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Effect of shear on R-T mixing at low and medium Atwood numbers BHANESH AKULA, DEVESH RANJAN, Department of Mechanical Engg., Texas A&M University — Combined RT and KH instabilities are studied at three different Atwood numbers using the gas channel facility at TAMU. In the experiment, two gas streams of different densities (heavy over light) flowing parallel to each other are initially separated by a thin splitter plate. At the end of the splitter plate the two fluids are allowed to mix and the Rayleigh-Taylor instability develops. Simultaneous 3 wire and cold wire anemometry (S3WCA) is used to measure velocities and densities at different locations along and across the channel. Temperature is used as a marker to identify the streams and density is calculated from the temperature measured using a temperature probe with a constant current anemometer. High resolution digital imaging is performed to measure mixing heights and growth rates by injecting smoke into one of the streams and collecting the scattered light from the fog particles illuminated by the back lighting of the channel. Experiments are performed at Atwood numbers 0.04, 0.1 and 0.3. At these Atwood numbers, effect of shear is studied by varying the velocity of one the top stream. Initial conditions are characterized at the interface right after the splitter plate using S3WCA. Different parameters obtained from these measurements including, molecular mixing parameter θ, u', v', w' rms profiles, velocity correlations, vertical turbulent mass flux ρ'v' and their effect on mixing growth rate are discussed.

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