

# South African Institute of Physics



## Annual Report

July 2007

A report for the membership of the SAIP

## Foreword

This is the inaugural annual report of the South African Institute of Physics.

It has been very gratifying to note that the business of the Institute has expanded considerably over recent years. This welcome evolution has made it increasingly difficult to accommodate sufficiently comprehensive oral reporting and tabling of written reports at the Annual General Meeting (AGM) given the enormous time constraints. It is therefore time to recognize the growth of the Institute by the introduction for the first time of an Annual Report. This report will communicate to the SAIP membership, affiliated societies and other stakeholders activities of Council, the various Specialist Groups, committees, task teams, etc. This will enable us to allocate substantially more time at the AGM for the President's report, the Treasurer's report, various announcements, the election and voting procedures of the Institute as well as feedback from the membership.

Members may raise issues related to this report directly with the secretary or at the annual general meeting.

**Prof Harm Moraal**  
**President**

**Dr. Jaynie Padayachee**  
**Secretary**  
**Email: [secretary@saip.org.za](mailto:secretary@saip.org.za)**

# Table of Contents

<b>FOREWORD.....</b>	<b>1</b>
<b>TABLE OF CONTENTS .....</b>	<b>2</b>
<b>1. PRESIDENT’S REPORT .....</b>	<b>4</b>
1.1 INTRODUCTION .....	4
1.2 COUNCIL .....	4
1.3 MEMBERSHIP .....	4
1.4 FINANCES .....	4
1.5 INTERNATIONAL LIAISON.....	5
1.6 WOMEN IN PHYSICS IN SOUTH AFRICA (WiPiSA) .....	5
1.7 ANNUAL CONFERENCE.....	5
1.8 SAIP OFFICE .....	5
1.9 EDUCATION.....	5
1.10 MEETING WITH THE NRF PRESIDENT .....	5
1.11 HISTORY OF PHYSICS .....	6
1.12 DONATION .....	6
1.13 WEBSITE .....	6
1.14 PERSPECTIVE .....	6
1.15 ACKNOWLEDGEMENTS .....	6
<b>2. TREASURER’S REPORT .....</b>	<b>7</b>
2.1. CURRENT FINANCIAL SITUATION .....	7
2.2. ACTUAL VS PROPOSED BUDGET FOR 2006/7 .....	8
2.3. PROPOSED BUDGET FOR 2008/9 .....	8
2.4. WiPiSA STATEMENT .....	9
2.6. FET WORKSHOP STATEMENT .....	10
<b>3. SHAPING THE FUTURE OF PHYSICS .....</b>	<b>11</b>
<b>4. EDUCATION COMMITTEE .....</b>	<b>14</b>
<b>5. MARKETING COMMITTEE.....</b>	<b>16</b>
5.1. STRATEGIC OBJECTIVES: .....	16
5.2. KEY FOCUS AREAS:.....	17
5.3. SUMMARY OF ENVISIONED OUTCOMES: .....	17
<b>6. COMMUNICATIONS .....</b>	<b>18</b>
6.1 WEBSITE .....	18
6.2 NEWSLETTER.....	18
<b>7. STUDENT COMMITTEE .....</b>	<b>19</b>
7.1 STUDENT MEMBERSHIP .....	19
7.2 STUDENT LIAISON ON COUNCIL.....	19
7.3 STUDENT COMMITTEE.....	19
7.4 EXCLUSIVE STUDENT ACTIVITIES .....	19
7.5 COMMUNITY INVOLVEMENT.....	19
7.6 JOB AND BURSARY EXPOSURE.....	19
<b>8. WOMEN IN PHYSICS .....</b>	<b>20</b>
8.1. OVERVIEW .....	20
8.2. AIMS .....	20
8.3. OBJECTIVES.....	20
8.4. WORKING GROUP MEETINGS.....	20
8.5. DEPARTMENTAL LAUNCHES.....	21
8.6. PROJECTS .....	21
8.7. WOMEN’S DAY CELEBRATIONS 2006 .....	22
8.8. WORKSHOP ON BUILDING EVALUATION INTO PROPOSALS .....	23
8.9. BASELINE STUDY.....	23
8.10. MARKETING MATERIAL FOR WiPiSA.....	23
8.11. IUPAP REPRESENTATIVE FOR SOUTH AFRICA .....	23
8.12. CONCLUSIONS.....	25
8.13. RECOMMENDATIONS .....	25
8.14. ACKNOWLEDGEMENTS .....	25

<b>9. SILVER MEDAL .....</b>	<b>26</b>
KAVILAN MOODLEY: SILVER MEDAL 2007 .....	26
<b>10. SPECIALIST GROUP REPORTS .....</b>	<b>27</b>
10.1 APPLIED AND INDUSTRIAL PHYSICS SPECIALIST GROUP .....	27
10.2 ASTROPHYSICS & SPACE SCIENCE SPECIALIST GROUP .....	28
10.3 CONDENSED MATTER PHYSICS AND MATERIAL SCIENCE SPECIALIST GROUP .....	32
10.4 PHYSICS EDUCATION SPECIALIST GROUP .....	33
10.5 LASERS OPTICS AND SPECTROSCOPY SPECIALIST GROUP .....	35
10.6 NUCLEAR, PARTICLE AND RADIATION PHYSICS SPECIALIST GROUP .....	36
10.7 THEORETICAL PHYSICS SPECIALIST GROUP .....	38

# 1. President's Report

## 1.1 Introduction

The period from July 2006 until June 2007 was a year of consolidation and significant progress, with several projects and initiatives coming to fruition.

## 1.2 Council

The members of the outgoing Council, elected in July in 2005 were:

Council Member	Portfolio	Council Member	Portfolio
Harm Moraal	President	Diane Grayson	Education
Nithaya Chetty	President-Elect	Dieter Heiss	Awards
Jaynie Padayachee	Secretary	Peter Martinez	Conferences
Japie Engelbrecht	Treasurer	Erich Rohwer	Specialist Group Liaison
Attie Combrinck	Student Member	Edmund Zingu	International Liaison
Simon Connell	Marketing		

The Executive Committee consisted of the President, President-Elect, Secretary and Treasurer. Three meetings were held during the year; 20 October 2006 at the University of Pretoria; 2 March 2007 at the University of the Witwatersrand (with the conference organisers); and 2 July 2007 (during the present conference at Wits).

## 1.3 Membership

On 12 June 2007 the SAIP membership was:

By Category	2007	2006	By Specialist Area	
Honorary	11	12	Applied & Industrial Physics	48
Emeritus	33	28	Astrophysics	97
Ordinary	273	258	Education	27
Associate	16	18	Lasers, Optics & Spectroscopy	49
Student	205	173	Nuclear, Radiation & Particle Physics	64
Retired	4	6	Plasma Physics	9
Institutional	3	3	Solar-Terrestrial & Space Physics	21
Honorary Institutional	1	1	Condensed Matter & Materials Science	156
			Theoretical Physics	26
<b>Total Members</b>	<b>547</b>	<b>499</b>	General	8

Since 2002 ordinary membership has decreased with 6% from 290, but student members have increased with 420%. The decrease in ordinary members is partly due to the fact that members who are two years in arrears with their subscriptions are removed from the membership list, having been given a final reminder earlier in the year. The increase in student membership to about 1/3 of the total justifies the change in the constitution to provide for a Student Member on Council.

## 1.4 Finances

The Treasurer, Japie Engelbrecht, will report on the financial state of the Institute. The increased membership fees by a stable number of fee-paying members and various cost-saving measures have contributed to a positive bank balance. Council is actively working to

designate and spend this money for strategically important initiatives, in particular for its newly established office (see item 8).

### **1.5 International Liaison**

The interests of the South African physics community in the affairs of the International Union of Pure and Applied Physics (IUPAP) are represented by the National Liaison Committee for IUPAP. As from 2005 this Committee consists of the Council of the SAIP. This newly-constituted committee met for the first time on 20 October 2006.

### **1.6 Women in Physics in South Africa (WiPiSA)**

Since 2005 the Department of Science and Technology sponsors an initiative for Women in Physics in South Africa (WiPiSA) with Mmantsae Diale of the University of Pretoria as the co-ordinator. This activity continued with several meetings, data gathering for a baseline study, and a workshop on how to incorporate evaluation into one's proposals. Individual projects at the University of Stellenbosch, North-West University (Mafikeng campus), University of Venda for Science and Technology, Nelson Mandela Metropolitan University and Wits Planetarium were supported financially.

### **1.7 Annual Conference**

The 51<sup>st</sup> annual conference was hosted by the University of the Western Cape in collaboration with iThemba LABS, the South African Astronomical Observatory and the Hermanus Magnetic Observatory. This very successful event included a plenary session a panel discussion on information technology and physics, as well as a series of winter schools.

On behalf of the SAIP we record our sincere appreciation to the members of the organising committee for their tremendous efforts to host this successful conference.

### **1.8 SAIP Office**

The most significant development of the year is that, with funding from the Department of Science and Technology, we are now proceeding to establish the SAIP Office from September 2007. It will be housed in the new DST building and staffed by an executive officer and an assistant. Funding for subsequent years will be based on the SAIP showing the capability to generate a significant fraction of the cost from other sources.

This office will become our face to the world, in an environment where important decisions about the future of science and technology are made. We foresee that this exciting development will make a large contribution to the coordinated marketing of our subject, outreach into society, co-operation in Africa, and a stronger engagement with educational and industrial matters that affect the health of physics.

### **1.9 Education**

Secondary education of physics remains a cornerstone of the success of our profession. A second workshop to acquaint university lecturers with the new FET curriculum was held on 8 and 9 February 2007. It was funded by DST and organised and facilitated by Prof. D. Grayson. Thirty people attended, including four representatives from DST, plus the universities of Stellenbosch, Pretoria, Witwatersrand, Zululand, Fort Hare, Limpopo, KwaZulu-Natal, Johannesburg, Venda, North-West, Nelson Mandela Metropolitan, Cape Town and Free State, and the Durban and Tshwane Universities of Technology. The focus was on the details of the Physics part of the curriculum, and the group is currently preparing an outline of what should be covered in a course for teachers, as well as a sample of a few pages of curriculum materials that would be suitable for such a course, to be presented at the current conference.

### **1.10 Meeting with the NRF President**

The Council executive met with Prof. Mzamo Mangaliso, the new president of the NRF on 1 December 2006 to introduce the SAIP to him, to describe what we do, and hear his vision for the development of science and technology. He emphasized the importance of standard "small"

science alongside our current macro-projects, an elaborated that we will have to learn better how to conduct our work as an academic enterprise. The lack of sufficiently large bursaries and the fragmentation of funding were identified as critical shortcomings that the NRF is working on.

