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1 Overview

We announce a possible flux variation of XIS data taken after Dec. 18th, 2009, 2010. The inaccuracy in the pointing control along the DET-X axis may cause a change of the XIS effective area of ∼10–20% at the HXD nominal position. A smaller change may also result at the XIS nominal position.

2 Modulation of the count rate

Since launch, the 3-axis attitude control using the Inertial Reference Unit (IRU) had been done with the combination of IRU-X/Z/S1. We then switched over from the IRU-S1 to S2 at 03:21 on 18th, December 2009. The IRU-S2 or S1 controls the attitude in the DET-X direction while the IRU-X controls the attitude in the DET-Y direction. Since the switch, we have found that the accuracy of the attitude control along the DET-X axis became worse than previous by roughly a factor of two, though it has been different from observation to observation (see Figure 1 in suzakumemo 2010-04).

The pointing direction is corrected on the ground to within the calibration uncertainties. The calibration error of the pointing direction correction is larger for the data taken between December 18th, 2009 and June 15th, 2010, while it is smaller for those after June 15th, 2010. The image is reconstructed before the data are distributed to the users.

It is also notable that the count rate of the XIS detector varies by up to a few tens of percent. The variability is larger for sources pointed off-axis of the XRT-Is. This is because the variability results from a change of the effective area. The XRT vignetting function is smooth on-axis while sharp off-axis (suzakumemo 2008-05).

Unfortunately the change of the count rate can not be corrected in the processing. Therefore, users might see a variation of the XIS count rate with the 96min period of the satellite orbit.

Figure 1 and 2 show simulated lightcurves for two revolutions using attitude files of two different observations. The lightcurve simulated at the HXD nominal aimpoint is modulated by 10–20% in Figure 2 while less in Figure 1. The lightcurves at the XIS nominal are less modulated both in Figures 1 and 2.

If users see modulated lightcurves such as in Figure 1, please consider the possibility that the variation of the count rate might be artificial. Unfortunately, the lightcurves of the sources that **were observed after Dec. 18th, 2009 AND were targeted at the HXD nominal aimpoint**, may show this *artificial* variability. It is not expected for the sources at the XIS nominal position.

If you want to correct the modulation of the count rate with the 96-min period, we encourage you to consider the following analysis steps.

1. For spectral analysis:
   Please run the arf generator xissimarfgen with the option of the attitude(=???.att). The xissimarfgen calculates the variation of the effective area and outputs the arf file that takes into account the effective area variation.

2. For temporal analysis:
   Please use the xissim tool to simulate the effective area variation with the options of the attitude and the gtifile. We will announce a recipe for the correction of the light curve in future.

Acknowledgment

We thank Mr. C. Baluta for English correction of the original writing.

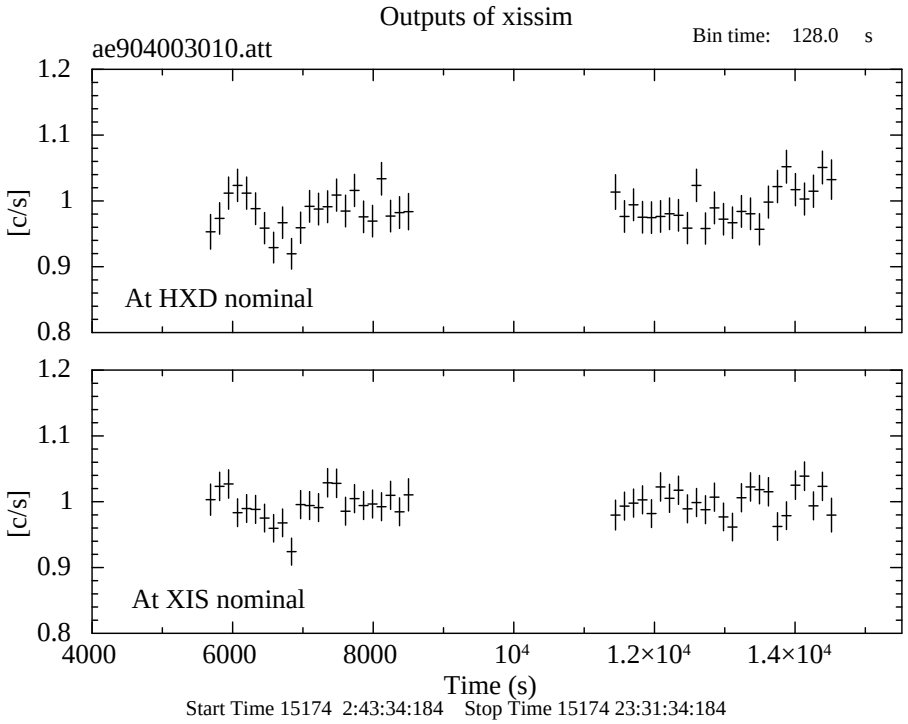

Figure 1: Simulated lightcurves using the attitude file for 3C 454.3 at the HXD (upper) and XIS nominal positions (lower). The observation was made at 2009-12-09 before the IRU-S2 is activated.

