

Abstract Submitted
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Split view Time-resolved PIV with a CW laser for 3-D measurements of planar velocity field¹ AMIR ELZAWAWY, Graduate Center of CUNY, YIANNIS ANDREOPOULOS, City College of New York — The demand to increase the temporal resolution of Stereo-PIV systems used in the measurement of highly unsteady flow fields is limited by the low repetition rate of the pulsed lasers and cameras. The availability of high-frame-rate digital cameras and CW lasers opens new possibilities in the development of continuous PIV systems with increased temporal resolution. The present setup consists of a single high-frame-rate camera which can accommodate two simultaneous stereo view images of the deforming fluid on its CMOS sensor obtained by using four different planar mirrors, appropriately positioned. This approach offers several advantages over traditional systems with two different cameras. First, it provides identical system parameters for the two views which minimize their differences and thus facilitating robust stereo matching. Second, it eliminates any need of synchronization between both cameras and the laser. And third its cost is substantially lower than the cost of a system with two cameras. The development of the technique will be described and the results of qualification tests in several wind tunnel flows will be presented and discussed.

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Amir Elzawawy
Graduate Center of CUNY

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