International Union of Pure and Applied Physics
27th General Assembly
London, United Kingdom, 2-4 November 2011

1. Welcome

1.1. IUPAP President Sukaketsu Ushioda welcomed everyone to the General Assembly in London. The last IUPAP GA in London was 57 years earlier (i.e. 1954). Cecilia's ascendance to IUPAP presidency is historic as she is the first woman president in the entire history of the IUPAP. Katsu congratulated the UK on the recent Nobel prizes in physics awarded to physicists from Manchester in recognition of their pioneering work on graphene.

1.2. Katsu further extended his congratulations to Australian pioneers in physics of accelerating distant supernovae. He paid tribute to John Nillson, former associate secretary and secretary general who recently passed away.

1.3. Katsu also thanked Judy Frantz and Jacki whose combined help to the IUPAP council has been most valuable. The turnover has been very good, with new members coming into council. It is against this backdrop that a proposal is being tabled to the GA to increase by two the number of Vice Presidents at Large (VPALs). Katsu also thanked the secretariat of the IOP and for the IOP to have contributed its resources to host the C&CC meeting together with the 27th General Assembly.

2. Official UK Welcome by IOP President

The IOP president, Sir Peter Knight officially welcomed the 27th IUPAP GA delegates to the UK.

3. Recognition of previous officers, adoption of the agenda and approval of the minutes

Sukaketsu Ushioda presented gifts to outgoing officers as a token of appreciation in recognition of their services to the IUPAP over the previous three years. He then asked for adoption of the agenda and approval of the minutes of the 26th General Assembly in Tsukuba, Japan in 2008. The agenda was adopted without additional items, and the minutes were accepted with the following corrections, *viz* American Mathematical Society to be replaced by European Mathematical Society on page 11.

4. Presidential address

4.1. Sukaketsu Ushioda presented the history of the IUPAP, starting from its launch at the IRC meeting in 1922 with a total of thirteen countries announcing their adherence to the union. The first president was Sir William Bragg. First General Assembly was held in Paris in 1923. Subsequently General Assemblies were held in 1925, 1931 and 1934. IUPAP was amongst the first unions to adhere to the new ICSU which was formed from the original IRC. IUPAP membership subsequently grew from 13 to 19. IUPAP General Assemblies resumed in 1947 after the end of World War II. The ICO was the first incorporated Commission.

4.2. IUPAP membership has grown by a total of 11 during the period covering Alan and Sukaketsu's terms as presidents. The IUPAP continues in its mission to assist worldwide development of physics, fostering international co-operation in physics, sponsoring international meetings, fostering communications and publications, and encouraging research and education.

4.3. IUPAP shares allocated to member states vary from 1 to 18, in a non-uniform structure of adhering bodies which (structure) often creates communication problems. The United States of America and Russia are the only two member states with 18 shares.

4.4. Ushioda showed all twenty IUPAP Commissions together with the four Affiliated Commissions. He listed a total of six working groups, *viz* WG1, WG2, WG4, WG5, WG7 and WG9. The IUPAP executive council comprises the past president, president, president elect, secretary general, associate secretary general, 5 vice presidents selected from commission chairs (VPCs) and three vice presidents at large (VPLs)

4.5. The General Assembly remains the highest decision making body of the IUPAP.

5. **Financial report**

5.1. Robert Kirby-Harris presented the financial report, showing the 2011 year-end forecasting a deficit of €31 000 which should be viewed against the available IUPAP reserves worth €1 M. The proposed 2012 IUPAP budget forecasts a deficit of €37 000 with an income of € 415 000 and an anticipated expenditure of € 468 000. The increase from €14 000 to €21 000 in the budget of the developing countries workshop is partially funded by the €5 000 originally set aside for the visiting scientist programme.

6. Proposal to increase membership dues (by 5%)

6.1. Robert Kirby-Harris gave a background explanation of how important it is to bring the IUPAP budget and expenditure into alignment. He pointed out that the proposal to increase the membership dues has been supported by council, which had considered amongst others the fact that IUPAP membership dues have remained frozen for almost six years. Instead of a 5% increase for two years running, the General Assembly approved to implement a 3% annual increase for three years, followed subsequently by inflationary linked increase.

7. Proposal to increase the number of Vice presidents at Large

7.1. Robert Kirby–Harris introduced the proposal to increase from three to five the number of vice presidents at large. Sukekatsu Ushioda mentioned that currently the three vice presidents at large make it difficult to cover the geographical distribution. Introducing two more vice-presidents at large will also ensure there is continuity within the council as the term of office of the VPALs will be out of phase.

7.2. South Africa inquired if bringing in two more vice presidents at large will balance with the budget provisions, to which question Robert Kirby-Harris replied in the affirmative.

8. Terms of office

8.1. It has always been inherently understood to be in the spirit of the rules of the terms of office that the chair is not supposed to step back in hierarchy. The current revision is an attempt to have this introduced and explicitly stated in the rules.

