Stuttgarter Physikalisches Kolloquium

Fachbereich Physik, Universität Stuttgart
Max-Planck-Institut für Festkörperforschung
Max-Planck-Institut für Intelligente Systeme*

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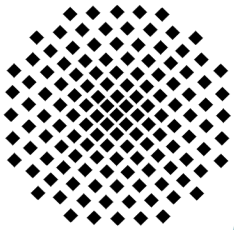

Dienstag, 17. Januar 2012	17:15 Uhr	Hörsaal V 57.01

Universität Stuttgart, Pfaffenwaldring 57, 70569 Stuttgart-Vaihingen

Gastgeber: Prof. Alejandro Muramatsu, Universität Stuttgart, Telefon: 0711 - 685-65204

Competing order in unconventional superconductors

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Abstract

The quest for better superconductors, with higher transition temperatures that perform at larger magnetic fields and lead to higher critical currents is among the major challenges in condensed matter physics and materials design. Somewhat ironically, superconductivity tends to emerge at comparatively high transition temperatures in those systems where it has to compete with other ordered states. This is the case in systems with structural instabilities, where superconductivity is caused by the exchange of phonons, i.e. quantized lattice vibrations. The same occurs in materials where magnetic order competes with superconductivity, as seen in copper-oxide based high-Tc systems, in heavy electron inter-metallic, in organic charge transfer salts and the recently discovered iron based systems. The same electrons that are responsible for magnetic order are participating in the formation of Cooper pairs, making the theoretical description of this competition a major theoretical challenge. We will discuss the role of competing order for the Cooper-pairing mechanism and pairing symmetry with comments on how those insights can be utilized to optimize and improve superconducting performance.

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