Programme

and

Book of Abstracts

South African Institute of Physics

57th Annual Conference

hosted by the

University of Pretoria

9 – 13 July 2012

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General Information

NAME TAGS
Please wear at all times to gain access to the campus, lecture halls, social functions and lunches.

PARKING
Please only use designated SAIP parking lots at the conference centre. Please do not park on any reserved parking on campus.

MESSAGES
A message board will be located near the registration desk.

POSTER SESSIONS
Posters should be put up on the poster boards on the 4th floor of the IT building for the whole duration of the conference. Double sided tape will be available from the registration desk. Presenters are requested to be present at their poster during their allocated session for discussion. Posters should be removed by Friday after lunch.

TEAS AND REFRESHMENTS
Tea, coffee and refreshments will be served in the mornings and afternoons on the ground floor, just outside the lecture complex.

LUNCHES
Lunches are served in the recreation hall in Conference Centre and in the Adler's restaurant. Delegates are requested to first fill up the recreation hall, before moving over the the restaurant area. Special meals (Vegetarian, Halaal, etc.) will only be available at the Adler's restaurant.

PRESENTATION PREVIEW FACILITIES
Please hand in your presentation timeously, preferably the day before or at least 30 minutes before each session. Assistants will be available in the mornings before the start of the first session, during tea times and 30 minutes before the start of the session after lunch. A computer will be available to preview your presentation and to obtain technical assistance in room 4-1 in the IT building.

ACCOMODATION
The rooms in the residence are to be vacated 11h00 on the day of departure. Please remember to return your key to the hostel reception. Should you need to leave your luggage at the hostel during the day, please arrange with the hostel reception.

TRANSPORT
A schedule for the shuttle service to Hatfield Gautrain station will be put up at the registration desk. Bus transport will be available from the residence building to the banquet function.

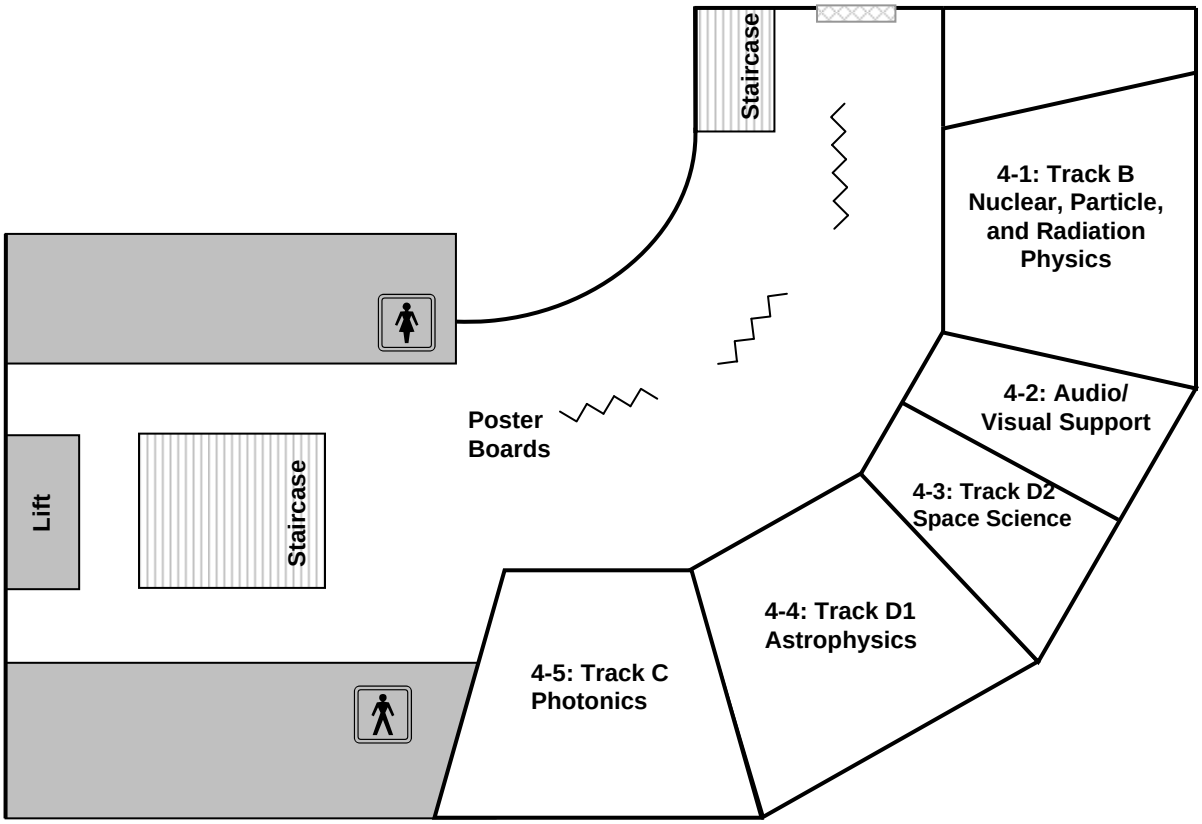
BANKING FACILITIES
There are ATMs available at the student centre on campus as well as in the Hatfield Plaza centre.

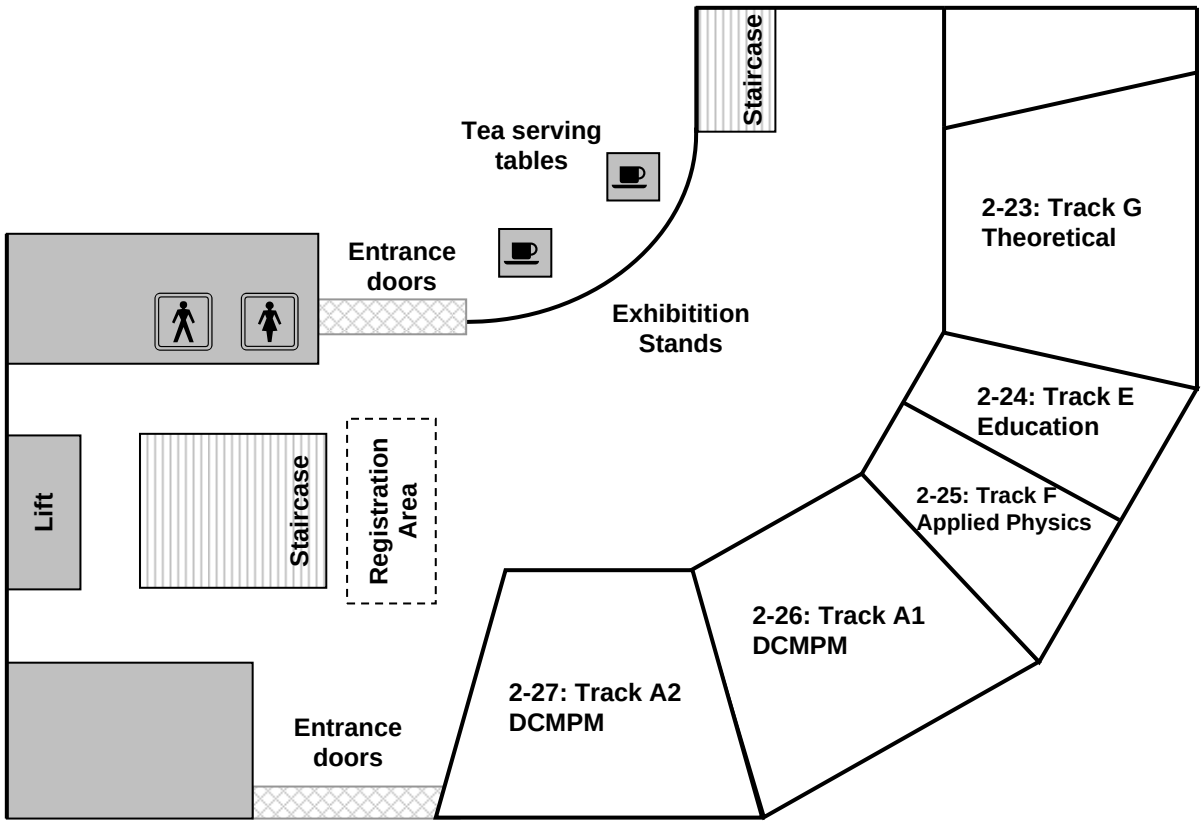
SAFETY
Please do take care with your personal possessions at all times. Keep your car doors locked whilst driving – and after parking your car.

EMERGENCY NUMBERS
Chair of LOC: 083 257 0538
Campus Security: 012 420 2310

Layout of IT Building Lecture Halls

4th Floor





Ground Floor

Guidelines to Speakers and Chairs

Speakers

- To make the conference more interactive 20 minute slots have been allocated for orals, 15 minutes for the presentation and 5 minutes for questions. The chair will warn you 2 minutes before your 15 minutes is up.
- Please double-check the date, time and venue for your presentation.
- If you use a PowerPoint presentation, make sure it is loaded on the presentation computer before the session starts. At the venue where you will be presenting.
- The session assistant will help you to get your presentation ready for your session.
- Be on time and report to the chair whether:
    - This is part of a group presentation.
    - You are competing for a prize.
- Please keep to the time allocated for your presentation.
- The chair will warn you 5 minutes before the end of your session.
- You are not allowed to move your presentation to any other time slot.
- Once the chair indicates the end of your session, you must stop your presentation immediately.
- Laser pointers will be available from the session assistants.

Chairs

- Because of the parallel sessions, please keep to the scheduled times.
- Double-check the date, time and venue of your session.
- Be prepared for your session.
- Confirm at the front desk 15 minutes before your session starts.
- Be on time – 5 minutes before your session starts.
- Consult with the session assistant in the venue (whether presentations are on computer and how the microphone system works.)
- Identify the speakers before your session starts.
- No changes are to be made to the programme. Talks may not be moved earlier due to a speaker not turning up.
- Welcome delegates and speakers at the beginning of your session.
- Make the following announcements:
    - All cell phones to be switched off.
    - The title and name of the speaker.
    - Whether it is a group presentation.
    - Whether the speaker competes for an MSc or PhD prize.
- Thank all speakers at the end of the session.
- Allow questions according to time.
- Report shortcomings to the session assistant.
- Report to the front desk if a speaker was absent.

These are only guidelines; please feel free to use your own initiative to make your session effective and enjoyable.

List of Meetings

General

Meeting	Date & Time	Venue
Astronomy Town Meeting	8 – 9 July 9:00 – 16:00	Plant sciences auditorium
NLC Rental Pool Meeting	Monday 9 July 8:00 – 16:00	IT 2-26
SAIP Council Meeting	Monday 9 July 9:00 – 10:30 11:00 – 13:00	Conference centre
NASSP Steering committee	Tuesday 10 July 11:00 – 12:20 14:30 – 15:50	Conference centre
SAIP Student member meeting	Wednesday 11 July 16:00 – 16:30	Foyer of IT building
SAIP Council with NSBP	Friday 13 July 8:00 – 9:00	Conference centre
SAIP Council with division chairs	Thursday 12 July 18:45 – 19:45	Conference centre
WiPiSA Lunch	Thursday 12 July 13:00 -14:00	Conference centre – reception hall
SAIP Council with HOD's	Wednesday 11 July 18:00 – 19:00	Conference centre
SAIP Annual General Meeting	Friday 13 July 14:00 – 15:30	Thuto 1-2

Specialist Meetings

Specialist Division	Date & Time	Venue
Division for Physics of Condensed Matter and Materials	Thursday 12 July 16:40 – 17:20	IT 2-26
Nuclear, Particle and Radiation Physics Division	Wednesday 11 July 16:50 – 17:50	IT 4-1
Photonics Division	Wednesday 11 July 8:40 – 9:00	IT 4-5
Division for Astrophysics	Thursday 12 July 8:40 – 9:20	IT 4-4
Division for Space science	Thursday 12 July 11:40 – 12:20	IT 4-3
Division for Physics Education	Thursday 12 July 14:10 – 14:50	IT 2-24
Applied Physics Forum	Wednesday 11 July 8:00 – 8:40	IT 2-25
Division for Theoretical and Computational Physics	Wednesday 11 July 11:15 – 11:55	IT 2-23

Social Functions

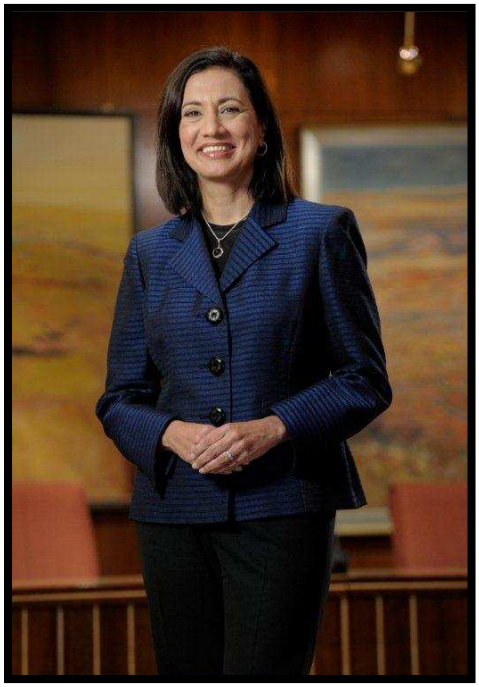
Welcome Reception Monday 9 July		
Welcome function	18:30 – 19:30	Musaion
Cocktail reception	19:30 – 21:00	Graduate Centre
Banquet Friday 13 July		
Buses depart	17:00	South Street, behind Erika residence
Freedom park visit*	17:30 – 18:30	Freedom Park
Banquet	18:30 for 19:00	Monument function hall, Voortrekker Monument

* Only delegates travelling by bus will be admitted. Secure parking will be available in South Street where delegates can park their vehicles and join the buses.

SAIP Specialist Divisions

Division	Chair	Institution	E-Mail
Division for Physics of Condensed Matter and Materials	Prof Japie Engelbrecht	NMMU	japie.engelbrecht@nmmu.ac.za
Nuclear, particle and radiation physics Division	Dr Simon Mullins	iThemba LABS (Gauteng)	smm@tlabs.ac.za
Photonics Division	Prof EG Rohwer	US	egr@sun.ac.za
Division for Astrophysics	Prof Patrick Woudt	UCT	pwoudt@ast.uct.ac.za
Division for Space science	Dr Andrew Collier	UKZN	collierab@gmail.com
Division for Physics Education	Dr Sam Ramaila	UJ	samr@uj.ac.za
Applied Physics Forum	Dr Frederick Vorster	NMMU	Frederik.Vorster@nmmu.ac.za
Division for Theoretical and computational physics	Prof Frikkie Scholtz	US	fgs@sun.ac.za

Welcome Message by the Vice-Chancellor and Principal of the University of Pretoria



As Vice-Chancellor and Principal it gives me great pleasure to welcome all conference delegates to the University of Pretoria (UP) campus. We are deeply honoured to have the opportunity to host the 57th Annual Conference of the South African Institute of Physics, particularly in the year that we are celebrating South Africa's status as co-host of the Square Kilometre Array (SKA). With over 45 000 full-time students and almost 20 000 distance education students, UP is one of South Africa's largest universities. We are a multi-campus university with nine faculties and a business school (the Gordon Institute of Business). UP has a well-established reputation as a research-intensive university that also produces high quality graduates in a wide range of professional disciplines such as engineering, medicine, veterinary science and business science.

Physics is one of the core academic departments in the Faculty of Natural and Agricultural Sciences and it is one of the oldest departments, having been established over a century ago. In the University's new long-term strategy, UP 2025, physics has been identified as a core academic discipline that underpins a number of related academic programs and professional areas such as engineering and medicine. Furthermore, we recognize that sufficient numbers of graduates in physics are essential for South Africa's economic success in a global era where science and technology capability has become a significant differentiator. Therefore, in terms of our long-term strategy the University has made a firm commitment to further develop physics as one of our core disciplines, especially given South Africa's growing status as a destination for cutting-edge science and technology.

Hosting the South African Institute of Physics Conference this year will give enhanced impetus to the status of physics at UP, which has an excellent track record of producing high quality graduates and research. It is particularly encouraging to note that a high proportion of the delegates are postgraduate students as this augurs well for the future of physics in the country. I wish you a productive conference and may your time at UP be enjoyable and memorable.

