

Abstract Submitted
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Characteristics of structured-illumination microscale particle tracking velocimetry MICHAEL SPADARO, MINAMI YODA, Georgia Institute of Technology — In microscale particle tracking velocimetry (μ PTV) images, the tracer particles beyond the focal plane can degrade contrast and introduce measurement errors. Structured-illumination microscale particle tracking velocimetry (SI μ PTV) is an imaging technique that adapts structured-illumination microscopy (SIM) for use in enhancing the axial spatial resolution of images of tracer particles in a flow. SI μ PTV takes two “raw” images modulated with a sinusoidally varying intensity profile (*i.e.*, acquired with “structured” illumination) with a phase shift between the images, and reconstructs the signal from the focal plane using a Hilbert transform-based approach. The technique was analyzed using artificial images to determine the origins of the anisotropy of the reconstructed tracer particle images observed in previous work and determine how parameters such as the number of “raw” images, the spatial frequency and phase shift of the illumination, and image contrast and background noise affect the accuracy of SI μ PTV measurements. These results are demonstrated with experimental data that expand the applicability of the technique to a broader range of flows.

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