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Single-Shot Imaging of Electron Band Structure by All-Optical Temporal Interferometry

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We propose a method for single-shot imaging of electron band structure. The electron band structure is encoded in the carry-envelope-phase (CEP) dependent frequency-shift of high harmonic radiation generated by a few-cycle laser field. By analyzing the quantum trajectories, the relation between electron band structure and frequency of the emitted radiation is established with a temporal two-slit interference. Based on this time-domain interferometry, the electron band structure can be retrieved from high harmonics with a few-cycle laser field in a given CEP. Our single-shot measurement paves the way to imaging the ultrafast transient modification to band structure.

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