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Early test of photosensors in high rate environment for gas Cherenkov JUNQI XIE, CHAO PENG, SYLVESTER JOOSTEN, ZEIN-EDDINE MEZIANI, Argonne National Laboratory, ALEXANDRE CAMSONNE, MARK JONES, Thomas Jefferson National Accelerator Facility, EDWARD KACZANOWICZ, MELANIE REHFUSS, NIKOLAOS SPARVERIS, Temple University, MICHAEL PAOLONE, New Mexico State University, MICHAEL FOLEY, MICHAEL MINOT, MARK POPECKI, Incom, Inc. — The upcoming SoLID experiment at Jefferson Lab will push the intensity frontier for a large-acceptance detector, requiring the use of a light-gas Cherenkov detector for trigger-level event selection. It is essential to validate the planned photosensors and readout electronics in high rate environment to determine the limits of these sensors and mitigate the risk of failure of the trigger-level event selection. We report a set of early studies of available photosensors and electronics using a small prototype telescopic Cherenkov device. Commercially available multi-anode photomultipliers (MaPMT) and low-cost large-area picosecond photodetectors (LAPPD) were tested with the JLab FADC250 modules for the data acquisition to assess their performance in such an environment. The experiment results show that both an MaPMT array and an internal stripline LAPPD could detect the Cherenkov signals and resolve single-electron events and pair production events. A GEANT4 simulation confirms the experimental performance of the prototype results through direct comparison. Detailed experiment results will be presented and suggested future tests will be discussed.

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