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Multi-scale modeling of compressible multi-fluid flow with sharp-interface method XIANGYU HU, NIKOLAUS ADAMS, Technical University of Munich — One important issue associated with the complexity of the dynamically evolving material interface is the scale- or mixing-dependent dynamics, which suggests very different physical phenomena depending on resolution and mixing of the material interface. We would like to present an idea of multi-scale modeling, in which the interface interaction is modeled as mechanical non-equilibrium or equilibrium depending on the scale measurement or resolvability of the interface. The work based on my previously developed conservative sharp-interface method for compressible multi-phase flows. In this finite-volume method, the interface is presented by a level-set function and the interface interaction is modeled by solving two-material Riemann problem. To extend this method for multi-scale modeling, two important issues have been addressed: one is to a scale-separation algorithm for identifying the resolved and unresolved interface; the other is to a mechanical equilibrium model and its coupling to the sharp-interface model with simple and efficient approaches.

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