Strategic Plan 2025 - 2030

SOUTH AFRICAN INSTITUTE OF PHYSICS

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Message from THE PRESIDENT

1. THE SAIP – WE SHAPE THE FUTURE

This document outlines a 5-year strategic plan (2025–2030) for the South African Institute of Physics (SAIP). The strategic plan aims to ensure that:

- The SAIP remains relevant, effective, and aligned with the evolving needs of the physics community and broader society.
- The South African Institute of Physics (SAIP) supports key government strategies, particularly the District Development Model (DDM), the Science, Technology and Innovation Decadal Plan 2022–2032 (STI Decadal Plan), the National Development Plan 2030 (NDP 2030), and the African Union Agenda 2063 (AU Agenda 2063).
- The SAIP improves and aligns business processes and systems for effective strategy implementation, delivery, and financial and programme sustainability.

1.1 What We Aim to Deliver by 2030

- **Unrivalled Expertise:** Our programmes are led by South Africa's top physicists, delivering world-class education, research, and skills development rooted in scientific excellence.
- **Beyond Academia:** We spark curiosity, drive innovation, and empower individuals to apply physics for real-world impact—far beyond the classroom.
- **Shaping the Future:** As a vital link between academia, industry, and government, we promote physics as a catalyst for skills development, economic growth, technological advancement, and sustainable development.
- **A National Vision:** We envision a physics-literate South Africa where physics serves as a practical tool for addressing challenges—fueling innovation, driving progress, and enhancing the quality of life for all.

This new Strategic Plan for the SAIP is largely a result of the SAIP reaching a nexus in its evolution as an organisation over the past few years. It was presented with the choice to either develop a bold and ambitious vision and opt for a significant step up in the scale and coverage of its activities or to continue along a more familiar path that held significant long-term risk for stagnation.

Engaging in a significant extension of its scale and scope of activities inherently carries risks, but after a Strategic Planning Workshop facilitated by successful practitioners in the South African NGO arena and careful deliberations by the Council, the decision was made to develop a new Strategic Plan for 2025-2030. The core of this plan is presented in this document.

As President of the Council during this gestation process, I have great confidence that the correct choice for the future trajectory was made. I sincerely hope that our membership and other stakeholders will support the Council during the critical implementation phases of this plan during the next few years. It is my sincere hope that every physicist will say, "We shape the future," in their research, teaching, and outreach activities so that all South Africans understand the role physics can play in improving their lives.

Prof Rudolph Erasmus

President – South African Institute of Physics

2. VISION AND STRATEGIC IDENTITY

The South African Institute of Physics is becoming a world-class, robust, and inclusive learned society and professional body for physics in South Africa, advancing physics education, research, and applications ultimately contributing to the country's socio-economic development.

We aim to achieve this through:

- Providing a platform for various stakeholders to interact with the physics community in an organised way and to benefit from physics.
- Addressing societal developmental needs, such as challenges in the science education pipeline and the shortage of women in the field of physics.
- Capacity building for physics to contribute to addressing national socio-economic challenges in the nexus of food, water, energy and climate change, including the Sustainable Development Goals (SDGs).
- Cooperating with government, civil society, donors, the private sector, academia, the international community and the public in addressing physics-underpinned needs in key policies such as the National Development Plan 2030 (NDP2030), the District Development Model (DDM), the Science and Technology Decadal Plan 2022- 2032, and African Union Agenda 2063.
- Continuously improve our Non-Profit and Public Benefit Organisation business models to achieve best practices in governance, project management, impact assessment, reporting, communication, volunteer and stakeholder engagement, fundraising, stewardship of donor grants, and asset management, ensuring that we are well-positioned to achieve our vision.

Ignite, Inspire, Empower.

Who is the SAIP?

The Voice of Physics in South Africa

What do we do?

We shape the future

How do we shape the future?

Advance Physics by
igniting, inspiring, and empowering

3. THE STATE OF PHYSICS IN SOUTH AFRICA

Physics plays a crucial role in addressing global challenges, including climate change, energy, water, health, food security, innovation, and employment. However, South Africa is not fully benefiting from physics due to a shortage of physics skills in the country. For example, District Development Model (DDM) reports[1][2] all highlight challenges linked to the shortage of physics-underpinned Science, Engineering, and Technology (SET) skills. In 2023, the SET skills shortage was identified by the South African presidency as the second biggest impediment to economic growth after crippling power outages.

