

Chez Pierre

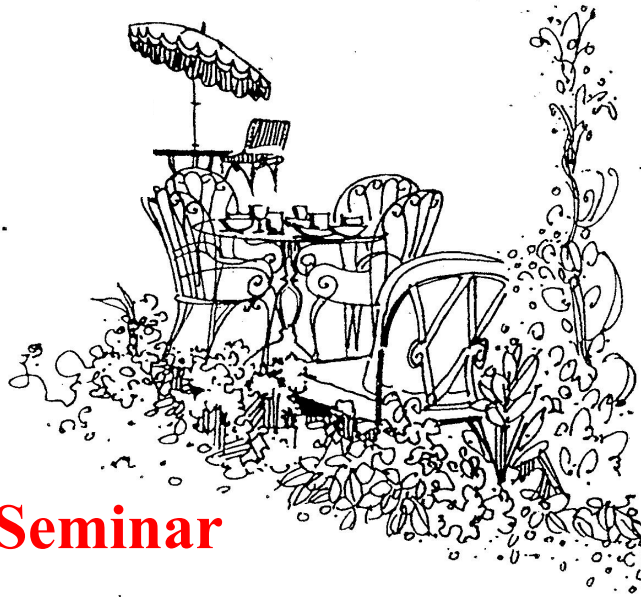
Presents ...

Monday, April 2, 2018

12:00pm Noon

MIT Room 4-331

Chez Pierre Seminar



Johnpierre Paglione – University of Maryland

“Exotic pairing and ordered states in topological half-Heuslers and nickel pnictides”

In all known fermionic superfluids, Cooper pairs are composed of spin-1/2 quasi-particles that pair to form either spin-singlet or spin-triplet bound states. The "spin" of a Bloch electron, however, is fixed by the symmetries of the crystal and the atomic orbitals from which it is derived, and in some cases can behave as if it were a spin-3/2 particle. The superconducting state of such a system allows pairing states to form beyond triplet, with higher spin quasi-particles combining to form quintet or even septet pairs. I will review our experimental evidence for high-spin pairing in the exotic superconducting state of the half-Heusler compound YPtBi, as well as discuss the influence of spin-orbit coupling on both the normal and superconducting states of this system. In addition, I will introduce our recent work on a nickel-based pnictide superconductor where charge order and nematic fluctuations help shape a phase diagram reminiscent of the high temperature superconductors.