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(54) Title: PARTICLE IMAGE VELOCIMETRY SUITABLE FOR X-RAY PROJECTION IMAGING

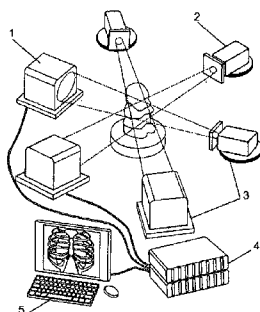


Figure 1

(57) Abstract: A 2D or 3D velocity field is reconstructed from a cross-correlation analysis of image pairs of a sample, without first reconstructing images of the sample spatial structure. The method can be implemented via computer tomographic X-ray particle image velocimetry, using multiple projection angles, with phase contrast images forming dynamic speckle patterns. Estimated cross-correlations may be generated via convolution of a measured autocorrelation function with a velocity probability density function, and the velocity coefficients iteratively optimised to minimise the error between the estimated cross-correlations and the measured cross-correlations. The method may be applied to measure blood flow, and the motion of tissue and organs such as heart and lungs.

