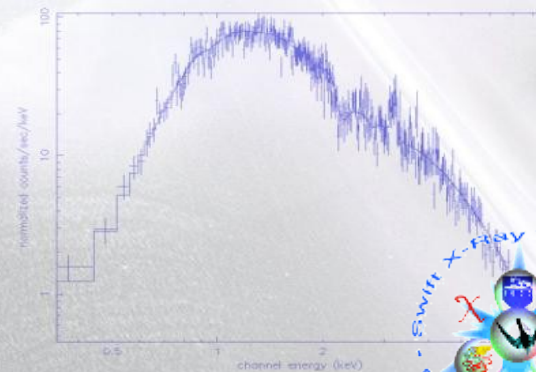
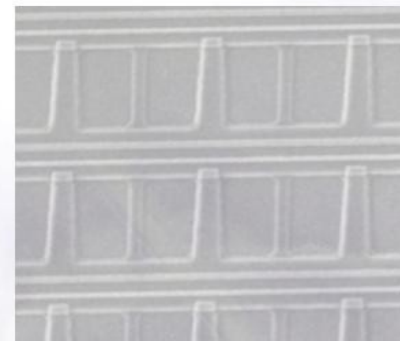
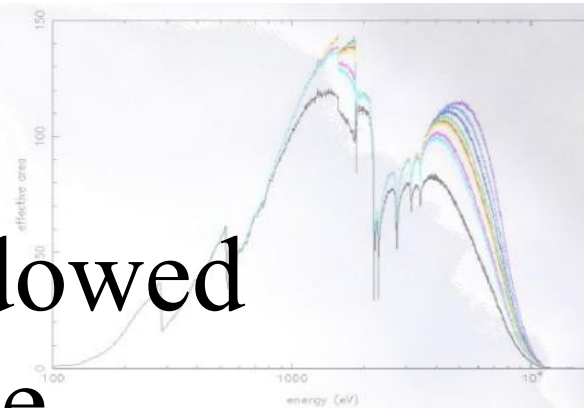


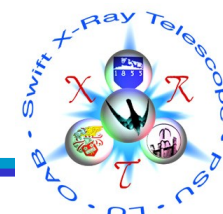
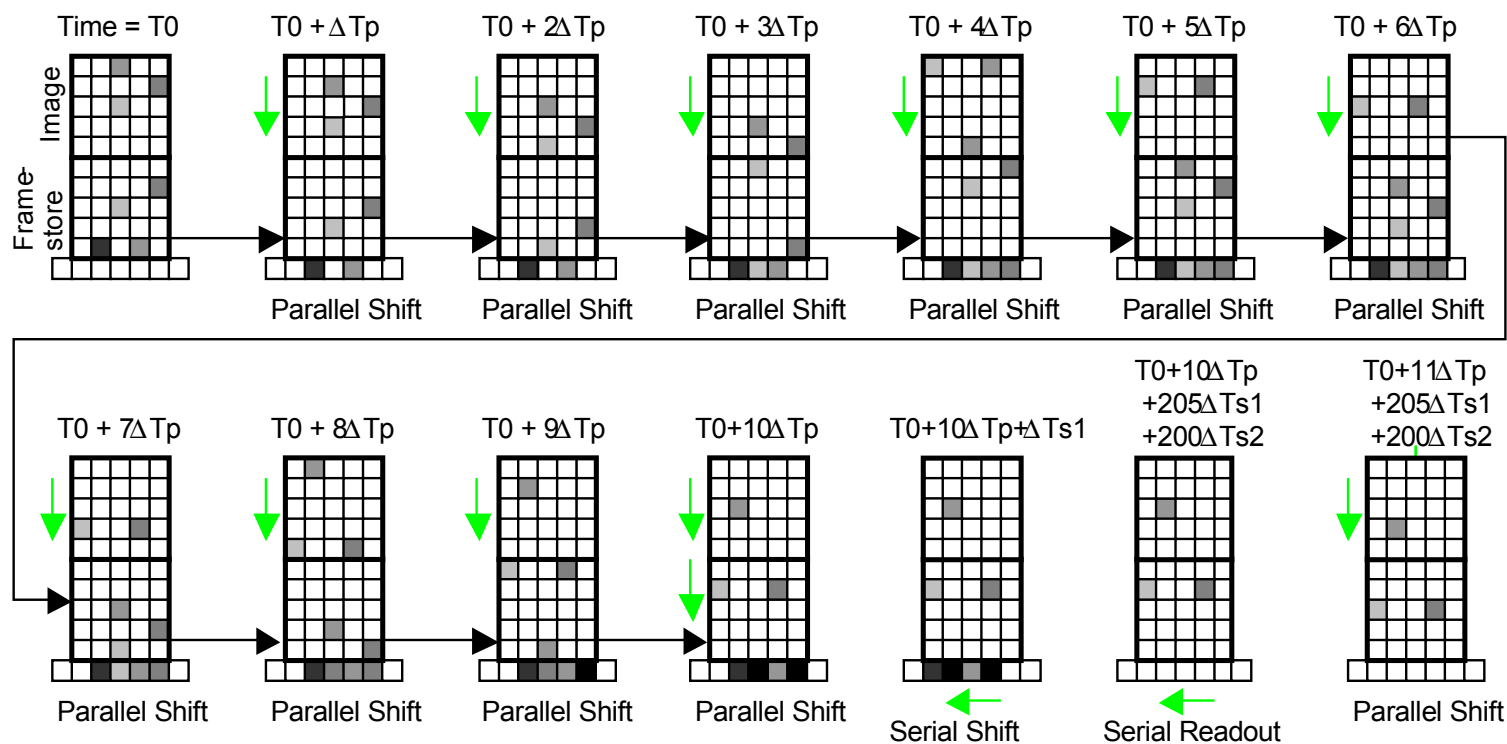
Swift-XRT Windowed Timing mode

Andy Beardmore
and the Leicester
Swift calibration team



- Data are clocked at a regular rate
- 10 rows are clocked into the serial register
- Central 200 columns are then read out of the serial register
 - Readout time is 1.78 ms per output row
 - $10 \times 15 \mu\text{s}$ (parallel) +
 - $(205 \times 1.5 + 200 \times 6.5) \mu\text{s}$ (serial)
- MET pixels inserted after every 200 pixel data row
- Pseudo-frames comprise 600 output rows
- WT mode selected automatically above $\sim 5\text{c/s}$
- Piled-up above $\sim 150\text{c/s}$





- On-board

- Bi

- E_v

- Ground

- Bi

- 2C

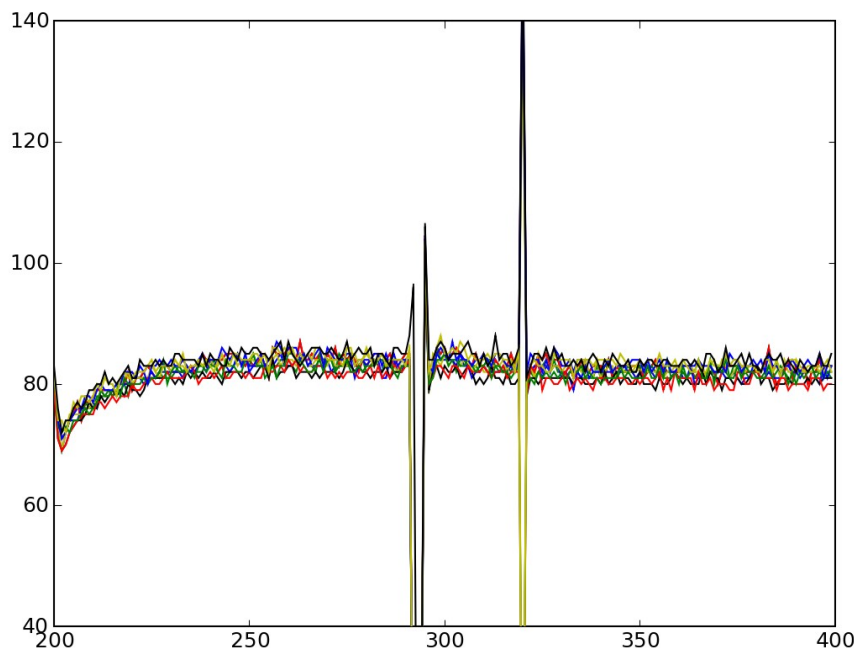
- te

- E_v

- location of known, bright, source)

