

ICTS M.Sc Project Seminar

- Title** : Interacting Particles in Two-Dimensional Turbulent Flows
- Speaker** : Mohit Gupta, ICTS-TIFR, Bangalore
- Project Guide** : Samriddhi Sankar Ray
- Date** : Friday, June 28, 2019
- Time** : 2:00 PM
- Venue** : Emmy Noether Seminar Room, ICTS Campus, Bangalore
- Abstract** : In the first half of the talk, we investigate the effect of a two-dimensional, incompressible, turbulent flow on soft granular particles and show the emergence of a crystalline phase due to the interplay of Stokesian drag and short-range inter-particle interactions. We quantify this phase through the bond order parameter and local density fluctuations and find a sharp transition between the crystalline and non-crystalline phase as a function of the Stokes number.
- In the second half, we investigate the competing effects of drag and elasticity on a model chain advected by a turbulent flow. We show how elastic interactions amongst inertial beads result in a non-trivial sampling of the flow. This behavior is quantified as a function of inertia and elasticity and is shown to be dramatically different from free, non-interacting heavy particles as well as massless chains studied by Picardo, et al. [Phys. Rev. Lett. 121, 244501 (2018)].
- We discuss about the emergence of two-dimensional crystals in a two-dimensional, incompressible turbulent flow. The crystalline structures emerge due to the interplay between Stokesian drag and short-range inter-particle interactions. We also show how these repulsive interactions change the nature of preferential concentration compared to non-interacting particles. I will also talk about the dynamics of inertial particles attached to a string of massless beads linked by springs in two-dimensional turbulent flow.