

Abstract Submitted
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A new method for spectral phase retrieval of broadband single attosecond pulses utilizing the autocorrelation of photoelectron streaking spectra SU-JU WANG, XI ZHAO, Kansas State University, WEIWEI YU, Liaoning Normal University, HUI WEI, C. D. LIN, Kansas State University — Recent progress in high-order harmonic generation with few-cycle mid-infrared lasers has pushed light pulses into the water-window region and beyond. These pulses have the bandwidth to support single attosecond pulses down to a few tens of attoseconds. An accurate characterization of such attosecond pulses is required for time-resolved probing of inner-shell electron dynamics. However, the presently available techniques for attosecond pulse measurements are not applicable to such short pulses. Here, we report a phase-retrieval method using the standard photoelectron streaking technique in the presence of an IR pulse assuming only the strong-field approximation. The new iterative algorithm allows accurate reconstruction of the spectral phase of light pulses ranging from extreme-ultraviolet to soft x-rays. Built on that, we propose further to calculate the autocorrelation (AC) of the streaking traces and use it to extract the spectral phase. The new method is found to be more accurate and more efficient especially for broadband water-window attosecond pulses.

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