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Develoepment of the AstroPix HV-CMOS active pixel sensor for AMEGO-X

AMEGO-X is planned as a satellite to explore all-sky medium energy gamma-ray observation. MeV gamma-ray observation is important for multi-messenger astronomy. AMEGO-X detector is based on the Si-stacked Compton camera and currently developped AstroPix is considered as Si sensors.
AstroPix is a novel high-voltage CMOS active pixel sensor. AstroPix has to be 0.5 mm thick and active full depletion. Also the energy resolution must be $< 10\%$ (FWHM) at 122 keV and the pixel pitch should be 0.5x0.5 mm2. Furthermore, the power consumption must be <1.5 mW/cm2. AstroPix has been developed to incrementally upgrade the chip design towards fulfilling the requirements for AMEGO-X and so far 4 version designs have been fabricated. The third version of AstroPix reached the target pixel pitch with a mean energy resolution of 6.2 keV (FWHM) at 59.5 keV. The latest version 4 is now evaluated in terms of such as I-V curve, noise performance, energy calibration/resolution, dynamic range, and depletion depth. We report the current status of AstroPix testing.

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