

C2 *Proposal of a possible IUPAP Workshop*

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From Cold Atoms to Astrophysics (and back)

Quantum mechanics, atomic physics and astrophysics have a long common history. The observation of discrete absorption lines of atomic vapors has been crucial for the development of the Bohr model with fundamental contributions to the development of the quantum mechanics. When the astrophysical community went beyond the mere detection of light intensities and used spectral information of detected light, a new window opened to the understanding of the constitution, formation and evolution of stars, planets and other astrophysical objects. Even quantum optics has entered the field of astrophysics, with the intensity correlation experiments on performed by Hanbury-Brown and Twiss in the 50s, even though optical interferometry, as pioneered by A. Labeyrie and now implemented on the VLTI, has been taken over to increase the angular resolution of astrophysical objects. The idea to have a workshop that can cover the following topics:

- i) Interference corrections
- ii) Levy flights
- iii) Polarimetry
- iv) Random lasing
- v) Optical Forces

Beyond the scattering properties of light in astrophysics, the mechanical feedback of light onto the atomic motion needs to be considered. In astrophysics, it has been known for a long time that equilibrium properties of self-gravitating systems are rather special: negative specific heat, canonical (fixed temperature) and microcanonical (fixed energy) ensembles are not equivalent. These anomalous features of long range interacting systems have been fully appreciated by other physicists' communities only later. When long range forces are considered, local properties of the particles in the cloud depend on all particles and thus on the total size of the system. Understanding the self-organizing behavior or the thermodynamics and out-of-equilibrium dynamics of long-range interacting systems is still a challenging objective. This is for instance the situation of gravity in 3 dimensions and leads to the so-called Jeans instability, responsible for the formation of large scale structures such as galaxies. In recent years it has been shown that statistical physics of long-range interacting systems generally exhibit a whole set of new qualitative properties and behaviors: temperature jumps, long-time relaxation (quasi-stationary states), violations of ergodicity, etc. These long range interactions are also well known in plasma physics, where the Vlasov equations and derivations of this are used to study collective dynamical effects. One can therefore use one components plasmas or trapped ions to study such collective effects with long range interactions.

Possible Experts (outside the cold atom community)

- (i) Intensity correlation : D. Dravins
- (ii) polarimetry of light scattered by hot atomic vapours : J. Stenflo
- (iii) random lasers : H. Cao, D. Stone
- (iv) Scattering : Robin Kaiser

Commission C4 – Astroparticle Physics

Report on the period Oct-2104 - April 2015

1. Membership

Newly Elected Members:

<i>Name</i>	<i>Country</i>	<i>Research field</i>	<i>remark</i>
Karl-Heinz Kampert	Germany	HE-CRs, EAS	Chair 2008,11,14
Sunil K. Gupta	India	HE-CRS, EAS, gamma-astr	Vice-chair, 2011, 2014
Adri Burger	South Africa	CR transport & modul., heliospheric phys.	Secretary 2011,2014
Jörg Hörandel	Netherlands	direct and HE CRs, EAS, gamma-astr.	2011,2014
Masaki Mori	Japan	Gamma-astr.	2011,2014
Michal Ostrowski	Poland	CR-Theory, gamma-astr.	2011,2014
Eun-Suk Seo	USA	Heliospheric Physics, direct CRs	2011,2014
Pierre Binetruy	France	Cosmology, gravitation, dark energy	2014
Pasquale Blasi	Italy	CR-Theory	2014
Zhen Cao	China	Gamma-Astronomy, CRs	2014
Joakim Edsjö	Sweden	indirect searches for dark matter	2014
Michael Kachelriess	Norway	CR-Theory	2014
Ryan Nichol	UK	UHE neutrinos	2014
Mikhail Panasyuk	Russia	CRs, EAS	2014

By email exchange and during its first teleconferences held on Febr. 9, and 19., and March 26, 2015, the newly formed commission discussed candidates for inter-union and associate membership. The commission herewith proposes the following candidates:

Inter-Union Members:

<i>Name</i>	<i>Country</i>	<i>Research field</i>	<i>Union</i>
Elisabete de Gouveia Dal Pino	Brazil	Gamma-astronomy	IAU
Mark Lester	UK	Heliospheric physics	SCOSTEP

Associate Members:

<i>Name</i>	<i>Country</i>	<i>Research field</i>	<i>Previous membership</i>
Steve Barwick	USA	neutrino astronomy	2011-2014
Ilya Usoskin	Finland	Heliospheric physics	-
Albert de Roeck	Belgium	Particle physics	-
Laura Baudis	Switzerland	Dark Matter searches	-

Rational: The commission wants to strengthen the links to astronomy (→ E. Dal Pino) and particle physics (→ A. de Roeck) as well as to SCOSTEP (→ M. Lester) and felt somewhat underrepresented in heliospheric physics (→ I. Usoskin), neutrino astronomy (→ S. Barwick), and in direct dark matter searches (→ L. Baudis). All candidates enjoy a large international visibility and perform strong research programs. They are all strongly supported by C4 and would be willing to serve in case of approval by IUPAP.

C4 asks for approval of these candidates.

