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### **ICTS Synopsis Seminar**

**Title** : Intermittency, Multifractality and Chaos in turbulence

**Speaker** : Ritwik Mukherjee (ICTS-TIFR, Bengaluru)

**Date** : Thursday, 11 December 2025

**Time** : 11:30 AM (IST)

**Abstract** : We explore how intermittency influences the statistical properties of the dissipation field by revisiting multifractality, which serves as a robust framework for interpreting intermittency. By comparing phenomenological predictions with numerical simulations, we find that, surprisingly, fluctuations follow a large-deviation principle in the Lagrangian perspective but not in the Eulerian one. We then examine how intermittency affects the chaotic properties of turbulent flows, showing that the scaling of Lyapunov exponent is controlled by intermittent fluctuations of velocity gradients. Finally, we introduce a geometric viewpoint on intermittency. By separating the magnitude and orientation of velocity increments, we reveal intermittency encoded in the structural organization of the flow field, providing a new pathway to understanding anomalous scaling, even in flows traditionally considered non-intermittent based on classical structure functions. If time permits, I will discuss the other projects in my thesis on solutions of the Navier-Stokes and Euler equations.

**Venue** : Feynman Lecture Hall

Zoom link: <https://icts-res-in.zoom.us/j/98246260364?pwd=rmRM3GWA4vMridWPXP8HggB7u138Lg.1>

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