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Energy dynamics in the Richtmyer-Meshkov instability induced turbulent mixing flow ZUOLI XIAO, HAN LIU, State Key Laboratory for Turbulence and Complex Systems, College of Engineering,Peking University — The Richtmyer-Meshkov instability (RMI) induced turbulent mixing flow in a shock tube is numerically investigated by using direct numerical simulation based on an effective in-house high-order turbulence solver (HOTS). The energy transfer and transport characteristics are studied both before and after re-shock. The celebrated Kolmogorov -5/3 spectrum can be observed in a long inertial subrange during the development of the turbulent mixing zone (TMZ). Insight is taken into the underlying mechanism by evaluating the energy-budget equations. A posteriori analysis of the influence of subgrid scales on resolved motions also gives a consistent picture of energy transfer in the RMI-induced turbulent mixing. Moreover, the kinetic energy cascade in the TMZ is discussed by using Favre filtering approach in physical space. A nonlinear vortex-stretching model for the subgrid-scale stress serves to explain the underlying mechanism of the energy cascade in the RMI-induced turbulence.

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