ICTS Postdoc/Graduate Student Seminar Series

Title : Hydrodynamic fluctuations and universality in conserved sandpile models

Speaker : Arghya Das, ICTS-TIFR, Bangalore

Date : Friday, September 7, 2018

Time : 11:15 AM

Venue : Emmy Noether Seminar Room, ICTS Campus, Bangalore

Abstract : Macroscopic systems often exhibit out of equilibrium complex features characterised by large scale correlations and power laws. Self organised criticality (SOC) was originally proposed as a potential mechanism in which similar effects can emerge entirely from local interactions. Although a variety of models had been devised to describe such power laws, most of them are seen to come with distinct exponents. The questions of their possible universality and origin of SOC still remain unsettled.

"Conserved sandpiles" are one of the most studied category of such models. We found that, although they are inherently out of equilibrium, a broad class of these models possess equilibrium like features in macroscopic spatial and temporal scales: the steady state density fluctuations are characterised by a nonequilibrium counterpart of chemical potential, and the transport coefficients (viz. diffusivity and conductivity) are related to local density fluctuation through Einstein relation. In this talk, I will demonstrate that the resulting hydrodynamic equation leads to a remarkable relation among the critical exponents and a variety of models are seen to follow it.

Note: This will be an ongoing biweekly seminar series (Fridays, 11:15 am) by the ICTS postdocs and graduate students