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Structural and mixing characteristics of passively controlled transverse jets with tabs[1] ELIJAH HARRIS, TAKESHI SHOJI, ANDREA BESNARD, ANN KARAGOZIAN, UCLA — Effects of small tabs in the periphery of the exit plane of a flush gaseous jet in crossflow (JICF) are explored in this experimental study. Positioning of one or more small tabs, occupying less than 5% of the cross-sectional area, can have a significant effect on jet structure and mixing for a range of jet-to-crossflow momentum flux ratios J. This passive control of the developing jet shear layer instabilities is observed to have differing effects, depending on whether the upstream shear layer (USL) in the absence of tabs is convectively unstable at high J or absolutely unstable at lower J values[2]. Acetone planar laser induced fluorescence (PLIF) imaging at centerplane and at multiple downstream cross-sectional locations shows that a single tab at or near the USL, especially under convectively unstable conditions with asymmetric cross-sections ($J \geq 20$), is seen to create a more symmetric counter-rotating vortex pair (CVP) structure associated with improved molecular mixing. At lower J values, e.g., $J \leq 12$, tabs can cause CVP cross-sectional structures to become less symmetric, with a weakening of the USL instabilities associated with CVP formation and a lesser degree of molecular mixing.

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[2]Megerian, et al., JFM **593**, pp. 93-129, 2007

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