

RELATIONS BETWEEN ELASTIC CROSS SECTIONS FOR COLLISIONS AMONG ISOTOPES OF HYDROGEN IONS, ATOMS AND MOLECULES¹

P. S. Krstić and D. R. Schultz

Integral elastic cross sections and their higher moments (momentum transfer and viscosity) are obtained on the basis of our fully quantum ab initio calculations for four types of hydrogen collision systems: ion-atom, atom-atom, ion-molecule and atom-molecule. The calculations are repeated for all isotopic combinations of the nuclei in both projectiles and targets, in the center-of-mass energy range of 0.1-100 eV. Charge transfer for ion-atom and spin-exchange for atom-atom cases are calculated, too. Particular attention is paid to the symmetric systems concerning the spin statistics, the inter-consistency of the cross sections definitions as well as their relation to the cross sections at higher energies, where classical distinguishability of nuclei can be taken into account. Useful scaling relations and estimates of their merit are obtained with respect to the systems isotopic constitution. Comparison between the cross sections for different system types is shown.

1. Abstract of paper to be published in *Journal of Physics B*.