

Calibration of the *XMM-Newton* RGS after SASv7.0.0

European Space Astronomy Centre

Mallorca 26-27 October 2006

SRON Utrecht & XMM-SOC@ESAC

Broad RGS themes

- ❑ Review of RGS with SAS v7.0.0 and its CCFs
- ❑ Schedule for new CCFs : 2007-01-31
- ❑ RGS pile-up
- ❑ The WHIM story
- ❑ Operational plans : single-node readout and “multiple-pointing”

New RGS CCFs with SAS



v7.0.0

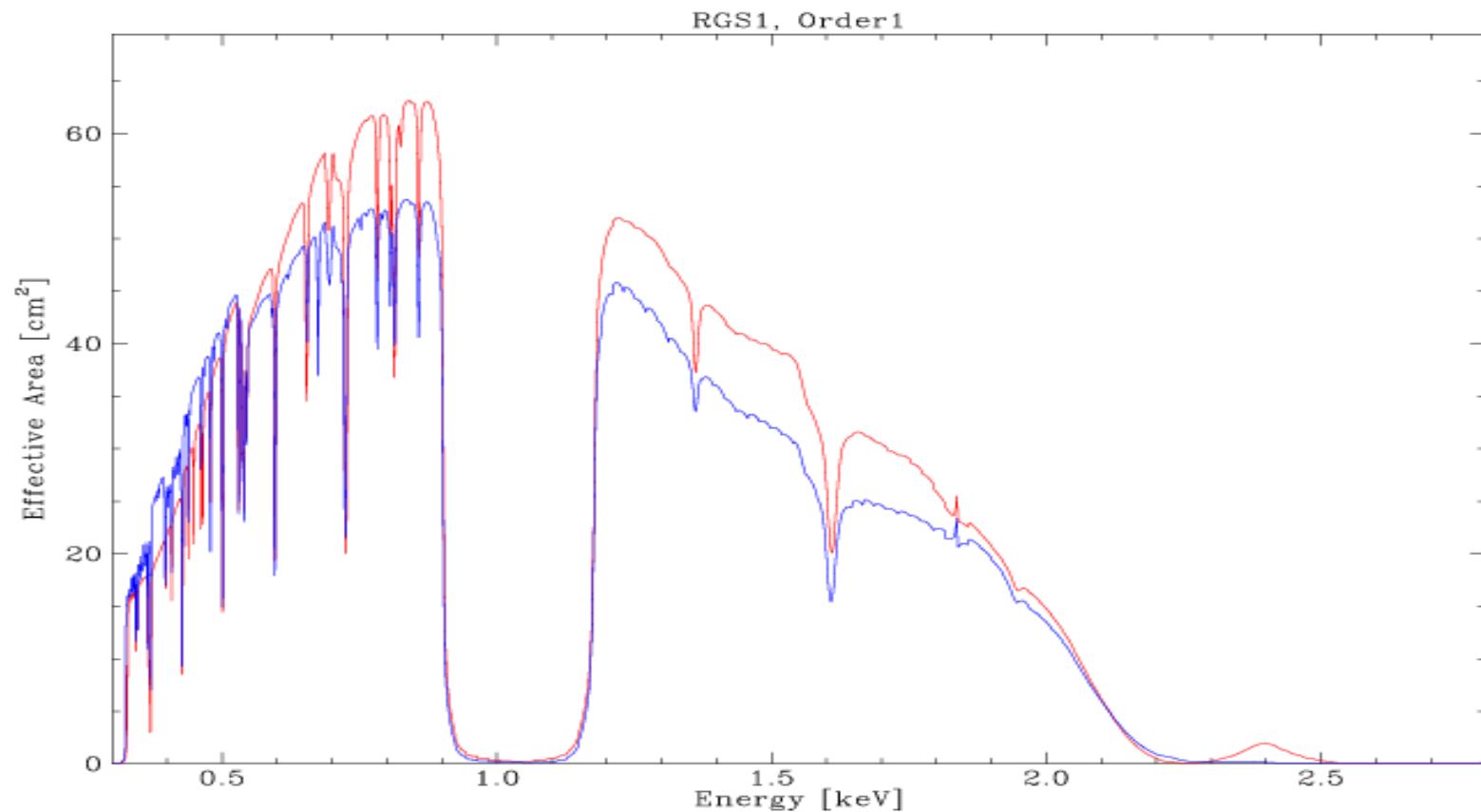
- RGS QUANTUMEF
- RGS CTI
- RGS COOLPIX
- RGS EXAFS
- RGS ADUConv

- RGS EFFAREACORR

- RGS background templates

RGS EFFAREACORR with

S & S - 700



Randall Smith, GSFC

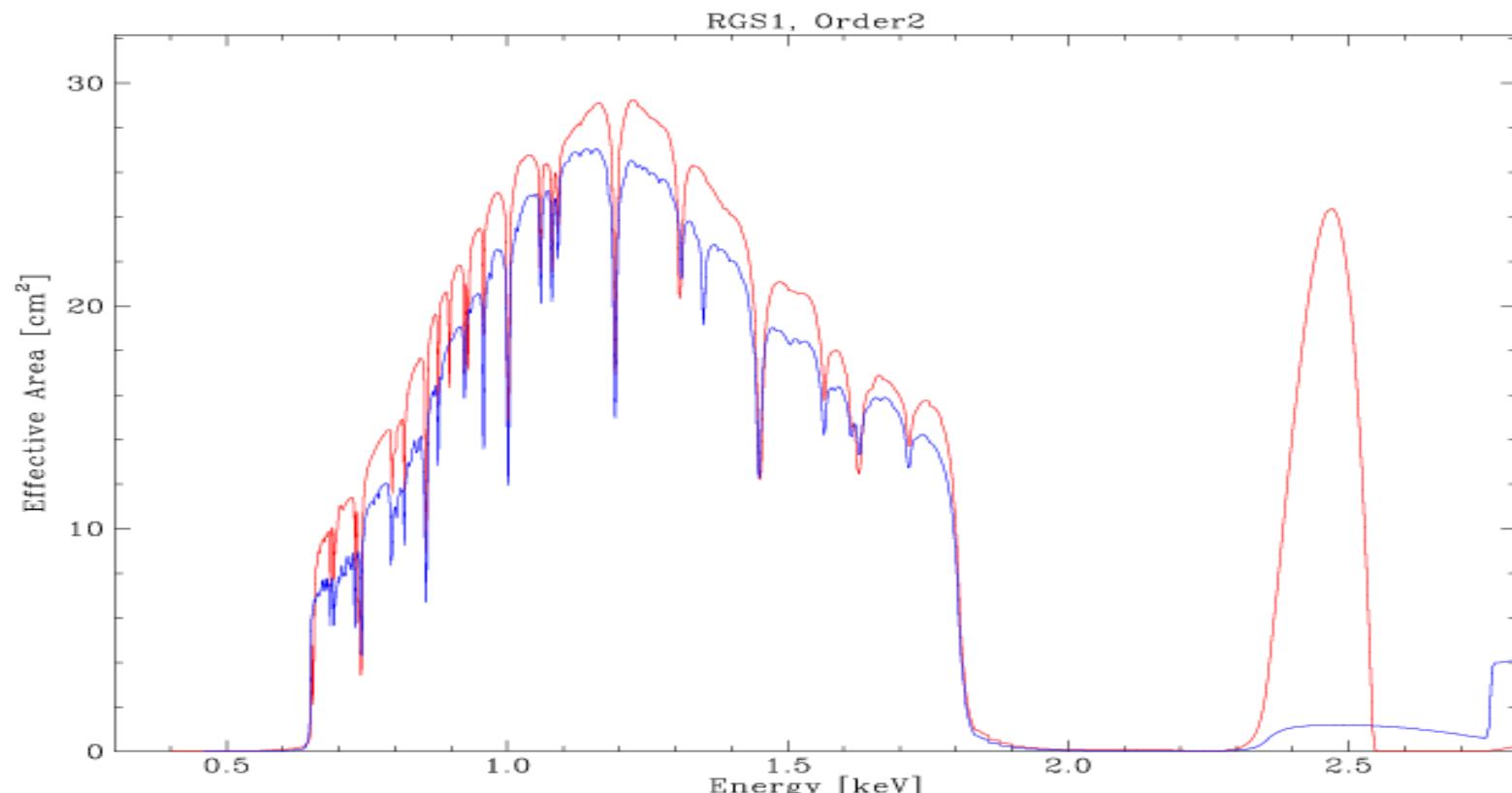
EPIC calibration 26-27 October 2006

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RGS EFFAREACORR with

SAS-7.0.0



⇒ new fudged RGS%_EFFAREACORR_0004

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SASv7.0.0 release of RGS background templates

