Max-Planck-Institut für Struktur und Dynamik der Materie



Max Planck Institute for the Structure and Dynamics of Matter

Tuesday, May 3rd 2016 – 16:00 CFEL Seminar room IV, O1.111 (Bldg. 99)

Francesco Peronaci

International School for Advanced Studies (SISSA), Trieste, Italy

Transient Dynamics of *d*-Wave Superconductors after a Sudden Excitation

In this talk I will discuss the transient dynamics of a d-wave BCS model after a quantum quench of the interaction parameter. The motivation comes from recent ultrafast pump-probe experiments on high-temperature superconductors.

It is found that the existence of gap nodes, with the associated nodal quasiparticles, introduces a decay channel which makes the dynamics much faster than in the conventional s-wave model. For every value of the quench parameter, the superconducting gap rapidly converges to a stationary value smaller than the one at equilibrium.

Using a sudden approximation for the gap dynamics, one finds an analytical expression for the reduction of spectral weight close to the nodes, in qualitative agreement with the experimental results.

References [1] F. Peronaci, M. Schir`o and M. Capone, Phys. Rev. Lett. 115, 257001 (2015). [2] J. Graf, C. Jozwiak, C. L. Smallwood, H. Eisaki, R. A. Kaindl, D-H. Lee, and A. Lanzara, Nature Physics 7, 805 (2011).



Host: Martin Eckstein

MAX-PLANCK-GESELLSCHAFT