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**Numerical simulation of multi-material mixing in an inclined interface Richtmyer-Meshkov instability** 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 air and SF6 in a shock tube are performed for a Mach 1.5 shock interacting with a planar material interface that is inclined with respect to the shock propagating direction. In the current configuration, unlike in the classical sinusoidal interface case, the evolution of the interface is fully non-linear from early time onwards. The simulations attempt to replicate an experiment conducted at the Texas A&M fluid mixing shock tube facility. Simulations of this problem at multiple spatial resolutions (upto 270 million grid points) have shown that even low order statistics like the net circulation are hard to capture at resolutions where the classical RM cases yield good results. Tight coupling between numerics and flow physics and large range of spatial scales make this a challenging problem to simulate numerically. 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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