

# V&V Reference Report

## L2 ASCDS Version : 8.4.3

Observation 13406 - L2 Version 3  
Chandra X-Ray Center

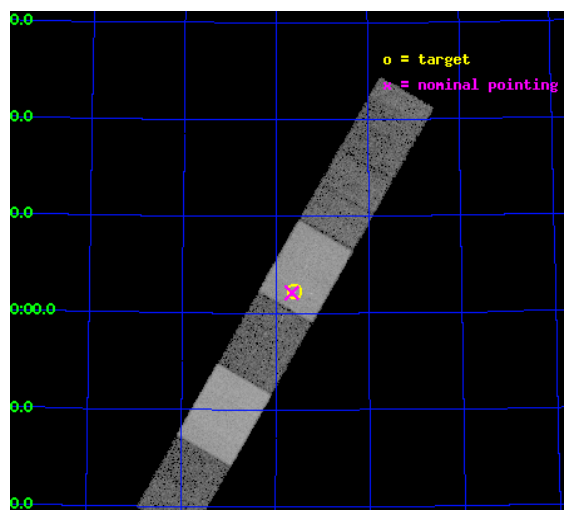
L2 Processing Date : Feb 9 2012

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# 1 Front

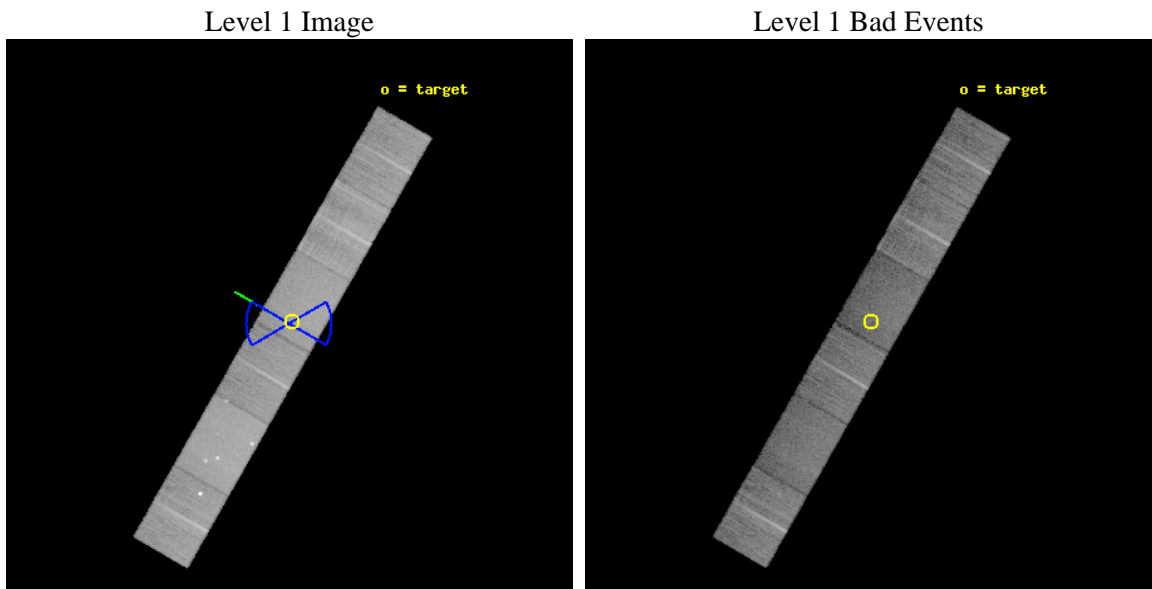
seq_num	702507	Sequence number
obs_id	13406	Observation id
title	THE FIRST SPATIALLY RESOLVED SPECTRUM OF AN AGN OUTFLOW IN AN EARLY-TYPE GALAXY: A DEEP HETG OBSERVATION OF MRK 3	Proposal title
observer	Dr Daniel Evans	Principal investigator
object	Markarian 3	Source name
dtcycle	0	&#160
cycle	P	events from which exps? Prim/Second/Both
ra_targ	93.90125	Observer's specified target RA [deg]
dec_targ	71.0375	Observer's specified target Dec [deg]
ra_nom	93.914370009063	Nominal RA [deg]
dec_nom	71.035173357683	Nominal Dec [deg]
roll_nom	299.84421515368	Nominal Roll [deg]
revision	3	Processing version of data
ontime	21786.460369229	Sum of GTIs [s]
livetime	21434.590137531	Livetime [s]
ontime4	21786.501409233	Sum of GTIs [s]
ontime5	21786.419329226	Sum of GTIs [s]
ontime6	21786.378289223	Sum of GTIs [s]
ontime7	21786.460369229	Sum of GTIs [s]
ontime8	21786.337249219	Sum of GTIs [s]
ontime9	21786.296209216	Sum of GTIs [s]
l2events	178028	Number of level 2 events



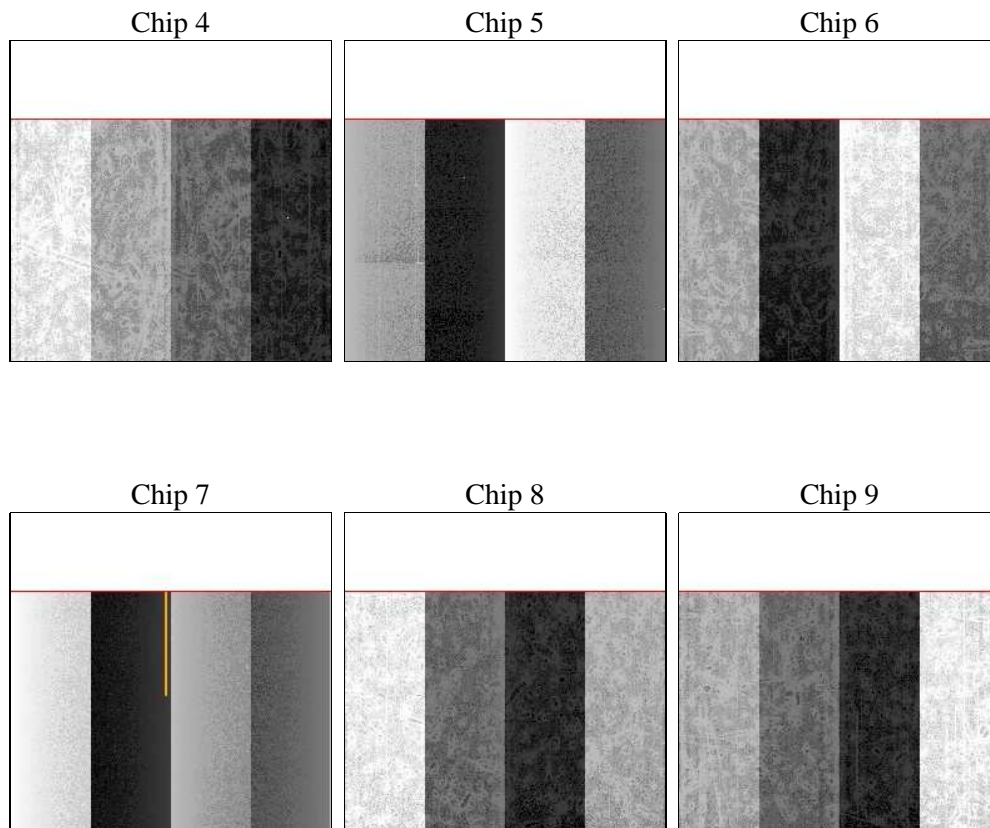
## 2 OBI

### 2.1 OBI

#### 2.1.1 Images



#### 2.1.2 Bias



### 2.1.3 Parameters

obi_num	0	Obi number	sched_exp_time	21736.587000	[s] Scheduled observation exposure time
ascdsver	8.4.3	Processing system revision	ontime	21786.460369229	Sum of GTIs [s]
caldbver	4.4.7	&#160	ontime4	21786.501409233	Sum of GTIs [s]
date	2012-02-09T19:05:19	Date and time of file creation	ontime5	21786.419329226	Sum of GTIs [s]
revision	3	Processing version of data	ontime6	21786.378289223	Sum of GTIs [s]
			ontime7	21786.460369229	Sum of GTIs [s]
			ontime8	21786.337249219	Sum of GTIs [s]
			ontime9	21786.296209216	Sum of GTIs [s]
			l1events	763585	Number of level 1 events

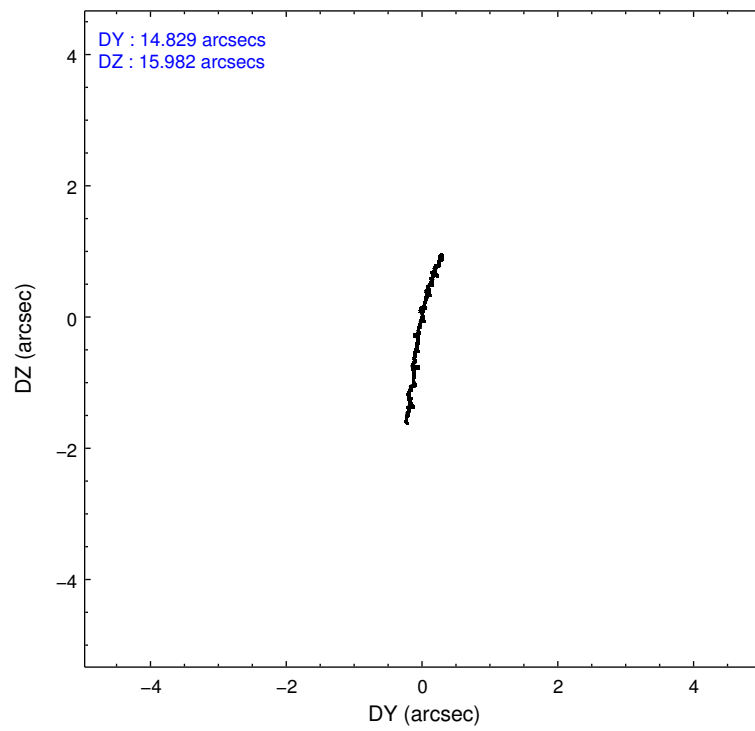
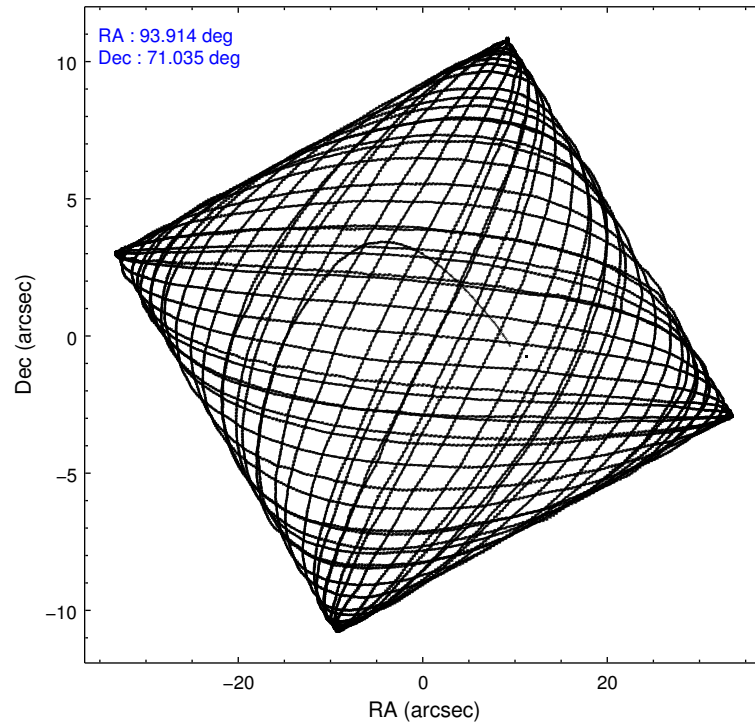
### 2.1.4 Events

