

# Activity report for the International Union of Pure and Applied Physics

## IUPAP

for the period 14 July 2022 to 9 October 2023

**The reference period has been a very active period for IUPAP. Conferences that had been postponed over and over again, due to the pandemic, could finally take place and the Union's involvement in the International Year of Basic Sciences for Sustainable Development turned out to be instrumental for the organisation of the UN observance, an effort that led to the proclamation of the International Decade of Sciences for Sustainable Development.**

## Representation in other bodies

IUPAP is a member of the International Science Council (ISC) and via this membership also in CODATA. The Union takes active part in both bodies via participation in the general assemblies and topical and regional meetings.

The International Year of Basic Sciences for Sustainable Development (IYBSSD) is not a legal entity and can therefore not have members as such. However, the IYBSSD Steering Committee, grouping a large number of unions, partners and supporters world wide, is lead by the IUPAP president and the IUPAP secretariat has also provided administrative support for financial transactions.

## Centenary celebrations

In addition to the successful Centennial Symposium held at ICTP, Trieste, on 11, 12 and 13 July 2022, the 100 years of [IUPAP was celebrated around the world](#). As part of the celebrations of the anniversary, IUPAP sponsors the production of an academic volume on the history of the IUPAP to be published open access by Oxford University Press in 2024 (see the report from AC6 below). The IUPAP anniversary has been featured in various publications, among others in [Nature](#).

## Conferences

One of the main IUPAP activities is to support the main conferences within the different physics disciplines. Conferences supported in [2022](#) and [2023](#) are listed on the IUPAP website. The approved financial support for two of the 2023-conferences had unfortunately to be withdrawn as the organisers were prevented from issuing invitation letters to colleagues working in Russia and Belarus even if these participants would have carried the neutral IUPAP affiliation. Hence, the IUPAP principle to ensure free circulation of scientists was not respected, which was recognised by the conference organisers. The work of the Commissions and the conference organising committees is of immense value to the community to maintain and develop different branches of physics.

This year around it was again time for the International Conference Women on Physics. The conference was held virtually from July 10–14, with nearly 500 delegates from 70 countries—clearly reflecting the importance this conference has gained within the physics community.

## Membership

### Territorial members

A large part of the territorial members remain strongly engaged with IUPAP. To better understand members' needs and expectations, specialised meetings were held with Australia and Spain. Furthermore it was explored how Australia and New Zealand can help to get the Pacific Islands included in the IUPAP fold. These explorations are ongoing and will hopefully conclude in the coming year.

## Payment of dues

Most members do pay their dues, but there is a group of members that are in arrears since quite some time. The situation has been tolerated as the Union did not want to exclude members during the period the Union celebrated 100 years of existence. The situation will be addressed at the 2023 General Assembly and proposed actions will be put forward. However, some members suffer from national restrictions or international sanctions and are prevented from paying their dues—their situation will be handled separately.

## Corporate associate members

Since the introduction of the membership class “Corporate associate members” in October 2021, the Union has attracted [five members](#) in this category. Next steps will be to attract more such members and get the new members involved in the various IUPAP activities.

## New class of membership: Associate territorial members

A new class of membership, “Associate territorial members”, will be proposed at the 2023 General Assembly. The category is intended as a pre-stage to membership for potential Territorial members that are not in the position to immediately sign up. Following careful explorations and considerations, Nepal will be the first territory to be proposed to join the Union in this category.

## Administrative affairs

### Headquarters and administrative offices

The IUPAP headquarters is based in Geneva. IUPAP is registered as an association under Swiss law and benefits from tax exemption. To support the operation IUPAP has an administrative office in Trieste run by Fondazione Internazionale Trieste per il Progresso e la Libertà delle Scienze. The entity in Singapore, International Union of Pure and Applied Physics Singapore Ltd., is still in the process of being wound up.

## Restructuring of IUPAP

After 100 years of existence, it is time to review the functioning of the Union. During the year, a self-evaluation has been carried out. This evaluation, combined with an external review, is meant to be the basis for a restructuring of IUPAP. The aim is to achieve more efficient ways of working better communication across the different IUPAP bodies.

## Prizes

The Commissions invest substantial work in evaluating candidates for prizes—prizes that are highly appreciated by the recipients and which have gained status within the respective physics disciplines. For the first time IUPAP will hand out an interdisciplinary Early Career Scientist Prize. The process was initiated following the 2022 General Assembly and the two winners—both allocated to the year 2023 for the first edition of the prize—will be announced at the 2023 General Assembly.

