁺ E= 19 - 79 keV (c.m.)	81E42	Schlachter,A.S. Berkner,K.H. Graham,W.G. Pyle,R.V. Steam,J.W. Tanis,J.A. Collisions of fast, highly stripped carbon, niobium and lead ions with molecular hydrogen. Phys. Rev. A 24 1110 1981 E C ⁴ (q=4,5,6), Nb ^q (q=23,28,31,34,36), Pb(q ⁺ =52,53,54,55,57,59) + H, 60-800 keV/amu
81E35	Pearl,B. R.A.Forrest and K.Dolder Measurements of cross sections for the formation of ⁷ Li ²⁺ by collisions between Li ⁺ ions. J. Phys. B 14 3457 1981 E ⁷ Li ⁺ + ⁷ Li ⁺ → ⁷ Li ²⁺ 19.3 - 87.6 keV (c.m.)	81E17	Seim, W. Müller, A. Salzborn, E. On the population of metastable ionic states in electron-capture collisions. Z. Phys. A 301 11 - 16 1981 E A ¹⁺ ,A ²⁺ + O ₂ → A ²⁺ ,A ³⁺ growth 0.25 - 1.7 keV/amu metastable state effect
81E39	Phaneuf,R.A. Production of high-Q ions by laser bombardment method. IEEE NS-28 1182 1981 E C ⁹ (q=3,4,5) + H ₂	81E43	Seim,W. Muller,A. Wirkner-Bott,I. Salzborn,E. Electron capture by Li ⁴⁺ (i=2, 3), N ⁴⁺ and Ne ⁴⁺ (i=2, 3, 4, 5) ions from atomic hydrogen. J. Phys. B 14 3475 1981 E Li ⁴⁺ (i=2,3), N ⁴⁺ (i=2,3,4,5),Ne ⁴⁺ (i=2, 3, 4, 5) + H

- 81E44 Shah, M.B., Gilbody, H.B.
Experimental study of the ionization of atomic hydrogen by fast H^+ and He^{2+} ions.
J. Phys. B 14 2361 1981 E
 H^+ , He^{2+} + $H \rightarrow$
- 81E45 Shah, M.B., Gilbody, H.B.
Experimental study of the ionization of atomic hydrogen by fast multiply charged ions of carbon, nitrogen and oxygen.
J. Phys. B 14 2831 1981 E
 $C^{2+,3+,4+}$, $N^{2+,3+,4+,5+}$, $O^{2+,3+,4+,5+}$ + $H \rightarrow H^+$
190-2370 keV
- 81E18 Tanis, J.A., Shafroth, S.M., Willis, J.E., Clark, M., Swenson, J., Strait, E.N., Mowat, J.R.
Simultaneous electron capture and excitation in $S + Ar$ collisions.
Phys. Rev. Letters 47 828-831 1981 E
 $S^{q+} + Ar \rightarrow S^{(q-1)+} S^{(q-2)+}$ ($q = 13-16$)
coincidence with K x-rays
2180 keV/amu
- 81E19 Tanis, J.A., Shafroth, S.M., Willis, J.E., Mowat, J.R.
Radiative electron capture by Cl ions incident on C and Cu foils.
Phys. Rev. A 23 366-370 1981 E
 $Cl^{2+} + C, Cu \rightarrow Cu^{(2-1)+} + hv + C^+, Cu^+$
x-ray spectroscopy
1142 - 2285 keV/amu
- 81E25 Tsurubuchi, S., Iwai, T.
Excitation of $Li(2p)$ and $He(2p)$ in collisions of Li^+ with He at energies below 4.2 keV.
J. Phys. B 14 243-259 1981 E
 $Li^+ + He \rightarrow Li(2P_{3/2}, 2P_{1/2})$
photon spectroscopy technique
 $6.4 \times 10^{-2} - 6.0 \times 10^{-1}$ keV/amu
transitions ($2p \rightarrow 2s$; $4d \rightarrow 2p$; $3d \rightarrow 2p$) of Li; also He^+ transition ($2p \rightarrow 1s$)
- 81E20 Vane, C.R., Prior, M.H., Marrus, R.
Electron capture by Ne^{10+} trapped at very low energies.
Phys. Rev. Letters 46 107-110 1981 E
 $Ne^{10+} + Ne \rightarrow Ne^{9+}$
trapped ion
 $3.5 \times 10^{-4} - 2.25 \times 10^{-3}$ keV/amu
recoil ion + trapping; total cross sections
- 81E46 Wirkner-Bott, I., Seim, W., Müller, A., Kester, P., Salzborn, E.
Electron capture by Li^{3+} and Li^{2+} ions in H_2 and He.
J. Phys. B 14 3987 1981 E
 $Li^{3+}, Li^{2+} + H_2, He \rightarrow 1-e$ capture
8-38 keV
- 81T 1 Borondo, F., Macías, A., Riera, A.
Asymmetry effect in the neutralization reaction $H^+ + H$
Phys. Rev. Letters 46 420-423 1981 T
 $H^+ + H \rightarrow H(1s) + H(nl)$
semi-classical approach
0.1 - 100 keV/amu
- 81T 3 Bransden, B.H., Ermolaev, A.M.
Charge exchange in $He^{++} - Li$ collisions
Phys. Lett. 84A 316-318 1981 T
 $He^{2+} + Li \rightarrow He^+(n) + Li^+$
CC (2-AO)
1.25 - 16.0 keV/amu
- 81T41 Bransden, B.H., Noble, C.J.
Charge transfer in $H^+ + He^+$ and $He^{2+} + H$ collisions.
J. Phys. B 14 1849 1981 T
 $H^+ + He^+ \rightarrow H(1s, 2s, 2p_n) + He^{2+}$; $H^+ + He^+(2s, 2p_n)$
 $E = 3.725 - 227.5$ keV; TCAE

- 81T2 Bransden, B.H. Noble, C.J.
Charge transfer in $H^+ + He^{2+}$ and $He^{2+} + H$ collisions
J. Phys. B 14 1849-1856 1981 T
 $H^+ + He^{2+} \rightarrow H + He^{2+}$; $He^{2+} + H \rightarrow He^+ + H$
Impact parameter
0.5 - 50 keV/amu
- 81T37 Burgdörfer, J.
Influence of the linear Stark effect on electron capture into fully stripped ions.
Phys. Rev. A 24 1756 - 1767 1981 T
 $H^+ + H, He \rightarrow H(n=2)$; $O^{8+} + He \rightarrow O^{7+}(n=2)$
OBK
50 - 400 keV/amu (H^+); $7 \times 10^2 = 1.3 \times 10^3$ keV/amu (O^{8+})
alignment parameters given; $(2p)/(2s)$ ratios given
- 81T4 Burgdörfer, J.
Angular momentum coherences in the differential capture amplitude in hydrogen
J. Phys. B 14 1019-1034 1981 T
 H^+ , $He^{2+} + Ar \rightarrow H(1s, 2s, 2p, 3s)$, $He^+(1s, 2s, 2p, 3s)$
Coulomb-Brinkman-Kramers approximation
6000 keV/amu
angular distribution; $A^{2+} + B^{(n-1)+}(1s) \rightarrow A^{(n-1)+}(nlm)$
- 81T36 Burgdorfer, J.
Influence of the linear Stark effect on electron capture into fully stripped ions
Phys. Rev. A 24 1736-1767 1981 T
 $H^+ + H, He \rightarrow H(n=2) + H^+$; $O^{8+} + He \rightarrow O^{7+}(n=2)$; $C^{6+} + He \rightarrow C^{5+}(n=2)$
modified OBK
50 - 400 keV/amu
- 81T5 Casaubon, J.I. Piancentini, R.D. Salin, A.
Charge exchange in low-energy $Li^{3+} - H$ collisions
J. Phys. B 14 L297-299 1981 T
 $Li^{3+} + H \rightarrow Li^{2+}(nl) + H^+$
impact parameter molecular approximation
1 - 5.7 keV/amu
- 81T39 Chibisov, M.I.
Exchange interaction between an atom and a multiply charged ion.
Sov. Phys.-Tech. Phys. 26 284 - 286 1981 T
analytical expression for exchange interaction
- 81T38 Chibisov, M.I.
Asymptotic form of three electron exchange in slow collisions of atoms and ions.
Sov. Phys.-Tech. Phys. 26 280 - 284 1981 T
asymptotic form for 3-electron exchange for triply charged ions; 1) direct exchange
2) successive exchange
- 81T6 Christensen, R.B. Watson, W.D.
Charge transfer in $S^{2+} + H$ collisions at eV collision energies
Phys. Rev. A 24 1331-1341 1981 T
 $S^{2+}(3p) + H(1s) \rightarrow S^+ + H^+$
ab initio MO method
 10^{-3} keV/amu
- 81T7 Crothers, D.S.F.
Continuum distorted waves; capture into the nth shell
J. Phys. B 14 1035-1040 1981 T
 $A^{2+} + H(1s) \rightarrow A^{(n-1)+}(n) + H^+$ ($A = H, He, Li, Be, B, C$)
CDW
130 keV/amu
- 81T8 Crothers, D.S.F. Todd, N.R.
Molecular treatment of charge-transfer in $He^{2+} - H$ collisions
J. Phys. B 14 2251-2258 1981 T
 $He^{2+} + H \rightarrow He^+(nl) + H^+$
CC(5-MO) with ETF
0.5 - 6.0 keV/amu
- 81T40 Dalgarno, A. Heil, T.G. Butler, S.E.
Charge transfer of O IV with hydrogen.
Astrophys. J. 245 793 - 797 1981 T
 $O^{3+} + H \rightarrow O^{2+}(2s^2 2p^3 s \ ^1P^o \ ^3P^o; 2s^2 2p^3 p \ ^1D, ^3D; 2s^2 2p^3 p \ ^1S, ^3S)$
MO
 $5 \times 10^3 - 5 \times 10^4$ K

81T19	Devi,K.R.S. Koonin,S.E. Mean-field approximation to P + He scattering Phys. Rev. Letters 47 27-30 1981 T H ⁺ + He → H ⁰ time-dependent Hartree-Fock method 4 - 100 keV/amu	81T14	Gargaud,M. Hanssen,J. McCarroll,R. Valiron,P. Charge exchange with multiply charged ions at low energies ; application to the N ³⁺ /H and C ⁴⁺ /H systems J. Phys. B 14 2259-2276 1981 T N ³⁺ + H → N ²⁺ (nl) + H ⁺ ; C ⁴⁺ + H → C ³⁺ (nl) + H ⁺ CC (MO) 7x10 ⁻⁷ - 7x10 ⁻³ (N ³⁺), 8x10 ⁻⁷ - 8x10 ⁻³ (C ⁴⁺) keV/amu
81T10	Dube,L.J. Briggs,J.S. Systematics of the single and double electron scattering contribution to charge exchange J. Phys. B 14 4595-4617 1981 T A ²⁺ + B ^{(a-1)+} (nlm) → A ^{(a-1)+} (n'l'm')	81T15	Gayet,R. Rivarola,R.D.R. Salin,A. Double electron capture by fast nuclei J. Phys. B 14 2421-2427 1981 T He ²⁺ + He → He ⁰ ; F ⁹⁺ + Ar → F ⁷⁺ (1s ²) CDW 1.25 - 350 keV/amu (He) ; 1578 - 3263 keV/amu (F)
81T11	Eichler,J. Eikonal theory of charge exchange between arbitrary hydrogenic states of target and projectile Phys. Rev. A 23 498-509 1981 T A ^{z+} + H(nl) → A ^{(a-1)+} (n'l') + H ⁺ (A = H, He, Li, B, C, Fe) eikonal approximation 10 - 3000 keV/amu	81T16	Green,T.A. Shipsey,E.J. Brown,J.C. Modified method of perturbed stationary states. III. Charge-exchange cross-sections for C ⁶⁺ - H collisions Phys. Rev. A 23 546-561 1981 T C ⁶⁺ + H → C ⁵⁺ (n) + H ⁺ CC (MO) 0.05- 30.0 keV/amu
81T13	Fujiwara,K. Close-coupling calculation for electron capture by an alpha particle from atomic hydrogen J. Phys. B 14 3977-3986 1981 T He ²⁺ + H → He ⁺ (nlm) + H ⁺ CC (19AO) 1.3 - 100 keV/amu	81T17	Heil,T.G. Butler,S.E. Dalgarno,A. Charge transfer of multiply charged ions at thermal energies Phys. Rev. A 23 1100-1109 1981 T N ²⁺ + H → N ⁺ + H ⁺ ; C ³⁺ + H → C ²⁺ (nl) + H CC (MO) 1.4x10 ⁻⁶ - 5.8x10 ⁻⁴ (N ²⁺), 2.2x10 ⁻⁵ - 6.7x10 ⁻⁴ (C ³⁺) keV/amu
81T12	Ford,A.L. Reading,J.F. Becker,R.L. Innershell capture and ionization in collisions of H ⁺ , He ²⁺ and Li ³⁺ projectiles with neon and carbon Phys. Rev. A 23 510-518 1981 T A ²⁺ + B → A ^{(a-1)+} (1s) + B ⁺ (1s ¹ , 2l ¹) (A = H, He, Li; B = C, Ne) target-centered basis expansion method 200 - 2000 keV/amu (C); 400 - 4000 keV/amu (Ne)	81T19	Ho,T.S. Lieber,M. Chan,F.T. Eikonal approximation of electron-capture cross sections in collisions of H-atoms with fast projectiles Phys. Rev. A 24 2925-2932 1981 T p + H → H(nl) + p ; C ⁶⁺ + H → C ⁵⁺ (nl) + p ; O ⁸⁺ + H → O ⁷⁺ (nl) + p ; Fe ²⁴⁺ + H → Fe ²³⁺ + p eikonal approximation 20 - 100 (p), 40 - 200 (others) keV/amu

- 81T20 Ho,T.S. Lieber,M. Chan,F.T. Omidvar,K.
Eikonal approximation for charge transfer from a multielectron atom to fast projectiles
Phys. Rev. A 24 2933-2945 1981 T
 $H^+ + He, C, Ar, N_2, O_2 \rightarrow H; He^{2+} + He, C \rightarrow He^+; Li^{3+} + C, Ne \rightarrow Li^{2+}$
eikonal approximation
500 - 10000 keV/amu
- 81T18 Ho,T.S. Umberger,D. Day,R.L. Lieber,M. Chan,F.T.
Eikonal calculation of electron capture cross sections from an arbitrary nlm shell of a
hydrogenic target into arbitrary $n'l'm'$ shell of a fast bare projectile
Phys. Rev. A 24 705-713 1981 T
 $A^{Z+} + B^{(Z-1)+}(nlm) \rightarrow A^{(Z-1)+}(n'l'm') + B^{Z+}$
Eikonal, OBK
20 - 200 keV/amu
- 81T21 Jakubassa-Amundsen,D.H.
Semiclassical impulse approximation for L-shell electron capture in asymmetric heavy
ion collisions
J. Phys. B 14 2647-2656 1981 T
 $H^+ + B \rightarrow H + B^+(2l^{+1})$ ($B = Ne, Ar$)
semiclassical impulse approximation
50 - 4000 keV/amu
capture probability
- 81T22 Kimura,M. Thorson,W.R.
Direct and charge-exchange excitation processes in $H^+ - H(1s)$ collisions at 1 to 7 keV
Phys. Rev. A 24 1780-1792 1981 T
 $H^+ + H(1s) \rightarrow H(2s, 2p) + H^+$
MO with ETF
1 - 7 keV/amu
- 81T23 Kimura,M. Thorson,W.R.
Molecular-state study of $He^{2+} + H(1s)$ and $He^+ + He^+(1s)$ collisions
Phys. Rev. A 24 3019-3031 1981 T
 $He^{2+} + H(1s) \rightarrow He^+(total, 2l); H^+ + He^+(1s) \rightarrow H(1s; n=2)$
CC
0.25 - 5 keV/amu
- 81T24 Kubach,C. Sidis,V.
Theoretical study of near-resonant charge exchange collisions of H^+ with alkali atoms
Phys. Rev. A 23 110-118 1981 T
 $H^+ + B \rightarrow H^0(2s+2p)$ ($B = Rb, K, Na$)
CC
0.2 - 6 keV/amu
- 81T25 Ludde,H.J. Dreizler,R.M.
Direct and capture processes in proton-hydrogen scattering I. Pilot study for
bombarding energies of 2 and 8 keV
J. Phys. B 14 2191-2201 1981 T
 $H^+ + H \rightarrow H(total, 2s, 2p) + H^+$
numerical solution of time-dependent Schroedinger equation
2 - 8 keV/amu
- 81T26 Macek,J. Taulbjerg,K.
Correction to Z_p/Z_t expansions for electron capture
Phys. Rev. Letters 46 170-174 1981 T
 $H^+ + Ar \rightarrow H^0 + Ar^+(1s^{-1})$
second Born approximation
2000 - 15000 keV/amu
- 81T27 Macias,A. Riera,A. Yonez,M.
Molecular treatment of $He^+ + H$ collisions
Phys. Rev. A 23 2941-2949 1981 T
 $He^+(1s) + H(1s) \rightarrow He(1s2p, ^1,3P)$
MO with IP
0.125 - 7.25 keV/amu
- 81T28 Mandal,C.R. Datta,S. Mukherjee,S.C.
Charge-transfer cross sections for collisions of fast Li^{3+} ions with atomic hydrogen
Phys. Rev. 24 3044-3050 1981 T
 $Li^{3+} + H \rightarrow Li^{2+}(1s, 2s, 2p, 3s, 3p, 3d) + H^+$
Coulomb-Born, Born
14.4 - 288 keV/amu

81T42	McGuire,J.H. Stolterfoht,N. Simony,P.R. Screening and antiscreening by projectile electrons in high velocity atomic collisions. Phys. Rev. A 24 97 1981 T $\text{He}^{2+} + \text{A}^{Z(1)+} \rightarrow \text{He}^{2+} + \text{A}^{Z+} + \text{e}$ (A=He, Li, Be, C, F) 10 - 10 ⁴ keV/amu ; PWBA	81T32	Shipsey,E.J. Browne,J.C. Olson,R.E. Electron capture and ionization in C^{3+} , N^{3+} , O^{4+} , $\text{O}^{6+} + \text{H}$ collisions J. Phys. B 14 869-880 1981 T C^{3+} , N^{3+} , $\text{O}^{4+} + \text{H} \rightarrow \text{C}^{4+}$, N^{4+} , $\text{O}^{5+} + \text{H}^+$ PSS (low velocities), CTMC (high velocities) 10 ⁻² - 10 ³ keV/amu total cross sections
81T29	Olson,R.E. n, l distribution in A^{q+} Phys. Rev. A 24 1726-1733 1981 T $\text{Z}^{q+} + \text{H} \rightarrow \text{Z}^{(q+1)+} + \text{H}^+$ (z = 1-20) CTMC 50, 100 keV/amu	81T33	Sidis,V. Kubach,C. Fussén,D. Developments in the $\text{H}^+ + \text{H}^+$ problem Phys. Rev. Letters 47 1280-1284 1981 T $\text{H}^+ + \text{H}^+ \rightarrow \text{H}^0(n) + \text{H}^0$ IPM 0.02 - 10 keV/amu
81T43	Olson,R.E. and B.Liu Interactions of Cs^+ with Cs^+ . J. Phys. B 14 1279 1981 T $\text{Cs}^+ + \text{Cs}^+ \rightarrow \text{Cs}^+ + \text{Cs}^{2+} + \text{e}$ Molecular orbital energy level. Cross sections estimated.(MO)	81T34	Sidis,V. Kubach,C. Pommier,J. Systematic theoretical investigation of charge exchange in $\text{He}^+ - \text{alkali-atom collisions}$ Phys. Rev. A 23 119-126 1981 T $\text{He}^+ + \text{B} \rightarrow \text{H}(2s+2p)$ (B = Cs, Rb, K, Na) CC 0.013-0.3 keV/amu
81T30	Presnyakov,I.P. Uskov,D.B. Janev,R.K. New analytic approach to the theory of charge exchange in atom-multiply charged ion collisions Phys. Letters 84A 243-246 1981 T $\text{A}^{Z+} + \text{H} \rightarrow \text{A}^{(Z+1)+}(n\ell) + \text{H}^+$ (z = 5-15, 20, 30) modified decay model 0.5 - 25 keV/amu Analytic expression for l-distribution; q-oscillation; only total cross sections given.	81T35	Simony,P.R. McGuire,J.H. Exact second Born calculations of 1s-1s electron capture in $\text{p} + \text{H}$ J. Phys. B 14 L737-741 1981 T $\text{H}^+ + \text{H}(1s) \rightarrow \text{H}(1s)$ second Born approximation 10000, 50000 keV/amu angular differential cross section
81T31	Shimakura,N. Inoue,H. Koike,F. Watanabe,T. Impact parameter treatment for $\text{Li}^+ - \text{Li}$ collisions using molecular basis with electron translation factors J. Phys. B 14 2203-2214 1981 T $\text{Li}^+ + \text{Li} \rightarrow \text{Li}(2s) + \text{Li}^+$ MO with ETF 0.015 - 0.14 keV/amu differential in angle	82E 1	Beyer,H.F. Mann,R. Folkmann,F. Electron capture by slow Ne^{8+} recoil ions J. Phys. B 15 1083-1088 1982 E $\text{Ne}^{8+} + \text{He, Ne, Ar, CH}_4, \text{Xe} \rightarrow \text{Ne}^{7+}$ K α x-ray observation recoil ion source ; recoil energy

82E 2	Bissinger,G. Joyce,J.M. Lapicki,G. Laubert,R. Varghese,S.L. Failure of cross section additivity for electron capture from hydrogen gases to bound states of hydrogen ions Phys. Rev. Letters 49 318-322 1982 E $H^+ + B \rightarrow H^0$ ($B = CH_4, C_2H_2, C_3H_6, C_4H_8$) growth 800 - 3000 keV/amu	82E 7	Dmitriev,I.S. Vorobiev,N.F. Zaikov,V.P. Kononova,Zh.M. Nikolaev,V.S. Teplova,Ya.A. Fainberg,Yu.A. Oscillations of the charge exchange cross sections and the average equilibrium charge of helium ions J. Phys. B 15 L351-355 1982 E $He^{2+} + He, N_2, Ne, Ar \rightarrow He^+, He^0$: $He^+ + He, N_2, Ne, Ar \rightarrow He^0$ growth 331 - 2070 keV/amu
82E 3	Bloemen,E. Dijkkamp,D. de Heer,F.J. Production of excited projectile states in collisions of 25-800 keV Ne^{2+} ($z=1,2,3,4$) with He, Ne and Ar J. Phys. B 15 1391-1413 1982 E $Ne^{2+}(z=1,2,3,4) + He, Ne, Ar \rightarrow Ne^{(z-1)+} + He^+, Ne^+, Ar^+$ photon emission spectroscopy 1.24 - 39,6 keV/amu	82E 8	El-Sherbini,T.M. de Heer,F.J. Projectile excitation in the collisions of Ar^{q+} ($q=1, 2$ and 3) with He and Ne J. Phys. B 15 423-438 1982 E $Ar^{q+} + He, Ne \rightarrow Ar^+, Ar^2$ ($q=1-3$) photon emission spectroscopy 0.375 - 10 keV/amu
82E 4	Brazuk,A. Winter,H. Excitation by electron capture in collisions of ground state and metastable Ne^{2+} with Xe at 40 keV J. Phys. B 15 2233-2244 1982 E $Ne^{2+} + Xe \rightarrow Ne^+(nl) + Xe^+$ photon emission spectroscopy 2.0 keV/amu	82E 44	Forrest,R.A. Peart,B. Dolder,K. Measurements of inelastic collisions between Tl^+ ions. J. Phys. B 15 L45 1982 E $Tl^+ + Tl^+ \rightarrow Tl^{2+}$ 33 - 92 keV (c.m.)
82E 5	Bruch,R. Dube,L.J. Trabert,E. Heckmann,P.H. Raith,B. Brand,K. Electron capture to Rydberg states ; C^{4+} in collisions with H_2 J. Phys. B 15 L857-862 1982 E $C^{4+} + H_2, He \rightarrow C^{3+}(nl) + H_2^+, He^+$ E : EUV ; T : TA, CDW, first and second Born 166 - 416 keV/amu	82E 9	Groh,W. Schlachter,A.S. Muller,A. Salzborn,E. Transfer ionization in slow collisions of He^{2+} ions in rare gases J. Phys. B 15 L207-212 1982 E $He^{2+} + A \rightarrow He^+ + A^+ + (i-1)e$ coincidence 1.88 - 8 keV/amu charge fraction
82E 6	Church,D.A. Holzschelter,H.M. Charge transfer from atomic hydrogen to O^{2+} and O^{3+} ions with electron-volt energy Phys. Rev. Letters 49 643-646 1982 E $O^{2+}, O^{3+} + H \rightarrow O^+, O^{2+}$ trapping technique 10^4 K rate constant		

- 82E10 Havener, C.C. Westerveld, W.B. Risley, J.S. Tolik, N.H. Tully, J.C.
Observation of a large electric dipole moment produced in electron transfer collisions of H^+ on He
Phys. Rev. Letters 48 296-929 1982 E
 $H^+ + He \rightarrow H^0(n=3) + H^+$
Balmer-alpha line observation
40 - 80 keV/amu
polarization as a function of electric field
- 82E11 Hegerberg, R. Elford, M.T. Skullerud, H.R.
The cross section for symmetric charge exchange of Ne^+ in Ne at low energies
J. Phys. B 15 797-811 1982 E
 $A^+ + A \rightarrow A^+ + A^+$ ($A = Ne, Ar$)
drift tube method
 $1 \times 10^{-4} - 1.25 \times 10^{-3}$ keV/amu
- 82E45 Hoffman, J.M. Miller, G.H. Lockwood, G.L.
Charge transfer of ground state C^+ , N^+ , and O^+ in N_2 and H_2 .
Phys. Rev. A 25 1930 1982 E
 C^+ , N^+ , O^+ + $N_2, H_2 \rightarrow 1-e$ capture
3-100 keV
- 82E46 Huber, B.A. Kahlert, H.J.
Total cross sections for electron capture by multiply charged ions in H, H_2 and He.
SFB Report 82-05-104 1982 E
compilation
- 82E47 Hvelplund, P. Andersen, A.
Electron capture by fast H^+ , He^+ and He^{2+} ions in collisions with atomic and molecular hydrogen.
Phys. Scri. 26 375 1982 E
 H^+ , He^+ , $He^{2+} + H, H_2 \rightarrow$
0.25-2.75 MeV
- 82E12 Iwai, T. Kaneko, Y. Kimura, M. Kobayashi, N. Ohtani, S. Okuno, K. Takagi, S.
Tawara, H. Tsurubuchi, S.
Cross sections for one-electron capture by highly stripped ions of B, C, N, O, F, Ne and S from He below 1 keV/amu
Phys. Rev. A 26 105-115 1982 E
 $A^{q+} + He \rightarrow A^{(q-1)+} + He^+$ ($A = B, C, N, O, F, Ne, S$; $q = 1-9$)
growth
0.44 - 1.11 keV/amu
total cross section
- 82E13 Kadota, K. Dijkkamp, D. van der Woude, R.L. de Boer, A. Yan, P.G. de Heer, F.J.
One-electron capture into excited states for He^{2+} - Li collisions in the energy range of 1.5 - 150 keV
J. Phys. B 15 3275-3296 1982 E
 $He^{2+} + Li \rightarrow He^+(nl) + Li^+$
photon emission spectroscopy
4 - 40 keV/amu
- 82E14 Kadota, K. Dijkkamp, D. van der Woude, R. Yan, P.G. de Heer, F.J.
Absolute cross sections for one-electron capture into the excited projectile states in collisions between He^{2+} (15-150 keV) and Li atoms
Phys. Letters 88A 135-139 1982 E
 $He^{2+} + Li \rightarrow He^+(nl)$
optical spectroscopy
3.75 - 37.5 keV/amu
- 82E15 Kambara, T. Awaya, Y. Hitachi, A. Kase, M. Kohno, I. Tonuma, T.
X-ray from radiative electron capture induced by 110 MeV Ne ions
J. Phys. B 15 3759-3767 1982 E
 $Ne^{10+} + H_2, He, CH_4, N_2, O_2, Ne \rightarrow Ne^{8+} + hv$
x-ray spectroscopy
5500 keV/amu
- 82E16 Kamber, Y. Mathur, D. Hasted, J.B.
Energy loss spectra of single electron capture products from Ar^{2+} collisions with Ar, Kr, and Xe
J. Phys. B 15 2051-2059 1982 E
 $Ar^{2+} + B \rightarrow Ar^+(nl)$ ($B = Ar, Kr, Xe$)
energy loss spectroscopy
0.013 keV/amu
no cross sections

- 82E17 Katayama, I. Berg, G.P.A., Hurlimann, W., Martin, S.A., Meissburger, J., Oelert, W., Rogge, M., Romer, J.G.M., Tain, J., Stenzen, B.
Charge transfer reactions of ^3He in carbon at 68, 99 and 130 MeV
Phys. Letters 92A 385-388 1982 E
 $^3\text{He}^{2+} + \text{C} \rightarrow \text{He}^+$
foil thickness dependence
22000 - 43000 keV/amu
- 82E48 Kim, H.J., Meyer, F.W.
Electron removal from $\text{H}^0(n)$ in fast collisions with multiply charged ions.
Phys. Rev. A 26 1310 1982 E
 $\text{N}^q, \text{O}^q, \text{Ar}^q (q=1-5) + \text{H}(n=9-24) \rightarrow 1\text{-e capture}$
25 keV/amu
- 82E18 Kimura, M., Iwai, T., Kaneko, Y., Kobayashi, N., Matsumoto, A., Ohtani, S., Okuno, K., Takagi, S., Tawara, H., Tsurubuchi, S.
The (n,l) distributions in electron capture reactions for C^{3+} , N^{4+} and O^{5+} ions colliding with He
J. Phys. B 15 1851-856 1982 E
 $\text{A}^q + \text{He} \rightarrow \text{A}^{q-1} + \text{He}^+ (\text{A}^q = \text{C}^{3+}, \text{N}^{4+}, \text{O}^{5+})$
energy-loss/-gain spectroscopy
 $2.5 \times 10^{-1} (\text{C}^{3+}), 2.85 \times 10^{-1} (\text{N}^{4+}), 3.12 \times 10^{-1} (\text{O}^{5+})$ keV/amu
- 82E43 Koizumi, T., Okuno, K., Kobayashi, N., Kaneko, Y.
Drift tube study symmetric resonance single- and double-charge transfer in $\text{Kr}^+ + \text{Kr}$, $\text{Xe}^+ + \text{Xe}$, $\text{Kr}^+ + \text{Kr}$ and $\text{Xe}^+ + \text{Xe}$ systems
J. Phys. Soc. Japan 51 2650 - 2656 1982 E
 $\text{A}^+ + \text{A} \rightarrow \text{A} + \text{A}^+; \text{A}^{2+} + \text{A} \rightarrow \text{A} + \text{A}^{2+} (\text{A} = \text{Kr}, \text{Xe})$
drift tube technique
 $1.25 \times 10^{-2} - 6 \times 10^{-4}$ (keV/amu)
- 82E19 Kusakabe, T., Hanaki, H., Nagai, N., Kuroda, K., Maeda, N., Sakisaka, M.
Ion-impact ion source applied to low energy charge-transfer collisions
Nucl. Instr. Meth. 198 577-581 1982 E
 $\text{He}^{2+} + \text{Ne} \rightarrow \text{He}^+, \text{He}^0$
growth
0.2 - 0.75 keV/amu
- 82E41 Mahan, B.H., Martner, C., Okeefe, A.
Laser-induced fluorescence studies of the charge transfer reactions of N_2^+ with Ar and N_2 .
J. Chem. Phys. 76 4433 - 4438 1982 E
 $\text{N}_2^+ + \text{Ar}, \text{N}_2 \rightarrow \text{N}_2$
trapped ion technique
 10^{-5} keV/amu
strong vibrational state dependence in N_2 targets but not in Ar targets
- 82E20 Mann, R., Cocke, C.L., Schlachter, A.S., Prior, M., Marrus, R.
Selective final-state population in electron capture by low-energy highly charged projectiles studied by energy-gain spectroscopy
Phys. Rev. Letters 49 1329-1332 1982 E
 $\text{Ne}^{9+}, \text{Ne}^{10+} + \text{He}, \text{Ne}, \text{Ar}, \text{Xe} \rightarrow \text{Ne}^{8+}(n), \text{Ne}^{9+}(n)$
energy-gain spectroscopy
0.025- keV/amu
crossing radius ; n-distribution only
- 82E38 Marrus, R., Prior, M., Vane, C.R.
Electron capture by trapped, low-energy, multiply charged neon ions.
Nucl. Instr. Meth. 202 171-175 1982 E
 $\text{Ne}^{q+} (q = 3 - 10) + \text{Ne} \rightarrow \text{Ne}^{q-1} + \text{Ne}^+$
trapped ion
thermal
- 82E21 Matsumoto, A., Ohtani, S., Iwai, T.
Experimental study of one-electron capture by ground and metastable Ar^{2+} ions from Na at 1.5 keV
J. Phys. B 15 1871-1881 1982 E
 $\text{Ar}^{2+}(\text{D}, ^3\text{P}) + \text{Na} \rightarrow \text{Ar}^+ + \text{Na}^+$
optical attenuation method
 3.75×10^{-2} keV/amu
- 82E22 McCullough, R.W., Goffe, T.V., Shaha, M.B., Lennon, M.O., Gilbody, H.B.
Electron capture by He^{2+} and He^+ ions in lithium vapor
J. Phys. B 15 111-117 1982 E
 $\text{He}^{2+}, \text{He}^+ + \text{Li} \rightarrow \text{He}^+, \text{He}^0$
growth
1.7 - 200 keV/amu
total cross section

- 82E49 McCullough, R.W., Shah, M.B., Lennon, M., Gilbody, H.B.
Electron loss by fast Li^+ ions.
J. Phys. B 15 791 1982 E
 $\text{Li}^+ + \text{Ar}, \text{H}_2, \text{N}_2, \text{O}_2 \rightarrow \text{Li}, \text{Li}^+, \text{Li}^{2+}, \text{Li}^{3+}$
100-2400 keV
- 82E23 Miathe, K., Dreiseidler, T., Salzborn, E.
Charge transfer of hydrogen atoms in N_2 and in caesium vapor
J. Phys. B 15 3069-3084 1982 E
 $\text{H} + \text{N}_2, \text{Cs} \rightarrow \text{H}^+, \text{H}^0$
growth
0.1 - 5 keV/amu
scattering effect in cross sections ($\theta = 0.8, 2.6$)
- 82E24 Murray, G.A., Stone, J., Mayo, M., Morgan, T.J.
Single and double electron transfer in $\text{He}^{2+} + \text{Li}$ collisions
Phys. Rev. A 25 1805-1807 1982 E
 $\text{He}^{2+} + \text{Li} \rightarrow \text{He}^+, \text{He}^0$
total cross section
- 82E25 Nagata, T.
Attenuation cross sections for single electron capture of proton in collision with alkali-atom targets
Mass spectroscopy in Japan 30 153-161 1982 E
 $\text{H}^+ + \text{Cs}, \text{Rb}, \text{K}, \text{Na} \rightarrow \text{H}$
attenuation method
0.3 - 5 keV/amu
- 82E50 Neil, P.A., Angel, G.C., Dunn, K.F., Gilbody, H.B.
Collisions between Cs^+ ions - a further experimental study.
J. Phys. B 15 4219 1982 E
 $\text{Cs}^+ + \text{Cs}^+ \rightarrow \text{Cs}_2^{2+}$
42 - 271 keV (c.m.)
- 82E51 Newman, J.H., Cogan, J.D., Ziegler, D.L., Nitz, D.E., Rundel, R.D., Smith, K.A., Stebbings, R.F.
Charge transfer in $\text{H}^+ - \text{H}$ and $\text{H}^+ - \text{D}$ collisions within the energy range 0.1-150 eV.
Phys. Rev. A 25 2976 1982 E
 $\text{H}^+ + \text{H}, \text{D} \rightarrow \text{H}$
0.1-150 keV
- 82E39 Niki, H., Izawa, Y., Otani, H., Yamanaka, C.
Charge exchange effect on laser isotope separation of atomic uranium (in Japanese).
Trans. Inst. Elec. Eng. 102C 45 - 51 1982 E
 $\text{U}^+ + \text{U} \rightarrow \text{U} + \text{U}^+$
 4×10^{-4} keV/amu
- 82E26 Ohtani, S., Kaneko, Y., Kimura, M., Kobayashi, N., Iwai, T., Matsumoto, A., Okuno, K., Takagi, S., Tawara, H., Tsurubuchi, S.
Observation of electron capture into selective state by fully stripped ions from He atom
J. Phys. B 15 1533-535 1982 E
 $\text{C}^{6+}, \text{O}^{8+} + \text{He} \rightarrow \text{C}^{5+}(\text{nl}), \text{O}^{7+}(\text{nl}) + \text{He}^+$
Energy-loss/gain spectroscopy
0.45 keV/amu
- 82E27 Panev, G.S.
Charge transfer in collisions of Mg^+ ions with Ca atoms
Phys. Letters 91A 348-350 1982 E
 $\text{Mg}^+ + \text{Ca} \rightarrow \text{Mg} + \text{Ca}^+$
crossed beam
0.006 - 0.08 keV/amu
total cross section
- 82E28 Pedersen, E.H., Folkmann, F., Pedersen, N.H.
Differential cross sections for K-shell ionization and capture by H^+ in $\text{C}(\text{CH}_3)$ and Ne
J. Phys. B 15 739-762 1982 E
 $\text{H}^+ + \text{B} \rightarrow \text{H} + \text{B}^+(1s^{-1})$ ($\text{B} = \text{C}, \text{Ne}$)
Auger electron coincidence
200 - 600 keV/amu (C), 500 - 1500 keV/amu (Ne)
impact parameter dependence
- 82E29 Pedersen, E.H., Pedersen, N.H.
Differential cross sections for K-shell ionization and capture in asymmetric collisions; scaling properties
J. Phys. B 15 2205-2220 1982 E
 $\text{A}^+ + \text{B} \rightarrow \text{A}^{(n-1)+} + \text{B}^+(1s)$ ($\text{A} = \text{H}, \text{He}, \text{Li}; \text{B} = \text{C}, \text{Ne}, \text{Ar}$)
Auger electron coincidence
200 keV/amu (C), 500 keV/amu (Ne), 1700 keV/amu (Ar)
probability as a function of impact parameter

82E30	Pedersen,E.P. Loftager,P. Rasmussen,J.L. Electron capture in close collisions between protons and carbon (CH ₄) J. Phys. B 15 4423-4436 1982 E H ⁺ + C -> H + C ⁺ (1s ⁻¹) Auger electron coincidence 200 - 2000 keV/amu Impact parameter dependence	82E33	Rille,E. Winter,H. State-selective and total one-electron capture in Ne ⁶⁺ - Li collisions (q = 1,2 ; E ≤ 30xq keV) Ne ⁶⁺ + Li -> Ne ^{6,5,4} (3l, 4l) (q=1,2) J. Phys. B 15 3489-3507 1982 E photon spectroscopy 0.25 - 1.5 keV/amu (Ne ⁶⁺ ; 1 - 3 keV/amu (Ne ²⁺) total and partial cross sections
82E52	Phaneuf,R.A. Alvarez,I. Meyer,F.W. Crandall,D.H. Electron capture in low-energy collisions of C ³⁺ and O ⁸⁺ with H and H ₂ . Phys. Rev. A 26 1892 1982 E C ³⁺ (q=3,4,5,6), O ⁸⁺ (q=2,3,4,5,6) + H,H ₂ -> 1-e capture	82E40	Shah, M.B. Gilbody, H.B. Ionization of H ₂ by fast protons and multiply charged ions of He, Li, C, N and O. J. Phys. B 15 3441 - 3453 1982 E H ⁺ , He ²⁺ , C ²⁺ , C ³⁺ , C ⁴⁺ + H ₂ -> H,He ⁺ , C ⁺ , C ²⁺ , C ³⁺ + H ⁺ + e projectile-recoil ion coincidence 16 - 160 keV/amu dissociative and non-dissociative ionization cross sections for H ⁺ , He ²⁺ , Li ⁺ , Li ²⁺ , Li ³⁺ , C ³⁺ (q = 2,3,4), N ⁶⁺ (q = 2,3,4,5), O ⁷⁺ (q = 2,3,4,5)
82E42	Piotrovskii, Yo.A. Tolmachev, Yu.A. Kasyanenko, S.U. Investigation of the non-resonant charge-exchange process in helium-mercury systems. Opt. Spectrosc. (USSR) 52 452 - 453 1982 E He ⁺ + Hg -> He + Hg ²⁺ (7 ² P _{3/2}) after-glow method rate coefficient at thermal energies	82E34	Tartis,J.A. Bernstein,E.M. Graham,W.G. Clark,M. Shafroth,S.M. Johnson,B.M. Jones,K.W. Meron,M. Resonant behavior in the projectile x-ray yield associated with electron capture in S + Ar collisions Phys. Rev. Letters 49 1325-1328 1982 E S ¹³⁺ + Ar -> S ¹²⁺ coincidence with x-ray 2180 - 5000 keV/amu
82E31	Richard,P. Pepmiller,P.L. Kawatsura,K. Electron excitation and capture in F ⁸⁺ plus Ne collisions Phys. Rev. A 25 1937-1942 1982 E F ⁸⁺ (1s) + Ne -> F ⁷⁺ x-ray spectroscopy 526 - 2100 keV/amu	82E35	Tawara,H. Richard,P. Kawatsura,K. Radiative electron-capture processes in zero-and one-electron heavy ion collisions with He Phys. Rev. A 26 154-161 1982 E F ⁸⁺ , F ⁹⁺ + He -> F ⁷⁺ , F ⁸⁺ + He ⁺ + hv x-ray spectroscopy 789 - 2100 keV/amu
82E32	Rille,E. Olson,R.E. Peacher,J.L. Blankenship,D.M. Kvale,T.J. Redd,E. Park,J.T. Isotope effect in electron-capture differential cross sections at intermediate energies Phys. Rev. Letters 49 1819-1821 1982 E H ⁺ , D ⁺ + H, D -> H ⁰ , D ⁰ E: growth with high temperature oven ; T: CTMC 40 keV/amu projectile dependence at small angles ; no target isotope dependence ; scaling law	82E36	Tsurubuchi,S. Iwai,T. Kaneko,Y. Kimura,M. Kobayashi,N. Matsumoto,A. Ohtani,S. Okuno,K. Takagi,S. Tawara,H. Two-electron capture into autoionising states of N ³⁺ (3l3l') and O ³⁺ (1s3l3l') in collisions of N ⁷⁺ and O ⁷⁺ with He J. Phys. B 15 L733-737 1982 E N ⁷⁺ , O ⁷⁺ + He -> N ³⁺ (3l, 3l'), O ³⁺ (1s3l3l') + He ²⁺ Energy-loss/gain spectroscopy 0.5 keV/amu (N ⁷⁺) ; 0.44 keV/amu (O ⁷⁺)

82T 1	Bienstock,S. Heil,T.G. Botcher,C. Dalgarno,A. Charge transfer of C^{3+} ions in atomic hydrogen Phys. Rev. A 25 2850-2852 1982 T $C^{3+} + H \rightarrow C^{2+}(2nl) + H^+$ CC (MO) 0.00083 - 0.416 keV/amu	82T 6	Datta,S. Mandal,C.R. Mukherjee,S.C. Sil,N.C. Calculation of cross sections for electron capture by fast Li^{2+} ions from atomic hydrogen in the continuum distorted wave approximation Phys. Rev. A 26 2551-2566 1982 T $Li^{3+} + H \rightarrow Li^{2+}(1s, 2s, 2p, 3s, 3p, 3d)$ CDW 100 - 1500 keV/amu
82T 2	Botcher,C. Heil,T.G. Low-energy charge exchange from hydrogen atoms by few-electron ions Chem. Phys. Letters 86 506-509 1982 T $Be^{4+}, B^{3+}, C^{3+} + H \rightarrow Be^{3+}, B^{2+}, C^{2+}; C^{3+} + H \rightarrow C^{2+}, C^{4+}$ fully quantal FSS $1.0 \times 10^{-4} - 0.1$ keV/amu total cross section	82T 7	Eichenaue,D. Grun,N. Scheid,W. Classical trajectory calculations of the differential cross sections for charge transfer in $H^+ - H$ collisions J. Phys. B 15 L17-20 1982 T $H^+ + H(1s) \rightarrow H(1s)$ CTMC 25, 60 keV/amu angular differential cross sections
82T 3	Bransden,B.H. Noble,C.J. Charge transfer in $Li^{3+} + H$ collisions J. Phys. B 15 451-455 1982 T $Li^{3+} + H \rightarrow Li^{2+}(nlm) + H^+$ CC (8, 14, 20-AO) 1.4 - 200 keV/amu	82T 9	Ermolaev,A.M. Miraglia,J.E. Bransden,B.H. Ionization and charge exchange in collisions between Li^+ ions at intermediate energies J. Phys. B 15 L677-680 1982 T $Li^+ + Li^+ \rightarrow Li^0 + Li^{2+}; Li^+ + Li^+ + e$ first Born approximation 5 - 1000 keV/amu
82T 4	Briggs,J.S. Greenland,P.T. Kocbach,L. Differential cross sections for high energy electron capture in the impulse approximation J. Phys. B 15 3085-3102 1982 T $H^+ + H, Ne \rightarrow H^0; Li^{3+} + Ne^{9+} \rightarrow Li^{2+}$ impulse approximation 10000 keV/amu (H) ; 20000 keV/amu (Li) angular differential cross sections	82T38	Ermolaev,A.M. Noble,C.J. Bransden,B.H. Charge exchange between Cs^+ ions and related studies. J. Phys. B 15 457 1982 T $Cs^+ + Cs^+ \rightarrow Cs(6s, 6p, 5d) + Cs^2; E=300 - 50000$ keV (c.m.) $Li^+ + Li^+ \rightarrow Li(2s, 2p, 3s, 3p, 3d) + Li^{2+}; E=50 - 750$ keV (c.m.) $H^+ + Li^+ \rightarrow H(1s) + Li^2; E=72 - 252$ keV (rel.) (TSAE)
82T 5	Crothers,D.S.F. McCann,J.F. Continuum-distorted-wave capture into the n-th shell ; l, m distribution Phys. Letters 92A 170-174 1982 T $C^{6+} + H(1s) \rightarrow C^{2+}(nlm) + H^+$ CDW	82T 8	Ermolaev,A.M. Noble,C.J. Bransden,B.H. Charge exchange between Cs^+ ions and related studies J. Phys. B 15 457-470 1982 T $Cs^+ + Cs^+ \rightarrow Cs(5p^6, nl) + Cs^{2+}(5p^5) (nl=5d, 6s, 6p); Li^+ + Li^+ \rightarrow Li(1s^2, nl) + Li^{2+}$ (n $\leq$ 3) two-state AO close-coupling 4.5 - 75 keV/amu

- 82T136 Errea, L.F., Mendez, L., Riera, A.
On the choice of translation factors for approximate molecular wave functions.
J. Phys. B 15 101-110 1982 T
 $\text{He}^{2+} + \text{H}(1s) \rightarrow \text{H}^+(n=2) + \text{H}^+$
MO with translation factor
0.25 - 25 keV/amu
- 82T10 Ford, A.L., Reading, J.F., Becker, R.L.
Coupled-channel calculations of ionization and charge transfer in $\text{p} + \text{Li}^{2+}$ and transfer in $\text{Li}^{2+,3+} + \text{H}(1s)$
J. Phys. B 15 3257-3274 1982 T
 $\text{Li}^{2+}(1s) + \text{H}(1s) \rightarrow \text{Li}^+(1snl) + \text{H}^+(n \leq 3)$; $\text{Li}^{3+} + \text{H}(1s) \rightarrow \text{Li}^{2+}(nl) + \text{H}^+(n \leq 4)$
perturbed one-and-a-half center
70, 86 - 400 keV/amu
- 82T13 Fritsch, W.
Atomic orbital expansion description for slow ion-atom collisions; a curved-line trajectory study
J. Phys. B 15 L389-392 1982 T
 $\text{C}^{6+} + \text{H} \rightarrow \text{C}^{3+}$
atomic expansion method
0.1 - 1.0 keV/amu
total cross section
- 82T11 Fritsch, W., Lin, C.D.
Excitation and charge transfer to 2s and 2p states in 1 - 20 keV $\text{H}^+ - \text{H}$ collisions
Phys. Rev. A 26 762-769 1982 T
 $\text{H}^+ + \text{H} \rightarrow \text{H}(2s, 2p)$
AO
1 - 20 keV/amu
- 82T12 Fritsch, W., Lin, C.D.
Electron transfer in $\text{Li}^{3+} + \text{H}$ collisions at low and intermediate energies
J. Phys. B 15 L281-288 1982 T
 $\text{Li}^{3+} + \text{H} \rightarrow \text{Li}^{2+}(nl) + \text{H}^+(n \leq 3)$
AO close-coupling
0.2 - 20 keV/amu
- 82T14 Fritsch, W., Lin, C.D.
Close-coupling calculations for inelastic processes in intermediate energy ion-atom collisions
J. Phys. B 15 1255-1268 1982 T
 $\text{H}^+ + \text{A}^{(q-1)+} \rightarrow \text{H} + \text{A}^{2+}$ (A = H, He)
two-center atomic orbital expansion method
1.5 - 100 keV/amu
- 82T10 Fritsch, W., Lin, C.D.
Atomic expansions for describing charge transfer in slow ion-atom collisions
Phys. Scripta T3 241-243 1982 T
 $\text{H}^+ + \text{H} \rightarrow \text{H}(2s) + \text{H}^+$; Li^{3+} , $\text{C}^{6+} + \text{H} \rightarrow \text{Li}^{2+}$; $\text{C}^{3+} + \text{H}^+$
atomic expansion method
0.1 - 100 keV/amu
total cross section
- 82T37 Gargaud, M., McCarroll, R., Valion, P.
Charge transfer ionization of Si^+ by H^+ at thermal energies.
Astron. Astrophys. 106 197-200 1982 T
 $\text{Si}^+(\text{?P}) + \text{H}^+ \rightarrow \text{Si}^{2+}(\text{?S}) + \text{H}$; $\text{Si}^{2+} + \text{H} \rightarrow \text{Si}^+ + \text{H}^+$
MO
10 - 19^6 K
- 82T16 Green, T.A., Peek, J.M., Riley, M.E., Shipsey, E.J., Brown, J.C.
Electron capture cross section for $\text{C}^{6+} - \text{H}(1s)$ collisions at electron-volt energies: a test of the Landau-Zener formula
Phys. Rev. A 26 1278-1282 1982 T
 $\text{C}^{6+} + \text{H}(1s) \rightarrow \text{C}^{3+}$
Landau-Zener + close-coupling
 $3 \times 10^{-4} - 2 \times 10^{-2}$ keV/amu
total cross section
- 82T17 Green, T.A., Riley, M.E., Shipsey, E.J., Brown, J.C.
Semiclassical trajectory on $\text{C}^{6+} - \text{H}$ charge exchange cross sections at low energy
Phys. Rev. A 26 3668-3671 1982 T
 $\text{C}^{6+} + \text{H} \rightarrow \text{C}^{3+}$
semiclassical approximation
 $3 \times 10^{-3} - 1.3$ keV/amu
total cross section

- 82T15 Green, T.A., Shipsey, E.J., Brown, J.C.
Modified method of perturbed stationary states. IV. Electron capture cross sections for the reaction $C^{6+} + H(1s) \rightarrow C^{5+}(nl) + H^+$
Phys. Rev. A 25 1364-1373 1982 T
 $C^{6+} + H \rightarrow C^{5+}(nl) + H^+$
Close coupling PSS (MO) with variationally optimized ETF
 $1 \times 10^{-3} - 2.25 \text{ keV/amu}$
- 82T18 Ho, T.S., Eichler, J., Lieber, M., Chan, F.T.
Calculation of the differential cross section for electron capture in fast ion-atom collisions
Phys. Rev. A 25 1456-1461 1982 T
 $H^+ + H(1s) \rightarrow H(nlm) + H^+$
optical eikonal approximation
25 - 125 keV/amu
angular differential for $1s \rightarrow nlm$ capture
- 82T19 Ishihara, T., Tsuji, A.
Eikonal approximation for electron capture into partially stripped projectile ions
Phys. Rev. A 26 2987-2989 1982 T
 $A^{q+} (q=1,2) + H \rightarrow A^{(q-1)+}(nl) (A = Li, C)$
eikonal approximation
50 - 500 keV/amu
ratio to OBK
- 82T40 Janev, R.K., Belic, D.S.
Quasi-resonant charge exchange collisions between multiply charged ions.
J. Phys. B 15 3479 1982 T
 $C^{4+} + B^+ \rightarrow C^+ + B^{4+}$; $He^{6+} + O^{4+} \rightarrow He^+(1s) + O^{4+}$; $N^{6+} + C^{4+} \rightarrow N^{4+} + C^{4+}$; $C^{4+} + B^{4+} \rightarrow C^{4+}(2s2p) + B^{4+}$;
 $O^{4+} + N^{4+} \rightarrow O^{4+} + N^{4+}$; $N^{6+} + C^{4+} \rightarrow N^{4+}(2s2p) + C^{4+}$; $F^{6+} + O^{4+} \rightarrow F^{4+} + O^{4+}$; $O^{4+} + N^{4+} \rightarrow O^{4+}(2s2p) + N^{4+}$;
 $Ne^{6+} + F^{4+} \rightarrow Ne^{4+} + F^{4+}$;
0.1 - 100 keV (c.m.) ; RZD
- 82T39 Janev, R.K., Belic, D.S.
Double resonant charge exchange in ion-ion collisions.
Phys. Letters 89A 190 1982 T
 $A^{2+} + A^{(2,2)+} \rightarrow A^{(2,2)+} + A^Z (A=Li, Be, B, C, N, O, F, Ne)$
threshold - 1 MeV ; IP ; scaling
- 82T21 Kimura, M., Olson, R.E., Pascale, J.
Molecular treatments of electron capture by protons from the ground and excited states of alkali-metal atoms
Phys. Rev. A 26 3113-3124 1982 T
 $H^+ + B \rightarrow H^0(\text{total}; 2s, 2p) (B = Na, K, Rb, Cs)$
MO
0.01 - 10.0 keV/amu
total, 2s, 2p cross sections
- 82T20 Kimura, M., Olson, R.E., Pascale, J.
Electron capture collisions of H^+ with ground-and excited state Na
Phys. Rev. A 26 1138-1141 1982 T
 $H^+ + Na(3s, 3p) \rightarrow H(2s, 2p)$
pseudo potential molecular-structure calculation with ETF
0.1 - 10 keV/amu
- 82T41 Lal, M., Srivastava, M.K., Tripathi, A.N.
Charge-transfer cross sections for particles colliding with hydrogenic ions.
Phys. Rev. A 26 305 1982 T
 $He^{2+} + A^{(2,1)+} \rightarrow He^+(1s, 2s, 2p) + A^{2+} (A=He, Li, Be, C, Fe)$
20 - 500000 keV ; CPB - scaling
- 82T22 Lin, C.D., Winter, T.G., Fritsch, W.
Three-center atomic expansion method for ion-atom collisions
Phys. Rev. A 25 2395-2398 1982 T
 $H^+ + H(1s) \rightarrow H(1s) + H^+$
three-center atomic expansion
2 - 25 keV/amu
Charge transfer probability, no cross section except for 13.7, 9.90, 7.8, 3.03 Å² at 2, 5, 10 and 25 keV, respectively.
- 82T23 Ludde, H.J., Dreizler, R.M.
Direct and capture processes in proton-hydrogen scattering. II. Total cross sections for bombarding energies of 1 to 50 keV
J. Phys. B 15 2703-2712 1982 T
 $H^+ + H(1s) \rightarrow H(nl) + H^+ (n \leq 3)$
pseudo-state close-coupling
1 - 50 keV/amu

82T24	Ludde,H.J. Dreizler,R.M. Electron capture with He^{2+} , Li^{3+} , Be^{4+} and B^{5+} projectiles from atomic hydrogen J. Phys. B 15 2713-2720 1982 T $\text{He}^{2+} + \text{H} \rightarrow \text{He}^{\epsilon}(\text{nl}) + \text{H}^+ (n \leq 3)$; Li^{3+} , Be^{4+} , $\text{B}^{5+} + \text{H} \rightarrow \text{Li}^{2+}$, Be^{3+} , $\text{B}^{4+} + \text{H}^+$ pseudo-state close-coupling 2 - 50 keV/amu	82T27	Olson,R.E. Electron capture and ionization in H^+ , He^{2+} + Li collisions J. Phys. B 15 L163-167 1982 T H^+ , $\text{He}^{2+} + \text{Li} \rightarrow \text{H}^0$, He^+ , $(\text{He}^0) + \text{Li}^+$, (Li^{2+}) ; H^+ , $\text{He}^{2+} + \text{Li}^+ + \text{e}$ CTMC 50 - 400 keV/amu
82T35	Macek,J. Alston,S. Theory of electron capture from a hydrogenlike ion by a bare ion Phys. Rev. A 26 250-270 1982 T $\text{A}^{Z+} + \text{B}^{Z+1+} \rightarrow \text{A}^{(Z-1)+} + \text{B}^{Z+}$ strong potential Born approximation	82T28	Olson,R.E. Kimura,M. Angular scattering in slow multiply charged ion atom collisions J. Phys. B 15 4231-4238 1982 T $\text{C}^{6+} + \text{H} \rightarrow \text{C}^{5+}$ quantal 0.25 - 225 keV/amu total cross section as a function of scattering angles
82T42	Maikagan,J.P. Piacentini,R.D. Rivarola,R.D. Differential cross sections for one-electron two center symmetric systems. Phys. Letters 88A 128 1982 T $\text{A}^{*+} + \text{A}^{(Z-1)+} \rightarrow \text{A}^{(Z-1)+} + \text{A}^{Z+}$ ($\text{A}=\text{He,Li,C,Ne}$) 25 keV/amu; TSAE-VC	82T29	Reading,J.F. Ford,A.L. Becker,R.L. One and a half centered calculations of ionization and charge transfer in H^+ + He^+ and He^{2+} + H collisions J. Phys. B 15 625 1982 T $\text{He}^{2+} + \text{H}(1s) \rightarrow \text{He}^{\epsilon}(\text{nl}) + \text{H}^+ (n \leq 5)$; H^+ + $\text{He}^{\epsilon}(1s, 2s, 2p) \rightarrow \text{H}(1s) + \text{He}^{2+}$ perturbed one-and-a-half-center 75.5 (He^{2+}); 20 - 400 (H^+) keV/amu
82T25	Moisewitsch,B.L. Second Born approximation for electron capture at ultrahigh relativistic impact energies J. Phys. B 15 3103-3110 1982 T $\text{A}^{*+} + \text{B}^{(Z-1)+} \rightarrow \text{A}^{(Z-1)+}$ relativistic second Born approximation asymptotic formula (E^{-1})	82T30	Rivarola,R.D. Miraglia,J.E. Comparison between the continuum distorted-wave and the second Born-Kramers approximations at high energies electron capture J. Phys. B 15 2221-2232 1982 T $\text{H}^+ + \text{H}(1s) \rightarrow \text{H}(1s) + \text{H}^+$ CDW, second Born-Kramers approximations 10000, 50000 keV/amu
82T26	Ohyama-Yamaguchi,T. Iikawa,Y. Charge transfer in collisions of Li^{3+} and Be^{4+} ions with atomic hydrogen at low impact energy J. Phys. Soc. Japan 51 2982-2988 1982 T Li^{3+} , $\text{Be}^{4+} + \text{H} \rightarrow \text{Li}^{2+}$, Be^{3+} PSS 0.1 - 20 keV/amu total cross section	82T31	Ryufuku,H. Ionization, excitation and charge transfer for impact of H^+ , Li^{3+} , B^{5+} , C^{6+} and Si^{14+} ions on atomic hydrogen Phys. Rev. A 25 720-736 1982 T H^+ , Li^{3+} , B^{5+} , C^{6+} , $\text{Si}^{14+} + \text{H} \rightarrow \text{H}^0$, Li^{2+} , B^{4+} , C^{5+} , $\text{Si}^{13+} + \text{H}^+$ UDWA 0.01 - 5000 keV/amu

82T32	Salin, A. Charge exchange in Li^{3+} - H collisions Phys. Letters 91A 61-63 1982 T $\text{Li}^{3+} + \text{H} \rightarrow \text{Li}^{2+} + \text{H}^+$ OEEM 1.29 - 50 keV/amu total cross section	82T34	West, B.W. Lane, N.F. Coben, J.S. Radiative charge transfer in collisions of He^{2+} ions and ground state H atoms Phys. Rev. A 26 3164-3169 1982 T $\text{He}^{2+} + \text{H}(1s) \rightarrow \text{He}^+(1s) + \text{H}^+ + h\nu$ optical potential method $1 \times 10^{-4} - 1 \text{ keV/amu}$
82T33	Simony, P.R. McGuire, J.H. Eichler, J. Exact second Born electron capture for p + He Phys. Rev. A 26 1337-1343 1982 T $\text{H}^+ + \text{He}(1s^2) \rightarrow \text{H}(1s)$ second Born approximation 1000 - 100000 keV/amu angular differential cross sections	82T46	Winter, T.G. Electron transfer in p - He^+ and He^{2+} - H collisions using Sturmian basis. Phys. Rev. A 25 697 1982 T $\text{H}^+ + \text{He}^+ \rightarrow \text{H} + \text{He}^{2+}$ 4 - 120 keV (c.m.) ; CC-S
82T45	Sinha, C. Guha, S. Roy, P.K. Sil, N.C. Electron capture by protons passing through helium-like ions, Phys. Rev. A 26 2586 1982 T $\text{H}^+ + \text{Li}^+ \rightarrow \text{H} + \text{Li}^{2+}$; $\text{He}^+ + \text{A}^{(Z-1)+} \rightarrow \text{H} + \text{A}^{(Z-1)+}$ (A=Be, B, C, O) 50 - 1000keV	83E 1	Afrosimov, V.V. Basalaev, A.A. Donets, E.D. Zinovev, A.N. Lozhkin, K.O. Panov, M.N. Electron capture cross sections of nuclei and multiply charged ions at hydrogen atoms JETP Letters 37 24-27 1983 E $\text{A}^{Z+}, \text{A}^{(Z-1)+}, \text{A}^{(Z-2)+} + \text{H} \rightarrow \text{A}^{(Z-1)+}, \text{A}^{(Z-2)+}, \text{A}^{(Z-3)+}$ (A = C, N, O, Ne) growth 0.47 - 5.2 keV/amu
82T44	Sinha, C. Guha, S. Sil, N.C. Electron capture by protons in collisions with some alkali-like ions using a model potential approach. J. Phys. B 15 1759 1982 T $\text{H}^+ + \text{A}^+ \rightarrow \text{H} + \text{A}^{2+}$ (A = Mg, Ca, Sr, Ba) 10 - 1000keV ; CB	83E 2	Afrosimov, V.V. Donets, E.D. Zinovev, A.N. Ovehinnikov, S.Y. Panov, M.N. Cross sections for characteristic x-ray emission in collisions of $\text{C}^{6+}, \text{N}^{6+}, \text{N}^{7+}$, and O^{8+} ions with hydrogen JETP Letters 38 80-83 1983 E $\text{C}^{6+}, \text{N}^{6+}, \text{N}^{7+}, \text{O}^{8+} + \text{H} \rightarrow \text{C}^{5+}, \text{N}^{5+}, \text{N}^{6+}, \text{O}^{7+} (2p-1s; \Sigma(np-1s))$ x-ray observation 0.47 - 7.5 keV/amu oven (dissociation 85%)
82T43	Sinha, C. Sil, N.C. A modified Coulomb-Born approximation and charge transfer in proton-positive ion collisions. Indian J. Pure and Appl. Phys. 20 26 1982 T $\text{H}^+ + \text{He}^+ \rightarrow \text{H} + \text{He}^0$, E=40 - 798 keV ; $\text{H}^+ + \text{Li}^{2+} \rightarrow \text{H} + \text{Li}^0$, E=44 - 873 keV ; $\text{H}^+ + \text{C}^{3+} \rightarrow \text{H} + \text{C}^0$, E=46 - 922 keV ; $\text{H}^+ + \text{N}^{4+} \rightarrow \text{H} + \text{N}^0$, E=47 - 933 keV MCB	83E 3	Baptist, R. Bliman, S. Bonnet, J.J. Chauvet, G. Dousson, S. Hitz, D. Jacquot, B. Knystautas, E.J. Radiative decay of lithium-like ions following charge exchange collisions of 60 keV O^{6+} ions with H_2 Phys. Lett. 93A 185-188 1983 E $\text{O}^{6+} + \text{H}_2 \rightarrow \text{O}^{5+}(nl) + \text{H}_2^+$ photon emission spectroscopy 3.75 keV/amu no cross sections given

83E 4	Bliman,S. Bonnefoy,M. Bonnet,J.J. Dousson,S. Fleury,A. Hitz,D. Jacquot,B. Charge exchange collision experiments with highly charged ions-status report Phys. Scripta T3 63-67 1983 E $A^{2+} + He \rightarrow A^{(q)+} (A = C, O, Ne); A^{q+}(q=3-16) + D_2 \rightarrow Ar^{(q-1)+}$ growth 2 - 5 keV/amu ECR source; total cross section and x-ray production cross section	83E 9	Cocke,C.L. Gray,T.J. Justiniano,E. Can,C. Waggoner,B. Varghese,S.L. Mann,R. Electron capture collisions involving low-energy highly stripped projectiles Phys. Scripta T3 75-78 1983 E $Ar^{q+} + He \rightarrow Ar^{(q-1)+}(q=3-6); Ne^{q+}(q=2-8) + He \rightarrow Ne^{(q-1)+}, Ne^{(q-2)+}; Ar^{q+}(q=2-10) + Li \rightarrow Ar^{(q-1)+}$ growth, energy gain spectroscopy 0.006 - 0.075 keV/amu recoil ion; total cross section ; n-distribution for $Ne^{10+} + Xe$
83E 5	Bliman,S. Bonnet,J.J. Chauvet,G. Dousson,S. Hitz,D. Jacquot,B. Krystautas,E.J. Radiative decay of lithium-like ions following charge exchange collisions of 3 keV amu^{-1} C^{4+} ions with H_2 J. Phys. B 16 L243-245 1983 E $C^{4+} + H_2 \rightarrow C^{3+}(nl) + H_2^+$ photon emission spectroscopy 3.3 keV/amu	83E10	Darnsgaard,H. Hangen,H.K. Hvelplund,P. Knudsen,H. Coincidence measurements of electron capture and target ionization in multiply charged $Au^{q+} + (He, Ne)$ collisions Phys. Rev. A 27 112-116 1983 E $Au^{q+}(q=5-21) + He, Ne \rightarrow Au^{(q-1)+}, Au^{(q-2)+} + He^{r+}(r=1,2), Ne^{r+}(r=1-6)$ coincidence 100 keV/amu
83E 6	Bliman,S. Hitz,D. Jacquot,B. Harel,C. Salin,A. Charge exchange in the $O^{8+} - He$ collisions at keV amu^{-1} energies J. Phys. B 16 2849-2860 1983 E $O^{8+} + He \rightarrow O^{7+}(n) + He^+, O^{6+}(n,n') + He^{2+}$ E: TOF; T: OEDM 0.9 - 5.3 keV/amu	83E11	Dijkkamp,D. Brazuk,A. Drenjic,A.G. de Heer,F.J. Winter,H. State-selective single-electron capture by 80 keV C^{4+} ions from He, H_2 and Li J. Phys. B 16 L343-346 1983 E $C^{4+} + He, H_2, Li \rightarrow C^{3+}(nl) + He^+, H_2^+, Li^+$ photon emission spectroscopy 6.66 keV/amu
83E 7	Chetoui,A. Wohrer,K. Rozet,J.P. Jolly,A. Stephan,C. Belkic,Dz. Gayet,A. Salin,A. State-to-state charge exchange cross sections in high-velocity asymmetric and near-symmetric collisions of 400 MeV Fe^{26+} ions J. Phys. B 16 3993-4003 1983 E $Fe^{26+} + B \rightarrow Fe^{25+}(nl) + B^+(1s^{-1}) (B = He, N, Ar)$ E: x-ray spectroscopy, T: continuum-distorted wave, strong-potential Born, impulse 7000 keV/amu x-ray (1s $\rightarrow$ np, nd)	83E56	Fussen,D. W. Claeys, A. Cornet, J. Jureta and P. Defrance Absolute total cross section measurement of ion pair production in $H(1s)-H(2s)$ collisions. J. Phys. B 15 L715 1983 E $H(1s) + H(2s) \rightarrow H^+ + H^-$
83E 8	Church,D.A. Kenefick,R.A. Burns,W.S. Holmes,C.S.O.R. Hultdt,S. Berry,S. Breinig,M. Elston,S. Rozet,J.P. Sellin,I.A. Taylor,D. Thomas,B. Charge transfer to multicharged recoil ions in a Penning trap Phys. Rev. Letters 51 1636-1639 1983 E $Ne^{q+} + Ne \rightarrow Ne^{(q-1)+}(q=2-6)$ trapping method $q \times 10^{-4}$ keV/amu rate coefficients	83E12	Gordeev,Yu.S. Dijkkamp,D. Drenjic,A.G. de Heer,F.J. Electron capture into different (n,l) states in slow collisions of C^{6+}, N^{6+}, O^{6+} and Ne^{6+} projectiles on He and H_2 targets Phys. Rev. Letters 50 1842-1845 1983 E $C^{6+}, N^{6+}, O^{6+}, Ne^{6+} + He \rightarrow C^{5+}(nl), O^{5+}(nl), Ne^{5+}(nl) + He^+; N^{6+}, O^{6+} + H_2 \rightarrow N^{5+}(nl), O^{5+}(nl) + H_2^+$ photon emission spectroscopy 0.56 - 6.25 keV/amu

- 83E13 Groh, W. Müller, A. Schlachter, A.S. Salzborn, E.
Transfer ionization in slow collisions of multiply charged ions with atoms
J. Phys. B 16 1997-2015 1983 E
 $A^{q+} + B \rightarrow A^{(q+k)+} + B^+ + (i-k)e$ ($A = \text{Ne}(q=1-7)$; $\text{Ar}(q=1-9)$; $\text{Kr}(q=1-12)$; $\text{Xe}(q=1-15)$)
coincidence
(3-5)xq keV
contribution of transfer ionization; charge fraction
- 83E14 Hall, J. Richard, P. Gray, T.J. Newcomb, J. Perniller, P. Lin, C.D. Jones, K. Johnson, B. Gregory, D.
Systematics of single and double K-shell vacancy production in titanium bombarded by heavy ions
Phys. Rev. A 28 99-110 1983 E
 $A^{Z+} + \text{Ti} \rightarrow A^{(Z+1)+}(1s) + \text{Ti}^+(1s^1)$; $A^{(Z+2)+}(1s^2) + \text{Ti}^{2+}(1s^2)$ ($A = \text{C, N, O, F, Mg, Si, S, Cl}$)
x-ray measurements
500 - 6500 keV/amu
- 83E15 Hanaki, H. Kusakabe, T. Nagai, N. Sakisaka, M.
Electron capture of He^{2+} from gas target atoms at round a few keV
J. Phys. Soc. Japan 52 424-430 1983 E
 $\text{He}^{2+} + A \rightarrow \text{He}^+ \text{He}^0$ ($A = \text{Ne, Ar, Kr, Xe, N}_2$)
growth method
0.175 - 1.125 keV/amu
recoil ion source
- 83E17 Huber, B.A.
Energy gain and loss spectroscopy of charged changing collisions between multiply charged ions and neutrals
Phys. Scripta T3 96-100 1983 E
 $A^{q+} + B \rightarrow A^{(q-1)+}$ ($A = \text{Ne, Ar, Kr, Xe}$; $B = \text{H}_2, \text{He, Ar, Xe}$; $q=2-6$)
growth, energy gain spectroscopy
0.25 keV/amu
cross section vs. crossing radius
- 83E57 Huber, B.A. Bumbel, A. Wiesemann, K.
A high-density effusive target of atomic hydrogen.
J. Phys. E 16 145 1983 E
 $\text{Kr}^{n+} + \text{H, H}_2 \rightarrow 1\text{-e capture}$; $\text{Kr}^{n+}, n=4,5,6 + \text{H} \rightarrow 1\text{-e capture}$
1-5 keV
- 83E16 Huber, B.A. Kahlert, H.J.
State-selective electron capture by $\text{Ar}^{2+}(^3P, ^1D, ^1S)$ ions in He, Ne and Kr
J. Phys. B 16 4655-4669 1983 E
 $\text{Ar}^{2+} + \text{He, Ne, Ar} \rightarrow \text{Ar}^+$
translational energy spectroscopy
0.015 keV/amu
metastable beam fraction determined through beam attenuation
- 83E54 Hug, M.S. Doverspike, L.D. Champion, R.L.
Electron detachment for collisions of H and D with hydrogen molecules.
Phys. Rev. A 27 2831-2839 1983 E
 $\text{H}^+, \text{D}^+ + \text{H}_2 \rightarrow \text{H, D}$
parallel plate technique
threshold - 0.2 keV/amu
- 83E18 Hvelplund, P. Samsoe, E. Andersen, L.H. Haugen, H.G. Knudsen, H.
Population of n,l states in electron-capture collisions between highly charged, medium-velocity ions and H_2
Physica Scripta T3 176-181 1983 E
 $\text{Au}^{q+} + \text{H}_2 \rightarrow \text{Au}^{(q-1)+}(n) + \text{H}_2^+$ ($12 \leq q \leq 18$)
photon emission spectroscopy
100 keV/amu
- 83E19 Johnsen, R.
Spectroscopic observations of the radiative charge transfer and association of helium ions with neon atoms at thermal energy
Phys. Rev. A 28 1460-1468 1983 E
 $\text{He}^+ + \text{Ne} \rightarrow \text{He} + \text{Ne}^+ + h\nu$
selected ion drift tube technique
 3×10^{-5} keV/amu
rate coefficient
- 83E20 Kahlert, H.J. Huber, B.A. Wiesemann, K.
Charge exchange and transfer ionisation in low-energy Ne^{2+} - Xe collisions
J. Phys. B 16 449-459 1983 E
 $\text{Ne}^{2+} + \text{Xe} \rightarrow \text{Ne}^+ + \text{Xe}^+$; $\text{Ne}^+ + \text{Xe}^{2+} + e$
energy-loss/-gain spectroscopy
 10^{-2} keV/amu

83E21	Kamber,E.Y. Hasted,J.B. Single electron capture by Ar^{2+} and Ar^{3+} ions impacting helium J. Phys. B 16 3025-3035 1983 E $Ar^{2+}, Ar^{3+} + He \rightarrow Ar^+, Ar^{2+}(nl) + He^+ + \Delta E$ energy loss spectroscopy 0.0135, 0.03 keV/amu energy loss spectra	83E25	Kusakabe,T. Nagai,N. Hanaki,H. Horiuchi,T. Sakisaka,M. Charge transfer cross sections for slow Ne^{2+} ions on He and H_2 J. Phys. Soc. Japan 52 4122-4128 1983 E $Ne^{q+} + B \rightarrow Ne^{q-k+} + B^{k+}$ ($q=2-5$; $B = He, H_2$; $k=1-2$) growth 0.15 - 3 keV/amu
83E22	Knudsen,H. Hvelplund,P. Andersen,L.H. Bjornelund,S. Experimental investigation of electron capture by highly charged ions of medium velocities Phys. Scripta T3 101-109 1983 E general analysis	83E27	Lennon,M. McCullough,R.W. Gilbody,H.B. State-selective electron capture by C^{2+}, C^{3+}, N^{2+} and Ar^{2+} ions in rare gases J. Phys. B 16 2191-2204 1983 E $C^{2+} + He, Ne, Ar \rightarrow C^+; N^{2+} + He, Ne \rightarrow N^+; Ar^{2+} + He, Ne \rightarrow Ar^+; C^{3+} + He \rightarrow C^{2+}$ energy-loss/-gain spectroscopy 0.13 - 5 (C^{3+}); 5.7×10^{-2} - 0.57 (N^{2+}); 3.5×10^{-3} - 0.125 (Ar^{2+}); 0.25 - 1.5 (C^{3+})
83E23	Kuen,I. Stori,H. Howorka,F. Measurement of direct and charge exchange excitation cross sections in collisions of 1 - 800 eV (laboratory frame) He^+, Ne^+, Ar^+, Kr^+ and B^+ ions and of 1 - 3600 eV He^{2+}, Ne^{2+} and Ar^{2+} ions with O_2 (wavelength region 2000 - 8000 Å) Phys. Rev. A 28 119-126 1983 E $A^+ + O_2 \rightarrow A^0$ ($A = He, Ne, Ar, Kr, B$); $A^{2+} + O_2 \rightarrow A^+$ ($A = He, Ne, Ar$) photon-spectroscopy 1.2×10^{-3} - 0.45 keV/amu (A^+); 1.2×10^{-3} - 0.9 keV/amu (A^{2+}) emission cross sections	83E28	Lindinger,W. Reactions of doubly charged ions at near thermal energies Phys. Scripta T3 115-119 1983 E $A^{2+} + B \rightarrow A^+$ ($A = He, C, O, Ne, Mg, Ar, Ca, Kr$; $B = He, Ne, Ar, Kr, Xe, Hg, H_2, N_2, O_2, NO, CO_2, SO_2, NO_2, NH_3, CH_4, C_2H_2$) swarm method thermal energy rate coefficient - crossing radius
83E24	Kusakabe,T. Hanaki,H. Nagai,N. Horiuchi,T. Konomi,I. Sakisaka,M. Charge transfer cross sections for multiply charged slow Ne, Ar, Kr and Xe ions on various gas targets I. rare gas targets Mem. Fac. Eng. Kyoto Univ. 45 35-49 1983 E Kr and Xe ions on various gas targets I. rare gas targets $A^{q+} + B \rightarrow A^{q-k+} + B^{k+}$ ($A = Ne, Ar, Kr, Xe$; $q=2-11$; $B = He, Ne, Ar, Kr, Xe$; $k=1-5$) growth 0.15 - 3 keV/amu	83E30	Matsumoto,A. Iwai,T. Kaneko,Y. Kimura,M. Kobayashi,N. Ohtani,S. Okuni,K. Takagi,S. Tawara,H. Tsurubuchi,S. Measurement of relative population between $B^{2+}(2s)$ and $B^{2+}(2p)$ in electron capture collision of B^{3+} with He J. Phys. Soc. Japan 52 3291-3293 1983 E $B^{3+} + He \rightarrow B^{2+}(2s, 2p)$ energy-gain spectroscopy 0.09 - 0.3 keV/amu relative value
83E26	Kusakabe,T. Hanaki,H. Nagai,N. Horiuchi,T. Sakisaka,M. q-dependence of electron capture cross sections for slow Kr^{q+} and Xe^{q+} ions on H_2 and He Phys. Scripta T3 191-193 1983 E $Kr^{q+}(q=2-9), Xe^{q+}(q=2-10) + H_2, He \rightarrow Kr^{q-k+}, Xe^{q-k+}$ ($k=1-2$) growth 0.29 keV/amu total cross section	83E29	Matsumoto,A. Sano,T. Twai,T. Observation of N_2^+ 3914 Å band emission in collisions of singly- and doubly-charged Ar, Kr and Xe ions with N_2 at keV energies J. Phys. Soc. Japan 52 1173-1177 1983 E $A^{q+} + N_2 \rightarrow A^{(q-1)+} + N_2^+$ ($B = 2\text{ur}^+$) ($A = Ar, Kr, Xe, q=1,2$) optical spectroscopy 0.03 - 0.2 keV/amu relative emission cross section

- 83E31 Mayo, M. Stone, J.A. Morgan, T.J.
Charge changing cross sections for 1 - 70 keV H⁺ and H⁰ in collisions with calcium and strontium metal vapors
Phys. Rev. A 28 1315-1321 1983 E
H⁺(H⁰) + Ca, Sr → H⁰, H (H⁺, H)
growth
1 - 70 keV/amu
- 83E32 McCullough, R.W. Lennon, M. Wilkie, F.G. Gilbody, H.B.
State-selective electron capture by N²⁺ ions in atomic hydrogen using collision spectroscopy
J. Phys. B 16 L173-176 1983 E
N²⁺ + H → N⁺(2s2p³) ³P⁰, ³D⁰ + H⁺
energy-loss/-gain
0.57 keV/amu
- 83E33 Mikoushkin, V.M. Ogurtsov, G.N. Flaks, I.P.
Autoionisation in quasimolecular system formed in multiply charged ion-atoms collisions
J. Phys. B 16 L405-408 1983 E
He⁺, He²⁺, Ne⁺, Ar⁺ + Xe → He, He⁺, Ne⁽ⁿ⁻¹⁾⁺, Ar⁽ⁿ⁻¹⁾⁺ + Xe²⁺ + e (n=1,2,3)
electron emission spectroscopy
1.25 - 7.5 (He⁺, He²⁺), 0.25 - 1.5 (Ne⁺), 0.125 - 0.75 (Ar⁺) keV/amu
- 83E34 Muller, A. Groh, W. Salzborn, E.
Statistical interpretation of transfer ionization in slow collisions of multiply charged ions with atoms
Phys. Rev. Letters 51 107-109 1983 E
Xeⁿ⁺ + Xe → Xe⁽ⁿ⁻¹⁾⁺ + Xe²⁺ + (k-i)e (q=3-15)
statistical model for transfer ionization and multiple-ionization
- 83E35 Neil, P.A. Angel, G.C. Dunn, K.F. Gilbody, H.B.
Charge transfer and ionization in H⁺ - C⁺ and H⁺ - N⁺ collisions
J. Phys. B 16 2185-2190 1983 E
H⁺ + C⁺, N⁺ → H⁰ + C²⁺, N²⁺
crossed beam technique
65 - 470 keV/amu
- 83E36 Ohtani, S.
Recent activities at NICE Nagoya
Phys. Scripta T3 110-114 1983 E
A^{q+} + He → A^{(q-1)+}(n) + He⁺ (A=C, N, O; q=3-8)
energy gain spectroscopy
1xq/M (keV/amu)
total cross section vs. crossing radius
- 83E37 Okuno, K. Tawara, H. Iwai, T. Kaneko, Y. Kimura, M. Kobayashi, N. Matsumoto, A. Ohtani, S. Takagi, S. Tsurubuchi, S.
Energy-spectroscopic studies of electron-capture processes by low-energy, highly stripped C, N, and O ions from He
Phys. Rev. A 28 127-134 1983 E
C⁴⁺, C³⁺, N⁵⁺, N⁶⁺, O⁶⁺ + He → (single and double) electron transfer
energy-loss/-gain spectroscopy
0.33, 0.66 (C⁴⁺); 0.41, 0.82 (C³⁺); 0.36, 0.72 (N⁵⁺); 0.43, 0.86 (N⁶⁺); 0.37, n-distribution; no cross sections
- 83E38 Panov, M.N. Basalava, A.A. Lozhkin, K.O.
Interaction of fully stripped, hydrogenlike and heliumlike C, N, O, Ne and Ar ion with H and He atoms and H₂ molecules
Phys. Scripta T3 124-130 1983 E
Ar^{q+}(q=3-7) + He → Ar^{(q-1)+}(nl) + He⁺
photon emission spectroscopy
0.6 - 8 keV/amu
- 83E39 Peart, B. Rinn, K. Dolder, K.
Measurements of cross sections for inelastic collisions between ⁴He⁺ ions
J. Phys. B 16 2831-2835 1983 E
He⁺ + He⁺ → He⁰ + He²⁺; He⁺ + He²⁺ + e
crossed beam
7 - 29 keV/amu
- 83E58 Peart, B. Rinn, K. Dolder, K.
Measurements of charge transfer and ⁴He²⁺ production in collisions between protons and ⁴He⁺ ions.
J. Phys. B 16 1461 1983 E
H⁺ + He⁺ → H + He²⁺; He²⁺
14 - 67 keV (c.m.)

- 83E41 Pedersen,E.H. Cocke,C.L. Rasmussen,J.L. Varghese,S.L. Waggoner,W.
Capture of Ar K-shell electrons by protons
J. Phys. B 16 1799-1804 1983 E
 $H^+ + Ar \rightarrow H + Ar^+(1s^{-1})$
x-ray coincidence
1500 - 10000 keV/amu
impact parameter dependence
- 83E42 Pedersen,E.H. Cocke,C.L. Stockli,M.
Experimental observation of the Thomas peak in high velocity electron capture by protons from He
Phys. Rev. Letters 50 1910-1913 1983 E
 $H^+ + He \rightarrow H^0$
2820 - 7400 keV/amu
angular distributions in Thomas peak
- 83E43 Phaneuf,R.A.
Electron capture by slow Fe^{8+} ions from hydrogen atoms and molecules
Phys. Rev. A 28 1310-1314 1983 E
 $Fe^{8+}(q=3-14) + H, H_2 \rightarrow Fe^{q-1+}$
growth
0.01 - 0.095 keV/amu
total cross sections
- 83E44 Prior,M.H. Marrus,R. Vane,C.R.
Electron capture by trapped Ne^{6+} ions at very low energies
Phys. Rev. A 26 141-150 1983 E
 $Ne^{6+}(q=1-10) + Ne, Xe \rightarrow Ne^{q-1+}$
trapping beam technique
 $5 \times 10^{-5} - 3.5 \times 10^{-3}$ keV/amu
trapped recoil ion
- 83E45 Sakisaka,M. Hanaki,H. Nagai,N. Horiuchi,T. Konomi,I. Kusakabe,T.
A statistical model for collisions of multiple electron transfer
J. Phys. Soc. Japan 52 716-717 1983 E
 $Kr^{q+}(q=2-9) + Kr \rightarrow Kr^{(q-2)+} + Kr^{1+}$ ($q=1-5$)
0.29 keV/amu
multiple electron transfer
- 83E46 Schlachter,A. Stearns,J.W. Graham,W.G. Berkner,K.H. Pyle,R.V. Tanis,J.A.
Electron capture for fast highly charged ions in gas targets; an empirical scaling rule
Phys. Rev. A 27 3372-3374 1983 E
300 - 8500 keV/amu
total cross section; scaling law
- 83E47 Schuessler,H.A. Holder,C.H. Sing,O.
Orbiting charge transfer cross sections between He^+ ions and cesium atoms at near-thermal ion-atom energies
Phys. Rev. A 28 1817-1820 1983 E
 $He^+ + Cs \rightarrow He(1s^2, 1s2s, 1s2p)$
trapped technique
 $3.9 \times 10^{-5} - 2.4 \times 10^{-4}$ keV/amu
- 83E48 Shah, M.B. Gilbody, H.B.
Crossed-beam coincidence studies of ionization and electron capture in collisions of multiply charged ions with hydrogen atoms.
J. Phys. B 16 4395 - 4403 1983 E
 $Ar^{q+} + H \rightarrow Ar^{q-1+} + H^+$ ($q = 3, 4, 5, 6$)
projectile-recoil ion coincidence
3.5 - 100 keV/amu
ionization cross sections also given for C^{3+} ($q = 2, 3, 4, 5, 6$), O^{7+} ($q = 2, 3, 4, 5, 6$), Ar^{q+} ($q = 3, 4, 5, 6, 7, 8, 9$) + H ($E = 10 - 400$ keV/amu)
- 83E49 Shields,G.C. Moran,T.F.
Single- and double-electron transfer reactions of ground and metastable state Ar^{2+} ions
J. Phys. B 16 3591-3601 1983 E
 $Ar^{2+} + B \rightarrow Ar^+, Ar^0$ ($B = O_2, N_2, CO, CO_2, CH_4, C_2H_6$)
TOF
0.1 - 0.175 keV/amu
total cross section
- 83E50 Rudd,M.E. DuBois,R.D. Toburen,L.H. Ratcliffe,C.A. Goffe,T.V.
Cross sections for ionization of gases by 5 - 4000 keV protons and for electron capture by 5 - 150 keV protons
Phys. Rev. A 28 3244-3257 1983 E
 $H^+ + B \rightarrow H^0$ ($B = He, Ne, Ar, Kr, H_2, N_2, CO, O_2, CH_4, CO_2$)
condenser plate method
5 - 150 keV/amu

83E49	Stevens, J. Petersen, R.S. Pollack, E. Electron capture in small-angle $\text{Ar}^{2+} + \text{Ar}$ collisions Phys. Rev. A 27 2396-2402 1983 E $\text{Ar}^{2+} + \text{Ar} \rightarrow \text{Ar}^+ (2p) + \text{Ar}^+(3s^2 3p^4 \text{nl})$ energy loss/gain spectroscopy 0.0725 keV/amu scattering angle 0-1; relative cross section	83E52	Winter, H. Empirical state-selection rules for electron capture in low energy-ion-atom collisions Phys. Scripta T3 159-162 1983 E $\text{Ne}^+, \text{Ne}^{2+}, \text{O}^+ + \text{Li} \rightarrow \text{Ne}(\text{nl}), \text{Ne}^+(\text{nl}), \text{O}(\text{nl}) + \text{Li}^+$ energy-loss/gain spectroscopy 7 - 25 keV/amu
83E59	Takagi, S. Ohtani, S. Kadota, K. Fujita, J. Collision experiment on highly ionized ions using vacuum spark source. Nucl. Instr. Meth. 213 539 1983 E $\text{Fe}^{4+} + \text{H}_2, \text{Ar} \rightarrow \text{Fe}^{3+}$ 2.5-10 keV	83E53	Yan, P.G. van der Woude, R. Dijkkamp, D. de Heer, F.J. Electron capture into excited states in collisions between multiply charged ions and atoms Phys. Scripta T3 120-123 1983 E $\text{He}^{2+}, \text{C}^{3+}, \text{O}^{4+}(q=1,2,3) + \text{Li} \rightarrow \text{He}^+, \text{C}^{q-1+}, \text{O}^{q-1+}(\text{nl}) ; \text{C}^{3+}, \text{O}^{4+} + \text{H}_2 \rightarrow \text{C}^{q-1+}, \text{O}^{q-}(\text{nl})$ photon emission spectroscopy 1 - 37.5 keV/amu
83E60	Takagi, S. Ohtani, S. Kadota, K. J. Fujita, J. Cross sections for one-electron capture by highly stripped ions of Be, B and C from H_2 and Ar below 10 keV. J. Phys. Soc. Japan 52 3759 1983 E $\text{Be}^{3+,4+,5+}, \text{B}^{3+,4+} + \text{H}_2, \text{Ar} \rightarrow 1\text{-e capture}$ $\text{C}^{3+,4+,5+} + \text{Ar} \rightarrow 1\text{-e capture}$ 2-10 keV	83T 1	Allan, R.J. Dickinson, A.S. McCarroll, R. Molecular treatment of charge exchange in $\text{H}^+ + \text{Li}$ collisions J. Phys. B 16 467-480 1983 T $\text{H}^+ + \text{Li} \rightarrow \text{H} (n=2)$ PSS 0.03 - 15 keV/amu
83E50	Terasawa, M. Gray, T.J. Hagmann, S. Hall, J. Newcomb, J. Peppmiller, P. Richard, P. Electron capture by and electron excitation of two-electron fluorine ions incident on helium Phys. Rev. A 27 2868-2875 1983 E $\text{F}^{7+}(1s2s^3S) + \text{He} \rightarrow \text{F}^{6+}(1s2s2p^4P)$ x-ray spectroscopy 315 - 2100 keV/amu total cross section	83T37	Alston, S. Theory of electron capture from a hydrogen-like ion by a bare ion; intermediate-state contributions to the amplitude Phys. Rev. A 27 2342-2357 1983 T $\text{H}^+ + \text{B} \rightarrow \text{H} + \text{B}^+ (\text{B} = \text{C, Ne, Ar})$ strong potential Born approximation 100 - 20000 keV/amu
83E51	Winter, H. Comments on "radiative decay of lithium-like ions following exchange collisions of 3 keV/amu C^{3+} with H_2 " J. Phys. B 16 L521-523 1983 E $\text{C}^{4+} + \text{H}_2 \rightarrow \text{C}^{3+}(\text{nl})$ VUV photon spectroscopy 3 keV/amu	83T 2	Barany, A. Brandas, E. Elander, N. Rittby, M. Resonances in low energy charge transfer between multiply charged ions and neutral atoms described with dilated Titchmarsh-Weyl theory Phys. Scripta T3 233-235 1983 T Titchmarsh-Weyl theory quasi-molecule with polarization force; no cross sections given

83T 3	Bienstock, S. Heil, T.G. Dalgarno, A. Charge transfer of O^{3+} ions in collisions with atomic hydrogen Phys. Rev. A 27 2741-2743 1983 T $O^{3+} + H \rightarrow O^{2+} + H^+$ CC (MO) 0.000006 - 0.312 keV/amu	83T 6	Devi, K.R.S. Garcia, J.D. $He^{2+} + He$ collisions in time-dependent Hartree-Fock theory J. Phys. B 16 2837-2847 1983 T $He^{2+} + He(1s^2) \rightarrow He^+, He^0$ time-dependent Hartree-Fock theory 7.5 - 37.5 keV/amu
83T38	Borondo, F. Macias, A. Riera, A. Asymmetry effect in $H^+ + H^+$ neutralization application to the $n=3$ pseudo crossing Chem. Phys. Letters 100 63 1983 T $H^+ + H^+ \rightarrow H + H(n=2, 3)$ MO with pseudo-crossing 0.05 - 5 keV/amu	83T 7	Dickinson, A.S. McCarroll, R. Adiabatic switching factors in slow atomic collisions J. Phys. B 16 459-466 1983 T $H^+ + Li$ MO with adiabatic switching factors transition probabilities only
83T39	Brandt, D. Resonant transfer and excitation in ion-atom collisions Phys. Rev. A 27 1314-1318 1983 T $Si^{11+} + He \rightarrow Si^{10+}; S^{10+} + He, Ar \rightarrow S^{12+}$ 1A	83T43	Duman, E.L. Tishchenko, N.P. Shmatov, I.P. Theory of charge-exchange transitions to excited states in ion-atom collisions. Sov. Phys.- Dokl. 28 641 - 643 1983 T $He^+(1s) + Rb \rightarrow He(1s^2) + Rb^{*+}(5p)$ Landau-Zener model rate coefficients at thermal energies
83T 4	Bransden, B.H. Noble, C.J. Chandler, J. Theoretical studies of the interaction of He^{2+} with $H(1s)$ and H^+ with He J. Phys. B 16 4191-4201 1983 T $He^{2+} + H \rightarrow He^+(nl) + H^+$; $He^+(1s) + H^+ \rightarrow He^{2+} + H \rightarrow He^{2+} + H^+$ (2s, 2p) CC (AO) 3.7 - 230 keV/amu	83T 8	Errea, L.F. Mendez, L. Riera, A. Excitation and charge transfer in $He^+ + H$ collisions. A molecular approach including two electron transition factors Phys. Rev. A 27 3357-3360 1983 T $He^+ + H \rightarrow He^0$ common-translation-factor method 2.5, 6.5 keV/amu
83T 5	Crothers, D.S.F. Refined orthogonal variation-perturbation continuum-distorted-wave treatment of $B^{3+} + H(1s) \rightarrow B^{(2,3)}(nl) + H^+$ at intermediate velocity for $n, Z \gg 1$ Phys. Scripta T3 236-240 1983 T $A^{2+} + H(1s) \rightarrow A^{(n-1)}(n) + H^+$ ($A = 12-18, n = 9-16$) orthogonal variation-perturbation CDW 100 keV/amu n-dependence	83T47	Falcon, C.A. Charge exchange in low-energy $^3He^+ - ^4He^{2+}$ collisions J. Phys. B 16 1793 1983 T $^3He^+ + ^4He^{2+} \rightarrow ^3He^{2+} + ^4He^+$ 20 - 100 eV (c.m.) ; PSS

83T11	Fritsch, W. Lin, C.D. Atomic orbital expansion study of electron capture in $H^+ + Li$ and $He^{2+} + Li$ collisions J. Phys. B 16 1595-1603 1983 T $He^{2+} + Li \rightarrow He^{+}(nl) + Li^+$ CC (40-AO) 0.5 - 20 (H^+), 0.1 - 2.0 (He^{2+}) keV/amu	83T15	Harel, C. Salin, A. Application of OEDM orbitals to many electron systems; $He - H$ collisions J. Phys. B 16 55-70 1983 T $He^+ + H(1s) \rightarrow He(1s^2, 1s2p)$ OEDM 0.19 - 7.5 keV/amu total cross sections included
83T 9	Fritsch, W. Lin, C.D. Coupled-state calculations for excitation, charge transfer and ionization in 1 - 75 keV proton-hydrogen atom collisions Phys. Rev. A 27 3361-3364 1983 T $H^+ + H \rightarrow H(2s, 2p)$ TSAE 1 - 75 keV/amu	83T16	Heil, T.G. Butler, S.E. Dalgarno, A. Charge transfer of doubly charged and triply charged ions with atomic hydrogen at thermal energies Phys. Rev. A 27 2365-2383 1983 T $A^{2+}, A^{3+} + H \rightarrow A^+, A^{2+}$ ($A = C, N, O, Ne$) MO $10^{-2} - 10^{-4}$ keV/amu
83T12	Goritz, M. Briggs, J.S. Alston, S. Strong potential Born theory of radiative electron capture J. Phys. B 16 L665-670 1983 T $Ne^{10+} + H \rightarrow Ne^{9+} + H^+ + hv$ strong potential Born approximation 5625 keV/amu	83T18	Janev, R.K. Excited states created in charge transfer collisions between atoms and highly charged ions Phys. Scripta T3 208-221 1983 T $A^{2+} + H \rightarrow A^{q-1}(n,l) + H^+$ ($A = He, Li, Be, C, N, F, Ne, Na, Mg, Al, Si, S, Ar, Ca, Cr, Ni, Sr$) Landau-Zener model with rotational transitions 1 - 100 keV/amu review; general scaling for n and l distribution
83T13	Grun, N. Scheid, W. Calculation of the impact parameter dependence of the charge exchange for $Li^{3+} + H$ at 10.5 keV by the finite difference method J. Phys. B 16 L425-428 1983 T $Li^{3+} + H \rightarrow Li^{2+}$ finite difference method 1.5 keV/amu P(l) dependent on magnetic substates ($m=0, 1, 2$)	83T19	Janev, R.K. Belic, D.S. Electron capture into excited states in $H + Ar^{18+}, Kr^{36+}$ and Xe^{54+} charge transfer collisions Physica Scripta T3 246-248 1983 T $Ar^{18+}, Kr^{36+}, Xe^{54+} + H \rightarrow Ar^{17+}(n), Kr^{35+}(n), Xe^{53+}(n) + H^+$ MLZ $10^{-2} - 10^2$ keV/amu
83T14	Hardie, D.J.W. Olson, R.E. Charge transfer and ionization processes involving multiply charged ions in collision with atomic hydrogen J. Phys. B 16 1983-1996 1983 T $X^{q+} + H \rightarrow X^{q-1}(n) + H^+$; $X^{q+} + H^+ + e^-$ ($X^{q+} = H^+, He^{2+}, C^{6+}, O^{8+}$) CTMC 25, 50, 100 keV/amu total ($E=25-200$ keV/amu) ; partial ($E=25-50$ keV/amu)	83T17	Janev, R.K. Belic, D.S. Bransden, B.H. Total and partial cross sections for electron capture in collisions of hydrogen atoms with fully stripped ions Phys. Rev. A 28 1293-1302 1983 T $A^{2+} + H \rightarrow A^{q-1}(n) + H^+$ ($z = 5-54, A^{2+}$ fully stripped ion) 0.03 - 80 keV/amu Multichannel Landau-Zener theory with rotational coupling included.

83T20	Kazanskii, A.K. Komarov, I.V. Charge exchange of C^{6+} and O^{8+} ions with hydrogen atoms; strong coupling calculation Sov. J.-Tech. Phys. 27 1064-1067 1983 T $C^{6+}, O^{8+} + H \rightarrow C^{5+}, O^{7+}$ strong coupling 0.25 - 4.0 keV/amu total cross section	83T24	Ludde, H.J. Dreizler, R.M. Method for the calculation of global probabilities for many electron systems J. Phys. B 16 3971-3981 1983 T $He^{2+} + He \rightarrow He^+, He^0$ IP
83T22	Kimura, M. Sato, H. Olson, R.E. Molecular treatment of charge transfer in Li^+ + Ca collisions Phys. Rev. A 28 2085-2090 1983 T $Li^+ + Ca \rightarrow Li(2s, 2p) + Ca^+$ PSS with ETF 0.1 - 20 keV/amu	83T25	Macias, A. Riera, A. Yanez, M. Excitation and charge transfer in $He^+ + H$ collisions. A study of the origin dependence of calculated cross sections Phys. Rev. A 27 213-219 1983 T $He^+(1s) + H(1s) \rightarrow He(1s2p \ ^13P)$ Impact parameter formalism 0.125 - 7.5 keV/amu
83T21	Kimura, M. Thorson, W.R. Molecular-state studies of charge transfer in $Li^{3+} - H, Be^{4+} - H$ and $B^{3+} - H$ collisions J. Phys. B 16 1471-1480 1983 T $Li^{3+}, Be^{4+}, B^{3+} + H \rightarrow Li^{2+}, Be^{3+}, B^{4+}$ MO switching function 1 - 15 keV/amu total cross section	83T26	McCarroll, R. Valiron, P. Charge exchange of highly charged ions at low energy Phys. Scripta T3 226-232 1983 T $C^{4+} + H \rightarrow C^{3+}(nl) + H^+$; $N^{3+} + H \rightarrow N^{2+}(nl) + H^+$ CC (MO) $8 \times 10^{-7} - 4 \times 10^{-2} (C^{4+})$; $7 \times 10^{-7} - 3.5 \times 10^{-2} (N^{3+})$ keV/amu
83T46	Kohring, G.A. Wetmore, A.E. Olson, R.E. Ion scattering from state-selected Rydberg atoms Phys. Rev. A 28 2526 - 2528 1983 T $H^+ + H(n=10, l=9; ml=0,9) \rightarrow H + H^+$ CTMC 0.25 - 25 keV/amu charge transfer; sensitive to ml ionization; insensitive to ml	83T27	McGuire, J.H. Eichler, J. Simony, P.R. Exact second Born calculations for electron capture for systems with various projectile and target charges Phys. Rev. A 28 2104-2112 1983 T $H^+ + H, Be, C, O, Ne \rightarrow H^0$; $He^{2+} + He \rightarrow He^+$; $Be^{4+} + Be \rightarrow Be^{3+}$; $C^{5+} + C \rightarrow C^{5+}$; $O^{8+} + O \rightarrow O^{7+}$; $Ne^{10+} + Ne \rightarrow Ne^{9+}$ second Born approximation 10000 - 200000 keV/amu angular distribution
83T23	Ludde, H.J. Dreizler, R.M. Direct and capture processes in proton-hydrogen scattering III. differential cross sections and charge exchange probabilities J. Phys. B 16 1009-1015 1983 T $H^+ + H \rightarrow H^0(1s, 2l)$ time-dependent Schrodinger equation 1 - 2 keV/amu	83E48	Miraglia, J.E. Ion-atom single ionization at high and intermediate energies J. Phys. B 16 1029 1983 T $H^+ + He^+ \rightarrow H^+ + He^{2+} + e$ 30 - 300 keV; MCDW, MSA

- 83T28 Opradlee, L., Valiron, P., McCarroll, R.
Single charge exchange in Ar^{6+} - He collisions
J. Phys. B 16 2017-2028 1983 T
 $\text{Ar}^{6+} + \text{He} \rightarrow \text{Ar}^{5+}(3s^2nl) + \text{He}^+$
MO close-coupling (model potential)
0.12 - 1.2656 (4 states) ; 0.025 - 1.2656 (6 states) keV/amu
- 83T44 Ostrovskii, V.N.
Charge exchange involving ion excitation.
Sov. Phys.-JETP 57 766-769 1983 T
 $\text{He}^+ + \text{Hg}(6s^2) \rightarrow \text{He} + \text{Hg}^{*}(7p)$
asymptotic theory
- 83T45 Ostrovskii, V.N., Tolmachev, Yu.A.
Calculation of cross sections for charge-exchange with ion excitation.
Opt. Spectrosc. (USSR) 55 646-647 1983 T
 $\text{He}^+ + \text{Hg}(6s^2) \rightarrow \text{He}(2s^2) + \text{Hg}^{*}(7p \ ^2P_{3/2})$
asymptotic theory
rate coefficients at thermal energies
- 83T29 Presnyakov, L.P., Uskov, D.B., Janev, R.K.
Charge exchange in slow collisions of multiply charged ions with atoms
Soviet J.-JETP 56 525-531 1983 T
 $\text{A}^{q+} + \text{H}_2 \rightarrow \text{A}^{(q-1)+} + \text{H}_2 \ (\text{A} = \text{C}^{6+}, \text{N}^{7+}, \text{O}^{8+}, \text{Ne}^{10+}, \text{Ar}^{18+}) ; \text{C}^{6+} + \text{H} \rightarrow \text{C}^{5+}$
decay model
0.1 - 20 keV/amu
- 83T30 Salin, A.
Comments on adiabatic switching factors in slow atomic collisions
J. Phys. B 16 L661-664 1983 T
- 83T40 Sato, H., Kimura, M.
Molecular state calculations of charge transfer in $\text{H}^+ + \text{Li}$ and $\text{He}^{2+} + \text{Li}$ collisions.
Phys. Letters 96A 286-289 1983 T
 $\text{H}^+, \text{He}^{2+} + \text{Li} \rightarrow \text{H}, \text{He}^+(\text{total})$
MO
0.1 - 20 keV/amu
- 83T31 Sato, H., Kimura, M., Wetmore, A.E., Olson, R.E.
Electron capture cross sections for TiH^{4+}
J. Phys. B 16 3037-3044 1983 T
 $\text{Ti}^{4+} + \text{H} \rightarrow \text{Ti}^{3+}(nl) + \text{H}^+ ; \text{Ti}^{3+} + \text{H}^+ \rightarrow \text{Ti}^{4+} + \text{H}(nl)$
Impact parameter PSS (MO) with ETF
0.1 - 10 keV/amu
- 83T32 Shields, G.A., Dalgarno, A., Sternberg, A.
Line emission from charge transfer with atomic hydrogen at thermal energies
Phys. Rev. A 28 2137-2140 1983 T
 $\text{O}^{3+}(2p) + \text{H} \rightarrow \text{O}^{2+}(2p3p, \ ^1P, \ ^3D_1)$
modeling
 6.25×10^{-5} keV/amu
evaluation from astrophysical data
- 83T33 Shipsey, E.J., Green, T.A., Brown, J.C.
Modified method of perturbed stationary states. V. Electron-capture cross sections for the reaction $\text{O}^{8+} + \text{H}(1s) \rightarrow \text{O}^{7+}(n, l) + \text{H}^+$
Phys. Rev. A 27 821-832 1983 T
 $\text{O}^{8+} + \text{H} \rightarrow \text{O}^{7+}(nl) + \text{H}^+ \ (n=4, 5, 6, 7, l=0 - n-1)$
close coupling ; PSS (MO) with variationally optimized ETF
 $13 \times 10^{-3} - 34$ keV/amu
- 83T36 Sidis, V., Kubach, C., Fussen, D.
Ionic-covalent problem in the $\text{H}^+ + \text{H} \leftrightarrow \text{H}^+ + \text{H}$ collisional system
Phys. Rev. A 27 2431-2446 1983 T
 $\text{H}^+ + \text{H} \rightarrow \text{H}^{(n)} + \text{H} \ (n \leq 4) ; \text{H}^+ + \text{He} \rightarrow \text{H}(n) + \text{He}^+ \ (n \leq 5)$
MO model
0.02 - 10 keV/amu
- 83T34 Tan, C.K., Lee, A.R.
Electron capture into excited states of hydrogen
J. Phys. B 16 1445-1459 1983 T
 $\text{H}^+ + \text{H} \rightarrow \text{H}(n) + \text{H}^+ \ (n \leq 4) ; \text{H}^+ + \text{He} \rightarrow \text{H}(n) + \text{He}^+ \ (n \leq 5)$

- 83T35 Taulbjerg, K. Briggs J.S.
Multiple scattering theory of electron capture in intermediate-to high-velocity collisions
J. Phys. B 16 3811-3824 1983 T
CDW method
formulation only
- 83T41 Wang, T.S. Delos, J.B.
Electron detachment for H(D) in collisions with Ne.
J. Chem. Phys. 79 4306 - 4309 1983 T
H, D + Ne -> H(D)
- 83T42 Yoshida, J. O-Ohata, K.
Charge transfer reaction of $O^{3+} + H \rightarrow O^{2+} + H^+$ in low energy collision.
J. Phys. Soc. Japan 52 417 - 423 1983 T
 $O^{3+} + H \rightarrow O^{2+} + H^+$
PSS
2 - 240 keV/amu
- 84E 1 Andersen, L.H. Frost, M. Hvelplund, P. Knudsen, H. Datz, S.
Correlated two-electron effects in highly charged ion-atom collisions: transfer ionization and transfer excitation in 20-MeV $Au^{13+} + He$ collisions
Phys. Rev. Letters 52 518-521 1984 E
 $Au^{13+} + He \rightarrow Au^{14+} + He^+$; $Au^{13+} + He^{2+}$
Electron emission spectroscopy coincidence with final projectile charge state
3939.0 keV/amu
- 84E52 Andersen, N. Andersen, T. Jepsen, L. Maccek, J.
Electron detachment processes in keV H, Li, Na, K - rare gas collisions.
J. Phys. B 17 2281-2294 1984 E
 $A + He, Ne, Ar \rightarrow A^+, A^+ (A = H, Li, Na, K)$
growth
0.36 - 100 keV/amu
total detachment cross section
- 84E 2 Anholt, R. Andriamonje, S.A. Morenzoni, E. Stoller, Ch. Molitoris, J.D. Meyerhof, W.E. Borman, H. Xu, J.S. Xu, Z.Z. Rasmussen, J.O. Hoffmann, D.H.
Observation of radiative capture in relativistic heavy ion-atom collisions
Phys. Rev. Letters 53 234-237 1984 E
 $A^{q+} + B \rightarrow A^{(q-1)+} + hv + B^+$ ($q = z, z-1$; $A = Xe, La, U$; $B = Be-Ta$)
x-ray spectroscopy
 10^4 keV/amu
REC cross sections; angular distribution
- 84E 3 Astrer, G. Barany, A. Cederquist, H. Danared, H. Hultdt, S. Hvelplund, P. Johnson, A. Knudsen, H. Liljeby, L. Renfelt, K.G.
Absolute cross sections for multifelectron processes in low-energy $Ar^{q+} - Ar$ collisions as measured with a new technique
J. Phys. B 17 L877-883 1984 E
 $Ar^{q+} + Ar \rightarrow Ar^{q+} + Ar^{2+} + (r+s-q)e$
TOF
0.45xq keV/amu
recoil ions
- 84E 4 Aumayr, F. Fehringer, M. Winter, H.
Inelastic $H^+ - Li(2s)$ collisions (2-20 keV); II. electron capture into H(2p) and H(3l) subshells
J. Phys. B 17 4201-4211 1984 E
 $H^+ + Li(2s) \rightarrow H(2p), H(3s, 3p, 3d)$
photon spectroscopy
2 - 20 keV/amu
- 84E 6 Bahring, A. Hertel, J.V. Meyer, E. Schmidt, H.
Polarization dependence of resonant charge transfer in low energy collisions of Na^+ with laser-excited $Na^*(3p)$
Phys. Rev. Letters 53 1433-1436 1984 E
 $Na^+ + Na^*(3s, 3p) \rightarrow Na(3s, 3p) + Na^+$
E; photon spectroscopy; T: MO modal calculation
0.045 - 0.075 keV/amu
polarization measured
- 84E 5 Baptist, R. Bonnet, J.J. Chauvet, G. Desclaux, J.P. Dousson, S. Hitz, D.
Polarisation of light emitted after charge transfer from H_2 to C^{4+} ions
J. Phys. B 17 L417-421 1984 E
 $C^{4+} + H_2 \rightarrow C^{3+}(3lm) + H_2^+$
photon emission spectroscopy
0.3 - 3 keV/amu

- 84E7
Berkowitz, K. Zorn, J.C.
Charge transfer into the metastable 2s level of hydrogen by protons colliding with K and Na
Phys. Rev. A 29 611-616 1984 E
 $H^+ + K, Na \rightarrow H(2s)$
growth
0.5 - 2.5 keV/amu
- 84E8
Boellaard, A.
Electron capture into He^{2+} - Li collisions at 0.55 - 10.0 keV
POM Institute for Atomic and Molecular Physics Report No. 58.2 1984 E
 $He^{2+} - Li \rightarrow He^+(nl)$
photon spectroscopy
0.138 - 2.5 keV/amu
- 84E10
Bordenave-Montesquieu, A. Benoit-Cattin, P. Gleizes, A. Marrakchi, A.I. Dousson, S. Hitz, D.
Two-electron capture into autoionising configurations $N^{n+}(1snl'n'l')$ with $n=2,3,4$ and $n \geq n$ electron spectroscopy in collisions of $N^{n+}(1s)$ with He and H_2 at 4.2 keV/amu¹
J. Phys. B 17 L223-227 1984 E
 $N^{6+} + He, H_2 \rightarrow N^{4+}(1snl'n'l') + He^{2+}, H_2^{2+}$ ($n=2,3,4$; $n \geq n$)
electron emission spectroscopy
4.2 keV/amu
- 84E9
Bordenave-Montesquieu, A. Benoit-Cattin, P. Gleizes, A. Marrakchi, A.I. Dousson, S. Hitz, D.
Autoionisation of $N^{n+}(nl'n'l')$ with $n=2,3,4$ and $n' \geq n$ measured by electron spectroscopy in collisions of N^{n+} with He and H_2 at 4.9 keV/amu¹
J. Phys. B 17 L127-131 1984 E
 $N^{7+} + He, H_2 \rightarrow N^{3+}(nl'n'l') + He^{4+}, H_2^{4+}$ ($n=2,3,4$; $n' \geq n$)
electron emission spectroscopy
4.9 keV/amu
- 84E12
Brazuk, A. Dijkkamp, D. Drenjic, A.G. de Heer, F.J. Winter, H.
Measurement of metastable fractions in multiply charged ion beams by ion excitation in core-conserving electron capture
J. Phys. B 17 2489-2505 1984 E
 $C^{2+}, N^{3+}, O^{4+} + Li \rightarrow C^+, N^{2+}, O^{3+}, N^+ + Li^+$
photon emission spectroscopy
1.665 (C^{2+}), 1.43 (N^{3+}), 1.25 (O^{4+}), 1.43 (N^{2+}) keV/amu
- 84E11
Brazuk, A. Winter, H. Dijkkamp, D. Boellaard, A. de Heer, F.J. Drenjic, A.G.
Absolute emission cross sections for detection of plasma impurity ions with active neutral lithium beam diagnostics
Phys. Lett. 101A 139-141 1984 E
 $C^{n+}, O^{n+} + Li \rightarrow C^{(q-1)+}, O^{(q-1)+} + Li^+$ ($q = 3, 4, 5, 6$; $q' = 4, 5, 6, 7$)
photon emission spectroscopy
1.66, 2.5 ($C^{n+} + Li$); 1.25, 1.88 ($O^{n+} + Li$) keV/amu
- 84E50
de Bruijn, D.P. Neuteboom, J. Sidis, V. Los, J.
A detailed experimental study of the dissociative charge exchange of H_2^+ with Ar, Mg, Na and Cs targets at keV energies
Chem. Phys. 85 215-231 1984 E
 $H_2^+ + B \rightarrow H_2^+ (B = Ar, Mg, Na, Cs)$
growth
0.75 - 3.75 keV/amu
- 84E13
Dijkkamp, D. Brazuk, A. Drenjic, A.G. de Heer, F.J. Winter, H.
Single-electron capture into $C^{3+}(n,l)$ subshells in $C^{4+} - Li$ collisions (20-80 keV)
J. Phys. B 17 4371-4385 1984 E
 $C^{4+} + Li \rightarrow C^{3+}(nl) + Li^+$ ($n \leq 7$)
photon emission spectroscopy
0.8 - 6.7 keV/amu
- 84E14
Dmitriev, I.S. Vorobev, N.F. Konovalova, Zh.M. Nikolaev, V.S. Novozhilova, V.N. Taplova, Ya.A. Fainberg, Yu.A.
Loss and capture of electrons by fast ions and atoms of helium in various media
Sov. Phys. -JETP 57 1157-1164 1984 E
 $He^{2+}, He^+ + B \rightarrow He^+, He^0$; He^0 ($B = He, Ne, N_2, Sr$)
E; growth; T: modified OBK
331 - 2070 keV/amu
- 84E15
DuBois, R.D.
Electron production in collisions between light ions and rare gases; The importance of the charge transfer and direct ionization channels
Phys. Rev. Letters 52 2348-2351 1984 E
 $H^+, He^+ + B \rightarrow H^0, He^0 + B^+$ ($B = Ne, Ar, Kr$)
coincidence between H^0, He^0 and B^{n+} ions
15 - 100 (H); 4 - 25 (He) keV/amu

- 84E16 DuBois, R.D., Giese, J.P., Cocke, C.L.
Contribution of electron capture to 2p-vacancy production in p-Mg collisions
Phys. Rev. A 29 1079-1082 1984 E
 $H^+ + Mg(2p) \rightarrow H^0 + Mg(2p^1) ; H + Mg(2p^1)$
growth
25 - 80 keV/amu
- 84E53 Friedrich, B., Herman, Z.
Dynamics of low energy charge transfer processes : $Ar^{2+} + He \rightarrow Ar^+ + He^+$ at eV collision energies.
Chem. Phys. Letters 107 375-380 1984 E
 $Ar^{2+}(^3P, ^1D) + He \rightarrow Ar^+$
crossed beam technique
 $1.25 \times 10^{-5} - 4 \times 10^{-3}$ keV/amu
relative cross sections only, different angular distributions for 3P and 1D states
- 84E17 Gould, H., Greiner, D., Lindstrom, P., Symons, T.J.M., Crawford, H.
Electron capture by U^{91+} and U^{92+} and ionization of U^{90+} and U^{91+}
Phys. Rev. Letters 52 180-183 1984 E
 $U^{91+}, U^{92+} + B \rightarrow U^{90+}, U^{91+}$ ($B = C, Cu, Ta$)
growth method
 $4 \times 10^3 - 9.6 \times 10^5$ keV/amu
- 84E18 Graham, W.G., Berkner, K.H., Pyle, R.V., Schlachter, A.S., Stearns, J.W., Tanis, J.A.
Charge transfer cross sections for multiply charged ions colliding with gaseous targets at energies from 310 keV/amu to 8.5 MeV/amu
Phys. Rev. A 30 722-728 1984 E
 $A^{q+} + B \rightarrow A^{(q-1)+}, A^{(q-2)+}, A^{(q-1)+}$ ($A = C, Ar, Fe, Nb, Pb ; q = 6-59 ; B = H_2, He, N_2, Ne, Ar, Xe$)
growth
310 - 8500 keV/amu
total cross section
- 84E30 Hanaki, H., Kusakabe, T., Horiuchi, T., Konomi, I., Nagai, N., Yamaguchi, T., Sakisaka, M.
Charge transfer cross sections for multiply charged slow Ne, Ar, Kr and Xe ions on various gas targets II. molecular gas targets
Mem. Fac. Eng. Kyoto Univ. 46 1-17 1984 E
 $A^{q+} + B \rightarrow A^{(q-k)+} + B^{k+}$ ($A = Ne, Ar, Kr, Xe ; q = 2-11 ; B = H_2, N_2, CO_2, CH_4, C_2H_6, C_3H_8 ; k = 1-5$)
growth
0.15 - 3 keV/amu
- 84E54 Havener, C.C., Rouze, N., Westerveld, W.B., Risley, J.S.
Experimental determination of the current density of the $H(n=3)$ state produced in electron-transfer collisions of H^+ on He.
Phys. Rev. Letters 53 1049-1052 1984 E
 $H^+ - He \rightarrow H(n=3)$
Balmer-alpha line as a function of transverse electric field
40 - 80 keV/amu
current distribution of $H(n=3)$
- 84E19 Heckman, V., Martin, S.J., Jakacky, J., Pollack, E.
Electron capture in $H^+ + H_2$
Phys. Rev. A 30 2261-2263 1984 E
 $H^+ + H_2 \rightarrow H(1s) + H_2^+(^2\Sigma_g^+)$
TOF method
1 - 3 keV/amu
probability as a function of scattered angle
- 84E20 Howald, A.M., Miers, R.E., Allen, J.S., Anderson, L.W., Lin, C.C.
Charge-changing cross sections for 1 - 25 keV $H(1s)$ incident on a Na-vapor target
Phys. Rev. A 29 1083-1087 1984 E
 $H(1s) + Na \rightarrow H^+, H$
growth
1 - 25 keV/amu
total cross section
- 84E21 Huber, B.A., Kahlert, H.J.
On the importance of metastable $Ne^{2+}(^1D_2)$ ions in charge-changing $Ne^{2+} - Xe$ collisions
J. Phys. B 17 L69-74 1984 E
 $Ne^{2+} + Xe \rightarrow Ne^+ + Xe^+ ; Ne^+ + Xe^{2+} + e$
energy-loss/-gain spectroscopy
 $2 \times 10^{-2}, 5 \times 10^{-2}$ keV/amu
- 84E22 Huber, B.A., Kahlert, H.J., Wiesemann, K.
Study of electron capture reactions by means of double translational spectroscopy
J. Phys. B 17 2883-2895 1984 E
 $Ar^{2+}, Ar^{3+} + Ar \rightarrow Ar^{2+*} + Ar^+$
double translational spectroscopy
0.015 keV/amu

84E23	Iwai, T., Kaneko, Y., Kimura, M., Kobayashi, N., Matsumoto, A., Ohtani, S., Okuno, K., Takagi, S., Tawara, H., Tsurubuchi, S. The dependence on Q of cross sections for one-electron capture by S^{1+} , S^{1+} and K^{2+} ($q=7-25$) ions from He J. Phys. B 17 195-99 1984 E S^{1+} , S^{1+} , K^{2+} ($q=7-25$) + He $\rightarrow$ S^{10+} , S^{12+} , K^{2+} ($q=11+$) + He $^{+}$ + ΔE translational energy spectroscopy 1xq keV total cross sections vs. crossing radius	84E27	Kamber, E. Y., Hasted, J. B. Energy loss spectra for single electron capture in Ar^{2+} - He collisions Vacuum 34 63-65 1984 E Ar^{3+} - He $\rightarrow$ Ar^{2+} + H^{+} + ΔE energy loss spectroscopy 0.03 keV/amu no cross section
84E24	Jolly, A., Wöhler, K., Chetoui, A., Rozet, J. P., Stephan, C., Dubé, L. J. Total charge transfer cross sections for 400 MeV bare Fe^{26+} ions colliding with He, N_2 , Ne and Ar targets J. Phys. B 17 235-242 1984 E Fe^{26+} + He, N_2 , Ne, Ar $\rightarrow$ Fe^{2+} Lyman x-rays 7140 keV/amu total cross section	84E28	Kase, M., Kikuchi, A., Yagishita, A., Nakai, Y. Single- and double-electron capture cross sections for Ne^{+} in He, Ne and Ar J. Phys. B 17 671-677 1984 E Ne^{2+} + He, Ne, Ar $\rightarrow$ Ne^{+} , Ne^0 growth 25 - 150 keV/amu total cross section
84E25	Justiniano, E., Cocke, C. L., Gray, T. J., DuBois, R. Can, C., Waggoner, W., Schuch, R., Schmidt-Bocking, H., Ingwersen, H. Total cross sections for electron capture and transfer ionization by highly stripped, slow Ne, Ar, Kr and Xe projectiles on helium Phys. Rev. A 29 1088-1095 1984 E Ne^{6+} , Ar^{6+} , Kr^{6+} , Xe^{6+} + He $\rightarrow$ $Ne^{(q+1)+}$, $Ar^{(q+1)+}$, $Kr^{(q+1)+}$, $Xe^{(q+1)+}$ ($i=1-2$) (0.25 - 1.0)xq keV recoil ion sources ; total cross sections	84E29	Katayama, I., Berg, G. P. A., Hulimann, W., Martin, S. A., Meissburger, I., Adelert, W., Rogge, M., Romer, J. G. M., Rain, J. L., Zemlo, L., Gaul, G. High energy electron capture and stripping in gas targets J. Phys. B 17 L23-28 1984 E $^3He^{2+}$ + N_2 , Ne, Ar $\rightarrow$ He attenuation method $2 \times 10^4 - 4 \times 10^4$ keV/amu
84E26	Kamber, E. Y., Brenton, A. G., Beynon, J. H. Single electron capture collisions of ground and metastable N^{2+} ions with atomic and molecular gases J. Phys. B 17 4919-4933 1984 E N^{2+} , N^{2+} + He, Ne, Ar, Kr, Xe, H_2 , N_2 $\rightarrow$ Ne^{+} translational energy spectroscopy 0.43 keV/amu no cross sections given	84E49	Kheyrandish, H., Armour, D. G., Jones, E. J. The measurement of charge transfer cross sections for a variety of ions on air and argon Vacuum 34 269-273 1984 E A^{+} + B $\rightarrow$ A ($A = Sb, As, In, P, N_2, O_2, N, O, Ge, Cr, Fe; B = air, Ar$) growth 0.08 - 2.9 keV/amu
		84E56	Koizumi, T., Okuno, K., Kaneko, Y. Drift tube study of one-electron capture reactions between doubly-charged ions and rare gas atoms J. Phys. Soc. Japan 53 567 - 573 1984 E Kr^{2+} + Ne $\rightarrow$ Kr^{+} + Ne^{+} Xe^{2+} + Ar $\rightarrow$ Xe^{+} + Ar^{+} drift tube technique $1 \times 10^7 - 10^4$ keV/amu

84E31	McCullough, R.W., Wilkie, F.G., Gilbody, H.B. State-selective electron capture by slow C^{2+} and C^{3+} ions in atomic hydrogen J. Phys. B 17 1373-1382 1984 E $C^{2+} + H \rightarrow C^+ + H^+$; $C^{3+} + H \rightarrow C^{2+}((2s3s)^3S, (2s3p)^3P^o, (2p)^2^1S, (2p)^2^1D) + H^+$ energy-loss/gain spectroscopy $5 \times 10^{-2} - 1.5$ keV/amu	84E36	Peterson, J.R., Bae, Y.K. Product states of H_3^+ , H_2^+ and O_2^+ electron capture in Cs Phys. Rev. A 30 2807-2810 1984 E D_2^+ ; D_3^+ ; O_2^+ + Cs $\rightarrow$ dissociative charge transfer energy analysis 0.3 keV/amu
84E32	Newcomb, J., Dillingham, T.R., Hall, J., Varghese, S.L., Pepmiller, P.L., Richard, P. Electron capture by metastable projectiles on He and Ne Phys. Rev. A 29 82-91 1984 E $F^{2+}(1s2s^3S) + He, Ne \rightarrow F^{3+}$ Auger electron 315 - 789 keV/amu	84E37	Roncini, P., Barat, M., Laurent, H., Pommier, J., Dousson, S., Hitz, D. Transfer ionization and two-electron capture processes in Ne^{4+} - He collisions at 3 - 34 keV energies J. Phys. B 17 1521-525 1984 E $Ne^{6+} + He \rightarrow Ne^{5+}$ ($n=3,4$) energy-gain spectroscopy 0.1 keV/amu angular dependence of energy-gain spectra; contribution of two-electron capture and transfer ionization
84E33	Nielsen, E.H., Andersen, L.H., Barany, A., Cederquist, H., Hvelplund, P., Knudsen, H., MacAdam, K.B., Sorensen, J. Energy-gain spectroscopy measurements of single-electron capture by Ar^{6+} in Ne and Ar J. Phys. B 17 1139-144 1984 E $Ar^{6+} + Ne, Ar \rightarrow Ar^{5+}(nl)$ energy-gain spectroscopy 0.0025 - 0.025 keV/amu total and partial cross section	84E38	Schmeissner, C., Cocke, C.L., Mann, R., Meyeroth, W. Energy-gain spectroscopy studies of electron capture from helium by slow multiply charged neon ions Phys. Rev. A 30 1661-1671 1984 E $Ne^{q+} + He \rightarrow Ne^{(q-1)+}$ ($q=3-8$) energy-loss/-gain $3.5 \times 10^{-3} - 2.6 \times 10^{-2}$ keV/amu
84E34	Nikulin, V.K., Dijkkamp, D., Gordeev, Yu.S., Samoylov, A.V., de Heer, F.J. Electron capture into excited projectile states in 6 - 100 keV Ne^{4+} - Ne collisions J. Phys. B 17 1721-725 1984 E $Ne^{4+} + Ne \rightarrow Ne^{3+}(2p^2, nl); Ne^{2+}(2p^2, nl^2)$ 0.25 - 6.25 keV/amu	84E39	Sorensen, J., Andersen, L.H., Hvelplund, P., Knudsen, H., Liljeby, L., Nielsen, E.H. Cross sections $\hat{\sigma}_{\infty}(nl)$ for electron capture collisions between medium velocity, highly charged ions and molecular hydrogen J. Phys. B 17 4743-4756 1984 E $Au^{8+} + H_2 \rightarrow Au^{(q-1)+}(nl) + H_2^+$ ($q=12-18$) photon emission spectroscopy 100 keV/amu
84E35	Ohtani, S. One-electron capture by highly stripped ions from helium atoms Electronic and Atomic Collisions (eds. Eichler, J., Hertel, I.V., Stollerfohl, N.) $C^{3+}, N^{5+}, O^{6+} + He \rightarrow C^{(q-1)+}, N^{(q-1)+}, O^{(q-1)+} + He^+$ energy-loss/-gain	84E40	Szucs, S., Karamera, M., Terao, M., Brouillard, F. Experimental study of the mutual neutralization of H^+ and H^- between 5 and 2000 eV J. Phys. B 17 1613-1622 1984 E $H^+ + H^- \rightarrow H + H$ merging beam technique $5 \times 10^{-3} - 2$ keV/amu

- 84E41 Tanis, J.A., Bernstein, E.M., Graham, W.G., Stockli, M.D., Clark, M., McFarland, R.H., Morgan, T.J., Berkner, K.H., Schlachter, A.S., Stearns, J.W.
Resonant electron transfer and excitation in two- three- and four electron Ca^{n+} and V^{n+} ions colliding with helium
Phys. Rev. Letters 53 2551-2554 1984 E
 $\text{Ca}^{n+}(q=16-18)$, $\text{V}^{n+}(q=19-21) + \text{He} \rightarrow \text{Ca}^{(q-1)+}$, $\text{C}^{(q-1)+}$
RTE
2500 - 9000 (Ca), 3530 - 9000 (V) keV/amu
- 84E51 Tanis, J.A., Bernstein, E.M., Stockli, M.P., Graham, W.G., Berkner, K.H., Markovich, D.J., McFarland, R.H., Pyle, R.V., Stearns, J.W., Willis, J.E.
Correlations between charge-changing interactions and projectile K α -x-ray emission in Ar + Xe collisions
Phys. Rev. A 29 2232 1984 E
 $\text{Ar}^{n+} + \text{Xe} \rightarrow \text{Ar}^{(q-1)+}$ ($q=15, 16, 17$)
coincidence between x-rays and projectiles
4000 - 4500 keV/amu
- 84E42 Tawara, H., Iwai, T., Kaneko, Y., Kimura, M., Kobayashi, N., Matsumoto, A., Ohtani, K., Takagi, S., Tsurubuchi, S.
Energy-spectroscopy studies of electron-capture processes of low-energy, highly stripped F and Ne ions in collisions
Phys. Rev. A 29 1529-1532 1984 E
 $\text{F}^{n+} + \text{He} \rightarrow \text{F}^{(q-1)+} + \text{He}^+(q=6, 7, 8)$; $\text{Ne}^{n+} + \text{He} \rightarrow \text{Ne}^{(q-1)+} + \text{He}^+$ ($q=7, 8, 9$)
energy-loss/gain spectroscopy
1 xg/M keV/amu
- 84E43 Varghese, S.L., Waggoner, W., Cocke, C.L.
Electron capture from lithium by protons and helium ions
Phys. Rev. A 29 2453-2456 1984 E
 H^+ , He^+ , $\text{He}^{2+} + \text{Li} \rightarrow \text{H}^0$, He^0 , He^+
growth
0.257 - 3.85 (H), 0.06 - 2 (He) keV/amu
- 84E44 Waggoner, W., Cocke, C.L., Varghese, S.L., Stockli, M.
Experimental cross sections for electron capture from lithium by slow, highly charged, rare-gas projectiles
Phys. Rev. A 29 2457-2462 1984 E
 Ne^{n+} , Ar^{n+} , Kr^{n+} , $\text{Xe}^{n+} + \text{Li} \rightarrow \text{Ne}^{(q-1)+}$, $\text{Ar}^{(q-1)+}$, $\text{Kr}^{(q-1)+}$, $\text{Xe}^{(q-1)+}$ ($q=2-10$)
Li-oven
(0.1 - 1.0) xq keV
- 84E45 Watts, M.F., Angel, G.C., Dunn, K.F., Gilbody, H.B.
Charge transfer and ionization in collisions between Li^+ ions
J. Phys. B 17 1631-1635 1984 E
 $\text{Li}^+ + \text{Li}^+ \rightarrow \text{Li}^+ + \text{Li}^{2+} + e$; $\text{Li}^0 + \text{Li}^{2+}$
crossed beam technique
0.053 - 0.24 keV/amu
- 84E46 Williams, I.D., Gettles, J., Gilbody, H.B.
Electron capture, loss and excitation in collisions of H^+ , $\text{H}(1s)$, $\text{H}(2s)$ and H^- in atomic oxygen
J. Phys. B 17 1547-1558 1984 E
 $\text{H}^+ + \text{B} \rightarrow \text{H}^0$ (total, 2s); $\text{H}(1s) + \text{B} \rightarrow \text{H}^+$, $\text{H}^0(2s)$, H^- ; $\text{H}(2s) + \text{B} \rightarrow \text{H}^+$, H^- ($\text{B} = \text{O}, \text{O}_2$)
growth
2.5 - 25 keV/amu
Ir tube furnace
- 84E47 Wohrer, K., Chetoui, A., Rozet, J.P., Jolly, A., Stephan, C.
K-K transfer cross sections in near-symmetric Fe^{26+} ion-atom collisions at intermediate velocity
J. Phys. B 17 1575-1587 1984 E
 $\text{Fe}^{26+} + \text{B} \rightarrow \text{Fe}^{23+}(1s) + \text{B}(1s^{-1})$ ($\text{B} = \text{Ar}, \text{Kr}, \text{Zr}, \text{Ag}, \text{Sn}$)
x-ray spectroscopy
7142 keV/amu
- 84E48 Woods, C.J., Sofield, C.J., Cowern, N.E.B., Murrell, M., Draper, J.
Comparison of charge-changing cross sections in gaseous and solid targets
J. Phys. B 17 867-878 1984 E
 $\text{C}^{3+} + \text{B} \rightarrow \text{C}^{(q-1)+}$ ($q=4-6$; $i=1, 2$; $\text{B}=\text{carbon foil}, \text{CH}_4, \text{C}_2\text{H}_6, \text{C}_2\text{H}_2$)
growth
3000 keV/amu
- 84T 1 Aberg, T., Blomberg, A., Tulkke, J., Goscinski, O.
Maximum entropy theory of recoil charge distributions in electron capture collisions
Phys. Rev. Letters 52 1207-1210 1984 T
maximum entropy theory

- 84T 2 Amundsen, P.A. Jakubassa-Amundsen, D.H.
Charge transfer to a fast projectile in the presence of a nuclear resonance
Phys. Rev. Letters 53 222-225 1984 T
 $H^+ + Ni, C \rightarrow H^0$
strong potential Born approximation
3110 - 3200 keV/amu (Ni) ; 350 - 550 keV/amu (C)
- 84T 3 Amundsen, P.A. Jakubassa-Amundsen, D.H.
Charge transfer at large scattering angles in the strong-potential Born approximation
J. Phys. B 17 2671-2686 1984 T
 $H^+ + C, Ni \rightarrow H(1s)$
strong-potential Born approximation
 $3 \times 10^3 - 20 \times 10^3$ keV/amu
angular distribution
- 84T 4 Andriamonje, S. Chemin, J.F. Roturier, J. Saboya, B. Schuerer, J.N. Gayet, R. Salin, A. Laurent, H. Aguer, P. Briand, J.P.
Production of projectile and target KX-rays by single and multiple electron capture in collisions of Si^{14+} and Si^{13+} ions with argon atoms at 4.5 and 5.5 MeV/amu
Z. Phys. A 317 251-265 1984 T
 $Si^{10+} + Ar \rightarrow Si^{(q-1)+}, Si^{(q-2)+}, Si^{(q-3)+}$ ($q=14, 13$)
T : molecular model ; E : x-ray coincidence
4000 - 5450 keV/amu
- 84T 5 Banyard, K.E. Shircliffe, G.W.
Electron capture from hydrogen atoms by fast $Li^+(1s^2)$, $Li^{2+}(1s)$ and Li^{3+} ions
Phys. Rev. A 30 604-606 1984 T
 $Li^+(1s^2)$, $Li^{2+}(1s)$, $Li^{3+} + H \rightarrow Li(1s^2, nl)$, $Li^+(1s, nl)$, $Li^{2+}(nl)$
continuum intermediate state approximation
28 - 1428 keV/amu
- 84T 7 Bienstock, S. Dalgarno, A. Heil, T.G.
Charge transfer of N^{3+} ions in collisions with atomic hydrogen
Phys. Rev. A 29 2239-2241 1984 T
 $N^{3+} + H \rightarrow N^{2+}(nl, n'l'n''l'') + H^+$
CC (MO) with unitarized, multichannel distorted-wave approximation
 $0.278 \times 10^3 - 5$ keV/amu
- 84T60 Bienstock, S. Heil, T.G. Dalgarno, A.
Distorted-wave theory of heavy-particle collisions at intermediate energies.
Phys. Rev. A 29 503 - 508 1984 T
 $O^{2+} + He \rightarrow O^+(2p^3 \ ^3P^o, \ ^3D^o)$
DWA
 $10^{-3} - 5$ keV/amu
- 84T 6 Bienstock, S. Heil, T.G. Dalgarno, A.
Distorted-wave theory of heavy-particle collisions at intermediate energies
Phys. Rev. A 29 503 - 508 1984 T
 $C^{3+} + H \rightarrow C^{2+}(nl) + H^+$; $O^{2+} + H \rightarrow O^+(nl) + H^+$
CC (MO)
0 - 5 keV/amu
Quantum-mechanical treatment in close-coupling and unitarized distorted-wave approximation
- 84T 8 Bonnet, J.J.
Photon emission spectroscopy of lightly charged ions following low energy charge exchange collisions
Ann. Phys. (Fr.) 9 629-639 1984 T
review
classical one electron model ; Landau-Zener model
- 84T 9 Bransden, B.H. Ermolaev, A.M. Shingal, R.
One- and two-electron models for electron capture by He^+ ions from Li^0 at intermediate energies
J. Phys. B 17 4515-4521 1984 T
 $He^+(1s) + Li(2s, 1s) \rightarrow He(1s^2)$
two-center AO
0.25 - 100 keV/amu
- 84T10 Burgdorfer, J. Dube, L.J.
Multiple scattering approach to coherent excitation in electron-capture collisions
Phys. Rev. Letters 52 2225-2228 1984 T
 $H^+ + He \rightarrow H(n=3) + He^+$
first Born approximation; multiple scattering theory (CDW)
9.4 - 500 keV/amu

84T11	Casaubon, J.I. Piancinini, R.D. Charge exchange by fully stripped lithium ions on metastable and ground state hydrogen atoms at low energies J. Phys. B 17 1623-1630 1984 T $\text{Li}^{3+} + \text{H}(1s), \text{H}(2s) \rightarrow \text{Li}^{2+}(\text{nl})$ OEDM + Landau-Zener method 0.02 - 2.57 keV/amu	84T61	Dube, L.J. Multiple scattering approaches to the electron transfer process : I. some calculable approximations. J. Phys. B 641 - 658 641 - 658 1984 T general hydrogenic states strong potential Born, Impulse Approx. continuum-distorted-wave approximation.
84T12	Crothers, D.S.F. McCann, J.M. A second-order continuum distorted-wave theory of charge transfer at high energy J. Phys. B 17 1177-184 1984 T $\text{H}^+ + \text{H}(1s) \rightarrow \text{H}(1s)$ second-order CDW 10000, 50000 keV/amu angular differential cross sections	84T15	Ermolaev, A.M. Charge transfer in collisions between protons and lithium atoms J. Phys. B 17 1069-1081 1984 T $\text{H}^+ + \text{H} \rightarrow \text{H}(\text{nlm})$; $\text{H}^+ + \text{Li} \rightarrow \text{H}(\text{nl})$ TCAE with translational factors 1.5 - 145 keV/amu (H) ; 0.5 - 109 keV/amu (Li)
84T59	Datta, S. Mandal, C.R. Mukherjee, S.C. Charge transfer in $\text{H}^+ - \text{He}^+(1s)$ collisions Can. J. Phys. 62 307-311 1984 T $\text{H}^+ + \text{He}^+(1s) \rightarrow \text{H}(1s, 2s, 2p, 3s, 3p, 3d) + \text{He}^{2+}$ CIS 50 - 10000 keV/amu	84T16	Ermolaev, A.M. Bransden, B.H. Charge transfer in $\text{He}^{2+} + \text{Li}$ collisions J. Phys. B 17 1083-1092 1984 T $\text{He}^{2+} + \text{Li} \rightarrow \text{He}^+(\text{nl}) + \text{Li}^+$ CC (24-AO) 0.475 - 400 keV/amu
84T13	Deco, G.R. Maidagan, J.M. Rivarola, R.D. Electron capture by proton and alpha particle impact on helium atoms J. Phys. B 17 L707-711 1984 T $\text{H}^+, \text{He}^{2+} + \text{He}(1s^2) \rightarrow \text{H}(\text{nl}), \text{He}^+(\text{nl})$ symmetric eikonal approximation 25 - 1000 keV/amu (H) ; 25 - 2500 keV/amu (He)	84T17	Feagin, J.M. Briggs, J.S. Reeves, T.M. Simultaneous charge transfer and excitation J. Phys. B 17 1057-1068 1984 T $\text{A}^{(s-1)+} + \text{B}^{(s-1)+} \rightarrow \text{A}^{(s-2)+}(\text{nl}, \text{n'l}') + \text{B}^{2+}$ strong-potential Born approximation
84T14	Devi, K.R.S. Garcia, J.D. Coriolis coupling effects in time-dependent Hartree-Fock calculations of ion-atom collisions Phys. Rev. A 30 600-603 1984 T $\text{He}^{2+} + \text{He} \rightarrow \text{He}^+, \text{He}^0$ time-dependent Hartree-Fock calculation 7.5, 62.5 keV/amu	84T64	Feickert, C.A. Blint, R.J. Surratt, G.T. Watson, W.D. Quantal calculations of charge transfer in collisions between N V and atomic hydrogen. Astrophys. J. 286 371 - 376 1984 T $\text{N}^{4+} + \text{H} \rightarrow \text{N}^{3+}(3p, 3d) + \text{H}^+$ Quantal calculation $10^{-3} - 10^{-1}$ keV/amu 3d capture is dominant at low energies.