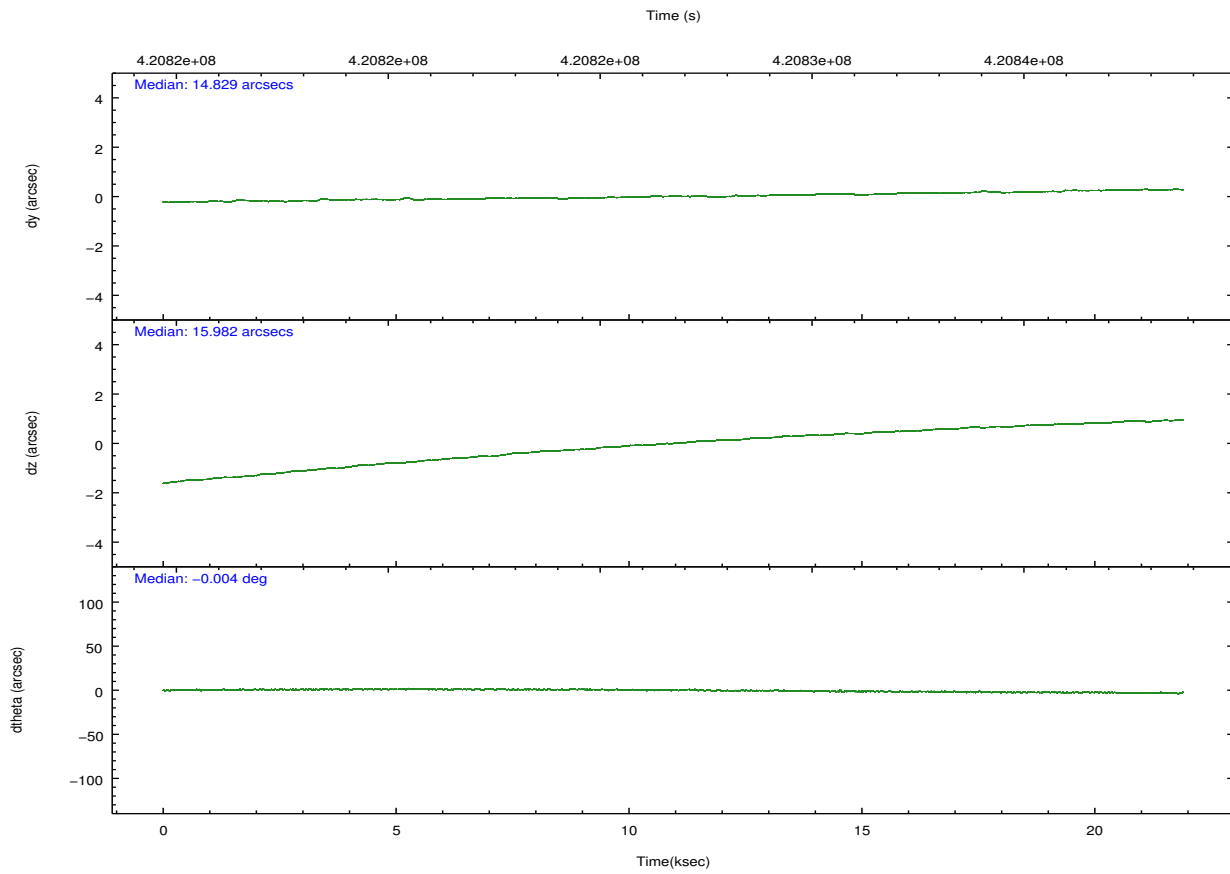
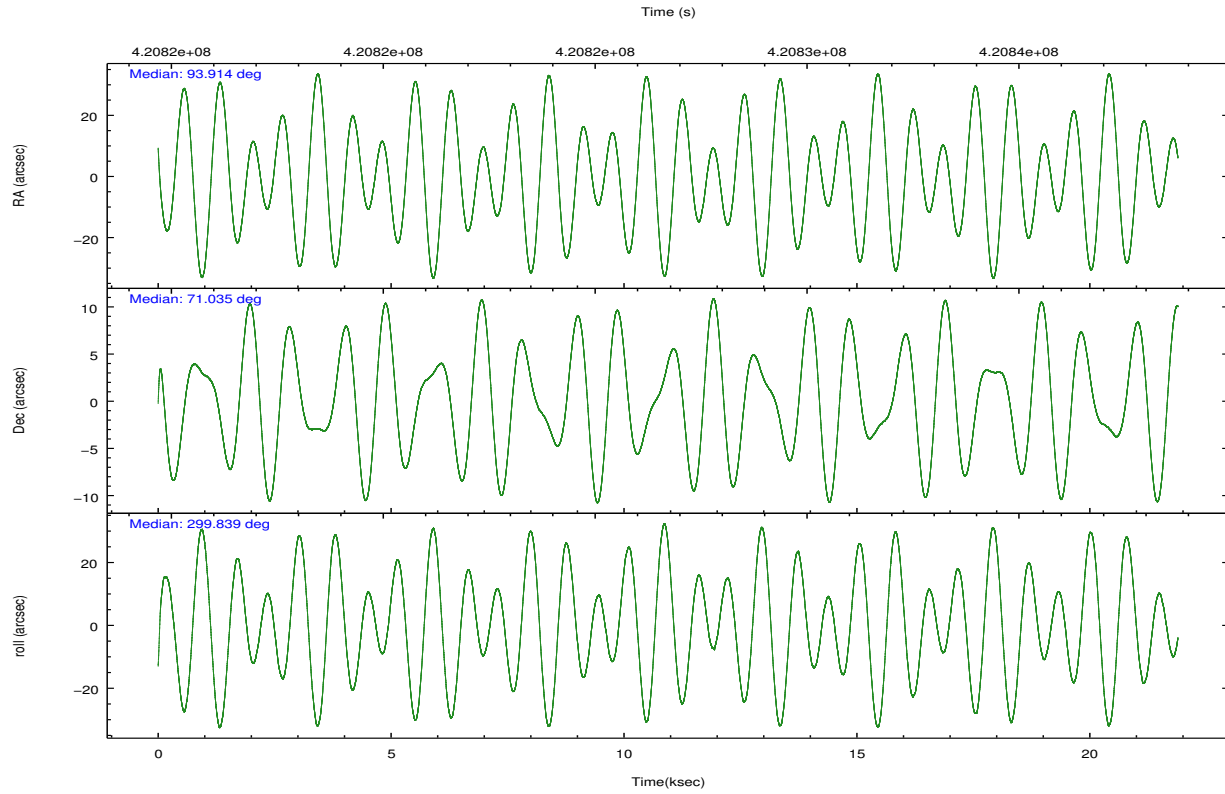
	ccd 4	ccd 5	ccd 6	ccd 7	ccd 8	ccd 9		ccd 4	ccd 5	ccd 6	ccd 7	ccd 8	ccd 9
level 1 events	125522	162247	104625	130670	137538	102983	grade 0 events	11524	11111	4214	5551	10930	4367
rejected events	105829	79904	92268	70564	100549	90448		9%	6%	4%	4%	7%	4%
rejected %	84%	49%	88%	54%	73%	87%	grade 1 events	124	293	55	152	100	54
								0%	0%	0%	0%	0%	0%
							grade 2 events	3200	23148	2745	12295	8453	2767
								2%	14%	2%	9%	6%	2%
							grade 3 events	1368	3598	1374	5505	4080	1358
								1%	2%	1%	4%	2%	1%
							grade 4 events	1322	3577	1358	5551	3750	1383
								1%	2%	1%	4%	2%	1%
							grade 5 events	4694	12790	4708	13314	6973	5274
								3%	7%	4%	10%	5%	5%
							grade 6 events	2282	40919	2668	31214	9777	2661
								1%	25%	2%	23%	7%	2%
							grade 7 events	101008	66811	87503	57088	93475	85119
								80%	41%	83%	43%	67%	82%

## 2.2 Compared Parameters

Parameter	Planned	Actual	Parameter	Planned	Actual
Instrument	ACIS	ACIS	Obspar format version number	7	7
Detector	ACIS-456789	ACIS-456789	Obspar file type	PREDICTED	ACTUAL
Grating	HETG	HETG	Obspar update status	NONE	UPDATED
Data mode	FAINT	FAINT	Number of optional ACIS chips dropped	0	0
Observation mode	POINTING	POINTING	On-chip summing requested	N	N
[deg] Pointing RA	93.841004	93.91437000906319	Subarray requested	CUSTOM	CUSTOM
[deg] Pointing Dec	71.048573	71.03517335768341	Subarray start row	1	1
[deg] Pointing Roll	299.756976	299.8442151536783	Subarray row count	774	774
[deg] Roll angle	270.000000	270.000000	Alternating exposures requested	N	N
[deg] Roll tolerance	30.000000	30.000000	[s] Primary exposure time	0.000000	2.5
Roll constraint allows 180D rotation	Y	Y			
[mm] SIM focus pos	-0.684267	-0.6828225247311905			
[mm] SIM defocus	0	0.001444936568705701			
[mm] SIM translation stage pos	-187.132523	-187.1254020033014			
[mm] SIM translation stage offset	-3	-3.007120579706367			
[s] Observation start time (MET)	420815931.184000	420814461.44587			
Observation start date	2011-05-03T13:17:45	2011-05-03T12:54:21			
[s] Observation end time (MET)	420837667.184000	420837891.92208			
Observation end date	2011-05-03T19:20:01	2011-05-03T19:24:51			
Read mode	TIMED	TIMED			

