

**DECLARATION OF THE
CONSULTATIVE COMMITTEE FOR THERMOMETRY
OF ITS 27TH MEETING**

Requirement for new determinations of thermodynamic temperature

Thermodynamic temperature, T , is the basic physical quantity to which all measurements of temperature should ultimately be referred.

The CCT observes that:

- the International Temperature Scale of 1990, ITS-90 has been in place for 24 years and has inherent weaknesses, including known discrepancies from T ;
- the Provisional Low-Temperature Scale of 2000, PLTS-2000, remains provisional with currently no resolution of its inherent discrepancy of ~6% at the lowest temperatures;
- experiments to determine the Boltzmann constant, k , will draw to a close with the unit redefinition.

For these reasons, the CCT encourages NMIs to conduct significant experiments for the determination of thermodynamic temperature, to ensure that the SI unit *kelvin* is realized and disseminated in an optimum way in the coming decades.

In particular new thermodynamic temperature determinations are required to support:

- In the short term: the introduction and implementation of the *mise en pratique* for the definition of the kelvin (*MeP-K*) through determining robust, reliable values of $T-T_{90}$ and $T-T_{2000}$.
- In the medium term: facilitate direct dissemination of the redefined kelvin through developing robust and reliable methodologies to disseminate T , particularly at the extremes of temperature >1300 K and <1 K.
- In the long term: generate the background data required for a new unified temperature scale of improved thermodynamic consistency compared to the currently defined scales.