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Attosecond streaking with twisted X waves

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Attosecond streaking is an established technique to measure timing information in the interaction of ultrashort laser pulses with atoms or molecules. This technique is based on the photoionization by an attosecond laser pulse in the presence of a strong linearly polarized near infrared (NIR) laser pulse. We investigate the attosecond streaking with an X wave pulse carrying orbital angular momentum and a strong linearly polarized near infrared (NIR) laser pulse. In contrast to plane wave pulses, X waves have a spatially dependent temporal profile, which modifies the ionization process. In this contribution we theoretically explore the influence of this complex pulse structure on the streaking of photoelectrons for both localized and macroscopically extended targets. On the basis of the strong-field approximation (SFA), we find that the streaking spectra of localized targets sensitively depend on the opening angle of the X wave and the position of the atomic target relative to the beam axis. For macroscopically extended targets, we find that the streaking spectra do not depend on the parameters characterizing the twist of the X wave.

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