

Activity report for the International Union of Pure and Applied Physics

IUPAP

for the period 23 October 2021 to 13 July 2022

Legal status and purpose

IUPAP, celebrating 100 years of activities in 2022, decided at its general assembly in 2021 to establish a Swiss association, in the meaning of Articles 60 et seq. of the Swiss Civil Code. The constituting assembly for the new association—with the same members and officers as “the old IUPAP”—was held online on 23 October 2021. The new association is domiciled in the Canton of Geneva with the address % Oberson Abels SA, Rue De-Candolle 20, CP 225, CH-1211 Geneva 12, Switzerland. The public company International Union of Pure and Applied Physics Singapore Ltd., incorporated on 13 December 2014 to support IUPAP’s activities, will remain activated until the new IUPAP association is fully operational.

The purpose of IUPAP remains to assist in the worldwide development of physics, to foster international cooperation in physics, and to help in the application of physics toward solving problems of concern to humanity.

Administration

To carry out its activities, IUPAP is supported by an administrative office located in Trieste, Italy. The office is run by [La Fondazione Internazionale Trieste per il Progresso e la Libertà delle Scienze](#) (FIT). IUPAP has a three years—renewable—contract with FIT. The Singapore office, which was hosted by the [Nanyang Technological University](#), has been winding up. Financial matters will in the future be handled by FIT through a PostFinance account in Switzerland.

Membership

The articles of the new IUPAP association opens for a new category of membership—corporate associate members—to make closer ties with the large group of physicists working in industry. Working Group 16 is actively trying to attract companies and organisations employing physicists to sign up for membership. During the reference period the [European Organization for Nuclear Research](#) (CERN), Switzerland and the [Advanced Laser Light Source](#) (ALLS), Canada, have adhered as corporate associate members.

There has been no change in the territorial members since the last general assembly. However, following the innovation of Ukraine, the Executive Committee invited Ukraine, with the [National Academy of Sciences](#) as the adhering body, as territorial members. The invitation is subject to ratification at the 2023 General Assembly.

To let the chairs of the commissions and the affiliated commissions take part in the general assembly, ex-officio, this group has been defined as personal members in the articles of the new association. These members have voting rights and are exempted from paying membership dues.

The Executive Committee has started a series of in-depth meetings with territorial members to get a better understanding of their situation, expectations towards IUPAP, and to explore possible common activities. Unfortunately, due to the augmented workload linked to the organisation of the [International Year of Basic Sciences for Sustainable Development](#) and the transfer of the administrative office from Singapore to Trieste, less meetings than initially intended have taken place. Up to meetings have been held with Australia and Spain. Furthermore, possibilities for recruiting members in the Pacific region are being explored with New Zealand and discussions about membership are ongoing with Nepal.

Dues

Total expected dues for 2021 are 859101,62 EUR. This includes dues remaining from earlier years. The administrative office has put it as a high priority to recover all outstanding dues. The delay in receiving the dues is partly linked to the financial situation following the pandemic and partly linked to the change of office from Singapore to Trieste.

Commissions and working groups

The newly elected Executive Committee and Commission Chairs (EC & CC) met for the [traditional meeting in January 2022](#). The discussions included topics such as implementation of the resolutions made by the general assembly, membership issues, the role and operation of commissions and working groups, procedures for sponsorship and endorsement of conferences, financial matters, and the [International Year for Basic Sciences for Sustainable Development](#).

Most working groups are active and function well. However, there are dormant groups—the necessity and future of these groups will be brought up for discussion at the general assembly. WG16 (Physics and Industry) has worked particularly closely with the Executive Committee as it has been seen as a priority to get a pool of corporate associate members involved in IUPAP activities. The work of WG18 (Ethics) and WG19 (Quantum Science and Technology), established in 2021, has been delayed as the membership of these two groups still remains to be defined.

C2: Symbols, Units, Nomenclature, Atomic Masses and Fundamental Constants

The commission did not formally meet recently. However several subjects were discussed, with a close link to the international BIPM organisation : the place of dimensionless and especially angle units in the International system of units (SI) and its Brochure, the new structure (GUM) or content (VIM) of guides in metrology. Other topics are under discussion : SUNAMCO medals, impact of digitalization, revised SI and measurement of fundamental constants. Revision of the "red book" to comply with the revised SI progress slowly. Two meetings (distant and hybrid) will be planned during the fall 2022.

