

# V&V Reference Report

## L2 ASCDS Version : 8.4.3

Observation 12875 - L2 Version 3  
Chandra X-Ray Center

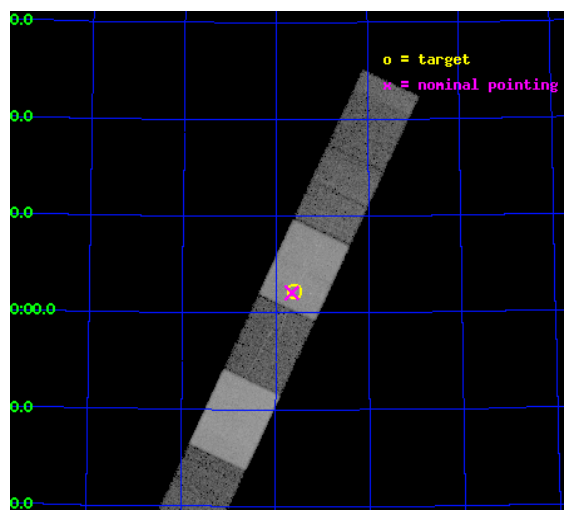
L2 Processing Date : Feb 8 2012

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# 1 Front

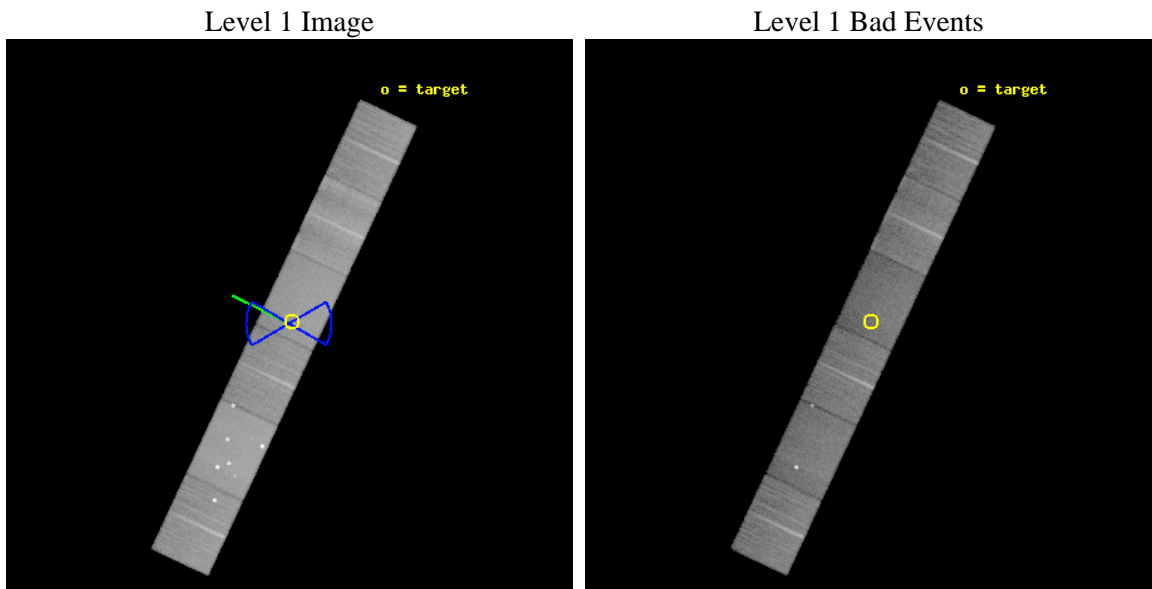
seq_num	702507	Sequence number
obs_id	12875	Observation id
title	THE FIRST SPATIALLY RESOLVED SPECTRUM OF AN AGN OUTFLOW IN AN EARLY-TYPE GALAXY: A DEEP HETG OBSERVATION OF MRK 3	Proposal title
observer	Dr Daniel Evans	Principal investigator
object	Markarian 3	Source name
dtcycle	0	&#160
cycle	P	events 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	93.913783420159	Nominal RA [deg]
dec_nom	71.034833624703	Nominal Dec [deg]
roll_nom	295.14478164292	Nominal Roll [deg]
revision	3	Processing version of data
ontime	30352.425409019	Sum of GTIs [s]
livetime	29862.207412141	Livetime [s]
ontime4	30352.466449022	Sum of GTIs [s]
ontime5	30352.384369016	Sum of GTIs [s]
ontime6	30352.343329012	Sum of GTIs [s]
ontime7	30352.425409019	Sum of GTIs [s]
ontime8	30352.302278876	Sum of GTIs [s]
ontime9	30352.261249006	Sum of GTIs [s]
l2events	255518	Number of level 2 events



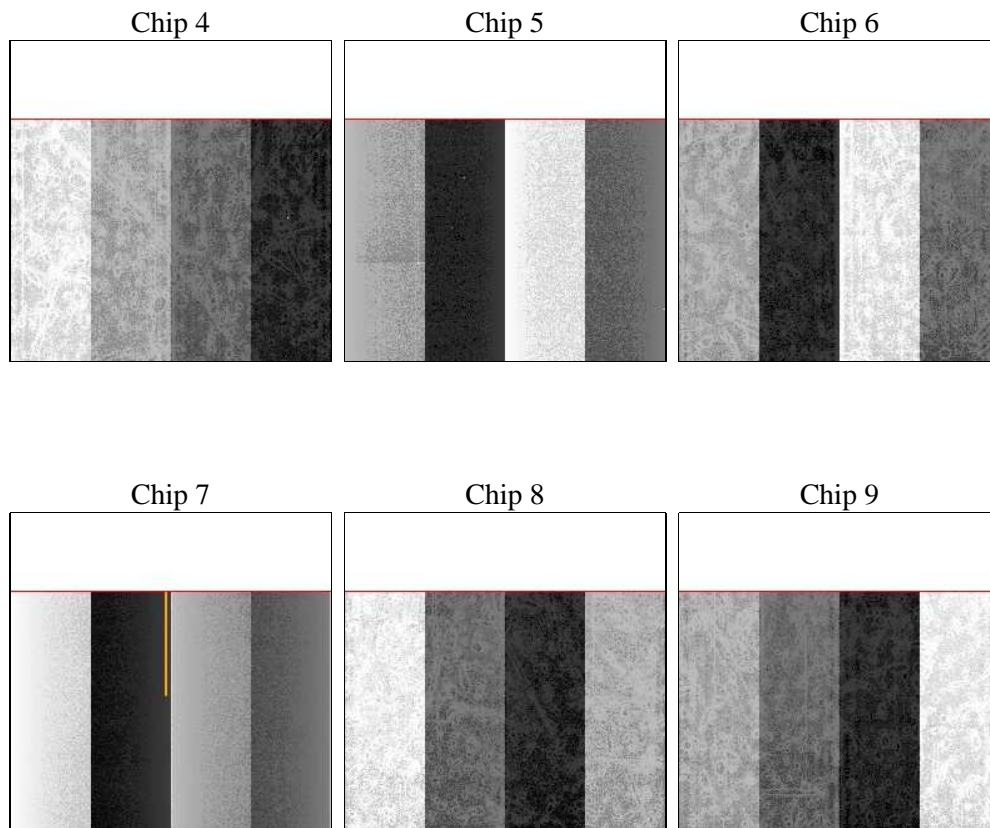
## 2 OBI

### 2.1 OBI

#### 2.1.1 Images



#### 2.1.2 Bias



### 2.1.3 Parameters

obi_num	0	Obi number	sched_exp_time	30595.000000	[s] Scheduled observation exposure time
ascdsver	8.4.3	Processing system revision	ontime	30352.425409019	Sum of GTIs [s]
caldsver	4.4.7	&#160	ontime4	30352.466449022	Sum of GTIs [s]
date	2012-02-08T23:47:28	Date and time of file creation	ontime5	30352.384369016	Sum of GTIs [s]
revision	3	Processing version of data	ontime6	30352.343329012	Sum of GTIs [s]
			ontime7	30352.425409019	Sum of GTIs [s]
			ontime8	30352.302278876	Sum of GTIs [s]
			ontime9	30352.261249006	Sum of GTIs [s]
			l1events	1127412	Number of level 1 events

