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gFEX, the ATLAS Calorimeter Level 1 Real Time Processor

Monday, 13 April 2015 15:00 (15 minutes)

The global feature extractor (gFEX) is a component of the Level-1 Calorimeter trigger Phase-I upgrade for the ATLAS experiment. It is intended to identify patterns of energy associated with the hadronic decays of high momentum Higgs, W, & Z bosons, topquarks, and exotic particles in real time at the LHC crossing rate. The single processor board will be implemented as a fast reconfigurable processor based on four largeFPGAs. The board will receive coarse-granularity information from all the ATLAS calorimeters on 264 optical fibers with the data transferred at the 40 MHz LHC clock frequency. The gFEX will be controlled by a single system-on-chip processor, ZYNQ, that will be used to configure FPGAs, monitor board health, and interface to external signals. Although the board is being designed specifically for the ATLAS experiment, it is sufficiently generic that it could be used for fast data processing at other HEP or NP experiments. We will present the design of the gFEX board and discuss how it is being implemented.

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