Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

Study of the instabilities induced near the separator plate in atomization processes DANIEL FUSTER, STEPHANE ZALESKI, UPMC Univ Paris 06, UMR 7190, Institut Jean Le Rond d'Alembert, F-75005 Paris, France —
This work presents current advances in the simulation of the primary atomization zone, paying a special attention to the effect of the separator plate on the flow patterns observed downstream. Gerris, a CFD Open Source code, is used to perform the simulations. The methods implemented on it combining adaptive quad/octree spatial discretisation, geometrical Volume-Of-Fluid interface representation, balanced-force continuum-surface-force surface tension formulation and height-function curvature estimation, have allowed us to carry out accurate simulations near the separator plate. The inclusion of the separator plate in the analysis have been shown to have a capital importance on the instabilities generated just after it. The influence of some operational parameters like the momentum ratio, the gas and liquid Reynolds numbers based on the thickness of the boundary layer, the density and viscosity ratios or the thickness and angle of the separator plate are investigated. The analysis of these phenomena is aimed at shedding some new insight into the physical mechanisms controlling atomization processes and to provide better basis for future theoretical analysis.

Stephane Zaleski
UPMC Univ Paris 06, UMR 7190, Institut Jean Le Rond d'Alembert,
F-75005 Paris, France

Date submitted: 01 Aug 2008 Electronic form version 1.4