

President: Bruce McKellar • Editor-in-Chief: Kok Khoo Phua • Editors: Maitri Bobba; Sun Han

SEPTEMBER 2016

Message from the President



Twenty years ago Jan Nilsson, then President of IUPAP, published an article *What can IUPAP do for you?*¹ to explain to the physics community what IUPAP was and how it was contributing and how it hoped to contribute to physics and physicists worldwide. Reading it today, I am impressed by how little the structure of IUPAP has changed in the last two decades. We still run on a shoestring budget, then 200,000 GBP per year, now about 380,000 GBP. This increase just matches US inflation for the period, but IUPAP is a worldwide activity, and the appropriate inflation rate for us to use is much harder to decide, but it will certainly exceed the US rate. Our income has not kept up with inflation.

In 1996, almost all of our income came from our members' subscriptions, with a supplement from UNESCO, and now, all of it comes from our members. We still depend on volunteers to do our work — we have one

paid staff member and about 600 volunteers in our Council, 18 Commissions, 4 Affiliated Commissions, 10 Working Groups and 60 Liaison Committees working for IUPAP. In addition there are similar number of volunteers working each year to deliver the conferences IUPAP supports. We have not created any new commissions since 1996, but we do have more working groups.

Jan Nilsson went on to describe what IUPAP was doing for physics and physicists. I won't do that here, because that is the purpose of these newsletters we have been producing since April 2015. But I want to use this opportunity to challenge all readers of this newsletter to think about what IUPAP should be doing more or less of. For example:

- Do we support enough or too many conferences?
- How can we better educate physicists so that they are not trapped by fake conferences and fake journals?
- How should we adapt our structure to reflect changes in the world of physics?
- How can we increase our financial base without asking our members for more?

You can submit your suggestions to me directly at bhjmckellar@mac.com or through your national liaison committee, contact details for which you can find at http://iupap.org/members-liaisons/

I look forward to receiving your input on to helping us decide how IUPAP should develop over the next 20 years.

Bruce McKellar

Message from the Secretary General



In the last few months, many events have occurred. Within the physics community, we mourn the deaths of several eminent members: Ahmed Zeweil, Kerson Huang and Katherine Gebbie. We have also witnessed turmoil in Istanbul, Turkey and several unrests in other parts of the world, for instance, the unnecessary bombing in Nice. Despite these unhappy events and uncertainties in our lives, Science, particularly Physics, needs to continue with unwavering strength. At IUPAP, we are hoping that major scientific powerhouses throughout the world will take on the cudgel to deal directly or indirectly with these global crises. We hope that as responsible members of the physics (world) community, some of us will see an increasing need to champion for the rights to do good science independent of politics, gender, social, environmental and humanity issues.

Kok Khoo Phua

The Council of the International Union of Pure and Applied Physics (IUPAP) expresses its concern over recent developments in Turkey

Bruce H J McKellar (President, International Union of Pure and Applied Physics) For the Executive Council of the International Union of Pure and Applied Physics

The Council of the International Union of Pure and Applied Physics (IUPAP), in accordance with the IUPAP Resolution on the Universality of Science, adopted in 2011, and Statute 5 (the Principle of Universality (freedom and responsibility) of Science) of the International Council of Science, to which IUPAP subscribes as a member of the International Council of Science, expresses its concern over recent developments in Turkey which run counter to these principles.

We respectfully encourage the President and Government of Turkey to move forward in ways which respect and sustain Turkish democracy and Turkish science. We, with many other scientific and academic organisations, are concerned that many academics and educators in Turkey have been dismissed or suspended in haste, and that overseas travel by academics was suspended and is now controlled.

Physics, and indeed all of science, is an activity which requires communication, consultation, and collaboration across borders. Without openness and international connections, physicists are unable to contribute fully to their science or their own nation. The present restrictions are thus not in the best interests of Turkey. The IUPAP Council is pleased that academic travel restrictions have been eased, but strongly recommends that they be removed, that the broad sanctions against the academic community in Turkey be removed, and that the rule of law be applied as the authorities work against the coup movement.

