

C2-Commission Report 2018

Report to IUPAP Council

Commission on Symbols, Units, Nomenclature, Atomic Masses, and Fundamental Constants

Chair: Peter Mohr, Vice–Chair: Marc Himbert, Secretary: Michael de Podesta

Members: Xing ZHU, Kazuhiko Sugiyama, Michael Krystek, Alexander Potekhin, Antti Manninen, Anna (Ania) Kwiatkowski, Isabel Godinho, Kyong Hon Kim, Daniel Varela Magalhaes, Dinesh Kumar Aswal, Martin Milton (ex-officio)

Activities of Commission C2

1. Recommendation to the BIPM.

The International Committee on Weights and Measures (CIPM), through the Consultative Committee on Units (CCU), requested input from IUPAP concerning a possible change of wording in the new edition of the International System of Units (SI) Brochure. The question concerned a controversial change in the definition of units. Members of Commission C2, which is relevant for unit questions, were asked for input and the opinion of the majority was transmitted in reply to the request. The conclusion, not to change the definition for the new edition, agreed with the conclusion of the overwhelming majority of National Metrology Institutes and other international organizations such as IUPAC who were also asked for input.

2. Publicize the new SI.

It is expected that the International System of Units (SI) will be redefined on 20 May 2019 based on fixed values of certain physical constants. Commission C2 is carrying out a publicity campaign designed to familiarize the wider scientific community with the upcoming changes. Videos for this purpose have been made by former Chair and Vice Chair Vanderlei Bagnato and William Phillips which explain the new SI for a general audience. These videos were presented to the IUPAP General Assembly in October of 2017. These C2 resources are available to members of IUPAP who wish to carry out publicity for the changes. Additional material will be developed and made available to the community.

3. Revise the Red Book.

The 1987 revision of the SUNAMCO ‘Red Book’ has for nearly a quarter of a century provided physicists with authoritative guidance on the use of symbols, units and

nomenclature. As such, it is cited as a primary reference by the IUPAC ‘Green Book’ (*Quantities, Units and Symbols in Physical Chemistry*, 3rd edition, E. R. Cohen et al., RSC Publishing, Cambridge, 2007) and the SI Brochure (*The International System of Units (SI)*, 8th edition, BIPM, Sevres, 2006). Commission C2 is in the process of revising this publication to bring it up to date. This is particularly timely in view of the upcoming redefinition of the SI which will be taken into account and explained.

4. Continue discussion of the SI, e.g., questions about how to treat the radian and other so-called dimensionless units.

The SI was originally recommended to be an international system of units by IUPAP in 1960, and Commission C2 has maintained a role in recommending further improvements, including IUPAP General Assembly (GA) resolutions supporting the choice of constants to define the new SI and supporting the decision to proceed with the redefinition in May 2019. Other issues for possible resolutions to be considered by the IUPAP GA include the role of the radian in the SI, the nature of frequency units, and the treatment of counting quantities. These questions have been under discussion by the members of C2 and the discussions will continue in order to arrive at an agreeable resolution of the problems from a physics perspective.

5. Organize in-person or possibly video meetings of C2.

It has been realized that in-person meetings of the members of Commission C2 would be of considerable value toward reaching the goals of the commission. In the recent past, this has been difficult due to the diversity of the membership which means that there is no natural international conference where many members are likely to attend. One meeting that might be suitable is the *Conference on Precision Electromagnetic Measurements* (CPEM). Another possibility is to hold video meetings where all members can participate if desired. These options are being explored and will be tested as possible ways to interact.

6. Recommend suitable appointments for members of the various committees that seek IUPAP representation.

Various organizations seek representation of IUPAP on their committees, particularly those associated with the International Bureau of Weights and Measures (BIPM) and certain standards organizations. Many of these committees are concerned with issues that are in close relation to the purview of Commission C2, so traditionally this commission is asked to recommend people to serve as representatives. We expect to continue to provide such recommendations and at the same time, we intend to make such representatives associate members of C2 if they are not already members. This means that there is a good number of such members due to the significant number of organizations requesting IUPAP representation. The associate membership is done to provide lines of communication between the requesting committees and IUPAP.

7. Recommend Conferences for IUPAP support.

Commission C2 has and will continue to recommend conferences that warrant IUPAP endorsement and/or support. C2 recommended conferences taking place in the near future are the conference on *Physics of Simple Atomic Systems* (PSAS) to be held in May 2018 and the *Conference on Precision Electrical Measurements* (CPEM) to be held in July 2018.

8. Seek candidates for prize nominations.

Commission C2 will seek suitable candidates for the early career researcher award and the SUNAMCO medal award.