



SXI Contamination Analysis

Eric D. Miller (MIT)
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RXJ1856 – SXI Analysis Bad vs. Good ARF

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=====
#Model TBabs<1>(bbodyrad<2> + bbodyrad<3>)constant<4>*hcnocol<5> Source No.: 1
Active/On
#Model Model Component Parameter Unit Value
# par comp
#
# Data group: 1
# 1 1 TBabs nH 10^22 1.10000E-02 frozen
# 2 2 bbodyrad kT keV 6.28300E-02 frozen
# 3 2 bbodyrad norm 1.42884E+05 frozen
# 4 3 bbodyrad kT keV 3.22600E-02 frozen
# 5 3 bbodyrad norm 1.87964E+06 frozen
# 6 4 constant factor 1.00000 frozen
# 7 5 hcnocol H sC18 0.0 frozen
# 8 5 hcnocol C sC18 -3.88711E-02 +/- 3.46307E-02
# 9 5 hcnocol N sC18 0.0 frozen
# 10 5 hcnocol O sC18 0.0 frozen
#
# Data group: 2
# 11 1 TBabs nH 10^22 1.10000E-02 = p1
# 12 2 bbodyrad kT keV 6.28300E-02 = p2
# 13 2 bbodyrad norm 1.42884E+05 = p3
# 14 3 bbodyrad kT keV 3.22600E-02 = p4
# 15 3 bbodyrad norm 1.87964E+06 = p5
# 16 4 constant factor 1.00000 = p6
# 17 5 hcnocol H sC18 0.0 = p7
# 18 5 hcnocol C sC18 0.621581 +/- 3.74639E-02
# 19 5 hcnocol N sC18 0.0 = p9
# 20 5 hcnocol O sC18 0.0 = p10
#
#
#Fit statistic : C-Statistic = 542.755 using 402 PHA bins and 400
degrees of freedom.
#
#Test statistic : Chi-Squared = 596.558 using 402 PHA bins.
# Reduced chi-squared = 1.49139 for 400 degrees of freedom
# Null hypothesis probability = 6.063244e-10