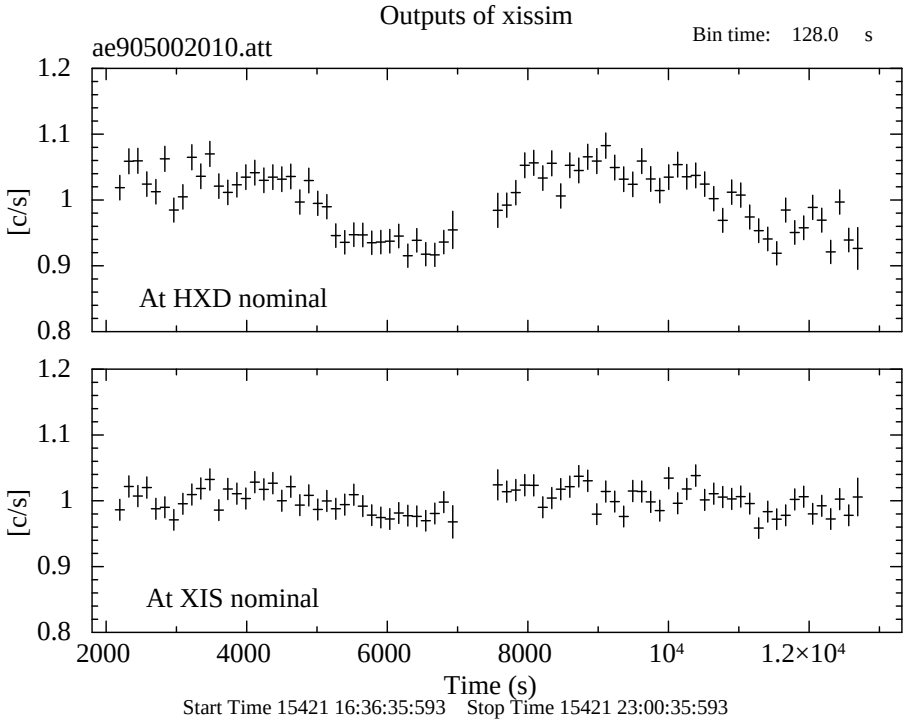

Figure 2: Same as those in Figure 1 but for GX 304−1. The observation was made at 2010-08-13 after the IRU-S2 is activated.

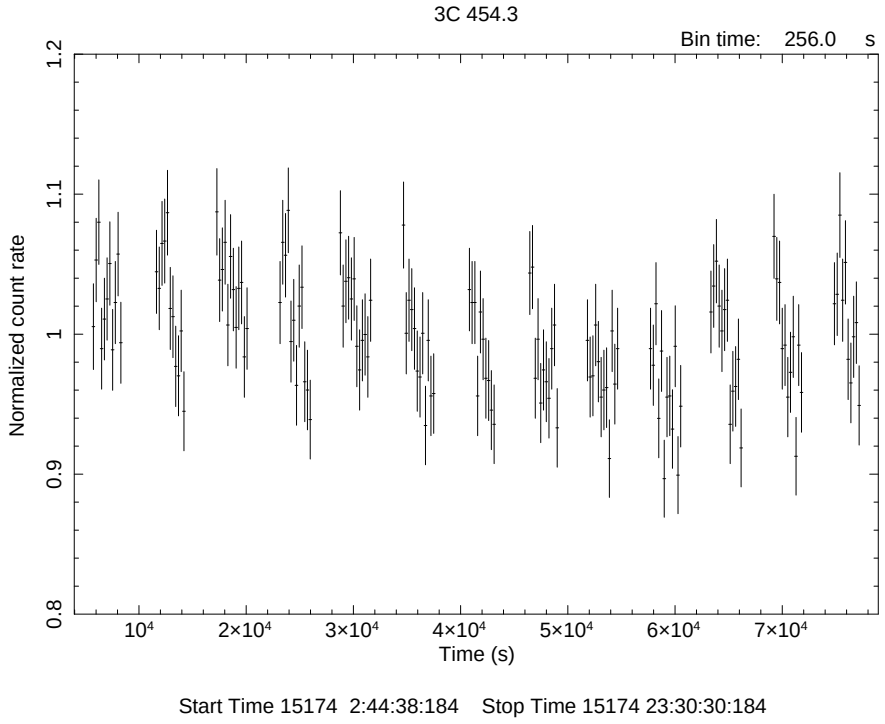

Figure 3: An example of the light curve of the data taken at the HXD nominal position with the full window option. The average of the count rate is normalized to unity. The target is 3C 454.3.