



# PHYSICS & ASTRONOMY WEEKLY CALENDAR

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

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

**November 12, 2007**

## Departmental Colloquium

### "High Energy Astrophysics with the Large Millimeter Telescope"

3:40 PM - Thursday, November 15, 2007

109 Nicholson Hall

Alberto Carramiñana

Dept. of Astrophysics, INAOE, Tonantzintla, Mexico

Host - Greg Stacy

• Refreshments served at 3:15 PM in 229 Nicholson Hall •

The Large Millimeter Telescope (LMT) is a 50m antenna for millimeter wave astronomy located in central Mexico and due to enter operations in 2008. The LMT, the largest single-dish antenna of its kind, benefits from a high altitude site (4600m) and first-class instrumentation already proven on smaller telescopes. Although the prime science case of the LMT resides in the study of the origin of planets, stars, galaxies and the Universe itself, it will be a prime instrument for multiwavelength astronomy. In the era of the Gamma-ray Large Area Space Telescope (GLAST), the LMT will be a powerful tool for mapping dense gamma-ray emitting clouds, blazar monitoring and gamma-ray burst studies.

## **Material Science and Engineering**

### "Anomalous c-axis Transport in Layered Metals"

3:40 PM - Wednesday, November 14, 2007

109 Nicholson Hall

Dmitri Maslov - University of Florida

Host - Ilye Vekhter

Transport in many layered materials—cuprates, perovskites, graphite, etc.—shows an interesting anomaly. Whereas the temperature dependence of the in-plane resistivity is metallic, that of the out-of-plane (c-axis) resistivity one is insulating or even non-monotonic. We show that the band transport in all directions, described by the standard Boltzmann equation, is robust with respect to both elastic and inelastic scattering as long as  $E_F \tau \gg 1$ , and hence this anomaly cannot be explained within any model containing only usual (potential) impurities and inelastic degrees of freedom. A model of phonon-assisted tunneling via resonant states located in between the layers is shown to explain a non-monotonic temperature dependence of the c-axis resistivity observed in experiments.

## **SPECIAL SEMINAR**

### **Material Science and Engineering**

#### "Polymeric Electronic Devices Characterized with NEXAFS Microscopy and Resonant Soft X-Ray Reflectivity"

1:30 PM - Thursday, November 15, 2007

435 Nicholson Hall

Harald Ade - North Carolina State University

Host - Dave Ederer - CAMD

Organic electronic devices are often multi-component, heterogeneous systems ranging from relatively well defined bilayers to thin film blends laterally phase-separated at multiple length scales. Complete understanding of device structures and morphology and the correlation to device performance often requires sophisticated characterization methods. Near Edge X-ray Absorption Fine Structure (NEXAFS) microscopy and resonant soft x-ray reflectivity (RSOXR) are techniques that offer high intrinsic contrast to image materials in real space or to characterize structure in reciprocal space with ~30 nm spatial resolution and a q-range of ~2 nm<sup>-1</sup>, respectively. Furthermore, the high contrast is strongly photon energy dependent and correlated to the chemical moieties present in the sample, thus allowing compositionally sensitive characterization. I will present the present state of the art of these characterization tools with a focus on the most recent applications to organic electronic devices. This includes the development of Soft X-ray Beam Induced Current (SoXBIC) measurements that will allow to directly correlate local efficiency in organic bulk-heterojunction solar cell to the local composition and the use of RSOXR to characterize interfacial properties in multilayered OLEDs for which conventional reflectivity has no sensitivity. The use of these soft x-ray methods for organic devices has only recently been initiated and their full potential to device characterization has yet to be explored.

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***Saturday Science***

**"Fire Ant Management"**

**10:00 - 11:30 - SATURDAY, NOVEMBER 17, 2007**

**ROOM 130 NICHOLSON HALL**

**Dale Pollet - ENTOMOLOGY - LSU**

Host - Ravi Rau

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***Publications:***

"Metaphors of Physics", **A.R.P.Rau**, Sampark 5, 2 (2007).