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Reducing the cross-talk between the sensor and circuit layers in the Kyoto's X-ray Astronomical SOIPIXs

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We have been developing X-ray SOIPIXs, "XRPIX", for future X-ray astronomy satellites based on the silicon-on-insulator (SOI) CMOS technology. XRPIX is equipped with a function of "event-driven readout", which allows us to read out the hit pixels only in order to realize a high time resolution better than 10micro sec. Current version of XRPIX suffers from significant degradation of the readout noise in the event-driven readout mode compared with that in the frame readout mode, in which all the pixels are read out serially. Previous studies have clarified that it is due to cross-talks between buried P-well (BPW) in the sensor layer and in-pixel circuits in the circuit layer. Thus, we newly developed Double SOI (DSOI) type of XRPIX and reduce the cross-talks. The DSOI wafer has an additional silicon layer working as an electrical shield between the BPW and the in-pixel circuits. We confirmed successful reduction of the cross-talk by observing the analog waveform of the pixel circuit. We will give results on the X-ray performance in the presentation.

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Session Classification: After dinner POSTER session, with drinks: (All presenters are requested/encouraged to attend their posters; All participants are requested to participate the session, with drinks!)

Track Classification: Pixels (incl. CCD's) - X-ray imaging