### ***1.11 History of Physics***

Prof. P.R. de Kock of the University of Stellenbosch was appointed by Council to write a history of the development of physics in South Africa, focusing on the last 50 years, and from the perspective of the SAIP's role in this development. He will be assisted by Dr. C.A. Engelbrecht from the University of Johannesburg. An application for funding of R 110 000 was submitted on 30 April to the NRF focus area: Distinct South African Research Opportunities: Cultural Heritage and Identity Formation.

### ***1.12 Donation***

Prof. C.B. van Wyk, founder and second president of the SAIP donated an amount of R 50 000 to the SAIP with the wish that this be used for the promotion of quality in physics at the highest level, without being prescriptive. Council keeps this money in a trust fund and is considering the options.

### ***1.13 Website***

I remind all members of the SAIP website at <http://www.saip.org.za> which was set up and is maintained by Secretary Padayachee, and where one can find an extended version of the activities of the Institute, and almost all of the background for the items in this report, including the minutes of our meetings. There is also room on the website for physics departments to advertise their offerings. I encourage you to use this facility to market your department.

### ***1.14 Perspective***

In April 2007 a report-back letter was written to the International Panel that investigated the status and future of physics in South Africa three years ago. This letter detailed how, apart from their strategic support, the DST and NRF invested R 2,16 M in physics marketing/awareness/development projects that are directly administered by the SAIP. In addition to this, the National Institute of Theoretical Physics was established. With the much larger investments in strategically important macro-projects, we experience the current state of physics as healthy. The overriding concern, however, remains the dearth of suitably qualified physicists, and we therefore recognise that all our efforts must continue to concentrate on recruiting, educating and retaining them.

### ***1.15 Acknowledgements***

I express my sincere appreciation for the support of all Council members in their respective portfolios, in particular the visionary role of President-Elect Chetty. The business of the SAIP could only be conducted successfully with the responsible financial management of Treasurer Engelbrecht and the dynamic administration of Secretary Padayachee. We are indebted to them for their dedication.

It was a privilege and an honour to serve as president during this term in which several projects of the SAIP came to fruition.

**Prof Harm Moraal  
President**

## 2. Treasurer's Report

### 2.1. Current Financial Situation

The financial situation at the time of this report is as follows:

#### 2.1.1. Arrears 2004

The membership of members in arrears from 2004 were terminated.

#### 2.1.2. Arrears 2005

Currently 44 members (down from 99) are still in arrears with their membership. The amount owed is R 5 105 (down from R 23 735 - this amount included the arrears for 2003 and 2004). These members were given until the end of June 2007 to pay outstanding amounts or face termination of their membership.

#### 2.1.3. Arrears 2006

A total of 113 members are in arrears for 2006, with R 27 820 (down from R 54 376) still due for 2006 membership, which includes the amounts in points 1 and 2 above.

#### 2.1.4. Arrears 2007

274 Members still have to pay their membership, but money is coming in steadily. R 67 705 is outstanding, which includes the amounts from 1 to 3 above.

#### 2.1.5. Balances of Accounts

Current Account (30/05/2007)	R 29,720.66	FET Training withdrew more than was allocated, and owes R 1,388.87 Balance : 31,109.53
Moneymarket (06/05/2007)	R 1,606,262.50	Money for : WiPiSA (R 182,959.78) SAIP Office (R 527,000) Marketing (R 250,000) Physics in Industry (R 79 000) included herein Balance : R 567, 302.72
Moneymarket (06/05/2007)	R 51,455.66	CB van Wyk Trustfund

## 2.2. Actual vs Proposed Budget for 2006/7

PROPOSED vs ACTUAL BUDGET FOR THE FINANCIAL YEAR ENDING 31 MARCH 2007

INCOME	BUDGET	ACTUAL	EXPENDITURE	BUDGET	ACTUAL
	R	R		R	R
Donations	100	200	Affiliation fees	500	450
Membership fees	66,275	78,585	Bank charges	1,500	555
Interest	5,500	5,641	Honoraria	6,000	8,000
Conference surplus	50,000	0	Overseas speaker	15,000	15,000
Sponsorships	1,000	5,500	Science olympiad	1,000	
Transfer from 32 Day Account	48,000	0	Scifest	1,000	
Interest on Moneymarket		50,729	Secretary/Treasurer Expenses	5,000	2,954
			Travel expenses (Council)	25,000	23,747
			Meetings : Specialist Groups	10,000	
			Specialist group prizes	3,000	9,500
			Website + Postnet	2,000	990
			Audit of Financial Statements	750	1,000
			SAIP Office	100,000	
			Excess for year	125	78,459
	170,875	140,655		170,875	140,655

## 2.3. Proposed Budget for 2008/9

PROPOSED BUDGET FOR THE FINANCIAL YEAR ENDING 31 MARCH 2009

INCOME	R	EXPENDITURE	R
Donations	200	Affiliation fees	750
Membership fees :		Bank charges	2,000
Institutional members (2 X R 2 000)	4,000	Honoraria	8,000
Ordinary members (230 x R 300)	69,000	Overseas speaker	15,000
Associate members (10 x R 150)	1,500	Physics olympiad	3,000
Student/Retired members (165 x R 75)	12,375	Scifest	1,000
Subscribed Members (2xR50)	100	Secretary/Treasurer Expenses	3,500
Interest on accounts	45,000	Travel expenses (Council)	30,000
Conference surplus (UP + UWC + Wits)	45,000	Specialist group prizes (R 1 500 x 6)	9,000
Sponsorships	3,000	Website + Postnet	1,500
		Audit of Financial Statements	3,500
		Website Maintenance	1,500
		SAIP Office	100,000
		Excess for year	1,425
	180,175		180,175

## 2.4. WiPiSA Statement

### FINANCIAL STATEMENT : WOMEN IN PHYSICS PROGRAMME

INCOME	R	EXPENDITURE	R
DST	514,000	Travel (April meeting)	1,418.00
		TuksSport (April meeting)	1,200.00
		Workshop (Kgabi)	2,700.00
		Travel (June meeting)	1,122.00
		Maths-Science Clinic (travel)	1,450.00
		TuksSport (June meeting)	774.60
		<b>Surplus (30/6/2006)</b>	<b>360,378.00</b>
		Prelaunch work (D Grayson)	8,000.00
		Travel (July meeting)	180.00
		Travel (July meeting)	1,541.50
		Tukssport (July meeting:travel)	300.00
		<u>Girls in Physics program :</u>	
		University of Venda	30,000.00
		University of Stellenbosch	17,410.00
		Jhb Planetarium	7,000.00
		Travel (Oct meeting)	1,371.50
		<b>Surplus (30/09/2006)</b>	<b>294,575.00</b>
		<u>Girls in Physics program :</u>	
		University of Mmabato	45,500.00
		NMMU	29,500.00
		Launch costs (MW Diale)	11,650.00
		Travel (July meeting)	1,126.00
		WiPiSA Dept Launch NWU	2,238.20
		<b>Surplus (31/12/2006)</b>	<b>204,560.80</b>
		Andromeda Workshop	5,716.80
		Travel (February meeting)	1,124.00
		WiPiSA Functions :	
		University of Pretoria	1,063.75
		SAAO	3,642.96
		<b>Surplus (31/03/2007)</b>	<b>193,013.29</b>
		Unibrooks B&B (Meeting)	1,965.00
		Irene Quist Photography	2,500.00
		Workshop for Girls (UP)	5,078.51
		Unibrooks B&B (Meeting)	510.00
		<b>Surplus (31/05/2007)</b>	<b>182,959.78</b>
	514,000.00		514,000.00

## 2.6. FET Workshop Statement

### FINANCIAL STATEMENT : FET WORKSHOPS

INCOME	R	EXPENDITURE	R
DST	89,100.00	Workshop Material	3,638.39
		<u>Travel :</u>	
		G Arendse	417.60
		D Gunda	260.88
		Z. Jia	595.00
		JJA Smit	913.92
		MA Letsoalo	1,587.20
		S Ramaila	588.00
		V Sankaran	2,430.88
		Andromeda (Workshop)	30,780.00
		Univ of the Free State	1,397.00
		Andromeda (Baseline)	47,880.00
		<b>Balance (31/05/2007)</b>	-1,388.87
	89,100.00		89,100.00

**Prof Japie Engelbrecht**  
Treasurer

### 3. Shaping the Future of Physics

19 April 2007, marked the third anniversary of the launch of the “Shaping the Future of Physics” project in South Africa.

Very significant progress has been made with the implementation of the recommendations, and we are grateful that the South African Department of Science and Technology has been very forthcoming in financing our proposals. We have publicised the International Panels’ report and its recommendations widely. It has been a central part of our past three annual general meetings, it was the subject of two editorials of the South African Journal of Science, and it drew interest at a workshop of the South African ICSU Board in August 2006.

The report has been exceedingly valuable in shaping the agenda of the SAIP during these past three years. The report stated that the SAIP would need a full-time office if all 14 recommendations were going to get the attention that they deserved. The crowning glory for us is that this is now going to become a reality – after considerable planning, the DST informed us on 28 February 2007 that they will finance our business plan for the first three years of operation of this office. The amount of R 527 000 plus SAIP funds allows for the appointment of an executive officer and an assistant. The office will be located in the Science Societies wing of the new DST building. Thus, we will now have an address and an identity to develop. During the next three years we need to demonstrate financial sustainability of the office. Our business plan spells out how we aim to achieve this.

