

# CMS COLLABORATION

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**Abstract.** CMS Collaboration is an international scientific collaboration located at European Organization for Nuclear Research (CERN), Switzerland, dedicated in carried out research on experimental particle physics. Consisting of 182 institutions from 42 countries from all around the world, CMS Collaboration hosts a general purpose detector i.e. the Compact Muon Solenoid (CMS) for members in CMS Collaboration to conduct experiments from the collision of two proton beams accelerated to a speed of 8TeV in the LHC ring. In this paper, we described how the CMS detector is used by the scientists in CMS Collaboration to reconstruct the most basic building of matter..

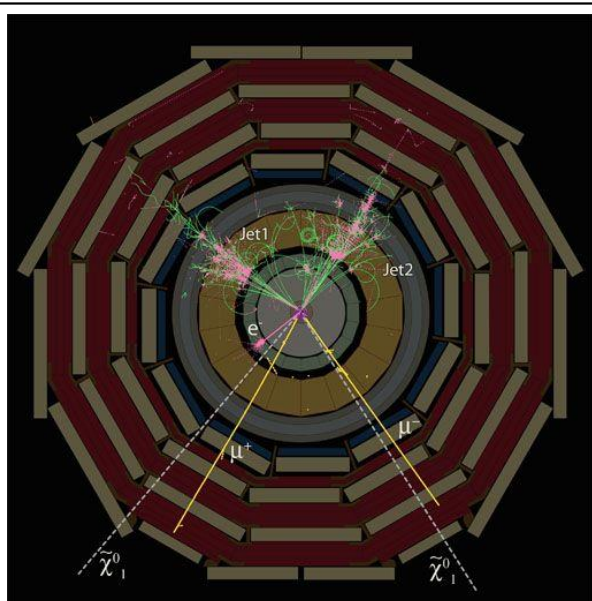
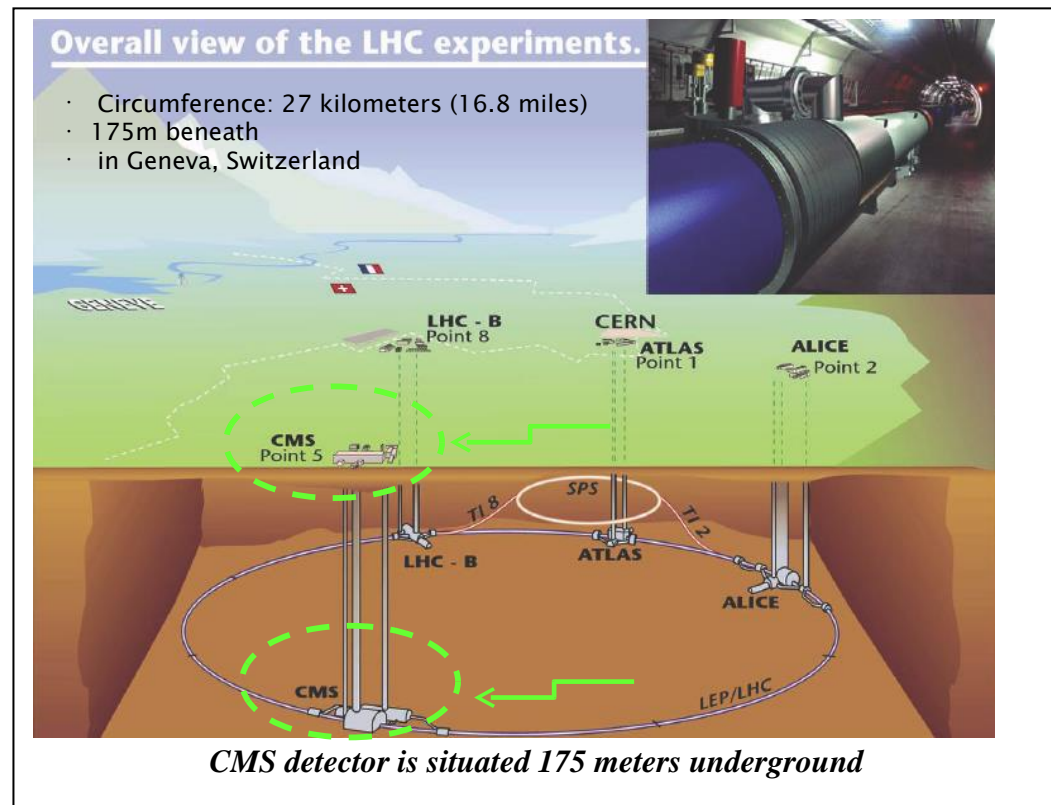
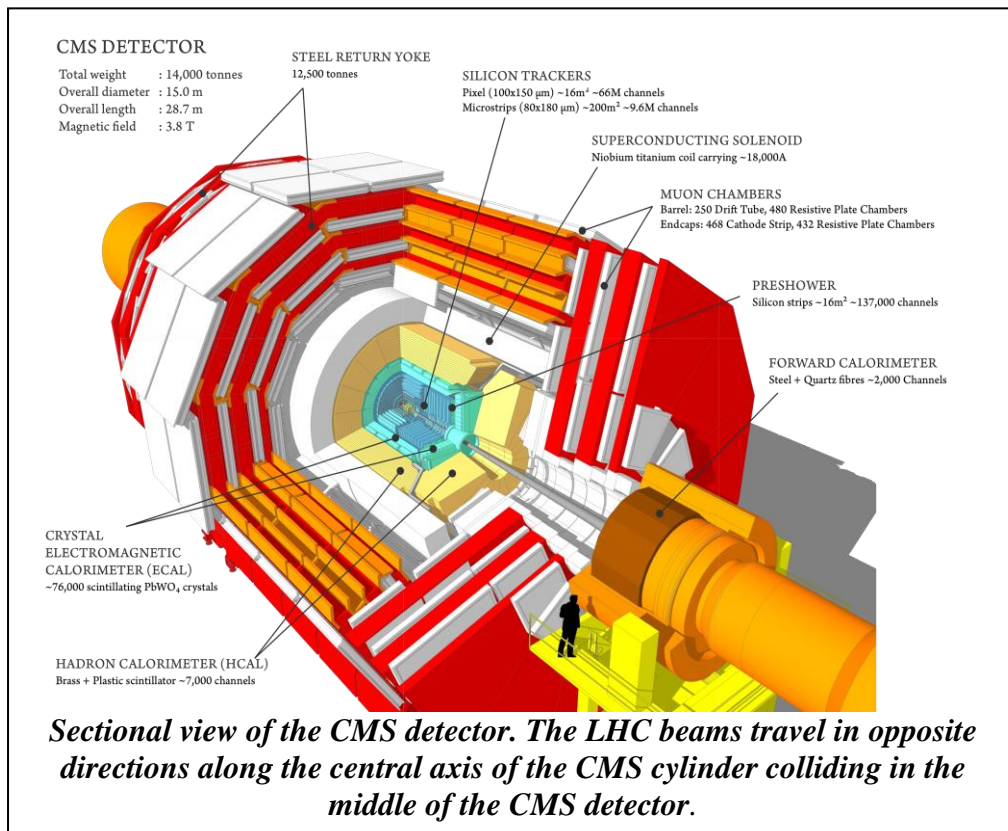
**INTRODUCTION.** Malaysia was officially **accepted into the CMS Collaboration on 20 October 2013**, after a voting by the CMS Board Members in the CMS Meeting in Taiwan recently. The acceptance of Malaysia into the CMS Collaboration is under the umbrella **National Centre of Particle Physics (NCP)**, which is jointly sponsored by **University of Malaya and Academy of Sciences Malaysia**. NCPP will coordinate the activities of Malaysia as member of CMS Collaboration. Malaysia is the 42<sup>nd</sup> country to join CMS Collaboration **at the frontier of research**.

