Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Monte Carlo simulations of magnetic clustering at a quantum critical point[1] TOM HEITMANN, University of Missouri Research Reactor, JOHN GADDY, JAGAT LAMSAL, WOUTER MONTFROOIJ, Department of Physics and Astronomy, University of Missouri — We present the results of Monte Carlo simulations on a percolating magnetic system with relevance to quantum critical point materials. It has previously been shown that, for heavily doped quantum critical point compounds such as $Ce(Ru_{0.24}Fe_{0.76})_2Ge_2$, the formation and dynamics of magnetic clusters strongly influences the physical response of the system at low temperature. Our simulation is based on the idea that finite-size effects force small magnetic clusters to order at comparatively high temperatures and, once formed, are impervious to Kondo shielding. Disorder acts to introduce a distribution of Kondo temperatures which, in turn, governs the formation of clusters as the temperature is lowered. We implement a percolation model based on such a distribution– first introduced by Bernal et al.– and with a restriction whereby Kondo shielding is allowed to remove moments from the infinite cluster *only*. We investigate how this influences thermodynamic quantities as well as how well the simulations align with our analytic theory that is based on the same restriction.

[1]This research is supported by the U.S. Department of Energy, Basic Energy Sciences, and the Division of Materials Sciences and Engineering under Grant No. DE-FG02-07ER46381

Tom Heitmann
University of Missouri Research Reactor

Date submitted: 09 Nov 2011 Electronic form version 1.4