Why RGS1 TEMPLATEBCKGND_003.CCF & RGS2 TEMPLATEBCKGND_003.CCF

- consistent use of **rgsspectrum** v2.6
 - new **BACKSCAL** per channel, not per CCD node
 - new **QUALITY** per channel
 - ⇒ more low **BACKSCAL** values
 - ⇒ more 'bad' **QUALITY** channels
- XSPEC takes no account of background **QUALITY**
 - ⇒ outliers in the background-subtracted spectrum
 - ⇒ replace **BACKSCAL(QUALITY=1)** with node **median(BACKSCAL(QUALITY=0))**
- SAS v7.0.0 PI extraction regions ⇒ 90% & 95%
- 100% cross-dispersion
 - ⇒ 64 extensions such as X100_P095_1_8.00

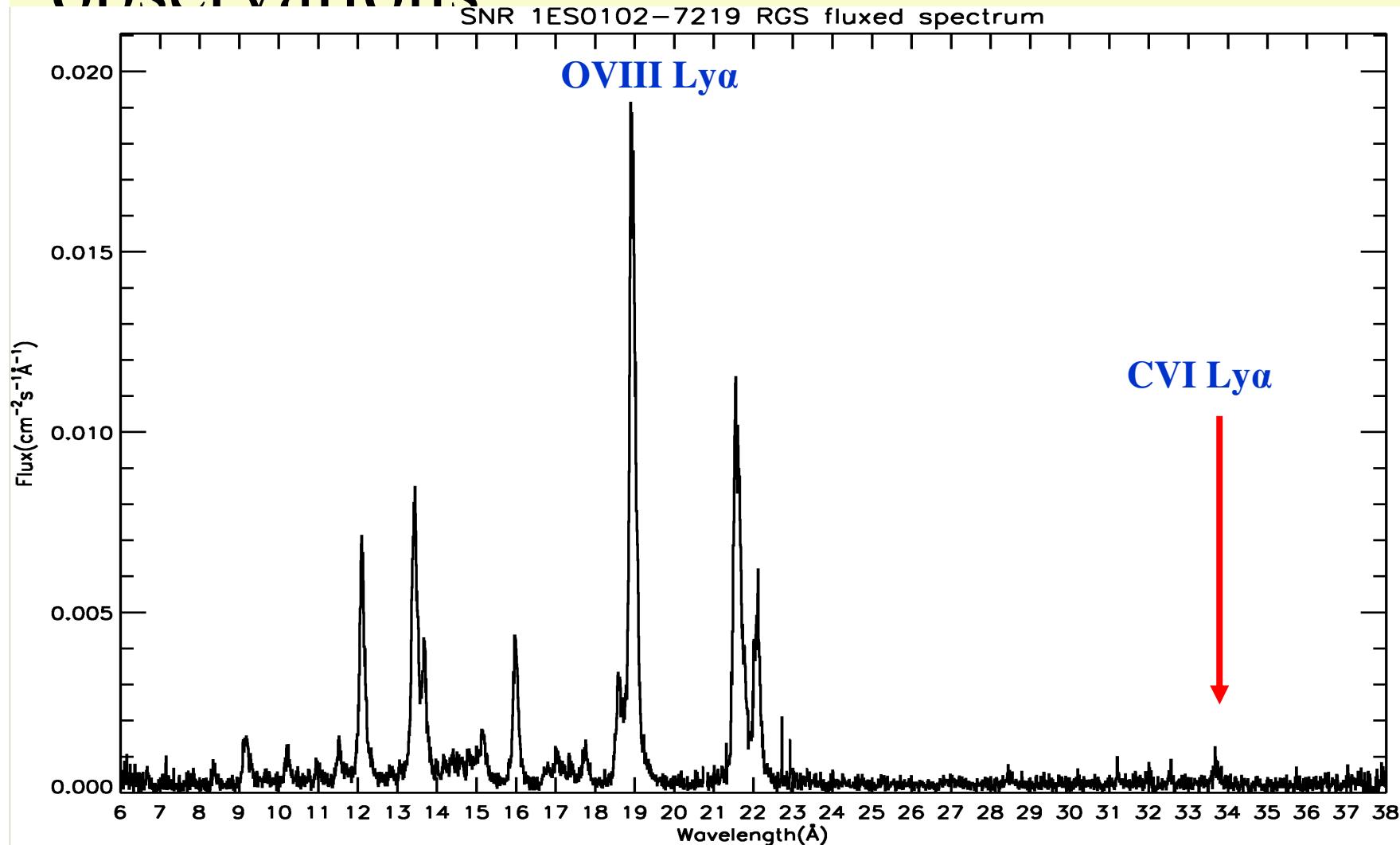
Charo

RGS with SAS v7.0.0

- How do you judge ?
- We have reached the stage for quantitative statistical tests
 - C-statistic
- RGS physical test harness
 - SNR 1ES0102-7219 is constant
 - HR1099 spectrum is bremsstrahlung continuum (and weak lines)
 - Procyon spectrum is lines (and weak continuum)
 - Crab

