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Numerical study on turbulent mixing of planar shock accelerated heavy triangular gases interface. YUTAO SUN, Institute of applied physics and computational mathematics — The interaction of a planar shock wave with a sulfur hexafluoride (SF6) triangular inhomogeneity surrounded by air is numerically studied based on high resolution finite volume method with Minimum Dispersion and Controllable Dissipation (MDCD) reconstruction. The vortex dynamics of Richtmyer-Meshkov instability (RMI) and the turbulent mixing during the evolution of Kelvin–Helmholtz instability (KHI) are well discussed. Several typical processes for shock driven inhomogeneity flow to become turbulent mixing transition are well demonstrated in this study. The spectral analysis of turbulent kinetic energy (TKE) shows that the merging process of the primary Kelvin–Helmholtz billows will extend the region with a broadband spectrum of motion, and consequently, enhance the overall mixing of fluids. Both analysis of the TKE spectra and the variable-density energy spectra manifests the inertial range by the latter stages. Additionally, length scales analysis shows that the Liepmann-Taylor scale is decoupled from the inner-viscous scale during the evolution, which implies that there is a turbulent mixing transition. A further analysis of energy transfer in Fourier space indicates the nonlinear transfer term is of significance while the physical dissipation term is negligible. The detailed analysis for the nonlinear transfer term implies that the quadratic and pressure components are dominant terms.

Yutao Sun
Institute of applied physics and computational mathematics

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