CGPM

Consultative Committee for Photometry and Radiometry

Working together to promote and advance the global comparability of measurements

Maria Luisa Rastello, CCPR President

November 2022

CGPM

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27e réunion de la Conférence générale des poids et mesures

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Overview

Photometry

Describes the effects of visible light
on the human eye
in terms of brightness and colour
as perceived by the human eye.

CCPR

Overview

Radiometry

Metrology related to the physical measurement of the properties of electromagnetic radiation, including visible light.

CCPR

Overview

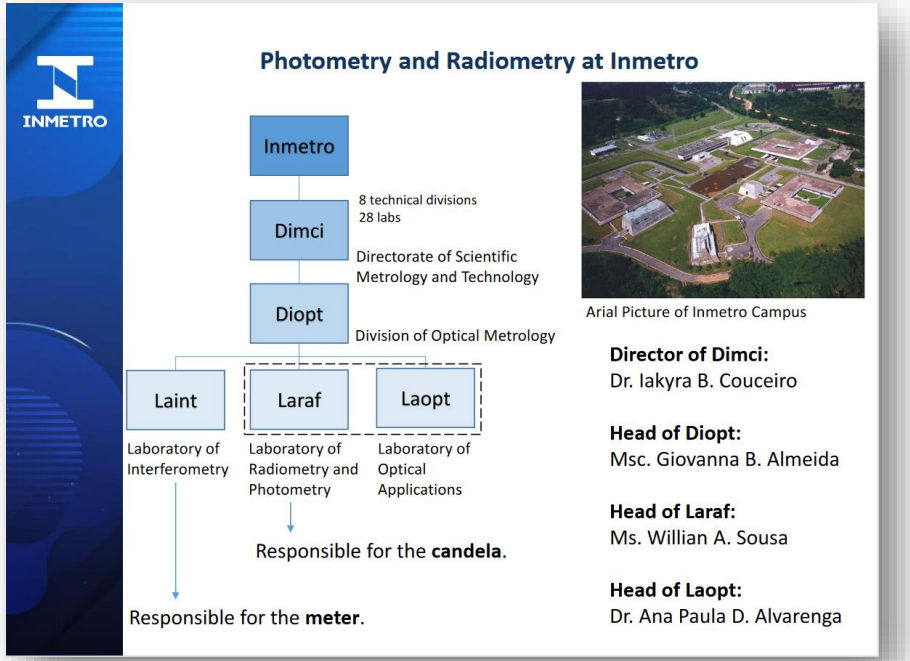
The luminous efficacy of monochromatic radiation of frequency 540×10^{12} Hz, K_{cd}, is 683 lm/W.

CCPR

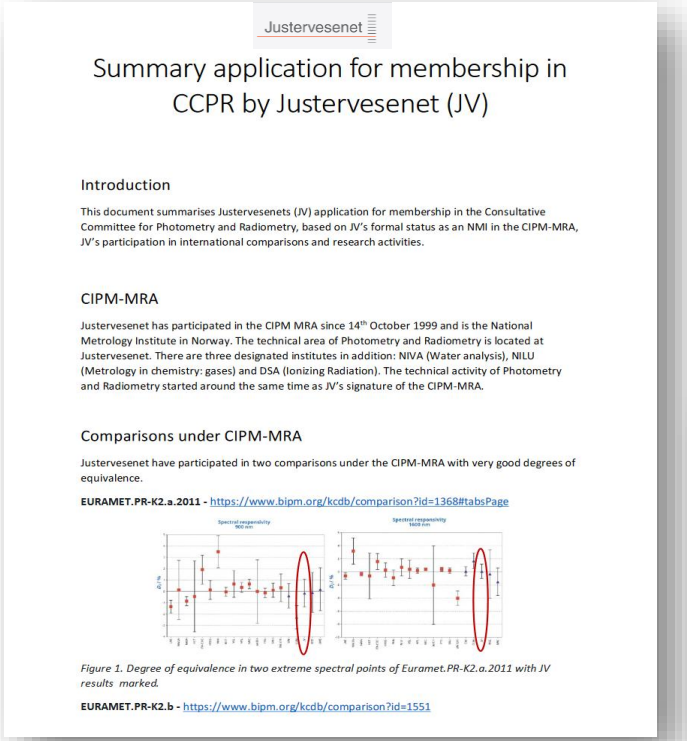
New Members

3 **new members** since 2018:

INMETRO (Brazil)



JV (Norway)


Justervesenet

Summary application for membership in CCPR by Justervesenet (JV)

Introduction

This document summarises Justervesenets (JV) application for membership in the Consultative Committee for Photometry and Radiometry, based on JV's formal status as an NMI in the CIPM-MRA, JV's participation in international comparisons and research activities.

