

Abstract Submitted  
for the MAR11 Meeting of  
The American Physical Society

**Mesoscopic Anderson Box: Connecting Weak to Strong Coupling**

DONG E. LIU, Duke University, SEBASTIEN BURDIN, Univ. of Bordeaux I, France, HAROLD U. BARANGER, Duke University, DENIS ULLMO, Univ. Paris Sud, France — Both the weakly coupled and strong coupling Anderson impurity problem are characterized by a Fermi-liquid theory with weakly interacting quasi-particles. In an Anderson box, mesoscopic fluctuations of the effective single particle properties will be large. We study how the statistical fluctuations in these two problems are connected. We use random matrix theory and the slave boson mean field approximation (SBMF, at low temperature) to address this question, obtaining the following results. First, for a resonant level model such as results from the SBFM approximation, we find the joint distribution of energy levels with and without the resonant level present. Second, if only energy levels within the Kondo resonance are considered, the distribution of perturbed levels collapse to one universal form for both GOE and GUE for all values of the coupling  $V$ . Finally, a purely Fermi liquid method is developed for calculating the perturbed levels within the Kondo resonance. Comparing the levels that result to those of the SBFM, we find remarkable agreement.

Dong E. Liu  
Duke University

Date submitted: 19 Nov 2010

Electronic form version 1.4