- Pattern recognition

- CTI (and now trap) corrections applied



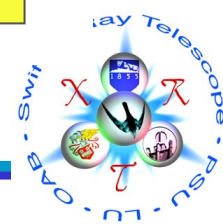
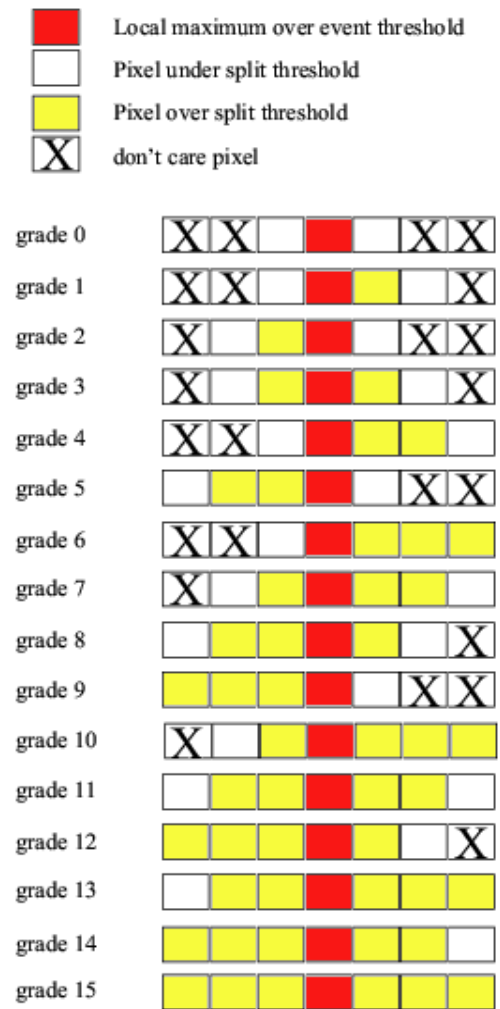
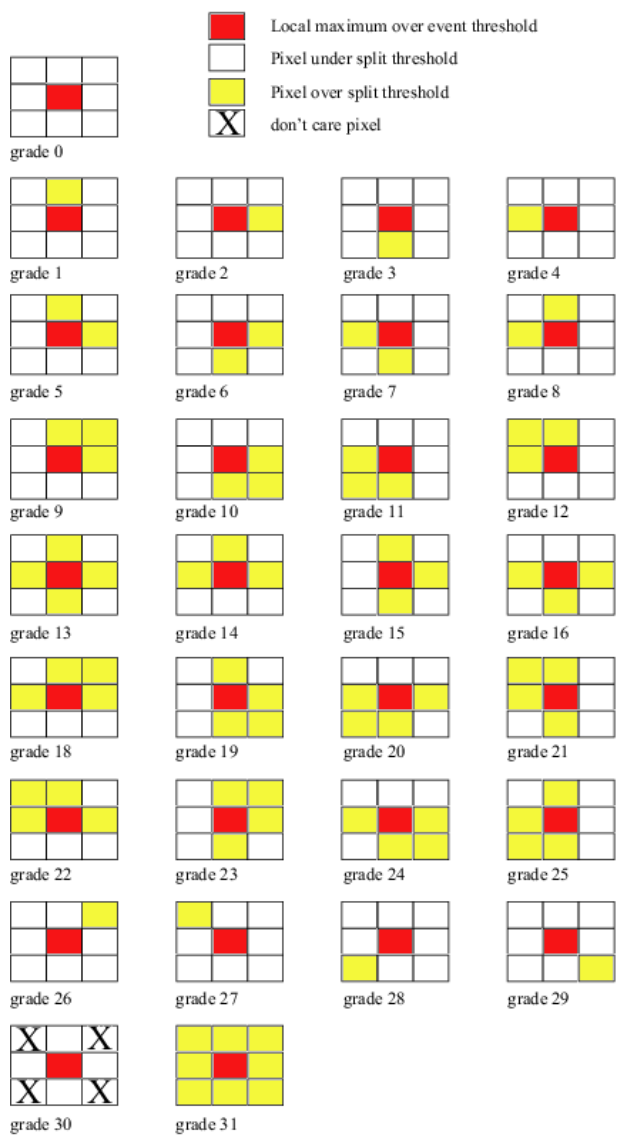
bias level

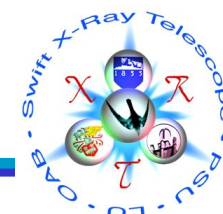
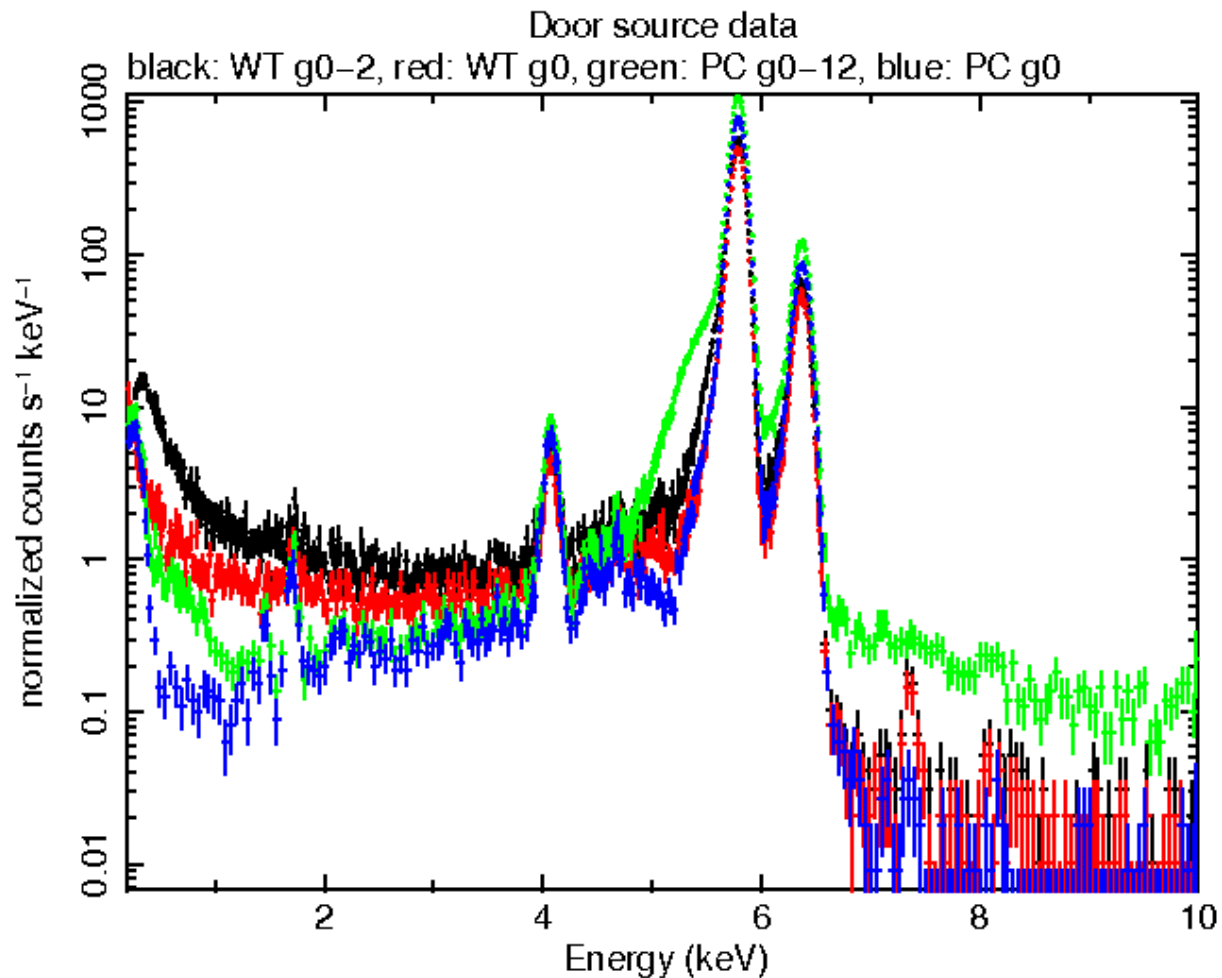
measured

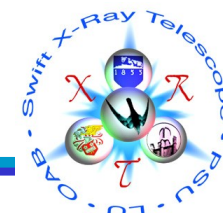
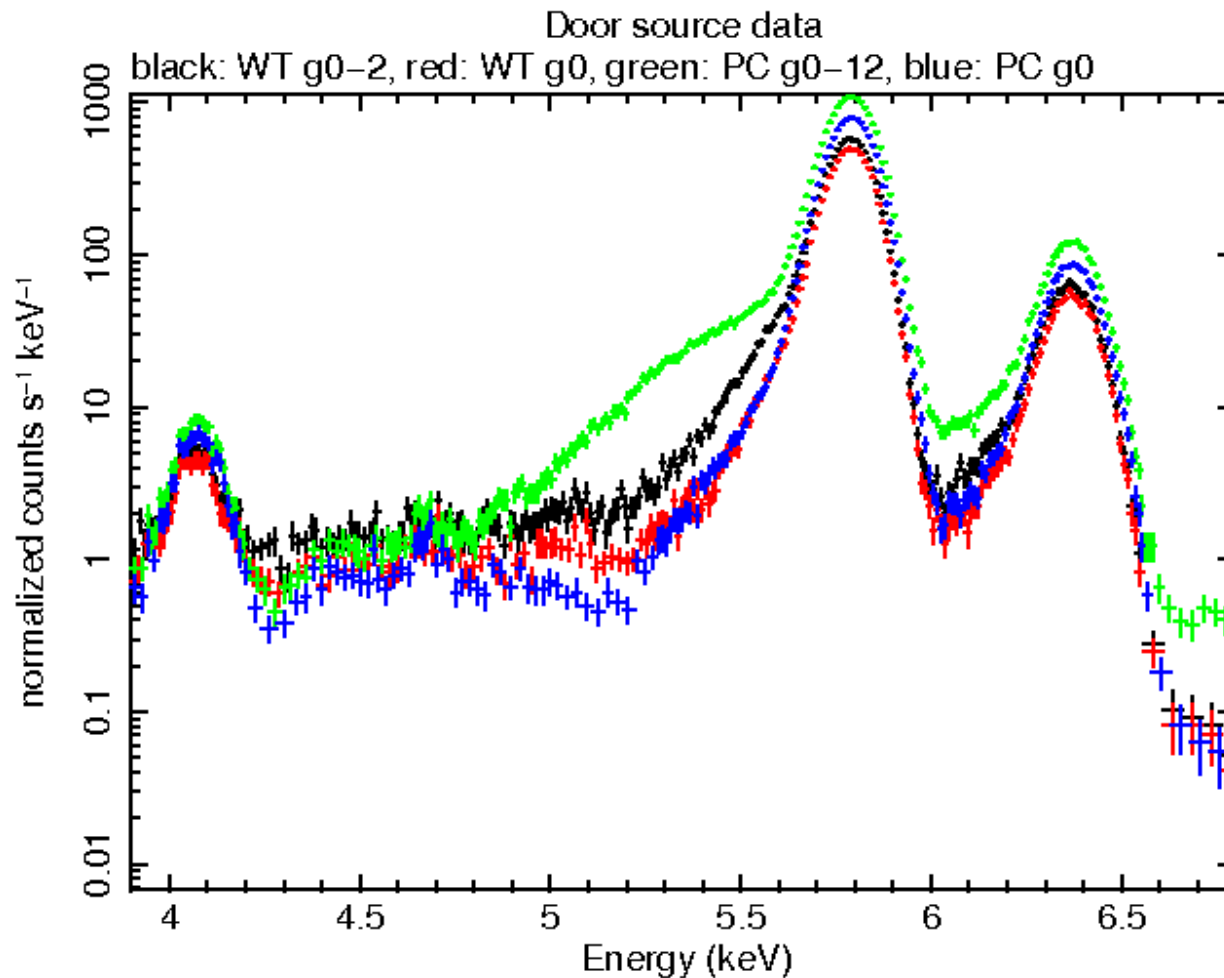
– “last