C3: Statistical Physics

The commission has analysed the nominations received for the Boltzmann Medal 2022. In a previous online meeting, the C3 had fixed the procedure to follow in order to identify the awardees. Two rounds of voting took place online and at the end of February the two winners were announced to the community, Prof. Deepak Dhar and Prof. John J. Hopfield. Next, the C3 analysed the nominations received for the Early Career Scientist Prizes 2022. A zoom meeting was held to discuss the candidate profiles and, after two rounds of voting, the three awardees were announced to the community, Dr. Kyogo Kawaguchi, Dr. Camille Scalliet and Dr. Suraj Shankar. Finally, the C3 made public the call for bids to select the organizer of the conference StatPhys29 in 2025. The evaluation of the submitted proposals will be evaluated in July 2022.

C4: Astroparticle Physics

The commission met online 3 times: on 17 and 22 November 2021, and on 7 June 2022. In the first two meetings, both the previous members and current members met with an agenda devoted to the transition and the candidate associate members of C4 in this term. In the most recent meeting, the commission treated the IUPAP C4 endorsed conferences and initiated the discussion with the local organizing committee members of the International Cosmic Ray Conference 2023.

C5: Low Temperature Physics

The work of the commission is in full swing. To simplify communication, one email list for the members and another list—including both members and associated members—have been defined. The commission has worked out a proposal for a new mission/mandate to better reflect the current situation of low temperature physics. Four winners were elected for the Early Career Scientist Prize and announced in December 2021. The International Symposium on Quantum Fluids and Solids (QFS2023) is being proposed for IUPAP sponsorship. The 29th International Conference on Low Temperature Physics, originally scheduled in 2020, is postponed to August 2022 due to the pandemic. The commission nominated Prof. Yanina Fasano (Argentina) to be elected as an associate member.

C6: Biological Physics

The commission held an online meeting on 14 Apr 2022. The commission will soon launch "The IUPAP Medal for the Physics of Life", presented every three years at the International Conference on Biological Physics (ICBP). The award, consisting of a gilded medal and a certificate, recognizes outstanding achievements in biological physics, regardless of the nominee's age and employment status. C6 will start the call for nominations in July 2022. Preparations in progress for a type-A conference, ICBP2023, to be held in Seoul, Korea, from 14 Aug to 18 Aug 2023. Professors John Damilakis and Prof. Peter Pohl are suggested to become associated members of the commission.

C8: Semiconductors

On 12 November 2021, all new and old members of the commission gathered by Skype meeting to greet. New members appreciated old members' service and old ones congratulated and encouraged new members. In February 2022 the commission appointed two excellent winners of the Early Career Scientist Prize. On 28 June 2022 the commission will have a regular meeting in Sydney at the ICPS conference to check the preparations for ICPS 2024 and 2026. The operation of the commission goes well but there is a concern how to keep to the budget under the covid situation for in-person conferences.

C9: Magnetism

The commission has selected Dr. Chunhui Du from the University of California, San Diego as recipient of the 2022 IUPAP Early Career Scientist Prize in Magnetism. She is recognized "*for fundamental contributions to the understanding, detection and control of spin dynamics and spin currents in magnetic oxides*". The commission has decided to cancel the 2022 International Conference on Magnetism (ICM 2022) in Shanghai during July 3-8, 2022, which was already postponed from 2021, due to the still ongoing COVID-19 situation. The IUPAP C9 Awards Session and C9 Business Meeting originally planned for ICM 2022 will be shifted to the 24th International Colloquium on Magnetic Films and Surfaces (ICMFS-2022) during July 10-15, 2022, in Okinawa, Japan.

C10: Structure and Dynamics of Condensed Matter

The commission is currently accepting nominations for IUPAP C10 2023 Early Career Scientist Prize (ECSP), whose winner will be selected this fall. The commission strongly encourages nominations of women and other underrepresented groups. Furthermore, the commission is looking forward to interface with activities of the International Year of Basic Sciences for Sustainable Development (IYBSSD) starting in July 2022.

C11: Particles and Fields

The IUPAP 100 years symposium in Trieste and ICHEP-2022 in Bologna will have a common session with an address given by Anatoly G. Zagorodny, given via videolink from Kiev, Ukraine. The commission has also been involved in the preparations for the celebrations related to the 10 years of the Higgs discovery and the ramp-up for the Run 3 of the LHC at CERN.

