

Stephen Hawking tours the future of particle physics at CERN

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Stephen Hawking, Lucasian Professor of Cambridge University and best-selling author of *A Brief History of Time*, has paid a week long visit to CERN in Geneva – the world's largest centre for particle physics.

Prof. Hawking was visiting the Theory Unit of the Physics Department at CERN. The Theory Unit welcomes about 400 visiting physicists per year, who come together to debate and discuss their ideas. As a key figure in the field of theoretical cosmology, Prof. Hawking's visit reinforces the exciting anticipation of the Large Hadron Collider (LHC), due to start up in 2007, and the importance of CERN as a central meeting place for the best minds in physics.

The LHC will be the world's largest and most powerful particle accelerator. It possesses enough energy to recreate the first instances of the Big Bang, by colliding particles at a total energy of 14 tera-electronvolts. The LHC will be central to the next generation of experiments at CERN, enabling scientific investigations that have never been possible before. Its potential to revolutionise our understanding of the Universe is eagerly anticipated by the scientific community.

"You have an exciting two years ahead of you", said Prof. Hawking as he congratulated Robert Aymar, the Director General of CERN, and the CERN community for their scientific work. During his visit, Prof. Hawking descended 100 metres underground to tour various facilities of the LHC. When asked what he considered to be the most important discoveries that the new experiments can make, Prof. Hawking

commented, "There are three candidates: superpartners, black holes and the Higgs". He considers superpartners and black holes to be the most important findings.

Superpartners are particles that should theoretically exist. They are 'supersymmetric partners' to those particles we already know of at present. Yet to be found by physicists, they could make up the mysterious dark matter in the Universe. Their predicted existence underlies other theories, such as string theory, which are being developed as 'the theory of everything'. The Higgs boson is the last undiscovered particle predicted to exist by the Standard Model of particle physics. First hypothesised in 1964, it has yet to be directly observed; the LHC can confirm its existence, which would verify the present Standard Model's explanation of the origin of particle mass.

Prof. Hawking also gave two lectures at CERN – a specialist seminar on 'The Semi-Classical Birth of The Universe', and a colloquium titled 'The Origin of The Universe'. The colloquium, simultaneously broadcast to five other locations at CERN, was warmly received by a total audience of 850.

Prof. Hawking was at CERN from 24 September to 1 October 2006.

His lectures are available at the following web link:

'Exceptional CERN Colloquium - The Origin of the Universe' (for a general audience): agenda.cern.ch/fullAgenda.php?ida=a063382

'The Semi-Classical birth of the Universe' (for a specialist audience): agenda.cern.ch/fullAgenda.php?ida=a063459

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