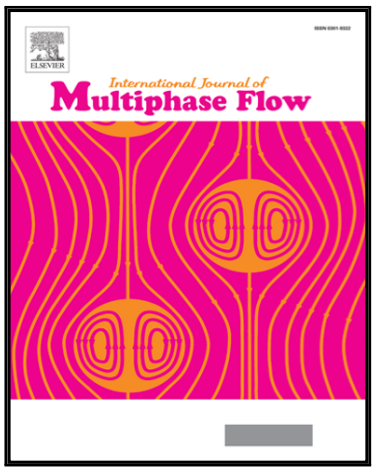

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Where does the droplet size distribution come from?

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Abstract

This study employs DNS of two-phase flows to enhance primary atomization understanding and modeling to be used in numerical simulation in RANS or LES framework. In particular, the work has been aimed at improving the information on the liquid-gas interface evolution for modeling approaches, such as the Eulerian-Lagrangian Spray Atomization (ELSA) framework. Even though this approach has been already successfully employed to describe the complete liquid atomization process from the primary region to the dilute spray, improvements are still expected on the derivation of the drop size distribution (DSD). The main aim of the present work is the introduction of a new framework to achieve a continuous description of the DSD formation during the atomization process. The attention is here focused on the extraction from DNS data of the behavior of geometrical variable of the liquid-gas interface, such as the mean (H) and Gauss (G) surface curvatures. The use of a Surface Curvature Distribution is also proposed and studied.

A Rayleigh-Plateau instability along a column of liquid and a droplet collision case are first of all considered to analyze and to verify the capabilities of the code to correctly predicting the curvature distributions. A statistical analysis

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