Contribution ID : 69

The development of high performance online tracker for High Level Triggering of Muon Spectrometer of ALICE

Content :

The Muon Spectrometer of ALICE (A Large Ion Collider Experiment) has started its operation since the beginning of the LHC era. The major physics goal of the Spectrometer is to study the heavy quark resonances through their muonic decay channel at forward rapidity (2.5<y<4) in the PbPb collisions at LHC. In these collisions, the signals of high transverse momentum dimuons (for instance coming from Upsilon decays) are rare events (expected to be about one in a million for minimum bias Pb-Pb beam) with large amount of background data and therefore, online data processing is necessary to reject the background events before the data is even written to disk. ALICE High Level Trigger (HLT) provides the central facility of parallel computation with the controlled data flow framework to achieve substantial background rejection without any loss of interesting signals. During the real-time processing, the Dimuon part of High Level Trigger (dHLT) will serve the purpose of higher level filtration of interesting events by online track reconstruction, and a typical rejection factor of 5 over the hardware muon trigger. A fast track finding algorithm has been developed for the full Muon Spectrometer, based on Kalman Filter and Cellular Automaton, which can process central PbPb events at the rate of 1 kHz. The development, performance and results of such a fast tracking algorithm will be point of central emphasis.

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Session classification : --not yet classified--

Track classification : --not yet classified--

Type : --not specified--