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ROB performance in a high luminosity scenario

The first layer of the CMS (Compact Muon Solenoid) DT (Drift Tube) readout system is built around the ROBs (Read Out Boards), which are responsible for the time measurement of the chamber signals to allow reconstruction of charged particle tracks with a resolution of 250 μm per cell.

ROB boards have shown an excellent performance during LHC operation and are expected to continue their operation safely during all LHC Phase 1 up to 2022. Present LHC upgrades for Phase 2 foresee an increase of instantaneous luminosity up to $7 \cdot 10^{34} \text{ cm}^{-2} \cdot \text{s}^{-1}$ which will increase significantly the expected hit rate. Moreover, CMS is studying to increase the Level 1 Accept (L1A) latency of the trigger signal from 3.2 μs to 20 μs to allow including tracking subdetector information into the Level 1 trigger decision and also the L1A frequency from 100 kHz maximum to up to 1 MHz, in order to accommodate the increase of trigger rate due to the higher luminosity.

ROB operation under such conditions has been studied and tested in the laboratory and results are presented in this paper.

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