

XMM-Newton CCF Release Note

XMM-CCF-REL-114

RGS Cross-Dispersion PSF

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1 CCF components

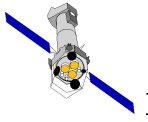
Name of CCF	VALDATE	EVALDATE	List of Blocks changed	CAL VERSION	XSCS flag
RGS1_CROSSPSF_0003	2000-01-01T00:00:00		CROSSPSF		NO
RGS2_CROSSPSF_0003	2000-01-01T00:00:00		CROSSPSF		NO

2 Changes

The cross-dispersion small angle distribution as a function of β has been recalibrated using the first observation of Mkn 421 in revolution 165 [1]. A combination of two gaussians and a lorentzian were fit for 8 different beta bins in each RGS, after subtraction of large angle cross-dispersion distributions and background.

3 Scientific Impact of this Update

The distribution is used for the selection regions in the image domain. The selection region impacts on the effective area of RGS. These new distributions reflect a better knowledge of background, the large-angle scatter distribution, and the instrument boresight. Specially the introduction of the energy dependance in the recalibration of the scattering parameters, leading to changes in the effective area model (large angle cross-dispersion, see [2]), made necessary the re-calibration of the small angle distribution.



4 Estimated Scientific Quality

Decrease of the uncertainty of this contribution to the effective area for narrow selection regions is estimated to be reduced to one percent or less.

5 Test procedures

General checks:

- use FV (or a different FITS viewer) for files inspection. It should contain 1 binary extension, check that the applied changes are correct in the corresponding header extension.

Check improvements:

- compare using *calview* the cross dispersion point spread function using former and new calibration files.
- process RGS point source data using SAS, check the selection regions using *rgsimplot*

6 Test results

Files inspection of both RGS1_CROSSPSF_0003 and RGS2_CROSSPSF_0003 ok.
calview inspection of the new files is not proper within the CAL version used (3.136.1).

RGS data from PKS2155-304 (rev 362), were reduced with *rgsproc*, using the central source coordinates (the observation was a bit displaced). The selection regions in both spatial and order images were obtained through *rgsimplot*. The selections of 90% coverage of the cross-dispersion PSF are seen in the figs. 1 and 2, while the RGS2 selection with 85% coverage is shown in fig. 3.

The old selection regions, considered accurate only to the 5-10 % level are shown in Fig. 4. These plots have been obtained by SAS (PPS) 5.2.1.

References

- [1] "The Small-Angle Cross-Dispersion Distribution", John R. Peterson, RGS-COL-CAL-01005, December 12, 2001
- [2] "The Cross-Dispersion Distribution of the Large-Angle Scattered Light", J. Cottam and J. Peterson, RGS-COL-CAL-01004, July 11, 2001

