

# *Chez Pierre*

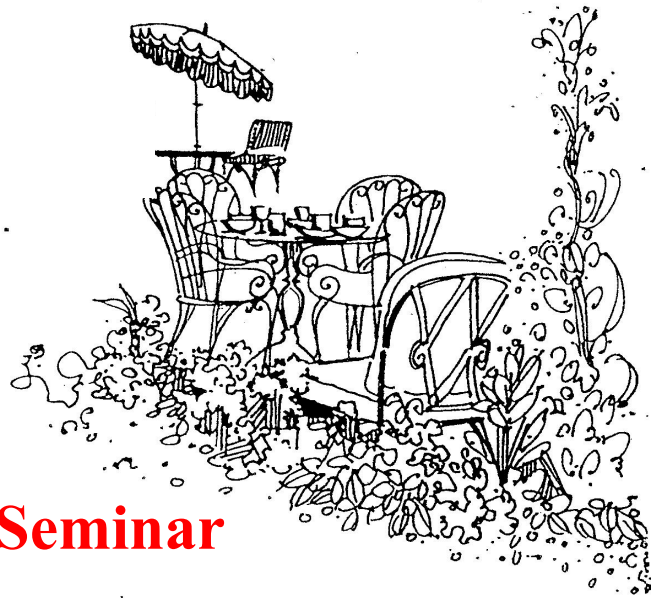
Presents ...

**Monday, November 19, 2018**

**12:00pm Noon**

**MIT Room 4-331**

## **Chez Pierre Seminar**



**Peter Abbamonte**, University of Illinois-Urbana Champaign

“Density fluctuations in strange metals”

Metals exhibit plasmon excitations, which are collective modes one can think of as sound waves in the electron density (as opposed to the atomic density). The so-called "strange metals" are bizarre phases of matter that fail to exhibit well-defined quasiparticles but somehow are still good conductors, leading one to wonder what degree of freedom is actually carrying the charge. A sensible question to ask is, Do strange metals exhibit plasmons? In this talk I will describe momentum-resolved EELS (M-EELS) measurements of several strange metals, notably  $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+x}$  which is also a high temperature superconductor. I will show that plasmon excitations are barely defined in these materials, which instead exhibit an incoherent continuum of charge fluctuations with no particular length or time scale. These fluctuations exhibit a simple, power law form, suggesting some kind of scale-invariant phase is present, though the data *are not* consistent with a (textbook) quantum critical point. I will discuss efforts by theorists to explain this phenomenon using holographic approaches based on the AdS-CFT correspondence.