College of Science
Department of Physics & Astronomy

WEEKLY CALENDAR

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202 NICHOLSON HALL
Louisiana State University
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WEEKLY CALENDAR

January 13 - 17, 2014

DEPARTMENTAL COLLOQUIUM

"Emerging Technologies in Breast Imaging"

3:30 PM January 15, 2014
109 Nicholson Hall

Stephen J. Glick
University of Massachusetts Medical School

Host: Wayne Newhauser

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

Although x-ray mammography has saved many lives and is considered the imaging modality of choice for early detection and diagnosis of breast cancer, it is far from perfect. One of the limiting problems with mammography is that the recorded image represents the superposition of a three-dimensional (3D) object onto a two-dimensional (2D) plane, and thus overlapping breast tissue on the resulting image can make detection and diagnosis of breast cancer challenging. Two promising tomographic x-ray breast imaging methods have been developed to reduce breast structure overlap, namely digital breast tomosynthesis (DBT), and dedicated breast CT (BCT). This talk will first review the basics of breast imaging including new tomographic breast imaging modalities, and then discuss some of the new technologies being developed at University of Massachusetts Medical School to further improve the accuracy of breast cancer detection and diagnosis..

DEPARTMENTAL COLLOQUIUM

"Studying Structure and Function at the Atomic Level"

3:30 PM January 16, 2014
109 Nicholson Hall

Linda Young
Argonne National Laboratory

Host: Mette Gaarde

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

How does one peer into complex systems to understand structure and function? Can such a tool help create designer materials and designer drugs? A powerful tool to visualize matter at the atomic level is a synchrotron source that emits tunable, polarized x-rays to penetrate matter and provide elemental, chemical, and orientational selectivity. In this lecture, I will describe the Advanced Photon Source, the nation's most versatile x-ray synchrotron source and give examples of experimental programs that investigate material behavior at pressures equivalent to those at the center of the earth, control of phase changes in novel superconductors, and function in biological systems.

PUBLIC LECTURE

Sponsored by the Distinguished Traveling Lecturer Program of the APS Division of Laser Science

"X-RAY LASERS – NO LONGER SCIENCE FICTION"

Friday, January 17, 2014 – 10:00 AM
Hill Memorial Library

Linda Young
Argonne National Laboratory

Light refreshments will be served

The first optical laser was created by Ted Maiman in May of 1960 at Hughes Research Laboratories. From that small-scale demonstration, lasers are now ubiquitous in society, as celebrated by Laser Fest 2010, which marked the laser's 50th anniversary. Within that timespan we also witnessed the birth of the world's first x-ray free-electron laser, the Linac Coherent Light Source (LCLS) at the Stanford Linear Accelerator (SLAC), which produced coherent radiation at 0.15 nm (4000 times shorter than the common laser pointer) on April 20, 2009. LCLS is no ordinary laser; it employs a 1-kilometer linear accelerator (Linac) to accelerate electrons very close to the speed of light and a 100-meter array of magnets to produce x-ray bursts containing gigawatts of power – a billionfold increase over that available from x-ray synchrotrons, the other research tool used by scientists interested in determining three-dimensional structure of materials at the atomic scale. In this lecture I will describe the birth of the machine, the first experiments that elucidated the response of matter to these powerful x-ray laser pulses, and the challenges ahead as the x-ray laser enthusiasts from around the globe race to fulfill their dream of imaging single biomolecules without the need for crystallization.

LA-SiGMA
Louisiana Alliance for Simulation-Guided Materials Applications

Spring Seminar

Premala Chandra
Rutgers University, New Jersey

"Hastatic Order in URu2Si2"

3:30pm - 4:30pm, Friday, January 17, 2014

1008B, Digital Media Center, Louisiana State University

PUBLICATIONS:

1. "Super-resolving quantum radar: Coherent-state sources with homodyne," **Kebei Jiang, Hwang Lee,** Christopher C. Gerry and **Jonathan Dowling**, J. Appl. Phys. 114, 193102 (2013); http://dx.doi.org/10.10631/1.4829016.
2. "Density profiles and collective modes of a Bose-Einstein condensate with light-induced spin-orbit coupling," Qin-Qin Lu and **Daniel Sheehy**, Physical Review A88 043645 (2013).
3. "Faint UBVRI Standard Star Fields", James L. Clem and **Arlo U. Landolt**, 2013, Astronomical Journal, 146, 88.
4. "UBVRI Photometric Standard Stars Around the Sky at +50 Degrees Declination" **A. U. Landolt**, 2013, Astronomical Journal, 146, 131.
5. "Comments on the UBV Photometric System's Defining Standard Stars" **A. U. Landolt**, 2013, Journal of the American Association of Variable Star Observers (JAAVSO), 41, 244.
6. "Hoyle state and rotational features in Carbon-12 within a no-core shell-model framework", **Alison C. Dreyfuss**, **Kristina D. Launey, Tomas Dytrych, Jerry P. Draayer**, and Chairul Bahri, Physics Letters B 727 (2013) 163.
7. "1-, 2-, and 6-qubits, and the Ramanujan–Nagell theorem," Y. Pavlyukh and **A.R.P.Rau**, Intl. J. Quantum Inf. 11, 1350056 (2013).