## 2.3 Aspect



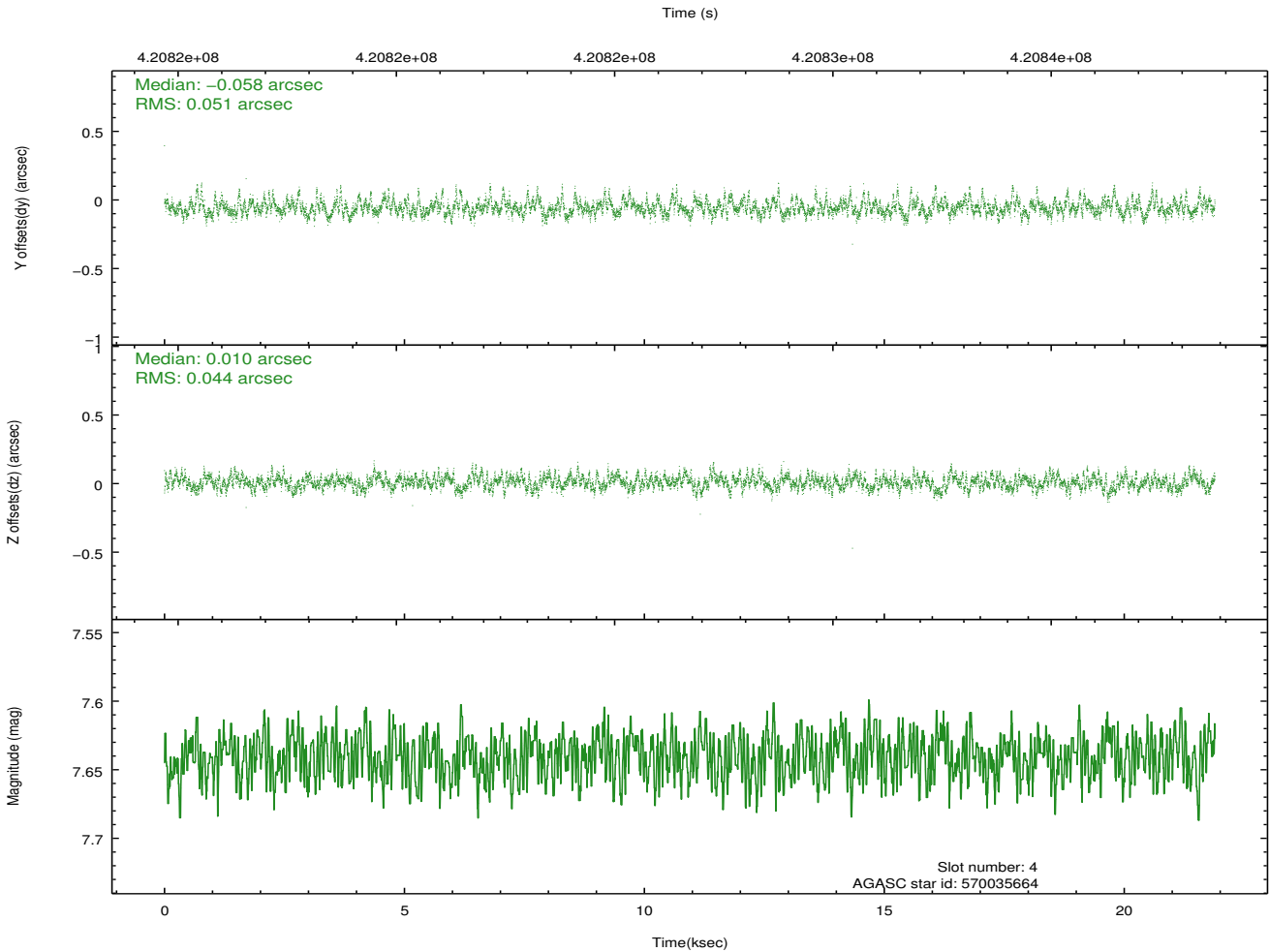
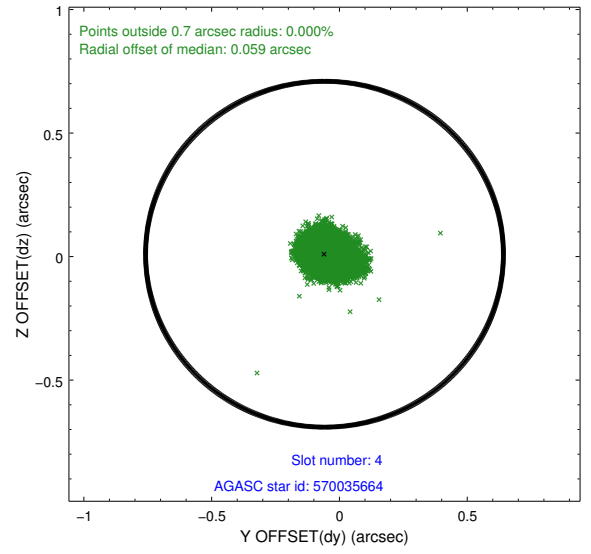
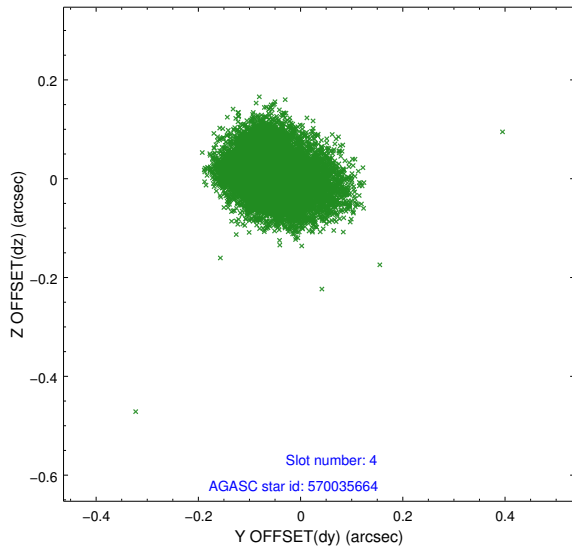


### Slot Statistics

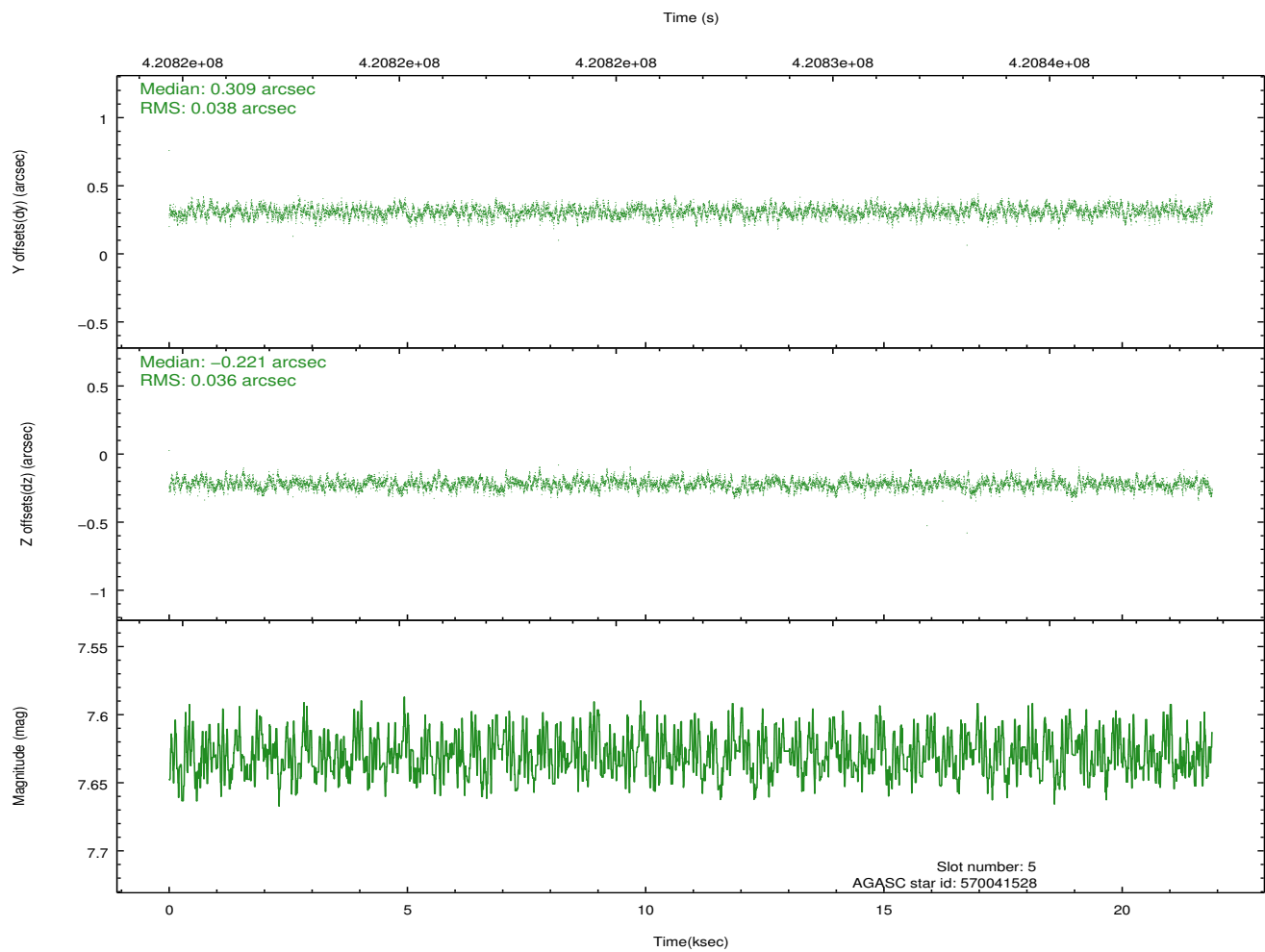
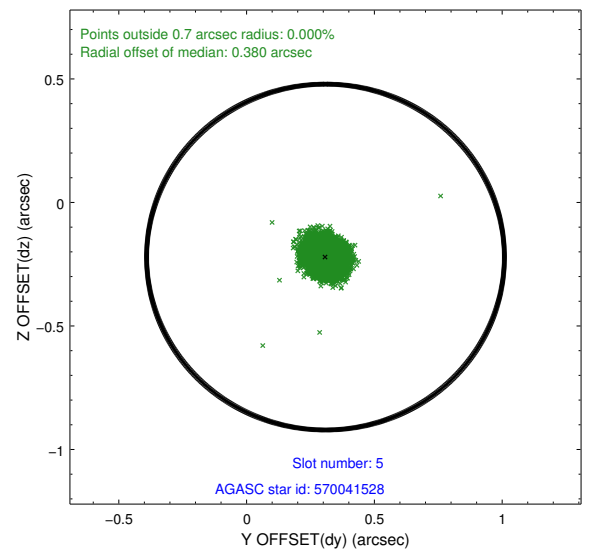
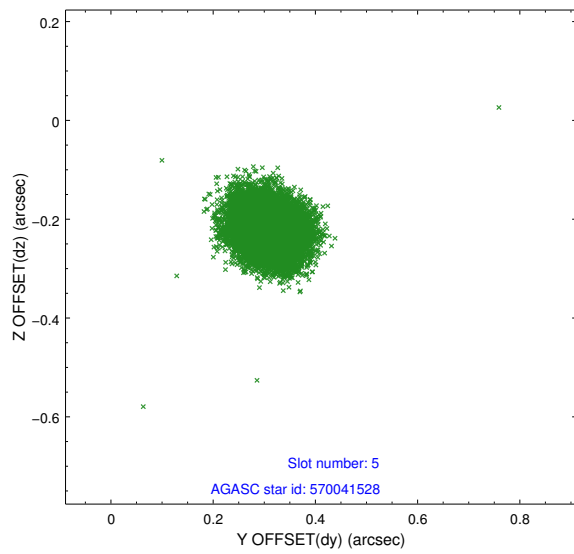
slot	status	id	mag	n_pts	med_dy	med_dz	dr1	dr2	ra	dec	mean_y	mean_z
0	FID	ACIS-S-2	6.93	5340	-0.114	-0.087	0.018	0.028	0.000000	0.000000	-767.72	-1799.44
1	FID	ACIS-S-4	7.02	5340	0.229	0.080	0.010	0.016	0.000000	0.000000	2145.83	109.02
2	FID	ACIS-S-5	7.06	5340	-0.145	0.017	0.015	0.025	0.000000	0.000000	-1820.38	102.81
3	OMITTED		0.00	0	0.000	0.000	0.000	0.000	0.000000	0.000000	0.00	0.00
4	GUIDE	570035664	7.64	10679	-0.058	0.010	0.071	0.118	92.975426	71.130782	-763.47	-724.34
5	GUIDE	570041528	7.63	10677	0.309	-0.221	0.055	0.088	93.751561	70.667714	1137.99	-772.85
6	GUIDE	570559512	8.95	10609	-0.146	0.140	0.090	0.146	94.524462	71.891845	-2258.92	2172.59
7	GUIDE	570565312	8.28	10675	-0.111	0.071	0.059	0.095	94.342210	71.606805	-1463.92	1493.01

