Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Non-Equilibrium Effects on the Hidden Order of Microstructured URu_2Si_2[1] LAUREL E WINTER, LANL/NHMFL, PHILIP J. W. MOLL, Max Planck Institute for Chemical Physics of Solids, B. J. RAMSHAW, Cornell University, ARKADY SHEKHTER, NHMFL/FSU, N. HARRISON, LANL/NHMFL, ERIC D. BAUER, LANL, ROSS D. MCDONALD, LANL/NHMFL — Despite extensive studies on the heavy-fermion URu_2Si_2, the order parameter associated with the hidden order state has yet to be established. It is known, however that the hidden order can be suppressed with pressure and high magnetic fields, which results in the development of antiferromagnetism, and the realization of a polarized state respectively. Focused Ion Beam lithography (FIB) of URu_2Si_2 has enabled high magnetic field observation of quantum oscillations in the resistance, indicating the preservation of sample quality to micron scale structures. These recent advances in FIB lithography have enabled the application of unprecedented electric fields while minimizing the effects of Joule heating in highly conductive metals at cryogenic temperatures. To this end, we have been able to create the necessary sample geometry to study the effect of an electric field upon hidden order in magnetic fields up to 15 T. Preliminary results suggest that above a characteristic threshold electric field, hidden order is suppressed revealing a state with similar magnetoresistive properties to the Kondo lattice in the absence of hidden order.

[1]Work supported by US Dept. of Energy through LANL/LDRD Program and G.T. Seaborg Institute, as well as NSF DMR-1157490 and the State of Florida.

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Date submitted: 11 Nov 2016 Electronic form version 1.4