

Abstract Submitted  
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**Observation of non-ballistic dissociation trajectories in iodine pump-probe x-ray scattering experiments**<sup>1</sup> IAN GABALSKI, MATTHEW WARE, PHILIP BUCKSBAUM, PULSE Institute/Stanford University — Frequency resolved x-ray scattering (FRXS) analysis of ultrafast time-resolved internal motion in molecules is especially useful in identifying low signal-to-noise features such as dissociation. Weak vibrations and terminal dissociation speeds, as well as dissociation time shifts, have been reported using this method. Here we show that FRXS can also reveal accelerations during dissociation, which appear as diffuse features with characteristic fringe patterns in the FRXS map. Simulations of non-ballistic iodine trajectories are compared to iodine photodissociation x-ray scattering experiments, revealing evidence for non-ballistic dissociation trajectories subject to both repulsive and attractive forces.

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