The BIPM Mass Department

CCM meeting

26-27 February 2015

Bureau International des Poids et Mesures

Activities of the Mass Department

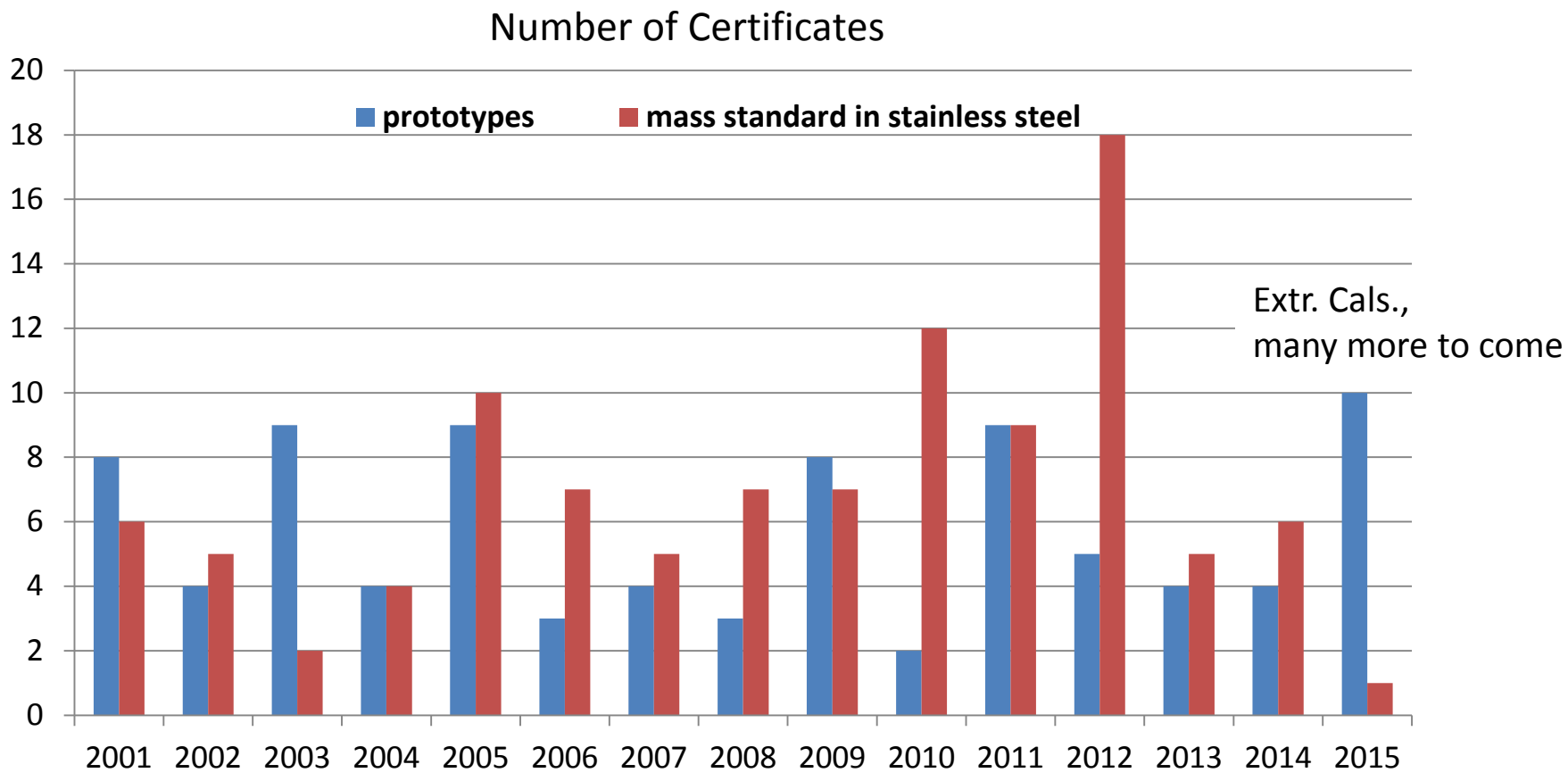
Preparations for the new SI

- extraordinary calibrations with respect to the IPK
- participation in the IAC: weighing of ^{28}Si spheres
- development of a watt balance for future realization of kilogram
- creation of an ensemble of 1 kg mass standards stored in inert atmospheres (ERMS) to facilitate dissemination of new kg and for ongoing key comparison

