Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Comparison of Magnetization Tunneling in the Giant-Spin and Multi-Spin Descriptions of Single-Molecule Magnets JUNJIE LIU, Department of Physics, University of Florida, ENRIQUE DEL BARCO, Department of Physics, University of Central Florida, STEPHEN HILL, NHMFL and Department of Physics, Florida State University — We perform a mapping of the spectrum obtained for a triangular Mn_3 single-molecule magnet (SMM) with idealized C_3 symmetry via exact diagonalization of a multi-spin (MS) Hamiltonian onto that of a giant-spin (GS) model which assumes strong ferromagnetic coupling and a spin $S = 6$ ground state. Magnetic hysteresis measurements on this Mn_3 SMM reveal clear evidence that the steps in magnetization due to magnetization tunneling obey the expected quantum mechanical selection rules [J. Henderson *et al.*, Phys. Rev. Lett. **103**, 017202 (2009)]. High-frequency EPR and magnetization data are first fit to the MS model. The tunnel splittings obtained via the two models are then compared in order to find a relationship between the sixth order transverse anisotropy term B_6^6 in GS model and the exchange constant J coupling the Mn^{III} ions in the MS model. We also find that the fourth order transverse term B_4^3 in the GS model is related to the orientation of JahnTeller axes of Mn^{III} ions, as well as J

Junjie Liu
Department of Physics, University of Florida

Date submitted: 20 Nov 2009 Electronic form version 1.4