time from

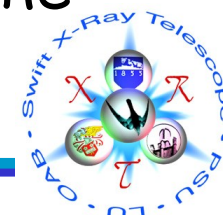




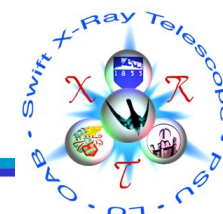
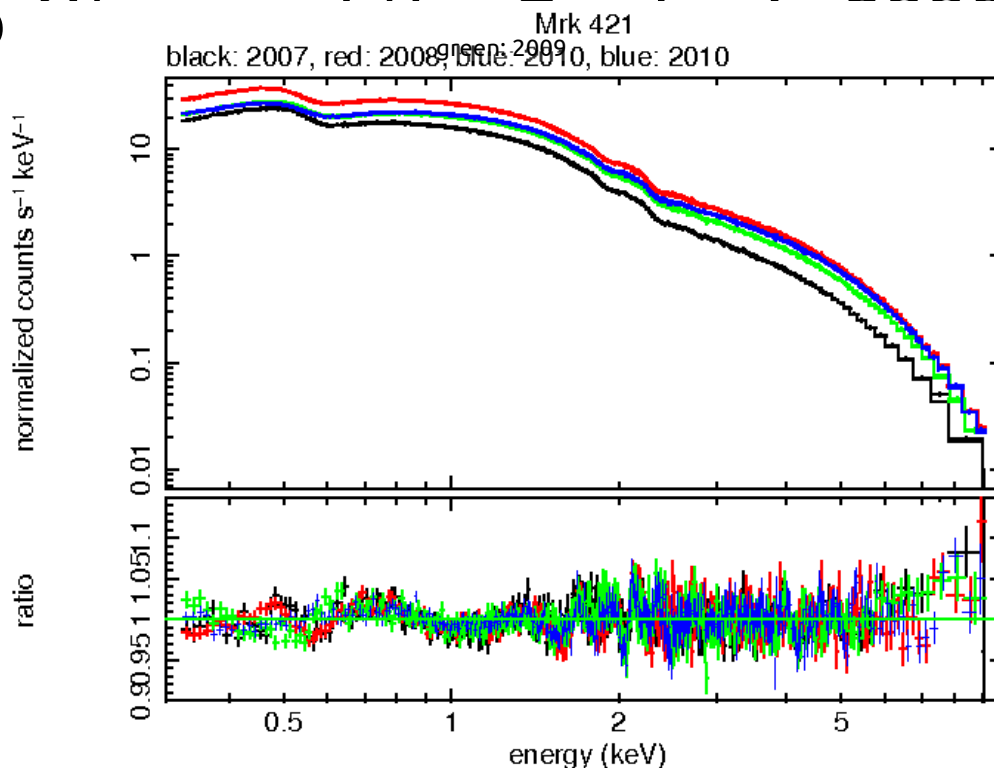




- Found the current v012 WT broadened RMF works quite well on trap corrected data.
 - Suggests level of broadening applied in 2007-09 is good for trap corrected data in 2008-2010.
- However, comparison of unbroadened and broadened RMF made us realise a $\sim 16-18$ eV shift (to lower energies) exists, caused by the broadening function
- Corrected this shift (by 2 PI channels, 20eV)
- Further cosmetic corrections applied around the Si edge



- Used to refine the Si residuals
- NB - gain fit with offset of $\sim 10\text{eV}$ required to ...



- Cyg X-1 : 920s simultaneous with Suzaku

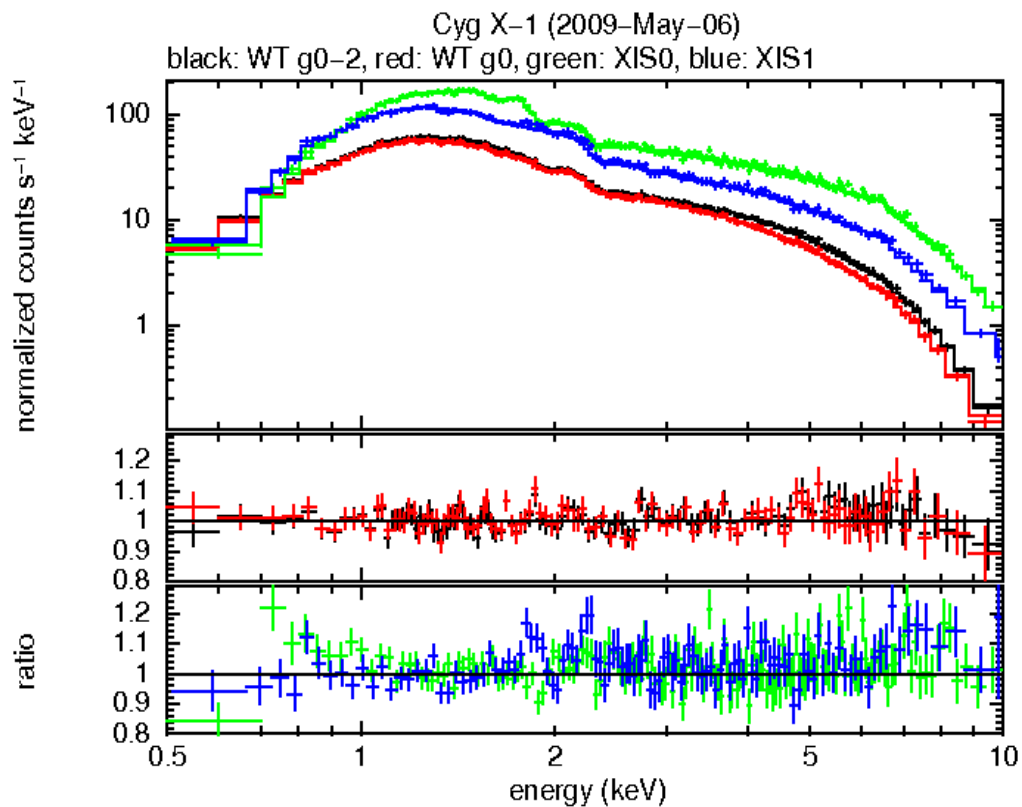
Suzaku XIS0/1 (tied)

NH	0.857 +/- 0.054	
diskbb kT	0.223 +/- 0.017	
diskbb norm	(2.05 +1.58 -0.92)e5	
PL Gamma	1.795 +/- 0.028	
Fx	(11.08 +0.07 -0.22)e-9	XIS0
(0.5-10)	(10.55 +0.07 -0.22)e-9	XIS1

XRT WT grade 0-2 grade 0

NH	0.852 +/- 0.052	0.799 +/- 0.050
diskbb kT	0.218 +/- 0.020	0.234 +/- 0.025
diskbb norm	(1.57 +1.38 -0.76)e5	(0.82 +0.86 -0.43)e5
PL Gamma	1.736 +/- 0.031	1.737 +/- 0.033
Fx	(9.46 +0.06 -0.14)e-9	(9.35 +0.07 -0.19)e-9
(0.5-10)		





spb 8-Mar-2011 13:48



Check on PKS2155-304

- PKS2155-305 : 9ks simultaneous with XMM (2009 May)

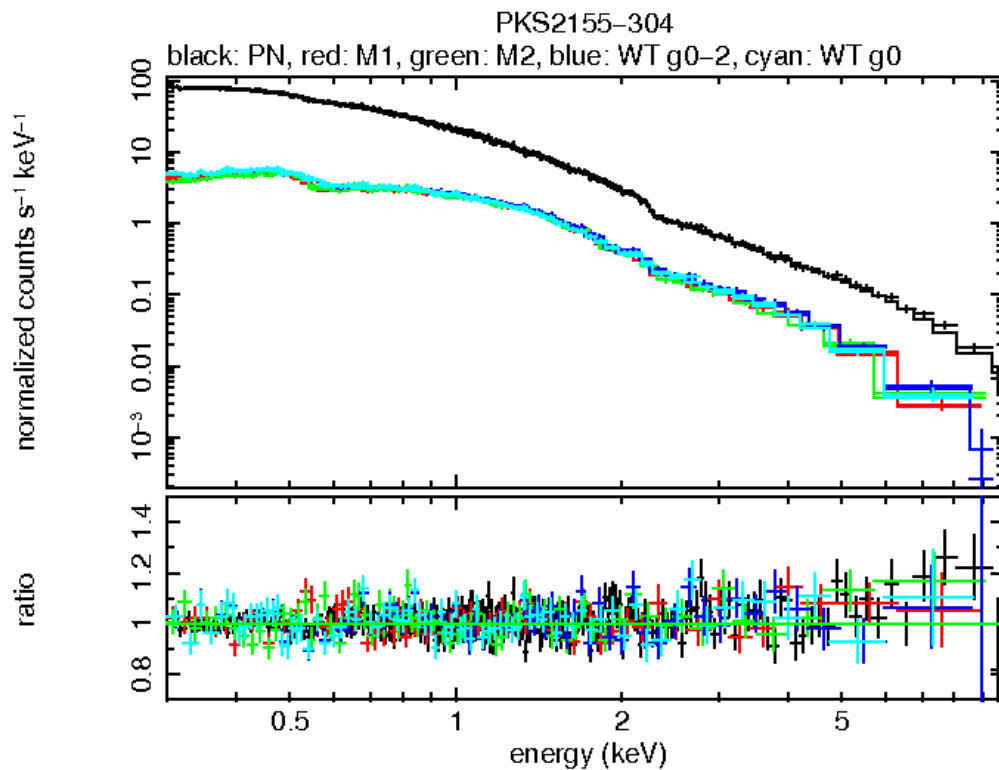
Model: phabs * bkpow

XMM	PN	M1	M2
NH	(1.29 +/- 0.03)e20	(0.09+/-0.01)e20	(1.03+/- 0.09)e20
Alpha1	2.688 +/- 0.030	2.509 +/- 0.035	2.540 +/- 0.115
Ebreak	1.03 +/- 0.070	1.211 +/- 0.12	1.176 +/- 0.18
Alpha2	2.882 +/- 0.015	2.844 +/- 0.048	2.925 +/- 0.060
Fx (0.3-10) e-10	1.27 +/- 0.015	1.23 +/- 0.015	1.22 +/- 0.005

