

Meeting date	<b>02.-04.07.2002</b>	ref./réf.	XMM-SAS-VILSPA/2002-77/Mn	page/page	1 7
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*date de la réunion*

Meeting place	<b>VILSPA</b>	chairman	S. Sembay
<i>lieu de la réunion</i>		<i>président</i>	

Minute's date	25-7-2002	participant
<i>dates de minute</i>		Doris Neumann 2-4
		Frank Haberl 2,5-4
		Jan Willem den Herder 3-4
		Jean Ballet 2-4
		Konrad Dennerl 2,5-4
		Martin Turner 3,9-4
		Michael Freyberg 2,5-4
		Nicola La Palombara 2
		Paul Bennie 2-4
		Philippe Ferando 2,5-4
		Philippe Marty 2-4
		Richard Saxton 2-4
		Silvano Molendi 2-4
		Slava Zavlin 2,5-4
		Steve Sembay 2-4
		Ulrich Briel 2-4
		Uwe Lammers 2-4
		Vadim Burwitz 2,5-4
		Wolfgang Pietsch 2,5-4
		Bruno Altieri 2-4
		Guillermo Buenadicha 2
		Leo Metcalfe 2-4
		Marcus Kirsch 2-4
		Matthias Ehle
		Mauro Casale 2
		Michael Smith 2-4
		Stephane Rives 2

Subject/objet	CAL Meeting	copy/copi
		F.Jansen

## **1 MOS related issues**

### **1.1 Paul Bennie - Consistent gain and rmf solution from MOS**

New ADU CONV files ready to be implemented in SAS (time dependent and pattern dependent)

Work on time dependent RMF is still ongoing

- [Hand over the ADU CONV from Leicester to VILSPA \(Paul to Bruno\) AI\\_1](#)

### **1.2 Paul Bennie – Consistent MOS Cooling**

- Test was a success
- Seems to be a change in number of counts from 250-400 eV
- Search for an analytical correlation between MOS energy and count rate

### **1.3 Marcus Kirsch - Future MOS CTI Corrections**

- A pragmatic solution should be found for the short term planning
- For the future it would be good to have a real CTI model, that also includes the rate dependency of the CTI

### **1.4 Silvano Molendi – MOS internal BG**

Temporal behaviour of MOS internal bkg:

- Strong variations in intensity (30-50 %)
- Variations of line and continuum uncorrelated
- The shape of the continuum is constant

CLOSED observations vs. internal bkg

- Analysis of OUT\_OF\_FOV events for both Open and CLOSED observations
- Variation of line intensity
- Shape of the continuum is the same
- Calibration of the vignetting curve using the CXB
- Coarse angular scale evidence for deviations (optical axis offset)
- Further statistics needed, work in progress (increase of statistics by a factor of 3)

### **1.5 Jean Ballet – Bright Pixels Energy**

- Bright Pixels are correlated with time and energy
- Flickering pixels only occur at MOS2 CCD1 and 4 (concentrated at 5 keV)

### **1.6 Steve Sembay - MOS1 Timing Mode Spectral Calibration**

- Possible overall offset of 13 eV compared to SW mode.
- Response matrices are available and should be made public soon [AI\\_2 Steve](#)

## **2PN related issues**

### **2.1 Konrad Dennerl - CCD offsets? Latest investigations**

- Below 1.5 keV problems with gain, where there should be additional energy dependent gain tuning factors in FF.
- Offsets (not energy dependent) from former analysis in S/W but have never been activated.
- Doubles behave in a different way than singles
- Analysis ongoing

### **2.2 Konrad Dennerl – CTI long term degradation**

- $dCTI/dt$   $1.4 \cdot 10E-5$  per year
- Inline with the current implemented long term corrections in CTI\_CCF

### **2.3 Frank Haberl – detector response matrix update**

- Investigations on RX J1856.5-3754 (featureless BB T~61 eV)
- Pn has lowest NH values, fixing the NH to CHANDRA or RGS data pn is up to 60 % off below 0.5 keV (more flux in data than in model).
- Problem might be due to wrong redistribution (Partial Event Model Parameters).
- Oxygen edge fudged (O edge is not clear, because it is too large for QE???)
- Shoulder of PE model has been modelled in a different way (increased shoulder) but it is not working for every source (not in spectra with events above 1 keV)  
does not work with doubles in the same way.

