



- RAY ASTRONOMY 2019

Current Challenges and New Frontiers in the Next Decade

8-13 September 2019
CNR/INAF Research Area, Bologna, Italy

Contribution ID: 125

Type: **Poster**

X-ray Imaging Polarimetry with a 2.5 μm Pixel CMOS Sensor for Visible Light at Room Temperature

Friday, 13 September 2019 20:02 (2 minutes)

We demonstrate that a CMOS pixel sensor with a pixel size of 2.5 μm can work as a photo-electron tracking X-ray polarimeter. Although it is designed for visible light by GPixel Inc., we succeed in detecting X-ray photons with an energy resolution of 176 eV @5.9 keV (FWHM) at room temperature. This performance is remarkable considering that conventional X-ray CCD detectors need to be cooled down to -100°C to detect X-rays in the photon counting mode. We irradiate a polarized X-ray beam to this CMOS sensor with various rotation angles in SPring-8, the synchrotron radiation facility in Japan, to evaluate its polarimetry sensitivity. Modulation factors obtained from the number ratio of the double pixel events with different split directions are $7.63 \pm 0.07\%$ and $15.5 \pm 0.4\%$ at 12.4 keV and 24.8 keV, respectively. These results show this CMOS sensor can measure X-ray polarization with the highest spatial resolution ever. We discuss possible applications for future missions of this type of sensors.

Topic

Future missions

Affiliation

Osaka University

Primary author: ASAKURA, Kazunori (Osaka University)

Co-authors: NODA, Hirofumi (Osaka University); Prof. MATSUMOTO, Hironori (Osaka University); Dr NAKAJIMA, Hiroshi (Kanto Gakuin University); Prof. TSUNEMI, Hiroshi (Osaka University); Prof. AWAKI, Hisamitsu (Ehime University); HAYASHIDA, Kiyoshi (Osaka University); Mr OKAZAKI, Koki (Osaka University); Mr IDE, Shuntaro (Osaka University); Mr HANASAKA, Takashi (Osaka University); YONEYAMA, Tomokage (Osaka University)

Presenter: ASAKURA, Kazunori (Osaka University)

Session Classification: POSTER SESSION