Abstract Submitted
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Control with the switching behavior in exchange-coupled nanomagnets ERIK FOLVEN, Norwegian Univ. of Science and Technology , YAYOI TAKAMURA, Univ. of California Davis , ANDREAS SCHOLL, ANDREW DORAN, ANTHONY YOUNG, Advanced Light Source, LBNL , SCOTT T. RETTERER, Oak Ridge National Laboratory , HELEN GOMONAY, National Technical Univ. of Ukraine , THOMAS TYBELL, JOSTEIN GREPSTAD, Norwegian Univ. of Science and Technology — Control with the switching behavior of monodomain nanomagnets is key to a range of magnetic device technologies. We have recently demonstrated that shape-induced stabilization of antiferromagnetic (AFM) domains can be achieved in embedded $LaFeO_3$ thin film nanostructures.[1,2] This finding offers a pathway to influence the switching behavior of nanoscale thin film ferromagnets through exchange coupling across the interface between an antiferromagnet and a ferromagnet. Here, we show how the switching field for rectangular nanomagnets may be significantly reduced in $LaFeO_3$ (AFM)/$La_{0.7}Sr_{0.3}MnO_3$ (FM) heterostructures. Mediated by the interface exchange coupling, the engineered domains in the $LaFeO_3$ layer give rise to a uniaxial bias field acting on the magnetic moments in the $La_{0.7}Sr_{0.3}MnO_3$. By tailoring the AFM domain state, we can align this bias field perpendicular to the long axis of the magnetic element, effectively lowering the potential barrier between the two stable single domain states of the rectangular nanomagnet. The experimental data obtained with element specific x-ray spectromicroscopy is compared with a simple theoretical model. 1. Folven et al., Nano Letters 10, 4578 (2010) 2. Folven et al., Nano Letters 12, 2386 (2012)

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