2. C4 Name Change:

The international scientific community largely welcomed the recent C4 name change from “Cosmic Rays” to “Astroparticle Physics”. However, a small group of people, mostly from heliospheric physics, had conveyed their uneasiness about this change to the IUPAP General Assembly. C4 will continue doing its best to get the entire scientific community behind this change. Moreover, it will continue integrating new scientific communities under the umbrella of C4, such as direct and indirect dark matter searches.

3. ApPIC & C4:

C4 and the newly formed WG10: Astroparticle Physics International Committee (ApPIC), chaired by Michel Spiro (CNRS) tightened their links with the C4-chair being appointed ex-officio member of ApPIC. The current membership can be found at:

<http://iupap.org/working-groups/wg10-astroparticle-physics-international-committee-appyic/>

4. New IUPAP / C4 Webpages:

The improved system and almost instant response time by the new IUPAP administration helped to clean-up and improve the C4 pages.

5. Upcoming Meetings supported by IUPAP in 2015:

A-type conference:

34th International Cosmic Ray Conference (“The Astroparticle Conference”),
30 July–6 August 2015, The Hague, The Netherlands,

(Chair of organising committee: Ad van den Berg, University of Groningen)

<http://icrc2015.nl>

B-type conference:

TAUP 2015: XIV International Conference on Topics in Astroparticle and
Underground Physics, 7–11 September 2015, Torino, Italy

(Chair: Nicolao Fornengo, University and INFN Torino, Italy)

<http://taup2015.to.infn.it>

6. IUPAP Awards 2015

The IUPAP award ceremony will take place in the opening session of the ICRC 2015 in The Hague. The winners of the IUPAP Young Scientists Awards 2015 are:

Prof. Dr. Julia Tjus (Bochum University, Germany) for her outstanding work connecting phenomenology and experiment in neutrino astronomy.

Dr. Claudio Kopper (Madison, USA) for his outstanding contribution to the analysis of the IceCube data, leading to the first-ever observation of high-energy cosmic neutrinos.

C4 also serves to select the winners of the O’Ceallaigh and Bhabha Medals. The 2015 winners are:

Prof. Jun Nishimura (Institute of Space and Astronautical Science, Japan)
O’Ceallaigh Medal

Prof. Tom K. Gaisser (Bartol Research Lab, USA)
Bhabha Medal.

Karl-Heinz Kampert
Chair, IUPAP C4 – Astroparticle Physics
April 15, 2015

C5 Activity Report for the IUPAP Council and Commission Chairs Meeting April 2015

(submitted by J. Saunders, Chair C5)

Officers/Members 2014-2017

Chair	John Saunders	UK
Vice-Chair	Srinivasan Ramakrishnan	India
Secretary	William Halperin	USA
Members:	Viktoria Bekeris	Argentina
	John Beamish	Canada
	Hong Ding	China
	Pertti Hakonen	Finland
	Jean-Pascal Brison	France
	Christian Pfleiderer	Germany
	Naoto Nagaosa	Japan
	Hans Hilgenkamp	Netherlands
	Maxim Kagan	Russian Federation
	Peter Skyba	Slovakia
	Juhn-Jong Lin	Taiwan
Associate Members (2013-2015):	Jacek Kossut	Poland
	YoshiChica Otani	Japan

Main Achievements

Brief Review of Activity in 2014

See activity report for the IUPAP General Assembly, November 2014 for further detail.

Two sponsored conferences took place:

Type A: 27th International Conference on Low Temperature Physics (LT27), Aug 6-13, 2014 Buenos Aires, Argentina.

Type B: International Conference on Ultralow Temperature Physics (ULT2014), Aug 14-19, San Carlos de Bariloche, Argentina.

LT27 was the first of this series held in the Southern Hemisphere and the first in South America. Both the Conference Chair and Co-Chair were women.

Three IUPAP Young Scientist Prizes were presented, with associated invited talks. The Prizes were awarded to Cory R Dean, Leonardo DiCarlo and Mathieu Le Tacon.

The London and Simon prizes, the two major international prizes in Low Temperature Physics were presented, with associated invited talks, at the opening ceremony. The London Prize, sponsored by C5, was awarded to Michel Devoret, John Martinis and Robert J Schoelkopf. The Simon Prize was awarded to Peter Wölfle.

Commission C5 met at LT27 in August 2014. Subsequent business has been conducted by e-mail. C5 has received the report on ULT 2014 (posted on IUPAP site), and a full report (draft) from the LT27 organisers.

The proceedings of LT27 were published online in December 2014 (Journal of Physics Conference Series, Volume 568). As well as an Editorial Foreword, the report on LT27 prepared by C5 (included in the November 2014 activity report) is also published there.

Sponsored Conferences (2015)

Type B

International Symposium on Quantum Fluids and Solids 2015 (QFS2015)

Aug 10-15, 2015, Niagara Falls, USA

About 200 participants

Chair: F Gasparini, Co-Chair: E. Krotscheck.

Sponsored Conferences Proposed in 2016

Type B

International Symposium on Quantum Fluids and Solids 2016 (QFS2016)

Aug 11-15, 2016, Prague

About 250 participants

Chair: L Skrbek

IUPAP sponsorship has been requested (submission date 23 March 2015). This request has received unanimous approval from C5.

Planned Sponsored Conferences (2017)

Type A

28th International Conference on Low Temperature Physics (LT28). Selected by C5. Request for support anticipated.

