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Time-dependent study of anisotropy in Rayleigh-Taylor instability induced turbulent flows with a variety of density ratios[1] YE ZHOU, WILLIAM CABOT, Lawrence Livermore Natl Lab — This study focuses on understanding the time-dependent anisotropy, mixing, scaling of flows induced by Rayleigh-Taylor instability (RTI), complementing the late-time snapshots reported by Cabot & Zhou [*Phys. Fluids*, **25**, 015107 (2013)]. In particular, we utilize three large datasets with different Atwood numbers (density ratios) from well resolved direct numerical simulations (DNS) at moderate Reynolds number with the goal of determining the degree of departure of this inhomogeneous flow from that of homogeneous, isotropic turbulence (HIT). Three key time-dependent statistical measurements are considered in detail to delineate the role played by the acceleration. First, a number of directional length scales in this anisotropic turbulence are inspected. Second, the relationship among the outer-scale, turbulence length, and the Taylor-microscale based Reynolds numbers is also clarified. Finally, the normalized dissipation rate is employed to inspect the distinctive features of the flow in inhomogeneous direction parallel to gravity and in the homogeneous perpendicular directions.

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