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CLUE: a clustering algorithm for current and future experiments

CLUE (CLUstering of Energy) is a fast parallel clustering algorithm for High Granularity Calorimeters in High Energy Physics. In these types of detectors, such as that to be built to cover the endcap region in the CMS Phase-2 Upgrade for HL-LHC, the standard clusterisation algorithms using combinatorics are expected to fail due to large number of digitised energy deposits (hits) in the reconstruction stage bringing to a consequent memory/timing explosion. This innovative algorithm uses a grid spatial index for fast querying of neighbours and its timing scales linearly with the number of hits within the range considered. Initially CLUE was developed in a standalone repository that allow performance benchmarking with respect to its CPU and GPU implementations, demonstrating the power of algorithmic parallelization in the coming era of heterogeneous computing. Within the CMS experiment, CLUE is not only the official clusterisation algorithm currently in use for the HGCAL local reconstruction, but it was also tested successfully on real test beam data. Recently CLUE was also imported in the key4hep framework and first results will be shown for detectors proposed in future collider projects.

Significance

References

Speaker time zone

Compatible with Europe

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Session Classification: Posters: Raspberry

Track Classification: Track 2: Data Analysis - Algorithms and Tools