C12: Nuclear Physics

The commission is currently finishing the evaluation of the nominations for IUPAP C12 2022 Early Career Scientist Award, where we had 26 very good candidates. The short list was large, comprising 18 names, due to the excellency of the candidates. The winners will be announced in July. The prizes will be awarded at the 28th INPC Conference that will take place from the 11th to the 16th of September, 2022 in Cape Town, South Africa. The C12 members had a meeting with the local organizing committee of INPC 2022 in April and decided to go ahead with the in-person conference and the dates that were proposed originally. It is important to say that among the conferences supported by IUPAP, DREB2022 (Direct Reactions with Exotic Beams) took place at the University of Santiago de Compostela in Spain. There was very good in-person attendance allowing and enabling scientific interaction and discussion. A comprehensive report for the activity is available from [Indico](#).

C13: Physics for Development

The commission held its first meeting on 7 June 2022, and a number of new members were welcomed. Three type D conferences were recommended to be supported by IUPAP, and the commission also treated other budgetary issues. Four Candidates for the Associate Member of C13 have been proposed to the EC, they are David Hutchinson, José David Manguera Viana, Angie Sanchez, and Sekazi Mtingwa. Because education plays such a fundamental role for sustainable development, along with the basic sciences, C13 has recommended a liaison to C14, Ajith Kumar, as the Associate Member of C14.

C14: Physics Education

The commission has held four virtual (zoom) meetings (February 11, April 8, May 9, and June 23, 2022). A new ICPE Handbook "*Connecting Research in Physics Education with Teacher: Education 3*", edited by a current

(second-term) C14 member Dr. Jenaro Guisasola and a former C14 member Dr. Eilish McLoughlin, is completed and published. A comprehensive report of the activities is available from [Indico](#).

C15: Atomic, Molecular, and Optical Physics

The commission awarded the Early Career Scientist Prize 2022 to Ana Asenjo-García and recommended to support, as Type A conference, the [33rd International Conference on Photonic, Electronic and Atomic Collisions \(ICPEAC\)](#) to be held in Ottawa, Canada, from July 25th to August 1st, 2023. Furthermore, the commission selected photos in the framework of the IUPAP Photo Contest. A more comprehensive report is available from [Indico](#).

C16: Plasma Physics

The activities of the commission for the first two quarters of its mandate were fully conducted remotely, thanks to the mailing list IUPAP-C16-Members@cern.ch and through a Zoom meeting organized Friday 17 June 2022 (to which 8 Commission members - over 12 – participated). The discussions led to: (i) the submission of the candidature of Prof. Vasyl Maslov from the National Science Centre “Kharkov Institute of Physics and Technology”, Ukraine, as C16 associate member, (ii) the recommendation to support ICPIG2023 as IUPAP sponsored conference for next year and (iii) the selection of the 2022 Early Career Scientist Prize on Plasma Physics. including definition of 4 selection criteria. Ten nominations (40% of female nominees) were received, of extremely high quality as recognized by the whole commission. A first round (by email) allowed selecting 2 nominees for a second round of discussions during the meeting. Finally, the 2022 prize was awarded to Dr Marija Vranic (IST, Portugal).

C17: Laser Physics and Photonics

The commission opened the call for applications to the Early Career Scientist Prize in November 2021. The call closed on 8 April 2022. This time around, two prizes will be awarded to scientists with less than 8 years of experience after their Ph.D. One prize is for outstanding contributions of a fundamental nature, and the other is for applied contributions. The two winners will be announced in July 2022.

C18: Mathematical Physics

The commission was represented at the January 2022 EC&CC meetings. Furthermore, the commission has nominated Sylvia Serfati, Vice-President of the International Association of mathematical Physics, as associate member.

C19: Astrophysics

The IUPAP Young Scientist Medals for 2020 and 2021 have been widely advertised through national mailing lists and through various international astronomy organizations. The winners will be invited to give a presentation of their scientific achievements at the [Texas Symposium on Relativistic Astrophysics](#). To welcome the new members of the commission a video conference is scheduled for 30 July to plan the 2022 activities. Among others it is planned to update the "ASTROPHYSICS HIGHLIGHTS 2020" report summarizing the recent discoveries in the field of Astrophysics.

C20: Computational Physics

The commission held its first planning meeting with all members on 7 February 2022. Because of the pandemic, the meeting was virtual. In June the commission completed the selection of the winner for the 2022 IUPAP Early Career Scientist Prize in Computational Physics. The 33rd Annual Conference on Computational Physics (CCP2022) is set to take place virtually on from 1–4 August, organized and hosted by the University of Texas at Austin, USA.