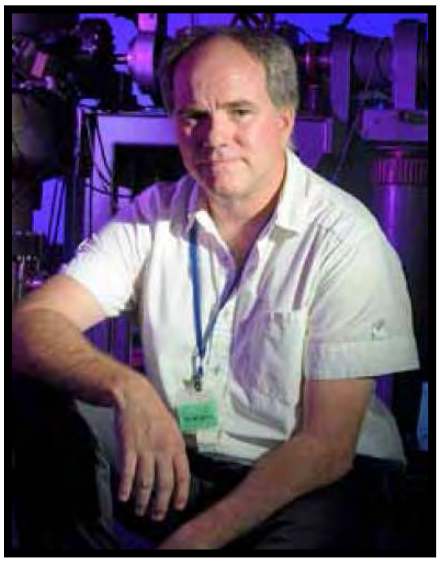
Professor Cheryl de la Rey
Vice-Chancellor and Principal

Message from the SAIP President

Once again, we all look forward to the most important event in the calendar of the South African Institute of Physics – our Annual Conference! It is my pleasure to welcome you all. Pretoria University will host us,to commemoratethe centenary of their Physics Department. Three meetings precede the conference. The Astronomy Town Meeting, the Winter School on Easy Java Simulations and the Winter School on The Physics Of Probing – with Emphasis on Neutrons. The conference itself is an opportunity for scholarly presentation, discussion, building networks and planning for the future, both within the Divisions and Forumsas well as within the broader community. This year, perhaps the most dramatic development is the site award decision of the Square Kilometer Array (SKA). We believe this is an opportunity not only for all physicists, but for the whole country. Our Conference this year and its satellite meetings provide an opportunity for us to plan how we will work coherently to maximize the research, training opportunities, spin off benefits and promotion of physics in South Africaarising from the SKA. We will also have feedback on a project that was born at the 2008 Conference held at the University of Limpopo – The Review of Physics Training. The Draft Benchmark Statement has been developed and the review is in progress in partnership with the Council on Higher Education (CHE). We are all urged to participate in this review through our local departments, and we have every anticipation we will see the same enormous benefits to the health of the discipline as we saw arise from the preceding project on Shaping the Future of Physics. Yet another important issue for us is our discussion on the development of a Professional Designation and our registration as a Professional Body. To the students, a special welcome and a special invitation to participate in your field's satellite meetings as well as in the Annual General Meeting. Your professional career has already started, and the conference is in many ways crafted to optimize benefits for you. A special welcome also to the invited guests, listed in the next pages and to Prof Charles McGruder and DrNiaImara from the National Society of Black Physicists in the USA (NSBP). The NSBP has partnered with us in many projects to benefit physics in Africa. We are all deeply indebted to the Local Organizing Committee chaired by Prof Chris Theron,whichhascompiled an excellent programme and to Mr Brian Masara, Executive Officer of the SAIP Executive Office and his team, for their significant role in managing and developing the many projects of Council. Finally many thanks to you all, who are participating, we wish you a very rewarding and valuable experience.

Simon Connell
President, South African Institute of Physics

Message from the head of department



The Physics Department of the University of Pretoria welcomes you all to the 57th Annual SAIP conference. In 1912 Prof PG Gundry, who was appointed in 1908 as professor of “Mathematics and Physics” became the head of the Department of Physics. It is this “unbundling” of physics one hundred years ago that prompted the department to host this conference (not that mathematics could be unbundled from physics in any real sense of the word!). Your presence at this conference will help us look forward to another 100 years of exciting physics.

We planned this conference so that there could be many fruitful scientific discussions. Since so many of our conference contributions are in poster format we have decided to have them displayed for the duration of the conference. Please feel free to continue discussions around your poster at any suitable time. If you require an ad hoc meeting room to set up a new collaboration or plan an activity, we will be able to assist.

If you are unfamiliar with the department, visit our exhibition stall. Postgraduate students will be there to tell you about their own research work. If you are interested in visiting some of our facilities, please ask. We are more than willing to show you around and discuss the opportunities for collaboration and future studies.

We wish you a fruitful conference, may the debates be robust and the networks you build up be productive.

Prof. Chris Theron
Head: Department of Physics, UP

Invited Plenary Speaker

Ralph Wijers
Professor of High-Energy Astrophysics
Astronomical Institute Anton Pannekoek
University of Amsterdam, The Netherlands

Ralph Wijers graduated from Leiden Observatory and got his PhD from the University of Amsterdam in 1991. He was introduced to research in gamma-ray bursts by Paczynski during his Compton Fellowship at Princeton University Observatory, and worked on early GRB afterglow research with Rees in Cambridge. In 1998, he became assistant professor at SUNY Stony Brook, and in 2002 he accepted the chair of High-Energy Astrophysics at the University of Amsterdam. His research interests also include transients, e.g., with the new LOFAR telescope. He is an NWO vici and ERC Advanced Investigator laureate and director of the Astronomical Institute Anton Pannekoek.

Gamma-ray bursts and other transients: Ephemeral tests of extreme physics

Tuesday 10 July 9:30 – 10:30 in Thuto 1-2

Gamma-ray bursts were discovered serendipitously by test ban treaty verification programmes in the 1960s. They became one of the longest-lasting enigma's in astrophysics until observations with new technologies in 1990s revealed them to be distant explosions, in which massive stars in their death form a black hole. Both in probing the extreme end of gravitational physics and magnetohydrodynamics, and in probing the very distant Universe, they allow us to test fundamental physics in regimes well beyond the reach of terrestrial laboratories. I will give an overview of the current state of affairs, and will also show how time-domain astronomy with modern radio telescopes such as LOFAR and ultimately the SKA may lead us to even rarer and stranger objects, possibly signalling even more extreme physics.

Invited Plenary Speaker

Mark Moldwin
Atmospheric, Oceanic and Space Sciences
University of Michigan, USA

Mark Moldwin is the Associate Chair for Academic Affairs and a Professor of Space Sciences within the University of Michigan's Department of Atmospheric, Oceanic and Space Sciences within the College of Engineering. Prior to joining the faculty of UM in July of 2009, Dr. Moldwin was a Professor of Space Physics at UCLA (2000-2009), Professor Physics and Space Sciences at Florida Institute of Technology in Melbourne (1994-2000) and a Postdoctoral Research Fellow in the Space and Atmospheric Sciences and Non-proliferation and International Security groups at Los Alamos National Laboratory. Dr. Moldwin joined the lab in 1992 after receiving his Ph.D. in Astronomy/Space Physics from Boston University. He was awarded a B.A. in Physics with Honors from the University of Alaska-Fairbanks in 1987. Dr. Moldwin's primary research interests are ionospheric, magnetospheric and heliospheric plasma physics, and pre-college space science education and outreach. He has published over 125-refereed scientific articles and a textbook on these subjects. Dr. Moldwin was a NASA/ASEE Kennedy Space Center Faculty Fellow, a Los Alamos National Laboratory Associated Western Universities Faculty Fellow, and a NASA Goddard Space Flight Center Visiting Scientist. Prof. Moldwin is a National Science Foundation CAREER Award winner and a Research Corporation Cottrell Scholar. Prof. Moldwin is or has been the principal or co-investigator of over 50 externally peer-reviewed scientific projects including building the magnetometers to fly on NASA's Space Technology – 5 satellites, the upcoming Air Force DSX mission satellite, and ground-based magnetometer deployment in North America, South America, Africa and Antarctica. Prof. Moldwin has taught over a dozen different physics and space science courses, was awarded Florida Tech's Teaching Excellence Award, UCLA's Academic Senate's Distinguished Teaching Award and was rated as a Top Ten Professor by the Associated Student's of UCLA. He currently serves as the Editor-in-Chief of Reviews of Geophysics.

An Introduction to Space Weather: How it Impacts South African Technology and Society

Tuesday 10 July 12:30 – 13:30 in Thuto 1-2

Space Weather is the term that describes changes in the Earth's space environment due to storms on the Sun that impact society and technology. In today's modern technological societies, we are becoming increasingly dependent on systems that are susceptible to space weather storms - including communication, navigation and power systems. This paper introduces the drivers of space weather and discusses how our technological systems are at risk to major space storms.

Invited Plenary Speaker

Gerrit Bauer
Institute of Materials Research, Tohoku University, Japan and
Kavli Institute of NanoScience, TU Delft, The Netherlands

Gerrit Ernst-Wilhelm Bauer (*1956) holds an Engineering Degree (1980) in Chemical Technology from Twente University (The Netherlands) and Doctor Degree in Physics (1984) from the Technical University Berlin (Germany) for research carried out at the Hahn-Meitner-Institute of Nuclear Research. After a postdoc at the Institute for Solid State Physics of the University of Tokyo (1984-86), he became a member of the Scientific Staff of the Philips Research Laboratories (1986-92). He was appointed Professor of Physics at Delft University of Technology in 1992 and at Tohoku University in 2011. He (co)authored >200 refereed scientific papers in the area of condensed matter physics, in the last two decades mainly in the field of magnetoelectronics/ spintronics. He received the Wilhelm-Conrad-Röntgen Award from Würzburg University (2000), the Outstanding Referee Award by the American Physical Society (2008), the Lars Onsager Medal from the Norwegian University of Science and Technology (2009). He became Fellow of the American Physical Society in 2010 “for exposing the interaction between spin transport, magnetization dynamics, charge and heat transport, and mechanical motion”.

Spin caloritronics – more than spin-dependent thermoelectrics
Tuesday 10 July 16:30 – 17:30 in Thuto 1-2

The spin degree of freedom of the electron affects not only charge, but also heat and thermoelectric transport, leading to new effects in small structures that are studied in the field of spin caloritronics (from calor, the Latin word for heat).
This lecture addresses the basic physics of spin caloritronics. Starting with an introduction into thermoelectrics and Onsager’s reciprocity relations, the generalization to include the spin dependence in the presence of metallic ferromagnets will be addressed. Using this foundation I will describe several recently discovered spin-dependent effects in metallic nanostructures and tunneling junctions in terms of a two spin-current model of non-interacting.
Next, I will argue that a different class of spin caloritronic effects exists that can be explained only by the collective spin dynamics in ferromagnets. The thermal spin transfer torque that allows excitation and switching of the magnetization in spin valves as well as the operation of nanoscale heat engines is complemented by thermal spin pumping. The latter generates the so-called spin Seebeck effect, which is generated by a heat current-induced non-equilibrium of magnons at a contact between an insulating or conducting ferromagnet and a normal metal. Under these conditions a net spin current is injected or extracted from the normal metal that can be detected by the inverse spin Hall effect.
Both classes of effects can be understood in the adiabatic approximation for the magnetization dynamics and computed in terms of material-dependent electronic structures. Further issues to be addressed are the relation between electric, thermal and acoustic actuation of the magnetic order parameter, as well as the application potential of spin caloritronics.
More details and a bibliography can be found in Ref. [1].

[1] G.E.W. Bauer, E. Saitoh, and B.J. van Wees, Spin Caloritronics, Nature Materials, in press.

Invited Plenary Speaker

Ramon Lopez
Department of Physics,The University of Texas at Arlington, USA

Ramon E Lopez is a Professor of Physics at the University of Texas at Arlington. His research is both in space plasma physics and physics education, and he is the author of over 100 peer-reviewed papers. Ramon is a Fellow of the American Physical Society (APS) and of the American Association for the Advancement of Science (AAAS). His awards include the 2002 APS Nicholson Medal, the 2010 SACNAS (the Society for the Advancement of Chicanos and Native Americans in Science) Distinguished Scientist Award, the 2012 APS Edward A. Bouchet Award, and two NASA Group Achievement Awards. Ramon has also been very active in precollege science education. He was a member of the design and writing team for Active Physics (high school curriculum materials), and he contributed to several elementary school units of the Science and Technology for Children series. Ramon was one of the authors of the College Board's Standards for College Success Science Standards and he is part of the Leadership Team for the writing of the Next Generation Science Standards that will guide K-12 science education in the United States. He has also served as a science education consultant for numerous school districts, state departments of education, and other organizations including the Discovery Channel. Ramon earned a B.S. in physics in 1980 from the University of Illinois at Urbana-Champaign, and Ph.D. in space physics in 1986 from Rice University.

Some things physicists have learned about physics education by doing research in cognitive science

Wednesday 11 July 9:30 – 10:30 in Thuto 1-2

Education is something that concerns all faculties in university science departments. Physics as a discipline has been a leader in taking that general concern and transforming it into a sub-discipline of the field: Physics Education Research (PER). PER is based on cognitive science, and in fact some important aspects of cognitive science (such as studies of experts versus novices) have been done with physics as the context for the investigations. Today, there are a number of PER groups in physics departments around the world, doing research in applied cognitive science that focuses on issues of teaching and learning physics. These physicists are publishing papers in peer-reviewed journals, getting grants, and graduating students with Ph.D.s, just like every other area of physics. In this talk I will touch on several findings from cognitive science that have huge implications for how we teach physics, as well as some results from PER that are leading the way in university science education across all fields.

Invited Plenary Speaker

Elsabé Brits
Specialist science journalist

Elsabé Brits is a specialist science journalist of 19 years experience at the daily Afrikaans newspaper, Die Burger, in Cape Town, South Africa. She covers most academic research fields and current scientific issues including genetics, astronomy, biology, evolution, paleontology, archeology, physics and medicine. Elsabé has won several national journalism awards during her career. She is vice-president of the South African Science Journalists' Association which is affiliated from the WFSJ. She has written a book on bipolar mood disorder called: Kyk my in die oë (Tafelberg, 2011).

Communicating Science – How to wake the sleeping, gray cat
Wednesday 11 July 12:00 – 12:45 in Thuto 1-2

How do I share my work with the public, through the media, in a world where information technology is changing fast? What is a press release, a press conference, an embargo and more importantly: what are they not? What should my expectations be compared to those of the media.

In communicating science giving less is not more.

However explaining difficult science in an easy understandable language which is accessible to all, requires skill and practice The aim of communicating with the media and ultimately the public should be: to reach as many people as possible, with the long term goal of the public understanding of science and the sharing of knowledge.

Invited Plenary Speaker

Patrick Regan
Department of Physics, University of Surrey, United Kingdom

Paddy Regan is Professor of Physics at the University of Surrey, Guildford, UK. He joined the academic staff at Surrey in 1994 following postdoctoral research positions in experimental nuclear physics at the University of Pennsylvania, USA (1991-2) and the Australian National University in Canberra (1992-4). He studies for his BSc (Hons) degree in Physics at the University of Liverpool (1988) and his DPhil in experimental nuclear physics from the University of York (1991). He was elected a UK Fellow of the Institute of Physics in 2000. He has co-authored more than 200 peer-reviewed papers on nuclear structure physics and radiation detection research in the scientific literature and given more than 80 invited international conference and workshop presentations. He also pursues research into measurements of naturally occurring radioactive materials (NORM) in the environment using applications of the gamma-ray spectroscopic techniques he uses in his more fundamental research projects. Paddy has been the Director of the Masters Course (MSc) in Radiation and Environmental Protection at the University of Surrey since 2002. To date, he has supervised 21 PhD students and over 100 MSc research. He has been a Visiting Research Associate at the Wright Nuclear Structure Laboratory, Yale University since 2002 and an Adjunct Professor at the University of Notre Dame (London Programme) since 2003. From 2001 until 2010, Paddy was the Collaboration Spokesperson for the Stopped RISING Collaboration which studied the internal structure of the most exotic forms of atomic nuclei following either metastable state or beta-decay. He has served as the Chair of the GSI Users Executive Committee (2009) and as a member of the UK Science and Technologies Facilities Council (STFC) Education, Training and Careers (ETC) Committee (2007-2011). He is the current Chair of the PreSPEC International Steering Committee, which oversees the experimental programme for nuclear structure physics at GSI/FAIR. He is elected member of the NuSTAR Board for the FAIR project in Darmstadt, Germany. He is also regularly engaged by the UK and international TV, radio and written press media on issues related to radiation and nuclear physics. In this capacity he has made over 100 mainstream TV and radio appearances on issues related to radiation physics in the last four years. In his spare time Paddy plays a poor game of squash, even worse golf and tries to do the occasional sponsored run for the Mental Health Charity MIND. He is married to Susie, a nurse, and they have four school-age children, Hannah, John, Sarah and Rebekah.

