

Abstract Submitted  
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**Extending micro-PIV to unsteady flows and real time 3D particle tracking using spinning disk confocal microscopy**<sup>1</sup> STEVEN KLEIN, Mechanical Engineering, Arizona State University, JONATHAN POSNER, Mechanical Engineering, Chemical Engineering, Arizona State University — A high speed micro particle imaging velocimetry system based on a spinning disk confocal microscope is presented. The confocal system uses a spinning disk with a series of pinholes arranged in an Archimedes spiral to optically section the sample, rejecting light originating from out of focus particles. Unsteady flows require two frame cross correlations and can be better resolved using the increased correlation signal to noise ratio provided by the confocal system, resulting in less erroneous vectors for the same validation criteria and illumination intensity. By utilizing a high speed CMOS camera we can obtain vector fields at up to 2500 Hz, which is ultimately limited by the speed of rotating pinhole disk. Volumetric scans of fluorescently labeled microspheres are acquired 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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