

Abstract Submitted
for the DAMOP08 Meeting of
The American Physical Society

A Novel Merged-Beams Apparatus for Studying Anion-Neutral Reactions¹ D.W. SAVIN, H. BRUHNS, H. KRECKEL, M. LESTINSKY, W. MITTHUMSIRI, M. SCHNELL, B. SEREDYUK, Columbia Astrophysics Laboratory, M.E. BANNISTER, C.C. HAVENER, Oak Ridge National Lab, A. DORN, Max Planck Institute for Nuclear Physics, O. HEBER, M.L. RAPPAPORT, Weizmann Institute of Science, A.M. COVINGTON, University of Nevada at Reno — We are developing a novel apparatus at the Columbia Astrophysics Laboratory to study anion-neutral reactions. Beginning with an anion beam, we use photodetachment to generate a self-merged, anion-neutral beams arrangement. Laboratory beam energies are in the keV range. Because the beams run co-linear, center-of-mass energies from the meV to keV range will be achievable. Our proof-of-principle measurement is the associative detachment (AD) reaction $\text{H}^- + \text{H} \rightarrow \text{H}_2 + \text{e}^-$. Published values for this process differ by over a factor of 5. Measurements using our novel apparatus will help to resolve this fundamental issue in physics and chemistry. We will observe the AD reaction by detecting fast H_2^+ ions formed through ionizing collisions of the AD-generated H_2 with the background gas in the vacuum chamber. Here we present the current status of the project and discuss our future plans.

¹This work is supported in part by the NSF Chemistry Research Instrumentation and Facilities: Instrument Development (CRIF:ID) Program.

Daniel Wolf Savin
Columbia Astrophysics Laboratory

Date submitted: 29 Jan 2008

Electronic form version 1.4