Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Variational calculations for spin canting at ferromagnetic/antiferromagnetic interfaces G. RICHARD, Department of Physics and Astronomy, James Madison University, J.-X. ZHU, Theoretical Divison and Center for Integrated Nanotechnologies, Los Alamos National Laboraotry, A.V. BALATSKY, Institute for Materials Science, Los Alamos National Laboratory, J.T. HARALDSEN, Department of Physics and Astronomy, James Madison University — Understanding the complex interaction between materials is critical for the development of spintronic and electronic devices in the technology industry. In this report, we examine the canting of local moments throughout a ferromagnetic/antiferromagnetic heterostructure, where a combination of interlayer mixing and orbital reconstruction can be described as a local exchange field at the interface. Using a variational method and semi-classical approach, we examine the canting of spins throughout the full multilayer heterostructure. We approximate the interlayer interactions as an effective field throughout the interface and apply a standard spin Hamiltonian with spin anisotropy for the intralayer interactions of the ferromagnetic and antiferromagnetic layers. Overall, we show that observed finite magnetization and rotation of the local moment observed in LSMO/BFO is due to the interface interactions. Furthermore, we predict a size limit for this effect in the antiferromagnetic (BFO) layer.

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Date submitted: 09 Nov 2014 Electronic form version 1.4