HEAVY FERMION: Rise of the topologies

A TALK BY Piers Coleman

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DATE / TIME	Monday, 21st of January 2013, 04:00 p.m. (CET)
LOCATION	Seminar Room 138C, Vienna University of Technology, "Freihaus"-building, 9th floor, "yellow" – Wiedner Hauptstraße 8-10, A-1040 Vienna, AUSTRIA

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Heavy fermion materials, discovered more than four decades ago, contain the largest spin-orbit coupling interactions known to mankind. Yet strangely, their link with topology has only become evident in the last few years. I will talk about two new generations of topologies now challenging this once peaceful, venerable field.

These are classes of insulator and "failed Kondo insulator". We'll look at the world's oldest topological insulator, unknowingly discovered at Bell Labs and Stanford 45 years ago, yet only predicted to be topological in 2011, and recently confirmed to be so in a series of hot new experimental studies of the past few months. I'll talk about the particular challenges that are faced in trying to understand and model the band-structure of these materials.

We'll also look at "vortex metals", failed Kondo insulators containing a line vortex in momentum space. There are two new candidates for this state of matter, and if you come to my talk, you'll not only learn that what they are, you'll see how they challenge our field in a fundamental fashion.