

XMM-Newton CCF Release Note

XMM-CCF-REL-8

EPIC Spectral Response

D Lumb

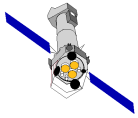
October 3, 2000

1 CCF components

Name of CCF	VALDATE	List of Blocks changed	CAL VERSION	XSCS flag
EMOS1_EFFICIENCY_0001	2000_01_01T00:00:00	EFFICIENCY		YES
EMOS2_EFFICIENCY_0001	2000_01_01T00:00:00	EFFICIENCY		YES
EPN_EFFICIENCY_0001	2000_01_01T00:00:00	EFFICIENCY		YES
EMOS1_QUANTUMEF_0006	2000_01_01T00:00:00	EBINS QE_CCDn		NO
EMOS2_QUANTUMEF_0006	2000_01_01T00:00:00	EBINS QE_CCDn		NO
EPN_QUANTUMEF_0007	2000_01_01T00:00:00	EBINS QE_CCDn		NO
EMOS1_FILTRANSX_0005	2000_01_01T00:00:00	FILTER- <i>name</i> EBINS		NO
EMOS2_FILTRANSX_0005	2000_01_01T00:00:00	FILTER- <i>name</i> EBINS		NO
EPN_FILTRANSX_0007	2000_01_01T00:00:00	FILTER- <i>name</i> EBINS		NO
EMOS1_REDIST_0007	2000_01_01T00:00:00	CCD_REDISTRIBUTION PHE_EBOUNDS BINNEDPLEBOUNDS		NO
EMOS2_REDIST_0007	2000_01_01T00:00:00	CCD_REDISTRIBUTION PHE_EBOUNDS BINNEDPLEBOUNDS		NO
EPN_REDIST_0004	2000_01_01T00:00:00	CCD_REDISTRIBUTION PHE_EBOUNDS BINNEDPLEBOUNDS		NO

2 Changes

First release



The CCD efficiencies, filter transmissions and mirror collection area were all measured on-ground, but to various levels of accuracy. The EPIC CCD efficiency measurements were made in a synchrotron facility, but there were discrepant values whose nature remained unresolved.

Files `xxx_EFFICIENCY` include the spatial and energy dependence of CCD detection efficiency. They are arranged with efficiencies of each pattern type. Thus the efficiency of the nominal MOS spectral pattern type selection is built up from the rows pertaining to pattern types 0 – 12, while for PN the equivalent data are for `PAT_TYP=0 – 1`.

The files `xxx_REDIST` contain the coefficients used in the code to build observation-specific response matrices.

3 Scientific Impact of this Update

First release

4 Estimated Scientific Quality

A combination of reconciling with theoretical models, and measurement of spectral residuals in-orbit has been undertaken, such that for some targets, spectral discrepancies at less than the 10% level have been obtained. Progress is being made for pathological cases of soft and hard sources, and in understanding the consequences of pile-up.

As ever, progress in improving the spectral response knowledge will continue to develop with more widespread use of data sets of different quality and characteristics. In the mean time users should be aware not to over-interpret spectral features near instrument absorption edges, and at the extremes of energy range, nor at count rates inappropriate to the readout mode of use. Namely energies $\leq 300\text{eV}$, around C K (280eV) O K (540eV), ALk (1.55keV), Si K (1.84keV) and Au M (2.3keV) edges, and at energies $\geq 8\text{keV}$.

5 Expected Updates

The mode dependencies of the EPIC cameras is uncertain yet with respect to the spectral response. While it is hoped that the gain dependencies cover all aspects of mode changes, it is possible that at least in timing mode, the 1-d clocking scheme causes events to be merged, and so the response distributions may ALSO be different