Abstract Submitted
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The "real" fully low-dimensional characteristics of a subsonic jet flow[1] CHARLES TINNEY, Universite de Poitiers, MARK GLAUSER, Syracuse University, LAWRENCE UKEILEY, University of Florida, PETER JORDAN, Universite de Poitiers — An experimental investigation concerning the large scale turbulent features of the flow exiting from an axisymmetric converging nozzle at Mach 0.85 (cold) is discussed using PIV techniques. The PIV system allows for all 3 components of the velocity field to be captured along the (r-theta) plane of the jet between x/D=3 and 8. The full kernel matrix is constructed comprising all nine normal and shear stress terms from which the symmetry assumptions of the azimuthal correlations are addressed. A Fourier-azimuthal and Proper Orthogonal Decomposition is performed using scalar and vector forms of the technique whereby the scalar decomposition of the axial velocity is shown to agree with previous investigations with a peak in azimuthal mode 5 at x/D=3, and a shift to mode 2 by x/D=8. The scalar solutions to the radial and azimuthal velocity components are shown to possess most of their energy in the first few azimuthal modes (0, 1 and 2), with very little change along the streamwise direction. The solution to the 3 component vector decomposition shows a peak in azimuthal mode 5 at x/D=3 with a gradual shift to mode 2 at x/D=8, similar to the scalar solution to the axial velocity.

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Charles Tinney
Universite de Poitiers

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