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Insight into spin transport in oxide heterostructures from interface-resolved magnetic mapping M.N. GRISOLIA, F.Y. BRUNO, C. VISANI, Unité Mixte de Physique CNRS/Thales, 91767 Palaiseau (FRANCE) and Université Paris-Sud, 91405 Orsay (FRANCE), S. VALENCIA, R. ABRUDAN, A.A. UNAL, Helmholtz-Zentrum Berlin, 12489 Berlin (GERMANY), M. VARELA, J. TORNOS, A. RIVERA-CALZADA, Z. SEFRIOUI, C. LEON, J. SANTAMARIA, U. Complutense 28040 Madrid (SPAIN), S. J. PENNYCOOK, The University of Tennessee, TN 37996 (USA), J.E. VILLEGAS, A. BARTHELEMY, M. BIBES, Unité Mixte de Physique CNRS/Thales, 91767 Palaiseau (FRANCE) and Université Paris-Sud, 91405 Orsay (FRANCE) — At interfaces between complex oxides electronic, orbital and magnetic reconstructions may produce states of matter absent from the materials involved, offering novel possibilities for electronic and spintronic devices. Here we show that magnetic reconstruction has a strong influence on spin transport. In epitaxial heterostructures combining layers of antiferromagnetic $LaFeO_3$ (LFO) and ferromagnetic $La_{0.7}Sr_{0.3}MnO_3$ (LSMO), we find that a net magnetic moment is induced in the first few unit planes of LFO near the interface with LSMO. Using Xray photoemission electron microscopy, we show that the ferromagnetic domain structure of the manganite electrodes is imprinted into the antiferromagnetic tunnel barrier, endowing it with spin selectivity. Finally, we find that coexisting ferromagnetic and antiferromagnetic interactions strongly influence the tunnel magnetoresistance of LSMO/LFO/LSMO junctions through competing spin polarization and spin filtering effects.

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