

WEEKLY CALENDAR

May 3, 2010

Departmental Colloquium

"Nanoscience and High-current Superconducting Wires: A connection"

**3:40 PM, May 6, 2010
109 Nicholson Hall**

**David Christen
Oak Ridge National Laboratory**

Host: Ronging Jin

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

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 ~ 1 GeV region to date. The latest neutrino cross-section results from MiniBooNE will be presented.

Special Colloquium

3:40 PM, May 4, 2010
109 Nicholson Hall

"Loop Quantum Gravity Dynamics"

Krisina Giesel

Technische Universität München

Host: Jorge Pullin

Loop Quantum Gravity (LQG) is a research program that tries to consistently combine the principles of General Relativity and Quantum Field Theory. A major unresolved problem in LQG is the proper implementation of the quantized Einstein equations, which encode the dynamics of the quantum theory. After a brief review of the elements of the theory we present a specific approach to the dynamics of LQG and in particular the corresponding semiclassical sector. Finally we discuss how this framework could be used in principle to investigate possible effects of quantum spacetime on cosmology and particle physics.

Special Colloquium

3:40 PM, May 7, 2010
119 Nicholson Hall

"Non-standard Dispersion Relations from (loop) Quantum Gravity"

Hanno Sahlmann

Karlsruhe Institute for Technology

Host: Jorge Pullin

Quantum gravity is expected to change the small-scale structure of space-time. This in turn may lead to changes in the way matter fields propagate at high energies. I will discuss some preliminary results on the dispersion relations of matter fields from loop quantum gravity and some more generic models of Planck scale space-time, with some interesting ramifications. A non-technical introduction to the relevant aspects of loop quantum gravity will be given. I finish by proposing a calculation that could potentially make some more definite statement on matter dispersion relations from loop quantum gravity.

PUBLICATIONS:

"Quantum discord for two-qubit X states," M. Ali, **A.R.P. Rau**, and G. Alber, Phys. Rev. A 81, 042105 (2010).