

V&V Reference Report

L2 ASCDS Version : 10.7.1

Observation 22216 - L2 Version 1
Chandra X-Ray Center

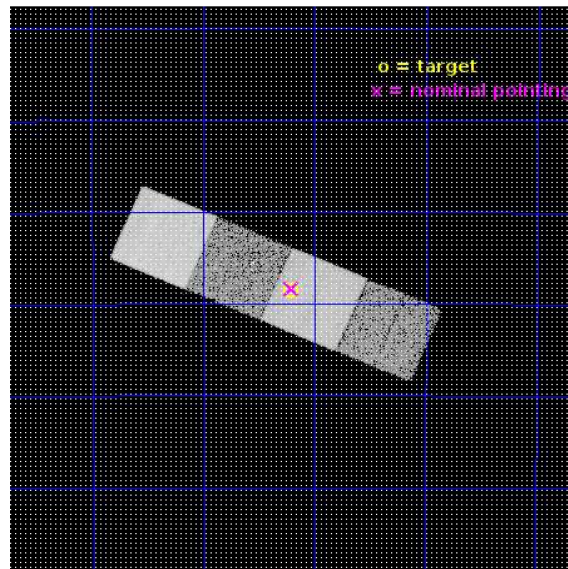
L2 Processing Date : May 13 2019

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1 Front

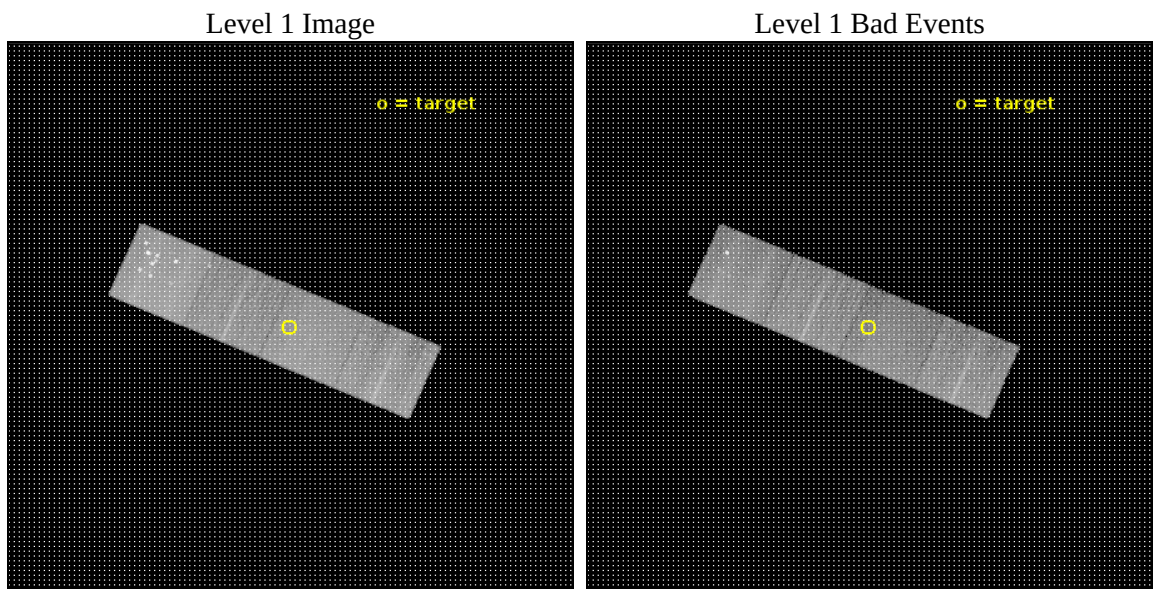
seq_num	201260	Sequence number
obs_id	22216	Observation id
title	Identifying Accretion at a Key Stage of Pre-main Sequence Stellar Evolution	Proposal title
observer	Dr. Claude Canizares	Principal investigator
object	SZ 96	Source name
dtcycle	0	
cycle	P	events from which exps? Prim/Second/Both
ra_targ	242.052667	Observer's specified target RA [deg]
dec_targ	-39.142633	Observer's specified target Dec [deg]
ra_nom	242.05256515328	Nominal RA [deg]
dec_nom	-39.139124996495	Nominal Dec [deg]
roll_nom	23.156521373454	Nominal Roll [deg]
revision	1	Processing version of data
ontime	13230.800101876	Sum of GTIs [s]
livetime	13057.929958172	Livetime [s]
ontime5	13230.800101876	Sum of GTIs [s]
ontime6	13230.800101876	Sum of GTIs [s]
ontime7	13230.800101876	Sum of GTIs [s]
ontime8	13230.800101876	Sum of GTIs [s]
l2events	140727	Number of level 2 events



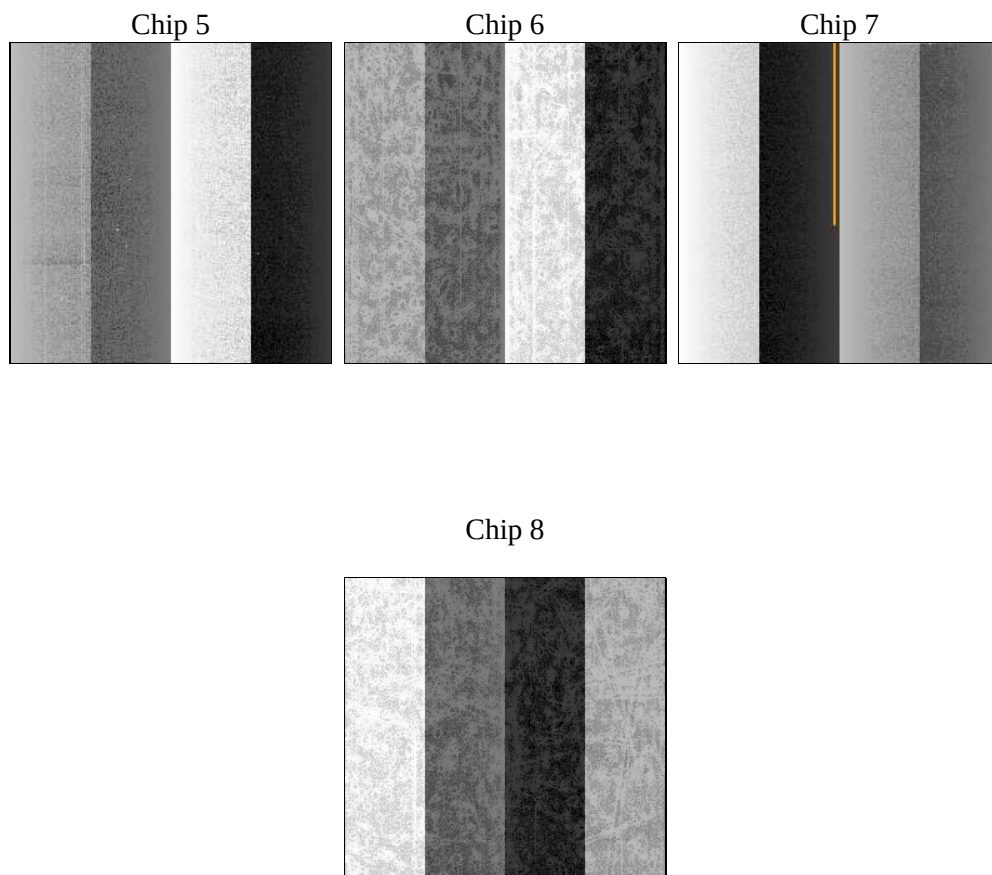
2 OBI

2.1 OBI

2.1.1 Images



2.1.2 Bias



2.1.3 Parameters

obi_num	0	Obi number	sched_exp_time	13214.110000	[s] Scheduled observation exposure time
ascdsver	10.7.1	Processing system revision	ontime	13230.800101876	Sum of GTIs [s]
caldsver	4.8.2	 	ontime5	13230.800101876	Sum of GTIs [s]
date	2019-05-12T05:55:30	Date and time of file creation	ontime6	13230.800101876	Sum of GTIs [s]
revision	1	Processing version of data	ontime7	13230.800101876	Sum of GTIs [s]
			ontime8	13230.800101876	Sum of GTIs [s]
			l1events	536245	Number of level 1 events
			tgmethod	iPSF	Method used to create src1a file
			zo_pos	(4096.50, 4070.38)	src1a sky pixel position

2.1.4 Events

	ccd 5	ccd 6	ccd 7	ccd 8
level 1 events	184142	102901	125590	123612
rejected events	88566	91521	72558	93617
rejected %	48%	88%	57%	75%

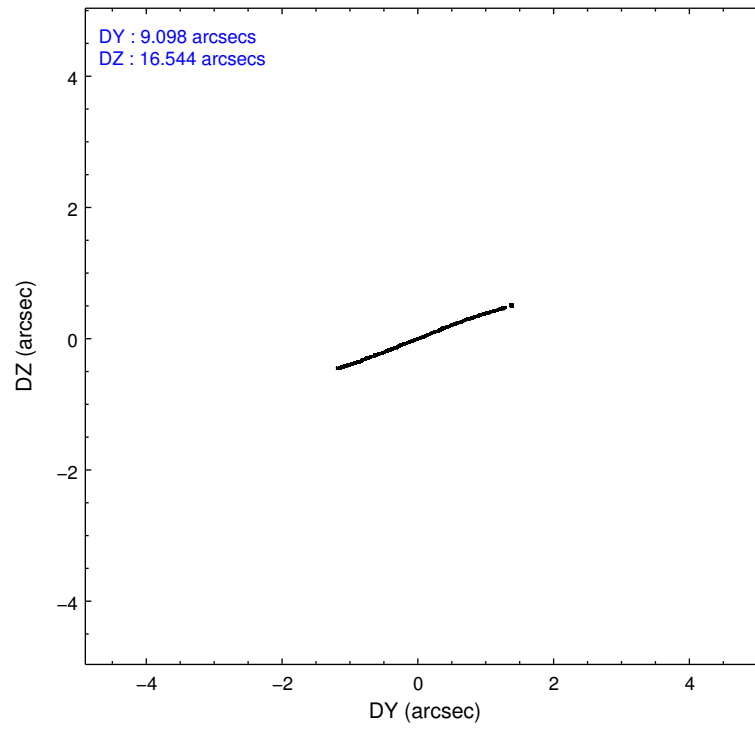
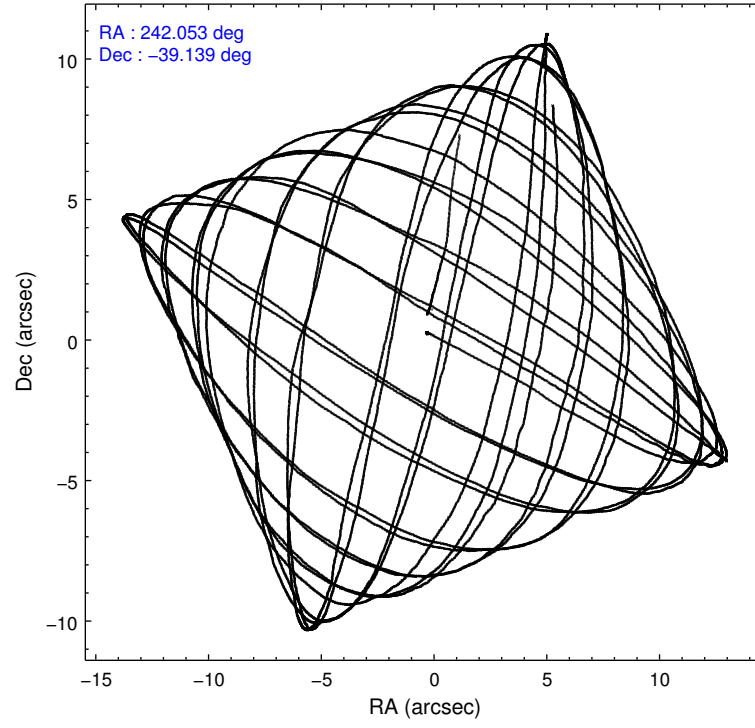
	ccd 5	ccd 6	ccd 7	ccd 8
grade 0 events	21506	3205	4364	8416
	11%	3%	3%	6%
grade 1 events	497	43	163	78
	0%	0%	0%	0%
grade 2 events	28410	3328	10645	7527
	15%	3%	8%	6%
grade 3 events	2145	826	4157	3056
	1%	0%	3%	2%
grade 4 events	2162	847	4135	2782
	1%	0%	3%	2%
grade 5 events	10017	3851	11964	6219
	5%	3%	9%	5%
grade 6 events	41670	3215	29917	8339
	22%	3%	23%	6%
grade 7 events	77735	87586	60245	87195
	42%	85%	47%	70%

