Domain Morphology and Structure Factor in the Asymmetric Cahn-Hilliard Equation SOHEI YASUDA, BENJAMIN VOLLMAYR-LEE, Bucknell University, ANDREW RUTENBERG, Dalhousie University — The Cahn-Hilliard equation for conserved order parameter coarsening is modified to allow for unequal mobilities in the two equilibrium phases. This asymmetric Cahn-Hilliard equation is then simulated using an unconditionally stable algorithm, which enables reaching times well into the $L \sim t^{1/3}$ dynamic scaling regime. Our goal is to address questions of the universality of the scaled domain morphology; in particular, to test our conjecture that the morphology should depend on the mobility asymmetry. We study mobility ratios of 1, 2, 4 and 8 and find that the domain size distribution depends strongly on the mobility asymmetry: the higher (lower) mobility phase forms a smaller (larger) backbone cluster with more (fewer) smaller domains, and the magnitude of the effect grows with the mobility ratio. Interestingly, the structure factor shows no discernible dependence on the mobility asymmetry.

Benjamin Vollmayr-Lee
Bucknell University

Date submitted: 27 Nov 2007   Electronic form version 1.4