RGS A(t) from SNR

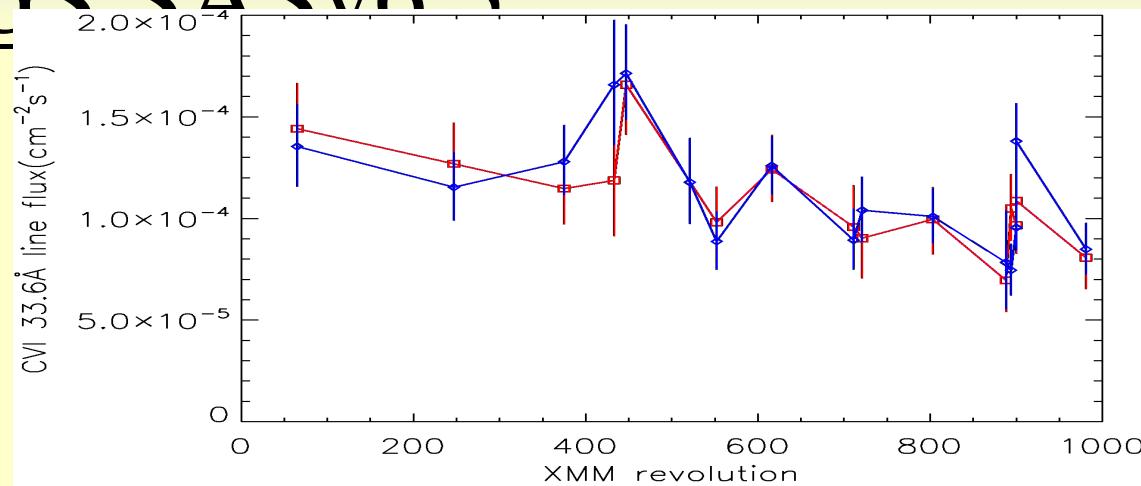
observations



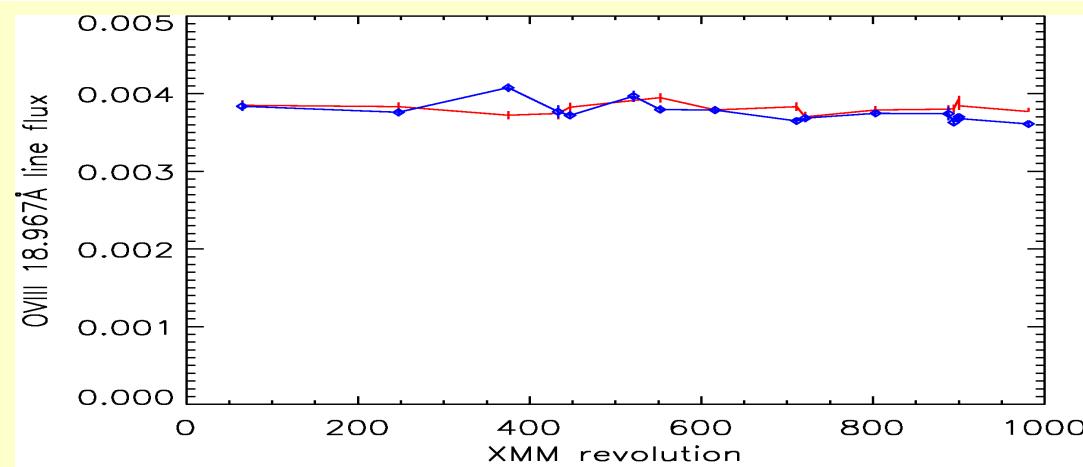
SNR IES0102-7219 with



RGS $\Sigma \Delta \Sigma_{\text{V6}} 5$

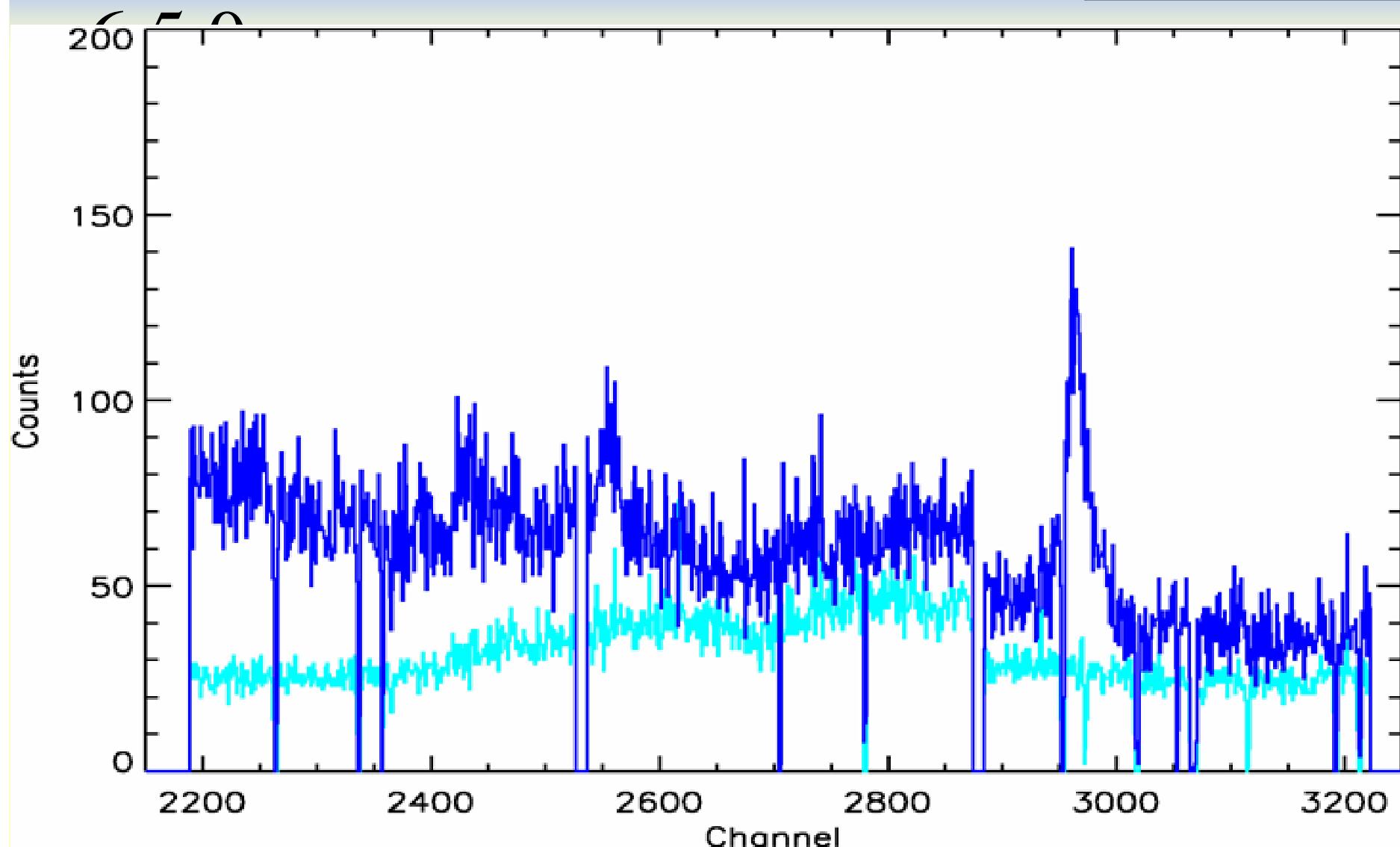


CVI Ly α 33.734 Å



OVIII Ly α 18.967 Å

SNR TES0102-7219 in SAS