The Council of IUPAP expresses its strong support of our Turkish colleagues, and the Turkish Physical Society. We note that the 32nd International Physics Congress of the Turkish Physical Society will be held in Bodrum from 6 to 9 September 2016, and we hope that it will be a successful meeting with a full complement of international participants.

*The above statement was published on the IUPAP website on the 5th of August 2016.

An appreciation of the contribution of Katharine Gebbie (1932-2016) to IUPAP

IUPAP was saddened to learn of the death of Katharine Gebbie on 17 August 2016. Katharine is best known as the founding Director of the Physical Measurement Laboratory of the National Institute of Standards and Technology (NIST), and of its two immediate predecessors, the Physics Laboratory and the Center for Atomic, Molecular and Optical Physics. In spite of this heavy workload, she also found time to devote some of her amazing energy to IUPAP.

The IUPAP Working Group on Women in Physics (WG5) was created in 1999 by the General Assembly with the charge to survey and to improve the situation on women in physics. Katharine Gebbie, a champion on gender issues, was an obvious choice for the group. We are grateful that she accepted this task in addition to her administrative duties at NIST, serving on WG5 from 2000 to 2005.

In order to understand the level of women's participation in physics in different countries and cultures, WG5 decided to convene, in 2002, the First IUPAP International Conference on Women in Physics. One important obstacle for the event was financial, and Katharine made a big contribution to raising the necessary funding. In addition, she also volunteered to coordinate the Discussion Groups on Getting Women into the Physics Leadership Structure Nationally and Internationally.

The conference brought together over 300 physicists from 65 countries, covering all the continents. Katharine had the task of understanding the power structure in these different cultural backgrounds and finding a way of facilitating an efficient

discussion in this diverse community. She did this difficult job with empathy and elegance. Katharine was firm without being bossy and understanding without shifting her bright eyes from the main target, promoting women.



Her leadership was collective and plural but still one could see her DNA imprinted in the resolutions that came out of the conference. Katharine Gebbie inspired the women participating in conferences and the WG5 in their continuing task.

After she left the Working Group on Women in Physics in 2005, Katherine continued to serve IUPAP by becoming a member of the Commission on Atomic, Molecular and Optical Physics (C15). She served on C15 from 2005 to 2014, chairing it from 2012 to 2014. In her time as Chair, with the Commission and in meetings of the Council and Commission Chairs she continued to contribute to IUPAP with her characteristic empathy and elegance. During this period, Katharine was a long term member of the US Liaison Committee for IUPAP, making important contributions to IUPAP through that mechanism.

Katherine enriched the life of IUPAP and the lives of those of us who worked with her. Vale Katherine



IUPAP President visits Thailand

Bruce McKellar, President of IUPAP, was very pleased to have accepted the invitation of Sukit Limpijumnong, the President of the Thai Physical Society to participate in the Siam Physics Congress 2016 at Ubon Ratchathani from 8th to 10th June. Bruce gave a plenary talk which introduced IUPAP to participants and also reviewed his own recent research on applications of the He-McKellar-Wilkins phase to Bose Einstein Condensates. The discussion following his presentation reflected great interest in understanding how IUPAP linked physicists around the world and how it may be possible for Thailand to participate fully in IUPAP activities. Sukit convened a meeting of nine leaders of Thai physics departments and research institutes with Bruce to discuss how Thailand may become a member of IUPAP. The benefits of

membership include the provision of at least one member of a Commission, and an improved chance of hosting an IUPAP Conference or workshop. Both of these would bring improved international recognition of physics in Thailand. As is usual in such discussions, the question of how to find the membership fees was an important consideration.

Attendance at the Siam Physics Congress 2016 gave Bruce an excellent overview of the scale and vigour of research in physics and physics education in Thailand. It is hoped that Thailand will become a member of IUPAP so that the rest of the world can receive greater benefit from Thai physics.



