Abstract Submitted
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X-ray ionization and fragmentation of XeF_2[1] S.H. SOUTHWORTH, R.W. DUNFORD, G. DOUMY, E.P. KANTER, B. KRÄSSIG, P.J. HO, A.M. MARCH, C.S. LEHMANN, A. PICÓN, L. YOUNG, Argonne National Laboratory, D. RAY, Lawrence Berkeley National Laboratory, R. WEHLITZ, U. Wisconsin Synchrotron Radiation Center — An inner-shell hole produced by x-ray absorption in a heavy atom decays in a multi-step process with emission of fluorescent photons and Auger electrons. If the heavy atom is in a molecular environment, the initial hole and the holes produced by the first decay steps remain localized, but eventually charge is redistributed to neighboring atoms and the system Coulomb explodes. Such processes are responsible for x-ray damage in molecules and materials. It is informative to study charge redistribution in XeF_2 molecules in comparison with core-hole decays in atomic Xe [1]. We have used hard x rays at Argonne's Advanced Photon Source to produce Xe 1s holes and a multi-hit x-ray/ion spectrometer to measure charge distributions and kinetic energies released to the fragment ions. At Wisconsin's Synchrotron Radiation Center, soft x rays were used to measure ion charge-state yields resulting from Xe $3d_{5/2}$, Xe $3d_{3/2}$, and F 1s holes. To explore core-hole decay dynamics on the femtosecond time scale, x-ray-pump/x-ray-probe experiments are planned at the Linac Coherent Light Source.

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

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