

Abstract Submitted  
for the DAMOP07 Meeting of  
The American Physical Society

**Development and Construction of a Novel Apparatus for Studying Anion-Neutral Reactions.**<sup>1</sup> B. SEREDYUK, H. BRUHNS, H. KRECKEL, W. MITTHUMSIRI, D.W. SAVIN, Columbia Astrophysics Laboratory, M.E. BANISTER, C.C. HAVENER, Oak Ridge National Laboratory, 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. We will use fast, merged anion-neutral beams and detect the charged end products. Laboratory beam energies will be in the keV range. Because the beams run co-linear, center-of-mass energies from the sub-eV to keV range can be achieved. Proof-of-principle measurements will be carried out using the associative detachment reaction  $\text{H}^- + \text{H} \rightarrow \text{H}_2^- \rightarrow \text{H}_2 + \text{e}^-$ . Published values for this process differ by over a factor of 5. Our proposed research will help to resolve this fundamental issue. We will present our current progress on the design and construction of this apparatus. Future possible research directions include adding a cold molecular anion source in order to study reactions of the type such as  $\text{X} + \text{YZ}^-$ . This will allow investigations into a wide range of anion-neutral reactions.

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

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Date submitted: 02 Feb 2007

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