South Africa faces a fundamental and systemic challenge of poor maths and science education, leading to low pass rates in physical sciences at school, resulting in few people pursuing tertiary training in science, engineering, and technology. Additionally, there are low numbers of females in physics, as well as low participation from previously disadvantaged communities in the field, and low enrollment in physics at universities, leading to a shortage of physicists in the economy and weakening the entire science, engineering, and technology system. Exacerbating the problem, some South African schools are discontinuing mathematics and physical science. For example, over the period 2014–2022, 26 schools phased out mathematics, and 23 schools phased out physical science (https://www.iol.co.za/capeargus/). Consequently, physics is unable to reach its full potential and make a significant contribution to addressing the country's socio-economic challenges.

3.1 Strategic challenges facing Physics in South Africa

Physics in South Africa faces several deep-rooted, multi-dimensional, and systemic problems that are complex, have no clear single solution, and involve numerous interdependent factors. Below are the key challenges SAIP will address.

3.1.1 Education and skills gap

Problem: The shortage of physics skills in South Africa is rooted in systemic challenges in education at all levels, including primary, secondary, and tertiary levels. Poor access to quality education, lack of physics-trained educators, and under-resourced schools perpetuate this gap.

Complexities:

- Unequal access to quality education due to socio-economic disparities.
- Limited teacher training programs to enhance physics instruction, particularly in underserved areas.
- Inadequate exposure to practical physics applications, making the subject less engaging and relevant to students.

3.1.2 Limited awareness of physics as a driver for development

Problem: There is limited understanding among policymakers, industries, and the public of how physics can directly contribute to solving socio-economic challenges.

Complexities:

- Perception of physics as an abstract or academic discipline with little practical relevance.
- Difficulty in communicating the societal value of physics in addressing issues such as energy, healthcare, and infrastructure.
- Lack of visibility and representation of physics-related innovations in South African industries.

3.1.3 Inequitable participation in physics

Problem: Physics in South Africa struggles with gender, diversity, stereotypes and geographic inequities, limiting diversity and inclusivity in the field.

Complexities:

- Historical inequalities affecting access to education and professional opportunities in physics.
- Underrepresentation of women and marginalised communities in physics-related careers.
- Structural barriers that prevent rural populations from accessing quality physics education and resources.

3.1.4 Misalignment of physics education and industry needs

Problem: There is often a disconnect between what is taught in physics programs and the skills required by industries to address real-world problems.

Complexities:

- Outdated curricula that do not reflect modern technological and industrial demands.
- Insufficient collaboration between academic institutions and industries to align skills training with market needs.
- Lack of emphasis on interdisciplinary approaches that integrate physics with engineering, data science, and innovation.

3.1.5 Slow adoption of physics-driven innovations

Problem: Translating physics research into practical solutions and commercial applications is a slow and underdeveloped process.

Complexities:

- Weak collaboration among physicists, industries, and policymakers hinders the scaling of innovations.
- Limited funding and infrastructure for prototyping and commercialisation.

3.1.6 Addressing global challenges with local impact

Problem: Global challenges, such as climate change, energy sustainability, and healthcare innovation, necessitate physics-driven solutions that are both physics-based and locally relevant.

Complexities:

- Difficulty in adapting global physics advancements to South Africa's unique socio-economic and environmental context.
- Competing development priorities that overshadow long-term, science-driven solutions.
- Limited capacity for interdisciplinary collaboration to tackle complex global-local challenges.

3.1.7 Evolving technology and its impacts on physics

Problem: The rapid pace of technological advancement creates both opportunities and challenges for physics research, education, and application.

Complexities:

- Need for continuous adaptation of curricula and research priorities to keep up with technological trends (e.g., AI, quantum computing).
- Balancing traditional physics disciplines with emerging fields that require new skill sets.
- Limited access to cutting-edge technologies and resources for physicists in South Africa.

3.1.8 SAIP organidsational sustainability and volunteerism

Problem: As a voluntary learned society, SAIP depends on the commitment of its members, which can fluctuate over time.

