"I WANNA KNOW FLUCTUATION"

A One-day Discussion Meeting On Fluctuation

Venue : Institute Lecture Hall

Date : 06. 03. 2003

ABSTRACTS

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Speaker : A. M. Srivastav

Title : Fluctuations in Physics: a Brief Survey

Fluctuations play a very important role in almost every branch of physics. This talk will give a brief introduction to some of the examples, namely, fluctuations in phase transitions, fluctuations in quantum field theory (perturbative and non-perturbative), and fluctuations in the universe

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Speaker : Goutam Tripathy

Title: Fluctuations Out Of Equilibrium

I will talk about fluctuations in nonequilibrium systems. The basic ideas will be discussed by taking simple model systems of driven lattice gases and moving interfaces. Interesting scale invariance arises in these systems because of break down of fluctuation-dissipation relation.

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Spaeker : Debasis Dan

Title : Giant Diffusion and Optimal Transport

Systems in stationary nonequilibrium states (steady states) are always beset with fluctuations. These fluctuations are small and may not be noticeable for macroscopic variables. We focus on some recent results which show that these fluctuations can be enhanced by orders of magnitude near bifurcations or points of instability. For some specific class of potentials it has also been shown that diffusion coefficient can decrease with increasing temperature; a counter intuitive phenomena and is related to coherent or optimal transport. Consequence of these on noise induced transport will be discussed.

Speaker : D. Sahoo

Title: Fluctuation In Fluids

Theories of fluctuations in fluids will be reviewed at various levels as outlined below:

1. Fluctuations in physical variables of a closed system in thermodynamic equilibrium, their probability distributions and time correlations.
2. Landau-Lifshitz theory of fluctuating hydrodynamics; equilibrium fluctuations in fluid hydrodynamic variables.
3. Fluctuations in nonequilibrium steady states–fluid under steady temperature and velocity gradients.
4. Fluctuations in an arbitrary nonequilibrium state.
5. Fluctuations at instabilities leading to order and dissipative structure–the Rayleigh-Benard instability.

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Speaker : S. C. Phatak

Title: Fluctuations in Relativistic Heavy Ion Collisions

I shall begin with the discussion on fluctuations in cross sections in low energy nuclear scattering. I shall argue that the fluctuations essentially arise due to a large number of overlapping resonances. I shall then discuss about what one can learn from these fluctuations. In the second part of my talk, I shall consider the emerging area of fluctuations in relativistic heavy ion collisions. I shall first motivate why one should look at fluctuations in these reactions and then discuss what one may possibly learn from these.

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Speaker : B. N. Dev

Title : Fluctuation In Physics - Experimental Aspects

Fluctuations are present and important in phenomena pervading various fields as diverse as physics, electronics, chemistry, astronomy, metro- logy, biology and interdisciplinary areas. In this talk, fluctuations (noise) in some physical systems dealing with electrical conductance, tunneling current and phase transitions will be discussed with accent on the experimental aspects. How the study of fluctuations can provide valuable information, which cannot be obtained by deterministic techni- ques, will be explained with an example of a familiar phenomenon.

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