

Abstract Submitted
for the DAMOP18 Meeting of
The American Physical Society

A Comparison of Strong and Weak Field Ionization as a Probe of Excited State Molecular Dynamics¹ YUSONG LIU, SPENCER HORTON, State Univ of NY- Stony Brook,US, PRATIP CHAKRABORTY, SPIRIDOULA MATSIKA, Temple University, US, PHILIPP MARQUETAND, University of Vienna, Austria, TAMAS ROZGONYI, Institute of Materials and Environmental Chemistry, Research Centre for Natural Sciences, Hungarian Academy of Sciences, VARUN MAKHIJA, University of Ottawa, Canada, RUARIDH FORBES, University College London, UK, University of Ottawa, Canada, PAUL HOCKETT, RONE LAUSTEN, National Research Council, Canada , ALBERT STOLOW, University of Ottawa, National Research Council, Canada , THOMAS WEINACHT, State Univ of NY- Stony Brook,US — Ionization can serve as a universal probe of excited state molecular dynamics, such as internal conversion, dissociation, and isomerization. We conduct time-resolved photoelectron and photoion spectroscopy measurements of excited state state dynamics in both weak field (UV-pump/VUV-probe) and strong field (UV-pump/IR-probe) ionization (WFI and SFI). We investigate the relative merits of WFI versus SFI as probes in two different classes of molecules - halogenated methanes (CH₂I₂) and cyclic organic molecules (uracil). Experimentally, both WFI and SFI approaches show similar dynamics - CH₂I₂ undergoes rapid internal conversion followed by dissociation and uracil has substantial population trapping in the excited state in addition to rapid internal conversion back to the ground state. Theoretically, we compare the experimental results with electronic structure and dynamics calculations. We find that while SFI and WFI provide qualitatively similar information about the excited state dynamics, only WFI results can be compared quantitatively with calculations.

¹United State Department of Energy

Yusong Liu
State Univ of NY- Stony Brook

Date submitted: 26 Jan 2018

Electronic form version 1.4