XRT WT	grade 0-2	grade 0
NH	(2.11+/-0.8) e20	(2.30+/-0.7)e20
alpha1	2.404 +/- 0.10	2.426 +/- 0.094
Ebreak	1.130+/-0.17	1.160+/-0.16
Alpha2	2.816 +/- 0.055	2.830 +/- 0.056
Fx (0.3-10) e-10	1.17 +/- 0.015	1.17 +/- 0.016

Cf Galactic NH = 1.48e20 cm⁻²



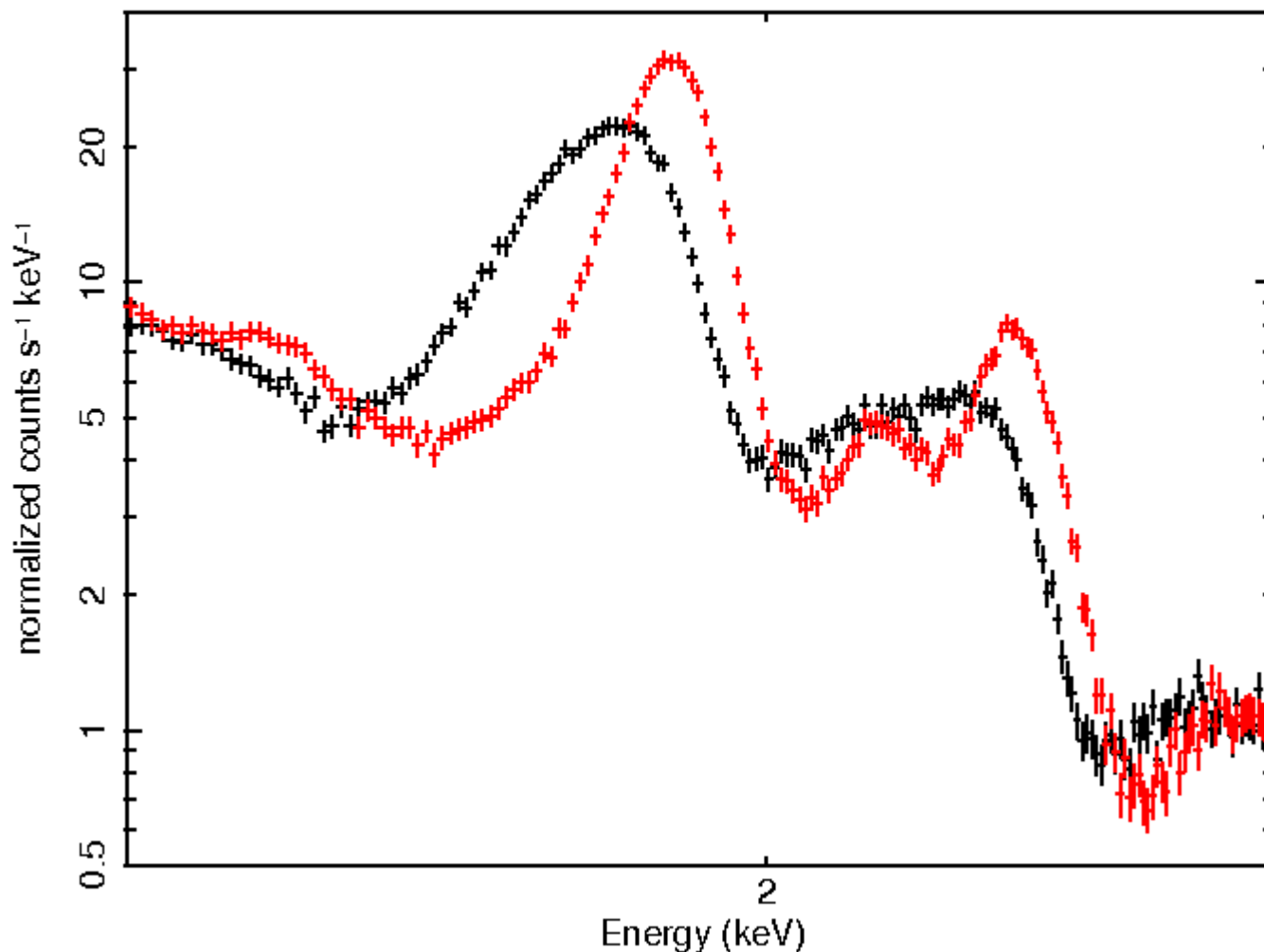


spb 8-Mar-2011 16:05

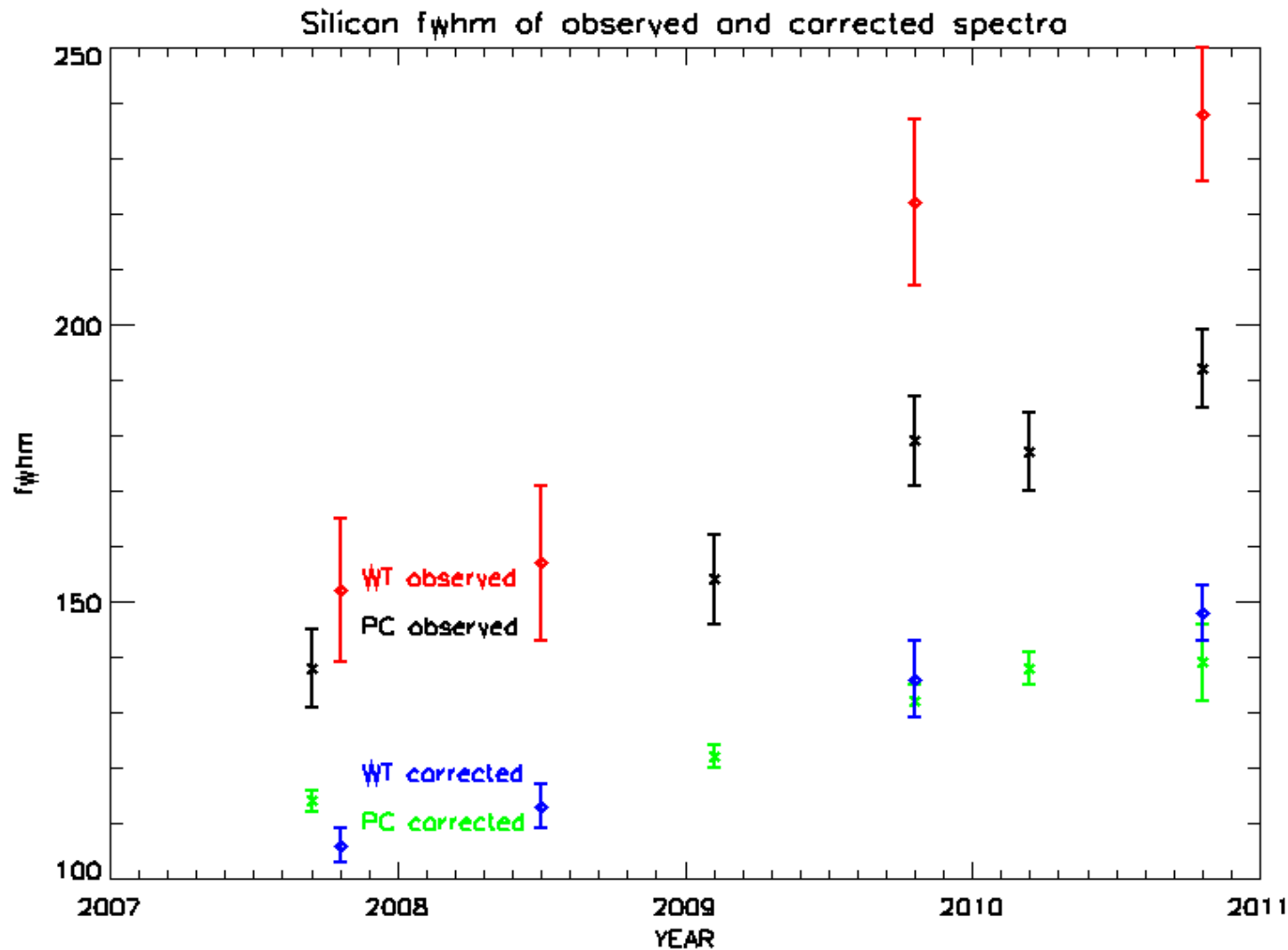


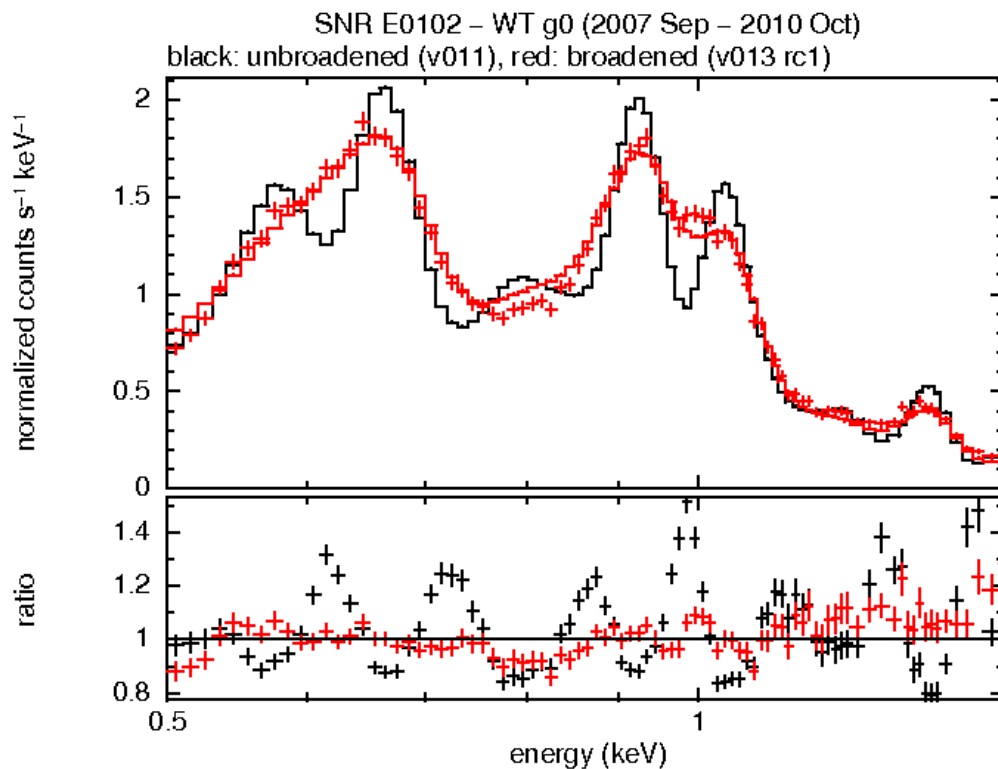
WT trap corrected spectra

Tycho 2010/10 – WT Original and Corrected spectrum



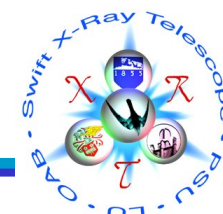