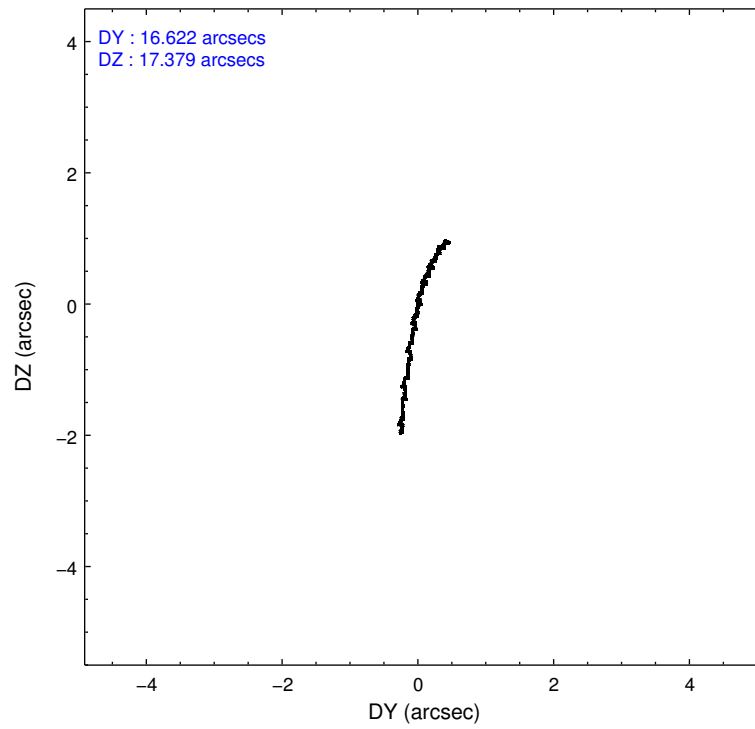
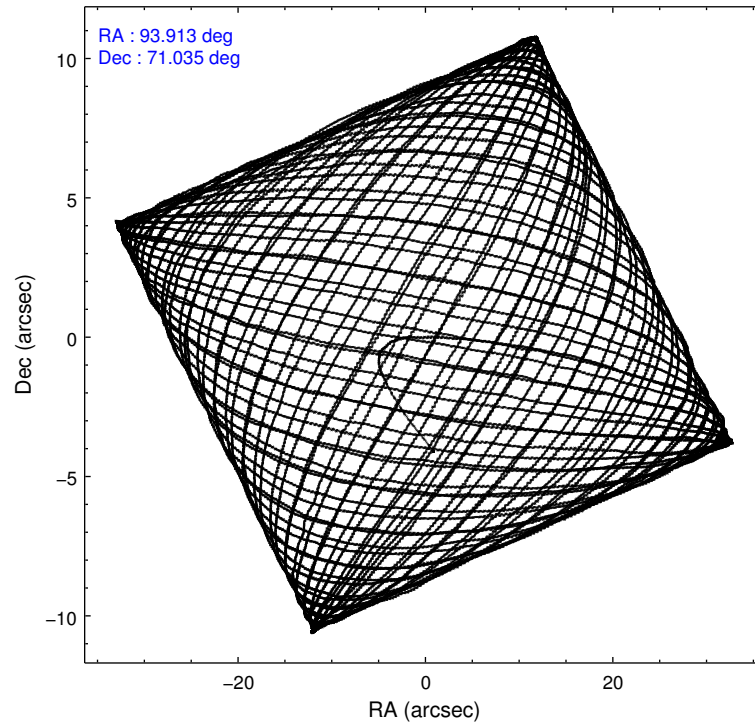
### 2.1.4 Events

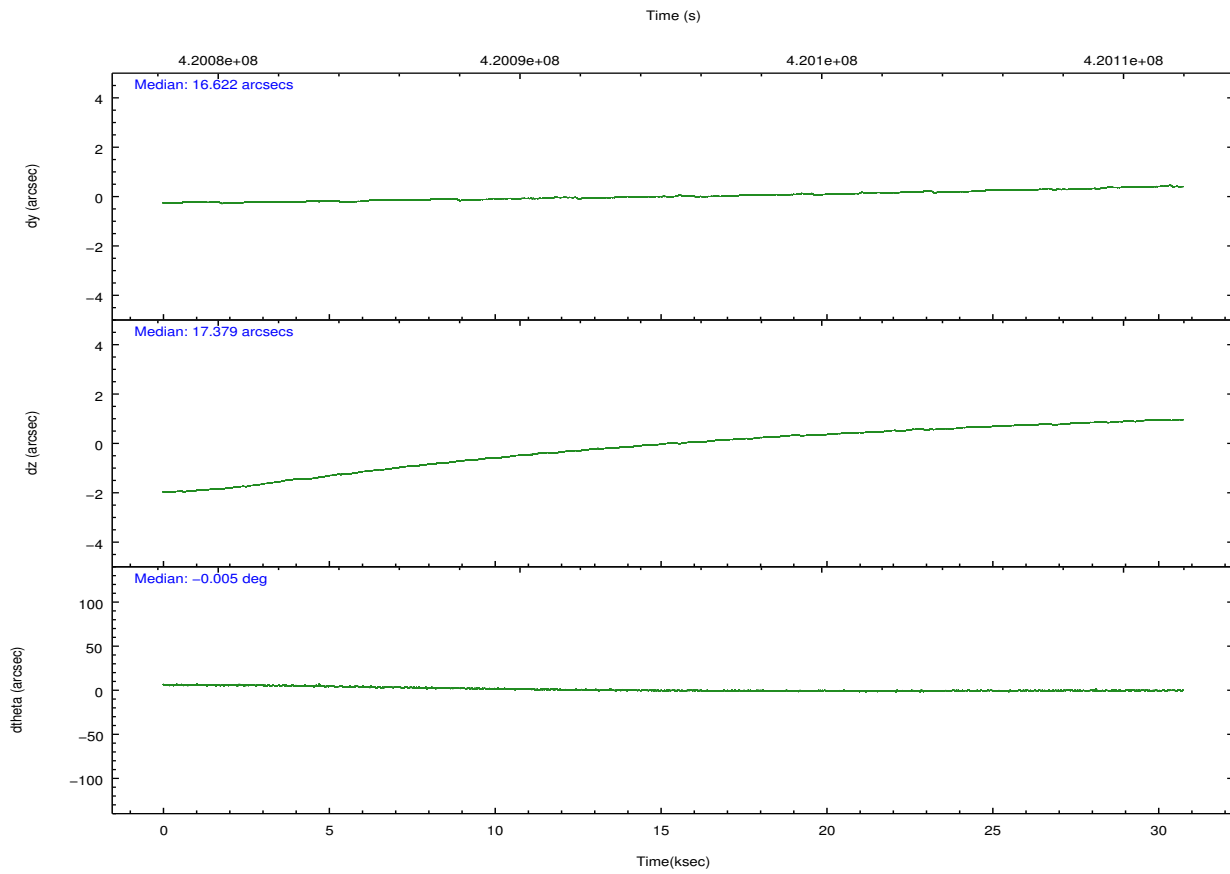
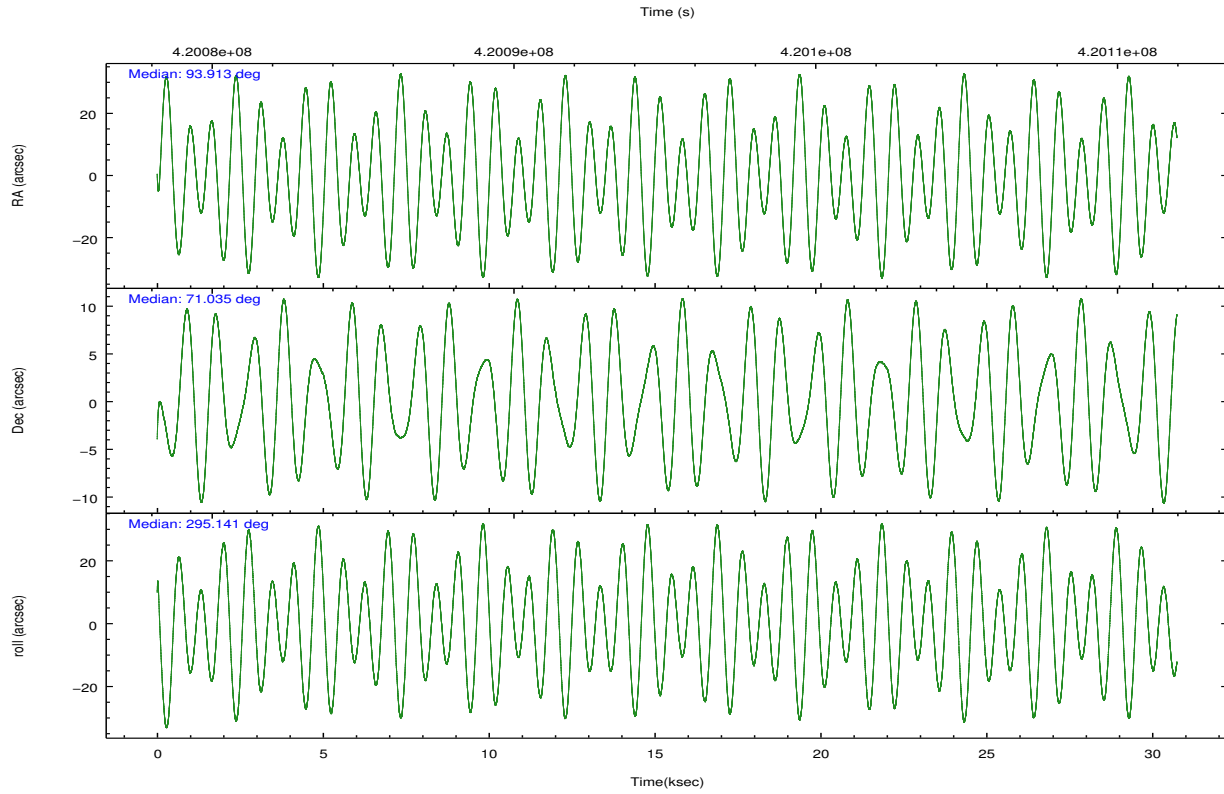
	ccd 4	ccd 5	ccd 6	ccd 7	ccd 8	ccd 9		ccd 4	ccd 5	ccd 6	ccd 7	ccd 8	ccd 9
level 1 events	175710	262033	153021	188335	199100	149213	grade 0 events	15006	31348	6085	8005	15532	6461
rejected events	148963	122716	135264	101701	146450	130923		8%	11%	3%	4%	7%	4%
rejected %	84%	46%	88%	54%	73%	87%	grade 1 events	155	567	68	223	134	65
								0%	0%	0%	0%	0%	0%
							grade 2 events	4623	35648	3941	17898	12091	3978
								2%	13%	2%	9%	6%	2%
							grade 3 events	1954	5337	1968	7849	5652	2022
								1%	2%	1%	4%	2%	1%
							grade 4 events	1953	4714	1924	7941	5259	1893
								1%	1%	1%	4%	2%	1%
							grade 5 events	6760	18762	6655	19407	9995	7632
								3%	7%	4%	10%	5%	5%
							grade 6 events	3213	62280	3841	44946	14118	3938
								1%	23%	2%	23%	7%	2%
							grade 7 events	142046	103377	128539	82066	136319	123224
								80%	39%	84%	43%	68%	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	93.844009	93.91378342015916	Subarray requested	CUSTOM	CUSTOM
[deg] Pointing Dec	71.050162	71.03483362470341	Subarray start row	1	1
[deg] Pointing Roll	295.054146	295.1447816429205	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)	420079847.184000	420078773.80766			
Observation start date	2011-04-25T00:49:41	2011-04-25T00:32:53			
[s] Observation end time (MET)	420110442.184000	420111272.45935			
Observation end date	2011-04-25T09:19:36	2011-04-25T09:34:32			
Read mode	TIMED	TIMED			

