

Development of trigger-mode fine-pitch silicon hybrid detectors for electron tracking Compton camera

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Compton imaging is an important gamma-ray imaging method with wide-band energy measurement and large field-of-view in medical, astrophysics and environmental applications. One of the drawbacks of Compton imaging is its low signal to noise ratio (SNR) and electron tracking of Compton recoil electrons may help to improve SNR to limit the Compton cones to Compton arc. We have designed and fabricated a fine-pitch (18 μm) pixel hybrid silicon detectors by combining 18 μm pixel silicon sensor (450 μm thickness) and pixel ASIC (5 mm x 5 mm) fabricated with TSMC 250 nm CMOS technology using micro-bumps. ASIC includes the function to generate trigger for readout of the electron track and synchronize with the absorbers in Compton camera. Basic performance of the detector will be reported in the conference.

Your name

Kenji Shimazoe

Institute

The University of Tokyo

Email address

shimazoe@g.ecc.u-tokyo.ac.jp

Authors: TAKEDA, Ayaki (University of Miyazaki); Mr MATSUNAGA, Daisuke (Horiba); SHIMAZOE, Kenji (The University of Tokyo); MOTOYOSHI, Makoto; UENOMACHI, Mizuki (Kyoto University); OKUBO, Yuji (Horiba); AOYAMA, junichi (Horiba); SATOH, setsuo (KEK)

Presenter: SHIMAZOE, Kenji (The University of Tokyo)

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