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Crossflow Influence on Transverse Jet Shear Layer Instabilities: Theory and Computations.[1] LEONARDO ALVES, ROBERT KELLY, ANN KARAGOZIAN, UCLA — Linear stability analysis and 3D transient numerical simulations of the round jet injected normally into a crossflow are utilized to explore the influence of the crossflow on changes in transverse jet nearfield shear layer stability characteristics. The stability analysis explores two alternative continuous base flows at the jet exit, in contrast to earlier discontinuous base flows[2], and represents the upstream crossflow as spatially uniform, hence representative of a jet nozzle extended from the injection wall. The 3D low Reynolds number numerical simulations, on the other hand, explore the influence of crossflow with an injection wall boundary layer upstream of a flush-mounted transverse jet. Each approach provides support for experimental observations[3] on differences in the shear layer instability between flush-injected and extended nozzle-injected transverse jets. The results indicate similar trends to those of experiments in the variation of disturbance amplitude and Strouhal number as the jet-to-crossflow velocity ratio is reduced from 10 to 4.

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[2]Alves, L., et al., *Bull. Amer. Phys. Soc.*, Vol. 49, No. 9, p. 52, 2004.
[3]Megerian, S., et al., *Bull. Amer. Phys. Soc.*, Vol. 5 0, No. 9, 2005.

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