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The Laser-Assisted Photoelectric Effect on Surfaces LUIS MIAJA-AVILA, GUIDO SAATHOFF, CHIFONG LEI, MARGARET MURNANE, HENRY KAPTEYN, JILA, Univ. of Colorado, MARTIN AESCHLIMANN, Univ. of Kaiserslautern, Germany, JOHN GLAND, Univ. of Michigan — The laser-assisted photoelectric effect (LAPE) in atoms is widely used for the characterization of ultrashort EUV pulses and for femtosecond-to-attosecond spectroscopy. We recently observed the equivalent process in the original manifestation of the photoelectric effect i.e. photoemission from surfaces [PRL **97,** 113604 (2006)]. In our experiment, ultrafast 800nm pulses are split into probe and pump beams. The probe beam is upconverted into the EUV at 30nm using high harmonic frequency conversion. The 800nm pump beam is spatially and temporally overlapped with the EUV beam on a Pt(111) sample. A time-of-flight detector measures the kinetic energy of the photoemitted electrons. In the presence of the pump beam, these electrons can either absorb or emit an IR photon, leading to sidebands in the EUV photoelectron spectrum. These sidebands are visible as modulations near the Fermi edge. Surface LAPE will extend EUV pulse measurements to higher photon energies. It also has the potential to study ultrafast, femtosecond-to-attosecond time-scale processes in solids and in surface-adsorbate systems, where complex, correlated, electron dynamics are expected.

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