Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Direct Numerical Simulations of Combined Rayleigh-Taylor/Shear Flow to Late Times JON BALTZER, DANIEL LIVESCU, Los Alamos National Laboratory — Rayleigh-Taylor instability between two fluids of differing densities occurs when the density gradient is misaligned with the pressure gradient. Background shear may also be present in applications such as ICF. Shear itself can also trigger instabilities of the Kelvin-Helmholtz type. Olson *et. al.* (Phys. Fluids, 2011) previously simulated combined Rayleigh-Taylor instability and shear, and they found that shear produced complex and non-monotonic changes to the growth rate in the early nonlinear regime, in contrast to the simple increase predicted by linear stability theory. New direct numerical simulations are performed to determine how the interactions of buoyant production and shear affect the structure of turbulence at later times. The density ratio of the fluids is 7. The configuration is similar to Rayleigh-Taylor instability studies, but introducing shear affects transitional structures and continues to significantly change the statistics of density fluctuations and Reynolds stresses at late times. Statistics and budgets associated with this flow are important for variable-density turbulence modeling.

Jon Baltzer
Los Alamos National Laboratory

Date submitted: 01 Aug 2019 Electronic form version 1.4