Vol 6, Issue 3,September 2014 Webpage Email

Physics Comment

A Southern African Physics Magazine

Physics & Family

Interview with Silver Medalist Dr Weltman

A Quarterly Newsletter Issue No 3 - Spring 2014

National Support Centre for Science ?

Will there be a new national "meta" research facility to develop equipment for other research facilities? (p 4)

Physics Education

SAIP continuous its Physics teacher development project (p. 6) and tackles the physics education crises identified by the Review of Undergraduate Physics Training in SA. (p 24)

MSc Space Science

New Masters programme at UCT (p 20)

SAIP President reports

The annual report of the SAIP President gives an overview of the current activities of the SA Institute of Physics. (p.23)

Editorial board: T. Konrad and A.D.M. Walker

Contents

Editor‘s Note

The news broke at the beginning of last week that the South African Department of Energy might be interested in purchasing up to eight Russian nuclear power plants with pressurised water reactors (total capacity 9.6 GW) for up to 50 billion US $ (p. 4). Such an investment would have a huge impact on physics university education and research in South Africa. Nuclear power is still viewed controversially by the public in connection with its safety issues, the nuclear waste it produces and its monetary costs. What do Physicists think? I would like to invite a debate in Physics Comment. Please send me your opinion (letter to the Editor). Should South Africa rely on nuclear power of this magnitude for its energy security?

In this issue of Physics Comment we report on one of the ideas for new national research facilities, the so-called National Support Centre for Science - a kind of meta “work shop” tasked to develop tools for other research facilities (p. 4). For example, this could be the design of new components of a synchrotron beam line, high throughput electronics for SKA or CERN, or equipment for a space platform. How to be a dedicated scientist without sacrificing your family life is discussed in an interview with the winner of the SAIP De Beers Silver Medal, Dr Amanda Weltman. Dr Weltman’s advice: work on interesting scientific problems, because it is liberating, and marry wisely. Among other things there is news from the very active Women in Physics workgroup (p. 13) and about a new Masters programme in Space Studies at the University of Cape Town (p. 21).

With best wishes
Prof. Thomas Konrad

Caption of picture on frontpage: Dr Amanda Weltman and her family. With kind permission of Dr. Weltman.

Physics Comment is a journal published by the South African Institute of Physics (SAIP) and appears quarterly . The vision of the SAIP is to be the voice of Physics in South Africa.

News from South Africa

The National Support Centre for Science (NSCS)

Prof Simon Connell, University of Johannesburg.

The DST is offering Physicists the chance to motivate for a new National Research Infrastructure. This emerged following the first phase of the South African Research Infrastructure Roadmap project. The DST engaged in a very visionary and deeply consultative process involving two inclusive workshops held during 2013 with the full South African Research community. The report emerging from this process can be accessed as a public document on the DST website:
http://www.dst.gov.za/images/pdfs/SARIR%20Report%20Ver%202.pdf

Several new National Research Infrastructures (RI) are proposed in this document. The new national RI proposed to be located within Physical Sciences and Engineering, is the National Support Centre for Science (NSCS). This centre would have a critical mass of equipment and expertise in the design and fabrication of sophisticated research instrumentation. It would drive excellence in a wide range of fields which require a significant high technology capacity for measurement, sensing, diagnosis, fabrication and modification in a way that may exhibit extreme sensitivity, perhaps in extreme or novel environments. It would have wide applicability. So for example, it could involve the capacity to develop the components one may find in a modern synchrotron beam line, or the high throughput electronics components for a SKA or CERN detection system, or equipment in the modern medical treatment or diagnosis of disease, or for space platforms. One's imagination could extend this list. Such a high-tech design and fabrication centre would support both the participation and

The NSCS could be located on the campus where there is already substantial research infrastructure (such as iThemba LABS, NECSA or the CSIR). It would then attract further RI's and Scientific Industries to that campus. The example above shows the Lund complex (ESS, Max IV with many other associated high tech Industries and RI's).

The South African research community would access it as a National Facility

leadership in the use of large-scale local and international infrastructure as well as extending the capacity for developing local instrumentation. The South African research community would access it as a National Facility. It would lead to the development of a cohort of manpower for design and fabrication in this space. It would establish the equipment and procedures required. It would ultimately build excellence in science and also develop competitive industry. It could be seen as creating a platform which motivates the feasibility of the next generation of large scale infrastructure South Africa might establish, in fact, the same document envisages this as a stepping stone to an African Light Source (further in the future).

A 25 page "Meta-design" report must be ready by the 30th October 2014. This will be used in a ranking process. The selected RIs will then proceed further. Conceptual Design Reports (CDR) and Technical Design Reports (TDR) should be completed by 31 March 2015. These will then be used in the final decision for support.

Prof Simon Connell (UJ) has been appointed by the DST to act as the champion for the development of the Meta-design report, and possibly the CDR and TDR if this RI is selected to proceed. All colleagues with an interest in the National Science Support Centre should please interact with him. It is expected that the Centres of Excellence, the existing National Facilities, as well as the programmes that access large scale infrastructure will be beneficiaries and can therefore contribute to the Meta-design report. However, any researcher who has an interest is welcome to contribute.

The process of developing the Meta-design report will be hosted through a webpage of the SAIP:

http://www.saip.org.za/NSCS

You may use this collaboration tool, or you may e-mail Prof Connell directly: (shconnell@uj.ac.za).

Purchase of Nuclear Power Plants from Russia?

by Prof T.Konrad, UKZN, Durban

The South African Department of Energy (DOE) announced in a press release on the 23. September that an intergovernmental agreement on a strategic partnership in nuclear energy between South Africa and Russia was signed. Similar agreements would be planed with other vendor countries of nuclear power plants. Earlier press releases of the DOE and of the South African Nuclear Energy Cooperation (NECSA) indicated a potential purchase of up to 8 nuclear power plants with Russian VVER reactors (Pressurized Water Reactors) with a total capacity up to 9.6 GW for up to 50 billion US$ (R 556bn) from Russia. An investment of this magnitude might massively change the employment and research landscape for physicists in South Africa.

So far only commercial nuclear power plant on the African continent: Koeberg 30 km north of Cape Town, operational since 1984/86. Photo © Philipp P Egli/Wikimedia

Former SAIP President Simon Connell comments: " $50 billion spent on Nuclear Power would be a significant boost for Physics. Advanced training in Physics is essential for all aspects of Nuclear Power, which includes design, construction, operation, management and finally decommissioning of Nuclear Power plants as well as the fuel cycle from mining and fabrication to waste management. It is primarily the

correct implementation of physics principles that ensures safety and efficiency. The SA economy desperately needs a green modality for base load provision. South African physicists have been active for several years in designing training courses and developing the capacity to contribute to this important new undertaking."

Materials Physics Flying High at NMMU

Mrs Lindsay Westraadt - Project Coordinator Centre for HRTEM, NMMU, Port Elisabeth

The Centre for High Resolution Transmission Electron Microscopy (HRTEM) is very proud of Prof Jan Neethling who was awarded the prestigious NMMU 2014 Researcher-of-the-Year Award for his work in the field of materials physics and advanced electron microscopy. Prof Neethling is the Director of the Centre for HRTEM and a Professor of Physics at NMMU. His research focuses on the use of advanced electron microscopy in the analysis and development of a wide range of strategic materials including ceramics used in nuclear fission reactors, nanoparticle catalysts, semiconductors, diamond, and metal and platinum alloys.

Prof Neethling campaigned for more than 12 years to obtain support for the establishment of an advanced HRTEM facility in South Africa. Success came in 2008 when the funding for the Centre for HRTEM was approved by the DST and the NRF, and the official opening of the centre took place on 11 October 2011. Since the launch of the centre in 2011, Prof Neethling has been instrumental in initiating extensive local and international collaboration networks which now include research institutions and universities in South Africa, Japan, Russia, China, Germany, Sweden, the United Kingdom and the USA. In its short existence, the Centre for HRTEM has already produced a number of cutting-edge research articles, and is positively contributing to both industrial and academic research in South Africa. In 2013 alone Prof Neethling authored/co-authored 10 articles in refereed journals and 28 refereed conference proceedings.

Prof Jan Neethling (Director: Centre for HRTEM)

Source: Tandetron Accelerator Systems, High Voltage Engineering, specification document

3 MV Tandetronaccelerator for iThemba LABS

Prof Carlos Pineda-Vargas : iThemba Labs Manager: Materials Research Department

In a meeting of the 23rd July 2014 the NRF Board awarded a BID to High Voltage Engineering EUROPA B.V. to supply, install and commission a 3 MV Tandetron Accelerator for the Materials Research Department (MRD) at iThemba LABS. The finalisation of this milestone was due to the contribution and effort of many colleagues at the NRF and iThemba LABS.

> The MRD would like to share this success with the scientific community interested in low energy accelerator, ion beam analysis and surface science

The MRD would like to express our gratitude to the CEO, Dr van Jaarsveld, the Management team at iThemba LABS, in particular to Dr Lowry Conradie for his kind assistance, advice and wise suggestions in all the steps of the tender process and to the MRD Users Advisory Committee and the MRD Users community as a whole for their constant support on this project. The MRD would like to share this success with all the MRD users and all the scientific community in general interested in low energy accelerator, ion beam analysis and surface science. "This is a time for jubilation at the MRD after a process that took almost a year and will benefit substantially the development of state-of-the-art research and the creation of skill capacity in South Africa" expressed the Head of the MRD, Prof Carlos Pineda-Vargas. The manufacturing of the Tandetronaccelerator will take however about twenty four months, and the commissioning is expected to be on the third quarter of 2016.

South Africans visit Sweden

Prof Japie Engelbrecht, Physics Department, NMMU, Port Elizabeth

Members of the Physics Departments at NMMU and UFS recently attended the 65th Annual Meeting of the Nordic Microscopy Society (SCANDEM 2014) which was hosted in Linköping, Sweden. Four oral presentations and two posters were delivered on semiconducting materials, metallic alloys, phosphors and biological samples during the 2-day conference by the South African group.

Prof Peter van Arken (Max Planck Institute, Stuttgart, Germany and Honorary Professor at NMMU), Miss Geneveve Deyzel (MSc student) and Profs Japie Engelbrecht and Mike Lee. Mr MYA Yacoob and Prof Hendrik Swart of UFS were not available for the photo.

After SCANDEM 2014, the group was joined by more staff and students, including Profs Koos Terblans (UFS) and JR Botha (NMMU), for the 4th Linköping – Port Elizabeth / Bloemfontein Workshop. The workshop, organised by Profs Erik Janzén and Per-

Left: the South African/Swedish Collaborative Research group, together with some family members, outside a restaurant near Karlskrona,

Olof Holtz of Linköping University, was held in Karlskrona, Sweden from 15th – 18th June, 2014. Eighteen oral presentations were presented during the report back meeting. These workshops are the result of the South African/Swedish Collaborative Research Programme which was initiated by Profs Japie Engelbrecht and Erik Janzén. After the morning oral sessions, the group visited the local university in Karlskrona and various industries (including Aberdare Cables) in the afternoons.

For more information : Contact Prof Japie Engelbrecht (Japie.Engelbrecht@nmmu.ac.za).

