

CCT Member and Observer Activity Report

Institute: National Scientific Center "Institute of Metrology" (NSC "IM"), Kharkiv, Ukraine

Period: May 2024 – May 2026

Staff involved in thermometry of the institute: 6

Research and Development

- **Radiation Thermometry Realization:** Successfully developed a new copper freezing point cell (1084.62 °C) based on custom technical specifications and drawings. Conducted a comprehensive metrological investigation of both the newly established copper cell and the existing silver freezing point cell (961.78 °C), while simultaneously evaluating the performance, stability, and characteristics of the LP4 radiation thermometer.
- **Contact Thermometry Fixed-Points:** Conducted comprehensive research and performance validation of newly established contact thermometry fixed-point cells, including the triple point of water, and the melting/freezing points of gallium, aluminum, and copper.
- **Metrology Partnership ThermoSI Project Contributions:** Investigated and characterized specialized miniature fixed-point cells (mini-cells) within the framework of the European Metrology Programme for Innovation and Research (EMPIR) ThermoSI project. This included the comprehensive characterization of existing zinc, tin, and gallium mini-cells, as well as the research of a new copper mini-cell custom-designed according to technical specifications.
- **Machine Learning for Plateau Recognition:** Applied artificial neural networks to analyze and process experimental transition data from miniature fixed-point cells. The developed models successfully recognized melting/freezing plateaus with a success rate exceeding 90%.

Comparison and Committee Activity

- **Radiation Thermometry Comparisons:** Collaborating with the PTB (Physikalisch-Technische Bundesanstalt, Germany) on bilateral radiation thermometry comparisons utilizing aluminum and silver fixed points.
- **Low-Temperature Comparisons:** Actively working with the Institute of Low Temperature and Structure Research (INTiBS, Wrocław, Poland) on low-temperature comparisons focusing on the mercury triple point.
- **TC-T Engagement:** Participated in the TC-T (Technical Committee for Thermometry) annual meeting in 2025 in an offline format to coordinate regional metrological tasks.
- **ThermoSI Project Meetings:** Actively contributed to ThermoSi project milestones by participating in three technical meetings (the initial kick-off meeting for task allocation, followed by the M12 and M18 progress review sessions) to monitor project implementation and report on scheduled deliverables.

Institutional & Technical Frameworks

- **Documentation and Quality System:** Performed a major overhaul of the institutional technical framework. Updated national standard passports, revised calibration methodologies where gaps were identified, and updated uncertainty budgets for high-precision calibration chains.
- **Maintenance of the National Base:** Conducted continuous maintenance, validation, and routine servicing of the primary and secondary national temperature standards infrastructure to guarantee unbroken traceability.

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