Bruce McKellar at SPC2016 with prize winners, officers of the Thai Physical Society and of the Committee of SPC 2016.

11th International Conference on the Identification of Dark Matter (IDM2016) in Sheffield, UK (18 - 22 July 2016)

M. Malek (Local Organising Committee)

The Identification of Dark Matter (IDM) series is one of the three main conferences on the missing mass of the universe. This series was founded in 1996 by Prof Neil Spooner of the University of Sheffield. In 2016, to celebrate its 20th anniversary, the conference returned to Sheffield. The conference was held at the Master Cutlers Hall and attracted over 200 delegates from 26 countries, representing theorists and experimentalists, physicists and astrophysicists.

A particular highlight of the conference was the new results from the Large Underground Xenon (LUX) experiment, presented on 21st July by Dr Aaron Manalaysay of the University of California at Davis. In his talk, Dr Manalaysay showed that LUX has improved the world sensitivity to weakly interacting massive particle (WIMP) dark matter by a factor of four. Other possibilities for the composition of dark matter also exist; in recent years, axions have been surging in popularity amongst both theorists and



Prof. Karl van Bibber gives the closing remarks

experimenters. Another high point of the conference came on Tuesday 19th July when Dr Ed Daw, of the University of Sheffield, presented an impressive overview of global axion searches.

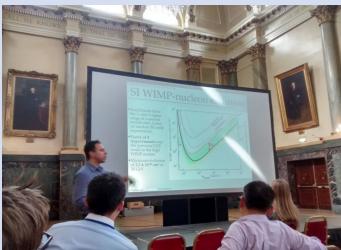
Large international scientific projects, like those hunting for dark matter, are models of cooperation between nations and, hopefully, point the way towards a more peaceful world. In the twenty-first century, nearly every major project is multi-national in scope. This spirit of cooperation was underlined at the civic reception that opened the conference, hosted at the Sheffield Town Hall by the Lord Mayor, Debbie Fox. In her address to the delegates, she noted that Sheffield is the United Kingdom's first 'City of Sanctuary', with similar goals of peace.

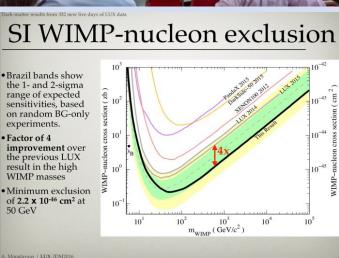
Other evening events throughout the week included a public talk given by Professor Katherine Freese of the University of Michigan, in which she addressed the fundamental question: 'What is the Universe made of?' The conference banquet was held at Chatsworth, family seat of the Dukes of Devonshire — the Cavendish family, which has its own connection to the physical sciences. At the dinner, Professor Spooner recounted to delegates stories of how he founded the conference series, and also the nearby Boulby Underground Laboratory.

On the final day, the conference was closed by Professor Karl van Bibber of the University of California at Berkeley. Professor Bibber recounted the long history of dark matter searches, going back to the initial discovery of 'missing mass' in 1933 by Professor Fritz Zwicky. Efforts to identify dark matter have continued for 83 years. In his closing statement, Prof Bibber charged the younger scientists in the room with finally discovering the nature of dark matter by 2033 — before the centenary of Prof Zwicky's discovery.

The conference was a resounding success in fostering both science and international cooperation. The generous sponsorship of the IUPAP C4 commission was most helpful in making this

conference possible. All members of the Local Organising Committee would like to express their appreciation for this support.





