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Direct Numerical Simulations of Rayleigh-Taylor instability DANIEL LIVESCU, TIE WEI, MARK PETERSEN, Los Alamos National Laboratory — The development of the Rayleigh-Taylor mixing layer is studied using data from an extensive new set of Direct Numerical Simulations (DNS). This includes a suite of simulations with grid size of $1024^2 \times 4608$ and Atwood number ranging from A=0.04 to 0.9, in order to examine small departures from the Boussinesq approximation as well as large Atwood number effffects, and a high resolution simulation of grid size $4096^2 \times 4032$ and Atwood number of 0.75. After the layer width had developed substantially, additional branched simulations have been run under reversed and zero gravity conditions. The results presented address the role of the initial conditions on the mixing layer development and the discrepancy between the growth rates in various experiments and numerical simulations, as well as the changes in Rayleigh-Taylor turbulence properties at large density ratios.

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