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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. It 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 real time at the LHC crossing rate. The single processor board is packaged in an Advanced Telecommunications Computing Architecture (ATCA) module and implemented as a fast reconfigurable processor based on three Xilinx Vertex Ultra-scale FPGAs. 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 by a single system-on-chip processor, ZYNQ, that will be used to configure all the processor Field-Programmable Gate Array (FPGAs), monitor board health, and interface to external signals. This talk will focus on the design of the gFEX and its integration tests with ATLAS.

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