

*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

April 13, 2009

### DEPARTMENTAL COLLOQUIUM

**"Ex Luna, Scientia! Nuclear Astrophysics from the Moon"**

**3:40 PM, April 16, 2009  
109 Nicholson Hall**

**Richard Miller  
University of Alabama-Huntsville**

**Host: Michael Cherry**

**• Refreshments served at 3:15 PM in 201 Nicholson Hall •**

The Lunar Occultation Observer (LOCO) is a new  $\gamma$ -ray astrophysics mission concept being developed to probe the nuclear regime ( $\sim 0.02$ -10 MeV). LOCO will perform an all-sky survey of the Cosmos at nuclear energies, and will have the capability to address multiple high-priority science goals. Placed into lunar orbit, LOCO will utilize the Moon's unique environment to maximize performance relative to terrestrial endeavors. Specifically, LOCO will use the Moon to occult astrophysical sources as they rise and set along the lunar limb. The encoded temporal modulation will then be used to image the sky thereby enabling spectroscopic, time-variability, point- & extended-source analyses. This Lunar Occultation Technique (LOT) enables the excellent flux sensitivity, position, and energy resolution required of the next-generation nuclear astrophysics mission. In addition, occultation imaging eliminates the need for complex, position sensitive detectors. The LOCO concept is cost effective, and has a relatively straightforward and scaleable implementation. I will review the top-level mission concept, simulations and performance estimates, as well as the astrophysics and lunar science goals.

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### Publications:

"Some classes of 'nontrivial zeroes' of angular momentum addition coefficients", T. A. Heim, J. Hinze, and **A.R.P.Rau**, J. Phys. A : Math. Theor. 42, 175203 (11 pp) (2009).

"Consistent discretizations as a road to Quantum Gravity," R. Gambini and **J. Pullin**, Cambridge University Press 2009.

"Large  $\beta$ -Delayed Neutron Emission Probabilities in the  $^{78}\text{Ni}$  Region," **E. F. Zganjar** with UNIRIB colleagues, Physical Review Letters, 102, 142505 (2009).