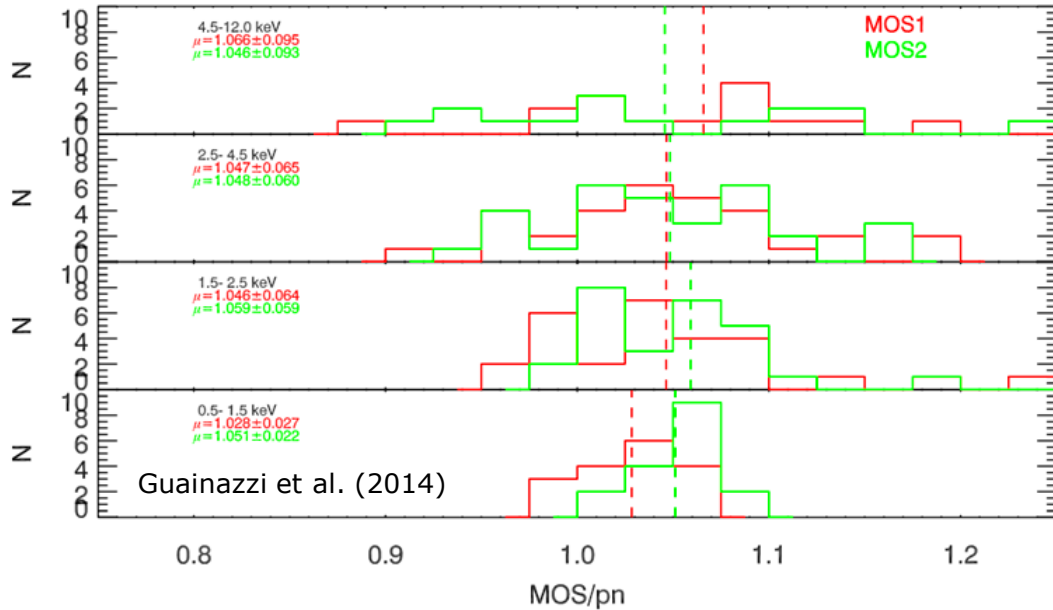


CORRAREA Calibration Status

**Michael Smith (ESAC), Cornelia Heinitz (IAAT),
Chris Tenzer (IAAT), Martin Stuhlinger (ESAC)**

EPIC Calibration & Operations Meeting, ESAC, 15-16 March 2018

CORRAREA Correction



CORRAREA:

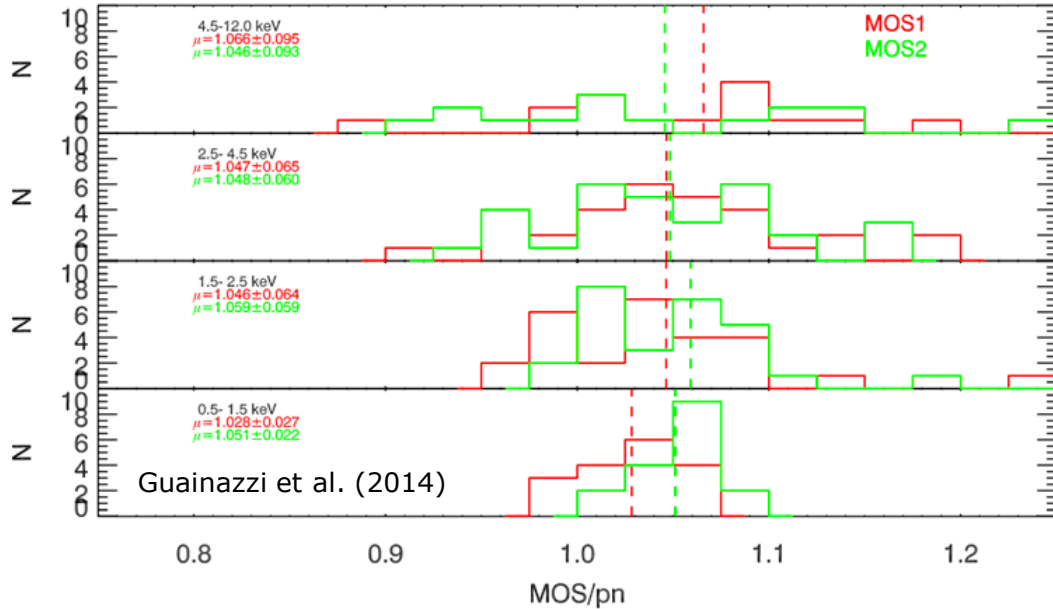
An empirical correction of the EPIC on-axis effective areas by an E-dependent multiplicative factor.

Implemented as non-default option in SAS 14 (Guainazzi et al. 2014).

sample of 46 sources
analysed with SAS v13.5
and calibration files of ~ 2014



CORRAREA Correction



CORRAREA:

An empirical correction of the EPIC on-axis effective areas by an E-dependent multiplicative factor.

Implemented as non-default option in SAS 14 (Guainazzi et al. 2014).