We next summarise the progress with each of the report’s recommendations:

- 1. Primary and Secondary Education:** Given the huge task, we needed to be selective. We did this by focusing on the demands set by the new FET curriculum for grades 10, 11, and 12 at secondary level. DST made available R 295 000 over a three-year period for Diane Grayson and Max Braun to conduct annual workshops for university lecturers who train secondary school teachers in physics. The idea is that these lecturers will prepare the teachers for this curriculum. The first two workshops were held in November 2005 and February 2007, with the second one attended by representatives of almost all the university physics departments. The third one is planned towards the end of 2007. We see this as an effective way to get physicists involved in the quality improvement of secondary level education.
- 2. Undergraduate and Postgraduate Education.** The Panel was specifically concerned about financial barriers and challenges of integration of students of different cultures into existing departments, particularly the transfer of students from HBUs to HWUs. The financial barriers are discussed in (5) below, while the transfer and integration of students is getting ongoing attention of individual departments with our encouragement. Good examples of integration efforts are a considerable list of inter-institutional programmes and specific recruitment drives on the honours level. These programmes lead to very a significant crossing of geographical and demographical barriers, and they have the effect that at many universities the composition of the postgraduate school is entirely different from the undergraduate one. We are satisfied that these programmes leave little or no untapped potential on this level.
- 3. Marketing of Physics in Industry.** The DST has awarded an amount of R 79 000 for our Applied Physics group to develop electronic and printed material to attract students to the applied fields. It is going to be in the format of role models who successfully applied their physics, or the way of thinking they learned from physics, in industry.
- 4. Public Understanding.** In 2005 the DST awarded R 500 000 for South Africa’s highly successful participation in the International Year of Physics. In February 2007 they also awarded a further R 250 000 to our Marketing Committee. A Business Plan was developed and has been accepted by Council. There are several aspects to this plan, but its core is a mobile “Physics Pavilion” which will be a physical presence of promotional material for deployment at various strategic events and centres. A search is in progress for the new position of a marketing co-ordinator (who may be temporarily attached to the SAIP office).

5. **Human Resource Development.** Once again, we needed to focus. Two developments are: (1) The DST funded a programme for Women in Physics in South Africa with a once-off amount of R 512 000. (2) Access to tertiary education through bursaries proved to be less successful so far, because it is difficult to get special treatment for physics - as you recommended. Bursaries for the junior postgraduate (honours) level is the most crucial shortcoming and we have had a useful interaction with Prof. Mangaliso Mzamo, the new NRF president, and his executive, about this. They agree that all postgraduate bursaries are entirely inadequate, they welcome our interaction with them about this, and a significant first step of the NRF has been a relaxation of the top-up rules of their bursaries from other sources. On the undergraduate level there are extensive private and public funding schemes, so that our biggest contribution is not to find more money but to advertise and promote these schemes through our marketing actions, such as in (4) above.
6. **Research Information Network.** This has been a huge success. In his budget speech in March 2007 the Minister of Finance announced an allocation of R 95 M for broadband internet access for the science and technology sector. Rollout of the South African Research Network (SAReN) has begun and a significant number of universities, science councils and national facilities will soon be added sequentially to this new network within the 2007/8 financial year. Regional and metropolitan nodes will be interconnected via a multi-gigabit "backbone, which will also be connected to major international research networks. We are confident that the SAIP initiative was an important contribution to this development.
7. **National Research Digital Library.** We have not actively worked on this one, but are aware that it is getting similar attention on a much broader level than just physics. The implementation of the SAReN may be seen as an enabling step in this direction.
8. **Flagship Projects.** The acronyms SALT, H.E.S.S., PBMR, KAT, MeerKAT and SKA, have become so synonymous with the development of South African physics that they need no further description. They are examples of projects that would probably have happened without your recommendation, but the report did put them in the correct context of the bigger picture of physics in South Africa, to reflect the healthy state of the subject. These macro-projects are largely driven by our strategically minded DST. For instance, in the same budget speech as the one referred to above, the Minister announced an amount of R 500 M for the development of the KAT/MeerKAT/SKA project. The report specifically proposed the formation of a National Theoretical Physics Facility, which is now a reality (see point 12 below). A Synchrotron facility was mentioned as a possible Flagship project. At this stage, a plan has been implemented to promote capacity building, awareness and access in respect of the use of international synchrotron facilities as a much enhanced research tool in several disciplines. The Pebble Bed Modular Reactor (PBMR) has got a significant boost of several hundred million Rand in the 2007 budget. This will translate in invigorated support of Nuclear Particle and Radiation Physics.
9. **Long-term Strategy.** The Panel recommended a strategy for national development priorities and international competitiveness. This included optimal access to expensive equipment through National User Facilities (NUFs) on a scale more comprehensive than hitherto. This item has remained on the agenda without major new actions from the SAIP due to lack of capacity, but it forms an integral part of the job description for our to-be-appointed executive officer.
10. **Small Science.** The Panel warned that preoccupation with flagship projects and NUFs should not lead to the neglect of other research. We are acutely aware of this danger - it formed an integral part of our discussion with the NRF executive mentioned above. These projects may siphon off quality students from postgraduate schools at well-established university departments. Although the students do eventually graduate from such departments, their physical absence for long periods of time is detrimental to the health of the department. We hold the view that such departments still offer the best quality postgraduate training. An important requirement to sustain this quality is that these postgraduate schools need to have a healthy pyramidal structure of post-doctoral fellows, Ph.D., M.Sc. and Honours students.

11. **Infrastructure and Equipment.** The Panel's concern about the state of the research infrastructure is in the same category as in (9). This is an NRF responsibility, and they do have a Research Infrastructure Support Programme (RISP), comprising of the National Equipment Programme (NEP) and the National Nanotechnology Equipment Programme (NNEP). Equipment awards of up to R 5 M each are made.
12. **Theoretical Physics.** The Panel recommended the establishment of a National Theoretical Physics Facility to counter fragmentation of this important branch of Physics. The National Institute for Theoretical Physics (NITheP), with its headquarters located at the Stellenbosch Institute for Advanced Studies (STIAS), and with secondary hubs at the University of KwaZulu-Natal and the University of the Witwatersrand was established in the second half of 2006. In its first year of operation it is funded with R 2,1 M by the DST/NRF, and Prof. H.B. (Hendrik) Geyer was appointed as interim director. This institute is not directly or indirectly administered by the SAIP, but rather by the NRF on behalf of the DST. The SAIP strongly endorses it, however, because it brings a healthy balance to the specialist fields of South African Physics: the SAIP has seven Specialist Groups, of which Theoretical Physics is one. The other six have always had focus points in national facilities, special programmes, NRF focus areas, centres of excellence, industry, or in the broader education sector. The NITheP, with its strong emphasis on postgraduate education and development of talent, now provides a similar, much-needed focus for theoretical physics.
13. **Management and Policy Committee.** We did not implement the recommendation that this *ad hoc* committee of the DST, NRF and SAIP should remain in existence as a monitoring and report-back body.
14. **Technological Spin-off.** The Panel noted that advanced research projects not only bring immediate rewards to industry and commerce, but that they also raise the possibility of new, previously unforeseen, developments. From the SAIP side we do not see an urgent need to pursue this, comfortable in the knowledge that the DST is actively nurturing and supporting such innovations in a large variety of projects.

The Shaping of Future of Physics was conceived at a time of great concern about the state of Physics in South Africa. We now find ourselves in a state of significant optimism based on tangible outcomes on most of our concern areas. In summary, we look back on a three-year period in which the agenda of physics in South Africa was thoroughly shaped by the Future of Physics investigation, and in which our two partners, the DST and NRF more than played their part to make the implementation successful. Apart from their strategic support, the amounts mentioned above add up to R 2,16 M, invested in physics marketing/ awareness/development projects directly administered by the SAIP. In addition to this, the National Institute of Theoretical Physics has been established. With the much larger investments in strategically important macro-projects, we experience the current state of physics as healthy. The overriding concern, however, remains the dearth of suitably qualified physicists, and we therefore recognise that all our efforts must continue to concentrate on recruiting, educating and retaining physicists in South Africa.

We expect that the report and its recommendations will be useful as our guideline for another three years. We foresee that the scene will then have developed to such an extent that a new review may be called for.

**Prof Harm Moraal**  
**President**

## 4. Education Committee

In 2006 the Department of Science and Technology produced a document entitled MST Educator Support For the National System of Innovation, as a culmination to a series of meetings. Part of the impetus for this programme came from the success of the SAIP's workshop for Physics lecturers on the new FET curriculum, held in October 2005. After our workshop, which DST funded, DST took the initiative to approach the chemists (SACI) and mathematicians (SAMS) to encourage them to also involve university lecturers in supporting teachers with the implementation of the new curriculum. From the beginning of 2007, DST has put in place an Educator Support Programme (ESP). The ESP makes provision for teacher development projects to be run by the SAIP, SACI, SAMS, AMESA and SAASTE, as well as by DST itself. (AMESA and SAASTE are teacher professional bodies.) An ESP Working Group was constituted in January 2007, and includes representatives of the five bodies mentioned above, as well as DST and DoE representatives. I have been attending these meetings on behalf of the SAIP. There have been three meetings so far this year. At the last meeting on 6 June 2007 we were informed by DST that they planned to hold a workshop on 21 and 22 June to establish an umbrella body for Maths, Science and Technology olympiads and competitions. Lebs Mphahlele from DST said he had contacted Case Rijksdijk to attend on behalf of the Physics Olympiad. Lebs also told us that the DST's Youth into Science Strategy would be launched on 28 June at SciBono.

SETAG sent out a questionnaire asking professional bodies what support they can provide for the Youth into Science Strategy. In particular, they want to know:

1. Do we have a career guidance related initiative?
2. Do we (or our members or constituents) have a bursary or student financial aid scheme?
3. Would we be able to contribute towards the DST maths and science camps (for a total of 2000 learners a year):
  - (a) learning and information material
  - (b) site visits
  - (c) speakers to talk about our profession, career paths, opportunities and requirements
  - (d) role model speakers to relate personal experiences

Council members were asked to send comments and suggestions to me, but no responses were received.

SAIP's contribution to the ESP for the 2006/7 financial year was the FET workshop held on 8 and 9 February 2007 at the University of Pretoria for Physics lecturers. Prior to the workshop we had to submit a three-year plan of our proposed activities. Thirty participants, including lecturers from 17 institutions, attended the workshop. Invitations had been sent to the Physical Science coordinators from each provincial department of education, but, unfortunately, none of them were able to attend. Representatives from the DST and the Department of Education did attend. On the second day of the workshop participants divided into four groups, corresponding to the four physics-related strands of the FET curriculum (Mechanics, Waves, Sound and Light, Electricity and Magnetism, and Properties of Matter).

At the end of the workshop it was agreed that each group would present an outline of the topics they thought should be included in a course for teachers at the SAIP conference in July, together with a few sample pages of appropriate materials. The ultimate aim of the project is for the Physics community to compile materials that could be used in courses for teachers by any Physics Department in the country, without any one department having to generate all the materials.

Although an amount of R119 242 was budgeted for the FET workshop, only R70 551 was actually spent, largely because the amount needed to pay for flights and accommodation was much less than anticipated. Thus there is a surplus from the DST grant, which SAIP must either return to DST or submit a motivation to be able to use it on some other aspect of teacher development. (Since the funds come from the ESP they cannot be used for another purpose).