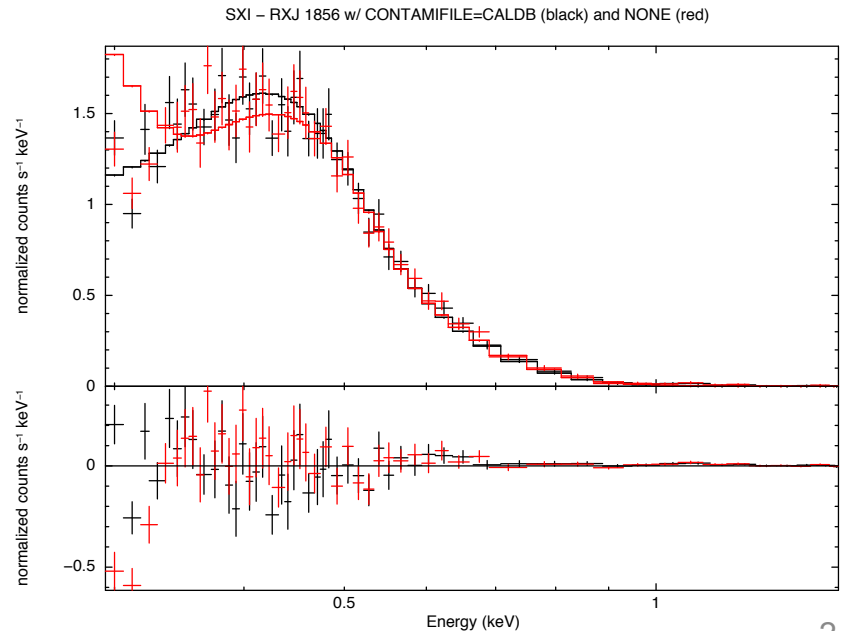
```

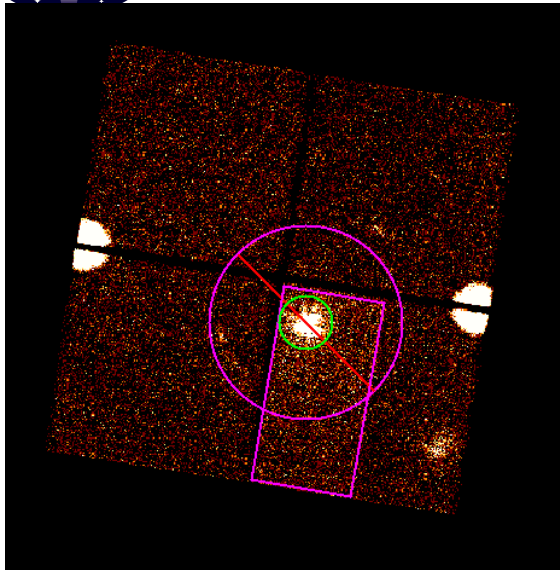
bad ARF

good ARF

- From ACIS and XIS experience, QE is not reliable at energies $E < \text{EventTH} + n \times \text{SplitTH}$, for $n = 3-4$ (unless grade branching accounted for in calib.)
- For SXI RXJ1856, EventTH=40, SplitTH=15, so $E < 0.5-0.6$ keV may be bad
- For SXI others, EventTH=100, so $E < 0.9$ keV may be bad

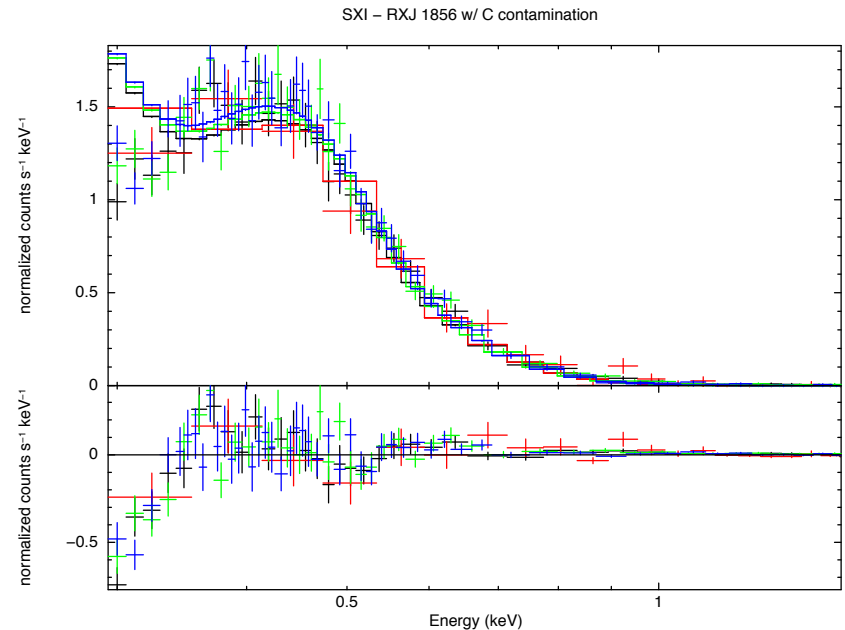
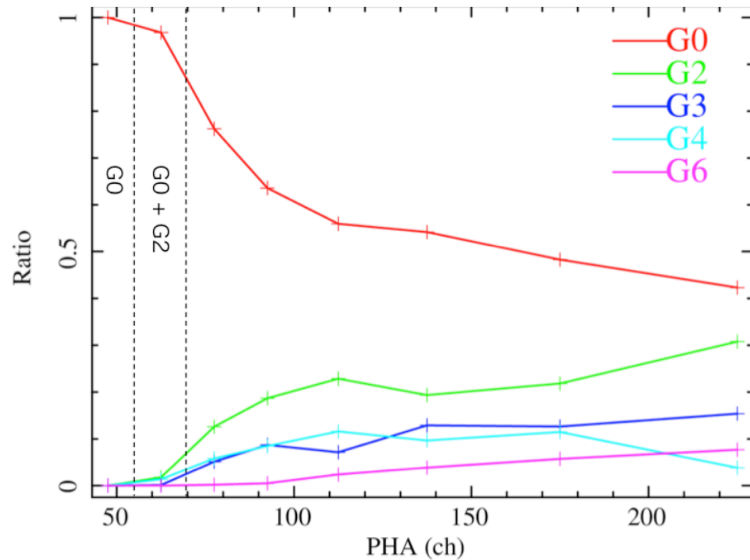
- model from Beuermann+ (2006) *Chandra* LETG, *ROSAT*, *EUVE*
- wilm abund, vern xsect
- norm fixed
- contamination C column varies
- Black = bad ARF
- Red = good ARF





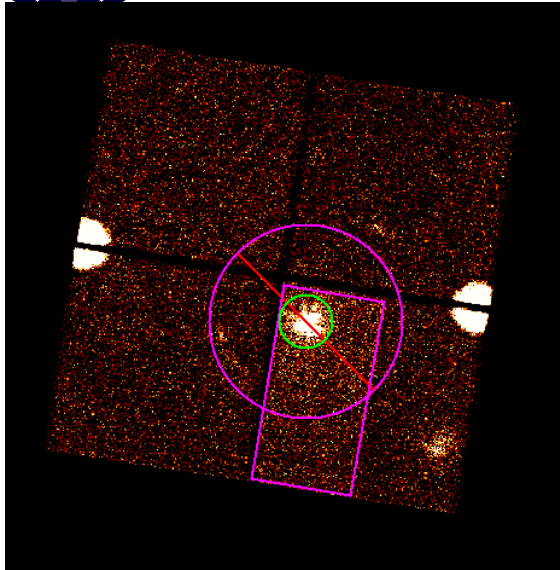
- Sequence
 - ah100043030sxi_p0100004f0
 - ah100043040sxi_p0100004f0
 - ah100043050sxi_p010000530
 - ah100043060sxi_p010000530

DATE_OBS:
 2016-03-18T16:27
 2016-03-19T14:44
 2016-03-23T14:47
 2016-03-24T11:35





RXJ1856 – SXI Analysis Good ARF

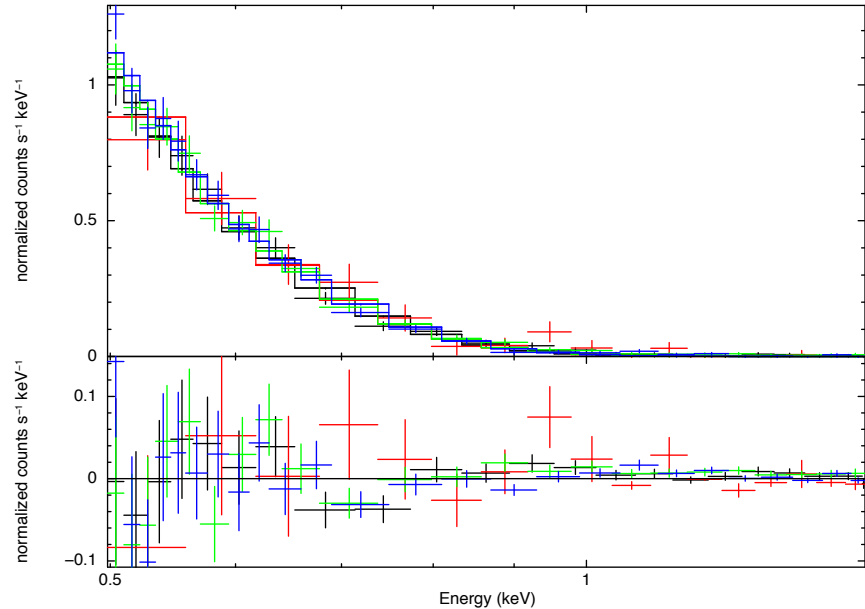
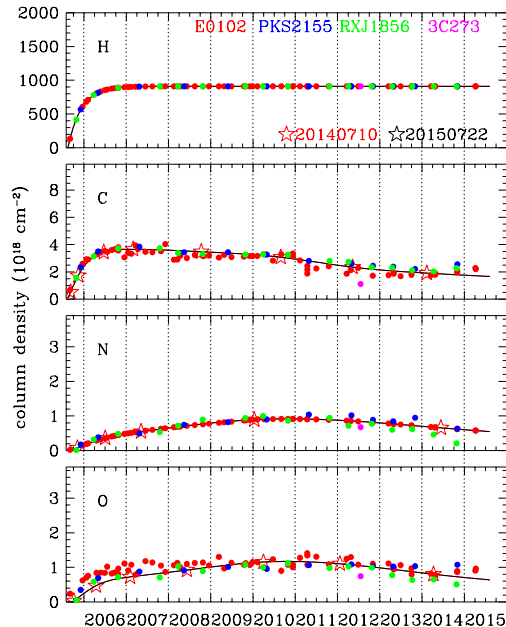


XIS1

