CCT member and observer Activity Report

**Period:** January 2017 to December 2021

**Institute:** NMIJ/AIST

**State economy:** APMP

**Number of persons involved in thermometry of the institute:**

**Short summary of research and development:**

**Contact thermometry**

- Evaluation of $T-T_{90}$ between TPW to the melting point Ga using acoustic thermometry [C2, C3]
- Development of low temperature thermometers and investigation of long term stability and non-uniqueness of SPRTs below TPW [C5, C14]
- Realization of the triple point of mercury and observation of its large supercooling [C9]
- Evaluation of the temperature of the triple points of SF$_6$ and CO$_2$ as alternative candidates to the triple point of mercury for the fixed point of the ITS-90 [C1, C6, C7]
- Development of high temperature SPRT up to the freezing point of Ag [C8, C15]
- Development of metal-carbon eutectic fixed points for calibration of thermocouples [C16]
- Development of calibration apparatus for the contact surface thermometers [C4, C17]

**Non-contact thermometry**

- Development of high emissivity microcavity type blackbody sheet and flat-plate reference radiator [R1, R3, R6, R7].
- Research for improving the reliability of non-contact body temperature measurement [R1, R3, R6].
- Research on the Optical frequency comb thermometry [R2, R11].
- Research on the radiometric temperature measurement by incoherent digital holography [R8, R10].
- Performance evaluation of high-temperature fixed points [R4, R5, R9, R13].
- Research on radiation thermometry [R12].

**Humidity**

- Development of trace-moisture analyser based on cavity ring-down spectroscopy [H1, H3, H6, H8].
- Participation of key comparison [H2, H5].
· Development of primary-trace moisture standard [H4, H9].
· Improvement of primary high-humidity standard generator [H7].

**Thermophysical quantities**

· Development of measurement techniques for Thermophysical quantities [T1-T6]
· Supply of certified reference material (CRM) for thermophysical quantities [T7-T9]

**Short summary of recent comparison activity:**

**Contact thermometry**


**Non-contact thermometry**

· Lead APMP. T-S11, T-S12, APMP TCI project [R9], participation in CCT-K10, APMP. T-S15, EMPIR project "Implementing the new kelvin" [R13].

**Humidity**

· Lead APMP. T-K8 [H2], participation in CCT-K8, APMP.T-K6:2013, APMP.T-S14, and APMP.T-17.

**Thermophysical quantities**

· Lead APMP. T-S9, T-S10, CCT-S3(Thermal Diffusivity)

**Link to bibliography or list of bibliography (last 5 years):**


