

V&V Reference Report

L2 ASCDS Version : 10.7.1

Observation 22129 - L2 Version 1
Chandra X-Ray Center

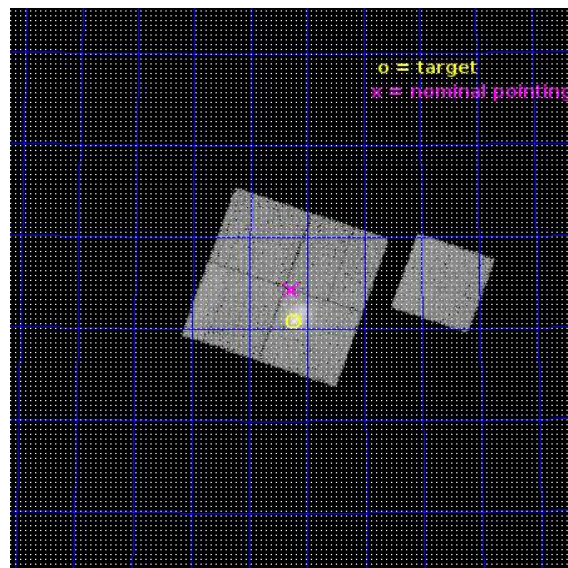
L2 Processing Date : Mar 3 2019

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1 Front

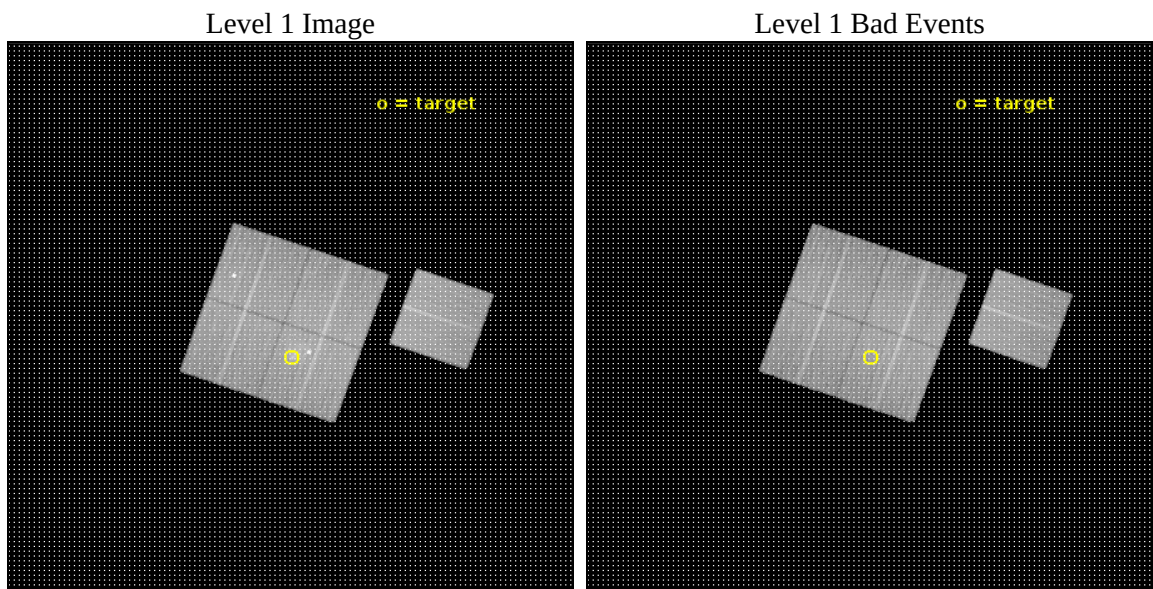
seq_num	801762	Sequence number
obs_id	22129	Observation id
title	Shock structure, the electron-ion equilibration timescale and the disintegrating cool core in A2146	Proposal title
observer	Helen Russell	Principal investigator
object	Abell 2146	Source name
dtcycle	0	
cycle	P	events from which exps? Prim/Second/Both
ra_targ	239.06125	Observer's specified target RA [deg]
dec_targ	66.346917	Observer's specified target Dec [deg]
ra_nom	239.06900069044	Nominal RA [deg]
dec_nom	66.405121350255	Nominal Dec [deg]
roll_nom	109.20161131319	Nominal Roll [deg]
revision	1	Processing version of data
ontime	30056.79306519	Sum of GTIs [s]
livetime	29664.078936304	Livetime [s]
ontime0	30056.669865727	Sum of GTIs [s]
ontime1	30059.851995707	Sum of GTIs [s]
ontime2	30063.034066081	Sum of GTIs [s]
ontime3	30056.79306519	Sum of GTIs [s]
ontime6	30059.769895792	Sum of GTIs [s]
l2events	119398	Number of level 2 events



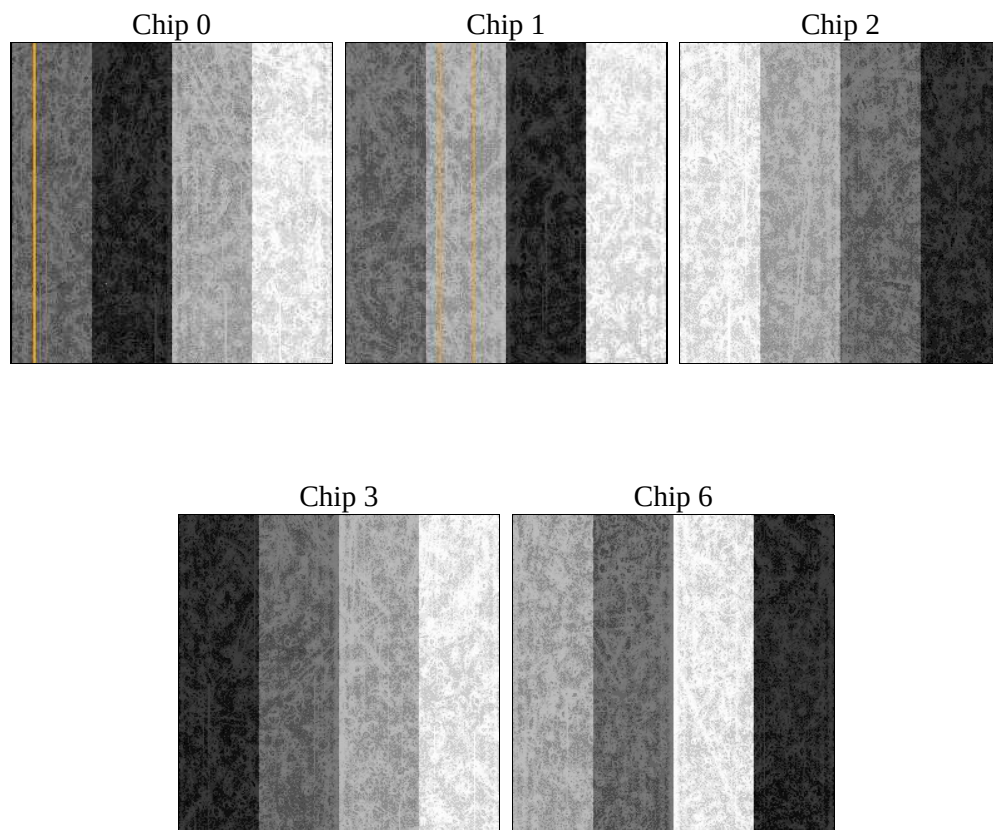
2 OBI

2.1 OBI

2.1.1 Images



2.1.2 Bias



2.1.3 Parameters

obi_num	0	Obi number	sched_exp_time	30000.000000	[s] Scheduled observation exposure time
ascdsver	10.7.1	Processing system revision	ontime	30056.79306519	Sum of GTIs [s]
caldsver	4.8.2	 	ontime0	30056.669865727	Sum of GTIs [s]
date	2019-03-04T01:52:20	Date and time of file creation	ontime1	30059.851995707	Sum of GTIs [s]
revision	1	Processing version of data	ontime2	30063.034066081	Sum of GTIs [s]
			ontime3	30056.79306519	Sum of GTIs [s]
			ontime6	30059.769895792	Sum of GTIs [s]
			l1events	1182617	Number of level 1 events