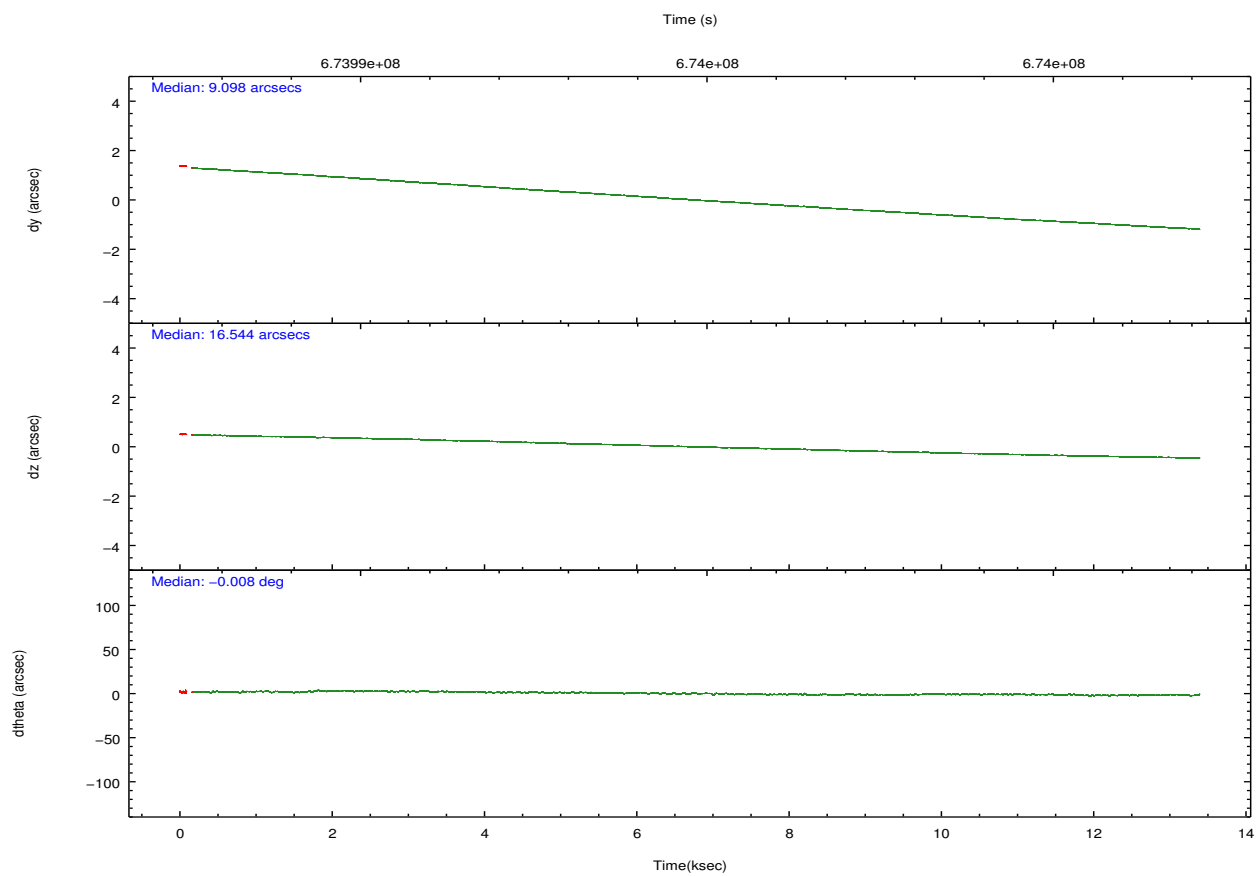
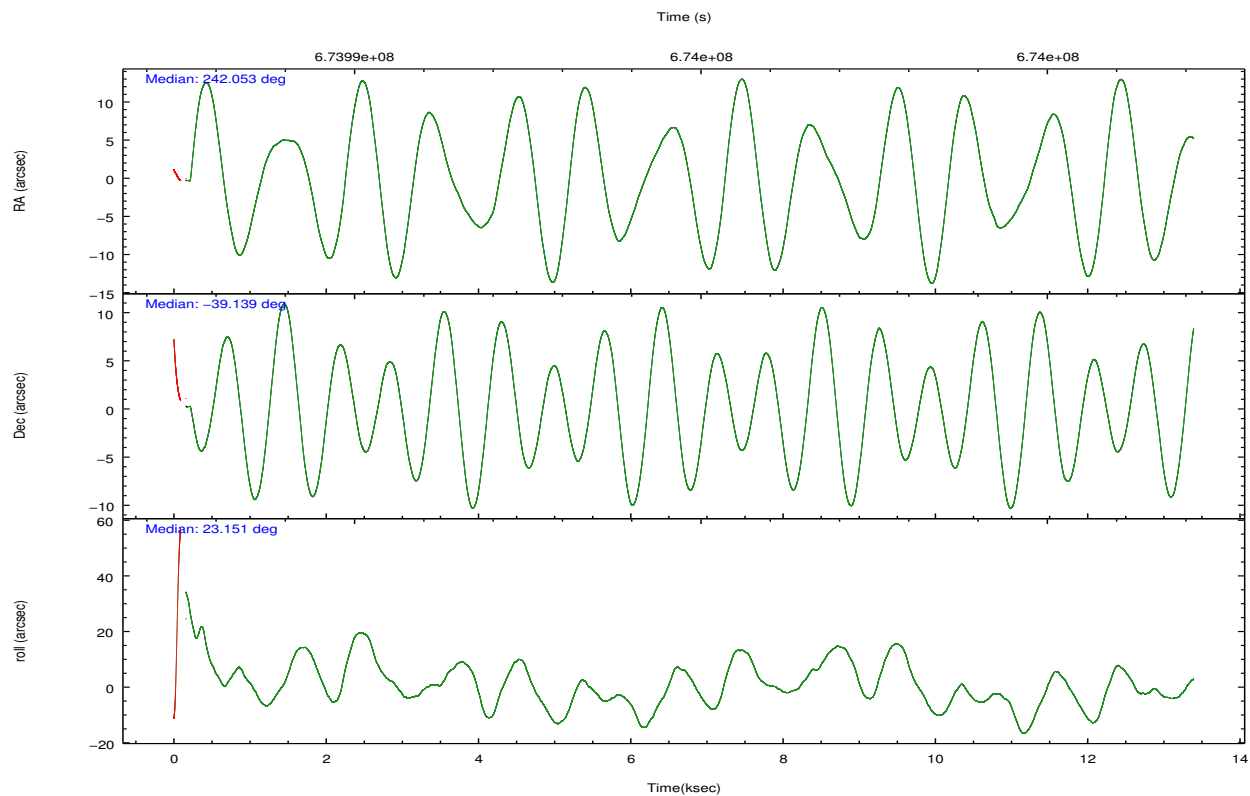
2.2 Compared Parameters

Parameter	Planned	Actual
Instrument	ACIS	ACIS
Detector	ACIS-5678	ACIS-5678
Grating	HETG	HETG
Data mode	FAINT	FAINT
Observation mode	POINTING	POINTING
[deg] Pointing RA	242.031683	242.0525651532755
[deg] Pointing Dec	-39.161291	-39.13912499649521
[deg] Pointing Roll	22.986754	23.15652137345359
[mm] SIM focus pos	-0.684267	-0.6828225247311905
[mm] SIM defocus	0	0.001444936568705701
[mm] SIM translation stage pos	-190.132523	-190.1425803651734
[mm] SIM translation stage offset	0	0.01005778216563158
[s] Observation start time (MET)	673988243.184000	673986833.42528
Observation start date	2019-05-11T18:56:14	2019-05-11T18:33:53
[s] Observation end time (MET)	674001457.184000	674001804.0636801
Observation end date	2019-05-11T22:36:28	2019-05-11T22:43:24
Read mode	TIMED	TIMED

Parameter	Planned	Actual
Obspar format version number	7	7
Obspar file type	PREDICTED	ACTUAL
Obspar update status	NONE	UPDATED
CCD I0 on	N	N
CCD I1 on	N	N
CCD I2 on	N	N
CCD I3 on	N	N
CCD S0 on	O2	N
CCD S1 on	Y	Y
CCD S2 on	Y	Y
CCD S3 on	Y	Y
CCD S4 on	Y	Y
CCD S5 on	O1	N
Number of optional ACIS chips dropped	2	2
On-chip summing requested	N	N
Subarray requested	NONE	NONE
Alternating exposures requested	N	N
[s] Primary exposure time	0.000000	3.1

