Electron capture in collisions of Li II with molecular hydrogen isotopes at low keV range of impact energy

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Lithium neutral beams are now routinely used for plasma diagnostics; in addition to the electron density function measured through the lines of collisional excitation, the concentration of edge plasma impurities and ion temperature profiles may be inferred from the Li charge transfer spectroscopy [1]. Charge recombination of Li^+ at keV energy with H_2, HD, D_2 molecules is therefore an atomic collision process of practical technological importance.
On the experimental side, the cross section data for electron capture by $^7Li^+$ measured at the group of Kinki Univ. are presented and compared with earlier measurements for the proton projectile, adding further to the series of plasma related measurements [2]. On the theoretical side, the lowest singlet and triplet electronic states available in the literature are used to study the electron capture dynamics at high energy. The role of asymptotic vibrational states is compared among the isotopes.
Our results reflect a consistent trend of charge transfer cross section enhancement with decrease in the reduced mass of molecular isotope pronounced significantly at lower collision energies, and may add to quantitative understanding of fusion edge plasma processes [3].

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