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The Speedster-EXD - A New Event-Triggered Hybrid CMOS X-ray Detector CHRISTOPHER GRIFFITH, ABE FALCONE, ZACH PRIESKORN, DAVID BURROWS, Pennsylvania State Univ — We present the characterization of a new event driven x-ray hybrid CMOS detector developed by Penn State University in collaboration with Teledyne Imaging Sensors. Hybrid CMOS detectors currently have many advantages over CCDs including lower susceptibility to radiation damage, lower power consumption, and faster read-out time to avoid pile-up. The Speedster-EXD hybrid CMOS detector has many new features that improve upon the previous generation of detectors including two new in-pixel features that reduce noise from known noise sources: (1) a low-noise, high-gain CTIA amplifier to eliminate interpixel capacitance crosstalk and (2) in-pixel CDS subtraction to reduce kTC noise. The most exciting new feature of the Speedster-EXD is an in-pixel comparator that enables read out of only the pixels which contain signal from an x-ray event. The comparator threshold can be set by the user so that only pixels with signal above the set threshold are read out. This comparator feature can increase effective frame rate by orders of magnitude. We present the read noise, dark current, interpixel capacitance, energy resolution, and gain variation measurements of two Speedster-EXD detectors.

Christopher Griffith
Pennsylvania State Univ

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