

Modeling and Simulation of Active Liquid Crystals with Applications to Cytokinesis

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I will discuss a general model for active liquid crystal gels/solution in which a concentration, polarity vector and orientation tensor are used to describe the mesoscopic structure of the active matter system. We then analyze the mechanism for instability which is inherent in the material system to obtain a phase diagram for the active parameters and the geometry of the active particle. We then conduct numerical simulation to investigate the possible emergent structures in the phase space of various active parameters. A limit of the model is then applied to model the cortex in an animal cell to investigate the cell division dynamics, known as cytokinesis.