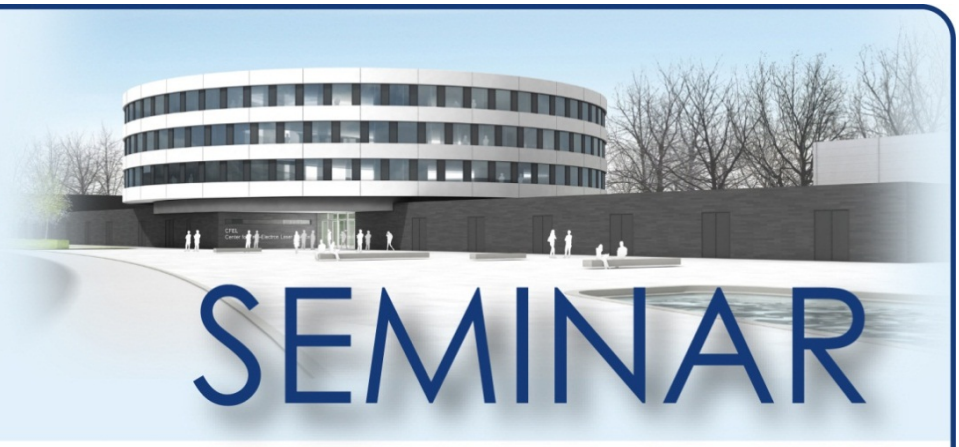
CFEL SCIENCE



SEMINAR

4th May 2022 - 2:00 p.m.

Virtual meeting room in ZOOM (ID: 895 1951 2902 / PW: 925239)

Alicia Palacios

Department of Chemistry, Universidad Autónoma de Madrid, Spain

Controlling attosecond electron dynamics in small atoms and molecules: XUV-XUV pump-probe schemes

Monitoring electron dynamics in matter requires the use of coherent light sources that can offer attosecond resolution. High-harmonic generation techniques and free electron laser (FEL) facilities currently provide coherent femtosecond and attosecond pulses with the necessary time resolution to achieve this goal. The talk will present recent theoretical developments to interpret and predict the outcome of currently feasible XUV-XUV and X-ray pump-probe experiments. For several years, XUV-IR pump-probe protocols have been employed to retrieve electronic dynamics information, for instance, in applications exploring photoionization time delays employing attosecond electron streaking or RABBIT (reconstruction of attosecond beating by interference of two-photon transitions) techniques. Despite the success of these applications, one typically finds that the IR field dominates the dynamics, usually distorting the atomic or molecular potential. The ideal alternative is thus the use of XUV-XUV pump-probe schemes, where the short wavelengths ensure a negligible potential distortion. Recent applications obtaining time-resolved images of the ultrafast dynamics triggered in excited and ionized molecular targets will be presented, with particular focus on the relevance of properly accounting for the electron-electron correlation terms even in the simplest atom, and electron-nuclear coupled motion in molecular targets.

Host: Robin Santra – CFEL-DESY Theory Division