XMM-Newton CCF Release Note

XMM-CCF-REL-65

RGS Line Spread Function

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1 CCF components

Name of CCF	VALDATE	List of Blocks changed	CAL VERSION	XSCS flag
RGS1_LINESPREADFUNC_0003	1999-01-01T00:00:00	FIGURE, BOWS	xmmsas_20010329_1900	NO
RGS2_LINESPREADFUNC_0003	1999-01-01T00:00:00	FIGURE, BOWS	xmmsas_20010329_1900	NO
XMM_MISCDATA_0012	1999-01-01T00:00:00	MISCDATA	—	NO

2 Changes

`LINESPREADFUNC`

- addition of table `BOWS` to hold the parameters of the non-flatness distribution of the grating plates
- addition of factor `SCALE` in table `FIGURE` to scale the assembly time misalignment distribution (see [1, function `CAL_getRGAFigure`])

`MISCDATA` the value of `ROWLAND` of RGS2 was changed such that $L = 2R\cos\gamma_0 = 6706\,\mathrm{mm}$

3 Scientific Impact of this Update

These changes implement the analysis of the RGS LSF as described in [2]. Together with the defocus function (see [1, function `CAL_getRFCdefocus`]), and the CCF's `XRT1_XPSF_0004, XRT2_XPSF_0004` this should all correct the deficiencies of the RGS LSF as described below.

4 Estimated Scientific Quality

This should cure the problem of the LSF of being too narrow, as being previously derived by `rgsrmfgen`. It was found that when using the response matrix from `rgsrmfgen`, due to the narrow SAS LSF the superposition of all modeled wings is not sufficient to describe the pseudo-continuum created by the true data superposition of the wings. Also near a bright line, there are more points close to the "background" than in the line, therefore the fitting procedure tries to put the model within the error bars of these points (the surrounding continuum has a larger weight than the line). These two effects force the fitting program to add a featureless continuum, basically a high-T component.

References

[1] Christian Erd, Phillipe Gondoin, David Lumb, Rudi Much, Uwe Lammers, and Giuseppe Vacanti. *Calibration Access and Data Handbook*. XMM-PS-GM-20, issue 1.0, ESA/SSD, September 2000. http://xmm.vilspa.esa.es/calibration/docs/general/calhb.ps.gz.

[2] A. Rasmussen. *Tuining and Assessment of the RGS LSF model appropriate for Response Matrix Generation.* RGS-COL-CAL-01002, Columbia, March 2001. http://xmm.astro.columbia.edu/cal_files/cal01002.ps.