Fermiology in Solid State Sciences

By
Prof Mukunda P Das
Department of Theoretical Physics, RSPE
The Australian National University Canberra, ACT 2601

Date: 25 October 2016, Tuesday
Time: 4pm – 5pm
Venue: Hilbert Space (PAP-02-02)
Host: Assoc Prof Pinaki Sengupta

Abstract

The Fermi surface is an abstract object in the reciprocal space for a material lattice, enclosing the set of all electronic band states that are filled according to the Pauli principle. Its topology is dictated by the underlying material structure, and its volume is the carrier density in the material. The Fermi surface is central to predictions of thermal, electrical, magnetic, optical and superconducting properties in metallic systems.

In this talk I shall discuss mainly complex correlated systems emphasising several key facts about Fermi surfaces, where a proper theoretical understanding is still lacking. We address some critical difficulties whether the Fermi surface is a ground state property and concerning its stability in strongly correlated systems.

Short Biography

Prof Mukunda Das is Honorary Professor in Theoretical Physics. He is Fellow of American Physical Society, Institute of Physics (UK) and Australian Institute of Physics. His research interest concerns the fundamental aspects of condensed matter, which include Superconductivity, Vortex Matter, Bose-Einstein Condensation, Meso- and Nanoscopic Systems, Strongly Correlated Electrons, Density Functional Theory and Theory of Disordered States. He is also interested in the professional ethics, an important subject of philosophy.