Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Disorder-induced magnetic quantum phase transition in cuprate materials[1] BRIAN M. ANDERSEN, University of Copenhagen, SIEGFRIED GRASER, University of Augsburg, PETER J. HIRSCHFELD, University of Florida — High temperature superconductors exhibit an unusual interplay between superconductivity and magnetism. Inside the superconducting dome antiferromagnetic order can be induced by external magnetic fields or chemically by impurity substitution. It is well-known that, for example, Zn or Ni may induce static order, but neutrons have also provided detailed inelastic data of the spin dynamics in the disordered case. We model the magnetic fluctuations and show how local Coulomb correlations naturally give rise to a slowing down of the dynamics in a d-wave superconductor in the presence of nonmagnetic imputities. We also discuss the difference between magnetic and nonmagnetic impurities, and show the connection to the so-called stripe picture.

[1]This work was supported by The Danish Council for Independent Research — Natural Sciences (B. M. A.), and DOE under grant DE-FG02-05ER46236 (P.J.H.).

Brian M. Andersen
University of Copenhagen

Date submitted: 19 Nov 2009 Electronic form version 1.4