2.1.4 Events

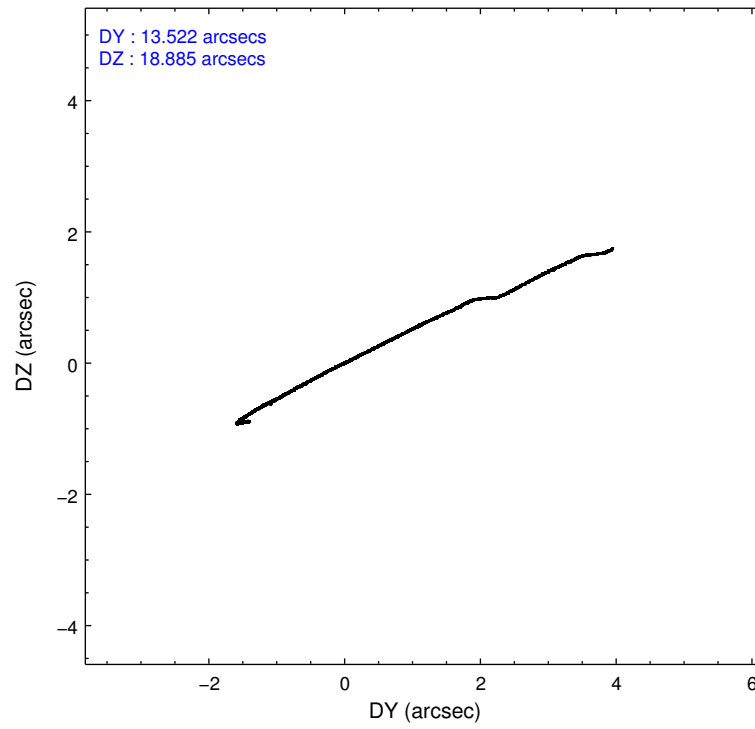
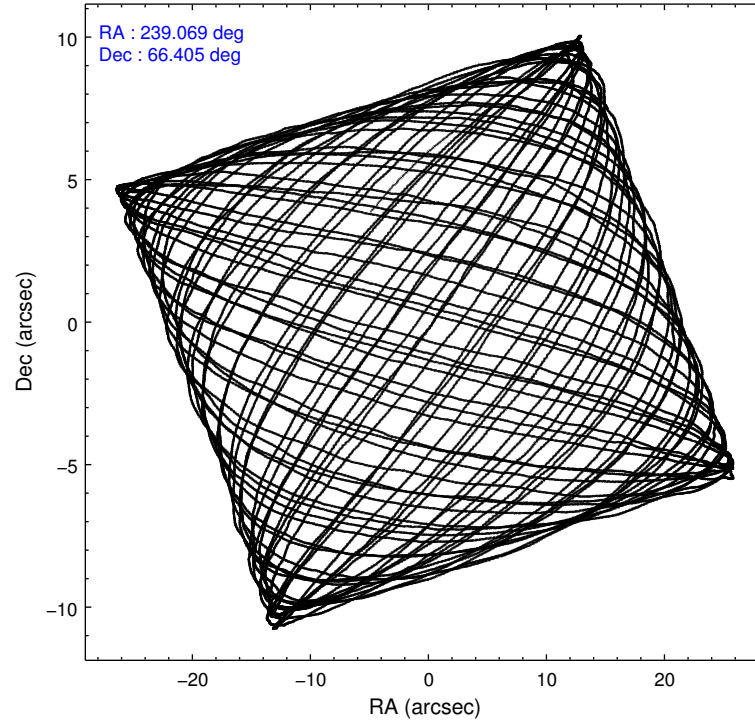
	ccd 0	ccd 1	ccd 2	ccd 3	ccd 6
level 1 events	222907	217297	239802	259219	243392
rejected events	189070	189626	215740	212716	218073
rejected %	84%	87%	89%	82%	89%

