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Simulation of Material Mixing in Shocked and Reshocked Gas-Curtain Experiments[1] AKSHAY GOWARDHAN, FERNANDO GRINSTEIN, LANL — The unique combination of shock and turbulence emulation capabilities supports direct use of implicit large eddy simulation (ILES) as an effective simulation anzatz in shock-driven mixing research. This possibility is demonstrated in the context of a prototypical case study for which available laboratory data can be used to test and validate the ILES modeling. The particular ILES strategy tested here is based on a nominally-inviscid simulation model using LANL's RAGE code and adaptive mesh refinement. An SF6 gas curtain is formed by forcing SF6 through a linear arrangement of round nozzles into the shocktube test section. Once a steady state is achieved, the gas curtain is shocked (M=1.2), and its later evolution subject to Ritchmyer-Meshkov flow instabilities, transition, and non-equilibrium turbulence phenomena are investigated based on high resolution simulations for shocked and reshocked cases. The gas curtain used at initialization for the RAGE simulations was separately simulated using a 3D Navier-Stokes-Boussinesq code. Various approaches to introducing weak 3D perturbations to emulate the noise inherent in the experimental setup were tested with special focus on addressing initial condition effects on late-time mixing.

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