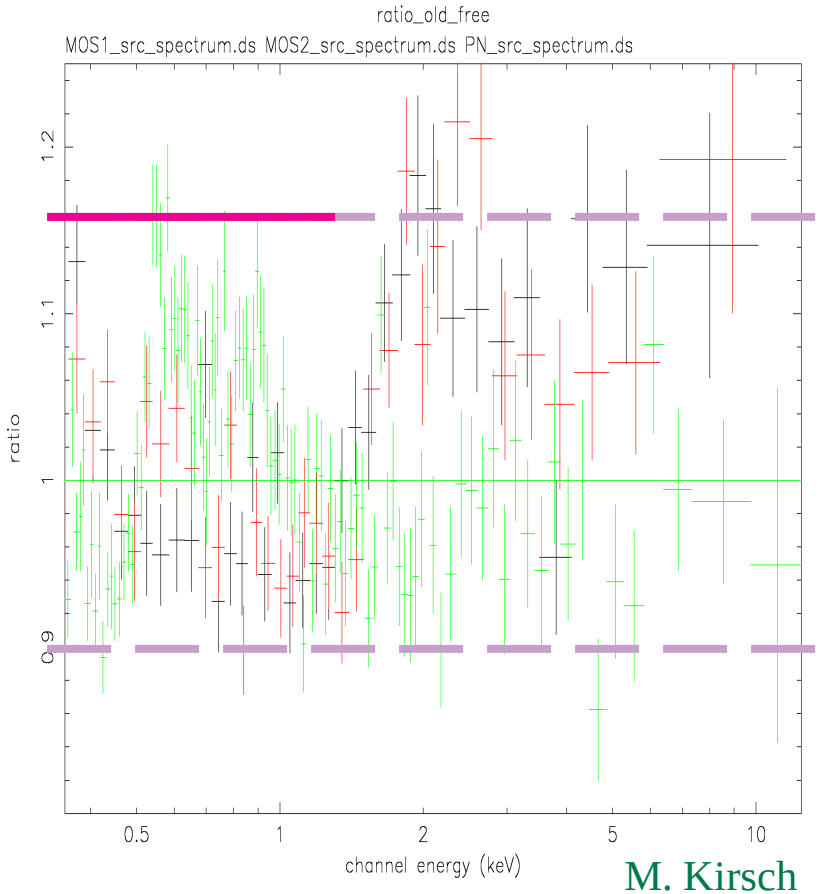
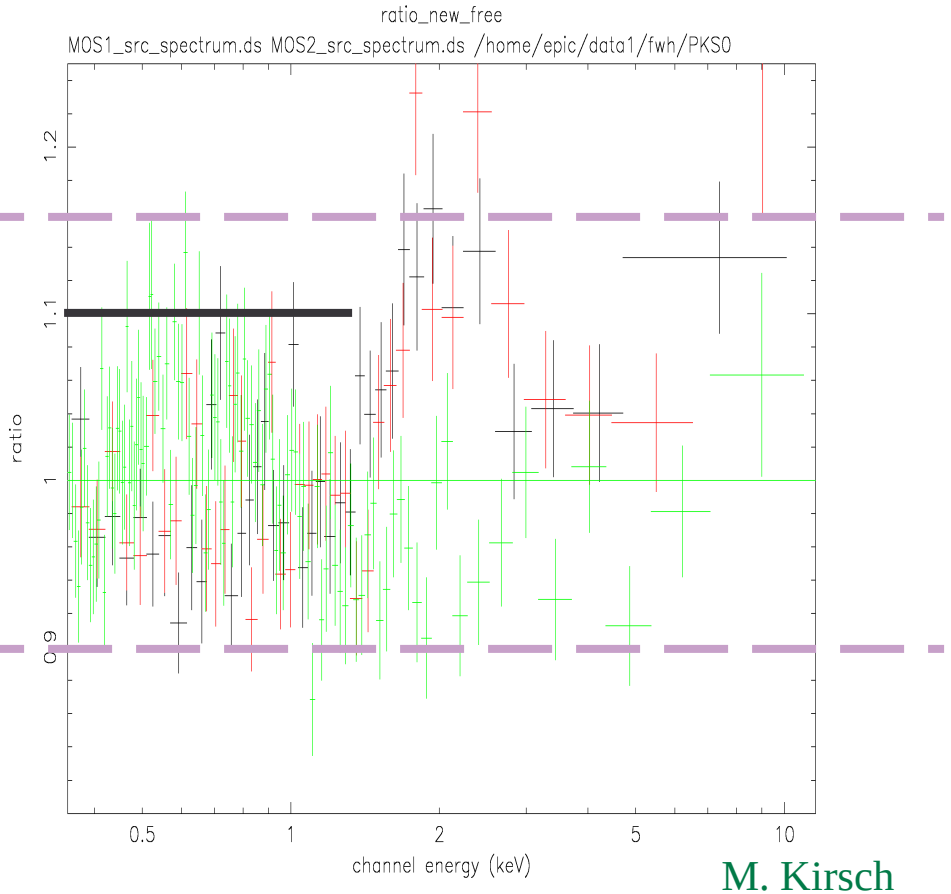
Cross calibration PKS0558 -504

Marcus G. F. Kirsch (EPIC)
Andy M. T. Pollock (RGS)

CAL Workshop MPE
cross.-cal before and after



M. Kirsch



M. Kirsch

the observation

PKS0558-504

- RA: 05:59:47.00 DEC: -50:26:51.0
- radio-loud Narrow-Line Seyfert 1
- Rev. 153 (0129360201)
  - MOS1: Large Window, Thin Filter (S004)
  - MOS2: Large Window, Thin Filter (S006)
  - pn: Small Window, Thin Filter (S001)

