

NATIONAL INSTITUTE FOR FUSION SCIENCE**Partial and Total Electronic Stopping Cross Sections of Atoms
and Solids for Protons****T. Kaneko**

(Received — Nov. 30, 1990)

NIFS-DATA-9

Dep. 1990

**RESEARCH REPORT
NIFS-DATA Series**

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PARTIAL AND TOTAL ELECTRONIC STOPPING CROSS SECTIONS OF ATOMS AND
SOLIDS FOR PROTONS

Toshiaki KANEKO *

National Institute for Fusion Science
Nagoya 464-01, Japan

Based on a wave packet theory[Phys.Rev.A40,2188(1989); Phys. Stat.Sol.(B)156,49(1989)], partial and total electronic cross sections of target elements in atomic and solid phases with atomic number Z ranging from 2 (He) to 92 (U) are tabulated shell by shell for protons with velocity v from $0.2v_0$ to $20v_0$ ($v_0=2.18 \times 10^8$ cm/s).

[keywords ; electronic stopping, partial cross section, total cross section, proton, wave packet theory]

* Permanent address:

Faculty of Science, Okayama University of Science
1-1 Ridaicho, Okayama 700, Japan

INTRODUCTION

The electronic stopping power of matter for energetic ions has attracted our attention theoretically[1-11] as well as experimentally because it is one of the fundamental problems in the studies of both the atomic collision phenomena in solids and the plasma-wall interaction in a fusion reactor. So far, theoretical estimates have been performed of the stopping of a free electron gas[1-4] and of atomic electrons based either on Born approximation[5,6] or on a momentum-exchange model[7]. In addition, the density-functional calculations[8], the kinetic theory based on the binary-encounter model[9], and the local-electron-density-model (LEDM) calculations[10,11] have been also presented. Recently, tables of electronic stopping power of atoms up to krypton were made on the basis of the kinetic binary-encounter model[12]. Quite recently, the idea of the wave packet treatment was newly presented to estimate the stopping and the straggling of bound electrons by means of the dielectric function method together with the independent shell model[13]. The calculated stopping and straggling cross sections of atoms up to Xe ($Z=54$) were tabulated[14,15]. The main thrust of this theory is the use of momentum-space representation to describe a bound-electron system. Here, we have an idea that each atomic shell serves only as a wave packet of the interacting electron gas with an appropriate momentum-occupation probability. Then, by studying the dielectric response of this system, the one-shell polarization can be calculated. Hence the dielectric function is straightforwardly obtained to be applied to the stopping cross sections. This paper is devoted to the presentation of calculated

results on partial and total electronic stopping cross sections of elements with atomic number Z_2 ranging from 2 (He) to 92 (U) in atomic and solid phases for a proton at velocities from $0.2v_0$ to $20v_0$ ($v_0=2.18 \times 10^8$ cm/s).

One-shell dielectric function

In general, atomic states are degenerate with respect to magnetic quantum number without an external magnetic field. Then, atomic states of bound electrons are classified by a set of the principal and angular-momentum quantum numbers, i.e., (n,l) . We assume that the wave packet involves equivalent N bound electrons in a normalization volume V . The case is considered where the number density of the electrons is additive, and V and N go to infinity with N/V constant. This situation allows us to treat the discrete q values as continuous. The occupation probability $W(q)$ of momentum $\hbar q$ for a shell (n,l) introduced into the wave packet system, is determined by maximizing the entropy

$$S = - \sum_q W(q) \ln\{ W(q) \} , \quad (1)$$

under the condition that the total number N and the total energy E of the wave packet composed of plane waves are kept constant:

$$2 \sum_q W(q) = N , \quad 2 \sum_q W(q) \times \hbar^2 q^2 / 2m = E . \quad (2)$$

Here \sum_q means $V/(2\pi)^3 \int d^3q$ and a factor 2 comes from spin multiplicity. Using the Lagrange method of undetermined multipliers, one obtains a result $W(q) = W(0) \exp(-q^2/\bar{q}^2)$, with $(\hbar\bar{q})^2/2m=2E/3$.

The characteristic momentum $\hbar q$ for a shell is determined later and found to depend on the number density of the bound electrons considered. We may assume that the occupation of the lowest momentum ($\hbar q=0$) in the wave packet system is complete regardless of N , since we consider not a dilute but a dense electron gas. Hence we may set $W(0)=1$ so that $W(q)$ is reduced to

$$W(q)=\exp(-q^2/\bar{q}^2). \quad (3)$$

Let us consider the response of the wave-packet system with the ground state occupation probability $W(q)$. Details of derivation is omitted here, but the density-fluctuation component in the $k-\omega$ space can be calculated within the frame of linear response[13]. As a result, the RPA one-shell dielectric function $\xi(\vec{k}, \omega)$ can be expressed by $\xi(\vec{k}, \omega) = 1 + 4\pi \alpha(\vec{k}, \omega)$, where the one-shell polarization is given by

$$4\pi \alpha(\vec{k}, \omega) = V(k) (2/V) \sum_p [W(p+k) - W(p)] / [\hbar\omega - (E_{p+k} - E_p) + i\hbar\eta]. \quad (4)$$

In the above, $E_p = (\hbar p)^2/2m$, $V(k)=4\pi e^2/k^2$ and η is a positive infinitesimal. One can calculate directly the imaginary part of $\xi(\vec{k}, \omega)$. On the other hand, the real part of $\xi(\vec{k}, \omega)$ is also calculated from the Kramers-Kronig relation. Thus, one obtains the explicit form

$$\left. \begin{aligned} \xi(z,u) &= 1 + (\chi^2/z^2)[f_1(z,u) + i f_2(z,u)], \\ f_1(z,u) &= (\pi)^{1/2}/(4z)[G(u+z) - G(u-z)], \\ f_2(z,u) &= \pi/(8z)[\exp\{-(u-z)^2\} - \exp\{-(u+z)^2\}], \end{aligned} \right\} \quad (5)$$

by using the reduced variables z and u instead of k and ω :
 $z=k/(2\bar{q})$ and $u=m\omega /(\hbar\bar{q})$. In the above equations, $\chi^2=mv_0/(\pi\hbar\bar{q})$
and $G(y)=y \times \exp(-y^2)\Phi(1/2,3/2;y^2)$, where $\Phi(1/2,3/2;y^2)$ is a
degenerate hypergeometric function[16]. Figure 2 shows the graphs
of functions, $f_1(z,u)$ and $f_2(z,u)$, of $\xi(z,u)$. It is proved that
this dielectric function satisfies the sum rules[13].

One-shell stopping cross section

According to the dielectric function method, the one-shell
stopping power S for a point charge is calculated as follows:

$$S = 4\pi (Z_1 e^2)^2 / (mv^2) \rho L$$

$$L = -8 / (\pi^{3/2} \chi^2) \int_0^\infty dz z \int_0^{v/\bar{v}} du u \operatorname{Im}[\xi(z,u)^{-1} - 1], \quad (6)$$

where $\rho = N/V$, $\bar{v} = \hbar\bar{q}/m$ and L denotes the one-shell stopping number.
At low velocities, i.e., $v \ll \bar{v}$, L is reduced to

$$L = (1/3)(v/v_0)^3 (1/2\pi^2 \rho a_0^3)$$

$$\times \int_0^\infty dt t e^{-t} / [t + (\pi^{1/2} \chi^2 / 2) e^{-t} \Phi(1/2, 3/2; t)]^2. \quad (7)$$

On the other hand, at high velocities,

$$L = \ln(2mv^2/\hbar\omega_p) - \langle v^2 \rangle / v^2 - (1/2)\langle v^2 \rangle^2 / v^4 + \dots, \quad (8)$$

where ω_p is the plasma frequency defined by $\omega_p = (4\pi\rho e^2/m)^{1/2}$
and $\langle v^2 \rangle = (3/2)\bar{v}^2$.

Determination of \bar{q}

In order to estimate the stopping power S of the shell considered, the parameter \bar{q} should be determined. Substituting (3) into the former of (2), we obtain $\bar{q} = (\pi)^{1/2} (4N/V)^{1/3}$. If N_1 and n denote the number of electrons in the system per atom, and the number density of those atoms, respectively, one gets $\bar{q} = (N_1)^{1/3} \times Q$ from $N = N_1 \times n$, where $Q = (\pi)^{1/2} (n/V)^{1/3}$. Moreover, from the discussion about Q [13], Q is determined from the value of the Hartree-Fock momentum distribution [17,18] at the origin:

$$Q = [(f_{HF}(0))^{-2/3} / \pi]^{1/2} \quad (9)$$

Here one realizes that two quantities N_1 and Q are needed to evaluate the one-shell stopping power by means of the wave-packet theory. Figures 3(a) and 3(b) show the calculated Q values for atom targets from He ($Z_2=2$) to U ($Z_2=92$).

Contribution of conduction electrons

If a target material involves conduction electrons, their contributions are estimated by means of the Lindhard-Winther theory [4]. The characteristic parameter in this case is the r_s value, defined from the density n_0 of the conduction electrons through the relation $4\pi (r_s a_0)^3 / 3 = 1/n_0$, where n_0 is determined by multiplying the number of conduction electrons per atom, N_f , by the number density of atoms. If one uses atomic mass density ρ_a [g/cm³] and atomic weight M_a [g/mol], r_s can be calculated by

$$r_s = 1.389 (M_a / N_f \rho_a)^{1/3} \quad (10)$$

Total stopping cross sections

The total stopping cross section of a target material is calculated by summing up partial contributions of individual shells. If a table involves square brackets in the head line, calculation was carried out for the target in an atomic phase and a solid phase. One has to choose a configuration before (after) a slash within the brackets in the case of atomic (solid) phase considered. Configurations outside the brackets are common to both phases. At this time, the total value before (after) slash in a column 'TOTAL' should be chosen. An example will be shown in section of EXPLANATION OF TABLES.

Figures 4(a) and 4(b) show comparison of the calculated energy dependence with the experimental data [19-36] of the stopping cross section of Kr (atomic phase) and Al (solid phase) for a proton with kinetic energies from 1 keV to 10^4 keV. Three electrons per atom are assumed to take part in the conduction band. One finds that theoretical curves for the total stopping quantitatively agree well with the trend of the data. Figure 5 shows the target dependence of stopping cross sections for a proton at $v=0.2v_0$, $2v_0$, and $4v_0$. The data are cited from empirical values[37]. Though the calculated values are a bit greater, each case agrees well with the data in magnitude and phase of the oscillatory values. The whole results of calculation are tabulated in TABLES.

Acknowledgment

The author is indebted to Mr. M. Hosono, K. Nakagawa, M. Moriya, K. Hayase, K. Miura, S. Matsushita, T. Nishihara, Y.

Matsukuma, T. Taguchi, M. Murakami, and N. Yamato for making an extended version of the preliminary tables(IPPJ-AM). Also, he would like to acknowledge encouragement of Dr. Hiro Tawara of National Institute for Fusion Science, Nagoya. This work was partly supported by a Grant-in-Aid of Fundamental Scientific Research from the Ministry of Education, Science and Culture.

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FIGURE CAPTIONS

Fig.1: Present momentum distribution for $r_s=1$, for which $q=1.745$ (atomic units). For comparison the Fermi-Dirac distribution is illustrated for the same electron density, where $q_F = 1.919$ (atomic units).

Fig.2: The functions $f_1(z,u)$ and $f_2(z,u)$ involved in the real and imaginary part, respectively, of the present dielectric function $\xi(z,u)$.

Fig.3(a)-(b): Values of the parameter Q with respect to Z_2 , which are determined from a table of Hartree-Fock wavefunctions[Ref.17,18].

Fig.4:(a) Stopping cross sections of Kr for a proton. Lines: this theory (total and partial (4p,4s,3d) values). Other symbols are the kinetic theory (X) [Ref.12] and the experimental data (○-Ref.19, ▲-Ref.20, ●-Ref.21, △-Ref.22, ▼-Ref.23, ▽-Ref.24, □-Ref.25).

(b) Stopping cross sections of Al for a proton. Lines: this theory (total and partial (2p,2s,free) values). Other symbols are the experimental data (X-Ref.26, ○-Ref.27, ▽-Ref.28, △-Ref.21, ▼-Ref.29, □-Ref.30, ■-Ref.31, ●-Ref.32, ▲-Ref.33, + -Ref.34, ▣-Ref.35, ◊-Ref.36).

Fig.5: Z_2 (target atomic number) dependence of the electronic stopping cross sections for protons at $v=0.2v_0$, $2v_0$, and $4v_0$. The data are cited from [Ref.37].

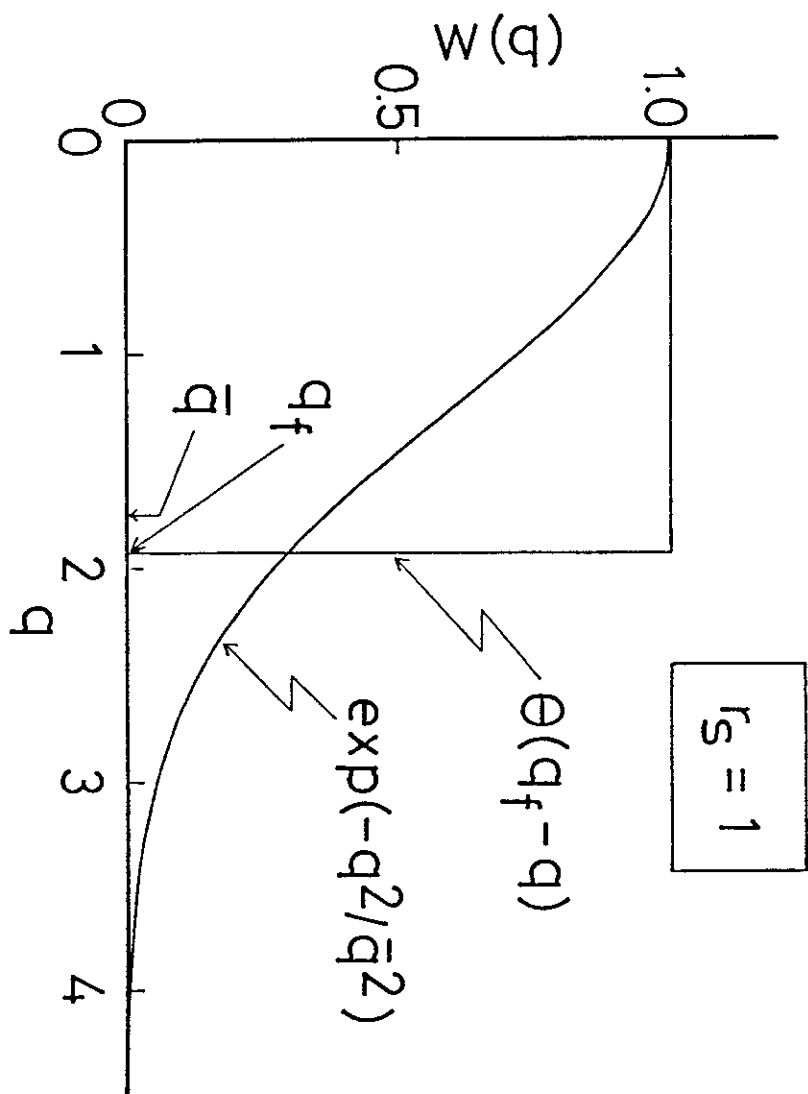
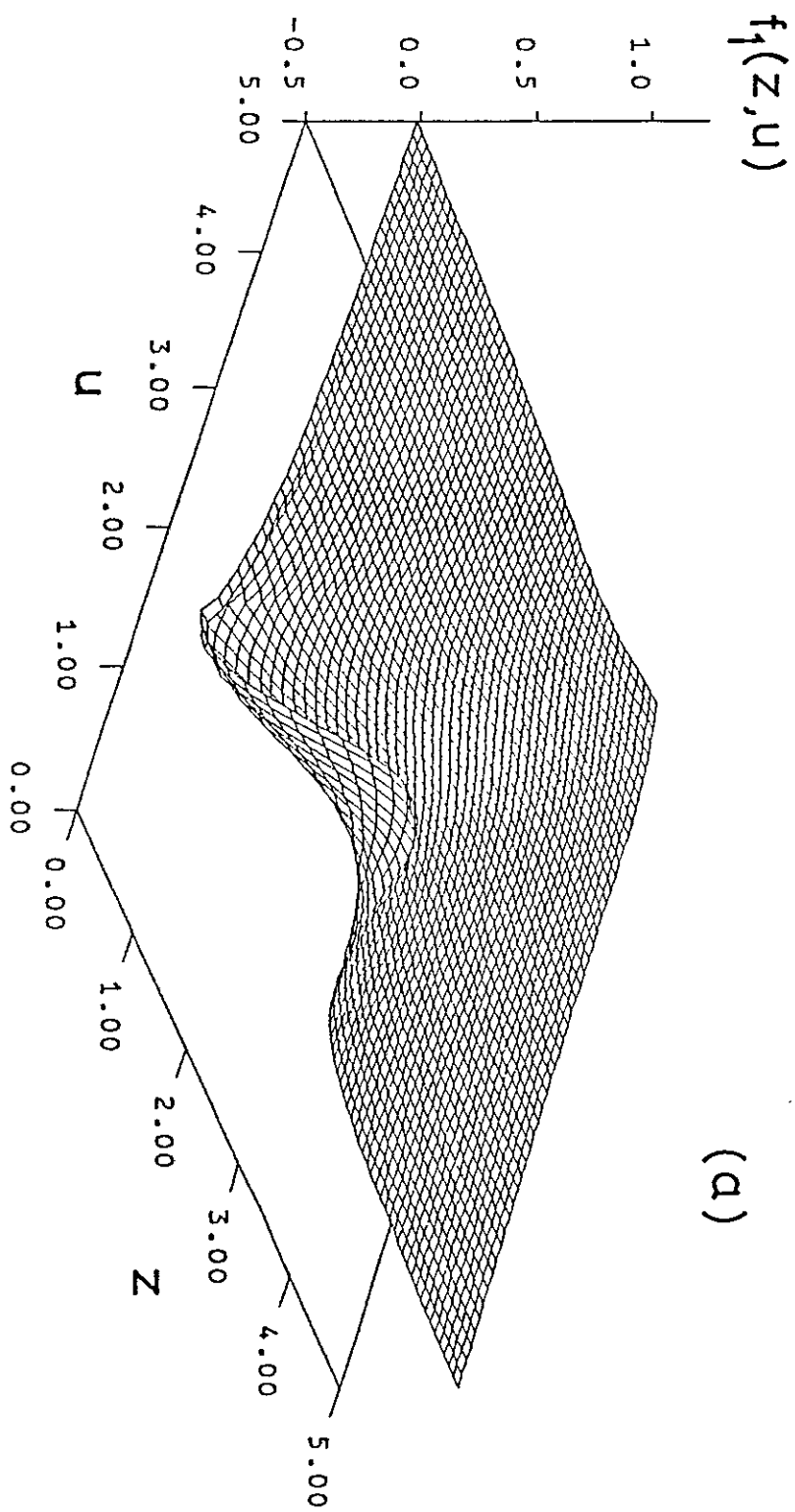
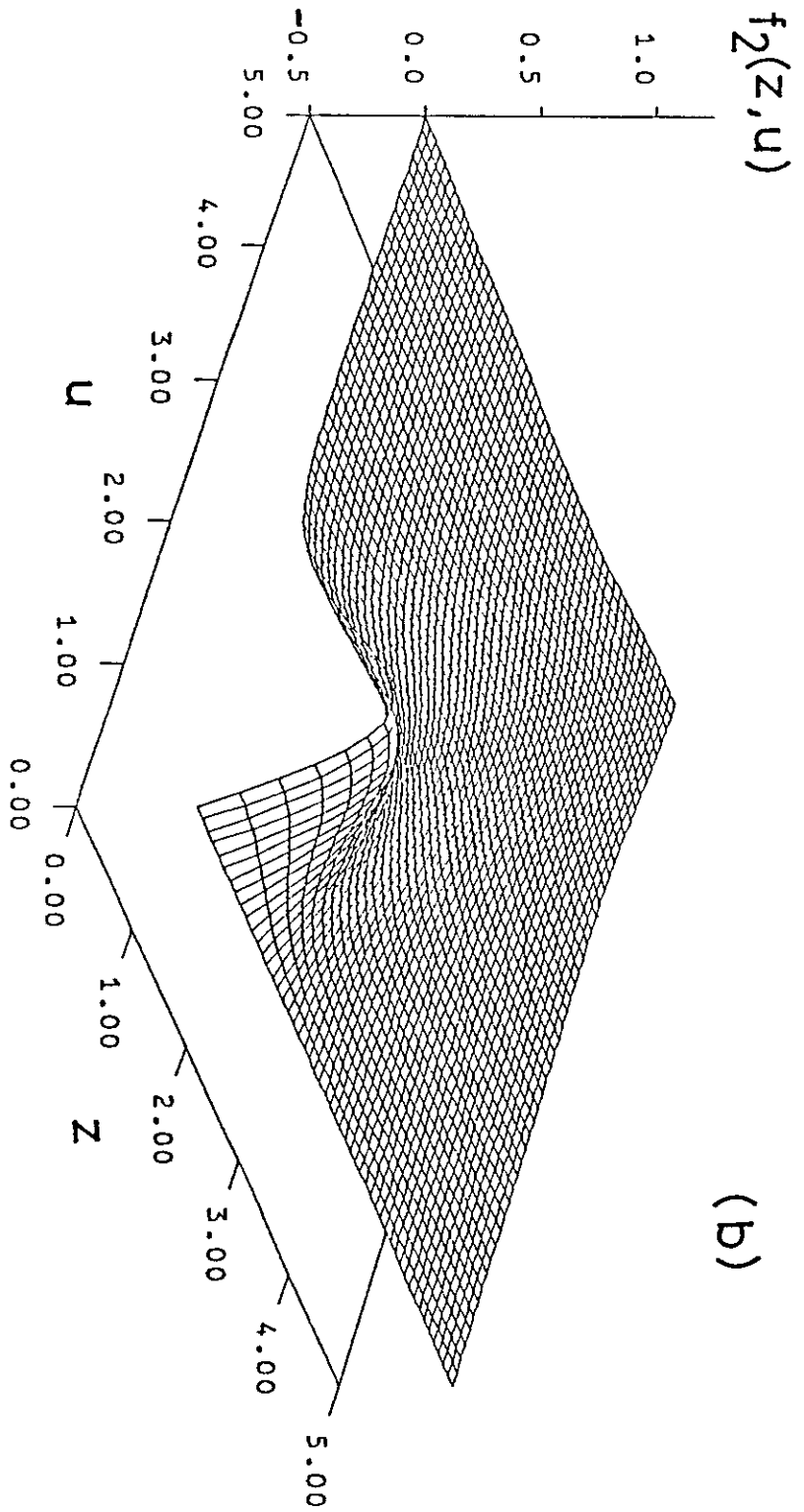


Figure 1



(a)

Figure 2(a)



(b)

Figure 2(b)

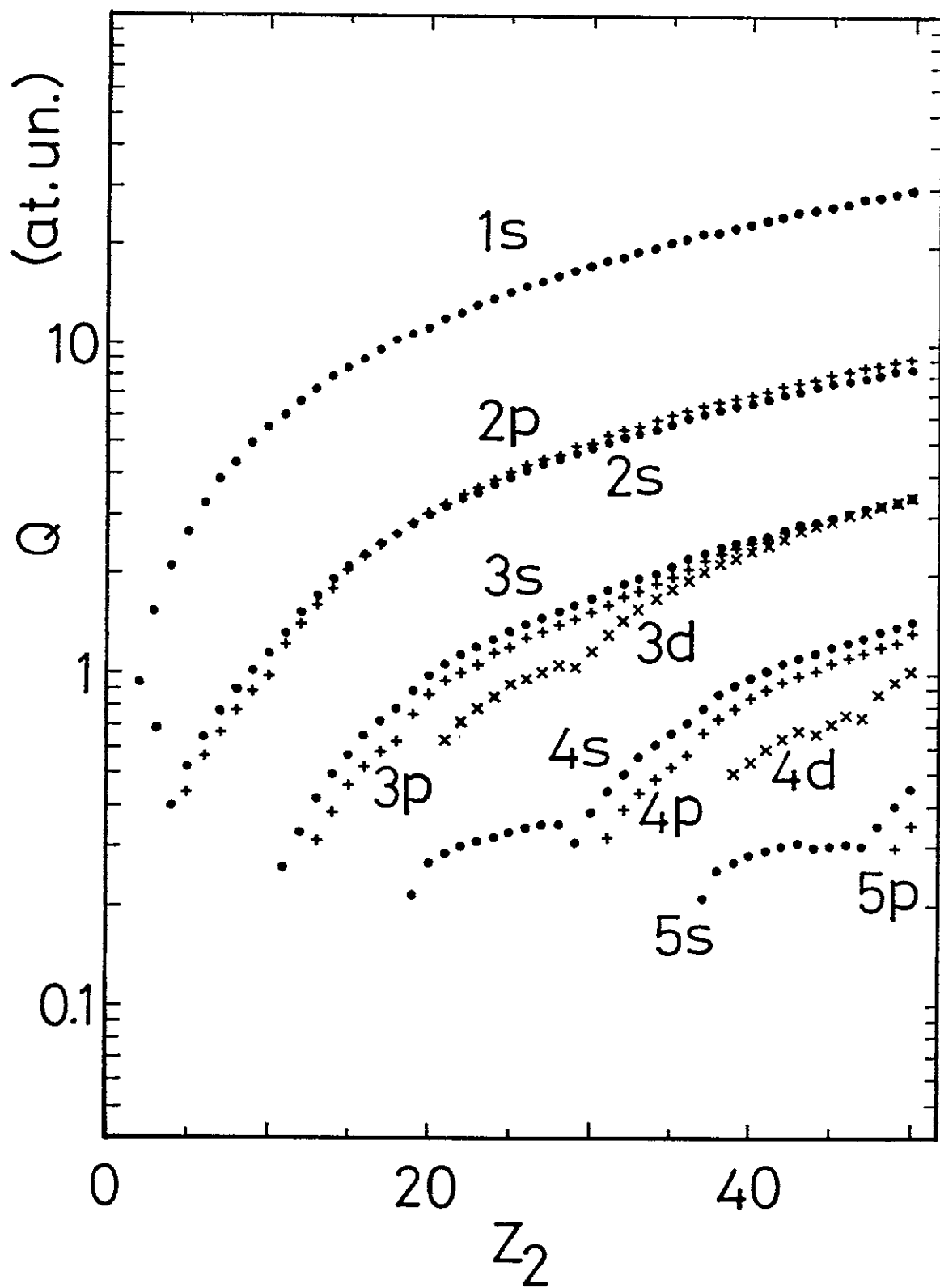


Figure 3(a)

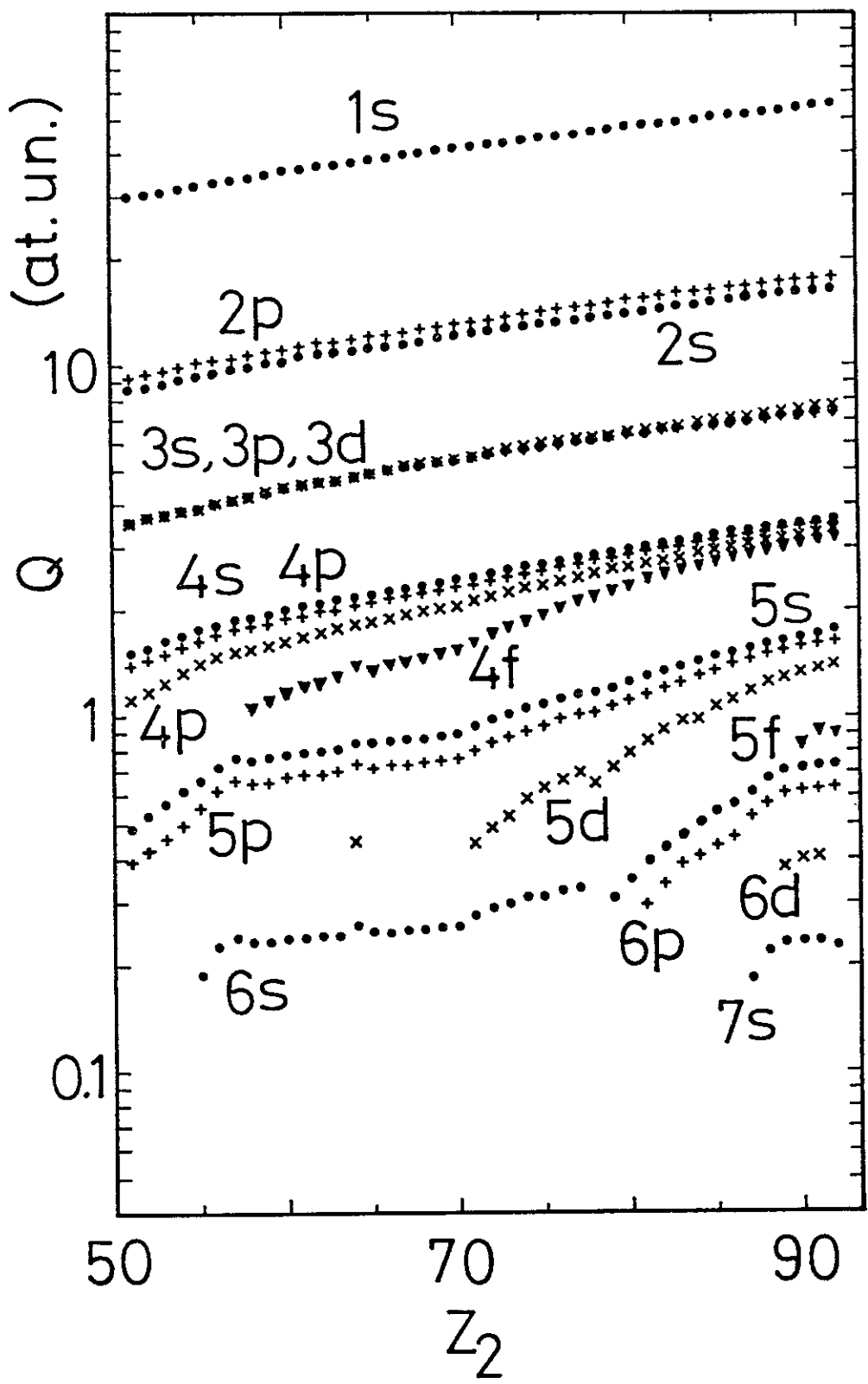


Figure 3(b)

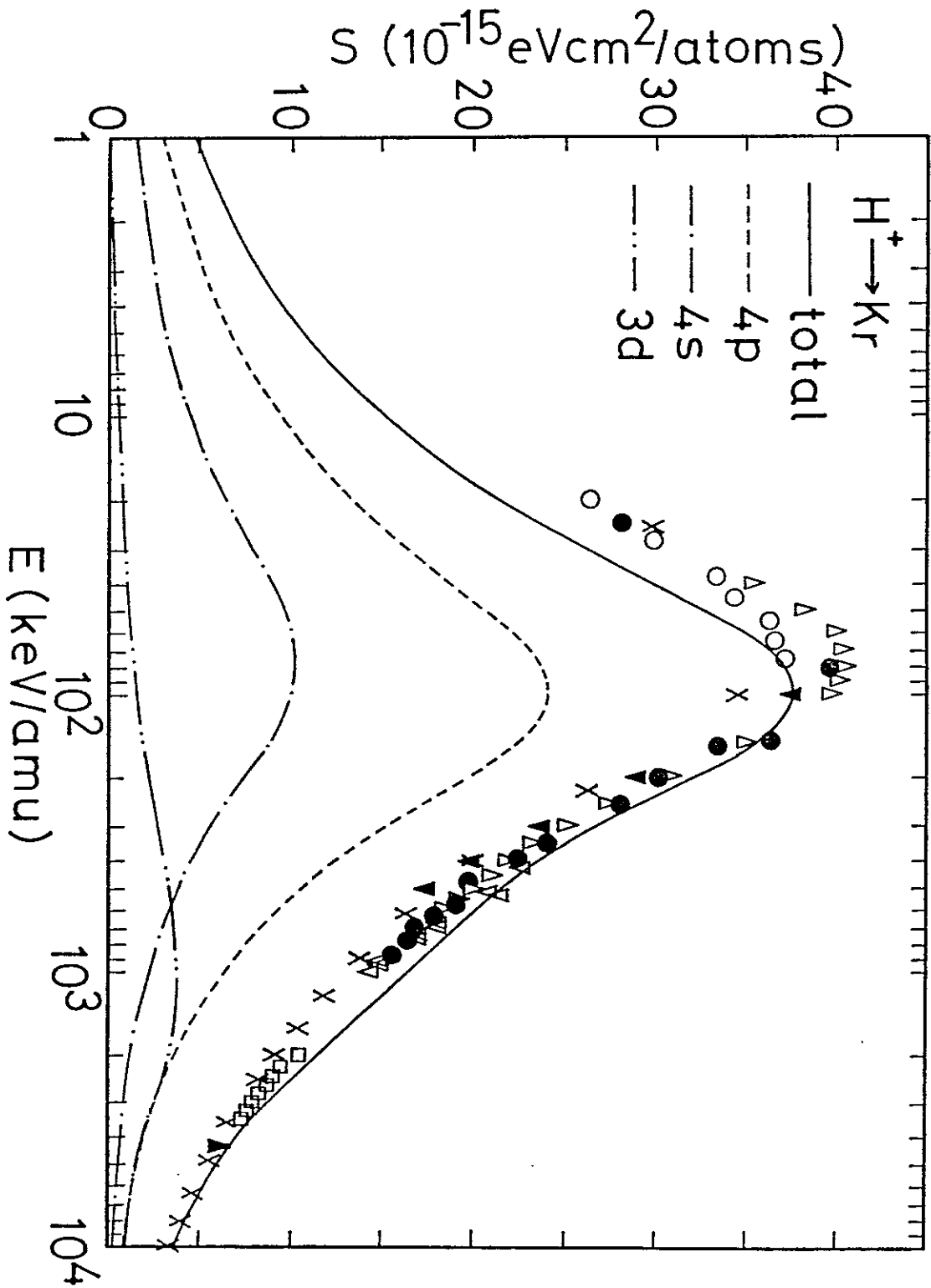


Figure 4(a)

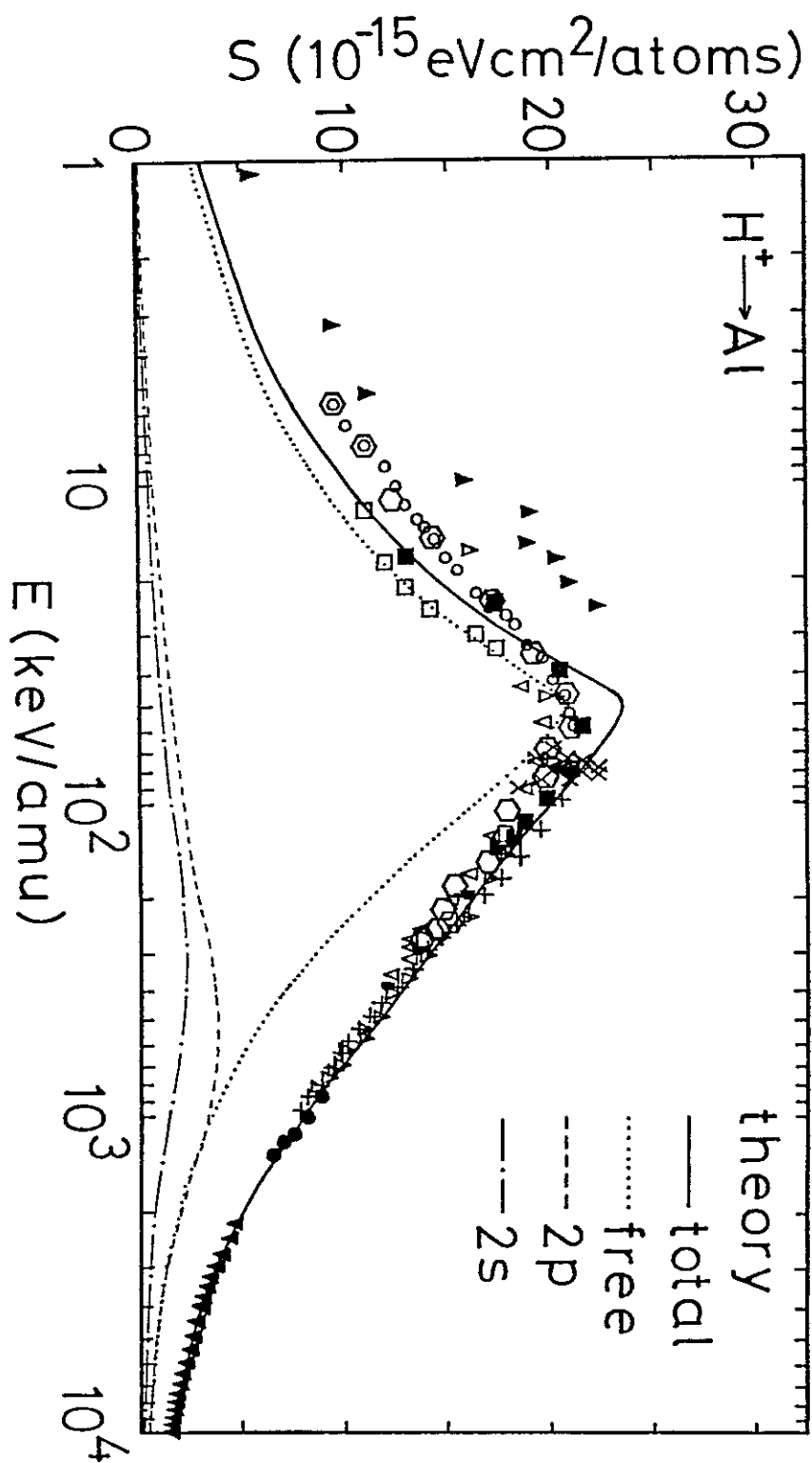


Figure 4(b)

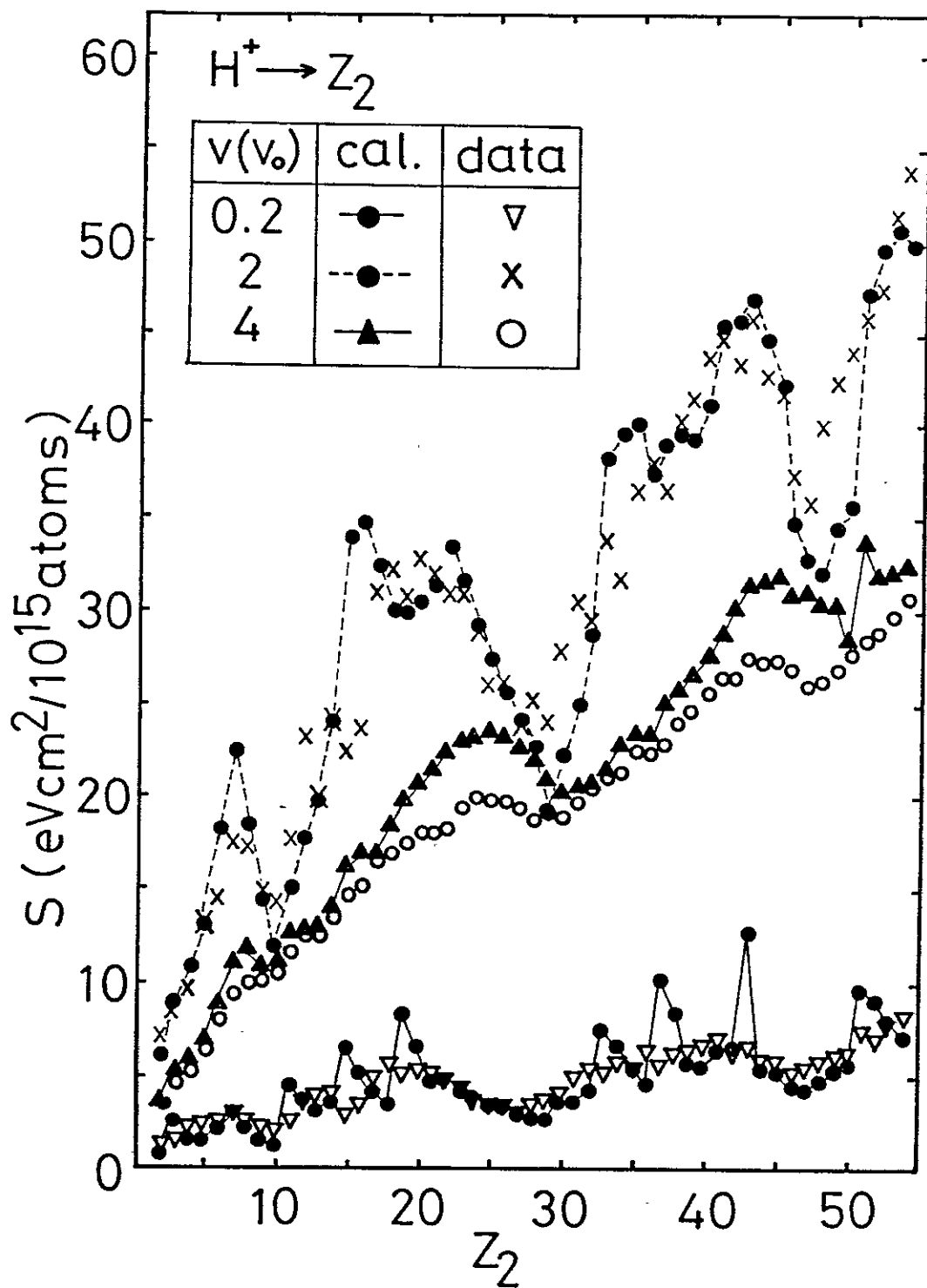


Figure 5

EXPLANATION OF TABLES

- ① Symbol of a target element with atomic number.
- ② Electron state (the number N_1 of electrons).#
- ③ Values of Q in atomic units for atomic states or R_S for conduction electrons.
- ④ Proton velocity in units of $V_0 (= 2.18 \times 10^8 \text{ cm/s})$.
 $V=1$ corresponds to kinetic energy $E=25 \text{ keV/amu}$.
- ⑤ Stopping cross sections in units of $10^{-15} \text{ eVcm}^2/\text{atom}$.#

Square brackets denote a selection of the electronic configuration for atomic phase (in front of a slash) or for solid phase (behind a slash). The configuration out of the brackets is common to both phase. The corresponding total stopping cross sections are calculated separately in a column 'TOTAL'.

For example : Al stopping for a proton at $V = 0.2V_0$

$$\begin{aligned} \text{Atomic phase stopping} &= 1s(2) + 2s(2) + 2p(6) + 3s(2) + 3p(1) \\ &= 0.00405 + 0.164 + 0.225 + 4.69 + 7.64 \\ &= 12.7 \end{aligned}$$

$$\begin{aligned} \text{Solid phase stopping} &= 1s(2) + 2s(2) + 2p(6) + \text{free}(3) \\ &= 0.00405 + 0.164 + 0.225 + 2.65 \\ &= 3.04 \end{aligned}$$

	A.1 (Z=13) $1s(2)2s(2)2p(6) [3s(2)3p(1)/free(3)]$													
O/Rs	7.276		1.713		1.625		0.4228		0.3202		2.070			
V	TOTAL		1s(2)		2s(2)		2p(6)		3s(2)		3p(1)		free(3)	
0.2	12.7	3.04	0.00405	0.164	0.225	4.69	7.64	2.65						
0.4	27.5	6.21	0.00812	0.328	0.450	9.71	17.0	5.42						
0.6	42.6	9.46	0.0122	0.492	0.675	15.1	26.4	8.28						
0.8	50.1	12.8	0.0162	0.655	0.898	20.3	28.2	11.2						
1.0	49.0	16.3	0.0203	0.817	1.12	23.8	23.2	14.3						
1.2	45.4	19.9	0.0243	0.977	1.34	24.3	18.8	17.6						
1.4	40.6	23.4	0.0284	1.13	1.56	22.5	15.4	20.7						
1.6	35.4	22.7	0.0324	1.29	1.77	19.5	12.8	19.6						
1.8	31.1	21.4	0.0364	1.44	1.98	16.8	10.8	17.9						
2.0	27.8	20.3	0.0404	1.58	2.19	14.7	9.28	16.3						
2.2	25.2	18.9	0.0443	1.71	2.39	13.0	8.07	14.8						
2.4	23.0	17.9	0.0483	1.83	2.58	11.5	7.06	13.4						
2.6	21.3	17.1	0.0522	1.94	2.76	10.3	6.25	12.3						
2.8	19.8	16.2	0.0561	2.04	2.94	9.21	5.56	11.2						
3.0	18.6	15.6	0.0599	2.12	3.10	8.32	5.00	10.3						
3.2	17.6	14.9	0.0638	2.18	3.26	7.56	4.50	9.43						
3.4	16.6	14.4	0.0676	2.22	3.39	6.91	4.05	8.70						
3.6	15.8	13.9	0.0713	2.25	3.52	6.33	3.66	8.05						
3.8	15.1	13.4	0.0751	2.25	3.63	5.83	3.32	7.46						
4.0	14.5	13.0	0.0788	2.24	3.72	5.39	3.03	6.93						
5	11.8	11.0	0.0966	2.02	3.92	3.79	2.02	4.98						
6	9.74	9.29	0.113	1.66	3.74	2.77	1.46	3.76						
7	9.07	7.72	0.128	1.32	3.34	2.09	1.10	2.93						
8	6.52	6.39	0.142	1.10	2.78	1.64	0.858	2.37						
9	5.41	5.34	0.153	0.927	2.31	1.32	0.701	1.95						
10	4.56	4.53	0.162	0.793	1.94	1.09	0.575	1.63						
12	3.52	3.53	0.173	0.602	1.55	0.784	0.412	1.20						
14	2.77	2.80	0.174	0.472	1.23	0.593	0.308	0.927						
16	2.25	2.27	0.185	0.381	1.00	0.461	0.240	0.720						
18	1.84	1.91	0.152	0.315	0.838	0.371	0.196	0.606						
20	1.57	1.60	0.135	0.266	0.706	0.305	0.162	0.495						

<u>He (Z=2) Is(2)</u>			<u>Li (Z=3) Is(2) [2s(1)/free(1)]</u>			<u>Be (Z=4) Is(2) [2s(2)/free(2)]</u>						
0/Rs	----->	0.9383	0/Rs	----->	1.559	0.6754	3.260	0/Rs	----->	2.116	0.3905	1.870
V	TOTAL	Is(2)	V	TOTAL	1s(2)	2s(1)	free(1)	V	TOTAL	1s(2)	2s(2)	free(2)
0.2	0.704	0.704	0.2	1.59 / 2.65	0.206	1.38	2.44	0.2	5.74 / 1.50	0.0967	5.64	1.40
0.4	1.43	1.43	0.4	3.16 / 5.60	0.414	2.75	5.19	0.4	12.0 / 3.04	0.194	11.8	2.85
0.6	2.15	2.15	0.6	4.83 / 8.87	0.621	4.21	8.25	0.6	18.7 / 4.63	0.291	18.4	4.34
0.8	2.87	2.87	0.8	6.51 / 12.7	0.827	5.68	11.9	0.8	24.9 / 6.25	0.387	24.5	5.86
1.0	3.59	3.59	1.0	8.04 / 14.7	1.03	7.01	13.7	1.0	28.3 / 7.90	0.482	27.8	7.42
1.2	4.28	4.28	1.2	9.16 / 13.3	1.23	7.93	12.1	1.2	27.7 / 9.61	0.577	27.1	9.03
1.4	4.92	4.92	1.4	9.63 / 11.9	1.43	8.20	10.5	1.4	25.0 / 12.1	0.670	24.3	11.4
1.6	5.48	5.48	1.6	9.52 / 10.8	1.62	7.89	9.14	1.6	21.4 / 12.4	0.762	20.6	11.6
1.8	5.92	5.92	1.8	9.06 / 9.83	1.81	7.25	8.02	1.8	18.7 / 11.8	0.852	17.8	10.9
2.0	6.20	6.20	2.0	8.45 / 9.03	1.98	6.47	7.05	2.0	16.4 / 10.9	0.939	15.4	10.0
2.2	6.31	6.31	2.2	7.84 / 8.45	2.14	5.70	6.31	2.2	14.6 / 10.2	1.02	13.6	9.19
2.4	6.26	6.26	2.4	7.41 / 7.93	2.28	5.13	5.65	2.4	13.1 / 9.51	1.10	12.0	8.41
2.6	6.05	6.05	2.6	6.99 / 7.49	2.40	4.59	5.09	2.6	11.9 / 8.88	1.18	10.7	7.70
2.8	5.70	5.70	2.8	6.66 / 7.10	2.50	4.16	4.60	2.8	10.9 / 8.31	1.25	9.61	7.06
3.0	5.23	5.23	3.0	6.30 / 6.76	2.58	3.72	4.18	3.0	9.98 / 7.81	1.32	8.66	6.49
3.2	4.78	4.78	3.2	6.07 / 6.45	2.63	3.44	3.82	3.2	9.24 / 7.35	1.37	7.86	5.98
3.4	4.38	4.38	3.4	5.80 / 6.15	2.65	3.15	3.50	3.4	8.61 / 6.96	1.43	7.18	5.53
3.6	4.01	4.01	3.6	5.54 / 5.87	2.65	2.89	3.22	3.6	8.04 / 6.59	1.47	6.57	5.12
3.8	3.75	3.75	3.8	5.30 / 5.59	2.62	2.68	2.97	3.8	7.55 / 6.26	1.51	6.05	4.75
4.0	3.53	3.53	4.0	5.05 / 5.32	2.58	2.47	2.74	4.0	7.11 / 5.96	1.53	5.57	4.43
5	2.62	2.62	5	3.95 / 4.13	2.19	1.76	1.94	5	5.43 / 4.74	1.54	3.89	3.20
6	2.02	2.02	6	3.02 / 3.18	1.73	1.32	1.45	6	4.21 / 3.82	1.40	2.80	2.42
7	1.61	1.61	7	2.42 / 2.52	1.40	1.02	1.12	7	3.32 / 3.09	1.19	2.13	1.90
8	1.31	1.31	8	1.97 / 2.05	1.16	0.804	0.894	8	2.64 / 2.50	0.966	1.68	1.53
9	1.09	1.09	9	1.62 / 1.70	0.972	0.647	0.729	9	2.15 / 2.06	0.797	1.35	1.26
10	0.928	0.928	10	1.36 / 1.44	0.830	0.534	0.608	10	1.83 / 1.77	0.710	1.12	1.06
12	0.689	0.689	12	1.01 / 1.07	0.628	0.383	0.441	12	1.34 / 1.33	0.544	0.791	0.785
14	0.523	0.523	14	0.783 / 0.830	0.492	0.291	0.338	14	1.03 / 1.03	0.429	0.605	0.602
16	0.410	0.410	16	0.621 / 0.663	0.395	0.226	0.268	16	0.813 / 0.827	0.350	0.463	0.477
18	0.332	0.332	18	0.509 / 0.542	0.326	0.183	0.216	18	0.662 / 0.680	0.290	0.372	0.390
20	0.274	0.274	20	0.423 / 0.448	0.273	0.150	0.175	20	0.565 / 0.563	0.245	0.320	0.318

<u>B (Z=5)</u>				<u>C (Z=6)</u>			
<u>1s(2)</u>	<u>2s(2)2p(1)/free(3)</u>	<u>2.693</u>	<u>0.5184</u>	<u>0.4505</u>	<u>1.560</u>	<u>0/Rs</u>	<u>3.268</u>
<u>1s(2)</u>	<u>2s(2)</u>	<u>2p(1)</u>	<u>free(3)</u>	<u>V</u>	<u>TOTAL</u>	<u>1s(2)</u>	<u>2s(2)</u>
<u>0/Rs</u>	<u>----></u>	<u>0.5184</u>	<u>1.560</u>	<u>0/Rs</u>	<u>----></u>	<u>3.268</u>	<u>0.6420</u>
<u>V</u>	<u>TOTAL</u>	<u>1s(2)</u>	<u>free(3)</u>	<u>V</u>	<u>TOTAL</u>	<u>1s(2)</u>	<u>2p(2)</u>
0.2	6.42 / 1.43	0.0528	1.39	0.2	4.07 / 2.17	0.0324	1.75
0.4	16.2 / 2.92	0.105	2.81	0.4	8.31 / 4.38	0.0645	3.56
0.6	20.8 / 4.42	0.158	4.26	0.6	12.7 / 6.64	0.0962	5.41
0.8	27.6 / 5.92	0.211	5.71	0.8	17.1 / 8.93	0.127	7.29
1.0	31.6 / 7.45	0.263	7.19	1.0	21.2 / 11.3	0.160	9.08
1.2	32.3 / 9.00	0.315	8.68	1.2	24.6 / 13.6	0.192	10.6
1.4	30.3 / 10.6	0.366	10.2	1.4	26.5 / 16.0	0.223	11.7
1.6	27.6 / 12.3	0.417	11.9	1.6	26.8 / 19.5	0.254	12.1
1.8	24.8 / 13.7	0.467	13.2	1.8	25.7 / 19.4	0.285	11.8
2.0	21.6 / 13.2	0.515	12.7	2.0	23.8 / 18.3	0.315	11.1
2.2	19.2 / 12.5	0.563	11.9	2.2	21.1 / 17.1	0.344	10.1
2.4	17.2 / 11.7	0.610	11.1	2.4	18.9 / 15.9	0.373	8.87
2.6	15.5 / 10.9	0.655	10.2	2.6	17.1 / 14.7	0.401	8.00
2.8	14.1 / 10.2	0.699	9.48	2.8	15.6 / 13.5	0.428	7.27
3.0	12.8 / 9.51	0.740	8.77	3.0	14.3 / 12.6	0.454	6.65
3.2	11.8 / 8.91	0.780	8.13	3.2	13.3 / 11.7	0.480	6.13
3.4	10.9 / 8.38	0.817	7.55	3.4	12.2 / 10.9	0.504	5.65
3.6	10.1 / 7.87	0.852	7.02	3.6	11.3 / 10.2	0.528	5.25
3.8	9.37 / 7.42	0.884	6.54	3.8	10.5 / 9.54	0.550	4.81
4.0	8.77 / 7.02	0.914	6.11	4.0	10.2 / 8.95	0.571	4.47
5	6.53 / 5.47	1.01	4.46	5	7.30 / 6.75	0.653	3.25
6	5.09 / 4.42	1.02	3.40	6	5.69 / 5.33	0.689	2.45
7	4.07 / 3.63	0.960	2.67	7	4.60 / 4.33	0.675	1.92
8	3.30 / 3.03	0.856	2.17	8	3.73 / 3.56	0.621	1.53
9	2.70 / 2.52	0.725	1.79	9	3.10 / 2.98	0.551	1.27
10	2.24 / 2.13	0.615	1.51	10	2.59 / 2.52	0.483	1.05
12	1.64 / 1.59	0.476	1.11	12	1.86 / 1.88	0.370	0.740
14	1.26 / 1.24	0.381	0.861	14	1.45 / 1.47	0.302	0.571
16	1.00 / 1.00	0.313	0.690	16	1.14 / 1.19	0.252	0.437
18	0.818 / 0.82	0.262	0.560	18	0.936 / 0.971	0.214	0.361
20	0.681 / 0.689	0.223	0.466	20	0.773 / 0.814	0.184	0.291

$\frac{N(Z=7)}{Q/Rs}$		$\frac{1s(2)2s(2)2p(3)}{----->}$		$\frac{O(Z=8)}{Q/Rs}$		$\frac{1s(2)2s(2)2p(4)}{----->}$	
Q/Rs	TOTAL	$1s(2)$	$2s(2)$	$2p(3)$	$1s(2)$	TOTAL	$2s(2)$
		3.873	0.7680	0.6656	4.421		0.8894
V							
0.2	2.94	0.0209	1.15	1.76	0.0149	2.11	0.811
0.4	5.91	0.0417	2.32	3.55	0.0297	4.23	1.63
0.6	8.93	0.0626	3.51	5.36	0.0445	6.37	2.46
0.8	12.0	0.0835	4.70	7.20	0.0594	8.51	3.28
1.0	15.0	0.104	5.88	8.99	0.0742	10.6	4.10
1.2	17.8	0.125	6.98	10.7	0.0890	12.7	4.89
1.4	20.1	0.145	7.91	12.1	0.104	14.6	5.61
1.6	21.8	0.166	8.57	13.1	0.118	16.3	6.22
1.8	22.6	0.186	8.89	13.5	0.133	17.6	6.66
2.0	22.5	0.206	8.87	13.5	0.147	18.4	6.90
2.2	21.8	0.225	8.57	13.0	0.161	18.8	6.94
2.4	20.6	0.245	8.09	12.2	0.175	18.7	6.80
2.6	19.1	0.264	7.52	11.4	0.189	18.3	6.53
2.8	17.9	0.283	7.04	10.6	0.202	17.5	6.19
3.0	16.3	0.301	6.34	9.60	0.216	16.7	5.84
3.2	15.0	0.319	5.85	8.85	0.229	15.7	5.37
3.4	13.9	0.337	5.41	8.15	0.242	14.6	4.95
3.6	12.9	0.354	5.01	7.54	0.254	13.8	4.57
3.8	12.0	0.370	4.63	7.00	0.267	12.8	4.28
4.0	11.2	0.386	4.32	6.50	0.279	12.0	3.99
5	8.26	0.456	3.12	4.69	0.334	8.92	2.91
6	6.42	0.507	2.36	3.55	0.378	6.96	2.23
7	5.19	0.535	1.86	2.80	0.409	5.61	1.76
8	4.31	0.540	1.50	2.26	0.425	4.65	1.42
9	2.64	0.525	1.24	1.87	0.427	3.94	1.18
10	3.10	0.492	1.04	1.56	0.416	3.38	1.00
12	2.27	0.395	0.749	1.12	0.362	2.55	0.733
14	1.73	0.313	0.564	0.849	0.295	1.96	0.553
16	1.36	0.259	0.442	0.663	0.240	1.54	0.433
18	1.12	0.220	0.359	0.537	0.199	1.25	0.351
20	0.928	0.188	0.297	0.443	0.176	1.04	0.288

