

Abstract Submitted  
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**Imaging Polyatomic Molecules in Three Dimensions using Molecular Frame Photoelectron Angular Distributions**<sup>1</sup> J.B. WILLIAMS, A.L. LANDERS, Auburn University, C. TREVISAN, California Maritime Academy, T. JAHNKE, M.S. SCHOEFFLER, R. DOERNER, University of Frankfurt, I. BOCHAROVA, F. STURM, C.W. MCCURDY, A. BELKACEM, TH. WEBER, Lawrence Berkeley National Laboratory — We demonstrate a method for determining the full three-dimensional molecular frame photoelectron angular distribution in polyatomic molecules using methane as a prototype. Simultaneous double Auger decay and subsequent dissociation allow measurement of the initial momentum vectors of the ionic fragments and the photoelectron in coincidence, allowing full orientation by observing a three-ion decay pathway,  $[\text{H}^+, \text{H}^+, \text{CH}_2^+]$ . We find the striking result that at low photoelectron energies the molecule is effectively imaged by the focusing of photoelectrons along bond directions.

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Allen Landers  
Auburn University

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