A cross-diffusion system with Cahn-Hilliard terms: analysis and long time behavior

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The aim of this talk is to introduce a class of cross-diffusion systems involving Cahn-Hilliard terms. This class arises in modelling mixtures composed of several species that interact with one another with cross-diffusion effects and also have the tendency to separate from each other. In the case under consideration, only one species (that accounts for the void) does separate from the others. The interest for such a model stems from the fact that in many real world applications there exist multiphase systems where miscible entities may coexist in one single phase of the system.

After an introduction of the model, we will present some results on existence of weak and stationary solutions, then we will discuss the large-time asymptotics, and conclude with an outlook to some future developments.

This talk is based on joint works with Jean-Cauvin Vila and Virginie Ehrlacher (Paris) and Jan-Frederik Pietschmann (Augsburg).