

XMM-Newton CCF Release Note

XMM-CCF-REL-146

EPIC Filter Transmission

M. Smith

April 9, 2003

1 CCF components

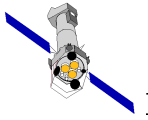
Name of CCF	VALDATE	EVALDATE	Blocks Changed	CAL Version	XSCS Flag
EMOS1_FILTRANSX_0011	1998-01-01T00:00:00	-	FILTER-THIN1, -THIN2, -MEDIUM, -THICK, -OPEN, EBINS		NO
EMOS2_FILTRANSX_0011	1998-01-01T00:00:00	-	FILTER-THIN1, -THIN2, -MEDIUM, -THICK, -OPEN, EBINS		NO

2 Changes

The data for the MOS Thick filter have been changed to match the BESY measurements.

The applicability of ground based MOS filter transmission curves to observed in-flight filter transmissions has been investigated. Observations in which the MOS units were cycled through the filters show that the most consistent results between filters are attained with the Thick filter transmission values derived from the BESY data.

The transmission values and energy binning are the same for all filters as those of issue 0006, except for the addition of a 0 eV anchor point to avoid a small negative transmission excursion at very low energy (below threshold).



3 Scientific Impact of this Update

Spectral fitting below ~ 1.0 keV of Thick filter data should be improved with this CCF.

Analysis of two PKS 2155-304 observations in which one MOS unit was cycled through the filters with the other unit in Medium filter, and *vice versa* shows an improvement in cross filter consistency of Thick filter data of $\sim 5\%$ below 1.0 keV up to $\sim 12\%$ at energies < 0.3 keV; see Figs. 1 and 2. This is due to a general underestimate of the transmission as described in the previously issued CCF, as illustrated in Fig. 3.

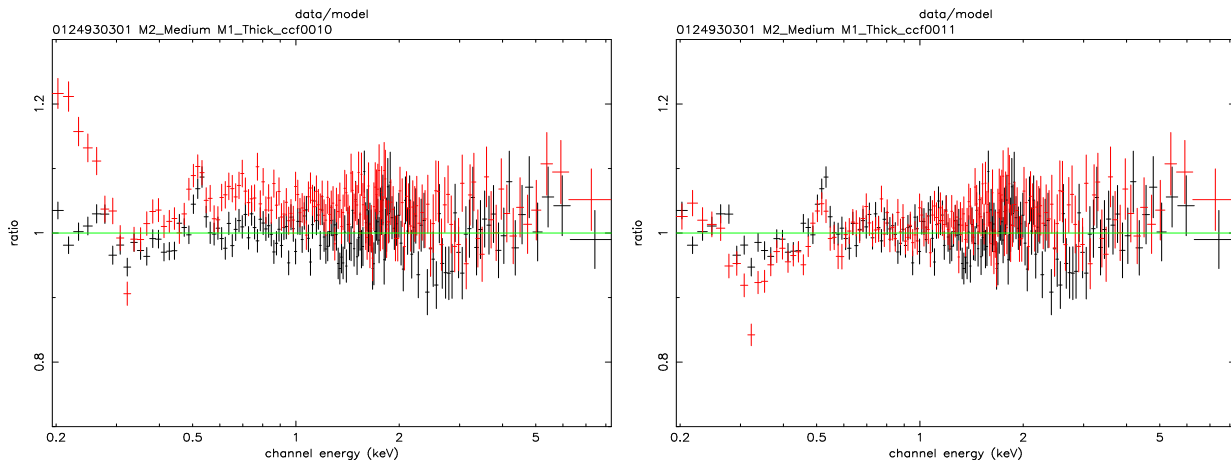


Figure 1: Comparison of data to model ratio of simultaneous MOS1 Medium filter (black) and MOS2 Thick filter (red) observation of PKS 2155-304. At left the results for the previous CCF, at right those for the the new CCF.

