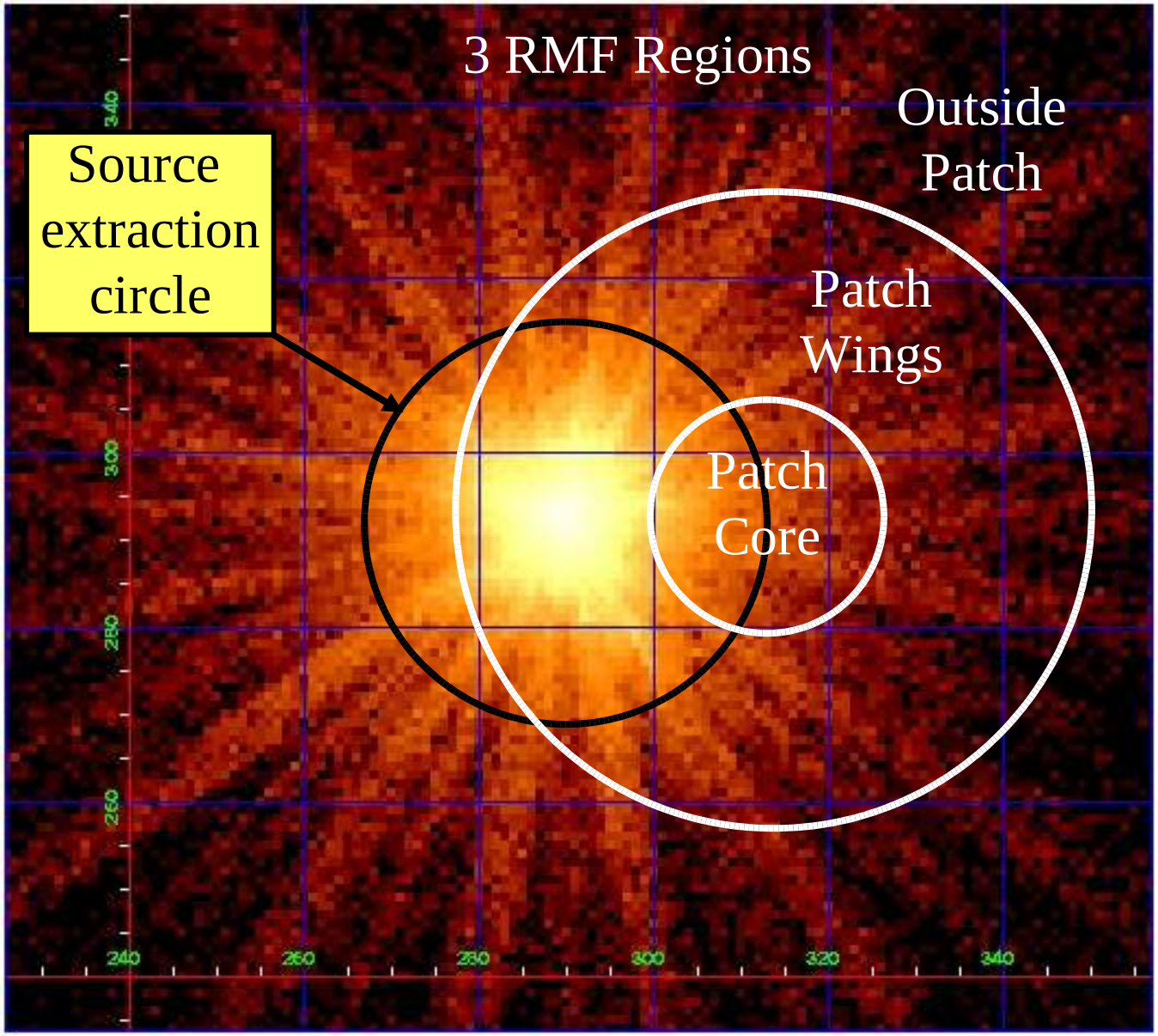
Implementation of the MOS spatial/temporal DRM:

Does it work ?

Zeta Puppis: Checking the line response ~450 eV

3C 273: Instrumental edges and comparison with EPIC-pn

RXJ1856: The very low energy response, 100-300 eV



As of SAS v6.5:

3 RMF regions

0”-15”,
15”-40”,>40”

2 Instruments

9 Epochs

54 parameter files

18 CCFs

PSF (rmfgen default) or flat weighting to create average RMF

(automatically generated in SAS)

LUX: Delivered (eventually) full set of parameter files to ESAC

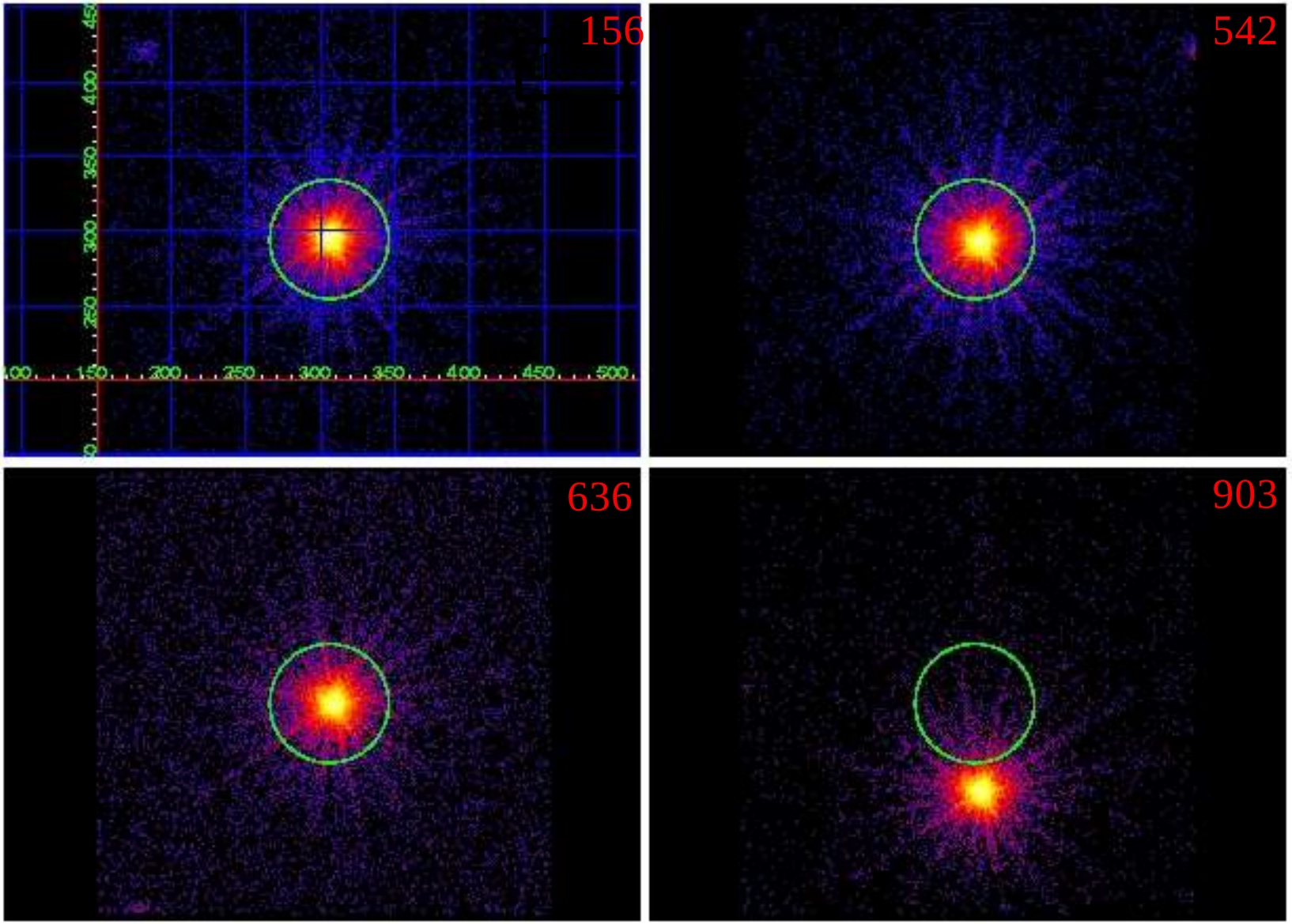
With SAS6.5.0 initially only CCFs for epochs post REV 370 were released to users. Earlier epochs were not released because there was not time to test them within the ESAC system.

There was a problem with backwards compatability with SAS6.1.0

Hence, full set will be released end of October…giving opportunity to refine some of the rmf parameter values in the process.

