Numerics for a compressible Allen-Cahn-Navier-Stokes-System

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The Talk will present a numerical scheme for compressible Navier-Stokes equations coupled with an Allen-Cahn Type equation. These equations are obtained from a thermodynamic consistent phase field model for two-phase flow given by a work of Gabriele Witterstein [1]. The governing equations are solved by a Local Discontinuous Galerkin scheme in combination with implicit and explicit Runge Kutta time stepping schemes of higher order. We will discuss in particular the treatment of the additional second order term modeling the surface tension in the momentum balance equation and the behavior of the discrete total energy.

References

 Witterstein G., Sharp interface limit of phase change flows., Adv. Math. Sci. Appl., 20 (2010), pp. 584-629

Joint work with: Dietmar, Kröner (Department of Applied Mathematics, University of Freiburg)