

Students' Annual Seminar

A novel inertial instability and MIPS in swimmer suspensions

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Polar active fluids consist of head-tail asymmetric self-propelled particles (SPPs) suspended in a fluid medium, such as bacterial suspensions and fish schools. The collective motion of swimmers in these suspensions exhibits a variety of intriguing phenomena. In the first part of the presentation, I will discuss a novel instability observed in inertial suspensions, leading to the emergence of new phases of active matter. I will delve into the physical mechanism of this instability, emphasising the crucial role of inertia.

In the second part of the presentation, I will focus on motility-induced phase separation (MIPS) in swimmer suspensions. This phenomenon occurs in systems where the swimmers' velocity is dependent on density, resulting in slower movement in regions of high density. As a consequence, phase separation of the swimmers into dense and dilute clusters occurs. We will explore the effects of hydrodynamics on MIPS, aiming to better understand this complex behaviour.

Friday, May 3rd 2024

14:00 Hrs (Tea / Coffee 13:45 Hrs)

CR-4, TIFR-H