

NEXT LITE-SEMINAR

Towards petahertz photonics

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Wiedner Hauptstr. 8, 1040 Vienna, Seminar room DB Gelb 10
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Host: J. Burgdörfer

Abstract

The ultimate physical speed limits of metrology and signal processing are defined by how fast the electric or optical properties of materials can be manipulated. In this context, highly nonlinear processes induced in dielectrics and semiconductors by intense few-cycle laser pulses are of particular importance—these processes allow one to significantly change the properties of a medium within a fraction of an optical cycle, as well as design measurements providing time-resolved access to the underlying phenomena. For example, a sufficiently intense ultrashort laser pulse can make electrons and holes traverse a large part of the Brillouin zone without damaging the solid. This significant degree of intraband motion underlies the recently discovered high-harmonic generation in solids, and it also has an impact on known nonlinear phenomena. By better understanding strong-field-driven electron dynamics, we hope to learn how to better control them and thus utilize their potential for novel applications. This talk reviews our recent theoretical work on exploring strong-field phenomena in solids.