

Abstract Submitted
for the DAMOP12 Meeting of
The American Physical Society

Molecular Frame Photoelectron Angular Distributions as a Probe of Geometry and Auger Dissociation Dynamics¹ CYNTHIA S. TREVISAN, California Maritime Academy, THOMAS N. RESCIGNO, Lawrence Berkeley Nat. Lab, C. WILLIAM MCCURDY, Univ. Cal. Davis — Complex Kohn variational calculations of the molecular frame photoelectron distributions (MFPADs) for 1s core ionization of CH₄, NH₃, and H₂O are presented for ejected electron energies below 25 eV. Surprisingly, in these three cases there are energy ranges in which the photoelectron MFPADs effectively form “images” of the molecular geometry. Comparison with recent momentum imaging experiments on methane at the Advanced Light Source verify this effect. Simultaneous double Auger decay in these molecules can produce dissociation into three charged fragments, e.g., CH₂⁺ + 2 H⁺, allowing the complete orientation of the molecule and therefore the measurement of 3D MFPADs that test these predictions. In other Auger decay channels the measurement of 3D MFPADs verifies axial recoil (prompt dissociation) or probes its absence in the Auger dissociation dynamics of small molecules.

¹Work Supported by DOE Basic Energy Sciences

C. William McCurdy
Univ. Cal. Davis

Date submitted: 25 Jan 2012

Electronic form version 1.4