Aug 9-16, 2017, Gothenburg, Sweden

About 1,200 participants

Chair: P. Delsing, Co-Chairs: M. Fogelström, J Bylander, F Lombardi.

Type B

International Conference on Ultralow Temperature Physics (ULT2017). Approved by C5. Request for support anticipated.

August 2017, Heidelberg, Germany

About 200-250 participants.

Chair: C. Enss.

Projected Activities for 2015 – IUPAP Commission on Semiconductors (C8)

1. Test new conference endorsement procedure using the 33rd International Conference on the Physics of Semiconductors (ICPS) (Beijing, 2016.7.31 - 2016.8.5) as a test case – done.
2. Prepare for a meeting of C8 at the 21st International Conference on Electronic Properties of Two-Dimensional Systems/17th International Conference on Modulated Semiconductor Structures (EP2DS/MSS), July 26-31, 2015, Sendai, Japan, our odd-year IUPAP-supported type A conference.
3. C8 meeting Tuesday July 28 at the EP2DS/MSS conference, Sendai, Japan.
 - introduction of new members and brief review of the roles of IUPAP and the commission
 - update on the preparations for ICPS 2016 in Beijing
 - update on the preparations for ICPS 2018 (tentatively scheduled for Montpellier, France)
 - informal discussions with possible bidders for ICPS 2020
 - review of EP2DS/MSS 2015
 - discussion on new Associate members from C5 and C17
 - discussion regarding the next round of C8 Young Scientist Prizes, to be awarded at ICPS 2016
 - discussion on how to improve the visibility of C8 and IUAP in the physics community
 - higher visibility for the Young Scientist prizes
 - possible proactive involvement with conferences that seek support sporadically, use of the new endorsement mechanism
4. Poll members not in attendance, communicate new Assoc. Members to IUPAP

C8 Membership 2014-2015

Chair	Michael Thewalt	Canada	thewalt@sfu.ca
Vice-Chair	Belita Koiller	Brazil	bkoiller@gmail.com
Secretary	Rolf Haug	Germany	haug@nano.uni-hannover.de
Member	Qi-Kun Xue	China	qkxue@mail.tsinghua.edu.cn
Member	Pascale Senellart	France	pascale.senellart@lpn.cnrs.fr
Member	Young Dong Kim	Korea	ydkim@khu.ac.kr
Member	Amalia Patanè	United Kingdom	amalia.patane@nottingham.ac.uk
Member	Yasuhiko Arakawa	Japan	arakawa@iis.u-tokyo.ac.jp
Member	Robert Suris	Russian Federation	suris@theory.ioffe.rssi.ru
Member	Per Olof Holtz	Sweden	poh@ifm.liu.se
Member	Anna Cavallini	Italy	Anna.Cavallini@bo.infn.it
Member	Jacek Kossut	Poland	kossut@ifpan.edu.pl
Member	Uli Zülicke	New Zealand	uli.zuelicke@vuw.ac.nz
Member	Alan MacDonald	United States	macd@physics.utexas.edu
Assoc. Mem.	Jason Petta	C17 United States	petta@princeton.edu
Assoc. Mem.	Jukka Pekola	C5 Finland	pekola@boojum.hut.fi
Observer	Robin Nicholas	United Kingdom	r.nicholas1@physics.ox.ac.uk

The Commission C 10 major activity report from 1/2015 till now:

1. The C 10 YSP 2015 award ceremony was held in APS March meeting, San Antonio, US, March 3, 2015. The prize winner is Prof. Keji Lai, University of Texas, Austin.
2. We have just announced publically in the IUPAP web site on the C 10 2016 YSP to start the nomination process from 5/1 till 7/15.
3. Given the very diversity of the fields in C 10, the commission members have not be able to meet face to face in the past. The conference of “ Materials and Mechanism of Superconductivity “ is a C 10 sponsored conference, and the 11th conference will be held in Geneva, from 8/23-28 this year. The C 10 members such as Laura Green (Vice chair) and Marisa Medarde from Switzerland have suggested to take this opportunity to have most of our C 10 members to get together during this M²S conference.
4. One of discussion focus for our commission meeting in M²S is to consider on how to incorporate the Materials Genome Initiative (MGI) in US, as well as the “ Materials’ Revolution--Computational Design and Discovery of Novel Materials” (MARVEL) in SWISS into C 10.

C 10 Chair
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C11 Report to IUPAP Commission Chairs and Executive Committee

April 2015

Juan Fuster, Chair C11 Commission

C11 Officers:

Chair: Juan Fuster (2014) (2011), Spain

Vice-Chair: Heidi Schellman (2014)(2011), USA

Secretary: Soo-Bong Kim (2014)(2011), Korea

C11 Members:

Martin Schnabl (2014) Czech Republic

Zhizhong Xing (2014) China

Amol Dighe I(2014) ndia

Dezső Horváth (2014) Hungary

Mark Lancaster (2011) United Kingdom

Mihoko Nojiri (2014) Japan

Vladimir Kekelidze (2011) Russian Federation

Raymond Volkas (2014) Australia

Sergio Novaes (2011) Brazil

Per Olof Hulth (2014) Sweden

Florenca Canelli (2014) Switzerland

C11 Associate Members:

Johannes Knapp (C4)

Jean-Michel Poutissou (C12)

Thanu Padmanabhan (C19)

Note: We regret to inform that Professor Per Olof Hulth passed away on March 2015

Activities:

The 37th International Conference on High Energy Physics (ICHEP 2014) (<http://www.ichep2014.es>) was hosted by IFIC in Valencia, Spain July 2-9. For its 37th edition, ICHEP went for the first time to Spain. ICHEP 2014 attracted a total of 967 scientists from 53 countries, with the largest delegation of 193 participants coming from Spain. The women participation was 198. The scientific programme in Valencia consisted of parallel and plenary sessions. In the 15 parallel sessions, 538 experimental and theoretical communications were presented, covering most of the areas in the field. A summary of the results discussed in these sessions was then given in 55 talks in the 42 plenary sessions that took place in the second half of the conference. The scientific programme was completed with the display of more than 200 posters that summarized the work of young researchers. The presence of young scientists was large. The 60th CERN anniversary and Industrial session complemented the programme. A large number of outreach activities was organized during and before the conference with 18 topical seminar and outreach talks. The exposition "Accelerating Science" from CERN

was brought to Valencia and got more than 244.000 visitors at the Arts and Science Museum of Valencia. A total of 52 grants were awarded to young scientists to cover their attendance to the meeting.

The third Technology and Instrumentation conference (TIPP 2014) (<http://www.tipp2014.nl/index.html>) was held in June in Amsterdam. A total of 448 people attended of whom 77 were women, 53 were from the US, 79 from the Netherlands. The scientific programme in Amsterdam consisted of parallel and plenary sessions. There were a total of 229 parallel talks in 5 parallel tracks, 19 plenary talks and 170 posters. It was notice that a significant amount of posters didn't show up (59) due to the fact only oral presentations could be covered from their home Institutes. Better format and more weight to poster presentations should be considered for future conferences. An industry session took place. Several outreach activities and a public lecture completed the dissemination programme. Prizes for best oral and posters were awarded.

Neutrino 2014 (<http://neutrino2014.bu.edu/>) was held in Boston in early June. 549 attended of whom 85 were women. 287 of the participants were from outside the US. Of particular note this year was a presentation by IceCube on the first detection of high-energy astrophysical neutrinos, a long sought goal of neutrino telescopes. The RENO experiment announced the first observation of an unanticipated component in the reactor neutrino flux.

The annual meeting of the IUPAP C11 Commission was held on July 5, 2011 at the Conference Center during the ICHEP conference. At this meeting, the commission reviewed recently sponsored conferences, discussed the upcoming conferences seeking sponsorship, reviewed progress on upcoming conferences and selected the location of future conferences. The list of selected upcoming sponsored IUPAP conferences is:

- 2015, International Symposium on Lepton Photon Interactions at High Energies (LP2015) in Ljubjana (Slovenia), August 17-22, 2015;
- 2016, The 38th International Conference on High Energy Physics (ICHEP 2016) in Chicago (USA), August 3-9 2016;
- 2017, International Symposium on Lepton Photon Interactions at High Energies (LP2015) in Guangzhou (China);
- 2017, TIPP 2017 at IHEP Beijing (China);
- 2018, The 38th International Conference on High Energy Physics (ICHEP 2018) in Seoul (Korea).

The C11 Chair Hiroaki Aihara and Vice-Chair Francois Le Diberder finished their term. A unanimous and warm recognition of their service was expressed by the committee. Juan Fuster was nominated as Chair, Heidi Schellman as Vice-Chair and Soo-Bong Kim as Secretary.

The 2014 IUPAP C11 Young Scientist Prizes were awarded at the ICHEP 2014 conference in Valencia to:

- Claude Duhr, IPPP Durham. For his outstanding contributions to elementary particle theory, in particular, to formal developments in quantum field theory and their applications to precision calculations in collider phenomenology.
- Kersten Tackmann, DESY. For her outstanding contributions to experimental high energy physics, in particular, to the discovery of the Higgs Boson via its gamma gamma decay mode with the ATLAS experiment.

The 2016 IUPAP C11 Young Scientist Prizes will be awarded at the ICHEP conference in Chicago. The biennial C11 prizes honor achievement by two young scientists in the fields of experimental and theoretical particle physics. The deadline for nominations for the 2016 prizes will be January 15, 2016.

IUPAP C11 also sponsored the 5th International Particle Accelerator Conference (IPAC) June 15-20 in Dresden, Germany (<http://www.ipac14.org/>) The annual IPAC conference covers accelerator physics and technologies.

Associates:

New associate members from other IUPAP Commissions need to be nominated from the C4, C12 and C19 Commissions. In addition to these traditional members in the C11 Commission other associate members from the ICFA group and the new Accelerator Science group (if finally created) will also be nominated.

New Accelerator Science Group at IUPAP

Over the past year there has been discussion on a proposed IUPAP Commission or Working Group on accelerator science. Juan Fuster was asked by Roy Rubinstein (secretary of ICFA, the International Committee for Future Accelerators) to express the C11 opinion on this topic. Juan Fuster joined the ICFA meeting in Newport News, VA, USA in February 2015 and the C11 members later held a phone meeting to discuss the issue. The C11 commission members expressed a positive view the creation of a new IUPAP Working Group in Accelerator Science.

