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Near Resonant Charge Transfer in Intermediate-High Energy Collisions between Molecular Ions and Atomic Hydrogen[1] V.M. ANDRIANARIJAONA, Department of Physics, Pacific Union College, Angwin CA 94508, USA, D.G. SEELY, Department of Physics, Albion College, Albion, MI 49224, USA, I.N. DRAGANIC, C.C. HAVENER, Physics Division, Oak Ridge National Laboratory, Oak Ridge TN 37831, USA — Using the Oak Ridge National Laboratory (ORNL) ion–atom merged–beams apparatus, absolute cross sections of near resonant direct and dissociative charge transfer (CT) between H/D and different molecular ions (D_2^+, CO^+, O_2^+, and D_3^+) are measured from 20eV/u to 2keV/u collision energies. Below a few hundred eV/u collision energy, each measured cross section exhibits the dynamics of the vibrational and rotational modes of the molecular ion. Toward high energy collisions where the differences in the Q-value of the reaction can be neglected and the ro–vibrational modes can be considered as frozen, the measured CT cross sections for the diatomic ions increase, lose track of the ro-vibrational mode signatures and all converge to (7.5 ± 0.5) x 10^{-16} cm^2 at 2keV/u. The measured CT cross section for the tri-atomic ion D_3^+, which may have only endoergic dissociative CT channels, differs from that of the diatomic ions.

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