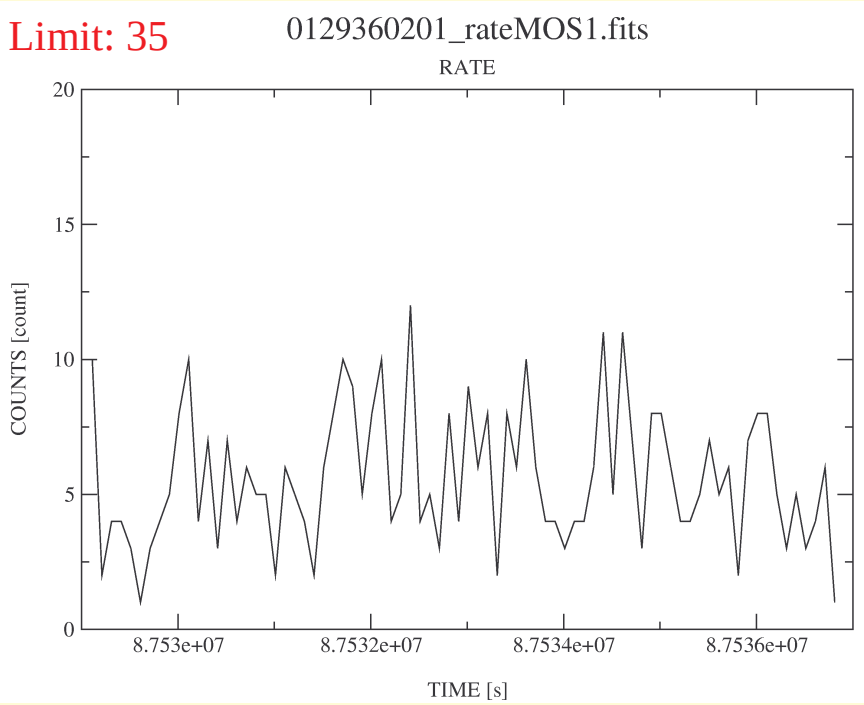
- MOS selection: #XMMEA_EM && (PATTERN<=12)
- pn selection: (FLAG==0) && (PATTERN<=4)
- fit model: const(PL+BB+BB)

check for high flaring bg

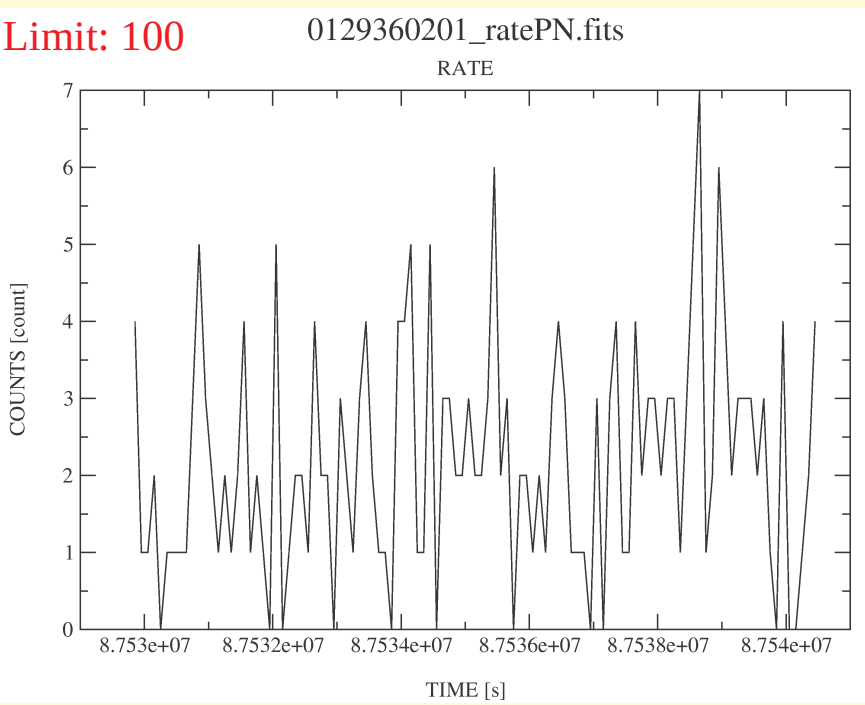
(#XMMEA_EM && (PI>10000) && (PATTERN==0)) < 0.35 cts/sec (#XMMEA_EP && (PI>10000) && (PATTERN==0)) < 1cts/sec

