

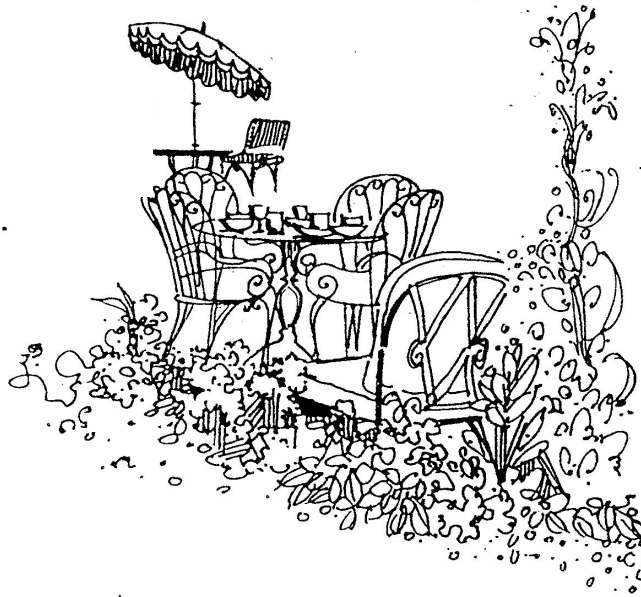
Chez Pierre

Presents ...

Monday, September 28, 2015

12:00pm

MIT Room 4-331



Chez Pierre Seminar

Chandra Varma

University of California-Riverside

MIT Room 6C-307 for the Fall 2015 term

”Quantum Critical Fluctuations Leading to Strange Metals in 2D Metallic Anti-ferromagnets, Ferromagnets and in the Cuprates“

Models for metallic anti-ferromagnets map to the dissipative XY model as do XY ferromagnets, the superconductor-insulator transition, and the model for loop-current order in Cuprates. The spectral function of the quantum-critical fluctuations for this model in 2D for a range of parameters is determined by topological defects - instantons and 2D vortices; it is a separable function of space and time, with a $1/\tau$ dependence at criticality. The marginal fermi-liquid properties for the fermions follow from coupling to such fluctuations.

These fluctuations are directly measured by inelastic neutron scattering in the quantum-critical region of the new Fe- based compounds, in a 2D ferromagnet and in heavy-Fermions, and deduced in cuprates through analysis of ARPES. ARPES also reveals the coupling function of the fermions to the fluctuations so as to give nearly angle-independent normal self-energy but d-wave pairing energy.