



Contribution ID: 31

Type: **not specified**

Mechanical support structure of the CMS Phase-2 Outer Tracker Barrel (TB2S)

Thursday 9 June 2022 09:00 (30 minutes)

The CMS experiment, installed at CERN, benefits from the LHC hadrons collisions for its research studies. In preparation of the upgrade of the accelerator toward high-luminosity conditions, called Phase-2 period, the CMS sub-detectors have to be renewed and their performances improved. In particular its silicium tracker will reach its end of life due to radiation damages at the end of the LHC Run 3. Beside the change of the damaged sensitive parts its concept is also being upgraded to cope with higher tracks multiplicity and larger data rate.

The upgrade of the CMS experiment requires a complete re-building of its tracker. The global architecture will be close to the one of the tracker currently in use: with barrel and end-cap parts. This contribution focuses on the preparation on the mechanical support structure of one of the largest part of the future tracker: the Tracker Barrel with 2S-sensors - sensors with 2 aligned strips sections. This part supports the most outer tracker layers in the barrel region.

The preparation of the construction of this mechanical structure will be discussed. Its design is inspired from the current tracker design but needed adaptations. The mechanical behaviour has been studied with finite elements analyses. The most delicate parts have been prototyped and undergone mechanical test for comparison with the expected performances. The construction process is defined for achieving optimal mechanical precision.

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