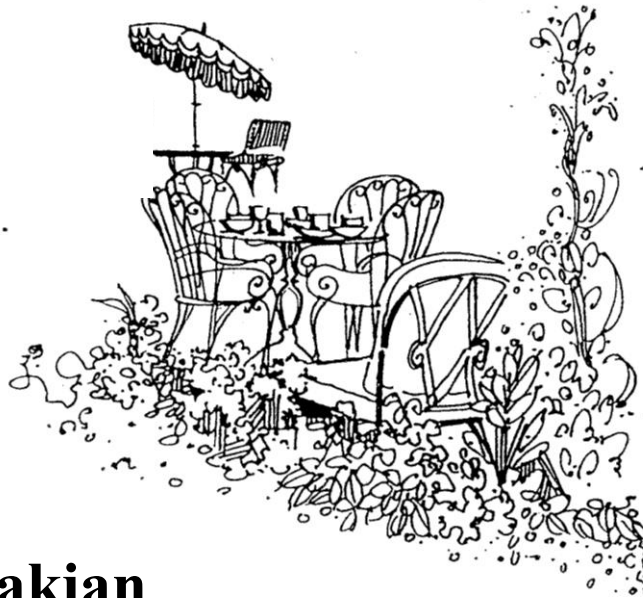


Chez Pierre

Presents ...

Monday, October 18, 2010
12:00pm
MIT Room 4-331



Raffi Budakian

University of Illinois at Urbana-Champaign

“Evidence for Half-Integer Fluxoid States in Mesoscopic Rings of Sr_2RuO_4 ”

In the past decade, there has emerged strong evidence to support spin-triplet superconductivity in the layered-perovskite Sr_2RuO_4 (SRO), whose ground state is thought to be analogous to the A-phase of superfluid ^3He . It is believed that the spin and orbital degrees of freedom of the superconducting order parameter can give rise to states with remarkable properties, such as chiral domains, and half-quantum vortices (HQV) that may obey non-Abelian statistics. With regards to the latter, recent theoretical work suggests that the HQV state could be made energetically favorable in mesoscopic SRO samples. In this talk, I will present a new method for ultrasensitive cantilever magnetometry that allows us to probe the magnetic response of mesoscopic samples of SRO. Our most intriguing observation is the appearance of fractional fluxoid states having half the magnetic moment of the full, or integer, fluxoid. In this talk, I will discuss the conditions required to stabilize the half-integer fluxoid states, and also present some ideas as to their origin.

[1] A. W. Sandvik, Phys. Rev. Lett. 98, 227202 (2007).

[2] T. Senthil et al., Science 303, 1490 (2004).

[3] A. W. Sandvik, Phys. Rev. Lett. 104 177201 (2010).

[4] A. W. Sandvik, V. N. Kotov, and O. P. Sushkov (in progress).