Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Exploring interfacial ferromagnetism and modulation of magnetic anisotropy in Iridate-Manganite superlattices DI YI, CHARLES FLINT, PURNIMA BALAKRISHNAN, Stanford Univ, ALPHA N'DIAYE, ELKE ARENHOLZ, LBNL, YURI SUZUKI, Stanford Univ — Recently, research on 5d transition metal oxides (TMOs) with pronounced spin-orbit coupling (SOC) has been flourishing due to the emergence of new topological states and potential application in spintronics. Interfaces between 3d and 5d TMOs, where both the Coulomb correlation (U) and SOC are comparably strong, promise emergent properties that differ from those of the bulk constituents. One intriguing example is the $SrIrO_3/La_{1-x}Sr_xMnO_3$ superlattice system. In this series of superlattices, we have observed a metal-insulator transition (MIT) by tuning the hole doping ratio (x). Charge transfer from Ir to Mn cations, as measured by x-ray absorption spectroscopy, depends on the density of Mn e_g electrons (*1-x*). The degree of charge transfer determines the transport properties ranging from metal to insulator. The entire series of superlattices is ferromagnetic despite the fact that $La_{1-x}Sr_xMnO_3$ is antiferromagnetic for x>0.5. More interestingly, we found a systematic evolution of magnetic anisotropy that can be independently modulated by changing the hole doping (x), the thickness of the manganite layer or the thickness of the iridate layer. The evolution of magnetic anisotropy is likely correlated with the symmetry change of oxygen octahedra (BO_6, where B = Ir or Mn) at the interface, as revealed by x-ray dichroism and diffraction measurements. Our results demonstrate that the low dimensional spin-orbit entangled 3d-5d interfaces provide a new playground to uncover electronic/magnetic properties unattainable in the bulk.

Di Yi
Stanford Univ

Date submitted: 17 Nov 2016 Electronic form version 1.4