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AstroPix: HV-CMOS monolithic active pixel sensors for gamma-ray observatories

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A next-generation gamma-ray observatory operating in the medium-energy gamma-ray band (˜100 keV to 100 MeV) will provide crucial capabilities needed to identify and classify multi-messenger sources and to probe the explosive and energetic processes in the universe including relativistic jets and gamma-ray bursts. Advancements in tracker detector technologies and instrument design are critical for the operation of gamma-ray observatories searching for transients in the medium-energy gamma-ray regime. AstroPix is a high-voltage CMOS monolithic active pixel sensor under development for next-generation Compton and pair-production imaging telescopes. AstroPix detectors possess a large dynamic energy range (25-700 keV) with high spatial (500 x 500 um^2) segmentation and spectral (<10% FWHM at 60 keV) resolution. The 2x2 cm^2 AstroPix detector digitizes photon and charged particle interactions on-chip and is optimized for low power consumption, targeting <1.5 mW/cm^2. Command and data handling is managed through chip-to-chip communication and simplifies large-scale detector plane integration. Improvements to the AstroPix design continue, primarily seeking to achieve full pixel depletion (500 um thick) and to further reduce power consumption. In this talk, I will discuss the continued progress in AstroPix detector development and highlight recent testing and calibration efforts.

Eligibility for "Best presentation for young researcher" or "Best poster for young researcher" prize

Yes

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