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3-D Simulations to Investigate Initial Condition Effects on the Growth of Rayleigh-Taylor Mixing ARINDAM BANERJEE, Missouri S&T (formerly University of Missouri-Rolla), MALCOLM J. ANDREWS, Los Alamos National Laboratory — The effect of initial conditions on the growth rate of turbulent Rayleigh–Taylor (RT) mixing has been studied using carefully formulated numerical simulations. An integrated large-eddy simulation (ILES) using a finite-volume technique was employed to solve the three-dimensional incompressible Euler equations with numerical dissipation. The initial conditions were chosen to test the dependence of the RT growth parameters (α_b, α_s) on variations in (a) the spectral bandwidth, (b) the spectral shape, and (c) discrete banded spectra. Our findings support the notion that the overall growth of the RT mixing is strongly dependent on initial conditions. Variation in spectral shapes and bandwidths are found to have a complex effect of the late time development of the RT mixing layer and raises the question of whether we can design RT transition and turbulence based on our choice of initial conditions. In addition, our results provide a useful database for the initialization and development of closures describing RT transition and turbulence.

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