Complexities:

- Limited time and resources from members who are often juggling professional and personal commitments.
- Difficulty in maintaining long-term engagement with volunteers and fostering leadership continuity.
- Challenges in balancing voluntary contributions with the need for professional management.
- SAIP operates in a resource-limited environment, competing for funding against other critical development priorities.
- Dependence on inconsistent government and donor funding.
- Limited capacity to develop sustainable revenue streams through partnerships, training, and services.
- High costs associated with running outreach programs, training initiatives, and maintaining organisational operations.

4. THE SAIP 2025–2030 STRATEGIC PLAN

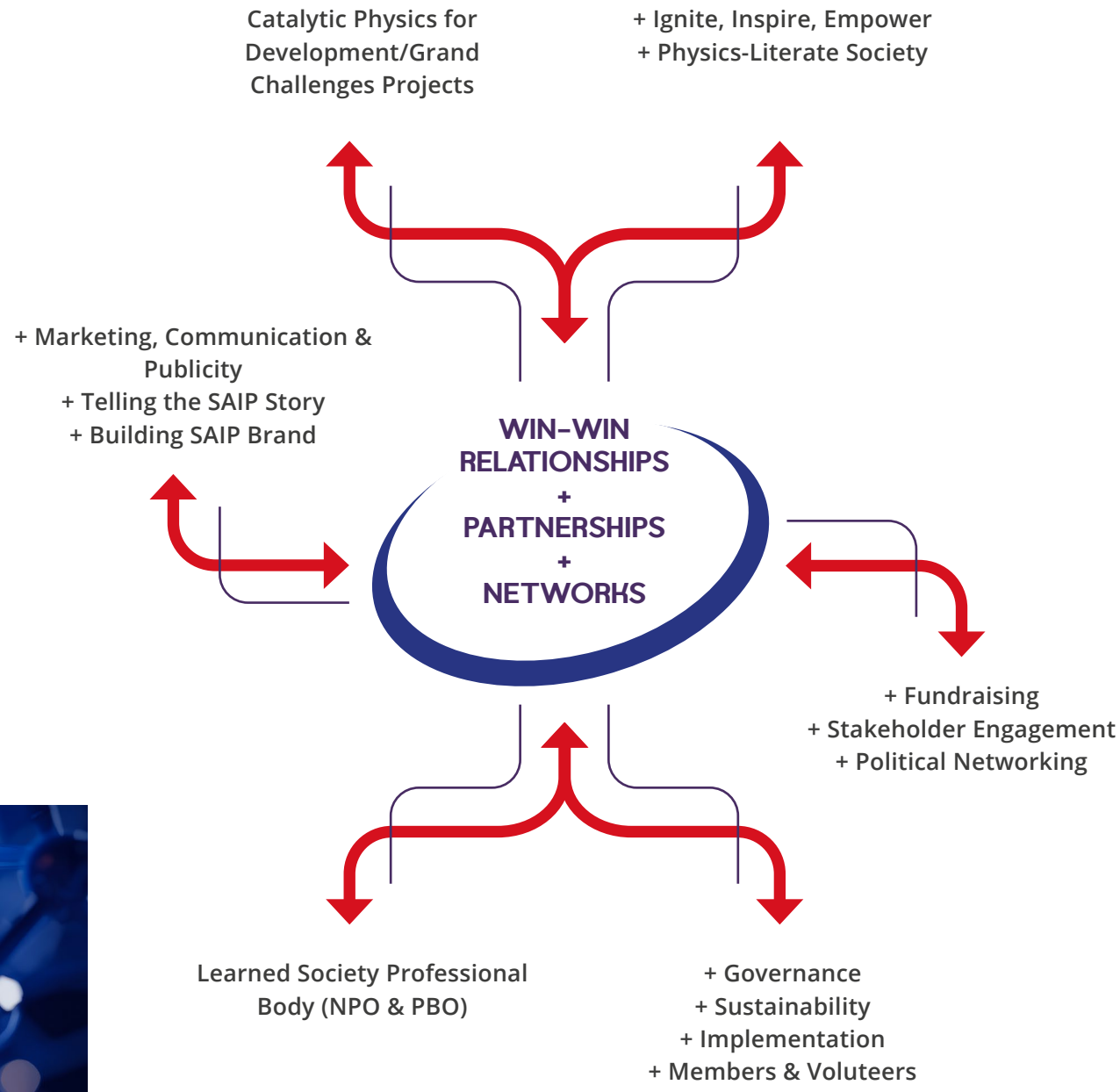
4.1 Core Strategy

SAIP will become a leader in building strong, lasting symbiotic relationships that connect physics and its applications to South Africa's grand challenges and developmental needs, promoting collaborative relationships that cultivate a physics-literate society, ignite a love of physics, inspire innovation, and empower all to harness physics for sustainable socioeconomic development.

Relationship Building is the glue that should hold everything together, including the focus that leads our activities.

SAIP will strengthen its relationships by developing:

- Membership and volunteers who are the foundation of the institute,
- Catalytic projects in physics for addressing grand challenges,
- Physics marketing, communication and publicity,
- Stakeholder engagement, political networking and fundraising.



4.2 Strategic Intent

4.2.1 Advancing physics for socio-economic development

