

## The US and the CMS Experiment



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Discoveries from the Compact Muon Solenoid experiment at the Large Hadron Collider at CERN in Geneva, Switzerland, promise to revolutionize our understanding of the universe.

With more than 900 participants from 48 institutions across the country, US CMS is the largest national group in the 3,000-member international CMS collaboration. Supported by the Department of Energy's Office of Science and the National Science Foundation, the US CMS collaboration consists of 431 physicists, nearly 200 graduate students and roughly 300 engineers, technicians and computer scientists.

The US makes significant contributions to nearly every aspect of the detector throughout all phases including construction, installation, preparation for experiment startup, and operation. The US CMS collaboration plays a major role in the construction and operation of the experiment's global network of computing facilities, contributing resources from eight computing centers via the Open Science Grid. US scientists also develop highly sophisticated computing tools that will enable physicists to operate the CMS detector, reconstruct the data, analyze it and, ultimately, make discoveries.

### The CMS Detector

Discovering new physics at the energy frontier

<b>Total weight:</b>	12,500 tons
<b>Overall diameter:</b>	52 feet
<b>Overall length:</b>	70 feet
<b>Detection elements:</b>	100 million
<b>Collaborating scientists:</b>	3,000
<b>Collaborating countries:</b>	39
<b>Location:</b>	300 feet underground in Cessy, France

### The US CMS Collaboration

<b>Participants:</b>	More than 900
<b>Institutions:</b>	46 universities and 2 national laboratories
<b>States represented:</b>	23 plus Puerto Rico
<b>Ph.D. physicists:</b>	431
<b>Graduate students:</b>	199
<b>Cost of US construction project:</b>	\$167 million
<b>Construction contributions:</b>	Leading role in muon detectors, calorimeters, charged particle tracking devices, and trigger and data acquisition systems
<b>Computing contributions:</b>	Resources from 8 computing centers

### Scientific Goals

CMS scientists will use the unprecedented amount of data collected by the CMS detector in the quest to answer these and other questions:

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?