Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Unconventional magnetic field tuned quantum ground states in the noncentrosymmetric compound $Yb_2Fe_{12}P_7$[1] RYAN BAUMBACH, JAMES HAMLIN, LEI SHU, DIEGO ZOCCO, M. BRIAN MAPLE, University of California, San Diego, JIM O'BRIEN, Quantum Design, PEI -CHUN HO, California State University, Fresno — Although so-called non-Fermi-liquid (NFL) behavior has been intensely investigated, there is no consensus as to its origin. A well known scenario for NFL behavior is the quantum critical point (QCP) model, where a second order phase transition (usually antiferromagnetic) is suppressed to $T = 0$ K by a control parameter. NFL behavior is found near the QCP, after which FL behavior is recovered for larger tuning parameter values. We will discuss the unusual phase diagram in single crystals of the noncentrosymmetric compound $Yb_2Fe_{12}P_7$, which exhibits a crossover from a zero magnetic field NFL ground state to another distinct NFL quantum region which is stabilized with magnetic field. Interestingly, the transition between the two states coincides with the suppression of antiferromagnetism towards $T = 0$ K. Based on these observations, we argue that a fundamental understanding of QCP and NFL phenomena and their interrelationship has yet to be realized.

[1]Crystal growth was supported under the DOE research grants DE FG02-04ER46105 and DE-FG02-04ER46178. Low temperature measurements were supported by the NSF research grant 0802478.

Ryan Baumbach
Univeristy of California, San Diego

Date submitted: 11 Nov 2009 Electronic form version 1.4