<u>F (Z=9) 1s(2)2s(2)2p(5)</u>			<u>Ne (Z=10) 1s(2)4s(2)2p(6)</u>					
g/Rs	---->	4.995	1.014	0.8776	0/Rs	5.572	1.136	0.9814
V	TOTAL	1s(2)	2s(2)	2p(5)	V	TOTAL	2s(2)	2p(6)
0.2	1.59	0.0109	0.585	0.995	0.2	1.24	0.446	0.785
0.4	3.19	0.0217	1.18	1.99	0.4	2.49	0.894	1.56
0.6	4.81	0.0325	1.78	3.00	0.6	3.73	1.35	2.36
0.8	6.42	0.0432	2.38	4.00	0.8	4.97	1.80	3.14
1.0	8.01	0.0538	2.97	4.99	1.0	6.20	2.24	3.91
1.2	9.56	0.0642	3.54	5.96	1.2	7.40	2.68	4.68
1.4	11.1	0.0749	4.08	6.90	1.4	8.57	3.10	5.42
1.6	12.4	0.0856	4.57	7.78	1.6	9.68	3.49	6.13
1.8	13.7	0.0962	4.98	8.58	1.8	10.7	3.83	6.81
2.0	14.7	0.107	5.29	9.27	2.0	11.6	4.13	7.43
2.2	15.4	0.117	5.47	9.82	2.2	12.4	4.35	7.98
2.4	15.9	0.127	5.52	10.2	2.4	13.0	4.48	8.45
2.6	16.0	0.137	5.45	10.4	2.6	13.5	4.54	8.83
2.8	15.8	0.147	5.26	10.4	2.8	13.7	4.50	9.09
3.0	15.4	0.157	4.95	10.3	3.0	13.7	4.38	9.23
3.2	14.7	0.166	4.57	9.92	3.2	13.6	4.18	9.26
3.4	13.8	0.176	4.20	9.40	3.4	13.2	3.91	9.15
3.6	12.9	0.185	3.87	8.80	3.6	12.7	3.63	8.92
3.8	12.0	0.194	3.58	8.20	3.8	12.1	3.37	8.57
4.0	11.2	0.203	3.33	7.63	4.0	11.4	3.13	8.15
5	8.35	0.243	2.49	5.61	5	8.55	2.32	6.05
6	6.62	0.276	1.94	4.40	6	6.76	1.82	4.73
7	5.41	0.301	1.55	3.56	7	5.56	1.46	3.86
8	4.51	0.315	1.27	2.93	8	4.65	1.20	3.20
9	3.83	0.320	1.06	2.46	9	3.98	1.01	2.71
10	3.31	0.314	0.899	2.10	10	3.44	0.854	2.32
12	2.53	0.282	0.671	1.58	12	2.65	0.643	1.76
14	1.99	0.239	0.516	1.23	14	2.11	0.502	1.39
16	1.59	0.200	0.406	0.982	16	1.71	0.397	1.12
18	1.29	0.168	0.327	0.795	18	1.40	0.320	0.922
20	1.07	0.146	0.270	0.657	20	1.17	0.265	0.765

Na (Z=11) 1s(2)2s(2)2p(6) [3s(1)/free(1)]										Mg (Z=12) 1s(2)2s(2)2p(6) [3s(2)/free(2)]									
Q/Rs	---->	6.121	1.312	1.205	0.2617	3.986	Q/Rs	---->	6.689	1.518	1.420	0.3347	2.656						
V	TOTAL	1s(2)	2s(2)	2p(6)	3s(1)	free(1)	V	TOTAL	1s(2)	2s(2)	2p(6)	3s(2)	free(2)						
0.2	13.0 / 4.61	0.00638	0.316	0.473	12.2	3.81	0.2	11.7 / 6.74	0.00505	0.221	0.315	8.06	3.10						
0.4	30.0 / 9.96	0.0128	0.634	0.950	28.4	8.36	0.4	18.2 / 7.54	0.0101	0.443	0.681	17.1	6.44						
0.6	42.4 / 16.1	0.0191	0.950	1.42	40.0	13.7	0.6	28.6 / 11.6	0.0152	0.664	0.946	27.0	10.0						
0.8	37.9 / 22.2	0.0255	1.27	1.90	34.7	19.0	0.8	36.9 / 16.0	0.0202	0.885	1.259	34.7	13.8						
1.0	30.7 / 20.4	0.0319	1.58	2.35	26.7	16.4	1.0	38.5 / 21.6	0.0253	1.10	1.570	35.8	18.9						
1.2	25.9 / 18.7	0.0382	1.89	2.83	21.1	13.9	1.2	35.4 / 23.3	0.0303	1.32	1.878	32.1	20.0						
1.4	22.6 / 17.3	0.0446	2.19	3.28	17.1	11.8	1.4	30.3 / 21.9	0.0354	1.53	2.182	26.5	18.1						
1.6	20.3 / 16.4	0.0509	2.47	3.73	14.1	10.2	1.6	26.7 / 20.3	0.0404	1.73	2.480	22.5	16.1						
1.8	18.8 / 15.8	0.0571	2.74	4.15	11.9	8.85	1.8	23.9 / 19.0	0.0453	1.93	2.771	19.2	14.3						
2.0	17.7 / 15.4	0.0634	2.98	4.57	10.1	7.77	2.0	21.8 / 17.9	0.0503	2.11	3.053	16.6	12.7						
2.2	16.9 / 15.1	0.0696	3.19	4.95	8.73	6.89	2.2	20.2 / 17.1	0.0552	2.28	3.324	14.5	11.4						
2.4	16.4 / 14.9	0.0757	3.36	5.31	7.62	6.14	2.4	18.8 / 16.3	0.0601	2.43	3.583	12.8	10.3						
2.6	15.9 / 14.7	0.0818	3.48	5.63	6.69	5.52	2.6	17.8 / 16.1	0.0650	2.55	3.826	11.3	9.55						
2.8	15.5 / 14.6	0.0878	3.55	5.92	5.90	4.97	2.8	16.9 / 15.2	0.0698	2.65	4.052	10.1	8.43						
3.0	15.0 / 14.3	0.0938	3.57	6.16	5.21	4.50	3.0	15.2 / 14.8	0.0746	2.72	4.257	9.13	7.68						
3.2	14.6 / 14.1	0.0997	3.55	6.34	4.65	4.10	3.2	15.6 / 14.4	0.0793	2.77	4.439	8.28	7.03						
3.4	14.2 / 13.8	0.1056	3.49	6.48	4.16	3.75	3.4	15.0 / 13.9	0.0840	2.78	4.596	7.54	6.46						
3.6	13.8 / 13.5	0.111	3.39	6.56	3.77	3.45	3.6	14.5 / 13.6	0.0887	2.77	4.727	6.89	5.95						
3.8	13.4 / 13.2	0.117	3.28	6.60	3.40	3.17	3.8	14.1 / 13.2	0.0933	2.73	4.829	6.41	5.50						
4.0	13.0 / 12.8	0.123	3.15	6.58	3.10	2.93	4.0	13.5 / 12.8	0.0978	2.67	4.902	5.83	5.09						
5	10.7 / 10.7	0.150	2.49	5.95	2.08	2.05	5	11.2 / 10.9	0.120	2.23	4.859	3.95	3.63						
6	8.55 / 8.59	0.174	1.94	4.94	1.49	1.53	6	9.09 / 8.96	0.140	1.76	4.342	2.84	2.71						
7	6.81 / 6.87	0.195	1.55	3.94	1.12	1.18	7	7.36 / 7.32	0.157	1.43	3.622	2.16	2.12						
8	5.63 / 5.68	0.212	1.27	3.26	0.887	0.932	8	5.97 / 2.58	0.173	1.18	2.932	1.69	1.70						
9	4.75 / 4.81	0.226	1.06	2.75	0.711	0.768	9	4.94 / 4.98	0.185	0.986	2.416	1.35	1.39						
10	4.08 / 4.12	0.234	0.900	2.35	0.589	0.629	10	4.32 / 4.36	0.195	0.840	2.169	1.12	1.16						
12	3.12 / 3.17	0.238	0.676	1.79	0.416	0.470	12	3.30 / 3.34	0.203	0.632	1.657	0.803	0.845						
14	2.47 / 2.51	0.228	0.527	1.40	0.314	0.354	14	2.62 / 2.66	0.199	0.497	1.307	0.615	0.655						
16	2.01 / 2.04	0.201	0.421	1.14	0.245	0.271	16	2.13 / 2.16	0.184	0.400	1.063	0.478	0.509						
18	1.66 / 1.69	0.173	0.344	0.942	0.197	0.223	18	1.75 / 1.79	0.163	0.330	0.882	0.378	0.417						
20	3.10 / 3.12	0.149	0.283	0.852	0.162	0.179	20	1.48 / 1.51	0.142	0.275	0.747	0.317	0.343						

A.1 (Z=13)		1s(2)2s(2)2p(6) [3s(2)3p(1)/free(3)]										S.i (Z=14)										1s(2)2s(2)2p(6) [3s(2)3p(2)/free(4)]									
0/Rs	---->	7.276	1.713	1.625	0.4228	0.3202	2.070	0/Rs	---->	7.988	1.890	1.797	0.5014	0.3833	2.006	0/Rs	---->	7.988	1.890	1.797	0.5014	0.3833	2.006								
V	TOTAL	1s(2)	2s(2)	2p(6)	3s(2)	3p(1)	free(3)	V	TOTAL	1s(2)	2s(2)	2p(6)	3s(2)	3p(2)	free(4)	V	TOTAL	1s(2)	2s(2)	2p(6)	3s(2)	3p(2)	free(4)								
0.2	12.7 / 3.04	0.00405	0.164	0.225	4.69	7.64	2.65	0.2	9.35 / 3.61	0.00317	0.128	0.174	3.15	5.89	3.30	0.2	9.35 / 3.61	0.00317	0.128	0.174	3.15	5.89	3.30								
0.4	27.5 / 6.21	0.00812	0.328	0.450	9.71	17.0	5.42	0.4	19.4 / 7.32	0.00635	0.257	0.349	6.45	12.3	6.71	0.4	19.4 / 7.32	0.00635	0.257	0.349	6.45	12.3	6.71								
0.6	42.6 / 9.46	0.0122	0.492	0.675	15.1	26.4	8.28	0.6	30.1 / 11.2	0.00952	0.385	0.523	9.92	19.3	10.3	0.6	30.1 / 11.2	0.00952	0.385	0.523	9.92	19.3	10.3								
0.8	50.1 / 12.8	0.0162	0.655	0.898	20.3	28.2	11.2	0.8	40.2 / 15.1	0.0127	0.513	0.697	13.4	25.6	13.9	0.8	40.2 / 15.1	0.0127	0.513	0.697	13.4	25.6	13.9								
1.0	49.0 / 16.3	0.0203	0.817	1.12	23.8	23.2	14.3	1.0	46.7 / 19.1	0.0158	0.640	0.870	16.4	28.8	17.6	1.0	46.7 / 19.1	0.0158	0.640	0.870	16.4	28.8	17.6								
1.2	45.4 / 19.9	0.0243	0.977	1.34	24.3	18.8	17.6	1.2	47.6 / 23.4	0.0190	0.765	1.04	18.1	27.7	21.6	1.2	47.6 / 23.4	0.0190	0.765	1.04	18.1	27.7	21.6								
1.4	40.6 / 23.4	0.0284	1.13	1.56	22.5	15.4	20.7	1.4	45.2 / 28.4	0.0222	0.888	1.21	18.2	24.9	26.3	1.4	45.2 / 28.4	0.0222	0.888	1.21	18.2	24.9	26.3								
1.6	35.4 / 22.7	0.0324	1.29	1.77	19.5	12.8	19.6	1.6	40.4 / 27.6	0.0253	1.01	1.38	17.0	20.9	25.2	1.6	40.4 / 27.6	0.0253	1.01	1.38	17.0	20.9	25.2								
1.8	31.1 / 21.4	0.0364	1.44	1.98	16.8	10.8	17.9	1.8	36.3 / 26.0	0.0285	1.13	1.54	15.5	18.1	23.3	1.8	36.3 / 26.0	0.0285	1.13	1.54	15.5	18.1	23.3								
2.0	27.8 / 20.3	0.0404	1.58	2.19	14.7	9.28	16.3	2.0	32.1 / 24.2	0.0316	1.24	1.70	13.4	15.7	21.2	2.0	32.1 / 24.2	0.0316	1.24	1.70	13.4	15.7	21.2								
2.2	25.2 / 18.9	0.0443	1.71	2.39	13.0	8.07	14.8	2.2	28.9 / 22.5	0.0347	1.35	1.86	11.9	13.8	19.3	2.2	28.9 / 22.5	0.0347	1.35	1.86	11.9	13.8	19.3								
2.4	23.0 / 17.9	0.0483	1.83	2.58	11.5	7.06	13.4	2.4	26.3 / 21.1	0.0378	1.45	2.01	10.6	12.2	17.6	2.4	26.3 / 21.1	0.0378	1.45	2.01	10.6	12.2	17.6								
2.6	21.3 / 17.1	0.0522	1.94	2.76	10.3	6.25	12.3	2.6	24.1 / 17.8	0.0409	1.54	2.16	9.52	10.8	16.2	2.6	24.1 / 17.8	0.0409	1.54	2.16	9.52	10.8	16.2								
2.8	19.8 / 16.2	0.0561	2.04	2.94	9.21	5.56	11.2	2.8	22.3 / 18.7	0.0439	1.63	2.30	8.59	9.70	14.7	2.8	22.3 / 18.7	0.0439	1.63	2.30	8.59	9.70	14.7								
3.0	18.6 / 15.6	0.0599	2.12	3.10	8.32	5.00	10.3	3.0	20.8 / 17.7	0.0470	1.70	2.44	7.80	8.77	13.5	3.0	20.8 / 17.7	0.0470	1.70	2.44	7.80	8.77	13.5								
3.2	17.6 / 14.9	0.0638	2.18	3.26	7.56	4.50	9.43	3.2	19.4 / 16.8	0.0500	1.77	2.57	7.10	7.93	12.4	3.2	19.4 / 16.8	0.0500	1.77	2.57	7.10	7.93	12.4								
3.4	16.6 / 14.4	0.0676	2.22	3.39	6.91	4.05	8.70	3.4	18.3 / 16.0	0.0530	1.82	2.69	6.48	7.24	11.4	3.4	18.3 / 16.0	0.0530	1.82	2.69	6.48	7.24	11.4								
3.6	15.8 / 13.9	0.0713	2.25	3.52	6.33	3.66	8.05	3.6	17.3 / 15.3	0.0560	1.86	2.80	5.96	6.63	10.6	3.6	17.3 / 15.3	0.0560	1.86	2.80	5.96	6.63	10.6								
3.8	15.1 / 13.4	0.0751	2.25	3.63	5.83	3.32	7.46	3.8	16.4 / 14.7	0.0589	1.89	2.90	5.49	6.10	9.81	3.8	16.4 / 14.7	0.0589	1.89	2.90	5.49	6.10	9.81								
4.0	14.5 / 13.0	0.0788	2.24	3.72	5.39	3.03	6.93	4.0	15.7 / 14.1	0.0619	1.90	2.99	5.08	5.62	9.13	4.0	15.7 / 14.1	0.0619	1.90	2.99	5.08	5.62	9.13								
5	11.8 / 11.0	0.0966	2.02	3.92	3.79	2.02	4.98	5	12.6 / 11.7	0.0760	1.80	3.27	3.60	3.90	6.57	5	12.6 / 11.7	0.0760	1.80	3.27	3.60	3.90	6.57								
6	9.74 / 9.29	0.113	1.66	3.74	2.77	1.46	3.76	6	10.4 / 9.85	0.0894	1.57	3.25	2.69	2.82	4.95	6	10.4 / 9.85	0.0894	1.57	3.25	2.69	2.82	4.95								
7	9.07 / 7.72	0.128	1.32	3.34	2.09	1.10	2.93	7	8.55 / 8.23	0.102	1.25	3.01	2.06	2.12	3.87	7	8.55 / 8.23	0.102	1.25	3.01	2.06	2.12	3.87								
8	6.52 / 6.39	0.142	1.10	2.78	1.64	0.858	2.37	8	7.07 / 6.89	0.113	1.03	2.63	1.62	1.67	3.12	8	7.07 / 6.89	0.113	1.03	2.63	1.62	1.67	3.12								
9	5.41 / 5.34	0.153	0.927	2.31	1.32	0.701	1.95	9	5.88 / 5.78	0.123	0.876	2.21	1.31	1.35	2.57	9	5.88 / 5.78	0.123	0.876	2.21	1.31	1.35	2.57								
10	4.56 / 4.53	0.162	0.793	1.94	1.09	0.575	1.63	10	4.95 / 4.93	0.131	0.756	1.88	1.08	1.11	2.16	10	4.95 / 4.93	0.131	0.756	1.88	1.08	1.11	2.16								
12	3.52 / 3.53	0.173	0.602	1.55	0.784	0.412	1.20	12	3.75 / 3.77	0.143	0.573	1.46	0.775	0.801	1.59	12	3.75 / 3.77	0.143	0.573	1.46	0.775	0.801	1.59								
14	2.77 / 2.80	0.174	0.472	1.23	0.593	0.308	0.927	14	2.96 / 3.00	0.147	0.453	1.17	0.587	0.599	1.23	14	2.96 / 3.00	0.147	0.453	1.17	0.587	0.599	1.23								
16	2.25 / 2.27	0.166	0.381	1.00	0.461	0.240	0.720	16	2.57 / 2.53	0.145	0.366	1.06	0.497	0.504	0.955	16	2.57 / 2.53	0.145	0.366	1.06	0.497	0.504	0.955								
18	1.84 / 1.91	0.152	0.315	0.838	0.371	0.196	0.606	18	1.98 / 2.03	0.137	0.303	0.800	0.367	0.372	0.792	18	1.98 / 2.03	0.137	0.303	0.800	0.367	0.372	0.792								
20	1.57 / 1.60	0.135	0.266	0.706	0.305	0.162	0.495	20	1.68 / 1.70	0.125	0.257	0.680	0.301	0.316	0.640	20	1.68 / 1.70	0.125	0.257	0.680	0.301	0.316	0.640								

P (Z=15)		1s(2)2s(2)3s(2)2p(6)3p(3)		S (Z=16)		1s(2)2s(2)3s(2)2p(6)3p(4)							
q/Rs	---->	8.467	2.083	0.5729	2.050	0.4647	q/Rs	---->	9.065	2.263	0.6495	2.246	0.5167
V	TOTAL	1s(2)	2s(2)	3s(2)	2p(6)	3p(3)	V	TOTAL	1s(2)	2s(2)	3s(2)	2p(6)	3p(4)
0.2	6.65	0.00271	0.101	2.31	0.125	4.12	0.2	5.31	0.00227	0.0818	1.72	0.0990	3.41
0.4	13.5	0.00545	0.202	4.68	0.249	8.39	0.4	10.7	0.00455	0.164	3.47	0.198	6.90
0.6	20.7	0.00817	0.302	7.16	0.375	12.9	0.6	16.3	0.00682	0.246	5.27	0.297	10.5
0.8	28.0	0.0109	0.402	9.66	0.499	17.4	0.8	21.9	0.00909	0.327	7.09	0.396	14.1
1.0	34.5	0.0136	0.502	12.0	0.623	21.4	1.0	27.4	0.0114	0.408	8.85	0.494	17.6
1.2	39.3	0.0163	0.600	13.8	0.746	24.2	1.2	32.1	0.0136	0.488	10.4	0.592	20.6
1.4	41.2	0.0190	0.697	14.6	0.868	24.9	1.4	35.4	0.0159	0.567	11.4	0.688	22.7
1.6	40.2	0.0217	0.792	14.5	0.988	23.9	1.6	36.9	0.0181	0.645	11.9	0.784	23.6
1.8	37.6	0.0244	0.886	13.6	1.11	21.9	1.8	36.5	0.0204	0.721	11.7	0.878	23.2
2.0	34.1	0.0271	0.976	12.4	1.22	19.5	2.0	34.8	0.0227	0.795	11.0	0.972	22.0
2.2	30.8	0.0298	1.06	11.2	1.34	17.1	2.2	32.5	0.0249	0.867	10.2	1.06	20.3
2.4	28.0	0.0325	1.15	10.1	1.45	15.4	2.4	29.8	0.0271	0.937	9.25	1.15	18.5
2.6	25.7	0.0351	1.23	9.04	1.56	13.8	2.6	27.1	0.0293	1.00	8.27	1.24	16.5
2.8	23.7	0.0377	1.30	8.18	1.67	12.5	2.8	25.0	0.0315	1.07	7.54	1.33	15.0
3.0	21.9	0.0403	1.36	7.43	1.77	11.3	3.0	23.1	0.0337	1.12	6.88	1.41	13.7
3.2	20.5	0.0430	1.42	6.81	1.87	10.3	3.2	21.6	0.0359	1.18	6.29	1.49	12.6
3.4	19.2	0.0455	1.48	6.24	1.96	9.47	3.4	20.2	0.0381	1.23	5.78	1.57	11.6
3.6	18.1	0.0481	1.52	5.73	2.05	8.71	3.6	19.0	0.0402	1.27	5.34	1.65	10.7
3.8	17.1	0.0506	1.56	5.28	2.13	8.05	3.8	17.9	0.0424	1.31	4.93	1.72	9.86
4.0	16.2	0.0532	1.58	4.91	2.21	7.45	4.0	16.9	0.0445	1.34	4.59	1.78	9.17
5	12.9	0.0655	1.58	3.49	2.50	5.27	5	13.3	0.0549	1.39	3.28	2.06	6.56
6	10.7	0.0771	1.42	2.62	2.61	3.96	6	11.0	0.0647	1.30	2.48	2.20	4.95
7	8.95	0.0879	1.20	2.04	2.55	3.07	7	9.26	0.0740	1.14	1.94	2.22	3.88
8	7.46	0.0978	0.975	1.61	2.36	2.42	8	7.83	0.0826	0.940	1.56	2.12	3.12
9	6.26	0.107	0.831	1.31	2.07	1.94	9	6.63	0.0904	0.788	1.27	1.94	2.54
10	5.29	0.114	0.714	1.08	1.78	1.61	10	5.62	0.0973	0.679	1.05	1.70	2.10
12	3.94	0.126	0.546	0.768	1.35	1.15	12	4.18	0.108	0.525	0.755	1.29	1.51
14	3.11	0.132	0.433	0.579	1.09	0.875	14	3.23	0.115	0.375	0.569	1.04	1.14
16	2.52	0.132	0.353	0.455	0.899	0.679	16	2.65	0.117	0.339	0.446	0.853	0.891
18	2.90	0.127	0.292	0.373	0.751	0.550	18	2.20	0.115	0.283	0.359	0.720	0.718
20	1.76	0.118	0.246	0.301	0.639	0.453	20	1.85	0.109	0.239	0.297	0.614	0.592

C.1 (Z=17)										A.r (Z=18)									
1s(2)2s(2)3s(2)2p(6)3p(5)					1s(2)2s(2)3s(2)2p(6)3p(6)					1s(2)2s(2)3s(2)2p(6)3p(6)					1s(2)2s(2)3s(2)2p(6)3p(6)				
0/Rs	----->	9.665	2.443	0.7195	2.440	0.5761	0/Rs	----->	10.37	2.610	0.7869	2.635	0.6231						
V	TOTAL	1s(2)	2s(2)	3s(2)	2p(6)	3p(5)	V	TOTAL	1s(2)	2s(2)	3s(2)	2p(6)	3p(6)						
0.2	4.18	0.00193	0.0676	1.33	0.0804	2.71	0.2	3.59	0.00158	0.6571	1.09	0.0658	2.37						
0.4	8.55	0.00386	0.134	2.71	0.160	5.54	0.4	7.21	0.00318	0.114	2.19	0.132	4.77						
0.6	12.9	0.00578	0.199	4.10	0.239	8.38	0.6	10.9	0.00477	0.171	3.31	0.197	7.18						
0.8	17.3	0.00770	0.267	5.51	0.317	11.2	0.8	14.5	0.00636	0.228	4.43	0.263	9.61						
1.0	21.7	0.00961	0.334	6.88	0.396	14.0	1.0	18.2	0.00794	0.285	5.54	0.329	12.0						
1.2	25.7	0.0115	0.400	8.13	0.476	16.7	1.2	21.6	0.00952	0.341	6.58	0.394	14.3						
1.4	29.1	0.0134	0.465	9.14	0.554	18.9	1.4	24.8	0.0111	0.396	7.48	0.458	16.4						
1.6	31.5	0.0153	0.529	9.78	0.631	20.6	1.6	27.3	0.0127	0.451	8.14	0.522	18.2						
1.8	32.7	0.0172	0.591	9.95	0.708	21.5	1.8	29.2	0.0143	0.505	8.50	0.586	19.5						
2.0	32.7	0.0190	0.652	9.71	0.782	21.5	2.0	30.1	0.0159	0.557	8.54	0.648	20.3						
2.2	31.6	0.0209	0.711	9.19	0.856	20.8	2.2	30.1	0.0174	0.609	8.31	0.710	20.5						
2.4	29.7	0.0227	0.768	8.35	0.928	19.6	2.4	29.4	0.0190	0.659	7.89	0.771	20.1						
2.6	27.1	0.0246	0.823	7.44	0.999	17.8	2.6	28.3	0.0206	0.708	7.39	0.831	19.4						
2.8	24.6	0.0265	0.875	6.67	1.07	16.0	2.8	27.0	0.0221	0.754	6.93	0.890	18.4						
3.0	22.6	0.0283	0.923	6.13	1.14	14.4	3.0	25.4	0.0237	0.799	6.26	0.948	17.4						
3.2	21.2	0.0302	0.969	5.66	1.20	13.3	3.2	23.7	0.0252	0.841	5.76	1.00	16.0						
3.4	19.8	0.0320	1.01	5.22	1.26	12.3	3.4	22.2	0.0267	0.880	5.31	1.06	14.9						
3.6	18.7	0.0338	1.05	4.84	1.32	11.5	3.6	20.8	0.0282	0.917	4.92	1.11	13.8						
3.8	17.7	0.0356	1.08	4.50	1.38	10.7	3.8	19.5	0.0298	0.950	4.57	1.16	12.8						
4.0	16.7	0.0374	1.11	4.18	1.44	9.97	4.0	18.5	0.0313	0.980	4.25	1.21	12.0						
5	13.2	0.0461	1.17	3.03	1.66	7.26	5	14.4	0.0386	1.07	3.08	1.43	8.79						
6	10.8	0.0543	1.08	2.30	1.79	5.54	6	11.8	0.0457	1.07	2.34	1.59	6.72						
7	8.98	0.0619	0.923	1.81	1.80	4.38	7	9.84	0.0525	0.996	1.84	1.67	5.29						
8	7.58	0.0689	0.772	1.47	1.71	3.55	8	8.37	0.0589	0.874	1.49	1.67	4.27						
9	6.44	0.0752	0.649	1.21	1.55	2.95	9	7.20	0.0648	0.736	1.23	1.62	3.56						
10	5.51	0.0808	0.565	1.01	1.38	2.48	10	6.26	0.0702	0.626	1.03	1.50	3.03						
12	4.12	0.0895	0.442	0.726	1.08	1.79	12	4.74	0.0794	0.485	0.746	1.20	2.24						
14	3.22	0.0947	0.357	0.548	0.864	1.35	14	3.66	0.0862	0.388	0.565	0.945	1.68						
16	2.60	0.0964	0.294	0.430	0.723	1.06	16	2.94	0.0902	0.318	0.441	0.781	1.31						
18	2.16	0.0949	0.246	0.346	0.617	0.854	18	2.42	0.0916	0.266	0.354	0.663	1.05						
20	1.82	0.0909	0.210	0.286	0.530	0.704	20	2.06	0.0903	0.226	0.292	0.568	0.886						

K (Z=19) 1s(2)2s(2)3s(2)2p(6)3p(6) [4s(1)/free(1)]

q/Rs	----->	10.75	2.813	0.8905	2.868	0.7610	0.2185	4.964
V	TOTAL	1s(2)	2s(2)	3s(2)	2p(6)	3p(6)	4s(1)	free(1)
0.2	21.2 / 8.59	0.00144	0.0472	0.809	0.0529	1.47	18.8	6.21
0.4	49.8 / 19.1	0.00289	0.0944	1.63	0.106	2.94	45.1	14.3
0.6	59.4 / 33.6	0.00434	0.142	2.45	0.159	4.41	52.2	26.4
0.8	48.5 / 33.0	0.00589	0.189	3.27	0.212	5.89	38.9	23.4
1.0	41.5 / 31.0	0.00723	0.234	4.09	0.264	7.35	29.6	19.0
1.2	37.3 / 30.0	0.00867	0.282	4.89	0.317	8.78	23.0	15.7
1.4	35.0 / 29.7	0.0101	0.328	5.60	0.369	10.2	18.5	13.2
1.6	33.6 / 29.7	0.0116	0.373	6.20	0.420	11.4	15.1	11.3
1.8	32.7 / 29.7	0.0130	0.418	6.64	0.472	12.5	12.7	9.74
2.0	32.1 / 29.7	0.0144	0.462	6.89	0.522	13.4	10.8	8.51
2.2	31.4 / 29.6	0.0159	0.505	6.92	0.572	14.1	9.25	7.51
2.4	30.4 / 29.2	0.0173	0.547	6.79	0.622	14.5	7.95	6.68
2.6	29.3 / 28.3	0.0187	0.588	6.52	0.671	14.6	6.92	5.97
2.8	27.9 / 27.3	0.0201	0.628	6.18	0.719	14.4	6.01	5.37
3.0	26.6 / 26.1	0.0215	0.666	5.84	0.766	14.0	5.32	4.86
3.2	25.1 / 24.8	0.0229	0.702	5.37	0.812	13.5	4.71	4.41
3.4	23.7 / 23.5	0.0243	0.736	4.94	0.857	12.9	4.26	4.04
3.6	22.3 / 22.1	0.0257	0.769	4.57	0.901	12.2	3.86	3.69
3.8	21.2 / 21.1	0.0271	0.799	4.14	0.944	11.8	3.48	3.39
4.0	19.8 / 19.8	0.0285	0.827	3.99	0.986	10.9	3.15	3.14
5	14.8 / 14.8	0.0352	0.925	2.91	1.17	7.61	2.13	2.18
6	11.6 / 11.7	0.0417	0.950	2.23	1.32	5.88	1.50	1.61
7	10.1 / 10.2	0.0479	0.909	1.76	1.41	4.88	1.13	1.24
8	8.62 / 8.70	0.0538	0.826	1.42	1.44	3.98	0.892	0.984
9	7.41 / 8.31	0.0593	0.710	1.18	1.43	3.32	0.715	0.805
10	6.46 / 6.39	0.0644	0.605	0.999	1.37	2.81	0.612	0.681
12	4.93 / 5.00	0.0731	0.465	0.733	1.14	2.10	0.420	0.488
14	3.86 / 3.91	0.0796	0.373	0.552	0.913	1.63	0.318	0.353
16	3.09 / 3.12	0.0839	0.306	0.433	0.739	1.28	0.251	0.277
18	2.56 / 2.58	0.0857	0.258	0.350	0.633	1.03	0.200	0.218
20	2.15 / 2.17	0.0852	0.219	0.288	0.543	0.852	0.164	0.183

C.a (Z=20) 1s(2)2s(2)3s(2)2p(6)3p(6) [4s(2)/free(2)]

l/Rs	----->	11.35	2.997	0.9972	0.2707	3.071	0.8695	3.273
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	2p(6)	3p(6)	free(2)
0.2	15.0 / 6.69	0.00125	0.0402	0.616	13.2	0.0444	1.06	4.93
0.4	32.5 / 14.0	0.00250	0.0803	1.24	29.0	0.0887	2.12	10.5
0.6	50.7 / 22.0	0.00376	0.121	1.86	45.4	0.133	3.19	16.7
0.8	58.6 / 31.2	0.00501	0.161	2.48	51.5	0.177	4.25	24.1
1.0	54.8 / 36.4	0.00625	0.201	3.10	46.0	0.222	5.30	27.6
1.2	47.3 / 34.7	0.00750	0.240	3.70	36.8	0.266	6.33	24.2
1.4	42.4 / 33.2	0.00874	0.280	4.27	30.2	0.309	7.33	21.0
1.6	39.0 / 32.0	0.00999	0.318	4.77	25.3	0.353	8.28	18.3
1.8	36.5 / 31.2	0.0112	0.357	5.19	21.4	0.396	9.16	16.1
2.0	34.6 / 30.5	0.0125	0.394	5.50	18.3	0.438	9.94	14.2
2.2	33.1 / 29.8	0.0137	0.431	5.67	15.9	0.481	10.6	12.6
2.4	31.8 / 29.1	0.0150	0.467	5.71	14.0	0.522	11.1	11.3
2.6	30.5 / 28.3	0.0162	0.503	5.63	12.4	0.563	11.4	10.2
2.8	29.2 / 27.4	0.0174	0.537	5.46	11.0	0.604	11.6	9.21
3.0	27.9 / 26.4	0.0186	0.570	5.22	9.92	0.644	11.6	8.38
3.2	26.6 / 25.3	0.0199	0.602	4.96	8.94	0.683	11.4	7.64
3.4	25.2 / 24.1	0.0211	0.632	4.64	8.09	0.722	11.1	7.00
3.6	24.0 / 23.1	0.0223	0.661	4.45	7.35	0.760	10.7	6.44
3.8	22.6 / 21.9	0.0235	0.689	4.09	6.67	0.796	10.3	5.95
4.0	21.3 / 20.7	0.0247	0.714	3.82	6.07	0.832	9.84	5.49
5	16.4 / 16.2	0.0305	0.811	2.81	4.05	0.996	7.68	3.87
6	13.1 / 13.1	0.0362	0.850	2.15	2.93	1.13	5.96	2.89
7	10.8 / 10.9	0.0416	0.833	1.71	2.19	1.22	4.77	2.25
8	9.11 / 9.17	0.0468	0.775	1.39	1.73	1.27	3.91	1.79
9	7.82 / 7.87	0.0517	0.685	1.15	1.41	1.28	3.25	1.46
10	6.77 / 6.85	0.0562	0.588	0.974	1.15	1.25	2.76	1.23
12	5.19 / 5.27	0.0641	0.447	0.725	0.808	1.09	2.06	0.883
14	4.09 / 4.15	0.0704	0.360	0.554	0.620	0.885	1.60	0.676
16	3.29 / 3.35	0.0747	0.298	0.434	0.477	0.721	1.29	0.537
18	2.72 / 2.75	0.0771	0.250	0.352	0.401	0.606	1.04	0.432
20	2.29 / 2.33	0.0776	0.213	0.290	0.324	0.527	0.856	0.360

S c (Z=21) 1s(2)2s(2)3s(2)2p(6)3p(6) [3d(1)4s(2)/free(3)]

0/Rs	---->	11.96	3.181	1.071	0.2859	3.273	0.9463	0.6286	2.370
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	2p(6)	3p(6)	3d(1)	free(3)
0.2	14.7 / 5.11	0.00108	0.0346	0.518	11.6	0.0376	0.866	1.59	3.60
0.4	31.4 / 10.3	0.00218	0.0690	1.04	25.3	0.0753	1.73	3.26	7.41
0.6	49.2 / 15.8	0.00327	0.104	1.56	39.8	0.113	2.59	5.02	11.4
0.8	59.7 / 21.5	0.00436	0.138	2.08	47.1	0.150	3.45	6.78	15.7
1.0	58.6 / 27.4	0.00544	0.173	2.60	43.0	0.188	4.30	8.29	20.1
1.2	53.0 / 36.6	0.00652	0.207	3.11	35.1	0.225	5.14	9.15	27.8
1.4	48.2 / 37.1	0.00760	0.240	3.59	29.0	0.262	5.96	9.17	27.1
1.6	44.2 / 35.8	0.00869	0.274	4.03	24.3	0.299	6.74	8.56	24.5
1.8	41.0 / 34.3	0.00977	0.307	4.42	20.7	0.336	7.48	7.77	21.8
2.0	38.1 / 33.0	0.0109	0.339	4.72	17.8	0.372	8.16	6.72	19.4
2.2	35.9 / 31.8	0.0119	0.371	4.94	15.4	0.408	8.75	5.97	17.2
2.4	34.0 / 30.5	0.0130	0.402	5.04	13.6	0.444	9.24	5.31	15.4
2.6	32.4 / 29.5	0.0141	0.433	5.05	12.0	0.479	9.62	4.77	13.9
2.8	30.9 / 28.4	0.0152	0.463	4.97	10.7	0.514	9.87	4.30	12.5
3.0	29.4 / 27.2	0.0162	0.492	4.81	9.65	0.548	10.0	3.91	11.4
3.2	28.0 / 26.0	0.0173	0.520	4.61	8.71	0.581	10.0	3.56	10.3
3.4	26.6 / 24.9	0.0183	0.547	4.40	7.91	0.615	9.88	3.26	9.47
3.6	25.2 / 23.7	0.0194	0.573	4.14	7.20	0.647	9.68	2.99	8.71
3.8	24.0 / 22.7	0.0204	0.598	3.95	6.57	0.679	9.40	2.75	8.02
4.0	22.6 / 21.5	0.0215	0.621	3.66	6.00	0.710	9.08	2.55	7.43
5	17.4 / 16.8	0.0266	0.713	2.69	4.01	0.854	7.35	1.81	5.26
6	13.7 / 13.4	0.0136	0.760	2.07	2.89	0.973	5.66	1.35	3.95
7	11.3 / 11.2	0.0364	0.761	1.65	2.18	1.06	4.54	1.03	3.06
8	9.48 / 9.42	0.0409	0.723	1.34	1.70	1.12	3.74	0.811	2.45
9	8.11 / 8.11	0.0453	0.656	1.12	1.37	1.14	3.12	0.655	2.02
10	7.03 / 7.06	0.0493	0.571	0.948	1.13	1.13	2.66	0.541	1.70
12	5.42 / 5.46	0.0565	0.431	0.705	0.825	1.02	1.99	0.389	1.25
14	4.27 / 4.31	0.0624	0.350	0.545	0.608	0.854	1.56	0.294	0.943
16	3.44 / 3.49	0.0667	0.288	0.429	0.479	0.702	1.25	0.229	0.758
18	2.83 / 2.86	0.0694	0.243	0.345	0.381	0.586	1.02	0.184	0.599
20	2.38 / 2.42	0.0705	0.207	0.285	0.316	0.505	0.844	0.151	0.505

T i (Z=22) 1s(2)2s(2) 3s(2) 2p(6) 3p(6) 3d(2) 4s(2)/free(2)]

θ/Rs	---->	12.54	3.364	1.140	0.2973	3.473	1.010	0.7176	2.405
ν	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	2p(6)	3p(6)	3d(2)	free(2)
0.2	13.2 / 5.08	9.54 (-4)	0.0300	0.445	10.6	0.0323	0.732	1.36	2.48
0.4	28.1 / 10.3	0.00192	0.0598	0.893	22.9	0.0645	1.47	2.73	5.11
0.6	44.1 / 15.8	0.00288	0.0899	1.34	36.2	0.0966	2.20	4.14	7.89
0.8	54.5 / 21.3	0.00384	0.120	1.79	44.0	0.129	2.94	5.56	10.8
1.0	54.6 / 27.0	0.00480	0.150	2.23	41.5	0.161	3.66	6.94	13.9
1.2	49.7 / 33.3	0.00575	0.179	2.67	34.0	0.193	4.38	8.20	17.6
1.4	46.0 / 34.3	0.00671	0.208	3.08	28.2	0.225	5.08	9.21	16.5
1.6	43.3 / 34.4	0.00766	0.237	3.47	23.8	0.257	5.75	9.84	14.9
1.8	41.0 / 34.2	0.00862	0.266	3.82	20.2	0.288	6.39	10.0	13.4
2.0	38.9 / 33.5	0.00957	0.294	4.12	17.4	0.319	6.99	9.77	12.0
2.2	37.0 / 32.6	0.0105	0.322	4.34	15.2	0.350	7.53	9.27	10.8
2.4	35.2 / 31.6	0.0115	0.350	4.48	13.4	0.381	7.99	8.67	9.75
2.6	33.6 / 30.6	0.0124	0.377	4.54	11.8	0.411	8.38	8.04	8.84
2.8	31.9 / 29.4	0.0134	0.403	4.52	10.6	0.441	8.66	7.30	8.05
3.0	30.4 / 28.3	0.0143	0.428	4.44	9.48	0.471	8.85	6.63	7.35
3.2	29.0 / 27.1	0.0152	0.453	4.30	8.60	0.500	8.94	6.14	6.74
3.4	27.5 / 25.9	0.0162	0.477	4.13	7.80	0.529	8.93	5.64	6.20
3.6	26.2 / 24.8	0.0171	0.500	3.94	7.12	0.557	8.84	5.21	5.72
3.8	24.9 / 23.7	0.0180	0.522	3.75	6.51	0.585	8.67	4.84	5.29
4.0	23.6 / 22.6	0.0190	0.543	3.55	5.96	0.612	8.44	4.49	4.91
5	18.2 / 17.7	0.0235	0.630	2.60	3.99	0.739	7.00	3.23	3.51
6	14.3 / 14.1	0.0279	0.681	2.00	2.86	0.847	5.45	2.44	2.64
7	11.7 / 11.6	0.0322	0.694	1.60	2.16	0.932	4.39	1.91	2.05
8	9.86 / 9.80	0.0363	0.672	1.31	1.70	0.991	3.60	1.55	1.64
9	8.45 / 8.45	0.0401	0.623	1.09	1.38	1.02	3.03	1.27	1.35
10	7.31 / 7.32	0.0438	0.553	0.922	1.13	1.03	2.58	1.06	1.14
12	5.62 / 5.65	0.0504	0.422	0.650	0.804	0.959	1.94	0.759	0.834
14	4.45 / 4.47	0.0558	0.337	0.536	0.612	0.822	1.51	0.630	0.630
16	3.59 / 3.62	0.0600	0.278	0.424	0.481	0.683	1.22	0.445	0.508
18	2.96 / 2.99	0.0629	0.236	0.341	0.383	0.563	1.00	0.363	0.412
20	2.49 / 2.51	0.0644	0.201	0.282	0.315	0.490	0.831	0.302	0.337

V (Z=23) 1s(2)2s(2)3s(2)2p(6)3p(6)3d(3) [4s(2)/free(2)]

Q/Rs	----->	13.15	3.546	1.207	0.3078	3.673	1.075	0.7885	2.238
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	2p(6)	3p(6)	3d(3)	free(2)
0.2	12.0 / 4.32	0.000840	0.0262	0.387	9.79	0.0279	0.627	1.18	2.11
0.4	25.5 / 8.83	0.00169	0.0523	0.777	21.0	0.0558	1.26	2.36	4.33
0.6	40.0 / 13.5	0.00254	0.0786	1.17	33.2	0.0836	1.89	3.55	6.65
0.8	50.2 / 18.1	0.00338	0.105	1.55	41.2	0.112	2.52	4.75	9.06
1.0	51.1 / 22.9	0.00423	0.131	1.94	39.8	0.139	3.14	5.94	11.6
1.2	47.1 / 28.8	0.00507	0.157	2.32	33.6	0.167	3.75	7.08	15.3
1.4	43.6 / 30.9	0.00591	0.182	2.68	28.0	0.195	4.35	8.13	15.3
1.6	40.9 / 31.4	0.00675	0.208	3.03	23.5	0.222	4.93	9.02	14.0
1.8	39.2 / 31.7	0.00759	0.233	3.34	20.2	0.249	5.49	9.68	12.7
2.0	37.6 / 31.8	0.00843	0.258	3.62	17.3	0.277	6.02	10.1	11.5
2.2	36.1 / 31.5	0.00927	0.282	3.84	15.0	0.303	6.50	10.2	10.4
2.4	34.9 / 30.9	0.0101	0.306	4.00	13.3	0.330	6.93	9.99	9.38
2.6	33.4 / 30.2	0.0110	0.330	4.09	11.7	0.356	7.30	9.63	8.52
2.8	32.1 / 29.4	0.0118	0.353	4.12	10.5	0.382	7.60	9.15	7.77
3.0	30.8 / 28.4	0.0126	0.376	4.09	9.49	0.408	7.83	8.64	7.11
3.2	29.3 / 27.3	0.0134	0.398	4.00	8.54	0.434	7.97	7.99	6.53
3.4	28.1 / 26.3	0.0143	0.419	3.88	7.81	0.459	8.03	7.52	6.01
3.6	26.7 / 25.2	0.0151	0.440	3.73	7.08	0.483	8.02	6.90	5.55
3.8	25.4 / 24.0	0.0159	0.460	3.55	6.54	0.508	7.94	6.41	5.14
4.0	22.9 / 23.0	0.0167	0.479	3.41	4.71	0.531	7.80	5.97	4.77
5	18.7 / 18.1	0.0207	0.560	2.53	3.98	0.644	6.58	4.37	3.42
6	14.8 / 14.5	0.0247	0.612	1.96	2.90	0.741	5.21	3.34	2.57
7	12.0 / 11.9	0.0284	0.632	1.56	2.15	0.820	4.22	2.62	2.01
8	10.1 / 10.0	0.0321	0.622	1.28	1.69	0.879	3.49	2.13	1.61
9	8.67 / 8.63	0.0356	0.588	1.07	1.37	0.916	2.92	1.77	1.33
10	7.52 / 7.51	0.0389	0.533	0.906	1.12	0.929	2.49	1.51	1.11
12	5.86 / 5.84	0.0448	0.413	0.678	0.833	0.893	1.89	1.11	0.816
14	4.62 / 4.63	0.0499	0.325	0.530	0.610	0.787	1.48	0.837	0.623
16	3.73 / 3.75	0.0539	0.271	0.422	0.475	0.654	1.19	0.654	0.498
18	3.07 / 3.10	0.0569	0.230	0.342	0.380	0.557	0.981	0.524	0.409
20	2.59 / 2.61	0.0587	0.197	0.281	0.314	0.472	0.823	0.441	0.334

C r. (Z=24) 1s(2)2s(2)3s(2)2p(6)3p(6)3d(4) [4s(2)/free(2)]

Q/Rs	---->	13.77	3.728	1.273	0.3175	3.872	1.139	0.8529	2.127
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	2p(6)	3p(6)	3d(4)	free(2)
0.2	11.1 / 3.87	7.42(-4)	0.0230	0.340	9.11	0.0243	0.544	1.03	1.88
0.4	23.4 / 7.75	0.00149	0.0460	0.682	19.5	0.0487	1.09	2.06	3.85
0.6	36.7 / 11.8	0.00224	0.0691	1.02	30.8	0.0729	1.64	3.10	5.89
0.8	46.6 / 15.9	0.00299	0.0921	1.36	38.7	0.0972	2.18	4.13	8.01
1.0	48.2 / 20.0	0.00374	0.115	1.70	38.4	0.122	2.72	5.16	10.2
1.2	45.3 / 24.6	0.00448	0.138	2.03	33.5	0.146	3.25	6.17	12.8
1.4	41.3 / 28.4	0.00522	0.160	2.36	27.7	0.170	3.77	7.12	14.8
1.6	38.6 / 28.7	0.00596	0.183	2.66	23.3	0.194	4.28	8.00	13.4
1.8	36.8 / 29.1	0.00570	0.205	2.95	19.9	0.218	4.77	8.77	12.2
2.0	35.4 / 29.4	0.00745	0.227	3.20	17.1	0.241	5.23	9.38	11.1
2.2	34.3 / 29.4	0.00819	0.249	3.41	14.9	0.265	5.67	9.81	10.0
2.4	33.4 / 29.3	0.00894	0.270	3.58	13.2	0.288	6.06	10.0	9.11
2.6	32.4 / 29.0	0.00968	0.291	3.69	11.7	0.311	6.41	10.0	8.29
2.8	31.4 / 28.6	0.0104	0.311	3.75	10.4	0.334	6.71	9.88	7.57
3.0	30.4 / 28.0	0.0112	0.331	3.76	9.38	0.356	6.94	9.59	6.94
3.2	29.2 / 27.1	0.0119	0.351	3.71	8.47	0.379	7.12	9.19	6.37
3.4	28.2 / 26.3	0.0126	0.370	3.63	7.74	0.401	7.23	8.77	5.87
3.6	26.9 / 25.3	0.0133	0.389	3.52	7.05	0.423	7.27	8.25	5.43
3.8	25.9 / 24.5	0.0141	0.407	3.39	6.48	0.444	7.25	7.88	5.03
4.0	24.6 / 23.3	0.0148	0.424	3.23	5.94	0.465	7.18	7.30	4.68
5	19.3 / 18.7	0.0184	0.499	2.55	4.00	0.565	6.30	5.38	3.36
6	15.3 / 15.0	0.0218	0.551	1.98	2.87	0.652	5.07	4.14	2.53
7	12.5 / 12.3	0.0252	0.576	1.58	2.18	0.725	4.08	3.29	1.98
8	10.5 / 10.4	0.0285	0.576	1.29	1.72	0.783	3.38	2.68	1.59
9	8.93 / 8.86	0.0316	0.553	1.08	1.38	0.822	2.84	2.23	1.31
10	7.75 / 7.72	0.0345	0.511	0.914	1.13	0.842	2.42	1.89	1.10
12	5.01 / 6.00	0.0400	0.403	0.681	0.811	0.828	1.84	1.41	0.805
14	4.77 / 4.79	0.0447	0.317	0.531	0.600	0.750	1.44	1.09	0.619
16	3.87 / 3.90	0.0485	0.265	0.425	0.469	0.644	1.17	0.857	0.494
18	3.21 / 3.22	0.0514	0.224	0.346	0.391	0.544	0.960	0.699	0.398
20	2.68 / 2.70	0.0534	0.192	0.286	0.312	0.463	0.808	0.568	0.331

Mn (Z=25) 1s(2)2s(2)3s(2)2p(6)3p(6)3d(5) [4s(2)/free(2)]

θ/Rs	---->	14.38	3.908	1.339	0.3263	4.070	1.201	0.9177	2.139
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	2p(6)	3p(6)	3d(5)	free(2)
0.2	10.3 / 3.65	6.59(-4)	0.0204	0.301	8.55	0.0213	0.477	0.897	1.91
0.4	21.7 / 7.40	0.00133	0.0408	0.603	18.2	0.0427	0.958	1.80	3.90
0.6	23.9 / 11.2	0.00199	0.0612	0.905	28.8	0.0640	1.44	2.70	5.97
0.8	43.5 / 15.0	0.00266	0.0816	1.21	36.6	0.0853	1.91	3.60	8.11
1.0	45.7 / 19.0	0.00332	0.102	1.50	37.0	0.107	2.38	4.49	10.3
1.2	43.2 / 23.4	0.00399	0.122	1.80	32.9	0.128	2.85	5.36	13.1
1.4	38.9 / 26.4	0.00465	0.142	2.08	27.0	0.149	3.31	6.21	14.5
1.6	36.3 / 26.9	0.00531	0.162	2.36	22.9	0.170	3.76	7.02	13.5
1.8	34.5 / 25.0	0.00596	0.182	2.61	19.5	0.191	4.19	7.76	10.0
2.0	33.2 / 27.4	0.00663	0.201	2.85	16.9	0.212	4.60	8.41	11.1
2.2	32.1 / 27.5	0.00729	0.220	3.05	14.7	0.233	4.99	8.96	10.1
2.4	31.4 / 27.5	0.00795	0.239	3.21	13.0	0.253	5.35	9.37	9.13
2.6	30.7 / 27.5	0.00861	0.258	3.34	11.5	0.273	5.68	9.64	8.31
2.8	30.0 / 27.3	0.00926	0.276	3.42	10.3	0.294	5.96	9.76	7.59
3.0	29.2 / 27.0	0.00992	0.294	3.45	9.25	0.313	6.20	9.73	6.96
3.2	28.4 / 26.4	0.0106	0.312	3.44	8.38	0.333	6.39	9.58	6.39
3.4	27.6 / 25.9	0.0112	0.329	3.39	7.64	0.353	6.52	9.33	5.89
3.6	26.7 / 25.1	0.0119	0.346	3.31	6.98	0.372	6.61	9.01	5.44
3.8	25.7 / 24.3	0.0125	0.362	3.21	6.39	0.391	6.64	8.65	5.04
4.0	24.6 / 23.4	0.0132	0.378	3.09	5.88	0.410	6.62	8.26	4.69
5	19.8 / 19.2	0.0163	0.447	2.47	3.98	0.498	5.98	6.39	3.36
6	15.8 / 15.4	0.0195	0.497	1.91	2.86	0.578	4.95	4.96	2.53
7	12.8 / 12.7	0.0225	0.526	1.53	2.15	0.646	3.95	3.97	1.98
8	10.7 / 10.6	0.0254	0.532	1.25	1.69	0.700	3.28	3.25	1.60
9	9.19 / 9.13	0.0282	0.518	1.05	1.37	0.740	2.76	2.71	1.31
10	7.97 / 7.95	0.0309	0.487	0.895	1.12	0.764	2.37	2.30	1.10
12	6.19 / 6.19	0.0358	0.394	0.671	0.798	0.766	1.79	1.73	0.805
14	4.95 / 4.96	0.0402	0.312	0.523	0.607	0.711	1.41	1.35	0.620
16	4.04 / 4.06	0.0438	0.255	0.420	0.473	0.622	1.14	1.08	0.494
18	3.32 / 3.33	0.0466	0.217	0.341	0.389	0.531	0.943	0.859	0.397
20	2.79 / 2.80	0.0487	0.188	0.280	0.316	0.454	0.792	0.705	0.332

F.e (Z=26) 1s(2)2s(2)3s(2)2p(6)3p(6)3d(6) [4s(2)/free(2)]

q/Rs	---->	14.97	4.089	1.406	0.3365	4.269	1.266	0.9630	2.118
Y	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	2p(6)	3p(6)	3d(6)	free(2)
0.2	9.51 / 3.41	5.92(-4)	0.0182	0.266	7.96	0.0188	0.419	0.823	1.86
0.4	20.0 / 6.91	0.00119	0.0363	0.535	16.9	0.0377	0.841	1.65	3.81
0.6	31.3 / 10.5	0.00179	0.0545	0.802	26.6	0.0565	1.26	2.48	5.83
0.8	40.5 / 14.1	0.00239	0.0727	1.07	34.3	0.0753	1.68	3.30	7.92
1.0	43.2 / 17.8	0.00298	0.0907	1.33	35.5	0.0942	2.09	4.12	10.1
1.2	41.1 / 21.8	0.00358	0.0109	1.59	31.9	0.113	2.50	4.92	12.6
1.4	37.1 / 25.1	0.00417	0.127	1.85	26.3	0.132	2.91	5.71	14.3
1.6	34.5 / 25.5	0.00477	0.144	2.09	22.3	0.150	3.30	6.46	13.3
1.8	32.6 / 25.7	0.00536	0.162	2.32	19.1	0.169	3.68	7.17	12.2
2.0	31.4 / 25.8	0.00595	0.179	2.54	16.6	0.187	4.05	7.83	11.0
2.2	30.4 / 26.0	0.00654	0.196	2.73	14.4	0.206	4.40	8.40	10.0
2.4	29.7 / 26.0	0.00714	0.213	2.89	12.8	0.224	4.73	8.89	9.08
2.6	29.1 / 26.1	0.00773	0.230	3.01	11.3	0.242	5.03	9.27	8.27
2.8	28.6 / 26.1	0.00832	0.247	3.10	10.1	0.260	5.29	9.54	7.55
3.0	28.0 / 26.0	0.00891	0.263	3.16	9.12	0.277	5.53	9.68	6.92
3.2	27.5 / 25.8	0.00949	0.279	3.17	8.27	0.295	5.72	9.71	6.36
3.4	26.8 / 25.1	0.0101	0.294	3.15	7.52	0.312	5.87	9.63	5.86
3.6	26.1 / 24.6	0.0107	0.309	3.10	6.88	0.329	5.98	9.46	5.42
3.8	25.3 / 24.0	0.0112	0.324	3.03	6.32	0.346	6.04	9.21	5.02
4.0	24.4 / 23.2	0.0118	0.338	2.93	5.81	0.363	6.06	8.92	4.67
5	21.2 / 19.6	0.0147	0.402	2.41	4.97	0.442	5.64	7.28	3.35
6	16.1 / 15.8	0.0175	0.450	1.85	2.84	0.514	4.81	5.62	2.53
7	13.1 / 12.9	0.0202	0.481	1.49	2.15	0.577	3.81	4.52	1.97
8	10.9 / 10.8	0.0229	0.492	1.23	1.69	0.628	3.18	3.70	1.59
9	9.34 / 9.30	0.0254	0.485	1.03	1.35	0.668	2.69	3.09	1.31
10	8.12 / 8.09	0.0279	0.462	0.873	1.12	0.694	2.31	2.63	1.09
12	6.30 / 6.30	0.0324	0.383	0.655	0.807	0.708	1.75	1.97	0.804
14	5.06 / 5.07	0.0364	0.306	0.511	0.612	0.671	1.38	1.54	0.619
16	4.14 / 4.14	0.0398	0.248	0.412	0.480	0.599	1.11	1.24	0.482
18	3.42 / 3.44	0.0426	0.212	0.338	0.377	0.517	0.922	1.02	0.398
20	2.89 / 2.90	0.0446	0.184	0.279	0.318	0.444	0.779	0.842	0.331

C.o. (Z=27) 1s(2)2s(2)3s(2)2p(6)3p(6)3d(7) [4s(2)/free(2)]

Q/Rs	----->	15.58	4.269	1.472	0.3457	4.467	1.329	1.014	2.075
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	2p(6)	3p(6)	3d(7)	free(2)
0.2	8.87 / 3.17	5.31(-4)	0.0163	0.238	7.48	0.0167	0.371	0.745	1.78
0.4	18.6 / 6.43	0.00107	0.0325	0.478	15.8	0.0335	0.745	1.47	3.63
0.6	29.1 / 9.75	0.00161	0.0487	0.716	24.9	0.0502	1.12	2.25	5.55
0.8	37.9 / 13.0	0.00214	0.0650	0.954	32.4	0.0668	1.49	2.99	7.54
1.0	41.1 / 16.6	0.00268	0.0812	1.19	34.1	0.0836	1.85	3.73	9.59
1.2	39.2 / 20.1	0.00322	0.0973	1.42	30.9	0.100	2.22	4.46	11.8
1.4	35.4 / 23.5	0.00375	0.113	1.65	25.8	0.117	2.57	5.17	13.9
1.6	32.8 / 24.0	0.00428	0.129	1.87	21.9	0.134	2.92	5.86	13.1
1.8	31.0 / 24.2	0.00481	0.145	2.08	18.8	0.150	3.27	6.52	12.0
2.0	29.6 / 24.2	0.00534	0.161	2.27	16.3	0.166	3.59	7.15	10.9
2.2	28.7 / 24.4	0.00588	0.176	2.45	14.2	0.183	3.91	7.72	9.87
2.4	28.0 / 24.4	0.00641	0.191	2.60	12.6	0.200	4.21	8.23	8.97
2.6	27.5 / 24.5	0.00694	0.206	2.73	11.2	0.215	4.48	8.66	8.18
2.8	27.1 / 24.6	0.00748	0.221	2.83	9.98	0.231	4.73	9.01	7.47
3.0	26.6 / 24.5	0.00800	0.236	2.89	9.00	0.247	4.95	9.27	6.85
3.2	26.2 / 24.3	0.00853	0.250	2.93	8.16	0.262	5.15	9.43	6.30
3.4	25.7 / 24.1	0.00906	0.264	2.93	7.43	0.278	5.30	9.49	5.81
3.6	25.2 / 23.8	0.00958	0.278	2.90	6.80	0.293	5.42	9.47	5.37
3.8	24.6 / 23.3	0.0101	0.291	2.85	6.25	0.308	5.51	9.36	4.98
4.0	23.9 / 22.8	0.0106	0.304	2.78	5.76	0.323	5.56	9.19	4.63
5	20.0 / 19.4	0.0132	0.363	2.30	3.93	0.395	5.32	7.72	3.32
6	16.2 / 15.9	0.0157	0.409	1.80	2.82	0.460	4.64	6.10	2.51
7	13.2 / 13.0	0.0182	0.440	1.45	2.13	0.517	4.13	4.93	1.96
8	12.1 / 12.0	0.0206	0.454	1.20	1.67	0.566	3.08	4.08	1.58
9	9.49 / 9.43	0.0229	0.453	1.00	1.36	0.605	2.62	3.43	1.30
10	7.00 / 6.98	0.0251	0.437	0.853	1.11	0.632	2.24	2.93	1.09
12	6.42 / 6.42	0.0393	0.372	0.641	0.800	0.654	1.71	2.20	0.799
14	5.14 / 5.16	0.0330	0.300	0.504	0.599	0.632	1.35	1.73	0.618
16	5.02 / 5.03	0.0362	0.244	0.405	0.472	0.574	1.09	1.39	0.480
18	3.51 / 3.53	0.0388	0.207	0.333	0.376	0.503	0.907	1.15	0.398
20	2.97 / 2.99	0.0409	0.178	0.278	0.314	0.435	0.766	0.960	0.330

Ni (Z=28) 1s(2)2s(2)3s(2)2p(6)3p(6)3d(8) [4s(2)/free(2)]

Q/Rs	---->	16.18	-4.449	1.538	0.3546	4.664	1.392	1.065	2.066
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	2p(6)	3p(6)	3d(8)	free(2)
0.2	8.30 / 3.01	4.80(-4)	0.0146	0.213	7.05	0.0149	0.331	0.676	1.76
0.4	17.4 / 6.10	9.67(-4)	0.0292	0.429	14.9	0.0299	0.663	1.38	3.60
0.6	27.1 / 9.20	0.00145	0.0438	0.643	23.4	0.0449	0.995	2.03	5.50
0.8	35.6 / 12.5	0.00194	0.0585	0.856	30.6	0.0597	1.32	2.71	7.46
1.0	39.1 / 15.8	0.00242	0.0730	1.07	32.8	0.0747	1.65	3.38	9.49
1.2	37.6 / 19.1	0.00291	0.0875	1.28	30.2	0.0896	1.98	4.04	11.7
1.4	34.0 / 22.5	0.00339	0.102	1.48	25.3	0.105	2.29	4.69	13.8
1.6	31.4 / 22.8	0.00387	0.116	1.68	21.6	0.119	2.61	5.32	13.0
1.8	29.5 / 22.8	0.00435	0.130	1.87	18.6	0.134	2.91	5.93	11.9
2.0	28.1 / 22.8	0.00483	0.145	2.05	16.1	0.149	3.21	6.51	10.8
2.2	27.1 / 23.0	0.00531	0.158	2.21	14.0	0.163	3.49	7.06	9.85
2.4	26.4 / 23.0	0.00580	0.172	2.36	12.4	0.178	3.76	7.56	8.95
2.6	25.9 / 23.1	0.00628	0.186	2.48	11.0	0.192	4.02	8.01	8.16
2.8	25.5 / 23.1	0.00676	0.199	2.58	9.89	0.206	4.25	8.39	7.46
3.0	25.2 / 23.1	0.00724	0.212	2.65	8.92	0.221	4.46	8.71	6.84
3.2	24.8 / 23.0	0.00771	0.225	2.70	8.08	0.235	4.64	8.96	6.28
3.4	24.5 / 22.9	0.00819	0.238	2.72	7.37	0.248	4.80	9.12	5.80
3.6	24.1 / 22.7	0.00866	0.250	2.71	6.75	0.262	4.93	9.21	5.36
3.8	23.7 / 22.5	0.00914	0.263	2.68	6.19	0.276	5.03	9.22	4.97
4.0	23.2 / 22.1	0.00961	0.275	2.63	5.70	0.289	5.10	9.17	4.62
5	20.0 / 19.4	0.0120	0.329	2.21	3.91	0.354	5.00	8.17	3.32
6	16.5 / 16.2	0.0142	0.372	1.74	2.82	0.413	4.43	6.68	2.51
7	13.4 / 13.2	0.0165	0.403	1.41	2.13	0.466	3.66	5.35	1.95
8	11.2 / 11.1	0.0187	0.420	1.17	1.67	0.511	2.99	4.44	1.58
9	9.59 / 9.54	0.0208	0.423	0.981	1.35	0.549	2.54	3.73	1.30
10	8.32 / 8.30	0.0228	0.413	0.837	1.11	0.577	2.18	3.19	1.09
12	6.50 / 6.51	0.0266	0.361	0.630	0.789	0.604	1.67	2.42	0.799
14	5.22 / 5.24	0.0301	0.294	0.493	0.594	0.593	1.32	1.90	0.618
16	4.30 / 4.31	0.0330	0.240	0.397	0.466	0.549	1.08	1.54	0.480
18	3.59 / 3.61	0.0356	0.202	0.328	0.376	0.487	0.891	1.27	0.399
20	3.04 / 3.06	0.0376	0.173	0.275	0.310	0.425	0.750	1.07	0.330

C.u. (Z=29) 1s(2)2s(2)3s(2)2p(6)3p(6)3d(10) [4s(1)]/free(1) 1.

