Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Enhanced Pairing Correlations near a Quantum Critical Point in Two Impurity Anderson Model with a Pseudogap ANG CAI, Rice University, JEDEDIAH PIXLEY, University of Maryland, QIMIAO SI, Rice University — Significant progress has been made on the understanding of quantum critical heavy fermion metals. In addition to the spin density wave quantum critical point (QCP), a Kondo destruction QCP beyond the Landau framework has been discovered. However, its implications on the formation of unconventional superconductivity remain unclear. Motivated by a cluster-EDMFT approach [1], we address this question in simplified models for Kondo destruction QCP, as arising in the two impurity pseudogap Anderson model. We study the model using the continuous time quantum Monte-Carlo method, with either an Ising or Heisenberg inter-impurity RKKY interaction. For each case we have found a QCP distinct from both the Kondo destruction criticality of a single impurity pseudogap Anderson model and the quantum criticality of the conventional two impurity model. We observe critical local moment fluctuations with a power-law divergence in the staggered spin susceptibility, and show that the single-particle spectral function obey energy over temperature scaling. We find that the singlet pairing susceptibility is significantly enhanced near the QCP. Implications for unconventional superconductivity in quantum critical heavy fermion systems will be discussed. [1] J.H.Pixley, A. Cai, Q. Si, arXiv:1409.1090

Ang Cai
Rice University

Date submitted: 14 Nov 2014 Electronic form version 1.4