## 2.4 Star Slots

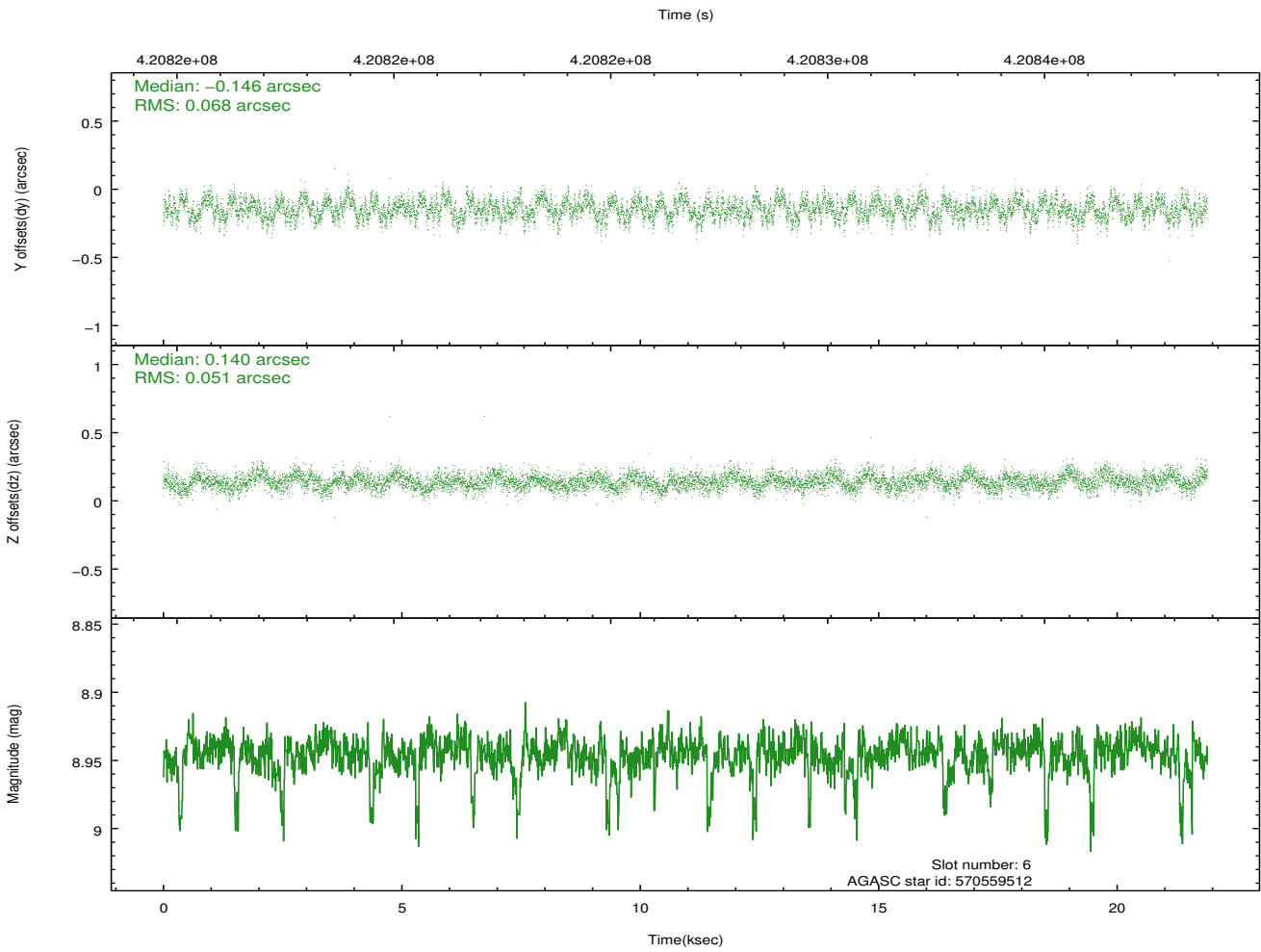
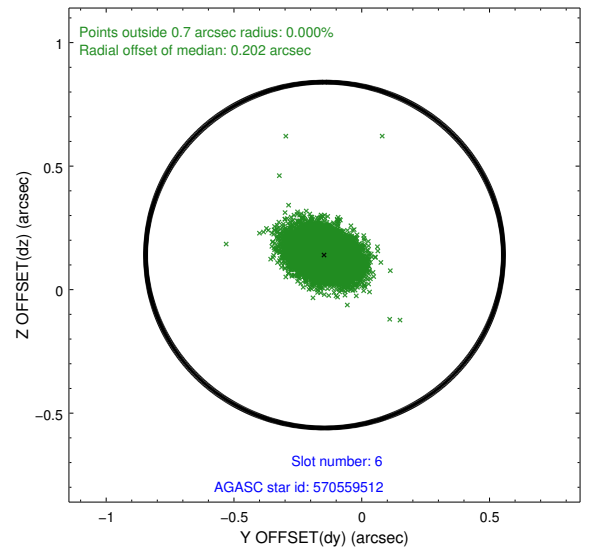
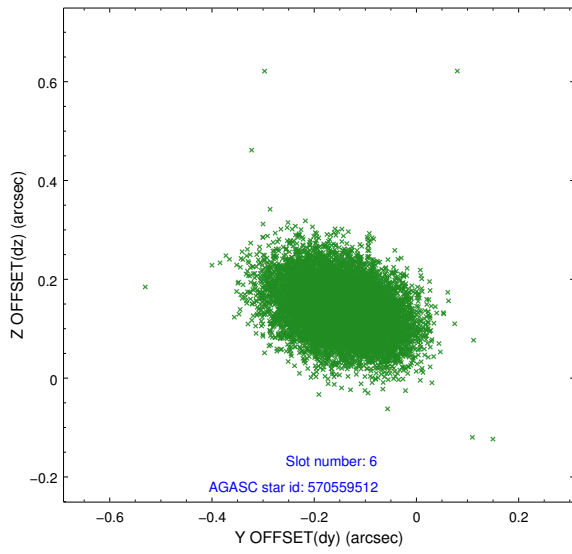
### 2.4.1 Slot 4



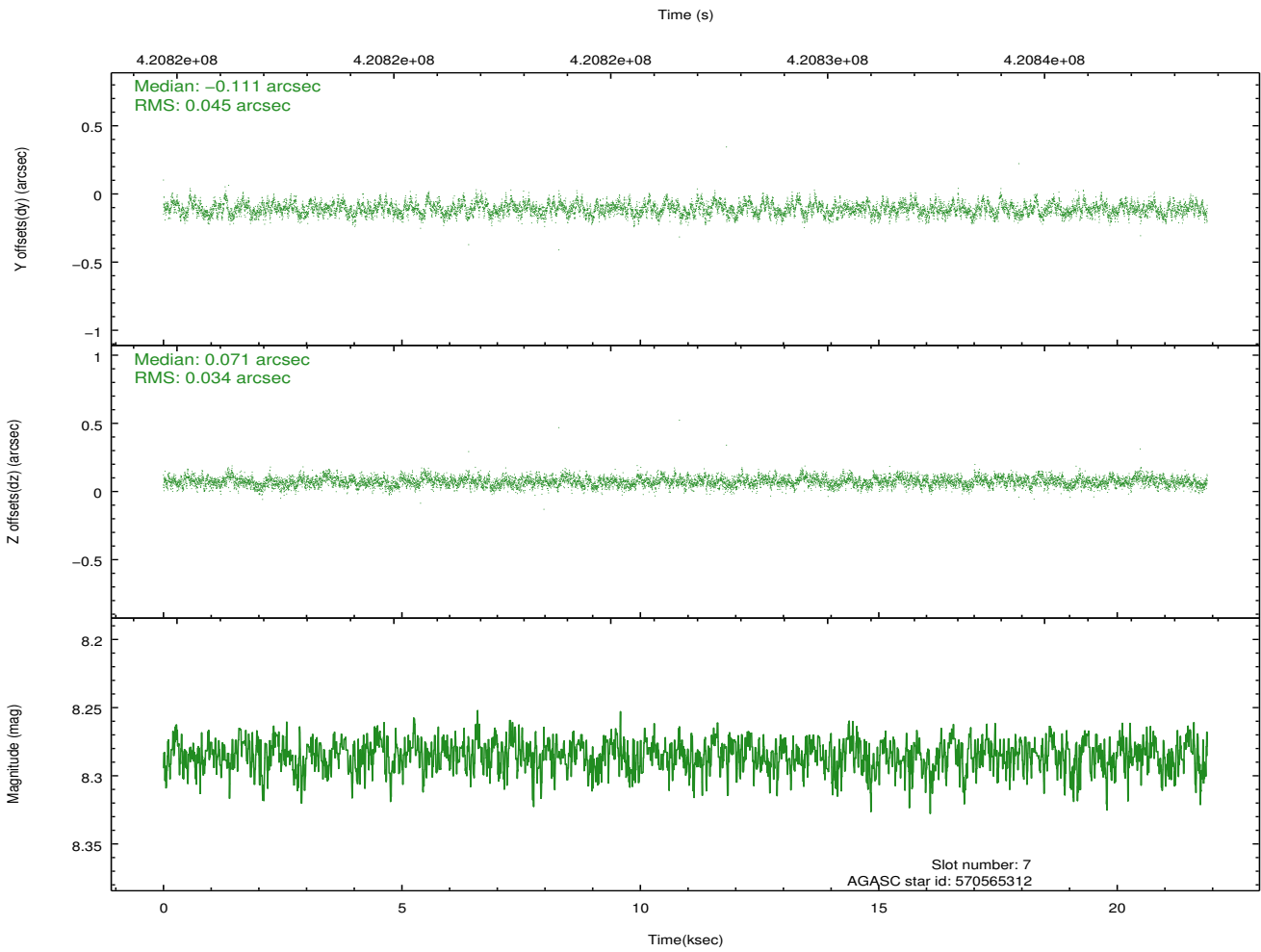
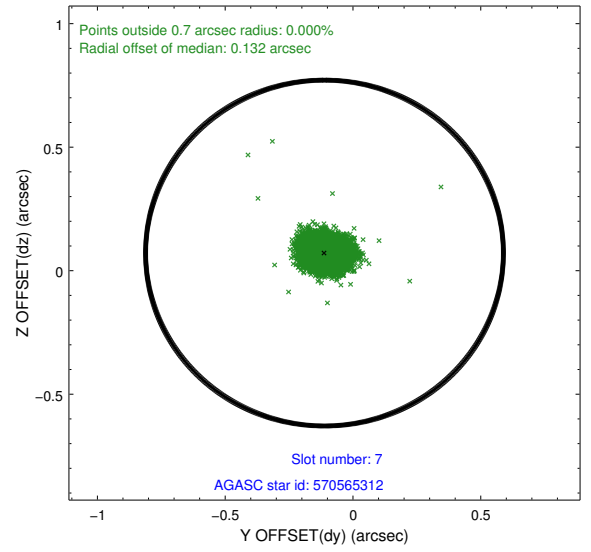
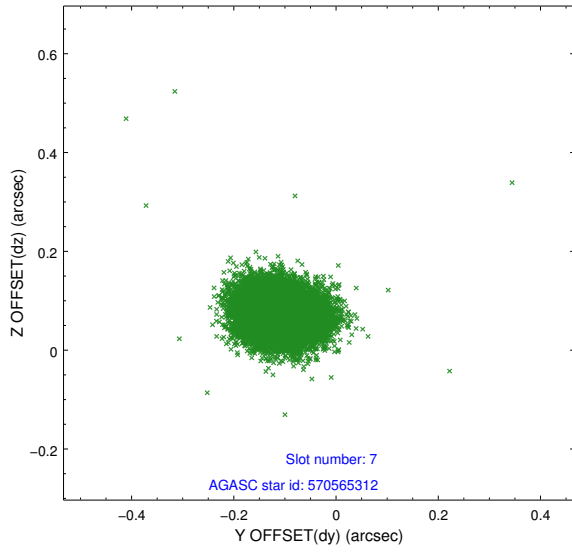
## 2.4.2 Slot 5



