

BIG DATA SCIENCE IN SOUTH AFRICA REACHING NEW FUNDING HIGHS THROUGH THE SOUTH AFRICAN CERN COLLABORATION

The national SA-CERN programme, funded by the Department of Science and Technology, was given a significant boost in funding, allocating (R62m) to this very successful programme. **iThemba Laboratory for Accelerator Based Sciences (iThemba LABS), as the pioneering and largest sub-atomic research facility in Africa, serves as the natural host for collaborating universities to access international large research facilities like CERN through the SA-CERN programme**

The SA-CERN programme gives South Africa access to the largest open research facility in the world, CERN, located in Geneva, Switzerland, a central facility for physics research, serving about 7000 scientists, representing 500 institutions and over 90 nationalities. CERN remains at the forefront of developments in nuclear, particle and computational physics. All of the BRICS countries (Brazil, Russia, India, China and South Africa) are actively engaged in research at CERN. The Large Hadron Collider (LHC) is now collecting data at twice the previous beam energy and expectations for new discoveries are very high. These anticipated new discoveries and breakthroughs present excellent opportunities to South African scientists, students and fellows with ground breaking knowledge and innovation to the benefit of the local society and knowledge generation.

Some of the highlights over the past year for South African scientists and participating students for the national SA-CERN programme include: (i) The Wits School of Physics recently announced (February 2016) the electronics boards of the ATLAS Experiment Tile Calorimeter Super Readout Driver (now referred to as PPr) manufactured by a South African company TraX have recently passed X-ray quality control and are now ready for mounting; (ii) Growth in the SA-CERN programme include Physics Department of the University of Cape Town made available a post-doctoral position, the Department of Physics and Electronics of Rhodes University, Grahamstown, joined the ALICE group as well as the University of Witwatersrand (WITS) and University of the Western Cape joining the Isolde group and very recently University of Zululand joined the ATLAS group; (iii) After several years of discussions South Africa joined the ISOLDE Collaboration which brings with it many benefits, with the South African group involved in experiments with the Emission Mössbauer Collaboration at ISOLDE being allocated beam time for measurements. A major outcome of the formalisation of our interaction with ISOLDE/CERN is the leap in the number of South African participants in experiments utilising radioactive ion beams at the ISOLDE facility at CERN, from five (2 senior scientists and 3 research students) in 2014 to 18 (9 scientists and 9 research students). The ISOLDE collaboration only bodes well for the long term iThemba LABS South African Isotope Facility's research strategy, expected to be realised within the next 5 to 10 years; (iv) Siegfried Fortsch, a scientist from iThemba LABS, substantially increased South Africa's footprint at CERN when he was appointed as the Run Co-ordinator of the ALICE experiment a position normally afforded to member states; and (v) SA-CERN participation has doubled over the past three years for both students (69) incl. post docs and research/academic staff (37). A further capability brought about through the SA-CERN collaboration is the establishment of a Tier 2 data processing facility at the Centre for High Performance Computing. This facility underpins SA's ability to collaborate on Big Data International science experiments, CERN.

The national SA-CERN programme continues to have a major impact on the development of physics in South Africa. It strengthens the South African physics community and makes research at the highest level accessible to local scientists and students. Public interest in results from the Large Hadron Collider remains high as witnessed by numerous newspaper and magazine articles and continued interest from radio and TV shows. The programme governance, through iThemba LABS, outstandingly contributes to the excellent research and human capacity development achievements of the programme. These efforts and successes are recognised by the DST and recently the National SA-CERN programme's budget was increased for the next three year cycle.