8.2. Ordinary members of commissions should serve two terms in office.

8.3. Service in all capacities should not exceed 3 terms. The word continuous, which preceded the word service, was struck out from the original proposal.

8.4. The Council, and not the General Assembly as originally proposed, may grant exceptions for those Commissions that undertake long-term projects or where continuity is particularly important.

9. Presentation by Professor Sir Chris Llewellyn Smith FRS

9.1. Professor Sir Chris Llewellyn Smith FRS, the president of SESAME Council and Director of Energy Research at Oxford University, gave a scientific presentation on Synchrotron Light for Experimental Science and Applications. His presentation focussed on the third generation light source under construction near Amman, which is an initiative that seeks to foster science and technology in the Middle East, covering such diverse fields as biology, medical science, materials science engineering and technology.

9.2. Modelled along the lines of CERN, the SESAMME initiative also seeks to address the fact that out of the 60 synchrotron facilities that exists throughout the world, none is located in the Middle East Region.

9.3. Scientists from countries with limited science budget provisions will be able to access the SESAMME facilities through research collaborations and partnerships.

10. General Considerations of Working Groups

10.1. **PANAGIC**: Robert Kirby-Harris reported that the council has agreed that PANAGIC should be dissolved.

10.2. **ICFA:** The International Committee on Future of Accelerators was created in 1976 to facilitate collaborations in the construction of accelerators. Its main membership is derived from directors of major laboratories or specialists in linear accelerators. ICFA has played an important role since its establishment in 1976, receiving much of its specialist support from members of Commission 11. A booklet titled Beacons of Discovery is under preparation to provide a global picture of particle physics. Currently the main focus of ICFA is the broadening of linear colliders. Sukaketsu Ushioda stated that the ICFA website has to be linked with that of IUPAP.

10.3. **Communications in Physics:** The Working Group 2 on Communications in Physics focusses on problems that are emerging in publishing. Currently the availability and reliability of the internet is of particular concern as it impacts negatively on the provision of an optimized and comprehensive networking of international facilities. Amongst its major activities, the working group held a workshop on peer review on 13 October 2011, which was attended by 40 participants. The need to attract more funding has been one of the obstacles identified by the working group. The working group would like to have a declaration from IUPAP emphasizing the importance of peer review as an essential component of scientific enterprize. The working group has also agreed that there should be a minimum basic rights for authors when they sign “away” the copyrights to publishers; minimum rights such as being able to use the material for teaching purposes. IUPAP has endorsed this position.

10.4. **PANAGIC:** The report of Working Group 4, Particle and Nuclear Astrophysics and Gravitation International Committee (PaNAGIC) was submitted together with that of GWIC. PANAGIC was established to support international exchange of ideas and to help in the convergence of the international scientific community in large scale activity in the field of particle and nuclear astrophysics, gravitation and cosmology. The working group has been chaired by David Sinclair since 2004.

10.5. **Women in Physics:** The working group number 5 on Women in Physics was formed by the resolution of the Atlanta IUPAP General Assembly to survey the situation of women in

physics in IUPAP member countries and to analyse and report on the collected data along with suggestions on how to improve the situation. The working group held its 4th International Conference on Women in Physics at Stellenbosch, South Africa on 5 – 8 April 2011. A global survey of women physicists was conducted in 8 languages, with the questionaire worked out in close consultation with team leaders from different regions to ensure continental and regional compatibility. The results of the survey highlight pertinent issues affecting women, such as the difficulties in getting positions at editorial staff levels. Amongst the resolutions adopted at the Stellenbosch conference is the need to improve effectiveness of girls education in Physics, and collaborating with Commission 14 to summarize guidelines for training of physics educators at all levels, with special attention on research-based and gender-sensitive teaching approaches.

10.6. **ICUL:** Working group number 7, the International Committee on Ultra-high Intensity Lasers provides an avenue for discussions among representatives of the Ultrahigh Intensity Lasers facilities and members for exploration of new areas of fundamental and applied research. ICUIL has collaborated with ICFA to exercise the Joint Task Force on future applications of laser acceleration in order to promote collaboration between the accelerator and the laser research communities. The ICUIL working group participated in the first workshop of EuroNNAc, the European Network for Novel Accelerators held at CERN on 3 – 6 May to explore possibilities of applying ultra-high gradient acceleration techniques in large electron beam facilities. Other projects the working group participated in include the LASERLAB-EUROPE and the €850 M European Light Infrastructure (ELI). The 5th biennial ICUIL Conference will be held on 26 September – 1 October in Szegen, Rumania.

