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Time-resolved X-ray fragmentation probing of molecular isomerization VLADIMIR PETROVIC, Department of Physics, Stanford University, MARCO SIANO, Blackett Laboratory, Imperial College London, UK, JAMES L. WHITE, Department of Applied Physics, Stanford University, PHILIP H. BUCKSBAUM, Departments of Physics and Applied Physics, Stanford University, AMO14110 COLLABORATION — Short intense X-ray pulses, now available at FELs, are already having a strong impact on the AMO science. In addition to scattering or resonant absorption, it is possible to use X-ray radiation to probe processes on molecular timescales through non-resonant absorption by initiating a molecular fragmentation in a time-resolved manner. Core-ionized molecules composed of light elements predominantly relax through Auger decay into multiply charged molecular ions, which subsequently fragment through Coulomb repulsion. The fragmentation patterns (ion time-of-flight spectra, ion-kinetic energy release, Auger spectra, etc.) encode information about instantaneous nuclear geometry and momenta. Unlike intense IR laser field fragmentation, X-ray fragmentation occurs in the weak-field regime. In order to test the potential of time-resolved X-ray fragmentation for probing isomerization, we selected the example of ring opening of 1,3-cyclohexadiene. In a time-resolved UV-pump - X-ray fragmentation-probe experiment performed at Linac Coherent Light Source at SLAC we observed an increase in the average ion-KER and an increase in the number of lighter fragments upon photoexcitation. We discuss how the evolving fragmentation patterns reflect the structural change that the molecule is undergoing.

Vladimir Petrovic
Department of Physics, Stanford University

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