

Sharp Interface Limit for the Cahn-Larché System

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The Cahn-Larche system is a system, which couples the Cahn-Hilliard equation with the system of linearized elasticity. It is derived in order to describe anisotropies in the material due a crystalline structure, which can play an important role during the phase separation. We discuss the sharp interface limit of this diffuse interface model to its sharp interface limit, where the Mullins-Sekerka equation is coupled to the system of linearized elasticity. As long as the limit system possesses a classical smooth solution convergence is proved by adapting the method of Alikakos, Bates and Chen for the single Cahn-Hilliard equation. To this end a finite piece of the expansion, derived by the formally matched asymptotics calculations, is constructed and its difference to the exact solution is estimated. Moreover, the existence of classical solutions is discussed briefly.