Analysis and simulation of viscoelastic phase separation

Prof. Dr. Maria Lukácová-Medvidová, University of Mainz

We consider a viscoelastic phase separation model that describes phase-separation of a dynamically asymmetric mixture, which is composed of fast and slow components.

In dynamically asymmetric mixtures the phase separation generally leads to the transient formation of network-like structures of a slow-component-rich phase and its volume shrinking.

Consequently, in order to model such a rich dynamical behaviour the resulting viscoelastic phase separation model combines the Cahn-Hilliard-type equation for two-phase flows and the Peterlin-Navier-Stokes equations for viscoelastic fluids. We will present our recent results on the global existence of weak solutions and the weak-strong uniqueness principle. Numerical experiments will illustrate rich dynamical behaviour arising in the viscoelastic phase separation.