Zeta Puppis On/Off axis…..40” Radius Regions

MOS1



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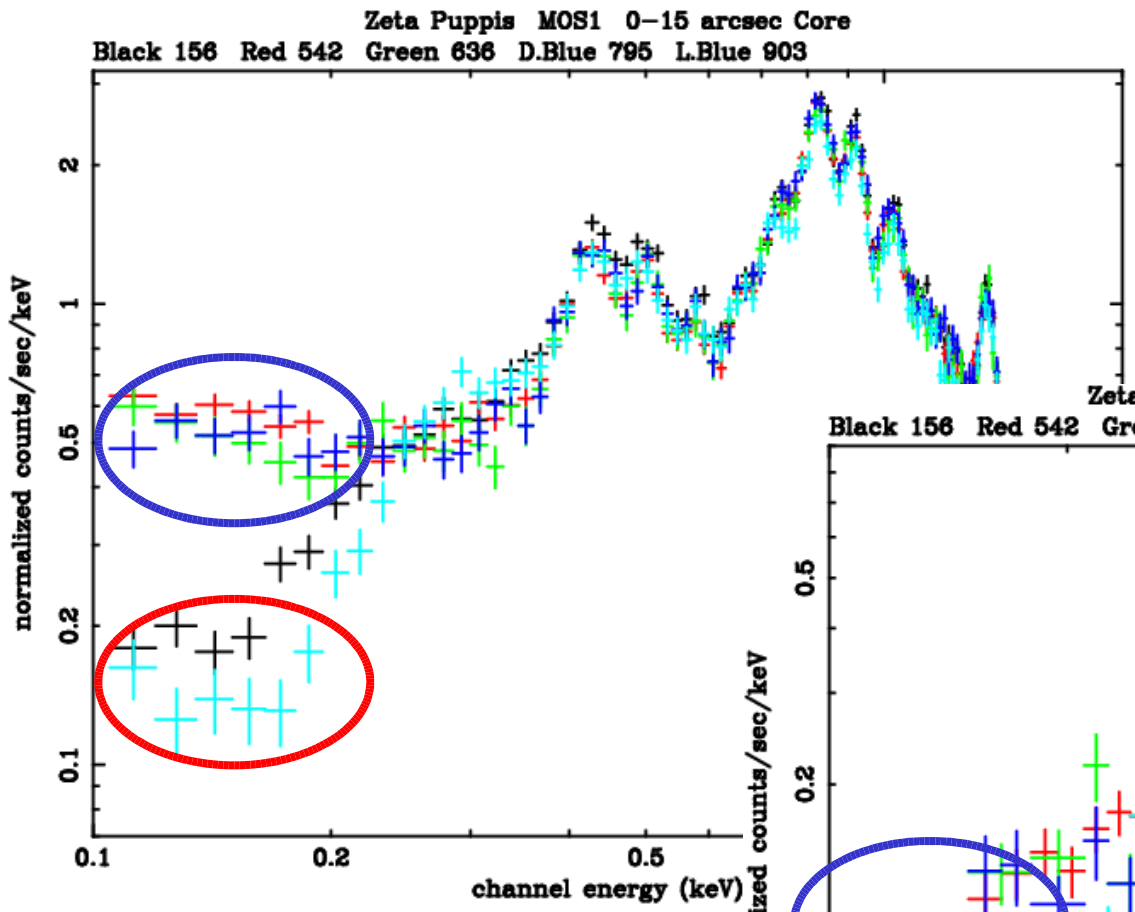
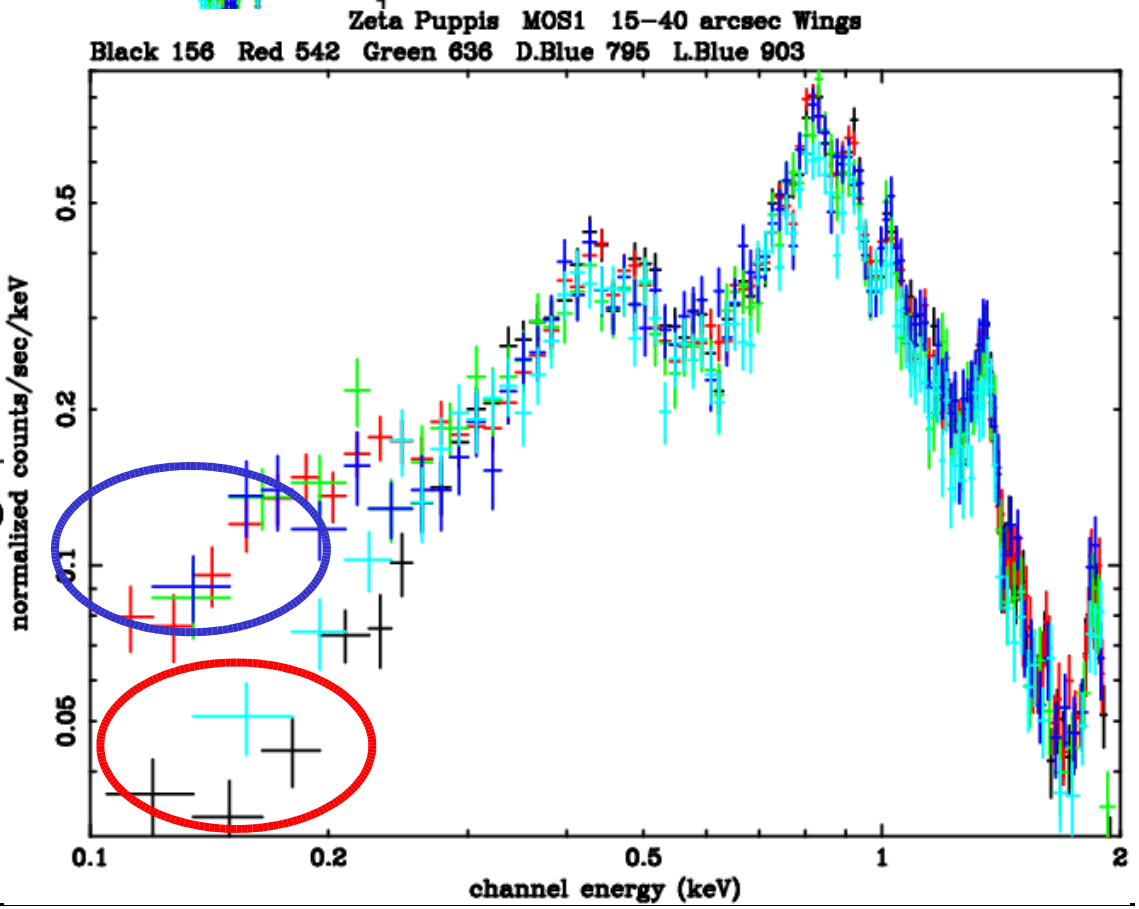


MOS1

ON-AXIS 542,636,795



ON-AXIS 156

OFF-AXIS 903

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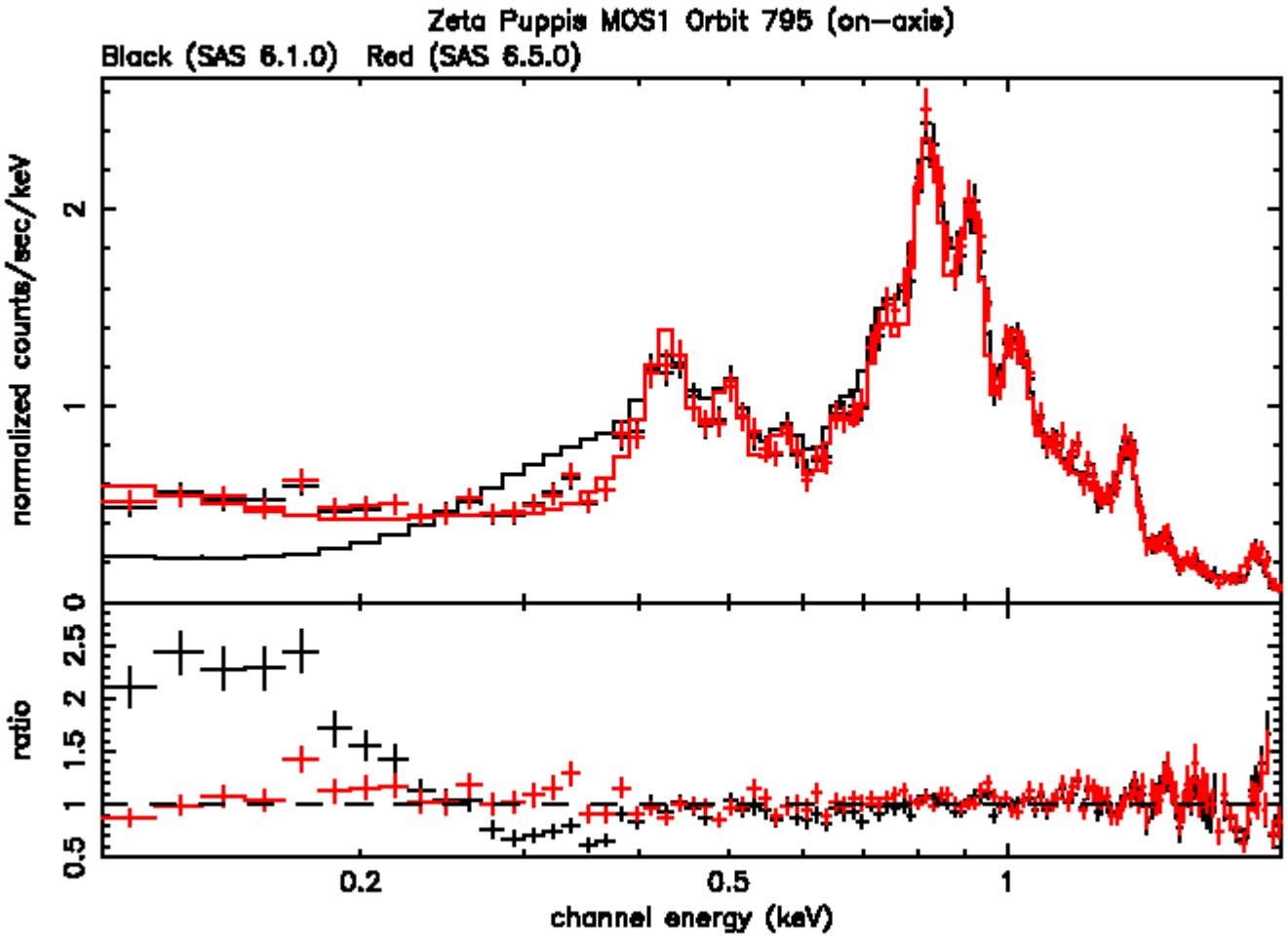
Model: RGS fluxed spectrum with “Blazar Correction” supplied by Andy P.



0.1-2 keV

M1/RGS=1.077

M2/RGS=1.081

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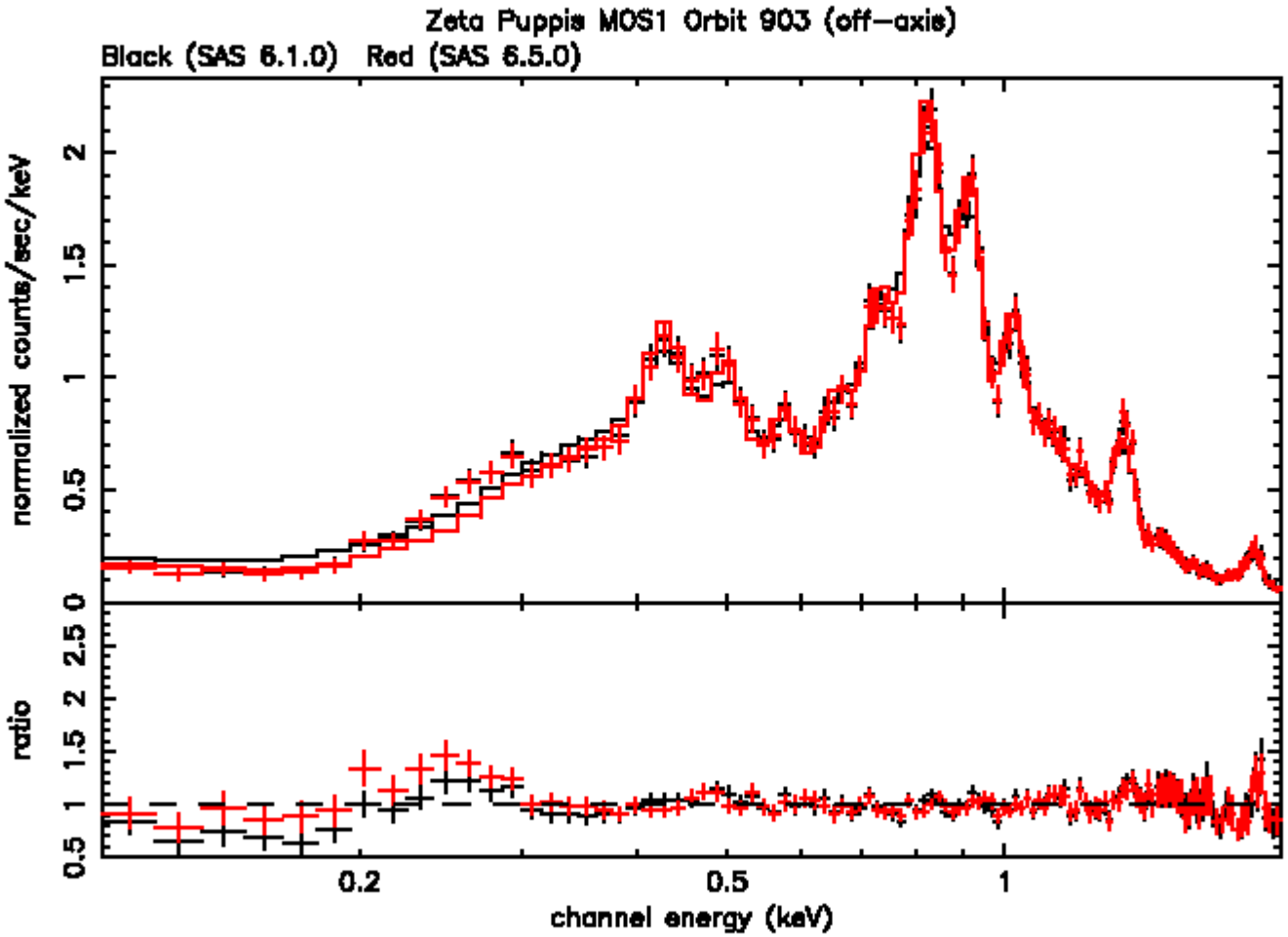

