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Study of an electronic nematic with precise control of the applied magnetic field vector JAN BRUIN, SUPA, University of St Andrews, RODOLFO BORZI, Instituto de Investigaciones Fisicoquimicas Teoricas y Aplicadas and Departamento de Fisica, IFLP, UNLP, ANDREAS ROST, SUPA, University of St Andrews, ROBIN PERRY, SUPA, University of Edinburgh, SANTIAGO GRIGERA, Instituto de Física de liquidos y sistemas biologicos, UNLP and SUPA, University of St Andrews, ANDREW MACKENZIE, SUPA, University of St Andrews — The layered perovskite metal $Sr_3Ru_2O_7$ has gained considerable interest since the discovery of its field tuned quantum criticality [1] and the subsequent discovery of a new electronic phase with a high magnetoresistive anisotropy, consistent with the existence of an electronic nematic fluid [2]. This anisotropy may be oriented by applying a moderate field (H_{ab}) in the plane of the RuO layers. The study of the behaviour of the electronic nematic state requires precise control over both the magnitude and direction of H_{ab}. For this purpose, we operate a 3-axis 9/1/1 tesla vector magnet, which offers full control of the magnetic field vector with a high degree of precision. Here, we present recent magnetotransport data for $Sr_3Ru_2O_7$ measured in the vector magnet. We confirm the two-fold to four-fold rotational symmetry breaking and show that it occurs even in the limit of small values of H_{ab}. Additionally, we address pinning of the anisotropy underlying crystal lattice. Finally, we show the dependence of the anisotropy on magnetic field and temperature, which may help explain its origin at the microscopic scale.

[1] S. A. Grigera *et al.*, *Science* **294**, 329 (2001) [2] R. A. Borzi *et al.*, *Science* **315**, 214 (2007)

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