

INTERACTION OF RYDBERG ATOM WITH LOW-ENERGY ELECTONS

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For the reason of ultracold plasma recombination rate coefficients formulas in case of low-impact electron energy are discussed. We consider electron energy E less or equal to the threshold energy of state excitation. Many cross-sections and rate coefficients formulas for excitation and deexcitation calculating are available in literature. All that formulas, however, have a limited range of validity and useful when incident electron energy is bigger then state ionization energy. It is shown that extrapolation of this transfer rates formulas are incorrectly used for the E approx $1K$. In this paper with direct account taken of low incident electron energy new rate coefficients were wrote. These new formulas are compared with previously known and existing experimental data. The proposed approach allowed to write rate constants which are several times smaller than previously known. Moreover, ultra-low temperature calculations show that the resulting formulas are physically correct asymptotic behavior at $E \rightarrow 0$ because of rates independence from incident electron energy. To assess the accuracy we use obtained rate coefficients for ultracold plasma recombination computing. The results of calculations find out a good agreement with the experimental data.