

Abstract Submitted
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Direct numerical simulations of Rayleigh-Taylor instability with gravity reversal MARK PETERSEN, DANIEL LIVESCU, ROBERT GORE, Los Alamos National Laboratory — We have conducted high resolution, high Reynolds number Direct Numerical Simulations (DNS) of the Rayleigh-Taylor (RT) instability on the 0.5 petaflop, 150k compute cores BG/L Dawn supercomputer at Lawrence Livermore National Lab. This includes a suite of simulations with Atwood number ranging from 0.04 to 0.9 and grid size of 1024^2 by 4096, and a high resolution simulation of grid size 4096^3 and Atwood number of 0.75. After the layer width has developed substantially, additional branched simulations have been run under reverse gravity and zero gravity conditions. The simulations provide an extensive database to study Rayleigh-Taylor turbulence, including mixing layer growth rate and self-similar behavior, turbulence and mixing asymmetries, and spectral characteristics. Individual terms in the moments transport equations are recorded to develop and validate turbulence closure models.

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