



Meeting date	05.11.2007	ref./réf.	XMM-SOC_EPIC_BG_WG-006	page/page	1 7
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date de la réunion

Meeting place	Mallorca	chairman	A. Read
<i>lieu de la réunion</i>		<i>président</i>	

Minutes' date	28.12.2007	Participants Andy Read (AR): scientific chair, EPIC (Leicester) Jenny Carter (JC), EPIC calibration and BGWG Support (Leicester) Steve Snowden (SS), XMM-Newton US-Guest observers facility (Goddard) Wolfgang Pietsch (WP), Michael Freyberg (MF) (MPE Garching) Silvano Molendi (SM, INAF Milano) Matthias Ehle (ME), ESA coordination (ESAC)
<i>dates de minute</i>		
		This minutes plus related documents will all be available on the web: http://www.src.le.ac.uk/projects/xmm/technical/

Subject/objet	Minutes of meeting EPIC Background Working Group 6	copy/copi	Minutes by M. Ehle
		<i>M. Turner, U. Briel, S. Sembay, M. Kirsch, K. Kuntz, M. Santos-Lleo, N. Schartel, A. Parmar</i>	

1.0 Action Items from last meetings (AR)

AI_EPIC_BG_WG_01_01: SS to provide by October 2005 to SOC

- Proton screening tool
- Use of multiple light curves for screening
- Provide list of st. candles for BG analysis comparison with different tools

- By end of December 2005 a SAS task version will be available for DT, aiming release for SAS 7.0 – (SAS task by B. Perry for DT; there was a problem with Perl numerical recipes & PGP key for upload) – see new AI_EPIC_BG_WG_03_07 - **CLOSED**
- list of BG candles – Abell 1795 (used for ESAS & comp. with Chandra) - **CLOSED**

 AI_EPIC_BG_WG_01_04: AR to invite other BG experts to next meetings and to provide possibly scripts/tasks – **DROPPED (ALL TIME ACTION)**

 AI_EPIC_BG_WG_01_12: MF: Once any BG or Closed fits files had been obtained, the user can change their CCF_PATH etc. setup so that a new cifbuild would incorporate these extra files. This enables the BG/Closed events files (e.g. the ones used in SS's task) to be used in the SAS, without them having to be included in the CCF files. - **ONGOING** - Interface TBD (MF & RS)

 AI_EPIC_BG_WG_02_01: MK to ask RGS if RGS BG light curve could help EPIC screening **CLOSED**: correlation discussed in XMM-SOC-USR-TN-0014

 AI_EPIC_BG_WG_02_03: ME to test and transfer WPs script of 01_11 to SOC thread **CLOSED**, (done as part of a Young Graduate Trainee project)

 AI_EPIC_BG_WG_03_02: On all: provide AR with additional links & more papers for BG component table - **DROPPED (all-time action)**

 AI_EPIC_BG_WG_03_05: on AR: to test if sky-recast tool is working correctly on specific data set (i.e a cluster) – **CLOSED**

AI_EPIC_BG_WG_03_07: on ME: test soft proton screening s/w SAS tool “espfilt”

**½ CLOSED – v0.8.2 is available in SAS 7.1:
MOS data looks OK, pn not yet included**

 AI_EPIC_BG_WG_03_08: on MF: UHB update section 3.2.4: outside FoV eff. Area (up to 80 arcmin), Update of CCF (currently not supported, calview, 15 arcmin, TBC) **OPEN** – provide numbers from simulations by B. Aschenbach

 AI_EPIC_BG_WG_03_10: on SM: provide BGWG with script on bkg treatment in spectral analysis (after publication of related paper) – **OPEN**

 AI_EPIC_BG_WG_03_11: on AR: check HK parameters for anomalous MOS FWC data - **ONGOING**

 AI_EPIC_BG_WG_04_02: on SS/K. Kuntz: try to extend MOS tools such that they also work for EPIC-pn by about June 2007 – **ONGOING** – see Section 2.2

 AI_EPIC_BG_WG_04_05: on JC/ME: test if location selection tool for blank-sky fields can be installed at ESAC – **DROPPED**, see section 2.3

 AI_EPIC_BG_WG_04_06: on JC/AR: check if ‘ghosting’ script can be made available to all users via the BGWG script page – **CLOSED**

 AI_EPIC_BG_WG_04_07: on AR: trigger the generation of full field-of-view FWC MOS data by K. Kuntz (standard mode), and make them available to ME for an update of the FWC web page and related Newsletter announcement – **CLOSED**

AI_EPIC_BG_WG_04_08: on AR: trigger the generation of smaller sub-sets of EPIC-pn FWC data

(with M. Freyberg) \Rightarrow update of FWC web page needed - **OPEN**

AI_EPIC_BG_WG_04_10: on SS: ask K. Kuntz to include a figure on the dependence of the flaring MOS background on the orbital position of XMM-Newton in the planned paper
 – **CLOSED**