Rev. 153

Limit: 35



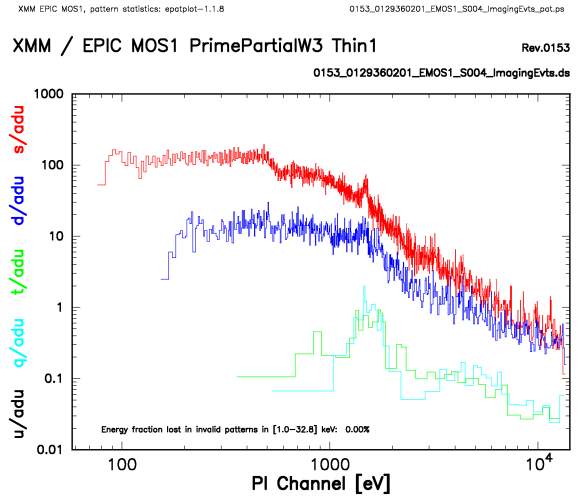
Limit: 100

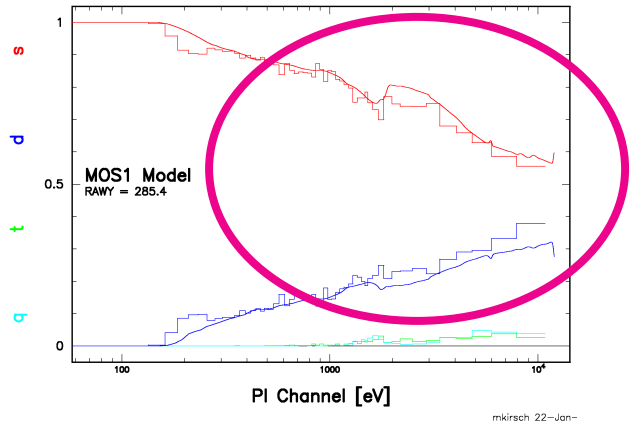


→ no radiation

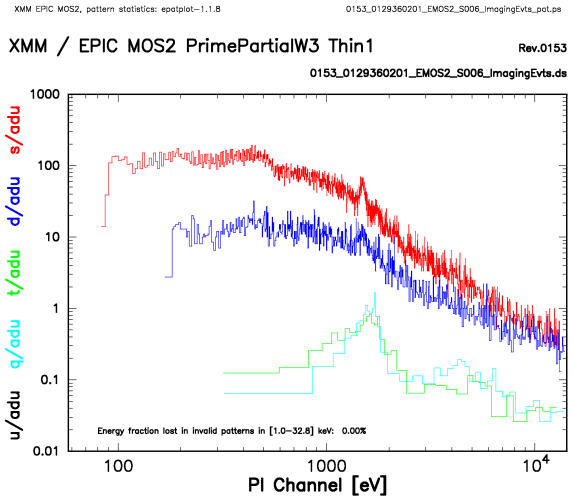
check for pile-up

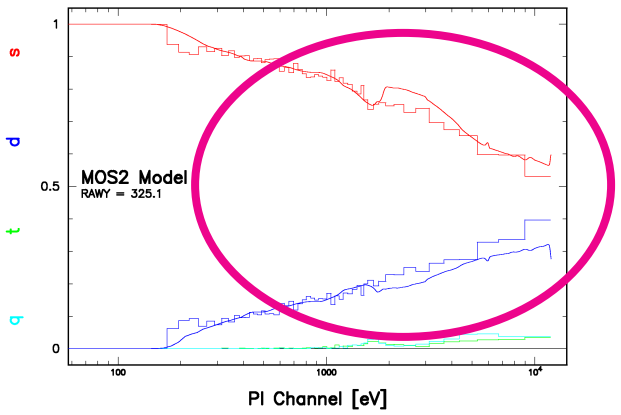
MOS1



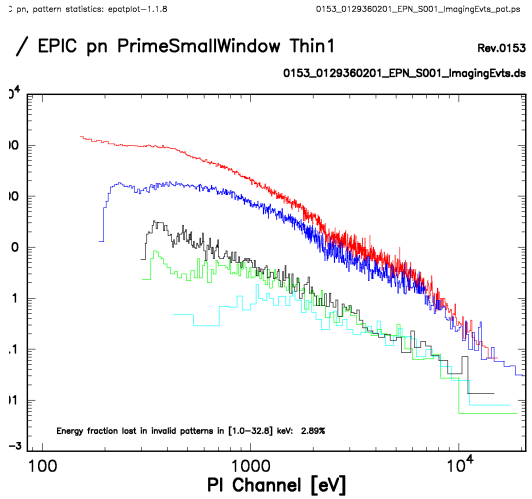


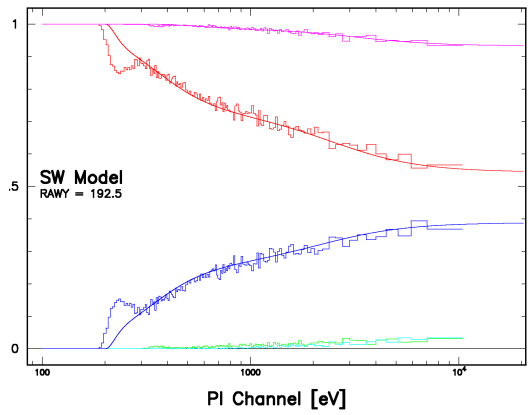
MOS2





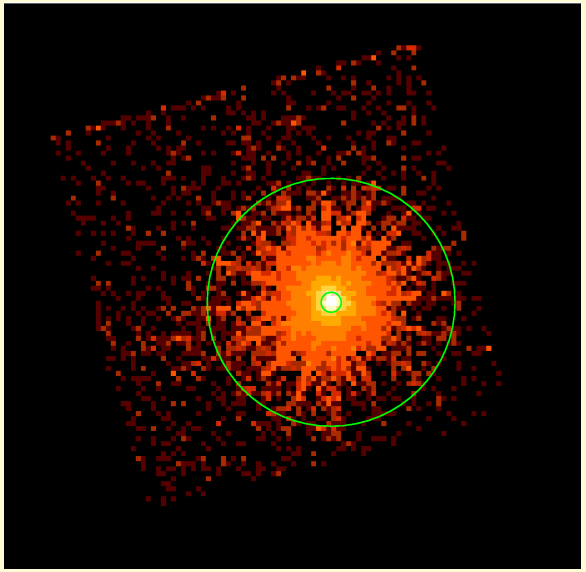
