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Magnetic non-uniformity in $(La_{0.4}Pr_{0.6})_{0.67}Ca_{0.33}MnO_3$ films and measurement of the strain-magnetization coupling coefficient[1] S. SINGH, M.R. FITZSIMMONS, T. LOOKMAN, Los Alamos National Laboratory, H. JEEN, Oak Ridge National Laboratory, M.A. ROLDAN, Complutense University, Madrid 28040, Spain, M. VARELA, Oak Ridge National Laboratory, A. BISWAS, University of Florida — We have characterized the non-uniformity of chemical and magnetic properties of $(La_{0.4}Pr_{0.6})_{0.67}Ca_{0.33}MnO_3$ (LPCMO) films grown on $NdGaO_3$ using polarized neutron reflectometry (PNR). Our data indicate that the films exhibit coexistence of different magnetic phases as a function of depth. The variation of magnetism with depth is correlated with a variation of chemical composition with depth. Using PNR we also measured the magnetization depth profile of the LPCMO film as a function of applied bending stress. From these measurements we were able to obtain values for the coupling coefficients relating strain to the variation of the magnetization depth profile. Our results suggest that application of compressive (tensile) bending stress increases (suppresses) magnetization. We will discuss the implications of our results on the prevailing theories of the role of strain on phase separation in manganites.

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Turab Lookman
Los Alamos National Laboratory

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