10.7. **ICNP:** Working group number 9 on International Cooperation in Nuclear Physics was formed by the resolution of the 2005 Cape Town General Assembly to, among other, provide a description of the landscape of key issues in Nuclear Physics research for the next 10 to 20 years. Membership of WG9 now includes the directors of a broad representation of the world's major nuclear physics laboratories from GANIL in Grance, GSI in Germany, Frascati in Italy, BNL, FRIB and Jlab in the USA, TRIUMF in Canada, RIKEN in Japan, Lanzhou in China and iThemba LABS in South Africa. One of the major activities of the ICNP over the past three years has been the preparation of IUPAP Report 41, which is a handbook of Nuclear Physics user facilities world-wide, together with a concise outline of the main physics challenges. The ICNP continues to provide a much needed forum for laboratory directors to share information while advancing the objective of world-wide development of nuclear physics.

11. Reports from Inter Union Working Groups:

11.1. COSPAR: Committee on Space Research held its 38th Scientific Assembly in Bremen, Germany in July 2010, drawing about 3 400 participants who took part in scientific events covering virtually all branches of space research. The COSPAR Space Science Awards were conferred in 2010 to Guenther Hasinger and Steven W. Squyres. COSPAR Council elected Professor G. Bignami as President of COSPAR for the period 2010 – 2014 to succeed Professor R. M. Bonnet who served for a period of eight years. COSPAR remains effective in bringing together practitioners in the various disciplines of space research. Most scientists affiliated to COSPAR have a background in either Physics or Applied Physics; and COSPAR itself is expected to continue playing a useful role in defining the direction of space research in the future.

11.2. SCOPE: Scientific Committee on Problems of the Environment: A new vice-president has been elected. A number of awards and prizes have been given during the year. Third edition of lifetime achievement awards and for young scientists are planned for 2012.

11.3. SCOSTEP: A new representative has been appointed, although SCOSTEP was not represented at the General Assembly.

11.4. BIPM: The BIPM appoints one member to C2. It was particularly noted that the BIPM report on the possible future revision of the SI units highlighted possible changes on the definitions of the kilogram, kg, the ampere, A, the kelvin, K and the model, which are to be referenced, respectively, to the Planck constant, h, the Boltzmann constant k, the elementary charge, e, and the Avogadro constant N_A.

11.5. IUPAB: Not represented
11.6. IEC: Not represented

12. International Year of Light: John Dudley from the European Physical Society (EPS) together with Luisa Cirafelli, the president of the EPS led a delegation of six which presented to the General Assembly a proposal requesting IUPAP endorsement for the United Nations General Assembly to declare 2015 the International Year of Light. This will be a global initiative whose broad scope of activities will include celebrating pioneers of the science of light as well as celebrating specific advances in 1815, 1865, 1915 and 1965, which are years during which milestones were realised which went on to establish light at the center of modern science. The proposal is scheduled to be tabled to the United Nations in 2012. Since UNESCO has a cultural tag, and is the body through which the proposal is to be tabled to the UN, the committee felt that cultural nuances of light should be highlighted. Barring debates on the order and weight of the contributions of particular scientists, e.g. Einstein, Hilbert and Raman, the General Assembly endorsed the proposal to have the United Nations declare 2015 the International Year of Light.

13. Report from ICSU: Bruce Mckellar gave the ICSU report which highlighted the establishment of ICSU Regional Offices in Africa, Latin America and the Caribbean, and Asia and the Pacific. Kennedy Reed, the outgoing chair of C13, has been elected to the board of ICSU under the category of ordinary member for the period 2011 – 2014. He, Kennedy Reed, should now 'represent' IUPAP on ICSU. There has been attempts by ICSU to start a programme on sustainable energy, and efforts are currently underway to secure financial resources to establish such a program along the lines of a working group. This should tie in very well with the IUPAP initiative to re-establish the working group on energy. The subscription fees of the ICSU-affiliated unions have increased. The whole structure of ICSU is to undergo a review before ICSU develops its next strategic plan. Affiliated unions such as IUPAP are expected to make inputs to guide the review process.

14. Reports from Commissions: With the exception of Commission 13 and 14, all other commission and affiliated commission reports were taken as read and noted. The chairs of Commissions 13 and 14 gave presentations for the activities of their commissions in line with past practice where two commissions are selected to give presentations to the General Assembly. Commissions 13 and 14 have done likewise at the last General Assembly in Japan.

14.1 **Commission 13:** The Commission on Physics Development is mandated to improve the conditions for physics and physicists in developing countries of the world. In line with its mandate, C13 has in the past three years recommended and secured from the IUPAP financial support for conferences held in such places as Senegal (Intn'l Conference on Lasers and Optics in Science and Technology – Launch of the African Physical Society, in Dakar, 2009), Peru (Andean Workshop on Spectroscopy and Congress on Spectroscopy and Applications, held in Limatetetetet, 2009), Tunisia (New Trends in Conducting Materials: From Fundamentals to Applications, held at Sousse, Tunisia, 2010), South Africa (African School on Electronic Structure Method and Applications Applications, held at AIMS in Cape Town, 2010), Cuba (Sixth International Meeting on Photodynamics, held

