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The Compressible Rayleigh-Taylor Instability and Vortex Dynamics in Stratified Media SCOTT A. WIELAND, University of Colorado at Boulder, DANIEL LIVESCU, Los Alamos National Laboratory, OLEG V. VASILYEV, University of Colorado at Boulder, SCOTT J. RECKINGER, Montana State University — Fully resolved adaptive wavelet-based direct numerical simulations (WDNS) of the single-mode, compressible, and miscible Rayleigh-Taylor instability (RTI) have been performed at Reynolds numbers significantly larger than those previously attained. To ensure that WDNS properly captures the full extent of the length and time scales, an exhaustive resolution study was completed. The ensuing results explore the effects of compressibility and background stratification on the vortex generation and interaction that serves as the driver behind the RTI development beyond the early stages. To better understand the eventual suppression that arises at large background stratification, the simplified cases of a pair of counter rotating vortices (2D) and a vortex ring (3D) in stratified media are also presented for the purpose of isolating and explaining the physics behind these effects on RTI growth.

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