In addition to its own prizes, IUPAP regularly nominates candidates for prizes handed out by other bodies. Most recently IUPAP is associated with the Frontiers Planet Prize as an international scientific partner to promote the prize across the IUPAP membership to widen the call for participation.

## Commissions and Working Groups

All the Commissions seem to function well—holding regular meetings, proposing conferences for sponsorship and endorsement, hand out prizes etc.

Following the measures taken by the 2022 General Assembly, most of the Working Groups seem to function well. WG16 (Physics and Industry) has continued to work particularly closely with the Executive Council as getting more corporate associate members is considered a priority.

## List of reports received by Commissions and Working Groups

[C2: Symbols, Units, Nomenclature, Atomic Masses and Fundamental Constants](#)

The field covered by the Commission has been strongly impacted in the past years by the 2019 evolution in the definition of the SI units decided by the General conference of Weights and Measures. So the activity of the C2 commission during the time, Jul. 2022 to Sept. 2023, can be summarised in two points. First, we considered applications (spontaneous and transmitted by members) to the IUPAP—SUNAMCO medal, and we formed a jury to examine proposals and select a nominee : the winner was Dr Richard Brown, from the UK. Second, the C2 members participated in the consolidation of the advances obtained by the 2019 reform, and entered in the discussions about the following “new” subjects : digital transition and the concept of metadata in the field of measurement; evolution of vocabulary standards, especially the proper concept of quantity in measurement ; place of the dimensionless quantities and of angles among the international system of units. Delegates from C2 commission participated in several international committees of the metrological organisation on these subjects (Consultative committee for units of the International committee of Weights and Measures, Joint committee for guides in metrology—gathering several international bodies) and in the relevant working groups, in coordination with working groups from the international standardisation bodies.

### **C3: Statistical Physics**

In the last year, since October 2022, the C3 Commission held several online steering committee meetings for the organisation of StatPhys 28 in Tokyo. The Conference took place from August 7 to August 11 2023 in hybrid mode, with more than 1000 participants physically present and about 100 online. During the Conference the Awards Ceremony took place, assigning the Boltzmann medals and the early Career Scientist Awards 2022. In Tokyo the C3 Commission also had the traditional meeting where the new governance and the updated composition of the Commission for the term 2025–27 were decided. Moreover, the C3 also inquired with Prof. Stefano Ruffo about the progress in the organisation of StatPhys29 in Florence (Italy), which will take place in July 2025.

### **C4: Astroparticle Physics**

In the last one year, the commission met 5 times: on September 27, 2022, December 21, 2022, April 5, 2023, May 9, 2023 and July 29, 2023. Among them, the first 4 meetings were held online. The last one was held essentially in a face-to-face style with online participation accepted. In the first four meetings, various issues related to the International Cosmic Ray Conference 2023 (ICRC2023) were discussed. In the most recent meeting held in Nagoya during ICRC2023, the commission heard the preliminary report on ICRC2023 and the preparation status for ICRC2025. In addition, the commission discussed and decided the C4 endorsed IUPAP conferences in 2024, and the candidate location for ICRC2027. In addition, the commission served as a committee to select the winners of several prizes; IUPAP Early Career Scientist Prizes (2 prizes), O’Ceallaigh medal and IUPAP-TIFR Homi Bhabha Award.

### **C5: Low Temperature Physics**

The Commission was involved in the organization of three major conferences: the International Conference on Low Temperature Physics (LT29), the International Conference on Ultra Low Temperature Physics (ULT2022) and the International Conference on Quantum Fluids and Solids (QFS2023). For further details consult the [full report](#).

### **C6: Biological Physics**

A C6 member, Dr. Laura Cantù from Italy, died in Aug 2022, and the position is kept vacant. The call for "The IUPAP Medal for the Physics of Life" was opened Aug.–Nov. 2022. The Medal selection committee was organised by C6 members, two previous C6 chairpersons, and three YSP awardees, and in March 2023, the committee selected two Medalists, Dr. John Hopfield and Dr. Frank Jülicher. C6 also selected the 2022 and 2023 ECSP awardees, Dr. Ming Guo and Dr. Ricard Alert, and invited two Medalists for the Physics of Life, YSP, and ECSP awardees to the awarding ceremonies at the International Conference on Biological Physics (ICBP) held in Seoul on 14-18 Aug 2023. The C6 meeting was held hybrid (in person at Seoul + online) on 17 Aug 2023.

