



Engineering and integration of upgraded CMS Tracker services

Code	EP4150
Programme	FCT
Department	EP
Responsible	33762 - Dr. Duccio Abbaneo

Title

Engineering and integration of upgraded CMS Tracker services

Description

The whole CMS tracking system will be replaced in in 2025, in preparation of the High-Luminosity operation of the LHC.

Engineered solutions are required in order to integrate mechanically and functionally all the new Tracker services between the Tracker detectors and patch panels located inside the CMS detector volume.

Tracker services include large numbers of optical fibres, electrical cables, CO₂ cooling lines and environmental sensors. The Tracker detector and associated services volumes have to be sealed and flushed with dry gas to reduce the humidity levels to allow the operation of Inner and Outer Tracker detectors at sub-zero temperatures.

All the mechanical elements included inside the CMS detector have to be designed to be compatible with the limited space and other constraints linked to choice of materials (e.g. low mass, fire-safe, low activation under radiation exposure, high resistance to radiation damage), and attention has also to be given to the requirements and constraints linked with other neighbouring detector sub-systems and mechanical elements in the vicinity of the CMS Tracker and LHC beam-pipe.

The work will be mainly focused on mechanical design activity to develop a variety of components linked with the very dense organization of the services. This work will involve substantial overlap with other disciplines, including applied physics, learning about instrumentation of the particle detectors as well as the effects of radiation on materials.

Skills

Mechanical Engineering: Computer integrated/aided design

Disciplines

Mechanical Engineering

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