Connecting The Dots 2020



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Type: Plenary

A novel reconstruction framework for an imaging calorimeter for HL-LHC

Wednesday 22 April 2020 13:50 (15 minutes)

To sustain the harsher conditions of high luminosity LHC in 2026, the CMS experiment has designed a novel endcap calorimeter that uses silicon sensors to achieve radiation tolerance, with the additional benefit of a very high readout granularity. In regions characterised by lower radiation levels, small scintillator tiles with individual SiPM readout are employed. A novel reconstruction approach is being developed to fully exploit the granularity and other significant features of the detector like precision timing, with a view to deployment in the high pileup environment of HL-LHC. An iterative reconstruction framework (TICL) has been put in place, and is being actively developed. The inputs to the framework are clusters of energy deposited in individual calorimeter layers delivered by a density-based algorithm which has recently been developed and tuned. In view of the expected pressure on the computing capacity in the HL-LHC era, the algorithms and their data structured are being designed with GPUs in mind. Preliminary results show that significant speed-up can be obtained running the clustering algorithm on GPUs. Moreover, machine learning techniques are being investigated and integrated into the reconstruction framework. This talk will describe the approaches being considered and show first results.

Consider for young scientist forum (Student or postdoc speaker)

Yes

Second most appropriate track (if necessary)

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Session Classification: Recording sessions