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综述

移相干涉测量术及其应用

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摘要 为了对移相式数字干涉仪在光学元件测量中的应用有全面了解，介绍了移相干涉术的基本原理。结合激光数字波面干涉仪，阐述移相干涉术的四步重叠平均算法、压电晶体移相器(PZT)的结构、3 PZT的组合方法、移相器的标定误差和非线性误差的校正方法、波面相位解包的自适应种子算法、波面相位的评价指标等内容。结合移相数字波面干涉仪，叙述了移相干涉测量技术在普通光学元件、红外光学元件、大口径光学元件、非球面光学元件等测量中的应用并指出了应用过程中的注意事项。最后明确指出光干涉技术正沿着高相位分辨率、高空间分辨率、宽波段和瞬态高速测量的方向发展，并将会在瞬态波前测量、微机械的微结构动态分析等方面有着越来越广泛的应用。

关键词 移相干涉术 光学测量 干涉仪

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Phase shift interferometry and its application

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Abstract In order to comprehend the application of the phase shift digital interferometry in measurement of optical components, the basic principle of the phase shift interferometry (PSI) is introduced. The overlapping averaging 4 frame algorithm, the configuration of piezoelectric transducer (PZT), the combination method for three PZTs, the correction method for calibration error and nonlinear error of phase shifter, the wave surface phase unwrapping adaptive algorithm, and evaluating specification of wave surface phase are described. The application of the modern optical interferometry in the measurement of common optical elements, IR optical elements, large aperture optical elements and aspheric optical components is introduced according to the digital phase shift wave surface interferometer. It is clearly pointed out that the developing trend of the optical interferometry moves towards high phase resolution, high spatial resolution, wide wave range and high speed transient measurement, and it will find ever increasing applications in the transient wavefront measurement, microstructure dynamic analysis for micro mechanics and so on.

Key words phase shift interferometry optical measurement interferometer

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