



News

What's on at Wits

Procurement

Wits Weather

Conferences

Wits90

Particle likely to be a Higgs boson: New results from CERN

10 April 2013

The ATLAS and CMS experiments at the CERN's Large Hadron Collider (LHC) declared the discovery of a new boson on 4 July 2012. This new boson is believed to be connected with the mechanism that explains the origin of mass of elementary particles in the universe. This discovery is a historical moment for the physics of fundamental interactions and it will be covered in textbooks for generations come. That been said, the study of this new particle will take a long time. The properties of this new particle and the way it interacts with other known particles may hold surprises. This can lead to even more groundbreaking discoveries. Therefore, the prospects of this exploration are very exciting.

The ATLAS and CMS experiments have recently unveiled results using the full data set provided by the LHC during 2012. This corresponds to two and a half times more data than the amount used for the discovery announcement. The analysis of these data seems to indicate that the basic properties of this new boson are consistent with that of a Higgs boson.

"The preliminary results with the full 2012 data set are magnificent and to me it is clear that we are dealing with a Higgs boson though we still have a long way to go to know what kind of Higgs boson it is," said CMS spokesperson Joe Incandela.

"The beautiful new results represent a huge effort by many dedicated people. They point to the new particle having the spin-parity of a Higgs boson as in the Standard Model. We are now well started on the measurement programme in the Higgs sector," said ATLAS spokesperson Dave Charlton.

These results represent a new milestone for the understanding of the newly discovered particle. However, critical questions remain unanswered:

"It remains an open question, however, whether this is the Higgs boson of the Standard Model of particle physics, or possibly the lightest of several bosons predicted in some theories that go beyond the Standard Model. Finding the answer to this question will take time." (CERN press office)

Wits continues to make a strong contribution to the ATLAS experiment. The group is composed of three academic staff, Dr O. Boeriu (NRF rated scientist), Dr T. Vickey (P-rated scientist) and Prof. B. Mellado who joined the group in February 2013. The group has a large number of post-doctoral fellows, honours, masters, PhD students and technical staff. The group has made long-standing and visible contributions to the discovery of the new particle and continues to do so now. They group have several positions of leadership in four out of the five main discovery modes of the newly discovered Higgs boson. This also includes a long list of scientific outputs. In addition, the group is very active in the maintenance, operations and upgrade of the detector. The latter is particularly important to meet the technological challenges of a new more powerful LHC. This is necessary in order to investigate the nature of the Higgs boson and whether nature displays others.

The ATLAS group at Wits is developing a high-throughput electronics laboratory on campus. High-throughput electronics deal with massive data transfer at very high rates in challenging environments. These would include environments with high levels of radiation, possible event upsets and other factors that may result in data corruption. In order to deal with these challenges the group works with other fields in the School of Physics. Collaboration has started with Prof. E. Sideras-Haddad, the Director of MPRI (Materials Physics Research Institute) in the School of Physics. A programme of radiation-related tests in facilities in South Africa has been identified. In terms of science the ultimate goal would be to have design and production of electronics in South Africa that would become an integral part of the ATLAS experiment at CERN. Achieving this makes our effort competitive with those in European and North American countries.

Because of the nature of the projects synergistic activities with other Schools on the Wits campus are in progress. The group has started interacting with Prof. I. Hofsajer, Prof. K. Nixon and Dr S. Levitt from the School of Electrical and Information Engineering. Common projects are expected to develop in the area of high-throughput electronics and related software. The group has also been collaborating with Prof. S. Hazelhurst in the integration of computing at Wits into the CERN Grid, a new Internet.

The Head of the School of Physics, Prof. John Carter, at the University of the Witwatersrand congratulates the members of University's Wits-ATLAS Group and states that the School is proud to host those members of the SA-CERN team, which have played a crucial role in the recent discovery of the Higgs boson at the LHC. The group has gone from strength to strength over the last years and now with the new developments in electronics technology and grid computing is poised to make further significant contributions in the years to come. Special thanks should go to the Dean of the Faculty of Science, Prof. Andrew Crouch, for his support of the Wits visionary outlook some years back and for providing the resources to



allow Wits to make a significant contribution to the LHC discoveries.

WITS UNIVERSITY

Tel: +27 (0)11 717 1000

1 Jan Smuts Avenue
Braamfontein 2000
Johannesburg, South Africa

Prospective
Faculties & Schools
Current Students
Places & Spaces
Research & Library

Newsroom
International
Term Dates
Wits Enterprise
Vacancies
Wits Site Map
Wits Intranet



Copyright © 2000-2013
University of the Witwatersrand, Johannesburg

[Privacy Policy](#) | [Disclaimer](#) | [Terms of Use](#) | [PAIA](#) | [ISPA](#)