Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Observation of Strain Induced Crystal Field Changes in La0.8MnO3 Single Crystal Manganite Films QING QIAN, New Jersey Institute of Technology, TREVOR TYSON, New Jersey Institute of Technology, M DELEON, New Jersey Institute of Technology, J BAI, Oak Ridge National Laboratory, C.-C. KAO, Brookhaven National Laboratory — We have studied $La_{0.8}MnO_3$ single crystal manganite films with varying thickness (from 4000 Å to 50 Å) on $LaAlO_3$ substrates. We measured the Mn K_β x-ray emission spectrum, which is sensitive to the crystal field about the Mn sites. Our high-resolution x-ray emission results showed there exists a strong crystal field in manganite films near the substrate due to substrate induced compression of the films. The strong crystal field leads to a partial Mn 3d high spin to low spin transformation. This observation provides a clue to the origin of the reduction in the bulk magnetization in ultrathin manganite films.

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Date submitted: 30 Nov 2004 Electronic form version 1.4