CIPM-MRA

Justervesenet has participated in the CIPM MRA since 14th October 1999 and is the National Metrology Institute in Norway. The technical area of Photometry and Radiometry is located at Justervesenet. There are three designated institutes in addition: NIVA (Water analysis), NILU (Metrology in chemistry: gases) and DSA (Ionizing Radiation). The technical activity of Photometry and Radiometry started around the same time as JV's signature of the CIPM-MRA.

Comparisons under CIPM-MRA

Justervesenet have participated in two comparisons under the CIPM-MRA with very good degrees of equivalence.

EURAMET.PR-K2.a.2011 - https://www.bipm.org/kcdb/comparison?id=1368#tabsPage

Figure 1. Degree of equivalence in two extreme spectral points of Euramet.PR-K2.a.2011 with JV results marked.

EURAMET.PR-K2.b - https://www.bipm.org/kcdb/comparison?id=1551

NSC-IM (Ukraine)
- *official observer*


On the activity of
National Scientific Centre "Institute of Metrology"
in the field of "Photometry and radiometry"
to the 25th meeting of CCPR

National Scientific Centre "Institute of Metrology"

Dr. Mykola Huriev

CCPR

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

- Revision of the *Principles governing photometry* written with CIE published May 2019
- New Task Group on cone-fundamentals launched after CCPR May 2022 on-line meeting

"long-term strategic objective to implement a scientifically rigorous photometric system based on cone-fundamentals to provide a new link between photometric and radiometric quantities"

