

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Control of the Octahedral Tilts in Lanthanum Cobaltite and the Impact on Magnetic Properties MICHAEL BIEGALSKI, HAILE AMBAYE, VALERIA LAUTER, HANS CHRISTEN, Oak Ridge National Laboratory — Strain can be accommodated in two ways in perovskite materials, either via the extension of bond lengths or the rotation of the relatively rigid BO_6 octahedra. To explore the effects of octahedral tilts on magnetism, we have used epitaxy to control the octahedral tilting in the unit cell of $\text{La}_{0.5}\text{Sr}_{0.5}\text{CoO}_3$ by growth on cubic $\text{La}_{0.3}\text{Sr}_{0.7}\text{Al}_{0.65}\text{Ta}_{0.35}\text{O}_3$ (LSAT) and orthorhombic NdGaO_3 . From X-ray diffraction, the films grown on LSAT were shown to have a cubic structure whereas the films grown on NdGaO_3 show an orthorhombic distortion. Due to the large paramagnetic response of the NdGaO_3 polarized neutron reflectometry was used to probe the magnetic structure of the films. The polarized neutron reflectometry demonstrates that changes in the crystal structure due to the epitaxially imposed symmetries alter the magnetism in these materials.

Michael Biegalski
Oak Ridge National Laboratory

Date submitted: 27 Nov 2010

Electronic form version 1.4