

Abstract Submitted
for the DAMOP15 Meeting of
The American Physical Society

Differential cross sections for electron transfer, excitation, and elastic scattering in keV-energy collisions between protons and He⁺ ions
THOMAS WINTER, Retired — Coupled-state differential cross sections are being determined for electron transfer, excitation, and elastic scattering in collisions between keV-energy protons and He⁺ ions. Integrated cross sections for these and other collisions were recently reported.¹ Some differential cross sections were previously considered with smaller Sturmian bases as well as triple-center bases² using an eikonal approach.³ The impact parameter ρ is now expressed in terms of the scattering angle for potential scattering with an impact-parameter-dependent effective nuclear charge corresponding to partial screening by an electron in the He⁺ ground state. Integrating over the scattering angle, this formal transformation does yield the same total cross sections for excitation and electron transfer as when integrating directly over ρ . Differential cross sections obtained in this way are likely to be valid at least for elastic scattering when this is the dominant channel.

¹T. G. Winter, Phys. Rev. A **87**, 032704 (2013).

²T. G. Winter, Phys. Rev. A **49**, 1767 (1994).

³L. Wilets and S. J. Wallace, Phys. Rev. **69**, 84 (1968).

Thomas Winter
Retired

Date submitted: 27 Jan 2015

Electronic form version 1.4