Author Biography: Prof Japie Engelbrecht is Professor Emeritus in the Physics Department at the NMMU. He has been active in the field of semiconducting materials characterization by infrared spectroscopy, complimented by electron microscopy, for the past 35 years. He also serves as chair of the Division for Physics of Condensed Matter and Materials.

Teacher development: Taking a quantum leap into the future

Dr Sam Ramaila – Chairperson: Council Education Committee (SAIP)

In pursuit of a common vision, the South African Institute of Physics conducted a teacher professional development workshop in partnership with the University of Johannesburg, Institute of Physics (UK) and the Gauteng Department of Education during the period 30th June – 2nd July 2014. This significant event took place at the Soweto Campus of the University of Johannesburg inspired by the meaningful enhancement of mathematics and science education for sustainable development.

Chief Executive Officer of Shanduka Group, Ms Phuti Mahanyele, delivering the keynote address

Delivering the keynote address during the workshop, the Chief Executive Officer of Shanduka Group, Ms Phuti Mahanyele, reflected on the significance of the role played by teachers towards the realization of strategic socio-economic priorities in society. As a flagship project of SAIP, the Teacher Development Project is viewed as a viable and sustainable means through which concerted efforts aimed at human capital development can be consolidated and brought to full fruition.

Above:Teachers who attended the workshop. Below: Teachers during the interactive sessions

Embracing the atmosphere that prevailed during the workshop characterized by the zeal to acquire knowledge for genuine professional empowerment, Director of Johannesburg Central District Ms Tshepo Seate recognized teachers' demonstrated courage and resilience in discharging their professional responsibilities in the face of pervasive fundamental challenges. In this regard, the need for skills development as a central pillar for accelerated growth in key areas of human endeavour cannot be overemphasized and this basic consideration augurs well for global competitiveness. Despite their complex ramifications, various sectors within the economy need skills and this key imperative requires a return to basics in terms of the provision of essential training and teacher professional development is no exception.

Director of Johannesburg Central District, Ms Tshepo Seate, with Prof Azwinndini Muronga (Director of UJ Soweto Science Centre) and Dr Igle Gledhill (SAIP President) during the workshop

Exciting annual SAIP conference at UJ

Mr Brian Masara, EO of the SAIP, Pretoria

The University of Johannesburg hosted the 2014 South African Institute of Physics annual conference at its Kingsway campus in the week 7-11 July 2014. The conference attracted 500 physicists from around the country, as well as several prominent guest speakers from the Americas, Europe and Asia.

The conference was officially opened by the Minister of Science and Technology, Naledi Pandor, on Monday 7 July 2014.

The conference was preceded by 3 workshops and 2 winter schools. The winter schools were held on

- Magnetism – Materials science and Nanotechnology
- Astroparticle physics critical for CTA, MeerKAT and SKA

The following workshops were hosted

- National Laser Centre Rental Pool Meeting focusing on promoting laser physics of the SA community.
- Workshop on Photovoltaics
- AMS workshop at iThemba Labs Gauteng where Africa's first accelerator mass spectrometry (AMS) facility was unveiled by Science and Technology Minister Naledi Pandor on 7. July 2014.

- Teacher Development Session - On Friday 11 July 2014 the Education Division hosted a full day workshop with teachers from Gauteng.

Key highlights from the SAIP 2014 included the following

- A plenary lecture on the latest progress of the construction of the Square Kilometer Array (SKA), delivered by Prof Justin Jonas.

- Prof Emmanuel Tsesmelis, of the European Organisation for Nuclear Research (CERN) and Oxford University, talking on the dramatic discoveries made at CERN in recent years, including the long anticipated finding of the Higgs boson, which resulted in the awarding of the Physics Nobel Prize to the discovery team (which included South African participation).

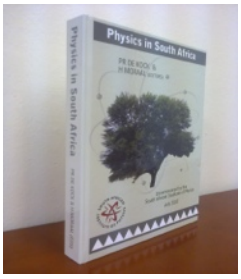
- Local innovation also came into the spotlight during the talk by Prof Andrew Forbes of the CSIR, whose team was much in the news last year for their digital laser.

Other plenary speakers included theoretical physicist Prof Toshimi Suda of Tohoku University, Japan, nanoscientist Prof Eric Fullerton of San Diego University, USA, photovoltaics expert Prof Vladimir Djakanov, based in Germany, photonics specialist Prof Miles Padgett of Glasgow University, Astrophysicist Megan Donahue of Michigan University, USA, Prof Cedric Linder (Uppsala, Sweden) and Prof Marcia Barbosa (Brasil) who shared talks in Physics Education and Women in Physics, respectively.

The conference was concluded on Friday evening at the De Beers Banquet where the SAIP was awarding the prestigious De Beers Gold Medal, Honorary Membership and Student Prizes. Prof Nithaya Chetty and Prof Japie Engelbrecht were awarded Honorary membership of SAIP. Prof Manfred Hellberg was awarded the De Beers Gold Medal.

Photos of the conference will be published on the SAIP webpage.

Purchase the book Physics in South Africa



Order from SAIP Office.

The book is currently available from the SAIP Office in Pretoria in hard copy and currently priced as

a) Hard covered Copy R500 per copy

b) Soft covered Copy R250 per copy

Courier and postage fees is for the customer's account.

To order your copy please Email or Phone +27 12 841 2655/2627.

WiPiSA Departmental Lunches Funding Opportunity

Prof Aletta Prinsloo, alettap@uj.ac.za,

Two of the main objectives of WiPiSA are

- to encourage and stimulate an interest in girls and women to study physics

- to support girls and women to work in physics-related careers and assist in removing/overcoming obstacles and barriers for girls and women in their studies and at workplace.

To meet this objectives we initiated an idea to have departmental lunches across universities within South Africa. The lunch activity is expected to bring women in physics together; academics, those in leadership roles and students (both undergraduates and postgraduates) to enjoy a meal together while encouraging and stimulating interests in others to study physics, networking and talking about some challenges they are facing as women in physics.

WiPiSA will provide a funding of R3000-00 only for your institution to organize the lunch. We therefore request you to help us accomplish this goal, or forward the name and contact information of the representative from your department to facilitate this activity. We would appreciate if the lunch event can be held before the end of November 2014 as this will help us to compile a report. WIPiSA expects you to send us:

- A short report about the event (venue, number of attendees, activities, etc).

- The outcomes of the event (students were motivated, links established, etc).

- Few event pictures.

Please do not hesitate to contact me at *tibanmm@unisa.ac.za* for further enquiries.

Join SAIP Membership

By Brian Masara (SAIP office, Pretoria)

Physics is a basic science that is a basis for all science and technology disciplines. This results in physics graduates working in every sector imaginable. Therefore SAIP caters for a wide range of industries and economic sectors.

SAIP membership includes any physicists who graduated with at least physics related degree working in either; industry, commerce, government, academia, research, theoretical physics, experimental physics, and uses physics skills and thought processes in their job/career.

Why Professional Membership is Important

Academic qualifications are only the beginning of a career in physics and its applications. The need for continuing professional development is widely recognised to be the mechanism by which professionals maintain their knowledge after the formal education process has been completed. By becoming a member of a professional society one demonstrates their commitment to maintaining competence in their field through continuing your professional development from activities such as conferences, schools and workshops and abiding by an acceptable code of conduct. Membership of a professional society is an important addition to a physicist's personal credentials for example when competing for a job membership of professional society will distinguish one from other applicants with similar qualifications but no professional affiliation.

What members say about SAIP membership

Dr Igle Gledhill - It's useful to have a professional home that is not an employer or an alma mater. I came back from four years in the USA and switched fields at the same time. Funnily enough, SAIP is home – the banquet is a hoot, the conferences keep me up to date, the Institute is serious about science in South Africa and gets things done, and my colleagues keep me on my toes.

Dr Daniel Moeketsi - SAIP provide a platform to showcase physics research progress and direction in the country and expose students to many career opportunities both in public and private sector. I encourage postgraduate students to subscribe for SAIP membership and actively participate in the organisation's annual activities.

Membership benefits

I. Stay informed - News flashes and alerts to are sent directly to your email. A quarterly magazine, Physics Comment, will keep you briefed on physics news, government policy and jobs in industry and academia.
II. Specialist Groups and Networking - Through the various activities of SAIP, networks have been established with the African and International Physics communities, to benefit all our members. You'll make important new contacts and forge lifelong professional relationships by getting involved in a specialist group.
III. Save Money - You'll receive discounted rates for SIAP conferences, and have the benefit of paying affiliate membership fees for IOP membership.
IV. Employment opportunity information - Job advertisements will be displayed on our new website and mailed to members from time to time.
V. Access to current information on sources of funding grants and scholarships - Exclusive service provided to our members via a direct email system.
VI. Scientific meetings - The annual conferences and workshops provide learning opportunities for different specialisation areas and varying degrees of experience.
VII. Especially for the global physics community - You'll have the opportunity to be partake in events organised by the SAIP for the Physics community in South Africa as well as Africa: developmental workshops, schools and conferences.
VIII. Additional resources - Your membership privileges also include information and guidance when applying for and acquiring visas to study, participate in scientific meeting and research opportunities in South Africa and abroad. There is also an exclusive member-only area on our website.
IX. Career guidance and resources - Career assistance is provided to all members to find their career path in industry or academia.
X. Opportunities to win awards for excellence - SAIP recognises contributions to physics in SA by awarding two different medals and various student prizes at the annual conference.
XI. Teaching and Learning Resources for schools - As part of our growing outreach programme we provide teachers and learners with the tools and opportunities to allow and motivate more learners to follow careers with physics as a background.

JOIN SAIP TODAY CLICK THE LINK BELOW FOR MORE INFORMATION ON HOW TO APPLY

http://www.saip.org.za/index.php/members/membership-info

Free SAIP Membership for 3rdYear and Honours Physics Students

Mr Brian Masara, EO of SAIP, Pretoria

The SAIP Council passed a resolution to extend free membership all 3rd Year Physics students and all Honours Physics Students. In order for 3rd year and honours students to be given free SAIP membership they must do the following

1. Approach their supervisor or physics head of department and ask them to send a request to SAIP
2. The HoDs / Supervisors can choose to make their students free SAIP members
3. The supervisor or HOD can send an email with the students' names and email address to SAIP on info@saip.org.za

The 3rd year and honours students will have the following benefits

- Receive all SAIP electronic communication such as the Physics Comment magazine and adverts for scholarships, conferences and jobs.
- Attend the SAIP annual conference as student membership rates

This subscription will be valid for 1 year from January to December only hence for honours students they can ask their supervisor/HoD to renew it every year in January.

SA Physics Graduates Database

By Brian Masara (SAIP office, Pretoria)

If you have a degree in physics and you are currently working, studying or unemployed and resident in South Africa, or have studied physics in South Africa we kindly request you to sign up and give us your personal statistics. We need you! The statistics we collect, with your help, will be used to influence legislation, decision-making and all matters related to physics funding required for training more physicists.