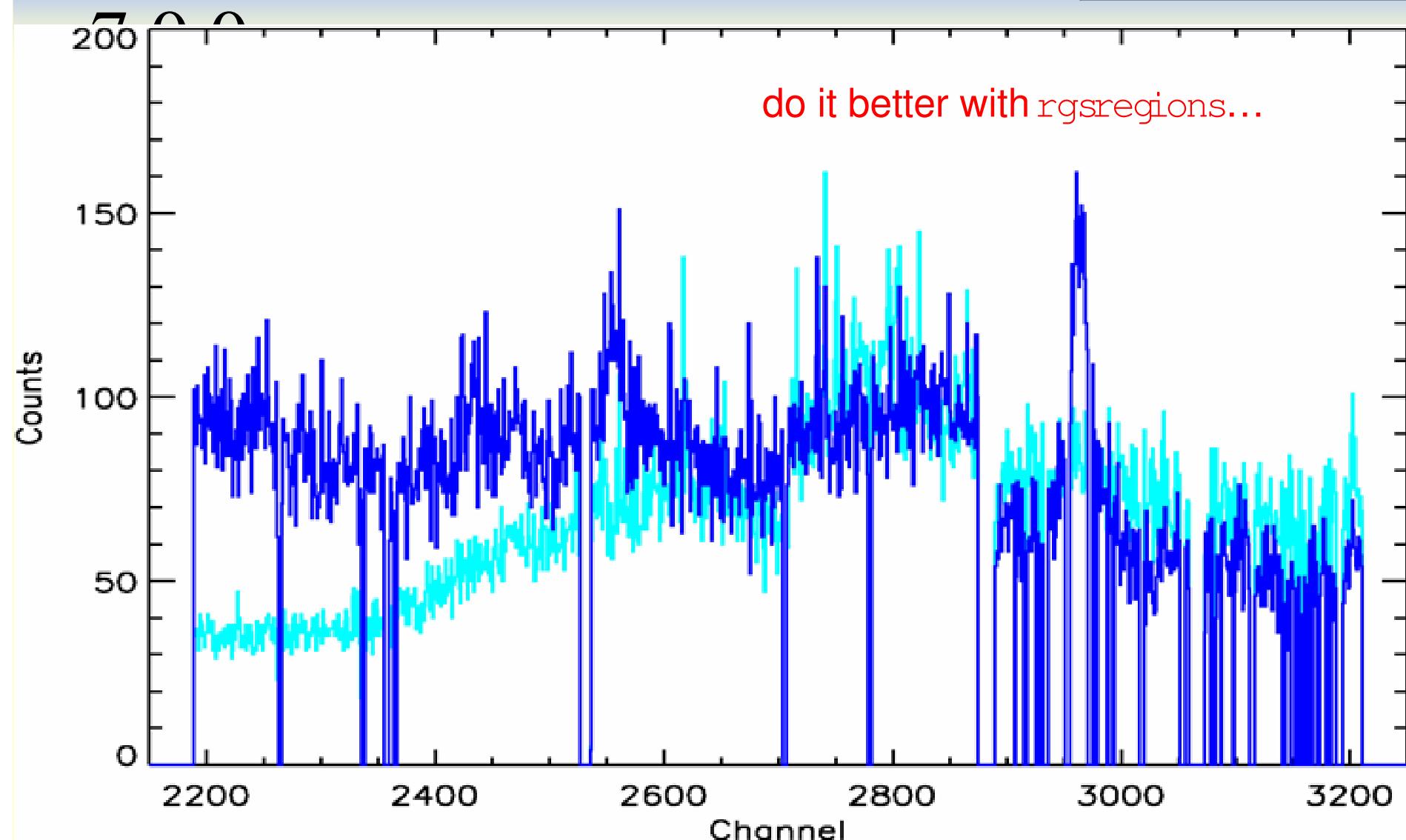


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SNR TES0102-7219 in SAS

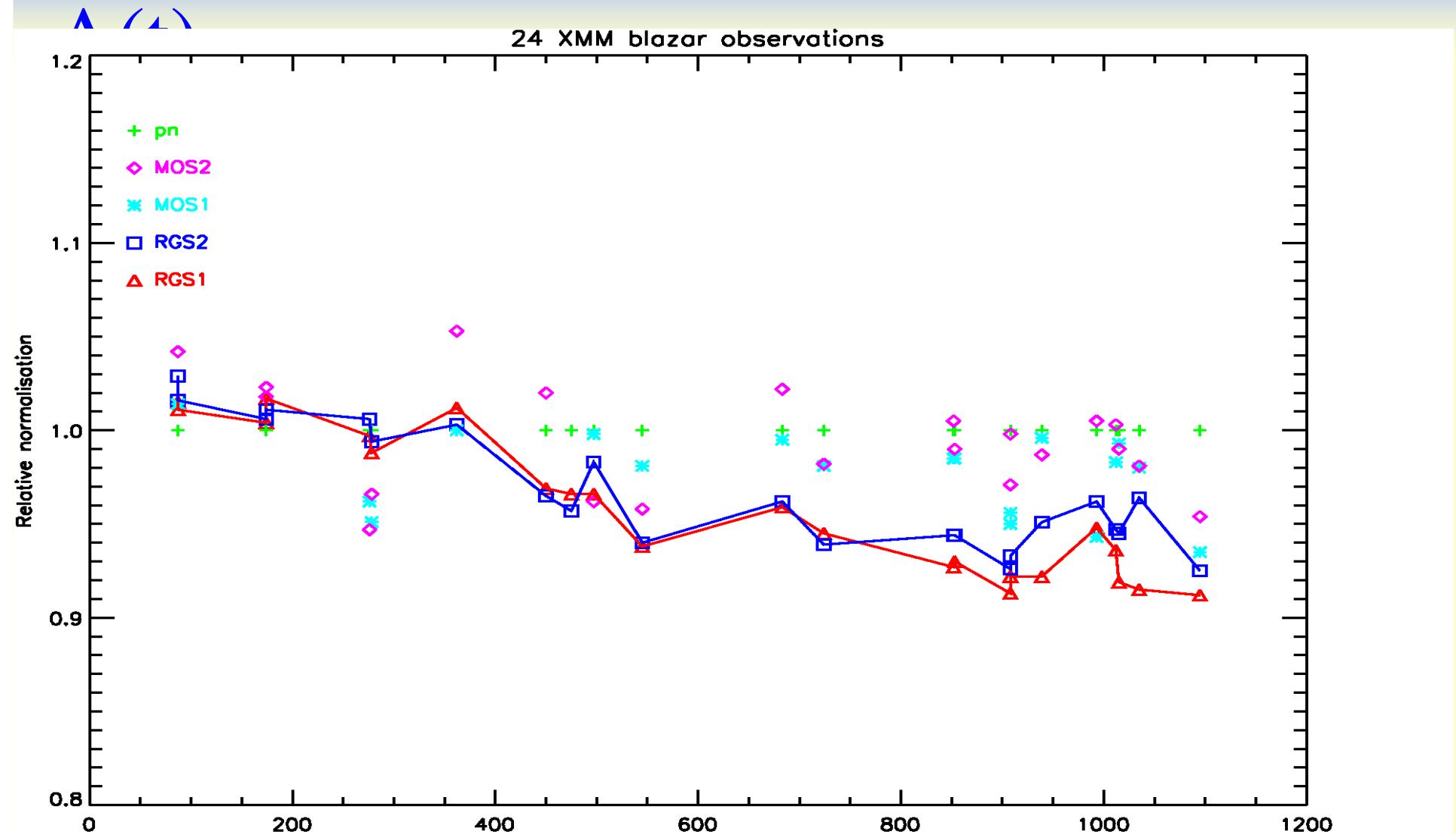


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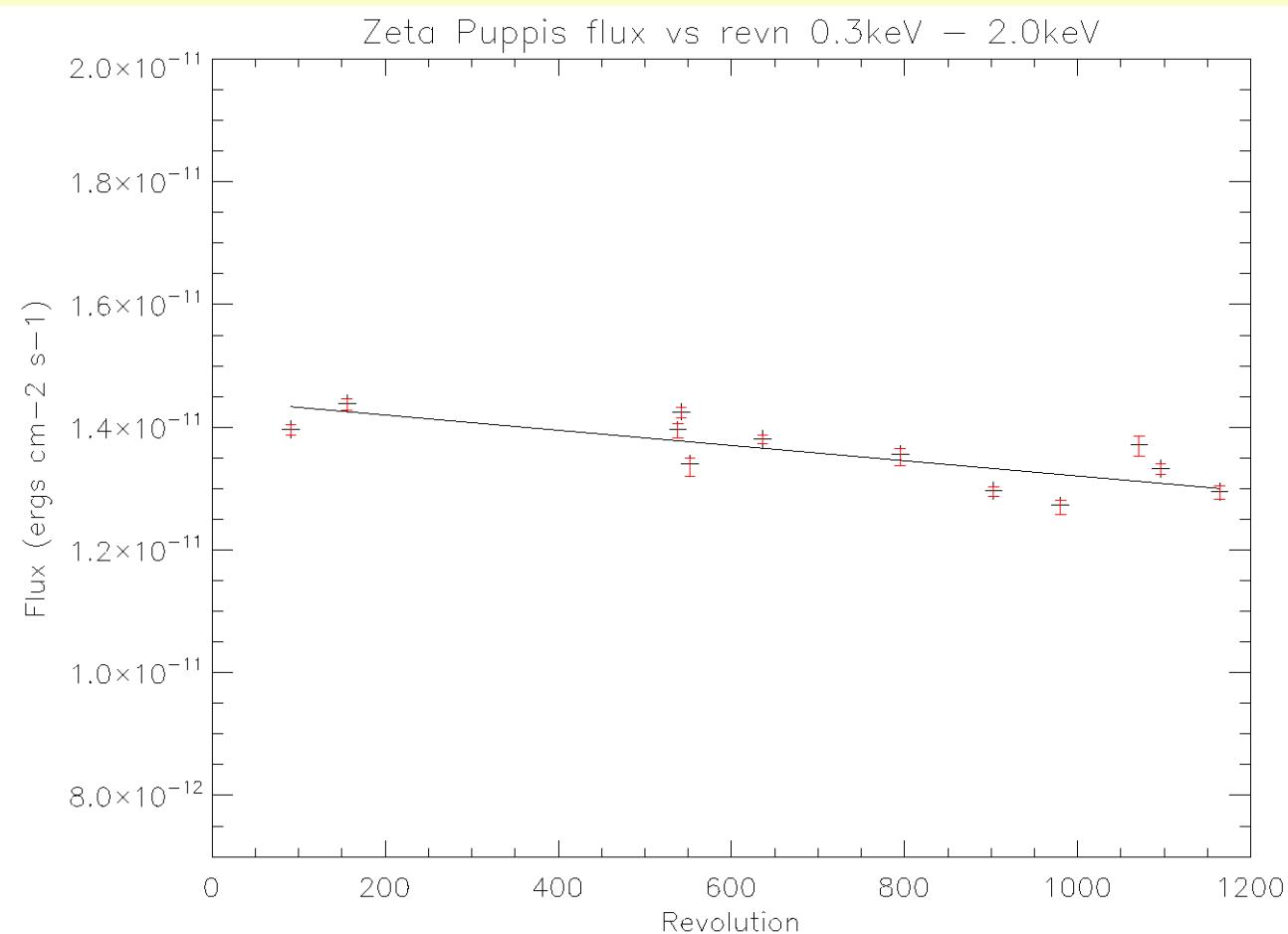
RGS vs EPIC statistics \Rightarrow



