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Particle Flow and PUPPI in the Level-1 trigger at CMS for the HL-LHC

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With the planned addition of the tracking information in the Level 1 trigger in CMS for the HL-LHC, the algorithms for Level 1 trigger can be completely reconceptualized. Following the example for offline reconstruction in CMS to use complementary subsystem information and mitigate pileup, we explore the feasibility of using Particle Flow-like and pileup per particle identification techniques at the hardware trigger level. This represents a new type of multi-subdetector pattern recognition challenge for the HL-LHC. We present proof-of-principle studies on both physics and resource usage performance of a prototype algorithm for use by CMS in the HL-LHC era.

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