

Ultrafast dynamics in solids and at interfaces

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One of the basic questions in solid state physics is to understand why a material behaves like an insulator or metal. Systems with a half-filled band are usually expected to be metallic, however, may undergo a metal-to-insulator transition at low temperatures due to charge density wave (CDW) formation or pure electron correlations (Mott insulator). Electron correlations are also at the heart of solid state phenomena like superconductivity or the Kondo effect. The dynamics of the underlying elementary processes occurs on femto- to attosecond timescales, however, only few experiments provide direct access to the time evolution of the electronic structure. Similar timescales govern interface phenomena like charge transfer and relaxation of core excited adsorbates. In this talk I will present a brief overview on electron dynamics in solids and at interfaces and discuss some challenges for ultrafast spectroscopy and recent experiments in this field.