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Observation of Strain Induced Crystal Field Changes in La_{0.8}MnO₃ 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}MnO₃ single crystal manganite films with varying thickness (from 4000 Å to 50 Å) on LaAlO₃ 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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