Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Investigation of Atwood ratio influence on turbulent mixing transition of a shock-driven variable density flow after reshock[1] MOHAMMAD MOHAGHAR, JOHN CARTER, GOKUL PATHIKONDA, DEVESH RANJAN, Georgia Inst of Tech — The current study experimentally investigates the influence of the initial Atwood ratio (At) on the evolution of Richtmyer-Meshkov instability at the Georgia Tech Shock Tube and Advanced Mixing Laboratory. Two Atwood numbers (At=0.22 and 0.67) are studied, which correspond to the gas combinations of nitrogen seeded with acetone vapor (light) over carbon dioxide (heavy) and same light gas over sulfur hexafluoride (heavy) respectively. A perturbed, multi-mode, inclined interface (with an amplitude to wavelength ratio of 0.088) is impulsively accelerated by the incident shock traveling vertically from light to heavy gas with a Mach number ≈1.55. The effect of Atwood ratio on turbulent mixing transition after reshock at the same non-dimensional times between the two cases is examined through ensemble-averaged turbulence statistics from simultaneous planar laser induced ?uorescence (PLIF) and particle image velocimetry (PIV) measurements. Preliminary studies over the smaller Atwood number indicates that turbulent mixing transition criteria can be satisfied after reshock.

[1]This work was supported by the National Science Foundation CAREER Award no. 1451994

Devesh Ranjan
Georgia Inst of Tech

Date submitted: 30 Jul 2017 Electronic form version 1.4