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Mixing Characteristics for Flush and Elevated Jets in Crossflow[1] LEVON GEVORKYAN, TAKESHI SHOJI, WEN YU PENG, DANIEL GETSINGER, OWEN SMITH, ANN KARAGOZIAN, UCLA — The present experiments explore the mixing and structural characteristics of equidensity and variable density gas-phase transverse jets using acetone PLIF as well as stereo PIV. Flush and elevated nozzles as well as a flush pipe geometry are explored in these studies, for a range of jet-to-crossflow momentum flux ratios J and density ratios S, spanning previously-determined conditions creating upstream shear layers which are either convectively unstable or absolutely unstable. The present studies quantify a range of mixing and flow metrics for the jet in crossflow, including conditional unmixedness, conditional probability density function, and scalar dissipation rates associated with both the jet cross-section and the centerplane longitudinal imaging. Correlations between mixing parameters and the structural symmetry/asymmetry in the JICF are observed, as are connections with the state of the shear layer and vorticity evolution.

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