LUX presents the world's best results for WIMP dark matter

On the Campus Tour with WG5

Prof Nicola Wilkin (Local Organising Chair, University of Birmingham) n.k.wilkin@iop.org

On a gloriously sunny weekend in early June, IUPAP WG5 (Women in Physics) was hosted by the University of Birmingham, UK. A three day event packed with activities led to the planning of what

will be a thought-provoking programme for the 6th International Conference on Women in Physics, which will be held 16th-20th July 2017 in Birmingham. The conference will be jointly hosted



On the Campus tour, LOC and IOC:

Amy Light (Conference Dept, Institute of Physics, UK), Helen Ansell (Undergraduate physicist, University of Birmingham, UK), Anna Green (Postgraduate physicist, University of Birmingham, UK), Nicola Wilkin (Local Organising Chair, University of Birmingham, UK), Dawn Stewart (Conference Dept, Institute of Physics), Jess Wade (Kings College, London, UK), Lilia Meza Montes (Autonomous U. of Puebla, Mexico), Penny Gowland (University of Nottingham, UK), Igle Gledhill (CSIR, South Africa). Susan Burrows (University of Warwick, UK), Manling Sui (Beijing U. of Technology, China), Silvina Ponce Dawson (U. Buenos Aires, Argentina), Barbara Gabrys (University of Oxford, UK). Kwek Leong Chuan (Nanyang Technological U., Singapore), Shohini Ghose (Wilfrid Laurier U., Canada), Prajval Shastri (Indian Institute of Astrophysics, India), Jackie Beamon-Kiene (American Physical Society, USA)



by the Institute of Physics and the Midlands Physics Alliance (the Universities of Birmingham, Warwick and Nottingham).

WG5 had the opportunity to tour the facilities, including the historic Aston Webb building (see photograph) which will act as the central area for the conference as well as the student accommodation facilities and the opportunity to visit the city centre. The programme will include leadership and education themes, including an in-conference outreach event with Birmingham school children to share different international outreach activities. With the support of the Midlands Alliance and many other UK

universities, there are plans to host day visits for those on travel grants to a research laboratory most relevant to their interests as well as undergraduate laboratory skills for those who are teaching-focused.

http://icwip2017.iopconfs.org/Home

STATPHYS 26 - C3

STATPHYS 26 the largest international conference in statistical physics, covering all aspects of statistical physics was organized in Lyon, France from 18-22 July 2016. Organized every three years since 1945 by the International Union of Pure and Applied Physics (IUPAP), the conference covered a wide range of topics including traditional aspects of statistical mechanics, such as applications to hard and soft condensed matter, phase transitions, disordered systems and non-equilibrium physics, as well as emergent and modern applications such as turbulence, signal processing, complex systems and mathematics.

The conference took place at the Palais des Congrès de Lyon, a superb facility, including a main meeting room and a complete set of rooms for sessions, all within walking distance. It has hosted 1350 participants. In addition to many French delegates, the larger conference delegations were from Japan (119), Germany (94), United States (85), Italy (73) and South Korea (70). More than 50 nationalities were represented including participants from Georgia, Kuwait, New Zealand, Philippines and Uzbekistan.

The Boltzmann Medal for 2016 was awarded during the Boltzmann Ceremony to Daan Frenkel and Yves Pomeau for their seminal contributions to Statistical Physics throughout their fabulous careers. Similarly, the Young Scientist Award for 2016 was awarded during the conference to Lisa Manning and Martin Lenz, recognizing their outstanding achievements as scientists at an early stage of their careers in the field of Statistical Physics.

In the unanimous opinion of the participants, the level of plenary talks and different contributions was outstanding. The poster sessions, hosting nearly 700 presentations, were also a great success. New scientific collaborations have emerged from these numerous presentations, thanks to discussions during walks in the beautiful close by Parc de la Tête d'Or, or even during the gala in the reception rooms of the City Hall.

A moving human rights session was organized, as well as a memorial talk for Boltzman medalist Leo Kadanoff who passed away a few months ago. We also maintained a very friendly atmosphere throughout the conference: from the enthusiastic reception by the dynamic team of volunteers, through to the discovery of Lyon traboules. There were two official morning jogs around the Parc de la Tête d'Or and an intercontinental football tournament on Wednesday afternoon: team "Amerika" won the first Statphys World Cup!

