International Union of Pure and Applied Physics
26th General Assembly
Tsukuba, Japan, 15-17 October 2008

1. Welcome

IUPAP President welcomed everyone to the General Assembly and congratulated Japan on the recent Nobel prizes in physics awarded to Japanese physicists. The first General Assembly held in Japan was in 1993 when Yamaguchi became president. At this General Assembly Sukekatsu Ushioda will become President.

2. Official Japanese Welcome

The official Japanese welcome was first by R. Kimura, Vice-President of NIMS (National Institute of Materials Science), which hosted the General Assembly, on behalf of the President Teruo Kishi, and secondly by I Kanazawa, President of the Science Council of Japan, which reports directly to the Minister.

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

Alan Astbury asked for a few moments silence in honour of past IUPAP president who had died recently: Allan Bromley, President 1984-87, who died in February 2005, Kai Siegbahn, President 1981-1984, who died in July 2007, and Yurii Ossipyan, President 1990-1993, who died in September 2008.

He then asked for adoption of the agenda and approval of the minutes of the 25th General Assembly in Cape Town. These were accepted.

4. Presidential address

Alan Astbury continued: Following the General Assembly in Cape Town in 2005 IUPAP held the World Conference on Physics and Sustainable Development in Durban. This had four themes and the IUPAP has continued the theme of trying to help physics in developing countries.

The Council and Commission Chairs meetings in London in February 2006 looked at how to bring more developing countries into IUPAP membership. This was developed further at the meeting in Prague in October 2006, where the Young Scientist Prize was agreed and work with UNESCO to promote basic research were initiated. At the 2007 meeting in Rio de Janeiro the means for encouraging developing countries into membership were agreed. Also agreement was made to produce statements on hands-on physics and the universality of science/freedom of movement.

The Young Scientist Prize consists of a medal in bronze and an award of initially $1,000, which was just raised to 1000 Euro. It is awarded by Commissions to young scientist within eight years of having completed their PhD (career gaps permitted). They are being awarded at the rate of 11 or 12 a year. Of the 27 to receive the prize, three are women.

Developing countries are now offered reduced rates initially on joining IUPAP and they are permitted to bid to host IUPAP sponsored workshops in their countries. These initiatives have proved successful and a number of countries have become members.

There is a joint IUPAC/IUPAP working group on new elements, mainly heavy ion fusions. A slate of physicists and chemists has now been agreed from which five people will be picked to form working groups to look at new elements. IUPAP has a number of other working groups. Their reports were at the back of the papers for the General Assembly and are posted on the IUPAP website.

5. Financial report

a. Financial report
Judy Franz reported that IUPAP is in good financial state with reserves of about $1 million. Having the income in Euros and the expenditure in dollars has been an advantage. It is possible to operate on a deficit budget, as in 2007, as the reserves are slightly larger than they need be. Expenditure in 2009 is likely to be about $600k

b. Proposed dues
Judy Franz said that as a result of this there was no need to increase the dues, thus dues will have remained constant for 9 years. There may be a need for an increase at the next General Assembly in 2011. She moved that there be no dues.
This was carried.

c. Increases in Members' shares
Judy Franz reported that India had raised its shares from 4 to 8, Korea from 3 to 7, Spain from 4 to 8 and moved that these increases be approved.
Motion carried.

6. Secretary General's report

a. IUPAP affairs
Judy Franz reported that both Cuba and Latvia were four years arrears in their dues and lost their vote.

b. Member affairs
Judy Franz reported that 11 new Members had joined IUPAP since the last General Assembly: Algeria, Cameroon, Columbia, Costa Rica, Ethiopia, Greece, Mongolia, Philippines, Peru, Romania and Singapore. This brings the total number of members to 59. She wished those present to encourage others to join. IUPAP wants the members to be active but there can be problems if the adhering body is remote from physics, which may happen if it is the Academy.

7. Proposal to increase the size of the commissions

Alan Astbury explained that because of the increase in Members, in particular Members from developing countries and the increase in shares, an increase in the size of the commissions from 13 to 14 was needed to achieve reasonable representation. He moved that this be done.
The motion was carried.

8. First presentation of slates for elections and discussion of procedures

Alan Astbury and Judy Franz presented the slates for elections to the commissions and explained that there would be a chance to make renominations later. Voting would be on Friday. A few minor modifications were made, mainly in correction of spelling or clarification of first and family names and with one correction of a country nomination.

