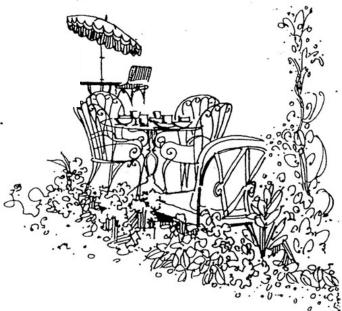*Chez Pierre*

Presents ...

Friday, September 23, 2022
12:00 pm
Duboc Room - 4-331

Special Chez Pierre Seminar

Charles Kane, University of Pennsylvania

"Topology of the Fermi Sea"

The Fermi sea in a metal is a topological object characterized by an integer topological invariant called the Euler characteristic, χ_F. In this talk we will argue that for a 2D fermi gas χ_F is reflected in a quantized frequency dependent non-linear 3 terminal conductance that generalizes the Landauer conductance in D=1. We will critically address the roles of electrical contacts and Fermi liquid interactions, and we will propose experiments on 2D Dirac materials, such as graphene, using a triple point contact geometry. We will go on to show that for a D dimensional Fermi gas, χ_F is also reflected in the multipartite entanglement characterizing D+1 regions that meet at a point. This introduces a new connection between topology and entanglement and generalizes a well-known result that relates the bipartite entanglement entropy of a 1+1D conformal field theory to its central charge c.   We will argue that for an interacting 3D Fermi liquid, χ_F distinguishes distinct topological Fermi liquid phases.