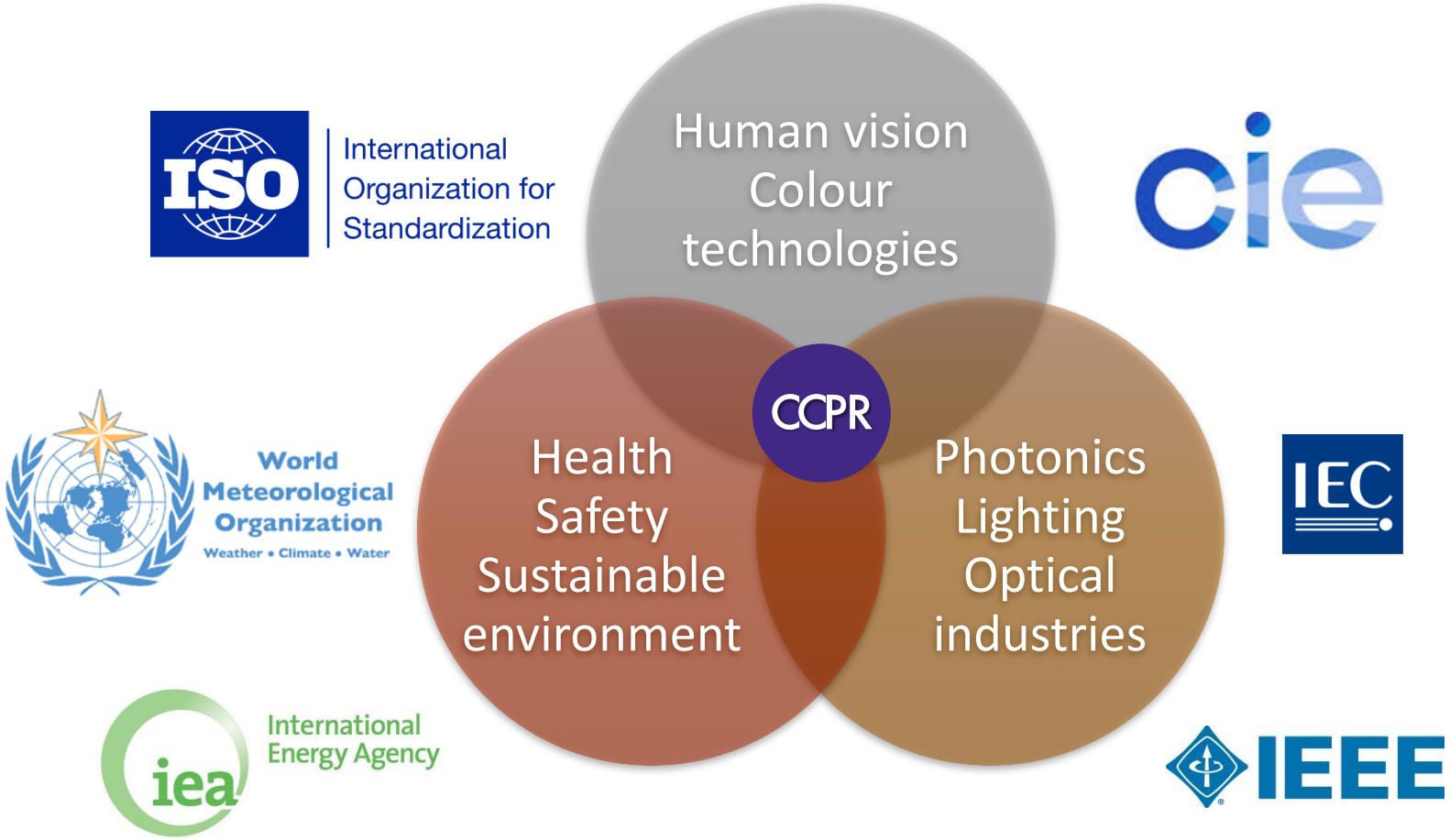
CCPR

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

- New Task Group : digitalization – To identify the role that CCPR can play in Digital SI
  - Digital Calibration certificates
  - Data formats
  - Digital sensors and complex systems

CCPR

Facilitating dialogue between NMIs and stakeholders



CCPR

Global comparability of measurements

- **Strengthening core competencies at the CC level**

  2nd round of Key Comparisons ongoing

- **Extending comparability world-wide with RMOs**

  10 RMO comparisons in progress

- **Testing future standards** in Pilot Studies, e.g.

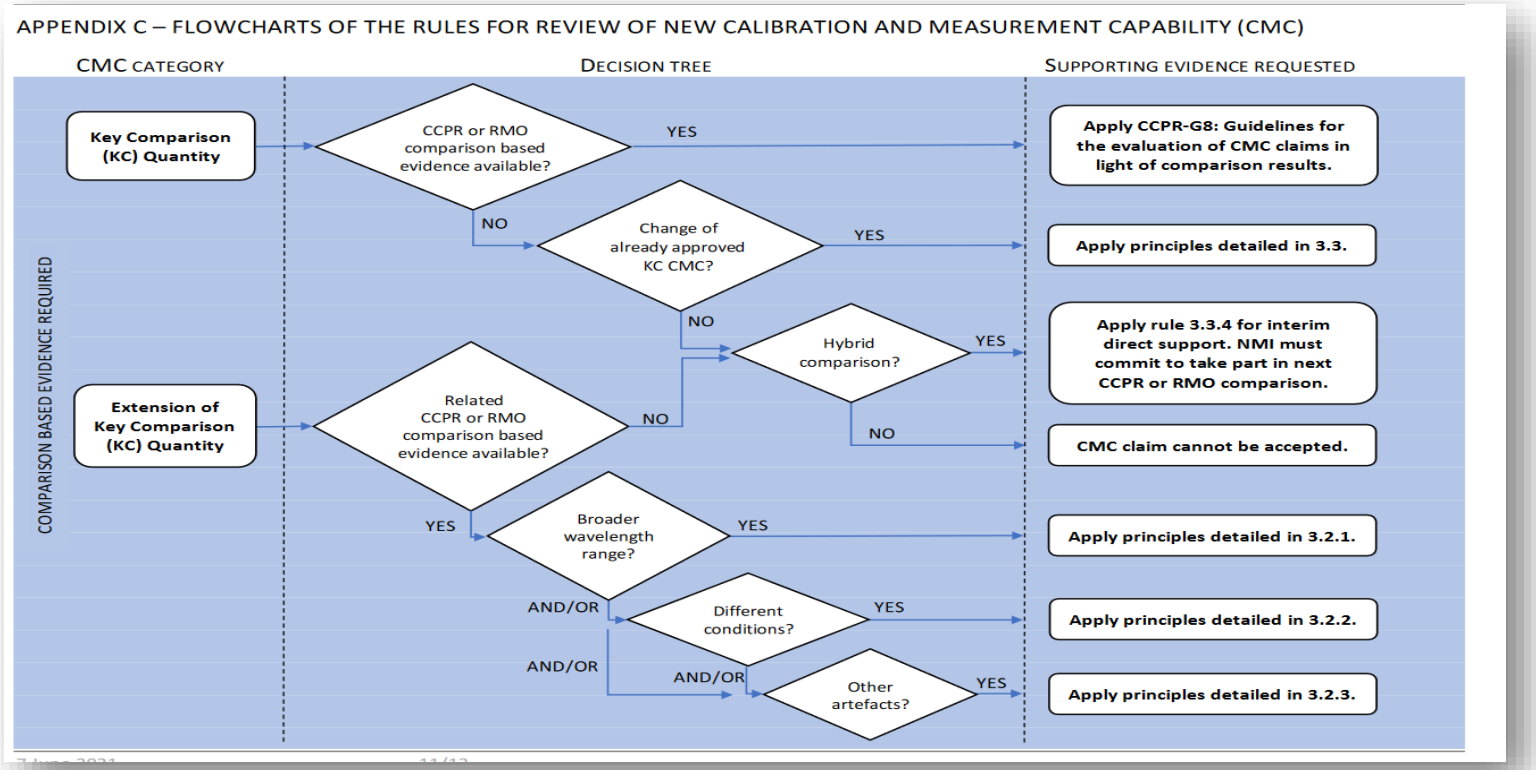
  « detection efficiency of single-photon detectors »