9. Statement on the Universality of Science

This was introduced by Pavel Exner and Annick Suzor-Weiner. (This and other resolutions appear on the IUPAP website). Concern was expressed by a US delegate that this might mean that IUPAP conferences could not be held in the US. Judy Franz explained that five years ago IUPAP, along with others, went to the US government and the situation did improve but that it appears that the situation has deteriorated in the last two years. Alan Astbury said that some people are being deterred from going to conferences because they fear they won't get a visa. It was important to have a strong statement. Roger Elliott said that it was important to co-ordinate this with ICSU, which has a major revision of its statement in progress. Alan Astbury explained that voting on this and the other resolutions would take place on Friday.

10. Resolution on on the Importance of Active Learning and Hands on Science

This was introduced by Pratibha Jolly, stressing the importance of experiments in physics education rather than just relying on theory and computer simulations. Annick Suzor-Weiner added that it was important that IUPAP tells this to education ministers in developing countries in particular. Various delegates also mentioned the need for mathematics.

11. Communications Working Group report

(Reports from working groups are available on the IUPAP web site.) This was presented by Roger Elliott, who stressed amongst other points: open access cannot be free and a proper business model is required; more consideration is needed on methods of working by young physicists such as closed websites; author identification (similar names. names being given slightly differently, different transliterations); early work on ethics needs re-emphasising. Gregor Herten said IUPAP should give recommendations to publishers on allowing authors to put papers on open-access sites. Pavel Exner noted that the ERC recommends open access but that the big publishers are a formidable force. He also reported that he American Mathematical Society was working on author identification.

12. Working Group on International Cooperation in Nuclear Physics (ICNP) report

Tony Thomas reported. This is the most recent of the working groups and includes directors of major facilities. It has written a book *The Global Nuclear Physics Exercise*, which will be updated every three years. It makes input into the OECD Global Science Forum. Big facilities are getting very expensive and this is an opportunity to bring funding agencies and nuclear physicists together.

13. Working Group on Women in Physics report

Barbara Sandow reported. Women in physics sessions were now being included in IUPAP conferences, there were now 16 women in physics groups in different countries plus a number of regional groups. The working group had held its third conference the previous week in Seoul, with 283 delegates from 57 countries. She introduced the five part resolution from the conference. Vera Luth (USA) noted that parts 2 and 3 of the resolution referred to

both men and women. Jocelyn Bell-Burnell (UK) observed that when organizations are well managed both men and women benefit but women benefit more. In response to a question on regarding facilities for women at conferences Barbara Sandow replied that she thought that it was better not to bring children. Others thought that such facilities could be advantageous but they should be targeted at both men and women.

14. Working Group on Particle and Nuclear Astrophysics and Gravitation (PaNAGIC) report

David Sinclair reported on the need for international cooperation and coordination in the field. It includes the Gravitational Wave International Committee. The OECD Global Science Forum has called for a roadmap in this area and has also asked PaNAGIC for a definition of astroparticle physics and its relationship to other parts of physics.

15. Call for renominations for IUPAP Commissions

Alan Astbury introduced the slate for the Executive Council. He proposed Cecilia Jarlskog from Sweden (a mathematical physicist well known for her work on the Nobel prize committee) as the President-Designate. She would be IUPAP's first woman President. Alan Astbury explained that the Secretariat will be moving from the American Physical Society (APS) to the Institute of Physics (IOP). It was thus proposed that Robert Kirby-Harris, Chief Executive of IOP become the Secretary General. Rudzani Nemutudi from South Africa was proposed as Associate Secretary General, bringing African representation to the Council. He proposed on behalf of the IUPAP Council Aleksandr Kaminskii (Russia), Marcia Barbosa (Brazil) and Mustansir Barma (India) as Vice-Presidents at Large to balance the geographical spread and proposed that that of the Chairs of Commissions Henri Orland (France), Klaus von Klitzing (Germany), Sadamichi Maedawa (Japan), Samuel Bader (USA) and Patricia McBride (USA) should also serve Vice-Presidents.

He invited renominations for Commissions. A proposal from China, Taipai was made regarding C3, but this was later withdrawn, China, Taipai saying they proposed increasing their shares in IUPAP to get greater representation on Commissions in 2011.