- 84T19 Fritsch, W.
Atomic-basis study of electron transfer in $H^+ + Na$ and $H^+ + K$ collisions
Phys. Rev. A 30 1135-1138 1984 T
 $H^+ + Na, K \rightarrow H^0(nl)$
atomic-orbital expansion method
0.2 - 20 keV/amu
total and partial cross section
- 84T20 Fritsch, W.
Determination of high-n partial transfer cross sections in bare-nucleus-hydrogen-atom collisions
Phys. Rev. A 30 3324-3327 1984 T
 $C^{6+}, N^{7+}, O^{8+} + H \rightarrow C^{5+}, N^{6+}, O^{7+}(n, l)$
semi-classical close-coupling with AO basis
4 - 25 keV/amu
partial cross section (n, l)
- 84T21 Fritsch, W., Lin, C.D.
Atomic-basis study of electron transfer into $C^{3+}(nl)$ orbitals in $C^{4+} + H$ and $C^{4+} + Li$ collisions
J. Phys. B 17 3271-3278 1984 T
 $C^{4+} + H \rightarrow C^{3+}(nl) + H^+$; $C^{4+} + Li \rightarrow C^{3+}(nl) + Li^+$
CC (AO)
0.1 - 20 keV/amu
- 84T18 Fritsch, W., Lin, C.D.
Atomic-orbital-expansion studies of electron transfer in bare-nucleus Z ($Z=2, 4-8$)-hydrogen-atom collisions
Phys. Rev. A 29 3039-3051 1984 T
 $Z^{2+} + H \rightarrow Z^{1+}(nl) + H^+$ ($Z=2, 4-8$)
CC (AO)
0.133 - 25 keV/amu
- 84T22 Gerratt, J.
R-matrix theory of charge transfer
Phys. Rev. A 30 1643-1660 1984 T
R-matrix theory formalisms
- 84T23 Ghosh, M., Datta, S., Mukherjee, S.C.
Calculation of cross sections for electron capture between arbitrary hydrogenic states of target and projectile
Phys. Rev. A 30 1307-1310 1984 T
 $H^+ + H(2l) \rightarrow H(3l') + H^+$
continuum intermediate state approximation
25 - 1000 keV/amu
arbitrary $(nlm) \rightarrow (n'l'm')$
- 84T24 Gonzales, A.D., Miraglia, J.E.
Comparison between the mechanical and radiative electron capture processes at high energies
Phys. Rev. A 30 2292-2296 1984 T
 $H^+ + H(1s), C^{3+}(1s), He(1s^2) \rightarrow H^0$
CDW
1000 - 200000 keV/amu
- 84T25 Grozdanov, T.P.
A model for final-state mixing following electron capture in slow collisions of fully stripped, multicharged ions and hydrogen atoms
Phys. Scripta 30 194-197 1984 T
 $C^{6+} + H(1s) \rightarrow C^{5+}(4l) + H^+$
MO with Stark mixing
0.05 - 20 keV/amu
- 84T26 Hanssen, J., Gayet, R., Hartel, C., Salin, A.
Electron capture by C^{4+}, N^{5+} and O^{6+} from atomic hydrogen in the keV/amu energy range
J. Phys. B 17 L323-328 1984 T
 $C^{4+}, N^{5+}, O^{6+}(1s^2) + H \rightarrow C^{3+}, N^{4+}, O^{5+} + H^+$
Molecular approximation
0.25 - 25 keV/amu
total cross section
- 84T27 Humphries, W.J., Moisewitsch, B.L.
Relativistic second Born approximation for electron capture
J. Phys. B 17 2655-2669 1984 T
 $H^+ + H(1s) \rightarrow H(1s) + H^+$
relativistic second Born approximation
 $1 \times 10^3 - 1 \times 10^8$ keV/amu

- 84T28 Jakubassa-Amundsen, D.H., Hippler, R., Betz, H.D.,
Radiative electron capture in fast ion-atom collisions
J. Phys. B 17 3943-3949 1984 T
 $S^{16+} + C \rightarrow S^{15+}(1s)$
E: x-ray spectroscopy; T: strong-potential Born approximation
3900 keV/amu
- 84T30 Janev, R.K., Joachain, C.J., Nedelkovic, N.N.
Resonant electron transfer in slow collisions of protons with Rydberg hydrogen atoms
Phys. Rev. A 29 2463-2478 1984 T
 $H^+ + H(n) \rightarrow H(n) + H^+$ ($n=10-50$)
under- and over-barrier model
 $10^{-5} - 10^{-2}$ keV/amu
- 84T29 Janev, R.K., McDowell, M.R.C.
Electron removal from H and He atoms in collisions with C^{6+} , N^{7+} and O^{8+} ions
Phys. Letters 102A 405-408 1984 T
 $A^{q+} + H, He \rightarrow A^{(q-1)+} + H^+, He^+$; $A^{q+} + H^+, He^+ + e$
CTMC
50, 100 keV/amu
scaling for electron removal; total cross section
- 84T62 Karbovanets, M.I., Lazur, V.Yu., Chibisov, M.I.
Non-resonant exchange between two electrons.
Sov. Phys.-JETP 59 47-52 1984 T
 $C^{4+} + He \rightarrow C^{3+} + He^+$
quasi-classical approximation
- 84T31 Kimura, M., Iwai, T., Kaneko, Y., Kobayashi, N., Matsumoto, A., Ohtani, S., Okuno, K.,
Takagi, S., Tawara, H., Tsurubuchi, S.
Landau-Zener model calculations of one-electron capture from He atoms by highly stripped ions at low energies
J. Phys. Soc. Japan 53 2224-2232 1984 T
 $C^{6+}, N^{7+}, O^{8+}, F^{9+}, Ne^{10+}$ ($q=4-9$), K^{11+} ($q=10-25$) + $He \rightarrow A^{(q-1)+}(n)$
multichannel Landau-Zener
1xq keV
total and partial(n) cross sections
- 84T32 Kimura, M., Olson, R.E.
Electron capture to (nl) states in collisions of C^{4+} and C^{6+} with He
J. Phys. B 17 L713-719 1984 T
 $C^{4+} + He \rightarrow C^{3+}, C^{5+} + He$; $C^{6+} + He \rightarrow C^{5+}, C^{7+} + He$
PSS with ETF
20 keV/amu
- 84T33 Kochbach, L., Briggs, J.S.
Theory of electron capture by fast projectiles scattered through large angles
J. Phys. B 17 3255-3270 1984 T
 $H^+ + Ne \rightarrow H^0$
IP
200 - 550 keV/amu
capture probabilities as a function of scattering angle
- 84T34 Larsen, O.G., Taulbjerg, K.
Theory of electron capture by partially stripped ions in slow collisions with atomic hydrogen
J. Phys. B 17 4523-4542 1984 T
 $A^{6+} + H(1s) \rightarrow A^{5+}$ ($A = Ar, Cr, Mg$)
CC with ETF
0.015 - 4 keV/amu
- 84T35 Maitagan, J.M., Rivaola, R.D.
A symmetric eikonal-type approximation for electron capture in ion-atom collisions
J. Phys. B 17 2477-2487 1984 T
 $H^+ + H(1s), He(1s) \rightarrow H(1s)$; $H^+ + He^+(1s) \rightarrow H(1s)$
symmetric eikonal approximation
500 - 100000 keV/amu
K-K total and partial (in angle) cross sections
- 84T36 Mandal, C.R., Datta, S., Mukherjee, S.C.
Electron capture from atomic hydrogen by fully stripped ions of $Be^{4+}, B^{5+}, C^{6+}, N^{7+}$ and O^{8+} in the continuum intermediate-state approximation
Phys. Rev. A 30 1104-1106 1984 T
 $A^{Z+} + H \rightarrow A^{(Z-1)+} + H^+$ ($A = Be, B, C, N, O$)
continuum-intermediate state approximation
47 - 1111 keV/amu
total cross sections

- 84T37 McDowell, M.R.C. Janev, R.K.
Electron capture, ionisation and transfer-ionisation in fast $Au^{q*} + He$ collisions
J. Phys. B 17 2295-2305 1984 T
 $Au^{q*} + He \rightarrow Au^{(q-1)+} + He^e$; $Au^{(q-1)+} + He^{2+} + e$ ($q = 6-25$)
CTMC
20 - 300 keV/amu
n-distribution
- 84T38 McGuire, J.H. Stockli, M. Cocke, C.L. Pedersen, E.H. Sil, N.C.
Study of the Thomas peak in electron capture
Phys. Rev. A 30 89-94 1984 T
 $H^+ + H, He \rightarrow H^0$
T. strong potential Born approximation; E. growth
2820 - 3000 keV/amu
 H_2 instead of H in experiment; angular differential cross sections
- 84T39 Miraglia, J.E.
Electron capture in asymmetric collisions
Phys. Rev. A 30 1721-1726 1984 T
 $H^+ + C(1s), O(1s) \rightarrow H(1s)$
peaking impulse approximation
200 - 4000 keV/amu
- 84T40 Morrison, H.G. Opik, U.
An impact-parameter method for heavy-particle collisions involving one electron, II.
Attempts to improve the accuracy, and results on $He^{2+} - H$ collisions
J. Phys. B 17 857-865 1984 T
 $H^+ + H, He \rightarrow H(2s, 2p) + H^e, He^{2+}; He^{2+} + H \rightarrow He^e(\text{total}, 2s, 2p) + H^+$
new impact-parameter method
25 (H^+), 19.4, 25, 41.7, 50 (He^{2+}) keV/amu
- 84T41 Olson, R.E. Kimura, M. Sato, H.
Molecular-state cross section calculations for $H + Cs \rightarrow <- H + Cs^+$
Phys. Rev. A 30 1692-1696 1984 T
 $H + Cs(6s, 6p, 5d) \rightarrow H + Cs^+$
pseudo-potential molecular-structure calculation
0.1 - 10 keV/amu
- 84T42 Presnyakov, L.P. Uskov, D.B.
Ionization and charge exchange in atom collision with multicharged ion
Sov. Phys. JETP 59 515-522 1984 T
 $A^{q*} + H \rightarrow A^{(q-1)+}(n) + H^e; A^{q*} + H^+ + e$ ($q \geq 3$)
Keldysh quasi-classical method
10 - 400 keV/amu
analytic expression for (n, l) distribution
- 84T63 Riera, A.
Practical criterion for the determination of translational factors.
Phys. Rev. A 30 2304 - 2310 1984 T
translation factor in MO model
- 84T43 Rittby, M. Elander, N. Brandas, E. Barany, A.
Resonance structure in charge transfer cross sections; an application to the $N^{3+} + H \rightarrow N^{2+} + H^+$ reaction
J. Phys. B 17 L677-681 1984 T
 $N^{3+} + H \rightarrow N^{2+}(3s) + H^+$
 $10^8 - 10^3$ keV/amu
rich resonance
- 84T44 Rivarola, R.D.
Resonant electron capture in $H^+ + H(1s)$ collisions
Phys. Rev. A 30 1122-1124 1984 T
 $H^+ + H(1s) \rightarrow H(1s)$
CDW
10000 keV/amu
- 84T45 Rivarola, R.D. Salin, A.
K-shell one-electron capture in asymmetric collisions at intermediate and high energies
J. Phys. B 17 659-669 1984 T
 $H^+ + He^e, Ne^{2+}, Ar^{17+} \rightarrow H(1s); H^+ + He, C, Ne \rightarrow H(1s)$
CDW
400 - 20000 keV/amu
differential (in angle) cross sections

- 84T46 Rivarola, R.D., Salin, A., Stockli, M.P.
Differential electron-capture cross sections in high energy ion-atom collisions; comparison of experiment and theory for the Thomas peak
J. Physique Letters 45 L259-264 1984 T
 $H^+ + H_2, He \rightarrow H^0$
CDW
2820 - 7400 keV/amu
- 84T47 Salin, A.
Intrashell mixing following electron capture from atomic hydrogen targets by slow ions. I - Fully stripped projectiles
J. de Physique 45 671-680 1984 T
 $C^{6+} + H \rightarrow C^{5+}(4l) + H^+; O^{8+} + H \rightarrow O^{7+}(5l) + H^+; Ne^{10+} + H \rightarrow Ne^{9+}(6l) + H^+$
PSS
1 - 16 keV/amu
- 84T48 Shimakura, N., Inoue, H., Watanabe, T.
Differential cross sections for $Li^+ - Li$ collisions using molecular bases; quantum effect
J. Phys. B 17 2687-2694 1984 T
 $Li^+ + Li(2s) \rightarrow Li(2s) + Li^+; Li(2p) + Li^+ \rightarrow Li(2s) + Li^+; Li(2p) + Li^+ \rightarrow Li(2p) + Li^+$
JWKB
0.07 - 0.14 keV/amu
angular distribution
- 84T58 Sidis, V., de Bruijn, D.P.
Theory of near-resonant charge exchange in atom-molecule collisions. dissociate NRCE in the $H_2^+ + Mg$ collision
Chem. Phys. 85 201-214 1984 T
 $H_2^+ + Mg \rightarrow H_2^+ + Mg^+$
IPM
0.75 - 3.75 keV/amu
- 84T49 Spruch, L., Shakeshaft, R.
Simple heuristic derivation of some charge transfer probabilities at asymptotically high incident velocities
Phys. Rev. A 29 2283-2285 1984 T
- 84T50 Stollberg, M.T., Lee, H.W.
Charge transfer in low-energy collisions of He^{2+} and Li^{3+} with various neutral atoms
Phys. Rev. A 29 2448-2452 1984 T
 $He^{2+} + Li, Be, B, C, Na, Mg, K, Cs \rightarrow He^+(n); Li^{3+} + H, He, Li, Be, B, C, Ne, Na, Mg, K, Ar, Cs \rightarrow Li^{2+}(n)$
Landau-Zener model
0.05 - 5.18 keV/amu
- 84T51 Suzuki, H., Kajikawa, Y., Toshima, N., Ryufuku, H., Watanabe, T.
Electron-capture cross sections from He in collision with bare nuclear ions
Phys. Rev. A 29 525-528 1984 T
 $A^{q+} + He \rightarrow A^{(q-1)+} + He^+ (A = H^+, Li^{2+}, Be^{4+}, C^{6+}, O^{8+})$
UDWA
 $1 - 10^3$ keV/amu
total cross section
- 84T52 Suzuki, H., Toshima, N., Watanabe, T., Ryufuku, H.
Exponential distorted-wave approximation for charge transfer in collisions of multicharged ions with atomic hydrogen
Phys. Rev. A 29 529-535 1984 T
 $A^{q+} + H \rightarrow A^{(q-1)+} + H^+ (A = He^{2+}, Li^{3+}, Be^{4+}, B^{5+}, C^{6+})$
exponential UDWA
0.1 - 1000 keV/amu
total cross section
- 84T53 Suzuki, R., Nakamura, H., Ishiguro, E.
Semiclassical scattering theory based on the dynamical state representation; application to the $Li^+ + Na$ and $Li + Na^+$ collisions
Phys. Rev. A 29 3060-3070 1984 T
 $Na^+ + Li(2s) \rightarrow Na(3s); Li^+ + Na(3s) \rightarrow Li(2s, 2p) + Na^+$
semiclassical theory
0.25 - 5 keV/amu
- 84T54 Thorson, W.R., Choi, J.H.
Long-range secondary couplings in $X^{z-} - H(1s)$ charge transfer collisions
Phys. Rev. A 30 743-749 1984 T
 $A^{z+} + H(1s) \rightarrow A^{(z-1)+}(nl)$
molecular state CC + long-range dipole and quadrupole coupling
15 - 20 keV/amu
no cross section given

84T55	Wada,K. Murai,T. Close-coupling calculation for charge transfer in $\text{Be}^{4+} + \text{H}(1s)$ collisions at low energies J. Phys. B 17 1363-367 1984 T $\text{Be}^{4+} + \text{H}(1s) \rightarrow \text{Be}^{3+}$ CC (11) 0.1 - 25 keV/amu	85E 2 Andriamonje,S. Chemin,J.F. Rofurier,J. Saboya,B. Schenrer,J.N. Belkic,Dz. Gayet,R. Solin,A. Laurent,H. Schapira,J.P. Electron capture from the krypton M-shell by MeV protons J. Physique 46 349-353 1985 E $\text{H}^+ + \text{Kr} \rightarrow \text{H}^0(1s) + \text{Kr}^+(3l^{-1})$ E : x-ray coincidence ; T : CDW 2000 - 3000 keV/amu
84T56	Winter,T.G. Lin,C.D. Triple-center treatment of electron transfer and excitation in p - H collisions Phys. Rev. A 29 567-582 1984 T $\text{H}^+ + \text{H} \rightarrow \text{H}^0(2s, 2p) + \text{H}^+$ triple-center AO 1.5 - 15 keV/amu	85E 4 Aumayr,F. Lakits,G. Husinsky,W. Winter,H. Inelastic $\text{H}^+ - \text{Li}(2s)$ collisions (2-20 keV) ; III. electron capture into the $\text{H}(2s)$ subshell J. Phys. B 18 2493-2501 1985 E $\text{H}^+ + \text{Li}(2s) \rightarrow \text{H}(2s)$ photon spectroscopy 2 - 20 keV/amu
84T57	Yenen,O. Jaacks,D.H. Macek,J. Two-state charge transfer calculation in $\text{H}^+ - \text{H}_2$ collisions Phys. Rev. A 30 597-599 1984 T $\text{H}^+ + \text{H}_2 \rightarrow \text{H}^0$ Denkov model 1 - 50 keV/amu	85E 3 Aumayr,F. Winter,H. Total single-electron capture cross sections for impact of H^+ , H_2^+ , He^+ , and Ne^+ (2-20 keV) on Li Phys. Rev. A 31 67-71 1985 E $\text{A}^+ + \text{Li}(2s) \rightarrow \text{A}^0$ (A = H, H_2 , He, Ne) growth 2 - 20 (H) keV/amu ; 0.1 - 1 keV/amu total cross section
85E 6	Alvarez,I. Cisneros,C. Morales,A. Morgan,T.J. H^- formation in $\text{H}^0 + \text{Mg}$ collisions Phys. Letters 109A 268-270 1985 E $\text{H}^0 + \text{Mg} \rightarrow \text{H}^-$ growth 1.0 - 5.0 keV/amu	85E 5 Aumayr,F. Winter,H. Excitation by impact of He^+ (2-20 keV) on $\text{Li}(2s)$ J. Phys. B 18 L741-746 1985 E $\text{He}^+ + \text{Li}(2s) \rightarrow \text{He}(\text{total}, 2p, 3p)$ photon spectroscopy 0.5 - 5 keV/amu
85E 1	Andrews,M.C. McDaniel,F.D. Duggan,J.L. Miller,P.D. Pepmiller,P.L. Krause,H.F. Rossee,T.M. Rayburn,L.A. Mehra,R. Lapicki,G. M-shell electron capture and direct ionization of gold by 25 MeV carbon and 32 MeV oxygen ions Nucl. Instr. Meth. in Phys. Res. B 10/11 186-189 1985 E $\text{C}^{6+}, \text{O}^{8+} + \text{Au} \rightarrow \text{C}^{5+}, \text{O}^{7+} + \text{Au}^+(3l^{-1})$ x-ray coincidence 2000 keV/amu	85E 7 Bae,Y.K. Coggiola,M.J. Peterson,J.R. Charge transfer of 50 eV - 4 keV H^+ , H_2^+ , H_3^+ , N^+ and N_2^+ in Cs ; absolute cross sections Phys. Rev. A 31 3627-3632 1985 E $\text{A}^+ + \text{Cs} \rightarrow \text{A}^0$ (A = H, H_2 , H_3 , N, N_2) attenuation method 0.05 - 4 keV/amu (H) ; 0.025 - 0.28 keV/amu attenuation cross sections dominated by single electron capture

- 85E 9 Baltayan, P. Pebay-Peyroula, J.C. Sadeghi, N.
Determination of the rate constants for population of the individual Cd^{+} levels in thermal Penning and charge transfer reactions of $\text{He}^+(2S_1)$ and He^+ with cadmium. *J. Phys. B* 18 3615-3628 1985 E
 $\text{He}^+ + \text{Cd} \rightarrow \text{He} + \text{Cd}^{+}(j)$
flowing-afterglow method
cross sections and rate coefficients at thermal energies
- 85E 8 Barany, A. Astner, G. Cederquist, H. Danard, H. Hultdt, S. Hvelplund, P. Johnson, A. Knudsen, H. Liljeby, L. Ransfelt, K.G.
Absolute cross sections for multi-electron processes in low energy $\text{Ar}^{+} - \text{Ar}$ collisions; comparison with theory
Nucl. Instr. Meth. in Phys. 9 397-399 1985 E
Res. B
 $\text{Ar}^{+} + \text{Ar} \rightarrow \text{Ar}^{q+} + \text{Ar}^{k+} (q=4-8; k=1-5; n=0-3)$
coincidence technique
0.045xq keV/amu
- 85E10 Bliman, S. Bonnet, J.J. Bordenave-Montesquieu, A. Dousson, S. Druetta, M. Hitz, D. Mayo, M.
Radiative decay following low energy charge exchange collisions at the AGRIPPA facility
Nucl. Instr. Meth. in Phys. 9 371-376 1985 E
Res. B
 $\text{Ne}^{8+}, \text{O}^{8+}, \text{Al}^{8+} + \text{H}_2 \rightarrow \text{Ne}^{7+}(\text{nl}), \text{O}^{7+}(\text{nl}), \text{Al}^{7+}(\text{nl})$
x-ray, VUV photon spectroscopy
1.56 - 3.84 keV/amu
grazing incidence spectrometer; crystal spectrometer
- 85E11 Bonnet, J.J. Fleury, A.F. Bornefoy, M. Politis, M.F. Chassevent, M. Bliman, S. Dousson, S. Hitz, D.
Electron capture into different (nl) states in slow collisions of Ne^{8+} projectiles on He and H_2 targets
J. Phys. B 18 L23-27 1985 E
 $\text{Ne}^{8+} + \text{He}, \text{H}_2 \rightarrow \text{Ne}^{7+}(\text{nl}) + \text{He}^+, \text{H}_2^+$
photon emission spectroscopy
1 - 4 keV/amu
- 85E13 Bordenave-Montesquieu, A. Benoit-Cattin, P. Gleizes, A. Marrakchi, A.I. Dousson, S. Hitz, D.
Experimental cross sections for two-electron capture into nitrogen autoionising states in $\text{N}^{6+}(q=6,7)$ on He and H_2 collisions at 10.5 q keV
Nucl. Instr. Meth. in Phys. 9 389-391 1985 E
Res. B
 $\text{N}^{6+,7+} + \text{H}_2, \text{He} \rightarrow \text{N}^{4+,5+}(\text{nl}, \text{n'l}') ; n=2,3,4$
electron spectroscopy
0.75xq keV/amu
- 85E12 Bordenave-Montesquieu, A. Boenit-Cattin, P. Gleizes, A. Dousson, S. Hitz, D.
One-electron capture into Li-like autoionizing $\text{N}^{+}(\text{1s2ln'l'})$ configurations by metastable $\text{N}^{3+}(\text{1s2s}^3\text{S})$ multicharged ions in collisions with He and H_2 , observed by electron spectroscopy at 3.4 keV/amu
J. Phys. B 18 L195-199 1985 E
 $\text{N}^{3+} + \text{He}, \text{H}_2 \rightarrow \text{N}^{+}(\text{1s2ln'l'})$
electron spectroscopy
3.42 keV/amu
- 85E14 Brazuk, A. Winter, H. Dijkkamp, D. de Heer, F.J. Drenje, A.G.
Subshell-selective electron capture from lithium by slow multiply charged ions
Nucl. Instr. Meth. B 9 442-447 1985 E
 $\text{C}^{+} + \text{Li}(2s) \rightarrow \text{C}^{+}(\text{n,l})$
1.67 - 6.67 keV/amu
- 85E15 Can, C. Gray, T.J. Varghese, S.L. Hall, J.M. Tunnel, L.N.
Electron-capture cross sections for low-energy highly charged neon and argon ions from molecular and atomic hydrogen
Phys. Rev. A 31 72-83 1985 E
 $\text{Ne}^{q+}(q=2-7), \text{Ar}^{q+}(q=2-10) + \text{H}, \text{H}_2 \rightarrow \text{Ne}^{q+}, \text{Ar}^{q+}$
H-oven
(0.4 - 1.25)xq keV
- 85E16 Cederquist, H. Andersen, L.H. Barany, A. Hvelplund, P. Knudsen, H. Nielsen, E.H. Pedersen, J.O.K. Sorensen, J.
State-selective single- and double-electron capture processes in slow $\text{C}^{+} + \text{He}, \text{Ne}, \text{Ar}$ and Xe collisions
J. Phys. B 18 3951-3969 1985 E
 $\text{C}^{+} + \text{Ne}, \text{Ar}, \text{Xe} \rightarrow \text{C}^{3+} + \text{Ne}^+, \text{Ar}^+, \text{Xe}^+; \text{C}^{4+} + \text{He}, \text{Ne} \rightarrow \text{C}^{2+} + \text{He}^{2+}, \text{Ne}^{2+}$
energy-loss/-gain
0.0416 keV/amu

85E17	Chetoui,A. Rozet,J.P. Vernhet,D. Wohrer,K. Bouisset,P. Tonati,A. Stephan,C. Charge exchange process with low energy multicharged ions; n,l populations Nucl. Instr. Meth. in Phys. 240 488-491 1985 E Res. A $Al^{12+} + He, H_2 \rightarrow Al^{11+}(n,l)$ photon spectroscopy 10xq/27 (keV/amu) Lyman spectra observed; Si(Li) used; relative intensities	85E22	Clark,M. Brandt,D. Swenson,J.K. Shafroth,S.M. Non-resonant electron transfer and projectile K-electron excitation in ion-atom collisions Phys. Rev. Letters 54 544-546 1985 E $Si^{11+} + He \rightarrow Si^{10+}$ growth 469 - 2940 keV/amu
85E18	Chetoui,A. Wohrer,K. Rozet,J.P. Vernhet,D. Stephan,C. High velocity capture process in excited states of multicharged ions Nucl. Instr. Meth. in Phys. 10/11 134-137 1985 E Res. B $Ar^{18+} + N_2 \rightarrow Ar^{17+}(np); Fe^{26+} + He, N_2 \rightarrow Fe^{25+}(np)$ 6250 keV/amu (Ar); 7140 keV/amu (Fe) n-distribution	85E71	Clark,M. Shafroth,S.M. Resonant transfer and excitation(RTE) and non-resonant transfer and excitation(NTE) in Si^{11+} on He collisions Nucl. Instr. Meth. in Phys. 10/11 124-127 1985 E Res. B $Si^{11+} + He \rightarrow Si^{10+}$ coincidence with x-ray and charge changed projectile 535 - 3571 keV/amu
85E20	Ciric,D. Brazuk,A. Dijkkamp,D. de Heer,F.J. Winter,H. State-selective electron capture in $C^{4+} - H, H_2$ collisions (0.7 - 4.6 keVamu ⁻¹) studied by photon spectroscopy J. Phys. B 18 3629-3639 1985 E $C^{3+} + H, H_2 \rightarrow C^{2+} + H^+, H_2^+$ photon emission spectroscopy 0.7 - 4.6 keV/amu	85E23	Coggiola,M.J. Bae,Y.K. Peterson,J.R. Single-electron-capture cross sections for 1-10 keV Li^+ ions in alkaline-earth vapors Phys. Rev. A 32 784-788 1985 E $Li^+ + Mg, Ca, Sr, Ba \rightarrow Li^0$ attenuation method 0.14 - 1.4 keV/amu total cross section
85E21	Ciric,D. Dijkkamp,D. Vlieg,E. de Heer,F.J. Selective electron capture into He II (n,l) subshells in collisions of He^{2+} with atomic and molecular hydrogen J. Phys. B 18 4745-4762 1985 E $He^{2+} + H, H_2 \rightarrow H^+(n,l)$ photon spectroscopy 1.25 - 10 keV/amu	85E24	Cotte,P.H. Druetta,M. Martin,S. Denis,A. Desesquelles,J. Hitz,D. Dousson,S. UV spectroscopy of charge exchange collisions between N^{3+} ions and H_2, He Nucl. Instr. Meth. in Phys. 9 743-46 1985 E Res. B $N^{3+} + H_2^+, He \rightarrow N^{4+}(1s^2nl)$ UV spectroscopy 0.8 - 3.57 keV/amu
85E19	Ciric,D. Dijkkamp,D. Vlieg,E. de Heer,F.J. Subshell-selective electron capture cross sections in collisions of He^{2+} and C^{4+} with atomic hydrogen J. Phys. B 18 L17-22 1985 E $C^{4+} + H \rightarrow C^{3+}(nl) + H^+(n=3,4); He^{2+} + H \rightarrow He^+(2p) + H^+$ photon emission spectroscopy 1 - 7 ($C^{4+}-H$), 1 - 10 ($He^{2+}-H$) keV/amu	85E28	Dijkkamp,D. Boellaard,A. de Heer,F.J. Single electron capture in slow $He^{2+} - Li$ collisions Nucl. Instr. Meth. in Phys. 9 377-381 1985 E Res. B $He^{2+} - Li \rightarrow He^+(n,l)$ VUV spectroscopy 0.55 - 10 keV/amu

- 85E25 Dijkkamp,D. Ciric,D. de Heer,F.J.
Total capture and line-emission cross sections for C^{6+} , N^{7+} , O^{8+} - H collisions in the energy range
Phys. Rev. Letters 54 1004-1007 1985 E
 C^{6+} , N^{7+} , O^{8+} - H $\rightarrow$ $C^{3+}(nl)$, $N^{6+}(nl)$, $O^{7+}(nl)$
VUV spectroscopy
3 - 7.5 keV/amu
- 85E29 Dijkkamp,D. Ciric,D. de Heer,F.J. Vlieg,E.
(n,l)-subshell electron capture cross sections in collisions of C^{4+} , N^{5+} and O^{6+} with atomic hydrogen
Nucl. Instr. Meth. in Phys. 9 403-407 1985 E
Res. B
 C^{4+} , N^{5+} , O^{6+} + H $\rightarrow$ $C^{3+}(n,l)$, $N^{4+}(n,l)$, $O^{5+}(n,l)$
VUV spectroscopy
1 - 7 keV/amu
- 85E27 Dijkkamp,D. Ciric,D. Vlieg,E. de Boer,A. de Heer,F.J.
Subshell-selective electron capture in collisions of C^{4+} , N^{5+} , O^{6+} with H, H₂ and He
J. Phys. B 18 4763-4793 1985 E
 C^{4+} , N^{5+} , O^{6+} + B $\rightarrow$ C^{3+} , N^{4+} , $O^{5+}(nl)$
photon spectroscopy
0.5 - 12 keV/amu
- 85E26 Dijkkamp,D. Gordeev,Yu.S. Brazuk,A. Drentje,A.G. de Heer,F.J.
Selective single-electron capture into (n,l) subshells in slow collisions of C^{6+} , N^{6+} , O^{6+} and Ne^{6+} with He, H₂, and Ar
J. Phys. B 18 737-756 1985 E
 C^{6+} , N^{6+} , O^{6+} , Ne^{6+} + He $\rightarrow$ $C^{5+}(nl)$, $N^{5+}(nl)$, $O^{6+}(nl)$, $Ne^{5+}(nl)$ + He⁺; C^{6+} , N^{6+} , O^{6+} + H₂ $\rightarrow$ $C^{5+}(nl)$, $N^{5+}(nl)$, $O^{6+}(nl)$ + H₂⁺; O^{6+} + Ar $\rightarrow$ $O^{5+}(nl)$ + Ar⁺
photon emission spectroscopy
0.56 - 6.25 keV/amu
- 85E31 Druetta,M. Mayo,M. Bliman,S. Martin,S. Hitz,D. Dousson,S. Deresquelles,J.
Etude spectroscopique de la collision d'echange de charge entre Ne^{8+} et He
J. de Phys. Letters 46 L869-873 1985 E
 Ne^{8+} + He $\rightarrow$ Ne^{7+} , Ne^{6+}
VUV spectrometer
2.4 - 4 keV/amu
emission cross section
- 85E30 Druetta,M. Mayo,M. Cotte,P.H. Martin,S. Dousson,S. Hitz,D. Tran Cong,K.
Absolute cross sections for electron capture into (n,l) subshells of N VI by VUV spectroscopic study of the N^{6+} - He collision
Phys. Letters 108A 338-339 1985 E
 N^{6+} + He $\rightarrow$ N^{5+} (n,l)
VUV spectrometer
4,2 keV/amu
- 85E33 DuBois,R.D.
Charge transfer and ionization of lithium by protons and helium ions
Phys. Rev. A 32 3319-3323 1985 E
 H^+ , He^{2+} , He^+ + Li $\rightarrow$ H^0 , He^+ , He^0
growth
15 - 200 keV/amu
differentials in Li charge states
- 85E32 DuBois,R.D. Toburen,L.H.
Electron capture by protons and helium ions from lithium, sodium and magnesium
Phys. Rev. A 31 3603-3611 1985 E
 H^+ , He^+ + B $\rightarrow$ H^0 , He^0 ; He^{2+} + B $\rightarrow$ He^+ , He^0 (B = Li, Na, Mg)
growth
2 - 100 keV/amu (H); 1.3 - 66.7 keV/amu (He)
- 85E34 Graham,W.G. Berkner,K.H. Bernstein,E.M. Clark,M. McFarland,R.H. Morgan,T.J. Schlechter,A.S. Stearns,J.W. Stockli,M.P. Tanis,J.A.
Charge state dependence of single electron capture and loss cross sections for highly stripped V ions in He at 8.55 MeV/amu
J. Phys. B 18 2503-2508 1985 E
 $V^{3+}(q=18-23)$ + He $\rightarrow$ $V^{(q-1)+}$
growth
8550 keV/amu
total cross sections
- 85E35 Hall,J. Richard,P. Pémiller,P.L. Gregory,D.C. Miller,P.D. Moak,C.D. Jones,C.M. Alton,G.D. Bridwell,L.B. Soffield,C.J.
Energy systematics of single- and double- K-shell vacancy production in titanium bombarded by chlorine ions
Phys. Rev. A 33 914-920 1985 E
 Cl^{8+} + Ti $\rightarrow$ $Cl^{(q-1)+}$, $Cl^{(q-2)+}$ + $Ti^+(1s^{-1})$, $Ti^{2+}(1s^{-2})$
x-ray spectroscopy
7 - 15 x10³ keV/amu

- 85E36 Hippler, R. Faust, M. Wolf, R. Kleinpoppen, H. Lutz, H.O.
Polarization studies of H(2p) charge-exchange excitation; $H^+ + Ar$ collisions
Phys. Rev. A 31 1399-1404 1985 E
 $H^+ + Ar \rightarrow H(2p) + Ar^+$
linear and circular polarizar
1.5 - 3 keV
polarization at scattering angle of 0.5 - 3.5
- 85E37 Huber, B.A. Kahlert, H.J.
Vibrational excitation of H_2^+ in electron capture collisions of Xe^{2+} and Ar^{2+} with H_2
J. Phys. B 18 491-498 1985 E
 $Xe^{2+} + H_2 \rightarrow Xe^+ + H_2^+(v)$; $Ar^{2+} + H_2 \rightarrow Ar^{2+}(nl) + H_2^+(v)$
energy-gain/-loss
 4.6×10^{-3} , 2.3×10^{-4} (Xe^{2+}); 1.5×10^{-1} , 0.75 (Ar^{2+}) keV/amu
- 85E38 Hvelplund, P. Andersen, L.H. Barany, A. Cederquist, H. Heinemeier, J. Knudsen, H. Macadam, K.B. Nielsen, E.H. Sorensen, J.
Energy-gain spectroscopy studies of state-selective electron capture for multiply charged Ar recoil ions; comparison with the extended classical barrier model
Nucl. Instr. Meth. in Phys. 9 421-425 1985 E
Res. B
 Ar^{4+} ($q=6-10$) + Ne, Ar, Xe $\rightarrow Ar^{q+}(nl)$
energy gain spectroscopy-energy defect
0.025 keV/amu
- 85E39 Jellen-Wutte, U. Schweitzer, J. Vanek, W. Winter, H.
Scattering-angle-dependent translational energy spectroscopy for electron capture by double charged ions
J. Phys. B 18 L779-785 1985 E
 Ar^{2+} , Kr^{2+} , $Xe^{2+} + He, Ne, Ar \rightarrow Ar^+, Kr^+, Xe^+$
translational energy spectroscopy
identification of various reaction channel
- 85E40 Jones, M.L. Doughty, B.M. Dillingham, T.R. Jones, T.A.
Electron capture by 20 - 150 keV protons on hydrogen gases
Nucl. Instr. Meth. in Phys. 10/11 142-145 1985 E
Res. B
 $H^+ + CO, CH_4, C_2H_6, C_3H_8 \rightarrow H^0$
growth
20 - 150 keV/amu
- 85E42 Kamber, E.Y. Brenton, A.G. Beynon, J.H. Hasted, J.B.
Single-electron capture spectra for collisions of O^{2+} on He, N_2 and H_2
J. Phys. B 18 933-941 1985 E
 $O^{2+} + He, N_2, H_2 \rightarrow O^{+}(nl)$
translational spectroscopy
0.125 - 0.38 keV/amu
- 85E41 Kamber, E.Y. Hormis, W.G. Brenton, A.G. Hasted, J.B. Baynon, J.H.
Double electron capture by Ar^{2+} from rare-gas atoms
J. Phys. B 18 117-124 1985 E
 $Ar^{2+} + He, Ne, Ar, Kr \rightarrow Ar^+ + He^{2+}, Ne^{2+}, Ar^{2+}, Kr^{2+}$
energy-loss/-gain
0.2 keV/amu
- 85E75 Kelbch, S. Ullrich, J. Mann, R. Richard, P. Schmidt-Bocking, H.
Cross sections for the production of highly charged argon and xenon recoil ions in collisions with high velocity uranium projectiles.
J. Phys. B 20 323 - 336 1985 E
 U^{9+} ($q = 65 - 75$) + Ar, Xe $\rightarrow U^{(q-1)+}$ ($q = 1-4$) + Ar^{2+} ($i = 1-18$), Xe^{2+} ($i = 1-33$)
scattered projectile-recoil ion coincidence technique
3600 - 15500 keV/amu
partial (r,i) cross sections given
- 85E43 Lee, A.R. Williams, D.G. Butcher, E.C.
Isotope effect in electron capture by protons into the 2s-state of hydrogen
Phys. Letters 107A 218-220 1985 E
 $H^+ + H_2, D_2 \rightarrow H(2s)$
photon measurement
8 - 16 keV/amu
no isotope effect found
- 85E44 Lembo, L.J. Danzmann, K. Stoller, Ch. Meyerhof, W.E. Hansch, T.W.
Observation of polarized optical radiation following electron capture into slow, highly ionized neon
Phys. Rev. Letters 55 1874-1876 1985 E
4 keV $Ne^{8+} + Na \rightarrow Ne^{7+}(nl)$
0.2 keV/amu

85E46	Maro,M. Hitz,D. Druetta,M. Dousson,S. Desclaux,J.P. Blümann,S. Spectroscopy of Al VIII produced by low energy charge changing collisions Phys. Rev. Letters 54 317-319 1985 E $Al^{18+} + H_2 \rightarrow Al^{17+}$ optical spectroscopy 3 keV/amu	85E50	Meyer,F.W. Howald,A.M. Havener,C.C. Phaneuf,R.A. Low-energy total electron capture cross sections for fully stripped and H-like projectiles incident on H and H_2 Phys. Rev. A 32 3310-3318 1985 E $A^{Z+}(Z-1)^+ + H, H_2 \rightarrow A^{(Z-1)+}(Z-2)^+ (A = C, N, O, F, Ne)$ H-oven 0.18 - 8.5 keV/amu
85E45	Mathur,D. Badrinathan,C. Rajgara,F.A. Rafeja,U.T. Electron capture collisions of $Kr^{2+}(^3P)$ in H_2 J. Phys. B 18 4795-4804 1985 E $Kr^{2+}(^3P) + H_2 \rightarrow Kr^+$ growth + energy loss spectroscopy 0.012 - 0.06 keV/amu	85E51	Meyerhof,W.E. Anholt,R. Eichler,J. Gould,H. Munger,Ch. Alonso,J. Thieberger,P. Wegner,H.E. Atomic collisions with relativistic heavy ions. III. electron capture Phys. Rev. A 32 3291-3301 1985 E $Xe^{6+} + B \rightarrow Xe^{6-i+} (q=52-54; B=Be-Au; i=1-3)$ solid target 82000 - 200000 keV/amu
85E47	McAfee,K.B. Hozack,R.S. Charge and energy transfer in symmetric doubly charged $Ar^{2+} + Ar$ collisions Phys. Rev. A 32 810-814 1985 E $Ar^{2+}(^1S) + Ar \rightarrow Ar + Ar^{2+}(^3P)$ translational energy spectroscopy 0.006 keV/amu energy spectra only	85E52	Nakamura,T. Kobayashi,N. Kaneko,Y. Ion-energy-loss spectroscopy of Kr^{2+} -He and -Ne collisions II. one-electron capture processes J. Phys. Soc. Japan 54 1743-1749 1985 E $Kr^{2+}(^3P, ^1D_2, ^1S_0) + He, Ne \rightarrow Kr^+$ energy-loss spectroscopy 0.006 - 0.018 keV/amu
85E48	McDaniel,F.D. Totten,A. Bhalla,R.P. Lapicki,G. Carbon K-shell vacancy production and K-K electron capture cross sections for 0.4 - 1.5 MeV H^+ ions incident on CH_4 targets Nucl. Instr. Meth. A24 492-497 1985 E $H^+ + C \rightarrow H(1s) + C^+(1s^{-1})$ Auger electron coincidence 400 - 1500 keV/amu	85E53	Nielsen,E.H. Andersen,L.H. Barany,A. Cedarquist,H. Heinemeier,J. Hvelplund,P. Knudsen,H. MacAdam,K.B. Sorensen,J. Energy-gain spectroscopy of state-selective electron capture for multiply charged Ar recoil ions J. Phys. B 18 1789-1808 1985 E $Ar^{q+} + Ne, Ar, Xe \rightarrow Ar^{q-1+} (q=6-10)$ energy-gain/-loss spectroscopy $1 \times 10^{-2} - 5 \times 10^{-2}$ keV/amu
85E49	Meyer,F.W. Howald,A.M. Havener,C.C. Phaneuf,R.A. Observation of low-energy Z oscillations in total electron capture cross sections for bare projectiles colliding with H and H_2 Phys. Rev. Letters 54 2663-2666 1985 E $A^{Z+} + H, H_2 \rightarrow A^{(Z-1)+} (A = C, N, O, F, Ne)$ growth 0.3 - 3.0 keV/amu total cross section	85E54	Pearl,B. Bennett,M.A. Dolder,K. New measurements of the mutual neutralization of H^+/H^- and He^+/H^- ions J. Phys. B 18 L439-444 1985 E $H^+ + H^- \rightarrow H + H; He^+ + H^- \rightarrow He + H$ crossed beam technique 0.03 - 2 keV/amu (H^+); 0.1 - 3 keV/amu (He^+)

85E73	Pepmiller, P.L. Richard, P. Newcomb, J. Hall, J. Dillingham, T.R. Formation of doubly excited two-electron ions during $F^{8+} + He$, $F^{8+} + Ne$ and $F^{8+} + Ar$ collisions. Phys. Rev. A 31 734-743 1985 E $F^{8+}(1s) + He, Ne, Ar \rightarrow F^{7+}(2p^2, 2s2p)$ photon spectroscopy 684 - 1630 keV/amu	85E59	Rozet, J.P. Chevallier, P. Legagneux-Piquerna, P. Chetoui, A. Stephan, C. Capture cross sections in highly excited P states of Ar^{17+} in high velocity collisions of 250 MeV Ar^{18+} on N J. Phys. B 18 943-948 1985 E $Ar^{18+} + N_2 \rightarrow Ar^{17+}$ (np, n≤10) x-ray spectroscopy 6250 keV/amu $1/n^3$ distribution
85E55	Phaneuf, R.A. Kimura, M. Sato, H. Olson, R.E. Electron capture by slow Al^{10+} ions colliding with hydrogen Phys. Rev. A 31 2914-2917 1985 E $Al^{10+}(q=2-10) + H, H_2 \rightarrow Al^{(q-1)+}$ E. growth; T. MO expansion 0.02 - 0.12 keV/amu total cross section; laser source	85E60	Rudd, M.E. Goffe, T.V. Itoh, A. Ionization cross sections for 10 - 300 keV/U and electron capture cross sections for 5 - 150 keV/U $^3He^{2+}$ ions in gases Phys. Rev. A 32 2128-2133 1985 E $He^{2+} + B \rightarrow He^+, He^0$ (B = He, Ne, Ar, Kr, H ₂ , N ₂ , CO, O ₂ , CH ₄ , CO ₂ , H ₂ O) condenser plate 1.67 - 50 keV/amu total cross section
85E56	Puerta, J. Huber, B.A. Single electron capture by state-prepared Ar^{2+} projectiles in Ar J. Phys. B 18 4445-4453 1985 E $Ar^{2+} + Ar \rightarrow Ar^+$ translational energy spectroscopy 0.01 keV/amu metastable fraction	85E61	Rudd, M.E. Itoh, A. Goffe, T.V. Cross sections for ionization, capture and loss for 5 - 450 keV He^+ on water vapor Phys. Rev. A 32 2499-2500 1985 E $He^+ + H_2O \rightarrow He^0, He^{2+}$ condenser plate 1.25 - 112.5 keV/amu
85E57	Puerta, J. Kahlert, H.J. Koslowski, H.R. Huber, B.A. Single electron capture by state-selected multiply charged Ar^{n+} ions (q=3,4) Nucl. Instr. Meth. in Phys. 9 415-420 1985 E Res. B $Ar^{3+,4+} + He, Ne, Ar, Kr \rightarrow Ar^{2+}, Ar^{3+}$ translational energy spectroscopy 0.02 keV/amu forward angles (theta - 0±0.7)	85E62	Scheurer, J.N. Baker, O.K. Meyerhof, W.E. Large angle scattering and nuclear resonance effect in electron capture in $H^+ + C$ and $H^+ + N$ collisions J. Phys. B 18 L85-89 1985 E $H^+ + C, N \rightarrow H^0$ 350 - 1000 keV/amu (C), 1050 - 1065 keV/amu (N) theta = 30, 150
85E58	Rinn, K. Melchert, F. Salzborn, E. Measurements of charge transfer in $H^+ - He^+$ collisions J. Phys. B 18 3783-3795 1985 E $H^+ + He^{6+} \rightarrow H^0 + He^{2+}$ crossed beam technique 8 - 100 keV/amu	85E74	Serenkov, I.T. Illin, R.N. Sakharov, V.I. Detachment of an electron from hydrogen, chlorine, or titanium ions colliding with argon, sodium or magnesium. Sov. Phys.-JETP 61 243-248 1985 E $H^+ + B \rightarrow H$ (B = Na, H ₂) ; $Cl^+ + B \rightarrow Cl$ (B = Ar, Na, Mg) ; $Ti^+ + B \rightarrow Ti$ (B = Ar, Na, Mg) growth 0.2 - 5 keV/amu

- 85E63 Shafroth,S.M. Aways, Y. Kase, M. Kambara, T. Kumagai, H. Nishida, M. Shibata, H. Tawara, H.
Angular distribution of REC for Ar^{4+} on C at 1 MeV/amu
Nucl. Instr. Meth. in Phys. 240 546-548 1985 E
Res. A
 $Ar^{q+} + C \rightarrow Ar^{q+1+}(1s) + h\nu + C^+$
x-ray spectroscopy
1000 keV/amu
angular distribution
- 85E64 Shah, M.B. Elliott, D.S. Gilbody, H.B.
Ionization and charge transfer in collisions of H^+ and He^{2+} with lithium
J. Phys. B 18 4245-4258 1985 E
 H^+ , $He^{2+} + Li \rightarrow H^0$, He^+
growth method
22 - 2100 keV/amu
Li-oven
- 85E72 Tanis, J.A. Bernstein, E.M. Oglesby, C.S. Graham, W.G. Clark, M. McFarland, R.H. Morgan, T.J. Stockli, M.P. Berkner, K.H. Schlachter, A.S. Sterns, J.W. Johnson, B.M. Jones, K.W. Meron, M.
Resonant-transfer and excitation for highly charged ions ($16 \leq Z \leq 23$)
Nucl. Instr. Meth. in Phys. 10/11 128-233 1985 E
Res. B
 S^{13+} , Ca^{16+} - $1s^+$, V^{19+} - $2s^+$ + $He \rightarrow S^{12+}$, Ca^{15+} - $1s^+$, V^{18+} - $2s^+$ + He^+
coincidence
469 - 6250 (S); 2500 - 9000 (Ca); 3529 - 9020 (V) keV/amu
- 85E65 Tawara, H. Iwai, T. Kaneko, Y. Kimura, M. Kobayashi, N. Matsumoto, A. Ohtani, K. Takagi, S. Tsurubuchi, S.
Electron capture in $Fr^+(q=10-41) + He$ collisions at low energies
Nucl. Instr. in Phys. Res. B 9 432-434 1985 E
 $Fr^+(q=10-41) + He \rightarrow Fr^{q+1+}$
energy gain spectroscopy
0.08 - 0.3 keV/amu
cross sections vs. q and crossing radius
- 85E66 Tawara, H. Iwai, T. Kaneko, Y. Kimura, M. Kobayashi, N. Matsumoto, A. Ohtani, S. Okuno, K. Takagi, S. Tsurubuchi, S.
Electron capture processes of Fr^+ ions with very high charge state ($41 \leq q \leq 10$) in collisions with He atoms
J. Phys. B 18 337-350 1985 E
 $Fr^+ + He \rightarrow Fr^{q+1+} + He^+$ ($q=10-41$)
energy-loss/gain
 6×10^{-2} - 0.73 keV/amu
- 85E67 van Wijngaarden, A. Patel, J. Becker, K. Drake, G.W.F.
Charge-exchange processes of hydrogen ions with Hg atoms at keV energies
Phys. Rev. A 32 2150-2157 1985 E
 $H^+ + Hg \rightarrow H^0$; $H^+ + Hg \rightarrow H^0$
growth
23.8 - 134.2 keV/amu
- 85E68 Varghese, S.L. Bissinger, G. Joyce, J.M. Laubert, R.
Atomic total electron-capture cross sections from C, O, F and S bearing molecular gases for -MeV/u H^+ and He^+ projectiles
Phys. Rev. A 31 2202-2209 1985 E
 H^+ , $He^+ + B = H^0$, He^0 ($B = C, O, F, S$ compound gas)
growth
800 - 3000 keV/amu (H); 800 keV/amu (He)
- 85E69 Vernhet, D. Chetoui, A. Wohrer, K. Rozet, J.P. Piquemal, P. Hitz, P. Dousson, S. Salin, A. Stephan, C.
Alignment of Ne^{8+} nP states produced by collisions of Ne^{8+} with H_2 at 4 keV/amu
Phys. Rev. A 32 1256-1259 1985 E
 $Ne^{8+} + H_2 \rightarrow Ne^{8+}(1snl)$
4 keV/amu
- 85E70 Wilkie, F.G. Yousif, F.B. McCullough, R.W. Geddes, J. Gilbody, H.B.
Total and state-selective capture by slow N^{2+} ions in atomic and molecular hydrogen
J. Phys. B 18 479-489 1985 E
 $N^{2+} + H \rightarrow N^+(2p^2) + H^+$; $N^{2+} + H, H_2 \rightarrow N^+ + H^+, H_2^+$
energy-gain/-loss
 4.28×10^{-2} - 14.3 keV/amu

85T59	Abramov, V.A., Lisitsa, V.S., Pigarov, A.Yu. Changes in effective charge-exchange cross sections in a plasma JETP Letters 42 356-358 1985 T enhancement of cross sections due to excited atoms in a plasma	85T 3	Burgdörfer, J., Dube, L.J. Population of Rydberg states by electron capture in fast-ion-atom collisions Phys. Rev. A 31 634-640 1985 T $z^+ + H(1s) \rightarrow H(n=10, 1, m) + H^+$ CDW 25 - 10000 keV/amu
85T 1	Allan, R.J., Hanssen, J. Quasimolecular treatment of Na - Na ⁺ , Li - Li ⁺ , Li - Na ⁺ and Na - Li ⁺ collisions with a common translation factor J. Phys. B 18 1981-1997 1985 T $Li^+ + Li(2s), Na(3s) \rightarrow Li^0; Na^+ + Li(2s), Na(3s) \rightarrow Na^+$ CC with ETF 0.06 - 3.4 keV/amu	85T 4	Burgdörfer, J. Final state angular momentum distributions in charge transfer collisions at high energies Nucl. Instr. Meth. in Phys. A240 519-526 1985 T Res. $A^{2+} + B(1s) \rightarrow A^{(n-1)+}(nlm) + B^+$ Born, CDW, PCI, quasi-resonant over barrier model 30 - 500 keV/amu
85T60	Anholt, R. Atomic collisions with relativistic heavy ions II. light-ion charge states. Phys. Rev. A 31 3579 - 3592 1985 T $C^{6+}, Ne^{10+}, Ar^{18+} + B \rightarrow C^{5+}, Ne^{9+}, Ar^{17+}$ (non-radiative) (B= Al, Ni, Cu, Ag, Ta, Au) four state model $1.4 \times 10^3 - 2.1 \times 10^6$ keV/amu	85T 5	Chatterjee, I., Bhattacharyya, B. Quantum electrodynamic study of electron capture by light stripped ions Phys. Scripta 32 504-506 1985 T $Li^{3+} + H \rightarrow Li^{2+}$ relativistic QED 14 - 285 keV/amu
85T 2	Anholt, R., Eichler, I. Eikonal calculations of electron capture by relativistic projectiles Phys. Rev. A 31 3505-3508 1985 T $C^{6+}, Ne^{10+}, Ar^{18+} + B \rightarrow C^{5+}, Ne^{9+}, Ar^{17+}$ (B = Al-U) eikonal 140000 - 2100000 keV/amu	85T 6	Chatterjee, S.N., Roy, B.N. Modified BEA calculations of He ²⁺ impact double electron capture cross sections of atoms J. Phys. B 18 4283-4293 1985 T $He^{2+} + He, Li, Ar, Kr \rightarrow He^0$ BEA 10 - 250 keV/amu
85T64	Bendahan, M., Bliman, S., Dousson, S., Hitz, D., Gayet, R., Hanssen, J., Harel, C., Salin, A. Electron capture from atomic hydrogen by multiply charged ions in low energy collisions J. de Phys. 46 561-572 1985 T $A^{q+} + H \rightarrow A^{(q-1)+} + H^+$ (A = B, C, N, O, F, Ne; q= 4-10) 0.25 - 50 keV/amu molecular calculation with translational factor	85T 9	Crother, D.S.F., McCann, J.F. Exact two-channel variational continuum distorted-wave theory; results for symmetric resonant exchange J. Phys. B 18 2907-2913 1985 T $H^+ + H(1s) \rightarrow H(1s) + H^+$ CDW, travelling AO 1 - 500 keV/amu

85T 7	Crothers,D.S.F. First-order continuum-distorted-wave double-scattering nlm transitions J. Phys. B 18 2879-2892 1985 T $A^{2+} + B^{(e-1)l}(1s) \rightarrow A^{(e-1)l}(nlm)$ first-order CDW double scattering	85T14	Dube,I.J., Will,U. Bruch,R. Trabert,E. Heckmann,P.H. Theory and experiment of electron capture in collisions of multiply charged projectiles with light targets Nucl. Instr. Meth. in Phys. 9 408-412 1985 T Res. B $C^{4+} + H_2, He \rightarrow C^{3+}(1s^2nl)$ T : CDW, B1 ; E : photon spectroscopy 166 - 417 keV/amu
85T 8	Crothers,D.S.F. Second-order continuum-distorted-wave double scattering nlm transitions J. Phys. B 18 2893-2906 1985 T $A^{2+} + B^{(e-1)l}(1s) \rightarrow A^{(e-1)l}(nlm)$ second-order CDW double scattering	85T15	Eicher,J. Relativistic eikonal theory of electron capture Phys. Rev. A 32 112-121 1985 T $Ne^{10+} + B^{(e-1)l+} \rightarrow Ne^{9+}(1s) + B^{2+}$ relativistic eikonal 10000 - 100000000 keV/amu analytic expression
85T10	Deco,G.R. Rivarola,R.D. A second-order symmetric eikonal approximation for electron capture at high energies J. Phys. B 18 2283-2293 1985 T $H^+ + H(1s) \rightarrow H(1s)$ symmetric eikonal approximation, CDW 500 - 200000 keV/amu	85T16	Errea,L.F. Gomez-Llorente,J.M. Mendez,L. Riera,A. Practical criterion for the determination of translation factors, II. Application to $He^{2+} + H(1s)$ collisions Phys. Rev. A 32 2158-2165 1985 T $He^{2+} + H \rightarrow He^{+}(nl) + H^+$ CC (MO) with ETF 0.25 - 25 keV/amu
85T11	Dewangan,D.P. Eichler,J. Boundary conditions and the strong potential Born approximation for electron capture J. Phys. B 18 165-69 1985 T strong potential Born approximation	85T17	Errea,L.F. Mendez,L. Riera,A. Yonez,M. Hansen,J. Harel,C. Salin,A. Charge exchange in $Li^{2+}(1s) + H(1s)$ collisions, A molecular approach including two-electron translation factors J. de Physique 46 719-726 1985 T $Li^{2+}(1s) + H(1s) \rightarrow Li^{+}(1s2s), Li^{+}(1s2p), Li^{+}(total)$ 8 MO expansion method with ETF 0.5 - 25 keV/amu
85T13	Dube,I.J., Burgdörfer,J. Electron capture into Rydberg states in collisions between multiply charged ions and hydrogen Nucl. Instr. Meth. in Phys. 9 392-396 1985 T Res. B $C^{6+} + H(1s) \rightarrow C^{5+}(nlm) + H^+$ CDW, CDW-PCI 25 - 900 keV/amu multiple scattering effect ; partial cross section	85T18	Fritsch,W. Lin,C.D. Close-coupling study of K-shell vacancy production in near-symmetric collisions Phys. Rev. A 31 1164-1167 1985 T $F^{8+} + Ne \rightarrow F^{7+} + Ne^{+}(1s^{-1}) ; S^{15+} + Ar \rightarrow S^{14+} + Ar^{+}(1s^{-1})$ modified AO 231 - 520 keV/amu (F); 500 - 2800 keV/amu (S)
85T12	Dube,I.J. Eichler,J. Structural and asymptotic properties of the eikonal approximation for electron capture J. Phys. B 18 2467-2483 1985 T eikonal approximation formulation		

- 85T19 Gargaud, M. McCarroll, R.
Charge transfer in low-energy collisions of N^{3+} , C^{4+} and N^{3+} with H and H_2
J. Phys. B 18 463-477 1985 T
 N^{3+} , C^{4+} , N^{3+} + H, $H_2 \rightarrow N^{2+}$, C^{3+} , N^{4+} + H^+ , H_2^+
CC(MO)
1.0 keV/amu
- 85T20 Gayet, R. Hanssen, J. Harel, C. Salin, A.
Electron capture from atomic hydrogen in the keV/amu energy range
Nucl. Instr. Meth. in Phys. 9 413-414 1985 T
Res. B
 C^{4+} , N^{3+} , O^{6+} + H $\rightarrow$ C^{3+} , N^{4+} , O^{5+} + H^+
Molecular calculation
0.25 - 25 keV/amu
- 85T21 Ghosh, M. Mandal, C.R. Mukherjee, S.C.
Single and double electron capture from lithium by fast alpha particles
J. Phys. B 18 3797-3804 1985 T
 He^{2+} + Li $\rightarrow$ $He^+(nl)$ + Li; He^0 + Li^{2+}
CDW approximation
200 - 500 keV/amu
- 85T22 Gorzdanov, T.P. Janev, R.K. Lazur, V. Yu.
Two-electron exchange in slow ion-atom collisions
Phys. Scripta 32 64-68 1985 T
 A^{2+} + A $\rightarrow$ A + A^{2+} (A = Ne, Ar, Kr, Xe)
asymptotic expansion
 3.8×10^{-3} - 0.25 keV/amu
total cross section
- 85T61 Horbatsch, M. Dreizler, R.M.
Semiclassical description of electron loss in fast U^{6+} / $^{73+}$ - Ar collisions.
Phys. Letters 113A 251 - 253 1985 T
 U^{6+} , U^{73+} + Ar $\rightarrow$ Ar $^{+}$
quantum statistical, semiclassical, independent particle model
3600 - 15000 keV/amu
total cross sections.
- 85T23 Humphries, W.J. Moiseiwitsch, B.L.
Third Born approximation for electron capture at relativistic energies
J. Phys. B 18 1209-1222 1985 T
 A^{Z+} + $B^{(Z-1)+} \rightarrow A^{(Z-1)+}$ + B^{Z+}
third Born approximation
analytic expression; no cross sections given
- 85T24 Humphries, W.J. Moiseiwitsch, B.L.
Total cross sections for electron capture at relativistic energies
J. Phys. B 18 2295-2301 1985 T
 A^{Z+} + $B^{(Z-1)+}(1s) \rightarrow A^{(Z-1)+}(1s)$ + B^{Z+} (A = C, Ne, Ar; B = Al, Cu, Ag)
relativistic second Born approximation
140000 - 1050000 keV/amu
- 85T26 Jakubassa-Amundsen, D.H.
Nonadiabatic sliding model for rearrangement collisions
Phys. Rev. A 32 2166-2174 1985 T
 O^{8+} + C $\rightarrow$ O^{7+} + C + hv; S^{16+} + Ne $\rightarrow$ S^{15+} + Ne $^+$ + hv (REC)
sliding model
- 85T27 Jakubassa-Amundsen, D.H.
Radiative electron capture accompanying resonant nuclear scattering
Z. Phys. A 322 191-197 1985 T
 $^{16}O^{8+}$, $^{20}Ne^{10+}$ + He $\rightarrow$ O^{7+} , Ne $^{9+}$
1187 - 1250 keV/amu (O), 885 - 887 keV/amu (Ne)
- 85T25 Jakubassa-Amundsen, D.H. Amundsen, P.A.
Exact relativistic second Born approximation for electron capture
Phys. Rev. A 32 3106-3108 1985 T
relativistic second Born approximation
scaling at asymptotic region, $(\ln E)^2/E$
- 85T28 Jakubassa-Amundsen, D.H. Amundsen, P.A.
Electron capture across a nuclear resonance in the strong potential Born approximation
J. Phys. B 18 757-774 1985 T
 H^+ + ^{22}Ne , ^{28}Si , $^{36}Ni \rightarrow H^0$; He^{2+} + ^{16}O , ^{20}Ne , $^{28}Si \rightarrow He^+$
strong potential Born approximation
1000 - 5500 keV/amu

85T29	Janev,R.K. Nedeljkovic,N.N. Quasi-stationary spectrum of Rydberg atoms in the field of a highly charged ion J. Phys. B 19 1809-1825 1985 T $A^{Z+} + B(n \gg 1) \rightarrow A^{(Z-1)+} + B^+ (A \gg B)$ Tunneling theory	85T30	Kimura,M. Olson,R.E. Electron capture in pseudo-two-electron systems ; $Ar^{4+} + He$ Phys. Rev. A 31 489-491 1985 T $Ar^{4+} + He \rightarrow Ar^{7+}(nl) + He^+$ PSS (MO) with two electron ETF 0.02 - 10 keV/amu
85T32	Kimura,M. Molecular-state treatment of excitation and charge transfer processes in $H^+ + He(1s^2)$ collisions Phys. Rev. A 31 2158-2161 1985 T $H^+ + He(1s^2) \rightarrow H(nl) + He^+(1s)$; $H^+ + He(1s, 2l)$ MO expansion with IP 1 - 30 keV/amu	85T35	Kimura,M. Olson,R.E. Electron capture in $O^{8+} - He$ collisions J. Phys. B 18 2729-2735 1985 T $O^{8+} + He \rightarrow O^{7+} + He^+$ MO expansion with ETF 0.2 - 50 keV/amu total cross section
85T33	Kimura,M. Charge transfer in ion-molecule collisions at keV energy region ; Study of $H^+ + H_2$ collisions by the electron-translational-factor-modified molecular-orbital-expansion method Phys. Rev. A 32 802-809 1985 T $H^+ + H_2 \rightarrow H(1s) + H_2$ MO expansion with ETF 0.2 - 20 keV/amu cross section ratios between H and H_2 targets	85T36	Kimura,M. Olson,R.E. Slow ion-atom collisions Nucl. Instr. Meth. in Phys. 10/11 207-213 1985 T Res. B $H^+ + H \rightarrow H^0$; $He^{2+} + Li \rightarrow He^+$; $Ti^{4+} + H \rightarrow Ti^{3+}$; $C^{4+} + He \rightarrow C^{3+}$; $C^{5+} + He \rightarrow C^{3+}(nl)$; $H^+ + Cs \rightarrow H^0$ MO review ; partial cross section for $C^{6+} + He \rightarrow C^{3+}(nl)$; total cross section for others
85T34	Kimura,M. Lin,C.D. Unified treatment of slow atom-atom and ion-atom collisions. II. Applications to $H^+ + H$ and $C^{6+} + H$ collisions Phys. Rev. A 32 357-1362 1985 T $H^+ + H \rightarrow H + H^+$; $C^{6+} + H \rightarrow C^{3+} + H^+$ unified treatment (matching method) 1 - 15 (H), 0.1 - 10 (C^{6+}) keV/amu	85T37	Kobayashi,K. Toshima,N. Ishihara,T. Eikonal approximation for proton-helium electron capture processes Phys. Rev. A 32 1363-1368 1985 T $H^+ + He \rightarrow H + He^+$ eikonal approximation $10^2 - 10^4$ keV/amu total and angle-differential cross sections
85T31	Kimura,M. Lin,C.D. Unified treatment of slow atom-atom and ion-atom collisions Phys. Rev. A 31 590-592 1985 T $H^+ + He^+ \rightarrow H + He^{2+}$; $H^+ + He^{2+} + e$ MO (at inner region) + AO (at large nuclear distance) 2 - 5 keV/amu no cross sections given for charge transfer	85T38	Kochbach,L. Taulbjerg,K. On the theory of electron capture from inner shells in intermediate and high-energy collisions J. Phys. B 18 L79-83 1985 T IA no absolute cross sections given

- 85T39 Macek,J.
Treatment of divergent terms in the strong potential Born approximation
J. Phys. B 18 L71-74 1985 T
strong potential Born approximation
modified Coulomb Green's function to avoid divergence
- 85T40 Martiarena,M.I. Garibotti,C.R.
Radiative electron capture to the continuum
Phys. Letters 113A 307-310 1985 T
radiative electron capture to continuum in $H^+ + He$; $Ne^{10+} + He$; $Ar^{16+} + He$
first Born
RECC spectra in Ne^{10+} , $Ar^{17+} + He$ collisions
- 85T41 McCann,J.F.
Continuum distorted-wave theory of relativistic electron capture
J. Phys. B 18 L569-573 1985 T
 $H^+ + H(1s) \rightarrow H(1s) + H^+$; $H^+ + B^{4+}(1s) \rightarrow H(1s) + B^{3+}$
relativistic CDW theory
 $10^3 - 10^8$ keV/amu
- 85T42 McDowell,M.R.C. Janev,R.K.
Charge exchange and ionisation in collisions of fast partially stripped ions of iron with hydrogen
J. Phys. B 18 L295-301 1985 T
 $Fe^{9+} + H \rightarrow Fe^{q-1+} + H^+$; $Fe^{q+} + H^+ \rightarrow e$ ($q=12-18$)
CTMC
10 - 400 keV/amu
Scaling laws for the cross sections as a function of q
- 85T43 McGuire,J.H. Kletke,R.E. Sil,N.C.
Strong-potential Born calculations for 1s-1s electron capture from atoms by protons
Phys. Rev. A 32 815-821 1985 T
 $H^+ + B \rightarrow H + B^+(1s^{-1})$ ($B = H, He, C, Ne, Ar, Xe$)
strong potential Born approximation
200 - 100000 keV/amu
angle-differential cross sections
- 85T44 Miraglia,J.E.
Radiative electron capture in proton-hydrogen collisions
Phys. Rev. A 32 2702-2706 1985 T
 $H^+ + H \rightarrow H^0 + H^+ + h\nu$
Born, CDW
 $10 - 10^4$ keV/amu
- 85T45 Miraglia,J.E. Garibotti,C.R. Gonzalez,A.D.
Photon spectrum associated with radiative electron capture processes
Phys. Rev. A 32 250-253 1985 T
 $Ne^{10+} + He, Ne \rightarrow Ne^{9+}; Ar^{17+} + He \rightarrow Ar^{16+}$
first Born approximation
7000 keV/amu (Ne), 7200 keV/amu (Ar)
- 85T62 Newby, C.W.
Charge transfer calculations using switching functions.
J. Phys. B 18 1781 - 1788 1985 T
 $He^{2+} + H(1s) \rightarrow He^+(2s,n=2) + H^+$
AO with translation factor
0.25 - 200 keV/amu
- 85T47 Olson,R.E. Kimura,M.
Molecular-state cross section calculations for $H + Na \rightarrow < H^+ + Na^+$
Phys. Rev. A 32 3092-3094 1985 T
 $H + Na \rightarrow H^+ + Na^+$; $H + Na^+ \rightarrow H + Na$ (3s, 3p, 4s)
pseudo potential MO
0.1 - 5 keV/amu
- 85T44 McGuire,J.H.
Non-orthogonality in the strong potential Born approximation
J. Phys. B 18 L75-77 1985 T
strong potential Born approximation

- 85T63 Opradole, L., McCarroll, R., Valion, P.
Charge transfer of Si^{4+} with helium.
Astron. Astrophys. 148 229-233 1985 T
 $\text{Si}^{4+} + \text{He} \rightarrow \text{Si}^{3+}(2p^3 3p)^2P, (2p^4 3s)^2S + \text{He}^+$; $\text{Si}^{3+} + \text{He}^+ \rightarrow \text{Si}^{4+} + \text{He}$
molecular quantal treatment
 $4 \times 10^{-7} - 3.5 \text{ keV/amu}$
rates given
- 85T48 Peach, G., Willis, S.L., McDowell, M.R.C.
The classical theory of charge transfer and ionization processes in collisions between complex atomic ions
J. Phys. B 18 3921-3937 1985 T
classical theory
general theory
- 85T49 Saha, G.C., Datta, S., Mukherjee, S.C.
Electron capture from multielectron atoms by fast ions in the continuum intermediate-state approximation
Phys. Rev. A 31 3633-3638 1985 T
 $\text{H}^+ + \text{C}, \text{N}, \text{O}, \text{Ne}, \text{Ar} \rightarrow \text{H}^0$
continuum-intermediate-state approximation
 $500 - 20000 \text{ keV/amu}$
- 85T50 Shingal, R., Bransden, B.H., Flower, D.R.
Neutralization in $\text{H}^+ + \text{H}$ collisions
J. Phys. B 18 2485-2491 1985 T
 $\text{H}^+ + \text{H}^+ \rightarrow \text{H}(1s) + \text{H}(nl)$
two-center AO expansion method
 $8 - 50 \text{ keV/amu}$
- 85T51 Sidorovich, V.A., Nikolaev, V.S., McGuire, J.H.
Calculation of charge-changing cross sections in collisions of H^+ , He^{2+} and Li^{3+} with He atoms
Phys. Rev. A 31 2193-2201 1985 T
 $\text{A}^{2+} + \text{He} \rightarrow \text{A}^{(1)+}(1s), \text{A}^{(2)+}(1s^2)$
independent-electron model
 $25 - 4000 \text{ keV/amu}$
also single and double ionization of He; ionization with electron capture into ground state
- 85T52 Stallcop, J.R., Partridge, H.
 $\text{N}^+ - \text{N}$ long-range interaction energies and resonance charge exchange
Phys. Rev. A 32 639-642 1985 T
 $\text{N}^+ + \text{N} \rightarrow \text{N} + \text{N}^+$
self-consistent field method
 $7 \times 10^{-5} - 7 \times 10^{-3} \text{ keV/amu}$
- 85T53 Stich, W., Lüdde, H.J., Dreizler, R.M.
TDHF calculations for two-electron systems
J. Phys. B 18 1195-1207 1985 T
 $\text{H}^+ + \text{He}(1s^2) \rightarrow \text{H}; \text{He}^{2+} + \text{He}(1s^2) \rightarrow \text{He}^+, \text{He}^0; \text{Li}^{3+} + \text{He}(1s^2) \rightarrow \text{Li}^{2+}; \text{He}^+(2s) + \text{H}(1s), \text{He}^+(2s) \rightarrow \text{He}$
TDHF
 $7 \times 10^{-5} - 7 \times 10^{-3} \text{ keV/amu}$
- 85T54 Thylwe, K.E., Barany, A.
A semiclassical analysis of orbiting resonances in slow charge transfer processes
Nucl. Instr. Meth. in Phys. 9 435-437 1985 T
Res. B
 $\text{N}^{3+} + \text{H} \rightarrow \text{N}^{2+}$
semiclassical
 $10^{-5} - 10^{-2} \text{ keV/amu}$
total cross sections
- 85T55 Toepfer, A., Lüdde, H.J., Jacob, B., Dreizler, R.M.
Many-electron aspects in ion-atom collisions; $2p-2s$ vacancy transfer in the $\text{Ne}^+ + \text{Ne}$ system
J. Phys. B 18 1969-1980 1985 T
 $\text{Ne}^+ + \text{Ne} \rightarrow \text{Ne}(2p) + \text{Ne}^+(2s)$
IP
 $0.25 - 25 \text{ keV/amu}$
- 85T56 van Hemert, M.C., van Dishoeck, E.F., van der Hart, J.A., Koike, F.
Quantum-mechanical and impact-parameter treatment of $\text{He}^{2+} - \text{H}$ collisions
Phys. Rev. A 31 2227-2243 1985 T
 $\text{He}^{2+} + \text{H} \rightarrow \text{He}^+(\text{ln}) + \text{H}^+$
CC (AO-MO)
 $5 \times 10^{-3} - 1.25 \times 10^{-1} \text{ (quantum)}, 2.5 \times 10^{-2} - 2.5 \text{ (semiclassical) keV/amu}$

- 85T57 Wada,K. Murai,T.
Charge transfer in $\text{Be}^{4+} + \text{H}(1s)$ collisions; convergence and oscillatory structure of the total cross sections
J. Phys. B 18 4259-4269 1985 T
 $\text{Be}^{4+} + \text{H}(1s) \rightarrow \text{Be}^{3+}$
MO close-coupling method
2.0 - 25.0 keV/amu
- 85T58 Willis,S.L. Peach,G. McDowell,M.R.C. Banerji,J.
Charge transfer and ionization processes in collisions involving atoms and ions of hydrogen and helium
J. Phys. B 18 3939-3950 1985 T
 $\text{He}^+ + \text{H} \rightarrow \text{He} + \text{H}^+; \text{He}^+ + \text{H}^+ + e; \text{He}^+ + \text{He}^+ \rightarrow \text{He} + \text{He}^{2+}; \text{He}^+ + \text{He}^{2+} + e$
classical theory

- 86E69 Afrosimov, V.V. Basaliev, A.A. Panov, M.N. Samoilov, A.V.
Electron capture from helium atoms into various electronic states by multiply charged argon ions.
Sov. Phys.-JETP 64 273-279 1986 E
 $\text{Ar}^{q+}(q = 3-8) + \text{He} \rightarrow \text{Ar}^{q-1+}(nl), \text{Ar}^{q-2+}(nl, n'l') ; \text{Ar}^{q-1+} + \text{He}^{2+}$
translational energy spectroscopy + ion coincidence technique
0.12 - 0.47 keV/amu
- 86E70 Andersen, L.H. Jensen, K.E. Knudsen, H.
High velocity behavior ($v \gg e^2 h/2\pi$) of electron capture to the continuum in H^+ , He^{2+} + He collisions.
J. Phys. B 19 L161-166 1986 E
 $\text{H}^+, \text{He}^{2+} + \text{He} \rightarrow \text{H}^+, \text{He}^{2+} + e + \text{He}^+$
electron spectroscopy
 $10^3 - 2.6 \times 10^3$ keV/amu (H) ; $0.4 - 2 \times 10^3$ keV/amu (He)
- 86E71 Anholt, R. Meyerhof, W.E.
Atomic collisions with relativistic heavy ions VI : the state of ions in matters.
Phys. Rev. A 33 1556-1568 1986 E
 $\text{Xe}^{52+}, \text{Xe}^{44+} + \text{Be}, \text{U} \rightarrow \text{Xe}^{51+}, \text{Xe}^{43+}$
photon spectroscopy
 $8.2 \times 10^4 - 1.97 \times 10^5$ keV/amu
also K X-ray production, K-REC cross sections given
- 86E72 Anholt, R. Stoller, Ch. Molitoris, J.D. Spooner, D.W. Morenzoni, E. Andriamonje, S.A. Meyerhof, W.E.
Atomic collisions with relativistic heavy ions VI : radiative process.
Phys. Rev. A 33 2270-2280 1986 E
 $\text{Xe}^{44+} + \text{Be}, \text{Ni}, \text{Ta} \rightarrow \text{Xe}^{43+} + \text{REC}; \text{La}^{57+} \rightarrow \text{La}^{56+}; \text{U}^{92+} + \text{Be}, \text{Ni}, \text{U} \rightarrow \text{U}^{91+}$
photon spectroscopy
 $8 \times 10^4 - 1.8 \times 10^5$ keV/amu (Xe) ; 1.7×10^5 keV/amu (La) ; 4×10^5 keV/amu (U)
primary bremsstrahlung
- 86E1- Aumayr, F. Lakits, G. Winter, H.
Electron capture from Li (2s) by doubly charged ions (5-40 keV)
Phys. Rev. A 33 846-850 1986 E
 $\text{A}^{2+} + \text{Li}(2s) \rightarrow \text{A}^+ + \text{Li}^+$ (A = N, Ne, Ar, Kr, Xe)
growth
0.04 - 2.9 keV/amu

- 86E12 Bendati, N. Duong, H.T. Juncar, P. Saint Jalme, J.M. Vialle, J.L.
 $\text{Na}^+ - \text{Na}$ charge exchange processes studied by collinear laser spectroscopy
J. Phys. B 19 233-238 1986 E
 $\text{Na}^+ + \text{Na}(3s) \rightarrow \text{Na}(3s, 3p) + \text{Na}^+$
collinear laser spectroscopy
0.2 keV/amu
no cross sections given, density-dependence
- 86E4 Bischof, G. Linder, F.
Crossed beam study of $\text{He}^+ - \text{O}_2$ charge transfer reactions in the collision energy range 0.5 - 200 eV
Z. Phys. D 1 303-320 1986 E
 $\text{He}^+ + \text{O}_2 \rightarrow \text{He} + \text{O} + \text{O}^+$
crossed beam technique
 $1.25 \times 10^{-4} - 0.05$ keV/amu
- 86E73 Bliman, S. Bonnet, J.J. Bonnefoy, M. Dousson, S. Fleury, A. Hitz, D. LuDac, T. Mayo, M.
X-UV spectroscopy of low energy charge exchange collisions.
J. de Phys. (colloq.) 47(C-6) 41-46 1986 E
 $\text{Ne}^{8+} + \text{He} \rightarrow \text{Ne}^{7+}(1s^2 nl) (nl = 3s, 3p, 4s, 4p, 4d, 3d+4f)$
photon spectroscopy
1.56 - 4 keV/amu
- 86E15 Bruijn, D.P.de
Dissociation of H_2 products of electron capture
Electronic and Atomic Collisions 697-704 1986 E (North-Holland)
 $\text{H}_2^+ + \text{B} \rightarrow \text{H}_2^+(B = \text{Ar, Mg, Na, Cs})$
translational spectroscopy
0.75 - 3.3 keV/amu
dissociation mechanisms studied
- 86E16 Bruijn, D.P.de Neuteboom, J. Govers, T.R. Los, J.
Dissociative decay of $n=3$ levels in H_2 . I. populated in charge exchange of H_2^+ with Cs
Phys. Rev. A 34 3847-3854 1986 E
 $\text{H}_2^+ + \text{Cs} \rightarrow \text{H}_2(n=3) \rightarrow \text{H}(1s) + \text{H}(2l)$
position-/time-sensitive detector
1.25 - 5 keV/amu
no cross sections given

- 86E13
Claeys, W. Cornet, A. Lorent, V. Jureta, J. Fussén, D.
Electron capture by 1.6 - 5 keV metastable hydrogen atoms in the inert gases and H_2
J. Phys. B 19 2955-2958 1986 E
 $H(2s) + B \rightarrow H + B^+$; $H(1s) + B \rightarrow H^+ + B^-$ ($B = H_2, He, Ne, Ar, Kr, Xe$)
growth method
1.6 - 5 keV
Cs-neutralized H beam
- 86E14
Cornille, M. Dubau, J. Bely-Dubau, F. Bliman, S. Hitz, D. Mayo, M. Bonnet, J.J.
Bonnefoy, M.
Spectroscopy of doubly excited Ne VII produced in low energy charge exchange collisions
J. Phys. B 19 L393-397 1986 E
 $Ne^{8+} + He \rightarrow Ne^{6+}$ ($n = 2, 3, 4$)
photon spectroscopy
2.4 - 4 keV/amu
no cross section given
- 86E15
Courbin, C. Sidis, V. Wahnon, P.
Theoretical study of the alignment and orientation of $n=2$ levels in the $Li^+ + He$ collision.
Ann. de Phys. (France) 11(C-3) 113 - 124 1986 E
 $Li^+ + He \rightarrow Li^+(2^2P) + He^+$
photon spectroscopy
0.07 - 3 keV/amu
also $Li^+ + He^+(2^1P)$ excitation.
- 86E16
Druetta, M. Bouchama, T. Martin, S.
Single electron capture into $Ne^{6+}(n,l)$ shells in $Ne^{7+} + H_2$ collisions
J. Phys. B 19 L723-726 1986 E
 $Ne^{7+} + H_2 \rightarrow Ne^{6+}(n,l)$
VUV spectroscopy
3.5 keV/amu
emission cross sections given
- 86E 7
DuBois, R.D.
Ionization and charge transfer in He^{2+} - rare gas collisions
Phys. Rev. A 33 1595-1601 1986 E
 $He^{2+} + B \rightarrow He^+, He^0 + B^+(B = He, Ne, Ar, Kr)$
coincidence technique
3.75 - 50 keV/amu
- 86E18
Dubois, R.D.
Charge transfer leading to multiple ionization of neon, sodium and magnesium
Phys. Rev. A 34 2738-2745 1986 E
 $H^+, He^+, He^{2+} + B \rightarrow H, He, He^+ + B^+$; $H, He, He^+ + B^+ + (i-1)e$; $H^+, He^+, He^{2+} + B^+ + e$; $He^{2+} + B \rightarrow He + B^{2+}$; $He + B^+ + (i-2)e$ ($i=1-4$, $B = Ne, Na, Mg$)
coincidence
2 - 50 keV/amu
total cross sections
- 86E19
Elliott, D.S. Shah, M.B. Gilbody, H.B.
Ionization and charge transfer in collisions of H^+ and He^{2+} with potassium
J. Phys. B 19 3277-3286 1986 E
 $H^+ + K \rightarrow H + K^+ + (i-1)e$ ($i=1-4$); $He^{2+} + K \rightarrow He^+ + K^+ + (i-1)e$; $He + K^+ + (i-2)e$ ($i=1-4$)
coincidence
38 - 2070 keV/amu
total cross sections
- 86E20
Fournier, P.G. Aouchiche, H. Lorent, V. Baudon, J.
Energy distribution of H^+ ions produced by double capture in proton - H_2 collisions
Phys. Rev. A 34 3743-3748 1986 E
 $H^+ + H_2, D_2 \rightarrow H^+ + H_2^+, D_2^+$
translational energy spectroscopy
3 - 9 keV/amu
no cross section given
- 86E21
Giase, J.P. Cooke, C.L. Waggoner, W. Tunnel, L.N. Varghese, S.L.
Energy-gain spectroscopy of electron-capture collisions between low-energy Ar and Ne projectiles and atomic and molecular targets
Phys. Rev. A 34 3770-3781 1986 E
 $Ar^{q+}(q=4-8), Ne^{q+}(q=4-7) + D, D_2 \rightarrow Ar^{(q-1)+}, Ne^{(q-1)+}(n,l)$
translational-energy spectroscopy
- 0.05 keV/amu

- 86E10 Graham, W.G., Bernstein, E.M., Clark, M.W., Tanis, J.A., Berkner, K.H., Gohil, P., McDonald, R.J., Schlachter, A.S., Stearns, J.W., McFarland, R.H., Morgan, T.J., Muller, A.
Structure in the energy dependence of high energy electron capture cross sections
Phys. Rev. A 33 3591-3594 1986 E
 $\text{Ca}^{9+} + \text{H}_2 \rightarrow \text{Ca}^{q+} + \text{H}^+$ ($q=16-19$)
growth method
2425 - 9200 keV/amu
two bumps near 200 - 300 MeV
- 86E75 Guyon, P.M., Goves, T.R., Baer, T.
State selected ion-molecule reactions; a summary of experimental and theoretical analysis on the system $\text{N}_2^+(\nu) + \text{Ar}^+ \rightarrow \text{N}_2^+(\nu') + \text{Ar}^+$.
Z. Phys. D 4 89 - 101 1986 E
 $\text{N}_2^+(\nu) + \text{Ar} \rightarrow \text{N}_2^+(\nu') + \text{Ar}^+$; $\text{Ar}^+(\text{P}_j) + \text{N}_2 \rightarrow \text{Ar} + \text{N}_2^+(\nu)$
photoionization + TOF
 $5 \times 10^{-4} - 1.4 \times 10^{-2}$ keV/amu
- 86E22 Haggmann, S., Kalch, S., Cocks, C.L., Richard, P., Skutlartz, A., Schmidt-Bocking, H., Schuch, R., Johnson, B., Meron, M., Jones, K.
Recoil charge state - target K-Auger electron coincidences : a technique to study excitation patterns in K-K charge transfer
Phys. Rev. A 34 2897-2910 1986 E
 F^{8+} , $\text{F}^{9+} + \text{Ne} \rightarrow \text{F}^{7+}$, $\text{F}^{8+} + \text{Ne}^+(\text{K}^{-1})$
Auger-electron / recoil ion coincidence
230 - 530 keV/amu
no cross sections
- 86E76 Hall, J., Richard, P., Pennmiller, P.L., Gregory, D.C., Miller, P.D., Moak, C.D., Jones, C.M., Alton, G.D., Bridwell, L.B., Sofield, C.J.
Energy systematics of single and double K-shell vacancy production in titanium bombarded by chlorine ions.
Phys. Rev. A 4 914 - 920 1986 E
 $\text{Cl}^{17+} + \text{Ti} \rightarrow \text{Cl}^{16+}$, $\text{Cl}^{15+} + \text{Ti}^+(\text{K}^{-1}, \text{K}^{-2})$
photon spectroscopy
 $5 \times 10^2 - 1.5 \times 10^3$ keV/amu
Single and double K-shell ionization cross sections ; K-K and KK-KK transfer cross sections
- 86E23 Havener, C.C., Rouze, N., Westervelt, W.B., Risley, J.S.
Experimental determination of the density matrix describing collisionally produced $\text{H}(n=3)$ atoms
Phys. Rev. A 33 276-293 1986 E
 $\text{H}^+ + \text{He} \rightarrow \text{H}(n=3)$
Balmer-alpha intensity as a function of axial and transverse electric field
40 - 80 keV/amu
density matrix
- 86E24 Hippler, R., Harbich, W., Faust, M., Lutz, H.O., Dube, L.J.
Alignment of $\text{H}(2p)$ following $\text{H}^+ - \text{He}$, Ar charge-changing collisions
J. Phys. B 19 1507-1514 1986 E
 $\text{H}^+ + \text{He}$, Ar $\rightarrow \text{H}(2p) + \text{He}^+$, Ar^+
Lyman-alpha measurement
0.5 - 5 ; 35 - 300 keV/amu
integral alignment factor A_{20}
- 86E25 Hird, B., Abbas, I.A., Bruyere, M.
Single- and double-electron detachment cross sections for O collisions with rare gas atoms
Phys. Rev. A 33 2315-2319 1986 E
 $\text{O} + \text{B} \rightarrow \text{O}^+$ ($\text{B} = \text{He}, \text{Ne}, \text{Ar}, \text{Kr}, \text{Xe}$)
growth method
0.6 - 7 keV/amu
- 86E26 Hornis, W.G., Hasted, J.B., Kamber, E.Y., Brenton, A.G., Beynon, J.H.
Single electron capture by Ar^{3+} from rare gas atoms
Int. J. Mass Spec. Ion Phys. 70 153-162 1986 E
translational energy spectroscopy
0.23 keV/amu
no cross sections given. only spectra with state identifications
- 86E 8 Hornis, W.G., Kamber, E.Y., Hasted, J.B.
Differential $\text{N}^{2+} - \text{He}$ collisions with capture
Int. J. Mass Spectr. Ion Processes 69 211-216 1986 E
 $\text{N}^{2+} + \text{He} \rightarrow \text{N}^+$
translational energy spectroscopy
0.07 keV/amu
no cross section

- 86E28 Horsdal, E. Jensen, B. Nielsen, K.O.
Critical angle in electron capture
Phys. Rev. Letters 57 1414-1416 1986 E
 $H^+ + He \rightarrow H + He^+; H + He^{2+} + e$
coincidence
200 - 500 keV/amu
angle-differential cross sections
- 86E27 Horsdal, E. Jensen, B. Nielsen, K.O.
Experimental study of charge transfer near a nuclear scattering
Phys. Rev. Letters 57 675-678 1986 E
 $Ne(H^+, H^0)$ nuclear reaction
1955 keV/amu
- 86T38 Kimura, M.
Theoretical treatment of electron capture and excitation in two-electron system ion-atom, atom-atom collisions at low to intermediate energy.
Electronic and Atomic Collisions 431 - 444 1986 E
(1986, Elsevier, North-Holland)
review
- 86E29 Kimura, M.
Electron capture by slow and highly stripped iodine ions from helium atoms
Electronic and Atomic Collisions 471-478 1986 E
(North-Holland)
 $I^{q+} + He \rightarrow I^{(q-1)+}$ ($q=10-40$)
short review
- 86E30 Knudsen, H. Andersen, L.H. Jensen, K.E.
The double-differential cross sections for electron capture to the continuum in the strong interaction region : fast, highly charged ions on helium atoms
J. Phys. B 19 3341-3352 1986 E
 $C^{6+}, O^{8+}, Cl^{11+}, Au^{11+} + He \rightarrow ECC$
electron spectroscopy
100 - 2000 keV/amu
ECC
- 86E31 Kusakabe, T. Horiuchi, T. Nagai, N. Hanaki, H. Konomi, I. Sakisaka, M.
Charge transfer of multiply charged slow argon, krypton and xenon ions on atomic and molecular targets. single-charge transfer cross sections
J. Phys. B 19 2165-2174 1986 E
 $Ar^{q+}(q=2-7) + He, H_2 \rightarrow Ar^{(q-1)+}; Kr^{q+}(q=2-9), Xe^{q+}(q=2-11) + B \rightarrow Kr^{(q-1)+}, Xe^{(q-1)+}$
($B = He, Ne, Ar, Kr, Xe, H_2, N_2, CO_2, CH_4, C_2H_6, C_3H_8$)
growth
- 0.3 keV/amu
scaling law proposed. recoil ions used. total cross sections given.
- 86E32 Larsen, P.H. Eilford, M.T.
The mobilities of Xe ions in Xe and the derived charge transfer cross section for Xe^+ ($^2P_{3/2}$) ions in Xe
J. Phys. B 19 449-461 1986 E
 $Xe^+(^2P_{3/2}) + Xe \rightarrow Xe + Xe^+$
drift tube technique
 $2 \times 10^{-6} - 3 \times 10^{-3}$ keV/amu
- 86E62 Leeuw, P.E. van der Tip, A. Kouot, W. Kleyn, A.W. Los, J.
Differential cross sections for collisional neutralization of H by rare gases
Chem. Phys. 101 183-199 1986 E
 $He + He, Ar, Xe \rightarrow He^0$
position sensitive detection (E), impulse approximation (T)
0.12 - 0.5 keV/amu
relative angle-differential cross sections
- 86E33 Liao, C.L. Ng, C.Y.
Vibrational state distributions of $H_2^+(v')$ resulting from the electron transfer reactions $H_2^+(v=0,1) + H_2(v=0) \rightarrow H_2^+(v') + H_2^+(v')$ in the energy range of 2-16 eV
J. Chem. Phys. 84 197-200 1986 E
 $10^{-3} - 10^{-2}$ keV/amu
- 86E35 Liao, C.L. Shao, J.D. Xu, R. Flesch, G.D. Li, Y.G. Ng, C.Y.
A state-to-state study of the electron transfer reactions $Ar^+(^2P_{3/2,1/2}) + N_2(X, v=0) \rightarrow Ar^+(^1S_0) + N_2^+(X, v')$
J. Chem. Phys. 85 3874-3890 1986 E
 $Ar^+(^2P_{3/2,1/2}) + N_2(v=0) \rightarrow Ar^+(^1S_0) + N_2^+(v')$
crossed-beam / photo ionization
 $6 \times 10^{-6} - 1 \times 10^{-3}$ keV/amu

- 86E34 Liao, C.L., Xu, R., Ng, C.Y.
Fine structure effect on the charge transfer reaction $\text{Ar}^+(\text{P}_{3/2,1/2}) + \text{N}_2(\text{X } ^1\Sigma_g^+, v=0)$
J. Chem. Phys. 84 1948-1950 1986 E
 $\text{Ar}^+(\text{P}_{3/2,1/2}) + \text{N}_2(\text{X } ^1\Sigma_g^+, v=0) \rightarrow \text{Ar}^+(\text{S}_0) + \text{N}_2^+(\text{X } ^2\Sigma_g^+, v')$
 $2.5 \times 10^{-4} - 1 \times 10^{-2} \text{ keV/amu}$
- 86E36 Liao, C.L., Xu, R., Ng, C.Y.
A state-to-state study of the electron transfer reactions $\text{N}_2^+(\text{X}, v'=0-2) + \text{Ar}^+(\text{S}_0) \rightarrow \text{N}_2(\text{X}, v) + \text{Ar}^+(\text{P}_{3/2,1/2})$
J. Chem. Phys. 85 7136-7145 1986 E
 $\text{N}_2^+(\text{X}, v'=0-2) + \text{Ar}^+(\text{S}_0) \rightarrow \text{N}_2(\text{X}, v) + \text{Ar}^+(\text{P}_{3/2,1/2})$
crossed beam / photo ionization
 $1 \times 10^{-4} - 0.02 \text{ keV/amu}$
- 86E9 Liljeby, L., Astner, G., Barany, A., Cederquist, H., Danared, H., Hultdt, S., Hvelplund, P., Johnson, A., Knudsen, H., Rensfelt, K.G.
Absolute cross sections for multielectron processes in slow $\text{Ar}^{n+} + \text{Ne}, \text{Ar}, \text{Kr}$ collisions
Phys. Scripta 33 310-320 1986 E
 $\text{Ar}^{n+} + \text{B} \rightarrow \text{Ar}^{n+} + \text{B}^+$ ($q=1-8$; $r=0-8$; $s=1-6$; $\text{B}=\text{Ne}, \text{Ar}, \text{Kr}$)
TOF + coincidence
 0.045 xq keV/amu
- 86E37 MacAdam, K.B.
Failure of classical scaling in low-velocity charge transfer from Rydberg atoms
Phys. Rev. A 34 2767-2770 1986 E
scaling to $\text{H}^+ + \text{H}(1s) \rightarrow \text{H(alt)} + \text{H}^+$
- 86E38 Mann, R.
Total one-electron capture cross sections for Ar^{n+} and I^{n+} ions in slow collisions on H_2 and He
Z. Phys. D 3 85-90 1986 E
 $\text{Ar}^{n+}(q=4-15), \text{I}^{n+}(q=5-27) + \text{B} \rightarrow \text{Ar}^{q-1+}, \text{I}^{q-1+}$ ($\text{B} = \text{H}_2, \text{He}$)
growth
 $0.02 - 0.07 \text{ keV/amu (Ar)} ; 0.008 - 0.04 \text{ keV/amu (I)}$
recoil ions by 2 GeV U^{7+} (I^{n+} observed), total cross sections given
- 86E40 Mathur, D., Badarinarayan, C., Rajgaria, F.A., Raheja, U.T.
Translational energy loss spectroscopy of molecular dications from methane
Chem. Phys. 103 447-459 1986 E
 $\text{CH}_n^+(n=1-5) + \text{B} \rightarrow \text{CH}_n^{2+}$ ($\text{B} = \text{Kr}, \text{CH}_4, \text{N}_2, \text{air}$)
translational spectroscopy
 $0.03 - 0.4 \text{ keV/amu}$
no cross section given
- 86E39 Mathur, D., Kingston, R.G., Harris, F.M., Beynon, J.H.
State-diagnosed electron capture collisions of $\text{Cs}_2^{n+}(q=2,3)$ with atomic and molecular targets
J. Phys. B 19 L575-580 1986 E
 $\text{Cs}_2^{n+}(q=2,3) + \text{B} \rightarrow \text{Cs}_2^{q-1+}$
translational energy spectroscopy
 $0.02 - 0.03 \text{ keV/amu}$
no cross sections given, reaction window
- 86E41 Matsuo, T., Kobayashi, N., Kaneko, Y.
Study of low energy charge transfer reactions of $\text{Ar}^+ + \text{N}_2$ and $\text{Ar}^+ + \text{O}_2$ by Time-of-Flight technique
J. Phys. Soc. Japan 55 3045-3053 1986 E
 $\text{Ar}^+ + \text{B} \rightarrow \text{Ar} + \text{B}^+$ ($\text{B} = \text{N}_2, \text{O}_2$)
TOF technique
 $2.5 \times 10^{-7} - 2 \times 10^{-6} \text{ keV/amu}$
angular distribution ($0 - 2^\circ$)
- 86E59 McFarland, J.A., Bernstein, E.M., Clark, M.W., Graham, W.G., Mueller, D.W., Muller, A., Stockli, M.P., Berkner, K.H., Gohil, P., McDonald, R.J., Schlachter, A.S., Stearns, J.W.
Resonant transfer and excitation : dependence on projectile charge state and target-electron momentum distribution
Phys. Rev. A 34 2543-2546 1986 E
 $\text{Ca}^{n+} + \text{H}_2, \text{He} \rightarrow \text{Ca}^{q-1+}$ ($q=10-19$)
X-ray/scattered particle coincidence
 $2500 - 9250 \text{ keV/amu}$
- 86E42 Morenzoni, E., Anholt, R., Meyerhof, W.E.
Separated projectile and target K X-ray production in symmetric heavy ion collisions as a function of the target thickness
Z. Phys. D 4 133-140 1986 E
 $\text{Ar}^{n+} + \text{A} \rightarrow \text{A}^{(q-1)+}(1s) + \text{A}^+(\text{K}^-)$ ($\text{A} = \text{Ni}, \text{Cu}, \text{Nb}, \text{A}$)
X-ray yield over thickness dependence
 $1000 - 1500 \text{ keV/amu}$

- 86E11 Muller,A. Schuch,B. Groh,W. Salzborn,E. Beyer,H.F. Mokler,P.H. Olson,R.E.
Multiple electron capture and ionization in collisions of highly stripped ions with Ar atoms
Phys. Rev. A 33 3010-3017 1986 E
 $\text{Fe}^{q+}(q=5,10,12,15,20,25)$, $\text{U}^{q+}(q=44)$ + Ar $\rightarrow$ $\text{Fe}^{(q-i)+}$, $\text{U}^{(q-i)+}(i=0-5)$ + $\text{Ar}^{i+}(i=1-14)$
E : recoil ion-projectile ion coincidence ; T : CTMC
1400 keV/amu
- 86E43 Nagata,T. Kuribara,M.
Cross sections for formation of H(2p) and H(2s) atoms on H⁻-alkali atom charge transfer collisions
J. Phys. Soc. Japan 55 500-506 1986 E
 $\text{H}^+ + \text{B} \rightarrow \text{H}(2\text{p},2\text{s})$ (B = Na, K, Rb, Cs)
growth
0.006 - 5 keV/amu
- 86E78 Noll, M. Toennies, J.P.
Vibrational state resolved measurements of differential cross sections for $\text{H}^+ + \text{O}_2$ charge transfer collisions.
J. Chem. Phys. 85 3313 - 3325 1986 E
 $\text{H}^+ + \text{O}_2(v=0) \rightarrow \text{H} + \text{O}_2^+(v'=0-5)$
TOF method
scattering angle = 0 - 11 deg.
- 86E44 Okuno,K.
Charge transfer of Ar^{2+} and Kr^{2+} in their own gases studied by the beam guide technique
J. Phys. Soc. Japan 55 1504-1515 1986 E
 $\text{A}^{2+} + \text{A} \rightarrow \text{A}^+, \text{A}^0$ (A = Ar, Kr)
octopole ion-beam guide technique
 $10^{-3} - 0.01$ keV/amu (Ar) ; $3 \times 10^{-4} - 0.01$ keV/amu (Kr)
total cross sections
- 86E82 Okuno,K. Kaneko,Y.
Low energy collision experiments using the beam-guide technique-charge transfer cross sections of Ar^{3+} and Kr^{3+} in their own gases (in Japanese)
Mass Analysis (Shitsuryo-Bunseki- 34 351 - 365 1986 E
Japanese Journal)
 $\text{A}^{3+} + \text{A} \rightarrow \text{A}^{2+}, \text{A}^+, \text{A}^0$ (A=Ar,Kr)
beam-guide technique
 $4 \times 10^{-6} - 0.02$ keV/amu
- 86E45 Panev,G.S.
Total charge transfer cross sections in collisions of Ca⁺ ions with Mg and Sr atoms
Phys. Letters 115A 338-339 1986 E
 $\text{Ca}^+ + \text{Mg}, \text{Sr} \rightarrow \text{Ca}$
cross beam technique
0.002 - 0.025 keV/amu
total cross sections
- 86E46 Peart,B. Bennett,M.A.
Measurement of one-electron transfer between $^3\text{He}^{2+}$ and H⁻ ions
J. Phys. B 19 L321-324 1986 E
 $^3\text{He}^{2+} + \text{H}^- \rightarrow \text{He}^+ + \text{H}$
crossed beam technique
0.03 - 2.6 keV/amu
- 86E47 Peart,B. Wilkins,P.M.
Measurement of charge transfer between B^{2+} - H⁻ and $^{3+}$ - H⁻
J. Phys. B 19 L515-517 1986 E
 $\text{B}^{2+} + \text{H}^- \rightarrow \text{B}^+ + \text{H}$; $\text{C}^{3+} + \text{H}^- \rightarrow \text{C}^{2+} + \text{H}$
crossed beam technique
0.4 - 2.4 keV/amu
- 86E 3 Rice,J.E. Marnar,E.S. Terry,J.L. Kallne,E. Kallne,J.
Observation of charge-transfer population of high n-levels in Ar^{16+} from neutral hydrogen in the ground and excited states in a Tokamak plasma
Phys. Rev. Letters 56 50-53 1986 E
 $\text{Ar}^{17+} + \text{H}, \text{H}(n) \rightarrow \text{Ar}^{16+}$
photon spectroscopy
 4×10^{-2} keV/amu (maxellian)
- 86E49 Roncin,P. Barat,M. Laurent,H.
Differential cross sections for one- and two-electron capture by highly charged ions (N^{7+} , O^{7+} , Ne^{8+} , Ne^{9+}) at low keV energies
Europhys. Letters 2 371-377 1986 E
 $\text{A}^{8+} + \text{He} \rightarrow \text{A}^{7+,6+}$; $\text{A}^{7+} + \text{He} \rightarrow \text{A}^{3+,6+}$ (A = N, O, Ne)
translational energy spectroscopy
- 0.5 keV/amu
relative differential cross sections

- 86E48 Roncin, P., Gaboriaud, M.N., Laurent, H., Barati, M.
Transfer excitation in low-energy (keV/amu) multiply charged ion-atom collisions
J. Phys. B 19 L691-695 1986 E
 $\text{Ne}^{7+} + \text{He} \rightarrow \text{Ne}^{6+}$
translation spectroscopy/position-sensitive detector
0.5 keV/amu
relative differential cross sections (angle)
- 86E50 Rozet, J.P., Chetoui, C., Bouisset, P., Vernhet, D., Wohrer, K., Touati, A.,
Stephan, C., Gradin, J.P.
Anomalous population of deep capture states of fast ions emerging from solid foils
Phys. Rev. Letters 58 337-340 1986 E
 $\text{Kr}^{36+} + \text{B} \rightarrow \text{Kr}^{35}$ (B=C, Ne, Al, Si, Ar, Cr, Cu, Zr, Sb)
thickness-dependence
 3.3×10^4 keV/amu
K-, L-shell capture cross sections
- 86E51 Sasao, M., Sato, K., Matsumoto, A., Nishizawa, A., Takagi, S., Amemiya, S.,
Masuda, T., Tsurita, T., Fukuzawa, F., Haruyama, S., Kanamori, Y.
Electron capture cross sections in high energy $\text{He}^{2+} + \text{Li}$ collisions
J. Phys. Soc. Japan 55 102-105 1986 E
 $\text{He}^{2+} + \text{Li} \rightarrow \text{He}^+ \text{He}$
growth technique
200 - 500 keV/amu
- 86E52 Schoenfeldt, W.A., Mokler, P.H., Hoffmann, D.H.H., Warczak, A.
Resonant electron transfer and L-shell excitation at 3.6 MeV/u $\text{Sm}^{9+} \rightarrow \text{Xe}$ collisions
at $q=34-52$
Z. Phys. D 4 161-176 1986 E
 $\text{Sm}^{9+} + \text{Xe} \rightarrow \text{Sm}^{(q)+}$ ($q=34-52$)
X-ray/scattered particle coincidence
3600 keV/amu
- 86E54 Scott, D., Champion, R.L., Doverspike, L.D., Hug, M.S.
Collisions of Cs^+ with atoms and molecules
J. Phys. B 19 3991-4006 1986 E
 $\text{Cs}^+ + \text{B} \rightarrow \text{Cs} + \text{B} + e$; $\text{Cs} + \text{B}^-$ (B = He, Ne, Ar, Kr, Xe, D₂, N₂, O₂, CO, CO₂,
SO₂, N₂O, CH₄, SF₆)
parallel-plate technique
 7×10^{-4} keV/amu
- 86E53 Scott, D., Hug, M.S., Champion, R.L., Doverspike, L.D.,
Alkali-negative ion-molecule collisions
Phys. Rev. A 33 170-177 1986 E
 $\text{A} + \text{B} \rightarrow \text{A} + \text{B}^-$, $\text{A} + \text{B} + e$ (A = Na, K; B = H₂, D₂, N₂, O₂, CO, CO₂, CH₄)
parallel-plate technique
threshold - 7×10^{-3} keV/amu
- 86E79 Sharma, S., Hastied, J.B., Mathur, D.
Energy loss spectra of N^{2+} ions with Kr and Xe gases.
Ind. J. Phys. B 60(B) 508 - 516 1986 E
 $\text{N}^{2+} + \text{Kr}$, $\text{Xe} \rightarrow \text{N}^+(nl)$
translational energy spectroscopy
0.5 keV/amu
Peak assignment; no cross sections given
- 86E55 Stollerfoht, N., Havener, C.C., Phaneuf, R.A., Swenson, J.K., Shafroth, S.M.,
Meyer, F.W.
Evidence for correlated double-electron capture in low energy collisions of O^{6+} with
He
Phys. Rev. Letters 57 74-77 1986 E
 O^{6+} , $\text{C}^{6+} + \text{He} \rightarrow \text{O}^{4+}$, C^{5+}
Auger electron spectroscopy at zero degree
 $3.75/3.33$ keV/amu
no cross sections given
- 86E77 Suzuki, Y., Kaneko, T., Sakisaka, M.
An apparatus for measuring collisional dissociation and electron capture of molecular
ions.
Nucl. Instr. Meth. in Phys. Res. B 16 397 - 402 1986 E
 $\text{CO}^+ + \text{Ar} \rightarrow \text{C}^+ + \text{O} + \text{Ar}$; $\text{O}^+ + \text{C} + \text{Ar}$; $\text{C}^+ + \text{O} + \text{Ar} + e$; $\text{C} + \text{O} + \text{Ar}^+$; $\text{CO} + \text{Ar}^+$;
 $\text{CO}^+ + \text{Ar}^+ + e$; $\text{H}_2^+ + \text{Ar} \rightarrow \text{H}^+ + \text{H} + \text{Ar}$; $\text{H}^+ + \text{H} + \text{Ar} + e$; $\text{H} + \text{H} + \text{Ar}^+$; $\text{H}_2 + \text{Ar}^+$;
 $\text{H}_2^+ + \text{Ar}^+ + e$
position-sensitive ion-atom coincidence method
0.29 - 0.43 keV/amu (CO^+); 4 - 6 keV/amu (H_2^+)
- 86E56 Suzuki, Y., Kaneko, T., Torrita, M., Sakisaka, M.
Dissociation and electron capture of H_2 ions in collisions with He, Ne and Ar atoms
J. Phys. Soc. Japan 55 3037-3044 1986 E
 $\text{H}_2^+ + \text{B} \rightarrow \text{H}^+ + \text{H} + \text{B}$; $\text{H}^+ + \text{H} + \text{B}$; $\text{H} + \text{H} + \text{B}^+$; $\text{H}_2 + \text{B}^+$; $\text{H}_2^+ + \text{Y}^+$ (B = He,
Ne, Ar)
scattered ion/recoil ion coincidence
2 - 8 keV/amu

