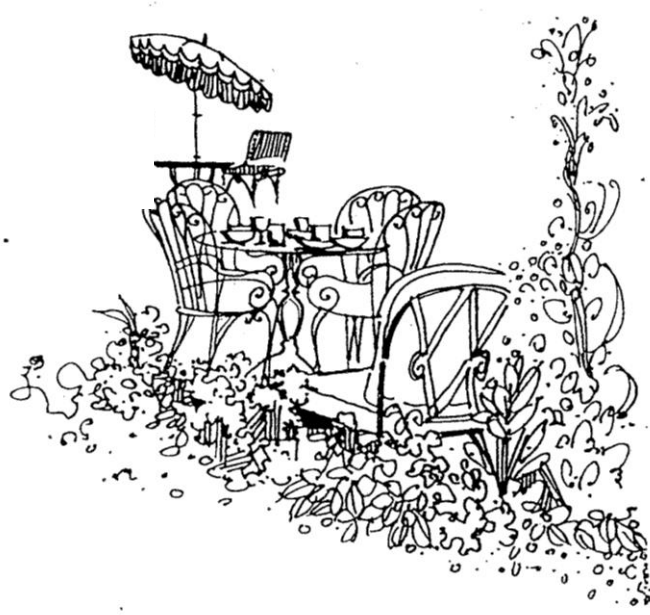
Chez Pierre

Presents ...

Monday, September 26, 2011
12:00pm
MIT Room 4-331



Qimiao Si

Rice University

"Quantum Criticality and Strongly Correlated Electrons"

Quantum criticality results from competing interactions of correlated systems that favor rivaling ground states. It is, or sometimes suspected to be, pertinent to a variety of strongly correlated systems, and its influence reaches a surprisingly wide range of parameter space. In this talk, I will discuss some of the representative issues that are being considered in heavy fermion systems, which in recent years have become a prototypical setting for quantum criticality. Among the issues, one is quantum criticality beyond the Landau framework of order-parameter fluctuations, which appears here in the form of a Kondo breakdown local quantum criticality [1]. Another concerns emergent phase near quantum critical points, which manifests here in the form of a global phase diagram [2]. Finally, I will touch upon heavy fermion superconductivity, in particular its interplay with metallic antiferromagnetism and electronic localization [3].

[1] Q. Si, arXiv:1012.5440, in "Understanding Quantum Phase Transitions", edited by L. D. Carr (2010).
[2] Q. Si and F. Steglich, Science 329, 1161 (2010).
[3] O. Stockert et al, Nature Phys. 7, 119 (2011).