

Abstract Submitted  
for the DAMOP07 Meeting of  
The American Physical Society

Sorting Category: 3. (E)

**Geometric and Isotopic Influences on the Fragmentation Patterns of Rapidly Ionized Methane and Ammonia<sup>1</sup>**

LAURA DOSHIER, AMY LUEKING, IVAN LEE, ERIC WELLS, Department of Physics, Augustana College, Sioux Falls, SD 57197, ELI PARKE, MAT LEONARD, KEVIN D. CARNES, ITZIK BEN-ITZHAK, J.R. Macdonald Laboratory, Department of Physics, Kansas State University, Manhattan, KS 66506 — The fragmentation branching ratios of (deuterated) ammonia and methane ionized by 19 MeV  $F^{7+}$  and 4 MeV  $H^+$  projectiles have been measured with an emphasis on dissociation channels that require bond rearrangement. For these projectiles, the collision time is approximately 10 attoseconds, a duration over which nuclear motion is negligible. As a result, the rearrangement occurs during the post-collision dissociation process and nuclear mass plays a role. Production of  $H_2^+$  and  $H_3^+$  ions, in coincidence with either neutral or ionic fragments, was analyzed for these eight collision systems. Statistically significant isotopic effects are observed in some (*e.g.*  $H^+ + NH_3^+ \rightarrow H^+ + N + H_3^+$ ), but not all (*e.g.*  $F^{7+} + NH_3^+ \rightarrow F^{7+} + N + H_3^+$ ), dissociation pathways.

<sup>1</sup>Supported by the Chemical Sciences, Geosciences and Biosciences Division, Office of Basic Energy Sciences, Office of Science, U.S. Department of Energy, and by Research Corporation.

Prefer Oral Session

Prefer Poster Session

Department of Physics, Augustana College, Sioux Falls, SD 57197

Eric Wells

eric.wells@augie.edu

Date submitted: 05 Feb 2007

Electronic form version 1.4