pn



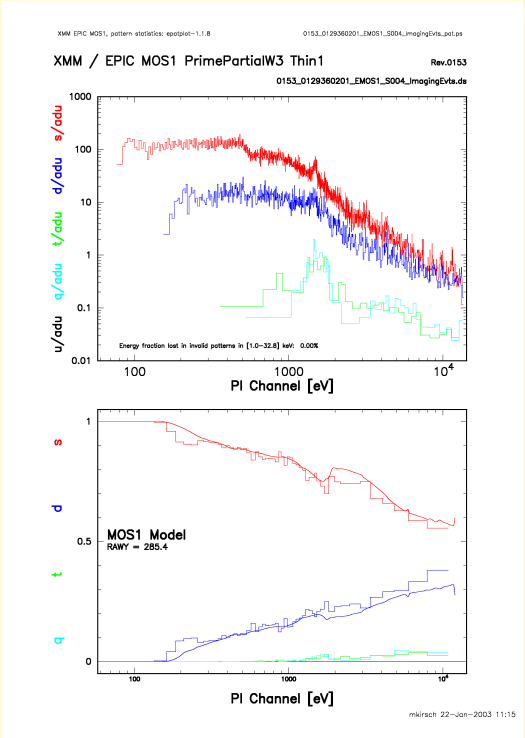


change extraction region

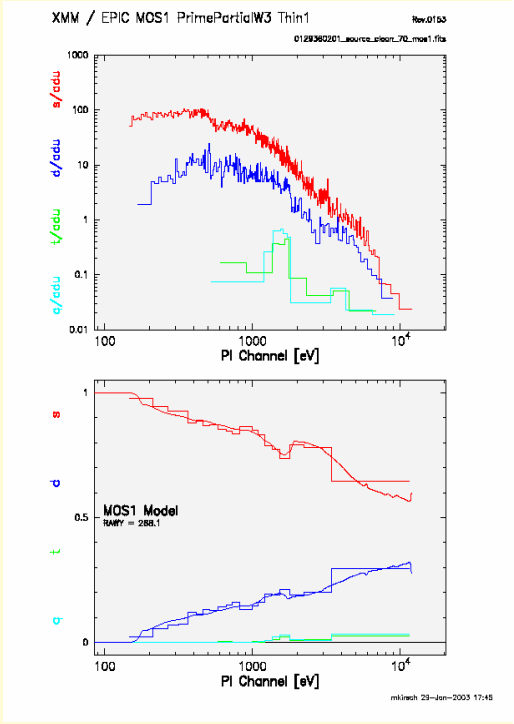
- extract MOS data from annulus with
  - R_i=9 arcsec
  - R_o= 108 arcsec



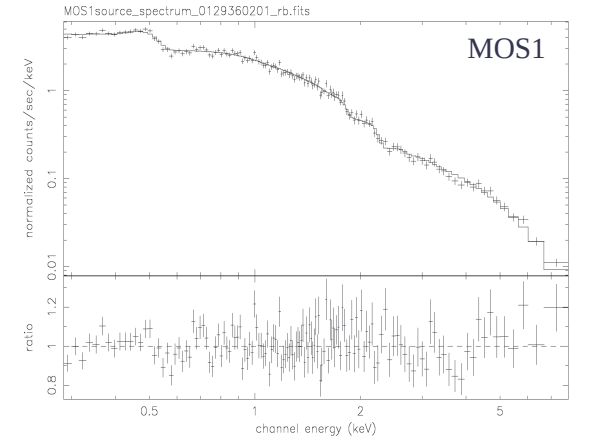
circle

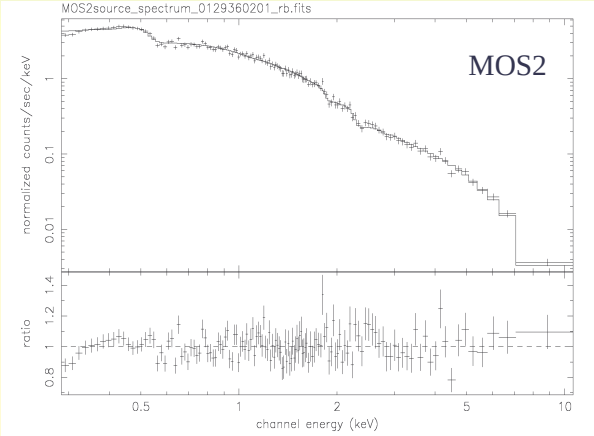


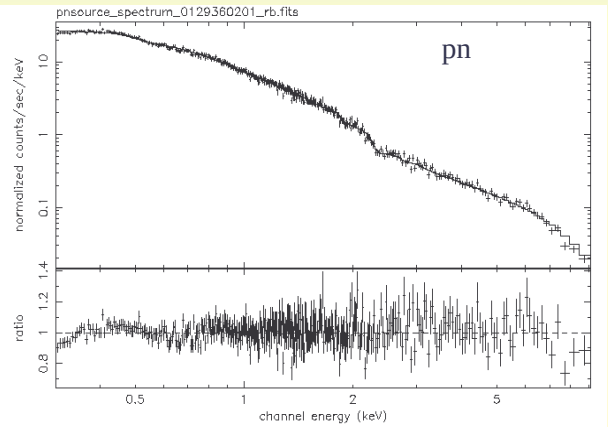
annulus



individual fitting (circle)

