

Abstract Submitted  
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**Angular Dependence of Auger Decay of Double Core Vacancies in N<sub>2</sub>** JAMES CRYAN, JAMES GLOWNIA, PHILIP BUCKSBAUM, RYAN COFFEE, The PULSE Institute, SLAC National Accelerator Lab, LCLS AMO 02709 COLLABORATION<sup>1</sup> — We present a first experimental step toward angle-resolved multiple-core vacancy Auger electron spectroscopy. We observe Auger decay for both single-site and double-site  $K^{-2}$  vacancy pairs in N<sub>2</sub> and find that the single-site double vacancy undergoes an Auger process whose angular pattern qualitatively resembles previous measurements of  $1\sigma_g^{-1}$  Auger decay. In addition, we measure the angle dependence of the Auger decay of single core vacancies to quasi-bound molecular dication states. Ultimately, the combination of impulsive molecular alignment and x-ray free-electron lasers enables angle resolution for few femtosecond chemical dynamics.

<sup>1</sup>[www.pulse.slac.stanford.edu/amo02709](http://www.pulse.slac.stanford.edu/amo02709)

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