SAIP is committed to leveraging physics to address South Africa's critical socio-economic challenges. By championing physics-driven solutions in areas such as energy sustainability, climate change, healthcare innovation, and industrial competitiveness, SAIP seeks to position physics as a key driver of national development and progress.

4.2.2 Building a physics-skilled and inclusive society

SAIP aims to foster a culture where physics knowledge empowers communities and contributes to national growth. By addressing skills shortages in key sectors and promoting STEM education, SAIP will enhance South Africa's capacity for scientific and technological innovation. Additionally, SAIP is dedicated to ensuring equitable access to physics education and careers, particularly for underrepresented groups such as women, rural populations, and marginalised communities.

4.2.3 Driving knowledge transfer and innovation

SAIP seeks to bridge the gap between physics research and practical application. By facilitating the transformation of scientific discoveries into scalable, real-world solutions, SAIP aims to enhance economic development, industrial growth, and societal well-being in South Africa and the broader African continent.

4.2.4 Becoming a global leader in physics collaboration

SAIP aspires to be the foremost organisation in Africa, connecting physicists, industries, and policymakers to solve developmental challenges. Through strategic partnerships, SAIP will facilitate cross-sectoral collaboration, enabling impactful physics-based innovations.

4.2.5 Strengthening membership growth and retention

SAIP will strengthen value-driven initiatives to effectively expand, retain, and engage its membership base, particularly by including members from the industry, business, and private sectors.

