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Complete collision data set for electrons scattering on molecular hydrogen MARK ZAMMIT, Los Alamos National Laboratory, LIAM SCARLETT, DMITRY FURSA, IGOR BRAY, Curtin University, YURI RALCHENKO, National Institute of Standards and Technology, KAYLA DAVIE, University of Maryland
— Electron collisions with molecular hydrogen and its isotopologues are ubiquitous throughout the Universe and are particularly important in the modeling and analysis of fusion plasmas. To model such plasmas, applications require a complete set of cross sections that are accurate, and resolve the initial and final states of the molecule's electronic and vibrational state. While the need for such electron collision data exists, there are at present no available sets of collision data which include rovibrational sublevels, transitions between excited states, and isotope effects. In addition, widely-used sets of collision data for H_2 have many transitions that are in significant disagreement, in some cases differing by an order of magnitude. Recently the convergent close-coupling (CCC) method has been applied to electron scattering from H_2, demonstrating convergence of the elastic, excitation and ionization cross sections over a wide-range of electron impact energies. An important development of this approach was the spheroidal formulation, which allows the calculation of accurate collision data over a large range of internuclear separations. Here we present a complete set of CCC cross sections for electron scattering from the vibrationally excited states of H_2.

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