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Precision timing measurement in CMS

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A new timing detector in CMS will measure minimum ionizing particles (MIPs) with a time resolution of about 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, as well as a barrel timing layer (BTL), based on LYSO:Ce crystals coupled to SiPMs. In this talk we present an overview of the MTD design, describe the latest progress towards prototyping and production, and show test beam results demonstrating the achieved target time resolution.

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