Abstract Submitted
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Disentangling Rescattering Interference Structures in High Fidelity Laser-Induced Photoelectron Imaging[1] NICHOLAS WERBY, Department of Physics at Stanford University, PULSE Institute, ADI NATAN, PULSE Institute, SLAC National Accelerator Laboratory, RUARIDH FORBES, Department of Physics at Stanford University, PULSE Institute, ROBERT LUCCHESE, Lawrence Berkeley National Lab, PHILIP BUCKSBAUM, Department of Physics and Applied Physics at Stanford University, PULSE Institute — Velocity-map imaging (VMI) is a useful tool for probing the dynamic structures of atoms and molecules. This poster presents high fidelity VMI data of the laser-induced photoelectron momentum spectrum of argon gas. By employing an energy filtering with Legendre decomposition algorithm we filter out the characteristic above threshold ionization (ATI) rings, resulting in the approximate single cycle direct ionization spectrum. We observe angle and energy dependent interference patterns in the rescattering regime and we suggest that these patterns are from the interference of long trajectory rescattered electrons. We compare our data to calculations of an electron elastically scattering from a Hartree-Fock ion target and find strong agreement with our measurements at high electron momenta. Our methodologies of data acquisition and processing greatly improve the fidelity of VMI measurements, and may uncover momentum interference structures that are unexplored in earlier studies, further unraveling strong field ionization processes.

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