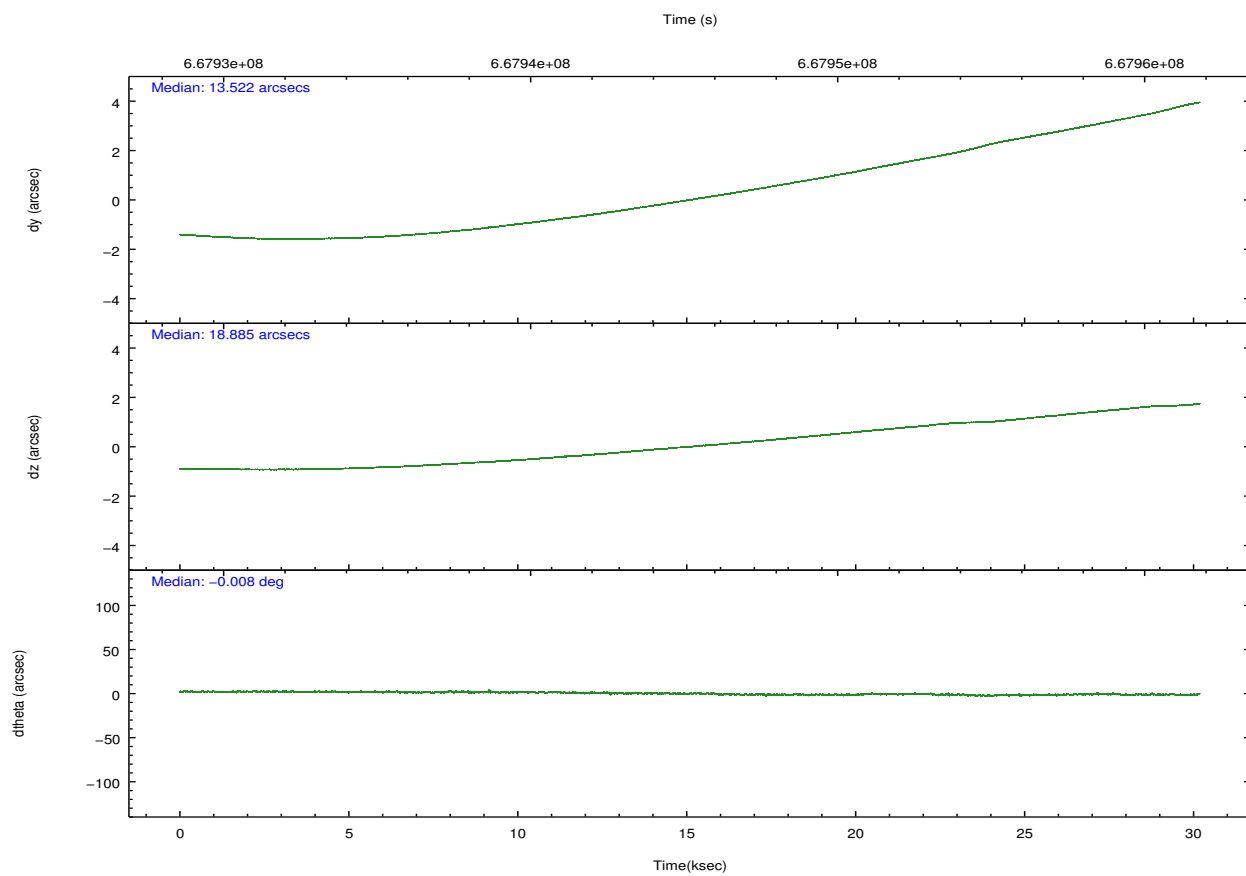
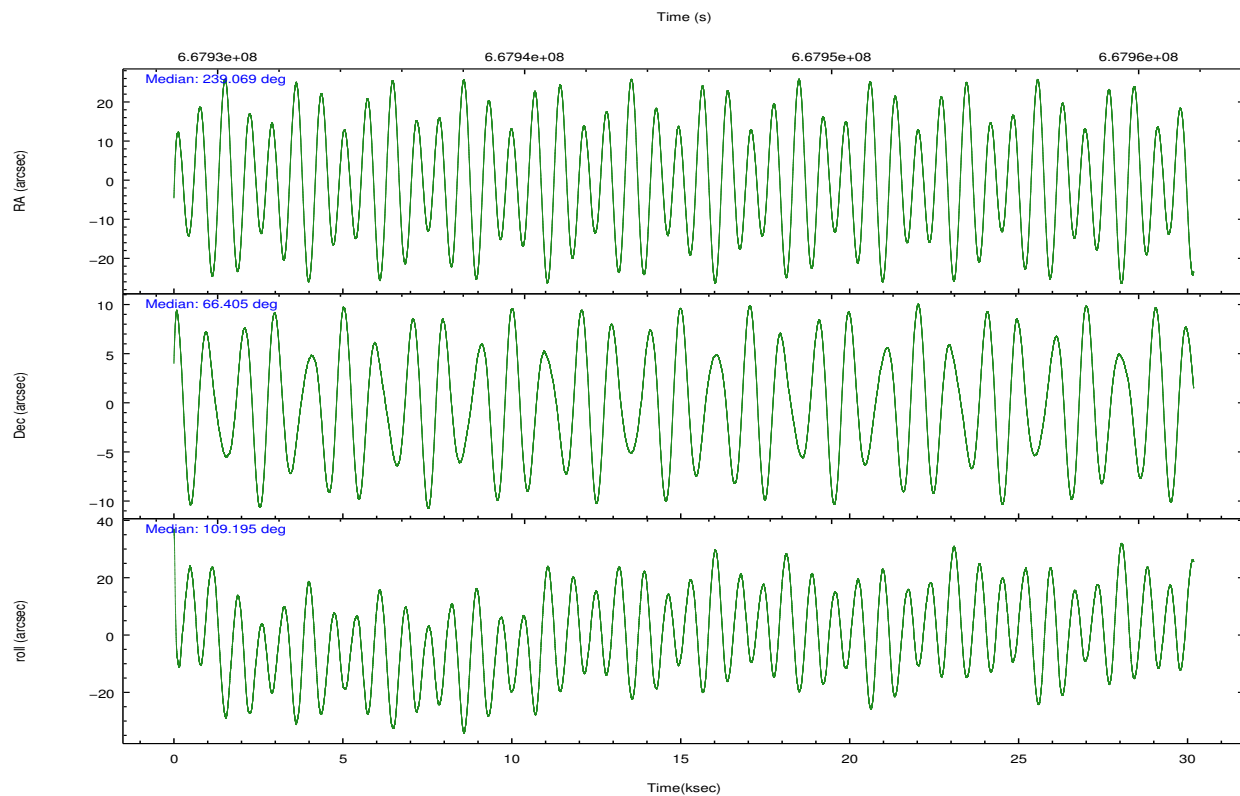
	ccd 0	ccd 1	ccd 2	ccd 3	ccd 6
grade 0 events	8017	8631	8502	28298	7683
	3%	3%	3%	10%	3%
grade 1 events	124	107	121	219	94
	0%	0%	0%	0%	0%
grade 2 events	15512	7648	5734	6809	6488
	6%	3%	2%	2%	2%
grade 3 events	2455	2325	2346	2898	2315
	1%	1%	0%	1%	0%
grade 4 events	2365	2447	2521	2863	2288
	1%	1%	1%	1%	0%
grade 5 events	9195	9641	8836	10559	9858
	4%	4%	3%	4%	4%
grade 6 events	5497	6624	4967	5643	6552
	2%	3%	2%	2%	2%
grade 7 events	179742	179874	206775	201930	208114
	80%	82%	86%	77%	85%

2.2 Compared Parameters

Parameter	Planned	Actual	Parameter	Planned	Actual
Instrument	ACIS	ACIS	Obspar format version number	7	7
Detector	ACIS-01236	ACIS-01236	Obspar file type	PREDICTED	ACTUAL
Grating	NONE	NONE	Obspar update status	NONE	UPDATED
Data mode	VFAINT	VFAINT	CCD I0 on	Y	Y
Observation mode	POINTING	POINTING	CCD I1 on	Y	Y
[deg] Pointing RA	239.121330	239.069000690438	CCD I2 on	Y	Y
[deg] Pointing Dec	66.387157	66.40512135025467	CCD I3 on	Y	Y
[deg] Pointing Roll	108.944961	109.2016113131886	CCD S0 on	N	N
[mm] SIM focus pos	-0.782348	-0.7809083437167272	CCD S1 on	N	N
[mm] SIM defocus	0	0.001439871863259334	CCD S2 on	O1	Y
[mm] SIM translation stage pos	-233.592463	-233.5874344608287	CCD S3 on	N	N
[mm] SIM translation stage offset	0	-0.005018542100998502	CCD S4 on	N	N
[s] Observation start time (MET)	667930288.184000	667929171.72524	CCD S5 on	N	N
Observation start date	2019-03-02T16:10:19	2019-03-02T15:52:51	Number of optional ACIS chips dropped	0	0
[s] Observation end time (MET)	667960288.184000	667961161.46465	On-chip summing requested	N	N
Observation end date	2019-03-03T00:30:19	2019-03-03T00:46:01	Subarray requested	NONE	NONE
Read mode	TIMED	TIMED	Alternating exposures requested	N	N
			[s] Primary exposure time	0.000000	3.1

