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Influence of growth mode & substrate doping on the reversed remanent magnetic configuration in $La_{0.7}Sr_{0.3}MnO_3$ films D.A. ARENA, C.S. NELSON, National Synchrotron Light Source, Brookhaven Nat. Lab, J.-S. LEE, C.-C. KAO, SSRL, SLAC Nat. Accelerator Lab, E. NEGUSSE, Physics Dept, Montana State Univ., T.S. SANTOS, Center for Nanoscale Materials, Argonne Nat. Lab — Charge transfer effects which can occur at oxide interfaces can modify the properties of oxide thin films. In such a system, an unusual reversed orientation of the remanent magnetic state was observed recently for $La_{0.7}Sr_{0.3}MnO_3$ on Nb-doped $SrTiO_3$(001) deposited via pulsed laser deposition[1]. We observe a similar effect for $La_{0.7}Sr_{0.3}MnO_3$ grown via molecular beam epitaxy, a deposition method with different growth kinetics, onto both Nb-doped and undoped $SrTiO_3$ (STO) substrates. The reversed magnetic state occurrs in both samples, and a region of slightly increased charge density was revealed with x-ray reflectivity. Intriguingly, the onset of the reversed remanent state occurred at different temperatures: ∼125K for the Nb:STO substrate and ∼240K for the undoped STO substrate. High resolution x-ray diffraction reveals a subtle relationship with the cubic-to-tetragonal structural transition of the STO substrate at ∼105 K. Our results point to an additional mechanism for controlling the magnetism in mixed-valence oxide films[2].

[1]J.-S. Lee *et al., Phys. Rev. Lett.* **105**, 257204 (2010)
[2]J.-S. Lee *et al., J. Phys. D: Appl. Phys.* **44**, 245002 (2011)

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