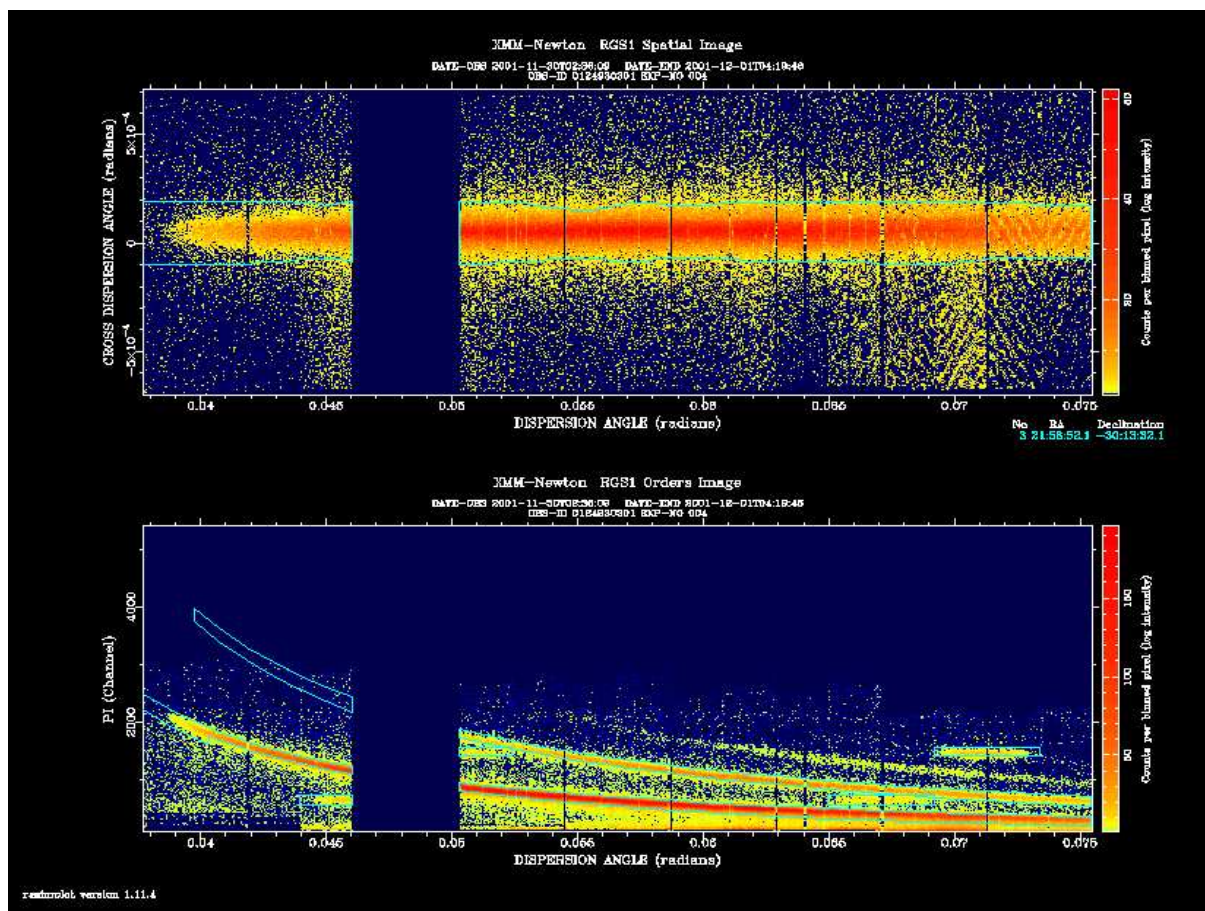
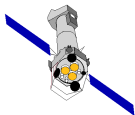


Figure 1: RGS1 90% selection regions in spatial and energy plots, as obtained by *rgsimplot*

