LSU | 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
October 28 - November 1, 2013

DEPARTMENTAL COLLOQUIUM

"Testing Particle Physics at the Inflationary Scale in a Finite Universe"

3:30 PM October 31, 2013
109 Nicholson Hall

Sarah Shandera
Pennsylvania State University

Host: Ivan Agullo

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

Early universe cosmology is entering a new phase thanks to more precise measurements constraining the primordial density inhomogeneities. The Planck satellite and current and near future Large Scale Structure surveys are pursuing statistics of the inhomogeneities beyond the well-measured power spectrum. The potential of these new statistics has changed the way we think about theories of the primordial universe, including inflation. I will present the current understanding of how new data may decode the particle physics of inflation. I will also present new results on an old issue in inflation: our ability to test the theory is limited by the fact that we observe a single, finite universe.

LA-SiGMA
Louisiana Alliance for Simulation-Guided Materials Applications

Fall Seminar

Andrey Chubukov

University of Wisconsin-Madison

" Pairing mechanism and gap symmetry in Fe-based superconductors with only electron or only hole pockets"

3:30pm - 4:30pm, Wednesday, October 30, 2013

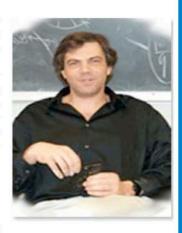1008B, Digital Media Center, Louisiana State University

LA-SIGMA

Louisiana Alliance for Simulation-Guided Materials Applications

Fall Seminar
3:30pm - 4:30pm, Wednesday, October 30, 2013
1008B, Digital Media Center, Louisiana State University

Pairing mechanism and gap symmetry in
Fe-based superconductors with only electron or only hole pockets
By
Andrey Chubukov
University of Wisconsin-Madison

The pairing in moderately doped Fe-pnictides and Fe-chalcogenides is generally understood as being due to magnetically enhanced interaction between hole and electron pockets. Recently, however, superconductivity has been observed in AFe_2Se_2 (A = K, Rb, Cs), which contain only electron pockets, and in KFe_2As_2, which contains only hole pockets. In the talk, I review different (and sometimes conflicting) scenarios for the pairing in these systems and propose my own. I argue that the pairing condensate in systems with only electron pockets necessary contains not only a conventional intra-pocket component, but also inter-pocket component, made of two fermions belonging to different electron pockets. I analyze the interplay between intra-pocket and inter-pocket pairing depending on the ellipticity of electron pockets and the strength of their hybridization and show that with increasing hybridization the system undergoes a transition from a d-wave state to an s^{+-} state, in which the gap changes sign between hybridized pockets. This s^{+-} state has the full gap and at the same time supports spin resonance, in agreement with the data. Near the boundary between d and s^{+-} states the system develops s+id state which breaks time-reversal symmetry. For systems with only hole pockets, I argue for s^{+-} state in which the gap changes sign between hole pockets. I show that this state is qualitatively different from s^{+-} state when both hole and electron pockets are present. I further show that the transition from one s-wave state to the other involves highly unusual s+is state which again breaks time reversal symmetry.

Andrey Chubukov currently holds a faculty position at the University of Wisconsin-Madison. Prior to joining UW, Dr. Chubukov was a professor at the University of Maryland, College Park and a Research Scientist at the P.L. Kapitza Institute for Physical Problems in Moscow, respectively. He has authored/co-authored over 220 research papers, and has given over a 100 national and international invited and plenary conference and workshop talks, colloquia, and seminars at various Universities and Research Centers.

__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/