86E57	Swenson,J.K., Yamazaki,Y., Miller,P.D., Krause,H.F., Dittner,P.F., Pepmiller,P.L., Datz,S., Stolterfoht,N. Observation of resonant transfer and excitation to specific LS-coupled states in $O^{+} + He$ collisions by high resolution, 0° Auger-electron spectroscopy Phys. Rev. Letters 57 3042-3045 1986 E $O^{+} + He \rightarrow O^{+}$ Auger spectroscopy 312 - 1562 keV/amu	86E 6	Ullrich,J., Bethge,K., Kelbch,S., Schadt,W., Schmidt-Böcking,H., Stiebing,K.E. Absolute cross sections for projectile-charge-state-correlated multiple ionisation processes in Ne - Ne collisions J. Phys. B 19 437-448 1986 E $Ne^{+} + Ne \rightarrow Ne^{+} + Ne^{+}(q=2, 3 ; f=1-6)$ coincidence technique 75 - 360 keV/amu
86E58	Tang,S.Y., Wang,D.P., Neynaber,R.H. Ion pair production in Li - Cs collisions J. Phys. B 19 L831-836 1986 E $Li + Cs \rightarrow Li^{+} + Cs^{+}$ Merging beam technique 0,14 - 0,8 keV/amu	86E81	Van Zyl, B. Gealy, M.W. Neumann, H. Balmer-line emission from low-energy H^{+} impact on rare atoms. Phys. Rev. A 33 2333 - 2338 1986 E $H^{+} + He, Ne, Kr, Xe \rightarrow H^{+}(n) + hv(n = 3,4 \rightarrow n = 2)$ photon spectroscopy 1.25 - 2 keV/amu (He) ; 0.5 - 2 keV/amu (Ne) ; 0.04 - 2 keV/amu (Kr,Xe) Balmer-alpha and -beta line emission cross section ; also polarization
86E80	Tanis, J.A., Bernstein, E.M., Clark, M.W., Graham, W.G., McFarland, R.H., Morgan, T.J., Mowat,J.R., Mueller, D.W., Müller, A., Stockli, M.P. Resonant transfer and excitation ; dependence on projectile charge state and target- electron momentum distribution. Phys. Rev. A 34 2543 - 2546 1986 E $Ca^{+}(q = 10 - 19) + H_2, He \rightarrow Ca^{(q-1)+}$ photon spectroscopy	86E63	Vogt,H., Schuch,R., Justiniano,E., Schulz,M., Schwab,W. Experimental test of higher-order electron capture processes in collisions of fast protons with atomic hydrogen Phys. Rev. Letters 57 2256-2259 1986 E $H^{+} + H(1s) \rightarrow H + H^{+}$ atomic hydrogen 2800 - 5000 keV/amu angle-differential cross section ($\theta = 0.005 - 0.8$ mrad)
86E60	Terao,M., Szucs,S., Cherkani,M., Brouillard,F., Allan,R.J. Experimental and theoretical study of electron transfer in the $He^{2+} + H$ collision Europhys. Letters 1 123-128 1986 E $^3He^{2+} + H \rightarrow ^3He^{+} + H$ merged beam + coincident product (E), OEDM + translation factor (T) $5 \times 10^{-2} - 2.25$ keV/amu	86E64	Wang,H.Y., Church,D.A. Electron transfer from H_2 to N^{3+} near 0.1 eV/amu J. Phys. B 19 L799-801 1986 E $N^{3+} + H_2 \rightarrow N^{2+}$ trapped ion 10^{-4} keV/amu
86E61	Tobita,K., Takeuchi,H. One-electron loss cross section of helium in hydrogen gas J. Phys. Soc. Japan 55 4231-4233 1986 E $He + H_2 \rightarrow He^{+}$ growth 0.5 - 4 keV/amu	86E65	Warczak,A., Liesen,D., Liu,B. Strong influence of electron capture on the characteristic X-ray emission following close heavy-ion-atom collisions J. Phys. B 19 3975-3990 1986 E $U + Sn ; Pb + Ag$ impact parameter/X-ray coincidence 1400 keV/amu

- 86E66 Watts, M.F. Dunn, K.F. Gilbody, H.B.
Redetermination of cross sections for charge transfer and ionization in $H^+ - He^+$ collisions
J. Phys. B 19 L355-359 1986 E
 $He^+ + He^+ \rightarrow H + He^{2+}$
crossed beam technique
0.05 - 0.14 keV/amu
- 86E67 Watts, M.F. Hopkins, C.J. Angel, G.C. Dunn, K.F. Gilbody, H.B.
Charge transfer and ionization in collisions of protons with Al^+ , Ga^+ , In^+ and Tl^+ ions
J. Phys. B 19 3739-3747 1986 E
 $H^+ + B^+ \rightarrow H + B^{2+}$ ($B = Al, Ga, In, Tl$)
Crossed beam
50 - 600 keV/amu
Ionization + charge transfer cross sections given
- 86E 5 Wilkie, F.G. McCullough, R.W. Gilbody, H.B.
State-selective electron capture by slow C^{3+} and N^{3+} ions in H and H_2
J. Phys. B 19 239-251 1986 E
 $C^{3+} + H \rightarrow C^{2+}(2s3d\ ^1D, ^3D; 2s3p\ ^1P, ^3P; 2s3s\ ^3S; 2p^2\ ^1S, ^3D) + H^+$
translational energy spectroscopy + H-oven
0.125 - 1 keV/amu
only energy gain spectra for $C^{3+} + H_2$; $N^{3+} + H$; H_2 collisions
- 86E68 Williams, D.G. Lee, A.R. Butcher, E.C.
Differential cross sections for transfer into the 2s state of hydrogen: $H^+ + H_2$, $H^+ + D_2$
J. Phys. B 19 4007-4016 1986 E
 $H^+ + H_2, D_2 \rightarrow H(2s)$
3.3 - 24 keV/amu
angle-differential cross sections
- 86T 6 Allan, R.J.
Charge transfer in $H^+ - He^+$ collisions; molecular orbital calculations
J. Phys. B 19 321-334 1986 T
 $H^+ + Na(3s) \rightarrow H(nl) + Na^+$
PSS with ETTF
- 86T14 Allan, R.J.
 $He^+(1s) + He^+(1s)$ charge transfer collisions
J. Phys. B 19 L683-689 1986 T
 $He^+(1s) + He^+(1s) \rightarrow He + He^{2+}$
SCE/CI with translation factor
5 - 70 keV/amu
- 86T 9 Allan, R.J. Shingal, R. Flower, D.R.
Charge transfer in $H^+ - Na(3p)$ collisions; a possible ultraviolet laser mechanism
J. Phys. B 19 L251-256 1986 T
 $H^+ + Na(3p) \rightarrow H(nl) + Na^+$
AO (>0.2 keV/amu); MO (<0.4 keV/amu)
0.02 - 10 keV/amu
- 86T64 Archirel, P. Levy, B.
A simple determination of the potential energy curves and couplings for long-range charge-transfer reactions: Application to the system $(ArN_2)^+$.
Chem. Phys. 106 51-68 1986 T
 $Ar + N_2(X, A, v) \rightarrow Ar^+ + N_2$; $Ar^+(^2P_{1/2}, ^2P_{3/2}) + N_2 \rightarrow Ar + N_2^+$
ab initio approach
 2×10^{-2} keV/amu
- 86T65 Baer, M. Nakamura, H. Ohsaki, A.
A quantum-mechanical study of chemical reaction and charge-transfer processes in the $(Ar+H_2)^+$ system.
Chem. Phys. Letters 131 468-474 1986 T
 $Ar^+ + H_2(v_0 = 0, 1) \rightarrow Ar + H_2^+(v_f)$
reactive infinite-order sudden approx.
chemical reactions
- 86T15 Barany, A. Danared, H. Cederquist, H. Hveplund, P. Knudsen, H. Pedersen, J.O.K. Cocke, C.L. Tunnell, L.N. Waggoner, W. Giese, J.P.
Stueckelberg angular scattering oscillations in two electron capture by C^{4+} from He at low energies.
J. Phys. B 19 L427-431 1986 T
 $C^{4+} + He \rightarrow C^{2+} + He^{2+}$
Two state curve crossing model
0.025 - 0.125 keV/amu
Angle differential cross sections

- 86T16 Belkic,Dz. Gayet,R. Hansen,J. Salin,A.
The first Born approximation for charge transfer collisions
J. Phys. B 19 2945 - 2953 1986 T
 $H^+; He^{2+}; Li^{3+} + C \rightarrow H(1s), He^+(1s), Li^{2+}(1s) + C^+(K^{-1}); He^{2+} + H \rightarrow He^+(1s); H^+ + Ar \rightarrow H(1s) Ar^+(K^{-1})$
First Born approximation
100 - 2000 keV/amu
K-shell capture cross sections
- 86T66 Belkic, Dz. Saini, S. Taylor, H.S.
Electron capture by protons from the K-shell of H and Ar.
Z. Phys. D 3 59 - 67 1986 T
 $H^+ + H(1s) \rightarrow H(nlm) + H^+; H^+ + Ar \rightarrow H(nl) + Ar^+(K^{-1})$
T-matrix
25 - 125 keV/amu (H); $10^3 - 1.3 \times 10^4$ keV/amu (Ar)
angular distribution
- 86T 4 Bienstock,S. Dalgarno,A. Heil,T.G.
Charge transfer in $N^{2+} + H$ collisions at slow to intermediate velocities
Phys. Rev. A 33 2078-2080 1986 T
 $N^{2+} + H \rightarrow N + H^+$
CC + UDWA
 $5.4 \times 10^{-3} - 5.36$ keV/amu
- 86T17 Blanco,S.A. Falcon,C.A. Piancetti,R.D.
Electron capture from H(2s) by H^+ at low energies
J. Phys. B 19 3945 - 3950 1986 T
 $H^+ + H(2s) \rightarrow H(n=2) + H^+$
MO
0.06 - 2.25 keV/amu
The cross sections in table 1 should be multiplied by a factor of 10 (see J.Phys.B 21 (1986) L49)
- 86T67 Braga, J.P. Knowles, D.B. Murrel, J.N.
A theoretical study of the non-adiabatic charge transfer process $Ar^{2+}(^2P) + He(^1S) \rightarrow Ar^+(^2P) + He^+(^3S)$.
Mol. Phys. 57 665 - 674 1986 T
 $Ar^{2+}(^2P) + H(^1S) \rightarrow Ar(^2P) + He(^3S)$
close-coupling calculation with C.I.
 $3 \times 10^{-5} - 3 \times 10^{-3}$ keV/amu
also angular differential cross sections; comparison with Landau-Zener calculation
- 86T68 Briggs, J.S.
Critical second-order scattering in three-body rearrangement and break-up processes.
J. Phys. B 19 2703 - 2714 1986 T
second-order T-matrix
- 86T18 Burgdorfer,J. Morgenstern,R. and Niehaus,A.
Angular momentum distribution in the classical over-barrier model for electron capture into highly charged slow projectiles.
J. Phys. B 19 L507 - 513 1986 T
 $O^{6+}, N^{5+} + H, H_2 \rightarrow O^{3+}, N^{4+}$
Modified classical over-barrier model
average angular momentum.
- 86T10 Burgdorfer,J. Taulbjerg,K.
Distorted-wave methods for electron capture in ion-atom collisions
Phys. Rev. A 33 2959-2969 1986 T
 $A^{z+} + B^{(z-1)+} \rightarrow A^{(z-1)+} + B^{z+}$
distorted-wave with strong potential Born ; CDW
- 86T19 Cole,S.K. DePristo,A.E.
State-to-state differential cross sections from semiclassical energy conserving trajectory calculations ; $H_2^+(v) + H_2(v=0) \rightarrow H_2^+(v'') + H_2^+(v')$
J. Chem. Phys. 85 1389 - 1395 1986 T
 $H_2^+(v) + H_2(v=0) \rightarrow H_2^+(v'') (v = 0,2,5,8)$
semiclassical energy conserving trajectory calculation
 $4 \times 10^{-3} - 8 \times 10^{-3}$ keV/amu
- 86T20 Copper,D.L. Ford,M.J. Gerratt,J. Raimondi,M.
Calculation of potential energy curves for the process $C^{3+}(2l) + H(1s) \rightarrow C^{2+}(nl n'l') + H^+$
Phys. Rev. A 34 1752 - 1756 1986 T
 $C^{3+}(2L) + H(1s) \rightarrow C^{2+}(nl n'l'; l_L) + H^+$
Spin-coupled valence-bond theory
potential energy curves only;no cross sections
- 86T69 Dakhnovskii, Yu.I. Ovchinnikov, A.A.
Adiabatic electron transfer in polar media : Quantum transition state theory.
Mol. Phys. 58 237 - 252 1986 T
general theory
transition state theory

- 86T21 Danared, H. Barany, A.
Semiclassical scattering effects in two electron capture by C^{4+} from He at low energies.
J. Phys. B 19 3109 - 3120 1986 T
 $C^{4+} + He \rightarrow C^{2+}$
Semiclassical/semiquantal methods
0.25 - 0.125 keV/amu
Angle-differential cross sections is oscillatory
- 86T22 Deco, G.R. Hanssen, J.Rivarola, R.D.
Application of a first-Born-type approximation for 2l electron capture in ion-atom collisions
J. Phys. B 19 L635 - 638 1986 T
 $H^+ + H(1s) \rightarrow H(2s, 2p)$; $H^+ + He(1s^2) \rightarrow H(2s, 2p)$
First-Born-approximation
25 - 1000 keV/amu
Total cross sections
- 86T24 Deco, G.R. Piancetti, R.D. Rivarola, R.D.
Symmetric eikonal theory for $n,l,m \rightarrow n,l,m$ electron capture ion-atom collisions.
J. Phys. B 19 3727 - 372 1986 T
General system
Symmetric eikonal approximation
- 86T23 Deco, G.R. Rivarola, R.D.
Relativistic continuum distorted-wave model for electron capture
J. Phys. B 19 1759 - 1770 1986 T
 $H^+ + H(1s) \rightarrow H(1s) + H^+$
CDW model
 $5 \times 10^7, 5 \times 10^9$ keV/amu
Angular distribution
- 86T70 Devdariani, A.V. Ostrovskii, V.N.
Exothermic charge exchange with excitation of the ion : extrapolation of cross sections into the region of thermal collisions
Opt. Spectrosc. (USSR) 60 558 - 561 1986 T
 $He^+ + Cd \rightarrow He + Cd^{*}(4415, 3250 \text{ \AA})$; $He^+ + Zn \rightarrow He + Zn^{*}(5894 \text{ \AA})$
Landau-Zener
rate coefficients at thermal energies
- 86T25 Dewangan, D.P. Eichler, J.
A first-order Born approximation for charge exchange with Coulomb boundary conditions.
J. Phys. B 19 2939 - 2944 1986 T
 $H^+ + Ar \rightarrow H + Ar^+(K^{-1})$
First order Born approximation
 $10^3 - 2 \times 10^4$ keV/amu
- 86T26 Eichler, J.
Relativistic eikonal theory of electron capture
Electronic and Atomic Collisions 257 - 262 1986 T (1986, Elsevier, North-Holland)
 $Ne^{10} + A^{(Z-1)+}(1s) \rightarrow Ne^{9+}(1s) + A^{Z+}$; $Xe^{54+}, Xe^{52+} + B \rightarrow Xe^{53+}, Xe^{51+}$ ($B = Be, Al, Cu, Au$)
Eikonal approximation
 $10^4 - 10^8$ keV/amu
Total cross sections
- 86T28 Errea, L.F. Martin, F. Mendez, L. Riera, A. Yanez, M.
Molecular (Feshbach) treatment of charge exchange $Li^{3+} + He$ collisions II cross sections
J. Chem. Phys. 84 5422 - 5426 1986 T
 $Li^{3+} + He \rightarrow Li^{2+} + He$
MO with common translation factor approach
0.2 - 5 keV/amu
- 86T27 Errea, L.F. Mendez, L. Mo, O. Riera, A.
Non-adiabatic ionic-covalent transitions: exponential linear model for the charge exchange and neutralization $Na + H \rightarrow Na^+ + H^-$
J. Chem. Phys. 84 147 - 151 1986 T
 $Na(3s) + H \rightarrow Na^+ + H^-$; $Na^+ + H^- \rightarrow Na(3s, 3p, 4s) + H$
MO
0.16 - 5 keV/amu
- 86T1 Errea, L.F. Mendez, L. Mo, O. Riera, A.
Nonadiabatic ionic-covalent transitions exponential-linear model for the charge exchange and neutralization reactions $Na + H \rightarrow Na^+ + H^-$
J. Chem. Phys. 84 147 - 151 1986 T
 $Na(3s) + H(1s) \rightarrow Na^+ + H^-$; $Na^+ + H^- \rightarrow Na(3s, 3p, 4s) + H(1s)$
5 MO with ETF
0.16 - 5.0 keV/amu

- 86T29 Friedrich, B. Pick, S. Hladek, L. Herman, Z. Nikitin, E.E. Reznikov, A.I. Umanskii, S. Ya
Dynamics of charge transfer $Ar^{2+}(^1P) + He(^1S) \rightarrow Ar(^2P) + He(^2S)$ at low collision energies; comparison of experimental results with quasiclassical calculations of the differential cross sections.
J. Chem. Phys. 84 8001 - 8012 1986 T
 $Ar^{2+}(^3P) + He(^1S) \rightarrow Ar(^2P) + He(^2S)$
IZ
1.5x10⁻³ - 4x10⁻⁵ keV/amu
Angular distribution
- 86T30 Fritsch, W. Lin, C.D.
Atomic orbital expansion study for the (quasi) two electron collisions system $O^{6+} + He$ and $C^{6+} + He$.
J. Phys. B 19 2683 - 2694 1986 T
 $C^{6+}, O^{6+} + He \rightarrow C^{3+}, O^{3+}(n, l)$
AO
0.5 - 40 keV/amu
(n, l) partial cross sections given
- 86T7 Fussen, D. Kubach, C.
Theoretical study of mutual neutralization in $H^+ - H$ collisions at low energy (0.02-20 eV)
J. Phys. B 19 L31-34 1986 T
 $H^+ + H \rightarrow H + H(n=2, 3)$
quantum close-coupling treatment
2x10⁻⁴ - 2x10⁻² keV/amu
n=3 dominant, particularly at low energies
- 86T71 Godunov, A.L. Kunikeev, S.D. Senashenko, V.S.
Differential cross sections for electron capture by protons in hydrogen and helium.
Sov. J. Plasma Phys. 12 784 - 788 1986 T
 $H^+ + He, H \rightarrow H + He^+, H^+$
Faddeev equation with final state interaction
1x10² - 7.4x10³ keV/amu
- 86T31 Henne, A. Toepfer, A. Ludde, H.J. Dreizler, R.M.
Time-dependent Hartree-Fock calculations for the $He^+(1s) + He^+(1s)$ system
J. Phys. B 19 L361 - 365 1986 T
 $He^+(1s) + He^+(1s) \rightarrow He^{2+} + He$
Time-dependent Hartree-Fock
1 - 20 keV/amu
- 86T33 Horbatsch, M.
Semiclassical description of multiple electron capture and ionization in fast bare-nucleus-rare gas collisions I. $C^{6+} - Ca^{20+}$ on Ne at 1 MeV/amu
Z. Phys. D 1 337 - 345 1986 T
 $Ar^{4+} + Ne \rightarrow Ne^{2+}$ (A = C-Ca ; i = 1-8)
Quantum statistical semiclassical method
1000 keV/amu
- 86T11 Horbatsch, M.
Calculation of transfer ionization processes in ion-atom collisions
J. Phys. B 19 L193-198 1986 T
 $C^{6+}, O^{8+} + Ne \rightarrow C^{3+}, O^{7+} + Ne^{2+}$ (i=1-8)
quantum statistical time-dependent mean-field theory
1000 keV/amu
- 86T32 Horbatsch, M. Dreizler, R.M.
Semiclassical description of multiple electron capture and ionization in fast bare nucleus-rare gas collisions II. energy dependence of $C^{6+}, Mg^{12+}, Ca^{20+} - Ne$ collisions.
Z. Phys. D 2 183 - 191 1986 T
 $Ar^{2+} + Ne \rightarrow Ne^{2+}$ (A = C, Mg, Ca ; i = 1-10)
Semiclassical quantum statistical independent particle model
50 - 5000 keV/amu
- 86T34 Hsin, S.H. Lieber, M. Klatke, R.E. McGuire, J.H. Sie, N.C.
Strong-potential Born approximation calculations of 1s - 2p electron capture.
Phys. Rev. A 34 1772 - 1778 1986 T
 $H^+ + H(1s) \rightarrow H(n, l, m) + H^+$ (n = 1, 2)
Strong-potential Born approximation
1000 - 200000 keV/amu
Also angle-differential cross sections
- 86T35 Jain, A. Lin, C.D. Fritsch, W.
Electron capture in $C^{6+} + He$ and $O^{8+} + He$ collisions at intermediate energies in the atomic orbital expansion method.
Phys. Rev. A 34 3676 - 3683 1986 T
 $Ar^{2+} + He \rightarrow Ar^{(2-1)+}(n, l, m)$ (A = C, O)
AO
10 - 2000 keV/amu

- 86T37 Janev, R.K., Krstic, P.S.
Non-adiabatic transitions between two groups of intersecting energy levels.
J. Phys. B 19 3695 - 3715 1986 T
Closed forms for transition probabilities.
- 86T36 Janev, R.K., Lazur, V.Yu., Grozdanov, T.P.
Dynamic autoionization widths for capture ionization in slow ion-atom collisions.
J. Phys. B 19 421 - 436 1986 T
Analytic expressions for dynamic autoionization in transfer ionization
- 86T72 Kern, K., Schlier, Ch.
Orbiting trajectories and the adiabatic approximation to the capture cross section.
Z. Phys. D 1 391 - 401 1986 T
average dipole orientation (ADO) theory; Monte Carlo calculation
- 86T40 Kimura, M.
Theoretical investigation of charge transfer in collisions of C^{6+} and N^{7+} ions with H and H_2 targets at low to intermediate energy
Phys. Rev. A 33 4440 - 4443 1986 T
 C^{6+} , N^{7+} + H, $H_2 \rightarrow C^{5+}$, N^{6+}
travelling MO
0.1 - 10 keV/amu
Total cross sections given
- 86T 5 Kimura, M., Chapman, S., Lane, N.F.
Electron capture in $Ar^+ + H_2$ collisions in the keV energy regime
Phys. Rev. A 33 1619-1625 1986 T
 $Ar^+ + H_2 \rightarrow Ar^0 + H_2^+$
MO with ETF
 7.5×10^{-3} - 0.25 keV/amu
- 86T42 Kimura, M., Lane, N.F.
Symmetric resonant charge transfer in $H^+ + H$ and $He^{2+} + He$ collisions at extremely low energies.
Phys. Rev. A 34 4421 - 4423 1986 T
 $H^+ + H \rightarrow H H^+$; $He^{2+} + He \rightarrow He + He^{2+}$
MO
 10^{-10} - 10^{-6} keV/amu
- 86T39 Kimura, M., Lane, N.F.
Theoretical study of alignment and orientation in $Li^+ + He$ collisions
Phys. Rev. Letters 56 2160 - 2163 1986 T
 $Li^+ + He \rightarrow Li(2^3P)$
MO expansion method
0.14 - 3 keV/amu
Alignment and orientation
- 86T41 Kimura, M., Lin, C.D.
Charge transfer and excitation process in p-He collisions studied using a unified atomic orbital-molecular orbital matching method.
Phys. Rev. A 34 176 - 184 1986 T
 $H^+ + He \rightarrow H(2s, 2p, total) + He^+$; $H^+ He(2^1P, 2^3S)$
MO - AO matching method
1 - 100 keV/amu
Impact parameter dependence
- 86T43 Kirby, K., Heil, T.G.
A molecular representation of $Al^{3+} + H$ charge transfer reactions.
J. Chem. Phys. 85 6220 - 6224 1986 T
 $Al^{3+} + H \rightarrow Al^{2+}$
MO expansion
0.014 - 14 keV/amu
Total cross section
- 86T73 Kobayashi, K., Ishihara, T.
Differential cross sections for electron capture in fast proton-hydrogen collisions.
Phys. Rev. A. 34 626 - 628 1986 T
 $H^+ + H \rightarrow H + H^+$
eikonal approx. with distortion by internuclear interaction
25 - 125 keV/amu
angular distribution over 0 - 3 mrad
- 86T74 Korsch, H.J., Möhlenkamp, R., Thylwe, K.E.
Semiclassical complex energy theory of orbiting resonances in curve crossing systems.
J. Phys. B. 19 2151 - 2163 1986 T
 $N^{3+} + H \rightarrow N^{2+} + H^+$
semiclassical complex energy theory

- 86T44 Macek,J.
Electron capture mechanisms
Nucl. Instr. Meth. in Phys. Res. B 13 573 - 577 1986 T
review
- 86T46 Martin,F. Riera,A. Yanez,M.
Molecular (Feshbach) treatment of charge exchange $\text{Li}^{3+} + \text{He}$ collisions I energies and couplings.
J. Chem. Phys. 84 5412 - 5421 1986 T
 $\text{Li}^{3+} + \text{He} \rightarrow \text{Li}^{2+} + \text{He}^+$
Feshbach projection operator formalism
Energy couplings
- 86T45 Martin,F. Riera,A. Yanez,Z.
Single and double charge transfer in $\text{Be}^{4+} + \text{He}$ collisions : a molecular (Feshbach) approach
Phys. Rev. A 34 4675 - 4681 1986 T
 $\text{Be}^{4+} + \text{He} \rightarrow \text{Be}^{3+}, \text{Be}^{2+}$
MO with translation factor
0.25 - 25 keV/amu
Total cross sections given
- 86T47 Men,F.K. Kimura,M. Olson,R.E.
Resonant charge transfer in symmetric alkali-ion-alkali-atom collisions.
Phys. Rev. A 33 3800 - 3806 1986 T
 $\text{A}^+ + \text{A} \rightarrow \text{A} + \text{A}^+$ ($\text{A} = \text{Li}, \text{Na}, \text{K}, \text{Rb}, \text{Cs}$)
MO expansion method with translation factor
0.01 - 5 keV/amu
total cross sections
- 86T48 Moisewitsch,B.L.
Relativistic symmetric eikonal approximation for electron capture.
J. Phys. B 19 3733 - 3738 1986 T
general formalism
eikonal approximation
- 86T49 Niehaus,A.
A classical model for multiple electron capture in slow collisions of highly charged ions with atoms.
J. Phys. B 19 2825 - 2937 1986 T
general system
modified over-barrier model
- 86T50 Nikitin,E.E. Reznikov,A.I. Umanskii,S.Ya.
Two-level model of charge exchange with Coulomb interaction in one of the channels; quantum and quasi-classical cross sections in the weak coupling limit.
Sov. Phys-JETP 64 937 - 941 1986 T
 $\text{Ar}^{2+} + \text{He} \rightarrow \text{Ar}^+ + \text{He}^+$
DWA
 1×10^{-5} keV/amu
- 86T 2 Ojha,P.C. Girardean,M.D. Gilbert,J.D. Straton,J.C.
Fock-Tani transformation and a first-order theory of charge transfer
Phys. Rev. A 33 112-123 1986 T
 $\text{H}^+ + \text{H}(1s) \rightarrow \text{H}(1s) + \text{H}^+$
Fock-Tani transformation of second-quantized Hamiltonian
2 - 800 keV/amu
angular distribution
- 86T51 Olson,R.E. Weimore,A.E. McKenzie,M.R.
Double electron transitions in collisions between multiply charged ions and helium atoms.
J. Phys. B 19 L629 - 634 1986 T
 $\text{A}^{q+} + \text{He} \rightarrow \text{A}^{q+} + \text{He}^+ + e$; $\text{A}^{q+} + \text{He}^{2+} + 2e$; $\text{A}^{(q-1)+} + \text{He}^+ + e$; $\text{A}^{(q-2)+} + \text{He}^{2+}$ ($q = 1 - 50$)
classical trajectory Monte Carlo method
1000 keV/amu
total cross sections
- 86T52 Opradocce,L. Falcon,C. Casaubon,J.I.
Single electron capture by Li^{3+} from He in low energy collisions
J. Phys. B 19 2319 - 2329 1986 T
 $\text{Li}^{3+} + \text{H} \rightarrow \text{Li}^{2+}$
close-coupling technique
 2×10^{-2} - 6 keV/amu
Total cross sections

86T12	Reinhold, C.O. Falcon, C.A. Classical ionization and charge transfer cross sections for H^+ + He and H^+ + Li^+ collisions with consideration of model interactions Phys. Rev. A 33 3859 - 3866 1986 T $H^+ + He \rightarrow H + He^+$, $H^+ + He^+ + e$; $H^+ + Li^+ \rightarrow H^+ + Li^{2+}$, $H^+ + Li^{2+} + e$ Classical trajectory Monte Carlo 50 - 1000 keV/amu total cross sections	86T 8	Shingal, R. Bransden, B.H. Ermolaev, A.M. Flower, D.R. Newby, C.W. Noble, C.J. Charge transfer in H^+ - Na^0 collisions; atomic orbital calculations J. Phys. B 19 309-320 1986 T $H^+ + Na(3s) \rightarrow H(nl) + Na^+(n=1,2,3)$; $Na^+ + H(1s) \rightarrow Na(3l) + H^+(l=0,1,2)$ two-center expansion in travelling AO 0.5 - 20 keV/amu
86T13	Saha, G.C. Electron capture in collisions of He^+ with Li atoms and of Li^{3+} , C^{6+} and O^{8+} with He atoms in the high energy region Phys. Rev. A 34 2809 - 2821 1986 T $He^{2+} + Li(1s) \rightarrow He^+(nl)$; $He^{2+} + Li(2s) \rightarrow He^+(nl)$; $Li^{3+} + He(1s) \rightarrow Li^{2+}(nl)$; $C^{6+} + He(1s) \rightarrow C^{5+}(nl)$; $O^{8+} + He \rightarrow O^{7+}(nl)$ CDW approximation 200 - 4000 keV/amu	86T55	Shingal, R. Noble, C.J. Bransden, B.H. Flower, D.R. Semiclassical calculations of charge exchange and excitation in Na^+ - Li and Li^+ - Na collisions using atomic orbital expansions. J. Phys. B 19 3951 - 3964 1986 T $Na^+ + Li \rightarrow Na(n,l) + Li$; $Li^+ + Na \rightarrow Li(n,l) + Na^+$ travelling AO 0.25 - 49 keV/amu Partial cross sections (n,l)
86T53	Saha, G.C. Datta, S. Mukherjee, S.C. Electron capture in collisions of He^{2+} with Li atoms and of Li^{3+} , C^{6+} and O^{8+} with He in the high energy region. Phys. Rev. A 34 2809 - 2821 1986 T $He^{2+} + Li(1s,2s) \rightarrow He^+(1s,2s,2p,3s,3p,3d) + Li^+$; $Li^{3+} + C^{6+}, O^{8+} + He \rightarrow Li^{2+}, C^{5+}, O^{7+}(nl) + He(n = 1 - 5)$ CDW 200 - 4000 keV/amu	86T77	Shurygina, Ya.A. Senashenko, V.S. Teplova, Ya.A. Calculation of the one-electron charge transfer cross sections of H^+ , He^{2+} and Li^{3+} nuclei in collisions with light atoms at medium and high energies. Sov. Phys.-Tech. Phys. 31 897 - 903 1986 T $H^+, He^{2+}, Li^{3+} + C, N \rightarrow H, He^+, Li^{2+}$; $H^+ + He \rightarrow H$; $He^{2+} + H \rightarrow He^+$ strong coupling equations (0.2 - 2.5) $\times 10^3$ keV/amu (C); (0.15 - 5) $\times 10^3$ keV/amu (Ne); (20 - 5000) keV/amu analytical expressions for K-shell electron transfer
86T76	Saha, G.C. Mukherjee, S.C. X-ray cross section in helium for electron capture into excited states by C^{6+} and O^{8+} ions in the continuum distorted-wave approximation. Phys. Letters A 117 23 - 26 1986 T $C^{6+}, O^{8+} + He \rightarrow C^{5+}(n), O^{7+}(n) + hv$ CDW (0.42 - 2.1) $\times 10^3$ keV/amu (C); (0.625 - 2.5) $\times 10^3$ keV/amu (O)	86T56	Sinha, C. Tripathi, S. Sii, N.C. Charge transfer in the eikonal approximation. Phys. Rev. A 34 1026 - 1030 1986 T $H^+ + H \rightarrow H(1s) + H^+$ Eikonal approximation 40 - 5000 keV/amu
86T54	Salin, A. Convergence of coupled-state calculations for electron capture by bare ions from atomic hydrogens, Phys. Rev. A 34 4436 - 4437 1986 T $N^{7+} + H(1s) \rightarrow N^{6+} + H^+$ MO (5, 25 states) 0.1 - 10 keV/amu Total cross sections	86T75	Spalburg, M.R. Los, J. Devdariani, A.Z. On the validity of simple two-state electronic transition models. Chem. Phys. 103 253 - 263 1986 T general theory Landau-Zener-Demkov model locations and widths of transition zones calculated

- 86T57 Taubjerg,K.
Reaction windows for electron capture by highly charged ions
J. Phys. B 19 L367 - 372 1986 T
General system
Landau-Zener
- 86T58 Toshima,N. Watanabe,T.
Simplified distorted-wave treatment for asymmetric electron capture processes
Phys. Rev. A 33 1382-1384 1986 T
 $A^{n+} + H(1s) \rightarrow A^{(n-1)+} + H^+$ (A = C, Ne)
DWBA
 $10^{-1} - 10^3$ keV/amu
- 86T59 Urbain,X. Giusti-Suzor,A. Fussen,D. Kubach,C.
Theoretical study of associative ionization in $H^+ - H^+$ collisions at low energy (0.001 - 5 eV)
J. Phys. B 19 L273 - 277 1986 T
 $H^+ + H^+ \rightarrow H_2^+ + e$
 $1 \times 10^{-6} - 5 \times 10^{-3}$ keV/amu
- 86T60 Waknon,P. Gala,S. Diro,M.C. Courbin-Gaussorgues,C. Sidis,V.
Theoretical study of population sharing between n=2 levels in the $Li^+ + He$ collision.
J. Phys. B 19 611 - 628 1986 T
 $Li^+ + He \rightarrow Li(n=2) + He^+$; $Li^+ + He(n=2)$
Half-collision model
0.14 - 4.3 keV/amu
- 86T61 Winter,T.G.
Electron transfer and ionization in collisions between protons and the ions Li^{2+} and He^+ studied with the use of a Sturmian basis.
Phys. Rev. A 33 3842 - 3852 1986 T
 $H^+ + Li^{2+}$, $He^+ \rightarrow H + Li^{3+}$, He^{2+} ; $H^+ + Li^{3+}$, $He^{2+} + e$
Coupled state Sturmian approach
17.5 - 200 keV/amu
Total cross sections
- 86T62 Zaifman,D. Maor,D.
Heisenberg core in classical trajectory Monte Carlo calculation of ionization and charge exchange.
Phys. Rev. Letters 56 320 - 323 1986 T
 $H^+ + He \rightarrow H + He^+$
Classical trajectory Monte Carlo method
20 - 200 keV/amu
- 86T63 Zygelman,B. Dalgarno,A.
Direct charge transfer of He^+ in neon.
Phys. Rev. A 33 3853 - 3858 1986 T
 $He^+ + Ne \rightarrow He + Ne^+$
Diabatic formulation
 $\sim 10^{-4} - 2$ keV/amu
Total cross sections
- 86T66 Wetmore,A.E. Cole,H.R. Olson,R.E.
Calculation of electron capture cross sections for collisions of Be^{2+} and B^{3+} on H.
J. Phys. B 19 1515 - 1525 1986 T
 $Be^{2+} + H \rightarrow Be^+$, $Be^+(2s)$, $Be^+(2p)$; $B^{3+} + H \rightarrow B^{2+}$
PSS with translation factor
2s, 2p total cross sections for Be^{2+} , total cross sections for B^{3+}

- 87E 1 Afrosimov, V.V., Basaliev, A.A., Lozhkin, K.O., Panov, M.N.
Filling of various electronic states in collisions of multiply charged argon ions with hydrogen atoms and molecules
JETP Letters 48 107-110 1987 E
 $Ar^{q+} + H, H_2 \rightarrow Ar^{q+}(4s, 4p, 4d, 4f, 5s, 5p) ; Ar^{q+} + H \rightarrow Ar^{q+}(3s^2 3p^2 4s, 3s^2 3p^2 3d, 3s^2 3p^4, 3s^2 3p^2 4p)$
translational energy spectroscopy
 $5 \times 10^{-2} - 2 \text{ keV/amu}$
- 87E 2 Almeida, D.P., Castro Faria, N.V., de Freire, F.L., Montenegro, E.C., Pinho, A.G.de
Collisional formation and destruction of fast negative hydrogen ions in He, Ne and Ar targets
Phys. Rev. A 36 16-25 1987 E
 $H + B \rightarrow H, H^+ ; H + B \rightarrow H^+ ; H^+ + B \rightarrow H^- (B = He, Ne, Ar)$
growth method
300 - 2000 keV/amu
- 87E 3 Andriamonje, S., Chevallier, M., Cohen, C., Duru, J., Gaillard, M.J., Genre, R., Hage-Ali, M., Kirsch, R., Mazuy, B., Morj, J., Moulin, J., Peizat, J.C., Remillieux, J., Schmaus, D., Toulmond, M.
Observation of radiative electron capture into K, L, M shells of 25 MeV/u Xe^{58+} ions channeled in silicone
Phys. Rev. Letters 59 2271-2274 1987 E
 $Xe^{58+} + Si \rightarrow Xe^{57+} + hv$
X-ray spectroscopy
 $2.5 \times 10^4 \text{ keV/amu}$
no cross sections, only estimation for REC
- 87E 4 Anholt, R., Meyerhof, W.E., Xu, X.Y., Gould, H., Feinberg, B., McDonald, R.J., Wegner, H.E., Thieberger, P.
Atomic collisions with relativistic heavy ions VIII. charge state studies of relativistic uranium ions
Phys. Rev. A 36 1586-1600 1987 E
 $U^{q+}(q=83-91), Xe^{q+}(q=52-54) + B \rightarrow U^{(q-k)+}, Xe^{(q-k)+}(k=1-3) (B = Al, Cu, Ag, Au)$
 $10^5 - 10^6 \text{ keV/amu}$
ionization cross sections scaled with $1/Z_1^2$
- 87E 6 Aumayr, F., Lakis, G., Winter, H.
Charge transfer and target excitation in $H^+ - Na(3s)$ collisions (2 - 20 keV)
J. Phys. B 20 2025-2030 1987 E
 $H^+ + Na(3s) \rightarrow H^0 + Na^+ ; H^+ + Na(3p)$
photon spectroscopy technique
2 - 20 keV/amu
- 87E 18 Aumayr, F., Lakis, G., Winter, H.
Electron capture and target excitation in slow ion-alkali atom collisions : a systematic study.
Z. Phys. D 6 145 - 153 1987 E
 $A^+ + B \rightarrow A^0 + B^+ (A = He, Ne, Ar, C, N, O ; B = Li(2s), Na(3s))$
growth
0.25 - 5 keV/amu
also excitation cross section to $Li(2p)$ and $Na(3p)$ with interference filter.
- 87E 5 Aumayr, F., Winter, H.
 Ly -alpha emission in $H^+ - Na$ collisions (1 - 20 keV)
J. Phys. B 20 L803-807 1987 E
 $H^+ + Na(3s), Na^+(3p) \rightarrow H^+(2p)$
photon spectroscopy
1 - 20 keV/amu
- 87E 11 Baer, M., Dueren, R., Friedrich, B., Niedner, G., Noll, M., Toennies, J.P.
Dynamics of $H^+ + Kr$ and $H^+ + Xe$ elastic and charge transfer collisions : state-selected differential cross sections at low collision energies
Phys. Rev. A 36 1063-1072 1987 E
 $H^+ + Kr(^1S_0) \rightarrow H(n=1) + Kr(^2P_{3/2}, ^2P_{1/2}) ; H^+ + Xe(^1S_0) \rightarrow H(n=1, 2) + Xe(^2P_{3/2}, ^2P_{1/2})$
TOF
0.03 - 0.05 keV/amu (c.m.)
angular distribution
- 87E 7 Baptist, R., Bonnet, J.J., Bonnefoy, M., Boursey, E., Brenac, A., Chassevent, M., Chaurat, G., Dousson, S., Duff, Y., Le Fleury, A., Gargaud, M., Hitz, D.
Subshell-selective electron capture in collisions of C^{4+} (0.05 a.u. $< v < 0.40$ a.u.) with H and H_2
Nucl. Instr. Meth. in B23 123-127 1987 E
Phys. Res.
 $C^{4+} + H, H_2 \rightarrow C^{3+}(3s, 3p, 3d)$
VUV photon spectroscopy
0.05 - 3.3 keV/amu
ratios of subshell cross sections

- 87E8 Barat,M. Gaboriaud,M.N. Guillemot,L. Roncin,P. Laurent,H. Andriamonje,S.
Coincident energy gain spectroscopy of electron capture in multiply charged ions colliding with He, H_2 and heavy rare gas targets
J. Phys. B 20 5771 - 5783 1987 E
 C^{6+} , N^{7+} , O^{8+} + He, $\text{H}_2 \rightarrow \text{C}^{5+}$, N^{6+} , O^{7+} ; C^{6+} , N^{7+} + Ar, Xe $\rightarrow \text{C}^{5+}$, N^{6+} ; N^{6+} , O^{7+} ; Ne^{8+} + He $\rightarrow \text{N}^{6+}$, O^{6+} , Ne^{6+} ; N^{6+} + Ar $\rightarrow \text{N}^{5+}$; O^{7+} + $\text{H}_2 \rightarrow \text{O}^{6+}$; Ne^{8+} + He, Ar $\rightarrow \text{Ne}^{7+}$; O^{6+} + He, Ne, H_2 , Ar, Kr, Xe
energy gain spectroscopy
0.5 keV/amu
no cross sections, only n-distribution
- 87E9 Bernstein,E.M. Clark,M.W. Tanis,J.A. Berkner,K.H. McDonald,R.J.
Schlachter,A.S. Stearns,J.W. Graham,W.G. McFarland,R.H. Morgan,T.J.
Mowat,L.R. Mueller,D.W. Stockli,M.P.
Resonant electron transfer and L-shell excitation for Nb^{31+} and La^{40+} ions
J. Phys. B 20 L505-510 1987 E
 $\text{A}^{(3-3+)} + \text{H}_2 \rightarrow \text{A}^{(2-2+)} + \text{H}_2$ (A = Nb, La)
coincidence between X-rays and scattered particles
3240 - 5040 keV/amu (La); 2370 - 6450 keV/amu (Nb)
- 87E10 Bordenave-Montesquieu,A. Benoit-Cattin,P. Boudjema,M. Gleizes,A.
Bachau,H.
Angular momenta determination of N^{3+} (313 I°) capture states in N^{7+} - He collisions
J. Phys. B 20 L695-703 1987 E
 N^{7+} + He $\rightarrow \text{N}^{3+}$ (313 I°) L° + He^{2+}
electron-spectroscopy
- 87E11 Bouchama,T. Desesquelles,J. Druetta,M. Farison,M. Martin,S.
Radiative two-electron capture and doubly excited state excitation in N^{3+} + He low energy collisions
J. Phys. B 20 L457-461 1987 E
 N^{3+} (1s 2) + He $\rightarrow \text{N}^{3+}$ (1s 2 nl n'l°)
0.357 - 4.28 keV/amu
emission cross sections for 2s 2 1S - 2s2p ^1P transition
- 87E12 Binder, J. Huber, B.A. Koslowski, H.R. Wiesemann, K.
Near-threshold translational energy spectroscopy (NTTES).
J. Phys. B 20 2713 - 2721 1987 E
 $\text{Ar}^{31+}(\text{nl}) + \text{Ar} \rightarrow \text{Ar}^{29+}(\text{n'l}') + \text{Ar}^+(\text{n''l''})$
translational energy spectroscopy
variable electron energy for ionization in order to identify electronic states of ions
- 87E13 Church,D.A. Kravis,S.D. Sellin,I.A. Levin,C.S. O.J.C. Short,R.T. Meron,M.
Johnson,B.M. Jones,K.W.
Confined thermal multicharged ions produced by synchrotron radiation
Phys. Rev. A 36 2487-2490 1987 E
 $\text{Ar}^{q+}(\text{q}=2-5) + \text{Ar} \rightarrow \text{Ar}^{(q-1)+} + \text{Ar}^+$
trapped ion
 10^{-3} keV/amu
rate coefficients at 300K
- 87E14 Coggiola,M.J. Peterson,J.R. Huestis,D.L.
Angular scattering effects in D $^+$ production by double electron capture of D $^+$ in Cs
Phys. Rev. A 36 2008-2023 1987 E
 $\text{D}^+ + \text{Cs} \rightarrow \text{D}^0$, $\text{D}^+ + \text{D}^0 + \text{Cs} \rightarrow \text{D}^0$, $\text{D}^+ + \text{D}^+ + \text{Cs} \rightarrow \text{D}^0$
 $0.125 - 1$ keV/amu
angular differential cross sections
- 87E15 Danared,H. Andersen,H. Astner,G. Defrance,P. Rachafi,S.
Absolute differential cross sections for high-charge low-energy Ar colliding with Ar
Phys. Scripta 36 756-764 1987 E
 $\text{Ar}^{q+} + \text{Ar} \rightarrow \text{Ar}^{q+} + \text{Ar}^+$ (q = 6-13)
recoil-scattered ion coincidence
 $0.27(\text{q}=6) - 0.59(\text{q}=13)$ keV/amu
total cross sections for q=6-13, differential cross sections for q=6-9,10
- 87E16 Danared,H. Andersson,H. Astner,G. Barany,A. Defrance,P. Rachafi,S.
Angular differential cross sections for high charge low energy Ar colliding with Ar
J. Phys. B 20 L165-170 1987 E
 $\text{Ar}^{q+}(\text{q}=8,9,11) + \text{Ar} \rightarrow \text{Ar}^{q+} + \text{Ar}^+$ (r = q-1, q-2, q-3)
translational energy spectroscopy
 $0.045 \times \text{q}$ keV/amu
relative cross sections
- 87E17 Burnside, R.G. Tepley, C.A. Wickwar, V.B.
The O $^+$ -O collision cross sections : can it be inferred from aeronautical measurements
Annales Geophysicae 5(A) 343 - 350 1987 E
 $\text{O}^+ + \text{O} \rightarrow \text{O} + \text{O}^+$
the previous values should increase by a factor of $1.7(+0.7; -0.3)$

- 87E17 Dev, B., Boers, A.L.
Collision cross sections and the efficiency of a Bendix multiplier for 2-5 keV He, Ar and H₂ ions and neutrals
J. Phys. B 20 3463-3473 1987 E
 $A^+ + A \rightarrow A^+ + A^*$ ($A = \text{He, Ar, H}_2$)
growth
2 - 5 keV (for all ions)
- 87E80 Druetta, M., Martin, S., Bouchama, T., Harel, C., Jouin, H.
Spectroscopic study of the charge exchange collision between Ar²⁺ and He or H₂ at beam energies of 80, 40 and 8 keV
Phys. Rev. A 36 3071-3076 1987 E
 $\text{Ar}^{2+} + B \rightarrow \text{Ar}^{2+}(\text{4f}, \text{5f}) + B^+$ ($B = \text{He, H}_2$)
X-ray spectroscopy (E), PSS (T)
0.5 - 2 keV/amu
emission cross sections, cross sections for (n,l) states
- 87E19 DuBois, R.D.
Ionization and charge transfer in He²⁺ - rare gas collisions II.
Phys. Rev. A 36 2583 - 2593 1987 E
 $\text{He}^{2+} + B \rightarrow \text{He}^+ + B^+ + (k-1)e$; $\text{He}^0 + B^+ + (k-2)e$ ($B = \text{He, Ne, Ar, Kr}$)
projectile-recoil ion coincidence
50 - 500 keV/amu
- 87E20 Eibel, F., Salzborn, E.
Charge transfer of 0.2-5 keV protons and hydrogen atoms in sodium, potassium and rubidium vapor targets.
J. Phys. B 20 4531 - 4542 1987 E
 $\text{H}^+ + B \rightarrow \text{H} + B^+$; $\text{H} + B^{2+} : \text{H} + B \rightarrow \text{H}^+ + B + e$; $\text{H}^+ + B^+$ ($B = \text{Na, K, Rb}$)
growth method
0.5 - 5 keV/amu
also secondary electron emission coefficients for SS, Cu
- 87E21 Eibel, M., Waitzel, R.
Luminescence of Ar⁺ ion emitted after electron capture of Ar²⁺ ions from K-atoms.
Z. Phys. D 7 171 - 176 1987 E
 $\text{Ar}^{2+}(\text{3p}^4 \text{ } ^3\text{P}, \text{ } ^1\text{D}) + \text{K} \rightarrow \text{Ar}^+ + \text{K}^+$
optical attenuation method
0.1 keV/amu
- 87E22 Friedrich, B., Niedner, G., Noll, M., Toennies, J.P.
Vibrationally resolved inelastic and charge transfer scattering of H⁺ by H₂O.
J. Chem. Phys. 87 5256 - 5265 1987 E
 $\text{H}^+ + \text{H}_2\text{O} \rightarrow \text{H}^0$
TOF
0.03 - 0.05 keV/amu
probabilities given as a function of scattering angle.
- 87E83 Friedrich, B., Niedner, G., Noll, M., Toennies, J.P.
 $\text{H}^+ + \text{Xe}$ low energy collisions : opposite phase oscillations of the elastic and charge transfer differential cross sections.
Z. Phys. D 6 49 - 53 1987 E
 $\text{H}^+ + \text{Xe} \rightarrow \text{H}^+ + \text{Xe}$; $\text{H} + \text{Xe}$
TOF technique
4 - 6.6 keV/amu
angular distribution
- 87E84 Friedrich, B., Vancura, J., Herman, Z.
Crossed-beam investigation of the single-electron charge transfer process $\text{Kr}^{2+} + \text{He} > \text{Kr}^+ + \text{He}^+$ at sub-eV collision energies.
Int. J. Mass Spectro. 80 177 - 185 1987 E
Ion Phys.
 $\text{Kr}^{2+}(\text{ } ^1\text{D}_2, \text{ } ^1\text{S}_0) + \text{He} \rightarrow \text{Kr}^+(\text{ } ^2\text{P}_{3/2}, \text{ } ^2\text{P}_{1/2}) + \text{He}^+$
crossed-beam technique
 $3.8 \times 10^{-4} - 6.2 \times 10^{-6}$ keV/amu
total cross section ratios only
- 87E85 Futrell, J.M.
Crossed-molecular beam studies of the state-to-state reaction dynamics of charge transfer at low and intermediate energy.
Int. J. Quant. Chem. 31 133 - 159 1987 E
crossed-beam technique
review
- 87E23 Gealy, M.W., Van Zyl, B.
Cross sections for electron capture and loss I. H⁺ and H⁺ impact on H and H₂.
Phys. Rev. A 36 3091 - 3099 1987 E
 $\text{H}^+ + B \rightarrow \text{H}$; $\text{H} + B \rightarrow \text{H}$ ($B = \text{H, H}_2$)
High temperature oven
0.06 - 2 keV/amu

87E24	Gealy, M.W. Van Zyl, B. Cross sections for electron capture and loss II. H impact on H and H ₂ Phys. Rev. A 36 3100 - 3107 1987 E H + B → H ⁺ ; H ⁺ (B = H, H ₂) High temperature oven technique 0.66 - 2 keV/amu	87E26	Hippler, R.H. Schiwietz, G. Bossler, J. delta-electron spectroscopy of transfer and ionization of proton-rare gas atom collisions. Phys. Rev. A 35 485 - 488 1987 E H ⁺ + He, Ne, Ar → delta-electron spectroscopy 300 keV/amu
87E86	Geddes, J. Yousif, F.B. Gilbody, H.B. Balmer alpha emission in collisions of H, H ⁺ , H ₂ ⁺ and H ₃ ⁺ with CH ₄ . J. Phys. B 20 4773 - 4778 1987 E H ⁺ + CH ₄ → H(3s; 3d; H-alpha; total) dissociative capture cross sections given also.	87E28	Hippler, R. Harbich, W. Madeheim, H. Kleinpoppen, H.K. Lutz, H.O. Cross sections for charge excitation to H(2p) in proton-rare gas atom collisions (1 - 25 keV/amu) Phys. Rev. A 35 3139 - 3141 1987 E H ⁺ + B → H(2p) + B ⁺ (B = He, Ne, Ar) photon detection method 1 - 25 keV/amu
87E25	Hagmann, S. Kelbch, S. Schmidt-Böcking, H. Cocke, C.L. Richard, P. Schuch, R. Skudlartz, A. Ullrich, J. Johnson, B. Meron, M. Jones, K. Trautmann, D. Rosel, F. K-K charge transfer and electron emission for 0.13 MeV/amu F ⁸⁺ + Ne collisions. Phys. Rev. A 36 2603 - 2612 1987 E F ⁸⁺ + Ne → F ⁸⁺ + Ne ⁺ (K ⁻¹) 1.30 keV/amu Impact parameter dependence	87E31	Hoekstra, R. Ciric, D. de Heer, F.J. Morgenstern, R. Electron capture in collisions of O ⁸⁺ with H; absolute line emission cross sections. Phys. Letters A 124 73 - 76 1987 E O ⁸⁺ + H → O ⁷⁺ (nl) + H ⁺ photon spectroscopy line emission cross sections for n=3->2, n=4->3, n=5->4; n=5->3 and n=6->3 transitions.
87E27	Hippler, R. Datz, S. Miller, P.D. Pepmiller, P.L. Dittner, P.F. Double- and single-electron capture and loss in collisions of 1 - 2 MeV/u boron, oxygen and silicon projectiles with helium atoms. Phys. Rev. A 35 585 - 590 1987 E B ³⁺ , O ⁸⁺ , Si ¹⁴⁺ + He → B ⁴⁺ , B ³⁺ , O ⁷⁺ , O ⁶⁺ , Si ¹³⁺ , Si ¹²⁺ ; O ⁶⁺ , O ⁷⁺ , Si ¹³⁺ , Si ¹²⁺ + He → O ⁷⁺ , O ⁸⁺ , Si ¹³⁺ , Si ¹²⁺ , Si ¹⁰⁺ , Si ¹¹⁺ growth method 1000 - 2000 keV/amu	87E30	Hoekstra, R. de Heer, F.J. Winter, H. Two- and more-electron transitions in slow multicharged ion-He collisions. Nucl. Instr. Meth. in 23 104 - 108 1987 E Phys. Res. B C ⁴⁺ + B → C ³⁺ , C ²⁺ ; N ⁴⁺ + B → N ³⁺ , N ²⁺ ; N ³⁺ + B → N ⁴⁺ , N ³⁺ ; O ³⁺ + B → O ⁴⁺ , O ³⁺ (B = He) retardation method 0.5 - 6 keV/amu
87E29	Hippler, R. Faust, M. Woelf, R. Kleinpoppen, H. Lutz, H.O. Polarization studies of H(2p) charge exchange excitation; H ⁺ + He collisions Phys. Rev. A 36 4644 - 4651 1987 E H ⁺ + He → H(2p) + He ⁺ photon spectroscopy 1 - 4 keV/amu alignment and orientation	87E32	Hopkins, C.J. Watts, M.F. Dunn, K.F. Gilbody, H.B. Measurement of cross section for charge transfer in H ⁺ - C ⁺ and H ⁺ - N ⁺ collisions. J. Phys. B 20 3867 - 3872 1987 E H ⁺ + B ⁺ → H + B ⁺ ; H ⁺ + B ²⁺ + e (B = C, N) crossed beam technique 46 - 141 keV/amu

- 87E33 Hornis, W.G. Kamber, E.Y., Hasted, J.B., Brenton, A.G., Beynon, J.H.
State-selective electron capture by Xe^{n+} ions from rare gas atoms.
Int. J. Mass Spectrom. 76 263 - 276 1987 E
Ion Processes
 Xe^{n+} ($n = 2 - 7$) + B $\rightarrow$ $\text{Xe}^{(q-1)+}$
translational energy spectroscopy
 $2 \times 10^{-2} \text{ q}$ (keV/amu)
total cross sections, various transfer channels determined.
- 87E34 Horsdal-Pedersen, E.
Probabilities for electron capture by protons from neon at large scattering angles.
J. Phys. B 20 785 - 792 1987 E
 $\text{H}^+ + \text{Ne} \rightarrow \text{H}$
400 - 1000 keV/amu
probabilities for electron capture ($\theta = 22.5 - 90^\circ$)
- 87E87 Howard, S.L., Rockwood, A.L., Tarbton, W., Friedrich, B., Anderson, S.G., Futrell, J.H.
Observation of finite-structure transitions in rare gas charge transfer at surprisingly low energies using a crossed molecular beam technique.
Chem. Phys. Letters 140 385 - 388 1987 E
 $\text{Kr}^+(^2\text{P}_{3/2}) + \text{Kr}(^1\text{S}_0) \rightarrow \text{Kr}(^1\text{S}_0) + \text{Kr}^+(^2\text{P}_{3/2}, ^2\text{P}_{1/2})$
crossed-beam technique
 $1 \times 10^{-4} \text{ keV/amu}$
- 87E88 Howard, S.L., Rockwood, A.L., Trafton, W., Friedrich, B.F., Anderson S.G., Futrell, J.H.
Differential cross section for the competing charge-transfer reactions $\text{Kr}^+(^2\text{P}_{3/2}) + \text{Kr}(^1\text{S}_0) \rightarrow \text{Kr}(^1\text{S}_0) + \text{Kr}^+(^2\text{P}_{3/2})$ and $\text{Kr}^+(^2\text{P}_{3/2}) + \text{Kr}(^1\text{S}_0) \rightarrow \text{Kr}(^1\text{S}_0) + \text{Kr}^+(^2\text{P}_{1/2})$.
Can. J. Phys. 65 1077 - 1081 1987 E
 $\text{Kr}^+(^2\text{P}_{3/2}) + \text{Kr} \rightarrow \text{Kr}(^1\text{S}_0) + \text{Kr}^+(^2\text{P}_{3/2}, ^2\text{P}_{1/2})$
crossed-beam technique-translational energy spectroscopy
 $1.1 \times 10^{-4} - 2.4 \times 10^{-4} \text{ keV/amu}$
- 87E35 Huber, B.A.
Recent applications of translational energy spectroscopy in atomic collision processes.
Com. At. Mol. Phys. 21 15 - 39 1987 E
a review
- 87E36 Hvelplund, P., Barany, A.B., Cederquist, H., Pedersen, J.O.K.
Energy gain spectroscopy studies of electron capture by Xe^{n+} ($10 \leq n \leq 20$) in collisions with Ne, Ar and Xe.
J. Phys. B 20 2515 - 2529 1987 E
 Xe^{n+} ($q = 10 - 20$) + B $\rightarrow$ $\text{Xe}^{(q-1)+}$, $\text{Xe}^{(q-2)+}$, $\text{Xe}^{(q-3)+}$
energy gain spectroscopy
0.01 keV/amu
- 87E89 Jonathan, P., Lee, A.R., Brenton, A.G., Beynon, J.H.
Capture dissociation of $\text{H}^+ \text{I}_2$ in rare gases and small hydrocarbons.
Int. J. Mass Spectro. 79 101 - 113 1987 E
Ion Processes
 $\text{H}_2^+ + \text{B} \rightarrow \text{H}_2^+ + \text{H}^+ + \text{H}^+ + \text{H}^+ + \text{H}^+$ (B = He, Ne, Ar, Kr, CH₄, C₂H₆, C₃H₈, C₂H₄, C₃H₆, C₄H₁₀)
translational energy spectroscopy
3 keV/amu
no cross sections given
- 87E90 Kambara, T., Awaya, Y., Kase, M., Kumagai, H., Shibata, H., Tonuma, T.
REC X-rays for ^3He and ^4He targets.
J. Phys. Soc. Japan 56 1907 - 1908 1987 E
 $\text{Ne}^{10+} + ^3\text{He}, ^4\text{He} \rightarrow \text{Ne}^{9+}(\text{REC})$
X-ray spectroscopy
 $5.5 \times 10^3 \text{ keV/amu}$
no isotope effect in REC
- 87E39 Kamber, E.Y., Cocke, C.L., Giese, J.P., Pedersen, J.O.K., Waggoner, W.
State-selective differential single-electron-capture cross sections for O^{2+} - He collisions.
Phys. Rev. A 36 5575 - 5580 1987 E
 $\text{O}^{2+} + \text{He} \rightarrow \text{O}^+ + \text{He}^+$
translational energy spectroscopy
 $3.75 \times 10^{-3} - 1.6 \times 10^{-2} \text{ keV/amu}$
angular distribution, predominant capture into $2p^1$ ^2P state.
- 87E37 Kamber, E.Y., Hornis, W.G., Brenton, A.G., Hasted, J.B., Beynon, J.H.
State-selective electron capture by Kr^{n+} ions from rare-gas atoms.
J. Phys. B 20 105 - 120 1987 E
 Kr^{n+} ($q = 2, 3, 4$) + B $\approx$ $\text{Kr}^{(q-1)+} + \text{B}^+$ (B = He, Ne, Ar, Kr, Xe)
translational energy spectroscopy
0.1 - 0.3 keV/amu
partial cross sections for $\text{Kr}^{4+} + \text{He}, \text{Ne} \rightarrow \text{Kr}^{3+}(4p^3 \text{ } ^4\text{S}, 4p^4 \text{ } ^4\text{P}, 5s \text{ } ^4\text{P} + 4p^2(3\text{P})4d)$ and total cross sections.

87E38	Kamber, E.Y. Jonathan, P. Brenton, A.G. Benon, J.H. Single electron capture by Ar^{2+} from atomic and molecular targets. J. Phys. B 20 4129 - 4142 1987 E $Ar^{2+} + B \rightarrow Ar^+ (B = He, Ne, Ar, Kr, Xe, O_2, NO, N_2O, NH_3, CO_2, CH_4, C_2H_6, 1-C_4H_8, C_2H_4)$ translational energy spectroscopy 0.15 keV/amu identification of transfer channels ; no cross sections	87E43	Knuksen, H. Andersen, L.H. Hvelplund, P. Sorensen, J. Ciric, D. Simultaneous capture and ionization for fast ion impact on helium. J. Phys. B 20 1253 - 257 1987 E $H^+, He^{2+} + He \rightarrow H, He^+ + He^{2+} + e ; H, He^+ + He^+$ coincidence technique 10 ³ keV/amu (H) ; 350 - 1500 keV/amu (He) ratios only. no cross sections
87E40	Kelly, G.J. Hird, B. Double electron capture cross sections for F^+ in a magnesium-vapor target. Phys. Rev. A 35 5262 - 5265 1987 E $F^+ + Mg \rightarrow F^+$ Oven 0.16 - 0.70 keV/amu	87E44	Laurent, H. Barat, M. Gaboriaud, M.N. Guillemot, L. Roncin, P. Differential cross section and electron transfer mechanisms in multiply charged ion-atom collisions. J. Phys. B 20 6581 - 6595 1987 E $C^{6+} + B \rightarrow C^{3+}(n), C^{4+}(n, n')$ (B= He, H ₂ , Ar, Xe) ; $N^{6+} + B \rightarrow O^{3+}(n), O^{4+}(n, n')$ (B= H ₂ , Ar, Kr) ; $N^{7+} + B \rightarrow N^{6+}(n), N^{5+}(n, n')$ (B= H ₂ , He, Ar, Xe) ; $O^{7+} + B \rightarrow O^{6+}(n), O^{5+}(n, n')$ (B= He, H ₂) ; $O^{8+} + B \rightarrow O^{7+}(n), O^{6+}(n, n')$ (B= He, H ₂) ; $Ne^{8+} + B \rightarrow Ne^{7+}$
87E91	Kikiani, B.I Lomsadze, R.A. Gochilashvili, M.R. Mosulishvili, N.O. Lavrov, V.M. Ionization, charge exchange and stripping in $K^+ + He$ and $K^+ + Ne$ collisions at ion energies 0.7 - 7.0 keV. Sov. Phys.-JETP 64 468 - 474 1987 E $K^+ + He, Ne \rightarrow K$ condenser method $1.8 \times 10^{-2} - 1.8 \times 10^{-1}$ keV/amu also ionization and stripping cross sections given	87E45	Lee, A.R. Jonathan, P. Brenton, A.G. Benon, J.H. Translational energy loss of H^+ fragments from capture-dissociation of H_2^+ in collisions with rare gas atoms. Phys. Letters A 122 346 - 349 1987 E $H_2^+ + B \rightarrow H^+ ; H^+$ translational energy spectroscopy 3 keV/amu no cross sections given
87E41	Kim, H.J. Janev, R.K. Electron loss sections in symmetric multicharged ion collisions. Phys. Rev. Letters 58 1837 - 1840 1987 E $A^{3+} + A^{3+} \rightarrow A^{*+} + A^{2+}$ (A= Ar, Kr) folded beam technique 3.0 keV/amu (Ar) ; 1.4 keV/amu	87E92	Lee, A.R. Jonathan, P. Brenton, A.G. Beynon, J.H. Dissociative electron capture of H_2^+ into H fragments. Int. J. Mass Spectro. 75 329 - 343 1987 E Ion Processes $H_2^+ + B \rightarrow H^+ + H^+$ (B = H ₂) translational energy spectroscopy 3 keV/amu
87E42	Kimura, M. Kobayashi, N. Ohtani, S. Tawara, H. State-selective one-electron capture from H and H ₂ by slow, highly stripped C, N, O and Ne ions. J. Phys. B 20 3873 - 3884 1987 E $Ne^{q+}(q=8,9), O^{q+}(q=6-8), N^{q+}(q=5-7), C^{q+}(q=4-6) + H, H_2 \rightarrow A^{q-1+}$ translational energy spectroscopy ; MCLZ model 0.6 keV/amu n - distribution; no cross sections		

- 87E55 Müller, A., Schuch, B., Groh, W., Salzborn, E.
Multiple-electron processes in 1.4 MeV/u ion-atom collisions.
Z. Phys. D 7 251 - 260 1987 E
 $A^{q+} + B \rightarrow A^{q-1+}, A^{q-2+}, A^{q-3+} + B^1$ (A = N, Fe, Kr, Gd, U ; q = 6-44 ; B = Ne, Ar, Kr, Xe ; i = 1-19)
projectile-recoil ion coincidence
1400 keV/amu
no cross sections but relative intensities of recoil ions.
- 87E46 Mann, R., Schulte, H.
Evidence for one-step double electron capture in single collisions of slow O^{6+} and C^{4+} ions with rare gas atoms.
Z. Phys. D 4 343 - 349 1987 E
 $O^{6+}, C^{4+} + B \rightarrow O^{4+}, C^{2+}$ (B = He, H₂, Ar, Xe)
zero-degree Auger electron spectroscopy
6 - 7 keV/amu
no cross sections given. Coster-Kronig transitions.
- 87E48 Marselle, P., Bliman, S., Desclaux, J.P., Doussin, S., Hitz, D.
Spectroscopy of Mg-like Ar produced in low energy charge exchange collisions.
J. Phys. B 20 5127 - 5132 1987 E
 $Ar^{7+} + He \rightarrow Ar^{6+} + He^+$
photon spectroscopy (100 - 1000 Angstrom)
1.75 keV/amu
no cross sections given, n=4 level dominant.
- 87E47 Marselle, P., Bliman, S., Indelicato, P., Hitz, D.
Single electron capture into $Ar^{6+}(nl)$ subshells in $Ar^{7+} + He$ collisions.
J. Phys. B 20 L423 - 426 1987 E
 $Ar^{7+} + He \rightarrow Ar^{6+}(4l)$
VUV spectroscopy
1.75 keV/amu
1-distribution, emission cross section.
- 87E50 Mathur, D., Kingston, R.G., Harris, F.M., Brenton, A.G., Beynon, J.H.
State-selected electron capture by molecular ion collisions of CS_2^{3+} and CS_2^{2+} with monatomic and diatomic targets.
J. Phys. B 20 1811 - 1822 1987 E
 $CS_2^{3+}, CS_2^{2+} + B \rightarrow CS_2^+, CS_2^{2+}$ (B = He, Ne, Ar, Kr, Xe; H₂, N₂, O₂)
translational energy spectroscopy
no cross sections given
- 87E49 Mathur, D., Reid, C.J., Harris, F.M.
State-diagnosed electron capture by OCS^{3+} ions in collisions with atomic and molecular gases.
J. Phys. B 20 L577 - 581 1987 E
 $OCS^{3+} + B \rightarrow OCS^{2+}$ (B = Ar, Kr, Xe, H₂, N₂, O, CH₄)
translational energy spectroscopy
0.27 keV/amu
energy gain spectrum only, no cross sections given
- 87E51 McAfee, K.B., Szmanda, C.R., Hozack, R.S.
Excitation energy transfer charge exchange during collisions of $N^+(^1S)$ with N_2
Phys. Rev. A 36 2056 - 2060 1987 E
 $N^+(^1P, ^1D, ^1S, ^1S) + N_2 \rightarrow N + N_2^+ ; N_2^{2+} + N_2 \rightarrow N_2^+ + N_2^+$
translational energy spectroscopy
no cross sections given
- 87E52 McCullough, R.W., Wilson, S.M., Gilbody, H.B.
State-selective capture by slow Ar^{6+} , Ar^{5+} and Ar^{4+} recoil ions in H, H₂ and He.
J. Phys. B 20 2031 - 2055 1987 E
 $Ar^{4+} (q=4,5,6) + B \rightarrow Ar^{q-1+}(n,l) + B^+$ (B = H, H₂, He)
translational energy spectroscopy ; Multichannel Landau-Zener model.
energy-gain spectroscopy, no cross sections. MLZ calculated cross sections.
- 87E53 McGuire, J.H., Salzborn, E., Muller, A.
Simultaneous capture and ionization in helium.
Phys. Rev. A 35 3265 - 3268 1987 E
 $A^{3+} + He \rightarrow A^{2+} + He^{2+} + e$ (A = H, He, Li)
projectile-recoil ion coincidence
1 - 5 x 10³ keV/amu
data compilation and analysis.
- 87E93 Melchert, F., Rink, K., Rinn, K., Salzborn, E.
Ionization in He⁺-He⁺ collisions.
J. Phys. B 20 L797 - 801 1987 E
 $He^+ + He^+ \rightarrow He^+ + He^{2+} + e ; He^{2+} + He$
crossed beam technique
2.75 - 28 keV/amu

87E54	Melcher, F. Rink, K. Rinn, K. Salzborn, E. Grun, N. Charge transfer in $\text{He}^+ - \text{He}^+$ collisions. J. Phys. B 20 L223 - 230 1987 E $\text{He}^+ + \text{He} \rightarrow \text{He}^0 + \text{He}^{2+}$ coincidence technique ; two-state coupling. 15 - 224 keV/amu	87E101	Panev, G.S. Andersen, N. Andersen, T. Dably, P. Orientation and alignment of $\text{Mg}^+(3p)$ states excited in 1 - 60 keV collisions with He and Ar. Z. Phys. D 5 331 - 337 1987 E $\text{Mg}^+(3s) + \text{He}, \text{Ar} \rightarrow \text{Mg}^+(3p)$ photon-particle coincidence technique 0.04 - 2.5 keV/amu
87E94	Nakai, Y. Shirai, M. Tabata, T. Ito, R. Cross sections for charge transfer of hydrogen atoms and ions colliding with gaseous atoms and molecules. At. Data and Nucl. Data Tables 37 69 - 101 1987 E analytic formula for charge transfer cross sections as a function of collision energy.	87E59	Pearl, B. Foster, S.J. Measurements of mutual neutralization of Li^+ with H^- ions and of Na^+ with O^- ions. J. Phys. B 20 L691 - 694 1987 E $\text{Li}^+ + \text{H}^- \rightarrow \text{Li} + \text{H}$; $\text{Na}^+ + \text{O}^- \rightarrow \text{Na} + \text{O}$ crossed beam technique 0.03 - 2.4 keV/amu
87E56	Niedner, G. Noll, M. Toennies, J.P. Selective vibrational excitation and mode conservation in $\text{H}^+ + \text{CO}_2/\text{N}_2\text{O}$ inelastic and charge transfer collisions. J. Chem. Phys. 87 2067 - 2083 1987 E $\text{H}^+ + \text{B} \rightarrow \text{H}^+ + \text{B}(n_1, n_2, n_3)$; $\text{H} + \text{B}^+(n_1, n_2, n_3)$ (B= $\text{CO}_2, \text{N}_2\text{O}$) TOF 0.01 - 0.03 keV/amu Angular distribution.	87E60	Pedersen, J.O.K. Hvelplund, P. Energy gain spectroscopy studies of electron capture from neon by doubly charged CO ions J. Phys. B 20 L317 - 322 1987 E $\text{CO}^{2+} + \text{Ne} \rightarrow \text{CO}^+ + \text{Ne}^+$ energy gain spectroscopy 3×10^{-3} keV/amu no cross sections given
87E57	Niedner, G. Noll, M. Toennies, J.P. Schlier, Ch. Observation of vibrationally resolved charge transfer in $\text{H}^+ + \text{H}_2$ at $E_{\text{cm}} = 20$ eV. J. Chem. Phys. 87 2685 - 2694 1987 E $\text{H}^+ + \text{H}_2(v=0) \rightarrow \text{H} + \text{H}_2^+(v_f)$; $\text{H}^+ + \text{H}_2(v_f)$ TOF 0.03 keV/amu doubly differential cross sections for $\text{H}_1\text{H}_2^+\text{H}_3$.	87E61	Phaneuf, R.A. Janev, R.K. Hunter, H.T. Charge exchange processes involving iron ions. Nucl. Fusion Special 7 - 20 1987 E Supplement $\text{Fe}^{8+} + \text{B} \rightarrow \text{Fe}^{(q+1)+} + \text{B}^+$ (B= $\text{H}, \text{H}_2, \text{He}$) Evaluated cross section and rare coefficients
87E58	Ohtani, S. Kimura, M. Kobayashi, N. Tawara, H. Observation of selective electron capture by fully stripped C, N and O ions from H atoms. J. Phys. Soc. Japan 56 1271 - 1273 1987 E $\text{A}^{Z+} + \text{H} \rightarrow \text{A}^{(Z-1)+}(\text{n}) + \text{H}^+$ (A= C, N, O) translational energy spectroscopy 0.75 keV/amu n-distribution. no cross section.	87E62	Pollitis, M.F. Jouin, H. Bonnefoy, M. Bonnet, J.J. Chassevent, M. Fleury, A.F. Bliman, S. Harel, C. Relative (n,l) populations following electron capture by low energy N^{7+} , O^{8+} and Ne^{8+} ions from two-electron targets (H_2, He). J. Phys. B. 20 2267 - 2279 1987 E $\text{N}^{7+}, \text{O}^{8+}, \text{Ne}^{8+} + \text{H}_2, \text{He} \rightarrow \text{N}^{(q+)}(\text{n}, l), \text{O}^{(q+)}(\text{n}, l), \text{Ne}^{(q+)}(1s^2, \text{nl})$ photon spectroscopy 4 keV/amu no cross sections. relative population only

87E63	Roncin, P., Geboriand, M.N., Barat, M., Laurent, H. Transfer ionization in collisions involving multiply charged ions at low keV energy Europhys. Letters 3 53 - 59 1987 E $N^{7+} + B \rightarrow N^{6+} + B^+$ (B= Ar, Xe; k= 1 - 4) translational energy spectroscopy + recoil ion 0.75 keV/amu no cross sections	87E68	Schwab, W., Baptista, G.B., Justiniano, E., Schuch, R., Vogt, H., Weber, E. W. Measurement of the total cross sections for electron capture of 2.0 - 7.5 MeV H^+ in H , H_2 and He. J. Phys. B 20 2825 - 2834 1987 E $H^+ + H_2, He \rightarrow H$ liquid nitrogen-cooled Wood tube $2 \times 10^3 - 7.5 \times 10^3$ keV/amu
87E64	Schon, W., Krudener, S., Melckert, F., Rinn, K., Wagner, M., Salzborn, E., Karamera, M., Szucs, S., Terao, M., Fussen, D., Janev, R., Urbain, X., Brouillard, F. Transfer ionization in H^+ + H^+ collisions, Phys. Rev. Letters 59 1565 - 1568 1987 E $H^+ + H^+ \rightarrow H + H^+ + e$ crossed beam, LZ $5 \times 10^2 - 40$ keV/amu	87E95	Sedgwick, J.B., Paulson, B.P., Shields, G.C., Moran, T.F. Competition between single and double electron transfer in collisions of doubly charged molecular pyrrol molecules. Int. J. Mass Spectro. 79 127 - 140 1987 E Ion Processes $C_4H_5N^{3+} + C_4H_5N \rightarrow C_4H_5N^+, C_4H_5N$ TOF 0.068 - 0.090 keV/amu $\sigma_{20} = 0.3 \times \sigma_{21}$
87E65	Schon, W., Krudener, S., Melckert, F., Rinn, K., Wagner, M., Salzborn, E., Mutual neutralization in H^+ - H^+ collisions J. Phys. B 20 L759 - 764 1987 E $H^+ + H^+ \rightarrow H + H$ crossed beam technique 1 - 40 keV/amu	87E96	Sekiya, H., Tsuji, M., Nishiyamura, Y. Optical study of the $He^+ + N_2$ charge transfer reaction in a flowing afterglow and in a low-pressure chamber coupled with flowing afterglow. J. Chem. Phys. 87 325 - 330 1987 E $He^+ + N_2 \rightarrow He + N_2^{+*}$ photon-spectroscopy + flowing afterglow technique 2×10^3 keV/amu no cross section given
87E67	Schulz, M., Justiniano, E., Konrad, J., Schuch, R., Salin, A. K-shell to K-shell charge transfer in collisions of bare decelerated S ion with Ar. J. Phys. B 20 2057 - 2073 1987 E $S^{16+} + Ar \rightarrow S^{15+}(1s) + Ar^+(K^{-1})$ X-ray-X-ray coincidence technique 500 keV/amu Impact parameter dependence. no cross sections given	87E97	Shul, R.J., Upschulte, B.L., Passarella, R., Keese, R.G., Castleman, A. W. Thermal energy charge-transfer reactions of Ar^+ and Ar_2^+ . J. Phys. Chem. 91 2556 - 2562 1987 E $Ar^+, Ar_2^+ + B \rightarrow Ar, Ar_2 + B^+$ (B = H_2S, CS_2, NO_2 , all 26 molecules) selected ion flow tube technique rate coefficients at thermal energies
87E66	Schulz, M., Justiniano, E., Schuch, R., Mokler, P.H., Reusch, S. Separated resonances in simultaneous capture and excitation of S^{15+} in H_2 observed by K-X-ray-K-X-ray coincidences. Phys. Rev. Letters 58 1734 - 1737 1987 E $S^{15+} + H_2 \rightarrow S^{14+}(2l, nl) + H_2^+$ X-ray-X-ray coincidence 2190 - 5000 keV/amu resonant capture + excitation	87E99	Suzuki, R., Kaneko, T., Tomita, M., Sakisaka, M. Dissociation and electron capture of CO^+ and CF^+ ions in collisions with He, Ne and Ar atoms. J. Phys. Soc. J apan 56 495 - 501 1987 E $AC^+ + B \rightarrow A + C^+ + B$; $A^+ + C + B$; $A^+ + C^+ + e + B$; $A + C + B^+$; $AC + B^+$; $AC^+ + B^+ + e$ (B= He, Ne, Ar) coincidence technique 0.13 - 0.5 keV/amu

87E70	Tanis,J.A. Clark,M.W. Price,R. Olson,R.E. Contribution of transfer ionization to total electron capture from a helium target. Phys. Rev. A 36 1952 - 1954 1987 E O^{8+} ($q=5,6,7,8$) + He $\rightarrow O^{q-1+}$ + He $^+$; O^{q-1+} + H^{2+} + e 500 - 1500 keV/amu large contribution of transfer ionization. scaling law.	87E74	Varghese,S.L. Electron capture phenomena in proton-atom and proton-molecular collisions. Nucl. Instr. Meth. in 24 115 - 118 1987 E Phys. Res. B $H^+ + Li \rightarrow H + Li^+$; $H^+ + B \rightarrow H^+ + B^+$ ($B=CH_4, C_2H_2, C_2H_4, C_2H_6, C_3H_6, C_3H_8, (CH_2)_6, C_3H_8, C_4H_8, O_2, CO, CO_2$) growth 0.26 - 3.85 keV/amu (Li); 800 - 3000 keV/amu (B)
87E102	Tsurubuchi, S. Arikawa, T. Optical spectroscopic study on Li^+ + Ne collision. J. Phys. Soc. Japan 56 1996 - 2003 1987 E $Li^+ + Ne \rightarrow Li(2P_{3/2}, 2P_{1/2})$ photon spectroscopy technique $5.7 \times 10^{-2} - 5.7 \times 10^{-1}$ keV/amu transition ($2p \rightarrow 2s$; $3d \rightarrow 2p$; $4d \rightarrow 2p$) of Li; also Ne^* transition	87E77	Wang,H.Y. Church,D.A. Electron transfer collisions of low energy multicharge nitrogen ions with H_2 and N_2 . Phys. Rev. A 36 4261 - 4266 1987 E N^{q+} ($q=2,3,4$) + B $\rightarrow N^{(q-1)+}$ ($B=H_2, N_2$) trapping technique 10^{-4} keV/amu rate coefficients
87E71	Tunnell,L.N. Cocke,C.L. Giese,J.P. Kamber,E.Y. Varghese,S.L. Waggoner,W. Experimental angular distributions for electron capture by slow Ne^{q+} ($q=3-6$) ions from He. Phys. Rev. A 35 3299 - 3308 1987 E Ne^{q+} ($q=3-6$) + He $\rightarrow Ne^{(q-1)+}$ recoil ion beam 0.01 - 0.06 keV/amu angular differential cross sections (absolute)	87E75	Wang,Y. Champion,R.L. Doverspike,L.D. Slow collisions of H^- and D^- with Na and K. Phys. Rev. A 35 1503 - 1509 1987 E $H, D + Na, K \rightarrow H, D$ growth method $2 \times 10^{-3} - 0.3$ keV/amu electron capture, detachment cross sections
87E72	Van Der Zande,W.J. Koot,W. Peterson,J.R. Los,J. Charge exchange of O^{2+} with Cs: spectroscopy and predissociation pathways for the Π_g Rydberg states of O_2 . Chem. Phys. Letters 140 175 - 180 1987 E $O_2^+(X^2\Pi_g) + Cs \rightarrow O_2(^1\Pi_g, ^3\Pi_g)$ translational energy spectroscopy $\rightarrow 0.1$ keV/amu Vibrationally separated states determined	87E76	Wang,Y. Champion,R.L. Doverspike,L.D. Slow collisions of H^- and D^- with Cs. Phys. Rev. A 36 381 - 383 1987 E $H, D + Cs \rightarrow H, D + Cs^+$; $H, D + e + Cs$ condenser $3 \times 10^{-3} - 0.25$ keV/amu
87E73	Van Zy,l.B. Gealy,M.W. Neumann,H. Lyman-alpha emission from H^+ impact on rare-gas atoms. Phys. Rev. A 35 4551 - 1560 1987 E $H^+ + B \rightarrow H(2p, Lyman-alpha) + B^+$ ($B=He, Ne, Kr, Xe$) 0.01 - 2 keV/amu polarization of Lyman-alpha lines	87E98	Warczak, A. Pre-collision and post-collisional capture; crucial phenomena for inner-shell processes in very heavy systems. Comm. At. Mol. Phys. 20 19 - 34 1987 E review

87E99	Winter, H. Mack, M. Hoekstra, R. Niehaus, A. de Heer, F.J. Comment on "Evidence for correlated double-electron capture in low-energy collisions of O^{6+} with He^+ ". Phys. Rev. Letters 58 957 1987 E $O^{6+} + He \rightarrow O^{4+} + He^{2+}$ short comment	87T 1	Aberg, T. Blomberg, A. MacAdam, K.B. Interpretation of final state distributions in charge transfer from Rydberg atoms J. Phys. B 20 4795-4814 1987 T $A^+ + Na(nl) \rightarrow A(nl) + Na^+$ ($A=Ne, Na, Ar$; $n=23-35$; $l=0,2$) Maximum entropy principle 0.5 - 2 keV/amu
87E103	Witte, R. Campbell, E.E.B. Richter, C. Schmidt, H. Hertel, I.V. Alignment and orientation effects in resonant charge exchange from laser excited $Na^+(3p)$. Z. Phys. D 5 101 - 111 1987 E $Na^+ + Na^+(3p)$ laser-excited atom target $2 \times 10^{-3} - 4 \times 10^{-3}$ keV/amu	87T58	Anholt, R. Becker, U. Atomic collisions with relativistic heavy ions IX. ultrarelativistic collisions. Phys. Rev. A 36 4628 - 4636 1987 T REC and non-radiative electron capture cross sections based on scaling laws, also ionization cross sections given
87E100	Yenen, O. Jaacks, D.H. Martin, P.J. Quasidiatomic study of Ly-alpha producing H_f^+ - Ne collisions at keV. Phys. Rev. A 36 1517 - 1521 1987 E $H_f^+ + Ne \rightarrow H^+ + H^+ \rightarrow Ly\text{-alpha}$ photon-particle (H, H^+) coincidence technique 2.5 keV/amu direction excitation with subsequent dissociation is more likely than electron capture followed by dissociation.	87T 2	Bacchus-Montabonel, M.C. Ab initio potential-energy curves and radial and rotational couplings for the process $N^{5+} + He \rightarrow N^{4+} + He^+$ Phys. Rev. A 36 1994-2001 1987 T $N^{5+} + He \rightarrow N^{4+} + He^+$ ab initio calculation with configuration interaction no cross section given
87E78	Yousif, F.B. Lindsay, B.G. Simpson, F.R. Latimer, C.J. Dissociative ionization and charge transfer in $He^+ - O_2$ collisions. J. Phys. B 20 5079 - 5088 1987 E $He^+ + O_2 \rightarrow He + O^+(^4\Sigma_u, ^2\Sigma_g^-)$ TOF with dissociated ions 0.7 - 4 keV/amu Energy and angular distribution of dissociated ions	87T 3	Bachau, H. Autoionization of diatomic quasi-molecules Europhys. Letters 3 559-564 1987 T $N^{7+} + He \rightarrow N^{6+} + He^{2+} + e$ quasi-molecular model Auger ionization; transfer Penning ionization; two-electron capture followed by autoionization
87E79	Zouros, T.J. Schneider, D. Stolterfoht, N. Production of $(2s^2)S$, $(2p^2)D$ and $(2s2p)P$ states by double electron capture in 150 - 500 keV $^3He^{2+} + He$ collisions. Phys. Rev. A 35 1963 - 1966 1987 E $^3He^{2+} + He \rightarrow He^0 + He^{2+}$ o-degree angular spectroscopy 50 - 166 keV/amu	87T66	Baer, M. Nakamura, H. A three-dimensional quantum mechanical study of exchange and charge transfer processes in the $(Ar+H_2)^+$ system. J. Chem. Phys. 87 4651 - 4664 1987 T $H_2^+ + Ar$ infinite order sudden approx. 6×10^{-4} keV/amu

87T67	Barnard, S.A. Ford, M.J. Cooper, D.L. Gurratt, J. Raimondì, M. Calculation of potential energy curves for electron capture by C^{3+} from neutral lithium using spin-coupled VB theory. Mol. Phys. 61 1193 - 1198 1987 T $C^{3+}(2s) + Li(2p) \rightarrow C^{2+}(nlnl'; l) + Li^+(1s^2)$ spin-coupled valence band method potential energy curves	87T 8	Cooper, I.L. Dickinson, A.S. Sur, S.K. Ta, C.T. Ab initio studies of collision between Li^+ ions J. Phys. B 20 2005-2023 1987 T $Li^+ + Li^+ \rightarrow Li^{2+}(1s) + Li(1s^2 2s; 1s^2 2p)$ 1.4 - 13 keV/amu
87T 5	Belkic, D. Saini, S. Taylor, H.S. Critical test of first order theories for electron transfer in collisions between multi-charged ions and atomic hydrogen: The boundary condition problem Phys. Rev. A 36 1601-1617 1987 T $A^{z+} + H \rightarrow A^{(z-1)+}(nl) + H^+$ ($A=H, He, Li, Be, B, C$) 1st Born with/without correct boundary condition 20 - 300 keV/amu (nl) distribution and total cross section	87T10	Crothers, D.S.F. Dunseath, K.M. Target continuum distorted-wave theory for capture of inner-shell electron by fully stripped ions J. Phys. B 20 4115-4128 1987 T $H^+ + B \rightarrow H + B^+(K^{-1})$ ($B=C, Ne, Ar$) Target continuum distorted-wave, CDW $10^2 - 2 \times 10^3 (C); 3 \times 10^2 - 6 \times 10^3 (Ne); 10^3 - 2 \times 10^4 (Ar)$ keV/amu K-shell electron transfer cross sections
87T 4	Belkic, D. Taylor, H.S. First-order theory for charge exchange with correct boundary conditions; general results for hydrogen like and multielectron target atoms Phys. Rev. A 35 1991-2006 1987 T $^4He^{2+} + Li \rightarrow He^+(nlm) + Li^+(1s^{-1}/2s^{-1})$ first Born with correct boundary condition 62.5-625 keV/amu general theory	87T 9	Crothers, D.S.F. McCarroll, R. Correlated continuum distorted-wave resonant double electron capture in $He^{2+} - He$ collisions J. Phys. B 20 2835-2842 1987 T $He^{2+} + He \rightarrow He + He^{2+}$ CDW 125 - 350 keV/amu
87T 6	Blanco, S.A. Falcon, C.A. Reinhold, C.O. Casaubon, J.I. Piancettini, R.D. Electron capture in low and intermediate energy collisions between completely stripped light ions and metastable $H(2s)$ targets J. Phys. B 20 6295-6304 1987 T $A^{z+} + H(2s) \rightarrow A^{(z-1)+}$ ($A=H, He, Li, C$) MO with ETF, LZ, CTMC 0.06-0.5 keV/amu total cross sections	87T59	Deco, E.R. Rivarola, R.D. Relativistic electron capture in ion-atom collisions. J. Phys. B 20 3853 - 3865 1987 T $H^+ + H(1s) \rightarrow H(1s) + H^+$; $C^{6+}, Ne^{10+}, Ar^{18+} + B \rightarrow C^{5+}, Ne^{9+}, Ar^{17+}$ ($B = 15 - 92$) CDW model $5 \times 10^4 - 10^8$ keV/amu K-K-electron transfer cross sections.
87T 7	Borondo, F. Martin, F. Yanez, M. Molecular treatment of the ion-pair formation reaction in $H(1s) + H(1s)$ collision Phys. Rev. A 35 60 - 65 1987 T $H(1s) + H(1s) \rightarrow H^+ + H^+(1s^2)$ MO 0.25 - 9.00 keV/amu	87T12	Deco, G.R. and Rivarola, R.D. Relativistic continuum distorted-wave model for arbitrary initial and final shells - electron capture in ion-atom collisions J. Phys. B 20 5117-25 1987 T $A^{z+} + B \rightarrow A^{(z-1)+} + B^+$ ($A=C, Ne, Ar$; $B=12-92$) relativistic CDW 10^6 keV/amu

87T11 Deco,G.R. Rivarola,R.D.
A theoretical model for charge transfer at relativistic energies
J. Phys. B 20 317-324 1987 T
 $H^+ + H(1s) \rightarrow H(1s) + H^+$; $H^+ + B^{+*}(1s) \rightarrow H(1s) + B^{+*}$
Symmetric alkonal theory
 $5 \times 10^5 - 10^8$ keV/amu
Analytic expression for K-K transfer

87T13 Deco,G.R. Rivarola,R.D.
On spin flip charge exchange in relativistic ion-atom collisions
Nucl. Instr. Meth. in 28 154-156 1987 T
Phys. Res. B
CDW
K-K transfer cross sections equivalence between second Born and CDW for
spin-flip asymptotic form at relativistic energies

87T60 Dewangan,D.P. Eichler,J.
Electron capture and the long range of the Coulomb interaction.
Comm. At. Mol. Phys. 21 1 - 13 1987 T
a review

87T68 Dubé, L.T. Salin, A.
Electron capture to Rydberg and low-lying continuum states.
J. Phys. B, 20 1499 - 502 1987 T
 $O^{8+} + He \rightarrow O^{7+}(n = 2 - 10) + He^+$
CDW
50 - 125 keV/amu
 $A^{Z+} + He$ ($A = 1 - 6$) at 800 - 1200 keV/amu

87T14 Eichler,J.
Theory of relativistic charge exchange with Coulomb boundary conditions
Phys. Rev. A 35 3248-3255 1987 T
 $H^+ + H \rightarrow H(1s) + H^+$; $Ne^{10+} + B \rightarrow Ne^{9+}(1s) + B^+(K^{-1})$ ($B=Al-U$)
relativistic first-order Born with Coulomb boundary condition
 $10^4 - 10^6$ keV/amu (H^+); 10^6 keV/amu (Ne^{10+})

87T16 Ermolaev,A.M. Hewitt,R.N. McDowell,M.R.C.
Quantal and classical calculations of $He^{2+} + Li$ interactions at intermediate energies: I
charge transfer
J. Phys. B 20 3125-3155 1987 T
 $He^{2+} + Li(1s^2 2s) \rightarrow He^+(nl) + Li^+(1s^2)$ [$n=2,3,4,5,6$]; $He^{2+} + Li^+(1s^{2+}) \rightarrow He^+(nl) + Li^+(1s)$ [$nl = 1s, 2s, 3p, 3s$]
close coupled AO and CTMC
2-100 keV/amu

87T15 Ermolaev,A.M. McDowell,M.R.C.
Quantal and classical calculations of interactions between p and Li^{2+} ions in the proton
energy range from 17.5 keV to 3.0 MeV
J. Phys. B 20 1379-383 1987 T
 $H^+ + Li^{2+}(1s) \rightarrow H(nlm) + Li^{1+}$; $H^+ + Li^{1+}$; $H^+ + Li^{2+}(nl)$
close coupled AO, CTMC
 $17.5 \cdot 3 \times 10^3$ keV/amu

87T17 Errea,L.F. Gomez-Llorente,J.M. Mendez,L. Riera,A.
Convergence study of $He^{2+} + H$ and $He^+ + H^+$ charge exchange cross sections using a
molecular approach within an optimized common translation factor
J. Phys. B 20 6089-6103 1987 T
 $He^{2+} + H \rightarrow He^+(total, 2s, 2p, 3s, 3p, 3d)$; $He^+ + H^+ \rightarrow He^{2+} + H(total, 1s)$
MO with translation factor

87T18 Errea,L.F. Gomez-Llorente,J.M. Mendez,L. Riera,A.
Practical criterion for the determination of translation factors III. a common translation
factor with optimized asymptotic form
Phys. Rev. A 35 4060-4067 1987 T
 $He^{2+} + H(1s) \rightarrow He^+(2s, 2p) + H^+$
5keV/amu

87T19 Freire,F.L. Montenegro,E.C.
On the calculation of the electron capture within the strong potential Born
approximation
Z. Phys. D 7 239-241 1987 T
Strong potential Born approx.
analytical expressions for high energy limit

87T20	Fritsch, W. Lin, C.D. Two electron description of electron transfer in $\text{He}^+ + \text{He}^+$ collision Phys. Letters A 123 128-131 1987 T $\text{He}^+ + \text{He}^+ \rightarrow \text{He}(\text{all}, ^3\text{S}) + \text{He}^{2+}$ AO 3-80 keV/amu significant contribution from ^3S state	87T25	Ghosh, M. Mandal, C.R. Mukherjee, S.C. Double electron capture from helium by ions of helium, carbon and oxygen Phys. Rev. A 35 5259-5261 1987 T $\text{A}^{2+} + \text{He} \rightarrow \text{A}^{(2-2+)} + \text{He}^{2+}$ ($\text{A}=\text{He}, \text{Li}, \text{C}, \text{O}$) CDW, continuum Intermediate State (CIS) approx. 125-500 keV/amu (He) ; 160-400 keV/amu (Li) ; $10^3\text{-}2 \times 10^3$ keV/amu (C) ;
87T21	Gargaud, M. McCarroll, R. Valiron, P. Influence of rotational coupling on charge transfer in low-energy C^{4+}/H collisions J. Phys. B 20 1555-1564 1987 T $\text{C}^{4+} + \text{H} \rightarrow \text{C}^{3+}(^3\text{P}), \text{C}^{3+}(\text{total}) + \text{H}^+$ MO with translation effect + radial/rotational coupling $9 \times 10^{-4} - 1.178$ keV/amu	87T26	Graham, W.G. Bernstein, E.M. Clark, M.W. Tanis, J.A. Predicted electron-correlation effects in U^{98+} collisions with light targets at GeV energies Phys. Letters A 125 134-136 1987 T $\text{U}^{98+} + \text{B} \rightarrow \text{U}^{88+}$ ($\text{B}=\text{H}_2, \text{C}$) $10^4\text{-}2 \times 10^4$ keV/amu Non-radiative direct capture, REC, RTE
87T22	Gayet, R. Salin, A. Simultaneous capture and ionization by fast ion impact on helium J. Phys. B 20 L 571-576 1987 T $\text{A}^{2+} + \text{He} \rightarrow \text{A}^{(2-1+)} + \text{He}^+ ; \text{A}^{(2-1+)} + \text{He}^{2+} + e$ ($\text{A}=\text{H}, \text{He}, \text{Li}, \text{O}$) CDW 400 - 1500 keV/amu	87T27	Heil, T.G. Sharma, J.B. Differential cross sections for the charge transfer reaction $\text{O}^{2+} + \text{He} \rightarrow \text{O}^+ + \text{He}^+$ at low energies Phys. Rev. A 36 3669-3673 1987 T $\text{O}^{2+} + \text{He} \rightarrow \text{O}^+(2p^3 \ ^3\text{P}, ^3\text{D}) + \text{He}^+$ PSS $3 \times 10^{-4}\text{-}0.03$ keV/amu Differential cross sections
87T23	Gazdy, B. Micha, D.A. Electron transfer and spin-flip processes in atom-atom collisions from variationally improved time-dependent Hartree-Fock results Phys. Rev. A 36 546-556 1987 T $\text{He}^{2+} + \text{He} \rightarrow \text{He}^{2+} + \text{He}$ (elastic) ; $\text{He} + \text{He}^{2+} ; \text{He}^+ + \text{He}^+ ;$ $\text{He}^+(u) + \text{He}^+(u) \rightarrow \text{He}^+(u) + \text{He}^+(u)$ (elastic) ; $\text{He}(u) + \text{He}^{2+}(u)$ time dependent Hartree-Fock 7.5-25 keV/amu Impact parameter dependence of probabilities	87T28	Henne, A. Ludde, H.J. Toepfer, A. Dreizler, R.M. Atomic basis calculations for the two-electron system $\text{Li}^{2+}\text{-H}$ Phys. Letters A 124 508-509 1987 T $\text{Li}^{2+} + \text{H} \rightarrow \text{Li}^+ + \text{H}^+$ AO 1-36 keV/amu
87T24	Ghosh, M. Mandal, C.R. Mukherjee, S.C. Charge transfer cross sections for asymmetric collisions of protons with carbon, nitrogen, oxygen, neon and argon Phys. Rev. A 35 2815-2820 1987 T $\text{H}^+ + \text{B} \rightarrow \text{H} + \text{B}^+(\text{K})$ ($\text{B}=\text{C}, \text{N}, \text{O}, \text{Ne}, \text{Ar}$) DW with peaking-impulse approximation 150-20000 keV/amu	87T30	Hiro, K. Watanabe, T. Angular-distribution and linear polarization correlation of photons induced by the relativistic radiative electron capture process Phys. Rev. A 36 5862-5865 1987 T Born approx. REC into K and L shells ; angular distribution

- 87T29 Hino, K. Watanabe, T.
Cross sections of relativistic radiative electron capture by use of the strong-potential Born calculation
Phys. Rev. A 36 581-590 1987 T
 $\text{Xe}^{4+} + \text{Be}$; $\text{U}^{92+} + \text{Be}$
Relativistic strong-potential Born approx.
 $197 \times 10^3 \text{ keV/amu}$ (Xe); $4.22 \times 10^3 \text{ keV/amu}$ (U)
Angular distribution
- 87T31 Hsin, S.H. Lieber, M.
Third-Born-approximation effects in electron capture
Phys. Rev. A 35 4833-4835 1987 T
 $\text{H}^+ + \text{H} \rightarrow \text{H} + \text{H}^+$
Strong potential Born approximation; DWBA
 $10^3\text{-}2 \times 10^3 \text{ keV/amu}$
Angular distribution
- 87T69 Ivakin, I.A. Karbovanets, M.I. Ostrovskii, V.N.
Charge exchange with ion excitation: asymptotic theory.
Opt. Spectrosc. (USSR) 63 288-292 1987 T
 $\text{He}^+ + \text{Cd} \rightarrow \text{He} + \text{Cd}^{*+}$; $\text{Ne}^+ + \text{Hg} \rightarrow \text{Ne} + \text{Mg}^{*+}$
Semiclassical method
rate coefficients at thermal energies
- 87T32 Jain, A. Lin, C.D. Fritsch, W.
Density matrix for the $\text{H}(n=3)$ atoms formed in electron capture process of H^+ - helium collisions at 25-100 keV
Phys. Rev. A 35 3180-3182 1987 T
 $\text{H}^+ + \text{He} \rightarrow \text{H}(n=3)$
Two-centred AO close-coupling expansion method
Density matrix; time lag of electron after capture into $n=3$
- 87T33 Jain, A. Lin, C.D. Fritsch, W.
Density matrices of the excited $\text{H}(n=2 \text{ and } 3)$ atoms formed in 25-100 keV proton-helium charge transfer collisions
Phys. Rev. A 36 2041-2055 1987 T
 $\text{H}^+ + \text{He} \rightarrow \text{H}(n=2,3) + \text{He}^+$
Ab initio calculation
25-100 keV/amu
Capture cross sections for $1s, 2s, 2p, 3s, 3p$ and $3d$
- 87T34 Jakubassa-Amundsen, D.H.
Distorted-wave Born theory for electron capture during resonant nuclear scattering
J. Phys. B 20 L 705-709 1987 T
 $\text{H}^+ + \text{C} \rightarrow \text{H} + \text{C}^+(\text{K}^{-1})$
DWBA
 10^3 keV/amu
Probabilities as a function of scattering angle
- 87T35 Jakubassa-Amundsen, D.H.
On the applicability of the impulse approximation for radiative electron capture into bound and continuum states
J. Phys. B 20 325-336 1987 T
 $\text{A}^{Z+} + \text{He} \rightarrow \text{A}^{(Z-1)+}$ (A=C, Ne)
Impulse approximation/strong potential Born approximation
Differential cross section
- 87T62 Johnson, C.A.F. Parker, J.E.
The charge transfer reactions of protons with carbon dioxide: a two-state treatment.
Chem. Phys. 111 307-312 1987 T
 $\text{H}^+ + \text{CO}_2 \rightarrow \text{H} + \text{CO}_2^+$
two-state model (Stueckelberg-Demkov)
 $0.1 - 5.0 \text{ keV/amu}$
relative branching ratios for CO_2^+ ; CO^+ , O^+ , C^+ .
- 87T36 Kartoshkin, V.A.
Isotope effect in charge exchange of He^+ ions with helium atoms
JETP Letters 45 154-156 1987 T
 $^3\text{He} + ^3\text{He}^+$; $^4\text{He}^+ \rightarrow ^3\text{He}^+ + ^3\text{He}$; ^4He
Rate constant at 300K ($>10\%$ difference)
- 87T37 Kimura, M. Lane, N.F.
Travelling-molecular-orbital-expansion studies of electron capture in collisions of fully stripped ions ($Z=6-9$) with H and He
Phys. Rev. A 35 70-78 1987 T
 $\text{A}^{Z+} + \text{H, He} \rightarrow \text{A}^{(Z-1)+} (n)$ (A=C, N, O, F)
Travelling MO
 $0.1-10 \text{ keV/amu}$
- 87T61 Kimura, M. Lin, C.D.
A unified atomic-orbital and molecular-orbital matching method for ion-atom and atom-atom collisions.
Comm. At. Mol. Phys. 20 35-49 1987 T

- 87T38 Lin, C.D. Macek, J.H.
Theory of anisotropy transfer and calculations of alignment of np states populated in electron capture by highly charged ions
Phys. Rev. A 35 5005-5011 1987 T
 $O^{8+} + He \rightarrow O^{7+}(\text{Lyman } \alpha) ; Ne^{8+} + H_2 \rightarrow Ne^{8+}(\text{Lyman } \alpha)$
300 - 2200 keV/amu (O) ; 4 keV/amu (Ne)
- 87T39 McGuire, J.H. Deb, N.C. Sil, N.C. Taulbjerg, K
Third-Born-approximation calculation of electron capture
Phys. Rev. A 35 4830-4832 1987 T
 $H^+ + H \rightarrow H + H^+$
Symmetrized strong potential Born approximation with third Born term
 $10^3 - 2 \times 10^9$ keV/amu
Angular distribution
- 87T40 McKenzie, M.L. Olson, R.E
Ionization and charge exchange in multiply charged ion-helium collisions at intermediate energies
Phys. Rev. A 35 2863-2868 1987 T
 $A^{q+} + He \rightarrow A^{(q-1)+} + He^+ ; A^{q+} + He^+ + e ; A^{(q-2)+} + He^{2+} ; A^{q+} + He^{2+} + 2e ; A^{(q-1)+} + He^{2+} + e (q=1-100)$
Classical trajectory Monte Carlo method
1000 - 5000 keV/amu
Scaling law for q and E
- 87T63 Mercier, E. Chambrand, G.
Quasi-diabatic potential energies and electronic couplings for $(ArH)^{+,*}$; mechanisms and threshold of excited hydrogen formation in low-energy collisions.
J. Phys. B. 20 4659 - 4671 1987 T
 $Ar^+ + H \rightarrow Ar^+(3p^3 3d) + H^+$
 2.5×10^{-4} keV/amu
potential energies and coupling ; no cross sections given ; cross sections for $Ar^+ + H^+(2p\pi)$ process.
- 87T41 Moiseiwitsch, B.L.
Symmetric eikonal approximation for electron capture at relativistic energies
J. Phys. B. 20 L171-174 1987 T
 $H^+ + B^{q+} \rightarrow H(1s) + B^{q+}(1s) ; A^{2+} + H(1s) \rightarrow A^{(2-1)+}(1s) (Z=13-92)$
Relativistic eikonal approximation
 $5 \times 10^3 - 10^8$ keV/amu
- 87T42 Moiseiwitsch, B.L.
Relativistic eikonal phase factors for electron capture
J. Phys. B. 20 4111-4114 1987 T
Relativistic eikonal approximation
Formalism
Neufeld, D.A. Dalgarno, A.
Charge transfer in collisions of doubly charged ions of iron and nickel with hydrogen atoms
Phys. Rev. A 35 3142-3144 1987 T
 $Fe^{2+}, Ni^{2+} + H \rightarrow Fe^+, Ni^+$
Landau-Zener approximation
 $10^3 - 10^5$ K rate coefficients $Fe^{2+} \rightarrow Fe^+$ (ground state) ; preferential. $Ni^{2+} \rightarrow Ni^+$ (excited state) ; preferential.
- 87T64 Nikitin, E.E. Reznikov, A.I. Umanskii, S.Y.
Two-level model of charge exchange with coulomb interaction in one of the channels; quantum and quasiclassical cross sections in the weak-coupling limit.
Sov. Phys.-JETP 64 937 1987 T
 $Ar^{2+} + He$
- 87T44 Ohyama-Yamaguchi, T
Double- and single-charge transfer in collision of C^{6+} ion with He atom at low impact energies
J. Phys. Soc. Japan 56 1693-1702 1987 T
 $C^{6+} + He \rightarrow C^{3+} + He^+ ; C^{6+} + He^{2+}$
PSS with impact parameter approximation
0.1 - 10 keV/amu
 $\sigma(6,4) = 0.1 \times \sigma(6,5)$
- 87T45 Pachter, M.C. Gonzalez, A.D. Miraglia, J.E.
Retardation effects in radiative electron capture
Phys. Rev. A 35 4108-4113 1987 T
 $Xe^{54+} e \rightarrow Xe^{53+}(1s) + hv ; H^+ + H(1s) \rightarrow H(1s) + H^+ + hv$
 $5.6 \times 10^3 - 5.1 \times 10^4$ keV/amu
Retarding effects at high impact energy; total, double, triple differential cross sections

- 87T46 Reinhold, C.O. Miraglia, J.E.
Electron capture from H(2s) by protons at intermediate energies
J. Phys. B 20 541-549 1987 T
 $H^+ + H(2s) \rightarrow H(n=1,2,3) + H^+$
A close-coupling with ETF, classical trajectory Monte Carlo method
1-200 keV/amu
- 87T47 Roberts, M.J.J.
A comparative study of the second-order Born and Faddeev-Watson approximation: II
charge transfer
J. Phys. B 20 551-564 1987 T
 $H^+ + He(1s^2) \rightarrow H(1s) + He^+(1s)$
Second Born approximation, Faddeev-Watson approximation
2820 - 20000 keV/amu
Angular differential cross sections
- 87T48 Saha, G.C. Datta, S. and Mukherjee, S.C.
Charge transfer in collisions of atomic hydrogen with N^{7+} ions in the high energy
region
Phys. Rev. A 36 1656-1662 1987 T
 $N^{7+} + H(1s) \rightarrow N^{6+}(nlm) + H^+$
CDW
710-2857 keV/amu
Arbitrary (nlm) $\rightarrow$ arbitrary (n'l'm') transfer
- 87T49 Shimakura, N. Sato, H. Kimura, M. Watanabe, T.
Electron capture processes in collisions of O^{6+} with He using the travelling molecular
orbital method
J. Phys. B 20 1801-1810 1987 T
 $O^{6+} + He \rightarrow O^{3+}(n,l) + He^+$
MO expansion method with ETF
0.14 - 7 keV/amu
(n,l) partial cross sections
- 87T52 Shingal, R. Bransden, B.H.
Mutual neutralization in $H^+ + H^+$ collisions
J. Phys. B 20 L 533 - 535 1987 T
 $H^+ + H^+ \rightarrow H(nl) + H(1s)$
Multistate impact parameter method
8 - 50 keV/amu
- 87T53 Shingal, R. Bransden, B.H.
Charge transfer, target excitation and ionization in $H^+ + Na(3s)$ collisions
J. Phys. B 20 4815 - 4825 1987 T
 $H^+ + Na(3s) \rightarrow H^+ + Na(nl) ; H(nl) + Na^+$
Two-center expansion with travelling atomic orbitals
0.8 - 50 keV/amu
- 87T51 Shingal, R. Bransden, B.H. Flower, D.R.
Formation of H(2s) and H(2p) in collisions between ground state hydrogen atoms
J. Phys. B 20 L477 - 480 1987 T
 $H(1s) + H(1s) \rightarrow H(1s) + H(2s,2p)$
travelling AO model
1-100 keV/amu
- 87T50 Shingal, R. Noble, C.J. Bransden, B.H.
A study of charge transfer and excitation processes in collisions of alpha particles
with sodium atoms
J. Phys. B 20 793 - 799 1987 T
 $He^{2+} + Na(3s) \rightarrow He^+(nl) + Na^+(nl=1s,2s,2p,3s,3p,3d,4s,4p,4d,4f)$
coupled state impact parameter method
2.5 - 67.5 keV/amu
Preferential capture into $He^+(3l)$ at low energy (<30 keV)
- 87T54 Tan, J. Lin, C.D. Kimura, M.
A quantal study of differential cross sections for double charge transfer in $C^{4+} - He$
collisions
J. Phys. B 20 L 91 - 97 1987 T
 $C^{4+} + He \rightarrow C^{2+}$
Quantal two-channel MO close-coupling expansion method
0.04 - 0.13 keV/amu
Angular differential cross sections
- 87T65 Tiwari, Y.N. Roy, D.N.
Electron capture cross sections in proton-lithium atom collisions.
Ind. J. Pure Appl. Phys. 25 323 - 327 1987 T
 $H^+ + Li \rightarrow H + Li^+$

- 87T55 Toshima,N. Ishihara,T. Eichler,J.
Distorted-wave theories for electron capture and the associated high energy behavior of cross sections
Phys. Rev. A 36 2659 - 2666 1987 T
 $H^+ + He \rightarrow H^0 + He^+$
DW with Coulomb boundary conditions
50 - 10⁴ keV/amu
- 87T56 Winter,T.G.
Electron transfer and ionization in collisions between protons and the ions He^+ , Li^{2+} , Be^{3+} , B^4 and C^{5+} studied with the use of a Sturmian basis
Phys. Rev. A 35 3799 - 3809 1987 T
 $H^+ + B^{(Z-1)+} \rightarrow H(1s, total) + B^{Z+}$; $H^+ + B^{(Z-1)+} + e$ (B=He, Li, Be, B, C)
Coupled-Sturmian-pseudo state approach
75 - 937 keV/amu (B) ; 150 - 600 (C) ; 17.5 - 150 (He) ; 17.5 - 200 (Li) ; 50 -
- 87T57 Winter,T.G. Hutton,G.J. Day,A.R. Lane,N.F.
Differential cross sections for electron transfer and elastic scattering in collisions between alpha particles and hydrogen atoms
Phys. Rev. A 36 625 - 640 1987 T
 $He^{2+} + H \rightarrow He^+ + H^+$; $He^{2+} + H(elastic)$
MO
1 - 70 keV/amu
Angular distribution

- 88E 1 Andersson, H.A. Astner, G. Cederquist, H.
Total cross sections for different charge changing processes in collisions of highly charged Xe ions with He atoms at low energy.
J. Phys. B 21 L187 - 93 1988 E
 $\text{Xe}^{q+}(\text{q} = 11-31) + \text{He} \rightarrow \text{Xe}^s(\text{q}' = \text{q}-1, \text{q}-2) + \text{He}^{s+}(\text{s} = 1, 2)$
coincidence technique
 $3 \times 10^{-2} \text{ keV/amu}$
- 88E 2 Anholt, R. Xu, X.Y. Stoller, Ch. Molitoris, J.D. Meyerhof, W.E.
Intermediate-velocity atomic collisions; electron capture and loss in 10 - 42 MeV C ions.
Phys. Rev. A 37 1105 - 1114 1988 E
 $\text{C}^{q+}(\text{q} = 6, 5, 4, 3) + \text{B} \rightarrow \text{C}^{q'-1}(\text{B} = \text{H}_2, \text{He}, \text{N}_2, \text{O}_2, \text{Ne}, \text{Ar}, \text{Kr}, \text{Xe}) ; \text{C}^{q+} + \text{B} \rightarrow \text{C}^{q+}$
Glauber theory for ionization; eikonal approximation for electron capture.
 $833 - 2100 \text{ keV/amu}$
equilibrium-charge distributions calculated from observed data.
- 88E 3 Baker, O.K. Meyerhof, W.E. Spooner, D.W. Stoller, Ch. Scheurer, J.N.
Nuclear resonance effect in atomic electron capture by protons.
Phys. Rev. Letters. 60 913 - 916 1988 E
 $\text{H}^{+} + {}^{22}\text{Ne} \rightarrow \text{H} + \text{Ne}^{+}$
 1500 keV/amu
- 88E 61 Barat, M.
Multiple electron capture processes by highly charged ions.
Comm. At. Mol. Phys. 21 307 - 319 1988 E
review
- 88E 4 Benoit-Carlin, P. Bordenave-Montesquieu, A. Boudjerna, M. Gleizes, A.
Dousson, S. Hitz, D.
Multiple capture in $\text{N}^{7+} + \text{Ar}$ investigated by electron spectroscopy (70keV, $\theta = 10^\circ$).
J. Phys. B 21 3387 - 3416 1988 E
 $\text{N}^{7+} + \text{Ar}, \text{He}, \text{H}_2 \rightarrow \text{N}^{s+}(\text{n}1, \text{n}1') (\text{n} = 2, 3, 4)$
electron spectroscopy
 5 keV/amu
no cross sections given ; electron peaks assigned to $(\text{n}1\text{n}1')$
- 88E 5 Bouchama, T. Druetta, M. Martin, S.
Subshell selective electron capture in collision of $\text{O}^{6+}(\text{q} = 6, 7)$ with H_2 , He at 10q keV.
Nucl. Instr. Meth. in Phys. Res. B 31 371 - 373 1988 E
 $\text{O}^{6+} + \text{H}_2 \rightarrow \text{O}^{s+}(\text{1s}^n\text{1l}) ; \text{n} = 3, 4 ; \text{O}^{7+} + \text{H}_2, \text{He} \rightarrow \text{O}^{6+}(\text{1s nl} ; \text{n} = 3, 4)$
photon spectroscopy
 $3.75 - 4.4 \text{ keV/amu}$
- 88E 6 Brechignac, C. Cahuzac, Ph. Leygnier, J. Pflaum, R. Weiner, J.
Direct observation of charge-exchange collisions between mass-selected $(\text{Na})_n^{+}$ clusters and Cs atoms.
Phys. Rev. Letters 61 314 - 317 1988 E
 $(\text{Na})_n^{+} + \text{Cs} \rightarrow (\text{Na})_n + \text{Cs}^{+} (\text{n} = 1 - 21)$
TOF
 0.05 keV/amu
total cross sections $(40 - 20 \text{ \AA}^2 \text{ for } \text{n} = 1 - 20)$
- 88E10 Castro Faria, N.V. Freire, F.L. de Pinho, A.G.
He⁺ formation by two-and three-electron capture.
Z. Phys. D 8 167 - 170 1988 E
 $\text{He}^{2+}, \text{He}^{+} + \text{B} \rightarrow \text{He}^{\circ} (\text{B} = \text{He}, \text{Ne}, \text{Ar}, \text{Kr})$
growth method
 $187 - 1000 \text{ keV/amu}$
- 88E 9 Castro Faria, N.V. Freire, F.L. de Pinho, A.G.
Electron loss and capture by fast helium ions in noble gases.
Phys. Rev. A 37 280 - 283 1988 E
 $\text{He}^{2+} + \text{B} \rightarrow \text{He}^{\circ}, \text{He}^{+} ; \text{He}^{+} + \text{B} \rightarrow \text{He}^{\circ} (\text{B} = \text{He}, \text{Ne}, \text{Ar}, \text{Kr}) ; \text{He}^{+} + \text{B} \rightarrow \text{He}^{2+} (\text{B} = \text{He}, \text{Ne}, \text{Ar}, \text{Kr})$
growth/attenuation method
 $187 - 1000 \text{ keV/amu}$
total cross sections
- 88E 7 Chiu, Y.N. Friedrich, B. Maring, W. Niedner, G. Noll, M. Toennies, J.P.
Charge transfer and structured vibrational distributions in $\text{H}^{+} + \text{CH}_4$ low-energy collisions.
J. Chem. Phys. 88 6814 - 6830 1988 E
 $\text{H}^{+} + \text{CH}_4 \rightarrow \text{H}^{\circ} (\text{elastic}) ; \text{H} + \text{CH}_4^{+}, \text{CH}_3^{+}, \text{CH}_2^{+}$
crossed beam technique + TOF (energy loss measurement)
 $10^{-2} - 3 \times 10^{-2} \text{ keV/amu}$
elastic scattering : $\theta = 0 - 10^\circ ; \text{CH}_4^{+} ; \text{CH}_3^{+} ; \text{CH}_2^{+} = 74 : 22 : 4 \text{ at } 30 \text{ eV}$

- 88E8 Church, D.A.
Studies of ion collisions in ion traps.
Phys. Scripta T 22 164 - 170 1988 E
 $N^{3+} + H_2 \rightarrow N^{2+} + H_2^+$
Penning ion trap
 10^{-4} keV/amu
a review on low energy electron transfer.
- 88E11 Engelhardt, C.L. Jaacks, D.H.
Isotopic velocity-dependent effects in $He^+ + H_2$ or D_2 collisions.
Phys. Rev A 37 1041 - 1043 1988 E
 $He^+ + H_2(D_2) \rightarrow He(3P; m_1=1) + H_2^+(D_2^+)$
 $0.25 - 3$ keV/amu
rotational coupling in united-atom
- 88E12 Ferguson, F.E. Richter, R. Lindinger, W.
Competitive charge-transfer and vibrational quenching of $N_2^+(X, v=1)$ in collisions with O_2 and NO .
J. Chem. Phys. 89 1445 - 2447 1988 E
 $N_2^+(X, v=1) + O_2 \rightarrow N_2 + O_2(a^1\Pi_u) ; N_2^+(X, v=0) + NO \rightarrow N_2 + NO(a^1\Sigma^+)$
 $3 \times 10^{-6} - 3.6 \times 10^{-5}$ keV/amu
rate constants $N_2^+(X, v=1) + B \rightarrow N_2^+(X, v=0) + B$ ($B = O_2, NO$) also investigated.
- 88E13 Finck, K. Wang, Y. Roller-Lutz, Z. Hutz, H.O.
Lyman-alpha emission in collisions of H^+ ions with $Na(3s)$ and laser-assisted $Na(3p)$ atoms
Phys. Rev. A 38 6115 - 6119 1988 E
 $H^+ + Na(3s, 3p) \rightarrow H(2p)$
growth method
 $0.5 - 10$ keV/amu
- 88E14 Gay, T.J. Redd, E. Blankenship, D.M. Park, J.T. Peacher, J.I. Seely, D.G.
Charge transfer in quasi-one-electron systems at 'high' energy.
J. Phys. B 21 L467 - 472 1988 E
 $Mg^+ + He \rightarrow Mg; Be^+ + He \rightarrow Be$
energy-loss spectroscopy
 $1.25, 2.78, 6.25$ keV/amu (Mg) ; 6.25 keV/amu (Be)
angle-differential cross sections
- 88E15 Giese, J.P. Cocke, C.L. Waggoner, W.T. Pedersen, J.O.K. Kamber, E.Y. Tunnell, L.N.
Non-Frank-Condon transitions in two-electron capture from D_2 by low-energy, highly charged Ar projectiles.
Phys. Rev. A 38 4494 - 4503 1988 E
 $Ar^{2+} + D_2 \rightarrow Ar^{2+} + D^+ + D^+$
projectile-break-up proton coincidence
 $1.25 \times 10^{-2} - 0.25$ keV/amu
- 88E16 Guyon, P.M. Baer, T. Cole, S.K. Govers, T.R.
The electron transfer and collision-induced dissociation cross section of state-selected H_2^+ and D_2^+ ions.
Chem. Phys. 119 145 - 158 1988 E
 $H_2^+, D_2^+(v=1-10) + H_2 \rightarrow H_2, D_2 + H_2^+ ; H^+ + H, D^+ + D$
TREPICO
 -10^{-3} keV/amu
collision-induced dissociation > charge transfer for high v ; the reverse for low v .
- 88E19 Hadman, M. Jonathan, P. Kingston, R.G. Brenton, A.G.
Single-electron capture by $Cl^{2+}(^4S, ^2D, ^2P)$ from rare-gas targets.
Int. J. Mass Spec. Ion Proc. 83 331 - 338 1988 E
 $Cl^{2+} + B \rightarrow Cl^{2+*}, Cl^+$ ($B = He, Ne, Ar, Kr, Xe$) ; $Cl^+ + He \rightarrow Cl^{1*}$
translation energy spectroscopy
 0.17 keV/amu
only energy spectra for identification of levels $Cl^{2+}(^4S)$ and metastable($^2D, ^2P$) states contained.
- 88E17 Hamdan, M. Lee, A.R. Branton, A.G.
Fine-structure translations in collisions of Xe^{2+}, Xe^{3+} and Xe^{4+} ions with He atoms.
J. Phys. B 21 L561 - 566 1988 E
 $Xe^{2+}(^3P, ^1D_2), Xe^{3+}(^4S_{3/2}, D_{3/2}, ^3P), Xe^{4+}(^1D_2) + He \rightarrow Xe^+, Xe^{2+}, Xe^{3+}$
translational energy spectroscopy
 0.04 keV/amu
no cross sections given; only translational energy spectra.

