Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Quantum criticality in the 2D Hubbard: from weak to strong coupling DIMITRIOS GALANAKIS, Lousiana State University, KARLIS MIKELSONS, EHSAN KHATAMI, Georgetown University, PENG ZHANG, ZHAOXIN XU, JUANA MORENO, MARK JARRELL, Louisiana State University — We study the phase diagram of the two-dimensional Hubbard model in the vicinity of the quantum critical point which separates the fermi liquid from the pseudogap region. We use the Dynamical Cluster Approximation (DCA) in conjunction with the weak-coupling continuous time quantum Monte Carlo (CTQMC) cluster solver. We measure the filling n_c and the density of states at the critical point as a function of the Coulomb interaction U. We observe a change in behavior when the Coulomb interaction is of the order of the bandwidth. We also evaluate the temperature range in which the system is under the influence of the quantum critical point and compare it with the effective spin coupling J_{eff}. We discuss the consistency of these results with various mechanisms of quantum criticality. This research is supported by NSF DMR-0706379 and OISE-0952300.

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Date submitted: 03 Mar 2010 Electronic form version 1.4