Area Seminar

Title	The enigma of Cuprate high-temperature superconductivity: clues from infrared optical conductivity
Date and Time	03/08/2012 11:00:00
Speaker	Navinder Singh Physical Research Laboratory, Ahmedabad
Area	Theoretical Physics
Venue	Room No. 469
Abstract	Recently, K. Y. Yang, T. M. Rice, and F. C. Zhang (YRZ) have proposed an ansatz for electron Green's function in the pseudogap and superconducting states of Cuprate high temperature superconductors based upon their previous study of Renormalized Mean Field Theory (RMFT) of Cuprates. This RMFT captures the essence of Phil Anderson's Resonance Valence Bond (RVB) model of Cuprates that is based on the strong electron-electro correlation effects. We apply YRZ ansatz to compute optical conductivity using Green's function formulation of Kubo formula. In the over-doped region, optical properties of the Cuprate superconductors agree, qualitatively, with BCS form for d-wave pairing. But in the pseudogap regime a number of anomalous features appear not explainable by BCS form (due to strong electron-electron correlation). We analyze the development of pseudogap and superconducting gap with the variation of temperature and doping. Our results qualitatively agree with the measurements. An effort will be made for pedagogical presentation.