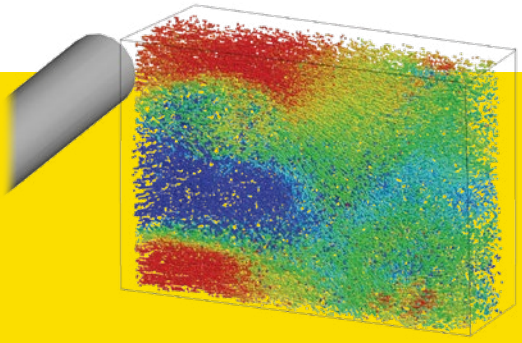
INSIGHT™ V3V 4D PTV DENSE PARTICLE IDENTIFICATION AND RECONSTRUCTION (DPIR)

PEAKS, PROJECTIONS, PATHS—GO DPIR



Insight™ V3V introduces Dense Particle Identification and Reconstruction (DPIR). A 4D PTV algorithm that builds on the recent advances in Computer Vision and is the first to integrate for volumetric PIV measurements through Peaks, Projections, Paths–a novel technique applicable to both time-resolved and non-time-resolved cases.

Description

DPIR measures real particle images rather than relying on virtual images created by an optical transfer function–without making assumptions about particle image characteristics. DPIR uses intensity Peaks, Projections from other cameras, and time-resolved Paths to identify particle image centroids in dense fields and triangulate with greater accuracy than traditional techniques.

The key feature of DPIR is its ability to simultaneously fit multiple particle images, rather than iterative basic particle identification, which subtracts intensities on each iteration, sometimes erroneously.

With DPIR, you are able to get results from your volumetric PIV measurements with the upmost accuracy and highest spatial resolution to uncover the smallest flow structures.

Features

+ Able to Identify reconstruct highly overlapped particle images
+ No optical transfer function
+ >95% yield for dual frame data, up to 100% for multi-frame data
+ Handles seeding densities of 0.1ppp
+ 3D trajectories with velocity and acceleration with time-resolved data

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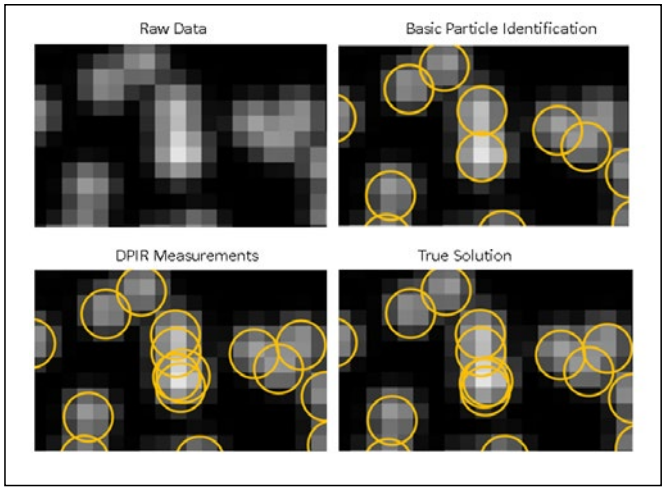

Figure 1

DPIR is able to accurately identify particle images even in dense flows because it utilizes intensity Peaks, camera Projections, and time-resolved Paths to predict and fit particle images, outperforming basic particle identification.

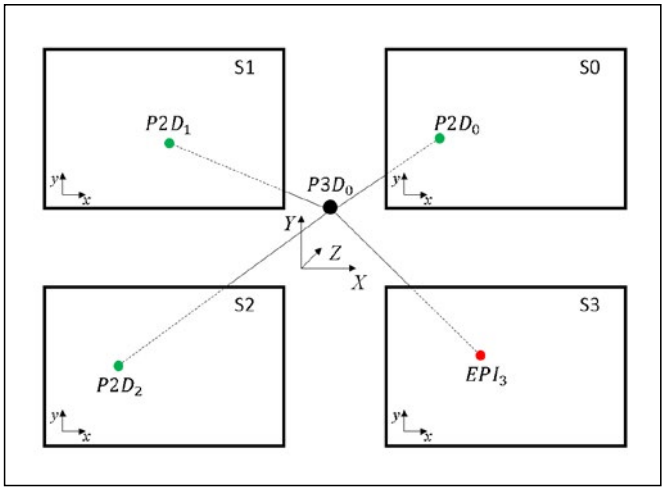

Figure 3

A particle in 3D is created via matching and triangulation from P2Ds in sensors 0 through 2 (green circles). The projection into sensor 3 (a red circle), is used to identify the particle image in that sensor.

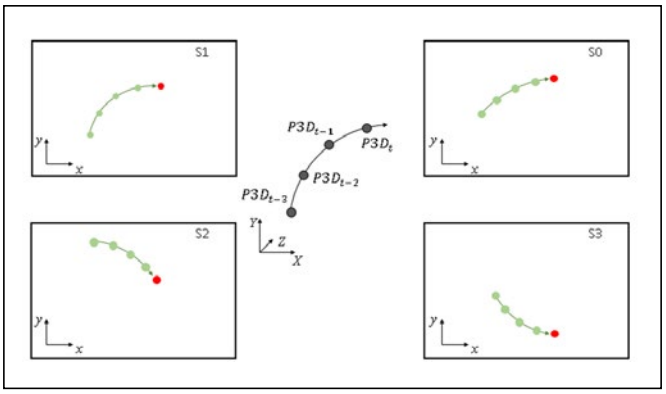

Figure 2

A 3D trajectory consisting of 4 particles is observed in four sensors as 2D paths of particle images (green circles). The red circles denote predicted particle image locations at time t+1.

UNDERSTANDING, ACCELERATED

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