

Abstract Submitted  
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**Electron transfer, ionization, and excitation in collisions between protons and the ions  $\text{He}^+$ ,  $\text{Li}^{2+}$ ,  $\text{Be}^{3+}$ ,  $\text{B}^{4+}$ , and  $\text{C}^{5+}$**  THOMAS WINTER, Penn State U., Wilkes-Barre Campus — Coupled-state cross sections have been determined for electron transfer, ionization, and excitation in collisions between keV-energy protons and the hydrogenic ions  $\text{He}^+$ ,  $\text{Li}^{2+}$ ,  $\text{Be}^{3+}$ ,  $\text{B}^{4+}$ , and  $\text{C}^{5+}$ ,<sup>1</sup> extending work reported 26 years ago with a limited basis for electron transfer and ionization only<sup>2</sup>; the  $\text{C}^{5+}$  process was also considered in a later study.<sup>3</sup> In the present calculation, a basis of 60 Sturmians on each center has been used, and in a second calculation, a basis of 280 Sturmians on the target nucleus and a single  $1s$  function on the proton, with greater overall accuracy than the previously published results. Further, cross sections for direct excitation and capture to individual excited states up to  $3d$  have been determined. The extent to which high-energy scaling rules with target nuclear charge  $Z$  are valid has been re-examined for transfer to the ground state, total transfer, and ionization, and is now considered also for excitation and individual-state processes at intermediate energies near where the cross sections peak.

<sup>1</sup>T. G. Winter, Phys. Rev. A (in preparation).

<sup>2</sup>T. G. Winter, Phys. Rev. A **35**, 3799 (1987).

<sup>3</sup>T. G. Winter, Phys. Rev. A **56**, 2903 (1997).

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