in Havana, 2010) and Palestine (Palestinian Conference on Modern Trends in Mathematics and Physics II, held at AN-Najah National University in Nablus, 2010). The chair of C13 has put considerable efforts in the establishment of the IUPAP visiting scientists programme. The commission has in the past years forged closer links and co-operation with other IUPAP commissions, largely around activities of common interest, the prime example in this regard is co-operation with C20 in facilitating the launch in 2010 of ASESMA school in Meizenberg, Cape Town, South Africa. The school will now move to other African countries every two years. The next school will be held in Moi University in Kenya. Future potential hosts include Ghana, Senegal and Nigeria. As a result of discussions with Physicists in the equatorial part of the African region, Kenya has now initiated a process to apply for IUPAP membership. Commission C13 is expected to continue implementing its mandate to improve conditions of physics and physicists in developing countries.

14.2 **Commission 14**: Prathiba Jolly presented the report of the activities of Commission 14. The mandate of the commission has been modified from the original one in order to emphasize more on physics, education and research. There has been notable changes in the demographics of the commission, notably the fact that since 2008 commission 14 has had 8 women members in its committee in contrast to none before 2008. The publications of the commission include the Survey on Teaching, A Centernary Volume of Einstein, A Centenary Volume of Neils Bohr and a Collection of articles by all chairs of IUPAP commission. The commission runs an ICPE (International Conference on Physics Eduucation) Biennial Medal. The Young Scientist Prize has thus far proven a challenge for the commission as it is very difficult to identify talent at grassroots. The commission has built linkages with relevant bodies such as ASPEN, LAPEN, EPSEPD, EUPEN and STEPS. Other initiatives of commission 14 include collecting information about physics teacher education degree program at various universities around the world, and increasing participation of school teachers in physics education programs. Teacher education in particular has been extremely close to the thrust of the work of commission 14. In this regard the commission has identified lack of funding as one of the main obstacles prohibiting physics teachers from attending conference events.

15. First Presentation on slates nominations/election and outline of slates for Commissions and Executive Council: IUPAP president Sukaketsu Ushioda read to the General Assembly the slate of the Executive Council nominees together with the individual citations for President designate (Bruce McKellar, Australia), Secretary General (Robert Kirby-Harris, United Kingdom), Associate Secretary General (Rudzani Nemutudi, South Africa), and Vice Presidents at Large (VPALs) Mustansir Barma (India), Marcia Cristina Bernardes Barbosa (Brazil), Alexander Kaminskii (Russia). Katsu also mentioned the names of Francis Allotey (Ghana) and Wenlong Zhan (China) as the two additional proposed Vice Presidents at Large should the proposal be carried by the General Assembly to increase the total number of VPALs from three to five. Katsu emphasised that the reason for introducing the item before voting was to ensure that candidates could have enough time to think about the proposals before voting on Friday 4 November 2011.

16. Outline of Commission Slates: Robert Kirby-Harris explained the background and the exhaustive process followed before constructing the slate. The commission membership slate was compiled after consultation with commissions and national liaison committees. A total of 14 members are allocated per commission. In response to a question whether there has been cases where commissions have suggested names that were not endorsed by national committees, Robert Kirby-Harris explained that council has done its utmost best to respond to peculiar sensitivities and expectations of both commissions and national liaison committees. The president explained that while all comments and proposals from commissions and national liaison offices were taken into account, it remained a challenge to meet all expectations. In instances where countries expectations were radically different from those of commissions, the category of associate membership

remains available an avenue to complement representation by providing a link between commissions. A delegate from South Africa pointed out that the slate showed a lot of glaring empty lines in the Middle East Region, and while this may be understandable at the moment, it is something the IUPAP should look at and address in the future.

General Assembly adjouned

17. **Talk by Professor Rolf Heuer, Director General, CERN:** The Director General of CERN, Professor Rolf Heuer, gave a talk titled Accelerating Science and Innovation, The search of a deeper understanding of our Universe at the Large Hadron Collider, The World's Largest Particle Accelerator. In his introductory remarks, professor Heuer stated that the LHC was nothing else but a Super-Microscope used to study physics laws of first moments after the Big Bang, which makes the facility well suited to increase symbiosis between Particle Physics, Astrophysics and Cosmology. It also serves as a fascinating center to bring young people to natural science. He explained the Standard Model developed over 40 years ago and pointed out that the missing cornerstone of the standard model is to understand the origin of the mass of elementary particles. The LHC seeks to address such questions as the origin of mass/matter, as well as the origin of electroweak symmetry breaking, unification of quantum physics and general relativity, understanding of dark matter and dark energy. In his conclusion, he stated that the LHC will allow for the study of the Higgs mechanism in detail, and as more data is delivered by the LHC, scientists are starting to realize that we are just at the beginning of exploring 95% of the Universe since the discovery of the standard model in the past decades saw the precision studies of 5% of the Universe. The future remains bright in the dark universe, and while there are questions of raising the energy levels to 14 TeV, the current director will only go up to 13 TeV.

