

19th January 2017, 15:15

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Theoretische Clusterphysik

Attosecond Electron Scattering in Dielectrics

Scattering of electrons in dielectrics is at the heart of laser nanomachining, light-driven electronics, and radiation damage. Accurate theoretical predictions of the underlying dynamics require precise knowledge of the low-energy electron transport involving elastic and - even more important - inelastic collisions. Here, we demonstrate real-time access to electron scattering in isolated SiO_2 nanoparticles via attosecond streaking [1]. Utilizing semiclassical Monte-Carlo trajectory simulations [2,3] we identify that the presence of the field inside the dielectric cancels the influence of elastic scattering, enabling selective characterization of the inelastic scattering time [4].

- [1] R. Kienberger et al., Nature 427, 817-821 (2004)
- [2] F. Süßmann et al., Nat Commun. 6, 7944 (2015)
- [3] L. Seiffert et al., Appl. Phys. B 122, 1-9 (2016)
- [4] L. Seiffert et al., submitted

Talk: English
Slides: English

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