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

WEEKLY CALENDAR

April 26, 2010

Departmental Colloquium

"First Science Results from Kepler"

3:40 PM, April 29, 2010
109 Nicholson Hall

Bill Cochran
University of Texas-Austin

Host: Bradley Schaefer

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

The Kepler spacecraft, launched in March 2009, is designed to detect potentially habitable Earths around other stars by detecting the transits of these planets across the disks of their parent stars. This requires performing differential photometry to a precision of 20ppm on a sample of 170,000 stars for a period of 3.5 years. We will discuss the on-orbit performance of the Kepler photometer, and then present the first scientific results from Kepler. Five new transiting planets around solar-type stars have been discovered so far, along with several other interesting objects..

Special Colloquium

3:40 PM, April 26, 2010
119 Nicholson Hall

"Loop Quantum Gravity and Black Holes"

Alejandro Corichi
Universidad Nacional Autonoma de Mexico

Host: **Jorge Pullin**

Quantum gravity attempts to bring together general relativity and quantum theory in a single framework. Apart from the search for unification, there are some other hints that point, quite possible, to the form that such theory might have. Black holes provide such information. Even when they are prominent classical objects and are subject of very active astronomical searches, they might provide the clue to quantum gravity. I will review the role played by black holes in our search for a quantum theory of gravity and how loop quantum gravity has provided a framework where those requirements can be put to a test. In particular loop quantum gravity can account for the entropy of all black holes of astrophysical interest, and might provide a way of testing quantum gravity effects at a macroscopic level.

Special Colloquium

3:40 PM, April 28, 2010
262 Nicholson Hall

"Quantum transport in ultrathin films: Spin-resolved tunneling and anomalous Hall effect study in disordered CNi3 films"

Yimin (Max) Xiong
Louisiana State University
Host: **Rongying Jin**

Special Colloquium

3:40 PM, April 30, 2010
119 Nicholson Hall

"Beyond the Big Bang in Loop Quantum Gravity"

Parampreet Singh
Perimeter Institute
Host: **Jorge Pullin**

According to general relativity, the universe began with a big bang. At this initial singularity, the space-time curvature diverges and the classical description of space-time, which is essential for the known laws of physics, breaks down. A key question is whether a quantum theory of gravity can give insights on resolving this problem. I will review recent developments in the quantization of simple cosmological models using loop quantum gravity, which have provided robust predictions on the resolution of singularities. These results suggest that the quantum gravitational effects lead to a bounce of our universe to a contracting branch when the space-time curvature becomes of the order of Planck scale. Thus the initial singularity is avoided and the space-time continues beyond the big bang. The resulting new physics leads to a rich phenomenology and guides us towards understanding a generic resolution of space-time singularities.

Special Colloquium

3:40 PM, May 3, 2010
435 Nicholson Hall

"Neutrino Interactions at ~1 GeV – A New Chapter"

Martin Tzanov
University of Colorado
Host: **Thomas Kutter**

Neutrinos have been a proving ground for the Standard Model of Particle Physics since the early 70s when scaling was studied at the ~1 GeV scale. The following generation of neutrino scattering experiments probed the structure of nucleons at the 10-100 GeV scale. Then the discovery of the neutrino oscillations started a renaissance in neutrino physics. Future neutrino oscillation experiments will be able to measure the neutrino oscillation parameters with unprecedented precision, which requires a precise knowledge of neutrino interaction cross-sections on nuclear targets at ~1 GeV. The MiniBooNE experiment at Fermilab has accumulated the largest sample of neutrino interactions in the ~1GeV region to date. The latest neutrino cross-section results from MiniBooNE will be presented.