

Abstract Submitted
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Comparison of UV and Strong-field Driven Dynamics of Bromoform (CHBr₃) probed by Femtosecond XUV Transient Absorption Spectroscopy¹ B.W. TOULSON, Lawrence Berkeley Natl Lab, F. LACKNER, Institute of Experimental Physics, Graz University of Technology, A.S. CHATTERLEY, Lawrence Berkeley Natl Lab, D.M. NEUMARK, Department of Chemistry, UC Berkeley, S.R. LEONE, Department of Chemistry and Department of Physics, UC Berkeley, O. GESSNER, Lawrence Berkeley Natl Lab — UV excitation and strong-field ionization induced dynamics of Bromoform (CHBr₃) have been studied using table-top XUV transient absorption spectroscopy. Element-specific core-to-valence transitions provide an atomic scale perspective, sensitive to changes in the local valence electronic structure, with ultrafast time resolution. The formation of both neutral and ionized fragments is probed with the same measurement. Strong-field ionization (10^{14} W/cm²) of Bromoform yields predominantly neutral Br atoms. No evidence of transient species or molecular products was observed. While depletion of the parent molecule signal is rapid (<30 fs), product formation occurs on a slower, 70 fs timescale for spin-orbit excited Br* atoms. Ground state Br atoms form even more slowly and only after a pronounced delay, strongly indicating a multi-step relaxation/dissociation mechanism. In contrast, UV dissociation of Bromoform leads to parent signal depletion and Br/Br* product formation with comparable (<100 fs) time constants. The branching between Br & Br* is comparable to that observed in the strong-field experiment.

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