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## Development of Crystal+SiPM Sensors for the CMS MTD Barrel Timing Layer

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As part of the CMS Phase II Upgrade, a new MIP Timing Detector (MTD) will measure minimum ionizing particles with a time resolution of  $\sim 30\text{-}40$  ps and hermetic coverage up to a pseudo-rapidity of  $|\eta|=3$ . The central Barrel Timing Layer (BTL) will be based on LYSO:Ce crystals read out with SiPMs. The BTL will use elongated crystal bars with double-sided read out, with a SiPM on each end of the crystal, in order to maximize detector performance within the constraints of space, cost, and channel count. This unusual geometry enables the instrumentation of large surfaces while minimizing the active area of the photodetectors, and thus noise and power consumption. We will present the extensive R&D studies carried out to optimize the MTD BTL crystal-based technology and will present recent test beam results.

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