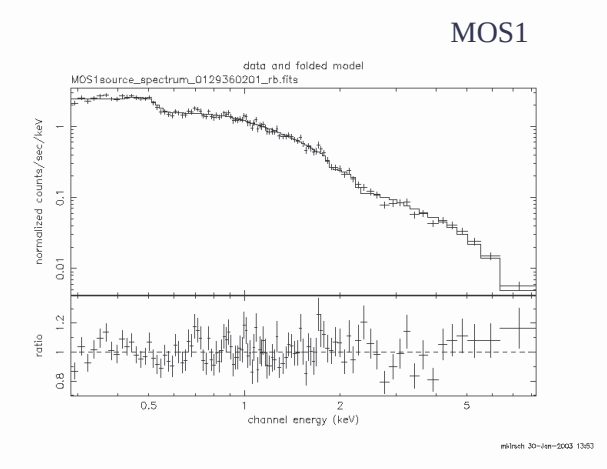


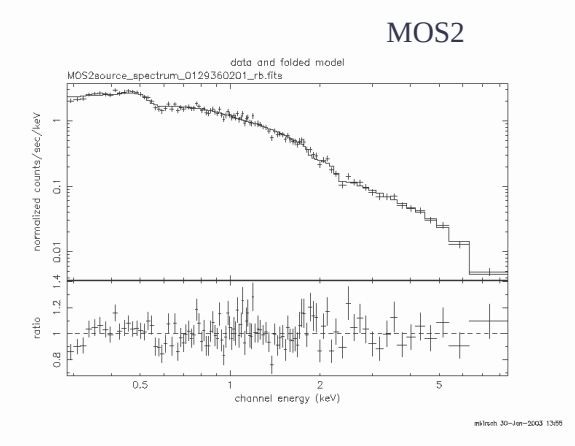




	MOS1	MOS2	pn	typ error	
PI	2.135	2.098	2.012	0.07	
PI_norm	5.77E-03	5.31E-03	4.62E-03	6.00E-05	
bb T in eV	74	122	117	6	
bb_norm	6.42E-05	1.05E-04	1.34E-04	6.00E-06	
bb T in eV	162	401	246	10	
bb_norm	4.96E-05	1.88E-05	5.00E-05	6.00E-06	
flux 0.3-2 ergscm**-2 s**-1	2.39E-11	2.41E-11	2.58E-11		
flux 2-10 ergscm**-2 s**-1	1.22E-11	1.22E-11	1.19E-11		

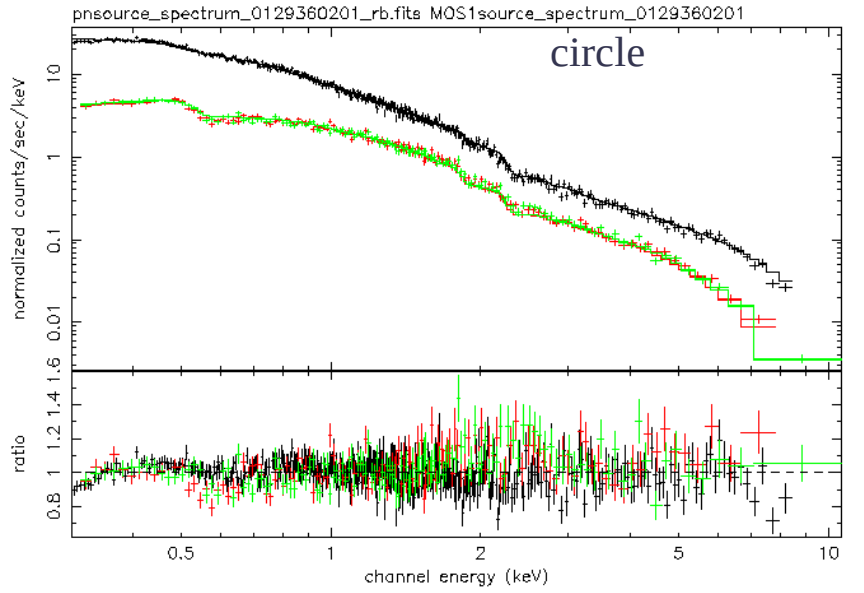
individual MOS-fitting (annulus)

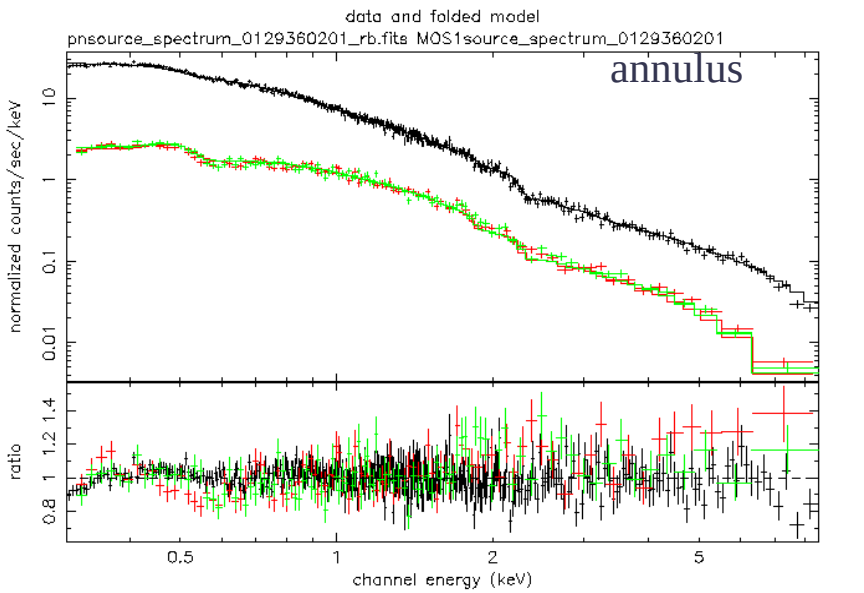




	MOS1	MOS1_ann	MOS2	MOS2_ann
PI	2.135	1.995	2.098	2.045
PI_norm	5.77E-03	5.10E-03	5.31E-03	5.02E-03
bb T in eV	74	77	122	121
bb_norm	6.42E-05	1.09E-04	1.05E-04	1.11E-04
bb T in eV	162	179	401	324
bb_norm	4.96E-05	6.59E-05	1.88E-05	1.96E-05
flux 0.3-2 ergscm**-2 s**-1	2.39E-11	2.41E-11	2.41E-11	2.35E-11
flux 2-10 ergscm**-2 s**-1	1.22E-11	1.33E-11	1.22E-11	1.23E-11