From RISING at GSI to the DESPEC Fast-Timing Project at FAIR: The New Nuclear Spectroscopy of the Most Exotic Isotopes

Thursday 12 July 9:30 – 10:30 in Thuto 1-2

The last decade has seen an explosion in research activity into measurements of the internal structure of nuclear species with unusual proton-to-neutron ratios. This work has been carried out at major international nuclear science laboratories such as NSCL-MSU (USA); RIBF (Japan); GANIL (France); and GSI (Germany). The study of nuclear matter with exotic proton-to-neutron ratios compared to the less than 300 'stable' isotopes which we see in nature allows scientific investigations to be made into the fundamental nature of the strong nuclear force, the creation of elements through explosive nucleosynthesis scenarios and basic interactions between protons and neutrons. Basic, 'long-known facts' regarding our understanding of nuclear structure science, such as the extra binding associated with closed shells of protons or neutrons are found to require modification with these new insights. The study of such nuclei often requires investments in facilities which are required to create the exotic nuclei for study using high-energy, heavy-ion collisions. The most exotic nuclear fragments from such reactions need then to be separated and selected on an event-by-event basis for detailed spectroscopic investigation. This presentation will give an overview of a major collaborative study, based at the GSI facility, to investigate the internal structure of hitherto unreachable sections of the nuclear chart. The **R**are **Is**otope **In**vestigations at **G**SI or 'RISING' collaboration utilised the most powerful, high-resolution gamma-ray spectrometer used to date for such studies, consisting of 105 independent, high-efficiency germanium semiconductor detectors, each with digital signal processing. Some of the experimental challenges and scientific highlights of the experimental campaigns will be presented, including new spectroscopic studies of the heaviest nuclei with similar numbers of protons and neutrons and the most neutron-rich heavy nuclei studied to date. The future of such research requires continual upgrades, both in terms of accelerator performance and in terms of radiation detection equipment. The final part of the talk will discuss the potential for the use of arrays of $LaBr_3$ scintillation detectors in future spectroscopic studies of exotic nuclei at new radioactive beam facilities such as FAIR in Europe and FRIB in the USA. These detectors combine acceptable gamma-ray full energy peak resolution with excellent timing properties, allowing the direct determination of nuclear decay transition rates into the sub-nanosecond regime.

Invited Plenary Speaker

Diane Grayson
University of Pretoria, South Africa

Diane Grayson obtained an MSc in plasma physics from the University of KwaZulu Natal, under Manfred Hellberg. She received a Fulbright Fellowship to do a PhD in the Physics Department at the University of Washington in Seattle under Lillian McDermott on the use of computers in physics education. In 2006 the University of Umeå in Sweden awarded her an honorary doctorate.
Since returning to South Africa in 1990 Diane has been Coordinator of the Science Foundation Programme at UKZN, Academic Vice-Rector of the Mathematics, Science and Technology Education College in Limpopo, Professor of Science Education and Head of the Centre for the Improvement of Mathematics, Science and Technology Education at UNISA and Director of her consultancy, Andromeda Science Education. Currently she manages the Engineering Augmented Degree Programme at the University of Pretoria. Diane served on the Council of the South African Institute of Physics for six years and on the International Commission on Physics Education for six years, and represented South Africa at two IUPAP General Assemblies. She also served on the Women in Physics in South Africa working group for seven years, and was local programme chair for the 4th IUPAP Women in Physics conference in 2011. At present she is the Deputy Chair of the Science, Technology, Engineering and Mathematics standing committee of the Academy of Science of South Africa.

Widening the net: attracting and keeping women in physics
Thursday 12 July 12:30 – 13:10 in Thuto 1-2

Physics has a smaller percentage of qualified women than almost any other science. And Physics is less attractive as a qualification than many other degree programmes that are perceived to lead to better jobs. In South Africa, the pool of learners who even qualify to major in Physics after high school is very small. So Physics needs women. Women also need Physics, with the high level of intellectual stimulation, useful applications and opportunities for creativity it offers. What prevents more women from entering and staying in Physics? In this talk I will give some of the reasons and discuss what can be done to improve the situation, including challenging stereotypes, modifying curricula and teaching practices, role-modelling and improving the general climate in which physics students and physicists study and work. Findings in the UK and USA show that such climate change is good for both women and men, and can lead to increased job satisfaction and productivity.

Invited Plenary Speaker

André Vantomme
Instituut voor Kern- en Stralingsfysica, Leuven, Belgium

Professor André Vantomme (born 1964) completed his PhD at KU Leuven in 1991. From 1991 to 1993 he held a post-doctoral position at the California Institute of Technology, in Pasadena, USA, followed by another post-doctoral position at the Instituut voor Kern- en Stralingsfysica in Leuven, Belgium.

He was appointed as an assistent professor at KU Leuven in 1997, and as full professor in 2007. He is head of the Ion and Molecular Beam Laboratory, and he specialises in nuclear solid state physics, i.e. study of the fundamental structural and functional properties of materials, mainly at the nanometer scale and using nuclear techniques (ion beams and hyperfine interactions).

He conducts a number of experiments at large scale facilities, e.g. CERN (accelerators in Geneva, Switzerland), ESRF (synchrotron in Grenoble, France) and HZ (neutron facility in Berlin, Germany). Prof. Vantomme is also well known is South Africa as he completed a number of long term research visits to iThemba LABS, in Faure, South Africa.

In situ RBS and XRD investigation of thin film formation
Friday 13 July 9:30 – 10:30 in Thuto 1-2

Thin films formed by solid phase reaction often exhibit a complex composition of several atomic species. The (re)distribution, diffusive and reactive properties of the individual species as well as their relative motion upon thermal treatment have a distinct influence on the formation properties and thus on overall thin film properties. X-ray diffraction (XRD) and Rutherford backscattering spectrometry (RBS) measurements have proven most valuable in the study of thin film formation as a function of thermal treatment. RBS is ideally suited when the compositional depth profile of thin films plays a crucial role. On the other hand, X-ray diffraction provides very valuable information on the lattice structure (hence the phase!) and texture of the material.
Conventionally, several specimens are subjected to different heat treatments and subsequently analyzed one by one for a complete overview of the response of a thin film to thermal annealing. Because of the discrete character of this approach, however, critical stages for the understanding of the development of thin film properties (such as transient phase formation) are easily overlooked. This problem is avoided by determining the specimen properties in real time, i.e. *during* annealing with a high sampling rate [1]. Additionally, real-time measurements drastically decrease the workload, as kinetic parameters, redistribution properties and phase sequence, for example, can be obtained from a combined ramped RBS or XRD annealing, while numerous specimens have to be analyzed in the conventional approach.
To illustrate the strength and complementarity of these real-time techniques, we will present a number of examples of (ternary) silicide and germanide thin film growth processes by thermal annealing. First, we will discuss the real-time determination of (re)distribution of Pt during Ni(Pt)Si formation in a solid phase reaction, using three different sample configurations, i.e. a homogeneous Pt-Ni alloy, a Pt capping layer and a Pt interlayer, all containing the same Pt/Ni atomic ratio (varying from 0 to 10 at. %) [2,3]. Secondly, we have applied a real-time approach to investigate the dominating diffusing species during nickel and palladium germanide formation, two of the most promising candidates for use as ohmic contacts were germanium to replace silicon in devices. The movement of a thin (inert) marker during phase formation has been continuously monitored by real-time RBS, allowing to determine the relative contribution of the atomic species to diffusion [4]. A third example deals with metallization of GeSn, a material which is used to enhance the charge transport properties in the MOSFET channel via strain engineering. In order to identify a suitable material to contact these source and drain areas, we have investigated how the Sn content redistributes during Ni/GeSn reaction, influencing the thin film formation process and hence the contact properties [5].

References

[1] C. C. Theron, J. C. Lombard and R. Pretorious, Nucl. Instr. and Methods B, **161**, 48 (2000).
[2] J. Demeulemeester, D. Smeets, C. Van Bockstael, C. Detavernier, C. M. Comrie, N. P. Barradas, A. Vieira and A. Vantomme, Appl. Phys. Lett., **93**, 261912 (2008).
[3] J. Demeulemeester, D. Smeets, C. M. Comrie, C. Van Bockstael, W. Knaepen, C. Detavernier, K. Temst and A. Vantomme, J. Appl. Phys., **108**, 043505 (2010).
[4] C. M. Comrie, D. Smeets, K. J. Pondo, C. van der Walt, J. Demeulemeester, W. Knaepen, C. Detavernier, A. Habanyama, and A. Vantomme submitted to Thin Solid Films (2011).
[5] J. Demeulemeester, A. Schrauwen, O. Nakatsuka, S. Zaima, M. Adachi, Y. Shimura, C. M. Comrie, C. Fleischmann, C. Detavernier, K. Temst and A. Vantomme, Appl. Phys. Lett., **99**, 211905 (2011).

Invited Plenary Speaker

Burkhard Schillinger
Technische Universität München
Forschungsneutronenquelle Heinz Maier-Leibnitz FRM II,
Germany

Burkhard Schillinger developed one of the first digital CCD detectors for neutron radiography as his master thesis in 1993. For his thesis, he developed Neutron Computed Tomography at the old FRM reactor of Technische Universität München, Germany, and prepared for the Neutron Imaging facility ANTARES at the new FRM II reactor, which he built as a PostDoc. He now has a permanent position as Instrument Responsible.
In collaboration with other institutes, new imaging methods were developed in rapid succession.
After six years of successful operation, ANTARES had to be dismantled because of a redistribution of beam lines. The new facility ANTARES Upgrade at the neighbouring beamline is nearing completion and will incorporate all lessons learnt at ANTARES for improvement.

Neutron imaging – a powerful set of methods complementary to X-rays
Friday 13 July 12:30 – 13:30 in Thuto 1-2

With the introduction of digital imaging detectors about two decades ago, the development of neutron imaging has taken huge leaps and has opened fields that had been unthinkable in the days of film radiography.
Standard Radiography was soon followed by 3D neutron computed tomography, then stroboscopic imaging to look at running engines.
Recent neutron imaging installations are optimised for high beam collimation and thus for high spatial resolution – and we can now examine rat lungs for medical studies which deliver no contrast for X-rays.
The magnetic spin of the neutron can be used to either visualize magnetic fields, or measure depolarisation in magnetic materials, proving that the perfect samples that the neutron scatterers use are often not perfect at all.
Phase contrast imaging is used for edge enhancement so we can even see single bubbles in Aluminium foam, and energy or wavelength scans let us measure the shift of Bragg cutoffs in crystal lattices to measure stress and strain directly in images.

The talk will look into details of recent Neutron Imaging methods and applications at modern facilities, like one will soon be available at NECSA.

Easy Java Simulations for Physics Winter School	
9 July 2012, Venue: IT 2-27	
Programme	
7:30 – 8:45	*Registration & Tea* (IT Building)
8:45 – 9:00	*Welcome and Opening* Prof. Nithaya Chetty
9:00 – 9:45	*Introduction to EJS* Johan Janse van Rensburg (UP)
9:45 – 10:30	*Using EJS in an advanced 3rd-year level physics course* Dr. Spencer Weaton (UCT)
10:30 – 11:00	Tea break
11:00 – 12:20	*Interactive building of EJS simulations* Johan Janse van Rensburg (UP)
12:20 – 12:45	*EJS Project Presentation by student* Guillermo Hamity (Hons, UP)
12:45 – 13:00	*Available EJS Resources* Dr. Trisha Salagaram (UP)
13:00 – 14:00	Lunch (Recreation Hall – Conference Centre)
14:00 – 15:30	Optional – Interested delegates can bring own laptops/ use PC's in computer lab to do some hands on work using EJS

The Physics Of Probing – With Emphasis On Neutrons	
9 July 2012, Venue: IT 2-23	
Programme	
7:30 – 8:45	*Registration & Tea* (IT Building)
8:45 – 9:00	*Welcome and Opening* Dr. Freddie Vorster (SAIP: Chairman Applied Physics Forum)
9:00 – 9:45	*Fundamentals of the interaction of quanta with matter* Dr. Gawie Nothnagel (NECSA)
9:45 – 10:30	*Probing Techniques and Diagnostics* Dr. Andrew Venter (NECSA)
10:30 – 11:00	Tea break
11:00 – 11:45	*Overview of trends in neutron science* Dr. Chris Franklyn (NECSA)
11:45 – 13:00	*Further questions and discussion of the morning session* Mr. Frikkie de Beer (NECSA)
13:00 – 14:00	Lunch (Recreation Hall – Conference Centre)
14:00 – 14:45	*Selected neutron diffraction applications* Dr. Vladimir Luzin (Australian Nuclear Science & Technology Organisation)
14:45 – 15:30	*Selected neutron imaging applications* Dr. Burkhard Schillinger (Technische Universität München, Germany)
15:30 – 16:00	Tea break
16:00 – 16:45	*Some fast neutron techniques and applications* Mr. Graham Daniels (NECSA)
16:45 – 17:30	*Epilogue (wrap-up)* Dr. Freddie Vorster (SAIP: Chairman Applied Physics Forum)

SAIP 2012 Tuesday 10 July

7:30 - 9:15	**Registration (IT Building) & Tea**			
9:15 - 9:30	**Welcome Session (Thuto 1-2)**			
9:30 - 10:30	**Plenary: Gamma-ray bursts and other transients: Ephemeral tests of extreme physics Prof. WIJERS, Ralph (Thuto 1-2)**			
10:30 - 11:00	**Tea Break (IT)**			
	Track A1: Division for Condensed Matter Physics and Materials (IT 2- 26) MSc Prize Awards Dr. Botha, Andre (UNISA)	**Track A2: Division for Condensed Matter Physics and Materials (IT 2 - 27) PhD Prize Awards Prof. Chetty, Nithaya (UP)**	**Track B: Nuclear, Particle and Radiation Physics (IT 4-1) High Energy Physics 1 Dr. Assamagan, Ketevi Adikle (Brookhaven National Laboratory)**	**Track C: Photonics (IT 4-5) Biophotonics Dr. Neethling, Pieter (SUN)**
11:00 - 11:20	Improving the microhardness and wear resistance of Titanium and Titanium carbide based metal matrix composite 120 Mr. OCHONOGOR, FRANKLIN (TUT) MSc	Van der Waals density functional studies of hydrogen adatoms on bilayer graphene 48 Mr. MAPASHA, Edwin (UP) PhD	Data analysis of W-boson in p-p and Pb-Pb collisions at LHC energies 434 Mr. DU TOIT, Pieter (UP/ iThemba LABS for the ALICE Collaboration) MSc	Ability of $ZnPcS_{mix}$-phthalocyanine in inducing cellular death in human breast cancer cells (MCF-7) using laser irradiation 275 Mr. MFOUO TYNGA, Ivan (UJ) MSc
11:20 - 11:40	Effects of the substrate temperature on the properties of vanadium dioxide nano-coatings deposited on glass substrate by inverted cylindrical magnetron sputtering 128 Mr. MADIBA, Itani Given (UWC) MSc	Brillouin scattering study of ion-implanted chemical vapour deposited diamond 77 Mr. MOTOCHI, Isaac (Wits) PhD	Analysis of Monte-Carlo generated Data for W production in the semi-muonic channel using the ALICE Detector 435 Mr. SENOSI, KGOTLAESELE JOHNSON (UCT/iThemba LABS for the ALICE collaboration) MSc	Response of low intensity laser irradiation on collagen production in diabetic wounded fibroblast cells in vitro 144 Ms. AYUK, Sandra (Laser Research Center, UJ) MSc
11:40 - 12:00	Angle Resolved PhotoEmission Spectroscopy (ARPES) Study of $Sr_4Ru_3O_{10}$ 142 Mr. NGABONZIZA, Prosper (UJ) MSc	SnO_2 NCs morphology control during microwave synthesis 80 Mr. RAKGALAKANE, Ben PhD	W Mass Measurement at D0 358 Dr. YACOOB, Sahal (UKZN)	Global DNA methylation status of colorectal cancer cells exposed to photodynamic therapy 82 Mr. VORSTER, Louis (Laser Research Cente, UJ) MSc
12:00 - 12:20	Luminescent dynamics of $GdTaO_4:Pr^{3+}$ 149 Mr. NOTO, Luyanda Lunga (UFS) MSc	Synthesis and characterization of ZnO flower-like nanostructures using the chemical bath deposition method 188 Mr. KOAO, Lehlohonolo (UFS) PhD	Production of muons in the ALICE experiment at the LHC 29 Dr. BUTHELEZI, Zinhle (iThemba LABS)	Neuroblastoma cells efficiently photo-transfected using 1064nm femtosecond laser pulses 409 Dr. MTHUNZI, Patience (CSIR - NLC)
12:20 - 12:30	**Walk**			
12:30 - 13:30	**Plenary: An Introduction to Space Weather: How it Impacts South African Technology and Society Prof. MOLDWIN, Mark (Thuto 1-2)**			
13:30 - 14:30	**LUNCH**			
	Track A1: Division for Condensed Matter Physics and Materials (IT 2- 26) MSc Prize Awards Prof. Chawanda, Albert (UP)	**Track A2: Division for Condensed Matter Physics and Materials (IT 2 - 27) PhD Prize Awards Prof. Comrie, Craig (iThemba LABS)**	**Track B: Nuclear, Particle and Radiation Physics (IT 4-1) High Energy Physics 2 Prof. Cleymans, Jean (UCT)**	**Track C: Photonics (IT 4-5) Spectroscopy Prof. Rohwer, Erich (SUN)**
14:30 - 14:50	First principle stability study of $FePO_4$ and $LiFePO_4$ polymorphs 156 Mr. LETHOLE, NDANDULENI LESLEY (UL) MSc	Nanostructured tungsten trioxide thin films by aqueous chemical growth for applications in gas sensing and electrochromism 107 Mr. SONE, Bertrand (UWC / iThemba LABS) PhD	**Non-Specialist talk** 45 ATLAS+CMS HIggs Combination	Aerosol measurements over CSIR-Paardefontein (South Africa) test range using LIDAR 71 Mr. MUDAU, Azwitamisi Eric (CSIR - DPSS)
14:50 - 15:10	Conversion of $FeCl_3$ into FeSi fibrous structures at high temperature for gas sensing applications 165 Mr. THABETHE, SIBONGISENI (CSIR - NCNSM) MSc	Tuning the electrical transport properties of carbon nanotubes (MWNTs and DWNTs) through semiconductor, semi-metal and metal filling 121 Mr. CHIMOWA, George (Wits) PhD	Dr. ASSAMAGAN, Ketevi Adikle (UJ/ Brookhaven National Laboratory)	An improved Nd:YAG laser pumped setup for vacuum ultra violet spectroscopy of carbon monoxide molecules 317 Mr. RIGBY, Charles (SUN - LRI) PhD
15:10 - 15:30	A Molecular Dynamics Simulation of Platinum Nanoparticle Formation During Vapour Deposition 216 Mr. WESSELS, Leon (UFS) MSc	First principles LDA + U and GGA + U study of protactinium and protactinium oxides: Dependence on the effective U parameter 154 Mr. OBODO, Kingsley (UP) PhD	Search for Higgs to 4 leptons through new gauge bosons 369 Mr. NTSOELE, Phineas (UJ)	Investigation of the time-dependent electric field induced second harmonic signal from the Si/SiO_2 interface 148 Mr. NDEBEKA, Wilfrid (SUN - LRI) PhD
15:30 - 15:50	RBS-Channelling Investigation of Radiation Damage and Diffusion of Krypton implanted into 6H-SiC 217 Mr. MABENA, Chemist (UP) MSc	Comparative Study of Nanostructures VO_2 nanoplates: Annealing effect and Structural Properties 170 Ms. SIMO, Aline (iThemba LABS) PhD	Measurement of the Missing Transverse Momentum based on tracks in proton-proton collisions at sqrt(s) = 7 TeV centre-of-mass energy with the ATLAS detector 505 Mrs. LEE, Claire (UJ) PhD	Complex refractive index determination using Terahertz time domain spectroscopy 360 Dr. NEETHLING, Pieter (SUN - LRI)
15:50 - 16:20	**Tea Break (IT)**			
16:20 - 16:30	**Walk**			
16:30 - 17:30	**Plenary: Spin caloritronics – more than spin-dependent thermoelectrics Prof. BAUER, Gerrit (Thuto 1-2)**			
17:30 - 19:30	**Poster session 1 (IT Building)**			

