

Progressively damage in X-ray CCDs onboard HAYABUSA XRS

Masatsuna Iwasaki[1]; Tatsuaki Okada[2]; Kei Shirai[3]; Hiroaki Shiraishi[2]; Yukio Yamamoto[2]; Takehiko Arai[2]; Kazunori Ogawa[4]; Manabu Kato[2]

[1] Earth and Planetary , titech; [2] ISAS/JAXA; [3] ISAS; [4] Dept. of Earth and Planetary Sci., Titech.

The asteroid explorer Hayabusa was launched from Uchinoura on 9 May 2003. It carries XRS(X-ray fluorescence spectrometer) to observe the major element on the surface of ITOKAWA. XRS consists of two components, one is composed of four charge coupled devices (CCDs) that see ITOKAWA. And the other is composed of 1 CCD that sees standard sample which compound of the C1 chondrite and basalt to calibrate the strength between Solar X-ray and fluorescence X-ray.

This CCDs had been developed by Hamamatsu Photonics K.K. It has a large effective sensor area (effective area 25cm^2) and a very high energy resolution(160eV @ 5.9keV).

We examined CCDs for relatively long time degradation level by using 'CCDs-image' data in cruising phase.

As a result, we find this CCDs has degradation more or less before arriving ITOKAWA. In this presentation, we evaluated the increase of hotpixel, dark current, transfer noise and read out noise, assuming gain remained consistent.

And we report another peculiar problem of Hayabusa XRS. The collimator was installed to limit of XRS field view(3.5deg , 3.5deg) in front of the main component. From CCDs-image data, it was clarified that the stripes of the collimator appeared in the CCDs image. In this presentation, we report the reasons why these strips appeared.