2.3 Aspect



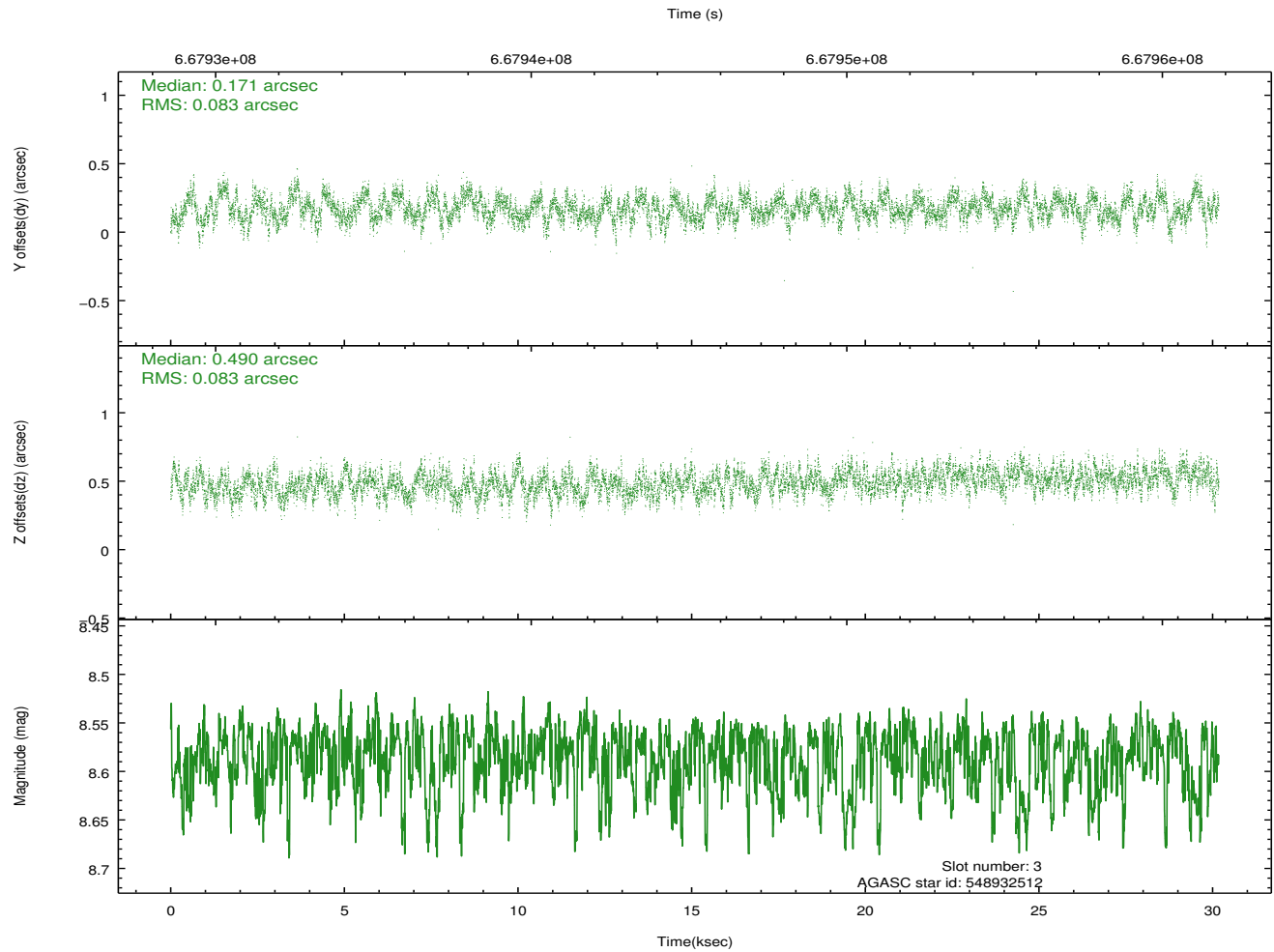
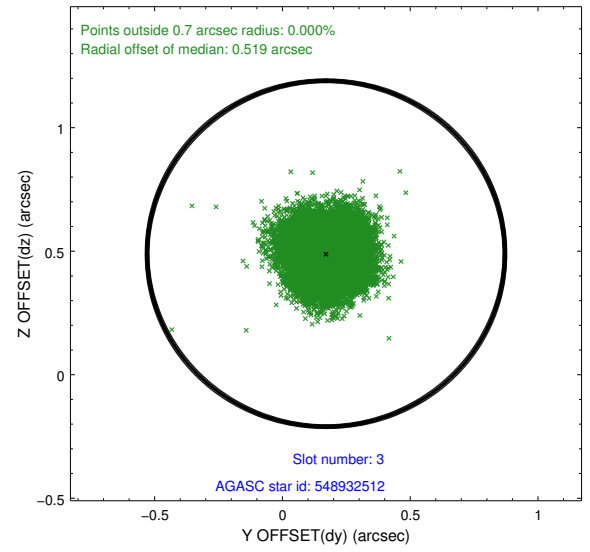
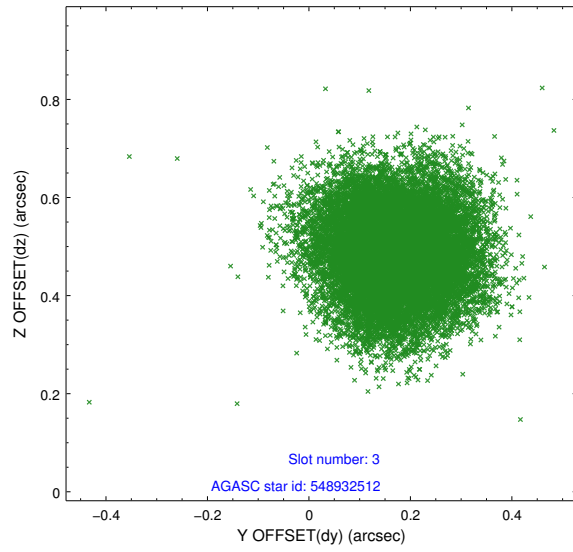


Slot Statistics

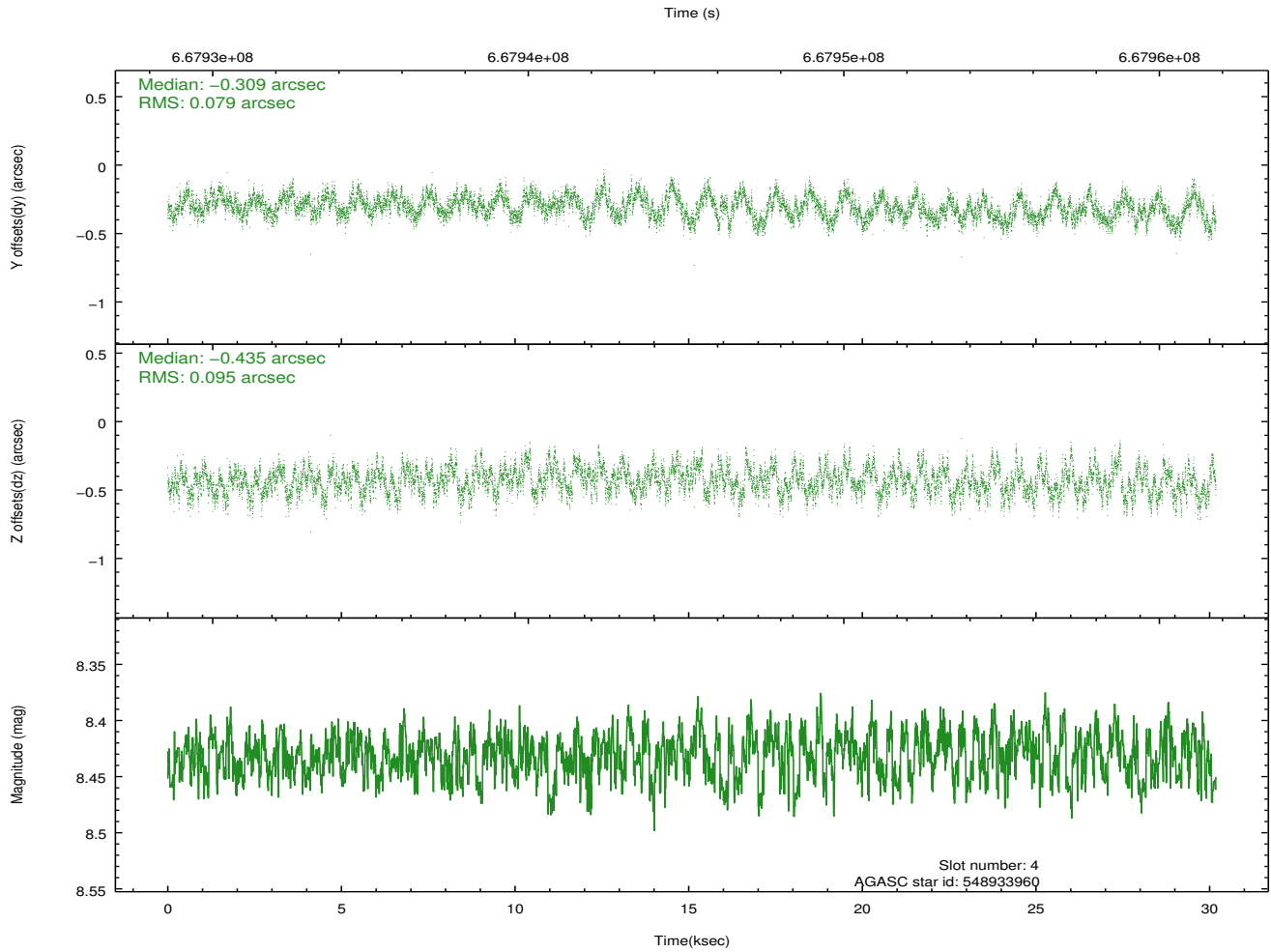
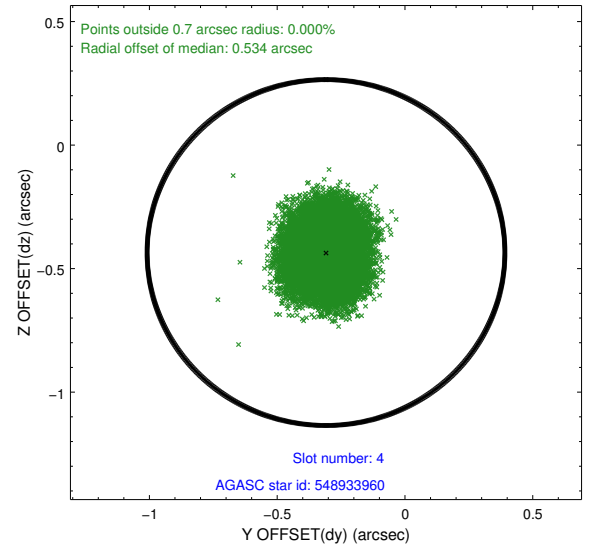
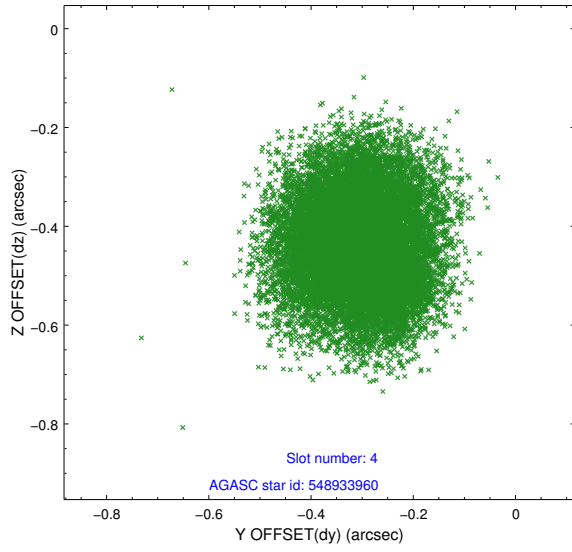
pt	status	used	id	mag	n_pts	frac_pts	med_dy	med_dz	dr1	dr2	ra	dec	mean_y	mea
0	FID		ACIS-I-1	7.22	7361	1.000	0.087	-0.066	0.018	0.065	0.000000	0.000000	925.76	-842
1	FID		ACIS-I-5	7.23	7360	1.000	-0.482	0.004	0.030	0.076	0.000000	0.000000	-1823.09	1054
2	FID		ACIS-I-6	7.23	7362	1.000	0.306	0.130	0.031	0.075	0.000000	0.000000	391.20	1699
3	GUIDE	used	548932512	8.58	14718	1.000	0.171	0.490	0.127	0.197	239.727627	66.054972	-1414.01	-450
4	GUIDE	used	548933960	8.43	14712	1.000	-0.309	-0.435	0.134	0.206	237.671184	66.428675	840.26	1918
5	GUIDE	used	548937184	9.82	14695	1.000	-0.024	-0.366	0.307	0.483	238.771821	66.565432	770.78	264
6	OMITTED			0.00	0	0.000	0.000	0.000	0.000	0.000	0.000000	0.000000	0.00	0
7	GUIDE	used	549849072	9.15	14707	1.000	0.188	0.315	0.192	0.297	240.420863	66.802816	835.71	-2233

