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Three-dimensional direct numerical simulations of co/counter-current vertical gas-Liquid annular flows[1] ASMA FARHAOUI, LYES KAHOUADJI, Imperial College London, JALEL CHERGUI, DAMIR JURIC, LIMSI, CRNS, France, SEUNGWON SHIN, Hongik University, South Korea, RICHARD CRASTER, OMAR MATAR, Imperial College London — We carry out three-dimensional numerical simulations of co/counter current Gas-Liquid annular flows using the parallel code, BLUE, based on a projection method for the resolution of the Navier-Stokes equations and a hybrid Front-Tracking/Level-Set method for the interface advection. Gas-Liquid annular flows and falling films in a pipe are present in a broad range of industrial processes. This configuration consists of an important multiphase flow regime where the liquid occupies the area adjacent to the internal circumference of the pipe and the gas flows in the pipe core. Experimentally, four distinctive flow regimes were identified (dual-wave, thick ripple, disturbance wave and regular wave regimes), that we attempt to simulate. In order to visualize these different regimes, various liquid (water) and gas (air) flow-rates are investigated.

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