Abstract Submitted
for the DAMOP19 Meeting of
The American Physical Society

Resonant final-state effects in time-resolved photoemission time delays from Cu(111) surfaces.[1] MARCELO J. AMBROSIO, UWE THUMM, Kansas State University — Photoemission from solid targets includes the excitation and propagation of electrons inside the substrate, followed by their propagation in vacuum and detection [1,2]. While the imprint of the initial-state valence electronic structure of solids on photoemission spectra is well understood from photoemission spectroscopy in the energy domain, state-of-the-art time-resolved photoelectron spectroscopy [3,4] allows, in addition, the scrutiny of photoelectron propagation in the electronic continuum. We calculated photoemission spectra as a function of the delay between the exciting attosecond pulse train and assisting infrared (IR) laser pulse. Accounting for final-state interactions of the photoelectron with the IR electric field and the periodic substrate, our simulations show a resonantly enhanced sideband yield at photoelectron kinetic energies near 23.9 eV, in conjunction with a pronounced increase of the photoelectron wavefunction amplitude inside the solid on a length scale of a few nanometers. This resonant shift of final-state photoelectron probability density towards the bulk can be interpreted as an increase in the photoelectron propagation time in the solid and is commensurate with the resonant phases recently measured by Kasmi et al. [3]. [1] R. Locher et al., 2015 Optica 2, 405. [2] M. J. Ambrosio et al., 2018 Phys. Rev. A 97, 043431. [3] L. Kasmi et al., 2017 Optica 4, 1492. [4] Z. Tao et al., 2016 Science 353, 62.

[1]Supported by the NSF and the Division of Chemical Sciences, Office of the Basic Energy Sciences, Office of Energy Research, US DoE.

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Date submitted: 29 Jan 2019 Electronic form version 1.4