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Looking at Residuals with 3C 273

18 Observations analysed:

0094

0095 x 2

0096

0277 x 2

0370

0373

0472

0554

0563 x 2

0655

0735

0835 x 3

1023

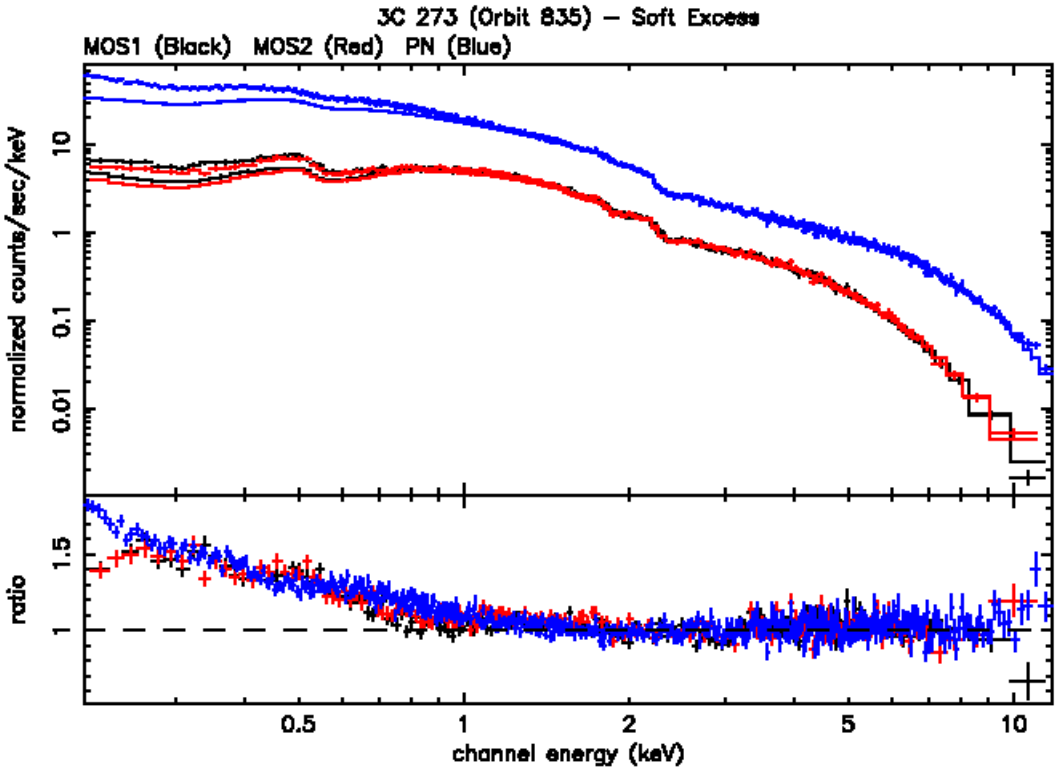
MOS SW mode:

7.5-40” annulus

RMF contribution:

Patch Core ~54%

Patch Wings~46%



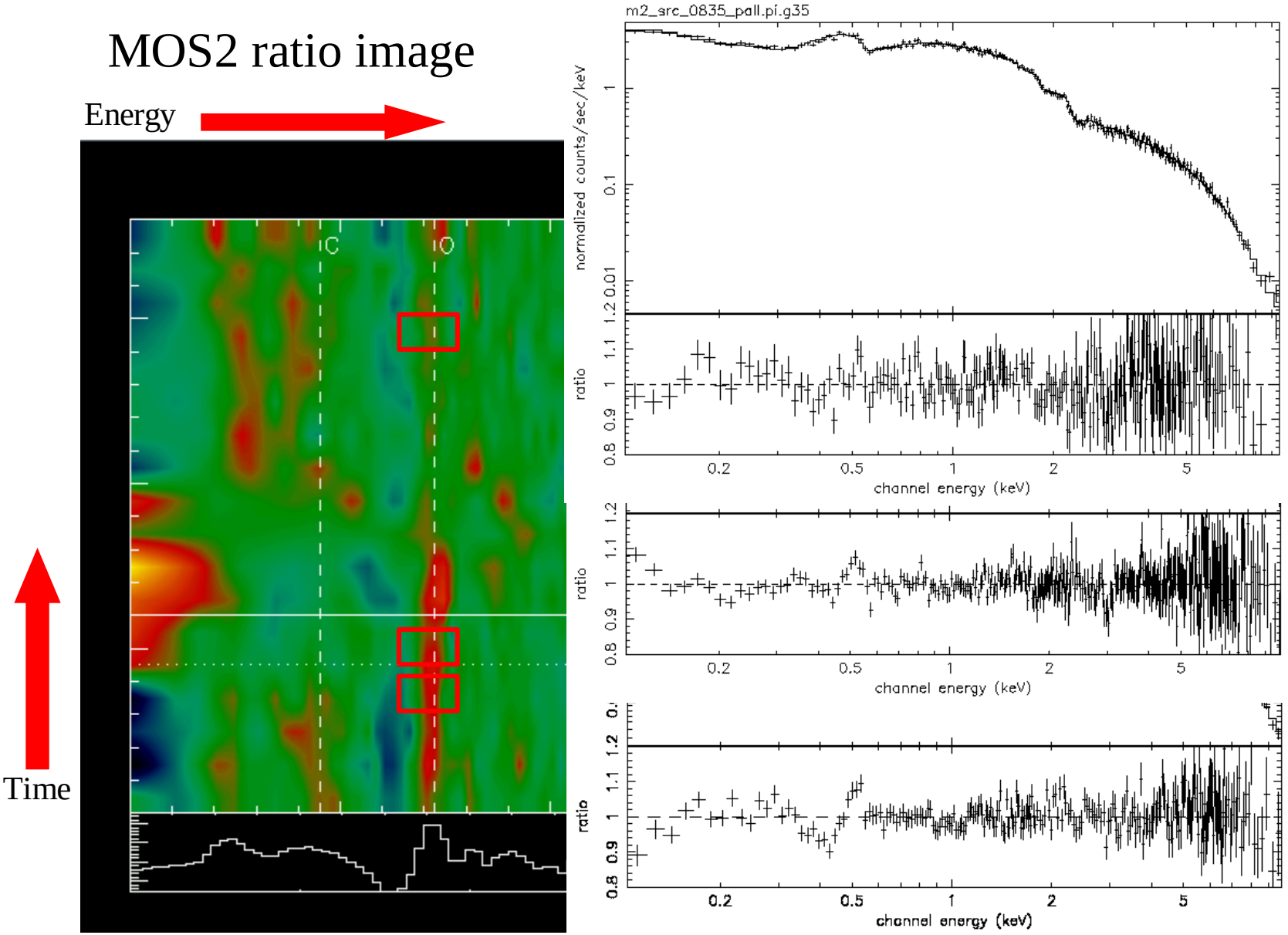
tbabs * (bb + bb + po)

$n_H = 1.79 \times 10^{20} cm^{-2}$ (fixed)

