Abstract Submitted
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Coulomb explosion imaging of small organic molecules at LCLS BENJAMIN ERK, ARTEM RUDENKO, DANIEL ROLLES, BENEDIKT RUDEK, LUTZ FOUCAR, SASCHA EPP, MAX CRYLE, ILME SCHLICHTING, CHRISTOPH BOSTEDT, SEBASTIAN SCHORB, JOHN BOZEK, ARNAUD ROUZEE, AXEL HUNDERTMARK, FRANK FILSINGER, LAUGE CHRISTENSEN, KIYOSHI UEDA, JOACHIM ULLRICH, for the CAMP Collaboration — Fragmentation of small organic molecules by intense ultrashort X-ray free-electron laser (FEL) pulses (2000eV, 0.4-2mJ, 3-200fs) has been studied using Coulomb explosion imaging. The experiment was conducted in the CFEL-ASG Multi-Purpose (CAMP) end station installed at the AMO beamline of the Linac Coherent Light Source (LCLS) at Stanford. In order to increase and localize X-ray absorption we used methylselenol, ethylselenol and phenylselenol compounds containing heavy selenium atom as a substitute for naturally occurring oxygen. By measuring kinetic energies and emission angles of few ionic fragments in coincidence, we can separate different fragmentation pathways and reconstruct molecular geometry (bond lengths and angles) at the moment of explosion. The results yield unique information on the structural rearrangement the molecule undergoes upon few-photon absorption, in particular, pointing to the ultrafast charge redistribution within the molecule, which has direct implications for the radiation damage induced by intense X-ray pulses.

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