Discretization of a phase field model

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In our presentation we will discuss a phase field model introduced in 2014. This model was proposed to describe chemically reacting fluid mixtures consisting of N constituents where phase transitions between a liquid and a vapor phase may occur. The phase field indicates the present phase or the transition layer. The discretization of the model is a challenge for several reasons. Difficulties arise for instance from steep gradients in the density as well as from the nature of the phase field quantity. We will focus on this in our presentation.