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Pattern morphology and dynamical scaling in the Cahn Hilliard model[1] TIMOTHY SULLIVAN, PUSHKAR DAHAL, Department of Physics, Kenyon College, PETER PALFFY-MUHORAY, Liquid Crystal Institute, Kent State University — Numerical simulations were carried out in two-dimensions of the dimensionless Cahn-Hilliard equation. Simulations were run for a factor of ten in time beyond previously reported results. The simulations also covered a broad range of values of the mean composition,$\langle\psi\rangle_0$. To determine the dynamical scaling exponent, b, an equation of the form $R_G(t) = at^b + c$ was fit to a measure of average domain size. In contrast to previous results, we found that b varied substantially with$\langle\psi\rangle_0$. The largest deviation from the Lifshitz-Slyozov value of 1/3 occurred at $\langle\psi\rangle_0 = 0.15$, where $b = 0.221 \pm 0.04$. We used a measure of the non-circularity of minority domains to show that for $\langle\psi\rangle_0 \lesssim 0.20$ the domain shapes are not scale invariant for times exceeding our simulation times. We also point out the possible existence of a phase boundary $\langle\psi\rangle_{0,c}$that separates a phase with circular domains of minority component from a phase with non-circular minority component domains.

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