

Condensed Matter and Center for Quantum Materials Seminar
Friday October 17, 2014
1:30 PM room B-131
Physics Building, Stony Brook University

Competing Interactions in Nanoscale Multielemental Heterostructures: Utility for Harvesting Thermal Energy

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This lecture will focus on the electronic, magnetic and atomic scale structural behavior of interfaces and grain boundaries created by layer-by-layer deposition and nanostructuring. The systems of interest are mostly the perovskite class of transition metal oxides where broken symmetries at interfaces, quantum confinement due to dimensional constraints and multivalent nature of elements conspire to produce novel correlated electronic phenomena. We will discuss how the carrier density and mobility in these systems can be tuned by external perturbations like light, heat gradient, electrostatic gating and magnetic field. The utility of such systems for harvesting energy from waste heat sources and solar radiation will be addressed. Nanostructuring as a means to optimize the figure-of-merit of some bulk thermoelectrics will be discussed and the utility of emergent nanoscale techniques to probe electronic and thermal transport across interfaces/grain boundaries will be emphasized.