### 2.4.3 Slot 6

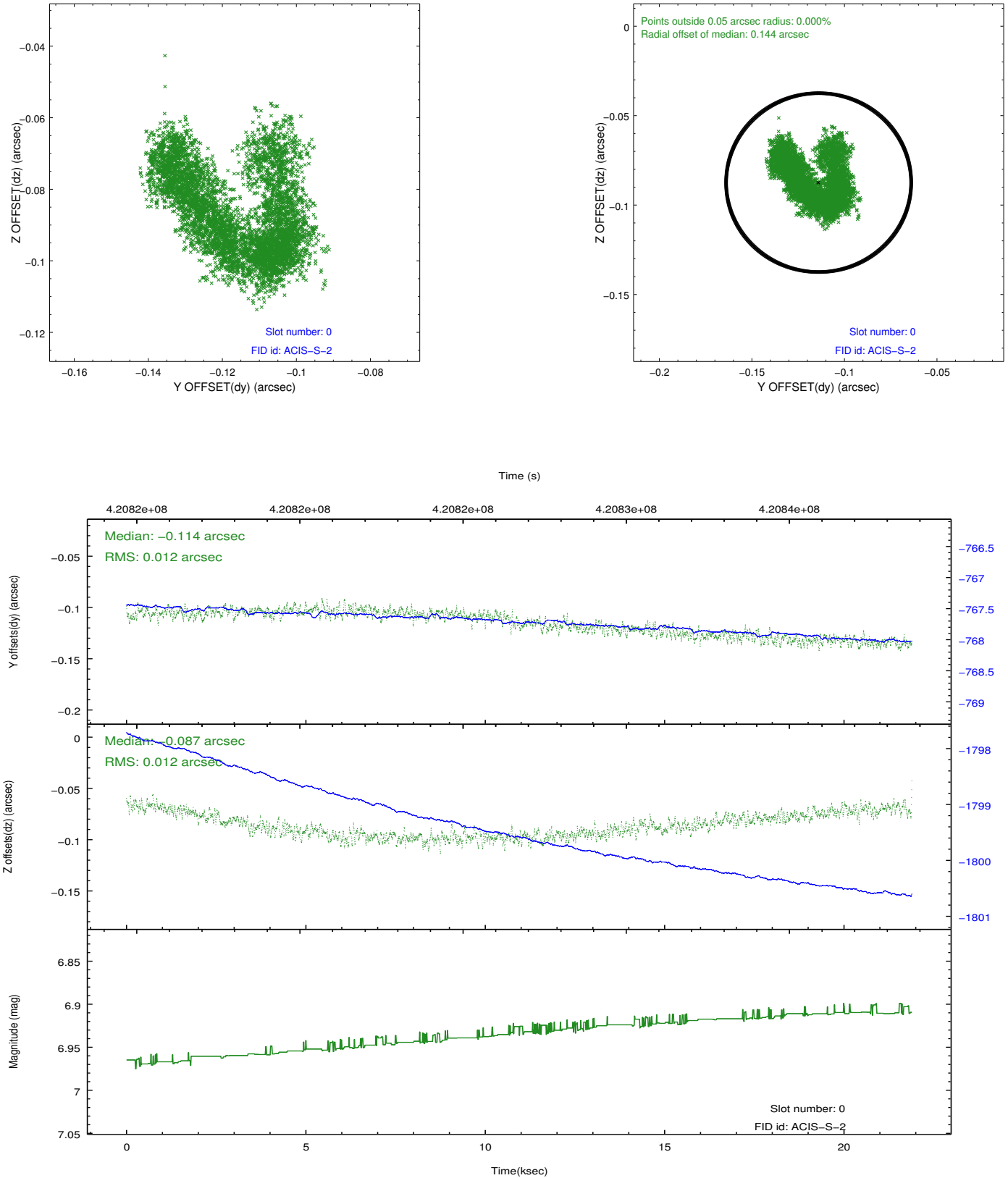


### 2.4.4 Slot 7

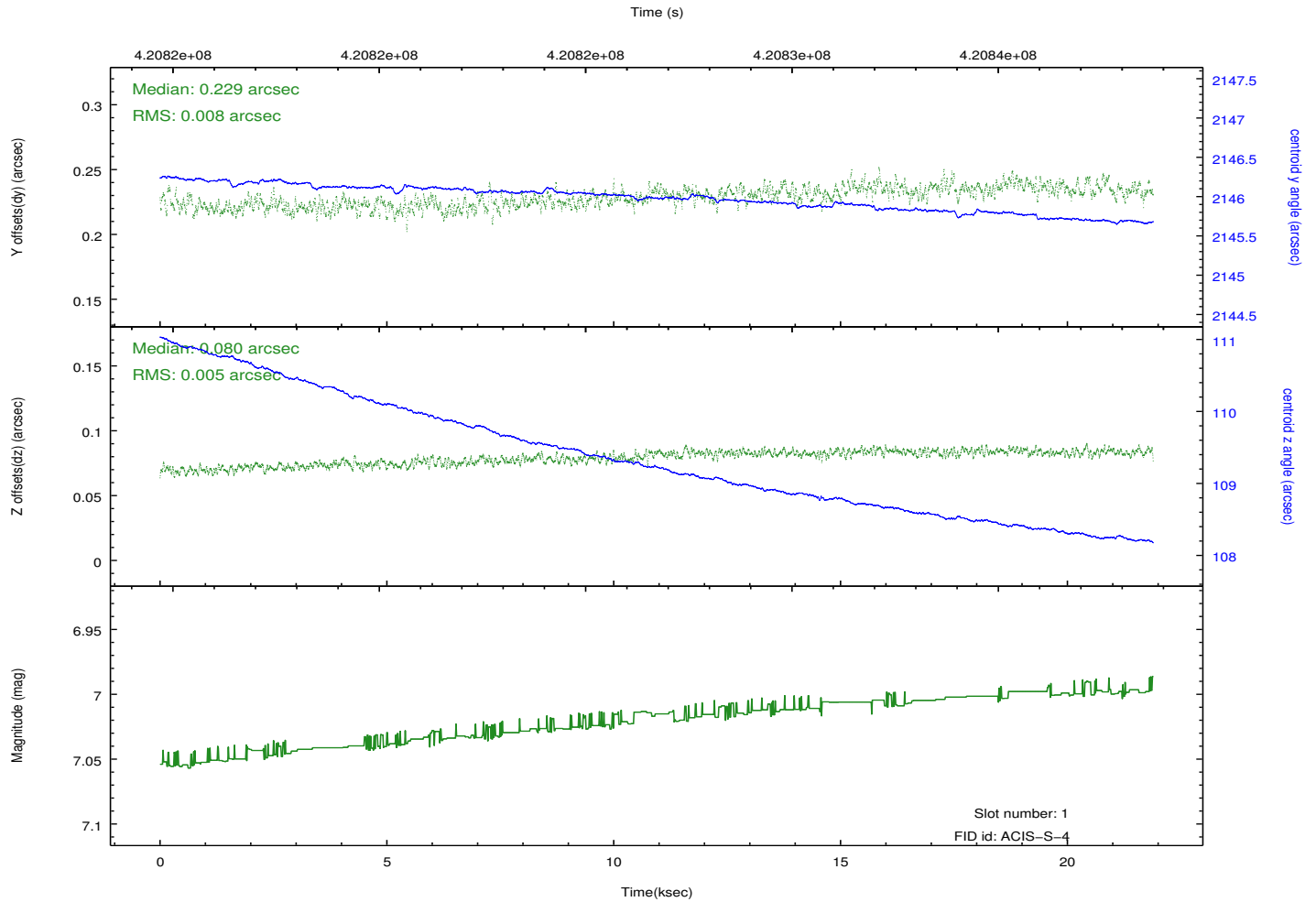
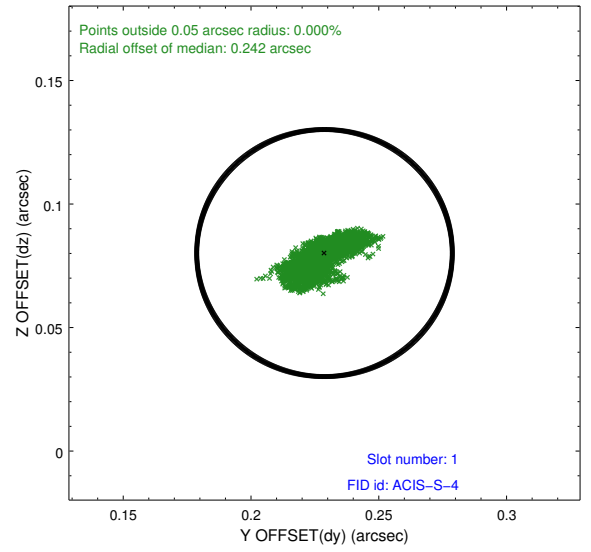
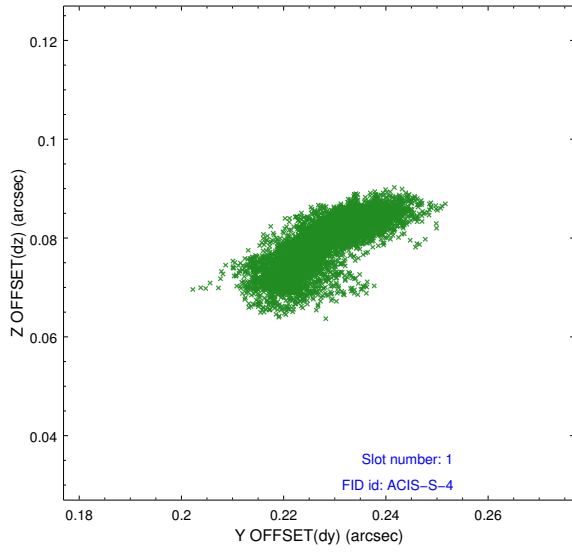