Complementarity with the existing ICFA Working Group is needed to avoid duplication. The C11 commission foresees the new Group as a bottom-up approach to be managed by the accelerator scientist community whereas ICFA is a more top-down body mainly concerned with the coordination by laboratories of large future experimental facilities. ICFA is mainly focused on the future of Particle Physics whereas the new Group should cover much broader domains of the accelerator science. Such a new group should have strong links to ICFA and C11.

C12 Report to the IUPAP Council and Commission Chairs Meeting April 2015

C12: Commission on Nuclear Physics (Alinka Lépine-Szily)

1. The latest annual meeting of C12 was held on July 12, 2014 at Hotel Johanneshof, Egelsbach, Germany c/o GSI with 12 out of the 14 commission members present. This meeting followed the annual meeting of the IUPAP Working Group 9 on International Cooperation in Nuclear Physics which was held at GSI, Darmstadt, Germany, on July 11. The members of WG.9 were welcomed to attend the meeting of C12 as observers and vice versa.

The major items on the agenda were

- the selection of the IUPAP conference support
- the recommendation and the selection of the executive member and new members for the next C12.

Those discussions and decisions were held in camera in the Executive session.

Election of new Officers and Members of C12

Hide Sakai explained the different aspects of the officer and member election:

- sub-field,
- geographical region,
- relevant experience,
- gender, etc.

After a careful discussion, taking into account the various factors and the nominations from the national IUPAP committees, the Commission agreed on a list of candidates to be presented to the Nomination Sub-Committee.

Conference recommendations

There were one pre-approval request for the Type-A and seven requests

The committee heard presentations by the organizers of the conferences to be held in 2015:

- Few Body problems in Physics FB21 (Daniel Phillips)
- Electromagnetic Isotope Separators and Related Topics EMIS-2015 (Helmut Weick)
- Symmetries in Subatomic Physics SSP-2015 (Willem van Oers)
- Nucleus-Nucleus Collisions NN2015 (Claudio Spitaleri)
- Latin American Symposium on Nuclear Physics and Applications XI LASNPA (A. Lépine-Szily)
- Origin of Matter and Evolution of Galaxies OMEG2015 (Weiping Liu)
- Electromagnetic Interactions with Nucleons and Nuclei EINN (C. Alexandrou) via "Skype"

After careful deliberation by the C12 members, the following recommendations for IUPAP sponsorship were suggested :

- Category A support pre-approval requested
International Conference on Nuclear Physics (INPC 2016), Adelaide, Australia, September 2016.
- Category B support:
NN2015, LASNPA2015, EMIS2015, FB21 in that ranking order
- Category C support:
OMEG2015, SSP2015 and EINN2015.

2. Our annual meeting in 2015 will be held on June 5, 2015 in Washington DC. The main subjects of our meeting will be the following:

- a) Recommendation for conference support

The conferences that should ask support are the following

- International Nuclear Physics Conference INPC 2016 (Anthony Thomas)
- International Spin Physics Symposium SPIN2016 (Mathias G. Perdekamp)
- Nuclei in Cosmos NIC2016 (Tohru Motobayashi)
- International Conference on Meson-Nucleon Physics and the Structure of the Nucleon MENU2016

- b) IUPAP Young Scientist Prize Selection process

Three awards will be given at the INPC2016 conference to the winners of the selection performed by the C12 members. The divulgation of the award by different media and the selection process will be discussed at our meeting in June.

- c) Associate members to other commissions

The C12 has associate members at the following commissions:

- C11 (Particle Physics)
- C19 (Astrophysics)
- C13 (Physics for development)
- APPIC working group

New associate members will be elected to these commissions

Alinka Lépine-Szily
IUPAP-Nuclear Physics Commission C12- Chair

International Commission on Physics Education (C14) Activities in 2015

1. Conference

International Conference on Physics Education (ICPE 2015), Beijing, China, August 10-14, 2015.

This conference will be supported by IUPAP and C14. The conference will focus on “Engaging Students in Physics – Research and Practice”. Web site: <http://www.iupap-icpe2015.org/>

2. PHYSWARE

PHYSWARE 2015 was held on January 25 to 30 at the ICTP Trieste. PHYSWARE is a collaborative workshop to promote physics teaching and learning in the developing world. PHYSWARE 2015 was generously sponsored by ICTP and co-sponsored by IUPAP and EPS.

3. Annual ICPE face-to-face meeting

We plan to hold our annual commission meeting on August 14, 2015, i.e. immediately after the end of the ICPE 2015 conference in Beijing. The items to be discussed will be:

1) Future conferences

World Conference on Physics Education (WCPE) 2016, July 11-16, São Paulo, Brazil.

ICPE 2017 and beyond.

2) ICPE Newsletter

3) ICPE Medal

The problem: we have only one blank ICPE Medal left.

4) Young Scientist Award

5) New associate members of ICPE

6) New projects for 2015-2017



IUPAP C17: Commission on Laser Physics and Photonics

Report to IUPAP Council and Commission Chairs Meeting, Trieste, 25-26 April 2015

1. IUPAP C17 Young Scientist Prize

The IUPAP Commission on Laser Physics and Photonics runs its Young Scientist Prizes every two years, awarding two prizes in each round. These two prizes recognize the very highest level of achievements in fundamental and applied research. The 2015 prizes attracted 12 nominations, 9 male, 3 female. Geographical spread included Australia(3), Austria(1), Belgium(1), Canada(1), Germany(1), New Zealand(1), Spain(2), United Kingdom(1), USA(1).