2.3 Aspect



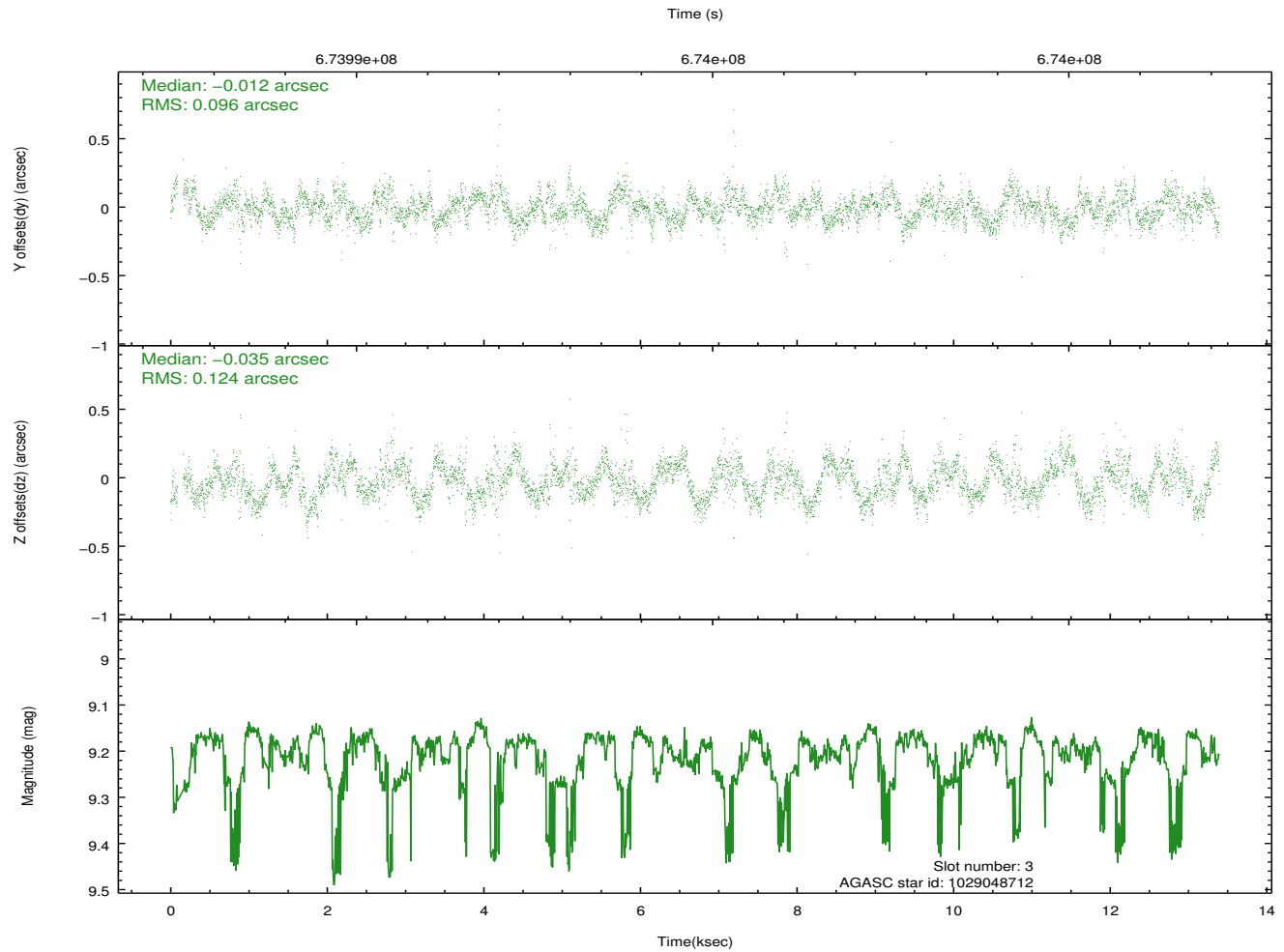
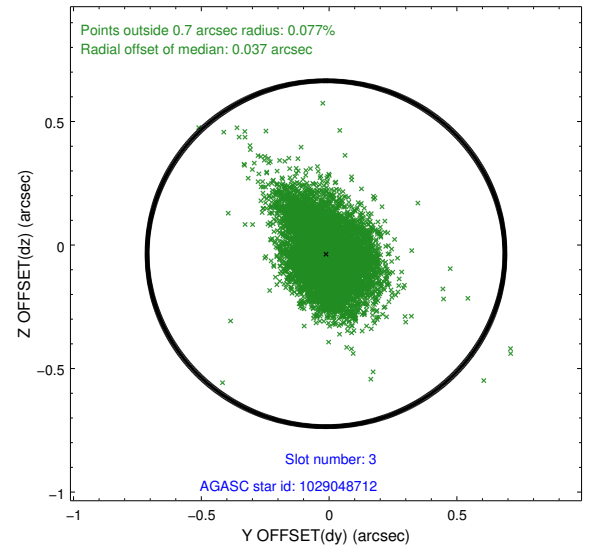
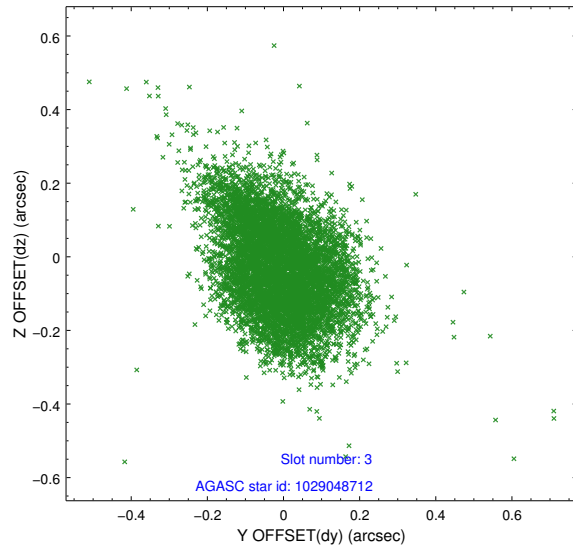


Slot Statistics

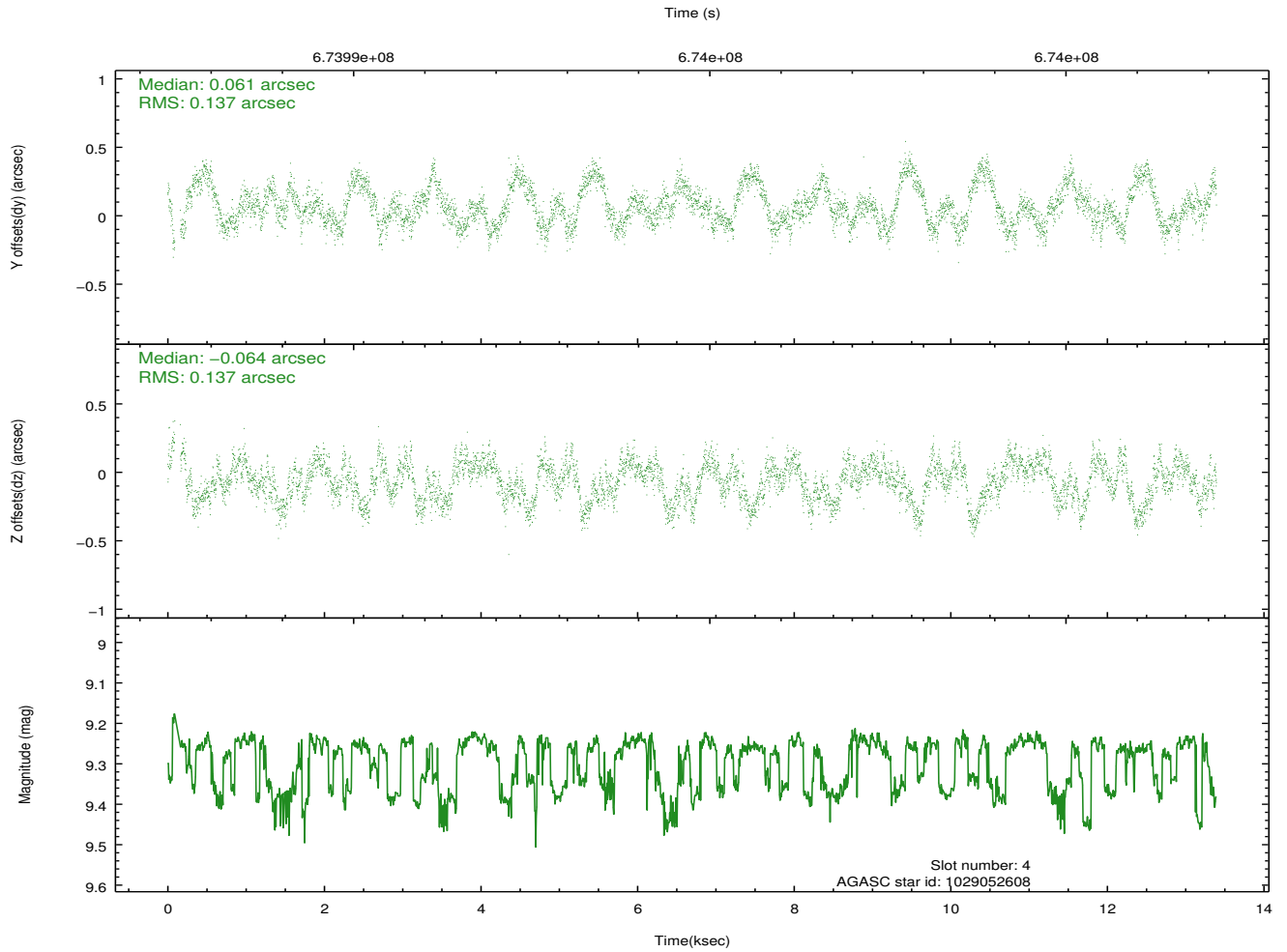
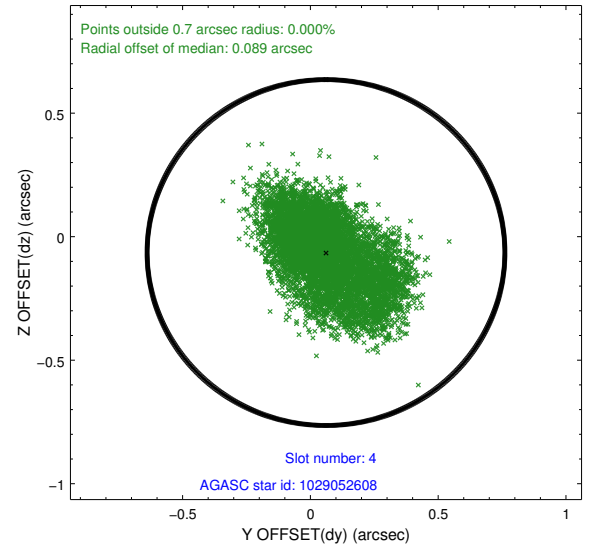
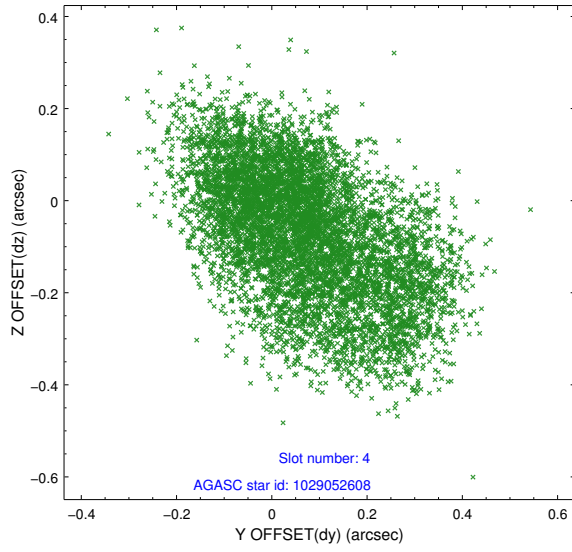
pt	status	used	id	mag	n_pts	frac_pts	med_dy	med_dz	dr1	dr2	ra	dec	mean_y	mea
0	FID		ACIS-S-1	7.26	3250	1.000	0.034	-0.127	0.018	0.036	0.000000	0.000000	934.20	-1733
1	FID		ACIS-S-4	7.29	3250	1.000	0.544	0.075	0.021	0.037	0.000000	0.000000	2152.23	170
2	FID		ACIS-S-5	7.26	3250	1.000	-0.605	0.063	0.018	0.044	0.000000	0.000000	-1814.92	164
3	GUIDE	used	1029048712	9.20	6470	1.000	-0.012	-0.035	0.162	0.268	241.237794	-38.954366	-1759.61	1544
4	GUIDE	used	1029052608	9.28	6491	1.000	0.061	-0.064	0.209	0.331	241.909057	-39.099888	-230.28	337
5	GUIDE	used	1029059360	8.26	6497	1.000	-0.019	-0.012	0.117	0.189	241.638388	-39.259513	-1148.41	100
6	GUIDE	used	1029580280	9.15	6494	1.000	-0.036	0.086	0.231	0.391	242.322361	-39.646406	58.91	-1922
7	MONITOR	unused		0.00	0	0.000	0.000	0.000	0.000	0.000	0.000000	0.000000	0.00	0

