Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Thickness dependence of the exchange bias in epitaxial manganite bilayers[1] ALEXEY KOBRINSKII, University of Minnesota, MARIA VARELA, Oak Ridge National Laboratory, ALLEN GOLDMAN, University of Minnesota, U OF MN OXIDE MBE TEAM, OAK RIDGE NAT'L LAB COLLABORATION — A series of thin ferromagnetic/antiferromagnetic (F/AF) bilayers of doped lanthanum manganites La2/3Ca1/3MnO3 (F) and La1/3Ca2/3MnO3 (AF) have been grown by ozone-assisted molecular beam epitaxy (OAMBE). The lattice of the substrate material (001) SrTiO3 is a good match to that of the manganites. Growth by the OAMBE method results in samples with sharp interfaces, which are suitable systems to study the interfacial phenomenon of exchange bias (EB). We present STEM and high-resolution X-ray diffraction data that verify the high structural quality of the samples. We have studied EB as a function of the AF layer thickness and determined two critical values of the thickness for the onset and for the saturation of the hysteresis loop shift which is traditionally used to measure the effect. The observed dependence of EB on the AF layer thickness can be described within the original or generalized Meiklejohn-Bean model. Using this simple approach we have estimated the interfacial coupling energy and the antiferromagnetic anisotropy constant.

[1]This work was supported by the NSF through the University of Minnesota MRSEC under Grant NSF/DMR-0212032.

Alexey Kobrinskii
University of Minnesota

Date submitted: 05 Dec 2007 Electronic form version 1.4