

Abstract Submitted
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Ultrafast Molecular Dynamics probed by Vacuum Ultraviolet Pulses¹ JAMES CRYAN, ELIO CHAMPENOIS, NIRANJAN SHIVARAM, TRAVIS WRIGHT, Chemical Sciences Division, Lawrence Berkeley National Laboratory, CHAN-SHAN YANG, Department of Physics, National Tsing Hua University, ROGER FALCONE, The Advanced Light Source, Lawrence Berkeley National Laboratory, ALI BELKACEM, Chemical Sciences Division, Lawrence Berkeley National Laboratory — We present time-resolved measurements of the relaxation dynamics in small molecular systems (CO_2 and C_2H_4) following ultraviolet (UV) photo-excitation. We probe these excitations through photoionization and velocity map imaging (VMI) spectroscopy. Vacuum and extreme ultraviolet (VUV/XUV) pump and probe pulses are created by exploiting strong-field high harmonic generation (HHG) from our state-of-the-art 30 mJ, 1 kHz laser system. Three dimensional photoelectron and photoion momentum images recorded with our VMI spectrometer reveal non-Born Oppenheimer dynamics in the vicinity of a conical intersection, and allow us track the state of the system as a function of time. We also present initial experiments with the goal of controlling the dynamics near a conical intersection using a strong-field IR pulse. Finally, we will show progress towards measurements of time-resolved molecular frame photoelectron angular distributions (TRMFPADs) by applying our VUV/XUV pulse sequence to an aligned molecular ensemble.

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