Abstract Submitted
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Multi-camera PIV of two-phase oscillating sheet flow CHANG LIU, KEN KIGER, University of Maryland — We present a multi-camera thin light sheet imaging method to accurately measure dispersed phase concentration and velocity up to optical densities of close to O[1]. The work is an extension of prior single camera methods that utilize particle image characteristics to identify the dispersed phase and infer the effective measurement volume thickness. By introducing multiple camera perspectives, stereo photogrammetry can be combined with the redundancy of information available in the images to provide 1) increased accuracy in determining individual particle locations, and 2) increased reliability in identifying all of the dispersed phase objects. As a byproduct, the velocity of all three components is also available. As an example, this new method is directly applied to oscillating sheet flow conditions. From a single image pair, individual particles are identified and tracked, giving the instantaneous volume concentration and dispersed phase velocity. A median filter method is used to isolate an image composed only of the much smaller tracer particles, and processed to generate a 3-component continuous phase velocity field. Given the concentration and velocities of the two phases, two-phase flow properties such as the sedimentation rate and momentum coupling will be reported.

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