



Contribution ID: 3

Type: **Plenary**

Fast pattern recognition for ATLAS track triggers in HL-LHC

Wednesday, April 22, 2020 3:50 PM (25 minutes)

A fast hardware based track trigger is being developed in ATLAS for the High Luminosity upgrade of the Large Hadron Collider (HL-LHC). The goal is to provide the high-level trigger with full-scan tracking at 100 kHz and regional tracking at 1 MHz, in the high pile-up conditions of the HL-LHC. A method for fast pattern recognition using the Hough transform is investigated. In this method, detector hits are mapped onto a 2D parameter space with one parameter related to the transverse momentum and one to the initial track direction. The performance of the Hough transform is studied at different pile-up values and compared, using full event simulation of events with average pile-up of 200, with a method based on matching detector hits to pattern banks of simulated tracks stored in a custom made Associative Memory ASICs. As a possible way to reduce the number of hit clusters that need to be considered by this system, and taking advantage of the new ATLAS Inner Tracker, the use of track stub finding and extrapolation is investigated. A preliminary discussion of the resulting hit reduction and associated speedup, and any associated performance loss, will be presented.

Consider for young scientist forum (Student or postdoc speaker)

No

Second most appropriate track (if necessary)

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Session Classification: Recording sessions