Present kilogram definition

- provision of 1 kg Pt-Ir prototypes to Member States
- mass calibrations (Pt-Ir, st. st.) for NMIs (incl. volume / density)
- investigation of mass transfer between air and vacuum
- coordination activities (CCM, EMRP JRPs, RMO TCs,...)

Calibrations of mass standards per year



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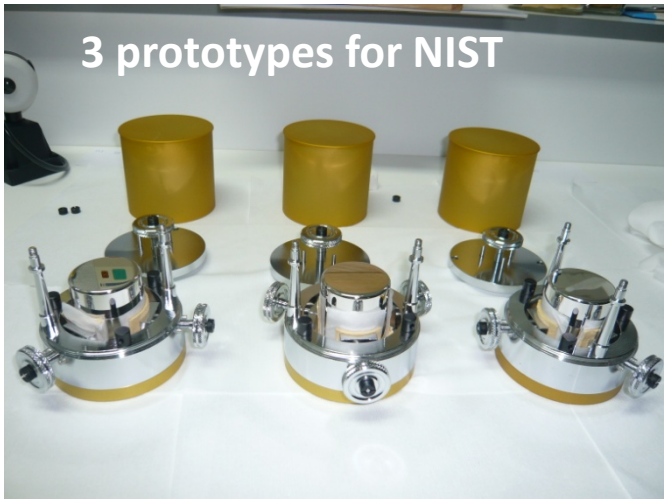
Fabrication of new prototypes and stacks

NIST: 3 Pt-Ir prototypes (incl. density determination and 2 air-vacuum characterizations)

NRC: 1 Pt-Ir prototype and 1 stack of 8 discs (incl. density and air-vacuum characterization)

SASO: 1 Pt-Ir prototype (fabrication finished, final calibration)



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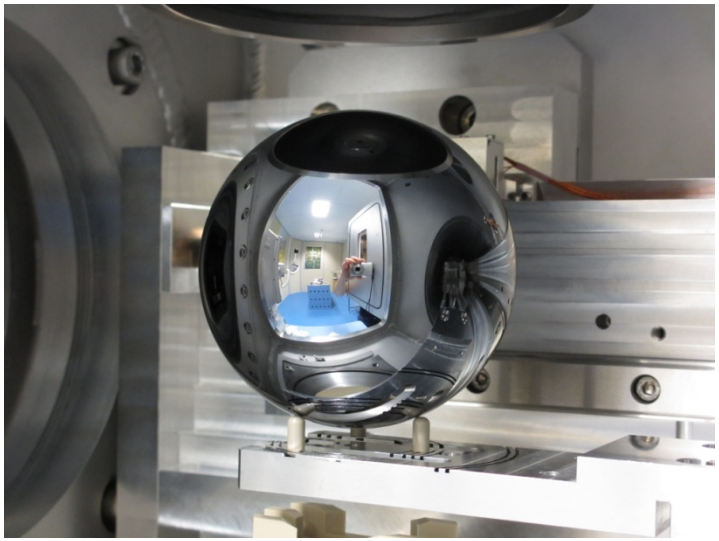
International Avogadro Coordination

Feb 2014: Weighing of **^{28}Si-spheres Avo28-S5 and -S8** after repolishing, under vacuum using the Sartorius CCL 1007 mass comparator

