Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

sp^3 tight binding model of $Ga_{1-x}Mn_xAs$ within the Dynamical Mean Field Approximation[1] ABDOLMADJID NILI, UNJONG YU, DANA BROWNE, JUANA MORENO, MARK JARRELL, Louisiana State University — We present the results of a self-consistent dynamical mean field treatment of the ferromagnetic order in GaAs doped with Mn. We use the sp^3 tight binding model as the non-interacting Hamiltonian for the parent material's (GaAs) band structure. The spin-orbit interaction is introduced as $\lambda_\alpha s.l$ where α=c and a for cation (Ga) and anion (As) respectively. Tight binding parameters are fitted in order to capture the correct band structure around the center of the Brillouin zone within the relevant energy scale. We model the interaction between randomly distributed magnetic ions and itinerant charge carriers with a modified double- exchange coupling. Band repulsion resulting from the inclusion of the conduction band improves our model by confining the impurity band. We investigate the effect of the double-exchange coupling on the magnetic and transport properties of the material.

[1]This work was supported by the National Science Foundation through OISE-0952300 and DMR-0548011.

Abdolmadjid Nili
Louisiana State University

Date submitted: 10 Dec 2009 Electronic form version 1.4