

Abstract Submitted  
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**Dissociative and non-dissociative photo double ionization of hydrocarbon molecules:  $C_2H_4$  and  $C_2H_2$** <sup>1</sup> B. GAIRE, P. BRAUN, I. BOCHAROVA, F. STURM, D. HAXTON, A. BELKACEM, TH. WEBER, Lawrence Berkeley National Laboratory, C.L. COCKE, J.R. Macdonald Laboratory, Kansas State University, A. LANDERS, Department of Physics, Auburn University, R. DORNER, University of Frankfurt — Dissociative and non-dissociative ionization is observed when molecules interact with photons of energy near the double ionization threshold. Non-dissociative ionization will lead to a stable dication. The yield of the dication provides more information about the dicationic states involved. We explore the non-dissociative ionization of acetylene and ethylene molecules while employing the COLd Target Recoil Ion Momentum Spectroscopy (COLTRIMS) method. In contrast to the generation of acetylene dications, our measurements indicate that no stable ethylene dication can be produced via photo double ionization. We will discuss the role of non-adiabatic effects leading to the instant fragmentation of the ethylene dications into different breakup channels.

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