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Adaptive-mesh-refinement simulation of partial coalescence cascade of a droplet at a liquid-liquid interface ABBAS FAKHARI, Univ of Notre Dame, DIOGO BOLSTER, University of Notre Dame — A three-dimensional (3D) adaptive mesh refinement (AMR) algorithm on structured Cartesian grids is developed, and supplemented by a mesoscopic multiphase-flow solver based on state-of-the-art lattice Boltzmann methods (LBM). Using this in-house AMR-LBM routine, we present fully 3D simulations of partial coalescence of a liquid drop with an initially flat interface at small Ohnesorge and Bond numbers. Qualitatively, our numerical simulations are in excellent agreement with experimental observations. Partial coalescence cascades are successfully observed at very small Ohnesorge numbers (Oh 10-4). The fact that the partial coalescence is absent in similar 2D simulations suggests that the Rayleigh-Plateau instability may be the principle driving mechanism responsible for this phenomenon.

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