ICTS Seminar

Title : A First-Principles Correlated Approach to the Normal State of Layered Strontium Ruthenate

Speaker : Mukul S Laad, Institute of Mathematical Sciences, Chennai

Date : Wednesday, September 21, 2016

Time : 11:30 am

Venue : Emmy Noether Seminar Room, ICTS Campus, Bangalore

Abstract : Unconventional Superconductivity (USC) in layered Sr$_{2}$RuO$_{4}$ is of long-standing interest because it is long thought to be a superconducting analogue of ^{3}He. However, resurgence of recent data points toward a much more involved pairing symmetry, where the interplay between multi-band character, sizable multi-band electronic correlations and strong spin-orbit coupling conspires to select an apparently rather unusual, hitherto unknown, USC pair symmetry. This mandates detailed revisiting of the normal state and, in particular, of the T-dependent incoherence-coherence crossover. Here, using a modern first-principles correlated view, we study this issue in the real structure of Sr$_{2}$RuO$_{4}$ in detail and present a unified and quantitative description of a range of unusual physical responses in the normal state across the crossover. Armed with these strengths, we propose that a new and important element, that of dominant (quasi-one-dimensional xz,yz) interband charge fluctuations in a ``Hund'' metal, may be a primary pair glue for USC in this system. We will emphasize internal consistency of our proposed scenario vis-a-vis a wide range of constraints imposed by extant data.