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ICTS Fluid Dynamics Seminar

- Title** : Modeling Mixing in Turbulence – Non-Markovianity is essential
- Speaker** : Prateek Gupta (Indian Institute of Technology Delhi)
- Date** : Friday, 28 November 2025
- Time** : 11:30 AM (IST)
- Abstract** : Mixing is a classically accepted "syndrome" of turbulence. In this talk, I will discuss some of our findings on mixing of density inhomogeneities (active scalars) in homogeneous isotropic random fields such as hydrodynamic turbulence and random shocks. A denser inhomogeneity pushes into its surroundings and a lighter inhomogeneity shrinks due to differential diffusion. This results in different characteristic mixing times, with mixing time identified as the time instant when diffusion takes over from stirring. As an attempt to model this, we show that existing (and widely used) Markovian synthetic turbulent fields fail to capture mixing of both passive scalars and active scalars. Finally, we explain in detail how non-Markovianity captures essential physics of turbulence phenomenologically and helps in modeling mixing in turbulence.
- Venue** : Emmy Noether Seminar Room
Zoom Link: <https://icts-res-in.zoom.us/j/92605744242?pwd=ObVZ1av3viAdVi7ZlwBYb7BOUyUJOD.1>
Meeting ID: 926 0574 4242
Passcode: 282829