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Optimal use of timing measurement in vertex reconstruction at CMS

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The upgrade of the CMS apparatus for the HL-LHC will provide unprecedented timing measurement capabilities, in particular for charged particles through the Mip Timing Detector (MTD). One of the main goals of this upgrade is to compensate the deterioration of primary vertex reconstruction induced by the increased pileup of proton-proton collisions by separating clusters of tracks not only in space but also in time.

This contribution discusses the ongoing algorithmic developments to optimally exploit such new information, going beyond the initial studies at the time of the detector proposal, both from the physics and computational performance point of view. Different possible approaches are evaluated, comparing improvements of traditional methods and innovative techniques.

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