

C2-Commission Report 2019 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)

Associate Members: Vanderlei Bagnato, William Phillips, John Rumble, Stephan Schlamming, Eric Shirley, Carl Williams

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 recommendation, 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.

The International System of Units (SI) was redefined on 20 May 2019 based on fixed values of certain physical constants. Former Chair and Vice Chair Vanderlei Bagnato and William Phillips have been giving talks and produced videos that explain the new SI for a general audience. William Phillips and Peter Mohr, together with a retired high-school physics teacher, have written a paper for The Physics Teacher journal to help explain the new SI to high school students.

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 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), 9th edition, BIPM, Sevres, 2019). Commission C2 expects to update this publication, which is particularly timely in view of the recent redefinition of the SI. A subcommittee to work on the Red Book revision, consisting of Marc Himbert, Martin Milton, Peter Mohr, and William Phillips, has been formed.

4. Resume 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 angles in the SI, the nature of frequency units, the treatment of counting quantities, as well as the definition of units. 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. 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 some standards organizations. Many of these committees are concerned with issues that are in close relation the purview of Commission C2, so this commission recommends people, who may be associate members, to serve as representatives.

6. 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 International Conference on Precision Physics of Simple Atomic Systems (PSAS) to be held in 2020 and the Conference on Precision Electromagnetic Measurements (CPEM) to be held in 2020.

7. Seek candidates for prize nominations.

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