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

GB/T 44815-2024

**Lasers and laser-related equipment - Test methods for laser
beam polarization parameters**

激光器和激光相关设备 激光束偏振特性测量方法

(English Translation)

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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.

This document is modified to adopt ISO 12005:2022 "Laser and laser-related equipment - Measurement methods of laser beam parameters using polarization".

The technical differences between this document and ISO 12005:2022 and their reasons are as follows.

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

--- Changed the expression of polarization state terminology to adapt to my country's technical conditions (see 3.2);

--- The normative reference GB/T 13863 replaces ISO 11554 to adapt to my country's technical conditions (see 4.3.1).

The following editorial changes have been made to this document.

- The name of the standard was changed to "Measurement Method of Polarization Characteristics of Laser Beams of Lasers and Laser-related Equipment";
- Deleted the reference document CIE059-1984;
- Changed Appendix A and added Figure A.1 Polarization Poincare sphere based on Stokes parameters;
- Removed references.

1 Scope

This document describes the measurement method for the polarization characteristics of laser beams and specifies the content of the test report.

This document applies to the measurement of polarization state and polarization degree of continuous wave (CW) laser beam or stable pulsed laser beam, complete or partial linear polarization the polarization direction of the laser beam can be measured, as well as the polarization state of the highly divergent laser beam and the large-aperture laser beam.

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 to this document.

GB/T 13863 Laser radiation power and power instability test method (GB/T 13863-2011, ISO 11554:2006, MOD) GB/T 15313 Laser Terminology (GB/T 15313-2008, ISO 11145:2006, MOD)

3 Terms and Definitions

The terms and definitions defined in GB/T 15313 apply to this document.

The URLs for terminology databases used for standardization maintained by ISO and IEC are as follows.

polarization

The phenomenon in which the electric field vector oscillation is confined to a specific direction.

Note: This is a basic phenomenon, explained by the concept that electromagnetic radiation is a

transverse wave motion, i.e. the oscillations are perpendicular to the direction of propagation. It is usually believed that these oscillations are electric fields.

Oscillation of vector.

state of polarization Description of the polarization (3.1) classification.

Note: Polarization state is divided into linear polarization state, circular polarization state, elliptical polarization state or unpolarized state.

Ellipticityangle

< Elliptically polarized radiation > angle, whose tangent is the signed ratio of the minor axis b to the major axis a of the polarization ellipse, where the positive and negative signs represent indicates right-handed or left-handed elliptical polarization (3.1), that is, $\tan\epsilon = \pm b/a$.

NOTE 1 The polarization ellipse is described by the motion of the endpoints of the electric field vector in a plane perpendicular to the direction of propagation of the radiation (see Annex A).

Note 2: The ellipticity angle is limited to $-45^\circ \leq \epsilon \leq 45^\circ$. When $\epsilon = \pm 45^\circ$, it is a circular polarization state, and when $\epsilon = 0^\circ$, it is a linear polarization state (see Appendix A).