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## Development, Characterization and Quality Control of Silicon Photomultipliers for the CMS Barrel Timing Layer

*Thursday 9 October 2025 14:40 (20 minutes)*

The CMS experiment at CERN is adding a new timing detector, the Barrel Timing Layer (BTL), as part of the Phase II upgrade of the detector in preparation for high luminosity running at the LHC. The detector is comprised of more than 160,000 LYSO crystals, each read out at both ends by a Silicon Photomultiplier (SiPM). Our group led the development of the BTL SiPMs and their packaging, including the implementation of small thermoelectric coolers (TEC) to cool the SiPMs during operation and heat them during downtimes to anneal away radiation damage. We were also responsible for the quality control of 50% of the production SiPMs. Results will be shown for more than 180,000 SiPM channels illustrating excellent yield and uniformity of performance across the production, as well as results from radiation and long-term aging studies of a smaller sample of SiPMs.

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