



College of
Science
Department of Physics
& Astronomy

WEEKLY CALENDAR

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202 NICHOLSON HALL
Louisiana State University
Baton Rouge, Louisiana 70803-4001

WEEKLY CALENDAR

November 18 - 22, 2013

DEPARTMENTAL COLLOQUIUM

"Exchange bias and other emergent magnetic phenomena in hybrid nanostructures"

3:30 PM November 21, 2013
109 Nicholson Hall

Hariharan Srikanth

University of South Florida

Host: Shane Stadler

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

Surface and interface effects in oxide nanoparticle assemblies have been increasingly found to play significant roles in controlling the magnetic properties. Modification of the surface spin structure in magnetic oxide nanoparticles can be achieved by controlling the particle shapes and forming hybrid structures. We discuss how these effects often lead to novel magnetic properties, useful for applications, such as tunable exchange bias (EB) and inverse magnetocaloric effect (MCE). Exchange bias (EB)-like behavior in magnetic nanoparticles has been observed and reported in a number of systems. However the origin is not well understood and the results have often been misinterpreted in numerous reports in the literature. We have recently done systematic experiments to investigate these intriguing phenomena using a range of probes such as DC and AC magnetometry, RF transverse susceptibility, magnetocaloric effect and small angle neutron scattering (SANS). In this talk we will emphasize the need for systematic experimental studies to understand the origin and physics of magnetism in nanostructures and the correlation between surface anisotropy, freezing of surface and core spins with exchange bias. We will also present our recent advances in development of magnetic polymer nanocomposites that exhibit tunable microwave response.

PUBLICATIONS:

1. "Dynamical decoupling with tailored wave plates for long-distance communication using polarization qubits", **Bhaskar Roy Bardhan**, Katherine L. Browne, and **Jonathan Dowling**, Physical Review A88, 052311 (2013).
 2. "Level statistical properties of the spherical mean-field plus standard pairing model", **Xin Guan**, **Kristina D. Launey**, Jianzhong Gu, Feng Pan, and **Jerry P. Draayer**, Phys. Rev. C 88 (2013) 044325.
 3. "Program in C for studying characteristic properties of two-body interactions in the framework of spectral distribution theory", **K.D. Launey**, S. Sarbadhicary, **T. Dytrych**, **J.P. Draayer**, Comput. Phys. Commun. 185 (2014) 254.
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Fall Seminar

Dan Dessau

University of Colorado, Boulder, CO, Department of Physics

"What Sets the Tc in Cuprate High Temperature Superconductors?"

3:30pm - 4:30pm, Wednesday, November 20, 2013
1008B, Digital Media Center, Louisiana State University



Louisiana Alliance for Simulation-Guided Materials Applications

Fall Seminar

3:30pm - 4:30pm, Wednesday, November 20, 2013
1008B, Digital Media Center, Louisiana State University

What Sets the T_c in Cuprate High Temperature Superconductors?

By

Dan Dessau

University of Colorado, Boulder, CO
Department of Physics

We have developed a new variant of angle-resolved photoemission spectroscopy (ARPES) that gives greatly improved accuracy of gap measurements compared to all other spectroscopic probes and also allows us to make the first quantitative extraction of the pair-breaking scattering rates. The results from this new method give critical new insights into the origin of pseudogaps, Fermi arcs, and superconductive pairing in the cuprate superconductors, helping us answer the critical question “What sets the T_c ?”



Following this I will present recent results from some iridium oxides, which mix strong spin orbit coupling with correlation (Mott) effects. When doped with carriers, many of the iconic properties of the cuprates such as Fermi arcs and pseudogaps can also be found in these compounds, indicating that these materials should become a fertile playground for the study of correlated electron matter.

Dan Dessau received his PhD in Applied Physics from Stanford University in 1993, after which he accepted a DOE Distinguished Postdoctoral Fellowship at SLAC/SSRL, Stanford University. He joined the Physics Department, University of Colorado Boulder in 1995, winning an ONR young investigator award and an NSF CAREER award. He has been at the forefront of spectroscopies of correlated systems for many years, making seminal early contributions on the pairing symmetry and pseudogaps in cuprates and on the nature of the colossal magnetoresistance in manganites. He originated the techniques of laser-ARPES and the new TDoS method of ARPES analysis.

UNO - Liberal Arts Building 234

LATech - PML 1015, Center for Instructional Technology, at the Wyly Tower

Note, this seminar will ONLY be available via abobe connect <http://connect.lsu.edu/la-sigma/>

