Sylvie Benzoni-Gavage

On a phase field model for solid-liquid phase transitions

We consider a Caginalp-like model with a strong coupling between temperature and the order parameter, in which the latent heat is a nonlinear function of those unknowns. By formal multiscale asymptotics we identify a Stefan-like model in the sharp interface limit, with a generalized Gibbs-Thomson relation telling how much the interface temperature differs from the equilibrium temperature when the interface is moving or/and is curved, and with a jump condition for the heat flux involving a new, nonlinear term compared to standard models. From the PDE analysis point of view, the initial-boundary value problem for the diffuse interface model is proved to be locally well-posed in time.

This is a joint work with Laurent Chupin, Didier Jamet, and Julien Vovelle.