Satyendra Nath Bose National Centre for Basic Sciences

Azadi Ka Amrit Mahotsav

Visitor, Associates and Students' Programme (VASP) presents Webinar Series on

Statistical Mechanics

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TITLE

The long-ranged influence of disorder on active systems

ABSTRACT

The talk will describe the impact of quenched random potentials on active matter. By developing a methodology for studying these systems both bulk and boundary disorder will be considered. For dilute systems, it will be shown that bulk disorder leads to generic long-range correlations, decaying as a power-law, and steady-state currents. Disorder localized along a wall confining the system leads to long-range density modulations and eddies whose amplitude decays as a power law with the distance from the wall, but whose extent grows with it. The talk will also consider dense scalar active systems whose sole hydrodynamic mode is the density. These are known to exhibit a motility induced phase separation in dimensions d >= 2. It will be shown that bulk potential disorder destroys the transition in dimensions d<4, while boundary disorder destroys it in dimensions d<3.

SPEAKER

Professor Yariv Kafri, *Technion - Israel Institute of Technology, Israel*

Prof. Yariv Kafri is the Lidow Chair in Solid State Physics at the Technion - Israel Institute of Technology, Haifa, Israel. His research is focused on statistical mechanics and its applications, concerning systems which are far from equilibrium and which often display striking dynamical and collective behavior, usually not observed in equilibrium. His research interest spans a wide range of topics, including non-equilibrium fluctuations, molecular motors, translocation of polymers, conformations of DNA molecules, chemotaxis of bacteria, target location by proteins and physics of vortices. Recently, he has been working on active-matter systems and driven diffusive systems; he has contributed immensely in problems of characterizing large-scale spatio-temporal structures, dynamical phase transitions and large deviations in such systems.