V/Rs	---->	16.77	4.625	1.584	0.3125	4.856	1.436	1.035	2.673
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(1)	2p(6)	3p(6)	3d(10)	free(1)
0.2	9.37 / 2.86	4.35(-4)	0.0132	0.198	8.08	0.0134	0.306	0.754	1.57
0.4	20.6 / 5.87	8.77(-4)	0.0264	0.398	18.0	0.0269	0.613	1.51	3.27
0.6	31.7 / 8.88	0.00132	0.0396	0.597	27.9	0.0404	0.920	2.27	5.08
0.8	34.3 / 12.2	0.00176	0.0529	0.795	29.1	0.0537	1.23	3.02	7.02
1.0	30.1 / 16.1	0.00220	0.0660	0.991	23.7	0.0672	1.53	3.77	9.67
1.2	26.8 / 17.8	0.00264	0.0792	1.19	19.1	0.0806	1.83	4.50	10.1
1.4	24.5 / 18.0	0.00308	0.0922	1.38	15.6	0.0940	2.12	5.23	9.07
1.6	23.0 / 18.1	0.00351	0.105	1.56	13.0	0.107	2.41	5.94	8.06
1.8	22.3 / 18.5	0.00395	0.118	1.74	11.0	0.121	2.70	6.62	7.16
2.0	21.8 / 18.8	0.00439	0.131	1.90	9.39	0.134	2.97	7.28	6.39
2.2	21.6 / 19.2	0.00482	0.143	2.06	8.15	0.147	3.23	7.90	5.72
2.4	21.6 / 19.6	0.00526	0.156	2.20	7.14	0.160	3.49	8.48	5.15
2.6	21.7 / 20.0	0.00570	0.168	2.32	6.31	0.173	3.73	9.00	4.65
2.8	21.8 / 20.4	0.00614	0.180	2.42	5.63	0.186	3.95	9.47	4.23
3.0	22.0 / 20.8	0.00657	0.192	2.50	5.04	0.199	4.15	9.86	3.85
3.2	22.0 / 21.0	0.00700	0.204	2.55	4.53	0.211	4.33	10.2	3.52
3.4	22.0 / 21.2	0.00744	0.216	2.58	4.08	0.224	4.49	10.4	3.24
3.6	21.9 / 21.2	0.00787	0.227	2.58	3.68	0.236	4.62	10.6	2.99
3.8	21.8 / 21.2	0.00830	0.238	2.56	3.33	0.249	4.72	10.7	2.76
4.0	21.5 / 21.0	0.00873	0.249	2.52	3.04	0.261	4.80	10.6	2.56
5	19.3 / 19.1	0.0109	0.299	2.16	2.03	0.319	4.78	9.73	1.82
6	16.4 / 16.3	0.0129	0.340	1.72	1.46	0.373	4.30	8.17	1.36
7	14.1 / 13.3	0.0150	0.371	1.39	1.02	0.422	3.60	6.48	1.06
8	11.2 / 11.2	0.0170	0.389	1.15	0.873	0.465	2.93	5.39	0.852
9	9.63 / 9.63	0.0189	0.395	0.968	0.691	0.500	2.50	4.56	0.695
10	8.38 / 8.39	0.0208	0.389	0.825	0.571	0.528	2.15	3.90	0.580
12	6.55 / 6.56	0.0243	0.348	0.621	0.410	0.559	1.64	2.95	0.422
14	5.30 / 5.31	0.0275	0.288	0.487	0.309	0.557	1.30	2.33	0.322
16	4.39 / 4.38	0.0303	0.236	0.394	0.266	0.524	1.06	1.88	0.255
18	3.66 / 3.67	0.0327	0.197	0.325	0.194	0.472	0.880	1.56	0.208
20	3.11 / 3.12	0.0346	0.171	0.272	0.160	0.415	0.743	1.31	0.172

Z.n (Z=30)		1s(2)2s(2)3s(2)2p(6)3p(6)3d(10) [4s(2)/free(2)]									
0/Rs	----->	17.37	4.803	1.668	0.3837	5.055	1.520	1.170	2.534		
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	2p(6)	3p(6)	3d(10)	free(2)		
0.2	6.90 / 3.82	3.95(-4)	0.0120	0.175	5.87	0.0121	0.266	0.557	2.79		
0.4	14.3 / 7.77	7.98(-4)	0.0240	0.350	12.3	0.0242	0.532	1.12	5.77		
0.6	22.3 / 12.0	0.00120	0.0359	0.526	19.2	0.0363	0.799	1.67	8.94		
0.8	29.6 / 16.4	0.00160	0.0479	0.700	25.5	0.0484	1.06	2.23	12.3		
1.0	33.8 / 21.1	0.00200	0.0599	0.872	28.7	0.0604	1.33	2.78	16.0		
1.2	33.8 / 25.0	0.00240	0.0718	1.04	27.7	0.0725	1.59	3.32	18.9		
1.4	31.9 / 24.3	0.00280	0.0840	1.21	24.9	0.0846	1.84	3.86	17.3		
1.6	29.0 / 23.6	0.00320	0.0954	1.37	20.9	0.0966	2.10	4.38	15.5		
1.8	27.0 / 22.8	0.00359	0.107	1.53	18.0	0.109	2.34	4.90	13.8		
2.0	25.6 / 22.3	0.00399	0.119	1.68	15.7	0.120	2.58	5.39	12.4		
2.2	24.5 / 21.8	0.00439	0.130	1.82	13.8	0.132	2.82	5.87	11.1		
2.4	23.8 / 21.6	0.00478	0.141	1.95	12.2	0.144	3.04	6.32	10.0		
2.6	23.2 / 21.5	0.00518	0.153	2.06	10.8	0.156	3.25	6.75	9.07		
2.8	22.8 / 21.4	0.00558	0.164	2.16	9.69	0.167	3.45	7.14	8.25		
3.0	22.5 / 21.3	0.00598	0.175	2.24	8.74	0.179	3.64	7.49	7.53		
3.2	22.2 / 21.2	0.00637	0.185	2.30	7.93	0.190	3.80	7.80	6.89		
3.4	22.0 / 21.1	0.00677	0.196	2.34	7.24	0.202	3.95	8.07	6.34		
3.6	21.8 / 21.0	0.00716	0.206	2.36	6.64	0.213	4.09	8.28	5.85		
3.8	21.5 / 20.8	0.00755	0.217	2.36	6.10	0.224	4.19	8.44	5.40		
4.0	21.2 / 20.7	0.00794	0.227	2.34	5.56	0.235	4.28	8.55	5.02		
5	19.3 / 19.0	0.00988	0.273	2.07	3.90	0.288	4.39	8.37	3.57		
6	16.6 / 16.5	0.0118	0.311	1.68	2.82	0.338	4.05	7.40	2.67		
7	13.8 / 13.8	0.0137	0.341	1.34	2.13	0.382	3.50	6.10	2.08		
8	11.4 / 11.4	0.0155	0.360	1.12	1.67	0.422	2.86	4.99	1.67		
9	9.79 / 9.81	0.0172	0.369	0.941	1.35	0.456	2.41	4.24	1.37		
10	8.54 / 8.58	0.0190	0.367	0.804	1.11	0.483	2.09	3.67	1.15		
12	6.68 / 6.73	0.0222	0.335	0.506	0.800	0.517	1.60	2.80	0.850		
14	5.38 / 5.42	0.0251	0.282	0.478	0.599	0.521	1.27	2.20	0.636		
16	4.44 / 4.49	0.0278	0.232	0.385	0.467	0.498	1.03	1.79	0.512		
18	3.71 / 3.75	0.0301	0.193	0.319	0.372	0.455	0.858	1.49	0.414		
20	3.17 / 3.20	0.0320	0.167	0.267	0.315	0.404	0.726	1.26	0.340		

G.a. (Z=31) 1s(2)2s(2)3s(2)2p(6)3p(6)3d(10) [4s(2)4p(1)/free(3)]

Q/Rs	---->	17.97	4.982	1.755	0.4430	5.292	1.594	0.3215	1.302	2.192
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	2p(6)	3p(6)	4p(1)	3d(10)	free(3)
0.2	12.6 / 3.85	3.61(-4)	0.0109	0.154	4.21	0.0107	0.236	7.56	0.426	3.02
0.4	27.2 / 7.91	7.28(-4)	0.0218	0.309	8.68	0.0215	0.472	16.8	0.853	6.19
0.6	42.1 / 12.0	0.00109	0.0327	0.464	13.5	0.0322	0.708	26.1	1.28	9.49
0.8	49.5 / 16.3	0.00146	0.0436	0.617	18.1	0.0429	0.942	28.0	1.71	12.9
1.0	49.0 / 20.7	0.00183	0.0545	0.770	21.6	0.0536	1.18	23.2	2.13	16.5
1.2	46.3 / 26.5	0.00219	0.0653	0.920	22.6	0.0643	1.41	18.7	2.54	21.5
1.4	42.5 / 28.2	0.00255	0.0761	1.07	21.4	0.0750	1.63	15.3	2.95	22.4
1.6	38.4 / 27.3	0.00292	0.0868	1.21	19.0	0.0856	1.86	12.8	3.36	20.7
1.8	34.9 / 26.2	0.00328	0.0974	1.35	16.7	0.0963	2.08	10.8	3.76	18.8
2.0	31.8 / 25.0	0.00364	0.108	1.49	14.5	0.107	2.29	9.29	4.14	17.0
2.2	29.6 / 24.2	0.00400	0.118	1.61	12.7	0.117	2.50	8.04	4.52	15.3
2.4	28.0 / 23.4	0.00437	0.129	1.73	11.4	0.128	2.70	7.07	4.88	13.9
2.6	26.7 / 22.9	0.00473	0.139	1.84	10.2	0.138	2.89	6.25	5.22	12.6
2.8	25.6 / 22.3	0.00509	0.149	1.93	9.20	0.149	3.08	5.56	5.54	11.5
3.0	24.7 / 22.0	0.00546	0.159	2.01	8.29	0.159	3.25	4.99	5.84	10.6
3.2	23.9 / 21.6	0.00582	0.169	2.07	7.51	0.169	3.40	4.49	6.12	9.70
3.4	23.3 / 21.3	0.00618	0.179	2.12	6.87	0.179	3.55	4.04	6.37	8.93
3.6	22.8 / 21.1	0.00654	0.188	2.15	6.34	0.189	3.66	3.66	6.58	8.25
3.8	22.3 / 20.8	0.00690	0.198	2.16	5.81	0.199	3.78	3.33	6.77	7.65
4.0	21.7 / 20.5	0.00725	0.207	2.16	5.31	0.209	3.87	3.03	6.91	7.10
5	19.5 / 18.8	0.00903	0.249	1.96	3.76	0.256	4.05	2.03	7.13	5.10
6	16.9 / 16.5	0.0108	0.286	1.64	2.76	0.301	3.83	1.45	6.64	3.82
7	14.3 / 14.1	0.0125	0.314	1.30	2.10	0.342	3.39	1.10	5.77	3.00
8	11.8 / 11.7	0.0142	0.334	1.08	1.63	0.378	2.80	0.855	4.73	2.41
9	10.1 / 10.1	0.0158	0.344	0.915	1.33	0.410	2.42	0.700	3.96	1.99
10	8.72 / 8.71	0.0174	0.345	0.783	1.09	0.436	2.03	0.581	3.44	1.66
12	6.81 / 6.83	0.0203	0.322	0.555	0.789	0.471	1.56	0.412	2.64	1.22
14	5.49 / 5.53	0.0231	0.275	0.467	0.589	0.481	1.24	0.308	2.10	0.934
16	4.53 / 4.57	0.0256	0.228	0.379	0.462	0.467	1.01	0.240	1.71	0.744
18	3.80 / 3.82	0.0277	0.190	0.313	0.376	0.434	0.842	0.196	1.42	0.596
20	3.24 / 3.27	0.0295	0.164	0.263	0.308	0.391	0.714	0.162	1.21	0.499

Ge (Z=32) 1s(2)2s(2)3s(2)2p(6)3p(6)3d(10) [4s(2)4p(2)/free(4)]

Q/Rs	---->	18.60	5.163	1.843	0.5034	5.491	1.686	0.3851	1.427	2.090
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	2p(6)	3p(6)	4p(2)	3d(10)	free(4)
0.2	9.73 / 4.32	3.29(-4)	0.00994	0.136	3.12	0.00372	0.205	5.83	0.338	3.62
0.4	19.9 / 8.71	6.63(-4)	0.0199	0.274	6.38	0.0135	0.410	12.2	0.677	7.39
0.6	31.0 / 13.5	9.97(-4)	0.0298	0.411	9.82	0.0292	0.615	19.0	1.02	11.3
0.8	41.4 / 18.1	0.00133	0.0397	0.546	13.3	0.0389	0.819	25.3	1.35	15.3
1.0	48.3 / 23.1	0.00166	0.0497	0.681	16.2	0.0486	1.02	28.5	1.69	19.5
1.2	49.7 / 28.3	0.00200	0.0596	0.815	18.0	0.0584	1.22	27.5	2.02	24.1
1.4	47.7 / 32.8	0.00233	0.0694	0.946	18.1	0.0681	1.42	24.8	2.35	28.0
1.6	43.4 / 31.8	0.00266	0.0792	1.07	17.0	0.0778	1.62	20.9	2.67	26.3
1.8	39.6 / 30.2	0.00300	0.0888	1.20	15.5	0.0874	1.81	18.0	2.99	24.1
2.0	35.8 / 28.8	0.00332	0.0985	1.32	13.3	0.0970	2.00	15.6	3.30	21.9
2.2	33.0 / 27.3	0.00365	0.108	1.43	11.8	0.107	2.18	13.7	3.60	19.8
2.4	30.7 / 26.0	0.00398	0.118	1.54	10.6	0.116	2.36	12.1	3.89	18.0
2.6	28.9 / 25.0	0.00431	0.127	1.64	9.51	0.126	2.53	10.8	4.17	16.4
2.8	27.4 / 24.2	0.00464	0.136	1.73	8.57	0.135	2.69	9.68	4.44	15.0
3.0	26.1 / 23.4	0.00497	0.145	1.80	7.76	0.144	2.84	8.73	4.70	13.8
3.2	25.1 / 22.7	0.00530	0.154	1.87	7.07	0.154	2.99	7.93	4.93	12.6
3.4	24.2 / 22.2	0.00563	0.163	1.92	6.47	0.163	3.12	7.21	5.15	11.7
3.6	23.5 / 21.7	0.00596	0.172	1.96	5.96	0.172	3.24	6.62	5.35	10.8
3.8	22.8 / 21.2	0.00629	0.181	1.98	5.49	0.181	3.35	6.08	5.53	9.98
4.0	22.2 / 20.8	0.00661	0.189	1.99	5.08	0.190	3.44	5.61	5.69	9.28
5	19.6 / 18.8	0.00823	0.229	1.86	3.59	0.233	3.68	3.90	6.09	6.66
6	17.1 / 16.6	0.00982	0.263	1.60	2.68	0.274	3.56	2.82	5.91	5.04
7	14.6 / 14.4	0.0114	0.290	1.26	2.01	0.312	3.22	2.13	5.35	3.93
8	12.3 / 12.2	0.0129	0.310	1.05	1.62	0.346	2.73	1.67	4.54	3.16
9	10.3 / 10.2	0.0144	0.321	0.889	1.31	0.376	2.27	1.35	3.78	2.60
10	9.06 / 9.05	0.0159	0.324	0.762	1.08	0.401	1.96	1.11	3.26	2.18
12	6.94 / 6.97	0.0186	0.308	0.580	0.774	0.436	1.51	0.797	2.52	1.60
14	5.60 / 5.65	0.0212	0.268	0.458	0.586	0.450	1.21	0.601	2.01	1.24
16	4.62 / 4.66	0.0235	0.224	0.378	0.459	0.442	0.985	0.465	1.64	0.962
18	3.86 / 3.92	0.0255	0.188	0.307	0.365	0.416	0.824	0.372	1.37	0.797
20	3.30 / 3.34	0.0272	0.160	0.259	0.301	0.379	0.695	0.317	1.16	0.661

A.s. (Z=33) 1s(2)2s(2)3s(2)4s(2)2p(6)3p(6)4p(3)3d(10)

q/rs	---->	19.20	5.342	1.932	0.5583	5.961	1.784	0.4416	1.548
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	2p(6)	3p(6)	4p(3)	3d(10)
0.2	7.68	3.02(-4)	0.00909	0.121	2.45	0.00884	0.178	4.64	0.275
0.4	15.7	6.09(-4)	0.0182	0.243	4.98	0.0177	0.355	9.48	0.550
0.6	24.0	9.16(-4)	0.0273	0.365	7.62	0.0266	0.533	14.6	0.827
0.8	32.4	0.00122	0.0364	0.486	10.3	0.0354	0.710	19.7	1.10
1.0	39.8	0.00153	0.0455	0.606	12.7	0.0442	0.885	24.1	1.37
1.2	44.9	0.00183	0.0545	0.725	14.6	0.0531	1.06	26.8	1.64
1.4	46.4	0.00214	0.0635	0.841	15.3	0.0619	1.23	27.0	1.91
1.6	45.0	0.00244	0.0725	0.956	15.0	0.0707	1.40	25.3	2.17
1.8	42.3	0.00275	0.0814	1.07	14.0	0.0795	1.57	23.1	2.43
2.0	38.3	0.00305	0.0902	1.18	12.6	0.0882	1.73	19.9	2.69
2.2	36.2	0.00335	0.0989	1.28	12.2	0.0969	1.89	17.7	2.94
2.4	32.9	0.00366	0.107	1.38	10.2	0.106	2.05	15.9	3.18
2.6	30.7	0.00396	0.116	1.47	9.21	0.114	2.20	14.2	3.42
2.8	28.9	0.00426	0.125	1.55	8.32	0.123	2.34	12.8	3.64
3.0	27.4	0.00457	0.133	1.62	7.56	0.131	2.48	11.6	3.86
3.2	26.1	0.00487	0.141	1.69	6.88	0.140	2.61	10.6	4.06
3.4	25.0	0.00517	0.150	1.74	6.32	0.148	2.73	9.69	4.25
3.6	24.1	0.00547	0.158	1.78	5.81	0.156	2.84	8.89	4.43
3.8	23.3	0.00578	0.166	1.81	5.36	0.165	2.94	8.22	4.60
4.0	22.5	0.00608	0.173	1.83	4.98	0.173	3.04	7.61	4.75
5	19.6	0.00756	0.210	1.75	3.52	0.213	3.31	5.38	5.22
6	17.2	0.00903	0.242	1.53	2.64	0.250	3.28	4.02	5.24
7	14.9	0.0105	0.268	1.24	2.05	0.285	3.04	3.09	4.90
8	12.7	0.0119	0.288	1.02	1.63	0.317	2.65	2.43	4.33
9	10.7	0.0133	0.300	0.869	1.31	0.345	2.22	1.96	3.66
10	9.12	0.0146	0.305	0.746	1.08	0.369	1.89	1.62	3.10
12	7.11	0.0172	0.294	0.569	0.783	0.404	1.47	1.16	2.41
14	5.72	0.0195	0.261	0.448	0.589	0.420	1.18	0.875	1.93
16	4.70	0.0217	0.220	0.364	0.452	0.417	0.963	0.689	1.57
18	3.94	0.0236	0.185	0.302	0.363	0.398	0.802	0.551	1.32
20	3.36	0.0253	0.157	0.254	0.300	0.366	0.681	0.454	1.12

Se (Z=34) 1s(2)2s(2)3s(2)4s(2)2p(6)3p(6)3d(10) [4p(4)/free(4)]

0/Rs	---->	19.81	5.525	2.020	0.6111	5.893	1.870	0.4809	1.671	2.222
Y	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	2p(6)	3p(6)	4p(4)	3d(10)	free(4)
0.2	6.53 / 6.65	2.77(-4)	0.00833	0.109	1.98	0.00806	0.158	4.04	0.227	4.16
0.4	13.2 / 13.5	5.59(-4)	0.0167	0.218	4.01	0.0162	0.315	8.19	0.454	8.51
0.6	20.1 / 20.7	0.00841	0.0250	0.326	6.11	0.0243	0.473	12.5	0.682	13.1
0.8	27.1 / 28.1	0.00112	0.0333	0.434	8.24	0.0323	0.630	16.8	0.908	17.8
1.0	33.7 / 35.6	0.00140	0.0417	0.542	10.3	0.0404	0.786	20.9	1.13	22.8
1.2	39.3 / 45.0	0.00168	0.0499	0.648	11.9	0.0484	0.941	24.3	1.36	30.0
1.4	42.8 / 46.8	0.00196	0.0582	0.752	12.9	0.0565	1.09	26.3	1.58	30.3
1.6	43.8 / 45.1	0.00224	0.0664	0.855	13.1	0.0645	1.25	26.6	1.80	27.9
1.8	42.6 / 42.4	0.00252	0.0746	0.955	12.6	0.0726	1.39	25.5	2.01	25.3
2.0	40.5 / 39.6	0.00280	0.0827	1.05	11.8	0.0805	1.54	23.7	2.22	22.8
2.2	38.0 / 36.8	0.00308	0.0907	1.15	10.8	0.0885	1.68	21.8	2.43	20.6
2.4	34.7 / 34.2	0.00336	0.0987	1.23	9.57	0.0964	1.82	19.2	2.63	18.7
2.6	32.3 / 31.9	0.00364	0.107	1.32	8.64	0.104	1.96	17.4	2.83	17.0
2.8	30.3 / 30.0	0.00392	0.114	1.40	7.82	0.112	2.09	15.8	3.02	15.5
3.0	28.6 / 28.4	0.00420	0.122	1.46	7.13	0.120	2.21	14.4	3.20	14.2
3.2	27.1 / 27.0	0.00447	0.130	1.53	6.54	0.128	2.33	13.1	3.38	13.0
3.4	25.9 / 25.9	0.00475	0.137	1.58	6.00	0.135	2.44	12.0	3.55	12.0
3.6	24.8 / 24.8	0.00503	0.145	1.62	5.51	0.143	2.55	11.1	3.71	11.1
3.8	23.8 / 23.9	0.00531	0.152	1.66	5.11	0.150	2.64	10.2	3.85	10.3
4.0	23.0 / 22.9	0.00558	0.159	1.68	4.73	0.158	2.73	9.52	3.99	9.51
5	19.7 / 19.7	0.00695	0.193	1.65	3.38	0.195	3.02	6.79	4.48	6.82
6	17.3 / 17.3	0.00830	0.223	1.47	2.54	0.229	3.05	5.10	4.62	5.12
7	15.0 / 15.0	0.00963	0.248	1.22	1.99	0.261	2.88	3.99	4.45	4.02
8	13.0 / 13.0	0.0109	0.267	0.994	1.59	0.291	2.57	3.19	4.07	3.22
9	11.0 / 11.1	0.0122	0.280	0.845	1.29	0.317	2.18	2.58	3.52	2.66
10	9.40 / 9.50	0.0134	0.287	0.726	1.06	0.340	1.85	2.12	3.01	2.22
12	7.18 / 7.29	0.0158	0.280	0.554	0.762	0.375	1.43	1.52	2.24	1.63
14	5.70 / 5.80	0.0180	0.253	0.439	0.572	0.393	1.14	1.15	1.73	1.25
16	4.65 / 4.75	0.0200	0.216	0.357	0.450	0.394	0.937	0.896	1.38	0.995
18	3.88 / 3.97	0.0219	0.182	0.297	0.363	0.380	0.787	0.723	1.13	0.817
20	3.43 / 3.50	0.0235	0.155	0.250	0.297	0.353	0.668	0.596	1.08	0.667

B. r (Z=35) 1s(2)2s(2)3s(2)4s(2)2p(6)3p(6)4p(5)3d(10)

Q/Rs	----->	20.41	5.704	2.110	0.6626	6.091	1.962	0.5237	1.783
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	2p(6)	3p(6)	4p(5)	3d(10)
0.2	5.55	2.56(-4)	0.00767	0.0974	1.64	0.00739	0.140	3.46	0.192
0.4	11.2	5.16(-4)	0.0154	0.195	3.31	0.0148	0.279	6.99	0.384
0.6	16.9	7.76(-4)	0.0230	0.293	5.02	0.0222	0.419	10.6	0.577
0.8	22.8	0.00104	0.0306	0.340	6.76	0.0296	0.558	14.2	0.769
1.0	28.4	0.00130	0.0383	0.485	8.43	0.0370	0.696	17.8	0.960
1.2	33.5	0.00155	0.0465	0.581	9.90	0.0444	0.833	21.0	1.15
1.4	37.6	0.00181	0.0536	0.675	11.0	0.0518	0.970	23.5	1.34
1.6	40.0	0.00207	0.0611	0.767	11.4	0.0592	1.10	25.1	1.52
1.8	40.7	0.00233	0.0686	0.858	11.3	0.0665	1.24	25.4	1.71
2.0	39.9	0.00259	0.0761	0.945	10.8	0.0738	1.37	24.8	1.89
2.2	38.4	0.00284	0.0835	1.03	10.1	0.0811	1.49	23.5	2.06
2.4	35.7	0.00310	0.0909	1.11	8.98	0.0884	1.62	21.5	2.24
2.6	34.4	0.00336	0.0982	1.19	8.05	0.0956	1.74	20.8	2.41
2.8	32.1	0.00361	0.105	1.26	7.32	0.103	1.86	18.9	2.57
3.0	30.2	0.00387	0.113	1.32	6.69	0.110	1.97	17.3	2.73
3.2	28.6	0.00413	0.120	1.38	6.15	0.117	2.08	15.9	2.89
3.4	27.2	0.00439	0.127	1.44	5.66	0.124	2.18	14.6	3.04
3.6	25.9	0.00464	0.134	1.48	5.23	0.131	2.28	13.5	3.18
3.8	24.7	0.00490	0.140	1.52	4.83	0.138	2.37	12.4	3.31
4.0	23.8	0.00515	0.147	1.54	4.50	0.145	2.45	11.6	3.43
5	20.1	0.00642	0.179	1.55	3.22	0.179	2.75	8.29	3.92
6	17.4	0.00767	0.207	1.40	2.44	0.211	2.83	6.23	4.13
7	15.3	0.00890	0.231	1.22	1.91	0.241	2.71	4.90	4.07
8	13.4	0.0101	0.250	0.992	1.54	0.269	2.51	3.95	3.84
9	11.6	0.0113	0.263	0.840	1.28	0.294	2.18	3.27	3.47
10	9.98	0.0125	0.271	0.727	1.07	0.316	1.86	2.73	2.99
12	7.68	0.0147	0.270	0.555	0.796	0.350	1.42	2.02	2.25
14	6.22	0.0167	0.250	0.440	0.614	0.371	1.14	1.56	1.83
16	5.14	0.0187	0.217	0.356	0.489	0.376	0.935	1.24	1.50
18	4.34	0.0204	0.184	0.295	0.396	0.368	0.785	1.02	1.26
20	3.68	0.0219	0.156	0.250	0.326	0.347	0.667	0.837	1.08

K r (Z=36) 1s(2) 2s(2) 3s(2) 4s(2) 2p(6) 3p(6) 4p(6) 3d(10)

q/Rs	----->	21.00	5.888	2.199	0.7115	6.281	2.078	0.5679	1.898
v	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	2p(6)	3p(6)	4p(6)	3d(10)
0.2	4.73	2.36(-4)	0.00706	0.0878	1.38	0.00681	0.121	2.97	0.164
0.4	9.53	4.78(-4)	0.0141	0.176	2.79	0.0137	0.241	5.97	0.328
0.6	14.4	7.18(-4)	0.0212	0.264	4.22	0.0205	0.362	9.00	0.493
0.8	19.3	9.58(-4)	0.0282	0.351	5.67	0.0273	0.482	12.1	0.657
1.0	24.1	0.00120	0.0353	0.438	7.09	0.0341	0.602	15.1	0.820
1.2	28.6	0.00144	0.0423	0.524	8.37	0.0409	0.720	17.9	0.982
1.4	32.6	0.00168	0.0493	0.609	9.39	0.0477	0.838	20.4	1.14
1.6	35.5	0.00192	0.0563	0.692	10.0	0.0545	0.954	22.4	1.30
1.8	37.2	0.00216	0.0632	0.774	10.2	0.0613	1.07	23.6	1.46
2.0	37.2	0.00239	0.0701	0.853	9.89	0.0681	1.18	24.0	1.16
2.2	37.1	0.00263	0.0769	0.930	9.36	0.0748	1.29	23.6	1.77
2.4	35.9	0.00287	0.0837	1.00	8.73	0.0815	1.40	22.6	1.91
2.6	34.4	0.00311	0.0904	1.07	8.14	0.0882	1.51	21.4	2.06
2.8	32.5	0.00334	0.0971	1.14	7.37	0.0948	1.61	20.0	2.20
3.0	28.9	0.00358	0.104	1.20	6.72	0.101	1.71	18.4	2.34
3.2	28.7	0.00382	0.110	1.26	6.18	0.108	1.80	16.7	2.48
3.4	27.2	0.00406	0.117	1.31	5.69	0.114	1.90	15.5	2.61
3.6	26.0	0.00430	0.123	1.35	5.25	0.121	1.98	14.4	2.73
3.8	24.8	0.00453	0.129	1.39	4.84	0.127	2.07	13.4	2.85
4.0	23.6	0.00477	0.136	1.42	4.53	0.134	2.14	12.5	2.96
5	19.9	0.00594	0.165	1.45	3.24	0.165	2.43	9.05	3.42
6	16.8	0.00710	0.191	1.31	2.34	0.200	2.55	6.55	3.68
7	15.1	0.00824	0.214	1.16	1.92	0.222	2.50	5.43	3.68
8	13.2	0.00936	0.232	0.951	1.55	0.248	2.33	4.39	3.52
9	11.5	0.0105	0.245	0.802	1.27	0.272	2.05	3.64	3.22
10	9.96	0.0115	0.253	0.691	1.06	0.292	1.77	3.07	2.83
12	7.59	0.0136	0.254	0.534	0.762	0.325	1.34	2.22	2.14
14	6.03	0.0155	0.236	0.372	0.578	0.345	1.08	1.68	1.72
16	5.00	0.0173	0.207	0.344	0.446	0.352	0.895	1.32	1.42
18	4.20	0.0189	0.177	0.286	0.361	0.346	0.748	1.06	1.20
20	3.58	0.0204	0.151	0.241	0.299	0.328	0.637	0.876	1.02

R_b (Z=37) 1s(2)2s(2)3s(2)4s(2)2p(6)3p(6)4p(6)3d(10) [5s(1)/free(1)]

0/Rs	---->	21.44	6.084	2.294	0.7857	0.2084	6.483	2.175	0.6553	2.013	5.222
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(1)	2p(6)	3p(6)	4p(6)	3d(10)	free(1)
0.2	25.2 / 10.5	0.000224	0.00648	0.0790	1.09	21.7	0.00626	0.108	2.10	0.141	6.95
0.4	57.9 / 23.3	0.000452	0.0130	0.158	2.20	50.8	0.0126	0.215	4.22	0.282	16.2
0.6	66.1 / 46.4	0.000679	0.0194	0.237	3.32	55.4	0.0189	0.323	6.36	0.424	35.7
0.8	54.3 / 45.9	0.000907	0.0259	0.316	4.45	40.0	0.0251	0.430	8.49	0.565	31.6
1.0	48.0 / 42.9	0.00113	0.0324	0.394	5.56	30.1	0.0314	0.536	10.6	0.705	25.0
1.2	44.7 / 41.3	0.00136	0.0389	0.471	6.60	23.4	0.0376	0.642	12.7	0.845	20.0
1.4	43.2 / 40.8	0.00159	0.0453	0.548	7.50	18.7	0.0439	0.747	14.6	0.983	16.3
1.6	42.4 / 40.6	0.00181	0.0517	0.623	8.17	15.3	0.0501	0.851	16.2	1.12	13.5
1.8	41.9 / 40.4	0.00204	0.0580	0.697	8.53	12.8	0.0564	0.953	17.5	1.26	11.3
2.0	41.2 / 40.0	0.00227	0.0644	0.769	8.56	10.9	0.0626	1.05	18.4	1.39	9.69
2.2	40.0 / 39.1	0.00249	0.0707	0.839	8.32	9.27	0.0688	1.15	18.8	1.52	8.38
2.4	38.6 / 38.0	0.00272	0.0769	0.906	7.91	7.95	0.0750	1.25	18.8	1.65	7.33
2.6	36.7 / 36.3	0.00294	0.0831	0.970	7.40	6.90	0.0811	1.35	18.2	1.78	6.48
2.8	34.9 / 34.6	0.00317	0.0892	1.03	6.94	6.03	0.0872	1.44	17.4	1.90	5.76
3.0	32.9 / 32.8	0.00339	0.0953	1.09	6.26	5.32	0.0933	1.53	16.5	2.02	5.17
3.2	31.1 / 31.0	0.00362	0.101	1.14	5.76	4.73	0.0993	1.62	15.5	2.14	4.65
3.4	29.6 / 29.6	0.00384	0.107	1.19	5.31	4.26	0.105	1.70	14.7	2.23	4.21
3.6	28.1 / 28.1	0.00407	0.113	1.23	4.92	3.83	0.111	1.78	13.7	2.35	3.85
3.8	26.6 / 26.6	0.00429	0.119	1.27	4.57	3.47	0.117	1.85	12.7	2.47	3.51
4.0	25.4 / 25.5	0.00451	0.125	1.30	4.25	3.18	0.123	1.93	11.9	2.57	3.24
5	20.8 / 21.0	0.00562	0.152	1.36	3.08	2.12	0.152	2.21	8.72	2.99	2.23
6	18.1 / 17.9	0.00672	0.177	1.28	2.34	1.89	0.179	2.34	6.66	3.25	1.65
7	15.5 / 15.6	0.00780	0.198	1.13	1.84	1.15	0.205	2.33	5.27	3.33	1.25
8	13.5 / 13.7	0.00886	0.215	0.934	1.49	0.903	0.229	2.21	4.27	3.25	0.998
9	11.8 / 11.9	0.00990	0.229	0.777	1.23	0.716	0.251	1.99	3.54	3.04	0.813
10	10.3 / 10.4	0.0109	0.237	0.676	1.03	0.602	0.271	1.73	2.99	2.72	0.691
12	7.86 / 7.90	0.0129	0.241	0.521	0.746	0.432	0.303	1.31	2.21	2.09	0.471
14	6.25 / 6.30	0.0147	0.227	0.414	0.565	0.317	0.323	1.06	1.67	1.66	0.363
16	5.82 / 5.86	0.0164	0.202	0.338	0.441	0.248	0.332	0.869	1.31	2.07	0.284
18	4.32 / 4.35	0.0180	0.174	0.281	0.355	0.199	0.329	0.733	1.06	1.17	0.225
20	3.69 / 3.71	0.0194	0.149	0.239	0.292	0.170	0.315	0.625	0.883	0.998	0.191

S r (Z=38) 1s(2) 2s(2) 3s(2) 4s(2) 2p(6) 3p(6) 4p(6) 3d(10) [5s(2)/free(2)]

- 0/Rs	---->	22.09	6.267	2.392	0.8639	0.2546	6.681	2.276	0.7329	2.127	3.576
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	2p(6)	3p(6)	4p(6)	3d(10)	free(2)
0.2	18.0 / 8.80	0.000206	0.00599	0.0711	0.870	15.2	0.00578	0.0958	1.61	0.123	6.00
0.4	39.4 / 18.5	0.000416	0.0120	0.142	1.75	33.8	0.0116	0.191	3.22	0.245	12.9
0.6	60.9 / 29.2	0.000626	0.0180	0.214	2.64	52.5	0.0174	0.287	4.84	0.368	20.8
0.8	67.4 / 47.4	0.000836	0.0240	0.284	3.53	56.3	0.0232	0.383	6.46	0.491	36.3
1.0	60.3 / 49.9	0.00105	0.0300	0.355	4.41	46.3	0.0290	0.478	8.06	0.613	35.9
1.2	54.2 / 47.5	0.00125	0.0360	0.424	5.25	37.5	0.0347	0.572	9.63	0.734	30.8
1.4	49.9 / 45.2	0.00146	0.0419	0.493	6.01	30.7	0.0405	0.666	11.1	0.854	26.0
1.6	47.1 / 43.6	0.00167	0.0478	0.561	6.64	25.6	0.0463	0.758	12.5	0.974	22.1
1.8	45.1 / 42.4	0.00188	0.0537	0.628	7.07	21.6	0.0521	0.850	13.7	1.09	18.9
2.0	43.4 / 41.2	0.00209	0.0596	0.693	7.28	18.6	0.0578	0.940	14.6	1.21	16.4
2.2	41.8 / 40.0	0.00230	0.0654	0.756	7.27	16.1	0.0635	1.03	15.2	1.32	14.3
2.4	40.2 / 38.7	0.00250	0.0712	0.817	7.07	14.1	0.0692	1.12	15.5	1.44	12.6
2.6	38.5 / 37.2	0.00271	0.0769	0.876	6.74	12.5	0.0749	1.20	15.5	1.55	11.2
2.8	36.7 / 35.6	0.00292	0.0826	0.932	6.34	11.1	0.0806	1.29	15.2	1.66	10.0
3.0	34.9 / 33.9	0.00313	0.0883	0.985	5.97	9.99	0.0862	1.37	14.7	1.76	9.01
3.2	33.0 / 32.2	0.00333	0.0939	1.03	5.45	8.99	0.0918	1.45	14.0	1.87	8.16
3.4	31.2 / 30.5	0.00354	0.0994	1.08	5.00	8.09	0.0973	1.52	13.4	1.97	7.42
3.6	29.5 / 29.0	0.00375	0.105	1.12	4.64	7.32	0.103	1.59	12.6	2.07	6.80
3.8	28.1 / 27.7	0.00396	0.110	1.16	4.32	6.63	0.108	1.66	11.9	2.16	6.24
4.0	26.5 / 26.2	0.00416	0.116	1.19	4.02	6.06	0.114	1.73	11.0	2.25	5.74
5	21.3 / 21.3	0.00519	0.141	1.26	2.94	4.04	0.141	2.00	8.12	2.64	4.01
6	18.0 / 18.1	0.00620	0.164	1.21	2.24	2.91	0.166	2.15	6.27	2.90	2.96
7	15.6 / 15.7	0.00720	0.184	1.09	1.77	2.19	0.190	2.17	4.98	3.02	2.29
8	13.6 / 13.7	0.00818	0.201	0.917	1.44	1.71	0.213	2.08	4.06	2.99	1.83
9	12.0 / 12.1	0.00914	0.214	0.763	1.19	1.40	0.233	1.92	3.38	2.85	1.49
10	10.5 / 10.6	0.0101	0.223	0.662	1.00	1.15	0.252	1.68	2.85	2.61	1.24
12	8.04 / 8.14	0.0119	0.229	0.510	0.733	0.823	0.283	1.28	2.13	2.04	0.918
14	6.39 / 6.47	0.0136	0.219	0.406	0.554	0.616	0.303	1.03	1.64	1.61	0.698
16	5.24 / 5.30	0.0152	0.197	0.332	0.434	0.480	0.313	0.850	1.29	1.33	0.544
18	4.41 / 4.45	0.0167	0.171	0.276	0.350	0.393	0.313	0.718	1.04	1.13	0.430
20	3.75 / 3.78	0.0180	0.147	0.235	0.289	0.324	0.303	0.612	0.856	0.966	0.355

Y (Z=39) 1s(2) 2s(2) 3s(2) 4s(2) 2p(6) 3p(6) 4p(6) 3d(10) [4d(1) 5s(2) / free(3)]

0/Rs	---->	22.77	6.446	2.478	0.9202	0.2692	6.878	2.375	0.7913	2.198	0.4980	2.376
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	2p(6)	3p(6)	4p(6)	3d(10)	4d(1)	free(3)
0.2	17.8 / 5.93	0.000190	0.00557	0.0651	0.748	13.4	0.00535	0.0859	1.33	0.113	2.09	3.62
0.4	39.8 / 12.2	0.00383	0.0112	0.130	1.50	29.4	0.0107	0.171	2.67	0.225	5.71	7.46
0.6	62.1 / 18.7	0.00677	0.0167	0.195	2.26	46.0	0.0161	0.258	4.01	0.338	8.92	11.5
0.8	73.3 / 25.3	0.00770	0.0223	0.260	3.02	51.9	0.0215	0.343	5.35	0.451	11.9	15.8
1.0	71.7 / 32.2	0.00963	0.0278	0.325	3.78	46.2	0.0268	0.429	6.68	0.563	13.6	20.3
1.2	64.3 / 42.1	0.00116	0.0334	0.388	4.50	36.9	0.0322	0.513	7.98	0.675	13.3	28.0
1.4	58.6 / 43.5	0.00135	0.0389	0.451	5.17	30.3	0.0375	0.597	9.23	0.785	12.0	27.2
1.6	53.8 / 42.9	0.00154	0.0445	0.514	5.75	25.3	0.0429	0.680	10.4	0.895	10.2	24.6
1.8	50.3 / 41.9	0.00173	0.0499	0.575	6.19	21.5	0.0482	0.763	11.4	1.00	8.82	21.9
2.0	47.6 / 40.9	0.00192	0.0554	0.634	6.47	18.4	0.0535	0.844	12.3	1.11	7.67	19.4
2.2	45.3 / 39.8	0.00212	0.0608	0.693	6.56	16.0	0.0588	0.924	13.0	1.22	6.76	17.3
2.4	43.1 / 38.5	0.00231	0.0662	0.749	6.48	14.0	0.0641	1.00	13.4	1.32	5.98	15.4
2.6	41.0 / 37.2	0.00250	0.0715	0.804	6.27	12.4	0.0694	1.08	13.6	1.42	5.32	13.9
2.8	39.0 / 35.7	0.00269	0.0768	0.856	5.98	11.0	0.0746	1.16	13.6	1.52	4.77	12.5
3.0	37.1 / 34.3	0.00288	0.0821	0.905	5.64	9.91	0.0798	1.23	13.3	1.62	4.31	11.4
3.2	35.1 / 32.7	0.00307	0.0873	0.951	5.27	8.94	0.0850	1.30	12.9	1.72	3.91	10.4
3.4	33.4 / 31.2	0.00326	0.0924	0.994	5.06	8.08	0.0902	1.37	12.4	1.81	3.57	9.49
3.6	31.6 / 29.7	0.00345	0.0975	1.03	4.63	7.34	0.0953	1.44	11.8	1.91	3.27	8.71
3.8	30.0 / 28.3	0.00364	0.103	1.07	4.32	6.68	0.100	1.50	11.2	1.99	3.01	8.03
4.0	28.5 / 27.1	0.00383	0.108	1.10	4.03	6.08	0.106	1.56	10.6	2.08	2.78	7.43
5	22.4 / 21.7	0.00478	0.131	1.18	2.94	4.06	0.130	1.82	7.78	2.45	1.93	5.27
6	18.7 / 18.3	0.00571	0.153	1.16	2.24	2.93	0.154	1.97	6.01	2.71	1.40	3.95
7	16.1 / 15.9	0.00663	0.172	1.05	1.77	2.20	0.177	2.02	4.83	2.84	1.06	3.06
8	14.0 / 13.9	0.00754	0.188	0.901	1.44	1.73	0.198	1.96	3.93	2.84	0.831	2.46
9	12.3 / 12.2	0.00843	0.201	0.752	1.19	1.41	0.217	1.83	3.27	2.73	0.669	2.02
10	10.7 / 10.7	0.00931	0.211	0.642	1.01	1.14	0.235	1.64	2.77	2.53	0.555	1.70
12	8.28 / 8.33	0.0110	0.218	0.500	0.746	0.809	0.264	1.26	2.07	2.01	0.395	1.25
14	6.59 / 6.61	0.0126	0.210	0.400	0.566	0.626	0.285	0.995	1.61	1.58	0.301	0.943
16	5.40 / 5.44	0.0141	0.191	0.327	0.445	0.479	0.296	0.831	1.28	1.31	0.231	0.759
18	4.53 / 4.54	0.0155	0.168	0.272	0.354	0.402	0.298	0.703	1.02	1.11	0.187	0.599
20	3.85 / 3.88	0.0167	0.145	0.231	0.287	0.322	0.290	0.600	0.847	0.957	0.157	0.505

Zr (Z=40) 1s(2)2s(2)3s(2)4s(2)2p(6)3p(6)4p(6)3d(10)4d(2)5s(2)/free(d)

Q/Rs	---->	23.32	6.633	2.570	0.9719	0.2826	7.079	2.473	0.8435	2.326	0.5400	2.117
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	2p(6)	3p(6)	4p(6)	3d(10)	4d(2)	free(4)
0.2	16.6 / 5.77	0.000178	0.00517	0.0594	0.655	11.9	0.00495	0.0774	1.14	0.0976	2.65	3.72
0.4	35.5 / 11.7	0.000359	0.0104	0.119	1.32	26.0	0.00995	0.155	2.29	0.195	5.40	7.61
0.6	55.4 / 17.8	0.000541	0.0155	0.178	1.98	41.0	0.0149	0.232	3.43	0.292	8.27	11.7
0.8	67.4 / 23.9	0.000721	0.0207	0.237	2.64	48.1	0.0199	0.309	4.57	0.390	11.2	15.8
1.0	67.5 / 30.4	0.000902	0.0258	0.296	3.30	43.5	0.0248	0.386	5.71	0.487	13.8	20.2
1.2	63.3 / 37.7	0.00108	0.0310	0.354	3.94	35.5	0.0298	0.463	6.82	0.584	15.6	25.5
1.4	59.6 / 44.9	0.00126	0.0361	0.412	4.54	29.3	0.0348	0.539	7.90	0.679	16.2	30.8
1.6	56.1 / 45.1	0.00144	0.0413	0.469	5.07	24.5	0.0397	0.614	8.91	0.774	15.6	29.1
1.8	52.7 / 44.0	0.00162	0.0463	0.525	5.50	20.8	0.0447	0.688	9.84	0.869	14.4	26.5
2.0	49.7 / 42.6	0.00180	0.0514	0.579	5.80	17.9	0.0496	0.761	10.7	0.962	13.0	23.8
2.2	46.9 / 41.4	0.00198	0.0564	0.633	5.95	15.5	0.0545	0.834	11.3	1.05	11.4	21.4
2.4	44.5 / 39.9	0.00216	0.0614	0.685	5.96	13.6	0.0594	0.905	11.8	1.15	10.2	19.2
2.6	42.3 / 38.4	0.00234	0.0664	0.735	5.84	12.1	0.0643	0.975	12.1	1.23	9.19	17.4
2.8	40.2 / 36.8	0.00252	0.0713	0.783	5.63	10.8	0.0692	1.04	12.2	1.32	8.29	15.7
3.0	38.2 / 35.3	0.00270	0.0762	0.829	5.35	9.70	0.0740	1.11	12.1	1.41	7.52	14.3
3.2	36.3 / 33.8	0.00288	0.0811	0.872	5.08	8.76	0.0788	1.18	11.9	1.49	6.86	13.1
3.4	34.4 / 32.2	0.00306	0.0859	0.913	4.72	7.94	0.0856	1.24	11.5	1.58	6.31	12.0
3.6	32.7 / 30.8	0.00324	0.0906	0.950	4.51	7.24	0.0883	1.30	11.1	1.67	5.79	11.1
3.8	30.9 / 29.2	0.00342	0.0953	0.984	4.15	6.60	0.0931	1.36	10.6	1.73	5.33	10.2
4.0	29.4 / 27.9	0.00359	0.0999	1.02	3.89	6.01	0.0978	1.42	10.2	1.81	4.94	9.46
5	23.1 / 22.3	0.00448	0.122	1.11	2.85	4.02	0.121	1.66	7.58	2.15	3.51	6.73
6	19.2 / 18.7	0.00536	0.143	1.10	2.18	2.89	0.143	1.81	5.85	2.39	2.64	5.06
7	16.4 / 16.1	0.00622	0.161	1.01	1.73	2.19	0.164	1.88	4.70	2.54	2.03	3.95
8	14.3 / 14.2	0.00708	0.176	0.883	1.41	1.72	0.184	1.85	3.84	2.58	1.60	3.18
9	12.5 / 12.4	0.00791	0.189	0.741	1.17	1.38	0.202	1.75	3.21	2.53	1.30	2.62
10	11.0 / 11.0	0.00874	0.198	0.629	0.986	1.14	0.219	1.59	2.73	2.39	1.07	2.19
12	8.50 / 8.52	0.0103	0.207	0.491	0.731	0.821	0.247	1.24	2.04	1.95	0.771	1.61
14	6.72 / 6.77	0.0118	0.202	0.392	0.556	0.608	0.268	0.972	1.59	1.55	0.580	1.24
16	5.06 / 5.09	0.0132	0.186	0.321	0.437	0.479	0.280	0.813	1.26	1.27	0.452	0.965
18	4.25 / 4.30	0.0146	0.164	0.268	0.351	0.383	0.283	0.688	1.02	1.08	0.368	0.796
20	3.63 / 3.67	0.0158	0.143	0.227	0.289	0.320	0.278	0.588	0.842	0.925	0.299	0.663

