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Magnetotransport in $LaNiO_3/La_{2/3}Sr_{1/3}MnO_3$ superlattices with non-collinear magnetic ordering JASON HOFFMAN, University of British Columbia, STEPHEN WU, Argonne National Laboratory, BRIAN KIRBY, National Institute of Standards and Technology, ANAND BHATTACHARYA, Argonne National Laboratory — Non-collinear magnetic textures can give rise to exotic charge and spin transport behaviors, and may allow for the control of magnetism using small electric currents. While these textures have been observed in a number of bulk materials and in thin films, realizing non-collinear magnetism in heterostructures presents new avenues to tune their properties using tailored interfaces and gate electric fields. We have previously used polarized neutron reflectometry (PNR) to demonstrate that superlattices of paramagnetic $LaNiO_3$ (LNO) and ferromagnetic $La_{2/3}Sr_{1/3}MnO_3$ (LSMO) adopt a non-collinear magnetic structure. In this work, we characterize the non-collinearity as a function of temperature and magnetic field using anisotropic magnetoresistance (AMR) and Nernst effect measurements. We observe rotational hysteresis at low fields, while the magnitude of the AMR is found to vary non-monotonically with applied field. To understand this behavior, we develop a simple free-energy model that includes contributions from biaxial anisotropy, Zeeman energy, and exchange coupling between the LSMO and the LNO layers. From this analysis, we are able to extract the orientation of the magnetization of the individual LSMO layers, which agrees well with the values measured using PNR.

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