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The role of strain in the magnetic properties of $La_{0.7}Sr_{0.3}MnO_3$ films studied by magnetic force microscopy RAVI KUMMAMURU, YEONG-AH SOH, Dept. of Physics and Astronomy, Dartmouth College, Hanover, NH 03755., NEIL MATHUR, LUIS HUESO, Department of Materials Science, University of Cambridge, Cambridge CB2 3QZ, UK , CONDENSED MATTER, DEPARTMENT OF PHYSICS AND ASTRONOMY, DARTMOUTH COLLEGE TEAM, DEVICE MATERIALS GROUP, DEPARTMENT OF MATERIALS SCIENCE, UNIVERSITY OF CAMBRIDGE COLLABORATION — In order to elucidate the role of strain in the magnetic properties of manganite films, we studied the behavior of the magnetic domains in $La_{0.7}Sr_{0.3}MnO_3$ (LSMO) films grown on $SrTiO_3$ (STO) and $NdGaO_3$ (NGO) substrates, which are differently strained. Our previous studies on the magnetic properties of $La_{0.7}Sr_{0.3}MnO_3$ films grown on STO substrates using magnetic force microscopy showed a distinct magnetic texture within magnetic domains, and spin reorientation and enhancement of T_C near grain boundaries. These results were attributed to the strain in the film caused by the lattice mismatch with the substrate and the strain relaxation at the grain boundaries. Our new studies on $La_{0.7}Sr_{0.3}MnO_3$ films grown on NGO substrates, which have very low strain due to a close lattice match between the film and substrate, show no presence of magnetic texture and a very sharp transition from the paramagnetic to ferromagnetic phase.

Ravi Kummamuru
Dartmouth College

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