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TI Investigation of critical parameters controlling the efficiency of associative ionization

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LA English

DT Article

DE ion-ion collisions; associative ionization; astrochemistry

ID MERGED-BEAM MEASUREMENTS; H+-H-COLLISIONS; MUTUAL NEUTRALIZATION; DISSOCIATIVE RECOMBINATION; CROSS-SECTIONS; REACTIVE COLLISIONS; MOLECULAR-HYDROGEN; CHEMI-IONIZATION; SLOW COLLISIONS; LOW-ENERGY

AB This paper compiles our merged-beam experimental findings for the associative ionization (AI) process from charged reactants, with the aim of guiding future investigations with e.g. the double electrostatic ion storage ring DESIREE in Stockholm. A reinvestigation of the isotopic effect in H-(D-) + He+ collisions is presented, along with a review of H-3(+) and NO+ production by AI involving ion pairs or excited neutrals, and put in perspective with the mutual neutralization and radiative association reactions. Critical parameters are identified and evaluated for their systematic role in controlling the magnitude of the cross section: isotopic substitution, exothermicity, electronic state density, and spin statistics.

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