MAR15-2014-020311

Abstract for an Invited Paper
for the MAR15 Meeting of
the American Physical Society

Nematicity without magnetism in FeSe - evidence for orbital ordering?

CHRISTOPH MEINGAST, Institute for Solid State Physics, Karlsruhe Institute of Technology, Germany

The origin of electronic nematicity and its relation to superconductivity is one of the hotly debated questions in the field of Fe-based superconductivity. Both spin and orbital degrees of freedom have been invoked with nematicity, as well as with the superconducting pairing itself. It is thus important to find out to which degree spin and/or orbital physics is driving the physics of these materials. FeSe is a particularly interesting material, because it undergoes a similar nematic C4 symmetry breaking transition as found in other Fe-based materials, but without long-range magnetic order. Recent advances in low-temperature vapor growth of FeSe single crystals [1] have led to a wealth of new experimental results. Here we discuss the nature of the nematic phase transition in FeSe in light of recent elastic, NMR, ARPES and quantum oscillations studies [2-4] and compare it to other Fe-based materials [5,6]. . . . . [1] A. E. Böhmer, et al., Phys. Rev. B 87, 180505(R) (2013). . . . [2] A. E. Böhmer, et al., arXiv:1407.5497. . . . [3] T. Terashima, et al., Phys. Rev. B 90, 144517 (2014). . . . [4] T. Shimojima, et al., Phys. Rev. B 90, 121111(R) (2014). . . [5] A. E. Böhmer, et al., PRL 112, 047001 (2014). . . [6] R. M. Fernandes, et al, PRL 111, 137001 (2013). . . .