

WEEKLY CALENDAR

Physics & Astronomy

202 Nicholson Hall



Baton Rouge, LA 70803-4001
<http://www.phys.lsu.edu>

Louisiana State University
November 15, 2004

TEL: (225) 578-2261
FAX: (225) 578-5855



GENERAL SEMINAR

"Superconductivity and giant fluctuations in quantum critical metals"

Dr. Stephen Julian

Cambridge, England and University of Toronto, Canada

Thursday, November 18, 2004, 3:40 PM in Room 109 Nicholson Hall

Host: Dr. Ilya Vekhter

(Refreshments served at 3:15 p.m. in Room 229 Nicholson)

Abstract

The modern, quantum theory of condensed matter regards each material as a Universe unto itself, with excitations that are analogous to the electrons, positrons, photons, etc. of our everyday universe. By applying hydrostatic pressure to a material we can modify the 'particles' that inhabit it, creating some very peculiar worlds in which particles decay before they can propagate while the interaction between the particles becomes divergently strong. I will describe experiments on systems which we believed would show these properties but still be amenable to conventional analysis: three-dimensional metals that are on the verge of magnetic order at the absolute zero of temperature. Such magnetic 'quantum critical' systems are found, however, to behave even more strangely than predicted, having novel superconducting phases or strange states where giant, very slow fluctuations seem to mimic the effects of static disorder.

Solid State Seminar

Density of states of an optical lattice: WKB approach

Dr. Chris Hooley

University of Birmingham, England

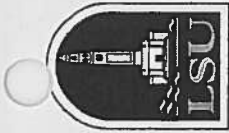
Tuesday, November 16, 2004 at 3:40 p.m., Room 280 Nicholson Hall

Host: Dr. Ilya Vekhter

Announcement:

Office of Motor Vehicles Mobile Customer Service Center will be on campus Thursday, November 18, 2004, from 9:00AM to 3:00PM. The location will be on Tower Drive (Between LSU Union and Coates Hall).

Visit our website for upcoming events: www.phys.lsu.edu



INAUGURAL CONFERENCE
ROOM 435, NICHOLSON ANNEX

NOVEMBER 18th, 2004
8:45AM

HORACE HEARNE JR. LABORATORY FOR THEORETICAL PHYSICS

Department of Physics & Astronomy
Louisiana State University and A&M College, Baton Rouge, Louisiana

PURPOSE

This conference will highlight the inauguration of a new theoretical physics laboratory operating at Louisiana State University. The Laboratory is led by Jonathan Dowling and Jorge Pullin, and will concentrate on gravitational physics and on quantum technologies. The Laboratory is funded in part by a donation from the estate of Horace Hearne Jr., an LSU graduate.

PROGRAM

8:45 am Opening Remarks, Risa Palm, LSU Executive Vice Chancellor and Provost
9:00 *Quantum Effects in Gravitational Wave Interferometers*, Nergis Mavalvala,¹ Massachusetts Institute of Technology
10:00 BREAK
10:30 *Fundamental and Applied Quantum Eraser*, Marlan Scully,² Texas A&M/Princeton University
12:00 noon LUNCH BREAK
2:00 pm *Gravity and the Quantum*, Abhay Ashtekar,³ Penn State
3:00 BREAK
3:30 *Quantum Entanglement*, Gerard Milburn,⁴ The University of Queensland
4:30 BREAK
7:30 BANQUET, LSU Faculty Club

CONFERENCE REGISTRATION / BANQUET RESERVATION

Please confirm your Conference Registration and/or Banquet Reservation with quantum@phys.lsu.edu, or call 225-578-2163.

SPONSORED BY:

Jonathan Dowling and Jorge Pullin, Horace Hearne Jr. Chairs in Theoretical Physics

¹Nergis Mavalvala is the Cecil & Ida Green Career Development Professor at the Massachusetts Institute of Technology. She is one of the leading figures in the investigation of quantum optical effects in gravitational wave detectors, similar to the LIGO project.

²Marlan Scully is a Distinguished Research Professor of Physics and Director of the Institute for Quantum Studies at Texas A&M University, and also holds additional appointments in the Physics Department at Princeton University and at the Max Planck Institute for Quantum Optics in Germany. He is a world renowned authority in quantum and laser physics, for such things as his invention of the first fully quantum theory of the laser.

³Abhay Ashtekar is the Ebedy Professor of Physics at Penn State. He is the inventor of a new formulation of Einstein's general relativity that opens new possibilities for merging the theory with quantum mechanics. This approach is now being pursued by hundreds of researchers around the world and together with string theory is perceived as one of the leading approaches to quantum gravity.

⁴Gerard Milburn is a Professor of Physics at the University of Queensland in Australia, and Deputy Director of the Australia Centre for Quantum Computer Technology. He is an internationally-recognized expert in quantum technologies, including quantum optics, quantum information processing, and quantum nano-electromechanical systems. He is the inventor of the first all optical scheme for quantum computing.