SAIP 2012 Tuesday 10 July

Registration (IT Building) & Tea					7:30 - 9:15
Welcome Session (Thuto 1-2)					9:15 - 9:30
Plenary: Gamma-ray bursts and other transients: Ephemeral tests of extreme physics Prof. WIJERS, Ralph (Thuto 1-2)					9:30 - 10:30
Tea Break (IT)					10:30 - 11:00
Track D1: Astrophysics (IT 4-4) **Stellar Astrophysics** **Dr. Gulbis, Amanda (SALT)**	**Track D2: Space Science (IT 4-3)** **Ionosphere (1)** **Dr. Collier, Andrew (HMO)**	**Track E: Physics Education (IT 2-24)** **Dr. Naidoo, Deena (Wits)**	**Track F: Applied Physics Forum (IT 2-25)** **Radiation Physics** **Mr. De Beer, Frikkie (Necsa)**	**Track G: Theoretical Physics (IT 2-23)** **Prof. Scholtz, Frederik (NITheP)**	
Pulsation modes in B stars recently discovered in the Galaxy and the LMC 433 Dr. ENGELBRECHT, Christian (UJ)	Neural Network Based M(3000)F2 Global Model: An Option for the M(3000)F2 module within the IRI Global Model 69 Mr. ORONSAYE, Samuel MSc (Rhodes & SANSA)	An informal teaching of light and lasers through the CSIR-NLC PULSE programme 51 Mr. SHIKWAMBANA, Lerato (CSIR-NLC)	Effects of impurities and defects on the performances of synthetic diamond crystals when used as radiation sensors for medical applications 55 Mr. ADE, Nicholas (Wits) PhD	On the analytic properties of the Jost function 287 Mr. MVONDO-SHE, Yannick MSc (UP)	11:00 - 11:20
A search for pulsating B-type variable stars in the southern open clusters NGC 6204 and Hogg 22 96 Mr. MENTZ, Jaco (NWU) MSc	Development of an ionospheric map for Africa 72 Mr. SSESSANGA, Nicholas PhD (SANSA)	Curriculum reform – Does it provide the divide between developed and developing countries? 41 Dr. RAMAILA, Sam (UJ)	Assessment of spatial resolution and contrast in 3-dimensions at SANRAD 237 Mr. RADEBE, Mabuti Jacob Radebe (Necsa) PhD	Parametrization of scattering data using genetic algorithm 482 Mr. OGUNBADE, Prince Olusegun (UP) PhD	11:20 - 11:40
Angular Momentum of Giant Molecular Clouds 517 Dr. IMARA, Nia (Astronomy Department, University of California, Berkeley, USA)	TEC response over the African sector during selected storm conditions 109 Dr. HABARULEMA, John Bosco (SANSA)	The African School of Fundamental Physics and its Applications 46 Dr. ASSAMAGAN, Ketevi Adikle (UJ/ Brookhaven National Laboratory)	The Study of a Diamond Bearing Rock Sorter: Mineral-PET 441 Mr. TCHONANG, Marius (UJ) PhD	A study of resonant- and bound-state dependence on the variables of a step-potential for a quantum mechanical system by making use of the Jost Functions 266 Mr. VAANDRAGER, Paul MSc (UP)	11:40 - 12:00
	TIDs propagation properties over the South Africa region 153 Mr. TYALIMPI, Vumile MSc (SANSA)	Making problem solving in physics explicit 111 Dr. HERBERT, Mark (UWC)	Image optimization techniques in a PET diamond location system 377 Mr. COOK, Martin (UJ) PhD	Onset of Chaos in Intrinsic Josephson Junctions 450 Prof. BOTHA, Andre (UNISA)	12:00 - 12:20
Walk					12:20 - 12:30
Plenary: An Introduction to Space Weather: How it Impacts South African Technology and Society Prof. MOLDWIN, Mark (Thuto 1-2)					12:30 - 13:30
LUNCH					13:30 - 14:30
Track D1: Astrophysics (IT 4-4) **Stellar Astrophysics** **Dr. McBride, Vanessa (UCT & SAAO)**	**Track D2: Space Science (IT 4-3)** **Neutral Atmosphere & Satellites** **Mr. Delport, Brett (UKZN)**	**Track E: Physics Education (IT 2-24)** **Mr. Clerk, Douglas (Wits)**	**Track F: Applied Physics Forum (IT 2-25)** **Radiation Physics** **Dr. Nothnagel, Gabriel (NECSA)**	**Track G: Theoretical Physics (IT 2-23)** **Prof. Muronga, Azwinndini (UJ)**	
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Listen to Our Universe and beyond 70 Mr. Maritz, Jacques (UFS) MSc	Orbit decay predictions of Low Earth Orbit Satellites and the DeorbitSail 140 Mr. AFFUL, Michael (SUN) MSc	Adjusting the height of the hurdle 228 Mr. VAN DER MERWE, Johan (Military Academy)	Dr. VENTER, Andrew (NECSA)	Applications of Space Geodesy in tests of general relativity 262 Prof. COMBRINCK, Ludwig (HartRAO)	15:30 - 15:50
Tea Break (IT)					15:50 - 16:20
Walk					16:20 - 16:30
Plenary: Spin caloritronics – more than spin-dependent thermoelectrics Prof. BAUER, Gerrit (Thuto 1-2)					16:30 - 17:30
Poster session 1 (IT Building)					17:30 - 19:30

SAIP 2012 Wednesday Morning 11 July

	Track A1: Division for Condensed Matter Physics and Materials (IT 2- 26)	Track A2: Division for Condensed Matter Physics and Materials (IT 2 - 27)	Track B: Nuclear, Particle and Radiation Physics (IT 4-1)	Track C: Photonics (IT 4-5)
7:30 - 8:00	**Registration & Tea (IT Building)**			
	MSc Prize Awards **Prof. Dejene, Francis (UFS)**	**PhD Prize Awards** **Dr. Chirwa, Max (Walter Sisulu University)**	**Reaction Mechanisms and Fission** **Dr. Roux, David (Rhodes)**	**Ultrafast spectroscopy** **Prof. ROHWER, Erich (SUN)**
8:00 - 8:20	First-Principle Study on Stabilities of Reactive Products of Sulphur and Oxygen in Lithium- and Sodium- air Batteries 224 Mr. MASEDI, CLIFFTON (UL) MSc	Effect of ruthenium on oxidation behaviour of copper interconnect 173 Mr. SULE, RASIDI (TUT) PhD	Reaction mechanisms studied using the iThemba LABS recoil detector 85 Dr. NTSHANGASE, Sifiso Senzo (University of Zululand)	
8:20 - 8:40	Structural and Magnetic Properties of $MgCe_xFe_{2-x}O_4$ Nanoferrites 260 Mr. MKWAE, Prince (UKZN) MSc	The effect of nano-sized Alq3 on the external quantum and power efficiency of OLEDs 184 Ms. DUVENHAGE, Mart-Mari (UFS) PhD	Characterization of Incomplete Fusion Reaction with AFRODITE and DIAMANT 465 Mr. BONGANI, Maqabuka (UJ) MSc	Observing Photo-Induced Dynamics in the Charge Density Wave Compound 4HB-TaSe2 by means of Femtosecond Electron Diffraction 101 Ms. VON FLOTOW, Andrea (SUN) PhD
8:40 - 9:00	Characterisation of polycrystalline diamond samples from different origins 294 Ms. MOIPOLAI, Tshegofatso (UJ) MSc	Spin density wave behaviour in the $(Cr_{84}Re_{16})_{100-y}V_y$ system 357 Mrs. JACOBS, Bincy Susan (UJ) PhD	High Resolution Two Proton Stripping reactions with the AFRODITE/WAFANA2 setup 412 Dr. PAPKA, Paul (SUN)	**Photonics Division Group Meeting**
9:00 - 9:20	Nitrogen-doped carbon nanospheres 310 Mr. MARSICANO, Vincent (Wits) MSc	Mechanical properties of graphene and boronitrene 92 Mr. ANDREW, Richard (UP) PhD	A facility for fast-neutron irradiations at Jyvsäkylä and its use for nuclide cross-section measurements in fission 351 Dr. JONES, Pete (iThemba LABS)	Prof. ROHWER, Erich (SUN)
9:20 - 9:30	**Walk**			
9:30 - 10:30	**Plenary: Some things physicists have learned about physics education by doing research in cognitive science - Prof. LOPEZ, Ramon (Thuto 1-2)**			
10:30 - 10:55	**Tea Break (IT)**			
	MSc Prize Awards **Prof. Lombardi, Enrico (UNISA)**	**PhD Prize Awards** **Dr. Manyala, Ncholu (UP)**	**Reactors and Radio-activity** **Dr. USMAN, IYABO (iTHEMBA LABS)**	**Beam propagation** **Strauss, Hencharl (NLC)**
10:55 - 11:15	An investigation of the structural and magnetic properties of Ho substituted $BiFeO_3$ 343 Mr. NCUBE, Mehluli (Wits) MSc	Synthesis and characterization of europium activated lanthanum oxysulphide by sol- combustion method 196 Mr. ALI, Ali Abdub Guyo (UFS) PhD	Assessment of beryllium depletion modeling on SAFARI-1 reactor core parameters in aid of OSCAR-4 validation 5 Mr. BRAYSHAW, Richard (Necsa / Eskom) MSc	Essence of re-calibrating optical instruments: Analysis of digital delay line 32 Dr. IREETA, Winston Tumps (NMMU / Makerere University)
11:15 - 11:35	Synthesis, Structural Characterization and Magnetic Properties of $Mg_{1-x}Zn_xFe_2O_4$ Nanoparticles 347 Mr. MASINA, Patrick (UKZN) MSc	Erbium point defects and complexes in GaN: A G0W0 and hybrid functional study 245 Mr. OUMA, Cecil (UP) PhD	Criticality Effects Of Storage Patterns Of Spent Nuclear Fuel Casks 53 Mr. LEOTLELA, Mosebetsi (Wits) PhD	Generation of high order modes 499 Mr. NGCOBO, Sandile (CSIR) PhD
11:35 - 11:55	Synthesis and characterization of SnO_2 Nanostructures for gas sensing applications 380 Mr. THABETHE, Bongani (CSIR) MSc	Quantum critical behaviour in the $(Cr_{98.4}Al_{1.6})_{100-x}Mo_x$ and $(Cr_{100-y}Al_y)_{95}$ Mo_5 alloy series 328 Mr. MUCHONO, Blessed (UJ) PhD	Biological Monitoring of Air Pollution with Plants: results from a pilot study in the Western Cape, South Africa 119 Ms. NDLOVU, Ntombizikhona Beaulah (SUN) PhD	A transmitter-receiver model of the propagation of the second moments of a non-Gaussian non-spherical laser beam through an ABCD system 476 Dr. MAFUSIRE, Cosmas (CSIR - NLC)
11:55 - 12:00	**Walk**			
12:00 - 12:45	**Plenary: Communicating Science – How to wake the sleeping, gray cat Ms. BRITS, Elsabé (Thuto 1-2)**			
12:45 - 13:45	**LUNCH (Date a scientist - Sci-Enza)**			
13:45 - 14:00	**Conference Photo at Amfitheatre**			
14:00 - 16:00	**Demonstration Competition (AE du Toit Auditorium)**			
16:00 - 16:30	**Tea Break (IT)**			