ζ Pup with SAS v7.0.0

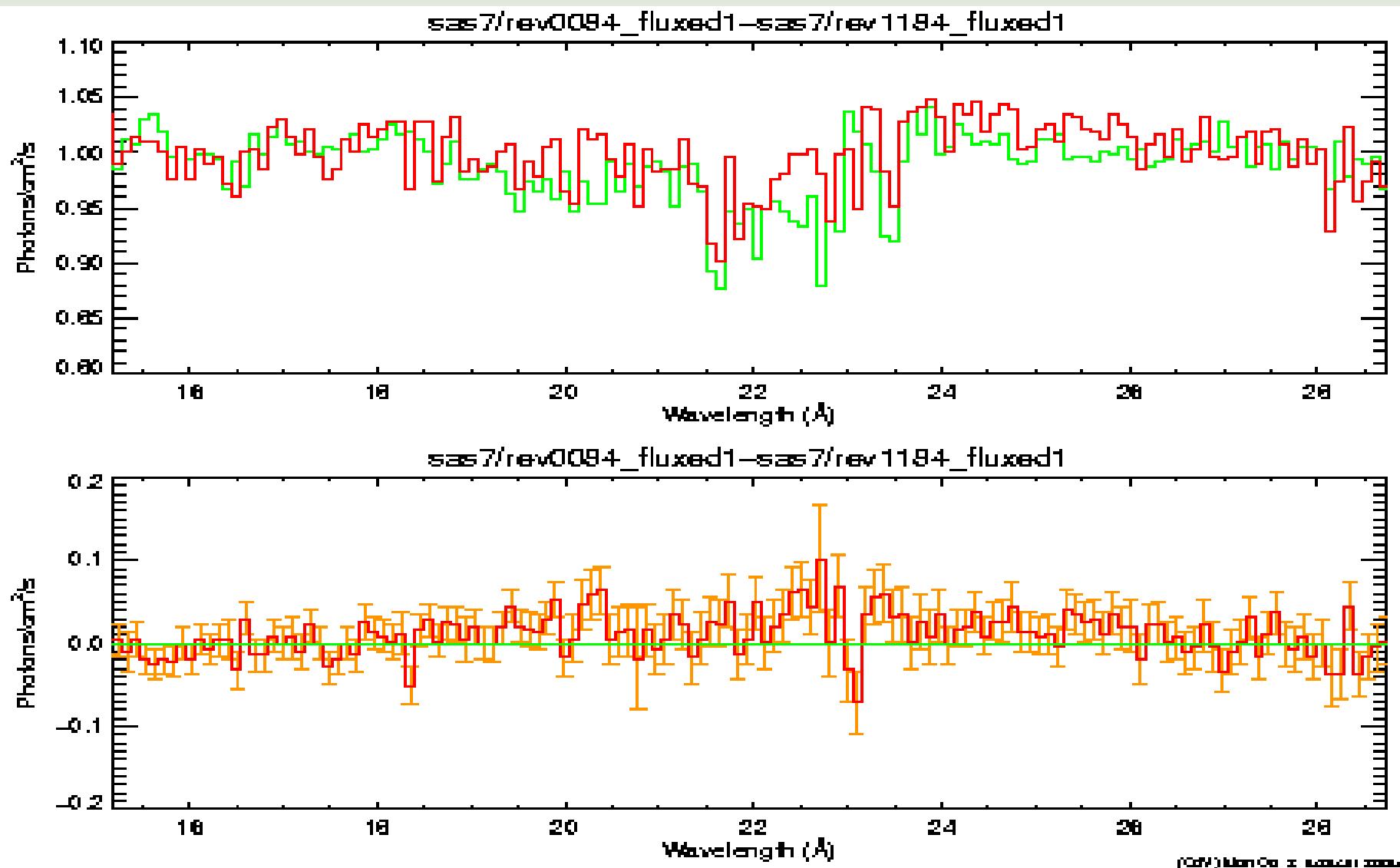


A(t)

