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The influence of SPIV calibration misalignment on the modal decomposition of axisymmetric jet turbulence MAJA WÄNSTRÖM, WILLIAM K. GEORGE, Chalmers University of Technology, KNUD ERIK MEYER, Technical University of Denmark — As shown in Wänström et al[1],the single point second moment statistics of Cartesian coordinate system velocity components are subject to artificial surplus when the camera-to-camera disparity is large relative to the Taylor microscale of the turbulence. The size and magnitude of the disparity field depends on the misalignment between the calibration plane and the measurement plane. The geometry of the SPIV camera setup distributes the noise unequally over the Cartesian components, particularly over the in-plane ones. As a consequence, the jet flow inherent axisymmetry in a polar coordinate system is distorted and the azimuthal invariance lost, so that the azimuthal Fourier series expansion is questionable. This work aims to investigate the sensitivity of a classical Fourier series expansion/POD decomposition of cross-plane SPIV data to the errors described above. Data sets with varying degrees of calibration misalignment at different downstream positions are analyzed and compared to the result obtained with an attempted correction method.

[1]M. Wänström, W.K. George, K E. Meyer and C. Westergaard "Identifying sources of stereoscopic PIV measurement errors on turbulent round jets" *2007 FEDSM2007-3725* Proc. FEDS 2007 San Diego, USA.

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