kT_B ~100 eV and kT_{BB} ~ 250 eV

Page et al. 2004 MNRAS, **349,** 57

MOS2 ratio image



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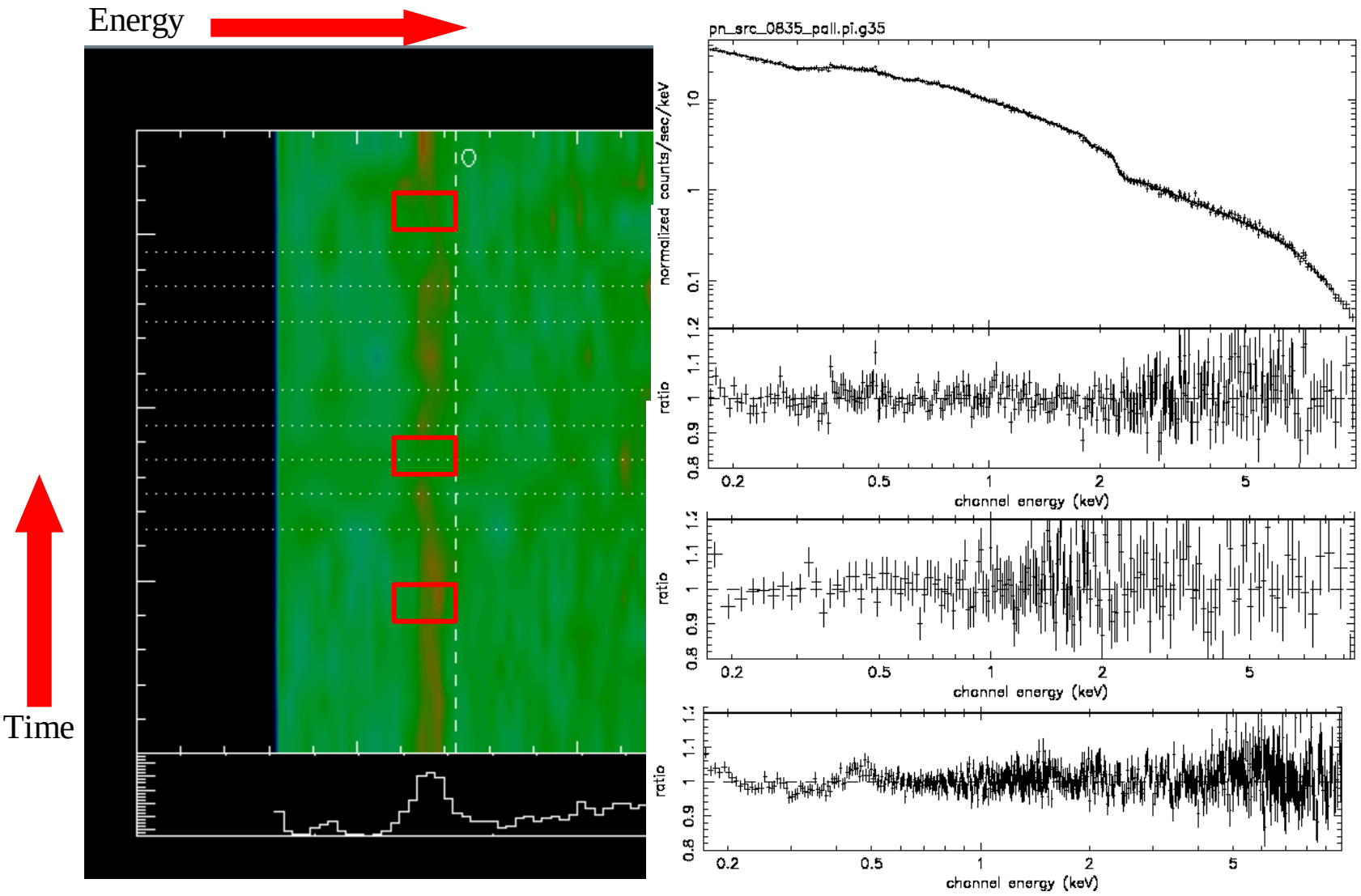
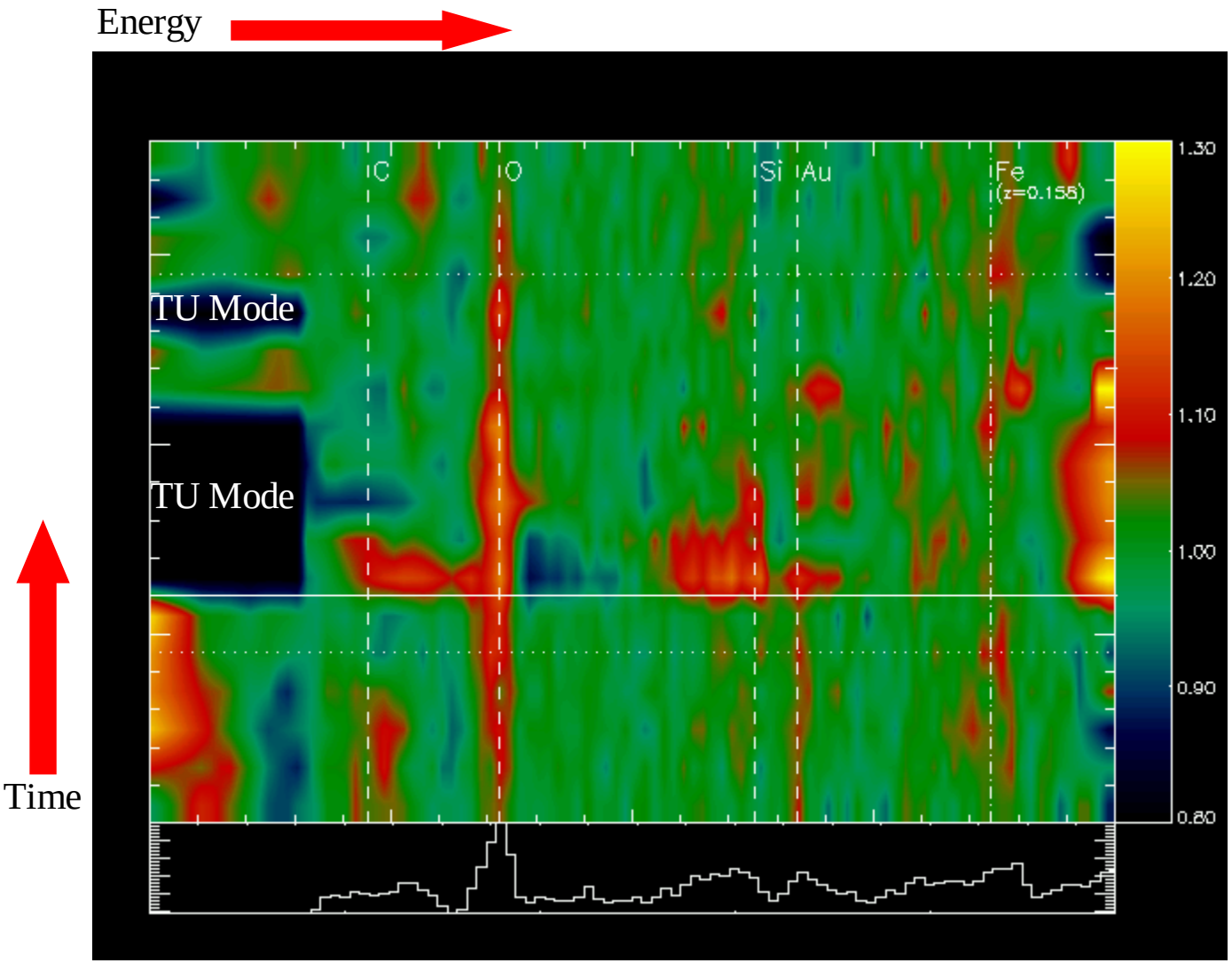
PN ratio image



MOS1 ratio image



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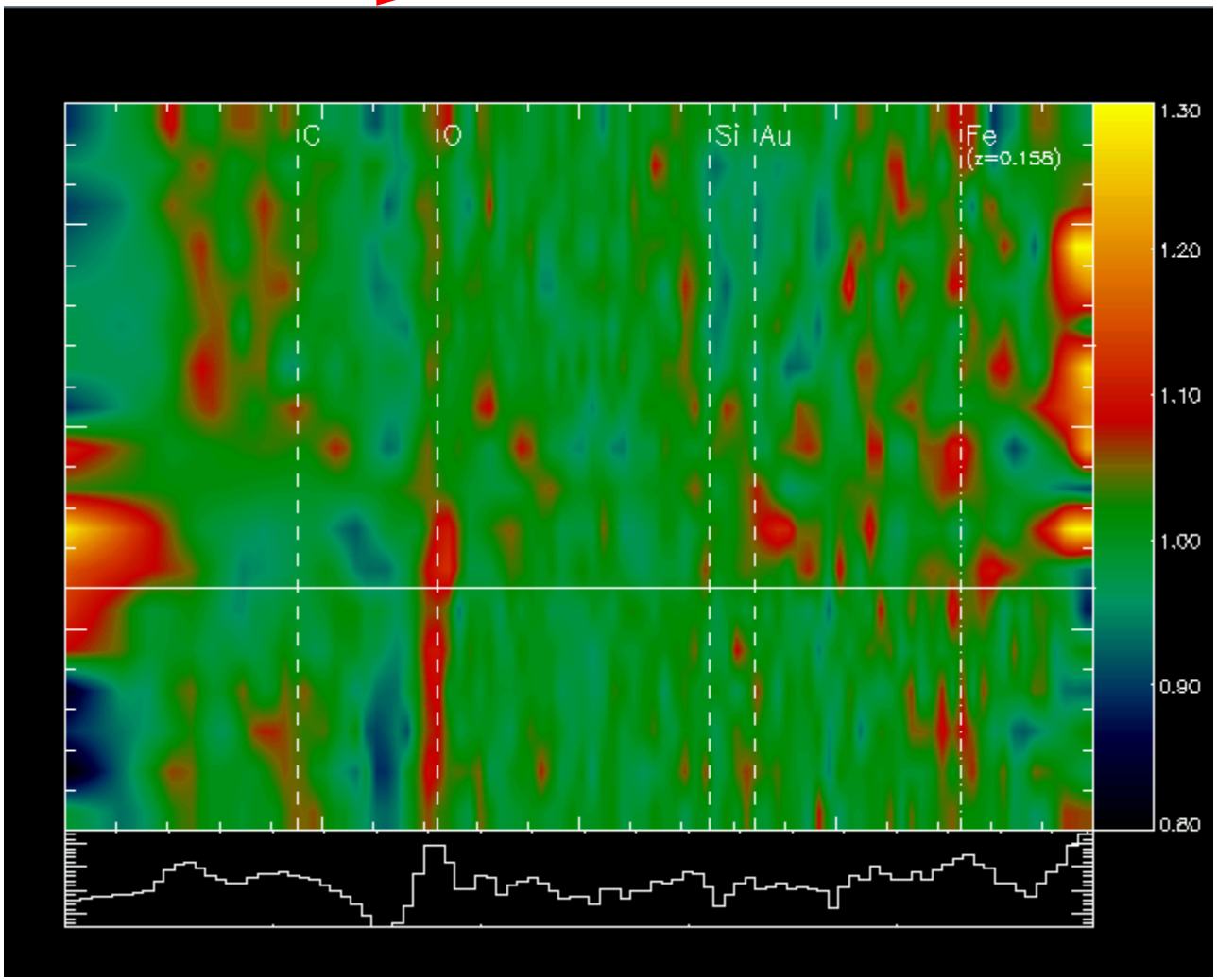
MOS2 ratio image

