

Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Large Eddy Simulations of the Tilted Rig Experiment: A Two-dimensional Rayleigh-Taylor Instability Case¹ BERTRAND ROLLIN, NICHOLAS A. DENISSEN, JON M. REISNER, MALCOLM J. ANDREWS, Los Alamos National Laboratory — The tilted rig experiment is a derivative of the rocket rig experiment designed to investigate turbulent mixing induced by the Rayleigh-Taylor (RT) instability. A tank containing two fluids of different densities is accelerated downwards between two parallel guiding rods by rocket motors. The acceleration is such that the pressure and density gradients face opposite directions at the fluids interface, creating a Rayleigh-Taylor unstable configuration. The rig is tilted such that the tank is initially at an angle and the acceleration is not perpendicular to the fluids interface when the rockets fire. This results in a two dimensional Rayleigh-Taylor instability case where the fluids experience RT mixing and a bulk overturning motion. The tilted rig is therefore a valuable experiment to help calibrating two-dimensional mixing models. Large Eddy Simulations of the tilted rig experiments will be compared to available experimental results. A study of the behavior of turbulence variables relevant to turbulence modeling will be presented. LA-UR 12-23829.

¹This work was performed for the U.S. Department of Energy by Los Alamos National Laboratory under Contract No.DEAC52-06NA2-5396.

Bertrand Rollin
Los Alamos National Laboratory

Date submitted: 10 Aug 2012

Electronic form version 1.4