N b (Z=41) 1s(2)2s(2)3s(2)4s(2)5s(2)2p(6)3p(6)4p(6)3d(10) f 4d(3)/free(3)]

q/Rs	---->	23.96	6.813	2.661	1.022	0.2934	7.318	2.572	0.8935	2.440	0.5890	2.126
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	2p(6)	3p(6)	4p(6)	3d(10)	4d(3)	free(3)
0.2	15.7 / 16.2	1.65(-4)	0.00482	0.0544	0.580	10.9	0.00454	0.700	0.990	0.0863	2.36	2.82
0.4	32.0 / 33.0	3.34(-4)	0.00965	0.109	1.17	23.7	0.00911	0.140	1.99	0.172	4.76	5.76
0.6	50.0 / 51.6	5.02(-4)	0.0145	0.163	1.75	37.4	0.0137	0.210	2.98	0.258	7.22	8.82
0.8	61.9 / 64.2	6.70(-4)	0.0193	0.217	2.34	45.0	0.0182	0.280	3.97	0.345	9.71	12.0
1.0	63.1 / 66.3	8.38(-4)	0.0241	0.271	2.92	42.0	0.0228	0.350	4.95	0.431	12.1	15.3
1.2	59.3 / 64.5	0.00101	0.0289	0.325	3.49	34.3	0.0273	0.419	5.92	0.516	14.3	19.5
1.4	56.8 / 64.3	0.00117	0.0337	0.377	4.02	28.5	0.0318	0.487	6.86	0.601	15.8	23.3
1.6	54.6 / 59.9	0.00134	0.0385	0.429	4.51	23.9	0.0364	0.555	7.75	0.685	16.6	21.9
1.8	52.4 / 55.7	0.00151	0.0432	0.481	4.91	20.4	0.0409	0.623	8.58	0.769	16.6	19.9
2.0	50.1 / 51.8	0.00168	0.0479	0.531	5.22	17.5	0.0454	0.689	9.33	0.851	15.9	17.9
2.2	47.8 / 49.1	0.00184	0.0526	0.580	5.41	15.2	0.0499	0.755	9.96	0.933	14.8	16.1
2.4	45.5 / 46.4	0.00201	0.0573	0.628	5.48	13.4	0.0544	0.820	10.5	1.01	13.6	14.5
2.6	43.0 / 44.0	0.00218	0.0619	0.675	5.43	11.9	0.0589	0.883	10.8	1.09	12.1	13.1
2.8	40.9 / 41.6	0.00234	0.0665	0.719	5.29	10.6	0.0633	0.946	11.0	1.17	11.1	11.8
3.0	38.9 / 39.6	0.00251	0.0711	0.762	5.08	9.53	0.0678	1.01	11.0	1.25	10.1	10.8
3.2	37.0 / 37.6	0.00267	0.0756	0.803	4.83	8.64	0.0722	1.07	10.9	1.32	9.28	9.84
3.4	35.2 / 35.7	0.00284	0.0801	0.841	4.56	7.85	0.0766	1.12	10.7	1.40	8.54	9.02
3.6	33.5 / 33.9	0.00301	0.0846	0.876	4.36	7.13	0.0809	1.18	10.4	1.47	7.87	8.30
3.8	31.7 / 32.1	0.00317	0.0889	0.909	4.05	6.52	0.0853	1.24	10.0	1.54	7.27	7.67
4.0	30.1 / 30.4	0.00334	0.0933	0.939	3.74	5.97	0.0896	1.29	9.59	1.61	6.79	7.11
5	28.9 / 24.1	0.00416	0.114	1.03	2.77	3.99	0.111	1.51	7.57	1.92	4.86	5.06
6	19.7 / 19.8	0.00498	0.133	1.04	2.13	2.86	0.131	1.67	5.88	2.15	3.67	3.80
7	16.8 / 16.9	0.00579	0.151	0.974	1.68	2.17	0.151	1.75	4.72	2.31	2.87	2.97
8	14.6 / 14.7	0.00658	0.165	0.863	1.37	1.70	0.169	1.74	3.85	2.37	2.33	2.39
9	12.8 / 12.9	0.00736	0.178	0.730	1.14	1.38	0.186	1.67	3.21	2.35	1.90	1.96
10	11.2 / 11.3	0.00813	0.187	0.618	0.964	1.12	0.202	1.54	2.73	2.25	1.57	1.64
12	8.72 / 8.80	0.00961	0.197	0.481	0.718	0.811	0.229	1.21	2.04	1.89	1.13	1.21
14	6.91 / 6.99	0.0110	0.194	0.386	0.550	0.609	0.249	0.95	1.59	1.52	0.850	0.928
16	5.65 / 5.72	0.0124	0.180	0.316	0.430	0.480	0.261	0.795	1.28	1.23	0.668	0.739
18	4.73 / 4.79	0.0136	0.161	0.263	0.347	0.382	0.266	0.674	1.03	1.05	0.536	0.597
20	4.01 / 4.07	0.0147	0.141	0.223	0.286	0.313	0.263	0.576	0.853	0.902	0.441	0.497

M.o (2=42) 1s(2) 2s(2) 3s(2) 4s(2) 2p(6) 3p(6) 4p(6) 3d(10) 4d(4) [5s(2)/free(2)]

q/Rs	---->	24.50	6.997	2.752	1.070	0.3032	7.477	2.670	0.9416	2.552	0.6356	2.320
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	2p(6)	3p(6)	4p(6)	3d(10)	4d(4)	free(2)
0.2	13.8 / 5.99	0.000155	0.00449	0.0298	0.519	10.1	0.00428	0.0636	0.870	0.0768	2.09	2.29
0.4	29.2 / 12.0	0.000314	0.00900	0.0998	1.04	21.8	0.00860	0.127	1.75	0.154	4.20	4.70
0.6	45.6 / 18.3	0.000473	0.0135	0.150	1.57	34.5	0.0129	0.191	2.62	0.230	6.34	7.24
0.8	57.3 / 24.8	0.000631	0.0180	0.200	2.09	42.4	0.0172	0.254	3.49	0.307	8.49	9.90
1.0	59.1 / 31.2	0.000789	0.0224	0.249	2.61	40.6	0.0215	0.318	4.35	0.384	10.6	12.7
1.2	55.7 / 39.8	0.000947	0.0269	0.298	3.12	33.6	0.0258	0.380	5.20	0.460	12.6	17.7
1.4	53.3 / 42.9	0.00111	0.0314	0.347	3.60	28.0	0.0300	0.443	6.03	0.535	14.4	17.6
1.6	51.4 / 43.9	0.00126	0.0359	0.395	4.04	23.5	0.0343	0.505	6.82	0.611	15.5	16.0
1.8	50.3 / 44.5	0.00142	0.0403	0.442	4.43	20.1	0.0386	0.566	7.57	0.685	16.5	14.3
2.0	48.8 / 44.2	0.00158	0.0447	0.488	4.73	17.3	0.0429	0.627	8.25	0.759	16.6	12.7
2.2	47.2 / 43.4	0.00173	0.0491	0.534	4.95	15.1	0.0472	0.687	8.85	0.832	16.2	11.3
2.4	45.4 / 42.4	0.00189	0.0535	0.578	5.05	13.2	0.0514	0.746	9.34	0.904	15.5	10.2
2.6	43.6 / 41.0	0.00205	0.0578	0.621	5.06	11.7	0.0556	0.804	9.72	0.975	14.6	9.13
2.8	42.4 / 40.2	0.00220	0.0621	0.662	4.97	10.5	0.0598	0.861	9.97	1.05	13.7	8.25
3.0	39.7 / 37.7	0.00236	0.0664	0.702	4.82	9.47	0.0640	0.917	10.1	1.11	12.4	7.49
3.2	37.6 / 35.9	0.00252	0.0706	0.740	4.62	8.53	0.0682	0.971	10.1	1.18	11.4	6.83
3.4	35.8 / 34.3	0.00267	0.0748	0.776	4.40	7.77	0.0724	1.03	9.96	1.25	10.5	6.25
3.6	34.0 / 32.7	0.00283	0.0789	0.810	4.14	7.07	0.0765	1.08	9.74	1.31	9.72	5.75
3.8	32.5 / 31.3	0.00299	0.0830	0.841	3.95	6.49	0.0806	1.13	9.46	1.38	9.04	5.31
4.0	30.8 / 29.8	0.00314	0.0871	0.870	3.66	5.95	0.0847	1.18	9.13	1.44	8.40	4.91
5	24.5 / 24.0	0.00392	0.107	0.967	2.70	4.00	0.105	1.39	7.36	1.72	6.10	3.48
6	20.0 / 19.8	0.00469	0.125	0.985	2.07	2.86	0.124	1.54	5.70	1.94	4.63	2.61
7	17.0 / 16.9	0.00545	0.141	0.935	1.65	2.17	0.143	1.63	4.58	2.10	3.65	2.03
8	14.7 / 14.6	0.00620	0.155	0.842	1.34	1.70	0.160	1.64	3.75	2.18	2.96	1.63
9	12.9 / 12.9	0.00694	0.167	0.718	1.12	1.38	0.176	1.59	3.13	2.18	2.45	1.34
10	11.4 / 11.4	0.00756	0.176	0.610	0.948	1.13	0.191	1.48	2.66	2.12	2.06	1.13
12	8.89 / 8.92	0.00906	0.187	0.472	0.705	0.800	0.217	1.19	1.99	1.83	1.49	0.825
14	7.08 / 7.09	0.0104	0.186	0.379	0.546	0.619	0.237	1.56	1.56	1.49	1.12	0.626
16	5.77 / 5.79	0.0117	0.175	0.310	0.429	0.482	0.250	0.779	1.25	1.21	0.877	0.503
18	4.83 / 4.85	0.0128	0.157	0.259	0.345	0.381	0.256	0.660	1.02	1.03	0.707	0.399
20	4.10 / 4.12	0.0139	0.138	0.220	0.285	0.316	0.254	0.565	0.842	0.881	0.582	0.335

T.c. (Z=43) 1s(2)2s(2)3s(2)4s(2)5s(2)2p(6)3p(6)4p(6)3d(10)4d(5)

0/Rs	--->	25.76	7.178	2.843	1.117	0.3114	7.676	2.766	0.9833	2.667	0.6797
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	2p(6)	3p(6)	4p(6)	3d(10)	4d(5)
0.2	12.8	1.35(-4)	0.00420	0.0460	0.468	9.53	0.00399	0.0581	0.782	0.0686	1.86
0.4	27.0	2.74(-4)	0.00841	0.0919	0.939	20.4	0.00802	0.116	1.57	0.137	3.73
0.6	42.2	4.12(-4)	0.0126	0.138	1.41	32.3	0.0120	0.174	2.36	0.205	5.62
0.8	53.5	5.51(-4)	0.0168	0.184	1.88	40.3	0.0161	0.232	3.14	0.274	7.51
1.0	55.8	6.89(-4)	0.0210	0.229	2.35	39.3	0.0201	0.290	3.91	0.343	9.38
1.2	53.5	8.27(-4)	0.0252	0.275	2.80	33.7	0.0240	0.348	4.68	0.411	11.2
1.4	50.8	9.64(-4)	0.0294	0.319	3.24	28.0	0.0280	0.405	5.42	0.478	12.9
1.6	49.1	0.00110	0.0335	0.364	3.65	23.6	0.0320	0.461	6.14	0.545	14.3
1.8	47.9	0.00124	0.0377	0.407	4.01	20.1	0.0360	0.517	6.82	0.612	15.4
2.0	46.9	0.00138	0.0418	0.450	4.31	17.3	0.0400	0.573	7.45	0.678	16.1
2.2	45.9	0.00151	0.0459	0.492	4.53	15.1	0.0440	0.628	8.01	0.743	16.3
2.4	44.7	0.00165	0.0500	0.533	4.66	13.3	0.0479	0.682	8.49	0.808	16.1
2.6	43.3	0.00179	0.0541	0.573	4.71	11.8	0.0519	0.735	8.87	0.872	15.6
2.8	41.7	0.00193	0.0581	0.612	4.67	10.5	0.0588	0.788	9.15	0.935	14.9
3.0	40.0	0.00206	0.0621	0.649	4.56	9.47	0.0597	0.839	9.32	0.997	14.1
3.2	38.3	0.00220	0.0660	0.684	4.41	8.58	0.0636	0.889	9.37	1.06	13.2
3.4	36.9	0.00234	0.0700	0.718	4.22	7.80	0.0675	0.939	9.32	1.12	12.6
3.6	34.9	0.00247	0.0739	0.750	4.00	7.12	0.0714	0.987	9.19	1.18	11.6
3.8	33.2	0.00261	0.0777	0.780	3.83	6.46	0.0752	1.03	8.97	1.23	10.8
4.0	31.6	0.00275	0.0815	0.807	3.59	5.94	0.0790	1.08	8.71	1.29	10.1
5	25.1	0.00342	0.100	0.906	2.63	4.03	0.0978	1.28	7.18	1.55	7.34
6	20.4	0.00410	0.117	0.933	2.03	2.88	0.116	1.43	5.54	1.76	5.62
7	17.3	0.00476	0.133	0.897	1.62	2.19	0.133	1.52	4.46	1.91	4.42
8	14.9	0.00542	0.146	0.818	1.32	1.69	0.150	1.54	3.65	2.00	3.58
9	13.1	0.00607	0.158	0.708	1.10	1.36	0.165	1.51	3.07	2.03	2.97
10	11.6	0.00670	0.167	0.602	0.930	1.15	0.179	1.43	2.61	1.99	2.51
12	9.13	0.00794	0.178	0.464	0.696	0.823	0.204	1.17	1.96	1.76	1.86
14	7.25	0.00912	0.178	0.372	0.538	0.604	0.224	0.927	1.53	1.45	1.41
16	5.91	0.0103	0.169	0.304	0.425	0.472	0.237	0.761	1.23	1.19	1.11
18	5.41	0.0113	0.154	0.255	0.843	0.381	0.243	0.647	1.01	0.989	0.880
20	4.17	0.0123	0.136	0.217	0.282	0.312	0.243	0.555	0.838	0.861	0.718

Ru (Z=44) 1s(2)2s(2)3s(2)4s(2)2p(6)3p(6)4p(6)3d(10) [5s(1)4d(7)/4d(5)free(3)]

l/Rs	---->	25.86	7.379	2.906	1.161	0.3027	7.887	2.858	1.020	2.778	0.6662	1.956	0.6662
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(1)	2p(6)	3p(6)	4p(6)	3d(10)	4d(7)	free(3)	4d(5)
0.2	12.1 / 5.61	0.000134	0.00390	0.0435	0.426	8.70	0.00371	0.0534	0.714	0.0617	2.08	2.34	1.95
0.4	26.4 / 11.3	0.00271	0.00783	0.0869	0.855	19.6	0.00746	0.107	1.44	0.123	4.18	4.75	3.92
0.6	40.1 / 17.1	0.00408	0.0117	0.131	1.28	29.9	0.0112	0.160	2.15	0.185	6.29	7.24	5.90
0.8	43.9 / 22.9	0.000545	0.0156	0.174	1.71	30.3	0.0149	0.214	2.87	0.247	8.39	9.81	7.89
1.0	45.0 / 32.4	0.000582	0.0195	0.217	2.14	24.4	0.0187	0.267	3.57	0.308	10.5	12.4	9.86
1.2	39.9 / 34.9	0.000818	0.0234	0.260	2.55	19.5	0.0224	0.320	4.27	0.369	12.5	15.2	11.8
1.4	39.4 / 41.4	0.000954	0.0273	0.302	2.95	16.0	0.0261	0.372	4.95	0.430	14.4	18.9	13.5
1.6	39.7 / 43.7	0.00109	0.0312	0.344	3.33	13.2	0.0298	0.424	5.61	0.491	16.2	18.4	15.0
1.8	40.2 / 44.6	0.00123	0.0351	0.385	3.67	11.2	0.0335	0.476	6.24	0.551	17.6	17.1	16.1
2.0	40.7 / 44.7	0.00136	0.0389	0.426	3.95	9.56	0.0372	0.527	6.83	0.610	18.7	15.6	16.7
2.2	40.9 / 44.4	0.00150	0.0427	0.466	4.18	8.28	0.0409	0.577	7.36	0.669	19.3	14.2	16.9
2.4	40.9 / 43.8	0.00163	0.0465	0.505	4.33	7.24	0.0446	0.627	7.82	0.728	19.5	13.0	16.6
2.6	40.4 / 42.6	0.00177	0.0503	0.543	4.40	6.41	0.0483	0.676	8.20	0.785	19.3	11.9	16.0
2.8	39.6 / 41.1	0.00191	0.0541	0.579	4.40	5.70	0.0519	0.725	8.49	0.842	18.8	10.9	15.1
3.0	38.5 / 39.9	0.00204	0.0578	0.615	4.33	5.10	0.0556	0.772	8.69	0.898	18.0	9.97	14.5
3.2	37.2 / 38.2	0.00218	0.0615	0.649	4.21	4.57	0.0592	0.819	8.78	0.954	17.1	9.18	13.5
3.4	35.7 / 36.3	0.00231	0.0652	0.681	4.05	4.10	0.0628	0.865	8.79	1.01	16.1	8.48	12.3
3.6	34.5 / 34.6	0.00245	0.0688	0.712	3.88	3.70	0.0664	0.909	8.71	1.06	15.4	7.84	11.4
3.8	32.8 / 33.1	0.00258	0.0724	0.741	3.68	3.36	0.0700	0.952	8.55	1.11	14.2	7.28	10.6
4.0	31.3 / 31.7	0.00272	0.0760	0.767	3.55	3.05	0.0736	0.994	8.34	1.17	13.2	6.77	9.92
5	24.9 / 25.2	0.00339	0.0932	0.865	2.57	2.04	0.0912	1.18	6.92	1.40	9.77	4.88	7.25
6	20.4 / 20.7	0.00406	0.109	0.898	2.00	1.47	0.108	1.33	5.39	1.60	7.50	3.68	5.54
7	17.3 / 17.5	0.00471	0.124	0.870	1.59	1.11	0.124	1.42	4.35	1.75	5.94	2.89	4.37
8	15.0 / 15.2	0.00536	0.137	0.801	1.30	0.862	0.140	1.45	3.59	1.84	4.82	2.32	3.55
9	13.3 / 13.5	0.00600	0.148	0.698	1.08	0.697	0.154	1.44	3.00	1.88	4.01	1.91	2.95
10	11.6 / 11.7	0.00664	0.157	0.597	0.919	0.571	0.168	1.37	2.56	1.87	3.40	1.61	2.49
12	9.20 / 9.30	0.00786	0.168	0.456	0.685	0.408	0.191	1.14	1.92	1.70	2.52	1.18	1.85
14	7.37 / 7.49	0.00903	0.170	0.366	0.534	0.307	0.210	0.915	1.51	1.42	1.93	0.918	1.44
16	6.01 / 6.11	0.0102	0.163	0.301	0.422	0.243	0.223	0.744	1.22	1.17	1.52	0.713	1.15
18	5.00 / 5.12	0.0112	0.150	0.254	0.342	0.194	0.230	0.633	1.00	0.969	1.22	0.590	0.942
20	4.25 / 4.37	0.0122	0.134	0.215	0.281	0.159	0.232	0.545	0.832	0.840	1.00	0.492	0.788

R.h (Z=45) 1s(2)2s(2)3s(2)4s(2)2p(6)3p(6)4p(6)3d(10) [5s(1)4d(8)/4d(6)free(3)]

Q/Rs	---->	26.37	7.555	3.000	1.202	0.3040	8.089	2.953	1.065	2.884	0.7091	1.903	0.7091
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(1)	2p(6)	3p(6)	4p(6)	3d(10)	4d(8)	free(3)	4d(6)
0.2	11.6 / 5.07	0.000127	0.00367	0.0401	0.391	8.62	0.00347	0.0491	0.642	0.0560	1.84	2.19	1.74
0.4	26.3 / 11.2	0.000257	0.00735	0.0801	0.785	19.4	0.00697	0.0981	1.29	0.112	3.69	4.46	3.49
0.6	38.7 / 15.6	0.000387	0.0110	0.120	1.18	29.6	0.0105	0.147	1.93	0.168	5.53	6.79	5.24
0.8	42.3 / 21.0	0.000516	0.0147	0.160	1.57	30.1	0.0140	0.196	2.58	0.224	7.38	9.17	7.00
1.0	39.2 / 26.0	0.000646	0.0183	0.200	1.96	24.3	0.0174	0.245	3.21	0.280	9.21	11.6	8.74
1.2	37.6 / 32.0	0.000775	0.0220	0.240	2.34	19.5	0.0209	0.294	3.84	0.335	11.0	14.2	10.4
1.4	36.8 / 38.1	0.000905	0.0257	0.279	2.71	15.9	0.0244	0.342	4.45	0.391	12.7	17.9	12.0
1.6	36.8 / 40.6	0.00103	0.0293	0.317	3.06	13.2	0.0278	0.390	5.05	0.446	14.3	17.8	13.5
1.8	37.3 / 41.6	0.00116	0.0330	0.356	3.38	11.2	0.0313	0.437	5.62	0.500	15.8	16.6	14.7
2.0	37.8 / 42.2	0.00129	0.0366	0.393	3.65	9.53	0.0348	0.485	6.16	0.554	17.0	15.3	15.6
2.2	38.3 / 42.4	0.00142	0.0402	0.430	3.87	8.26	0.0383	0.531	6.65	0.608	17.8	14.0	16.2
2.4	38.5 / 42.1	0.00155	0.0438	0.466	4.03	7.24	0.0417	0.577	7.08	0.661	18.4	12.8	16.4
2.6	38.5 / 41.5	0.00168	0.0473	0.501	4.13	6.39	0.0451	0.622	7.46	0.714	18.6	11.7	16.3
2.8	38.1 / 40.5	0.00181	0.0508	0.535	4.15	5.69	0.0486	0.667	7.76	0.765	18.5	10.7	15.9
3.0	37.5 / 39.3	0.00193	0.0543	0.569	4.11	5.10	0.0520	0.711	7.98	0.817	18.1	9.83	15.2
3.2	36.5 / 38.0	0.00206	0.0578	0.600	4.02	4.56	0.0554	0.754	8.11	0.867	17.5	9.05	14.5
3.4	35.4 / 36.9	0.00219	0.0613	0.631	3.90	4.10	0.0588	0.797	8.16	0.917	16.7	8.36	13.9
3.6	34.1 / 35.1	0.00232	0.0647	0.660	3.75	3.69	0.0621	0.838	8.14	0.966	15.9	7.74	12.8
3.8	32.9 / 33.3	0.00245	0.0681	0.687	3.57	3.36	0.0655	0.878	8.05	1.01	15.2	7.19	11.8
4.0	31.5 / 31.7	0.00258	0.0715	0.713	3.43	3.05	0.0688	0.917	7.89	1.06	14.3	6.69	10.9
5	25.0 / 25.5	0.00321	0.0877	0.809	2.52	2.04	0.0852	1.09	6.63	1.28	10.4	4.83	8.11
6	20.5 / 20.8	0.00384	0.103	0.848	1.97	1.47	0.101	1.23	5.23	1.46	8.08	3.65	6.24
7	17.4 / 17.7	0.00447	0.117	0.832	1.58	1.11	0.116	1.33	4.26	1.61	6.43	2.87	4.96
8	15.0 / 15.2	0.00509	0.129	0.774	1.29	0.864	0.131	1.37	3.50	1.71	5.25	2.30	4.04
9	13.2 / 13.4	0.00570	0.140	0.684	1.07	0.697	0.145	1.36	2.95	1.76	4.37	1.90	3.36
10	11.3 / 11.8	0.00629	0.149	0.588	0.908	0.572	0.158	1.32	2.51	1.76	3.38	1.61	2.84
12	9.30 / 9.41	0.00746	0.160	0.446	0.679	0.409	0.180	1.12	1.89	1.63	2.78	1.18	2.12
14	6.58 / 6.68	0.00858	0.163	0.360	0.531	0.307	0.198	0.901	1.48	1.39	2.15	0.910	1.65
16	5.96 / 6.05	0.00964	0.158	0.288	0.423	0.244	0.211	0.731	1.20	1.15	1.70	0.718	1.32
18	5.02 / 5.13	0.0106	0.146	0.250	0.343	0.194	0.219	0.620	0.907	0.956	1.37	0.586	1.09
20	4.33 / 4.44	0.0116	0.131	0.213	0.282	0.159	0.222	0.538	0.823	0.820	1.13	0.491	0.911

$$P_d(Z=46) \quad 1s(2)2s(2)3s(2)4s(2)2p(6)3p(6)4p(6)3d(10)4d(8) \quad [5s(1)4d(9)/4d(8)free(2)]$$

Q/Rs	---->	27.01	7.741	3.095	1.243	0.3037	8.291	3.048	1.110	2.981	0.7509	2.281	0.7509
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(1)	2p(6)	3p(6)	4p(6)	3d(10)	4d(9)	free(2)	4d(8)
0.2	11.4 / 4.93	0.000119	0.00344	0.0371	0.360	8.64	0.00325	0.0452	0.579	0.0514	1.632	2.20	1.60
0.4	24.8 / 9.85	0.000241	0.00690	0.0740	0.723	19.4	0.00554	0.0904	1.16	0.103	3.28	4.52	3.21
0.6	37.9 / 15.0	0.000362	0.0104	0.111	1.09	29.7	0.00980	0.136	1.75	0.154	4.92	6.95	4.81
0.8	41.2 / 20.3	0.000484	0.0138	0.148	1.45	30.3	0.0131	0.181	2.33	0.205	6.55	9.49	6.41
1.0	38.4 / 25.6	0.000505	0.0172	0.185	1.81	24.8	0.0163	0.226	2.90	0.257	8.17	12.2	8.00
1.2	36.0 / 32.0	0.000726	0.0207	0.221	2.16	19.8	0.0196	0.271	3.47	0.308	9.77	16.0	9.56
1.4	34.9 / 34.2	0.000848	0.0241	0.258	2.50	16.1	0.0228	0.315	4.02	0.359	11.3	15.6	11.1
1.6	34.6 / 35.2	0.000969	0.0275	0.293	2.82	13.4	0.0261	0.360	4.56	0.409	12.8	14.3	12.5
1.8	34.9 / 36.2	0.00109	0.0309	0.329	3.12	11.3	0.0293	0.403	5.08	0.459	14.1	12.9	13.8
2.0	35.3 / 36.9	0.00121	0.0343	0.364	3.38	9.65	0.0326	0.447	5.57	0.509	15.3	11.6	14.9
2.2	35.8 / 37.5	0.00133	0.0377	0.400	3.60	8.35	0.0358	0.490	6.03	0.558	16.3	10.5	15.8
2.4	36.2 / 37.8	0.00145	0.0411	0.431	3.77	7.31	0.0391	0.533	6.44	0.607	17.0	9.48	16.4
2.6	36.4 / 37.9	0.00157	0.0444	0.464	3.87	6.45	0.0423	0.575	6.80	0.656	17.5	8.61	16.8
2.8	36.4 / 37.6	0.00169	0.0477	0.496	3.92	5.75	0.0455	0.616	7.10	0.704	17.7	7.84	16.8
3.0	36.1 / 37.2	0.00181	0.0510	0.527	3.90	5.17	0.0487	0.657	7.33	0.751	17.6	7.17	16.7
3.2	35.5 / 36.3	0.00193	0.0543	0.557	3.84	4.66	0.0519	0.697	7.49	0.798	17.4	6.58	16.3
3.4	34.7 / 35.3	0.00205	0.0576	0.585	3.74	4.23	0.0551	0.736	7.58	0.844	16.9	6.06	15.7
3.6	33.7 / 34.3	0.00217	0.0608	0.613	3.61	3.85	0.0582	0.775	7.60	0.889	16.3	5.59	15.2
3.8	32.9 / 33.3	0.00229	0.0640	0.639	3.50	3.53	0.0614	0.812	7.56	0.933	15.8	5.18	14.5
4.0	31.5 / 31.8	0.00241	0.0672	0.663	3.30	3.25	0.0645	0.849	7.46	0.977	14.9	4.81	13.6
5	26.2 / 25.5	0.00301	0.0825	0.758	2.62	2.25	0.0799	1.02	6.35	1.18	11.9	3.44	10.0
6	21.6 / 21.2	0.00360	0.0969	0.802	2.05	1.65	0.0949	1.15	5.27	1.36	9.13	2.59	7.75
7	18.2 / 17.9	0.00419	0.110	0.796	1.62	1.25	0.109	1.24	4.25	1.50	7.33	2.02	6.22
8	15.6 / 15.4	0.00477	0.122	0.753	1.33	0.972	0.123	1.29	3.51	1.60	5.91	1.62	5.10
9	13.7 / 13.6	0.00534	0.133	0.686	1.11	0.794	0.136	1.30	2.94	1.65	4.93	1.34	4.24
10	12.1 / 12.0	0.00591	0.141	0.594	0.925	0.653	0.149	1.27	2.51	1.67	4.19	1.12	3.62
12	9.65 / 9.62	0.00701	0.153	0.448	0.704	0.459	0.170	1.12	1.90	1.59	3.10	0.821	2.71
14	7.82 / 7.76	0.00807	0.158	0.361	0.539	0.344	0.188	0.910	1.48	1.39	2.44	0.625	2.10
16	6.43 / 6.39	0.00907	0.155	0.299	0.436	0.268	0.202	0.739	1.19	1.16	1.97	0.501	1.70
18	5.35 / 5.34	0.0100	0.145	0.250	0.363	0.215	0.210	0.621	0.986	0.965	1.58	0.398	1.39
20	4.61 / 4.56	0.0109	0.132	0.213	0.302	0.184	0.214	0.538	0.831	0.819	1.37	0.335	1.17

A.g. (Z=47) 1s(2)2s(2)3s(2)4s(2)2p(6)3p(6)4p(6)3d(10)4d(10) [5s(1)/free(1)]

Q/Rs	---->	28.25	7.886	3.180	1.278	0.3045	8.456	3.126	1.138	3.634	0.7370	3.020
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(1)	2p(6)	3p(6)	4p(6)	3d(10)	4d(10)	Free(1)
0.2	11.3 / 4.79	0.000105	0.00328	0.0346	0.337	8.57	0.00308	0.0424	0.545	0.0491	1.74	2.06
0.4	24.8 / 9.87	0.000213	0.00657	0.0690	0.676	19.3	0.00620	0.0847	1.10	0.0982	3.50	4.34
0.6	37.8 / 15.2	0.000321	0.00985	0.104	1.01	29.5	0.00930	0.127	1.64	0.147	5.25	6.84
0.8	41.1 / 20.6	0.000428	0.0131	0.138	1.35	30.1	0.0124	0.169	2.19	0.196	6.99	9.58
1.0	38.0 / 26.3	0.000535	0.0164	0.173	1.69	24.2	0.0155	0.212	2.73	0.245	8.72	12.5
1.2	36.0 / 27.8	0.000643	0.0197	0.207	2.01	19.5	0.0186	0.254	3.26	0.294	10.4	11.3
1.4	35.0 / 29.1	0.000750	0.0229	0.240	2.33	15.9	0.0217	0.295	3.78	0.343	12.1	9.96
1.6	34.8 / 30.3	0.000857	0.0262	0.274	2.64	13.2	0.0247	0.337	4.29	0.391	13.6	8.73
1.8	35.1 / 31.7	0.000964	0.0295	0.307	2.92	11.1	0.0278	0.378	4.78	0.439	15.1	7.69
2.0	35.6 / 32.9	0.00107	0.0327	0.339	3.17	9.53	0.0309	0.419	5.25	0.486	16.4	6.82
2.2	36.2 / 34.2	0.00118	0.0359	0.371	3.38	8.26	0.0340	0.459	5.68	0.533	17.5	6.08
2.4	36.7 / 34.9	0.00129	0.0391	0.403	3.55	7.23	0.0371	0.499	6.08	0.580	18.3	5.46
2.6	37.0 / 35.5	0.00139	0.0423	0.433	3.67	6.39	0.0401	0.538	6.42	0.626	18.8	4.92
2.8	37.0 / 35.7	0.00150	0.0455	0.463	3.73	5.69	0.0432	0.577	6.73	0.672	19.1	4.46
3.0	36.8 / 35.8	0.00160	0.0486	0.492	3.73	5.09	0.0462	0.616	6.96	0.717	19.1	4.06
3.2	36.3 / 35.5	0.00171	0.0517	0.521	3.69	4.56	0.0492	0.653	7.13	0.762	18.8	3.71
3.4	35.5 / 34.8	0.00182	0.0548	0.548	3.61	4.10	0.0522	0.690	7.24	0.806	18.4	3.39
3.6	34.5 / 34.0	0.00192	0.0579	0.573	3.50	3.69	0.0552	0.726	7.28	0.849	17.8	3.12
3.8	33.5 / 33.0	0.00203	0.0609	0.598	3.37	3.36	0.0582	0.762	7.26	0.892	17.1	2.89
4.0	32.3 / 31.9	0.00214	0.0640	0.621	3.22	3.05	0.0612	0.796	7.19	0.934	16.3	2.68
5	26.6 / 26.5	0.00267	0.0786	0.714	2.53	2.04	0.0758	0.954	6.30	1.129	12.8	1.89
6	21.8 / 21.7	0.00319	0.0923	0.761	1.97	1.47	0.0900	1.08	5.08	1.298	9.94	1.41
7	18.3 / 18.3	0.00371	0.105	0.761	1.58	1.11	0.104	1.18	4.08	1.434	7.95	1.09
8	15.7 / 15.7	0.00423	0.116	0.723	1.29	0.864	0.117	1.23	3.38	1.533	6.48	0.873
9	13.8 / 13.8	0.00473	0.126	0.656	1.08	0.696	0.129	1.24	2.84	1.591	5.39	0.717
10	12.2 / 12.2	0.00523	0.135	0.571	0.910	0.572	0.141	1.21	2.42	1.608	4.59	0.600
12	9.72 / 9.75	0.00621	0.147	0.431	0.683	0.410	0.162	1.07	1.84	1.530	3.44	0.435
14	7.85 / 7.88	0.00715	0.151	0.350	0.533	0.307	0.179	0.876	1.44	1.335	2.67	0.338
16	6.44 / 6.46	0.00805	0.148	0.289	0.424	0.244	0.192	0.716	1.17	1.119	2.14	0.265
18	5.37 / 5.39	0.00891	0.139	0.243	0.347	0.194	0.200	0.602	0.960	0.937	1.74	0.213
20	4.52 / 4.54	0.00971	0.127	0.207	0.286	0.160	0.204	0.492	0.808	0.797	1.43	0.184

C d (Z=48) 1s(2)2s(2)3s(2)4s(2)2p(6)3p(6)4p(6)3d(10)4d(10) [5s(2)/free(2)]

0/Rs	---->	28.11	8.103	3.298	1.344	0.3492	8.694	3.241	1.213	3.209	0.8742	2.592
v	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	2p(6)	3p(6)	4p(6)	3d(10)	4d(10)	free(2)
0.2	9.33 / 4.96	0.000106	0.00305	0.0315	0.298	7.31	0.00286	0.0386	0.466	0.0424	1.14	2.94
0.4	19.5 / 10.2	0.000216	0.00912	0.0629	0.598	15.4	0.00575	0.0772	0.934	0.0849	2.30	6.08
0.6	32.0 / 17.1	0.000325	0.00917	0.0946	0.896	24.3	0.00864	0.116	1.40	0.170	4.59	9.44
0.8	39.8 / 21.1	0.000434	0.0122	0.126	1.19	31.7	0.0115	0.154	1.87	0.170	4.59	13.0
1.0	43.7 / 27.4	0.000543	0.0153	0.157	1.49	33.6	0.0144	0.193	2.33	0.212	5.72	17.3
1.2	42.7 / 31.5	0.000651	0.0183	0.188	1.78	30.6	0.0173	0.231	2.78	0.254	6.84	19.4
1.4	39.6 / 31.7	0.000760	0.0214	0.219	2.06	25.6	0.0201	0.269	3.23	0.296	7.94	17.7
1.6	37.7 / 31.7	0.000868	0.0244	0.250	2.34	21.8	0.0230	0.307	3.66	0.338	8.99	15.8
1.8	36.4 / 31.8	0.000977	0.0274	0.280	2.59	18.7	0.0258	0.344	4.09	0.379	10.0	14.1
2.0	35.6 / 32.0	0.00109	0.0304	0.310	2.82	16.2	0.0287	0.382	4.49	0.421	11.0	12.6
2.2	35.1 / 32.3	0.00119	0.0334	0.339	3.02	14.1	0.0316	0.419	4.87	0.462	11.8	11.3
2.4	34.9 / 32.5	0.00130	0.0364	0.368	3.19	12.5	0.0344	0.455	5.23	0.502	12.6	10.1
2.6	34.7 / 32.8	0.00141	0.0394	0.396	3.31	11.1	0.0373	0.491	5.55	0.542	13.2	9.18
2.8	34.5 / 32.9	0.00152	0.0423	0.423	3.39	9.96	0.0401	0.527	5.83	0.582	13.7	8.33
3.0	34.2 / 32.8	0.00163	0.0453	0.450	3.43	8.97	0.0429	0.562	6.07	0.621	14.0	7.60
3.2	33.8 / 32.7	0.00173	0.0482	0.476	3.42	8.11	0.0457	0.596	6.26	0.660	14.2	6.96
3.4	33.4 / 32.4	0.00184	0.0511	0.501	3.37	7.39	0.0485	0.630	6.40	0.699	14.3	6.40
3.6	32.7 / 31.8	0.00195	0.0539	0.525	3.29	6.77	0.0513	0.663	6.48	0.736	14.2	5.89
3.8	32.0 / 31.2	0.00206	0.0568	0.548	3.19	6.22	0.0541	0.696	6.52	0.774	13.9	5.45
4.0	31.2 / 30.5	0.00216	0.0596	0.570	3.08	5.73	0.0569	0.728	6.51	0.810	13.6	5.05
5	26.3 / 26.0	0.00270	0.0733	0.659	2.47	3.92	0.0705	0.875	5.91	0.983	11.3	3.59
6	21.5 / 21.4	0.00323	0.0862	0.709	1.91	2.82	0.0837	0.996	4.93	1.13	8.87	2.69
7	18.0 / 18.0	0.00376	0.0981	0.717	1.53	2.13	0.0965	1.09	3.90	1.26	7.21	2.10
8	15.5 / 15.5	0.00428	0.109	0.690	1.25	1.67	0.109	1.14	3.25	1.36	5.92	1.69
9	13.6 / 13.6	0.00480	0.119	0.635	1.05	1.35	0.120	1.16	2.75	1.42	4.98	1.38
10	12.0 / 12.0	0.00530	0.127	0.560	0.890	1.11	0.131	1.15	2.35	1.45	4.24	1.15
12	9.61 / 9.66	0.00629	0.138	0.425	0.670	0.796	0.151	1.03	1.79	1.42	3.19	0.845
14	7.81 / 7.85	0.00725	0.144	0.343	0.521	0.596	0.168	0.859	1.40	1.27	2.50	0.639
16	6.44 / 6.48	0.00816	0.142	0.283	0.419	0.468	0.180	0.705	1.14	1.08	2.01	0.509
18	5.39 / 5.43	0.00902	0.135	0.239	0.341	0.376	0.189	0.589	0.941	0.915	1.66	0.416
20	4.57 / 4.60	0.00983	0.124	0.204	0.282	0.311	0.193	0.507	0.788	0.776	1.38	0.342

I n (Z=49) 1s(2)2s(2)3s(2)4s(2)2p(6)3p(6)4p(6)3d(10)4d(10) [5s(2)5p(1)/free(3)]

0/Rs	---->	28.77	8.289	3.378	1.403	0.4054	8.905	3.344	1.264	0.3020	3.317	0.9545	2.408
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	2p(6)	3p(6)	4p(6)	5p(1)	3d(10)	4d(10)	free(3)
0.2	15.6 / 5.42	0.997(-4)	0.00287	0.0297	0.268	5.17	0.00268	0.0356	0.420	8.75	0.0389	0.921	3.74
0.4	33.9 / 11.2	0.000203	0.00576	0.0592	0.537	10.7	0.00539	0.0712	0.844	19.7	0.0779	1.85	7.70
0.6	52.0 / 17.0	0.000305	0.00864	0.0890	0.806	16.8	0.00810	0.107	1.27	30.1	0.117	2.77	11.9
0.8	59.7 / 23.3	0.000407	0.0115	0.119	1.073	22.4	0.0108	0.142	1.68	30.3	0.156	3.69	16.3
1.0	58.9 / 29.6	0.000509	0.0144	0.148	1.34	25.9	0.0135	0.178	2.10	24.4	0.194	4.60	21.0
1.2	55.6 / 36.6	0.000611	0.0172	0.177	1.60	25.8	0.0162	0.213	2.51	19.6	0.233	5.50	26.4
1.4	51.2 / 36.7	0.000713	0.0201	0.206	1.86	23.3	0.0189	0.248	2.91	16.0	0.272	6.39	24.8
1.6	46.8 / 35.9	0.000815	0.0230	0.235	2.10	20.0	0.0215	0.283	3.31	13.3	0.310	7.25	22.4
1.8	43.6 / 35.2	0.000917	0.0258	0.263	2.33	17.3	0.0242	0.318	3.69	11.2	0.348	8.08	20.1
2.0	41.3 / 34.6	0.00102	0.0287	0.291	2.55	15.1	0.0269	0.352	4.06	9.57	0.386	8.86	18.0
2.2	39.5 / 34.1	0.00112	0.0315	0.319	2.74	13.3	0.0296	0.386	4.41	8.30	0.424	9.59	16.2
2.4	38.2 / 33.8	0.00122	0.0343	0.346	2.90	11.8	0.0323	0.419	4.74	7.25	0.461	10.3	14.6
2.6	37.2 / 33.6	0.00132	0.0371	0.372	3.03	10.5	0.0350	0.453	5.04	6.41	0.498	10.8	13.3
2.8	36.4 / 33.4	0.00143	0.0399	0.399	3.12	9.42	0.0376	0.486	5.31	5.71	0.535	11.3	12.1
3.0	35.6 / 33.0	0.00153	0.0427	0.424	3.17	8.50	0.0403	0.519	5.54	5.10	0.571	11.7	11.0
3.2	34.9 / 32.7	0.00163	0.0454	0.449	3.18	7.72	0.0429	0.551	5.74	4.57	0.607	12.0	10.1
3.4	34.2 / 32.4	0.00173	0.0481	0.472	3.16	7.04	0.0455	0.582	5.89	4.11	0.642	12.2	9.31
3.6	33.4 / 31.8	0.00183	0.0508	0.495	3.11	6.44	0.0482	0.613	5.99	3.71	0.677	12.3	8.58
3.8	32.6 / 31.3	0.00193	0.0535	0.517	3.03	5.93	0.0508	0.643	6.05	3.36	0.711	12.2	7.94
4.0	31.7 / 30.5	0.00203	0.0562	0.538	2.94	5.48	0.0534	0.673	6.07	3.06	0.745	12.1	7.37
5	27.0 / 26.4	0.00254	0.0691	0.625	2.41	3.84	0.0662	0.810	5.65	2.04	0.905	10.6	5.27
6	22.2 / 21.9	0.00304	0.0814	0.676	1.85	2.78	0.0786	0.926	4.82	1.47	1.05	8.48	3.96
7	18.4 / 18.3	0.00353	0.0927	0.689	1.49	2.11	0.0907	1.01	3.82	1.11	1.17	6.81	3.07
8	15.8 / 15.8	0.00402	0.103	0.668	1.23	1.65	0.102	1.07	3.18	0.854	1.26	5.65	2.47
9	13.8 / 13.8	0.00450	0.112	0.621	1.03	1.33	0.113	1.10	2.69	0.698	1.33	4.76	2.03
10	12.2 / 12.2	0.00498	0.120	0.551	0.874	1.10	0.124	1.09	2.31	0.572	1.36	4.07	1.71
12	9.73 / 9.78	0.00592	0.132	0.421	0.655	0.791	0.143	1.00	1.76	0.409	1.35	3.07	1.25
14	7.91 / 7.96	0.00681	0.137	0.336	0.512	0.592	0.158	0.843	1.38	0.307	1.23	2.40	0.945
16	6.53 / 6.58	0.00768	0.137	0.278	0.412	0.467	0.171	0.696	1.11	0.243	1.06	1.95	0.762
18	5.48 / 5.53	0.00850	0.131	0.236	0.338	0.378	0.179	0.578	0.901	0.194	0.901	1.61	0.618
20	4.65 / 4.69	0.00927	0.121	0.201	0.279	0.306	0.184	0.502	0.779	0.159	0.766	1.35	0.507

S n (Z=50) 1s(2)2s(2)3s(2)4s(2)2p(6)3p(6)4p(6)3d(10)4d(10) [5s(2)5p(2)/free(4)]

q/Rs	---->	29.38	8.482	3.480	1.460	0.4511	9.103	3.442	1.326	0.3537	3.415	1.035	2.304
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	2p(6)	3p(6)	4p(6)	5p(2)	3d(10)	4d(10)	free(4)
0.2	12.6 / 6.00	9.41(-5)	0.00270	0.0275	0.243	4.03	0.00253	0.0330	0.373	7.08	0.0360	0.755	4.51
0.4	26.2 / 12.3	1.91(-4)	0.00542	0.0549	0.487	8.31	0.00509	0.0661	0.749	14.9	0.0722	1.52	9.26
0.6	40.8 / 18.6	2.88(-4)	0.00813	0.0824	0.731	12.9	0.00764	0.0989	1.12	23.5	0.108	2.27	14.2
0.8	54.0 / 25.5	3.85(-4)	0.0108	0.110	0.973	17.3	0.0102	0.132	1.49	30.7	0.144	3.02	19.5
1.0	61.1 / 32.3	4.81(-4)	0.0135	0.137	1.21	20.8	0.0127	0.165	1.86	32.9	0.180	3.77	24.9
1.2	61.0 / 41.5	5.77(-4)	0.0162	0.164	1.45	22.0	0.0153	0.198	2.23	30.2	0.216	4.51	32.7
1.4	56.5 / 41.8	6.74(-4)	0.0189	0.191	1.68	20.9	0.0178	0.230	2.59	25.4	0.252	5.23	31.6
1.6	52.0 / 40.4	7.70(-4)	0.0216	0.218	1.91	18.8	0.0203	0.263	2.94	21.6	0.287	5.94	28.8
1.8	48.1 / 38.8	8.66(-4)	0.0243	0.244	2.12	16.6	0.0229	0.295	3.28	18.6	0.323	6.63	25.9
2.0	44.8 / 37.6	9.62(-4)	0.0270	0.270	2.32	14.5	0.0254	0.327	3.61	16.1	0.358	7.29	23.4
2.2	42.3 / 36.5	0.00106	0.0297	0.296	2.50	12.8	0.0279	0.359	3.93	14.1	0.393	7.91	21.1
2.4	40.3 / 35.6	0.00115	0.0323	0.321	2.65	11.4	0.0304	0.390	4.23	12.4	0.427	8.49	19.1
2.6	38.8 / 34.9	0.00125	0.0349	0.346	2.78	10.2	0.0330	0.421	4.50	11.0	0.462	9.01	17.3
2.8	37.5 / 34.3	0.00135	0.0376	0.370	2.87	9.15	0.0355	0.452	4.76	9.90	0.496	9.48	15.8
3.0	36.5 / 33.7	0.00144	0.0402	0.394	2.94	8.26	0.0380	0.482	4.98	8.92	0.529	9.87	14.4
3.2	35.5 / 33.1	0.00154	0.0428	0.417	2.97	7.51	0.0405	0.512	5.17	8.09	0.563	10.2	13.2
3.4	34.6 / 32.6	0.00163	0.0453	0.439	2.97	6.87	0.0429	0.541	5.33	7.37	0.596	10.4	12.2
3.6	33.7 / 31.9	0.00173	0.0479	0.460	2.94	6.28	0.0454	0.570	5.45	6.74	0.628	10.6	11.2
3.8	32.9 / 31.3	0.00182	0.0504	0.481	2.88	5.78	0.0479	0.598	5.53	6.21	0.660	10.7	10.4
4.0	32.0 / 30.6	0.00192	0.0529	0.501	2.81	5.35	0.0503	0.626	5.58	5.70	0.692	10.7	9.66
5	27.4 / 26.6	0.00240	0.0652	0.584	2.33	3.77	0.0624	0.755	5.33	3.91	0.842	9.73	6.90
6	22.9 / 22.5	0.00287	0.0767	0.636	1.81	2.79	0.0742	0.865	4.64	2.82	0.975	8.17	5.19
7	18.8 / 10.5	0.00334	0.0875	0.654	1.46	2.11	0.0856	0.951	3.73	2.13	1.09	6.48	4.04
8	16.0 / 15.9	0.00380	0.0974	0.640	1.20	1.65	0.0966	1.01	3.09	1.67	1.18	5.40	3.24
9	14.0 / 14.0	0.00426	0.106	0.601	1.01	1.34	0.107	1.04	2.62	1.35	1.25	4.56	2.68
10	12.3 / 12.3	0.00471	0.114	0.540	0.855	1.11	0.117	1.04	2.25	1.11	1.29	3.90	2.24
12	9.82 / 9.88	0.00559	0.125	0.416	0.645	0.779	0.135	0.969	1.71	0.790	1.29	2.95	1.65
14	8.00 / 8.07	0.00645	0.131	0.330	0.505	0.586	0.150	0.827	1.35	0.595	1.19	2.33	1.25
16	6.61 / 6.68	0.00727	0.132	0.276	0.406	0.462	0.162	0.686	1.10	0.467	1.04	1.88	1.00
18	5.54 / 5.59	0.00805	0.127	0.231	0.334	0.374	0.171	0.572	0.907	0.376	0.888	1.56	0.797
20	4.72 / 4.78	0.00878	0.118	0.198	0.278	0.303	0.176	0.491	0.766	0.310	0.757	1.31	0.670

S_b (Z=51) 1s(2)2s(2)3s(2)4s(2)5s(2)2p(6)3p(6)4p(6) 3d(10)4d(10) [5p(3)/free(3)]

Q/Rs	----->	30.03	8.664	3.572	1.520	0.4933	9.302	3.539	1.391	0.4000	3.520	1.111	2.533
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	2p(6)	3p(6)	4p(6)	5p(3)	3d(10)	4d(10)	free(3)
0.2	10.4 / 8.74	0.886(-4)	0.00255	0.0257	0.219	3.27	0.00239	0.0307	0.331	5.84	0.0333	0.632	4.18
0.4	21.4 / 18.1	0.000180	0.00512	0.0513	0.441	6.70	0.00480	0.0615	0.664	12.0	0.0667	1.27	8.65
0.6	32.8 / 27.6	0.000271	0.00769	0.0771	0.662	10.3	0.00721	0.0920	0.996	18.6	0.1000	1.90	13.4
0.8	44.1 / 37.4	0.000362	0.0102	0.103	0.881	13.9	0.00961	0.123	1.33	25.1	0.133	2.53	18.4
1.0	53.5 / 47.3	0.000453	0.0128	0.128	1.10	17.0	0.0120	0.154	1.65	30.2	0.167	3.16	24.0
1.2	58.5 / 54.7	0.000544	0.0153	0.154	1.31	18.7	0.0144	0.184	1.98	32.1	0.200	3.78	28.3
1.4	58.3 / 53.5	0.000635	0.0180	0.179	1.52	18.6	0.0168	0.214	2.30	30.8	0.233	4.38	26.0
1.6	55.3 / 50.7	0.000726	0.0205	0.204	1.73	17.3	0.0192	0.245	2.61	27.9	0.266	4.98	23.3
1.8	51.6 / 47.8	0.000816	0.0230	0.290	1.92	15.7	0.0216	0.275	2.92	24.6	0.298	5.56	20.8
2.0	47.5 / 44.6	0.000907	0.0255	0.253	2.10	13.6	0.0240	0.304	3.21	21.5	0.331	6.12	18.6
2.2	44.5 / 42.2	0.000997	0.0280	0.277	2.27	12.0	0.0264	0.334	3.50	19.0	0.363	6.65	16.7
2.4	42.1 / 40.2	0.00109	0.0305	0.301	2.42	10.7	0.0287	0.363	3.77	16.9	0.395	7.16	15.0
2.6	40.1 / 38.6	0.00118	0.0330	0.324	2.54	9.62	0.0311	0.392	4.02	15.1	0.427	7.62	13.6
2.8	38.5 / 37.4	0.00127	0.0355	0.347	2.64	8.67	0.0335	0.421	4.25	13.6	0.459	8.05	12.4
3.0	37.1 / 36.1	0.00136	0.0380	0.369	2.72	7.87	0.0358	0.449	4.46	12.3	0.490	8.42	11.3
3.2	36.0 / 35.1	0.00145	0.0404	0.391	2.76	7.16	0.0382	0.477	4.65	11.2	0.521	8.74	10.3
3.4	34.9 / 34.2	0.00154	0.0429	0.412	2.77	6.54	0.0405	0.504	4.81	10.2	0.551	9.00	9.51
3.6	33.9 / 33.3	0.00163	0.0453	0.432	2.76	6.01	0.0429	0.531	4.94	9.37	0.581	9.20	8.77
3.8	33.0 / 32.5	0.00172	0.0477	0.452	2.72	5.54	0.0452	0.558	5.03	8.64	0.611	9.34	8.11
4.0	32.1 / 31.7	0.00181	0.0501	0.470	2.67	5.13	0.0475	0.584	5.10	7.97	0.641	9.41	7.52
5	27.6 / 27.3	0.00226	0.0617	0.551	2.23	3.62	0.0590	0.705	5.00	5.61	0.780	8.96	5.35
6	23.3 / 23.2	0.00270	0.0727	0.603	1.76	2.70	0.0701	0.810	4.43	4.15	0.906	7.79	4.01
7	19.2 / 19.2	0.00314	0.0830	0.624	1.42	2.07	0.0809	0.893	3.66	3.14	1.01	6.24	3.12
8	16.3 / 16.3	0.00358	0.0924	0.616	1.18	1.62	0.0913	0.932	2.99	2.47	1.10	5.16	2.51
9	14.2 / 14.2	0.00401	0.101	0.583	0.986	1.31	0.101	0.985	2.54	2.01	1.17	4.37	2.05
10	12.5 / 12.6	0.00444	0.108	0.530	0.840	1.08	0.111	0.993	2.20	1.65	1.21	3.75	1.73
12	9.94 / 10.0	0.00528	0.120	0.411	0.632	0.780	0.128	0.937	1.67	1.18	1.23	2.86	1.27
14	8.29 / 8.35	0.00608	0.126	0.324	0.487	0.581	0.143	0.811	1.49	0.893	1.15	2.26	0.955
16	6.71 / 6.78	0.00686	0.127	0.270	0.400	0.456	0.155	0.677	1.08	0.698	1.02	1.83	0.766
18	5.62 / 5.69	0.00760	0.123	0.229	0.330	0.370	0.163	0.566	0.891	0.556	0.873	1.51	0.622
20	4.78 / 4.84	0.00830	0.115	0.196	0.275	0.304	0.169	0.481	0.750	0.452	0.748	1.28	0.511

T e (Z=52) 1s (2) 2s (2) 3s (2) 4s (2) 5s (2) 2p (6) 3p (6) 4p (6) 5p (4) 3d (10) 4d (10) ..

