

# Outreach & Forum Day: A Gateway to Innovation

Closure of the ASP2010 - Stellenbosch (SA) - August 1<sup>st</sup> to 21<sup>st</sup>, 2010  
<http://africanschoolofphysics.web.cern.ch/africanschoolofphysics/Forum.html>

## Saturday August 21<sup>st</sup> 2010 @ NITheP

This is part of the African School of Physics, a three week long course directed at post graduate students. The material covered includes Theoretical Subatomic Physics, Experimental Subatomic Physics, Accelerators and Technology, Information Technology and the GRID.

The final component, the Forum Day, however, has a much wider appeal. It takes advantage of opportunity provided by the key visiting experts who would like to connect with experts in Government, Industry and Research. It is planned and delivered by a selection of the world's top educators and practitioners of High Energy Physics, Research and also Applications.

### Closure of ASP2010 & Introduction to Outreach, Forum Day

By Christine DARVE (*ASP2010 Main organizer*)

### DST Address

By Dr. Daniel ADAMS (*South African Department of Science and Technology representative - Chief Director: Emerging Research Areas & Infrastructure – Human Capital and Knowledge Systems*)

### Lectures (~45 minutes each):

- 1. Road Map for Discoveries at Hadron Colliders**  
By Peter JENNI (*ATLAS Former Spokesperson*)
- 2. Roadmap to High Energy Physics: SA-CERN and ALICE**  
By Jean CLEYMANS (*SA-CERN Spokesperson*)
- 3. Particle accelerators: ships of discovery, engines of development**  
By Philippe LEBRUN (*Former Head of CERN Accelerator Technology Department*)
- 4. CERN – A Gateway to Collaboration & Innovation**  
By Emmanuel TSESMELIS (*CERN Director-General Adviser*)
- 5. Energetics and Nuclear Fusion**  
By Norbert HOLTKAMP (*ITER Principal Deputy Director General*)
- 6. Progress in Particle therapy in Europe**  
By Manjit DOSANJIH (*ENLIGHT Coordinator and Life Sciences Adviser*)

### DST meeting - Concluding comments

By Dr. Daniel ADAMS (*Chief Director: Emerging Research Areas & Infrastructure – Human Capital and Knowledge Systems*)

### Poster Session:

#### Fast neutron filter design for the neutron diffraction technique

By Naima Zahar:

#### Radio Detection of Ultra High Energy Cosmic Rays with the CODALEMA experiment

By Ahmed Rebai

## **Road Map for Discoveries at Hadron Colliders:**

By Peter JENNI (CERN)  
*ATLAS Former Spokesperson*

Particle physics at the high energy frontier is dominated by experiments at hadron colliders. The Tevatron Collider at Chicago, USA, with its successful exploitation and many searches for new physics is now being followed by the Large Hadron Collider (LHC) at Geneva, Switzerland, which will explore a new territory of physics in the coming decades. The LHC will allow us to study, in a laboratory, for the first time fundamental physics phenomena as they occurred very shortly after the Big Bang. The experiments address questions like: why have particles a mass, what is the mysterious non-visible dark matter in the Universe, are there more than four dimensions in Nature, what are the smallest building blocks of matter? South African teams are part of the challenging LHC experiments. Results and expectations from both projects will be discussed.

## **Roadmap to High Energy Physics: SA-CERN and ALICE:**

By Jean CLEYMANS (UCT)  
*SA-CERN Spokesperson*

The historical moments describing the collaboration between South-African Institutes and CERN are summarized.

## **Particle accelerators: ships of discovery, engines of development:**

By Philippe LEBRUN (CERN)  
*Former Head of the Accelerator Technology Department*

Particle accelerators were born a century ago, together with the discovery of elementary particles. Cross-fertilized by technical progress and emerging technologies, they have shown sustained development over the years to become the modern ships of discovery in high-energy and nuclear physics, and also – as powerful sources of probe radiation – in atomic, molecular and condensed-matter science. Today, particle accelerators have found their way as new tools in health and medicine, both for research and clinical applications, as well as in industry and security. We will present examples of such diverse applications and briefly discuss future paths of development.

