

# ATLAS is one of the 4 major experiments at the Large Hadron Collider at CERN.

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## About

ATLAS is a general-purpose particle physics experiment run by an international collaboration. Together with CMS, is designed to exploit the full discovery potential and the huge range of physics opportunities that the LHC provides.

ATLAS' scientific exploration uses precision measurement to push the frontiers of knowledge by seeking answers to fundamental questions such as: What are the basic building blocks of matter? What are the fundamental forces of nature? Could there be a greater underlying symmetry to our universe?

ATLAS physicists test the predictions of the Standard Model, which encapsulates our current understanding of what the building blocks of matter are and how they interact. These studies can lead to ground-breaking discoveries, such as that of the Higgs boson, physics beyond the Standard Model and the development of new theories to better describe our universe.

The years ahead will be exciting as ATLAS takes experimental physics into unexplored territories – maybe with new processes and particles that could change our understanding of energy and matter.

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## The Detector

The largest volume detector ever constructed for a particle collider, ATLAS has the dimensions of a cylinder, 46m long, 25m in diameter, and sits in a cavern 100m below ground. The ATLAS detector weighs 7,000 tonnes, similar to the weight of the Eiffel Tower.

The detector itself is a many-layered instrument designed to detect some of the tiniest yet most energetic particles ever created on earth. It



consists of six different detecting subsystems wrapped concentrically in layers around the collision point to record the trajectory, momentum, and energy of particles, allowing them to be individually identified and measured. A huge magnet system bends the paths of the charged particles so that their momenta can be measured as precisely as possible.

Beams of particles travelling at energies up to seven trillion electron-volts, or speeds up to 99.999999% that of light, from the LHC collide at the centre of the ATLAS detector producing collision debris in the form of new particles which fly out in all directions. Over a billion particle interactions take place in the ATLAS detector every second, a data rate equivalent to 20 simultaneous telephone conversations held by every person on the earth. Only one in a million collisions are flagged as potentially interesting and recorded for further study. The detector tracks and identifies particles to investigate a wide range of physics, from the study of the Higgs boson and top quark to the search for extra dimensions and particles that could make up dark matter.

## The Collaboration

ATLAS comprises 3000 scientists from around 180 institutions around the world, representing 38 countries from all the world's populated continents. It is one of the largest collaborative efforts ever attempted in science. Almost 1200 doctoral students are involved in detector development, data collection and analysis. The collaboration depends on the efforts of countless engineers, technicians and administrative staff.

ATLAS elects its leadership and has an organizational structure that allows teams to self-manage, and members to be directly involved in decision-making processes. Scientists usually work in small groups, choosing the research areas and data that interest them most. Any output from the collaboration is shared by all members and is subject to rigorous review and fact-checking processes before results are made public. The success of the collaboration is bound by individual commitment to physics and the prospect of exciting new results that can only be achieved with a complete and coherent collaborative effort.

The only way to realize such a challenging project, with the required intellectual and financial resources, and to maximize its scientific output is through international collaboration. Large project funds are investments from funding agencies of countries participating in ATLAS. There are also contributions from CERN, and some resources from individual universities.



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## Contact

For media requests, inquiries and visits, contact the CERN Press Office:

**[Press.Office@cern.ch](mailto:Press.Office@cern.ch)**

If you are interested in ATLAS Outreach & Education, contact:

**[Atlas.Public@cern.ch](mailto:Atlas.Public@cern.ch)**

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## Multimedia

ATLAS has a large selection of photos, videos and diagrams available for journalists and media professionals. Visit:

**<http://atlas.ch/resources/multimedia>**

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## Updates

Follow the latest news from the ATLAS collaboration by visiting:

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