AI_EPIC_BG_WG_05_00: on all: send presentations to AR - **CLOSED**

AI_EPIC_BG_WG_05_01: on ME: continue testing of espfilt task with the goal of a first public release in SASv7.1 - **CLOSED**

AI_EPIC_BG_WG_05_02: on ME/AR/JC: prepare a web page with plots of count rates derived in the standard SSC/PPS energy bands - **CLOSED**

AI_EPIC_BG_WG_05_03: on AR: test combined full FoV MOS FWC data before public release
 - **CLOSED**

AI_EPIC_BG_WG_05_04: on SS/ME: release of a new ESAS (MOS only) version - **CLOSED**

AI_EPIC_BG_WG_05_05: on SS: try to extend functionality of ESAS for pn and deliver a progress report for the next BGWG meeting – **CLOSED** (report provided, otherwise see open AI_EPIC_BG_WG_04_02)

AI_EPIC_BG_WG_05_06: on AR/SS/ME: formulate request for more FWC calibration data – **CLOSED**, see Section 2.1

AI_EPIC_BG_WG_05_07: on ME: prepare web page & Newsletter item to announce ‘images’ script
 - **CLOSED**

2 Reports

2.1 BG report from the June XMM-Newton User Group meeting (ME)

XMM-Newton User Group (UG), during their last meeting June 7th 2007, asked for a presentation on the EPIC background treatment. ME delivered a ~30 min. talk describing the BGWG motivation and goals, the kind of user support BGWG is currently providing (info, data and s/w tools) and their future plans.

After the talk UG expressed thanks for all the work done and was impressed by the tremendous amount of work done by BGWG.

Some specific questions:

- maintainability of ESAS \rightarrow long term plan is to get it into SAS
- plans for Blank Sky datasets for window modes – enough data? enough demand?
- Lack of enough FWC data to characterize instrumental BG \rightarrow UG Recommendation 2007-06-08/45: UG recommends that the BGWG makes a study of the needs for closed filter data; this has been closed in the meantime:
 - o NRCO#70 to do monthly 10 ksec FWC full-frame exposures up to end of 2007 in place since August
 - o Afterwards done as new routine cal. observation (until further notice)
 - o Currently observations performed in good part of orbit, if it can be done at beginning/end or during slews is TBC (AI_EPIC_BG_WG_06_01)

2.2 The Status of XMM-ESAS (SS)

A new version of the XMM-ESAS (XMM-Newton Extended Source Analysis Software) was released in July (see AI_EPIC_BG_WG_05_04, announced in XMM-Newsletter #67).

Future development plans for ESAS are:

- start extending the background tools also to pn data
- include the use of the SAS task “mosaic” to merge mosaic-type observations (instead of the currently used Fortran programme)
- add a call to the f_in/f_out script to measure the remaining soft proton contamination
- use the soft proton model derived from an outer annulus only.

Progress was slower than expected due to work on publications of the Analysis Method/Cluster Catalogue (on astro-ph) and on paper about Particle BG (not yet on astro-ph) → AI_EPIC_BG_WG_06_02
 In addition ESAS needs to be modified for SAS v7.1 (work in progress, patch needed). Version will include better handling and removal of point sources and will use SAS task espfilt → AI_EPIC_BG_WG_06_03

PN modifications: data processing nearly finished, corner data looks promising, out-of-time event handling will need to be correctly addressed.

2.3 The Status of the Blank Sky files and software (JC)

New release of files May 2007 addressing issues:

- low-E residual sources in some files
- small correction to vignettted exposure maps
- additional exposure maps with extra flags made available

Updates to pages: count rate graphs added in SSC bands

Investigation/consideration of:

- ghosting problem, scaling of exposure maps, addition of new modes and increasing the size of the component file sets
- BGSelector tool
 - o improved, generic version of SelectRADec
 - o select on equatorial/galactic coordinates, nH, revolution., exposure, time
 - o ready for upload to pages → AI_EPIC_BG_WG_06_04

It has been discussed if it is feasible to think about the generation of background template files corresponding to the background environment of a specific observation under study (similarly to as it is available via the SAS task rgsbkgmodel) – this was seen as ‘nice to have’ but also as a medium/long term task which would still need serious development efforts.

2.4 EPIC pn BG spectra for low surface brightness sources (WP)

WP gave a presentation on a new method developed by his student (M. Bauer) on how to analyse low surface brightness sources with EPIC, especially the halo emission in NGC 253, see related AI_EPIC_BG_WG_06_05 and 06.