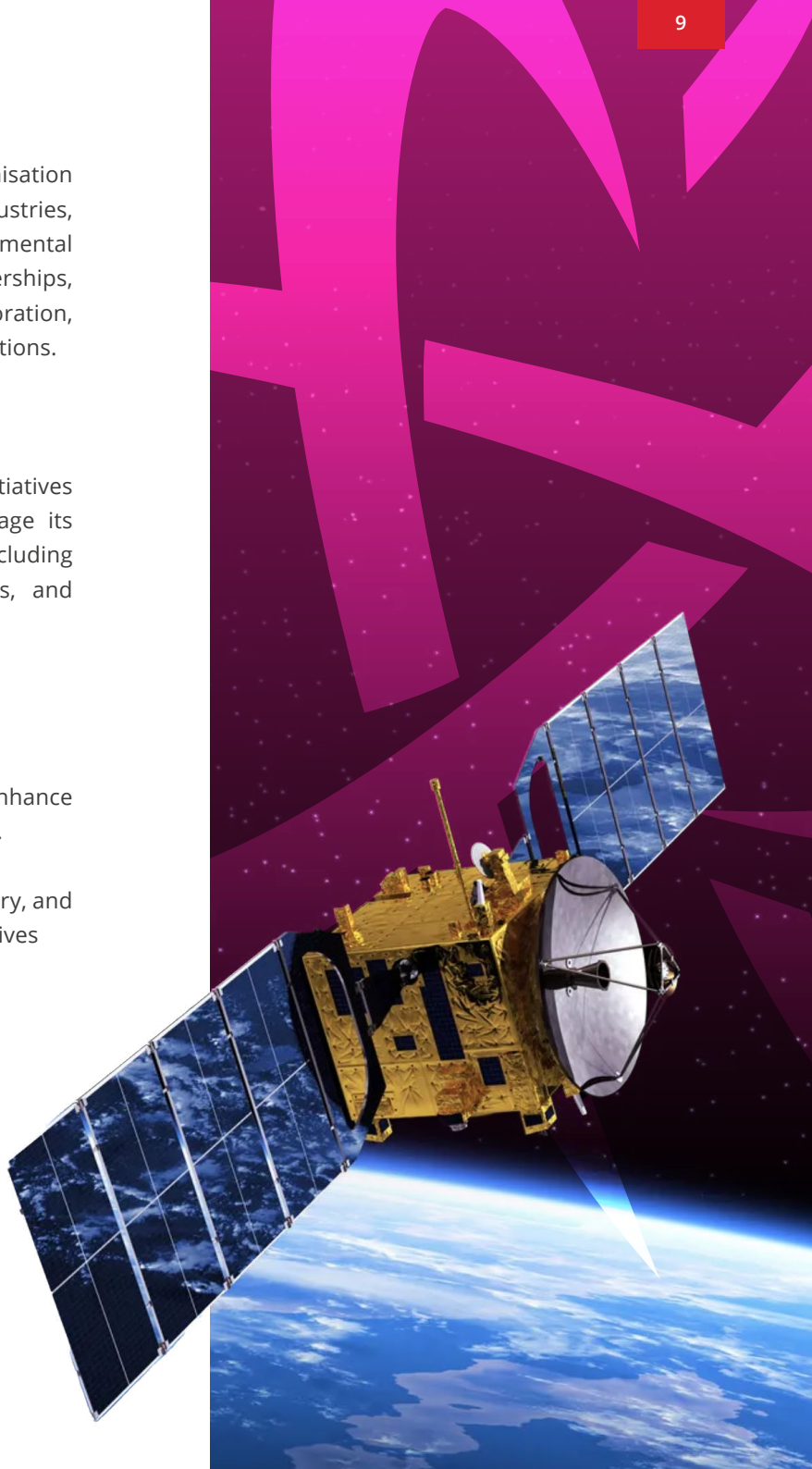
4.3 Strategic priorities and objectives

4.3.1 Strategic Partnerships

Objective: Promote partnerships that enhance the reach and impact of SAIP's initiatives.

Strategies:

- Collaborate with government, industry, and international partners to align initiatives with national and global priorities.
- Develop partnerships that create internship and employment opportunities for physics graduates.
- Leverage international networks to access expertise, resources, and funding.



4.3.2 Physics capacity for national priorities support

Objective: Address physics-related needs in key policies and national priorities.

Strategies:

- Support physics education and innovation aligned with the National Development Plan 2030.
- Implement district-level initiatives tailored to local development needs (e.g., Physics in My Village).
- Promote research that addresses priorities outlined in the Science and Technology Decadal Plan (2022-2032).

4.3.3 Strengthening the physics education pipeline

Objective: Improve physics education from early childhood development to higher education.

Strategies:

- Implement teacher development programs to enhance physics instruction.
- Expand outreach programs to inspire young learners, with a particular focus on girls and students from rural areas.
- Collaborate with the Department of Basic Education to enhance curriculum development, including virtual experiments aligned with CAPS.

4.3.4 Gender inclusivity and transformation

Objective: Increase the participation of women in physics education and careers.

Strategies:

- Encourage and support girls and women in pursuing studies and careers in physics.
- Develop mentorship programs and outreach initiatives such as WiPiSA events and Women's Month activities.
- Provide resources and training for teachers on attracting and retaining girls in the field of physics.

4.3.5 Professional development for physicists

Objective: Strengthen SAIP's role in the professional development of physicists.

Strategies:

- Organise conferences, workshops, and online training opportunities.
- Publish conference proceedings and research outputs to enhance professional growth.

4.3.6 Communication, advocacy, and public engagement

Objective: Increase public understanding of physics and its societal relevance.