AC1: International Commission for Optics (ICO)

No report available.

AC2: International Society on General Relativity and Gravitation (ISGRG)

No report available.

AC3: International Commission for Acoustics (ICA)

The International Commission for Acoustics (ICA) is composed of 47 member societies, eight international affiliate members, and five observer members. The 2022 Board Meeting and General Assembly are scheduled to be in-person at the congress in Gyeongju, Korea. For the International Year of Sound, ICA was involved the opening at Sorbonne University in January 2020, the production of a film on the importance of sound in our lives which is available in short and long version, and an international student competition. The student competition received over 650 entries for the primary school level and nearly 100 stanzas and videos for the high school

level. There will be various closing events around the world, with the final closing during the ICA congress in Korea, 24-28 October 2022. Approximately 900 abstracts have been accepted for presentation at ICA2022, covering all areas of acoustics. The congress will be held with physical presence of the participants, who however, have the option to participate remotely through internet facilities, if for some reason they are not able to travel to Korea. The comprehensive AC3 report can be consulted from [Indico](#).

[AC4: International Commission on Medical Physics \(IOMP\)](#)

The AC4 organizes a session on the 'International Year of Basic Sciences for Sustainable Development' during the World Congress of Medical Physics and Biomedical Engineering <https://wc2022.org/>. During the Congress, there will be a ceremony dedicated to the IUPAP Early Career Scientist Prize to present the awards and honour the awardees. IOMP's triennial scientific meetings (the International Congress of Medical Physics, ICMP, and the World Congress) are excellent opportunities to promote IUPAP activities and the IOMP-IUPAP cooperation.

[AC5: International Association of Physics Students \(IAPS\)](#)

AC5 has been very active since its formalisation in November 2021, increasing in size by over 20% to now consist of approximately 90,000 students. Many initiatives took place, ranging from in-person outreach activities for the International Day of Light and the IAPS School Day, to IYBSSD events and the new Physics4Peace campaign. The PLANCKS competition was hosted in Munich as the first hybrid IAPS major event with 40 teams from 26 countries. The winners were awarded the IUPAP Early Career Scientist award. This competition was supported as a part of the IUPAP Centenary celebrations and the funds were used for travel support to foster inclusiveness. AC5 is getting involved in various IUPAP Commissions and Working Groups, and is keen to increase its involvement in WG16, WG5 and C14. Furthermore, the International Conference of Physics students, iaps4Materials and iaps4Climate events are coming up soon.

[AC6: Affiliated Commission on the History and Philosophy of Physics \(IUCHPP\)](#)

In October 2021, the new inter-union commission on the History and Philosophy of Physics was created. This is an inter-union commission between the IUPAP and the International Union for the History of History and Philosophy of Science and Technology. As part of the Centenary Project, the commission organised a two-day online workshop on the history of the IUPAP to prepare the October conference on the topic in Donostia/San Sebastian (Spain). Oxford University Press approved the book proposal prepared by the commission and the book "Globalizing physics: One hundred years of the International Union of Pure and Applied Physics" shall be published as an open access monograph in 2023.

[WG1: International Committee for Future Accelerators \(ICFA\)](#)

ICFA has continued having a very active pace of activities, with a two-day annual meeting in March, a Fall meeting being planned, and regular meetings of the seven ICFA panels. A particular area of focus remains the international coordination for a potential International Linear Collider. The panels continue to serve very valuable functions for the community ranging from accelerator beam dynamics to data preservation.

[WG9: International Cooperation in Nuclear Physics \(ICNP\)](#)

The update of [IUPAP Report 41](#) is an important ongoing activity. The report provides a brief description of the nuclear facilities that have an acknowledged user organization. The report is in the process of being considerably revised and updated. Most of the material to update the description of the facilities has been collected. In the next months the editing of the new material will be completed. Furthermore the working group has been actively involved in the organization of the [IUPAP Nuclear Science Symposium and IUPAP WG.9 Annual General Meeting](#) at Southeastern Universities Research Association (SURA), June 14-15, 2022. In addition, the working groups webpage is being renovated.

