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Cryogenic Testing of CRYO ASIC for Photon Readout

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Integrating cryogenic readout electronics directly into large noble liquid detectors offers reduced front-end noise and minimized detector backgrounds, thus enhancing sensitivity for rare event searches. The CRYO ASIC is a compact 7 mm × 9 mm System-on-Chip (SoC) waveform digitizer and serializer specifically designed for cryogenic operation. The ASIC interfaces directly with signals from time projection chambers (TPCs) and transmits digitized data to the data acquisition (DAQ) system with low power dissipation. While primarily designed for charge readout, the CRYO ASIC can be used for cryogenic readout for large area silicon photomultipliers (SiPMs). In this talk, we present characterization results of SiPM readout using the CRYO ASIC. These results demonstrate that the ASIC can support scalable and low-noise photon detection for next-generation rare event search experiments.

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