

Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

A method to resolve low velocities in a PIV system¹ SUNIL BHARADWAJ, MEHEBOOB ALAM, Jawaharlal Nehru Centre for Advanced Scientific Research, Jakkur PO, Bangalore 560064 — A method is proposed to improve the velocity-dynamic range (VDR) of particle-image velocimetry (PIV) technique. This method uses two different timings of a pulsed laser and an outlier detection technique that helped to measure very low velocities, bypassing the limits set by the VDR of the PIV-system. The lower limit of the resolvable velocity is not set by the algorithm but by the laser-timings. The reliability of the method is verified by carrying our planar measurements of the mean and fluctuation velocities in an axisymmetric jet at a Reynolds number of about 3500. The radial velocity, which is usually an order-of-magnitude lower than the axial velocity, is successfully resolved in the ambient region of the jet as compared to results obtained by employing the post-processing techniques of the standard PIV-system. Overall, the proposed method seems to increase the velocity-dynamic range of PIV-algorithm to capture low-velocities in an otherwise fast flow.

¹This work is supported by the BARC, Government of India (BARC/MA/4350).

Meheboob Alam
Jawaharlal Nehru Centre for Advanced Scientific Research,
Jakkur PO, Bangalore 560064

Date submitted: 31 Jul 2015

Electronic form version 1.4