

## X-ray polarimetry and spectroscopy with the CMOS detector IU233N5-Z

X-ray and gamma-ray polarimetry are essential tools for studying the radiation mechanism of high-energy astrophysics. However, there are few such observations. The CMOS is a detector with better spatial and time resolutions compared to CCD. Then, we focused on a small pixel-size CMOS detector IU233N5-Z. That CMOS detector is an optical sensor with 1 million pixels and a small size ( $1.12 \times 1.12 \mu\text{m}^2$ ). To evaluate the X-ray spectral performance, we irradiated the X-ray sources ( $^{55}\text{Fe}$ ,  $^{57}\text{Co}$  and  $^{241}\text{Am}$ ) to CMOS at room temperature and obtained values of FWHMs (e.g.,  $\text{FWHM}@5.9\text{keV} = 180 \text{ eV}$ ). These are a similar resolution to that of a CCD detector. In addition, from the Fe result, we obtained the depletion layer of the IU233N5-Z as  $6 \mu\text{m}$ . Also, to evaluate the X-ray polarimetry, we irradiated  $^{90}\text{Sr}$  and observed the electron tracks as long as 30 pixels  $\sim 30 \mu\text{m}$ . Furthermore, we beamed the polarized X-ray (15, 30, 50, and 70 keV) at SPring-8. From these measurements, we also observed tracks of the photoelectrons and found the indication of the X-ray polarization from the event directions. In this presentation, we will discuss these results.

### Submission declaration

Original and unpublished

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**Track Classification:** Pixel sensors for tracking