Non-magnetic nematicity in iron-based superconductors?

Abstract: The relationship between the structural (nematic) and magnetic phase transitions in iron-based superconductors has been extensively studied in recent years. I will present measurements of the elastic shear-modulus and the strain-dependent resistivity anisotropy, which are sensitive probes of the nematic susceptibility. While structural distortion and magnetism track each other closely in most iron-based materials, there are a few exceptions, which I will discuss in this talk. Namely, the observation of a magnetically ordered C4 (tetragonal) phase in K-doped BaFe2As2 may indicate that nematicity is not necessary for magnetism. However, the binary FeSe gives an example of a nematic phase without magnetic order. Finally, I will present new data on Co-doped CaFe2As2, showing that in this system, the coupling of structure and magnetism can be tuned between extreme values by doping and uniaxial strain.

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