University of Huddersfield Repository

Kumar, Prashant, Martin, Haydn, Maxwell, Graeme and Jiang, Xiang

Design and development of a self calibrated optical chip interferometer for high precision on-line surface measurement

Original Citation


This version is available at http://eprints.hud.ac.uk/id/eprint/13488/

The University Repository is a digital collection of the research output of the University, available on Open Access. Copyright and Moral Rights for the items on this site are retained by the individual author and/or other copyright owners. Users may access full items free of charge; copies of full text items generally can be reproduced, displayed or performed and given to third parties in any format or medium for personal research or study, educational or not-for-profit purposes without prior permission or charge, provided:

• The authors, title and full bibliographic details is credited in any copy;
• A hyperlink and/or URL is included for the original metadata page; and
• The content is not changed in any way.

For more information, including our policy and submission procedure, please contact the Repository Team at: E.mailbox@hud.ac.uk.

http://eprints.hud.ac.uk/
DESIGN AND DEVELOPMENT OF A SELF CALIBRATED OPTICAL CHIP INTERFEROMETER FOR HIGH PRECISION ON-LINE SURFACE MEASUREMENT

Prashant Kumar¹, Haydn Martin ¹, Graeme Maxwell² and Xiangqian Jiang¹
¹ University of Huddersfield, Queensgate, Huddersfield HD1 3DH, UK
² Centre for Integrated Photonics, Adastral Park, Ipswich IP5 3RE, UK

ABSTRACT

Surface characterization plays an important role in many manufacturing processes. In this paper we propose the development of a hybrid optical chip interferometer device which will allow online surface measurement at high precision with improved autonomy. The research methodology involves the integration of individual optoelectronic components onto a silicon daughterboard which is then incorporated on a silica motherboard to produce the final hybrid structure. The fundamental principle of operation of the device is based on wavelength scanning interferometry and optical phase measurement techniques. The integrated optics chip device combined with an optical probe will be compact and robust and may be used for high precision surface measurement and absolute distance measurement.

Keywords surface metrology, integrated optics, interferometry, wavelength scanning, phase shifting.