

Abstract Submitted
for the DAMOP16 Meeting of
The American Physical Society

Few-femtosecond sensitivity of ultrafast molecular dynamics with time-resolved photoelectron spectra¹ ELIO G. CHAMPENOIS, Graduate Group in Applied Science and Technology, University of California, Berkeley, California 94720, USA, JAMES P CRYAN, PULSE Institute for Ultrafast Energy Science, SLAC National Accelerator Laboratory, Menlo Park, California 94025, USA, KIRK LARSEN, Graduate Group in Applied Science and Technology, University of California, Berkeley, California 94720, USA, NIRANJAN H. SHIVARAM, ALI BELKACEM, Chemical Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, California 94720, USA — We explore ultrafast dynamics involving non-adiabatic couplings following valence electronic excitation of small molecular systems. By measuring the time-resolved photoelectron spectra (TRPES) resulting from ionization with ultraviolet light, the excited wave packet can be tracked with state specificity. If the nuclear motion is dominated by a limited number of degrees of freedom, the TRPES also yields information about the molecular geometry. Even with limited temporal resolution, the onset times of the signal at different photoelectron energies can lead to few-femtosecond sensitivity. Applying this technique to ethylene (C_2H_4) excited to the $\pi\pi^*$ state, ultrafast motion along the twist coordinate is observed along with transient population to the $\pi 3s$ state through non-adiabatic coupling.

¹This work was supported by the U.S. Department of Energy, Office of Basic Energy Sciences, Chemical Sciences, Geosciences, and Biosciences Division under Contract No. DE-AC02-05CH11231.

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Date submitted: 29 Jan 2016

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