2.4 Star Slots

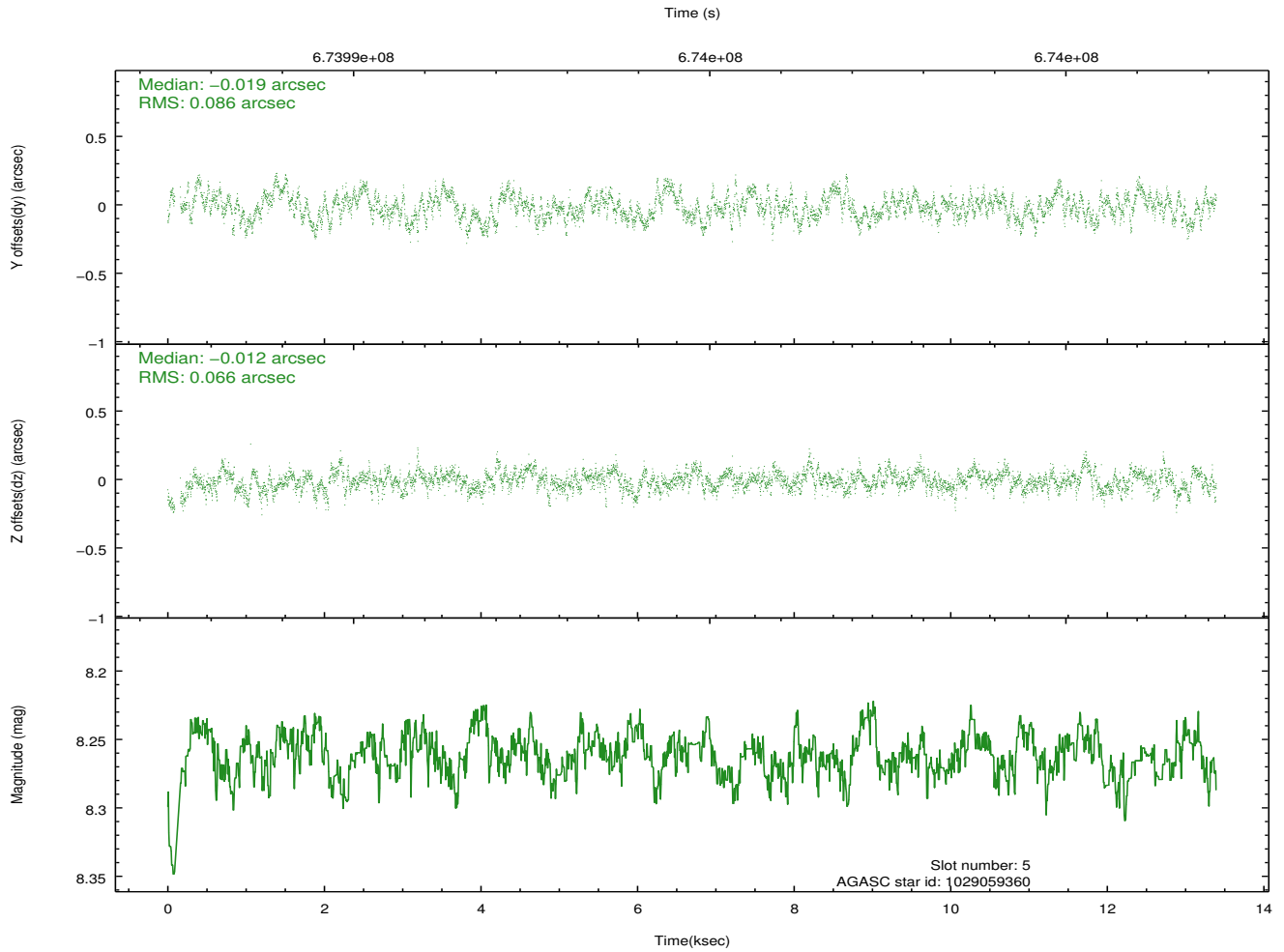
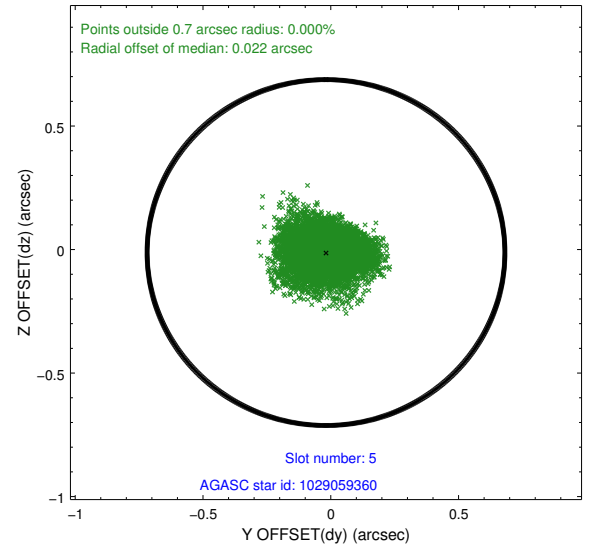
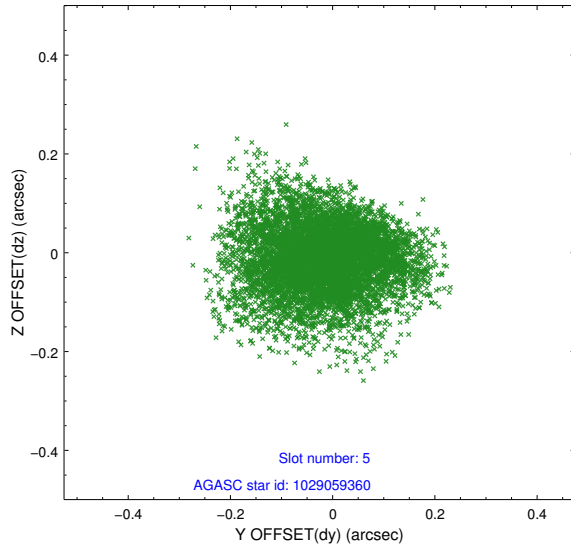
2.4.1 Slot 3



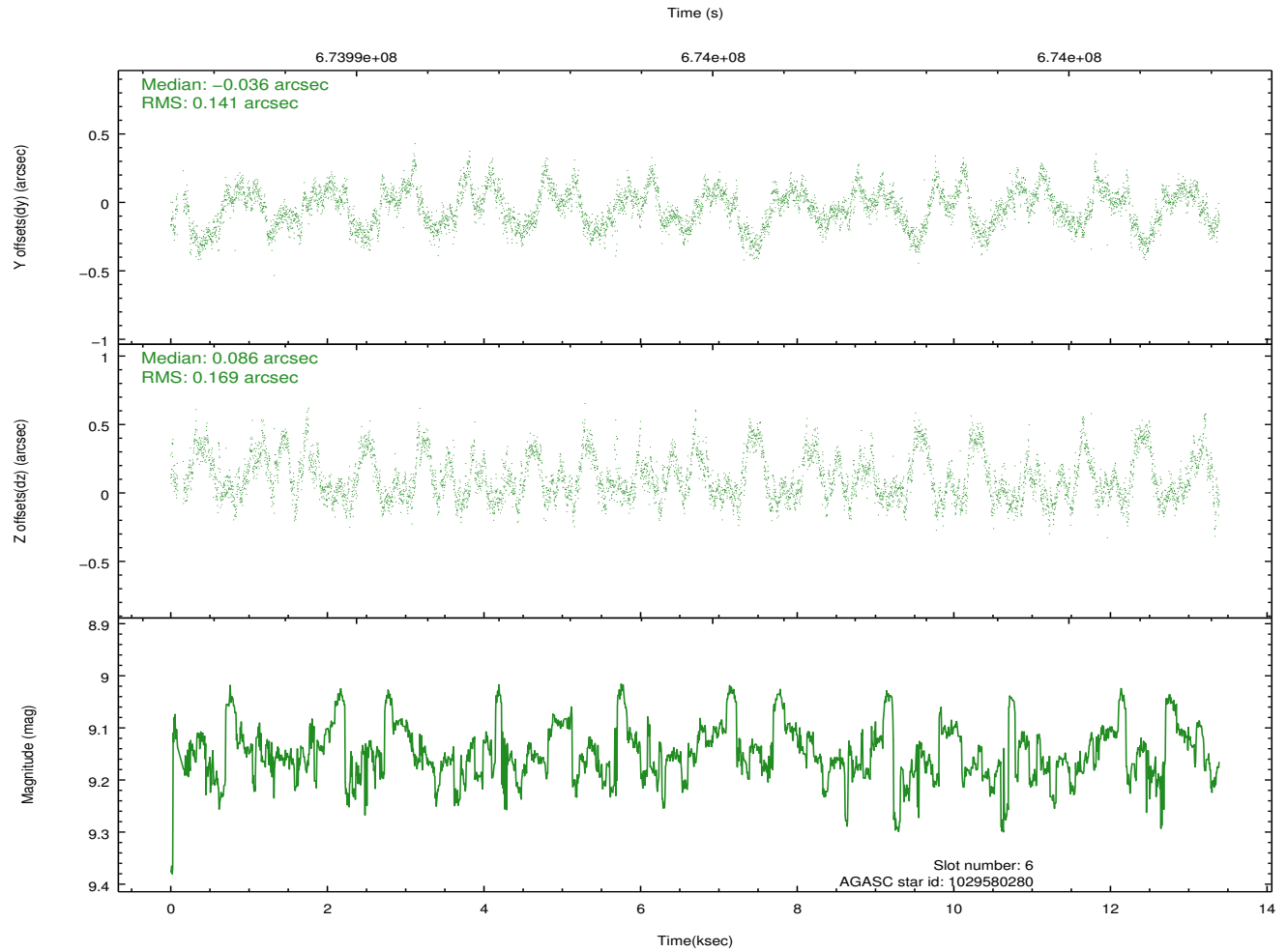
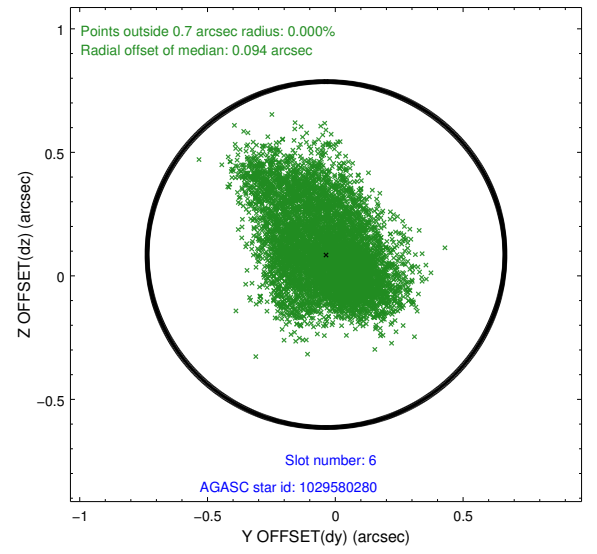
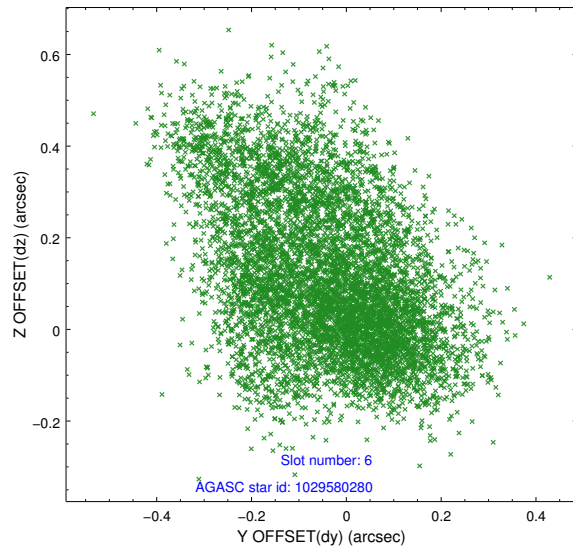
2.4.2 Slot 4



