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Mixing Characteristics of Convectively and Absolutely Unstable Jets in Crossflow[1] LEVON GEVORKYAN, DANIEL GETSINGER, OWEN SMITH, ANN KARAGOZIAN, University of California, Los Angeles — This experimental study explores the mixing characteristics of both unforced and acoustically forced variable density transverse jets via acetone PLIF measurements. A range of jet-to-crossflow momentum flux ratios J and density ratios S are explored in this study, spanning conditions for which the jet shear layer transitions from being convectively to absolutely unstable. While there are clear differences in the flow structure among convectively unstable, absolutely unstable, and externally forced jets in crossflow, it is of interest in the present study to explore the implications of such differences for jet mixing. A range of metrics is used to quantify jet mixing, including jet centerline concentration decay and spread,[2] and the spatial evolution of jet cross-sectional Unmixedness, Spatial Mixing Deficiency, and Scale of Segregation.[3] It is found that the cross-sectional jet fluid distribution can be affected significantly by unforced shear layer stability characteristics as well as the nature of jet forcing, and hence can affect mixing in ways that are not evident from centerplane mixing metrics alone.

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[2]Smith, S. H. and Mungal, M. G., **JFM**, 357, 83-122, 1998
[3]D. Bothe in **Micro and Macro Mixing**, 17-35, Springer 2010

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