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Single and multi-mode initial condition influence on turbulent mixing in Richtmyer-Meshkov flows[1] SRIDHAR BALASUBRAMANIAN, GREG ORLICZ, KATHY PRESTRIDGE, Los Alamos National Laboratory, EXTREME FLUIDS TEAM — Experimental evidence is needed to verify and validate the numerical hypothesis that shock-driven flows retain the memory of initial conditions. We present the results of an experimental study to understand the influence of initial condition parameters, namely amplitude and wavelength of perturbations, on mixing and transition in Richtmyer Meshkov flows. Single and multi-mode membrane-free initial conditions in form of a gas curtain (air-SF_6-air) at Mach number $M = 1.2$ and Atwood number, A=0.67 was used. The evolution of instability is captured using high resolution simultaneous PLIF and PIV. Statistics such as mixing widths, density self-correlation parameter, turbulent kinetic energy, turbulent Reynolds number, and variances of velocity fluctuations were measured to quantify the amount of mixing. Some of these statistics were found to be in disagreement with the linear theory. Based on the results, a correlation between mixing at late times and initial condition parameters is found.

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