

Abstract Submitted
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Multi-color particle shadow accelerometry (cPSA)¹ GRANT DOWELL, MCPHAIL MICHAEL, ARNOLD FONTAINE, MICHAEL KRANE, ARL Penn State, LARRY GOSS, Innovative Scientific Solutions, Inc., JAMES CRAFTON, Innovative Scientific Solutions, Inc. — We present an extension of multi-color particle shadow velocimetry (cPSV) to unsteady acceleration measurement. cPSV uses a multi-color, pulsed LED light source for illumination. Particle shadow images recorded by a digital color camera are color separated and inverted. Standard DPIV processing methods are then used to estimate 2-D displacement vector fields. Acceleration estimates are facilitated by acquisition of three sequential images (one per color) in each camera exposure. Here, we prove the technique by measuring the tangential acceleration of a moving solid body, and compare the results to accelerometer measurements. We also present preliminary acceleration measurements performed in a near-wall turbulent pipe flow.

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