

ICS 17.040
CCS A 52

JJG

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

JJG 353-2006

Replacing JJG 353-1994

**Verification Regulation of 633nm Frequency Stabilized Lasers
(English Translation)**

Issued on: March 8, 2006

Implemented on: September 8, 2006

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine**

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4.1

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633nm frequency stabilization laser verification procedure Meter is the basic length unit in the International System of Units (SI). The 17th International Metrology Conference in October 1983 (CGPM) passed the current m definition, ie "meter is light in vacuum, at intervals of 1/299,792,458 seconds the length of the internal propagation". At the same time, the original m definition was abolished. There are three methods for recurring the current m definition.

--- $l=c \cdot t$, that is, first measure the time t required for the plane electromagnetic wave to propagate over the distance l in the vacuum, and then $c \cdot t$ can find the measured length l ;

--- $\lambda = c/f$

, that is, measuring the frequency f of the plane electromagnetic wave, and then by c/f Find the vacuum wavelength λ and use λ as the length standard;

--- Directly refer to the 12 laser radiation lines recommended by the International Metrology Commission (see the cited literature for details) Vacuum wavelength value or frequency value and used according to the given uncertainty.

This procedure uses the third method described above and selects 633nm stabilized on the saturated absorption line of iodine molecules.

The He-Ne laser wavelength is used as a measurement standard.

In.1992, the International Metrology Conference specified a relative standard uncertainty of 2.5×10^{-11} for the 633 nm laser wavelength reference.

The laser interferometer as the base standard of the length measurement in the length

measurement is calculated according to the emission wavelength of the light source.

Length value. Various frequency-stabilized lasers as interferometer light sources have stable output wavelength (frequency) characteristics.

It is the basic working condition to ensure the normal operation of the interferometer.

1 Scope

This procedure applies to the first verification and subsequent verification of different types of frequency-stabilized 633 nm lasers. Suitable for all kinds of the trace value of the vacuum wavelength (frequency) value of the output wavelength of the stabilized 633 nm laser and the different sampling intervals Measurement of frequency stability.

The qualified 633nm frequency-stabilized laser can be used as the interferometer source of the standard equipment for national level, Provincial (department) level and interferometric measurement systems for various verification and calibration devices of enterprises and institutions.

2 Citations

This procedure refers to the following documents.

Documents Concerning the New Definition of the Meter, Metrologia, 19 (1984) 163.

(the document of the definition of the new meter, the measurement, 19 volumes (1984) 163 pages.) Mise en Pratique of the Definition of the Metre (1992), Metrologia, 30 (1994) 523.

(Implementation method of the definition of the meter (1992), measurement, 30 volumes (1994) 523 pages.) Practical Realization of the Definition of the Metre (1997), Metrologia, 36 (1997) 211.

(Implementation of the definition of meters (1997), Measurement, Vol. 36 (1997) 211.)