Close link with the IPK through the use of air-vacuum transfer standards



Spheres also measured at PTB and NMIJ

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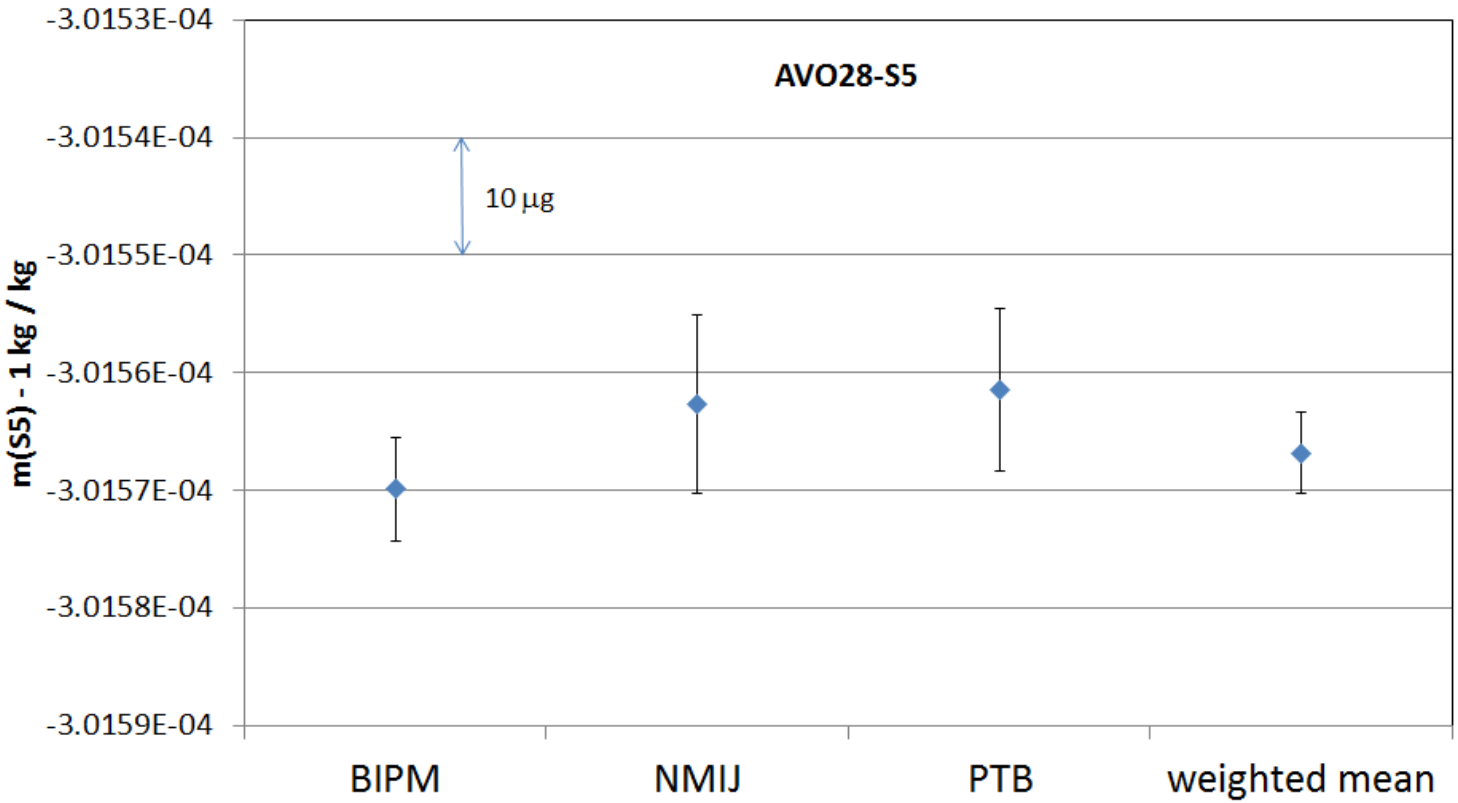
Mass determinations of AVO28-S5 (in vacuum)



