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## DIRECT NUMERICAL SIMULATIONS OF A SINGLE DROP IN BAG MODE BREAK-UP

## César I. Pairetti<sup>a,b</sup>, Santiago Márquez Damián<sup>c,d</sup>, Norberto M. Nigro<sup>c,e</sup> and Stéphane Zaleski<sup>f</sup>

<sup>a</sup>Facultad de Ciencias Exactas, Ingeniería y Agrimensura, Universidad Nacional de Rosario, Rosario, Argentina, pairetti@fceia.unr.edu.ar, http://web.fceia.unr.edu.ar

<sup>b</sup>Centro Científico y Tecnológico Rosario, CONICET, Rosario, Argentina

<sup>c</sup>Research Center for Computational Methods, CONICET, Santa Fe, Argentina, http://www.cimec.org.ar

<sup>d</sup>Facultad Regional Santa Fe, Universidad Tecnólogica Nacional, Santa Fe, Argentina

<sup>e</sup>Facultad de Ingenieria y Ciencias Hidricas, Universidad Nacional del Litoral, Santa Fe, Argentina

fInstitut Jean leRond d'Alembert, UPMC-CNRS, Paris, France

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**Abstract.** Secondary break-up consist on the decomposition of droplets, ligaments and rims into smaller droplets forming a spray. This phenomenon is driven by interface deformation given by the growth of hydrodynamic instabilities, depending on Reynolds and Weber numbers. Bag mode break-up takes place at moderate gas Weber numbers, at which the drops turns into a film and inflates. Film thickness decreases until a hole forms and expands, giving place to decomposition in smaller droplets. This mechanism is present in several break-up processes and is of great interest to understand the underlying physics of liquid atomization. In this work, we present the Direct Numerical Simulations (DNS) results of a single liquid droplet submerged in an air stream in bag mode regime. Navier-Stokes equations for the two-phase flow are solved using a Volume of Fluid with a Piecewise Linear Interface Capturing (PLIC) formulation and geometrical advection schemes on the volume fraction and momentum equations, programmed in the Basilisk suite. The deformation of the drop into a film and the posterior evolution of its thickness is studied until the formation of a hole and the results are compared with experimental data.