Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Energetics of superconductivity in the two dimensional Hubbard model EMANUEL GULL, University of Michigan, ANDREW J. MILLIS, Columbia University — The energetics of the interplay between superconductivity and the pseudogap in high temperature superconductivity is examined using the eight-site dynamical cluster approximation to the two dimensional Hubbard model. Two regimes of superconductivity are found: a weak coupling/large doping regime in which the onset of superconductivity causes a reduction in potential energy and an increase in kinetic energy, and a strong coupling regime in which superconductivity is associated with an increase in potential energy and decrease in kinetic energy. The crossover between the two regimes is found to coincide with the boundary of the normal state pseudogap, providing further evidence of the unconventional nature of superconductivity in the pseudogap regime. However the absence, in the strongly correlated but non-superconducting state, of discernibly nonlinear response to an applied pairing field, suggests that resonating valence bond physics is not the origin of the kinetic-energy driven superconductivity.

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Date submitted: 06 Nov 2012 Electronic form version 1.4