Meeting: 999, Nashville, Tennessee, SS 11A, Special Session on Nonlinear Partial Differential Equations and Applications

999-35-263 **Stephen J Watson*** (s-watson@northwestern.edu), ESAM, 2145 Sheridan Road, Evanston, IL 60208. *Coarsening Dynamics for the Convective Cahn-Hilliard Equation.*

We characterize the coarsening dynamics associated with a convective Cahn-Hilliard equation (**cCH**) in one space dimension. First, we derive a sharp-interface theory through a matched asymptotic analysis. Two types of phase boundaries (kink and anti-kink) arise, due to the presence of convection, and their motions are governed to leading order by a nearest-neighbors interaction coarsening dynamical system ($\mathcal{CDS}$). Theoretical predictions on $\mathcal{CDS}$ include:

- The characteristic length $\mathcal{L}_{\mathcal{M}}$ for coarsening exhibits the temporal power law scaling $t^{1/2}$; provided $\mathcal{L}_{\mathcal{M}}$ is appropriately small with respect to the *Peclet* length scale $\mathcal{L}_{\mathcal{P}}$.
- Binary coalescence of phase boundaries is impossible
- Ternary coalescence may only occur through the *kink-ternary* interaction; two kinks meet an anti-kink resulting in a kink.

Direct numerical simulations performed on both $\mathcal{CDS}$ and **cCH** confirm each of these predictions. (Received August 24, 2004)