Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Mixing and turbulence generated by the tilted Rayleigh-Taylor instability DANIEL LIVESCU, Los Alamos National Laboratory, TIE WEI, New Mexico Tech — In most practical applications of Rayleigh-Taylor instability (RTI), the initial interface is not perpendicular to the direction of acceleration. When the degree of tilting of the interface is non-negligible, the resulting mean flow is no longer one-dimensional as is the case with the classical RTI, and the two main turbulence production mechanisms, buoyancy and shear, are both present. The development of the instability can be decomposed into a large overturning motion, which leads to a strengthening of the mean shear, the formation of a large side wall bubble and spike, and the interior mixing layer growth. Results from very large Direct Numerical Simulations are presented of this unique unit problem and used to study the competition between shear and buoyancy production of turbulence and the respective effects on the mixing and turbulence properties. In particular, the development of the mixing layer seems more sensitive to the properties of the initial perturbation than in classical RTI.

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Date submitted: 02 Aug 2013 Electronic form version 1.4