

Development and characterization of the latest X-ray SOI pixel sensor for a future astronomical mission

Tuesday, 4 September 2012 14:40 (20 minutes)

We have been developing a novel active pixel sensor, X-ray SOIPIX (Silicon-On-Insulator Pixel Sensor), for a future X-ray astronomical mission.

It offers wide-band and high-time-resolution imaging spectroscopy with a low non-X-ray background rate. The most distinguished feature of X-ray SOIPIX is an intra-pixel trigger system for the timing detection. We have so far demonstrated that prototypes have the 10 us time resolution with the trigger system and the full depletion layer of 250 um.

A new prototype, named XRPIX2, has been produced in 2012.

It consists of two different size pixel arrays for evaluation of the design; one is 30 um pixel pitch with the format of 144 x 64 (small pixel array), and the other is 60 um pixel pitch with the format of 72 x 36 (large pixel array).

We increased the sense-node gain with reducing the parasitic capacitance in both pixel size arrays.

In order to improve the charge collection efficiency, we applied multi-via structure in the part of the large pixel array.

We will talk about the detailed design and characterization of XRPIX2.

Primary author: Mr NAKASHIMA, Shinya (Kyoto Univ.)

Co-authors: Dr IWATA, Atsushi (A-R-Tec Corp.); Mr TAKEDA, Ayaki (KEK); Dr ICHIMIYA, Ryo (KEK); Mr RYU, Syukyo (Kyoto Univ.); Mr OHMOTO, Takafumi (A-R-Tec Corp.); Prof. TSURU, Takeshi (Kyoto Univ.); Mr IMAMURA, Toshifumi (A-R-Tec Corp.); Dr MIYOSHI, Toshinobu (KEK); Prof. ARAI, Yasuo (KEK); Ms IKEMOTO, Yukiko (KEK)

Presenter: Mr NAKASHIMA, Shinya (Kyoto Univ.)

Session Classification: Session4

Track Classification: X-ray imaging applications - Astronomy