Statphys26 has once again been a wonderful illustration of the international adventure that is Science. It has shown us that the mixing of backgrounds, approaches and origins is surely the way to go, taking us together towards uncharted territories and new discoveries. We are delighted that Statphys26 has resulted in such great success.

The C3 commission has announced that the next issue in the series, Statphys27, will be taking place for the first time in South America: Buenos Aires in Argentina. See you there!



The Boltzmann medalists Daan Frenkel (left) and Yves Pomeau (right) around Itamar Procaccia, Chairman of the IUPAP C3 commission.



Recipients of the Young Scientist Award, Lisa Manning (left) and Martin Lenz (right), around Itamar Procaccia, Chairman of the IUPAP C3 commission.

YOUNG SCIENTIST AWARDS

Commission on Semiconductors (C8)



2016 - Kimberly Dick Thelander

For her work in controlling and understanding the growth of nanowires, including three-dimensional structures, superlattices, crystal phase engineering and bandgap design.

Kimberly Thelander is a Professor of Materials Science at Lund University, Lund, Sweden, appointed jointly at the division of Solid State Physics and the Center for Analysis and Synthesis. She completed undergraduate studies in Chemical Physics at the University of Waterloo, Canada, followed by a PhD in Physics from Lund University.

Her research is focused on the development of novel materials in nanostructures, specifically focused on unusual polytypes and alloy semiconductors in III-V nanowires. Most recently, she has been involved in the development of in-situ TEM for real-time investigations of nanowire growth.



2016 - Samuel Stranks

For pioneering discoveries in the field of perovskite solar cells and optoelectronics through spectroscopy.

Sam Stranks is a TED Fellow and a Marie Curie Fellow currently based jointly at the Massachusetts Institute of Technology and Cambridge University. He graduated from Adelaide University in 2007 with a BA and BSc (First Class Honours in Physics) and a University Medal. He completed his PhD as a Rhodes Scholar at Oxford University with Robin Nicholas, receiving the 2012 Institute of Physics Roy Thesis Prize for his work on carbon nantoube/

polymer blends for organic solar cell applications. From 2012-2014, he worked as a post-doctoral researcher in Henry Snaith's group at Oxford University where he was also a Junior Research Fellow at Worcester College and Lecturer in Physics at Corpus Christi College. He will establish his research group at Cambridge University as a Royal Society University Research Fellow in October 2016.

Sam's work focuses on understanding and manipulating the optoelectronic properties of metal halide perovskites, which are generating a great deal of attention for their use in high performance solar cells and light-emission applications. He was involved in many of the early breakthroughs in this burgeoning field, including the first reports of long carrier diffusion lengths, visualization of ion migration in these materials and description of charge carrier recombination kinetics.

Commission on Atomic, Molecular and Optical Physics (C15)



2016 - Yu-Ao Chen

For his outstanding contributions on quantum information and simulation

Yu-Ao Chen received his Master's degree from the University of Science and Technology of China (USTC) at Hefei (China) in 2004, and his doctorate from Heidelberg University (Germany) in 2008 under the supervision of Prof. Jian-Wei Pan. After spending several years as postdoctoral researcher and project leader working with Prof. Immanuel Bloch in Germany, he returned to USTC at Shanghai (China) as professor to start up his own group in 2011.

He covers a wide range in the field of AMO physics. He has carried out numerous outstanding achievements, namely multi-photon entanglement in quantum information processing, quantum memory toward long distance quantum communication, and recent work on quantum simulation with ultra-cold atoms in optical lattices.

He has been awarded many prestigious prizes including the 2013 Fresnel Prize for fundamental aspects from the European Physical Society and the Qiu Shi Outstanding Youth Scholar in China.

Commission on Computational Physics (C20)



2016 - Jianwei Sun

For his innovative and deep achievements in developing efficient and accurate density functionals for computation in quantum chemistry, materials science, and condensed matter physics

Jianwei Sun received his Ph.D in physics from Tulane University in 2010 and continued with his postdoc work there till 2013. He subsequently moved to the College of Science and Technology at Temple University as a Research Assistant Professor of Physics and was promoted to Research Associate Professor of Physics in 2015.

