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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($1s$) 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.

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[2]T. G. Winter and J. R. Winter, Phys. Rev. A **61**, 052709 (2000).
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[4]T. G. Winter, Phys. Rev. A **83**, 022709 (2011).

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