“Fundamental research is a crucial component of human development. Exploring the unknown and understanding the mysteries around us is what makes humans unique. Particle physicists have approached these challenges systematically and how to work together efficiently and successfully. CERN and the LHC represent the quintessence of a social endeavor where thousands of scientists work together on a common goal: to understand the laws of the Universe itself. The pursuit of knowledge is our unifying driving force.

The discovery of the Higgs boson was only the first step in this journey and many other secrets of Nature are yet waiting to be revealed. What is dark matter and dark energy? What role do they play in our existence? How does gravity fit into our understanding of the laws of physics? Nature knows what we will find, but with the CMS experiment we are eager to explore.”

Luca Malgeri, CMS Physics Coordinator 2014-2015

FACTS

- 2840 scientists (including over 940 PhD students)
- 970 engineers
- 191 research institutes, universities and laboratories
- 43 countries
- $4.4 \times 10^{15}$ proton-proton collisions
- 64 petabytes (or over 64,000 terabytes) of data collected
- Over 430 scientific publications since 2010

As of August 2015

www.cern.ch/cms

cms.secretariat@cern.ch
The CMS Collaboration brings together scientists from across the globe in a quest to advance humanity’s knowledge of the very basic laws of our Universe.

The collaboration is named after the Compact Muon Solenoid, one of the general-purpose particle detectors at CERN’s Large Hadron Collider. By colliding protons as well as lead ions, the LHC can recreate conditions that have not existed since the birth of the Universe. Using the CMS detector to observe these collisions, particle physicists can peer back in time to better understand physics at its fundamentals. Having already discovered a Higgs boson — the key to the origin of mass — CMS will shed light on numerous other open questions. For example: What is 80% of all matter in the Universe, the so-called Dark Matter? How does the newly discovered Higgs boson fit in the theory?

In keeping with CERN’s commitment to open access for high-energy physics, the scientific results from CMS are shared openly with the world.

**Physics Challenges**

- **Electroweak Physics**
- **Higgs Boson Properties**
- **Extra Dimensions**
- **New Physics Phenomena**
- **New Forces**
- **Energy Frontier**
- **Dark Matter**
- **Standard Model**
- **A Theory of Everything**
- **Exploration**
- **The Origin of Mass**

**The Mission of CMS: Physics**

*“Dizzying progress in science as well as new insights over the last decades coupled the physics of the cosmos and that of elementary particles into a unified field of research. Poles apart like the CMS experiment at the LHC and IceCube joined in the hunt for the particle nature of dark matter.”*

Prof. Francis Halzen, University of Wisconsin-Madison, Principal Investigator for IceCube.