ME Seminar

MECHANICAL ENGINEERING
INDIAN INSTITUTE OF SCIENCE

Finding Order in Chaotic Hydrodynamic Systems

Dr. Balachandra Suri, Assistant Professor, ME@IISc

ABSTRACT

Fluids driven out of equilibrium, such as water flowing in a pipe due to a pressure gradient, display a rich variety of dynamical behaviors. For instance, spatiotemporally chaotic fluid motion can emerge either gradually or abruptly upon increasing the strength of driving. Additionally, chaos resulting from either transition scenario can be sustained or transient (with a finite lifetime). Recent numerical and experimental studies, borrowing ideas from the theory of low-dimensional nonlinear dynamical systems, have addressed some of these intriguing questions by identifying order that underpins chaotic dynamics. In this talk, we shall discuss some of these developments in the context of quasi-two-dimensional turbulence and hydrodynamic-quantum analogs.

ABOUT THE SPEAKER

Balachandra Suri recently joined the Department of Mechanical Engineering at IISc as an assistant professor. Previously, he worked as a postdoctoral research fellow at IST-Austria. Before that, he received a Ph.D. in Physics from the Georgia Tech-Atlanta and an Integrated Master's in Physics from IIT-Kharagpur. His research lies at the intersection of nonlinear dynamics and fluid turbulence, with the goal of finding order in chaotic hydrodynamic systems. His recent work focused on coherent structures in transitional turbulence, hydrodynamic stability, chaos in hydrodynamic quantum analogs, and highly turbulent flows in pipes and square ducts.

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