

Abstract Submitted
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Color-Coded Three-Dimensional Particle Tracking Velocimetry for Micro-Flow Applications¹ WEI-HSIN TIEN, DANA DABIRI, University of Washington, JAY HOVE, University of Cincinnati — A color-coded three-dimensional particle image velocimetry is successfully adapted into a microscope setup using a 10X magnification lens. 3 high-power LED with different wavelengths are used as light sources for each color-coded pinhole, and a color separation algorithm based on decorrelation stretch is developed to account for the multiple exposure problem caused by the color filters. Overlapped particle images are then identified with a cascade correlation method, and the triplets are matched to reconstruct the 3D particle locations with a calibration-based epi-polar line search method. The velocity field is reconstructed by a vision-based particle tracking algorithm. With the ability to track particles in higher particle densities, the experimental setup is used to image an 800 x 800 x 500 micrometer volume of an accelerating backward-facing step micro-channel flow.

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Wei-Hsin Tien
University of Washington

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