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Nonideal Effects in Single Mode Richtmyer-Meshkov Instability Shock Tube Experiments ROBERT MORGAN, JEFFREY JACOBS, The University of Arizona, JEFFREY GREENOUGH, WILLIAM CABOT, Lawrence Livermore National Laboratory — Shock tube experiments on the late time Richtmyer-Meshkov instability (RMI) are presented. The growth of the instability from a diffuse sinusoidal initial perturbation impacted by a Mach 1.2 shock wave (SW) is studied. The RMI develops from an air-SF6 interface in a 2.0 m long test section. The RMI is visualized using planar Mie scattering using an Nd:YLF laser for illumination and recorded using high speed CMOS cameras. This visualization system allows the recording of the time history of the RMI. Measured growth rates are found to be greater than those predicted by models and numerical simulations. In addition, measurements of SW accelerated flat interfaces show them to accelerate after SW interaction. A numerical investigation was then undertaken to investigate the effects of boundary layers and openings in the shock tube test section. These simulations show that openings tend to reduce the impulsive drive affecting the interface but still produce constant interface velocity. However, the presence of boundary layers tends to produce an acceleration similar to that observed in the experiments. It is proposed that this boundary layer induced interface acceleration leads to enhanced growth due to the Rayleigh-Taylor instability.

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