

A touch of nonlinearity and heterogeneity in active matter: from swimmers in fluids to mixtures of colloids

Abstract:

Living matter, such as biological tissue, can be viewed as a nonequilibrium hierarchical assembly, where at each scale self-driven components come together by consuming energy in order to form increasingly complex structures. The remarkable properties of living or “active-matter” systems, as they are generally known, such as versatility, self-healing, and self-replicating, have prompted the following questions: (1) do we understand the biology and biophysics that give rise to these properties? (2) can we achieve similar functionality with synthetic active materials? In this talk I will focus on two classes of systems that remain surprisingly unexplored: active matter in fluids with finite inertia and multicomponent active colloidal mixtures. I will present our recent results showing novel emerging phase behavior and discuss their impact in materials and technology applications.