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**Reynolds-Averaged Navier-Stokes Modeling of Weak, Moderate, and Strong Shock-Induced Richtmyer-Meshkov Turbulent Mixing**[1]

TIBERIUS MORAN-LOPEZ, National Nuclear Security Administration, OLEG SCHILLING, Lawrence Livermore National Laboratory — Turbulent mixing of ideal gases (air and $SF_6$) induced by reshocked Richtmyer–Meshkov instability with Atwood number $At = -0.67$ (initially heavy-to-light) and shock Mach numbers $Ma = 1.05$, 1.25, 1.56, 3.00, and 5.00 is simulated using a weighted essentially nonoscillatory implementation of a multicomponent, two-equation Reynolds-averaged Navier–Stokes model. This study continues the previous application of this model to the $Ma = 1.24$, 1.50, and 1.98 Vetter–Sturtevant, $Ma = 1.45$ Poggi et al., and $Ma = 1.20$ Leinov et al. air/$SF_6$ cases to much larger Mach numbers. The cases considered are inspired by a large-eddy simulation study of transition to turbulence in singly-shocked Richtmyer–Meshkov instability over a progression of small-to-large Mach numbers by Lombardini, Pullin and Meiron (2012). Mixing layer widths, as well as various spatial mean and turbulent field profiles and statistics, are compared among the different Mach number cases and discussed. Other quantities signifying the intensity of the turbulence, such as the turbulent Reynolds number, are also compared and discussed. Turbulent transport equation budgets are used to assess the relative importance of the mechanisms contributing to turbulent mixing as the Mach number increases.

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