The Department of Education is very interested in working with the SAIP on teacher development. Veena Maharaj, the Physics coordinator in the Curriculum Development section (and a Physics graduate from the former UDW) would like to have a look at any materials we generate for teacher courses, and explore ways of working together with us. She is very concerned about helping teachers develop correct Physics content knowledge.

At the meeting of Council and HODs in July 2006, it was agreed that we would hold a one-day workshop before the 2007 conference to discuss undergraduate Physics curricula. Harm Moraal, the SAIP President, sent out a letter to all Physics Departments, in order to gauge support for the workshop. Unfortunately, only 7 departments responded and the workshop was therefore cancelled. Further discussion is needed on whether a workshop like this is needed in South Africa and, if so, how best to organise it so that it is supported by all Physics Departments.

**Prof Diane Grayson  
Education Portfolio, Council**

## 5. Marketing Committee

A business plan was drawn up in response to the approval in principle of funding from the DST in a letter dated 15 March 2006 from Ms Marjorie Pyoos (DST) to Dr Khotso Mokhele (NRF), CC Prof H Moraal (SAIP). This letter from the DST responded to the SAIP's plan (submitted on 16<sup>th</sup> August 2005) to address the recommendations of the "Shaping the Future of Physics in South Africa" report.

Since the funding offered by the DST is only a small fraction of what was asked for, we acknowledge the need to be innovative in our spending in order to ensure maximum impact. Exploring the niche that the SAIP can offer we found the following:

SAIP members are physicists and therefore they can contribute the physics base to outreach activities. The SAIP has a special privileged access to this membership, as well as to institutions like Universities and Research Facilities. Encouraging the participation of physicists within the outreach environment can be the key that is needed for larger scale impact. The optimal role of the SAIP in outreach is therefore to facilitate the linkages, networks and interactions that bring together the players with all the necessary capacities and skill sets to optimise the outputs for outreach activities. The SAIP can also help to shape the appreciation of the importance of outreach amongst its membership, and encourage the involvement of its members in outreach. The SAIP can therefore play a visionary and facilitating role, building partnerships and advising stakeholders, rather than itself becoming another outreach institution.

Taking these points under consideration, and in order to derive maximum benefit from the assigned budget, our plan is based on the following principles:

1. All materials and resources developed should be reusable and portable, for ease of sharing.
2. Utilise existing and build new networks and partnerships to maximise the dissemination of materials and ideas.
3. Ensure sustainability by building human capacity (focus on drivers of outreach projects rather than the beneficiaries, on people more than materials).
4. Ensure that the outreach community is intellectually well supported by the research community (encourage a working conversation between the two)

Long term impact remains a pivotal driver and it is envisioned that the effects of these tasks would stretch far beyond the period of funding. It is also believed that successful implementation would warrant the sharing of this model with other institutes such as SACI (South African Chemical Institute) so that other subject areas could enjoy similar benefits.

Note that this business plan is to be implemented in close collaboration with the NRF, specifically SAASTA. A summary of the implementation programme is given in tabular form.

### 5.1. Strategic Objectives:

The SAIP shall aim to align with the objectives of SAASTA in implementation of the business plan, these being:

1. **Science Education:** Building the quantity and quality of mathematics and science outputs at school level (developing SET human capital)
2. **Science Awareness:** Raising the general interest, engagement and appreciation of the benefit of science by the public and especially poorer communities. (strengthening the SET culture)
3. **Science Communication:** Communicating science to the South African citizenry (bringing science and scientists closer to civil society).

The SAIP will obviously concentrate on the subject of physics within each of these objectives.

## **5.2. Key Focus Areas:**

In support of these strategic objectives, we have identified 3 key focus areas where the SAIP feels it can play a valuable and long-term role given the allocated funding:

1. **Development of Resources to Market Physics:** These should be reusable, portable and specific to physics. The primary aim would be that these resources heighten the status of physics in the country.
2. **Establish and Support Partnerships and Networks:** The SAIP should identify areas in physics education, outreach and research environments where greater collaboration is needed and participate in its facilitation (use physics as a common ground for communication)
3. **Encourage Outreach Activities Amongst the Research Community:** Having access to the research community the SAIP should encourage the participation of researchers in outreach activities, especially in terms of role models, career information and communicating physics to the public.

Tasks will target various audiences including schools, universities, media, outreach organisations, education departments, research facilities and the public.

## **5.3. Summary of Envisioned Outcomes:**

At the end of the funding period it is envisioned that we will have achieved the following:

1. A constantly evolving Physics “Pavilion” which can be used for years to come at any event or venue that promotes science e.g. Scifest, Techno-X, National Science Week, Science Centres, etc
2. A network of physics students and researchers who engage in outreach activities.
3. Memoranda of Understanding signed between the SAIP and various stakeholders in the science outreach community (supported by working relationships).
4. A heightened status of outreach amongst the physics community perhaps in the form of formal recognition
5. Closer relationships between researchers and the media resulting in more accurate and frequent reporting of science.
6. Closer relationships between researchers and the outreach community.
7. Database of role models for outreach programmes.
8. Database of researchers (with a basic training in communication skills) for use in the media (interviews, etc)
9. Network of school science teachers and science clubs which can be used for future outreach programmes.
10. Network of physics societies at universities which can be used by future outreach programmes to encourage university students to remain in physics.
11. Database of career opportunities in physics.

The business plan was designed to be punchy, attractive and sustainable so that we can motivate for continued funding.

Ways in which the post of outreach-administrator could be continued, will be explored, e.g. co-funding the full-time outreach administrator in partnership with SAIP, NLC and/or other partners so as to generate the sustainable funding for a competent, dynamic person.

**Dr Simon Connell**  
**Marketing Portfolio, Council**

## **6. Communications**

### **6.1 Website**

The SAIP website (URL) was regularly updated throughout the period from 1 April 2006 to 31 March 2007. Items of interest including news, announcements of conferences, available jobs and available scholarships and bursaries have been added to the website as they are sent in.

More details have been added to the careers section and a section dedicated to Physics Departments is being built up. Departments are reminded to send in a summary of their activities for publishing on the website.

Members are reminded to send in items for publishing on the website to the Secretary at [secretary@saip.org.za](mailto:secretary@saip.org.za).

The SAIP website is hosted by eHost ([www.ehost.co.za](http://www.ehost.co.za)) and there were no noticeable instances of the eHost servers being unreachable, so the SAIP website has been reliably accessible.

It has been very encouraging to receive favourable feedback from various sectors, even outside of South Africa, regarding the information available on the www-site. Particular reference has been made to information on SAIP activities and the careers section.

### **6.2 Newsletter**

The SAIP (text-only) newsletter continued with 4 issues during the period from 1 April 2006 to 31 March 2007. Newsletters were published in May 2006, August 2006, November 2006 and February 2007. The newsletter is edited by Miss. Judith Ncapayi.

### **6.3 Acknowledgements**

The SAIP is grateful for the efforts of Miss. Judith Ncapayi in editing the SAIP newsletter.

**Dr Jaynie Padayachee**  
**Communications Portfolio, Council**

## **7. Student Committee**

### ***7.1 Student membership***

Student membership numbers continue to increase. This is very good news for physics in South Africa and is probably a direct consequence of the commitment that the Government is currently showing towards large-scale science projects. Approximately 40% of the more than 500 members of the SAIP are students. At this point it is of utmost importance that these students receive sufficient support to ensure their development into professional physicists, employed either in research or industry.

### ***7.2 Student Liaison on Council***

Unfortunately no valid nominations for the portfolio of Student Liaison on Council were received. During the annual students business meeting Mr. Gurthwin Bosman (University of Stellenbosch) was nominated and elected for this position for the 2007–2009 term.

### ***7.3 Student Committee***

A student committee was formed shortly after the 2006 SAIP conference, consisting of the student representatives of the various specialist groups. This committee will continue to support the new student member on Council.

### ***7.4 Exclusive Student Activities***

Since 2006 some activities during the annual conference have been organised exclusively for the student attendees. The LOC for the 2007 conference should be thanked and complimented for organising another successful lunch during which students had the opportunity to interact informally with the invited plenary speakers.

### ***7.5 Community Involvement***

The involvement of students in the development and awareness of physics in the community remains a priority for Council. Students indicated that they found it difficult to start up their own projects, considering their academic pressures. However, there is an exciting new opportunity, namely the DST Camps to be held in each of the nine provinces, during which students will have the opportunity to share their experiences in physics research with learners and to act as role models. During the annual business meeting students indicated that they would be willing to assist in such camps being held in close proximity to their universities.

### ***7.6 Job and Bursary Exposure***

The secretary of the SAIP maintains a page on the SAIP website with job vacancies and study opportunities for physics students, and updates to this page are emailed to SAIP student members. This is one of the benefits enjoyed by SAIP student members and they expressed their gratitude toward the secretary for exposing them to these opportunities.

**Dr Attie Combrink**  
**Student Liaison Portfolio, Council**

## **8. Women in Physics**

### **8.1. Overview**

As a means of addressing the under-representation of Women in Physics internationally, the Department of Science and Technology (DST) funded the South African Institute of Physics (SAIP) to start the Women in Physics in South Africa (WiPiSA) Project. The Women in Physics Project was launched in November 2005 in Durban and it became known as WiPiSA. The launch conference of WiPiSA was a great success. International speakers and attendees of the World Conference on Physics of Sustainable Development (WCPSD) and the US-Africa Advance Studies Institute on Photon Interaction were able to attend. The WiPiSA launch conference was sandwiched in between the two international events, which made it easy for the participants of both conferences to attend the launch conference of WiPiSA without incurring additional costs. A working group was selected at the launch to lead WiPiSA. Members of the working group met regularly throughout 2006 to deliberate and make progress on issues that affect women in physics.

### **8.2. Aims**

The following aims have been developed for WiPiSA, which embrace the international aims of Women in Physics, but are also unique to the South African situation, as identified in the pre-launch workshop:

- To stimulate an interest in physics amongst girls and women
- To encourage girls and women to study physics
- To encourage and support girls and women to work in physics-related careers
- To assist in removing or overcoming obstacles and barriers for girls and women to study physics and work in physics-related careers

### **8.3. Objectives**

In the same pre-launch workshop, the following objectives were identified:

- To attract girls into physics
- To support women embarking on careers in physics
- To promote women in physics in leadership roles
- To break stereotypes that discourage women from studying physics and working in physics-related careers
- To support women in physics who need to balance family and career
- To promote the creation of flexible jobs (not only full-time) that will allow women in physics who have families to follow meaningful career paths
- To promote funding criteria that take into consideration women who have families (and may interrupt their career for a time)
- To improve institutional structures and climate for women in physics
- To challenge gender discrimination in selection procedures and the workplace In achieving the aims the following activities were undertaken:

### **8.4. Working Group Meetings**

The Working Group had meetings on the following dates:

#### **2006**

8 February, 20 April, 9 June, 28 July, 1 November

## 2007

23 February, 12 April, 1 June

The meetings of the working group were characterised by harmony and growth in the personal lives, and that on its own is an achievement in addressing the issues that affect women in physics in South Africa. Some of the WiPiSA working group have experience some setbacks in our personal lives and the group was good at nurturing each other.