- 88E18 Hamdan, M. Mazumdar, S. Marathe, V.R. Badrinathan, C. Brenton, A.G. Mathur, D.
Excited states of XH^{2+} ($X = C, N, O, S$) ions : a combined experimental and theoretical study.
J. Phys. B 21 257 - 284 1988 E
 $XH^{2+} + He \rightarrow XH^+(X = C, N, O, S)$
translational energy spectroscopy
0.2 - 0.5 keV/amu
- 88E62 Hendi, G. Lavollee, M. Dutuit, O. Ozanne, J.B. Guyon, P.M. Gislason, E.A.
State-selected ion-molecule reactions : $N_2^+(v) + H_2 \rightarrow N_2 + H_2^+$ and $Ar^+(^2P_j) + H_2 \rightarrow Ar + H_2^+$.
J. Chem. Phys. 88 6381 - 6389 1988 E
 $N_2^+(v) + H_2 \rightarrow N_2 + H_2^+ ; Ar^+(^2P_j) + H_2 \rightarrow Ar + H_2^+$
TPEPICO
 $3.7 \times 10^{-4} - 5.2 \times 10^{-4}$ keV/amu
- 88E20 Hippler, R. Datz, S. Krause, H.F. Miller, P.D. Pepmiller, P.L. Dittmer, P.F.
Partial cross sections for electron capture into specific n states for 0.1 - and 0.25 - MeV/nucleon $Fe^+ - H_2$ collisions ($q = 12 - 18$)
Phys. Rev. A 27 3201 - 3203 1988 E
 $Fe^+(q = 12 - 18) + H_2 \rightarrow Fe^{(n-1)+}(n)$
photon spectroscopy
 $10^2, 2.5 \times 10^2$ keV/amu
strong core-effect
- 88E21 Hippler, R. Datz, S. Miller, P.D. Dittmer, P.F. Pepmiller, P.F.
Double and single electron capture and loss in 0.5 - 2.5 MeV/u $O^{9+} + Ne$ ($q=5,7,9$) collisions.
Z. Phys. D 8 163 - 166 1988 E
 $O^{9+}(q = 5,7,9) + Ne \rightarrow O^{(q-2)+}, O^{(q-1)+}, O^{(q+1)+}, O^{(q+2)+}$
growth
 $0.5 \times 10^3 - 2.5 \times 10^3$ keV/amu
total cross sections
- 88E60 Hird, B. Rahman, F. Orakzai, M.W.
Electron capture and loss by fast fluorine atoms in collisions with rare gas targets
Can. J. Phys. 66 973 - 977 1988 E
 $F + B \rightarrow F^+, F^* (B = He, Ne, Ar, Kr, Xe)$
growth method
1 - 5.9 keV/amu
- 88E22 Hird, B. Rahman, F. Orakzai, M.W.
Ion-production cross sections in chlorine-rare gas collisions.
Phys. Rev. A 37 4620 - 4624 1988 E
 $Cl^- + B \Rightarrow Cl, Cl^+ (B = He, Ne, Ar, Kr, Xe)$
growth method
0.31 - 3.2 keV/amu
total cross sections
- 88E23 Hoekstra, R. Ciric, D. Zimoviev, A.N. Gordeev, Yu.S. De Heer, F.J. Morgenstern, R.
Emission cross sections for fully stripped carbon colliding atomic hydrogen.
Z. Phys. D 8 57 - 61 1988 E
 $C^{6+} + H \rightarrow C^{n+}(n,n') + H^+(n-n' = 4-2 ; 4-3 ; 3-2 ; 5-2 ; 5-3 ; 7-6 ; 8-7)$
photon-spectroscopy
- 88E24 Howard, S. Rockwood, A. Anderson, S. Howorka, F. Furell, J.
Crossed-beam study of the charge-transfer reaction of helium ions with xenon.
Phys. Rev. A 37 3211 - 3216 1988 E
 $He^+ + Xe \rightarrow He + Xe^+$
crossed-beam technique
 $1.3 \times 10^{-3} - 2.4 \times 10^{-2}$ keV/amu
6s $^1P_{1/2}$ dominant; no cross sections given
- 88E25 Huq, M.S. Champion, R.L. Doverspike, L.D.
Low-energy collisions of O^{2+} with atoms and molecules.
Phys. Rev. A 37 2349 - 2353 1988 E
 $O^{2+} + B \rightarrow O^+ + B^+ (B = He, Ne, Ar, H_2, D_2, N_2, O_2)$
retarding method
 $1.8 \times 10^{-4} - 2.5 \times 10^{-3}$ keV/amu
only total cross section
- 88E26 Jonathan, P. Hamdan, M. Brenton, A.G. Willett, G.D.
Translational spectroscopy of the triatomic dications CO_2^{2+}, OCS_2^{2+} and CS_2^{2+} .
Chem. Phys. 119 159 - 170 1988 E
 $A^{2+} + B \rightarrow A^+ + B^+ (A = CO_2, OCS, CS_2; B = \text{rare gases})$
translational energy spectroscopy

- 88E63 Kamber, E.Y.
State-selective single- and double-electron capture by Ar^{4+} and Ar^{3+} ions from rare-gas atoms.
J. Phys. B 21 4185 - 4203 1988 E
 $\text{Ar}^{4+} + \text{B} \rightarrow \text{Ar}^{(q-1)+}$ ($q = 4, 5$; $\text{B} = \text{He}, \text{Ne}, \text{Ar}, \text{Kr}$)
translational energy spectroscopy
0.3 keV/amu
no cross sections ; only possible channels
- 88E27 Kamber, E.Y. Hornis, W.G. Hasted, J.B. Brenton, A.G. Beynon, J.H.
Multiple-electron capture processes by multiply charged ions from rare-gas atoms at low velocities.
J. Phys. B 21 3423 - 3438 1988 E
 $\text{Kr}^{2+} + \text{He}, \text{Ne}, \text{Ar} \rightarrow \text{Kr}^{3+}$; $\text{Kr}^{4+} + \text{Ne} \rightarrow \text{Kr}^{5+}$; $\text{Kr}^{3+} + \text{Ar}, \text{Kr}, \text{Xe} \rightarrow \text{Kr}^{4+}$; $\text{Kr}^{4+} + \text{Ar}, \text{Kr} \rightarrow \text{Kr}^{5+}$; $\text{Xe}^{3+} + \text{Ar} \rightarrow \text{Xe}^{4+}$; $\text{Xe}^{4+} + \text{Ne}, \text{Ar} \rightarrow \text{Xe}^{5+}$; $\text{Xe}^{4+} + \text{Kr} \rightarrow \text{Xe}^{5+}$
translational energy spectroscopy
energy spectra only, crossing radius estimated.
- 88E28 Kaname, R. Ushijima, Y. Kiskawa, M. Kiyaguchi, M. Nagata, T.
Total cross sections for collisional quenching of $\text{H}(2s)$ atom in molecular targets.
J. Phys. Soc. Japan 57 1212 - 1219 1988 E
 $\text{H}(2s) + \text{B} \rightarrow \text{sum}(\text{H}^+ + \text{H} + \text{H}(1s))$ ($\text{B} = \text{H}_2, \text{N}_2, \text{O}_2, \text{CO}, \text{CO}_2, \text{CH}_4$)
beam attenuation technique
0.2 - 3.5 keV/amu
- 88E29 Koslowski, H.R. Huber, B.A. Staemmler, V.S.
Angular distribution of Ar^+ ions resulting from single-electron capture in Ar^{2+} - He collisions.
J. Phys. B 21 2923 - 2937 1988 E
 $\text{Ar}^{2+} + \text{He}$
translational energy spectroscopy
 9.9×10^{-3} keV/amu
only relative angular differential cross sections.
- 88E30 Kushawaha, V. Michael, A. Mahmood, M.
Collisional studies involving N^+ and N_2^+ ion and HgX_2 ($\text{X} = \text{Cl}, \text{Br}, \text{I}$)
Phys. Rev. A 38 1809 - 1818 1988 E
 $\text{A}^+ + \text{HgB}_2 \rightarrow \text{A} + \text{HgB}_2^+$ ($\text{A} = \text{N}, \text{N}_2$; $\text{B} = \text{Cl}, \text{Br}, \text{I}$)
photon spectroscopy
 3.6×10^{-5} - 6.4×10^{-2} keV/amu
total cross sections ; partial cross sections.
- 88E31 Lombo, L.J. Dazmann, K. Stoller, Ch. Meyerhof, W.E. Hansch, T.W.
Core effect on the polarization of optical Rydberg transitions following electron capture into slow, highly ionized neon recoil ions.
Phys. Rev. A 37 1141 - 1151 1988 E
 $\text{Ne}^{q+}(q = 5 - 10) + \text{Na} \rightarrow \text{Ne}^{(q-1)+}$
photon-spectroscopy (visible, near UV)
0.2 keV/amu
emission cross sections determined (sharp variation at $q = 7$ and 8)
- 88E32 Lindsay, B.G. Laitner, C.J.
Some state-selected charge transfer processes involving 10 - 1500 eV rare-gas ions and simple molecules.
J. Phys. B 21 1617 - 1625 1988 E
 $\text{Ar}^+(^2\text{P}_{1/2}, ^2\text{P}_{3/2}) + \text{H}_2, \text{N}_2, \text{CO} \rightarrow \text{Ar}(^1\text{S}_0)$; $\text{Kr}^+(^2\text{P}_{1/2}, ^2\text{P}_{3/2}) + \text{CO} \rightarrow \text{Kr}(^1\text{S}_0)$
PEPICO
relative cross sections
- 88E33 Martinez, H. Cisneros, C. De Urquijo, J. Alvarez, I.
Absolute cross section measurements of the direct charge transfer of He^+ in neon in the energy range 0.5 - 5 keV
Phys. Rev. A 38 51914 - 51916 1988 E
 $\text{He}^+ + \text{Ne} \rightarrow \text{He} + \text{Ne}^+$
growth method
0.125 - 1.25 keV/amu
- 88E34 Martinez, R.I. Dheandhanoo, S.
Absolute cross section measurements in XQA instrument : $\text{Ar}^+ + \text{N}_2 \rightarrow \text{Ar} + \text{N}_2^+$
Int.J. Mass Spec. Ion Proc. 84 1 - 16 1988 E
 $\text{Ar}^+ + \text{N}_2 \rightarrow \text{Ar} + \text{N}_2^+$
triple quadrupole tandem mass spectrometer
 1.25×10^{-4} - 1.5×10^{-3} keV/amu
- 88E35 Meyer, F.W. Griffin, D.C. Havener, C.C. Hug, M.S. Phaneuf, R.A. Swenson, J.K. Stolterfoht, N.
Population of high-angular-momentum states in low-energy double-electron-capture collisions of O^{6+} with He
Phys. Rev. Letters 60 1821 - 1824 1988 E
 $\text{O}^{6+} + \text{He} \rightarrow \text{O}^{4+}(1s^2\text{pnl})$; $n = 6, 7$; $l = 0 - 5$
electron spectroscopy
1.88 - 6.6 keV/amu
relative cross sections for (n, l) distribution

- 88E36 Mokler, P.H. Reusch, S.
Comments on correlated electron capture in relativistic, high charge, heavy ions
Z. Phys. D 8 393 - 394 1988 E
 $A^{(Z-3)+} + H_2 \rightarrow A^{(Z-2)+}(A = S, Ti, Ge, Xe, Pb)$
RTE scaling for Li-like ions
- 88E64 Montenegro, E.C. Xu, X.Y. Meyerhof, W.E. Anholt, R.
Intermediate-velocity atomic collisions IV. Ar K-shell ionization and capture by C^{3+} and C^{4+} ions,
Phys. Rev. A 38 3357 - 3364 1988 E
 $C^{3+,4+} + Ar \rightarrow C^{n+,3+}(K) + Ar^+(K^{-1})$; $C^{3+} + Ar \rightarrow C^{3+}$
X-ray spectroscopy
 1.8×10^3 , 3.5×10^3 keV/amu
K-shell ionization cross section
- 88E37 Montenegro, E.C. Xu, X.Y. Meyerhof, W.E. Anholt, R. Darzmann, K. Schlachter, A.S. Rude, B.S. McDonald, R.J.
Intermediate-velocity atomic collisions III. electron capture in 8.6 MeV/amu Ca ions
Phys. Rev. A 38 1854 - 1859 1988 E
 $Ca^{n+}(q = 18, 19, 20) + B \rightarrow Ca^{(q-1)+} + B^+$ ($B = H_2, He, N_2, Ne, Ar, Kr, Xe$)
growth/K-X-ray coincidence
8600 keV/amu
total cross sections and K-capture cross sections (K-X-ray coincidence)
- 88E38 Mowat, J.R.
Ion-ion collisions and ion storage rings
Phys. Scripta T22 171 - 177 1988 E
review
- 88E39 Oza, D.H. Benoit-Cattin, P. Bordenave-Montesquieu, A. Boudjema, M. Gleizes, A.
Autoionization of $N^{3+}(3lnl')$ for $n' = 3 - 10$: experiment and theory
J. Phys. B 21 L131 - 137 1988 E
 $N^{7+} + B \rightarrow N^{3+}(3lnl') + B^{2+} \rightarrow N^{6+}(2l) + e + B^{2+}$ ($B = H_2, He, Ar$)
electron spectroscopy: pseudo-state close coupling calculation
electron energies
- 88E40 Penent, F. Champion, R.L. Doverspike, L.D. Esaulov, V.A. Grouard, J.P. Hall, R.I. Moutagnon, J.L.
Positive ion production in halogen negative ion collisions.
J. Phys. B 21 3375 - 3386 1988 E
 $F + B \rightarrow F^0, F^+$ ($B = N_2, Ne$); $Cl^- + Ar \rightarrow Cl^0, Cl^+$
growth + electron spectroscopy
 $4 \times 10^{-4} - 1 \times 10^{-2}$ keV/amu (F); $1.6 \times 10^{-3} - 7 \times 10^{-3}$ keV/amu (Cl)
- 88E41 Pommier, J. Kubaich, C. Tuan, V.N. Reynaud, C.
Angular analysis in the 100 - 1500 eV energy range
J. Phys. B 21 L665 - 670 1988 E
 $He^+ + Na \rightarrow He^+(2^3S, 2^1S, 2^3P, 2^1P) + Na^+$
TOF
0.025 - 0.375 keV/amu
 $\theta = 0 - 4^\circ$
- 88E42 Rajgara, F.A. Badrinathan, C. Mathur, D.
Absolute cross-sections for state-diagnosed electron capture by N^{2+} ions from molecular hydrogen
Int. J. Mass Spectrosc. Ion Proc. 85 229 - 236 1988 E
 $N^{2+}(2p^2P_{1/2}) + H_2 \rightarrow N^+(2p^2^1S_g, ^1D_2; 2p^3^3D_3)$
translational energy spectroscopy
0.036 - 0.36 keV/amu
 H_2^+ and H^+ + H are distinguished.
- 88E65 Royer, T. Doweck, D. Houver, J.C. Pommier, J. Andersen, N.
Collision spectroscopy with aligned and oriented atoms I. charge transfer in H^+ - $Na(3s, 3p)$ collisions.
Z. Phys. D 10 45 - 57 1988 E
 $H^+ + Na(3s, 3p) \rightarrow H$
TOF energy-loss spectroscopy + laser-excited atom target
0.3 - 3 keV/amu
- 88E45 Schönfeldt, W.A. Mokler, P.H. Maor, D.
Charge transfer in 1.4 MeV/amu $Ni^{16+} \rightarrow Kr$ collisions, $q = 16 - 22$
Z. Phys. D 9 47 - 57 1988 E
 $Ni^{16+}(q = 19 - 22) + Kr \rightarrow Ni^{q+}$
X-ray measurement
1400 keV/amu
total cross sections

- 88E43 Schlachter, A.S. Bernstein, E.M. Clark, M.W. DuBois, R.D. Graham, W.G. McFarland, R.H. Morgen, T.J. Mueller, D.W. Stockli, M.P. Tamis, J.A.
Multiple-electron capture in close nearly symmetric ion-atom collisions
J. Phys. B 21 L291 - 297 1988 E
 $\text{Ca}^{17+} + \text{Ar} \rightarrow \text{Ca}^{(17-p)+}$ ($p = 1 - 5$)
X-ray-ion coincidence technique
 1.17×10^3 keV/amu
- 88E44 Schmidt-Böcking, H. Prior, M.H. Dörner, R. Berg, H. Pedersen, J.O.K. Cooke, C.L. Stockli, M. Schlachter, A.S.
Angular dependence of multiple-electron capture in 90 keV Ne^{7+} - Ne collisions
Phys. Rev. A 37 4640 - 4648 1988 E
 $\text{Ne}^{7+} + \text{Ne} \rightarrow \text{Ne}^{q+} + \text{Ne}^{p+}$ ($q = 6 - 2$; $p = 1 - 6$)
recoil ion-scattered particle coincidence
angular distributions over $1 - 20$ mrad.; no cross sections given
- 88E46 Schuch, R. Schoof, H. Miller, P.D. Krause, H.F. Dittner, P.F. Datz, S. Olson, R.E.
Charge- and angle-correlated inelasticities in collisions of bare fast carbon ions with neon
Phys. Rev. Letters 60 925 - 928 1988 E
 $\text{C}^{6+} + \text{Ne} \rightarrow \text{C}^{3+} + \text{Ne}^{6+}$; $\text{C}^{3+} + \text{Ne}^{5+}$; $\text{C}^{6+} + \text{Ne}^{4+}$; $\text{C}^{6+} + \text{Ne}^{3+}$
scattered projectile-recoil ion coincidence
833 keV/amu
angular differential cross section
- 88E47 Schulz, M. Schuch, R. Datz, S. Justiniano, E.L.B. Miller, P.D. Schöne, H.
Resonant transfer and excitation in Li-like F colliding with H_2
Phys. Rev. A 38 5454 - 5457 1988 E
 $\text{F}^{6+} + \text{H}_2 \rightarrow \text{F}^{2+}(\text{1s2snlnl}') + \text{H}_2^{2+}$
X-ray-projectile coincidence
789 - 1713 keV/amu
- 88E49 Sedgwick, J.B. Nelson, I.R. Jordan, C.A. Abbey, L.E. Xu, Y. Moran, T.F.
Resonant and near-resonant charge transfer reactions of gaseous organic ions
Chem. Phys. Letters 146 113 - 120 1988 E
 $\text{C}_n\text{H}_m\text{N}_p^{n+} + \text{C}_q\text{H}_j\text{N}_k \rightarrow \text{C}_n\text{H}_m\text{N}_p^0 + \text{C}_q\text{H}_j\text{N}_k^{n+}$ ($n = 2,3,4$; $m = 3,4,5$; $p = 0,1$)
TOF
 4×10^{-2} keV/amu
- 88E50 Suraud, M.G. Bonnet, J.J. Bonnefoy, M. Chassevent, M. Fleury, A. Bliman, S. Dousson, S. Hitz, D.
X-ray emission spectroscopy of one-electron capture into Li-like radiative N^{4+} (1s2lnl') configurations by metastable $\text{N}^{3+}(\text{1s2s } ^3\text{S})$ ions in collisions with He and H_2
J. Phys. B 21 1219 - 1228 1988 E
 $\text{N}^{3+}(\text{1s2s } ^3\text{S}) + \text{H}_2, \text{He} \rightarrow \text{N}^{4+}(\text{1s2lnl'})$
photon spectroscopy
3.4 keV/amu
no cross section given
- 88E51 Tabata, T. Ito, R. Nakai, Y. Shirai, T. Sataka, M. Sugitara, T.
Analytic cross sections for charge transfer of hydrogen atoms and ions colliding with metal vapors
Nucl. Instr. Meth. in Phys. Res. B 31 375 - 381 1988 E
 $\text{H}^+(q = 1,0,-1) + \text{B} \rightarrow \text{H}^{p+}$ ($\text{B} = \text{Li, Na, Mg, Ca, Sr, Cs}$)
analytical fitting
- 88E52 Tsurubuchi, S. Arikawa, T.
Excitation of $\text{Li}(2p)$ in collisions of Li^+ with Ar and Kr atoms
J. Phys. Soc. Japan 57 1220 - 1225 1988 E
 $\text{Li}^+ + \text{Ar, Kr} \rightarrow \text{Li}^+(2p \rightarrow 2s; 3d \rightarrow 2p)$
photon spectroscopy
 $5.7 \times 10^{-2} - 0.57$ keV/amu
- 88E66 Tsurubuchi, S. Arikawa, T.
Excitation of $\text{Li}(2p)$ in collisions of Li^+ with Ar and Kr atoms.
J. Phys. Soc. Japan 57 1220 - 1225 1988 E
 $\text{Li}^+ + \text{Ar, Kr} \rightarrow \text{Li}(2p_{1/2} \rightarrow 2p_{3/2})$
photon spectroscopy
 $5.7 \times 10^{-2} - 5.7 \times 10^{-1}$ keV/amu
also emission cross sections for $2p \rightarrow 2s, 3d \rightarrow 2p$ of Li : polarization of $2p \rightarrow 2s$ transition
- 88E53 Underwood, T.A. Brainig, M. Gaither III, C.C. Frey, J.
Cusp-electron production in pure-target-ionization and transfer-ionization events for 0.1 MeV/u Li^{3+} projectiles on He and H_2 targets
Phys. Rev. A 38 6138 - 6142 1988 E
 $\text{Li}^{3+} + \text{H}_2, \text{He} \rightarrow \text{Li}^{2+}; \text{Li}^{2+} + \text{H}_2, \text{He} \rightarrow \text{Li}^{1+}$
growth method
100 keV/amu
cusp cross sections

- 88E54 Van Zyl, B. Neumann, H.
Lyman alpha emission cross sections for low-energy H and H⁺ collisions with N₂ and O₂
J. Geophys. Res. 93 1023 - 1027 1988 E
H + B -> H⁺(2p); H⁺ + B -> H⁺(2p) (B = N₂O₂)
Lyman alpha detection
0.04 - 2.5 keV/amu
- 88E55 Vermeeren, L. De Bisschop, P. Lievens, P. Silverans, R.E.
Velocity dependence of neutralization cross sections in collisions of ground state K⁺, Rb⁺, Sr⁺ and metastable Sr⁺(4d) ions with Na atoms
J. Phys. B 21 3417 - 3422 1988 E
K⁺, Rb⁺, Sr⁺, Sr⁺(4d) + Na -> K, Rb, Sr, Sr
- 88E56 Varnhet, D. Chetoui, A. Rozet, J.P. Stephan, C. Wöhren, K. Touati, A. Politis, M.F. Bouisse, P. Hitz, D. Dousten, S.
Characteristics of single capture nl distributions and double capture probabilities in slow collisions of Al¹³⁺, Al¹²⁺ and Ne⁸⁺ ions with two-electron targets (He, H₂)
J. Phys. B 21 3949 - 3968 1988 E
Ne⁸⁺ + B -> Ne⁸⁺(nl); Al¹²⁺ + H₂, He -> Al¹¹⁺(nl); Al¹³⁺ + He -> Al¹²⁺(nl)
photon spectroscopy
4 keV/amu
average <I>; double electron capture probabilities
- 88E57 Waggoner, W. Cocke, C.L. Tunnell, L.N. Havener, C.C. Meyer, F.W. Phaneuf, R.A.
Angular distributions for electron capture from He by multiply charged C, N, O, F and Ne ions
Phys. Rev. A 37 2386 - 2392 1988 E
C⁵⁺, N³⁺, O⁴⁺, N⁶⁺, O⁶⁺, F⁷⁺, Ne⁸⁺ + He -> A⁽ⁿ⁻¹⁾⁺
angular scattering spectroscopy
0.37 - 1.3 keV/amu
differential cross sections in angle
- 88E58 Wilson, S.M. McCullough, R.W. Gilbody, H.B.
State-selective electron capture by slow O³⁺ and Ne³⁺ recoil ions in H
J. Phys. B 21 1027 - 1035 1988 E
O³⁺(2s²2p)³p⁰ + H -> O²⁺(2s²2pnl) + H⁺(n = 2, 3); Ne³⁺(2s²2p¹nl)⁴S⁰ + H -> Ne²⁺(2s³p¹nl) + H⁺(n = 3)
translational energy spectroscopy
0.26 - 0.75 keV/amu(O); 0.09 - 0.7 keV/amu(Ne)
- 88E59 Zouros, T.J.M. Schneider, D. Stoltterfoht, N.
State-selective observation of resonant and non-resonant transfer-excitation in 50 - 500 keV ³He⁺ + H₂ collisions
J. Phys. B 21 L671 - 676 1988 E
He⁺ + H₂ -> He²⁺(2lnl') + H₂⁺
zero-degree electron spectroscopy
12.5 - 125 keV/amu
- 88T68 Abramov, D.I. Ovchinnikov, S.Yu. Solov'ev, E.A.
New type of resonances in elastic scattering
JETP Letters 47 504 - 508 1988 T
S-matrix
- 88T 1 Alston, S.
Strong-potential Born-approximation electron capture cross sections for realistic atomic potentials
Phys. Rev. A 38 3124 - 3127 1988 T
H⁺ + B -> H + B⁺(K⁻¹) (B = C, Ar)
strong-potential Born approx
150 - 2500 keV/amu(C); 1500 - 20000 keV/amu(Ar)
- 88T 2 Alston, S.
Further contributions of the Thomas double-scattering mechanism to electron capture in the second Born approximation
Phys. Rev. A 38 6092 - 6097 1988 T
H⁺ + H(1s), He(1s²) -> H(1s) + H⁺, He⁺
multiple-peaking approx., linearized-propagator approx.
10² - 5x10⁴ keV/amu
- 88T67 Ast, H. Liddle, H.J. Dreizler, R.M.
Optical potentials in ion-atom collisions I. Results for one-electron systems.
J. Phys. B 21 4143 - 4156 1988 T
H⁺ + H -> H; He²⁺ + H -> He⁺; Li³⁺ + H -> Li²⁺; H⁺ + He⁺ -> H; H⁺ + Li²⁺ -> H
1 - 10⁴ keV/amu
also ionization and excitation cross sections given

- 88T 3 Bachan, H. Deco, G. Salin, A.
Introduction of short-range interactions in continuum distorted-wave theory of electron capture for ion-atom collisions
J. Phys. B 21 1403 - 1410 1988 T
 $H^+ + Ne(2s, 2p^2, 2p^1) \rightarrow H(1s) + Ne^+$
CDW
 $10^2 = 3 \times 10^3 \text{ keV/amu}$
- 88T 4 Baer, M. Niedner, G. Toennies, J.P.
A comparison between theoretical and experimental state-to-state charge transfer cross sections for $H^+ + H_2$ at 20 keV : Evidence for quantum effects
J. Chem. Phys. 88 1461 - 1463 1988 T
 $H^+ + H_2(v=0) \rightarrow H + H_2^{+*}(v_f)$
infinite order sudden approx
 $2 \times 10^{-2} \text{ keV/amu}$
- 88T 5 Balkic, D.
Electron capture by fast protons from helium, nitrogen and oxygen : the corrected first Born approximation
Phys. Rev. A 37 55 - 67 1988 T
 $H^+ + B \rightarrow H + B^+(K^{-1})$ ($B = He, N, O$)
corrected first Born approximation
 $50 - 5 \times 10^4 \text{ keV/amu}$
K-electron capture
- 88T 6 Bhattacharyya, S. Rinn, K. Salzborn, E. Chatterjee, L.
High energy electron capture by fully stripped ions from He atoms - a QED approach
J. Phys. B 21 111 - 118 1988 T
 $Li^{3+} + He \rightarrow Li^{2+} + He^+$; $Li^{2+} + He^{2+} + e$
second-order S-matrix method
 $10^2 - 10^3 \text{ keV/amu}$
- 88T 7 Bianco, S.A. Piantetini, R.D.
Charge exchange between H^+ and $H(n=2)$ at low collision energies
J. Phys. B 21 L49 - 52 1988 T
 $H^+ + H(2s, 2p_{\sigma}, 2p_{\pi}) \rightarrow H(\text{total}, 2s, 2p_{\sigma}, 2p_{\pi,2})$
OEDM
 $0.06 - 2.25 \text{ keV/amu}$
dominant contribution from resonance reactions
- 88T 8 Boudjema, M. Benoit-Catin, P. Bordenave-Montesquieu, A. Glaizes, A.
State-selective one-electron capture by multiply charged ions, investigated with a modified multichannel Landau-Zener model
J. Phys. B 21 1603 - 1615 1988 T
 $Ar^{8+}(2p^6) + He, Ne, Ar, Xe \rightarrow Ar^{7+}(2p^6 n l; n=4-6)$; $Ar^{8+}(2p^6 3s^3 p) + D_2, He, Ar, Xe \rightarrow Ar^{8+}(2p^6 3s n l; n=4-6)$; $N^{8+}(1s 2s^3 S) + He \rightarrow N^{7+}(1s 2s 3l)$; $C^{6+}(1s 2s^3 S) + H_2 \rightarrow C^{5+}(1s 2s 3l)$
modified multichannel Landau-Zener model
 $2.5 \times 10^{-3} - 6.25 \text{ keV/amu}$
- 88T 9 Chatterjee, S.N. Prasad, S. Roy, B.N.
Proton and alpha particle impact transfer ionization cross sections for He and Li
J. Phys. B. 21 1209 - 1217 1988 T
 $H^+ + B \rightarrow H + B^+$; $He^{2+} + B \rightarrow He^+ + B^+$ ($B = He, Li$)
BEA
 $50 - 10^3 \text{ keV/amu}$ (H^+); $125 - 750 \text{ keV/amu}$ (He^{2+})
two successive collision-ionization in first and capture in second encounter
- 88T10 Deb, N.C.
Evaluation of $n l m \rightarrow n' l' m'$ capture amplitude in the target continuum distorted-wave theory
Phys. Rev. A 38 1202 - 1206 1988 T
CDW
- 88T11 Deco, G.R. Rivarola, R.D.
Electron capture in the target following $e^- e^-$ pair production in the simultaneous presence of the fields of the projectile and of the target
J. Phys. B 21 L299 - 302 1988 T
 $A^{Z+} + B^{Z'+} \rightarrow A^{Z'+} B^{3Z+} + e^+$
CDW
energy spectra of ejected e^+ at relativistic collision energies
- 88T12 Deco, G.R. Rivarola, R.D.
Electron capture in collisions between bare heavy ions at ultrarelativistic impact energies
J. Phys. B 21 1229 - 1235 1988 T
 $H^+ + H^+ U^{92+} \rightarrow H(1s) + H^+ U^{92+} + e^+$; $U^{92+} + U^{92+} \rightarrow U^{91+}(1s) + U^{92+} + e^+$
PWBA
distribution of emitted positrons at $\gamma_{\text{max}} = 10, 100$

- 88T13 Dewangan, D.P. Bransden, B.H.
The boundary-corrected second Born (B2B) approximation : proton-hydrogen electron capture
J. Phys. B 21 L353 - 357 1988 T
 $H^+ + H \rightarrow H + H^+$
B2B
125 keV/amu
angular distribution
- 88T14 Dunseath, K.M. Crothers, D.S.F. Ishihara, T.
The first-corrected Born and target continuum distorted theories of electron capture : a comparison of differential and total cross sections
J. Phys. B 21 L461 - 466 1988 T
 $H^+ + B \rightarrow H + B^+(K^{-1})$ ($B = N, O, Ar$)
200 - 6000 keV/amu (N,O) ; 6000 keV/amu (Ar)
angle-differential cross sections for Ar
- 88T15 Ermolaev, A.M.
Neutralization and detachment in collisions between protons and negative hydrogen ions in the proton energy range from 0.62 to 80.0 keV
J. Phys. B 21 81 - 101 1988 T
 $H^+ + H^- \rightarrow H(\text{total}, 1s, 2s, 2p, 3s, 3d, 4s, 4p, 4d) + H$
semi-classical impact parameter approx.
0.62 - 80 keV/amu
also direct ionization and capture into projectile continuum in $H^+ + H^- \rightarrow H^+ + H + e$
- 88T16 Forster, C. Shingal, R. Flower, D.R. Bransden, B.H. Dickinson, A.S.
Total and differential cross sections for charge transfer in $He^{2+} - He^+$ collisions : trajectory effects
J. Phys. B 21 3941 - 3948 1988 T
 $He^{2+} + He^+ \rightarrow He^+ + He^{2+}$
AO
0.21 - 2.5 keV/amu (c.m.)
theta = 0 - 13°
- 88T19 Fritsch, W.
Calculation of partial electron-transfer cross sections in 1 - 84 keV/amu $He^{2+} + H$ collisions
Phys. Rev. A 38 2664 - 2666 1988 T
 $He^{2+} + H \rightarrow He^+(nl) + H^+(n = 2, 3, 4, 5, 6)$
AO model
1 - 84 keV/amu
- 88T18 Fritsch, W. Lin, C.D.
Analysis of electron correlation in simultaneous electron transfer and excitation in atomic collision
Phys. Rev. Letters 61 690 - 693 1988 T
 $He^+ + H \rightarrow He^{2+}(2l, 2l') + H^+$
close-coupling AO method
20 - 150 keV/amu
transfer excitation impact parameter dependence
- 88T17 Fritsch, W. Lin, C.D.
Comment on atomic basis calculations for two electron system $Li^{2+} - H$
Phys. Letters A 127 425 - 426 1988 T
 $Li^{2+} + H \rightarrow Li^+ + H^+$
AO expansion method
1 - 40 keV/amu
total cross sections only
- 88T20 Gao, R.S. Johnson, L.K. Schafer, D.A. Newman, J.H. Smith, K.A. Stebbings, R.F.
Absolute differential cross sections for small-angle $He^+ - He$ elastic and charge transfer scattering at keV energies
Phys. Rev. A 38 2789 - 2793 1988 T
 $He^+ + He \rightarrow He^+ + He$; $He + He^+$
0.06 - 1.25 keV/amu
theta = 0.04 - 1°. Integrated cross sections given
- 88T21 Gargaud, M. McCarroll, R.
Charge transfer in low-energy $O^{2+} - H$ and $Si^{2+} - H$ collisions
J. Phys. B 21 513 - 520 1988 T
 $O^{2+} + H \rightarrow O^{3+}(3s, 3p, \text{total})$; $Si^{2+} + H \rightarrow Si^{3+}(3d, 4s, \text{total})$
molecular model with ETF
10⁻³ - 1 keV/amu
significant core effect in even total cross sections

- 88T22 Gargaud, M. McCarroll, R. Opradolce, L.
Charge transfer in low-energy Al^{3+} -H and Ti^{4+} -H collisions : effect of rotational coupling in three-state crossings
J. Phys. B 21 521 - 532 1988 T
 $Al^{3+} + H \rightarrow Al^{2+}(3s, 3p, 4s, 4p, \text{total})$; $Ti^{4+} + H \rightarrow Ti^{3+}(3s, 3p, 4s, 4p, \text{total})$
MO with translation factor
 0.8×10^{-3} - 1.1 keV/amu
- 88T23 Gauryacq, J.P. Wang, Y. Champion, R.L. Doverspike, L.D.
Electron detachment in low-energy H(D)-Na collisions
Phys. Rev. A 38 2284 - 2289 1988 T
 $H + Na \rightarrow H + Na^+$
effective range approx.
0.01 - 0.25 keV/amu
- 88T24 Graviele, M.S. Miraglia, J.E.
Electron capture in asymmetric collisions
Phys. Rev. A 38 5034 - 5037 1988 T
 $H^+ + B \rightarrow H + B^+(K^{-1})$ ($B = H, O, Ne, Ar$)
Impulse Approx.(IA), semigeneralized IA, eikonal IA, peaking IA, CDW, eikonal peaking IA
15 - 200(H); 150 - 4000(O); 200 - 5000(Ne); 1500 - 15000(Ar) keV/amu
- 88T25 Greenland, P.T. Harrison, M.F.A.
Excited impurity species and plasma transport
J. Phys. B 21 4035 - 4048 1988 T
 $A^{q+} + B^{r+}(n) \rightarrow A^{q-1+}(n') + B^{r+1+}$
classical-over barrier model
- 88T26 Grimbirt, D. Lassier-Gavers, B. Sidis, V.
Model potentials and related diabatic state for the $H^+ + O_2$ collisional system
Chem. Phys. 124 187 - 204 1988 T
 $H^+ + O_2$
effective model-potential approach
potential curves for $(HO_2)^+$ molecular system
- 88T27 Grozdanov, T.P. Krstic, P.S.
On a first order theory for charge exchange with Coulomb boundary conditions
Phys. Scripta 38 32 - 36 1988 T
 $H^+ + B^{(z-1)+} \rightarrow H + B^{z+}$ ($B = He, Li, Be, B, C$)
first order Coulomb Born approx.
 $(0.5-20) \times 25 \times Z^2$ keV/amu
analytical form for impact parameter dependence for K-K electron transfer
- 88T28 Hansen, J.P. Taubjerg, K.
Electron capture in highly charged ion collisions and a theoretical analysis of the energy-gain spectrum
J. Phys. B 21 2459 - 2471 1988 T
 $Ar^{6+} + D(1s) \rightarrow Ar^{5+}(4s, 4p, 4d, 4f, 5s, 5p, 5d, 5f, 5g) + D^+$
 $2\tilde{E}_{\infty}$ -state AO
0.1 keV/amu
- 88T30 Harel, C. Jouin, H.
Electron capture by slow multicharged ions : core effect on final l distribution
J. Phys. B 21 859 - 883 1988 T
 $C^{4+}, N^{3+}, O^{6+}, O^{8+}, Ne^{8+}, Ar^{8+} + H \rightarrow C^{3+}, N^{4+}, O^{7+}, O^{9+}, Ne^{7+}, Ar^{7+}(nl) + H^+$
MO expansion with OEDM
0.25 - 20 keV/amu
- 88T29 Harel, C. Salin, A.
Theory of low energy charge transfer by multiply charged ions.
Electronic and Atomic Collisions (631 - 642 1988 T
H.B.Gilbody, W.R.Newell, F.H.Read
 $A^{q+} + H \rightarrow A^{7+}(nl)$ ($A = O, Ne, Ar$) ; $N^{7+} + He \rightarrow N^{6+}(4l)$
OEPM
1 keV/amu
- 88T31 Ishihara, T. McGuire, J.H.
Second-order singularities in transfer ionization
Phys. Rev. A 38 3310 - 3318 1988 T
 $H^+ + He \rightarrow H + He^{2+} + e$
 5×10^3 - 5×10^4 keV/amu
Thomas peak in transfer ionization

- 88T32 Isler, R.C. Olson, R.E.
Contribution of excited hydrogen atoms to charge-exchange excitation of impurities in fusion plasmas
Phys. Rev. A 37 3399 - 3402 1988 T
 $C^{6+}, O^{8+} + H(n) \rightarrow C^{5+}(n'), O^{7+}(n') + H^+$ ($n = 2,3$; $n' = 4-30$)
classical-trajectory Monte Carlo method
13.3 - 40 keV/amu
effective emission cross sections also given
- 88T33 Janev, R.K. Krstic, P.S.
Dynamics of transfer-ionization processes in slow collisions of multi-charged ions with atoms
J. Phys. B 21 485 - 501 1988 T
General two electron transfer processes
- 88T34 Kimura, M.
Single- and double-electron capture in $He^{2+} + He$ collisions and single-electron capture in $He^{2+} + He^+$ collisions
J. Phys. B 21 L19 - 24 1988 T
 $He^{2+} + He \rightarrow He^+ + He^+(total)$; $He + He^{2+}$; $He^+ + He^+ \rightarrow He^{2+}$
travelling MO
- 88T35 Koike, F.
Continuous energy state model for charge transfer in collisions of fully stripped ions with hydrogen atoms
J. Phys. Soc. J apan 57 2344 - 2353 1988 T
 $O^{8+} + H \rightarrow O^{7+}(total)$; $Si^{14+} + H \rightarrow Si^{13+}(nl)$
continuous energy state model
1 - 10^3 keV/amu
- 88T36 Macek, J.
Perturbation approximation for scattering amplitudes in ion-atom collisions
Phys. Rev. A 37 1661 1988 T
general theory for perturbation expansion with Coulomb potential
- 88T37 Macek, J. Dong, X.Y.
Differential cross sections for electron capture: a comparison of three approximations
Phys. Rev. A 38 3327 - 3332 1988 T
 $H^+ + H(1s) \rightarrow H(1s) + H^+$
strong potential Born approx.; impulse approx.
 $5 \times 10^3, 10^4$ keV/amu
angular distribution of $H(1s)$, closed forms given
- 88T38 Maidagan, J.M.
First-order calculation in charge transfer at large scattering angles
J. Phys. B 21 1395 - 1401 1988 T
 $H^+ + Ne \rightarrow H + Ne^+$
750 keV/amu
scattering angle: 0 - 180 deg.
- 88T39 Martinez, A.E. Deco, G.R. Rivarola, R.D. Fainstein, P.D.
K-shell vacancy production in asymmetric collisions
Nucl. Instr. Meth. in Phys. Res. B 34 32 - 36 1988 T
 $A^Z + B \rightarrow A^{(Z-1)+} + B^+(K^{-1})$ ($A = H, He, Li$; $B = C, O, Ne$)
CDW-eikonal initial state approximation
500 - 5000 keV/amu
also ionization cross section given
- 88T40 Mathur, D.
A reaction window in double charge transfer mass spectroscopy
Int. J. Mass Spectro. Ion Proc. 83 203 - 208 1988 T
double electron transfer
Landau-Zener model
- 88T41 McGuire, J.H.
Electron capture at high velocities
Ind. J. Phys. 62B 261 - 277 1988 T
Strong potential Born approx.
- 88T42 McGuire, J.H. Deb, N.C. Aktas, Y. Sil, N.C.
Shake-over probability for electron capture
Phys. Rev. A 38 3333 - 3338 1988 T
first Born approx.
asymptotic energy region

- 88T43 McLaughlin, D.J. Hahn, Y.
K-shell resonant-transfer-excitation cross sections for S^{13+} and Ca^{17+}
Phys. Rev. A 37 3587 - 3589 1988 T
 $S^{13+} + He \rightarrow S^{12+}(K^{-1})$; $Ca^{17+} + He \rightarrow Ca^{16+}(K^{-1})$
Impulse approx.
 $1.56 \times 10^3 - 7.8 \times 10^3$ keV/amu(S); $3.5 \times 10^3 - 8 \times 10^3$ keV/amu(Ca)
dielectronic recombination cross section averaged over the momentum distribution
- 88T44 McLaughlin, D.J. Hahn, Y.
Cascade theory for double KX-ray emission in transfer and excitation collisions
Phys. Rev. A 38 531 - 534 1988 T
 $S^{13+} + H_2 \rightarrow S^{14+} \rightarrow S^{14+} + 2h\nu$
 $2.2 \times 10^3 - 5.9 \times 10^3$ keV/amu
K α -K α , K α -K β , K α -K γ coincidence
- 88T45 Miraglia, J.E. Gayet, R. Salin, A.
Radiative electron capture by ions channelled in crystals
Europhys. Letters 6 397 - 402 1988 T
 $O^{8+} + Ag \rightarrow O^{7+}(1s) + Ag^+(N^{-1}) + h\nu(REC)$
 2.2×10^3 keV/amu
REC comes mainly from N-shell electrons but not from valence electrons
- 88T46 Mizushima, M.
A note on the cross sections of the symmetric charge transfer between uranium ions
Japanese J. Appl. Phys. 27 449 - 451 1988 T
 $U^+ + U \rightarrow U + U^+$
time development operator formalism
 4×10^{-4} keV/amu
transfer of 6d, 7s electrons
- 88T47 Mo, O. Riera, A.
Excitation and charge exchange in $He^+ + Na$ collisions
J. Phys. B 21 119 - 124 1988 T
 $He^+ + Na \rightarrow He(\text{total})$
two-state MO with common translation factor
 $5 \times 10^{-2} - 10$ keV/amu
also $He^+ + Na(3s) \rightarrow He^+ + Na(3p)$ excitation cross sections
- 88T48 Moiseiwitsch, B.L.
Relativistic second-order OBK approximation for electron capture
J. Phys. B 21 603 - 610 1988 T
 $H^+ + H(1s) \rightarrow H(1s)$; $Ne^{10+} + B \rightarrow Ne^{9+}(1s) + B(K^{-1})$ (B = Al, Zn, Ag, Ta, U)
relativistic second-order OBK
 $10^5 - 5 \times 10^7$ keV/amu
- 88T49 Nikitin, E.E. Reznikov, A.I.
Theoretical total cross section and branching ratio for $Kr^{2+}(^2P_{3/2}, ^2P_{1/2})$ ions produced in low-energy charge exchange collisions of $Kr^{2+}(^1S_0)$ with $He(^1S_0)$
Chem. Phys. Letters 49 212 - 216 1988 T
 $Kr^{2+}(^1S_0) + He(^1S_0) \rightarrow Kr^{+}(^2P_{3/2}, ^2P_{1/2}) + He^{+}(^2S_{1/2})$
asymptotic approach
 $1 \times 10^{-6} - 2.4 \times 10^{-5}$ keV/amu
- 88T50 Opradotce, L. Benmeuraiten, L. McCarroll, R. Piancetini, R.D.
State-selective electron capture in slow $C^{3+} - H$ collisions
J. Phys. B 21 503 - 512 1988 T
 $C^{3+} + H \rightarrow C^{2+}(3s, 3p, \text{total})$
molecular model with ETF
 $0.125 - 5$ keV/amu
- 88T66 Ovchinnikov, S.Yu. Solovov, E.A.
Hidden crossings in ion-atom collisions.
Comm. At. Mol. Phys. 22 69 - 85 1988 T
review
- 88T51 Reinhold, C.O. Falcon, C.A.
Classical charge transfer and ionization cross sections for one- and three-dimensional collision processes
J. Phys. B 21 2473 - 2483 1988 T
 $A^{Z+} + H \rightarrow A^{(Z-1)+} + H^+$ (A = H, He, Li, C) : $H^+ + He^+ Li^{2+}(1s) \rightarrow H + He^{2+}, Li^{3+}$
classical trajectory Monte Carlo method
 $3 - 250$ keV/amu
total cross sections, ionization cross sections also given.

- 88T52 Roueff, E. Dalgarno, A.
Fine-structure excitation of O^{2+} by charge transfer of O^{3+} in H at low energies
Phys. Rev. A 38 93 - 97 1988 T
 $O^{3+}(^2P_{1/2,3/2}) + H \rightarrow O^{2+}$
multi-state MO expansion method.
 $1.9 \times 10^{-3} - 1.7 \times 10^{-1}$ keV/amu
also $O^{3+}(^4P_{3/2}) + H \rightarrow O^{3+}(^2P_{1/2}) + H$ cross sections given
- 88T56 Schultz, D.R. Olson, R.E.
Single-electron-removal processes in collisions of positrons and protons with helium at intermediate velocities
Phys. Rev. A 38 1866 - 1876 1988 T
 $H^+ + He \rightarrow H + He^+$
CTMC
1 - 500 keV/amu
angular distribution; ionization cross sections by H^+ and e^+
- 88T53 Shimamura, N.
Electron capture cross sections in $Be^{3+} + H$ collisions using the travelling-molecular-orbital method
J. Phys. B 21 2485 - 2496 1988 T
 $Be^{3+} + H(1s) \rightarrow Be^{2+}(2s, 2p, 3s, 3p) + H^+$
Travelling MO
0.39 - 6.25 keV/amu
- 88T54 Shingal, R.
Charge transfer, target excitation and ionization in $Li^+ + Li$ collisions
J. Phys. B 21 125 - 135 1988 T
 $Li^+ + Li(2s) \rightarrow Li(2s, 2p, 3s, 3p, 3d, total) + Li^+$
also $Li^+ + Li(2p, 3s, 3p, 3d, total)$ excitation cross sections and $Li^+ + Li^+ + e$ ionization cross sections
- 88T55 Shingal, R.
Charge transfer target excitation and ionization in $Be^{2+} + Li$ and $Li^+ + Be^+$ collisions
J. Phys. B 21 2065 - 2076 1988 T
 $Be^{2+} + Li(2s) \rightarrow Be^+(nl) + Li^+(nl=2s, 2p, 3s, 3p, 3d)$; $Li^+ + Be^+(2s) \rightarrow Li(nl) + Be^{2+}(nl=2s, 2p, 3s, 3p, 3d)$
multistate semi-classical impact parameter model.
1 - 90 keV/amu
also $Be^{2+} + Li(2s) \rightarrow Be^{2+} + Li(2p, 3s, 3p, 3d)$ and the alignment factor A_{20} ; $Be^{2+} + Li \rightarrow Be^{2+} + Li^+ + e$; $Li^+ + Be^+(2s) \rightarrow Li^+ + Be^+(nl)$ ($nl=2p, 3s, 3p, 3d$); $Li^+ +$
- 88T57 Sols, F. Flores, F.
Inelastic cross sections and charge state for B, C, N and O ions moving in metals
Phys. Rev. A 37 1469 - 1475 1988 T
 $A^{2+} + Al \rightarrow A^{(2,1)+}$; $A^{(2,1)+} + Al \rightarrow A^{2+}$ ($A = B, C, N, O$)
modified OBK
charge distributions calculated.
- 88T58 Tan, J. Lin, C.D.
Theoretical study of differential charge transfer cross sections for $Ne^{4+} + He$ collisions at low energies
Phys. Rev. A 37 1152 - 1160 1988 T
 $Ne^{4+}(2p^2 + p) + He(1s^2) \rightarrow Ne^{3+}(2p^2 3s^2 p, 4p) + He^+(1s)$
quantal two-channel calculation.
0.01 - 0.025 keV/amu
angular distributions
- 88T59 Terao, M. Harel, C. Salin, A. Allan, P.J.
Theoretical study of single-electron capture in $He^{2+} - H$ collision
Z. Phys. D 7 319 - 332 1988 T
 $He^{2+} + H^+ \rightarrow He^+(n=4,5) + H(1s)$
OEDM model with ETF
 $5 \times 10^{-4} - 2.25$ keV/amu
- 88T60 Toshima, N. Eichler, J.
Coupled-channels treatment of excitation and charge transfer in $U^{92+} + U^{91+}$ collisions at 1 and 0.5 GeV/u
Phys. Rev. Letters 60 573 - 576 1988 T
 $U^{92+} + U^{91+} \rightarrow U^{91+}(nl) + U^{92+}$
fully-relativistic, two-center, coupled channel calculation
 $5 \times 10^3 - 10^6$ keV/amu
excitation cross sections
- 88T61 Toshima, N. Eichler, J.
Coupled-channel theory of excitation and charge transfer in relativistic-atomic collisions
Phys. Rev. A 38 2305 - 2316 1988 T
 $U^{92+} + U^{91+}(1s; 2s) \rightarrow U^{91+}(1s; 2l; 3l)$; $Xe^{54+} + Ag, Au \rightarrow Xe^{53+}(1s; 2l; 3l)$
fully-relativistic, two-center, coupled channel theory
U (5×10^5 keV/amu; 8.2×10^6 ; 1.97×10^5 keV/amu)(Xe)

- 88T62 Valance, A. Maddarsi, M.El. Pradel, P.
Quantal calculation of differential cross sections for $H(1s)$ elastic scattering and H^+ ion formation from interactions of $H(1s)$ with caesium
J. Phys. B 21 995 - 1006 1988 T
 $H(1s) + Cs(6s) \rightarrow H^+ + Cs$; $H(1s) + Cs$
two-state curve-crossing model
- 88T63 Watanabe, T. Hino, K.
Photon emission processes induced by ion-atom collisions
Ind. J. Phys. 62B 278 - 295 1988 T
radiative electron capture
- 88T64 Winter, T.G.
Triple-center treatment of electron transfer and ionization in $He^{2+} - H$ and $p - He^+$ collisions
Phys. Rev. A 37 4656 - 4670 1988 T
 $He^{2+} + H(1s) \rightarrow He^+(total, 2s, 2p, 2p_1) : H^+ + He^+ \rightarrow H(1s, total) + He^{2+}$
triple center coupled state approach
1.6 - 40 keV/amu
also ionization cross sections
- 88T65 Winter, T.G.
Triple-center determination of differential cross sections for electron transfer and elastic scattering in $He^{2+} - H$ collisions
Phys. Rev. A 38 1612 - 1615 1988 T
 $He^{2+} + H \rightarrow He^+ + H^+$
Triple-center MO model
4 - 30 keV/amu
angular differential cross section for electron transfer. also elastic scattering cross sections given.

- 89E 1 Andersson, L.R. Pedersen, J.O.P. Barany, A. Bangsgaard, J.P. Hvelplund, P. Angular scattering effects in energy-gain spectra of A^{6+} ($A = \text{Ne, Ar, Kr, Xe}$): one-electron capture from He.
J. Phys. B 22 1603 - 1621 1989 E
 $A^{6+} + \text{He} \rightarrow A^{5+}$ ($A = \text{Ne, Ar, Kr, Xe}$)
energy-gain spectroscopy
 $1.5 \times 10^{-3} - 1 \times 10^{-1}$ keV/amu
 $\text{Ar}^{6+} + \text{He} \rightarrow \text{Ar}^{5+}(4p, 4s, 3d)$: T: semi-classical multi-state collision model
- 89E 2 Ashburn, J.R. Cline, R.A. Stone, C.D. van der Burgt, P.J. Westveld, W.B. Risley, J.S.
Experimental determination of the $\text{H}(n=3)$ density matrix for 80 keV H^+ on He.
Phys. Rev. A 40 4885 - 4901 1989 E
 $\text{H}^+ + \text{He} \rightarrow \text{H}(n=3) + \text{He}^+$
photon-polarization technique
80 keV
- 89E 4 Aumayr, F. Schweinzer, J. Winter, H.
State-selective electron capture in He^{2+} -Li collisions studied jointly by photon and translational energy spectroscopy.
J. Phys. B 22 1027 - 1034 1989 E
 $\text{He}^{2+} + \text{Li} \rightarrow \text{He}^+(n=2,3,4,5)$
photon spectroscopy + translational energy spectroscopy/coincidence
 $0.7 - 14$ keV/amu
 $n=3$ dominant at low energies; emission cross section for He^+ 468.6 nm line.
- 89E 3 Aumayr, F. Winter, H.
Experimental investigations on electron capture in the presence of metastable ion beam fractions.
Phys. Scripta T 28 96 - 100 1989 E
translational energy spectroscopy
a review on techniques for determining metastable beam fractions
- 89E 5 Bangsgaard, J.P. Hvelplund, P. Pederson, J.O.P. Andersson, L.R. Barany, A.
Energy-gain spectroscopy studies of $\text{O}^+(q=2-5)$ collisions with He atoms.
Phys. Scripta T 28 91 - 95 1989 E
 $\text{O}^+(q=2,3,4,5) + \text{He} \rightarrow \text{O}^{(q-1)+}(\text{nl})$
translational energy spectroscopy
 $1.5 \times 10^{-2} - 0.1$ keV/amu
- 89E 6 Ben-Itzhak, I. Mann, A. Meron, M. Rosner, B.
Single- and double-electron capture probabilities in close sub-MeV collisions of He^{2+} on Ar and N_2 .
Phys. Rev. A 40 2928 - 2934 1989 E
 $\text{He}^{2+} + \text{B} \rightarrow \text{He}^{2+}, \text{He}^+, \text{He}^0$ ($\text{B} = \text{Ar, N}_2$)
scattering technique
 $10^2 - 2.5 \times 10^3$ keV/amu
scattered angles at $0.7^\circ, 1^\circ$; T: Bohr-Lindhard model
- 89E 7 Bernstein, E.M. Clark, M.W. Tanis, J.A. Woodland, W.T. Barkner, K.H. Schlachter, A.S. Stearns, J.W. DuBois, R.D. Graham, W.G. Muller, D.W. Stockli, M.P.
Test of predicted $\Delta n \geq 1$ L-shell dielectronic recombination cross sections.
Phys. Rev. A 40 4085 - 4088 1989 E
 $\text{Nb}^{4+}(q=28-32) + \text{H}_2, \text{He} \rightarrow \text{Nb}^{(q-1)+} + \text{hv}$
X-ray-projectile coincidence
 $3.7 - 4.0 \times 10^3$ keV/amu
RTE
- 89E 8 Bliman, S. Suraud, M.G. Hitz, D. Rubensson, J.E. Nordgren, J. Cornille, M. Indelicato, P. Knystautas, E.J.
Spectroscopic study of doubly excited Na-like argon ions.
J. Phys. B 22 3647 - 3655 1989 E
 $\text{Ar}^{8+}(2p^2 3s) \ ^3P_{0,2} + \text{H}_1 \rightarrow \text{Ar}^{7+}(2p^2 3l \text{nl}')$
photon spectroscopy
2 keV/amu
- 89E 9 Boduch, P. Charpentier, M. Hennecart, D. Husson, X. Kucal, H. Lecler, D. Lesteven-Vaisse, I.
Photon emission spectroscopy of single and double electron capture in Ar^{2+} -He or H_2 collisions.
J. Phys. B 22 L 377 - 380 1989 E
 $\text{Ar}^{2+} + \text{B} \rightarrow \text{Ar}^{1+}, \text{Ar}^{0+}$ ($\text{B} = \text{H}_2, \text{He}$)
photon spectroscopy
3.75 keV/amu
no cross sections given; strong $\Delta n=0$ transitions ($n=5$ for single electron capture; $3\text{dnl}-3\text{dnl}'$ ($n=4,5$) for double electron capture)

- 89E10 Boman, S.A. Bernstein, E.M. Tanis, J.A.
Single-electron capture and loss cross sections versus target Z for 1 MeV/u oxygen ions incident on gases.
Phys. Rev. A 39 4423 - 4427 1989 E
 O^{8+} ($q = 5 - 8$) + B $\rightarrow O^{(q+1)+}; O^{(q-1)+}$ (B = D₂, He, Ne, Ar, Kr)
growth method
10³ keV/amu
- 89E11 Bouchama, T. Druetta, M. Martin, S.
Electron capture into excited states of low energy Kr⁴⁺ ($q = 8 - 7$) ions.
J. Phys. B 22 71 - 89 1989 E
Kr⁸⁺ + He, H₂ $\rightarrow$ Kr⁷⁺(4sml), Kr⁶⁺
photon (VUV) spectroscopy
emission cross sections for various transitions in Kr⁸⁺, Kr⁷⁺ impact.
- 89E12 Boudjema, M. Moretto-Capelle, P. Bondonave-Montesquieu, A. Benoit-Cattin, P. Gleizes, A. Bachaus, H. Galan, P. Martin, F. Riera, A. Yanez, M.
Double electron capture in collisions of the helium-like ions N⁵⁺, O⁶⁺ and Ne⁶⁺ with helium atoms.
J. Phys. B 22 L 121 - 127 1989 E
 $\Lambda^{2,2+}(1s^2) + He \rightarrow \Lambda^{2,4+}(1s^2 3131^1) + He^{2+}$ (A = N, O, Ne)
Electron spectroscopy
5 keV/amu
cross sections for (3131¹) capture
- 89E13 Brower, M.C. Pipkin, F.M.
Measurement of cross sections for electron capture into n=3 states of hydrogen.
Phys. Rev. A 39 3323 - 3335 1989 E
 $H^+ + He \rightarrow H(3L, M_L; 4, L) + He^+$
micro-wave resonance, optical method
30 - 80 keV/amu
observed Balmer-alpha line
- 89E14 Cederquist, H. Andersson, H. Astner, G. Hvelplund, P. Pedersen, J.O.P.
Evidence for radiative stabilization of two-electron transfer process in slow Xe⁶⁺-Xe (15 $\leq$ q $\leq$ 35) collisions.
Phys. Rev. Letters 62 1465 - 1468 1989 E
 $Xe^{6+} + Xe \rightarrow Xe^{(q+2)+} + Xe^{2+}$ ($q = 15 - 35$)
translational energy spectroscopy
3.1x10⁻² q keV/amu
radiative stabilization for high q ions
- 89E15 Cederquist, H. Liljeby, L. Biedermann, C. Levin, J.C. O. C.S. Rothard, H. Groeneveld, K.O. Vane, C.R. Sellin, I.A.
State-selected angular distributions of single-electron capture in very slow Ar⁴⁺-Ar collisions.
Phys. Rev. A 39 4308 - 4311 1989 E
 $Ar^{4+} + Ar \rightarrow Ar^{3+}(4p)$
translational energy-spectroscopy
8x10⁻⁴ - 5x10⁻³ keV/amu
no 4s capture
- 89E16 Church, D.A. Holzschelter, H.M.
Charge transfer from molecular hydrogen to stored O²⁺ and O³⁺ ions.
Phys. Rev. A 40 54 - 58 1989 E
 $O^{3+}, O^{2+} (^3P, ^1D) + H_2 \rightarrow O^{2+}, O^+ + H_2^+$
ion trapping technique/attenuation
8x10⁻³ keV/amu (O²⁺) ; 1.3x10⁻⁴ keV/amu (O³⁺)
rate coefficients
- 89E17 Cornat, A. Chen, S.H. Urbain, X. Antoine, Ph. Lorent, V. Brouillard, F.
Measurement of the angular distribution of the metastable hydrogen atoms formed in the transfer process $H^+ + Cs \rightarrow II(2s) + Cs^+$ in the energy range 200 - 3000 eV.
J. Phys. B 22 L647 - 650 1989 E
 $H^+ + Cs \rightarrow H(2s) + Cs^+$
0.2 - 2 keV/amu
angular distribution proportional to E⁻¹.
- 89E18 Dillingham, T.R. Doughty, B.M. Hall, J.M. Tipping, T.N. Sanders, J.M. Shinpaugh, J.L.
Single electron capture by 0.5 - 1.5 MeV/amu F³⁺ and F⁸⁺ on hydro carbon gases.
Nucl. Instr. Meth. in Phys. 40/41 40 - 43 1989 E
Res. B
 $F^{3+} + B \rightarrow F^{2+}; F^{8+} + B \rightarrow F^{7+}$ (B = CH₄, C₂H₄, C₂H₆, C₃H₆, C₃H₈, H₂)
growth method
5x10² - 1.5x10³ keV/amu
cross sections for carbon atoms deduced from those for hydrocarbons.

- 89E18 DuBois, R.D. Kover, A.
Single and double ionization of helium by hydrogen-atom impact.
Phys. Rev. A 40 3605 - 3612 1989 E
 $H + He \rightarrow H^+ + He^+; H^+ + He^{2+} + e$
projectile-recoil coincidence
25 - 300 keV/amu
also direct ionization and electron loss cross sections given over 25 - 1000 keV/amu
- 89E19 Fukuroda, A. Kobayashi, N. Kaneko, Y.
One-electron capture processes in $Ne^{2+} - H_2$ collisions.
J. Phys. B 22 3457 - 3469 1989 E
 $Ne^{2+}(^1S) + H_2 \rightarrow Ne^+(^2S) + H_2^+(X^2\Sigma, v)$
translational energy spectroscopy
0.025 - 0.1 keV/amu
relative cross sections
- 89E20 Fukuroda, A. Kobayashi, N. Kaneko, Y.
High-resolution study of one-electron capture processes in $Kr^{2+}(^1D) - Ne$ collisions.
J. Phys. B 22 3471 - 3481 1989 E
 $Kr^{2+}(^1D) + Ne \rightarrow Kr^+(^2P_{1/2,3/2}) + Ne^+(^2P^+)$
translational energy spectroscopy
 $5 \times 10^{-3} - 2.4 \times 10^{-2}$ keV/amu
relative cross sections
- 89E21 Gilbody, H.B.
Total cross sections for charge exchange and ionization in collisions of Cr^+ and Cr^+ ions with H, H_2 and He .
Phys. Scripta T 28 49 - 57 1989 E
review
- 89E22 Hamdan, M. Brenton, A.G.
Translational energy spectroscopy of $^{29}N_2^{2+}$; one-electron capture in collision with He and Ne atoms.
J. Phys. B 22 L 9 - 13 1989 E
 $^{29}N_2^{2+} + He(Ne) \rightarrow N_2^+ + He^+(Ne^+)$
translational energy spectroscopy
0.2 keV/amu
various channels observed; no cross sections given
- 89E23 Hamdan, M. Brenton, A.G.
High-resolution translational energy spectroscopy of CO^{2+} .
J. Phys. B 22 L 45 - 50 1989 E
 $CO^{2+} + Ne \rightarrow CO^+$
translational energy spectroscopy
0.2 keV/amu
double ionization energy = 41.76 ± 0.1 eV; various excited states observed; no cross sections
- 89E25 Havener, C.C. Huq, M.S. Krause, H.F. Schulz, P.A. Phanef, R.A.
Merged-beams measurements of electron capture cross sections for $O^{3+} + H$ at electron-volt energies.
Phys. Rev. A 39 1725 - 1740 1989 E
 $O^{3+} + H \rightarrow O^{4+} + H^+$
merged-beams technique
 $9 \times 10^{-4} - 8 \times 10^{-1}$ keV/amu
- 89E26 Hird, B. Orakzai, M.W. Rahman, F.
Electron loss and transfer for 20 - 110 keV iodine-rare gas collisions.
Phys. Rev. A 39 5010 - 5013 1989 E
 $I + B \rightarrow I^+; I^+ (B = He, Ne, Ar, Kr, Xe)$
growth method
0.15 - 0.86 keV/amu
- 89E27 Hoekstra, R. Ciric, D. de Heer, F.J. Morgenstern, R.
State-selective electron capture in collisions of C^{6+} and O^{8+} on atomic and molecular hydrogen studied by photon emission spectroscopy.
Phys. Scripta T 28 81 - 90 1989 E
 $C^{6+}, O^{8+} + H, H_2 \rightarrow C^{5+}, O^{7+}$
photon spectroscopy
1 - 9 keV/amu
emission cross sections

- 89E28 Hoekstra, R. Schlatmann, A.R. de Heer, F.J. Morgenstern, R.
Electron capture into $\text{He}^+(2p)$ in low energy collisions of He^{2+} with atomic and molecular hydrogen.
J. Phys. B 22 L 603 - 607 1989 E
 $\text{He}^{2+} + \text{H}_2 \rightarrow \text{He}^+(2p)$
photon spectroscopy
0.3 - 1.75 keV/amu
- 89E29 Houver, J.C. Doweik, D. Pommier, J. Richter, C.
Collisions spectroscopy with aligned and oriented atoms II. charge exchange in $\text{He}^+ - \text{Na}(3p)$ collisions.
J. Phys. B 22 L 585 - 589 1989 E
 $\text{He}^+ + \text{Na}(3s, 3p) \rightarrow \text{He}(n) + \text{Na}^+$
TOF method
0.125 - 0.75 keV/amu
 $n=2$ dominant at low energies : $n=3$ at high energies
- 89E30 Huq, M.S. Havener, C.C. Phaneuf, R.A.
Low energy electron capture by N^{3+} , N^{4+} and N^{5+} from hydrogen atoms using merged beams.
Phys. Rev. A 40 1811 - 1816 1989 E
 $\text{N}^{q+}(q = 3, 4, 5) + \text{H} \rightarrow \text{N}^{(q-1)+} + \text{H}^+$
merged-beam technique
 $1 \times 10^{-3} - 1.4$ keV/amu
- 89E31 Hutton, R. Prior, M.H. Chantrenne, S. Chen, M.H. Schneider, D.
Double and single electron capture in slow collisions of Ar^{q+} ions with He atoms.
Phys. Rev. A 39 4902 - 4905 1989 E
 $\text{Ar}^{q+} + \text{He} \rightarrow \text{Ar}^{7+}$; $\text{Ar}^{q+} + \text{He} \rightarrow \text{Ar}^{7+}$
zero-degree electron spectroscopy
2 keV/amu
- 89E32 Itoh, Y.
One-electron capture and deexcitation processes in $\text{Ar}^{11+} - \text{He}$ collisions at 10 eV.
J. Phys. Soc. Japan 58 1871 - 1874 1989 E
 $\text{Ar}^{2+}(^3P; ^1D) + \text{He} \rightarrow \text{Ar}^+(^3P) + \text{He}^+(^2S)$
translational energy spectroscopy
 2.5×10^{-4} keV/amu
angle = 0 - 3 deg.
- 89E33 Johnson, L.K. Gao, R.S. Dixon, R.G. Smith, K.A. Lane, N.F. Stebbings, R.F. Kimura, M.
Absolute differential cross sections for small angle $\text{H}^+ - \text{He}$ direct and charge transfer scattering at keV energies.
Phys. Rev. A 40 3026 - 3631 1989 E
 $\text{H}^+ + \text{He} \rightarrow \text{H}(0.02 - 1 \text{ deg.})$
position-sensitive detection
5 keV/amu
angular distribution (0.02 - 1 deg.). also direct scattering $\text{H}^+ + \text{He} \rightarrow \text{H}^+ + \text{He}$;
T : MO close-coupling calculation
- 89E34 Johnson, L.K. Gao, R.S. Hakes, C.L. Smith, K.A. Stebbings, R.F.
Direct and charge transfer scattering of KeV energy H^+ and He^+ projectiles from rare gas atoms to obtain small-angle absolute cross sections.
Phys. Rev. A 40 4920 - 4925 1989 E
 $\text{A}^+ + \text{B} \rightarrow \text{A}$ (A = H, He ; B = Ne, Ar, Kr, Xe)
0.5 - 5.0 keV/amu
diff. cross sections for scattering angle = 0.03 - 1.0 deg.
- 89E35 Koslowski, H.R. Huber, B.A.
Double-electron capture in low-energy collisions of Ar^{4+} with Ar and Kr.
J. Phys. B 22 2255 - 2264 1989 E
 $\text{Ar}^{4+} + \text{B} \rightarrow \text{Ar}^{2+}$
translational energy spectroscopy
 2×10^{-2} keV/amu
angular distributions ; no cross section given.
- 89E36 Lavollee, M. Henri, G.
State-selected atomic ion reactions ; a new experimental method. first results on the $\text{O}^+(^4S, ^3D, ^3P) + \text{N}_2$ system.
J. Phys. B 22 2019 - 2025 1989 E
 $\text{O}^+(^3P) + \text{N}_2 \rightarrow \text{O}(^3P) + \text{N}_2^+(v=1)$; $\text{O}^+(^3D) + \text{N}_2 \rightarrow \text{O}(^1D) + \text{N}_2^+(v=0)$
modified TPEPICO
 $5 \times 10^{-4} - 1.25 \times 10^{-3}$ keV/amu
ratios for $^3P/^3D(<1)$; no absolute cross sections
- 89E37 Lebius, H. Koslowski, H.R. Huber, B.A.
State-selective single electron capture by multiply charged ions-reaction window and multichannel Landau-Zener calculations.
Z. Phys. D 11 53 - 61 1989 E
 $\text{Ar}^{3+} + \text{Ar} \rightarrow \text{Ar}^{2+}$; $\text{Ne}^{3+} + \text{He} \rightarrow \text{Ne}^{2+}$; $\text{Ne}^{3+} + \text{Ne} \rightarrow \text{Ne}^{2+}$; $\text{Ar}^{3+} + \text{Ne} \rightarrow \text{Ar}^{2+}$
translational energy spectroscopy
 1.5×10^{-2} keV/amu
cross sections for different (nl) states ; T : Landau-Zener calculation

- 89E38 Lei, Z.M. Yang, F. Liu, J.R. Pan, G.Y. Yu, D.H. Sun, S. He²⁺ collisions with Ne and Ar atoms into excited states. Nucl. Instr. Meth. in Phys. 42 38 - 40 1989 E Res. B
- He²⁺ + B → He⁺(6g ²G_{7/2} → 4f ²F_{5/2}) ; He(3¹S → 2¹P ; 2³S) (B = Ne, Ar) photon spectroscopy
35 - 85 keV/amu
emission cross sections ; Ar⁺Ne⁺ emission cross sections in He⁺He²⁺ collisions
- 89E39 Linsay, B.G. Irvine, A.D. Latimer, C.J. Charge exchange of O₂⁺ ions with O₂ and CH₄ : the effect of internal energy studied using a new fixed wave-length PIPECO technique Int. J. Mass Spectro. Ion 91 113 - 122 1989 E Proc.
- O₂⁺O₂⁺ + O₂, CH₄ → O₂
PIPECO
1.5x10⁻² - 2.3x10⁻² eV/amu
- 89E40 Liu, C.J. Dunford, R.W. Berry, H.G. Parao, R.C. Groeneveld, K.O. Haas, M. Raphaelian, M.L.A. Subshell selective electron capture (2 - 105 keV/amu) studied by VUV spectroscopy in O⁶⁺ + He collisions. J. Phys. B 22 1217 - 1224 1989 E
- O⁶⁺ + He → O⁵⁺ + He⁺
photon spectroscopy
2 - 105 keV/amu
emission cross sections for 3p→2s ; 3s→2p ; 3d→2p ; 4f→3d ; 4d→3p
- 89E41 Loyd, D.H. Dawson, H.R. Balmer-alpha emission from H⁺ impact on Kr and Xe atoms. Nucl. Instr. Meth. in Phys. 40/41 219 - 220 1989 E Res. B
- H⁺ + Kr, Xe → H(3l)
photon-spectroscopy
4 - 20 keV/amu
- 89E42 Martin, S. Salmoun, A. Ouedane, Y. Druetta, M. Desesquelles, J. Denis, A. Double Rydberg of high angular momentum (l = 6 - 8) produced in Ar VIII by Ar²⁺ + Cs collisions. Phys. Rev. Letters 62 2112 - 2115 1989 E
- Ar²⁺ + Cs → Ar²⁺(1s²s²p⁵gnl ; n = 7 - 9) photon spectroscopy
2.25 keV/amu
transition energies ; no cross sections given
- 89E43 Martinez, H. Morales, A. de Urquijo, J. Alvarez, I. Cisneros, C. Absolute differential cross sections for single-electron capture of H⁰ in Ar at keV energies. Nucl. Instr. Meth. in Phys. 40/41 44 - 46 1989 E Rev. B
- H + Ar → H⁺
angular distribution
1 - 4 keV/amu
differential cross sections also given
- 89E44 Melchert, F. Debus, W. Liehr, M. Olson, R.E. Salzbom, E. Single- and double-electron removal from H in energetic collisions with multiply-charged argon ions. Europhys. Letters 9 433 - 439 1989 E
- H⁺ + Ar^{q+}(q = 1 - 8) → H, H⁺
crossed beam technique
3 - 100 keV/amu
scaled as q^{1.3}
- 89E45 Moretto-Capelle, P. Oza, D.H. Benoit-Cattin, P. Bordenave-Montesquieu, A. Boudjema, M. Gleizes, A. Dousson, S. Hiltz, D. Double capture in the O⁶⁺ + He collision investigated by electron spectroscopy (80 keV, 10 deg.). J. Phys. B 22 271 - 286 1989 E
- O⁶⁺ + He → O⁶⁺(3,n ; n = 3,4,5) + He²⁺
electron spectroscopy
5 keV/amu
identification of various channels : their energies and lifetimes.
- 89E46 Nakai, Y. Shirai, T. Tabata, T. Ito, R. A semiempirical formula for single-electron capture cross sections of multiply charged ions colliding with H, H₂ and He. Phys. Scripta T 28 77 - 80 1989 E
- analytical fitting

- 89E47 Okuno, K. Fukuroda, A. Kobayashi, N. Kaneko, Y.
High resolution translational energy spectroscopy of one-electron capture in Ne^{2+} - N_2 collisions.
J. Phys. Soc. Japan 58 1590 - 1594 1989 E
 $\text{Ne}^{2+} (^1\text{S}_0) + \text{N}_2 \rightarrow \text{Ne}^+ (^2\text{S}_{1/2}) + \text{N}_2^+ (\Sigma^+; v=0, 1; A^2 \Pi_u; v=0-4)$
translational energy spectroscopy
 $2 \times 10^{-2} - 8 \times 10^{-2}$ keV/amu
- 89E48 Peart, B. Foster, S.J. Dolder, K.
Measurement of the mutual neutralization of N^+/O^- and O^+/O^- .
J. Phys. B 22 1035 - 1042 1989 E
 $\text{N}^+ + \text{O}^- \rightarrow \text{N} + \text{O}; \text{O}^+ + \text{O}^- \rightarrow \text{O} + \text{O}$
inclined-beam technique
 $3.3 \times 10^{-2} - 2$ keV/amu
- 89E49 Rebrion, C. Rowe, B.R. Marquette, J.B.
Reactions of Ar^+ with H_2 , N_2 , O_2 and CO at 20, 30 and 70 K.
J. Chem. Phys. 91 6142 - 6147 1989 E
 $\text{Ar}^+ (\text{P}_{3/2}) + \text{B} \rightarrow \text{Ar} (\text{B} = \text{H}_2, \text{N}_2, \text{O}_2, \text{CO})$
cold nozzle technique
20, 30, 70 K
rate coefficients
- 89E50 Roncin, P. Barat, M. Gaboriaud, M.N. Guillemot, L. Laureut, H.
Collision spectroscopy of O^{6+} and N^{6+} colliding on a He target.
J. Phys. B 22 509 - 524 1989 E
 $\text{A}^{6+} + \text{He} \rightarrow \text{A}^{3+} (n=2,3,4), \text{A}^{4+} (2\text{ln}^1) (\text{A} = \text{N}, \text{O})$
energy-gain spectroscopy
0.6 keV/amu
angular distributions (0 - 0.15 deg.)
- 89E51 Salzborn, E.
Electron capture and ionization in ion-ion collisions.
J. de Phys. 50 C1/207 - 228 1989 E
a review
- 89E66 Sarkadi, L. Polinkas, J. Kover, A. Berenyi, D. Vajnai, T.
Observation of electron capture into continuum states of neutral atoms.
Phys. Rev. Letters 62 527 - 530 1989 E
 $\text{He} + \text{B}, \text{Ar} \rightarrow \text{He} + e + \text{B}^+ (\text{B} = \text{He}, \text{Ar})$
projectile-cusp electron coincidence
75 keV/amu
- 89E52 Saunders, W.A.
Charge exchange and metastability of small multiply charged gold clusters.
Phys. Rev. Letters 62 1037 - 1040 1989 E
 $(\text{Au})_n^{2+} + \text{B} \rightarrow (\text{Au})_n^{+}; (\text{Au})_n^{3+} + \text{B} \rightarrow (\text{Au})_n^{2+} (n=2-4; \text{B} = \text{Ar}, \text{N}_2, \text{Kr}, \text{CO}, \text{Xe}, \text{O}_2)$
 3×10^{-3} keV/amu
fragmentation cross sections are comparable to charge exchange cross sections.
- 89E54 Schauer, M.M. Jefferts, S.R. Barlow, S.E. Dunn, G.H.
Reactions of H_2 with He^+ at temperatures below 40K.
J. Chem. Phys. 91 4593 - 4596 1989 E
 $\text{He}^+ + \text{H}_2 \rightarrow \text{He} + \text{H} + \text{H}^+, \text{He} + \text{H}^+ \text{I}_2$
trapped ion technique
1.5 - 40 K
dissociative capture is dominant; rate coefficients
- 89E55 Schluz, M. Giese, J.P. Swenson, J.K. Datz, S. Dittner, P.F. Krause, H.F. Schöne, H. Vane, C.R. Benhenni, M. Shafroth, S.M.
Electron-electron interactions in transfer and excitation in $\text{F}^{8+} \rightarrow \text{H}_2$ collisions.
Phys. Rev. Letters 62 1738 - 1741 1989 E
 $\text{F}^{8+} + \text{H}_2 \rightarrow \text{F}^{7+*} + \text{H}_2^+$
zero-degree electron spectroscopy
 $9 \times 10^2 - 1.7 \times 10^3$ keV/amu
electron-electron interaction in ion-atom collisions.
- 89E56 Schweinzer, J. Winter, H.
State-selective preparation of long-lived highly excited ions by means of single electron capture.
J. Phys. B 22 893 - 905 1989 E
 $\text{Ar}^{2+} + \text{B} \rightarrow \text{Ar}^{*+} (\text{B} = \text{Mg}, \text{Li}, \text{Na}, \text{K})$
translational energy spectroscopy
 $7.5 \times 10^{-3} - 2.5 \times 10^{-1}$ keV/amu
fractions of metastable ions (2 - 5 %)
- 89E57 Shah, M.B. McCallion, P. Gilbody, H.B.
Ionization and electron capture in collisions of slow H^+ and He^{2+} ions with hydrogens.
J. Phys. B 22 3938 - 3988 1989 E
 $\text{A}^{2+} + \text{H}_2 \rightarrow \text{A}^{2+} + \text{H}_2^+; \text{A}^{2+} + \text{H} + \text{H}^+; \text{A}^{2+} + \text{H}^+ + \text{H}^+; \text{A}^{2+} + \text{H}^+ + \text{H}^+; \text{A}^{2+} + \text{H}_2^+$
 $; \text{A}^{2+} + \text{H}^+ + \text{H} (A = \text{H}, \text{He}^{2+})$
TOF
38 - 1500 keV/amu (H) : 31 - 550 keV/amu (He)

- 89E53 Shah, M.B. McCallion, P. Gilbody, H.B.
Electron capture and ionization in collisions of slow H^+ and He^{2+} ions with helium.
J. Phys. B 22 3037 - 3045 1989 E
 $H^+ + He \rightarrow H + He^+ ; H + He^+ + e ; He^{2+} + He \rightarrow He^+ + He^+ ; He^+ + He^{2+} + e$
coincidence technique
9 - 100 keV/amu (H) ; 6 - 67 keV/amu (He)
also $H^+ + He \rightarrow H^+ + He^+ + e ; H^+ + He^{2+} + 2e ; He^{2+} + He \rightarrow He^+ + He^+ + e$
- 89E58 Sofield, C.J., Bridwell, L.B. Moak, C.D. Miller, P.D. Gregory, D.C. Jones, C.M. Alton, G.D. Pepriller, P.L. Hall, J.M.
Charge exchange cross sections for 445 MeV Cl ions in solid C targets.
Phys. Rev. A 40 59 - 68 1989 E
 $Cl^{16+} + C \rightarrow Cl^{17+} ; Cl^{15+} + C \rightarrow Cl^{16+}, Cl^{17+} ; Cl^{17+} + C \rightarrow Cl^{16+} \text{ (total; } 2p; 3p) ; Cl^{16+} + C \rightarrow Cl^{15+}(5n)$
growth + fitting
 1.27×10^4 keV/amu
also excitation $Cl^{16+} + C \rightarrow Cl^{16+}(2p, 3p) ; Cl^{15+} + C \rightarrow Cl^{15+}(2 p)$
- 89E59 Sonnenfroh, D.M. Leone, S.R.
A laser-induced fluorescence study of product rotational state distributions in the charge transfer reaction: $Ar^+(^2P_{3/2}) + N_2 \rightarrow Ar + N_2^+(X)$ at 0.28 and 0.40 eV.
J. Chem. Phys. 90 1077 - 1085 1989 E
 $Ar^+(^2P_{3/2}) + N_2 \rightarrow Ar + N_2^+(X)$
ion-molecule crossed beam technique
(7 - 10) $\times 10^{-6}$ keV/amu
X-distribution
- 89E68 Swenson, J.K. Haverø, C.C. Stollerfoht, N. Sommer, K. Meyer, F.W.
Observation of Coulomb focusing of autoionization electrons produced in low-energy $He^+ + He$ collisions
Phys. Rev. Letters 63 35 - 38 1989 E
 $He^+ + He \rightarrow e(0^\circ-180^\circ)$
electron spectroscopy
0.5 - 3.75 keV/amu
- 89E60 Tanis, J.A. Schwietz, G. Schneider, D. Stollerfoht, N. Graham, W.G. Altevogt, H. Kowalik, R. Mattis, A. Skogvall, B. Schneider, T. Szmola, E.
Evidence for electron correlation during double capture in fast ($v = 10$ a.u.) collisions.
Phys. Rev. A 39 1571 - 1574 1989 E
 $Ne^{10+} + B \rightarrow Ne^{8+}, Ne^{6+} (B = He, Ne, Ar)$
electron-projectile coincidence
 3.5×10^3 keV/amu
strong electron correlation
- 89E61 Tawara, H. Fritsch, W.
Electron transfer data for C^{5+} and O^{7+} ions in collisions with H, H_2 and He targets - Present status and some related data needs in applications to fusion research.
Phys. Scripta T 28 58 - 66 1989 E
review
- 89E63 Tonuma, T. Kumagai, T. Matsuo, T. Tawara, H.
Coincidence measurements of slow recoil ions with projectile ions in 42 MeV $Ar^{8+} - Ar$ collisions.
Phys. Rev. A 40 6238 - 6245 1989 E
 $Ar^{8+} + Ar \rightarrow Ar^{q+} (q = 4, 6, 8, 10, 12, 14)$
projectile-recoil ion coincidence
 10^3 keV/amu
recoil ion production cross sections
- 89E65 van Zyl, B. Gealy, M.W. Neuman, H.
Lyman-alpha emission from low-energy $H + H_2$ and $H^+ + H_2$ collisions.
Phys. Rev. A 40 1664 - 1666 1989 E
 $H + H_2, H^+ + H_2 \rightarrow H^*(\text{Lyman-alpha})$
Lyman-alpha emission due to excited projectiles (not due to dissociative excitation of H_2)
- 89E62 Zouros, T.J.M. Lee, D.H. Richard, P. Sanders, J.M. Shinpaugh, J.L. Varghese, S.L. Karim, K.R. Bhalla, C.P.
State-selective observation of resonant transfer excitation in collisions of F^{6+} with He and H_2 targets.
Phys. Rev. A 40 6246 - 6250 1989 E
 $F^{6+} + H_2, He \rightarrow F^{2+}(1s2s2p^2) ^3D, ^1D$
zero-degree Auger electron spectroscopy
263 - 1740 keV/amu

- 89T 1 Alston, S.
Faddeev approach to electron capture.
Nucl. Instr. Meth. in Phys. 43 19 - 23 1989 T
Res. B
 $H^+ + He, H \rightarrow H^0(1s)$
Faddeev-Watson-Lovelace formalism
 5×10^3 keV/amu
Angular distribution of H^0
- 89T 2 Allison, S.
Closed-form expression for $1s \rightarrow 1s$ electron capture amplitude in second-order Faddeev approximation.
Phys. Rev. A 40 4907 - 4913 1989 T
2nd-order Faddeev approx.
- 89T56 Ameziau, K. Bacchus-Montabonel, M.C.
Ab initio potential energy curves for several molecular states of the multiply charged ion $(OHe)^{6+}$
Chem. Phys. 155 199 - 202 1989 T
 $O^{6+} + He \rightarrow O^{5+}$
ab initio calculation
potential energy curves
Bacchus-Montabonel, M.
Calculated partial cross sections for the single-electron capture process in the $N^{5+} + He$ collisions.
Phys. Rev. A 40 6088 - 6090 1989 T
 $N^{5+} + He \rightarrow N^{4+}(3s, 3p, 3d)$
semiclassical method
0.8 - 8 keV/amu
- 89T 4 Badnell, N.R.
Fine-structure effects on resonant transfer excitation cross sections for Li-like ion collisions with H_2 and He.
Phys. Rev. A 40 3579 - 3583 1989 T
 $S^{13+}, Ca^{17+}, Ti^{19+}, V^{20+}, Ni^{25+}, Ge^{28+} + B \rightarrow S^{12+}, Ca^{16+}, Ti^{18+}, V^{19+}, Ni^{24+}, Ge^{28+} + hv$ ($B = H_2, He$)
Impulse approx. (intermediate coupling, LS-coupling)
- 89T 5 Baer, M. Niedner-Schatteburg, G. Toennies, J.P.
A three-dimensional quantum mechanical study of vibrationally resolved charge transfer process in $H^+ + H_2$ at $E_{cm} = 20$ eV.
J. Chem. Phys. 91 4169 - 4182 1989 T
 $H^+ + H_2(v_1=0) \rightarrow H + H_2^+(v_f)$
Infinite order sudden approx. (IOSA)
 6×10^{-2} keV/amu
also $H^+ + H_2(v_f)$
- 89T 6 Bardsley, J.N. Gangopadhyay, P. Penetrante, B.N.
Symmetric charge transfer to multiply charged ions.
Phys. Rev. A 40 2724 - 2744 1989 T
 $He^{2+} + He^+ \rightarrow He^+ + He^{2+}$; $A^{(Z,2)+} + A^{(Z,3)+} \rightarrow A^{(Z,3)+} + A^{(Z,2)+}$ ($A = Be, B, C, N, O$); $A^{(Z,10)+} + A^{(Z,9)+} \rightarrow A^{(Z,9)+} + A^{(Z,10)+}$ ($A = Mg, Al, Si, P, S$)
IP with curved trajectories
 $10^{-2} - 10$ keV/amu
- 89T10 Belkic, D.
State-selective and total single-capture cross sections for fast collisions of multiply charged ions with He and Li.
Phys. Scripta 40 610 - 624 1989 T
 $A^{Z+} + B \rightarrow A^{(Z-1)+}(nl)$ ($A = H, He$; $B = He, Li$)
Corrected first Born approx.
 $10 - 2500$ keV/amu
- 89T 7 Belkic, D.
State-selective capture cross sections in proton-hydrogen and proton-helium collisions at intermediate and high energies.
Phys. Scripta T28 106 - 111 1989 T
 $H^+ + H, He \rightarrow H(2s, 2p, 3s, 3p, 3d, 4s)$
Corrected-first-Born approx.
 $20 - 1000$ keV/amu
- 89T 9 Belkic, D. Taylor, H.S.
A Schwinger-type variational principle for charge exchange at arbitrary energies.
Phys. Scripta 39 436 - 441 1989 T
Schwinger type variational method

- 89T15 Decker, D. Eichler, J.
Exact second-order Born calculations for charge exchange with Coulomb boundary conditions.
J. Phys. B 22 L95 - 100 1989 T
 $H^+ + H, He(1s) \rightarrow H(1s) + H^+ + He^+$
second-order Born approx. with Coulomb boundary conditions.
125(H), 5.4x10³(He) keV/amu
- 89T14 Decker, F. Eichler, J.
Consistent treatment of electron screening in charge transfer.
Phys. Rev. A 39 1530 - 1533 1989 T
 $H^+ + He \rightarrow H + He^+$; $H^+ + C \rightarrow H + C^+(K^{-1})$; $He^{2+} + Li \rightarrow He^+ + Li^+(K^{-1})$
screened first Born approx. with Coulomb boundary condition (SBLIS)
10² - 10⁴ keV/amu(H); 10² - 6x10² keV/amu(He)
- 89T16 Decker, F. Eichler, J.
Comparative study of the distorted-wave Born and boundary-corrected Born approximation for charge transfer up to the second order.
J. Phys. B 22 3023 - 3036 1989 T
 $H^+ + H \rightarrow H + H^+$
DWBA/boundary-corrected Born approx.
125 - 5000 keV/amu
angular distributions
- 89T58 Deco, G. Grün, N.
Capture from the vacuum in ion-ion collisions at relativistic energies
J. Phys. B 22 3709 - 3716 1989 T
 $S^{16+} + (H^+ - U^{92+}) \rightarrow S^{15+} + e^+$
DW model
(10-200)x10⁶ keV/amu
- 89T18 Deco, G.R. Rivarola, R.D.
Two-center effects in relativistic radiative electron capture.
Phys. Rev. A 39 5451 - 5454 1989 T
 $S^{16+}, U^{92+} + B \rightarrow S^{15+}, U^{91+} (B = 10 - 92)$
Matrix-continuum distorted-wave model
1.5x10⁶ keV/amu
- 89T17 Deco, G.R. Rivarola, R.D.
Pair productions with electron capture in relativistic heavy-ion collisions.
J. Phys. B 22 1043 - 1050 1989 T
DWBA
- 89T11 Bhalla, C.P. Karim, K.R.
Resonant transfer and excitation in collisions of Li-like F^{8+} and Ca^{17+} with light targets.
Phys. Rev. A 39 6060 - 6063 1989 T
 $F^{8+} + H_2 \rightarrow F^{3+*}, Ca^{17+} + H_2, He \rightarrow Ca^{15+*}$
Impulse approx.
6x10² - 1.9x10³(F); 3.7x10³ - 9.5x10³ keV/amu(Ca)
radiative and non-radiative rates calculated.
- 89T57 Bochkova, I.A. Ivakin, I.A. Osrovskii, V.N. Tolmachev, Yu.A. Kuligin, A.V.
Charge exchange in the He⁻-Hg system at thermal energies II. absolute cross sections of charge exchange with excitation
Opt. Spectrosc. (USSR) 67 298 - 301 1989 T
 $He^+ + Hg(6s^2) \rightarrow He^0(1s^2) + Hg^+(7p^2P_{1/2,3/2})$
T : two-state guasi molecular approx. E : plasma technique
- 89T12 Clary, C.C. Sonnenfroch, D.M.
Quantum mechanical calculations on the $Ar^+ + N_2$ charge transfer reaction.
J. Chem. Phys. 90 1086 - 1093 1989 T
 $Ar^+(^2P_{3/2}) + N_2(v=0, j) \rightarrow Ar + N_2^+(v'=1, j')$
Coupled channel-DWBA
(4-10)x10⁻⁶ keV/amu
cross sections for j'=0-28
- 89T13 Cue, N. Poizat, J.C. Remillieux, J.
Exciting the nucleus by target electron capture into atomic orbitals.
Europhys. Letters 8 10 - 23 1989 T
Nuclear excitation by electron capture (NEEC), the inverse of the internal conversion.

- 89T19 Dewangan, D.P. Chakraborty, H.S.
Analytic evaluation of the B1B cross sections.
J. Phys. B 22 L415 - 418 1989 T
B1B(boundary-corrected first Born approx.)
closed form for B1B for $1s \rightarrow 1s$ electron transfer
- 89T20 Dubois, A. Hansen, J.P. Nielsen, S.E.
Orientation of P states in ion-atom collisions: propensity rules for excitation and capture.
J. Phys. B 22 L279 - 284 1989 T
- 89T21 Errea, L.F. Mendez, L. Mo, O. Riera, A.
Molecular treatments of charge exchange in slow $C^{3+} + H$ collisions.
Phys. Scripta T28 67 - 70 1989 T
 $C^{3+} + H \rightarrow C^{2+}(\text{total}, 1s^2 2s 3s, 1s^2 2s 3p)$
MO
0.25 - 6.25 keV/amu
- 89T22 Errea, L.F. Mendez, L. Riera, A.
Excitation and charge transfer in $He^+ + H$ collisions.
Z. Phys. D 14 229 - 236 1989 T
 $He^+ + H \rightarrow He(1s^2; 1s2s; 1s2p) + H^+$
MO + CTF
0.5 - 25 keV/amu
also $H(2s; 2p)$ excitation
- 89T23 Gayet, R.
Multiply capture and ionization in high energy ion-atom collisions.
J. de Phys. 50 C1/53 - C1/70 1989 T
a review
- 89T24 Gramlich, K. Gruhn, N. Scheid, W.
Coupled-channel calculations with Gausse-type orbitals for charge transfer and ionization in collisions of the $(He-He)^{4+}$ system.
J. Phys. B 22 2567 - 2579 1989 T
 $He^{2+} + He \rightarrow He^+ He; He^+ + He^+ \rightarrow He + He^{2+}$
coupled-channel calculation (AO)
1 - 80 keV/amu (He^{2+}) ; 4 - 120 keV/amu (He^+)
also $He^{2+} + He \rightarrow He^{2+} + He^+ + e; He^+ + He^+ \rightarrow He^+ + He^{2+} + e$
- 89T25 Grozdanov, T.P. Janev, R.K. Krstic, P.S.
Two-state model for electron capture in $H^+ + H_2$ collisions at keV impact energies.
Phys. Letters. A 141 346 - 350 1989 T
 $H^+ + H_2 \rightarrow H(\text{total})$
two state model
0.2 - 20 keV/amu
- 89T26 Hahn, Y.
Transfer excitation processes in ion-atom collisions at high energies.
Phys. Rev. A 40 2950 - 2957 1989 T
 $Ca^{17+} + He \rightarrow Ca^{16+} + He^+; Nb^{31+} + H_2 \rightarrow Nb^{30+} + H_2^+$
Resonant transfer excitation
- 89T27 Hahn, Y. Ramadan, H.
Uncorrelated transfer excitation collisions at high energies.
Phys. Rev. A 40 6206 - 6209 1989 T
 $Ni^{31+} + H_2 \rightarrow Ni^{31+}; F^{9+} + He, H_2 \rightarrow F^{8+}$
Uncorrelated transfer excitation at high energies
- 89T28 Hansen, J.P. Andersson, L.R.
A study of charge transfer and core excitation in the $Ne^{6+} - He$ collisions at 2 keV projectile energy.
J. Phys. B 22 L285 - 288 1989 T
 $Ne^{6+} + He \rightarrow Ne^{5+} + He^+$
AO-CC
0.1 keV/amu
energy-gain spectrum : impact parameter dependence
- 89T29 Hansen, J.P. Kochbach, L. Taubjerg, K.
Partial capture cross sections and energy gain spectra in $Ar^{6+} - He(1s^2)$ collisions.
J. Phys. B 22 885 - 891 1989 T
 $Ar^{6+} + He(1s^2) \rightarrow Ar^{7+}(3d, 4s, 4p) + He^+$
AO
 $1.25 \times 10^{-2} - 1$ keV/amu

- 89T30 Hansen, J.P. Taubjerg, K.
Coupled-channel calculations of partial capture cross sections in multiply charged ion collisions with hydrogen.
Phys. Rev. A 40 4082 - 4084 1989 T
 $Ar^{q+} + H \rightarrow Ar^{q+}(4l;5l) ; Ar^{q+} + H \rightarrow Ar^{q+}(5l;6l)$
AO
1 - 50 keV/amu
- 89T59 Helfrich, K.
Extended universal correlation diagrams for the quantum mechanical one-electron two-centre problem
Z. Phys. D 13 295 - 299 1989 T
 $He^{2+} + H \rightarrow He^{+} + H^{+} ; Li^{3+} + H \rightarrow Li^{2+} + H^{+}$
correlation diagram
- 89T31 Hino, K. Watanabe, T.
Theory of the relativistic radiative electron capture incorporating effects of the internal conversion process.
Phys. Rev. A 39 3373 - 3387 1989 T
 $A^{Z+} + Be \rightarrow A^{(Z-1)+} + \nu(K-REC) + Be^{+}$ ($A = Ne, Ar, Kr, Xe, Ta, U$)
relativistic impulse approx.
 $10^4 - 10^5$ keV/amu
- 89T32 Jain, A. Lin, C.D. Frisch, W.
State-selective double-electron capture in $He^{2+} + He$ collision at intermediate impact energies.
Phys. Rev. A 39 1741 - 1746 1989 T
 $He^{2+} + He \rightarrow He(2s^2\ ^1S, 2s2p\ ^1P_o, 2p^2\ ^1D_o) + He^{2+}$
AO
50 - 167 keV/amu
- 89T54 Jakubassa-Amundsen, D.H.
The forward peak for neutral projectiles.
J. Phys. B 22 3989 - 3999 1989 T
 $He^{q+}(q = 2,1,0) + Ne \rightarrow (He^{q+} + e) + Ne^{+}$
peak-impulse-approx.
 10^3 keV/amu
- 89T34 Macek, J. Dong, X.Y.
Calculation of electro-capture cross sections in low energy collisions of C^{6+} with H.
Phys. Rev. A 40 95 - 100 1989 T
 $C^{6+} + H \rightarrow C^{3+}(total; 4l ; l=0-3) + H^{+}$
LZ with Stark effect coupling
 $1.3 \times 10^{-2} - 1.3 \times 10^3$ keV/amu
- 89T33 Macek, J. Taubjerg, K.
Strong potential wave functions with elastic channel distortion.
Phys. Rev. A 39 6064 - 6067 1989 T
Channel-distorted wave approx.
- 89T60 Martin, F. Sanchez, I. Bachau, H.
Coupled continuum perturbative Feshbach approach to calculate total and partial widths : $1^1S^e(3ln)$ resonance states of He, C^{4+} , N^{5+} and O^{6+}
Phys. Rev. A 40 4245 - 4255 1989 T
 $A^{Z+} + He \rightarrow A^{(Z-2)+} + He^{2+}$ ($A=He, C, N, O$)
Fresh formalism
- 89T35 Martinez, A.E. Deco, G.R. Rivarola, R.D. Fainstein, P.D.
Electron capture and ionization in atomic collisions.
Nucl. Instr. Meth. in Phys. 43 24 - 28 1989 T
Res. B
 $H^{+} + He^{+} \rightarrow H + He^{2+}; H^{+} + Ne \rightarrow H + Ne^{+}$
Continuum distorted wave-eikonal Initial state method
 $10 - 10^3$ keV/amu(He^{+})
differential cross sections. $H^{+} + He^{+} \rightarrow H^{+} + He^{2+} + e$
- 89T36 Marner, H. Briggs, J.S.
The capture of inner-shell electrons in the strong potential Born(SPB) approximation.
Z. Phys. D 13 75 - 76 1989 T
 $p + C \rightarrow H + C^{+}(K^{-1})$
Strong potential Born approx.
 $10^2 - 3 \times 10^3$ keV/amu

- 89T37 Moiseiwitsch, B.L.
Relativistic second-order Oppenheimer-Brinkman-Kramers cross sections for electron capture.
Phys. Rev. A 39 5609 - 5612 1989 T
 $A^{Z+} + B \rightarrow A^{(Z-1)+} (A = C, Ne, Ar; B = 13-79)$
relativistic OBK
 $1.4 \times 10^2 - 2.1 \times 10^6$ keV/amu
- 89T38 Nikulin, V.K. Samoylov, A.V.
On the role of correlated double-electron capture in slow multiply charged N^{7+} collisions with He.
J. Phys. B 22 L201 - 205 1989 T
 $N^{7+} + He \rightarrow N^{3+}(313l^1; 314f^1) + He^{2+}$
multichannel Landau-Zener-Nikitin model
 $6 \times 10^2 - 25$ keV/amu
also $N^{7+} + He \rightarrow N^{6+}(n=3, n=4) + He^+$; double capture dominant over single capture at low energies
- 89T39 Olson, R.E. Schultz, D.R.
n,l distributions for electron capture from H(1s) by C^{6+} and O^{8+} .
Phys. Scripta T28 71 - 76 1989 T
 $C^{6+} + O^{8+} + H \rightarrow C^{2+}(nl), O^{2+}(nl)$
CTMC
40 - 140 keV/amu
- 89T40 Olson, R.E. Ullrich, J. Schmidt-Böcking, H.
Multiple-ionization collisions dynamics.
Phys. Rev. A 39 5572 - 5583 1989 T
 $U^{32+} + Ne \rightarrow U^{32+} + Ne^{1+}; U^{31+}(n) + Ne^{1+}$
CTMC
 1.4×10^3 keV/amu
n-distribution; impact parameter; electron spectrum; angular distribution of scattered projectile; angular distribution of recoil ions; stopping power
- 89T52 Omar, G. Moussa, A.H. Hahn, Y.
Strong electron correlation and anomalous electron capture.
Phys. Rev. A 40 6709 - 6710 1989 T
 $Ca^+, Sc^{2+}, Ti^{3+}, Fe^{7+} + B \rightarrow Ca, Sc^+, Ti^{2+}, Fe^{6+}$

- 89T41 Opradolce, L. Casaubon, J.I. Piancettini, R.D.
Molecular treatment of single-electron capture in $Li^{3+} + Li$ collisions.
J. Phys. B 22 1809 - 1916 1989 T
 $Li^{3+} + Li(2s) \rightarrow Li^{2+}(n) + Li^+$
MO/Landau-Zener model
 $2 \times 10^{-4} - 1$ keV/amu
 $n=4$ dominant
- 89T42 Parker, J.E. Johnson, C.A.F.
A two-state treatment of the electron transfer reactions from carbon dioxide to helium ions.
Int. J. Mass Spectro. Ion 94 87 - 99 1989 T
Proc.
 $He^+ + CO_2 \rightarrow He$
two-state approx
0.025 - 1.25 keV/amu
branching ratios for $CO_2^+, CO^+, O^+, C^+, CO_2^{2+}$
- 89T53 Parlant, G. Gislason, E.A.
Theoretical state-to-state cross sections for collisions of $N_2^+(v) + Ar$: II results at higher energies.
J. Chem. Phys. 91 5359 - 5364 1989 T
 $N_2^+(v) + Ar \rightarrow N_2(v) + Ar^+ (^2P_{3/2,1/2}) (v = 0, 1, 2)$
1.2 - 320 eV
- 89T43 Rhoades-Brown, M.J. Bottcher, C. Strayer, M.R.
Feynman-Monte Carlo calculations of electron capture at relativistic collider energies.
Phys. Rev. A 40 2831 - 2834 1989 T
 $A^{Z+} + A^{Z+} \rightarrow A^{(Z-1)+} + A^{Z+} + e^+$ ($A = Si, Cu, I, Au, U$)
Feynman-Monte Carlo method
electron capture associated with pair production
- 89T44 Senba, M.
Charge exchange collisions in the presence of competing process: an integral equation approach.
J. Phys. B 22 2027 - 2040 1989 T
 $H + Ne \rightarrow H^+$
integral equation
0.2 - 2.8 keV/amu

- 89T45 Shingal, R. Lin, C.D.
Orientation-dependent atomic model for electron transfer in ion-molecular collisions: applications to $H^+ + H_2$
Phys. Rev. A 40 1302 - 1309 1989 T
 $H^+, He^{2+} + H_2 \rightarrow H, He^+$
1 - 400 keV/amu (H); 12.5 - 500 keV/amu (He)
ratios $\sigma(H_2)/\sigma(H)$
- 89T55 Shingal, R. Lin, C.D.
Ionization and electron transfer in $He^{2+} + H(1s)$ collisions.
J. Phys. B 22 L445 - 449 1989 T
 $He^{2+} + H(1s) \rightarrow He^+(total, 2s, 2p, 3s+3d, 3p)$
semi-classical impact parameter method
2 - 500 keV/amu
also $He^{2+} + H \rightarrow He^{2+} + H^+ + e$
- 89T46 Shingal, R. Lin, C.D.
Theoretical studies of electron capture in $H^+ + H_2$ collisions.
J. Phys. B 22 L659 - 664 1989 T
 $H^+ + H_2 \rightarrow H(total)$
orientation-dependent AO
4 - 100 keV/amu
impact parameter dependence
- 89T47 Toshima, N. Eichler, J.
Relativistic coupled-channel calculations including pseudostates.
Phys. Rev. A 40 125 - 132 1989 T
 $U^{92+} + U^{91+} \rightarrow U^{91+}(1s, 2s, 2p, 3s, 3p) + U^{92+}$
relativistic, coupled-channel calculation
5x10⁵ keV/amu
also excitation cross sections
- 89T48 Toshima, N. Ishihara, T.
Coulomb boundary conditions in high energy theories for electron capture processes.
Phys. Rev. A 40 638 - 641 1989 T
 $H^+ + H \rightarrow H(\theta) + H^+$
boundary corrected eikonal approx.
60, 125 keV/amu
angular distributions

- 89T49 Toshima, N. Ishihara, T. Ohsaki, A. Watanabe, T.
Impact-parameter treatment of classical trajectory Monte Carlo calculations for ion-atom collisions.
Phys. Rev. A 40 2192 - 2194 1989 T
 $H^+ + H \rightarrow H(\theta) + H^+$
simplified CTMC
60, 125 keV/amu
angular distributions
- 89T50 Wang, Y.D. McGuire, J.H. Rivarola, R.D.
Impact parameter treatment of high-velocity electron capture from diatomic molecules at fixed orientation.
Phys. Rev. A 40 3673 - 3680 1989 T
 $H^+ + H_2 \rightarrow H; He^{2+} + H_2 \rightarrow He^+$
IP
1 - 5 x10³ keV/amu
orientation angle dependence
- 89T51 Zygelman, B. Dalgarno, A. Kimura, M. Lane, N.
Radiative and nonradiative charge transfer in $He^+ + H$ collisions at low energy.
Phys. Rev. A 40 2340 - 2345 1989 T
 $He^+ + H \rightarrow He + H^+; He + H^+ + h\nu$
quantum mechanical method
2.5x10⁻⁵ - 2.5x10⁻² keV/amu
radiative association ($\rightarrow HeH^+ + h\nu$) is dominant at lowest energies; radiative capture is dominant above 10 meV : at higher energies non-radiative capture is dominant.

