

Spatial versus temporal phase shifting in electronic speckle-pattern interferometry: noise comparison in phase maps

Jan Burke and Heinz Helmers

Temporal and spatial phase shifting in electronic speckle-pattern interferometry are compared quantitatively with respect to the quality of the resultant deformation phase maps. On the basis of an analysis of the noise in sawtooth fringes a figure of merit is defined and measured for various in-plane and out-of-plane sensitive electronic speckle-pattern interferometry configurations. Varying quantities like the object-illuminating intensity, the beam ratio, the speckle size and shape, and the fringe density allows characteristic behaviors of both phase-shifting methods to be explored. © 2000 Optical Society of America

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1. Introduction

The application of phase-shifting techniques has

laterally by Δx from the center of the system's imaging aperture. This lateral shift generates the re-

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For further information:

Heinz.Helmerts@uni-oldenburg.de

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visibility. The temporal and the spatial phase shift angles in the i th phase sample are $i\alpha_t$ and $i\alpha_x$, respectively, and Φ_t and Φ_x are the phase-shift angles