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In-plane electronic anisotropy of underdoped iron arsenide superconductors

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Common to the high Tc cuprates, superconductivity in the Fe arsenides and related compounds is associated with suppression of an antiferromagnetic ground state. On the underdoped side of the phase diagram, in addition to the antiferromagnetic transition, the materials also suffer a phase transition that breaks the 4-fold rotational symmetry of the high-temperature crystal structure, this occurring at either the same or higher temperature than the Neel transition. Emerging evidence based on measurements of detwinned single crystals reveals a dramatic in-plane electronic anisotropy associated with this nematic transition.[1]

[1]In collaboration with: J.-H. Chu, H.-H Kuo, J. Analytis, M. Yi, D. H. Lu, Z. X. Shen, A. P. Sorini, A. F. Kemper, S.-K. Mo, T. P. Devereaux, R. G. Moore, M. Hashimoto, W. S. Lee, Z. Hussain, K. De Greve, P. L. McMahon, Y. Yamamoto (Stanford); Z. Islam (APS,ANL); A. Dusza, A. Lucarelli, F. Pfuner & L. Degiorgi (ETHZ).