Our strategic goals

- Produce research which has significant international impact, maximising our opportunities and resources.
- Deliver teaching programmes of exceptional quality, recognising the research themes within the Department.
- Provide a departmental environment within which both staff and students flourish.
- Sustain an effective public profile of the Department.

A major in Physics for the 3-year **BSc** at UCT is most often supported by a co-major in Astrophysics, Applied Mathematics, Mathematics or Computer Science. For the BSc in Physics, the following courses are typical:

FIRST YEAR (4 courses): Physics I ("Matter and Interactions"); Mathematics I; Applied Mathematics I; plus another course such as Astronomy, Statistics, Chemistry or Computer Science.

SECOND YEAR (3 courses): Physics II ("Intermediate Physics"); Mathematics II and/or Applied Mathematics II; and/or another course such as Astrophysics.

THIRD YEAR (2 courses): Physics III ("Advanced Physics"); plus a co-major in Applied Mathematics, Mathematics, Astrophysics or Computer Science.

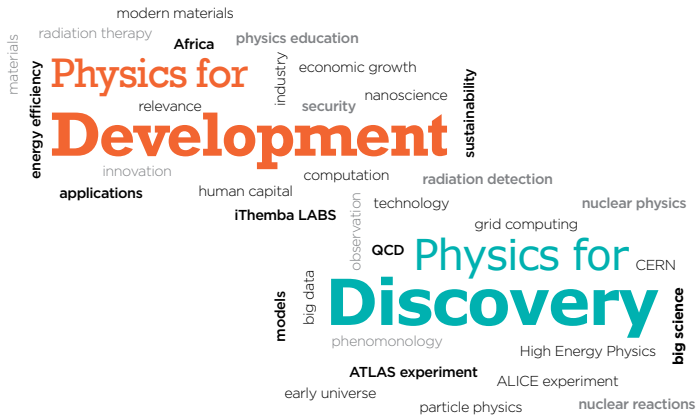
The BSc may be followed by the one-year **BSc(Hons)** in physics which features specialised modules and a research project. Further postgraduate study is possible through an **MSc** and then **PhD** by dissertation, which are directly linked to one of the many research interests in the department.

Our mission

To create new knowledge and applications in physics, and to educate students in Physics, within the context of UCT.

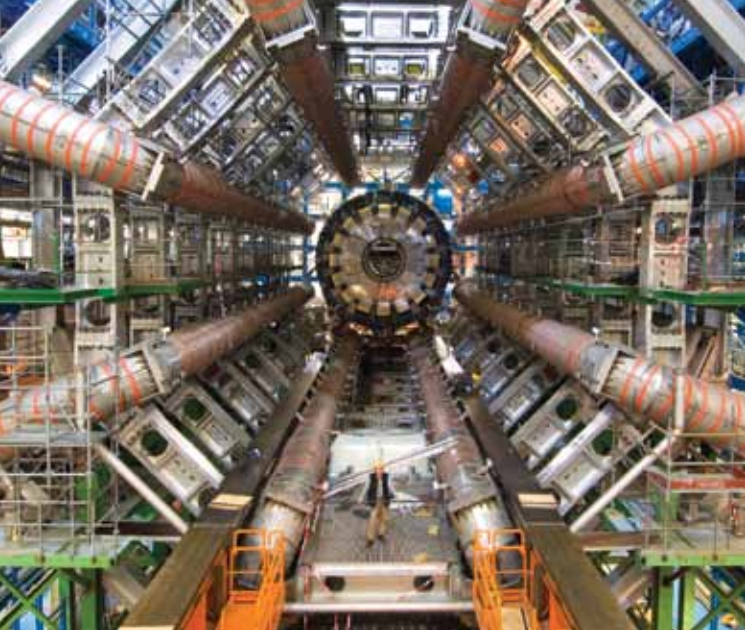
Our vision

UCT Physics will be unambiguously recognised both nationally and internationally as the leading Physics Department in Africa for its outstanding research and teaching.



DEPARTMENT OF PHYSICS

UNIVERSITY OF CAPE TOWN



ATLAS Experiment © 2016 CERN

High energy physics research

High energy physics research is concerned with understanding the conditions and evolution of the early universe. Particle physicists search for the irreducible constituents of our universe, which along with the mechanisms for their interactions, combine to form the Standard Model of particle physics. The forefront of experimental particle physics research takes place at CERN, the European Centre for Nuclear Research, in Geneva, Switzerland. The Department of Physics participates in two experiments at CERN: ATLAS and ALICE. The primary objective of the ATLAS experiment is to uncover new fundamental constituents of matter, such as the Higgs Boson discovered in 2012, while the ALICE experiment is mainly focused on understanding the state of matter known as the Quark-Gluon Plasma. The high energy physics theorists in the department contribute to new knowledge by constructing mathematical models of the physics of the early universe. The faculty and postgraduate students participating in either theory or experiment make frequent trips to CERN to conduct their research and collaborate with the large number of colleagues from around the world. The Square Kilometre Array radio astronomy project provides interesting opportunities to link radio astronomy, cosmology and particle physics, all of which constitute strong research programmes at UCT.

Nuclear physics and solid state physics

The Physics Department also supports research programs in experimental nuclear and materials physics. Nuclear physics research focuses on fundamental studies of the structure and behaviour of the atomic nucleus, and the use of neutrons and gamma-rays in industrial and medical applications. UCT Physics benefits from the facilities of iThemba LABS (national laboratory) which is located 30 km from UCT and where there is located a range of accelerator-based activities, mainly centred on the 200 MeV cyclotron which provides beams for fundamental, applied and medical research. The department also operates a positron emission particle tracking laboratory at iThemba LABS where medical PET scanners are used to study systems of flow, with particular interest in the minerals industries. Solid state physics research in the department is led by the Nanoelectronics Research Laboratory which features an ultracold (8 mK) closed-loop liquid helium refrigerator (which is the coldest place in Africa), providing opportunities for fundamental nano-scale research and materials applications. The department also supports research in physics education at university-level, which often supports the teaching programmes in the department.

RW James

Physics has been taught at UCT and its pre-cursor institutions since 1896. Experimental physics at UCT was initiated by Basil Schonland in the 1920s through his association with the Cavendish Laboratory at Cambridge. RW James arrived in Cape Town in 1937 from the University of Manchester where he had worked with Lawrence Bragg in the early days of x-ray crystallography at the Cavendish. James set as his goal the transformation of UCT from an institution which mainly focused on educating undergraduates for potential postgraduate study abroad, into a research-rich university. He built up physics research laboratories at UCT which offered post-graduate students opportunities to tackle international quality research projects. This attracted to the department students such as Aaron Klug and Allan Cormack, who both completed their substantive work at UCT which later lead to their Nobel Prizes. Today the department is building on this heritage by delivering teaching programmes of international quality, and producing research which is both globally competitive and locally relevant. The department also undertakes outreach programmes to local high schools.

CONTACT US

RW James Building, University Avenue.
University of Cape Town
Rondebosch 7700, Cape Town, South Africa

+27 (0) 21 650 3339
head.physics@uct.ac.za
www.phy.uct.ac.za
www.facebook.com/uctphysics