



College of
Science
Department of Physics
& Astronomy

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Weekly Calendar

April 30 – May 7, 2016

Departmental Colloquium

"Quantum Computers and Classical Computers: Using them Together and Telling them Apart"

3:30 PM Thursday, May 5, 2016

109 Nicholson Hall

**Graeme Smith
IBM**

Host: Mark Wilde

• **Refreshments served at 3:10 PM in 232 (Library) Nicholson Hall** •

Quantum computers promise exponential speedup over classical machines for certain computational problems, most notably factoring and simulation. However, efforts to build such a machine are in their infancy, with the state-of-the-art limited to a handful of qubits. In contrast, a classical machine costing a few hundred dollars can do billions of computations a second, and supercomputers can top a petaflop. In the first part of the talk, I'll discuss a way to use a small quantum computer together with a classical computer to emulate having a slightly larger quantum machine. The classical computer will allow us to add a few "virtual qubits" to our quantum machine. I will then turn to the question of certifying quantum computers: how do we check if a computer is genuinely quantum, and what does that mean? As an application, I will consider the superconducting circuit devices marketed by the Canadian company D-wave.

Announcement

- The Department Crawfish Boil will be held on Friday, May 6 at noon on the Quad, outside Nicholson Hall. Cost will be \$5 for students, \$8 for staff, and \$10 for faculty. Please RSVP and pay Shanan Schatzle in the Department office, room 202 Nicholson Hall.

Special Lecture at CCT

"Numerical Investigations of the Universe Beyond the Big Bang"

3:30 PM Monday, May 2, 2016
CCT Digital Media Center 1034
Parampreet Singh

Einstein's theory of classical General Relativity predicts that the spacetime ends at singularities. One such example is the big bang which is an inevitable event in the past evolution of our universe if General Relativity is true at all scales. All known laws of physics end at singularities. A fundamental goal of theoretical physics is to overcome the problem of singularities and develop a theory incorporating a marriage of quantum theory with classical gravity. We will discuss how loop quantum gravity results in a different picture of spacetime in the very early universe and the way reliable and robust physics can be extracted using computational methods. These numerical methods which we have been developing at LSU in last few years, have shed important insights on the resolution of singularities and have opened a new field of Numerical Loop Quantum Cosmology. We will discuss the way the big bang singularity gets resolved, novel properties of the quantum spacetime as deduced from numerical techniques and avenues to test predictions of quantum gravity in the near future.

LSU Physics & Astronomy in the News

- NASA has awarded a Louisiana Space Grant Consortium, or LaSPACE, research team at LSU a grant to develop an instrument that would fly into a thunderstorm to measure how lightning can produce high energy gamma-rays. The student-led project called, Correlation of Terrestrial gamma flashes, Electric fields and Lightning strikes, or COTEL, is one of 39 projects selected by the NASA Office of Education through the Undergraduate Student Instrument Project, or USIP, program. COTEL has been awarded a \$200,000 grant. [Read more](#)
- Second-year nuclear physics Ph.D. candidate Erin Good is helping expand the boundaries of nuclear physics research. LSU Reveille: [Doctoral student awarded national fellowship for nuclear physics research.](#)
- Prof. Brad Schaeffer weighs in on ancient supernova [SN1006](#) for National Geographic. <http://news.nationalgeographic.com/2016/04/160427-lost-supernova-sighting-sn1006-arab-astronomy/>

New Publications

Yin Wang, **Feng Pan**, **Kristina D. Launey**, Yan-An Luo, and **J. P. Draayer**, "Angular momentum projection for a Nilsson mean-field plus pairing model", Nucl. Phys. A 950 (2016) 1; doi:10.1016/j.nuclphysa. 2016.03.012.



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SATURDAY SCIENCE

AT LOUISIANA STATE UNIVERSITY

Using Space Robots to do Science in Antarctica



A public lecture by

Dr. Peter Doran

LSU Department of
Geology and Geophysics



April 30, 2016, 10-11:00 a.m.

Room 130 Nicholson Hall, LSU

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