2.4 Star Slots

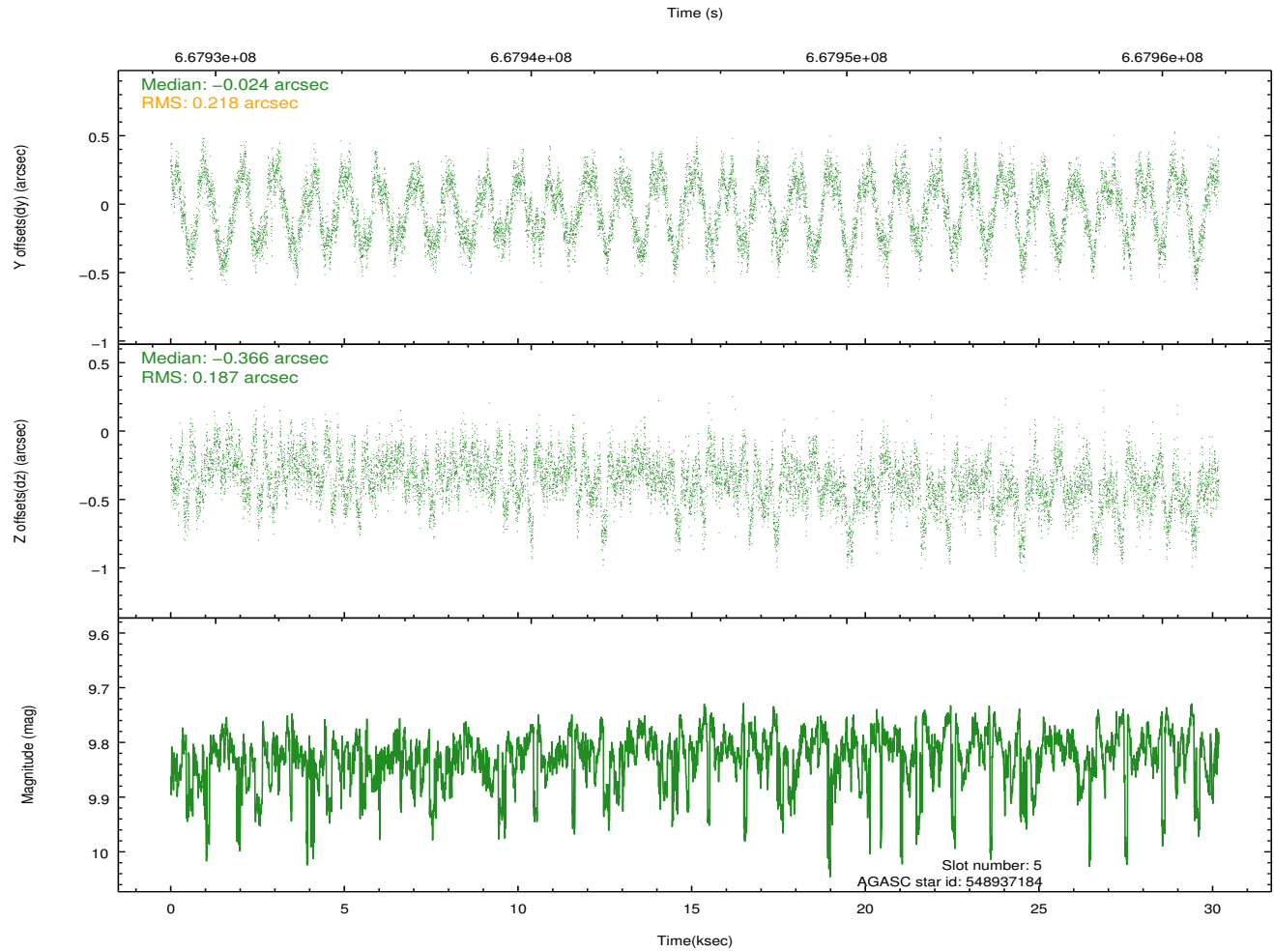
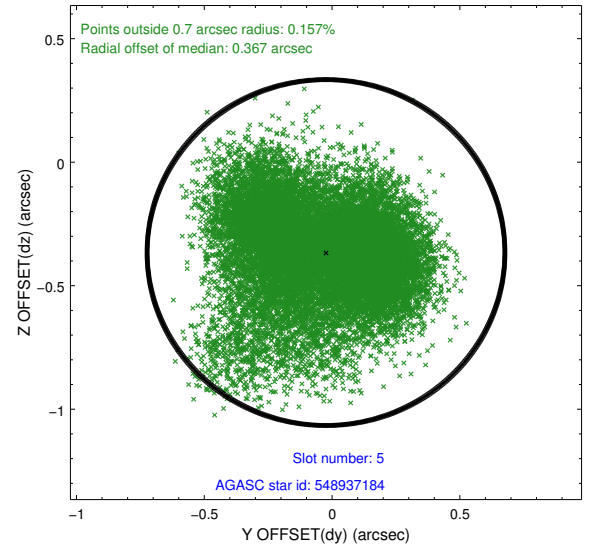
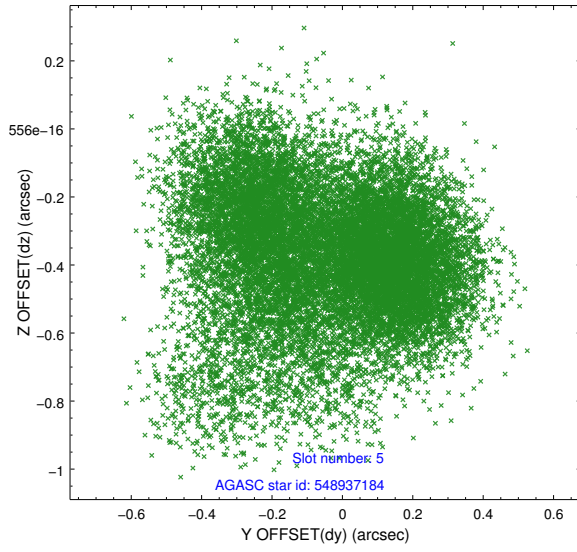
2.4.1 Slot 3