- 90E 1 Anderson, H. Cederquist, H. Asmer, G. Hvelplund, P. Pedersen, J.O.P.
Radiative stabilization of double-Rydberg states formed in slow $\text{Xe}^{q+} \cdot \text{Xe}$ collisions ($q=1-5$)
Phys. Scripta 42 150 - 158 1990 E
 $\text{Xe}^{q+} + \text{Xe} \rightarrow \text{Xe}^{(q-2)+} + e^- + \text{Xe}^{(q-2)+} + h\nu$
translational energy spectroscopy
0.4 - 1.0 keV/amu
for higher q , radiative stabilization plays a role
- 90E 2 Ashburn, J.R. Cline, R.A. van der Burgt, P.J.M. Westerveld, W.B. Risley, J.S.
Experimentally determined density matrices for $\text{H}(n=3)$ formed in $\text{H}^+ \cdot \text{He}$ collisions from 20 to 100 keV.
Phys. Rev. A 41 2407 - 2421 1990 E
 $\text{H}^+ + \text{He} \rightarrow \text{H}(n=3)$
photon spectroscopy (Balmer line)
- 90E 3 Barat, M. Roncin, P. Guillemot, L. Gaboriaud, M.N. Laurent, H.
Single and double electron capture by C^{4+} ions colliding with helium target.
J. Phys. B 23 2811 - 2819 1990 E
 $\text{C}^{4+} + \text{He} \rightarrow \text{C}^{3+}, \text{C}^{2+}$
translational energy spectroscopy
0.5 - 0.8 keV/amu
also angular differential cross sections given
- 90E 4 Biedermann, C. Cederquist, H. Andersson, L.R. Levin, J.C. Short, R.T. Elston, S.B. Gibbons, J.P. Andersson, H. Liljeby, L. Sellin, I.A.
Experimental and model angular distributions of one- and two-electron capture processes in 0.5 - 20 eV/u $\text{Ar}^{4+} \cdot \text{Ar}$ collisions.
Phys. Rev. A 41 5889 - 5908 1990 E
 $\text{Ar}^{4+} + \text{Ar} \rightarrow \text{Ar}^{3+}, \text{Ar}^{2+}$
transfer energy spectroscopy
 $0.5 \times 10^{-3} - 2 \times 10^{-2}$ keV/amu
angular distribution; only 4p L, but no 4s population
- 90E 5 Biedermann, C. Levin, J.C. Short, R.T. Elston, S.B. Gibbons, J.P. Sellin, I.A. Cederquist, H. Andersson, L.A. Andersson, H. Liljeby, L.
Total capture cross sections for very slow $\text{Ar}^{4+} \cdot \text{Ar}$ and $\text{Ar}^{6+} \cdot \text{Ar}$ collisions.
Phys. Rev. A 42 6905 - 6908 1990 E
 $\text{Ar}^{q+}(q=4,6) + \text{Ar} \rightarrow \text{Ar}^{(q-1)+}, \text{Ar}^{(q-2)+}$
Angular distribution measurements
 $2.5 \times 10^{-3} - 2.5 \times 10^{-2}$ keV/amu
- 90E 6 Brechignac, C. Cahuzac, Ph. Carlier, F. Leygnier, J. Hertel, I.V.
charge exchange in alkali cluster collisions
Z. Phys. D 17 61 - 67 1990 E
 $(\text{Na})_n^{+} + \text{Cs} \rightarrow (\text{Na})_n (n=1-21) : (\text{K})_n^{+} + \text{Cs} \rightarrow (\text{K})_n (n=1-14)$
laser-ionization
 $5 \times 10^{-3} - 6 \times 10^{-2}$ keV/amu
strong dependence on the energy defect, cluster size and impact energy
- 90E 7 Campbell, E.E.B. Hulser, H. Witte, R. Hertel, I.U.
Near resonant charge transfer in $\text{Na}(4D) + \text{K}^+ \rightarrow \text{Na}^+ + \text{K}^*$: optical pumping of the $\text{Na}(4d)$ state and energy dependence of rank 4 alignment.
Z. Phys. D 16 21 - 33 1990 E
 $\text{K}^+ + \text{Na}(4D) \rightarrow \text{K}^* + \text{Na}^+$
optical pumping
 $8 \times 10^{-3} - 8 \times 10^{-2}$ keV/amu
relative cross sections
- 90E 8 Cheng, S. Cocke, C.L. Kamber, E.Y. Hsu, C.C. Varghese, S.L.
Measurement of electron capture and ionization cross sections for D_2 in collisions with fast O^{8+} ions.
Phys. Rev. A 42 214 - 222 1990 E
 $\text{O}^{8+} + \text{D}_2 \rightarrow \text{O}^{8+} + \text{D}_2^+; \text{O}^{8+} + \text{D}^+; \text{O}^{8+} + \text{D}_2^{+*}; \text{O}^{8+} + \text{D}^+ + \text{D}^+; \text{O}^{8+} + \text{D}^+ + \text{D}^+ + \text{D}_2^{+*}$
projectile-recoil ion coincidence technique
 $0.5 - 1.25 \times 10^3$ keV/amu
different channels for D^+ ion production
- 90E 9 Chetoui, A. Martin, F. Politis, M.F. Rozet, J.P. Touati, A. Blumenfeld, L. Verthet, D. Wohrer, K. Stephan, C. Barat, M. Gaboriaud, M.N. Laurent, H. Roncin, P.
Doubly excited states populated in collisions of O^{8+} ions with He and H_2 at 1.24 keV/amu.
J. Phys. B 23 3659 - 3675 1990 E
 $\text{O}^{8+} + \text{He}, \text{H}_2 \rightarrow \text{O}^{6+}(n,n')$
projectile + X-ray coincidence technique
1.24 keV/amu

- 90E9 Datz, S. Hippler, R. Andersen, L.H. Dittner, P.F. Knudsen, H. Krause, H.F. Miller, P.D. Pepmiller, P.L. Rosseel, T. Schuch, R. Stollerfoht, N. Yamazaki, Y. Vane, C.R.
Coincidence studies of capture and ionization in highly-charged $\text{F}^{9+}\text{-He}$ and $\text{U}^{92+}\text{-He}$ collisions at medium velocities.
Phys. Rev. A 41 3559 - 3571 1990 E
 $\text{A}^{q+} + \text{He} \rightarrow \text{A}^{q+} + \text{He}^+ + \text{e}; \text{A}^{q+} + \text{He}^{2+} + 2\text{e}; \text{A}^{q+1+} + \text{He}^+; \text{A}^{q+1+} + \text{He}^{2+} + \text{e}$
($\text{A} = \text{I, U}; q = 5 - 44$)
projectile-recoil coincidence
 $10^3 - 10^3 \text{ keV/amu}$
- 90E10 de Jong, R. Niehaus, A.
Transfer ionization in He^{2+} -x-ray collisions.
J. Phys. B 23 3933 - 3954 1990 E
 $\text{He}^{2+} + \text{Xe} \rightarrow \text{He}^+ + \text{Xe}^{2+} + \text{e}$
electron + translational energy spectroscopy
 $10^{-1} - 5.5 \times 10^{-2} \text{ keV/amu}$
also angular distribution
- 90E11 DePaola, B.D. Parameswaran, R. Axmann, W.J.
High-resolution state-selective study of transfer with excitation in the $\text{F}^{8+} + \text{H}_2$ system.
Phys. Rev. A 41 6533 - 6535 1990 E
 $\text{F}^{8+}(1s) + \text{H}_2 \rightarrow \text{F}^{6+}(2p^2 \text{ } ^1\text{D}, 2s2p \text{ } ^1\text{P})$
electron spectroscopy
 $9.5 \times 10^2 - 1.6 \times 10^3 \text{ keV/amu}$
electron spectra in non-resonant transfer excitation (NTE)
- 90E12 Doweck, D. Houver, J.C. Pommier, J. Richter, C. Royer, T. Andersen, N. Palsdottir, B.
Strong effects of initial orbital alignment observed for electron capture in $\text{keV H}^+ \text{-Na}(3p)$ collisions.
Phys. Rev. Letters 64 1713 - 1716 1990 E
 $\text{H}^+ + \text{Na}(3s, 3p) \rightarrow \text{H}(n=2, 3) + \text{Na}^+$
translational energy spectroscopy
 $0.5 - 5 \text{ keV/amu}$
aligned with polarized light
- 90E13 Gao, R.S. Johnson, L.K. Hakes, C.L. Smith, K.A. Stebbings, R.F.
Collisions of kilo-electron-volt H^+ and He^+ with molecules at small angles : absolute differential cross sections for charge transfer.
Phys. Rev. A 41 5929 - 5933 1990 E
 $\text{H}^+ + \text{B} \rightarrow \text{H} (\text{B} = \text{N}_2, \text{O}_2, \text{CO}, \text{CO}_2, \text{NO}, \text{CH}_4) : \text{He}^+ + \text{B} \rightarrow \text{He} (\text{B} = \text{H}_2, \text{N}_2, \text{O}_2, \text{CO}, \text{NO})$
position-sensitive detector
 $0.5 - 5 \text{ keV/amu (H)} ; 0.4 \text{ keV/amu (He)}$
- 90E14 Gardner, J.A. Dressler, R.A. Salter, R.H. Murad, E.
Reaction cross section and product ion T-O-F measurements for collisions of N^+ and $\text{N}^+_{1/2}$ with CO_2 at suprathermal energies.
J. Chem. Phys. 93 7780 - 7786 1990 E
 $\text{N}^+ + \text{CO}_2 \rightarrow \text{N} + \text{CO}_2^+; \text{N}_2^+ + \text{CO}_2 \rightarrow \text{N}_2 + \text{CO}_2^+ + \text{CO}_2 \rightarrow \text{N} + \text{CO}_2^+; \text{N}_2^+ + \text{CO}_2 \rightarrow \text{N}_2 + \text{CO}_2^+$
translational energy spectroscopy
 $10^{-4} - 10^{-3} \text{ keV/amu}$
 $\text{N}^+ + \text{CO}_2 \rightarrow \text{NO} + \text{CO}^+$ also
- 90E62 Graham, W.G. Berkner, K.H. Bernstein, E.M. Clark, M.W. Feinberg, B. McMahan, M.A. Morgan, T.J. Rathbun, W. Schlachter, A.S. Tanis, J.A.
Resonant transfer and excitation for U^{90+} projectiles in hydrogen.
Phys. Rev. Letters 65 2773 - 2776 1990 E
 $\text{U}^{90+} + \text{H}_2 \rightarrow \text{U}^{89+}$
X-ray-projectile coincidence
($97 - 150$) $\times 10^3 \text{ keV/amu}$
- 90E15 Guillemot, L. Roncin, P. Gaboriaud, M.N. Barat, M. Laurent, H. Bliman, S. Suraud, M.G. Hitz, D. Bonnet, J.J. Bonnefoy, M. Chassevent, A. Fleury, A.
Collisions of metastable He-like C^{4+} ions on He and H_2 targets.
J. Phys. B 23 3353 - 3360 1990 E
 $\text{C}^{4+}(1s2s \text{ } ^3\text{S}) + \text{B} \rightarrow \text{C}^{3+}; \text{C}^{2+} (\text{B} = \text{H}_2, \text{He})$
translational energy + photon spectroscopy
 $0.8 - 3.3 \text{ keV/amu}$
no cross section given

- 90E16 Guillemot, L. Roncin, P. Gaboriaud, M.N. Laurent, H. Barat, M.
Critical study of the molecular Coulombic barrier model for multiple electron capture by highly charged ions.
J. Phys. B 23 4293 - 4312 1990 E
 $\text{Ar}^{q+}(q = 11, 9, 8, 7) + \text{Ar} \rightarrow \text{Ar}^{q+}; \text{Ar}^{2+} + \text{Xe} \rightarrow \text{Ar}^{2+}; \text{O}^{2+} + \text{He, Ar} \rightarrow \text{O}^{2+}; \text{N}^{7+} + \text{He} \rightarrow \text{N}^{2+}$
translational energy spectroscopy
~ 0.3 keV/amu
relative angular distributions
- 90E21 Hülser, H. Campbell, E.E.B. Witte, R. Genger, H. Hertel, I.V.
Observation of rank-4 alignment in near-resonant charge transfer $\text{Na}(4D) + \text{K}^+ \rightarrow \text{Na}^+ + \text{K}^+$
Phys. Rev. Letters 64 392 - 395 1990 E
 $\text{K}^+ + \text{Na}(4D) \rightarrow \text{K}^+ + \text{Na}^+$
polarized laser excitation
 $1 \times 10^{-2} - 3.8 \times 10^{-2}$ keV/amu
alignment factor
- 90E17 Hird, B. Elrick, B.M. Lacasse, H. Lacasse, J.H. Tune, P.
Bromine-rare gas electron transfer and electron loss cross sections at 15 - 130 keV collision energies.
Phys. Rev. A 41 5217 - 5220 1990 E
 $\text{Br} + \text{B} \rightarrow \text{Br}^+ (\text{B} = \text{He, Ne, Ar, Kr, Xe}), \text{Br}^- (\text{B} = \text{Ar, Kr, Xe})$
growth method
0.2 - 1.6 keV/amu
- 90E18 Hoekstra, R. Beijers, J.P.M. Schlattmann, A.R. Morgenstern, R. de Heer, F.J.
State-selective charge transfer in slow collisions of C^{2+} with H and H_2 .
Phys. Rev. A 41 4800 - 4808 1990 E
 $\text{C}^{2+} + \text{H, H}_2 \rightarrow \text{C}^{3+}(3s, 3p, 3d)$
photon spectroscopy
 $5 \times 10^{-2} - 1.3$ keV/amu
retarded beam
- 90E19 Holland, R.F. Cobb, D.D. Maier II, W.B. Clodius, W.B. Oshea, P.G. Bos, R. Froggott, B.C.
Production of N_2^+ first negative emission by impact of 1 MeV H^0 , H^+ and H^- on N_2 .
Phys. Rev. A 41 2429 - 2436 1990 E
 $\text{H}^- + \text{N}_2 \rightarrow \text{H}^0$
 10^3 keV/amu
 N_2^+ first negative (0-0), (0-1) band emissions.
- 90E20 Huels, M.A. Champion, R.L. Doverspike, L.D. Wang, Y.
Charge transfer and electron detachment for collisions of H⁺ and D⁺ with H.
Phys. Rev. A 41 4809 - 4815 1990 E
 $\text{H}^+, \text{D}^+ + \text{H} \rightarrow \text{H, D} + \text{H}^+; \text{H, D} + \text{e} + \text{H}$
crossed-beam method
 $7 \times 10^{-3} - 0.4$ keV/amu
- 90E22 Jensen, B. Pedersen, E.H.
Electron capture by Mg^+ and Mg^{2+} in slow collisions with Mg or Zn.
J. Phys. B 23 1501 - 1518 1990 E
 $\text{H}^+ + \text{Mg} \rightarrow \text{H}; \text{Mg}^+ + \text{Mg} \rightarrow \text{Mg} + \text{Mg}^+; \text{Mg}^{2+} + \text{Mg} \rightarrow \text{Mg} + \text{Mg}^{2+}, \text{Mg}^+ + \text{Mg}^+; \text{Mg}^+ + \text{Zn} \rightarrow \text{Mg} + \text{Zn}^+; \text{Mg}^{2+} + \text{Zn} \rightarrow \text{Mg}^+ + \text{Zn}^+, \text{Mg} + \text{Zn}^{2+}; \text{Zn}^+ + \text{Zn} > \text{Zn}^+ + \text{Zn}^+$
coincidence technique
3 - 10 keV/amu (H); $4 \times 10^{-2} - 20$ keV/amu (Mg); 0.15 - 7.7 keV/amu
- 90E23 Jogwisch, M. Huber, B.A. Wiesenmann, K.
A spectroscopic study of double electron transfer from Cu to Ar III in an ECR-microwave discharge.
Z. Phys. D 17 171 - 179 1990 E
 $\text{Ar}^{2+} + \text{Cu} \rightarrow \text{Ar}^0(6d[3/2]^0; 8s[3/2]^0)$
photon spectroscopy
thermal energy
cross sections ($10^{15} - 10^{14}$ cm²)
- 90E24 Kamber, E.Y. Brenton, A.G. Hughes, S.
State-selective single-electron stripping processes of Ar^{2+} ions in collisions with He and Ar.
J. Phys. B 23 L311 - 316 1990 E
 $\text{Ar}^{2+} + \text{He, Ar} \rightarrow \text{Ar}^{3+}$
translational energy spectroscopy
0.2 keV/amu
dominant contribution of ions in long-lived highly excited states
- 90E63 Kikiani, B.I. Lomsadze, R.A. Mosulishvili, N.O. Gochiashvili, M.R. Lavrov, V.M.
Ionization and charge transfer in collisions of Li^+ with Ar, Ne and He in the energy range 0.5 - 7.0 keV.
Sov. Phys. - JETP 71 51 - 56 1990 E
 $\text{Li}^+ + \text{B} \rightarrow \text{Li} (\text{B} = \text{He, Ne, Ar})$
condenser-method
0.07 - 1 keV/amu

- 90E26 Kusakabe, T, Mizumoto, Y, Katsurayama, K, Tawara, H.
Electron capture by C^+ , N^+ and O^+ ions in collisions with H_2 molecules and He atoms at low keV energies.
J. Phys. Soc. Japan 59 1987 - 1994 1990 E
 $C^+, N^+, O^+ + He, H_2 \rightarrow C, N, O$
growth method
 $5 \times 10^{-2} - 1$ keV/amu
controlled electron energy ion source used. : contribution of metastable ions.
- 90E25 Kusakabe, T, Yoneda, H, Mizumoto, Y, Katsurayama, K.
Charge transfer cross sections of $^3He^{2+}$ ions in collisions with He atoms and H_2 molecules in the energy range of 1 - 10 keV.
J. Phys. Soc. Japan 59 1218 - 1224 1990 E
 $He^{2+} + B \rightarrow He^+; He$ (B = He, H_2)
growth method
0.33 - 3.3 keV/amu
- 90E27 Kwong, V.H.S, Gibbons, T.T, Fang, Z, Jiang, J, Knoocke, H, Jiang, Y, Ruger, B, Huang, S, Braganza, E, Clark, W, Gardner, L.D.
Experimental apparatus for production, cooling and storing multiply charged ions for charge-transfer measurements.
Rev. Sci. Instr. 61 1931 - 1939 1990 E
 $W^{2+} + Ar \rightarrow W^+; N^{2+} + N_2 \rightarrow N^+$
ion-trapping method
thermal energy
rate coefficient
- 90E28 MacAdam, K.B, Gray, L.G, Rolles, R.G.
Projectile n distributions following charge transfer of Ar^+ and Na^+ in a Na Rydberg target.
Phys. Rev. A 42 5269 - 5281 1990 E
 $A^+ + Na(nl) \rightarrow A(n)$ (A = Ar, Na)
laser-excited target + field ionization
- 90E31 Martin, S, Denis, A, Desesquelles, J, Ouerdane, Y.
Rydberg transition emission after multi-electron capture in low-energy collisions of Ar^{q+} with He, Ne and Ar.
Phys. Rev. A 42 6564 - 6569 1990 E
 $Ar^{q+} + B \rightarrow Ar^{r+}$ (r = 7 - 4) (B = He, Ne, Ar)
photon spectroscopy
4.5 keV/amu
transition energies determined
- 90E30 Martin, S, Dennis, A, Quedane, Y, Salmoun, A, El Motassadeq, A, Desesquelles, J.
Multielectron capture in Kr^{18+} collisions with Kr and Ar at low energies by Rydberg transition spectroscopy.
Phys. Rev. Letters 64 2633 - 2636 1990 E
 $Kr^{18+} + B \rightarrow Kr^{(18-q)+}$ (q' = 2 - 6; B = Ar, Kr)
photon spectroscopy
4 keV/amu
emission cross sections given
- 90E65 Martinez, H, de Urquido, J, Cisneros, C, Alvarez, I.
Single and double electron capture of H^+ in SF_6 in the energy range 1 to 5 keV
Phys. Letters A 146 517 - 521 1990 E
 $H^+ + SF_6 \rightarrow H^0, H^-$
1 - 5 keV/amu
angular distributions
- 90E29 Mathur, D, Rajgaria, F.A, Badrinathan, C.
State-diagnosed charge stripping in low-energy collisions of ground-state and highly excited N^+ ions with He.
Phys. Rev. A 42 5282 - 5285 1990 E
 $N^+(2p^2\ ^3P, 2pnl) + He \rightarrow N^{2+}(2p\ ^2P_{1/2}) + He + e$
translational energy spectroscopy
0.14 keV/amu
- 90E32 McLaughlin, T.K, Wilson, S.M, McCullough, R.W, Gilbody, H.B.
State-selective electron capture by 2 - 8 keV O^{2+} recoil ions in H, H_2 and He.
J. Phys. B 23 737 - 744 1990 E
 $O^{2+} + B \rightarrow O^+(nl)$ (B = H, H_2, He)
translational energy spectroscopy
0.13 - 0.50 keV/amu
no cross section given
- 90E33 Mokler, P.H, Rousch, S, Warczak, A, Siachura, Z, Kambara, T, Müller, A, Schuch, R, Schulz, M.
Single transfer-excitation resonance observed via the two-photon decay in He-like Ge^{30+} .
Phys. Rev. Letters 65 3108 - 3111 1990 E
 $Ge^{30+} + H_2 \rightarrow Ge^{29+}(1s2s\ ^1S_0 - 1s^2\ ^1S_0)$
photon-photon coincidence technique
 $1.2 \times 10^4 - 1.9 \times 10^4$ keV/amu

- 90E34 Morce, M.N.
Formation of $\text{He}(3^1\text{D})$ by electron capture in collisions of He^+ with various polyatomic molecules.
Phys. Rev. A 42 2453 - 1990 E
 $\text{He}^+ + \text{B} \rightarrow \text{He}(3^1\text{D} - 2^1\text{P})$ ($\text{B} = \text{H}_2, \text{N}_2, \text{O}_2, \text{O}, \text{CO}_2, \text{N}_2\text{O}, \text{CH}_4, \text{C}_2\text{H}_2, \text{C}_2\text{H}_4, \text{C}_2\text{H}_6$)
photon spectroscopy
25 - 75 keV/amu
photon-emission cross sections
- 90E35 Nicolai, P., Chabot, M., Rozet, J.P., Politis, M.F., Chetoui, A., Stephan, C., Touati, A., Vernhet, D., Wohrer, K.
Contribution of intrashell excitation to the l-mixing of excited states of one-electron ions in solids.
J. Phys. B 23 3609 - 3627 1990 E
 $\text{Kr}^{36+} + \text{C}, \text{Al}, \text{Cu}(\text{foil}) \rightarrow \text{Kr}^{34+}(\text{nl})$
photon spectroscopy
 3.3×10^4 keV/amu
- 90E36 Pedersen, E.H., Giese, J.P.
Electron capture by fast protons in Ar : cross sections for capture from the M-shell.
Phys. Rev. A 41 4831 - 4836 1990 E
 $\text{H}^+ + \text{Ar} \rightarrow \text{H} + \text{Ar}^{q+}$
recoil-projectile coincidence method
 $8 \times 10^2 - 3.5 \times 10^3$ keV/amu
- 90E37 Posthumus, J.H., Morgenstern, R.
He-like ions colliding on H_2 : an analysis of the $1s^2 3^1\text{I}^1$ electron spectra.
J. Phys. B 23 2293 - 2304 1990 E
 $\text{N}^{3+}(1s^2), \text{O}^{6+}(1s^2) + \text{H}_2 \rightarrow \text{N}^{3+}(1s^2 3^1\text{I}^1), \text{O}^{6+}(1s^2 3^1\text{I}^1)$
Electron spectroscopy
1.7 - 7.7 keV/amu
- 90E38 Poulsen, J., Andersen, T., Cowan, R.D., Dahl, P., Hansen, J.E., Engholm Pedersen, J.
Electron detachment and excitation processes in F-He, Ne collisions : electron and optical emission from excited F and Ne states.
J. Phys. B 23 457 - 469 1990 E
 $\text{F}^+ + \text{He}, \text{Ne} \rightarrow \text{F}$
 $2.6 \times 10^2 - 0.79$ keV/amu
optical emission cross sections given also
- 90E39 Reese, C., Ebel, M.
Occupation of fine structure levels in electron capture of Ar^{2+} ions from various alkali atoms.
J. Phys. B 23 3869 - 3880 1990 E
 $\text{Ar}^{2+} + \text{B} \rightarrow \text{Ar}^+(3p^4 (^1\text{D}, ^3\text{P}) \text{nl}) + \text{B}^+$ ($\text{B} = \text{Na}, \text{K}, \text{Rb}, \text{Cs}$)
photon spectroscopy
 $5.7 \times 10^{-2} - 1.6 \times 10^{-1}$ keV/amu
- 90E40 Richter, C., Dowek, D., Houwer, J.C., Andersen, N.
Collision spectroscopy with aligned and oriented atoms : III. effects of initial orbital alignment on $\text{H}^+ \text{-Na}(3p)$ charge transfer.
J. Phys. B 23 3925 - 3932 1990 E
 $\text{H}^+ + \text{Na}(3p) \rightarrow \text{H}(n=2; n>3)$
translational energy spectroscopy
0.5 - 2 keV/amu
only relative cross sections
- 90E42 Roncin, P., Adjouri, C., Gaboriaud, M.N., Guillemot, L., Barat, M., Andersen, N.
Observation of orientation propensity for electron capture in multiply-charged-ion-atom collisions.
Phys. Rev. Letters 65 3261 - 3264 1990 E
 $\text{B}^{3+} + \text{He} \rightarrow \text{B}^{2+}(2p \rightarrow 2s)$
photon spectroscopy (polarizer)
0.2 - 1.7 keV/amu
- 90E41 Roncin, P., Gaboriaud, M.N., Guillemot, L., Laurent, H., Ohtani, S., Barat, M.
Electron capture by multiply charged ions on a helium target : a population mechanism for minor channels.
J. Phys. B 23 1215 - 1223 1990 E
 $\text{C}^{4+} + \text{He} \rightarrow \text{C}^{3+}; \text{C}^{6+} + \text{He} \rightarrow \text{C}^{5+}(\text{nl}); \text{N}^{6+} + \text{He} \rightarrow \text{N}^{5+}(\text{nl}); \text{O}^{6+} + \text{He} \rightarrow \text{O}^{5+}(\text{nl}); \text{O}^{8+} + \text{He} \rightarrow \text{O}^{7+}(\text{nl}); \text{O}^{8+} + \text{He} \rightarrow \text{O}^{6+}(n, n')$
translational energy spectroscopy + recoil ion coincidence
0.5 keV/amu
angular distribution
- 90E43 Sadilek, M., Vancura, J., Farnik, M., Herman, Z.
Beam scattering study of the charged transfer process $\text{N}^{2+}(\text{He}, \text{He}^+) \text{N}^+$ at low collision energies.
Int. J. Mass Spectro. Ion Proc. 100 197 - 207 1990 E
 $\text{N}^{2+}(^3\text{P}) + \text{He} \rightarrow \text{N}^+(^1\text{D}, ^3\text{P}) + \text{He}^+$
 $\sim 10^{-2}$ keV/amu

- 90E44 Sakaue, H.A. Kanai, Y. Ohta, K. Kushima, M. Inaba, T. Ohtani, S. Wakiya, K. Suzuki, H. Takayanagi, T. Kambara, T. Danjo, A. Yoshino, M. Awaya, Y. Autoionization of $C^{*}(2lnl')$ measured by electron spectroscopy in collisions of C^{6+} with He.
J. Phys. B 23 1401 - 405 1990 E
 $C^{6+} + He \rightarrow C^{*}(2lnl')$
electron spectroscopy
5 keV/amu
- 90E45 Sataka, M. Yagishita, A. Nakai, Y. Measurements of charge-changing cross sections in collisions of He and He⁺ and with H₂, O₂, CH₄, CO and CO₂.
J. Phys. B 23 1225 - 1234 1990 E
He + B → He⁺, He²⁺; He⁺ + B → He, He²⁺ (B = H₂, O₂, CH₄, CO, CO₂)
growth method
75 - 450 keV/amu
- 90E46 Schauer, M.M. Jefferts, S.R. Dunn, G.H. Nonresonant charge transfer in the threshold region for $^3He^{+} + ^4He^{+} \leftrightarrow ^3He + ^4He^{+}$
Phys. Rev. A 42 5332 - 5337 1990 E
 $^3He^{+} + ^4He \leftrightarrow ^3He + ^4He^{+}$
Penning trap
8 ~ 80 K
rate coefficient rates given
- 90E47 Schultz, D.R. Olson, R.E. Reinhold, C.O. Keck, S. Keck, C. Schmidt-Böcking, H. Ullrich, J. Coincident charge state production in $F^{8+} + Ne$ collisions.
J. Phys. B 23 3839 - 3847 1990 E
 $F^{8+} + Ne \rightarrow F^{5+}, F^{4+} + Ne^{+}$
projectile + recoil coincidence technique
 $5 \times 10^2 - 7.9 \times 10^2$ keV/amu
also $F^{8+} + Ne \rightarrow F^{7+} + Ne^{+}$
- 90E49 Schweinzer, J. Winter, H. Single electron capture from alkali atoms by slow doubly charged ions : I. He²⁺ (0.5 - 6 keV)-Li, Na, K-one-electron processes.
J. Phys. B 23 3881 - 3898 1990 E
He²⁺ + B → He⁺(nl) + B⁺ (B = Li, Na, K)
translational energy spectroscopy
0.125 - 1.5 keV/amu
- 90E48 Schweinzer, J. Winter, H. Single electron capture from alkali atoms by slow doubly charged ions : II. Ne²⁺, Ar²⁺ (0.5 - 6 keV)-Li, Na, K-two-electron processes.
J. Phys. B 23 3899 - 3908 1990 E
Ne²⁺(2p⁴3p, 1D, 3S) + B → Ne⁺{(2p⁴3p, 1D, 3S)nl} : Ar²⁺(3p⁴3p, 1D, 3S) + B → Ar⁺{(3p⁴3p, 1D, 3S)nl} (B = Li, Na, K)
translational energy spectroscopy
 $2.5 \times 10^{-2} - 0.3$ keV/amu (Ne) ; $1.25 \times 10^{-2} - 0.15$ keV/amu (Ar)
- 90E50 Shah, M.B. Gilbody, H.B. Ionization and electron capture in collisions of H⁺ and He²⁺ ions with carbon monoxide.
J. Phys. B 23 1491 - 1499 1990 E
 $A^{2+} + CO \rightarrow A^{2+} + CO^{+}$; $C^{+} + O, C + O^{+}, CO^{2+}, C^{+} + O^{+}, C^{2+}, A^{2+} + CO^{+}, C^{+} + O, C + O^{+}$ (A = H, He)
projectile-recoil coincidence method
10 - 98 keV/amu (H) ; 6.7 - 65 keV/amu (He)
- 90E51 Stollerfoht, N. Swenson, J.K. Havener, C.C. Meyer, F.W. Electron-correlation effects in double-electron capture collisions of 60 keV C⁶⁺ with He.
Phys. Rev. A 42 5396 - 5405 1990 E
 $C^{6+} + He \rightarrow C^{*}(nl nl')$
zero-degree electron spectroscopy
5 keV/amu
- 90E52 Tawara, H. Tonuma, T. Kumagai, H. Matsuo, T. Multiply charged carbon ions and their production mechanisms in MeV/amu Ar^{q+} (q = 14 - 4) + CH₄ collisions.
Phys. Scripta 42 434 - 438 1990 E
 $Ar^{q+} + CH_4 \rightarrow Ar^{(q-1)+}, Ar^{(q-2)+}, Ar^{(q-1)+}, Ar^{(q-2)+}$
projectile + recoil ion coincidence
 10^3 keV/amu
also multiply charged carbon ion production cross sections given
- 90E53 Tu, S. Church, D.A. Electron transfer collisions of Be²⁺ with H₂ and Be.
Chem. Phys. Letters 174 301 - 303 1990 E
Be²⁺ + H₂, Be → Be⁺
ion trap technique
thermal energies
rate coefficients at thermal energies

- 90E54 Vermeeren, L., Lievens, P., Silverans, R.E.
Velocity-dependent neutralization cross sections of Ba^+ ground and metastable states by Na.
Phys. Rev. A 42 3901 - 3906 1990 E
 $\text{Ba}^+(5d\ ^2D_{3/2},\ ^2D_{5/2}\ 6s) + \text{Na} \rightarrow \text{Ba}$
laser-pumping technique
- 90E55 Warczak, A., Siachura, Z., Szymanski, A., Stöhlker, Th., Kozhuharov, C., Livingston, A.E., Mokler, P.H., Reusch, S.
Evidence for resonant two-electron capture and excitation in collisions of H-like Ge with Ne.
Phys. Letters A 146 122 - 127 1990 E
 $\text{Ge}^{31+} + \text{Ne} \rightarrow \text{Ge}^{29+}$
X-ray-projectile coincidence technique
4.5 - 11.5x10³ keV/amu
- 90E56 Wilson, S.M., McLaughlin, T.K., McCullough, R.W., Gilbody, H.B.
State-selective electron capture by slow S^{2+} recoil ions in H, H_2 and He.
J. Phys. B 23 1315 - 1323 1990 E
 $\text{S}^{2+} + \text{H}, \text{H}_2, \text{He} \rightarrow \text{S}^{2+}(\text{nl})$
translational energy spectroscopy
0.075 - 0.28 keV/amu
no cross sections given
- 90E57 Wilson, S.M., McLaughlin, T.K., McCullough, R.W., Gilbody, H.B.
State selective electron capture by slow S^{2+} recoil ions in atomic and molecular hydrogen.
J. Phys. B 23 2969 - 2976 1990 E
 $\text{S}^{2+} + \text{H}, \text{H}_2 \rightarrow \text{S}^+(\text{nl})$
translational energy spectroscopy
0.06 - 0.25 keV/amu
no cross section given
- 90E58 Xu, Y., Moran, T.F., Thomas, E.W.
Charge-transfer reactions of ground-state $\text{C}^+(^2P)$ and metastable-state $\text{C}^+(^4P)$ ions with H_2 molecules.
Phys. Rev. A 41 1408 - 1412 1990 E
 $\text{C}^+(^2P, ^4P) + \text{H}_2 \rightarrow \text{C}^0$
beam attenuation + growth method
8x10⁻⁴ - 4x10⁻² keV/amu
- 90E59 Xu, Y., Thomas, E.W., Moran, T.F.
Charge transfer reactions of ground $\text{O}^+(^4S)$ and metastable $\text{O}^+(^2D, ^2P)$ ions with H_2 molecules.
J. Phys. B 23 1235 - 1243 1990 E
 $\text{O}^+(^4S, ^2D, ^2P) + \text{H}_2 \rightarrow \text{O}$
10⁻³ - 3x10⁻² keV/amu
metastable state cross sections cross sections.
Zouros, T.J.M., Bhailla, C.P., Lee, D.H., Richard, P.
Effects of alignment and interference in resonant transfer and excitation for F^{6+} and O^{3+} collisions with H_2 in zero-degree Auger measurements.
Phys. Rev. A 42 678 - 681 1990 E
 $\text{F}^{6+} + \text{H}_2 \rightarrow \text{F}^{3+}$; $\text{O}^{3+} + \text{H}_2 \rightarrow \text{O}^{4+}$
zero-degree electron spectroscopy
250 - 2000 keV/amu
- 90T45 Abramov, D.I., Ovchinnikov, S.Y., Solov'ev, E.A.
Quasi classical expression for parameters which determine non adiabatic transitions in a Z_1eZ_2 basis
Phys. Rev. A 42 6366 - 6378 1990 T
general formalism
adiabatic approx.
- 90T1 Allan, R.J., Courbin, C., Salas, P., Wamnon, P.
State-selective effects in the differential cross section for electron capture from laser-excited sodium atoms by protons.
J. Phys. B 23 L461 - 466 1990 T
 $\text{H}^+ + \text{Na}(3p) \rightarrow \text{H}(\text{nl}=2p)$
MO + CTMC
5x10⁻² - 1 keV/amu
- 90T2 Almeida, D.P., Langford, M.L.
Double electron capture in a Landau-Zener model : a reaction window.
Int. J. Mass Spectro. Ion Proc. 96 331 - 339 1990 T
 $\text{F}^+ + \text{Ne}, \text{Ar} \rightarrow \text{F}^0$; $\text{O}^+ + \text{Ar} \rightarrow \text{O}^0$; $\text{I}^+ + \text{Mg} \rightarrow \text{I}^0$; $\text{C}^{4+} + \text{He} \rightarrow \text{C}^{2+}$
Landau-Zener model
- 90T41 Ast, H., Ludde, H.J., Dreizler, R.M.
Optical potentials in ion-atom collisions: II. effective one-electron systems.
J. Phys. B 23 2305 - 2320 1990 T
 $\text{H}(1s) + \text{B} \rightarrow \text{H}(2s, 2p), \text{H}^+$ ($\text{B} = \text{He}, \text{Ne}, \text{Ar}$); $\text{H}(2s) + \text{B} \rightarrow \text{H}^+, \text{H}(\text{nl})$
truncated coupled-channel calculations
1 - 10² keV/amu

- 90T 4 Avakov, G.U. Ashurov, A.R. Blokhinisev, L.D. Kadyrov, A.S. Mukhamedzhanov, A.M. Poleyeva, M.V.
Three-body approach to the atomic reactions of electron transfer II. calculation of total cross sections.
J. Phys. B 23 4151 - 4164 1990 T
 $H^+ + H(1s), He(1s^2) \rightarrow H(nlm) : He^{2+} + H(1s) \rightarrow He^+(nlm)$
Fadeev three-body approach
 $0.1 - 10^3 \text{ keV/amu } (H^+); 0.1 - 10^2 \text{ keV/amu } (He^{2+})$
- 90T 3 Avakov, G.V. Ashurov, A.R. Blokhinisev, L.D. Mukhamedzhanov, A.M. Poleyeva, M.V.
Three-body approach to the atomic reactions of electron transfer I. theory.
J. Phys. B 23 2309 - 2326 1990 T
Alt-Grassberger-Sandhas three-body equations
- 90T 5 Badnell, N.R.
L-shell resonant transfer and excitation in niobium ions.
Phys. Rev. A 42 204 - 208 1990 T
 $Nb^{38+} + H_2 \rightarrow Nb^{(q-1)+*} (q = 28 - 32)$
impulse approx.
 $1.5 \times 10^3 - 15 \times 10^3 \text{ keV/amu}$
- 90T 6 Badnell, N.R.
K-shell resonant transfer excitation and excitation in calcium ions.
Phys. Rev. A 42 209 - 213 1990 T
 $Ca^{19+} (q = 10 - 12, 16 - 19) + H_2 \rightarrow Ca^{(q-1)+*}$
impulse approx.
 $9 \times 10^3 - 19 \times 10^3 \text{ keV/amu}$
- 90T 7 Badnell, N.R.
Anisotropic radiative emission effects on deduced resonant-transfer-excitation cross sections.
Phys. Rev. A 42 3795 - 3800 1990 T
hyperfine structure effect on anisotropic radiation
- 90T 8 Baer, M. Ng, C.Y.
A three-dimensional quantum mechanical study of the $H_2 + H_2^+$ system : calculation of reactive and charge transfer cross sections.
J. Chem. Phys. 93 7787 - 7799 1990 T
 $H_2^+(v=0) + H_2(v=0) \rightarrow H_2 + H_2^+$
Infinite order sudden approx. (IOSA)
 $1.25 \times 10^{-4} - 2.5 \times 10^{-4} \text{ keV/amu}$
- 90T46 Barany, A.
Barrier model describing collisions of highly charged ions
Phys. Scripta 42 280 - 284 1990 T
general review
- 90T42 Barrachina, R.O.
Collisional electron capture to the continuum of neutral projectiles.
J. Phys. B 23 2321 - 2332 1990 T
 $He + B \rightarrow (He + e) + B^+$
ab initio calculation
75 keV/amu
narrower than He^+
- 90T47 Belkic, D. Mancav, I.
Single electron capture from carbon by completely stripped projectiles
Phys. Scripta 42 285 - 292 1990 T
 $A^{Z_1} + C \rightarrow A^{(Z_1-1)+}(nl) + C^+(K^{-1})$
CBI
 $150 - 2.0 \times 10^4 \text{ keV/amu } (H) ; 75 - 2250 \text{ keV/amu } (He) ; 100 - 3000 \text{ keV/amu } (Li)$
- 90T43 Bhalla, C.P.
Angular distribution of Auger electrons and photons in resonant transfer and excitation in collisions of ions with light targets.
Phys. Rev. Letters 64 1103 - 1106 1990 T
 $Fe^{18+} + H_2 \rightarrow Fe^{17+}(2p^2 \text{ } ^1D)$
 $1 \times 10^3 \text{ keV/amu}$
non-isotropic distributions of Auger electrons and photons
- 90T 9 Chen, M.H.
Resonant transfer and excitation in collisions of Ca^{19+} with H_2 and He targets.
Phys. Rev. A 42 5228 - 5231 1990 T
 $Ca^{19+} (q = 16 - 19) + B \rightarrow Ca^{(q-1)+*} (B = H_2, He)$
Impulse approximation with MCDF
 $3.5 \times 10^3 - 10^4 \text{ keV/amu}$
- 90T10 Courbin, C. Allan, R.J. Salas, P. Wahnnon, P.
Total and differential charge transfer cross sections in $H^+ + Na(3s)$ or $Na^+(3p)$ collisions.
J. Phys. B 23 3909 - 3924 1990 T
 $H^+ + Na(3s, 3p) \rightarrow H(n=2) + Na^+$
MO
 $0.5 - 5 \text{ keV/amu}$

- 90T11 Crothers, D.S.F. Kunseath, K.M.
Target continuum distorted-wave theory for collisions of fast protons with atomic hydrogen.
J. Phys. B 23 L365 - 371 1990 T
 $H^+ + H \rightarrow H + H^+$
 5×10^3 keV/amu
differential cross sections
- 90T12 Datta, S.K. Crothers, D.S.F. McCarroll, R.
The relation between the Coulomb-Born and the boundary-corrected first-order Born approximations for electron capture.
J. Phys. B 23 479 - 493 1990 T
 $H^+ + Ne \rightarrow H + Ne^+(K^{-1})$
Coulomb-Born, boundary-corrected Born
 $10^3 - 6 \times 10^3$ keV/amu
- 90T13 Decker, F.
Second Born approximation for relativistic electron capture : exact Monte Carlo calculations for C^{6+} -Au and Ar^{18+} -Ag collisions.
Phys. Rev. A 41 6552 - 6554 1990 T
 $C^{6+} + Au \rightarrow C^{3+}(1s) + Au^+(K^-)$; $Ar^{18+} + Ag \rightarrow Ar^{17+}(1s) + Ag^+(K^-)$
second OBK approx.
 $4 \times 10^3, 1 \times 10^6$ keV/amu (Ar)
- 90T14 Dube, L.J. Mensour, B. Dewangan, D.P. Chakraborty, H.S.
Comment on the analytic evaluation of the B1B cross sections.
J. Phys. B 23 L711 - 714 1990 T
analytic evaluation of 1s-1s electron transfer
- 90T15 Erea, L.F. Mendez, L. Riera, A.
Modified molecular treatment of $He^+ + H^+$ collisions up to $v=2.5$ a.u.
Europhys. Letters 13 43 - 48 1990 T
 $He^+ + H^+ \rightarrow He^{2+} + H$; $He^{2+} + H^+ + e$
MO
5 - 150 keV/amu
- 90T16 Fritsch, W. Kimura, M. Lane, N.F.
Comparative molecular-orbital and atomic-orbital study of electron transfer and excitation in $He^+ + Na(3s)$ collisions at energies of 0.05 to 20 keV/amu.
Phys. Rev. A 41 508 - 511 1990 T
 $He^+ + Na(3s) \rightarrow$
AO, MO
0.05 - 20 keV/amu
also excitation to 3p state studied
- 90T17 Fritsch, W. Tawara, H.
Calculation of electron transfer cross sections in $Si^{9+} + H$ ($q = 4 - 14$) collisions at energies of 0.5 - 14 keV/amu.
Nucl. Fusion 30 373 - 382 1990 T
 $Si^{9+} + H \rightarrow Si^{(q-1)+}(nl)$ ($q = 4, 6, 7-14$)
AO
0.5 - 14 keV/amu
 $n=6$ dominant
- 90T18 Furlan, R.J. Russek, A.
Electron excitation in collisions of H_2^+ on He.
Phys. Rev. A 42 6436 - 6442 1990 T
 $H_2^+(1\sigma_g) + He(1s^2) \rightarrow H_2(1\sigma_g^2) + He^+(1s)$; $H_2(1\sigma_g, 1\sigma_u) + He^+(1s)$
MO
0.2 - 6 keV/amu
- 90T19 Gargaud, M. McCarroll, R. Lennon, M.A. Wilson, S.M. McCullough, R.W. Gilbody, H.B.
One-electron capture by slow Al^{2+} ions in atomic and molecular hydrogen.
J. Phys. B 23 505 - 511 1990 T
 $Al^{2+} + H, H_2 \rightarrow Al^+(total)$
E : recoil ions from vapor ; T : MO
0.01 - 2 keV/amu
- 90T20 Gianturco, F.A. Palma, A. Sempri, E. Stefani, F. Baer, M.
Coupled quantum treatment of vibrationally inelastic and vibronic charge transfer in proton- O_2 collisions.
Phys. Rev. A 42 3926 - 3939 1990 T
 $H^+ + O_2 \rightarrow H + O_2^+(v)$
infinite-order sudden approx.
 2.3×10^2 keV/amu

- 90T21 Grozdanov, T.P. Solovov, E.A.
Charge exchange, excitation and ionization via hidden avoided crossings.
Phys. Rev. A 42 2703 - 2718 1990 T
 $\text{He}^{2+} + \text{H}(1s) \rightarrow \text{He}^+ + \text{H}^+ ; \text{H}^+ + \text{He}^+(1s) \rightarrow \text{H} + \text{He}^{2+}$
asymptotic theory (nonadiabatic transition)
0.2 - 2.5 keV/amu
also ionization, excitation cross sections given
- 90T22 Hahn, Y. Dalgarno, A.
Production of negative hydrogen ions in neutral H + H collisions.
Phys. Rev. A 41 4783 - 4790 1990 T
 $\text{H}(1s) + \text{H}(1s) \rightarrow \text{H}^+ + \text{H}^- ; \text{H}(2s) + \text{H}(1s) \rightarrow \text{H}^+ + \text{H}^-$
distorted wave theory
0.2 - 2×10^2 keV/amu
- 90T23 Hansen, J.P. Kobach, L. Dubois, A. Nielsen, S.E.
Orientation and alignment effects for capture in multiply charged ion-atom collisions.
Phys. Rev. Letters 64 2491 - 2494 1990 T
 $\text{B}^{3+}(1s^2) + \text{He} \rightarrow \text{B}^{2+}(1s^2p)$
coupled-channel calculation
0.25 - 625 keV/amu
capture probability, orientation parameter, alignment angle as a function of impact parameter and of velocity.
- 90T24 Harel, C. Jouin, H.
Autoionizing double capture in N^{7+} on helium collisions at low energies.
Europhys. Letters 11 121 - 126 1990 T
 $\text{N}^{7+} + \text{He}(1s^2) \rightarrow \text{N}^{6+}(nl) + \text{He}^+(1s) ; \text{N}^{3+,4+}(n'l',n''l'') + \text{He}^{2+}$
MO
0.72 - 4.6 keV/amu
- 90T25 Jakubassa-Amundsen, D.H.
Relativistic second-order Born theory for electron capture.
Phys. Rev. A 42 653 - 654 1990 T
semiclassical theory
- 90T26 Kumar, A. Lane, N.F. Kimura, M.
Selective-state charge transfer in a collision between an alpha particle and ground-state Na: a molecular-state approach.
Phys. Rev. A 42 3861 - 3864 1990 T
 $\text{He}^{2+} + \text{Na} \rightarrow \text{He}^+(n=3) + \text{Na}^+$
semiclassical IP with MO
0.1 - 10 keV/amu
- 90T27 Luc-Koenig, E. Bauche, J.
Radiative and non-radiative decays of doubly-excited configurations in Ar^{2+} spectrum.
J. Phys. 23 1763 - 1782 1990 T
 $\text{Ar}^{2+} \rightarrow \text{Ar}^{2+}(1s^2 2s^2 2p^4 n l n'l') ; 1s^2 2s^2 2p^4 n l n'l')$
configuration-average method
energy level, wave length, radiative, non-radiative transition probabilities
- 90T48 Macek, J.H. Barrachina, R.O.
Born expansions and charged particle scattering
Comm. At. Mol. Phys. 24 287 - 297 1990 T
higher order terms in Born expansions
- 90T28 Mandal, C.R. Mandal, M. Mukherjee, S.C.
K-shell capture by He^{2+} and Li^{3+} on carbon and neon.
Phys. Rev. A 42 1803 - 1805 1990 T
 $\text{He}^{2+} + \text{B} \rightarrow \text{He}^+(1s, 2s, 2p, \text{total}) + \text{B}^-(\text{K}^-) ; \text{Li}^{3+} + \text{B} \rightarrow \text{Li}^{2+}(1s, 2s, 2p, \text{total}) + \text{B}^+$
(K) (B=C, Ne)
peaking impulse approx.
 $25 - 10^3$ keV/amu (He) ; $1.1 \times 10^3 - 3 \times 10^3$ keV/amu (Li)
- 90T29 Martinez, A.E. Rivarola, R.D.
Second-order distorted-wave approximations for charge exchange.
J. Phys. B 23 4165 - 4180 1990 T
 $\text{H}^+ + \text{H}(1s) \rightarrow \text{H}(1s) + \text{H}^+ ; \text{H}^+ + \text{Ar}(1s) \rightarrow \text{H}(1s) + \text{Ar}^+$
second-order CDW-EISA
 5×10^3 keV/amu (H) ; $10^3 - 2 \times 10^4$ keV/amu (Ar)
- 90T30 Mendez, L. Cooper, I.L. Dickinson, A.S. Mo, O. Riera, A.
Molecular treatment of mutual neutralization in slow $\text{Li}^+ + \text{H}^-$ collisions.
J. Phys. B 23 2797 - 2810 1990 T
 $\text{Li}^+ + \text{H}^- \rightarrow \text{Li}(1s^2 nl) + \text{H}(1s)$ ($nl = 2s, 2p, 3s$)
MO

- 90T31 Meng, L. Reinhold, C.O. Olson, R.E.
Subshell electron capture in collisions of fully stripped ions with He and H₂ at intermediate energies.
Phys. Rev. A 42 5286 - 5291 1990 T
 $A^{Z+} + He, H_2 \rightarrow A^{(Z-1)+}(nl)$ ($A = H, He, Li, C, O, Ne, Si, P$)
CTMC
20 - 2×10^3 keV/amu
- 90T32 Mo, O. Riera, A.
Charge exchange in $He^+ + Na(3p)$ collisions.
J. Phys. B 23 L373 - 377 1990 T
 $He^+ + Na(3p) \rightarrow He + Na^+$
MO
0.2 - 1 keV/amu
- 90T33 Nielsen, S.E. Hansen, J.P. Dubois, A.
Propensity rules for orientation in singly charged ion-atom collisions.
J. Phys. B 23 2595 - 2612 1990 T
 $H^+ + Na(3s, 3p) \rightarrow H(2s, 2p)$
AO + IP with ETF
0.25 - 225 keV/amu
- 90T34 Pascale, I. Olson, R.E. Reinhold, C.O.
State-selective capture in collisions between ions and ground- and excited state alkali metal atoms.
Phys. Rev. A 42 5305 - 5314 1990 T
 $Na^+ + Na(28d) \rightarrow Na(nlm)$; $N^{4+}, Ar^{2+} + Cs(6s) \rightarrow N^{3+}(nlm), Ar^{2+}(nlm)$
CTMC
- 90T35 Schmidt, A. Horbatsch, M. Dreizler, R.M.
Semiclassical phase space description of ionization and capture for ions colliding with hydrogen-like targets.
J. Phys. B 23 2327 - 2340 1990 T
 $H^+ + B \rightarrow H + B^+$; $H^+ + B^+ + e$ ($B = H, He^+, Li^{2+}$): $A^Z + H \rightarrow A^{(Z-1)+} + H$; $A^{Z+} + H^+ + e$ ($A = He, Li, C, Ne$): $Li^{3+} + Li^{4+} \rightarrow Li^{2+} + Li^{3+}$; $Li^{3+} + Li^{3+} + e$
semiclassical calculation
 $10 - 10^3$ keV/amu
- 90T36 Shingal, R. Bransden, B.H.
Neutralization in $H^+ + H$ and ion pair production in $H + H$ collisions.
J. Phys. B 23 1203 - 1214 1990 T
 $H^+ + H^+ \rightarrow H + H$; $H + H \rightarrow H^+ + H^+$
coupled-channel calculation
0.15 - 50 keV/amu
- 90T37 Slim, H.A. Heck, E.L. Bransden, B.H. Flower, D.R.
Calculated cross sections for electron capture by protons from helium into the $H(n=3)$ level.
J. Phys. B 23 L611 - 617 1990 T
 $H^+ + He \rightarrow H(n=3)$
semiclassical impact parameter method with AO
0.02 - 0.15 keV/amu
- 90T49 Stary, C. Lüdtke, H.J. Dreizler, R.M.
Optical, potential description of collisions of p and anti-p with alkali atoms
J. Phys. B 23 263 - 277 1990 T
 $p, \text{anti-}p + Na(3s)$; $Li(2s) \rightarrow Na(3l), Na^+$; $Li(2p), Li^+$
Optical potential approach
 $1 - 10^4$ keV/amu
- 90T38 Stoddeu, C.D. Monkhurst, H.J. Szalowicz, K.
Muon reactivation in muon-catalyzed d-t fusion from accurate p-He⁺ stripping and excitation cross sections.
Phys. Rev. A 41 1281 - 1292 1990 T
 $H^+ + He^+ \rightarrow H + He^{2+}$
Sturmian method
 $70 - 3 \times 10^3$ keV/amu
- 90T44 Szoter, L.
Comment on observation of electron capture into continuum states of neutral atoms.
Phys. Rev. Letters 64 2835 1990 T
general comments
- 90T39 Taubjerg, K. Barrachina, R.O. Macek, J.H.
Perturbation theory for strongly interacting atomic system.
Phys. Rev. A 41 207 - 219 1990 T
 $H^+ + Ar \rightarrow H^0 + Ar^+(K^-)$
Strong potential Born approx.
 $10^3 - 2 \times 10^4$ keV/amu

Distorted-wave approximations for relativistic atomic collisions.

Phys. Rev. A 41 5221 - 5224 1990 T

$H^+ + H \rightarrow H(1s) : U^{92+} + U^{91+} \rightarrow U^{91+}(1s)$

distorted-wave approx.

10^2 keV/amu (H^+) ; 5×10^5 keV/amu (U^{92+})

spin flip cross sections given

- 91E1 Andersson, L.R. Cederquist, H. Barany, A. Liljeby, L. Biedermann, C. Levin, J.C. Keller, N. Elston, S.B. Gibbons, J.P. Kimura, K. Sellin, I.A.
Simultaneous single-electron capture and projectile-core excitation enhanced through configuration interaction in very slow Ar^{6+} - He collisions.
Phys. Rev. A 43 4075 - 4078 1991 E
 $\text{Ar}^{6+} + \text{He} \rightarrow \text{Ar}^{5+}(3s^24s, 3s^24p, 3s3p3d)$
E : position-sensitive method ; T : multichannel Landau-Zener model
 1.6×10^{-3} - 1.3×10^{-2} keV/amu
angular distribution
- 91E2 Atan, H. Sieckelmacher, W. Lucas, M.W.
Single electron loss and single electron capture for 0.6 - 2.2 MeV colliding with rare gases.
J. Phys. B 24 2559 - 2569 1991 E
 $\text{He}^+ + \text{B} \rightarrow \text{He}^{2+}, \text{He}^0$ (B = He, Ne, Ar)
growth method
125 - 550 keV/amu
- 91E3 Aumayr, F. Gieler, M. Unterreiter, E. Winter, H.
State-selective electron capture by He^{2+} ions from laser-excited $\text{Na}^*(3p)$.
Europhys. Letters 16 557 - 561 1991 E
 $\text{He}^{2+} + \text{Na}(3p) \rightarrow \text{He}^+(n=4,5) ; \text{He}^{2+} + \text{Na}(3s) \rightarrow \text{He}^+(n=3)$
translational energy spectroscopy
1.5 keV/amu
- 91E4 Belyaev, V.A. Dubrovin, M.M. Khlopkin, A.N.
Measurement of the effective charge exchange cross section of hydrogen atoms on triply charged carbon ions.
Sov. J. Plasma Phys. 17 337 - 341 1991 E
 $\text{C}^{3+} + \text{H} \rightarrow \text{C}^{2+}$
merged-beam method
 1.5×10^{-3} - 0.7 keV/amu
- 91E5 Bernstein, E.M. Kanal, A. Zaharakis, K.E. Clark, M.W. Tanis, J.A. Ferguson, S.M. Badnell, N.R.
Resonant transfer excitation in collisions of F^{6+} and Mg^{9+} with H_2 .
Phys. Rev. A 44 4210 - 4214 1991 E
 $\text{F}^{6+}, \text{Mg}^{9+}(1s^22s) + \text{H}_2 \rightarrow \text{F}^{5+}, \text{Mg}^{8+}(1s^2n1\pi')$
X-ray-particle coincidence technique
 1.90×10^2 - 2×10^3 keV/amu (F) ; 1.3×10^3 - 2.5×10^3 keV/amu (Mg)
- 91E58 Bochkova, O.P. Ivakin, I.A. Kuligin, A.V. Ostrovskii, V.N. Tolmachev, Yu.A.
Charge exchange with ion excitation in the $\text{He}^+ - \text{Cd}$ system
Opt. Spectrosc. (USSR) 70 9 - 13 1991 E
 $\text{He}^+ + \text{Cd} \rightarrow \text{He} + \text{Cd}^{*}(n1) ; \text{He}^+(2s) + \text{Cd}^*(5s5p^1P_1) \rightarrow \text{Cd}^{*}(71,101)$
E : pulsed electron beam technique ; T : Mo model
thermal velocities
rate coefficients
- 91E6 Boudjema, M. Comille, M. Dubau, J. Moretto-Capelle, P. Bordenave-Montesquieu, A. Beroit-Catin, P. Gleizes, A.
Investigation of double capture in $\text{Ne}^{8+} + \text{He}, \text{H}_2$ by electron spectroscopy at 80 keV
II. experimental results.
J. Phys. B 24 1713 - 1737 1991 E
 $\text{Ne}^{8+}(1s^2) + \text{He}, \text{H}_2 \rightarrow \text{Ne}^{6+}(1s^23n1') ; 1s^24n1')$
electron spectroscopy
4 keV/amu
- 91E7 Campbell, E.E.B. Witte, R. Hertel, I.V.
Integral alignment of $\text{Na}(3p)$ in resonant charge transfer collisions.
J. Phys. B 24 4245 - 4247 1991 E
 $\text{Na}^+ + \text{Na}(3p) \rightarrow \text{Na}(3p\sigma, \pi^*, \pi)$
laser-excited technique
 4×10^{-3} - 1×10^{-1} keV/amu
relative cross section
- 91E59 Cederquist, H. Barany, A.
Absolute experimental and model cross sections for slow ions of very high charge colliding with He
Phys. Scripta T30 94 - 100 1991 E
a review/modified classical over-barrier model
- 91E8 Cederquist, H.
Transfer excitation in slow collisions between ions of very high charge and two-electron targets.
Phys. Rev. A 43 2306 - 2310 1991 E
 $\text{Xe}^{q+}(q = 10 - 31) + \text{He} \rightarrow \text{Xe}^{(q-1)+} + \text{He}^{*} ; \text{Xe}^{q+2+} + \text{He}^{2+}$
E : growth method ; T : extended over-barrier model
 $3 \times 10^{-2} \text{ to } 3 \times 10^{-1}$ keV/amu

- 91E9 Cederquist, H.
Radiative stabilization following transfer of two electrons to Xe^{n+} (q535) in slow collisions with He and Xe.
Z. Phys. D 21 S99 - 104 1991 E
review
- 91E12 Cheng, S. Cocke, C.L. Frohne, V. Kamber, E.Y. Varghese, S.L.
Electron capture by O^{8+} from aligned molecular deuterium.
Nucl. Instr. Meth. in Phys. Res. B 56/57 78 - 81 1991 E
 $\text{O}^{8+} + \text{D}_2 \rightarrow \text{O}^{7+}$
recoil-ion-projectile ion coincidence technique
625 keV/amu
- 91E11 Cherkani, C.H. Sz%u#lu#cs, S. Hus, H. Brouillard, F.
Transfer ionization in He^{2+} - H^- collisions: measurements of the exothermicity and theoretical interpretation.
J. Phys. B 24 2367 - 2377 1991 E
 $\text{He}^{2+} + \text{H}^- \rightarrow \text{He}^+ + \text{H}^+ + e$
E: merged beam technique; T: semiclassical calculation
single electron capture at large theta + resonant Penning ionization at small theta.
- 91E10 Cherkani, M.H. Sz%cs, S. Terno, M. Hus, H. Brouillard, F.
Transfer ionization in He^{2+} - H^- collisions : cross section measurements in the energy range 0.2 - 1300 eV.
J. Phys. B 24 209 - 218 1991 E
 $\text{He}^{2+} + \text{H}^- \rightarrow \text{He}^+ + \text{H}^+ + e$
merged beam technique with coincidence
 5×10^{-3} - 0.4 keV/amu
- 91E13 Cline, R.A. Westerveld, W.B. Rislley, J.S.
Measurement of electron-transfer cross sections for intermediate-energy H^+ - He collisions.
Phys. Rev. A 43 1611 - 1613 1991 E
 $\text{H}^+ + \text{He} \rightarrow \text{H}(3l) + \text{He}^+$
photon spectroscopy
25 - 100 keV/amu
- 91E14 Cornille, M. Ludac, T. Hitz, D. Bliman, S. Heckman, G.A. Knystautas, E.J.
Spectroscopic study of low-velocity charge-exchange collisions of S^{n+} ions with H_2 and He targets.
Phys. Rev. A 43 115 - 120 1991 E
 $\text{S}^{7+} + \text{H}_2, \text{He} \rightarrow \text{S}^{6+}, \text{S}^{5+}(\text{nl})$
photon spectroscopy
2 keV/amu
no absolute cross sections
- 91E60 Dhuitq, D. Benoit, C.
Vibrational excitation in proton-hydrogen collisions at medium energies
J. Phys. B 24 3599 - 3611 1991 E
 $\text{H}^+ + \text{H}_2(X^1\Sigma_g^-, v=0) \rightarrow \text{H}^+ + \text{H}_2(X^1\Sigma_g^+, v)$; $\text{H} + \text{H}_2^+$
translational energy spectroscopy
0.09 - 1.0 keV/amu
angular distributions
- 91E15 Donnelly, A. Geddes, J. Gilbody, H.B.
Balmer alpha emission in collisions of H^+ , He^+ and He^{2+} with hydrogen atoms.
J. Phys. B 24 165 - 172 1991 E
 $\text{H}^+, \text{He}^+, \text{He}^{2+} + \text{H} \rightarrow \text{H}(\text{Balmer-alpha})$
crossed-beam method
 $2.5 - 10^3$ keV/amu
charge transfer is important at low $\text{H}^+ + \text{H}$ collisions.
- 91E16 Donnelly, A. Geddes, J. Gilbody, H.B.
Balmer alpha emission in collisions of He^+ and He^{2+} ions with hydrogen.
J. Phys. B 24 3403 - 3408 1991 E
 $\text{He}^+, \text{He}^{2+} + \text{H}_2 \rightarrow \text{H}^*(n = 3 \rightarrow 2)$
 $2.5 - 25$ keV/amu (He^+) ; $17 - 67$ keV/amu (He^{2+})
dissociative electron capture
- 91E17 Doweik, D. Houwer, J.C. Richter, C. Andersen, N.
Collision spectroscopy with aligned and oriented atoms IV. neutralization in H^- - $\text{Na}(3s, 3p)$ collisions.
Z. Phys. D 18 231 - 234 1991 E
 $\text{H}^- + \text{Na}(3s, 3p) \rightarrow \text{H}$
translational energy spectroscopy + laser excitation
0.15 - 1.5 keV/amu

- 91E18 Dupeyrat, G. Marquette, J.B. Rowe, B.R. Rebrion, C.
Reactions of $\text{Ar}^{2+}(\text{p})$ ions with some neutrals at 30K.
Int. J. Mass Spectro. Ion Proc. 103 149 - 156 1991 E
 $\text{Ar}^{2+}(\text{p}) + \text{B} \rightarrow \text{Ar}^+ (\text{B} = \text{He}, \text{Ar}, \text{H}_2, \text{N}_2, \text{O}_2, \text{CO}_2)$
30K
rate coefficients at 30K.
- 91E19 Gao, R.S. Johnson, L.K. Smith, G.J. Hakes, C.L. Smith, K.A. Lane, N.F. Stebbings, R.F. Kimura, M.
Collisions between H^+ and H_2 at kilo-electron-volt energies: absolute differential cross sections for small-angle direct, single- and double-charge-transfer scattering.
Phys. Rev. A 44 5599 - 5604 1991 E
 $\text{H}^+ + \text{H}_2 \rightarrow \text{H}, \text{H}^+$
E : scattering experiment ; T : MO model
0.5, 1.5, 5.0 keV/amu
angular distribution
- 91E22 Gieler, M. Aumayr, F. Hutteneder, M. Winter, H.
Laser enhanced $\text{Li}\tilde{\text{e}}$ emission from (50eV - 15 keV) H^+ - Na collisions.
J. Phys. B 24 4419 - 4429 1991 E
 $\text{H}^+ + \text{Na}(3s, 3p) \rightarrow \text{H}^*(2p, 2s \rightarrow 1s)$
photon-spectroscopy + laser-excitation
0.05 - 15 keV/amu
- 91E20 Gieler, M. Aumayr, F. Ziegelwanger, P. Winter, H. Fritsch, W.
 $\text{Li}\tilde{\text{e}}$ emission from (0.1 - 20 keV) H^+ impact on Li, Na and K .
Phys. Rev. A 43 127 - 133 1991 E
 $\text{H}^+, \text{D}^+ + \text{B} \rightarrow \text{H}, \text{D}(2p\text{-Lyman-alpha}) (\text{B} = \text{Li}, \text{Na}, \text{K})$
photon spectroscopy
0.1 - 20 keV/amu
- 91E21 Gieler, M. Ziegelwanger, P. Aumayr, F. Winter, H. Fritsch, W.
Experimental and theoretical investigation of electron capture and target excitation in (1 - 20 keV) H^+ - K collisions.
J. Phys. B 24 647 - 655 1991 E
 $\text{H}^+ + \text{K}(4s) \rightarrow \text{H} + \text{K}^+ ; \text{H}^+ + \text{K}^*(4p \rightarrow 4s)$
growth + photon spectroscopy
1 - 20 keV/amu
- 91E61 Gord, J.R. Freiser, B.S. Buckner, S.W.
Kinetic energy release in thermal ion-molecule reactions : the $\text{Nb}^{2+}(\text{benzene})$ single charge transfer reaction
J. Chem. Phys. 94 4282 - 4290 1991 E
 $\text{Nb}^+ + \text{C}_6\text{H}_6 \rightarrow \text{Nb}^+$
Fourier transform ion cyclotron resonance method
rate coefficient at thermal velocities
- 91E23 Hansen, S.B. Gray, L.G. Hordal-Pedersen, E. McAdam, K.B.
Velocity dependence of total charge transfer from state-selected Na Rydberg targets.
J. Phys. B 24 L315 - 320 1991 E
 $\text{Na}^+ + \text{Na}(n, l) \rightarrow \text{Na}(n'l'm') + \text{Na}^+ (n' = 22 - 41)$
laser-excited target
relative cross sections
- 91E24 Higgins, M.J. Latimer, C.J.
The production of highly excited xenon atoms in charge exchange collisions.
J. Phys. B 24 2571 - 2578 1991 E
 $\text{Xe}^+ + \text{B} \rightarrow \text{Xe}^*(n=24-43) + \text{B}^+ (\text{B} = \text{He}, \text{Ne}, \text{Ar}, \text{CH}_4) ; \text{H}^+ + \text{Ne} \rightarrow \text{H}^*(n=24-43)$
field-ionization technique
- 91E62 Hippler, R. Plotzke, O. Harbich, W. Madeheim, H. Kleinpoppen, H. Lutz, H.O.
Electron dipole moments of $\text{H}(n=2)$ induced in H^+ - He and H^+ - He collisions
Phys. Rev. A 43 2587 - 1991 E
 $\text{H}^+ + \text{He} \rightarrow \text{H}(n=2)$
Lyman-alpha spectroscopy/quenching by external field
5 - 25 keV/amu
 $\text{H} + \text{He} \rightarrow \text{H}(n=2)$
- 91E25 Hoekstra, R. de Heer, F.J. Morgenstern, R.
State-selective electron capture in collisions of He^{2+} with H .
J. Phys. B 24 4025 - 4048 1991 E
 $\text{He}^{2+} + \text{H} \rightarrow \text{He}^*(2p \rightarrow 1s ; 3p \rightarrow 1s ; 4p \rightarrow 1s ; n=3 \rightarrow 2 ; 4 \rightarrow 3 ; n=4s, 4p, 4d)$
2 - 13 keV/amu
- 91E26 Hoekstra, R. de Heer, F.J. Morgenstern, R.
Photons shedding light upon basic charge exchange processes.
Z. Phys. D 21 S81 - 85 1991 E
review

- 91E27 Holt, R.A. Prior, M.H. Randall, K.L. Hutton, R. McDonald, J. Schneider, D.
Magnetic substrates populated by double-electron capture.
Phys. Rev. A 43 607 - 610 1991 E
 $C^{5+} + He \rightarrow C^{3+}(1s2l^2L) \rightarrow C^{4+}(1s^2) + e$
electron spectroscopy
1.5 - 5 keV/amu
relative population among L
- 91E28 Hopkins, C.J. Dunn, K.F. Gilbody, H.B.
Ionization and charge transfer in collisions of protons with Ba^+ and Sr^+ ions.
J. Phys. B 24 2379 - 2385 1991 E
 $H^+ + B^+ \rightarrow H + B^{2+}; H^+ + B^{2+} + e$ ($B = Ba^+, Sr^+$)
crossed beam method
50 - 500 keV/amu
- 91E29 Hughes, I.G. Dunn, K.F. Gilbody, H.B.
Electron capture in H^+-Ti^+ collisions.
J. Phys. B 24 L485 - 487 1991 E
 $H^+ + Ti^+ \rightarrow H + Ti^{2+} + (n-2)e$ ($n \geq 2$)
crossed-beam technique
 $2 \times 10^2 - 5 \times 10^2$ keV/amu
dominant transfer ionization
- 91E30 Hultsinger, H.P. Reinberg, B. Meyerhof, W.E. Baldochem, A. Alonso, J.B. Brunerfeld, L. Dillard, P.A. Gould, H. Guardiola, N. Krebs, C.F. McFahen, M.A. Rhodes-Brown, M.E. Rude, R.S. Schweppa, J. Spooner, D.W. Street, K. Thibergsen, P. Wagner, H.E.
Electron-electron interaction in projectile electron loss.
Phys. Rev. A 44 1712 - 1724 1991 E
 $Li^{2+}, C^{3+}, O^{7+} + H_2, He \rightarrow Li^{1+}, C^{6+}, O^{8+}; Au^{32+}, Au^{73+} + B \rightarrow Au^{53+}, Au^{76+}$ ($B = H_2, He, C, N_2$); $U^{86+}, U^{90+} + H_2, He \rightarrow U^{87+}, U^{91+}$
 $7.5 \times 10^2 - 4 \times 10^3$ keV/amu
- 91E31 Hutton, R. Schneider, D. Prior, M.H.
Isoelectronic study of double-electron capture in slow ion-atom collisions.
Phys. Rev. A 44 243 - 252 1991 E
 $Si^{13+}, Ar^{9+}, Sc^{12+}, Ti^{13+}, Fe^{17+}, Cu^{20+} + He \rightarrow Si^{13+}, Ar^{7+}, Sc^{10+}, Ti^{11+}, Fe^{15+}, Cu^{18+}$
Auger-electron spectroscopy
1.4 keV/amu
Auger electron spectra; no cross section given
- 91E32 Irvine, A.D. Latimer, C.J.
Charge transfer reactions of ground state O^+ ions with H_2 molecules.
J. Phys. B 24 L145 - L147 1991 E
 $O^+(^4S) + H_2 \rightarrow O + H_2^+$
photoionization source + growth technique
 $6 \times 10^{-3} - 6 \times 10^{-2}$ keV/amu
- 91E33 Koslowski, H.R. Lebius, H. Stalmler, V. Fink, R. Wiesemann, K. Huber, B.A.
Collisions of doubly charged nitrogen molecules with rare gas atoms.
J. Phys. B 24 5023 - 5034 1991 E
 $N_2^{2+}(c^3\Sigma^+_u(v=0,1)) + B \rightarrow N_2^+(X^2\Sigma^+_g(v'))$ ($B = He, Ne, Ar$)
Translational energy spectroscopy
 1×10^{-2} keV/amu
- 91E34 Kristensen, F.G. Horsdal, E.
Electron capture from Ar by fast protons: capture from the M subshell.
Phys. Rev. A 44 1604 - 1612 1991 E
 $H^+ + Ar \rightarrow H + Ar^+(3s3p^4^2S); H + Ar^{2+}(3s3p^3^4P, ^3P); H + Ar^{3+}(3s3p^4^4P, ^3D, ^2P); H + Ar^{4+}(3s3p^3^3D)$
photon-ion coincidence
100 - 800 keV/amu
- 91E35 Lee, D.H. Richard, P. Sanders, J.M. Zouros, T.J.M. Shinnpaugh, J.L. Varghese, S.L.
KLL resonant transfer excitation to $F^{6+}(1s2l^2l')$ intermediate states.
Phys. Rev. A 44 1636 - 1643 1991 E
 $F^{7+}(1s^2, 1s2s) + H_2, He \rightarrow F^{6+}(1s2l^2l')$
zero-degree electron spectroscopy
 $2.5 \times 10^2 - 2 \times 10^3$ keV/amu
- 91E36 Liu, C.J. Dunford, R.W. Berry, H.G. Church, D.A.
Alignment of Ne^{7+} following electron capture by Ne^{8+} ions in a sodium target.
Phys. Rev. A 43 572 - 574 1991 E
 $Ne^{8+} + Na \rightarrow Ne^{7+}(n = 9-8; 8-7)$
photon spectroscopy
4.8 - 32.8 keV/amu
linear polarization measured; no cross section

- 91E37 Lorent, V, Brouillard, F, Cornet, A, Urbain, X.
Electron capture by H(3l) atoms in collisions with Ne and Ar atoms.
J. Phys. B 24 219 - 226 1991 E
H(3l) + Ne,Ar -> H⁺
laser-assisted technique
0.6 - 3 keV/amu
- 91E38 Martin, S.J. Stevens, J. Pollack, E.
Single-electron capture and direct scattering in He²⁺ + D₂O₂ and N₂
Phys. Rev. A 43 3503 - 3508 1991 E
He²⁺ + B -> He⁺ (B = D₂O₂, N₂)
translational energy spectroscopy
0.5 - 1 keV/amu
angular distribution measured
- 91E39 Nakai, Y, Sataka, M.
Electron capture and loss cross sections in collisions of C atoms with He.
J. Phys. B 24 L89 - 91 1991 E
C + He -> C⁺, C²⁺, C³⁺
growth technique
25 - 125 keV/amu
- 91E40 Okuno, K, Soejima, K, Kaneko, Y.
Application of mini-EBIS to cross section measurements of single and double electron capture in low energy collisions of C⁴⁺, N⁴⁺ and O⁴⁺ with He.
Nucl. Instr. Meth. B 53 387 - 394 1991 E
A⁴⁺ + He -> A³⁺, A²⁺ (A = C, N, O)
OPIG + growth method
3x10⁻³ - 1x10⁻¹ keV/amu
- 91E41 Parmeswarun, R, Bhalla, C.P. Walch, B.P. DePaola, B.D.
Resonant transfer and excitation in collisions of C³⁺ with H₂ and He targets.
Phys. Rev. A 43 5929 - 5933 1991 E
C³⁺ + H₂, He -> C⁴⁺(2l,n'l')
zero-degree electron spectroscopy
333 - 833 keV/amu
- 91E42 Raphaelian, M.L.A. Berry, H.G. Mansour, N. Schneider, D.
Non-resonant transfer and excitation in Ne⁶⁺ - He collisions at intermediate energies.
Phys. Rev. A 43 4071 - 4074 1991 E
Ne⁶⁺(1s²2s²) + He -> Ne⁶⁺(1s²2sln'l')
zero-degree electron spectroscopy
15 - 60 keV/amu
no cross sections given
- 91E43 Reese, C. Elbel, M.
Reply to comment on occupation of fine structure levels in electron capture of Ar²⁺ ions from various alkali atoms.
J. Phys. B 24 L191 1991 E
- 91E44 Richter, C. Doweck, D. Houwer, J.C.
Collision spectroscopy with aligned and oriented atoms : V neutral particle production in H₂⁺ - Na(3s) and H₂⁺ - Na(3p) collisions.
J. Phys. B 24 L213 - 218 1991 E
H₂⁺ + Na(3s,3p) -> H₂(B¹Σ⁺_u, c³Π_u, C¹Π_u)
translational energy spectroscopy
0.25 - 2 keV/amu
- 91E45 Roncin, P, Gaboriaud, M.N. Barat, M.
Mechanism of true double electron capture by multiply charged ions.
Europhys. Letters 16 551 - 556 1991 E
A^{q+} + B -> A^{q-2+} (A = N⁷⁺, O⁷⁺, O⁸⁺, Ne⁸⁺, Ar⁸⁺, Ar¹¹⁺; B = He, Ar, Kr, Xe)
translational energy spectroscopy
1 keV/amu
angle-differential cross sections
- 91E46 Roncin, P, Laurent, H, Guilleminot, L, Gaboriaud, M.N. Barat, M.
Two electron processes in charge exchange reactions involving multiply charged ions.
Z. Phys. D 21 S93 - 98 1991 E
review

- 91E47 Sakabe, S., Izawa, Y., Hashida, M., Naka, T., Sudo, T., Mochizuki, T., Yamanaka, T., Nakai, S.
New cross-beam technique for charge transfer cross section measurement using a pulsed ion beam produced by laser photoionization.
Rev. Sci. Instr. 61 3678 - 3685 1991 E
Gd⁺ + Gd → Gd + Gd⁺
crossed-beam technique
6x10⁻⁴ - 6x10⁻³ keV/amu
- 91E63 Sakabe, H.A., Awaya, Y., Danjo, A., Kambara, T., Kanai, Y., Nabeshima, T., Nakamura, N., Ohtani, S., Suzuki, H., Takayanagi, T., Wakita, K., Yamada, I., Yoshino, M.
Ejected electron spectra from doubly-excited states(2lnl') of He-like ions produced by the B²⁺, C⁶⁺ - He collisions
J. Phys. B 24 3787 - 3795 1991 E
B²⁺, C⁶⁺ + He → B³⁺, C⁷⁺(2lnl')
zero-degree Auger electron spectroscopy
4.5 keV/amu
- 91E49 Schuch, R., Justiniano, E., Schulz, M., Datz, S., Dittner, P.F., Giese, J.P., Krause, H.F., Shōne, H., Vane, R.
Population of highly excited intermediate resonance states by electron transfer and excitation.
Phys. Rev. A 43 5180 - 5183 1991 E
S¹²⁺ + H₂ → S¹⁴⁺
X-ray - X-ray coincidence technique
4.7x10³ - 7.0x10³ keV/amu
Kα-Kα Kα-Kβ Kβ-Kβ coincidences
- 91E48 Schuch, R., Justiniano, E., Vogt, H., Decos, G., Gruen, N.
Double electron capture of He²⁺ from He at high velocity.
J. Phys. B 24 L133 - L138 1991 E
He²⁺ + He → He + He²⁺
E : growth method ; T : CDW
3.75x10² - 1.5x10³ keV/amu
angular cross sections at 1.5 MeV
- 91E50 Schulze, R., Melcher, F., Hagmann, M., Kridener, S., Krüger, J., Salzborn, E., Reinhold, C.O., Olson, R.E.
Mutual ionization in H⁺ - H⁺ collisions.
J. Phys. B 24 L7 - L12 1991 E
H⁺ + H⁺ → H⁰ + H⁰ + 2e ; H + H⁺ + 3e
crossed-beam technique with coincidence
1.5 - 90 keV/amu
- 91E51 Schweinzer, J., Winter, H.
Comments on occupation of fine structure levels in electron capture of Ar²⁺ ions from various alkali atoms.
J. Phys. B 24 L189 - L190 1991 E
Ar²⁺ + B → Ar⁺ (B = Na, K, Rb, Cs)
- 91E52 Shah, M.B., Gilbody, H.B.
Screening-antiscreeing effects in one-electron loss by fast Li⁺ and Li²⁺ ions in collisions with H₂ and He.
J. Phys. B 24 977 - 982 1991 E
Li⁺ + B → Li²⁺ (B = H₂); Li²⁺ + B → Li³⁺ (B = H₂, He)
growth method
43 - 386 keV/amu
- 91E53 Smith, G.J., Johnson, L.K., Gao, R.S., Smith, K.A., Stebbings, R.F.
Absolute differential cross sections for electron capture and loss by kilo-electron-volt hydrogen atoms.
Phys. Rev. A 44 5647 - 5652 1991 E
H + B → H⁺, H⁰ (B = H₂, N₂, O₂, Ar, He)
2.0 - 5.0 keV/amu
angular distribution
- 91E54 Suraud, M.G., Hoekstra, R., de Heer, F.J., Bonnet, J.J., Morgenstern, R.
State-selective electron capture into nl subshells in slow collisions of C³⁺ and N⁶⁺ with He and H₂ studied by photon emission spectroscopy.
J. Phys. B 24 2543 - 2558 1991 E
C³⁺ + H₂ → C⁴⁺(3l;4l) ; C³⁺, N⁶⁺ + He, H₂ → C⁴⁺, N⁷⁺(2p, 3p, 4p → 1s)
photon spectroscopy
- 91E64 Swenson, J.K., Burgdörfer, J.B., Meyer, F.W., Havenner, C.C., Greogory, D.C., Stollerfoht, N.
Coulomb path interference in low energy ion-atom collisions
Phys. Rev. Letters 66 417 - 420 1991 E
He⁺ + He → e
E : electron spectroscopy ; T : semiclassical approx.
2.5 keV/amu

- 91E65 Tani, M. Hishikawa, A. Okasaka, R.
The g-u interference oscillations observed in the emission cross sections and the optical polarizations in $\text{He}^+ - \text{He}$ collisions
J. Phys. B 24 1359 - 1376 1991 E
 $\text{He}^+ + \text{He} \rightarrow \text{He}^*(3l) + \text{He}^+$
photon spectroscopy
0.5 - 20 keV
- 91E55 Tanis, J.A. Bernstein, E.M. Clark, M.W. Ferguson, S.M. Price, R.N.
Target ionization accompanied by projectile electron loss in fast $\text{O}^{6+} + \text{He}$ collisions.
Phys. Rev. A 43 4723 - 4726 1991 E
 $\text{O}^{6+} + \text{He} \rightarrow \text{O}^{5+}, \text{O}^{7+}; \text{O}^{7+} + \text{He} \rightarrow \text{O}^{6+}, \text{O}^{8+}$
projectile-recoil ion coincidence technique
 $6.25 \times 10^2 - 2.5 \times 10^3$ keV/amu
- 91E57 Underwood, T.A. Breinig, M. Gaither, C.C.
Production of doubly excited projectile states in collisions of 0.1 MeV/u Ag^{4+} ions with He, H_2 and Ar targets.
Phys. Rev. A 44 1668 - 1676 1991 E
 $\text{Ag}^{4+} + \text{B} \rightarrow \text{Ag}^{3+}, \text{Ag}^{5+}, \text{Ag}^{6+}$ ($\text{B} = \text{He}, \text{H}_2, \text{Ar}$)
electron spectroscopy
 10^2 keV/amu
- 91E56 Unterreiter, E. Schweinzer, J. Winter, H.
Single electron capture for impact of (0.5 - 9 keV) C^{2+} on H_2, Ar and H_2
J. Phys. B 24 1003 - 1016 1991 E
 $\text{C}^{2+} (2s^2 \ ^1\text{S}, 2s2p \ ^3\text{P}^o) + \text{He}, \text{Ar}, \text{H}_2 \rightarrow \text{C}^+$
growth + attenuation technique
 $5 \times 10^{-2} - 4.6 \times 10^{-1}$ keV/amu
- 91T 1 Alston, S.
Generalized distorted-wave Born approximation for electron capture in ion-ion collisions.
Phys. Rev. A 43 5874 - 5877 1991 T
distorted-wave Born approx.
general formalism
- 91T 2 Amezian, K. Bacchus-Montabonel, M.C.
Ab-initio molecular treatment of single electron capture process for the $\text{O}^{6+} + \text{He}$ collision.
Indian J. Phys. 65B 217 - 225 1991 T
 $\text{O}^{6+} + \text{H} \rightarrow \text{O}^{5+} (3s, 3p, 3d)$
MO + semiclassical
0.5 - 7.1 keV/amu
- 91T 3 Andersson, L.R. Gargaud, M. McCarroll, R.
Electron capture in slow O^{5+}/H collisions.
J. Phys. B 24 2073 - 2082 1991 T
 $\text{O}^{5+} (1s^2 2s) + \text{H} \rightarrow \text{O}^{4+} (1s^2 2s n l; n l = 4s, 4p, 4d)$
(0.03 - 1.15×10^{-3} eV/amu)
- 91T 4 Bacchus-Montabonel, M.C. Courbin, C. McCarroll, R.
State-selective electron capture by O^{2+} from He.
J. Phys. B 24 4409 - 4417 1991 T
 $\text{O}^{2+} (2s^2 2p^2 \ ^3\text{P}) + \text{He} \rightarrow \text{O}^+ (2s^2 2p^3 \ ^2\text{P}, ^2\text{D})$
MO ab-initio calculation
 $25 \times 10^{-3} - 0.625$ keV/amu
- 91T 5 Badnell, N.R.
Double X-ray emission following resonant transfer and excitation in collisions of H-like ions with H_2 .
Phys. Rev. A 44 1554 - 1558 1991 T
 $\text{S}^{16+}, \text{Ge}^{31+} + \text{H}_2 \rightarrow \text{S}^{14+} (n l, n' l'), \text{Ge}^{30+} (n l, n' l')$
 $\text{K}\alpha, \text{K}\alpha, \text{K}\alpha, \text{K}\beta, \text{K}\gamma$ coincidences
- 91T 6 Baur, G.
Comment on "Feynman-Monte Carlo calculations of electron capture at relativistic collider energies".
Phys. Rev. A 44 4767 - 4768 1991 T
general formulation

- 91T7 Belkic, D.
Exact second-order Born approximation with correct boundary conditions for symmetric charge exchange.
Phys. Rev. A 43 4751 - 4770 1991 T
 $H^+ + H(1s) \rightarrow H + H^+$
second-order Born approx. with correct boundary.
60, 100, 125, 500 keV/amu
angular distribution
- 91T8 Belkic, D.
Electron transfer from hydrogen like atoms to partially and completely stripped projectiles: CDW approximation.
Phys. Scripta 43 561 - 571 1991 T
 $A^{Z-1}(n) \rightarrow A^{Z-1}(n) (A = H, He, Li, Be, B, C, N, O); Li^{8+} + H \rightarrow Li^{6+}(n)(total) (q = 3, 2); B^{8+} + H \rightarrow B^{6+}(n)(total) (q = 5, 4, 3, 2); C^{8+} + H \rightarrow C^{6+}(n)(total) (q = 6, 5, 4, 3, 2); N^{8+} + H \rightarrow N^{6+}(n)(total) (q = 7, 6, 5, 4, 3, 2); O^{8+} + H \rightarrow O^{6+}(n)(total) (q = 8, 7, 6, 5, 4, 3, 2)$
CDW approx.
 $10^2 - 10^4$ keV/amu (H); $6 - 6 \times 10^2$ keV/amu (O)
scaling as $\sigma_{total}/Z^3 - F/(keV/amu)$
- 91T61 Belyaev, A.K. Zagrebin, A.L. Tserkovnyi, S.I.
Partial cross sections and rate constants of charge transfer processes of helium ions by mercury atoms
Opt. Spectrosc. (USSR) 70 453 - 456 1991 T
 $He^+ + Hg(6s^2 \ ^1S_0) \rightarrow He(1s^2) + Hg^+(6d \ ^2D_{3/2,5/2}; 7p \ ^2P_{1/2,3/2})$
Pseudopotential method
thermal velocities
- 91T9 Botcher, C. Rhoades-Brown, M.J. Strayer, M.R.
Approximate analytic formula used to estimate electron capture cross sections at relativistic energies.
Phys. Rev. A 44 4709 - 4770 1991 T
general discussions
- 91T10 Boudjema, M. Cornille, M. Dubau, J. Moretto-Capelle, P. Bordenave-Montesquieu, A. Benoit-Catin, P. Glaizes, A.
Investigation of double capture in $Ne^{8+} + He, H_2$ by electron spectroscopy at 80 keV I Theory.
J. Phys. B 24 1695 - 1712 1991 T
 $Ne^{8+}(1s^2) + He, H_2 \rightarrow Ne^{6+}(1s^2 3ln^1; 1s^2 4ln^1)$
AUTOLSI method
peak energy, autoionization probabilities, radiative probabilities for Ne^{6+}
- 91T11 Brown, G.J.N. Crothers, D.S.F.
Phase-integral half-way-house variational continuum distorted waves.
J. Phys. B 24 173 - 194 1991 T
 $H^+ + H(1s) \rightarrow H(1s) + H^+$
CDW
 $10 - 10^3$ keV/amu
- 91T12 Campbell, E.E.B. Hertel, I.V. Nielson, S.E.
Electron translation factors in orienting charge transfer collisions.
J. Phys. B 24 3825 - 3836 1991 T
 $Na^+ + Na(3p) \rightarrow Na(3p) + Na^+$
semiclassical theory + ETF
- 91T14 Chen, Z. Lin, C.D.
State-selective double capture in collisions with helium atoms at low energies II. ejected electron
J. Phys. B 24 4231 - 4244 1991 T
 $C^{6+} + He \rightarrow C^{4+}(2131^1); O^{8+} + He \rightarrow O^{6+}(3131^1)$
IEA
5 keV/amu
Auger electron spectra
- 91T13 Chen, Z. Shingal, R. Lin, C.D.
State-selective double capture in collisions of bare ions with helium atoms at low energies I. total cross sections.
J. Phys. B 24 4215 - 4230 1991 T
 $C^{6+} + He \rightarrow C^{4+}(2131, 3131^1, 3141^1); C^{6+} + He \rightarrow C^{3+}(n=2, 3, 4); O^{8+} + He \rightarrow O^{6+}(n=3, n^1=3; n=3, n^1=4); O^{8+} + He \rightarrow O^{7+}$
IEA for double capture/AO for single capture
5 keV/amu (C)
- 91T15 Decker, F. Eichler, J.
Exact second-order Born calculations for relativistic electron capture.
Phys. Rev. A 44 377 - 387 1991 T
 $C^{6+} + B \rightarrow C^{3+}(K) + B^+(K) (B = Au); Ne^{10+}, Ar^{18+} + B \rightarrow Ne^{8+}(K), Ar^{17+}(K) + B^+(K) (B = Cu, Ag, Ta, Au)$
second-order Born approx.
 $4 \times 10^5 - 10 \times 10^7$ keV/amu
also angular distribution

- 91T16 Decker, F. Eichler, J.
Second-order Born calculations for electron capture in relativistic $U + U$ collisions.
Phys. Rev. A 44 2195 - 2197 1991 T
 $U^{92+} + U^{91+} \rightarrow U^{91+} + U^{92+}$
relativistic second-order OBK
 $5 \times 10^5 - 10 \times 10^7$ keV/amu
- 91T62 Deco, G Grün, N.
An approximate description of the double capture process in $He^{2+} + He$ collisions with static correlation
Z. Phys. D 18 339 - 343 1991 T
 $He^{2+} + He \rightarrow He + He^{2+}$
CDW
0.125 - 1.5 MeV/amu
angular distributions
- 91T17 Dubois, A. Hansen, J.P. Lundsgaard, M. Nielsen, S.E.
Orientation and alignment effects in $H^+ - Na$ collisions.
J. Phys. B 24 L269 - 274 1991 T
 $H^+ + Na(3s) \rightarrow H(1s, 2s, 2p, n=3, \text{total})$
AO impact parameter method
3, 20 keV/amu
also excitation to $Na(3p)$
- 91T18 Dunseath, K.M. Crothers, D.S.F.
Transfer and ionization processes during the collision of fast H^+, He^{2+} nuclei with helium.
J. Phys. B 24 5003 - 5022 1991 T
 $H^+, He^{2+} + He \rightarrow H, He^+ + He^+; H, He^+ + He^{2+} + e; He^{2+} + He \rightarrow He + He^{2+}$
100 - 1600 keV/amu
also $H^+, He^{2+} + He \rightarrow He^+$
- 91T20 Errea, L.F. Herrero, B. Mendez, L. Mo, O. Riera, A.
Charge exchange and excitation in $C^{3+} + H$ collisions I. molecular calculations.
J. Phys. B 24 4049 - 4060 1991 T
 $C^{3+} + H \rightarrow C^{2+}$
MO
no cross sections given
- 91T21 Errea, L.F. Herrero, B. Mendez, L. Riera, A.
Charge exchange and excitation in $C^{3+} + H$ collisions II. partial and total cross section calculations.
J. Phys. B 24 4061 - 4075 1991 T
 $C^{3+} + H \rightarrow C^{2+}(\text{total}, 1s^2 2s 3s, 1s^2 2s 3p, 1s^2 2s 3d, 1s^2 2p^2)$
MO
0.04 - 9 keV/amu
- 91T19 Errea, L.F. Maidagan, J.M. Mendez, L. Riera, A.
Use of plane-wave translational factors in the molecular approach to atomic collisions.
J. Phys. B 24 L387 - 392 1991 T
 $He^{2+} + H \rightarrow He^+(2s, 2p, \text{total}) + H^+; He^+ + H^+ \rightarrow He^{2+} + H$
MO + plane-wave TF
- 91T59 Errea, L.F. Mendez, L. Riera, A.
Offsetting the Difficulties of the molecular model of atomic collisions in the intermediate velocity range.
Phys. Rev. A 43 3578 - 3586 1991 T
 $H^+ + He^+ \rightarrow H(1s) + He^{2+}$
MO + translation factor
1.75 - 40 keV/amu
also $H^+ + He^+(1s) \rightarrow H^+ + He^{2+} + e$
- 91T63 Fojon, O. Maidagan, J.M.
Electron capture and molecular resonance
J. Phys. B 24 2529 - 2542 1991 T
 $H^+ + CH_4 \rightarrow H^0; H^+ + N_2 \rightarrow H^0; H^+ + N_2 \rightarrow H^0; H^+ + ^{20}Ne \rightarrow H^0; H^+ + ^{22}Ne \rightarrow H^0$
peaking impulse approx.
at resonances
- 91T22 Foster, C. Cooper, J.L. Dickinson, A.S. Flower, D.R. Mendez, L.
Charge transfer in slow collisions of Ne^{2+} with H.
J. Phys. B 24 3433 - 3444 1991 T
 $Ne^{2+} + H$
rate coefficients

- 91T65 Fritsch, W.
Theoretical investigation of electron transfer in collisions between atomic hydrogen and the closed-3p-shell ions of Ti, Cr and Fe
Phys. Scripta T37 75 - 79 1991 T
 $Ti^{4+} + H \rightarrow Ti^{3+}(3d, 4f, 5l, total)$; $Cr^{6+} + H \rightarrow Cr^{5+}(3d, 4d, 5l, n=6, total)$; $Fe^{8+} + H \rightarrow Fe^{7+}(n=4, 5l, 6l, total)$
AO
0.5 - 100keV/amu
- 91T64 Fritsch, W., Shingai, R., Lin, C.D.
Close-coupling study of electron excitation in 1-300 keV/u He^{2+} - H collisions
Phys. Rev. A 44 5686 - 5692 1991 T
 $He^{2+} + H(1s) \rightarrow He^{2+} + H^*(n=2, 3)$
close-coupling method
1 - 300 keV/amu
line emission $n=2 \rightarrow 3$
- 91T23 Gayet, R., Hansen, J., Martinez, A., Rivarola, R.
CDW and CDW-EIS investigations in an independent electron approximation for the resonant double electron capture by swift He^{2+} in helium.
Z. Phys. D 18 345 - 350 1991 T
 $He^{2+} + He \rightarrow He + He^{2+}$
CDW / CDW + EIS
25 - 750 keV/amu
- 91T24 Gravielle, M.S., Miraglia, J.E.
Eikonal impulse approximation in electron capture processes.
Phys. Rev. A 44 7299 - 7306 1991 T
 $H^+ + H, He \rightarrow H^0(1s, 2s, 2p, 3s)$; $H^+ + B \rightarrow H + B^+(K^-)$ ($B = C, Ne, Ar$)
eikonal impulse approx.
- 91T66 Grozdanov, T.P., Salovey, E.A.
Separated- and united-atom limits for dynamical adiabatic states
Phys. Rev. A 44 5605 - 5610 1991 T
general formalism
- 91T25 Hansen, J.P., Dubois, A., Nielsen, S.E.
Orientation and alignment in H^+ -H collisions.
Phys. Rev. A 44 6130 - 6132 1991 T
 $H^+ + H \rightarrow H^*$
50, 100 keV/amu
also $H^+ + H^*(2p)$
- 91T26 Harel, C., Jouin, H., Pons, B.
Double capture in C^{6+} -He collisions at low impact energies.
J. Phys. B 24 L425 - 436 1991 T
 $C^{6+} + He \rightarrow C^{3+}(nl), C^{4+}(2ln'l')$; $n'=3, 4, 5$; $3l3l'$
OEDM
0.56 - 7.56 keV/amu
 n^3 -scaling
- 91T27 Horbatsch, M.
Theory of multiple ionization and capture in energetic ion-atom collisions.
Z. Phys. D 21 S63 - 67 1991 T
review
- 91T29 Jain, A., Shingai, R., Zouros, T.J.M.
State-selective nonresonant transfer excitation in 50-400 keV $^3He^+$ + H_2 and He collisions.
Phys. Rev. A 43 1621 - 1624 1991 T
 $^3He^+(1s) + H_2, He \rightarrow He^{2+}(2s^2 \ ^1S ; 2s2p \ ^1P ; 2p^2 \ ^1D)$
semi-classical IP
12.5 - 125 keV/amu
- 91T28 Jakubassa-Amundsen, D.H.
The impulse approximation for electron transfer in reactive nucleus-atom collisions.
J. Phys. B 24 3019 - 3044 1991 T
 $H^+ + C \rightarrow H + C^+(K^-)$
LA
 5×10^2 - 1×10^3 keV/amu
angular distribution

- 91T30 Janev, R.K.
Unified cross section scaling for electron capture from excited hydrogen atoms by multi-charged ions.
Phys. Letters A 160 67 - 70 1991 T
analytical scaling formula
- 91T31 Joutin, H. Harel, C.
Electron capture in He²⁺-metastable H(2s) low energy collisions.
J. Phys. B 24 3219 - 3227 1991 T
He²⁺ + H(2s) -> He⁺(3l ; 4l) + H⁺
PSS with CTF
- 91T32 Katsonis, K. Maynard, G. Janev, R.K.
Charge transfer and ionization cross sections for collisions of Ti⁹⁺, Cr⁹⁺, Fe⁹⁺ and Ni⁹⁺ ions with atomic hydrogen.
Phys. Scripta T37 80 - 80 1991 T
Ti⁹⁺(q = 4 - 11) + H -> Ti^{q-10+}; Cr⁹⁺(q = 4,6,8,10,13) + H -> Cr^{q-10+}; Fe⁹⁺(q = 4-6,8,10,12,15,20,26) + H -> Fe^{q-10+}; Ni⁹⁺(q = 4-6,8,10,12,14,17) + H -> Ni^{q-10+}
CTMC
10 - 10³ keV/amu
scaling $\sigma/\Omega \sim E/\Omega^{1/2}$, also ionization cross sections
- 91T34 Kimura, M.
H(n=2 and 3) density matrices resulting from low-to-intermediate-energy collisions of H⁺ ions with He atoms : the atomic-orbital-molecular-orbital matching approach.
Phys. Rev. A 44 R5339 - 5342 1991 T
H⁺ + He -> H⁺(n=2,3)
AO+MO
1 - 100 keV/amu
- 91T33 Kimura, M. Lane, N.F.
Theoretical study of charge transfer in He⁺ + H₂ collisions in the milli-electron volt region.
Phys. Rev. A 44 259 - 263 1991 T
He⁺ + H₂ -> He + H₂⁺; He + H⁺ + H
MO
10 - 500 K
rate coefficient given
- 91T38 Kuang, Y.R.
Model-potential OBK approximation for K-shell electron capture in asymmetric collisions.
Phys. Rev. A 44 1613 - 1619 1991 T
H⁺ + B -> H + B⁺(K⁻¹) (B = C,N,O,Ne,Ar) ; He²⁺ + Ne -> He⁺ + Ne⁺(K⁻¹)
OBK
2x10² - 1x10⁴ keV/amu
- 91T35 Kuang, Y.R.
Electron capture in collisions of H⁺ and He²⁺ projectiles with hydrogen ions.
J. Phys. B 24 L103 - 108 1991 T
H⁺, He²⁺ + B -> H, He⁺ (B = Be³⁺, B⁴⁺, C⁵⁺, N⁶⁺, O⁷⁺)
modified two orthogonal-state expansion method
50 - 500 keV/amu
- 91T36 Kuang, Y.R.
Electron capture in collisions between protons and the ions He⁺ and Li²⁺ calculated using a new united-atom model.
J. Phys. B 24 1645 - 1653 1991 T
H⁺ + He⁺, Li²⁺, Li⁺ -> H + He²⁺, Li³⁺, Li²⁺
united-atom model
30 - 200 keV/amu
- 91T37 Kuang, Y.R.
Modified Oppenheimer-Brinkman-Kramers approximation for K-shell capture in asymmetric collisions.
J. Phys. B 24 4993 - 5001 1991 T
H⁺ + B -> H + B⁺(K⁻¹) (B = N,O,Ne) ; He²⁺ + Ne -> He⁺ + Ne⁺(K⁻¹)
modified OBK
100 - 4000 keV/amu (H) ; 200 - 2000 keV/amu (He)
- 91T39 Kunikeev, Sh.D. Senashenko, V.S. Sidorovich, V.A.
Production of autoionizing states of fast charged particles by double electron capture.
Nucl. Inst. Meth. B 53 122 - 126 1991 T
He²⁺ + He -> He³⁺(2s² 'S; 2p² 'D, 2s2p 'P)
Independent model + quantum mechanical calculation
37 - 125 keV/amu
e-e correlation effect included

- 91T60 Kurpick, P. Heinemann, D. Sepp, W.D. Fricke, B.
Influence of occupation number of single particle levels on K-K charge transfer in collisions of 90 keV Ne^{8+} on Ne.
Z. Phys. D 22 407 - 409 1991 T
 $\text{Ne}^{8+} + \text{Ne} \rightarrow \text{Ne}^{8+} + \text{Ne}^{7+}$
coupled channel calculation
4.5 keV/amu
- 91T40 Liu, C.J. Dunford, R.W.
Depolarization following electron capture by highly charged ions in a polarized target.
J. Phys. B 24 2059 - 2071 1991 T
General theory
- 91T41 Macek, J.H.
Some remarks on strong-potential-Born expansions for ion-atom collisions.
J. Phys. B 24 5121 - 5132 1991 T
strong potential-Born approx.
- 91T42 Meyerhof, W.E. Hülsmöller, H.P. Dai, Q. McGuire, J.H. Wang, Y.D.
Projectile electron loss with a molecular hydrogen target.
Phys. Rev. A 43 5907 - 5918 1991 T
 $\text{A}^{(Z-1)+} + \text{H}_2 \rightarrow \text{A}^{Z+} \text{ (A = H, He, Li, C, O)}$
plane-wave Born approx.
 $1 \times 10^2 - 3.5 \times 10^3 \text{ keV/amu}$
- 91T43 Montenegro, E.C. Meyerhof, W.E.
Target screening effect on the projectile electron loss probability.
Phys. Rev. A 44 7229 - 7233 1991 T
 $\text{C}^{3+}, \text{C}^{3+} + \text{He} \rightarrow \text{C}^{4+}, \text{C}^{6+}$
time-dependent SCA
 $5 \times 10^2 - 4 \times 10^3 \text{ keV/amu}$
- 91T44 Nagy, O. Macek, J.H. Miraglia, J.E.
Impulse approximation in proton-hydrogen collisions.
Phys. Rev. A 43 5991 - 5996 1991 T
 $\text{H}^+ + \text{H} \rightarrow \text{H}^+(\text{nl}) + \text{H}^+ \text{ (nl = 1s, 2s, 2p, 3s)}$
peaked-impulse approximation
 $5 \times 10^3 \text{ keV/amu}$
angular distribution
- 91T45 Ostrovsky, V.N.
On the mechanisms for creation of the electron orbital polarization in the charge exchange processes.
J. Phys. B 24 L507 - 512 1991 T
 $\text{B}^{3+} + \text{He} \rightarrow \text{B}^{2+}(2p) + \text{He}^+$
quasi-molecular approx.
polarization due to time lag between electron orbital momentum and internuclear
- 91T46 Riesselmann, K. Anderson, L.W. Durand, L. Anderson, C.J.
Classical impulse approximation for the electron loss from H(1s) or H⁻ projectile passing through various gas targets.
Phys. Rev. A 43 5934 - 5945 1991 T
 $\text{H} + \text{B} \rightarrow \text{H}^+; \text{H}^- + \text{B} \rightarrow \text{H}, \text{H}^+ \text{ (B = He, Ne, Ar, Kr, Xe, H, N, O)}$
classical impulse approx.
 $9 \times 10^2 - 1.4 \times 10^6 \text{ keV/amu}$
- 91T47 Saha, B.C. Lane, N.F. Kimura, M.
Molecular-state treatment of $\text{He}^+(2p)$ excitation through electron capture in $\text{He}^{2+}\text{-H}_2$ collisions at low energies.
Phys. Rev. A 44 R1 - 4 1991 T
 $\text{He}^{2+} + \text{H}_2 \rightarrow \text{He}^+(2p)$
semi-classical MO
0.3 - 23 keV/amu
- 91T48 Salin, A.
Some remarks on the theory of high energy electron capture in ion-atom collisions.
Comm. At. Mol. Phys. 26 1 - 10 1991 T
- 91T67 Schultz, D.R. Meng, L. Rainhold, C.O. Olson, R.E.
 $\text{Fe}^{6+} + \text{H}, \text{H}_2$ and He electron loss and $\text{He}^{2+} + \text{H}(\text{n}=1,2)$ electron capture cross sections : processes of interest in fusion plasmas
Phys. Scripta T37 89 - 93 1991 T
 $\text{Fe}^{6+}(\text{q}=1,3,5,12,26) + \text{H} \rightarrow \text{H}^+; \text{Fe}^{6+}(\text{q}=1,3,5,12,26) \text{ H}_2 \rightarrow \text{H}_2^+, \text{H}^+ + \text{H}^+; \text{Fe}^{6+}(\text{q}=1,5,12,26) + \text{He} \rightarrow \text{He}^+, \text{He}^{2+}; \text{He}^{2+} + \text{H}(\text{n}=1,2) \rightarrow \text{He}^+(\text{n})$
CTMC
50 - 500 keV/amu(Fe) ; 30 - 100 keV/amu(He)

- 91T49 Shimakura, N. Kimura, M.
Electron capture in collisions of N^{5+} ions with H atoms from the meV to keV energy regions.
Phys. Rev. A 44 1659 - 1667 1991 T
 $N^{6+} + H \rightarrow N^{5+}$
quantum-mechanical + semiclassical
 $10^{-3} - 10^1$ keV/amu
nl=4s,4p the most dominant
- 91T50 Shingal, R. Lin, C.D.
Calculation of two-electron transition cross sections between fully stripped ions and helium atoms.
J. Phys. B 24 251 - 264 1991 T
 $A^{Z+} + He \rightarrow A^{(Z-1)+} + He^{2+} + e$ (A = He, Li, C, O, F)
coupled-channel semiclassical IP model with travelling AO
40 - 300 keV/amu (He) ; 40 - 400 keV/amu (Li) ; $10^2 - 10^3$ keV/amu (C) ; 200 - 400 keV/amu (O) ; 250 - 450 keV/amu (F)
- 91T51 Shingal, R. Lin, C.D.
H(n=2 and 3) density matrices produced in proton-helium collisions at intermediate energies.
J. Phys. B 24 963 - 975 1991 T
 $H^+ + He \rightarrow H(n=2, n=3) + He^+$
multichannel semiclassical IP + travelling AO
15 - 100 keV/amu
- 91T52 Slim, H.A. Heck, E.L. Bransden, B.H. Flower, D.R.
Ionization and charge transfer in proton-helium collisions.
J. Phys. B 24 L421 - 424 1991 T
 $H^+ + He \rightarrow H + He^+$
semiclassical impact parameter method
25 - 100 keV/amu
also ionization cross sections given
- 91T53 Slim, H.A. Heck, E.L. Bransden, B.H. Flower, D.R.
Charge transfer and excitation in proton-helium collisions.
J. Phys. B 24 1683 - 1694 1991 T
 $H^+ + He \rightarrow H(nl = 1s, 2s, 2p, 3s, 3p, 3d)$
semiclassical impact parameter method
10 - 235 keV/amu
- 91T54 Taulbjerg, K.
Status of the theory of electron capture in ion-atom collisions at low and intermediate energies.
Z. Phys. D 21 577 - 580 1991 T
review
- 91T55 Toshima, N. Eichler, J.
Identification of Thomas peaks in coupled channel calculations for charge transfer.
Phys. Rev. Letters 66 1050 - 1053 1991 T
 $H^+ + H(1s) \rightarrow H(1s) + H^+$
coupled-channel calculation
 5×10^3 keV/amu
- 91T68 Wang, J. Reinhold, C.O. Burgdörfer, J.
Electron loss at backward observation angles
Phys. Rev. A 44 7243 - 7251 1991 T
 $H^0 + Ar \rightarrow e ; He^+ + Ar \rightarrow e$
Impulse approx.
500, 800 keV/amu
angular+energy distributions of electrons
- 91T56 Wang, Y.D. McGuire, J.H.
Orientation dependence in electron capture to arbitrary projectile n states from molecular hydrogen.
Phys. Rev. A 44 367 - 372 1991 T
 $O^{8+} + H_2 \rightarrow O^{7+}(n)$
two-center approx.
 $5 \times 10^2 - 1.25 \times 10^3$ keV/amu
- 91T57 Winter, T.G.
Electron transfer and ionization in proton-helium collisions studied using a Sturmian basis.
Phys. Rev. A 44 4353 - 4367 1991 T
 $H^+ + He \rightarrow H(nl) \quad nl = 2s, 2p, 3s, 3p, 3d, \text{total}$
coupled-channel approx. with Sturmian basis
50 - 200 keV/amu
 $H^+ + He \rightarrow H^+ + He^+$

91T58

Yu, R.K.

Electron capture in collisions between protons and the ions He^+ and Li^{+2} calculated using a new united atom model.

J. Phys. 24 1645 - 1653 1991 T

$\text{H}^+ + \text{He}^+ \rightarrow \text{H}(\text{total}, 1s); \text{H}^+ + \text{Li}^{+2}, \text{Li}^{+2} \rightarrow \text{H}(\text{total}, 1s)$

impact parameter method + united-atom model

30 - 200 keV/amu

- 92E 1 Ali, R. Frohne, V. Cocke, C.L. Stockli, M. Cheng, S. Raphaelian, M.L.A.
Q-value measurements in charge-transfer collisions of highly charged ions with atoms by recoil longitudinal momentum spectroscopy.
Phys. Rev. Letters 69 2491 - 2494 1992 E
 $\text{Ar}^{15+} + \text{Ar} \rightarrow \text{Ar}^{(15-k)+} (k = 1, 2) + \text{Ar}^{k+} (k = 1 - 5)$
recoil longitudinal momentum spectroscopy
1.25 keV/amu
- 92E 2 Andersson, L.R. Cedarquist, H. Barany, A. Liljeby, L. Biedermann, C. Levin, J.C. Keller, N. Elston, S.B. Gibbons, J.P. Sellin, L.A.
One- and two-electron capture in slow Ar^{6+} -He collisions.
Phys. Rev. A 45 R4 - 7 1992 E
 $\text{Ar}^{6+} + \text{He} \rightarrow \text{Ar}^{4+}(3p4s; 3p4p)$
translational energy spectroscopy
 $1.5 \times 10^{-2} - 3.0 \times 10^{-3}$ keV/amu
Angular distributions
- 92E 3 Andriamonje, S. Chevallier, M. Cohen, C. Cue, N. Dauvergne, D. Dural, J. Genre, R. Girard, Y. Kirsch, R. L'Hoir, A. Poizat, J.C. Quere, Y. Remillieux, J. Schmaus, D. Toulemonde, M.
RTE measurement with Xe^{32+} ions channelled in a Si crystal.
Phys. Letters A 164 184 - 190 1992 E
 $\text{Xe}^{32+} + \text{Si} < 110 > \rightarrow \text{Xe}^{31+*}$
(3.3 - 4.3) $\times 10^4$ keV/amu
- 92E 4 Aumayr, F. Glaer, M. Schweinzer, J. Winter, H.
Electron capture in He^{2+} collisions with aligned $\text{Na}^+(3p)$ atoms.
Phys. Rev. Letters 68 3277 - 3280 1992 E
 $\text{He}^{2+} + \text{Na}^+(3p) \rightarrow \text{He}^+(n=4)$
translational energy spectroscopy
0.5 - 3.0 keV/amu
- 92E48 Beijers, J.P.M. Hoekstra, R. Morgenstern, R. de Heer, F.J.
State-selective electron capture and core excitation in slow Ne^{6+} - He collisions.
J. Phys. B 25 4851 - 4864 1992 E
 $\text{Ne}^{6+}(1s^2 2s^2 \ ^1S; 1s^2 2s 2p \ ^3P^o) + \text{He} \rightarrow \text{Ne}^{5+}(1s^2 2s^2 3l; 1s^2 2s 2p 3l)$
photon spectroscopy
0.07 - 1.2 keV/amu
- 92E 5 Beijers, J.P.M. Hoekstra, R. Schlatmann, A.R. Morgenstern, R. de Heer, F.J.
State-selective electron capture in slow collisions of C^{6+} and O^{6+} with He.
J. Phys. B 25 463 - 474 1992 E
 $\text{C}^{6+} + \text{He} \rightarrow \text{C}^{5+}(n=3 \rightarrow 2; n=4 \rightarrow 2); \text{O}^{6+} + \text{He} \rightarrow \text{O}^{5+}(3s, 3p, 3d)$
photon-spectroscopy
 $6 \times 10^{-2} - 1.5$ keV/amu (O) ; 0.3 - 1.8 keV/amu (C)
- 92E 6 Bliman, S. Barany, A. Bonnefoy, M. Bonnet, J.J. Chassevent, M. Fleury, A.G. Hitz, D. Knystautas, E.J. Nordgren, J. Rubensson, J.E. Suraud, M.G.
Single and double charge exchange collision spectroscopy of $\text{O}^{6+} + \text{He}$ at 3.8 keV/amu.
J. Phys. B 25 2065 - 2080 1992 E
 $\text{O}^{6+}(1s^2; 1s2s) + \text{He} \rightarrow \text{O}^{5+}(1s^2nl; 1s2l3l), \text{O}^{4+}(1s^2nl^n l')$
photon spectroscopy
3.8 keV/amu
- 92E 7 Bliman, S. Nordgren, J. Knystautas, E.J. Suraud, M.G.
Rydberg level population in the electron capture collision $\text{O}^{6+} + \text{He}$ at low velocity.
J. Phys. B 25 L435 - 438 1992 E
 $\text{O}^{6+}(1s^2) + \text{He} \rightarrow \text{O}^{5+}(1s^2nl) (n = 3 - 7)$
photon spectroscopy
3.75 keV/amu
- 92E 8 Bliman, S. Suraud, M.G. Hitz, D. Huber, B.A. Lebius, H. Cornille, M. Rubensson, J.E. Nordgren, J. Knystautas, E.J.
Collision spectroscopy of $\text{Ar}^{6+} + \text{He}$ at low velocities ($v < 1$ a.u.).
Phys. Rev. A 46 1321 - 1332 1992 E
 $\text{Ar}^{6+} + \text{He} \rightarrow \text{Ar}^{5+}, \text{Ar}^{6+}$
photon spectroscopy
0.2 keV/amu
- 92E10 Boduch, P. Chantepie, M. Hennecart, D. Husson, X. Lecler, D. Druetta, M. Wilson, M.
Spectroscopic analysis of visible and near UV light emitted in 120 keV Kr^{36+} -He and Kr^{36+} - H_2 collisions.
Phys. Scripta 46 337 - 342 1992 E
 $\text{Kr}^{36+} + \text{He}, \text{H}_2 \rightarrow \text{Kr}^{35+}(nl), \text{Kr}^{36+}(nl^n l')$
photon spectroscopy
1.4 keV/amu
emission cross sections

- 92E9 Boduch, P. Chantepe, M. Hamecart, D. Husson, X. Kucal, H. Lecler, D. Stollerfoht, N.
Spectroscopic analysis of visible and near UV light emitted by Ar^{2+} and Ar^{4+} ions produced in $\text{Ar}^{2+} + \text{He}$ and $\text{Ar}^{2+} + \text{H}_2$ collisions at 120 keV.
Phys. Scripta 45 203 - 211 1992 E
 $\text{Ar}^{2+} + \text{He}, \text{H}_2 \rightarrow \text{Ar}^{2+}, \text{Ar}^{4+} (\text{h}\nu)$
photon spectroscopy
3 keV/amu
photon transitions
- 92E11 Bordenave-Montesquieu, D. Dagnac, R.
Single-electron capture for 2 - 8 keV incident energy and direct scattering at 6 keV in He^{2+} -He collisions.
J. Phys. B 25 2573 - 2586 1992 E
 $\text{He}^{2+} + \text{He} \rightarrow \text{He}^+$
translational energy spectroscopy
0.5 - 2 keV/amu
angular scattering
- 92E13 Cederquist, H. Andersson, H. Beebe, E. Biedermann, C. Brongstrom, L. Engstrom, A. Gao, H. Hutton, R. Levin, J.C. Liljeby, L. Pajek, M. Quinteros, T. Selberg, N. Sigary, P.
Increase of true double-electron-capture cross sections in slow $\text{Xe}^{6+} - (\text{Xe}, \text{He})$ collisions at very high q .
Phys. Rev. A 46 2592 - 2595 1992 E
 $\text{Xe}^{6+} + \text{B} \rightarrow \text{Xe}^{(q,2)+}$ ($q = 15 - 42$)
projectile + recoil ion coincidence
 $3 \times 10^{-2} \text{ xq keV/amu}$
- 92E12 Cederquist, H. Beebe, E. Biedermann, C. Engstrom, A. Gao, H. Hutton, R. Levin, J.C. Liljeby, L. Quinteros, T. Selberg, N. Sigary, P.
On the role of transfer excitation in slow $\text{Xe}^{6+} - \text{He}, \text{Xe}$ ($15 \leq q \leq 45$) collisions
J. Phys. B 25 L69 - 75 1992 E
 Xe^{6+} ($q = 15 - 42$) + $\text{He}, \text{Xe} \rightarrow \text{Xe}^{(q,1)+}, \text{Xe}^{(q,2)+}$
projectile-recoil ion coincidence
0.25 - 1.0 keV/amu
- 92E14 Clark, M.W. Tanis, J.A. Bernstein, E.M. Badnell, N.R. DuBois, R.D. Graham, W.G. Morgan, T.J. Plano, V.L. Schlachter, A.S. Stockli, M.P.
Cross sections for resonant transfer and excitation in $\text{Fe}^{6+} + \text{H}_2$ collisions.
Phys. Rev. A 45 7846 - 7850 1992 E
 $\text{Fe}^{6+}(q=23,24,25) + \text{H}_2 \rightarrow \text{Fe}^{(q,1)+}$
X-ray + projectile coincidence
 $5.9 \times 10^3 - 9.4 \times 10^3 \text{ keV/amu}$
- 92E15 Fremont, F. Sommer, K. Lecler, D. Hickam, S. Boduch, P. Husson, X. Stollerfoht, N.
Angular distribution of Auger-electron emission following double electron capture in $\text{C}^{6+} + \text{He}$ collisions.
Phys. Rev. A 46 222 - 229 1992 E
 $\text{C}^{6+} + \text{He} \rightarrow \text{C}^{4+}(2\text{In}^{\text{I}})$
electron spectroscopy
5 keV/amu
- 92E16 Frieling, G.J. Hoekstra, R. Smulders, E. Dickson, W.J. Zinoviev, A.N. Kuppens, S.J. de Heer, F.J.
Cross sections for l-selective electron capture into the $\text{He}^+(n=4)$ shell in intermediate energy collisions of He^{2+} with H and H_2 .
J. Phys. B 25 1245 - 1255 1992 E
 $\text{He}^{2+} + \text{H}, \text{H}_2 \rightarrow \text{He}^+(n=4, 4s, 4p, 4d, 4f; n=4 \rightarrow n=3)$
photon spectroscopy
27 - 132 keV/amu
- 92E17 Gao, R.S. Dutta, C.M. Lane, N.F. Smith, K.A. Stebbings, R.F. Kimura, M.
Experimental and theoretical studies of the $\text{He}^{2+} + \text{He}$ system : differential cross sections for direct, single and double-charge-transfer scattering at keV energies.
Phys. Rev. A 45 6388 - 6394 1992 E
 $\text{He}^{2+} + \text{He} \rightarrow \text{He}^+, \text{He}$
E : position sensitive detection ; T : quantum-mechanical MO
0.5 - 3.3 keV/amu
angular distribution
- 92E55 Gaunt, D.M. Darzmann, K.
Velocity dependence of electron-capture particle cross sections and alignment in low-energy collisions of Ne^{2+} and Ar^{2+} with atomic Na.
Phys. Rev. A 46 5580 - 5593 1992 E
 $\text{Ne}^{2+} + \text{Na} \rightarrow \text{Ne}^{2+}(\text{nIm}, n=9-8) + \text{Na}^+ ; \text{Ar}^{2+} + \text{Na} \rightarrow \text{Ar}^{2+}(n=9-8) + \text{Na}^+$
photon-spectroscopy technique
polarization measured
- 92E49 Gieler, M. Aumayr, F. Windholz, L.
Coherent population trapping probed by charge exchange reactions.
Phys. Rev. Letters 69 3452 - 3454 1992 E
 $\text{He}^{2+} + \text{Na}(3s, 3p) \rightarrow \text{He}^+$
translational spectroscopy
2.5 keV/amu

- 92E56 Herrmann, R. Prior, M.H. Dörner, R. Schmidt-Böcking, H. Lyeis, C.M. Wille, U.
Multiple electron transfer in slow Ne^{q+} -Ne collisions.
Phys. Rev. A 46 5631 - 5642 1992 E
 $\text{Ne}^{q+} + \text{Ne} \rightarrow \text{Ne}^{q+}(q=8-4) + \text{Ne}^+(i=2-7)$
projectile-recoil ion coincidence technique
4.5 keV/amu
angular distribution ($\theta = 12 - 75 \text{ mrad}$)
- 92E50 Hoekstra, R. Summers, H.P. de Heer, F.J.
Charge transfer in collisions of protons with helium.
Supplement to Nucl. Fusion 3 63 - 69 1992 E
 $\text{H}^+ + \text{He} \rightarrow \text{H}(\text{total}, 2s, 2p, 3s, 3p, 3d)$
0.3 - 500 keV/amu
evaluated data
- 92E18 Hoekstra, R. Wolfrum, E. Beijers, J.P.M. de Heer, F.J. Winter, H. Morgenstern, R.
Electron capture into $\text{He}^+(4l)$ states in collisions of He^{2+} on Li.
J. Phys. B 25 2587 - 2596 1992 E
 $\text{He}^{2+} + \text{Li} \rightarrow \text{He}^+(4s, 4d, 4f)$
photon spectroscopy
0.8 - 9.75 keV/amu
 $n=4 \rightarrow 3$ photon emission
- 92E19 Houver, J.C. Doweik, D. Richter, C. Andersen, N.
Strong right-left asymmetry observed in charge transfer from circular atomic states near the matching velocity.
Phys. Rev. Letters 68 162 - 165 1992 E
 $\text{H}^+ + \text{Na}(3p, m_l=\pm 1) \rightarrow \text{H}(n=2) + \text{Na}^+$
laser-excited beam technique
1.0 keV/amu
asymmetry parameter
- 92E20 Hvelplund, P. Bjornelund, S.K. Knudsen, H. Tawara, H.
Electron capture in collisions between medium velocity multiply charged ions and H and H_2
Phys. Scripta 45 231 - 237 1992 E
 $\text{Dy}^{q+} + \text{H}, \text{H}_2 \rightarrow \text{Dy}^{(q-1)+}(q = 4 - 20)$; $\text{Re}^{q+} + \text{H}, \text{H}_2 \rightarrow \text{Re}^{(q-1)+}(q = 6 - 20)$; $\text{Ta}^{q+} + \text{H}, \text{H}_2 \rightarrow \text{Ta}^{(q-1)+}(q = 4 - 21)$; $\text{Au}^{q+} + \text{H}, \text{H}_2 \rightarrow \text{Au}^{(q-1)+}(q = 3 - 24)$; $\text{U}^{q+} + \text{H}, \text{H}_2 \rightarrow \text{U}^{(q-1)+}(q = 4 - 25)$
100 keV/amu (Dy, Ta, Re, U); 25 - 100 keV/amu (Au)

- 92E59 Jalbert, G. Coelho, L.F.S. de Castro Faria, N.V.
 H^+ formation from collisional destruction of fast H_3^+ ions in noble gases
Phys. Rev. A 46 3840 - 3845 1992 E
 $\text{H}_3^+ + \text{He}, \text{Ne}, \text{Ar}, \text{Xe} \rightarrow \text{H}^+$
growth technique
4 - 7 a.u.
- 92E52 Janev, R.K.
Cross section scaling for one- and two-electron loss processes in collisions of helium atoms with multiply charged ions.
Supplement to Nucl. Fusion 3 71 - 78 1992 E
empirical formula
scaling formula
- 92E60 Knystauts, E.J. Bliman, S.L.
Spectroscopy of highly charged ions using complementary techniques
Phys. Scripta T40 65 - 69 1992 E
 $\text{O}^{6+} + \text{He}, \text{H}_2 \rightarrow \text{O}^{5+}, \text{O}^{4+}(\text{nl})$; $\text{Ar}^{7+} + \text{He}, \text{He}_2 \rightarrow \text{Ar}^{6+}, \text{Ar}^{5+}(\text{nl})$; $\text{Ar}^{8+} + \text{He}, \text{H}_2 \rightarrow \text{Ar}^{7+}, \text{Ar}^{6+}(\text{nl})$
photon spectroscopy
- 2 keV/amu
no cross sections given : photon spectra comparison with beam foil spectra
- 92E21 Kravis, S.D. Church, D.A. Johnson, B.M. Meron, M. Jones, K.W. Levin, J.C. Sellin, I.A. Azuma, Y. Berrah-Mansour, N. Berry, H.G. Druetta, M.
Electron transfer from H_2 and Ar to stored multiply charged Ar ions produced by synchrotron radiation.
Phys. Rev. A 45 6379 - 6387 1992 E
 $\text{Ar}^{q+}(q=3-6) + \text{H}_2, \text{Ar} \rightarrow \text{Ar}^{(q-1)+}$
Penning ion trap
thermal energies
- 92E51 Krishnamurthi, V. Krishnamurthy, M. Marathe, V.R. Mathur, D.
Translational energy spectroscopic and quantum chemical study of $\text{CS}^{q+}(q=1,2)$ radicals : charge stripping and dissociation.
J. Phys. B 25 5149 - 5162 1992 E
 $\text{CS}^{q+}(q=1,2) + \text{He} \rightarrow \text{CS}^{(q-1)+}, \text{C}^+ + \text{S}, \text{C} + \text{S}^+, \text{C}^+ + \text{S}^+$
translational energy spectroscopy
0.07 keV/amu

- 92E22 Kwong, V.H.S, Fang, Z. Jiang, Y. Gibbons, T.T. Gardner, L.D.
Measurement of thermal-energy charge transfer rate coefficient of Mo^{6+} and argon.
Phys. Rev. A 46 201 - 205 1992 E
 $\text{Mo}^{6+} + \text{Ar} \rightarrow \text{Mo}^{5+}$
ion trapping technique
thermal energy
rate coefficient
- 92E23 Lebius, H. Huber, B.A.
Electron-electron interaction in slow charge exchange collisions.
Z. Phys. D 23 61 - 66 1992 E
 $\text{Ar}^{2+}(2p^6 1S; 2p^5 3s^3 P) + \text{He} \rightarrow \text{Ar}^{2+}$
translational energy spectroscopy
0.2 keV/amu
- 92E25 Martin, S. Denis, A. Ouerdane, Y. Carre, M.
Coincidence measurements between photons, projectiles and recoil ions in low energy $\text{Kr}^{18+} + \text{Kr}$ collisions : autoionizing and radiative effect of multi-excited states.
Phys. Letters A 65 441 - 446 1992 E
 $\text{Kr}^{18+} + \text{Kr} \rightarrow \text{Kr}^{16+}, \text{Kr}^{15+} + \text{Kr}^{r+}(r = 2 - 10)$
photon-projectile-recoil ion coincidence
4 keV/amu
- 92E24 Martin, S. Denis, A. Ouerdane, Y. Carre, M. Buchet-Poulizac, M.C.
Desesquelles, J.
Rydberg spectroscopy of single-electron capture in low-energy collisions of Ar^{18+} and Ar^{20+} with cesium.
Phys. Rev. A 46 1316 - 1320 1992 E
 $\text{Ar}^{18+}(1s^2 2s^2 2p^3 3s) + \text{Cs} \rightarrow \text{Ar}^{20+}(1s^2 2s^2 2p^3 3s n l = 8-12) ; \text{Ar}^{20+}(1s^2 2s^2 2p^3 3s^2) + \text{Cs} \rightarrow$
 $\text{Ar}^{20+}(1s^2 2s^2 2p^3 3s^2 n l = 8-12)$
photon spectroscopy
0.2 and 4 keV/amu
- 92E26 McCullough, R.W. McLaughlin, T.K. Koizumi, T. Gilbody, H.B.
State-selective one-electron capture by 8 keV He^{2+} ions in collisions with oxygen atoms.
J. Phys. B 25 L193 - 197 1992 E
 $\text{He}^{2+} + \text{O}_2 \rightarrow \text{He}^+$
translational energy spectroscopy
2 keV/amu
- 92E27 McLaughlin, T.K. McCullough, R.W. Gilbody, H.B.
State-selective electron capture by slow C^{4+} ions in collisions with H and H_2 .
J. Phys. B 25 1257 - 1264 1992 E
 $\text{C}^{4+} + \text{H}, \text{H}_2 \rightarrow \text{C}^{3+}(1s^2 3s, 3p, 3d)$
translational energy spectroscopy
4 - 16 keV
- 92E28 Mokler, P.H. Stohler, Th. Kozuharov, C. Stachura, Z. Warczak, A.
Radiative electron capture : a tool for structure studies of heavy few-electron ions.
Z. Phys. D 21 127 - 200 1992 E
 $\text{Ge}^{31+} + \text{H}_2 \rightarrow \text{Ge}^{30+}$
Photon measurement
 $4 \times 10^3 - 12 \times 10^3$ keV/amu
- 92E29 Montenegro, E.C. Sigaud, G.M. Meyerhof, W.E.
Intermediate-velocity atomic collisions V. Electron capture and loss in C^{3+} and O^{3+} collisions with H_2 and He.
Phys. Rev. A 45 1575 - 1582 1992 E
 $\text{C}^{3+} + \text{B} \rightarrow \text{C}^{2+}, \text{C}^{4+}; \text{O}^{3+} + \text{B} \rightarrow \text{O}^{2+}, \text{O}^{4+}$ (B = H_2, He)
growth method
125 - 333 keV/amu (C) ; 94 - 250 keV/amu (O)
- 92E61 Ogura, K. Arisawa, T. Shibata, T.
Charge transfer cross sections for heavy atom (in Japanese)
Shin-kuu (Vacuum) 35 301 - 304 1992 E
 $\text{Ga}^+ + \text{Ga} \rightarrow \text{Ga} + \text{Ga}^+$
laser-evaporation/ionization method
 $10^2 - 10^3$
- 92E30 Okuno, K. Soejima, K. Kaneko, Y.
Single- and double-electron capture in $^3\text{He}^{2+}$ - H_2 collisions at low energies from 1 to 2000 eV.
J. Phys. B 25 L105 - 108 1992 E
 $^3\text{He}^{2+} + \text{H}_2, \text{He} \rightarrow \text{He}^+, \text{He}^0$
attenuation method
 $0.3 \times 10^{-3} - 0.7$ keV/amu

- 92E31 Panev, G.S. Vitanov, N.V.
Total charge transfer cross sections in collisions of Sr^+ ions with Mg and Ca atoms.
J. Phys. B 25 123 - 27 1992 E
 $\text{Sr}^+ + \text{Mg}, \text{Ca} \rightarrow \text{Sr}$
growth method
 $2.8 \times 10^{-3} - 1.5 \times 10^{-2} \text{ keV/amu}$
- 92E53 Peart, B. Hayton, D.A.
Merged beam measurements of mutual neutralization of H^+ and H^- ions.
J. Phys. B 25 5109 - 5119 1992 E
 $\text{H}^+ + \text{H}^- \rightarrow \text{H} + \text{H}$
merged-beam technique
0.003 - 0.5 keV/amu
- 92E54 Phaneuf, R.A. Janev, R.K. Tawara, H. Kimura, M. Krstic, P.S. Peach, G. Mazing, M.A.
Status and critical assessment of the database for collisions of Be^{q+} and B^{q+} ions with $\text{H}, \text{H}_2, \text{He}$.
Supplement to Nucl. Fusion 3 105 - 112 1992 E
 $\text{Be}^{q+}(q=1-4), \text{B}^{q+}(q=1-5) + \text{T} \rightarrow \text{Be}^{(q-1)+}, \text{B}^{(q-1)+}$ (T = $\text{H}, \text{H}_2, \text{He}$)
T : evaluation
- 92E32 Posthumus, J.H. Lukey, P. Morgenstern, R.
The influence of angular momentum on double electron capture by highly charged ions.
J. Phys. B 25 987 - 999 1992 E
 $\text{C}^{6+} + \text{H}_2 \rightarrow \text{C}^{4+}(3131^0) ; \text{O}^{8+} + \text{He} \rightarrow \text{O}^{6+}(3131^0)$
electron spectroscopy
96 keV
- 92E33 Posthumus, J.H. Morgenstern, R.
Coincidences between electrons and target ions to identify capture channels in collisions of multiply charged ions on gas targets.
Phys. Rev. Letters 68 1315 - 1318 1992 E
 $\text{Ar}^{9+} + \text{Ar} \rightarrow \text{Ar}^{(9-n)+}$ (n = 2 - 6)
electron-recoil ion coincidence technique
2.7 keV/amu
electron energy spectra ; no cross sections
- 92E57 Posthumus, J.H. Morgenstern, R.
Multiple electron capture in slow Ar^{9+} and C^{5+} on Ne, studied by $e^- \text{Ne}^{q+}$ coincidences.
J. Phys. B 25 4533 - 4552 1991 E
 $\text{C}^{5+} + \text{Ne} \rightarrow \text{C}^{(5-i)+} + \text{Ne}^{i+}$ (i = 2, 3) ; $\text{Ar}^{9+} + \text{Ne} \rightarrow \text{Ar}^{(9-i)+} + \text{Ne}^{i+}$ (i = 2 - 5)
e-recoil ion coincidence technique
6.7 keV/amu (C) ; 2.7 keV/amu (Ar)
- 92E62 Reid, C.J.
State compositions of beams of $\text{C}^+, \text{O}^+, \text{S}^+$ and Cl^+ ions determined using charge-inversion spectroscopy
J. Phys. B 25 475 - 490 1992 E
 $\text{C}^+ + \text{Xe} \rightarrow \text{C}^+ ; \text{O}^+ + \text{Kr}, \text{Xe} \rightarrow \text{O}^+ ; \text{S}^+ + \text{NO} \rightarrow \text{S}^+ ; \text{Cl}^+ + \text{Xe} \rightarrow \text{Cl}^+$
translational energy spectroscopy
- 92E63 Reid, C.J.
Sequential electron capture reactions and state compositions of beams of first-row diatomic cations
J. Phys. B 25 4249 - 4271 1992 E
 $\text{O}_2^+, \text{NO}^+, \text{CF}^+, \text{CH}^+, \text{NH}^+, \text{CN}^+ + \text{Xe} \rightarrow \text{O}_2^+, \text{NO}^+, \text{CF}^+, \text{CH}^+, \text{NH}^+, \text{CN}^+$
translational energy spectroscopy
0.5 keV/amu
many cations include a fraction of metastable states
- 92E34 Roller-Lutz, Z. Finck, K. Wang, Y. Lutz, H.O.
Angle-differential measurement of $\text{H}(2p)$ electron capture in H^+ collision with $\text{Na}(3s)$ and laser-excited $\text{Na}(3p)$ atoms.
Phys. Letters A 169 173 - 176 1992 E
 $\text{H}^+ + \text{Na}(3s), \text{Na}(3p) \rightarrow \text{H}(2p)$
laser-excited Na target
1 keV/amu
angular distribution (0.05 - 0.3)
- 92E35 Saito, M. Imai, M. Iwasawa, K. Sakura, N. Imanishi, N. Fukuzawa, F.
Cross sections of charge exchange for fast He ions passing through Zn vapor.
J. Phys. Soc. Japan 61 2748 - 2753 1992 E
 $\text{He} + \text{Zn} \rightarrow \text{He}^+, \text{He}^{2+} ; \text{He}^+ + \text{Zn} \rightarrow \text{He}^+, \text{He}^0 ; \text{He}^{2+} + \text{Zn} \rightarrow \text{He}^+, \text{He}^0$
growth technique
200 - 500 keV/amu

- 92E36 Sakabe, S. Izawa, Y. Hashida, M. Nakai, S. Yamanaka, C.
Symmetric charge transfer cross sections for gadolinium in the energy range 10 - 1000 eV.
Phys. Rev. A 45 252 - 258 1992 E
 $\text{Ga}^+ + \text{Ga} \rightarrow \text{Ga} + \text{Ga}^+$
laser-evaporation/ionization method
 $6 \times 10^{-5} - 6 \times 10^{-3} \text{ keV/amu}$
- 92E37 Schlammann, A. Hoekstra, R. Folkerts, H.O. Morgenstern, R.
Electron capture and excitation in He^{2+} -Na collisions.
J. Phys. B 25 3155 - 3164 1992 E
 $\text{He}^{2+} + \text{Na} \rightarrow \text{He}^+(n = 4 \rightarrow 3; 5 \rightarrow 3; 4 \rightarrow 2; 3 \rightarrow 2) + \text{Na}^*(3p \rightarrow 3s; 4p \rightarrow 3s; 4d \rightarrow 3p)$
photon spectroscopy
2 - 9 keV/amu
photon emission cross sections
- 92E38 Schulz, M. Blankenship, D.M. Bross, S.W. Gaus, A.D. Gay, T.J. Htwe, W. Park, J.T. Peacher, J.L.
State-selective capture in collisions of protons with noble gases.
Phys. Rev. A 46 3870 - 3876 1992 E
 $\text{H}^+ + \text{B} \rightarrow \text{H}(2p) \text{ (B = He, Ne, Ar)}$
Lyman-alpha-H coincidence technique
50 keV/amu
angular distribution
- 92E39 Seely, D.G. Bross, S.W. Gaus, A.D. Edwards, J.W. Schulz, D.R. Gay, T.J. Park, J.T. Peacher, J.L.
Angular-differential cross sections for $\text{H}(2p)$ formation in intermediate-energy proton-helium collisions.
Phys. Rev. A 45 R1287 - 1290 1992 E
 $\text{H}^+ + \text{He} \rightarrow \text{H}(2p)$
E : photon-projectile coincidence ; T : CTMC
25 - 100 keV/amu
angular distributions
- 92E40 Shah, M.B. McCallion, P. Itoh, Y. Gilbody, H.B.
Electron capture and ionization in collisions of fast H^+ and He^{2+} ions with magnesium atoms.
J. Phys. B 25 3693 - 3708 1992 E
 $\text{H}^+, \text{He}^{2+} + \text{Mg} \rightarrow \text{H}, \text{He}^+ + \text{Mg}^{i+} \text{ (i = 1 - 4)}$
projectile-recoil ion coincidence technique
90 - 2000 keV/amu (H) ; 43 - 500 keV/amu (He)
- 92E41 Shinpaugh, J.L., Sanders, J.M. Hall, J.M. Lee, D.H. Schmidt-Böcking, H. Tipping, T.N. Zouros, T.J. Richard, P.
Electron capture and target ionization in collisions of bare projectile ions incident on helium.
Phys. Rev. A 45 2922 - 2928 1992 E
 $\text{A}^{Z+} + \text{He} \rightarrow \text{A}^{(Z-1)+} + \text{He}^+, \text{A}^{(Z-1)+} + \text{He}^{2+} + \text{e}, \text{A}^{Z+} + \text{He}^+ + \text{e}, \text{A}^{Z+} + \text{He}^{2+} + 2\text{e} \text{ (A = C, N, O, F)}$
projectile-recoil ion coincidence method
 $25 \times 10^2 - 2 \times 10^3 \text{ keV/amu}$
- 92E42 Soejima, K. Latimer, C.J. Okuno, K. Kobayashi, N. Kaneko, Y.
Cross sections for single and multiple electron capture in low energy collisions of C^{3+} with H_2O_2 and N_2 .
J. Phys. B 25 3009 - 3014 1992 E
 $\text{C}^{3+} + \text{H}_2\text{O}_2, \text{N}_2 \rightarrow \text{C}^{3+}, \text{C}^{2+}, \text{C}^+$
 $3 \times 10^{-4} - 0.7 \text{ keV/amu}$
- 92E58 Stöhlker, Th. Kozhuharov, Ch. Mokler, P.H. Olson, R.E. Stachura, Z. Warczak, A.
Single and double electron capture in collisions of highly ionized, decelerated Ge ions with Ne.
J. Phys. B 25 4522 - 4532 1992 E
 $\text{Ge}^{31+} + \text{Ne} \rightarrow \text{Ge}^{30+}, \text{Ge}^{29+}$
E : growth-method ; T : CTMC
 $(4 - 12) \times 10^3 \text{ keV/amu}$
- 92E43 Stöhlker, Th. Kozhuharov, C. Livingston, A.E. Mokler, P.H. Stachura, Z. Warczak, A.
Radiative electron capture into K-, L- and M-shell of decelerated hydrogenic Ge projectiles.
Z. Phys. D 23 121 - 125 1992 E
 $\text{Ge}^{31+} + \text{H}_2 \rightarrow \text{Ge}^{30+}$
radiative capture technique
 $4.5 \times 10^3 - 10 \times 10^4 \text{ keV/amu}$
- 92E44 Surud, M.G. Bliman, S. Hitz, D. Rubensson, J.E. Nordgren, J. Bonnet, J.J. Bonnefoy, M. Chassevent, M. Fleury, A. Cornille, M. Knysiautas, E.J. Barany, A.
Slow collisions of O^{6+} with H_2 at 3.8 keV/amu.
J. Phys. B 25 2363 - 2381 1992 E
 $\text{O}^{6+} + \text{H}_2 \rightarrow \text{O}^{5+}(1s^2nl) ; \text{O}^{4+}(1s^2nl^2l')$
photon spectroscopy
3.8 keV/amu
relative cross sections