0/Rs	----->	30.54	8.844	3.664	1.578	0.5338	9.498	3.637	1.449	0.4295	3.624	1.185
V	TOTAL	1s (2)	2s (2)	3s (2)	4s (2)	5s (2)	2p (6)	3p (6)	4p (6)	5p (4)	3d (10)	4d (10)
0.2	9.12	8.46(-5)	0.00242	0.0241	0.200	2.72	0.00226	0.0286	0.299	5.27	0.0309	0.539
0.4	18.6	1.72(-4)	0.00485	0.0481	0.402	5.55	0.00545	0.0573	0.600	10.7	0.0618	1.08
0.6	28.3	2.53(-4)	0.00728	0.0722	0.603	8.51	0.00682	0.0857	0.893	16.5	0.0927	1.62
0.8	38.2	3.45(-4)	0.00970	0.0963	0.802	11.5	0.00909	0.114	1.20	22.2	0.123	2.16
1.0	47.2	4.33(-4)	0.0121	0.120	1.00	14.2	0.0114	0.143	1.49	27.4	0.154	2.69
1.2	53.8	5.20(-4)	0.0145	0.144	1.20	16.0	0.0136	0.171	1.79	31.1	0.185	3.21
1.4	56.6	6.05(-4)	0.0170	0.168	1.39	16.5	0.0159	0.200	2.07	32.3	0.216	3.73
1.6	56.0	6.93(-4)	0.0194	0.191	1.57	15.9	0.0181	0.228	2.36	31.2	0.246	4.24
1.8	53.2	7.80(-4)	0.0218	0.214	1.75	14.6	0.0204	0.256	2.64	28.8	0.277	4.74
2.0	49.8	8.65(-4)	0.0242	0.237	1.92	13.0	0.0227	0.284	2.90	25.9	0.307	5.22
2.2	46.1	9.52(-4)	0.0266	0.260	2.08	11.4	0.0249	0.311	3.16	22.8	0.337	5.69
2.4	43.5	0.00104	0.0289	0.282	2.22	10.2	0.0272	0.338	3.41	20.4	0.367	6.13
2.6	41.2	0.00113	0.0313	0.304	2.34	9.20	0.0294	0.365	3.65	18.3	0.396	6.54
2.8	39.3	0.00121	0.0337	0.325	2.44	8.31	0.0317	0.392	3.86	16.6	0.425	6.92
3.0	37.8	0.00130	0.0360	0.346	2.52	7.56	0.0339	0.418	4.06	15.1	0.454	7.27
3.2	36.4	0.00138	0.0383	0.367	2.57	6.90	0.0361	0.445	4.24	13.7	0.483	7.58
3.4	35.2	0.00147	0.0406	0.386	2.59	6.30	0.0384	0.470	4.40	12.6	0.512	7.84
3.6	34.0	0.00156	0.0429	0.406	2.60	5.79	0.0406	0.495	4.53	11.5	0.540	8.06
3.8	33.1	0.00164	0.0452	0.424	2.58	5.34	0.0428	0.520	4.63	10.7	0.567	8.22
4.0	32.1	0.00173	0.0475	0.442	2.54	4.95	0.0450	0.545	4.71	9.87	0.595	8.34
5	27.6	0.00216	0.0585	0.519	2.17	3.51	0.0558	0.659	4.72	6.99	0.725	8.22
6	23.5	0.00258	0.0690	0.571	1.72	2.63	0.0664	0.758	4.26	5.27	0.844	7.31
7	19.7	0.00300	0.0788	0.595	1.39	2.04	0.0766	0.839	3.59	4.11	0.947	6.07
8	16.5	0.00342	0.0878	0.592	1.15	1.61	0.0865	0.898	2.92	3.20	1.03	4.95
9	14.4	0.00384	0.0960	0.565	0.968	1.30	0.0960	0.934	2.49	2.60	1.10	4.22
10	12.6	0.00424	0.103	0.519	0.826	1.07	0.105	0.946	2.14	2.13	1.14	3.63
12	10.1	0.00504	0.114	0.407	0.622	0.765	0.122	0.905	1.64	1.54	1.17	2.77
14	8.21	0.00582	0.121	0.321	0.487	0.583	0.136	0.794	1.30	1.16	1.11	2.20
16	6.79	0.00656	0.123	0.266	0.394	0.452	0.147	0.668	1.06	0.905	0.992	1.78
18	5.71	0.00728	0.120	0.226	0.326	0.365	0.156	0.560	0.877	0.735	0.859	1.48
20	4.85	0.00795	0.113	0.193	0.272	0.301	0.162	0.476	0.739	0.598	0.738	1.25

I (Z=53) 1s(2)2s(2)3s(2)4s(2)5s(2)2p(6)3p(6)4p(5)3d(10)4d(10)

0/Rs	---->	31.27	9.026	3.760	1.637	0.5723	9.709	3.732	1.506	0.4633	3.729	1.259
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	2p(6)	3p(6)	4p(6)	5p(5)	3d(10)	4d(10)
0.2	7.94	7.92(-5)	0.00229	0.0225	0.183	2.31	0.00213	0.0268	0.272	4.63	0.0286	0.463
0.4	16.1	1.61(-4)	0.00460	0.0450	0.367	4.70	0.00428	0.0535	0.544	9.37	0.0574	0.928
0.6	24.4	2.43(-4)	0.00690	0.0676	0.550	7.17	0.00643	0.0802	0.816	14.3	0.0860	1.39
0.8	32.9	3.24(-4)	0.00919	0.0901	0.733	9.68	0.00857	0.107	1.09	19.2	0.114	1.85
1.0	40.9	4.06(-4)	0.0115	0.113	0.913	12.0	0.0107	0.134	1.36	23.9	0.143	2.31
1.2	47.5	4.87(-4)	0.0138	0.135	1.09	13.8	0.0129	0.160	1.62	27.9	0.172	2.76
1.4	52.1	5.68(-4)	0.0161	0.157	1.27	14.6	0.0150	0.187	1.88	30.5	0.200	3.21
1.6	53.7	6.50(-4)	0.0184	0.179	1.44	14.5	0.0171	0.213	2.14	31.3	0.229	3.65
1.8	52.9	7.31(-4)	0.0206	0.200	1.60	13.6	0.0192	0.239	2.39	30.4	0.257	4.08
2.0	50.7	8.12(-4)	0.0229	0.222	1.76	12.4	0.0214	0.265	2.64	28.5	0.285	4.50
2.2	48.3	8.93(-4)	0.0252	0.243	1.90	11.2	0.0235	0.291	2.88	26.5	0.313	4.90
2.4	44.9	9.74(-4)	0.0274	0.264	2.04	10.1	0.0256	0.317	3.10	23.4	0.340	5.29
2.6	42.4	0.00106	0.0297	0.284	2.15	9.05	0.0277	0.342	3.32	21.2	0.368	5.66
2.8	40.4	0.00114	0.0319	0.305	2.25	8.21	0.0299	0.367	3.52	19.3	0.395	6.00
3.0	38.6	0.00122	0.0341	0.324	2.33	7.44	0.0320	0.392	3.71	17.6	0.422	6.32
3.2	37.0	0.00130	0.0363	0.344	2.39	6.81	0.0341	0.416	3.88	16.0	0.449	6.61
3.4	35.6	0.00138	0.0385	0.362	2.42	6.24	0.0362	0.440	4.03	14.7	0.475	6.86
3.6	34.4	0.00146	0.0407	0.381	2.44	5.73	0.0383	0.464	4.16	13.6	0.501	7.08
3.8	33.3	0.00154	0.0429	0.398	2.43	5.30	0.0403	0.487	4.27	12.6	0.527	7.26
4.0	32.3	0.00162	0.0450	0.415	2.41	4.91	0.0424	0.510	4.36	11.6	0.553	7.40
5	27.8	0.00202	0.0555	0.489	2.10	3.49	0.0526	0.619	4.45	8.34	0.675	7.52
6	23.7	0.00242	0.0655	0.541	1.69	2.62	0.0626	0.713	4.09	6.27	0.786	6.89
7	20.1	0.00282	0.0748	0.567	1.36	2.04	0.0723	0.791	3.51	4.91	0.883	5.89
8	16.9	0.00321	0.0835	0.568	1.13	1.61	0.0817	0.849	2.87	3.94	0.966	4.80
9	15.4	0.00360	0.0913	0.546	0.946	1.31	0.0967	0.887	2.42	3.20	1.03	4.07
10	12.8	0.00398	0.0983	0.507	0.808	1.08	0.0992	0.903	2.10	2.64	1.08	3.51
12	10.2	0.00474	0.109	0.402	0.613	0.768	0.115	0.873	1.61	1.89	1.11	2.69
14	8.32	0.00546	0.116	0.316	0.480	0.579	0.129	0.777	1.28	1.43	1.07	2.14
16	6.89	0.00617	0.118	0.259	0.389	0.456	0.140	0.658	1.04	1.12	0.967	1.74
18	5.80	0.00684	0.116	0.222	0.321	0.373	0.149	0.554	0.864	0.903	0.843	1.44
20	4.82	0.00748	0.110	0.192	0.270	0.302	0.155	0.469	0.728	0.744	0.728	1.22

Xe (Z=54) 1s(2)2s(2)3s(2)4s(2)5s(2)2p(6)3p(6)4p(6)5p(6)3d(10)4d(10).....													
q/Rs	---->	31.82	9.215	3.844	1.691	0.6078	9.916	3.824	1.577	0.4974	3.836	1.328	
v	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	2p(6)	3p(6)	4p(6)	5p(6)	3d(10)	4d(10)	
0.2	6.97	7.55(-5)	0.00217	0.0213	0.169	2.01	0.00201	0.0251	0.242	4.07	0.0266	0.405	
0.4	14.1	1.54(-4)	0.00435	0.0426	0.339	4.07	0.00404	0.0503	0.485	8.20	0.0533	0.812	
0.6	21.3	2.32(-4)	0.00653	0.0639	0.508	6.20	0.00607	0.0753	0.728	12.4	0.0799	1.22	
0.8	28.6	3.09(-4)	0.00870	0.0852	0.677	8.35	0.00810	0.100	0.969	16.7	0.106	1.62	
1.0	35.7	3.87(-4)	0.0109	0.106	0.844	10.4	0.0101	0.126	1.21	20.8	0.133	2.02	
1.2	42.0	4.64(-4)	0.0130	0.127	1.01	12.1	0.0121	0.151	1.45	24.6	0.160	2.42	
1.4	46.9	5.42(-4)	0.0152	0.148	1.17	13.1	0.0142	0.175	1.68	27.7	0.186	2.81	
1.6	50.2	6.19(-4)	0.0174	0.169	1.33	13.2	0.0162	0.200	1.91	29.5	0.212	3.57	
1.8	50.6	6.97(-4)	0.0195	0.190	1.48	12.7	0.0182	0.225	2.14	30.0	0.239	3.57	
2.0	49.9	7.74(-4)	0.0217	0.210	1.63	11.8	0.0202	0.249	2.36	29.3	0.265	3.94	
2.2	48.2	8.51(-4)	0.0238	0.230	1.76	10.9	0.0222	0.273	2.57	27.8	0.291	4.30	
2.4	45.8	9.29(-4)	0.0260	0.250	1.89	9.59	0.0242	0.297	2.78	26.0	0.316	4.65	
2.6	43.7	0.00101	0.0281	0.269	2.00	8.66	0.0262	0.321	2.97	24.1	0.342	4.97	
2.8	41.4	0.00108	0.0302	0.288	2.10	7.87	0.0282	0.345	3.16	21.9	0.367	5.29	
3.0	39.4	0.00116	0.0323	0.307	2.18	7.18	0.0302	0.368	3.33	20.0	0.392	5.57	
3.2	37.8	0.00124	0.0344	0.325	2.24	6.55	0.0322	0.391	3.49	18.4	0.417	5.84	
3.4	36.2	0.00131	0.0365	0.343	2.28	6.01	0.0342	0.414	3.64	16.9	0.442	6.08	
3.6	34.9	0.00139	0.0385	0.360	2.30	5.54	0.0362	0.436	3.77	15.6	0.466	6.30	
3.8	33.7	0.00147	0.0406	0.377	2.31	5.12	0.0381	0.458	3.88	14.5	0.490	6.48	
4.0	32.6	0.00154	0.0426	0.394	2.29	4.74	0.0461	0.480	3.97	13.5	0.514	6.63	
5	27.9	0.00193	0.0526	0.465	2.04	3.39	0.0498	0.582	4.13	9.68	0.628	6.86	
6	24.0	0.00231	0.0621	0.516	1.67	2.55	0.0593	0.673	3.88	7.32	0.733	6.48	
7	20.4	0.00269	0.0710	0.543	1.34	1.99	0.0684	0.748	3.42	5.74	0.825	5.70	
8	17.3	0.00366	0.0793	0.547	1.11	1.59	0.0773	0.805	2.81	4.65	0.904	4.69	
9	14.8	0.00343	0.0868	0.530	0.932	1.29	0.0859	0.844	2.36	3.81	0.968	3.94	
10	13.0	0.00380	0.0936	0.496	0.796	1.06	0.0940	0.863	2.04	3.17	1.014	3.39	
12	10.4	0.00452	0.104	0.397	0.604	0.761	0.109	0.844	1.58	2.28	1.054	2.63	
14	8.39	0.00522	0.111	0.314	0.474	0.574	0.122	0.760	1.25	1.69	1.026	2.08	
16	6.98	0.00589	0.114	0.259	0.384	0.449	0.133	0.649	1.02	1.34	0.940	1.69	
18	5.88	0.00653	0.112	0.221	0.318	0.362	0.142	0.548	0.844	1.09	0.827	1.41	
20	5.01	0.00715	0.107	0.189	0.267	0.297	0.148	0.465	0.716	0.905	0.718	1.19	

C s (Z = 55) 1s(2)2s(2)3s(2)4s(2)5s(2)2p(6)3p(6)4p(6)5p(6)3d(10)4d(10) [6s(1) / free(1)]

0/Rs	---->	32.25	9.405	3.943	1.765	0.6642	0.1900	10.11	3.917	1.641	0.5642	3.942	1.398	5.753
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(1)	2p(6)	3p(6)	4p(6)	5p(6)	3d(10)	4d(10)	free(1)
0.2	31.9 / 14.2	0.728(-4)	0.00206	0.0200	0.152	1.63	26.4	0.00191	0.0236	0.219	3.01	0.0248	0.356	8.65
0.4	74.4 / 31.6	0.000148	0.00412	0.0399	0.305	3.29	63.5	0.00384	0.0472	0.439	6.06	0.0496	0.713	20.7
0.6	75.7 / 58.7	0.000223	0.00619	0.0598	0.457	4.99	59.2	0.00577	0.0707	0.658	9.14	0.0744	1.07	42.2
0.8	64.7 / 56.4	0.000298	0.00825	0.0798	0.608	6.72	42.6	0.00769	0.0943	0.876	12.3	0.0990	1.42	34.3
1.0	59.4 / 54.4	0.000373	0.0103	0.0996	0.758	8.38	31.7	0.00961	0.118	1.09	15.3	0.124	1.78	26.7
1.2	57.3 / 53.9	0.000448	0.0123	0.119	0.907	9.84	24.5	0.0115	0.141	1.31	18.2	0.149	2.13	21.1
1.4	56.7 / 54.2	0.000523	0.0144	0.139	1.05	10.9	19.5	0.0134	0.165	1.52	20.8	0.173	2.47	17.0
1.6	56.4 / 54.3	0.000597	0.0165	0.158	1.20	11.4	15.9	0.0154	0.188	1.73	22.7	0.198	2.81	14.0
1.8	55.6 / 54.1	0.000672	0.0185	0.178	1.33	11.3	13.3	0.0173	0.211	1.93	23.9	0.222	3.14	11.8
2.0	54.0 / 52.7	0.000746	0.0206	0.197	1.47	10.7	11.3	0.0192	0.234	2.14	24.3	0.247	3.47	10.0
2.2	52.1 / 51.1	0.000821	0.0226	0.216	1.59	10.1	9.70	0.0211	0.257	2.33	23.8	0.271	3.79	8.67
2.4	49.5 / 48.6	0.000895	0.0246	0.234	1.71	8.97	8.44	0.0230	0.280	2.52	22.9	0.295	4.10	7.58
2.6	46.6 / 45.9	0.000970	0.0266	0.253	1.81	8.01	7.41	0.0249	0.302	2.70	21.4	0.319	4.39	6.69
2.8	44.7 / 44.1	0.00104	0.0286	0.271	1.91	7.32	6.58	0.0268	0.324	2.87	20.4	0.342	4.67	5.94
3.0	42.5 / 41.9	0.00112	0.0306	0.288	1.98	6.69	5.88	0.0287	0.346	3.03	18.9	0.366	4.94	5.31
3.2	40.2 / 39.7	0.00119	0.0326	0.305	2.05	6.15	5.28	0.0306	0.368	3.18	17.2	0.389	5.18	4.77
3.4	38.3 / 37.8	0.00127	0.0346	0.322	2.10	6.65	4.78	0.0325	0.389	3.32	15.9	0.412	5.41	4.33
3.6	36.7 / 36.3	0.00134	0.0366	0.339	2.13	5.22	4.35	0.0344	0.411	3.45	14.7	0.435	5.61	3.94
3.8	35.3 / 34.9	0.00141	0.0385	0.355	2.14	4.83	3.96	0.0362	0.432	3.55	13.7	0.458	5.79	3.61
4.0	34.0 / 33.7	0.00149	0.0405	0.370	2.14	4.50	3.61	0.0381	0.452	3.65	12.8	0.480	5.95	3.31
5	28.6 / 28.5	0.00186	0.0499	0.439	1.95	3.22	2.40	0.0473	0.549	3.86	9.22	0.587	6.32	2.28
6	24.5 / 24.4	0.00223	0.0590	0.489	1.68	2.44	1.72	0.0563	0.636	3.70	6.99	0.686	6.08	1.66
7	21.1 / 21.1	0.00259	0.0675	0.518	1.33	1.91	1.29	0.0651	0.709	3.37	5.51	0.775	5.55	1.29
8	18.0 / 18.0	0.00295	0.0755	0.526	1.11	1.54	1.01	0.0736	0.766	2.84	4.46	0.851	4.71	1.01
9	15.4 / 15.5	0.00331	0.0828	0.515	0.934	1.27	0.818	0.0818	0.806	2.36	3.69	0.913	3.91	0.827
10	13.5 / 13.5	0.00367	0.0894	0.490	0.798	1.07	0.670	0.0897	0.828	2.04	3.11	0.961	3.39	0.684
12	10.8 / 10.8	0.00436	0.100	0.401	0.605	0.795	0.469	0.104	0.823	1.57	2.31	1.01	2.60	0.485
14	8.85 / 8.87	0.00504	0.107	0.318	0.475	0.613	0.353	0.117	0.758	1.25	1.79	0.999	2.07	0.371
16	7.38 / 7.38	0.00569	0.111	0.260	0.383	0.489	0.279	0.128	0.654	1.02	1.43	0.932	1.69	0.284
18	6.22 / 6.22	0.00632	0.110	0.221	0.317	0.396	0.230	0.137	0.554	0.845	1.17	0.829	1.41	0.226
20	5.30 / 5.30	0.00692	0.106	0.189	0.267	0.326	0.185	0.143	0.471	0.716	0.978	0.723	1.19	0.192

Ba (Z=56) 1s(2)2s(2)3s(2)4s(2)5s(2)2p(6)3p(6)4p(6)5p(6)3d(10)4d(10) [6s(2)/free(2)]

Q/Rs	---->	32.94	9.589	4.039	1.807	0.7238	0.2280	10.30	4.015	1.704	0.6226	4.048	1.468	3.745
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	2p(6)	3p(6)	4p(6)	5p(6)	3d(10)	4d(10)	free(2)
0.2	24.1 / 11.0	0.686(-4)	0.00195	0.0188	0.143	1.33	19.7	0.00181	0.0221	0.199	2.38	0.0231	0.315	6.64
0.4	53.6 / 23.8	0.000140	0.00392	0.0375	0.287	2.68	44.7	0.00365	0.0443	0.399	4.78	0.0463	0.630	14.4
0.6	80.3 / 36.7	0.000211	0.00588	0.0562	0.431	4.05	66.9	0.00548	0.0663	0.599	7.20	0.0694	0.946	23.3
0.8	81.9 / 58.5	0.000281	0.00783	0.0750	0.574	5.44	63.9	0.00732	0.0884	0.797	9.63	0.0924	1.26	40.5
1.0	73.9 / 60.2	0.000352	0.00978	0.0937	0.715	6.80	51.5	0.00914	0.111	0.994	12.0	0.115	1.57	37.8
1.2	67.5 / 58.7	0.000423	0.0117	0.112	0.855	8.04	40.8	0.0110	0.133	1.19	14.3	0.139	1.88	32.0
1.4	63.8 / 57.4	0.000493	0.0137	0.131	0.993	9.04	33.2	0.0128	0.155	1.38	16.5	0.162	2.19	26.8
1.6	61.1 / 56.4	0.000564	0.0156	0.149	1.13	9.67	27.4	0.0146	0.176	1.57	18.3	0.185	2.49	22.7
1.8	58.9 / 55.3	0.000634	0.0176	0.167	1.26	9.87	23.0	0.0164	0.198	1.76	19.6	0.207	2.78	19.4
2.0	56.8 / 53.8	0.000705	0.0195	0.185	1.38	9.67	19.7	0.0182	0.220	1.94	20.3	0.230	3.07	16.7
2.2	54.6 / 52.0	0.000775	0.0215	0.203	1.50	9.19	17.2	0.0201	0.241	2.12	20.5	0.253	3.36	14.6
2.4	51.9 / 49.7	0.000845	0.0234	0.220	1.61	8.51	15.0	0.0219	0.262	2.30	20.1	0.275	3.63	12.8
2.6	49.6 / 47.8	0.000915	0.0253	0.238	1.72	7.97	13.2	0.0237	0.283	2.46	19.4	0.297	3.90	11.4
2.8	47.0 / 45.4	0.000986	0.0272	0.255	1.81	7.48	11.8	0.0255	0.304	2.62	18.2	0.319	4.15	10.2
3.0	45.1 / 43.7	0.00106	0.0291	0.271	1.88	6.83	10.6	0.0273	0.325	2.77	17.6	0.341	4.39	9.16
3.2	42.5 / 41.4	0.00113	0.0310	0.288	1.95	6.27	9.44	0.0291	0.345	2.91	16.3	0.363	4.62	8.29
3.4	40.3 / 39.2	0.00120	0.0329	0.304	2.00	5.77	8.67	0.0309	0.366	3.04	14.9	0.385	4.83	7.53
3.6	38.2 / 37.3	0.00127	0.0348	0.319	2.03	5.33	7.76	0.0327	0.386	3.16	13.8	0.406	5.02	6.88
3.8	36.7 / 35.8	0.00134	0.0366	0.334	2.05	4.92	7.24	0.0345	0.405	3.27	12.8	0.427	5.19	6.32
4.0	35.1 / 34.4	0.00141	0.0385	0.349	2.06	4.57	6.55	0.0363	0.425	3.36	11.9	0.448	5.35	5.83
5	29.5 / 28.9	0.00175	0.0475	0.414	1.91	3.28	4.62	0.0450	0.517	3.61	8.72	0.549	5.79	4.06
6	25.2 / 24.9	0.00210	0.0561	0.464	1.66	2.48	3.33	0.0536	0.599	3.52	6.67	0.642	5.69	2.99
7	21.5 / 21.3	0.00245	0.0643	0.494	1.31	1.94	2.51	0.0620	0.669	3.22	5.27	0.726	5.23	2.31
8	18.4 / 18.3	0.00279	0.0719	0.504	1.09	1.56	1.94	0.0701	0.725	2.79	4.27	0.799	4.59	1.84
9	15.8 / 15.7	0.00313	0.0790	0.497	0.921	1.29	1.59	0.0780	0.765	2.32	3.55	0.860	3.84	1.50
10	13.8 / 13.8	0.00346	0.0853	0.476	0.788	1.09	1.29	0.0855	0.789	2.00	2.99	0.907	3.28	1.24
12	11.0 / 11.0	0.00412	0.0958	0.396	0.598	0.806	0.940	0.0995	0.791	1.54	2.23	0.960	2.53	0.925
14	9.00 / 8.99	0.00476	0.103	0.315	0.469	0.623	0.708	0.112	0.737	1.23	1.73	0.957	2.02	0.698
16	7.48 / 7.49	0.00538	0.107	0.258	0.380	0.495	0.534	0.122	0.643	1.00	1.38	0.903	1.65	0.545
18	6.32 / 6.32	0.00598	0.107	0.217	0.315	0.403	0.445	0.131	0.547	0.832	1.13	0.812	1.38	0.445
20	5.38 / 5.38	0.00655	0.103	0.188	0.264	0.336	0.350	0.137	0.466	0.705	0.947	0.712	1.17	0.354

L.a (Z=57) 1s(2)2s(2)3s(2)4s(2)5s(2)2p(6)3p(6)4p(6)5p(6)3d(10)4d(10) [5s(2)5d(1)/free(3)]

l/Rs	---->	33.51	9.778	4.129	1.869	0.7658	0.2421	10.51	4.109	1.769	0.6650	4.164	1.529	0.4208	2.722
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	2p(6)	3p(6)	4p(6)	5p(6)	3d(10)	4d(10)	5d(1)	free(3)
0.2	25.0 / 8.76	0.654(-4)	0.00185	0.0177	0.132	1.16	17.1	0.00172	0.0208	0.181	2.03	0.0111	0.284	4.05	4.91
0.4	54.7 / 17.9	0.000133	0.00372	0.0354	0.264	2.34	38.4	0.00345	0.0417	0.363	4.08	0.0223	0.568	8.61	10.2
0.6	84.0 / 27.5	0.000201	0.00568	0.0531	0.396	3.53	58.8	0.00519	0.0625	0.545	6.13	0.0334	0.854	13.6	15.9
0.8	93.2 / 37.7	0.000268	0.00744	0.0709	0.528	4.74	80.2	0.00632	0.0832	0.725	8.19	0.0445	1.14	17.4	22.1
1.0	86.6 / 52.7	0.000336	0.00929	0.0885	0.658	5.92	49.2	0.00865	0.104	0.905	10.2	0.0556	1.42	17.9	33.2
1.2	78.8 / 68.0	0.000403	0.0111	0.106	0.787	7.02	39.4	0.0104	0.125	1.08	12.2	0.0667	1.70	16.3	34.9
1.4	72.2 / 57.9	0.000470	0.0130	0.124	0.913	7.96	32.2	0.0121	0.146	1.26	14.1	0.0778	1.97	13.5	31.4
1.6	67.5 / 56.9	0.000538	0.0149	0.141	1.04	8.62	26.7	0.0138	0.166	1.43	15.7	0.0889	2.25	11.4	27.5
1.8	63.9 / 55.8	0.000605	0.0167	0.158	1.16	8.94	22.5	0.0155	0.187	1.60	17.0	0.106	2.51	9.74	24.1
2.0	60.8 / 54.2	0.000672	0.0185	0.175	1.28	8.91	19.3	0.0173	0.207	1.77	17.9	0.111	2.78	8.43	21.1
2.2	57.8 / 52.4	0.000739	0.0204	0.192	1.39	8.58	16.7	0.0190	0.227	1.93	18.3	0.122	3.03	7.36	18.7
2.4	55.0 / 50.5	0.000806	0.0222	0.208	1.49	8.15	14.6	0.0207	0.247	2.09	18.3	0.133	3.28	6.47	16.6
2.6	51.9 / 48.0	0.000873	0.0240	0.225	1.59	7.44	12.9	0.0224	0.267	2.25	17.8	0.144	3.53	5.75	14.8
2.8	49.6 / 46.3	0.000940	0.0258	0.241	1.67	7.23	11.5	0.0241	0.287	2.39	17.2	0.155	3.76	5.15	13.3
3.0	46.6 / 43.8	0.00101	0.0277	0.257	1.75	6.51	10.3	0.0258	0.306	2.53	16.1	0.165	3.98	4.64	12.1
3.2	44.6 / 42.1	0.00107	0.0294	0.272	1.81	5.99	9.30	0.0275	0.325	2.67	15.6	0.176	4.19	4.19	11.0
3.4	42.1 / 39.9	0.00114	0.0312	0.287	1.86	5.54	8.43	0.0292	0.345	2.79	14.4	0.187	4.39	3.81	10.0
3.6	39.8 / 37.8	0.00121	0.0330	0.302	1.90	5.13	7.69	0.0309	0.363	2.90	13.2	0.197	4.57	3.48	9.20
3.8	37.9 / 36.1	0.00127	0.0348	0.316	1.93	4.74	7.05	0.0326	0.382	3.00	12.2	0.208	4.74	3.20	8.47
4.0	36.2 / 34.6	0.00134	0.0365	0.331	1.94	4.42	6.48	0.0343	0.400	3.10	11.5	0.218	4.89	2.95	7.82
5	29.9 / 28.9	0.00167	0.0451	0.393	1.83	3.18	4.49	0.0426	0.488	3.37	8.41	0.269	5.36	2.06	5.51
6	25.4 / 24.7	0.00201	0.0534	0.442	1.61	2.40	3.30	0.0508	0.566	3.33	6.45	0.318	5.35	1.53	4.10
7	21.6 / 21.1	0.00234	0.0612	0.472	1.29	1.89	2.49	0.0587	0.633	3.08	5.11	0.364	4.98	1.19	3.19
8	18.6 / 18.3	0.00266	0.0685	0.485	1.07	1.53	1.95	0.0665	0.688	2.73	4.16	0.406	4.48	0.943	2.55
9	15.8 / 15.5	0.00299	0.0752	0.480	0.905	1.26	1.58	0.0739	0.728	2.29	3.45	0.445	3.77	0.765	2.09
10	13.7 / 13.5	0.00331	0.0814	0.462	0.775	1.06	1.30	0.0811	0.754	1.94	2.92	0.480	3.20	0.630	1.74
12	10.8 / 10.9	0.00394	0.0916	0.390	0.589	0.788	0.920	0.0944	0.762	1.51	2.17	0.535	2.48	0.450	1.26
14	8.77 / 8.71	0.00455	0.0987	0.312	0.463	0.608	0.689	0.106	0.717	1.20	1.69	0.570	1.98	0.335	0.965
16	7.30 / 7.26	0.00514	0.103	0.254	0.375	0.484	0.534	0.117	0.632	0.984	1.35	0.584	1.62	0.264	0.762
18	6.20 / 6.18	0.00571	0.103	0.216	0.311	0.399	0.430	0.125	0.541	0.818	1.11	0.577	1.36	0.212	0.625
20	5.34 / 5.31	0.00626	0.100	0.185	0.261	0.330	0.366	0.131	0.462	0.694	0.929	0.552	1.15	0.175	0.515

C e (Z=58) 1s(2) 2s(2) 3s(2) 4s(2) 5s(2) 5s(2) 2p(6) 3p(6) 4p(6) 5p(6) 3d(10) 4d(10) 4f(2)

q/Rs	---->	34.13	9.963	4.221	1.902	0.7539	0.2335	10.72	4.204	1.800	0.6484	4.256	1.562	1.069
v	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	2p(6)	3p(6)	4p(6)	5p(6)	3d(10)	4d(10)	4f(2)
0.2	23.1	0.622(-4)	0.00176	0.0167	0.126	1.21	18.6	0.00163	0.0196	0.174	2.16	0.0202	0.269	0.521
0.4	51.1	0.000127	0.00354	0.0335	0.253	2.43	42.1	0.00328	0.0393	0.347	4.33	0.0406	0.538	1.04
0.6	77.3	0.000191	0.00531	0.0502	0.379	3.67	63.6	0.00493	0.0588	0.521	6.52	0.0608	0.808	1.57
0.8	80.8	0.000255	0.00708	0.0669	0.505	4.92	62.6	0.00658	0.0783	0.694	8.72	0.0810	1.08	2.09
1.0	73.8	0.000319	0.00884	0.0836	0.630	6.15	51.0	0.00822	0.0980	0.866	10.9	0.101	1.34	2.61
1.2	67.8	0.000384	0.0106	0.100	0.753	7.29	40.7	0.00986	0.118	1.04	13.0	0.122	1.61	3.12
1.4	64.1	0.000448	0.0124	0.117	0.875	8.25	33.0	0.0115	0.137	1.21	14.9	0.142	1.87	3.61
1.6	61.8	0.000512	0.0141	0.133	0.994	8.91	27.3	0.0131	0.157	1.37	16.6	0.162	2.13	4.05
1.8	60.1	0.000576	0.0159	0.149	1.11	9.19	23.0	0.0148	0.176	1.54	18.0	0.182	2.38	4.44
2.0	58.4	0.000639	0.0176	0.165	1.22	9.12	19.7	0.0164	0.195	1.70	18.8	0.202	2.63	4.74
2.2	56.5	0.000703	0.0194	0.181	1.33	8.74	17.0	0.0180	0.214	1.85	19.1	0.222	2.88	4.95
2.4	54.4	0.000767	0.0211	0.197	1.43	8.26	14.9	0.0197	0.233	2.01	19.0	0.241	3.11	5.06
2.6	51.9	0.000831	0.0229	0.212	1.52	7.53	13.1	0.0213	0.252	2.15	18.4	0.261	3.34	5.06
2.8	49.8	0.000895	0.0246	0.228	1.61	7.30	11.7	0.0229	0.270	2.29	17.6	0.280	3.57	4.98
3.0	47.3	0.000958	0.0263	0.243	1.68	6.60	10.5	0.0246	0.289	2.43	16.6	0.300	3.78	4.83
3.2	45.2	0.00102	0.0280	0.257	1.75	6.07	9.44	0.0262	0.307	2.56	15.9	0.319	3.98	4.60
3.4	42.8	0.00109	0.0297	0.272	1.80	5.61	8.55	0.0278	0.325	2.68	14.6	0.338	4.17	4.46
3.6	40.5	0.00115	0.0314	0.286	1.84	5.18	7.82	0.0294	0.343	2.79	13.3	0.357	4.35	4.17
3.8	38.6	0.00121	0.0331	0.300	1.86	4.79	7.14	0.0310	0.360	2.89	12.4	0.375	4.51	3.86
4.0	36.9	0.00128	0.0348	0.313	1.88	4.46	6.59	0.0326	0.378	2.98	11.6	0.394	4.66	3.57
5	30.5	0.00159	0.0430	0.373	1.79	3.21	4.55	0.0405	0.460	3.26	8.52	0.483	5.14	2.64
6	26.0	0.00191	0.0508	0.420	1.58	2.43	3.35	0.0483	0.535	3.25	6.53	0.566	5.18	2.03
7	22.2	0.00222	0.0583	0.451	1.28	1.90	2.51	0.0559	0.600	3.01	5.17	0.642	4.86	1.62
8	19.2	0.00253	0.0653	0.466	1.06	1.54	1.98	0.0632	0.653	2.70	4.21	0.709	4.41	1.32
9	16.4	0.00284	0.0718	0.464	0.894	1.27	1.57	0.0704	0.693	2.27	3.48	0.766	3.74	1.10
10	14.3	0.00315	0.0778	0.449	0.766	1.07	1.30	0.0772	0.720	1.93	2.95	0.812	3.17	0.934
12	11.3	0.00375	0.0877	0.385	0.583	0.791	0.916	0.0900	0.733	1.49	2.19	0.870	2.46	0.696
14	9.25	0.00433	0.0947	0.309	0.460	0.612	0.688	0.101	0.697	1.19	1.70	0.880	1.97	0.542
16	7.73	0.00490	0.0988	0.250	0.372	0.490	0.558	0.111	0.620	0.972	1.36	0.847	1.61	0.435
18	6.52	0.00545	0.0997	0.212	0.308	0.398	0.434	0.120	0.534	0.815	1.12	0.776	1.34	0.357
20	5.58	0.00597	0.0976	0.184	0.260	0.333	0.359	0.126	0.457	0.691	0.936	0.689	1.14	0.300

P r (z=59) 1s(2)2s(2)3s(2)4s(2)5s(2)6s(2)2p(6)3p(6)4p(6)5p(6)3d(10)4d(10)4f(3)

Q/Rs	z-->	34.76	10.16	4.310	1.948	0.7669	0.2358	10.92	4.301	1.844	0.6591	4.359	1.606	1.125
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	2p(6)	3p(6)	4p(6)	5p(6)	3d(10)	4d(10)	4f(3)
0.2	22.5	0.591(-4)	0.00168	0.0159	0.119	1.16	18.2	0.00155	0.0185	0.163	2.07	0.0190	0.251	0.495
0.4	49.7	0.000121	0.00336	0.0317	0.238	2.33	41.0	0.00312	0.0370	0.327	4.17	0.0381	0.502	0.995
0.6	75.3	0.000182	0.00505	0.0475	0.357	3.52	62.3	0.00469	0.0554	0.490	6.27	0.0571	0.754	1.49
0.8	79.4	0.000243	0.00673	0.0634	0.476	4.72	62.0	0.00626	0.0738	0.653	8.37	0.0761	1.00	1.99
1.0	72.4	0.000304	0.00840	0.0792	0.593	5.90	50.6	0.00782	0.0924	0.815	10.5	0.0950	1.25	2.48
1.2	66.3	0.000365	0.0101	0.0950	0.710	7.00	40.3	0.00938	0.111	0.975	12.5	0.114	1.50	2.97
1.4	62.6	0.000426	0.0118	0.111	0.824	7.93	32.7	0.0109	0.129	1.13	14.4	0.133	1.74	3.44
1.6	60.3	0.000487	0.0134	0.126	0.936	8.60	27.2	0.0125	0.147	1.29	16.0	0.152	1.98	3.88
1.8	58.6	0.000548	0.0151	0.142	1.05	8.92	22.8	0.0140	0.166	1.45	17.3	0.171	2.22	4.30
2.0	57.1	0.000608	0.0168	0.157	1.15	8.89	19.6	0.0156	0.184	1.60	18.2	0.190	2.46	4.67
2.2	55.4	0.000669	0.0184	0.172	1.25	8.56	17.0	0.0172	0.202	1.74	18.6	0.208	2.68	4.99
2.4	53.5	0.000730	0.0201	0.187	1.35	8.14	14.8	0.0187	0.220	1.89	18.5	0.227	2.91	5.24
2.6	51.3	0.000791	0.0217	0.201	1.44	7.43	13.1	0.0203	0.237	2.03	18.0	0.245	3.12	5.42
2.8	49.5	0.000851	0.0234	0.216	1.52	7.23	11.7	0.0218	0.255	2.16	17.3	0.263	3.33	5.51
3.0	47.0	0.000912	0.0250	0.230	1.59	6.51	10.4	0.0234	0.272	2.29	16.3	0.282	3.53	5.53
3.2	45.3	0.000972	0.0267	0.244	1.66	5.99	9.40	0.0249	0.289	2.41	15.7	0.300	3.72	5.48
3.4	43.0	0.00103	0.0283	0.258	1.71	5.54	8.53	0.0264	0.306	2.53	14.5	0.318	3.90	5.36
3.6	40.8	0.00109	0.0299	0.271	1.75	5.12	7.78	0.0280	0.323	2.63	13.2	0.335	4.07	5.19
3.8	39.0	0.00115	0.0315	0.284	1.78	4.74	7.13	0.0295	0.340	2.73	12.3	0.353	4.23	5.05
4.0	37.4	0.00121	0.0331	0.297	1.80	4.41	6.56	0.0310	0.356	2.82	11.5	0.370	4.37	4.83
5	31.1	0.00152	0.0409	0.355	1.74	3.18	4.52	0.0386	0.435	3.11	8.48	0.455	4.86	3.92
6	26.4	0.00182	0.0484	0.401	1.53	2.40	3.35	0.0460	0.506	3.13	6.47	0.533	4.95	3.04
7	22.6	0.00212	0.0555	0.432	1.27	1.89	2.52	0.0532	0.568	2.93	5.12	0.605	4.70	2.43
8	19.5	0.00241	0.0623	0.448	1.04	1.53	1.97	0.0602	0.620	2.65	4.17	0.669	4.31	1.98
9	16.7	0.00271	0.0685	0.448	0.882	1.26	1.57	0.0670	0.660	2.25	3.47	0.725	3.69	1.65
10	14.5	0.00300	0.0742	0.436	0.760	1.06	1.30	0.0736	0.687	1.90	2.93	0.770	3.13	1.40
12	11.5	0.00357	0.0839	0.379	0.575	0.787	0.918	0.0858	0.705	1.48	2.18	0.829	2.42	1.05
14	9.39	0.00413	0.0909	0.306	0.455	0.608	0.684	0.0968	0.677	1.18	1.69	0.844	1.93	0.814
16	7.84	0.00467	0.0950	0.248	0.369	0.484	0.548	0.106	0.608	0.966	1.36	0.819	1.58	0.652
18	6.62	0.00519	0.0963	0.210	0.306	0.399	0.433	0.114	0.527	0.804	1.11	0.757	1.32	0.537
20	5.66	0.00569	0.0948	0.181	0.257	0.329	0.363	0.121	0.453	0.683	0.931	0.678	1.12	0.448

N.d (Z=60) 1s(2)2s(2)3s(2)4s(2)5s(2)6s(2)2p(6)3p(6)4p(6)5p(6)3d(10)4d(10)4f(4)

Q/Rs	---->	35.31	10.34	4.402	1.991	0.7793	0.2381	11.12	4.395	1.887	0.6694	4.462	1.649	1.173
Y	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	2p(6)	2p(6)	4p(6)	5p(6)	3d(10)	4d(10)	4f(3)
0.2	21.9	0.566(-4)	0.00160	0.0150	0.113	1.11	17.8	0.00148	0.0175	0.154	2.00	0.0179	0.235	0.471
0.4	48.3	0.000116	0.00321	0.0300	0.226	2.24	40.0	0.00297	0.0350	0.308	4.01	0.0358	0.469	0.946
0.6	73.5	0.000174	0.00481	0.0450	0.338	3.39	61.0	0.00446	0.0524	0.463	6.04	0.0537	0.705	1.42
0.8	78.1	0.000233	0.00642	0.0601	0.451	4.54	61.4	0.00595	0.0697	0.616	8.06	0.0716	0.939	1.89
1.0	71.0	0.000291	0.00801	0.0750	0.562	5.67	50.1	0.00744	0.0873	0.769	10.1	0.0893	1.17	2.36
1.2	64.9	0.000349	0.00960	0.0899	0.672	6.74	40.0	0.00893	0.105	0.920	12.0	0.107	1.40	2.82
1.4	61.1	0.000408	0.0112	0.105	0.780	7.65	32.5	0.0104	0.122	1.07	13.8	0.125	1.63	3.27
1.6	58.8	0.000466	0.0128	0.119	0.887	8.31	27.0	0.0119	0.139	1.22	15.5	0.143	1.86	3.70
1.8	57.2	0.000524	0.0144	0.134	0.991	8.66	22.8	0.0134	0.157	1.36	16.7	0.161	2.08	4.12
2.0	55.7	0.000583	0.0160	0.149	1.09	8.67	19.4	0.0148	0.174	1.51	17.6	0.178	2.30	4.50
2.2	54.1	0.000641	0.0176	0.163	1.19	8.40	16.8	0.0163	0.191	1.65	18.1	0.196	2.51	4.85
2.4	52.4	0.000699	0.0192	0.177	1.28	8.02	14.7	0.0178	0.208	1.78	18.1	0.213	2.72	5.16
2.6	50.3	0.000757	0.0207	0.191	1.37	7.34	13.0	0.0193	0.224	1.92	17.7	0.231	2.93	5.41
2.8	48.7	0.000815	0.0223	0.205	1.44	7.14	11.6	0.0208	0.241	2.04	17.0	0.248	3.12	5.61
3.0	46.4	0.000873	0.0239	0.218	1.52	6.44	10.4	0.0222	0.257	2.17	16.0	0.265	3.31	5.74
3.2	44.8	0.000931	0.0254	0.232	1.58	5.92	9.38	0.0237	0.274	2.28	15.6	0.282	3.49	5.81
3.4	42.7	0.000989	0.0270	0.245	1.63	5.47	8.51	0.0252	0.290	2.39	14.4	0.299	3.66	5.81
3.6	40.7	0.00105	0.0285	0.257	1.67	5.06	7.76	0.0266	0.306	2.50	13.2	0.316	3.83	5.77
3.8	38.9	0.00111	0.0300	0.270	1.71	4.68	7.11	0.0281	0.322	2.59	12.2	0.332	3.98	5.66
4.0	37.3	0.00116	0.0316	0.282	1.73	4.37	6.53	0.0295	0.337	2.68	11.4	0.349	4.12	5.53
5	31.2	0.00145	0.0390	0.338	1.69	3.15	4.52	0.0367	0.412	2.97	8.99	0.428	4.61	4.61
6	26.5	0.00174	0.0462	0.382	1.49	2.38	3.33	0.0438	0.480	3.02	6.44	0.503	4.74	3.69
7	22.7	0.00203	0.0530	0.413	1.26	1.88	2.52	0.0507	0.539	2.85	5.10	0.571	4.54	2.97
8	19.7	0.00231	0.0595	0.430	1.03	1.52	1.95	0.0574	0.589	2.61	4.14	0.633	4.20	2.45
9	16.9	0.00259	0.0655	0.432	0.869	1.25	1.58	0.0639	0.629	2.22	3.44	0.686	3.64	2.04
10	14.7	0.00287	0.0710	0.423	0.750	1.06	1.31	0.0702	0.657	1.89	2.92	0.730	3.10	1.74
12	11.6	0.00342	0.0804	0.372	0.572	0.782	0.916	0.0819	0.679	1.46	2.17	0.790	2.38	1.31
14	9.46	0.00395	0.0873	0.303	0.450	0.604	0.686	0.0925	0.657	1.16	1.68	0.810	1.90	1.02
16	7.91	0.00447	0.0910	0.246	0.365	0.484	0.540	0.102	0.596	0.953	1.35	0.791	1.56	0.824
18	6.70	0.00498	0.0932	0.207	0.303	0.431	0.431	0.110	0.520	0.799	1.11	0.738	1.31	0.677
20	5.75	0.00546	0.0921	0.179	0.256	0.329	0.369	0.116	0.448	0.678	0.928	0.666	1.11	0.570

P.m.(Z=61) 1s(2)2s(2)3s(2)4s(2)5s(2)6s(2)2p(6)3p(6)4p(6)5p(6)3d(10)4d(10)4f(5)

0/Rs	---->	35.95	10.41	4.494	2.033	0.7916	0.2403	11.32	4.489	1.931	0.6793	4.565	1.692	1.215
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	2p(6)	3p(6)	4p(6)	5p(6)	3d(10)	4d(10)	4f(5)
0.2	21.4	0.538(-4)	0.00157	0.0142	0.107	1.07	17.4	0.00140	0.0165	0.145	1.93	0.0168	0.220	0.449
0.4	47.1	0.000110	0.00315	0.0285	0.214	2.16	39.1	0.00283	0.0331	0.290	3.87	0.0337	0.439	0.902
0.6	71.8	0.000166	0.00473	0.0427	0.321	3.26	59.8	0.00425	0.0496	0.436	5.82	0.0506	0.660	1.35
0.8	76.8	0.000221	0.00631	0.0569	0.428	4.37	60.8	0.00567	0.0660	0.581	7.78	0.0674	0.879	1.80
1.0	69.7	0.000277	0.00788	0.0711	0.533	5.46	49.6	0.00709	0.0826	0.725	9.72	0.0841	1.10	2.25
1.2	63.6	0.000333	0.00944	0.0853	0.638	6.49	39.7	0.00851	0.0991	0.868	11.6	0.101	1.31	2.68
1.4	59.9	0.000388	0.0110	0.0993	0.741	7.38	32.4	0.00992	0.116	1.01	13.4	0.118	1.53	3.12
1.6	57.5	0.000444	0.0126	0.113	0.842	8.04	26.8	0.0113	0.132	1.15	14.9	0.135	1.74	3.53
1.8	55.8	0.000499	0.0142	0.127	0.941	8.41	22.6	0.0127	0.148	1.29	16.2	0.151	1.95	3.94
2.0	54.4	0.000554	0.0157	0.141	1.04	8.46	19.4	0.0141	0.164	1.42	17.1	0.168	2.15	4.32
2.2	52.8	0.000610	0.0173	0.154	1.13	8.23	16.7	0.0156	0.180	1.56	17.6	0.184	2.36	4.68
2.4	51.2	0.000665	0.0188	0.168	1.22	7.88	14.7	0.0170	0.196	1.68	17.6	0.201	2.55	5.01
2.6	49.3	0.000721	0.0204	0.181	1.30	7.26	13.0	0.0184	0.212	1.81	17.3	0.217	2.74	5.30
2.8	47.8	0.000776	0.0219	0.194	1.38	7.05	11.5	0.0198	0.228	1.93	16.8	0.234	2.93	5.54
3.0	45.6	0.000831	0.0235	0.207	1.44	6.39	10.3	0.0212	0.244	2.05	15.8	0.250	3.11	5.74
3.2	44.1	0.000886	0.0250	0.220	1.51	5.84	9.33	0.0226	0.259	2.16	15.3	0.266	3.28	5.89
3.4	42.2	0.000941	0.0265	0.232	1.56	5.41	8.46	0.0240	0.274	2.27	14.2	0.282	3.45	5.98
3.6	40.3	0.000996	0.0280	0.244	1.60	5.01	7.72	0.0254	0.290	2.36	13.1	0.297	3.60	6.02
3.8	38.5	0.00105	0.0295	0.256	1.64	4.65	7.06	0.0268	0.305	2.46	12.1	0.313	3.75	6.01
4.0	37.1	0.00111	0.0310	0.268	1.66	4.32	6.50	0.0281	0.319	2.54	11.3	0.329	3.88	5.95
5	31.2	0.00138	0.0384	0.321	1.64	3.11	4.51	0.0350	0.390	2.84	8.31	0.404	4.37	5.17
6	26.7	0.00166	0.0454	0.364	1.46	2.37	3.31	0.0417	0.455	2.90	6.38	0.475	4.53	4.34
7	22.9	0.00193	0.0522	0.395	1.24	1.86	2.51	0.0483	0.512	2.77	5.06	0.540	4.39	3.48
8	19.8	0.00220	0.0585	0.413	1.02	1.50	1.94	0.0547	0.561	2.55	4.12	0.598	4.09	2.87
9	17.1	0.00247	0.0645	0.417	0.863	1.25	1.58	0.0609	0.600	2.20	3.43	0.650	3.59	2.41
10	14.9	0.00273	0.0699	0.410	0.741	1.05	1.31	0.0669	0.629	1.87	2.90	0.693	3.07	2.06
12	11.7	0.00326	0.0792	0.366	0.565	0.776	0.917	0.0782	0.653	1.43	2.15	0.753	2.34	1.56
14	9.54	0.00377	0.0861	0.300	0.447	0.687	0.687	0.0884	0.637	1.15	1.68	0.777	1.87	1.22
16	7.98	0.00426	0.0904	0.244	0.361	0.609	0.537	0.0974	0.584	0.947	1.34	0.764	1.55	0.983
18	6.76	0.00474	0.0921	0.205	0.300	0.394	0.430	0.105	0.513	0.789	1.10	0.719	1.29	0.812
20	5.81	0.00521	0.0912	0.176	0.253	0.329	0.369	0.111	0.443	0.670	0.922	0.653	1.10	0.685

S.m (Z=62) 1s(2)2s(2)3s(2)4s(2)5s(2)6s(2)7p(6)8p(6)9p(6)10d(10)4f(6)

B/Rs	---->	36.51	10.71	4.585	2.075	0.8031	0.2424	11.52	4.579	1.973	0.6884	4.667	1.734	1.258
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	2p(6)	3p(6)	4p(6)	5p(6)	3d(10)	4d(10)	4f(6)
0.2	20.9	0.515(-4)	0.00145	0.0135	0.102	1.04	17.1	0.00134	0.0157	0.138	1.87	0.0159	0.207	0.425
0.4	45.9	0.000105	0.00292	0.0270	0.204	2.09	38.2	0.00270	0.0314	0.275	3.75	0.0318	0.413	0.854
0.6	70.2	0.000159	0.00438	0.0405	0.305	3.15	58.6	0.00406	0.0471	0.413	5.64	0.0477	0.620	1.28
0.8	75.6	0.000212	0.00584	0.0541	0.406	4.22	60.2	0.00541	0.0627	0.550	7.53	0.0636	0.826	1.70
1.0	68.5	0.000265	0.00729	0.0676	0.507	5.27	49.2	0.00677	0.0784	0.687	9.40	0.0793	1.03	2.13
1.2	62.3	0.000319	0.00874	0.0810	0.606	6.27	39.4	0.00812	0.0941	0.822	11.2	0.0953	1.23	2.54
1.4	58.6	0.000372	0.0102	0.0943	0.704	7.13	32.1	0.00945	0.110	0.956	12.9	0.111	1.44	2.95
1.6	56.2	0.000425	0.0117	0.108	0.800	7.79	26.5	0.0108	0.125	1.09	14.5	0.127	1.64	3.35
1.8	54.5	0.000478	0.0131	0.121	0.894	8.18	22.5	0.0122	0.141	1.22	15.7	0.143	1.83	3.74
2.0	53.1	0.000532	0.0146	0.134	0.986	8.26	19.2	0.0135	0.156	1.35	16.7	0.158	2.03	4.11
2.2	51.7	0.000585	0.0160	0.147	1.07	8.08	16.7	0.0148	0.171	1.47	17.2	0.174	2.22	4.47
2.4	50.1	0.000638	0.0174	0.159	1.16	7.75	14.6	0.0162	0.187	1.60	17.3	0.190	2.40	4.80
2.6	48.3	0.000691	0.0189	0.172	1.24	7.19	12.9	0.0175	0.202	1.72	17.0	0.205	2.58	5.10
2.8	46.8	0.000744	0.0203	0.185	1.31	6.94	11.5	0.0189	0.217	1.81	16.5	0.220	2.76	5.37
3.0	44.8	0.000797	0.0217	0.197	1.38	6.34	10.3	0.0202	0.231	1.94	15.6	0.236	2.93	5.60
3.2	43.3	0.000850	0.0232	0.209	1.44	5.77	9.28	0.0216	0.246	2.05	15.1	0.251	3.09	5.80
3.4	41.5	0.000902	0.0246	0.221	1.49	5.35	8.42	0.0229	0.261	2.15	14.1	0.266	3.25	5.95
3.6	39.7	0.000955	0.0260	0.232	1.53	4.95	7.68	0.0242	0.275	2.25	13.0	0.281	3.40	6.05
3.8	38.0	0.00101	0.0274	0.244	1.57	4.60	7.25	0.0256	0.289	2.34	12.0	0.296	3.54	6.11
4.0	36.7	0.00106	0.0288	0.255	1.59	4.27	6.47	0.0269	0.304	2.42	11.2	0.310	3.67	6.12
5	31.1	0.00132	0.0356	0.306	1.59	3.10	4.49	0.0334	0.371	2.72	8.23	0.382	4.15	5.69
6	26.8	0.00159	0.0421	0.348	1.42	2.35	3.30	0.0399	0.433	2.80	6.83	0.449	4.34	4.96
7	22.9	0.00185	0.0484	0.379	1.23	1.85	2.49	0.0462	0.488	2.69	5.02	0.511	4.24	3.92
8	19.9	0.00211	0.0544	0.397	1.00	1.50	1.95	0.0523	0.556	2.50	4.09	0.567	3.97	3.27
9	17.3	0.00237	0.0599	0.403	0.851	1.24	1.58	0.0582	0.574	2.17	3.40	0.617	3.54	2.76
10	15.0	0.00262	0.0651	0.398	0.731	1.04	1.30	0.0640	0.603	1.85	2.88	0.659	3.03	2.36
12	11.8	0.00312	0.0740	0.359	0.558	0.773	0.921	0.0749	0.630	1.42	2.15	0.719	2.30	1.79
14	9.63	0.00361	0.0807	0.297	0.442	0.598	0.688	0.0847	0.618	1.14	1.67	0.745	1.86	1.41
16	8.04	0.00409	0.0852	0.243	0.360	0.479	0.534	0.0934	0.572	0.934	1.34	0.738	1.53	1.14
18	6.81	0.00455	0.0872	0.202	0.298	0.392	0.430	0.101	0.505	0.779	1.10	0.700	1.27	0.943
20	5.85	0.00500	0.0869	0.175	0.252	0.326	0.366	0.107	0.439	0.662	0.919	0.640	1.08	0.792

E. u. (Z=63) 1s(2) 2s(2) 3s(2) 4s(2) 5s(2) 6s(2) 2p(6) 3p(6) 4p(6) 5p(6) 3d(10) 4d(10) 4f(7)

Q/Rs	-----	3f(15)	10.90	4.667	2.118	0.8144	0.2429	11.72	4.673	2.014	0.6975	4.769	1.776	1.301
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	2p(6)	3p(6)	4p(6)	5p(6)	3d(10)	4d(10)	4f(7)
0.2	20.7	0.491(-4)	0.00139	0.0129	0.0965	1.00	17.0	0.00128	0.0149	0.131	1.81	0.0150	0.195	0.402
0.4	45.4	0.000100	0.00279	0.0258	0.193	2.02	38.0	0.00258	0.0298	0.261	3.63	0.0301	0.388	0.806
0.6	69.5	0.000151	0.00418	0.0387	0.290	3.04	58.4	0.00387	0.0446	0.392	5.46	0.0451	0.584	1.21
0.8	74.8	0.000202	0.00558	0.0516	0.386	4.08	60.0	0.00517	0.0594	0.522	7.29	0.0601	0.778	1.61
1.0	67.7	0.000253	0.00696	0.0645	0.481	5.09	49.1	0.00646	0.0743	0.652	9.11	0.0750	0.970	2.01
1.2	61.4	0.000304	0.00835	0.0773	0.576	6.06	39.3	0.00775	0.0892	0.780	10.9	0.0900	1.16	2.40
1.4	57.6	0.000355	0.00973	0.0901	0.669	6.91	32.1	0.00904	0.104	0.908	12.5	0.105	1.35	2.79
1.6	55.1	0.000406	0.0111	0.103	0.760	7.56	26.6	0.0103	0.119	1.03	14.0	0.120	1.54	3.17
1.8	53.4	0.000456	0.0125	0.115	0.850	7.96	22.5	0.0116	0.133	1.16	15.3	0.135	1.72	3.54
2.0	52.0	0.000507	0.0139	0.128	0.937	8.07	19.2	0.0129	0.148	1.28	16.2	0.150	1.91	3.90
2.2	50.6	0.000558	0.0153	0.140	1.02	7.93	16.7	0.0142	0.163	1.40	16.7	0.164	2.09	4.24
2.4	49.1	0.000608	0.0167	0.152	1.10	7.62	14.6	0.0155	0.177	1.52	16.9	0.179	2.26	4.56
2.6	47.4	0.000659	0.0180	0.164	1.18	7.11	12.9	0.0168	0.191	1.63	16.7	0.194	2.43	4.87
2.8	45.8	0.000709	0.0194	0.176	1.25	6.78	11.5	0.0180	0.205	1.74	16.2	0.208	2.60	5.15
3.0	44.0	0.000760	0.0208	0.188	1.31	6.30	10.3	0.0193	0.220	1.85	15.4	0.223	2.76	5.40
3.2	42.4	0.000810	0.0221	0.200	1.37	5.74	9.28	0.0206	0.234	1.95	14.8	0.237	2.92	5.62
3.4	40.8	0.000861	0.0235	0.211	1.42	5.29	8.42	0.0219	0.247	2.05	14.0	0.251	3.06	5.80
3.6	39.1	0.000911	0.0248	0.222	1.47	4.90	7.68	0.0231	0.261	2.14	12.9	0.265	3.21	5.95
3.8	37.4	0.000962	0.0261	0.233	1.50	4.55	7.03	0.0244	0.275	2.23	11.9	0.279	3.34	6.06
4.0	36.1	0.00101	0.0275	0.244	1.53	4.25	6.47	0.0257	0.288	2.31	11.1	0.293	3.47	6.13
5	30.9	0.00126	0.0340	0.293	1.54	3.07	4.48	0.0319	0.353	2.60	8.20	0.361	3.95	5.97
6	26.7	0.00151	0.0403	0.334	1.40	2.33	3.30	0.0381	0.412	2.70	6.30	0.425	4.16	5.27
7	23.1	0.00176	0.0463	0.364	1.22	1.84	2.49	0.0441	0.465	2.62	5.00	0.484	4.10	4.41
8	20.0	0.00201	0.0520	0.383	0.990	1.49	1.95	0.0500	0.511	2.44	4.08	0.538	3.85	3.62
9	17.4	0.00226	0.0574	0.399	0.839	1.23	1.58	0.0557	0.548	2.15	3.39	0.586	3.48	3.07
10	15.1	0.00250	0.0623	0.387	0.726	1.04	1.30	0.0612	0.577	1.84	2.87	0.627	3.00	2.63
12	11.9	0.00298	0.0710	0.353	0.555	0.769	0.922	0.0716	0.606	1.40	2.13	0.687	2.28	2.01
14	9.69	0.00345	0.0776	0.294	0.487	0.594	0.689	0.0811	0.599	1.12	1.66	0.715	1.83	1.59
16	8.09	0.00391	0.0821	0.241	0.356	0.475	0.535	0.0895	0.559	0.921	1.33	0.713	1.50	1.28
18	6.87	0.00435	0.0843	0.201	0.295	0.390	0.429	0.0968	0.498	0.774	1.09	0.681	1.27	1.06
20	5.92	0.00478	0.0844	0.173	0.250	0.325	0.365	0.103	0.434	0.658	0.917	0.627	1.08	0.897

