

XMM-Newton CCF Release Note

XMM-CCF-REL-186

EPIC-pn Filter Transmission

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March 14, 2005

1 CCF Components

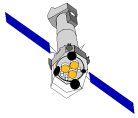
Name of CCF	VALDATE	EVALDATE	Blocks Changed	CAL Version	XSCS Flag
EPN_ FILTERTRANSX_0014	2000-02-01T00:00:00	-	FILTER-THICK		NO

2 Changes

The changes affect the pn Thick Filter transmission only. With respect to issue 0013, the issue 0014 pn Thick Filter transmission values have been lowered by up to 5% at and above the Al K edge (1.559 keV). The differences are at their greatest at the edge and decrease rapidly with increasing energy. A comparison of new *vs.* previous transmission values as function of energy is shown in Figure 1.

3 Scientific Impact of this Update

Spectral fitting with the new pn Thick Filter transmission should result in reduced instrumental residuals at and around the Al K absorption edge. This is illustrated in the spectral fits of two Thick Filter observations of Mkn 421 and PKS 2155-304 using the previous and new transmission values; see Figures 2 and 3.



4 Estimated Scientific Quality

The original ground calibration of the filter transmissions is limited at higher energies and thus leaves some room for improvement. The modified transmissions based on in-flight calibration show improved fits with instrumental discrepancies reduced from $\sim 3\text{-}4\%$ down to $\sim 1\text{-}2\%$ at and around the Al K absorption edge.

5 Expected Updates

As more calibration data is analysed there may be further modifications to the transmission curves. There is provision for inclusion of spatial variations which may improve the Thick Filter transmissions in particular.

6 Test Procedures

Functional testing with `calview` and `arngen`. F. Haberl (MPE) kindly provided the transmission data and supplied the scientific validation results of the PKS 2155-304 and Mkn 421 Timing Mode observations.

7 Summary of the Test Results

Correct functionality; changes with respect to the previous issue as intended. For scientific test results, see Sections 3 and 4.

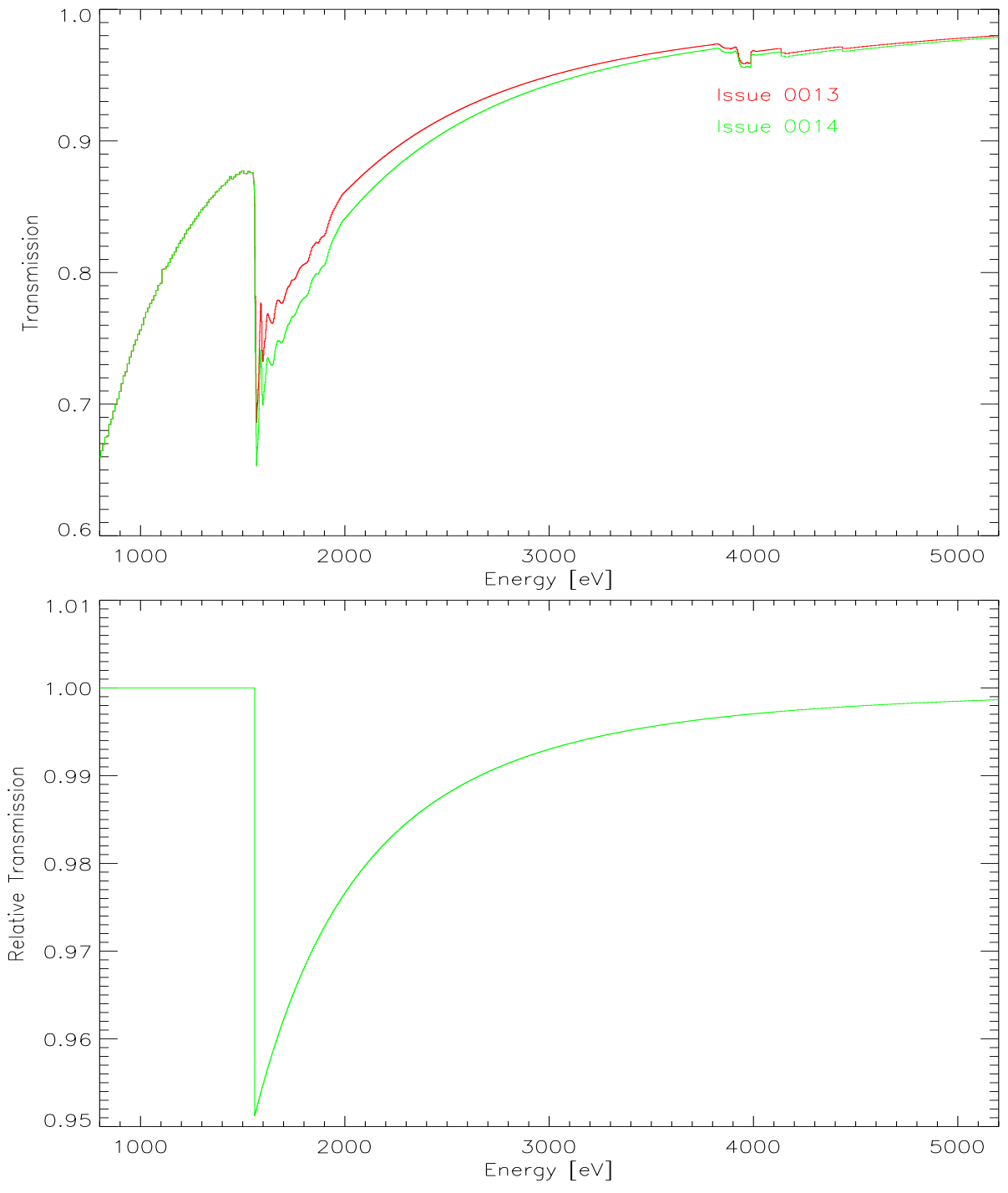
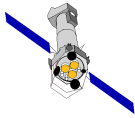


