LSU College of Science Department of Physics & Astronomy

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Weekly Calendar

December 1 - 5, 2014

Departmental Colloquium

What's the (Quantum) Matter with Black Holes?

3:30 PM December 4, 2014

109 Nicholson Hall

Emil Mottola
Los Alamos National Laboratory

HOST: Ivan Agullo

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

Classical General Relativity together with conventional equations of state suggest that in complete gravitational collapse a singular state of matter with infinite density could be reached to what is popularly called a "black hole." In addition to its interior singularities, in which space and time itself are crushed out of existence, the main characteristic feature of a black hole is its apparent horizon, the surface of finite area at which outwardly directed light rays are first trapped. The loss of information to the outside world this implies gives rise to additional difficulties with well-established principles of quantum mechanics and statistical physics.

I will overview the historical and most recent approaches to these problems, as well as the status of the gravitational vacuum condensate star proposal made in 2001, with negative pressure which actually is inherent in Schwarzschild's interior solution, and the implications the resolution of these issues will have for fundamental physics. The prospect of testing these ideas with astronomical observations in the next few years of Sgr A*, the 4 million solar mass "black hole" in the center of our Milky Way galaxy and other "black hole" candidates that will soon be probed by LIGO and the Event Horizon Telescope will also be discussed.

Special Seminar

Louisiana Consortium for Neutron Scattering

"Neutron Scattering in Soft Matter Workshop"

Monday, December 8, 2014, 8:30-4:30pm
100 Chemistry + Material Building, LSU

William Heller, Oak Ridge National Laboratory
Dvora Perahia, Clemson University
Boby Sumpter, Oak Ridge National Laboratory

Fall Seminar

LA-SiGMA
Louisiana Alliance for Simulation-Guided Materials Applications

3:30pm – 4:30pm, Wednesday, December 3, 2014

1008B, Digital Media Center, Louisiana State University

Chris Jacobsen
Argonne National Laboratory

NEUTRON SCATTERING IN SOFT MATTER
WORKSHOP

MODERATORS:
Donghui Zhang
LSU Assoc Prof of Chemistry
John DiTusa
LSU Prof of Physics

Dec 8, 2014

8:30am-4:30pm
100 Chemistry + Materials Building, LSU

Free

SPEAKERS:

WILLIAM HELLER

Instrument Scientist, EQ-SANS Diffractometer, Oak Ridge National Lab

Neutron Scattering for Soft Matter Science + Biology at Oak Ridge National Lab

William Heller is a physicist and instrument scientist on the EQ-SANS instrument at the Spallation Neutron Source of ORNL. His primary research interests are in the structure of biomembranes and their interactions with proteins and peptides. He also develops methods and software for modeling small-angle scattering data.

DVORA PERAHIA

Professor of Physical Chemistry, Clemson University

A Glimpse Into Soft Assemblies from Drug Delivery to Actuators: Small Angle Neutron Scattering; The Role of Interfaces in Energy Production, Capture, and Storage; and *Non-Polarized Neutron Reflectometry*

The focus of Dr. Perahia's research is the study of polymers and complex fluids, including polyelectrolytes, semi-fluoro polymers that form liquid crystals, conducting polymers, rodlike highly conjugated polymers, and monodispersed di-block and tri-block co-polymers.

BOBBY SUMPTER

Director, Nanomaterials Theory Institute, Oak Ridge National Lab

Interfacial Dynamics in Polymer-Based Multicomponent Materials

Dr. Sumpter's research is directed primarily toward developing and applying modern computational and mathematical capabilities for the understanding and prediction of chemical and physical processes ranging from the molecular to the nanoscale to full-size engineering applications, using a multidisciplinary approach that integrates chemistry, physics, materials science, mechanical engineering, and biology.

LUNCH PROVIDED. RESERVATIONS REQUIRED.

E-mail larkin@lsu.edu by Dec 5 to reserve your spot

Louisiana Consortium for Neutron Scattering

EPSCoR DEPARTMENT of ENERGY · LSU LOUISIANA STATE UNIVERSITY · Tulane University · THE UNIVERSITY of NEW ORLEANS · LOUISIANA TECH UNIVERSITY

LA-SiGMA

Louisiana Alliance for Simulation-Guided Materials Applications

Fall Seminar

3:30pm - 4:30pm, Wednesday, December 3, 2014

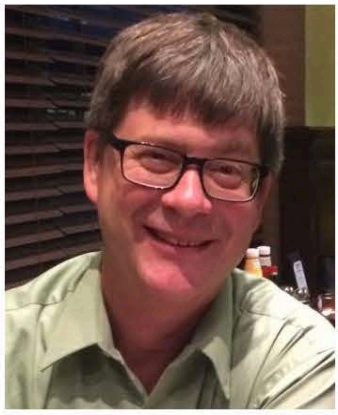
1008B, Digital Media Center, Louisiana State University

X-ray imaging in the age of computers: what would Roentgen and Abbe think?

By

Chris Jacobsen

Argonne National Lab & Northwestern University



Roentgen's discovery of X rays set the stage for our understanding of the atom, and Abbe's understanding of diffraction helped us see to the limits in microscopes. Through the first full century after these two discoveries, tremendous strides were made in fully realizing the potential of these two discoveries in x-ray imaging. However, in recent years we have seen the rise of x-ray microscopes where a computer plays an integral role in obtaining images via coherent diffraction methods, and where a computer helps us make sense of complex data in x-ray spectroscopic imaging. With these advances, we are able to gain new insights into how cells work at the nanoscale.

Chris Jacobsen's research interests are in the development of x-ray microscopy optics and methods, and their application to problems in biology and environmental science. He has worked with about two dozen PhD students in this area, with over 200 publications. He is the recipient of a Presidential Faculty Fellow award (White House/NSF) and other awards, and a Fellow of the American Association for the Advancement of Science, the American Physical Society, and the Optical Society of America. He is an Associate Division Director and Senior Physicist in the X-ray Science Division of the Advanced Photon Source at Argonne National Laboratory, and a Professor in the Department of Physics & Astronomy, and Chemistry of Life Processes Institute at Northwestern University.

UNO – 234, Liberal Arts Building ~ **LATech** – 122, Nethken Hall

SUBR – 211 J.B. Moore Hall ~ **Xavier** – 226 Qatar Pavillion

Tulane – 600, Lindy Boggs