Read more details here on confidentiality and great benefits of signing up and updating your details

To register click here .For enquiries contact SAIP Office at info@saip.org.za

A South African in "The District"

Dr Igle Gledhill, SAIP President, August 2014

A recent visit to Washington, District of Columbia ("The District"), opened opportunities between the SAIP and the US physics communities. Lawrence Norris, a very active member of the National Society of Black Physicists, arranged a series of meetings with the stars in the week just after the US-Africa summit in the same city.

Ambassador Rasool, South African Ambassador to the USA, was enthusiastic about the ties between the astronomy and astrophysics groups in the two countries. The opportunities for collaboration with the USA are inflating within this community. I became aware of the new field of astrodiplomacy: at a government-to-government level, signals are exchanged and acknowledged with delicacy and tact, and commitments are approached with profound preparation. Across the scientific community, enthusiasm is bounding to new heights, and invitations to work together are manifest.

I became aware of the new field of astrodiplomacy...

A cluster of astronomers assembled at the SA Embassy to discuss possibilities. Kartik Sheth, of the National Radio Astronomy Observatory, has close ties with present and future SA observatories already. Maura McLouglin spoke with warmth of Partnerships for International Research and Education (PIRE) opportunities in the International Pulsar Timing Array. Fred Raab, Director of the LIGO Hanford Observatories, would rejoice to see South Africans become involved in LIGO, with an observatory in LIGO's phase 3, but immediately through numerical relativity; follow-up code efficiency – with computer scientists; and detector characterisation. The last problem is a beautiful set of physics challenges: with 300-400 servo channels to monitor signals that are not gravity waves, how does noise get vetoed?

Science impact is booming at the NIST Center for Neutron Research to the extent that the number of beam lines has been doubled, and so has the physical size available. Here is Dan Neumann (following picture), Director of the Neutron Condensed Matter Science Group, with a section of the beam guide.

South African physicists may recognise below Guebre Tessema (NSF and "Shaping the Future of Physics in SA"), Dan Neumann (Director of the Neutron Condensed Matter Science Group), Lawrence Norris (very active member of the National Society of Black Physicists), Richard Ibberson (heading the Research Facilities Operations Group), and Fred Raab (Director, LIGO Hanford Observatories).

The National Cancer Institute is keen to build collaborations with South Africa through both SAIP and SAAPMB, the SA Association of Physicists in Medicine and Biology, with whom links are growing. George Redmond introduced 11 of his colleagues. Digital Imaging Standards, with a link to genomics, are of considerable interest in the USA and would benefit both countries. With proper standards, we may be able to choose more appropriate treatments not only from images of a tumour, but the surrounding tissue as well. Informatics, big data, and analytics play expanding roles all the way from radiation therapy to particle physics to environmental radiation protection.

Dorothy Beckett is the President of The Biophysics Society, and made time for excitement about possible collaborations and mutual benefits in the field. As in South Africa, capturing the interest of girls and boys at high school, and training university undergrads, are top of the agenda. How about movies of flying through a protein structure, shown in a planetarium?

There was time to visit Ted Hodapp of the American Physical Society to talk about programmes with teachers and education across the world (Ted Hodapp attended the IUPAP Int. Conf. on Women in Physics in Stellenbosch, 2011). At APS, Amy Flattan and Michelle Erwin exposed international travel and collaboration programmes that we can use.

Many South Africans will know Beth Cunningham (below left), of the American Association of Physics Teachers, and the Mas-

ter Teachers programme, with whom I also met; and very many will remember Jackie Beamon-Kiene (above right) from ICWIP 2011 in Stellenbosch.

Jim Gates (above right), now a Science Advisor to President Obama, traces his defining moments in the science-policy interface back to the "Shaping the Future of Physics in SA" review. Note the number plate. His Adinkra symbols in supersymmetry and supergravity have their roots in West African symbology. We agreed over lunch: the top priority in SA physics now, with research racing ahead, is educating our kids well and thoroughly in physics.

Please direct enquiries on collaborative opportunities to Brian Masara (EO) or Igle Gledhill .

Medals and Awards

2014 De Beers Gold Medal Winner: Manfred A Hellberg

by Prof Kristian Müller-Nedebock, SAIP Council

The SAIP 2014 De Beers Gold Medal was awarded to Professor Manfred A. Hellberg at the SAIP De Beers Banquet held on 11 July 2014 at Helderfontein Conference Centre. The Medal was handed over by De Beers representative Dr Cecil Churms Senior Scientist for the De Beers Group of Companies.

Left: Dr Igle Gledhill (President SAIP), Centre: Prof Manfred Hellberg (Gold Medalist), Right: Dr Cecil Churms (De Beers)

The 2014 De Beers Gold Medal of the South African Institute of Physics was awarded to Professor Manfred A. Hellberg for his achievements as a researcher and his significant role in the promotion of physics in the South African Physics community.

Following bachelor's and honours studies at the University of Cape Town, Manfred Hellberg pursued a Ph.D. in theoretical plasma physics at the University of Cambridge. This degree was awarded to him in 1965, which is also the year in which he joined the academic staff of the University of Natal at Durban. The greatest part of Prof. Hellberg's scientific career was spent at this University and its successor, the University of KwaZulu-Natal, where he is currently professor emeritus and senior research associate. At his home institution he has held senior administrative positions, including Dean of Science, and acting deputy vice-chancellorships.

Prof. Hellberg's research area involves theoretical studies of the properties of plasmas, in particular on linear and nonlinear electrostatic waves in kappa-distributed plasmas. His work includes, amongst other topics, studies on linear waves also involving Maxwellian plasmas and soliton behaviour, and most recently, solitons beyond the double layer speed and supersolitons. His papers are highly cited. Prof. Hellberg has held numerous distinguished research fellowships, including the Von Humboldt Fellowship and fellowships at

Princeton University. Among the other academic distinctions he has received are fellowships of the Royal Society of South Africa, the UK Institute of Physics and the honorary membership of the SAIP.

A member of the South African Institute of Physics since 1962, Manfred Hellberg has served and continues to serve the broader physics community in a variety of functions. These include a term as president of the SAIP, representation internationally in the International Union for Pure and Applied Physics (IUPAP) and activity on many councils and boards. Most recently, he has acted as convenor of the panel for the report "Shaping the Future of Physics in South Africa", which has had a fundamental and extremely positive impact in the physics community. He also headed the Astronomy Desk at the Department of Science and Technology in a time crucial to South African astronomical projects and collaborations.

Professor Hellberg was awarded the De Beers Gold Medal for 2014 for his outstanding research career in plasma physics that has earned him international recognition in this field and for the numerous contributions he has made in his service to Physics in South Africa, and, with his significant experience, represented South African Physics internationally.Lorem ipsum dolor sit amet

Prof Nithaya Chetty awarded SAIP Honorary Membership

by Prof J. Engelbrecht, Port Elizabeth

Prof Nithaya Chetty was awarded Honorary membership of SAIP at the SAIP 2014 in view of his vast contribution to SAIP and physics community.

Prof Chetty raised the issue of transformation of the SAIP at an Annual General Meeting of the Institute in 1999. Initially there was some resistance to the idea, but Prof Chetty persevered. His integrity and professionalism was accepted, and under his tactful guidance and leadership first the logo and then the Constitution of the Institute was modified to reflect the democratic society of South Africa. Prof Chetty continues to contribute to the activities of the Institute in many ways and on many forums.

Prof Nithaya Chetty is thus awarded for Honorary Membership of the South African Institute of Physics, for leading the transformation of the Institute.

He served actively on the SAIP Management and Policy Committee which oversaw the international review of Physics in South Africa. He was elected to the SAIP Council in 2005 and served as President from 2007 to 2009. He has been active in the Solid State Physics and Materials Science Specialist Group. The value of interaction among physicists is high on his agenda, and he has served among many others on the organising committees of the Chris Engelbrecht Theoretical Physics Summer Schools, and the IUPAP Conference on Physics and Industrial Development, Durban (1998). He headed the SA delegation to the IUPAP General Assembly in 2002, having attended as Capacity Building member in 1999. Prof Chetty was particularly active in the reformulation of the Constitution and By-laws of the Institute, a task which was very time-consuming, which required a great deal of consultation, and which was very necessary. He is now a member of the SAIP Policy Advisory Group.

Prof Chetty has been elected to the IUPAP C20 Commission on Computational Physics and won the bid to bring the IUPAP Conference on Computational Physics to SA for 2017. He continues to work untiringly for collaboration and excellence across the physics and astronomy communities, and in his position within the Astronomy Desk structure at NRF, has built good working relationships between different groups in the advent of big science in the form of SKA, SALT, and HESS (to name a few observation platforms).

While these achievements are important and place South Africa on the international scene, it is the manner in which he has approached them that supports this award best. He has demonstrated great personal courage in defence of academic freedom. He supports excellent science as the goal which draws us together as physicists. He has supported the Institute as the forum in which debate is encouraged and the voices of physicists can be heard. Prof Chetty has been instrumental in building the role of SAIP as the Voice of Physics in South Africa.

Prof Japie Engelbrecht awarded SAIP Honorary Membership

by Dr Igle Gledhill

Prof Japie Engelbrecht was awarded Honorary membership in view of his dedication to the health and spirit of the South African Institute of Physics. He was elected to Council in 2001, and has served as Treasurer since that year. In this capacity, he has taken SAIP through over 12 years of extraordinary change.

In this time, the Institute observed a crisis in the physics community in South Africa, and motivated a review which changed the relationship of physics with government and with membership profoundly. As a result of the review recommendations,SAIP became one of the very few South African institutes with full-time staff members: two full-time and two part-time staff members were appointed. Membership numbers rose steeply, and the attendant complexities for the Treasurer were taken calmly in stride.

SAIP was enabled to engage with government and manage projects of a different order of magnitude in funding. The SAIP total budget rose from to R 2.5 million by 2014, excluding international conference budgets. Two major IUPAP Conferences were hosted by SAIP. Over the last 4 years, 11 workshops and conferences have been hosted in addition to the Annual Conferences, and the SAIP accounts have never wavered in this onslaught of activity. The flow of funds for an increasing number of projects was managed meticulously by Japie, and the number of major projects is now approximately 10.

During his watch as Treasurer, SAIP became VAT-registered, and it was decided to appoint a Financial Officer in 2013 to relieve the Treasurer of the administrative load.

Japie has handled the varying demands of divisional and institute award funding, and supervised the striking of the Gold and Silver Medals.

As Head of the Department of Physics at NMMU and an extremely active and eminent physicist, he has chosen to work for the benefit of the whole community of established and young researchers.

At every turn, he has upheld the integrity of the Institute, and spoken fearlessly in defence of the values of the growing physics community. He has been a strident voice for lower conference fees and accessibility of the conference to students. He has brought uncompromising reasoning, to Council, and has urged the IUPAP General Assembly to control costs and concentrate on member benefits. He gives his time unstintingly and with joy, and has inserted a wry twist of humour into intense and fraught discussions to save the day.