CCPR

Global comparability of measurements

Harmonization and **rationalization** of CCPR rules to claim calibration and measurements capabilities, supporting access to emerging NMIs (economies)

New guidelines published in 2021



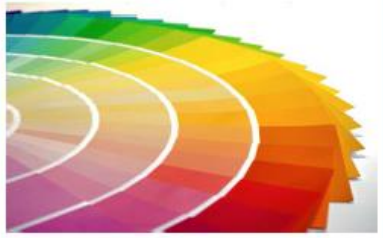
CCPR

Outlook

Lighting

Support energy efficient lighting (LED)

Appearance



Colour and other optical properties of materials

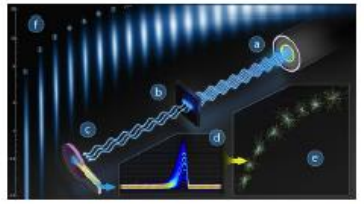
Photovoltaics

Energy rating standards

Climate

Support earth observation community

Quantum



Metrology infrastructure for optical quantum-enhanced measurements

More in new CCPR Strategy for 2022-2032 published on BIPM website

CCPR

Climate example - CCPR principles into QA4EO

TRACEABILITY

UNCERTAINTY

COMPARISON

Benefits of SI

STABILITY
Century scale

INTEROPERABILITY
equivalence world wide

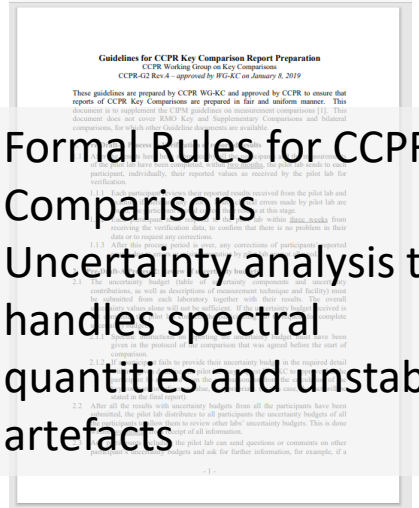
COHERENCE
Combining different measurements

QA4EO

TRACEABILITY

UNCERTAINTY

COMPARISON



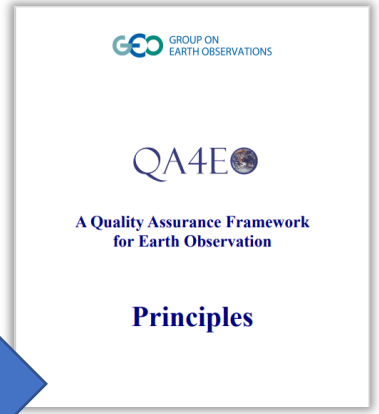
Guidelines for CCPR Key Comparison Report Preparation
CCPR Working Group on Key Comparisons
CCPR-G2 Rev.4 – *approved by WG-KC on January 8, 2019*

These guidelines are prepared by CCPR WG-KC and approved by CCPR to ensure that reports of CCPR Key Comparisons are prepared in fair and uniform manner. This

- Formal Rules for CCPR Comparisons
- Uncertainty analysis that handles spectral quantities and unstable artefacts

Exactly what we want for climate observations!

CCPR Guidelines used to develop QA4EO



GEO GROUP ON EARTH OBSERVATIONS

QA4EO

A Quality Assurance Framework for Earth Observation

Principles

Thank you for your attention