Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Multimodal Perturbation Evolution in the Compressible Rayleigh-Taylor Instability SCOTT WIELAND, University of Colorado Boulder, SCOTT RECKINGER, Montana State Univeristy, PETER HAMLINGTON, University of Colorado Boulder, DANIEL LIVESCU, Los Alamos National Laboratory — Explorations of the miscible, compressible, and single mode Rayleigh-Taylor instability (RTI) have shown that the initial type and strength of the background stratification can have a wide range of effects on the growth of the RTI, such as exaggerated bubble and spike asymmetries and complete growth suppression. These effects arise, in part, because background stratification significantly alters the vorticity dynamics of the system in comparison to the incompressible regime. In order to further understand the effects of background stratification on RTI growth and dynamics, high fidelity wavelet-based direct numerical simulations (WDNS) have been performed for an initially isothermal background state at a variety of stratification strengths, where the RTI is initiated using a multimodal perturbation at low Atwood number (i.e., 0.04). The formulation of the multimodal perturbation is outlined and the temporal evolution of the system is described for different stratification strengths. Preliminary results show that, in addition to the effects seen in the single mode regime, background stratification dampens high frequency perturbations, resulting in only the lower wavelength perturbations surviving until late times.

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Date submitted: 01 Aug 2017 Electronic form version 1.4