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Vortical Effects on the Compressible Rayleigh-Taylor Instability SCOTT WIELAND, University of Colorado Boulder, DANIEL LIVESCU, Los Alamos National Laboratory, OLEG V. VASILYEV, University of Colorado Boulder, SCOTT J. RECKINGER, Montana State University — High fidelity wavelet based direct numerical simulations (WDNS) of compressible, miscible, and single mode Rayleigh Taylor instability (RTI) with a stratified background density have been completed in 2 and 3 dimensions. As the instability grows, vorticity dynamics are largely responsible for the self-propagation and growth of the bubble and spike. However, in the presence of a background stratification, the vortex interactions are significantly altered. In the case of low Atwood number RTI, this leads to previously unseen regimes, namely, the exaggeration of bubble and spike asymmetries for a weakly stratified background state and the complete suppression of RTI growth in the strongly stratified scenario. To better understand these results, the vorticity transport equation budget was compared to the simplified scenarios of vortex pairs (2D) and vortex rings (3D) moving in a stratified medium.

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