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DESIGN AND DEVELOPMENT OF A SELF CALIBRATED OPTICAL CHIP INTERFEROMETER FOR HIGH PRECISION ON-LINE SURFACE MEASUREMENT

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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.