## 2.3 Aspect



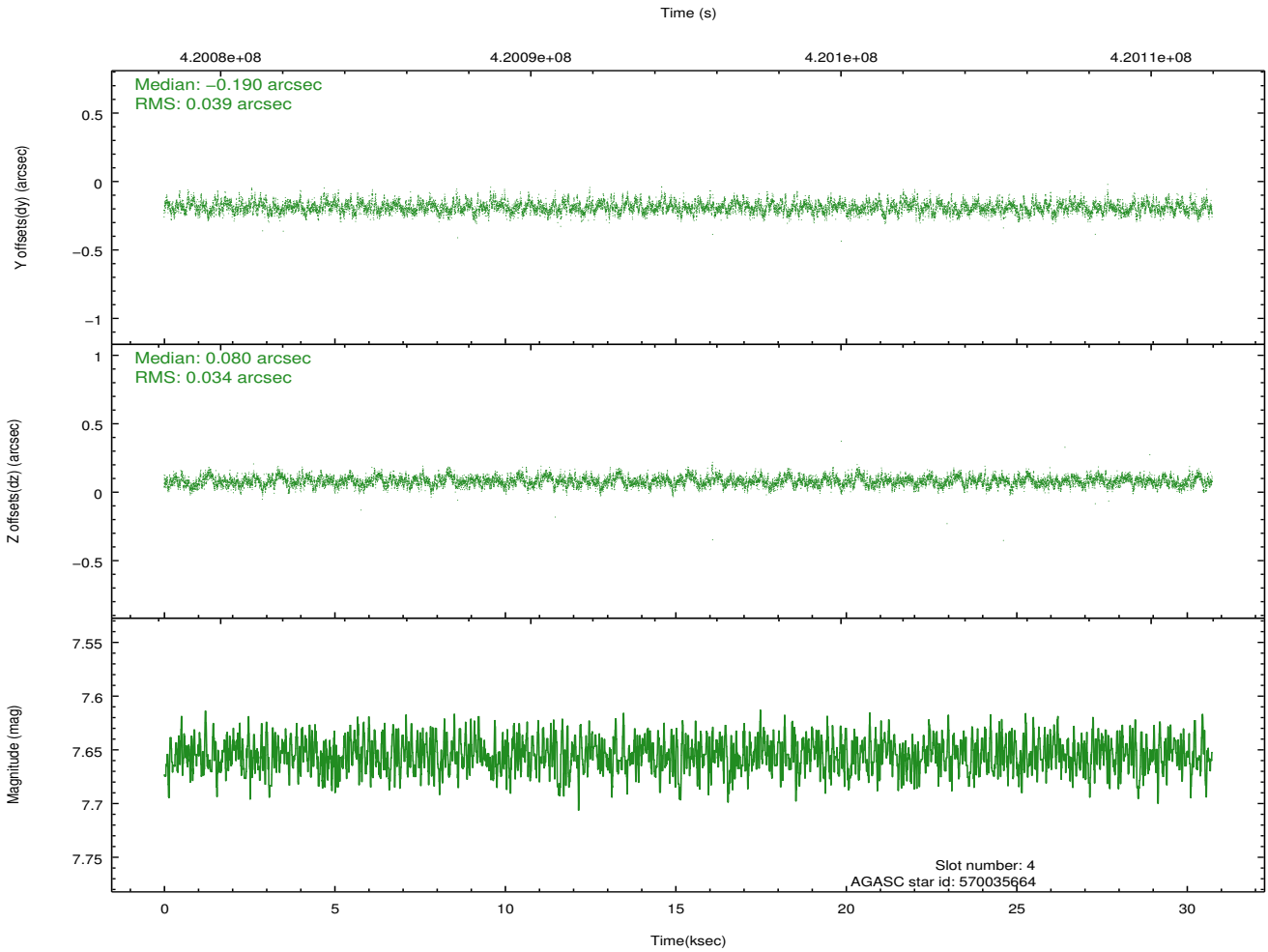
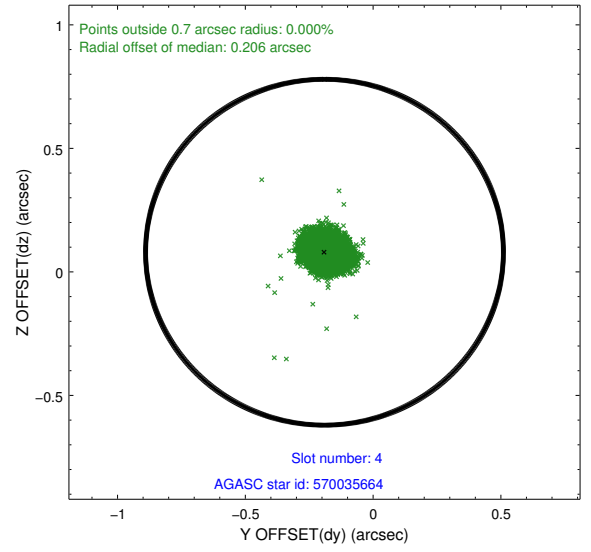
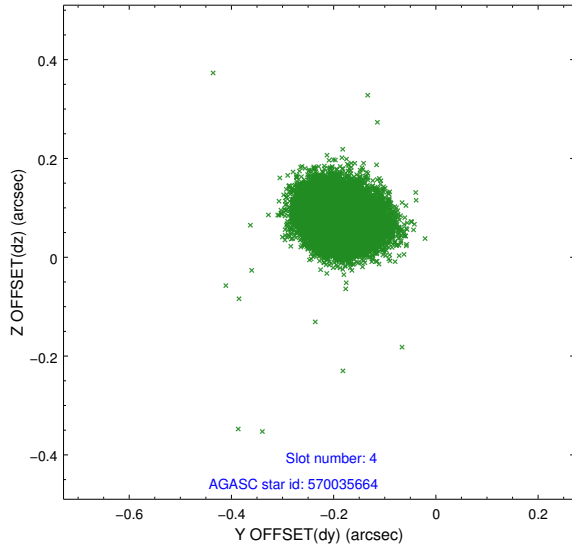


