SFB/TRR 21 - Seminar

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Short-range and short-lived charge-density-wave order and pseudogap features in underdoped cuprates superconductors

The pseudogap phase of high-T_c cuprates is controversially attributed to preformed pairs or to a phase which coexists and competes with superconductivity. One of the challenges is to develop theoretical and experimental studies in order to distinguish between both proposals. Very recently, [Nature Phys. **6**, 414 (2010), Science **331**, 1579 (2011)] new angle-resolved photoemission spectroscopy experiments on Pb-Bi2201 support the point of view that the pseudogap is distinct from superconductivity and associated to a spacial symmetry breaking without long-range order. In this paper it is shown that many features reported by these experiments can be described in the framework of the t-J model considering self-energy effects in the proximity to a d charge-density-wave instability. Present results lead to a pseudogap and Fermi arcs which depend on doping and temperature as in the experiments. Finally, the link between the presence of Fermi arcs and isotope effects on the superconducting critical temperature and the magnetic penetration depth in underdoped cuprates is discussed.

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