

Numerical Simulations of Complex Two-Phase Flows

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Abstract

We study a number of different flow situations using direct numerical simulations that employ a hybrid interfacial-tracking/level-set method methodology; these include turbulent jets of one liquid flowing into a stagnant phase of another, immiscible liquid, bubbles bursting through an interface, and droplets impacting on a mobile interfaces. A particular emphasis is placed upon the effect of surfactant on droplet generation in all of these cases. If time permits, we will also share results from numerical simulations of aeration in gas-liquid flows and emulsion formation liquid-liquid systems in stirred vessels. The numerical results will be used to isolate the physical mechanisms underlying the observed complex phenomena.