### Slot Statistics

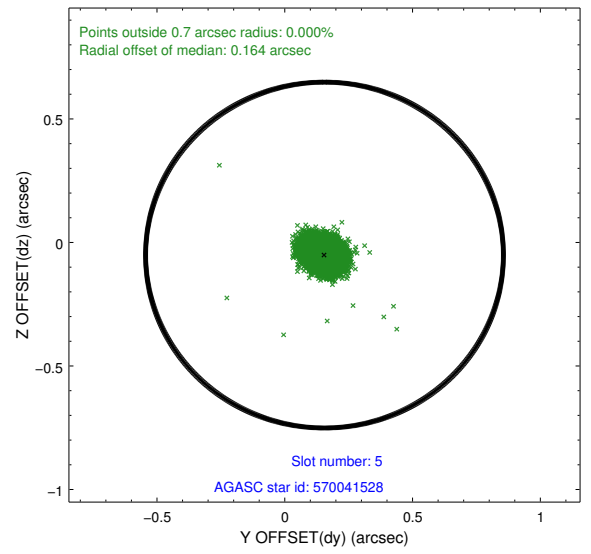
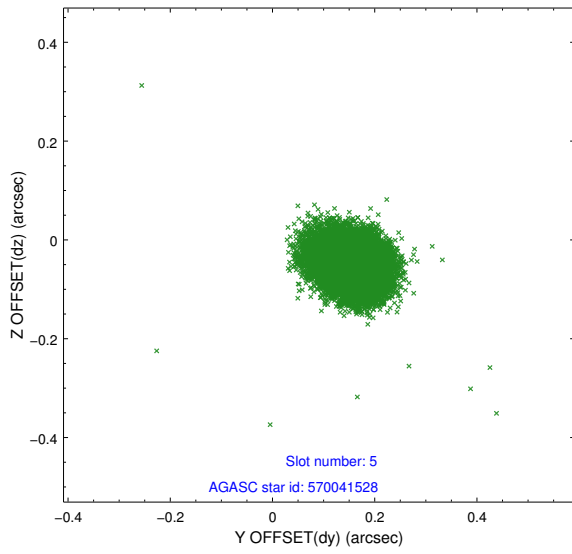
slot	status	id	mag	n_pts	med_dy	med_dz	dr1	dr2	ra	dec	mean_y	mean_z
0	FID	ACIS-S-2	6.98	7498	-0.118	-0.050	0.022	0.059	0.000000	0.000000	-769.54	-1800.77
1	FID	ACIS-S-4	7.07	7498	0.201	0.072	0.007	0.011	0.000000	0.000000	2143.99	107.81
2	FID	ACIS-S-5	7.10	7497	-0.116	-0.013	0.020	0.054	0.000000	0.000000	-1822.33	101.41
3	OMITTED		0.00	0	0.000	0.000	0.000	0.000	0.000000	0.000000	0.00	0.00
4	GUIDE	570035664	7.65	14995	-0.190	0.080	0.055	0.090	92.975426	71.130782	-697.96	-790.06
5	GUIDE	570041528	7.63	14993	0.155	-0.051	0.053	0.085	93.751561	70.667714	1201.06	-682.54
6	GUIDE	570565312	8.29	14995	-0.272	0.152	0.056	0.092	94.342210	71.606805	-1577.41	1362.25
7	GUIDE	570566608	9.25	14982	0.309	-0.183	0.089	0.146	93.871444	71.374624	-1044.28	523.36