The working group members were:

- Ms Mmantsae Diale – University of Pretoria (Chair)
- Prof Diane Grayson – Andromeda Science Education CC
- Dr Igle Gledhill – Council for Scientific and Industrial Research
- Dr Jackie Nel – University of Pretoria (Treasurer)
- Ms Patience Segonyane – Nuclear Energy Council of South Africa
- Dr Sharmila Goedhart – Hartebeesthoek Radio Astronomy Observatory
- Ms Sarah Buchner – Hartebeesthoek Radio Astronomy Observatory (Secretary)
- Dr Nnnesi Kgabi – North-West University (Mmabatho)
- Dr Zinhle Buthelezi – iThemba LABS

The working group achieved a special addition to women with PhDs when Nnnesi Kgabi graduated from North-West University in Potchefstroom in Environmental Science, a very important study and relevant to the era.

### **8.5. Departmental Launches**

In 2006 WiPiSA had a successful year, which saw some universities launching departmental groups of women in physics: University of Pretoria, University of Cape Town, Rhodes University, University of Johannesburg and North-West University (Mafikeng). In each of these departmental launches, each department had a lecture from an invited guest with physics students in the department, followed by a social gathering. This project was successful in each university, with one common result. Physics students ladies gained confidence in continuing with the subject, knowing well that there are potential mentors. A female academic or a senior student in the department of physics led the project. Each project cost about R2, 000.00. The University of Cape Town had a big group, which came from the department of physics and the SAO

### **8.6. Projects**

Different institutions have done excellent work in promoting physics among girls through the WIPISA funds. When a call was made [in July 2006] for institutions to send proposals to attract female students into their departments and promote physics in schools, only six universities responded, which may be due to lack of female leadership in physics departments. The following are the universities that were funded, together with the project leader and the cost of the project, followed by a brief report. Full reports are available.

#### **University of Witwatersrand – Planetarium**

**Project leader: Dr Claire Flanagan**

The WIPISA funds were allocated to the Planetarium to focus the ASTRO HIT SQUAD (AHS) on the girls. The AHS is an informal grouping of high-school learners who meet at the Planetarium occasionally to do astronomy-based activities. The group sometimes takes telescopes to “viewing sites”. At the moment, this group is totally dominated by boys. The funding has been used to enable the participation of girls.

#### **University of VENDA**

**Project leader: Dr Vaith Sankaran**

The project at the University of Venda was aimed at making it possible for rural girls to have a chance to participate in the Vuyani Science Centre activities. The Vuyani Science Resource Centre is located in the rural area and with the outreach activities expected to make a good impact on the local communities. The centre serves as one of the community outreach projects of the School of Mathematics and Natural Sciences of the University of Venda. It consists of laboratories and computer labs, which play an important role in enhancing the rural learners' perception of science and technology. Since most of the schools do not have any laboratory facilities, they rely on the facilities and services provided by the centre to get hands-on experience in performing the experiments at the centre. WiPiSA funds helped in addressing the need to attract female learners into physics and related areas from the rural areas around the Vuyani region.

### **University of North-West – Mafikeng**

**Project leader: Dr Nnenesi Kgabi**

The aims stated below were set to further the WiPiSA aim of 'Attracting girls into Physics'

- To assist female learners from schools that do not have or that have poorly equipped laboratories by conducting prescribed experiments.
- To establish trends in academic performance of girls at high school
- To evaluate the impact of experimental activities on girls' performance.

The first and second aims were achieved successfully with a group of Grade 10 learners at Disaneng High School, a rural school in Mafikeng [what was done with the learners?]. Activities are still being carried out to address the third aim. The funding from WiPiSA helped a lot to market the project to an extent that the Department of Education has requested that it be extended further to cover other villages like Lotlhakane and Makgobistadt in the Central region of the North-West province. The project is also considered as one of the interventions to address high failure rate of matriculants in the region.

### **Nelson Mandela Metropolitan University**

**Project leader: Dr Pearl Berndt**

The project entitled Operation Starlight was a Physics-centred weekend excursion to Noorspoort Guest Farm, 180km away from the university. One of the objectives of the project was to provide an opportunity for girls from different backgrounds to exchange ideas on Physics and its relevance in their communities. The project was strategically timed to include as many girls as possible, which have not chosen a career as yet, so that they can be introduced to careers in physics.

### **University of Pretoria**

**Project leader: Dr Jackie Nel**

**Project Leaders:** Dr Jackie Nel and Ms Mmantsae Diale, with assistance from Prof. Diane Grayson – WiPiSA Working Group members and Members of the University of Pretoria Physics Department.

The project took place on Friday afternoon at Hans Kekana High School, Hammanskraal. Three female teachers, four male teachers and 85 girl learners took part in the workshop. The project focused on using fun ways to teach the girls about some of the basics of physics (e.g. resistors, circuits and heat transfer) as well as giving them some practical experience in everyday skills (e.g. fitting an electrical plug, fitting an electrical switch in a circuit, using a screwdriver and a pair of pliers). The girls were given an opportunity to make a lamp from scratch, make resistor jewellery and eat ice cream made in front of them without a freezer or a fridge, but using liquid nitrogen.

## ***8.7. Women's Day celebrations 2006***

### **University of Stellenbosch**

**Project leader: Dr Gillian Arendse**

In celebration of National Women's day on 9 August 2006, the university of Stellenbosch hosted a project named "Girlz Just Wanna Have Phun" The project aimed at exposing female learners to Physics, and Science related careers, was offered to roughly 100 learners from schools in and around Stellenbosch. The learners were engaged in different group activities such as problem solving, design and manufacture as well as elementary electronics. Even though the organizer at times wondered whether the activities would be "girl-friendly", the learners didn't seem to "mind".

## ***8.8. Workshop on Building Evaluation into Proposals***

**Project Leader: Prof Diane Grayson**

One of the skills all physicists need, including women, is to be able to write good proposals. Diane Grayson was able to run a successful workshop that focused on one aspect of proposal writing for women in physics, namely how to build evaluation into a proposal. This aspect is important because often the end of a project is reached and it is impossible to collect data post hoc that would show how successful the project was. The work done was very good because as a Physicist herself, she was able to guide researchers in writing winning proposals. Young women entering research considered the workshop as very important, and the attendees included women who were not into physics

## ***8.9. Baseline Study***

**Project Leader: Prof Diane Grayson**

This project has two parts. Part I comprises the compilation of a database of women who obtained an Honours, Masters or PhD in Physics between 1995 and 2005. It includes women who obtained their degrees in South Africa, South African women who studied overseas, and foreign women who are working in South Africa. Each university Physics Department was asked to appoint a WiPiSA representative. These representatives were then requested to send a list of women who completed post-graduate degrees in their departments between 1995 and 2005. So far a list of 139 women has been compiled, but data is still coming in. In Part II, a selection of women will be questioned to find out if they are working in Physics-related jobs and why or why not.

## ***8.10. Marketing material for WIPISA***

**Project Leader: Dr Sharmila Goedhart**

The first step in our campaign was to design a logo that could be put onto promotional materials. So it has to be something that is bright and appealing to the eye but simple enough to use on documents that may be photocopied in black and white. At the same time it has to represent women, physics and South Africa to reflect the organisation's name. Part of the design element of the IUPAP working group for women in physics was used (the women's heads) to represent women of all ethnic types and reflect our link to IUPAP. The flag and map outline obviously represent South Africa. Selecting a recognisable symbol for physics is more challenging. The South African flag often leads to allusions to rainbows and I also recall the cover of my high school physical science textbook that had a prism refracting white light into a rainbow. So in the logo design the women's heads also symbolise a prism transforming South Africa into its full potential.

A colourful c-fold leaflet with a feminine font and background has been designed to advertise the activities of WiPiSA. Copies of this will be distributed at the SAIP annual conference.

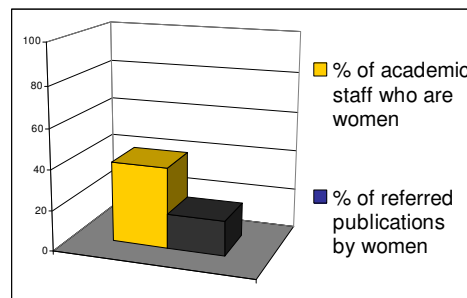
The logo could also be used on t-shirts or bags in future promotional campaigns.

## ***8.11. IUPAP Representative for South Africa***

Dr Igle Gledhill has been appointed as South African representative for the IUPAP working group of Women in Physics. She has attended a meeting of the working group in Germany on 19 - 22 April.

An outline of the progress among Women in Physics in South Africa as presented to IUPAP WG, April 2007.

- Data was collected for South Africa and the SAIP, and is summarised here. History and context
- A survey of 2002 revealed concern about physics in late 1990s
- “Flight of the flamingos”: a report on migration of science, engineering and technology workers
- SA scientific output halved as a proportion of global output 1987-2001
- An aging knowledge base
- Poor representivity



**Data from survey of 2002**

- Actions were taken in the form of:
  - A review – “Shaping the Future of Physics in SA”
  - Transformation
    - Conscious, and a lot of work
    - An inclination to have fun
    - A high fraction of students at conferences
  - Leaders “who make sure their successors are not just like them”
  - Support from Department of Science and Technology
- 2005 was a good year:
  - Year of Physics
  - 50<sup>th</sup> Anniversary of SAIP
  - First IUPAP General Assembly in Cape Town; first in Africa
  - World Conference on Physics and Sustainable Development in Durban
  - Launch of Women in Physics
- SAIP
  - Membership: 16.5% women at present, based on names, since gender is not explicitly requested on application forms
  - Prizes: women are significantly well represented among best student paper prizes, estimated at about 25%; but award of the Silver and Gold medals to a woman has been rare, and merits attention
  - Invitation of women as speakers to the annual conference merits attention
  - Significant funding has been made accessible to the community to increase the participation of women in physics

- The projects of WiPiSA were summarised, and
- Preliminary unpublished data from the study of graduate women in physics, 1995 to 2006, is encouraging, but much work remains to be done.

