

## **ICTS Seminar**

Title : Studies of Diamagnetism and Thermoelectric Transport in High Temperature Superconductors and Graphene

Speaker : Kingshuk Sarkar, Indian Institute of Science, Bangalore

Date : Wednesday, December 20, 2017

Time : 10:00 AM

Venue : Emmy Noether Seminar Room, ICTS Campus, Bangalore

Abstract : In the first part I will talk about the Nernst effect [1] and fluctuation diamagnetism and their correlation in high- $T_c$  superconductors. I will describe a calculation employing a phenomenological Ginzburg-Landau-like model to evaluate the transport coefficient  $\alpha_{xy}$  and the magnetization  $M$ . The dimensionless ratio  $M/(T\alpha_{xy})$  can be used to quantify the correlation between the Nernst effect and magnetization over the entire range of experimentally accessible values of field, temperature and doping. I will also demonstrate how the model employed explains the occurrence of diamagnetism and the Nernst effect in the pseudogap phase of cuprates.

In the second part I will talk about our recent study on the thermoelectric transport properties across twisted bilayer graphene [2]. We develop a phenomenological model based on the Landauer-Büttiker transport formalism to understand the thermoelectric transport measurement performed between two individual graphene layers placed within van der Waals separation with a relative twist angle between them. By performing a detailed analysis of the Seebeck coefficient we conclude that the measured thermopower is determined by the cross-plane layer-breathing mode rather than the properties of the tunnel junction.