Soft Living Active and Adaptive Matter

CCBM NSF-CREST CENTER FOR CELLULAR AND BIOMOLECULAR MACHINES

Phase separation in active liquid crystal mixtures: bulk and interfacial dynamics

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Abstract:

Liquid-liquid phase separation is an ubiquitous phenomenon in biological systems, and has inspired several lines of research in the active and soft matter community in the last few years, hoping it will shed light into processes ranging from the formation of primitive cells to morphogenesis and tissue dynamics. In this latter case, the impact of active liquid crystals on this process is of interest, as it can inform how cytoskeletal structures within the cell can drive this dynamics. I will go over continuum theories used to understand the coupling between active liquid crystals and phase separation, together with experimental systems that have inspired and informed this theoretical work. I will then show what this models can do, what their limitations are, and what interfacial dynamics one can extract from them, in both linear and nonlinear regimes, as nonreciprocal couplings between interface fluctuations and liquid-crystalline degrees of freedom can sustain propagating waves, mixing processes, and other nonequilibrium phenomena.

Date:
04/24/2023

Time:
9:00 AM-10:15 AM (PT)

About the speaker:

Dr. Caballero is a postdoctoral Researcher in the Physics Department at Unviersity of California Santa Barbara, studying various aspects of phase separation in active matter, such as effects of active turbulence on criticality and nonequilibrium interface dynamics. He obtained PhD in Theoretical physics at the University of Cambridge in 2020 advised by Michael Cates, studying critical properties of field theories of active matter.

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