16. International Council for Science (ICSU) report

Roger Elliott reported that at present there were three main themes: international research collaboration, universality of science, science policy. Regional offices had been set up for Africa (in South Africa), Latin America (Brazil) and Asia-Pacific (Malaysia). Efforts to set up an office for the Arab world have failed so far. Interdisciplinary projects are considered particularly important. Unions are the key components of ICSU although no longer appear in the name.

17. Panel discussion on doing physics in developing countries

There were short presentations by Guy de Teramond (Costa Rica), Gizaw Mengitsu (Ethiopia), Benjamin Chan (Philippines) and Raouf Bennaceur (Tunisia) followed by questions and answers. Important points included the following:

- There are problems for physicists who remain in Costa Rica, these are even more daunting for those who return. Communication is vital, with access to papers and internet archives. Continued links with centres where they did their PhD is important. The web greatly changes what can be done.
- Best practice in higher education is not possible in Ethiopia. There are 22 universities, mainly new, but there is a lack of good academic leadership. Salaries for research are very low and people need a second and sometimes a third job.
- Applied courses were popular in the Philippines as people understood what they meant and sent their children (parental guidance is still very strong). A major problem was the

lack of physics-trained teachers in schools and efforts are being made to try to resolve this.
- In Tunisia there are problems in education research, technology R&D management and finance. A significant problem is the lack of industry. There are successful collaborations with Japan, including the establishment of technology parks. The alliance is based in Tsukuba.
- Topics important in developing countries include physics and energy, physics and funding, a focus on agriculture, physics education, communication.
- A delegation from the Royal Society to Ghana managed to convince the government to support physics and the situation has improved greatly. Similar missions elsewhere may be helpful, although governments need to understand that the return from basic research is very long term.

18. Working Group on International Future Accelerators

Albrecht Wagner reported on ICFA. There is now a concentration on very few, very large accelerators unlike the situation ten years ago. The design of the International Linear Collider (ILC) is being overseen jointly by ICFA and FALC (a grouping of funding agencies). This global collaboration with FALC is essential. When there is an international consensus on neutrino facilities, ICFA may take this up too. ICFA has been involved in the SCOPE^3 open-access initiative.

19. 'The Pierre Auger Cosmic Ray Observatory – A New Window to the Cosmos'

Paul Mantsch gave a presentation on this detector which covers 3000 km^2 in the Mendoza Province in western Argentina and detects cosmic rays with energies in excess of 10^{19} eV.

20. 'The HESS experiment: organization in Namibia and scientific results'

Heinz Voelk gave a presentation. The High Energy Stereoscopic System (HESS) is a system of imaging atmospheric telescopes located on a site with a very clean, dry, dark atmosphere ~100 km from the University of Namibia.

21. 'SESAME – A Third Generation Synchrotron Light Source in the Middle East'

Zehra Sayers gave a presentation on SESAME (Synchrotron-light for Experimental Science and Applications in the Middle East), a third generation light source under construction in Jordan. This originally involved the transfer of BESSY 1 from Germany, but it is to be a third generation machine with a new ring, but using the booster and injector from Germany. The aims are to be a world-class synchrotron and to provide training, It brings together and contributes to improved understanding for people from different backgrounds.

22. 'Overview of the proposed redefinitions of SI units'

Peter Mohr explained the changes in definitions of SI units to link them to fundamental; constants. The metre was redefined in 1983 in terms of the speed of light. The main problem is the kg. The standard kg and its six copies in Paris are unstable and are drifting apart. The proposal is that this should be defined in terms of the Planck constant when there is sufficient agreement among experiments. There is a resolution on this topic prepared by IUPAP C2 SUNAMCO together with an essential background description. In response to question as to why a resolution was needed now, Judy Franz explained that the General Assembly met only once every three years and a resolution was needed now, dependent on satisfactory experiments, if IUPAP is to make an input on the decision.

23. Working Group on Ultra-High Intensity Lasers (ICUIL) report
Gerard Mourou gave a report on developments in this field. Developments are in two directions: laser fusion at GW for nanoseconds and TW – EW femtoseconds. The fast ignition project combines the two. This gives the scope from moving from relativistic optics to ultrarelativistic optics and nonlinear quantum electronics.

