LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

ARNOLD SOMMERFELD CENTER FOR THEORETICAL PHYSICS

Arnold Sommerfeld Lecture Series

Professor Andrew Millis

Columbia University
and
the Simons Foundation, USA

Condensed Matter Theory Seminar:

Electronic Squeezing of Pumped Phonons: Negative U and Transient Superconductivity

Advances in light sources and time resolved spectroscopy have made it possible to excite specific atomic vibrations in solids and to observe the resulting changes in electronic properties. I argue that in narrow-band systems the dominant symmetry-allowed coupling between electron density and dipole active modes implies an electron density-dependent squeezing of the phonon state which provides an attractive contribution to the electron-electron interaction, independent of the sign of the bare electron-phonon coupling and with a magnitude proportional to the degree of laser-induced phonon excitation. Reasonable excitation amplitudes lead to non-negligible attractive interactions that may cause significant transient changes in electronic properties including superconductivity. The mechanism is generically applicable to a wide range of systems, offering a promising route to manipulating and controlling electronic phase behavior in novel materials.

Friday, May 12, 2017, 9:00 h, Room A 450, Theresienstr. 37, LMU

Prof. U. Schollwöck
Prof. J. v. Delf