Tata Institute of Fundamental Research
Survey No. 36/P, Gopanpally Village, Serilingampally, Ranga Reddy Dist., Hyderabad - 500107

Webinar

Numerical studies of inertial particles in turbulence and buoyancy driven bubbly flows

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Two-phase flows, consisting of particles or bubbles dispersed in fluid, are widespread in nature and industries, e.g., aeolian process, bubble column reactors, boiling, volcanic eruption, clouds, etc. The presence of a dispersed phase can dramatically alter the fluid properties, e.g., bubbles in turbulent flow enhance mixing. In the absence of any dispersed medium, the turbulent kinetic energy spectrum has a universal scaling, $E(k) \sim k^{-5/3}$. In turbulence, the energy injected at large-scales is transferred to small scales by fluid inertia. The interaction of the dispersed phase with turbulence can alter this energy transfer mechanism. In this talk, I will discuss turbulence modulation due to its interaction with the dispersed phase. First, I will discuss the statistical properties of turbulence generated by a homogeneous swarm of buoyant bubbles rising in an otherwise quiescent liquid. Then I will discuss how the flow properties are modified due to the interaction of bubble swarm with large-scale external driving. In the final part of the talk, I will discuss the turbulence modulation in a particle-laden flow, where the size of the particle is smaller than the dissipation scale η.

Friday, Jul 24th 2020

11:30 AM