

Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Critical charge fluctuations in a pseudogap Anderson model¹

TATHAGATA CHOWDHURY, KEVIN INGERSENT, Department of Physics, University of Florida — Experiments on heavy-fermion β -YbAlB₄ raise the possibility of critical destruction of the Kondo effect in a mixed-valence system. We consider a toy model of this phenomenon: the particle-hole asymmetric Anderson model with a pseudogapped density of states $\rho(\epsilon) \propto |\epsilon - \epsilon_F|^r$ where ϵ_F is the Fermi energy. The model exhibits a critical spin response at a quantum phase transition separating a Kondo phase from a non-Kondo (local-moment) phase, where the Kondo energy scale is driven continuously to zero on approach from the Kondo side [1]. This Kondo-destruction transition has recently been shown, for certain values of r , to be accompanied by a divergence of the charge susceptibility coming from either phase [2]. Here we present a systematic numerical renormalization-group study of the charge response as a function of r . The charge fluctuations are described by critical exponents that show nontrivial r dependence. Over a range of r values, these exponents satisfy hyperscaling equations consistent with a scaling ansatz for the critical free energy at an interacting quantum phase transition. [1] K. Ingersent and Q. Si, Phys. Rev. Lett. 89, 076403 (2002). [2] J. H. Pixley et al., Phys. Rev. Lett. 109, 086403 (2012).

¹Supported by the NSF under DMR-1107814

Kevin Ingersent
Department of Physics, University of Florida

Date submitted: 15 Nov 2013

Electronic form version 1.4