Abstract Submitted
for the DAMOP14 Meeting of
The American Physical Society

Experimental evidence of light induced conical intersection in photodissociation of diatomic molecules[1] MATTHEW WARE, ADI NATAN, PHILLIP BUCKSBAUM, Stanford PULSE Institute, SLAC and Stanford University Department of Physics — We show experimental evidence for the existence of light induced conical intersections (LICI's) in diatomic molecules. Using a strong laser field, H_2^+ is photodissociated, and interference in the dissociated part of the angular distribution is observed for vibrational states that overlap the LICI. At the point of the LICI, non-Born-Oppenheimer dynamics dominate transitions between the ground ($1s\sigma_g$) and excited ($2p\sigma_u$) electronic states, and as a result strong rovibrational coupling takes place. Multiple quantum paths around the LICI contribute to the final dissociative state of the wavefunction, which produce interference in both the vibrational and rotational parts of the wavefunction. Numerically solving the time-dependent Schrödinger equation, we highlight how the observed interference arises in the presence of the LICI. Tuning laser frequency and polarization, we can change the LICI's position in phase space, and the simulation sheds insight into how to manipulate non-Born-Oppenheimer dynamics in diatomic molecules.

[1]This research is supported through the Stanford PULSE Institute at SLAC National Accelerator Lab by the U.S. Department of Energy, Office of Basic Energy Sciences

Matthew Ware
Stanford PULSE Institute, SLAC and
Stanford University Department of Physics

Date submitted: 31 Jan 2014 Electronic form version 1.4