

Abstract Submitted
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Isotope Effects in Low Energy Ion-Atom Collisions¹ D.G. SEELY, Albion College, C.C. HAVENER, R. REJOUB, Oak Ridge National Laboratory — Isotope effects for charge transfer processes have recently received increased attention Stolterfoht et al., PRL 99 (2007) 10301. The ion-atom merged-beams apparatus at Oak Ridge National Laboratory is used to measure charge transfer for low energy collisions of multi-charged atomic and molecular ions with H and D and is therefore well suited to investigate isotope effects. When charge transfer occurs at relatively large inter-nuclear distances (via radial couplings) the ion-induced dipole attraction can lead to trajectory effects, causing differences in the charge transfer cross sections for H and D. A strong isotope effect (nearly a factor of two) has been observed in the cross section for $\text{Si}^{4+} + \text{H(D)}$ below 0.1 eV/u. However, little or no difference is observed for $\text{N}^{2+} + \text{H(D)}$. Recently, strong effects have been predicted by Stolterfoht et al. for the fundamental system $\text{He}^{2+} + \text{H(D,T)}$ at collision energies below 200 eV/u where charge transfer occurs primarily through united-atom rotational coupling. We are currently exploring systems where rotational coupling is important and isotopic differences in the cross section can be observed.

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