LSU College of Science Department of Physics & Astronomy

202 Nicholson Hall
Louisiana State University
Baton Rouge, LA 70803
TEL: 225-578-2261
FAX: 225-578-5855
http://www.phys.lsu.edu

Weekly Calendar

April 20-24, 2015

Departmental Colloquium

"The quantum and classical world of atomic spins on surfaces"

3:30 PM Thursday, April 23, 2015

119 Nicholson Hall

Andreas Heinrich
IBM Almaden Research Center
HOST: Jiandi Zhang

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

The scanning tunneling microscope has been an extremely successful experimental tool because of its atomic-scale spatial resolution. In recent years this has been combined with the use of low temperatures, culminating in precise atom manipulation and spectroscopy with microvolt energy resolution. In this talk I will apply these techniques to the investigation of the electronic and magnetic properties of atoms and small clusters on surfaces. A particular focus will be on the emergence

Special Seminar:

Louisiana Consortium for Neutron Scattering
"Turning the magnetism in the multiferroic $Mn_{1-x}Co_xWO_4$"

Monday, April 20, 2015, 3:00-4:00 pm

1008B Digital Media Center, LSU

Feng Ye
Oak Ridge National Laboratory

LA-SiGMA
Louisiana Alliance for Simulation-Guided Materials Applications

Spring Seminar
Paulette Clancy
Cornell University
"TBD"

3:00pm, Wednesday, April 22, 2015
600 Lindy Boggs, Tulane University

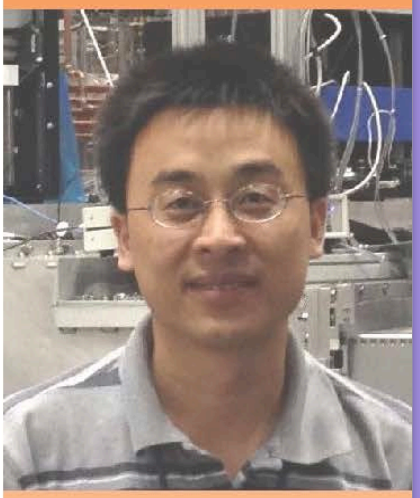
Publications:

1."Pairing correlations in a trapped one-dimensional Fermi gas", S. Kudla, D.M. Gautreau and **D.E. Sheehy**, Phys. Rev. A91, 043612 (2015).

LACNS

Louisiana Consortium for Neutron Scattering

SEMINAR SERIES 2015



Monday, April 20
3:00-4:00pm
1008B Digital Media Center
Louisiana State University

Tuning the magnetism in the multiferroic $Mn_{1-x}Co_xWO_4$

Multiferroic and magnetoelectric materials have attracted renewed attention since the magnetic orders breaks the spatial inversion symmetry and give rise to a ferroelectric state with a macroscopic polarization [1]. The frustrated nature of the magnetic state in multiferroic MnWO4 is the reason [2] for its extreme sensitivity of the ferroelectric/magnetic orders to small perturbations in form of magnetic and electric fields, external pressure, and chemical substitutions [3-5]. Using neutron diffractions, we have characterized the effect of cobalt substitution on the magnetic configuration and corresponding multiferroic behavior [6]. A complex phase diagram with multiple polarization flops upon increasing Co content is observed. Two critical concentrations separate the multiferroic phases with distinct spin structures and orientation of the ferroelectric polarizations. With application of hydrostatic pressure, we further examine the evolution of spin structures at various Co concentrations. Our neutron scattering results provide critical understanding of the pressure induced polarization-switching in the doped sample.

[1] T. Kimura et al., Nature 426, 55 (2003).
[2] F. Ye et al., Phys. Rev. B 84, 179901 (2011).
[3] R. P. Chaudhury et al., Phys. Rev. B 83, 014401 (2011).
[4] F. Ye et al., Phys. Rev. B 78, 193101 (2008).
[5] N. Poudel et al., Phys. Rev. B 89, 054414 (2014).
[6] F. Ye et al., Phys. Rev. B 86, 094429 (2012).

Guest Speaker

FENG YE

Lead Instrument Scientist, CORELLI Instrument Team

Oak Ridge National Laboratory

Dr. Ye's research focuses on phase transition, magnetic ordering, and spin dynamics of strongly correlated electron materials such as magnetoresistive oxides, frustrated systems, and multiferroics materials using neutron scattering techniques.

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Tulane University

Physics Colloquium

The quantum and classical world of atomic spins on surfaces

Dr. Andreas Heinrich
IBM's Almaden Research Center, CA

Thur. (Apr. 23rd) at 3:30PM in Rm 119 Nicholson Hall

The scanning tunneling microscope has been an extremely successful experimental tool because of its atomic-scale spatial resolution. In recent years this has been combined with the use of low temperatures, culminating in precise atom manipulation and spectroscopy with microvolt energy resolution. In this talk I will apply these techniques to the investigation of the electronic and magnetic properties of atoms and small clusters on surfaces. A particular focus will be on the emergence of classical behavior in chains of atoms that are assembled one atom at a time.

Related videos:

https://www.youtube.com/watch?v=hntVjNN6gDo
https://www.youtube.com/watch?v=f2OKVQmODC8
https://www.youtube.com/watch?v=Tush3Kan12Q
https://www.youtube.com/watch?v=6O7ilCsEKk4

Dr. Andreas Heinrich is a member of the research staff at the IBM Almaden Research Center in San Jose, CA. He is the project leader for scanning probe microscopy. The experiments conducted by Dr. Heinrich's group aim to extend the basic knowledge about the physics, chemistry, and materials properties of atomic-scale structures with a focus on exploring potential applications of nanostructures for atomic-scale logic and data-storage. Heinrich joined the IBM research group of Dr. Donald Eigler as a postdoctoral researcher in 1998 where he built a next-generation low-temperature scanning tunneling microscope operating at temperatures below 1K and in high magnetic fields. In January 2005, Heinrich took over the leadership of the STM lab from Dr. Eigler. Heinrich is devoted to educating the general public about the excitement of nanotechnology through hands-on demonstrations, is the author or co-author of papers published in the highest-ranking international journals and has given over 50 invited talks at international conferences. Heinrich received his PhD in 1998 from the University of Goettingen in Germany where he studied the materials properties of ternary compound semiconductors.