Abstract Submitted
for the DAMOP15 Meeting of
The American Physical Society

Imaging nonadiabatic laser-driven electron transient localization through high-order harmonic spectroscopy[1] MICHELLE MILLER, AGNIESZKA JARON-BECKER, ANDREAS BECKER, JILA and Department of Physics, University of Colorado Boulder — Theoretical predictions and indirect experimental observation hint that electrons within molecular systems can undergo highly nonadiabatic and transient localization on a sub-field cycle timescale. Direct observation of this rapid behavior is experimentally challenging, but would enable insights into laser-driven electron behavior on an attosecond time scale. In this theoretical study, we present and analyze signatures of intramolecular electron dynamics imprinted upon the molecular high-order harmonic generation (MHOHG) and above threshold ionization spectra of H_2^+ driven by mid-infrared wavelength light at moderate intensity and extended internuclear distances. We relate structural minima within the MHOHG spectrum and non-odd harmonic generation to electron dynamics at the time of ionization, demonstrating that the transient localization of the electron upon the counterintuitive nucleus results in the modulation of the radiated signal, allowing for the tracking of electron dynamics with sub-field cycle temporal resolution.

[1]Supported by the U.S. Department of Energy (Grant No. DE-FG02-09ER16103), and the U.S. National Science Foundation (Graduate Research Fellowship, Grants No. PHY-1125844 and No. PHY-1068706).

Michelle Miller
JILA and Department of Physics, University of Colorado Boulder

Date submitted: 01 Feb 2015 Electronic form version 1.4