He moved to the University of Texas at El Paso as an Assistant Professor in July 2016. Jianwei Sun has been working on the development of density functional theory (DFT) and its applications for more than 10 years. He has designed several efficient and accurate nonempirical functionals that are drastically different from old seminal work and stimulating the rethinking and reconstruction of old seminal work. The recently developed SCAN density functional is potentially useful throughout materials science, condensed matter physics, chemistry, and biology.



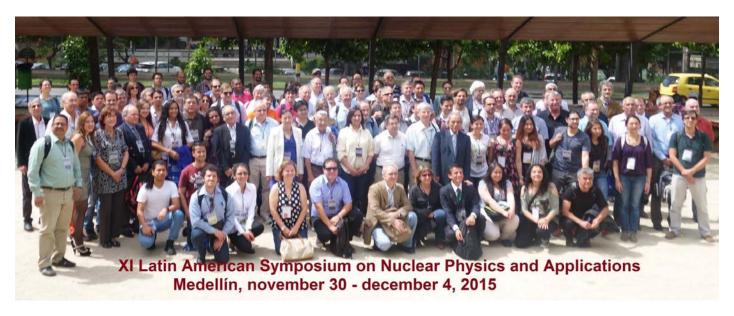
Conference Report 2015 – 2016

At the **20th International Conference on Magnetism (ICM)**, held in Barcelona, Spain from 5/7/2015 – 10/7/2015, Prof. Chia-Ling Chien, recipient of the 2015 Magnetism Award and Néel Medal, presented a lecture entitled "Golden Era of Modern Magnetism". Plenary talks were also presented by Andrew Millis on "Continuous time quantum Monte Carlo methods: from quantum impurity models to real materials", Eugenio Coronado on "Molecular spintronics", Eijih Saitoh on "Spin current generators" and Oliver Gutgfleisch on "Magnetic Materials for Green Technologies". 15 semi-Plenary lectures were presented by outstanding speakers covering the most relevant activities in topic areas mentioned above, among them were Dr. Marius V. Costache and Dr. Masamitsu Hayashi, recipients of the C9 - 2015 IUPAP Young Scientist Award.



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At the **XI Latin American Symposium on Nuclear Physics and Applications (LASNPA)**, held at Medellin, Colombia from 29/11/2015 – 4/12/2015, topics discussed included, probing early universe particle physics with neutrons at the Institut Laue-Langevin, the quest for an electric dipole moment of the neutron and the Microscopic Description of 6He elastic scattering on heavy targets.



At the **XXVII IUPAP Conference on Computational Physics, CCP2015**, held at the Indian Institute of Technology Guwahati, Assam, India from 2/12/2015 – 5/12/2015, a number of topics were discussed: Statistical Physics, Complex System and non-linear dynamics, Soft Materials and Polymer Physics, Computational Biological Physics, Quantum Many Body and Strongly Correlated Systems, Material and Nano Sciences, Astrophysics, Plasma, Gravitation and Cosmology, Atomic, Molecular and Optical Physics, High Energy, Nuclear and Particle physics, Fluid Dynamics, Oceanography, Geophysics and Climate modeling, Computational Physics Education, Software and Hardware Development. Eminent scientists from all over the world presented the state of the art activities in these areas. Key emphasis was placed on the application as well as availability of computations.