### **2.4 Wolfgang Pietsch – Further investigation of the orbital BG**

Including of radmon information of high flaring seasons filtering good time intervals, but no recommendations for observation angles with orbit position can yet be given. (Still ongoing)

### **2.5 Michael Freyberg - Background and MIPS investigation**

- Pixel emitting above the MIP threshold can corrupt the exposure times (MIP correction will neglect column with this pixel and neighbouring columns)
- Can be correlated to DLI files, but due to overflows in this counter not automatically correctable
- More internal lines detected, which however only contribute as a minor part to the BG
- Insufficient BG subtraction however could also cause features above 9 keV (ask Michael Fr)

### **2.6 Michael Freyberg - Not recognized events investigation**

- New feature in EPATPLOT (Version 1.1.5) (not recognized patterns are indicated) patterns which are not related to photons, or pattern pile up

### 2.7 Marcus Kirsch - Timing Mode update

- After fixing a bug in the barycen tool the relative deviation in the observed pulse period w.r.t. the most accurate radio data available ( $\Delta P/P$ ) is now considerably better than  $10^{-8}$ - $10^{-9}$ , with an absolute timing accuracy of  $< 500$  microseconds.

### 2.8 Vadim Burwitz - Soft flares in timing mode

- Flares can cause time gaps and low energy noise in timing mode, due to overflows of counters caused by MIPs (also present in all other modes but not that statistically significant)
- Exposure time is not corrected for that

## 3 MOS/PN Cross Calibration

### 3.1 Philippe Marty - MPS/PN QE & filter as compared to ground cal

- QE comparisons of Orsay QE and CCF QE show differences for the pn, underestimation in CCF, but might be due to use of only singles and doubles
- All filters have been calibrated but there is only one set in the CCFs, observation of OPEN filter to compare with closed might be performed
- MOS1 good agreement but might be overestimated  $< 350$  eV
- MOS2 good agreement but might be underestimated  $< 500$  eV
- PN systematic underestimation

[AI\\_3: MK to look for a field on which a open filter /filter comparison could be done](#)

### 3.2 Philippe Marty

??

### 3.3 Philippe Marty – MOS pn cross calibration

- RXJ1120 differences between M1/M2 14 %, M1/PN 101 %, M2/PN 112 %
- A209: M1/M2 5 %, M1/PN 101 %, M2/PN 98 %

Not entirely clear what this analysis should prove or not,, ask Philippe Marty

- Agreement of the EPIC instruments for kT on both targets

### 3.4 Steve Sembay (Gareth Griffith) – MOS pn cross calibration

- 10 % discrepancy between M1 thin and M2 medium filter below 300 eV

### 3.5 Steve Sembay – Broad band MOS cross calibration

- PKS2155 and Mrk 421 could not be fitted well with the same calibration
- Possible evidence for a change in filter or QE
- Excess in both cameras below 300 eV
- Comparison especially in the LOW band with Chandra LETG would be interesting

### 3.6 Richard Saxton - Estimating the position of the optical axis from PSF studies

- For pn similar results as Dave
- MOS different results

### 3.7 Bruno Altieri – Gain CTI

- Cas A Observation Iron line comparison
- Tendency for MOS to overcorrect with time on bright sources only (Cas-A), shift worse at rev312 than rev115
- Points towards a count rate CTI dependence
- but CasA is obviously an extreme case (central CCD fully illuminated)
- Opposite effect than seen with internal calibration source.

## 4 EPIC/RGS cross calibration

### 4.1 JW v. Herder – RGS Items

- RGS is planning a cooling test where EPIC should make use of the available Calibration Time (coordinate MK with ME, JWH and the EPIC team)
- Small scale variations of RGS CCD response (5 %) might be due to varying CCD pulse height data selections
- O-edge: significant O-edge due to H<sub>2</sub>O contamination

## 5 EPIC/Chandra cross calibration

### 5.1 Slava Zavlin -Comparison of Line positions: Chandra/pn ACIS versus XMM

- ACIS line positions are between pn and MOS (PN ACIS MOS)
- HETGS: Si 1870 eV pn 1866 mos 1882
- S 2453 2448 2471
- [Silvano to analyse Circinus A with respect to pn/MOS energy differences AI\\_4](#)

