

Roadmap towards the redefinition of the SI second – Current status

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Since 1967, the definition of the unit of time in the International System of Units (SI) — the second — has been based on a specific transition of the caesium atom. The most advanced primary frequency standards (laser-cooled caesium fountains) currently realize the second with a relative frequency accuracy of 10^{-16} . But, over the past decade, optical frequency standards have demonstrated a relative frequency accuracy 100 times greater, at the 10^{-18} level or beyond.

This breakthrough has raised the question of redefining the SI second. The Consultative Committee for Time and Frequency (CCTF) is actively advancing its roadmap towards the redefinition, provided that a preferred option for the new definition is consensually selected and that all mandatory criteria are met. The goal is to ensure both a clear improvement for users and a sustainable, long-term definition.

The CCTF roadmap [1] was endorsed by the 27th General Conference on Weights and Measures (CGPM) in 2022 [2]. An updated version of this roadmap underpins the resolution [3] to be submitted for approval at the 28th CGPM in October 2026, with the target date for the redefinition maintained in 2030.

This presentation will cover the key elements of the updated CCTF roadmap, focusing on recent progress, the current status and main challenges, as well as the workplan to move forward and reach the objective to take an important decision on the new definition in 2030.

References

- [1] Dimarcq, N. et al (2024). Roadmap towards the redefinition of the second. Metrologia, 61 012001.
- [2] <https://www.bipm.org/en/cgpm-2022/resolution-5>
- [3] Draft CGPM 2026 Resolutions are available at <https://www.bipm.org/en/cgpm-2026/documents>