

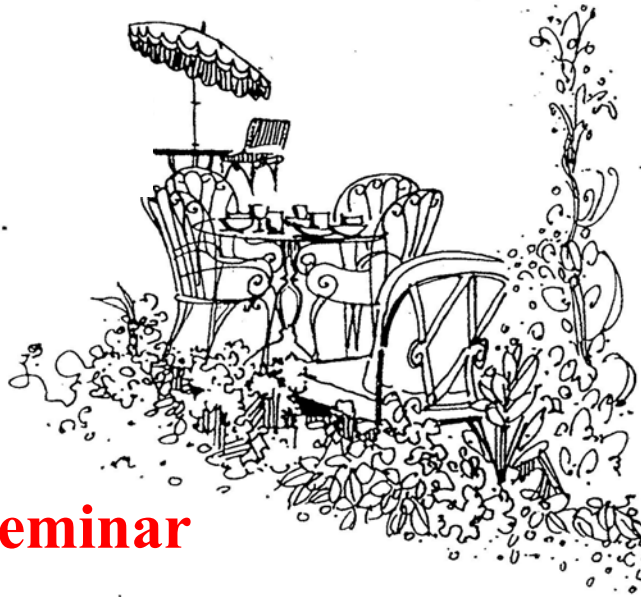
Chez Pierre

Presents ...

Monday, March 1, 2021

12:00pm Noon

Broadcast via Zoom



Chez Pierre Seminar

Brian Skinner – Ohio State University

"The case for samarium hexaboride without neutral fermions"

During the last six years there has been tremendous excitement about the Kondo insulator samarium hexaboride (SmB_6), following measurements of quantum oscillations of magnetization that coincide with a bulk insulating state. Such oscillations typically indicate a Fermi surface, raising the tantalizing possibility that the material hosts a Fermi surface of charge-neutral quasiparticles. A number of other "Fermi-surface-like" properties have also been detected, including a large, linear-in-T specific heat and a large optical conductivity. In this talk, however, I want to review the case for a "non-exotic" explanation of the SmB_6 measurements, in which the material is described merely as a disordered, narrow-gap semiconductor. This description turns out to require a revision of the canonical theories of the semiconductor impurity band in order to account for the unusual nature of the hybridized bands. I point out the ways in which the non-exotic description of SmB_6 is consistent with experiments, the ways in which it might not be, and the experimental results that would be needed to rule out the non-exotic "null hypothesis."