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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 44605-2024

**Laser and laser-related equipment - Absorption distribution
measurement of optical laser components - Photothermal
mapping method
(English Translation)**

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References

Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting is required.

This document is modified to adopt ISO 23701:2023 "Optics and photonics - Laser and laser-related equipment - Absorption measurement of laser optical components".

Photothermal Technology for Measurement and Imaging.

Compared with ISO 23701:2023, this document has the following structural adjustments.

Chapter 5 corresponds to 5.1 of ISO 23701:2023; -Chapter 6 corresponds to 5.2 of ISO 23701:2023; -Chapter 7 corresponds to 5.3 of ISO 23701:2023; -Chapter 8 corresponds to Chapter 6 of ISO 23701:2023; -Chapter 9 corresponds to Chapter 7 of ISO 23701:2023; -Chapter 10 corresponds to Chapter 8 of ISO 23701:2023; -Appendix A corresponds to ISO 23701:2023 Appendix B; -Annex B corresponds to Annex A of ISO 23701:2023.-the technical differences between this document and ISO 23701:2023 and their reasons are as follows.

The normative reference GB/T 15313 replaces ISO 11145 (see Chapter 3) to adapt to my country's technical conditions;

The normative reference GB/T 25915.1-2021 replaces ISO 14644-I (see 7.1) to adapt to my country's technology condition;

The reference to Annex B in 6.4 of ISO 23701:2023 has been deleted. Annex B gives the separation of surface absorption and volume absorption and does not There is a direct calibration procedure for depth measurement in three-dimensional absorption distribution

scanning measurement.

The following editorial changes were made to this document.

The name of the standard was changed to "Measurement Method of Absorption Distribution of Laser Optical Components of Lasers and Laser-related Equipment - Photothermal Imaging Method".

Harmonization with existing standards.

1 Scope

This document describes a method for measuring absorption of laser optical components and for imaging the absorption distribution with high spatial resolution in 2D/3D scanning.

Using the photothermal measurement method, the absorption measurement of the laser optical element is achieved through calibration, and the absorption distribution measurement is achieved through position scanning.

This document is applicable to the 2D/3D absorption distribution imaging measurement of laser optical components, that is, measuring the absorption as a function of position, for high power/high Absorption defect/absorption distribution detection of large aperture optical components in laser systems.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document.

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies.

in this document.

GB/T 15313 Laser Terminology (GB/T 15313-2008, ISO 11145:2006, MOD) GB/T 25915.1-2021 Clean rooms and related controlled environments Part 1: Classification of air cleanliness by particle concentration (ISO 14644-1:2015, MOD) ISO 80000-7 Quantities and units-Part 7: Light and radiation ation)

3 Terms and definitions

The terms and definitions defined in GB/T 15313 and ISO 80000-7 and the following apply to this document.

absorption

The radiant flux absorbed by the laser optics.

Absorption rate

The ratio of absorbed radiation flux to input radiation flux.

Absorption map

Absorption rate distribution map Absorption (3.1)/absorbance (3.2) measured at different locations on the sample.

NOTE: The definition of absorptivity used in this document is limited to absorption processes that convert the absorbed energy into heat. For certain types of optical components and radiation, Extraneous non-thermal processes may cause absorption losses that cannot be detected by the test methods described in this document.

4 Symbols and units of measurement

Table 1 gives the meaning of the symbols used in this document and the units of measurement (where relevant).