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Towards robust numerical simulation of air-blast atomization with high density ratios OLIVIER DESJARDINS, Department of Mechanical Engineering, University of Colorado at Boulder, VINCENT MOUREAU, TURBOMECA, SAFRAN group, France — While numerical methods for multiphase flows have progressed significantly in the past few years, simulating realistic flows with high density ratios remains a major hurdle, especially when combined with high shear, as encountered in air-blast atomization devices. In order to alleviate this issue, the Ghost Fluid Method (GFM) is extended to allow for higher accuracy. Additional robustness is achieved through the implementation of shock-capturing schemes. This approach is employed with both structured and unstructured meshes for the simulation of air-blast atomization of liquids with high density ratio. In particular, the atomization of a round water jet by a fast co-axial air stream studied experimentally by Marmottant and Villermaux (JFM 2004) is simulated in details. Advantages and limitations of this technique are discussed for this case, as well as for canonical two-phase configurations.

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