Abstract Submitted
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Turbulent Rayleigh-Taylor flow driven by time-varying accelerations PRAVEEN RAMAPRABHU, University of North Carolina, Charlotte, ANDREW LAWRIE, LMFA, Ecole Centrale de Lyon, KARTHIK MUTHURAMAN, University of North Carolina, Charlotte, UNC-LMFA COLLABORATION — We report on numerical simulations of turbulent Rayleigh-Taylor flow subject to variable acceleration histories. The acceleration profiles were inspired by experiments and theoretical studies, and include an impulsive acceleration, accel-decel profiles, as well as a constant drive as the baseline case. The simulations were performed using the MOBILE software, a variable-density, incompressible fluid flow code. The advection algorithm employs a 3^{rd}-order, monotonicity-preserving upwind scheme, allowing the definition of sharp interfaces in the flow, while pressure convergence is accelerated by the use of a multi-grid scheme. The simulations are initialized with two classes of perturbations: narrow-band, short-wavelength modes and broadband with long-wavelength modes. The effect of initial amplitudes on the perturbations is investigated under the variable drive conditions. The acceleration profiles are capable of producing stages of "demixing," useful in validating turbulence models of RTI.

Praveen Ramaprabhu
University of North Carolina, Charlotte

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