


# 19<sup>th</sup> Meeting of the Consultative Committee for Mass and Related Quantities

25-26 May 2023

Philippe Richard  
CCM President

Hao Fang  
CCM Executive secretary



Working together to  
promote and advance  
the global comparability  
of measurements

## 2. News from CIPM and CGPM

CIPM meetings since May 2021: June 2021, Oct 2021, June 2022, March 2023

Next CIPM meetings: June and October 2023

All CIPM decisions and reports are public!

<https://www.bipm.org/en/committees/ci/cipm>

Major focus:

Preparation for the 2022 CGPM

CIPM elections, finance, governance and digitalization

**International Committee  
for Weights and Measures**

Proceedings of the 111th meeting

(21-23 June 2022)



# CGPM Resolutions

Seven resolutions were adopted by the Member States

- On the report prepared by the International Committee for Weights and Measures on the “Evolving Needs in Metrology”
- On the global digital transformation and the International System of Units
- On the extension of the range of SI prefixes
- On the use and future development of UTC
- On the future redefinition of the second
- On universal adherence to the Metre Convention
- On the dotation of the International Bureau of Weights and Measures for the years 2024 to 2027



# 21st Century Metrology Grand Challenges

The CIPM identified five “Metrology Grand Challenges”:

- Climate change and environment
- Health & life sciences
- Food safety
- Energy
- Advanced manufacturing



Next to cross-cutting challenges related to *how* we make measurements:

- Digital Transformation
- “New” metrology (e.g. sensor networks, NMI-on-a-chip)



# How to move forward?

The CIPM proposes

to create appropriate forums to shape and coordinate the metrology community's response to the identified grand challenges with the objective to coordinate new possibilities for metrology to have an impact on global cross-cutting challenges.

- Forum on metrology in the digital world
- Sectorial Task Group on Climate Change and Environment
- First ideas about quantum technology forum

and

to start to develop a new vision for the work of the BIPM





# CGPM: CCM Presentation

**CGPM**

**Consultative Committee for Mass and Related Quantities - CCM**

Philippe Richard, CCM President  
November 2022

27<sup>e</sup> réunion de la Conférence générale des poids et mesures

1

**Mass and related quantities**

« the largest number of different quantities with a very broad impact on everyday life »

Mass	Force	Torque	Pressure	Vacuum
Density	Viscosity	Flow	Fluid flow	Gravimetry

**CCM**

2

**Scientific, economic and societal challenges**

**CCM**

3

**Climate change and Environment**

**CCM**

4

**Health and Life Sciences**

**CCM**

5

**Food Safety**

**CCM**

6

**Energy and Mobility**

**CCM**

7

**Advanced Manufacturing**

**CCM**

8

**Digital transformation**

**CCM**

9

**Global forum for progressing the state-of-the-art**

Workshops on...

- New activities and developments in mass and related quantities (CCM, 2019)
- Ion gauge (WG on Pressure and Vacuum, 2020)
- Gravimetry (BKG, Germany & LNE SYRTE, France, 2022)

**CCM**

10

**Global forum for progressing the state-of-the-art**

Revised SI, new technologies & new metrology

**CCM**

**Dissemination of the kilogram**

Key comparisons of kilogram realizations

2019: 7 participants  
2021: 9 participants

**CCM**

**Global comparability of measurements**

Good agreement

Traceability to the consensus value of the kilogram (since 1<sup>st</sup> February 2021)

**CCM**

**Facilitating dialogue between NMIs and stakeholders**

**CCM**

**Important work at the BIPM**

The BIPM Kibble balance is the primary realization of the member states

The BIPM strongly supports the CCM activities

The CCM fully supports the BIPM Work Programme 2024-2027

**CCM**



(see CGPM documents for full presentation)

# CGPM: CCM Poster 1/2

## Mass and Related Quantities

The Consultative Committee for Mass and Related Quantities (CCM)

force, torque, density, viscosity, fluid flow, gravimetry, pressure, vacuum, hardness