2.4.3 Slot 5

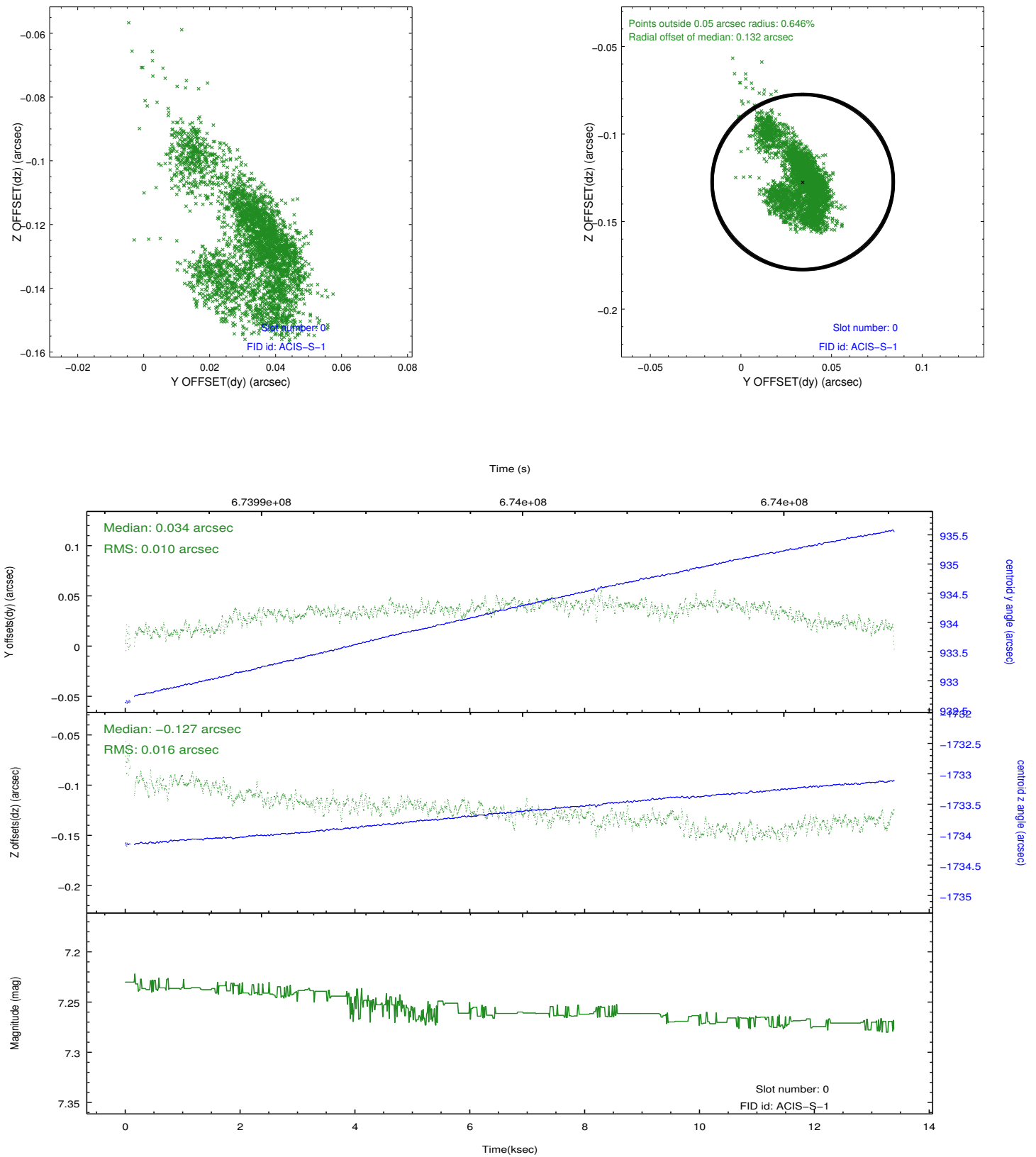


2.4.4 Slot 6

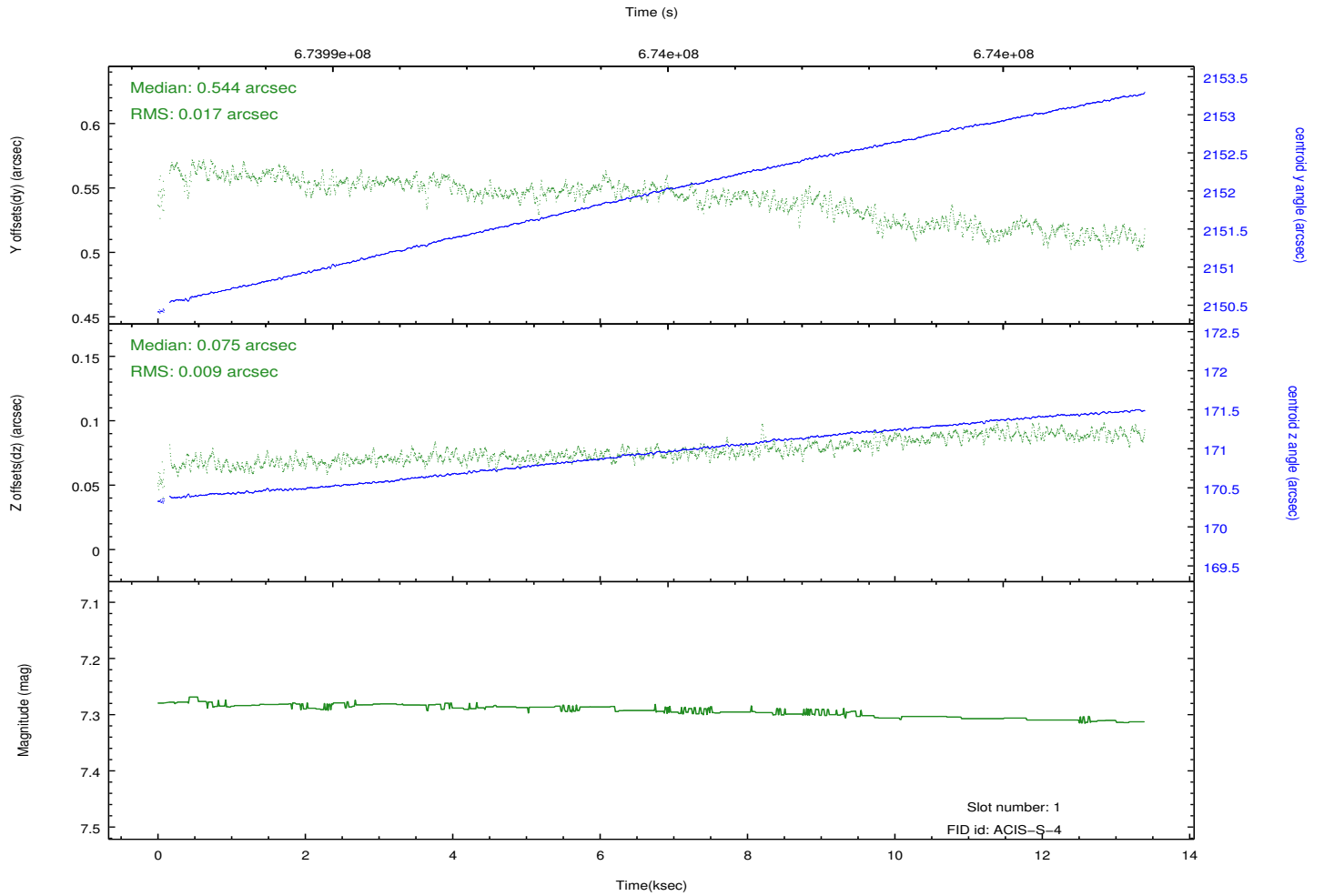
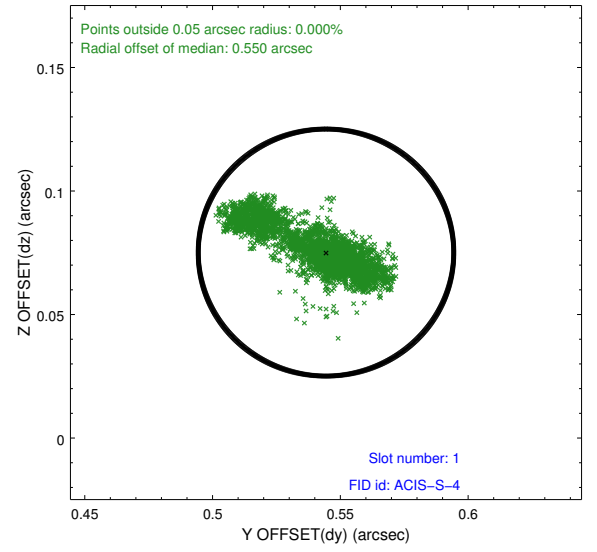
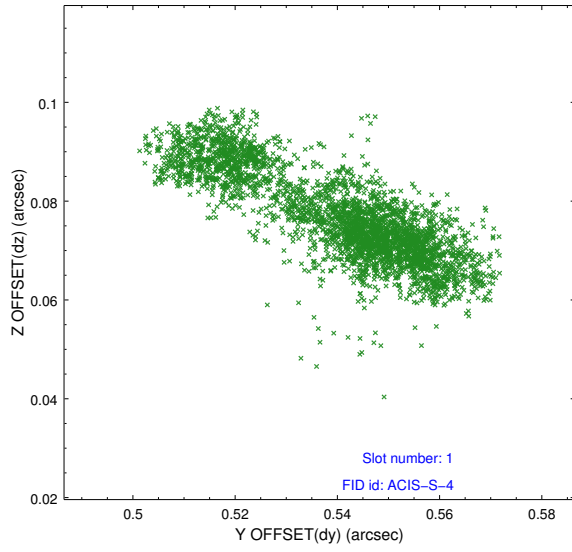


