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## WEEKLY CALENDAR

September 21, 2009

### Departmental Colloquium

**"Emergent Phenomena in Manganites under Spatial Confinement"**

**3:10 PM**, September 24, 2009  
109 Nicholson Hall

*Jian Shen*

Oak Ridge National Laboratory

**Host: Ward Plummer**

• *Refreshments served at 2:45 PM in 232 (Library) Nicholson Hall* •

For condensed matter physicists, materials are often separated into two classes: simple materials and strongly correlated materials. Because the interested problems are very different, there is, traditionally, very little overlap between the two fields. However, in the world of reduced dimensionality, the line is no longer well defined. Simple materials can become complex, and complex materials can become even more complex, or, sometimes, simple. In this talk, I will use a complex material  $\text{La}_{5/8-x}\text{Pr}_x\text{Ca}_{3/8}\text{MnO}_3$  (LPCMO) to demonstrate how emergent phenomena appear in reduced dimensionality. The emergent phenomena mostly originate from the electronics phase separations (EPS) in the LPCMO system. Helped by spatial confinement, the nature of the EPD including their dynamics can be cleanly studied using conventional transport measurements. It is hoped that these work will lead to a new field where the interplay between complexity and quantum effect will lead to fascinating new properties for future technology.

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#### Publications:

- Book Review of "Quantum Mechanics in Phase Space", **R.F. O'Connell**, edited by C.K. Zachos et al., Inter. J. of Quantum Information 6, 415-418 (2008).
- "Stochastic methods in atomic systems and QED," in "Symposium on atomic physics," **R.F. O'Connell**, Can. J. Phys 87, 1-5 (2009).
- "Gravito-Magnetism in one-body and two-body systems: Theory and Experiment", in "Atom Optics and Space Physics", Proc. of Course CLXVIII of the International School of Physics "Enrico Fermi", Varenna, Italy, 2007, **R.F. O'Connell**, edited by E. Arimondo, W. Ertmer and W. Schleich (IOS, Amsterdam, 2009).