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High Resolution Numerical Investigation of Turbulence in a Reshocked Richtmyer Meshkov Unstable Curtain of Dense Gas[1] SANTHOSH SHANKAR, SANJIVA LELE, Stanford University — High resolution numerical simulation of the impulsive acceleration of a dense gas curtain in air by a Mach 1.21 planar shock (modeling the experiments by Balakumar et al. PoF 2008) is carried out by solving the 3-D compressible multi-species Navier-Stokes equation coupled with a localized artificial diffusivity method to capture discontinuities in the flow-field. The simulations account for the presence of three species in the flow-field: air, SF_6 and acetone (used as a tracer species in the experiments). The reshock process is studied by re-impacting the evolving curtain with a reflected shock wave. Turbulence statistics computed in the flow-field following reshock are reported and compared with experiment where possible. Inertial range scaling, vorticity anisotropy and Reynolds stress development are studied in the reshocked flow. The high resolution data set is used to test certain modeling assumptions appearing in mixing models (BHR model) that have been traditionally used to study variable density flows.

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