2.5 FID Slots

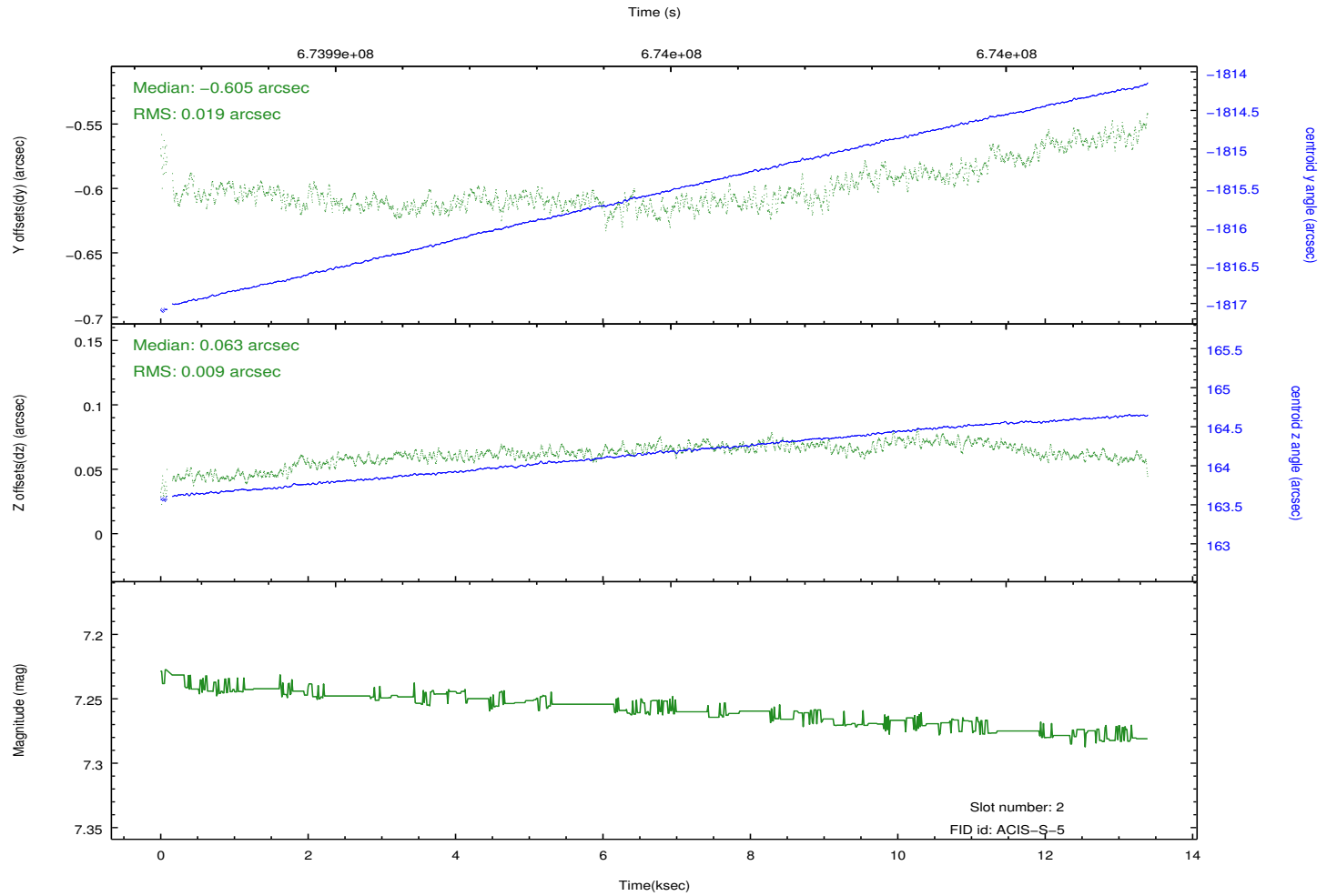
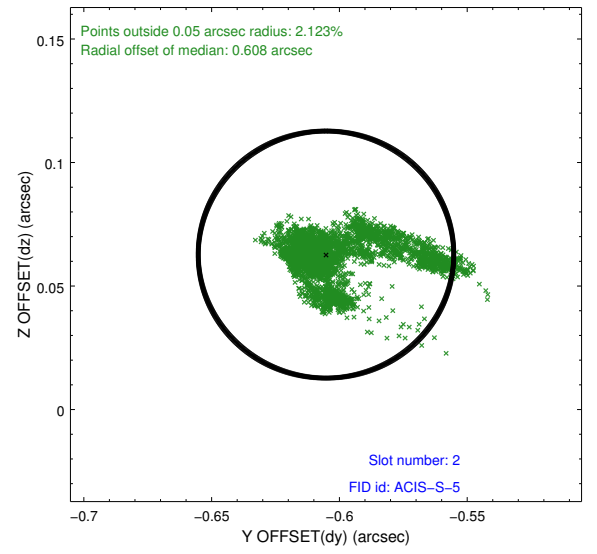
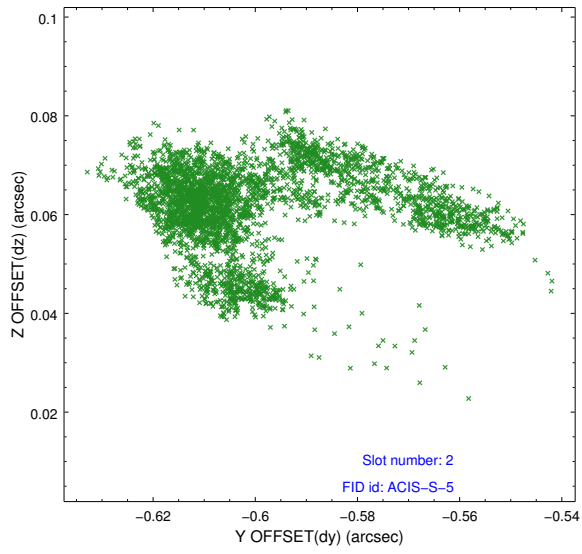
2.5.1 Slot 0



