Study of Topocluster Position Resolution in Firmware for the Global Event Processor for the HL-LHC Upgrade of the ATLAS Trigger System STEPHEN RACZ, BEN CARLSON[1], TAE HONG[2], University of Pittsburgh — To mitigate the effects of pileup in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector at the High-Luminosity LHC (HL-LHC), several pileup suppression algorithms are considered for implementation in the Phase II Global Event Processor (GEP). Many of these algorithms require sorting the topocluster energy clusters into local neighborhoods. This can be done via applying a grid to the topocluster data in eta-phi space. This study discusses the ability to optimize this grid application in firmware through various methods. A generalized binning algorithm and a linear transformation method were tested. The study found that a uniform grid is best instantiated with a linear transformation method, which can be instantiated through bit-shifting operations.

[1]supervisor
[2]supervisor

Stephen Racz
University of Pittsburgh

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