LSU LOUISIANA STATE UNIVERSITY

PHYSICS & ASTRONOMY WEEKLY CALENDAR

TEL: 225-578-2261
FAX: 225-578-5855
http://www.phys.lsu.edu

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

WEEKLY CALENDAR

January 24, 2011

Departmental Colloquium

Thursday, 3:40 PM, January 27, 2011
109 Nicholson Hall

"Nucleosynthesis in Classical Novae"

Christopher Wrede
University of Washington

Host: **Jeffrey Blackmon**

• Refreshments served at 3:15 PM in 232 (Library) Nicholson Hall •

A classical nova is a thermonuclear explosion occurring on the surface of a white-dwarf star that is accreting hydrogen-rich material from a companion star in a binary system. Our understanding of novae is based on astronomical observations and astrophysical models that incorporate the rates of certain nuclear reactions and decays. The temperature range for nova nucleosynthesis allows the relevant nuclear reactions to be measured in the laboratory at the energies of interest. Such measurements comprise an active area of experimental nuclear-astrophysics research. I will discuss general methods for determining reaction rates in novae and illustrate these methods with specific examples. The future holds the exciting prospect of comparing robust isotopic observations of nova ejecta with models of nova nucleosynthesis based on a complete set of experimentally determined thermonuclear reaction rates.

Condensed-Matter Physics Seminar

Friday, 3:00 PM, January 28, 2011
109 Nicholson Hall

From (π, 0) Magnetic Order to Superconductivity with (π, π) Magnetic Resonance in Iron Chalcogenides

Prof. Zhiqiang Mao
Director of Physics and Engineering Physics, Tulane University, LA

Host: Rongying Jin

The iron chalcogenide $Fe_{1+y}(Te_{1-x}Se_x)$ is structurally the simplest of the Fe-based superconductors. Although the Fermi surface is similar to iron pnictides, the parent compound $Fe_{1+y}Te$ exhibits antiferromagnetic order with in-plane magnetic wave-vector (π, 0). This contrasts the pnictide parent compounds where the magnetic order has an in-plane magnetic wave-vector (π, π) that connects hole and electron parts of the Fermi surface. Despite these differences, both the pnictide and chalcogenide Fe-superconductors exhibit superconducting spin resonances around (π, π), suggesting a common symmetry for their superconducting order parameter. A central question in this burgeoning field is therefore how (π, π) superconductivity can emerge from a (π, 0) magnetic instability. In this talk, I will address this issue. I will discuss the phase diagram of electronic and magnetic properties we recently established for this system, and show that the magnetic soft mode evolving from the (π, 0)-type magnetic long-range order is associated with weak charge carrier localization. Bulk superconductivity occurs only as magnetic correlations near (π, 0) are strongly suppressed and the magnetic mode at (π, π) becomes dominant. Our results suggest a common magnetic origin for superconductivity in iron chalcogenide and pnictide superconductors.