Evolution of FWHM of the observed and corrected Silicon line in Cas A & Tycho



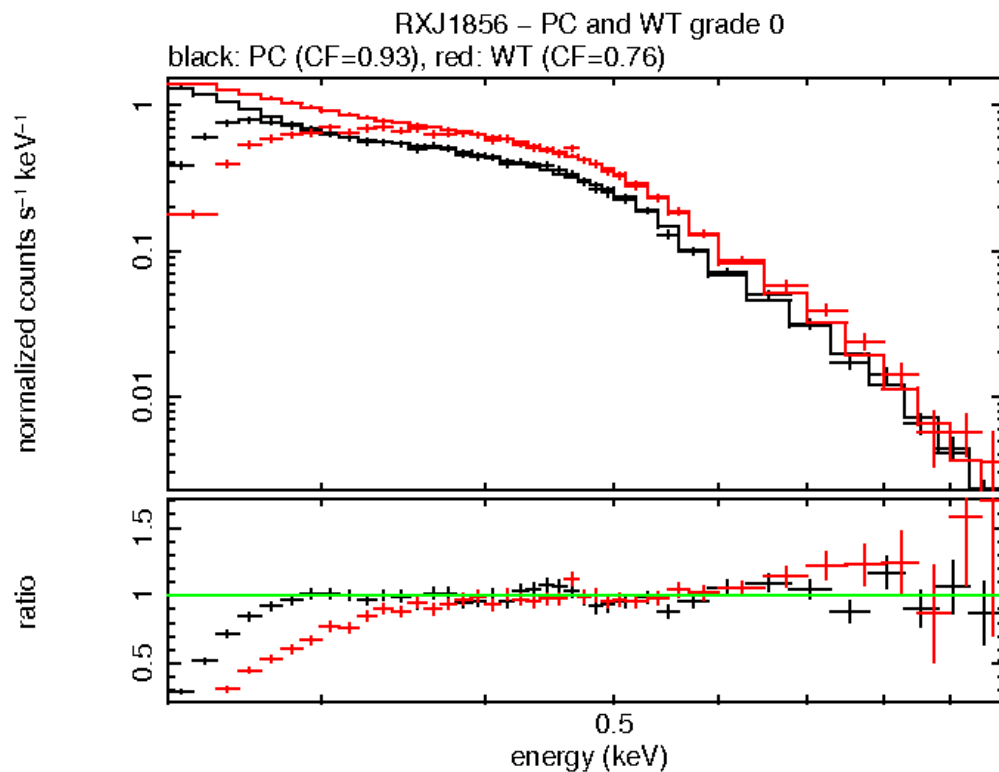


CF=0.88

apb 8-Mar-2011 18:06



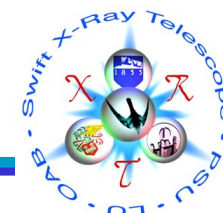
2007-09 to 2010-08

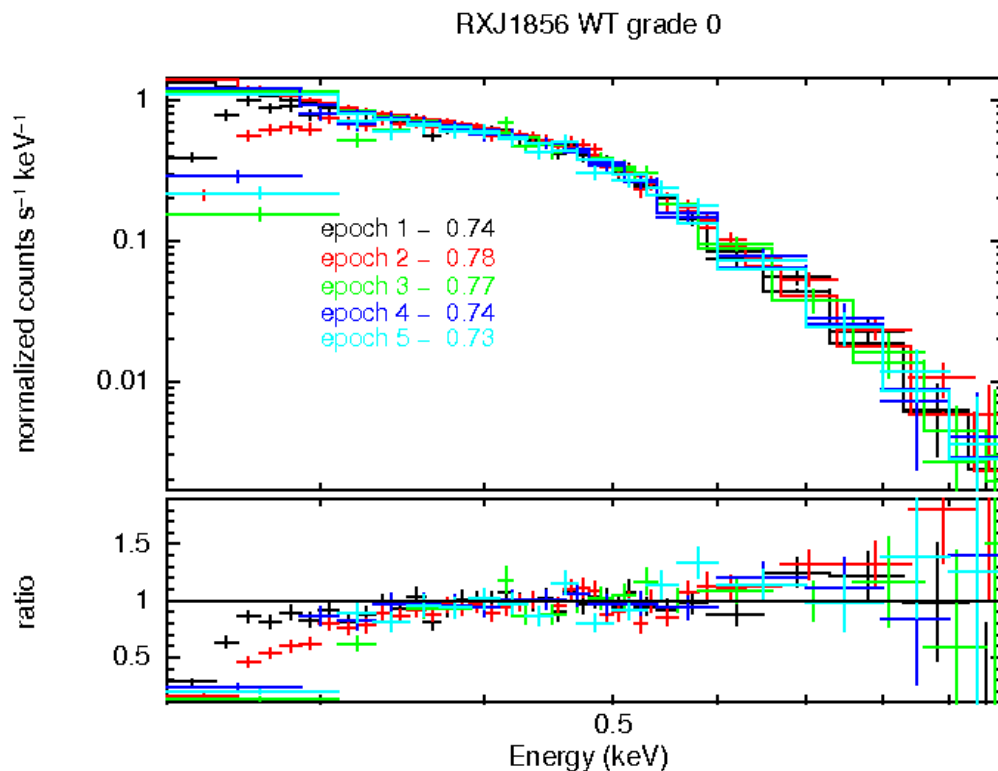


Fit > 0.4 keV

WT CF = 0.76

apb 8-Mar-2011 00:13





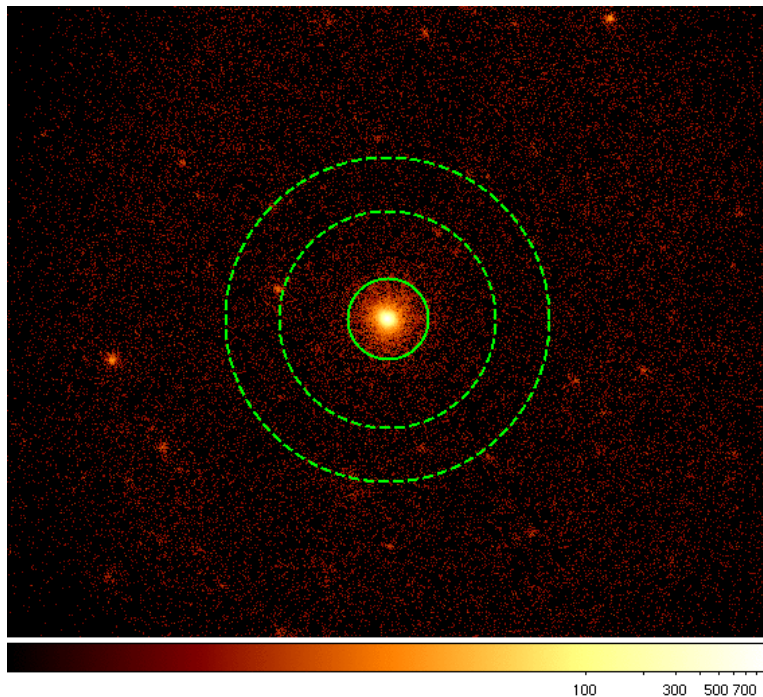
2007-09/11
 2008-09
 2009-10/11
 2010-04
 2010-08

apb 7-Mar-2011 12:00

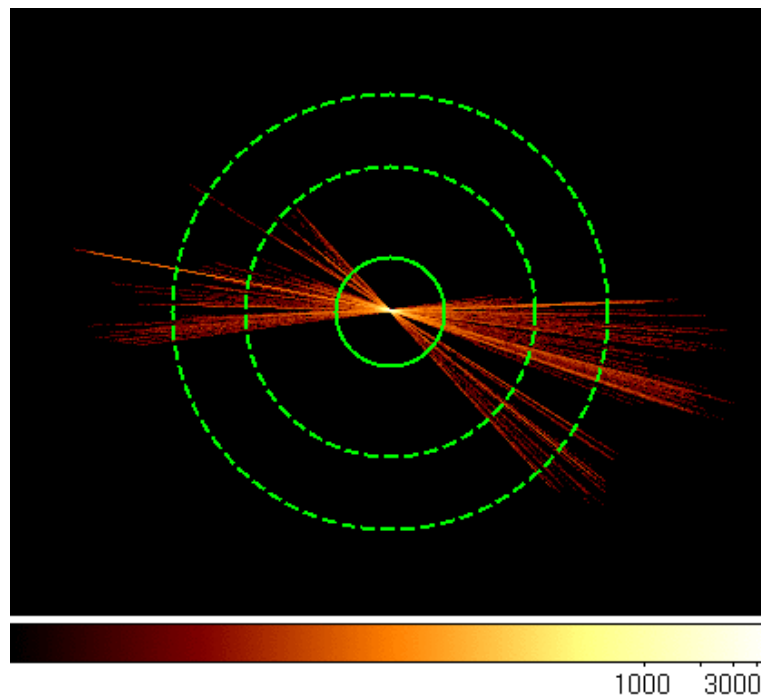
- Performance degrading at low E due to events disappearing below the 80DN (~ 0.225 keV) event threshold

