Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Eight-band model of the dilute magnetic semiconductor GaMnAs
A. NILI, University of Cincinnati, M. A. MAJIDI, J. MORENO, University of North Dakota, P. KENT, Oak Ridge National Laboratory , M. JARRELL, University of Cincinnati, R. S. FISHMAN, Oak Ridge National Laboratory — The ordered state of GaAs doped with Mn is studied using a self-consistent Dynamical Mean Field treatment parameterized with the LDA band structure of the parent material. The resulting model is an eight-band k·p model including the heavy and light valence bands, the split-off valence band and the conduction band. The interaction between randomly distributed magnetic ions and itinerant charge carriers is modeled with a modified double-exchange coupling, which includes the attractive potential between holes and charged magnetic ions. Since our method is not perturbative we can treat both strong and weak coupling regimes. We calculate the transition temperature, the temperature dependence of the local magnetization, the density of states and the spin polarization of the holes. We compare our results with more simplified models.

Abdolmadjid Nili
University of Cincinnati

Date submitted: 27 Nov 2007 Electronic form version 1.4