Spatial filtering velocimetry for real-time measurements of speckle dynamics due to out-of-plane motion. - DTU Orbit (08/11/2017)

Spatial filtering velocimetry for real-time measurements of speckle dynamics due to out-of-plane motion.

This paper describes an optical spatial filtering velocimetry technique that converts an expanding or contracting speckle pattern into a photocurrent. This photocurrent will have a quasi-sinusoidal dependency on this specific speckle motion. The spatial filter consists of a series of concentric rings. Each ring divides the incoming light into two radial-wise, almost even contributions and directs them by refraction toward two half-rings of photodetectors. The corresponding two photocurrents are balanced and provide a differential photocurrent. In this paper the optical spatial filtering velocimetry technique is used to demonstrate real-time measurements of speckle dynamics due to out-of-plane motion.

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