“Coarsening and phase transitions in spin models: evolution and geometry of spin domains”

Jefferson Arenzon

The classic scenario in coarsening dynamics concerns a system that in equilibrium exhibits a phase transition from a disordered high-temperature phase to an ordered low-temperature phase with a broken symmetry of the high-temperature phase, e.g., the Ising ferromagnet. After a sudden quench through the transition temperature, domains of the two ordered phases form and grow with time under the influence of the interfacial surface tension, which acts as a driving force for the domain growth. The domain morphology is statistically the same at all times when all lengths are measured in units of $R(t)$, a characteristic length scale (dynamical scaling). We present a review of our results for the size distribution of differently defined domains and discuss some recent results for a new measure of heterogeneity of these domains, that may shed some light on both equilibrium and out of equilibrium properties of these systems.