

## Resolution 5 of the 27th CGPM (2022)

### On the future redefinition of the second

The General Conference on Weights and Measures (CGPM), at its 27th meeting,

**recalling** that

- the CGPM at its 13th meeting (1967) defined the second as “the duration of 9 192 631 770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of the caesium 133 atom”,
- the CGPM at its 26th meeting (2018) revised the definitions of the base units of the SI including the second, which it defined by taking the fixed numerical value of the caesium frequency  $\Delta\nu_{\text{CS}}$ , which is the unperturbed ground-state hyperfine transition frequency of the caesium 133 atom, to be 9 192 631 770 when expressed in the unit Hz, which is equal to  $\text{s}^{-1}$ ,

**noting** that

- optical frequency standards based on different species and transitions in many National Metrology Institutes (NMIs) have surpassed the accuracy achievable by the realization of the current definition by a factor of up to 100,
- the reliability and uncertainty of the related time and frequency transfers are improving significantly,
- some institutes have demonstrated that time scales based on one or more optical frequency standards have the potential to be more accurate than the time scale based on the current definition of the second,
- these advances will allow further improvements in the realization and dissemination of time scales, particularly Coordinated Universal Time (UTC),

**further noting** that the Consultative Committee for Time and Frequency (CCTF) in its work to serve current and future needs in time metrology

- has carried out an extensive survey amongst metrological, scientific and technology institutions, and other stakeholders, which has confirmed world-wide interest in more accurate time and frequency services enabled by a new definition of the second,
- is working to identify the best candidate species or ensemble of species that could serve as the basis for a new definition,
- has prepared a roadmap of the actions and timings needed to decide on a new definition of the second and has established criteria and appropriate indicators to monitor progress towards such a new definition,

**encourages** the International Committee for Weights and Measures (CIPM)

- to promote the importance of achieving the objectives in the roadmap for the redefinition of the second,
- to bring proposals to the 28th meeting of the CGPM (2026) for the choice of the preferred species, or ensemble of species for a new definition of the second, and for the further steps that must be taken for a new definition to be adopted at the 29th meeting of the CGPM (2030),

and **invites** Member States to support research activities, and the development of national and international infrastructures, to allow progress towards the adoption of a new definition of the second.

The reader should note that the official version of this Resolution is the [French text](#)

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