simultaneous fitting

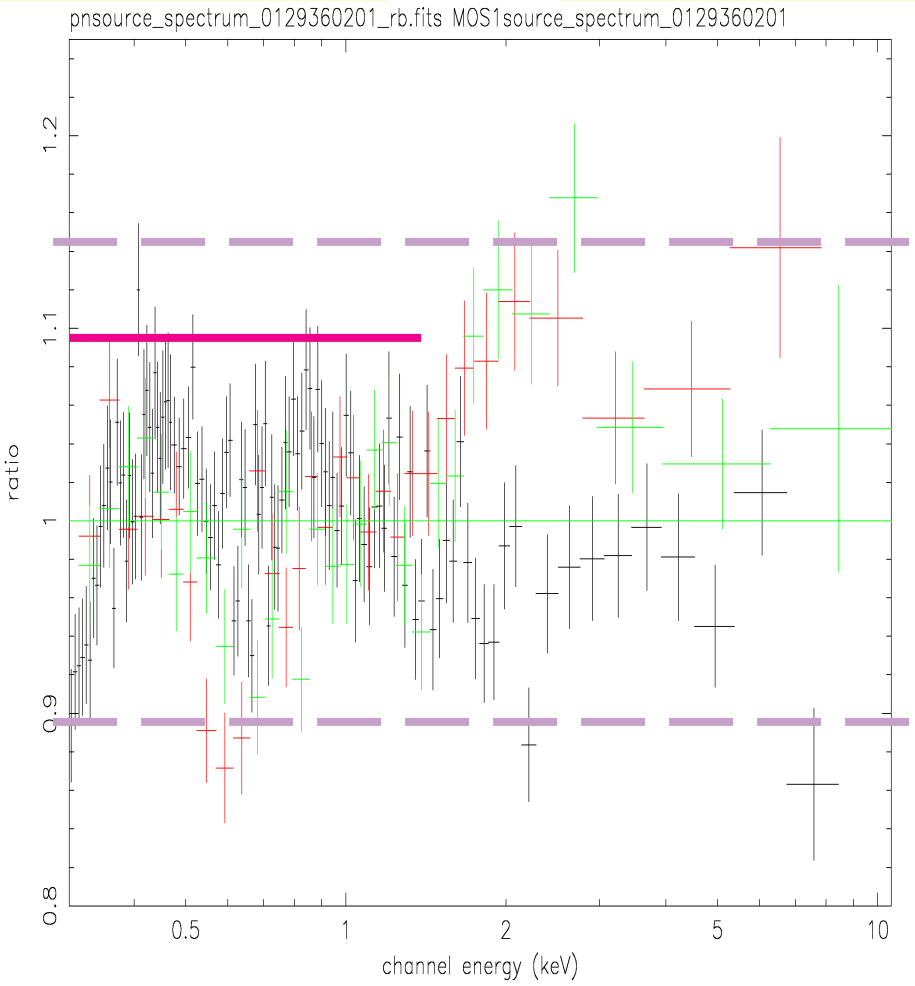




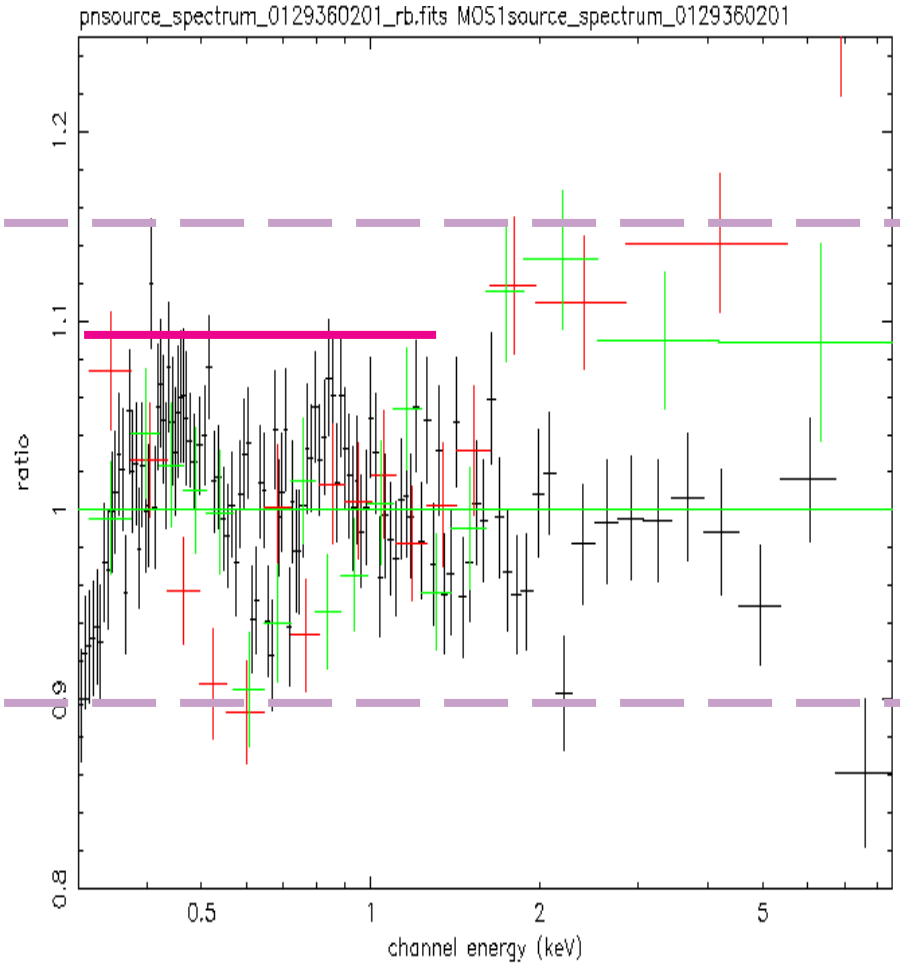
	MOS1	MOS1_ann	MOS2	MOS2_ann	pn	pn_ann
const	0.922	0.9322	0.9455	0.9275	1	1
PI	2.046	2.029	2.046	2.029	2.046	2.029
PI_norm	5.09E-03	4.93E-03	5.09E-03	4.93E-03	5.09E-03	4.93E-03
bb T in eV	115	115	1.15E+02	115	115	115
bb_norm	1.22E-04	1.24E-04	1.22E-04	1.24E-04	1.22E-04	1.24E-04
bb T in eV	0.2504	240	0.2504	240	0.2504	240
bb_norm	3.95E-05	4.55E-05	3.95E-05	4.55E-05	3.95E-05	4.55E-05
flux 0.3-2 ergscm**-2 s**-1		2.40E-11		2.39E-11		2.57E-11

