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Spin structure in exchange-biased epitaxial ferromagnetic oxide bilayers XIANGLIN KE, LAND BELENKY, CHANG-BEOM EOM, MARK RZCHOWSKI, University of Wisconsin-Madison, Madison, WI 53706 — We investigate the spin structure of exchange-biased ferromagnetic bilayers for varying thicknesses near the critical thickness of the biasing layer. The epitaxial $La_{0.67}Sr_{0.33}MnO_3$ (LSMO)/ $SrRuO_3$ (SRO) ferromagnetic oxide bilayers were grown on (001) $SrTiO_3$ single-crystal substrates by pulsed laser deposition with atomic-layer control. We find a $\sim$2nm critical thickness of the biasing layer for the disappearance of exchange bias. The antiferromagnetic interfacial exchange permits manipulation of the frozen-in spin structure, and the ferromagnetism of each layer enables direct magnetization measurements. From these measurements, we infer the thickness dependence of the spin structure of the biasing layer in terms of domain walls perpendicular and parallel to the bilayer interface. We find that parallel domain walls can be frozen into the biasing layer for thicknesses near the critical thickness.

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