



**Friday November 22<sup>nd</sup>, 2013**  
**4:10 – 5:00 pm, EPS108**

**“From Humble Electrons to Massive Quasiparticles: The Physics of Heavy-Fermion Materials”**

**Dr. Benjamin White, University of California, San Diego**

**Abstract:**

The properties of a simple metal such as sodium or copper can be described fairly well by models that, for simplicity, ignore interactions between electrons. When this unrealistic assumption fails in more complex materials, the canonical Landau-Fermi liquid theory is applied in which conduction electrons and their interactions are transformed into non-interacting quasiparticles with renormalized masses. In the case of so-called “heavy fermion” systems, a lattice of local magnetic moments is immersed in a sea of conduction electrons which undergoes the Kondo effect at each site, leading to the formation of quasiparticles of order 1000 times heavier than a free electron. In this colloquium, the fascinating story of heavy fermion physics will be presented, emphasizing the development of the field and touching on related topics of broad relevance to condensed matter physics such as quantum phase transitions and non-Fermi liquid behavior. The introduction of these topics sets the stage for a brief survey of some recent research on the important heavy fermion compound CeCoIn<sub>5</sub>.

**Host:**

John Neumeier

***\*\*\*Refreshments served in the EPS second floor lobby at 3:45\*\*\****

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