

IUPAP Commission on Nuclear Physics C12

Report to IUPAP Executive Committee and Commission Chairs

March 2018

Claes Fahlander, Chair of C12

Members of C12

The C12 commission has a new composition as of January 1 2018. We are 14 members, seven of which are new from this year, seven are women and seven are 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 and QCD matter physics. The C12 members are:

Chair: Claes Fahlander (2011)(2014) (2017) Sweden
Vice-chair: Joachim Stroth (2011)(2014) (2017) Germany
Secretary: Ani Aprahamian (2014) (2017) USA
Mahananda Dasgupta (2014) (2017) Australia
Andrey Fomichev (2014) (2017) Russia
Eugenio Nappi (2014) (2017) Italy
Hirokazu Tamura (2014) (2017) Japan
Anna Mackova (2017) Czech Republic
Debora Peres Menezes (2017) Brazil
Eberhard Widmann (2017) Austria
Fanny Farget (2017) France
Iris Dillmann (2017) Canada
Maria Jose Garcia Borge (2017) Spain
Yanlin Ye (2017) China

Annual general meeting of C12

The last annual general meeting of C12 was held at the RIKEN offices in Tokyo Japan on August 28 2017. As usual our C12 meeting was followed the day after by the annual meeting of IUPAP's Working Group 9, WG9. The members of WG9 are welcomed as observers to attend the meeting of C12, and vice versa. Together matters of forefront nuclear science research were addressed, as well as discussions on upgrading of current large-scale accelerator facilities for nuclear physics and planning of new such accelerator facilities in the world. In Tokyo, a third day was devoted to a Nuclear Science Symposium on these issues. The former chair of C12, Alinka Lépine-Szily, has already reported to IUPAP of that meeting and of the activities of C12 up till October 2018.

The next meeting of C12 will take place on September 7 2018 in connection to the European Nuclear Physics Conference which will be held in Bologna in Italy that same week.

IUPAP sponsorship of nuclear physics conferences

For 2018 C12 asked support for three conferences in category B, and one conference in category C. For one conference we asked for IUPAP endorsement. This activity has also been reported to IUPAP by Alinka Lépine-Szily.

IUPAP Young Scientist Prize in Nuclear Physics

The IUPAP Young Scientist Prize in Nuclear Physics is awarded every third year. The award ceremony takes place at the International Nuclear Physics Conference, INPC, a tri-annual conference, the largest in nuclear physics, which until now have been sponsored by IUPAP as category A. The last time the Young Scientist Prize was awarded was at the INPC meeting in Adelaide in Australia in 2016. Next time will be at the INPC conference in Glasgow in Scotland in 2019. Therefore, we have started the process of finding the successful candidates with the following timetable:

- a) March 2018: sending out the call for nominations via relevant e-mail lists available to the C12 members in their respective countries and continents, and via e-mail lists at various laboratories and organisations such as for example NuPECC, AnPhA, ALAFNA. The announcement can be found also on the IUPAP C12 webpage.
- b) September 1 2018: deadline to receive nominations.
- c) September 7 2018: first discussion of incoming nominations at the C12 meeting in Bologna.
- d) September 7 2018: discussion of the evaluation procedure at the C12 meeting in Bologna.
- e) September – December 2018: evaluation of the nominees.
- f) Spring 2019: IUPAP Secretary-General to approve the suggested winners and the citations.
- g) Spring 2019: inform the winners.
- h) July 2018: award of the prize to the winners at the INPC conference in Glasgow.

IUPAP Neutrino Panel

IUPAP has taken the initiative to create a Neutrino Panel as a combined effort under the supervision of the C4, C11 and C12 commissions together with the working groups WG1, WG9 and WG10. The suggested mission of the panel is – quote from mail from Bruce McKellar, past president of IUPAP: "***to promote international cooperation in the development of an experimental program to study the properties of neutrinos and to promote international collaboration in the development of future neutrino experiments to establish the properties of neutrinos***".