### **C8: Semiconductors**

The commission held the annual (hybrid) meeting at Grenoble, France during the EP2DS-25/MSS-21 conference. The organising committees for ICPS 2024(Ottawa) and 2026(Tokyo) reported the current progress of preparations which were well approved. We started an announcement of the Early Career Scientist Prize in Semiconductors, emphasising the female recommendations this time specifically. The commission decided to accept Park Systems, a Corporate Associate Member of the IUPAP, as an affiliate member of our commission. We also decided that a part of a special fund of our commission can be used to help the preparation for ICPS as a reserve fund but in the form of a loan in case.

### **C9: Magnetism**

The Commission now includes associate members from major sister magnetism societies to enhance interactions. These bodies are: IEEE Magnetics Society, American Physical Society Topical Group on Magnetism (GMAG), European Magnetism Association (EMA) and Asian Union of Magnetics Societies (AUMS). The Commission held an Award Ceremony to recognize recipients of the 2021 IUPAP Magnetism Award and Néel Medal and the 2019-2022 Young Scientist/ Early Career Scientist Prize in Magnetism (ECSPM) at the 2022 ICMFS Conference. The Commission's business meeting was also held at the same conference. The 2023 ECSPM has also been selected. For further details consult the [full report](#).

### **C10: Structure and Dynamics of Condensed Matter**

The Commission is involved in the upcoming Fourth International Conference on Materials Science (ICMS-2024). For further details, consult the [full report](#).

### **C11: Particles and Fields**

The Commission has focused on several key efforts, including:

- Selecting recipients for the C11 Early Career Scientist Prize
- Collaborating with conference organisers to implement diversity initiatives
- Providing support for the organisation of hybrid and virtual conferences
- Enhancing regional and gender balance within the C11 committee.

For further details, consult the [full report](#).

### **C12: Nuclear Physics**

The Commission held two joint meetings with Working Group-9 in 2022 to discuss the INPC conference, the new affiliate members of C-12, and the Early Career Scientist Prize. A joint meeting between C12 and WG9 is foreseen. The Commission has discussed how to communicate C12 activities to the outside and improve the visibility of C12 in the nuclear physics community. Regarding conferences, C12 recommends supporting NN2024 in category A, QNP 2024 in B, and NSTAR 2024 in C. For further details, consult the [full report](#).

### **C13: Physics for Development**

The Commission has monitored progress of the project *LAAAMP*, the International Conference on Women in Physics (ICWIP2023), the role of IUPAP in the Pacific, planning of the IYQ2025 and evaluated proposals for conference funding. For further details, consult the [full report](#).

### **C14: Physics Education**

Over the reference period, the Commission has met virtually four times. The Commission revised the ICPE medal rules, started a major revision of the web pages, and published [issue 75](#) of the newsletter via the Zenodo platform. For further details, consult the [full report](#).

### **C15: Atomic, Molecular, and Optical Physics**

The major activities from July 2022 to August 2023 are categorised into the following items:

- IUPAP C15 Early Career Scientist Prize 2023
- Conference attendance
- Conference support

For further details, consult the [full report](#).

### **C16: Plasma Physics**

The activities of the Commission were mainly conducted remotely via email. Several of the big conferences that had been postponed, due to the pandemic, finally took place. The winners of the Early Career Scientist Prize were presented with their certificates. For further details, consult the [full report](#).

### **C17: Laser Physics and Photonics**

The C17 members (both regular and associate ones) actively participated to the completion of the C17 Early Career Scientist Prize procedure, evaluating 14 nominations. The two winners, awarded in October 2022, were: 1) Daria Smirnova, from Australian National University, Canberra, AUS, for fundamental aspects on Laser Physics and Photonics. 2) Peter McMahon, from Cornell University, Ithaca, NY, USA, for applied aspects on Laser Physics and Photonics. In September 2022, the C17 past-chair, chair, vice-chair and the ICO associate member in C17 participated to the joint meeting with ICO (International Commission for Optics) to discuss

initiatives of mutual interest, during the OWLS-ICO 2022 Conference (5-9 September) in Dresden, Germany. In June 2023, C17 evaluated and approved one application for IUPAP Conference Sponsorship in 2024.

#### **C18: Mathematical Physics**

The Commission issued calls for conference support and evaluated incoming proposals. A setback in the call for applications for IUPAP conference support for the year 2023 was encountered. However, the Commission has received two applications in response to the call issued for the year 2024. In June, the call for nominations for the Early Career Scientist Prize was issued. The selection process for the laureates is scheduled to occur between the fall of 2023 and spring of 2024, with the winners being announced during the triennial ICMP to be held in 2024. For further details, consult the [full report](#).

