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Reconstruction in an imaging calorimeter for HL-LHC

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The CMS endcap calorimeter upgrade for high luminosity LHC in 2025 uses, for the most part, silicon sensors to achieve radiation tolerance, with the further benefit of a very high readout granularity. Developing a reconstruction sequence that fully exploits the granularity, and other significant features of the detector like precision timing, is a challenging task. The aim is for operation in the high pileup environment of HL-LHC. An iterative clustering framework (TICL) is being developed. This takes as input clusters of energy deposited in individual calorimeter layers delivered by an “imaging” algorithm which has recently been revised and tuned to deliver excellent performance. Mindful of the projected extreme pressure on computing capacity in the HL-LHC era the algorithms are being designed with GPUs in mind. In addition, reconstruction based entirely on machine learning techniques is being developed and studied. This talk will describe the approaches being considered and show first results.

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