

# Laboratory Measurements of Charge Transfer on Atomic Hydrogen at Thermal Energies

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We are carrying out charge transfer (CT) measurements for selected ions on atomic hydrogen using the ion-atom merged-beams apparatus [1] at Oak Ridge National Laboratory (ORNL). Our focus is on those ions for which CT is known to play an important role in determining the ionization structure, line emission, and thermal structure of observed cosmic photoionized plasmas. CT cross sections are performed by merging an intense beam of ions (produced using the ORNL Multicharged Ion Research Facility) with a ground state beam of atomic hydrogen. We plan to carry out measurements on selected ions of C, N, O, Ne, Mg, and Fe from sub-thermal ( $\sim 0.02$  eV) up to  $\sim$  keV energies. Our results will be used to provide important benchmarks for theory and to produce rate coefficients for plasma modeling. Preliminary cross section measurements have been performed for  $\text{Ne}^{3+}$  and  $\text{Ne}^{4+}$  and show unexpected behavior at low energies.

## References:

- [1] Havener, C. C. in “Accelerator-Based Atomic Physics Techniques and Applications”, ed. S. M. Shafroth and J. C. Austin (AIP Press, Woodbury, New York, 1997), p. 117-145

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