A new working group for Women in Physics in South Africa (WiPiSA)

by Dr Emanuela Carleschi, University of Johannesburg

Following the election of the new WiPiSA Chair held during the WiPiSA lunch at the last SAIP Conference hosted by the University of Johannesburg, a new working group for WiPiSA has been established. We have the pleasure of introducing to the community the people constituting the working group and their portfolios:

- Prof Aletta Prinsloo (UJ) – WiPiSA Chair; portfolio: coordination of all the WiPiSA activities, writing of funding proposals and funding administration
- Dr Sarah Buchner (SKA Offices Cape Town) – WiPiSA Secretary; portfolio: administration
- Ms Hellen Moyahabo Chuma (UL) – WiPiSA student representative; portfolio: community engagement and outreach
- Dr Emanuela Carleschi (UJ); portfolio: maintenance of the WiPiSA website, social media, and relationship to the community
- Prof Simon Connell (UJ) – WiPiSA male representative; portfolio: fundraising
- Dr Irvy (Igle) Gledhill (CSIR) – SAIP President; portfolio: link between WiPiSA and the broader SA Physics community
- Dr Malebo Tibane (UNISA) – previous WiPiSA Chair; portfolio: ensuring continuity with the past working group and for the ongoing WiPiSA activities
- Mr Brian Masara – SAIP Executive Officer; portfolio: link to SAIP office and activities, and organizational support

The first meeting of the new working group was held at the University of Johannesburg on Friday 12th September. During the meeting, it was decided that the committee should mostly focus on the following aims during the next two years:

- Attracting girls and women into physics
- Retaining and promoting women in physics by improving institutional and leadership structures

The visibility of WiPiSA amongst the broader community has been pointed out as the most relevant issue at this point. Therefore, the WiPiSA webpage will be revamped, as well as the WiPiSA Facebook page. Moreover, the database of the women working in physics departments, research institutes and industry in SA will be updated, in order to create a national network where women can find shared experiences, advice and support.

In order for us to do what we aim for, we need all the support that the community can give us. We are therefore looking for enthusiastic people (women and men, of course) to coordinate our activities on site. If you feel enthusiastic about this initiative, if you want to contribute and to dedicate some of your time to drive initiatives for women in physics and science in your community/university/institute, to make not only the physics community, but the country overall a better and more just place, please contact Prof Aletta (alettap@uj.ac.za) or Dr Emanuela (ecarleschi@uj.ac.za).

Let us share our dreams and hopes for the future of women. Because a physics community that is better for women, is better for us all!

The new WiPiSA working group: (left to right) Brian, Igle, Hellen, Aletta, Emanuela, Sarah, Simon. (Malebo was not present.)

UCT Astronomy WiPiSA Lunch

by Dr Sarah Blyte, UCT

With the generous support of Women in Physics in South Africa (WiPiSA), Prof. Renée Kraan-Korteweg in the Department of Astronomy at the University of Cape Town hosted a lunch for women in Astronomy on 17 September 2014. Women students in Astrophysics from first year through to PhD, postdoctoral fellows and female faculty members were invited and we managed a turn-out of 36 women! We were even surprised ourselves at the large number! The aim of the lunch was to show junior women in academia the options available to them with a degree in Astrophysics, both inside and outside academia and to show them, that there are successful women in a male-dominated field like Physics and that the number of women in the field is growing.

Prof. Kraan-Korteweg kicked off the lunch with a welcome and various faculty members shared some of their experiences of being women researchers and their various and differing career paths. We were treated to an excellent guest speech by Dr Carolina Ödman-Govender who provided insights into life for physical scientists outside of academia. This is something that is often neglected in academia since faculty members are not fully aware of the opportunities that exist to scientists outside of pure research careers and therefore it is often difficult for students to find out about them. The feedback from the students who attended was that these insights were very valuable as they weigh up their futures. There was also discussion of work/life balance and the importance of mentors. A highlight of the lunch was the award to Dr Amanda Weltman of the 2013 Jubilee Silver medal by Prof Kraan-Korteweg on behalf of the SAIP. A short interview of Dr Weltman follows. As a department we were very encouraged by the success of the lunch and plan on this becoming an annual event.

UCT WiPiSA lunch attendees.
Photo credit: B. Kuck.

Interview with Dr Amanda Weltman, Silver Medal Winner.

PC: **Dr Weltman, what is a 'chameleon' particle and how can it be detected?**

Dr Weltman: A chameleon particle is a new kind of particle whose mass and thus behaviour depends sensitively on its environment. It interacts with all kinds of matter particles and is thus detectable in a broad range of experiments on earth and in space. For example quantum laser experiments, casimir force experiments and IAXO - the proposed new axion telescope at CERN hold the possibility of detecting a chameleon field. More indirectly, we may be able to constrain or find signatures of these fields through astrophysical experiments and radio astronomy observations for example using MeerKAT or the SKA one day. Essentially by comparing subtle effects in regions of high and low density we may be able to tease out its effects in astrophysical observations.

PC: **You obtained your PhD from the Columbia University in New York and worked as Postdoc at the University of Cambridge in England. Why did you come back to Cape Town, where you had started your studies?**

Dr Weltman: My husband and I love South Africa and we felt that we would have the possibility to make a far greater impact on science and society in South Africa which is our home than we would in the USA or Europe.

***PC*: Your example shows that it is possible to win awards as a scientist without sacrificing family life. What would you advise young Physics students with the same aim to do?**

Dr Weltman: I don't think there is any one algorithm or path to follow to make it work. There are many subtle ingredients that have made this recipe work for me and I think other scientists all have their own blend. What has been crucial has been to find and maintain support structures. For many that is one's parents or grandparents, friends, cousins, neighbours, colleagues and most importantly one's spouse. If you want to make a family

life and a career work, I think it is crucial to have a spouse that recognises and respects what you do and who is willing to negotiate with you the delicate dance that is managing any career and a young family. I have found science to be a fantastic career for having a young family though it is filled with all kinds of unique challenges. Finding good partnerships is invaluable in life - a good life partner, colleagues and friends - really does make it easier to find the balance or to at least ride the wave without ever perfectly being in balance. My advice for young physics students is to focus on the physics and do good work. Try to work on interesting problems in new ways. It is liberating and if you are enjoying the science you will find a way to always fit it all in. And marry wisely. And be willing to constantly readjust your expectations of yourself in every arena. Some days you will rock and others you will want to crawl under a rock.

***PC:* How can Physics be made a more popular career choice in South Africa, in particular among females?**

Dr Weltman: I don't really know. I don't really know if we should be trying to do that. I think, rather, we should be teaching our daughters (and our sons) that they can be whatever they aspire to be and we should be providing them with the tools to do that. This means excellent education at a very early age and it means lots of role models. But rather than selling physics as a career choice - I think we should be investing in the women that do make this choice or want to make this choice - to make it a more sustainable option. I have seen excellent initiatives in the USA and in other areas of science - biology for example - where funding agencies provide support to make it more possible for women in their field to be more involved through the critical early family years. I have seen grants to provide for childcare, for travel funds for women to attend conferences with their children and a caregiver even for women to buy washing machines to reduce their workload at home (biology!). Maybe we should be investing in the women that are entering the field and in the field to ensure that we create a next generation of mentors and then the students will naturally follow.

Prof. R. Kraan-Korteweg (left) with Dr A. Weltman (right). Photo credit: B. Kuck

Obituary: Dr. Michael (Mike) Gaylard

by the Hartebeesthoek Radio Astronomy Observatory

It is with a great sense of loss that we have to announce the passing away of Dr. Mike Gaylard, Director of the Hartebeesthoek Radio Astronomy Observatory, a National Facility of the National Research Foundation.

The memorial for Mike Gaylard was held at HartRAO on Friday 22 August.

Mike was born on July 1 1952 in what was then Salisbury, Rhodesia (now Harare, Zimbabwe). He attended school in Salisbury and did his B.Sc. at the University of Rhodesia, followed by his B.Sc. Honours. He then came to Rhodes University in South Africa, and completed his M.Sc. on "The Performance of a 22 GHz Radio Telescope" in November 1976.

He joined the staff of the NITR (National Institute for Telecommunications Research), the parent institute of HartRAO on 1 December 1976. During 1977-78 he worked at NITR in the ionospheric propagation section and joined the HartRAO staff in January 1979. His first project at HartRAO was to commission the recently completed digital correlation spectrometer. He used this for his initial research work at HartRAO which was in the field of HII regions and recombination lines at 2.3 GHz. He was also the system manager for the HP computers used for controlling the telescope and associated equipment. He developed much of the software for automating observations and for analysing spectral line data.

Mike completed his Ph.D. on "Radio Studies of Ionised Hydrogen in the Southern Milky Way", using the HartRAO 26m telescope, in 1989. His work branched out into the field of 1612 MHz OH masers with the installation of the 18cm receiver in 1985. His field of work then enlarged to include methanol masers in star forming regions, where he collaborated extensively with Dr. Gordon Macleod (then of HartRAO) and Dr. Johan van der Walt of University of the North West. With the expansion of staff members at HartRAO, he became the leader of the Spectral Lines Programme and had some 70+ publications to his name. He supervised M.Sc. and Ph.D students, especially with Dr. Johan van der Walt at NWU, and then expanded to other universities as well. Some research staff members from HartRAO have gone on to become part of the SKA project.

He also headed the Science Awareness Outreach Programme at HartRAO from 1991. Creating an awareness of science in young people was one of his passions. Several staff members from the HartRAO Science Awareness Programme have also gone on to be part of the SKA project.

Mike was instrumental in the conceptualisation of the African Very Long Baseline Interferometry (VLBI) Network (AVN), a vision to have a network of radio astronomy telescopes throughout Africa, and actively participated in and championed its development. The AVN has the potential to spread radio astronomy as a science across the African continent.

He was among the key people who helped get the National Astronomy and Space Science Programme (NASSP) started. The NASSP school at HartRAO was something he enjoyed organizing and which has helped introduce a generation of SA astronomers to the practicalities of radio observing. He also understood that South African astronomers would do so much better working together than in their individual silos.

In an international context, Mike was the driving force behind South Africa's membership of the Joint Institute for VLBI in Europe (JIVE), which carries out a wide range of research and development activities in VLBI-

related fields, including radio astronomy data processing and applications of VLBI and radio astronomy technologies.

Mike Gaylard had the ability to make time to talk to and encourage students, even within a very busy schedule. To many young people he set a great example as a leader and a scientist. He will be sorely missed by family, colleagues and students.

Articles

Plasma physics of the upper atmosphere and inner magnetosphere

by Prof M Kosch [1]

Under the South Africa-UK Scientific Seminar Scheme sponsored by the Royal Society, London and the National Research Foundation a number of space scientists from the United Kingdom and South Africa were invited to take part in a seminar workshop on "Plasma physics of the upper atmosphere and inner magnetosphere " held at the South African National Space Agency's scientific institution in Hermanus from 10-12 September 2014 . The meeting was organized by Prof Mike Kosch. The major objective of the meeting was to explore the opportunities for cooperation and collaboration in a variety of fields of ground-based space science.

An important focus was the current international interest in the van Allen radiation belts and participants made a point of emphasizing how their own programmes and expertise could contribute to their study.

The topics of discussion covered a wide field from the low neutral atmosphere to regions deeper in geospace.