End of First day of the General Assembly

18. **United Nations Conference on Sustainable Development (Rio + 20):** Bruce McKellar gave a brief of the United Nations Conference on Sustainable Development (Rio + 20). He has been involved in the preparatory meetings and workshop organized by the Regional Commitee in Asia and the Pacific. The main aspect focussed on is the green economy as a mechanism of sustainable development; and one of the countries heavily involved in this respect is South Korea. There is a lot of resistance from most developed countries when it comes to adopting green economy as a mechanism of sustainable development. When most countries, especially the under-developed, talk about sustainable development, they are in essence talking simply about development. There is a need to develop a single index to decide whether a country is sustainably developed. Bruce McKellar felt that one number is needed as a measure of human development index together with ecological footprint per capita. The one aspect in which physicists could contribute to the (Rio + 20) conference is the area of energy. Sustainable means should be found to increase the use of energy without increasing the carbon footprint. In this respect the efforts of the IUPAP to revitalize the working group on energy are a step in the right direction.

19. Agenda Items from Liaison Committees and Inter-Union Groups:

19.1. **Review of the structure of commissions - Germany:**

The German delegate explained the rationale behind the German proposal to restructure or rename some Commissions and Affiliated Commissions of the IUPAP. Sukaketsu Ushioda read the recommendations formulated by council in response to each of the five itemised proposals submitted by the German Liaison committee. The following is a summary of the German proposal together with the recommendations of the executive council:

19.1.1. It is proposed to rename C4 to “Commission on Astroparticle Physics”

Executive committee recommendation: Chair of C4 should consult with C4 members and the broader community in order to bring a recommendation on the action to be taken on this proposal to the late 2012 Executive Council meeting.

19.1.2. C6: Commission on Biological Physics and AC4: International Organization on Medical Physics (IOMP)

The proposal is to better connect both Commissions. The chair of C6 is a member of AC4 but the chair of AC4 is currently not an official of C6. This should be corrected. Council recognizes the fact that the chair of AC4 is already an associate member of C6, which situation should make for a harmonized linkage between the two commissions.

19.1.3. C10: Commission on the Structure and Dynamics of Condensed Matter

Executive committee recommendation: Chair of C10 should consult C10 members and the broader community in order to bring a recommendation on the action to be taken with this proposal to the late 2012 Executive Council meeting.

19.1.4. C17: Commission on Quantum Electronics

The on-going efforts to align C17 with the research topics of modern optics and photonics are strongly supported. Possible new names to be considered for C17 include “laser Physics and Photonics”, “Quantum Optics and Photonics”, or “Optics and Photonics”.

19.1.5. AC2: International Commission on General Relativity and Gravitation: It is proposed that AC2 should be elevated to an official IUPAP Commission

Executive committee recommendation: The chair of AC2 should be invited to respond to the proposal regarding (AC2) becoming a Commission of IUPAP.

19.1.6. The overall recommendation of council: With the exception of the C17 proposal, all other issues raised in the proposal by the German Liaison committee should be referred to relevant commissions.

19.1.7. The General Assembly was further requested to delegate the power to the executive council to approve the change of names of commissions or affiliated commissions that might arise from the recommendations of the mandated commissions or working groups. After a debate on the principle of broadening the power of council in between General Assemblies, it was agreed that the idea should not be put to the current General Assembly as a proposal because it needs to be well and properly thought out. It was recommended that this should be tabled as a proper proposal in the next General Assembly.

19.2. **2013 International Year of Crystallography :**

The International Union of Crystalography (IUCr) submitted to the 27th IUPAP General Assembly a proposal requesting IUPAP to endorse the IUCr resolution to have 2013 declared the International Year of Crystallography. It was agreed that celebrating the centennial publication of the ground-breaking 1913 experiments by W.L. Bragg and W.H. Laue that led to the birth of modern crystallography is a befitting initiative as it stimulates scientific activity. The proposal to declare 2013 the International Year of Crystallography (IYCr2013) was accordingly endorsed and carried by the 27th IUPAP General Assembly.

19.3. **Inclusion of "sexual orientation" and "gender identity" to the statement on the Universality of Science: USA**

Robert Kirby Harris informed the General Assembly that currently the IUPAP documents and website refer to the ICSU Statement on Freedom in the Conduct of Science or ICSU resolutions on Free Circulation of Scientists. Since these statements are long and complicated, IUPAP Council had decided that it was important that IUPAP has its own Statement on the Universality of Science. Whereas the IUPAP statement is informed by the previous ICSU Statements, it however reflects the beliefs and needs of the IUPAP community. Accordingly, the IUPAP Statement on the Universality of Science will be amended to include sexual orientation, gender identity and disability in line with what appears on the ICSU's policy on the Universality of Science. Alan Astbury suggested that words that appeared in "red" on the draft update should be put in alphabetical order.