- 92E45 Vermeeren, L. Lievers, P. Buekenhoudt, A. Silverans, R.E.
Charge exchange collisions between alkaline-earth ions and alkaliatoms.
J. Phys. B 25 1009 - 1019 1992 E
Ba⁺(5d,6s) + Na,Rb,Cs → Ba⁺; Sr⁺(4d,5s) + Na,Rb → Sr⁺; Ca⁺(3d,4s) + Na → Ca⁺
laser-excited target technique
0.5 - 30 keV
- 92E46 Wolfrum, E. Hoekstra, R. de Heer, F.J. Morgenstern, R. Winter, H.
Absolute visible light emission cross sections for electron capture from Li atoms by
slow, highly charged ions.
J. Phys. B 25 2597 - 2606 1992 E
C⁶⁺, Ne⁸⁺(q=6,7,8,9) + Li → C⁵⁺(n=8->7,7->6), Ne⁶⁺(n=10->9,9->8,8->7)
photon spectroscopy
1 - 9 keV/amu
300 - 600 nm photons
- 92E47 Wolfrum, E. Schweinzer, J. Winter, H.
Suppressed electron capture in slow O⁺(⁴S^o, ²D^o, ²P^o) - He collisions.
Phys. Rev. A 45 R4218 - 4221 1992 E
O⁺(⁴S^o, ²D^o, ²P^o) + He → O⁰(³P)
translational energy spectroscopy + attenuation method
0.06 - 0.38 keV/amu
- 92T26 Bacchus-Montabonel, M.C.
Theoretical study of electron-capture processes in the collision of the metastable N³⁺
(1s2s) multicharged ion on a He target.
Phys. Rev. A 46 217 - 221 1992 T
N³⁺(1s2s) + He → N⁴⁺(1s2snl=3s,3p,3d) ; N³⁺(1s²) + He → N⁴⁺(1s²nl=3s,3p,3d)
MO
3.5 keV/amu
- 92T 3 Bachau, H. Gayet, R. Hanssen, J. Zetarka, A.
Transfer and excitation in ion-atom collisions at high impact velocities ; a unified
continuum distorted wave treatment of resonant and non-resonant modes in a four-
body approach: II application to the collision S¹³⁺(1s) + H(1s).
J. Phys. B 25 839 - 852 1992 T
S¹³⁺ + H, Be³⁺, Ne⁹⁺, S¹³⁺ → S¹⁴⁺(nl,n'l')
CDW-4B
2x10³ - 2.3x10⁴ keV/amu
- 92T 2 Bachau, H. Roncin, P. Harel, C.
Stabilization of autoionizing states during ion-atom collisions.
J. Phys. B 25 L109 - 115 1992 T
O⁸⁺ + H₂ → O⁶⁺(n,n')
- 92T53 Belkic, D. Gayet, R. Salin, A.
Cross sections for electron capture by fully stripped ions from atomic hydrogen.
At. Data and Nucl. Data Tables 51 59 - 150 1992 T
A²⁺ + H(1s) → A⁽²⁻¹⁾⁺(nlm) + H⁺ (A = H, He, Li, Be, B, C, O)
CDW method
40 - 10000 keV/amu
- 92T54 Belkic, D. Mancev, I.
Formation of H⁻ by double charge exchange in fast proton-helium collisions.
Phys. Scripta 45 35 - 42 1992 T
H⁺ + He → H⁻ + He²⁺
CDW approx.
20 - 1000 keV/amu
- 92T 4 Chen, M.H.
Resonant transfer and excitation in collisions of chlorine-like ions with H₂ targets.
Phys. Rev. A 45 4604 - 4609 1992 T
Fe¹⁸⁺, Nb²⁴⁺, La⁴⁰⁺ + H₂ → Fe⁸⁺, Nb²³⁺, La³⁹⁺
Impulse approx. + Multi-configuration Dirac-Fock method
535 - 2100 keV/amu (Fe) ; 1.4x10³ - 4.1x10³ keV/amu (Nb) ; 2.9x10³ - 5.8x10³
keV/amu (La)
- 92T 1 Avakov, G.V. Blokhinisev, L.D. Kadyrov, A.S. Mukhamedzhanov, A.M.
Electron capture in proton collisions with alkali atoms as a three-body problem.
J. Phys. B 25 213 - 219 1992 T
H⁺ + Li → H(nl; n=1-5, total) ; H⁺ + Na → H(2s,2p; total) ; H⁺ + K, Rb → H(total)
Impact parameter method with Fadeev three-body approach
5x10⁻² - 5x10 keV/amu

- 92T 5 Choudhury, K.S. Sural, D.P.
Electron capture in ground and excited states in proton-alkali-metal-atom collisions.
J. Phys. B 25 853 - 867 1992 T
 $H^+ + B \rightarrow H(1s, 2s, 2p) + B^+$ ($B = Na, K, Rb, Cs$)
Impulse approx.
50 - 500 keV/amu
angular differential cross sections
- 92T63 Corcchs, S.E. Dube, L.J. Maitagan, J.M. Rivarola, R.D. Salin, A.
Uniqueness of the minimal form of Coulomb asymptotic behavior in atomic collisions
J. Phys. B 25 2027 - 2036 1992 T
Impact parameter approx.
- 92T27 Crothers, D.S.F. O'Rourke, S.F.C.
Half-way house variational continuum distorted waves and anisotropy in electron capture to the continuum : The Thomas double scattering limit.
J. Phys. B 25 2351 - 2362 1992 T
CDW approx.
analytical expressions obtained
- 92T 6 Datta, S.
Electron capture by fast protons from carbon, neon and argon in the Coulomb Born approximation.
J. Phys. B 25 1001 - 1008 1992 T
 $H^+ + B \rightarrow H + B^+(K^-)$ ($B = C, Ne, Ar$)
Coulomb-Born approx.
 $10^2 - 2 \times 10^3$ keV/amu (C) ; $3 \times 10^2 - 7 \times 10^3$ keV/amu (Ne) ; $1 \times 10^3 - 2 \times 10^4$ keV/amu (Ar)
- 92T64 Dewangan, D.B. J. Eichler
The Z-expansion method of Macek and Coulomb boundary conditions
Comm. At. Mol. Phys. 27 317 - 333 1992 T
- 92T28 Dutta, C.M. Lane, N.F. Kimura, M.
Theoretical study of non resonant $^3He^+ + ^4He \rightleftharpoons ^3He + ^4He^+$ charge transfer in the threshold region.
Phys. Rev. A 46 3889 - 3892 1992 T
 $^3He^+ + ^4He \rightarrow ^3He + ^4He^+$; $^4He^+ + ^3He \rightarrow ^4He + ^3He^+$
quantum mechanical cal.
 $2.5 \times 10^{-7} - 1 \times 10^{-4}$ keV/amu
- 92T29 Ernalaev, A.M.
Mutual neutralization in collisions between negative hydrogen ions and singly-charged positive ions II : He^+ and Li^+ projectile at low-keV energies.
J. Phys. B 25 3133 - 3144 1992 T
 $He^+(1s) + H^- \rightarrow He(1snl ; n=2,3,4) ; Li^+(1s^2) + H^- \rightarrow Li(1s^2nl ; n=2,3,4)$
two-center AO
0.25 - 25 keV/amu (He^+) ; 0.07 - 25 keV/amu (Li^+)
- 92T55 Errea, L.F. Harel, C. Jouin, H. Maitagan, J.M. Mendez, L. Pons, B. Riera, A.
Plane-wave and common-translation-factor treatments of $He^{2+} + H$ collisions at high velocities.
Phys. Rev. A 46 5617 - 5630 1992 T
 $He^{2+} + H \rightarrow He^+$ ($n = 1, 2, 3$)
MO + Plane-wave + common translation factor method
also excitation to $H(n=2,3)$
- 92T 7 Errea, L.F. Lopez, A. Mendez, L. Riera, A.
Elastic, inelastic and charge exchange differential cross sections in $He^+ + H$ collisions.
J. Phys. B 25 811 - 824 1992 T
 $He^+ + H \rightarrow He + H^+$
MO with translation factor
0.4 - 6 keV/amu
angle-differential cross sections
- 92T30 Fritsch, W.
An improved model description for single electron capture processes from H_2 molecules.
Phys. Letters A 166 238 - 242 1992 T
 $H^+ + H_2 \rightarrow H(\text{total}, 2s, 2p)$
close-coupling AO calculation with one-electron potential + two-electron wave function
1.5 - 100 keV/amu
- 92T31 Fritsch, W.
Model description for single-electron transfer in slow-ion- H_2 -molecule collisions : studies for H^+ , He^{2+} and C^{4+} projectiles.
Phys. Rev. A 46 3910 - 3917 1992 T
 $H^+ + H_2 \rightarrow H(2p) ; He^{2+} + H_2 \rightarrow He^+ He^+(2s) ; C^{4+} + H_2 \rightarrow C^{3+}(n=3, 3s, 3p, 3d)$
one-electron potential model + close-coupling calculation
1 - 50 keV/amu (H) ; $1 - 10^2$ keV/amu (He) ; 4 - 30 keV/amu (C)

- 92T32 Fritsch, W. Lin, C.D.
One- and two-electron capture in collisions of slow B^{4+} and Be^{4+} ions with helium.
Phys. Rev. A 45 6411 - 6416 1992 T
 $B^{4+} + He \rightarrow B^{3+}(2s,2p), B^{2+}(2l2l')$; $Be^{4+} + He \rightarrow Be^{3+}(2s,2p), Be^{2+}(2l,2l')$
two-center AO
1.5 - 30 keV/amu
- 92T56 Fukuda, H. Ishihara, T.
Distorted atomic-orbital expansion for slow ion-atom collisions.
Phys. Rev. A 46 5531 - 5538 1992 T
 $He^{2+} + H \rightarrow He^{+}(n=2,2s,2p) + H^{+}$
distorted AO model
(5 - 50) $\times 10^{-3}$ keV/amu
- 92T10 Gayet, R. Hanssen, J.
Transfer and excitation in ion-atom collisions at high impact velocities; a unified continuum distorted wave treatment of resonant and non-resonant modes in a four body approach.
J. Phys. B 25 825 - 837 1992 T
general theory
CDW-4B method
- 92T57 Glass, J.T. McCann, J.F. Crothers, D.S.F.
Electron capture at semi-relativistic energies: distorted wave models.
J. Phys. B 25 L541 - 544 1992 T
general discussion
DW approx.
- 92T 8 Gravielle, M.S. Miraglia, J.E.
Double-electron capture as a two-step process.
Phys. Rev. A 45 2965 - 2973 1992 T
 $He^{2+} + He(1s^2) \rightarrow He(1s^2) + He^{*}; Li^{3+} + He(1s^2) \rightarrow Li^{+}(1s^2); B^{4+} + He(1s^2) \rightarrow B^{3+}(1s^2)$
DW approx.
50 - 700 keV/amu
angular distributions also
- 92T34 Hahn, Y.
Transfer excitation with shake-up and target charge effects.
Phys. Letters A 169 458 - 462 1992 T
 $Fe^{6+} + H_2 \rightarrow Fe^{3+}$
inclusion of shake-up and target charge
 $7 \times 10^2 - 2.4 \times 10^4$ keV/amu
- 92T 9 Hansen, J.P.
Dynamics of single- and double-electron capture in C^{4+} -He collisions.
J. Phys. B 25 L17 - 22 1992 T
 $C^{4+} + He \rightarrow C^{3+}(2s,2p,2s^2,2s2p,n=3); C^{2+}$
two-center closed-coupling method
0.75 - 1.1×10^4 keV/amu
- 92T11 Hansen, J.P. Dubois, A. Nielsen, S.E.
Partial cross sections and correlation effects in B^{3+} -He collisions.
Phys. Rev. A 45 184 - 189 1992 T
 $B^3 + He \rightarrow B^{2+}(2s;2p)$
one-electron model/two-electron model
1 - 500 keV/amu
- 92T58 Hansen, J.P. Nielsen, S.E. Dubois, A.
Trajectory-interference effects in ion-atom collisions.
Phys. Rev. A 46 R5331 - 5333 1992 T
 $H^{+} + H \rightarrow H(2p_{\pm 1}); He^{2+} + H \rightarrow He^{*}(2p_{\pm 1}) + H^{+}$
eikonal approx.
50 keV/amu
angular distribution, orientation parameters
- 92T33 Hansen, J.P. Taulbjerg, K.
Electron correlation in highly-charged ion collisions.
Phys. Rev. A 45 R4214 - 4217 1992 T
 $C^{3+} + He \rightarrow C^{3+}(1s2l2l')$
coupled-channel method
2 - 6 keV/amu
- 92T12 Harel, C. Jouin, H.
Double capture into autoionizing states in $Fe^{+} + He$ collisions at low impact energies.
J. Phys. B 25 221 - 237 1992 T
 $N^{7+}, O^{6+}, Ne^{5+} + He \rightarrow N^{3+}, O^{6+}, Ne^{6+}(nl,n'l')$
OEEM
0.8 - 9 keV/amu

- 92T13 Jackson, D. Slim, H.A. Bransden, B.H. Flower, D.R.
Excitation and charge transfer in He^+-H collisions.
J. Phys. B 25 L127 - 130 1992 T
 $^3\text{He}^+ + \text{H} \rightarrow \text{He} + \text{H}^+$
AO
7 - 300 keV
 $\text{He}^+ + \text{H} \rightarrow \text{He}^+ + \text{H}^+(2p)$
- 92T60 Kürpick, P. Ludde, H.J. Sepp, W.D. Fricke, B.
Application of inclusive probability theory to heavy ion-atom collisions.
Z. Phys. D 25 17 - 21 1992 T
 $\text{Ne}^{8+} + \text{Ne} \rightarrow \text{Ne}^{8+}(1s^2) + \text{Ne}^+(K^-)$
inclusive probability theory + independent particle model
130 keV/amu
- 92T35 Kazansky, A.K.
The rotation-Stark mechanism of creating large-L Rydberg states in double charge exchange.
J. Phys. B 25 L381 - 387 1992 T
production of large L Rydberg states
- 92T59 Krsic, P.S. Radmilovic, M. Janev, R.K.
Charge exchange, excitation and ionization in slow $\text{Be}^{4+} + \text{H}$ and $\text{B}^{3+} + \text{H}$ collisions.
Supplement to Nucl. Fusion 3 113 - 125 1992 T
 $\text{Be}^{4+}, \text{B}^{3+} + \text{H}(n=1,2) \rightarrow \text{Be}^{3+}(\text{total}, n)$
superpromotion model
0.2 - 100 keV/amu
- 92T14 Kuang, Y.R.
Electron capture by protons and alpha particles from two-electron targets.
J. Phys. B 25 199 - 221 1992 T
 $\text{H}^+, \text{He}^{2+} + \text{B}^{(2,2+)}(1s^2) \rightarrow \text{H}(1s), \text{He}^+(1s) \text{ (B = He, Be, B, C, N, O)} ; \text{He}^{2+} + \text{Li}(1s^2) \rightarrow \text{He}^+(1s) + \text{Li}^+(K^-)$
two-orthogonal state expansion method
20 - 2000 keV/amu
scaling $\sigma^*Z_1^2/Z_p^3 - (E/25)^*Z_p^2$
- 92T36 Kunikeev, Sh.D. Senashenko, U.S.
Effect of the target core on electron capture into the continuum of a fast neutral atom.
Sov. Phys. JETP 75 452 - 446 1992 T
 $\text{He} + \text{He} \rightarrow \text{He} + \text{He}^+$
target ion core model
25 - 125 keV/amu
- 92T61 Kürpick, P. Sepp, W.D. Fricke, B.
Inclusive probability calculations for the K-vacancy transfer in collisions of S^{15+} on Ar.
J. Phys. B 25 5431 - 5437 1992 T
 $\text{S}^{15+}(1s) + \text{Ar} \rightarrow \text{S}^{14+}(1s^2) + \text{Ar}^+(K^-)$
CC with relativistic HFS
146 - 500 keV/amu
- 92T15 Lewartowski, E. Coubin, C.
Classical model of electron capture from oriented sodium atoms.
J. Phys. B 25 L63 - 68 1992 T
 $\text{H}^+ + \text{Na}^*(3p) \rightarrow$
CTMC
1 - 3 keV/amu
- 92T37 Lundsgaard, M.F.V. Lin, C.D.
Reduced close-coupling calculations for electron capture processes in collisions of multiply charged ions with atoms.
J. Phys. B 25 L429 - 434 1992 T
 $\text{C}^{6+} + \text{H} \rightarrow \text{C}^{5+}(n=4,5)$
semiclassical IP
0.1 - 30 keV/amu
- 92T65 Macek, J.
Reply to "Some remarks on the theory of high energy electron capture in ion-atom collisions"
Comm. At. Mol. Phys. 27 177 - 183 1993 T
- 92T38 Macek, J. Ovchinnikov, S.Y.
Anomalous dependence of low energy electron capture from atomic hydrogen by multicharged ions.
Phys. Rev. Letters 69 2357 - 2359 1992 T
 $\text{O}^{8+} + \text{H}(n) \rightarrow \text{O}^{7+} + \text{H}^+$
(8 - 800) $\times 10^{-3}$ keV/amu
 $\sigma \sim n^7$

- 92T39 Martinez, A.E. Bullrich, J.A. Maidagan, J.M. Rivarola, R.D.
The continuum distorted-wave-eikonal initial state model for single electron capture in ion-atom collisions.
J. Phys. B 25 1883 - 1891 1992 T
 $H^+ + H_1He \rightarrow H(2s,2p)$
continuum CDW-eikonal approx.
20 - 10^3 keV/amu
- 92T40 Marxer, H. Briggs, J.S.
Total cross sections for K-K electron transfer in fast ion-atom collisions ; the impulse and strong potential Born approximations.
J. Phys. B 25 3823 - 3848 1992 T
 $H^+ + B \rightarrow H(1s) + B^+(K^{-1})$ (B = C, Ne, Ar) ; $He^{2+} + Ne \rightarrow He^+(1s) + Ne^+(K^{-1})$; $Li^{3+} + C \rightarrow Li^{2+}(1s) + C^+(K^{-1})$; $C^+ + Ar \rightarrow C^{3+}(1s) + Ar^+(K^{-1})$
strong potential Born , IP approx.
300 - 15000 keV/amu
- 92T16 Maynard, G. Janev, R.K. Katonis, K.
Electron capture and ionization in collisions of multicharged neon ions with atomic hydrogen.
J. Phys. B 25 437 - 444 1992 T
 $Ne^{q+} + H \rightarrow Ne^{(q-1)+} + H^+$ (q = 3 - 10)
CTMC
 $10 - 10^3$ keV/amu
also $Ne^{q+} + H \rightarrow Ne^{q+} + H^+ + e$; scaling over q/energy
- 92T17 McCann, J.F.
The distorted-wave impulse approximation for electron capture processes at intermediate collision energies.
J. Phys. B 25 449 - 461 1992 T
 $H^+ + H \rightarrow H + H^+$; $Li^{3+} + Ne \rightarrow Li^{2+} + Na^+(K^{-1})$
DW-Impulse approx.
50 - 800 keV/amu (H) ; $2 \times 10^2 - 6 \times 10^3$ keV/amu (Li)
- 92T66 Mo, O. Riera, A.
On Na atom excitation in low energy H + Na collisions
J. Phys. B. 25 1101 - 104 1992 T
 $H + Na(3s) \rightarrow H + Na(3p,4s)$
MO with common translation factor

- 92T41 Moiseiwitsch, B.L.
Ultra-high relativistic energy limit for electron capture.
J. Phys. B 25 L487 - 489 1992 T
3rd order OBK approx.
- 92T42 Moiseiwitsch, B.L.
Fine structure constant expansions for electron capture.
J. Phys. B 25 3015 - 3020 1992 T
 $H^+ + H \rightarrow H + H^+$; $C^{6+} + Au \rightarrow C^{3+}(1s) + Au^+(K^{-1})$; $Ne^{10+} + B \rightarrow Ne^{9+}(1s) + B^+(K^{-1})$ (B = Al, Zn, Ag, Ta, Au) ; $Ar^{18+} + B \rightarrow Ar^{17+}(1s) + B^+(K^{-1})$ (B = Cu, Ag, Ta, Au)
1st and 2nd Born + eikonal approx.
 $10^4 - 10^6$ keV/amu (H) ; $4 \times 10^5 - 10 \times 10^5$ keV/amu
- 92T43 O'Rourke, S.F.C. Crothers, D.S.F.
Half way house variational continuum distorted wave theory : high energy cross sections in the distorted wave perturbation approximation.
Z. Phys. D 24 165 - 169 1992 T
 $H^+ + H \rightarrow H(1s) + H^+$
CDW approx. + perturbation theory
- 92T67 Olson, R.E. Pascale, J. Hoekstra, R.
Lineemission from $C^{6+}, O^{8+} + Li$ electron capture collisions
J. Phys. B 25 4242 - 4247 1992 T
 $C^{6+}, O^{8+} + Li(2s) \rightarrow C^{3+}(nl), O^{7+}(nl) + Li^+$
CTMC
1 - 10keV/amu
maximum at n=7 for C^{6+} and at n=8-9 for O^{8+}
- 92T44 Pleksman, M. Ovchinnikov, S.Yu.
Asymptotic dependence of the electron capture cross section on the n quantum number in slow He^{2+} -H collisions.
J. Phys. B 25 L373 - 380 1992 T
 $He^{2+} + H \rightarrow He^+(n : n \leq 30)$
superpromotion model
1 - 25 keV/amu

- 92T18 Sakabe, S. Izawa, Y.
Simple formula for the cross sections of resonant charge transfer between atoms and their positive ions at low impact velocity.
Phys. Rev. A 46 1704 1992 T
 $A^+ + A \rightarrow A + A^+$
impact parameter method
 4.7×10^{-5} - 46 keV/amu
correction to Phys. Rev. A 45 (1992) 2086
- 92T19 Salin, A.
Comments on strong potential Born expansions for ion-atom collisions.
J. Phys. B 25 L137 - 143 1992 T
strong potential Born approx.
- 92T46 Schultz, D.R. Reinhold, C.O. Olson, R.E.
Classical calculation of high-energy electron capture in 5 MeV proton-hydrogen collisions.
Phys. Rev. A 46 666 - 669 1992 T
 $H^+ + H \rightarrow H$
CTMC
 5×10^3 keV/amu
angular distribution
- 92T45 Schultz, D.R. Reinhold, C.O. Olson, R.E. Seely, D.G.
Differential cross sections for state-selective electron capture in 25 - 100 keV proton-helium collisions.
Phys. Rev. A 46 275 - 283 1992 T
 $H^+ + He \rightarrow H(2s, 2p, 3s, 3p, 4s, 4p)$
CTMC
25 - 100 keV/amu
- 92T20 Shimakura, N. Itoh, M. Kimura, M.
Molecular treatment of electron capture in collisions of N^{4+} ions with H atoms.
Phys. Rev. A 45 267 - 275 1992 T
 $N^{4+} + H \rightarrow N^{3+}(2s3s; 2s3p; 2s3d; 2p3s)$
MO
 1×10^{-3} - 10 keV/amu
- 92T47 Shimakura, N. Koizumi, S. Suzuki, S. Kimura, M.
Molecular treatment of electron capture in atomic collisions in the me-to-keV-energy regime : collisions of C^{3+} ions with H atoms and the effect of core electrons.
Phys. Rev. A 45 7876 - 7882 1992 T
 $C^{3+}(1s) + H \rightarrow C^{2+}(1snl)$
quantum mechanical + MO methods
 1×10^{-3} - 0.8 keV/amu
- 92T21 Sizun, M. Grimbert, D. Sidis, V. Baer, M.
Vibrational state-to-state calculations of $H^+ + O_2$ charge transfer collisions.
J. Chem. Phys. 96 307 - 325 1992 T
 $H^+ + O_2(X^3\Sigma_g^-; v) \rightarrow H + O_2(X^3\Pi_g^-; v'')$
quantal infinite order sudden approx. + vibronic semiclassical approx.
 2×10^{-2} keV/amu
also $H^+ + O_2(X^3\Sigma_g^-; v')$
- 92T23 Toshima, N.
Absence of the Thomas peak in the classical-trajectory Monte Carlo calculations for proton-hydrogen collisions in the MeV region.
Phys. Rev. A 45 R2663 - 1992 T
 $H^+ + H \rightarrow H + H^+$
CTMC
 2.8×10^3 , 5×10^3 keV/amu
- 92T48 Toshima, N. Eichler, J.
Nonperturbative treatment of the Thomas mechanism in electron capture.
Phys. Rev. A 46 2564 - 2571 1992 T
 $H^+ + H \rightarrow H + H^+$
nonperturbative coupled-channel calculation
 $(1 - 5) \times 10^3$ keV/amu
angular distributions
- 92T49 Toshima, N. Igarashi, A.
Second Born approximation differential cross sections for p + H and p + He charge exchange collisions.
Phys. Rev. A 45 6313 - 6317 1992 T
 $H^+ + H \rightarrow H + H^+$; $H^+ + He \rightarrow H + He^+$
exact 2nd Born approx.
 1×10^3 - 2.8×10^3 keV/amu (H); 2.8×10^3 - 7.4×10^3 keV/amu (He)

- 92T22 Toshima, N. Stingal, R. Lin, C.D.
Orientation parameters and dipole moments of $\text{He}^+(n=2)$ states in $\text{He}^+ + \text{H}$ collisions : comparison of CTMC and close-coupling results.
J. Phys. B 25 L11 - 15 1992 T
 $\text{He}^{2+} + \text{H} \rightarrow \text{He}^+(n=2)$
CTMC + closed-coupling expansion
10, 25, 50 keV/amu
- 92T50 Vaeck, N. Hansen, J.E.
Competition between radiative and non-radiative decay processes in triply-excited $3l3'l''$ and doubly-excited $2lnl'$ states in nitrogen ions.
J. Phys. B 25 3267 - 3282 1992 T
 $\text{N}^{7+} + \text{Ar} \rightarrow \text{N}^{4+}(3l3'l''), \text{N}^{5+}(2lnl')$
CI approx.
radiative and non-radiative decay rates
- 92T51 Vaeck, N. Hansen, J.E.
Calculations of autoionization rates for double-Auger decay of multiply-excited states in nitrogen.
J. Phys. B 25 3613 - 3619 1992 T
double-Auger rates for $\text{N}(\text{K}^{-2})$ states
- 92T24 Vitinov, N. Panev, G.
Generalization of the Demkov formula in near-resonant charge transfer.
J. Phys. B 25 239 - 248 1992 T
 $\text{Li}^+ + \text{Na} \rightarrow \text{Li}^+ ; \text{K}^+ + \text{Rb} \rightarrow \text{K}$
generalized Demkov formula
- 92T68 Wang, J. Reinhold, C.O. Burgdörfer, J.
Electron-electron interaction and two-center effects in projectile ionization at backward emission Angles
Phys. Rev. A. 45 4507 - 4518 1992 T
 $\text{He}^+ \text{He} + \text{He} \rightarrow$
CDW-EIS approx.; CTMC
500 keV/amu
- 92T25 Winter, T.G.
Coupled-Sturmian and perturbative treatments of electron transfer and ionization in high energy p-He⁺ collisions.
Phys. Rev. A 45 1562 - 1568 1992 T
 $\text{H}^+ + \text{He}^+ \rightarrow \text{H} + \text{He}^{2+} ; \text{H}^+ + \text{He}^{2+} + e$
coupled-Sturmian approx.
225 - 2000 keV/amu
- 92T52 Zygelman, B. Cooper, D.L. Ford, M.J. Dalgarno, A. Gerratt, J. Raimondi, M.
Charge transfer of N^{4+} with atomic hydrogen.
Phys. Rev. A 46 3846 - 3854 1992 T
 $\text{N}^{4+} + \text{H} \rightarrow \text{N}^{3+}(2s3l) (l = 0, 1, 2)$
close-coupling MO calculation
0.007 - 0.6 keV/amu
also rate coefficient

- 93E 1 Afrosimov, V.V., Barash, D.F., Basalaev, A.A., Gushchina, N.A., Lozhkin, K.O., Nikulin, V.K., Panov, M.N., Stepanov, I. Yu.
Single- and double-electron capture from many-electron atoms by alpha particles in the MeV energy range
JETP 74 554 - 742 1993 E
 $\text{He}^{2+} + \text{B} \rightarrow \text{He}^+ \text{He}^0$ ($\text{B} = \text{He}, \text{Ne}, \text{Ar}, \text{Kr}, \text{Xe}, \text{N}_2$)
E: growth method; T: target CDW method
100 - 2.5x10³ keV/amu
- 93E 2 Ali, R., Cocke, C.L., Raphaelian, M.L.A., Stockli, M.
On the radiative stabilization in slow double-electron capture collisions of highly charged ions with neutral atoms
J. Phys. B 26 L177 - 184 1993 E
 $\text{Kr}^{q+}(q=13-34) + \text{Ar} \rightarrow \text{Kr}^{(q-2)+} + \text{Ar}^{2+}(q=6-17) + \text{Ar} \rightarrow \text{Ar}^{(q-2)+} + \text{e}^-$
projectile-recoil ion coincidence
10 keV/amu
- 93E 3 Ali, R., Cocke, C.L., Raphaelian, M.L.A., Stockli, M.
Angular distributions in charge-transfer collisions of 50keV Ar^{15+} with Ar
J. Phys. B 26 L685 - 692 1993 E
 $\text{Ar}^{15+} + \text{Ar} \rightarrow \text{Ar}^{14+} + \text{Ar}^{1+}(i=1,2,3,4) + \text{Ar}^{13+} + \text{Ar}^{12+}$
TOF coincidence technique
1.25 keV/amu
halo-scattering, angular distribution
- 93E 4 Alsmour, B., Urbain, X., Brouillard, F., Cornet, A.
Formation of H^+ in the collision of $\text{H}(3s)$ with helium and neon
J. Phys. B 26 1317 - 1327 1993 E
 $\text{H}(3s) + \text{He}, \text{Ne} \rightarrow \text{H}^+$
translational energy spectroscopy
0.4 - 3.0 keV/amu
cross section ratios for $\text{H}(2s)/\text{H}(3s)$ and $\text{H}(2s)/\text{H}(1s)$ given
- 93E 5 Aristov, N., Maring, W., Niedner-Schatteberg, G., Toennies, J.P., Chiu, Y.N., Köppel, H.
Vibrationally resolved inelastic scattering and charge transfer in $\text{H}^+ - \text{C}_2\text{H}_4$ collisions
J. Chem. Phys. 99 2682 - 2694 1993 E
 $\text{H}^+ + \text{C}_2\text{H}_4 \rightarrow \text{H} + \text{C}_2\text{H}_4^+$
TOF method
0.03 keV/amu
angular distribution
- 93E 6 Bachau, H., Harel, C., Roncin, P.
Reply to comment on stabilization of autoionizing states during ion-atom collisions
J. Phys. B 26 2981 - 2982 1993 E
 $\text{O}^{8+} + \text{Ar} \rightarrow \text{O}^{6+}(4,4), (4,5)$
TOF method
- 93E 7 Belkacem, A., Gould, H., Feinberg, B., Bossingham, R., Meyerhof, W.E.
Measurement of electron capture from electron-positron pair production in relativistic heavy ion collisions
Phys. Rev. Letters 71 1514 - 1517 1993 E
 $\text{U}^{92+} + \text{Au} \rightarrow \text{U}^{91+} + \text{e}^-$
 $\text{e}^- \text{e}^+$ - projectile coincidence
1x10⁶ keV/amu
- 93E 8 Beyer, H.F., Finlayson, K.D., Liesen, D., Indelicato, P., Chantler, C.T., Deslattes, R.D., Schweppo, J., Bosch, F., Jung, M., Klepper, O., Kol{}%{a}fning, W., Mushammer, R., Becker, K., Eickhoff, H., Franke, B., Gruber, A., Nolden, F., Spa{}%{a}fndtke, P., Steck, M.
X-ray transitions associated with electron capture into bare dysprosium
J. Phys. B 26 1557 - 1567 1993 E
 $\text{Dy}^{66+} + \text{Ar} \rightarrow \text{Dy}^{65+}$
internal gas target
2.92x10⁵ keV/amu
also REC; characteristic X-rays
- 93E 9 Boduch, P., Chantepie, M., Henvecart, D., Husson, X., Jacquest, E., Lecler, D., Duetta, M., Wilson, M.
Investigation of single and double electron capture in $\text{Ar}^{7+} - \text{He}, \text{H}_2$ collisions at 105 keV by photon spectroscopy
Phys. Scripta 47 24 - 31 1993 E
 $\text{Ar}^{7+} + \text{B} \rightarrow \text{Ar}^{6+}(3snl-3snl'; n=4,5; 3p4p \rightarrow 3s5P), \text{Ar}^{7+}(3s^2nl-3s^2nl'; n=6,7; 3s3pn1 - 3s3pn1')$
photon Spectroscopy
2.6 keV/amu
2000 - 6000 Å photon; photon emission cross sections; wave lengths
- 93E10 Bouchama, T., El-Motassadeq, A., Salmoun, A., Druetta, M., Church, D.A.
Electron capture study of $\text{Ar}^{7+} + \text{He}(\text{H}_2)$ by UV spectroscopy
Phys. Scripta 48 527 - 532 1993 E
 $\text{Ar}^{7+}(3s) + \text{He}, \text{H}_2 \rightarrow \text{Ar}^{6+}(3sn1, 3pn1')$
photon Spectroscopy
0.9 - 1.75 keV/amu

- 93E11 Cederguist, H., Biedermann, C., Selberg, N., Beebe, E., Pajek, M., Barany, A.
Strong onset of ionization in slow Xe^{2+} - Xe collisions at very high q
Phys. Rev. A 47 R4551 - 4554 1993 E
 $\text{Xe}^{2+}(q=13-37)$
Ion-ion coincidence technique
0.25 keV/amu
- 93E76 Cheng, S., Cocke, C.L., Frohne, V., Kamber, E.Y., McGuire, J.H., Wang, Y.
Angular distribution of dissociated deuterons by impact of 2 - 16 MeV O^{2+}
Phys. Rev. A 47 3923 - 3929 1993 E
 $\text{O}^{8+} + \text{D}_2 \rightarrow \text{O}^{7+} + \text{D}^+ + \text{D}$
projectile-recoil coincidence
2 - 16 MeV
- 93E12 Deck, F.J., Hesses, E.A., Lunden, S.R.
Population of high- l sulfur Rydberg levels by ion-Rydberg-atom charge
exchange
Phys. Rev. A 48 4400 - 4404 1993 E
 $\text{S}^+ + \text{Rb}(10f, 8f) \rightarrow \text{S}(n=9, 10)$
laser-excited target technique
0.3 keV/amu
- 93E13 Delon, A., Martin, S., Denis, A., Ouerdane, Y., Carre, M., Deses quelles, J., Buchet
Poulizac, M.C.
High charge states of Xe^{2+} recoil ions ($i=1-15$) produced by multi-capture
processes in low energy Xe^{2+} collisions on Xe
Rad. Eff. and Def. in Solids 126 337 - 340 1993 E
 $\text{Xe}^{2+} + \text{Xe} \rightarrow \text{Xe}^{(2+)+} + \text{Xe}(j=1-5; i=1-15)$
ion-ion coincidence technique
- 1 keV/amu
- 93E14 Fedchak, J.A., Huels, M.A., Doverspike, L.D., Champion, R.L.
Electron detachment and charge transfer for collisions of O^- and S^- with H
Phys. Rev. A 47 3796 - 3800 1993 E
 $\text{O}^-, \text{S}^- + \text{H} \rightarrow \text{O}, \text{S} + \text{H}^-$
RF-H target
 1×10^{-5} keV/amu
electron detachment
- 93E15 Feinberg, B., Gould, H., Meyerhof, W.E., Bellacera, A., Hüblster, H.P., Alonso, J.R., Blumenfeld, L., Dillard, E.,
Gundelf, N., Krebs, G.P., McMahon, M.A., Rouden Brown, M.J., Rude, B.S., Schwepp, J., Spooner, D.W., Street, K.,
Thibierge, P., Wegner, H.
Relativistic electron- and proton-impact ionization of highly stripped heavy ions
determined from projectile-electron loss in H_2 and He
Phys. Rev. A 47 2370 - 2373 1993 E
 $\text{Au}^{32+} + \text{H}_2, \text{He}, \text{N}_2 \rightarrow \text{Au}^{31+}; \text{U}^{86+} + \text{H}_2, \text{He} \rightarrow \text{U}^{87+}$
growth rate method
 $1 \times 10^4, 3.8 \times 10^3$ keV/amu (Au^{32+}); 4.05×10^3 keV/amu (U^{86+})
- 93E16 Folkerts, H.O., Hoekstra, R., Meng, L., Olson, R.E., Fritsch, W., Morgenstern, R.,
Summers, H.P.
 He^{2+} . He collisions : one-electron capture versus electron removal and target-
ion excitation
J. Phys. B 26 L619 - 624 1993 E
 $\text{He}^{2+} + \text{He} \rightarrow \text{He}^+(n=4 \rightarrow 3) + \text{He}^+; \text{He}^+ + \text{He}^+(n=4 \rightarrow 3)$
photon spectroscopy
1 - 300 keV/amu
- 93E17 Fremont, F., Sommer, K., Hickam, S., Boduch, P., Lecler, D., Stolterfohl, N.
Angular distribution of Auger electron emission following double electron
capture in 90 keV C^{6+} + He collisions
Nucl. Instr. Meth. B 79 3 - 7 1993 E
 $\text{C}^{6+} + \text{He} \rightarrow \text{C}^{4+}(2\ln 1')$
Auger-electron spectroscopy
7.5 keV/amu
- 93E18 Frohne, V., Cheng, S., Ali, R., Raphaelian, M., Cocke, C.L., Olson, R.E.
Measurements of recoil ion longitudinal momentum transfer in multiply ionizing
collisions of fast heavy ions with multi-electron targets
Phys. Rev. Letters 71 696 - 699 1993 E
 $\text{I}^{2+} + \text{Ne} \rightarrow \text{I}^{3+}, \text{I}^{2+}, \text{I}^{2+} + \text{Ne}^+(i=3-8)$
recoil-projectile recoil technique
 1×10^3 keV/amu
also $\text{I}^{3+} + \text{Ne} \rightarrow \text{I}^{2+} + \text{Ne}^+(i=1-5)$
- 93E19 Frost, M.J., Kato, S., Bierbaum, U.M., Leone, S.R.
Direct observation of the simultaneous transfer of vibrational energy and charge
in the $\text{N}_2^+(v) + \text{N}_2$ reaction
J. Chem. Phys. 98 5993 - 5995 1993 E
 $\text{N}_2^+(v) + \text{N}_2 \rightarrow \text{N}_2 + \text{N}_2^+(v=1, 2)$
TOF method
 -1×10^{-3} keV/amu

- 93E20 Gaboriaud, M.N. Roncin, P. Barati, M.
Evidence of direct stabilization in two-electron capture by multiply charged ions
J. Phys. B 26 L303 - 308 1993 E
 $N^{7+} + Kr \rightarrow N^{5+} \rightarrow N^{6+}$; $O^{8+} + Ar \rightarrow O^{6+} \rightarrow O^{7+}$; $Al^{9+} + Ne \rightarrow Al^{7+} \rightarrow Al^{8+}$
coincidence-translational energy spectroscopy
-1 keV/amu
- 93E21 Gieler, M. Aumayer, F. Gagg, R. Neureiter, C. Windhalz, L.
Application of an electro-optical modulator in inelastic collision studies with
laser-excited Na(3p) atoms
J. Phys. B 26 297 - 303 1993 E
 $He^{2+} + Na(3s), Na^*(3p) \rightarrow He^+$
laser-excited target
2.5 keV/amu
- 93E23 Gieler, M. Aumayer, F. Weber, M. Winter, H.P. Schweinzer, J.
Electron capture by doubly charged ions from laser-excited alkali atoms II. Hg^{2+} -
 $Li^*(2p)$ collisions
J. Phys B 26 2153 - 2164 1993 E
 $He^{2+} + Li^*(2p), Li(2s) \rightarrow He^+(nl)$
translational energy spectroscopy + laser-excited target
1.0 - 16 keV/amu
- 93E22 Gieler, M. Aumayer, F. Schweinzer, J. Koppensteiner, W. Husinsky, W.
Winter, H.P. Lozhkin, K. Hansen, J.P.
Electron capture by doubly charged ions from laser-excited alkali atoms I. He^{2+} -
 $Na^*(3p)$ collisions
J. Phys. B 26 2137 - 2151 1993 E
 $He^{2+} + Na(3s), Na^*(3p) \rightarrow He^+(nl)$
translational energy spectroscopy + laser-excited target
0.5 - 3 keV/amu
effect of polarization
- 93E24 Gonzalez, A.D. Giese, J.P. Horsdal-Pedersen, E.
Atomic-electron capture in the presence of a narrow nuclear resonance :
 $^{40}Ar(p,p)^{40}Ar$ reaction
Phys.Rev.A 48 3663 - 3669 1993 E
 $H^+ + Ar \rightarrow H(\text{theta}) + Ar^+$
target-floated technique
 1.857×10^3 keV/amu
- 93E25 Hansen, S.B. Ehrenreich, T. Horsdal-Pedersen, E. MacAdam, K.B. DuBois, L.J.
Electron capture from circular Rydberg atoms
Phys. Rev. Letters 71 1522 - 1525 1993 E
 $Na^+ + Li(1s^2 nlm) \rightarrow$
laser excitation + tfield ionization technique
0.1 keV/amu
- 93E26 Hayton, D.A. Peart, B.
Merged beam measurements of the mutual neutralization of O^+O^- and N^+O^- ions
J. Phys. B 26 2879 - 2885 1993 E
 $O^+ + O^- \rightarrow O + O$; $N^+ + O^- \rightarrow N + O$
merged-beam technique
 $3 \times 10^{-3} - 3 \times 10^{-2}$ keV/amu
- 93E27 Hirzebruch, S.E. Ruth, G. Winkel, E. Heinrich, W.
Response of BP-1 to ^{197}Au heavy ions at 11.3 GeV/nucleon
Nucl. Instr. Meth. B 74 519 - 522 1993 E
 $Au^{79+} + glass \rightarrow Au^{78+}, Au^{77+}, Au^{76+}$
glass track detector
 1.13×10^8 keV/amu
- 93E29 Hoekstra, R. Beijers, J.P.M. de-Heer, F.J. Morgenstern, R.
Simultaneous electron capture and target ion excitation in collisions of C^{4+} and
 N^{3+} on He
Z. Phys. D 25 209 - 215 1993 E
 $C^{4+}, N^{3+} + He \rightarrow C^{3+}, N^{4+} + He^*(2p)$; C^{2+}, N^{1+}
photon spectroscopy
0.05 - 7 keV/amu
- 93E28 Hoekstra, R. Olson, R.E. Folkerts, H.O. Wolfrum, E. Pascale, J. de-Heer, F.J.
Morgenstern, R. Winter, H.
Electron capture from Li by B^{3+}, N^{2+} and Be^{2+} ions
J.P. hys. B 26 2029 - 2040 1993 E
 $B^{2+}, N^{1+}, Be^{4+} + Li \rightarrow B^4(nl), N^{4+}(nl), Be^{3+}(nl)$
E: photon spectroscopy; T: CTMC
1-10 keV/amu

- 93E30 Hughes, M.P., Geddes, J., McCullough, R.W., Gilbody, H.B.
Cross sections for H(3s) formation in electron capture by protons in collisions with H atoms
Nucl. Instr. Meth. B 79 50 - 51 1993 E
 $H^+ + H \rightarrow H(3s) + H^+$
Balmer-alpha spectroscopy
10 - 100 keV/amu
- 93E31 Hutton, R., Hult, S., Nystrom, B., Heijkenskjöld, F., Glans, P., Larsson, M.O.
Photon spectroscopy following electron capture for the collision systems 10keV/q $Kr^{q+} + He(q=7,8,9)$
Phys. Scripta 48 569 - 572 1993 E
 $Kr^{q+}(q=7,8,9) + He \rightarrow Kr^{(q-1)+}(nl)$
photon spectroscopy
- 1 keV/amu
- 93E32 Jacquet, E., Boduch, P., Chantepie, M., Druetta, M., Harnecart, D., Husson, X., Leder, D., Olson, R.E., Pascale, J., Stollerfoht, N., Wilson, M.
120 keV Ar^{8+} -Li collisions studied by near UV and visible photon spectroscopy
Phys. Scripta 47 618 - 627 1993 E
 $Ar^{8+} + Li \rightarrow Ar^{7+}(nl), Ar^{6+}(nl), Ar^{5+}(nl) + h\nu$
photon spectroscopy
3 keV/amu
(200 - 600nm) photon emission cross sections given
- 93E33 Jalbert, G., Coelho, L.F.S., de-Castro-Faria, N.V.
Production of neutral fragments from the dissociation of fast H_3^+ ions
Phys. Rev. A 47 4768 - 4774 1993 E
 $H_3^+ + He, Ne, Ar, Xe \rightarrow H_2^+, H, H_2, 2H$
growth method
400 - 1230 keV/amu
- 93E35 Kamber, E.Y., Enos, C.S., Brenton, A.G.
Production of metastable Ar^* ions by electron-impact ionization of Ar measured by translational energy spectroscopy
Phys. Rev. A 48 338 - 342 1993 E
 $Ar^+(3d, nl) + O_2 \rightarrow Ar^{2+}$
translational energy spectroscopy
0.1 keV/amu
- 93E34 Kamber, E.Y., Enos, C.S., Breton, A.G.
Single-electron loss in low energy Ar^{q+} -He collisions
Nucl. Instr. Meth. B 79 71 - 74 1993 E
 $Ar^+ + He \rightarrow Ar^{2+}$
translational energy spectroscopy
0.1 keV/amu
- 93E36 Kamber, E.Y., Quintana, E.J., Pollack, E.
State-selective double-electron capture processes for Ar^{2+} -Ar collisions
J. Phys. B 26 113 - 120 1993 E
 $Ar^{2+} + Ar \rightarrow Ar^+(nl, \theta)$
TOF method
0.05 - 0.1 keV/amu
differential scattering
- 93E37 Kato, S., Frost, M.J., Bierbaum, U.M., Leone, S.R.
A selected ion flow tube-laser induced fluorescence instrument for vibrationally state-specific ion-molecule reactions
Rev. Sci. Instr. 64 2808 - 2820 1993 E
 $N_2^+(v=0,1,2) + N_2 \rightarrow N_2 + N_2^+$
laser-induced fluorescence technique
thermal energies
rate constant
- 93E38 Keller, N., Andersson, L.R., Miller, R.D., Westerlind, M., Elston, S.B., Sellin, I.A., Biedermann, C., Cederquist, H.
Angular distributions for double-electron capture in C^{4+} -He collisions
Phys. Rev. A 48 3684 - 3688 1993 E
 $C^{4+} + He \rightarrow C^{2+}(\theta)$
recoil ion technique
 $3 \times 10^{-2} - 6 \times 10^3$ keV/amu
Stueckelberg oscillations observed
- 93E39 Kwong, V.H.S., Fang, Z.
Charge transfer between O^{2+} ion and helium at electronvoet energy
Phys. Rev. Letters 71 4127 - 4129 1993 E
 $O^{2+} + He \rightarrow O^+$
ion trap
 1.5×10^{-4} keV/amu
rate coefficients

- 93E40 Lee, A.R., Enos, C.S., Brenton, A.G.
Single charge stripping of B^+ ions via electron-spin exchange
Phys. Letters A 173 447 - 450 1993 E
 $B^{2+}(2s^2\ ^1S) + Ne, O_2 \rightarrow B^{3+}(2s\ ^2S, 2p\ ^2P)$
translational energy spectroscopy
0.3 keV/amu
- 93E41 Lee, A.R., Wilkins, A.C.R., Enos, C.S., Brenton, A.G.
Spin conservation in single-electron capture by N^{2+} in He, Ne and Ar
Phys. Rev. A 48 2934 - 2939 1993 E
 $N^{2+}(2s^2p, 2s2p^3) + B \rightarrow N^+(B=He, Ne, Ar)$
translational energy spectroscopy
0.28 keV/amu
- 93E42 Maleki, S., Raphaelian, M.L.A., Stockli, M.P., Walch, B.P., DePaola, B.D.
Velocity dependence of absolute cross sections for charge capture by Ar^{7+} from ground-state and excited sodium
Phys. Rev. A 48 1185 - 1188 1993 E
 $Ar^{7+} + Na(3s, 3p) \rightarrow Ar^{6+}$
laser-excited target technique
1.5 - 27 keV/amu
- 93E43 Manning, M., Price, S.D., Leone, S.R.
Charge transfer and collision-induced dissociation reactions of CF_2^{2+} and CF_2^{3+} with the rare gases at a laboratory collision energy of 49 eV
J. Chem. Phys. 99 8695 - 8704 1993 E
 $CF_2^{2+} + B \rightarrow CF_2^+ + B \rightarrow CF_2^+(B=He, Ne, Ar, Kr, Xe)$
E⁺ TOF method; T; Landau-Zener theory
1 - 2 eV/amu
dissociative electron capture also given
- 93E44 Martin, S., Denis, A., Delon, A., Desesquelles, J., Querdane, Y.
Stabilized double electron capture in Kr^{4+} ($q=17, 18$) - Kr collisions
Phys. Rev. A 48 1171 - 1993 E
 $Kr^{4+}(q=17, 18) + Kr \rightarrow Kr^{(q-2)+} \rightarrow Kr^{(q-1)+} + h\nu$
photon spectroscopy + coincidence
5 keV/amu
- 93E45 Martinez, H., Alvarez, I., Cisneros, C., de-Urguijo, J.
Single electron capture in He^+ on SF_6 collisions at low keV energies
Nucl. Instr. Meth. B 82 389 - 392 1993 E
 $He^+ + SF_6 \rightarrow He^0$
0.25 - 1.25 keV/amu
Angular distributions also given
- 93E46 McLaughlin, T.K., Hodgkinson, J.M., Tawara, H., McCullough, R.W., Gilbody, H.B.
State-selective electron capture in collisions of slow Fe^{3+} and Fe^{4+} ions with H and He atoms
J. Phys. B 26 3587 - 3594 1993 E
 $Fe^{3+}, Fe^{4+} + H, He \rightarrow Fe^{2+}(nl), Fe^{3+}(nl)$
translational energy spectroscopy
0.1 - 0.3 keV/amu
- 93E47 McLaughlin, T.K., Tanuma, H., Hodykinson, J., McCullough, R.W., Gilbody, H.B.
State-selective electron capture by slow N^{4+} ions in collisions with helium
J. Phys. B 26 3871 - 3875 1993 E
 $N^{4+} + He \rightarrow N^{3+}(nl)$
translational energy spectroscopy
0.3 - 2 keV/amu
- 93E49 Montenegro, E.C., Melo, W.S., Jaecks, D.H.
Collective propensity of orientation for multielectron ions in collisions
Phys. Rev. Letters 71 991 - 994 1993 E
 $He^+ + Ar \rightarrow He^0 + Ar^+(3p^4p, ^2F_{7/2})$
photon-polarization + ion coincidence
0.25 keV/amu
orientation parameter
- 93E48 Montenegro, E.C., Melo, W.S., Meyerhof, W.E., de-Pinho, A.G.
Intermediate-velocity atomic collisions VI. Screening, antiscreening and related processes in $He^+ + (H_2, He)$
Phys. Rev. A 48 4259 - 4266 1993 E
 $He^+ + H_2, He \rightarrow He^{2+}$
projectile-recoil ion coincidence technique
37.5 - 1000 keV/amu

- 93E50 Ogura, K. Shibata, T.
Charge transfer cross section for gadolinium
J. Mass Spectrom. Soc. Japan 41 37 - 45 1993 E
Ga⁺ + Ga -> Ga + Ga⁺
evaporated/laser-irradiated target technique
10² - 10³ eV
- 93E51 Parameswaran, R. Watch, B.P. Maleki, S. Bhatta, C.P. DePaola, B.D.
Resonant transfer and excitation in C³⁺ + Li collisions
Phys. Rev. A 47 3801 - 3804 1993 E
C³⁺ + Li -> C²⁺
Zero-degree Auger electron spectroscopy
417 - 750 keV/amu
- 93E52 Price, S.D. Rogers, S.A. Leone, S.R.
Charge transfer and collision-induced dissociation reactions of OCS²⁺ and CO₂²⁺ with the rare gases at a laboratory collision energy of 49 eV
J. Chem. Phys. 98 9455 - 9465 1993 E
OCS²⁺, CO₂²⁺ + B -> OCS⁺, CO₂⁺ (B=He, Ne, Ar, Kr, Xe)
TOF method
-1x10⁻³ keV/amu
- 93E53 Prior, M.H. Holt, R.A. Schneider, D. Randall, K.L. Hutton, R.
Alignment of magnetic substrates in double-electron capture collisions
Phys. Rev. A 48 1964 - 1974 1993 E
C³⁺(1s) + He -> C³⁺(1s2l2l') ; Bⁿ⁺(1s) + He -> Bⁿ⁺(1s2l2l')
Auger electron spectroscopy
0.06 - 1.2 keV/amu
- 93E54 Quaski, S. Farizon-Mazuy, B. Farizon, M. Gaillard, M.J. Gerlic, E. Stern, M. Clouvas, A. Katsanos, A.
Fast negative helium ions produced by double electron capture in single He⁺-He collisions
Phys. Rev. A 48 1204 - 1208 1993 E
He⁺ + He -> He⁻
growth method
90 - 300 keV/amu
- 93E55 Quintana, E.J. Heckman, V.R. Pollack, E.
Electron capture in H⁺ + N₂ collisions
Phys. Rev. A 48 3670 - 3673 1993 E
H⁺ + N₂ -> H(1s) + N₂⁺
TOF method
0.5 - 3 keV/amu
angular distributions
- 93E56 Raphaelian, M.L.A. Berry, H.G. Berrah, N. Schneider, D.
Double electron capture in Ne⁸⁺ - He collisions intermediate energies
Phys. Rev. A 48 1292 - 1297 1993 E
Ne⁸⁺ + He -> Ne⁶⁺(nl;n'l') -> Ne⁷⁺(n''l'')
Auger electron spectroscopy
20 - 80 keV/amu
- 93E57 Renwick, S.P. Martell, E.C. Weaver, W.D. Risle, J.S.
Experimental determination of real elements of the density matrix and the dipole moment of H(n=3) atoms produced from 20 - 100 keV H⁺ + Ar
Phys. Rev. A 48 2910 - 2925 1993 E
H⁺ + He, Ar -> H(n=3, 3s, 3p, 3d)
Balmer-alpha spectroscopy
20 - 100 keV/amu
- 93E58 Richter, C. Andersen, N. Brenot, J.C. Doweck, D. Houver, J.C. Salgado, J.
Collisional spectroscopy with aligned and oriented atoms VI : a complete density matrix determination for the H⁺ + Na(3p) -> H(n=2) + Na⁺ process
J. Phys. B 26 723 - 743 1993 E
H⁺ + Na(3p) -> H(n=2) + Na⁺
laser-aligned target
- 93E59 Rogers, S.A. Price, S.D. Leone, S.R.
Charge transfer and collision-induced dissociation reactions of CO²⁺ with the rare gases at E=49 eV
J. Chem. Phys. 98 280 - 289 1993 E
CO²⁺ + B -> CO⁺ (B = He, Ne, Ar, Kr, Xe)
TOF method
1.75x10³ keV/amu
collisional-dissociation also

- 93E60 Roller-Lutz,Z, Wang, Y, Finck,K, Lutz,H.O.
Left-right asymmetry in H(2p) charge capture from laser-oriented Na(3p)
Phys. Rev. A 47 R13 - 15 1993 E
 $H^+ + Na(3p) \rightarrow H(2p) + Na^+$
laser-polarized target technique
1 keV/amu
- 93E61 Roller-Lutz,Z, Wang, Y, Finck,K, Lutz,H.O.
A quantum mechanically complete study of $H^+ + Na(3s) \rightarrow H(2p) + Na^+$ charge
exchange excitation
J. Phys. B 26 2697 - 2707 1993 E
 $H^+ + Na(3s) \rightarrow H(2p) + Na^{+3}$
particle-photon coincidence technique
1 - 5 keV/amu
Angular distribution
- 93E62 Said,R, Kamber,E.Y, Yaltkaya,S, Gopinathan,M, Ferguson,S.M.
Translational energy spectroscopy and differential cross sections for low-energy
 Ar^{2+} -Ar and Ne^{2+} -Ne collisions
Nucl. Instr. Meth. B 79 40 - 43 1993 E
 $Ne^{2+} + Ne \rightarrow Ne^+(nl, \theta)$; $Ar^{2+} + Ar \rightarrow Ar^+(nl, \theta)$
translational energy spectroscopy
 $3 \times 10^{-3} - 2.5 \times 10^{-2}$ keV/amu
- 93E63 Salgado,J, Dowek,D, Houver,J.C, Richter,C, Saubamea,B, Thomsen,J.W.
Collisional spectroscopy with aligned and oriented atoms VII. initial orbital
alignment effects in $H_2^+ - Na(3p)$ resonant charge transfer
J. Phys. B 26 L353 - 358 1993 E
 $H_2^+ + Na(3p), Na(3s) \rightarrow H_2^+ + Na^+$
0.25 - 0.1 keV/amu
- 93E64 Schlattmann,A.R, Hoekstra,R, Morgenstern,R, Olson,R.E, Pascale,J.
Strong velocity dependence of electron capture in collisions between aligned Na^+
(3p) and He^{2+}
Phys. Rev. Letters 71 513 - 516 1994 E
 $He^{2+} + Na^+(3p) \rightarrow He^+(n=4-7)$
polarized target technique
3 - 13 keV/amu
- 93E65 Sen,A, Li,X.
Measurements of electron capture and loss cross sections in collisions of Ar^{+}
and Ar^{2+} with He in the energy range of 50 - 300 keV
Nucl. Instr. Meth. B 79 44 - 49 1993 E
 $Ar^+ + He \rightarrow Ar^0, Ar^{2+}, Ar^{3+}$; $Ar^{2+} + He \rightarrow Ar^+, Ar^0, Ar^{3+}$
growth method
1.25 - 7.5 keV/amu
- 93E66 Tosh,R.E, Johnsen,R.
Single and double charge transfer of He^{2+} ions with molecules at near-thermal
energies
Int. J. Mass Spectro. and Ion 123 193 - 203 1993 E
Processes
 $He^{2+} + B \rightarrow He^+, He^0$ (B = $H_2, N_2, O_2, CO, CO_2, H_2O$)
ion-drift tube mass spectrometer
thermal energies
rate coefficients
- 93E67 Tribedi,L.C, Prasad,K.G, Tandon,P.N.
K-K electron transfer and K-shell-vacancy production cross sections for Ti
bombarded by Si and S beam at 1.25-4.70 MeV/amu
Phys. Rev. A 47 3739 - 3747 1993 E
 $Si^{14+}, S^{16+} + Ti \rightarrow Si^{13+}(1s), S^{15+}(1s) + Ti^+(K)$
X-ray spectroscopy
(1.25 - 4.70) MeV/amu
- 93E69 van der Kamp, A.B, Hiemstra, R.S, van der Zande, W.J, Fink, R, Jungen, M.
The spectroscopy and dynamics of the n=3, 4 Rydberg states in O_2^+
J. Chem. Phys. 99 7487 - 7498 1993 E
 $O_2^+ + Cs, K, Na \rightarrow O_2^+(n)$
TOF + translational energy spectroscopy
12.6 eV
- 93E68 Vancura,J, Marchetti,V.J, Perotti,J.J, Kostroun,V.O.
Absolute total and one- and two-electron transfer cross sections for $Ar^{+}(q=8-16)$
on He and H_2 at 2.3xq keV
Phys. Rev. A 47 3758 - 3768 1993 E
 $Ar^{+}(q=8-16) + H_2, He \rightarrow Ar^{(q-1)+}, Ar^{(q-2)+}$
retarding grid method
- 0.5 keV/amu

93E73	Wörmann, Th. Roller-Lutz, Z. Lutz, H.O. Electron capture in Ar ⁺ collisions with laser-aligned Rydberg atoms Phys. Rev. A 47 R1594 - 1596 1993 E Ar ⁺ + Na(nlm) -> Ar [*] laser-aligned target method 0.01 - 0.1 keV/amu	93E75	Yalkaya, S. Kamber, E. Y. Ferguson, S.M. Differential cross sections for state-selective electron capture by low-energy Ar ⁿ⁺ ions from He and Ar Phys. Rev. A 48 382 - 391 1993 E Ar ⁿ⁺ (q=4,5) + He, Ar -> Ar ^{q-1} nl(theta) translational energy spectroscopy 2.5x10 ⁻³ - 1.3x10 ⁻² keV/amu differential angle scattering
93E70	Walch, B.P. Maleki, S. Ali, R. Stockli, M.P. Raphaelian, M.L.A. Cocke, C.L. Depaula, B.D. Enhancement of charge capture by a laser-excited target by highly charged ions Phys. Rev. A 47 R3499 - 3501 1993 E Ar ⁷⁺ + Na(3s, 3p) -> laser-excited target method 1.6 keV/amu	93T 9	Borve, K.J. Hansen, J.P. Electron capture from the light noble gases J. Phys. B 26 L677 - 683 1993 multi- Ar ⁴⁺ + He, Ne, Ar -> Ar ³⁺ (nl) multi-electron time-dependent model 2.5x10 ⁻³ - 25 keV/amu
93E71	Wang, Y. Fink, K. Roller-Lutz, Z. Lutz, H.O. Angle-differential H(2p) alignment in 1 keV H ⁺ - Na charge exchange collisions J. Phys. B 26 L61 - 63 1993 E H ⁺ + Na(3s) -> H(2p) + Na [*] photon spectroscopy 1 keV/amu	93T 1	Baccus-Montabone, M.C. Ameizau, K. Charge transfer in S ²⁺ + H collisions at intermediate energy Z. Phys. D 25 323 - 326 1993 T S ²⁺ (3s ² 3p ² 3P) + H -> S ⁺ (3s ² 3p ³ 2P, 2D) semiclassical MO basis 1.5x10 ⁻³ - 0.25 keV/amu
93E72	Westphal, A. He, Y.D. Measurement of cross sections for electron capture and stripping by highly relativistic ions Phys. Rev. Letters 71 1160 - 63 1993 E Au ⁷⁹⁺ + glass -> Au ⁷⁸⁺ ; Au ⁷⁸⁺ + glass -> Au ⁷⁹⁺ glass detector method 1.08x10 ⁹ keV/amu Barium-phosphate glass track detector used for charge-separation	93T 4	Belkic, D. Symmetric double charge exchange in fast collisions of bare nuclei with helium-like atomic systems Phys. Rev. A 47 189 - 200 1993 T He ²⁺ + He(1s ²) -> He(1s ²) + He ²⁺ correct first Born approx 25 - 500 keV/amu
93E74	Wu, W. Griese, J.P. Ben-Itzhak, I. Cocke, C.L. Richard, P. Stockli, M. Ali, R. Schöne, H. Olson, R.E. Velocity dependence of one- and two-electron processes in intermediate-velocity Ar ¹⁶⁺ + He collisions Phys. Rev. A 48 3617 - 3625 1993 E Ar ¹⁶⁺ + He -> Ar ¹⁵⁺ + He ⁺ ; Ar ¹⁴⁺ + He ²⁺ ; Ar ¹³⁺ + He ²⁺ + e TOF coincidence technique 0.9 - 60 keV/amu	93T 5	Belkic, D. Intermediate ionization continua for double charge exchange at high impact energies Phys. Rev. A 47 3824 - 3844 1993 T He ²⁺ + He(1s ²) -> He(1s ²) + He ²⁺ boundary-corrected continuum-intermediate state approx 250 - 1750 keV/amu angular distributions also

- 93T 2 Belkic,D
Two-electron capture from helium-like atomic systems by completely stripped particles
J. Phys. B 26 497-508 1993 T
 $\text{Li}^{3+} + \text{He} \rightarrow \text{Li}^+ + \text{He}^{2+}$
boundary-corrected first Born approx
1.5 - 1500 keV/amu
- 93T 3 Belkic,D. Mancev,I.
Four-body CDW approximation : dependence of prior and post total cross sections for double charge exchange upon bound-state wave functions
Phys. Scripta 47 18 - 23 1993 T
 $\text{H}^+ + \text{He}(1s^2) \rightarrow \text{H}(1s^2) + \text{He}^{2+}$
CDW approx.
10 - 1000 keV/amu
- 93T 6 Belyaev,A.K.
Charge exchange with ion excitation in collisions of helium ions with mercury atoms
J. Phys. B 26 3877 - 3890 1993 T
 $\text{He}^+(^2S_{1/2}) + \text{Hg}(^1S_0) \rightarrow \text{He}(^1S_0) + \text{Hg}^+(7p\ ^2P_{3/2})$
non-adiabatic quasi molecule model
thermal velocities
rate coefficients
- 93T 7 Belyaev,A.K.
Theoretical investigation of charge exchange with ion excitation in atomic collisions at thermal energies
Phys. Rev. A 48 4299 - 4306 1993 T
 $\text{He}^+ + \text{Hg} \rightarrow \text{He} + \text{Hg}^{*+}(7p^2P_{3/2})$
MO
thermal energies
also rate coefficients given
- 93T 8 Ben-Itzhak,I. Jain,A. Weaver,O.L.
Impact parameter dependence of classical capture probability from any initial state by fast bare projectiles
J. Phys. B 26 1711 - 1726 1993 T
 $\text{F}^{9+} + \text{H(nl)}, \text{He(nl)} \rightarrow \text{F}^{8+} ; \text{Ne}^{10+} + \text{H}(1s,2s,2p) \rightarrow \text{Ne}^{9+} ; \text{O}^{8+} + \text{He} \rightarrow \text{O}^{7+}, \text{O}^{6+}$
modified Bohr-Lindhard model
(1.4-2.5) $\times 10^3$ keV/amu

- 93T10 Borve,K.J. Hansen,J.P.
On the cluster-size dependence of electron capture cross sections in ion-cluster collisions
Z. Phys. D 25 247-251 1993 T
 $\text{H}^+ + (\text{Na})_n \rightarrow \text{H} \ (n=1-75)$
extended Bohr-Lind hard model/quantal model
1 - 16 keV/amu
- 93T11 Bugacov,A. Maidagan,J.M. Rivarola,R.D. Shingal,R.
Distortion effects for electron excitation in ion-atom collisions
Phys. Rev. A 47 1052 - 1058 1993 T
 $\text{H}^+ + \text{H}(1s) \rightarrow \text{H}^+ + \text{H}(2s,2p) ; \text{H}^+ + \text{Li}^{2+}(1s) \rightarrow \text{H}^+ + \text{Li}^{3+}(2s,2p) ; \text{A}^{Z+} + \text{H}(1s), \text{Ne}^{9+}(1s) \rightarrow \text{A}^{Z+} + \text{H}(n=2), \text{Ne}^{9+}(n=2) \ (\text{A}=\text{H}, \text{He}, \text{Li}, \text{Be}, \text{B})$
DW symmetric eikonal approx.
10 - 10^3 keV/amu (H) ; $10^3 - 10^4$ keV/amu (A)
scaling for projectile Z
- 93T12 Casaubon,J.I.
Charge exchange between bare beryllium and boron with metastable hydrogen atoms at low energies
Phys. Rev. A 48 3680 - 3683 1993 T
 $\text{Be}^{4+} + \text{H}(2s) \rightarrow \text{Be}^{3+}(\text{nl}) ; \text{B}^{3+} + \text{H}(2s) \rightarrow \text{B}^{2+}(\text{nl})$
Landau-Zener + OEDM
0.018 - 2.5 keV/amu
- 93T14 Chen,Z. Lin,C.D.
Double electron capture and the angular distribution of ejected electrons in Ne^{8+} -He collisions
Phys. Rev. A 48 1298 - 1307 1993 T
 $\text{Ne}^{8+} - \text{He} \rightarrow \text{Ne}^{6++} (3\text{lnl}')$
Independent-electron model
20 - 80 keV/amu
- 93T13 Chen,Z. Reading,J.F.
One-and-a-half-centered expansion method in charge-transfer calculations of proton-hydrogen scattering
Phys. Rev. A 48 352 - 356 1993 T
 $\text{H}^+ + \text{H}(1s) \rightarrow \text{H}(1s,2s,2p)$
OHCE method
10 - 300 keV/amu

- 93T15 Corches,S.E. Rivalova,R.D. McGuire,J.H. Wang,Y.D.
Distorted-wave models for single-electron capture from molecular targets by the impact of bare ions
Phys. Rev. A 47 201 - 207 1993 T
 $H^+ + H_2^+ \rightarrow H + H^{2+}$ $H^+ + H_2 \rightarrow H + H_2^+$
DW model (BIB,Bal)
 $10^2 - 5 \times 10^3$ keV/amu
- 93T16 Corches,S.E. Rivalova,R.D. McGuire,J.H.
Impact-parameter formulation for electron capture from molecular targets
Phys. Rev. A 47 3937 - 3944 1993 T
 $H^+ + H_2^+ \rightarrow H(1s) + 2H^+$
Impact parameter formulation
100 - 1000 keV/amu
- 93T17 Datta,S.K. Scheid,W. Grfin,N.
Electron capture by a fully stripped ion from two electron atomic and ionic targets in the Coulomb-Born approximation
J. Phys. B 26 2127 - 2136 1993 T
 $H + H \rightarrow H^+ + H$
Coulomb-Born approx.
25 - 100 keV/amu
- 93T18 Decker,F. Eichler,J.
Comment on "fine structure constant expansions for electron capture
J. Phys. B 26 2081 - 2083 1993 T
comments
- 93T19 Deco,G. Fojon,O. Maidagan,J. Rivalola,R.
Matrix continuum distorted-wave approximation for electron capture
Phys. Rev. A 47 3769 - 3774 1993 T
 $H^+ + H(1s) \rightarrow H(1s) + H^+ U^{92+} \rightarrow U^{91+} + U^{92+}$
relativistic matrix CDW approx.
 $50 - 10000$ keV/amu (H) ; 5×10^3 keV/amu (U)
- 93T20 Drakes,J.A. McGregorand,W.K. Muson,A.A.
Two-electron exchange in collisions of neutral molecules
J. Chem. Phys. 99 7813 - 7818 1993 T
general theory
molecular quantum electrodynamics
metastable molecule + ground state molecule collision
- 93T60 Dreizler, R.M. Errea, L.F. Henne, A. Lıdde, H.J. Riera, A. Sanchez, P.
Regularization of Coulomb potential in the treatment of non-resonant transitions to an ionizing continuum
Phys. Rev. A 47 3852 - 3860 1993 T
 $He^+ + H^+ \rightarrow He^{2+} + He^+(2s,2p)$
close-coupling method
20 - 500 keV/amu
- 93T21 Dubois,A. Nilsen,S.E. Hansen,J.P.
State-selectivity in $H^+Na(3s/3p)$ collisions : differential cross sections, alignment and orientation effects for electron capture
J. Phys. B 26 705 - 721 1993 T
 $H^+ + Na(3s/3p) \rightarrow H(2s,2p)$
semiclassical IP treatment with eikonal method
0.75 - 5.0 keV/amu
- 93T22 Errea,L.F. Harel,C. Jimeno,P. Jouin,H. Mendez,I.L. Riera,A.
Molecular data for the hydrogen quasmolecule using a one-electron model
J. Phys. B 26 3573 - 3578 1993 T
 $H^+ + H \rightarrow H + H$
MO model
- 93T23 Esry,B.D. Chen,Z. Lin,C.D. Piancastini,R.D.
Close-coupling calculations of electron capture cross sections from the $n=2$ states of H by protons and alpha-particles
J. Phys. B 26 1579 - 1586 1993 T
 $H^+, He^{2+} + H^+(2s;2p) \rightarrow H(nl;n=2-3), He^+(nl;n=3,4)$
semiclassical close-coupling method + travelling AO
0.25 - 16 keV/amu
- 93T24 Fabrikant,I
Electron transfer in $Ca^+(4snl) - Ca(4s^2)$ collisions
Phys. Rev. A 48 R3411 - 3414 1993 T
 $Ca^+(4snl) + Ca(4s^2) \rightarrow Ca^+(4s) + Ca(4s^24p)$
three-body Faddeev approx.
thermal velocities

- 93T61 Florescu, A., Sizum, M., Grimbirt, D., Sidis, V.
Multi-trajectory semi-classical method for the treatment of non-adiabatic atom-molecular collisions
Phys. Rev. A 47 2943 - 2950 1993 T
 $H^+ + O_2(v=0) \rightarrow H + O_2^+(v_l)$
IOS approx.
23 eV
- 93T25 Florescu, A., Sizum, M., Sidis, V.
Theoretical investigation of differential cross sections for vibrational excitation and vibronic charge transfer in $H^+ + H_2$ collisions
J. Chem. Phys. 99 7277 - 7278 1993 T
 $H^+ + H_2(v=0, X^1\Sigma_g^+) \rightarrow H + H_2^+(v=1-3, X^1\Sigma_g^+)$
quantal infinite order sudden approx.
0.03 eV/amu
also $H^+ + H_2(v=0, X^1\Sigma_g^+) \rightarrow H^+ + H_2^+(v=0-3, X^1\Sigma_g^+)$
- 93T26 Fritsch, W.
On the Coulomb explosion in slow ion-molecule collisions
Phys. Letters A 177 428 - 432 1993 T
 $H^+ + H_2 \rightarrow H + H_2^+; H + H_2^{2+} + e$
Close-coupling calculation
4 - 10 keV/amu
double ionization $\rightarrow H_2^{2+} \rightarrow H^+ + H^+$; polar angle dependence
- 93T27 Gargand, M., O'Rourke, S.F.C., McCarroll, R., Anderson, L.R.
Electron capture in slow collisions of N^{3+} ions with atomic hydrogen
Phys. Scripta 48 436 - 439 1993 T
 $N^{3+} + H \rightarrow N^{2+}(nl)$
MO
 $10 \times 10^{-3} - 1$ keV/amu
angular distributions; 3s-capture dominant
- 93T29 Hansen, J.P., Nilsen, S.E., Schweinzer, J.
Electron capture cross sections from initially aligned p-state atoms
J. Phys. B 26 L471 - 475 1993 T
 $H^+, He^{2+} + B^+ \rightarrow H(n=2,3), He^+(3,4,5) (B = H^+(2p_{\sigma}, 2p_{\pi}, 2p_x))$
time-dependent close-coupling method
1-56 keV/amu
- 93T28 Hansen, J.P., Taulberg, K.
Partial cross sections for single- and double-electron capture by multiply charged ions colliding with He
Phys. Rev. A 47 2987 - 2994 1993 T
 $C^{3+} + He \rightarrow C^{4+}, C^{3+}(nl); B^{3+} + He \rightarrow B^{4+}, B^{3+}(nl); B^{4+} + He \rightarrow B^{5+}, B^{4+}(nl);$
 $Be^{4+} + He \rightarrow Be^{5+}, Be^{4+}(nl)$
two-electron/two-center AO model
0.25 - 225 keV/amu
- 93T30 Henne, A., Lüdde, H.J., Toepfer, A., Gluth, T., Dreizler, R.M.
Doorway approximation of the optical potential: application to one-electron ion-atom scattering systems
J. Phys. B 26 3815 - 3833 1993 T
 $H^+ + H(1s) \rightarrow H^+ + He^+(1s) \rightarrow$
doorway approx.
 $10-10^3$ keV/amu (He^+); $2-10^3$ keV/amu (H)
excitation, ionization, electron loss
- 93T31 Ichihara, A., Shirai, T., Eichler, J.
Cross sections for electron capture in relativistic atomic collisions
At. Data and Nucl. Data Tables 55 63 - 79 1993 T
 $Au^{79+} + B \rightarrow Au^{78+}(nl) (B=C^{3+}, Al^{12+}, Cu^{28+}, Ag^{46+}, Au^{76+}); U^{92+} + B \rightarrow B^{91+}(nl)$
 $(B=C^{3+}, Al^{12+}, Cu^{28+}, Ag^{46+}, Au^{76+}, U^{91+})$
relativistic eikonal approx.
 $2 \times 10^5 - 1 \times 10^{10}$ keV/amu
- 93T33 Kazansky, A.K.
Trajectory study of post-collisional mixing of Rydberg states after double charge exchange
J. Phys. B 26 3863 - 3869 1993 T
classical trajectory calculation
- 93T32 Keller, S., Ast, H., Dreizer, R.M.
Quantum effects in CTMC models
J. Phys. B 26 L737 - 742 1993 T
 $H^+ + H \rightarrow H + H^+$
CTMC
10 - 200 keV/amu
also ionization $H^+ + H \rightarrow H^+ + H^+ + e$

- 93T34 Krishnamurthi, U.
On the application of the Landau-Zener curve crossing model to double charge transfer reactions
Int. J. Mass Spectro. Ion Processes 125 155 - 163 1993 T
Landau-Zener model
cross section as a function of energy defects
- 93T35 Krstic, P.S. Janev, R.K.
Excitation, ionization and electron-capture in slow $\text{He}^{2+} + \text{H}$ and $\text{H}^+ + \text{He}^+$ collisions
Phys. Rev. A 47 3894 - 3912 1993 T
 $\text{He}^{2+} + \text{H}(1s, 2s, 2p) \rightarrow \text{He}^+(n=1-4) + \text{H}^+$; $\text{H}^+ + \text{He}^+(1s) \rightarrow \text{H}(n) + \text{He}^{2+}$
hidden crossing model
0.1 - 30 keV/amu
excitation and ionization cross sections given
- 93T36 Kuang, Y.R.
Charge transfer in p-H and -H₂ collisions at low and high energies
Z. Phys. D 26 253 - 257 1993 T
 $\text{H}^+ + \text{H}_2 \rightarrow \text{H} + \text{H}^+, \text{H}_2^+$
MO with the initial united atom effect
0.1 - 200 keV/amu
- 93T62 Lafyatis, G.P. Kirby, K. Dalgarno, A.
Molecular cation NHe^{2+}
Phys. Rev. A 48 321 - 325 1993 T
 $\text{N}^{2+} + \text{He} \rightarrow \text{N}^+(\text{?P}, \text{?D}) + \text{He}^+$
MO-Landau-Zener
0.03 - 10³ eV
- 93T37 Lewartowski, E. Courbin, C.
A comparative study of classical and semiclassical models of the $\text{H}^+ - \text{Na}^+(3p)$ charge exchange process
J. Phys. B 26 3403 - 3413 1993 T
 $\text{H}^+ + \text{Na}^+(3p) \rightarrow \text{H}(n=2) + \text{Na}^+$
CTMC + semiclassical IP method
1 - 10 keV/amu
- 93T38 Moiseiwitsch, B.L.
Relativistic third-order Oppenheimer-Brinkman-Kramers cross sections for electron capture
J. Phys. B 26 2019 - 2028 1993 T
 $\text{C}^{6+} + \text{Al}, \text{Cu}, \text{Ag}, \text{Ta}, \text{Au} \rightarrow \text{C}^{5+}; \text{Ne}^{10+} + \text{Cu}, \text{Ag}, \text{Ta}, \text{Au} \rightarrow \text{Ne}^{9+}; \text{Ar}^{18+} + \text{Cu}, \text{Ag}, \text{Ta}, \text{Au} \rightarrow \text{Ar}^{17+}; \text{Xe}^{54+} + \text{Al}, \text{Cu}, \text{Ag}, \text{Ta}, \text{Au} \rightarrow \text{Xe}^{53+}$
OBK3
 $1.4 \times 10^4 - 1.0 \times 10^6$ keV/amu
- 93T39 Moribayashi, K. Hira, K. Matsuzawa, M. Kimura, M.
Hyperspherical approach to double-electron excitation of He by fast-ion impact
IV. excitation to the (2l, 3l') and (3l, 3l') manifolds by multiply-charged ion impact
Phys. Rev. A 47 4874 - 4876 1993 T
 $\text{A}^{2+} + \text{He}(1s^2) \rightarrow \text{He}^{**}(2l, 2l'; 2l, 3l'; 3l, 3l') \text{ (A=1-10)}$
OBK3
 $(1-10) \times 10^3$ keV/amu
- 93T40 Mukherjee, M.
Relativistic electron capture including inter-nuclear interaction
Z. Phys. D 27 249 - 252 1993 T
 $\text{H}^+ + \text{H} \rightarrow \text{H} + \text{H}^+$
1st Born approx. with inter-nuclear interaction
 $10 \times 10^3 - 5 \times 10^7$ keV/amu
- 93T41 Oliveira, G.H. Ramirez, C.A. Rivarola, R.D.
Electronic excitation of dielectronic targets by ion impact
Phys. Rev. A 47 1000 - 1005 1993 T
 $\text{H}^+ + \text{He}(1s^2) \rightarrow \text{H}^+ + \text{He}(1s2s; 2p); \text{Kr}^{34+}(1s^2) + \text{B}(\text{B=B-40}) \rightarrow \text{Kr}^{34+}(1s2l); \text{Fe}^{24+}(1s^2) + \text{B} \rightarrow \text{Fe}^{24+}(1s2p; 3p)(\text{B=2-20})$
Impact parameter method + symmetric eikonal approx.
 $15 - 10^3$ keV/amu (H^+);
- 93T63 Padmovathi, D.A. Mishra, M.K. Rabitz, H.
Role of potential structure in non-adiabatic collisions with applications to $\text{He}^+ + \text{Ne}(2p^2) \rightarrow \text{He}^+ + \text{Ne}(2p^3s)$ and $\text{Na} + \text{I} \rightarrow \text{Na}^+ + \text{I}^-$
Phys. Rev. A 48 279 - 285 1993 T
 $\text{He}^+ + \text{Ne}(2p^2) \rightarrow \text{He}^+ + \text{Ne}(2p^3s); \text{Na} + \text{I} \rightarrow \text{Na}^+ + \text{I}^-$
close-coupling calculations
27 - 71 eV

- 93T42 Ramillon, M., McCarroll, R.
Electron capture to excited states in H^+ collisions with H and He
Phys. Scripta 48 573 - 579 1993 T
 $H^+ + H, He \rightarrow H(2s, 2p, 3s, 3p, 3d, 4s; \text{total})$
DWA
20 - 200 keV/amu
angular distributions also given
- 93T43 Richter, K., Solovov, E.A.
Application of the advanced adiabatic approach to charge exchange in slow collisions between H and O^{5+}
Phys. Rev. A 48 432 - 441 1993 T
 $O^{5+} + H \rightarrow O^{4+}(nl; n=5-8)$
advanced adiabatic approx.
0.1 - 20 keV/amu
- 93T44 Roncin, P., Gaboriaud, M.N., Barat, M., Bordenau-Montesquieu, A., Moretto-Capelle, P., Benhenni, M., Bauchau, H., Haral, C.
Auto transfer to Rydberg states and indirect sialization following double capture
J. Phys. B 26 4181 - 4199 1993 T
advanced adiabatic approx.
- 93T45 Schippers, S., Schlachtmann, A.R., Morgenstern, R.
Dependence of electron capture from $Na^*(3p)$ on orbital alignment : a kinematic effect ?
Phys. Letters A 181 80 - 84 1993 T
 $He^{2+} + Na^*(3P) \rightarrow He^+(n=4 \rightarrow 3)$
overlap integral in momentum space
- 93T47 Shimakura, N., Kimura, M.
Molecular treatment of electron capture in collisions of O^{3+} ions with H atoms at energies from 6eV/amu to 10keV/amu : transfer ionization
Phys. Rev. A 48 3652 - 3662 1993 T
 $O^{3+} + H \rightarrow O^{2+}(2lnl')$
MO
 $6 \times 10^{-3} - 10$ keV/amu
- 93T46 Shimakura, N., Kimura, M., Lane, N.F.
Double- and single-electron capture in $He^{2+} + H_2$ collisions in the energy range from 50eV to 2keV
Phys. Rev. A 47 709 - 710 1993 T
 $He^{2+} + H_2 \rightarrow He^+ + H_2^+; He + H^+ + H^-$
MO expansion model
 $12.5 \times 10^{-3} - 0.50$ keV/amu
- 93T48 Shimakura, N., Suzuki, S., Kimura, M.
Molecular treatment of electron capture at low to intermediate collision energies : collisions of B^{4+} ions with H atoms
Phys. Rev. A 47 3930 - 3936 1993 T
 $B^{4+}(1s^2) + H \rightarrow B^{3+}(1s^2nl) + H^+$
MO with EITF.
 $10^{-2} - 10$ keV/amu
- 93T49 Slim, H.A.
Balmer-alpha emission in H^+-H collisions at intermediate energies
J. Phys. B 26 L743 - 746 1993 T
 $H^+ + H \rightarrow H(n=3 \rightarrow 2) + h\nu$
coupled channel calculation
15 - 100 keV/amu
- 93T50 Stolterfoht, N.
Evidence for auto-excitation producing inner-shell vacancies in slow ion-atom collisions
Phys. Rev. A 47 R763 - 766 1993 T
 $Ar^+ + Si \rightarrow Ar^+ Si^+(L^{-1})$
auto-excitation model
- 93T51 Toshima, N.
Convergence of the perturbation series for high energy electron capture
J. Phys. B 26 L281 - 286 1993 T
 $H^+ + H \rightarrow H$
AO close-coupling method
 5×10^3 keV/amu
angular distributions

- 93T52 Toshima, N., Lin, C.D.
Propensity rule for magnetic-substate distributions for electron capture from excited states of atoms by multiply charged ions
Phys. Rev. A 47 4831 - 4836 1993 T
 $\text{He}^{2+} + \text{H}(2s;2p) \rightarrow \text{He}^+(\text{n}lm); \text{Li}^{3+} + \text{H}(2s;2p) \rightarrow \text{Li}^{2+}(\text{n}lm)$
close-coupling two center AO model
0.25 - 16 keV/amu
- 93T53 Vaeck, N., Hansen, J.E.
Comment on stabilization of autoionizing states during ion-atom collisions
J. Phys. B 26 2977 - 2980 1993 T
post-collision interaction in autoionizing state
- 93T54 van der Hart, H.W., Hansen, J.E.
Competition between radiative and non-radiative decay for doubly excited $2lnl'$ and $3lnl'$ states in C^{4+}
J. Phys. B 26 641 - 662 1993 T
 $\text{C}^{6+} + \text{He} \rightarrow \text{C}^{4+*}(2lnl'; 3lnl')$
truncated diagonalization method with B-spline
- 93T55 van der Hart, H.W., Hansen, J.E.
Competition between radiative and non-radiative decay for the doubly-excited $1s^2 3lnl'$ states in O^{4+}
J. Phys. B 26 3297 - 3312 1993 T
 $\text{O}^{6+} + \text{B} \rightarrow \text{O}^{4+}(1s^2 3lnl')$
truncated diagonalization method + B-spline
radiative/non-radiative decay rates for $1s^2 3lnl'$
- 93T56 Wang, J., Olson, R.E., Tökeš, K.
quantal and classical correspondence of double scattering
J. Phys. B 26 L613 - 618 1993 T
 $\text{H}^0 + \text{H} \rightarrow \text{H}^+ + \text{H}^+$
quantal/classical calculation
75 - 400 keV/amu
e-e interaction included ejected electron
- 93T57 Wang, Y.D., McGuire, J.H., Weaver, O.L., Corchis, S.E., Rivaola, R.D.
Molecular-alignment dependence in the transfer excitation of H_2
Phys. Rev. A 47 3966 - 3975 1993 T
 $\text{H}^+ + \text{H}_2 \rightarrow \text{H} + \text{H}^+$
Independent-electron model/SCA/PWBA
500 - 5000 keV/amu
- 93T58 Winter, T.G.
Coupled-Sturmian treatment of electron transfer and ionization in proton-carbon collisions
Phys. Rev. A 47 264 - 272 1993 T
 $\text{H}^+ + \text{C} \rightarrow \text{H} + \text{C}^+(\text{K}^{-1})$
coupled-Sturmian-pseudostate approx.
75 - 600 keV/amu
also $\text{H}^+ + \text{C} \rightarrow \text{H}^+ + \text{C}^+(\text{K}^{-13}) + e$
- 93T59 Winter, T.G.
Coupled-Sturmian treatment of electron transfer and ionization in proton-neon collisions
Phys. Rev. A 48 3706 - 3713 1993 T
 $\text{H}^+ + \text{Ne} \rightarrow \text{H}^0 + \text{Ne}^+(\text{K}^{-1})$
Coupled-Sturmian-pseudostate approx.
250 - 1500 keV/amu
Also ionization cross sections

- 94E 1 Ali, R. Cooke, C.L. Raphaelian, M.L.A. Stockli, M.
Multielectron processes in 10 keV/u Ar^{q+} ($5 \leq q \leq 17$) on Ar collisions.
Phys. Rev. A 49 3586 - 3596 1994 E
 Ar^{q+} ($q=5-17$) + Ar $\rightarrow \text{Ar}^{q+} + \text{Ar}^+$
projectile-recoil ion coincidence technique
10 keV/amu
- 94E 2 Andriamonje, S.
Electronic capture and excitation of highly charged channeled ions.
Nucl. Instr. Meth. B 87 116 - 123 1994 E
- 94E 4 Beijers, J.P.M. Hoestra, R. Morgenstern, R.
State-selective charge transfer between He-like ions and He.
Phys. Rev. A 49 363 - 373 1994 E
 $\text{A}^{(Z-1)+} + \text{He} \rightarrow \text{A}^{(Z-3)/(\text{nl})}$ ($\text{A} = \text{N, O, F, Ne}$)
VUV photon spectroscopy
0.05 - 2 keV/amu
- 94E 3 Belkacem, A. Gould, H. Fainberg, B. Bossingham, R. Meyerhof, W.E.
Projectile energy and atomic number dependence of electron capture from pair
production in relativistic heavy ion collisions.
Phys. Rev. Letters 73 2432 - 2435 1994 E
 $\text{La}^{57+} + \text{Cu, Ag, Au} \rightarrow \text{La}^{46+}$
positron-projectile coincidence
0.41, 0.96, 1.3 GeV/amu
- 94E 5 Benhenni, M. Shafroth, S.M. Swenson, J.K.
Alignment effects in fast ion-atom collisions.
Nucl. Instr. Meth. B 86 28-37 1994 E
a review
- 94E 6 Bliman, S. Cornille, M.
Spectroscopic studies of metastable ion-atom collisions : an overview of doubly
excited systems.
Nucl. Instr. Meth. B 87 51-57 1994 E
a review
- 94E 7 Bliman, S. Cornille, M. Katsonis, K.
Dielectronic recombination versus charge exchange : electron capture by metastable
ions.
Phys. Rev. A 50 3134-3141 1994 E
 $\text{A}^{(Z-2)+} (1s2s) + \text{H}_2 \rightarrow \text{A}^{(Z-3)+} (1s2lnl')$ ($\text{A} = \text{C, N, O}$)
photon spectrometer
10xq keV
- 94E 9 Bordenave-Montesquieu, A. Moretto-Capolle, P.
Investigation by high resolution electron spectroscopy of the helium-like $3l3l'$
Rydberg series in double capture processes at low collision velocity : auto transfer
to Rydberg states and electron stabilization.
J. Phys. B 27 4243 - 4261 1994 E
 $\text{N}^{7+} + \text{He} \rightarrow \text{N}^{3+} (3l, nl')$; $\text{Ne}^{10+} + \text{He} \rightarrow \text{Ne}^{8+} (3l, nl')$
electron spectroscopy
70 keV (N), 100 keV (Ne)
- 94E 8 Bordenave-Montesquieu, D. Dagnac, R.
Single-electron capture in He^{2+} - D_2 collisions.
J. Phys. B 20 543 - 553 1994 E
 $\text{He}^{2+} + \text{D}_2 \rightarrow \text{He}^+ + \text{D}_2^+$
translational energy spectroscopy
1.5 - 2 keV/amu
angular distribution (10° - $2^\circ 30'$)
- 94E10 Bross, S.W. Bonham, S.M. Gans, A.D. Peacher, J.L. Vajnai, T. Schultz, M.
Differential transfer ionization cross sections for 50 - 175 keV proton-helium
collisions.
Phys. Rev. A 50 337 - 342 1994 E
 $\text{H}^+ + \text{He} \rightarrow \text{H} + \text{He}^{2+} + e$
E : projectile-recoil ion coincidence technique ; T : CTMC
50 - 175 keV
- 94E11 Chabot, M. Wohrer, K. Chetoui, A. Rojet, J.P. Touti, A. Verhiet, D. Politis, M.F.
Stephan, C. Grandin, J.P. Macias, A. Martin, F. Riera, A. Sanz, J.L. Gayet, R.
New investigation of saturation effect in ion-atom excitation.
J. Phys. B 27 111 - 125 1994 E
 $\text{Kr}^{34+} + \text{B} \rightarrow \text{Kr}$ ($\text{B} = \text{C, Si, Ar, Cu, Zn}$)
E : photon spectroscopy
 33.9×10^3 keV/amu
Lyman-X-rays observed due to excitation

- 94E12 Cline, R. van der Burg, P.T.M. Westerveld, W.B. Risley, J.S.
Measurement of the $H(n=2)$ density matrix for 20 - 100 keV collisions of H^+ on He.
Phys. Rev. A 49 2613 - 2629 1994 E
 $H^+ + He \rightarrow H(2s, 2p) + He^+$
Lyman-alpha spectroscopy
20 - 100 keV/amu
- 94E13 de Nijs, G. Hoekstra, R. Morgenstern, R.
A coincidence study of multiple-electron capture in $^{16}N^{7+}$ -Ar collisions.
J. Phys. B 27 2557 - 2567 1994 E
 $N^{7+} + Ar \rightarrow N^{6+}, N^{5+}, N^{4+}, N^{3+}$
projectile-electron coincidence method
1 - 10 keV/amu
- 94E14 Denis, A. Martin, S. Chen, L. Desesquelles, J.
Velocity dependence of captured electron l-distributions low-energy collisions of Ar^{6+} with atomic Cs
Phys. Rev. A 50 2263 - 2268 1994 E
 $Ar^{6+} + Cs \rightarrow Ar^{7+}$
photon spectroscopy
- 94E15 Dennis, K. Akimune, H. Berg, G.P.A. Chang, S. Davis, B. Fujiwara, M. Harakeh, M.N. Jänschke, J. Liu, J. Pham, K. Roberts, D.A. Stephenson, E.J.
Atomic charge exchange between helium ions and targets from carbon to bismuth at $\beta=0.36$.
Phys. Rev. A 50 3992 - 3999 1994 E
 $^3He^{2+} + B \rightarrow He^+ (B = 6-83)$
charge equilibration method
200 MeV
- 94E16 Ehrenreich, T. Day, J.C. Hansen, S.B. Hosdal, Pedersen, E. MacAdam, K.B. Mogenssen, K.S.
Electron capture from oriented elliptic Rydberg atoms.
J. Phys. B 27 L383 - 389 1994 E
 $Na^+ + Li^*(n) \rightarrow Na$
laser-excited target
2.5 keV
- 94E17 Fedchack, J.A. Champion, R.L. Doverspike, L.D. Wang, Y.
Slow collisions of Na⁺ and K⁺ with atomic hydrogen.
J. Phys. B 27 3045 - 3054 1994 E
 $A^+ + H \rightarrow A + H$
growth-method
3 - 20 eV
- 94E18 Folkerts, H.O. Bliet, F.W. Meng, L. Olson, R.E. Morgenstern, R. von Hellermann, M. Summers, H.P.S. Hoekstra, R.
 He^{2+} -He collisions : one-electron capture and target ion excitation.
J. Phys. B 27 3475 - 3488 1994 E
 $He^{2+} + He \rightarrow He^+(nl) + He^+(1s)$
E : photon spectroscopy ; T : CTMC
1 - 75 keV/amu
also $He^{2+} + He \rightarrow He^{3+} + He^+(nl) + e$
- 94E19 Fremont, F. Merabet, H. Chesnel, J.Y. Husson, X. Lepoutre, A. Leder, D. Rieger, G. Stollerfoht, N.
Auger electron emission following double electron capture in 150 keV $Ne^{10+} + He$ collisions.
Phys. Rev. A 50 3117 - 3123 1994 E
 $Ne^{10+} + He \rightarrow Ne^{8+}(nln'l')$
electron spectroscopy
150 keV
- 94E20 Gaboriaud, M.N. Barat, M. Roncin, P. Sidis, V.
Transfer excitation in F^{8+} and Ne^{7+} ions colliding with He and Ne targets.
J. Phys. B 27 4595 - 4609 1994 E
 $F^{8+}(1s^2 2s) + B \rightarrow F^{8+}(1s^2 2snl) (B=He, Ne) ; Ne^{7+}(1s^2 2s) + B \rightarrow Ne^{6+}(1s^2 2snl) (B=He, Ne)$
E : coincidence-energy-gain spectroscopy ; T : quasi-molecular model
3 - 10 keV
- 94E21 Graham, W.G.
Charge-changing and excitation in high energy, multicharged ion collisions.
Nucl. Instr. Meth. B 87 58 - 63 1994 E
a review

- 94E22 Graul, S.T. Williams, S. Dressler, R.A. Salter, H. Murad, E.
Guided-ion beam measurements of $X^+ + NO(X=Ar, N_2)$ reactions.
J. Chem. Phys. 100 7348 - 7359 1994 E
 $Ar^+ + NO \rightarrow Ar + NO^+$; $Ar + O^+ + N$; $Ar + O + N^+$; $N_2^+ + NO \rightarrow N_2 + NO^+$; $N_2 + O^+ + N$; $N_2 + N^+ + O$
guided-ion beam technique
0.1 - 10 eV
- 94E23 Guenckunst, A. Zuccati, S. Mehlhorn, W.
 L_{γ} -subshell alignment of magnesium after electron capture by protons.
J. Phys. B 27 533 - 542 1994 E
 $H^+ + Mg \rightarrow H + Mg^+(2p^{-1}, ^2P_{3/2,1/2})$
Auger electron spectroscopy
40 - 240 keV/amu
alignment parameter
- 94E24 Hashida, M. Sakabe, S. Izawa, Y. Nakai, S.
Modified crossed-beam apparatus for charge transfer cross section measurement
Rev. Sci. Instr. 65 877 - 881 1994 E
 $Gd^+ + Gd \rightarrow Gd + G_d^+$
crossed-beam technique
 $10 - 10^3$
- 94E25 Herman, Z. Birkinshaw, K. Pacak, U.
A beam scattering study of non-dissociative charge transfer between Kr^+ and CH_4 at collision energies below 1 eV
Int. J. Mass Spectro. Ion Proc. 135 47 - 53 1994 E
 $Kr^+ + CH_4 \rightarrow Kr + CH_4$
crossed beam technique
0.45 - 1.11 eV
- 94E26 Hoekstra, R. Folkerts, H.O. Beijers, J.P.M. Morgenstern, R. de Heer, F.J.
 $He^{2+} + H_2$ collisions : non-dissociative and dissociative one-electron capture.
J. Phys. B 27 2021 - 2031 1994 E
 $He^{2+} + H_2 \rightarrow He^+(nl : n=2,3,4) ; He^0(nl : n=2,3)$
photon spectroscopy
1 - 13 keV/amu
- 94E27 Huels, M.A. Fedchak, J.A. Champion, R.L. Doverspike, L.D. Gauyacq, J.P. Tailler-Billy, D.
Electron detachment in low-energy collisions of halogen anions with atomic hydrogen.
Phys. Rev. A 49 255 - 264 1994 E
crossed-beam technique
0.1 - 20 eV
- 94E28 Hvelplund, P. Andersen, L.H. Brink, C. Yu, D.H. Lorents, D.C. Ruoff, R.
Charge transfer in collisions involving multiply charged C_{60} molecules.
Z. Phys. D 30 323 - 326 1994 E
 $C_{60}^{2+}, C_{60}^{3+} + B \rightarrow C_{60}^+, C_{60}^{2+}$ ($B=H_2, He, Ar, Kr, Xe, NO$)
Growth method
(40 - 120) keV
- 94E29 Irby, V.D. Gay, T.J. Park, J.T. Bross, S.W. Gans, A.D.
Superelectronic and inelastic $He^{2+} + He$ state-selective electron capture
Phys. Rev. A 50 2292 - 2297 1994 E
 $^3He^{2+} + He \rightarrow He^+(n) + He^+(n')$
Translational energy spectrometer
15, 30, 45 keV/amu
- 94E30 Itoh, Y.
Differential cross section measurements for one-electron capture processes in Ar^{2+} -Ne system at $E_{lab}=40, 60$ and 80 eV
J. Phys. Soc. Japan 63 941 - 947 1994 E
 $Ar^{2+} + Ne \rightarrow Ar^+ + Ne^+$
crossed-gas target method
40, 60, 80 eV
 $\theta = 0 - 20$
- 94E31 Jacquet, E. Boduch, P. Chantepie Druetta, M. Hennecart, D.
Visible and near-UV photon spectroscopy of charge-exchange collisions between Ar^{2+} and Li at 105 keV
Phys. Scripta 49 417 - 423 1994 E
 $Ar^{2+} + Li \rightarrow Ar^{3+} (3snl, 3pnl, 3dnl)$
photon spectroscopy (2000 - 6000 Å)
2.6 keV/amu

- 94E32 Keller, N. Miller, R.D. Westerlind, M. Elston, S.B. Sellin, I.A. Andersson, L.R. Biedermann, C. Cedergust, H.
Angular distributions for single- and double-electron electron capture in slow C^{4+} -Ne collisions.
Phys. Rev. A 50 462 - 467 1994 E
 $C^{4+} + Ne \rightarrow C^{3+}, C^{2+}$
recoil ion source
400 eV
- 94E33 Lee, A.R. Wilkins, A.C.R. Enos, C.S. Brenton, A.G.
Single electron capture by C^{3+} ions in He, Ne and Ar
Int. J. Mass Spectro. and Ion Proc. 130 83 - 88 1994 E
 $C^{3+} + He, Ne, Ar \rightarrow C^{2+}$
translational energy spectroscopy
6 keV
- 94E34 Lee, A.R. Wilkins, A.C.R. Enos, C.S. Brenton, A.G.
Translational energy spectroscopy of single electron capture by C^{2+} ions in He, Ne and Ar
Int. J. Mass Spectro. Ion Proc. 134 213 - 220 1994 E
 $C^{2+} + B \rightarrow C^{+} + B^{+}$
translational spectroscopy
4 keV
- 94E35 Lee, A.R. Wilkins, A.C.R. Leather, C. Brenton, A.G.
Translational energy spectra for single electron capture by O^{2+} in He, Ne and Ar
Phys. Rev. A 50 1149 - 1154 1994 E
 $O^{2+}(1s^2 2s^2 2p) + He, Ne, Ar \rightarrow O^{+}$
translational energy spectroscopy
4 keV
- 94E36 Levin, J.C. Short, R.T. Biedermann, C. Cederquist, H. Elston, S.B. Sellin, I.A.
Determination of mean energies and impact parameters characteristic of charge-charging reactions.
Phys. Rev. A 49 228 - 235 1994 E
 $Cl^{3+} + Ar \rightarrow Cl^{4+}$; $Cl^{3+} + Ar \rightarrow Cl^{7+}$; $Cl^{10+} + Ar \rightarrow Cl^{9+}$, Cl^{8+} ; $P^{3+} + Ar \rightarrow P^{8+}$, P^{7+}
projectile-recoil ion coincidence technique
 10^3 keV/amu (F); 6300 keV/amu (Cl)
coincidence with loss
- 94E37 Lieben, D. Beyer, H.P. Fillayson, K.D. Bosch, F. Jung, M. Klepper, O. Moehammer, R. Beckert, K. Eickhoff, H. Franke, B. Nolden, F. Spadke, P. Sieck, M. Menzel, G. Deslattes, R.D.
X-rays from radiative electron capture of highly-charged heavy ions in an electron cooler.
Z. Phys. D 30 307 - 313 1994 E
 Au^{78+} , Au^{79+} , $U^{91+} + e \rightarrow Au^{77+}$, Au^{78+} , $U^{90+} + hv$
x-ray-projectile coincidence technique
200 - 300 MeV/amu
- 94E38 Lork, R. Tybislowski, M. Bends, M. Berger, R.J. Neuwirth, W.
Formation of O_2 in charge transfer collisions of fast molecular hydrogen ions with O_2 molecules
Z. Phys. D 29 213 - 221 1994 E
 H_2^+ , D_2^+ , H_3^+ , D_3^+ + $O_2 \rightarrow O_2^+$
TOF
4 - 64 keV/amu
- 94E39 Martin, S. Bernard, J. Denis, A. Desesquelles, J. Chen, L. Ouerdane, Y.
The double capture incollisions of bare and hydrogen-like ions with rare gas atoms ($Z=7-13$)
Phys. Rev. A 50 2322 - 2326 1994 E
 $A^{Z+} + B \rightarrow A^{(Z-2)+} + B^{2+}$ ($A=N, O, F, Ne$; $B=He, Ne, Ar, Kr, Xe$; $A=Na, Al$; $B=Ne, Ar, Kr, Xe$)
projectile-recoil ion coincidence technique
2xq keV
- 94E40 Matsuo, T. Tonuma, T. Kumagai, H. Tawara, H.
Cross sections of Ne^{1+} recoil ion production through pure ionization, electron loss and electron capture of projectiles in 1.05 MeV/amu $Ar^{6+} + Ne$ collisions.
Phys. Rev. A 40 1178 - 1183 1994 E
 $Ar^{6+} + Ne \rightarrow Ar^{4+} + Ne^{2+}$ ($q=4, 6, 8, 10, 12, 14$)
projectile-recoil ion coincidence technique
1.05 MeV/amu
- 94E41 Meyerhof, W.E. Montenegro, E.C.
Two-center electron-electron interaction in projectile electron excitation and loss
Nud. Instr. Meth. B 86 45 - 51 1994 E
a review

- 94E42 Moretto-Capelle, P., Bordanave-Montesquieu, A., Gonzalez, A., Benhenni, M., Auger doorway of the $\text{Ne}^{7+}(1s2nl')$ Rydberg series around $\text{Ne}^{6+}(1s2s^2S)$ threshold
J. Phys. B 27 L317 - 323 1994 E
 $\text{Ne}^{6+}(1s) + \text{Ne} \rightarrow \text{Ne}^{7+}(1s2nl')$
electron spectroscopy
90 keV
- 94E43 Moudry, B.W., Yenen, O., Jaeks, D.H., Alignment and orientation of Ar^* in $\text{He}^+ - \text{Ar}$ collisions
Z. Phys. D 40 199 - 204 1994 E
 $\text{He}^+ + \text{Ar} \rightarrow \text{He} + \text{Ar}^*(3p^4p')$
photon spectroscopy
0.25 keV/amu
- 94E44 Murphy, J.G., Dunn, K.F., Gilbody, H.B., He^{2+} formation in collisions between fast He^+ ions.
J. Phys. B 27 3687 - 3694 1994 E
 $\text{He}^+ + \text{He}^+ \rightarrow \text{He}^{2+} + \text{He}$; $\text{He}^+ + \text{He}^{2+} + e$
crossed-beam technique
108 - 460 keV
- 94E45 Nakamura, N., Nabeshima, T., Currell, F.J., Kanai, Y., Kitazawa, S., Kolde, M., Sakae, H.A., Iida, H., Matsui, Y., Wakita, K., Takayanagi, T., Kambara, T., Aways, Y., Suzuki, H., Ohlami, S., Safronova, U.I., Ejected-electron spectra from the triplet states of $\text{O}^{4+}(1s^23l^3)$ produced by $\text{O}^{6+} + \text{O}_2$ collisions
J. Phys. B 27 L785 - L793 1994 E
 $\text{O}^{6+}(1s^3) + \text{O}_2 \rightarrow \text{O}^{4+}(1s^2nl^3)$
E; Electron spectroscopy; T: Z-expansion method
60 keV
- 94E46 Ogawa, H., Katayama, I., Sugai, I., Haruyama, Y., Saito, M., Yoshida, K., Tosaki, M., Ikegami, H., Electron loss cross sections of 10.6 MeV/amu light ions.
Nucl. Instr. Meth. B 88 350 - 354 1994 E
 $\text{A}^{z-1+} + \text{C}(\text{foil}) \rightarrow \text{A}^{z+}(\text{A} = \text{He, C, O})$
attenuation method
10.6x10³ keV/amu
- 94E47 Okasaka, R., Kawabe, K., Kawamoto, S., Tani, M., Kuma, H., Iwai, T., Mita, K., Iwamae, A., Excitation function of $\text{He}(n=3)$ levels in the intermediate-velocity regime of $\text{He}^+ - \text{He}$ collisions
Phys. Rev. A 49 246 - 254 1994 E
 $\text{He}^+ + \text{He} \rightarrow \text{He}^*(nl; n=3)$
photon spectroscopy
20 - 300 keV
also $\text{He}^+ + \text{He} \rightarrow \text{He}^+ + \text{He}^*(n=3)$; polarization
- 94E48 Oswald, W., Schramm, R., Jakubassa-Amundsen, D.H., Betz, H.D., Electron capture to the continuum in collisions of projectiles with Ne targets
J. Phys. B 27 513 - 532 1994 E
 $\text{H}^+, \text{O}^{6+} + \text{Ne} \rightarrow \text{H}^*, \text{O}^{7+*} \rightarrow \text{H}^*, \text{O}^{8+}$
E: Zero-degree electron spectroscopy; T: Second Born approx.; impulse approximation
(1.25 - 5.0)x10³ keV/amu
- 94E49 Patton, C.J., Bolorizadeh, M.A., Shah, M.B., Geddes, J., Gilbody, H.B., Electron capture and transfer ionization in collisions of H^+ and He^{2+} ions with Fe atoms
J. Phys. B 27 3695 - 3706 1994 E
 $\text{H}^+, \text{He}^{2+} + \text{Fe} \rightarrow \text{H}, \text{He}^+, \text{He}^0$
coincidence-technique
70 - 500 keV/amu
multiple ionization of Fe^* ($r = 1 - 4$)
- 94E50 Peart, B., Hayton, D., Merged beam measurements of the mutual neutralization of He^+/H^- and Li^+/D^- ions
J. Phys. B 27 2551 - 2556 1994 E
 $\text{He}^+ + \text{H}^- \rightarrow \text{He} + \text{H}$; $\text{Li}^+ + \text{D}^- \rightarrow \text{Li} + \text{D}$
Merged beam technique
0.6 - 300 keV (cm)
- 94E51 Radchenko, V.I., Scattering fast hydrogen particles in gaseous media
JETP 78 445 - 455 1994 E
 $\text{H}^0 + \text{B} \rightarrow \text{H}^+; \text{H}^+ + \text{B} \rightarrow \text{H}^0, \text{H}^+$ (B = He, Ar, Kr, Xe, H₂, O₂, CO₂, C₂H₄, K)
growth method
1.67x10³, 5.0x10³ keV/amu
scattering cross sections of H^+ , H^0 and H^- without charge change

- 94E52 Richter, C., Andersen, N., Doweck, D., Houver, J.C., Salgado, J., Thomsen, J.W.
Polarization effects in electron transfer reactions with laser excited Na(3p) at medium energies
Z. Phys. D 30 211 - 215 1994 E
 $H^+, H_2^+, He^+ + Na(3p) \rightarrow H^*, H_2^*, He^*; Li^+ + Na(3s, 3p) \rightarrow Li$
translational energy spectroscopy
1 keV
- 94E53 Rieger, G., Boudch, P., Chantepie, M., Cremer, G., Jacquet, E., Lecler, D., Wilson, M.
Study of photon spectra emitted during $N^{3+} + Li$ collisions
Phys. Scripta 50 493 - 500 1994 E
 $N^{3+}(1s^2) + Li \rightarrow N^{4+}(1s^2nl) + Li^+$
photon spectroscopy (200 - 600 nm)
75 keV
- 94E54 Roncin, P., Adjouri, C., Andersen, N., Barat, M., Dubois, A., Gaboriaud, M.N., Hansen, J.P.H., Nielsen, S.E., Szilagyi, S.Z.
Differential cross sections and orientation propensities for electron capture in 0.75 - 12 keV $B^{3+} - He$ collisions : experiment and atomic basis theory
J. Phys. B 27 3079 - 3091 1994 E
 $B^{3+}(1s) + He \rightarrow B^{2+}(1s2s, 2p)$
E : projectile-recoil ion-photon spectroscopy ; T : AO
0.175 - 12 keV
angular differential
- 94E55 Said, R., Kamber, E.Y., Yaitkaya, S., Ferguson, S.M.
Experimental study of single-electron capture by low-energy Ne^{6+} recoil ions ($q = 3 - 6$) from He, Ne and Ar using translational energy spectroscopy
J. Phys. B 27 3993 - 4008 1994 E
 $Ne^{6+}(q = 3 - 6) + B \rightarrow Ne^{6+1+}$
translational energy spectroscopy
0.1 - 0.6 keV
angular distribution
- 94E56 Schippers, S., Schlattmann, A.R., Wiersma, W.P., Hoekstra, R., Morgenstern, R., Olson, R.E., Pascale, J.
Anisotropy effects in electron capture by O^{6+} from aligned $Na^+(3p)$
Phys. Rev. Letters 27 1628 - 1631 1994 E
 $O^{6+} + Na^+(3p) \rightarrow O^{5+}(n=5-15)$
E : photon spectroscopy ; T : CTMC
2 - 8 keV/amu
photons ($n=10 \rightarrow n'=8$) ; anisotropy
- 94E57 Söhlker, Th., Giesel, H., Imrich, H., Kandier, T., Kozhuharov, C., Möller, P.H., Munzenberg, G., Nickel, F., Scheidenberger, C.S., Suzuki, T., Kucharski, M., Watzak, A., Rymuza, P., Stachura, Z., Kriesbach, A., Dauvergne, D., Dunford, B., Eichler, J., Ichihara, A., Shirai, T.
L-subshell resolved photon angular distribution of radiative electron capture into He-like uranium
Phys. Rev. Letters 73 3520 - 3523 1994 E
 $U^{90+} + C \rightarrow U^{89+}(1s^2s, 2p) + REC$
E : photon spectroscopy ; T : relativistic calculation
 89×10^6 keV/amu
deviation of $\sin^2(\theta)$ for L-REC
- 94E58 Tanaka, M., Shimakura, N., Ohshima, T., Katori, K., Fujiwara, M., Ogata, H., Kondo, M.
Spin-polarized electron capture for the $Na + {}^3He^{2+}$ system at a ${}^3He^{2+}$ impact energy of 5.33 - 9.33 keV/amu
Phys. Rev. A 50 1184 - 1196 1994 E
 ${}^3He^{2+} + Na(3s) \rightarrow He^+(n=3,4)$
photon spectroscopy
5.33 - 9.33 keV/amu
polarized ion beam source
- 94E59 Tribedi, L.C., Nanai, V., Press, M.R., Kurup, M.B., Prasad, K.G., Tandon, P.N.
Radiative electron capture by fully stripped channelled light ions
Phys. Rev. A 49 374 - 378 1994 E
 $A^{Z+} + Si^{100+} \rightarrow A^{Z+1+} + h\nu$
photon-spectroscopy
(3-7.5) $\times 10^3$ keV/amu
- 94E60 Tribedi, L.C., Prasad, K.G., Tandon, P.N., Chen, Z., Lin, C.D.
Single- and double-K-shell ionization and electron-transfer cross sections for Fe and Ni bombarded by Si ions and Fe by Si ions at 1.25 - 4.70 MeV/amu
Phys. Rev. A 49 1015 - 1020 1994 E
 $Si^{14+} + Fe \rightarrow Si^{13+}(1s) + Fe^+(K^{-1})$; $Si^{12+}(1s^2) + Fe^+(K^{-2})$; $Si^{16+} + Fe, Ni \rightarrow Si^{15+}, S^{14+}$
X-ray spectroscopy
(1.25 - 4.70) $\times 10^3$ keV/amu
- 94E61 Ulrich, A., Gerthöfer, R., Krötz, W., Wieser, J., Murnick, D.E.
Ion-atom charge transfer system in a heavy ion atom pumped laser
Phys. Rev. A 50 1931 - 1934 1994 E
 $Ar^{2+} + Cs \rightarrow Ar^+$
photon spectroscopy
 10^5 keV
recoil ion produced by 100 MeV S

- 94E62 van der Kamp, A.B., Beijerbergen, J.H.M., Cosby, P.C., van der Zande, W.J.
 $N_2^+(A^1\Pi_u \leftarrow X^1\Sigma_g^+)$ excitation in the charge exchange collision with C_2 : two electron effects at keV energies
 J. Phys. B 27 5037 - 5053 1994 E
 $N_2^+ + C_2 \rightarrow N_2^+$
 translational energy spectroscopy
 5 keV
- 94E63 van der Kamp, A.B., Cosby, P.C., van der Zande, W.J.
 Charge-transfer production of predissociated N_2 states I. the $n=3$ Rydberg state region (12.8 - 14 eV)
 Chem. Phys. 184 319 - 333 1994 E
 $N_2^+ + Cs \rightarrow N_2^+$
 T-O-F + position sensitive detector technique
 4.8 - 7 keV
- 94E64 Vancura, J., Kostroun, V.O.
 Ionization and dissociation of N_2 and CO in collisions with 2.3xq keV Ar^{q+} ($8 \leq q \leq 14$)
 Phys. Rev. A 49 321 - 328 1994 E
 $Ar^{2q+}(q=8-14) + N_2, CO$
 TOF method
 dissociation and ionization
- 94E65 Vancura, J., Perotti, J.J., Flidr, J., Kostroun, V.O.
 Absolute total, one-, two- and three-electron transfer cross sections for $Ar^{q+}(q=8-16)$ on Ar at 2.3xq keV
 Phys. Rev. A 49 2515 - 2523 1994 E
 $Ar^{q+}(q=8-16) + Ar \rightarrow Ar^{(q-1)+}, Ar^{(q-2)+}, Ar^{(q-3)+}$
 growth method
 2.3 X q keV
- 94E66 Vane, C.R., Datz, S., Dittner, P.F., Giese, J., Jones, N.L., Krause, H.F., Rossel, T.M.
 Radiative electron capture by high energy oxygen ions in hydrogen and helium.
 Phys. Rev. A 49 1847 - 1853 1994 E
 $O^{8+} + H_2, He \rightarrow O^{7+} + h\nu$
 X-ray spectroscopy
 $5.9 \times 10^3 - 13.9 \times 10^3$ keV/amu
- 94E67 Vane, C.R., Datz, S., Dittner, P.F., Kraus, H.F., Schuch, R., Gao, H., Hutton, R.
 Electron-positron pair production in Coulomb collisions by 6.4 TeV sulfur ions
 Phys. Rev. A 50 2313 - 2321 1994 E
 e^-e^+ pair spectrometer method
 6.4×10^{12} eV
 e^-e^+ pair production
- 94E68 Walch, B., Cocke, C.L., Voelpel, R., Salzborn, E.
 Electron capture from C_{60} by slow multiply charged ions
 Phys. Rev. Letters 72 1439 - 1442 1994 E
 $Ar^{q+} + C_{60} \rightarrow Ar^{(q-1)+} + C_{60}^{+1}(i=1-6)$
 projectile-recoil ion coincidence technique
 2 keV/amu
- 94E69 Wang, Y., Westphal, J., Roller-Lutz, Z., Lutz, H.O.
 The role of an initial $Na(3p)$ state alignment in 1 keV $H^+ + Na(3p) \rightarrow H(2p) + Na^+$ collisions
 Z. Phys. D 30 217 - 222 1994 E
 $H^+ + Na(3p) \rightarrow H(2p) + Na^+$
 photon-projectile coincidence technique
 1 keV
- 94E70 Wu, W., Giese, J.P., Chen, Z., Ali, R., Cocke, C.L., Pichard, P., Stockli, M.
 Evidence for population of highly asymmetric states in double-electron capture by $O^{7+,8+}$ and N^{7+} colliding with He at low to intermediate velocities
 Phys. Rev. A 50 502 - 510 1994 E
 $O^{7+}, O^{8+} + He \rightarrow O^{6+}, O^{6+}; N^{7+} + He \rightarrow N^{6+}$
 coincidence-recoil momentum spectroscopy
 1 - 72 keV
- 94T 1 Adjouri, C., Roncin, P., Gaboriand, M.N., Barat, M., Andersen, N.
 Quasi molecular analysis of orientation and alignment in B^{3+} - rare gas electron capture processes.
 J. Phys. B 27 3093 - 3113 1994 T
 $B^{3+}(1s) + He, Ne \rightarrow B^{2+}(1s2s, 2p)$
 quasi-molecular model
 0.75 - 6 keV

- 94T 3 Alston, S.
Inner-shell capture using atomic potentials : a distorted strong-potential Born treatment.
Phys. Rev. A 49 310 - 320 1994 T
 $H^+ + C, Ne, Ar \rightarrow H + C^+, Ne^+, Ar^+(1s^{-1})$
distorted strong-potential Born approx.
150 - 2000 keV/amu (C) ; 1500 - 15000 keV/amu (Ar)
- 94T 2 Alt, E.O. Avakov, G.V. Blokhintsev, L.D. Kodyrov, A.S. Mukhamedzhanov, A.M.
Charge exchange reactions in a three-body eikonal approach
J. Phys. B 27 4653 - 4674 1994 T
 $H^+ + H(1s, 2s, 2p) \rightarrow H(n=1-5) ; He^{2+} + H(1s) \rightarrow He^+(1s, 2s) ; Li^{3+} + H(1s) \rightarrow Li^{2+}$
three-body eikonal approx.
0.1 - 10^3 keV/amu (H) ; 0.5 - 10^3 keV/amu (He) ; 1 - 500 keV/amu (Li)
- 94T 4 Asie, A. Hencken, K. Trautmann, D. Baur, G.
Electromagnetic pair production with capture.
Phys. Rev. A 50 3980 - 3983 1994 T
analytical expression for any ion target.
- 94T 5 Avakov, G.V. Blakhintsev, L.D. Dias, O. Mukhamedzhanov, A.M.
Off-shell effects in three-body equations for the atomic reactions of electron transfer.
J. Phys. B 27 3067 - 3078 1994 T
 $H^+ + H \rightarrow H + H^+ ; He^{2+} + H \rightarrow He^+ + H^+$
Impact parameter method with Alt-Grassberger-Sandhas equation.
0.2 - 500 keV/amu
- 94T 6 Bacchus-Montabonel, M.C. Fraija, F.
Electron capture processes in the collision of metastable $B^{3+}(1s2s)$ on atomic hydrogen.
Phys. Rev. A 49 5108 - 5111 1994 T
 $B^{3+}(1s2s) + H \rightarrow B^{2+}(1s2n'l')$
MO
- 94T 7 Belkic, D.
Double charge exchange at high impact energies.
Nucl. Instr. Meth. B 86 62 - 81 1994 T
- 94T 8 Belkic, D. Mancev, I. Mudrinic, M.
Two-electron capture from helium by fast alpha particles.
Phys. Rev. A 49 3646 - 3658 1994 T
 $He^{2+} + He \rightarrow He + He^{2+}$
second Born-DWA
25 - 1750 keV/amu
- 94T 9 Brandenbrink, S. Reihl, H. Wörmann, Th. Röhler-Lutz, Z. Lutz, H.O.
CTMC calculations of electron capture from oriented elliptical Rydberg atoms.
J. Phys. B 27 L391 - 394 1994 T
 $Na^+ + Li^*(nl) \rightarrow Na$
CTMC
3.12 keV
- 94T10 Brown, G.J.N. Crothers, D.S.F.
The role symmetry in variational continuum distorted-wave models of electron capture by protons from hydrogen.
J. Phys. B 27 5309 - 5320 1994 T
 $H^+ + H \rightarrow H + H^+$
variational CDW method
 $10 \cdot 10^3$ keV
- 94T11 Castillo, J.F. Cooper, I.L. Errea, L.F. Mendez, L. Riera, A.
Molecular treatment of charge transfer in $C^{2+} + H$ collisions : I. Ab initio evaluation of electronic energies and dynamic couplings.
J. Phys. B 27 5011 - 5026 1994 T
 $C^{2+} + He \rightarrow C^+ + He^+$
MO
- 94T12 Castillo, J.F. Cooper, I.L. Errea, L.F. Mendez, L. Riera, A.
Molecular treatment of charge transfer in $C^{2+} + He$ collisions : II. Dynamical treatment.
J. Phys. B 27 5027 - 5035 1994 T
 $C^{2+}(1s^2 2s^2 {}^1S ; 1s^2 2s 2p {}^3P) + He \rightarrow C^+$
MO
1 - 50 keV
- 94T13 Chen, Z. Lin, C.D. Toshima, N.
Calculation of Q-values in single- and double-charge transfer collisions of highly charged ions with atoms.
Phys. Rev. A 50 511 - 517 1994 T
 $A^{Z+} + H \rightarrow A^{(Z-1)+} ; A^{Z+} + He \rightarrow A^{(Z-1)+}(n) , A^{(Z-2)+}(n, n') (A = He, B, N, O)$
close-coupling method
5 - 80 keV/amu