### **8.12. Conclusions**

WiPiSA has had a very successful year. Through the grants made to run projects and host social gatherings at university Physics Departments, the number of people and activities associated with WiPiSA is growing.

### **8.13. Recommendations**

The WiPiSA working group recommends that the project be given the last year to run with the same funds to complete a three year cycle, which becomes a proper statistical instrument to qualitatively evaluate the project. Furthermore, the project reports from universities and additional material available from women in physics project may be put together to publish a book on the activities of women in physics in South Africa, using the same funds

### **8.14. Acknowledgements**

The WiPiSa work has been made successful by the dedication of the WiPiSA working group. The leadership of Mmantsae Diale was fully supported by members of the working group, the president of SAIP, Prof Harm Moraal and the DST Project manager, Dr Tshepo Seekoe and his team.

**Ms Mmanstae Diale  
Chair, Women in Physics**

## 9. Silver Medal

### ***Kavilan Moodley: Silver Medal 2007***

Cosmology has become one of the most attractive and competitive research subjects in recent years. Modern technology and instrumentation, together with theoretical progress, appear to support the human drive to find answers to fundamental questions - concerning the origin of our world and of our own existence - on a level never reached before. It is in this competitive field where *KAVILAN MOODLEY* is working with outstanding success.

Kavilan and his collaborators were the first to develop a general framework in which to investigate combinations of adiabatic and isocurvature fluctuations in the early universe. They showed how observations of the Cosmic Microwave Background could constrain the nature of primordial fluctuations, motivating for polarization measurements, which are now the focus of several high-profile experiments. They also showed how the inclusion of isocurvature fluctuations could degrade constraints on spatial curvature in the universe. Kavilan's work earned him an invitation to join the Atacama Cosmology Telescope project, a new generation Cosmic Microwave Background experiment run by the team who carried out the hugely successful Wilkinson Microwave Anisotropy Probe project. In this project he is expanding his research interests to include observations with the Southern African Large Telescope. He was also invited to join the Science Advisory Committee for the Square Kilometre Array and is currently supervising a project involving pulsars and gravitational wave science for the SKA.

Kavilan has done outstanding work in growing the Physics research community in South Africa. He ran a research internship program for students from disadvantaged backgrounds, he lectured at the African Institute of Mathematical Sciences and the National Astrophysics and Space Science Program. His fund-raising efforts have resulted in a flux of international visitors to UKZN and SA and allowed many students to travel to the US, France, the UK and Chile. He has organised various workshops and schools, he was an active committee member at the Theoretical Physics Summer School in 2006. He supervises students and a postdoc and makes contributions in general to the research projects of many other students.

Kavilan has been a co-author of three papers in Physical Review Letters, three papers in Physical Review D and two in Monthly Notices of the Royal Astronomical Society. Five of these, including two in PRL, were published while he was a lecturer at UKZN. The papers have, so far, received over 250 citations.

Kavilan's enthusiasm, his dedication and his uncompromising pursuit of true excellence in research have been an inspiration to all who work with him.

The South African Institute of Physics is proud to have a young researcher of this calibre within their ranks. Kavilan Moodley is the obvious candidate to be awarded the Silver Medal in this year 2007, the most prestigious award bestowed by the Institute to young researchers under the age of 35 years.

**Prof Dieter Heiss  
Convenor, Awards Committee, Council**

## **10. Specialist Group Reports**

### ***10.1 Applied and Industrial Physics Specialist Group***

#### **Attendance**

14 people were in attendance at the group AGM. Since the time and place of the AGM was advertised, those in attendance concluded that there were enough attendees to provide legitimacy to the rest of the meeting agenda.

#### **Restructuring of the Specialist Group**

In January 2007 an email was sent out to all SAIP members who had expressed an interest in the Applied Physics specialist group. 6 responses were received, and all in favour of the accepting the proposals. These same proposals were discussed at the group AGM, and after some discussion, were accepted by all present.

The proposed changes are:

With respect to the SAIP conference (abstracts, presentations and student prizes):

a) That all other specialist groups be asked to accept the responsibility of evaluating the SAIP conference abstracts of relevance to the group, and take on the responsibilities of evaluating the student presentations for consideration of student prizes. The “applied” presentations themselves may still be presented in the “Applied Physics” conference program slots. Where there is ambiguity or overlap between multiple research fields, representatives from all the applicable specialist groups will be required, if no single “traditional” specialist group can sufficiently evaluate the work.

b) Only those presentations that do not fall under any other specialist group will remain the sole responsibility of the Applied Physics Group.

In summary: For all “applied physics” submissions to the SAIP conference: If the submission can be considered to be an application of one of the traditional (solid state-, nuclear-, optics-, astro-, -education or theoretical physics), that the relevant group be responsible for the evaluation of the submitted abstracts (for inclusion in the program) and the evaluation of the student presentations (for student prizes). Precise details can be finalised before the next conference.

3) All “industrial and commercial” related activities will be handled (by an as yet un-identified organisation), and not by this group, which represents academic physics research.

4) Taking the above into account, the group wants to be renamed to “Applied Physics Group”.

5) The number of presentations is again very high. The question of presentation quality, though, is not being addressed. Our terms of reference document will address the question of “what makes an acceptable applied physics presentation”.

**Dr Kevin Meyer**  
**Chair, Applied and Industrial Physics Specialist Group**

## **10.2 Astrophysics & Space Science Specialist Group**

The current committee is as follows:

Chair: Dr Lee-Anne McKinnell (L.McKinnell@ru.ac.za)

Secretary: Prof. Phil Charles (pac@sao.ac.za)

Fundraiser: Dr Ramotholo Sefako (rrs@sao.ac.za)

Student Representative: Jasper Snyman (fskjs@puknet.ac.za)

### **Annual conference**

A total number of 53 oral abstracts and 4 poster abstracts were submitted for consideration in this year's program. The group was allocated 45 slots for oral presentations, resulting in a number of papers being moved to the poster session. The resulting SAIP 2007 programme was very full with 43 oral presentations, 2 non-specialist talks and 14 posters.

There was good representation from the student community with 18 of the oral presentations given by students. Thanks to the generous contributions by the national facilities, student prizes will be awarded again this year. The categories for student prizes have been reworked with 5 categories now existing as follows:

PhD 1<sup>st</sup> Prize, PhD 2<sup>nd</sup> Prize, MSc Prize in Astrophysics, MSc Prize in Space Science, and an encouragement prize.

For the first time, an encouragement prize will be awarded in 2007 to a student who through the presentation of their paper demonstrates that significant effort has been put into producing a good presentation, but who does not necessarily qualify for one of the other prizes. This prize can be awarded to a student who is known to have overcome significant hurdles in order to present, for example, non-english first language background.

Prizes were funded by HMO, SAAO, HartRAO and SAIP. Arrangements have been made for all funds to be transferred to the awardees electronically, using the SAIP account, in order to have greater accountability.

The SG committee is extremely grateful to the conference organisers who were very accommodating with our efforts to produce a workable programme.

### **Specialist Group Meeting**

A specialist group meeting was held during SAIP 2007 on Tuesday 3 July 2007. About 50 people attended from within the Astrophysics and Space Science community including students. The terms of reference were laid out for the group, and the structure of the programme was discussed in some detail. The following issues were raised:

→ the sg has grown considerably in the last few years, and we are attracting more students, therefore we need to design the program for the SG accordingly. A poster session is essential as it is not possible to fit everyone into the oral sessions, therefore it has been suggested that the poster session become more prominent and appealing to researchers, ie: have themed poster sessions, have the poster sessions in a more prime time during the conference, have the posters up near the venue for the orals.

→ the issue of single or parallel sessions was discussed, and there are two points of view on this, with the primary one being that single sessions allow cross discipline interaction.

→ the issue of separate days for disciplines, or mixing the disciplines was also discussed, and no definite rule has been decided on this.

It was agreed that a survey of group participants would be held to determine how members feel about these issues.

At the meeting, Kevin Govender from SAAO reported on plans for the International Year of Astronomy, which will be in 2009. the website for this major event is <http://www.astronomy2009.org/>

## HartRAO

This section contains highlights from HartRAO for the period July 2006 – June 2007.

Prof Roy Booth took over as Director from Prof Justin Jonas during 2006.

Attie Combrink was awarded a PhD by UCT for his thesis on research applications of GPS. Christina Langa has submitted her MSc thesis to NorthWest University. Her research project was on a methanol maser source previously shown to “flicker”. Her data showed that this source in fact shows regular variations in intensity, with a period of 30 days.

The replacement of the main reflecting surface of the 26-m telescope from 2000 - 2005 produced a major improvement in performance of receivers operating at short wavelengths. To further capitalise on this improvement, a new receiver for the 1.3cm wavelength band was built, covering 22 - 24 GHz. This saw first light on 2007 Feb 01, and is now being used for research on water masers and thermal ammonia emission in star-forming regions. First results are reported at this conference.

As part of the Karoo Array Telescope (KAT) project to build a demonstrator leading to the Square Kilometre Array (SKA), the eXperimental Development Model (XDM) 15-m diameter radio telescope prototype was built at HartRAO. On site construction started in January 2007, and the telescope structure was completed in May. The first two receivers for XDM were built by HartRAO and should be installed within weeks.

A redundant 6.5-m diameter satellite phone downlink antenna was obtained from the nearby Telkom Earth Station and re-erected at HartRAO as part of the international C-BASS project to map the polarization of the galactic radio emission at 5GHz in order to help remove its contribution from the cosmic microwave background.

Several GPS base stations have been installed in African countries to extend the network of IGS stations in the region for scientific research. The stations include Nampula in Mocambique, Rodrigues island near Mauritius, and an island off the west African coast.

Operation of the MOBLAS-6 satellite laser ranger continues, in a joint project with NASA.

The 26-m telescope was scheduled for 60 24-hour dual S-/X-band geodetic VLBI experiments, and continues to operate as part of the European VLBI network for astronomical research, and also participated in VLBI experiments with the Australia Telescope Long Baseline Array (AT-LBA). Between VLBI's the 26-m telescope continues to be used for various single-dish research projects.

## HMO

This section contains highlights from HMO for the period July 2006 – June 2007.

During the year the HMO holds three major schools for students, namely:

- A summer school in Digital Signal Processing for 3<sup>rd</sup> year students;
- A summer school in space physics for NASSP honours students;
- A winter school in space physics for 3<sup>rd</sup> year students;

All 3 schools have been very well supported in the past year, and HMO has received good evaluations from the students attending.

