

INSTITUTE LECTURE

Clustering Correlations and Phase Separation in Fluctuating Environment

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Abstract : Shared histories lead to strong correlations. Thus, particles which find themselves in the same randomly evolving environment have a tendency to cluster and approach an interesting state. This talk is about such states, their scaling properties, and how they develop in time. A key signature is that the scaled correlation function shows a singularity at small argument (either a cusp or a divergence), pointing to giant fluctuations. Fluctuation-dominated states lie between order and disorder, yet differ in an essential way from customary critical states. We will discuss their occurrence in a variety of theoretical systems (particles on a fluctuating surface; aster-induced lipid clustering; a long-range Ising model), as well as their recent observation in an experiment on colloidal particles in an active fluid.



About the speaker:

Prof. Mustansir Barma is a distinguished theoretical physicist known for his seminar contribution to statistical physics and condensed matter theory. He has been closely associated with TIFR, where he held senior academic positions, including the Directorship of the institute during 2007-2014.

His research spans a wide range of topics, including non-equilibrium statistical mechanics, driven diffusive systems, phase transitions, and many-body phenomena. Prof. Barma's work has significantly advanced our understanding of collective behaviour in interacting particle systems, with applications ranging from surface growth to transport processes. A fellow of major science academies in India, he has received several prestigious honours in recognition of his scientific contributions and leadership in the physics community

Tuesday, April 28, 2026 at 2:30 PM.

Venue: Prof. S.M. Chitre Hall, UM-DAE CEBS