- 94T14 Corchs, S.E., Rivarola, R.D., McGuire, J.H., Wang, Y.D.
Electron capture from H_2 targets by H^- and He^{2+} ions. Dependence of the cross sections on the orientation of the molecular axis.
Phys. Scripta 50 469 - 472 1994 T
 $H^+ \cdot He^{2+} + H_2(\theta_{\text{HIA}}) \rightarrow H \cdot He^+$
BIB molecular model
 $10^2 - 5 \times 10^3$ keV/amu
- 94T15 Courbin, C., Machholm, M., Lewartowski, E.
Orientation and alignment in charge exchange processes involving sodium atoms studied by semi-classical molecular theory.
Z. Phys. D 30 205 - 210 1994 T
 $H^+ + Na(3p) \rightarrow H; Li^+ + Na(3p) \rightarrow Li$
semi-classical MO model
1, 2 keV/amu
- 94T16 Dutta, C.M., Lane, N.F., Kimura, M.
Electron capture in collisions of excited $Na^*(3p)$ atoms with He^- ions at 0.1 - 7 keV/u; effects of alignment of the initial $Na^*(3p)$ orbital.
Phys. Rev. A 49 1806 - 1815 1994 T
 $He^+ + Na^*(P_{3,2}) \rightarrow He(2s, 2p_{3,2})$; $He^+ + Na(3s) \rightarrow He$
MO
0.1 - 7 keV/amu
alignment factor
- 94T17 Ermolaev, A.M.
Neutralization of protons in energetic collisions with hydrogen-like beryllium ions.
J. Phys. B 27 L671 - 675 1994 T
 $H^+ + Be^{3+}(1s) \rightarrow H(ml) + Be^{4+}$
AO
100 - 3000 keV
also ionization to Be^{4+} (100 - 1000 keV/amu)
- 94T18 Ermolaev, A.M., Jackson, D., Shimakura, N., Watanabe, T.
Study of $He^+ - H$ collisions at intermediate keV energies using pseudo-one- and two-electron atomic orbital expansions.
J. Phys. B 27 4991 - 5009 1994 T
 $He^+ + H \rightarrow He + H^+$
AO
2.5 - 100 keV/amu
also ionization, excitation, Balmer-Alpha-line emission
- 94T20 Errea, L.F., Herrevo, B., Mendez, L., Rabadan, I., Sanchez, P.
Molecular treatment of excitation and charge transfer in $Be^+ - He$ collisions.
J. Phys. B 27 L753 - 761 1994 T
 $Be^+(2s) + H(1s) \rightarrow Be(2s^2, 2s2p) + H^+$
MO model (28 states)
also excitation to $Be^+(2p)$, $H(2l)$
- 94T19 Errea, L.F., Meudez, L., Riera, A., Harel, C., Jouin, H., Pons, B.
Common-translational factor method with an atomic basis.
Phys. Rev. A 50 418 - 422 1994 T
 $He^{2+} + H \rightarrow He^+(n=2) + H^+$
Close-coupling AO with common translational factor
0.25 - 156 keV/amu
also $He^{2+} + H^+$; $He^{2+} + H(n=2)$
- 94T21 Errea, L.F., Sanchez, P.
Application of regularized probability absorber states to $He^+ + H^+$ collisions.
J. Phys. B 27 3677 - 3686 1994 T
 $He^+ + H^+ \rightarrow He^{2+} + H$; $He^{2+} + e + H^+$
close-coupling + probability absorber method
10 - 500 keV
also excitation to $He^+(n=2,3)$
- 94T22 Fraija, F., Allouche, A.R., Bacchus-Montabonel, M.C.
Ab initio treatment of electron capture by B^{4+} ions from atomic hydrogen.
Phys. Rev. A 49 272 - 276 1994 T
 $B^{4+}(1s) + H \rightarrow B^{3+}(\text{total}, 1s3l)$
AO with ETF
 $2 \times 10^{-3} - 10$ keV
- 94T23 Fraija, F., Bacchus-Montabonel, M.C., Gargaud, M.
Ab initio molecular treatment of electron capture processes in the $B^{3+} + He$ collision.
Z. Phys. D 29 179 - 182 1994 T
 $B^{3+}(1s^2) + He(1s^2) \rightarrow B^{3+}(1s^2 2s; 1s^2 2p) + He^+$
MO
0.2 - 6.25 keV/amu

- 94T24 Fritsch, W.
On transfer excitation in slow ion-helium collisions.
Phys. Letters A 192 369 - 373 1994 T
 $C^{3+} + He \rightarrow C^{3+}(n=2-5) + He^+$; $C^{3+}(n=2-3) + He^+(n=2)$
AO
8 keV/amu
also target excitation to $He(n=2)$ and scaling for other ions/charges.
- 94T25 Fritsch, W.
Theoretical study of electron processes in slow $He^{2+} - He$ collisions.
J. Phys. B 27 3461 - 3474 1994 T
 $He^{2+} + He \rightarrow He^+(nl) + He^+(1s)$; $He^+(nl) + He^+(nl : n=2-4)$
closed-coupling two-electron model
4 - 65 keV/amu
also target excitation to $He(1snl) n=2-3$
- 94T27 Gargaud, M. Bacchus-Montabone, M.C. McCarroll, R. Grozdanov, T.
Orientation propensity for states populated by electron capture in B^{3+}/He collisions.
J. Phys. B 27 4675 - 4680 1994 T
 $B^+ + He \rightarrow B^{2+}(1s^2p^2p)$
quasi-molecular representation
0.3 - 1.5 keV
- 94T26 Gargaud, M. Fraija, F. Bacchus-Montabone, M.C. McCarroll, R.
Total and differential electron capture cross sections in B^{3+}/He collisions.
J. Phys. B 27 3985 - 3992 1994 T
 $B^{3+} + He \rightarrow B^{2+}(1s^2s; 2p) + He^+$
model potential
1 eV - 10 keV
- 94T28 Gayet, R. Hansen, J.
Resonant and non-resonant modes of transfer and excitation processes in ion-atom collisions.
Nucl. Instr. Meth. B 86 52 - 61 1994 T
a review
- 94T29 Glass, J.T. McCann, J.F. Crothers, D.S.F.
Asymmetric theories of relativistic electron capture.
J. Phys. B 27 3975 - 3984 1994 T
 $H^+ + H \rightarrow H + H^+$; $A^{2+} + B \rightarrow A^{(2-1)+}$ ($A = C, Ne, Ar$; $B=10-92$)
relativistic CDW + EI model
140 - 400 MeV/amu
- 94T30 Glass, J.T. McCann, J.F. Crothers, D.S.F.
Relativistic continuum distorted wave theory for electron capture
J. Phys. B 27 3445 - 3460 1994 T
 $H^+ + H \rightarrow H + H^+$; $H^+ + Zn^{29+}(1s) \rightarrow H(1s) + Zn^{30+}$; $A^{2+} + B \rightarrow A^{(2-1)+}$ ($A = C, Ne, Ar$; $B=10-92$)
relativistic CDW
10 - 10⁶ MeV/amu (H); 140 - 1050 MeV/amu (Ar)
- 94T31 Gulyas, L. Szabo, Gy.
Resonant double electron capture by fast He^{2+} from He : the first-order Born approximation with correct boundary condition
Z. Phys. 29 115 - 119 1994 T
 $He^{2+} + He(1s^2) \rightarrow He(1s^2) + He^{2+}$
first-order Born approx. with correct boundary condition
- 94T32 Homan, D.M. Cavagnaro, M.J. Harmin, D.A.
Charge transfer in ion collisions with circular Rydberg atoms.
Phys. Rev. A 50 R1965 - 1994 T
 $Na^+ + Li(n=25) \rightarrow Na$
classical electron + elementary model
2.5 keV
- 94T33 Horvath, P. Bacchus-Montabone, M.C. McCarroll, R.
Electron capture by state-selected O^{2+} ions from atomic hydrogen.
J. Phys. B 27 3115 - 3127 1994 T
MO
20 eV - 30 keV
cross sections (3P) - 3 x cross sections ($^1D, ^1S$)
- 94T34 Ichihara, A. Shirai, T. Eichler, J.
Radiative electron capture in relativistic atomic collisions.
Phys. Rev. A 49 1875 - 1884 1994 T
 $A^{2+} + e \rightarrow A^{(2-1)+}(K, L)$ ($A=20-100$)
Impulse approx.
10² - 2x10³ MeV/amu
- 94T35 Kabachnik, N.M.
New trends in the study of alignment and orientation in ion-atom collisions.
Nucl. Instr. Meth. B 86 20 - 27 1994 T
a review

- 94T37 Kazansky,A.K. Ostrovsky,V.N.
Orientation effects in charge exchange : probing short-range repulsion by interference patterns.
Phys. Rev. A 50 2273 - 2278 1994 T
 $B^{3+} + He \rightarrow B^{2+}(2p) + He^{+}$
three-state model
- 94T36 Kazansky,A.K. Rorcin,P.
Stabilization of multiple electron capture by the post-collisional increase of angular momentum of Rydberg electrons.
J. Phys. B 27 5537 - 5550 1994 T
 $N^{7+} \rightarrow N^{5+}(nl'n'l') ; Ne^{10+} \rightarrow Ne^{8+}(nl'n'l')$
model calculation
- 94T38 Kimura,M. Dalgarno,A. ChanCranupony,L. Li,Y. Hirsch,G. Buenker,R.J.
Non-radiative and radiative electron capture in collisions of He^{+} ions with C atoms below 1000 eV.
Phys. Rev. A 49 2541 - 2544 1994 T
 $He^{+} + C \rightarrow He + C^{+}(^2D,^2P)$
MO
 $10^{-5} - 10^3$ eV
- 94T40 Kimura,M. Gu,J.P. Li,Y. Hirsch,G. Buenker,R.J.
Comment on "Suppressed electron capture in slow $O^{+}(^4S^{\circ},^4D^{\circ},^4P^{\circ}) - He$ collisions".
Phys. Rev. A 49 3131 - 3133 1994 T
 $O^{+}(^4S,^4D,^4P) + He \rightarrow O(^3P) + He^{+}$
MO
0.6 - 10 keV
- 94T39 Kimura,M. Gu,J.P. Liebermann,H.P. Li,Y. Hirsch,G.H. Buenker,R.J. Dalgarno,A.
Electron capture and excitation in collisions of $O^{+}(^4S,^2D,^2P)$ ions with He atoms and He^{+} ions with O atoms at energies below 10 keV.
Phys. Rev. A 50 4854 - 4858 1994 T
 $O^{+}(^4S,^2P,^2D) + He \rightarrow O ; He^{+} + O(^3P) \rightarrow He + O^{+}(^2P)$
semiclassical/full quantum mechanical MO
0.16 - 9.0 keV
- 94T41 Kuang,J. Chen,Z. Lin,C.D.
A perturbation/close-coupling method for inelastic processes in ion-atom collisions.
J. Phys. B 27 5731 - 5740 1994 T
 $H^{+} + H \rightarrow H + H^{+} ; H^{+} + H^{+}(n)$
perturbation/close-coupling method
20 - 200 keV
also excitation to $H(n=2,3,4)$
- 94T43 Lin,C.D. Toshima,N.
Selectivity of electron capture probabilities on the initial state magnetic quantum numbers in ion-atom collisions.
Z. Phys. D 30 189 - 192 1994 T
 $H^{+} + H(4f) \rightarrow H(4f) + H^{+}$
two-center AO
1, 4 keV/amu
- 94T42 Lin,C.D. Toshima,N. Fritsch,W.
Alignment and orientation in atomic collisions.
Nucl. Instr. Meth. B 86 12 - 19 1994 T
a review
- 94T44 Lundgaard,M.F.V. Toshima,N. Chen,Z. Lin,C.D.
Electron capture from elliptic Rydberg states.
J. Phys. B 27 L611 - 617 1994 T
 $H^{+} + H(n=3,4,5) \rightarrow H ; Ne^{+} + Li(n=25) \rightarrow Na$
Close-coupling method
- 94T45 Lundy,C.J. Olson,R.E. Schultz,D.R. Pascale,J.P.
Coherence parameters for electron capture in $H^{+} + He$ collisions.
J. Phys. B 27 935 - 942 1994 T
 $h^{+} + He \rightarrow H(n=2,3,4) + He^{+}$
CTMC
30 - 250 keV/amu
- 94T47 Macchalm,M. Courtin,C.
Alignment and orientation for charge exchange in $Li^{+} - Na(3s,3p)$ collisions : II. time-dependent outer electron density and current.
J. Phys. B 27 4703 - 4714 1994 T
 $Li^{+} + Na(3p) \rightarrow Li$
semiclassical close-coupling mode
1 - 2 keV

- 94T46 Machtholm, M. Lewartowski, E. Courbin, C.
Alignment and orientation for charge transfer in $\text{Li}^+ - \text{Na}(3s, 3p)$ collisions :
I. differential and total cross sections.
J. Phys. B 27 4681 - 4702 1994 T
 $\text{Li}^+ + \text{Na}(3s3p) \rightarrow \text{Li}(2s, 2p)$
semiclassical close-coupling method
1 - 1.5 keV
- 94T48 Martinez, A.E. Gayet, R. Hanssen, J. Rivarola, R.D.
Thomas two-step mechanisms for double electron transfer
J. Phys. B 27 1375 - 382 1994 T
 $\text{He}^{2+} + \text{He} \rightarrow \text{He}^0 + \text{He}^{2+}$
CDW-EIS approx.
1 - 5 MeV (total) ; 1.5 - 400 MeV (angular distribution)
- 94T49 McCartney, M. Crothers, D.S.F.
Capture via ionization
J. Phys. B 27 1485 - 488 1994 T
 $\text{H}^+ + \text{H} \rightarrow \text{H} + \text{H}^+$
CDW-EIS method
10 - 500 keV
- 94T50 Meng, L. Olson, R.E. Folkerts, H.O. Hoekstra, R.
State-selective electron capture in $\text{He}^{2+} - \text{H}_2$ collisions.
J. Phys. B 27 2269 - 2276 1994 T
 $\text{He}^{2+} + \text{H}_2 \rightarrow \text{He}^+(\text{nl}) + \text{H}_2^+$; $\text{He}^+(\text{nl}) + \text{H}_2^{2+} + e$ ($n=1-6$)
T : CTMC ; E : photon spectroscopy
30 - 200 keV/amu
- 94T51 Micha, D.A. Runge, K.
Time-dependent many-electron approach to slow ion-atom collisions : the coupling
of electronic and nuclear motions.
Phys. Rev. A 50 322 - 336 1994 T
 $\text{H}^+ + \text{H} \rightarrow \text{H}^0 + \text{H}^+$; $\text{He}^{2+} + \text{H} \rightarrow \text{He}^+$
eikonal + time-dependent TDHF
2 - 10^3 eV (H)
- 94T52 Nitikin, E.E. Taulbjerg, K.
Effect of rotational coupling on charge transfer into Coulomb channels.
J.P hys. B 27 2259 - 2268 1994 T
 $\text{Ar}^{8+} + \text{Ne} \rightarrow \text{Ar}^{7+}$
perturbation theory
1 keV
- 94T53 Ostrovsky, V.N.
Asymptotic theory of $s \rightarrow p$ charge exchange : Extended Demkov model.
Phys. Rev. A 49 3740 - 3751 1994 T
 $\text{H}^+ + \text{Na}(3p) \rightarrow \text{H}(n=2) + \text{Na}^+$
extended Demkov model
1 keV/amu
- 94T54 Pradhan, A. Dalgarno, A.
Charge transfer of H^+ with Cl and Cl^+ with H.
Phys. Rev. A 49 960 - 964 1994 T
 $\text{H}^+ + \text{Cl} \rightarrow \text{H} + \text{Cl}^+$
MO
50 - 10^3 K
rate coefficients
- 94T55 Reading, J.F. Ford, A.L. Hall, K.A. Lindroth, E.
A review of some selected two electron processes in ion-atom collisions.
Nucl. Instr. Meth. B 86 38 - 44 1994 T
a review
- 94T56 Roller-Lutz, Z. Höelmann, R. Blum, K. Lutz, H.O.
Angular correlation analysis of non-isotropic atomic collision ensembles.
J. Phys. B 27 2009 - 2019 1994 T
 $\text{H}^+ + \text{Na}(3p) \rightarrow \text{H}(2p) + \text{Na}^+$
- 94T57 Salin, A.
New light on old problems
Ncl. Instr. Meth. B 86 1 - 11 1994 T
a review
- 94T58 Schweinzer, J. Wutte, D. Winter, H.P.
A study of electron capture and excitation processes in collisions of multiply
charged ions with lithium atoms.
J. Phys. B 27 137 - 153 1994 T
 H^+ , He^2 , Li^{3+} , Be^{4+} , $\text{C}^{5+} + \text{Li}(2s; 2p; 3p) \rightarrow \text{H}$, He^+ , Li^{2+} , Be^{3+} , C^{4+}
AO-close-coupling method
1-10 keV/amu
scaling

- 94T59 Tharamel,J. Kharchenko,V.A. Dalgarno,A.
Resonant charge transfer in collisions between positive ions.
Phys. Rev. A 50 496 - 501 1994 T
 $H^+ + H \rightarrow H + H^+$; $He^+ + He \rightarrow He + He^+$; $Li^{2+} + Li^+ \rightarrow Li^+ + Li^+$; $Li^{2+} + Li^+ \rightarrow Li^+ + Li^+$; $Be^{2+} + Be^+ \rightarrow Be^+ + Be^+$; $B^{2+} + B^+ \rightarrow B^+ + B^+$; $C^{2+} + C^+ \rightarrow C^+ + C^+$; $N^{2+} + N^+ \rightarrow N^+ + N^+$; $O^{2+} + O^+ \rightarrow O^+ + O^+$
semiclassical treatment
 10^{-10^4} eV
scaling laws
Thurman,U.
94T60 Charge exchange and electron emission in slow collisions of highly charged ions with C_{60} .
J. Phys. B 27 3515 - 3532 1994 T
 $Ar^{20+} + C_{60} \rightarrow Ar^{17+}$
semiclassical over-barrier model
80 keV
Toshima,N.
94T61 Ionization and charge transfer of atomic hydrogen in collisions with multiply charged ions.
Phys. Rev. A 50 3940 - 3947 1994 T
 $A^{Z+} + H \rightarrow A^{(Z-1)+}$ (A=He, Li, Be, C, N, O)
AO close-coupling method
1 - 400 keV/amu
also ionization and excitation of H
Toshima,N.
94T62 Unexpected large contribution of C^{2+} deep bound states in $C^{6+} + H$ collisions.
J. Phys. B 27 L49 - L54 1994 T
 $C^{6+} + H \rightarrow C^{3+} + H^+$
close-coupling AO
1 - 200 keV/amu
also $C^{6+} + H^+ + e$
Toshima,N. Lin,C.D.
94T63 Dependence of electron capture probabilities on the initial-state magnetic quantum number in ion-atom collisions.
Phys. Rev. A 49 397 - 401 1994 T
 $H^+ + H(4f_{m_l})$; $m_l = -3, -2, -1, 1, 2, 3 \rightarrow H$
CC, CTMC
0.05 - 0.4 a.u.
- 94T65 van der Hart,H.W.
Radiative stabilization in double electron capture to $4l4l'$ states in O^{6+} .
J. Phys. B 27 3489 - 3514 1994 T
 $O^{8+} + Ar \rightarrow O^{6+}(4l4l'; 4l5l')$
truncated diagonalization method
- 94T64 van der Hart,H.W. Hansen,J.E.
The importance of the ATR effect for radiative stabilization in double electron capture.
J. Phys. B 27 L395 - 400 1994 T
 $N^{7+} \rightarrow N^{5+}(nln'l')$; $n=3,4$
- 94T66 van der Kamp,A.B. Los,J. van der Zande,W.J. Sidis,V.
Theoretical study of charge exchange collisions between O_2^{2+} molecular ions and alkali atoms.
Chem. Phys. 179 165 - 178 1994 T
 $O_2^{2+} + C, K, Na \rightarrow O_2^+(n)$
semi-classical MCA
12 keV
 $n = 3, 4$: most dominant
Wang,J. Olson,R.E.
94T67 Dominance of the Thomas mechanism for electron capture from oriented Rydberg atoms.
Phys. Rev. Letters 72 332 - 335 1994 T
 $H^+ + H(n=25) \rightarrow H(\theta)$
CTMC
37.5 keV/amu
double Thomas peak
Winter,T.G.
94T68 Coupled-state differential cross sections for electron transfer and elastic scattering in collisions between and He^+ ions.
Phys. Rev. A 49 1767 - 1773 1994 T
 $H^+ + He^+(1s) \rightarrow H + He^{2+}$
trophe-center AO + Sturmian-pseudo state approx.
4 - 25 keV/amu (c.m.)

95E1	Allen, J.S., X. D. Fang, A. Sen, R. Matulioniene and T. J. Kvale Double electron detachment cross sections in intermediate-energy H plus noble - gas collisions Phys. Rev. A 52 357 - 63 1995 $H^+ + B \rightarrow H^+(B=He, Ne, Ar)$ E : growth method 3 - 50 keV	95E64	Cisneros, C. de Urguijo, J. Alvarez, I. Aguilar, A. Juarez, A.M. Martinez, H. Electron capture collision processes involving multiply-charged Si, Ni, Ti, Mo and W ions with H, H ₂ and He targets Suppl. Nucl. Fusion 6 247-261 1995 $Si^{q+}(q=2,14) + H \rightarrow Si^{q+}; Si^{q+}(q=2,9) + H_2 \rightarrow Si^{q+}; Si^{q+}(q=4,8,11,13,14) + He \rightarrow Si^{q+}; Ti^{q+}(q=2,22) + H \rightarrow Ti^{q+}; Ti^{q+}(q=2,4) + H_2 \rightarrow Ti^{q+}; Ti^{q+}(q=4) + He \rightarrow Ti^{q+}; Ni^{q+}(q=4,13,15,28) + H \rightarrow Ni^{q+}; Mo^{q+}(q=3-30,42) + H \rightarrow Mo^{q+}; Mo^{q+}(q=4-18) + H_2 \rightarrow Mo^{q+}; W^{q+}(q=3-30,74) + H \rightarrow W^{q+}; W^{q+}(q=4-15) + H_2 \rightarrow W^{q+}$
95E2	Bordenave-Montesquieu, D. and R. Dagnac Differential cross sections for single-electron capture in He ²⁺ - D collisions J. Phys. B 28 2181 - 92 1995 $He^{2+} + D \rightarrow He^+(n=2, 3)$ E : translational energy spectroscopy 4, 6, 8 keV/amu	95E7	DePaola, B.D., M. T. Huang, S. Winecki, M. P. Stockli, Y. Kanai, S. R. Lundeen, C. W. Fehrenbach and S. A. Arko Absolute cross sections for charge capture from Rydberg targets by slow highly charged ions Phys. Rev. A 52 2136 - 140 1995 $Xe^{8+}(q=8, 16, 32, 40) + Rb^+(10f) \rightarrow Xe^{(q-1)+}$ E : laser-excited target technique 0.25 - 9 keV/amu
95E3	Brandau, C. F. Melchert, S. Krüdener, S. Meuser, A. Pfeiffer, K. V. Diemar, T. Bartsch, E. Salzborn, D. B. Uskov, A. D. Ulansev and L. P. Presnyakov Quasi-resonant charge exchange between carbon and boron ions J. Phys. B 28 1579 - 84 1995 $C^{2+} + B^+ \rightarrow C^+ + B^{2+}$ $B^{2+} + C^+ \rightarrow B^+ + C^{2+}$ E : crossed beam technique 1.3 - 160 keV (c.m.)	95E8	Dmitriev, I.S., Ya. A. Toplova and Yu. A. Fainberg An experimental study of single electron loss cross sections for hydrogen atoms and negative hydrogen ions in various media JETP 80 28 - 31 (1995) $H + B \rightarrow H^+; H^+ + B \rightarrow H^0(B=H_2, He, N_2, Ne, Ar, Xe)$ E : growth method 0.3, 0.7 MeV
94E4	Bruckmeier, R., Ch. Wunderlich and H. Figger Enhanced charge transfer to molecular ions by electronic excitation of the target Phys. Rev. A 52 334 - 41 1995 $A^+ + Cs(6^2P_{3/2}) \rightarrow A(A=ArH, ArD, D_3)$ E : laser-excited target method 15 keV	95E9	Dressler, R.A., S. T. Arnold and E. Murad Charge transfer dynamics in ion-poly atomic molecule collisions : $X^+ + H_2O(X = N, Kr)$ luminescence study J. Chem. Phys. 103 9989 - 10000 1995 $A^+ + H_2O(v_l = 0) \rightarrow A + H_2O^+(A : v_l = 7-13) (A = N, Kr)$ E : photon spectroscopy 0.4-130 eV
95E5	Cederquist, H. C. Biedermann, N. Selberg and P. Hvelplund Measurements of translational energy gain for one- and two-electron transfer in slow $Ar^{q+}(q=15-18)$ collisions Phys. Rev. A 51 2169 - 78 1995 $Ar^{q+}(q=15,16,17,18) + He \rightarrow Ar^{(q-1)+}(n), Ar^{(q-2)+}(n, n')$ E : translational energy gain spectroscopy 3.35 keV $\times$ q	95E65	Druetta, M. Hitz, D. Jettikant, B. Charge exchange collisions of multi-charged $Ar^{q+}, Kr^{q+}, Fe^{q+}$ and Ni^{q+} ions with He and H_2 Suppl. Nucl. Fusion 6 225-246 1995 $Ar^{q+} + H_2, He \rightarrow Ar^{q+}; Kr^{q+} + H_2, He; Fe^{q+} + He \rightarrow Fe^{q+}; Fe^{q+} + H_2, He \rightarrow Fe^{q+}; Ni^{q+} + H_2 \rightarrow Ni^{q+}$ photon spectroscopy 50-60 keV (Ar) ; 90-100 keV (Kr) ; 105-120 keV (Fe) ; 340 keV (Ni)
95E6	Cederquist, H. C. Biedermann, N. Selberg and P. Hvelplund Oscillations in mean capture Q - values as functions of the projectile charge in slow $Xe^{q+} - He(q=25-44)$ collisions Phys. Rev. A 51 2191 - 98 1995 $Xe^{q+} + He \rightarrow Xe^{(q-1)+}(q=25-44)$ E : translational energy spectroscopy 3.4 keV $\times$ q q=25-31, 33, 35-37, 39-44		

- 95E10 Fang, Z. and V. H. S. Kwong
Charge transfer between the $2p^2\ ^3P$ ground state O^{2+} ion and He, H_2 , N_2 and CO at electron-volt energies
Phys. Rev. A 51 1321 - 26 1995
 $O^{2+} + B \rightarrow O^+(B=He, H_2, N_2, CO)$
E : ion-trap technique
2.5 eV
- 95E11 Folkerts, L. M. A., Haque, C. C., Harvener, N., Shimakura and M. Kimura
Low-energy electron capture by N^{4+} ions from H atoms : experimental study using merged beam and theoretical analysis by molecular representation
Phys. Rev. A 51 3685 - 92 1995
 $N^{4+} + D(1s) \rightarrow N^{3+}$
E : merged beam technique
1-300 eV/amu
- 95E12 Forest, J.L., J. A. Tanis, S. M. Ferguson, R. R. Haar, K. Lifrieri and V. L. Plano
Single and double ionization of helium by intermediate-to-high velocity He^+ projectiles
Phys. Rev. A 52 350 - 56 1995
 $He^+ + He \rightarrow He + He^+, He + He^{2+} + e$
E : projectile-recoil ion coincidence technique
0.125 - 3.0 MeV/amu
also $He^+ + He \rightarrow He^{2+}$
- 95E67 Gilbody, H.B.
Charge transfer and ionization studies involving metallic species
Suppl. Nucl. Fusion 6 197-212 1995
 $Al^{1+} + H \rightarrow Al^+; Fe^{4+} + H, He \rightarrow Fe^{3+}; H^+ + Fe, Cu \rightarrow H^+; He^+ + Fe, Cu \rightarrow He^+$
data compilation and ionization
- 95E13 Glosser, J., A. Hagedorn, U. Herne, M. Izziok and T. Simonides
Partial differential cross sections for inelastic $He^+ + Ne$ collisions at low energy
Z. Phys. D 35 93 - 100 1995
 $He^+(1s) + Ne \rightarrow He(1s2s)$
E : energy-loss spectroscopy
100 - 200 eV
- 95E14 Gosselin, A., D. Hennecart, X. Husson, H. Kucal, D. Lecler, A. Lepoutre, A. Cassimi, J. P. Grandin, P. Jardin and C. Adjouri
Partial and total cross sections for single electron capture by Ar^{2+} from He in the 400 - 2400 eV energy range
J. Phys. B 28 445-56 1995
 $Ar^{2+} + He \rightarrow Ar^{2+}$ (total, 4d, 4f, 5s, 5p)
E : translational energy spectroscopy + retardation technique
400 - 2400 eV
- 95E15 Havener, C.C., A. Muller, P. A. Zeijlman van Ernichoven and R. A. Phaneuf
Low-energy electron capture by C^{3+} from hydrogen using merged beams
Phys. Rev. A 51 2982 - 88 1995
 $C^{3+} + D \rightarrow C^{2+}$ (total)
E : merged beam technique
0.26 - 2700 eV/amu
- 95E16 Hayton, D.A. and B. Peart
Merged beam measurements of the mutual neutralization of He^+O^- and Na^+O^- ions
J. Phys. B 28 L279 - 83 1995
 $He^+ + O^- \rightarrow He + O$
 $Na^+ + O^- \rightarrow Na + O$
E : merged beam technique
1.2 - 500 eV (He^+) ; 0.6 - 30 eV (Na^+)
- 95E17 Heber, O., G. Sampaoli, B. B. Bandoo, R. J. Maurel, R. L. Watson, I. Ben - Izhak, J. M. Sanders, J. L. Shinnpaugh and P. Richard
Multiple-electron ionization, capture and loss by 19 MeV F^{9+} ($q=2-9$) in collisions with Ne and Ar.
Phys. Rev. A 52 4578 - 85 1995
 $F^{9+}(q=4-9) + Ne, Ar \rightarrow F^{q-1+}; F^{9+}(q=6-9) + Ne, Ar \rightarrow F^{q-2+}; F^{9+}(q=2-8) + Ne, Ar \rightarrow F^{q-1+}; F^{9+}(q=2-6) + Ne, Ar \rightarrow F^{q-2+}$
E : projectile-recoil ion coincidence technique
19 MeV
- 95E18 Hodgkinson, J.M., T. K. McLaughlin, R. W. McCullough, J. Geddes and H. B. Gilbody
Importance of dissociative excitation by slow He^{2+} ions in one-electron capture collisions with H_2
J. Phys. B 28 L393 - 97 1995
 $He^{2+} + H_2 \rightarrow He^+(1s) + H^+ + H(2l); He^+(2l) + H_2^+$
E : translational energy spectroscopy
0.5 - 2.0 keV/amu
- 95E19 Hoekstra, R.
Line emission from collisions of multiply charged ions on He and Li for charge exchange spectroscopy diagnostics at tokamaks
Comm. At. Mol. Phys. 30 361 - 79 1995
 $He^{2+} + B \rightarrow He^+(4l) (B = H, H_2, He, Li, Na)$
 $A^{2+} + Li \rightarrow A^+(7l) (A = B, N, C)$
evaluated cross sections
1 - 10^3 keV/amu
- 95E66 Hoekstra, R., Beijers, J.M.P., Bliok, F.W., Schippers, S., Morgenstern, R.
Fusion-related experiments with medium-z multiply charged ions
Suppl. Nucl. Fusion 6 213-223 1995
 $He^{2+} + Na \rightarrow He^+; B^{2+}, C^{2+} + Li \rightarrow B^+, C^+; N^{2+} + He, Li \rightarrow N^+; N^{2+} + Li \rightarrow N^+; O^{2+} + He \rightarrow O^+; O^{2+} + Li \rightarrow O^+$
1-25 keV/amu (He) ; 1-10 keV/amu (B, C) ; 0.05-10 keV/amu (N) ; 0.1-10 keV/amu (O)

95E20	Itoh,A. N. Inanishi, F. Fukuzawa, N. Hanamoto, S. Hanawa, T. Tanaka, T. Ohdaira, M. Saito, Y. Haruyama and T. Shirai Single-, double- and triple-electron capture cross sections for multicharged slow carbon ions in H ₂ , CH ₄ , C ₂ H ₆ , C ₃ H ₈ and CO ₂ molecules J. Phys. Soc. Japan 64 3255-64 1995 C ³⁺ + B → C ⁰ ; C ³⁺ + B → C ¹⁺ , C ⁰ ; C ³⁺ + B → C ²⁺ , C ¹⁺ , C ⁰ (B=H ₂ , CH ₄ , C ₂ H ₆ , C ₃ H ₈ , CO ₂); C ⁴⁺ + H ² → C ³⁺ , C ²⁺ E : recoil ion beam 6.3 - 16.3 keV	95E24	Kandler,T. Th. Stöhlker, P. H. Mokler, C. Kozhuharov, H. Geisel, C. Scheidenberger, P. Rymuza, Z. Stachura, A. Warczak, R. W. Dunford, J. Eichler, A. Ichihara and T. Shirai Photon angular distribution of radiative electron capture into the M shell of He-like uranium ions at 110-140 MeV/u Z. Phys. D 35 15-18 1995 U ⁹⁰⁺ + C (foil) → U ⁸⁹⁺ (1s ² nl : n = 2,3) E : photon spectroscopy 110 - 140 MeV/amu
95E22	Jacquet,E. J. Pascale, P. Boduch, M. Chantepie, M. Druetta, D. Leder and M. Wilson New investigations of near UV and visible photon emission resulting from 60 keV C ⁴⁺ -Li collisions Phys. Scripta 51 64-68 1995 C ⁴⁺ (1s ² , 1s2s) + Li → C ³⁺ (1s ² nl ; n = 5-9) E : photon spectroscopy 60 keV transition energies determined	95E26	Khemliche,H. M. H. Prior and D. Schneider Complex subsite amplitudes formed in double electron capture Phys. Rev. Letters 74 5013 - 5016 1995 C ³⁺ + He → C ²⁺ [1s (2s2p ¹ P) ² P ; 1s2p ² ² D] E : Auger electron spectroscopy 25 keV
95E21	Jacquet,E. J. Pascale, P. Boduch, M. Chantepie and D. Leder Velocity and core-electron effects in state-selective electron capture following Ar ²⁺ + Li collisions J. Phys. B 28 2221 - 31 1995 Ar ²⁺ + Li → Ar ²⁺ (nl ; n = 8-11) E : photon spectroscopy 1.5 - 4.5 keV/amu	95E27	Kimura,M. N. Nakamura, H. Watanabe, I. Yamada, A. Darjo, K. Hosaka, A. Matsumoto, S. Ohtani, H. Sakaue, M. Sakurai, H. Tawara and M. Yoshino A scaling law of cross sections for multiple electron transfer in slow collisions between highly charged ions and atoms J. Phys. B 28 1643 - 47 1995 scaling law
95E23	Kambara,T. J. Z. Tang, Y. Awaya, B. D. DePaola, O. Jazutski, Y. Kanai, M. Kimura, T. M. Kojima, V. Mergel, Y. Nakai, H. W. Schmidt-Böcking and I. Shimamura Three-dimensional recoil ion momentum analyses in 8.17 MeV O ⁷⁺ - H ₂ collisions J. Phys. B 28 4593-606 1995 O ⁷⁺ + He → O ⁶⁺ + He ⁺ ; O ⁶⁺ + He ²⁺ E : recoil momentum spectroscopy 8.17 MeV	95E28	Kravis,K. H. Saitoh, K. Okuno, K. Saejima, M. Kimura, I. Shimamura, Y. Awaya, Y. Kaneko, M. Oura and N. Shimakura Single and double charge exchange cross sections for Ar ^{q+} + H ₂ (q=6,7,8,9,11) collisions from 6 eV to 11 keV Phys. Rev. A 52 1206 - 12 1995 Ar ^{q+} (q= 6-9,11) + H ₂ → Ar ^{q-1+} , Ar ^{q-2+} E : OPIG technique 6 eV - 11 keV
95E25	Kandler,T. P. H. Mokler, Th. Stöhlker, H. Geissel, H. Irnich, Ch. Kozhuharov, A. Kriesbach, M. Kucharski, G. Munzenberg, F. Nickel, P. Rymuza, C. Scheidenberger, Z. Stachura, T. Suzuki, A. Warczak, D. Dauvergne and R. W. Dunford Transition selective investigation of the resonant transfer and excitation in U ⁹⁰⁺ → C collisions Phys. Letters A 204 274 - 80 1995 U ⁹⁰⁺ + C → U ⁸⁹⁺ (1s ² 2l'nl ^{n'}) E : X-ray-projectile coincidence technique 105 - 140 MeV/amu	95E30	Kvale,T.J. J. S. Allen, A. Sen, X. D. Fang and R. Matulioniene Curvature in the scattered-beam growth curves in H ⁺ + (He, Ne, Ar) collisions Phys. Rev. A 51 1360 - 66 1995 H ⁺ + He, Ne, Ar → H ⁰ , H ⁺ E : growth method 3 - 50 keV
		95E29	Kvale,T.J. J. S. Allen, X. D. Fang, A. Sen and R. Matulioniene Single-electron detachment cross sections for 5-50 keV H ⁺ ions incident on He, Ne and Ar atoms Phys. Rev. A 51 1351 - 59 1995 H ⁺ + He, Ne, Ar → H ⁰ E : growth method 3 - 50 keV

- 95E31
Larsson, M.O. A. M. Gonzalez, R. Hallin, F. Heijkenkjold, R. Hutton, A. Langerais, B. Nystrom, G. O'Sullivan and A. Wannstrom
Wave lengths and energy levels of Xe VII and Xe VIII obtained by collision-based spectroscopy
Phys. Scripta 51 69 - 75 1995
 $\text{Xe}^{8+} + \text{He}, \text{Ar} \rightarrow \text{Xe}^{(q-1)+}$
E : photon spectroscopy
10 keV $\times$ q
- 95E32
Laulhe, C. E. Jacquet, G. Cremer, J. Pascale, P. Boduch, G. Rieger, D. Lecler, M. Chantepie and J. L. Cojan
Polarization of lines emitted after electron capture into Ar^{7+} (nlm) sub levels during 80 keV Ar^{8+} - Li collisions
Phys. Rev. A 52 3803 - 808 1995
 $\text{Ar}^{8+} + \text{Li} \rightarrow \text{Ar}^{7+}(\text{nlm}; n=8, 9)$
E : photon spectroscopy
80 keV
- 95E34
MacAdam, K.B. J. C. Day, J. C. Aquilar, D. M. Homan, A. D. MacKellar and N. J. Cavagnero
Transient molecular-ion formation in Rydberg electron capture
Phys. Rev. Letters 75 1723 - 26 1995
 $\text{K}^+ + \text{Na}(24d, 25s) \rightarrow \text{K}$
E : laser-excited target
- 95E33
Martin, S. J. Bernard, L. Chen, A. Denis and J. Desesquelles
Stabilized double electron capture in Ne^{10+} - He collisions : velocity dependence of Rydberg-electron (n, l) distributions
Phys. Rev. A 52 1218 - 23 1995
 $\text{Ne}^{10+} + \text{He} \rightarrow \text{Ne}^{8+}, \text{Ne}^{8*}$
E : photon spectroscopy + recoil ion coincidence
0.9 - 9 keV/amu
- 95E68
Martinez, H. Fuentes, B.E. Alvarez, I. Cisneros, C. de Urquijo, J.
Single and double electron capture in H^+ on Kr collisions at low-keV energies
Chem. Phys. 190 139 - 143 1995
 $\text{H}^+ + \text{Kr} \rightarrow \text{H}^0, \text{H}$
differential and total cross sections
1 - 5 keV
- 95E37
Melchert, F. M. Benner, S. Kridener, R. Schulze, S. Meuser, K. Huber, E. Salzborn, D. R. Uskov and L. P. Presnyakov
Neutralization of H in energetic collisions with multiply charged ions
Phys. Rev. Letters 74 888 - 91 1995
 $\text{H}^+ + \text{Ne}^{6+}(q=1-4), \text{Ar}^{7+}(q=1-8), \text{Xe}^{8+}(q=1-8) \rightarrow \text{H}^0$
E : crossed beam technique
20 - 200 keV (c.m.)
- 95E36
Melchert, F. R. Schulze, S. Kridener, S. Meuser, E. Salzborn, D. B. Uskov, A. D. Ulanisev and L. P. Presnyakov
Single- and double-electron detachment in collisions of two negative hydrogen ions
J. Phys. B 28 3299 - 308 1995
 $\text{H}^- + \text{H}^- \rightarrow \text{H}^0, \text{H}^+$
E : crossed beam technique
0.15 - 300 keV
- 95E35
Melchert, F. S. Kridener, R. Schulze, S. Petri, S. Pfaff and E. Salzborn
Measurements of resonant charge transfer in He^{2+} - He^+ collisions
J. Phys. B 28 L355 - 59 1995
 $\text{He}^{2+} + \text{He}^+ \rightarrow \text{He}^+ + \text{He}^{2+}$
E : crossed beam technique
4 - 200 keV
- 95E38
Mergel, V. R. Dörner, J. Ullrich, O. Jaguzki, S. Lencinas, S. Nüttgens, L. Spielberger, M. Unverzagt, C. L. Cocke, R. E. Olson, M. Schulz, U. Buck, E. Zanger, W. Theisinger, M. Isser, S. Gais and H. Schmidt-Böcking
State-selective scattering angle dependent capture cross sections measured by cold target recoil ion momentum spectroscopy
Phys. Rev. Letters 74 2200 - 03 1995
 $\text{He}^{2+} + \text{He} \rightarrow \text{He}^+(n) + \text{He}^+(n')$
E : recoil ion momentum spectroscopy
0.25 - 1.0 MeV
- 95E39
Mokler, P.H. Th. Stöhlker, C. Kozhuharov, R. Moshhammer, P. Rymuza, Z. Stachura and A. Warczak
Doppler-shift assisted fast-ion spectroscopy : a case study for X-ray emissions from 277 MeV/u Pb^{81+} ions
J. Phys. B 28 617 - 29 1995
 $\text{Pb}^{81+} + \text{N}_2 \rightarrow \text{Pb}^{80+} + \text{REC}$
E : Doppler-shift spectrometer
277 MeV/u
- 95E40
Mokler, P.H. Th. Stöhlker, R. W. Dunford, A. Gallus, T. Kandler, G. Menzel, H. T. Prinz, P. Rymuza, Z. Stachura, P. Swiat and A. Warczak
The X-ray spectrum of H-like uranium
Z. Phys. D 35 77 - 80 1995
 $\text{U}^{92+} + \text{N}_2 \rightarrow \text{U}^{91+}(n; n=1-6)$
E : photon spectroscopy
49 MeV/amu

- 95E41 Muller, U. H. A. J. Meijer, N. C. R. Halme, M. Kmit, J. H. V. Lauritsen, J. O. P. Pedersen, C. Richter, J. W. Thomsen, N. Andersen and S. E. Nielsen
Orbital alignment dependence of electron capture cross sections I: $H^+ + Na(3p)$ near the matching velocity
Z. Phys. D 33 187 - 96 1995
 $H^+ + Na(3p) \rightarrow H(n=1-4)$
E: laser-excited target technique
0.5 - 15 keV/amu
- 95E42 Nakamura, N., F. J. Currell, A. Danjo, M. Kimura, A. Matsumoto, S. Ohnari, H. Sakaue, M. Sakurai, H. Tawara, H. Watanabe, I. Yamada and M. Yoshino
Target dependence of multi-electron processes in $H^+(q=10, 15) +$ rare gas (Ne, Ar, Kr, Xe) collisions
J. Phys. B 28 2959 - 72 1995
 $H^+(q=10, 15) + B \rightarrow I^{q,p+1} + B^+(j=1-5)$ (B=Ne, Ar, Kr, Xe)
E: projectile-recoil ion coincidence technique
1.5 keV $\times$ q
- 95E43 Nakamura, N., H. Ida, Y. Matsui, K. Wakiya, T. Takayanagi, M. Koide, F. J. Currell, S. Kitazawa, H. Suzuki, S. Ohnari, U. I. Safronova and M. Sekiguchi
Electron spectra from singlet and triplet states of $O^+(1s^2 313^1; 1s^2 314^1)$ produced by 60 and 120 keV $O^{6+} + He, Ne, Ar$ collisions
J. Phys. B 28 4743 - 58 1995
 $O^{6+} + He, Ne, Ar \rightarrow O^{+}(1s^2 n1n'1')$
E: electron spectroscopy
60, 120 keV
- 95E44 Pesnelle, A. R. Trainham, J. Pascale, E. Monnard and H. J. Andr 
Very high Kr^{2+} Rydberg states after electron capture from laser-excited $Rb^+(17p)$ atoms into Kp^{2+}
Phys. Rev. Letters 74 4169 - 72 1995
 $Kp^{2+} + Rb^+(17p) \rightarrow Kr^{2+}(n=70-110)$
E: laser-excited target technique
18, 40 keV
- 95E45 Radchenko, V. I. and G. D. Vedmanov
Scattering of hydrogen ions and atoms in gases
JETP 80 1 - 9 1995
 $H^0 + B \rightarrow H^+; H^+ + B \rightarrow H^0, H^+(B = He, Ar, Kr, Xe, H_2, O_2, CO_2, C_2H_2)$
E: scattering technique
1.67 - 14.9 MeV
- 95E46 Raphaelian, M. L. A., M. P. Stockli, W. Wu and C. L. Cocke
Energy-transfer processes during $Xe^{30+} - Ar$ collisions for projectile velocities between 0.3 and 1.0 a.u.
Phys. Rev. A 51 1304 - 10 1995
 $Xe^{30+} + Ar \rightarrow Xe^{30-q+n+} + Ar^{q+} + ne$
E: projectile-recoil ion coincidence technique
2.5 - 25 keV/amu
- 95E47 Rieger, G. P. Boduch, M. Chantepie, E. Jacquet, D. Leder and J. Pascale
Electron capture into $N^{+}(1s^2 nl)$ subshells during $N^{3+} + Li$ collisions at 40 - 120 keV
J. Phys. B 28 2689 - 70 1995
 $N^{3+}(1s^2) + Li \rightarrow N^{+}(1s^2 nl)$
E: photon spectroscopy
40 - 120 keV
- 95E48 Saito, M., Y. Haruyama, N. Hamamoto, K. Yoshida, A. Itoh and N. Imanishi
Production cross sections of recoil ions in coincidence with final charge states of 2 MeV C^{6+} projectiles
J. Phys. B 28 5117 - 26 1995
 $C^{6+} + Ar \rightarrow C^{2+}, C^{+}$
E: projectile-recoil ion coincidence
3 MeV
- 95E49 Schippers, S. P. Boduch, J. van Buchem, F. W. Bielek, R. Holkstra, R. Morgenstern and R. E. Olson
Polarized light emission in keV $He^{2+} + Na(3s)$ collisions
J. Phys. B 28 3271 - 82 1995
 $He^{2+} + Na(3s) \rightarrow He^{+}(n=4) + Na^{+}$
E: photon spectroscopy
2 - 13.3 keV/amu
 $n = 4 \rightarrow 3$ transition
- 95E50 Schwarz, U. F. Linder and K. Rohr
Cross sections for the interaction of multiply charged Ta and Ti ions with H_2 and He at low energies
J. Phys. B 28 839 - 44 1995
 $Ta^{q+}(q = 3, 4, 5) + H_2 \rightarrow Ta^{(q-1)+}$
 $Ti^{q+}(q = 3, 4) + H_2 \rightarrow Ti^{(q-1)+}; Ti^{q+}(q = 2, 3) + He \rightarrow Ti^{(q-1)+}$
E: laser-plasma source + retarding method
1-30 eV/amu
- 95E52 Seifert, N. N. D. Gibson and J. S. Risley
Experimental determination of the real elements of the density matrix of $H(n=3)$ atoms produced in 20 - 100 keV collisions of H^+ on Kr
Phys. Rev. A 52 3816 - 23 1995
 $H^+ + Kr \rightarrow H(n=3)$
E: photon spectroscopy
20 - 100 keV
- 95E51 Seifert, N. N. D. Gibson, S. P. Renwick and J. S. Risley
On the formation of $H(n=3)$ dipole moments in collisions of protons on rare gas atoms
Z. Phys. D 35 231 - 33 1995
 $H^+ + He, Ar, Kr \rightarrow H(n=3)$
E: optical spectroscopy
20 - 100 keV

95E53	Shah, M.B., C. J. Patton, M. A. Bolorizadeh, J. Geddes and H. B. Gilbody Electron capture and transfer ionization in collisions of fast H^+ and He^{2+} ions with Cu atoms J. Phys. B 28 1821 - 33 1995 $H^+ + Cu \rightarrow H + Cu^{q+}$ ($q=1-5$); $He^{2+} + Cu \rightarrow He^+ + Cu^{q+}$, $He + Cu^{q+}$ ($q=1-7$) E : crossed beam technique + coincidence 70 - 720 keV/amu (H^+) ; 35 - 360 keV/amu (He^{2+})	95E58	Uiterwaal, C.J.G.J., J. van Eck and A. Niehaus State-selected ion-molecule reactions : charge transfer and atomic rearrangement processes in thermal energy collisions of $H_2^+(X;v) + N_2$ and of $N_2^+(X,A;v) + H_2$ J. Chem. Phys. 102 744 - 53 1995 $H_2^+(X;v) + N_2 \rightarrow H_2 + N_2^+$ $N_2^+(X,A;v) + H_2 \rightarrow N_2 + H_2^+$ E : PEPICO thermal energies		
95E54	Shen, H., P. Hvelplund, D. Mathur, A. Barany, H. Cederquist, N. Selberg and D. C. Lorents Fullerene-fullerene collisions : fragmentation and electron capture Phys. Rev. A 52 3847 - 51 1995 $C_{60}^+, C_{70}^+ + C_{60}, Xe \rightarrow C_{60}, C_{70}^+ ; C_{60}^{2+}, C_{70}^{2+} + C_{60}, Xe \rightarrow C_{60}^+, C_{70}^+ ; C_{70}^{3+} + C_{60}, Xe \rightarrow C_{70}^{2+}, C_{70}^+$ 100 keV	95E59	Wilkins, A.C.R., A.R. Lee and A.G. Brenton State-selective double-electron capture processes by Xe^{3+} and Kr^{3+} J. Phys. B 28 1015 - 21 1995 $Kr^{3+} + Ar \rightarrow Kr^+ ; Xe^{3+} + Ar, Kr \rightarrow Xe^+ + Ar^{2+}, Kr^{2+}$ E : translational energy spectroscopy 6 keV		
95E55	Stöhlker, Th., C. Kozhuharov, P. H. Mokler, A. Wareczak, F. Bosch, H. Geissel, R. Moshammer, C. Scheidenberger, J. Eichler, A. Ichihara, T. Shirai, Z. Stachura and P. Rymuza Radiative electron capture studied in relativistic heavy ion-atom collisions Phys. Rev. A 51 2098 - 111 1995 $Au^{78+}, Au^{79+} + B \rightarrow Au^{77+}, Au^{78+} ; Pb^{82+} + N_2 \rightarrow Pb^{80+}, Pb^{81+} ; Bi^{82+}, Bi^{83+} + C \rightarrow Bi^{81+}, Bi^{82+} ; U^{91+}, U^{92+} + Be, C, N_2, Ar \rightarrow U^{90+}, U^{91+}$ E : photon spectroscopy + coincidence technique 100 - 1000 MeV/amu	95E60	Wu, W., K.L. Wong, C.L. Cocke, J.P. Giese and E.C. Montenegro Recoil longitudinal momentum and Q-value measurements in electron-capture processes of fast multiply charged ions colliding with He Phys. Rev. A 51 3718 - 25 1995 $O^{7+}, F^{8+} + He \rightarrow O^{6+}(1snl), F^{7+}(1snl)$ ($n=1, 2$) E : projectile-recoil ion coincidence spectroscopy 0.6 - 3.7 MeV/amu		
95E56	Thomsen, J.W., N. Andersen, D. Doweck, J. C. Houver, M. O. Larsson, J. H. V. Lauritsen, U. Müller, J. O. P. Pedersen, J. Salgado and A. Svensson Orbital alignment dependence of electron transfer cross sections II. 1 - 15 keV He^+ - Na (3p) collisions J. Phys. B 28 L93 - 99 1995 $He^+ + Na(3s, 3p) \rightarrow He^0(2l)$ E : TOF 1 - 15 keV	95E61	Yamada, I., F. J. Currel, A. Danjo, M. Kimura, A. Matsumoto, N. Nakamura, S. Ohnari, H. Sakae, M. Sakurai, H. Tawara, H. Watanabe and M. Yoshino Decay of multiply excited Rydberg ions produced in I^{10+} - rare gas collisions J. Phys. B 28 L9 - 13 1995 $I^{10+} + B \rightarrow I^{q+}$ ($q=9-5$) ($B=Ne, Ar, Kr, Xe$) E : projectile-recoil ion coincidence technique 15 keV		
95E57	Tribedi, L.C., V. Nanal, M. B. Kurup, K. G. Prasad and P. N. Tandon Radiative electron capture by bare and H-like Si and Cl ions using the channeling technique and the associated solid-state effect Phys. Rev. A 51 1312 - 20 1995 $Si^{13+}, Si^{14+} + Si \rightarrow Si^{12+}, Si^{13+} ; Cl^{16+}, Cl^{17+} + Si \rightarrow Cl^{15+}, Cl^{16+}$ E : photon spectroscopy 2 - 5 MeV/amu	95E62	Yu, Y.C., H. L. Sun, J. L. Duggan, F. D. McDaniel, J. Y. Yin and G. Lapicki Charge-state dependence of M-shell X-ray production in Ho by 2 - 12 MeV carbon ions Phys. Rev. A 52 3836 - 46 1995 C^{q+} ($q=5,6$) + Ho $\rightarrow C^{q-1+}$ ($n=3$) E : X-ray spectroscopy 4 - 12 MeV	95E63	Zaharakis, K.E., R. R. Haer, O. Woitke, M. Zhu and J. A. Janis Recombination in $Kr^{34+} + H_2$ collisions Phys. Rev. A 52 2910 - 14 1995 $Kr^{34+} + H_2 \rightarrow Kr^{33+}$ E : X-ray-projectile coincidence method 37.2 - 47.5 MeV/amu REC cross sections at 90

95T1	Alston,S. Comparison of eikonal and multiple-scattering representations of internuclear scattering in charge transfer at forward angles Phys. Rev. A 52 3860 - 67 1995 $H^+ + H \rightarrow H$ $H^+ + He \rightarrow H$ T : 2nd order Faddeev representation 0.6 - 2.5 MeV (H) ; 1.8 - 7.1 MeV (He) scattering distributions	95T7	Chaudhuri, C. S. Sanjay and T. K. Rai - Dastidar Theoretical study of single and double charge transfer in He^{2+} - He collisions at kilo-electron-volt energies in a diabatic molecular representation Phys. Rev. A 52 1137 - 42 1995 $He^{2+} + He \rightarrow He^+$ (total, 2s, 2p), He^0 T : diabatic MO 1.0 - 25 keV/amu target excitation to $He^+(2p)$
95T3	Alston,S. K-shell electron capture from negative ions J. Phys. B 28 5127 - 35 1995 $H^+ + B^{n+}(i = -1, 0, 1) \rightarrow H(1s)$ (B=C, O, F, Si, S, Cl) T : Distorted strong potential Born approx. 0.1 - 20 MeV	95T8	Das,M. N. C. Deb, N. C. Sil and S. C. Mukherjee Electron capture by fully stripped high-Z projectiles from the hydrogen atom Phys. Rev. A 52 4616 - 21 1995 $A^{Z+} + H \rightarrow A^{Z-1+}(nlm)$ ($A = Ti^{22+}, V^{23+}, Fe^{26+}$) T : CDW 400 - 900 keV/amu
95T2	Alston,S. T. Brennan and F. Bannion III Thomas double scattering in electron capture from oriented molecular hydrogen Phys. Rev. A 52 3899 - 909 1995 $H^+ + H_2 \rightarrow 1l^0$ T : 2nd-order Born approx. 2.5 - 10 MeV	95T9	Eerden,M.J.J. M. C. M. van der Sanden, D. K. Otorbaev and D. C. Schram Cross section for the mutual neutralization reaction $H_2^+ + H^+$, calculated in a multi-crossing Landau-Zener approximation Phys. Rev. A 51 3362 - 65 1995 $H^+ + H^+ \rightarrow H + H$ $H_2^+(v) + H^+ \rightarrow H_2(v') + H$ T : Landau-Zener model 0.02-10 eV
95T4	Bradenbrink,S. H. Reihl, Z. Roller-Lutz and H. O. Lutz Classical trajectory studies of charge changing collisions involving Rydberg target atoms J. Phys. B 28 L133 - 38 1995 T : classical trajectory method	95T10	Eichler,J. Charge transfer from the negative-energy continuum Phys. Rev. Letters 75 3653 - 56 1995 $S^{16+} + Cu \rightarrow S^{15+}(1s_{1/2}) ; La^{37+} + B \rightarrow La^{36+}(B = Cu, Ag, Au)$ T : OBK 0.4 - 1.3 GeV/amu
95T5	Busnengo,H.F. A. E. Martinez and R. D. Rivarola Distorted wave models for electron capture in asymmetric collisions Phys. Scripta 51 190 - 95 1995 $H^+ + H(1s) \rightarrow H(nl) ; He^{2+} + H(1s) \rightarrow He^+(2s, \text{total}) ; Li^{3+} + H(1s) \rightarrow Li^{2+}$ T : CDW-EIS approx. 50 - 1000 keV/amu	95T11	Eichler,J. A. Ichihara and T. Shirai Photon angular distributions from radiative electron capture in relativistic atomic collisions Phys. Rev. A 51 3027-35 1995 $A^{Z+} + \rightarrow A^{Z-1+} + hv(REC)$ ($A = Sn, Yb, Th$) T : relativistic calculation with spin-flip 20, 100, 300 MeV/amu Angular distributions of K-, L- and M-REC
95T6	Busnengo,H.F. A. E. Martinez, R. D. Rivarola and L. J. Dube Distorted wave models for electron capture in asymmetric collisions III. Differential cross sections and the double scattering region J. Phys. B 28 3283 - 98 1995 $H^+ + H \rightarrow H(nlm) + H^+$ T : CDW, CDW-eikonal, eikonal final-state approx. 0.125 - 2.8, 5 MeV/amu		

95T12	Errea, L.F., B. Herrero, L. Mendez and A. Riera Molecular calculation of total and differential charge transfer cross sections in $C^{4+} + He$ collisions J. Phys. B 28 693 - 709 1995 $C^{4+} + He \rightarrow C^{3+}(2l, 3l), C^{3+}(2s^2, 2s2p, 2p^2)$ T : MO 0.04 - 6 keV/amu	95T16	Gayet, R., J. Hansen and L. Jacqui Transfer and excitation in ion-atom collisions at high impact velocities III. Application of the CDW-4B theory to an almost symmetrical system : $He^+ - He$ J. Phys. B 28 2193 - 208 1995 $He^+ + He \rightarrow He(2p^2, 2s2p, 2s^2)$ T : CDW 30 - 200 keV/amu
95T13	Errea, L.F., C. Harel, H. Jouin, L. Mendez, B. Pons and A. Riera Molecular treatment of $H^+ + He^+(1s)$ collisions including pseudostates Phys. Rev. A 52 R2505 - 507 1995 $H^+ + He^+(1s) \rightarrow H(1s) + He^{2+}; H^+ + He^{3+} + e$ T : MO with common translational factor + pseudostates 9 - 300 keV/amu	95T17	Gravielle, M.S. and J.E. Miraglia State-selective scaling in electron capture by multicharged ions on light atoms Phys. Rev. A 51 2131 - 39 1995 $A^{Z+} + H \rightarrow A^{(Z-1)+}(nl) (A = Li, B, C, F)$ $A^{Z+} + He \rightarrow A^{(Z-1)+}(nl) (A = He, Li, C, N, O, F)$ T : eikonal impulse approx. 20 - 300 keV $\times q$ scaling for nl-distribution
95T46	Fritsch, W. Theoretical studies on slow collisions between medium-Z metallic ions and neutral H, H ₂ or He Suppl. Nucl. Fusion 6 131-145 1995 $Si^{4+} + H, He \rightarrow Si^{3+}; Ti^{4+} + H, He \rightarrow Ti^{3+}; Fe^{4+} + H \rightarrow Fe^{3+}; Ni^{4+} + H \rightarrow Ni^{3+};$ AO 0.2-100 keV/amu (Si) ; 2-120 keV/amu (Ti) ; 2-80 keV/amu (Fe) ; 1.5-80 keV/amu	95T18	Grosser, J. and H. Sturk Numerical treatment of inelastic $He^+ + Ne$ collisions at low energy Z. Phys. D 35 81 - 91 1995 $He^+(1s) + Ne \rightarrow He(1s, 2s)$ T : coupled-channel calculation 100 - 200 eV
95T47	Gargaud, M., MacCarroll, R. Electron capture from H and He by $Al^{13+}, Si^{14+}, Ar^{18+}$ and Ti^{22+} in the eV to keV energy range Suppl. Nucl. Fusion 6 163-171 1995 $Al^{13+} + H \rightarrow Al^{12+}; Si^{14+} + H \rightarrow Si^{13+}; Si^{14+} + H \rightarrow Si^{12+}; Ar^{18+} + H, He \rightarrow Ar^{17+}; Ti^{22+} + H \rightarrow Ti^{21+}$ MO 0.8-1130 eV	95T20	Herrero, B., I. L. Cooper, A. S. Dickinson and D. R. Flower Low-energy electron capture from H and D by C^{4+} ions J. Phys. B 28 4607 - 18 1995 $C^{4+}(1s^2 2s) + H, D \rightarrow C^{3+}(1s^2 nln'l') + H^+$ T : MO 0.004 - 90 eV/amu
95T14	Gargaud, M., R. MacCarroll and L. Benmearajem Model potential methods for the description of electron capture by multiply charged ions from single- and multi-electron targets : application to $Ar^{16+} - H$ and $Ar^{16+} - He$ systems Phys. Scripta 51 752 - 58 1995 $Ar^{16+} + H \rightarrow Ar^{15+}(4l, 5l); Ar^{16+} + He \rightarrow Ar^{15+}(3l, 4l)$ T : model potential method 4 - 350 keV/amu	95T19	Herrero, B., I. L. Cooper, A. S. Dickinson and D. R. Flower Charge transfer in slow $N^{2+} + H$ collisions J. Phys. B 28 711 - 24 1995 $N^{2+}(1s^2 2s^2 2p^2 P^o) + H \rightarrow N^+(1s^2 2s 2p^3 P^o, ^3D^o; 1s^2 2s^2 2p^2 ^3P) + H^+$ T : MO with common translational factor 0.1 - 100 eV/amu rate coefficient given also
95T15	Gavres, P., M. S. Pindzola, D. R. Schultz and J. C. Wells Schrödinger equation for proton-hydrogen collisions in two dimensional Cartesian space Phys. Rev. A 52 3808 - 76 1995 $H^+ + H \rightarrow H$ T : 3D time-dependent Schrödinger equation 10 - 100 keV	95T21	Hildenbrand, R., N. Grdin and W. Scheid Coupled channel calculations with Cartesian Gaussian basis functions for $H + He$ and $He^+ + He$ collisions J. Phys. B 28 4781 - 98 1995 $He^+ + He \rightarrow He(2^1S)$ T : CC with Cartesian-Gaussian basis 10 - 600 keV $He^+ + He \rightarrow He^+ + He(2^1S; 2^3S; 2^1P; 2^3P; 3^1S; 3^3P; 3^1P; 3^3P)$

95T22	Homan,D.M. M. J. Cavagnaro, D. A. Harnin Classical charge-transfer and ionization channels for ion collisions with circular Rydberg atoms Phys. Rev. A 51 2075 - 84 1995 T : classical phase-space method	95T28	Kuang,J. Z. Chen and C. D. Lin Excitation and charge transfer in $\text{He}^+ + \text{H}$ collisions J. Phys. B 28 2173 - 79 1995 $\text{He}^+ + \text{H} \rightarrow \text{He} + \text{H}^+$ T : AO 2.5 - 25 keV/amu also excitation cross sections $\text{He}^+ + \text{H}(2l)$ Balmer emission
95T24	Hose,G. Charge exchange and excitation in $\text{H} + \text{He}^{2+}$ and $\text{He}^+ + \text{H}^+$ collisions using single- and multi-channel perturbed-stationary-state propagators Phys. Rev. A 51 2223 - 46 1995 $\text{He}^{2+} + \text{H} \rightarrow \text{He}^+(\text{nl}; n=1-4) + \text{H}^+$ $\text{H}^+ + \text{He}^+ \rightarrow \text{H}(n=1-3) + \text{He}^{2+}$ T : pss 0.5 - 22.5 keV/amu (He^{2+}) ; 5 - 228 keV/amu (H^+) also excitation to $\text{H}(n=1-3)$	95T29	Lopez-Castillo ,A. and F. R. Ornellas Theoretical charge-exchange Galliean invariant cross sections for $\text{B}^{3+} + \text{He}$ collisions Phys. Rev. A 51 381 - 90 1995 $\text{B}^{3+}(1s^2) + \text{He} \rightarrow \text{B}^2(1s^2\text{nl})$ T : pss 0.1 - 10 keV/amu
95T23	Hose,G. Semiclassical multi-channel perturbed-stationary state model for rearrangement atomic collisions Phys. Rev. A 51 2199 - 221 1995 T : multi-channel PSS	95T31	Lundsgaard,M.F.V. and S. E. Nielsen Coherence parameters for $\text{He}^+(2p)$ capture and $\text{H}(2p)$ excitation in $\text{He}^{2+} - \text{H}(1s)$ collisions Z. Phys. D 34 97 - 105 1995 $\text{He}^{2+} + \text{H}(1s) \rightarrow \text{He}^+(2p)$ T : AO 0.5 - 225 keV/amu
95T25	Jain,A. and T. G. Winter Electron transfer, target excitation and ionization in $\text{H}^+ + \text{Na}(3s)$ and $\text{H}^+ + \text{Na}(3p)$ collisions in the coupled-Sturmian-pseudostate approach Phys. Rev. A 51 2963 - 73 1995 $\text{H}^+ + \text{Na}(3s, 3p) \rightarrow \text{H} + \text{Na}^+$ T : two-center coupled-Sturmian-pseudostate approx. 1 - 100 keV	95T30	Lundsgaard,M.F.V. Z. Chen, C. D. Lin and N. Toshima Electron capture from circular Rydberg atoms Phys. Rev. A 51 1347 - 50 1995 $\text{H}^+ + \text{H}(3d, 4f, 5g), \text{Na}(3p) \rightarrow \text{H}$ T : close-coupling calculation
95T26	Kimura,M. J. P. Gu, G. Hirsch and R. J. Buenker Electron capture in collisions of $\text{N}^+(\text{^2S}, \text{^3P})$ with He : the effect of metastable ions Phys. Rev. A 51 2063 - 66 1995 $\text{N}^+(\text{^2S}, \text{^3P}) + \text{He} \rightarrow \text{N}(\text{^4S}) + \text{He}^+$ T : MO 1.5 - 100 keV	95T32	Mancev,J. Four-body corrected first Born approximation for single charge exchange at high impact energies Phys. Scripta 51 762 - 68 1995 $\text{H} + \text{H} \rightarrow \text{H}^+ + \text{H}^-$; $\text{He}^+ + \text{H} \rightarrow \text{He}(1s^2) + \text{H}^+$; $\text{He}^+ + \text{He} \rightarrow \text{He}(1s^2) + \text{He}^{2+}$ T : CB1-4B approx. 20 - 2000 keV
95T27	Kimura, M. Y. Li, G. Hirsch and R. J. Buenker Elastic and inelastic processes in $\text{H}^+ + \text{CH}_4$ collisions in the low-kilo-electron-volt regime Phys. Rev. A 52 1196 - 205 1995 $\text{H}^+ + \text{CH}_4(\text{C}_2\text{v}, \text{C}_2\text{v}) \rightarrow \text{H}$ T : MO with full quantum-mechanical representation 50 - 2000 eV	95T33	Mitroy,J. Formation of antihydrogen by charge-transfer reaction Phys. Rev. A 52 2859 - 64 1995 $\text{anti-p} + \text{Ps}(\text{nl}) \rightarrow \text{anti-H}(\text{n'l}) + \text{e}^-$ T : unitarized Born approx. < 4 eV

95T34	Morales, J. A. Diz, E. Deumens and Y. Öhrn Electron nuclear dynamics of $\text{H}^+ + \text{H}_2$ collisions at $E_{\text{en}} = 30$ eV J. Chem. Phys. 103 9968 - 80 1995 $\text{H}^+ + \text{H}_2 \rightarrow \text{H}(\theta) + \text{H}_2^+(\nu_e)$ ($\nu_e = 0$) T : Electron nuclear dynamics theory 30 eV inelastic scattering, rearrangement, dissociation	95T40	Sanchez, I. and H. Bachau Properties of $\text{Ne}^{8+}(4,4)$ and $\text{Ne}^{8+}(3,n)$ states populated during ion - atom collisions J. Phys. B 28 795 - 806 1995 $\text{Ne}^{10+} + \text{He} \rightarrow \text{Ne}^{8+}(4,4) (3,n) + \text{He}^{2+}$ T : close-coupling method 1.0, 4.6 keV/amu
95T35	Nielson, S.E. J. P. Hansen and A. Dubois Electron transfer in keV $\text{Li}^+ - \text{Na}(3s, 3p)$ collisions : I. atomic basis coupled-channel calculations J. Phys. B 28 5295-307 1995 $\text{Li}^+ + \text{Na}(3s, 3p) \rightarrow \text{Li}(nlm)$ T : AO 1 - 50 keV	95T48	Schulitz, D.R. Krstic, P.S. Inelastic processes in 0.1-1000 keV/amu collisions of $\text{Ne}^q(q=7010)$ ions with atomic hydrogen Suppl. Nucl. Fusion 6 173-196 1995 $\text{Ne}^q(q=7-10) + \text{H} \rightarrow \text{Ne}^{q-1}(nl)$ CTMC, hidden crossing method 0.1-200 keV/amu
95T36	Ostrovsky, V.N. Rydberg atom-ion collisions : classical overbarrier model for charge exchange J. Phys. B 28 3901 - 14 1995 $\text{N}^+ + \text{Cs} \rightarrow \text{N}^{2+} ; \text{Ar}^{2+} + \text{Cs} \rightarrow \text{Ar}^{2+} ; \text{Na}^+ + \text{Na}(nl) \rightarrow \text{Na}$ T : classical over-barrier model 0.25 - 25 keV/amu n-scaling	95T41	Shibata, T. and K. Ogura Symmetric charge transfer of gadolinium and neodymium J. Phys. Soc. Japan 64 3136 - 40 1995 $\text{A}^+ + \text{A} \rightarrow \text{A} + \text{A}^+ (\text{A}=\text{Gd}, \text{Nd})$ T : asymptotic (Smirnov) theory 2 eV - 5 keV
95T37	Rod, T.H. and S. E. Nielsen Orbital alignment dependence of electron transfer cross sections III : coupled channel results for $\text{He}^+ - \text{Na}(3s, 3p)$ collisions J. Phys. B 28 L607 - 14 1995 $\text{He}^+ + \text{Na}(3s, 3p) \rightarrow \text{He}$ T : classical coupled-channel calculation 0.25 - 9.0 keV/amu	95T42	Shimakura, N. S. Yamada, S. Suzuki and M. Kimura Low-energy collisions of O^{3+} ions with He atoms : single-electron capture, projectile excitation and transfer excitation and ionization Phys. Rev. A 51 2989 - 96 1995 $\text{O}^{3+}(1s^2 2s) + \text{He} \rightarrow \text{O}^{2+}(1s^2 2snl) ; \text{O}^{3+}(1s^2 nl n'l')$ T : MO with ETF 0.060 - 15 keV/amu
95T38	Saha, B.C. Molecular-state treatment of electron capture in slow collisions of C^{4+} with H : alignment and orientation effects Phys. Rev. A 51 5021- 1995 $\text{C}^{4+}(1s^2) + \text{H} \rightarrow \text{C}^{3+}(1s^2 3l) + \text{H}^+$ T : close-coupling + MO 0.02 - 1.0 keV/amu	95T43	Stancil, P. C. and B. Zygelman Kinematic isotope effects in low energy electron capture Phys. Rev. Letters 75 1495 - 98 1995 $\text{N}^{4+}(2s) + \text{H}, \text{D} \rightarrow \text{N}^{3+}(3l) + \text{H}^+, \text{D}^+$ T : full quantum calculation 0.1 - 30 eV
95T39	Salasnich, L. and F. Sattin Charge-exchange processes between excited helium and fully stripped ions Phys. Rev. A 51 4281 - 83 1995 $\text{A}^{2+} + \text{He}^+(2s) \rightarrow \text{A}^{(2-1)+}(n) (\text{A} = \text{Li, Be, B, C, O})$ T : CTMC 10, 20 , 30 keV/amu Scaling in n-distribution	95T44	Thumm, U. Electron transfer and emission in slow collisions of N^{4+} with C_{60} J. Phys. B 28 91 - 101 1995 $\text{N}^{3+} + \text{C}_{60} \rightarrow \text{N}^{4+}, \text{N}^{3+}$ T : COB model 50 keV

95T45

Wang, Y.D., C. D. Lin, N. Toshima and Z. Chen
Ionization and charge transfer in collisions of highly charged ions with helium at low
velocities
Phys. Rev. A 52 2852 - 58 1995
 $A^{Z+} + \text{He} \rightarrow A^{(Z-1)+} + \text{He}^+$ (A=C, N, O)
T : two-center AO model
42 - 72 keV/amu

96E1	Andriamonje, S., Chevallier, M., Cohen, C., Cue, N., Dauvergne, D., Duran, J.J., Fujimoto, F., Kirsch, R., L'Hoir, A., Poizat, J.C., Quere, Y., Remillieux, J., Rohl, C., Tothard, H., Rozet, J.P., Schmaus, D., Toulmonde, M., Vernhet, D. K-shell radiative electron capture with bare 60 MeV/u Kr ions channelled in a Si crystal; experiments and simulations Phys. Rev. A 54 1404 - 1416 1996 Kr ³⁶⁺ + Si<110> -> REC REC+projectile coincidence 60 MeV/amu				
96E2	Aumay, F., Gieler, M., Winter, H.P., Schweinzer, J. Electron capture by doubly charged ions from laser excited alkali atoms : III Ne ²⁺ , Ar ²⁺ - Na(3p) collisions J. Phys. B 29 1515 - 1523 1996 Ne ²⁺ , Ar ²⁺ + Na(3s,3p) -> Ne ⁺ (nl), Ar ⁺ (nl) laser-excited target + translational energy spectroscopy 10 keV				
96E3	Beck, B.R., Steiger, J., Weinberg, G., Church, D.A., MacDonald, J., Schneider, D. Measurement of charge exchange between H ₂ and low-energy ions with charge states q=35 - 80 Phys. Rev. Letters 77 1735 - 1738 1996 Xe ^{q+} (q=35,43,44,45,46), Th ^{q+} (q=73-80) + H ₂ -> Penning ion trap 6 eV				
96E4	Beijers, J.P., Hoekstra, R., Morgenstern, R. State-selective charge transfer in slow collisions of O ³⁺ with H and H ₂ J. Phys. B 29 1397 - 1408 1996 O ³⁺ (1s ² 2s ² 2p ²) + H, H ₂ -> O ²⁺ (1s ² 2s ² 2pnl) vuv spectroscopy 45 - 752 eV/amu				
96E5	Bliman, S., Bruch, R., Altick, P.L., Schneider, D., Prior, M.H. Double electron capture in low energy Fe ¹⁷⁺ + He collisions Phys. Rev. A 53 4176 - 4182 1996 Fe ¹⁷⁺ + He -> Fe ¹⁵⁺ (2p ² nl ² nl') + He ²⁺ zero-degree electron spectroscopy 170 keV				
96E6	Briand, J.P., de Billy, L., Jin, J., Khemeliche, H., Prior, M., Xie, Z., Nectoux, M., Schneider, D.H. Interaction of slow Ar ^{17+,18+} ions with C ₆₀ : an insight into ion-surface interactions Phys. Rev. A 53 R2925 - 2929 1996 Ar ¹⁷⁺ , Ar ¹⁸⁺ + C ₆₀ -> X-ray-recoil ion coincidence 10xq keV				
96E7	Cassimi, A., Duponchel, S., Flechard, X., Jardin, P., Sortais, P., Hamecart, D., Olson, R.E. State-selective electron capture in low velocity multiply charged ions, helium collisions Phys. Rev. Letters 76 3679 - 3682 1996 Ne ¹⁰⁺ , Ar ¹⁸⁺ + He -> Ne ⁹⁺ , Ar ¹⁷⁺ (n) recoil momentum spectroscopy 6.8 keV/amu				
96E8	Chen, L., Bernard, J., Martin, S., Denis, A., Desesquelles, J. Two-electron capture and stabilization in collisions of C ⁶⁺ with rare-gas targets at low energy Phys. Rev. A 54 3049 - 3054 1996 C ⁶⁺ + He, Ne, Ar, Kr, Xe -> C ⁴⁺ projectile-recoil-ion TOF 12, 60, 114 keV				
96E9	Chesnet, J.Y., Merabet, H., Fremont, F., Cremer, G., Husson, X., Lecler, D., Rieger, G., Spieler, S., Grether, M., Stolterfoht, N. Dielectronic processes producing radiative stabilization in slow Ne ¹⁰⁺ + He collisions Phys. Rev. A 53 4198 - 4204 1996 Ne ¹⁰⁺ + He -> Ne ⁸⁺ (3nl';4nl') Auger electron spectroscopy 10, 150 keV				
96E10	Chesnet, J.Y., Merabet, H., Husson, X., Fremont, F., Lecler, D., Jouin, H., Harel, C., Stolterfoht, N. Energy dependence of cross sections for double-electron capture in 48-132 keV C ⁶⁺ + He collisions Phys. Rev. A 53 2337 - 2344 1996 C ⁶⁺ + He -> C ⁴⁺ (2l, nl') electron spectroscopy 48-132 keV				

96E11	Cisneros, C. Martinez, H. Fuentes, B.E. Alvarez, I. de Urquijo, J. Dominguez, I. Single electron capture of H^+ in Mg in the energy range 0.5 to 5.0 keV Nucl. Instr. Meth. B 117 1-4 1996 $H^+ + Mg \rightarrow H^0$ angular distributions 0.5-5 keV E	Edens, J. Kamber, E. Y. Akgüingör, K. Ferguson, S.M. Differential single-electron capture cross sections in low-energy Ar^{q+} ($q=4-8$) ions-He and Ar collisions Nucl. Instr. Meth. B 111 27-30 1996 $Ar^{q+}(q=4-8) + He, Ar \rightarrow Ar^{q-1+}$ recoil ion source 0.6-2.5 keV E
96E12	de Nijs, G. Folkerts, H.O. Hoekstra, R. Morgenstern, R. Multiple target ionization in collisions between highly charged ions and Ar J. Phys. B 29 85 - 95 1996 $C^{6+}, N^{6+}, O^{6+}, Ne^{6+}, Ar^{6+}, Kr^{6+} + Ar \rightarrow Ar^{r+}$ ($r < 9$) TOF 2 keV/amu E	Folkerts, H.O. Hoekstra, R. Morgenstern, R. Velocity and charge state dependence of molecular dissociation induced by slow multicharged ions Phys. Rev. Letters 77 3339 - 3342 1996 $He^{2+}, O^{7+} + CO \rightarrow C^{n+} + O^{n+}$ kinetic energy measurement 2 - 11 keV/amu E
96E13	de Nijs, G. Hoekstra, R. Morgenstern, R. Charge equilibrium pathways following C^{6+} - Ar collisions J. Phys. B 29 6143-6153 1996 $C^{6+} + Ar \rightarrow Ar^{2+}, Ar^{3+}, Ar^{4+}, Ar^{5+} + electron$ electron-recoil ion coincidence technique 4.67 keV E	Frenont, F. Bedouet, C. Chesnel, J.Y. Merabet, H. Husso, X. Grether, M. Spieler, A. Stofferfort, N. Experimental evidence for dielectronic excitation producing Ne-K vacancies in 35 keV $N^{7+} + Ne$ collisions Phys. Rev. A 54 R4509-4612 1996 $N^{7+}, N^{6+} + Ne \rightarrow$ Auger electron spectroscopy 35 keV E
96E14	Dominguez, I. de Urquijo, J. Cisneros, C. Martinez, H. Alvarez, I. Single- and double-electron loss of H in collisions with SF_6 , CH_4 and CO Phys. Rev. A 54 506 - 509 1996 $H^+ + SF_6, CH_4, CO \rightarrow H^0, H^+$ growth rate method 1 - 5 keV E	Frohne, V. Cheng, S. Ali, R.M. Raphaelian, L.A. Cocke, C.L. Olson, R. Measurements of recoil and projectile momentum distributions for 19 MeV $F^{8+} + Ne$ collisions Phys. Rev. A 53 2407 - 2416 1996 $F^{8+} + Ne \rightarrow$ recoil ion momentum spectroscopy : CTMC 19 MeV E
96E15	Dowek, D. Houver, J.C. Reiser, I. Salgado, J. Svensson, A. Thomsen, J.W. Andersen, N. Nielsen, S.E. Dubois, A. Left-right scattering asymmetries for electron transfer from oriented and tilted aligned Na(3p) states to $H(n=2,3)$ Phys. Rev. A 54 970 - 973 1996 $H^+ + Na(3p) \rightarrow H(n=2,3)$ laser-excited target : angular distributions : also AO calculation 2 keV/amu E	Greenwood, J.B. Burns, D. McCullough, R.W. Geddes, J. Gilbody, H.B. The first use of state-prepared beams of C^{2+} in studies of state-selective electron capture collisions J. Phys. B 29 L599 - 603 1996 $C^{2+}(^1S; ^3P) + Ar \rightarrow C^+$ translational energy spectroscopy 4 keV/amu E

96E2	Greenwood,J.B, Burns,D, McCullough,R.W, Geddes,J, Gilbody,H.B. State-selective one-electron capture from He, Ne and Ar by 4 keV state-prepared C^{3+} ions J. Phys. B 29 5867-5880 1996 $C^{2+}(1s^2 2s^2 1S; 1s^2 2s^2 p^3 P) + He, Ne, Ar \rightarrow C^+$ translational energy spectroscopy 4 keV	96E26	Kamber,E.Y, Angütingör,K, Safvan,C.P, Mathur, D. State-selective single-electron capture in very slow collisions between metastable N_2^{2+} ions and neutral atoms and molecules Chem. Phys. Letters 258 336-341 1996 $N_2^{2+} + He, Ne, Ar, D_2, N_2, O_2 \rightarrow N_2^+$ translational energy spectroscopy 28 eV
96E22	Hashida,M, Sakabe,S, Izawa, Y. Cross section of symmetric charge transfer between Gd^+ and Gd^+ in the energy range 30-1000 eV Phys. Rev. A 53 1487 - 1491 1996 $Gd^+ + Gd^+ \rightarrow Gd + Gd^+$ laser-ionization 30 -1000 eV	96E27	Katayama,I, Ikegami,H, Ogawa,H, Haruyama, Y, Tozaki,M, Aoki,A, Fukuzawa,F, Yoshida,K. High-resolution study of electron capture by 72- and 52-MeV 4He projectiles from target of high atomic number Phys. Rev. A 53 242 - 249 1996 $He^{2+} + B \rightarrow He^+$ ($B=V,Cr,Cu,Ge,Nb,Ag,Sn$) energy-loss spectroscopy 52, 72 MeV also electron loss cross sections
96E23	Hashida,M, Sakabe,S, Izawa, Y. Cross sections of charge transfer between a Gd atom and its singly charged positive ion in metastable states close to the ground state Phys. Rev. A 54 4573 - 4576 1996 $Gd^{2+} + Gd^{2+} \rightarrow Gd^{3+} + Gd^{1+}$ laser ionization method 30 - 1000 eV	96E28	Kato,S, de Gouw,J.A, Lin,C.D, Bierbaum,V.M, Leone,S.R. Vibrational enhancement of the charge transfer rate constant of N_2^+ ($v=0-4$) with Kr at thermal energies J. Chem. Phys. 105 5455-5466 1996 N_2^+ ($v=0-4$) + Kr $\rightarrow N_2^0 + Kr^+$ selected-ion flow tube technique thermal energies
96E24	Jin,J, Khemliche,H, Prior,M, Xie,Z New highly charged fullerene ions : production and fragmentation by slow ion impact Phys. Rev. A 53 615 - 618 1996 $Ar^{q+}(q=4,5,8,12,16,17), Kr^{23+}, Xe^{27+}, Bi^{37+}(q=20,38,44,46), U^{46+} \rightarrow C_{60}^{q+}$ ($r=1-9$) electron-recoil-ion TOF 10kVxq	96E29	Kravis,S.D, Abdallah,M, Cocke,C.L, Lin,C.D, Stockli,M, Walch,B, Wang,Y.D, Olsen,R.E, Rodriguez,V.D, Wu,W, Piekma,M, Watanabe,N. Single ionization of He by low-velocity protons and C^{6+} ; ejected electron momentum distributions Phys. Rev. A 54 1394 - 1403 1996 $H^+, C^{6+} + He \rightarrow He^+$ electron momentum spectroscopy + recoil ion 0.63-2.39 au (H) ; 1.16-1.63 au (C)
96E25	Kamber,E.Y, Akgütingör,K, Leather,C, Branton,A.G. Transfer-excitation processes in collisions of N^{3+} ions with H_2, He, Ne and Ar targets Phys. Rev. A 54 1452 - 1458 1996 $N^{3+} + H_2, He, Ne, Ar \rightarrow N^{2+}$ translational energy spectroscopy 6-15 keV	96E30	Lauritsen,J.H, Thomsen,J.w, Andersen,N, Dowek,D, Houwer,J.C, Pedersen,J.O, Salgado,J, Svensson,A. Electron transfer in keV $Li^+ - Na(3p)$ collisions : III experiments on initial alignment dependence J. Phys. B 29 1093 - 1100 1996 $Li^+ - Na(3s,3p) \rightarrow Li Li^+ - Na(3p)$ energy loss spectroscopy 1 - 45 keV

96E31	Lindsay,B.G. Sieglaff,D.R. Schafer,D.A. Haker,K.A. Smith,K.A. Stebbings,R.F. Charge transfer of 0.5, 1.5 and 5 keV protons with atomic oxygen : absolute differential and integrated cross sections Phys. Rev. A 53 212 - 218 1996 $H^+ + O \rightarrow H^+(\theta), H^0$ 0.5, 1.5, 5.0 keV	E	96E37	Olamba,K. Szucs,S. Chenu,J.P. El Arbi,N. Brouillard,F. Improvement of the merged-beam method and its application to the study of the reactions : $H^+ + He^+ \rightarrow H + He$ J. Phys. B 29 2837 - 2846 1996 $H^+ + He^+ \rightarrow H + He$ merged beam method 5 - 4000 eV	E
96E32	Martin,S. Bernard,J. Chen,L. Denis,A. Desesquelles,J. Double Rydberg states formed in stabilized triple electron capture Phys.Rev. Letters 77 4306 - 4309 1996 $C^{6+} + Ne, Ar, Kr, Xe : O^{8+} + Ar, Kr, Xe : Ne^{10+} + Ar, Kr, Xe \rightarrow$ photon spectroscopy : projectile-recoil coincidence 1 keV/amu	E	96E38	Pesnelle,A. Pascale,J. Trainham,R. Andra,H.J. State-selective electron capture by 18 keV K^{2+} ions from laser-excited $Rb^{*}(15p-25p)$ Rydberg atoms Phys. Rev. A 54 4051 - 4063 1996 $K^{2+} + Rb(15p-25p) \rightarrow Kr^{2+}(nl)$ laser-excited target 18 keV	E
96E33	Merabet,H. Cremer,G. Fremont,F. Chesnel,J.Y. Stollerfont,N. Energies and radiative and nonradiative decay rates of doubly excited $3nl'$ and $4nl'$ ($n \geq 40$) states in Ne^{8+} Phys. Rev. A 54 373 - 378 1996 $Ne^{10+} + He \rightarrow Ne^{8+}(3nl', 4nl')$ n-dependence calculated by Cowan-code	E	96E39	Pieksma,M. Gargaud,G. McCarroll,R. Havener,C.C. Electron capture cross section at near-thermal collision energies for $Si^{4+} + D$ Phys. Rev. A 54 R13 - 16 1996 $Si^{4+} + D \rightarrow Si^{3+}$ merged beam technique 0.01 - 1000 eV/amu MO calculation	E
96E34	Moudry,B.W. Yeren,O. Jaacks,D.H. Macek,J.H. Experimental determination of orbital and spin orientation of $(Ar^+)^*$ formed in collisions Phys. Rev. A 54 4119 - 4126 1996 $He^+ + Ar \rightarrow He + Ar^+(3p^4[D]^1p^2F_{7/2,5/2})$ photon-product TOF 0.67, 1, 2 keV	E	96E40	Quintana,E.J. Pollack,E. $H^0 + N_2$ collisions at low-kilo-electron-volt energies Phys. Rev. A 53 206 - 211 1996 $H^0 + N_2 \rightarrow H^0, H^+, H^-$ energy-loss spectroscopy 1 - 3 keV	E
96E35	Nakamura,N. Awaya,Y. Currell,F.J. Kambara,T. Kanai,Y. Kitazawa,S. Koide,M. Ohtani,S. Safronova,U.I. Suzuki,H. Takayanagi,T. Wakiya,K. Electron spectra from doublet and quartet states of $N^{4+}(1s3l3l')$ produced by 60 keV $N^{6+} + H_2, O_2$ collisions J. Phys. B 29 1995 - 2006 1996 $N^{6+} + H_2, O_2 \rightarrow N^{4+}(1s3l3l')$ electron spectroscopy 60 keV	E	96E41	Quintana,E.J. Pollack,E. $H^0 + H_2$ and $H^0 + O_2$ collisions at low kilo-electron-volt energies Phys. Rev. A 54 4015 - 4021 1996 $H^0 + H_2 \rightarrow H^0(\text{elastic}), H^+, H^-$ $H^0 + O_2 \rightarrow H^0(\text{elastic}), H^+, H^-$ TOF energy-loss spectroscopy 1,2,3 keV	E
96E36	Nanal,V. Tribedi,L.C. Kurup,M.B. Prasad,K.G. Tandon,P.N. Novel features in projectile X-rays and radiative electron capture photons emission from highly stripped channelled ions J. Phys. B 29 5857-5866 1996 $S^{36}, S^{36+}, Si^{13+} + Si < 100 \text{ \AA} \rightarrow Si^{13+}, Si^{14+} + hv(\text{REC})$ 90-143 MeV	E			

96E42	Reid,C.J. Electron-transfer ionization of CS ₂ into hidden cationic states below 20 eV J. Phys. B 29 71 - 83 1996 H ⁺ , O ⁺ , F ⁺ , P ⁺ , P ₂ ⁺ , S ⁺ , Ar ⁺ , CS ⁺ + CS ₂ -> translational energy spectroscopy 8 keV	E	Thompson, W.R. Shah, M.B. Gilbody, H.B. Electron capture in collisions of 5-67 keV/amu He ²⁺ ions with oxygen atoms J. Phys. B 29 2847 - 2853 1996 He ²⁺ + O -> He ⁺ + O ⁺ ; He ⁺ + O ²⁺ ; He + O ²⁺ TOF + Ir-oven 5 - 67 keV/amu	E
96E43	Remscheid, A. Huber, B.A. Pykavy, M. Staemmler, V. Wiesemann, K. Electron capture and dissociation of the N ₂ ³⁺ molecule in slow Ar ²⁺ /N ₂ collisions J. Phys. B 29 515 - 529 1996 Ar ²⁺ + N ₂ -> N ₂ ³⁺ -> N ²⁺ + N ⁺ retardation + TOF 8 - 16 keV	E	Thomsen, J.W. Andersen, N. Dowek, D. Houver, J.C. Lauritsen, J.H.V. Muller, U. Pedersen, J.O.P. Salgado, J. Svensson, s. Orbital alignment dependence of electron transfer cross sections IV : 1-15 keV Ne ⁺ , Ar ⁺ + Na(3p) collisions Z. Phys. D 37 133-139 1996 Ne ⁺ , Ar ⁺ + Na(3s,3p) -> Ne ⁰ , Ar ⁰ energy-loss spectroscopy 1-15 keV	E
96E44	Schippers, S. Hoekstra, R. Morgenstern, R. Olson, R.E. Anisotropy and polarization in charge changing collisions of C ⁴⁺ with Na(3s) and laser aligned Na(3p) J. Phys. B 29 2819 - 2836 1996 C ⁴⁺ + Na(3s), Na(3p) -> C ²⁺ (nl) photon spectroscopy 3 - 7 keV/amu	E	Thomsen, J.W. Reiser, I. Andersen, N. Houver, J.C. Salgado, J. Sidly, E. Svensson, A. Dowek, D. An experimental determination of the complete transition matrix for the electron transfer process Li ⁺ + Na(3s) -> Li(2p) + Na ⁺ J. Phys. B 29 5459-5473 1996 Li ⁺ + Na(3s) -> Li(2s,2p) + Na ⁺ photon-neutral particle coincidence technique 1 keV	E
96E45	Selberg, N. Barany, A. Biedermann, C. Satterlin, C.J. Cederquist, H. Langereis, A. Larsson, M.O. Waennstroem, Hvelplund, P. Slow collisions between highly charged ions and C ₆₀ : absolute delta-E values and cross sections Phys. Rev. A 53 874 - 879 1996 Ar ^{q+} (q=8,13,14,15) + C ₆₀ -> Ar ^{q-1+} energy-gain spectroscopy 3.3kV xq	E	Vancuura, J. Mucha, P.J. Kostroun, V.O. Spectroscopic study of electrons emitted in Ar ^{q+} (q=8-16) on Ar at 2.3q keV collision energy Phys. Rev. A 53 2379 - 2390 1995 Ar ^{q+} (q=8-16) + Ar -> electron spectroscopy 2.3q keV	E
96E46	Thompson, W.R. Shah, M.B. Gilbody, H.B. One-electron capture in collisions of 6-100 keV protons with oxygen atoms J. Phys. B 29 725 - 732 1996 H ⁺ + O -> H TOF + Ir-furnace 6-600 keV	E	Vikor, L. Sarkadi, L. Penent, F. Bader, A. Palinka, J. Single- and double-electron detachment from H ⁺ in collisions with He Phys. Rev. A 54 2161 - 2168 1996 H ⁺ + He -> H + e; H ⁺ + 2e electron spectroscopy 85 keV	E

96E52	Watson,R.L. Sampoll,G. Hovart,V. Heber,O. Kinetic energy release in the dissociative capture-ionization of CO molecules by 97 MeV Ar^{14+} Phys. Rev. A 53 1187 - 1190 1996 $\text{Ar}^{14+} + \text{CO} \rightarrow \text{Ar}^{13+} + \text{C}^{*} + \text{O}^{*}$ projectile-recoil-ion TOF 97 MeV E	96T4	Bachau,H. Investigation of the properties of (3,3,3) triply excited states of multicharged ions J. Phys. B 29 4365 - 4379 1996 $\text{N}^{7+} \rightarrow \text{N}^{4+}(3,3,3)^3\text{S}^{*o}$ T
96E53	Wu,W. Deveney,E.F. Datz,S. Desai,D.D. Krause,H.F. Sanders,J.M. Vane,C.R. Cocke,C.L. Giese,J.P. Scaling rule for target ionization by highly charged ions at low-to-intermediate velocities Phys. Rev. A 53 2367 - 2370 1996 $\text{C}^{10+}, \text{Cu}^{28+}, \text{I}^{54+}(q=6-10) + \text{He} \rightarrow \text{He}^{*}$ recoil-ion-projectile TOF 1.6 - 3.1 au E	96T5	Belkic,Dz. Reformulated impulse approximation (RIA) for charge exchange in fast ion-atom collisions Phys. Scripta 53 414-430 1996 $\text{H}^{+} + \text{H} \rightarrow \text{H} + \text{H}^{*}$ RIA 60 keV - 3 MeV T
96T1	Alston,S. Modified Fadeev treatment of electron capture Phys. Rev. A 54 2001 - 2021 1996 $\text{H}^{+} + \text{He} \rightarrow \text{H}^0$ T	96T6	Bhattacharjee,B. Das,M. Deb,N.C. Mukherjee,S.C. Two-electron capture by He^{2+} , Li^{3+} and B^{3+} in the independent-event model Phys. Rev. A 54 2973 - 2976 1996 He^{2+} , Li^{3+} , $\text{B}^{3+} + \text{He} \rightarrow \text{He}^{*}$, Li^{2+} , B^{4+} CDW with independent-event model 0.5-6 MeV (He) ; 1-4 MeV/amu (Li) ; 5-25 MeV (B)
96T2	Fadeev multiple-scattering theory 293 keV/amu angular distributions Ashok,J. Winter,T.G. Single electron transfer and target excitation in $\text{He}^{2+} + \text{Na}(3s)$ collisions at 2-50 keV/amu in the coupled-Sturmian-pseudostate approach J. Phys. B 29 4675 - 4687 1996 $\text{He}^{2+} + \text{Na}(3s) \rightarrow \text{He}^{*}(2l,3l,4l)$ Sturmian 2 - 50 keV/amu also excitation to $\text{Na}(3p,3d,4l)$ Bacchus-Montabonel,M.C. Double-electron capture processes in $\text{B}^{4+} + \text{He}$ collisions Phys. Rev. A 53 3667 - 3670 1996 $\text{B}^{4+}(1s) + \text{He} \rightarrow \text{B}^{2+}(1s2l2l')$ MO 0.1 - 0.7 au T	96T7	Brown,G.J. Crothers,D.S.F. Close-coupling symmetrized variational continuum distorted-wave theory : electron capture in alpha-particle collisions with hydrogen J. Phys. B 29 1705 - 711 1996 $\text{He}^{2+} + \text{H}(1s) \rightarrow \text{He}^{*}(1s,2s,2p)$ symmetrized variational CDW 7 - 1000 keV/amu T
96T3		96T8	Brown,G.J.N. Crothers,D.S.F. A theoretical description of electron capture by H^{+} from He^{+} ions using symmetrized variational continuum distorted waves J. Phys. B 29 6165-6174 1996 $\text{H}^{+} + \text{He}^{+} \rightarrow \text{H}^0 + \text{He}^{2+}$ symmetrized variational CDW 20-500 keV T
		96T9	Brown,G.J.N. Crothers,D.S.F. Close-coupling symmetrized variational continuum distorted-wave theory : electron capture to excited states in p-H collisions Phys. Rev. Letters 76 392 - 395 1996 $\text{H}^{+} + \text{H}(1s) \rightarrow \text{H}(2s,2p)$ symmetrized variational CDW 5 - 200 keV T

96T10	Busnegro,H.F. Martinez,A.E., Rivarola,R.D. Single electron capture from He target J. Phys. B 29 4193 - 4205 1996 H ⁺ , He ²⁺ , Li ³⁺ , B ⁴⁺ , C ⁶⁺ , N ⁷⁺ , O ⁸⁺ , F ⁹⁺ + He -> H(nl=2s,2p,3s,3p,3d,4s), He ⁺ , Li ²⁺ , B ⁴⁺ , C ⁶⁺ , N ⁷⁺ , O ⁸⁺ , F ⁹⁺ CDW-EIS, -EFS 20-3000 keV/amu				
96T11	Cherkani,M.H. Fussen,D. Chibisov,M.I. Brouillard Electron detachment of H in collisions with multiply charged ions Phys. Rev. A 54 1445 - 1447 1996 H ⁺ + A ^{q+} -> H ⁰ (A=Ne,Ar,Xe) two-state model 10 - 200 keV scaling law				
96T12	Cohen,J.S. Quasiclassical-trajectory Monte Carlo methods for collisions with two-electron atoms Phys. Rev. A 54 573 - 586 1996 H ⁺ + He -> H + He ⁺ ; H + He ²⁺ + e; He ²⁺ + He -> He ⁺ + He ⁺ + e; Li ³⁺ + He -> Li ²⁺ + He ⁺ ; Li ³⁺ + He ²⁺ + e; Li ³⁺ + He ²⁺ Quasi-CTMC 25-2000 keV/amu also single/double ionization				
96T13	Croft,H. Dickinson,A.S. Charge transfer in slow collisions of Na with H ⁺ J. Phys. B 29 57 - 70 1996 H ⁺ + Na(3s,3p) -> H(n=2) + Na ⁺ MO 0.01 - 34 eV				
96T14	Das,M. Deb,N.C. Mukherjee,S.C. Calculation of cross sections for electron capture by fast fully stripped ions from atomic hydrogen Phys. Scripta 54 44-49 1996 A ^{q+} + H -> A ^{(q-1)+} (nl) (A=Li,Be,B,C,N,O,Ne) DW 200-700 keV/amu				
96T15	Dubois,A. Hansen,J.P. Comparison between quantal and classical scattering dynamics in singly charged ion-atom collisions J. Phys. B 29 L225 - 230 1996 H ⁺ + Na(3p) -> H CTMC 1 keV				
96T16	Ermolaev,A.M. Korotkov,A.A. Close-coupling calculation of p + Be ³⁺ collisions at intermediate and high energies and application to JET plasmas J. Phys. B 29 2797 - 2818 1996 H ⁺ + Be ³⁺ (1s) -> H(n=1,2) AO 30 keV - 10 MeV also excitation, ionization				
96T17	Errea,I.,F. Harel,C. Jimeno,P. Jouin,H. Mendez,L. Riera,A. Molecular treatment of electron detachment in H ⁺ + H ⁺ collisions Phys. Rev. A 54 967 - 969 1996 H ⁺ + H ⁺ -> H + H MO with CTF 0.1 - 0.9 au				
96T28	Fourre,I. Courbin,C. Classical trajectory study of orientation and alignment effects for charge exchange processes in H ⁺ - Na(3p _m) collisions Z. Phys. D 38 103-111 1996 H ⁺ + Na(3p _m) -> H CTMC 1-8 keV				
96T19	Fritsch,W. Lin,C.D. One- and two-electron transitions in slow C ³⁺ - He collisions : total and angle-differential cross sections and coherence parameters Phys. Rev. A 54 4931-4942 1996 C ³⁺ -(1s) + He -> C ⁴⁺ (1snl : n=2,3), C ³⁺ (1s2l2l') semiclassical close-coupling AO 1-35 keV/amu				

96T20	Gargaud,M. McCarroll,R. Orientation of the (3p) ² p state resulting from electron capture in Al ¹³⁺ /H collisions J. Phys. B 29 3673 - 3682 1996 Al ¹³⁺ + H/D → Al ²⁺ (2p ⁶ 3p) ² P, Al ²⁺ (2p ⁶ 3s) ² S MO 0.5 - 10 keV/amu angular differential cross sections Gayet,R. Hanssen,J. Jacqui,L. Martinez,a. Rivarola,R. Double electron capture by fast bare ions in helium atoms : production of singly and doubly excited states Phys. Scripta 53 549-556 1996 A ^{q+} + He → A ^{(q-2)+} (nl,n'l') (A=He,Li,B.) four-body CDW 0.4-30 MeV	T		
96T21				
96T22	Glass,J.T. McCann,J.F. Crothers,D.S.F. Second-order relativistic electron capture Z. Phys. D 36 119-124 1996 relativistic CDW	T		
96T23	Grande,P.L. Schiwietz,G. Sigaud,G.M. Montenegro,E.C. Nonperturbative treatment of the screened-Coulomb contribution of projectile-electron loss Phys. Rev. A 54 2983 -2990 1996 He ⁺ + B → He ²⁺ (B=He,Ne,Ar,Kr) coupled-channel calculation 250-1000 keV/amu	T		
96T24	Herrero,B. Cooper,I.L. Dickinson,A.S. Structure and coupling in the (Si-H) ³⁺ quasimolecule J. Phys. B 29 5583-5595 1996 Si ³⁺ + H → Si ²⁺ potential energy and wavefunctions rate coefficients Ichihara,A. Shirai,T. Eichler,J. Radiative electron capture and the photoelectric effect at high energies Phys. Rev. A 54 4954-4959 1996 Au ⁷⁹⁺ + Au → Au ⁷⁸⁺ + hv(REC) photoionization for Au ⁷⁸⁺ , U ⁹¹⁺ : radiative recombination of free electron 10.8 GeV/amu	T		
96T26				Ionescu,D.C. Eichler,J. Bound-free electron-positron pair creation in relativistic heavy-ion collisions as a charge-transfer processes Phys. Rev. A 54 4960-4967 1996 first-order distorted wave Born approx.
96T27				Jakimoski,d. Savichev,V.I. Solov'ev,E.A. H-type of hidden crossings in atomic collisions involving highly charged ions Phys. Rev. A 54 2962 - 2966 1996 H ⁺ + O ⁷⁺ (1s) → H(n) + O ⁸⁺ hidden crossing method : also excitation 0.05 - 1.0 MeV/amu
96T28				Janev,R.K. Solov'ev,E.A. Wang, Y. Electron capture, excitation and ionization in slow collisions of Li ³⁺ ions with ground state and metastable hydrogen atoms J. Phys. B 29 2497 - 2514 1996 Li ³⁺ + H(1s), H(2s) → Li ²⁺ (nl) hidden crossing method 0.1 - 20 keV/amu also ionization, excitation
96T29				Kazansky,A.K. Ostrovsky,V.N. Rydberg-atom-ion collision : classical theory of intrashell transitions J. Phys. B 29 3651 - 3672 1996 Na ⁺ + Na(28d, 26d) → Na ⁺ + Na(28l,26l) classical trajectory
96T30				Kimura,M. Gu,J.P. Hirsch,G. Buenker,R.J. Electron capture in collisions of O ²⁺ (³ P) ions with He atoms at energies below 10 keV : the effect of metastable O ²⁺ (¹ D) ions Phys. Rev. A 53 4164 - 4168 1996 O ²⁺ (³ P, ¹ D) + He → O ⁺ MO 0.02 - 1000 eV/amu
96T31				Kimura,M. Li,Y. Hirsch,G. Buenker,R.J. Elastic and inelastic processes in H ⁺ + C ₂ H ₂ collisions below the 1.5 keV regime Phys. Rev. A 54 5019-5026 1996 H ⁺ + C ₂ H ₂ → H ⁰ MO 0.1-7 keV angular distributions

96T43	Wang,J. Olson,R.E. Cornelius,K. Tokesi,K. Slow convergence to n^4-scaling of cross sections in electron capture from Rydberg states J. Phys. B 29 L537 - 543 T $H^+ + H(n,n-1) \rightarrow H(n^+) + H^+$ CTMC
96T44	Yakhontov,V.I., Amusia,M.Ya. Radiative double electron capture in fast heavy ion-atom collisions Phys. Letters A 221 328-334 1996 T $A^{n+} \rightarrow A^{(n-2)+} + h\nu$ (double electron capture with REC single photon) ($A=10-100$)

A list of finding references for particular combinations of collision partners

an example :

H <--- projectile ion

q = -1 : 77E12(He)

charge reference number (target)

(the first two numbers : the year of publication)

(the third : P;proceedings/review/book, E;experiment, T;theory,)

(the last : target atom/ molecules)

* : excited or metastable state

Atomic ion species

H

q = -1 : 77E12(He,Ar,Xe,N₂), 80E33(He,Ar,H₂,N₂,O₂), 81E21(H,He,Ne,Ar,H₂,N₂), 81E24(Na), 83E54(H₂), 84E52(He,Ne,Ar), 85E74(Na,H₂), 86E62(He,Ar,Xe), 87E2(He,Ne,Ar), 87E23(H,H₂), 87E75(Na,K), 87E76(Cs), 88E51(Li,Na,Mg,Ca,Sr,Cs), 90E19(N₂), 90E20(H), 91E17(Na(3s,3p)), 91E50(H⁺), 94E51(He,Ar,K,Kr,Xe,H₂,O₂,CO₂,C₂H₂), 95E1(He,Ne,Ar), 95E8(He,Ne,Ar,Xe,H₂,N₂), 95E36(H⁺), 95E37(Ne^{q+}:q=1-4,Ar^{q+}:q=1-8,Xe^{q+}:q=1-8), 95E45(He,Ar,Kr,Xe,H₂,O₂,CO₂,C₂H₂), 96E14(SF₆,CH₄,CO), 96E37(He⁺), 96E51(He)

; 85T41(Ne), 84T42(Cs⁺), 88T23(Na), 91T46(He,Ne,Ar,Kr,Xe,H,N,O),

96T11(Ne⁴⁺,Ar⁴⁺,Xe⁴⁺), 96T38(H⁺)

q = 0 : 79E15(Na,K,Cs), 79E24(H,H₂), 80E14(Na,K,Rb,Cs), 80E30(H,H₂), 80E35(H), 80E36(H), 82E23(Cs,N₂), 83E31(Ca,Sr), 83E56(H(2s)), 84E22(Na), 84E49(O,O₂), 85E1(Mg), 86E13(He,Ne,Ar,Kr,Xe,H₂), 87E2(He,Ne,Ar), 87E20(Na,K,Rb), 87E24(H,H₂), 88E28(H₂,N₂,O₂,CO,CH₄), 88E51(Li,Na,Mg,Ca,Sr,Cs), 88E54(N₂,O₂), 89E18(He), 89E43(Ar), 90E19(N₂), 91E37(Ne,Ar), 91E53(H₂,N₂,O₂,He,Ar), 94E51(He,Ar,K,Kr,Xe,H₂,O₂,CO₂,C₂H₂), 95E8(He,Ne,Ar,Xe,H₂,N₂), 95E29(He,Ne,Ar), 95E30(He,Ne,Ar), 95E45(He,Ar,Kr,Xe,H₂,O₂,CO₂,C₂H₂), 96E40(N₂), 96E41(H₂,O₂) ; 79T4(H), 80T2(H), 85T48(Na), 86T5(Na), 86T27(Na), 87T51(H), 88T62(Cs), 89T44(Ne), 90T41(He,Ne,Ar), 90T22(H), 90T29(H,Ar), 91T42(H₂),

91T46(He,Ne,Ar,Kr,Xe,H,N,O), 91T88(Ar), 92T66(Na(3s)), 93T17(H), 93T56(H), 93T57(H₂), 93T58(C), 93T59(Ne), 93T61(O₂(v=0)), 95T32(H), 95T34(H₂), 96T36(He)

q = 0* : 79E6(He,Ne,Ar,Kr), 84E49(O,O₂), 93E4(He,Ne)

; 90T41(He,Ne,Ar)

q = 1 : 69E1(N₂), 74E1(Ar), 77E1(N,O,Ne), 77E5(Cs), 78E14(He,Ne,Ar,Kr,Xe), 79E10(CO,CO₂,N₂O), 79E11(Mg,Ar,Ba), 79E12(Mg,Ar,Ba), 79E15(Na,K,Cs), 79E18(Cs), 79E19(Ne,Ar,CH₄), 80E12(Cs), 80E14(Na,K,Rb,Cs), 80E18(He,Ne,Ar,H₂,N₂,O₂), 80E23(Ar), 80E24(CH₄,C₂H₂,C₂H₄,C₂H₆,C₃H₈), 80E25(H₂), 80E35(H), 80E38(Li⁺), 81E33(H), 81E44(H), 82E2(CH₄,C₂H₂,C₃H₈), 82E10(He), 82E25(Na,K,Rb,Cs), 82E28(C,Ne), 82E29(C,Ne,Ar), 82E30(C), 82E32(H,D), 82E40(H₂), 82E47(H,H₂), 83E28(He,Ne,Ar,Kr,Xe,Hg,H₂,N₂,O₂,NO,CO₂,SO₂,NO₂,NH₃,CH₄,C₂H₂), 82E51(H,D), 83E31(Ca,Sr), 83E35(C⁺,N⁺), 83E40(Ar), 83E41(He), 83E44(He,Ne,Ar,Kr,H₂,N₂,CO,CH₄,CO₂), 83E58(He⁺), 84E4(Li), 84E7(Na,K), 84E16(Ne,Ar,Kr), 84E17(Mg), 84E21(H₂), 84E42(H⁺), 84E46(Li), 84E49(O,O₂), 84E54(He), 85E3(Kr), 85E4(Li), 85E5(Li), 85E7(Cs), 85E33(Li), 85E34(Li,Na,Mg), 85E37(Ar), 85E41(CO,CH₄,C₂H₆,C₃H₈), 85E44(H₂,D₂), 85E49(C), 85E55(H⁺), 85E59(He⁺), 85E63(C,N), 85E65(Li), 85E69(Hg), 85E71(Ne,CH₄,C₂H₂,C₂H₄,C₂H₆,C₃H₈), 85E73(C₃H₈,C₄H₈,O₂,CO,CO₂,CF₄,C₂F₆,SF₆), 85E18(Ne,Na,Mg), 86E19(K), 86E20(H₂,D₂), 86E23(He), 86E24(He,Ar), 86E27(Ne), 86E28(He), 86E37(H), 86E43(Na,K,Rb,Cs), 86E63(H), 86E68(H₂,D₂), 86E70(He), 86E78(O₂), 86E91(He,Ne,Ar,Kr,Xe), 87E2(He,Ne,Ar), 87E5(Na,Na(3p)), 87E6(Na), 87E11(Kr), 87E20(Na,K,Rb), 87E22(H₂O), 87E23(H,H₂), 87E26(He,Ne,Ar), 87E28(He,Ne,Ar), 87E29(He), 87E32(C⁺,N⁺), 87E34(Ne), 87E43(He), 87E53(He), 87E56(CO₂,N₂O), 87E57(H₂), 87E64(H⁺), 87E65(H⁺), 87E68(H,He,H₂), 87E73(He,Ne,Kr,Xe), 87E74(Li,CH₄,C₂H₂,C₂H₄,C₂H₆,C₃H₈,C₆H₁₂,C₃H₈,C₄H₈,CO,CO₂), 87E83(Xe), 87E86(CH₄), 88E3(22Ne), 88E7(CH₄), 88E13(Na), 88E51(Li,Na,Mg,Ca,Sr,Cs), 89E2(He), 89E13(He), 89E17(Cs), 89E33(He), 89E34(Ne,Ar,Kr,Xe), 89E40(Kr,Xe), 89E53(He), 89E57(H₂), 89E65(H₂), 90E2(He), 90E12(Na(3s),Na⁺(3p)), 90E13(N₂,O₂,CO,CO₂,NO,CH₄), 90E22(Mg), 90E19(N₂), 90E36(Ar), 90E40(Na⁺(3p)), 90E50(CO), 90E65(SF₆), 91E15(H), 91E13(He), 91E19(H₂), 91E21(K), 91E22(Na(3s),Na⁺(3p)), 91E20(Li,Na,K), 91E24(Ne), 91E28(Sr⁺,Ba⁺), 91E29(Tl⁺), 91E34(Ar), 91E60(H₂(X)), 91E62(He), 92E19(Na⁺(3p)), 92E34(Na⁺(3s,3p)), 92E38(He,Ne,Ar), 92E39(He), 92E40(Mg), 92E50(He), 92E53(H⁺), 93E5(C₂H₄), 93E24(Ar), 93E30(H), 93E55(N₂), 93E57(He,Ar), 93E58

(He), 87T33(He), 87T34(C), 87T39(H), 87T45(H), 87T46(H⁺(2s)), 87T47(He), 87T52(H⁻), 87T53(Na), 87T55(He), 87T56(He⁺, Li²⁺, Be³⁺, B⁴⁺, C⁵⁺), 87T59(H), 87T62(CO₂), 87T65(Li), 88T1(C,Ar), 88T2(H,He), 88T3(Ne), 88T4(H₂), 88T5(He, N, O), 88T7(H(2s)), 88T9(He, Li), 88T12(H⁺, U⁹²⁺), 88T13(H), 88T14(N, O, Ar), 88T15(H⁻), 88T24(H, O, Ne, Ar), 88T26(O₂), 88T27(He⁺, Li²⁺, Be³⁺, B⁴⁺, C⁵⁺), 88T31(He), 88T37(H), 88T38(Ne), 88T39(C, O, Ne), 88T48(H), 88T51(H, He⁺, Li²⁺), 88T56(He), 88T64(He⁺), 88T67(H, He⁺, Li²⁺), 89T1(H, He), 89T5(H₂), 89T7(H, He), 89T8(H), 89T10(He, Li), 89T14(He, C), 89T15(H, He), 89T16(H), 89T25(H₂), 89T35(Ne, He⁺), 89T36(C), 89T45(H₂), 89T46(H₂), 89T48(H), 89T49(H), 89T50(H₂), 90T1(Na⁺(3p)), 90T4(H, He), 90T10(Na(3s), Na⁺(3p)), 90T11(H), 90T12(Ne), 90T20(O₂), 90T31(H₂, He), 90T33(Na(3s, 3p)), 90T35(H, He⁺, Li²⁺), 90T36(H⁻), 90T37(He), 90T38(He⁺), 90T39(Ar), 90T40(H), 90T47(C), 90T49(Li(2s), Na(3s)), 91T7(H), 91T11(H), 91T17(Na), 91T24(H, He, C, Ne, Ar), 91T25(H), 91T28(C), 91T34(He), 91T35(Be²⁺, B⁴⁺, C⁵⁺, N⁶⁺, O⁷⁺), 91T36(He⁺, Li⁺, Li²⁺), 91T37(N, O, Ne), 91T38(C, N, O, Ne, Ar), 91T44(H), 91T50(He), 91T52(He), 91T53(He), 91T55(H), 91T57(He), 91T58(He⁺, Li⁺, Li²⁺), 91T59(He⁺), 91T64(CH₄, N₂, Ne), 92T1(Li, Na, K, Rb), 92T5(Na, K, Rb, Cs), 92T6(C, Ne, Ar), 92T14(He, Be²⁺, B³⁺, C⁴⁺, N⁵⁺, O⁶⁺), 92T15(Na⁺(3p)), 92T17(H), 92T21(O₂), 92T23(H), 92T25(He⁺), 92T30(H₂), 92T31(H₂), 92T39(H, He), 92T40(C, Ne, Ar), 92T42(H), 92T43(H), 92T45(He), 92T46(H), 92T48(H), 92T49(H), 92T53(H), 92T54(He), 92T58(H), 93T3(He), 93T10((Na)_n:n=1-75), 93T11(H, Li²⁺, Ne⁹⁺), 93T13(H), 93T15(H₂, H₂⁺), 93T16(H₂⁺), 93T19(H), 93T21(Na⁺(3s, 3p)), 93T22(H⁻), 93T23(H(2s, 2p)), 93T25(H₂:v=0), 93T26(H₂), 93T29(H(n=2, 3)), 93T30(H, He⁺), 93T32(H), 93T35(He⁺), 93T36(H, H₂), 93T37(Na(3p)), 93T40(H), 93T41(He), 93T42(H, He), 93T49(H), 93T51(H), 94T2(H(1s, 2s, 2p)), 94T3(C, Ne, Ar), 94T5(H), 94T10(H), 94T14(H₂), 94T17(Be³⁺), 94T29(H), 94T30(H, Zn²⁹⁺), 94T41(H), 94T43(H⁺(4f)), 94T44(H(n=3, 4, 5)), 94T45(He), 94T49(H), 94T51(H), 94T53(Na⁺(3p)), 94T54(CI), 94T55(Na⁺(3p)), 94T58(Li⁺(2s, 2p, 3p)), 94T59(H), 94T63(H⁺(4f_m)), 94T67(H(n=25)), 94T68(He⁺), 95T1(H, He), 95T2(H₂), 95T3(C⁻, C⁺, C⁺:O⁻, O⁺:F⁺, F⁺:Si⁻, Si⁺:Cl⁻, Cl⁺, Cl⁺), 95T5(H), 95T6(H), 95T9(H⁻), 95T15(H), 95T24(He⁺), 95T25(Na⁺(3s, 3p)), 95T27(CH₄), 95T30(H⁺(3d, 4f, 5g), Na(3p)), 95E(Fe, Cu), 96T1(He), 96T5(H), 96T8(He⁺), 96T9(H), 96T10(He), 96T12(He), 96T13(Na⁺(3s, 3p)), 96T15(Na⁺(3p)), 96T16(Be³⁺), 96T17(H⁻), 96T18(Na(3p_m)), 96T27(O⁷⁺), 96T31(C₂H₂), 96T33(H), 96T34(H⁺(n=4)), 96T43(H⁺(n-1))

(Na⁺(3p)), 93E60(Na⁺(3p)), 93E61(Na(3s)), 93E71(Na(3s)), 94E10(He), 94E12(He), 94E23(Mg), 94E48(Ne), 94E49(Fe), 94E52(Na(3p)), 94E69(Na(3p)), 95E41(Na(3p)), 95E51(He, Ar, Kr), 95E52(Kr), 95E53(Cu), 95E67(Kr), 96E11(Mg), 96E15(Na(3p)), 96E29(He), 96E31(O), 96E42(CS₂), 96E46(O),
; 62T1(H), 73T1(Ar), 74T1(H), 75T1(Ar), 75T4(H), 76T4(He, Ar), 77T1(H), 77T2(H), 77T3(He), 77T4(H), 77T8(H), 77T12(H), 77T13(H), 78T3(H), 78T8(C, N, O, Ne, Ar), 78T9(H⁻), 78T10(H), 78T11(H), 78T13(H), 78T17(Cs), 78T19(He, Ar), 79T2(Li), 79T5(He), 79T9(H, He), 79T10(H(2s)), 79T15(Ar), 79T18(He), 79T19(Ar), 79T21(H), 79T22(H), 79T23(H), 79T24(He⁺, Li²⁺), 79T25(H, He, Ar), 79T26(H₂), 79T28(H), 79T29(H), 79T31(H), 79T35(H), 79T37(He⁺, Li²⁺, C⁵⁺), 80T1(C, Ne, Ar), 80T8(O), 80T17(C, N, O, Ne, Ar), 80T20(Ne, Ar, Kr), 80T21(Ne⁹⁺, Ca¹⁹⁺), 80T23(H), 80T24(H, Cu²⁸⁺), 80T25(He⁺, Li²⁺, Be³⁺, C⁵⁺), 80T28(He), 80T29(H), 80T31(H), 80T36(He⁺), 80T39(He⁺), 81T1(H⁻), 81T3(He⁺), 81T4(Ar), 81T5(H, He), 81T8(H), 81T10(He), 81T12(H), 81T14(C, Ne), 81T19(H), 81T20(He, C, Ar, N₂, O₂), 81T21(H), 81T22(Ne, Ar), 81T23(H), 81T25(Na, K, Rb), 81T26(H), 81T27(Ar), 81T30(H), 81T34(H⁻), 81T36(H), 81T37(H, He), 81T41(He⁺(1s, 2s, 2p), 82T4(H, Ne), 82T7(H), 82T10(Li⁺, Li²⁺), 82T12(H), 82T13(H, He⁺), 82T18(H), 82T20(Na), 82T21(Na, K, Rb, Cs), 82T22(H), 82T23(H), 82T28(Li), 82T30(He⁺), 82T31(H), 82T32(H), 82T34(He), 82T43(He⁺, Li²⁺, C⁵⁺, N⁶⁺), 82T44(Mg⁺, Ca⁺, Sr⁺, Ba⁺), 82T45(Li⁺), 82T46(He⁺), 83T1(Li), 83T2(C, Ne, Ar), 83T5(H⁻), 83T10(Li), 83T12(Li), 83T13(H), 83T14(H), 83T17(H), 83T26(H), 83T30(H, Be, C, O, Ne), 83T37(H⁻), 83T38(H, He), 83T40(Li), 83T46(H(n)), 84T2(C, N), 84T3(C, N), 84T10(He), 84T12(H), 84T13(He⁺), 84T14(He), 84T19(Na, K), 84T24(H(2s, 2p)), 84T25(H, He, C⁵⁺), 84T2(H), 84T30(H), 84T34(Ne), 84T36(H, He, He⁺), 84T39(H, He), 84T40(C, O), 84T41(H, He⁺), 84T42(Cs), 84T45(H), 84T46(He, C, Ne, He⁺, Ne⁹⁺, Ar¹⁷⁺), 84T47(He, H₂), 84T53(He), 84T58(H), 84T59(H₂), 85T5(H), 85T10(H), 85T11(H), 85T29(Ne, Si, N), 85T31(He), 85T32(H₂), 85T33(He⁺), 85T34(H), 85T36(H, Cs), 85T38(He), 85T41(He), 85T42(H), 85T45(H, He, C, Ne, Ar, Xe), 85T46(H), 85T50(C, N, O, Ne, Ar), 85T51(H⁻), 85T52(He), 85T54(He), 86T1(Na), 86T2(Na), 86T6(H⁻), 86T9(H), 86T10(Na), 86T12(He), 86T16(C, Ar), 86T17(H(2s)), 86T22(H, He), 86T23(H), 86T25(Ar), 86T34(H), 86T41(He), 86T42(H), 86T56(H), 86T58(H⁻), 86T61(He⁺, Li²⁺), 86T62(He), 86T66(H), 86T71(H, He), 86T73(H), 86T77(He, C, N), 87T5(H), 87T6(H(2s)), 87T7(H), 87T10(C, Ne, Ar), 87T11(H, B⁴⁺), 87T14(H), 87T15(Li²⁺), 87T22(He), 87T24(C, N, O, Ne, Ar), 87T31(H), 87T32

D

q = -1 : 80E17(Na,Rb,Cs), 83E54(H₂), 87E14(Cs), 87E75(Na,K), 87E76(Cs), 90E20(H)

; 83T41(Ne)

q = 0 : 80E17(Na,Rb,Cs), 87E14(Cs),

q = 1 : 79E13(Mg,Ca,Sr,Ba), 80E17(Na,Rb,Cs), 82E32(H,D), 87E14(Cs), 91E20(Li,Na,K)

He

q = 0 : 82E37(H₂), 86E61(H₂), 89E66(He,Ar), 90E45(H₂,O₂,CH₄,CO,CO₂), 92E35(Zn)
; 89T54(Ne), 92T36(He), 92T68(He)

q = 1 : 63E1(N₂,O₂), 65E1(N₂,O₂), 70E2(N₂), 76E2(He), 76E11(He,Ar,Kr,H₂,N₂,O₂), 76E12(He,Ar,Kr,H₂,N₂,O₂), 77E3(Xe,Ar), 77E5(Cs), 78E3(He), 78E14(He,Ne,Ar,Kr,Xe), 79E8(Ar), 79E20(He), 81E16(Na,K,Rb,Cs), 81E27(H), 82E7(He,Ne,Ar,N₂), 82E22(Li), 82E37(Hg), 82E37(H₂), 82E47(H), 83E19(Ne), 83E23(O₂), 83E33(Xe), 83E39(He⁺), 83E47(Cs), 84E15(He,Ne,N₂,Sr), 84E16(Ne,Ar,Kr), 84E46(Li), 85E5(Li), 85E6(Li), 85E33(Li), 85E34(Li,Na,Mg), 85E62(H₂O), 85E76(Cd), 86E2(O₂), 86E18(Ne,Na,Mg), 86E66(He⁺), 86E67(B⁺), 87E11(Xe), 87E17(He,Ar,H₂), 87E18(Li,Na), 87E54(He⁺), 87E93(He⁺), 87E96(N₂), 88E9(He,Ne,Ar,Kr), 88E10(He,Ne,Ar,Kr), 88E11(H,D₂), 88E24(Xe), 88E33(Ne), 88E41(Na), 88E59(H₂), 89E29(Na), 89E34(Ne,Ar,Kr,Xe), 89E54(H₂), 90E13(H₂,N₂,O₂,CO,NO), 90E34(H₂,N₂,O₂,CO,CO₂,N₂O,CH₄,C₂H₄,C₂H₆), 90E46(He⁺), 91E2(He,Ne,Ar), 91E15(H), 91E16(H₂), 91E58(Cd), 91E64(He), 91E65(He), 92E35(Zn), 93E45(SF₆), 93E48(H₂,He), 93E49(Ar), 93E54(He), 94E43(Ar), 94E47(He), 94E44(He⁺), 94E50(H⁻), 94E52(Na⁺(3p)), 95E12(He), 95E13(Ne), 95E16(O⁻), 95E56(Na⁺(3s,3p)), 96E34(Ar)

