Report of the World Conference on Physics and Sustainable Development

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The *World Conference on Physics and Sustainable Development* (WCPSD), a landmark event organized to celebrate the International Year of Physics, was held during 31 October-3 November 2005, at the Inte rnational Conference Centre in Durban, South Africa. The Conference brought together, students, educators, scholars, representatives and decision-makers from numerous government and non-government agencies around the world, who formulated a plan aimed at resolving the challenges posed by sustainable development. Physics has made numerous contributions to the global economy in areas such as electronics, materials and computer technology, and to health through x-rays, synchrotron radiation, magnetic resonance imaging and nuclear medicine. However, these revolutionary technologies have been of greater benefit to people in the developed world than in the developing world. The Durban Conference was, in the words of Dr. Edmund Zingu, President of the South African Institute of Physics, *"an attempt to redirect the attention and efforts of physicists towards the Millennium Development Goals,"* endorsed by world leaders at the United Nations Millennium Summit in September 2000. The conference served as the first global forum to focus the physics community on development goals and to create new mechanisms of cooperation toward their achievement. It created an intellectual platform for an assessment of physics in development and the role it can play for sustainable development, particularly in the emerging and the developing countries. Participants from developed and developing nations examined the contributions that physics has made to society in the past in order to formulate and sharpen action-oriented plans for the contributions that it can and should make in future.

The above Conference was a follow-up on the 1999 UNESCO-ICSU World Conference on Science, which sought to strengthen the ties between science and society, as well as the broader UN World Summit on Sustainable Development that took place in Johannesburg in 2002. This Conference was cosponsored by several international organizations including: *International/World Year of Physics*, UNESCO; the Abdus Salam International Centre for Theoretical Physics (ICTP); the International Union of Pure and Applied Physics (IUPAP); and the South African Institute of Physics (SAIP). About five-hundred physicists participated. Importantly there were several observers/representatives from numerous agencies including, American Physical Society; European Laboratory for Particle Physics (CERN) in Geneva, European Physical Society, IAEA, IUPAP, UNESCO, World Bank and several of the African organizations.

WCPSD was preceded by *the 25th General Assembly* of the IUPAP in Cape Town. It is the first time that the General Assembly (held once in three years) was held in the Continent of Africa; and the second time that it was held outside of USA/Canada and Europe (held once in Asia; in Japan in 1993). WCPSD was immediately followed by two major Physics events in Durban: *US-Africa Advanced Studies Institute on Photon Interactions with Atoms and Molecules* and *the IAEA Technical Meeting on Accelerator-based Physics for sustaining the flow of Technology and Skills.*

WCPSD was much different from most of the other conferences, where the individual presentations of one's own research are the chief focus. WCPSD laid a great emphasis on chalking out programmes to work towards sustainable development. The Conference covered the following four focal themes:

- Physics Education (330 registered participants)
- Energy & Environment (80 registered participants)
- Physics & Economic Development (52 registered participants)
- Physics & Health (47 registered participants)

Besides there were about thirty participants involved in coordination and organizing. The Conference was inaugurated by His Excellency, Mosibudi MANGNENA, Minister of Science and Technology, South Africa. A welcome civic reception & banquet was held on the first day by the Mayor Councilor Obed MLABA. The first day consisted of a Plenary Session with presentations by the Organizers, Keynote Speakers and the Programme Chairs of each theme. The second day was devoted to active discussions among the sub-groups under each of the four themes. A brief summary of each of the four is outlined below.

An urgent need was felt to strengthen the *Physics Education*. Physicists pledged to make high-quality physics resources widely available in developing countries by establishing a website along with Resource Centres in Africa, Asia and Latin America. These will prepare instructional materials and model workshops for

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teacher trainers in Asia, Latin America and Africa. The resulting resource material will be made available on the web. A multidisciplinary mobile science team will also be created to provide online support.

Under the umbrella of *Energy and Environment*, efforts to enhance efficiency and reduce pollution in transportation will include investigating new battery technologies and improved internal combustion technology for hybrid application. Teams will develop solar photovoltaic technologies, including new and environmentally-friendly processes for generating and storing electricity. Efforts shall be made to enhance the usage of wind power.

The focal theme, *Physics & Economic Development*, drew a lot of attention with active participation from representatives of UNESCO, IAEA, IUPAP, World Bank, among others. This working group has come up with a series of recommendations and initiatives on how to strengthen Research and Development (R&D). Physics makes a vital contribution to the economy. It was pointed out that physics-based industries account for 43% of manufacturing employment in the United Kingdom. A Training Facility for Physicists in Economic Development is proposed, which shall provide training in entrepreneurship and related skills. The group further proposed to launch a joint research project on nanoscience and nanotechnology with a focus on clean water, air and energy. It proposes an integrated approach to strengthen R&D in nanosciences and help turn nanotechnologies into commercially viable products for the benefit of society, in the developing countries. An online network devoted to physics and agriculture was also proposed. Most members of this group will be following up with laboratory work and liaison with the industry. The group also urged the creation of International/ Regional Science Centres (including the AfSRF: *African Synchrotron Radiation Facility*) in the developing countries.

Under th e fourth and final theme, *Physics & Health*, educational resources will be made available through the Physics and Engineering Resources for Healthcare Development (PERHD) website, sponsored by the World Conference. Further projects include creating a network of training centres in physics of radiation therapy using shared resources from institutions around the world and providing guidelines to elaborate educational programmes in medical physics.

The Conference had about 200 Poster Presentations, displayed for two days. The third and the last day was devoted to the presentations of the summaries of the deliberations of each of the sub-groups on the preceding day. There shall be some follow-up meetings to review the progress of the deliberations and proposals during the WCPSD. An interesting item in the Conference was *The Lab in a Lorry*. This mobile laboratory is a partnership between the Schlumberger Foundation and the Institute of Physics, UK. It is contributing to popularizing physics among school students and in creating a general awareness. In the conference the accelerators and accelerator facilities were mentioned in the context of the sustainable development. Radiation and the radiation sources were mentioned in the context of health physics and the materials sciences. Role of accelerator facilities (including synchrotron radiation facilities) in the arena of international cooperation was also covered. Further details about the WCPSD are available at, http://www.wcpsd.org/.

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