

Abstract Submitted
for the DAMOP14 Meeting of
The American Physical Society

Table-top imaging of the non-adiabatically driven isomerization in the acetylene cation SAMUEL BEAULIEU, HEIDE IBRAHIM, INRS-EMT, BENJI WALES, Department of Physics, University of Waterloo, BRUNO E. SCHMIDT, NICOLAS THIRÉ, ÉRIC BISSON, INRS-EMT, CHRISTOPH T. HEBEISEN, NRC Ottawa, VINCENT WANIE, MATHIEU GIGUERE, JEAN-CLAUDE KIEFFER, INRS-EMT, JOE SANDERSON, Department of Physics, University of Waterloo, MICHAEL S. SCHURMAN, NRC Ottawa, FRANÇOIS LÉGARÉ, INRS-EMT — One of the primary goals of modern ultrafast science is to follow nuclear and electronic evolution of molecules as they undergo a photo-chemical reaction. Most of the interesting dynamics phenomena in molecules occur when an electronically excited state is populated. When the energy difference between electronic ground and excited states is large, Free Electron Laser (FEL) and HHG-based VUV sources were, up to date, the only light sources able to efficiently initiate those non-adiabatic dynamics. We have developed a simple table-top approach to initiate those rich dynamics via multiphoton absorption. As a proof of principle, we studied the ultrafast isomerization of the acetylene cation. We have chosen this model system for isomerization since the internal conversion mechanism which leads to proton migration is still under debate since decades. Using 266 nm multiphoton absorption as a pump and 800 nm induced Coulomb Explosion as a probe, we have shoot the first high-resolution molecular movie of the non-adiabatically driven proton migration in the acetylene cation [1]. The experimental results are in excellent agreement with high level ab initio trajectory simulations. [1] H. Ibrahim *et al.*, *Nature Communication*, (Under Review)

Samuel Beaulieu
INRS-EMT

Date submitted: 28 Jan 2014

Electronic form version 1.4