سمینار هفتگي ماده چگال نرم

Mobility induced phases in self-propelled active matter

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Abstract

Active matter systems, ranging from the size of the human body such as flocks of birds and schools of fish to micrometer and nanometer scales -bacterial colonies and molecular motors because of the consumption and injection of energy in their units are always out of equilibrium. In the past decades these systems have attracted a great attention. It was shown by using basic local interactions, some behavior of these systems and their collective patterns can be produced. Here a new model was introduced, in which we consider overdamped Langevin dynamics as our system dynamics. Also, a pairwise torque acts on particles as their particle-particle interaction. This interaction consists of two terms, velocities alignment and an attraction-repulsion potential. Molecular dynamics techniques are exploited to simulate and find collective patterns in the system. Different collective patterns by changing our potential and varying ratios of alignment to potential terms in our model, has been seen. Phase shift and phase separation in the system are shown and effects of the dimensions of space (for ۲d and ۳d simulation boxes) are studied.

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