## 2.4 Star Slots

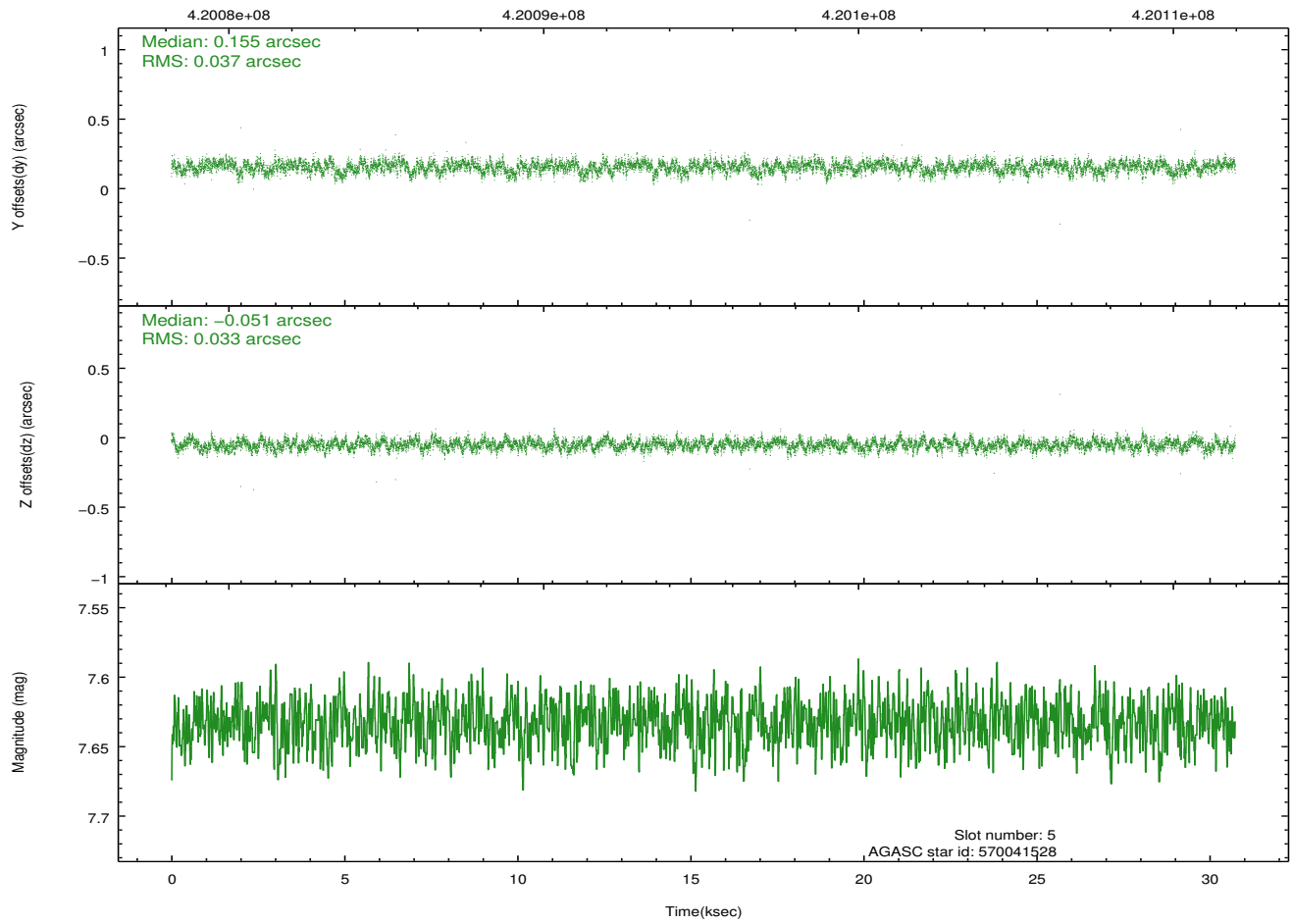
### 2.4.1 Slot 4



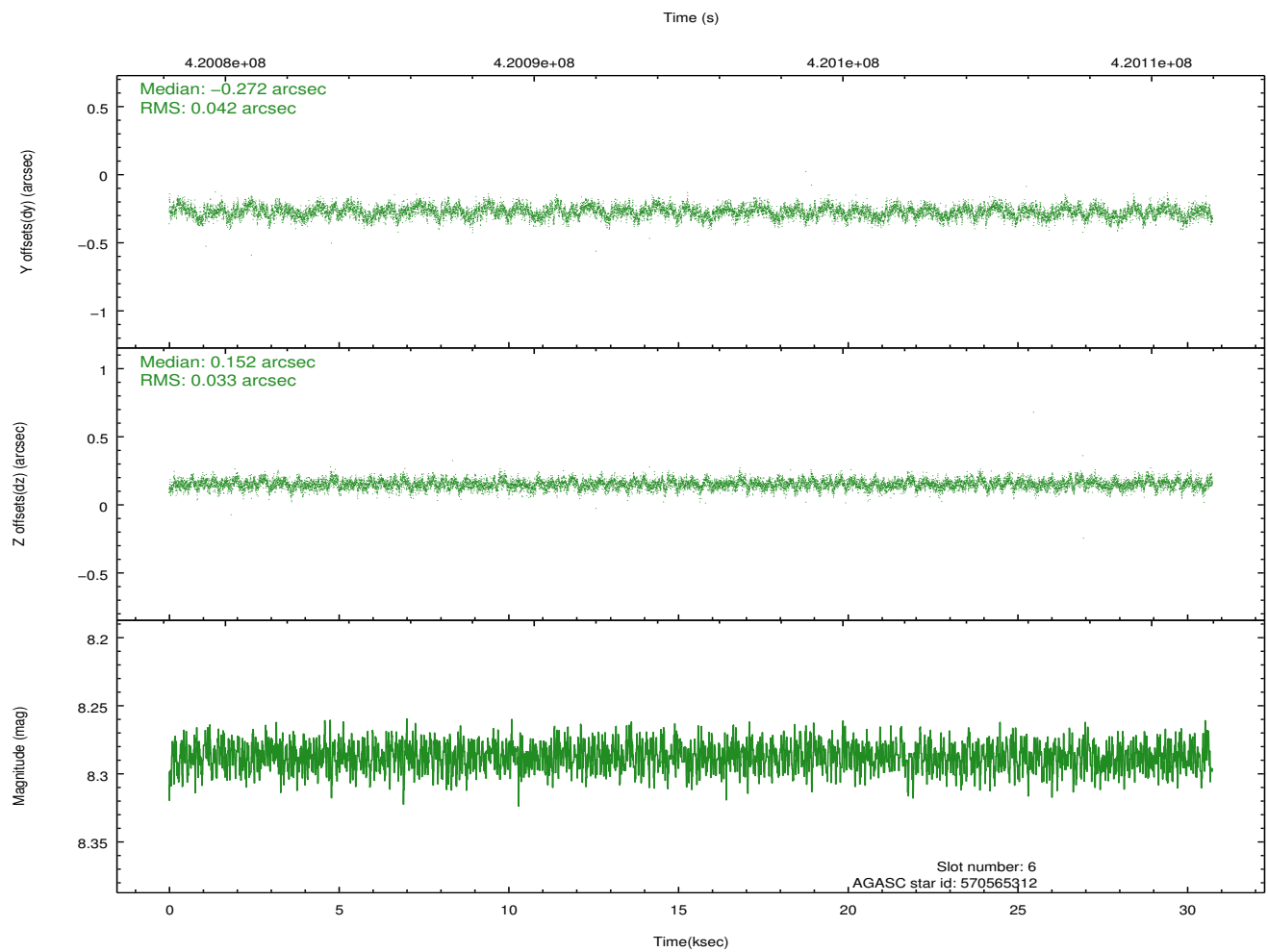
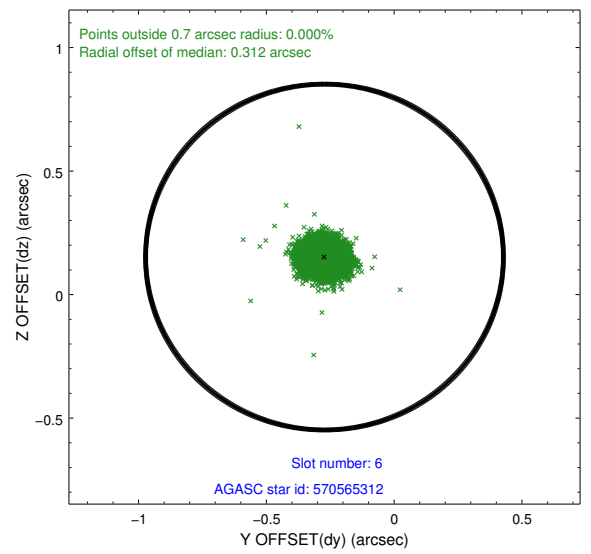
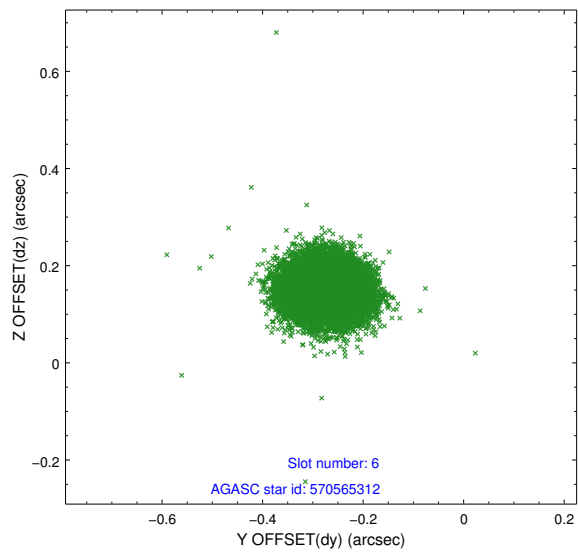
## 2.4.2 Slot 5



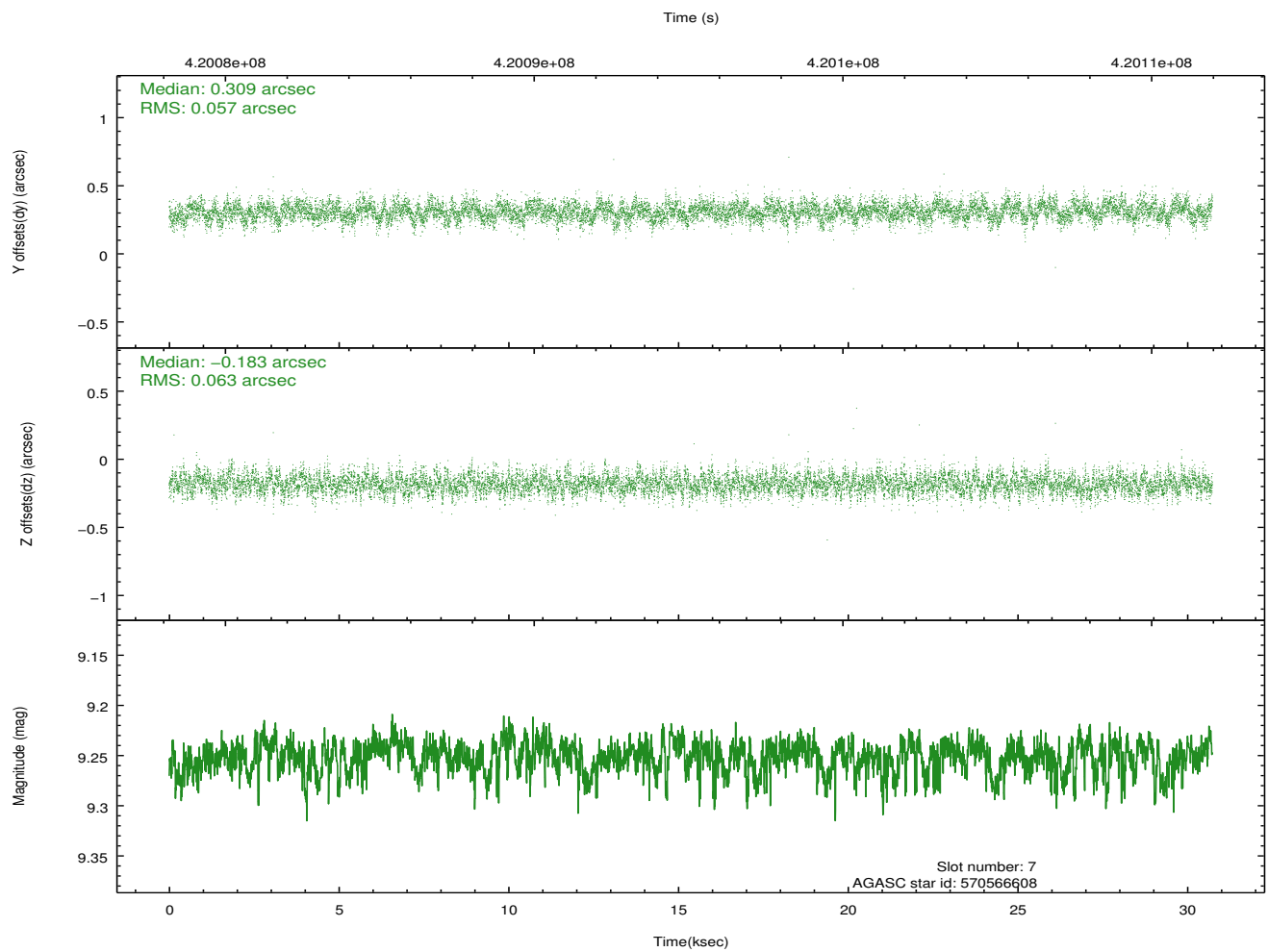
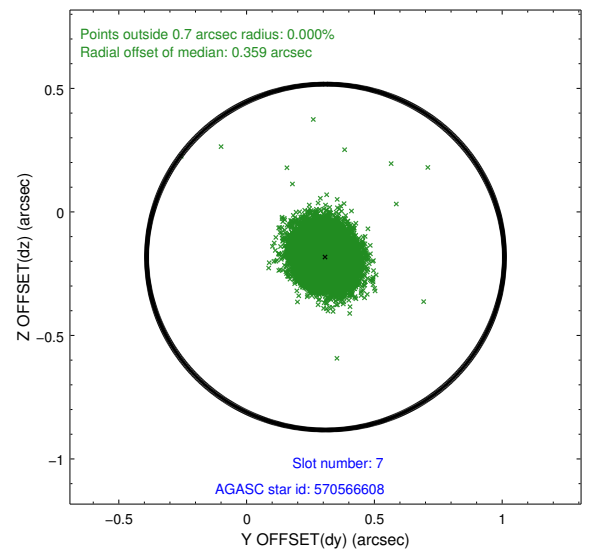
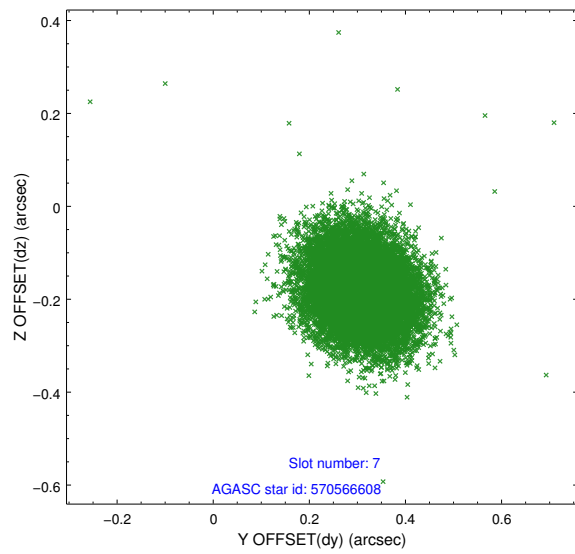
Time (s)



