

Abstract Submitted
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Improving the spatial resolution of particle image velocimetry by means of weighting window functions HOLGER NOBACH¹, NICHOLAS T. OUELLETTE, EBERHARD BODENSCHATZ², Cornell University — Due to its high robustness, correlation-based particle image velocimetry (PIV) has become the prime choice for processing image-based flow measurements in fluid dynamics experiments. The algorithm-inherent averaging process over certain image subspaces limits the achievable spatial resolution. By utilizing appropriate weighting window functions in an iterative refinement loop, the spatial resolution can be improved significantly. We will prove the concept by investigating the achievable stability and spatial resolution given by the frequency response function for different windowing functions. An algorithm that implements the windowing concept will be introduced yielding a densely sampled estimate of the velocity field. The ability of the entire procedure to improve the spatial resolution is shown using a simulated flow field with high velocity gradients.

¹Max Planck Society

²Max Planck Society

Eberhard Bodenschatz
Cornell University

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