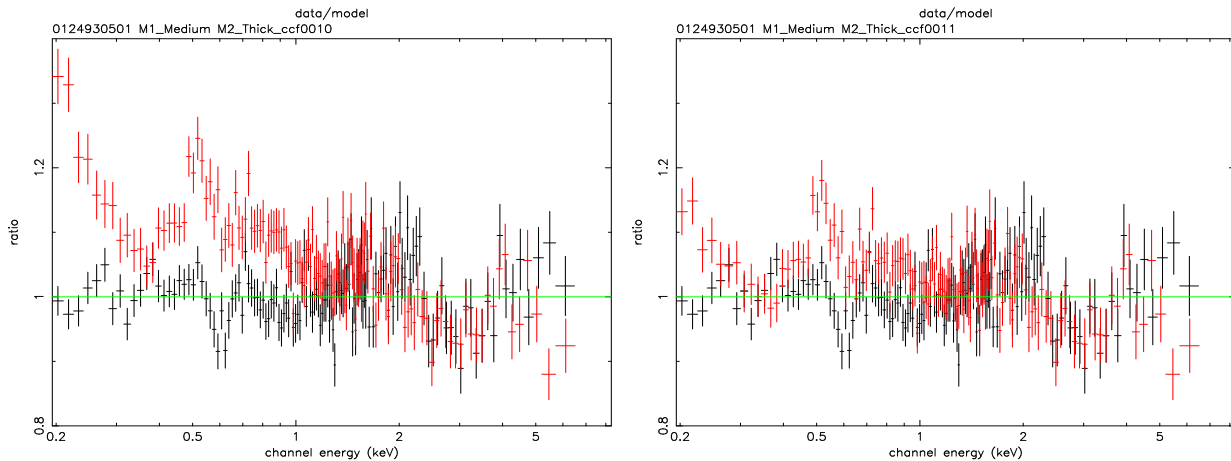


Figure 2: Similar to Fig. 1, only here with MOS2 in Medium filter (black) and MOS1 in Thick filter (red). Again, at left the results for the previous CCF, at right those for the the new CCF.

As the format of the CCF requires a common energy bin structure, the energy binning has changed for all filters. This results in small changes (at the percent level) of the interpolated transmission values of the Thin-1, Thin-2 and Medium filters.

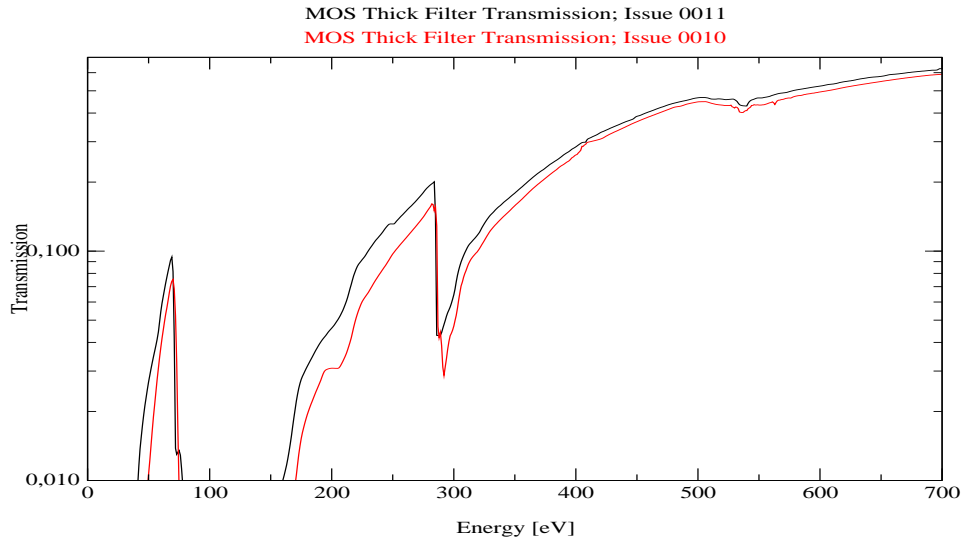
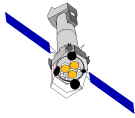


Figure 3: Comparison of the current (in black) and previous (in red) MOS Thick filter transmission. The current transmission is somewhat higher, especially below 0.4 keV.

4 Estimated Scientific Quality

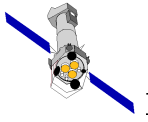
The filter transmission values for MOS1 and MOS2 are currently the same, although the filters are not identical. Moreover, the spatial variations around the C edge of the Thick filter is not handled in the CCF.

5 Expected Updates

As more calibration data is analysed there may be improvements in the transmission curves. Spatial region expressions may be introduced to handle the spatial variation of the Thick filter transmission in particular.

6 Test procedures

Functional testing with *calview* and *arfgen*. Comparison with previous transmission values using *calview*. Testing of the scientific quality on two PKS 2155-304 observations (0124930301 and 0124930501) which allowed a good analysis of cross filter consistency of spectral fitting.



7 Summary of the test results

See Section 3