Charge Transfer, Ionization, and Excitation in Collisions between Protons and the Ions He$^+$, Li$^{2+}$, Be$^{3+}$, B$^{4+}$, and C$^{5+}$ THOMAS WINTER, Penn State U., Wilkes-Barre Campus — Coupled-state cross sections are being determined for electron transfer, ionization, and excitation in collisions between keV- to MeV-energy protons and the hydrogenic ions He$^+$, Li$^{2+}$, Be$^{3+}$, B$^{4+}$, and C$^{5+}$, extending work reported 25 years ago with a limited basis for electron transfer and ionization only, over a limited energy range below the peak in the ionization cross section.$^1$; the first and last processes [with the ions He$^+$ and C$^{5+}$] were also considered in related studies.$^2,^3$ The presently used one- and two-center Sturmian bases are similar to those in the recent large-basis calculations for antiproton-H(1$s$) atom collisions.$^4$. Detailed convergence studies are being carried out, and scaling rules with nuclear charge are being re-examined, as are connections with perturbative results for all three processes, including Born cross sections for excitation into individual lower excited states.

$^3$T. G. Winter, Phys. Rev. A 69, 042711 (2004)).

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