

Abstract Submitted  
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**Competing anisotropies and complex magnetism in SrRuO<sub>3</sub>/SrMnO<sub>3</sub> superlattices<sup>1</sup>** OMAR CHMAISSEM, Y. CHOI, Y.C. TSENG, D. HASKEL, D.E. BROWN, S. KOLESNIK, D. DANASHER — Using element-specific x-ray resonance techniques, we have investigated the interfacial magnetic coupling in SrRuO<sub>3</sub>/SrMnO<sub>3</sub> superlattices. A strong out-of-plane SRO anisotropy coupled with AFM Ru-Mn interactions result in a canted Mn structure with a significant induced net Mn moment that reduces to zero under a strong magnetic field. At  $T > T_{CSRO}$ , the SRO anisotropy is removed and the planar Mn AFM structure cants to produce a net Mn moment along the field direction. Below  $T_C$ , the net development of in-plane Mn moment is suppressed by partially frustrated exchange interactions at the AFM-SMO/FM-SRO interfaces and competing Mn-Ru anisotropies. Hysteretic magnetization curves show a two-step magnetization reversal and enhanced coercivity. X-ray measurements confirm that the low-field magnetization reversal coincides with “free” Ru moments inside the SRO layers and that the high-field magnetization reversal involves the interfacial magnetization in the SMO layers and provide strong evidence for the presence of pinned SRO moments at the SRO/SMO interface.

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