

Weekly Calendar & News

April 22-29, 2017

Departmental Colloquium

Ion Traps for Astrophysics: Where no Trap has Gone BeforeJason Clark

Argonne National Laboratory

Host: Scott Marley**3:30 PM Thursday, April 27****119 Nicholson Hall****• Refreshments served at 3:10 PM in 232 (Library) Nicholson Hall •**

How were all the elements in the universe created? Scientists across many disciplines have been trying to answer this question for decades. Much progress in our understanding of nucleosynthesis has been made, but the origin of half the elements heavier than iron is still unknown. Supernovae are possible sources of heavy-element production, whereby elements are produced through a rapid series of nuclear reactions on neutron-rich nuclei in a process termed the astrophysical 'r' process. In an attempt to reproduce the observed distribution of element abundances in the universe, models are generated which inherently rely upon many nuclear physics inputs, including the masses of the nuclides involved and their beta-decay properties. However, the uncertainties in these nuclide properties are often too large and limit our understanding of heavy-element nucleosynthesis.

Ion traps have revolutionized mass spectroscopy and have the potential to do the same for beta-decay spectroscopy as well. Precise mass measurements of radioactive nuclides are now routinely performed around the world, but nuclides involved in the astrophysical r process are often too challenging to produce for study at accelerator facilities. The newly commissioned CARIBU facility, an upgrade to Argonne National Laboratory's ATLAS facility, provides copious amounts of these previously elusive neutron-rich nuclei. A program of mass measurements at CARIBU is underway, where the Canadian Penning trap mass spectrometer has already been used to determine the masses of more than 100 of these nuclides to a mass precision of 100 parts per billion or better. In addition, a specially designed ion trap is currently being developed to facilitate a new program of beta-decay spectroscopy using nuclides produced by CARIBU. Results from a recent set of measurements have indicated this new technique of using ion traps to perform beta-decay studies could significantly advance the field. Indeed, ion traps for astrophysics are going where no trap has gone before.

LSU Physics & Astronomy in the News

- Alison Dreyfuss Receives U.S. Department of Energy Graduate Research Award http://www.lsu.edu/physics/news/2017/04/drefuss_award.php
- Six LSU Students Receive NRC Scholarship in Health Physics http://www.lsu.edu/physics/news/2017/04/nrc_scholarship.php
- Ivan Agullo was quoted in New Scientist: <https://www.newscientist.com/article/2127615-quantum-effects-cloak-impossible-singularities-with-black-holes/> and <https://futurism.com/new-research-challenges-what-we-thought-we-knew-about-the-big-bang/>
- Amber Stuver was quoted in this Physics World article: <http://physicsworld.com/cws/article/news/2017/apr/20/computer-model-helps-explain-how-ligo-s-black-holes-formed>

New Publications

- "[Cosmological dynamics in spin-foam loop quantum cosmology: challenges and prospects](#)" by David A Craig and Parampreet Singh. Class. Quantum Grav. 34 074001 (2017)
- "[Numerical simulations of loop quantum Bianchi-I spacetimes](#) " by Peter Diener, Anton Joe, Miguel Megevand and Parampreet Singh. Class. Quantum Grav. 34 094004 (2017)

Events

- **Saturday Science:** "Camera (gamma detector) for the heart" by [Joyoni Dey](#) **Where:** Room 130 Nicholson Hall, **When:** Saturday April 22, 10:00 AM (**flyer attached below**)
- **Physics & Astronomy Department Awards Ceremon**, **When:** Monday, April 24, 2017 3:30 PM, **Where:** Room 119 Nicholson Hall
- **Wednesday Science Fashion Day**



- **LaCNS Seminar:** Error! Hyperlink reference not valid. by Prof. Toby Nelson from Oklahoma State Univ. (**flyer attached**) **Where:** 208 Williams Hall, **When:** Friday, April 28, 2017 12:30 PM
- **Physics and Astronomy Annual Crawfish Boil** on May 5, 12 PM at Quad side of Nicholson Hall: Please see Shanan Schatzle, Business Manager, in 202-H to make your reservation and payment. Cost: \$8 - Students \$10 - Staff (Admin., Shop and Researchers) \$12 – Faculty
- [Landolt Astronomical Observatory](#) **Public Star Party / Open House**

STAR PARTY OPEN HOUSE AT OBSERVATORY



When: 9:00-10:00 PM
Saturday, April 29
Where: Roof of Nicholson Hall

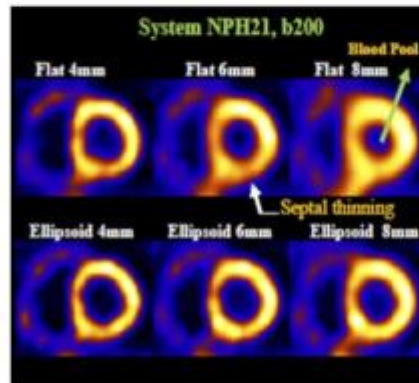


Do remind your students to not come if the sky is so cloudy that nothing can really be seen. We will have a 'Rain Date' on the next night; 30 April at the same time.

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

LSU

College of
Science
Department of Physics
& Astronomy



LaCNS/Macromolecular Chemistry Seminar

Friday, April 28

12:30 pm

208 Williams Hall

Louisiana State University

Redefining Melanin: From Eumelanin-Inspired Materials to Structure-Property Relationship

Melanin is a unique class of natural occurring pigments found in the hair, eyes, skin and the brain of mammals. Eumelanin is the black-brown variety of Melanin and understood to be a biosynthesized heterogeneous macromolecule containing 5,6-dihydroxyindole and 5,6-dihydroxyindole-2-carboxylic acid. Nature has chosen this substance with such complexity and undefined structure as the centerpiece for so many functions like coloration, radiation hardness, and neuron protector.

This presentation will begin with an introduction to what we call Eumelanin-inspired materials. Here, we will explore the tunability of the Eumelanin-inspired indole core for applications such as sensors, OLEDs and antimicrobials. To follow, our progress toward understanding Eumelanin structure-property relationship to define function will be presented.

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2017



Guest Speaker

**Dr.
Toby
Nelson**

Professor,
Department of
Chemistry

Oklahoma State
University

Free and open to the public



www.lsu.edu/physics/lacns

