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Experiments and simulations of molecular mixing in a reattaching shear layer ARISTIDES BONANOS, GEORGIOS MATHEOU, PAUL DI-MOTAKIS, California Institute of Technology — Experiments and simulations of a turbulent, compressible, re-attaching shear layer were conducted in order to investigate molecular mixing and validate the computational model. Experiments were conducted in a two-stream blow-down type wind-tunnel, with the top stream having a Mach number of 0.5 and two lower-to-upper stream mass flux ratios: 0.22 and 0.11. The two streams were seeded with hydrogen and fluorine respectively and the heat release from the reaction was used as a tracer of the mixed fluid. Molecular mixing was measured using the "flip experiment" technique. The experiments were modeled with a compressible large-eddy simulation (LES) solver using the stretchedvortex subgrid-scale model for momentum and scalar transport. The results from the experiments and simulations will be presented and discussed.

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