28th of October 2020

**Summary report of recent NMIJ/AIST thermometry activities**

**Recent activities of NMIJ/AIST**

**1. Contact thermometry**

·Development of acoustic thermometry and Jonson noise thermometry to measure the Boltzmann constant and thermodynamic temperature [C1-C4].

·Evaluation of $T$-$T_{90}$ between TPW to the melting point Ga using acoustic thermometry [C3, C4].

·Investigation of long term stability and non-uniqueness of SPRTs below TPW and development of low temperature thermometers [C5, C6].

·Realization of the triple point of mercury and observation of its large supercooling [C7].

·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 [C8, C9].

·Development of high temperature SPRT up to the freezing point of Ag [C10, C11].

·Development of metal-carbon eutectic fixed points for calibration of thermocouples [C12].

·Development of calibration apparatus for the contact surface thermometers [C13, C14].

·Lead APMP.T-K7.1 [C15], participating CCT-K1.1, CCT-K4.1, CCT-K9, APMP.T-K9.

**2. Non-contact thermometry**

·Research on the radiometric temperature measurement by incoherent digital holography [R1, R3].

·Research on the Optical frequency comb thermometry [R4].

·Evaluation of the thermodynamic temperature of the fixed points [R5, R6].

·Investigation on the furnace effect of high-temperature fixed points.

·Development of the emissivity compensating radiation thermometry.

·Lead APMP. T-S11, T-S12, APMP TCI project [R2], participation in CCT-K10, APMP. T-S15, EMPIR project "Implementing the new kelvin" [R6].

**3. Humidity**

· Development of primary-trace moisture standard [H1, H6].

· Development of trace-moisture analyaser based on cavity ring-down spectroscopy [H3, H5].

· Participation of key comparison [H2].

· Improvement of primary high-humidity standard generator [H4].

**4. Thermophysical quantities**

· Development of measurement techniques for Thermophysical quantities [T1-T4].

· Supply of certified reference material(CRM) for thermophysical quantities [T5].

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

**Recent publication of NMIJ/AIST**


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