2.5.2 Slot 1

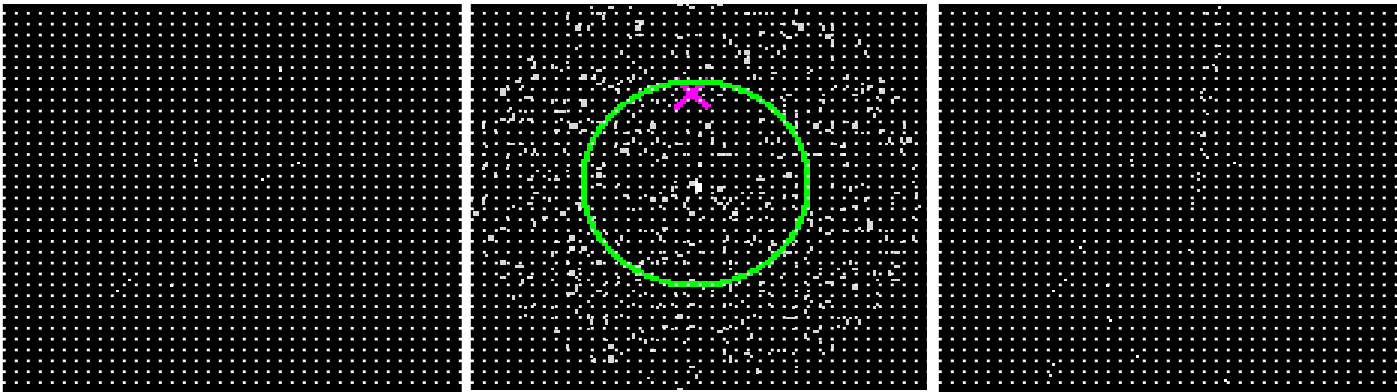


2.5.3 Slot 2



3 Gratings

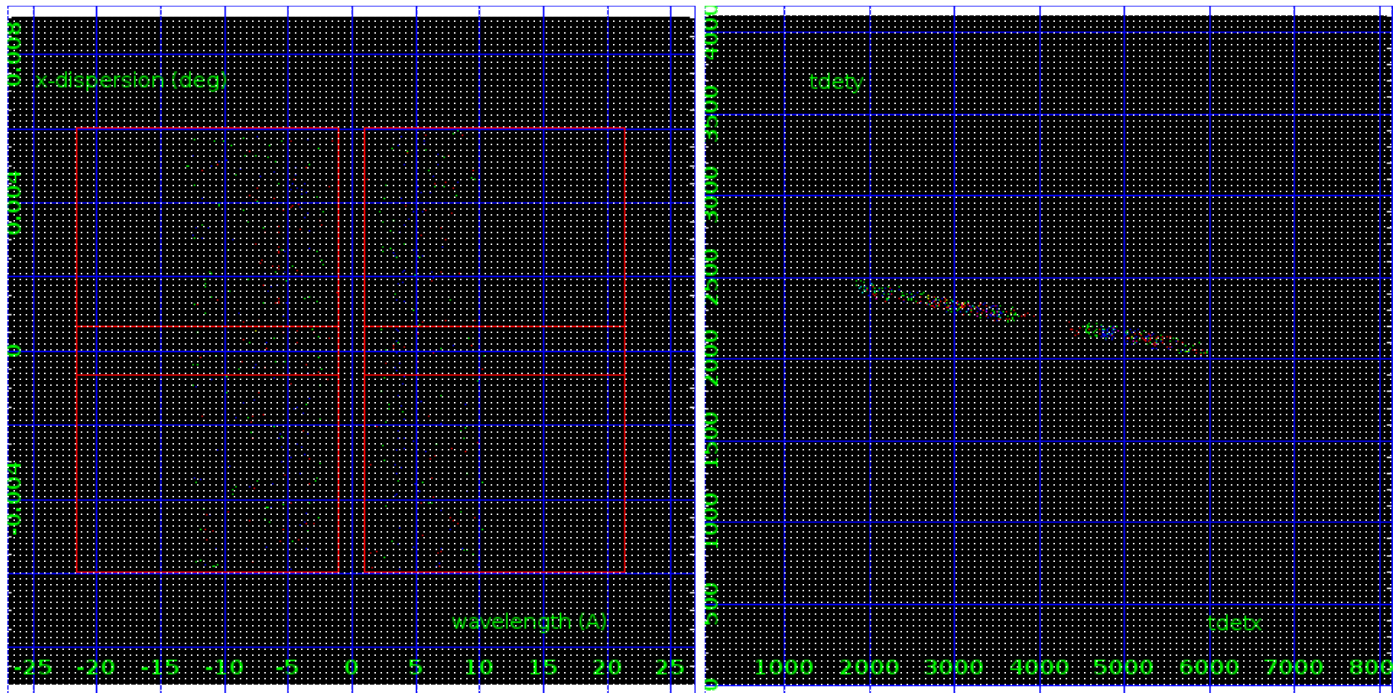
3.1 HEG Arm



HEG Order Sort 123

HEG Zero Order

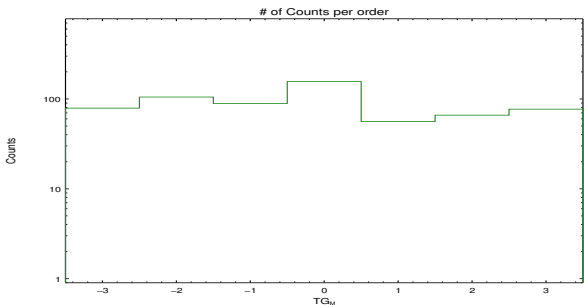
HEG Order Sort ALL

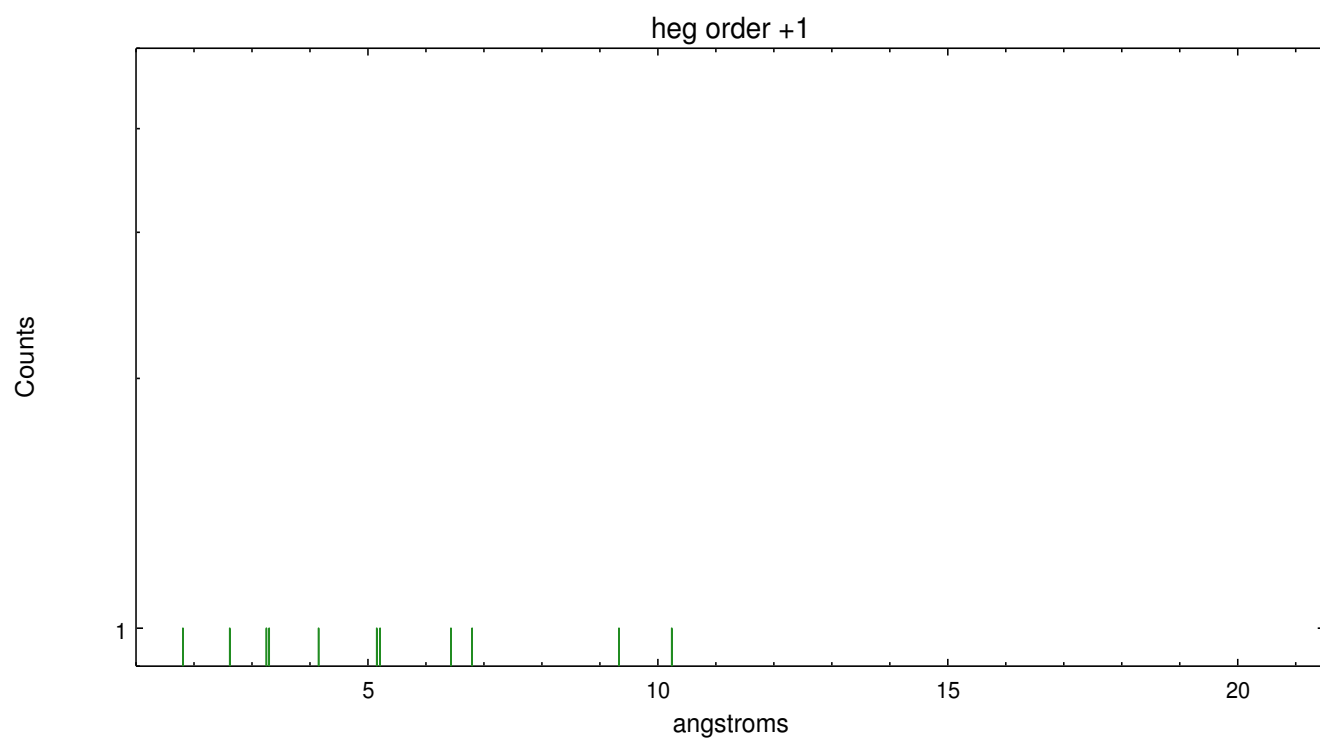
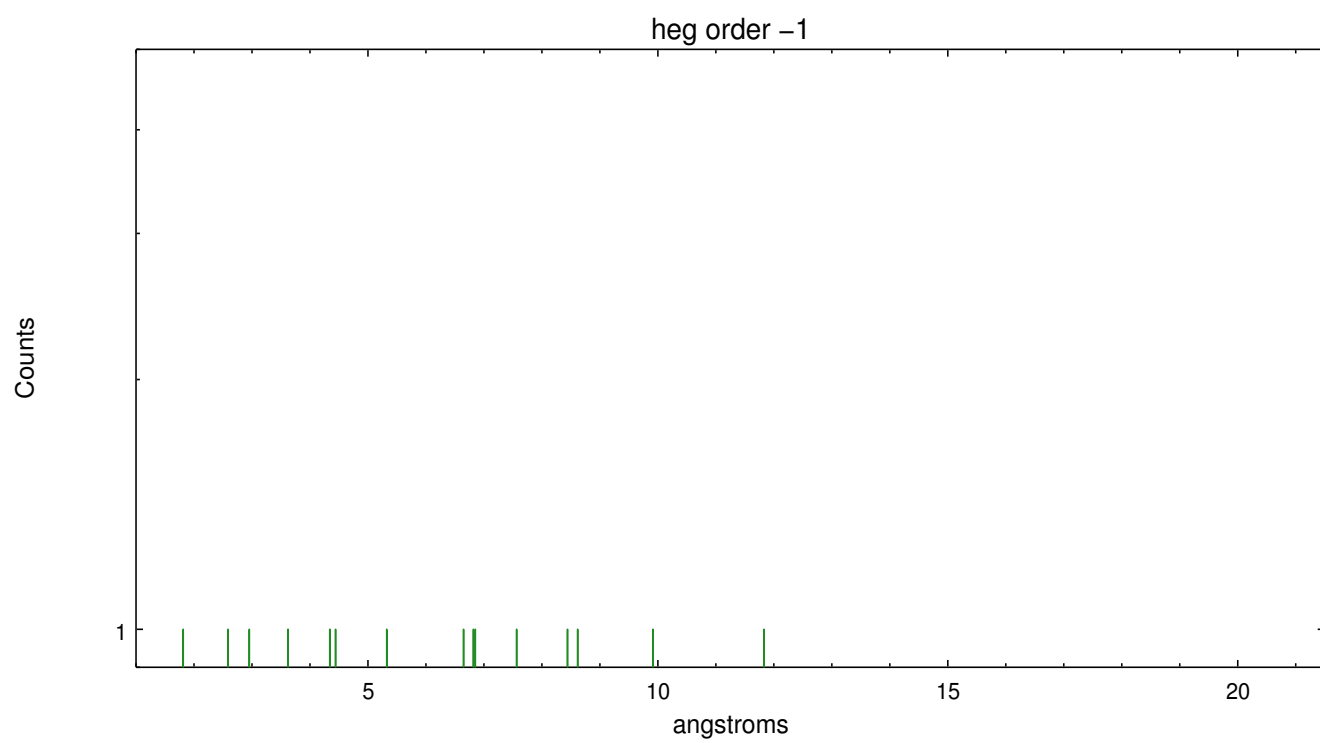