uncertainty of weighted mean: 3.5 µg

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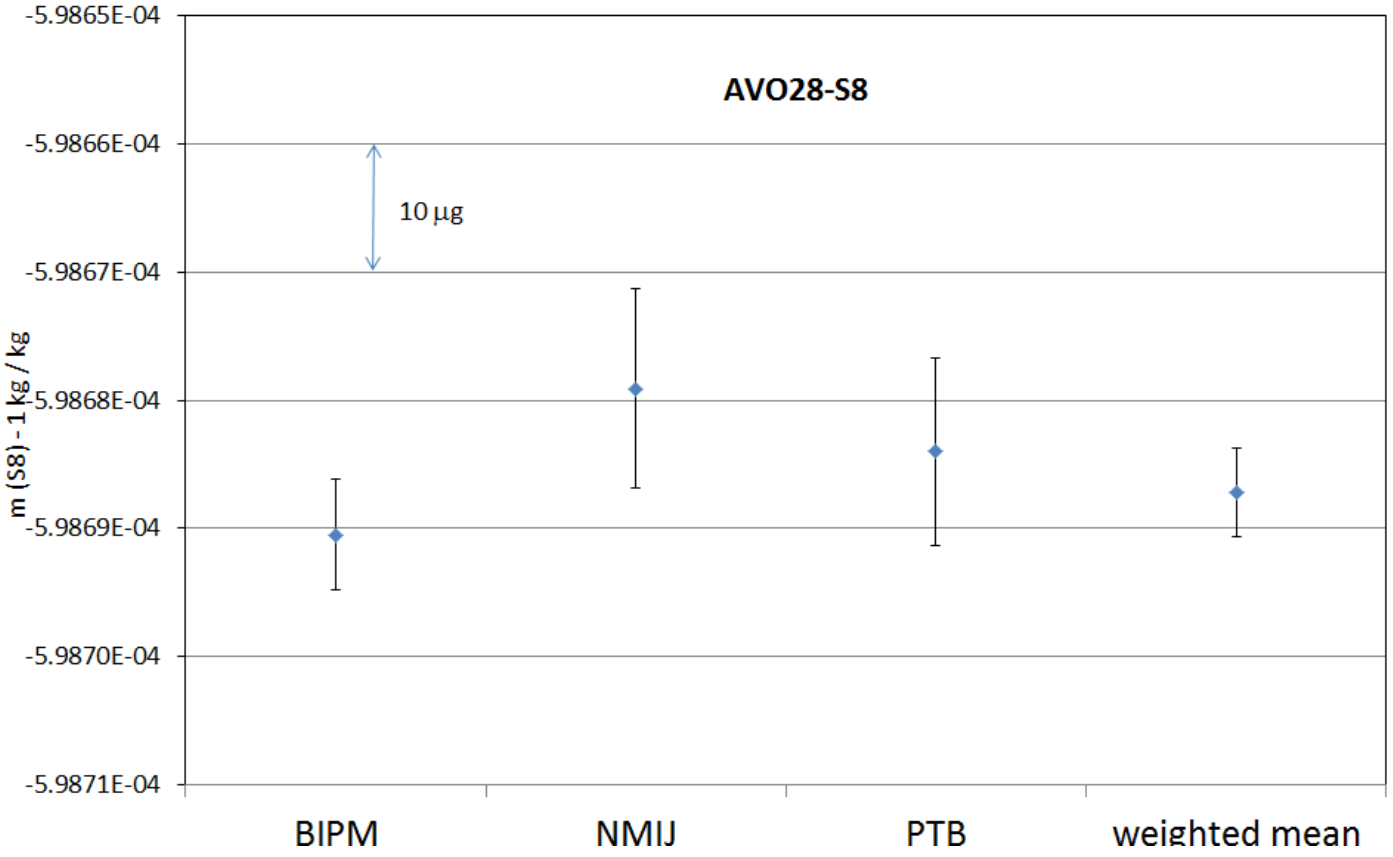
Mass determinations of AVO28-S8 (in vacuum)