### 2.4.3 Slot 6

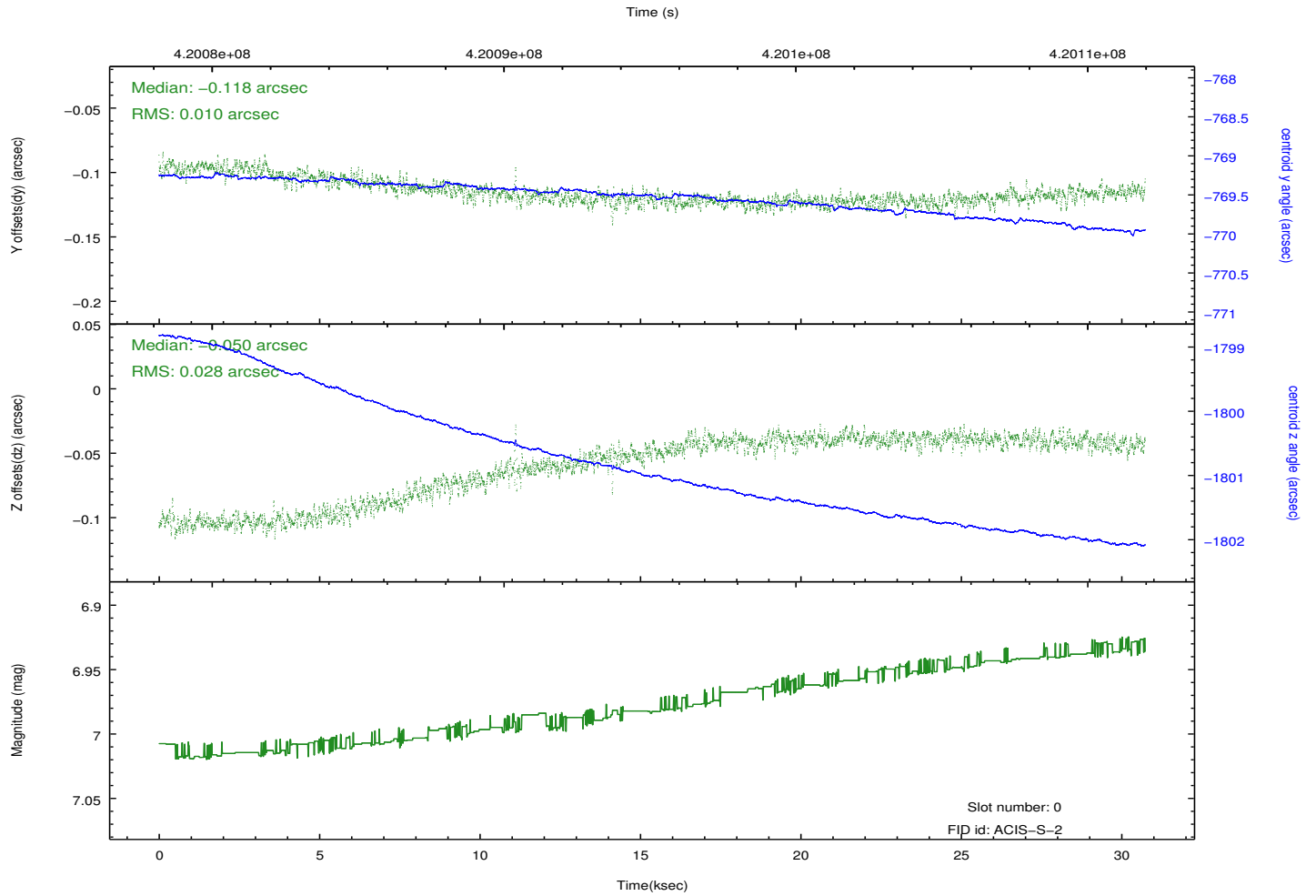
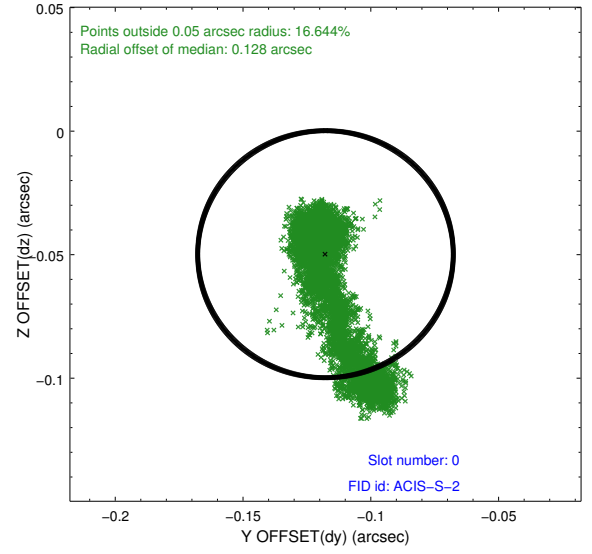
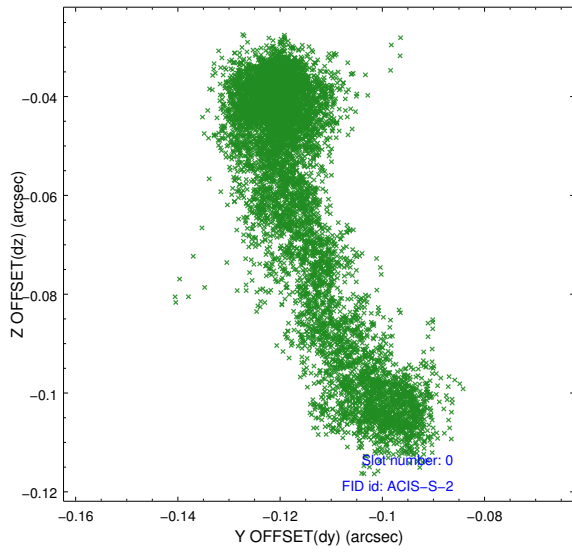