### Dissemination of the kilogram following redefinition

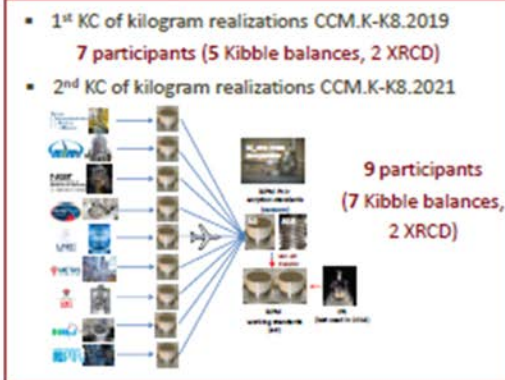


$$h = 6.626\,070\,15 \times 10^{-34} \text{ J s}$$

- *mise-en-pratique* published in May 2019 and regularly updated
- CCM detailed note on the dissemination process
  - an internationally coordinated dissemination from realization experiments using a Consensus Value
  - dissemination of the first Consensus Value from 1<sup>st</sup> Feb. 2021, adjustments to the CMCs of 31 NMIs on the KCDB
  - dissemination of the second Consensus Value from early 2023

### Global forum for progressing the state of the art

- workshop on the new activities and developments in mass and related quantities during the CCM meeting in May 2019
- workshop "ion gauge" organized by the WG on Pressure and Vacuum in May 2020
- 2 workshops on gravimetry organized by BKG Germany and LNE SYRTE France in cooperation with IAG Working Group in 2022





# CGPM: CCM Poster 2/2

## Facilitating dialogue between NMIs and stakeholders



Note on the impact of the beginning of Phase 2 of the kilogram dissemination process on BIPM mass calibrations

Beginning of a new phase of the dissemination of the kilogram



25 members  
6 observers

17th meeting of the CCM (2019)



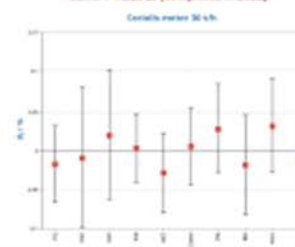
18th meeting of the CCM (2021)



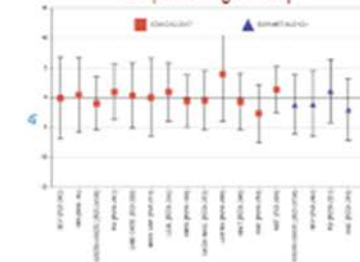
## Global comparability of measurements

- 2965 CMCs in 29 service categories
- 55 comparisons completed from 2019 to 2022
- 3 guidance documents for supporting KCs and CMCs
  - key comparison report template
  - guidelines for approval and publication of the final reports of key comparisons
  - guidelines for submission and review of CMCs

comparison in fluid flow  
CCM.FF-43.2015 (completed in 2022)



comparison in gravimetry



Bureau  
International des  
Poids et  
Mesures

27th meeting of the CGPM (2022)

[www.bipm.org](http://www.bipm.org)





# News from CIPM

## Election of the CIPM Bureau in March 2023

CIPM President

Wynand Louw

CIPM Secretary

Takashi Usuda

CIPM Vice-Presidents

Philippe Richard and James Olthoff



# News from CIPM

## **| Decision CIPM/112-6 (2023)**

The CIPM appointed Dr V. Coleman as the President of the Consultative Committee for Length (CCL) for a four-year term.

## **| Decision CIPM/112-5 (2023)**

The CIPM appointed Dr J.-T. Janssen as the President of the Consultative Committee for Ionizing Radiation (CCRI) for a four-year term.

## **| Decision CIPM/112-4 (2023)**

The CIPM decided to reappoint the Presidents of the following Consultative Committees for four-year terms:

- Consultative Committee for Acoustics, Ultrasound and Vibration (CCAUV): Dr H. Laiz.
- Consultative Committee for Electricity and Magnetism (CCEM): Prof. G. Rietveld.
- Consultative Committee for Mass and Related Quantities (CCM): Dr P. Richard.
- Consultative Committee for Photometry and Radiometry (CCPR): Dr M.L. Rastello.
- Consultative Committee for Amount of Substance: Metrology in Chemistry and Biology (CCQM): Dr S.-R. Park.
- Consultative Committee for Thermometry (CCT): Dr Y. Duan.
- Consultative Committee for Time and Frequency (CCTF): Dr N. Dimarcq.
- Consultative Committee for Units (CCU): Prof. J. Ullrich.



# Thank you.

[Philippe.Richard@metas.ch](mailto:Philippe.Richard@metas.ch)  
CCM President

[Fang@bipm.org](mailto:Fang@bipm.org)  
CCM Executive secretary

A large, colorful spiral graphic composed of many concentric, slightly offset rings in a rainbow color palette (red, orange, yellow, green, blue, purple, pink). The spiral is centered on the right side of the slide.

Working together to  
promote and advance  
the global comparability  
of measurements