

Fluctuations, phase transitions, and superconductivity in iron-based superconductors

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Abstract:

Iron-based systems seem to be siblings of the cuprates, some heavy fermion systems, and possibly also organic metals rather than relatives of the recently discovered hydrides. More specifically, the close proximity of, e.g., magnetic order and superconductivity is considered crucial for the relatively high transition temperatures T_c . Consequently, the fluctuations of the competing phase are believed to play a similar role for Cooper pairing as the phonons in conventional superconductors. I will show that some of the related critical fluctuations can be visualized in light scattering experiments. Whereas a direct relation of the fluctuations to superconductivity cannot yet be established we find experimental evidence of their importance for the structural and magnetic ordering.