## 2.4.4 Slot 7

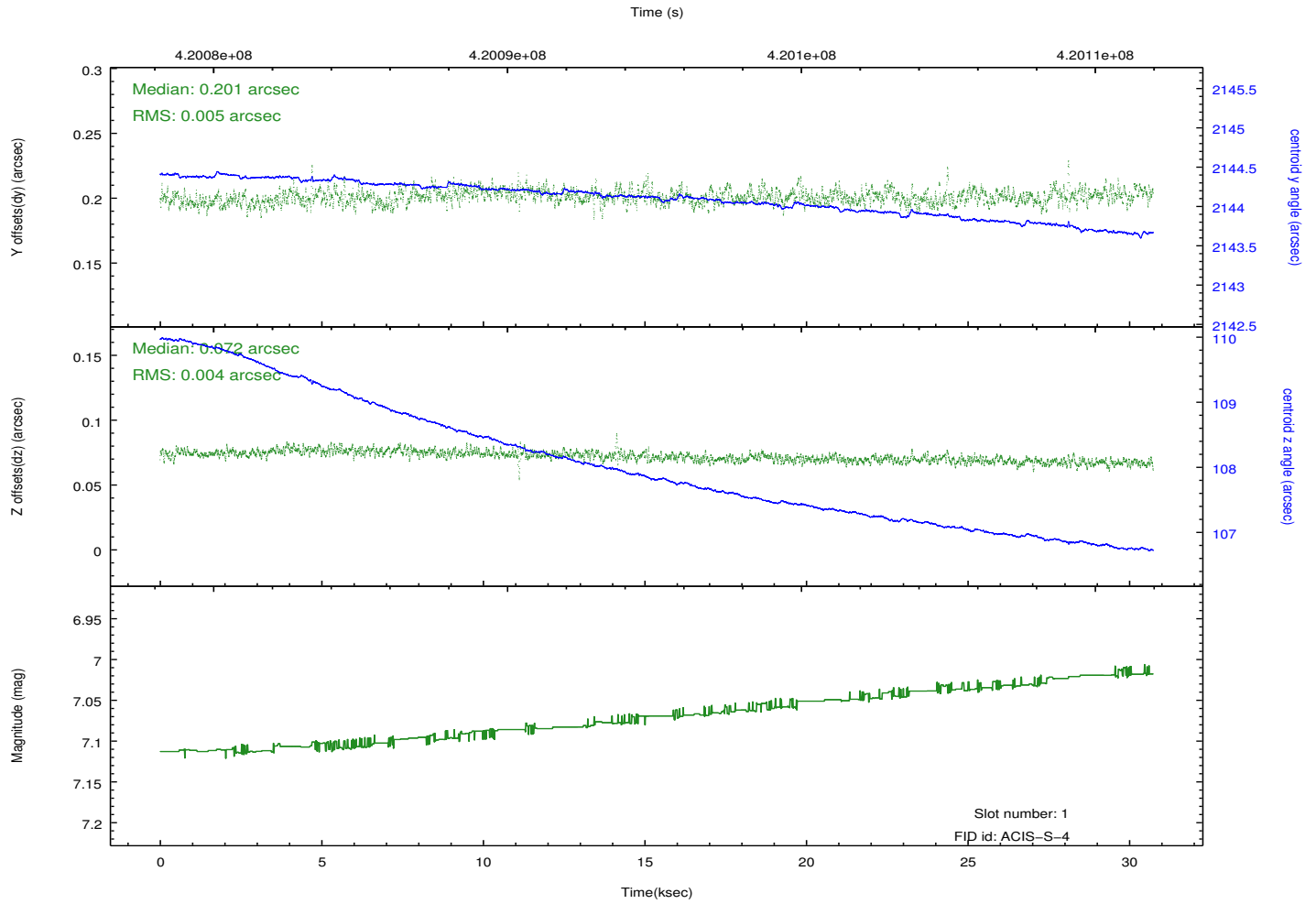
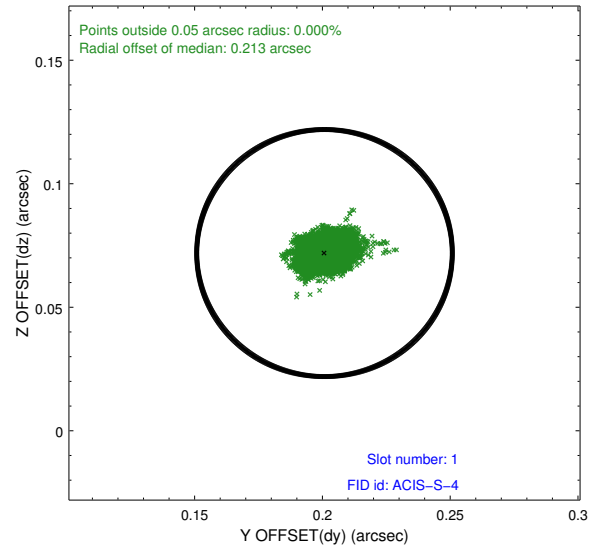
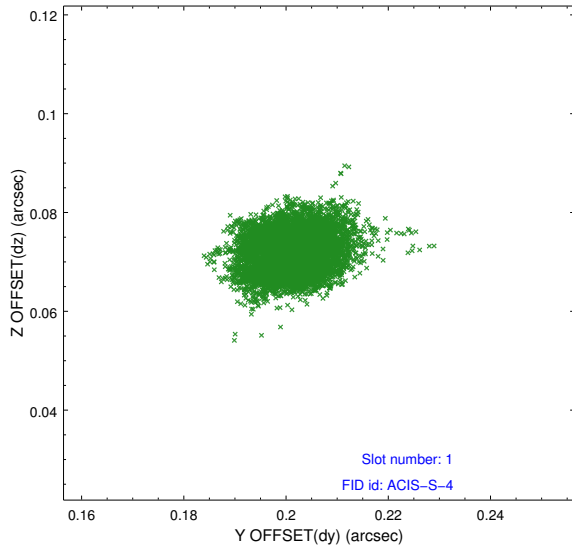