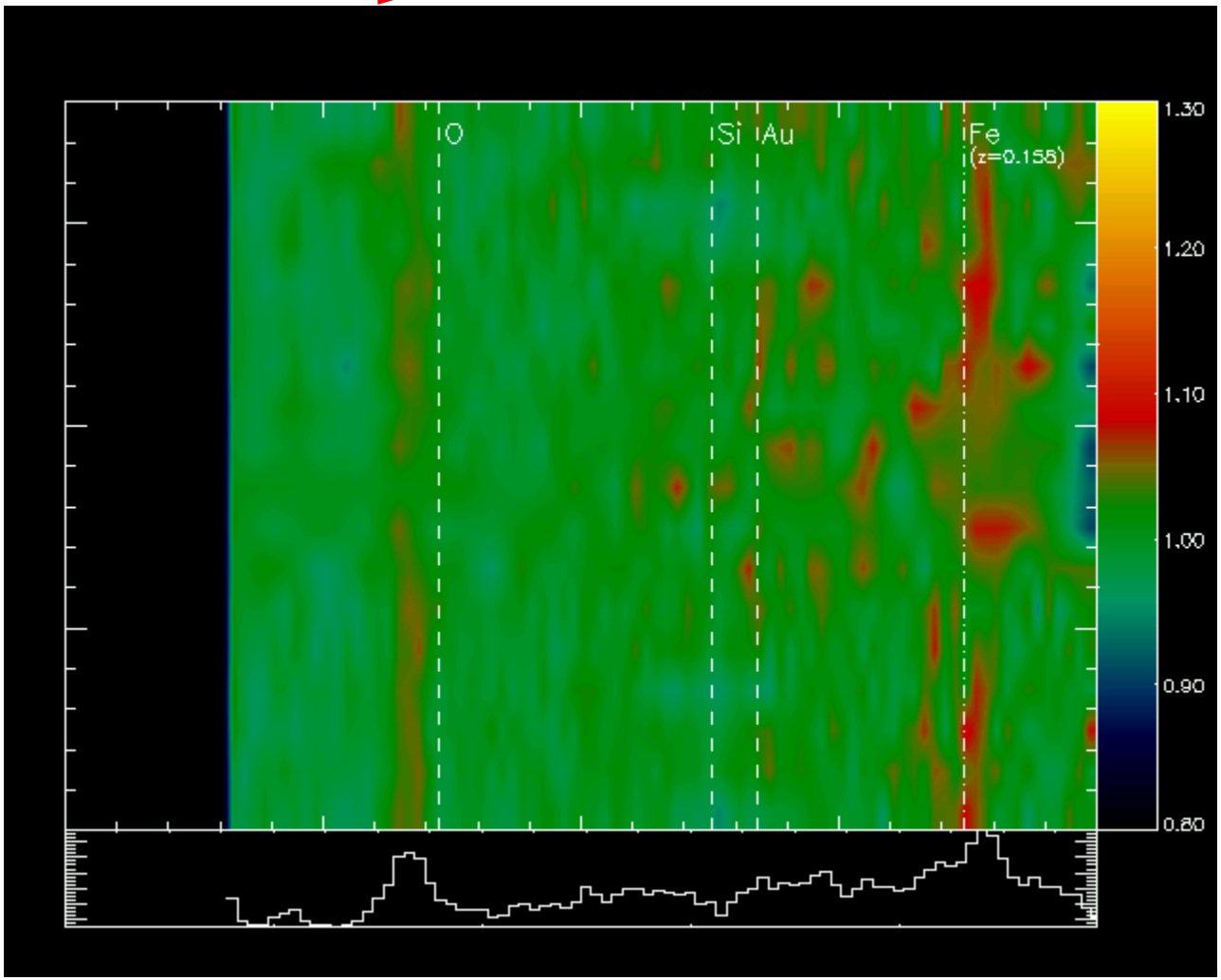
Energy



Time

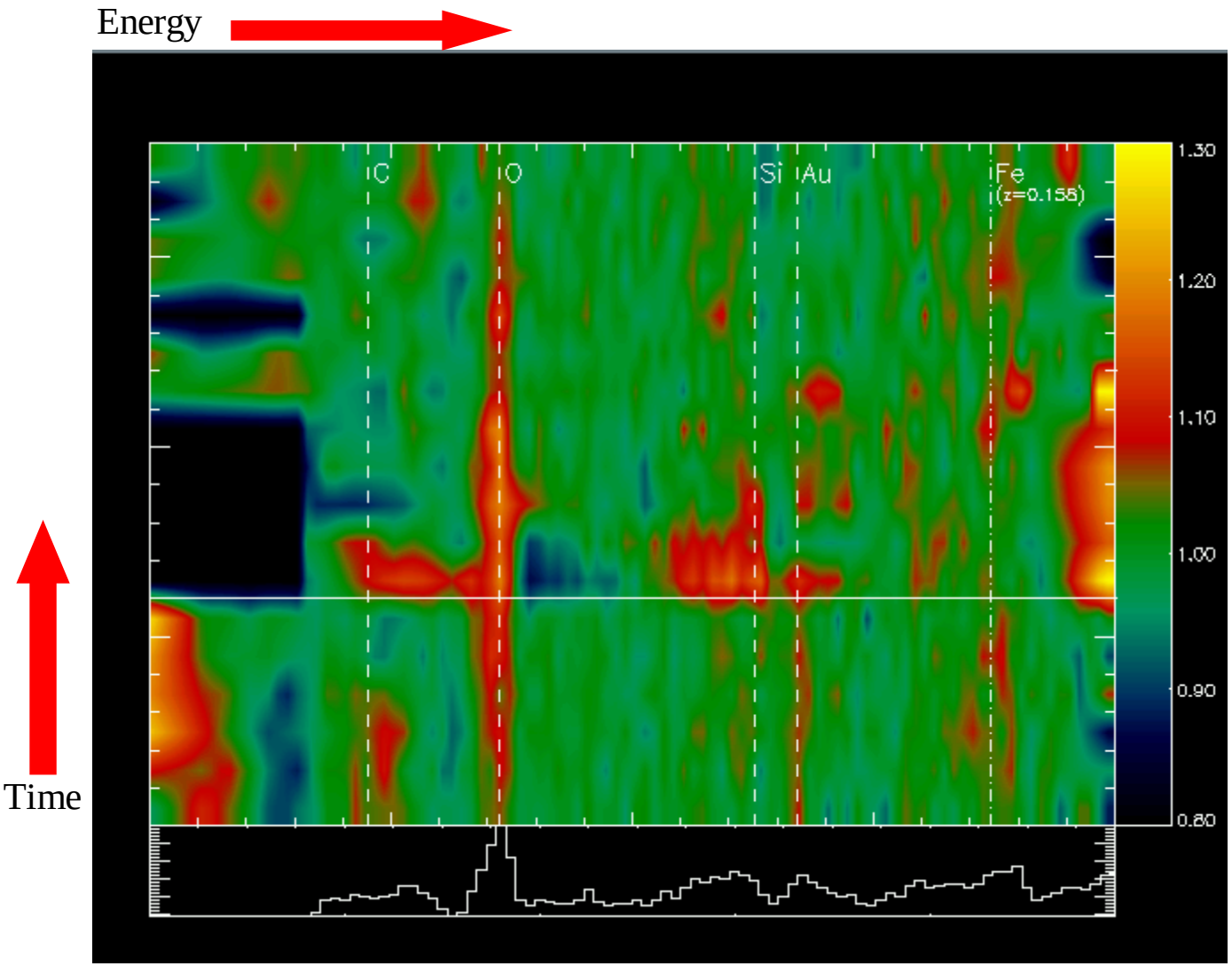
PN ratio image

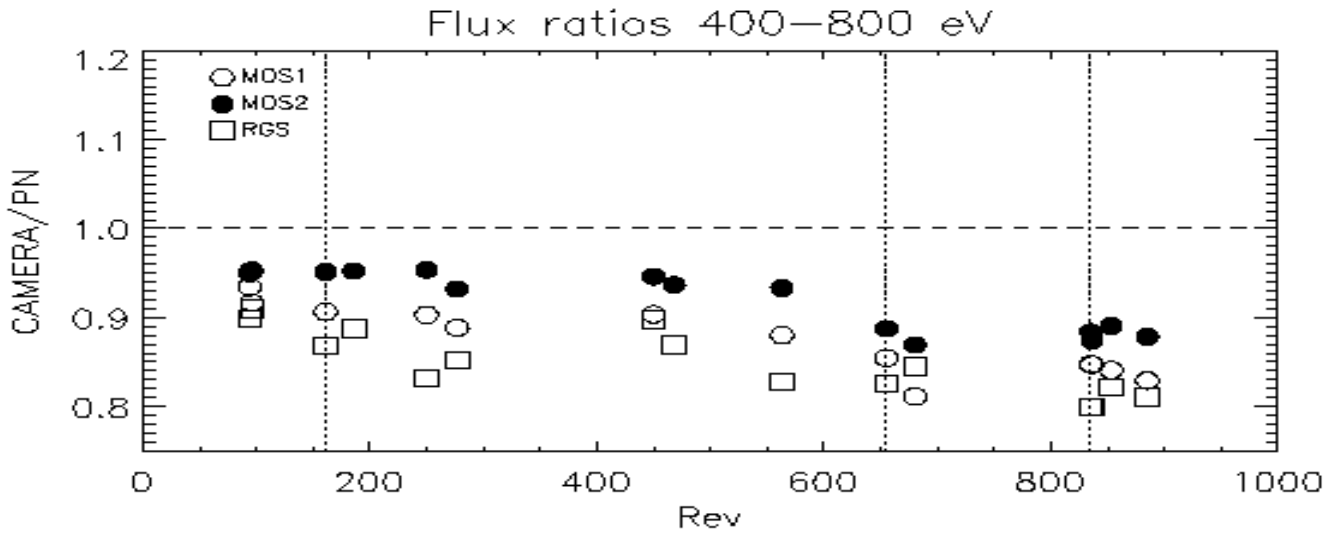
Energy

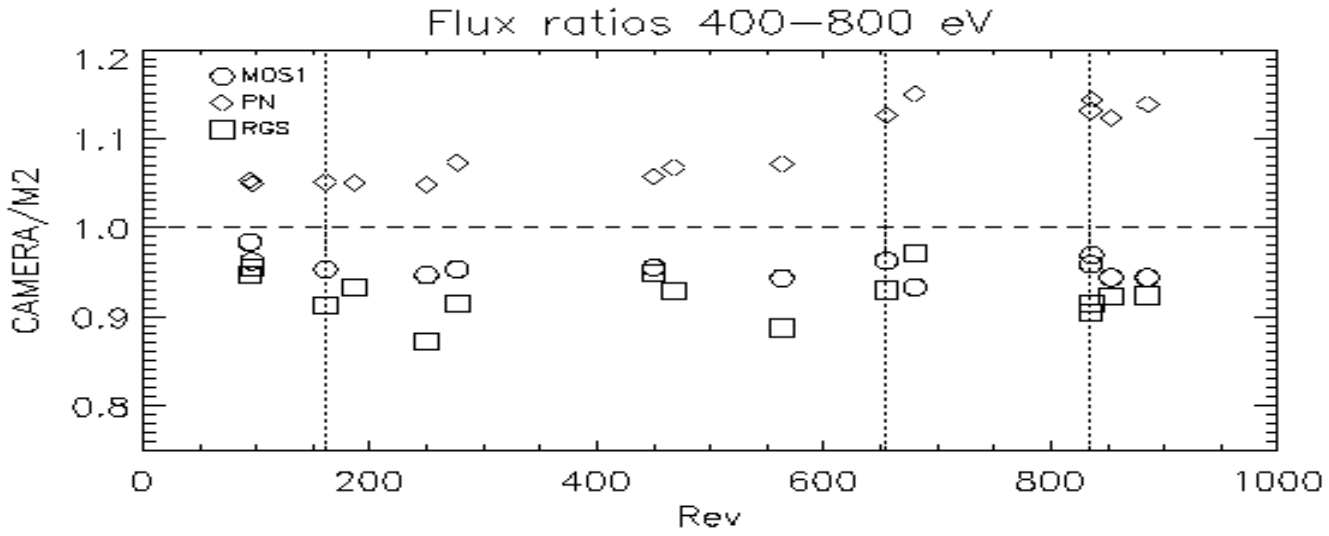


Time

MOS1 ratio image







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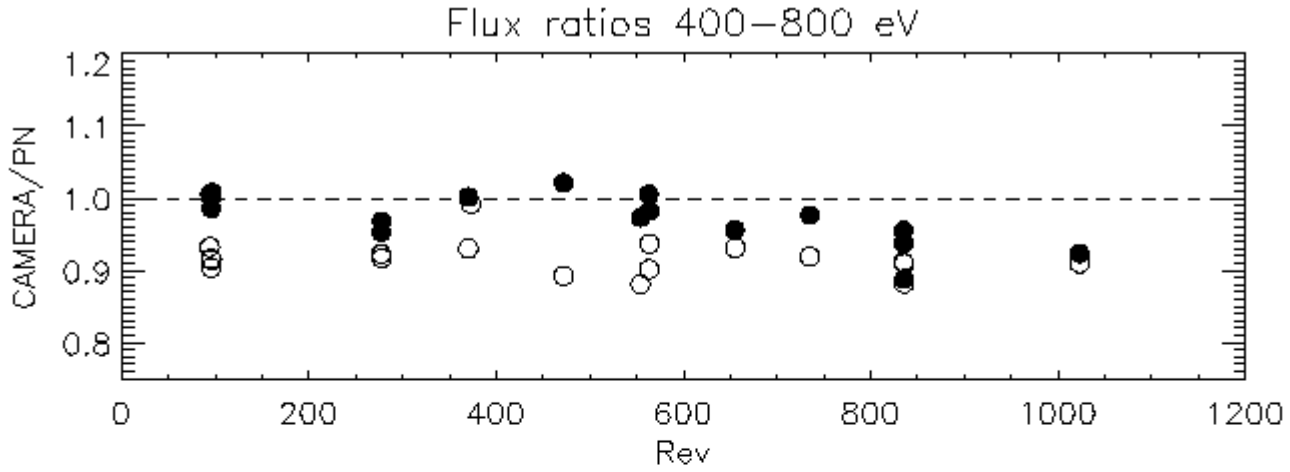

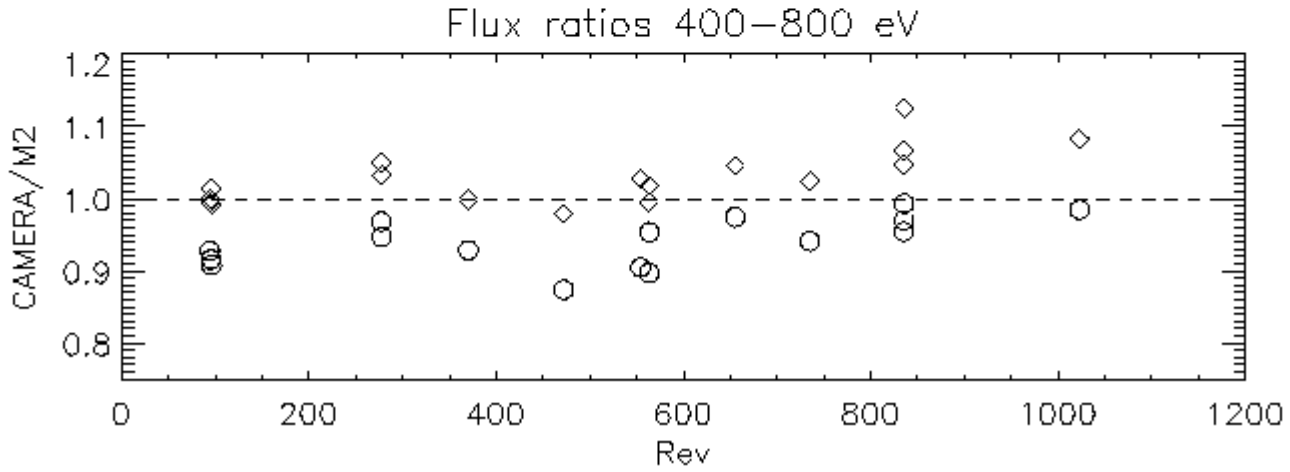

