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Volumetric 3D-3C (V3V) Particle Tracking Velocimetry measurement of turbulent twin jet NIMESH VIRANI, VESSELINA ROUSSINOVA, Department of Mechanical, Automotive and Materials Engineering, University of Windsor, RAM BALACHANDAR, Department of Civil and Environmental Engineering, University of Windsor — Recently developed (by TSI, Inc., Shoreview, MN, USA) V3V- Volumetric three-direction, three-component (3D-3C) particle tracking velocimetry technique, is applied for understanding of inherently complex interaction between turbulent twin jets. Two jets are separated by a distance of approximately 2D, where D is the diameter of the jet and Reynolds number based on exit diameter of the pipe, for both jet is around 12000. Jets are released into a channel comprising of quiescent water and channel dimensions are such that, jets can remain free from any kind of boundary effects. The measurement volume of approximately 15010050 mm^3 in X, Y and Z directions, which is equivalent to 63D42D21D in terms of pipe diameter, was investigated for mean and turbulence characteristics of problem under consideration. Particle tracking velocimetry (PTV) is applied to trace randomly spaced seeding particles between concurrently captured two frames of the same instant of flow field. PTV eliminates inherent bias present in the traditional FFT correlation based analysis of particle image velocimetry (PIV). Access to all three components of velocity enabled us to get insight of shear layer merging phenomena between two jets, which resulted into some interesting instantaneous flow structures. Time-averaged and turbulent characteristics of jets' interaction are analyzed using various statistical analysis tools and they reiterate the necessity of 3D examination.

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