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Attosecond Spectroscopy of Multi-Electron Dynamics in Atoms and Solids

Light-matter interaction starts with light-field driven electron dynamics. Attosecond spectroscopy can achieve a temporal resolution way above optical frequencies and thus allows to investigate the energy exchange dynamics between electric fields and matter with unprecedented detail.

I will discuss how such experiments reveal the influence of electronic correlations on the photoelectric effect and show how solid state attosecond spectroscopy provides us with a time-domain understanding of multi electron dynamics also in solids. These studies observe lasting and transient optical excitations across the band gap of semiconductors and dielectrics with sub-femtosecond response time, the resulting band-structure modifications and the energy exchange dynamics between light-field and solid.