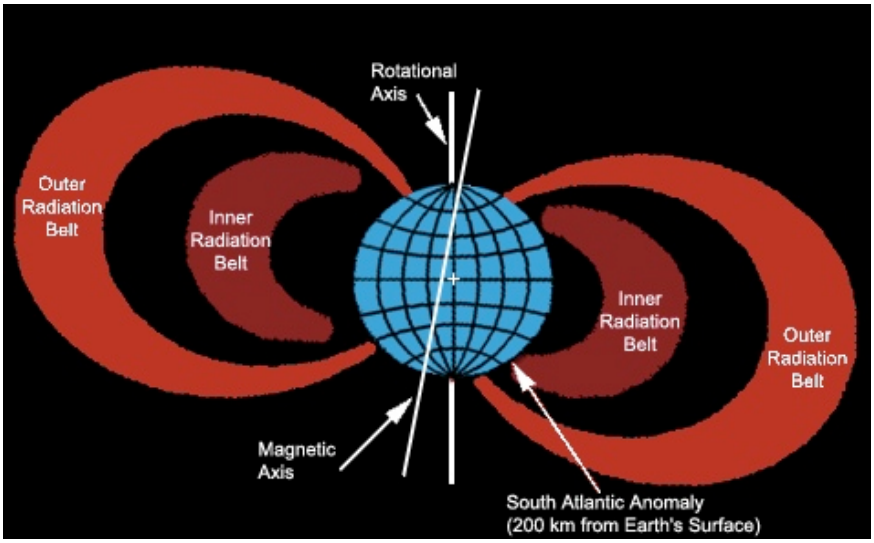
A large number of key questions were indentified to which the group could make a contribution. Processes of transport and loss of energetic particles in the radiation belts dominated these.

Radiation belt particles are trapped in the geomagnetic field. In a uniform field they would follow spiral paths. Because the field lines converge as they approach the earth they are reflected and bounce between hemispheres. Because of the inhomogeneity of the field the bouncing motion is accompanied by a drift in the azimuthal direction so that they drift round the Earth on field lines that intersect the equatorial plane at approximately constant radius. Interaction with various types of waves can disrupt these motions. Interaction with the fields of VLF (very low frequency waves ~2 to 50 kHz) can change the helical pitch angle so that the particles penetrate deeper in to the neutral atmosphere, collide with neutral molecules and are

Participants

Dr. Mark Clilverd (British Antarctic Survey)
Dr. Mick Denton (Lancaster University)
Dr. Martin Füllekrug (University of Bath)
Prof. Mike Kosch (Chair) (SANSA and Lancaster University)
Dr. Clare Watt (University of Reading, UK)
Dr. Shimul Maharaj (UKZN).
Dr. John-Bosco Habarulema (SANSA) .
Mr. Morne Gijben (SA Weather Service).
Dr. Carel Olivier (SANSA)
Dr. Stefan Lotz (SANSA)
Dr. Shimul Maharaj (SANSA)
Dr. Heather McCreadie (UKZN)
Prof. Jon Rash (UKZN)
Prof. Sivakumar Venkatamaran (UKZN)
Prof. David Walker (UKZN)
A few of of the South African delegates originally invited were unable to attend and were represented by colleagues.

1 Prof Kosch is Chief scientist at SANSA Space and also holds a part time position of Prof of Space Physics at the University of Lancaster UK. This article is based on his report of the meeting, The information is used by permission.



"Courtesy NASA/JPL-Caltech."

lost. Interaction of the drift bounce-motion with ULF (ultra low frequency waves with periods of the order of 5 to 20 minutes) can cause diffusion across the magnetic field lines leading to large scale redistribution of the particles.

Ways of studying these processes include

- using the AARDVARK international chain of VLF receivers detecting signals guided in the earth-ionosphere waveguide together with a chain of spectral riometers extending as far as Sanae base in Antarctica to quantify the total radiation belt losses into the atmosphere.
- Using a spectral riometer on Gough Island to investigate the South Atlantic Magnetic Anomaly's contribution to the total radiation belt losses.
- Use spectral riometers on Marion Island (RSA) and at Rothera (UK) to investigate slot region precipitation .
- Compare ground-based and satellite particle precipitation data using existing RBSP (Radiation belt storm probe) and the new Japanese ERG (launch December 2015) satellite missions.
- Use SuperDARN radars (RSA has a radar at Sanae (Antarctica) and the UK has such several radars in both hemispheres) to measure the electric field due to ULF waves at the ionospheric boundary and deduce field-aligned currents, Joule heating and particle acceleration/loss from the radiation belts.
- Use artificial VLF wave injections by high-power VLF transmitters to study wave-particle interactions in the radiation belts and with ground-based optics to help quantify the radiation belt loss process.

Another hot topic was the study of transient luminous events above thunderstorms (sprites, elves and other fanciful labels). An ideal site for South African observations might be the Sutherland astronomical observatory. The extensive lightning detection arrays available in South Africa are a valuable resource. Africa is the only continent with the north and south mid-latitudes over the same land region. This should be exploited to gain understanding of positive ionospheric storm effects. The contribution of travelling atmospheric/ionospheric disturbances to ionospheric storm effects should be quantified. Off-axis solar flares and coronal mass ejections from the sun can be studied by using ground-based magnetometers and the Polar Cap index found from such is a proxy for solar wind energy entering the magnetosphere. The index predicts magnetic substorm onset by several minutes and has a linear relationship to substorm intensity.

The meeting ran smoothly and generated much debate and many questions, both during and after the sessions. As listed above, many opportunities for scientific collaboration were identified and various funding opportunities will be investigated. From the initiators' point of view, the meeting was an unqualified success.

UCT introduces new masters programme in Space Studies

Dr Peter Martinez

SpaceLab, University of Cape Town

The Space Age began on 4 October 1957 with the launch of Sputnik, the world's first satellite. Sputnik was basically just an orbiting radio beacon, but it started a revolution in space applications. Since then, space technology and space applications have developed to such an extent that they are now part of the critical infrastructure of the modern information society. Space applications are also a key contributor to sustainable development in areas such as food and water security, weather prediction, climate change monitoring, environmental resource management, disaster management, search-and-rescue, financial transactions, urban planning, telemedicine and tele-education, to name but a few.

With so many useful space applications, the African space arena is evolving rapidly. A number of African countries having recently established space agencies, or are considering doing so in the near future. The South African National Space Agency (SANSA) was established in 2010. All of these developments are creating a demand for space professionals in Africa. There is thus an urgent need to develop human capital in this domain on the continent.

The University of Cape Town has introduced a new multidisciplinary masters programme specialising in Space Studies. This programme is aimed at anyone who wishes to enter the space sector, or wishes to deepen his or her knowledge of this sector. No prior knowledge of space technology is required or assumed. Potential participants include young professionals seeking to enter the space sector and established professionals in military, government or private sector positions who encounter space science and technology issues in their day-to-day work and are seeking to acquire a broad knowledge of the space sector.

Space Studies encompasses the study of outer space and all aspects of space activities, whether of a purely scientific and exploratory nature, or of a utilitarian nature to improve the daily lives of people on Earth.

A multi-disciplinary qualification

The space domain, by its very nature, is multi-disciplinary. This programme provides an interdisciplinary postgraduate qualification that exposes participants to all the key aspects of space science and technology, with emphasis on space applications for societal benefit. The programme provides a balance of the scientific, engineering and applications aspects of space technology, as well as the policy, financial, commercial and regulatory aspects. The programme is offered through the Faculty of Engineering and the Built Environment at the University of Cape Town.

Programme structure and duration

This is a two-year programme. The first year of the programme comprises coursework that provides a broad foundation in space studies. In the second year, the participants complete a research dissertation on a topic of interest to them. Depending on the progress of the participant and the topic of the research dissertation, participants may be permitted to upgrade to a PhD during the dissertation phase of the programme, in which case programme completion would require at least three years.

YEAR 1
- Core Courses
- Elective Courses

YEAR 2
- Thesis + optional elective courses

The *Space Mission Analysis and Design* module focuses on the definition, analysis, design and development of space systems. This component also addresses the space environment and access to space.

The *Space Applications* module focuses on the applications of space technology, with hands-on experiential learning in a number of applications areas. These activities are aligned with identified national and African needs and priorities

The *Space and Society* module focuses on the societal aspects of space applications and covers the security, policy, regulatory and financial aspects of public and private sector space activities, as well as national and regional space programmes. This component also has an element of space awareness and outreach in which participants are trained in how to communicate effectively with the public, policy makers and the media.

In addition to the compulsory core courses, participants must complete further elective coursework. This is to encourage participants to deepen their knowledge of particular aspects of space technology, or to broaden their multi-disciplinary knowledge of space technology and its applications.

Participants then deepen their knowledge of a specific discipline by completing a research-based dissertation in that discipline. Thesis topics are chosen in alignment with identified research needs in the national and continental space programmes. A multi-disciplinary approach to the consideration of each particular research topic will be encouraged.

The academic curriculum and research components of the programme will be developed and updated in alignment with several needs required to support sustainable development in Africa. These needs are being identified by the South African National Space Agency, the emerging African Space Policy of the African Union Commission and the United Nations space applications programme.

Mode of delivery
The programme is designed to accommodate participants who cannot be resident in Cape Town for the full duration of the degree. The courses are offered in intensive one-week or two-week blocks, with pre-contact reading and post-contact assignments and various distance-learning activities. Participants are required to be in Cape Town for the intensive course periods. Students also have the opportunity to visit local space facilities.

The dissertation topics are chosen to align with each student's academic background and interests. Participants completing the programme on a part-time basis with the support of corporate or government sponsors are encouraged to choose thesis topics of relevance to their work situation and/or their sponsoring institutions.

International character
The presenters on the programme are drawn from a wide range of local and international space experts. The programme is thus a local South African programme with global exposure to space activities. The programme endeavours to attract a diverse student cohort as well, both geographically and in terms of academic background of the participants. Networking is an important aspect of this programme. The programme aims to produce a cohort of African space professionals who share a common training experience during which they form friendships that they will take forward in their careers.

Prior knowledge and experience
Applicants should have completed a four-year degree in any discipline of Engineering, Science, Mathematics, Law or Commerce. No prior knowledge or experience of the space arena is required, or assumed. Participants will be required to complete all the compulsory courses in the programme and will be encouraged to support each other in a cross-disciplinary manner.

Physicists who have completed a BSc(Hons) in physics, or who expect to complete their honours degree in the 2014 academic year, are invited to apply for admission to the Space Studies programme in 2015.

Bursaries
A limited number of bursaries are available to support successful applicants.

More information
For more information about the programme, visit the website spacelab.uct.ac.za or send an email to spacelab@uct.ac.za .

SAIP President's Report AGM 11 July 2014

Dr I Gledhill – SAIP President

Abdus Salam, the Pakistani Nobel Laureate in Physics in 1979, observed: "*In the final analysis it is the mastery and utilisation of modern science and technology that distinguishes the South from the North*."

In time, I think this statement is even more relevant now than it was 35 years ago: in space, I've always been concerned about what constitutes "the South", since in relative terms it could include the whole earth or none of the earth. That aside, I find Prof Salam's words useful in moving from the past to the future.

