New Reconstruction Accuracy Metric for 3D PIV ABHISHEK BA-JPAYEE, ALEXANDRA TECHET, MIT — Reconstruction for 3D PIV typically relies on recombining images captured from different viewpoints via multiple cameras/apertures. Ideally, the quality of reconstruction dictates the accuracy of the derived velocity field. A reconstruction quality parameter Q is commonly used as a measure of the accuracy of reconstruction algorithms. By definition, a high Q value requires intensity peak levels and shapes in the reconstructed and reference volumes to be matched. We show that accurate velocity fields rely only on the peak locations in the volumes and not on intensity peak levels and shapes. In synthetic aperture (SA) PIV reconstructions, the intensity peak shapes and heights vary with the number of cameras and due to spatial/temporal particle intensity variation respectively. This lowers Q but not the accuracy of the derived velocity field. We introduce a new velocity vector correlation factor Q_v as a metric to assess the accuracy of 3D PIV techniques, which provides a better indication of algorithm accuracy. For SAPIV, the number of cameras required for a high Q_v are lower than that for a high Q. We discuss Q_v in the context of 3D PIV and also present a preliminary comparison of the performance of TomoPIV and SAPIV based on Q_v.

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