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Calibration Specification for Digital Laser Spherical Interferometers

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(English Translation)

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Appendix E Calibration Certificate Information and Internal Page Format (15)

Introduction

The preparation of this specification is based on JJF 1071-2010 "Rules for Compiling National Measurement and Calibration Specifications" "General Measurement Terms and Definitions" and JJF 1059.1-2012 "Measurement Uncertainty Evaluation and Expression" as the basis and in accordance with.

This specification is the first release.

Calibration Specification of Digital Laser Spherical Interferometer

1 Scope

This specification applies to the calibration of digital laser spherical interferometers.

2 Reference documents this specification refers to the following documents.

JJF 1100-2016 Calibration Specification for Plane Constant Thickness Interferometer GB/T 2831-2009 Surface deviation of optical parts ISO 14999-4.:2015 Interferometry of optical and photonic optics and optical systems. Part 4.

Description and evaluation of tolerances specified in ISO 10110 (Optics and photonics-Interferometricmeasurement ofopticalelementsandopticalsystems-Part 4. InterpretationandevaluationoftoleranncesspecifiedinISO 10110) for dated reference documents, only the dated version applies to this specification; for those without date references the latest version (including all amendments) is applicable to this specification.

3 Terms and definitions the terms and definitions defined in GB/T 2831-2009 and ISO 14999-4.:2015 and the following apply to this specification.

3.1 Surface form deviation the deviation of the measured optical surface relative to the reference optical surface.

3.2 Peak-to-valey (PV) value the maximum value of surface deviation minus the minimum value, referred to as PV value.

3.3 PVr value robustpeak-to-valey (PVr) value 36-term Zernike polynomial fitting of surface shape deviation plus surface PV value plus 3 times fitting residuals (surface shape deviation minus 36 items Zernike polynomial fitting surface) root mean square value.

Note: The definition of Zernike polynomials is defined according to the ISO 14999-4.:2015 Appendix

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B standard.

3.4 F number of spherical optics the ratio of the radius of curvature of the spherical surface to the clear aperture.

Note: The F number of the spherical element under test should be less than or equal to the F number of the spherical lens of the digital laser spherical interferometer in order to achieve digital Full-caliber calibration of laser spherical interferometer. It is recommended to choose the spherical mirror with the closest F number (slightly smaller) to be calibrated digital laser spherical interferometer the F-number of the measured spherical element, and the length of the optical cavity should be as short as possible to improve the measurement repeatability.

4 Overview

The digital laser spherical interferometer is mainly used for the measurement of the surface deviation of spherical optical elements.

The digital laser spherical interferometer generates reference light and test light through its spherical lens, and the test light is incident on the ball under test the surface of the surface element is reflected back, and the light wave carrying the deviation of the surface shape of the measured spherical element forms an interference strip with the reference light

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