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Dynamics of Richtmyer-Meshkov (RM) mixing with reshock
SWATHI MULA, STUART CRAIG, KATHY PRESTRIDGE, Los Alamos National Laboratory — Variable density mixing plays a very important role in a number of applications, including inertial confinement fusion, supernovae, and supersonic combustion ramjet engines. To better understand the dynamics of variable density mixing, experiments are developed at the Vertical Shock Tube (VST) facility at Los Alamos National Laboratory. At this facility, an initially perturbed density interface (air-SF6, Atwood number = 0.6) is impulsively accelerated by a low Mach shock wave (Mach <3), which induces Richtmyer-Meshkov (RM) mixing of the two fluids. Initial perturbations on the air-SF6 interface are generated by an oscillating flapper that initially separates the two fluids. The time evolution of RM mixing is studied by way of simultaneous density and velocity measurements using Planar Laser Induced Fluorescence (PLIF) and Particle Image Velocimetry (PIV) techniques. For two separate initial conditions, the measurements capture the air-SF6 interface, at multiple time locations, before and after the passage of shock and reshock at Mach = 1.3. At each time location, multiple instantaneous shots are acquired. From these measurements, we study the evolution of RM instability along with the dependence of mixing flow features (post-shock and reshock) on the initial conditions.

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