Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Inhomogeneous magnetic phases: a LOFF-like phase in $Sr_3Ru_2O_7$
ANDREW BERRIDGE, University of Birmingham, SANTIAGO GRIGERA, University of St Andrews, BEN SIMONS, University of Cambridge, ANDREW GREEN, University of St Andrews — The phase diagram of $Sr_3Ru_2O_7$ contains a metamagnetic transition that bifurcates to enclose an anomalous phase with intriguing properties - a large resistivity with anisotropy that breaks the crystal-lattice symmetry - and an interesting entropic landscape. We propose that this is a magnetic analogue of the spatially inhomogeneous superconducting Fulde-Ferrel-Larkin-Ovchinnikov state. Based on a microscopic theory of Stoner magnetism we derive a Ginzburg-Landau expansion where the magnetisation transverse to the applied field can become spatially modulated. We show that this reproduces the observed phase diagram of $Sr_3Ru_2O_7$. We consider the dependence of the system on the angle of the applied magnetic field and calculate the signatures of the metamagnetic transition and inhomogeneous phase in the entropy and specific heat. These results are compared with the experimental observations.

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Date submitted: 03 Dec 2009 Electronic form version 1.4