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 (SmB6), 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 SmB6 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 SmB6 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.