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Streaking of shake-up ionization RENATE PAZOUREK, STEFAN NAGELE, Institute for Theoretical Physics, Vienna University of Technology, Austria, EU, JOHANNES FEIST, ITAMP, Harvard-Smithsonian Center for Astrophysics, USA, ANDREAS KALTENBÄCK, EMIL PERSSON, Institute for Theoretical Physics, Vienna University of Technology, Austria, EU, BARRY I. SCHNEIDER, Office of Cyberinfrastructure, National Science Foundation, USA, LEE A. COLLINS, Theoretical Division, Los Alamos National Laboratory, USA, JOACHIM BURGDÖRFER, Institute for Theoretical Physics, Vienna University of Technology, Austria, EU — We investigate whether an apparent "time delay" between electrons ionized by an attosecond XUV pulse with and without shake-up excitation of the remaining ion can be extracted using XUV-IR streaking setups. The classical interpretation of attosecond streaking states that the release time of an electron can be directly mapped to the momentum shift which the electron acquires from the IR pulse. However, detailed quantum mechanical investigations show that the ionization and shake-up process itself are modified by the IR field, leading to additional momentum shifts of the ionized electrons which are not related to a real "time delay." We address this problem for the helium atom for which we solve the full time-dependent Schrödinger equation including all correlation effects.

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