

Abstract Submitted
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A Hardware Track Finder for the ATLAS Trigger System

JEREMY LOVE, Argonne National Lab, ATLAS FTK TEAM — The existing ATLAS three tier trigger system reduces the event rate from 40 MHz to ~ 400 Hz, at the LHC design luminosity of 10^{34} cm⁻² s⁻¹. After the upgrades of Long Shutdown 2, the LHC will deliver luminosities beyond the design specification. The increasing luminosity will lead to larger event sizes and will require more sophisticated trigger algorithms to reduce backgrounds and maintain bandwidth limitations. These issues are most difficult to handle for the Level-2 trigger system. The ATLAS Fast TrackFinder (FTK) is a hardware trigger designed to operate at the full Level-1 accept rate of 100 KHz and provide high quality tracks to the Level-2 trigger system. FTK performs track reconstruction in custom electronics with massive parallelism of associative memories and FPGAs. An overview of the FTK system design will be presented along with the latest R&D prototype progress of the individual components. Recent results on the performance impact for important physics areas including b-tagging, lepton isolation, tau-tagging, and primary vertex finding will be shown from ATLAS MC simulation studies for different LHC luminosities.

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