### 5.2 Philippe Marty - cross cal and temp discrepancies on cluster of galaxies

- Work on dark frames (CLOSED observation)

### 5.3 Matthias Ehle- Feedback on the EPIC calibration from the viewpoint of the USG and community

- USG:
  - Constraints should be taken into account for cal targets (good visibility is required)
  - Calibration for cool MOS should be completed before cooler MOS is used for science (The approach of the PI is to cool the camera and stay then at the lower temperature starting the calibration there. Before that a cooling test of the second MOS camera should be performed.)
- Guest Observers are worried about:
  - EPIC Cross calibration (20-30eV difference of high energy line-positions MOS/pn, 10% flux discrepancy)
  - Calibration down to 0.1-0.2
  - Residuals close to absorption edges

## 6 Splinter Meetings

### 6.1 Splinter Meeting on cross calibration

- The RGS cooling test should be used to perform PSF investigations with Mrk 421. The observation could be performed with the new pn FF mode (masking) later than October 2002
- QE
  - Low energy: With Frank's new response matrices all relevant data should be reanalysed
  - High energy:
    - PN QE could be verified with the Crab (Frank) [AI\\_5](#)
    - Investigation on Seyfert 2 galaxy will be performed by Silvano, [AI\\_6](#)
- Filter:
  - MK to check if we could perform an OPEN filter measurement on a region where optical light is negligible. [AI\\_3](#)
  - Reanalyse thick filter data (Steve) [AI\\_7](#)
  - Co-ordination of filter analysis with the aim to find out which filter is in which camera (Martin) [AI\\_8](#)
- Vignetting: MPE to analyse Coma data for MOS and pn [AI\\_9](#) (Uli)

### 6.2 Splinter meeting on MOS-CTI

It was decided not to publish the ADUCONV files for the MOS, because in about 2 months time we would be able to release a new CTI correction which than requires other ADUCONV. It is the cleaner approach to correct first for CTI and then for Gain:

Timeline:

- Bruno and Paul to work out new time dependent CTI.CCFs correlated to the steps found in the CTI monitoring (done by 15. August) [AI\\_10](#) (Bruno, Paul)
- New ADUCONV.CCFs will then be developed by Paul and will be made public together with time dependent RMFs, which later can also be produced by the SAS. (ADUCONV and RMFs ready by end of September 2002) [AI\\_11](#) (Paul)

## 7 AOB

- Prioritised list of ongoing calibration for the cal document (Steve, Ulrich, Marcus)
- Future work on off-axis calibration should be structured in some way
- Observations related to MOS cooling should be discussed within the EPIC consortium in order get maximal use out of it also for the PN camera.
- **Next Meeting: 12-14 11 in Tuebingen**

## **8 Summary of Action Items**

- **AI\_CAL\_VILSPA\_2002/1:** Hand over the ADUCONV from Leicester to VILSPA (Paul to Bruno)
- **AI\_CAL\_VILSPA\_2002/2:** Steve to provide VILSPA with MOS Timing response matrices
- **AI\_CAL\_VILSPA\_2002/3:** MK to look for a field on which an open filter / filter comparison could be done
- **AI\_CAL\_VILSPA\_2002/4:** Silvano to analyze Circinus A with respect to pn/MOS energy differences
- **AI\_CAL\_VILSPA\_2002/5:** Frank to verify pn QE with the Crab
- **AI\_CAL\_VILSPA\_2002/6:** Silvano to investigate on Seyfert 2 galaxy concerning high energy QE
- **AI\_CAL\_VILSPA\_2002/7:** Steve to reanalyse thick filter data
- **AI\_CAL\_VILSPA\_2002/8:** Martin to co-ordinate filter analysis with the aim of finding out which filter is in which camera
- **AI\_CAL\_VILSPA\_2002/9:** MPE (Ulrich) to analyse Coma data for MOS and pn
- **AI\_CAL\_VILSPA\_2002/10:** Bruno and Paul to work out new time dependent CTI\_CCFs correlated to the steps found in the CTI monitoring (done by 15. August)
- **AI\_CAL\_VILSPA\_2002/11:** Paul to develop new ADUCONV.CCFs and time dependent RMFs, in line with the new CTI\_CCFs ADUCONV and RMFs ready by end of September 2002). This replaces **AI\_CAL\_VILSPA\_2002/1**