uncertainty of weighted mean: 3.5 µg

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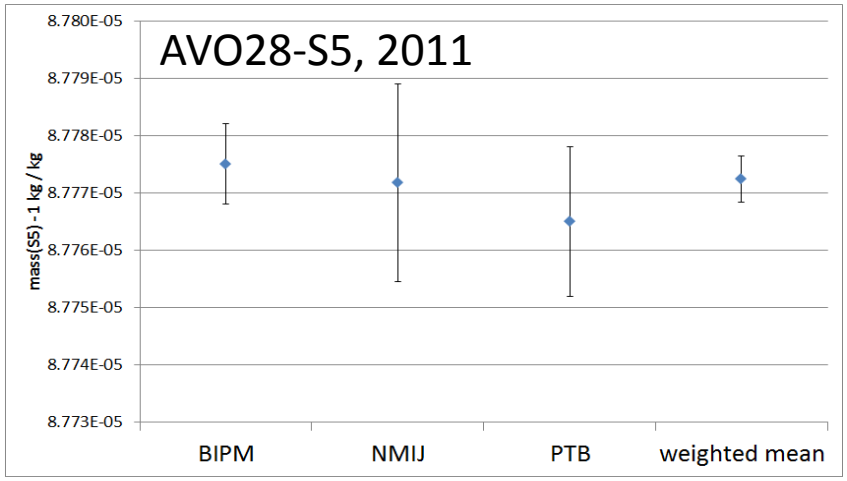
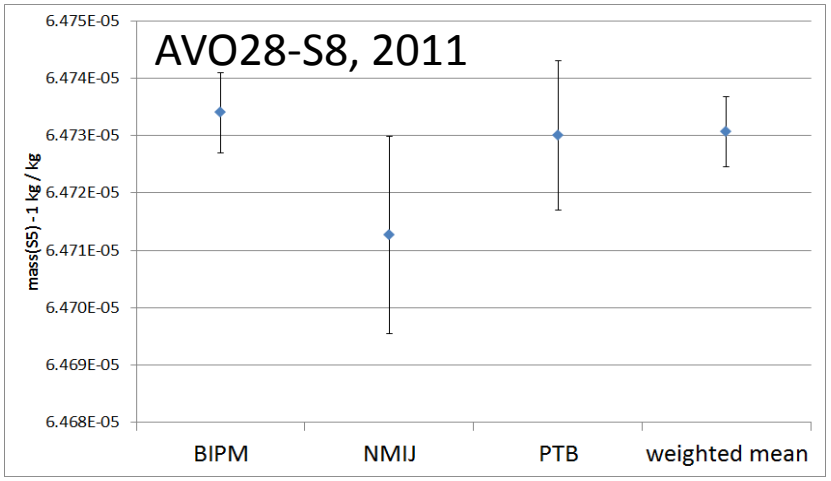
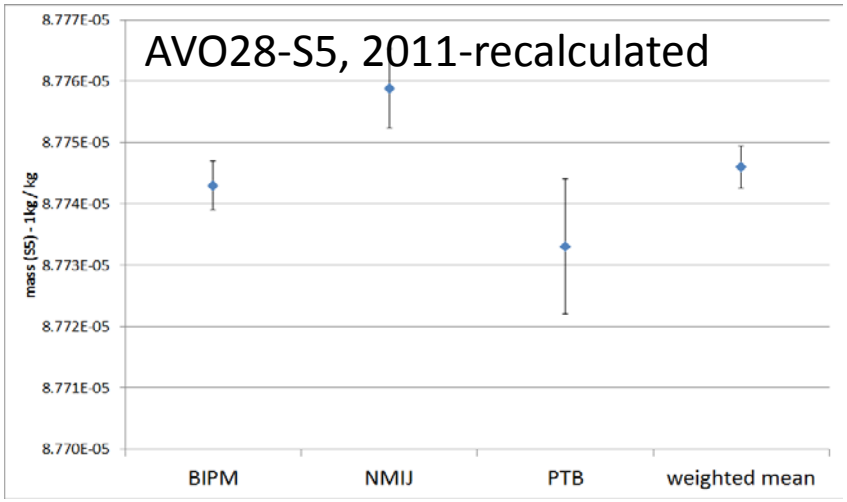
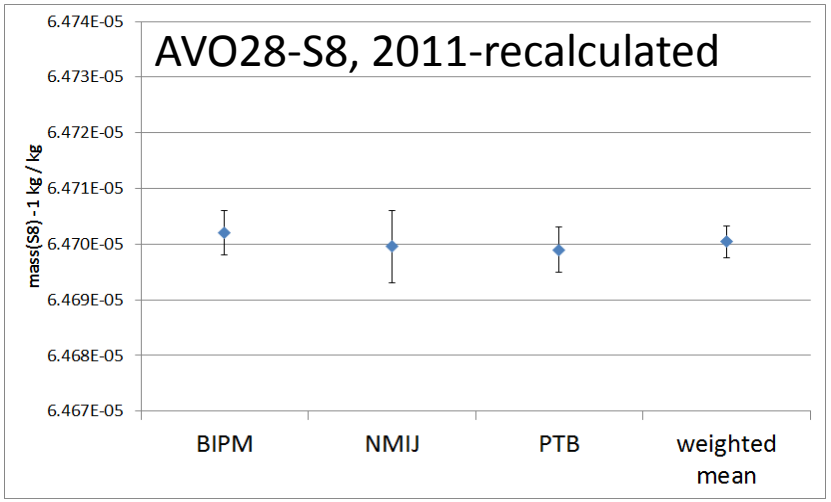
Recalculation of sphere masses of 2011