ratios

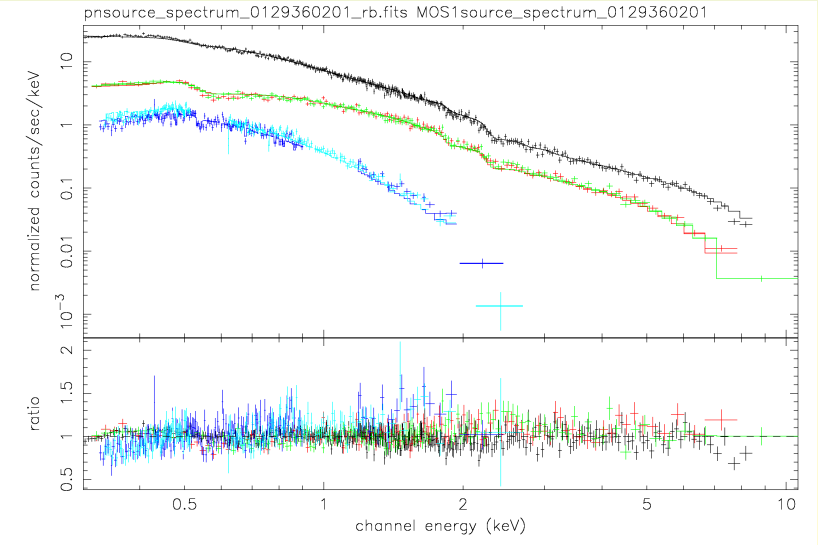
circle

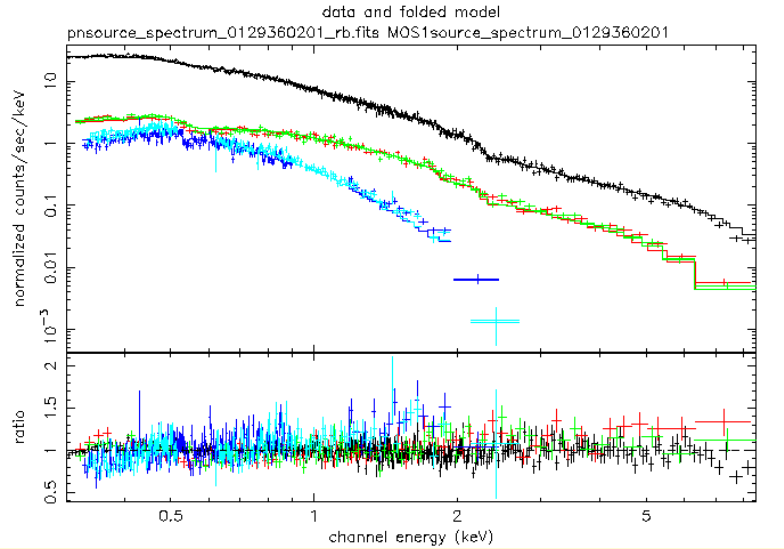


annulus



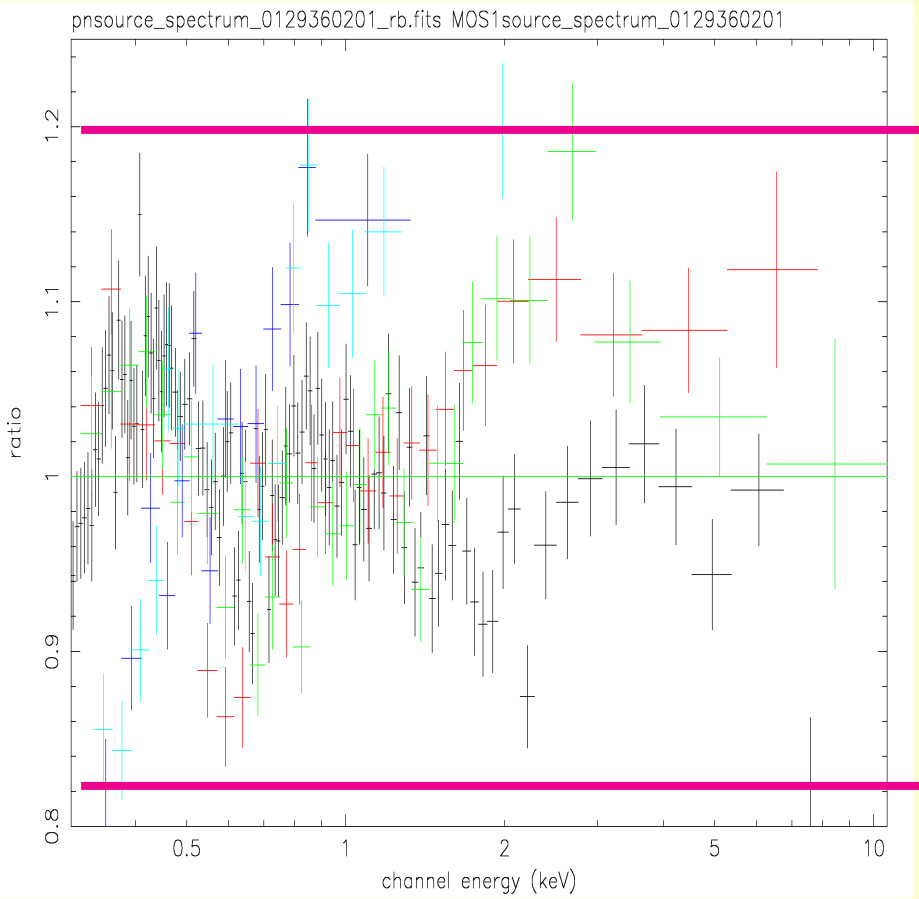
EPIC and RGS

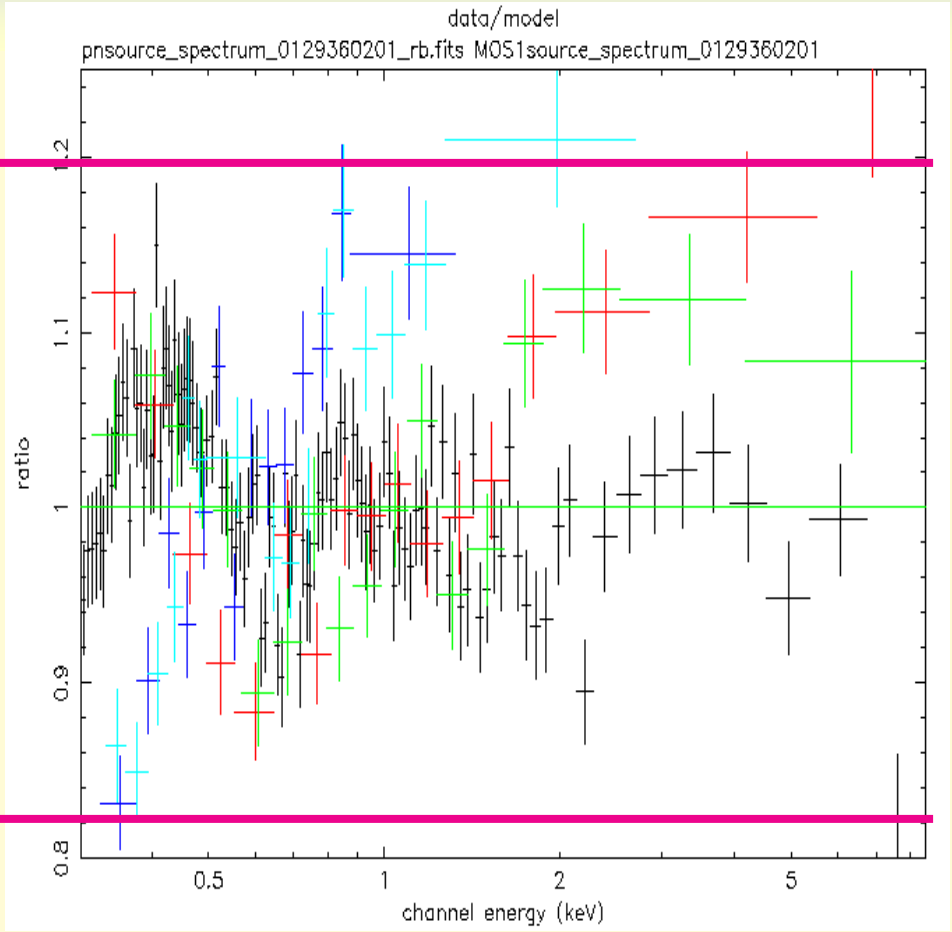




	MOS1	MOS2	PN	RGS1	RGS2
const	0.928	0.9234	1	0.8235	0.8338
PI	1.918	1.918	1.918	1.918	1.918
PI_norm	4.14E-03	4.14E-03	4.14E-03	4.14E-03	4.14E-03
bb T in eV	124	1.24E+02	1.24E+02	124	124
bb_norm	1.53E-04	1.53E-04	1.53E-04	1.53E-04	1.53E-04
bb T in eV	293	293	293	293	293
bb_norm	5.10E-05	5.10E-05	5.10E-05	5.10E-05	5.10E-05
flux 0.3-2 ergscm**	2.37E-11	2.36E-11	2.55E-11	2.10E-11	2.13E-11
flux 2-10 ergscm**-	1.15E-11	1.15E-11	1.24E-11		

EPIC and RGS ratio





conclusion

- pn residuals at O-edge decreased with the new QE and CTI in SW-Mode by 3-4% (SAS 5.4.1)
- still problems around gold edge for the MOSs
- RGS shows significant trend in spectral shape: harder spectrum
- Individual EPICs show residuals ± 5-7 %
- EPIC cameras agree within ± 10-13 %
- EPIC & RGS agree within ± 20 %

plans for further cross-cal

The RGS and EPIC CAL scientists plan to:

- analyse systematically a set of EPIC and RGS observations
- fold RGS spectra as a "model" trough EPIC matrices for a set of observations
  --> QE differences?
  --> trends in spectral shape?
  --> O-edge?
- start systematic cross calibration with Chandra