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Ultrafast nanooptics: Using strong laser fields to control the motion of electrons in and around metallic nanotstructures CHRISTOPH LIENAU, University of Oldenburg — Sharp metallic nanotapers irradiated with few-cycle laser pulses are emerging as a source of highly confined coherent electron wavepackets with attosecond duration and strong directivity. The possibility to steer, control or switch such electron wavepackets by light is expected to pave the way towards real-time probing of electron motion in solid state nanostructures. Such pulses can be generated by strong-field induced tunneling and acceleration of electrons in the near-field of sharp gold tapers within one half-cycle of the driving laser field. Here, we study for the first time the effect of the carrier envelope phase of few cycle laser pulses on the motion of electrons emitted from metallic nanostructures by strong-field tunneling [1]. We illuminate very sharp, single-crystalling gold tips with CEP-stable few-cycle near-infrared pulses at 1.5 μm and record angle-resolved kinetic energy spectra of the photoemitted electrons. Our experiments give first evidence for the effect of absolute phase of the laser pulses on the emission direction and kinetic energy distribution of the photoemitted electrons.

[1] B. Piglosiewicz *et al.*, *Nature Photonics*, doi:10.1038/NPOTON.2013.288 (2013).

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