From June to November 2006, Dr Shimul Maharaj spent a 6-month post-doctoral visit working with Prof Karl-Heinz Glassmeier at the Technical University of Braunschweig, Germany. He carried out research on MHD waves observed in Cluster satellite data.

Dr Andrew Collier, visited Hungary and Germany to assess various locations for the installation of a VLF receiver, which will be conjugate to Marion Island. A trip to Marion Island was also made to gather information for writing an environmental impact assessment for the VLF installation there.

HMO researchers presented a Space Weather Course to 6 Eskom engineers on 30-31 October 2006. The objective was to give the attendees a basic understanding of space weather and enable them to monitor the geomagnetic storm parameters which have detrimental effects on power grids.

A lightning detector was set up in Hermanus as part of the World Wide Lightning Location Network (WWLLN). There were some teething problems and it is only expected to be fully operational in early 2007.

Dr Lee-Anne McKinnell attended the annual International Space Environment Service (ISES) meeting held in Beijing, China, from 15 – 16 July 2006. She reported to ISES on the HMO's preparations to become a Regional Warning Center (RWC) for Africa and held discussions on how this would be achieved. As a consequence of this visit the HMO made an official application to become the RWC for Africa in April 2007, and in June 2007 received notification of the acceptance of the application by ISES. Therefore, the HMO is now the RWC for Africa.

The HMO has started to use Amateur Radio as a means to excite young people in science. An amateur radio station has been set up in the science center and a number of staff are now licenced. Practical activities around radio communication are now held regularly.

In October 2006, the HMO hosted a workshop on "Ionospheric Tomography and its applications for High Frequency (HF) Radio Communication". The workshop was jointly funded by the NRF and the Royal Society under the SA UK Science Liaison Network funding agreement. The workshop focused on the use of MIDAS for Ionospheric Tomography and involved 4 researchers from the UK, 8 researchers and students from HMO, and 3 participants from elsewhere in South Africa and Africa.

Several meetings were held between the Space Physics Group and the Department of Communications (DoC) to discuss the purchase by the DoC of an ionosonde to be hosted by the HMO. The DoC has now placed an order for a Lowell DPS-4 ionosonde which will be installed at the HMO in late 2007. This ionosonde will make the fourth in the South African ionosonde network.

## **SAAO**

Following the SALT inauguration at the end of 2005, the SAAO has been totally focused on commissioning the telescope and its instruments, so as to bring it up to the level of performance that was initially specified. Major progress has been made with the commissioning (other large telescope projects have taken 1.5 – 2.5 years to complete) and we expect to start normal operations towards the end of this year.

A significant recent development was the addition of two new partners to the SALT consortium: the American Museum of Natural History (AMNH) in New York, and the Inter-University Center for Astronomy and Astrophysics (IUCAA) in Pune, India. The additional investment that they have brought has completed the planned initial capitalization of the project, and enabled us to begin construction of the last of the three first generation instruments, the High Resolution Spectrograph (HRS). The HRS is being built at the University of Durham in the UK and is expected to be completed in late 2009.

## **IHY and IPY**

Although it was originally planned to have themed sessions on the International Polar Year (IPY) and International Heliophysical Year (IHY) during 2007, this was not possible due to the low number of papers contributed along these lines. However, a paper was given by Dr Pierre Cilliers on the status of IPY, and a non-specialist lecture was presented by Dr Andrew Collier which included some work undertaken under the auspices of IPY. Prof Marius Potgieter presented on the Heliosphere and included some scientific activities around IHY. He also prepared a poster on IHY which was included in the scientific poster session. The local organizers allowed us some poster space to display IPY and IHY general interest posters for the duration of the conference. It is anticipated that next year themed scientific sessions on IHY and IPY activities will be more feasible.

The HMO is participating in IPY 2007-08 through a national project "Polar Space Weather Studies during IPY/IHY", which forms part of the coordinated multinational IPY research project "ICESTAR/IHY".

The HMO's involvement consists of the installation of new research equipment and making observations at three primary locations, namely:

- On the SA Agulhas Research Ship during voyages to southern islands and Antarctica:

- Ashtek Z-FX dual frequency GPS receiver for ionospheric studies.
- At the SANAE-IV base in Antarctica:
  - Novatel GSV4004B GPS ionospheric scintillation monitor for ionospheric studies.
  - Overhauser GSM-19W magnetometer for total geomagnetic field measurements.
  - DI Flux theodolite for absolute geomagnetic field measurements.
  - FGE fluxgate magnetometer for continuous recording of vector geomagnetic field
  - A narrowband VLF Omnipal receiver for studies of whistler-mode waves.
- On Marion Island in the South Atlantic ocean:
  - A narrowband VLF Omnipal receiver for studies of whistler-mode waves.
  - Novatel GSV4004B GPS ionospheric scintillation monitor for ionospheric studies.

Real-time data from the SANAE-IV Overhauser Magnetometer has been streamed to the HMO since June 25 2007. All other data are currently logged at the observation locations for later download or retrieval, pending the installation of a wideband communications system by DEAT.

On 1 August 2006, Anton Feun was appointed as the SANAE IV overwintering IPY Engineer team member for 2007 responsible for the installation and maintenance of new Space Physics instrumentation at SANAE IV. During December 2007 a new optical fibre communications system was installed for instruments in the magnetically quiet area of SANAE IV.

On October 25-27 2006 the first regional IPY workshop was held in South Africa in Somerset West with presentations by a number of our international colleagues, among others Dr Cynan Ellis-Evans, Head of the Programme Office of the British Antarctic Survey and Dr Barbara Thompson of NASA.

Ben Opperman of the HMO represented the South African team at the ICESTAR IPY Kickoff meeting in Helsinki on February 5-9, 2007 and Dr Pierre Cilliers of the HMO participated in the IPY workshop during the UAMPY Kickoff meeting in Rome 21-24 May 2007. During April 2007 Dr Andrew Collier installed the new IPY equipment on Marion Island.

## **CHPC**

The topic 'Computational Space Physics and Astrophysics' has been selected as one of three flagship projects of the newly created SA Centre for High Performance Computing (<http://www.chpc.ac.za/>). The research consists of the numerical simulations of cosmic rays (energetic charged particles) from their 'birth' in the galaxy to their 'death' when entering the Earth's atmosphere. For this, the acceleration of these particles at astrophysical shocks in supernova remnants, their propagation in the Galaxy and the transport in our local turbulent astrosphere, called the Heliosphere, need to be calculated. These simulations will help to test different theories, and to explain recent observations from various spacecraft in the heliosphere and will be applicable to studies of the influence of cosmic rays on heliospace and the effects of changes in space climate on the environment of Earth. The group at North-West University (NWU) have undertaken this work under the guidance of Prof Marius Potgieter, who presented on this topic at SAIP 2007. This will create a much needed link between the CHPC center and the Astrophysics and Space Science community.

**Dr Lee-Anne McKinnell**  
**Chair, Astrophysics & Space Science Specialist Group**

### **10.3 Condensed Matter Physics and Material Science Specialist Group**

In the current year held two executive committee meetings were held, in March at UCT and at the beginning of the conference. The AGM, which was held on Tuesday 3<sup>rd</sup> July at the conference, was well attended, particularly by younger and student members. Elections are only held in alternate years, and there is therefore only one change to the membership of the executive committee. Dr. Chris Theron, of Element Six, was co-opted as the Industrial representative in March. The other members of the committee are: David Britton (chair), Hendrik Swart (deputy chair), Koos Terblans (Secretary), Jaapie Engelbrecht (Treasurer), Mmantsai Diale (Student and African Outreach), Johan Malherbe, and David McLachlan.

A very successful "Conference on Photonic Materials" was organised by the Physics department, NMMU. The meeting was held at the Kariega game reserve in the Eastern Cape from 2<sup>nd</sup> - 6<sup>th</sup> May 2007.

The Terms of Reference for the specialist group were discussed at the executive committee meeting and at the AGM. Minor revisions were made and the new version will be published on the website. The main changes are:

- Revision of portfolios to represent the actual operational requirements;
- An additional goal of promoting industrial cooperation, and
- An additional task of cooperation with the A-MRS and similar organisations.

The Awards Programme was again advertised widely in order to encourage students to present their research work in the fields of Condensed Matter Physics and Materials Science. Entries were received for all categories, except for the Element Six Essay Award for the best undergraduate or honours essay. The winners of the other 8 prizes will be announced at the conference dinner and published on the website. From this year, the award for the best oral presentation by a PhD candidate will be called the Frank Nabarro Prize, in honour of the late Prof F.R.N. Nabarro. Within the specialist group Prof Nabarro is best identified with this prize, because he served for many years as the convenor of the committee of adjudicators.

**Prof David Britton**  
**Chair, Condensed Matter Physics and Material Science Specialist Group**

## **10.4 Physics Education Specialist Group**

The meeting was chaired by Gillian Arendse (GA) and attended by 18 delegates.

### 1. Welcome

Delegates were welcomed by the chairperson (GA).

### 2. Statistics of SAIP '07

A call for papers was issued by the chair inviting delegates to contribute along certain themes. A total of 24 oral presentations and 2 poster presentations were accepted. The numbers for the 2006 conference at UWC were 13 and 2 respectively. It is worrying however that there are no research papers presented by full-time students.

### 3. Terms of reference

The terms of reference were accepted by the meeting and minor changes were suggested. One of the biggest changes is that the committee is reduced to three members as the student representative is no longer available. The revised document will be circulated to all delegates present. The document indicates that the activities of the group are structured around three main foci, namely physics education research, community interaction, and promotion/marketing. These portfolios will be the responsibility of the three committee members. GA will investigate whether a student representative is available.

### 4. General:

#### a) Communication

The chairperson voiced his frustration with regards to the lack of response from delegates to requests sent out via email. Delegates are encouraged to get involved to ensure that the group realize its aims and goals.

#### b) Science clubs (Sivuyile Manxoyi)

Sivuyile shared his experiences with regards to science clubs as a vehicle to "bridge the gaps" between schools, institutions of higher learning and industry. Scientists are encouraged to get involved by availing themselves for presentations, workshops, etc. A webpage ([www.scienceclub.org.za](http://www.scienceclub.org.za)) has been set-up to provide a platform for further discussion and interaction.

#### c) Olympiads (correspondence from Case Rijdsdijk)

The following email was received from Case Rijdsdijk: "Had a meeting with DST towards the end of last month. Things are at last beginning to move! A task team has been asked to set up a Closed Cooperation as an umbrella body for all competitions and Olympiads in SA. The cooperation will be set up by December '07 with a board that meets 4x pa. The official launch will be some time in April '08, and hopefully we can get SAPHO on the road by 2009.

