Chez Pierre

Presents ...

**Monday, December 8, 2014**
**12:00pm**
**MIT Room 4-331**

# Chez Pierre Seminar


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## *"Whither the correlated oxide Interface"*


Complex oxides are a class of materials characterized by a variety of competing interactions that create a subtle balance to define the lowest energy state and lead to a wide diversity of intriguing properties ranging from high Tc superconductivity to exotic magnetism and orbital phenomena. By utilizing the bulk properties of these materials as a starting point, interfaces between different classes of complex oxides offer a unique opportunity to break the fundamental symmetries present in the bulk and alter the local environment. Utilizing our recent advances in oxide growth, we can now combine materials with distinct or even antagonistic order parameters to create new materials in the form of heterostructures with atomic layer precision. The broken lattice symmetry, strain, and altered chemical and electronic environments at the interfaces then provide a unique laboratory to manipulate this subtle balance and enable novel quantum states not attainable in bulk. Understanding of these phases however requires detailed microscopic studies of the heterostructure properties. In this talk I will review our recent work on extreme unit-cell thin nickelate, titanates and cupratemanganite heterostructures to illustrate recently uncovered principles of rational materials design and control of quantum many-body phenomena by the interface.



J. Chakhalian et al, Nature Materials 11, 92–94 (2012).
Jian Liu et al, Nature Communications 4, (2013).
J. Chakhalian et al, Review of Modern Physics (to appear in Nov.); eprint arXiv:1408.3173