## 2.5 FID Slots

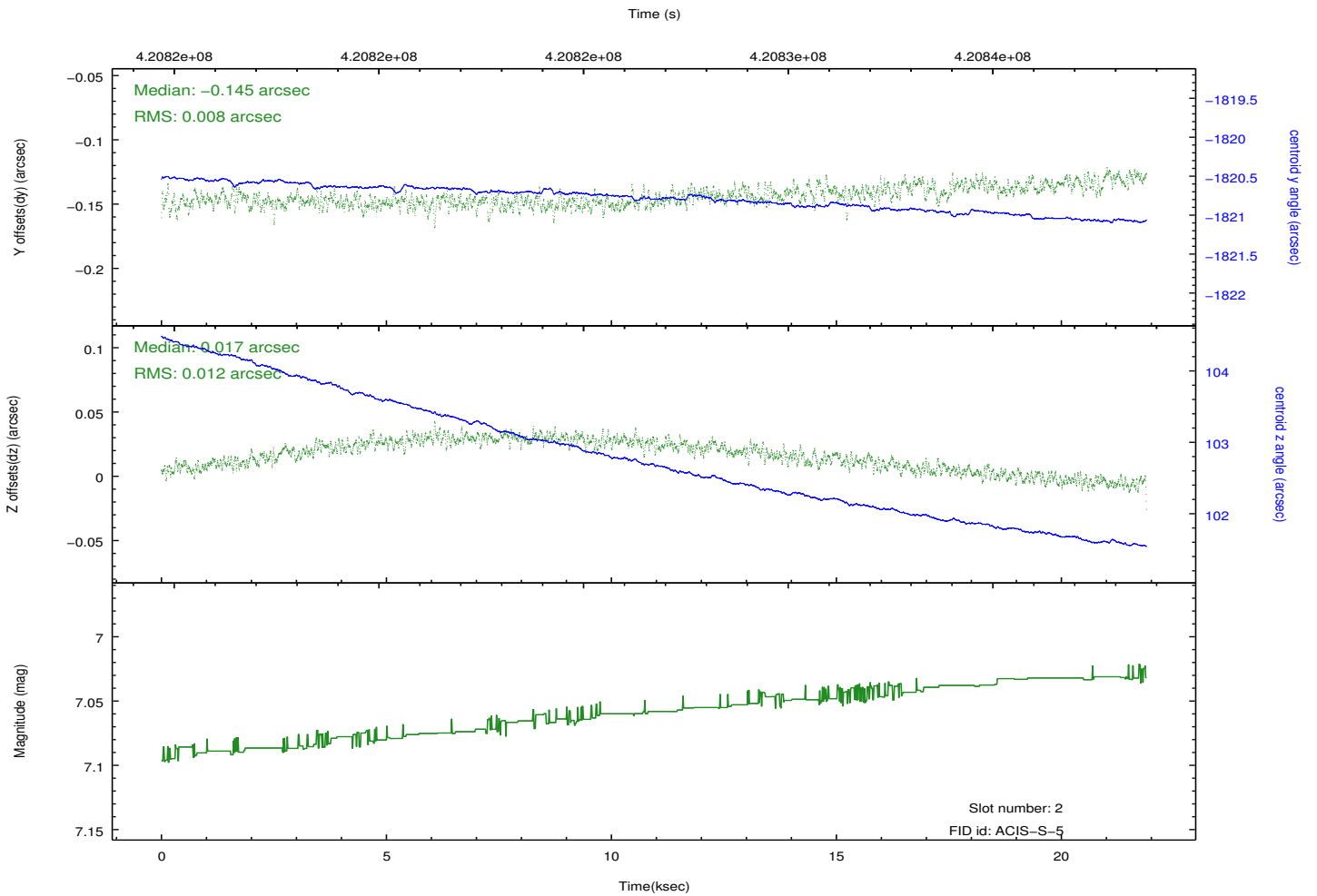
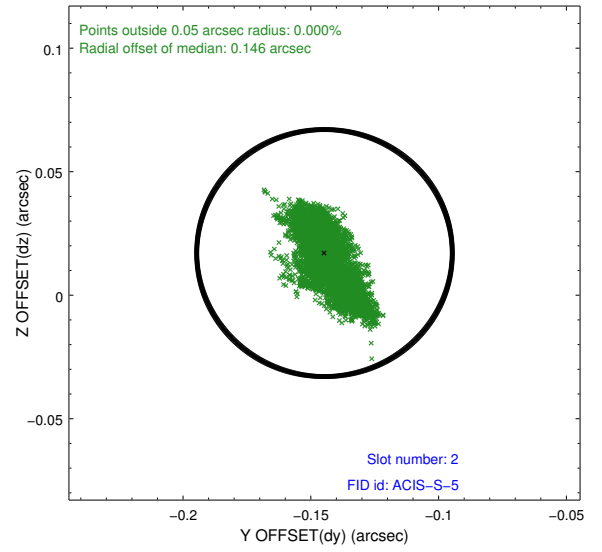
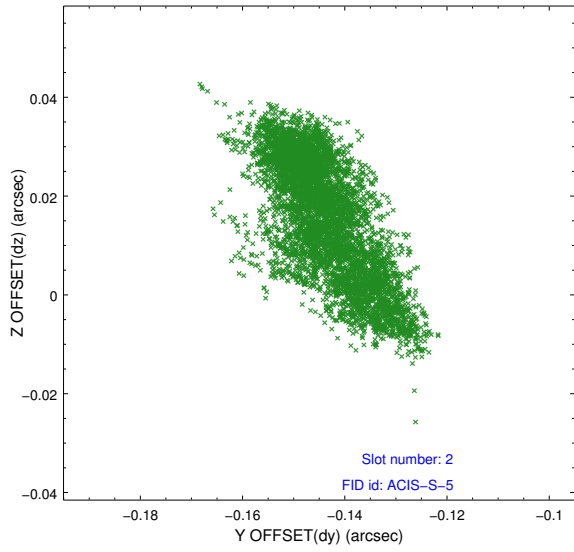
### 2.5.1 Slot 0



