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Light field particle image velocimetry BRYCE MCEWEN, Brigham Young University, JESSE BELDEN, Naval Undersea Warfare Center, TADD TRUSCOTT, Brigham Young University — Three-dimensional flow field measurement of microscopic environments requires innovative solutions. We propose a system capable of measuring instantaneous, three- dimensional velocities in microscopic flow fields using light field microscopy. The light field microscope used in these experiments consists of a camera that images the back focal plane of a micro lens array (similar to the system proposed by Levoy 2006). The lens array enables capture of the light field in a single image, which can then be reparameterized to render synthetically-refocused images at different focal depths post-capture. A three-dimensional volume can be reconstructed from this synthetic focal stack, and particles extracted for velocity measurements.

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