

MAR11-2010-020243

Abstract for an Invited Paper  
for the MAR11 Meeting of  
the American Physical Society

### **Chern Number Spins of Mn Acceptor Magnets in GaAs**

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State-of-the-art STM techniques have made it possible to substitute transition metal impurities for individual atoms in semiconductor crystals and have provided detailed information on the nature of the bound acceptor or donor states. Individual coupled acceptor (or donor)-impurity centers represent a new class of nanomagnets which we refer to as *acceptor or donor magnets*. Here we determine the effective total spin  $J$  of local moments formed from acceptor states bound to Mn ions in GaAs by evaluating their magnetic Chern numbers. When individual Mn atoms are close to the sample surface, the total spin changes from  $J = 1$  to  $J = 2$ , due to quenching of the acceptor orbital moment. For Mn pairs in bulk, the total  $J$  depends on pair orientation in the GaAs lattice and on the separation between the Mn atoms. We point out that Berry curvature variation as a function of local moment orientation can profoundly influence the quantum-spin dynamics of these magnetic entities.

<sup>1</sup>Work done in collaboration with T. O. Strandberg and A. H. MacDonald.