

Abstract for a General Audience

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Gamma ray observations provide a wealth of information that astrophysicists can use to learn about the most energetic physical phenomena in the Universe. The Cherenkov Telescope Array (CTA) will be the largest and most powerful ground based gamma-ray observatory ever constructed when it is completed in 2020. Integral in the electronics systems that will be used by CTA telescopes to collect scientific data are the front end electronics which have the jobs of digitizing the data so that it can be transmitted to a computer for analysis and also sending a signal to trigger the readout of the data if it meets certain criteria. TARGET-7 is a proposed solution for the front end electronics of some CTA telescope prototypes and extensive research was carried out by the author over the summer of 2014 at SLAC National Accelerator Laboratory to characterize the performance of the triggering function. The studies resulted in the discovery that TARGET-7 does not meet some of the criteria regarding triggering that CTA requires to accomplish scientific goals. Further study revealed the cause of this to be a coupling between the sampling and triggering functions that are intrinsic to the design of TARGET-7. Thus, a new design will be needed for CTA applications. Research and development of a new design is ongoing and will certainly feature a separation of the triggering and digitizing processes..