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P1.67: UniCorn –a universal readout system for ColorPix-2 ASIC

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Silicon photon counting pixel detectors suffer from low absorption efficiency in the gamma spectrum. Therefore, a high-Z material such as CdTe/CZT is frequently used as the sensing material as its absorption efficiency is much higher than silicon sensors. However, these sensors suffer from the charge-sharing effect and secondary fluorescent photons with long mean free paths, which deprive the incident photons of energy. To compensate for these effects, we have developed the ColorPix-2 test ASIC with built-in charge sharing and hit allocation algorithm that compensate for these effects. The pixel matrix of the ColorPix-2 is 32 x 32 pixels. The ASIC consists of several blocks, such as an internal bandgap reference from which the reference currents for tuning DACs are derived, setting the operating point of the analog front-end electronics. A 3.2 Gbps serial readout system with CML logic to read data from the pixel matrix.
A new readout system called UniCorn has been developed to acquire data from the detector. The readout system consists of a computer running a UniCorn application connected to an Artix-7 FPGA via USB 3.0. The FPGA is responsible for ASIC configuration and data readout. The system is capable of working at readout speeds of 3.2 Gbps. First results of the ASIC testing will be presented.

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