

Weekly Calendar & News

April 14 - 22, 2017

Department Colloquium

[Testing Superstring Theory with Cosmological Observations?](#)

[Robert Brandenberger](#)

McGill University

Host: Ivan Agullo

3:30 PM Thursday, April 20

119 Nicholson Hall

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

Superstring theory promises to unify all four forces of nature at the quantum level. Therefore, superstring theory should play an important role in early universe cosmology. I will argue that taking into account new degrees of freedom and new symmetries which distinguish string theories from point particle theories will lead to a non-singular early universe and a new mechanism of cosmological structure formation which is consistent with current data but makes interesting predictions for future observations, in particular for the spectrum of primordial gravitational waves.

New Publications

- ["Understanding emergent collectivity and clustering in nuclei from a symmetry-based no-core shell-model perspective"](#) by A. C. Dreyfuss, K. D. Launey, T. Dytrych, J. P. Draayer, R. B. Baker, C. M. Deibel,¹ and C. Bahri

LSU Physics & Astronomy in the News

- Research led by Ivan Agullo Discovers Hidden Aspects of Electrodynamics
http://www.lsu.edu/mediacenter/news/2017/04/11physastro_agullo_prl.php
- Gabriela González Elected to the American Academy of Arts and Sciences
http://www.lsu.edu/mediacenter/news/2017/04/12physastro_gonzalez_academy.php

Events

- Brad Schaefer's talk: "Dating the Crucifixion"
Where: [Highland Road Park Observatory](#)
When: Friday April 14, 7:30 PM
- [LaCNS Seminar: "Neutron Imaging Capabilities at the Oak Ridge National Laboratory"](#) by Dr. Hassina Bilheux, Lead Instrument Scientist, Neutron Imaging Facility, Oak Ridge National Laboratory. **Where:** 1008B Digital Media Center **When:** Monday April 17, 3 PM (**flyer attached below**)
- Dr. Gaarde & Dr. Schaefer will be presenting on [CxC Movie Night](#) on April 17th - Science behind Arrival film



- **Saturday Science:** "Camera (gamma detector) for the heart" by [Joyoni Dey](#) (**flyer attached below**)
Where: Room 130 Nicholson Hall
When: Saturday April 22, 10:00 AM



Monday, April 17

3:00 pm

1008B Digital Media Center

Louisiana State University

Neutron Imaging Capabilities at the Oak Ridge National Laboratory

Oak Ridge National Laboratory is home to two of the most powerful neutron sources in the world: the 1.4 MW Spallation Neutron Source (SNS) and the 85 MW High Flux Isotope Reactor (HFIR). Neutron imaging is a non-destructive characterization technique capable of mapping light elements buried in high-Z materials. The technique has been used for defects in materials (fracture, porosity, etc.), in-situ time-dependent measurements such as water uptake in plant roots or Li distribution in battery electrodes, and archeological investigations (identification of a counterfeit object), to name a few.

This presentation gives an overview of recent applications at HFIR CG-1D imaging. Lately, the CG-1D team has prototyped qualitative polarized imaging using white beam neutrons and is currently working toward monochromatic capability to enable quantitative measurements of superconducting materials.

In preparation for the SNS VENUS imaging beamline, the team has developed Bragg edge imaging capabilities combined with neutron diffraction at the SNAP and VULCAN beamlines. Wavelength-dependent neutron transmission exhibits abrupt drops when the neutron wavelength is twice the value of d-spacing, allowing identification of crystalline planes. This technique has been applied to additively manufactured Inconel 718 with different crystalline orientations. Combination of the Bragg edge results with diffraction data is discussed, along with the microstructure interpretation of the results. An attempt at modeling Bragg edges is also presented. Finally, an overview of the jupyter notebook-based Python iBeatles user interface used to identify and fit Bragg edges is discussed.

**SEMINAR
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2017**



Guest Speaker

**Dr.
Hassina
Bilheux**

Lead Instrument
Scientist

Oak Ridge National
Laboratory

Free and open to the public



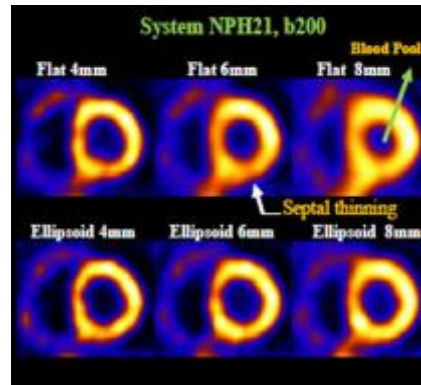
www.lsu.edu/physics/lacns



SATURDAY SCIENCE

Camera (gamma detector) for the heart

A public lecture by
Dr. Joyoni Dey



About the Speaker

Dr. Dey is an Assistant Professor in the Department of Physics and Astronomy in the Medical Physics program. She focuses on designing new systems and algorithms to help large patient populations with new imaging advances: for example, faster systems for more efficient acquisition, lowering dose requirement, accurate pathological quantification, correct motion artifacts for better diagnosis.

Single Photon Emission Tomography (SPECT) is a medical imaging modality used primarily to assess heart disease, with about 7 million patients scanned per year in the USA alone. SPECT systems detect gamma-rays emitted from injected radio-tracers, up-taken by the heart. Dr. Dey will talk about her invention of a new SPECT system that improves sensitivity three-fold compared to state-of-the-art, lowering dose and time-of-acquisition for Cardiac SPECT.

22 April 2017, 10-11:00 a.m.

Room 130 Nicholson Hall, LSU