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The domain walls of antiferromagnetic $TbMnO_3$ thin films C. DAUMONT, S. FAROKHIPOOR, Solid state for electronic materials, University of Groningen, C. MAGEN, EMES-CNRS, Toulouse and Instituto de Nanociencia de Aragón, Universidad de Zaragoza, D. RUBI, Solid state for electronic materials, University of Groningen and GIA and INN, CAC-CNEA, San Martin, S. VENKATESAN, Department of Chemistry and Center for NanoScience, Ludwig-Maximilians University Muenchen, E. SNOEK, EMES-CNRS, Toulouse and Instituto de Nanociencia de Aragón, Universidad de Zaragoza, M. DOEBLINGER, A. MUELLER, C. SCHEU, Department of Chemistry and Center for NanoScience, Ludwig-Maximilians University Muenchen, B. NOHEDA, Solid state for electronic materials, University of Groningen — In bulk $TbMnO_3$ below 28K, the Mn sublattice orders as an antiferromagnetic cycloidal spin structure. This breaks inversion symmetry and induces a macroscopic electrical polarization: $TbMnO_3$ is a multiferroic material with a strong magnetoelectric coupling. Contrary to the bulk, $TbMnO_3$ thin films grown on (001)-$SrTiO_3$ substrates show ferromagnetic-like behavior with a magnetic moment of $1.5\mu_B$/f.u. at 15K. However, the thickness dependence of the magnetic moments is not consistent with magnetism homogeneously distributed through the film. Additionally, epitaxial strain enables the stabilization of different symmetries and particular domain configurations at nanometric scales. Large strain gradients and/or lowering of symmetry at the boundaries of these domains allow the appearance of physical responses distinct from those of the domains. In this work we investigate the contribution of the domain walls to the magnetic moment.

C. Daumont
Solid state for electronic materials, University of Groningen

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