Abstract Submitted
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**Parallel direct numerical simulation of three-dimensional spray formation**[1] JALEL CHERGUI, DAMIR JURIC, LIMSI-CNRS, SEUNGWON SHIN, Hongik University, Republic of Korea, LYES KAHOUADJI, OMAR MATAR, Imperial College London — We present numerical results for the breakup mechanism of a liquid jet surrounded by a fast coaxial flow of air with density ratio (water/air) $\sim$ 1000 and kinematic viscosity ratio $\sim$ 60. We use code BLUE, a three-dimensional, two-phase, high performance, parallel numerical code based on a hybrid Front-Tracking/Level Set algorithm for Lagrangian tracking of arbitrarily deformable phase interfaces and a precise treatment of surface tension forces. The parallelization of the code is based on the technique of domain decomposition where the velocity field is solved by a parallel GMRes method for the viscous terms and the pressure by a parallel multigrid/GMRes method. Communication is handled by MPI message passing procedures. The interface method is also parallelized and defines the interface both by a discontinuous density field as well as by a triangular Lagrangian mesh and allows the interface to undergo large deformations including the rupture and/or coalescence of interfaces.

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