Christmas physics, chemistry, nano seminar:

Nonlinear Optics of Metals at Terahertz Frequencies

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Time: Friday Dec 19, 11:15 Duration: 45 minutes Place: 1510-213 (Auditorium VI)

Abstract

With the development of high-power table-top terahertz (THz) sources, terahertz nonlinear optics is a rapidly growing field of science. Nonlinear phenomena have been demonstrated for various gases, liquids, and solid-state materials including semiconductor and insulators. So far very little or no work has been reported on THz-induced nonlinearities in metallic systems.

In this presentation I will discuss a few highly nonlinear THz phenomena involving metals which we recently observed in our laboratories at DTU Fotonik. I will show that a strong THz pulse can lead to ultrafast electron field emission from resonant metallic structures. Emitted electrons can be used to start chemical reactions or physical processes, here illustrated by nitrogen plasma formation. Next I will show that a mass transfer from a metal can be initiated by a strong THz transient, which forms the principle for operation of an optical fuse. Finally I will discuss AC tunneling between gold nano-islands.



Henrik Stapelfeldt