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Active Control of Jet Noise Using High Resolution TRPIV Part 1: POD Analysis ZACHARY BERGER, Syracuse University , STANISLAV KOSTKA, Spectral Energies , KERWIN LOW, MATT BERRY, Syracuse University , SIVARAM GOGINENI, Spectral Energies, MARK N. GLAUSER, Syracuse University — In the current investigation, we seek to develop advanced flow control techniques for a high speed compressible jet, of nozzle diameter 2". Using hydrodynamic pressure and 10kHz time-resolved PIV in the near-field, as well as acoustic pressure in the far-field, we implement various techniques to further our understanding of this complex flow field. This work focuses on the near-field velocity measurements for the Mach 0.6 and 0.85 jet. The current 2-component PIV setup allows analysis of the streamwise (r-z) plane of the jet with a 1.5D window. The area of interest is $x/D = 3-6$ (region of the collapse of the potential core), where there are many potential noise sources propagating to the far-field. In-depth POD analyses will be performed in order to correlate the time-dependent POD coefficients with the pressure signals and develop advanced strategies for closed-loop flow control. For the Mach 0.6 case, at a streamwise location of $x/D = 3-4.5$, a favorable convergence rate of the spatial eigenvalues can be seen from 1000 snapshots; 45% energy from 20 modes.

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