

ICTS Seminar

Title : Unusual stability of active liquid crystals on substrates

Speaker : Ananyo Maitra, Sorbonne Universite, France

Date : Wednesday, February 12, 2020

Time : 2:30 pm

Venue : Emmy Noether Seminar Hall, ICTS Campus, Bangalore

Abstract : It was thought that uniaxial order of suspensions of actively driven anisotropic objects, such as swimming bacteria or motor-microtubule extracts would always be destabilised at high enough active driving due to the Simha-Ramaswamy instability. In contrast, I will show that nematic and polar suspensions on substrates may sustain quasi-long-range and long-range order in two dimensions respectively, at any value of activity due to extra nonequilibrium forces allowed in systems that lack momentum conservation. I will then discuss the character of these phases in detail. Finally, I will discuss how the phase behaviour is modified due to random, quenched orientational disorder due to the substrate. I will show that the polar phase retains long-range order even in this case but the apolar phase is destroyed beyond a scale which can, however, increase with activity.