G d (Z=64) 1s(2)2s(2)3s(2)4s(2)5s(2)6s(2)2p(6)3p(6)4p(6)5p(6)3d(10)4d(10)5d(1)4f(7)

0/Rs	---->	37.74	11.01	4.769	2.170	0.8537	0.2586	11.93	4.791	2.068	0.7372	4.882	1.824	0.4537	1.399
v	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	2p(6)	3p(6)	4p(6)	5p(6)	3d(10)	4d(10)	5d(1)	4f(7)
0.2	21.3	0.470(-4)	0.00135	0.0122	0.0908	0.895	14.7	0.0122	0.0139	0.122	1.58	0.0141	0.182	3.40	0.335
0.4	46.2	0.962(-4)	0.00271	0.0244	0.182	1.80	32.5	0.00246	0.0279	0.244	3.18	0.0283	0.363	7.16	0.672
0.6	71.7	0.00145	0.00407	0.0366	0.273	2.71	50.6	0.00369	0.0418	0.367	4.77	0.0424	0.545	11.3	1.01
0.8	82.9	0.000194	0.00543	0.0488	0.363	3.63	55.0	0.00493	0.0557	0.489	6.37	0.0565	0.727	14.8	1.34
1.0	78.7	0.000242	0.00678	0.0610	0.453	4.54	46.3	0.00616	0.0696	0.610	7.95	0.0705	0.907	16.0	1.67
1.2	71.6	0.000291	0.00813	0.0731	0.542	5.40	37.3	0.00739	0.0835	0.730	9.49	0.0846	1.09	14.7	2.00
1.4	65.8	0.000340	0.00947	0.0852	0.630	6.18	30.6	0.00862	0.0974	0.849	11.0	0.0987	1.26	12.6	2.32
1.6	61.5	0.000388	0.0108	0.0972	0.716	6.82	25.5	0.00984	0.111	0.967	12.3	0.113	1.44	10.8	2.64
1.8	58.4	0.000437	0.0122	0.109	0.800	7.25	21.6	0.0111	0.125	1.08	13.5	0.127	1.61	9.23	2.95
2.0	56.0	0.000486	0.0135	0.121	0.883	7.44	18.5	0.0123	0.139	1.20	14.4	0.141	1.78	8.03	3.26
2.2	53.8	0.000534	0.0149	0.133	0.962	7.40	16.1	0.0135	0.152	1.31	15.0	0.155	1.95	7.01	3.55
2.4	51.7	0.000583	0.0162	0.144	1.04	7.17	14.1	0.0147	0.166	1.42	15.3	0.168	2.12	6.20	3.83
2.6	49.7	0.000631	0.0176	0.156	1.11	6.84	12.5	0.0160	0.179	1.53	15.3	0.182	2.28	5.51	4.09
2.8	47.6	0.000679	0.0189	0.167	1.18	6.34	11.1	0.0172	0.193	1.63	15.1	0.196	2.43	4.94	4.34
3.0	45.9	0.000728	0.0202	0.178	1.24	6.13	9.98	0.0184	0.206	1.73	14.6	0.209	2.59	4.46	4.57
3.2	43.8	0.000776	0.0215	0.189	1.30	5.57	9.01	0.0196	0.219	1.83	13.9	0.223	2.73	4.03	4.77
3.4	42.2	0.000825	0.0228	0.200	1.35	5.10	8.19	0.0208	0.232	1.92	13.5	0.236	2.87	3.68	4.95
3.6	40.4	0.000873	0.0242	0.210	1.39	4.76	7.47	0.0221	0.245	2.01	12.6	0.250	3.01	3.37	5.10
3.8	38.6	0.000921	0.0255	0.221	1.43	4.40	6.84	0.0233	0.258	2.09	11.6	0.263	3.14	3.09	5.23
4.0	37.0	0.000969	0.0267	0.231	1.46	4.12	6.31	0.0245	0.270	2.17	10.7	0.276	3.26	2.85	5.33
5	31.4	0.00121	0.0331	0.278	1.49	3.00	4.38	0.0304	0.331	2.46	7.93	0.340	3.73	1.99	5.38
6	27.1	0.00145	0.0392	0.317	1.36	2.28	3.24	0.0363	0.387	2.58	6.11	0.400	3.95	1.48	4.87
7	23.5	0.00169	0.0451	0.347	1.20	1.80	2.47	0.0421	0.438	2.52	4.88	0.456	3.93	1.15	4.26
8	20.3	0.00193	0.0507	0.367	0.981	1.45	1.93	0.0477	0.481	2.37	3.97	0.508	3.73	0.920	3.46
9	17.7	0.00216	0.0559	0.375	0.826	1.21	1.56	0.0531	0.518	2.11	3.31	0.554	3.41	0.753	2.93
10	15.4	0.00240	0.0608	0.374	0.715	1.02	1.28	0.0584	0.547	1.82	2.81	0.593	2.96	0.622	2.54
12	12.0	0.00286	0.0693	0.345	0.547	0.755	0.907	0.0684	0.578	1.38	2.10	0.653	2.24	0.446	1.94
14	9.80	0.00331	0.0759	0.290	0.434	0.585	0.680	0.0776	0.576	1.11	1.63	0.684	1.80	0.333	1.53
16	8.20	0.00375	0.0804	0.239	0.351	0.469	0.540	0.0857	0.543	0.914	1.31	0.685	1.48	0.260	1.24
18	6.96	0.00417	0.0827	0.198	0.293	0.384	0.435	0.0928	0.488	0.763	1.08	0.660	1.25	0.209	1.03
20	5.97	0.00458	0.0829	0.171	0.247	0.321	0.348	0.0987	0.428	0.649	0.901	0.613	1.06	0.171	0.873

T b (Z=65) 1s(2) 2s(2) 3s(2) 4s(2) 5s(2) 6s(2) 2p(6) 3p(6) 4p(6) 5p(6) 3d(10) 4d(10) 4f(9)

0/Rs	----	38.40	11.29	4.858	2.203	0.8381	0.2487	12.14	4.868	2.099	0.7165	4.373	1.860	1.363
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	2p(6)	3p(6)	4p(6)	5p(6)	3d(10)	4d(10)	4f(9)
0.2	19.5	0.448(-4)	0.00126	0.0116	0.0874	0.936	16.1	0.00116	0.0134	0.118	1.70	0.0134	0.173	0.373
0.4	42.7	0.917(-4)	0.00254	0.0233	0.175	1.88	35.8	0.00235	0.0268	0.235	3.40	0.0269	0.345	0.747
0.6	65.7	0.138(-3)	0.00381	0.0349	0.263	2.84	55.4	0.00352	0.0401	0.353	5.11	0.0404	0.519	1.12
0.8	71.9	0.185(-3)	0.00508	0.0465	0.350	3.80	58.1	0.00470	0.0534	0.470	6.83	0.0538	0.691	1.49
1.0	65.1	0.231(-3)	0.00634	0.0582	0.436	4.75	47.9	0.00588	0.0667	0.587	8.52	0.0671	0.863	1.86
1.2	59.1	0.278(-3)	0.00760	0.0697	0.522	5.65	38.6	0.00705	0.0801	0.703	10.2	0.0806	1.03	2.23
1.4	55.2	0.324(-3)	0.00886	0.0812	0.606	6.46	31.5	0.00822	0.0934	0.817	11.8	0.0940	1.20	2.59
1.6	52.7	0.370(-3)	0.0101	0.0927	0.689	7.10	26.2	0.00939	0.107	0.931	13.2	0.107	1.37	2.94
1.8	51.0	0.417(-3)	0.0114	0.104	0.771	7.52	22.1	0.0106	0.120	1.04	14.4	0.121	1.53	3.29
2.0	49.7	0.463(-3)	0.0127	0.115	0.850	7.69	19.0	0.0117	0.133	1.15	15.3	0.134	1.70	3.63
2.2	48.4	0.509(-3)	0.0139	0.126	0.927	7.61	16.4	0.0129	0.146	1.26	15.9	0.147	1.86	3.96
2.4	47.0	0.556(-3)	0.0152	0.138	1.00	7.34	14.4	0.0141	0.159	1.37	16.1	0.160	2.01	4.28
2.6	45.5	0.602(-3)	0.0164	0.148	1.07	6.95	12.7	0.0152	0.172	1.47	16.0	0.174	2.17	4.58
2.8	43.9	0.648(-3)	0.0177	0.159	1.14	6.48	11.3	0.0164	0.185	1.57	15.7	0.187	2.32	4.86
3.0	42.4	0.694(-3)	0.0189	0.170	1.20	6.20	10.2	0.0176	0.197	1.67	15.0	0.200	2.46	5.13
3.2	40.7	0.740(-3)	0.0201	0.180	1.25	5.62	9.18	0.0187	0.210	1.76	14.3	0.212	2.60	5.37
3.4	39.5	0.786(-3)	0.0214	0.191	1.30	5.17	8.33	0.0199	0.223	1.85	13.8	0.225	2.74	5.59
3.6	37.8	0.832(-3)	0.0226	0.201	1.35	4.82	7.59	0.0210	0.235	1.94	12.7	0.238	2.87	5.78
3.8	36.3	0.878(-3)	0.0238	0.211	1.39	4.46	6.96	0.0222	0.247	2.02	11.8	0.251	2.99	5.95
4.0	34.9	0.924(-3)	0.0250	0.221	1.41	4.16	6.40	0.0234	0.259	2.10	10.9	0.263	3.11	6.09
5	30.2	0.00115	0.0310	0.266	1.45	3.03	4.44	0.0291	0.318	2.39	8.09	0.324	3.57	6.31
6	26.5	0.00138	0.0368	0.304	1.34	2.30	3.28	0.0347	0.372	2.51	6.22	0.382	3.81	5.89
7	23.3	0.00161	0.0423	0.333	1.19	1.81	2.49	0.0402	0.421	2.47	4.94	0.436	3.82	5.29
8	20.1	0.00184	0.0476	0.353	0.975	1.47	1.95	0.0455	0.464	2.32	4.03	0.485	3.64	4.35
9	17.5	0.00206	0.0525	0.363	0.822	1.22	1.56	0.0508	0.499	2.09	3.36	0.530	3.36	3.64
10	15.3	0.00229	0.0571	0.362	0.707	1.03	1.28	0.0558	0.528	1.80	2.84	0.568	2.93	3.16
12	12.0	0.00273	0.0652	0.338	0.545	0.761	0.927	0.0654	0.650	1.37	2.12	0.627	2.21	2.42
14	9.83	0.00316	0.0716	0.287	0.430	0.589	0.897	0.0742	0.561	1.10	1.65	0.659	1.79	1.92
16	8.20	0.00358	0.0762	0.237	0.350	0.471	0.534	0.0821	0.533	0.903	1.32	0.664	1.47	1.56
18	6.98	0.00398	0.0787	0.197	0.290	0.386	0.428	0.0890	0.481	0.760	1.08	0.643	1.24	1.30
20	6.00	0.00438	0.0793	0.168	0.246	0.323	0.354	0.0948	0.424	0.646	0.909	0.601	1.06	1.09

D y (Z=66) 1s(2)2s(2)3s(2)4s(2)5s(2)6s(2)7s(2)8s(2)9p(6)4p(6)5p(6)3d(10)4d(10)4f(10)

q/Rs	---->	38.99	11.47	4.947	2.245	0.8492	0.2509	12.33	4.952	2.140	0.7257	5.075	1.901	1.398
v	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	2p(6)	3p(6)	4p(6)	5p(6)	3d(10)	4d(10)	4f(10)
0.2	19.0	0.429(-4)	0.00121	0.0111	0.0834	0.907	15.7	0.00112	0.0128	0.112	1.64	0.0127	0.164	0.356
0.4	41.7	0.879(-4)	0.00243	0.0222	0.167	1.82	35.1	0.00225	0.0256	0.224	3.30	0.0255	0.326	0.713
0.6	64.2	0.133(-3)	0.00365	0.0333	0.251	2.75	54.3	0.00338	0.0384	0.336	4.96	0.0383	0.491	1.07
0.8	70.7	0.177(-3)	0.00487	0.0444	0.334	3.68	57.4	0.00451	0.0511	0.448	6.62	0.0510	0.654	1.42
1.0	64.1	0.222(-3)	0.00608	0.0555	0.416	4.60	47.5	0.00564	0.0638	0.559	8.26	0.0637	0.816	1.78
1.2	58.1	0.266(-3)	0.00729	0.0665	0.498	5.47	38.3	0.00676	0.0766	0.669	9.87	0.0764	0.977	2.13
1.4	54.2	0.311(-3)	0.00850	0.0775	0.578	6.26	31.3	0.00789	0.0893	0.778	11.4	0.0891	1.14	2.47
1.6	51.7	0.355(-3)	0.00971	0.0884	0.658	6.90	26.0	0.00901	0.102	0.886	12.8	0.102	1.30	2.81
1.8	50.0	0.340(-3)	0.0109	0.0992	0.735	7.33	22.0	0.0101	0.115	0.993	14.0	0.115	1.45	3.14
2.0	48.6	0.444(-3)	0.0121	0.110	0.811	7.51	18.8	0.0113	0.127	1.10	14.9	0.127	1.61	3.47
2.2	47.4	0.488(-3)	0.0133	0.121	0.885	7.46	16.3	0.0124	0.140	1.20	15.5	0.140	1.76	3.79
2.4	46.1	0.533(-3)	0.0146	0.131	0.956	7.22	14.3	0.0135	0.152	1.30	15.8	0.152	1.91	4.10
2.6	44.6	0.577(-3)	0.0157	0.142	1.02	6.87	12.7	0.0146	0.164	1.40	15.7	0.165	2.05	4.39
2.8	43.0	0.621(-3)	0.0169	0.152	1.09	6.38	11.3	0.0157	0.177	1.50	15.4	0.177	2.20	4.67
3.0	41.7	0.666(-3)	0.0181	0.162	1.15	6.15	10.1	0.0169	0.189	1.59	14.8	0.189	2.33	4.94
3.2	40.0	0.710(-3)	0.0193	0.172	1.20	5.58	9.14	0.0180	0.201	1.68	14.1	0.201	2.47	5.18
3.4	38.8	0.754(-3)	0.0205	0.182	1.25	5.14	8.29	0.0191	0.213	1.77	13.6	0.214	2.60	5.41
3.6	37.2	0.798(-3)	0.0217	0.192	1.29	4.77	7.57	0.0202	0.225	1.85	12.7	0.226	2.72	5.61
3.8	35.7	0.842(-3)	0.0228	0.201	1.33	4.44	6.93	0.0213	0.237	1.93	11.7	0.238	2.84	5.79
4.0	34.4	0.887(-3)	0.0240	0.211	1.36	4.12	6.39	0.0224	0.248	2.00	10.8	0.250	2.95	5.95
5	29.8	0.00111	0.0297	0.254	1.41	3.00	4.43	0.0279	0.304	2.29	8.01	0.308	3.41	6.32
6	26.3	0.00133	0.0353	0.291	1.31	2.28	3.26	0.0333	0.356	2.42	6.17	0.363	3.65	6.08
7	23.3	0.00155	0.0406	0.320	1.18	1.80	2.49	0.0385	0.403	2.40	4.90	0.414	3.68	5.55
8	20.3	0.00176	0.0457	0.340	0.968	1.46	1.94	0.0437	0.445	2.27	4.00	0.461	3.53	4.71
9	17.6	0.00198	0.0505	0.350	0.810	1.21	1.55	0.0487	0.480	2.06	3.33	0.504	3.29	3.91
10	15.4	0.00219	0.0549	0.352	0.703	1.02	1.28	0.0536	0.508	1.79	2.82	0.542	2.90	3.39
12	12.1	0.00262	0.0628	0.330	0.538	0.758	0.918	0.0629	0.542	1.35	2.11	0.600	2.19	2.60
14	9.88	0.00303	0.0691	0.283	0.427	0.586	0.697	0.0714	0.545	1.08	1.64	0.633	1.76	2.07
16	8.26	0.00343	0.0736	0.235	0.348	0.469	0.533	0.0790	0.521	0.898	1.32	0.641	1.45	1.69
18	7.02	0.00383	0.0763	0.195	0.289	0.384	0.429	0.0857	0.474	0.750	1.08	0.625	1.22	1.41
20	6.04	0.00421	0.0771	0.167	0.243	0.322	0.353	0.0914	0.419	0.639	0.904	0.587	1.04	1.19

H o (Z=67) 1s(2)2s(2)3s(2)4s(2)5s(2)6s(2)7p(6)8p(6)9p(6)3d(10)4d(10)4f(11)

l/Rs	V	39.57	11.65	5.045	2.287	0.8604	0.2529	12.55	5.069	2.179	0.7334	5.176	1.942	1.433
	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	2p(6)	3p(6)	4p(6)	5p(6)	3d(10)	4d(10)	4f(11)
0.2	18.6	0.412(-4)	0.00116	0.0106	0.0796	0.879	15.5	0.00106	0.0120	0.107	1.60	0.0121	0.155	0.340
0.4	40.8	0.844(-4)	0.00233	0.0211	0.159	1.77	34.4	0.00214	0.0241	0.213	3.22	0.0242	0.309	0.680
0.6	62.9	0.127(-3)	0.00350	0.0316	0.239	2.66	53.3	0.00322	0.0361	0.321	4.83	0.0363	0.465	1.02
0.8	69.6	0.170(-3)	0.00467	0.0422	0.318	3.56	56.7	0.00430	0.0480	0.428	6.45	0.0484	0.619	1.36
1.0	63.3	0.213(-3)	0.00584	0.0527	0.397	4.45	47.2	0.00537	0.0600	0.534	8.05	0.0604	0.773	1.70
1.2	57.2	0.256(-3)	0.00700	0.0632	0.475	5.30	38.0	0.00645	0.0720	0.639	9.61	0.0725	0.926	2.03
1.4	53.3	0.298(-3)	0.00815	0.0737	0.552	6.07	31.1	0.00752	0.0840	0.743	11.1	0.0846	1.08	2.36
1.6	50.7	0.341(-3)	0.00932	0.0840	0.628	6.70	25.9	0.00859	0.0959	0.847	12.5	0.0966	1.23	2.68
1.8	49.0	0.384(-3)	0.0105	0.0943	0.702	7.13	21.9	0.00966	0.108	0.949	13.6	0.109	1.38	3.00
2.0	47.7	0.426(-3)	0.0116	0.105	0.775	7.34	18.8	0.0107	0.120	1.05	14.6	0.121	1.52	3.32
2.2	46.4	0.469(-3)	0.0128	0.115	0.845	7.31	16.3	0.0118	0.131	1.15	15.2	0.133	1.67	3.62
2.4	45.1	0.512(-3)	0.0140	0.125	0.913	7.10	14.3	0.0129	0.143	1.25	15.5	0.144	1.81	3.92
2.6	43.8	0.554(-3)	0.0151	0.135	0.978	6.79	12.6	0.0139	0.155	1.34	15.5	0.156	1.95	4.21
2.8	42.2	0.597(-3)	0.0163	0.145	1.04	6.30	11.2	0.0150	0.166	1.43	15.2	0.168	2.08	4.48
3.0	41.0	0.639(-3)	0.0174	0.154	1.10	6.10	10.1	0.0161	0.178	1.52	14.7	0.180	2.21	4.74
3.2	39.3	0.682(-3)	0.0185	0.164	1.15	5.55	9.11	0.0171	0.189	1.61	13.9	0.191	2.34	4.99
3.4	38.0	0.724(-3)	0.0197	0.173	1.20	5.08	8.26	0.0182	0.200	1.69	13.5	0.203	2.46	5.22
3.6	36.5	0.767(-3)	0.0208	0.183	1.24	4.72	7.54	0.0193	0.212	1.77	12.6	0.214	2.58	5.43
3.8	35.1	0.809(-3)	0.0219	0.192	1.28	4.39	6.92	0.0203	0.223	1.85	11.6	0.226	2.70	5.62
4.0	33.8	0.851(-3)	0.0230	0.201	1.31	4.10	6.36	0.0214	0.234	1.92	10.8	0.237	2.81	5.79
5	29.3	0.00106	0.0285	0.242	1.37	2.98	4.41	0.0266	0.287	2.20	7.94	0.292	3.25	6.28
6	26.0	0.00127	0.0339	0.278	1.29	2.27	3.25	0.0317	0.336	2.34	6.15	0.345	3.50	6.19
7	23.1	0.00148	0.0390	0.306	1.16	1.79	2.48	0.0368	0.381	2.33	4.89	0.394	3.55	5.70
8	20.3	0.00169	0.0439	0.326	0.960	1.45	1.93	0.0417	0.421	2.22	3.99	0.439	3.43	5.03
9	17.7	0.00190	0.0485	0.337	0.805	1.20	1.56	0.0465	0.455	2.03	3.32	0.481	3.22	4.21
10	15.5	0.00211	0.0528	0.340	0.693	1.02	1.28	0.0512	0.482	1.77	2.81	0.517	2.86	3.60
12	12.1	0.00251	0.0605	0.322	0.532	0.753	0.912	0.0601	0.517	1.33	2.10	0.574	2.17	2.77
14	9.90	0.00291	0.0666	0.279	0.423	0.585	0.692	0.0683	0.524	1.08	1.63	0.608	1.73	2.21
16	8.29	0.00330	0.0712	0.232	0.344	0.467	0.534	0.0756	0.505	0.886	1.31	0.619	1.44	1.81
18	7.07	0.00368	0.0739	0.194	0.286	0.383	0.432	0.0821	0.463	0.746	1.08	0.606	1.21	1.51
20	6.08	0.00404	0.0749	0.164	0.242	0.320	0.351	0.0877	0.412	0.635	0.903	0.574	1.04	1.28

E. r (Z=58) 1s(2)2s(2)3s(2)4s(2)5s(2)2p(6)3p(6)4p(6)5p(6)3d(10)4d(10)4f(12)

Q/Rs	--->	39.91	11.84	- 5.128	2.328	0.8657	0.2549	12.75	5.162	2.221	0.7420	5.277	1.982	1.465
v	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	2p(6)	3p(6)	4p(6)	5p(6)	3d(10)	4d(10)	4f(12)
0.2	18.3	0.402(-4)	0.00111	0.0101	0.0761	0.866	15.2	0.00102	0.0114	0.102	1.56	0.0115	0.147	0.326
0.4	39.9	0.824(-4)	0.00224	0.0202	0.152	1.74	33.7	0.00205	0.0229	0.203	3.13	0.0230	0.294	0.652
0.6	61.7	0.124(-3)	0.00336	0.0303	0.229	2.62	52.3	0.00309	0.0344	0.306	4.70	0.0345	0.441	0.978
0.8	68.6	0.166(-3)	0.00447	0.0404	0.305	3.51	56.1	0.00412	0.0458	0.407	6.27	0.0460	0.588	1.30
1.0	62.5	0.208(-3)	0.00559	0.0506	0.380	4.39	46.8	0.00515	0.0572	0.508	7.82	0.0574	0.734	1.63
1.2	56.5	0.250(-3)	0.00670	0.0606	0.454	5.22	37.9	0.00618	0.0687	0.609	9.34	0.0689	0.879	1.95
1.4	52.5	0.291(-3)	0.00781	0.0706	0.528	5.98	30.9	0.00721	0.0801	0.708	10.8	0.0804	1.02	2.26
1.6	50.0	0.333(-3)	0.00892	0.0806	0.601	6.61	25.8	0.00823	0.0915	0.807	12.1	0.0918	1.17	2.58
1.8	48.2	0.375(-3)	0.0100	0.0904	0.672	7.04	21.8	0.00926	0.103	0.904	13.3	0.103	1.31	2.88
2.0	46.9	0.417(-3)	0.0112	0.100	0.741	7.26	18.7	0.0103	0.114	1.00	14.2	0.115	1.45	3.18
2.2	45.6	0.458(-3)	0.0123	0.110	0.809	7.24	16.2	0.0113	0.125	1.09	14.8	0.125	1.58	3.48
2.4	44.4	0.500(-3)	0.0134	0.120	0.874	7.04	14.2	0.0123	0.136	1.19	15.2	0.137	1.72	3.77
2.6	43.0	0.541(-3)	0.0145	0.129	0.937	6.75	12.6	0.0134	0.148	1.28	15.2	0.149	1.85	4.05
2.8	41.5	0.583(-3)	0.0156	0.139	0.996	6.27	11.2	0.0144	0.159	1.37	14.9	0.160	1.98	4.31
3.0	40.3	0.625(-3)	0.0167	0.148	1.05	6.07	10.1	0.0154	0.170	1.45	14.5	0.171	2.10	4.57
3.2	38.6	0.666(-3)	0.0178	0.157	1.10	5.53	9.07	0.0164	0.180	1.54	13.8	0.182	2.23	4.81
3.4	37.4	0.707(-3)	0.0188	0.166	1.15	5.07	8.24	0.0174	0.191	1.62	13.4	0.193	2.34	5.04
3.6	36.0	0.749(-3)	0.0199	0.175	1.19	4.70	7.52	0.0185	0.202	1.69	12.5	0.204	2.46	5.26
3.8	34.5	0.790(-3)	0.0210	0.184	1.23	4.38	6.89	0.0195	0.212	1.77	11.6	0.215	2.57	5.45
4.0	33.2	0.832(-3)	0.0221	0.193	1.26	4.07	6.35	0.0205	0.223	1.83	10.7	0.225	2.67	5.63
5	28.9	0.00104	0.0274	0.233	1.32	2.97	4.40	0.0255	0.274	2.11	7.91	0.278	3.10	6.21
6	25.7	0.00124	0.0325	0.267	1.26	2.27	3.25	0.0304	0.321	2.26	6.10	0.328	3.36	6.25
7	22.9	0.00145	0.0374	0.295	1.14	1.78	2.47	0.0353	0.364	2.26	4.85	0.375	3.43	5.85
8	20.3	0.00165	0.0421	0.315	0.953	1.45	1.93	0.0400	0.403	2.16	3.96	0.419	3.34	5.31
9	17.8	0.00186	0.0466	0.327	0.793	1.20	1.56	0.0446	0.436	2.00	3.30	0.458	3.15	4.49
10	15.6	0.00206	0.0507	0.330	0.684	1.01	1.29	0.0491	0.463	1.75	2.80	0.494	2.82	3.80
12	12.2	0.00246	0.0582	0.316	0.529	0.752	0.907	0.0577	0.498	1.32	2.09	0.550	2.16	2.95
14	9.96	0.00284	0.0642	0.276	0.420	0.582	0.687	0.0656	0.508	1.06	1.63	0.585	1.72	2.53
16	8.35	0.00322	0.0687	0.231	0.343	0.466	0.535	0.0727	0.492	0.881	1.31	0.597	1.42	1.93
18	7.10	0.00359	0.0715	0.193	0.285	0.382	0.434	0.0791	0.455	0.736	1.07	0.589	1.20	1.68
20	6.12	0.00395	0.0727	0.153	0.241	0.319	0.350	0.0845	0.407	0.627	0.900	0.560	1.02	1.37

T m (Z=69) 1s(2)2s(2)3s(2)4s(2)5s(2)6s(2)2p(6)3p(6)4p(6)5p(6)3d(10)4d(10)4f(13)

O/Rs	---->	40.78	12.03	5.218	2.369	0.8820	0.2568	12.96	5.259	2.259	0.7496	5.379	2.022	1.498
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	2p(6)	3p(6)	4p(6)	5p(6)	3d(10)	4d(10)	4f(13)
0.2	17.9	0.378(-4)	0.00107	0.00967	0.0729	0.828	14.9	9.74(-4)	0.0109	0.0976	1.52	0.0109	0.140	0.312
0.4	39.1	0.777(-4)	0.00214	0.0194	0.146	1.66	33.1	0.00197	0.0218	0.195	3.05	0.0219	0.279	0.623
0.6	60.5	0.117(-3)	0.00322	0.0290	0.219	2.51	51.4	0.00295	0.0327	0.293	4.58	0.0328	0.419	0.936
0.8	67.6	0.157(-3)	0.00429	0.0387	0.291	3.35	55.5	0.00394	0.0436	0.390	6.11	0.0437	0.559	1.25
1.0	61.6	0.196(-3)	0.00536	0.0483	0.364	4.19	46.5	0.00493	0.0544	0.487	7.63	0.0546	0.697	1.56
1.2	55.6	0.235(-3)	0.00642	0.0579	0.435	4.99	37.6	0.00591	0.0654	0.583	9.11	0.0655	0.835	1.86
1.4	51.6	0.275(-3)	0.00749	0.0675	0.505	5.72	30.8	0.00690	0.0763	0.678	10.5	0.0764	0.972	2.17
1.6	49.0	0.314(-3)	0.00855	0.0770	0.575	6.34	25.6	0.00788	0.0871	0.773	11.8	0.0873	1.11	2.47
1.8	47.2	0.353(-3)	0.00962	0.0865	0.643	6.78	21.7	0.00886	0.0979	0.866	13.0	0.0982	1.24	2.76
2.0	45.9	0.393(-3)	0.0107	0.0959	0.710	7.01	18.6	0.00934	0.109	0.958	13.9	0.109	1.37	3.05
2.2	44.7	0.432(-3)	0.0118	0.105	0.775	7.03	16.1	0.0108	0.119	1.05	14.5	0.120	1.50	3.34
2.4	43.5	0.471(-3)	0.0128	0.114	0.838	6.87	14.1	0.0118	0.130	1.14	14.9	0.131	1.63	3.61
2.6	42.2	0.510(-3)	0.0139	0.124	0.898	6.61	12.5	0.0128	0.141	1.23	14.9	0.141	1.76	3.88
2.8	40.8	0.550(-3)	0.0149	0.133	0.955	6.17	11.2	0.0138	0.151	1.31	14.7	0.152	1.88	4.15
3.0	39.6	0.589(-3)	0.0160	0.142	1.01	5.98	10.0	0.0147	0.161	1.39	14.3	0.162	2.00	4.40
3.2	38.0	0.628(-3)	0.0170	0.150	1.06	5.48	9.03	0.0157	0.172	1.47	13.6	0.173	2.12	4.64
3.4	36.7	0.667(-3)	0.0181	0.159	1.10	5.00	8.20	0.0167	0.182	1.55	13.2	0.183	2.23	4.86
3.6	35.3	0.706(-3)	0.0191	0.168	1.15	4.64	7.49	0.0177	0.192	1.62	12.4	0.194	2.34	5.08
3.8	33.9	0.745(-3)	0.0201	0.176	1.18	4.33	6.87	0.0186	0.202	1.69	11.5	0.204	2.45	5.28
4.0	32.6	0.784(-3)	0.0212	0.184	1.21	4.02	6.32	0.0196	0.212	1.76	10.7	0.214	2.55	5.46
5	28.4	0.978(-3)	0.0262	0.223	1.29	2.94	4.39	0.0244	0.261	2.03	7.85	0.265	2.97	6.10
6	25.4	0.00117	0.0311	0.257	1.23	2.24	3.24	0.0291	0.306	2.18	6.08	0.312	3.23	6.25
7	22.7	0.00137	0.0359	0.284	1.12	1.77	2.47	0.0338	0.348	2.20	4.84	0.357	3.32	5.97
8	20.3	0.00156	0.0404	0.304	0.945	1.44	1.93	0.0383	0.385	2.11	3.95	0.399	3.24	5.51
9	17.9	0.00175	0.0447	0.316	0.785	1.19	1.56	0.0427	0.417	1.97	3.29	0.437	3.07	4.75
10	15.7	0.00194	0.0487	0.320	0.680	1.01	1.28	0.0471	0.444	1.74	2.78	0.472	2.78	4.04
12	12.2	0.00232	0.0560	0.308	0.522	0.746	0.906	0.0553	0.480	1.31	2.08	0.527	2.14	3.10
14	9.98	0.00268	0.0619	0.272	0.416	0.580	0.683	0.0629	0.491	1.06	1.62	0.562	1.69	2.48
16	8.38	0.00304	0.0663	0.229	0.339	0.463	0.537	0.0698	0.479	0.869	1.30	0.576	1.41	2.03
18	7.14	0.00339	0.0692	0.191	0.282	0.380	0.436	0.0760	0.446	0.733	1.07	0.571	1.18	1.71
20	6.16	0.00373	0.0705	0.163	0.239	0.318	0.349	0.0813	0.401	0.624	0.896	0.547	1.02	1.45

Y b (Z=70) 1s(2)2s(2)3s(2)4s(2)5s(2)6s(2)2p(6)3p(6)4p(6)5p(6)3d(10)4d(10)4f(14)

0/Rs	---->	41.38	12.21	5.311	2.407	0.8918	0.2585	13.16	5.353	2.298	0.7573	5.479	2.062	1.533
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	2p(6)	3p(6)	4p(6)	5p(6)	3d(10)	4d(10)	4f(14)
0.2	17.6	0.363(-4)	0.00102	0.00923	0.0700	0.806	14.7	9.34(-4)	0.0104	0.0934	1.48	0.0104	0.133	0.298
0.4	38.4	0.746(-4)	0.00206	0.0185	0.140	1.82	32.5	0.00189	0.0208	0.186	2.97	0.0208	0.265	0.594
0.6	59.4	0.113(-3)	0.00309	0.0277	0.210	2.44	50.7	0.00283	0.0313	0.280	4.47	0.0316	0.399	0.893
0.8	66.8	0.150(-3)	0.00412	0.0369	0.280	3.26	55.0	0.00378	0.0416	0.373	5.96	0.0417	0.531	1.19
1.0	61.0	0.188(-3)	0.00515	0.0462	0.349	4.08	46.3	0.00473	0.0520	0.466	7.44	0.0520	0.663	1.49
1.2	54.8	0.226(-3)	0.00617	0.0553	0.418	4.86	37.3	0.00567	0.0624	0.558	8.89	0.0623	0.794	1.78
1.4	50.8	0.264(-3)	0.00720	0.0645	0.486	5.58	30.6	0.00662	0.0728	0.650	10.3	0.0728	0.925	2.07
1.6	48.3	0.302(-3)	0.00822	0.0736	0.553	6.18	25.6	0.00756	0.0831	0.740	11.6	0.0831	1.05	2.35
1.8	46.4	0.339(-3)	0.00925	0.0826	0.618	6.62	21.6	0.00850	0.0934	0.829	12.7	0.0935	1.18	2.64
2.0	45.1	0.377(-3)	0.0103	0.0916	0.682	6.87	18.5	0.00944	0.104	0.917	13.6	0.104	1.31	2.92
2.2	43.9	0.415(-3)	0.0113	0.101	0.745	6.91	16.1	0.0104	0.114	1.00	14.2	0.114	1.43	3.19
2.4	42.7	0.455(-3)	0.0123	0.109	0.805	6.77	14.1	0.0113	0.124	1.09	14.6	0.124	1.55	3.46
2.6	41.5	0.490(-3)	0.0133	0.118	0.863	6.53	12.5	0.0123	0.134	1.17	14.7	0.135	1.67	3.72
2.8	40.1	0.528(-3)	0.0144	0.127	0.919	6.11	11.1	0.0132	0.144	1.26	14.5	0.145	1.79	3.97
3.0	38.9	0.566(-3)	0.0154	0.135	0.971	5.91	9.99	0.0141	0.154	1.33	14.1	0.155	1.91	4.21
3.2	37.4	0.603(-3)	0.0164	0.144	1.02	5.45	9.01	0.0151	0.164	1.41	13.5	0.165	2.02	4.45
3.4	36.1	0.641(-3)	0.0174	0.152	1.07	4.96	8.19	0.0160	0.174	1.49	13.0	0.175	2.13	4.67
3.6	34.8	0.678(-3)	0.0184	0.160	1.11	4.60	7.48	0.0169	0.184	1.56	12.4	0.185	2.23	4.88
3.8	33.4	0.716(-3)	0.0194	0.168	1.14	4.29	6.85	0.0179	0.193	1.63	11.5	0.195	2.33	5.08
4.0	32.1	0.753(-3)	0.0204	0.176	1.17	4.01	6.31	0.0188	0.203	1.69	10.6	0.204	2.43	5.26
5	27.9	0.940(-3)	0.0252	0.214	1.25	2.93	4.38	0.0234	0.249	1.96	7.82	0.252	2.84	5.95
6	25.0	0.00113	0.0300	0.246	1.21	2.23	3.24	0.0280	0.293	2.11	6.04	0.298	3.10	6.20
7	22.5	0.00131	0.0345	0.273	1.10	1.76	2.47	0.0324	0.333	2.14	4.80	0.341	3.20	6.03
8	20.2	0.00150	0.0389	0.292	0.938	1.43	1.93	0.0368	0.369	2.07	3.92	0.381	3.15	5.63
9	17.9	0.00168	0.0430	0.305	0.780	1.18	1.56	0.0411	0.400	1.93	3.27	0.418	3.00	4.98
10	15.7	0.00187	0.0470	0.310	0.671	1.00	1.28	0.0452	0.427	1.72	2.78	0.451	2.74	4.27
12	12.3	0.00223	0.0540	0.301	0.520	0.744	0.907	0.0531	0.463	1.31	2.08	0.505	2.12	3.26
14	10.0	0.00258	0.0597	0.268	0.414	0.576	0.680	0.0605	0.456	1.04	1.61	0.540	1.68	2.61
16	8.42	0.00293	0.0641	0.226	0.338	0.461	0.539	0.0672	0.466	0.865	1.30	0.557	1.39	2.14
18	7.19	0.00326	0.0671	0.190	0.281	0.378	0.435	0.0732	0.437	0.729	1.07	0.554	1.17	1.80
20	6.19	0.00359	0.0686	0.161	0.238	0.316	0.348	0.0784	0.396	0.622	0.894	0.533	1.00	1.53

L_u (Z=71) 1s(2)2s(2)3s(2)4s(2)5s(2)6s(2)2p(6)3p(6)4p(6)5p(6)3d(10)4d(10)5d(1)4f(1)4i(1)4j(1)

0/Rs	---->	41.99	12.42	5.399	2.467	0.9367	0.2770	13.38	5.447	2.350	0.8014	5.594	2.111	0.4444	1.624
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	2p(6)	3p(6)	4p(6)	5p(6)	3d(10)	4d(10)	5d(1)	4f(14)
0.2	18.7	3.49(-5)	0.000978	0.00885	0.0658	0.716	12.5	0.000893	0.00993	0.0882	1.29	0.00982	0.125	3.57	0.257
0.4	40.0	7.16(-5)	0.00197	0.0177	0.132	1.44	27.3	0.00180	0.0199	0.176	2.59	0.0197	0.250	7.53	0.513
0.6	62.6	0.000108	0.00295	0.0265	0.198	2.17	43.0	0.00271	0.0299	0.265	3.89	0.0296	0.375	11.9	0.771
0.8	75.5	0.000145	0.00394	0.0354	0.263	2.89	49.7	0.00362	0.0398	0.353	5.19	0.0394	0.500	15.5	1.03
1.0	73.8	0.000181	0.00492	0.0442	0.328	3.62	44.4	0.00452	0.0496	0.440	6.47	0.0492	0.625	16.6	1.28
1.2	65.9	0.000217	0.00590	0.0530	0.393	4.31	35.4	0.00542	0.0596	0.527	7.74	0.0590	0.748	15.0	1.54
1.4	59.9	0.000254	0.00688	0.0618	0.457	4.96	29.2	0.00633	0.0696	0.614	8.95	0.0689	0.871	12.9	1.79
1.6	55.5	0.000290	0.00785	0.0705	0.519	5.52	24.5	0.00723	0.0794	0.699	10.1	0.0787	0.992	10.9	2.03
1.8	52.2	0.000326	0.00884	0.0792	0.581	5.96	20.7	0.00813	0.0893	0.784	11.1	0.0885	1.11	9.38	2.28
2.0	49.8	0.000362	0.00982	0.0878	0.642	6.25	17.9	0.00903	0.0991	0.867	12.0	0.0983	1.23	8.13	2.52
2.2	47.7	0.000399	0.0108	0.0963	0.701	6.36	15.5	0.00992	0.109	0.949	12.6	0.108	1.35	7.11	2.76
2.4	45.9	0.000435	0.0118	0.105	0.758	6.31	13.6	0.0108	0.119	1.03	13.1	0.118	1.46	6.28	2.99
2.6	44.2	0.000471	0.0127	0.113	0.813	6.13	12.1	0.0117	0.128	1.11	13.3	0.127	1.58	5.58	3.22
2.8	42.5	0.000507	0.0137	0.121	0.866	5.86	10.8	0.0126	0.138	1.19	13.3	0.137	1.69	4.99	3.44
3.0	40.8	0.000543	0.0147	0.130	0.915	5.52	9.68	0.0135	0.147	1.26	13.1	0.147	1.80	4.50	3.65
3.2	39.4	0.000579	0.0156	0.138	0.962	5.30	8.74	0.0144	0.157	1.34	12.7	0.156	1.90	4.08	3.86
3.4	37.7	0.000616	0.0166	0.146	1.01	4.86	7.94	0.0153	0.166	1.41	12.2	0.165	2.08	3.71	4.06
3.6	36.3	0.000652	0.0176	0.154	1.05	4.44	7.26	0.0162	0.175	1.48	11.8	0.175	2.11	3.40	4.25
3.8	34.8	0.000688	0.0185	0.161	1.08	4.14	6.66	0.0171	0.185	1.54	11.1	0.184	2.20	3.12	4.43
4.0	33.4	0.000724	0.0195	0.169	1.11	3.87	6.13	0.0180	0.194	1.60	10.3	0.194	2.30	2.88	4.60
5	28.4	0.000903	0.0241	0.205	1.20	2.84	4.27	0.0224	0.238	1.86	7.58	0.239	2.69	2.01	5.26
6	25.3	0.00108	0.0286	0.236	1.17	2.18	3.16	0.0267	0.280	2.02	5.90	0.282	2.95	1.50	5.58
7	22.7	0.00126	0.0330	0.262	1.07	1.72	2.43	0.0310	0.319	2.06	4.70	0.324	3.07	1.16	5.54
8	20.4	0.00144	0.0372	0.282	0.927	1.40	1.91	0.0352	0.354	2.00	3.85	0.362	3.04	0.928	5.24
9	18.2	0.00162	0.0412	0.295	0.773	1.16	1.53	0.0393	0.384	1.89	3.21	0.397	2.91	0.759	4.79
10	16.0	0.00179	0.0450	0.301	0.660	0.963	1.26	0.0433	0.410	1.69	2.73	0.429	2.69	0.625	4.15
12	12.5	0.00214	0.0518	0.294	0.512	0.731	0.899	0.0509	0.446	1.29	2.04	0.482	2.10	0.445	3.13
14	10.1	0.00248	0.0574	0.264	0.408	0.566	0.679	0.0580	0.461	1.03	1.59	0.517	1.65	0.345	2.52
16	8.52	0.00281	0.0617	0.224	0.333	0.454	0.527	0.0645	0.454	0.852	1.27	0.535	1.38	0.264	2.09
18	7.24	0.00314	0.0647	0.189	0.277	0.373	0.423	0.0703	0.428	0.719	1.05	0.535	1.16	0.209	1.75
20	6.26	0.00345	0.0663	0.160	0.235	0.312	0.352	0.0753	0.390	0.613	0.880	0.518	0.995	0.171	1.49

H f (Z=72) 1s(2) 2s(2) 3s(2) 4s(2) 5s(2) 6s(2) 2p(6) 3p(6) 4p(6) 5p(6) 3d(10) 4d(10) 5d(2) 4f(14)

o/Rs	---->	42.61	12.65	5.489	2.518	0.9746	0.2889	13.58	5.540	2.403	0.8409	5.697	2.169	0.4900	1.712
v	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	2p(6)	3p(6)	4p(6)	5p(6)	3d(10)	4d(10)	5d(2)	4f(14)
0.2	17.0	0.335(-4)	0.000931	0.00847	0.0625	0.651	11.3	0.00858	0.00949	0.0833	1.15	0.00936	0.117	3.33	0.225
0.4	36.1	0.688(-4)	0.00187	0.0170	0.125	1.31	24.6	0.00173	0.0190	0.166	2.30	0.0188	0.233	6.81	0.448
0.6	56.3	0.000104	0.00281	0.0254	0.188	1.97	38.8	0.00260	0.0286	0.250	3.46	0.0282	0.350	10.5	0.674
0.8	69.7	0.000139	0.00375	0.0339	0.250	2.63	46.3	0.00347	0.0380	0.333	4.61	0.0376	0.467	14.2	0.898
1.0	71.8	0.000174	0.00469	0.0424	0.312	3.28	43.0	0.00434	0.0475	0.416	5.75	0.0469	0.583	17.3	1.12
1.2	67.1	0.000209	0.00562	0.0508	0.373	3.92	34.3	0.00521	0.0570	0.498	6.87	0.0562	0.698	18.5	1.34
1.4	63.3	0.000243	0.00655	0.0592	0.434	4.51	28.4	0.00608	0.0665	0.580	7.96	0.0655	0.813	18.8	1.56
1.6	59.4	0.000278	0.00748	0.0676	0.494	5.04	23.8	0.00694	0.0760	0.660	8.98	0.0750	0.926	17.4	1.78
1.8	56.3	0.000313	0.00841	0.0759	0.552	5.47	20.3	0.00781	0.0854	0.740	9.92	0.0843	1.04	16.1	1.99
2.0	52.9	0.000348	0.00935	0.0841	0.610	5.77	17.5	0.00867	0.0948	0.819	10.7	0.0936	1.15	13.9	2.21
2.2	50.4	0.000383	0.0103	0.0923	0.666	5.92	15.2	0.00953	0.104	0.897	11.4	0.103	1.26	12.3	2.42
2.4	48.2	0.000418	0.0112	0.100	0.721	5.93	13.4	0.0104	0.113	0.974	11.9	0.112	1.37	11.0	2.62
2.6	46.1	0.000452	0.0121	0.108	0.773	5.81	11.8	0.0113	0.123	1.05	12.2	0.121	1.47	9.80	2.82
2.8	44.2	0.000487	0.0131	0.116	0.824	5.62	10.6	0.0121	0.132	1.12	12.3	0.131	1.58	8.83	3.02
3.0	42.4	0.000522	0.0140	0.124	0.872	5.30	9.51	0.0130	0.141	1.19	12.2	0.140	1.68	8.01	3.21
3.2	40.8	0.000557	0.0149	0.132	0.917	5.14	8.61	0.0139	0.150	1.26	11.9	0.149	1.78	7.28	3.39
3.4	39.0	0.000591	0.0158	0.140	0.958	4.76	7.83	0.0147	0.159	1.33	11.5	0.158	1.88	6.66	3.57
3.6	37.4	0.000626	0.0167	0.147	0.997	4.37	7.14	0.0156	0.168	1.40	11.2	0.167	1.97	6.11	3.74
3.8	35.9	0.000661	0.0176	0.155	1.03	4.02	6.56	0.0164	0.177	1.46	10.7	0.176	2.06	5.63	3.90
4.0	34.4	0.000695	0.0185	0.162	1.06	3.77	6.05	0.0173	0.186	1.52	10.1	0.184	2.15	5.20	4.06
5	29.1	0.000868	0.0230	0.197	1.15	2.78	4.21	0.0215	0.228	1.77	7.58	0.228	2.58	3.68	4.69
6	25.6	0.00104	0.0273	0.227	1.13	2.13	3.11	0.0257	0.268	1.93	5.87	0.269	2.79	2.75	5.04
7	22.9	0.00121	0.0315	0.253	1.04	1.69	2.41	0.0298	0.306	1.98	4.67	0.309	2.92	2.14	5.09
8	20.6	0.00138	0.0355	0.272	0.916	1.38	1.90	0.0338	0.339	1.94	3.86	0.346	2.91	1.72	4.90
9	18.4	0.00155	0.0393	0.285	0.767	1.14	1.53	0.0378	0.369	1.84	3.21	0.380	2.81	1.41	4.57
10	16.3	0.00172	0.0429	0.292	0.655	0.966	1.26	0.0416	0.394	1.67	2.71	0.411	2.62	1.19	4.04
12	12.7	0.00206	0.0495	0.287	0.505	0.721	0.898	0.0490	0.430	1.28	2.04	0.462	2.07	0.873	3.06
14	10.7	0.00238	0.0550	0.260	0.403	0.559	0.675	0.0558	0.446	1.02	1.59	0.497	1.63	0.662	2.46
16	8.62	0.00270	0.0592	0.222	0.329	0.448	0.528	0.0621	0.442	0.846	1.27	0.516	1.35	0.512	2.03
18	7.35	0.00302	0.0623	0.187	0.276	0.368	0.424	0.0678	0.420	0.708	1.05	0.518	1.15	0.413	1.71
20	6.34	0.00332	0.0640	0.159	0.234	0.309	0.346	0.0727	0.384	0.609	0.875	0.505	0.979	0.342	1.46

T.a. (Z=73) 1s(2)2(2)3s(2)4s(2)5s(2)6s(2)2p(6)3p(6)4p(6)5p(6)6p(6)3d(10)4d(10)5d(3)4f(14)

W/Rs	----	43.22	12.80	5.578	2.570	1.010	0.2987	13.79	5.634	2.458	0.8781	5.800	2.227	0.5329	1.798
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	2p(6)	3p(6)	3p(6)	5p(6)	3d(10)	4d(10)	5d(3)	4f(14)
0.2	15.6	0.321(-4)	0.00902	0.00813	0.0594	0.597	10.5	0.000823	0.00908	0.0786	1.03	0.00892	0.109	2.98	0.198
0.4	32.9	0.661(-4)	0.00181	0.0163	0.119	1.20	22.7	0.00166	0.0182	0.157	2.07	0.0179	0.218	6.05	0.396
0.6	51.3	0.998(-4)	0.00273	0.0244	0.178	1.80	35.8	0.00250	0.0273	0.236	3.11	0.0269	0.327	9.21	0.595
0.8	64.4	0.000133	0.00363	0.0325	0.237	2.41	43.6	0.00333	0.0364	0.314	4.14	0.0358	0.436	12.4	0.793
1.0	67.5	0.000167	0.00454	0.0406	0.296	3.01	41.5	0.00417	0.0454	0.393	5.17	0.0447	0.545	15.5	0.990
1.2	64.0	0.000201	0.00544	0.0487	0.354	3.59	33.5	0.00500	0.0545	0.470	6.18	0.0536	0.653	18.0	1.19
1.4	61.9	0.000234	0.00635	0.0568	0.412	4.14	27.9	0.00593	0.0636	0.547	7.16	0.0626	0.760	19.5	1.38
1.6	59.7	0.000268	0.00724	0.0648	0.469	4.63	23.5	0.00666	0.0727	0.624	8.09	0.0715	0.866	19.7	1.57
1.8	57.2	0.000301	0.00815	0.0728	0.525	5.05	20.0	0.00749	0.0817	0.699	8.95	0.0804	0.971	19.0	1.76
2.0	54.8	0.000335	0.00906	0.0807	0.580	5.36	17.3	0.00832	0.0907	0.774	9.72	0.0893	1.08	17.8	1.95
2.2	51.9	0.000368	0.00996	0.0885	0.633	5.54	15.0	0.00915	0.0996	0.847	10.4	0.0981	1.18	15.9	2.13
2.4	49.2	0.000402	0.0109	0.0963	0.685	5.59	13.2	0.00997	0.109	0.920	10.9	0.107	1.28	14.0	2.32
2.6	47.1	0.000435	0.0118	0.104	0.735	5.53	11.7	0.0108	0.117	0.991	11.2	0.116	1.38	12.7	2.49
2.8	45.1	0.000469	0.0127	0.112	0.784	5.38	10.5	0.0116	0.126	1.06	11.4	0.125	1.48	11.5	2.67
3.0	43.2	0.000502	0.0135	0.119	0.830	5.12	9.40	0.0125	0.135	1.13	11.4	0.133	1.57	10.5	2.84
3.2	41.5	0.000535	0.0144	0.127	0.873	4.91	8.53	0.0133	0.144	1.20	11.2	0.142	1.67	9.63	3.01
3.4	39.8	0.000569	0.0153	0.134	0.914	4.66	7.73	0.0141	0.152	1.26	11.0	0.150	1.76	8.85	3.17
3.6	38.1	0.000602	0.0162	0.141	0.951	4.30	7.08	0.0149	0.161	1.32	10.6	0.159	1.85	8.16	3.32
3.8	36.6	0.000635	0.0171	0.149	0.985	3.96	6.49	0.0158	0.169	1.38	10.3	0.168	1.93	7.54	3.47
4.0	35.1	0.000669	0.0180	0.156	1.02	3.68	6.00	0.0166	0.178	1.44	9.79	0.176	2.02	6.99	3.61
5	29.9	0.000835	0.0223	0.189	1.11	2.73	4.17	0.0206	0.219	1.68	7.94	0.217	2.38	4.99	4.20
6	26.0	0.00100	0.0265	0.219	1.10	2.10	3.09	0.0247	0.257	1.84	6.14	0.257	2.64	3.77	4.57
7	23.2	0.00117	0.0305	0.243	1.02	1.67	2.39	0.0286	0.293	1.90	4.88	0.295	2.77	2.95	4.69
8	20.8	0.00133	0.0344	0.263	0.905	1.36	1.89	0.0325	0.326	1.88	4.00	0.330	2.79	2.38	4.57
9	18.6	0.00149	0.0382	0.276	0.760	1.13	1.52	0.0363	0.354	1.76	3.33	0.363	2.71	1.96	4.33
10	16.6	0.00166	0.0417	0.283	0.645	0.954	1.26	0.0400	0.379	1.64	2.82	0.393	2.55	1.65	3.91
12	13.0	0.00198	0.0481	0.280	0.502	0.710	0.893	0.0471	0.415	1.27	2.10	0.443	2.05	1.22	3.00
14	10.5	0.00229	0.0534	0.256	0.400	0.553	0.672	0.0537	0.432	0.997	1.63	0.478	1.61	0.941	2.37
16	8.76	0.00260	0.0577	0.220	0.327	0.443	0.528	0.0598	0.430	0.832	1.32	0.498	1.33	0.745	1.98
18	7.46	0.00290	0.0607	0.186	0.272	0.364	0.420	0.0652	0.411	0.703	1.08	0.502	1.13	0.600	1.67
20	6.43	0.00320	0.0625	0.158	0.231	0.305	0.346	0.0701	0.378	0.600	0.901	0.492	0.964	0.493	1.42

