

Abstract Submitted  
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**Towards High Speed, Whole Volume Velocimetry of Unsteady Microscale Flows**<sup>1</sup> STEVEN A. KLEIN, Mechanical Engineering, Arizona State University, JONATHAN D. POSNER, Mechanical Engineering, Chemical Engineering, Arizona State University — Development of a diagnostic platform for measuring three dimensional velocity fields in whole microscopic volumes is presented. The imaging system is based on Nipkow spinning disk based confocal microscopy. The confocal system provides for optical sectioning thinner than 500 nm which allows for rejection of light originating from out of focus particles. Out of focus light in standard microPIV typically results in depth averaging, poor SNR, and the inability to measure unsteady flows. Spinning disk confocal imaging provides depth resolved imaging, high SNR images with increased particle volume fractions, and imaging rates of 5000 frames per second. Volumetric scanning is obtained by rapid translation of the high numerical aperture objective using a piezo stage. High speed optical sectioning and volumetric scanning of microscopic volumes can be used for real time visualization and velocimetry of three dimensional flows and cellular processes.

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