SAIP 2012 Wednesday Morning 11 July

Registration & Tea (IT Building)					7:30 - 8:00
Track D1: Astrophysics (IT 4-4) **Pulsars** **Dr. Venter, Christo (NWU)**	**Track D2: Space Science (IT 4-3)** **Cosmic Rays** **Dr. Habarulema, John Bosco (HMO)**	**Track E: Physics Education (IT 2-24)** **Mr. Fish, Derek (Unizul Science Centre)**	**Track F: Applied Physics Forum (IT 2-25)** **Radiation Physics** **Dr. Vorster, Frederik (NMMU)**	**Track G: Theoretical Physics (IT 223)** **Dr. Greben, Jan (CSIR)**	
		The symmetry of Gauss's law and Ampère's law 257 Dr. KROON, Ted (UFS)	**Applied Physics Forum Group Meeting**	Analytical techniques for noise filtering in quantum logic gates 84 Dr. UYS, Hermann (CSIR - NLC)	8:00 - 8:20
Inferring the presence of nearby sources of cosmic rays by method of galactic propagation modelling 331 Mr. BISSCHOFF, Driaan MSc (NWU)	Modelling of galactic cosmic ray electrons in the heliosphere 22 Ms. NNDANGANENI, Rendani Rejoyce MSc (NWU)	Exploring large group dynamics 42 Dr. RAMAILA, Sam (UJ)	Dr. VORSTER, Frederik (NMMU)	Derivation of the quantum-bit-error rate for the BB84 protocol based on the phase-covariant-cloning machine 280 Mr. MAFU, Mhlambululi MSc (UKZN)	8:20 - 8:40
The anatomy of γ-ray pulsar light curves 229 Mr. SEYFFERT, Albertus MSc (NWU)	Numerical Modelling of Cosmic Rays in the Inner Heliosphere 354 Mr. RAATH, Jan-Louis MSc (NWU)	An evaluation of students' performance in a typical first year non-calculus based Mechanics Module 263 Dr. NAIDOO, Deena (Wits)	A low-cost Thermo-Luminescence system for use with .NET computing environments 17 Mr. MBONGO, Mduduzi MSc (UFS)	Monitoring the State of a Single Quantum System 423 Mr. GARAPO, Kevin (UKZN)	8:40 - 9:00
The Effect of Different Magnetospheric Structures on Predictions of Gamma-ray Pulsar Light Curves 127 Ms. BREED, Monica (NWU) MSc	A multi-detector study of the effect of a varying heliospheric current sheet tilt angle on cosmic-ray intensity 391 Mr. MOLOTO, KATLEGO PhD (NWU)	The problem of motivation: what students want, what students need, and what works well within a Physics context 268 Mr. VAANDRAGER, Paul (UP)	Selectivity of ice crystallization and refrigeration waste heat integration in freeze desalination of brine - Application and Optimisation 137 Mr. MTOMBENI, Tabani MSc (TUT)	Non-Hermitian approach to the dissipative dynamics of two-level system 61 Dr. ZLOSHCHASTIEV, Konstantin (UKZN)	9:00 - 9:20
Walk					9:20 - 9:30
Plenary: Some things physicists have learned about physics education by doing research in cognitive science - Prof. LOPEZ, Ramon (Thuto 1-2)					9:30 - 10:30
Tea Break (IT)					10:30 - 10:55
Track D1: Astrophysics (IT 4-4) **Pulsars** **Dr. Engelbrecht, Christian (UJ)**	**Track D2: Space Science (IT 4-3)** **Magnetosphere** **Mr. Afful, Michael (UCT)**	**Track E: Physics Education (IT 2-24)** **Dr. Moji, Cable (UP)**	**Track F: Applied Physics Forum (IT 2-25)** **Industrial Physics** **Dr. Mamphweli, Sampson (UFH)**	**Track G: Theoretical Physics (IT 223)** **Prof. Scholtz, Frederik (NITheP)**	
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Modelling the soft-photon energy density of globular clusters 218 Mr. PRINSLOO, Phillip Hons (NWU)	Narrowband VLF Observations as Validation of Plasmaspheric Model 12 Dr. COLLIER, Andrew (SANSA)	Active Learning in Thermal and Statistical Physics at the University of the Witwatersrand 296 Dr. KEARTLAND, Jonathan (Wits)	Prediction of aerodynamic loads in arbitrary manoeuvre: identifying flow regimes 405 Dr. GLEDHILL, Irvy (Igle) (CSIR)	**Theoretetical & Computational Physics Division Group Meeting**	11:15 - 11:35
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Conference Photo (Amfitheatre)					13:45 - 14:00
Demostration Competition (AE du Toit Auditorium)					14:00 - 16:00
Tea Break (IT)					16:00 - 16:30

SAIP 2012 Wednesday Afternoon 11 July

	Track A1: Division for Condensed Matter Physics and Materials (IT 2- 26) **MSc Prize Awards** **Dr. Mwakikunga, Bonex (CSIR - NLC)**		Track A2: Division for Condensed Matter Physics and Materials (IT 2 - 27) **PhD Prize Awards** **Dr. Meyer, Walter (UP)**		Track B: Nuclear, Particle and Radiation Physics (IT 4-1) **Anti-neutrinos and beta-decay** **Dr. Mullins, Simon (iThemba LABS)**		Track C: Photonics (IT 4-5) **Pulse shaping** **Forbes, Andrew (CSIR - NLC)**	
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	Mr. MCINTOSH, Ross (Wits)	MSc	Ms. VAN DER WALT, Cornelia (UFS)	PhD	Mr. VAN ROOY, Milton (SUN / iThemba LABS)	PhD	Mr. SMIT, Andre Smit (CSIR - NLC)	PhD
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	Mr. MUKHAWANA, Mxolisi (UP)	MSc	Mr. SULEIMAN, MOHAMMED (Wits)	PhD			Mr. HENDRIKS, Attie (CSIR - NLC)	PhD
17:10 - 17:30	Mechanisms of luminescence in carbon-doped alpha aluminium oxide: Investigations using time-resolved optical stimulation technique	206	Interaction mechanism for energy transfer from Ce to Tb ions in silica	308	**Division meeting**		Prism pulse compressor	338
	Mr. NYIRENDA, Angel (Rhodes)	MSc	Mr. SEED AHMED, Hassan (UFS)	PhD			Mr. OKOYE, Raphael (SUN - LRI)	MSc
17:30 - 17:50	Laser surface alloying of aluminium (AA1200) alloy for improving hardness property	440	Growth and characterization of RF magnetron sputtered NbN and ZrN thin films	309			Femtosecond laser pulse shaping using a 4f-pulse shaper	352
	Mr. RAMBAU, Tshimangadzo (TUT)	Tech	Mr. KURIA, Jonah (Wits)	PhD	Dr. MULLINS, Simon (iThemba LABS (Gauteng))		Mr. SPANGENBERG, Dirk (SUN)	PhD

SAIP 2012 Wednesday Afternoon 11 July

Track D1: Astrophysics (IT 4-4) **Stellar Astrophysics** **Dr. Frescura, Fabio (Wits)**	Track D2: Space Science (IT 4-3)	Track E: Physics Education (IT 2-24) **Dr. Ramaila, Sam (UJ)**	Track F: Applied Physics Forum (IT 2-25) **Radiation Physics** **Dr. Gledhill, Igle (CSIR)**	Track G: Theoretical Physics (IT 2 23) **Prof. Joubert, Daniel (Wits)**	
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Periodic X-ray modulations in supersoft X-ray sources 318 Mrs. ODENDAAL, Alida PhD (UFS)		How much do first year physics students really understand? An entry-level test 378 Mr. MOLEFE, Paul (UJ)		The role of the initial system-bath correlations in the dynamics of open quantum systems 199 Dr. SEMIN, Vitalii (UKZN)	16:50 - 17:10
Orbital periods of Be X-ray binaries through optical lightcurves 83 Dr. MCBRIDE, Vanessa (UCT / SAAO)		Investigation of the understanding of heat-time graphs by extended program students at the Mamelodi Campus of the University of Pretoria 335 Dr. MOJI, Cable (UP)	Measurement and simulation of neutron beam fluence spectra 110 Dr. HERBERT, Mark (UWC)	Dissipative dynamics of a spinless electron strongly interacting with the environment of spinless electrons 187 Mr. MWALABA, Michael MSc (UKZN / NITheP)	17:10 - 17:30
The asymmetric outflow of RS Ophiuchi 98 Dr. MOHAMED, Shazrene (SAAO)			On a popular myth: "Scientific research cannot be subject to quality management". Think again! Who says it cannot be? 264 Mr. THERON, Bertus (CSIR)	Decoherence-assisted transport in quantum networks 270 Ms. MARAIS, Adriana (UKZN / NITheP) PhD	17:30 - 17:50

SAIP 2012 Thursday Morning 12 July

7:30 - 8:00	**Registration & Tea (IT Building)**			
	Track A1: Division for Condensed Matter Physics and Materials (IT 2- 26) **Hons Prize Awards** **Dr. Maphanga, Rapela (UL)**	**Track A2: Division for Condensed Matter Physics and Materials (IT 2 - 27)** **PhD Prize Awards** **Mr. Msimanga, Mandla (iThemba LABS)**	**Track B: Nuclear, Particle and Radiation Physics (IT 4-1)** **Nuclear Resonances : From Pygmy to Giant** **Prof. Carter, John (Wits)**	**Track C: Photonics (IT 4-5)** **Quantum Optics** **Dr. Mafusire, Cosmas (CSIR - NLC)**
8:00 - 8:20	Semi-metallic transport in ultra-thin layers of carbon films deposited by laser ablation 411 Mr. COLEMAN, Christopher (Wits) Hons	Charge injection at metal–polymer interfaces 326 Mr. JHAMBA, Lordwell (Wits) PhD	A study of the complete electric dipole response in ^{96}Mo 94 Dr. NEVELING, Retief (iThemba LABS)	Compensating birefringence effects in fibre for polarisation encoded QKD 225 Ms. PILLAY, Sharmini (UKZN) MSc
8:20 - 8:40	Extracting device parameters of pn-junction diodes using sigmoidal properties of resistance – voltage curves: theory, simulation and application 503 Ms. HANGOMA, Pesi (Univeristy of Zambia) Hons	Quantification of printed silicon aggregates using Ultra-small angle X-ray scattering 398 Mr. JONAH, Emmanuel Ohieku Jonah (UCT) PhD	Fine structure of E2 strength in one-proton-different nuclei from (p,p') experiments 201 Dr. USMAN, IYABO (iTHEMBA LABS)	Realization of B92 QKD protocol using id3100 Clavis2 system 190 Mr. SENEKANE, Makhamisa (UKZN) PhD
8:40 - 9:00	Density Functional Tight-Binding (DFTB) study of Si as an anode material 242 Mr. PHOSHOKO, Katlego (UL) Hons	NiS Nanostructures for application in room temperature gas sensors 400 Ms. CEBISA, Ella (CSIR) PhD	Effects of nuclear deformation on the fine structure of the Isoscalar Giant Quadrupole Resonance from even-even neodymium isotopes using proton inelastic scattering 359 Mr. KUREBA, Chamunorwa Oscar (Wits) PhD	Progress toward Ion Trapping at the NLC 81 Dr. UYS, Hermann (CSIR - NLC)
9:00 - 9:20	Laser surface alloying of Al with Mo for hardness improvement 222 Mr. NKOSI, Humphrey (TUT) BTech	Nitrogen-vacancy in diamond for Solid-state quantum computing 443 Mr. ZULU, Bheki (UKZN) PhD	Investigation of fine structure of the Isovector Giant Dipole Resonance in nuclei across the periodic table using proton inelastic scattering at zero degrees 371 Mr. JINGO, Maxwell (Wits) PhD	Magneto-Optical trapping of rubidium atoms 320 Mr. ELNOUR, HUZIFA MOHAMMED AHAMED MOHAMMED (SUN)
9:20 - 9:30	**Walk**			
9:30 - 10:30	**Plenary: From RISING at GSI to the DESPEC Fast-Timing Project at FAIR: The New Nuclear Spectroscopy of the Most Exotic Isotopes - Prof. REGAN, Patrick (Thuto 1-2)**			
10:30 - 11:00	**Tea Break (IT)**			
	Track A1: Division for Condensed Matter Physics and Materials (IT 2- 26) **Dr. MATHE, Bhekumusa (Wits)**	**Track A2: Division for Condensed Matter Physics and Materials (IT 2 - 27)** **PhD Prize Awards** **Dr. Nel, Jacqueline (UP)**	**Track B: Nuclear, Particle and Radiation Physics (IT 4-1)** **Radio-active beams, shielding and monitoring** **Dr. Jacobs, Noel Mkhululi (SUN)**	**Track C: Photonics (IT 4-5)** **Optical trapping** **Dr. Uys, Hermann (CSIR - NLC)**
11:00 - 11:20	Comparative study of luminescence properties of Eu^{2+}, Dy^{3+} and Tm^{3+} co-doped $CaAl_2O_4$ powder phosphors 437 Dr. DHLAMINI, Mokhotjwa Simon (UNISA)	Effect of Li composition on HCP to BCC phase transformation in ultra-lightweight binary Mg-Li alloys: an ab initio study 500 Mr. PHASHA, Maje (CSIR) PhD	News on the iThemba LABS Radioactive Beams Project 203 Dr. BARK, Robert (iThemba LABS)	Novel Double MOT System for a BEC Experiment 161 Ms. SEMONYO, Malehlohonolo (UKZN) PhD
11:20 - 11:40	Thermoluminescent properties of $Ba_{1-x}Mg_xAl_2O_4:Eu^{2+},Dy^{3+}$ prepared by combustion method 418 Dr. MOTHUDI, Bakang Moses (UNISA)	Temperature dependence of the capture cross section for the E3 defect in Ir/ZnO Schottky contacts 507 Mr. MTANGI, Wilbert (UP) PhD	Radiation Shielding calculations using MCNPX transport code for cost optimization of the shielding material to be used at iThemba LABS 75 Mr. ZIPHO, Phumlani (iThemba LABS) MSc	A Bose-Einstein condensation machine 159 Dr. MORRISSEY, Michael (UKZN)
11:40 - 12:00	Synthesis and electrochemical properties of cation doped spinel $LiM_xMn_{2-x}O_4$ (M=Ni, Al and x=0, 0.5) cathode materials for Li-ion battery 279 Dr. KEBEDE, Mesfin (CSIR)	The magnetocaloric effect in $PrNiSi_2$ 313 Mr. SNYMAN, JL (UJ) PhD	Radiation shielding analysis and optimisation for the mineral-PET Kimberlite sorting facility using the Monte Carlo calculation code MCNPX 10 Mr. CHINAKA, Eric (UJ & NECSA) Mphil	Robust qutrit quantum states in atmospheric turbulence 116 Dr. ROUX, Filippus (CSIR - NLC)
12:00 - 12:20	Absorption and site-selective laser spectroscopy of $BaF_2:Nd^{3+}$ single crystals 210 Dr. MUJAJI, Marjorie (Wits)	Defects in the traditional analogy between the dipolar structure of a circular current and a simple electric dipole's 20 Dr. CHIRWA, Max (Walter Sisulu University)	The development and characterization of a mobile monitor for background neutrons 323 Mr. TSATSI, George (UJ & NECSA) MSc	Simulating atmospheric turbulence with random phase screens 491 Mr. HAMADOU IBRAHIM, Alpha (CSIR - NLC) PhD
12:20 - 12:30	**Walk**			
12:30 - 13:10	**Plenary: Widening the net: Attracting and keeping women in physics Prof. GRAYSON, Diane (UP) (Thuto 1-2)**			
13:10 - 14:10	**LUNCH (Women in Physics)**			

SAIP 2012 Thursday Morning 12 July

Registration & Tea (IT Building) — 7:30 - 8:00

Track D1: Astrophysics (IT 4-4) Prof. Woudt, Patrick (UCT)	Track D2: Space Science (IT 4-3) Cosmic Rays Dr. Opperman, Ben (SANSA)	Track E: Physics Education (IT 2-24) Prof. Grayson, Diane (UP)	Track F: Applied Physics Forum (IT 2-25) Renewable Energy Prof. van Dyk, Ernest (NMMU)	Track G: Theoretical Physics (IT 2-23) Prof. Konrad, Thomas (UKZN)	
	Simulation of Space Plasmas with Kappa Distributions 180 Mr. ABDUL, Reginald (UKZN)	The missing link between conceptual theories and reasoning 420 Mr. MOTSOENENG, John (UP)	A case study into the effects of partial shadowing on a 4 kWp photovoltaic array 344 Ms. CROZIER, Jacqui PhD (NMMU)	Critical exponents and the extensive nature of statistical entropy 103 Dr. SALAGARAM, Trisha (UP)	8:00 - 8:20
	Beam-generated electrostatic instabilities in two-electron temperature space plasmas 192 Mr. MBULI, Lifa (SANSA / UWC) MSc	National Senior Certificate results: Steady improvement versus output quality 43 Dr. RAMAILA, Sam (UJ)	An Investigation into the operational modes used in a charge controller in a grid integrated photovoltaic system with battery storage 376 Mr. ALISTOUN, Warren MSc (NMMU)	Entropic entanglement criteria for fermion systems 49 Dr. ZANDER, Claudia (UP)	8:20 - 8:40
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Prof. WOUDT, Patrick (UCT)	Solitary Waves in a Magnetized Plasma with Two Temperature Electrons 472 Mr. RUFAI, Odutayo Raji PhD (UWC)	Is Foundation Provision the solution to first year students' performance? 438 Ms. SONDEZI-MHLUNGU, Buyi (UJ)	Development of CTJ Cell Characterisation Techniques for HCPV Modules 384 Mr. SCHULTZ, Ross (NMMU) MSc	Control in boson-boson dynamics through long time scale discontinuities 145 Dr. GIRALDI, Filippo (UKZN & NITheP)	9:00 - 9:20

Walk — 9:20 - 9:30

Plenary: From RISING at GSI to the DESPEC Fast-Timing Project at FAIR: The New Nuclear Spectroscopy of the Most Exotic Isotopes - Prof. REGAN, Patrick (Thuto 1-2) — 9:30 - 10:30