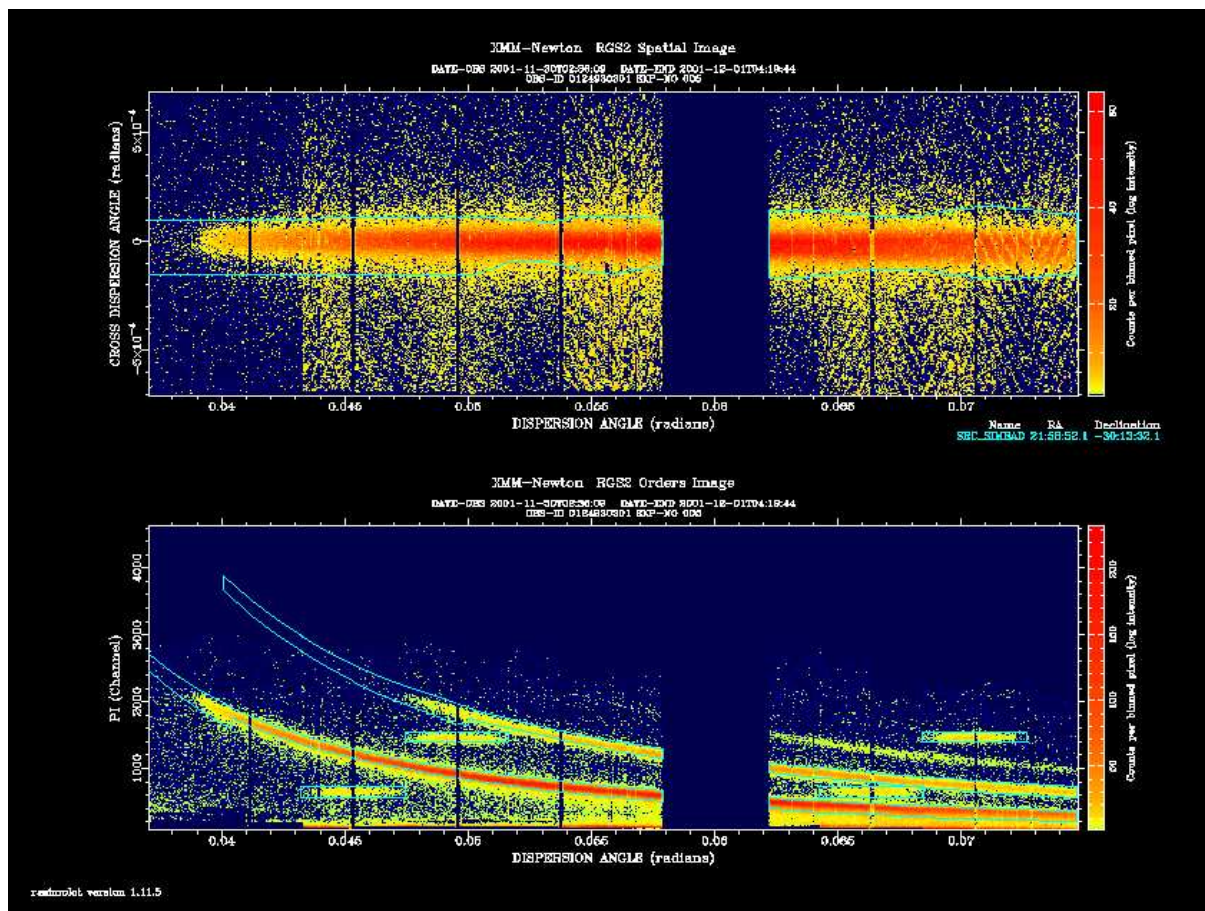
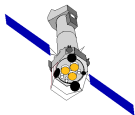


Figure 2: RGS2 90% selection regions in spatial and energy plots, as obtained by *rsimplot*

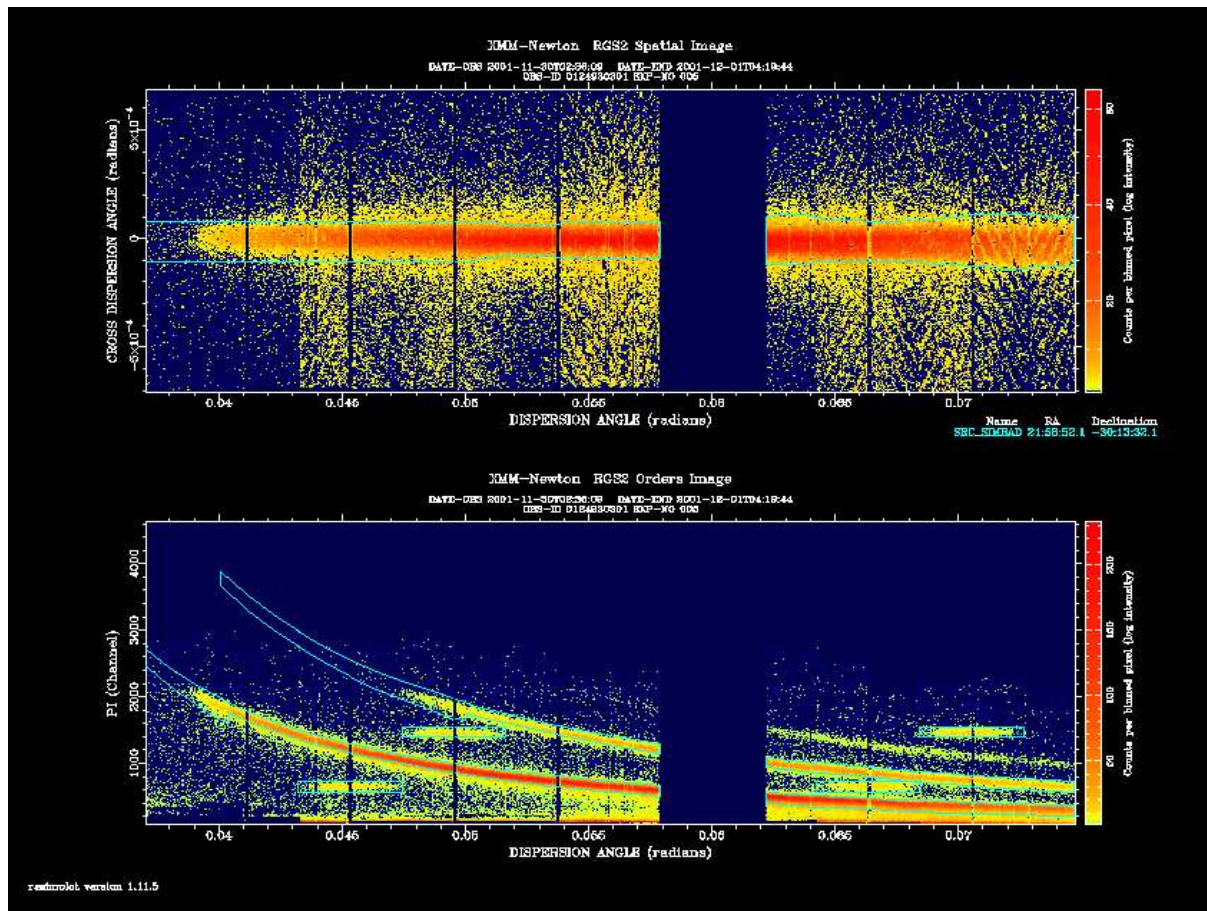
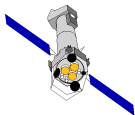


