

**MINUTES FOR THE MEETING OF CCT-WG-CTH ON 2022-04-03
Temperature 2023 Anaheim**

Attendees: Christof Gaiser (PTB) chairman, Robin Underwood (NPL), Yasuki Kawamura & Ikuhiko Saito (representing NMIJ/AIST), Laurent Pitre (LNE-CNAM), Patrick Rourke (NRC), Roberto Gavioso (INRiM) Peter Steur (INRiM), Inseok Yang (KRISS), Xiaojuan Feng (representing NIM), Jonathan Pearce (NPL), Aleksandra Kowal (invited expert) (INTIBS)

Agenda

1. MeP-K & $T-T_{90}$:
 - I. General update by members performing new measurements of T above 400 K
 - II. Update on the status of the missing review paper on JNT
 - III. Update of the $T-T_{90}$ estimates given on the BIPM website
2. Primary Thermometry:
 - I. Short presentation by Roberto about a new EU-Project on a direct comparison of primary thermometers
3. ITS-90:
 - I. Sub-group summarizing the work on alternative fixed points should be initiated. This work includes an exploration of the possibilities for a future amended version of ITS-90.
 - II. Possible amendments to ITS-90 guide (Patrick & Jonathan)
4. Other issues:
 - I. Lessons learned (Laurent)

Decisions and actions:

1. Colleagues presented their work in the field of primary thermometry above 400 K. NIM is working on two different AGT systems in the range between 323 K and 505 K and is expecting first data at the end of this year. NPL together with colleagues from Taiwan are working on AGT systems above 400 K. At the moment no concrete time plan for a first data can be given. Also INRiM is working on an AGT system in this temperature range. Concerning JNT at the moment the work is mainly focus on practical primary thermometry (NPL and PTB)
2. The review article on JNT is now finalized and will be submitted by Rod White within the next weeks to Metrologia
3. A draft of an updated version of the best estimates for the BIPM website is circulated with the minutes and will be agreed with the members and with WG-NCTh
4. Roberto Gavioso briefly presented the new EU project on primary thermometry. It is a very important project for the community because it is a first direct comparison of different primary thermometers and can be regarded as a prototype of future necessary comparisons in this field. In addition, the hope is to solve at the same time open questions connected to the realization of the ITS-90, e.g., in the region around the neon triple-point.
5. A subgroup summarizing the work on alternative fixed points was initiated. Members will be Bernd, Jon, Patrick, Peter, Xiaojuan, Christof and possibly others. A first task is a clarification on the scope. The questions were raised if superconducting fixed points and eutectics should be included. In a first step Bernd and Jon will exchange their thoughts on these issues. In addition, a topic raised by Peter after the Temperature Symposium on Xe and future work on the Xe-TP can be a task of this subgroup.
6. Possible amendments to ITS-90 guide have been mentioned by Patrick & Jonathan. In a first step only part 5 of the guide is under inspection. Jon and Patrick should make a list of

their ideas and present that to a sub-group (Bernd, Peter, Richard, Christof and possibly others). This will be the basis of a decision whether the guide will be revised or not.

7. In a discussion about the lessons learned during the work on the $T-T_{90}$ estimates it was agreed that next time, the data and the data treatment will be agreed within the group before starting with a draft. It was also agreed that there will be an update of the publication only when significant data in the temperature range above 400 K and below 4 K is available. In the meantime, at the BIPM website, an updated list of most recent measurements on primary thermometry not included in the 2022 update will be available.