




# Consultative Committee for Mass and Related Quantities - CCM

Philippe Richard, CCM President

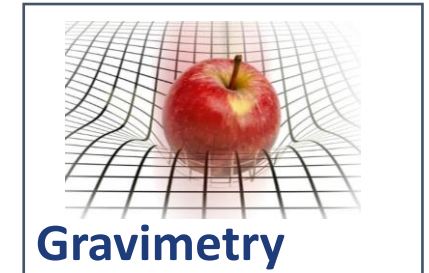
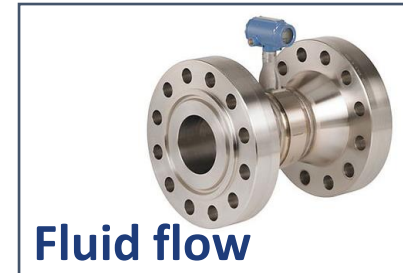
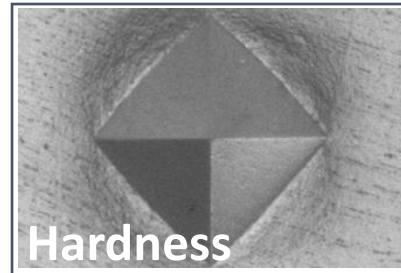
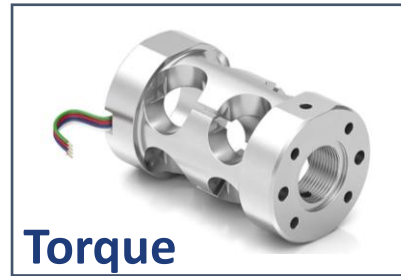
November 2022