#### **C19: Astrophysics**

The members of the Commission have discussed and suggested holding an IUPAP *Intercommission Workshop* with the aim to improve the different Commissions and Working Groups liaison and synergy. The basic idea was illustrated by the C19 Chair, Pietro Ubertini, during the end of the 2022 Trieste Meeting, to the IUPAP President, Michel Spiro, and Silvina Ponce Dawson. They were both positive, caveat a number of issues to be analysed and agreed at a later stage. Consequently, during the C19 web meeting held on the 1<sup>st</sup> of June, the idea to proceed with the Workshop was unanimously decided and formally proposed to the IUPAP Executive Council. Silvina Ponce Dawson took the action to call a web meeting with the interested people on the 18<sup>th</sup> of August 2023. Details and actions from the discussion are:

- The proposal must be discussed in greater detail during the next Executive Council meeting (EC&CC).
- Pietro Ubertini will provide a more comprehensive proposal that clearly outlines the objectives, format, and logistics of the event.
- Nithaya Chetty will liaise with Pietro Ubertini to align their understanding of the proposal and work towards developing a sensible package.

It was finally decided to meet soon to discuss these matters.

#### **C20: Computational Physics**

The commission completed the selection of the winner for the 2023 IUPAP Early Career Scientist Prize in Computational Physics. The Prize went to Dr. Sinéad M. Griffin at Lawrence Berkeley National Laboratory. The 34<sup>rd</sup> Conference on Computational Physics (CCP2023) was held in Kobe, Japan on August 4–8, 2023. The Conference was in a hybrid format with 433 registered participants from 28 countries.

#### **AC1: International Commission for Optics (ICO)**

The International Commission for Optics has taken the initiative to organise "Optics & Photonics Africa 2023", which is expected to have an impact on the optics and photonics activity on the African continent. The Commission was also central in the General Congress for Optics and Photonics, an in-person meeting held in Dresden, Germany from 5–9 September 2022. For further details, consult the [full report](#).

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

The International Society on General Relativity and Gravitation meets triennially. The 23<sup>rd</sup> International Conference on General Relativity and Gravitation (GR23), was held July 2022 in Beijing, China. This was a hybrid meeting with most international attendees joining on-line. The Scientific Organizing Committee, chaired by Prof. Veronika Hubeny (University of California, at Davis), developed the scientific program in collaboration with the Local Organizing Committee led by Prof. Rong-Gen Cai (Chinese Academy of Sciences). For further details, consult the [full report](#).

#### **AC3: International Commission for Acoustics (ICA)**

Not received.

#### **AC4: International Commission on Medical Physics (IOMP)**

The AC4 will be hosting the International Conference on Medical Physics (ICMP) <https://icmp2023.org/> in Mumbai, India from December 6<sup>th</sup> to December 9<sup>th</sup>, 2023. At the conference, an 'IUPAP Early Career Award' ceremony will be held to honour the awardees. The triennial scientific meetings of IOMP (the ICMP and the World Congress) are great opportunities to showcase IUPAP activities and the excellent collaboration between IOMP and IUPAP.

#### **AC5: International Association of Physics Students (IAPS)**

The International Association of Physics Students, worked during the past year broadly on closer collaboration with IUPAP, focussing on the development of the Memorandum of Understanding and the restructuring of the awarding procedure associated with the Early Career Scientific Prize in AC5. The Memorandum of Understanding has received comments from the IUPAP Executive Council and Commission 14, as well as the General Meeting of IAPS and is expected to be finalised by the in-person General Assembly in 2024. Furthermore, AC5 has returned its B-type funded main conference, ICPS, to in-person attendance and expects it to grow for next year's edition in Tbilisi, Georgia in 2024. Its B-type funded physics competition, PLANCKS, took place in May 2023 in Milan, Italy with a record-high international attendance. Most crucially, IAPS has been accepted as one of the first 15 Young Academies and Associations of the International Science Council, with IUPAP as the ISC supporting member. In the Young Academies and Associations Board, IAPS is the only international student association, thus spearheading the ISC's representation for this new membership type.

