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

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

equivalent to

$\lambda(\mathrm{HeNe}_{\mathrm{unstabilised}}) = 632.990\ 8$ 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/utils/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).