## 2.5.2 Slot 1



### 2.5.3 Slot 2

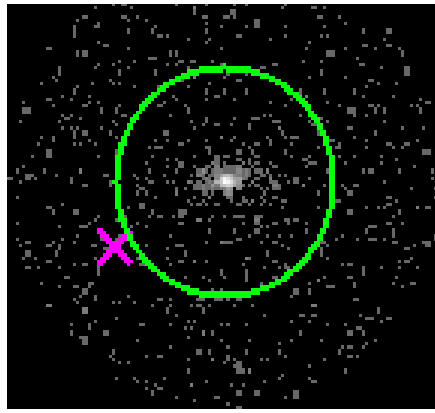


### 3 Gratings

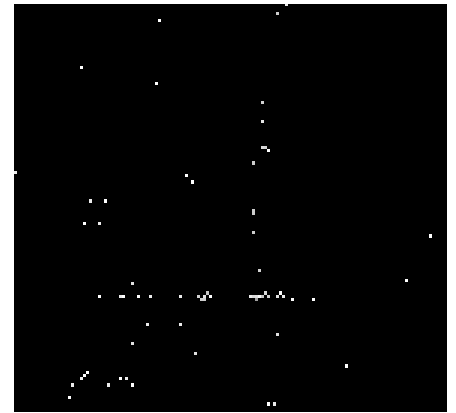
#### 3.1 HEG Arm



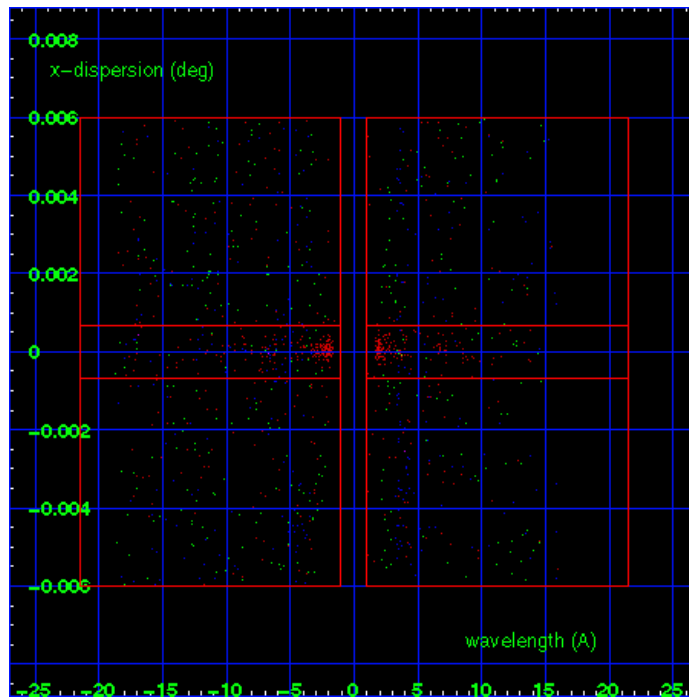
HEG Order Sort 123



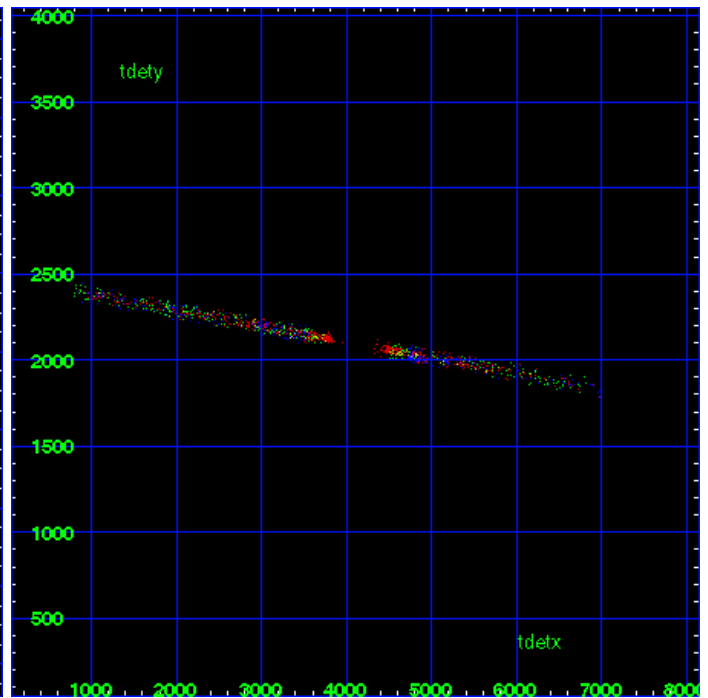
HEG Zero Order



HEG Order Sort ALL

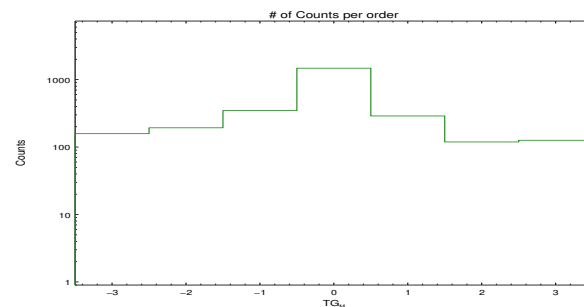


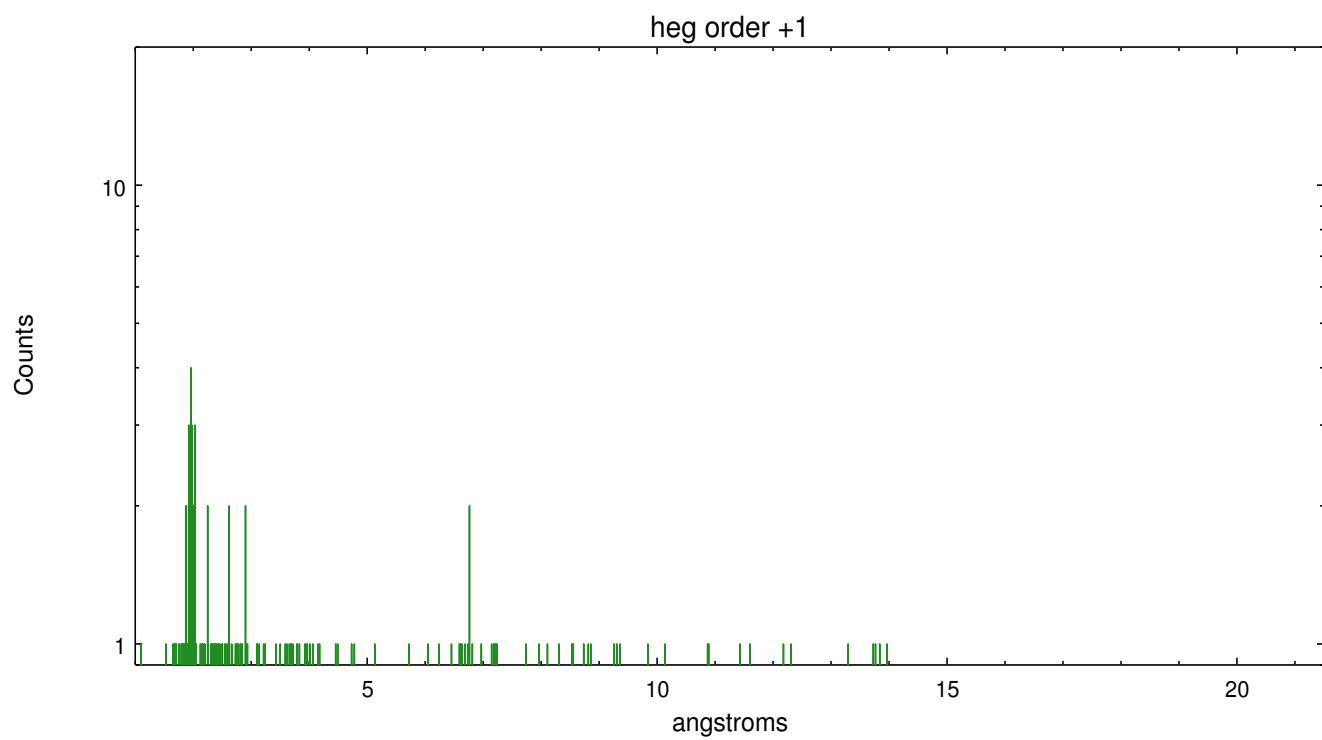
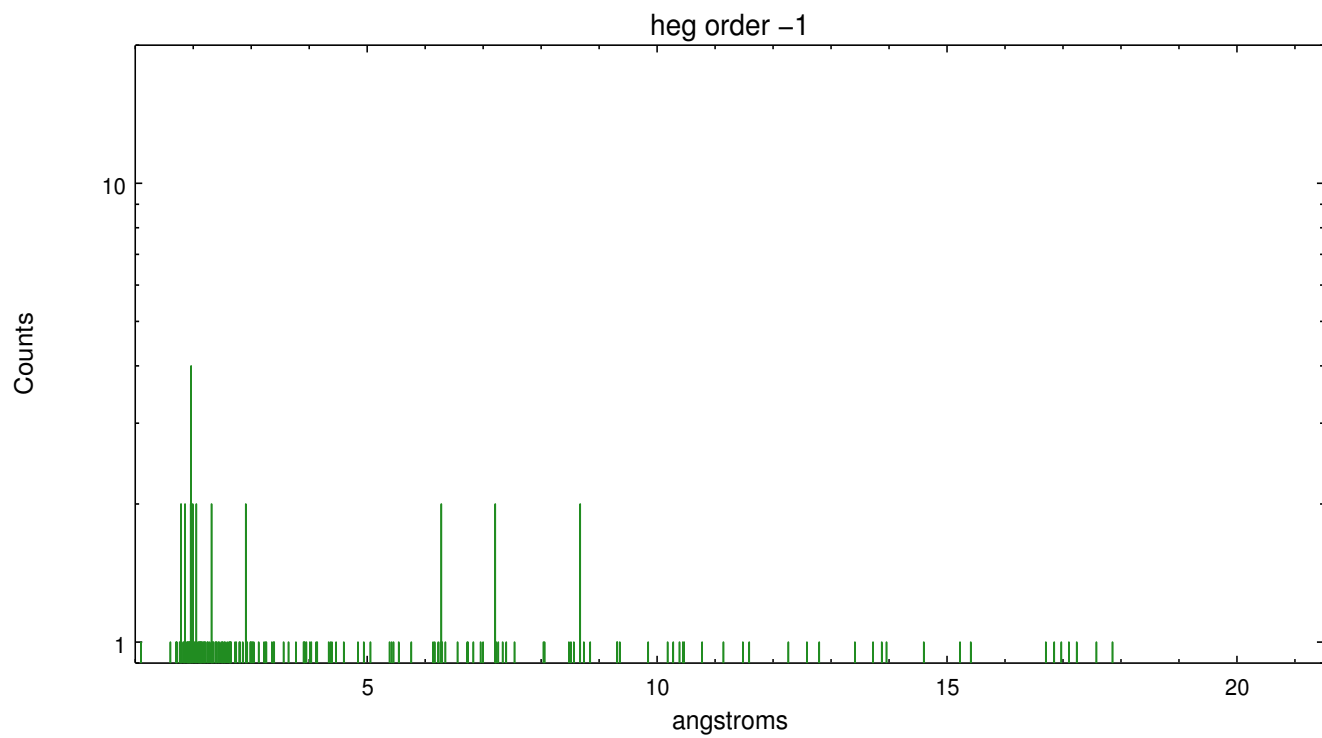
Spot Image HEG



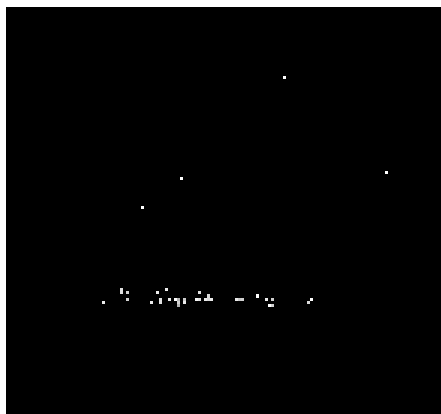
Full Detector HEG

	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	158	193	347	1476	289	119	126

