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Progress with Molecular Mixing Measurements & High Atwood Number Experiments at Texas A&M University MALCOLM J. AN-DREWS, Los Alamos National Laboratory, WAYNE N. KRAFT, NICHOLAS J. MUESCHKE, Texas A&M University — Current progress with high Schmidt number molecular mixing measurements in a small Atwood number water channel facility is reported. In the experiments, the pH of the heavy (salt) and light (fresh) water streams is controlled by adding acid or alkali to each stream. As the two streams molecularly mix, the chemical reaction between the acid and alkali is marked by a phenolphthalein chemical indicator, which is imaged under backlit conditions. The current high Schmidt number (\sim 700) experiments have resulted in low measures of molecular mixing as compared with previous experiments and simulations at moderate Schmidt numbers. In addition, progress with measurements at high Atwood numbers (~ 0.6) in a gas channel facility using helium and air is also reported. Instantaneous velocity and density measurements inside the mixing layer are obtained using a novel combined hot-wire / cold-wire anemometry technique, where temperature is used as a fluid marker. This technique provides detailed simultaneous velocity and density measurements which allows for determination of velocity and density variances, velocity-density cross-correlations, and their spectra.

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