Contribution ID: **335** Type: **Poster**

Towards a precise measurement of particles time-of-flight with the new Mip Timing Detector for the CMS Experiment

Thursday 18 July 2024 20:40 (20 minutes)

The MIP Timing Detector (MTD) of the CMS experiment, currently under construction for the High Luminosity phase of LHC, emerges as a key player in the pursuit of unrivaled temporal precision in particle physics.

The precise measurement of the time-of-arrival of charged particles provided by the MTD enables the implementation of a 4D vertex reconstruction and helps to discriminate interaction vertices within the same bunch crossing, aiming to recover the vertex cross-contamination levels of the current LHC conditions.

In this contribution, we explore the impact of the measured track momentum uncertainty in the time-of-flight determination and its use in the vertex reconstruction and mass hypothesis assignment, shedding light on its potential impact on event reconstruction and classification.

The results presented in this abstract open new avenues for an effective usage of precision timing in pileup mitigation and as a tool to probe new physics with characteristic time structures.

Alternate track

1. Detectors for Future Facilities, R&D, Novel Techniques

I read the instructions above

Yes

Author: PALMERI, Noemi (Sapienza Universita e INFN, Roma I (IT))

Presenter: PALMERI, Noemi (Sapienza Universita e INFN, Roma I (IT))

Session Classification: Poster Session 1

Track Classification: 12. Operation, Performance and Upgrade (incl. HL-LHC) of Present Detectors