

RECOMMENDATION OF THE INTERNATIONAL COMMITTEE FOR WEIGHTS AND MEASURES

Preparative steps towards new definitions of the kilogram, the ampere, the kelvin and the mole in terms of fundamental constants

RECOMMENDATION 1 (CI-2005)

The International Committee for Weights and Measures (CIPM),

considering

- Resolution 7 of the 21st General Conference on Weights and Measures (CGPM), 1999, concerning a future definition of the kilogram;
- the recent, 2005, Recommendations of the Consultative Committee for Mass and Related Quantities (CCM), the Consultative Committee for Electricity and Magnetism (CCEM), the Consultative Committee for Amount of Substance - Metrology in chemistry (CCQM) and the Consultative Committee for Thermometry (CCT) concerning proposals for and matters related to changes in the definitions of the kilogram, the ampere and the kelvin;
- the Recommendation of the CCU [Recommendation U 1 (2005)] which brings together all of the major points of these other recommendations and which requests that the CIPM:
 - approve in principle the preparation of new definitions and *mises en pratique* of the kilogram, the ampere and the kelvin so that if the results of experimental measurements over the next few years are indeed acceptable, all having been agreed with the various Consultative Committees and other relevant bodies, the CIPM can prepare proposals to be put to Member States of the Metre Convention in time for possible adoption by the 24th CGPM in 2011;
 - give consideration to the possibility of redefining, at the same time, the mole in terms of a fixed value of the Avogadro constant;
 - prepare a Draft Resolution that may be put to the 23rd CGPM in 2007 to alert Member States to these activities;
 - further encourages National Metrology Institutes to pursue national funding to support continued relevant research in order to facilitate the changes suggested here and improve our knowledge of the relevant fundamental constants, with a view to further improvement in the International System of Units;
- the need for careful consideration to be given to both the form and content of possible new definitions of these units, not only individually but also taken as an ensemble;

approves, in principle, the preparation of the new definitions, as requested by the CCU in its Recommendation cited above;

invites all Consultative Committees

- particularly the CCM, CCEM, CCQM and CCT, to consider the implications of changing the definitions of the above-mentioned base units of the SI, and to submit a report to the CIPM not later than June 2007;

- to monitor closely the results of new experiments relevant to the possible new definitions, to identify necessary conditions to be met before proceeding with changing the definitions, and to consider, in particular, the alternative ways of redefining the above mentioned units;
- to solicit input from the wider scientific and technical community on this important matter;

recommends that National Metrology Institutes

- should pursue vigorously their work presently underway aimed at providing the best possible values of the fundamental constants needed for the redefinitions now being considered;
- should prepare for the long term maintenance of those experiments that will, in due course, be necessary for the practical realization of the new definitions.