

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Quantum criticality and non-Fermi-liquid behavior in a two-level two-lead quantum dot¹ XIN WANG, ANDREW J. MILLIS, Columbia University — We investigate the possibility of occupation switching and quantum criticality in a model of two quantum impurities coupled to two leads, using analytical and quantum Monte Carlo techniques. For spinless electrons, no phase transition is found, in agreement with previous numerical renormalization group calculations. For electrons with spin, we have found that in the weakly interacting regime, all properties vary smoothly with parameters; while in the strongly interacting regime, occupation numbers vary discontinuously at zero temperature as level energies are changed. The discontinuity point is characterized by non-Fermi-liquid behavior, visible in self-energies and correlation functions.

¹This work is supported by NSF-DMR-0705847, NSF-CHE-0641523 and the New York State Office of Science, Technology and Academic Research (NYSTAR).

Xin Wang
Columbia University

Date submitted: 13 Nov 2009

Electronic form version 1.4