

Magnetic excitations in the FeAs based superconductors

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We have performed various neutron-scattering and x-ray studies on two members of the family of oxypnictides superconductors¹: LaOFeAs and LiFeAs. Powder neutron-diffraction experiments reveal a significantly larger Fe magnetic moment in LaOFeAs² than previously reported and indicate pronounced structural anomalies appearing already above the long-range structural transition. Comprehensive studies on superconducting single crystals of pure LiFeAs do not yield any evidence for magnetic ordering in this material. However, inelastic neutron-scattering experiments find incommensurate magnetic fluctuations appearing close to the wave vector of the striped antiferromagnetic order in the parent compounds of the other FeAs systems. These incommensurate magnetic excitations clearly respond to the opening of the superconducting gap.

¹Y. Kamihara et al., J. Am. Chem. Soc. **130**, 3296 (2008).

²N. Qureshi et al., Phys. Rev. B **82**, 184521 (2010).