The panel is thought to be composed of about 15 members in total. During early 2018 we have discussed, within C12, several experts which we believe could contribute to such a panel by looking at neutrinos from a nuclear physics point of view, e.g. neutrino-less double-beta decay, neutrino-nucleon scattering etc. We came up with a list of six persons that I presented to the chair of C11, Heidi Schellman. She has taken the initiative to two telephone meetings with the chairs of C4, C11, C12, WG1, WG9 and WG10 to discuss the full list of experts suggested by all of the commissions and working groups. We will have one more telephone meeting in April 2018, and I believe that Heidi Schellman will present the result of our discussions at the C&CC meeting in Singapore in May.

Issues related to the discovery of new superheavy elements

Joint Working Party – JWP

It is the important task of IUPAC and IUPAP to validate claims of discovery of new superheavy elements. To this end IUPAC and IUPAP jointly elect, when needed, a Joint Working Party, JWP, which consists of experts with a deep knowledge of the field, typically three physicists indicated by IUPAP and three chemists indicated by IUPAC, but which themselves are not involved in the superheavy element research being validated. The last JWP was established in 2012 to consider claims for the discovery of the new elements with atomic numbers 113, 115, 117 and 118. The claims were accepted by the JWP in their report published in December 2015, and the four new elements subsequently got their names in 2016.

On the initiative of the past president of IUPAP, Bruce McKellar, it was decided, in 2016, that it was time to overlook the rules related to the validation of claims of discovery; how should the next JWP be constituted, how should it operate, what should be the procedure for the announcement of new elements and the nomination of their names, and how should the publication of the JWP report be done. In fact, it was decided to overlook the whole validation process and a first draft of the document "*IUPAC and IUPAP Procedures for Validating Claims for the Discovery of New Elements and Naming those Elements*" was written. The draft was presented by Bruce McKellar to C12 at our meeting in Adelaide in September 2016. We discussed it and we made suggestions for changes and additions to the draft. As I understand it, the presidents of IUPAP and IUPAC are presently discussing the content of the document, to come to a joint agreement about this new terms of reference. The document will then be published on the IUPAP homepage.

There are many important changes in that document. It will make the process more transparent and with more recognition to the physicists involved in superheavy element research, and it will involve the C12 commission of IUPAP as an expert committee to a larger extent than before. This will give C12 more visibility in issues related to superheavy element research, but also, of course, more responsibilities.

Joint Working Group – JWG

When the JWP is to validate claims for the discovery of a new superheavy element they need a rulebook where they can find which is the most important criteria for the discovery, which criteria are necessary to look at in more detail, what parameters have been measured in the respective claimant experiments, on what grounds do the different experiments build their evidence for the discovery, etc. Such a rule book was presented in 1991 by the Transfermium Working Group, TWG, and it was published that same year. The Presidents of IUPAP and IUPAC decided in early 2017 that these criteria also needed to be overlooked and probably revised. To that end they jointly appointed a new group, the Joint Working Group, JWG, to review these rules and produce a new document. The group consists of three physicists appointed by IUPAP and three chemists appointed by IUPAC. I'm one of the members in the JWG. We have met two times during 2017, the first time in May 2017 in Egelsbach near the GSI laboratory outside Darmstadt in Germany, and second time in September 2017 in connection to the superheavy element conference held in Kazimierz in Poland. In between meetings we communicate via e-mail. We are currently writing on the document, which has been processed to a next-to-final version. It will be presented to the presidents of IUPAP and IUPAC in 2018 after which it will be submitted for publication.

International Year of the Periodic Table – IYPT

The year 2019 will be the International Year of the Periodic Table, IYPT. The past chair of C12, Alinka Lépine-Szily, is a member of the IYPT Advisory Board. She will be IUPAP's and C12's spokesperson at the IYPT organisation when it comes to plans of actions, financial questions, etc.

IYPT will give us the possibility to increase the visibility of nuclear physics when it comes to superheavy elements; to clarify the notion of these very heavy elements and the production and identification of them, which mainly is by means of nuclear physics methods and techniques. C12 is the natural place within IUPAP to discuss actions as to what to do with respect to this matter, and for the IUPAP council to consult with when questions arise. Thus, it gives the possibility also to increase visibility to C12 and to IUPAP.

C12 members are encouraged to use the IYPT to make public lectures wherever we are. Other ideas how to implement this will be discussed at the next C12 meeting in Bologna later this year.