W (Z=74) 1s(2)2s(2)3s(2)4s(2)5s(2)2p(6)3p(6)4p(6)5p(6)3d(10)4d(10)4f(14) [5d(4)6s(2)/free(6)]

l/Rs	---->	43.84	12.98	5.665	2.623	1.045	0.3070	14.00	5.728	2.512	0.9141	5.902	2.287	0.5927	1.880	1.620
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	2p(6)	3p(6)	4p(6)	5p(6)	3d(10)	4d(10)	5d(4)	4f(14)	free(6)
0.2	14.2 / 4.91	3.09(-5)	0.000869	0.00780	0.0564	0.550	9.85	0.000790	0.00869	0.0744	0.936	0.00852	0.102	2.47	0.177	3.03
0.4	30.0 / 9.95	6.36(-5)	0.00175	0.0156	0.113	1.10	21.2	0.00159	0.0174	0.149	1.88	0.0171	0.204	4.97	0.353	6.12
0.6	46.7 / 15.1	9.60(-5)	0.00263	0.0234	0.169	1.66	33.4	0.00240	0.0262	0.223	2.82	0.0257	0.305	7.51	0.530	9.26
0.8	59.2 / 20.2	0.000128	0.00350	0.0312	0.225	2.21	41.4	0.00320	0.0348	0.297	3.75	0.0342	0.407	10.1	0.707	12.5
1.0	62.2 / 25.3	0.000161	0.00437	0.0390	0.281	2.76	40.0	0.00400	0.0435	0.371	4.68	0.0427	0.509	12.6	0.883	15.7
1.2	60.5 / 30.5	0.000193	0.00525	0.0468	0.337	3.30	34.1	0.00480	0.0522	0.445	5.60	0.0512	0.610	14.9	1.06	19.0
1.4	58.4 / 35.5	0.000225	0.00611	0.0545	0.391	3.81	28.3	0.00560	0.0609	0.518	6.49	0.0597	0.710	16.9	1.23	22.3
1.6	56.8 / 42.7	0.000257	0.00698	0.0622	0.445	4.28	23.6	0.00640	0.0696	0.590	7.34	0.0683	0.809	18.2	1.40	27.1
1.8	55.7 / 45.8	0.000290	0.00785	0.0699	0.499	4.67	20.3	0.00719	0.0782	0.661	8.13	0.0768	0.907	18.7	1.57	29.1
2.0	54.1 / 45.9	0.000322	0.00873	0.0775	0.551	4.98	17.5	0.00799	0.0868	0.732	8.85	0.0853	1.00	18.5	1.74	27.8
2.2	52.2 / 45.3	0.000354	0.00960	0.0850	0.602	5.18	15.1	0.00878	0.0954	0.802	9.47	0.0937	1.10	17.7	1.91	25.9
2.4	50.3 / 44.1	0.000386	0.0105	0.0925	0.651	5.27	13.3	0.00957	0.104	0.871	9.97	0.102	1.20	16.7	2.07	23.8
2.6	48.0 / 42.9	0.000418	0.0113	0.100	0.699	5.25	11.8	0.0104	0.112	0.938	10.3	0.111	1.29	15.2	2.23	21.9
2.8	46.9 / 41.7	0.000451	0.0122	0.107	0.746	5.14	10.6	0.0112	0.121	1.00	10.6	0.119	1.38	14.7	2.39	20.1
3.0	44.7 / 40.3	0.000483	0.0131	0.115	0.790	4.95	9.57	0.0120	0.129	1.07	10.6	0.127	1.47	13.3	2.54	18.5
3.2	42.7 / 38.9	0.000515	0.0139	0.122	0.831	4.71	8.52	0.0128	0.138	1.13	10.6	0.135	1.56	12.3	2.69	17.0
3.4	41.0 / 36.5	0.000547	0.0148	0.129	0.871	4.55	7.78	0.0136	0.146	1.19	10.4	0.144	1.65	11.3	2.84	15.7
3.6	39.3 / 36.2	0.000579	0.0156	0.136	0.907	4.22	7.21	0.0143	0.154	1.25	10.1	0.152	1.73	10.4	2.98	14.5
3.8	37.7 / 34.9	0.000611	0.0165	0.143	0.940	3.90	6.61	0.0151	0.162	1.31	9.80	0.160	1.81	9.66	3.11	13.5
4.0	36.0 / 33.6	0.000643	0.0173	0.150	0.970	3.60	6.02	0.0159	0.170	1.37	9.47	0.168	1.89	8.96	3.24	12.6
5	30.4 / 28.8	0.000803	0.0215	0.182	1.07	2.67	4.20	0.0198	0.210	1.60	7.73	0.208	2.24	6.44	3.80	9.08
6	26.3 / 25.2	0.000962	0.0255	0.211	1.07	2.06	3.17	0.0237	0.247	1.76	5.99	0.246	2.49	4.87	4.17	6.89
7	23.3 / 22.5	0.00112	0.0294	0.235	0.992	1.64	2.38	0.0275	0.281	1.83	4.78	0.282	2.63	3.83	4.33	5.42
8	20.8 / 20.2	0.00128	0.0332	0.254	0.894	1.33	1.89	0.0312	0.313	1.81	3.91	0.316	2.67	3.09	4.28	4.37
9	18.7 / 18.2	0.00144	0.0368	0.267	0.753	1.11	1.58	0.0349	0.341	1.74	3.25	0.348	2.61	2.55	4.09	3.61
10	16.7 / 16.3	0.00159	0.0402	0.275	0.637	0.943	1.28	0.0384	0.365	1.61	2.76	0.377	2.48	2.15	3.78	3.04
12	13.2 / 13.0	0.00190	0.0464	0.273	0.495	0.702	0.898	0.0452	0.401	1.26	2.07	0.425	2.02	1.59	2.94	2.24
14	10.6 / 10.4	0.00221	0.0517	0.252	0.395	0.547	0.675	0.0516	0.419	0.900	1.61	0.461	1.60	1.23	2.32	1.73
16	8.85 / 8.73	0.00250	0.0559	0.218	0.323	0.439	0.529	0.0575	0.419	0.781	1.29	0.481	1.31	0.978	1.93	1.39
18	7.57 / 7.45	0.00280	0.0589	0.184	0.271	0.360	0.450	0.0628	0.402	0.693	1.06	0.487	1.11	0.804	1.62	1.13
20	6.53 / 6.44	0.00308	0.0608	0.157	0.228	0.302	0.362	0.0676	0.372	0.592	0.890	0.479	0.956	0.665	1.40	0.936

Re (Z=75) 1s(2)2s(2)3s(2)4s(2)5s(2)2p(6)3p(6)4p(6)5p(6)3d(10)4d(10)5d(5)4f(14)

0/Rs	---->	44.46	13.17	5.760	2.675	1.079	0.3143	14.21	5.822	2.568	0.9492	6.005	2.350	0.6339	1.961
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	2p(6)	3p(6)	4p(6)	5p(6)	3d(10)	4d(10)	5d(5)	4f(14)
0.2	13.3	0.297(-4)	0.000863	0.00747	0.0537	0.509	9.33	0.000758	0.00833	0.0703	0.853	0.00813	0.0950	2.20	0.159
0.4	27.9	0.612(-4)	0.00168	0.0150	0.107	1.02	20.0	0.00153	0.0167	0.140	1.71	0.0163	0.190	4.42	0.317
0.6	43.5	0.923(-4)	0.00253	0.0224	0.161	1.53	31.6	0.00230	0.0251	0.211	2.57	0.0245	0.285	6.66	0.476
0.8	55.5	0.000123	0.00337	0.0299	0.214	2.05	39.5	0.00307	0.0334	0.281	3.42	0.0327	0.380	8.91	0.635
1.0	58.7	0.000155	0.00421	0.0374	0.268	2.56	38.7	0.00384	0.0417	0.351	4.27	0.0408	0.475	11.1	0.793
1.2	58.2	0.000185	0.00505	0.0448	0.320	3.05	34.4	0.00461	0.0500	0.420	5.10	0.0489	0.569	13.3	0.949
1.4	55.9	0.000217	0.00588	0.0522	0.372	3.53	28.5	0.00538	0.0583	0.489	5.91	0.0570	0.662	15.2	1.11
1.6	54.5	0.000248	0.00671	0.0596	0.424	3.96	23.8	0.00614	0.0666	0.558	6.69	0.0652	0.755	16.8	1.26
1.8	53.5	0.000279	0.00755	0.0669	0.475	4.34	20.3	0.00691	0.0749	0.625	7.43	0.0733	0.846	17.8	1.41
2.0	52.6	0.000310	0.00839	0.0742	0.524	4.65	17.6	0.00767	0.0832	0.692	8.10	0.0814	0.937	18.3	1.56
2.2	51.5	0.000341	0.00923	0.0815	0.573	4.86	15.3	0.00844	0.0914	0.758	8.69	0.0895	1.03	18.3	1.71
2.4	50.0	0.000372	0.0101	0.0886	0.620	4.98	13.4	0.00920	0.0995	0.823	9.18	0.0976	1.12	17.8	1.86
2.6	48.5	0.000403	0.0109	0.0958	0.666	4.99	11.9	0.00996	0.108	0.887	9.56	0.106	1.20	17.0	2.01
2.8	46.6	0.000433	0.0117	0.103	0.711	4.91	10.6	0.0107	0.116	0.950	9.81	0.114	1.29	15.8	2.15
3.0	45.3	0.000464	0.0126	0.110	0.753	4.77	9.54	0.0115	0.124	1.01	9.94	0.122	1.37	15.3	2.29
3.2	43.2	0.000495	0.0134	0.117	0.793	4.55	8.64	0.0123	0.132	1.07	9.95	0.129	1.46	13.9	2.42
3.4	41.3	0.000526	0.0142	0.124	0.831	4.41	7.87	0.0130	0.140	1.13	9.84	0.137	1.54	12.7	2.55
3.6	39.6	0.000557	0.0150	0.130	0.866	4.15	7.18	0.0138	0.148	1.19	9.63	0.145	1.62	11.8	2.68
3.8	37.9	0.000588	0.0158	0.137	0.899	3.84	6.60	0.0145	0.155	1.24	9.36	0.153	1.69	11.0	2.81
4.0	36.4	0.000617	0.0167	0.143	0.928	3.56	6.05	0.0153	0.163	1.29	9.11	0.161	1.77	10.3	2.93
5	30.6	0.000772	0.0207	0.175	1.03	2.62	4.23	0.0190	0.201	1.52	7.58	0.199	2.10	7.44	3.45
6	26.2	0.000926	0.0246	0.202	1.03	2.03	3.13	0.0228	0.237	1.68	5.82	0.235	2.34	5.68	3.81
7	23.2	0.00108	0.0283	0.226	0.970	1.61	2.42	0.0264	0.270	1.76	4.66	0.270	2.50	4.48	4.00
8	20.8	0.00123	0.0320	0.244	0.881	1.32	1.92	0.0300	0.300	1.75	3.83	0.303	2.54	3.63	4.00
9	18.6	0.00138	0.0355	0.258	0.747	1.10	1.53	0.0335	0.328	1.69	3.19	0.333	2.50	3.01	3.87
10	16.7	0.00153	0.0388	0.266	0.632	0.928	1.27	0.0369	0.351	1.58	2.71	0.361	2.40	2.54	3.63
12	13.3	0.00183	0.0448	0.266	0.488	0.695	0.917	0.0435	0.387	1.24	2.03	0.409	1.99	1.88	2.89
14	10.7	0.00212	0.0499	0.247	0.393	0.541	0.883	0.0497	0.405	0.977	1.58	0.443	1.58	1.46	2.27
16	8.91	0.00241	0.0540	0.215	0.321	0.434	0.823	0.0554	0.407	0.813	1.27	0.465	1.29	1.17	1.89
18	7.60	0.00270	0.0571	0.183	0.268	0.357	0.749	0.0606	0.393	0.688	1.05	0.472	1.10	0.958	1.59
20	6.56	0.00297	0.0590	0.156	0.227	0.299	0.648	0.0652	0.365	0.588	0.879	0.466	0.940	0.801	1.37

O s (Z=76) 1s (2) 2s (2) 3s (2) 4s (2) 5s (2) 6s (2) 2p (6) 3p (6) 4p (6) 5p (6) 3d (10) 4d (10) 5d (6) 4f (14) _

l/Rs	---->	45.02	13.35	5.846	2.726	1.113	0.3225	14.42	5.923	2.622	0.9836	6.107	2.406	0.6621	2.041
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	2p(6)	3p(6)	4p(6)	5p(6)	3d(10)	4d(10)	5d(6)	4f(14)
0.2	12.5	0.287(-4)	0.000806	0.00719	0.0512	0.472	8.79	0.000729	0.00795	0.0866	0.714	0.00778	0.0894	2.05	0.143
0.4	26.1	0.591(-4)	0.00162	0.0144	0.102	0.947	18.8	0.00147	0.0160	0.133	1.57	0.0156	0.179	4.12	0.286
0.6	40.7	0.892(-4)	0.00243	0.0216	0.154	1.42	29.6	0.00221	0.0239	0.200	2.35	0.0234	0.268	6.20	0.429
0.8	52.3	0.000119	0.00325	0.0287	0.205	1.90	37.5	0.00295	0.0319	0.267	3.13	0.0312	0.358	8.28	0.573
1.0	56.0	0.000149	0.00406	0.0359	0.255	2.37	37.5	0.00369	0.0398	0.333	3.91	0.0390	0.447	10.4	0.715
1.2	56.1	0.000179	0.00486	0.0431	0.305	2.83	34.0	0.00443	0.0478	0.399	4.67	0.0468	0.535	12.3	0.857
1.4	53.4	0.000209	0.00567	0.0503	0.355	3.27	27.9	0.00517	0.0557	0.464	5.42	0.0545	0.623	14.2	0.998
1.6	52.1	0.000239	0.00647	0.0574	0.404	3.68	23.5	0.00591	0.0637	0.529	6.14	0.0623	0.710	15.8	1.14
1.8	51.4	0.000269	0.00728	0.0644	0.453	4.04	20.0	0.00664	0.0716	0.593	6.82	0.0701	0.797	17.2	1.28
2.0	50.8	0.000299	0.00809	0.0714	0.500	4.34	17.3	0.00737	0.0795	0.657	7.44	0.0779	0.883	18.0	1.41
2.2	50.1	0.000329	0.00890	0.0784	0.547	4.56	15.0	0.00811	0.0873	0.719	8.01	0.0856	0.967	18.4	1.55
2.4	49.2	0.000359	0.00970	0.0853	0.592	4.69	13.2	0.00884	0.0951	0.781	8.48	0.0933	1.05	18.4	1.68
2.6	48.0	0.000389	0.0105	0.0922	0.636	4.74	11.8	0.00957	0.103	0.842	8.87	0.101	1.13	17.9	1.81
2.8	46.6	0.000419	0.0113	0.0990	0.678	4.69	10.5	0.0103	0.111	0.902	9.15	0.107	1.22	17.2	1.94
3.0	44.9	0.000449	0.0121	0.106	0.719	4.59	9.43	0.0110	0.118	0.960	9.31	0.116	1.29	16.2	2.07
3.2	43.7	0.000479	0.0129	0.112	0.758	4.41	8.53	0.0118	0.126	1.02	9.37	0.124	1.37	15.7	2.19
3.4	41.8	0.000508	0.0137	0.119	0.795	4.24	7.77	0.0125	0.134	1.07	9.32	0.131	1.45	14.4	2.31
3.6	39.9	0.000538	0.0145	0.125	0.829	4.06	7.08	0.0132	0.141	1.13	9.18	0.139	1.52	13.2	2.43
3.8	38.1	0.000568	0.0153	0.132	0.861	3.78	6.51	0.0140	0.149	1.18	8.96	0.146	1.60	12.2	2.54
4.0	36.6	0.000598	0.0161	0.138	0.889	3.51	6.00	0.0147	0.156	1.23	8.73	0.154	1.67	11.5	2.65
5	30.7	0.000746	0.0199	0.168	0.987	2.58	4.18	0.0183	0.192	1.45	7.38	0.190	1.98	8.42	3.14
6	26.3	0.000894	0.0237	0.195	1.00	1.99	3.09	0.0219	0.226	1.61	5.70	0.225	2.23	6.46	3.50
7	23.2	0.00104	0.0273	0.218	0.948	1.59	2.41	0.0254	0.258	1.69	4.57	0.259	2.38	5.12	3.70
8	20.8	0.00119	0.0309	0.236	0.868	1.30	1.91	0.0288	0.288	1.69	3.74	0.290	2.44	4.17	3.75
9	18.6	0.00134	0.0342	0.250	0.740	1.09	1.55	0.0322	0.314	1.64	3.14	0.319	2.41	3.46	3.66
10	16.8	0.00148	0.0374	0.258	0.628	0.918	1.28	0.0355	0.337	1.54	2.67	0.347	2.32	2.93	3.47
12	13.4	0.00177	0.0433	0.260	0.485	0.688	0.908	0.0419	0.373	1.23	2.00	0.393	1.96	2.17	2.83
14	10.8	0.00205	0.0483	0.243	0.388	0.536	0.692	0.0479	0.392	0.970	1.56	0.427	1.56	1.69	2.24
16	8.96	0.00233	0.0524	0.213	0.317	0.430	0.537	0.0534	0.395	0.800	1.25	0.449	1.27	1.36	1.83
18	7.63	0.00260	0.0554	0.182	0.266	0.354	0.419	0.0584	0.383	0.678	1.03	0.457	1.08	1.11	1.55
20	6.60	0.00287	0.0574	0.155	0.226	0.296	0.343	0.0629	0.359	0.579	0.867	0.453	0.925	0.930	1.34

I r (Z=77) 1s(2)2s(2)3s(2)4s(2)5s(2)6s(2)2p(6)3p(6)4p(6)5p(6)3d(10)4d(10)5d(7)4f(14)

o/Rs	---->	45.62	13.54	5.937	2.778	1.147	0.3296	14.63	6.010	2.677	1.018	6.211	2.464	0.6935	2.118
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	2p(6)	3p(6)	4p(6)	5p(6)	3d(10)	4d(10)	5d(7)	4f(14)
0.2	11.8	0.276(-4)	0.000776	0.00691	0.0488	0.439	8.35	0.000700	0.00765	0.0632	0.718	0.00743	0.0841	1.89	0.130
0.4	24.6	0.570(-4)	0.00156	0.0138	0.0974	0.880	17.8	0.00142	0.0154	0.126	1.44	0.0149	0.168	3.79	0.260
0.6	38.3	0.860(-4)	0.00234	0.0207	0.146	1.32	28.0	0.00213	0.0230	0.189	2.16	0.0224	0.252	5.70	0.390
0.8	49.5	0.000115	0.00313	0.0276	0.195	1.76	35.9	0.00284	0.0307	0.253	2.83	0.0299	0.336	7.61	0.521
1.0	53.6	0.000144	0.00391	0.0345	0.243	2.20	36.5	0.00355	0.0383	0.316	3.59	0.0373	0.422	9.50	0.650
1.2	53.6	0.000173	0.00469	0.0414	0.291	2.63	33.2	0.00426	0.0460	0.380	4.29	0.0447	0.503	11.3	0.779
1.4	50.9	0.00202	0.00546	0.0483	0.339	3.04	27.3	0.00497	0.0536	0.440	1.98	0.0521	0.586	13.1	0.907
1.6	49.6	0.00231	0.00624	0.0551	0.385	3.42	23.1	0.00568	0.0613	0.502	5.64	0.0596	0.668	14.7	1.03
1.8	48.9	0.00260	0.00701	0.0619	0.432	3.77	19.9	0.00639	0.0689	0.562	6.27	0.0670	0.750	16.1	1.16
2.0	48.5	0.00290	0.00779	0.0686	0.477	4.06	17.0	0.00709	0.0765	0.623	6.86	0.0745	0.830	17.2	1.29
2.2	48.2	0.00317	0.00857	0.0753	0.521	4.28	14.9	0.00780	0.0840	0.682	7.39	0.0819	0.910	17.9	1.41
2.4	47.6	0.00346	0.00935	0.0820	0.565	4.43	13.1	0.00850	0.0915	0.741	7.85	0.0892	0.989	18.2	1.53
2.6	46.9	0.00375	0.0101	0.0886	0.607	4.49	11.6	0.00920	0.0990	0.799	8.24	0.0966	1.06	18.2	1.65
2.8	45.9	0.00404	0.0109	0.0951	0.648	4.48	10.4	0.00991	0.107	0.856	8.53	0.104	1.14	17.8	1.77
3.0	44.7	0.00433	0.0117	0.102	0.687	4.40	9.31	0.0106	0.114	0.911	8.72	0.111	1.22	17.2	1.88
3.2	43.2	0.00461	0.0124	0.108	0.724	4.27	8.44	0.0113	0.121	0.966	8.82	0.118	1.29	16.3	2.00
3.4	42.1	0.00490	0.0132	0.114	0.760	4.09	7.68	0.0120	0.129	1.02	8.82	0.126	1.37	15.8	2.11
3.6	40.4	0.00519	0.0140	0.121	0.793	3.97	7.02	0.0127	0.136	1.07	8.73	0.133	1.44	14.7	2.22
3.8	38.5	0.00548	0.0147	0.127	0.824	3.72	6.44	0.0134	0.143	1.12	8.57	0.140	1.51	13.6	2.32
4.0	36.8	0.00576	0.0155	0.133	0.852	3.46	5.93	0.0141	0.150	1.17	8.36	0.147	1.57	12.6	2.42
5	30.7	0.000720	0.0192	0.162	0.950	2.54	4.15	0.0176	0.185	1.38	7.01	0.182	1.87	9.33	2.88
6	26.3	0.000862	0.0228	0.188	0.972	1.97	3.08	0.0210	0.218	1.54	5.55	0.215	2.11	7.18	3.22
7	23.1	0.00101	0.0264	0.210	0.926	1.57	2.37	0.0244	0.249	1.62	4.47	0.248	2.27	5.71	3.44
8	20.7	0.00115	0.0298	0.228	0.853	1.28	1.90	0.0278	0.278	1.64	3.68	0.278	2.34	4.66	3.51
9	18.6	0.00129	0.0330	0.242	0.733	0.904	1.07	0.0310	0.303	1.59	2.75	0.306	2.32	3.22	3.46
10	16.7	0.00143	0.0361	0.250	0.624	0.909	1.26	0.0342	0.326	1.51	2.62	0.332	2.25	3.28	3.32
12	13.5	0.00171	0.0418	0.253	0.478	0.681	0.897	0.0403	0.361	1.22	1.97	0.377	1.93	2.45	2.77
14	10.9	0.00198	0.0467	0.239	0.386	0.531	0.676	0.0461	0.381	0.962	1.54	0.411	1.55	1.90	2.20
16	9.01	0.00225	0.0507	0.210	0.316	0.426	0.533	0.0515	0.385	0.794	1.24	0.433	1.25	1.53	1.79
18	7.68	0.00251	0.0537	0.180	0.263	0.351	0.421	0.0563	0.375	0.673	1.02	0.443	1.06	1.26	1.52
20	6.65	0.00277	0.0557	0.154	0.224	0.294	0.347	0.0607	0.353	0.576	0.856	0.441	0.918	1.05	1.31

P t (Z=78) 1s(2)2s(2)3s(2)4s(2)5s(2)2p(6)3p(6)4p(6)5p(6)3d(10)4d(10)5d(10)4f(14)

0/Rs	----	46.37	13.73	6.027	2.829	1.163	14.83	6.106	2.729	1.026	6.316	2.526	0.6460	2.195
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	2p(6)	3p(6)	4p(6)	5p(6)	3d(10)	4d(10)	5d(10)	4f(14)
0.2	3.86	2.64(-5)	0.000747	0.00664	0.0466	0.424	0.000675	0.00724	0.0601	0.704	0.00711	0.0789	2.40	0.119
0.4	7.74	5.44(-5)	0.00150	0.0133	0.0930	0.851	0.00136	0.0147	0.124	1.41	0.0143	0.158	4.12	0.237
0.6	11.6	8.22(-5)	0.00226	0.0199	0.140	1.28	0.00205	0.0221	0.180	2.12	0.0214	0.236	7.24	0.356
0.8	15.5	0.000110	0.00301	0.0265	0.186	1.70	0.00274	0.0294	0.240	2.82	0.0286	0.315	9.66	0.475
1.0	19.3	0.000138	0.00376	0.0332	0.232	2.13	0.00342	0.0367	0.300	3.52	0.0357	0.394	12.1	0.593
1.2	23.1	0.000165	0.00451	0.0398	0.278	2.54	0.00411	0.0441	0.360	4.21	0.0428	0.472	14.4	0.710
1.4	26.8	0.000193	0.00526	0.0464	0.323	2.94	0.00479	0.0514	0.419	4.88	0.0499	0.550	16.7	0.828
1.6	30.2	0.000221	0.00601	0.0530	0.368	3.31	0.00547	0.0588	0.477	5.53	0.0570	0.627	18.7	0.944
1.8	33.3	0.000248	0.00676	0.0595	0.412	3.65	0.00616	0.0661	0.536	6.15	0.0641	0.703	20.6	1.06
2.0	36.0	0.000276	0.00751	0.0660	0.456	3.94	0.00684	0.0733	0.593	6.73	0.0712	0.780	22.1	1.17
2.2	38.8	0.000303	0.00826	0.0724	0.498	4.16	0.00752	0.0806	0.650	7.26	0.0783	0.854	23.2	1.29
2.4	39.7	0.000331	0.00900	0.0788	0.540	4.31	0.00819	0.0878	0.706	7.72	0.0853	0.928	23.8	1.40
2.6	40.6	0.000359	0.00975	0.0852	0.580	4.38	0.00871	0.0950	0.761	8.10	0.0924	1.00	24.0	1.51
2.8	40.9	0.000386	0.0105	0.0915	0.619	4.38	0.00955	0.102	0.815	8.39	0.0994	1.07	23.7	1.62
3.0	40.8	0.000414	0.0112	0.0977	0.657	4.32	0.0102	0.109	0.868	8.59	0.106	1.14	23.2	1.72
3.2	40.2	0.000441	0.0120	0.104	0.693	4.20	0.0109	0.116	0.920	8.69	0.113	1.21	24.2	1.83
3.4	39.4	0.000469	0.0127	0.110	0.727	4.03	0.0116	0.123	0.971	8.70	0.120	1.28	21.4	1.93
3.6	38.5	0.000496	0.0134	0.116	0.759	3.91	0.0123	0.130	1.02	8.63	0.127	1.35	20.4	2.03
3.8	37.0	0.000524	0.0142	0.122	0.789	3.68	0.0130	0.137	1.07	8.48	0.134	1.42	19.0	2.13
4.0	35.4	0.000551	0.0149	0.128	0.817	3.43	0.0136	0.144	1.12	8.28	0.141	1.48	17.6	2.22
5	29.5	0.000688	0.0185	0.156	0.916	2.52	0.0170	0.178	1.32	6.89	0.174	1.77	12.9	2.65
6	25.5	0.000825	0.0220	0.181	0.942	1.95	0.0203	0.210	1.47	5.53	0.206	1.99	10.0	2.98
7	22.5	0.000961	0.0254	0.203	0.904	1.57	0.0236	0.239	1.56	4.45	0.237	2.15	7.98	3.19
8	20.2	0.00110	0.0287	0.221	0.833	1.28	0.0268	0.267	1.58	3.67	0.266	2.23	6.52	3.29
9	18.2	0.00123	0.0317	0.234	0.727	1.07	0.0299	0.292	1.58	3.06	0.294	2.23	5.44	3.27
10	16.5	0.00137	0.0349	0.243	0.619	0.908	0.0330	0.314	1.47	2.61	0.319	2.17	4.62	3.16
12	13.4	0.00163	0.0404	0.247	0.475	0.677	0.0390	0.348	1.21	1.96	0.363	1.89	3.44	2.70
14	10.9	0.00190	0.0452	0.234	0.380	0.528	0.0445	0.369	0.955	1.53	0.396	1.53	2.68	2.17
16	9.01	0.00215	0.0491	0.208	0.312	0.425	0.0497	0.371	0.781	1.24	0.419	1.24	2.16	1.75
18	7.68	0.00240	0.0521	0.179	0.262	0.350	0.0545	0.367	0.663	1.02	0.429	1.05	1.77	1.49
20	6.66	0.00265	0.0541	0.153	0.222	0.294	0.0587	0.346	0.567	0.854	0.429	0.902	1.49	1.29

A.u. ($\lambda=79$) 1s(2)2s(2)3s(2)4s(2)5s(2)2p(6)3p(6)4p(6)5p(6)3d(10)4d(10)5d(10)4f(14) [6s(1)/free(1)]

R/Rs	46.84	13.92	6.119	2.886	1.199	0.3111	15.04	6.206	2.787	1.070	6.417	2.588	0.7206	2.270	3.010	
v	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(1)	2p(6)	3p(6)	4p(6)	5p(6)	3d(10)	4d(10)	5d(10)	4f(14)	free(1)
0.2	11.3 / 5.18	2.56(-5)	0.000720	0.00638	0.0443	0.394	8.17	0.000650	0.00703	0.0570	0.635	0.00681	0.0741	1.84	0.109	2.05
0.4	24.6 / 10.6	5.29(-5)	0.00145	0.0128	0.0884	0.790	18.3	0.00131	0.0141	0.114	1.28	0.0137	0.148	3.69	0.218	4.31
0.6	37.7 / 16.4	8.00(-5)	0.00218	0.0192	0.133	1.19	28.1	0.00197	0.0212	0.171	1.91	0.0206	0.222	5.54	0.326	6.78
0.8	42.1 / 22.3	0.000107	0.00290	0.0255	0.117	1.58	29.3	0.00263	0.0282	0.228	2.55	0.0274	0.296	7.39	0.436	9.50
1.0	40.0 / 30.0	0.000134	0.00363	0.0319	0.221	1.97	24.1	0.00329	0.0352	0.285	3.17	0.0342	0.370	9.22	0.544	14.1
1.2	38.4 / 32.1	0.000161	0.00435	0.0383	0.264	2.36	19.4	0.00395	0.0422	0.341	3.80	0.0410	0.444	11.0	0.652	13.1
1.4	37.9 / 33.5	0.000188	0.00507	0.0446	0.308	2.73	15.8	0.00461	0.0493	0.397	4.40	0.0478	0.517	12.7	0.759	11.4
1.6	38.1 / 34.9	0.000215	0.00579	0.0509	0.350	3.08	13.1	0.00527	0.0563	0.452	4.99	0.0546	0.589	14.4	0.866	9.87
1.8	38.7 / 36.2	0.000421	0.00651	0.0572	0.392	3.40	11.1	0.00593	0.0633	0.507	5.56	0.0615	0.661	15.9	0.972	8.56
2.0	39.6 / 37.5	0.000268	0.00724	0.0634	0.433	3.67	9.53	0.00658	0.0703	0.562	6.09	0.0683	0.732	17.3	1.08	7.47
2.2	40.4 / 38.7	0.000295	0.00796	0.0696	0.474	3.90	8.24	0.00724	0.0772	0.616	6.58	0.0751	0.803	18.4	1.18	6.56
2.4	41.1 / 39.7	0.000322	0.00868	0.0758	0.514	4.06	7.22	0.00789	0.0841	0.669	7.01	0.0818	0.873	19.2	1.28	5.81
2.6	41.5 / 40.3	0.000349	0.00940	0.0819	0.552	4.15	6.39	0.00854	0.0910	0.721	7.38	0.0886	0.942	19.7	1.38	5.18
2.8	41.6 / 40.6	0.000376	0.0101	0.0880	0.590	4.17	5.68	0.00919	0.0979	0.773	7.68	0.0953	1.01	19.9	1.48	4.65
3.0	41.4 / 40.5	0.000402	0.0108	0.0940	0.626	4.13	5.10	0.00985	0.105	0.824	7.90	0.102	1.08	19.8	1.58	4.20
3.2	40.8 / 40.0	0.000429	0.0115	0.0999	0.660	4.04	4.60	0.0105	0.111	0.873	8.04	0.109	1.14	19.5	1.68	3.81
3.4	40.0 / 39.6	0.000456	0.0123	0.106	0.693	3.89	4.18	0.0112	0.118	0.922	8.10	0.115	1.21	18.9	1.77	3.47
3.6	39.1 / 38.5	0.000483	0.0130	0.112	0.724	3.77	3.81	0.0118	0.125	0.969	8.08	0.122	1.27	18.2	1.86	3.18
3.8	38.2 / 37.6	0.000509	0.0137	0.117	0.753	3.61	3.49	0.0125	0.132	1.02	7.99	0.128	1.33	17.6	1.95	2.93
4.0	36.7 / 36.2	0.000536	0.0144	0.123	0.780	3.38	3.22	0.0131	0.138	1.06	7.84	0.135	1.39	16.6	2.04	2.71
5	31.0 / 30.7	0.000669	0.0178	0.150	0.879	2.50	2.23	0.0164	0.170	1.26	6.54	0.167	1.67	12.9	2.44	1.89
6	26.6 / 26.4	0.000802	0.0212	0.174	0.910	1.95	1.65	0.0195	0.201	1.41	5.37	0.198	1.89	10.1	2.76	1.41
7	23.2 / 23.1	0.000935	0.0245	0.196	0.881	1.56	1.24	0.0227	0.230	1.50	4.33	0.228	2.04	7.94	2.98	1.09
8	20.7 / 20.6	0.00107	0.0277	0.213	0.820	1.28	0.978	0.0258	0.256	1.53	3.58	0.256	2.13	6.52	3.09	0.870
9	18.6 / 18.5	0.00120	0.0308	0.227	0.719	1.06	0.780	0.0288	0.281	1.50	3.01	0.282	2.14	5.40	3.10	0.715
10	16.8 / 16.8	0.00133	0.0337	0.236	0.614	0.907	0.641	0.0318	0.302	1.44	2.56	0.307	2.10	4.60	3.02	0.597
12	13.7 / 13.7	0.00159	0.0390	0.241	0.468	0.677	0.465	0.0375	0.336	1.19	1.92	0.349	1.85	3.50	2.64	0.433
14	11.1 / 11.1	0.00184	0.0437	0.230	0.375	0.527	0.347	0.0429	0.357	0.947	1.51	0.382	1.51	2.64	2.14	0.337
16	9.15 / 9.15	0.00209	0.0475	0.205	0.310	0.423	0.267	0.0480	0.364	0.776	1.21	0.405	1.23	2.13	1.73	0.264
18	7.82 / 7.82	0.00234	0.0505	0.177	0.259	0.349	0.214	0.0526	0.358	0.659	1.00	0.416	1.03	1.78	1.47	0.212
20	6.74 / 6.74	0.00258	0.0526	0.152	0.220	0.294	0.179	0.0567	0.340	0.564	0.842	0.417	0.895	1.46	1.26	0.183

Hg (Z=80) 1s(2)2s(2)3s(2)4s(2)5s(2)6s(2)7p(6)8p(6)9p(6)3d(10)4d(10)5d(10)4f(14)

Q/Rs	---->	47.41	14.09	6.183	2.939	1.242	0.3500	15.25	6.294	2.845	1.116	5.521	2.650	0.7876	2.345
v	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	7p(6)	3p(6)	4p(6)	5p(6)	3d(10)	4d(10)	4f(14)	
0.2	9.97	0.248(-4)	0.000697	0.00621	0.0423	0.361	7.27	0.00625	0.00677	0.0540	0.572	0.00653	0.0697	1.48	0.100
0.4	20.8	0.512(-4)	0.00140	0.0124	0.0844	0.725	15.4	0.00126	0.0136	0.108	1.15	0.0131	0.139	2.97	0.200
0.6	32.3	0.773(-4)	0.00211	0.0186	0.127	1.09	24.2	0.00190	0.0204	0.162	1.72	0.0197	0.209	4.46	0.300
0.8	42.3	0.000103	0.00281	0.0248	0.169	1.45	31.5	0.00254	0.0272	0.216	2.29	0.0262	0.279	5.94	0.401
1.0	47.0	0.000129	0.00351	0.0310	0.211	1.81	33.5	0.00317	0.0340	0.270	2.86	0.0328	0.348	7.41	0.500
1.2	46.5	0.000156	0.00421	0.0373	0.253	2.16	30.3	0.00381	0.0407	0.323	3.42	0.0393	0.417	8.85	0.600
1.4	44.6	0.000182	0.00491	0.0434	0.294	2.50	25.9	0.00444	0.0475	0.376	3.97	0.0458	0.486	10.3	0.698
1.6	43.2	0.000208	0.00561	0.0496	0.334	2.83	22.0	0.00508	0.0542	0.429	4.50	0.0524	0.554	11.6	0.796
1.8	42.5	0.000234	0.00630	0.0557	0.375	3.13	18.9	0.00571	0.0610	0.481	5.02	0.0589	0.622	12.9	0.894
2.0	42.1	0.000260	0.00700	0.0617	0.414	3.39	16.4	0.00634	0.0677	0.533	5.50	0.0654	0.689	14.0	0.990
2.2	42.0	0.000285	0.00770	0.0678	0.453	3.61	14.3	0.00697	0.0744	0.584	5.95	0.0719	0.756	15.0	1.09
2.4	42.0	0.000311	0.00840	0.0738	0.491	3.77	12.6	0.00760	0.0811	0.635	6.36	0.0784	0.821	15.9	1.18
2.6	41.9	0.000337	0.00910	0.0797	0.528	3.88	11.2	0.00823	0.0877	0.685	6.72	0.0849	0.886	16.5	1.27
2.8	41.7	0.000363	0.00979	0.0856	0.564	3.92	10.0	0.00886	0.0943	0.734	7.02	0.0913	0.950	16.9	1.37
3.0	41.4	0.000389	0.0105	0.0915	0.598	3.91	9.02	0.00949	0.101	0.782	7.25	0.0977	1.01	17.1	1.46
3.2	40.9	0.000415	0.0112	0.0973	0.632	3.85	8.18	0.0101	0.107	0.829	7.41	0.104	1.08	17.0	1.55
3.4	40.2	0.000441	0.0119	0.103	0.663	3.74	7.44	0.0108	0.114	0.875	7.51	0.110	1.14	16.8	1.63
3.6	39.3	0.000467	0.0126	0.109	0.694	3.61	6.81	0.0114	0.120	0.920	7.53	0.117	1.20	16.6	1.72
3.8	38.3	0.000493	0.0132	0.114	0.722	3.50	6.26	0.0120	0.127	0.964	7.50	0.123	1.26	15.9	1.80
4.0	37.3	0.000519	0.0139	0.120	0.748	3.31	5.78	0.0126	0.133	1.01	7.40	0.129	1.31	15.5	1.88
5	32.1	0.000648	0.0173	0.146	0.846	2.63	4.04	0.0158	0.164	1.20	6.32	0.160	1.57	12.7	2.26
6	27.3	0.000776	0.0206	0.170	0.882	2.05	3.09	0.0188	0.194	1.34	5.26	0.190	1.79	9.82	2.56
7	23.7	0.000905	0.0238	0.191	0.859	1.62	2.32	0.0219	0.222	1.44	4.24	0.218	1.94	7.86	2.78
8	21.1	0.00103	0.0268	0.208	0.802	1.33	1.86	0.0248	0.248	1.47	3.49	0.245	2.03	6.43	2.90
9	18.9	0.00116	0.0298	0.221	0.711	1.12	1.52	0.0278	0.271	1.45	2.94	0.271	2.06	5.38	2.93
10	17.0	0.00129	0.0326	0.231	0.609	0.927	1.25	0.0306	0.292	1.40	2.50	0.295	2.02	4.55	2.88
12	13.9	0.00154	0.0379	0.236	0.465	0.704	0.990	0.0362	0.325	1.18	1.89	0.336	1.82	3.40	2.56
14	11.3	0.00178	0.0424	0.227	0.373	0.540	0.672	0.0414	0.346	0.939	1.48	0.349	1.49	2.65	2.10
16	9.34	0.00203	0.0462	0.203	0.306	0.437	0.527	0.0463	0.334	0.762	1.19	0.391	1.82	2.14	1.71
18	7.92	0.00227	0.0492	0.176	0.257	0.363	0.418	0.0508	0.350	0.648	0.985	0.403	1.02	1.76	1.44
20	6.84	0.00250	0.0513	0.151	0.219	0.303	0.344	0.0549	0.334	0.555	0.826	0.405	0.880	1.48	1.24

T 1 (Z=81) 1s(2) 2s(2) 3s(2) 4s(2) 5s(2) 6s(2) 2p(6) 3p(6) 4p(6) 5p(6) 6p(6) 3d(10) 4d(10) 5d(10) 4f(14)

Q/Rs	---->	48.08	14.30	6.301	2.995	1.288	0.3958	15.43	6.400	2.902	1.155	0.2977	6.623	2.712	0.8538	2.419
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	2p(6)	3p(6)	4p(6)	5p(6)	6p(1)	3d(10)	4d(10)	5d(10)	4f(14)
0.2	16.9	2.38(-5)	0.000670	0.00591	0.0403	0.330	5.47	0.00601	0.00648	0.0513	0.525	9.05	0.00626	0.0656	1.21	0.0924
0.4	36.5	4.92(-5)	0.00135	0.0118	0.0804	0.663	11.4	0.00122	0.0130	0.103	1.06	20.4	0.0126	0.131	2.44	0.185
0.6	55.8	7.44(-5)	0.00203	0.0177	0.121	0.995	17.8	0.00184	0.0195	0.154	1.58	31.0	0.0189	0.197	3.65	0.277
0.8	64.1	9.95(-5)	0.00270	0.0236	0.161	1.33	23.8	0.00246	0.0260	0.205	2.11	30.9	0.0252	0.263	4.87	0.370
1.0	64.1	0.000125	0.00338	0.0296	0.201	1.65	27.1	0.00307	0.0325	0.256	2.63	25.3	0.0315	0.328	6.07	0.462
1.2	60.8	0.000153	0.00405	0.0355	0.241	1.98	26.7	0.00369	0.0389	0.307	3.14	20.1	0.0377	0.393	7.25	0.554
1.4	56.5	0.000175	0.00472	0.0413	0.280	2.29	23.9	0.00430	0.0454	0.358	3.65	16.4	0.0439	0.458	8.41	0.645
1.6	52.0	0.000200	0.00539	0.0472	0.319	2.59	20.0	0.00492	0.0519	0.408	4.14	13.6	0.0502	0.522	9.53	0.735
1.8	49.2	0.000225	0.00606	0.0530	0.357	2.87	17.3	0.00553	0.0584	0.458	4.61	11.4	0.0565	0.586	10.6	0.825
2.0	47.3	0.000250	0.00673	0.0588	0.395	3.11	15.1	0.00614	0.0648	0.507	5.06	9.77	0.0628	0.650	11.6	0.914
2.2	45.9	0.000275	0.00741	0.0645	0.432	3.33	13.2	0.00675	0.0712	0.556	5.48	8.46	0.0690	0.712	12.5	1.00
2.4	44.9	0.000300	0.00808	0.0702	0.468	3.49	11.7	0.00736	0.0776	0.604	5.87	7.40	0.0752	0.774	13.3	1.09
2.6	44.2	0.000325	0.00875	0.0759	0.504	3.61	10.5	0.00797	0.0839	0.651	6.21	6.53	0.0814	0.836	13.9	1.18
2.8	43.4	0.000350	0.00941	0.0815	0.538	3.67	9.39	0.00858	0.0903	0.698	6.51	5.82	0.0876	0.896	14.4	1.26
3.0	42.7	0.000374	0.0101	0.0871	0.571	3.68	8.48	0.00919	0.0965	0.744	6.74	5.21	0.0938	0.956	14.7	1.35
3.2	42.0	0.000399	0.0107	0.0926	0.603	3.65	7.70	0.00980	0.103	0.789	6.92	4.70	0.0999	1.02	14.8	1.43
3.4	41.1	0.000424	0.0114	0.0981	0.634	3.57	7.04	0.0104	0.109	0.833	7.04	4.26	0.106	1.07	14.8	1.51
3.6	40.2	0.000450	0.0121	0.104	0.663	3.46	6.44	0.0110	0.115	0.876	7.09	3.89	0.112	1.13	14.7	1.59
3.8	39.2	0.000474	0.0127	0.109	0.690	3.36	5.93	0.0116	0.121	0.918	7.09	3.56	0.118	1.18	14.4	1.67
4.0	38.1	0.000499	0.0134	0.114	0.716	3.22	5.48	0.0122	0.127	0.959	7.03	3.28	0.124	1.24	14.0	1.74
5	32.7	0.000623	0.0166	0.139	0.813	2.61	3.85	0.0153	0.157	1.14	6.16	2.26	0.154	1.49	11.8	2.09
6	27.9	0.000747	0.0198	0.162	0.852	2.03	2.87	0.0182	0.186	1.29	5.18	1.67	0.182	1.69	9.33	2.38
7	24.0	0.000870	0.0229	0.182	0.886	1.62	2.23	0.0211	0.213	1.38	4.14	1.26	0.210	1.85	7.50	2.60
8	21.3	0.000994	0.0258	0.199	0.919	1.32	1.78	0.0241	0.237	1.42	3.43	0.982	0.236	1.94	6.14	2.73
9	19.0	0.00112	0.0287	0.212	0.952	1.10	1.47	0.0269	0.262	1.41	2.89	0.787	0.261	1.97	5.16	2.78
10	17.2	0.00124	0.0314	0.222	0.981	0.931	1.22	0.0297	0.281	1.36	2.46	0.652	0.283	1.95	4.37	2.74
12	14.0	0.00148	0.0365	0.229	0.958	0.697	0.877	0.0351	0.313	1.16	1.86	0.459	0.324	1.78	3.29	2.49
14	11.4	0.00172	0.0409	0.221	0.938	0.543	0.658	0.0402	0.335	0.931	1.46	0.342	0.356	1.47	2.57	2.07
16	9.44	0.00195	0.0446	0.200	0.904	0.435	0.514	0.0449	0.344	0.757	1.18	0.273	0.378	1.21	2.07	1.69
18	7.98	0.00218	0.0476	0.174	0.868	0.358	0.415	0.0493	0.341	0.644	0.972	0.216	0.391	1.01	1.70	1.41
20	6.90	0.00241	0.0497	0.150	0.829	0.299	0.340	0.0533	0.327	0.552	0.820	0.182	0.394	0.864	1.43	1.22

P_b (Z=82) 1s(2)2s(2)3s(2)4s(2)5s(2)2p(6)3p(6)4p(5)5p(6)3d(10)4d(10)5d(10)4f(14) [5s(2)5p(2)/free(4)]

l/Rs	---->	48.66	14.47	6.392	3.048	1.332	0.4353	15.63	6.495	2.957	1.202	0.3435	6.725	2.773	0.917	2.493	2.304
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	5s(2)	6s(2)	3p(6)	4p(6)	5p(6)	6p(2)	3d(10)	4d(10)	5d(10)	4f(14)	free(4)
0.2	14.0 / 6.54	2.30(-5)	0.000649	0.00569	0.0385	0.304	4.38	0.000585	0.00623	0.0489	0.476	7.59	0.00601	0.0620	1.02	0.0855	4.51
0.4	29.3 / 13.4	4.76(-5)	0.00131	0.0114	0.0759	0.611	9.05	0.00118	0.0125	0.0978	0.956	16.1	0.0121	0.124	2.06	0.171	9.26
0.6	45.6 / 20.4	7.20(-5)	0.00196	0.0171	0.116	0.916	14.1	0.00178	0.0188	0.147	1.43	25.3	0.0181	0.186	3.09	0.256	14.2
0.8	60.0 / 27.8	9.62(-5)	0.00262	0.0227	0.154	1.22	18.9	0.00237	0.0250	0.196	1.91	32.8	0.0242	0.248	4.11	0.342	19.5
1.0	67.2 / 35.3	0.000121	0.00327	0.0285	0.192	1.52	22.4	0.00297	0.0312	0.244	2.38	34.5	0.0302	0.310	5.12	0.427	25.0
1.2	66.6 / 47.1	0.000145	0.00392	0.0342	0.230	1.82	23.2	0.00356	0.0374	0.293	2.85	31.1	0.0362	0.371	6.12	0.512	34.8
1.4	62.5 / 49.1	0.000169	0.00457	0.0398	0.268	2.11	21.8	0.00416	0.0437	0.341	3.30	26.4	0.0422	0.432	7.10	0.596	34.8
1.6	57.7 / 48.0	0.000193	0.00522	0.0454	0.305	2.39	19.1	0.00475	0.0499	0.389	3.75	22.4	0.0482	0.493	8.06	0.680	31.8
1.8	53.7 / 46.5	0.000217	0.00587	0.0511	0.342	2.64	16.5	0.00534	0.0561	0.436	4.18	19.1	0.0543	0.554	8.97	0.764	28.4
2.0	50.8 / 45.2	0.000242	0.00652	0.0566	0.378	2.88	14.4	0.00593	0.0623	0.483	4.59	16.5	0.0603	0.613	9.83	0.846	25.3
2.2	48.7 / 44.1	0.000266	0.00717	0.0622	0.413	3.08	12.7	0.00652	0.0684	0.530	4.98	14.5	0.0663	0.673	10.6	0.928	22.6
2.4	47.0 / 43.2	0.000290	0.00782	0.0677	0.448	3.25	11.3	0.00711	0.0746	0.575	5.34	12.7	0.0722	0.731	11.3	1.01	20.2
2.6	45.6 / 42.4	0.000314	0.00847	0.0731	0.482	3.37	10.1	0.00770	0.0807	0.621	5.67	11.3	0.0782	0.789	12.0	1.09	18.2
2.8	44.5 / 41.7	0.000338	0.00912	0.0786	0.515	3.45	9.07	0.00828	0.0868	0.665	5.95	10.1	0.0841	0.847	12.5	1.17	16.4
3.0	43.5 / 41.1	0.000362	0.00976	0.0839	0.547	3.48	8.17	0.00888	0.0928	0.709	6.19	9.13	0.0900	0.903	12.8	1.25	14.9
3.2	42.5 / 40.4	0.000386	0.0104	0.0893	0.578	3.47	7.43	0.00947	0.0989	0.752	6.38	8.25	0.0959	0.959	13.1	1.32	13.6
3.4	41.6 / 39.6	0.000411	0.0111	0.0945	0.608	3.41	6.85	0.0101	0.105	0.795	6.52	7.53	0.102	1.01	13.2	1.40	12.4
3.6	40.6 / 38.8	0.000435	0.0117	0.0997	0.636	3.32	6.27	0.0107	0.111	0.836	6.60	6.89	0.108	1.07	13.2	1.47	11.4
3.8	39.6 / 38.1	0.000459	0.0123	0.105	0.662	3.23	5.77	0.0112	0.117	0.876	6.63	6.31	0.113	1.12	13.1	1.55	10.6
4.0	38.5 / 37.2	0.000483	0.0130	0.110	0.687	3.13	5.31	0.0118	0.123	0.915	6.61	5.82	0.119	1.17	12.8	1.62	9.78
5	32.8 / 31.9	0.000603	0.0161	0.134	0.783	2.56	3.74	0.0147	0.151	1.09	5.95	4.07	0.148	1.41	10.8	1.95	6.92
6	28.2 / 27.6	0.000722	0.0192	0.157	0.826	1.99	2.80	0.0176	0.179	1.23	5.09	3.02	0.175	1.61	8.90	2.22	5.19
7	24.3 / 23.8	0.000842	0.0222	0.176	0.815	1.58	2.17	0.0205	0.245	1.33	4.05	2.34	0.202	1.76	7.19	2.43	4.04
8	21.5 / 21.1	0.000961	0.0250	0.193	0.767	1.30	1.75	0.0233	0.229	1.37	3.36	1.87	0.227	1.86	5.94	2.57	3.24
9	19.2 / 18.9	0.00108	0.0278	0.205	0.694	1.08	1.43	0.0260	0.251	1.37	2.82	1.52	0.251	1.90	4.96	2.63	2.67
10	17.3 / 17.1	0.00120	0.0305	0.215	0.599	0.917	1.21	0.0287	0.271	1.33	2.42	1.25	0.273	1.89	4.23	2.62	2.24
12	14.1 / 14.0	0.00143	0.0354	0.223	0.451	0.686	0.874	0.0339	0.303	1.15	1.83	0.898	0.312	1.74	3.18	2.41	1.64
14	11.5 / 11.4	0.00166	0.0388	0.216	0.366	0.535	0.655	0.0389	0.324	0.923	1.43	0.677	0.343	1.46	2.50	2.03	1.25
16	9.53 / 9.49	0.00189	0.0434	0.197	0.301	0.429	0.515	0.0434	0.334	0.748	1.16	0.522	0.366	1.20	2.01	1.67	1.00
18	8.05 / 8.01	0.00211	0.0463	0.172	0.253	0.409	0.477	0.0477	0.332	0.658	0.958	0.426	0.379	0.991	1.66	1.39	0.794
20	6.96 / 6.94	0.00233	0.0484	0.149	0.215	0.296	0.342	0.0516	0.320	0.549	0.805	0.351	0.384	0.858	1.39	1.20	0.688

B_i (Z=83) 1s(2)2s(2)3s(2)4s(2)5s(2)6s(2)2p(6)3p(6)4p(6)5p(6)6p(6)3d(10)4d(10)5d(10)4f(14)

0/Rs	---->	49.25	14.66	6.489	3.104	1.377	0.4716	15.85	6.593	3.014	1.253	0.3842	6.829	2.837	0.9724	2.567
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	2p(6)	3p(6)	4p(6)	5p(6)	6p(6)	3d(10)	4d(10)	5d(10)	4f(14)
0.2	11.9	2.22(-5)	0.000627	0.00547	0.0368	0.280	3.64	0.000563	0.00599	0.0466	0.430	6.42	0.00577	0.0584	0.880	0.0792
0.4	24.4	4.61(-5)	0.00126	0.0110	0.0734	0.563	7.47	0.00114	0.0120	0.0931	0.862	13.3	0.0116	0.117	1.77	0.159
0.6	37.6	6.96(-5)	0.00190	0.0164	0.110	0.844	11.5	0.00171	0.0180	0.140	1.29	20.6	0.0174	0.175	2.65	0.237
0.8	50.6	9.31(-5)	0.00253	0.0219	0.147	1.12	15.6	0.00229	0.0240	0.186	1.72	27.7	0.0232	0.234	3.53	0.317
1.0	60.9	0.000117	0.00316	0.0274	0.183	1.40	18.8	0.00286	0.0300	0.233	2.15	32.9	0.0290	0.292	4.40	0.396
1.2	65.6	0.000140	0.00379	0.0329	0.220	1.68	20.3	0.00343	0.0360	0.279	2.57	34.3	0.0348	0.350	5.26	0.475
1.4	64.8	0.000163	0.00442	0.0383	0.256	1.94	19.7	0.00400	0.0420	0.325	2.98	32.3	0.0406	0.408	6.10	0.553
1.6	60.7	0.000187	0.00504	0.0437	0.291	2.20	18.0	0.00457	0.0480	0.370	3.38	28.4	0.0463	0.465	6.93	0.631
1.8	57.5	0.000210	0.00567	0.0491	0.326	2.44	16.4	0.00514	0.0540	0.415	3.78	25.0	0.0521	0.522	7.72	0.708
2.0	53.6	0.000234	0.00630	0.0545	0.361	2.66	14.3	0.00571	0.0599	0.460	4.15	21.6	0.0579	0.578	8.47	0.785
2.2	51.0	0.000257	0.00693	0.0598	0.395	2.86	12.7	0.00628	0.0658	0.504	4.51	19.1	0.0636	0.634	9.18	0.861
2.4	48.9	0.000280	0.00756	0.0651	0.428	3.02	11.3	0.00685	0.0717	0.548	4.84	17.1	0.0694	0.690	9.82	0.936
2.6	47.0	0.000304	0.00818	0.0703	0.461	3.15	10.1	0.00741	0.0776	0.591	5.15	15.2	0.0751	0.745	10.4	1.01
2.8	45.6	0.000327	0.00881	0.0756	0.492	3.23	9.06	0.00798	0.0835	0.634	5.42	13.7	0.0808	0.799	10.9	1.08
3.0	44.3	0.000351	0.00943	0.0807	0.523	3.28	8.19	0.00855	0.0893	0.676	5.65	12.4	0.0864	0.852	11.3	1.18
3.2	43.1	0.000374	0.0101	0.0859	0.553	3.28	7.45	0.00911	0.0951	0.717	5.85	11.3	0.0921	0.905	11.6	1.23
3.4	42.0	0.000397	0.0107	0.0909	0.581	3.25	6.81	0.00969	0.101	0.757	5.99	10.3	0.0977	0.957	11.8	1.30
3.6	40.9	0.000420	0.0113	0.0959	0.608	3.19	6.24	0.0103	0.107	0.797	6.10	9.43	0.103	1.01	11.9	1.37
3.8	39.9	0.000444	0.0119	0.101	0.634	3.10	5.76	0.0180	0.112	0.853	6.15	8.70	0.109	1.06	11.9	1.44
4.0	38.7	0.000467	0.0125	0.106	0.658	3.02	5.31	0.0114	0.118	0.073	6.17	7.95	0.115	1.11	11.8	1.50
5	33.3	0.000583	0.0156	0.129	0.753	2.52	3.75	0.0142	0.146	1.04	5.71	5.63	0.142	1.33	10.3	1.81
6	28.7	0.000699	0.0185	0.151	0.798	1.93	2.80	0.0170	0.172	1.18	4.97	4.23	0.168	1.53	8.65	2.07
7	24.4	0.000815	0.0214	0.170	0.793	1.55	2.17	0.0197	0.197	1.27	3.93	3.26	0.194	1.67	6.90	2.28
8	21.5	0.000930	0.0242	0.186	0.750	1.27	1.75	0.0224	0.220	1.32	3.27	2.60	0.218	1.77	5.71	2.42
9	19.3	0.00105	0.0269	0.199	0.685	1.06	1.44	0.0251	0.242	1.33	2.76	2.18	0.241	1.82	4.81	2.49
10	17.4	0.00116	0.0295	0.209	0.594	0.903	1.20	0.0277	0.261	1.29	2.36	1.79	0.263	1.82	4.11	2.49
12	14.2	0.00139	0.0343	0.217	0.448	0.676	0.882	0.0327	0.293	1.13	1.79	1.31	0.301	1.59	3.09	2.33
14	11.7	0.00161	0.0385	0.212	0.361	0.527	0.665	0.0375	0.314	0.915	1.41	0.978	0.331	1.43	2.44	1.99
16	9.64	0.00183	0.0421	0.194	0.299	0.423	0.515	0.0419	0.325	0.743	1.84	0.768	0.354	1.18	1.96	1.65
18	8.16	0.00204	0.0450	0.171	0.250	0.350	0.420	0.0461	0.324	0.630	0.944	0.633	0.368	0.983	1.62	1.37
20	7.00	0.00226	0.0471	0.148	0.213	0.292	0.340	0.0499	0.314	0.540	0.793	0.508	0.373	0.842	1.37	1.17

