Abstract Submitted
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Strain driven anisotropic magnetoresistance in antiferromagnetic $La_{0.4}Sr_{0.6}MnO_3$ thin films[1] T. ZAC WARD, Oak Ridge National Laboratory, A.T. WONG, University of Tennessee, YAYOI TAKAMURA, University of California, Davis, ANDREAS HERKLOTZ, Oak Ridge National Laboratory — Antiferromagnets (AFM) are a promising alternative to ferromagnets (FM) in spintronic applications. The reason stems from the fact that at high data storage densities stray fields could destroy FM set states while AFMs would be relatively insensitive to this data corruption. This work presents the first ever example of antiferromagnetic $La_{0.4}Sr_{0.6}MnO_3$ thin films stabilized in different strain states. Strain is found to drive different types of AFM ordering, and these variations in ordering type are shown to have a profound impact on both the magnitude and character of the materials' resistive response to magnetic field direction, or anisotropic magnetoresistance (AMR) behavior (one standard of spintronic suitability). The compressively strained film shows the highest recorded AMR response in an ohmic AFM device of 63%, while the tensile strained film shows a typical AFM AMR of 0.6%. These findings demonstrate the necessity of understanding electron ordering in AFM spintronic applications and provide a new benchmark for AMR response.

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