Abstract Submitted
for the DAMOP13 Meeting of
The American Physical Society

X-ray ionization and fragmentation of IBr[1] DIPANWITA RAY, R.W. DUNFORD, S.H. SOUTHWORTH, E.P. KANTER, G. DOUMY, D.A. WALKO, P.J. HO, A. PICON, Argonne National Laboratory — We are investigating the fundamental physics of "molecular damage" due to x-ray absorption and vacancy cascades. Our experiment aims to understand the decay processes in IBr following K-shell ionization of the Br, or I atom. Following our prior studies of XeF_2 molecule [1], the tunable monochromatic x-ray beam at the Argonne's Advanced Photon Source was crossed with a gas beam of IBr, atomic Kr, or Xe, and the final excited ion fragments were collected for events whose initial decay was via K-alpha or K-beta fluorescence, using an improved x-ray/ion coincidence momentum imaging setup. We compare the total charge produced and the individual breakup modes for the two separate cases where the initial K-shell photoionization step creates a deep inner-shell vacancy in (i) Br and (ii) I in IBr molecule. We also compare the total charge distribution in IBr initiated by photoionization of Br to the total charge distribution following photoionization of atomic Kr and Xe, in order to identify processes unique to the molecular decay. The experimental results along with theoretical modeling enable us to get a better understanding of the dynamics of the decay processes.

[1] R. W. Dunford et al., Phys. Rev. A **86**, 033401 (2012).

[1]This work was supported by the Chemical Sciences, Geosciences, and Biosciences Division and the Advanced Photon Source by the Office of Basic Energy Sciences, Office of Science, US Dept of Energy, Contract DE-AC02-06CH11357.

Dipanwita Ray
Argonne National Laboratory

Date submitted: 29 Jan 2013 Electronic form version 1.4