Max-Planck-Institut für Struktur und Dynamik der Materie

Max Planck Institute for the Structure and Dynamics of Matter

Wednesday, March 23, 2016 – 15:00 h
CFEL Seminar room II (Bldg. 99)

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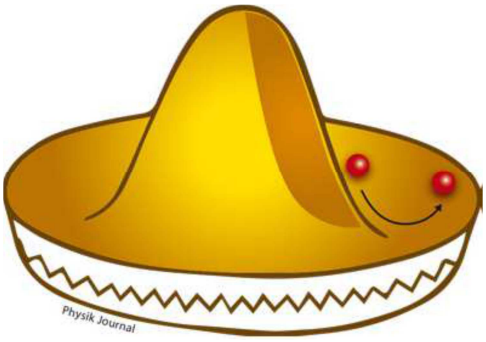
Superconductors in non-equilibrium: Higgs oscillations and induced superconductivity

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.



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