Graduate School Seminar

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INSTITUT FÜR PHYSIK

Talks in WS 2017/2018

Traditio et Innovatio

Universität Rostock

21st December 2017, **15:00 s.t.**

Benjamin Liewehr

AG Theoretical cluster physics and nanophotonics

High harmonic generation from thin solid targets

The onset of ultrafast structural modification of dielectric materials is accompanied by a wealth of non-linear phenomena, ranging from rapid ionization over local plasma formation, to high-harmonic generation (HHG)[1]. Brunel harmonics[2,3] in particular are a promising optical probe for plasma diagnostics on the femtosecond time scale as they emerge from the modulation of the plasma density.

Starting from rate equations for tunnel ionization, we investigate conditions for laser-pulse intensity and carrier wavelength where the dependence of ionization probability on the driving-field amplitude is encoded in the harmonic signal. Predictions from a continuums approach are compared with time resolved electron acceleration spectra from three-dimensional, microscopic particle-in-cell (MicPIC) simulations[4], where the competing effect of impact ionization, light-wave propagation and the emerging plasma mirror in the dielectric solid are observed.

References:

[1] H. Liu et al., *Nature Phys.* **13** , 262 (2017)
[2] F. Brunel, *J. Opt. Soc. Am.* B **4**, 521 (1990)
[3] I. Babushkin et al., *J. Mod. Opt.* **64**, 1078 (2017)
[4] Ch. Peltz et al., N*ew J. Phys.* **14,** 065011 (2012).

Talk: English
Slides: English

Location: Institute of Physics, Albert-Einstein-Str. 24, HS1