

# 608<sup>th</sup> ASRC Seminar

Date: 13:30-15:00 Wednesday 2 December

Location: Meeting room 103, ASRC Building

Speaker: Dr. Dirk Manske  
(Max-Planck-Institut)

Title: Superconductors in non-equilibrium:  
Higgs oscillations and induced  
superconductivity

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 we present a theoretical study of the non-equilibrium dynamics in superconductors. First, within the framework of the density matrix theory we 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, we 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.

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