Abstract Submitted
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E-1039 FPGA Trigger[1] NOAH WUERFEL, University of Michigan, SPINQUEST COLLABORATION — The SpinQuest (Fermilab E-1039) experiment will measure an azimuthal asymmetry in the Drell-Yan production of μ^+ μ^- pairs from 120 GeV/c proton interactions with polarized nucleons to extract the Sivers function for $\bar{u}$ and $\bar{d}$. A large combinatorial background from muons produced in the beam dump requires a trigger which is capable of identifying dimuon pairs originating 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. TDC outputs can be adjusted channel-by-channel in 1-ns steps for realignment with the beam RF clock. 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 are presented and planned upgrades to the trigger logic discussed.

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