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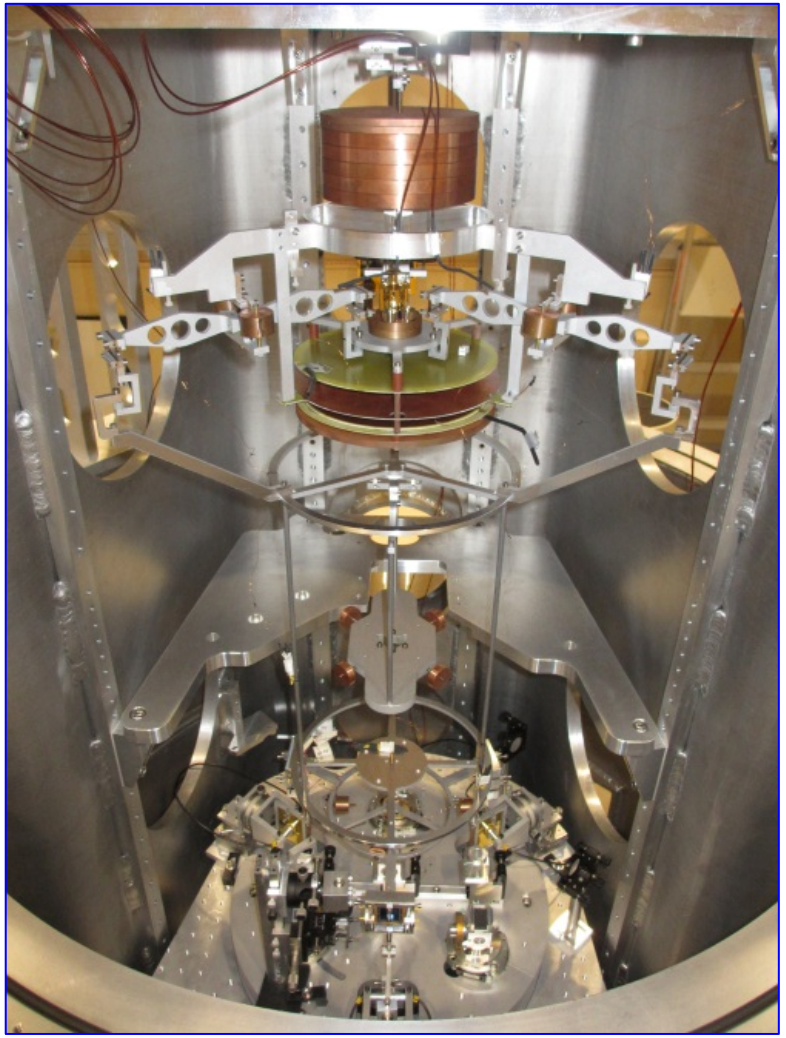
BIPM watt balance



presented by Hao Fang

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Ensemble of reference mass standards (ERMS)

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presented by Estefania de Mirandés