Tea Break (IT) — 10:30 - 11:00

Track D1: Astrophysics (IT 4-4) Radio astronomy Prof. Kraan-Korteweg, Renee (UCT)	Track D2: Space Science (IT 4-3) Magnetosphere Dr. Collier, Andrew (SANSA)	Track E: Physics Education (IT 2-24) Mr. Molefe, Paul (UJ)	Track F: Applied Physics Forum (IT 2-25) Renewable Energy Dr. Vorster, Frederik (NMMU)	Track G: Theoretical Physics (IT 2-23) Dr. Snyman, Izak (NITheP)	
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Prof. JARRETT, Tom (UCT/Caltech)		Best-fit Physics: Adapting presentations to diverse school backgrounds 484 Mr. FISH, Derek (Unizul Science Centre)	[333] Design, construction and characterization of a steady state solar simulator 333 Mr. MTHIMUNYE, Thabiso Vincent (UFH) MSc	Unsharp mesaurement in Quantum Mechanics and its realization 422 Dr. CHOUDHARY, Sujit Kumar (UKZN)	11:20 - 11:40
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Forward Application of Propagation Path Effects in Radio Interferometry Using Measurement Equations 79 Mr. NATARAJAN, Iniyan MSc (UCT)	Dr. COLLIER, Andrew (SANSA)	The use of models and simulation in the teaching of thermal physics 512 Dr. WHEATON, Spencer (UCT)	Construction and evalauation of a PV/T collector under low concentration using the batch method 470 Mr. SAMUKONGA, Gilbert MSc (University of Zambia)	From large N nonplanar anomalous dimensions to open spring theory 151 Mr. KEMP, Garreth (Wits) PhD	12:00 - 12:20

Walk — 12:20 - 12:30

Plenary: Widening the net: Attracting and keeping women in physics Prof. GRAYSON, Diane (UP) (Thuto 1-2) — 12:30 - 13:10

LUNCH (Women in Physics) — 13:10 - 14:10

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			Nuclear Structure	Beams
	Dr. Mothudi, Bakang Moses (UNISA)	Dr. Meyer, Walter (UP)	Mr. Ntshangase, Sifiso Senzo (UCT)	Esser, Daniel (CSIR - NLC)
14:10 - 14:30	Depth profiling and thickness measurements of transition metal based thin hard coatings using Heavy Ion ERD time of flight spectrometry 350 Dr. MSIMANGA, Mandla (iThemba LABS)	Magnetic 4f-systems and their application in spintronics 106 Dr. NOLTING, Volkmar (Vaal University of Technology)	In-beam spectroscopy of ^{72}Ge 427 Dr. ROUX, David (Rhodes)	
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14:50 - 15:10	Enhanced tunnel transport in disordered carbon superlattice structures incorporated with nitrogen 385 Prof. BHATTACHARYYA, Somnath (Wits)	Segregation measurements of In and S on a Cu(In,S) ternary alloy using Auger Electron Spectroscopy coupled with a linear programmed heater 195 Mr. MADITO, Moshawe (UFS)	New rotational bands in ^{192}Tl 194 Mr. EASTON, Jayson (UWC & iThemba LABS) MSc	**Non-Specialist Talk** 521 Digital Holograms
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	Prof. Engelbrecht, Japie (NMMU)	**Prof. Malherbe, Johan (UP)**	**Clustering, break-up and spontaneous fission** **Dr. Papka, Paul (SUN)**	**Beams** **Dr. Uys, Hermann (CSIR - NLC)**
16:00 - 16:20	Study of irradiation-induced primary defects in wide bandgap semiconductors 402 Mr. JANSE VAN RENSBURG, Johan (UP)	Synthesis and characterisation of titania supported gold nanoclusters for catalysts via magnetron sputtering 33 Dr. HARRIS, Richard (Mintek)	Investigation of the 11.16 MeV state of ^{12}C 115 Mr. NEMULODI, Fhumulani (SUN) PhD	Detection of Bessel-Gauss modes by the use of digital holography 200 Ms. ISMAIL, Yaseera (CSIR - NLC) PhD
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17:00 - 17:20	Prof. Engelbrecht, Japie (NMMU)			Modal analysis through complex amplitude and phase modulation 314 Mr. NAIDOO, Darryl (CSIR) PhD
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Commissioning the new Sutherland High-speed Optical Cameras (SHOC) 288 Mr. COPPEJANS, Rocco MSc (SAAO / UCT)	Diurnal Double Maxima (DDM) structures observations in South Africa 232 Dr. KATAMZI, Zama Thobeka (SANSA)	Dr. Ramaila, Sam (UJ)	Determination of energy yield for multi-MW photovoltaic power stations 365 Prof. VAN DYK, Ernest (NMMU)	Non supersymmetric large N background for two Yang-Mills coupled matrices 259 Dr. ZAIDI, Alia (Wits)	14:30 - 14:50
Molecular gas and dust of selected lensed SMGs from the Herschel-ATLAS Science Demonstration Phase Data 436 Dr. LEEUW, Lerothodi (UJ)	Ionospheric dynamics observed along the South-west African longitude GNSS-receiver chain 449 Dr. Opperman, Ben (SANSA)	Incorporating an engineering project into an augmented Physics course Prof. Grayson, Diane (UP)	Analysis of the solar radiation data and the determination of regression coefficients for the Vhembe region of Limpopo Province, South Africa 277 Mrs. MULAUDZI, Sophie (University of Venda)	Two Loop Dilatation Operator in $N=4$ SYM 97 Ms. SMITH, Stephanie (Wits) PhD	14:50 - 15:10
The detailed nature of active central cluster galaxies 169 Dr. Loubser, Ilani (NWU)	Application of MAGIC code to Compute TEC over South Africa region using GNSS networks 469 Mr. VAN DE HEYDE, Valentino MSc (UWC)		Energy conservation measure in RDP houses in South Africa 304 Mr. OVEREN, Ochuko (UFH) MSc	Geometries of quantum systems: Towards an AdS / quantum mechanics correspondence 185 Mr. VAN ZYL, Hendrik (SUN) PhD	15:10 - 15:30
Tea Break (IT)					15:30 - 16:00
Track D1: Astrophysics (IT 4-4) Extragalactic Astronomy Dr. Loubser, Ilani (NWU)	**Biophysics (IT 4-3)** Dr. Sparrow, Raymond (CSIR)	**Track E: Physics Education (IT 2-24)**	**Track F: Applied Physics Forum (IT 2-25)** Renewable Energy Dr. Diale, Mmantsae (UP)	**Track G: Theoretical Physics (IT 2-23)** Prof. de Mello Koch, Robert (Wits)	
Ram pressure statistics in the galaxy environments of the MareNostrum Universe simulation 301 Mr. MGUDA, Zolile (UCT) PhD	Quantum effects in biological systems: An introduction 554 Prof. PETRUCCIONE, Francesco (UKZN)		SEM analysis as a diagnostic tool for photovoltaic cell degradation 330 Mr. OSAYEMWENRE, Gilbert (UFH) MSc	KMS states 4 Ms. BARNES, Gwendolyn (UP)	16:00 - 16:20
Central stellar populations of brightest cluster galaxies 175 Ms. VILJOEN, Danièl (NWU) MSc	Biophysical characterization of biologics 552 Dr. STOYCHEV, Stoyan (CSIR – Biosciences)		Model free kinetic analysis of biomass/sorbent blends for gasification purposes 124 Ms. MABUDA, Irene (UFH) PhD	Biofilaments in assays of molecular motors: collective effects and the role of geometry 265 Prof. Müller-Nedebock, Kristian (SUN)	16:20 - 16:40
Using Galaxy Clusters to constrain Dark Energy 248 Dr. Gilbank, David (SAAO)	Optical tweezing, guiding, sorting and transfection of mammalian cells 553 Dr. MTHUNZI, Patience (CSIR - NLC)		Optimization of biogas by co-digestion using a field-scale bath digester 243 Mr. MUKUMBA, Patrick PhD (UFH)	Topological equivalence of polymers: regular isotopy in a projection geometry 332 Mr. ROHWER, Chris (SUN) PhD	16:40 - 17:00
Extragalactic Large-Scale Structures in the Northern Zone of Avoidance 186 Ms. RAMATSOKU, Mpati MSc (UCT)	Effect of epidermal absorption on laser treatment dose calculations 276 Mrs. KARSTEN, Aletta (CSIR - NLC)		An automated temperature control model for a well-mixed biomass digester 300 Mr. PAGONA, FELIX (UFH) PhD		17:00 - 17:20
Break					17:20 - 17:30
Poster Session 2 (IT Building)					17:30 - 19:30

SAIP 2012 Friday 13 July

7:30 - 8:00	**Registration & Tea (IT Building)**		
	Track A1: Division for Condensed Matter Physics and Materials (IT 2- 26) **Dr. Rammutla, Erasmus Koena (UL)**	**Track B: Nuclear, Particle and Radiation Physics (IT 4-1)** **Nuclear Theory** **Mr. Ngcobo, Zipho (iThemba Labs)**	**Track C: Photonics (IT 4-5)** **Lasers** **Roux, Filippus (CSIR - NLC)**
8:00 - 8:20	Real-time XRD/RBS study of platinum germanide formation on Ge<100> and Ge<111> substrates 453 Prof. COMRIE, Craig (iThemba LABS)	Linking nuclear masses with nucleon separation energies 44 Prof. KARATAGLIDIS, Steven (UJ)	Tm-doped double-clad fibre laser development 373 Mr. RIAAN STUART COETZEE, Riaan (SUN) MSc
8:20 - 8:40	Tunable half-metallicity in substitutionally-doped boronitrene 50 Dr. UKPONG, Aniekan Magnus (UP)	Application of the Isobaric Mass Multiplet Equation to the rp process in Nuclear Astrophysics 65 Prof. RICHTER, Werner (iThemba LABS)	Wavelength Selected, Tm:YLF Slab Pump-Source 334 Dr. STRAUSS, Hencharl (CSIR - NLC)
8:40 - 9:00	**Non-specialist talk** **Materials analysis of the fuels for the next generation of nuclear reactors**	Ground state properties of doubly closed-shell nuclei with the Potential Harmonic Expansion Method 312 Mr. MUKERU, Bahati (UNISA) MSc	Challenges in developing a Holmium slab laser to pump a rod OPO 428 Mr. JACOBS, Cobus (CSIR - NLC)
9:00 - 9:20	Prof. MALHERBE, Johan (UP)	The formulation of a hybrid nuclear cluster potential 388 Mrs. KAMBLAWE, Amany (SUN) MSc	Mid-Infrared doubly-resonant Optical Parametric Oscillator based on $ZnGeP_2$ 346 Mr. KOEN, Wayne (CSIR - NLC)
9:20 - 9:30	**Walk**		
9:30 - 10:30	**Plenary: *In situ* RBS and XRD investigation of thin film formation** **Prof. VANTOMME, André (Thuto 1-2)**		
10:30 - 11:00	**Tea Break (IT)**		
	Track A1: Division for Condensed Matter Physics and Materials (IT 2- 26) **Prof. Swart, Hendrik (UFS)**	**Track B: Nuclear, Particle and Radiation Physics (IT 4-1)** **High Energy Physics 3** **Dr. Buthelezi, Zinhle (iThemba LABS)**	**Track C: Photonics (IT 4-5)** **Materials** **Dr. Mthunzi, Patience (CSIR - NLC)**
11:00 - 11:20	The Lattice Dynamics of Mercuric Chloride 160 Dr. KEARTLAND, Jonathan (Wits)	Relativistic Thermodynamics: Transverse Momentum Distributions in High-Energy Physics 11 Prof. CLEYMANS, Jean (UCT)	Computation of Amplified Spontaneous Emission in multi-element laser models 416 Mr. COLLETT, Oliver (CSIR - NLC)
11:20 - 11:40	Volume element structure and roton-maxon-phonon excitations in superfluid helium-4 beyond the Gross-Pitaevskii approximation 60 Dr. ZLOSHCHASTIEV, Konstantin (UKZN)	Quarkonium and heavy flavour production in pp and PbPb collisions studied with ALICE at the LHC 430 Dr. VILAKAZI, Zeblon (iThemba LABS)	Syntheses and characterization of copper chalcogenide nanoparticles and their use in solution processed photovoltaics 8 Mr. KALENGA, Pierre Mubiayi (Wits) PhD
11:40 - 12:00	Analysis of Iodine Implanted 6H-SiC 466 Prof. MALHERBE, Johan (UP)	Studying Hot Many Body QCD 543 Dr. HOROWITZ, Will (UCT)	Solution – combustion synthesis and photoluminescence property of $(Gd,Y)BO_3:Tb^{3+}$ phosphor powders 181 Prof. DEJENE, Francis (UFS)
12:00 - 12:20		From chi-squared to Bayesian model comparison: Levy expansions of Bose-Einstein correlations in e+e- correlations 247 Mr. DE KOCK, Michiel (SUN) PhD	Capability of testing the ageing behaviour of incandescent lamps 284 Ms. GOVENDER, Patricia (CSIR DPSS unit)
12:20 - 12:30	**Walk**		
12:30 - 13:30	**Plenary: Neutron imaging – a powerful set of methods complementary to X-rays** **Dr. SCHILLINGER, Burkhard (Thuto 1-2)**		
13:30 - 14:30	**LUNCH**		
14:30 - 16:00	**SAIP Annual General Meeting (Thutho 2-1)**		
17:00 - 23:00	**Banquet (Voortrekker Monument)**		

SAIP 2012 Friday 13 July

Registration (IT Building) & Tea				7:30 - 8:00
Track D1: Astrophysics (IT 4-4)	**Biophysics (IT 4-3)** **Dr. Sparrow, Raymond (CSIR)**	**Track F: Applied Physics Forum (IT 2-25)** **Materials** **Dr. Ferrer, Phil (Wits)**	**Track G: Theoretical Physics (IT 2-23)** **Prof. Lekala, Mantile (UNISA)**	
	Comparison of optical techniques to measure melanin absorption 286 Mrs. KARSTEN, Aletta (CSIR - NLC)	New Interactive and Graphical Calculation Method for Setting up Isochronous Magnetic Fields in the Solid Pole Injector Cyclotron 2 at iThemba LABS 130 Dr. DE VILLIERS, John Garrett (iThemba LABS)	Equilibration of hot and dense nuclear matter 510 Mr. THOVHOGI, Tshilidzi (UJ) PhD	8:00 - 8:20
	An FTIR study on the chlorophyll and apoprotein aggregation states in LHCII due to solvent effects 35 Dr. SMIT, Jacoba (CSIR Modelling and Digital Sciences / Synthetic Biology ERA (Biosciences))	Induced stress studies of RF magnetron sputtered ZrC thin films 410 Dr. WAMWANGI, Daniel (Wits)	Light flavor symmetry breaking for heavy baryons 47 Mr. BLANCKENBERG, Jaco (SUN) PhD	8:20 - 8:40
	Elastic response of lament networks with active cross-links 549 Prof. MüLLER-NEDEBOCK, Kristian (SUN)	Stability of high temperature operating Ru-SiC Schottky diodes using 6H-SiC as a substrate, and nickel as an ohmic contact 478 Mr. MUNTHALI, Kinnock Vundawaka (UP) PhD	Progress in Thermodynamics and Electrodynamics of Relativistic Fluids 439 Prof. MURONGA, Azwinndini (UJ)	8:40 - 9:00
	Modelling the HIV epidemic in Africa 87 Dr. MATTHEWS, Alan (UKZN)	Fabrication and characterization of an AlGaN-based four-quadrant solar-blind UV photodetector device 475 Mr. VAN SCHALKWYK, Louwrens (UP)	Followup on the Monte Carlo simulation of MUSR using GEANT 4 481 Mr. HARTMAN, Jonathan (UJ)	9:00 - 9:20
Walk				9:20 - 9:30
Plenary: *In situ* RBS and XRD investigation of thin film formation **Prof. VANTOMME, André (Thuto 1-2)**				9:30 - 10:30
Tea Break (IT)				10:30 - 11:00
Track D1: Astrophysics (IT 4-4) **Extragalactic Astronomy and Cosmology** **Dr. Leeuw, Lerothodi (UJ)**	**Biophysics (IT 4-3)** **Dr. Sparrow, Raymond (CSIR)**	**Track F: Applied Physics Forum (IT 2-25)** **Materials** **Dr. Wamwangi, Daniel (Wits)**	**Track G: Theoretical Physics (IT 2-23)** **Prof. Rampho, Gaotsiwe Joel (UNISA)**	
The mass overdensity of the Great Attractor as determined from a deep NIR imaging survey 62 Prof. KRAAN-KORTEWEG, Renee (UCT)	On the calculation of solvation free energy from Kirkwood-Buff integrals: A large scale molecular dynamics study 19 Mr. DEDNAM, Wynand (UNISA)	Physics publication productivity in South Africa 86 Dr. MATTHEWS, Alan (UKZN)	Fermi edge singularity and finite frequency spectral features in a semi-infinite 1D wire 451 Dr. SNYMAN, Izak (NITheP)	11:00 - 11:20
Cosmic Telescope Chromacity: apparent spectral distortions in a high-redshift, gravitationally lensed starburst/AGN 419 Dr. DEANE, Roger (UCT)	Profiling of nutrients and trace elements in sorghum bicolor mutants 551 Ms. MBAMBO, Zodwa (CSIR – Biosciences)	Design of a high-resolution PID temperature controller for use in a low-cost thermo-luminescence system 215 Mr. MBONGO, Mduduzi (UFS) MSc	Mapping Kohn-Sham eigenenergies onto vertical ionization energies 102 Prof. JOUBERT, Daniel (Wits)	11:20 - 11:40
Exploring dark energy and the dark equation of state 150 Mr. MOHLABENG, Gopolang (University of Kansas) MSc	Molecular modelling of calcium dependent protein kinase 4 (CDPK4) from plasmodium falciparum 550 TSEKOA, Tsepo (CSIR Biosciences)	Morphological and Luminescent properties of $Y_3(AlGa)_5O_{12}:Ce^{3+}$ powder phosphor 141 Mr. DLAMINI, Sipho (UFS) MSc	Molecular simulations of phosphoric acid in high temperature PEM fuel cells using different thermostat algorithms 348 Ms. MAASDORP, Lynndle (UWC) PhD	11:40 - 12:00
			Structural and electronic properties of ZnO: a hybrid density functional study 271 Mr. MOLEPO, Mahlaga (Wits)	12:00 - 12:20
Walk				12:20 - 12:30
Plenary: Neutron imaging – a powerful set of methods complementary to X-rays **Dr. SCHILLINGER, Burkhard (Thuto 1-2)**				12:30 - 13:30
LUNCH				13:30 - 14:30
SAIP Annual General Meeting (Thutho 1-2)				14:30 - 16:00
Banquet (Voortrekker Monument)				17:00 - 23:00