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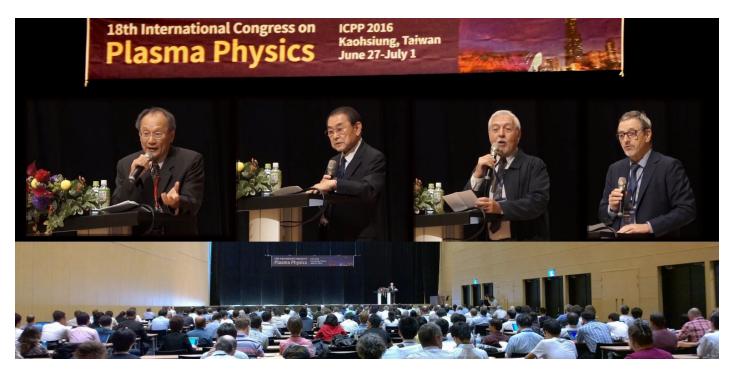
At the **Sixth International Conference on Nanostructures (ICNS6)**, held on Krish Island, Iran from 7/3/2016 – 10/3/2016, two important workshops were held in conjunction with the conference entitled "How to prepare papers for publication in high impact Journals" and "Commercialization in Nanoscience" which were greatly welcomed by the participants and it is hoped that it will be the start of a trend of more practical conferences. The conference was also attended by distinguished world- renowned scientists who held different scientific sessions and workshops.



http://www.nanosharif.ir/page.asp?id=489



At the **18th International Congress on Plasma Physics (ICPP-2016)**, held at the Kaohsiung Exhibition Center, Kaohsiung City, Taiwan from 27/6/2016 – 1/7/2016, the scientific program consisted of one keynote lecture, 8 plenary talks, 164 invited talks, 65 oral talks, and 115 poster papers. In the plenary and invited talks, the most up-to-date development of plasma science and technology were presented. Two special issues of the ICPP-2016 are now planned for publication. The Nuclear Fusion (NF) will publish a special issue in magnetic confinement physics and the Plasma Physics and Controlled Fusion (PPCF) will publish a special issue in all other areas.



At the **24th International Conference on Supersymmetry and Unification of Fundamental Interactions (SUSY 2016)**, held at the University of Melbourne, Melbourne, Australia from 3/7/16 – 8/7/16, discussions included summaries from ATLAS and CMS on their searches for supersymmetric particles which confirmed no excesses in data recorded by the LHC at 13TeV during 2015. These results have enabled the experiments to eclipse previous limits on supersymmetric particles set by data recorded at 8TeV. SUSY 2016 saw a diverse range of talks representing many sectors of the vibrant theory community. The properties of the Higgs boson continues to be a strong motivational force, leading to new results in precision Higgs mass calculations in a variety of models and studies of the alignment limit. The absence of any signal from the LHC has also led to much work on "non-minimal" SUSY, which goes beyond the minimal supersymmetric Standard Model.



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At the **XXVII International Conference on Neutrino Physics and Astrophysics**, held in London, UK from 4/7/16 – 9/7/16, the longand short-baseline neutrino oscillation physics, solar, atmospheric neutrino measurements, the physics of astrophysical neutrinos and their impact on astronomy and cosmology, were reviewed. New results were reported by the NOvA (US) experiment, the T2K experiment and the reactor neutrino experiments Daya Bay, Double Chooz and RENO. The observation of high-energy cosmic neutrinos (IceCube and Antares) was exciting and opened a new field of multi-messenger astronomy. Progress in the search for dark matter and 0nu2beta decay were also presented. The prospects of the field and the development of novel developments in accelerators and detectors were discussed.



http://neutrino2016.iopconfs.org/IOP/media/uploaded/EVIOP/event_582/Group_Photo_-_Copy.jpg

At the Celebration Of The 2015 International Year Of Light: Official Launching Of The African Optics And Photonics Society (LAM 11)- International Workshop On Light, Optics, Lasers, Photonics And Applications For Sustainable Development, held at Dakar, Senegal from 23/11/15 – 27/11/15, there were laboratory sessions on laser multispectral imaging in collaboration with partners from ISP at Uppsala University in Sweden. Research groups in Mali, Senegal, Cote d'Ivoire Kenya and Ghana received new equipment on laser multispectral imaging to take home.

Upcoming Conferences

8-11 October 2016 Atlanta, USA 13th Mathematical Results in Quantum Theory (QMath13) 2-5 December 2016 Bangkok, Thailand 22nd International Conference on Medical Physics (ICMP)