A TRACK FINDING ALGORITHM FOR A TIME MULTIPLEXED L1 TRACK TRIGGER FOR THE PHASE II CMS EXPERIMENT

CMS Phase II Tracker

Time Multiplexed Trigger Concept
- All data in a single node
- Two Processing Layers (Pre & Main Processors)
- Stub Data ordered before processing
- Concept Architecture based on MP7 board (FPGA Virtex 7)
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Track Finding based on the Hough Transform Method

\[ \phi(r) = \pm \frac{cB}{2p_t} r + \beta \]

HT Basics
Straight lines considered in terms of slope-intercept parameter \((m,c)\)
Point \((x, y) \rightarrow \) Line \((m,c)\)
Line \((x, y) \rightarrow \) Point \((m,c)\)

Track Candidates selected requiring hits in 5+ layers

Algorithm Efficiency vs. PU (ttbar sample)

Filtered Cells in ttbar events

Firmware Implementation