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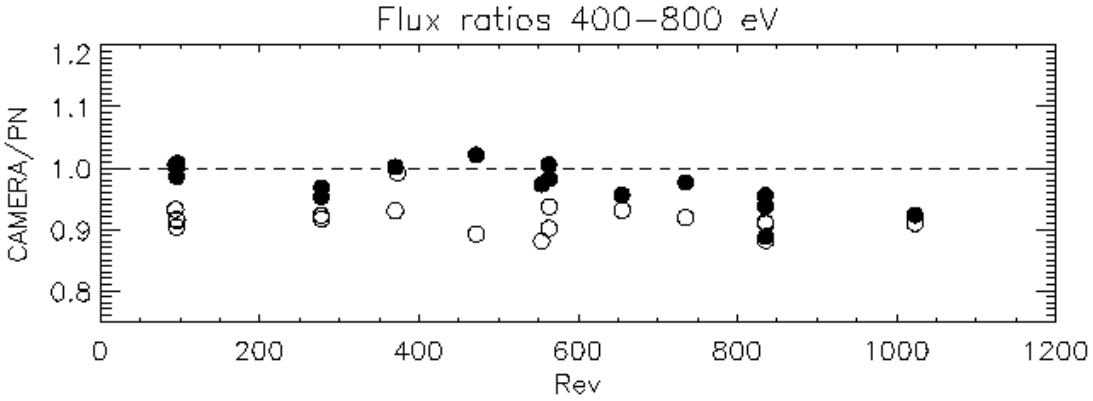

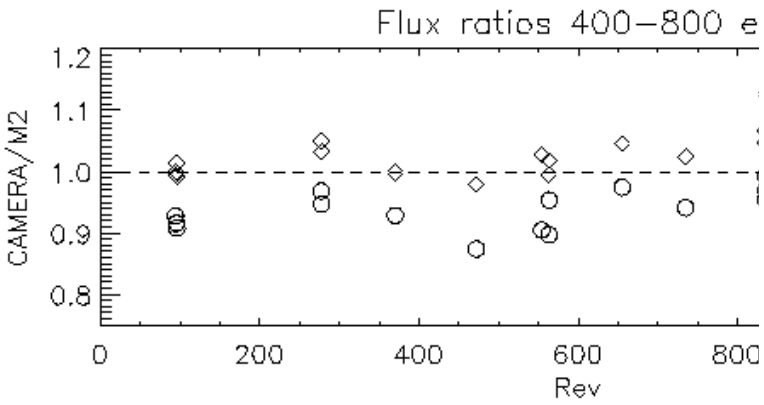

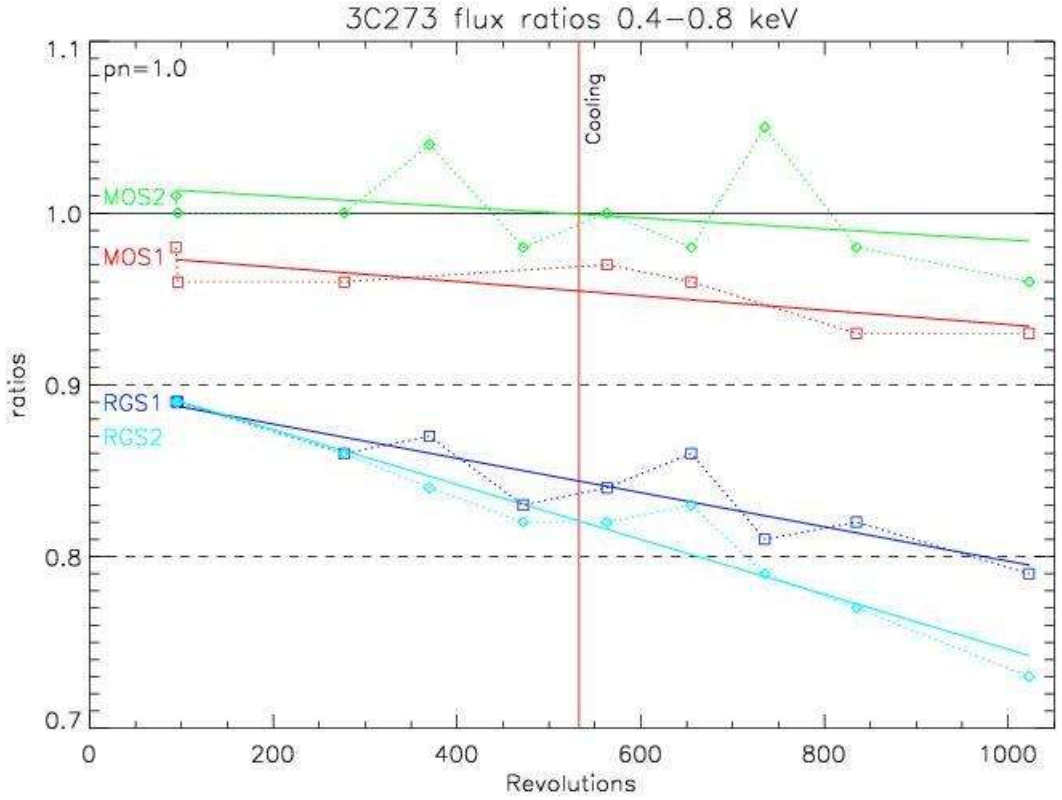

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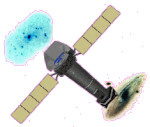

XMM
EPIC
MOS

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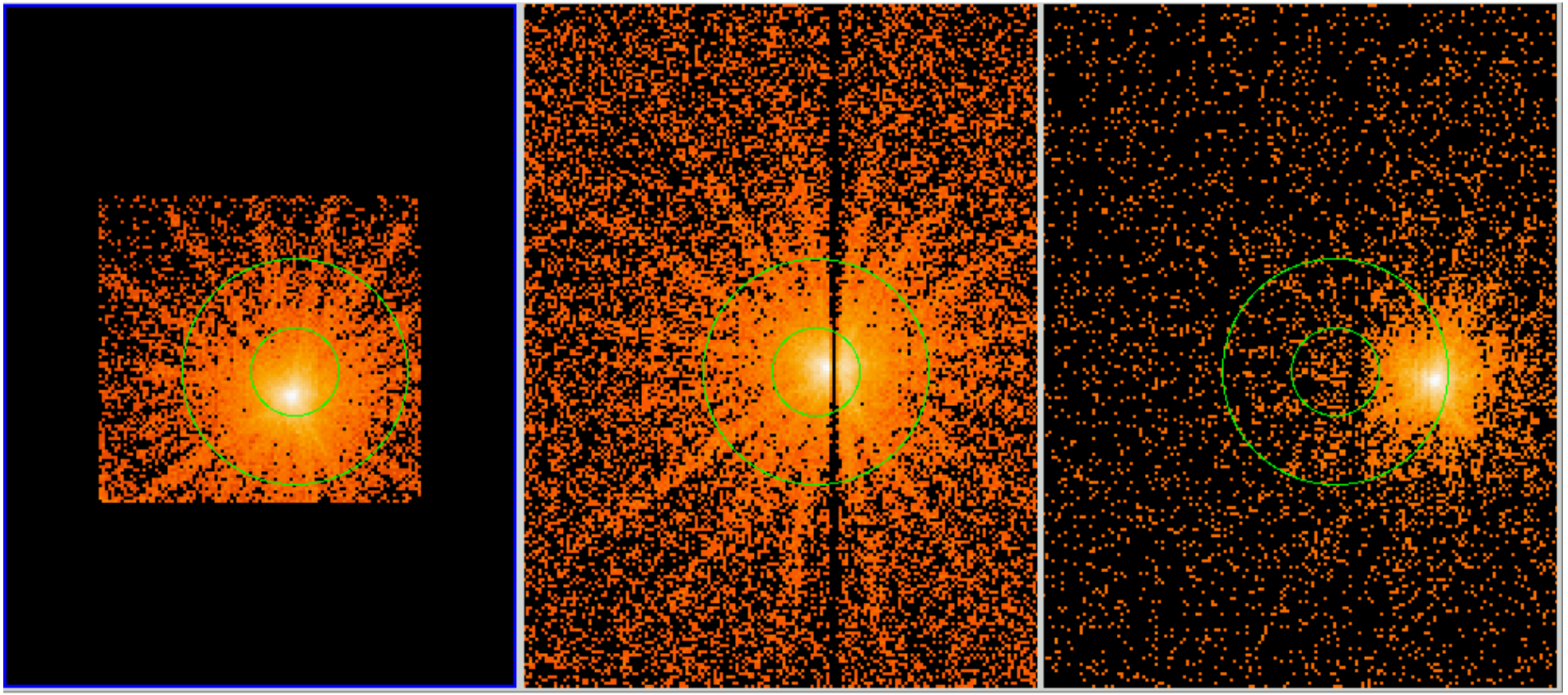
Investigating the soft response with RXJ1856