Poster session 1 – Tuesday 10 July 17:30 – 19:30 (IT Building)

Track A: Division for Condensed Matter Physics and Materials

ID	Title	Presenter	Prize level	Board No
6	FTIR assessment of $Al_xGa_{1-x}N$ epilayers	Prof. ENGELBRECHT, Japie		**A1**
18	Synthesis and Characterization of BaB_8BO_{13}: Eu nanophosphors Prepared Using Solution- Combustion Method	Mr. SITHOLE, THOKOZANE MOSES	MSc	**A3**
34	A new method for obtaining the mole fraction in $Al_xGa_{1-x}N$ epilayers	Ms. DEYZEL, Genevéve	3rd year	**A5**
54	An experimental and modeling study of the thermoluminescence of natural quartz	Mr. LONTSI SOB, Aaron Joel	MSc	**A7**
73	Room Temperature FePt Nanoparticles Formation Kinetics during Laser Solution Photolysis	Mr. NKOSI, Steven	PhD	**A9**
76	Modification of glassy carbon under strontium ion implantation	Ms. ODUTEMOWO, opeyemi		**A11**
88	Graphene based nano-coatings for space application	Mr. NANGAMSO, Nyangiwe		**A13**
93	Effect of concentration on the optical and solid state properties of ZnO thin films deposited by Aqueous Chemical Growth (ACG) method	Mr. MAMMAH, Sylvester	PhD	**A15**
105	Synthesis and characterization of MnS nanoparticles using the chemical bath deposition method	Mr. KOAO, Lehlohonolo	PhD	**A17**
122	Theoretical calculation of positron states and annihilation rates in BaF_2	Mr. JILI, Thulani		**A19**
123	Morphological, structural and photoluminescence properties of sol-gel synthesized strontium titanate ($SrTiO_3$:Pr:Al) nanophosphors	Mr. LOTHA, Thandikhaya Lungisa	Hons	**A21**
129	Defect identification in $FeTiO_3$ using positron annihilation technique	Mr. JILI, Thulani		**A23**
135	Heat treatment of glassy carbon implanted with cesium at room and high temperatures	Mr. LANGA, Dolly	PhD	**A25**
138	Magnetic substitution in $CePt_2Si_2$ and $CeCu_5In$ Kondo lattice compounds	Mr. MAHLUBI, Zwelithini	MSc	**A27**
139	Diblock copolymers as templates for semiconductor nanostructure fabrication	Mr. DOBSON, Stephen	Hons	**A29**
143	Influence of working atmosphere on $Y_3(Al,Ga)_5O_{12}$:Tb thin films grown by PLD technique	Mr. MOHMMED, Abdelrhman	PhD	**A31**
163	Influence of temperature and precursor concentration on synthesis of HDA-capped Ag_2Se nanoparticles	Mr. MLAMBO, Mbuso	PhD	**A33**
167	Thickness and Solvent influence on the photo-active layer in Organic photovoltaic devices	Ms. MBULE, Pontsho Sylvia	PhD	**A35**
168	Annealing effects on Pt coating morphology	Ms. THABEZHE, Nokwethemba	MSc	**A37**
172	The formation of ordered phases in Pt-Mo coated systems	Mr. KHUMALO, Zakhelumuzi		**A39**
176	Structural, morphological and luminescence properties of hexagonal ZnO particles by wet chemical process	Prof. DEJENE, Francis		**A41**
178	Synthesis and characterization of sputter deposited TiN thin films	Ms. NYALUNGA, Gezekile	Hons	**A43**
189	Sol-gel synthesis and Characterization of Structural and Luminescence Properties of $ZnAl_2O_4$ singly doped with Mn^{2+}, Cr^{2+}, or Pb^{2+} powder phosphors	Mr. MOTLOUNG, Setumo Victor	PhD	**A45**
193	Synthesis and characterization of green $SrAl_2O_4$:Tb^{3+} phosphor using solution combustion method	Ms. FOKA, Kewele Emily	MSc	**A47**
202	Synthesis and characterisation of sputter deposited AlN thin films	Mr. HLATSHWAYO, Simphiwe	MSc	**A49**
209	Synthesis and characterization of a narrowband $Ca_5(PO_4)_3(OH)$:Gd^{3+}, Pr^{3+} phosphor for medical applications	Ms. MOKOENA, PUSELETSO	MSc	**A51**
211	Effects of synthesised temperature and solvents on the ZnO properties	Ms. TSHABALALA, Modiehi Amelia	MSc	**A53**

221	Synthesis and Magnetic properties of $Mg_{0.2}Cr_{1.8-x}Fe_xO_3$ oxides	Mr. MBELA, Kalengay	PhD	**A55**
230	Structural, Electrical and Electronic Properties of carbon and carbon-based materials	Mr. MBIOMBI, Wilfred		**A57**
231	Feasibility study of DFTB+ parameterization Li, Ti and O systems	Mr. GANDAMIPFA, Mulatedzi	MSc	**A59**
233	MOCVD grown ZnO on R-sapphire: effect of high growth temperature and high VI/II ratio on the morphology and optical properties	Dr. TALLA, Kharouna		**A61**
239	Study of Current-Voltage-Temperature (I-V-T) Characteristics of Palladium Schottky contacts on n-Ge (100)	Prof. CHAWANDA, Albert		**A63**
241	Synthesis of a three dimensional graphene network for ultracapacitor application	Mr. BELLO, Abdulhakeem	PhD	**A65**
253	A Comparative Study of Zn-doped Al_2O_3 versus Al-doped ZnO Thin Films on Glass for Optimizing Transparent Conducting Properties	Ms. NJINGANA, Primrose Nosicelo	MSc	**A67**
282	Characterization and XPS information of commercially $Y_2O_2S:Eu^{3+}$ powder phosphor	Dr. DOLO, JAPPIE		**A69**
292	Deposition, Structural, Optical and Electrical Characterization of Silicon Carbide Thin Films for Solar Cell Applications	Mr. KHOELE, Joshua	MSc	**A71**
305	Computer Simulation Study of Synthetic Nickel-Rich Pentlandite ($Fe_4Ni_5S_8$) Surfaces	Mr. MKHONTO, Peace Prince	MSc	**A73**
311	Defect complexes on SiC surfaces	Ms. KHOZA, Eva	MSc	**A75**
315	Computational studies of palladium/platinum sulfide using solid-solution approach	Ms. MASENYA, Mamogo		**A77**
322	Tranport properties of LiPF6 in PEO-PDMS polymer matrix	Mr. KUBAI, Thomas		**A79**
389	Computer simulation studies of spinel $LiMn_2O_4$ and $LiNi_xMn_{2-x}O_4$ ($0 \leq x \leq 2$)	Mr. MALATJI, kemeridge Tumelo	Hons	**A81**
459	Characterization of the electrical properties of the Platinum-Palladium-Hydrogen system	Ms. VAN DEN BERG, Claire	Hons	**A83**
493	Microstructural and electrical evaluation of ZnO solgel films	Mr. STEYN, Ruhann	3rd year	**A85**
501	Comparison of screened hybrid functionals to GGA functionals for predicting the properties of intrinsic radiation induced defects in Si	Mr. WEBB, Geoffrey	Hons	**A87**

Track B: Nuclear, Particle and Radiation Physics

ID	Title	Presenter	Prize level	Board No
30	Low Temperature Transport of HTR Nuclear fuel Composite Graphite	Ms. MUROVHI, Phathutshedzo	MSc	**B1**
37	A study of the relationship between the concentrations of naturally occurring radionuclides in various locations in the Western Cape	Dr. BEZUIDENHOUT, Jacques		**B3**
39	Light Ion Spectrometer for the study of multi-body decays of heavy nuclei	Mr. MALAZA, Vusi	MSc	**B5**
56	Nuclear Incompressibility and Nuclear Symmetry Energy Calculated Using M3Y-type Interaction Derived from Variational Calculation	Mr. GBAORUN, Frederick		**B7**
67	Photon dose distributions between 3D-water phantom and Profiler2 scanning system	Dr. SITHOLE, Enoch		**B9**
155	Baryon - Omega Meson Electroproduction	Mr. UNWUCHOLA, Doomnull Attah	MSc	**B11**
219	Fine Structure of the Isovector Giant Dipole Resonance using the (p,p') reaction at zero degrees: Effects of strong nuclear deformation	Ms. DONALDSON, Lindsay	MSc	**B13**
345	Monte Carlo simulation of an in-situ gamma-ray detector system used in conjunction with a planned calibration facility	Mr. SEHONE, Alfred Mogotsi	MSc	**B15**
374	Numerical calculations of received dose due to various geometries of radioactive material	Mr. COOK, Martin	PhD	**B17**
383	TIGRESS segmented gamma-ray detector studies	Mr. NONCOLELA, Sive	PhD	**B19**

455	Evaluation of the Potential of Parametric Neutron Activation Analysis in the RINGAS Irradiation Positions of the SAFARI-1 Research Reactor	Mr. VILAKAZI, Happy	MSc	**B21**
508	A Study of the Interaction of Charge Carriers and Defects in Diamond	Mr. TSHISEKEDI, MUPEMBE	MSc	**B23**

Track C: Photonics

ID	Title	Presenter	Prize level	Board No
147	Characterization of spectral broadening of femtosecond pulses in microstructured fiber	Mr. NDEBEKA, Wilfrid	PhD	**C1**
177	Luminescence studies of a solution-combustion synthesized of blue-green $BaAl_xO_y:Eu^{2+},Dy^{3+}$ nanophosphors	Prof. DEJENE, Francis		**C3**
246	Optimized discharge excitation techniques for short pulse gas lasers: TEA CO_2 laser	Mr. KYEYUNE, Farooq	MSc	**C5**
339	Photo-induced isomerisation reactions in mercury dithizonates	Mr. OLAOYE, OLUFEMI OPEYEMI	PhD	**C6**
401	High Efficient TEMp0 End Pumped Nd:YAG Lasers	Mr. NGCOBO, Sandile	PhD	**C7**
519	Sorting Orbital Angular Momentum states of light	Ms. MHLANGA, Thandeka		**C9**

Track D1: Astrophysics

ID	Title	Presenter	Prize level	Board No
16	Listen to Our Universe	Mr. MARITZ, Jacques	MSc	**D1**
58	Seyfert 2 galaxies with unusually wide nebular lines	Prof. WINKLER, Hartmut		**D3**

Track D2: Space Science

ID	Title	Presenter	Prize level	Board No
7	Core flow inversions from the Earth's magnetic field	Dr. DE VILLIERS, Jean		**D5**
13	Particle-in-cell simulations of electron Bernstein waves	Mr. KOEN, Etienne	PhD	**D7**
21	TGFS: Power of source lightning strokes	Mr. OGUNJOBI, Olakunle	PhD	**D9**
27	Using WWLLN to track tropical cyclone Irena	Mr. DELPORT, Brett	PhD	**D11**
52	Lower and upper thermospheric wind variations during magnetically quiet days	Dr. SIVLA, William Tafon		**D13**
100	Ion-Bernstein waves in a plasma with a kappa velocity distribution	Mr. NSENGIYUMVA, Francois	PhD	**D15**

Track F: Applied Physics

ID	Title	Presenter	Prize level	Board No
15	Digital Arduino Driven Spectrometer using Scientific MATLAB Orientated Interface and Protocol	Mr. MARITZ, Jacques	MSc	**F1**
157	Towards Quantification of Cu and Ni Using X-Ray Radiography	Mr. BAM, Lunga		**F3**
197	Phonon confinement analysis of carbon doped titanium dioxide quantum dots	Mr. RAYMOND, Taziwa	PhD	**F5**
226	Rarefied Gas Ejection as a Thrust Mechanism for Miniature Electric Space Propulsion Systems	Mr. KROMMENHOEK, Marinus	MSc	**F7**
227	VCSEL Technology for Square Kilometre Array (SKA) Optical Fibre Network	Mr. ROTICH, Enoch	PhD	**F9**
235	Investigations on the Characterization of Ion implanted boron Nitride	Ms. ARADI, Emily	PhD	**F11**
255	Construction of a centralised microprocessor based smart metering system with optimised scheduling of energy usage	Ms. MWEWA, MELODY	MSc	**F13**

274	Are the Dynamics of Fluid Injection a Mechanism of Improving the Acoustic Characteristics of Performance Exhaust Mufflers?	Mr. MATHEBULA, Ipeleng		**F15**
278	An all-optical system designed for the heating and temperature measurement of the diamond tool	Ms. MASINA, Bathusile	PhD	**F17**
327	Confined single- and multiple-jet impingement heat transfer in helium-cooled beam window assemblies at a cyclotron facility	Dr. STEYN, G. F.		**F19**
395	Printed Transistors Based on Nanoparticulate Silicon	Mr. WALTON, Stanley	PhD	**F21**
448	Low temperature deposition of silicon nitride thin films by hot-wire CVD	Mr. ADAMS, Abdulghaaliq	MSc	**F23**
462	Thermally activated charge transport in printed silicon networks	Mr. MAGUNJE, BATSIRAI	PhD	**F25**

Track G: Theoretical and Computational Physics

ID	Title	Presenter	Prize level	Board No
281	Upper bound to accessible information for the six-state quantum key distribution protocol	Mr. MAFU, Mhlambululi	MSc	**G1**
366	An Accurate Determination of Pressure Profiles in Microfluidic Crevices and Networks	Mr. RAMNATH, Vishal		**G3**
302	Topology of the landscape of optimally controlled transitions in a multilevel system	Ms. MADIGOE, Ramathabathe	MSc	**G5**
424	Nonlocality arguments in the temporal Clauser–Horne–Shimony–Holt scenario	Dr. CHOUDHARY, Sujit Kumar		**G7**
492	Computational study of O vacancy and Ti doped tin-dioxide(SnO_2)	Mr. NTIMANE, NDUMA	MSc	**G9**

Poster session 2 – Thursday 12 July 17:30 – 19:30 (IT Building)

