

## Agenda for the 29th meeting of CCT – Session 5

### Online meeting

**Start:** Tuesday 9 February 2021 13:00 (UTC+1, CET)

1. Welcome by the CCT President, Dr Yuning Duan, and the Director of the BIPM, Dr Martin J. T. Milton
2. Approval of the agenda
3. Approval of *Rapporteur*
4. Feedback from the TG-ThQ meeting and recent activities, J.-R. Filtz - LNE
5. Feedback from the TG-GoTh meeting and recent activities, R. White (recently retired from) - MSL
6. Feedback from the WG-SP meeting and recent activities, Y. Duan – CIPM
7. Recommendation from the CCT to the CIPM, C. Gaiser – PTB [CCT/20-48rev2]
8. On TG-GoTh: Dissolution of TG-GoTh
9. Creation of 4 TGs, guided by a Coordinator for *Guide on secondary Thermometry* [CCT/20-75]
10. Proposal for the creation of a TG for air temperature measurements, A. Merlone - INRIM [CCT/20-74]
11. Additional approvals requested by the CCT
  - 11.1 Repeat of CCT-K6 [CCT/20-72], S. Bell – NPL, and A. Peruzzi - NRC
  - 11.2 Revised Terms of Reference WG-NCTh [CCT/20-71], G. Machin - NPL
  - 11.3 Renewed activity cycle for TG-CTh-ET
  - 11.4 Revised Terms of Reference TG-CTh-ET [CCT/20-73], Z. Ahmed – NIST
  - 11.5 Approval of the “CMC review protocol for thermal diffusivity measurements” [CCT/20-49rev]
12. Updates of WG and TG Chairs
13. Request to become member of the CCT from Norway – Å.A. Falnes Olsen (Justervesenet)
14. Future frequency for meetings of the CCT and its Working Groups

15. Next meeting
16. Approval for open access
17. AOB
18. Presentation by A. Peruzzi – NRC
19. Closure of 29<sup>th</sup> meeting of the CCT

## **Time evolution of the thermodynamic temperature scale**

Dr Andrea Peruzzi

*National Research Council Canada (NRC) Canada*

The redefinition of the kelvin in 2019 prompted us to reflect on its future impacts and to ask ourselves questions such as:

- How consistent is the new unit with the previous?
- What will be the long-term effect of removing the triple point of water from the unit definition?
- Is the new universal constant-based unit definition affecting the metric structure of the thermodynamic temperature scale?

The answers to such questions are intertwined with our definition of thermodynamic temperature.

In my presentation I will recall the main elements that are necessary for the definition of thermodynamic temperature and its scale, and I will introduce the different metric structures that measurement scales (including temperature scales) can have, according to the classification of measurement theory.

In light of such classification, I will show how the thermodynamic temperature scale evolved in the past 100 years and I will discuss the consistency of the new kelvin definition with the old one and the effect of decoupling the triple point temperature from the unit definition.

*Andrea Peruzzi graduated in Physics in 1995 from the University of Florence and received his Ph.D. in Material Science and Technology in 1998 from the same university. From 1998 to 2000 he worked as postdoc for the European Network on Cryogenic Detectors at both the Laboratory of Nuclear Physics and High Energy of the University of Zaragoza and the Gran Sasso National Laboratory of the National Institute of Nuclear Physics of L'Aquila. From 2000 to March 2020 he worked as research scientist in temperature metrology at VSL, the Dutch Metrology Institute. Since April 2020 he works as senior research officer at the NRC Metrology Research Centre.*

*He has authored more than 100 peer-reviewed papers in the field of thermal metrology. He chaired the EURAMET TC-T from 2010 to 2014 and he has been chairing the CCT Working Group on Key Comparisons since 2014. He has contributed to several EMRP/EMPIR projects in the field of thermal metrology.*

*His current research interests are: isotopic and chemical impurities in the triple point of water, non-uniqueness of the ITS-90, alternative fixed points to mercury and high-accuracy deep-ocean thermometry.*