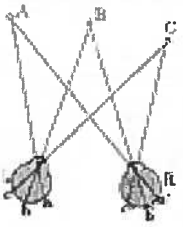

WEEKLY CALENDAR

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March 5, 2007

General Seminar

"Dust Yields in Clumpy SNe Shells: 1987A Revisited"

3:40PM / Thursday, 8 March 2007 / Room 109

[Refreshments served at 3:15 PM in Room 229 Nicholson]

Host: Dr. Geoffrey Clayton

Barbara Ercolano, Ph.D.

Harvard-Smithsonian Center for Astrophysics

Special Seminar

"A unifying perspective on charge fractionalization"

3:40PM / Monday, 12 March 2007 / Room 109

[Refreshments served at 3:15 PM in Room 229 Nicholson]

Host: Dr. John DiTusa

Alexander Seidel, Ph.D.

Florida State University National High Magnetic Field Laboratory

Condensed matter physicists are generally faced with the task of solving problems involving some 1024 particles that interact strongly. Amazingly, in many cases this task of seemingly hopeless complexity is amenable to the following simple strategy: Try to find a way to (almost) switch of the interactions in a manner that preserves all the fundamental properties of the system. If this is possible, one says that the system is "adiabatically connected" to a non-interacting system.

In the past 20 years, however, much focus has been on problems where the traditional approach does not seem feasible. In particular, a new paradigm has surfaced which applies to certain novel incompressible quantum liquids that are said to have "topological order". This new paradigm encompasses the fractional quantum Hall liquids, as well as some theoretically proposed scenarios for novel magnetism in materials similar to the parent compounds of high transition temperature superconductors. The phenomenology of topologically ordered states is very exotic, including fractionally charged excitations and fractional braiding statistics. This fact seems to preclude the possibility that these states have simple non-interacting limits. In spite of this, it will be shown in this talk that such a trivial limit does exist for fractional quantum Hall systems. In fact, by studying quantum Hall states on cylinders with varying circumference, these states can be adiabatically evolved into simple one-dimensional charge-density-wave systems. This point of view provides simple, intuitive pictures for some of the exotic properties of fractional quantum Hall systems. In particular, the principles of charge fractionalization in two spatial dimensions and in one spatial dimension are completely unified by this approach. The potential usefulness of this adiabatic continuity for some unresolved problems will also be discussed.

References:

[1] A. Seidel, H. Fu, D.-H. Lee, J. M. Leinaas, J. E. Moore
Phys. Rev. Lett. 95, 266405 (2005).
[2] A. Seidel, D.-H. Lee, Phys. Rev. Lett. 97, 056804 (2006).
[3] A. Seidel, D.-H. Lee, cond-mat/0611535.

Publications:

"Head-on collisions of boson stars," **C. Palenzuela, I. Olabarrieta, L. Lehner**, and S. L. Liebling, Phys. Rev. D 75 064005 (2007).