

Abstract Submitted  
for the DAMOP16 Meeting of  
The American Physical Society

**Strong-field isomerization dynamics of fast beams of hydrocarbon ions**<sup>1</sup> BETHANY JOCHIM, JYOTI RAJPUT, BEN BERRY, T. SEVERT, M. ZOHRABI, PEYMAN FEIZOLLAH, K. D. CARNES, B. D. ESRY, I. BEN-ITZHAK, J. R. Macdonald Laboratory, Department of Physics, Kansas State University, Manhattan, KS 66506 USA — Bond rearrangement and fragmentation of hydrocarbons in intense laser fields has been a topic of considerable interest in the strong-field community in recent years. We study the interactions of keV hydrocarbon ion beams with ultrafast, intense laser pulses, employing coincidence 3D momentum imaging to elucidate the fragmentation dynamics and identify laser parameters that might be used for controlling outcomes such as the branching ratios. We focus on dissociation to ensure that isomerization occurs on the particular electronic channels of the molecular ion investigated. In  $C_2H_2^+$ , for example, we measure the intensity-dependent branching ratios of the acetylene ( $CH^+ + CH$ ) and vinylidene (*e.g.*,  $C^+ + CH_2$ ) channels. The relative fragmentation rates between the acetylene and vinylidene channels change by a factor of  $\sim 2$  over the range of experimental intensities ( $10^{13}$ – $10^{15}$  W/cm<sup>2</sup>). Other hydrocarbons of interest include not only cations but also anions, such as  $C_2H_2^-$ .

<sup>1</sup>Supported by the Chemical Sciences, Geosciences, and Biosciences Division, Office of Basic Energy Sciences, Office of Science, U. S. Department of Energy. BJ was also supported in part by DOE-SCGF (DE-AC05-06OR23100).

Bethany Jochim  
J. R. Macdonald Laboratory, Department of Physics, Kansas State University, Manhattan, KS 66506 USA

Date submitted: 29 Jan 2016

Electronic form version 1.4