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Metamagnetic Nematic Phase of $Sr_3Ru_2O_7$

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In this talk I will review our group's recent observations that a quantum phase with pronounced electrical transport anisotropies forms in the vicinity of a metamagnetic quantum critical point in $Sr_3Ru_2O_7$. The behaviour, which is strongly dependent on disorder and is only seen in the highest purity crystals, has phenomenological similarities with prior observations on two-dimensional electron gases in semiconductor devices [1,2]. Its appearance in bulk in $Sr_3Ru_2O_7$ has allowed us to perform a number of thermodynamic measurements, and also offers the promise of study using modern surface-based spectroscopies such as angle resolved photoemission and spectroscopic imaging scanning tunneling microscopy. References [1] For example M.P. Lilly *et al.*, Phys. Rev. Lett. **82**, 394 (1999); ibid **83**, 824 (1999) [2] W. Pan *et al.*, Phys. Rev. Lett. **83**, 820 (1999). Collaborators: S.A. Grigera[1], R.A. Borzi[1,2], A. Rost[1], J.F. Mercure[1], J. Farrell[1], R.S. Perry[3], A.G. Green[1], M. Allan[1], M. Wang[4], J. Lee[1], F. Baumberger[1], S.J.S Lister[1], S.L. Lee[1], J.C.S. Davis[1,4], Z.X. Shen[5], Y. Maeno[6]. [1] University of St Andrews, Scotland [2]INFTA, La Plata, Argentina [3] University of Edinburgh, Scotland [4]Cornell University, USA [5] Stanford University, USA [6] Kyoto University, Japan