

# Precision Timing with the CMS MIP Timing Detector for High-Luminosity LHC

*Tuesday, 28 May 2024 09:30 (20 minutes)*

The Compact Muon Solenoid (CMS) detector at the CERN Large Hadron Collider (LHC) is undergoing an extensive Phase 2 upgrade program to prepare for the challenging conditions of the High-Luminosity LHC (HL-LHC). A new timing detector for CMS will measure minimum ionizing particles (MIPs) with a time resolution of ~30-40 ps for MIP signals at a rate of 2.5 Mhit/s per channel at the beginning of HL-LHC operation. The precision time information from this MIP timing detector (MTD) will reduce the effects of the high levels of pileup expected at the HL-LHC, bringing new capabilities to the CMS detector. The MTD will be composed of an endcap timing layer (ETL), instrumented with low-gain avalanche diodes and read out with the ETROC chip, and a barrel timing layer (BTL), based on LYSO:Ce crystals coupled to SiPMs and read out with the TOFHIR2 chip. In this talk we present an overview of the MTD design and the expanded physics capabilities introduced by MTD, describe the latest progress towards prototyping and production, and show the latest test beam results demonstrating the achieved target time resolution.

## Collaboration

CMS Collaboration

## Role of Submitter

The presenter will be selected later by the Collaboration

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