

Abstract Submitted
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Filming nuclear dynamics of iodine using x-ray diffraction at the LCLS¹ MATTHEW WARE, Stanford University, SLAC, and PULSE Institute, ADI NATAN, SLAC and PULSE Institute, JAMES GLOWNIA, SLAC and LCLS, JAMES CRYAN, SLAC and PULSE Institute, PHIL BUCKSBAUM, Stanford University, SLAC, and PULSE Institute — We will provide an overview of our analysis of the nuclear dynamics of iodine. At the LCLS, we pumped a gas cell of iodine with a weak 520nm, 50 fs pulse, and the nuclear dynamics are then probed with 9 keV, 40 fs x-rays with variable time delay. This allows us to simultaneously image nuclear wavepackets on the dissociating A state, on the bound B state, and even Raman wavepackets in the ground electronic state. We will explain at length how we isolate each of these signals using a Legendre decomposition of our x-ray data and the selection rules for each of the transitions. Likewise, we will discuss how we convert the x-ray diffraction patterns into real-space movies of the nuclear dynamics.

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