



Approved by the CIPM in October 2007

**RECOMMENDED VALUES OF STANDARD FREQUENCIES
FOR APPLICATIONS INCLUDING
THE PRACTICAL REALIZATION OF THE METRE AND
SECONDARY REPRESENTATIONS OF THE SECOND**

HELIUM NEON LASER (unstabilized) ($f \approx 474$ THz)

HeNe laser operating on the $3s_2 \rightarrow 2p_4$ transition

1. CIPM recommended value [1] of the frequency

$$f(\text{HeNe}_{\text{unstabilised}}) = 473.612\,7 \text{ THz}$$

equivalent to

$$\lambda(\text{HeNe}_{\text{unstabilised}}) = 632.990\,8 \text{ nm}$$

with a relative standard uncertainty of 1.5×10^{-6} applies apply to the radiation in vacuum of an unstabilized helium-neon laser operating solely on the $3s_2 \rightarrow 2p_4$ transition, independent of the isotopic mixture of the neon.

This wavelength (in vacuum) value was also recommended by CIPM 2007 as a Realization of the Definition of the Metre

2. Source data

The source data are derived from an investigation carried out by the CCL and published in [2]

3. References

[1] Procès-Verbaux des Séances du Comité International des Poids et Mesures, 96th meeting (2007) 2009, Recommendation 2 (CI-2007): On the value and uncertainty of unstabilized He-Ne lasers, page 186. (see e.g. <http://www.bipm.org/utis/en/pdf/CIPM2007-EN.pdf#page=78>).

[2] J. A. Stone, J. E. Decker, P. Gill, P. Juncar, A. Lewis, G. D. Rovera, M. Viliesid: Advice from the CCL on the use of unstabilized lasers as standards of wavelength: the helium–neon laser at 633nm. *Metrologia* **46**, 11–18 (2009).