Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Effect of local electronic tuning in $CeCoIn_5$ KRZYSZTOF GOFRYK, FILIP RONNING, M.N. OU, PAUL TOBASH, XIN LU, ERIC BAUER, JOE THOMPSON, Los Alamos National Lab, S. STOYKO, A. MAR, University of Alberta, ZACH FISK, UC Irvine — The relationship between quantum criticality (QC), non-Fermi-liquid (nFl) behavior and the emergence of unconventional superconductivity (SC) in the vicinity of an antiferromagnetic quantum critical point (QCP) is one of the important issues in strongly correlated electron physics. Here we report on the effect of electronic tuning on superconductivity and quantum criticality in $CeCoIn_5$ driven by electron (Pt and Sn) and hole doping (Hg). We show that both Pt and Sn doping have similar strong effect on superconductivity and push the system slightly away from the QCP. The sub-linear power law exponent, even at a high doping level (where the superconductivity is suppressed) could point to the formation of electronic inhomogeneity. Moreover, hole doping by Hg can tune the system back to the QCP as demonstrated by an increase of T_c (and subsequently the onset of AFM), a decrease of the coherence temperature T^* and an increase of the power law coefficient n stressing the importance of the interplay of electronic tuning and pair breaking effects.

Filip Ronning
Los Alamos National Lab

Date submitted: 09 Nov 2011 Electronic form version 1.4