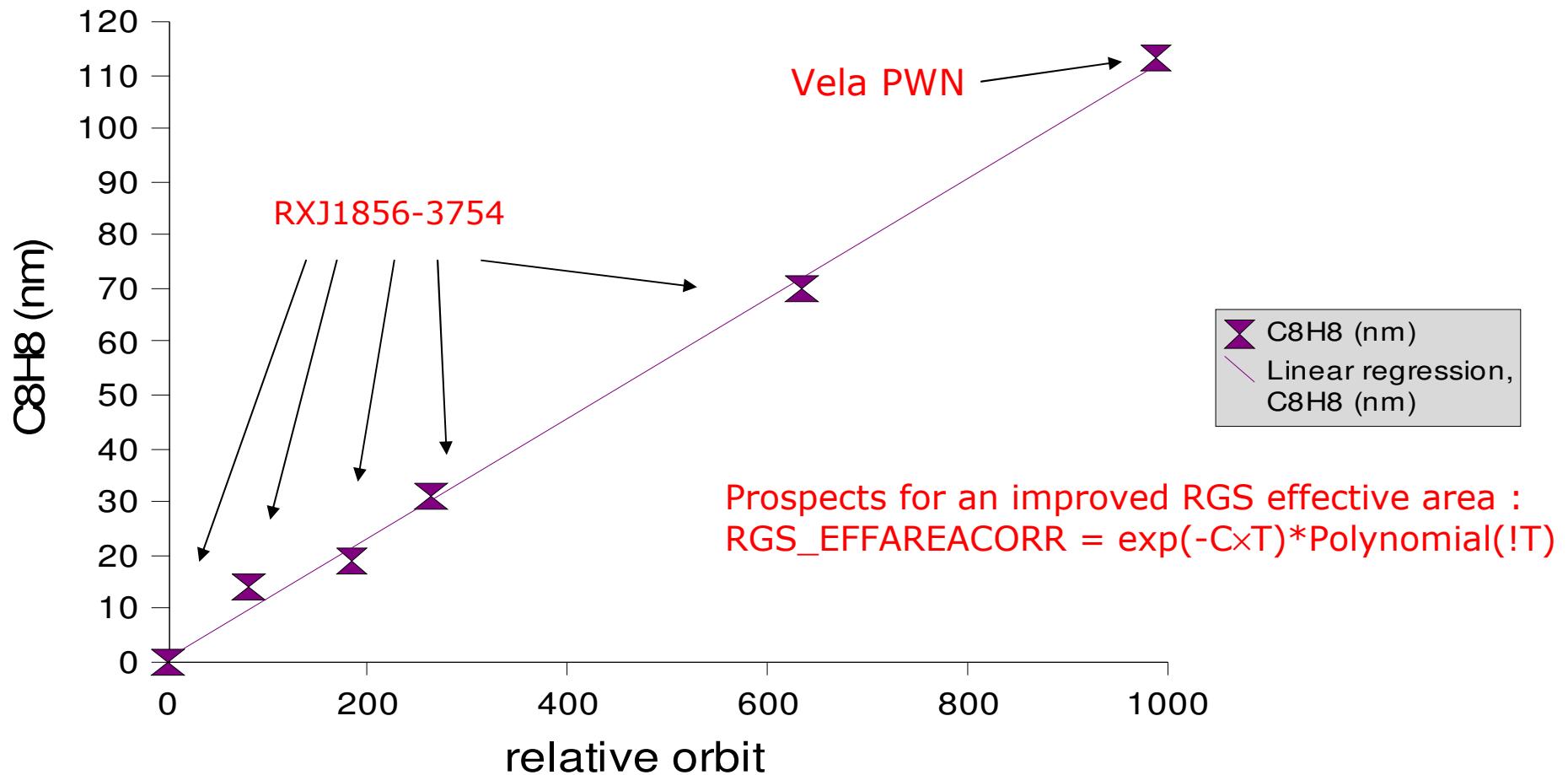


Jenny Carter, Leicester

No change in O-absorption in Mkn421

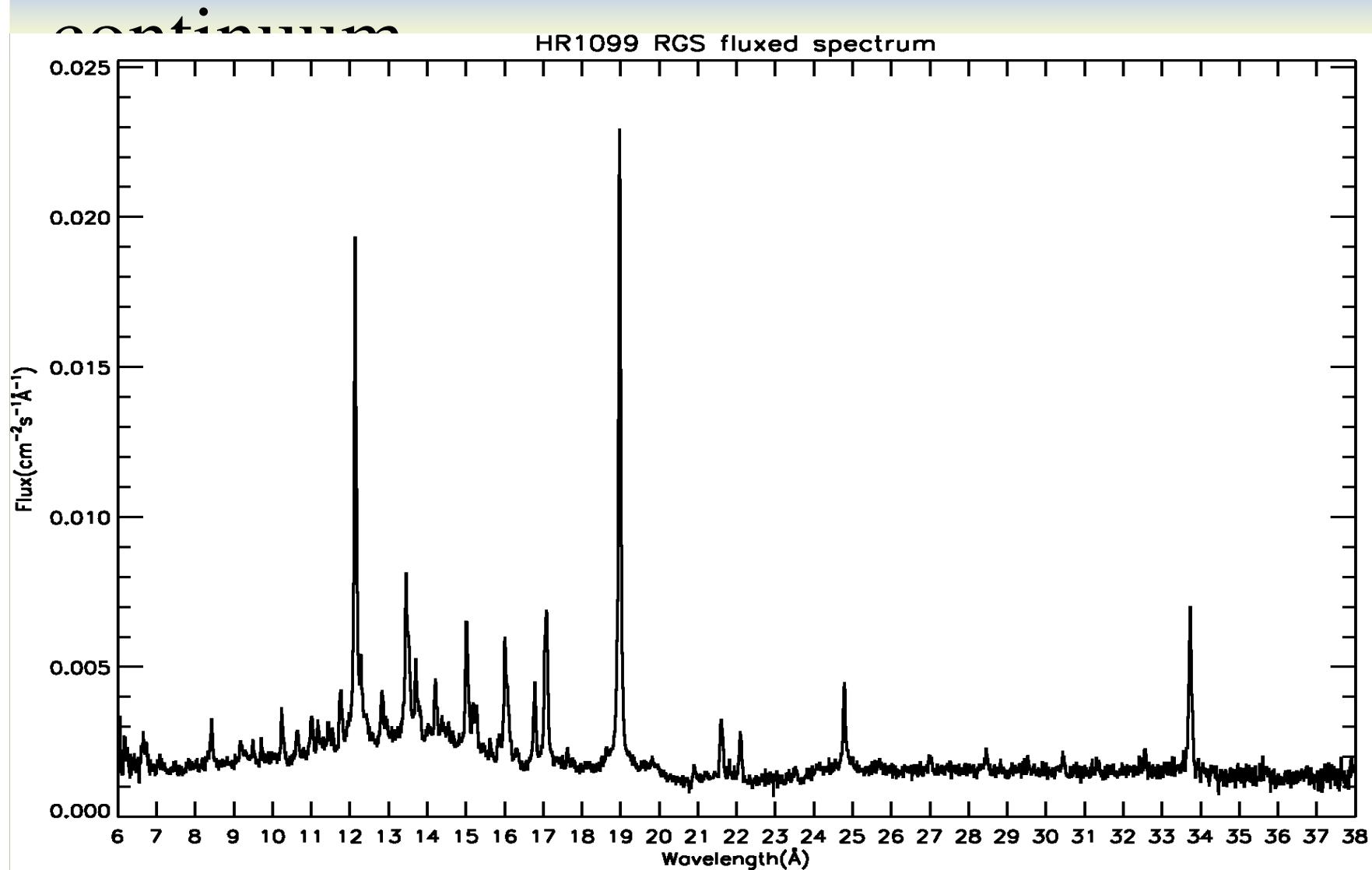


Contamination history



C-layer increase of about 20 nm/year

RGS A(λ) from HR1099



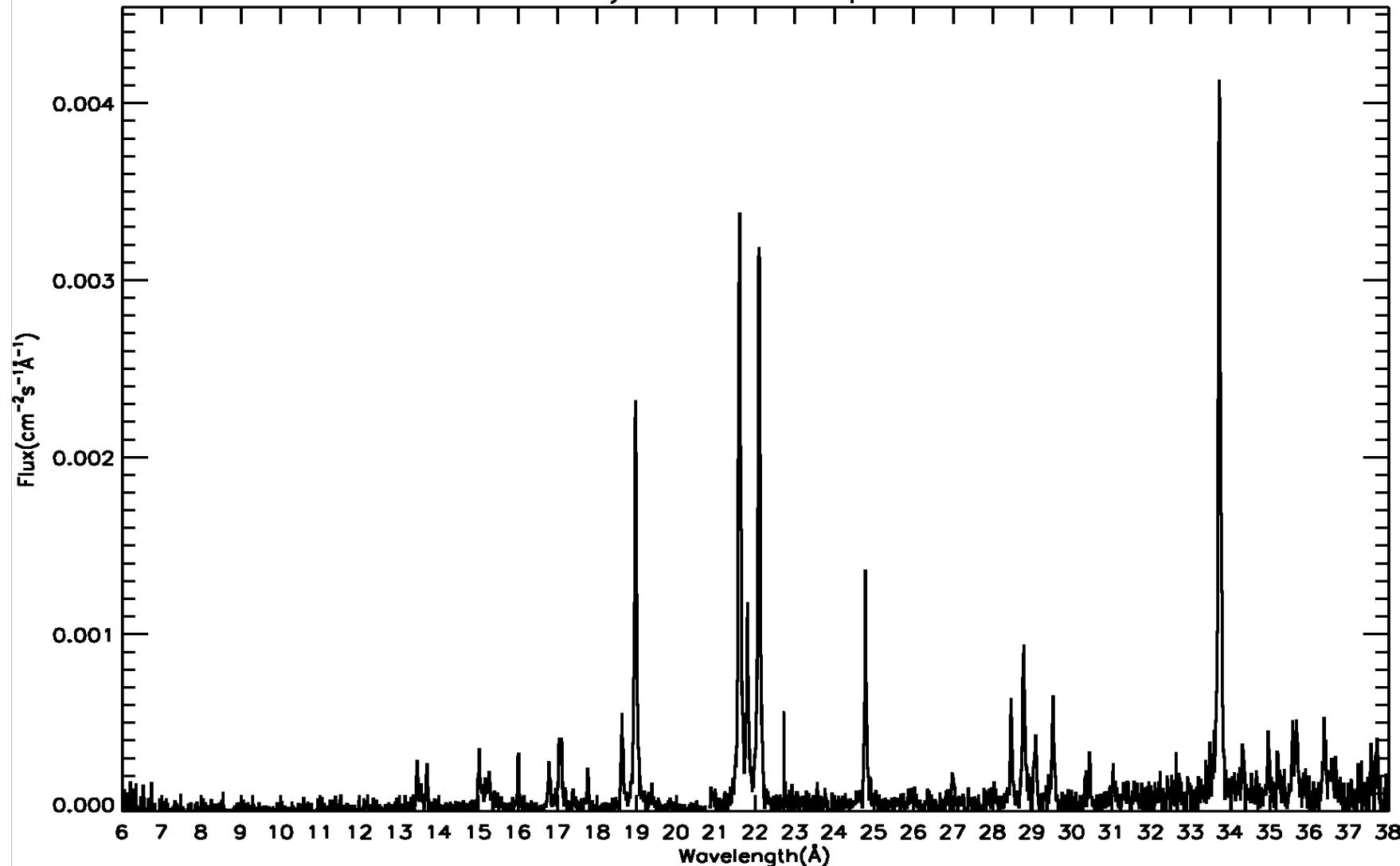
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XCal from Procyon lines