19.4. **To reconstitute the IUPAP Working Group on Energy – USA:**

Samuel Bader explained the context of the proposal to reconstitute the IUPAP Working Group on Energy. He stated that the motivation and the spirit behind the proposal was not to create the mission for the working group but rather to assemble a group of experts in the field who will be empowered to formulate the mission and scope of the working group and to present such formulation to the IUPAP executive council within a period of 18 months from the date of the appointment of its members. The need to revitalize the working group on energy came in part out of the realization that the world is undergoing an energy transition from fossil to alternative, environmentally friendly and sustainable sources of energy, locating energy issues at the centre of the on-going international scientific dialogue and research that should benefit from forums such as can be nurtured by the IUPAP. During the debate, it was also recommended from the floor that in revitalizing the working group on energy, note should also be taken of the existence of the IAEA Committee on Energy, which committee has the requisite international outfit. Combining efforts or comparing notes with such committee could only benefit IUPAP. The proposal was supported as revitalizing the working group on energy could also pave the way for IUPAP to join forces with ICSU in tackling broad issues concerning energy, climate change and similar initiatives. Sam Bader was mandated to collate names of individuals who should constitute the revitalized Working Group on Energy. A delegate from South Africa suggested that the revitalized working group should also include representatives from countries that are "sustainably underdeveloped".

19.5. **Gender Champion for IUPAP commissions – UK**

The position of Gender Champion was proposed in order to strengthen the links between IUPAP Commissions and the Working Group on Women in Physics, and to embed gender awareness within the activities of the Commissions. The core responsibilities of the gender champion will amongst others include collecting information on the representation of women in all activities organised by the commissions to assist in the tracking of participation of women in IUPAP activities. Marcia Barbosa was proposed and endorsed by the C&CC meeting as the suitable candidate for the IUPAP gender champion. A delegate from South Africa suggested that the role of the gender champion should be a specific role of one of the VPALs even after Marcia Barbosa's term.

19.6. **Links with IAPS (International Association of Physics Students) - UK**

Robert Kirby-Harris gave a background of the proposal to encourage cooperation between the IUPAP and the International Association of Physics Students (IAPS), a body of physics students currently most active in the United Kingdom but whose central aim is to encourage and facilitate interaction amongst physics students from different

countries. Robert Kirby- Harris further pointed out that it was important for the IUPAP to do more than just endorse the proposal of the IAPS, but rather to become pro-active in promoting cooperation with other relevant bodies. To that end the IUPAP could start by encouraging its national member states and their liaison offices to lend their support to initiatives of the type proposed by the IAPS.

19.7. **From IU Group: Formal acceptance of the names and symbols:**

The Joint IUPAC – IUPAP Working Party on the Discovery of Elements of atomic number greater than 111 submitted an inter-Union Group report (I.U.19), which report recommends that the names of three elements whose synthesis has been confirmed by both the current and the previous Joint Working Party (JWP) be formally accepted by the 27th IUPAP General Assembly. The JWC report also noted that the claims for elements 113, 115 and 118 were deemed to be insufficiently certain. The three elements whose synthesis has been sufficiently confirmed, and thus recommended for formal acceptance, are element 110 named darmstadtium, symbol Ds, element 111 named roentgenium, symbol Rg and element 112, named copernicium, symbol Cn. A delegate asked if there would be a press release considering the fact that this is such a historic decision, to which question Robert Kirby-Harris and Beth Taylor responded that something will be put on the website to inform the scientific community. The (IUPAP) General Assembly also noted that the report of the Joint Working Party has also been presented to and accepted by the IUPAC.

20. Presentation of slates; nominations/election and outline of slates for Commissions and Executive Council:

20.1. Sukaketsu Ushioda displayed the slide outlining the slate of the executive council nominations. He invited objections, and no objections were raised against the council slate. Commission slates were displayed, with each delegate having received a hard copy circulated by Williamina. Sukaketsu Ushioda re-emphasized the two dimensional matrix jig-saw on the commission slate, and went on to point out that there was an invisible third dimension on the jig-saw, which is that of geographical representation.

20.2. Ushioda also indicated that in future, the jig-saw puzzle to balance the commission slate should be tackled much earlier as it is not a trivial task. Each national liaison committee should notify council in the event of a change of guard in terms of people responsible for IUPAP affairs in member states. Liaison committees of adhering bodies should communicate before nominations are sent in order to facilitate the balancing of the commission slate.

20.3. A delegate from the floor remarked that barring the challenges it faced, the IUPAP council had done a remarkable job in ensuring a certain level of representation by candidates from developing countries.

20.4. Malcom McCallum suggested that a central IUPAP E_Mail could be set up and national liaison committees and/or adhering bodies should be encouraged to submit more nominees than they have IUPAP shares in order to make the job of president and secretary easier when balancing the commission slate.

