

## WEEKLY CALENDAR

December 14, 2009

### Condensed Matter Seminar

"Unusual Fermi Surface reconstruction driven by moderate magnetic fields in layered ruthenates"

2:00 PM, Thursday, December 17, 2009  
119 Nicholson Hall

Pramod Kumar

Tulane University

Host: Rongying Jin

Trilayered ruthenate  $\text{Sr}_4\text{Ru}_3\text{O}_{10}$  exhibits puzzling magnetic properties. For field applied along the  $c$ -axis it exhibits typical itinerant ferromagnetic (FM) behavior, while moderate field (2-3T) applied along the  $ab$ -plane can induce a metamagnetic (MM) transition [1]. Such coexistence of ferromagnetism and metamagnetism has been shown to be associated with a multiple band effect; FM bands derived from  $d_{xy}$  orbital coexists with MM bands from  $d_{xz,yz}$  orbitals [2,3]. In this talk, I will discuss our Hall effect studies on this compound. Our results reveal that Fermi surface of  $\text{Sr}_4\text{Ru}_3\text{O}_{10}$  changes dramatically through the MM transition. This Fermi surface change leads the Hall resistivity  $\rho_{xy}$  to strongly deviation from the scaling relation with magnetization, i.e.  $\rho_{xy}$  to strongly deviation from the scaling relation with magnetization, i.e.  $\rho_{xy} = R_0H + 4\pi R_sM$ , which holds at fields well below and above the MM transition field. Such a significant change of FS is unexpected for general itinerant MM transitions.

[1] Cao et al., Phys. Rev. B 68, 174409 (2003)

[2] J. Jo et al., Phys. Rev. B 75, 094413 (2007).

[3] Fobes et al., unpublished.

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### CONGRATULATIONS TO:

Dr. Jonathan Dowling on his recent election to fellowship in the American Association for the Advancement of Science.

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### PUBLICATIONS:

"Undecidability and the Problem of Outcomes in Quantum Measurements," Rodolfo Gambini, Luis Pedro Garcia Pintos, **Jorge Pullin**, Springer Science, Business Merdia, LLC, 2009.

"Fermi surfaces changes in  $\text{La}_{1-x}\text{Sm}_x\text{B}_6$  and  $\text{Ce}_{1-x}\text{Ca}_x\text{B}_6$  studied using the de Haas-van Alphen effect and magnetic susceptibility," **R. G. Goodrich, D. P. Young**, N. Harrison, C. Capan, and Z. Fisk, Physical Review B 80, 233101 (2009).

"Optimization of quantum interferometric metrological sensors in the presence of photon loss," Tae-Woo Lee, **Sean D. Huver, Hwang Lee, Lev Kaplan, Steven B. McCracken**, Changjun Min, Dmitry B. Uskov, Christoph F. Wildfeuer, Georgios Veronis, and **Jonathan P. Dowling**, Phys. Rev. A 80, 063803 (2009).

"Collective and noncollective states in  $^{116}\text{Cd}$  studied via the  $\beta$  decays of  $^{116}\text{Ag}^{m1,m2,gs}$ , A. Piechaczek and **E. F. Zganjar** with UNIRIB Colleagues, Physical Review C 80, 054318 (2009).