Figure 1: Comparison of pn Thick Filter transmissions around the Al K edge. Top: absolute transmission values of issues 0013 (red) and 0014 (green). Bottom: relative transmission of issue 0014 with respect issue 0013.

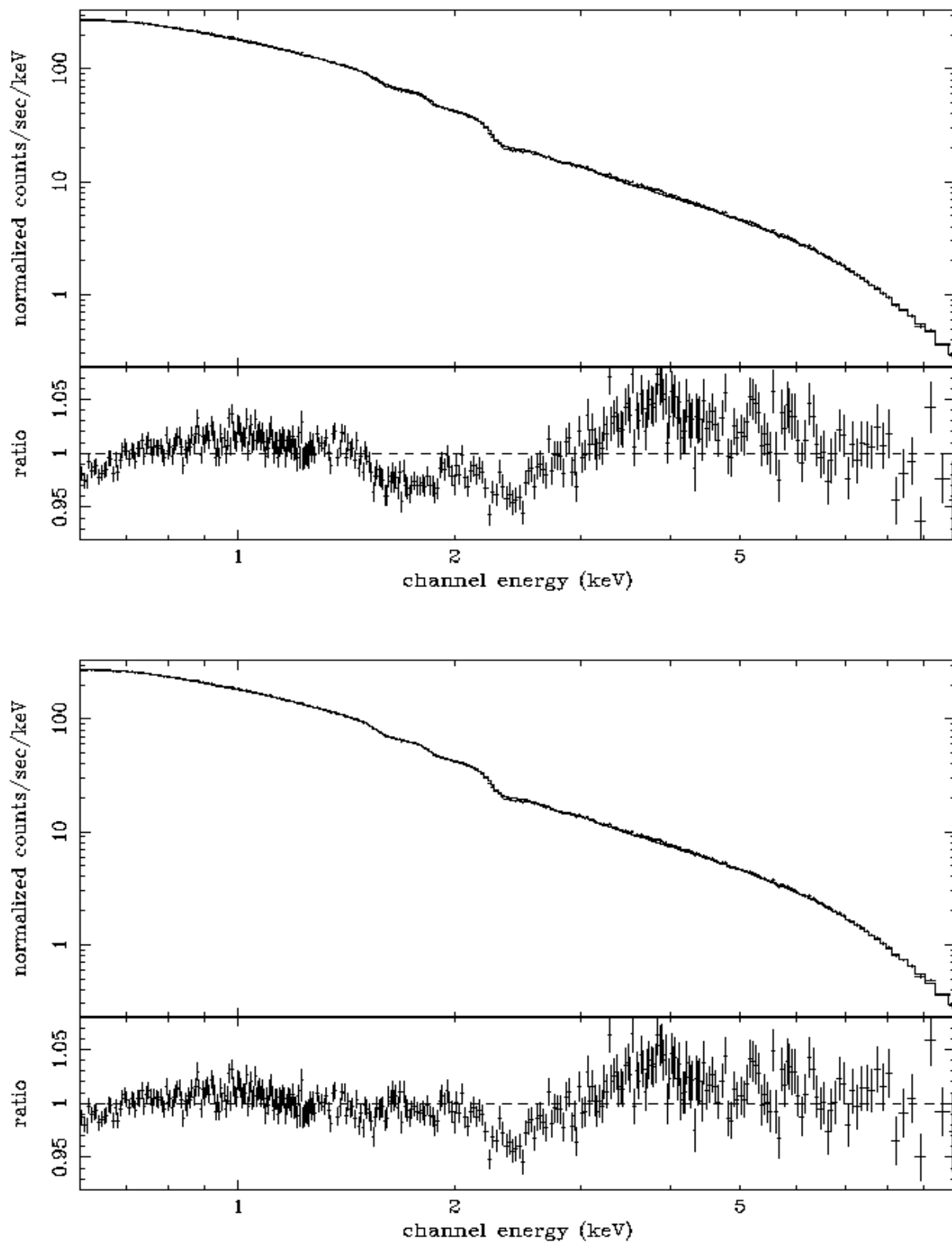
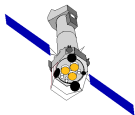


Figure 2: Mkn 421 (observation 0099280101, pn, Thick Filter, Timing Mode) spectral fit results using issue 0013 (top) and 0014 (bottom) filter transmissions. The residuals with respect to a broken powerlaw model are significantly reduced at and around the Al K edge.