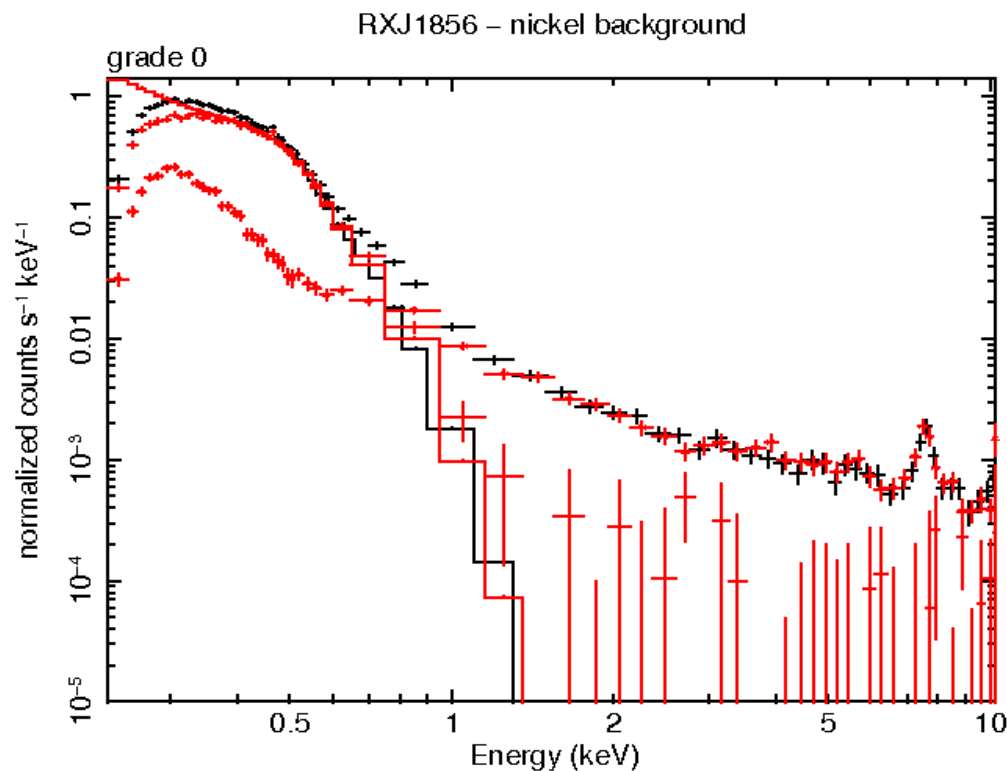


PC



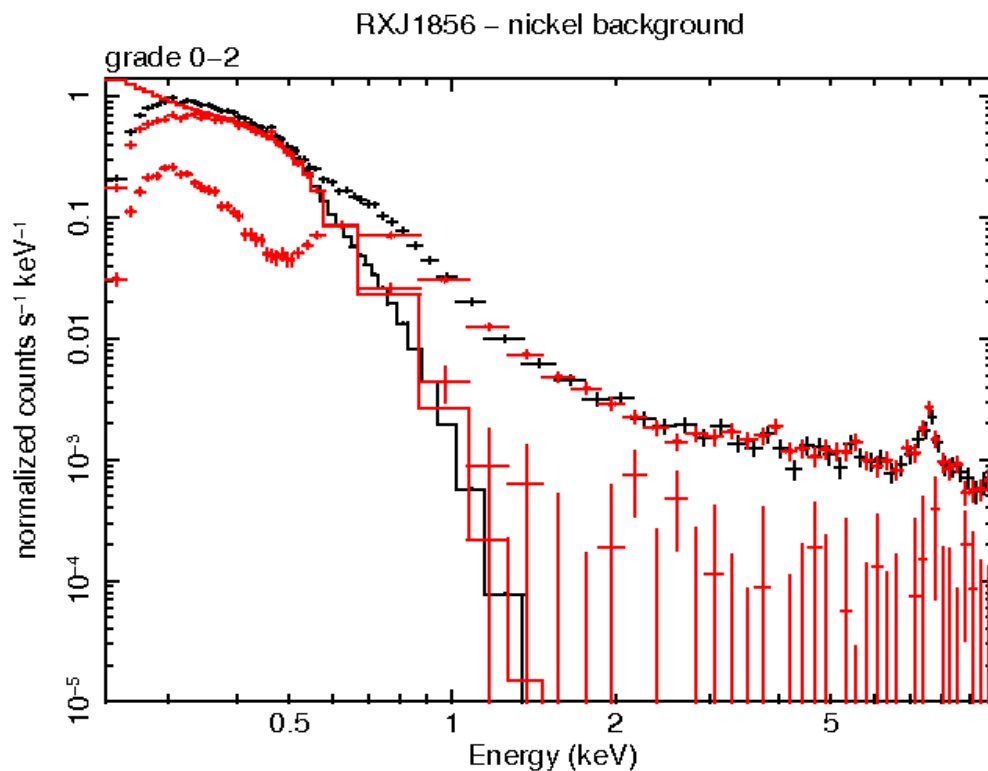
WT





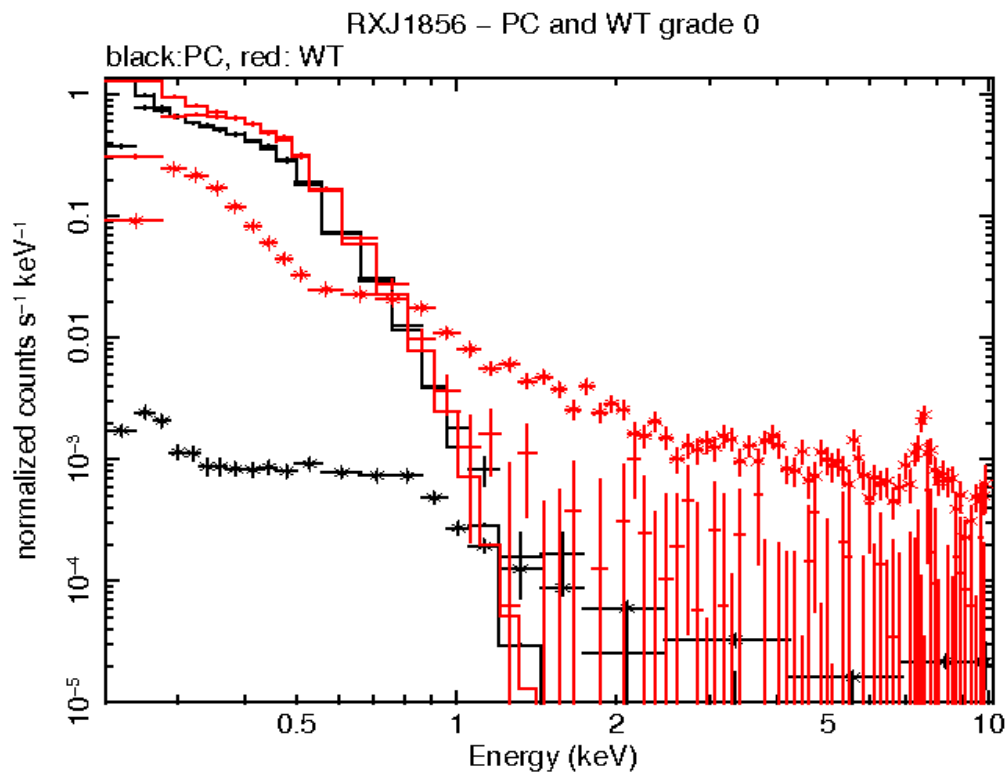
apb 7-Mar-2011 12:48





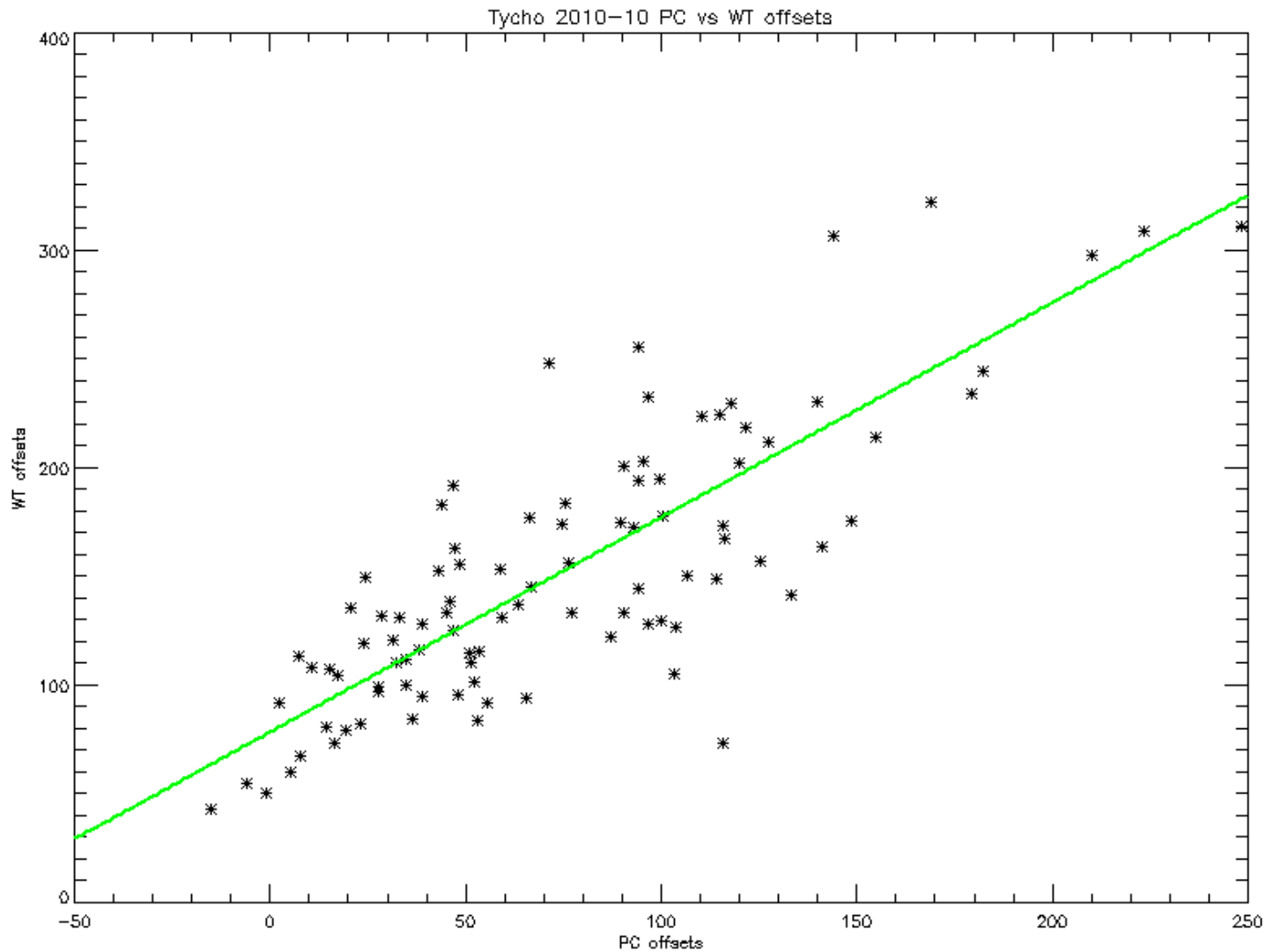
apb 7-Mar-2011 12:45





apb 7-Mar-2011 16:57





$WT_OFFSET = 78 \text{ ev} + 0.98 * PC_OFFSET \implies$ A Shift more then a scaling factor

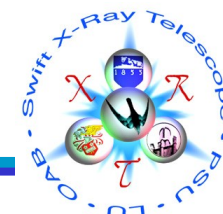


