ICTS | INTERNATIONAL CENTRE for THEORETICAL SCIENCES

TATA INSTITUTE OF FUNDAMENTAL RESEARCH

ICTS Statistical Physics Journal Club Seminar

Title : Breakdown of hydrodynamics below four dimensions in a dipole-conserving fluid.

Speaker : Sahil Kumar Singh (ICTS - TIFR, Bengaluru)

Date : Tuesday, 14th March 2023

Time : 03:30 pm (IST)

Abstract : A many body system in equilibrium can be described by the rules of statistical mechanics. However, non-equilibrium situations are more ubiquitous in nature than equilibrium ones, and their general theory is not known. Hydrodynamics is one of the attempts to describe them. It is like a perturbation theory, with the zeroth order dynamics (also referred to as the Euler equations) obtained by assuming local equilibrium, and the first order dynamics (known as the Navier-Stokes equation) obtained by treating deviations from local equilibrium in a first order approximation. However, in certain situations, the first order terms may diverge, leading to a breakdown of the perturbation theory and thus of hydrodynamics itself. We will discuss such breakdown in a dipole-conserving fluid below four dimensions. Our discussion will be based on [1].

References:

[1] P. Glorioso, J. Guo, J. F. Rodriguez-Nieva and A. Lucas, *Breakdown of hydrodynamics below four dimensions in a fracton fluid,* Nature Physics (**18**), August 2022, 912-917.

Venue : **Hybrid Mode**

Offline: Chern Lecture Hall (ICTS)

Online: Please click on the below link to join the seminar

https://icts-res-in.zoom.us/j/82697507647?pwd=MkYrVDFxbXdocGxqZUlRdnBhVk5tdz09

Meeting ID: 826 9750 7647

Passcode: 141423