Addressed BG components:

- sky BG: BG region chosen at border of FoV → different vignetting & detector BG
- detector BG: using FWC observations close (in revolution number) to NGC 253 observation (avoiding different detector setting or performance); correcting for different particle radiation levels by re-scaling the FWC via Rejected Line Counter from HK file (Pros: large detector area, no OoT event influence)
- Out-of-Time events (OoT, PN): by subtracting OoT spectrum and detector BG spectrum, OoT events are subtracted twice → OoT spectrum from detector BG needs to be added again

Additional problem: sky BG is vignetted, detector BG not

→ a rather complicated equation is needed to compute the total BG spectrum as a sum over OoT events, detector BG, detector OoT events and sky background

Noted differences between new & conventional method in case of the NGC 253 halo emission:

1. conventional method requires additional power law component
2. flux is higher (up to 22%) in conventional method
3. fitted temperatures are consistent between both methods

3 Discussion

For details, see presentation by AR available on-line at <http://www.src.le.ac.uk/projects/xmm/technical/>

3.1 Web Pages

The current layout and contents of the BGWG web-pages was shown and changes since the previous meeting were highlighted: text changes, new scripts, etc.

3.2 BG components Synopsis Table

No update, see AI_EPIC_BG_WG_03_02.

3.3 Long term BG Trends

The document XMM-SOC-USR-TN-0014 by P. Rodriguez and R. Gonzalez (XMM-Newton SOC), available at <http://xmm.esac.esa.int/docs/documents/USR-TN-0014-1-0.pdf>, on “The behaviour of the XMM-Newton Background: From the beginning of the mission until August 2006” was presented by AR:

In summary:

The study of the evolution of the BG (over years) shows that

- RGS and EPIC instruments generally agree w.r.t. the BG
- There is no clear trend over the mission
- Largest changes are seen at the end of the revolutions: BG increased from 2000 to 2003 and since then slowly declined

The Seasonal trends (due to asymmetry of the Earth’s magnetic field along sun-antisun line) are such that

- At the start of an orbit, the effect is strong with high BG in Feb-Aug and min in Dec & Jan
- At apogee, smaller variations over the year, similar trend with marked minimum in Dec & Jan
- At the end of an orbit, highest level of BG and strongest variations, with maximum in April

(Note that the marked difference between RGS and pn rates at the late phase of an orbit is an artefact caused by a selection effect only: At the end of an orbit EPIC is always closed earlier than RGS exposures are stopped, i.e. there are different BG limits for EPIC and RGS.

• RGS can observe longer, i.e. can observe at times where the BG radiation is higher.

• EPIC data is available in this last part of the orbit only if the BG radiation is low there.)

3.4 New Scripts/Tools

The Image script to perform EPIC image creation, cleaning, exposure correction, smoothing and merging of EPIC-pn and MOS data, has been released on the BGWG page.

The script BGRbinning2SKY has been modified such that it now can rebin and project any DETX/Y image of any binning onto the sky to the spatial scale and sky X/Y position of a user provided input image.

The Fin/Fout script base on a tool by SM and published by AR via the BGWG page has been updated to include a warning on the lost CCD6 for MOS1. The tool should still be updated with new threshold numbers to be provided by SM, see AI_EPIC_BG_WG_06_06.

4 Final session: - Summing up

4.1 AOB

None.

4.3 Next meeting

- Date and Location will be attached to the next EPIC Cal/Ops meeting, currently planned for 7-9 April 2008 in Mallorca: These meetings usually take 1.5 days so that a 0.5 day BGWG meeting can be scheduled before or after this.

New Action Items resulting from this meeting:

- AI_EPIC_BG_WG_06_01: On SS/KK: After reception of more 10 ksec FWC data, re-discuss observing strategy: is it useful to collect FWC at start/end of orbit or during slew observations?
- AI_EPIC_BG_WG_06_02: On AR: link papers by SS/KK on Analysis Method/Cluster Catalogue and on the Particle BG in BG components table
- AI_EPIC_BG_WG_06_03: On SS/ME: release of a new ESAS (MOS only) version updated for SAS v7.1
- AI_EPIC_BG_WG_06_04: On JC: internal release of BGSelector and public release (with ME) after testing
- AI_EPIC_BG_WG_06_05: On WP: ask M. Bauer about the possibility to convert the new BG handling method into a script/tool for general usage
- AI_EPIC_BG_WG_06_06: On WP: ask M. Bauer to compare the new method with the principal method used by XMM-ESAS, i.e. not subtracting but modelling of the background; SS is interested to help when files are available from M. Bauer.
- AI_EPIC_BG_WG_06_07: ON SM: to provide new threshold numbers for the Fin/Fout tool to AR to allow him another update of that script (specifically to account for the MOS1 CCD6 loss).

Possible future AI (on R. Saxton+student)?

Use SciSim to simulate cluster & bkg and test different analysis methods on it (also for Chandra simulator).