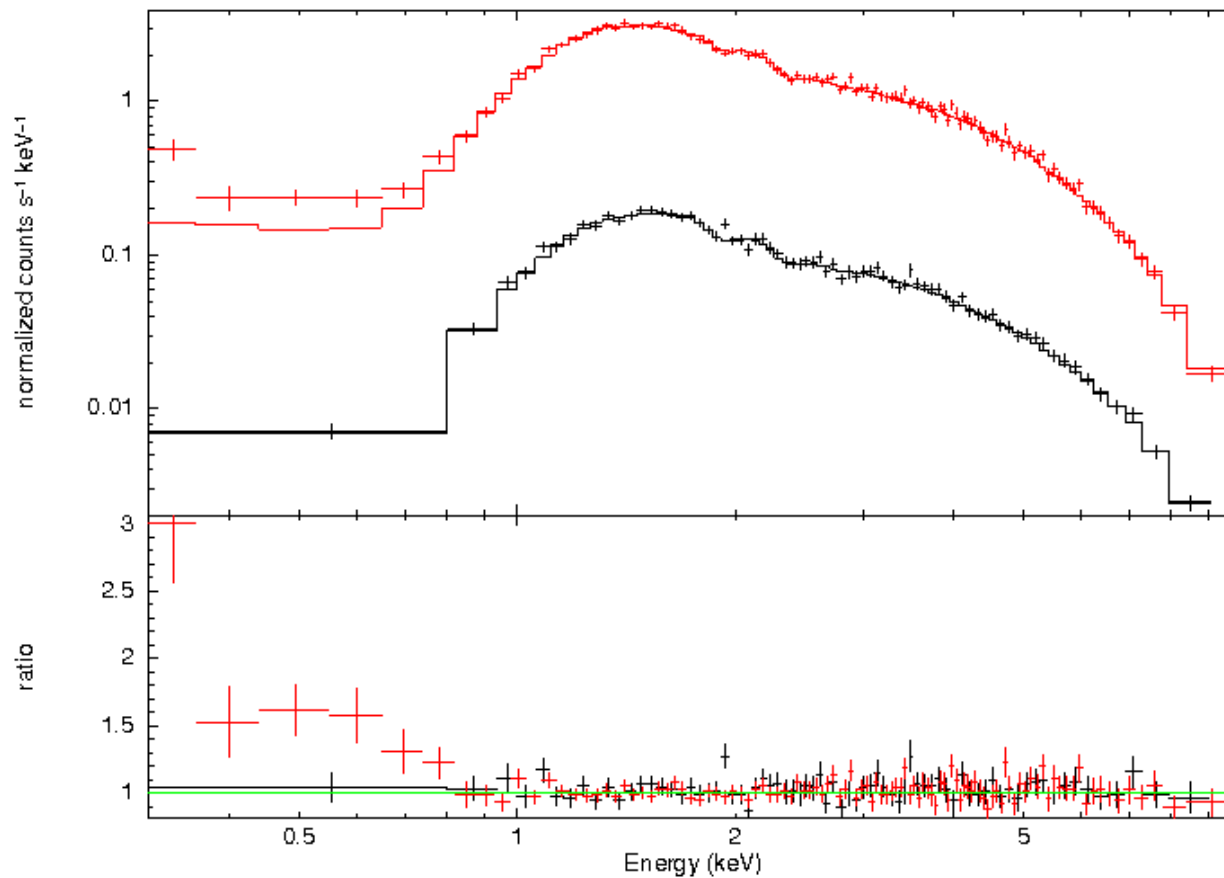


WT redistribution problem from heavily absorbed sources



- Current (V011/012) WT redistribution tail (of high E incident photons down to low E) was refined on sources with a column density $\sim 1-3 \times 10^{22} \text{ cm}^{-2}$
- Hints from absorbed transients that there might be issues with this.
- Also, observations of G21.5 (post-substrate voltage change) revealed a problem

