

Optics & Laser Technology 32 (2000) 235-240

Optics & Laser Technology

www.elsevier.com/locate/optlastec

## Matched data storage in ESPI by combination of spatial phase shifting with temporal phase unwrapping

Jan Burke, Heinz Helmers\*

Carl von Ossietzky Universität Oldenburg, FB Physik Postfach 2503, D-26111 Oldenburg, Germany

Received 3 April 2000; accepted 25 May 2000

## Abstract

We combine the spatial phase-shifting technique with the real-time fringe counting capability of temporal phase unwrapping to provide simple solutions for some practical tasks in ESPI. First, we develop a method for automatically matched data storage intervals and apply this technique to a long-term observation of a biological object with strongly varying deformation rate. Second, we easily obtain on-line displacement and deformation data during the observation of a complexly structured discontinuous object. © 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Electronic speckle pattern interferometry (ESPI); Spatial phase shifting; Temporal phase unwrapping

1. Introduction						Let us introduce the following notation: every obje	ct	
							state is represented by a two-dimensional phase ma	ıр
In	interferometry.	spatial	phase	shifting	(SPS)	has	$\varphi(x, v) \mod 2\pi$ : the suffix "mod $2\pi$ " will be omitted f	or
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\* Corresponding author. Tel.: +49-441-798-3512; fax: +49-441-798-3576.

would therefore be favourable if both, the temporally unwrapped data and several phase maps  $\varphi(x, y)$  were stored for future processing. From these phase maps conventional

E-mail address: heinz.helmers@uni-oldenburg.de (H. Helmers).