Abstract Submitted
for the GEC08 Meeting of
The American Physical Society

Isotope Effects in Ion-Atom Collisions[1] CHARLES HAVENER, Oak Ridge National Laboratory — The ion-atom merged-beams apparatus at Oak Ridge National Laboratory is used to measure charge transfer for low energy collisions of multi-charged ions with H and D. The apparatus has been relocated and upgraded to accept high velocity beams from the 250 kV High Voltage Platform at the Multi-Charged Ion Research Facility. Isotope effects for charge transfer processes have recently received increased attention. (Stolterfoht et al , PRL 99, 103201 (2007)). The higher velocity beams allow, for the first time, measurements with both H and D from keV/u down to meV/u collision energies. When charge transfer occurs at relatively large distances (via radial couplings) the ion-induced dipole attraction leads to trajectory effects (Havener et al., ICPEAC XVII Proceedings, Brisbane, 1991) causing differences in the charge transfer cross section for H and D. Such a strong isotope effect has now been directly observed for Si^{4+} + H(D), but not for N^{2+} + H(D). Strong effects have been predicted in the charge transfer cross section for the fundamental system He^{2+} + H(D, T) (Stolterfoht et al.) at collision energies where charge transfer occurs primarily through united-atom rotational coupling. Currently we are exploring systems where isotope effects in rotational coupling can be measured.

[1]Work supported by the Division of Chemical Sciences, Office of Basic Energy Sciences, and the Division of Applied Plasma Physics, Office of Fusion Energy Sciences, U. S. DoE under Contract No. DE-AC05-00OR22725 with UT-Batelle, LLC.

Charles Havener
Oak Ridge National Laboratory

Date submitted: 13 Jun 2008 Electronic form version 1.4