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Simultaneous Measurements of Density and Velocity Fields in Single-interface Richtmyer-Meshkov Instabilities RICARDO MEJIA-ALVAREZ, BRANDON WILSON, KATHY PRESTRIDGE, Los Alamos National Laboratory, EXTREME FLUIDS TEAM — The Extreme Fluids Team at Los Alamos National Laboratory (LANL) has developed a new Vertical Shock Tube (VST). This facility is equipped with high-resolution diagnostics for simultaneous measurements of density and velocity fields in single-interface Richtmyer-Meshkov instabilities (RMI). The VST was conceived to provide high resolution PIV and PLIF data for a better understanding of the underlying phenomena of single-interface RMI. Additionally, these results will serve as a benchmark for RANS models and ILES. To reduce downtime and improve repeatability, a membraneless driver operates this VST. However, the Mach number response to the driver pressure differs from the one in membrane-based shock-tubes. Such differences are addressed in this talk. Additionally, this VST has the capability of introducing multi-modal 3-D perturbations in the interface between the working gases. Some examples of a perturbed air/SF₆ interface are presented. Finally, an instance of a simultaneous PIV-PLIF measurement at the initial conditions is presented.

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