

Report of the CCM Working Group on the Realization of the kilogram (CCM WGR-kg)

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Proposed changes to membership

- ◆ WGR-kg will soon be merged with WGD-kg
- ◆ All member institutes of WGR-kg are members of WGD-kg
- ◆ New member proposed:
CMS/ITRI of Chinese Taipei (no member of WGD-kg)
Presentations about XRCD method at two WGR-kg meetings,
Owner of a Si-28 sphere,
Sets up an XRF/XPS apparatus for surface measurements
Delegate: Sheng-Jui Chen

WG meetings held since last CCM

- ◆ 06 July 2018 as satellite meeting of the CPEM 2018 (joint meeting with CCEM Working Group on Electrical Methods to Monitor the Stability of the Kilogram (WGKG))
- ◆ 14 May 2019 (before the CCM meeting)

WG meetings planned

- ◆ None
(WGR-kg will be merged with WGD-kg)

Main actions taken and main achievements

- ◆ Relative uncertainty 0.9×10^{-8} for NRC Kibble balance
- ◆ Relative uncertainty 1.3×10^{-8} for NIST Kibble balance
- ◆ Relative uncertainty 5.7×10^{-8} for LNE Kibble balance
- ◆ Relative uncertainty 1.2×10^{-8} for the International Avogadro Coordination (mainly INRIM, NMIJ, PTB)
- ◆ Final value of Planck's constant
- ◆ New kg definition approved by CGPM

Main actions taken and main achievements

- ◆ Commercial Kibble balance developments at NIST, NPL, PTB
- ◆ Four more Si-28 spheres produced and – partly - measured
- ◆ ITRI purchased a ^{28}Si sphere and sets up an XRF/XPS apparatus
- ◆ Apparatuses for small masses and forces at KRISS, NIST, NMIJ, INRIM, ...
- ◆ Support of Task Group on the phases for the dissemination of the kilogram following redefinition (TGPfD-kg) is on-going

Progressing the state of the art

- ◆ More Kibble balances are planned (CENAM, LATU, NMISA, ...?)
- ◆ More Si-28 crystals and spheres will be produced and measured by PTB (for other NMIs)
- ◆ Natural silicon will be used at PTB to realize the new kg

Liaison & stakeholders

- ◆ CCM, CIPM, CGPM, BIPM, NMIs
- ◆ OIML, WELMEC, verification offices
- ◆ Calibration laboratories
- ◆ Industry, manufacturer of balances and mass standards

KCs completed and underway

- ◆ Pilot Study completed and published
- ◆ Organization of first KC started

KCs planned

- ◆ First Key Comparison on the realization of the kilogram will probably start end of 2019
- ◆ Second Key Comparison about two years later

Program of work for the next 5 years

- ◆ Organize two key comparisons on the realization of the kg
- ◆ Support TGPfD-kg for determining the Consensus Value
- ◆ Establish review criteria and service categories for CMCs
- ◆ Update the *mise en pratique* (if necessary)
- ◆ Meetings of realization projects, reports to CCM
- ◆ WGR-kg ends on May 20, 2019
- ◆ Program of work will be merged with the program of WGD-kg

Thank you for some
exciting years!

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