



Seminar

Superconductors in non-equilibrium: Higgs oscillations and induced superconductivity

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时间: 2015年11月19日 (周四) 上午10:00

Venue: Room W563, Physics Building, Peking University

地点: 北京大学物理楼西563

Abstract

Non-equilibrium pump-probe time-domain spectroscopy opens new perspectives in studying the dynamical properties of strongly correlated electron systems. New effects, such as transient superconductivity or Higgs oscillations of the superconducting condensate can be obtained. Using various methods I present a theoretical study of the non-equilibrium dynamics in superconductors. First, within the framework of the density matrix theory I study Higgs oscillations in one- and two-band superconductors which allow to detect directly properties of the superconducting condensate as a function of time. For two-band superconductors, the interplay of the phase (Leggett) and amplitude (Higgs) modes is analyzed in detail and new predictions are made. Secondly, employing the time-dependent Lanczos algorithm to the one-dimensional extended Hubbard model, I study the appearance of a transient Meissner effect which is a fingerprint of induced superconductivity. This is in agreement with the obtained correlation functions and opens a new way to induce superconductivity in experiment.

About the Speaker

Dirk Manske is currently permanent staff scientist and group leader at the Max Planck Institute for Solid State Research and Adjunct Professor for Theoretical Physics at the Free University of Berlin, Germany. He obtained his physics education at the University of Hamburg, where he received a PhD (Dr. rer. nat.) in Theoretical Physics in 1997. Before taking his position at the MPI, he spend one year at the ETH Zuerich and 5 years at the Free University of Berlin where he received his Habilitation in 2003. His research group at the MPI focuses on the Theory of Correlated Electron Systems, in particular Theory of Superconductivity in Novel and Complex Systems. In 2013 he was Visiting Professor at Kyoto University and in 2014 Visiting Professor at Tokyo University of Science, Japan, respectively. Dirk Manske has also written a book on 'Theory of Unconventional Superconductivity' (Springer, published 2004).