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A Strain Mediated Ferromagnetic to Antiferromagnetic Transition in ESMO Thin Films STEVEN DISSELER, ALEX GRUTTER, NIST Center for Neutron Research, EUN JU MOON, Drexel University, DUSTIN GILBERT, NIST Center for Neutron Research, ELKE ARENHOLZ, Advanced Light Source, Lawrence Berkeley National Lab, STEVEN MAY, Drexel University — Strain engineering in complex oxide heterostructures has recently emerged as a valuable tool for tuning magnetic and electrical properties of thin films. The mixed-valence manganite compound $Eu_{0.7}Sr_{0.3}MnO_3$ (ESMO) is ideally suited for strain engineering, as the bulk tolerance factors places it squarely between a ferromagnetic and antiferromagnetic ground state for doping level. We find a magnetic state which is very sensitive to substrate-induced strain, ranging from a fully saturated ferromagnetic state to antiferromagnetism, as well as intermediate phase-separated states characterized by partial ferromagnetic ordering. We find conclusive evidence that the antiferromagnetic structure is G-type with an ordering above 200 K, well above the observed ferromagnetic transition temperature of the remaining films. Potential mechanisms for this behavior based on variations of the octahedral connectivity will be discussed.

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