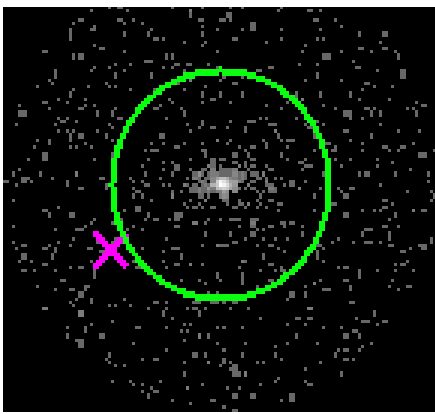




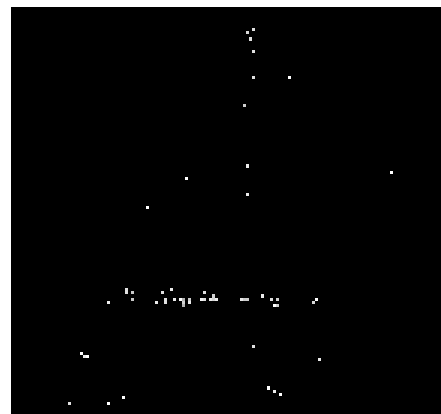
### 3.2 MEG Arm



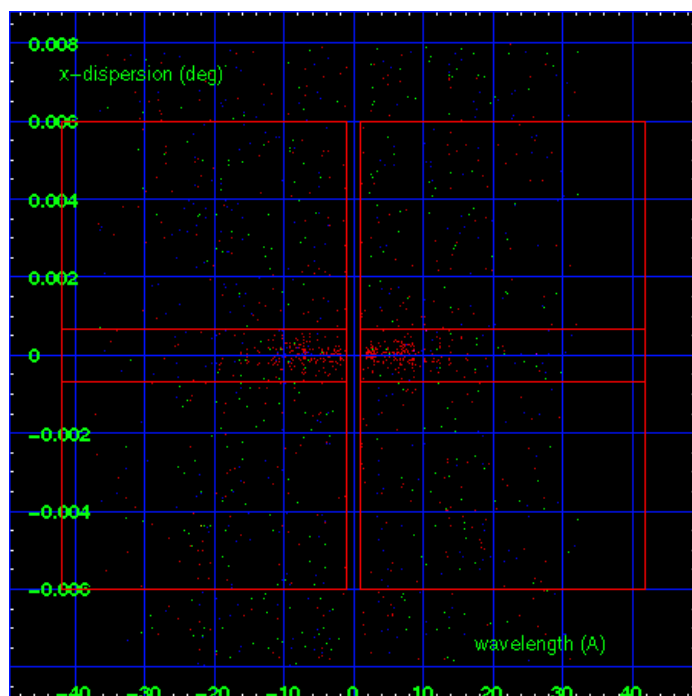
MEG Order Sort 123



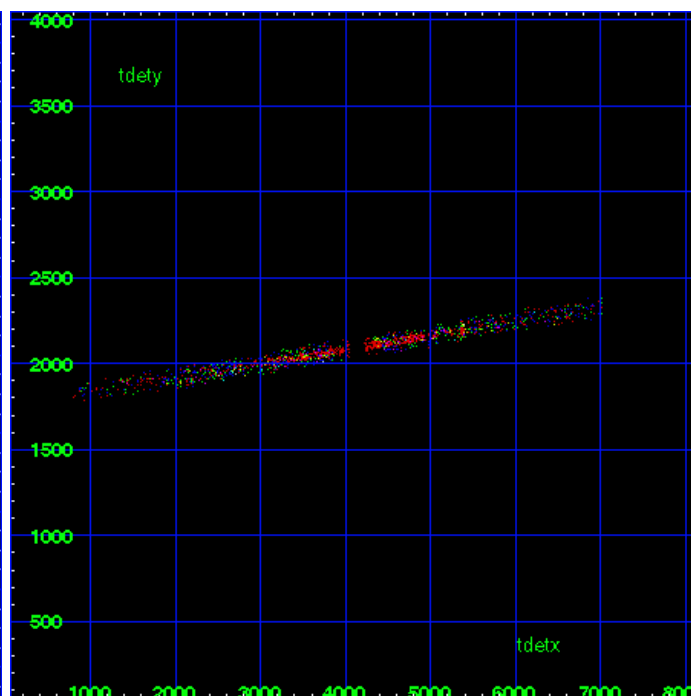
MEG Zero Order



MEG Order Sort ALL

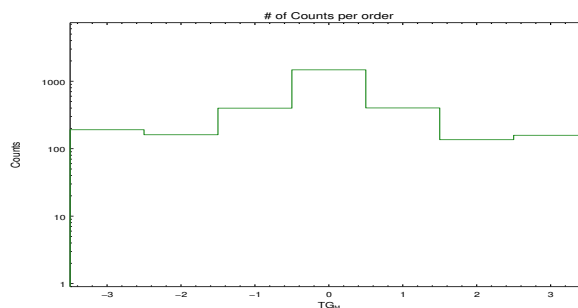


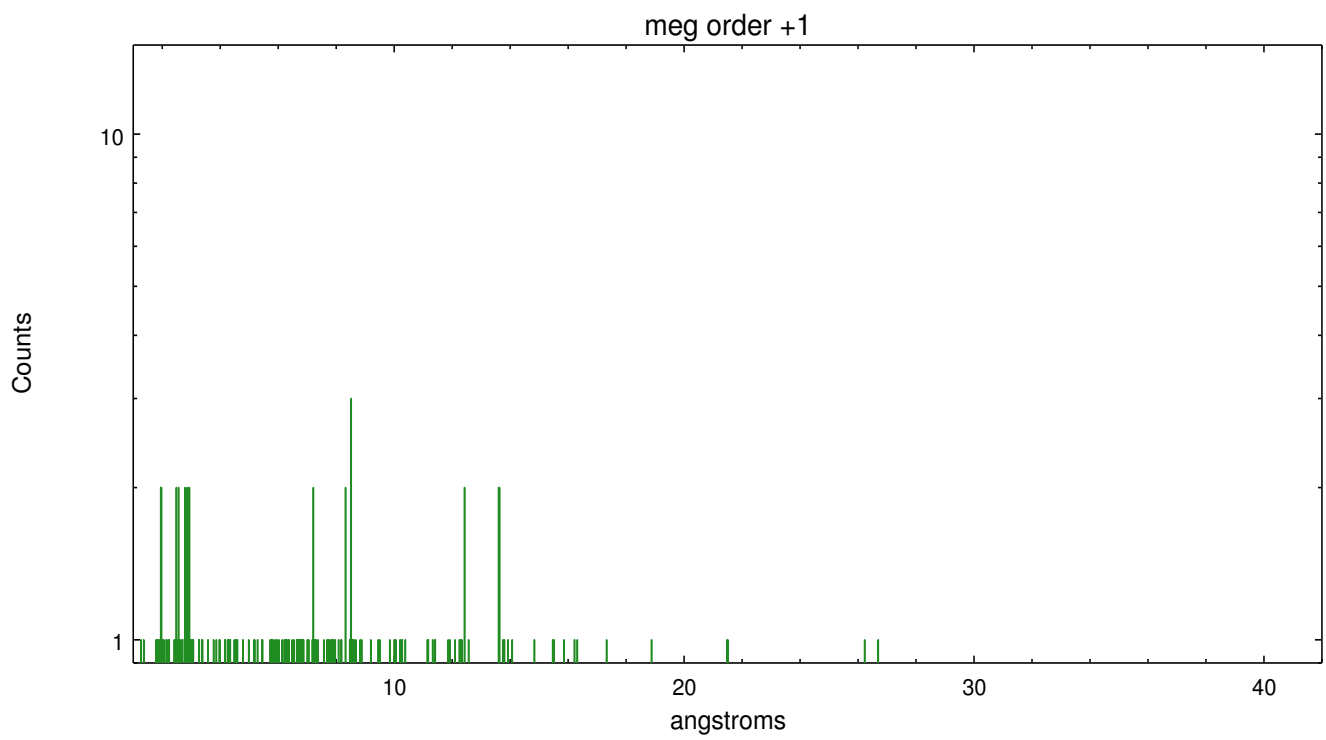
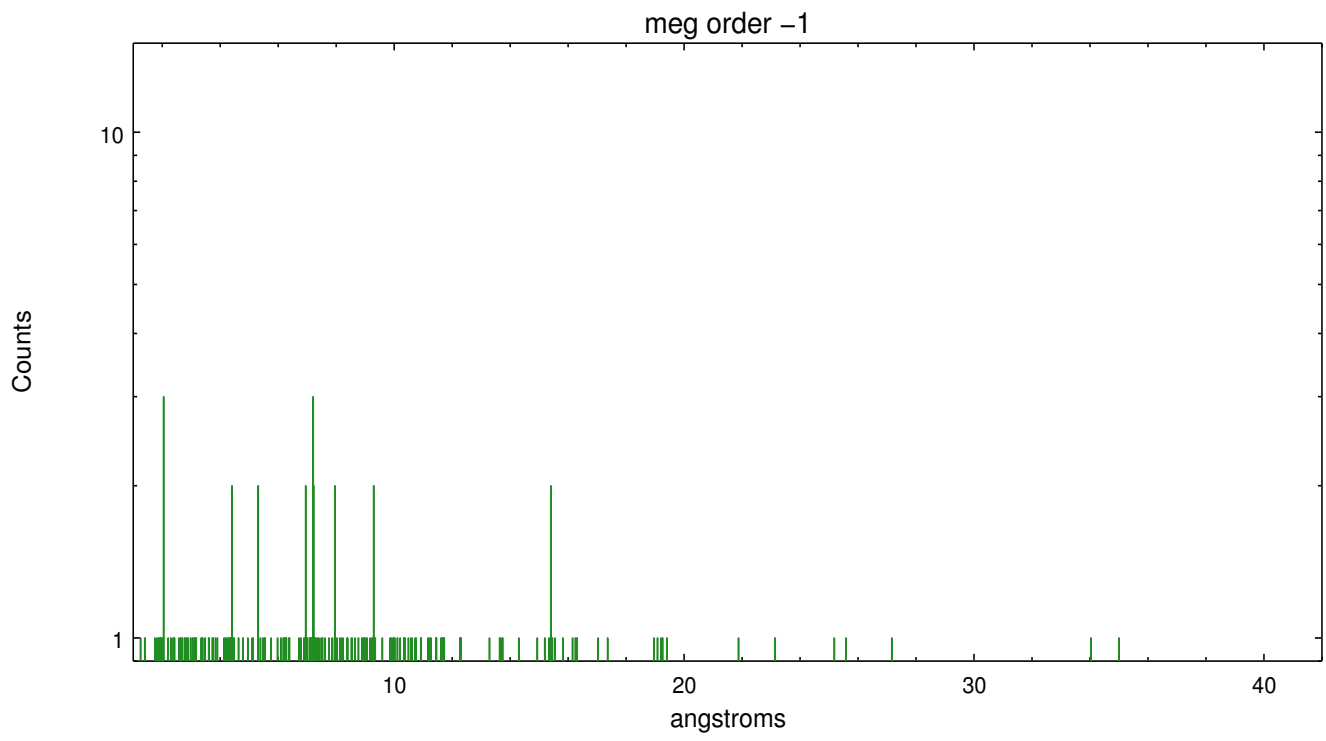
Spot Image MEG



Full Detector MEG

	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	191	161	399	1476	402	136	158





# A Summary

## A.1 Status

V&V Scientist	Joy Nichols
V&V Date (YYYY-MM-DD)	2012.02.10
V&V Edition	1
V&V Disposition and Status	OK
V&V Charge Time	21.786460362852

## A.2 Comments

Roll constraint met.

=== The guide star in slot 3 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.

=== WARNING: there are no standard ciao tools for analysis of grating spectra from extended sources. The shape of an emission 'line' will be the shape of the zero order spatial structure convolved with the instrumental LSF. Grating extractions can be used, but need to be combined with custom spatial-spectral analysis, since wavelength is multi-valued at any particular diffraction angle. ===== The data for this observation have been processed using the 'EDSER' sub-pixel event-repositioning algorithm of Li et al. (2004, ApJ, 610, 1204). Small-scale features should become sharper for sources near the aim point. The improvement will be less noticeable for off-axis sources where the size of the point-spread function is comparable to or larger than the size of an ACIS pixel. To take full advantage of the improvement, images should be binned on spatial scales smaller than the size of an ACIS pixel. Note that, at present, the point-spread function has not been calibrated for data to which the EDSER algorithm has been applied. If dither was disabled for the observation, then the algorithm can introduce artificial aliasing effects on spatial scales smaller than a pixel. If you would prefer to use no sub-pixel adjustment or to apply a coordinate randomization, then use `acis_process_events` to reprocess the data with the parameter `pix_adj=NONE` or `RANDOMIZE`, respectively.