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Turbulence in reshocked Richtmyer-Meshkov unstable fluid layers B.J. BALAKUMAR, GREG ORLICZ, RAY RISTORCELLI, SRIDHAR BALASUBRAMANIAN, KATHY PRESTRIDGE, CHRIS TOMKINS, Los Alamos National Laboratory — Advances in the implementation of high resolution PIV (150um vector-to-vector resolution) and PLIF (50um resolution) diagnostics have allowed the experimental measurement and characterization of turbulent mixing in Richtmyer-Meshkov unstable fluid layers after reshock (Balakumar et. al., Phys. Fluids, 2008). Using instantaneous PLIF data obtained at closely spaced intervals of time, we illustrate the rapid disintegration of the primary wavelengths of the initial interface and the beginning of a turbulence cascade generating smaller flow structures after reshock. The enhanced mixing is reflected in the variation of the density probability distribution function between the pre-reshock and post-reshock states. The density self-correlation is observed to exhibit a double-peaked structure and mild non-Boussinesq effects are observed in a layer with varicose initial interfacial perturbations. Density and velocity pdfs are used to examine the streamwise asymmetry of the mixing layer with large fluctuations occurring preferentially upstream of the centerline. Other turbulence statistics including the 2nd and 4th order structure functions, RMS statistics (both velocity and density) and turbulence intensity are also presented.

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