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Radiation Hardness of Trigger Electronics[1] IRENE ZAWISZA, Cyclotron Institute, Texas A&M University, ALEXEI SAFONOV, JASON GILMORE, VADIM KHOTILOVICH, Dept. of Physics & Astronomy, Texas A&M University — As the maximum intensity of particle accelerators increases, probing the most basic questions of the Universe, detectors and electronics must be designed to insure reliability in high-radiation environments. As the Large Hadron Collider (LHC) beam intensity is increased, it is necessary to upgrade the electronics in the Compact Muon Solenoid (CMS). To select interesting events, CMS utilizes fast electronics, which are installed in the experimental cavern. However, much higher post-upgrade levels of radiation in the cavern set tight requirements on the radiation hardness of the new electronics. Damaging effects of high and low energy radiation leads to disruption of digital circuits and accumulated degradation of silicon components. Quantifying the radiation exposure is required for the design of a radiation-tolerant system, but current simulation studies suffer from large uncertainties. We compare simulation predictions with measured performance in two different experimental studies, which evaluate component performance for pre and post irradiation determining the survivability of electronics in the harsh CMS environment.

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