



ICTS

INTERNATIONAL  
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TATA INSTITUTE OF FUNDAMENTAL RESEARCH

## **ICTS Fluid Dynamics Seminar**

- Title** : The role of synoptic circulations in lower-tropospheric dry static energy variability over a South Asian heatwave hotspot
- Speaker** : Hardik Shah (Indian Institute of Science Education and Research, Pune)
- Date** : Friday, 07 November 2025
- Time** : 11:30 AM (IST)
- Abstract** : We examine the role of the synoptic-scale circulation in the distribution of daily changes of 600-900 hPa dry static energy (DSE) in a South Asian heatwave hotspot. Using a combination of linear regression and decision trees, we identify how the quasilinear (mean-eddy) and nonlinear (eddy-eddy) components of the flow contribute to different parts of this distribution. We show that the presence of synoptic eddies leads to strong correlations in the quasilinear components due to quasigeostrophy, and that nonlinear components are observed to play an important role in the tails of this distribution. We show that the specific nonlinear components that are involved depend on the phase of growth or decay of DSE and of the pre-existing DSE anomaly. We identify energetically distinct configurations involved in the tails of this distribution, and identify eddy configurations corresponding to each of these energetic configurations, providing a discrete set of "regimes" which can be used to classify extreme daily DSE changes.
- Venue** : Emmy Noether Seminar Room  
Zoom Link: <https://icts-res-in.zoom.us/j/92098868858?pwd=zHkYaxVR0ba0sqwax8dwa7FbJIToOZ.1>  
Meeting ID: 920 9886 8858  
Passcode: 070809