**CMS DETECTORS** consist of layers of material that exploit the different properties of particles to catch and measure the energy and momentum of each one. CMS needed:

- a high performance system to detect and measure muons,
- a high resolution method to detect and measure electrons and photons (an electromagnetic calorimeter),
- a high quality central tracking system to give accurate momentum measurements, and
- a “hermetic” hadron calorimeter, designed to entirely surround the collision and prevent particles from escaping.

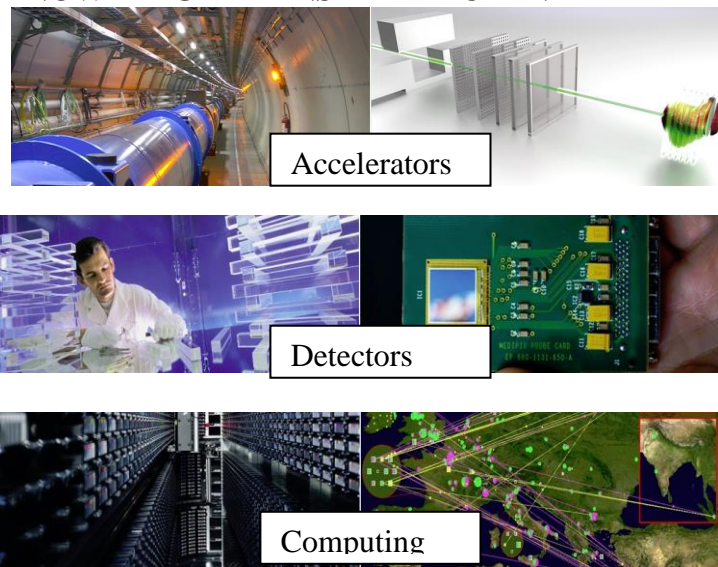
**COMPACT MUON SOLENOID (CMS):**

- is a particle detector that is designed to see a wide range of particles and phenomena produced in high-energy collisions in the LHC
- measure the different particles, and use this key data to build up a picture of events at the heart of the collision.



*This event shows the production of a supersymmetric particle. The decay of the particle is such that every single layer of CMS is needed to detect the full range of emerging particles: electrons, muons, neutrinos and jets. produced by quarks.*

## KNOWLEDGE TRANSFER AT CERN



## PEOPLE STATISTICS:

- 2680 physicists (of which 891 are students)
- 859 engineers
- 281 technicians
- 182 institutes
- 42 countries



*ASM President Tan Sri Datuk Dr Ahmad Tajuddin Ali (right) with Director of National Centre of Particle Physics Prof Dr Wan Ahmad Tajuddin Ali Wan Abdullah at CMS detector in LHC, CERN Switzerland*

