ICTS PhD Seminar

Title : Nonlinear Instability and Turbulence Suppression in Stratified Flows

Speaker : Ritabrata Thakur (International Centre for Theoretical Sciences - TIFR, Bangalore)

Date : Friday, 6th November 2020

Time : 03:30 pm (IST)

Abstract : We study the effects of various degrees of viscosity variations with a nonlinear 'direct-adjoint' looping technique in a three-dimensional channel flow on the optimal disturbance and consequently the nonmodal energy growth in subcritical Reynolds number. Viscosity stratification introduces localisation of the optimal perturbation and nonlinearity is a crucial ingredient in predicting that the colder (or the higher-viscosity) wall plays an important role in sustaining the nonlinear optimal. The Orr and the (modified) lift-up mechanisms can symbiotically couple only in the nonlinear regime to give rise to inflectional base velocity profiles.

In the second half, we discuss measurements of geophysical turbulence in the Bay of Bengal with mixing meters. We study the role of low-salinity water in modulating subsurface turbulence and elaborate on the seasonal nature and the depth penetration of geophysical turbulence using data of over a year. This could be of importance to understand the feedback of the Bay to the Indian monsoon. We find a prolonged suppressed phase of geophysical turbulence and provide evidence of an interesting diurnally varying mixing signature in the Bay.

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