0878 0968 0980



pn prime pn prime

RXJ 1856 MOS1 (RAWX,RAWY) emchain/xmmea_em

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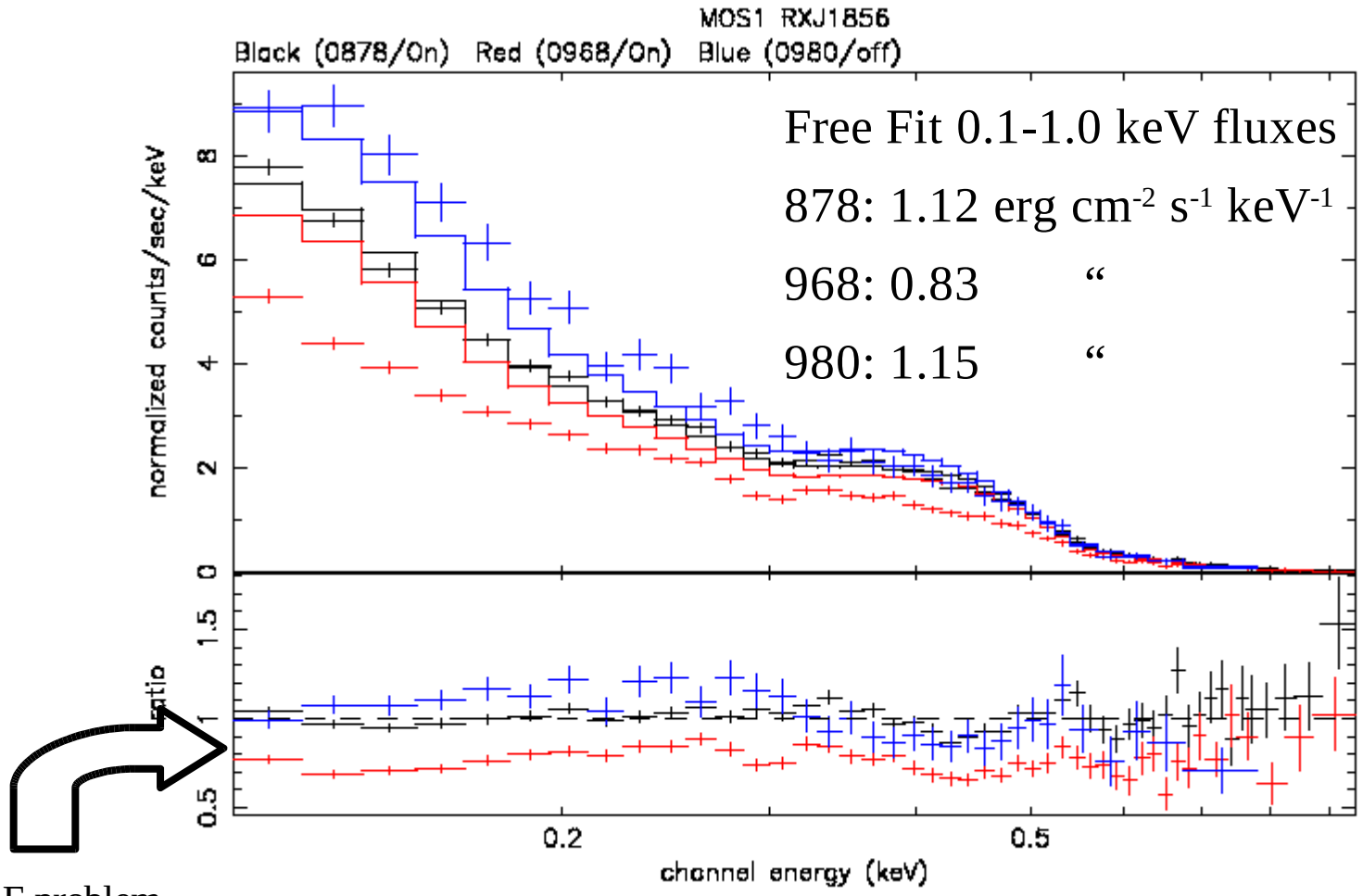
tbabs*bb model fit to Rev 878 folded through 878, 968 and 980 response



ARF problem

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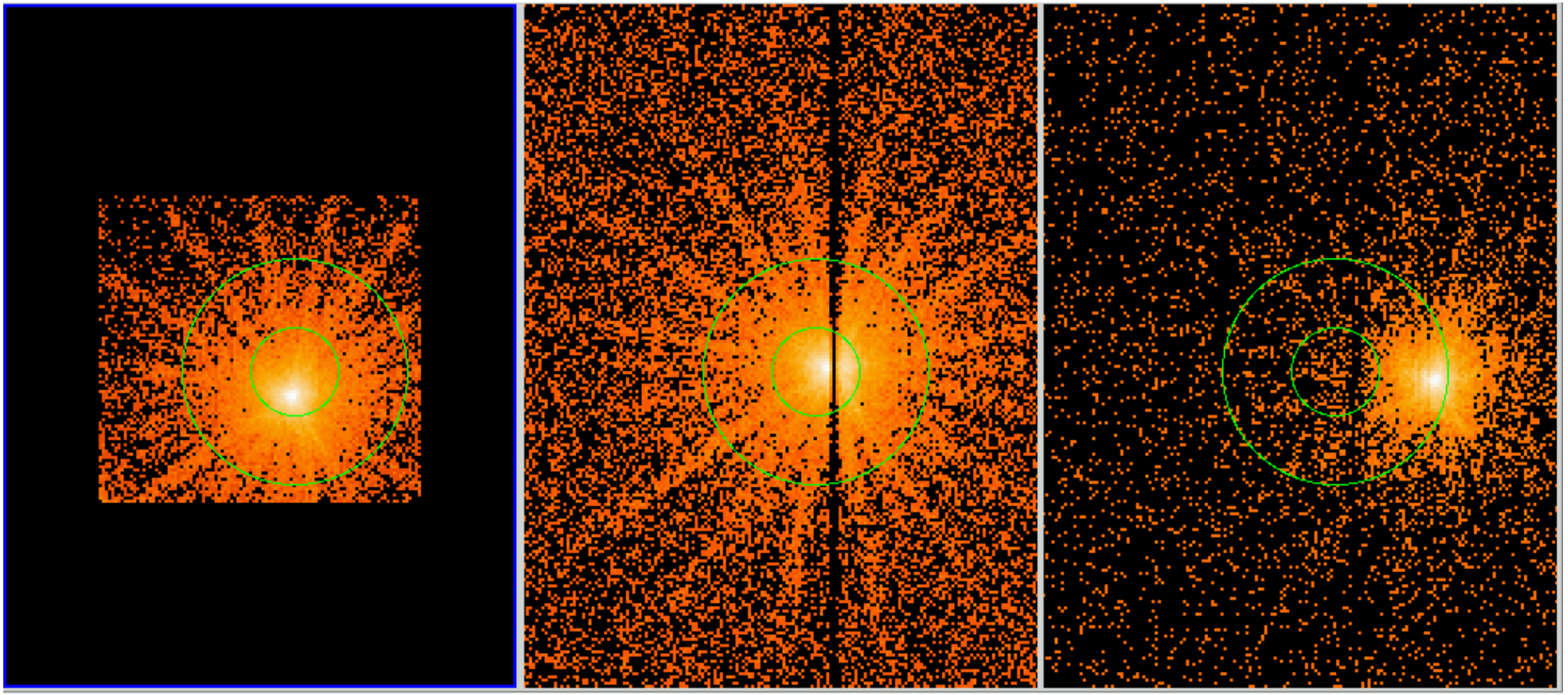
RXJ 1856 MOS1 (RAWX,RAWY) emchain/xmmea_em

