

## **Webinar**

### **Incompressible polar active matter: Defects, Coarsening and Turbulence**

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Polar active matter encompasses a broad class of continuously driven systems that show spectacular collective behaviour. Examples include bacterial suspensions, bird flocks, fish schools, and rods on a vibrating surface. In such systems, individuals move in a preferred direction at the expense of free energy, internal or taken up from the environment. Active systems where the dynamics of the surrounding fluid is ignored are called dry. Rest are wet. An ordered state is stable for a dry active suspension. In contrast, wet systems show complex flow structures with characteristic eddy sizes much larger than an individual.

In this talk, I will discuss the statistical and dynamical properties of incompressible polar active matter. First, I will show that at Reynolds number of order unity, suspension inertia coupled with the swimmer motility can stabilize orientational order against small perturbations. I will then characterize the nature of turbulent steady states arising from the instabilities of the ordered state. In the second part of my talk, I will describe the coarsening dynamics of incompressible dry active matter. I will show that the coarsening proceeds via defect merger, and turbulence accelerates the coarsening dynamics. Finally, I will highlight the crucial differences of the coarsening dynamics in two and three dimensions.

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***2:00 PM***