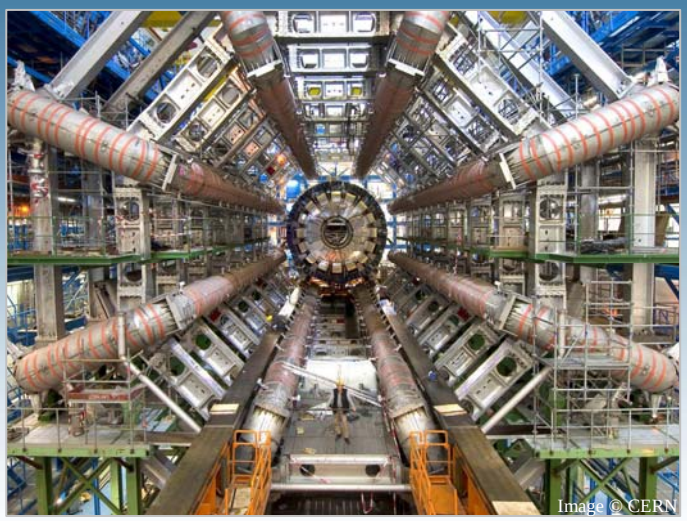
US/LHC

Particle Physics at Discovery's Horizon

The US and the ATLAS Experiment



The ATLAS experiment at CERN in Geneva, Switzerland, will open up new frontiers in the exploration of matter, energy, space and time when the Large Hadron Collider starts running.

One billion high-energy proton collisions will take place every second inside the vast ATLAS detector, housed 300 feet underground in a cavern 10 stories high. More than 2,500 scientists from 37 countries will sift through this data in search of tiny signals that could answer some of mankind's biggest questions.

The US ATLAS collaboration numbers more than 650 physicists, engineers, technicians and graduate students from 43 universities and national laboratories. Supported by the Department of Energy's Office of Science and the National Science Foundation, US ATLAS contributes to all of the detector's systems, each dedicated to measuring different properties of fundamental particles. Resources from six US computing centers are integrated into the global LHC computing network via the Open Science Grid. US scientists develop and test vital parts of the cutting-edge data acquisition system, which converts raw data from the ATLAS detector into a digital form that physicists use to search for and measure fundamental particles and forces.

The ATLAS Detector

Largest-volume particle physics detector ever built

Total weight:	7,700 tons
Overall diameter:	82 feet
Overall length:	150 feet
Detection elements:	100 million
Collaborating scientists:	2,500
Collaborating countries:	37

Location: 300 feet underground near Geneva, Switzerland

The US ATLAS Collaboration

Participants:	More than 650
Institutions:	39 universities and 4 national laboratories
States represented:	21
Ph.D. physicists:	348
Graduate students:	150

Cost of US construction project: $164 million

Construction contributions: Leading role in design, construction and testing for charged particle tracking systems, liquid argon and tile calorimeters, muon spectrometers and data acquisition system

Computing contributions: Resources from 6 large computing centers, hardware and software for detectors and data analysis

Scientific Goals

ATLAS will address the most basic and compelling questions of 21st century physics:

1. Are there undiscovered principles of nature?
2. What is the origin of mass?
3. Do extra dimensions exist?
4. What is dark matter?
5. How can we solve the mystery of dark energy?
6. How did the universe come to be?