During the year before the 2014 SAIP Conference, considerable activity has taken place in the physics community. I will summarise the major points briefly. However, I wish first to thank and congratulate our generous hosts, Prof Hartmut Winkler, Prof Steven Karataglidis, Dr Emanuela Carleschi, Prof Aletta Prinsloo, Prof Charles Sheppard, and *all* the members of the Department of Physics at the University of Johannesburg, and the hard-working, dedicated, tireless Local Organising Committee. Unlike a pulsar, this conference is virtually glitch-free; like a pulsar, it shines like a beacon.

A significant event during this last year, conducted far from electromagnetic interference, was the launch of the first Meerkat antenna in the Northern Cape. While SKA is constantly used as a major indicator of the growth of South African science, the placement of the bulk of the array in our geographic region has already

had big implications for the way that science will be conducted in future in South Africa. Billion dollar projects are noticeable, and require good governance, excellent organisation, and funding beyond anything our community has dealt with before. With these come interdisciplinary collaborations between physics and finance, between burgeoning science and bureaucracy, and between political interest and the pursuit of proof. It is essential for the science community to cohere under these circumstances. In physics and astronomy, an overriding drive to accomplish good science has served the community well during the last year.

The astronomers, cosmologists, and particle physicists have followed their respective fields of interest and found that they need the same field of view. The great questions of physics of the 20th and 21st centuries will need attention by minds trained in widely divergent fields, in which even the nature of evidence may seem to differ. It is therefore more essential than ever that scientific infrastructure in South Africa provides a space in which rational debate can be held, in which well-informed debate can be fostered, and in which the fundamental nature of science is respected.

The South African Institute of Physics provides such a space at every meeting. It is not only the Voice of Physics in South Africa but must truly represent the members as scientists, and therefore be the ears and eyes of Physics, and it must engage the brains of physics.

Membership

Membership is free for 3rd year and Honours students, and is considerably reduced for post-graduate students. Teachers are being enthusiastically welcomed as Associate Members. Retired members receive reduced rates at the Annual Conference. I encourage students to join and to participate in the national science infrastructure.

Undergraduate teaching and learning in Physics

The Institute's strategy during the past year has centred on a consideration of the future and the past. In terms of the future, it has been apparent from a multitude of sources that physics education is in crisis in South Africa. The Review of Undergraduate Physics Teaching and Learning was delivered in 2013 and confirms, in particular, that a substantial majority of students entering physics are under-prepared to cope with the concepts, work ethic, and basic tools required in their first year. The tasks posed by the recommendations are daunting and it is the success of the physics community in the past, in Shaping its own Future in a very successful way, that provides a strong intent to succeed again.

I'm delighted that every member of the Group of Experts has affirmed the willingness to continue into Phase 2, to take action. Prof Johan Malherbe has taken up the chair of this group, which includes Prof Craig Comrie, Dr Joseph Asante, Prof Makaiko Chitambo, Dr Mmantsae Diale, Prof Harm Moraal, Prof David Wolfe, Prof Ramon Lopez, and Prof Carl Weiman. As chair of the Division of Physics Education, Dr Sam Ramaila has taken up the valuable and central challenge of moving the implementation phase forward. Dr Ramaila has formed an able Planning Committee.

I have undertaken to visit every physics department between 2014 and 2015, and with the invaluable support of Prof David Wolfe have started with UWC, UCT, Stellenbosch, and UKZN (the last more informally). These visits will continue and the agenda is the implementation of the Review recommendations.

Here is a brief summary of the recommendations and progress:

1. SAIP coordinates the initiative: taking place. A plan of action (Recommendation 11) has been put in place and by Sam Ramaila, for which the SAIP owes him and the Physics Education Committee

considerable thanks.

2. A 4-year physics undergraduate programme should be adopted: this has been strengthened by the independent report of our partner, the Council on Higher Education.
3. Research-based innovation must be strengthened in underpinning undergrad physics teaching and learning: departments that have been visited so far each have physics education specialists, and in at least two very innovative teaching and learning methods have been piloted and are in use; one of these is the use of "whiteboard sessions" as student-driven tutorials.
4. More appropriate and rigorous techniques of monitoring and evaluating physics teaching should be employed: we may be lagging in real innovation here so far. I am open to correction.
5. Departments should guard against adjusting the standard of their degrees to accommodate students' lack of preparedness: observations so far indicate that departments are attempting to be rigorous in this respect and are aware of the problem.
6. Student work ethic: I hereby challenge the Physics Education researchers to provide all the departments in the country with their findings on the subject before July 2015.
7. Interaction between Education and Science faculties: this will be taken up at higher levels within universities.
8. The support of women in the physics community: is progressing well under the guidance of Women in Physics in South Africa. I encourage applications for projects from all regions, and ask for rigorous reporting.
9. Regional and national meetings have not yet taken place, and form part of the Plan of Action.
10. The tracking of graduate experience: occurs in some departments and is being actively put forward in others. The SAIP server overhaul, which is very necessary, has meant that the graduate database has been offline since January, and I sincerely hope to see it up and running soon.

Schools

The complementary part of the physics education strategy is the Development of Teachers. In 2013, the IOP London partnership in development workshops was very successfully piloted, and resulted in a substantial grant from the British High Commission and Institute of Physics (IOP), London, for a tremendous impetus to the programme: the Workshops have been scaled up from 30 teacher participants to 600, and physicists will recognise that any scaling of effort may be very non-linear. An enormous debt of gratitude is owed to Prof David Wolfe for his perseverance, courage, and passion for science in Africa in getting this moving. I would like to thank Dr Sam Ramaila, Case Rijsdijk, Prof Azwinndini Muronga, Brian Masara, and the partnership of the Gauteng Department of Education, the University of Johannesburg and the Soweto Science Centre, and IOP with SAIP. On July 1st this year, 600 teachers willingly gave up their leave and their script-marking to attend the workshop in order to improve their skills in physics teaching and their understanding of physics concepts. This is no mean sacrifice; the vibe at the workshop was tangible. The guest speakers, Ms Phuti Mahanyele, CEO of Shanduka Group, and Ms Tshepo Seate, Director of GDE Johannesburg Central, both held the attention of their audience effortlessly and with inspiration.

Over the last year it has become apparent that the crisis in education in maths and science is no longer the elephant in the classroom, but is acknowledged. It is also becoming apparent that engagement with the Provincial Departments of Education has been considerably more fruitful than engagement at a national level.

Professional Physicist Registration

Moving forward to the space of the practising Physicist, the structures needed for the Professional Physicist registration, prompted by the Minister of Higher Education and Training, have been put in place: Chapter 7 of the By-Laws have been amended to take account of the registration requirements, amendments to the Code of Conduct have been made, and both the Standards Committee and the Disciplinary Committee have been set up. Prof Johan Malherbe, who has deep experience across many years as a member of the SA Council for Natural Scientific Professions, has joined forces to help provide robust structures to support Pr. Phys. as a

registration of physicists who adhere to a Code of Conduct, protect the interests of the public, and are desirable and ethical professionals on company and institute staff.

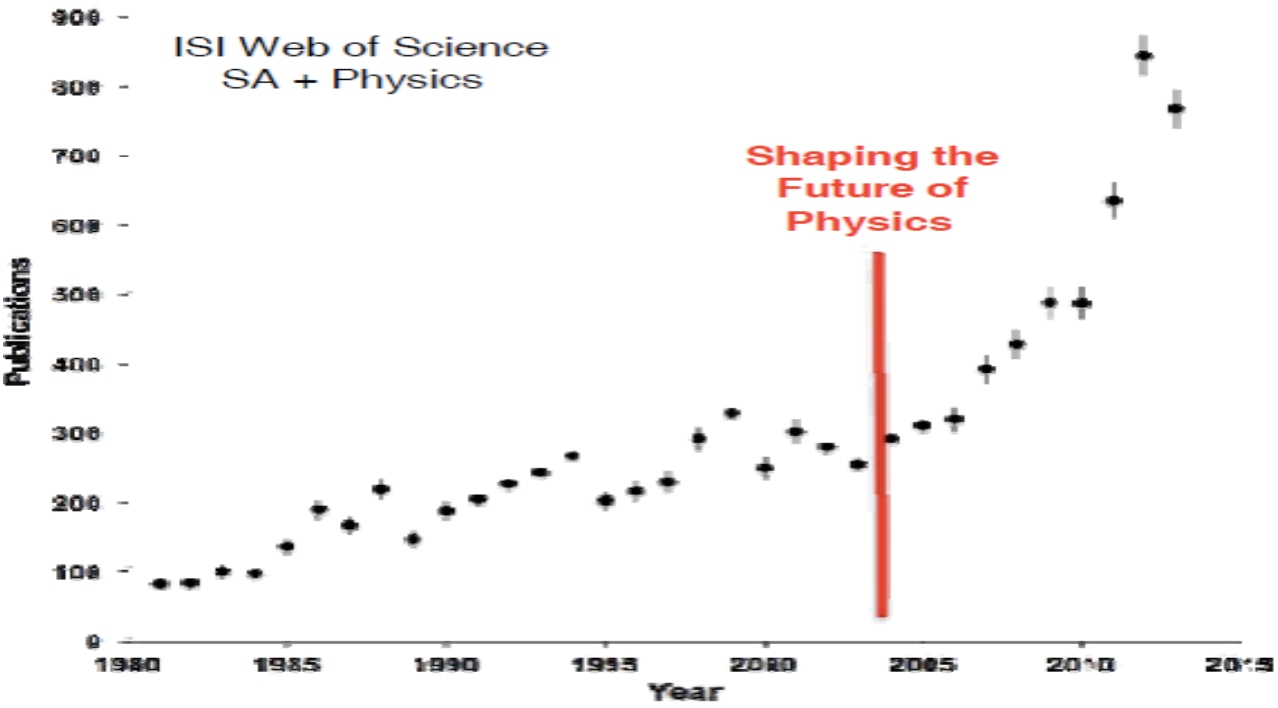
I'm delighted to announce that pilot registration has opened at the 2014 Annual Conference.

Physicists have been early adopters and are good at testing new processes. The piloting phase is intended to expose any unintended consequences and membership should contact the Executive Office to register and to comment on improvements.

Growth and Enablement

The SA community in physics is experiencing unprecedented growth. The SA Institute of Physics is concomitantly bulging at the seams with projects. The help that the Department of Science and Technology has given is beyond price, and included the personal support of both Minister Hanekom and Minister Pandor during the past year. Minister Pandor generously opened the 2014 Conference and issued several very direct challenges to the community, including the expansion of the Teacher Development Programme to the whole country.

I am often asked by other scientists how the physicists managed to do this - it is a completely different scale of operations from most of our sibling institutes. SAIP is driven by the initiatives that come from membership and through the Heads of Departments and Schools, through the Members, and through the Divisions and Forums. Without this vigorous proactive striving to test solutions, we would not have had the 2003-2004 Review "Shaping the Future of Physics", which was instrumental in establishing NITheP, WiPiSA, and other initiatives, but which also provided our community with a permanent full-time Executive Office. This is an enabling factor of unique significance. I would like to thank Brian Masara and his staff, Linette White, Roelf Botha, and Jan Meybergh. They run at far more than full capacity, and much effort is being directed towards enabling the expansion of the Office. Without them, we would accomplish very few of the actions that are taking us ahead more rapidly than ever before. I offer the following data, courtesy of Simon Connell, for consideration.



