

Abstract Submitted
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Attosecond Photoelectron Spectroscopy of Metal Surfaces¹

CHANG-HUA ZHANG, UWE THUMM, Kansas State University — Recent attosecond streaking spectroscopy experiments [Cavalieri *et al.*, Nature **449**, 1029 (2007)] using co-propagating extreme ultraviolet (XUV) and infrared (IR) pulses of variable relative delay have measured a delay of approximately 100 attoseconds between photoelectrons emitted by a single XUV photon from localized core states and delocalized conduction-band states of a tungsten surface. We analyze the underlying XUV photoemission - IR streaking mechanism by combining a perturbative description of the XUV photoemission process and the subsequent non-perturbative IR streaking of the photoelectrons. Our calculated time-resolved photoelectron spectra depend on the transport of photo-released electrons inside the solid, agree with the experiments of Cavalieri *et al.*, and demonstrate that the observed temporal shift is caused by the interference of core-level photoelectrons that originate in different layers of the solid and experience a temporal modulation induced by the streaking field.

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