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Abstract for an Invited Paper
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Imaging Molecular Dynamics of Non-Periodic Systems with Ultrafast X-ray Scattering¹

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Ultrafast x-ray scattering is an emerging tool to probe photoexcited molecular dynamics at the angstrom and femtosecond scale. This talk will discuss the different approaches used to leverage the information of the scattering signal. We will demonstrate how signal anisotropy can be used to reveal and disentangle weak to strong field dynamics of excited systems, both in the gas-phase and in solution. We will show how using spectral and wavelet-based analysis approaches allow to track non-periodic and complex motions such as temporal accelerations de-novo. These approaches harness both the temporal and spatial resolutions of the measurement to resolve in time and momentum weak signals below what is currently attainable using traditional methods and open the way to obtain track motions in more complex systems. We will discuss the limits of motion detection and the impact that higher photon energies, shorter pulses and high-repetition rate sources such as LCLS-II will have on ultrafast x-ray scattering of non-periodic systems.

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