Aim is to make this a default correction

- recalibration and further validation
- automated processing in view of future updates

sample of 46 sources
analysed with SAS v13.5
and calibration files of ~ 2014



Enlarged Source Sample



- Enlarged source sample building on original source selection and screening (Read et al. 2014)
- Using 3XMM-DR7 Serendipitous Source Catalogue
- Selection criteria:
 1. point-like
 2. Modes: Full Frame, Large Window, Small Window
 3. Filters: Thin, Medium, Thick
 4. Total # counts (0.2-12 keV): > 5000 cts (MOS), > 13500 cts (pn)
 5. Max. count rates (mode dependent pile-up limits)
 6. Near on-axis (within 2')
 7. Out of galactic plane ($|\text{galactic latitude}| > 15 \text{ deg}$)
 8. Non-crowded fields



Enlarged Source Sample



MOS1	MOS2	pn	# obs. 3XMM-DR6	# obs. 3XMM-DR7
LW	LW	FF	29	29
"	"	LW	41	50
"	"	SW	7	8
SW	SW	FF	15	15
"	"	LW	10	9
"	"	SW	31	55
FF	FF	FF	163	166
"	"	LW	6	6
FF	LW	FF	3	3
FF	SW	FF	2	2
LW	FF	FF	2	2
LW	SW	FF	2	2

~ 350 sources
(== observations)



Mainly done via bash, python and idl:

1. Data processing
2. Common GTI filtering
3. Images created for visual screening & background region selection
4. Spectral products, RMFs and ARFs
5. Data stacking per detector and creating exposure weighted ARFs/RMFs
6. Calculation of MOS1 / pn and MOS2 / pn residuals
7. Modelling of the residual ratios

Screening



Images have to be **screened** for:

- crowded fields chip gaps & bad CCD columns close to the source
- targets appearing extended or lying within extended emission
- anomalies e.g. loss of a quadrant

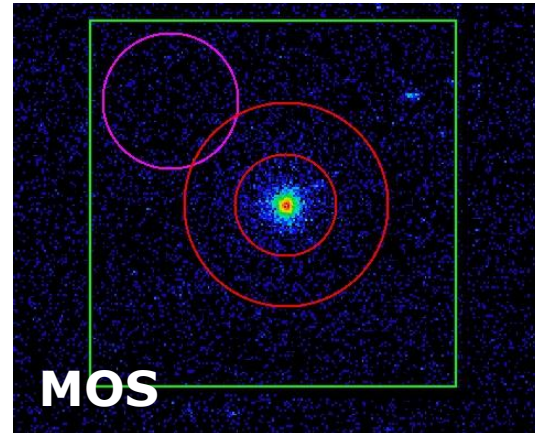
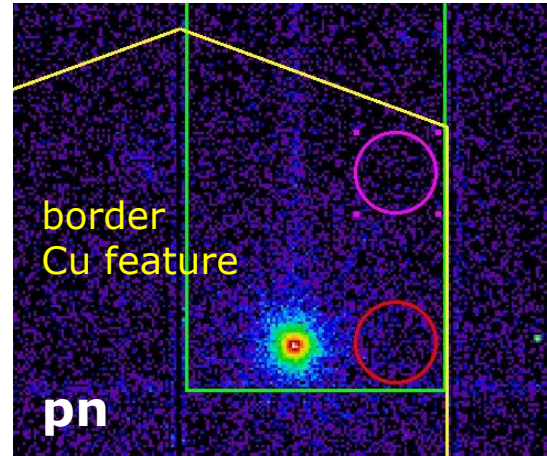


Screening

Images have to be **screened** for:

- crowded fields chip gaps & bad CCD columns close to the source
- targets appearing extended or lying within extended emission
- anomalies e.g. loss of a quadrant

Background selection (for FF mode):



Screening

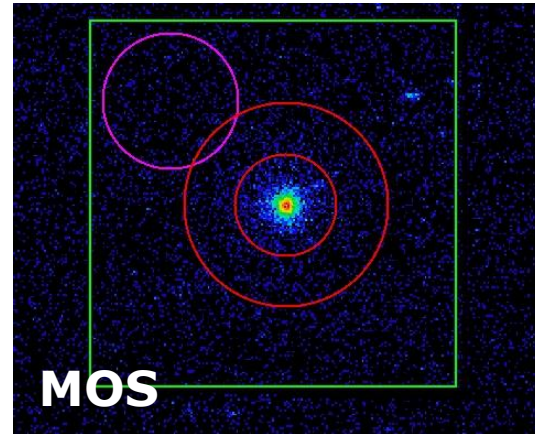
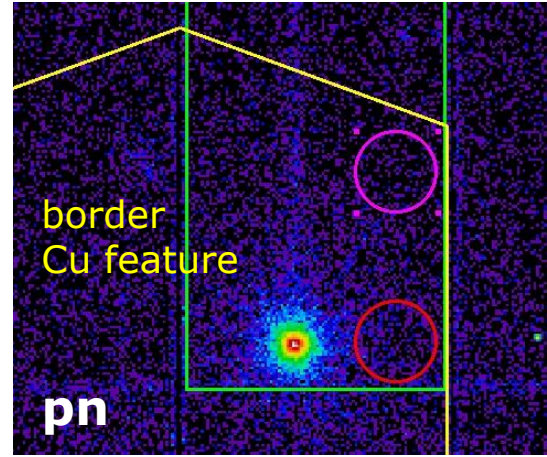
Images have to be **screened** for:

- crowded fields chip gaps & bad CCD columns close to the source
- targets appearing extended or lying within extended emission
- anomalies e.g. loss of a quadrant

Background selection (for FF mode):

Screening for pile-up using:

- source count rate
- pattern distributions (epatplot)
- diagonal event (MOS)



Summary & Outlook



the **automation** to get the residual ratio and the correction function is **done to a large degree**

the **source selection criteria** have been expanded

3XMM-DR7 has been searched for targets meeting the criteria and brought up **301 new potential observations** by including thick filter and window modes

the **screening** is **currently underway**

the CORRAREA **update** with the current public CCFs and SAS v16.1 is in the making

