Final Version

Consultative Committee for Thermometry
Recommendation T 2 (2005) to the CIPM

New determinations of thermodynamic temperature and the Boltzmann constant

The **Consultative Committee for Thermometry**

considering

- that thermodynamic temperature, T, is the basic physical quantity to which all measurements of temperature should ultimately be referred,
- that the International Temperature Scale of 1990, ITS-90, and the Provisional Low-Temperature Scale of 2000, PLTS-2000, provide practical representations of T,
- that determinations of thermodynamic temperature T are fundamental in supporting the ITS-90 and providing values of $(T - T_{90})$,
- that values of T are needed for the freezing temperatures of zinc, aluminium, silver, gold and copper, and transition temperatures in eutectic and other materials at higher temperatures, to reduce uncertainties in thermometry and radiometry,
- that the accuracy of the ITS-90 with respect to T has not been fully tested in the range below 273.16 K,
- that the PLTS-2000 may deviate from T by several percent at the lowest temperatures,
- that new determinations of the Boltzmann constant, k, are needed in preparation for an eventual re-definition of the kelvin,

recommends

- that national laboratories initiate and continue experiments to determine values of thermodynamic temperature and the Boltzmann constant.