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The ATLAS Fast Tracker Processing Units - track finding and fitting

Saturday 6 August 2016 18:00 (2 hours)

The Fast Tracker is a hardware upgrade to the ATLAS trigger and data-acquisition system, with the goal of providing global track reconstruction by the start of the High Level Trigger starts. The Fast Tracker can process incoming data from the whole inner detector at full first level trigger rate, up to 100 kHz, using custom electronic boards. At the core of the system is a Processing Unit installed in a VMEbus crate, formed by two sets of boards: the Associative Memory Board and a powerful rear transition module called the Auxiliary card, while the second set is the Second Stage board. The associative memories perform the pattern matching looking for correlations within the incoming data, compatible with track candidates at coarse resolution. The pattern matching task is performed using custom application specific integrated circuits, called associative memory chips. The auxiliary card prepares the input and reject bad track candidates obtained from from the Associative Memory Board using the full precision and a linearized fit. The track candidates from the auxiliary card use only 8 of 12 silicon layers, the track segments are extended to the additional layers by the Second Stage Board. During the first half of 2016, the first Fast Tracker VMEbus Processing Units will be installed in the ATLAS cavern. This talk will summarize the experience with newer associative memory chips and the boards; monitoring/debugging tools, including input/output data rates, track finding efficiency and track fitting results. Comparisons of the different metrics with offline simulation will also be shown.

Presenter: KRIZKA, Karol (University of Chicago (US))

Session Classification: Poster Session

Track Classification: Detector: R&D and Performance