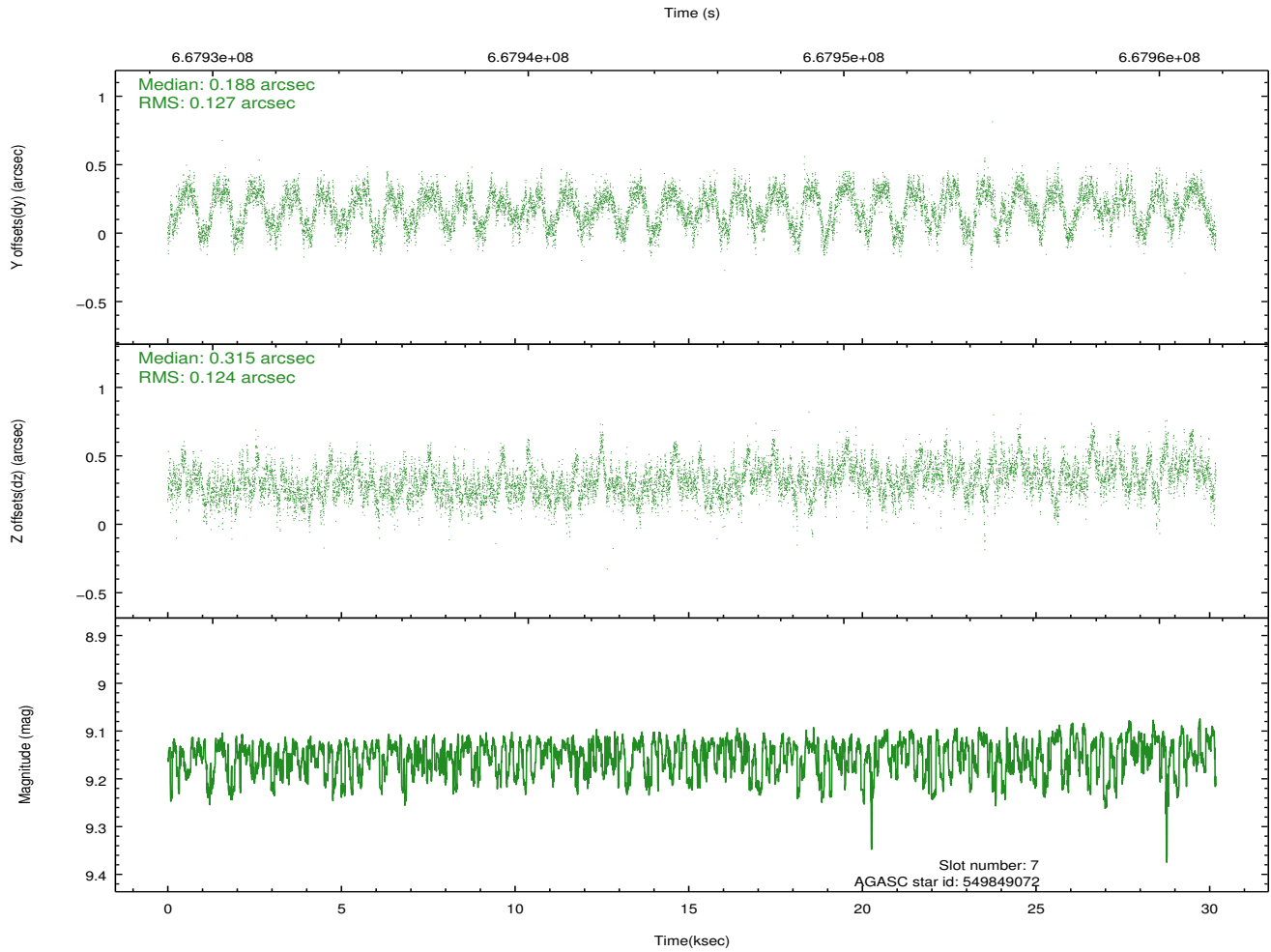
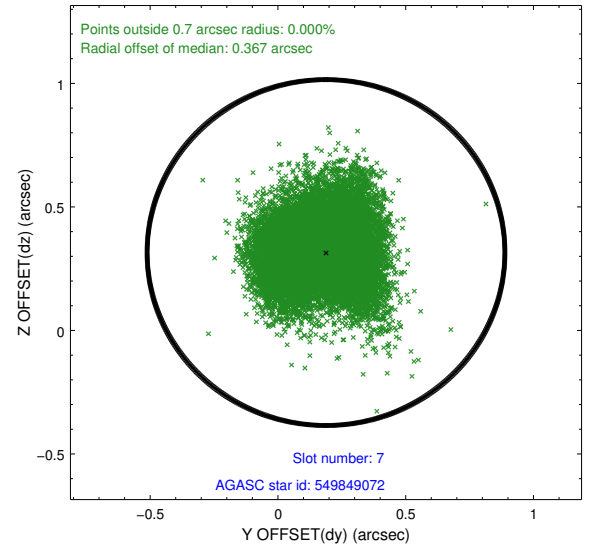
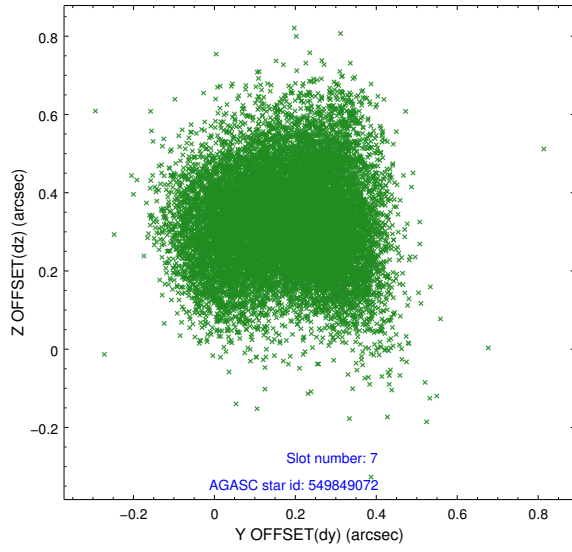
2.4.2 Slot 4



