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Simulation of Material Mixing in Shocked Gas-Curtain Experiments[1] AKSHAY GOWARDHAN, FERNANDO GRINSTEIN, Los Alamos National Laboratory — 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. An SF6 gas curtain is formed by forcing SF6 through a linear arrangement of round nozzles into the shocktube test section. The gas curtain is shocked (M=1.26, M=1.5), 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 particular strategy tested here is based on a nominally-inviscid simulation model using the LANL RAGE code and adaptive mesh refinement. Initial conditions for ILES are based on emulating the physics of SF6 falling through the test section of the shock tube until a steady state is reached using a separate 3D Navier-Stokes code which solves incompressible flow in the Boussinesq approximation.

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