Procyon RGS fluxed spectrum

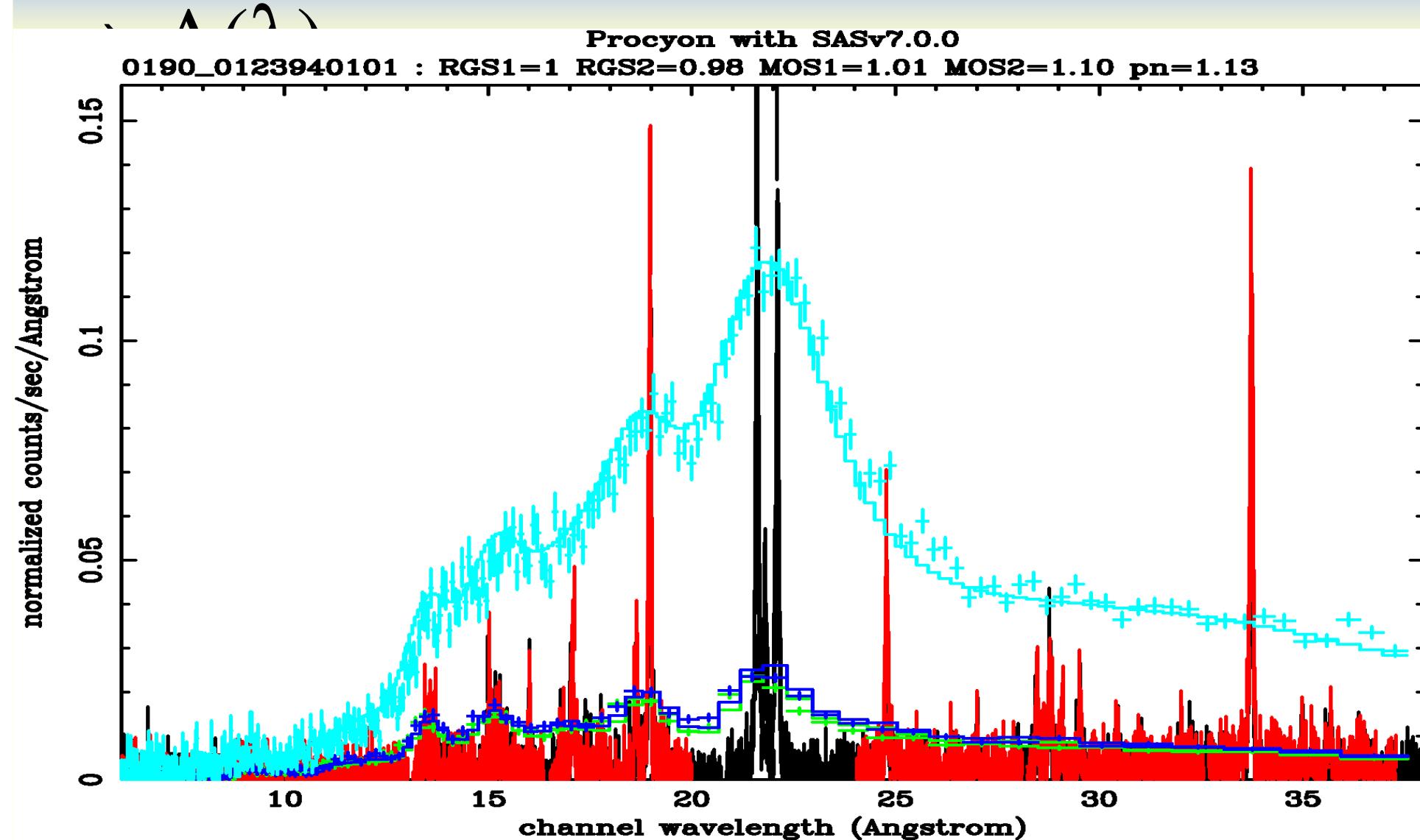


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Procyon with SAS v7.0.0

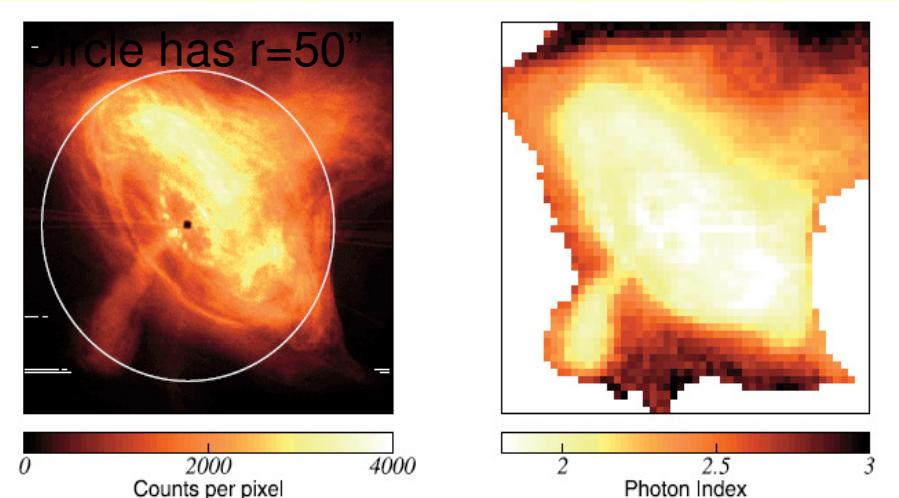


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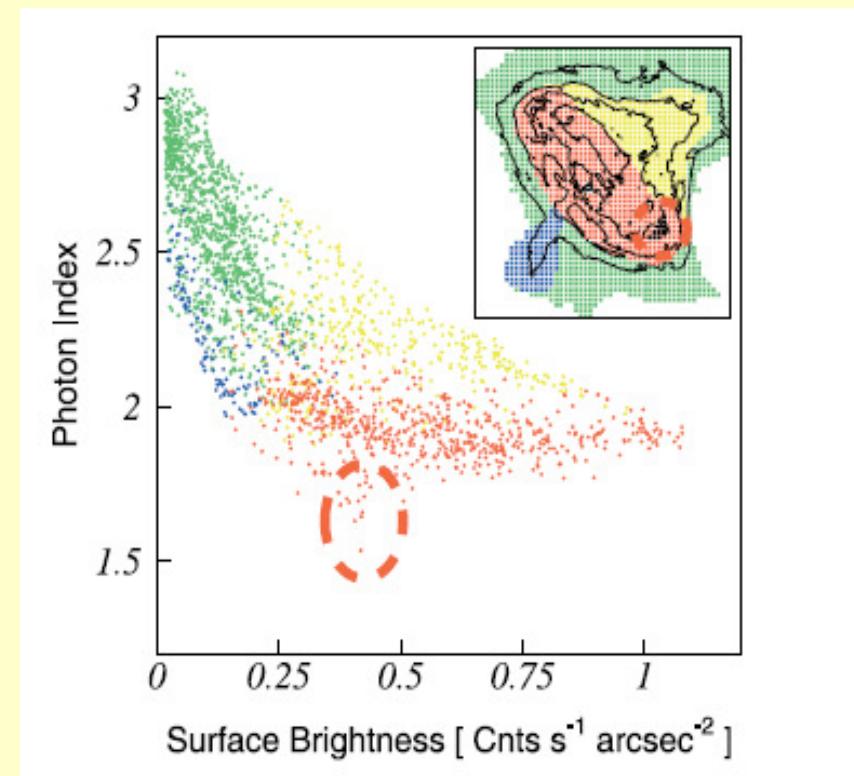
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Spatial variations in the Crab