0878 0968 0980



pn prime pn prime

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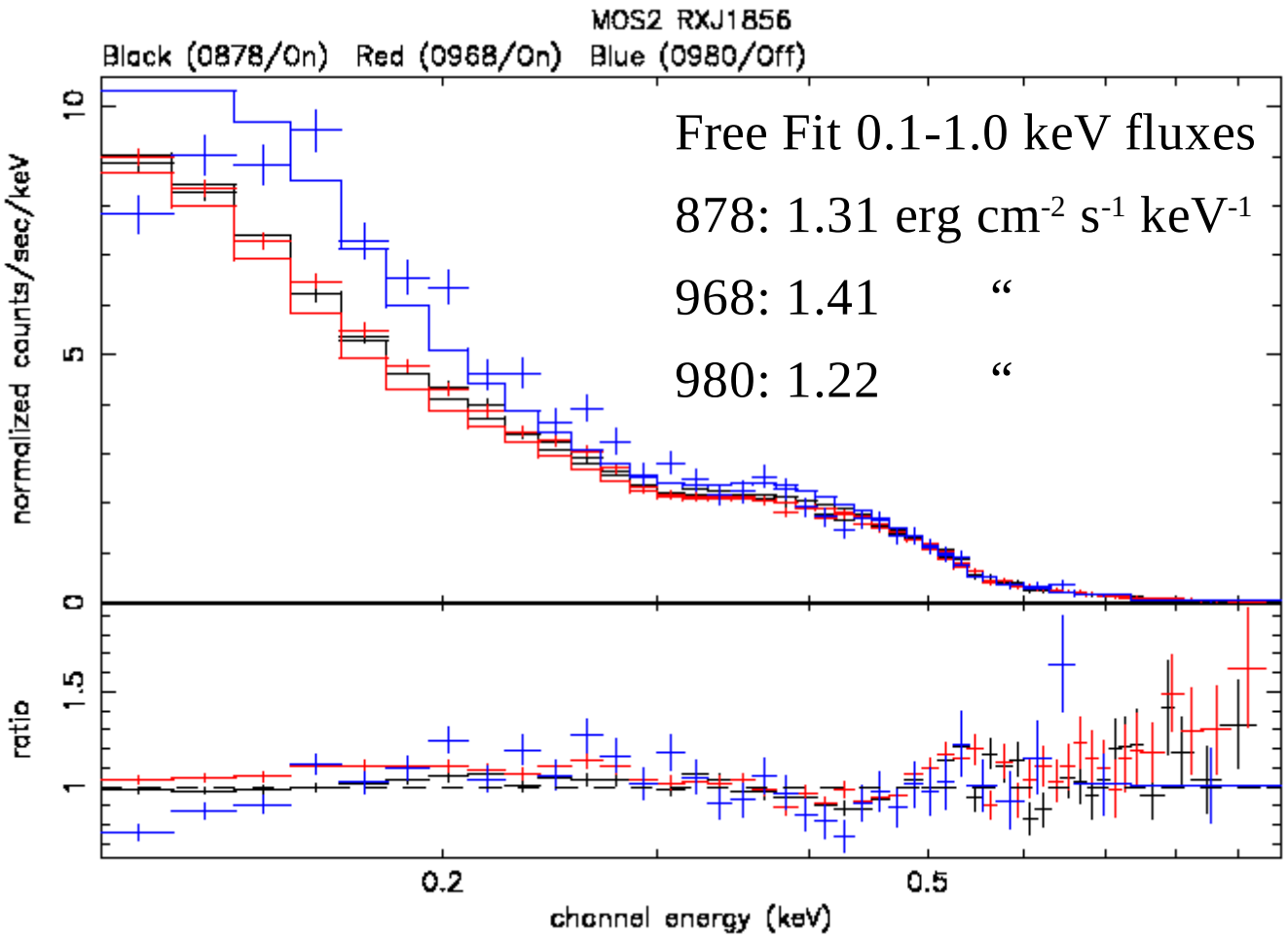

Free Fit 0.1-1.0 keV fluxes

878: 1.31 erg cm^{-2} s^{-1} keV^{-1}

968: 1.41 “

980: 1.22 “

c.f MOS1

878: 1.12

968: 0.83

980: 1.15

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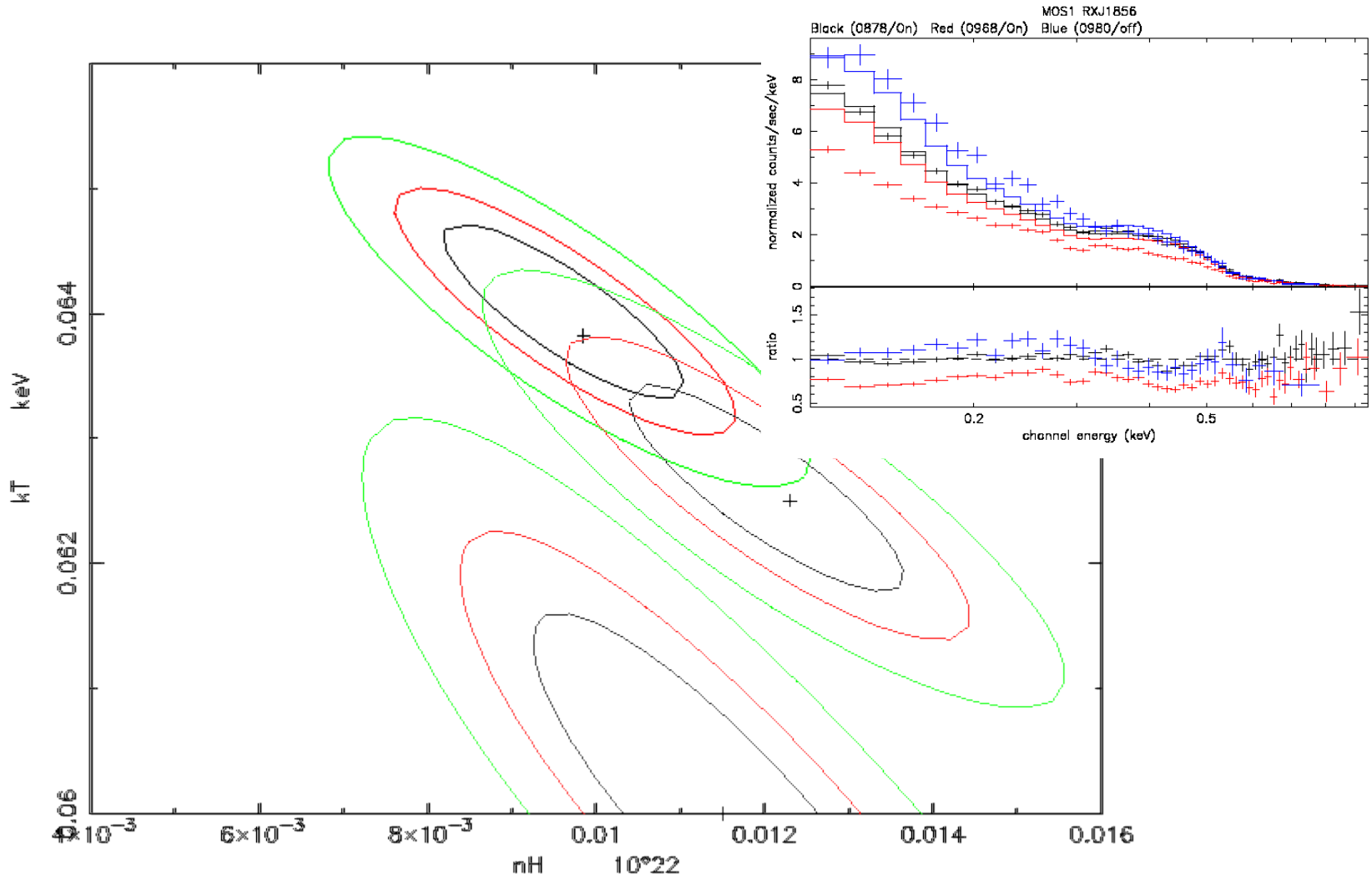
MOS1 spectral fit parameters: kT versus nH

878

968

980

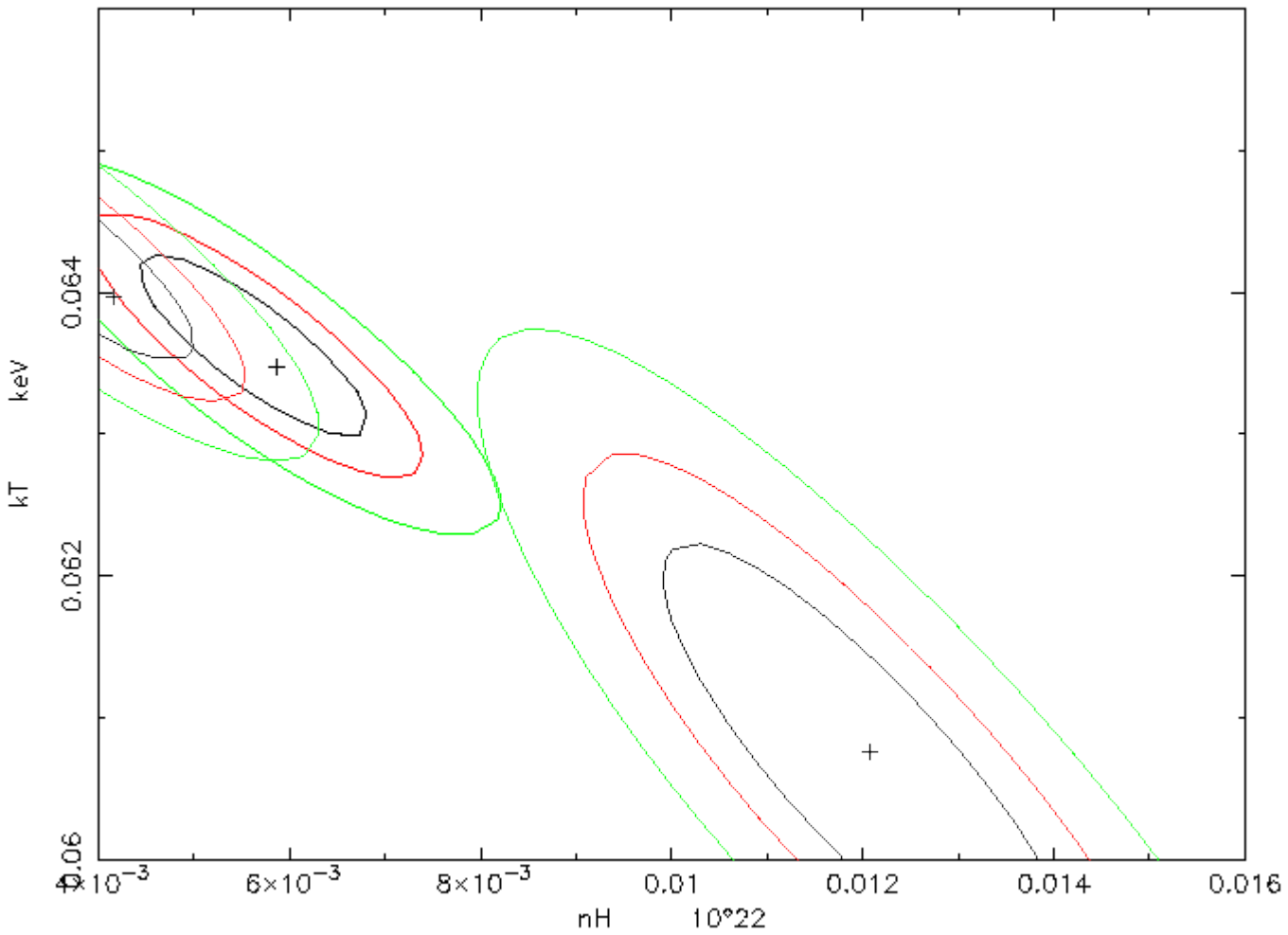


MOS2 spectral fit parameters: kT versus nH

878

968

980



Summary:

Line Response ~450 eV reasonable but unacceptable residuals around O edge

Late observations show stronger residuals around Si in MOS2 Indicating energy scale problem

10% difference in returned flux between MOS1 and MOS2 at low energies

Returned flux from MOS2 in agreement with pn

Very low energy response differences between MOS1 and MOS2 can be Resolved if we have an “agreed” physical model for RXJ 1856