

12th Beam Telescopes and Test Beams Workshop



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Test beam performance of sensor modules for the CMS Barrel Timing Layer

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The MIP Timing Detector (MTD) is a new sub-detector planned for the Phase 2 upgrade of the Compact Muon Solenoid (CMS) experiment at the CERN LHC. The MTD is designed to measure the time-of-arrival of charged particles with a resolution of 30-60 ps. The precision time information from MTD will reduce the effects of the high levels of pileup expected at the HL-LHC, bringing new capabilities to the CMS detector. The sensor technology chosen for the central part of the MTD, the Barrel Timing Layer (BTL), consists of scintillating LYSO:Ce crystal bars read out by silicon photomultipliers. In this talk, we will present an overview of the BTL design and discuss recent results of beam test campaigns conducted in 2023 at CERN and FNAL on final module prototypes, both non-irradiated and irradiated to a neutron fluence of 2×10^{14} 1MeV n_{eq}/cm^2 , as expected by the end of HL-LHC operations.

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