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A proposed DT-seeded muon track trigger for the CMS experiment at the HL-LHC

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The LHC program at 13 and 14 TeV, after the observation of the candidate SM Higgs boson, will clarify future subjects of study and shape the tools needed to carry them on. Any upgrade of the LHC experiments for unprecedented luminosities, such as the HL-LHC ones, must then maintain the acceptance on electroweak processes for a detailed study of the properties of the new particle. In particular, key triggers must allow for an acceptance of low-mass scale processes comparable to the one featured in 2012. In such a scenario, a new approach to early trigger implementation is needed. One of the next major steps is the exploitation of high-granularity tracking sub-detectors, such as the CMS Silicon Tracker, in the early trigger decision. This can be crucial for the confirmation of triggers in other subsystems, and for the improvement of the on-line momentum measurement resolution. A muon track-trigger for the CMS experiment at the HL-LHC is presented. A back-extrapolation of DT trigger primitives is proposed to match tracks found at Level 1 with muon candidates. Given the better momentum resolution of the CMS silicon tracker, the crucial role of the muon trigger will be to provide good spatial information to enhance the association with Level 1 tracks. The main figures-of-merit are presented, featuring sharp thresholds and less contamination from lower momentum muons, and an expected rate reduction of a factor 5 to 10 at typical thresholds with respect to the current algorithm.

Collaboration

CMS

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