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

# Mass and related quantities

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



# Scientific, economic and societal challenges





# Climate change and Environment

Air speed

Pressure

Density of water

Mass

Flow

Gravimetry



# Health and Life Sciences



Mass

Pressure

Force

Flow

Surface tension and density





# Food Safety



# Energy and Mobility

Density

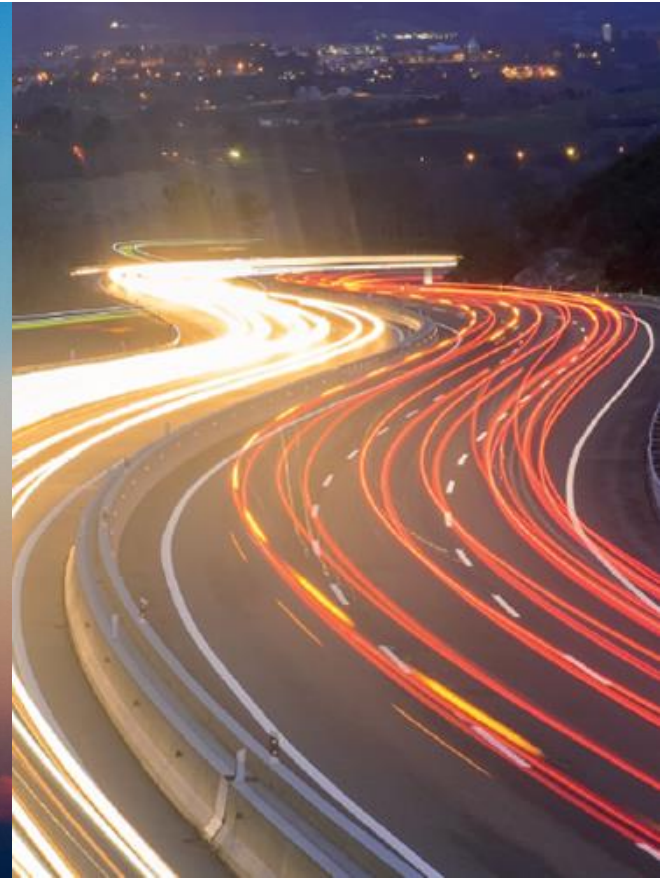
Viscosity

Pressure

Force

Torque

Flow





# Advanced Manufacturing



Mass

Force

Torque

Density

Hardness

Flow

Surface tension



# Digital transformation



# 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)

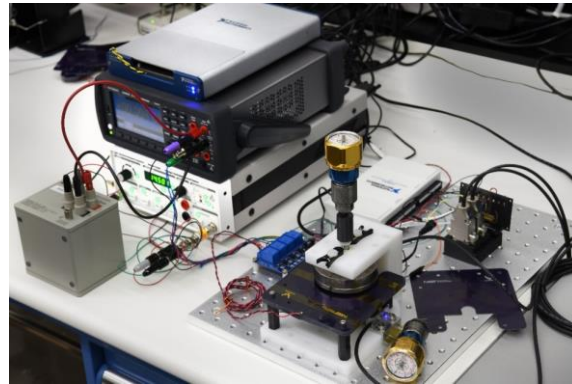


# Global forum for progressing the state-of-the-art

Revised SI, new technologies & new metrology



**Micro-Kibble  
balance**



**Electronic torque realizer**



**Ionization vacuum  
gauge**



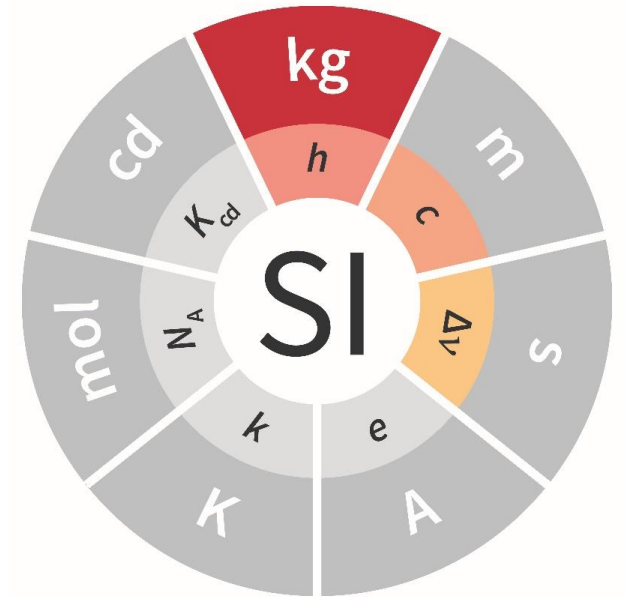
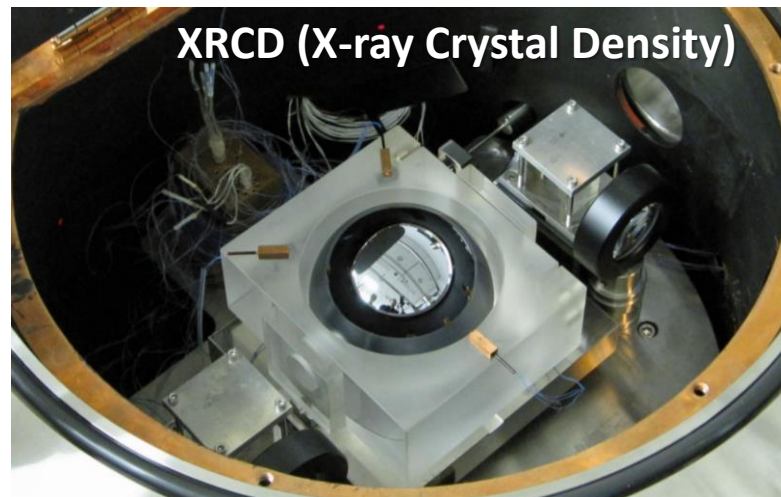
For industry 4.0, quantum sensing and digital transformation of metrology

