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Nematic spin correlations in the tetragonal state of uniaixial-strained $BaFe_{2-x}Ni_xAs_2$[1]

PENGCHENG DAI, Rice Univ

Understanding the microscopic origins of electronic phases in high-transition temperature (high-T_c) superconductors is important for elucidating the mechanism of superconductivity. In the paramagnetic tetragonal phase of $BaFe_{2-x}T_xAs_2$ (where T is Co or Ni) iron pnictides, an in-plane resistivity anisotropy has been observed. Here, we use inelastic neutron scattering to show that low-energy spin excitations in these materials change from fourfold symmetric to twofold symmetric at temperatures corresponding to the onset of the in-plane resistivity anisotropy. Because resistivity and spin excitation anisotropies both vanish near optimal superconductivity, we conclude that they are likely intimately connected.

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