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SpinQuest/E1039 FPGA Trigger

Tuesday, 25 August 2020 10:45 (15 minutes)

The SpinQuest(E1039) experiment is designed to extract the u-bar and d-bar Sivers functions through azimuthal asymmetry measurements of Drell-Yan induced dimuon pairs from 120 GeV/c proton beam interaction with polarized nucleon targets. A large combinatorial muon background produced in the beam dump magnet requires a trigger which identify dimuon pairs produced from the target in a high rate environment. The trigger system consists of four stations of scintillator hodoscopes whose 96 channels are digitized and processed by field-programmable gate array (FPGA) based VMEbus modules. Hodoscope hit patterns are compared to predetermined sets, chosen from Monte Carlo simulations, in a tiered lookup table to generate trigger decisions. The design and current status of the FPGA trigger as well as ongoing and planned upgrades to the trigger logic study will be presented.

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