

Abstract Submitted
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DNS, stability and sensitivity of the low-speed transverse jet¹
SAMANTHA HAREL, KRISHNAN MAHESH, University of Minnesota — DNS, tri-global stability and adjoint analysis are performed for a jet in cross-flow (JICF) using a novel capability developed on unstructured grids and parallel platforms. Linear stability analysis reveals that upstream shear-layer modes have frequencies that match simulation and experiment. The relative importance of upstream and downstream shear layer modes, as well as axisymmetric and non-axisymmetric modes is studied. Adjoint modes show that the upstream shear-layer is most sensitive along the upstream side of the jet nozzle. Lower frequency downstream modes are sensitive in the cross-flow boundary layer. The transverse jet has multiple pathways to instability; non-modal interactions are examined on their multiple time-scales. Helical actuations of the transverse jet is being studied; these results will be discussed.

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