Lawrence Berkeley National Laboratory

Recent Work

Title

The role of planar and vertical domain walls and uncompensated interface spins in exchange bias.

Permalink

https://escholarship.org/uc/item/4pb6k5xg

Authors

Scholl, Andreas
Liberati, Marco
Nolting, Frithjof
et al.

Publication Date

2005-10-18

eScholarship.org Powered by the California Digital Library
University of California

TITLE: The role of planar and vertical domain walls and uncompensated interface spins in exchange bias.

AUTHORS: Scholl, Andreas[1]; Liberati, Marco[2, 1]; Nolting, Frithjof[3]; Ohldag, Hendrik[4]; Stöhr, Joachim[4].

INSTITUTIONS:

1. Advanced Light Source, LBNL, Berkeley, CA, USA.
2. Department of Physics, Montana State University, Bozeman, MT, USA.
3. Swiss Light Source, Paul Scherrer Institut, Villigen, Switzerland.
4. Stanford Synchrotron Radiation Center, SLAC, Stanford, CA, USA.

ABSTRACT BODY:

Models of exchange bias put different emphasis on certain features in the magnetic microstructure of the interface between the ferromagnet and the antiferromagnet. Some stress the role of a) planar or b) vertical domain walls whereas others emphasize the role of c) uncompensated interface spins. Using X-ray Photoemission Electron Microscopy and X-ray Spectroscopy using X-ray Magnetic Dichroism, we will show that all three play a role, although planar walls only appear in soft antiferromagnets like single crystalline NiO [1]. Lateral walls enhance bias as will be shown in a statistical analysis of the domain-size-dependent bias field in $LaFeO_3$ [2].

This work was supported by the U.S. Department of Energy under Contract No. DE-AC03- 76SF00098 at Lawrence Berkeley National Laboratory.

References:

[1] A. Scholl, M. Liberati, E. Arenholz, H. Ohldag, J. Stohr, Phys. Rev. Lett. 92, 247201 (2004).

[2] A. Scholl, F. Nolting F, J.W. Seo, H. Ohldag, J. Stohr, S. Raoux, J.P. Locquet, J. Fompeyrine, Appl. Phys. Lett. 85, 4085, (2004).