

From CeCu₂Si₂ to SrFe₂As₂: fascinating physics due to competition or combination of different interactions

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The recent observation of high temperature superconductivity in doped RFeAsO and AFe₂As₂ systems has restarted the discussion about non-phononic coupling mechanism. In the present talk, I shall present our recent results on two isostructural, yet quite different systems. In CeCu₂Si₂, first inelastic neutron scattering experiments on single crystals revealed a resonance like feature in the magnetic excitation spectra which support magnetic mediated superconductivity at ambient pressure. In contrast valence fluctuations are discussed as likely origin of the superconducting state with enhanced T_c observed above 2.8 GPa in this compound. In the undoped RFeAsO and AFe₂As₂ systems one observe a structural distortion besides the antiferromagnetic ordering, and it is not yet clear which one is more relevant for the onset of superconductivity upon doping. I shall present XR and muon spin resonance results obtained on high quality SrFe₂As₂ samples which evidence a very strong coupling between both phenomena in this compound.