Contribution ID: **30** Type: **Oral**

40MHz Readout of CMS Silicon Modules in a High Intensity Beam

Friday, 31 May 2024 18:20 (20 minutes)

In order to maintain its outstanding performance under the challenging conditions brought by the high-luminosity LHC, the CMS collaboration is preparing the production of a new outer tracker detector. The upgraded detector modules will feature two silicon sensors and the ability of reading out correlated clusters, or stubs, compatible with high transverse momentum particles at the full 40 MHz collision rate. With the detector design being finalized and mass production planned to start during the second half of 2024, the scalability of the read-out system and the study of the commissioning and characterization of the detector in realistic conditions are ever-more pressing.

In this context, a joint beam-test was organised in partnership with the MUonE collaboration where twelve modules were placed in an asynchronous muon beam line reaching particle rates of about 50 MHz, with the full stub stream being recorded to disk triggerless. The experiment and read-out chain will be outlined, the commissioning procedures and operational challenges will be discussed and resulting system performance will be presented. From these results, the future prospects for both experiments will be discussed, as well as the milestones reached and still lying ahead before the full systems could be deployed.

Collaboration

CMS

Role of Submitter

I am the presenter

Primary author: MONK, David (Northwestern University)

Presenter: MONK, David (Northwestern University)

Session Classification: Electronics and On-Detector Processing - Oral session

Track Classification: T7 - Electronics and On-Detector Processing