

Seminar

Thermodynamics vs. Dynamics: Perspectives from phase transitions and fluid turbulence

Mahendra K. Verma

Indian Institute of Technology, Kanpur

Thermodynamics successfully describes natural phenomena under equilibrium, but principles of dynamics are invoked for nonequilibrium systems. Both these frameworks have different sets of assumptions. In this talk we elucidate how some of the critical assumptions of equilibrium statistical mechanics are broken in fluid turbulence and phase transitions. Then we discuss phase transition in a dynamical perspective. We show how a single framework based on large-scale modes successfully explains hysteresis at zero temperature, and phase coexistence (as in melting transition) in the presence of noise induced by temperature. Our model also explains how the width of the hysteresis loop shrinks in the presence of noise, as well as shows how initial condition can play a significant role in phase transitions.

Friday, Apr 29th 2016

11:30 AM (Tea/Coffee at 11:15 AM)

Seminar Hall, TCIS