#### d) Marketing (Derek Fish - DF)

SAIP received R250k to market physics in SA. Interventions will need to piggy back on existing events such as SciFest, National science week, etc. Further discussions are needed. DF will keep us posted.

#### e) NCS – teaching materials (Diane Grayson - DG)

Delegates who attended the FET-workshop organized by Diane Grayson were requested to give feedback on their progress with developing teaching materials to be used for teacher training at the SAIP conference. Unfortunately there was no response on the email request that was sent out by GA to invite delegates to the SAIP conference. The WITS school of Education is in possession of teaching material that has been developed over many years. It was suggested that DG should look at the existing material as a 1<sup>st</sup> draft.

#### f) SAIP '08

GA will conduct a survey to ascertain how many full-time students are currently involved in physics education research. These students will be targeted and encouraged to attend and present at the next SAIP meeting. A special effort will be made to interact with local

teachers and learners in the vicinity of the conference venue. It is envisaged that ESG will run workshops with teachers aimed at addressing the needs and challenges of the NCS. A demo-competition as well as interactive lecture demonstrations will be organised to excite the learners. The general public will be targeted through a “public lecture”.

**Dr Gillian Arendse**  
**Chair, Physics Education Specialist Group**

## ***10.5 Lasers Optics and Spectroscopy Specialist Group***

### **SAIP 2007**

The 2007 conference has once again been a success for the group, with around 43 oral and 16 poster presentations.

The new format of the conference resulted in the NLC user group report back meeting not being held as an extension of the SAIP conference. The NLC will rethink how the meeting can be attached to the SAIP conference once again, since this would be mutually beneficial.

The subgroup again managed to secure sponsorship from the CSIR(NLC), Scientific Development and Integration, A&J Scientific and the SAIP for student prizes.

### **Photonics initiative.**

The specialist group through the CSIR(NLC) together with the Laser Research Institute has initiated discussions with DST regarding a photonics initiative. The intention is to establish an integrated program in photonics similar to the nanotechnology initiative in material science. Initial funding has been granted by DST to generate a strategic plan through a workshop to be held with all stakeholders.

### **The NLC**

The CSIR (NLC) continues to serve the lasers community through its rental pool program. The rental pool program feedback session will be held on the 18<sup>th</sup> July in Bloemfontein.

### **The ALC**

The African Laser Centre (ALC) is aimed at encouraging research collaboration between African researchers and facilitating researcher and student exchanges between African institutes. The ALC appointed Prof Beye as CEO, with office at the CSIR. Several cooperative projects in Africa also involving also South African Universities are currently running. An ALC sponsored course 'Introduction to Lasers' will be held in November.

### **Terms of Reference**

The TOR was discussed at the specialist group meeting. No changes were made.

**Prof EG Rohwer**  
**Chair, Lasers Optics and Spectroscopy Specialist Group**

## **10.6 Nuclear, Particle and Radiation Physics Specialist Group**

### **Conference Statistics**

30 (12 MSc, 4 PhD) oral contributions, including 12 MSc and 4 PhD presentations, and 4 non-specialist talks of which 3 are by international experts.

### **Student Prizes**

Five cash prizes are associated with presentations, namely 2 PhD prizes of R2250 (courtesy Bio-Teknik) of R500 (courtesy SAIP) for oral contributions, 2 MSc prizes of R1250 (Bio-Teknik) and R500 (SAIP) for oral contributions, and possibly a prize of R1000 (Bio-Teknik) for the best poster presentation. Presentations were judged by Drs Wyngaardt and Newman.

### **Activities associated with committee portfolios**

#### **Future Projects: Rob Bark [iThemba LABS]**

During 2006, Dr Robert Bark attended the Radioactive Nuclear Beams 7 (RNB7) conference and went on a tour of radioactive beam facilities in Europe. The principle objective was to explore options for creating a radioactive ion beam (RIB) facility at iThemba LABS.

#### **Future Projects: John Carter (WITS)**

International funding from the Deutsche Forschungsgesellschaft (DFG) and the National Research Foundation (NRF) of close to R1.5M has provided a zero-degree scattering facility for use at intermediate energies. Strong international interest has led to collaboration from the Technical University Darmstadt, Germany, and the Research Centre for Nuclear Physics (RCNP), Osaka University, Japan, and to the transfer of technology and scientific exchange between the countries.

#### **Industrial Liaison : E Sideras-Haddad [University of the Witwatersrand]**

iThemba (Gauteng), under the chairmanship of Elias Sideras-Haddad, is in the process of organising a summer school on Nuclear Physics and applications, to be held in Skukuza from 27 January to 3 February 2008. The organizing committee and programme advisory committee are currently being finalized. PMBR will provide partial sponsorship of R110 000, and funding is also expected from NECSA, NRF, and the NNR. The conference will cater for approximately 80 students [BSc, BSc (Hons), MSc and PhD] and 12 lecturers. The venue and accommodation has already been booked and the deposit paid. There has been some discussion to change the name of the school from "Millennium School on Nuclear and Particle Physics" to "iThemba School on Nuclear Physics and applications".

#### **Outreach : GJ Arendse [University of Stellenbosch]**

Various contacts have been made with schools where workshops were presented to science educators on various topics. The second phase of the outreach activities will focus on promoting awareness of Nuclear Physics (applied, fundamental, applications) to smaller groups, specifically Grade-12 learners. The infrastructure of iThemba LABS (administration, logistics, etc.) will be utilized to ensure that the second phase is implemented successfully. Discussions in this regard will get underway as soon as a successor for Giny Stone has been appointed.

#### **International Liaison: Z Buthelezi [iThemba LABS]**

Special programmes such as AIMS (Muizenburg, Cape Town) are exemplary in creating opportunities as well as encourage physicists from neighbouring universities/ institutions to either lecture and/or supervise their students, thereby creating MSc and PhD opportunities for said students in nuclear physics and related sciences. Talks to establish links with Sudan Atomic Energy Commission, University of Dar es Salaam and many such institutions are underway. There is a great need to officiate and expand list of links with other international institutions e.g. Australian IOP, American, etc. Ms Buthelezi has been tasked to contact the University Centre of JINR (Dubna, Russia) regarding South African participation in the various postgraduate programs.

**Student representative: S Jones [University of Cape Town]**

No report received.

**Webmaster: M. Dalton [University of the Witwatersrand]**

The aim of this portfolio is to assist in providing the technology for having a meaningful group web page. The community has not been forthcoming with content.

**Nuclear Physics Schools**

- Fourth Millennium School on Nuclear and Particle Physics (January 2008, Skukuza). Chairperson of Organizing committee: Prof E Sideras-Haddad (WITS)
- SA-JINR (Joint Institute for Nuclear Research) Winter School (Hillhouse, Sofianos) to be held in Dubna (Russia): organized by NRF and DST.

**Report from the Director of iThemba LABS**

- Dr Lawrie has been appointed as deputy director, Dr Newman has taken over as group head of the physics group, and Dr Nemutudi has taken over as head of the materials research group.
- Ithemba LABS has drawn up a 5 year research plan to achieve an internationally leading position in sub-atomic research while training a transformed cohort of young scientists to meet South Africa's economic, social and intellectual needs. This plan is now in the public domain and open for discussion.
- A memorandum of understanding was signed between Stichtung EARTH, Stellenbosch University, the University of Cape Town and the University of the Western Cape to collaborate on building and testing a direction sensitive anti-neutrino detector.
- Encouraged participation in the SA-CERN programme.
- National Equipment Programme (NEP) applications have been submitted in relation to AMS, XRD, electronics associated with neutron physics research, upgrade of data acquisition system.
- Ithemba LABS hosted two conferences:
  - 6<sup>th</sup> Edward Bouchet International Conference on Physics and Technology for Sustainable development in Africa (EBASI), a US-Africa ICTP initiative and chaired by Krish Bharuth-Ram, was held from 24 -26 January 2007. The conference aimed to promote collaborations between American and African physicists, scientists, engineers and technologists.
  - A series of Four Meetings on Science at Synchrotrons, chaired by Simon Connell, was held from 5 to 10 February 2007. This series of meetings brought together scientists and students interested in research opportunities afforded by synchrotron facilities. More information can be found at: <http://www.synchrotrons.tlabs.ac.za>

**General**

- Discussed possibility of awarding a standardized certificate to student prize winners.
- Persons interested in collaborating in the radioactive ion beam FAIR project at GSI (Germany) are invited to contact Dr Lawrie at iThemba LABS.
- SA Nuclear Industry Association was recently launched and chaired by Rob Adam to bring all nuclear players together. Dr Vilakazi has been nominated to act on the executive committee.

**Dr Greg Hillhouse  
Chair, Nuclear, Particle and Radiation Physics Specialist Group**

## **10.7 Theoretical Physics Specialist Group**

The National Institute for Theoretical Physics (NITheP) became operational with the first DST/NRF grant being made available for the 2006/7 financial year. Amongst other things, a number of honours, masters and PhD level bursaries for theoretical physics study could be awarded for the 2007 academic year.

At present Prof Hendrik Geyer is serving as interim director and Profs Nithaya Chetty and Joao Rodrigues as interim deputy-directors. Together with Profs Albert van Jaarsveld and Krish Bharuth-Ram (NRF) and Bethuel Sehlapelo (DST) they form the NITheP interim management committee.

A final Strategy and Business Plan had been submitted to, and supported by, NRF, and DST is expected to allocate NITheP funds for the next five years on the basis of this plan.

A successful one day launch event of NITheP-KZN was held on 25 May 2007.

In January 2007 the 18<sup>th</sup> Chris Engelbrecht School was held over 10 days on the theme of Theoretical Foundations of Quantum Information Processing and Communication with Prof Francesco Petruccione chairing of the organizing committee.

The theme for the 19<sup>th</sup> school in January 2008 is *Soft Condensed Matter and the Physics of Biological Systems*. Dr Kristian Mueller-Nedebock chairs the organizing committee and seven international lecturers have already confirmed participation. The school will take place in Stellenbosch 23 Jan -1 Feb 2008 at the new STIAS facility where the NITheP main centre is accommodated.

At the AGM it was accepted that the NITheP vision, mission and strategic goals will serve as the terms of reference for the specialist group. The next OTP management committee election is scheduled for 2008.

**Prof Hendrik Geyer**  
**Chair, Theoretical Physics Specialist Group**