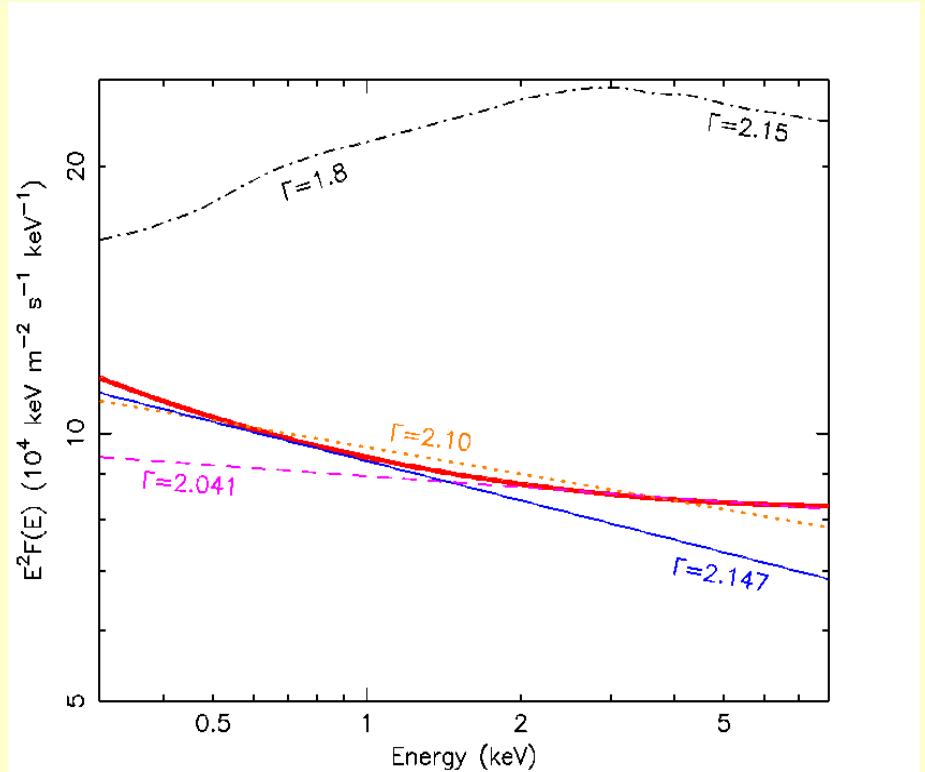


Mori et al., Chandra

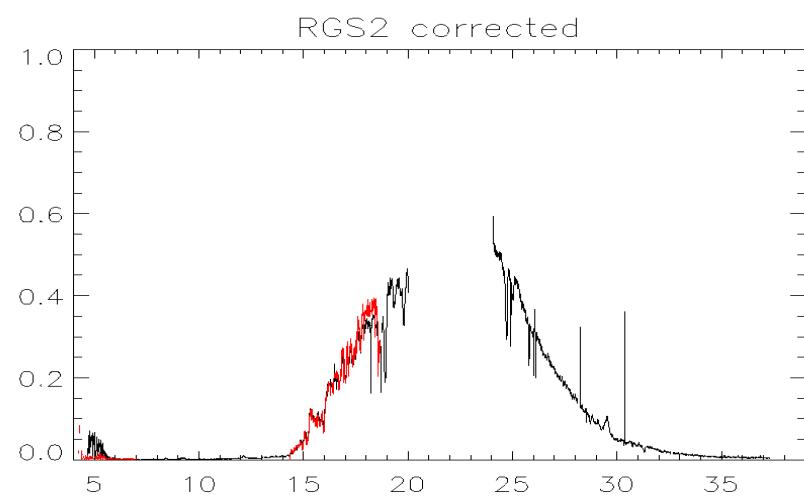
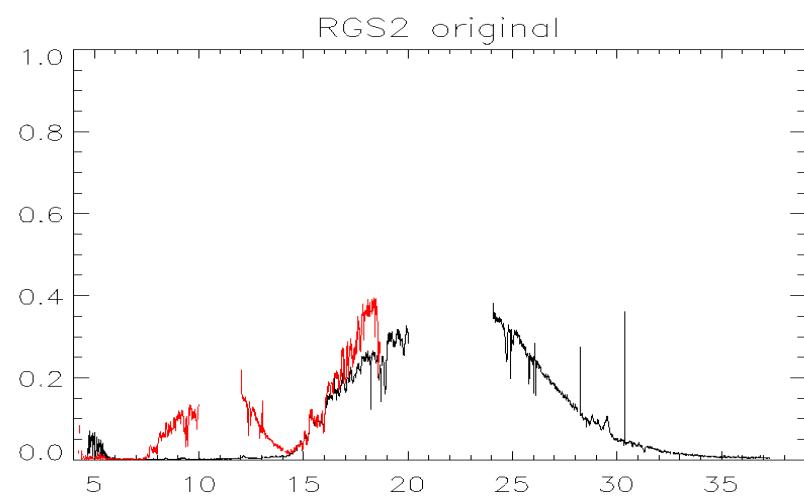
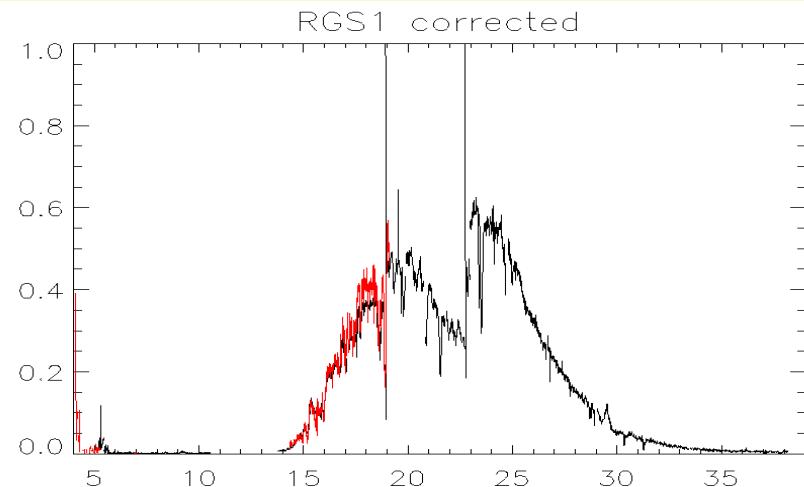
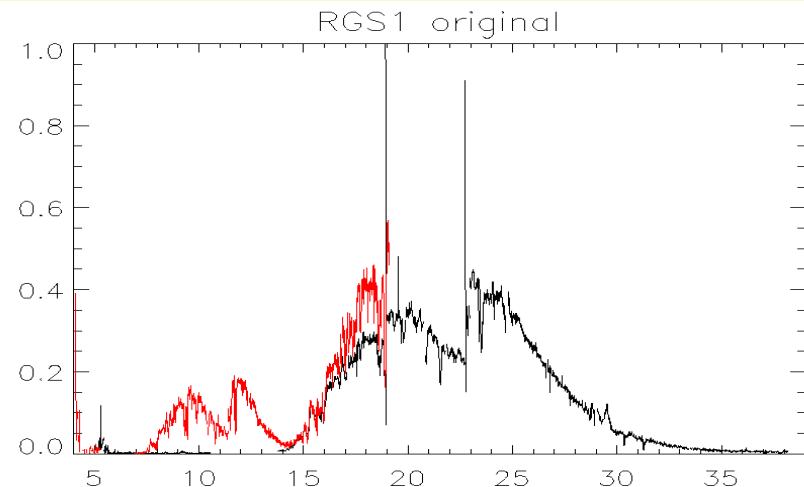


Curved Crab spectrum

- red : sum of individual Chandra spectra pixels
- purple: 2-8 keV range fit to red curve
- blue: Kuiper et al.
- orange: Mori's fit to total spectrum



RS Oph RGS pile-up



Miscellaneous

- The WHIM story
 - Everyone friends now
 - (RGS was right)
- Operational plans
 - single-node readout
 - a few remaining details
 - “multiple-pointing” for AO7
 - ⇒ implementation plan with 2006-12-31 deadline (Muñoz & Metcalfe)