Figure 3: RGS2 85% selection regions in spatial and energy plots, as obtained by *rgsimplot*

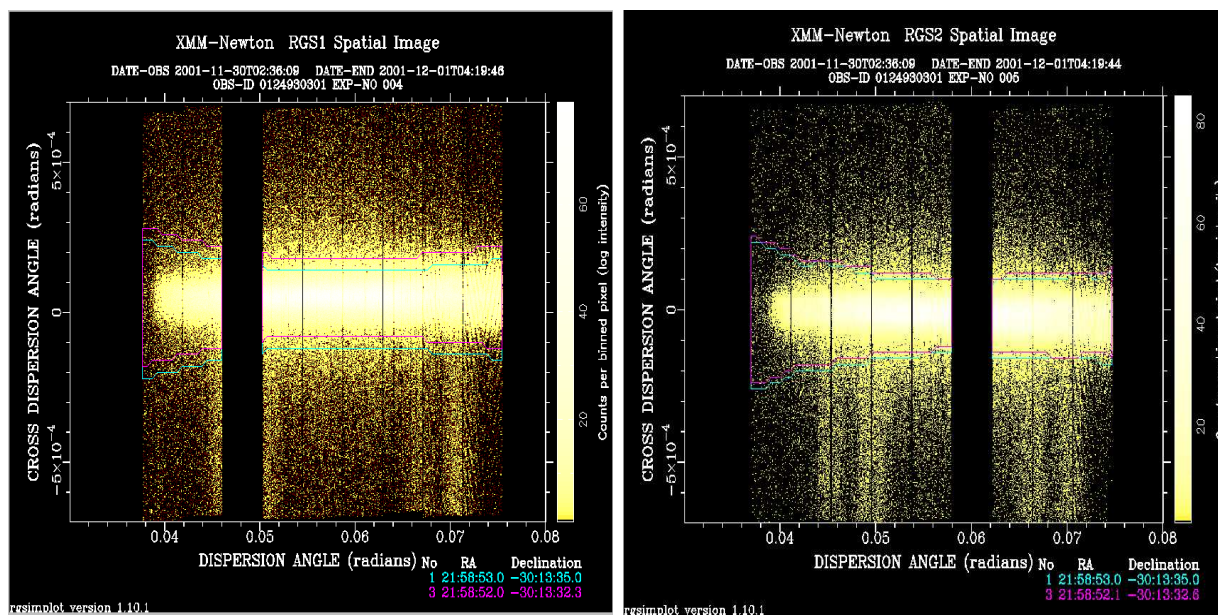


Figure 4: RGS1 and RGS2 spatial selection regions (PPS V5.2.1 products)