ULTRAFAST DIFFRACTION AND SPECTROSCOPY STUDIES OF GAS-PHASE PHOTOCHEMISTRY

DANIEL ROLLES, *J.R. Macdonald Laboratory, Kansas State University, Manhattan, KS, USA*.

The continuing progress of ultrafast sources such as X-ray free-electron lasers, high-repetition-rate near-infrared lasers, and Mega-electronvolt ultrafast electron diffraction facilities enable studies of electronic and structural dynamics in gas-phase molecules with unprecedented spatial and temporal resolution. I will present a series of experiments utilizing a variety of different spectroscopic techniques such as time-resolved photoelectron spectroscopy and Coulomb explosion imaging to study ring-opening and other isomerization reactions of molecules such a furan, toluene, thiophenone, and quadricyclane. The results are compared to experiments performed with other ultrafast techniques such as ultrafast electron and X-ray diffraction in order to highlight strengths and limitations of each technique.[a]

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