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Magnetic Behavior of Complex Oxide Magnetic Tunnel Junctions[1] SUZANNE G.E. TE VELTHUIS, YAOHUA LIU, J.W. FREELAND, Argonne National Laboratory, USA, M. ZHERNENKOV, M.R. FITZSIMMONS, Los Alamos National Laboratory, USA, C. VISANI, M. BIBES, A. BARTHÉLÉMY, Unité mixte de Physique CNRS/Thales, France, F. CUELLAR, Z. SEFRIOUI, C. LEON, J. SANTAMARIA, Universidad Complutense de Madrid, Spain — Half metallic manganese oxides have the potential of producing a large tunneling magnetoresistance (TMR) due to their high spin-polarization. To explore their applicability we investigated magnetic tunnel junctions (MTJs) with ferromagnetic $La_{0.7}Ca_{0.3}MnO_3$(LCMO) electrodes and an insulating $PrBa_2Cu_3O_7$(PBCO) barrier. In these MTJs, with temperature, the TMR peaks rather than increasing with decreasing T [1]. Our Polarized Neutron Reflectivity studies reveal differences in the magnetization, reversal behavior, and anisotropy, between the bottom and top LCMO layers. As was observed in the $YBa_2Cu_3O_7$(YBCO)/LCMO system[2,3], with X-Ray Magnetic Circular Dichoism we have found a non-zero net moment on the Cu of PBCO at low temperature, originating at the interface. Unlike for YBCO, the Cu moment does not persist up to T_C of LCMO. These combined results provide a possible origin of the anomalous TMR behavior.
[1] Z. Sefrioui et al., Appl. Phys. Lett. 88, 022512 (2006) [2] J. Chakhalian et al., Nature Phys. 2, 244 (2006); Science 318, 1114 (2007) [3] C. Visani et al., Phys. Rev. B 84, 060405(R) (2011)

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[X] Prefer Oral Session
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