[WG11: Gravitational Wave International Committee \(GWIC\)](#)

Great strides have been made toward realizing a next generation global network of ground-based gravitational wave observatories. [Einstein Telescope](#) was approved for the [Roadmap 2021 of ESFRI](#), the European Strategy Forum on Research Infrastructures, while [Cosmic Explorer](#) in the USA completed their [Horizon Study](#) and submitted it to NSF. Furthermore, an international team of astronomers from the [International Pulsar Timing Array](#) (IPTA) strengthened evidence for a signal that may hint at ultra-low frequency gravitational waves.

[WG14: Accelerator Science](#)

WG14 has restarted its activities after a hiatus due to the pandemics. Among the current activities are: revised membership finalized with improved gender and regional representation, preparation of the IUPAP endorsed conference IPAC22 – June 12-17 (first International Particle Accelerator Conference in person, still including

remote presentations and participants, after the pandemic): ~750 participants: 30% female representation, 1000 papers, 71 student grants, and WG14 Web page under construction (hoping to go on-line soon).

WG15: Soft Matter

WG15 has been preparing various international conferences. The group has initiated the formation of the Soft Matter Association of Asia and Oceania and is planning the formation of the Soft Matter Association of Americas. A comprehensive report is available from [Indico](#).

WG16: Physics and Industry

WG16 has been meeting monthly via Zoom since July 2020 to develop and implement goals and plans for the WG. Minutes of each meeting are recorded and approved by the WG. There will be a roundtable discussion on "Life outside of Academia" at the IUPAP Centenary in Trieste. A dedicated website for IUPAP corporate associated members is in preparation.

Resolutions

[Statement on the events occurring in Ukraine, March 1st, 2022](#)

[IUPAP resolution regarding international conferences in this time of crisis](#)

[Use of IUPAP affiliation at conferences](#)

The Executive Committee has invited Ukraine to join as a territorial member at no cost. This is subject to approval by the General Assembly.

IUPAP sponsored conferences are strongly encouraged to make their content available online, real time if possible.

Centenary celebrations

The [main celebration](#) took place in Trieste in the days preceding the general assembly. It turned out to be a successful event with a range of high-profile physicists and good attendance both in-person and online.

Several events have been events associated with IUPAP's centennial celebration, while other meetings, e.g. the [Annual Meeting of the Swiss Physical Society](#), included special IUPAP sessions. The list of recorded satellite events might be partial:

- [“Physics for Sustainable Development”](#) Rome, Italy, on 19 September 2022
- [“Annual Physics Conference of Iran”](#) during 5–8 September 2022
- [“7th National Conference on Superconductivity and Magnetism Advances”](#) during 6-7 July 2022
- [“Regional e-Conference on Physics”](#) organised by the Pakistan Physical Society under the auspices of the IUPAP during 18-21 January 2022
- [“100 Years of Physics in Africa”](#), organised by the African Physics Community in celebration of the IUPAP Centenary. The project plans to share stories that celebrate and communicate the immense contributions that physics education and research have made to Africa's development.

IYBSSD2022

The [International Year for Basic Sciences for Sustainable Development](#) was proclaimed by the [76th session of the United Nations General Assembly](#) 2 December 2021 for 2022. IUPAP is the legal entity placing contracts on behalf of the IYBSSD2022. The year will run for 12 months and was officially inaugurated at a ceremony held at the UNESCO Headquarters in Paris 8 July 2022. Over 80 organisations, among them many national science academies and their networks, are supporting the initiative and covering the related costs.

Conferences

Many of the 2021/22 conferences that were meant to be sponsored by IUPAP have been cancelled or postponed due to the COVID pandemic. The conference life is now gradually finding its former rhythm. In addition to the regular conferences, IUPAP also sponsored [PLANCKS 2022](#), Munich, Germany, 5–8 May 2022, an international team competition in theoretical physics for students.

IUPAP endorsed/sponsored conferences are listed on the [IUPAP web site](#).

Appreciations

The President and the rest of the Executive Committee would like to express their gratitude to everyone involved in the IUPAP activities. The hard work that is carried out in the commissions and in the working groups, and in conference organising committees is what makes IUPAP relevant for physicists around the world.

In particular, thanks are extended to Leong Chuan Kwek who has continued to be the link with the Singapore office even after his formal mandate was completed, Bruce McKellar who had to absorb much of the administrative burden in the gap between the Singapore and Trieste offices, Hari Haran Balakrishnan who have maintained the website, Luc Allemand who has the role ad the Secretary-General for IYBSSD, and at last, but not least our colleagues in the Trieste office: Anna Lisa Cesaro, Cecilia Cressi and Paola Rodari.