Track A: Division for Condensed Matter Physics and Materials

ID	Title	Presenter	Prize level	Board No
99	Nonlinear Optical Properties of Natural Dyes	ZONGO, Sidiki MALIK, Maaza	MSc	**A2**
114	Investigations of the Diffusion of Xenon Implanted in 6H-SiC	Ms. THABETHE, Thabsile	MSc	**A4**
258	A new white light emitting phosphor	Mr. SHAAT, Samy	PhD	**A6**
307	Modification of Surface Optical and Electrical properties of bulk GaSb (100) resulting from a Sulphur- based chemical treatment	Mr. MURAPE, Davison Munyaradzi	PhD	**A8**
319	Ab-initio study of structural stability of monoclinic, tetragonal and cubic $ZrO_{2-x}S_x$ for $0 \leq x < 2$	Mr. MULAUDZI, Masilu Godfrey	MSc	**A10**
321	Energy transfer from Ce^{3+} to Tb^{3+} in low quartz and amorphous SiO_2 hosts	Mr. TSHABALALA, Kamohelo George	PhD	**A12**
324	The structural and elastic properties of $Ti_{50}Pt_{50-x}Co_x$ ternaries using solid solution method employed in CASTEP	Ms. MAHLANGU, Rosinah		**A14**
336	Rare earth substitutions in $Mg_{0.5}Co_{0.5}Fe_2O_4$ nano-ferrites synthesized by Glycol-thermal method	Mr. MKWAE, Prince	MSc	**A16**
340	Optical properties of Mo-SiC thin film composites	Prof. NEMRAOUI, Ouassini		**A18**
349	Synthesis and Characterisation of Ag/Cu co-doped nano TiO_2	Mr. NUBI, Olatunbosun		**A20**
361	Magnetic phase diagram of CrIr	Mr. FERNANDO, Pius Rodney	PhD	**A22**
363	Electrical Properties of $Mn_{0.5}Co_{0.5}Fe_2O_4$ Nanosized Synthesized Via High-Energy Milling technique	Mr. ABDALLAH, HAFIZ M. I.	PhD	**A24**
367	The specific heat and magnetocaloric effect of $CePdIn_2$	Mr. SNYMAN, Jasper Snyman	PhD	**A26**
370	Effects of the wetting process in wool and mohair fibres studied by small-angle neutron scattering (SANS)	Mr. TJEBANE, Tjatji	MSc	**A28**
379	Scattering tensors in Si and Ge	Mr. NIYONGABO, PRIME	PhD	**A30**

387	Enhanced luminescence from Tb for the mixed spinel $Mg_xZn_{1-x}Al_2O_4$	Mr. TABAZA, Wael	PhD	**A32**
393	Clebsch-Gordan coefficients for Scattering Tensors in Bi_2Se_3	Dr. MACHATINE, Augusto		**A34**
394	Calculations of structural and electronic properties of manganese dioxide	Dr. MAPHANGA, Rapela		**A36**
399	Structural properties of some defects in tin-dioxide (SnO_2)	Mr. NTIMANE, James		**A38**
407	Half-metallic ferromagnetic ordering in Fe-doped diamond	Mr. BENECHA, Evans	PhD	**A40**
414	Optical Properties of SiN:H thin films obtained by hydrogen dilution	Mr. JACOBS, Sulaiman	MSc	**A42**
415	Comparison of the effects of annealing on Ni/Au and Ni/Ir/Au Schottky photodiodes	Mr. NGOEPE, Phuti	MSc	**A44**
417	DLTS and I-V-T characteristicsof e-beam deposited Pd/W 4H-SiC Schottky contacts	Mr. PARADZAH, Alexander	MSc	**A46**
425	On the interface properties of an oxidised Au/Ni/AlGaN MIS structure	Mr. LEGODI, Matshisa		**A48**
442	Green density effects on the structural and magnetic properties of $(Cd, Zn)_{0.5}Ni_{0.5}Fe_2O_4$	Dr. MOYO, Thomas		**A50**
452	Thermoluminescent properties of $CaAL_2O_4:Eu^{3+}$, (Dy^{3+},Sm^{3+}) phosphors prepared by solid state reaction	Mr. MMAKGABO COLEN, Manaka	MSc	**A52**
454	Temperature dependence of current-voltage characteristics of p-silicon Schottky diodes for radiation-hard detectors	Dr. MOLOI, Sabata		**A54**
458	The effects of annealing on the quality of Pt Si Schottky contacts and the defects introduced in Si during electron beam deposition	Ms. DANGA, Helga	MSc	**A56**
460	Structural and luminescence properties of yellow $Y_3Al_50_{12}:Ce^{3+}$ thin film phosphors prepared by Pulsed Laser Deposition	Dr. RORO, kittessa		**A58**
477	Heat treatment of 6H-Silicon Carbide implanted with palladium at room temperature	Ms. KABINI, Jeaneth Thokozile	MSc	**A60**
485	Solid state reaction between zirconium and silicon carbide at elevated temperatures	Mr. NJOROGE, eric	PhD	**A62**
487	Diffusion studies of Xenon and Krypton implanted in CVD-SiC	Dr. HLATSHWAYO, Thulani		**A64**
488	AFM and SEM studies on iodine implanted 6H-SiC	Mr. KUHUDZAI, Remeredzai Joseph	PhD	**A66**
495	The temperature dependence of the structure and magnetic properties of Mg-Mn-Co nanoferrites	Mr. MASINA, Patrick	MSc	**A68**
497	Room Temperature (RT), 429 °C and 600 °C Ion implantation of Cadmium (Cd) in Glassy Carbon: Diffusion behavior and RAMAN Analysis	Mr. SEBITLA, LESOLLE		**A70**
502	Comparison of electrical properties of Schottky contacts on Si, Ge, SiC and AlGaN using sputtering, electron-beam and resistive evaporation	Mr. MPHUTHI, Tiisetso	3rd year	**A72**
509	Ab-initio Study of Elastic Properties of Ru-Cr and Pt-Cr Alloys	Dr. TIBANE, Malebo		**A74**
522	Radiation damage of sapphire induced by ion implantation studied in nuclear and electronic energy loss regime	KOZAKIEWICZ, Anna		**A76**

Track B: Nuclear, Particle and Radiation Physics

ID	Title	Presenter	Prize level	Board No
57	Nuclear energy spectra calculated from derived single particle energies	Mr. GBAORUN, Frederick		**B2**
108	Development of a novel low power microwave proton ion source for Van de Graaff accelerator	Mr. NDLANGAMANDLA, Cebo		**B4**
158	Fingerprints of chiral bands associated with multi-quasiparticle configuration	Dr. SHIRINDA, OBED		**B6**
191	Plasma Characterisation of an Electron Cyclotron Resonance	Mr. SAKILDIEN, Muneer		**B8**
207	The Bound ground states of the Hypernucei with single Lambda particle	Mr. GOPANE, Ishmael Mmusi		**B10**
290	Detection at Necsa's Accelerator facility	Mr. DANIELS, Graham		**B12**
356	Statistical &gamma decay studies at iThemba LABS	Dr. NEGI, D		**B14**

364	Pressurized Water Reactor MOX/UO_2 Core Transient Benchmark Steady State Calculations with OSCAR-4	Mr. NTULI, Mduduzi		**B16**
392	^{222}Rn activity measurements in water samples in the Montagu area, Western Cape, South Africa using the RAD 7 alpha spectrometer detector	Mr. BOTHA, Ryno	Hons	**B18**
479	Simulation of a pencil proton beam through a phantom of water	Ms. JACOBS, Carmen		**B20**
498	Computing in large high energy physics collaborations	Dr. YACOOB, Sahal		**B22**
504	Standard Model Higgs→WW with hadronic tau decays in ATLAS	Mrs. LEE, Claire	PhD	**B24**

Track C: Photonics

ID	Title	Presenter	Prize level	Board No
256	Raman signatures of the modern pigment (Zn,Cd)$S_{1-x}Se_x$ and glass matrix of a red bead from Magoro Hill archeological site, as a method to recalibrate the historical settlement chronology	Mr. WEBB, Geoffrey	Hons	**C2**
273	A review of the mobile LIDAR system developed at the CSIR and a proposed improvement of the system	Mr. SHIKWAMBANA, Lerato	PhD	**C4**
285	Simulating indirect IR femtosecond pulse shaping	Ms. BOTHA, Nicolene	PhD	**C6**
421	Development of refractive delay stages for application in two-dimensional electronic spectroscopy	Mr. VAN DER WESTHUIZEN, David	MSc	**C8**
518	Laser mode control using an intracavity spatial light modulator	Ms. BURGER, Liesl		**C10**
520	Using streaked electron diffraction as an alternative to conventional femtosecond pump-probe electron diffraction	Ms. VON FLOTOW, Andrea		**C12**

Track D1: Astrophysics

ID	Title	Presenter	Prize level	Board No
208	Automating self-calibration - a software solution	Mrs. ODENDAAL, Alida		**D2**
444	Polarized Dust Emission of the Nearby Starburst Galaxies M82 and NGC253	Dr. LEEUW, Lerothodi		**D4**

Track D2: Space Science

ID	Title	Presenter	Prize level	Board No
104	Radiometric modelling of a satellite remote sensing system used for image generation	Ms. VAN DER WESTHUIZEN, Lynette		**D6**
244	What is the geomagnetic PC index?	Dr. MCCREADIE, Heather		**D8**
325	Digital HF Radar for Antarctic Space Science Research	Dr. GOVENDER, Kessie		**D10**
431	Variability of total electron content (TEC) over the crest of equatorial anomaly station UNZA - First results	Dr. SIBANDA, Patrick		**D12**
463	Evaluation of a space-grade fluxgate magnetometer for a CubeSat	Ms. SIZIBA, Electdom	MSc	**D14**
516	Investigating Dunedin Whistlers using Volcanic Lightning	Ms. ANTEL, Claire		**D16**

Track F: Applied Physics

ID	Title	Presenter	Prize level	Board No
91	Characterization and computer simulation of various biomass / coal blends for co-gasification for electricity generation	Mr. MABIZELA, Polycarp	MSc	**F2**
95	Synergistic evaluation of the biomass/coal blends for co-gasification purposes	Ms. GAQA, Sibongiseni	MSc	**F4**
117	Gasification characteristics of sugarcane bagasse	Mr. ANUKAM, Anthony	MSc	**F6**
133	A Voltage Source Simulation Model of a Solar Cell	Dr. KIBIRIGE, Betty		**F8**

166	Infrared thermography of operational photovoltaic modules	Mr. NDLOVU, FILIPU YELTON	MSc	**F10**
236	Effect of temperature on spectral response measurements of crystalline silicon photovoltaic cells	Mr. MALAPE, Maibi	PhD	**F12**
337	Measuringcurrent – voltage characteristics of photovoltaic cells and module at various wavelengths	Ms. NWOKOLO, Nwabunwanne	MSc	**F14**
329	A saturation boiling model for an elongated boiling water target operating at a high pressure	Dr. STEYN, G. F.		**F16**
342	Performance monitoring of a Passive Flat Plate Solar Water Heating system	Ms. NOTHANDO, Ndlovu	MSc	**F18**
461	Characterization of the by-products of the biomass gasification process	Ms. MABUDA, Irene	PhD	**F22**
467	The exposure levels of the saldanha population due to the high levels of natural occurring radiation	Mr. GEYSER, Alwyn	MSc	**F24**
486	Design of a light beam induced current measurement system for the characterisation of defects in crystalline silicon solar cells	Mr. BEZUIDENHOUT, Lucian	MSc	**F26**
515	Characterisation of grid tied micro-inverters using a solar array simulator	Mr. MAC LEOD, Brendon		**F28**

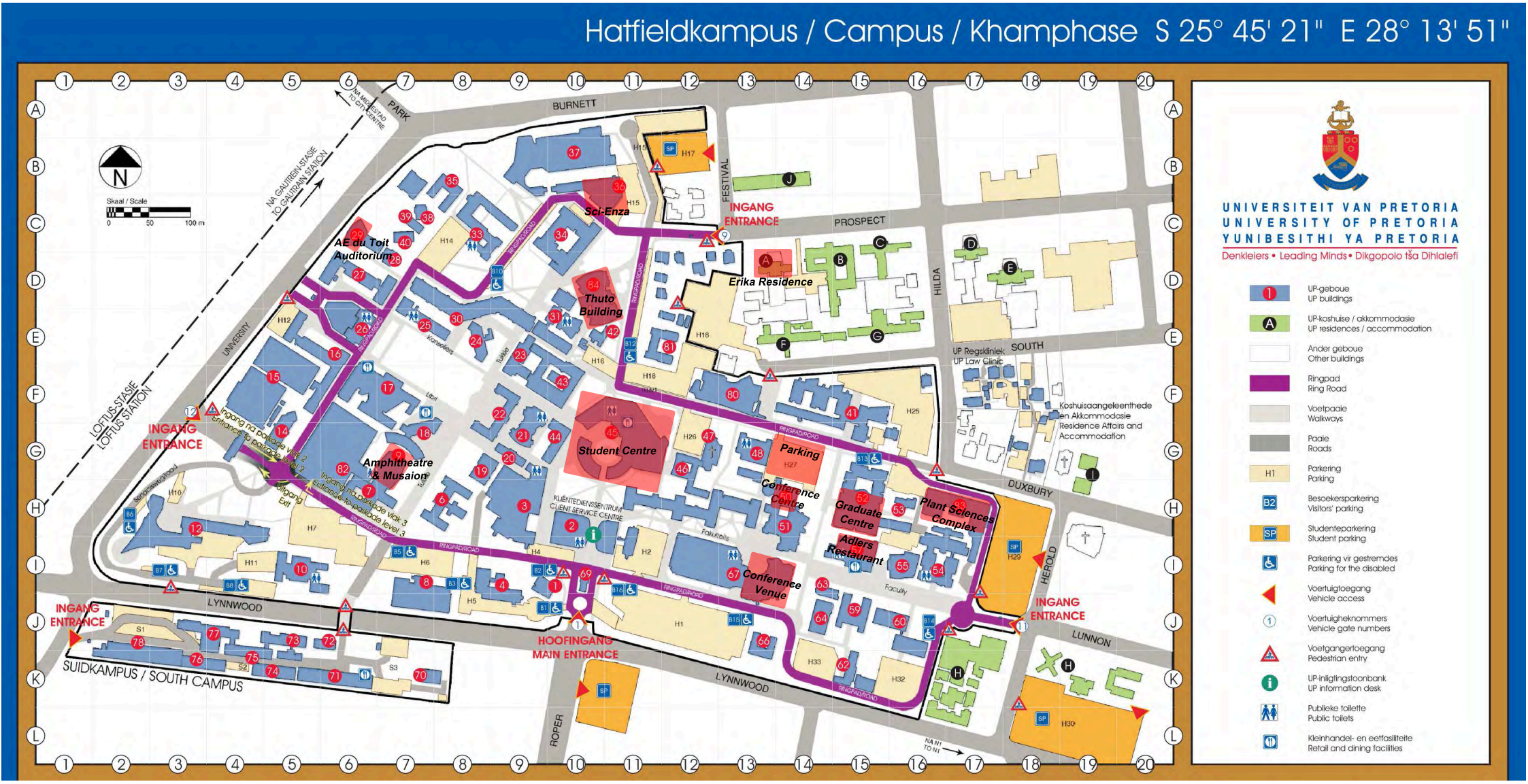
Track G: Theoretical and Computational Physics

ID	Title	Presenter	Prize level	Board No
31	Computational simulations of graphene and carbon nanotubes	Ms. SHAI, MOSHIBUDI	MSc	**G2**
66	Quantum Monte Carlo (QMC) study of Pressure-induced B3-B1 phase transition in GaAs	Mr. OUMA, Cecil	PhD	**G4**
299	First-Principles Calculations of the Structural, Electronic and Optical Properties of PdN and PdN2	Mr. SULEIMAN, MOHAMMED	PhD	**G6**
396	Raman Scattering Tensors in tetragonal WO_3	Mr. GOVENDER, Malcolm	PhD	**G8**
457	First-principles studies of extrinsic and intrinsic defects in boron nitride nanotubes	Mr. MASHAPA, Matete	PhD	**G10**

SAIP 2012

Book of Abstracts

Hatfieldkampus / Campus / Khamphase S 25° 45' 21" E 28° 13' 51"



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- UP-koshuise / akkommodasie / UP residences / accommodation
- Ander geboue / Other buildings
- Ringpad / Ring Road
- Voetpaaie / Walkways
- Paaie / Roads
- Parkering / Parking
- Besoekersparkering / Visitors' parking
- Studenteparkering / Student parking
- Parkering vir gestremdes / Parking for the disabled
- Voertuigtoegang / Vehicle access
- Voertuigheknommers / Vehicle gate numbers
- Voetgangertoegang / Pedestrian entry
- UP-inligtingstoonbank / UP information desk
- Publieke toilette / Public toilets
- Kleinhandel- en eetfasiliteite / Retail and dining facilities