## **CERN – A Gateway to Collaboration & Innovation:**

By Emmanuel TSESMELIS (CERN)  
*CERN Director General Adviser*

This presentation describes how CERN is seeking to concretise the role of fundamental research as a driver for innovation. This has been a very evident aspect of high-energy physics research. This type of research needs very sophisticated instruments using technologies that often exceed the available industrial know-how. Many of these technologies have been spun-off to innovations that have made our daily lives more efficient, practical and comfortable. CERN actively encourages technology transfer, or generally speaking the access to technologies, expertise and industrial processes to universities, laboratories and industries.

Claudio Parrinello will highlight CERN's role as a catalyst for the exchange of knowledge. However, CERN is actually more than a hub because it plays the role of an active "catalyser" in the exchange of knowledge. Several concrete examples will be discussed. An additional aspect is the CERN Global Network. This network aims to facilitate knowledge exchange across the various groups described above and to improve the visibility of partnership opportunities related to CERN's activities. It will also enable CERN to gather data on knowledge transfer through mobility. This Global Network will welcome former and current members, drawn amongst others, from Users and companies from CERN's member states, universities and research institutes. It will deliver a database of members and a dedicated website, providing information about partnership and knowledge-sharing opportunities (training, new R&D projects, transferable technologies, jobs etc) across the community. It will also foster the creation of special interest groups and organize events.

For more about the CERN Global Network, see

- <http://globalnetwork.cern.ch>.
- <http://cerncourier.com/cws/article/cern/42339>
- <http://technologytransfer.web.cern.ch/TechnologyTransfer/>

## **Energetics and Nuclear Fusion:**

By Norbert HOLTKAMP (ITER)  
*Principal Deputy Director General*

ITER (in Latin "the way") is designed to demonstrate the scientific and technological feasibility of fusion energy on an industrial scale. The principal goal of ITER is to generate 500 megawatts of fusion power for periods of 300 to 500 seconds with a fusion power multiplication factor of at least 10. The technical challenges of the project will be discussed together with the accompanying development program for the major components.

The ITER Organization was officially established in Cadarache, France, on 24 October 2007. The seven members engaged in the project – China, the European Union, India, Japan, Korea, Russia and the United States – represent more than half the world's population. The costs for ITER, which are shared by the seven members, include a construction cost of approximately 5.5 billion Euros, with a similar amount

foreseen for the twenty-five-year phase covering operation and the subsequent decommissioning. The status of the build up of the organizations will be discussed.

Since the establishment of the organization, the team in Cadarache and the supporting Domestic Agencies from each Member that have been created to deliver 90 % of the ITER hardware on an "In-Kind" basis, have executed a basic design review. Several changes, some major, have been incorporated in the present baseline as a result of this design review.

The present status of the construction project will also be presented. Many of the agreements between the ITER Organization and the Domestic Agencies have been signed, and active construction of superconducting strands, cables and other subsystems is underway, together with the supporting R&D necessary to ensure maximum performance. Preparation of the site and of the itinerary to transport heavy components to the site is essentially complete. Planning of building construction has reached a very mature state and preparatory excavations will commence soon.

### **Progress in particle therapy in Europe:**

By Manjit DOSANJIH (CERN)  
*ENLIGHT Coordinator and Life Sciences Adviser*

Hadrons play a critical role in the 21st century oncology: proton beams are now regularly used to treat cancer, and carbon-ion therapy starts to spread as well. State-of-the-art techniques borrowed from particle accelerators and detectors are a key element in particle therapy, and several European projects are actively fostering the connections between clinicians, physicists, biologists and engineers.

It is anticipated that the next decade will produce better outcomes from radiation techniques used in cancer therapy. There are many challenges along the way to achieve this for the largest number of suitable patients, as well as the integration of hadron therapy techniques into the multi-modality management of cancer. The generous contributions of the EU to this multidisciplinary effort by sharing training, education, research and development, is both exemplary and necessary in order to achieve progress as efficiently and rapidly as possible and at the lowest overall cost.