

Abstract Submitted  
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**Thermal Management of the CMS MTD Barrel Timing Layer**

GUILLERMO REALES, CMS Collaboration — The Compact Muon Solenoid (CMS) detector at the CERN Large Hadron Collider (LHC) is undergoing an extensive Phase II upgrade program to prepare for the challenging conditions of the High-Luminosity LHC (HL-LHC). In particular, a new timing layer will measure minimum ionizing particles (MIPs) with a time resolution of  $\sim 30$ ps and hermetic coverage up to a pseudo-rapidity of  $|\eta|=3$ . This MIP Timing Detector (MTD) will include a central barrel timing layer (BTL) based on LYSO:Ce crystals read out with SiPMs. To mitigate the effects of radiation damage to the SiPMs the detector will be operated at temperatures below  $-35$  C. The cooling system is based on evaporative CO<sub>2</sub> cooling. To maximize the geometric detector coverage interfaces of the SiPMs to the cooling infrastructure need to be minimized. We will present detailed studies on the thermal optimization of the BTL detector layout. Detailed simulations of the thermal performance are discussed and compared to tests on prototype setups

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