Nie Pin

Phase Separation in Active Matter: from Schematic to Realistic Models

Active matter describes the complex living particles, like school fishes, bird flocks, herds of animals, bacteria colonies. Active Brownian particles model is the most studied model in active matter field. ABPs are well known to have the motility-induced phase separation. Despite numerous investigations, the mechanisms of this phase separation are still under debate. The theoretical prediction of the phase diagram has not been correctly developed. Here I will demonstrate a new undiscovered mechanism which promotes the homogeneous phase. Based on this finding, a theoretical approach to predict the spinodal line of ABPs phase diagram is introduced. I will present the first investigation of the motility-induced phase-separation of frictional active matter. In addition, I have developed a more realistic model to describe the early stage formation of biofilm, using it to investigate how different parameters affect the developing of a biofilm.

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Time: 10 AM
Venue: SPMS-LT5, Level 3, SPMS
Supervisor: Prof Massimo Pica Ciamarra
Co-Supervisor: Prof Patrick Doyle