

Seminar

Active-passive mixture: insights from computer simulations

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Self-propelled agents, such as Active Brownian Particles (ABPs) [1] beyond a certain density undergo jamming like transition, known as the motility induced phase separation (MIPS) [2]. Presence of passive obstacles often speeds up the phase separation process by acting as nucleation centres. We capture this using computer simulations by introducing a star-shaped polymer in a bath of active particles [3]. In a different study, we show how a 50:50 mixture of monodisperse active and passive particles can be separated through an elastic meshwork, when phase separation is not possible [4]. We believe that our computation-based studies will help in understanding the interplay between the activity and crowding in such scenarios. This in principle will be useful in designing separation protocol for active-passive mixture.

References:

1. C. Bechinger, R. Di Leonardo, H. Lowen, C. Reichhardt, G. Volpe and G. Volpe, Rev. Mod. Phys., 88, 045006 (2016).
2. G. S. Redner, M. E. Hagan, A. Baskaran, Phys. Rev. Lett. 110, 055701 (2013).
3. R. S. Yadav, S. Sarma, R. Metzler and R. Chakrabarti, Soft Matter, 20, 3910 (2024).
4. R. S. Yadav and R. Chakrabarti, Soft Matter, 21, 2142 (2025).

Thursday, Apr 17th 2025

11:30 Hrs (Tea / Coffee 11:15 Hrs)

Auditorium, TIFRH