Strategies:

- Develop a comprehensive communication strategy using media, social platforms, and outreach events.
- Organise public lectures, science fairs, and school outreach programs.
- Launch advocacy campaigns to highlight the role of physics in national development.
- Showcase success stories and impact case studies through events and media campaigns.

4.3.7 Membership retention, growth and engagement

Objective: Expand and diversify SAIP's membership base while recognising excellence in physics.

Strategies:

- Launch targeted membership drives for students and early-career professionals.
- Enhance member benefits, including networking events and professional development resources.
- Recognise and reward excellence in physics through awards and mentorship programs.

4.3.8 International Collaboration

Objective: Leverage global partnerships to drive physics-based socio-economic development.

Strategies:

- Participate in African Union Agenda 2063 initiatives to foster regional collaboration.
- Align projects with the Sustainable Development Goals, with a focus on energy, environment, and health.
- Strengthen ties with international organisations such as the International Union of Pure and Applied Physics (IUPAP) and the International Astronomical Union (IAU), and establish the Southern Africa Physics Network (SAPhysNet).

4.3.9 Sustainability

Objective: Diversify income streams to ensure long-term financial stability and organisational leadership succession planning.

Strategies:

- Ensure organisational sustainability in leadership succession planning and skills diversity
- Develop a fundraising strategy targeting corporate sponsorships, grants, and industry partnerships.
- Strengthen donor engagement and recognition programs.
- Establish a volunteer network to support SAIP initiatives.
- Implement business models and financial policies that enhance revenue generation.

4.4 The SAIP Theory of Change

IMPACT STATEMENT: All South Africans understand physics to enhance the quality of life

OUTCOMES

Professional Home for Physicists, Learned Society and a Voice for Physics in South Africa	Increased access to quality physics education from ECD to High School in South Africa	Improved gender diversity, equity, and inclusion in physics in South Africa	Enhanced public awareness and appreciation of physics' vital role in driving development and innovation.	Internationally Competitive Physics in South Africa	Physics Contributing to Social, Industrial, & Economic Growth in South Africa

ACTIVITIES

Learned Society & SAQA-accredited Professional Designations Membership Development	Periodic Review of Physics Training in South Africa	Women in Physics in South Africa Forum	Physics in My Village Programme	Periodic Reviews every 20 – 25 Years on Shaping the Future of Physics in South Africa	Physics Research Supporting Grand Challenges
Physics Conferences, workshops and DHET-accredited Proceedings	Teacher Development Workshops on Skills Training Identified as Lacking in Matric Diagnostics Reports & Virtual Experiments	Girls in Physics and the Empower Her Program	Physics in Everyday Life Documentary Series	Represent SA in international physics bodies such as IUPAP, IUPAB and IAU	Industry, Academia & Policy Makers Collaboration Platform through the District Development Model (DDM)
Continuous Professional Development Courses for Physicists and Industry	South African Physics Olympiad (SAPhO)	Teacher Development Workshops on attracting and retaining girls in physics	Physics – Docu Dramas Series	Memoranda of Understanding (MoUs) with International Physics Bodies	Periodic Reviews every 20 – 25 Years on Shaping the Future of Physics in South Africa
Physics-relevant information dissemination, e.g. Physics Comment Magazine	Learner Support through Essential Skills Supplementary Materials	WiPiSA Lunches	Radio, TV, Print & Electronic Media programmes Promoting Physics	Host International Physics Conferences and Workshops in South Africa	Physics in My Village Programme
Recognise and Award Prizes for Excellence in Physics	Matric Exam Preparation Programme	Mentoring Programme	Outreach and Public Understanding of Physics Events NSW, Scifest, etc	Host Secretariats for Africa Wide Initiatives, African School of Physics, African Light Source, Southern Africa Physics Network	Continuous Professional Development Courses for Physicists and Industry
Young and Emerging Researchers Mentorship Programme	ECD Science Skills Programme	Women in Physics Plenary Sessions	Participate in international research Programmes	Governance, Risk and Financial Management	Business & Industry Membership Development

FOUNDATION: **Mutually beneficial, win-win collaborative relationships, partnerships, and networks with volunteers, academia, the private sector, civil society, the public, government, and international stakeholders to advance physics literacy, education, research, innovation, and applications in South Africa.**

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