Chez Pierre

Presents ...

Monday, November 6, 2017

12:00pm Noon

MIT Room 4-331

Chez Pierre Seminar

Stephen D. Wilson – University of California, Santa Barbara

"Unconventional metals from doped spin-orbit assisted Mott states"

A variety of new electronic states are predicted to arise in the presence of strong spin-orbit coupling and appreciable Coulomb interactions. Depending on the crystal lattice type and the relative balance of these energy scales, states ranging from new forms of quantum spin liquids to correlated topological phases to high temperature superconductivity are predicted to arise in materials at this frontier. The spin-orbit assisted (or $J_{eff}=1/2$) Mott state is one such example where spin-orbit coupling, strong crystal field splitting, and residual on-site Coulomb interactions act together to stabilize an unexpected Mott insulator. Here I will present some of our group's recent work exploring how this spin-orbit Mott state melts into nearby unconventional metallic states upon carrier substitution. Competing electronic states discovered close to the spin-orbit Mott phase will be a particular focus and their implications for more exotic phases at higher doping concentrations will be discussed.