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Unusual disorder-limited transport in Fe-based superconducting materials[1]

PETER HIRSCHFELD, University of Florida

The unusual temperature dependence of the resistivity and its in-plane anisotropy observed in the Fe-based superconducting materials, particularly $Ba(Fe_{1-x}Co_x)_2As_2$, has been a longstanding puzzle. I discuss first the effect of impurity scattering on the temperature dependence of the average resistivity within a simple two-band model of a dirty spin density wave (SDW) metal. Within this framework[1], many of the qualitative features of the transport can be understood by accounting for the growth of spin correlations pinned by impurities above the Neel temperature, and SDW-induced Lifshitz transitions below. I then discuss implications of this picture for the anisotropy observed in untwinned crystals. [1] Y. Wang, M. N. Gastiasoro, B. M. Andersen, M. Tomic, H.O. Jeschke, Roser Valenti, I. Paul and P.J. Hirschfeld, arXiv:1408.1933

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