20.5. Marcia Barbosa remarked that when names are suggested for commission officers, it should also be done in consultation with the relevant commission chairs. She emphasized that women should always watch out that there is fair and sufficient representation of women on the lists.

21. Physics in UK Lecture Programme

21.1. A total of six scientific lectures were presented by eminent scientists as part of the UK Lecture programme to highlight selected physics research programs and activities in the United Kingdom.

21.2. Professor Ernie Hill from the University of Manchester presented a talk titled " Graphene: From faster computers to stronger aircraft wings – will it leave up to expectations?" In his talk, he discussed the mechanical techniques used to peel sheets of graphene from the bulk of graphite. He highlighted the peculiar characteristic of graphene, *viz* the thinnest imaginable material, the strongest material ever measured, the most stretchable crystal, the highest current density at room temperature, the highest instrinsic mobility, and the longest mean free path at room temperature as the main basis of interest in the application of graphene in micro and nano-electronics. He showed images of clear half-integer Quantum Hall Effect observed on devices fabricated on sheets of graphene from experimental results obtained at Manchester University and published in Nature. He concluded his talk citing the use in touch screens and Liquid Crystal Displays (LCDs), chemical sensing and strengthening of composite materials as some of the potential applications of graphene.

21.3. Professor Sir Richard Friend from the Cavendish Laboratory, University of Cambridge gave a presentation on Organic Plastic Electronics, where basic Physics ends, and industry picks up. In his talk he pointed out that energetically it is always easier to dope low energy gap semiconductors, but also emphasised that no semiconductor technology evolves overnight. He stated that the first group III-V semiconductors lasted only for a short time, and it took a very long time to clean them up in a well-controlled clean-room engineering environment. He highlighted the challenges of bringing the costs of solar cells down to affordable levels.

21.4. Professor Helen Gleason from the University of Manchester gave a talk titled "Remarkable Structures in Liquid Crystals". Her presentation focussed on liquid crystal devices and micro-sized laser droplets. She explained how nematic liquid crystals exhibit orientational order. She stated in her conclusion that the Liquid Crystal Display (LCD) is a mature technology but challenges still exist for new application in electro-optics.

21.5. Professor Chris Dainty from the University of Ireland gave a presentation titled "Simple Physics for Better Vision" which focussed on the abberated eye, adaptive optics and supervision, the lens replacement in cataract surgery, the modelling of the eye, and the future of improved vision. He stated in his talk that cataract surgery was the most frequently performed surgical procedure, accounting for almost 14 million operations per year. He predicted in his conclusion that the future for improved cataract surgery will include personalized eye modelling, customised intra-ocular lenses and optically perfect imaging.

21.6. Professor David Payne, the director of the Opto-electronics Research Center (ORC) from the University of Southhampton gave a presentation on wireless and optical fibres and how the growing capacity of optical fibres have stimulated the digital revolution by offering tremendous band-width possibilities such as the 40 Gbits/s Wavelength Division Multiplexing (WDM) system. He cited as some of the global challenges the fact that we are rapidly exhausting the available bandwidth of existing fibre technology as the bandwidth demand keeps growing at a rate of almost 40% per year.

21.7. Professor John Pendry of Imperial College gave a presentation on Invisible Cloaks and a Perfect Lens. He discussed the concept of refraction of light according to Snell's Law. Describing light as a dance between electric and magnetic field, he discussed the general theory of relativity and explained how the path of light is bent by gravity. He gave

a comperative analysis of conventional materials in contrast to meta-materials whose properties are derived not from individual atoms but rather from properties of larger artificial constituents units called meta-atoms. From metal materials, split ring structures could be respond to magnetic fields even though they themselves are non-magnetic. Meta-materials that are accordingly tailored can be manipulated to bend light by exactly the right amount through the grading of the index of refraction.

22. Banquet at the Royal Society: Delegates of the General Assembly were treated to an evening of sumptuous banquet hosted by Lorna Casselton, the Royal Society Foreign Secretary

23. Voting on all Resolutions: Robert Kirby-Harris explained the voting procedures:

23.1. **Resolution 1:** To increase membership dues by 3% each year, for the years 2012, 2013 and 2014 and to introduce a regular annual inflationary increase from then on based on an international inflation indicator:

Resolution 1 was carried, with Singapore abstaining.

23.2. **Resolution 2:** The IUPAP Statutes should be revised to permit a further two Vice Presidents at Large to be elected so that there are a total of five Vice Presidents at Large within the council.

Resolution 2 carried, with the chair of Commission 15 abstaining

23.3. **Resolution 3:** To amend the By-Law IIB on terms of office:

23.3.1. All elections are for a term of three years.

23.3.2. Chairs may not be re-elected to any position on the Commission beyond their term as Chair, and Vice Chairs/Secretaries may not be re-elected to the same positions nor be re-elected as an ordinary member - except in extraordinary circumstances, and, in such circumstances, special approval by the General Assembly is required. Ordinary members may be elected twice.

