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Time-Resolved Particle Image Velocimetry of the 3-D, Multi-Mode Richtmyer-Meshkov Instability JEFFREY JACOBS, EVEREST SEWELL, KEVIN FERGUSON, The University of Arizona — We present recent experiments conducted on the multi-mode Richtmyer-Meshkov instability (RMI) using time-resolved Particle Image Velocimetry (PIV), comparing results initiated using high and low amplitude initial perturbations. Measurements of the growth parameter θ indicate a slight difference in growth rate exists between the two groups following the incident shock interaction, with additional differences in the growth of the instability following reshock. We validate a novel method of obtaining θ from the decay of turbulent kinetic energy (Thornber et al., J. Fluid Mech., 2010). Examination of the anisotropy ratio reveals an asymptotic value of approximately 1.8 in high amplitude experiments, with low amplitude experiments exhibiting decreasing anisotropy. High amplitude experiments exceed the threshold for mixing transition (Dimotakis, J. Fluid Mech., 2000) following the incident shock, with low amplitude experiments remaining below the threshold for most times. An extension of this analysis for developing flows (Zhou et al., Phys Rev E, 2003) reveals that neither flow satisfies the extended criterion for mixing transition. This observation is supported by the lack of an apparent inertial range in the power spectra of velocity.

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