



SFB1242

Nichtgleichgewichtsdynamik kondensierter
Materie in der Zeitdomäne

UNIVERSITÄT
DUISBURG
ESSEN

Open-Minded

**03.05.2018 / 10 Uhr c.t., Raum MG 272
Campus Duisburg**

Ultrafast control and tailoring of surface plasmon generated electron pulses

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Numerous fundamental physical processes, such as DNA, lattice, and atomic-molecular dynamics occur on a femtosecond time scale. To probe such processes, one requires high spatial and temporal resolutions which can be achieved through ultrafast electron microscopy techniques. Recently, due to high plasmon (collective oscillations of conduction band electrons) field confinement, nanoplasmonics has been employed for the generation of high energy electron pulses on the nanoscale. Yet, many of the current SP based methods suffer from an inherent lack of control, both in electron beam characteristics (kinetic energy, pulse duration, current, etc.) and spatial directionality.

The focus of this talk is on the generation and control of ultrashort electron pulses via surface plasmon (SP) waves. As such, new methods are presented to specifically control the kinetic energy and pulse duration of the generated electron pulses while also providing a mechanism for direction control. This presentation includes work on terahertz electric field control of SP generated electron pulses, the design of a nanoplasmonic based electron gun capable of generating attosecond electron packets, and lowering the nonlinear electron emission order of a dielectric/metal bilayer to allow for operation at lower laser intensities. Additionally, recent results on an ultrafast high current plasmon driven secondary electron source will be presented.

Für diese Zeit steht eine Kinderbetreuung nach vorheriger Anmeldung zur Verfügung.

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