2.4.3 Slot 5

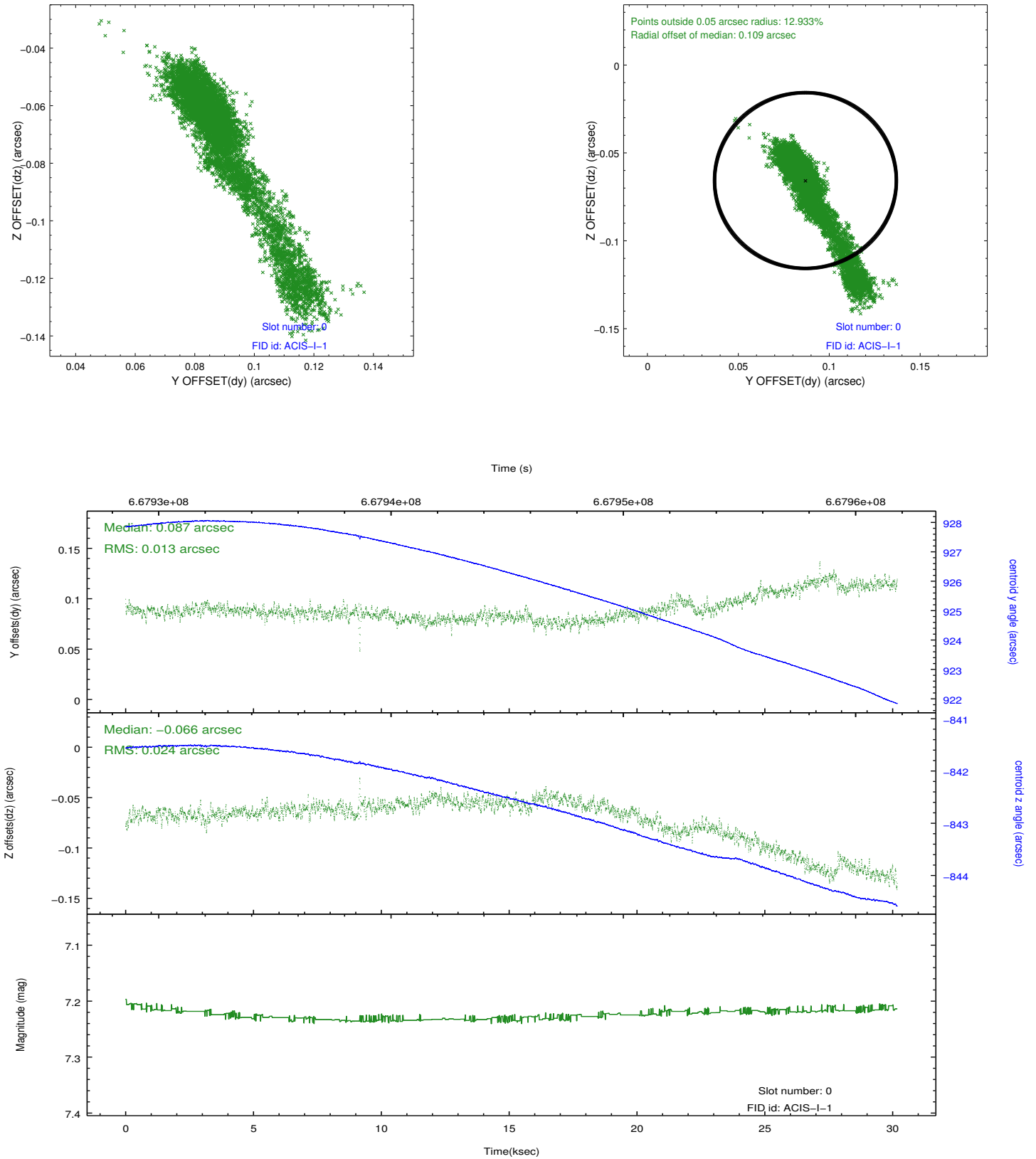


2.4.4 Slot 7

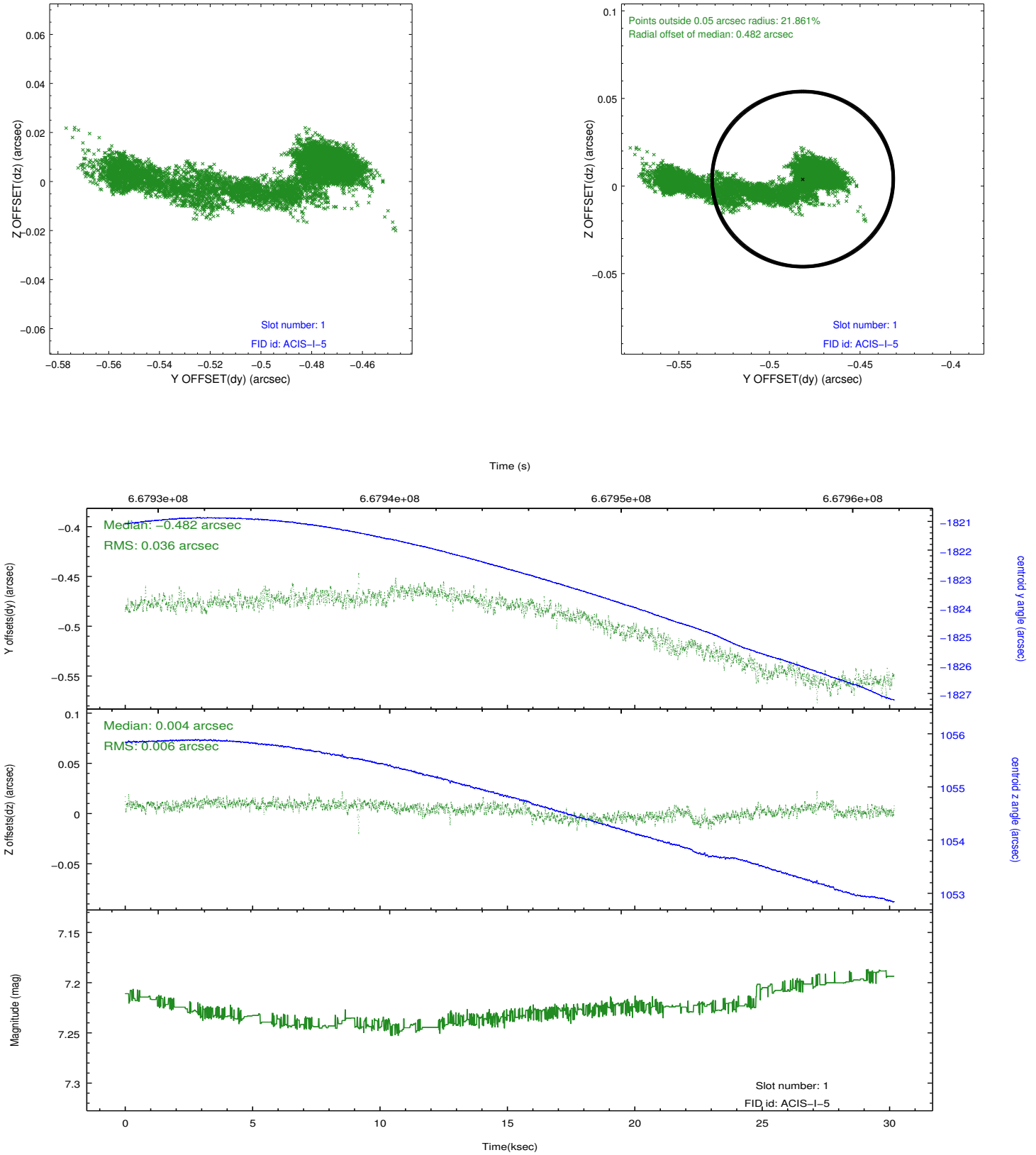


2.5 FID Slots

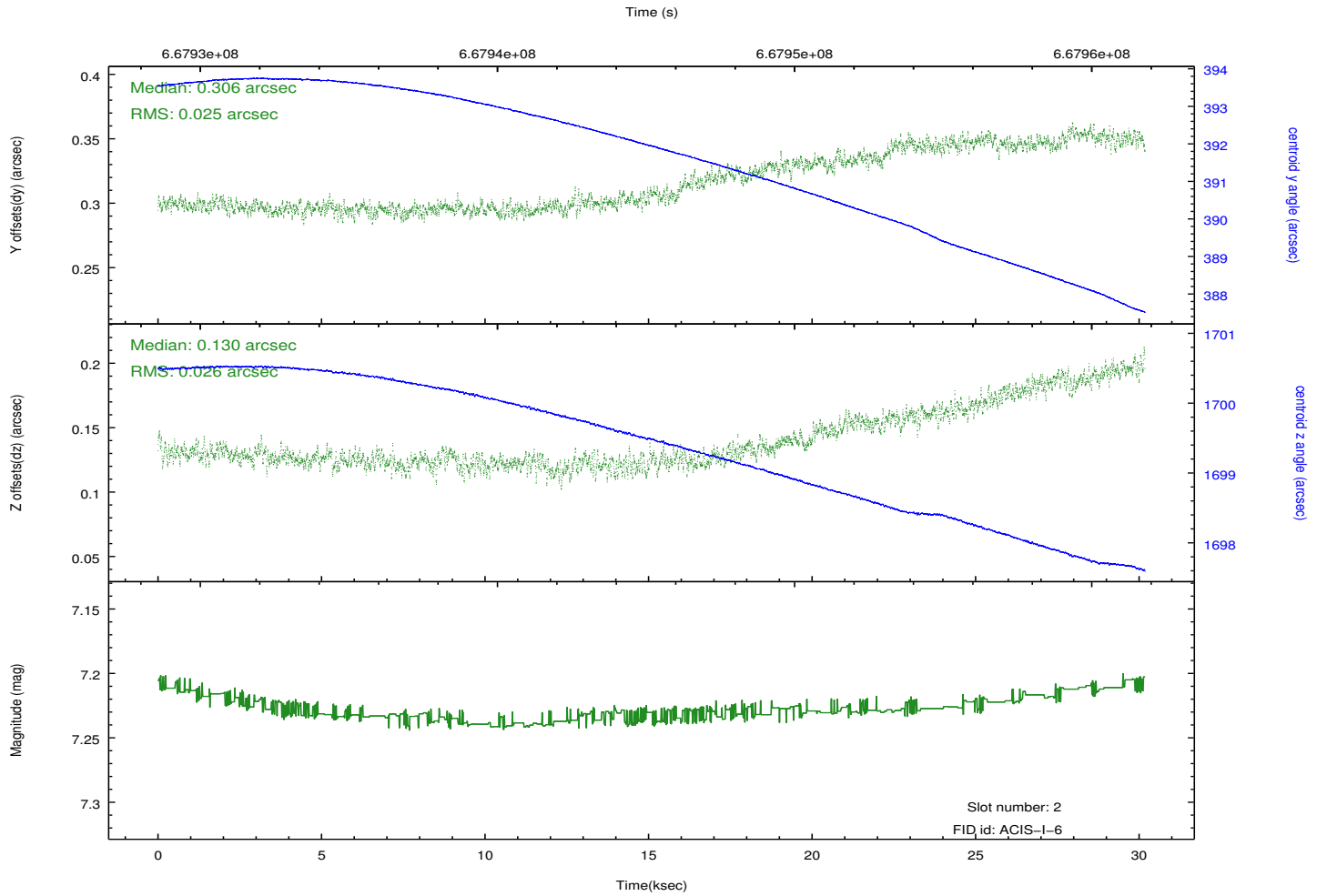
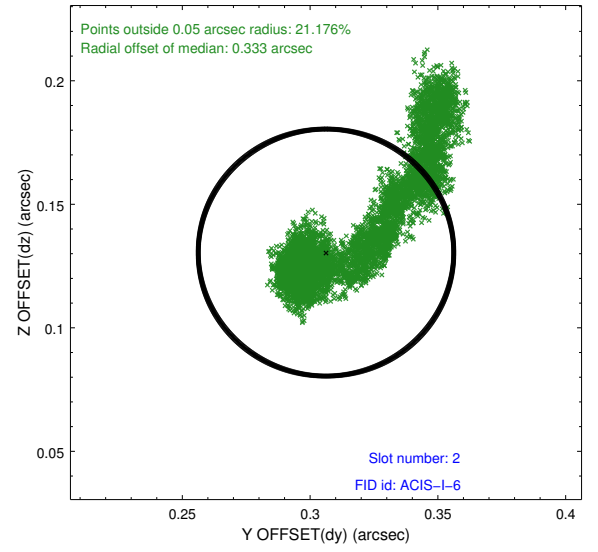
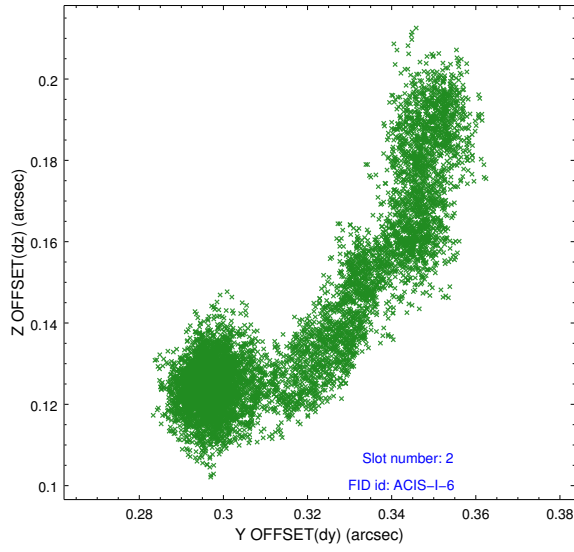
2.5.1 Slot 0



2.5.2 Slot 1



2.5.3 Slot 2



A Summary

A.1 Status

V&V Scientist	Jen Lauer
V&V Date (YYYY-MM-DD)	2019.03.04
V&V Edition	1
V&V Disposition and Status	OK
V&V Charge Time	30.05679306519

A.2 Comments

The focal plane temperature during the interval 667933224.98 - 667935615.08 (MET s) of this observation was warmer than the upper limit for optimum calibration of the ACIS gain and spectral resolution (i.e., -114.0 C for ACIS-I and -112.0 C for ACIS-S).

The Chandra calibration team calibrates the ACIS gain and spectral resolution using data from the external calibration source (ECS). ECS data show that the frontside-illuminated (FI) CCDs are more temperature sensitive than the backside-illuminated (BI) CCDs.

A summary of the current calibration status of the ACIS gain and spectral resolution can be found at:

http://asc.harvard.edu/cal/Acis/Cal_prods/Gain_and_Spectral_Resolution/Acis_response_summary.html

The main points are:

- 1) The gain on BI chips remains within 0.3% (i.e., the systematic uncertainty in the ACIS gain quoted on the Chandra Calibration Status Summary web page) at all measured temperatures.
- 2) The gain on FI chips remains within 0.3% below row 600 at all measured temperatures.
- 3) The gain on FI chips above row 600 can be underestimated by as much as 1% for focal plane temperatures exceeding -116 C.
- 4) The spectral resolution (i.e., FWHM) on BI chips is insensitive to the focal plane temperature.
- 5) Warmer focal plane temperatures increase the FWHM on FI chips by up to 30 eV near row 512 and by up to 70 eV near the top of the chips.

In summary, the user should be cautious in the spectral analysis of high S/N emission lines detected on the top half of FI chips in this observation. Default processing with the current version of the CALDB will underestimate photon energies by up to 1% and broaden emission lines by up to 70 eV.

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The guide star in slot 6 was removed from the aspect solution due to poor data quality. The aspect solution is improved by the removal of this guide star from the solution.