The 2015 IUPAP Young Scientist Prize in Laser Physics and Photonics (Applied Aspects) will be awarded to Dr Mark Thompson, Centre for Quantum Photonics, University of Bristol, United Kingdom. Dr Mark Thompson is awarded the prize “for his contributions to the new and emerging field of quantum photonics, and particularly for his pioneering work in integrated quantum photonic circuits.”

The 2015 IUPAP Young Scientist Prize in Laser Physics and Photonics (Fundamental Aspects) will be awarded to Dr Robert Fickler, Institute for Quantum Optics and Quantum Information, University of Vienna, Austria. Robert Fickler is awarded “for his groundbreaking contributions to the entanglement of complex structures of photons, which have opened up new avenues for quantum communication”.

The award ceremony will be hosted at CLEO/Europe – EQEC 2015 21-25 June 2015 in Munich. <http://www.cleoeurope.org/> and the award winners will be publicised more broadly thereafter.

Next call for the IUPAP C17 Young Scientist Prizes will be launched towards the end of 2016 for 2017. A longer term schedule of the major international conferences at which the prizes will be awarded, which also fulfill IUPAP requirements, is to be put in place before the call for nominations in 2016.

2. International Year of Light (and Light Based Technologies) 2015

The International Year is being celebrated extensively around the globe. The official website lists activities and documents the year: <http://www.light2015.org/Home.html>

91 National Nodes which are organising local campaigns, activities and events are also listed <http://www.light2015.org/Home/About/Country.html>

One of the very first events was inclusion of IYL related projections in the Sydney Harbour Bridge Pylon Displays on New Year’s Eve. <http://light2015.org.au/year-of-lights-starts-at-sydney-nye-fireworks/> The Sydney Harbour Bridge Icon turned on at midnight, a LED based display, featured a light bulb – in keeping with the theme of Sydney NYE2014 (Inspire Sydney) and IYL.

The official launch for IYL was held at the UNESCO Headquarters in Paris 19-20 January 2015. <http://www.light2015.org/Home/About/Resources/Videos.html> Prof Cristina Masoller attended as a representative of C17. Previous Chair, Prof Alan Shore (2008-2011) also attended as representative for Wales. Reports of the launch are reproduced in Appendix B. A copy of the program for the launch can be provided to anyone who would like it.

3. Laser Physicist/Research Leader Joins the Greek Government

Well known research leader in the European laser physics and photonics community, Professor Costas Fotakis, previously a Director of the Institute of Electronic Structure and Laser (IESL) at the Foundation for Research and Technology – Hellas (FORTH) in Crete, Greece and then elected as President of FORTH in 2011 started a new phase of his career as the Deputy Minister for Research and Innovation in the new Greek Government, January 2015. <http://greece.greekreporter.com/2015/02/01/who-is-who-in-the-new-greek-government/> Should we think of creating a directory of “Physics Angels” – those who have a physics background and/or strong interest in physics who have become influencers and who can be neutral supporters of physics? A strong, collective, disinterested voice from such a grouping could help to raise awareness of the contribution of physics to society.



Costas Fotakis is the new Deputy Minister for Research and Innovation in Greece.

4. Associate Members of C17

At the IUPAP Executive Council and Commission Chairs meeting of October 2012 C17 proposed the European Physical Society (EPS) as an associated member of the commission. This was approved. Two representatives from the EPS were named as Associate members to formalize liaison:

Prof John Dudley, President of the EPS, former chair of the QEOD/EPS
David Lee, Secretary General, EPS

Currently, there is a request to confirm Associate members of the Commission on the IUPAP website. It is proposed the term of these two Associate members be extended through 2015.

5. Ongoing Work of the Commission in 2015

Undertake a review of C17 conference support and ensure that networking occurs via which appropriate conferences are forthcoming in applications for support.

Discuss priorities for Associate members – Commission related research, education and outreach activities to be included in the discussion

Support the international Year of Light strongly. Plan for longer term beneficial legacies of the year.

Appendix A. Commission Membership 2014-2017

Officers:

Chair, Prof. Deborah Kane (2011) (2014)

Department of Physics and Astronomy

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International Year of Light Illuminates Paris



United Nations
Educational, Scientific and
Cultural Organization



International
Year of Light
2015

The opening ceremony for the International Year of Light was held in Paris on 19-20 January.

by Benjamin J. Eggleton

The opening ceremony for the International Year of Light and Light-based Technologies was a two-day celebration of the wonderful and diverse ways in which human society is uplifted by our interaction with light. The ceremony was most aptly held at the UNESCO headquarters in Paris, a city known for centuries as The City of Light.

UNESCO itself was founded in the aftermath of World War Two as an organisation designed to build lasting world peace by encouraging all of humankind to regard themselves not as individual competing nations, but rather as one people working in solidarity towards a common future where democracy, development and human dignity are available to all. UNESCO strives to achieve this goal by promoting education as a human right, fostering intercultural understanding, pursuing scientific cooperation and protecting freedom of expression.

