ICTS Thesis Defense Seminar

Title : Stability Studies of Inviscid Shallow Water Flows on a Sphere

Speaker : Mukesh Singh Raghav (ICTS-TIFR, Bengaluru)

Date : Monday, 30 March 2026

Time : 10:30 AM (IST)

Abstract :
Geophysical flows are commonly studied using shallow water equations under β-plane approximation, which support zonally propagating equatorially trapped waves. There is a lack of comprehensive understanding of effects of shear on these waves. Additionally, the suitability of β-plane approximation has not been systematically addressed.

In this talk, I will address the effects of mean shear on waves and limitations of β-plane by contrasting the eigenfrequency and equatorial trapping of modes between equatorial easterly and westerly profiles.

Next, I will discuss the non-normal growth of the system. In contrast to β-plane, the non-normality of the governing operator on the sphere enables the system to exhibit significant non-normal growth. I will discuss the growth and structure of optimal initial conditions responsible for growth in different configurations on the sphere. Finally, I will briefly discuss some features of the non linear evolution of these states.

Venue : Zoom link: https://icts-res-in.zoom.us/j/93054319834?pwd=B8RWeTorF4EsEDZxnM9JXzMKQK9CNC.1
Meeting ID: 930 5431 9834
Passcode: 544856