Chez Pierre

Presents ...

Monday, March 22, 2021

12:00pm Noon

Broadcast via Zoom

Chez Pierre Seminar

Johnpierre Paglione – University of Maryland

"Exotic superconductivity in nearly ferromagnetic UTe2"

Topological superconductivity has attracted great interest in condensed matter physics because of its potential applications in quantum computing. Spin-triplet superconductors are one promising class that can host the topological excitations of interest, but experimental realizations are few and far between. Here we report the discovery and properties of superconductivity in UTe2, a material closely related to known ferromagnetic superconductors such as UGe2, URhGe, and UCoGe, but lacking long-range magnetic order. Several experimentally measured properties feature telltale indications of an unconventional energy gap and a spin-triplet pairing state that is consistent with the presence of strong magnetic fluctuations due to an incipient quantum critical point. Furthermore, the superconductivity in UTe2 is remarkably robust to extremely high magnetic fields, showing re-entrant pairing up to at least 65 Tesla. I will review basic properties and our detailed investigations of the gap structure, relation to incipient magnetic order and Kondo coherence, as well as indications of an anomalous normal state fluid that suggest many surprises await for this exotic material.