C2-Commission Report 2020
Report to IUPAP Council

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

Chair: Peter Mohr, Vice–Chair: Marc Himbert

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 Schlamminger, Eric Shirley, Carl Williams

Activities of Commission C2

1. Recommendation to the BIPM.

The International Bureau of Weights and Measures (BIPM) regularly consults with IUPAP for recommendations on various issues. Recently, C2 endorsed the latest version of the Guide to Uncertainty in Measurement produced by the Joint Committee on Guides to Metrology (JCGM). The JCGM is a committee consisting of organizations such as IUPAP, IUPAC, ISO, etc., not national metrology institutes, who provide expert advice to the BIPM on various issues in metrology.

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. William Phillips and Peter Mohr, together with a retired high-school physics teacher, have published a paper in *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 is updating this publication, which is particularly timely in view of the recent redefinition of the SI. This update is being done in parallel with an update of the Green Book of IUPAC. A subcommittee to work on the Red Book revision, consisting of Marc Himbert, Martin Milton, Peter Mohr, William Phillips, and Eric Shirley 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. A resolution concerning this is being considered by the US Liaison Committee of IUPUP and has received broad support from other commissioners in the USLC.

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.

7. **Seek candidates for prize nominations.**

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