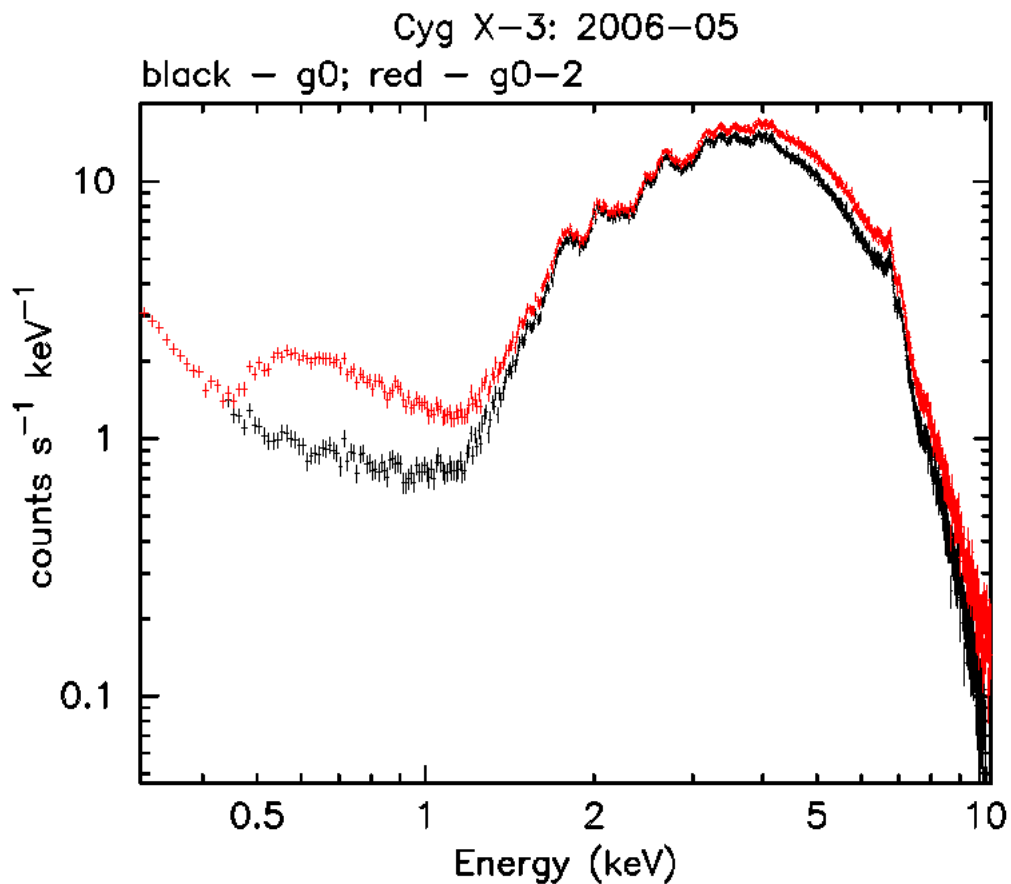




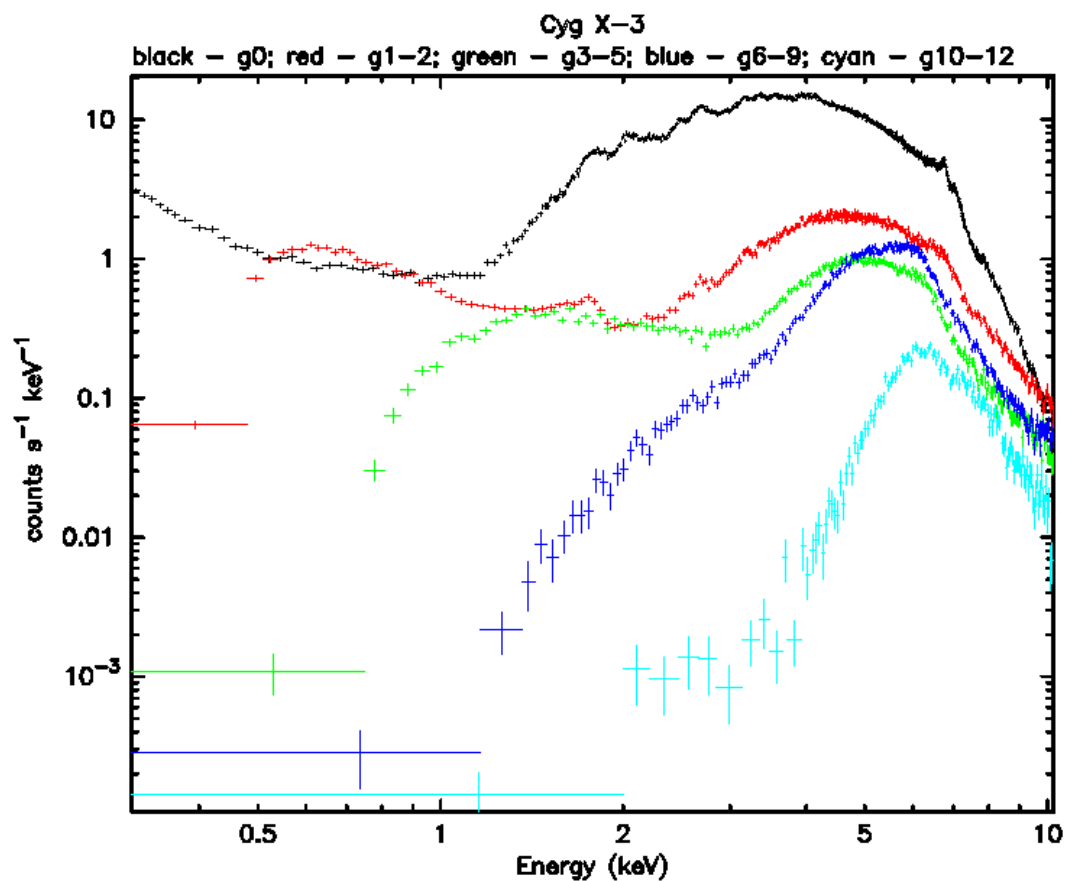
kpa 9-Apr-2011 17:52



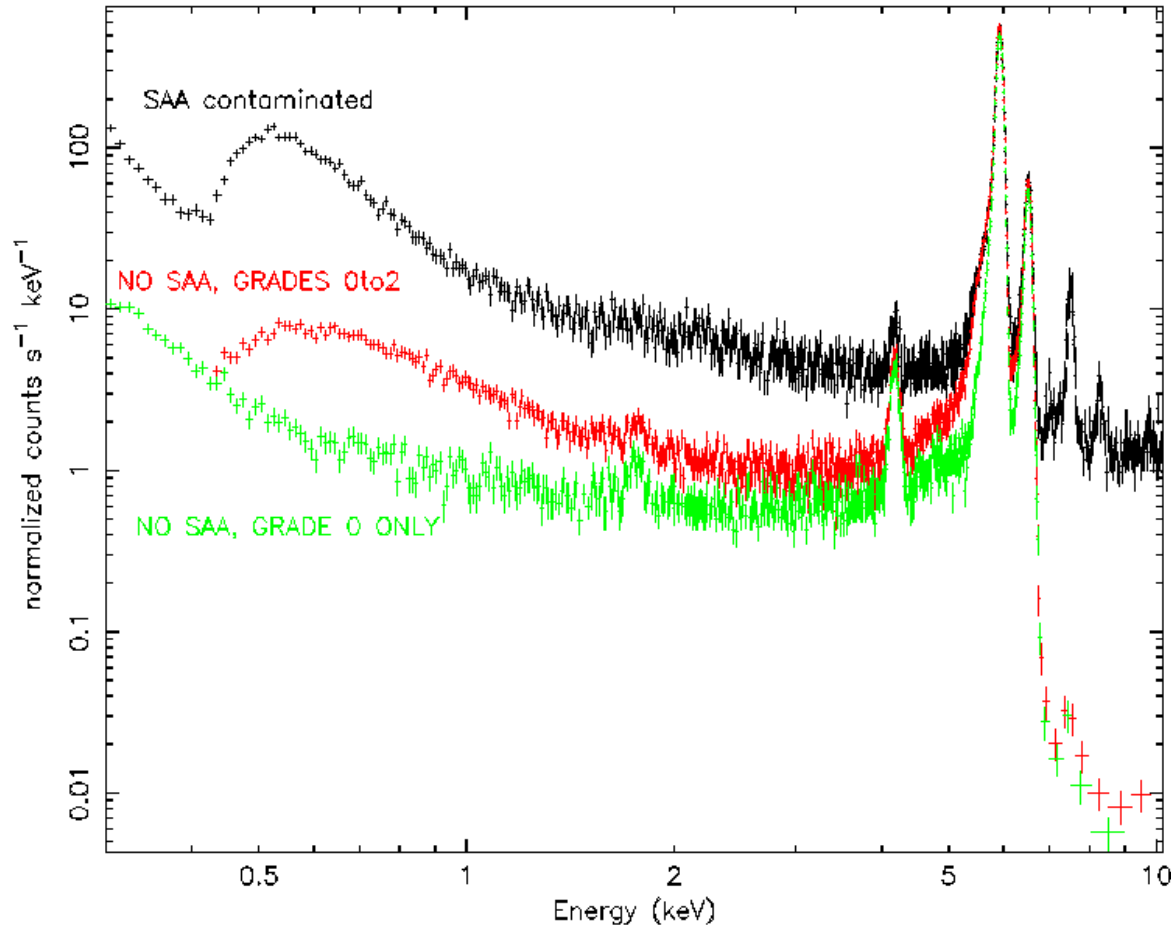
Exemplified by Cyg X-3



WT Grade dependence



WT door 2004 data



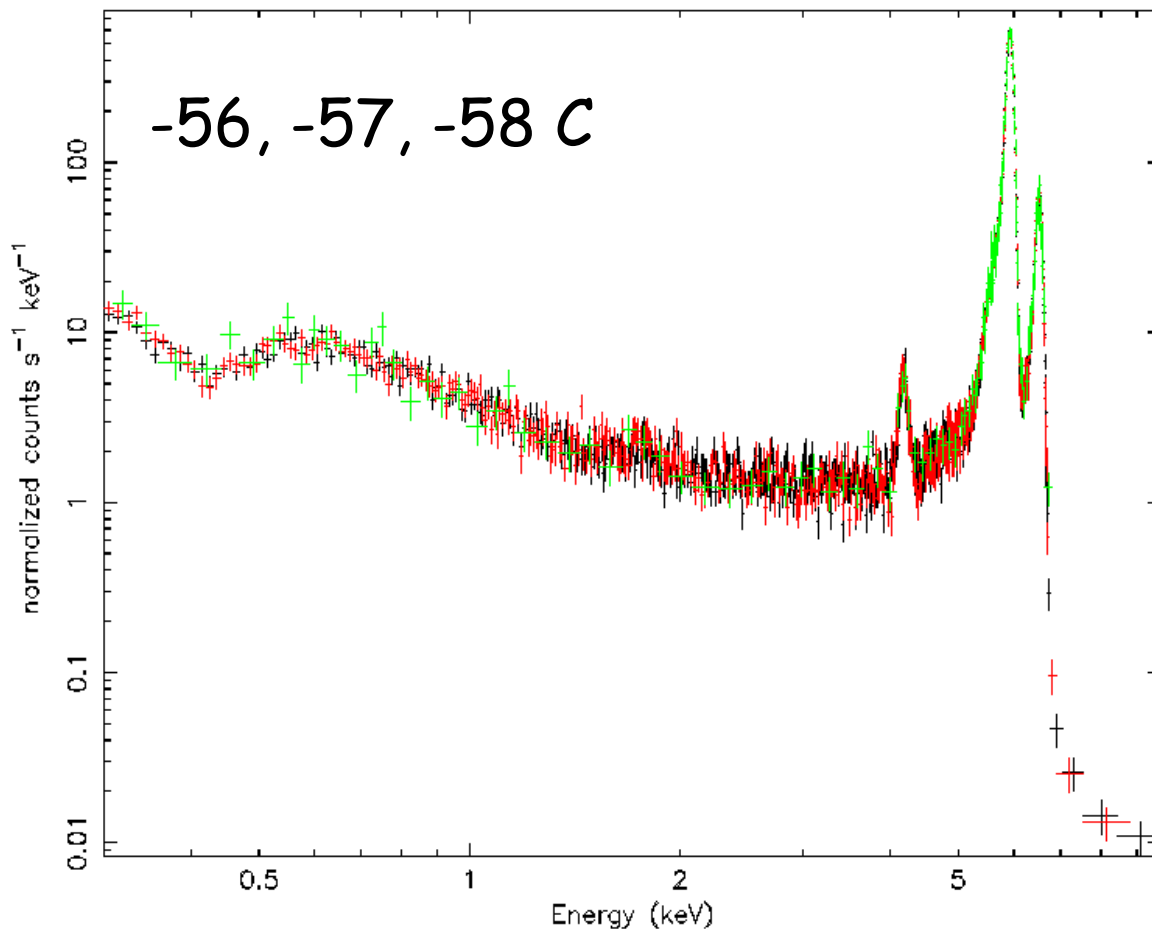
cp232 31-Mar-2010 16:18

- Currently no s/w SAA check in gti selection



Effect of CCD temperature

WT door 2004 data – Spectra vs CCDTemp



cp232 31-Mar-2010 16:39

