College of Science
Department of Physics & Astronomy

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Weekly Calendar

February 2 - 6, 2015

Special Colloquium

"Early Prediction of Clinical Outcome in Cervical Cancer during Radiation Theory"

3:30 PM Monday, February 2, 2015

435 Nicholson Hall

Zhibin Huang

Brody School of Medicine, East Carolina University

HOST: Wayne Newhauser

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

Early outcome prediction is of paramount importance in tumor therapy. This study is to investigate the early outcome prediction from two aspects: magnetic resonance imaging (MRI) and radiobiological modeling.

Dynamic contrast-enhanced magnetic resonance imaging (DCE-MRI) has been recently explored to assess tumor response to radiotherapy. By using DCE-MRI technique, tumor heterogeneity can be explored, yielding imaging markers related to clinical outcomes. In this study we explore the temporal changes of DCE-MRI perfusion patterns during the radiation therapy (RT) course and their influence on local control and survival in cervical cancer. Voxel-histogram method is used to investigate tumor perfusion patterns, resulting in DCE-MRI perfusion patterns, which are correlated with improved local tumor control and survival. Temporal change of tumor perfusion patterns before and during RT is observed and might be useful for clinical outcomes.

Radiobiological modeling on tumor kinetic response to RT provides important information. Tumor response model parameters based on MRI during and post RT have shown correlation with long-term tumor control in cervical cancer. However, the late availability of this information, not until 1-2 months after RT completion, may diminish its clinical value for outcome prediction. Whether radiobiological parameters of tumor regression assessed earlier during the treatment phase, within 4-5 weeks of radiation therapy initiation, can predict ultimate outcome in cervical cancer patients. We also investigate the synergistic effects of the model parameters on the value of predictive power during RT for cervical cancer.

The earlier availability of this outcome predictive information opens a time window for the adaptation of the ongoing therapy course in patients at risk of suboptimal outcome.

Departmental Colloquium

"Heating in atomic and molecular-scale junctions"

3:30 PM Thursday, February 5, 2015

119 Nicholson Hall

Douglas Natelson

Rice University

HOST: Ilya Vekhter

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

When a battery is connected to a wire, the macroscopic electrochemical energy of the battery eventually and irreversibly winds up as heat, the disorganized motions of the (very) many microscopic degrees of freedom of the electrons and ion cores of the conductor. This happens through the electron-vibrational coupling (transferring energy to the motions of ions) and electron-electron interactions (broadening the electronic distribution function). When the conductor approaches atomic dimensions, and we are now discussing an open quantum system with a small number of degrees of freedom driven out of equilibrium, the situation is tricky. While many theoretical analyses of these processes have been performed in various limits, historically it has been very difficult experimentally to interrogate the microscopic degrees of freedom on the nanometer length scales required for quantitative local understanding. I will present measurements of Raman response in biased single-molecule junctions, where the Raman response probes both vibrational populations and the electronic continuum. I will also present measurements of shot noise in biased atomic-scale metal junctions and will discuss this data in the context of vibrational and electron-electron interactions. These approaches let us see where energy is flowing and give us insights into sources of dissipation.

Special Seminar

Louisiana Consortium for Neutron Scattering

"Polymer chains in confined geometries"

Monday, February 2, 2015, 3:00 – 4:30pm

1008B Digital Media Center, LSU

Jyotsana Lal
Argonne National Laboratory

"Spinon excitations in one dimensional magnet Yb_2Pt_2Pb"

Wednesday, February 4, 2015, 3:30 – 4:30pm

1008B Digital Media Center, LSU

Liusuo Wu
Stony Brook University

Publications:

1. "Quantum shells in a quantum space-time", Rodolfo Gambini and **Jorge Pullin**, Class. Quantum Grav. 32 (2015) 035003 (9pp).

LACNS

Louisiana Consortium for Neutron Scattering

SEMINAR SERIES 2015

Monday, February 2
3:00pm
1008B Digital Media Center
Louisiana State University

Polymer chains in confined geometries

Advanced neutron scattering techniques have well elucidated the structure and dynamics of polymer chains in bulk. Much less is known about the structure and dynamics of polymer chains undergoing deformation either mechanical or under shear. An easy way to deform polymer chains is to confine them. In this talk, I will discuss the conformation of single neutral and charged polymers confined in nanopores, also present the case of hydrophobically modified polymers confined to two-dimensional membranes and polymer confined in microemulsion droplets. These experiments depend on the use of techniques that are sensitive to the polymer conformations such as Small Angle Neutron Scattering (SANS) and Neutron Spin Echo (NSE). A brief introduction to neutron scattering techniques will be made. These techniques used by the soft matter community provide fundamental experimental insights into the structure, self-assembly and dynamics of soft materials.

Guest Speaker

JYOTSANA LAL

Biophysicist, Materials Science Division

Argonne National Laboratory

Dr. Lal's work focuses on the structure and internal dynamics of proteins and coherent diffraction imaging of complex polymer matrices. Her research interests include the development of novel methods for the use of x-rays and neutrons for the study of biological and soft matter materials.

Free and open to the public

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Louisiana Consortium for Neutron Scattering

SEMINAR SERIES 2015

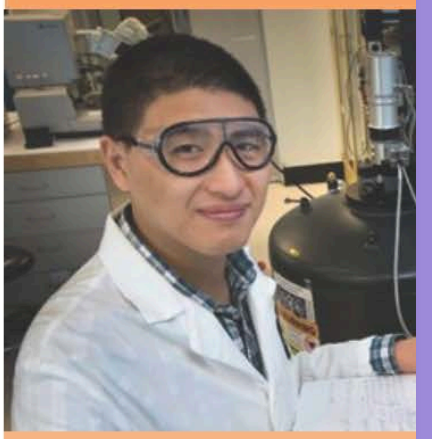
NEW DATE!

(RESCHEDULED FROM JAN 28)

Wednesday, February 4
3:30-4:30pm
1008B Digital Media Center
Louisiana State University

Spinon excitations in one dimensional magnet Yb_2Pt_2Pb

Emergent fractional excitations in low dimensional magnets have attracted great interest in condensed matter physics. Many studies have focused on Heisenberg spin 1/2 systems, where quantum fluctuations are expected to be strongest. Here I will present measurements on a new low dimensional magnet Yb_2Pt_2Pb, where fractional, quantum spinon excitations are realized from one dimensional ladders with classical Yb Ising moments. Both elastic and inelastic neutron scattering data on Yb_2Pt_2Pb single crystals will be presented. In contrast to 1D Heisenberg spin 1/2 chains, the broad continuum of excitations observed in Yb_2Pt_2Pb is extended to much higher energies, indicating four spinon excitations are important in this system.



Guest Speaker

LIUSUO WU

Postdoctoral Researcher

Stony Brook University

Dr. Wu is a Postdoctoral Associate in Experimental Condensed Matter with Meigan Aronson at Stony Brook University. His interests include heavy fermions, frustrated magnets, and neutron scattering experiments.

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