23.3.3. Normally the Secretary, Vice-Chair and Chair are to be chosen from among those who have served at least one term on the Commission.

23.3.4. Service in all capacities shall not exceed three terms.

23.3.5. The General Assembly may grant exceptions for those Commissions that undertake long-term projects or where continuity is particularly important

Resolution 3 carried unanimously.

23.4. **Resolution 4:** IUPAP endorses the global project to work through UNESCO to request a United Nations proclamation of an International Year of Light in 2015:

Resolution 4 carried unanimously.

23.5. **Resolution 5:** That the General Assembly approves the Executive Council's recommendations on the review of the structure of commissions and agrees to delegate powers to the Executive Council to approve changes of commission names and mandates that arise from working groups on this review.

Resolution 5 carried unanimously, see section 19.1 for full recommendations:

23.6. **Resolution 6:** The IUPAP fully endorses the proposal to establish an International Year of Crystallography in 2013.

Resolution 6 carried unanimously.

23.7. **Resolution 7:** The IUPAP endorses the revision to the IUPAP statement on the Universality of Science to include opposition to discrimination on the grounds of disability, gender identity, sex or sexual orientation.

Resolution 7 carried unanimously.

23.8. **Resolution 8:** The General Assembly notes with approval the decision taken by the Executive Council to re-establish the Working Group on Energy.

Resolution 8 carried unanimously.

23.9. **Resolution 9:** That IUPAP will appoint a gender champion from the Executive Council. A Vice President will act as gender champion. The chair, or other representative, of the Women in Physics Group is requested to liaise with the Gender Champion.

Resolution 9 carried unanimously

23.10. **Resolution 10:** IUPAP resolves to support the International Association of Physics Students.

Resolution 10 carried unanimously

23.11. **Resolution 11:** The IUPAP General Assembly formally accepts the following names and symbols: Element 110 darmstadtium, symbol Ds, Element 111 roentgenium, symbol Rg, Element 112 copernicium, symbol Cn.

Resolution 11 carried unanimously.

23.12. **Resolution 12:** IUPAP will adopt the resolution on women in physics from the 4th International Conference on Women in Physics

Resolution 12 carried unanimously.

23.13. **Resolution 13:** IUPAP strongly endorses the principles and practices of peer review and recognises that peer review is an essential part of the scientific endeavour.

Resolution 13 carried unanimously.

23.14. **Resolution14:** That the resolution continuing IUPAP's support for SESAME be adopted
Resolution 14 carried (with the removal of the word modest from the original proposal: *Revised wording:* IUPAP commits, within its own resource limits, to provide financial support to SESAMME). Korea (4 votes) abstained on the adoption of Resolution 14.

23.15. **Resolution 15: Election of Commission Members and Officers:** Sukekatsu Ushioda moved that the slates for the Commissions be approved.
Resolution 15 carried unanimously.

23.16. **Resolution 16: Election of Executive Council Officers:** Sukekatsu Ushioda moved that the slate for the Executive Council members be approved.
Resolution 16 carried unanimously.

24. **Introduction of the new president designate:** Sukekatsu Ushioda introduced the new IUPAP president designate, Bruce McKellar from the School of Physics, University of Melbourne, Australia.

25. **Introduction of new President:** Sukekatsu Ushioda introduced the new IUPAP president, Cecilia Jarlskog from the Division of Mathematical Physics, LTH, Lund University, Sweden. Amongst her other achievements, Katsu mentioned that Cecilia Jarlskog has served as a member of the board of trustees for the Nobel Prize Committee, is a member of the Swedish Academy of Science, an honorary professor at three Chinese Universities, holds honorary degree from the University of Dublin, and has been instrumental in the formation of the IUPAP Women in Physics Working Group. Cecilia in turn gave a presentation in which she paid tribute to Katsu and all other past IUPAP presidents, stating that having been in existence since 1922, the IUPAP should be proud of its long history whose list of presidents include scientific giants such as W.H. Bragg and R.A. Millikan. She stressed that one of the major issues confronting bodies such as the IUPAP today is the issue of Free Circulation of Scientists which has also been highlighted at this and the previous General Assemblies. She concluded her presentation appealing to delegates to ensure that world collaboration networks get bigger and more conclusive, urging members of commissions, working groups and liaison committees to come up with new ideas and initiatives to promote physics. During her tenure, one of the things she would like to see happening is more collaboration with ICSU, and more activities on energy.

26. **Final Remarks:** The outgoing president, Sukekatsu Ushioda thanked all commission chairs and executive council officers as well as the IOP in London for all the assistance he received during his tenure as IUPAP president. He once again thanked Alan Astbury for the invaluable assistance and guidance he provided within the council in his role as past president.

General Assembly concluded

Minutes Prepared by Rudzani Nemutudi (IUPAP Associate Secretary General)