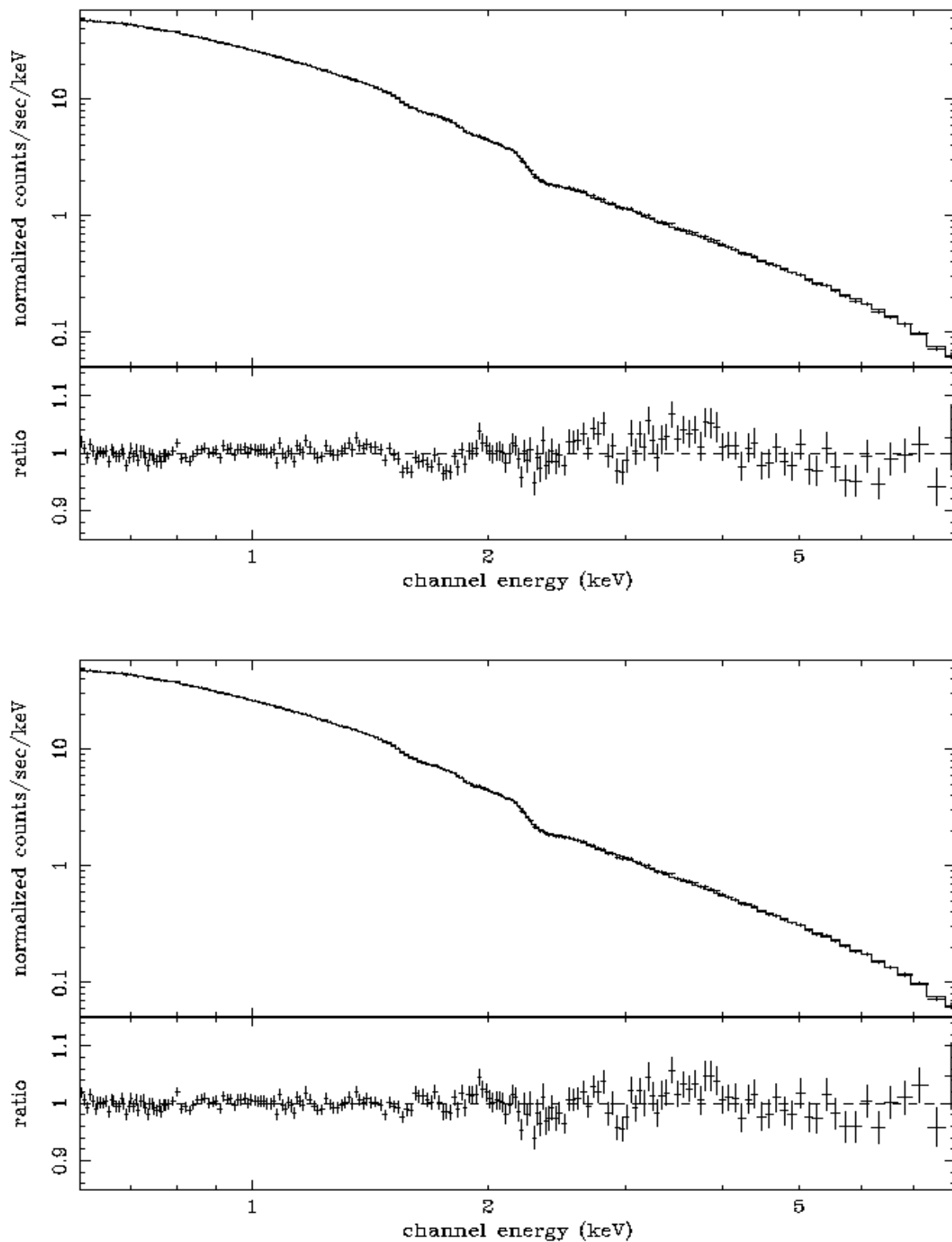
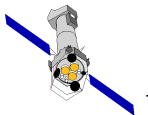


Figure 3: PKS 2155-304 (observation 0124930601, pn, Thick Filter, Timing Mode) spectral fit results using issue 0013 (top) and 0014 (bottom) filter transmissions. The model is a broken powerlaw. The residuals are reduced at and around the Al K edge.