

IUPAP Commission on Nuclear Physics C12

Report to IUPAP Executive Committee and Commission Chairs

August 2020

Claes Fahlander, Chair of C12

Annual general meeting of C12 2020

The general meeting of C12 is typically held once per year together with IUPAP's Working Group 9, International Cooperation in Nuclear Physics. The members of WG9 are welcomed as observers to the meeting of C12, and vice versa. Two full days of discussions. The relation between C12 and WG9 is very fruitful. Matters of forefront nuclear science research are being addressed. We have discussions and status reports on the large-scale accelerator facilities for nuclear physics around the world, and we exchange information on up-grades and construction of new such facilities.

This year the annual meetings of C12 and WG9 were supposed to be held at the head quarters of South-Eastern Universities Research Association (SURA) in Washington, DC, but due to the current situation with the Covid-19 pandemic, it was decided to postpone both meetings until 2021. However, matters of importance have been discussed over the internet.

Issues related to the discovery of new superheavy elements

In 2017 the Joint Working Group (JWG) of IUPAC and IUPAP was setup. By May 2018 their provisional report "*On the Discovery of New Elements*" was sent to the Presidents of the two unions, and was approved by them in June 2018. It was subsequently published in the journal Pure and Applied Chemistry: <https://doi.org/10.1515/pac-2018-0918>. The report have received comments from scientists and others interested in the topic. It has now been finalised and in June 2020 it was approved for publication in the same journal. The final version includes a preface prepared by Bruce McKellar, past President of IUPAP and approved by Michel Spiro, President of IUPAP and Christopher Brett, President of IUPAC.

IUPAC Division of Inorganic Chemistry

Last year, 2019, the Chair of the IUPAC Division of Inorganic Chemistry and the Chair of C12 met to discuss matters of common interest, and we took part in each others annual meetings. In particular we have common interests when it comes to validating claims for new elements of the periodic table. We met again informally during 2020, and we believe that this established new contact can be of value to both unions.

International Year of the Periodic Table

Last year, 2019, was the International Year of the Periodic Table, IYPT. C12 and other members of IUPAP were involved in various activities related to the IYPT, which I reported on to C&CC in August 2019. After that report an important conference of relevance to IYPT took place. It was the 6th International Conference on the Chemistry and Physics of the Transactinide Elements, TAN19, in Wilhelmshafen in Germany, a conference that was endorsed both by IUPAP and

IUPAC. TAN19 brought together nuclear physicists and nuclear chemists involved in the search of new superheavy elements, and both the presidents of IUPAC and IUPAP attended the conference to give welcome addresses.

The IYPT closing ceremony was held in December 2019 in Tokyo, also with participation of representatives from the two unions.

Recommendations for IUPAP sponsorship of nuclear physics conferences in 2020

In 2019 requests for IUPAP sponsorship were reviewed within C12 from conferences to be held during 2020. It was decided at the C&CC meeting in London in October 2019 to support three conferences:

- **ARIS2020**: 27th International Nuclear Physics Conference, to be held in Glasgow in Scotland.
- **Hadron Physics 2020**: XV Hadron Physics Conference, to be held in Brazil.
- **NIC2020**: International Symposium on Nuclei in the Cosmos to be held in Chengdu in China.

Due to the ongoing pandemic it has been decided by the organisers of all three conferences to postpone these conferences until 2021.

Recommendations for IUPAP sponsorship of nuclear physics conferences in 2021

This year, 2020, we received requests for IUPAP sponsorship of only one conference within C12, to be held during 2021. It is:

- **NN2021**: the "XIV International Conference on Nucleus-Nucleus Collisions", to be held in Canada in July 2021.

The conference was reviewed by all members of C12 and it was decided to suggest to IUPAP to support it in category B. A separate report on this has been sent in to Professor Nemutudi.

Change of name of "Internal Conversion Electrons"

The decay of an excited state in an atomic nucleus to a lower-lying state in the same nucleus can proceed in two ways: by the emission of a gamma ray or by the emission of an electron from an inner atomic shell. The latter process is called internal conversion and the emitted electrons are called "internal conversion electrons". It is a well-known process in nuclear physics, and it has been known since the 1920's.

Recently C12 received an email from Professor Heinz-Eberhard Mahnke of Freie Universität Berlin. He proposes to change the name of the emitted electrons of this well-known process of internal conversion to a more personalised name, namely to "Meitner-Ellis electrons", in recognition of the pioneering work done by Lise Meitner and Charles Drummond Ellis during the 1920's.

IUPAP is probably the right instance to deal with these kind of matters, but it is not clear what would be the proper procedure within IUPAP to look into such a proposition.

The President of IUPAP has asked C12 to discuss the matter, and to involve in the discussions also the Commission on Symbols, Units, Nomenclature, Atomic Masses and Fundamental Constants, the C2 Commission. We will at some point report to the President our joint recommendations.

New Chair of C12

At the C12 meeting in Glasgow in July 2019, it was unanimously decided to suggest to IUPAP that the next C12 chair should be Professor Ani Aprahamian of Notre Dame University, USA.

New Members of C12

The C12 commission consists of 14 members, presently seven women and seven men. We cover, both in experiment and theory, most fields of nuclear physics such as nuclear reactions, nuclear structure, nuclear astrophysics, nuclear instrumentation, hadron physics, QCD matter physics. Some of the C12 members will have to be replaced next year to start their assignments by January 2022.

Annual general meeting of C12 2021

The next general meeting of C12 is planned for July 2021 at the head quarters of South-Eastern Universities Research Association (SURA) in Washington, DC.