Abstract Submitted
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Three dimensional massively-parallel simulation of falling liquid films[1] SEUNGWON SHIN, Hongik University, Korea, IDRIS ADEBAYO, LYES KAHOUADJI, Imperial College London, JALEL CHERGUI, DAMIR JURIC, LIMSI, CNRS, OMAR K. MATAR, Imperial College London — We present results on the numerical study of falling liquid films using direct numerical simulations. Falling films due to their rich dynamics have been a subject of many interesting studies over the past decades. However, the majority of the research in the literature has focused only on the two-dimensional case due to the complexity of three-dimensional studies. In this work, we solve the full Navier-Stokes equations using a massively-parallelised numerical code *Blue*. The code utilises a domain-decomposition strategy for parallelization with MPI, and an hybrid front-tracking/level set method is designed to handle the deforming interface. Parallel GMRES and Multigrid iterative solvers are then employed to appropriately handle the linear system arising from the implicit solution for the fluid velocities and pressure in the presence of strong density and viscosity discontinuities across the fluid phases. Our result show many interesting dynamics, which cannot be observed in the two-dimensional studies.

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