The Gold Medal

I'm delighted to announce that the de Beers Gold medal will continue to be sponsored through the generosity

of de Beers. This is the highest award in Physics in South Africa, and is indeed "precious and rare".

Proceedings

The decision to publish Proceedings of the Annual Conference is founded on the need to provide an opportunity to both students and practicing physicists to have a published record of their Conference contributions. It is an opportunity for South Africa to take another step upwards in providing local scientific infrastructure. The road is not easy and Roelf Botha, Brian Masara and Prof Ilsa Basson have been formally thanked by Council for going well beyond the call of duty to assist in moving forward. The current status for the years is as follows: 2011, published, 145 papers accepted, 40 withdrawn or rejected; 2012, Council now providing editorial support , 39 papers accepted, 25 papers rejected, 109 papers still in review; 2013, 8 papers accepted, 6 papers withdrawn or rejected, 96 papers with authors for corrections, 2 papers in review: the expected publication date is August 2013.

More Highlights of the past year

- On 10 July 2014, Rhodes University and SAIP won the bid for the 15th International Conference on Luminescence and Electron Spin Resonance Dating.
- South Africa has been chosen to host the Conference on Computational Physics in 2017 and an LOC has been formed under the leadership of Prof Nithaya Chetty.
- The "Physics Teacher Development Project" moved from 30 to 600 participants (see above).
- A Mobile Physics Laboratory is operated in partnership with the CSIR Nanoscience and National Laser Centre.
- The SA Physics Olympiad project has been initiated, and with contributions of questions and liaison from departments, will start in 2015.
- A Policy Advisory Committee has been formed. A position paper on Secondary Education in SA has been drawn up and sent to the Chair of the SA ICSU Board, Prof Saths Cooper.
- Mr Brian Masara has become SAIP's scarce skills representative.
- The Marketing and Outreach programme reaches schools and publishes career brochures, information leaflets, and addresses Public Understanding of Science, particularly in order to assist aspirant physicists to convince their families that physics is a respectable and attractive profession. Many thanks to Prof Thomas Konrad and his team.
- Physics Comment is published quarterly. Prof Dave Walker has lent his very considerable experience to the Editing Desk of PC, and Prof Thomas Konrad has become a relentless newshound.
- The book "Physics in South Africa", edited by Runan de Kok and Harm Moraal, is completed and on sale through the Gift Shop.
- An increased number of press releases has been generated and SAIP's profile has been raised.
- A fully-fledged conference organising system is now available and has a sterling track record of international conferences.

- The SAIP INDICO system is fully up and running for conference management. Abstract and paper submission is running smoothly in 2014.
- A reviewer database has been gathered and is being grown. Please volunteer if you have not done so already. SAIP needs you.
- The Gift Shop is providing income to assist in sustaining the EO operations.

- The National Committee for IUPAP has participated in two ICSU Workshops.
- Dr Sahaal Yacoob has been accepted as a member of IPPOG, the International Particle Physics Outreach Group.
- Nominations have been made by the NC for: Chair of the NC of the International Astronomical Union, a member of the ICSU Executive Board, and eleven IUPAP positions.
- A substantial website upgrade has been undertaken.
- The Council has drafted a Strategy Review, including a situational analysis, benchmarking, self-evaluation, a strategic plan dealing with both intended and emergent strategy, and a 10 year plan to guide financial sustainability. Key environmental elements at present are the Human Capital pipeline, public understanding of physics, the increasingly multi-disciplinary aspects of physics, SAIP, Physics and the SKA, and government strategy.

International developments

SAIP supports and coordinates the National Committee for IUPAP, the International Union of Pure and Applied Physics, which emerged from the Solvay Conferences and was formally founded in 1922. South Africa was one of 13 founder members. Dr Rudzani Nemutudi has continued to serve as Associate Secretary General of IUPAP. Prof Adri Burger, Prof Deena Naidoo, Prof Patrick Woudt, and Prof Nithaya Chetty have served on Commissions C4, C14, C19 and C20 respectively. I have had the honour as serving as Vice-Chair of Working Group 5 on Women in Physics. For the new term of office, 11 nominations for Commissions were made. South Africa holds two votes in IUPAP.

Very strong ties with the Institute of Physics, London, the National Society of Black Physicists, USA, the African Physical Society, and the African Academy of Sciences continue. Through these links, SAIP has been able to assist in positioning South Africa for the projects of the future as well as the major projects moving forward today.

Governance and Council

SAIP is VAT registered. It has successfully registered with the Department of Social Welfare as a Non-Profit Organisation. Prof Alan Matthews has agreed to join Council as Treasurer, with oversight of the financial strategy of the Institute, and is heartily welcomed.

During 2014, Prof Japie Engelbrecht retires as outgoing Treasurer. He was elected to Council in 2001, and has served as Treasurer since that year. In this capacity, he has taken SAIP through over 12 years of extraordinary change. As Head of the Department of Physics at NMMU and an extremely active and eminent physicist, he has chosen to work for the benefit of the whole community of established and young researchers. He fortunately continues his ties with SAIP through his able Chairmanship of the Condensed Matter Division.

I wish to thank the tireless and determined Executive Members of Council, Prof Frikkie Scholz, Prof Simon Connell, Dr Malebo Tibane, both treasures of Treasurers, Prof Japie Engelbrecht and Prof Alan Matthews, as well as the members of Council Prof Ilsa Basson, Prof Thomas Konrad, Prof Kristian Müller-Nedebock, Prof Azwinndini Muronga, Dr Sam Ramaila, Prof Patrick Woudt, Dr Mmantsae Diale and student representative Zipho Ngcobo.

I.M.A. Gledhill

President, South African Institute of Physics

SAIP Main Objectives

1. To promote study and research in physics and related subjects and to encourage the applications thereof;
2. To further the exchange of knowledge among physicists by means of conferences and publications;
3. To uphold the status of, and ensure a high standard of, professional conduct among physicists;
4. To promote physics for socio-economic development in South Africa;
5. To co-operate with other institutes or societies, to the benefit of both;
6. To make a difference by offering a wide range of services and projects addressing various community and developmental needs in the physics community and related stakeholders.

Strategic Focus Areas for 2015 and onwards

1. Membership
2. Services
3. Physics Education and Research
4. Physics for Sustainable Development
5. Organisational Excellence

Opportunities

UCT - Physics Lecturers X 2

The Physics Department within the Faculty of Science at the University of Cape Town seeks to fill two permanent academic positions at the lectureship level to strengthen its present research themes in High Energy Physics, and Experimental Nuclear Physics. iThemba LABS national laboratory is located close to the university, and UCT is presently growing its high performance computing facilities.

For the HEP position, we seek candidates who will link to our present contributions to either the ATLAS or ALICE collaborations at CERN, or to our present activities in high energy nuclear or particle physics theory.

For the nuclear physics position we seek candidates who will augment our present activities in experimental nuclear or particle physics, either fundamental or applied, using the facilities at iThemba LABS. Skill in radiation detector development or digital data acquisition would be an advantage, but is not a prerequisite.

For More Details and How to Apply Click Here

MSc and PhD Opportunities with UKZN

The University of KwaZulu-Natal has positions for MSc studies in the High Energy Physics on the ATLAS Experiment For more information please contact Dr. Sahal Yacoob Yacoob@ukzn.ac.za

The University of KwaZulu-Natal has positions for MSc, PhD, and Post-doctoral studies available. More information may be found here: http://caes.ukzn.ac.za/Bursaries.aspx

The research group of Prof T. Konrad at UKZN offers MSc and PhD positions in Quantum Computing and Quantum Communication with photons as well as in Quantum Measurement and Control of ions. Contact Prof Konrad: konradt@ukzn.ac.za

ICTP Prize 2014: Call for Nominations

Nomination deadline is 30 September 2014

ICTP Prize 2014: Call for Nominations

20/03/2014 - Trieste

It is time to nominate young researchers from developing countries for the 2014 ICTP Prize. The prize recognizes outstanding and original contributions to physics by researchers under 40 and includes a sculpture, a certificate, and a cash prize of 3000 euros.

Past winners include Ashoke Sen (1989), the Indian theoretical physicist who has been awarded the 2012 Fundamental Physics Prize, and the current ICTP Director Fernando Quevedo (1998). The 2013 ICTP Prize was shared by two women: Yasaman Farzan (Iran) for her theoretical contributions to the physics of neutrinos, and Patchanita Thamyongkit (Thailand) for contributions to development of photovoltaic research.

The deadline for nominations is 30 September 2014. Detailed information on how to nominate a candidate is available on the ICTP Prize Page. Additional information may be obtained by writing to ictpprize2014@ictp.it.

Completed nominations must be submitted along with a signed and dated cover letter by 30 September 2014 by email (ictpprize2014@ictp.it), regular mail (ICTP Prize 2014, Director's Office,
ICTP,
Strada Costiera 11,
34051 Trieste, Italy) or fax (+39 040 2240 410).

The complete list of past winners and their award citations are available on the ICTP Prize Page.

More information: http://www.ictp.it/about-ictp/media-centre/news/2014/3/ictp-prize-2014-call-for-nominations.aspx

Postgraduate opportunities within South Africa – ALICE (SA-ALICE)

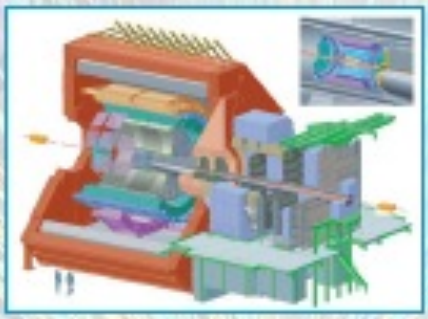
⇒ Take a "journey to the early Universe"

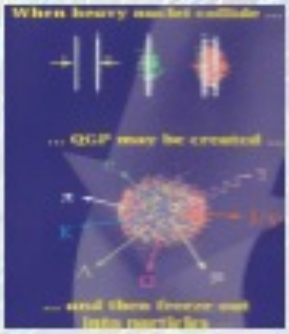
What happens to matter when it is heated to 100 000 times the temperature at the centre of the Sun?

Why do protons and neutrons weigh 100 times more than the quarks they are made of?

Can the quarks inside the protons and neutrons be free?

The Large Hadron Collider (LHC), situated at CERN 100m underground between Switzerland and France, and ALICE – A Large Ion Collider Experiment are the extraordinary tools to search for answers to these fundamental questions. SA-ALICE is participating in the ALICE Collaboration with a focus on muon and photon measurements in heavy-ion collisions at the LHC and online & offline computing upgrades of ALICE.





Student Opportunities:

SA-ALICE operates under the auspices of the South Africa – CERN (SA-CERN) program. We offer various

- *BSc Honours, MSc and PhD projects to students interested in the field of High Energy, Particle and Nuclear Physics & in Computing. Interested students will be able to travel to CERN (Geneva, Switzerland) to participate in experiments!*
- *Local ALICE Masterclasses to introduce 3rd year and Honours students to ALICE measurements.*
- *Outreach programs, e.g. annual International Particle Physics Masterclasses geared for high school pupils (http://www.tlabs.ac.za/physics-masterclass).*

For further information see http://sa-cern.tlabs.ac.za/alice or contact:
Dr T Dietel (tom.dietel@cern.ch) at UCT,
Drs Z Buthelezi (zinhle@tlabs.ac.za) and SV Förtsch (fortsch@tlabs.ac.za) at iThemba LABS.

