Abstract Submitted
for the DFD16 Meeting of
The American Physical Society

Three dimensional direct numerical simulation of complex jet flows[1] SEUNGWON SHIN, Hongik University, South Korea, LYES KAHOUADJI, Imperial College London, DAMIR JURIC, JALEL CHERGUI, LIMSI, CNRS, France, RICHARD CRASTER, OMAR MATAR, Imperial College London — We present three-dimensional simulations of two types of very challenging jet flow configurations. The first consists of a liquid jet surrounded by a faster coaxial air flow and the second consists of a global rotational motion. These computations require a high spatial resolution and are performed with a newly developed high performance parallel code, called BLUE, for the simulation of two-phase, multi-physics and multi-scale incompressible flows, tested on up to 131072 threads with excellent scalability performance. The method for the treatment of the fluid interfaces uses a hybrid Front Tracking/Level Set technique that defines the interface both by a discontinuous density field as well as by a local triangular Lagrangian mesh. Coriolis forces are taken into account and solved via an exact time-integration method that ensures numerical accuracy and stability.

[1]EPSRC UK Programme Grant EP/K003976/1

Omar Matar
Imperial College London

Date submitted: 02 Aug 2016 Electronic form version 1.4