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The global feature extractor: A new component of the Level-1 Calorimeter trigger Phase-I upgrade for the ATLAS experiment

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The global feature extractor (gFEX) is a component of the Level-1 Calorimeter trigger Phase-I upgrade for the ATLAS experiment. This new high-speed electronics system is intended to identify patterns of energy associated with the hadronic decays of high momentum Higgs, W, & Z bosons, top quarks, and exotic particles in hard real time at the LHC crossing rate. The single board is packaged in an Advanced Telecommunications Computing Architecture (ATCA) module and implemented as a fast reconfigurable processor based on three Xilinx Vertex Ultrascale+ FPGAs, along with a Xilinx Zynq Ultrascale+ Multi-Processor System on Chip (MPSoC). The board will receive coarse-granularity information from all the ATLAS calorimeters on optical fibers with the data transferred at the 40 MHz Large Hadron Collider (LHC) clock frequency. The gFEX is controlled and monitored by the Zynq MPSoC which configures the processor FPGAs, implements a Linux operating system, as well as the on-board Detector Control System, as well as provides an interface to external signals. This talk will focus on the design of the gFEX system, its commissioning, installation, and integration tests with ATLAS, as well as the expected physics impacts of the new approach to triggering for the ATLAS experiment.

In-person participation

Yes

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