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Interface magnetism in LSMO-$BiFeO_3$ heterostructures DIPANJAN MAZUMDAR, Center for Materials for Information Technology, University of Alabama, CECILIA SANCHEZ HANKE, Advanced Light Source, Lawrence Berkeley National Lab, ARUNAVA GUPTA, Center for Materials for Information Technology, University of Alabama, SUJOY ROY, Advanced Light Source, Lawrence Berkeley National Lab, U ALABAMA TEAM, LBNL TEAM — The interplay of the magnetic and ferroelectric order parameter is currently a topic of intense research. This magnetoelectric coupling can potentially be enhanced at the interface of a FM-FE heterostructure and, therefore, study of such prototype interfaces could provide fundamental insight to design of multiferroic materials. In this work interface magnetism investigations of multiferroic BFO (3-5nm) with a high-spin polarization ferromagnet (LSMO, 10nm) is presented. We have performed detailed resonant reflectivity studies at the Mn (for LSMO) and Fe (for BFO) L_3 edges in LSMO/BFO as a function of temperature. Analysis of the data using rigorous scattering theory employing the tensor nature of the refractive index has elucidated the charge and magnetic density depth profiles along the depth of the film. Investigations at room temperature do not show magnetism at the Fe-edge which imply that the antiferromagnetic order in BFO persists both in bulk and interface. A comprehensive interface characterization as a function of temperature will be presented.

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