ICTS Seminar

Title : Capturing Turbulent Dynamics and Statistics in Experiments using Exact Coherent States

Speaker : Balachandra Suri (Institute of Science and Technology, Austria)

Date : Thursday, 21st January 2021

Time : 03:30 pm (IST)

Abstract : Turbulence is widely regarded as the last unsolved problem of classical physics. Despite the availability of well-defined governing equations, a tractable framework that ``predicts" the dynamical and statistical properties of (even weak) turbulence has eluded scientists. In this talk, we demonstrate that such a framework can be developed using unstable nonchaotic solutions of the Navier-Stokes equation, called Exact Coherent States (ECS). In a moderately turbulent quasi-two-dimensional laboratory flow, we show that fleeting appearance of coherent structures is related to the dynamical significance of ECS in turbulence. We then construct a low-dimensional model for flow dynamics near an ECS and forecast turbulent evolution for a short duration. Analyzing their statistical significance, we show that frequently appearing ECS capture statistical averages (e.g., rate of energy dissipation) of turbulent flows accurately. Finally, we provide a geometrical description of transient turbulence using dynamical connections between ECS.

Venue : Please click on the below link to join the seminar

https://zoom.us/j/97073248248?pwd=YmJsWnRuODlWcVhiZGxPMzhUVUFPUT09
Meeting ID: 970 7324 8248
Passcode: 917334