```

=====
#Model TBabs<1>(bbodyrad<2> + bbodyrad<3>)constant<4>*hcnocol<5> Source No.: 1
Active/On
#Model Model Component Parameter Unit Value
# par comp
# Data group: 1
# 8 5 hcnocol C sC18 0.726076 +/- 0.143982
# Data group: 2
# 18 5 hcnocol C sC18 0.710763 +/- 0.398205
# Data group: 3
# 28 5 hcnocol C sC18 0.613143 +/- 0.126530
# Data group: 4
# 38 5 hcnocol C sC18 0.482538 +/- 0.113370
#
#
#Fit statistic : C-Statistic = 716.516 using 668 PHA bins and 664 degrees
of freedom.
#
#Test statistic : Chi-Squared = 748.774 using 668 PHA bins.
# Reduced chi-squared = 1.12767 for 664 degrees of freedom
# Null hypothesis probability = 1.215569e-02
  
```

SXI – RXJ 1856 w/ C contamination





RXJ1856 – SXI Contamination Results *SCT*

- Contamination is consistent with $N_C = 6 \pm 1 \times 10^{17} \text{ cm}^{-2}$
- No time dependence, possible O edge
- Should be treated as upper limit to contamination, consistent with first (uncontaminated) data point for Suzaku XIS
- For $E > 1 \text{ keV}$, less than 3% decrease in QE due to contamination; assume $N_C = 0$ in CALDB file with a caveat about RXJ1856 (suggestion)

