



- [Home](#)
- [About Us](#)
- [Business IT](#)
- [Career Opportunities](#)
- [Channelwise](#)
- [Subscribe](#)

- [Africa](#)
- [Channelwise](#)
- [Company News](#)
- [Industry Areas](#)
- [Technology Areas](#)
- [Press Offices](#)
- [Microsoft Dynamics](#)

subscribe: [Daily Newsletter](#)

search the site



[Positive growth in chip market](#)

[share this](#)

[Are you ready for the cyber-attack battle?](#)

Wits physicists on standby for LHC

Posted by IT-Online on Apr 8, 2015 in [Featured Article](#), [News](#) | [0 Comments](#)

•

ASUSPRO
Incredible Reliability

For
Professionals
who dare to look
beyond the
aesthetics

[Learn More](#)

ASUS
IN SEARCH OF INCREDIBLE



As the world's most powerful particle accelerator, the Large Hadron Collider (LHC) at CERN in Geneva, was re-started over the weekend, physicists from the University of the Witwatersrand are preparing to further explore the frontiers of science that led to the discovery of the Higgs boson particle in 2012.

The circulation beams rebooted on Sunday morning, a major milestone towards resuming proton-to-proton collisions and delivering protons at a new energy frontier before the summer in the northern hemisphere. "The return of beams to the LHC rewards a lot of intense, hard work from many teams of people," says the head of CERN's Beam Department, Paul Collier. "It is very satisfying for our operators to be back in the driver's seat with what is effectively a new accelerator to bring on-stream, carefully, step-by-step."

"Operating accelerators for the benefit of the physics community is what CERN is here for," adds CERN director general, Professor Rolf-Dieter Heuer.

The historic observation three years ago of the Higgs boson, a puzzle piece in the Standard Model of Particle Physics, opened up possibilities of more exotic particles waiting to be discovered.

"There are many questions left unanswered in the universe, some of which we hope to answer when the Large Hadron Collider (LHC) is once again fully operational," says Professor Bruce Mellado from the Wits School of Physics.

An expert on the Higgs boson, Mellado – who leads the University's involvement in the Atlas experiment at CERN – was recently appointed co-convenor in the Higgs Cross-section Group at CERN that puts together the work of more than 100 theorists and experimentalists, and oversees seven subgroups that are setting up standards for the study of the properties of the Higgs boson with the data that the Large Hadron Collider will provide. Mellado has

**NEVER WORRY
ABOUT THE
COST OF
INK AGAIN**

**WITH EPSON INK TANK
SYSTEM PRINTERS**



Epson L335



Epson L550



Epson M105



**Call 0860 000 953
for details**

[LEARN MORE](#)

EPSON
EXCEED YOUR VISION

also been made a member of the Large Hadron Electron Collider (LHeC) Coordination Group – a new proposed R12-billion facility to be constructed.

Mellado and colleagues in the High Energy Physics (HEP) group in the Wits School of Physics are investigating peculiarities seen in the Higgs boson results made publicly available by the ATLAS experiment.

The possible explanations to these peculiarities range from a set of random statistical fluctuations, which may disappear with more data, to a much more interesting possibility of the observation in laboratory conditions of dark matter particles. This would signify a finding as important as that of the Higgs boson.

HEP will be quite active in this investigation and crucial support from the Department of Science and Technology, through the SA-CERN programme and bursaries, as well as university contributions will play a critical role in this endeavour. Professor Alan Cornell, a high-energy particle physics theorist from the Mandelstam Institute for Theoretical Physics at Wits, collaborates with experimentalists of the HEP group to devise new scenarios unexplored before. Another new member to the HEP group, Dr Deepak Kar from the University of Glasgow, will bring a complimentary dimension to the group through his knowledge and experience.

Since the start of 2013, the Wits-ATLAS group has submitted and/or published over 60 proceedings and research papers. Students Harshna Jivan, Mitchell Cox and Robert Reed have received five prizes in the same period of time. The group has been honoured with the First Time Inventor Award (2014) and the Most Cited Researcher Award (2015) by the university.

