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Loss of Ferromagnetism at the Surface of in-situ cleaved $\mathbf{La_{1.28}Sr_{1.72}Mn_2O_7}$ JOHN W. FREELAND, Advanced Photon Source, Argonne National Laboratory, KEN GRAY, JOHN F. MITCHELL, Materials Science Division, Argonne National Laboratory, JERALD KAVICH, RICHARD KODAMA, Dept. of Physics, University of Illinois, Chicago — Instability of surface magnetism in the manganites is currently an area not well understood. In our previous work using exploring loss of ferromagnetic (FM) order at the surfaces of layered manganites, we found clear evidence for an intrinsic insulating non-FM surface layer atop adjacent ferromagnetic subsurface layers.[1] The presence of a non-FM surface layer of one bilayer thickness was observed by x-ray resonant magnetic scattering (XRMS), and point contact tunneling results showed this layer to be insulating. Although that study involved samples cleaved in air, our surface-sensitive spectroscopy indicated they were not chemically degraded. Here we present the XRMS results from samples cleaved under UHV conditions at 75 K. The XRMS shows the same interference effect due to the loss of FM order in the surface layer, thus supporting our earlier claim that the magnetic instability is not related to the preparation conditions. This research was supported by the U.S. Department of Energy, Office of Science, under Contract No. W-31-109-Eng-38.
[1] J.W. Freeland, K.E. Gray, L. Ozyuzer, P. Berghuis, Elvira Badica, J. Kavich, H. Zheng and J.F. Mitchell, Nature Materials **4**, 62 (2005)

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