Over the two days participants were led through this journey by a range of people who have made understanding



The IYL light show on UNESCO in Paris.

light the focus of their life's work. In line with UNESCO's goals, the organisers put together an event that celebrated the scientific, economic and social impacts of how light is used, offering a fascinating overview of the way a seemingly small innovation in one area can have profound impact in the lives of many.

Presentations ranged from Nobel Prize winners explaining how our understanding of light informs our understanding of the

foundations of the cosmos, to grassroots workers showing how bringing eyeglasses to isolated African villages or light into the homes of the poorest slum dwellers can fundamentally change human lives for the better. It was a rare and wonderful opportunity for all of us to lift our focus from the specifics of our own work and see the way that science interconnects with human societies around the globe.

This diversity in the presentations gave rise to stimulating conversations of the intersection of physics, technology, development and society. Highlights included presentations from leading scientists such as Steve Chu (1997 Nobel Prize winner and former US Secretary of Energy), William Phillips (1997 Nobel Prize winner), Serge Haroche (2012 Nobel Prize Winner), Gerard Mourou, Zhores Alferov (2000 Nobel Prize Winner), Alain Aspect, Brian Wilson and Sune Svanberg (Former chair of the Nobel Committee for Physics). We also heard fascinating presentations that dealt with "light for humanity and culture", including captivating talks on light solutions for many problems in developing countries. The International Year of Light asks us to expand our intellectual horizons when we consider the impact of our work, and



At UNESCO headquarters in Paris in the main auditorium just before the formal proceedings begin.

the opening ceremony helped us to start doing so.

CUDOS, a gold sponsor of IYL, will be organising a year-long series of events and will be focusing on developing its International Outreach resources, teaching photonics science to school students.

Benjamin Eggleton, ARC Laureate Fellow, is Director of CUDOS, ARC Centre of Excellence and is with the Institute of Photonics and Optical Science (IPOS) and the School of Physics, University of Sydney.



Professor Andrew White from the University of Queensland and Professor Benjamin Eggleton from the University of Sydney at the UNESCO headquarters in Paris.



Professor John Dudley the Chair of the IYL steering committee and current President of the European Physical Society speaking at the opening ceremony. Image credit: © UNESCO/Nora Houguenade.



Dr William Phillips presenting his keynote talk on cold atoms with striking demonstrations that engaged the audience (Nobel Prize winner in Physics). Image credit: SPIE.

SPIE News

by Amy Nelson

Solutions Enabled by Light Inspire at International Year of Light Celebration

Credit for all images: SPIE, the international society for optics and photonics.

United Nations' International Year of Light was launched by high-profile, diverse speakers, with technologies both simple and futuristic being reported at the UNESCO-hosted event

Paris, the City of Light, was home to opening ceremonies launching the United-Nations-declared International Year of Light and Light-based Technologies (IYL 2015) in January. High-level speakers took the stage at UNESCO headquarters to celebrate the many uses and roles of light in our lives.

IYL 2015 was adopted by the United Nations to raise awareness of how optical technologies promote sustainable development and provide solutions to worldwide challenges in energy, education, agriculture, communications and health. With UNESCO as lead agency, IYL 2015 programs promote improved public and political understanding of the central role of light in the modern world while also celebrating noteworthy anniversaries in 2015 - from the first studies of optics 1,000 years ago to discoveries in optical communications that power the Internet today.

Light is solar power installations and LEDs bringing light to remote communities; it is what enables instantaneous

communication across the globe and into space via phones and computers; it is a source of artistic inspiration for visual artists and musicians, and plays a role in most of the world's theologies.

The launch was one of the first IYL 2015 events. SPIE, the international society for optics and photonics, is a Founding Partner of IYL 2015.

More than a thousand participants went to Paris for the two-day event, with speakers including international diplomats and decision-makers, Nobel laureates, CEOs, and science and industry leaders from across the globe.

Keynote lectures, symposia, and round-table discussions covered areas of basic science, innovative lighting solutions for society, light pollution, emerging trends in photonics, the Einstein Centenary, the role of light-based technologies in addressing global challenges, light in art and culture, the history of science, and science policy.

Nobel Laureate Ahmed Zewail called for dialogue, not conflict, and vision and leadership to address the world's needs. Fellow Nobelist Steven Chu stressed the promise of solar power, and said there is "less than a 1-in-27-million chance that Earth's record hot streak is natural." Later, U.S. National Science Foundation director France Córdova stressed the importance of basic research in the discovery of new applications for light. Ziad Aldrees, Saudi Arabia's Ambassador and Permanent Delegate to UNESCO, harkened back to the scientific contributions of Ibn al-Haytham, whose seminal Book of Optics was written around 1015, and others working in the "Golden Age" of Muslim civilization.

Hearing from a wide variety of speakers



Flavia Schlegel, Assistant Director-General for Natural Sciences, UNESCO at the opening ceremony.

provided a really broad perspective on how light impacts our society, said Anne-Sophie Poulin-Girard, a Université Laval student who was among the participants.

John Dudley of Université de Franche-Comté, president of the European Physical Society and chair of the IYL global steering committee, pointed out the importance of the IYL 2015 observance to the optics and photonics community as a means to communicate the importance of the technologies in everyone's lives. "We only get one chance," he said "It is nice to celebrate but we need to get to work as well."

