Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

**Electron-mediated ferromagnetism and negative $s-d$ exchange splitting in semiconductors**[1] SU-HUAI WEI, GUSTAVO M. DALPIAN, National Renewable Energy Laboratory — Magnetic semiconductors have many unique physical properties that can be used for magneto-optical and spintronic applications. Currently, most of the studies on magnetic semiconductors are focused on hole-mediated FM systems. In this work we discuss several approaches that can enhance the spin- splitting at the conduction band edge and consequently induce electron-mediated stabilization of ferromagnetic semiconductors. We show that kinetic $s-d$ coupling can be introduced through chemical ordering and/or strain. We find that quantum confinement has a large effect on the spin- splitting at the conduction band edge. It can effectively reverse the sign of the conduction band splitting, thus, sheding light on the recent puzzling experimental observation that $s-d$ exchange splitting is negative in semiconductor superlattices. Finally, we show that, using rare-earth elements as magnetic dopants, the symmetry-allowed $s-f$ coupling can lead to a large splitting at the conduction band edge.

[1]This work is supported by DOE/BES

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Date submitted: 14 Oct 2005 Electronic form version 1.4