

Performance Verification and Calibration of the Soft X-ray Imager aboard ASTRO-H

Thursday 5 September 2013 14:20 (20 minutes)

We are developing the Soft X-ray Imager (SXI) on-board the ASTRO-H satellite, which is planned to be launched in 2015. The SXI consists of four CCDs arranged in a 2 by 2 mosaic and covers a wide field-of-view 38' by 38'. Since the CCDs are P-channel back-illuminated type and have the depletion layers of ~200 micrometers, the SXI has high quantum efficiency for X-rays in the wide range of 0.4-12 keV. In order to restore degradation of charge transfer efficiency (CTE), which results from charge traps generated by cosmic rays in orbit, artificial charges are injected into given pixels from the serial registers attached to the top of each column (CI). The CCDs are operated at low temperature of -120 degrees Celsius, which also suppresses the CTE degradation.

We carried out a performance verification by using the engineering model (EM) system developed before the flight model (FM). For the CI technique, uniform charges of $\sim 10^5$ e⁻ were injected into rows at regular intervals. The measured readout noise and energy resolution are 7 e⁻ (rms) and 150 eV (FWHM) at 6 keV, respectively. Charge transfer efficiency is about 10^{-6} per transfer.

We are constructing the FM system and will perform calibrations of response, gain, uniformity of the quantum efficiency. We will present the results on the experiments of the SXI EM and FM systems.

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Session Classification: Session 7

Track Classification: Applications in Space, Medical, Biology, Material Sciences