# Dissemination of the kilogram

Key comparisons of kilogram realizations

2019: 7 participants

2021: 9 participants

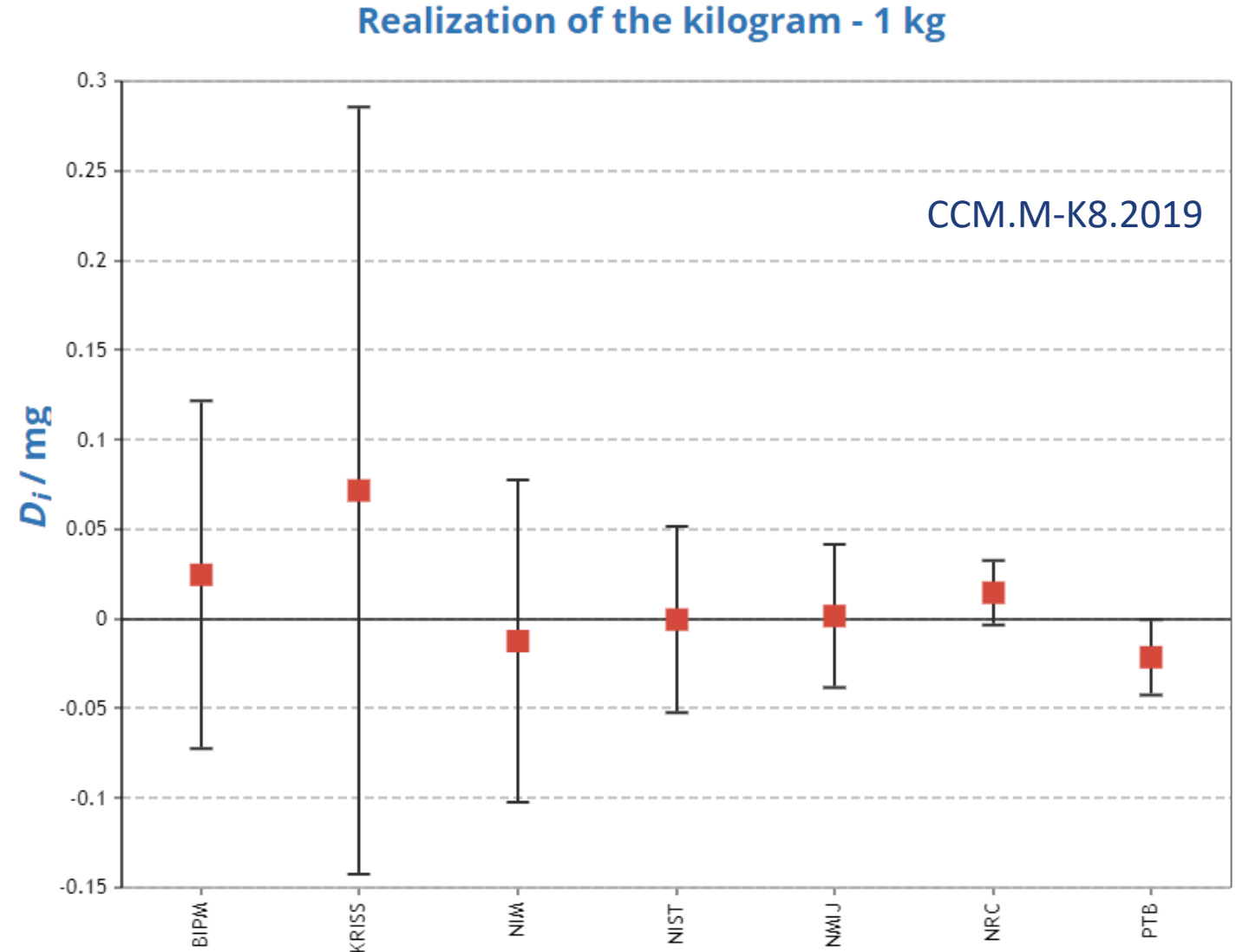




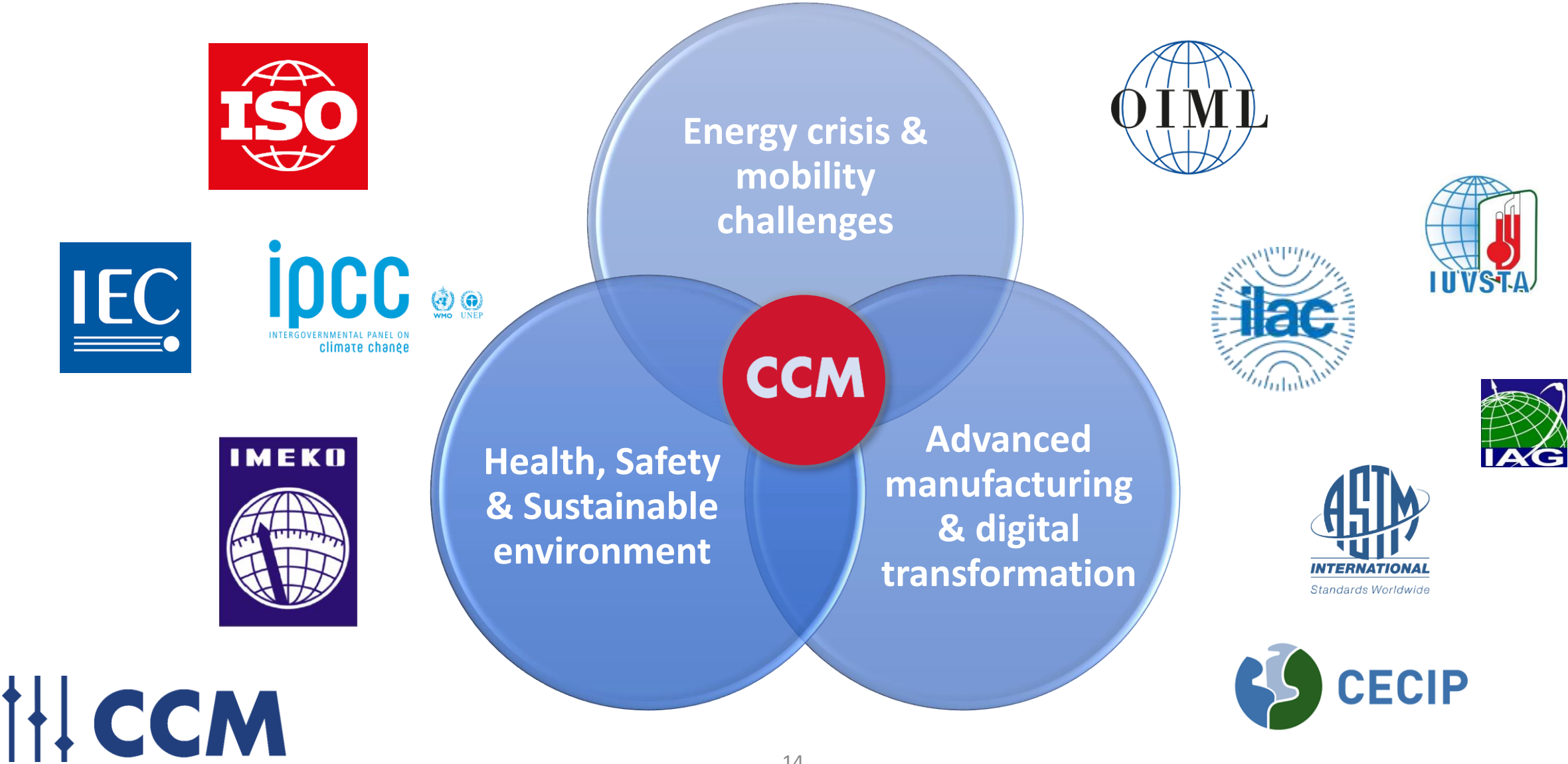
# Global comparability of measurements

Good agreement

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



# Facilitating dialogue between NMIs and stakeholders



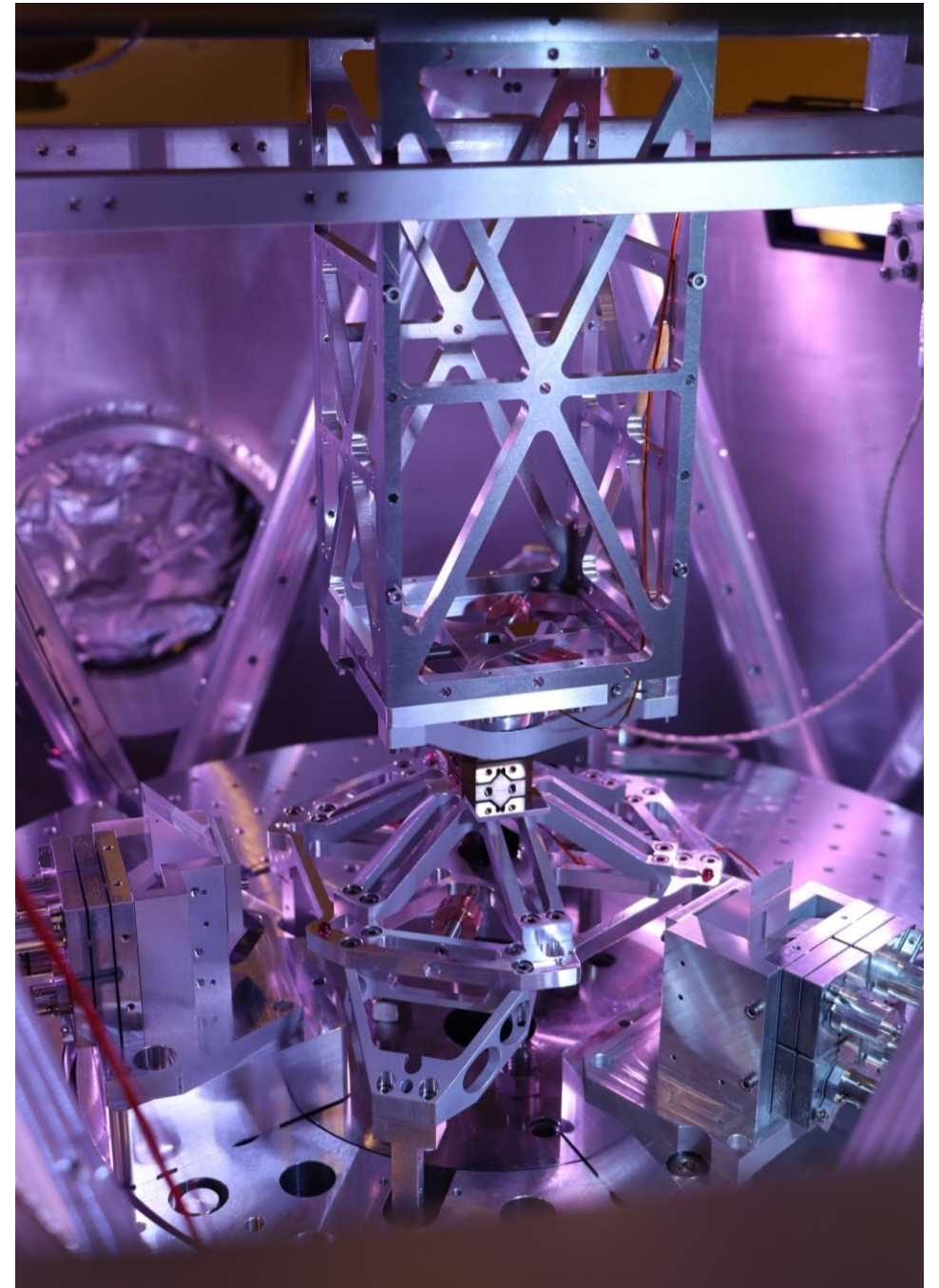


# Important work at the BIPM

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



# Outlook

Third comparison of primary realization

Scientific challenges

Next phase with individual primary realizations

The revised SI opens the way for many new direct realizations






# Thank you.

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CCM Executive secretary

A large, colorful spiral graphic on the right side of the slide. It consists of many concentric, slightly offset rings in a rainbow color palette (red, orange, yellow, green, blue, purple). The spiral starts from the center and expands outwards towards the top right corner.

Working together to  
promote and advance  
the global comparability  
of measurements