Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Antiferromagnetic Quantum Critical Point in CeRh(In,Sn)$_5$ ERIC BAUER, Los Alamos National Lab, D. J. MIXSON, F. RONNING, J. D. THOMPSON, J. L. SARRAO, R. MOVSHOVICH, M. F. HUNDLEY, G. R. STEWART —
CeRhIn$_5$ belongs to the family of CeMIn$_5$ (M=Co, Rh, Ir) heavy fermion superconductors that have attracted attention in recent years due to the rich variety of strongly correlated electron phenomena observed in these materials. The CeRhIn$_5$ compound exhibits antiferromagnetism at T_N=3.8 K with a Sommerfeld coefficient $\gamma \sim 300$ mJ/mol K^2. The Neel temperature is suppressed at a critical pressure $P_c \sim$25 kbar, while superconductivity is found to coexist with antiferromagnetism above ~ 15 kbar, reaching a maximum transition temperature $T_c = 2.1$ K. de Haas van Alphen measurements reveal a divergence of the effective mass at P_c, but signatures of an antiferromagnetic (AFM) quantum critical point (QCP) from other measurements are masked by the occurrence of superconductivity in this pressure range. The substitution of Sn for In in CeRhIn$_5$ offers an alternative way to probe the possible AFM QCP in this system. Preliminary measurements suggest an AFM QCP in CeRhIn$_{5-x}$Sn$_x$ at $x \sim 0.75$ with robust non-Fermi liquid behavior occurring for $x > 0.75$. The physical properties of the CeRh(In,Sn)$_5$ system will be discussed.

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Date submitted: 30 Nov 2004 Electronic form version 1.4