The HEP group was very active during the shutdown of the LHC since 2013 – in order to prepare the collider for almost double the previous collision energies. Members have designed and locally produced High Voltage, LED and ADC electronic boards that are used in a mobile integrity-checking system that validates and consolidates the electronics on the ATLAS detector at the LHC. These boards, along with custom software also developed by the group, used a new design, called Prometeo, which is intended for the upgrade of the LHC expected in the year 2022.

Storing the large amount of data – in the order of a

few Petabytes per second – that the LHC is expected to generate in the near future, is a major concern to physicists. In response, the HEP group also initiated the development of software tools that integrate the new hardware into the ATLAS detector control system, and the group is developing a novel way to deal with the data explosion by processing the data, in realtime, using energy efficient and cost-effective processors found in mobile phone devices.

These high-end electronics are being designed and developed in the new High-throughput Electronics Laboratory (HTEL) in the Wits School of Physics. The lab was inaugurated in November last year by the Wits Vice-chancellor and Principal, Professor Adam Habib, the Dean of the Faculty of Science, Professor Helder Marques, and Head of the School of Physics, Professor John Carter.

As a spinoff of this high-end electronics research, the HTEL also houses the design of low-cost computers for schools in Gauteng. The Technology Innovation Agency has awarded the HTEL with a grant to launch a pilot project at selected schools to study and develop these devices to best suit the education environment

The re-start of the LHC at the new energy frontier and with greater intensity also brings reinvigorated excitement for the ALICE experiment at the LHC. Professor Zebulon Vilakazi, Deputy Vice-Chancellor: Research, leads Wits' efforts at the ALICE experiment. The ALICE experiment seeks to investigate the state of matter that existed a millionth of a second after the Big Bang – known as the quark gluon plasma — a soup of matter particles that cooled down to form atomic nuclei that we observe today.

Professor Elias Sideras-Haddad leads synergistic activities between high-energy physics and the HTEL with nuclear physics and material sciences. At the forefront of these investigations lies a unique set of South African accelerator-based facilities that allow scientists to reproduce the challenging conditions of radiation at the LHC. In particular, radiation damage of ATLAS detector components is studied using several techniques developed for the material sciences.

Comments

Community

1 Login ▾

♥ Recommend

Sort by Best ▾

Start the discussion...

Be the first to comment.



Comstor™
sales@comstor.co.za
+27 11 848 900

The Cisco Aironet 1700 Series
AIR-CAP1702I-E-K9

Distribution Partner

The Aironet 1700 Series meets the growing requirements of wireless networks by delivering better performance.



28-29TH APRIL 2015
CTICC, CAPE TOWN,
SOUTH AFRICA

CLICK HERE »
to more information

HUAWEI



Learn. Connect. Discover.

Reimagine 2015 is the best opportunity to expand your professional network, explore Microsoft Dynamics solutions, and bring new ideas to life.

22 – 23 April 2015
Register Now!

 Microsoft Dynamics

Reimagine 2015



Oracle CIO Summit, South Africa - The Leadership Edge in the Digital Transform.



JOHANNESBURG - 12 May 2015

Featuring keynote speaker **Nenad Paocok**,
president of Global Success Advisors

In association
with



[REGISTER HERE](#)

ORACLE

NEVER WORRY ABOUT THE COST OF INK AGAIN

INK TANK SYSTEM PRINTERS



[LEARN MORE](#)

EPSON
EXCEED YOUR VISION

Channelwise **WestconGroup**

Cloud Resources  Microsoft

Contact Centers  aspect

Document Solutions  SAMSUNG

Enterprise Business  HUAWEI
HUAWEI ENTERPRISE A BETTER WAY

Gaming & Accessories

Mobile Computing

Office Equipment **RICOH**

Personal Computers **MECER**

Storage **NetApp**

Unified Comms 
INTERACTIVE INTELLIGENCE

Visual Instruments **EPSON**
EXCEED YOUR VISION