Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Field dependence of antiferromagnetic spin fluctuations in the heavy fermion superconductor $CeCoIn_5$ S. E. BROWN, UCLA, H. SAKAI, S.-H. BAEK, F. RONNING, E. D. BAUER, J. D. THOMPSON, Los Alamos National Laboratory — Magnetic fields are proposed as a tuning parameter for quantum critical fluctuations in the heavy fermion superconductor $CeCoIn_5$, with a critical point close to the superconducting B_{c2}. Here, ^{59}Co NMR spin lattice relaxation is used to study the effect of magnetic field applied on the amplitude, dimensionality, and anisotropy of antiferromagnetic spin fluctuations for temperatures covering T=100mK-100K and B =5-10T ($\parallel$ **c**). Spin fluctuations are evident for temperatures below $T \sim$ 40K, below which $[T_1T]^{-1}$ increases markedly for all fields. At lower temperatures, a significant dependence on magnetic field is observed. For fields $B > B_{c2}$ =5T, $[T_1T]^{-1}$ $\rightarrow$constant for $T < T_{FL}(B)$ at low temperatures; it is interpreted as a crossover to Fermi liquid behavior in the vicinity of a quantum critical point. The data are analyzed in terms of 2D antiferromagnetic spin fluctuation theory over the entire temperature range. Significant anisotropy in the spin fluctuation energy scale is inferred, and comparisons are made to parameters extracted from other measurements.

Stuart Brown
UCLA

Date submitted: 20 Nov 2009 Electronic form version 1.4