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Numerical Simulation of Multi-Material Mixing in an Inclined Interface Richtmyer-Meshkov Instability[1] AKSHAY SUBRAMANIAM, SANJIVA LELE, Stanford Univ — The Richtmyer-Meshkov instability arises when a shock wave interacts with an interface separating two fluids. In this work, high fidelity simulations of shock induced multi-material mixing between N_2 and CO_2 in a shock tube are performed for a Mach 1.55 shock interacting with a planar material interface that is inclined with respect to the shock propagation direction. In the current configuration, unlike the classical perturbed flat interface case, the evolution of the interface is non-linear from early time onwards. Our previous simulations of this problem at multiple spatial resolutions have shown that very small 3D perturbations have a large effect on vortex breakdown mechanisms and hence fine scale turbulence. We propose a comparison of our simulations to the experiments performed at the Georgia Tech Shock Tube and Advanced Mixing Laboratory (STAML). Results before and after reshock of the interface will be shown. Results from simulations of a second case with a more complex initial interface will also be presented. Simulations shown are conducted with an extended version of the Miranda solver developed by Cook et. al (2007) which combines high-order compact finite differences with localized non-linear artificial properties for shock and interface capturing.

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