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Examining PIV windowing effects on high-speed jet flow physics with POD MATTHEW BERRY, ANDREW MAGSTADT, ZACHARY BERGER, PATRICK SHEA, Syracuse University, CHRISTOPHER RUSCHER, SIVARAM GOGINENI, Spectral Energies, LLC., MARK GLAUSER, Syracuse University, SYRACUSE UNIVERSITY TEAM, SPECTRAL ENERGIES, LLC. COLLABORATION — The current investigation examines a 2 inch, high-speed, axisymmetric jet with two different PIV setups. Each PIV configuration is simultaneously sampled with far-field pressure. A time-resolved, 10 kHz, PIV system captures a high resolution 1.5 diameter sized window at several downstream locations. A standard, 4 Hz, PIV system utilizes 3 simultaneously captured cameras combined to view a single large interrogation window. Velocity measurements are taken at Mach 0.6, 1.0, and 1.1, along the centerline of the jet in the streamwise (r-z) direction. The low-dimensional modeling technique, proper orthogonal decomposition (POD), is implemented to help resolve the large scale, energetic events, within the flow field. Previous work used these modes to understand how certain flow structures correlated to the far-field acoustics. Due to the different interrogation regions of the PIV systems, windowing effects can yield different results between the setups. We can use this information to determine how windowing effects play a role in the POD convergence rates as well as the velocity to acoustic correlations.

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