; 62T1(He), 78T15(Ar,Cd,Cs), 78T16(Li), 79T4(H), 79T17(He,Ne,Ar,Kr,Xe), 81T24(He⁺), 81T28(H), 81T35(Na,K,Rb,Cs), 82T45(He²⁺,R³⁺,C⁴,O⁶⁺), 83T11(H), 83T18(H), 83T28(H), 83T47(He²⁺), 83T48(He⁺), 83T43(Rb), 83T44(Hg), 83T45(Hg), 84T9(Li), 85T39(H,He⁺), 85E71(Ne,CH₄,C₂H₂,C₂H₄,C₂H₆,C₃H₆,C₃H₈,C₄H₈,O₂,CO,CO₂,CF₄,C₂F₆,SF₆), 86T12(Li⁺), 86T14(He⁺), 86T31(He⁺), 86T63(Ne), 86T70(Zn,Cd), 87T17(H⁺), 87T20(He⁺), 87T36(³He), 87T69(Cd), 88T18(H), 88T20(He), 88T47(Na), 89T22(H), 89T24(He⁺), 89T42(CO₂), 89T51(H), 89T54(Ne), 90T15(H⁺), 90T16(Na), 90T32(Na⁺(3p)), 91T29(H₂,He), 91T33(H₂), 91T42(H₂),

91T61(Hg), 91T68(Ar), 92T7(H), 92T28(He), 92T29(H⁻), 92T68(He), 93T6(Hg), 93T7(Hg), 93T60(H⁺), 94T16(Na⁺(3s,3p)), 94T18(H), 94T21(H⁺), 94T38(C), 94T39(O), 95T16(He), 95T18(Ne), 95T21(He), 95T28(H), 95T32(H,He⁺), 95T37(Na⁺(3s,3p)), 96T23(He,Ne,Ar,Kr), 96T36(He)

q = 1 : 85T54(H,He⁺(2s)), 91E58(Cd⁺)

q = 2 : 75E1(He), 75E2(H), 75E3(He), 76E11(H,He,Ar,Kr,K,H₂,N₂,O₂), 78E4(He,Ne,Kr), 78E5(H,H₂), 78E8(H,H₂), 79E7(He,Ne,Ar,Kr,Xe), 80E25(H₂), 81E2(Li), 81E4(H), 82E7(He,Ne,Ar,N₂), 82E9(Ne,Ar,Kr,Xe), 82E13(Li), 82E14(Li), 82E17(C), 82E19(Ne), 82E22(Li), 82E24(Li), 82E29(C,Ne,Ar), 82E40(H₂), 82E47(H), 83E15(Ne,Ar,Kr,Xe,N₂), 83E23(O₂), 83E28(He,Ne,Ar,Kr,Xe,Hg,H₂,N₂,O₂,NO,CO₂,SO₂,NO₂,NH₃,CH₄,C₂H₂), 83E33(Xe), 83E53(Li), 84E8(Li), 84E15(He,Ne,N₂,Sr), 84E31(Ne,Ar,N₂), 84E46(Li), 85E20(H), 85E21(H,H₂), 85E26(Li), 85E33(Li), 85E61(He,Ne,Ar,H₂,N₂,O₂,CO,CO₂,CH₄,H₂O), 85E65(Li), 86E4(He,Ne,Ar,Kr), 86E18(Ne,Na,Mg), 86E19(K), 86E46(H⁻), 86E51(Li), 86E60(H⁻), 86E70(He), 87E19(He,Ne,Ar,Kr), 87E43(He), 87E53(He), 87E78(O₂), 87E79(He), 88E9(He,Ne,Ar,Kr), 88E10(He,Ne,Ar,Kr), 89E4(Li), 89E6(Ar,N₂), 89E28(H,H₂), 89E38(Ne,Ar), 89E49(Li,Na,K), 90E50(CO), 89E68(He), 90E10(Xe), 90E25(He,H₂), 90E49(Li,Na,K), 90E50(CO), 91E3(Na(3s),Na⁺(3p)), 91E10(H⁻), 91E11(H⁻), 91E15(H), 91E16(H₂), 91E25(H), 91E38(D₂,N₂,O₂), 91E48(He), 92E1(Na⁺(3p)), 92E11(He), 92E16(H,H₂), 92E17(He), 92E49(Na(3s),Na⁺(3p)), 92E18(Li), 92E26(O,O₂), 92E30(H₂,He), 92E35(Zn), 92E37(Na), 92E40(Mg), 93E1(He,Ne,Ar,Kr,Xe,N₂), 93E16(He), 93E21(Na(3s),Na⁺(3p)), 93E22(Na(3s),Na⁺(3p)), 93E23(Li(2s),Li⁺(2p)), 93E64(Na⁺(3p)), 93E66(H₂,N₂,O₂,CO,CO₂,H₂O), 94E8(D₂), 94E15(z=6-83), 94E18(He), 94E26(H₂), 94E29(He), 94E46(C), 94E49(Fe), 94E58(Na(3s)), 95E2(D), 95E18(H₂), 95E19(H,H₂,He,Li,Na), 95E35(He⁺), 95E38(He), 95E49(Na(3s)), 95E53(Cu), 95E66(Na), 95E67(Fe,Cu), 96E17(CO), 96E27(V,Cr,Cu,Ge,Nb,Ag,Sn), 96E47(O),

; 54T2(H), 80T10(H), 82T19(H), 84T5(H), 84T43(H), 85T18(H), 86T47(Li),
 87T28(H), 91T8(H), 91T42(H₂)
 q = 3 : 79E15(Na,K,Cs), 80E37(H), 81E43(H), 81E46(He,H₂), 82E29(C,Ne,Ar),
 82E40(H₂), 87E53(He)
 ; 77T5(H), 77T12(H), 77T13(H), 78T11(H), 78T20(He), 79T30(H), 79T31(H),
 80T4(H), 80T10(H), 81T6(H), 81T8(H), 81T12(H), 81T14(C,N), 81T20(C,Ne),
 81T29(H), 81T30(H), 82T3(H), 82T4(Ne⁹⁺), 82T6(H), 82T10(H), 82T14(H),
 82T24(H), 82T27(H), 82T32(H), 82T33(H), 82T39(Li⁺), 82T42(Li²⁺),
 83T13(H), 83T16(H), 83T20(H), 83T25(H), 84T5(H), 84T11(H, H⁺ (2s)), 84T43
 (H), 84T52(H,He,Li,Be,B,C,Ne,Na,Mg,K,Ar,Cs), 84T53(He), 84T54(H), 85T2
 (Li,Na), 85T6(H), 85T52(He), 85T54(He), 86T13(He), 86T16(C), 86T28
 (He), 86T46(He), 86T52(He), 86T77(C,N), 87T5(H), 87T6(H (2s)), 87T22
 (He), 87T25(He), 88T6(He), 88T39(C,O,Ne), 88T51(H), 88T67(H), 89T41
 (Li), 89T59(H), 90T28(C,Ne), 90T31(H₂,He), 90T35(H,Li²⁺), 90T47(C),
 91T8(H), 91T50(He), 92T8(He), 92T17(Ne), 92T40(C), 92T53(H), 93T2(He),
 93T11(H,Ne⁹⁺), 93T52(H⁺ (2s,2p)), 94T2(H), 94T58(Li⁺ (2s,2p,3p)), 94T59
 (Li²⁺), 94T61(H), 95T17(H,He), 95T5(H), 95T39(He⁺ (1s2s)), 96T6(He),
 96T10(He), 96T12(He), 96T14(H), 96T21(He), 96T28(H(1s), H⁺ (2s))

He

q = 1 : 79E17(He,Ne), 88E14(He), 92E54(H,H₂,He), 94T20(H)
 q = 2 : 83E60(Ar,H₂), 90E53(H₂,Be), 92E54(H,H₂,He)
 ; 54T1(H), 86T60(H), 88T55(Li), 89T6(Be⁺)
 q = 3 : 83E60(Ar,H₂), 92E54(H,H₂,He)
 ; 78T20(He), 88T53(H), 94T59(Be⁺)
 q = 4 : 83E60(Ar,H₂), 92E54(H,H₂,He), 93E28(Li),
 ; 77T4(H), 77T5(H), 77T9(H), 77T12(H), 77T13(H), 78T3(H), 78T11(H),
 79T10(H (2s)), 79T13(H), 79T30(H), 80T4(H), 81T8(H), 81T30(He), 82T2(H),
 82T24(H), 82T27(H), 82T39(Be²⁺), 83T20(H), 83T25(H), 83T30(He), 84T22
 (H), 84T37(H), 84T53(He), 84T54(H), 84T57(H), 85T58(H), 86T45(He),
 87T5(H), 91T8(H), 92T32(He), 92T53(H), 92T59(H(1s), H⁺ (2s)), 93T11(H,
 Ne⁹⁺), 93T12(H⁺ (2s)), 93T28(He), 94T58(Li⁺ (2s,2p,3p)), 94T59(Be³⁺),
 94T61(H), 95T39(He⁺ (1s2s)), 96T14(H)

B

q = 1 : 83E23(O₂), 92E54(H,H₂,He), 93E40(Ne,O₂),
 q = 2 : 80E29(H), 83E60(Ar,H₂), 86E47(H⁻), 92E54(H,H₂,He), 95E3(C⁺)

83T17(H), 83T20(H), 83T27(He), 83T30(He), 83T47(³He⁺), 83T40(Li),
 84T14(He), 84T15(He), 84T16(H,Li), 84T17(Li), 84T22(H), 84T41(H),
 84T43(H), 84T52(Li,Be,B,C,Ne,Na,Mg,K,Ar,Cs), 84T54(H), 85T7(He,Li,Ar,
 Kr), 85T17(H), 85T22(Li), 85T29(O,Ne,Si), 85T36(Li), 85T52(He), 85T54
 (He), 85T57(H), 85T62(H), 86T13(Li,Li (2s)), 86T16(H,C), 86T42(He),
 86T77(H,C,N), 87T4(Li), 87T5(H), 87T6(H (2s)), 87T9(He), 87T16(Li,
 Li (2p)), 87T17(H), 87T18(H), 87T22(He), 87T23(He), 87T25(He), 87T50
 (Na), 87T57(H), 88T16(He), 88T19(H), 88T34(He), 88T39(C,O,Ne), 88T51
 (H), 88T59(H⁻), 88T64(H), 88T65(H), 88T67(H), 89T6(He⁺), 89T10(He,Li),
 89T14(Li), 89T24(He), 89T32(He), 89T45(H₂), 89T54(Ne), 89T55(H), 89T57
 (Hg), 89T59(H), 89T60(He), 90T4(H), 90T21(H), 90T26(Na), 90T28(C,Ne),
 90T31(H₂,He), 90T35(H), 90T47(C), 91T18(He), 91T19(H), 91T23(He),
 91T31(H⁺ (2s)), 91T35(Be²⁺, B⁴⁺, C⁵⁺, N⁶⁺, O⁷⁺), 91T37(Ne), 91T38(Ne),
 91T39(He), 91T47(H₂), 91T50(He), 91T62(He), 91T65(H), 91T67(H (n=1,2)),
 92T8(He), 92T14(He,Li⁺, Be²⁺, B³⁺, C⁴⁺, N⁵⁺, O⁶⁺), 92T22(H), 92T31(H₂),
 92T40(Ne), 92T44(H), 92T53(H), 92T55(H), 92T56(H), 92T58(H), 93T4(He),
 93T5(He), 93T11(H,Ne⁹⁺), 93T23(H⁺ (2s,2p)), 93T29(H⁺ (n=2,3)), 93T35
 (H⁺ (1s,2s,2p)), 93T45(Na⁺ (3p)), 93T46(H₂), 93T52(H⁺ (2s,2p)), 94T2(H),
 94T5(H), 94T8(He), 94T14(H₂), 94T15(Na⁺ (3p)), 94T19(H), 94T13(H,He),
 94T25(He), 94T31(He), 94T48(He), 94T50(H₂), 94T51(H), 94T58(Li⁺ (2s,2p,
 3p)), 94T59(He⁺), 94T61(H), 95T17(He), 95T5(H), 95T7(He), 95T13(He⁺),
 95T24(H), 95T31(H), 96T2(Na (3s)), 96T6(He), 96T7(H), 96T10(He), 96T12
 (He), 96T21(He), 96T42(He)

Li

q = -1 : 82E49(Ar,H₂,N₂,CO₂), 84E52(He,Ne,Ar)
 q = 0 : 86E58(Cs)
 q = 1 : 69E1(N₂), 76E5(He,Ar), 79E9(Li), 81E35(Li⁺), 82E40(H₂), 84E48(Li⁺),
 85E24(Mg,Ca,Sr,Ba), 86E74(He), 87E59(H⁻), 87E102(Ne), 88E52(Ar,Kr),
 90E63(He,Ne,Ar), 91E52(H,H₂), 94E50(D⁻), 94E52(Na⁺ (3s,3p)), 96E30
 (Na⁺ (3s,3p)), 96E49(Na (3s))
 ; 76T8(Li), 80T10(H), 81T32(Li), 82T8(Li⁺), 82T9(Li⁺), 82T19(H),
 82T38(Li⁺), 83T24(Ca), 84T5(H), 84T49(Li), 84T55(Na), 86T38(He),
 86T55(Na), 86T59(He), 87T8(Li⁺), 88T17(H), 88T54(Li), 88T55(Be⁺),
 90T30(H⁻), 92T24(Na), 92T29(H⁻), 94T15(Na⁺ (3p)), 94T46(Na⁺ (3s,3p)),
 94T47(Na⁺ (3p)), 94T59(Li), 95T35(Na⁺ (3s,3p)), 96T35(Na⁺ (3s,3p))
 q = 2 : 81E43(H), 81E46(He,H₂), 82T10(H), 82E40(H₂), 91E30(H₂,He), 91E52(H,H₂,He)

$q = 3$: 76E3(He,Ne,Ar), 80E29(H), 81E30(D₂), 81E38(H), 81E39(H₂), 81E45(H), 82E12(He), 82E18(He), 82E40(H₂), 82E52(H, H₂), 82E52(H, H₂), 83E27(He), 83E53(Li, H₂), 83E55(H), 83E60(Ar, H₂), 84E12(Li), 84E33(H), 85E19(H, H₂), 86E11(H, H₂), 86E47(H⁺), 88E2(He, Ne, Ar, Kr, Xe, H, N₂, O₂), 91E4(H), 92E28(H₂, He), 93E51(Li), 94E33(He, Ne, Ar), 95E15(D), 95E20(H₂, CH₄, C₂H₆, C₃H₈, CO₂) ; 76T2(H), 77T6(H), 77T13(H), 78T20(H, He), 79T39(H), 80T6(H, He), 80T7(H, He), 80T30(H), 81T18(H), 82T1(H), 82T40(B⁺), 83T19(H), 83T29(H), 84T7(H), 84T31(H, He), 84T43(H), 86T20(H), 87T67(Li), 88T50(H), 88T51(H), 89T21(H), 91T8(H), 91T20(H), 91T21(H), 91T43(He), 95T20(H, D) $q = 4$: 70E4(He, Ne, Ar), 76E1(He), 76E3(He, Ne, Ar), 77E2(He), 80E25(H₂), 80E29(H), 81E30(D₂), 81E38(H), 81E39(H₂), 81E42(H₂), 81E45(H), 82E5 (He, H₂), 82E12(He), 82E40(H₂), 82E52(H, H₂), 83E1(H), 83E5(H₂), 83E11 (He, Li, H₂), 83E37(He), 83E51(H₂), 83E55(H), 83E60(Ar, H₂), 84E6(H₂), 84E12(Li), 84E14(Li), 84E51(C, CH₄, C₂H₆, C₃H₈), 85E14(Li), 85E16(He, Ne, Ar, Xe), 85E20(H), 85E28(H), 85E29(H, He, H₂), 86E55(He), 87E30(He), 87E42(H, H₂), 87E46(He, Ar, Xe, H₂), 88E2(He, Ne, Ar, Kr, Xe, H, N₂, O₂), 90E3 (He), 90E15(H₂, He), 90E18(H, H₂), 90E41(He), 91E27(He), 91E40(He), 92E27(H, H₂), 92E42(H₂, N₂, O₂), 93E29(He), 93E38(He), 94E32(He), 95E20 (H₂, CH₄, C₂H₆, C₃H₈, CO₂), 95E22(Li), 95E48(Ar), 96E44(Na⁺ (3s, 3p)) ; 76T3(H), 77T13(H), 77T16(He), 78T12(H), 80T7(H, He), 80T15(He), 80T30 (H), 81T15(H), 81E39(H₂), 84T21(H, Li), 84T27(H), 84T31(H, He), 84T32 (He), 84T33(He), 84T43(H), 84T62(He), 85T15(He, H₂), 85T20(H, H₂), 85T21 (H), 85T36(He), 86T7(He), 86T15(He), 86T21(He), 87T21(H), 87T54(He), 88T8(H₂), 88T30(H), 89T6(C³⁺), 90T2(He), 91T8(H), 92T9(He), 92T31 (H₂), 94T59(C³⁺), 95T12(He), 95T38(H) $q = 4^*$: 94E7(H₂) $q = 5$: 76E3(He, Ne, Ar), 81E9(He), 81E30(D₂), 81E38(H), 81E39(H₂), 81E42(H₂), 82E12(He), 82E52(H, H₂), 83E1(H), 83E37(He), 83E55(H), 83E60(Ar, H₂), 84E12(Li), 84E51(C, CH₄, C₂H₆, C₃H₈), 85E51(H, H₂), 87E42(H, H₂), 88E2(He, Ne, Ar, Kr, Xe, H, N₂, O₂), 88E57(He), 88E64(Ar), 91E30(H₂, He), 91E41(H₂, He), 91E54(H₂), 92E57(He), 93E53(He), 94E46(C), 95E19(Li), 95E26(He), 95E62(He), 95E66(Li) ; 76T3(H), 77T13(H), 80T30(H), 81T33(H), 84T31(H, He), 84T32(He), 86T30(He), 91T8(H), 91T42(H₂), 91T43(He), 92T33(He), 92T47(H), 93T28(He), 96T19(He) $q = 6$: 77E4(He), 80E25(H₂), 81E1(H₂), 81E9(He), 81E26(H₂, He), 81E30(D₂), 81E38(H), 81E39(H₂), 81E42(H₂), 82E12(He), 82E26(He), 82E52(H, H₂),

$q = 2$: 96T32(He)
 $q = 3$: 71E1(He), 77E2(He), 80E29(H), 82E12(He), 83E29(He), 83E60(Ar, H₂), 90E42(He), 92E54(H, H₂, He), 94E54(He) ; 77T13(H), 77T16(He), 78T12(H), 78T20(H), 80T30(H), 86T60(H), 89T6(B²⁺), 90T23(He), 91T8(H), 91T45(He), 92T11(He), 94T1(He, Ne), 94T6(H), 94T23(He), 94T26(He), 94T27(He), 94T37(He), 94T59(B²⁺), 95T29(He), 96T32(He) $q = 4$: 80E29(H), 82E12(He), 83E60(Ar, H₂), 92E54(H, H₂, He), 93E53(He), 96T3 (He) ; 77T13(H), 80T30(H), 91T8(H), 92T32(He), 93T28(He), 93T48(H), 94T22 (H), 96T41(H) $q = 5$: 77E4(He), 82E12(He), 87E27(He), 91E63(He), 92E54(H, H₂, He), 93E28(Li), 95E19(Li), 95E66(Li) ; 77T5(H), 77T9(H), 77T12(H), 77T13(H), 78T11(H), 79T30(H), 79T31(H), 79T32(H), 80T4(H), 80T30(H), 81T8(H), 81T12(H), 81T30(H), 82T2(H), 82T24(H), 82T32(H), 82T39(B³⁺), 83T20(H), 83T25(H), 84T22(H), 84T37 (H), 84T54(H), 85T64(H), 87T5(H), 88T57(Ai), 91T8(H), 92T8(He), 92T53 (H), 92T59(H(1s), H⁺(2s)), 93T11(H, Ne³⁺), 93T12(H(2s)), 93T28(He), 94T13(H, He), 94T59(B⁴⁺), 94T61(H), 95T17(H), 95T39(He⁺(1s2s)), 96T10 (He), 96T6(He), 96T14(H), 96T21(He)

C
 $q = -1$: 86E25(He, Ne, Ar, Kr, Xe)
 $q = 0$: 79E15(Na, K, Cs), 91E39(He)
 $q = 1$: 68E1(C), 78E16(Ar, H₂, N₂, O₂, CO, CO₂), 79E3(He), 79E15(Na, K, Cs), 80E34 (H₂, N₂), 82E45(H₂, N₂), 83E53(Li, H₂), 87E18(Li, Na), 90E26(He, H₂), 90E58(H₂), 92E62(Xe), 95E20(H₂, CH₄, C₂H₆, C₃H₈, CO₂) ; 82T19(H), 84T31(H, He) $q = 2$: 76E15(He, Ne), 80E29(H), 81E30(D₂), 81E45(H), 82E40(H₂), 83E27(He, Ne, Ar), 83E28(He, Ne, Ar, Kr, Xe, H₂, N₂, O₂, NO, CO₂, SO₂, NH₃, CH₄, C₂H₂), 83E53(Li, H₂), 83E55(H), 83E60(Ar, H₂), 84E33(H), 91E56(H₂, He, Ar), 95E3(B⁺), 95E20(H₂, CH₄, C₂H₆, C₃H₈, CO₂), 96E20(Ar), 96E21(He, Ne, Ar) ; 75T3(H), 77T6(H), 78T20(H), 80T6(H, He), 82T19(H), 82T40(B⁺), 83T19 (H), 84E11(Li), 84T31(H, He), 84T43(H), 91T8(H), 94T11(He), 94T12(He), 94E34(He, Ne, Ar) $q = 2^*$: 94T12(He), 96E20(Ar), 96E21(He, Ne, Ar)

q = 2 : 78E4(He), 79E21(He,Ne), 79E22(He,Ne,Ar), 80E25(H₂), 80E29(H), 81E43(H), 81E45(H), 82E40(H₂), 82E48(H^{*}(n=9-24)), 83E27(He,Ne), 83E32(H), 84E11(Li), 84E28(He,Ne,Ar,Kr,Xe,H₂,N₂), 85E72(H,H₂), 86E1(Li), 86E6(He), 86E79(Kr,Xe), 87E77(H₂,N₂), 88E42(H₂), 90E43(He), 93E41(He,Ne,Ar),
; 77T6(H), 80T6(H,He), 80T7(H,He), 81T18(H), 83T19(H), 84T31(H,He), 86T3(H), 91T8(H), 93T62(He), 95T19(H)
q = 3 : 80E29(H), 80E32(H^{*}(n=8-24)), 81E43(H), 81E45(H), 82E40(H₂), 82E48(H^{*}(n=9-24)), 84E11(Li), 86E64(H₂), 87E77(H₂,N₂), 88E8(H₂), 89E30(H), 96E25(H₂,He,Ne,Ar)
; 77T7(H), 77T13(H), 78T20(H), 79T20(H), 79T39(H), 80T6(H,He), 80T7(H,He), 80T22(H), 80T30(H), 81T15(H), 82T40(C²⁺), 83T3(H), 83T19(H), 83T29(H), 84T6(H), 84T31(H,He), 84T43(H), 84T44(H), 85T20(H,H₂), 85T55(H), 86T74(H), 91T8(H), 93T27(H)
q = 4 : 80E29(H), 81E43(H), 81E45(H), 82E12(He), 82E18(He), 82E40(H₂), 82E48(H^{*}(n=9-24)), 87E30(He), 87E77(H₂,N₂), 89E30(H), 91E40(He), 93E47(He), 95E11(D)
; 76T3(H), 77T13(H), 80T7(H,He), 80T30(H), 82T40(C³⁺), 84T31(H,He), 84T43(H), 84T64(H), 90T34(Cs), 91T8(H), 92T20(H), 92T52(H), 95T43(H,D)
q = 5 : 77E2(He), 80E29(H), 81E15(He,Ne,Ar,H₂,CH₄,NH₃), 81E43(H), 81E45(H), 82E12(He), 82E40(H₂), 82E48(H^{*}(n=9-24)), 83E1(H), 83E37(He), 85E13(He, H₂), 85E25(H,H₂), 85E28(H), 85E29(H,He,H₂), 87E10(He), 87E30(He), 87E42(H,H₂), 88E50(He,H₂), 88E57(He), 89E12(He), 89E30(H), 90E37(H₂), 93E28(Li), 93E29(He), 94E4(He), 94E53(Li), 95E19(Li), 95E47(Li), 95E66(He,Li)
; 76T3(H), 77T13(H), 80T30(H), 81T33(H), 84T27(H), 84T31(H,He), 84T32(He), 84T43(H), 85T20(H,H₂), 85T21(H), 86T18(H,H₂), 87T2(He), 88T8(He), 88T30(H), 89T3(He), 89T6(N⁴⁺), 91T8(H), 92T26(He), 94T59(N⁴⁺), 95T36(Cs), 95T44(C₆₀)
q = 5* : 94E7(H₂)
q = 6 : 80E25(H₂), 81E9(He), 82E12(He), 83E1(H), 83E2(H), 83E12(He,H₂), 83E37(He), 84E10(He,H₂), 85E12(He,H₂), 85E30(He,H₂), 85E32(He), 85E51(H,H₂), 87E8(He,Ar), 87E42(H,H₂), 87E44(He,Ar), 87E55(Ar), 88E57(He), 89E50(He), 90E41(He), 95E66(Li), 96E12(Ar), 96E18(He), 96E35(H₂O₂), ; 96T3(H), 77T13(H), 80T30(H), 84T31(H,He), 84T32(He), 91T8(H), 91T49(H)
q = 7 : 73E1(He,Ne), 77E4(He), 79E5(Ar), 80E25(H₂), 81E9(He), 81E10(Tl), 81E26(H₂,He), 82E12(He), 82E36(He), 83E1(H), 83E2(H), 83E14(Tl), 84E9

83E1(H), 83E2(H), 83E4(He), 83E12(He), 83E14(Tl), 83E55(H), 84E12(Li), 84E19(He,Ne,Ar,H₂), 84T43(H), 84E51(C,CH₄,C₂H₆,C₂H₂), 85E2(Au), 85E27(H), 85E30(He,H₂), 85E50(H,H₂), 85E51(H,H₂), 86E30(He), 87E8(He,Ar,Xe,H₂), 87E42(H,H₂), 87E44(He,Ar,Xe,H₂), 87E55(H), 88E2(He,Ne,Ar,Kr,Xe,H₂,O₂), 88E23(H), 88E46(He), 88E64(Ar), 89E27(H,H₂), 89E41(H₂), 90E41(He), 90E44(He), 90E51(He), 91E53(He), 92E5(He), 92E6(He), 92E15(He), 92E32(H₂), 92E41(He), 92E46(Li), 93E17(He), 95E62(He), 96E8(He,Ne,Ar,Kr,Xe), 96E10(He), 96E12(Ar), 96E13(Ar), 96E29(He), 96E32(He,Ar,Kr,Xe)
; 73T1(Ar), 75T1(Ar), 76T3(H), 76T5(H), 76T6(H), 77T4(H), 77T5(H), 77T13(H), 77T15(H), 77T17(H), 78T7(He,Ar,Kr), 78T11(H), 78T21(H), 79T1(H), 79T10(H^{*}(2s)), 79T14(H), 79T27(Cu), 79T30(H), 79T31(H), 79T32(H), 80T3(Ar), 80T9(H), 80T30(H), 81T5(He), 81T8(H), 81T12(H), 81T17(H), 81T19(H), 81T30(H), 82T2(H), 82T5(H), 82T11(H), 82T15(H), 82T16(H), 82T17(H), 82T29(H), 82T32(H), 82T39(C⁴⁺), 82T42(C⁵⁺), 83T13(H), 83T17(H), 83T20(H), 83T22(H), 83T23(H), 83T30(C), 83T32(H,H₂), 84T20(H), 84T22(H), 84T26(H), 84T31(H,He), 84T32(He), 84T33(He), 84T37(H), 84T48(H), 84T53(He), 84T54(H), 85T3(Ar-U), 85T13(H), 85T25(Ar¹²⁺, Cu²⁸⁺, Ag⁴⁶⁺), 85T34(H), 85T36(He), 85T60(Ar,Ne,Cu,Ag,Ta,Au), 85T64(H), 86T11(H), 86T13(He), 86T32(He), 86T33(He), 86T35(He), 86T40(H,H₂), 86T76(He), 87T5(H), 87T6(H^{*}(2s)), 87T12(z=12-92), 87T25(He), 87T35(He), 87T37(H,He), 87T44(He), 87T59(z=15-92), 88T32(H), 88T57(Ar), 89T34(H), 89T37(Ar,Cu,Ag,Ta,Au), 89T39(H), 89T60(He), 90T13(Au), 90T31(H₂,He), 90T35(H), 91T8(H), 91T13(He), 91T14(He), 91T15(Au), 91T26(He), 91T50(He), 92T37(H), 92T40(Ar), 92T42(Au), 92T53(H), 92T67(Li(2s)), 93T38(Ar,Cu,Ag,Ta,Au), 93T54(He), 94T24(He), 94T29(z=10-92), 94T30(z=10-92), 94T58(Li^{*}(2s,2p,3p)), 94T61(H), 94T62(H), 95T17(H,He), 95T39(He^{*}(1s2s)), 95T45(He), 96T10(He), 96T14(H)
q = 1 : 68E1(N), 76E4(He,Ne,Ar), 77E5(Cs), 79E25(Ar,H₂,N₂,O₂,CO,NO,CO₂), 80E8(He,Ne,Ar,Kr,Xe), 80E22(He), 80E34(H₂,N₂), 82E45(H₂,N₂), 82E48(H^{*}(n=9-24)), 84E32(Ar,Ar), 85E7(Cs), 87E18(Li,Na), 88E30(HgCl₂,HgBr₂,HgI₂), 89E48(O⁻), 90E14(CO₂), 90E26(He,H₂), 90E29(He), 93E26(O⁻), 95E9(H₂O:v=0)
; 62T1(H), 79T7(H), 84T31(H,He), 85T53(N), 95T26(He)
q = 1* : 95T26(He)

(He, H₂), 85E12(He, H₂), 86E27(H), 85E50(H, H₂), 85E51(H, H₂), 86E49(He), 87E8(He, Ar, Xe, H₂), 87E12(He), 87E42(H, H₂), 87E44(He, Ar, Xe, H₂), 87E58(H), 87E62(He, H₂), 87E63(Ar, Xe), 88E4(He, Ar, H₂), 88E39(He, Ne, H₂), 91E45(He, Ar, Kr, Xe), 92E41(He), 93E20(Kr), 94E9(He), 94E13(Ar), 94E39(He, Ne, Ar, Kr, Xe), 94E70(He), 96E18(Ne)
 ; 73T1(Ar), 75T1(Ar), 76T3(H), 76T5(H), 76T6(H), 77T5(H), 77T13(H), 78T7(He, Ar, Kr), 78T11(H), 81T30(H), 82T39(N⁵⁺), 83T20(H), 83T22(H), 83T32(H₂), 84T20(H), 84T22(H), 84T31(H, He), 84T32(He), 84T37(H), 85T64(H), 86T40(H, H₂), 86T54(H), 87T3(He), 87T37(H, He), 87T48(H), 88T57(Al), 89T38(He), 89T60(He), 90T24(He), 91T8(H), 92T12(He), 92T50(Ar), 93T44(He, Ar), 94T13(H, He), 94T36(), 94T61(H), 94T64(?), 95T17(He), 95T45(He), 96T4(), 96T10(He), 96T14(H)

0

q = -1 : 93E14(H)

q = 0 : 79E15(Na, K, Cs)

q = 1 : 78E15(Ar, H₂, N₂, O₂, CO, NO, CO₂), 79E15(Na, K, Cs), 80E8(He, Ne, Ar, Kr, Xe), 80E34(H₂, N₂), 81E14(He), 82E45(H₂, N₂), 82E48(H(n=9-24)), 83E52(Li), 83E53(Li, H₂), 84E32(Ar, Alr), 87E18(Li, Na), 87E82(O), 89E36(N₂), 89E48(O⁻), 90E26(He, H₂), 90E59(H₂), 91E32(H₂), 92E47(He), 92E62(Kr, Xe), 93E26(O₋), 96E42(CS₂)
 ; 63T1(H), 80T8(H), 84T31(H, He), 90T2(Ar), 94T39(He), 94T40(He)

q = 1* : 94T40(He)

q = 2 : 76E15(He), 78E4(He), 80E25(H₂), 80E29(H), 81E14(He), 81E23(O₂), 81E45(H), 82E6(H), 83E28(He, Ne, Ar, Kr, Xe, Hg, H₂, N₂, O₂, NO, CO₂, SO₂, NO₂, NH₃, CH₄, C₂H₂), 82E48(H*(n=9-24)), 82E52(H, H₂), 83E53(Li, H₂), 83E55(H), 85E42(He, H₂, N₂), 87E39(He), 88E25(He, Ne, Ar, H₂, D₂, N₂, O₂), 89E5(He), 89E16(H₂), 93E39(He), 94E35(He, Ne, Ar), 95E10(He, H₂, N₂, CO)
 ; 79T6(H), 80T6(H, He), 80T35(He), 83T19(H), 84T7(H), 84T31(H, He), 84T43(H), 84T60(He), 87T27(He), 91T4(He), 91T8(H), 94T33(H), 96T30(He)

q = 2* : 94T33(H), 96T30(He)

q = 3 : 80E25(H₂), 80E29(H), 81E14(He), 81E23(O₂), 81E45(H), 82E6(H), 82E48(H*(n=9-24)), 82E52(H, H₂), 83E53(Li, H₂), 83E55(H), 84E12(Li), 88E58(H), 89E5(He), 89E16(H₂), 90E32(H, H₂, He), 90E4(H, H₂)
 ; 77T13(H), 78T15(He, N), 80T6(H, He), 80T7(H, He), 80T30(H), 81T40(H), 83T4(H), 83T19(H), 83T35(H), 83T42(H), 84T31(H, He), 84T43(H),

88T52(H), 91T8(H)

q = 4 : 80E29(H), 81E14(He), 81E45(H), 82E48(H(n=9-24)), 82E52(H, H₂), 83E55(H), 84E12(Li), 87E7(H, H₂), 89E5(He), 91E40(He)
 ; 76T3(H), 77T13(H), 80T7(H, He), 80T30(H), 82T40(N³⁺), 84E11(Li), 84T31(H, He), 84T43(H), 88T21(H), 91T8(H)

q = 5 : 80E4(He), 80E29(H), 81E14(He), 81E45(H), 82E12(He), 82E18(He), 82E48(H*(n=9-24)), 82E52(H, H₂), 83E55(H), 84E12(Li), 86E57(He), 87E30(He), 87E70(He), 88E21(Ne), 88E57(He), 89E5(He), 89E10(He, Ne, Ar, Kr, H₂), 89E25(H)

; 76T3(H), 77T13(H), 80T30(H), 82T40(N⁴⁺), 84T31(H, He), 91T3(H), 91T8(H), 93T47(H), 95T42(He)

q = 6 : 77E2(He), 80E4(He), 80E20(C, Al), 80E25(H₂), 81E14(He), 82E12(He), 82E52(H, H₂), 83E1(H), 83E4(He), 83E12(He, H₂), 83E37(He), 83E55(H), 84E12(Li), 85E28(H), 85E29(H, He, H₂), 85E30(He, Ar, H₂), 86E55(He), 87E8(He, Ne, Ar, Kr, Xe, H₂), 87E27(He), 87E42(H, H₂), 87E44(Ar, Kr, H₂), 87E46(He, Ar, Xe, H₂), 87E70(He), 87E99(He), 88E5(H₂), 88E35(He), 88E57(He), 89E10(He, Ne, Ar, Kr, H₂), 89E12(He), 89E39(He), 89E50(He), 90E37(H₂), 90E41(He), 91E55(He), 92E7(He), 92E44(H₂), 92E60(H₂, He), 94E4(He), 94E45(O₂), 94E56(Na(3p)), 95E43(He, Ne, Ar), 95E66(He), 96E12(Ar)
 ; 76T3(H), 77T13(H), 78T15(He, N), 80T30(H), 81T33(H), 84T27(H), 84T31(H, He), 84T32(He), 84T43(H), 85T21(H), 86T18(H, H₂), 86T30(He), 87T49(He), 88T30(H), 89T6(O⁵⁺), 89T56(He), 91T2(H), 91T8(H), 93T55(), 94T59(O⁵⁺)

q = 6* : 94E7(H₂)

q = 7 : 80E4(He), 80E20(C, Al), 80E25(H₂), 81E9(He), 81E14(He), 82E12(He), 82E36(He), 83E1(H), 85E51(H, H₂), 86E49(He), 87E8(He, H₂), 87E27(He), 87E42(H, H₂), 87E44(He, H₂), 87E70(He), 88E5(He, H₂), 88E21(Ne), 88E57(He), 89E10(He, Ne, Ar, Kr, H₂), 91E30(H₂, He), 91E45(He, Ar, Kr, Xe), 94E46(C), 94E70(He), 95E23(He), 95E60(He), 96E17(CO)
 ; 76T3(H), 77T13(H), 84T31(H, He), 84T32(He), 91T8(H), 91T42(H₂)

q = 8 : 76E19(He, H₂, N₂, O₂, C₃H₈), 76E14(He, H₂, N₂, O₂, C₃H₈), 77E4(He), 79E5(Al), 80E4(He), 80E20(C, Al), 80E25(H₂), 81E1(H₂), 81E9(He), 81E14(He), 81E26(H₂, He), 82E12(He), 82E26(He), 83E1(H), 83E2(H), 83E4(He), 83E6(He), 83E14(Ti), 85E2(Au), 85E10(H₂), 85E27(H), 85E50(H, H₂), 85E51(H, H₂), 86E30(He), 87E8(He, Ar, Xe, H₂), 87E27(He), 87E31(H), 87E42(H, H₂), 87E44(He, Ar), 87E58(H), 87E62(He, H₂), 87E70(He), 88E21(Ne), 89E10(He, Ne, Ar, Kr, H₂), 89E27(H, H₂), 89E41(H₂), 89E45(He), 90E7(D₂), 90E8(H₂, He),

	90E16(He,Ar), 90E41(He), 91E12(D ₂), 91E45(He,Ar,Kr,Xe), 92E32(He), 92E41(He), 93E6(Ar), 93E20(Ar), 93E76(D ₂), 94E39(He,Ne,Ar,Kr,Xe), 94E48(Ne), 94E66(H ₂ ,He), 94E70(He), 95E66(Li), 96E32(Ar,Kr,Xe); 73T1(Ar), 75T1(Ar), 76T3(H), 76T6(H), 77T4(H), 77T5(H), 77T9(H), 77T10(Ag), 77T13(H), 78T3(H), 78T3(H), 78T7(Ne,Ar,Kr), 78T11(H), 78T13(H), 78T15(He,N), 79T1(H), 79T9(H,He), 79T10(H(2s)), 79T27(Cu), 79T31(H), 79T32(H), 79T34(H), 80T13(H), 81T5(He), 81T19(H), 81T30(H), 81T37(He), 82T39(O ⁶⁺), 83T17(H), 83T22(H), 83T23(H), 83T30(O), 83T32(H ₂), 83T36(H), 84T20(H), 84T22(H), 84T31(H,He), 84T32(He), 84T37(H), 84T43(H), 84T48(H), 84T53(He), 85T26(He), 85T27(C), 85T35(He), 85T64(H), 86T7(Ne), 86T33(Ne), 86T35(He), 86T13(He), 86T76(He), 87T22(He), 87T25(He), 87T37(H,He), 87T38(He), 87T68(He), 88T30(H), 88T32(H), 88T35(H), 88T45(Ag), 88T57(Al), 89T39(H), 89T60(He), 90T31(H ₂ ,He), 91T8(H), 91T13(He), 91T14(He), 91T50(He), 91T56(H ₂), 92T2(H ₂), 92T12(He), 92T38(H), 92T53(H), 92T67(Li(2s)), 93T8(He), 93T43(H), 93T55(), 94T13(H,He), 94T61(H), 94T65(Ar), 95T17(He), 95T39(He*(1s2s)), 95T45(He), 96T10(He), 96T14(H)	
K		
q = -1	: 80E33(He,Ar,H ₂ ,N ₂ ,O ₂), 88E40(Ne,N ₂), 90E38(He,Ne), 94E27(H)	
q = 0	: 88E60(He,Ne,Ar,Kr,Xe)	
q = 1	: 90T2(Ne,Ar), 96E42(CS ₂)	
q = 2	: 95E17(Ne,Ar)	
q = 3	: 95E17(Ne,Ar)	
q = 4	: 95E17(Ne,Ar)	
q = 5	: 95E17(Ne,Ar); 82T40(O ⁴⁺),	
q = 6	: 82E12(He), 84E45(He), 85E73(He,Ne,Ar), 88E47(H ₂), 88E57(He), 89E62(He,H ₂), 90E47(Ne), 90E60(H ₂), 91E5(H ₂), 94E20(He,Ne), 95E17(Ne,Ar)	
q = 7	: 82E12(He), 83E50(He), 84E34(He,Ne), 84E45(He), 88E57(He), 91E35(H ₂ ,He), 94E4(He), 95E17(Ne,Ar)	
q = 8	: 78T15(Ar), 84T32(He); 78E12(He), 81E9(He), 82E12(He), 82E31(Ne), 82E35(He), 84E45(He), 85E51(H,H ₂), 86E22(Ne), 89E55(H ₂), 90E11(H ₂), 95E17(Ne,Ar), 95E60(He), 84T32(He), 85T19(Ne), 90T43(H ₂)	
q = 9	: 77E4(He), 78E11(Si), 79E5(Al), 81F9(He), 81E10(Tl), 82F35(He), 83E14(Tl), 85E50(H,H ₂), 85E51(H,H ₂), 86E22(Ne), 87E25(Ne), 87E64(H ₂ ,CH ₄ ,C ₂ H ₄ ,C ₂ H ₆ ,C ₃ H ₆ ,C ₃ H ₈), 92E41(He), 93E18(Ne), 94E36(Ar), 94E39(He,Ne,Ar,Kr,Xe), 95E17(Ne,Ar), 96E19(Ne); 73T1(Ar), 75T1(Ar), 77T4(H), 77T5(H), 78T7(Ne,Ar,Kr), 79T18(Ne), 80T20(Ar), 81T16(Ar), 81T30(H), 82T39(F ⁷⁺), 83T20(H), 83T22(H), 85T64(H), 87T37(H,He), 91T50(He), 93T8(H*(nl),He*(nl)), 95T17(H,He), 96T10(He)	
Ne		
q = 1	: 70E2(N ₂), 70E3(Ar), 74E2(Cs), 77E5(Cs), 77E10(He,Ar,H ₂), 77E11(He), 78E13(He,Ne,Ar,Kr,Xe), 78E14(He,Ne,Ar,Kr,Xe), 79E8(Ar), 80E7(Ne), 80E13(He,Xe,H ₂), 81E17(O ₂), 82E3(He,Ne,Ar), 82E11(Ne), 82E33(Li), 83E23(O ₂), 83E33(Xe), 83E43(Ne,Xe), 83E52(Li), 85E5(Li), 87E18(Li,Na), 96E48(Na*(3s,3p))	
q = 2	: 62T1(Ne), 85T56(Ne), 87T1(Na), 87T69(Hg); 70E3(Ar), 77E10(He,Ar,H ₂), 77E11(He), 78E4(Ne,Ar), 78E9(He,Ne,Ar,Kr,Xe), 78E13(He,Ne,Ar,Kr,Xe), 79E7(He,Ne,Ar,Kr,Xe), 80E13(He,Xe,H ₂), 80E16(Xe), 80E19(He,Ne,Ar,Kr,Xe), 81E7(He), 81E12(H), 81E43(H), 82E3(He,Ne,Ar), 82E4(Xe), 83E8(Ne), 83E9(He), 83E13(He,Ne,Ar,Kr,Xe), 83E20(Xe), 83E23(O ₂), 83E24(He), 83E25(He,H ₂), 83E28(He,Ne,Ar,Kr,Xe), Hg,H ₂ ,N ₂ ,O ₂ ,NO,CO ₂ ,SO ₂ ,NO ₂ ,NH ₃ ,CH ₄ ,C ₂ H ₂), 83E33(Xe), 83E43(Ne,Xe), 83E52(Li), 84E20(H ₂), 84E23(Xe), 84E27(He), 84E30(He,Ne,Ar), 84E47(Li), 85E15(H,H ₂), 86E1(Li), 86E10(Ne), 88E48(Li), 89E19(H ₂), 89E47(N ₂), 90E48(Li,Na,K), 96E2(Na(3s,3p)); 79T6(H), 80T6(H,He), 80T7(H,He), 83T19(H), 84T43(H), 85T23(Ne), 91T22(H)	
q = 3	: 70E3(Ar), 77E10(He,Ar,H ₂), 77E11(He), 78E13(He,Ne,Ar,Kr,Xe), 80E13(He,Xe,H ₂), 80E25(H ₂), 81E7(He), 81E12(H), 81E43(H), 82E3(He,Ne,Ar), 82E38(Ne), 83E8(Ne), 83E9(He), 83E13(He,Ne,Ar,Kr,Xe), 83E24(He), 83E25(He), 83E33(Xe), 83E43(Ne,Xe), 84E20(H ₂), 84E27(He), 84E30(He,Ne,Ar), 84E47(Li), 85E15(H,H ₂), 86E10(Ne), 87E71(He), 88E58(H), 89E37(He,Ne), 94E55(He,Ne,Ar); 80T6(H,He), 80T7(H,He), 83T19(H), 84T43(H), 92T16(H)	
q = 4	: 70E3(Ar), 77E10(He,Ar,H ₂), 77E11(He), 78E13(He,Ne,Ar,Kr,Xe), 81E4(He), 81E7(He), 81E12(H), 81E43(H), 82E3(He,Ne,Ar), 82E38(Ne), 83E8(Ne), 83E9(He), 83E13(He,Ne,Ar,Kr,Xe), 83E24(He), 83E25(He), 83E33(Xe), 83E43(Ne,Xe), 84E20(H ₂), 84E27(He), 84E40(He), 84E47(Li), 85E15(H,H ₂), 86E10(Ne), 87E71(He), 88E58(H), 89E37(He,Ne), 94E55(He,Ne,Ar); 80T6(H,He), 80T7(H,He), 83T19(H), 84T43(H), 92T16(H)	

84E20(H₂), 84E27(He), 84E36(Ne), 84E40(He), 84E47(Li), 85E15(H, H₂),
86E21(D, D₂), 87E71(He), 94E55(He, Ne, Ar)
; 80T7(H, He), 84T43(H), 88T58(He), 92T16(H)
q = 5 : 81E7(He), 81E43(H), 82E38(Ne), 83E8(Ne), 83E9(He), 83E13(He, Ne, Ar, Kr,
Xe), 83E24(He), 83E35(He, H₂), 83E43(Ne, Xe), 84E20(H₂), 84E27(He),
84E40(He), 84E47(Li), 85E15(H, H₂), 86E21(D, D₂), 87E71(He), 88E31(Na),
93E62(Ne), 94E55(He, Ne, Ar)
; 84T43(H), 92T16(H)
q = 6 : 80E25(H₂), 81E7(He), 82E38(Ne), 83E8(Ne), 83E9(He), 83E12(He), 83E13
(He, Ne, Ar, Kr, Xe), 83E43(Ne, Xe), 84E27(He), 84E39(He), 84E40(He), 84E47
(Li), 85E15(H, H₂), 85E30(He), 86E21(D, D₂), 87E71(He), 88E31(Na),
88E57(He), 89E1(He), 91E42(He), 92E46(Li), 92E48(He), 94E55(He, Ne, Ar),
96E12(Ar)
; 82T40(F⁵⁺), 89T28(He), 92T16(H)
q = 7 : 82E12(He), 82E38(Ne), 83E9(He), 83E13(He, Ne, Ar, Kr, Xe), 83E43(Ne, Xe),
84E27(He), 84E40(He), 84E45(He), 85E15(H, H₂), 86E17(H₂), 86E21(D, D₂),
86E48(He), 86E49(He), 88E31(Na), 88E44(Ne), 91E45(He, Ar, Kr, Xe),
92E46(Li), 94E20(He, Ne)
; 92T16(H), 95T48(H)
q = 8 : 80E25(H₂), 81E3(Ne), 81E15(He, Ne, Ar, H₂, CH₄, NH₃), 82E1(He, Ne, Ar, Xe, CH₄),
82E12(He), 82E38(Ne), 83E1(H), 83E9(He), 83E43(Ne, Xe), 84E27(He),
84E40(He), 84E45(He), 85E10(H₂), 85E11(He, H₂), 85E31(He), 85E45(Na),
86E14(He), 86E49(He), 87E8(He), 87E42(H, H₂), 87E44(He, Ar), 87E62(He,
H₂), 88E31(Ne), 88E57(He), 89E12(He), 91E6(H₂, He), 91E36(Na), 92E46
(Li), 92E55(Na), 93E56(He), 94E4(He)
; 84T32(He), 88T30(H), 91T10(H₂, He), 92T12(He), 92T16(H), 93T14(He),
95T48(H)
q = 9 : 80E25(H₂), 82E12(He), 82E20(He, Ne, Ar, Xe), 82E38(Ne), 83E1(H), 83E43
(Ne, Xe), 84E45(He), 85E51(H, H₂), 85E71(H₂), 87E42(H, H₂), 87E44(He),
87E90(³He, ⁴He), 88E31(Na), 88E56(He, H₂), 92E46(Li), 92E56(Ne)
; 84T32(He), 87T38(H₂), 91T60(Ne), 92T16(H), 92T60(Ne), 95T48(H)
q = 10 : 73E1(He, Ne), 80E25(H₂), 81E15(He, Ne, Ar, H₂, CH₄, NH₃), 81E20(Ne), 81E26
(H₂, He), 82E15(He, Ne, H₂, N₂, O₂, CH₄), 82E20(He, Ne, Ar, Xe), 82E38(Ne),
83E1(H), 83E4(He), 83E43(Ne, Xe), 85E50(H, H₂), 85E51(H, H₂), 87E90(³He,
⁴He), 88E31(Na), 89E60(He, Ne, Ar), 94E9(He), 94E19(He), 94E39(He, Ne,
Ar, Kr, Xe), 94E42(Ne), 95E33(He), 96E7(He), 96E9(He), 96E32(Ne, Ar, Kr,
Xe), 96E33(He)

; 76T6(H), 77T4(H), 77T5(H), 77T13(H), 79T31(H), 79T35(H), 80T13(H),
80T23(H), 80T24(H, Cu²⁸⁺), 81T30(H), 82T39(Ne⁸⁺), 82T42(Ne⁹⁺), 83T15
(H), 83T20(H), 83T22(H), 83T30(Ne), 83T32(H₂), 84T48(H), 85T3(Al-U),
85T16(Ne⁹⁺, Zn²⁹⁺, Sn⁴⁹⁺, Yb⁶⁹⁺, Th⁸⁹⁺), 85T25(Al¹²⁺, Cu²⁸⁺, Ag⁴⁶⁺), 85T26
(He), 85T41(He), 85T47(He, Ne), 85T60(Al, Ni, Cu, Ag, Ta, Au), 85T64(H),
86T11(H), 86T26(Be³⁺, Al¹²⁺, Cu²⁸⁺, Au⁷⁸⁺), 87T12(z=12-92), 87T14(Al, Zn,
Ag, Ta, U), 87T35(He), 87T41(Al, Zn, Ag, Ta, U), 87T59(z=15-92), 88T48(Al,
Zn, Ag, Ta, U), 89T31(Be), 89T37(Cu, Ag, Ta, Au), 90T31(H₂, He), 90T35(H),
91T15(Cu, Ag, Ta, Au), 92T16(H), 92T42(Al, Zn, Ag, Ta, Au), 93T8(H^{1s}, 2s,
2p), 93T38(Cu, Ag, Ta, Au), 94T29(z=10-92), 94T30(z=10-92), 94T36(),
95T40(He), 95T48(H), 96T14(H)

Na

q = -1 : 84E52(He, Ne, Ar), 86E53(H₂, D₂, N₂, O₂, CO, CO₂, CH₄), 94E17(H)
q = 0 : 93T63(I)
q = 1 : 69E1(N₂), 76E7(Ne), 79E16(Ne), 81E36(Na⁺), 84E5(Na, Na⁺(3p)), 86E12
(Na), 87E59(O⁻), 87E103(Na⁺(3p)), 90E28(Na⁺(n1)), 91E7(Na⁺(3p)), 91E23
(Na⁺(3p)), 93E25(Li⁺(1s²n1m)), 94E16(Li⁺(n)), 95E16(O⁻)
; 76T8(Na), 84T55(Li), 86T5(H⁻), 86T10(H), 86T27(H⁻), 86T47(Na),
86T55(Li), 87T1(Na), 90T34(Na⁺(3p)), 91T12(Na), 94T9(Li⁺(n1)), 94T32
(Li⁺(n=25)), 94T44(Li⁺(n=25)), 95T36(Na⁺(n1)), 96T29(Na⁺(28d, 26d)),
96T34(Li⁺(n=25))
q = 11 : 94E39(Ne, Ar, Kr, Xe)
; 83T20(H)

Mg

q = 1 : 70E1(Ne, Ar, N₂), 78E7(Mg), 82E27(Ca), 87E101(He, Ar), 88E14(He), 90E22
(Mg, Zn)
q = 2 : 78E7(Mg), 80E2(Mg), 81E40(H₂, He), 83E28(He, Ne, Ar, Kr, Xe, Hg, H₂, N₂, O₂,
NO, CO₂, SO₂, NO₂, NH₃, CH₄, C₂H₂), 90E22(Mg, Zn)
; 54T1(H), 78T20(H), 80T7(H, He), 80T9(H), 89T6(Mg⁺)
q = 3 : 78T20(He), 80T7(H, He), 81E40(H₂, He),
q = 4 : 80T7(H, He), 81E40(H₂, He),
q = 5 : 81E40(H₂, He),
q = 6 : 84T35(H)
q = 9 : 91E5(H₂)
q = 12 : 81E10(Ti), 83E14(Ti)

q = 15 : 81E18(Ar), 87E66(H₂), 91E49(H₂), 96E36(SI<100>)
 ; 85T19(Ar), 88T44(H₂), 91T5(H₂), 92T3(H, Be³⁺, Ne⁹⁺, S¹⁵⁺), 92T61(Ar)
 q = 16 : 81E10(Tl), 81E18(Ar), 83E14(Tl), 87E67(Ar), 93E67(Tl), 94E60(Fe, Ni),
 94E67(Al, Pd, Au), 96E36(SI<100>)
 ; 77T5(H), 81T30(H), 83T8(H), 83T20(H), 84T29(C), 85T27(Ne), 89T18
 (z=10-92), 89T58(A^{z+}; A=1-92), 95T10(Cu)

Cf

q = -1 : 80E33(He, Ar, H₂, N₂, O₂), 85E74(Na, Mg, Ar), 88E22(He, Ne, Ar, Kr, Xe), 88E40
 (Ar), 94E27(H)
 q = 1 : 88E19(He), 92E62(Xe)
 q = 2 : 88E19(He, Ne, Ar, Kr, Xe)
 q = 5 : 94E36(Ar)
 q = 6 : 96E53(He)
 q = 7 : 96E53(He)
 q = 8 : 94E36(Ar), 96E53(He)
 q = 9 : 96E53(He)
 q = 10 : 94E36(Ar), 96E53(He)
 q = 11 : 86E30(He)
 q = 15 : 89E58(C)
 q = 16 : 89E58(C), 95E57(Si)
 q = 17 : 83E14(Tl), 86E76(Tl), 89E58(C), 95E57(Si)
 ; 78T7(Ne, Ar, Kr), 83T8(H), 83T22(H)

Ar

q = 1 : 70E2(N₂), 74E2(Cs), 76E9(Ar), 77E5(Cs), 78E4(Ar), 78E13(He, Ne, Ar, Kr,
 Xe), 78E14(He, Ne, Ar, Kr, Xe), 80E7(Ar), 80E11(Ar), 81E5(Ar), 81E17(O₂),
 82E8(He, Ne), 82E11(Ar), 82E48(H⁺ (n=9-24)), 83E23(O₂), 83E30(N₂), 83E33
 (Xe), 84E3(Ar), 86E8(Ne, Ar, Kr), 86E34(N₂), 86E35(N₂), 86E41(N, O₂),
 87E17(He, Ar, H₂), 87E18(Li, Na), 87E97(H₂S, CS₂, NO₂), 88E72(H₂), 88E32
 (H₂, N₂, CO), 88E34(N₂), 88E48(Li), 89E44(H⁻), 89E49(H₂, N₂, O₂, CO),
 89E59(N₂), 90E28(Na⁺ (n=1)), 93E34(Hc), 93E35(O₂), 93E65(He), 93E73
 (Na⁺ (n=1)), 94E22(NO), 96E42(CS₂), 96E48(Na⁺ (3s, 3p))
 ; 62T1(Ar), 86T8(H₂), 86T64(N₂), 86T65(H₂), 86T66(H₂), 87T1(Na), 87T63(H), 89T12
 (N₂), 93T50(Si)

q = 2 : 75E4(Ar), 76E6(Kr, N₂), 76E9(Ar), 77E9(Ne, Ar, Kr), 78E4(He, Ne, Kr),
 78E13(He, Ne, Ar, Kr, Xe), 79E7(He, Ne, Ar, Kr, Xe), 80E3(Ar), 80E6(He, Ne, Ar),
 80E9(Na), 80E10(Na), 80E19(He, Ne, Ar, Kr, Xe), 80E27(H, H₂), 80E31(H₂), 80E33(H₂),
 81E7(He), 81E8(He, Ne, Ar, Xe), 81E11(He, Xe), 81E13(He), 81E22(N₂), 81E30
 (D₂), 81E31(H), 82E8(He, Ne), 82E16(Ar, Kr, Xe), 82E21(Na), 82E48
 (H (n=9-24)), 83E9(Li), 83E13(Ar, Xe), 83E17(He, Ne, Ar), 83E21(He), 83E23
 (O₂), 83E24(He), 83E27(Hc, Ne), 83E28(He, Ne, Ar, Kr, Xe, Hg, H₂, N₂, O₂, NO,
 CO₂, SO₂, NO₂, NH₃, CH₄, C₂H₂), 83E30(N₂), 83E33(Xe), 83E48(N₂, O₂, CO, CO₂,
 CH₄, C₂H₆), 83E49(Ar), 84E3(Ar), 84E20(H₂), 84E27(He), 84E28(He, Ne, Ar,
 Kr, Xe, H₂, N₂), 84E47(Li), 84E53(He), 85E15(H, H₂), 85E40(He, Ne, Ar),
 85E48(Ar), 85E57(Ar), 86E1(Li), 86E8(Ne, Ar, Kr), 86E31(He, H₂), 86E44
 (Ar), 87E13(Ar), 87E21(K), 87E38(He, Ne, Ar, Kr, Xe, O₂, NO, N₂O, NH₃, CO₂,
 CH₄, C₂H₆, 1-C₄H₈, C₆H₆), 88E29(He), 89E32(He), 89E44(H⁻), 89E56(Li, Na,
 Mg, K), 90E23(Cu), 90E24(He, Ar), 90E39(Na, K, Rb, Cs), 90E48(Li, Na, K),
 91E18(He, Ar, H₂, N₂, O₂, CO₂), 91E43(Li, Na, K, Rb, Cs), 91E51(Na, K, Rb, Cs),
 93E36(Ar), 93E65(He), 94E30(Ne), 94E61(Cs), 96E2(Na⁺ (3s, 3p))
 ; 85T23(Ne), 86T29(He), 86T67(He), 86T50(He), 87T64(He)

q = 3 : 75E4(Ar), 76E6(Kr, N₂), 76E10(He), 78E1(He), 80E25(H₂), 82E8(He, Ne),
 78E4(He), 78E13(He, Ne, Ar, Kr, Xe), 80E3(Ar), 80E27(H, H₂), 80E31(H₂),
 81E7(He), 81E8(He, Ne, Ar, Xe), 81E13(Ne), 81E30(D₂), 81E31(H), 82E48
 (H (n=9-24)), 83E4(D₂), 83E9(He, Li), 83E13(Ar, Xe), 83E21(He), 83E24
 (He), 83E33(Xe), 83E38(He), 83E55(H), 84E3(Ar), 84E20(H₂), 84E24(Ar),
 84E27(He), 84E29(He), 84E47(Li), 85E15(H, H₂), 85E38(H₂), 85E43(He, Ne,
 Ar, Kr), 85E58(He, Ne, Ar, Kr), 86E8(Ne, Ar, Kr), 86E26(He, Ne, Ar, Kr, Xe),
 86E31(He, H₂), 86E69(Hc), 86E82(Ar), 87E13(Ar), 87E41(Ar³⁺), 87E81(Ar),
 89E35(Ar, Kr), 89E37(Ne, Ar), 89E44(H⁻), 92E21(H₂, Ar), 95T36(Cs)

q = 4 : 75E4(Ar), 76E6(Kr, N₂), 76E10(He), 78E1(He), 78E13(He, Ne, Ar, Kr, Xe),
 80E3(Ar), 80E27(H, H₂), 80E31(H₂), 81E7(He), 81E8(He, Ne, Ar, Xe), 81E13
 (Ne), 81E30(D₂), 81E31(H), 82E48(H (n=9-24)), 83E4(D₂), 83E9(He, Li),
 83E13(Ar, Xe), 83E24(He), 83E38(He), 83E55(H), 84E3(Ar), 84E20(H₂),
 84E27(He), 84E47(Li), 85E15(H, H₂), 85E38(H₂), 85E43(He, Ne, Ar, Kr),
 86E8(Ne, Ar, Kr), 86E21(D, D₂), 86E31(He, H₂), 86E38(He, H₂), 86E69(He),
 87E1(H), 87E13(Ar), 87E52(H, He, H₂), 88E63(He, Ne, Ar, Kr), 89E15(Ar),
 89E44(H⁻), 89E63(Ar), 90E4(Ar), 90E5(Ar), 90E52(Cu₄), 92E21(H₂, Ar),
 93E75(He, Ar), 94E40(Ne), 96E24(C₆₀), 96E16(He, Ar)

q = 5 : 75E4(Ar), 76E6(Kr, N₂), 76E10(He), 78E1(He), 78E13(He, Ne, Ar, Kr, Xe),
 80E3(Ar), 80E27(H, H₂), 80E31(H₂), 81E7(He), 81E8(He, Ne, Ar, Xe), 81E13
 (Ne), 81E30(H), 82E48(H⁺ (n=9-24)), 83E4(D₂), 83E9(He, Li), 83E13(Ar,
 Xe), 83E24(He), 83E38(He), 83E55(H), 84E3(Ar), 84E20(H₂), 84E27(He),

84E47(Li), 85E8(Ar), 85E15(H, H₂), 86E8(Ne, Ar, Kr), 86E21(D, D₂), 86E31(He, H₂), 86E38(He, H₂), 86E69(He), 87E13(Ar), 87E52(H, He, H₂), 88E15(D), 88E63(He, Ne, Ar, Kr), 89E44(H⁻), 92E21(H₂, Ar), 93E75(He, Ar), 94E1(Ar), 95E65(He, H₂), 96E16(He, Ar) 96E24(C₆₀)

q = 6 : 75E4(Ar), 75E6(Ne, Ar, Kr, Xe, N₂), 76E6(Kr, N₂), 76E10(He), 78E1(He), 78E13(He, Ne, Ar, Kr, Xe), 79E4(He, Ne, Ar, Kr, Xe), 80E3(Ar), 80E5(H₂), 80E15(He), 80E25(H₂), 80E27(H, H₂), 80E31(H₂), 81E7(He), 81E8(He, Ne, Ar, Xe), 81E13(Ne), 81E30(D₂), 81E31(H), 83E4(D₂), 83E9(He, Li), 83E13(Ar, Xe), 83E24(He), 83E38(He), 83E55(H), 84E3(Ar), 84E20(H₂), 84E27(He), 84E35(Ne, Ar), 84E47(Li), 85E8(Ar), 85E15(H, H₂), 85E39(Ne, Ar, Xe), 85E54(Ne, Ar, Xe), 86E8(Ne, Ar, Kr), 86E21(D, D₂), 86E31(He, H₂), 86E38(He, H₂), 86E69(He), 87E1(H, H₂), 87E16(Ar), 87E52(H, He, H₂), 89E1(He), 89E44(H⁻), 89E63(Ar), 90E5(Ar), 91E1(He), 92E2(He), 92E21(H₂, Ar), 93E2(Ar), 94E1(Ar), 94E40(Ne), 95E28(H₂), 95E65(He, H₂), 96E12(Ar), 96E16(He, Ar)

; 78T4(He, Ar), 83T31(He), 84T35(H), 88T28(D), 89T29(He), 89T30(H), 93T9(He, Ne, Ar), 95T47(H, He)

q = 7 : 75E4(Ar), 76E6(Kr, N₂), 76E10(He), 78E1(He), 78E13(He, Ne, Ar, Kr, Xe), 80E3(Ar), 80E25(H₂), 80E27(H, H₂), 81E7(He), 81E8(He, Ne, Ar, Xe), 81E13(Ne), 81E30(D₂), 83E4(He), 83E9(Li), 83E13(Ar, Xe), 83E24(He), 83E38(He), 83E55(H), 84E3(Ar), 84E20(H₂), 84E27(He), 84E47(Li), 85E8(Ar), 85E15(H, H₂), 85E39(Ne, Ar, Xe), 85E54(Ne, Ar, Xe), 86E8(Ne, Ar, Kr), 86E21(D, D₂), 86E31(He, H₂), 86E38(He, H₂), 86E69(He), 87E16(Ar), 87E52(H, He, H₂), 89E44(H⁻), 89E63(Ar), 90E5(Ar), 90E16(Ar), 90E31(He, Ne, Ar), 92E60(H₂, He), 93E2(Ar), 93E9(H₂, He), 93E10(H₂, He), 93E42(Na⁺(3s, 3p)), 93E70(Na(3s, 3p)), 94E1(Ar), 94E31(Li), 95E28(H₂), 96E16(He, Ar)

; 78T4(He, Ar)

q = 8 : 76E10(He), 78E13(He, Ne, Ar, Kr, Xe), 80E3(Ar), 80E25(H₂), 80E27(H, H₂), 81E7(He), 81E8(He, Ne, Ar, Xe), 81E13(Ne), 81E30(D₂), 83E4(D₂), 83E9(Li), 83E13(Ar, Xe), 83E55(H), 84E3(Ar), 84E27(He), 84E47(Li), 85E8(Ar), 85E15(H, H₂), 85E39(Ne, Ar, Xe), 85E54(Ne, Ar, Xe), 86E8(Ne, Ar, Kr), 86E21(D, D₂), 86E38(He, H₂), 86E69(He), 87E15(Ar), 87E16(Ar), 87E80(He, H₂), 89E8(H₂), 89E9(He, H₂), 89E44(H⁻), 89E63(Ar), 90E16(Ar), 90E52(CH₄), 91E45(He, Ar, Kr, Xe), 92E8(He), 92E9(H₂, He), 92E55(Na), 92E23(He), 92E24(Cs), 92E60(H₂, He), 93E2(Ar), 93E32(Li), 93E68(H₂, He), 94E1(Ar), 94E14(Cs), 94E40(Ne), 94E64(N₂, CO), 94E65(Ar), 94E68(C₆₀), 95E14(He), 95E21(Li), 95E28(H₂), 95E32(Li), 96E16(He, Ar), 96E43(N₂), 96E45(C₆₀),

96E50(Ar)

; 85T3(He), 88T8(He, Ne, Ar, Kr, Xe, D₂), 88T30(H), 90T34(Cs), 94T60(C₆₀), 94T63(Ar), 80E25(H₂), 80E27(H, H₂), 81E7(He), 81E13(Ne), 81E30(D₂), 83E4(D₂), 83E9(Li), 83E13(Ar, Xe), 83E55(H), 84E3(Ar), 84E27(He), 84E47(Li), 85E15(H, H₂), 85E39(Ne, Ar, Xe), 85E54(Ne, Ar, Xe), 86E38(He, H₂), 87E15(Ar), 87E16(Ar), 89E31(He), 89E42(Cs), 90E16(Ar), 91E31(He), 91E45(He, Ar, Kr, Xe), 92E24(Cs), 92E33(Ar), 92E57(Ne), 93E2(Ar), 93E68(H₂, He), 94E1(Ar), 94E64(N₂, CO), 94E65(Ar), 95E28(H₂), 96E50(Ar)

q = 9 : 80E3(Ar), 80E25(H₂), 80E27(H, H₂), 81E7(He), 81E13(Ne), 81E30(D₂), 83E4(D₂), 83E9(Li), 83E13(Ar, Xe), 83E55(H), 84E3(Ar), 84E27(He), 84E47(Li), 85E15(H, H₂), 85E39(Ne, Ar, Xe), 85E54(Ne, Ar, Xe), 86E38(He, H₂), 87E15(Ar), 87E16(Ar), 89E31(He), 89E42(Cs), 90E16(Ar), 91E31(He), 91E45(He, Ar, Kr, Xe), 92E24(Cs), 92E33(Ar), 92E57(Ne), 93E2(Ar), 93E68(H₂, He), 94E1(Ar), 94E64(N₂, CO), 94E65(Ar), 95E28(H₂), 96E50(Ar)

q = 10 : 80E3(Ar), 80E25(H₂), 81E7(He), 81E26(H₂, He), 83E4(D₂), 83E9(Li), 85E15(H, H₂), 85E39(Ne, Ar, Xe), 85E54(Ne, Ar, Xe), 86E38(He, H₂), 87E16(Ar), 89E63(Ar), 90E52(CH₄), 93E2(Ar), 93E68(H₂, He), 94E1(Ar), 94E40(Ne), 94E64(N₂, CO), 94E65(Ar), 95E28(H₂), 96E50(Ar)

q = 11 : 80E3(Ar), 81E30(D₂), 83E4(D₂), 86E38(He, H₂), 87E15(Ar), 87E16(Ar), 90E16(Ar), 91E45(He, Ar, Kr, Xe), 93E2(Ar), 93E68(H₂, He), 94E1(Ar), 94E40(Ne), 94E64(N₂, CO), 94E65(Ar), 95E28(H₂), 96E50(Ar)

q = 12 : 80E3(Ar), 81E30(D₂), 83E4(D₂), 86E38(He, H₂), 87E16(Ar), 89E63(Ar), 93E2(Ar), 93E68(H₂, He), 94E1(Ar), 94E40(Ne), 94E64(N₂, CO), 94E65(Ar), 96E50(Ar)

q = 13 : 83E4(D₂), 86E38(He, H₂), 87E16(Ar), 93E2(Ar), 93E68(H₂, He), 94E1(Ar), 94E64(N₂, CO), 94E65(Ar), 96E45(C₆₀), 96E50(Ar)

q = 14 : 83E4(D₂), 86E38(He, H₂), 89E63(Ar), 90E52(CH₄), 93E2(Ar), 93E68(H₂, He), 94E1(Ar), 94E40(Ne), 94E64(N₂, CO), 94E65(Ar), 96E45(C₆₀), 96E50(Ar), 96E52(CO)

q = 15 : 83E4(D₂), 84E44(Xe), 86E38(He, H₂), 92E1(Ar), 93E2(Ar), 93E3(Ar), 93E68(H₂, He), 94E1(Ar), 94E65(Ar), 95E5(He), 96E45(C₆₀), 96E50(Ar)

q = 16 : 83E4(D₂), 84E19(Ar), 84E44(Xe), 93E2(Ar), 93E68(H₂, He), 93E74(He), 94E1(Ar), 94E65(Ar), 95E5(He), 96E24(C₆₀), 96E50(Ar)

q = 17 : 84E19(Ar, H₂), 84E44(Xe), 93E2(Ar), 94E1(Ar), 95E5(He), 96E5(C₆₀), 96E24(C₆₀)

; 85T41(He), 85T47(He), 86E9(H, H⁺(n))

q = 18 : 73E1(He, Ne), 84E19(Ar, H₂), 85E18(N₂), 85E60(N₂), 95E5(He), 96E6(C₆₀), 96E7(He)

; 76T6(He), 77T5(H), 77T13(H), 80T13(H), 80T24(H, Cu²⁸⁺), 81T30(H), 83T8(H), 83T20(H), 83T21(H), 83T22(H), 83T32(H₂), 85T3(AI - U), 85T25(AI¹²⁺, Cu²⁸⁺, Ag⁴⁶⁺), 85T60(AI, Ni, Cu, Ag, Ta, Au), 87T12(z=12-92), 87T59(z=15-92), 89T31(Be), 89T37(Cu, Ag, Ta, Au), 90T13(Ag), 91T15(Cu, Ag, Ta, Au), 92T42(Cu, Ag, Ta, Au), 93T3((Cu, Ag, Ta, Au), 94T29(z=10-92),

94T30(z=10-92), 95T14(H,He)

K

$q = -1$: 84E52(He, Ne, Ar), 86E53(H₂, D₂, N₂, O₂, CO, CO₂, CH₄), 94E17(H)
 $q = 1$: 80E1(K), 81E36(K⁺), 87E91(He, Ne), 88E55(Na), 90E6(Na^{*}(4d)), 90E21
 (Na(4d)), 95E34(Na(24d, 25s))
 : 62T1(K), 76T8(K), 86T47(K)

Ca

$q = 0 : 93T24(Ca(nl))$

$q = 1 : 86E45(Ng, Sr), 92E45(Na)$

$\quad \quad ; 62T1(Ca), 76T8(Ca)$

$q = 2 : 83E28(He, Ne, Ar, Kr, Xe, Hg, H_2, N_2, O_2, NO, CO_2, SO_2, NH_3, CH_4, C_2H_2)$

$q = 10 : 86E59(He, H_2), 86E80(He, H_2)$

$\quad \quad ; 90T6(H_2)$

$q = 11 : 86E59(He, H_2), 86E80(He, H_2)$

$\quad \quad ; 90T6(H_2)$

$q = 12 : 86E59(He, H_2), 86E80(He, H_2)$

$\quad \quad ; 90T6(H_2)$

$q = 13 : 86E59(He, H_2), 86E80(He, H_2)$

$q = 14 : 86E59(He, H_2), 86E80(He, H_2)$

$q = 15 : 86E59(He, H_2), 86E80(He, H_2)$

$q = 16 : 84E43(He), 85E66(He), 86E5(He, H_2), 86E59(He, H_2), 86E80(He, H_2)$

$\quad \quad ; 90T6(H_2), 90T9(H_2, He)$

$q = 17 : 84E43(He), 85E66(He), 86E5(H_2), 86E59(He, H_2), 86E80(He, H_2), 8$

$\quad \quad ; 89T43(He, H_2), 89T4(He, H_2), 89T26(He), 90T6(H_2), 90T9(H_2, He)$

$q = 18 : 84E43(He), 85E66(He), 86E5(H_2), 86E59(He, H_2), 86E80(He, H_2), 86E80(He, H_2), 8$

$$\begin{aligned} q = 19 : & \text{ 86E5(H}_2\text{), 86E59(He, H}_2\text{), 86E80(He, H}_2\text{), 88E37(He, Ne, Ar, Kr, Xe, H}_2\text{, N}_2\text{)} \\ & \quad ; \text{ 90T9(H}_2\text{, He)} \\ q = 20 : & \text{ 88E37(He, Ne, Ar, Kr, Xe, H}_2\text{, N}_2\text{)} \\ & \quad ; \text{ 77T4(H), 79T31(H), 81T30(H), 83T20(H), 83T22(H), 86T32(Ne)} \end{aligned}$$

25

 $q = 12 : 91\text{E}31(\text{He})$

II

$q = -1 : 85E74(Na, Mg, Ar)$
 $q = 1 : 82E44(Tl_+)$
 $q = 2 : 95E50(He), 95E64(H, H_2)$
 $q = 3 : 95E50(H_2, He), 95E64(H)$
 $\quad ; 83T34(H^+), 95E50(H, H_2, He)$
 $q = 4 : 95E50(H_2), 95E64(H, H_2, He)$
 $\quad ; 83T34(H), 85T36(H), 88T22(H), 91T32(H), 91T65(H), 95T46(H_2, He),$
 $\quad 95T47(H)$
 $q = 5 : 91T32(H), 95E64(H)$
 $q = 6 : 91T32(H), 95E64(H)$
 $q = 7 : 91T32(H), 95E64(H)$
 $q = 8 : 91T32(H), 95E64(H)$
 $q = 9 : 91T32(H), 95E64(H)$
 $q = 10 : 91T32(H), 95E64(H)$
 $q = 11 : 91T32(H), 95E64(H)$
 $q = 12 : 95E64(H)$
 $q = 13 : 91E31(He), 95E64(H)$
 $q = 14 : 95E64(H)$
 $q = 15 : 95E64(H)$
 $q = 16 : 95E64(H)$
 $q = 17 : 95E64(H)$
 $q = 18 : 95E64(H)$
 $q = 19 : 88E36(H_2), 95E64(H)$
 $\quad ; 89T4(He, H_2)$
 $q = 20 : 95E64(H)$
 $q = 21 : 95E64(H)$
 $q = 22 : 83T22(H)$
 $\quad ; 95T6(H)$

V

$q = 18 : 85E35(He), 85E66(He)$
 $q = 19 : 84E43(He), 85E35(He), 85E66(He)$
 $q = 20 : 84E43(He), 85E35(He), 85E66(He)$
 $\quad ; 89T4(He, H_2)$
 $q = 21 : 84E43(He), 85E35(He)$
 $q = 22 : 85E35(He)$
 $q = 23 : 85E35(He)$

; 95T6(H)

Cr

q = 1 : 73E2(He,N₂), 84E32(Ar,Alr)

q = 4 : 91T32(H)

q = 6 : 84T35(H), 91T32(H), 91T65(H)

q = 8 : 91T32(H)

q = 10 : 91T32(H)

q = 13 : 91T32(H)

q = 24 : 83T20(H), 83T22(H)

Fe

q = 1 : 70E1(Ne,Ar,N₂), 84E32(Ar,Alr), 87E61(H,He, H₂)

q = 2 : 87T43(H)

q = 3 : 81E29(H₂), 83E42(H,H₂), 93E46(H,He), 95E67(H,He)

q = 4 : 81E28(He,Ne,Ar,Kr,Xe,H₂,N₂,O₂,CH₄,CO₂,CHF₃,CF₄,SF₆), 83E42(H,H₂),

93E46(H,He), 95E67(H,He)

; 91T32(H)

q = 5 : 80E27(H,H₂), 83E42(H,H₂), 86E7(Ar)

; 91T32(H)

q = 6 : 80E27(H,H₂), 83E42(H,H₂), 83E59(H₂)

; 91T32(H)

q = 7 : 81E29(H₂), 83E42(H,H₂), 95E65(He)

q = 8 : 83E42(H,H₂), 95E65(He,H₂)

; 91T32(H), 91T65(H), 95T46(H₂)

q = 9 : 78E2(H,H₂), 81E29(H₂), 83E42(H,H₂)

; 92T4(H₂)

q = 10 : 78E2(H,H₂), 81E29(H₂), 83E42(H,H₂), 86E7(Ar)

; 91T32(H)

q = 11 : 78E2(H,H₂), 81E29(H₂), 83E42(H,H₂)

q = 12 : 78E2(H,H₂), 81E29(H₂), 83E42(H,H₂), 86E7(Ar), 87E55(Ar)

; 85T43(H), 91T32(H)

q = 13 : 78E2(H,H₂), 81E29(H₂), 83E42(H,H₂)

; 85T43(H)

q = 14 : 78E2(H,H₂), 81E29(H₂), 83E42(H,H₂)

; 85T43(H)

q = 15 : 78E2(H,H₂), 81E29(H₂), 86E7(Ar), 87E55(Ne,Ar,Kr,Xe)

; 85T43(H), 91T32(H)

q = 16 : 78E2(H,H₂), 81E29(H₂),

; 85T43(H)

q = 17 : 78E2(H,H₂), 91E31(He), 96E5(He)

; 85T43(H)

q = 18 : 78E2(H,H₂), 81E29(H₂),

; 85T43(H)

q = 20 : 78E2(H,H₂), 81E29(H₂), 84E19(Ar), 86E7(Ar), 87E55(Ne,Ar,Kr,Xe)

; 91T32(H)

q = 21 : 78E2(H,H₂), 81E29(H₂), 84E19(Ar), 87E55(Ar)

q = 22 : 78E2(H,H₂), 81E29(H₂),

q = 23 : 78E2(H,H₂), 81E29(H₂), 84E19(Ar), 92E14(H₂)

q = 24 : 78E2(H,H₂), 81E29(H₂), 84E19(Ar), 92E14(H₂)

; 81T19(H), 93T41(C,Si,Ar,Cu,Zr)

q = 25 : 78E2(H,H₂), 81E29(H₂), 84E19(Ar), 86E7(Ar), 92E14(H₂)

q = 26 : 83E7(He,Ne,Ar), 84E19(Ar), 84E26(He,Ne,Ar,N₂), 84E50(Ar,Kr,Zr,Ag,Sn),

85E18(He,N₂)

; 77T13(H), 79T33(H), 80T13(H), 81T12(H), 83T22(H), 91T32(H), 95T6(H)

Ni

q = 2 : 87T43(H)

q = 4 : 95E64(H)

q = 5 : 95E64(H)

; 91T32(H)

q = 6 : 95E64(H)

; 91T32(H)

q = 8 : 95E64(H)

; 91T32(H)

q = 10 : 95E64(H)

; 91T32(H)

q = 12 : 95E64(H)

; 91T32(H)

q = 13 : 95E64(H)

q = 14 : 91T32(H)

q = 15 : 95E64(H)

q = 17 : 95E64(H), 95E65(H₂)

; 91T32(H)

q = 19 : 88E45(Kr), 95E64(H)
q = 20 : 88E45(Kr), 95E64(H)
q = 21 : 88E45(Kr), 95E64(H)
q = 22 : 88E45(Kr), 95E64(H)
q = 23 : 95E64(H)
q = 24 : 95E64(H)
q = 25 : 89T4(He, H₂), 95E64(H)
q = 26 : 95E64(H)
q = 27 : 95E64(H)
q = 28 : 95E64(H)

; 83T20(H), 83T22(H)

Cu

q = 1 : 70E1(Ne, Ar, N₂)
q = 6 : 96E53(He)
q = 7 : 96E53(He)
q = 8 : 96E53(He)
q = 9 : 96E53(He)
q = 10 : 96E53(He)
q = 20 : 91E31(He)
q = 29 : 83T22(H), 89T43(Cu²⁹⁺)

Zn

q = 1 : 90E22(Zn)
q = 2 : 80T9(H)
q = 30 : 77T4(H)

Ga

q = 1 : 92E36(Ga), 92E61(Ga), 93E50(Ga)

Ge

q = 1 : 84E32(Ar, Alr)
q = 29 : 88E36(H₂)
; 89T4(He, H₂),
q = 30 : 90E33(H₂)
q = 31 : 90E55(Ne), 92E28(H₂), 92E58(Ne), 92E59(H₂)

; 91T5(H₂)

As

q = 1 : 84E32(Ar, Alr)
q = -1 : 80E33(He, Ar, H₂, N₂, O₂),

Br

q = -1 : 80E33(He, Ar, H₂, N₂, O₂), 94E27(H)
q = 0 : 90E17(He, Ne, Ar, Kr, Xe)

Kr

q = 1 : 70E2(N₂), 75E5(Cs), 77E5(Cs), 78E14(He, Ne, Ar, Kr, Xe), 80E7(Kr),
81E5(Kr), 82E43(Kr), 83E23(O₂), 83E30(N₂), 87E87(Kr), 87E88(Kr),
88E32(CO), 94E25(CH₄), 95E9(H₂O: v=0)
; 62T1(Kr),

q = 2 : 78E6(Kr), 79E7(He, Ne, Ar, Kr, Xe), 80E19(He, Ne, Ar, Kr, Xe), 80E31(H₂), 81E7(He), 81E17(He, Ne, Xe), 82E43(Kr), 83E13(Ar, Xe), 83E24(He, Ne, Ar, Kr, Xe), 83E26(He, H₂), 83E28(He, Ne, Ar, Kr, Xe, Hg, H₂, N₂, O₂, NO, CO₂, SO₂, NO₂, NH₃, CH₄, C₂H₂), 83E30(N₂), 83E45(Kr), 83E57(H, H₂), 84E20(H₂, N₂, CO₂, CH₄, C₂H₆, C₃H₈), 84E27(He), 84E56(Ne), 84E47(Li), 85E40(He, Ne, Ar), 85E47(H₂), 85E53(He, Ne), 86E1(Li), 86E31(He, Ne, Ar, Kr, Xe, H₂, N₂, CO₂, CH₄, C₂H₆, C₃H₈), 86E44(Kr), 87E37(He, Ne, Ar, Kr, Xe), 87E84(He), 89E20(Ne)
; 85T23(Ne), 88T49(He)

q = 3 : 80E31(H₂), 81E7(He), 83E13(Ar, Xe), 83E24(He, Ne, Ar, Kr, Xe), 83E26(He, H₂), 83E45(Kr), 83E57(H), 84E20(H₂, N₂, CO₂, CH₄, C₂H₆, C₃H₈), 84E27(He), 84E47(Li), 86E31(He, Ne, Ar, Kr, Xe, H₂, N₂, CO₂, CH₄, C₂H₆, C₃H₈), 86E82(Kr), 87E37(He, Ne, Ar, Kr, Xe), 87E41(Kr³⁺), 88E27(Ar, Kr, Xe), 95E59(Ar)

q = 4 : 80E31(H₂), 81E7(He), 83E13(Ar, Xe), 83E24(He, Ne, Ar, Kr, Xe), 83E26(He, H₂), 83E45(Kr), 83E57(H), 84E20(H₂, N₂, CO₂, CH₄, C₂H₆, C₃H₈), 84E27(He), 84E47(Li), 86E31(He, Ne, Ar, Kr, Xe, H₂, N₂, CO₂, CH₄, C₂H₆, C₃H₈), 87E37(He, Ne, Ar, Kr, Xe), 88E27(Ar, Kr)

; 80T14(H₂)

q = 5 : 80E31(H₂), 81E7(He), 83E13(Ar, Xe), 83E24(He, Ne, Ar, Kr, Xe), 83E26(He, H₂), 83E45(Kr), 83E57(H), 84E20(H₂, N₂, CO₂, CH₄, C₂H₆, C₃H₈), 84E27(He), 84E47(Li), 86E31(He, Ne, Ar, Kr, Xe, H₂, N₂, CO₂, CH₄, C₂H₆, C₃H₈), 88E27(He, Ne, Ar), 95E65(He, H₂)
; 80T14(H₂)

$q = 6$: 80E31(H₂), 81E7(He), 83E13(Ar, Xe), 83E24(He, Ne, Ar, Kr, Xe), 83E26(He, H₂), 83E45(Kr), 84E20(H₂, N₂, CO₂, CH₄, C₂H₆, C₃H₈), 84E27(He), 84E47(Li), 86E31(He, Ne, Ar, Kr, Xe, H₂, N₂, CO₂, CH₄, C₂H₆, C₃H₈), 89E1(He), 95E65(He, H₂), 96E12(Ar)
; 80T14(H₂)

$q = 7$: 80E31(H₂), 81E7(He), 83E13(Ar, Xe), 83E24(He, Ne, Ar, Kr, Xe), 83E26(He, H₂), 83E45(Kr), 84E20(H₂, N₂, CO₂, CH₄, C₂H₆, C₃H₈), 84E27(He), 84E47(Li), 86E31(He, Ne, Ar, Kr, Xe, H₂, N₂, CO₂, CH₄, C₂H₆, C₃H₈), 89E1(He), 95E65(He, H₂), 96E12(Ar)
; 80T14(H₂)

$q = 8$: 81E7(He), 83E13(Ar, Xe), 83E24(He, Ne, Ar, Kr, Xe), 83E26(He, H₂), 83E45(Kr), 84E20(H₂, N₂, CO₂, CH₄, C₂H₆, C₃H₈), 84E27(He), 84E47(Li), 86E31(He, Ne, Ar, Kr, Xe, H₂, N₂, CO₂, CH₄, C₂H₆, C₃H₈), 89E11(He, H₂), 92E10(H₂, He), 93E31(He), 95E44(Rb⁺(17p)), 96E38(Rb⁺(15p-25p))

$q = 9$: 81E7(He), 83E13(Ar, Xe), 83E24(He, Ne, Ar, Kr, Xe), 83E26(He, H₂), 83E45(Kr), 84E20(H₂, N₂, CO₂, CH₄, C₂H₆, C₃H₈), 84E27(He), 84E47(Li), 86E31(He, Ne, Ar, Kr, Xe, H₂, N₂, CO₂, CH₄, C₂H₆, C₃H₈), 89E11(He, H₂), 93E31(He)

$q = 10$: 81E7(He), 83E13(Ar, Xe), 84E25(He), 84E27(He), 84E47(Li)

$q = 11$: 83E13(Ar, Xe), 84E25(He), 84E27(He), 84E47(Li)

$q = 12$: 83E13(Ar, Xe), 84E25(He), 84E27(He), 84E47(Li)

$q = 13$: 84E25(He), 84E27(He), 93E2(Ar)

$q = 14$: 84E25(He), 93E2(Ar)

$q = 15$: 84E25(He), 93E2(Ar)

$q = 16$: 84E25(He), 93E2(Ar)

$q = 17$: 84E25(He), 93E2(Ar), 93E44(Kr)

$q = 18$: 84E25(He), 87E55(Ne, Ar, Kr, Xe), 90E30(Ar, Kr), 92E25(Kr), 93E2(Ar), 93E44(Kr)

$q = 19$: 84E25(He), 93E2(Ar)

$q = 20$: 84E25(He), 93E2(Ar)

$q = 21$: 93E2(Ar)

$q = 22$: 84E25(He), 93E2(Ar)

$q = 23$: 84E25(He), 93E2(Ar)

$q = 24$: 93E2(Ar)

$q = 25$: 84E25(He), 93E2(Ar)

$q = 26$: 93E2(Ar)

$q = 27$: 93E2(Ar)

$q = 28$: 93E2(Ar), 96E24(C₆₀)

$q = 29$: 93E2(Ar)

$q = 30$: 93E2(Ar)

$q = 31$: 93E2(Ar)

$q = 32$: 93E2(Ar)

$q = 33$: 93E2(Ar)

$q = 34$: 93E2(Ar), 94E11(C, Si, Ar, Cu, Zr), 95E63(H₂)
; 93T41(C, Si, Ar, Cu, Zr)

$q = 36$: 81E6(Ti, Mn, Ni, Cu, Zr, Ag), 86E50(C, Ne, Al, Si, Ar, Cr, Cu, Zr, Sb), 90E35(C, Al, Cu), 96E1(Si<110>)
; 77T13(H), 80T13(H), 83T21(H), 83T22(H), 89T31(Be)

Rb

$q = 1$: 88E55(Na)
; 76T8(Rb), 86T47(Rb)

Sr

$q = 1$: 88E55(Na), 91E28(H⁺), 92E31(Mg, Ca), 92E45(Na, Rb)

$q = 38$: 83T20(H)

Zr

$q = 40$: 83T22(H)

Nb

$q = 2$: 91E61(C₆H₆)

$q = 23$: 81E42(H₂)

$q = 24$: 92T4(H₂)

$q = 28$: 81E42(H₂), 84E19(H₂), 89E7(He, H₂)
; 90T5(H₂)

$q = 29$: 89E7(He, H₂)
; 90T5(H₂)

$q = 30$: 89E7(He, H₂)
; 90T5(H₂)

$q = 31$: 81E42(H₂), 84E19(Ar, H₂), 87E9(H₂), 89E7(He, H₂)
; 89T27(H₂), 90T5(H₂)

$q = 32$: 89E7(He, H₂)
; 90T5(H₂)

$q = 34$: 81E42(H₂), 84E19(H₂)

q = 36 : 81E42(H₂)

Mo

q = 3 : 95E64(H)
q = 4 : 95E64(H, H₂)
q = 5 : 95E64(H, H₂)
q = 6 : 92E22(Ar), 95E64(H, H₂)
q = 7 : 95E64(H, H₂)
q = 8 : 95E64(H, H₂)
q = 9 : 95E64(H, H₂)
q = 10 : 95E64(H, H₂)
q = 11 : 95E64(H, H₂)
q = 12 : 95E64(H, H₂)
q = 13 : 95E64(H, H₂)
q = 14 : 95E64(H, H₂)
q = 15 : 95E64(H, H₂)
q = 16 : 95E64(H, H₂)
q = 17 : 95E64(H, H₂)
q = 18 : 95E64(H, H₂)
q = 19 : 95E64(H)
q = 20 : 95E64(H)
q = 21 : 95E64(H)
q = 22 : 95E64(H)
q = 23 : 95E64(H)
q = 24 : 95E64(H)
q = 25 : 95E64(H)
q = 26 : 95E64(H)
q = 27 : 95E64(H)
q = 28 : 95E64(H)
q = 29 : 95E64(H)
q = 30 : 95E64(H)
q = 42 : 95E64(H)
; 83T22(H)

Ag

q = 4 : 91E57(H₂, He, Ar)

Cd

q = 2 : 80T9(H)
q = 48 : 83T22(H)

In

q = 1 : 84E32(Ar, Alr)

Sb

q = 1 : 84E32(Ar, Alr)

I

q = -1 : 80E33(He, Ar, H₂, N₂, O₂), 94E27(H)
q = 0 : 89E26(He, Ne, Ar, Kr, Xe)
q = 1 : 87E40(Mg)
; 90T2(Mg)
q = 5 : 86E38(He, H₂), 90E9(He)
q = 6 : 86E38(He, H₂), 90E9(He), 96E53(He)
q = 7 : 86E38(He, H₂), 90E9(He), 95E31(He, Ar), 96E53(He)
q = 8 : 86E38(He, H₂), 90E9(He), 95E31(He, Ar), 96E53(He)
q = 9 : 86E38(He, H₂), 90E9(He), 96E53(He)
q = 10 : 85E67(He), 85E68(He), 86E29(He), 86E38(He, H₂), 90E9(He), 95E61(Ne, Ar, Kr, Xe), 95E42(Ne, Ar, Kr, Xe), 96E53(He)
q = 11 : 86E38(He, H₂), 90E9(He)
q = 12 : 86E38(He, H₂), 88E20(H₂), 88E53(He, H₂), 90E9(He)
q = 13 : 85E67(He), 85E68(He), 86E29(He), 86E38(He, H₂), 88E20(H₂), 88E53(He, H₂), 90E9(He)
q = 14 : 85E67(He), 85E68(He), 86E29(He), 86E38(He, H₂), 88E20(H₂), 90E9(He)
q = 15 : 85E67(He), 85E68(He), 86E29(He), 86E38(He, H₂), 88E20(H₂), 90E9(He), 95E42(Ne, Ar, Kr, Xe)
q = 16 : 86E38(He, H₂), 88E20(H₂), 90E9(He)
q = 17 : 85E67(He), 85E68(He), 86E29(He), 86E38(He, H₂), 88E20(H₂), 90E9(He)
q = 18 : 86E38(He, H₂), 88E20(H₂)
q = 19 : 85E67(He), 85E68(He), 86E29(He), 86E38(He, H₂), 90E9(He)
q = 20 : 85E67(He), 85E68(He), 86E29(He), 86E38(He, H₂)
q = 21 : 86E38(He, H₂), 90E9(He)
q = 22 : 85E67(He), 85E68(He), 86E29(He), 86E38(He, H₂)
q = 23 : 85E67(He), 85E68(He), 86E29(He), 86E38(He, H₂), 90E9(He)

q = 24 : 85E67(He), 85E68(He), 86E29(He), 86E38(He, H₂)
 q = 25 : 85E67(He), 85E68(He), 86E29(He), 86E38(He, H₂), 90E9(He)
 q = 26 : 85E67(He), 85E68(He), 86E29(He), 86E38(He, H₂)
 q = 27 : 85E67(He), 85E68(He), 86E29(He), 86E38(H₂), 90E9(He)
 q = 28 : 85E67(He), 85E68(He), 86E29(He)
 q = 29 : 85E67(He), 85E68(He), 86E29(He)
 q = 30 : 85E67(He), 85E68(He), 86E29(He)
 q = 31 : 85E67(He), 85E68(He), 86E29(He)
 q = 32 : 85E67(He), 85E68(He), 86E29(He)
 q = 33 : 85E67(He), 85E68(He), 86E29(He)
 q = 34 : 85E67(He), 85E68(He), 86E29(He)
 q = 35 : 85E67(He), 85E68(He), 86E29(He)
 q = 36 : 85E67(He), 85E68(He), 86E29(He)
 q = 37 : 85E67(He), 85E68(He), 86E29(He)
 q = 38 : 85E67(He), 85E68(He), 86E29(He)
 q = 40 : 85E67(He), 85E68(He), 86E29(He)
 q = 41 : 85E67(He), 85E68(He), 86E29(He)
 q = 53 : 89T43(I⁵³⁺)

Xe

q = 1 : 70E2(N₂), 75E5(Cs), 77E5(Cs), 79E2(Xe), 80E7(Xe), 80E26(Xe+),
 81E5(Xe), 82E43(Xe), 83E30(N₂), 86E32(Xe), 91E24(He, Ne, Ar, CH₄)
 ; 62T1(Xe)

q = 2 : 79E6(Xe), 79E1(Ar, Xe, H₂, N₂, O₂, CO₂), 79E2(Xe), 79E7(He, Ne, Ar, Kr, Xe),
 80E19(He, Ne, Ar, Kr, Xe), 80E27(H, H₂), 82E43(Xe), 83E13(Ar, Xe), 83E24
 (He, Ne, Ar, Kr, Xe), 83E26(He, H₂), 83E30(N₂), 84E20(H₂, N₂, CO₂, CH₄, C₂H₆,
 C₃H₈), 84E27(He), 84E47(Li), 84E56(Ar), 85E38(H₂), 85E40(He, Ne, Ar),
 86E1(Li), 87E33(He, Ne, Ar, Kr, Xe), 88E17(He)
 ; 85T23(Ne)

q = 3 : 79E2(Xe), 80E27(H, H₂), 83E13(Ar, Xe), 83E24(He, Ne, Ar, Kr, Xe), 83E26
 (He, H₂), 83E34(Xe),
 84E20(H₂, N₂, CO₂, CH₄, C₂H₆, C₃H₈), 84E27(He), 84E47(Li), 87E33(He, Ne, Ar,
 Kr, Xe), 88E17(He), 88E27(Ar), 95E59(Ar, Kr)

q = 4 : 79E2(Xe), 80E27(H, H₂), 83E13(Ar, Xe), 83E24(He, Ne, Ar, Kr, Xe), 83E26
 (He, H₂), 83E34(Xe), 84E20(H₂, N₂, CO₂, CH₄, C₂H₆, C₃H₈), 84E27(He),
 84E47(Li), 87E33(He, Ne, Ar, Kr, Xe), 88E17(He), 88E27(Ne, Ar, Kr)

q = 5 : 80E27(H, H₂), 83E13(Ar, Xe), 83E24(He, Ne, Ar, Kr, Xe), 83E26(He, H₂), 83E34
 (Xe), 84E20(H₂, N₂, CO₂, CH₄, C₂H₆, C₃H₈), 84E27(He), 84E47(Li), 87E33(He,
 Ne, Ar, Kr, Xe)
 q = 6 : 80E27(H, H₂), 83E13(Ar, Xe), 83E24(He, Ne, Ar, Kr, Xe), 83E26(He, H₂), 83E34
 (Xe), 84E20(H₂, N₂, CO₂, CH₄, C₂H₆, C₃H₈), 84E27(He), 84E47(Li), 87E33(He,
 Ne, Ar, Kr, Xe), 89E1(He)
 q = 7 : 80E27(H, H₂), 83E13(Ar, Xe), 83E24(He, Ne, Ar, Kr, Xe), 83E26(He, H₂), 83E34
 (Xe), 84E20(H₂, N₂, CO₂, CH₄, C₂H₆, C₃H₈), 84E27(He), 84E47(Li), 87E33(He,
 Ne, Ar, Kr, Xe)
 q = 8 : 80E27(H, H₂), 83E13(Ar, Xe), 83E24(He, Ne, Ar, Kr, Xe), 83E26(He, H₂), 83E34
 (Xe), 84E20(H₂, N₂, CO₂, CH₄, C₂H₆, C₃H₈), 84E27(He), 84E47(Li), 95E7
 (Rb(10f)),
 q = 9 : 80E27(H, H₂), 83E13(Ar, Xe), 83E24(He, Ne, Ar, Kr, Xe), 83E26(He, H₂), 83E34
 (Xe), 84E20(H₂, N₂, CO₂, CH₄, C₂H₆, C₃H₈), 84E27(He), 84E47(Li)
 q = 10 : 79E14(He, Ne, Na, Ar, Kr, Cd, Xe, Cs), 80E27(H, H₂), 83E13(Ar, Xe), 83E24(He,
 Ne, Ar, Kr, Xe), 83E26(He, H₂), 83E34(Xe), 84E20(H₂, N₂, CO₂, CH₄, C₂H₆,
 C₃H₈), 84E27(He), 84E47(Li), 87E36(Ne, Ar, Xe)
 q = 11 : 80E27(H, H₂), 83E13(Ar, Xe), 83E24(He, Ne, Ar, Kr, Xe), 83E34(Xe),
 84E20(H₂, N₂, CO₂, CH₄, C₂H₆, C₃H₈), 84E27(He), 84E47(Li), 87E36(Ne, Ar, Xe),
 88E1(He), 91E8(He)
 q = 12 : 80E27(H, H₂), 83E13(Ar, Xe), 83E34(Xe), 84E27(He), 87E36(Ne, Ar, Xe),
 88E1(He)
 q = 13 : 83E13(Ar, Xe), 83E34(Xe), 84E27(He), 87E36(Ne, Ar, Xe), 88E1(He), 91E8
 (He), 93E11(Xe)
 q = 14 : 83E13(Ar, Xe), 83E34(Xe), 87E36(Ne, Ar, Xe), 88E1(He), 91E8(He),
 93E11(Xe)
 q = 15 : 83E13(Ar, Xe), 83E34(Xe), 87E36(Ne, Ar, Xe), 88E1(He), 89E14(Xe),
 90E1(Xe), 91E8(He), 92E13(Xe), 93E11(Xe)
 q = 16 : 87E36(Ne, Ar, Xe), 88E1(He), 89E14(Xe), 91E8(He), 93E11(Xe), 95E7
 (Rb(10f))
 q = 17 : 87E36(Ne, Ar, Xe), 88E1(He), 89E14(Xe), 91E8(He), 93E11(Xe)
 q = 18 : 87E36(Ne, Ar, Xe), 88E1(He), 89E14(Xe), 91E8(He), 93E11(Xe)
 q = 19 : 87E36(Ne, Ar, Xe), 88E1(He), 89E14(Xe), 91E8(He), 93E11(Xe)
 q = 20 : 87E36(Ne, Ar, Xe), 88E1(He), 89E14(Xe), 90E1(Xe), 91E8(He), 92E13(Xe),
 93E11(Xe)
 q = 21 : 88E1(He), 89E14(Xe), 91E8(He), 93E11(Xe)
 q = 22 : 88E1(He), 89E14(Xe), 93E11(Xe)
 q = 23 : 88E1(He), 89E14(Xe), 91E8(He), 93E11(Xe)

q = 24 : 88E1(He), 89E14(Xe), 93E11(Xe)
 q = 25 : 88E1(He), 89E14(Xe), 90E1(Xe), 91E8(He), 92E13(Xe), 93E11(Xe), 95E6(He)
 q = 26 : 88E1(He), 89E14(Xe), 93E11(Xe), 95E6(He)
 q = 27 : 88E1(He), 89E14(Xe), 91E8(He), 93E11(Xe), 93E13(Xe), 95E6(He), 96E24(C₆₀)
 q = 28 : 88E1(He), 89E14(Xe), 92E13(Xe), 93E11(Xe), 95E6(He)
 q = 29 : 88E1(He), 89E14(Xe), 91E8(He), 93E11(Xe), 95E6(He)
 q = 30 : 88E1(He), 89E14(Xe), 90E1(Xe), 93E11(Xe), 92E13(Xe), 95E6(Ar), 95E6(He)
 q = 31 : 88E1(He), 89E14(Xe), 90E1(Xe), 91E8(He), 93E11(Xe), 92E13(He, Xe), 95E6(He)
 q = 32 : 89E14(Xe), 93E11(Xe), 92E13(He, Xe), 95E6(He), 95E7(Rb(10f))
 q = 33 : 89E14(Xe), 93E11(Xe), 92E13(He), 95E6(He)
 q = 34 : 89E14(Xe), 93E11(Xe), 95E6(He)
 q = 35 : 89E14(Xe), 90E1(Xe), 93E11(Xe), 92E13(He, Xe), 95E6(He), 96E3(H)
 q = 36 : 92E13(He, Xe), 93E11(Xe), 95E6(He)
 q = 37 : 92E13(He, Xe), 93E11(Xe), 95E6(He)
 q = 38 : 95E6(He)
 q = 39 : 95E6(He)
 q = 40 : 92E13(He), 95E6(He), 95E7(Rb(10f))
 q = 41 : 95E6(He)
 q = 42 : 92E13(He, Xe), 95E6(He)
 q = 43 : 95E6(He), 96E3(H)
 q = 44 : 95E6(He), 96E3(H)
 q = 45 : 96E3(H)
 q = 46 : 96E3(H)
 q = 51 : 88E36(H₂)
 q = 52 : 85E52(Be, Al, Cu, Ag, Au, Mylar), 86E71(Be, U), 87E4(Al, Cu, Ag, Au), 92E3(Si<110>); 86T26(Be³⁺, Al¹²⁺, Cu²⁸⁺, Au⁷⁸⁺)
 q = 53 : 85E52(Be, Al, Cu, Ag, Au, Mylar), 87E3(Si), 87E4(Al, Cu, Ag, Au)
 q = 54 : 85E52(Be, Al, Cu, Ag, Au, Mylar), 86E71(Be, U), 87E72(Be, Ni, Ta), 87E4(Al, Cu, Ag, Au); 83T21(H), 83T22(H), 86T26(Be³⁺, Al¹²⁺, Cu²⁸⁺, Au⁷⁸⁺), 87T29(Be), 88T61(Ag, Au), 89T31(Be), 93T38(Al, Cu, Ag, Ta, Au)

Cs

q = -1 : 86E54(He, Ne, Ar, Kr, Xe, D₂, N₂, O₂, CO, CO₂, SO₂, N₂O, CH₄, SF₆)
 q = 1 : 81E34(Cs⁺), 81E37(Cs⁺), 82E50(Cs⁺); 76T8(Cs), 81T43(Cs⁺), 82T8(Cs⁺), 86T47(Cs)
 q = 2 : 81E40(H₂, He, Ne, Kr), 86E39(Ar, Kr, Xe, H₂, N₂, O₂)
 q = 3 : 81E40(H₂, He, Ne, Kr), 86E39(He, Ne, Ar, Kr, Xe, H₂, N₂, O₂)
 q = 4 : 81E40(H₂, He, Ne, Kr)
 q = 5 : 81E40(H₂, He, Ne, Kr),

Ba

q = 1 : 90E54(Na), 91E28(H⁺), 92E45(Na, Rb, Cs); 80T38(Ba⁺)

La

q = 40 : 87E9(H₂); 92T4(H₂)

q = 57 : 87E72(Be, Ni, Ta), 94E3(Cu, Ag, Au); 95T10(Cu, Ag, Au)

Nd

q = 1 : 95T41(Nd)

Sm

q = 34 : 86E52(Xe)
 q = 35 : 86E52(Xe)
 q = 36 : 86E52(Xe)
 q = 37 : 86E52(Xe)
 q = 38 : 86E52(Xe)
 q = 39 : 86E52(Xe)
 q = 40 : 86E52(Xe)
 q = 41 : 86E52(Xe)
 q = 42 : 86E52(Xe)
 q = 43 : 86E52(Xe)
 q = 44 : 86E52(Xe)
 q = 45 : 86E52(Xe)
 q = 46 : 86E52(Xe)
 q = 47 : 86E52(Xe)

q = 48 : 86E52(Xe)
q = 49 : 86E52(Xe)
q = 50 : 86E52(Xe)
q = 51 : 86E52(Xe)
q = 52 : 86E52(Xe)

Gd

q = 1 : 91E47(Gd), 94E24(Gd), 96E22(Gd*), 96E23(Gd*)
; 95T41(Gd)
q = 37 : 87E55(Ar,Xe)

Dry

[illegible]

五

$$q = 1 : {}^{73}\text{E2}(\text{He}, \text{N}_2)$$
Tr
$$q = 3 : 95E50(H_2)$$

q = 4	: 92E20(H, H ₂), 95E50(H ₂)
q = 5	: 92E20(H, H ₂), 95E50(H ₂)
q = 6	: 92E20(H, H ₂)
q = 7	: 92E20(H, H ₂)
q = 8	: 92E20(H, H ₂)
q = 9	: 92E20(H, H ₂)
q = 10	: 92E20(H, H ₂)
q = 11	: 92E20(H, H ₂)
q = 12	: 92E20(H, H ₂)
q = 13	: 92E20(H, H ₂)
q = 14	: 92E20(H, H ₂)
q = 15	: 92E20(H, H ₂)
q = 16	: 92E20(H, H ₂)
q = 17	: 92E20(H, H ₂)
q = 18	: 92E20(H, H ₂)
q = 19	: 92E20(H, H ₂)
q = 20	: 92E20(H, H ₂)
q = 21	: 92E20(H, H ₂)
q = 73	: 89T31(Be)

三

	q	=	2	:	952627(Ar)
	q	=	3	:	95264(H)
	q	=	4	:	95264(H)
	q	=	5	:	95264(H,H ₂)
	q	=	6	:	95264(H,H ₂)
	q	=	7	:	95264(H,H ₂)
	q	=	8	:	95264(H,H ₂)
	q	=	9	:	95264(H,H ₂)
	q	=	10	:	95264(H,H ₂)
	q	=	12	:	95264(H,H ₂)
	q	=	13	:	95264(H,H ₂)
	q	=	14	:	95264(H,H ₂)
	q	=	15	:	95264(H,H ₂)
	q	=	16	:	95264(H)
	q	=	17	:	95264(H)
	q	=	18	:	95264(H)

q = 19 : 95E64(H)
 q = 20 : 95E64(H)
 q = 21 : 95E64(H)
 q = 22 : 95E64(H)
 q = 23 : 95E64(H)
 q = 24 : 95E64(H)
 q = 25 : 95E64(H)
 q = 26 : 95E64(H)
 q = 27 : 95E64(H)
 q = 28 : 95E64(H)
 q = 29 : 95E64(H)
 q = 30 : 95E64(H)
 q = 74 : 95E64(H)
 ; 83T22(H)

Re

q = 6 : 92E20(H,H₂)
 q = 7 : 92E20(H,H₂)
 q = 8 : 92E20(H,H₂)
 q = 9 : 92E20(H,H₂)
 q = 10 : 92E20(H,H₂)
 q = 11 : 92E20(H,H₂)
 q = 12 : 92E20(H,H₂)
 q = 13 : 92E20(H,H₂)
 q = 14 : 92E20(H,H₂)
 q = 15 : 92E20(H,H₂)
 q = 16 : 92E20(H,H₂)
 q = 17 : 92E20(H,H₂)
 q = 18 : 92E20(H,H₂)
 q = 19 : 92E20(H,H₂)
 q = 20 : 92E20(H,H₂)

Au

q = 2 : 81E14(He)
 q = 3 : 81E14(He), 92E20(H,H₂)
 q = 4 : 81E14(He), 92E20(H,H₂)
 q = 5 : 81E14(He), 83E10(He,Ne), 92E20(H,H₂)

q = 6 : 81E14(He), 83E10(He,Ne), 92E20(H,H₂)
 q = 7 : 81E14(He), 83E10(He,Ne), 92E20(H,H₂)
 ; 84T38(He)
 q = 8 : 81E14(He), 83E10(He,Ne), 92E20(H,H₂)
 q = 9 : 81E14(He), 83E10(He,Ne), 92E20(H,H₂)
 ; 84T38(He)
 q = 10 : 81E14(He), 83E10(He,Ne), 92E20(H,H₂)
 ; 84T38(He)
 q = 11 : 81E14(He), 83E10(He,Ne), 86E30(He), 92E20(H,H₂)
 q = 12 : 81E14(He), 83E10(He,Ne), 83E18(H₂), 84E41(H₂), 92E20(H,H₂)
 ; 84T38(He)
 q = 13 : 81E12(H₂), 81E14(He), 83E10(He,Ne), 83E18(H₂), 84E41(H₂), 92E20(H,H₂)
 ; 84T38(He)
 q = 14 : 81E14(He), 83E10(He,Ne), 83E18(H₂), 84E41(H₂), 92E20(H,H₂)
 ; 84T38(He)
 q = 15 : 81E12(H₂), 81E14(He), 83E10(He,Ne), 83E18(H₂), 84E1(He), 84E41(H₂),
 92E20(H,H₂)
 ; 84T38(He)
 q = 16 : 81E14(He), 83E10(He,Ne), 83E18(H₂), 84E41(H₂), 92E20(H,H₂)
 ; 84T38(He)
 q = 17 : 81E14(He), 83E10(He,Ne), 83E18(H₂), 92E20(H,H₂)
 q = 18 : 81E14(He), 83E10(He,Ne), 83E18(H₂), 84E41(H₂), 92E20(H,H₂)
 ; 84T38(He)
 q = 19 : 92E20(H,H₂)
 q = 20 : 81E14(He), 83E10(He,Ne), 92E20(H,H₂)
 ; 84T38(He)
 q = 21 : 81E14(He), 83E10(He,Ne), 92E20(H,H₂)
 ; 84T38(He)
 q = 22 : 81E14(He), 92E20(H,H₂)
 ; 84T38(He)
 q = 23 : 81E14(He), 92E20(H,H₂)
 ; 84T38(He)
 q = 24 : 81E14(He), 92E20(H,H₂)
 q = 25 : 84T38(He)
 q = 52 : 91E30(H₂,He,C,N₂), 93E15(H₂,He)
 q = 75 : 91E30(H₂,He,C,N₂)
 q = 78 : 93E72(glass), 94E37(e), 95E55(C,N₂,Al)

q = 79 : 93E27(glass), 93E72(glass), 94E37(e), 95E55(C,N₂,Al)
 ; 89T43(Au⁷⁹⁺), 93T31(C⁵⁺,Al¹²⁺,Cu²⁸⁺,Ag⁴⁶⁺,Au⁷⁸⁺), 96T25(Au)

Hg

q = 1 : 62T1(Hg)

Tl

q = 1 : 91E29(Tl⁺)

Pb

q = 2 : 81E40(He)

q = 3 : 81E40(He)

q = 4 : 81E40(He)

q = 5 : 81E40(He)

q = 6 : 81E40(He)

q = 7 : 81E40(He)

q = 8 : 81E40(He)

q = 52 : 81E42(H₂)

q = 53 : 81E42(H₂)

q = 54 : 81E42(H₂)

q = 55 : 81E42(H₂)

q = 57 : 81E42(H₂)

q = 59 : 81E42(H₂)

q = 79 : 88E36(H₂)

q = 81 : 95E55(N₂), 95E39(N₂)

q = 82 : 95E55(N₂)

Bi

q = 2 : 81E40(He,H₂)

q = 3 : 81E40(He,H₂)

q = 4 : 81E40(He,H₂)

q = 5 : 81E40(He,H₂)

q = 6 : 81E40(He,H₂)

q = 7 : 81E40(He,H₂)

q = 20 : 96E24(C₆₀)

q = 38 : 96E24(C₆₀)

q = 44 : 96E24(C₆₀)

q = 46 : 96E24(C₆₀)
 q = 82 : 95E55(C)
 q = 83 : 95E55(C)

Th

q = 73 : 96E3(H₁)

q = 74 : 96E3(H₁)

q = 75 : 96E3(H₁)

q = 76 : 96E3(H₁)

q = 77 : 96E3(H₁)

q = 78 : 96E3(H₁)

q = 79 : 96E3(H₁)

q = 80 : 96E3(H₁)

U

q = 1 : 82E39(U)
 ; 88T46(U)

q = 2 : 78T6(Ne)

q = 4 : 92E20(H,H₂)

q = 5 : 92E20(H,H₂)

q = 6 : 92E20(H,H₂)

q = 7 : 92E20(H,H₂)

q = 8 : 92E20(H,H₂)

q = 9 : 92E20(H,H₂)

q = 10 : 92E20(H,H₂)

q = 11 : 92E20(H,H₂)

q = 12 : 92E20(H,H₂)

q = 13 : 92E20(H,H₂)

q = 14 : 92E20(H,H₂)

q = 15 : 92E20(H,H₂)

q = 16 : 92E20(H,H₂)

q = 17 : 90E9(He), 92E20(H,H₂)

q = 18 : 90E9(He), 92E20(H,H₂)

q = 19 : 90E9(He), 92E20(H,H₂)

q = 20 : 90E9(He), 92E20(H,H₂)

q = 21 : 90E9(He), 92E20(H,H₂)

q = 22 : 90E9(He), 92E20(H,H₂)

q = 23 : 90E9(He), 92E20(H,H₂)
 q = 24 : 90E9(He), 92E20(H,H₂)
 q = 25 : 90E9(He), 92E20(H,H₂)
 q = 26 : 90E9(He)
 q = 27 : 90E9(He)
 q = 28 : 90E9(He)
 q = 29 : 90E9(He)
 q = 30 : 90E9(He)
 q = 31 : 90E9(He)
 q = 32 : 89T40(He), 90E9(He)
 q = 33 : 90E9(He)
 q = 34 : 90E9(He)
 q = 35 : 90E9(He)
 q = 36 : 87E55(He,Ar,Kr,Xe), 90E9(He)
 ; 78T6(N,Ne,Ar,Kr)
 q = 37 : 90E9(He)
 q = 38 : 90E9(He)
 q = 40 : 90E9(He)
 q = 41 : 87E55(Ar)
 q = 42 : 90E9(He)
 q = 44 : 86E7(Ar), 87E55(He,Ar,Kr,Xe), 90E9(He)
 q = 46 : 96E24(C₆₀)
 q = 48 : 87E55(Ar)
 q = 51 : 84E19(H₂)
 q = 52 : 84E19(H₂)
 q = 53 : 84E19(H₂)
 q = 54 : 84E19(He,Ne,Ar,Xe,N₂)
 q = 55 : 84E19(H₂)
 q = 56 : 84E19(H₂)
 q = 57 : 84E19(H₂)
 q = 58 : 84E19(H₂)
 q = 59 : 84E19(H₂)
 q = 65 : 85E75(Ar,Xe)
 ; 85T61(Ar)
 q = 75 : 85E75(Ar,Xe)
 ; 85T61(Ar)
 q = 83 : 87E4(Al,Cu,Ag,Au)

q = 86 : 91E30(H₂,He), 93E15(H₂,He)
 q = 89 : 87E4(Al,Cu,Ag,Au)
 ; 87T26(C,H₂)
 q = 90 : 87E4(Al,Cu,Ag,Au), 90E62(H₂), 91E30(H₂,He), 94E57(C), 95E24(C), 95E25(C)
 q = 91 : 84E18(C,Cu,Ta), 87E4(Al,Cu,Ag,Au), 94E37(e), 95E55(Be,C,N₂,Ar)
 q = 92 : 84E18(C,Cu,Ta), 87E72(Be,Ni,U), 93E7(Au), 95E55(Be,C,N₂,Ar), 95E42(N₂)
 ; 78T6(He), 87T29(Be), 88T12(U⁹²⁺), 88T60(U⁹¹⁺), 88T61(U⁹¹⁺), 89T31(Be), 89T43(U⁹²⁺), 89T47(U⁹¹⁺), 89T18(z=10-92), 90T40(U⁹¹⁺), 91T16(U⁹¹⁺), 93T19(U⁹¹⁺), 93T31(C⁵⁺,Al¹²⁺,Ag⁴⁶⁺,Au⁷⁸⁺,U⁹¹⁺)

Molecular ion species

H₂

q = 1 : 77E5(Cs), 84E13(Na,Mg,Ar,Cs), 85E5(Li), 85E7(Cs), 86E15(Na,Mg,Ar,Cs), 86E16(Cs), 86E33(H₂), 86E56(He,Ne,Ar), 86E77(Ar), 87E17(He,Ar,H₂), 87E45(He,Ne,Ar,Kr,Xe), 87E89(He,Ne,Ar,Kr,CH₄,C₂H₆,C₃H₈,C₂H₄,C₃H₆,C₄H₈), 87E92(H₂), 87E100(Ne), 88E16(H₂), 91E44(Na(3s,3p)), 93E63(Na(3s,3p)), 94E39(O₂), 94E52(Na(3p)), 95E58(N₂)
 ; 84T50(Mg), 86T19(H₂), 87T66(Ar), 90T8(H₂), 90T18(He), 95T9(H⁻)

H₃

q = 1 : 77E5(Cs), 85E7(Cs), 92E59(He,Ne,Ar,Xe), 93E33(He,Ne,Ar,Xe), 94E39(O₂)

D₂

q = 1 : 84E38(Cs), 88E16(H₂), 94E39(O₂)

D₃

q = 1 : 84E38(Cs), 94E39(O₂)

N₂

q = 1 : 77E5(Cs), 82E41(Ar,N₂), 84E32(Ar,Alr), 85E7(Cs), 86E36(Ar), 86E75(Ar), 87E51(N₂), 88E12(O₂,NO), 88E30(HgCl,HgBr,HgI), 88E62(H₂), 90E14(CO₂), 90E27(N₂), 93E19(N₂), 93E37(N₂), 94E22(NO), 94E62(Cs), 94E63(Cs), 95E58(H₂)
 ; 86T64(Ar), 89T53(Ar)

q = 2 : 87E51(N ₂), 89E22(He,Ne), 91E33(He,Ne,Ar), 96E26(He,Ne,Ar,D ₂ ,N ₂ ,O ₂), q = 2* : 96E28(Kr)	CN q = 1 : 92E63(Xe)
O ₂ q = 1 : 84E32(Ar,Alr), 84E38(Cs), 87E72(Cs), 89E67(O ₂ ,CH ₄), 92E63(Xe) q = 2 : 93E69(Na,K,Cs) ; 94T66(Na,K,Cs)	CS q = 1 : 92E51(He), 96E41(CS ₂) q = 2 : 92E51(He)
CO q = 1 : 86E77(Ar), 87E69(He,Ne,Ar) q = 2 : 87E60(He), 89E23(He), 93E59(He,Ne,Ar,Kr,Xe)	CS ₂ q = 2 : 87E50(He,Ne,Ar,Kr,Xe,Il ₂ ,N ₂ ,O ₂), 88E26(He,Ne,Ar,Kr,Xe) q = 3 : 87E50(He,Ne,Ar,Kr,Xe,Il ₂ ,N ₂ ,O ₂), 89E24(He,Ar)
CO ₂ q = 2 : 88E26(He,Ne,Ar,Kr,Xe), 93E52(He,Ne,Ar,Kr,Xe)	C ₄ H ₅ N q = 2 : 87E95(C ₄ H ₅ N)
CF q = 1 : 87E69(He,Ne,Ar), 92E63(Xe) q = 2 : 93E43(He,Ne,Ar,Kr,Xe)	NH q = 1 : 92E63(Xe) q = 2 : 88E18(He)
CF ₂ q = 2 : 93E43(He,Ne,Ar,Kr,Xe)	NO q = 1 : 92E63(Xe)
CH q = 1 : 86E40(Kr,N ₂ ,CH ₄ ,Alr), 92E63(Xe) q = 2 : 88E18(He)	OH q = 2 : 88E18(He)
CH ₂ q = 1 : 86E40(Kr,N ₂ ,CH ₄ ,Alr)	OCS q = 2 : 88E26(He,Ne,Ar,Kr,Xe), 93E53(He,Ne,Ar,Kr,Xe) q = 3 : 87E49(Ar,Kr,Xe,H ₂ ,N ₂ ,O ₂ ,CH ₄), 89E24(He,Ar)
CH ₃ q = 1 : 86E40(Kr,N ₂ ,CH ₄ ,Alr)	SH q = 2 : 88E18(He)
CH ₄ q = 1 : 86E40(Kr,N ₂ ,CH ₄ ,Alr)	K _n (n=1-14) q = 1 : 90E64(Cs)
CH ₅ q = 1 : 86E40(Kr,N ₂ ,CH ₄ ,Alr)	Ar ₂ q = 1 : 87E97(H ₂ S,CS ₂ ,NO ₂)

Na_n (n=1-21)
q = 1 : 88E6(Cs), 90E64(Cs)

 $(\text{Au})_n$ (n=2-4)
q = 2 : 89E52(Ar, Kr, Xe, N₂, O₂, CO)

 C_{60}
q = 1 : 95E54(Xe, C₆₀)
q = 2 : 94E28(H₂, He, Ar, Kr, Xe, NO), 95E54(Xe, C₆₀)
q = 3 : 94E28(H₂, He, Ar, Kr, Xe, NO)

 C_{70}
q = 1 : 95E54(Xe, C₆₀)
q = 2 : 95E54(Xe, C₆₀)
q = 3 : 95E54(Xe, C₆₀)

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