Abstract Submitted
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The Evolution of the single-mode Rayleigh-Taylor instability under the influence of time-dependent accelerations[1] PRAVEEN RAMAPRABHU, VARAD KARKHANIS, University of North Carolina at Charlotte, RAHUL BANERJEE, St. Paul's Cathedral Mission College, Kolkata, HILDA VARSHOCHI, University of North Carolina at Charlotte, MANORANJAN KHAN, Jadavpur University, ANDREW LAWRIE, University of Bristol, VARIABLE G RT COLLABORATION — From detailed numerical simulations of the single-mode Rayleigh-Taylor (RT) instability driven by time-varying acceleration histories, we report on several findings of relevance to the performance of Inertial Confinement Fusion capsules. The incompressible, Direct Numerical Simulations (DNS) were performed in two- and three-dimensions, and over a range of density ratios of the fluid combinations (characterized by the Atwood number). We have investigated several acceleration histories, including acceleration profiles g(t) of the general form t^n, with n > -2. For the 2D flow, results from numerical simulations are compared with a potential flow model developed and reported as part of this work. When the simulations are extended to three dimensions, bubble and spike growth rates are in agreement with an extension to the drag buoyancy model with modifications for time-dependent acceleration histories. We have come up with simple analytic solutions to the Drag Buoyancy model for variable g flows, and compared the solution with the 2D and 3D DNS results.

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