



DISPERSION AND OPTICAL THICKNESS MULTI-INTERFEROMETER INTERROGATION

Dispersion and Optical Thickness Multi-Interferometer Interrogation

Background

A fundamental challenge in many high precision manufacturing and data collection processes is the need to have highly accurate and stable units of measure (be it the thickness of a plate, or the size of a gap). Low Coherence Tandem Interferometry is a well known technique for measuring group delay and dispersion, and is particularly powerful when combined with Fourier transform processing to yield high-accuracy, high resolution measurements of optically thick and dispersive samples; i.e. measuring thickness and/or optical properties of samples. The Optics Research Group (ORG) at WIT has developed a novel approach to implementing Low Coherence Tandem Interferometry with significant advantages.

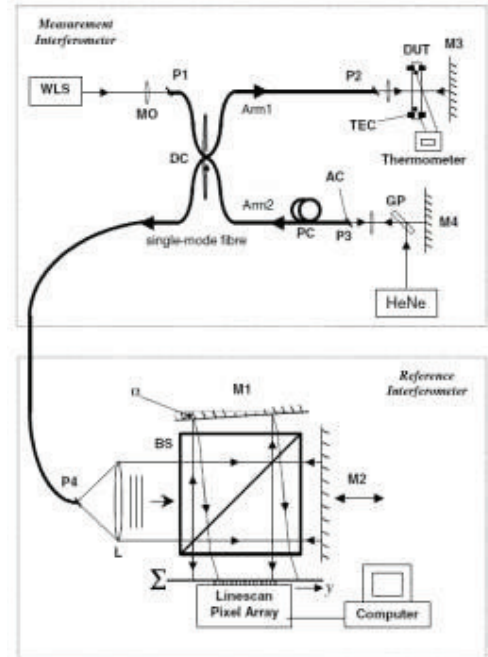
Technology Description

Fast accurate and high resolution measurements of optical path length changes are of significant importance in telecommunications and sensing. Also gauge block measurements are among the most commonly used standards for maintaining traceability in dimensional metrology. Optical interferometry with accuracies on the order of 10^{-8} m provides the most sensitive method of calibrating gauge blocks.

The figure on the right shows a recently reported statically scanned tandem interferometric configuration which illustrates the layout.

Established tandem interferometric configurations typically require a reference interferometer to interrogate each measurement interferometer.

The Optics Research Group has developed an approach which allows simultaneous interrogation of multiple measurement interferometers using a single reference interferometer facilitating multi-point measurement of distance, thickness, optical delay from a single reference interferometer.



Statically scanned tandem interferometer.





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Market Opportunity

The Optics Research Group has developed Bulk optic (lab based) and all-fibre (rugged, portable and vibration immune) designs which are suitable for deployment in a number of environments and remote measurements can also be conducted by transmission of signals between the two interferometers using a fibre network. Areas in which this technology can have an impact include telecommunications, industrial (including Military) gauge block measurement, optical thickness measurements, distance measurement, calibration and high tolerance control systems.

IP Status

The Optics Research Group has developed several patent pending technologies in the areas of optical devices, sensors and systems and has developed bulk optic and fibre based prototypes of this technology. For more information please contact either of the parties listed below.

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