Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

The Mobility Edge in Disordered Ferromagnetic Doped Semiconductors[1] ERIK NIELSEN, Department of Electrical Engineering, Princeton University, R. N. BHATT, Department of Electrical Engineering and Princeton Center for Theoretical Physics, Princeton University, Princeton, NJ 08544 — While the clearest example of ferromagnetism in doped semiconductors is seen in diluted magnetic semiconductors such as $Ga_{1-x}Mn_xAs$,[2] under certain conditions, semiconductors doped with non-magnetic impurities may also exhibit ferromagnetic ground states.[3] We present numerical results of the nature of single particle states in such a positionally disordered three-dimensional system with a maximally spin-polarized ground state using a realistic potential for hydrogenic centers.[4] In particular, we identify the mobility edges, which mark the energies at which single particle states become delocalized, and whose location relative to the Fermi energy determine electronic transport in the system. We describe the dependence of the mobility edges on impurity density and potential, and discuss the variation of conductivity with impurity and carrier density.

[1]Supported by NSF-MRSEC (DMR-0213706).
[2]H. Ohno, Science 281, 951 (1998)
[3]Erik Nielsen and R. N. Bhatt, APS March Meeting 2006.
[4]R. N. Bhatt and T. M. Rice, Physical Review B 23, 1920 (1981).

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Date submitted: 28 Nov 2006 Electronic form version 1.4