Contribution ID: **54** Type: **Poster**

Coherent control of photoemission from nanostructures with synthesized two-color fields - an update

Wednesday 14 February 2018 17:00 (2 hours)

We demonstrated two-color coherent control of multi-photon photoemission from a tungsten nanotip with the optical phase between two light fields [1] and now continue to investigate the coherent nature of two-color above-threshold photoemission from nanotip sources. As discussed in [1], by focusing 74 fs drive pulses at 1560 nm and their second harmonic at 780 nm onto the tip and changing the optical phase between the two colors, we observed an emission current modulation of up to 97.5 % due to interference between two different quantum channels in the material. We argued that the extremely high degree of coherence evidenced by this near-unity current modulation depth is due to the confining nature of local field enhancement at the nanotip. In addition, the pointy solid-state nature of the nanotip enables us to apply large DC fields, offering an additional degree of freedom to investigate the modulation contrast of the photoemitted electron yield [2]. As an experimental outlook an in-situ resharpening technique will be presented which produces single nanometer sized tips. This technique can be used to adjust apex radius and opening angle of the nanotip, which in turn strongly influences the local near-field distribution [3]. Furthermore, a highly nonlinear fiber (HNF) will be implemented to broaden the output spectrum of the fiber laser, achieving laser pulses with nearly single-cycle duration. Ultimately, both approaches aim to reach into the strong-field regime and observe field-driven two-color electron emission dynamics in future studies.

[1] M. Förster et al., Phys. Rev. Lett., 117, 217601 (2016).
[2] T. Paschen et al., J. Mod. Opt. 64, 10-11, 1054-1060 (2017).
[3] S. Thomas et al., New J. Phys., 17, 063010 (2015).
[4] M. Krüger et al., J. Phys. B., 47, 124022 (2014).

Primary authors: LEMELL, Christoph (Vienna University of Technology); LIBISCH, Florian (Vienna University of Technology); WACHTER, Georg (Vienna University of Technology); BURGDÖRFER, Joachim (Vienna University of Technology); FÖRSTER, Michael (Friedrich-Alexander-Universität Erlangen-Nürnberg); KRÜGER, Michael (Friedrich-Alexander-Universität Erlangen-Nürnberg); HOMMELHOFF, Peter (Friedrich-Alexander-Universität Erlangen-Nürnberg); THOMAS, Sebastian (Friedrich-Alexander-Universität Erlangen-Nürnberg); MADLENER, Thomas (Vienna University of Technology); PASCHEN, Timo (Friedrich-Alexander-Universität Erlangen-Nürnberg)

Presenter: PASCHEN, Timo (Friedrich-Alexander-Universität Erlangen-Nürnberg)

Session Classification: Poster session 1

Track Classification: Poster