Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Rare Earth Doping of Semiconducting $PtSb_2$ MARCUS BENNETT, MEIGAN ARONSON, DMITRY SOKOLOV, University of Michigan, ZACHARY FISK, Florida State University — We have measured the electronic transport, magnetic properties, and heat capacity of single crystals of semiconducting $PtSb_2$, doped with rare earth elements. The Hall voltage was measured in fields up to 9 T, and associated carrier concentrations ranged from 10^{17} to 10^{20} electrons per cm^3. Resistivity measurements from 1.8 K to 300 K showed metallic behavior for all the doped samples, and a superconducting transition near 2 K for some of the Yb and La doped samples. Subsequent heat capacity and Meissner effect measurements show that only a small fraction of the sample volume is superconducting. Magnetization measurements indicated ferromagnetism in some of the Gd and Ce doped crystals. Surface etching removed both the superconductivity and ferromagnetism, suggesting that both effects originate with surface phases, which we subsequently found and identified using electron microscopy. Despite the presence of these secondary phases, transport and heat capacity measurements indicate that rare earth doping introduces both magnetic moments and itinerant carriers into the semiconducting bulk. Work at the University of Michigan was performed under the auspices of the U.S. Department of Energy under grant DE-FG02- 94ER45526

Marcus Bennett
University of Michigan

Date submitted: 07 Dec 2004 Electronic form version 1.4