Stuttgarter Physikalisches Kolloquium

Fachbereich Physik, Universität Stuttgart
Max-Planck-Institut für Festkörperforschung
Max-Planck-Institut für Intelligente Systeme

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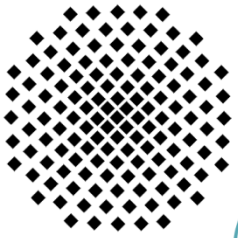

Dienstag, 12. Juli 2016	17:15 Uhr	Hörsaal V 57.01

Universität Stuttgart, Pfaffenwaldring 57, 70569 Stuttgart-Vaihingen

Gastgeber: Prof. Martin Dressel, Universität Stuttgart, Telefon: 0711 - 685-64946

Ultrafast Optical Control of Complex Quantum Materials

Stefan Kaiser
MPI & Universität Stuttgart - Antrittsvorlesung

Abstract

It is well known fact that various phase transitions in condensed matter can by triggered by external parameters such as temperature, pressure, electric field or magnetic field. Finding systems that show phase transitions triggered by external stimulation of light became a particular interesting field of research.

Advanced nonlinear optical methods such as ultra-broad band pump-probe spectroscopy open new ways of controlling ultrafast dynamics in complex solid-state materials on unprecedented timescales. In quantum materials, finding new ways of manipulating the complex interplay of electronic phases or effectively tuning electronic interactions opens new avenues in controlling physical properties and designing new functionalities. Some of the most remarkable examples are stabilizing a transient superconducting state far above its equilibrium critical temperature.

I will discuss how we investigate different scenarios like the balancing between competing phases triggered by ultra short light pulses or possibilities of dynamical stabilization of new states of matter in periodically driven light fields; thereby highlighting new methods we develop and new classes of materials that we explore.