



College of
Science
Department of Physics
& Astronomy

202 Nicholson Hall
Louisiana State University
Baton Rouge, LA 70803
TEL: 225-578-2261
FAX: 225-578-5855
<http://www.phys.lsu.edu>

Weekly Calendar

March 14 - March 19, 2016

Special Seminar

"Gravitational Wave and Electromagnetic Signals from Merging Black Holes and Neutron Stars"

3:30 PM Tuesday, March 15, 2016

109 Nicholson Hall

Francois Foucart

Lawrence Berkeley National Laboratory

Host: Juhan Frank

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

The detection by the LIGO collaboration of gravitational waves emitted by two merging black holes just opened an entirely new way to observe the universe. With this detection, gravitational wave astrophysics has become reality. In the next few years, gravitational wave detectors are expected to observe many more black hole mergers, as well as the first binary neutron star and black hole-neutron star mergers. In the presence of at least one neutron star, the gravitational waves will sometimes be followed by bright electromagnetic signals, ranging from short gamma-ray bursts to year-long radio transients. These signals provide us with additional information about the properties and environment of the mergers. Neutron star mergers can also help us understand nuclear interactions in the very dense medium at the core of neutron stars. Finally, matter ejected by the mergers can enrich the surrounding medium with heavy elements such as gold and uranium, whose origin remains poorly constrained today. In this talk, I will provide an overview of the many ways in which neutron star mergers can be detected, and discuss what we can learn from them and how numerical simulations can help us interpret upcoming observations. I will also discuss current frontiers in the simulation of these mergers, and what remains to be done in order to extract as much information as possible from the observation of their gravitational wave and electromagnetic signals.

LIGO Science Saturday

Once a month LIGO opens its doors to the public to tour, talk with scientists and visit a mini-science museum with around 50 interactive science exhibits. On March 19th, LIGO Livingston will hold extended (10 AM - 5 PM) Science Saturday hours so you can come out and celebrate LIGO's groundbreaking first-ever detection of gravitational waves!

<https://www.ligo.caltech.edu/LA/page/Science-Saturdays>

Departmental Colloquium

"BEC Analog Black Holes: Density-Density Correlation Function and the Hawking Effect"

3:30 PM Thursday, March 17, 2016

109 Nicholson Hall

Paul Anderson

Wake Forest University

Host: Ivan Agullo

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

Bose-Einstein condensates, BEC, analog black holes will be discussed with a focus on the density-density correlation function which is a quantity that can be measured in the laboratory. Computations of the density-density correlation function predict that there should be features that are related to the Hawking effect which can be measured and which provide a means for an indirect verification of this effect. A comparison of computations done in the context of traditional quantum mechanics with those done using quantum field theory in curved space techniques shows that the latter can provide useful information even when the approximations leading to it break down.

Publications

1. "Polar compensation at the surface of SrTiO₃ (111)." M. Saghaezyan, Lina Chen, Gaomin Wang, Hangwen Guo, E. W. Plummer, and Jiandi Zhang. Phys. Rev. Vol. 93, issue 12-15, March 2016. <http://arxiv.org/ftp/arxiv/papers/1603/1603.01680.pdf>
2. "Electronic, structural, and magnetic properties of LaMnO₃ phase transition at high temperature", Pablo Rivero, Vincent Meunier, and William Shelton
Phys. Rev. B 93, 024111 – Published 20 January 2016;
<http://journals.aps.org/prb/abstract/10.1103/PhysRevB.93.024111>
3. "Uniaxial pressure-induced half-metallic ferromagnetic phase transition in LaMnO₃", Pablo Rivero, Vincent Meunier, and William Shelton
Phys. Rev. B 93, 094409 – Published 8 March 2016
<http://journals.aps.org/prb/abstract/10.1103/PhysRevB.93.094409>

Saturday Science

LSU | College of
Science
Department of Physics
& Astronomy

SATURDAY SCIENCE

AT LOUISIANA STATE UNIVERSITY

Harnessing Chemistry to Combat Bacterial Resistance



A public lecture by

Dr. Carol Taylor

LSU Department of
Chemistry



19 March 2016, 10-11:00 a.m.

Room 130 Nicholson Hall, LSU

LSUSaturdayScience@gmail.com