Upcoming Conferences & Workshops

Bring International Physics Conferences to South Africa

The SAIP Office would like to help South African physics community to bring international conferences and workshops to South Africa. The SAIP can help with hosting these conferences as well as preparing bidding documents, budgeting and fundraising.

The SAIP office has helped in hosting very successful international physics conferences and workshops.

Please email the conferences you want us to help bring to South Africa to info@saip.org.za

16th Southern African Association of Science and Technology Centres (SAASTEC) Conference Nov 2014

Science Centres – Lighting up the way! The 16th Southern African Association of Science and Technology Centres (SAASTEC) Conference will be held at the Nelson Mandela Bay Science and Technology Centre in Uitenhage from the 17 – 20th November 2014. The theme for the conference this year is "Science Centres - lighting up the way". The sub-themes have been aligned to the 7 goals from the Science Centre World Summit 2014 that was held in Belgium earlier this year. Deadline for abstracts is 31st July 2014. Who should attend this conference? Professionals from science and technology centres, national research facilities, innovation support centres, museums, planetariums, aquariums and art galleries as well as researchers, educators, teachers, government officials, administrators and policy makers involved with the public understanding of science, mathematics and technology (PUSET), curriculum developers and subject advisors. Sponsors, industry partners, stakeholders and other interested members of the community are also welcome. For more details please visit http://www.saastec.co.za or contact Ginny Stone squigglez@telkomsa.net.

WORKSHOP ON DISCOVERY PHYSICS AT THE LHC KRUGER-2014

December 1 - 6, 2014, Protea Hotel Kruger Gate Portia Shabangu Road, Skukuza, Mpumulanga, South Africa

We are pleased to announce the Third Biennial "Workshop on Discovery Physics at the LHC" (KRUGER 2014).

The Workshop will be held at the 4-star Protea Hotel Kruger Gate, just 100 meters from the entrance to the Kruger National Park.

Please find details in the conference web page: http://www.kruger2014.tlabs.ac.za.

The conference aims to promote scientific exchange of new results and development of novel ideas and models related to the physics of the LHC.

The following topics will be covered:

- Particle Physics;
- Heavy Ion Physics;
- Physics after the discovery of the Brout-Englert-Higgs boson.

Accommodation, registration, abstract submission and other practical details can be found on the web page. Attendance will be limited to about 100 participants because of the number of available rooms in the hotel.

Students are encouraged to also take part in a related workshop/school on ``Hot and Dense Nuclear & Astrophysical Matter - HDM2014'' which will be organized by Professor Azwinndini Muronga (amuronga@uj.ac.za) at the University of Mafeking November 24 - 28, 2014.

Other related events of interest to students are: ``Chris Engelbrecht School in Particle Physics'', January 12 - 21, 2015, and the ``High Performance Signal and Data Processing'', January 26 - 30, 2015.

Limited funding for South African students is available.

SAIP2015

The SAIP2015 Annual Conference will be held in Port Elizaberth from 29 June to 3 July 2015

More information will be available soon

14th International Conference on Particle Induced X-ray Emission,

The 14th International Conference on Particle Induced X-ray Emission will be held at the Lord Charles Hotel in Somerset West, 26 Feb – 3 Mar 2015.

For more information visit : http://www.pixe2015.tlabs.ac.za

QIPC^2 2014

QUANTUM INFORMATION PROCESSING COMMUNICATION AND CONTROL 2014

Second Announcement

QIPCC 2014 is the third edition of the South African conference and school devoted to quantum information science and technology.

3-7 November 2014
Alpine Heath Resort (Drakensberg)

http://quantum.ukzn.ac.za/events/QIPCC2014

6th South African Conference on Photonic Materials (6th SACPM)

4 – 8 May 2015

Mabula Game Lodge, South Africa

Announcement and call for abstracts

The purpose of the conference is to bring together scientists from Africa and abroad, who are working on various issues related to photonic materials. Following the success of the previous 5 conferences, Mabula 2015 will follow the same general format. In particular, the conference will focus primarily (but not exclusively) on the following:

- III-nitrides such as GaN, AlGaN, InGaN, etc
- ZnO and other wide gap materials
- Materials for photovoltaic applications
- Narrow gap materials for mid-infrared applications, Thermal Photovoltaics, etc
- Photonic crystals for fiber applications
- Biophotonic contibutions will also be encouraged
- A few contributions on novel photonic materials (including polymers) will also be accommodated in the program.

Materials-related issues that would fall well within the scope of the conference are the following:

- Crystal growth and epitaxy
- Characterisation (photoluminescence, DLTS, IR spectroscopy, etc)
- Defect-related studies
- Process-related issues
- Modeling of materials
- Opto-electronic devices (novel structures, etc.)

A group of international speakers, all experts in their fields, will present invited lectures on topics related to the theme of the conference. The scientific programme will also include a number of oral presentations selected from submitted abstracts, as well as poster presentations. Ample time will be available for the discussion of research results. As the number of delegates will be limited to around 60, it is hoped that the conference will encourage much interaction, especially between local and international delegates.

We would particularly welcome the participation of senior (PhD) students and will offer a reduced conference registration fee to full-time bona fide students.

IMPORTANT DEADLINES:

- Abstract submission: 1 February 2015
- Notice of acceptance: 21 February 2015
- Registration deadline: 14 March 2015
- Early bird payment: 31 March 2015
- Final payment: 21 April 2015
- Manuscript submission: 18 April 2015
- Conference Commences: 4 May 2015
- Reviewing of manuscripts deadline: Last day of the conference

More information on conference fees, programme, and abstract and manuscript preparation is available at the conference website: http://events.saip.org.za/event/sacpm2015.

Requests for official Letters of Invitation (to help secure funding or facilitate entry into South Africa for participants) and any other information on the conference should be addressed to Dr Jackie Nel at +27-12-420-3580 or Jackie.nel@up.ac.za .

Physics Comment Editorial Policy

Deadline for submissions for the December 2014 issue of Physics Comment is 30. November 2014

Physics Comment is an electronic magazine for the Physics community of South Africa, providing objective coverage of the activities of people and associations active in the physics arena. It also covers physics-related ideas, issues, developments and controversies, serving as a forum for discussion. It is not a peer review journal.
Physics Comment publishes innovative reports, features, news, reviews, and other material, which explore and promote the many facets of physics. Physics Comment endeavours to:
support and inform the physics community
promote membership of the South African Institute of Physics
promote the understanding of physics to interested parties and the general public
represent the readers' point of view
focus on issues and topics of importance and of interest to the physics community
We accept submissions on any physics-related subject, which endeavours to inform readers and to encourage writers in their own researches. We aim to be politically, socially and geographically inclusive in the articles, which we commission and receive. Therefore we shall not discriminate according to political or religious views. Physics Comment does not support or endorse any individual politician or political party. However, contributions, which are being published, may contain personal opinions of the authors.
It is our desire to present unfettered the opinions and research of our readers and contributors. All articles submitted for publication are subject to editorial revision. Such revisions, if necessary, will be made in cooperation with the author.
The views expressed in published articles are those of the authors and are not attributed to the Editorial
The Editor will make the final determination of the suitability of the articles for publication.

Declaration by Author

When an author submits material for publication, this means:
The author(s) assures the material is original, his/her own work and is not under any legal restriction for publication online (e.g., previous copyright ownership).
The author allows PC to edit the work for clarity, presentation, including making appropriate hypermedia links within the work.
The author gives PC permission to publish the work and make it accessible in the Magazine's archives indefinitely after publication. The author may retain all other rights by requesting a copyright statement be placed on the work.
Authors should respect intellectual integrity by accrediting the author of any published work, which is being quoted.

Publication Deadlines

Physics Comment is published four times a year.

Issue	Closing Date	Publication Date
Issue 1	28 February	15 March
Issue 2	31 May	15 June
Issue 3	31 August	15 September
Issue 4	30 November	15 December

Specification and Submission of Content

Editorial Tone. As the voice of the physics community, the magazine will create a provocative, stimulating, and thoughtful dialogue with the readers; and provide a variety of perspectives that reflects the dynamism of the physics community.
Article types. The magazine is devoted to articles, reports, interesting facts, announcements and recent developments in several areas related to physics:
Manuscripts. Solicited manuscripts will be judged first for reader interest, accuracy and writing quality. The editor reserves the right to request rewrite, reject, and/or edit for length, organization, sense, grammar, and punctuation.
Re-use. The publisher reserves the right to reuse the printed piece in full or in part in other publications.
Submission and Format. Manuscripts must be submitted to the editor on or before the designated due date Manuscripts must be submitted electronically, on the prescribed Microsoft Word template available for download from http://www.saip.org.za/PhysicsComment/. Manuscripts are to be submitted directly to the editor:
PhysicsComment@saip.org.za.
Style. AP style is followed for punctuation, capitalization, italics and quotations.
Photography and Illustration. All solicited photography and illustration should be part of an article and will be judged first for technical quality and editorial appropriateness. The editor and art director reserve the right to request revision or reject any material that does not meet their criteria. The publisher reserves full rights to all solicited photography and illustration, including the right to reprint or reuse graphic material in other publications.

Categories of Content Contributions

Technical articles and reports: These are generic articles of about 1 500 words plus diagrams and pictures. A technical article covers a relevant feature topic. Articles are authored by the writer and publishing a 40-word resume of the author could enhance its credibility. By submitting an article that has been previously published the author confirms that he/she has the right to do so, and that all the necessary permissions have been received. Acknowledgement must be made within the article.
News: These are short editorial items usually not more than 250 words. Full colour pictures must be clearly referenced on the editorial submission and on the picture or picture file.
Advertorials: Advertorials could be published when supplied by the client. We recommend a maximum of 500 words plus one or two pictures for maximum impact. A PDF file of the laid out advertorial should be emailed by the client along with an MS Word file of the text and separate image files of the pictures. It is the client's responsibility to ensure that the advertorial is correct as it is in fact a paid for advert page.
Letters to the Editor: Letters to the Editor are encouraged. The Editor reserves the right to edit for length and format. The Editor will not change the political position of the initial letter. Physics Comment does not publish anonymous letters.
Advertising Policy: The Editorial Board will determine advertising prices for Physics Comment, subject to approval by SAIP Council. The objective will be to obtain revenue to maintain and develop the magazine. Physics Comment offers classified advertising to subscribers of the magazine for free. The advertisements must be a maximum of 60 words including the telephone number, and there is a limit of three free classifieds per subscriber, per issue. Advertisements may include a photo, which may be reduced in size or resolution by the editor to optimize loading time. All items or opportunities, which are being advertised for free, should be physics-related. The Editor reserves the right to refuse any advertising, which does not conform to the objectives of the magazine.

Submission of Articles

All articles must be submitted on the prescribed template available for download from http://www.saip.org.za/PhysicsComment/