

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

October 18, 2010

### Departmental Colloquium

3:40 PM, Monday, October 18, 2010

109 Nicholson Hall

**"Attometer Astrophysics: Gravitational wave astronomy with LIGO"**

*Sam Waldman*

*Kavli Institute for Astrophysics, Massachusetts Institute of Technology*

*Host: Gabriela Gonzalez*

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

The direct detection of gravitational waves will provide a revolutionary new probe of the most energetic processes in the universe. The 4 km long LIGO interferometers have demonstrated the sub-attometer displacement sensitivity ( $< 10^{-18}$  m/Hz<sup>(1/2)</sup>) required to place upper limits on a binary neutron star to beyond the Virgo galaxy cluster. Such mergers are thought to be the progenitors of short gamma-ray bursts and provide an ideal "golden event" signal for direct GW detection. We are now building a 2d generation detector, Advanced LIGO, to increase the detector sensitivity by an order of magnitude. Technically, this requires increasing the stored power 30-fold (to 750 kW), developing new low noise readouts, and lowering the seismic and thermal noise sources. After describing the physics underlying Advanced LIGO, I'll conclude with a novel application of LIGO technology to study holographic spacetime noise.

#### ANNOUNCEMENT:

There will be no classes beginning Thursday, October 21 - 22, 2010 due to Fall Holiday. Classes resume on Monday, October 25, 2010 at 7:30 a.m.