Spot Image HEG

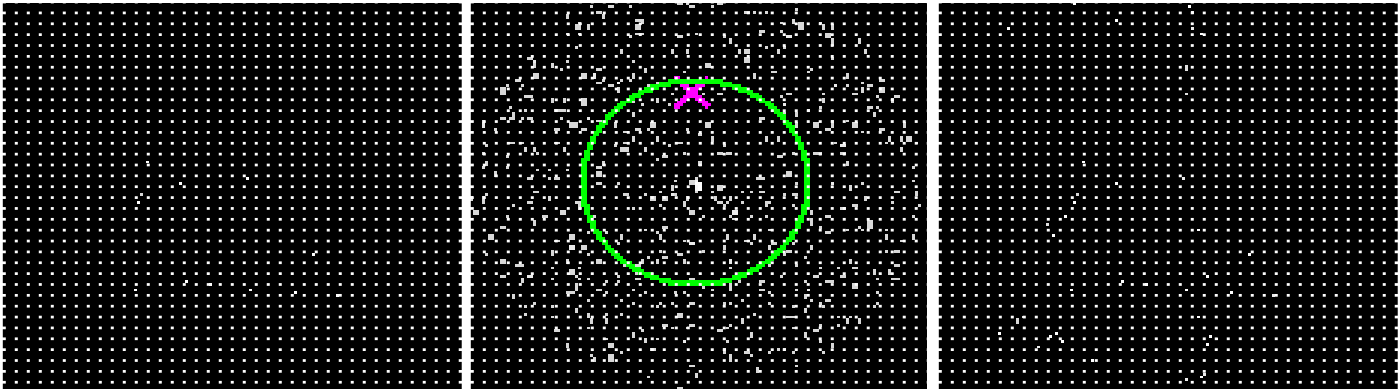
Full Detector HEG

	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	79	105	89	156	56	66	77





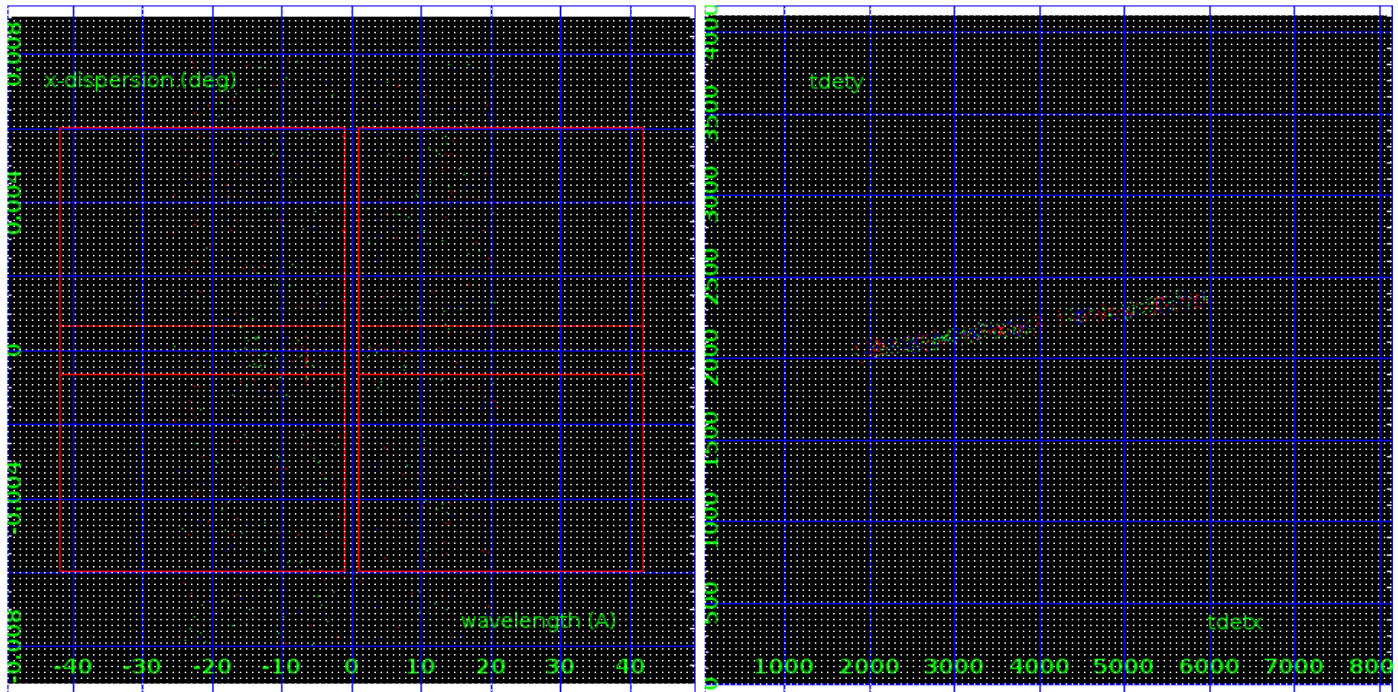
3.2 MEG Arm



MEG Order Sort 123

MEG Zero Order

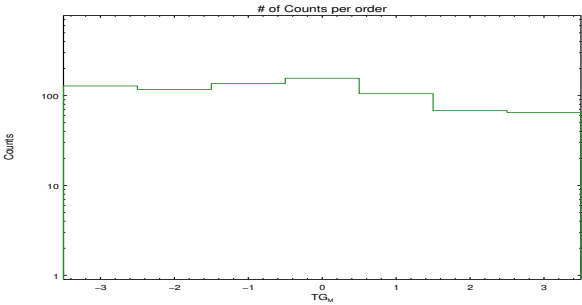
MEG Order Sort ALL

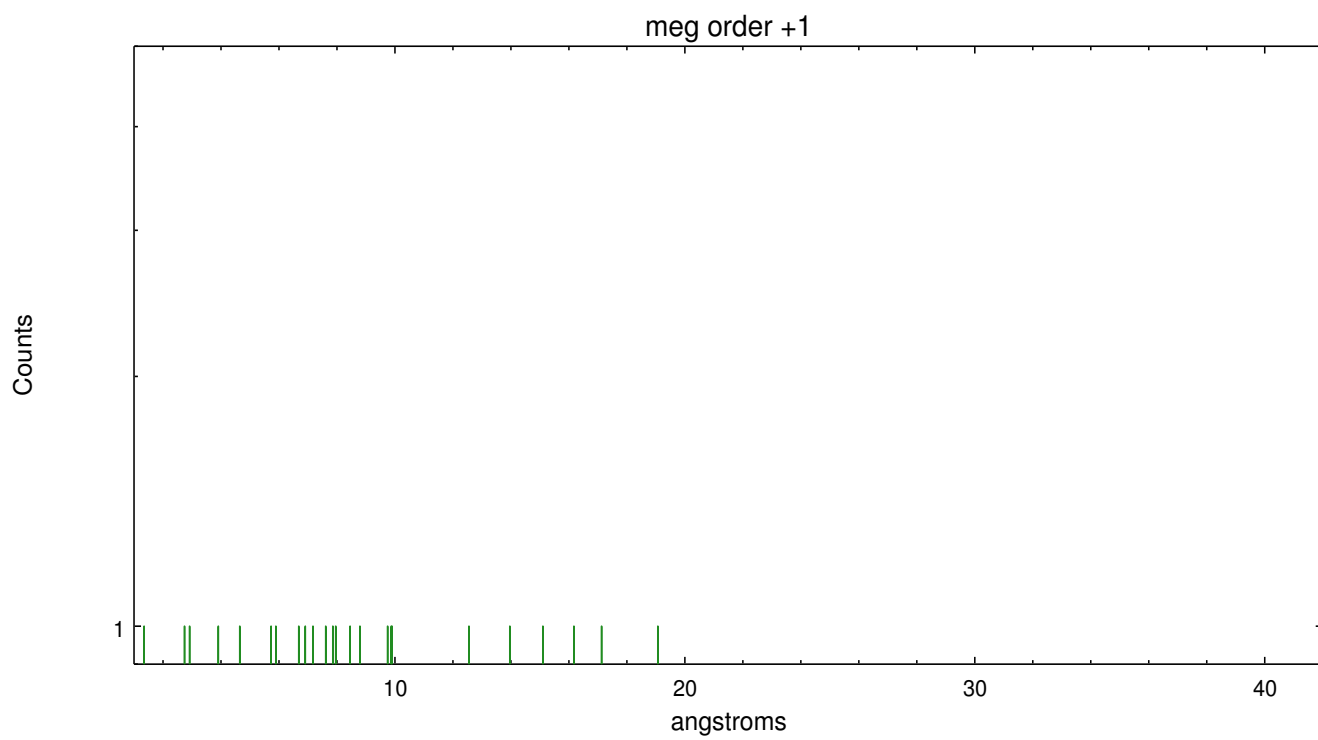
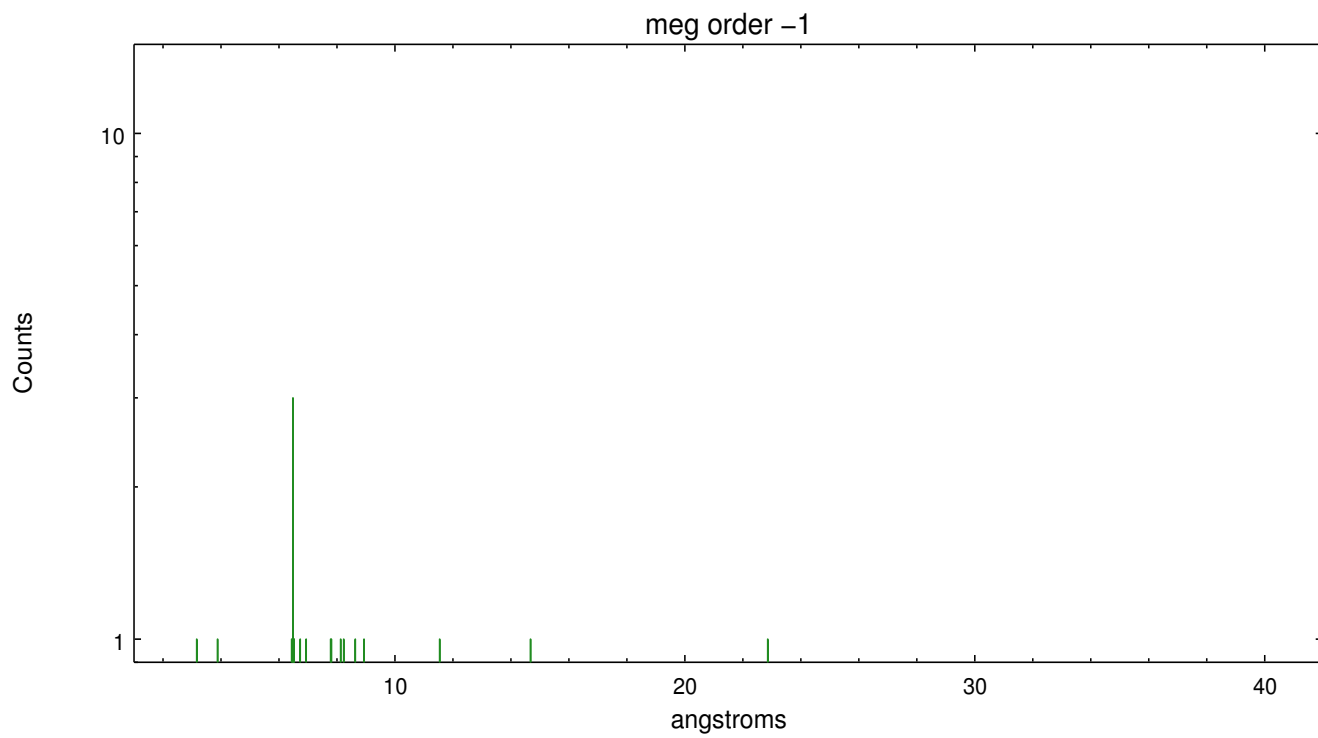


Spot Image MEG

Full Detector MEG

	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	128	117	136	156	105	68	65





A Summary

A.1 Status

V&V Scientist	Joy Nichols
V&V Date (YYYY-MM-DD)	2019.05.13
V&V Edition	1
V&V Disposition and Status	OK
V&V Charge Time	13.230800101876

A.2 Comments

Zeroth order too faint to be found automatically with software tools. The position of the zeroth order was determined manually and inserted into the processing for this version.

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The focal plane temperature is warmer than -112.0 C during the interval 673991590.38 - 674001451.48 (MET s) of this observation. This temperature is the upper limit of the verified ACIS calibration for the back-illuminated chips. The focal plane temperature during part 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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Optical monitor star used. The ACA has the capability to devote one or more of the eight image slots to "monitor" particular sky locations. This allows simultaneous optical photometry of one or more targets in the ACA field of view. These optical sources can be slightly fainter than the ACA guide star limit of $m_{ACA} = 10.2$ mag. The bright-end limit for monitor star photometry is $m_{ACA}=6.2$ mag. However, since there are a fixed number of image slots, devoting a slot to photometry instead of tracking a guide star results in a degradation of the image reconstruction and celestial location accuracy (Section 5.4). Using one monitor slot represents a 15 - 25% increase in the aspect image reconstruction RMS diameter, depending on the particular guide star configuration. Two monitor slots would increase the diameter by about 50 - 60%, but this configuration is not operationally allowed under normal circumstances. The photometric accuracy which can be achieved depends primarily on the star magnitude, integration time, CCD dark current, CCD read noise, sky background, and the CCD dark current uncertainty.