

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Exchange bias measurements of epitaxial magnetic oxide exchange bias bilayers. XIANGLIN KE, LAND BELENKY, CHANG-BEOM EOM, MARK RZCHOWSKI, University of Wisconsin-Madison, NIRT TEAM — It has been shown in epitaxial bilayers that antiferromagnetic exchange coupling exists at atomically abrupt interfaces between ferromagnetic oxides $\text{La}_{0.67}\text{Sr}_{0.33}\text{MnO}_3$ and SrRuO_3 [1,2]. We have grown the bilayers on (001) SrTiO_3 substrates by pulsed laser deposition with atomic layer control. By analyzing the in-plane magnetization loops of the LSMO layer, and the total magnetization of the (frozen) SRO layer, we determine the exchange field of the bilayer and the domain structure of the SrRuO_3 biasing layer as a function of cooling field. This data shows evidence for domain walls both parallel and perpendicular to the interface. We support this conclusion with a simple energy minimization including contributions from the interfacial exchange, dipole interaction with the cooling field, domain wall energies, and magnetostatic energy. We also pattern the samples with e-beam and x-ray lithography techniques. Size effect on coercivities of both LSMO and SRO electrodes and exchange bias in the bilayers will be discussed. [1] X. Ke, M. S. Rzchowski, L.J. Belenky, C. B. Eom, *Appl. Phys. Lett.*, **84**, 5458 (2004). [2] X. Ke, L.J. Belenky, C. B. Eom, M. S. Rzchowski, *J. Appl. Phys.* **97**, 10K115 (2005).

Xianglin Ke

Date submitted: 30 Nov 2005

Electronic form version 1.4