INSTITUTE SEMINAR

Friday, 27 June 2014   **4:00 p.m.**   **Fermion**

Speaker:
Upendra Harbola
IPC Department, Indian Institute of Science, Bangalore

Title:
Nonequilibrium fluctuating thermodynamics

Abstract:

The goal of statistical mechanics is to provide microscopic justification for the thermodynamic laws, in particular the second law of thermodynamics. Extending these concepts to nonequilibrium systems has been a long standing problem. In recent years, there have been some remarkable developments in this regard. Some exact relations, known as fluctuation relations, have been derived and experimentally verified for systems out of equilibrium. I shall discuss these recent developments.

Assuming a Markovian stochastic dynamics, I shall formulate the second law of thermodynamics for systems driven arbitrarily far from their equilibrium state. I shall then extend the ensemble picture of the second law to single stochastic trajectories. The fluctuation theorem follows naturally from the trajectory formulation. I shall then discuss some applications and different versions of the fluctuation theorem obtained in semiclassical and quantum model systems.