Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Optical Control of Internal Conversion in Pyrazine[1] GRANT BARRY, SIMA SINGHA, University of Illinois at Chicago, ZHAN HU, Jilin University, Changchun, P.R. China, TAMAR SEIDEMAN, Northwestern University, ROBERT GORDON, University of Illinois at Chicago — We apply quantum control schemes previously reserved for atoms and small molecules to more complex polyatomic molecules. Pyrazine was chosen as a model polyatomic molecule for its well-studied conical intersection seam between the S1 and S2 potential energy surfaces (PESs). Using shaped ultraviolet femtosecond laser pulses, we demonstrate optical control of the excited state dynamics of this molecule under collisionless conditions. This was achieved in a pump-probe experiment by employing a genetic algorithm programmed to suppress ionization of the pyrazine molecules at a preselected time. Our findings indicate that the optimized pulses localize the wave packet for times up to 1.5 ps at a location on the coupled S1/S2 PESs where ionization is energetically forbidden. Our approach is general and does not require knowledge of the molecular Hamiltonian.

[1]Funding provided by National Science Foundation grant no. CHE-0848198.

Grant Barry
University of Illinois at Chicago

Date submitted: 12 Nov 2013 Electronic form version 1.4