P o (z=84) 1s(2)2s(2)3s(2)4s(2)5s(2)6s(2)7p(6)8p(6)9p(6)4d(10)5d(10)4f(14)

q/Rs	--->	49.88	14.85	6.578	3.158	1.421	0.5055	16.08	6.690	3.118	1.295	0.4096	6.910	2.878	0.9764	2.640
v	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	7p(6)	3p(6)	4p(6)	5p(6)	6p(4)	3d(10)	4d(10)	5d(10)	4f(14)
0.2	10.7	2.14(-5)	0.000605	0.00528	0.0352	0.259	3.09	0.00541	0.00576	0.0427	0.396	5.89	0.00559	0.0563	0.871	0.0737
0.4	21.9	4.45(-5)	0.00122	0.0106	0.0703	0.521	6.32	0.00109	0.0116	0.0853	0.794	12.0	0.0112	0.113	1.75	0.147
0.6	33.4	6.72(-5)	0.00183	0.0159	0.106	0.781	9.72	0.00165	0.0174	0.128	1.19	18.5	0.0169	0.169	2.62	0.221
0.8	45.1	8.99(-5)	0.00244	0.0211	0.141	1.04	13.1	0.00220	0.0231	0.171	1.59	25.0	0.0225	0.225	3.49	0.295
1.0	55.5	0.000113	0.00305	0.0264	0.176	1.30	16.1	0.00275	0.0289	0.213	1.98	30.7	0.0281	0.281	4.35	0.368
1.2	62.6	0.000135	0.00366	0.0317	0.210	1.55	17.8	0.00330	0.0346	0.255	2.36	34.3	0.0337	0.337	5.20	0.441
1.4	65.0	0.000158	0.00427	0.0370	0.245	1.80	18.0	0.00385	0.0404	0.297	2.74	34.9	0.0393	0.393	6.04	0.514
1.6	63.9	0.000180	0.00487	0.0422	0.279	2.04	17.0	0.00440	0.0461	0.339	3.12	33.2	0.0449	0.448	6.86	0.587
1.8	61.8	0.000203	0.00548	0.0474	0.312	2.26	15.7	0.00494	0.0519	0.381	3.48	30.7	0.0505	0.503	7.64	0.659
2.0	57.1	0.000226	0.00608	0.0526	0.346	2.47	13.5	0.00549	0.0576	0.422	3.83	26.7	0.0561	0.557	8.39	0.730
2.2	54.0	0.000248	0.00669	0.0577	0.378	2.66	12.0	0.00604	0.0633	0.462	4.16	28.5	0.0616	0.611	9.09	0.801
2.4	51.5	0.000271	0.00730	0.0628	0.410	2.82	10.7	0.00658	0.0690	0.503	4.48	21.1	0.0672	0.665	9.73	0.871
2.6	49.4	0.000293	0.00790	0.0679	0.441	2.95	9.50	0.00713	0.0747	0.542	4.76	19.0	0.0728	0.718	10.3	0.940
2.8	47.7	0.000316	0.00851	0.0729	0.472	3.04	8.85	0.00767	0.0803	0.582	5.02	17.1	0.0783	0.770	10.8	1.01
3.0	46.2	0.000338	0.00911	0.0779	0.501	3.09	7.85	0.00822	0.0859	0.620	5.25	15.5	0.0838	0.822	11.2	1.08
3.2	44.8	0.000361	0.00971	0.0829	0.530	3.11	7.15	0.00877	0.0915	0.658	6.45	14.1	0.0893	0.872	11.4	1.14
3.4	43.6	0.000384	0.0103	0.0878	0.557	3.10	6.54	0.00931	0.0970	0.695	5.60	13.0	0.0947	0.923	11.7	1.21
3.6	42.3	0.000406	0.0109	0.0926	0.684	3.05	6.00	0.00986	0.103	0.732	5.72	11.9	0.100	0.972	11.8	1.27
3.8	41.1	0.000429	0.0115	0.0974	0.609	2.98	5.55	0.0104	0.108	0.768	5.79	11.0	0.106	1.02	11.8	1.34
4.0	39.9	0.000451	0.0121	0.102	0.632	2.90	5.13	0.0110	0.114	0.802	5.82	10.1	0.111	1.07	11.7	1.40
5	34.1	0.000563	0.0150	0.125	0.726	2.46	3.63	0.0137	0.140	0.962	5.50	7.18	0.138	1.29	10.3	1.69
6	29.3	0.000675	0.0179	0.146	0.772	1.90	2.71	0.0163	0.166	1.09	4.84	5.38	0.163	1.47	8.63	1.94
7	24.9	0.000787	0.0207	0.164	0.772	1.52	2.12	0.0190	0.190	1.18	3.87	4.20	0.188	1.62	6.89	2.14
8	21.9	0.000898	0.0234	0.180	0.734	1.25	1.70	0.0216	0.213	1.24	3.21	3.37	0.212	1.72	5.71	2.28
9	19.5	0.00101	0.0260	0.193	0.675	1.05	1.40	0.0241	0.233	1.25	2.72	2.77	0.234	1.77	4.81	2.36
10	17.5	0.00112	0.0285	0.203	0.588	0.885	1.17	0.0266	0.252	1.23	2.33	2.33	0.255	1.77	4.10	2.38
12	14.4	0.00134	0.0332	0.211	0.443	0.666	0.865	0.0315	0.283	1.10	1.77	1.71	0.292	1.66	3.09	2.25
14	11.8	0.00155	0.0373	0.207	0.359	0.520	0.653	0.0361	0.305	0.899	1.39	1.31	0.323	1.42	2.43	1.95
16	9.80	0.00177	0.0408	0.192	0.295	0.418	0.514	0.0404	0.316	0.733	1.13	1.02	0.345	1.18	1.96	1.63
18	8.26	0.00198	0.0437	0.169	0.248	0.344	0.411	0.0444	0.316	0.616	0.932	0.817	0.359	0.978	1.62	1.36
20	7.08	0.00218	0.0458	0.147	0.212	0.289	0.337	0.0481	0.307	0.529	0.783	0.672	0.365	0.838	1.36	1.15

A t (Z=85) 1s(2)2s(2)3s(2)4s(2)5s(2)6s(2)2p(6)3p(6)4p(6)5p(6)6p(6)6d(10)4d(10)5d(10)4f(14)

Q/Rs	---->	50.49	15.21	6.670	3.213	1.465	0.5377	16.28	6.786	3.128	1.337	0.4381	7.035	2.961	1.080	2.713
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	2p(6)	3p(6)	4p(6)	5p(6)	6p(5)	3d(10)	4d(10)	5d(10)	4f(14)
0.2	9.46	2.07(-5)	5.67(-4)	0.00509	0.0337	0.241	2.68	0.000523	0.00554	0.0423	0.366	5.28	0.00533	0.0523	0.679	0.0686
0.4	19.2	4.30(-5)	0.00114	0.0102	0.0672	0.483	5.45	0.00106	0.0111	0.0846	0.733	10.7	0.0107	0.105	1.36	0.137
0.6	29.2	6.50(-5)	0.00172	0.0153	0.101	0.725	8.36	0.00159	0.0167	0.127	1.10	16.3	0.0161	0.157	2.04	0.207
0.8	39.3	8.69(-5)	0.00229	0.0204	0.135	0.965	11.3	0.00213	0.0223	0.169	1.46	22.0	0.0214	0.209	2.72	0.274
1.0	48.8	1.09(-4)	0.00286	0.0255	0.168	1.20	13.9	0.00266	0.0278	0.211	1.83	27.4	0.0268	0.261	3.39	0.343
1.2	56.4	1.31(-4)	0.00343	0.0305	0.201	1.44	14.8	0.00319	0.0333	0.253	2.18	31.7	0.0321	0.313	4.05	0.411
1.4	60.8	1.53(-4)	0.00400	0.0356	0.234	1.67	16.3	0.00372	0.0389	0.295	2.54	34.1	0.0374	0.365	4.70	0.479
1.6	61.8	1.74(-4)	0.00457	0.0407	0.267	1.89	15.7	0.00425	0.0444	0.336	2.88	34.2	0.0428	0.416	5.34	0.548
1.8	60.2	1.96(-4)	0.00514	0.0457	0.299	2.10	14.4	0.00478	0.0480	0.378	3.22	32.6	0.0481	0.467	5.97	0.614
2.0	58.1	2.18(-4)	0.00570	0.0507	0.331	2.30	13.0	0.00531	0.0555	0.418	3.54	30.6	0.0535	0.518	6.56	0.680
2.2	54.1	2.40(-4)	0.00628	0.0556	0.362	2.48	11.4	0.00584	0.0610	0.459	3.85	26.9	0.0588	0.568	7.13	0.747
2.4	51.0	2.62(-4)	0.00684	0.0606	0.393	2.63	10.2	0.00637	0.0665	0.499	4.15	23.8	0.0641	0.618	7.66	0.812
2.6	48.8	2.84(-4)	0.00741	0.0655	0.423	2.76	9.21	0.00689	0.0719	0.538	4.42	21.6	0.0694	0.667	8.15	0.877
2.8	46.9	3.06(-4)	0.00798	0.0703	0.452	2.86	8.35	0.00742	0.0773	0.577	4.67	19.5	0.0746	0.716	8.59	0.941
3.0	45.3	3.27(-4)	0.00854	0.0752	0.480	2.92	7.56	0.00795	0.0827	0.615	4.89	17.8	0.0799	0.764	8.98	1.00
3.2	43.8	3.49(-4)	0.00911	0.0800	0.508	2.95	6.89	0.00848	0.0881	0.653	5.08	16.3	0.0851	0.812	9.30	1.07
3.4	42.5	3.71(-4)	0.00967	0.0847	0.534	2.95	6.31	0.00901	0.0935	0.690	5.24	14.9	0.0903	0.858	9.56	1.13
3.6	41.3	3.93(-4)	0.0102	0.0894	0.560	2.91	5.82	0.00953	0.0988	0.726	5.36	13.8	0.0955	0.904	9.74	1.19
3.8	40.1	4.14(-4)	0.0108	0.0940	0.584	2.87	5.36	0.0101	0.104	0.761	5.45	12.7	0.101	0.949	9.85	1.25
4.0	39.0	4.36(-4)	0.0113	0.0986	0.607	2.79	4.96	0.0106	0.109	0.796	5.50	11.8	0.106	0.994	9.90	1.31
5	33.7	5.45(-4)	0.0141	0.121	0.699	2.35	3.53	0.0132	0.135	0.954	5.29	8.43	0.131	1.21	9.29	1.58
6	29.2	6.53(-4)	0.0168	0.141	0.747	1.85	2.64	0.0158	0.160	1.08	4.67	6.34	0.156	1.39	8.15	1.82
7	24.8	7.61(-4)	0.0194	0.159	0.751	1.49	2.07	0.0183	0.183	1.18	3.82	4.96	0.179	1.52	6.47	2.01
8	21.8	8.69(-4)	0.0220	0.174	0.717	1.23	1.69	0.0209	0.205	1.23	3.15	4.00	0.202	1.62	5.37	2.15
9	19.4	9.76(-4)	0.0244	0.187	0.665	1.03	1.37	0.0233	0.225	1.24	2.67	3.30	0.224	1.68	4.54	2.24
10	17.5	0.00108	0.0268	0.197	0.583	0.872	1.17	0.0258	0.244	1.22	2.29	2.77	0.244	1.69	3.89	2.26
12	14.4	0.00129	0.0312	0.206	0.440	0.657	0.845	0.0305	0.274	1.09	1.74	2.05	0.280	1.61	2.96	2.17
14	11.9	0.00150	0.0352	0.203	0.353	0.513	0.649	0.0349	0.295	0.898	1.37	1.58	0.309	1.39	2.33	1.91
16	9.85	0.00171	0.0385	0.189	0.293	0.413	0.506	0.0391	0.307	0.732	1.11	1.25	0.332	1.16	1.88	1.60
18	8.30	0.00191	0.0413	0.167	0.245	0.340	0.406	0.0431	0.309	0.615	0.920	1.00	0.346	0.968	1.56	1.34
20	7.13	0.00211	0.0435	0.146	0.209	0.285	0.334	0.0466	0.301	0.529	0.777	0.825	0.353	0.821	1.32	1.14

R n (Z=86) 1s(2)2s(2)3s(2)4s(2)5s(2)2p(6)3p(6)4p(6)5p(6)6p(6)3d(10)4d(10)5d(10)4f(14)

Q/Rs	---->	51.11	15.23	6.761	3.271	1.508	0.5686	16.48	6.882	3.184	1.391	0.4675	7.139	3.025	1.132	2.785
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6p(2)	2p(6)	3p(6)	4p(6)	5p(6)	6p(6)	3d(10)	4d(10)	5d(10)	4f(14)
0.2	8.42	2.00(-5)	5.65(-4)	0.00491	0.0322	0.224	2.35	0.000506	0.00534	0.0404	0.331	4.71	0.00512	0.0495	0.604	0.0641
0.4	17.0	1.46(-5)	0.00114	0.00985	0.0642	0.450	4.77	0.00102	0.0107	0.0808	0.664	9.61	0.0103	0.0990	1.21	0.128
0.6	25.8	6.28(-5)	0.00171	0.0148	0.0966	0.675	7.29	0.00154	0.0161	0.121	0.996	14.4	0.0155	0.148	1.82	0.192
0.8	34.7	8.40(-5)	0.00228	0.0196	0.129	0.898	9.84	0.00206	0.0215	0.162	1.33	19.6	0.0206	0.198	2.42	0.256
1.0	43.2	1.05(-4)	0.00285	0.0246	0.161	1.12	12.2	0.00257	0.0268	0.202	1.60	24.2	0.0258	0.247	3.01	0.321
1.2	50.6	1.26(-4)	0.00342	0.0295	0.192	1.34	14.0	0.00309	0.0321	0.242	1.98	28.5	0.0309	0.295	3.60	0.384
1.4	55.9	1.48(-4)	0.00399	0.0344	0.224	1.55	14.8	0.00360	0.0375	0.282	2.30	31.7	0.0360	0.345	4.19	0.448
1.6	58.6	1.69(-4)	0.00455	0.0393	0.255	1.76	14.6	0.00411	0.0428	0.321	2.61	33.2	0.0411	0.394	4.76	0.511
1.8	58.7	1.90(-4)	0.00512	0.0441	0.286	1.96	13.6	0.00463	0.0481	0.361	2.92	33.9	0.0463	0.442	5.31	0.574
2.0	57.5	2.11(-4)	0.00568	0.0489	0.316	2.15	12.6	0.00514	0.0535	0.400	3.21	31.6	0.0514	0.490	5.85	0.636
2.2	55.2	2.32(-4)	0.00625	0.0537	0.346	2.31	11.0	0.00565	0.0588	0.438	3.50	29.8	0.0565	0.538	6.36	0.698
2.4	52.0	2.53(-4)	0.00682	0.0585	0.375	2.46	9.87	0.00616	0.0640	0.476	3.77	26.7	0.0616	0.585	6.85	0.759
2.6	49.4	2.74(-4)	0.00739	0.0632	0.404	2.59	8.50	0.00667	0.0693	0.514	4.02	24.0	0.0667	0.632	7.30	0.820
2.8	47.4	2.95(-4)	0.00795	0.0679	0.432	2.69	8.04	0.00718	0.0745	0.551	4.26	21.9	0.0718	0.678	7.71	0.880
3.0	45.6	3.17(-4)	0.00851	0.0726	0.460	2.76	7.72	0.00769	0.0797	0.588	4.47	20.0	0.0768	0.723	8.08	0.939
3.2	44.0	3.38(-4)	0.00908	0.0772	0.486	2.80	6.68	0.00820	0.0849	0.624	4.65	18.4	0.0819	0.768	8.39	0.998
3.4	42.7	3.59(-4)	0.00964	0.0818	0.512	2.81	6.13	0.00871	0.0901	0.660	4.81	16.9	0.0869	0.813	8.66	1.06
3.6	41.4	3.80(-4)	0.0102	0.0863	0.536	2.79	5.65	0.00922	0.0952	0.694	4.94	15.7	0.0919	0.857	8.86	1.11
3.8	40.1	4.01(-4)	0.0108	0.0908	0.559	2.75	5.22	0.00973	0.100	0.728	5.04	14.5	0.0968	0.900	9.01	1.17
4.0	39.0	4.22(-4)	0.0113	0.0952	0.582	2.69	4.83	0.0102	0.105	0.762	5.10	13.5	0.102	0.942	9.10	1.22
5	33.7	5.27(-4)	0.0141	0.117	0.672	2.23	3.44	0.0128	0.130	0.914	5.01	9.67	0.126	1.14	8.76	1.48
6	29.1	6.31(-4)	0.0167	0.136	0.722	1.82	2.58	0.0153	0.154	1.04	4.43	7.30	0.150	1.31	7.73	1.71
7	25.1	7.36(-4)	0.0194	0.154	0.729	1.47	2.02	0.0178	0.177	1.13	3.75	5.72	0.173	1.45	6.35	1.89
8	21.8	8.40(-4)	0.0219	0.169	0.701	1.21	1.53	0.0202	0.198	1.19	3.07	4.63	0.195	1.55	5.21	2.03
9	19.4	9.44(-4)	0.0247	0.181	0.654	1.01	1.34	0.0226	0.218	1.21	2.60	3.82	0.215	1.61	4.42	2.12
10	17.5	0.00105	0.0267	0.191	0.577	0.860	1.13	0.0249	0.235	1.19	2.25	3.22	0.235	1.63	3.81	2.16
12	14.4	0.00125	0.0311	0.201	0.437	0.649	0.829	0.0295	0.265	1.08	1.70	2.30	0.270	1.56	2.90	2.10
14	12.0	0.00145	0.0351	0.199	0.351	0.507	0.639	0.0338	0.287	0.889	1.35	1.84	0.299	1.37	2.28	1.87
16	9.35	0.00165	0.0384	0.186	0.289	0.408	0.502	0.0379	0.299	0.727	1.09	1.46	0.321	1.15	1.85	1.58
18	8.39	0.00185	0.0412	0.165	0.244	0.337	0.403	0.0417	0.301	0.605	0.906	1.19	0.336	0.959	1.53	1.33
20	7.19	0.00204	0.0433	0.144	0.208	0.282	0.332	0.0452	0.295	0.526	0.762	0.981	0.343	0.815	1.29	1.12

F. r (Z=87) 1s(2)2s(2)3s(2)4s(2)5s(2)6s(2)7s(1)2p(6)3p(6)4p(6)5p(6)6p(6)7d(1)8d(1)9d(1)5d(1)4f(1)4f

g/Rs	---->	51.59	15.41	6.856	3.327	1.554	0.6183	0.1842	16.67	6.972	3.245	1.439	0.5257	7.243	3.088	1.186	2.857
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	7s(1)	2p(6)	3p(6)	4p(6)	5p(6)	6p(6)	3d(10)	4d(10)	5d(10)	4f(14)
0.2	35.3	0.195(-4)	5.48(-4)	0.00474	0.0308	0.208	1.93	28.5	0.000490	0.00516	0.0385	0.305	3.57	0.00493	0.0469	0.538	0.0600
0.4	81.7	0.495(-4)	0.00110	0.00949	0.0615	0.418	3.90	68.1	0.000992	0.0104	0.0769	0.610	7.18	0.00991	0.0938	1.08	0.120
0.5	81.9	0.612(-4)	0.00166	0.0142	0.0925	0.626	5.94	61.3	0.00149	0.0156	0.115	0.915	10.9	0.0149	0.141	1.62	0.180
0.8	71.2	0.819(-4)	0.00221	0.0189	0.1232	0.834	8.01	43.7	0.00119	0.0207	0.154	1.22	14.6	0.0198	0.187	2.15	0.240
1.0	66.7	0.000103	0.00276	0.0237	0.154	1.04	9.97	32.4	0.00249	0.0259	0.192	1.52	18.2	0.0248	0.234	2.68	0.300
1.2	65.6	0.000123	0.00331	0.0284	0.184	1.24	11.6	25.0	0.00299	0.0310	0.230	1.82	21.6	0.0297	0.281	3.21	0.360
1.4	65.5	0.000144	0.00386	0.0331	0.214	1.44	12.6	19.9	0.00349	0.0362	0.268	2.11	24.4	0.0346	0.327	3.73	0.419
1.6	65.3	0.000164	0.00441	0.0378	0.244	1.64	12.9	16.2	0.00399	0.0414	0.306	2.40	26.4	0.0396	0.373	4.24	0.478
1.8	64.2	0.000185	0.00496	0.0425	0.274	1.82	12.5	13.5	0.00448	0.0465	0.344	2.68	27.3	0.0445	0.419	4.73	0.537
2.0	62.3	0.000206	0.00551	0.0472	0.303	2.00	11.7	11.5	0.00498	0.0517	0.381	2.96	27.1	0.0495	0.469	5.22	0.595
2.2	59.6	0.000226	0.00606	0.0518	0.332	2.16	10.5	9.84	0.00548	0.0568	0.417	3.22	26.1	0.0544	0.510	5.68	0.653
2.4	56.7	0.000247	0.00661	0.0564	0.360	2.30	9.27	8.56	0.00597	0.0619	0.454	3.47	24.7	0.0593	0.555	6.12	0.711
2.6	53.5	0.000267	0.00716	0.0610	0.387	2.42	8.38	7.52	0.00647	0.0670	0.490	3.71	22.5	0.0642	0.599	6.53	0.768
2.8	52.1	0.000288	0.00770	0.0655	0.413	2.52	7.64	6.67	0.00696	0.0720	0.525	3.93	21.8	0.0691	0.643	6.91	0.824
3.0	49.5	0.000308	0.00825	0.0700	0.441	2.60	6.97	5.96	0.00745	0.0771	0.560	4.13	19.7	0.0739	0.686	7.26	0.880
3.2	47.4	0.000329	0.00879	0.0745	0.466	2.65	6.37	5.36	0.00795	0.0821	0.595	4.31	18.2	0.0788	0.729	7.57	0.935
3.4	45.5	0.000350	0.00934	0.0789	0.491	2.67	5.85	4.84	0.00845	0.0870	0.629	4.47	16.7	0.0836	0.771	7.83	0.989
3.6	43.9	0.000370	0.00988	0.0833	0.514	2.66	5.40	4.40	0.00894	0.0920	0.662	4.60	15.4	0.0884	0.813	8.05	1.04
3.8	42.4	0.000391	0.0104	0.0876	0.537	2.64	4.99	4.01	0.00943	0.0969	0.695	4.70	14.3	0.0932	0.854	8.21	1.10
4.0	40.9	0.000411	0.0110	0.0919	0.559	2.59	4.62	3.65	0.00993	0.102	0.726	4.78	13.3	0.0980	0.894	8.33	1.15
5	34.9	0.000513	0.0136	0.113	0.647	2.17	3.32	2.43	0.0124	0.126	0.873	4.77	9.61	0.122	1.08	8.22	1.39
6	29.8	0.000615	0.0162	0.132	0.698	1.79	2.50	1.72	0.0148	0.149	0.995	4.27	7.26	0.144	1.25	7.30	1.61
7	25.8	0.000717	0.0188	0.149	0.709	1.44	1.96	1.30	0.0172	0.171	1.09	3.70	5.69	0.166	1.38	6.23	1.79
8	22.3	0.000819	0.0212	0.164	0.685	1.19	1.58	1.02	0.0196	0.192	1.14	3.01	4.60	0.188	1.48	5.09	1.92
9	19.8	0.000920	0.0236	0.176	0.642	0.995	1.30	0.812	0.0219	0.211	1.17	2.55	3.81	0.208	1.54	4.32	2.01
10	17.8	0.00102	0.0259	0.185	0.571	0.848	1.10	0.681	0.0242	0.228	1.16	2.19	3.20	0.227	1.57	3.71	2.06
12	14.6	0.00122	0.0302	0.196	0.434	0.640	0.809	0.473	0.0286	0.257	1.06	1.67	2.37	0.261	1.52	2.83	2.02
14	12.1	0.00142	0.0341	0.194	0.346	0.501	0.624	0.352	0.0328	0.279	0.880	1.33	1.83	0.289	1.35	2.24	1.83
16	10.1	0.00161	0.0374	0.183	0.288	0.403	0.485	0.280	0.0368	0.291	0.721	1.08	1.47	0.311	1.14	1.81	1.56
18	8.52	0.00180	0.0401	0.164	0.241	0.333	0.399	0.227	0.0405	0.294	0.601	0.894	1.19	0.326	0.951	1.50	1.31
20	7.31	0.00199	0.0422	0.143	0.207	0.279	0.329	0.192	0.0440	0.289	0.517	0.756	0.997	0.333	0.804	1.27	1.11

R_a (Z=88) 1s(2)2s(2)3s(2)4s(2)5s(2)7s(2)2p(6)3p(6)4p(6)5p(6)5p(6)3d(10)4d(10)5d(10)4f(14)

0/Rs	---	52.22	15.60	6.950	3.384	1.596	0.6679	0.2185	16.88	7.067	3.303	1.486	0.5754	7.346	3.150	1.239	2.929
v	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	7s(2)	2p(6)	3p(6)	4p(6)	5p(6)	6p(6)	3d(10)	4d(10)	5d(10)	4f(14)
0.2	27.4	1.88(-5)	5.30(-4)	0.00457	0.0295	0.195	1.61	21.7	4.74(-4)	0.00498	0.0367	0.281	2.87	0.00475	0.0445	0.482	0.0562
0.4	61.1	3.92(-5)	0.00107	0.00916	0.0350	0.391	3.25	49.8	9.53(-4)	0.00999	0.0735	0.563	5.78	0.00954	0.0891	0.966	0.113
0.6	89.9	5.92(-5)	0.00160	0.0137	0.886	0.586	4.93	72.8	0.00144	0.0150	0.110	0.844	8.72	0.0143	0.133	1.45	0.169
0.8	88.9	7.92(-5)	0.00214	0.0183	0.118	0.781	6.63	66.1	0.00193	0.0199	0.147	1.12	11.7	0.0191	0.178	1.93	0.225
1.0	79.4	9.92(-5)	0.00267	0.0229	0.147	0.974	8.27	50.8	0.00241	0.0250	0.184	1.40	14.6	0.0239	0.222	2.41	0.281
1.2	74.3	1.19(-4)	0.00321	0.0274	0.176	1.16	9.71	40.4	0.00289	0.0299	0.220	1.68	17.4	0.0286	0.267	2.88	0.337
1.4	71.3	1.39(-4)	0.00374	0.0320	0.205	1.35	10.8	32.8	0.00337	0.0349	0.256	1.95	19.8	0.0334	0.311	3.34	0.393
1.6	69.3	1.59(-4)	0.00427	0.0365	0.234	1.53	11.3	27.2	0.00385	0.0399	0.292	2.22	21.8	0.0381	0.355	3.80	0.448
1.8	67.2	1.79(-4)	0.00480	0.0410	0.262	1.71	11.2	22.9	0.00433	0.0449	0.328	2.48	23.0	0.0429	0.398	4.25	0.503
2.0	64.8	1.99(-4)	0.00533	0.0455	0.290	1.87	10.7	19.6	0.00481	0.0498	0.364	2.73	23.5	0.0476	0.442	4.68	0.558
2.2	62.2	2.19(-4)	0.00586	0.0500	0.318	2.02	10.0	17.0	0.00529	0.0548	0.399	2.98	23.2	0.0524	0.484	5.10	0.613
2.4	59.1	2.39(-4)	0.00640	0.0544	0.345	2.16	8.94	14.8	0.00577	0.0597	0.434	3.21	22.3	0.0571	0.527	5.50	0.666
2.6	56.1	2.59(-4)	0.00693	0.0588	0.371	2.28	8.00	13.1	0.00625	0.0646	0.468	3.43	21.0	0.0618	0.569	5.88	0.720
2.8	53.4	2.78(-4)	0.00746	0.0632	0.397	2.38	7.31	11.6	0.00673	0.0695	0.502	3.64	19.7	0.0665	0.611	6.24	0.773
3.0	51.4	2.98(-4)	0.00798	0.0676	0.422	2.46	6.70	10.4	0.00720	0.0743	0.536	3.83	18.7	0.0712	0.652	6.56	0.825
3.2	48.7	3.18(-4)	0.00851	0.0719	0.447	2.51	6.12	9.42	0.00768	0.0792	0.569	4.01	17.0	0.0759	0.693	6.86	0.877
3.4	46.7	3.38(-4)	0.00904	0.0761	0.471	2.54	5.66	8.55	0.00816	0.0840	0.601	4.16	15.7	0.0805	0.733	7.11	0.928
3.6	44.8	3.58(-4)	0.00956	0.0804	0.494	2.55	5.21	7.80	0.00864	0.0888	0.633	4.29	14.5	0.0852	0.773	7.33	0.979
3.8	43.2	3.78(-4)	0.0101	0.0846	0.515	2.53	4.83	7.14	0.00912	0.0898	0.664	4.40	13.5	0.0936	0.812	7.51	1.03
4.0	41.7	3.98(-4)	0.0106	0.0887	0.536	2.50	4.48	6.57	0.00960	0.0944	0.695	4.48	12.6	0.0983	0.850	7.65	1.08
5	35.4	4.96(-4)	0.0132	0.109	0.623	2.12	3.22	4.53	0.0120	0.122	0.836	4.55	9.12	0.117	1.03	7.71	1.31
6	30.3	5.95(-4)	0.0157	0.127	0.674	1.76	2.44	3.30	0.0143	0.144	0.955	4.14	6.94	0.139	1.19	6.97	1.51
7	26.2	6.94(-4)	0.0182	0.144	0.689	1.42	1.91	2.48	0.0166	0.165	1.05	3.63	5.46	0.160	1.32	6.10	1.69
8	22.6	7.92(-4)	0.0206	0.158	0.669	1.17	1.55	1.94	0.0189	0.185	1.10	2.96	4.43	0.181	1.42	4.95	1.82
9	20.0	8.90(-4)	0.0229	0.170	0.630	0.981	1.28	1.56	0.0212	0.204	1.13	2.51	3.66	0.200	1.48	4.20	1.91
10	17.9	9.90(-4)	0.0251	0.180	0.565	0.836	1.07	1.29	0.0234	0.221	1.12	2.16	3.09	0.219	1.51	3.63	1.96
12	14.7	0.00118	0.0293	0.190	0.432	0.632	0.793	0.914	0.0277	0.249	1.04	1.65	2.29	0.252	1.47	2.77	1.95
14	12.2	0.00137	0.0330	0.190	0.344	0.495	0.612	0.688	0.0318	0.270	0.871	1.31	1.77	0.279	1.32	2.19	1.78
16	10.2	0.00156	0.0363	0.180	0.284	0.400	0.539	0.6357	0.0357	0.283	0.716	1.06	1.42	0.301	1.12	1.78	1.53
18	8.60	0.00174	0.0390	0.162	0.240	0.329	0.439	0.594	0.0393	0.287	0.594	0.882	1.16	0.316	1.47	1.30	1.30
20	7.38	0.00193	0.0411	0.142	0.204	0.277	0.326	0.559	0.0426	0.283	0.514	0.746	0.970	0.324	0.799	1.25	1.10

A.c. (Z=89) 1s(2)2s(2)3s(2)4s(2)5s(2)6s(2)7s(2)2p(6)3p(6)4p(6)5p(6)6p(6)3d(10)4d(10)5d(10)6d(1)4f(14)

Q/Rs	---->	52.54	15.78	7.041	3.441	1.640	0.7029	0.2318	17.09	7.159	3.363	1.533	0.6110	7.458	3.212	1.281	0.3816	3.001
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	7s(2)	2p(6)	3p(6)	4p(6)	5p(6)	6p(6)	3d(10)	4d(10)	5d(10)	6d(1)	4f(14)
0.2	29.0	1.85(-5)	5.14(-4)	0.00442	0.0283	0.182	1.42	18.9	4.58(-4)	0.00481	0.0351	0.260	2.49	0.00456	0.0423	0.444	5.08	0.0528
0.4	63.8	3.85(-5)	0.00103	0.00885	0.0565	0.366	2.87	42.9	9.27(-4)	0.00966	0.0702	0.521	5.00	0.00916	0.0847	0.888	11.0	0.106
0.6	97.0	5.82(-5)	0.00155	0.0133	0.0849	0.548	4.35	64.6	0.00140	0.0145	0.105	0.781	7.54	0.0138	0.127	1.33	17.3	0.158
0.8	104	7.79(-5)	0.00207	0.0177	0.113	0.730	5.85	63.0	0.00186	0.0193	0.140	1.04	10.1	0.0183	0.169	1.77	21.2	0.211
1.0	96.9	9.75(-5)	0.00259	0.0221	0.141	0.910	7.30	51.3	0.00233	0.0241	0.175	1.30	12.6	0.0229	0.211	2.21	20.4	0.264
1.2	87.6	1.17(-4)	0.00311	0.0265	0.169	1.09	8.61	40.9	0.00280	0.0290	0.210	1.55	15.0	0.0275	0.254	2.65	16.8	0.316
1.4	81.4	1.37(-4)	0.00363	0.0310	0.197	1.26	9.65	33.2	0.00326	0.0337	0.245	1.80	17.2	0.0320	0.296	3.08	14.0	0.369
1.6	76.9	1.56(-4)	0.00414	0.0353	0.224	1.43	10.2	27.5	0.00373	0.0386	0.279	2.05	19.0	0.0366	0.337	3.50	11.8	0.421
1.8	73.2	1.76(-4)	0.00465	0.0397	0.251	1.60	10.4	23.1	0.00419	0.0434	0.313	2.29	20.4	0.0412	0.379	3.91	9.98	0.473
2.0	69.7	1.96(-4)	0.00517	0.0440	0.278	1.75	10.0	19.7	0.00466	0.0482	0.347	2.53	21.1	0.0457	0.420	4.31	8.61	0.524
2.2	66.5	2.15(-4)	0.00568	0.0483	0.305	1.90	9.54	17.1	0.00512	0.0530	0.381	2.76	21.1	0.0503	0.461	4.70	7.51	0.575
2.4	63.0	2.35(-4)	0.00620	0.0526	0.331	2.03	8.67	15.0	0.00558	0.0577	0.414	2.98	20.6	0.0548	0.501	5.07	6.59	0.626
2.6	60.2	2.54(-4)	0.00672	0.0569	0.356	2.15	8.43	13.1	0.00605	0.0624	0.447	3.18	19.9	0.0594	0.541	5.43	5.84	0.676
2.8	56.8	2.74(-4)	0.00723	0.0611	0.381	2.25	6.61	11.7	0.00651	0.0671	0.480	3.38	18.5	0.0639	0.581	5.76	5.23	0.725
3.0	54.6	2.93(-4)	0.00774	0.0653	0.405	2.32	6.91	10.5	0.00697	0.0720	0.511	3.56	18.0	0.0684	0.620	6.07	4.70	0.775
3.2	51.7	3.13(-4)	0.00825	0.0695	0.429	2.38	6.32	9.51	0.00743	0.0765	0.543	3.73	16.5	0.0729	0.659	6.35	4.25	0.824
3.4	49.1	3.32(-4)	0.00876	0.0736	0.452	2.41	5.85	8.60	0.00789	0.0812	0.574	3.88	15.0	0.0773	0.698	6.60	3.88	0.872
3.6	47.0	3.52(-4)	0.00927	0.0777	0.474	2.43	5.38	7.86	0.00836	0.0858	0.605	4.01	13.9	0.0818	0.735	6.82	3.53	0.916
3.8	45.1	3.71(-4)	0.00978	0.0818	0.495	2.43	4.99	7.19	0.00882	0.0904	0.635	4.12	13.0	0.0862	0.773	7.00	3.24	0.967
4.0	43.3	3.91(-4)	0.0103	0.0858	0.515	2.20	4.63	6.59	0.00928	0.0950	0.664	4.21	12.1	0.0907	0.809	7.15	3.00	1.01
5	36.5	4.88(-4)	0.0128	0.105	0.605	2.08	3.39	4.55	0.0116	0.118	0.800	4.33	8.81	0.112	0.982	7.32	2.08	1.23
6	31.2	5.85(-4)	0.0152	0.123	0.652	1.74	2.50	3.34	0.0139	0.139	0.915	4.00	6.73	0.134	1.13	6.74	1.55	1.43
7	26.9	6.80(-4)	0.0176	0.139	0.669	1.40	1.94	2.52	0.0161	0.160	1.00	3.57	5.32	0.154	1.26	5.98	1.20	1.59
8	23.2	7.79(-4)	0.0120	0.154	0.653	1.16	1.59	1.99	0.0183	0.179	1.06	2.92	4.31	0.174	1.36	4.89	0.952	1.72
9	20.3	8.75(-4)	0.0222	0.165	0.618	0.967	1.31	1.56	0.0205	0.197	1.09	2.26	3.58	0.193	1.42	4.12	0.762	1.82
10	18.2	9.71(-4)	0.0244	0.175	0.558	0.825	1.10	1.28	0.0226	0.214	1.09	2.12	3.02	0.210	1.46	3.57	0.626	1.87
12	14.9	0.00116	0.0285	0.186	0.429	0.624	0.808	0.923	0.0268	0.242	1.02	1.62	2.24	0.243	1.43	2.73	0.453	1.87
14	12.4	0.00135	0.0321	0.186	0.339	0.489	0.630	0.692	0.0308	0.263	0.961	1.29	1.74	0.270	1.30	2.15	0.340	1.73
16	10.3	0.00153	0.0353	0.177	0.283	0.396	0.501	0.564	0.0345	0.276	0.710	1.05	1.39	0.291	1.11	1.75	0.266	1.51
18	8.72	0.00172	0.0379	0.160	0.239	0.325	0.410	0.436	0.0381	0.280	0.590	0.870	1.14	0.306	0.935	1.45	0.209	1.28
20	7.46	0.00189	0.0400	0.141	0.203	0.274	0.328	0.349	0.0413	0.277	0.505	0.737	0.954	0.315	0.793	1.23	0.174	1.09

T.h (Z=90) 1s(2)2s(2)3s(2)4s(2)5s(2)6s(2)7s(2)2p(6)3p(6)4p(6)5p(6)6p(6)3d(10)4d(10)5d(10)6d(10)4f(14)5f(1)

0/Rs	53.39	15.98	7.132	3.498	1.679	0.7184	0.2340	17.31	7.251	3.423	1.572	0.6245	7.563	3.279	1.325	0.4012	3.024	0.8423	
v	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	7s(2)	2p(6)	3p(6)	4p(6)	5p(6)	6p(6)	4d(10)	5d(10)	6d(10)	4f(14)	5f(1)	
0.2	28.5	1.77(-5)	4.96(-4)	0.00427	0.0271	0.172	1.35	18.5	0.000442	0.00465	0.0335	0.244	2.36	0.00439	0.0401	0.408	4.52	0.0517	0.801
0.4	62.6	3.68(-5)	0.0100	0.00856	0.0542	0.345	2.72	41.8	0.00895	0.00933	0.0670	0.489	4.74	0.00883	0.0803	0.816	9.67	0.104	1.62
0.6	95.3	5.57(-5)	0.00150	0.0128	0.0814	0.517	4.13	63.3	0.00135	0.0140	0.100	0.733	7.15	0.0133	0.120	1.22	15.3	0.155	2.46
0.8	104	7.45(-5)	0.00200	0.0171	0.109	0.689	5.54	62.5	0.00180	0.0187	0.134	0.976	9.56	0.0177	0.160	1.63	19.3	0.267	3.31
1.0	98.0	9.33(-5)	0.00251	0.0213	0.135	0.859	6.92	51.0	0.00225	0.0233	0.167	1.22	11.9	0.0221	0.200	2.03	19.1	0.259	4.13
1.2	90.9	0.000112	0.00301	0.0256	0.162	1.03	8.18	40.6	0.00270	0.0280	0.201	1.46	14.2	0.0265	0.240	2.43	17.1	0.310	4.85
1.4	84.8	0.000131	0.00350	0.0299	0.189	1.19	9.19	38.0	0.00315	0.0326	0.234	1.69	16.3	0.0309	0.280	2.83	14.1	0.362	5.38
1.6	80.5	0.000150	0.00400	0.0341	0.215	1.35	9.82	27.3	0.00360	0.0373	0.267	1.93	18.1	0.0352	0.320	3.21	11.9	0.413	5.63
1.8	76.8	0.000168	0.00450	0.0383	0.241	1.51	9.99	23.0	0.00405	0.0419	0.299	2.15	19.5	0.0397	0.359	3.59	10.1	0.463	5.59
2.0	73.3	0.000187	0.00499	0.0425	0.267	1.66	9.76	19.7	0.00450	0.0466	0.332	2.38	20.2	0.0441	0.398	3.97	8.71	0.514	5.32
2.2	69.8	0.000206	0.00550	0.0467	0.292	1.79	9.28	17.0	0.00495	0.0512	0.364	2.59	20.4	0.0485	0.437	4.33	7.58	0.564	5.01
2.4	66.0	0.000225	0.00599	0.0509	0.317	1.92	8.56	14.9	0.00539	0.0558	0.396	2.80	20.0	0.0528	0.475	4.67	6.66	0.614	4.47
2.6	62.7	0.000243	0.00649	0.0550	0.342	2.03	8.13	13.1	0.00584	0.0604	0.427	3.00	19.4	0.0572	0.513	5.00	5.92	0.663	4.01
2.8	59.2	0.000262	0.00699	0.0591	0.366	2.13	7.50	11.7	0.00629	0.0649	0.458	3.18	18.2	0.0616	0.551	5.31	5.28	0.712	3.65
3.0	56.6	0.000281	0.00748	0.0632	0.389	2.21	6.85	10.5	0.00673	0.0695	0.489	3.36	17.5	0.0659	0.588	5.61	4.75	0.760	3.35
3.2	53.6	0.000299	0.00798	0.0672	0.412	2.27	6.30	9.43	0.00718	0.0740	0.519	3.52	16.3	0.0702	0.625	5.87	4.29	0.808	3.06
3.4	50.8	0.000318	0.00847	0.0712	0.434	2.31	5.78	8.58	0.00762	0.0785	0.549	3.66	14.8	0.0745	0.662	6.12	3.90	0.855	2.83
3.6	48.4	0.000337	0.00896	0.0752	0.455	2.33	5.34	7.79	0.00807	0.0830	0.578	3.79	13.7	0.0788	0.698	6.33	3.57	0.902	2.60
3.8	46.4	0.000355	0.00945	0.0791	0.476	2.33	4.94	7.16	0.00852	0.0874	0.607	3.90	12.8	0.0831	0.733	6.51	3.28	0.948	2.41
4.0	44.5	0.000374	0.00994	0.0830	0.495	2.32	4.59	6.58	0.00896	0.0919	0.635	3.99	11.9	0.0874	0.768	6.67	3.02	0.993	2.24
5	37.2	0.000467	0.0124	0.102	0.578	2.04	3.29	4.54	0.0112	0.114	0.767	4.16	8.71	0.108	0.933	6.93	2.10	1.21	1.61
6	31.8	0.000560	0.0147	0.119	0.631	1.72	2.49	3.35	0.0134	0.135	0.878	3.89	6.66	0.129	1.08	6.49	1.56	1.40	1.22
7	27.5	0.000653	0.0171	0.135	0.650	1.37	1.95	2.52	0.0156	0.155	0.965	3.50	5.27	0.149	1.20	5.84	1.20	1.56	0.956
8	23.6	0.000745	0.0193	0.149	0.638	1.14	1.57	1.98	0.0177	0.173	1.03	2.89	4.27	0.168	1.30	4.82	0.955	1.70	0.772
9	20.6	0.000837	0.0215	0.161	0.606	0.960	1.30	1.57	0.0198	0.191	1.06	2.42	3.54	0.186	1.36	4.04	0.772	1.79	0.638
10	18.4	0.000929	0.0236	0.170	0.552	0.819	1.09	1.30	0.0219	0.207	1.06	2.09	2.99	0.203	1.40	3.48	0.638	1.85	0.535
12	15.1	0.00111	0.0276	0.181	0.426	0.617	0.809	0.915	0.259	0.255	0.994	1.61	2.22	0.234	1.39	2.68	0.461	1.85	0.397
14	12.5	0.00129	0.0311	0.182	0.357	0.484	0.620	0.686	0.298	0.256	0.851	1.27	1.73	0.261	1.27	2.12	0.345	1.72	0.306
16	10.5	0.00147	0.0342	0.174	0.279	0.391	0.495	0.556	0.334	0.269	0.705	1.04	1.38	0.282	1.10	1.73	0.266	1.50	0.245
18	8.83	0.00164	0.0368	0.158	0.235	0.323	0.406	0.434	0.368	0.274	0.586	0.860	1.13	0.297	1.43	0.212	1.28	0.199	0.199
20	7.57	0.00181	0.0389	0.140	0.201	0.272	0.338	0.360	0.400	0.271	0.502	0.728	0.946	0.306	0.787	1.21	0.172	1.09	0.163

P a (Z=91) 1s(2)2s(2)3s(2)4S(2)5s(2)6s(2)7s(2)2p(6)3p(6)4p(6)5p(6)6p(6)3d(10)4d(10)5d(10)6d(1)4f(14)5f(2)

0/Rs	---->	54.06	16.16	7.225	3.553	1.713	0.7310	0.2356	17.51	7.347	3.480	1.607	0.6360	7.669	3.339	1.361	0.4120	3.081	0.9146
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	7s(2)	2p(6)	3p(6)	4p(6)	5p(6)	6p(6)	3d(10)	4d(10)	5d(10)	6d(1)	4f(14)	5f(2)
0.2	27.7	1.71(-5)	4.82(-4)	0.00413	0.0261	0.163	1.30	18.2	0.000428	0.00449	0.0321	0.231	2.26	0.00423	0.0382	0.381	4.25	0.0493	0.759
0.4	60.7	3.56(-5)	9.70(-4)	0.00827	0.0520	0.328	2.61	41.1	0.000868	0.00901	0.0642	0.462	4.54	0.00850	0.0766	0.763	9.06	0.0987	1.52
0.6	92.6	5.38(-5)	0.00146	0.0124	0.0782	0.492	3.96	62.4	0.00131	0.0135	0.0961	0.694	6.84	0.0128	0.115	1.14	14.3	0.148	2.29
0.8	102	7.20(-5)	0.00195	0.0165	0.104	0.655	5.31	62.1	0.00174	0.0180	0.128	0.924	9.14	0.0170	0.153	1.52	18.2	0.197	3.07
1.0	95.6	9.01(-5)	0.00243	0.0206	0.130	0.817	6.64	50.6	0.00218	0.0225	0.160	1.15	11.4	0.0213	0.191	1.90	18.4	0.246	3.83
1.2	88.8	0.000108	0.00292	0.0248	0.156	0.977	7.85	40.4	0.00262	0.0270	0.192	1.38	13.6	0.0255	0.229	2.27	16.8	0.296	4.57
1.4	82.8	0.000126	0.00340	0.0289	0.181	1.13	8.84	32.8	0.00305	0.0315	0.224	1.60	15.6	0.0297	0.267	2.64	13.8	0.344	5.25
1.6	78.9	0.000145	0.00388	0.0330	0.207	1.29	9.48	27.2	0.00349	0.0360	0.256	1.82	17.4	0.0340	0.305	3.01	11.6	0.393	5.83
1.8	75.8	0.000123	0.00437	0.0371	0.232	1.44	9.70	22.9	0.00392	0.0405	0.287	2.04	18.7	0.0382	0.342	3.36	9.91	0.441	6.28
2.0	72.9	0.000181	0.00485	0.0411	0.256	1.58	9.53	19.6	0.00436	0.0450	0.318	2.25	19.5	0.0425	0.380	3.71	8.56	0.490	6.54
2.2	69.8	0.000199	0.00533	0.0452	0.281	1.71	9.08	17.0	0.00479	0.0494	0.349	2.45	19.8	0.0467	0.417	4.05	7.45	0.537	6.63
2.4	66.7	0.000217	0.00582	0.0492	0.305	1.83	8.46	14.8	0.00523	0.0539	0.379	2.65	19.5	0.0509	0.453	4.37	6.56	0.585	6.53
2.6	63.5	0.000235	0.00630	0.0532	0.328	1.94	7.80	13.1	0.00566	0.0583	0.410	2.84	18.9	0.0551	0.490	4.69	5.83	0.632	6.33
2.8	60.4	0.000253	0.00678	0.0571	0.352	2.04	7.42	11.7	0.00609	0.0627	0.439	3.02	17.9	0.0593	0.526	4.98	5.20	0.678	5.98
3.0	57.5	0.000271	0.00726	0.0611	0.374	2.12	6.77	10.4	0.00652	0.0671	0.469	3.19	17.0	0.0635	0.562	5.26	4.68	0.724	5.70
3.2	54.9	0.000289	0.00774	0.0650	0.396	2.18	6.22	9.41	0.00696	0.0715	0.498	3.34	16.1	0.0677	0.597	5.52	4.23	0.770	5.38
3.4	51.8	0.000307	0.00822	0.0689	0.417	2.22	5.71	8.54	0.00739	0.0758	0.527	3.48	14.7	0.0718	0.632	5.75	3.86	0.815	4.91
3.6	49.3	0.000325	0.00870	0.0727	0.438	2.25	5.28	7.79	0.00782	0.0801	0.555	3.61	13.6	0.0760	0.666	5.96	3.53	0.860	4.52
3.8	47.2	0.000343	0.00917	0.0765	0.458	2.26	4.90	7.13	0.00826	0.0845	0.582	3.72	12.7	0.0801	0.700	6.15	3.23	0.904	4.22
4.0	45.2	0.000361	0.00965	0.0803	0.477	2.25	4.54	6.56	0.00869	0.0887	0.610	3.81	11.8	0.0842	0.733	6.30	2.98	0.947	3.93
5	37.7	0.000451	0.0120	0.0985	0.558	2.01	3.26	4.53	0.0108	0.110	0.736	4.00	8.62	0.104	0.892	6.63	2.08	1.15	2.88
6	32.2	0.000541	0.0143	0.115	0.611	1.71	2.46	3.35	0.0130	0.130	0.844	3.79	6.60	0.124	1.03	6.29	1.54	1.34	2.20
7	27.8	0.000630	0.0166	0.131	0.632	1.36	1.94	2.52	0.0151	0.149	0.930	3.44	5.22	0.143	1.15	5.71	1.19	1.50	1.74
8	23.9	0.000720	0.0188	0.144	0.623	1.12	1.56	1.97	0.0172	0.168	0.990	2.86	4.23	0.162	1.25	4.77	0.955	1.63	1.42
9	20.8	0.000809	0.0209	0.156	0.594	0.948	1.29	1.57	0.0192	0.185	1.02	2.38	3.51	0.179	1.31	3.97	0.772	1.72	1.17
10	18.6	0.000898	0.0229	0.165	0.545	0.810	1.08	1.30	0.0212	0.201	1.03	2.07	2.97	0.196	1.35	3.42	0.633	1.78	0.993
12	15.2	0.00107	0.0268	0.177	0.423	0.614	0.799	0.918	0.0251	0.228	0.974	1.59	2.21	0.226	1.35	2.64	0.450	1.79	0.737
14	12.6	0.00125	0.0303	0.178	0.332	0.481	0.621	0.684	0.0289	0.248	0.841	1.26	1.71	0.252	1.25	2.10	0.340	1.69	0.571
16	10.6	0.00142	0.0333	0.171	0.277	0.388	0.495	0.549	0.0324	0.261	0.699	1.03	1.37	0.273	1.08	1.71	0.269	1.48	0.457
18	8.93	0.00159	0.0359	0.156	0.234	0.320	0.401	0.433	0.0358	0.267	0.583	0.855	1.12	0.288	0.919	1.42	0.210	1.27	0.376
20	7.67	0.00175	0.0380	0.139	0.200	0.270	0.332	0.363	0.0389	0.266	0.500	0.724	0.943	0.298	0.781	1.21	0.173	1.08	0.315

U (Z=92) 1s(2)2s(2)3s(2)4s(2)5s(2)6s(2)7s(2)2p(6)3p(6)4p(6)5p(6)6p(6)3d(10)4d(10)5d(10)4f(14)5f(4)

0/Rs	---->	54.51	16.35	7.318	3.608	1.745	0.7252	0.2282	17.71	7.440	3.537	1.633	0.6267	7.766	3.396	1.387	3.167	0.9010
V	TOTAL	1s(2)	2s(2)	3s(2)	4s(2)	5s(2)	6s(2)	7s(2)	2p(6)	3p(6)	4p(6)	5p(6)	6p(6)	3d(10)	4d(10)	5d(10)	4f(14)	5f(4)
0.2	25.1	1.67(-5)	0.00467	0.00399	0.0251	0.156	1.32	19.6	0.00415	0.00434	0.0308	0.222	2.34	0.00409	0.0366	0.363	0.0459	0.900
0.4	53.6	3.47(-5)	0.000940	0.00800	0.0500	0.314	2.66	44.6	0.000841	0.00872	0.0616	0.444	4.70	0.00822	0.0733	0.727	0.0918	1.81
0.6	83.3	5.27(-5)	0.00141	0.0120	0.0751	0.470	4.03	66.8	0.00127	0.0131	0.0922	0.666	7.08	0.0124	0.110	1.09	0.138	2.71
0.8	85.9	7.03(-5)	0.00188	0.0160	0.100	0.626	5.41	63.8	0.00169	0.0174	0.123	0.887	8.47	0.0165	0.146	1.45	0.183	3.61
1.0	79.0	8.81(-5)	0.00236	0.0199	0.125	0.780	6.77	51.4	0.00211	0.0218	0.154	1.11	11.8	0.0206	0.183	1.81	0.229	4.51
1.2	74.0	0.000106	0.00183	0.0240	0.150	0.933	8.00	41.1	0.00254	0.0261	0.184	1.32	14.1	0.0247	0.219	2.17	0.275	5.39
1.4	70.8	0.000124	0.00330	0.0279	0.174	1.08	9.00	33.2	0.00296	0.0304	0.215	1.54	16.2	0.0288	0.256	2.52	0.321	6.23
1.6	69.1	0.000141	0.00376	0.0319	0.199	1.23	9.64	27.4	0.00338	0.0348	0.245	1.75	18.0	0.0328	0.292	2.87	0.356	7.02
1.8	68.0	0.000159	0.00423	0.0358	0.223	1.37	9.83	23.3	0.00381	0.0391	0.275	1.96	19.3	0.0369	0.328	3.21	0.411	7.72
2.0	66.5	0.000177	0.00470	0.0398	0.247	1.51	9.64	19.7	0.00423	0.0435	0.305	2.16	20.1	0.0410	0.363	3.54	0.456	8.31
2.2	64.9	0.000194	0.00517	0.0417	0.270	1.64	9.17	17.2	0.00465	0.0478	0.334	2.36	20.3	0.0451	0.399	3.86	0.500	8.76
2.4	62.7	0.000212	0.00564	0.0476	0.293	1.75	8.50	15.0	0.00507	0.0521	0.364	2.55	19.9	0.0492	0.434	4.18	0.544	9.04
2.6	60.6	0.000230	0.00611	0.0514	0.316	1.86	7.93	13.2	0.00549	0.0564	0.393	2.73	19.3	0.0533	0.469	4.48	0.588	9.15
2.8	58.2	0.000247	0.00657	0.0553	0.338	1.96	7.48	11.8	0.00591	0.0616	0.421	2.91	18.1	0.0574	0.503	4.76	0.632	9.11
3.0	56.1	0.000265	0.00704	0.0591	0.360	2.03	6.83	10.6	0.00633	0.0649	0.500	3.07	17.4	0.0614	0.538	5.03	0.675	8.93
3.2	53.5	0.000283	0.00750	0.0629	0.381	2.10	6.27	9.43	0.00674	0.0691	0.478	3.22	16.2	0.0654	0.571	5.28	0.717	8.63
3.4	51.0	0.000300	0.00797	0.0666	0.402	2.14	5.76	8.65	0.00717	0.0733	0.505	3.36	14.8	0.0695	0.605	5.51	0.760	8.28
3.6	48.9	0.000318	0.00843	0.0703	0.422	2.17	5.32	7.90	0.00759	0.0775	0.532	3.48	16.6	0.0735	0.638	5.71	0.801	8.00
3.8	46.8	0.000336	0.00889	0.0740	0.441	2.18	4.91	7.24	0.00801	0.0817	0.559	3.59	12.7	0.0775	0.670	5.90	0.842	7.48
4.0	44.8	0.000353	0.00935	0.0777	0.460	2.18	4.58	6.54	0.00843	0.0859	0.585	3.69	11.9	0.0814	0.703	6.05	0.883	6.95
5	37.5	0.000441	0.0116	0.0953	0.539	1.97	3.28	4.62	0.0105	0.106	0.707	3.89	8.70	0.101	0.855	6.41	1.08	5.10
6	32.0	0.000529	0.0139	0.112	0.591	1.69	2.48	3.33	0.0126	0.126	0.812	3.72	6.65	0.120	0.991	6.14	1.25	3.97
7	27.5	0.000616	0.0161	0.127	0.614	1.34	1.94	2.51	0.0146	0.145	0.896	3.38	5.24	0.139	1.11	5.60	1.40	3.16
8	23.8	0.000704	0.0182	0.140	0.609	1.11	1.57	1.94	0.0166	0.162	0.956	2.84	4.26	0.157	1.20	4.72	1.53	2.58
9	20.8	0.000791	0.0203	0.151	0.582	0.937	1.30	1.59	0.0186	0.179	0.991	2.36	3.54	0.174	1.27	3.92	1.62	2.15
10	18.6	0.000878	0.0222	0.161	0.538	0.801	1.09	1.29	0.0206	0.194	1.00	2.04	2.99	0.190	1.31	3.40	1.68	1.83
12	15.2	0.00105	0.0160	0.172	0.420	0.607	0.804	0.939	0.0244	0.221	0.954	1.57	2.22	0.219	1.31	2.61	1.71	1.37
14	12.7	0.00122	0.0294	0.174	0.330	0.476	0.624	0.707	0.0280	0.241	0.831	1.25	1.72	0.245	1.23	2.08	1.63	1.06
16	10.6	0.00139	0.0324	0.168	0.276	0.386	0.498	0.534	0.0315	0.255	0.694	1.02	1.38	0.265	1.07	1.69	1.45	0.855
18	8.99	0.00155	0.0349	0.154	0.231	0.319	0.402	0.444	0.0347	0.261	0.579	0.846	1.13	0.280	0.911	1.41	1.25	0.702
20	7.70	0.00172	0.0370	0.137	0.199	0.268	0.337	0.350	0.0378	0.260	0.491	0.717	0.946	0.290	0.776	1.19	1.07	0.590

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