MULTIPLE INTERFACIAL TENSIONS IN ACTIVE FIELD THEORIES OF PHASE SEPARATION

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ABSTRACT

In thermal equilibrium, the interfacial tension between coexisting phases is a free energy derivative with respect to the interfacial area. Consistent with thermodynamics, many different measurements or definitions of the tension (via, say, the capillary wave spectrum or the Laplace pressure at a curved interface) all give the same answer. There is no such consistency for interfaces in active systems. Indeed a minimal scalar field theory of active phase separation (Active Model B+) gives at least three distinct tensions, some of which can be negative without the interface losing stability. The various tensions have interesting consequences for the phase diagram and also for nucleation, where the quasipotential is calculable at the level of classical nucleation theory. I will describe the various tensions and their roles, and finally argue that their differences are enough to establish that the stationary measure of the field theory is nonlocal.