

Active matter: A paradigm for dissipative structure formation

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Active matter has become a central paradigm in non-equilibrium statistical physics, encompassing a range of systems that are driven through local dissipation. As a first example, I will discuss motile-induced phase separation in ensembles of self-propelled particles that convert residual or stored free energy into directed motion, ranging from synthetic colloidal particles to bacteria and cells. Even in the absence of a free energy underlying our understanding in passive systems, coexistence criteria can be determined. I will then argue that the same approach extends to chemically driven mixtures, yielding generalized Gibbs' coexistence criteria characterized by a jump of the chemical potential.