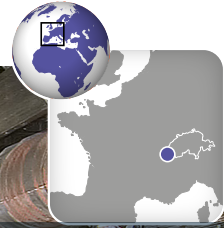
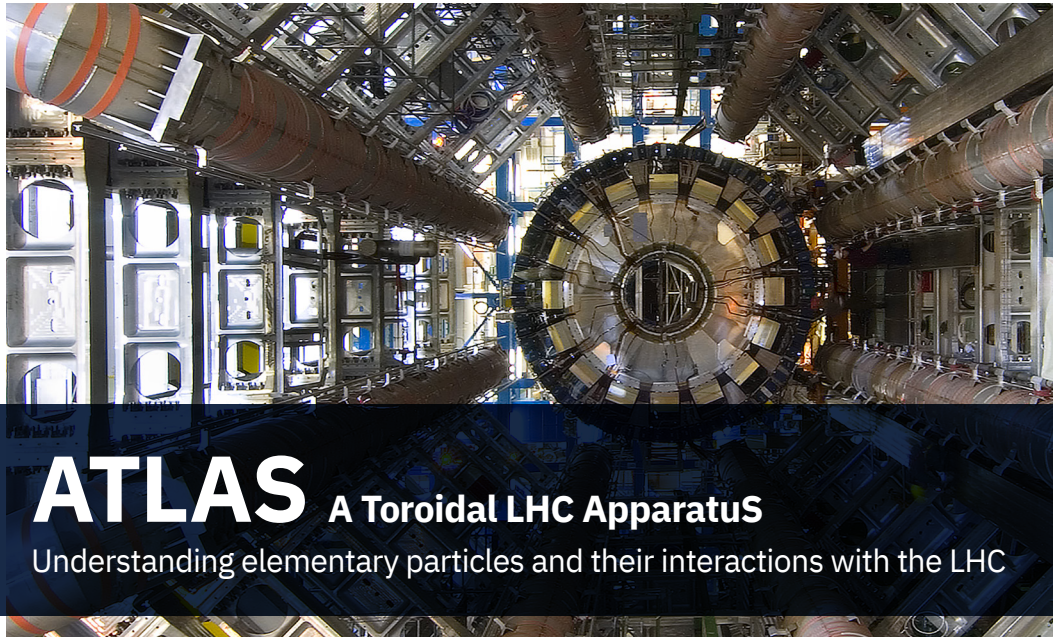


Elementary particles



LHC (CERN), Geneva
depth: 80m



ATLAS A Toroidal LHC Apparatus

Understanding elementary particles and their interactions with the LHC

Scientific leader: Laurent Serin (IJCLab) *

Laboratories involved: APC (Paris), CC-IN2P3 (Lyon), CPPM (Marseille), IJCLab (Orsay), LAPP (Annecy), L2IT (Toulouse), LPCA (Clermont-Ferrand), LPNHE (Paris), LPSC (Grenoble), OMEGA (Palaiseau)

Nature: research infrastructure

Status: international project based at the LHC Point 1 (Meyrin, Switzerland) on the CERN site. France and Switzerland are the host countries of the LHC.

Website: <https://atlas.cern/>

Scientific objectives

ATLAS is one of the four major experiments at the LHC. This versatile detector is designed to exploit the full physics potential of the accelerator by answering fundamental questions about the ultimate constituents of matter, the forces that govern them, and the underlying symmetries that govern our universe. To this end, ATLAS continues to study the Higgs boson after having co-discovered it, and is looking for possible new particles, such as those that might indicate additional dimensions of space-time or dark matter particles.

Resources deployed

ATLAS is built at CERN in a cavern 100 metres underground next to the LHC, the world's most powerful particle accelerator. At 46 metres long and 25 metres both high and wide, ATLAS is the largest particle detector built to date. Each of its six sub-detectors measures a particular parameter: trajectory, nature, energy of the particles. These detection systems provide 100 million measurements at a time, which ATLAS can activate at a rate of 40 million per second. A "trigger" system is used so that only interesting events are retained.

3 000 physicists	3 000km of cables
183 institutions	1 200 PhD students
38 participating countries	

IN2P3 CONTRIBUTIONS

- Design and construction of the ATLAS detection systems: central and front liquid argon accordion calorimeters, innovative R&D and construction of the pixel detector (then of its 4th layer), hadronic tile calorimeter, triggering system.
- Analyses of data leading to the discovery of the Higgs.
- Establishment of a TI computing infrastructure on the grid for the processing of LHC data at the IN2P3 CC in Lyon.
- Robust involvement in the ongoing refurbishment of the main sub-detectors for the high luminosity phase of the LHC.

Other french laboratories involved
Irfu (CEA Saclay)

2013 Nobel Prize in Physics awarded for the discovery of the Higgs boson	2029 High-luminosity LHC scheduled to begin
2014 Insertion of a 4 th layer of pixels closer to the collision point	2038 Expected end of operations
2015 First collisions at 13TeV	
2010 First collisions at 7TeV	
2003 Inauguration of the cavern	
1993 Approval of the ATLAS project	

* Since 2017