



TEL: 225-578-2261
FAX: 225-578-5855
<http://www.phys.lsu.edu>

202 NICHOLSON HALL
Louisiana State University
Baton Rouge, Louisiana 70803-4001

WEEKLY CALENDAR

September 3-7, 2012

DEPARTMENTAL COLLOQUIUM

"Whither is the correlated oxide Interface?"

3:40 PM, September 6, 2012
109 Nicholson Hall

Jak Chakhalian
University of Arkansas

Host: Jiandi Zhang

• *Refreshments served at 3:15 PM in 232 (Library) Nicholson Hall* •

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 T_c 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 summarize our recent work on unit-cell thin nickelate heterostructures to illustrate recently uncovered principles of rational materials design and control of interactions by the interface.

Publications:

1. "Heine-Stieltjes correspondence and the polynomial approach to the standard pairing problem", Xin Guan, **Kristina D. Launey**, Mingxia Xie, Lina Bao, Feng Pan, and **Jerry P. Draayer**, Phys. Rev. C 86, 024313 (2012).