The program featured several cultural and musical interludes, and the outside of the UNESCO building was lit by Finnish light artist Kari Kola with a display entitled "Light is Here" reflecting the powerful elements of the Northern lights.

Optical technologies for simple lighting, inexpensive eyeglasses, and solar power were among the many and varied applications of light celebrated during the second day of ceremonies. In a well-received and inspiring session on Light Solutions, three presenters described highly successful programs that are making huge improvements in quality of life in several areas of the world. Illac Diaz told how 'A Liter of Light' is using very low technology - a plastic bottle filled with water and chlorine - to create a 55-watt solar bulb powerful enough to light up a home while being environmentally friendly, inexpensive, and easy to make. Martin



UNESCO building interior.



"Light is Here" - a light artwork gracing the UNESCO building at the ceremony.

Aufmuth described how 'One Dollar Glasses' is changing lives by providing locally manufactured glasses at low cost to some of the approximately 150 million people worldwide who need prescription eyeglasses but cannot afford them - and who may be unable to work to earn money without them. The program also teaches people in the community how to make the glasses, further opening the path out of the cycle of poverty. Linda Wamune explained the 'Sunny Money' program, which provides solar-powered lights and chargers in African communities to enable more hours in the day for activities such as studying. Wamune said that the program is successful in part because the lights are sold rather than given away. People in Africa can afford such small technology devices, she said, and they place more

value on what has been purchased, as the perception is that items that are given away are of lesser quality.

Nobel Laureate William Phillips started the day with a dynamic, crowd-pleasing demonstration using liquid nitrogen. Fellow Nobelists Serge Haroche and Zhores Alferov gave thought-provoking and visionary talks - Haroche on how light reveals the quantum nature of physical reality, and Alferov on how heterostructures enable the creation of new structures with unique and superior electrical, optical, and mechanical properties.

Future of Light panellist Sune Svanberg (Lund University) made the audience laugh with a slide explaining the few "simple" steps to winning a Nobel prize. He joined fellow panellists Alain Aspect (UNESCO Niels Bohr Medal Laureate),

SPIE Fellow Bernard Kress (Google [X]), and 2014 SPIE Britton Chance Biomedical Optics Award winner Brian Wilson (Ontario Cancer Institute) in describing future applications of light in healthcare, computing and wearable technologies, and research.

A roundtable discussion on science policy moderated by Jose Mariano Gago, Portugal's former Minister of Science, Technology and Innovation, emphasized science as a tool for development. Gago encouraged nations to cooperate and improve the dialogue about science policy at an international level. Science, he said, "can be a source of peace or a source of conflict, a source of war or a source of development. It must rely on knowledge and trust."

Panellist Naledi Pandor, South African Minister of Science and Technology, pointed out a disconnect between Africa and the rest of the world, saying that the continent is often excluded from initiatives that are nominally "global." The continent needs to raise its profile with well-crafted science policy, building human capital in a wide range of disciplines, and making sure researchers have academic freedom and the infrastructure to work, she said.

"Every closing is an opening," observed Maciej Nalecz, UNESCO Director of the Division of Science Policy and Capacity-Building - the closing of IYL 2015 ceremonies are just the beginning of a year full of activities.

Read more: spie.org/x105834.xml

IUPAP C19 Astrophysics Activity report 2014.11 – 2015.04

Our work was started in the following directions:

1) C19 Webpage updating

First most urgent updates have been done and a team of five volunteering commission members (Petr Hadrava, Michel Rieutord, Grazina Tautvaisiene, and Pietro Ubertini lead by C19 Secretary Patrick Woudt) was consolidated for implementation of further improvements.

2) IUPAP Young Scientist Medals in the field of Astrophysics

A call for nominations for the IUPAP Young Scientist Medals in the field of Astrophysics of 2014 and 2015 was announced in February of 2015. A committee of ten members was appointed which will review the applications and select winners.

The IUPAP Young Scientist Medal in the field of Astrophysics of 2014 and 2015 will be awarded during the 28th Texas Symposium on Relativistic Astrophysics on December 13–18, 2015 in Geneva, Switzerland.

3) Face-to-face-meeting organization

The C19 face-to-face meeting is planned in the period of August 3-14, 2015 in Honolulu, USA during the General Assembly of the International Astronomical Union. Seven C19 members plan to meet.

4) Nomination of Associate members

The final list of the associated C19 members will be presented in autumn. Presently we have one candidate in our list (Kei-ichi Maeda, Waseda University, Japan).

5) IUPAP support of international conferences

For the IUPAP support traditionally was selected the 28th Texas Symposium on Relativistic Astrophysics to be held in Geneva on 13–18 December, 2015:

<https://indico.cern.ch/event/336103/>

6) Participation at organizing committees of international conferences supported by IUPAP

Three members of C19 work at the Scientific Organising Committee of the 28th Texas Symposium on Relativistic Astrophysics (Grazina Tautvaisiene, Shuang-Nan Zhang, and assoc. member Virginia Trimble).

7) International Year of Light

So far members act individually in their native countries. There are no common actions elaborated yet. The work is in progress.

Grazina Tautvaisiene
C19 Chair