

XMM-Newton CCF Release Note

XMM-CCF-REL-246

Correction to the long-term CTI for pn Large Window, Small Window and Fast Modes

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1 CCF components

Name of CCF	VALDATE	List of Blocks changed	Change in CAL HB
EPN_CTI_0019	2000-01-01T00:00:00	LONG_TERM_CTI	NO

2 Changes

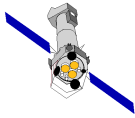
2.1 Reasons for this update

Issue#17 of the EPN CTI CCF included a refinement of the long-term CTI correction for Full Frame and Extended Full Frame modes. However, the value of the 3rd element of the vector column `T_COEFF` of the extension `LONG_TERM_CTI` was accidentally (and erroneously) changed from -1.4×10^{-6} to -1.4×10^{-7} in Rows#25 to #39. These rows correspond to the following modes: Large Window, Small Window, Timing, Burst, which should not have been affected by this CCF update.

The CCF described in this Release Note corrects this error.

3 Scientific Impact of this Update

The error can have a significant impact on the determination of line energies in exposures taken in one of the aforementioned modes, if pn data are reduced with CTI CCF Issues#17 and #18. Shifts by $\simeq 60$ eV in the determination of the centroid energy have been reported for the Fe K_{α} line in



NGC 4151 (Obs.#0402660201; Small Window Mode) with respect to the measurements yielded by the MOS cameras in the same observation, or to historical measurements of the same observable.

4 Estimated Scientific Quality

This CCF update will allow to recover the nominal accuracy in the energy reconstruction for pn Imaging Modes observations: ± 10 eV (cf. the EPIC Calibration Status Document).

5 Test procedures & results

The new CCF component has been visually inspected with the FTOOLS `fv` and `ftdiff` to ensure that:

- the values of Row#25 to Rows#39 in the 3rd component of the vector column `T_COEFF` in the extension `LONG_TERM_CTI` are all -1.4×10^{-6}
- that the only difference between Issue#18 and Issue#19 is related to the values mentioned in the bullet above

Moreover, it has been checked that Issue#19 yields the same long-term CTI correction for Full Frame and Extended Full Frame Modes as Issue#17.

In Fig. 1 the Fe K_{α} line measured by the pn camera in Obs.#0402660201 is compared for three versions of the EPN CTI CCF: a) Issue#16 (black); b) Issue#17 (red); Issue#19 (green). The comparison shows that this update recovers the proper CTI correction.

6 Expected Updates

A strategy to improve the long-term CTI correction for Large Window, Small Window and Fast Modes is under study.

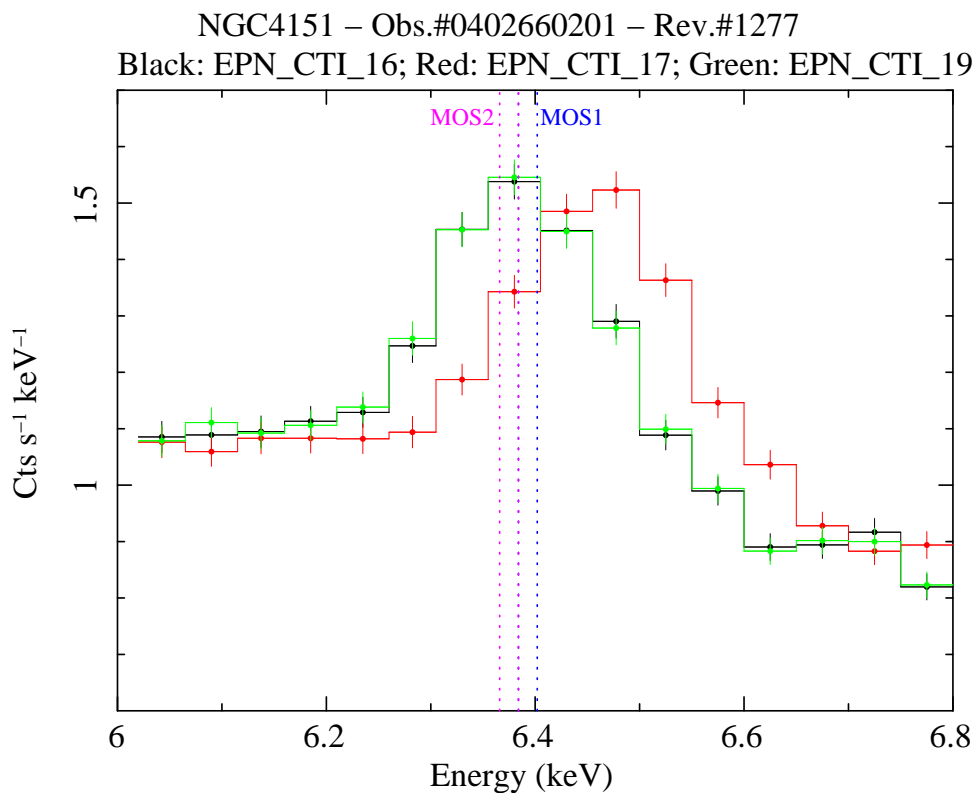
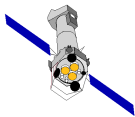


Figure 1: Iron K_{α} fluorescent line measured in the pn spectrum of NGC 4151 (Obs.#0402660201, Small Window), when the data were reduced with three different versions of the CTI CCF: a) Issue#16 (black); b) Issue#17 (red); Issue#19 (green). The *dotted* lines indicate the 90% confidence intervals for the measurement of the line centroid by the MOS cameras in the same observation: *blue*: MOS 1; *purple*: MOS 2