Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Spin-Orbit Electronic and Magnetic States in 5d Oxide Heterostructures JIAN LIU, Department of Physics and Astronomy, University of Tennessee — Complex oxides are a class of quantum materials where the d-electrons may self-organize into a variety of intriguing emergent electronic and magnetic phases. Recently, there are growing interests in systems where the strong spin-orbit coupling (SOC) may add a new dimension to the energetic landscape. On one hand, the interplay of SOC with electronic correlation is believed to derive novel quantum phenomena. But SOC scales with atomic number and is rather small for 3d electrons. On the other hand, while hosting strong SOC, 5d electrons exhibit weaker correlation and often stabilize a nonmagnetic ground state. Establishing approaches to design systems that combine the merits of both fundamental interactions has been challenging. Our investigations on various iridate-based heterostructures, such as iridate-manganite interfaces, show possible routes to control and utilize spin-orbit-entangled 5d electronic states by epitaxial layering. The experimental findings and theoretical analysis demonstrate heteroepitaxial designs for harnessing the non-symmorphic semimetallicity in ortho-perovskite iridates as well as tailoring spin-orbit magnetism and magnetic anisotropy when coupled with 3d magnetic oxides.

Jian Liu
Department of Physics and Astronomy, University of Tennessee

Date submitted: 11 Nov 2016 Electronic form version 1.4