#### **AC6: Affiliated Commission on the History and Philosophy of Physics (IUCHPP)**

In October 2022, and as part of the Centenary Project, The IUCHPP organised a workshop in Donostia/San Sebastian, Spain, as a way to discuss, polish and coordinate the chapters of the forthcoming book on the History of IUPAP. This book is now in press at Oxford University Press and it is expected to be out by mid-2024. The workshop was sponsored by IUPAP and the Donostia International Physics Center (DIPC). For further details about the AC6 activities, consult the [full report](#).

#### **WG1: International Committee for Future Accelerators (ICFA)**

ICFA has continued having a very active pace of activities, with a virtual meeting in March and the first in-person meeting since early 2020 in Melbourne Australia in July. A continued focus of activity is international coordination for a potential International Linear Collider. The seven ICFA panels continue to serve very valuable functions for the community across a range of topics from accelerator beam dynamics to instrumentation and data preservation. ICFA has additionally engaged community leaders to discuss a potential panel on Software, Data and Computing for HEP. Finally, the first ICFA Seminar in six years is planned for Nov. 28–Dec. 1 at DESY, Hamburg.

#### **WG5: Women in Physics**

The Working group has distributed travel grants and contributed towards the organisation of the 2023 International Conference Women on Physics. The conference was held virtually from July 10–14, with nearly 500 delegates from 70 countries, including about 200 hundred participants from India. It was co-organized with the Gender in Physics Working Group (GIPWG) of Indian Physics Association (IPA) and the Tata Institute of Fundamental Research (TIFR) and was hosted by the Homi Bhabha Centre for Science Education (HBCSE) of TIFR. For further details, consult the [full report](#).

#### **WG7: International Committee on Ultrahigh Intensity Lasers**

The 2023 activities of the IUPAP Working Group 7, the International Committee on Ultrahigh Intensity Lasers (ICUIL), were mainly devoted to the organisation of its conference and to the renewal of its membership. For further details, consult the [full report](#).

#### **WG9: International Cooperation in Nuclear Physics (ICNP)**

The activity in this period mainly concerned two issues: the update of Report 41 and the organisation of the annual meeting which took place on June 3, 2023 in Avignon (France). For further details, consult the [full report](#).

#### **WG11: Gravitational Wave International Committee (GWIC)**

For further details, consult the [full report](#).

#### **WG13: Newtonian Constant of Gravitation**

#### **WG14: Accelerator Science**

The working group has been involved in the following events and activities during the period:

- Joint ICTP-IAEA Advanced Workshop on Future Trends in Multidisciplinary Ion Beam Analysis (10-14 October 2022 – Vienna, Austria)– endorsed by IUPAP. About 20 participants. Given a short presentation on IUPAP and in particular WG14.
- International Particle Accelerator Conference - IPAC23, 7–12 May 2023, Venice, Italy. The conference was supported by IUPAP. Largest number of participants ever:



- ~1660 participants from 37 countries: 1800 papers, ~100 student grants, 116 industrial exhibitors. For the first time an IPAC in Europe included an Equal opportunity session.
- International Accelerator School on Superconducting Science and Technology for Particle Accelerators, 10–20 July 2023, Saskatoon, Canada. The conference was supported by IUPAP. About 30 students.
- WG14 Web page on-line (including links to on-line courses in accelerator science).

#### **WG15: Soft Matter**

The Working Group was involved in the organisation of the International Soft Matter Conference (ISMC) held in Osaka, Japan, September 4-8, 2023. During the conference the first meeting of the Soft Matter Association of Asia and Oceania was held, which will implement the mandate of IUPAP WG-15 in the region. The Soft Matter Association of the Americas (SMAA) was formed. The objectives of SMAA are the same as the mandate of IUPAP WG15 but focused on the Americas. For further details, consult the [full report](#).

#### **WG16: Physics and Industry**

The Chair, Christophe Rossel (Switzerland), will give his presentation via Zoom on 5 October.

#### **WG17: Centenary of IUPAP**

The Chair, Monica Altarelli (Switzerland), will give her presentation via Zoom on 5 October.

#### **WG18: Ethics**

The Chair, Ana María Cetto (Mexico), will give her presentation via Zoom on 5 October.

#### **WG19: Quantum Science and Technology**

The working group met virtually to discuss the question of creating a new commission on quantum information science and technology. There was broad consensus that a new commission is needed for several reasons. For details, see the [full report](#) by the Chair.

#### **WG20: Open Science**

The membership of the working group is not yet established. Prof. Alex Hansen (Norway) has accepted to be the chair of the working group and the aim is to deliver a full report by the in-person IUPAP General Assembly in China in October 2024.