24. Resolutions from Liaison Committees
Amy Flatten introduced the resolution from the US Liaison Committee, also supported by UK, Norway and Cyprus that IUPAP strongly endorse SESAME.
Session on Physics in Japan
Presentations were given as follows:

- 'Introduction'
  S. Nagamiya, Director, JPARC Center, KEK and JAEEA
- 'High Energy Physics in Japan – Present and Future'
  A. Suzuki, Director General;, KEK, High Energy Accelerator Research Organization
- 'Highlights of Condensed Matter Science'
  H. Fukuyama, Professor, Science, University of Tokyo
- 'Recent Topics in Materials and Nanotechnology in Japan'
  M. Aono, Director General, National Institute for Materials Science
- 'A Quarter Century of Quantum Dots: From Science to Practical Implementation'
  Y. Arakawa, Professor, University of Tokyo
- 'Frontier of Japanese Observational Astronomy'
  N. Kaifu, Professor, Open University of Japan

25. 'Mechanisms of earth's climate change and the role of human activities
This was given by Teruyuki Nakjima.

26. Memorandum of understanding with UNESCO
Alan Astbury introduced the memorandum (attached). The first draft would have put IUPAP under UNESCO and severely limited what it could do and the programme would be directed towards Africa. The memorandum as now presented will now help basic science in UNESCO and will also help IUPAP. It has been discussed with UNESCO, which seems happy to sign. He moved that IUPAP sign the memorandum.
Motion carried.

27. Election of commissions and officers
Alan Astbury explained that voting on these would be by weighted votes. He moved that the slates for the Commissions be approved.
Carried unanimously.

He moved that the slate for the Executive Council be approved.
Carried unanimously.

28. Votes on all resolutions
Alan Astbury explained that voting would be by show of hands. He moved that each resolution in turn be adopted:

- Universality of Science
  Carried unanimously.
- Importance of Active Learning and Hands-on Physics Education
  Carried unanimously.
- Endorsement of SESAME
  Carried unanimously.
- Proposed Redefinition of the SI Units
  Carried with 1 against and 8 abstentions.
- Women in Physics five-part Resolution
  Carried unanimously.

29. Reports from C13 and C14

Annick Suzor-Weiner explained that physics for development was really physics in developing countries. The aim of the Commission was bridging the gap and achieving better connections. C13 had helped define the new rules for attracting members from developing countries and had helped to encourage developing countries to join. C13 had also strengthened links with ICTP, UNESCO, CERN, IAEA, TWAS, APS, EPS, IOP. Concerted action was need on low-cost, high level instrumentation; support of networks such as LAM (Laser, atoms and molecules) and Centres such as AIMS (African Institute for Mathematical Sciences), support for the new type D conferences – workshops in developing countries. Conferences had been sponsored in developing countries in Africa and elsewhere. Of the challenges, major ones were preventing brain drain and improving communication. A suggestion had come from David Mukamel for sponsorship of physicists from developed countries to spend relatively long periods of time in developing countries.

Pratibha Jolly said that C14 was looking for information from people on best practice in physics education. Two volumes of 'Connecting Research in Physics Education with Teacher Education' had now been published along with two volumes of 'Physics Now'. In addition to the ICPE conferences there was the ICPE Medal, and the Young Scientist Prize for Physics Education had just been approved. C14 has a number of working groups looking at different aspects of physics education.

30. New business

A delegate from China, Taipei asked if reports from physical societies could be included. Judy Franz replied that this would not be appropriate, but if a Member has undertaken studies the results of which are suitable for wider distribution, these could be placed on the IUPAP website.

In response to a question regarding IUPAP influence with local funding agencies. Alan Astbury suggested that if one visits a developing country one should try to influence.

Introduction of the President Designate

Alan Astbury apologised that Cecilia Jarlskog could not be present. It was not until late that he was able to invite her, by which time she had conflicting engagements. It was agreed that Judy Franz should write to notify her and send best wishes from the General Assembly.

Some words from new President

Sukekatsu Ushioda noted that since its foundation IUPAP had grown from 13 to 59 Members. He picked on three themes: physics as the most basic of basic sciences; the need to be alert to climate change, energy and the environment; special interest in SESAME encouraging political enemies to work together.

Final Remarks

Alan Astbury wished Suketsu Ushioda good luck and thanked, those on Commissions, Commission Chairs, members of the Executive Council and Jackie Beamon-Kiene for her administrative work. Sukekatsu Ushioda thanked all those involved in the organization of the General Assembly. Alan Astbury gave particular thanks to Judy Franz, who was now retiring as Secretary General. Judy got a standing ovation.