## 2.5 FID Slots

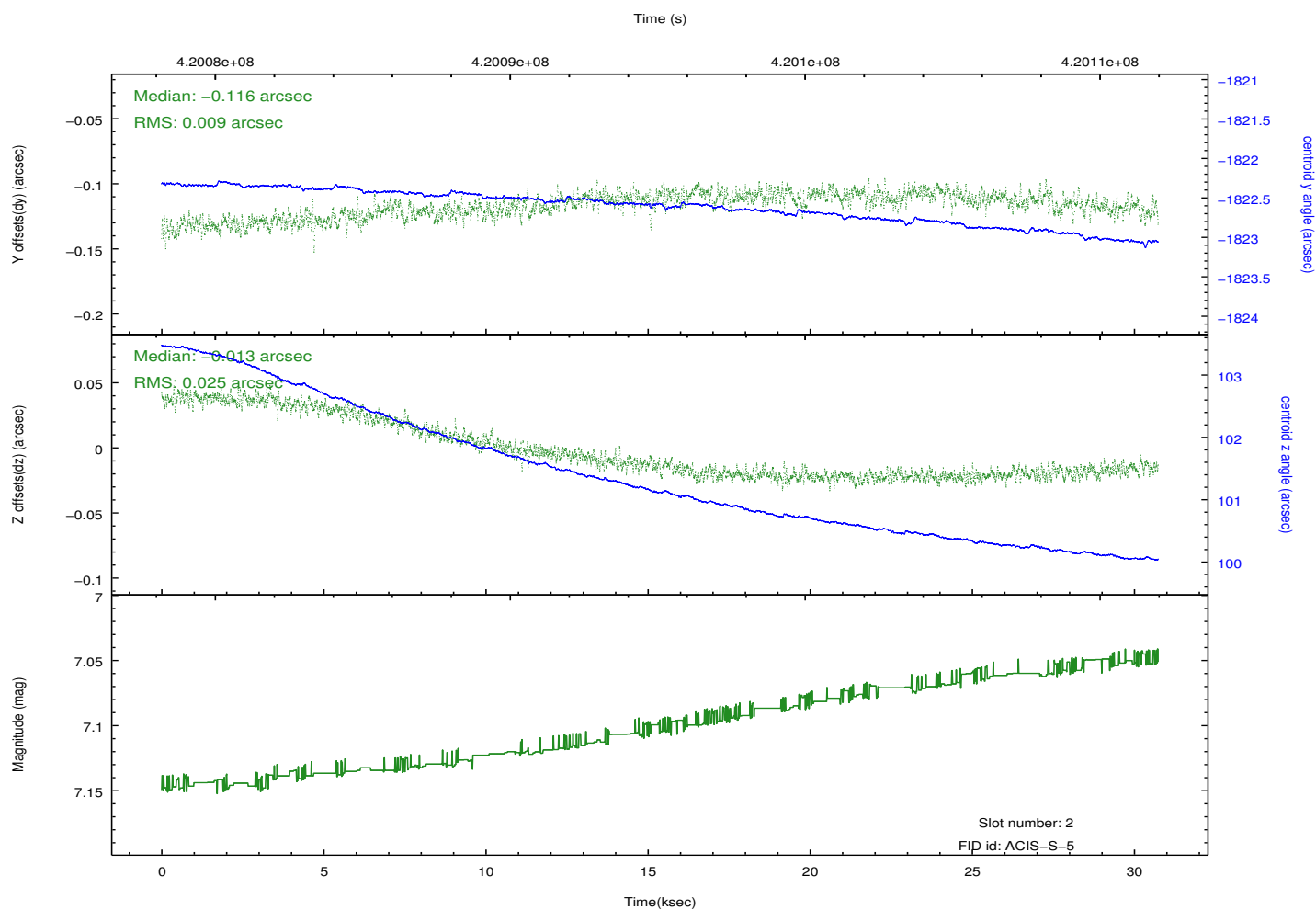
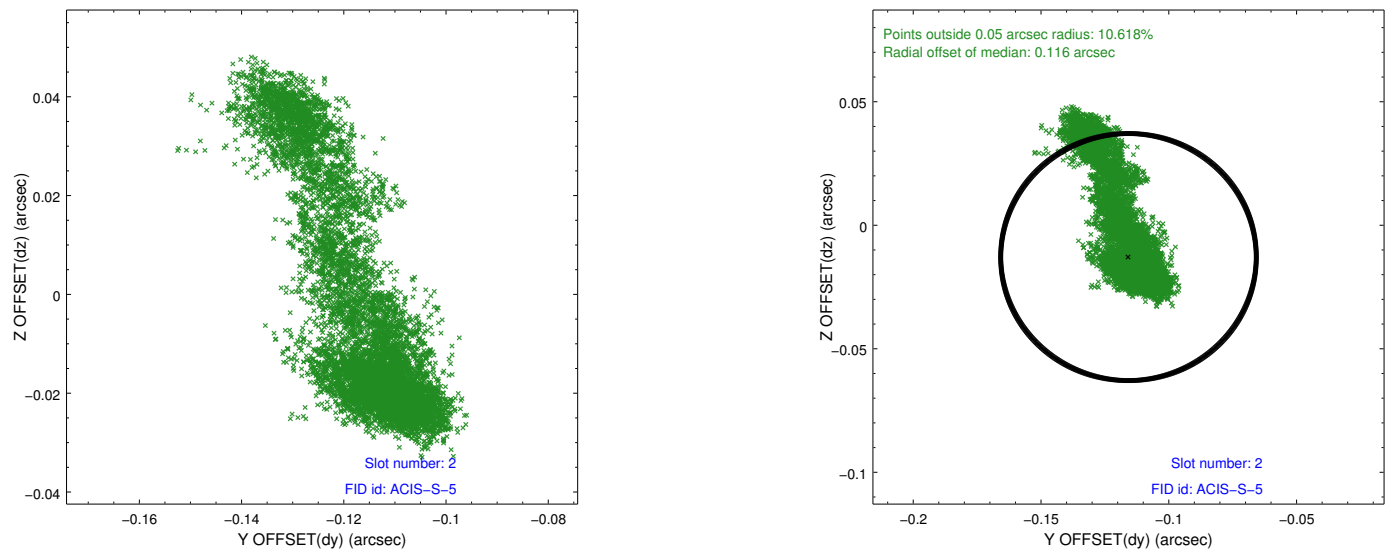
### 2.5.1 Slot 0



## 2.5.2 Slot 1



### 2.5.3 Slot 2

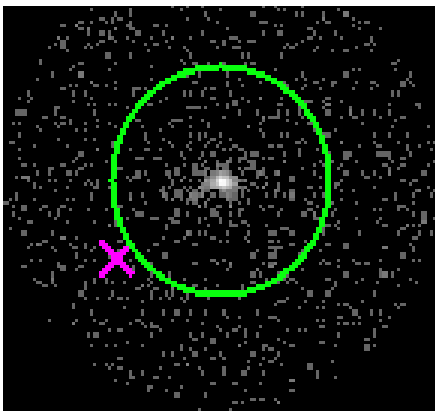


### 3 Gratings

#### 3.1 HEG Arm



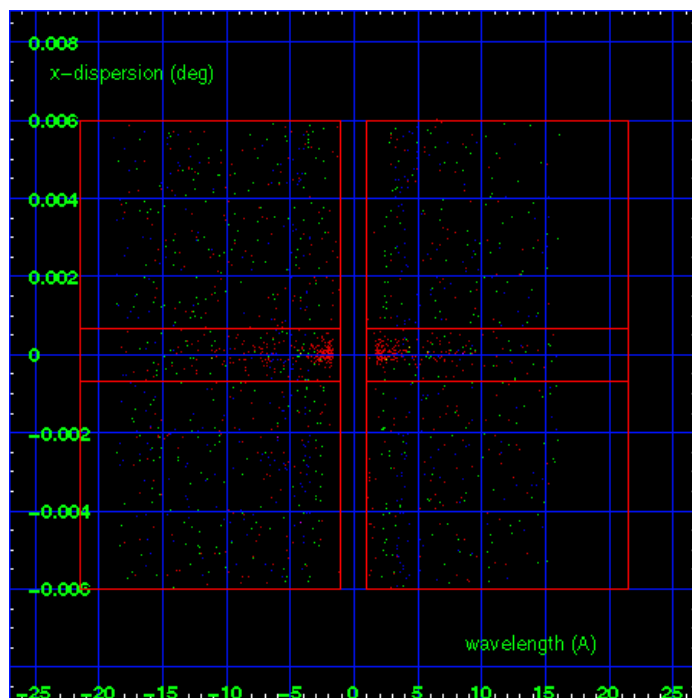
HEG Order Sort 123



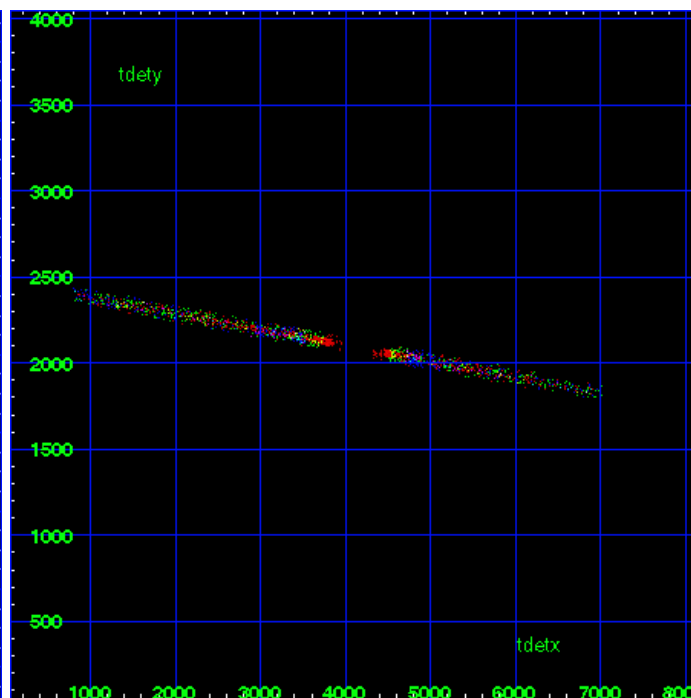
HEG Zero Order



HEG Order Sort ALL

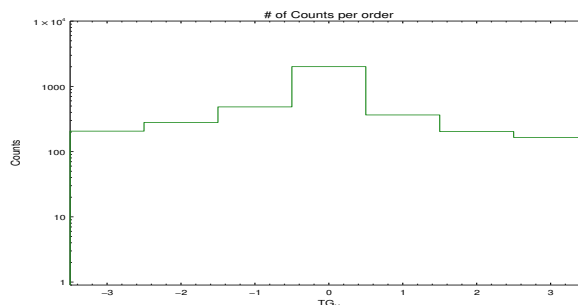


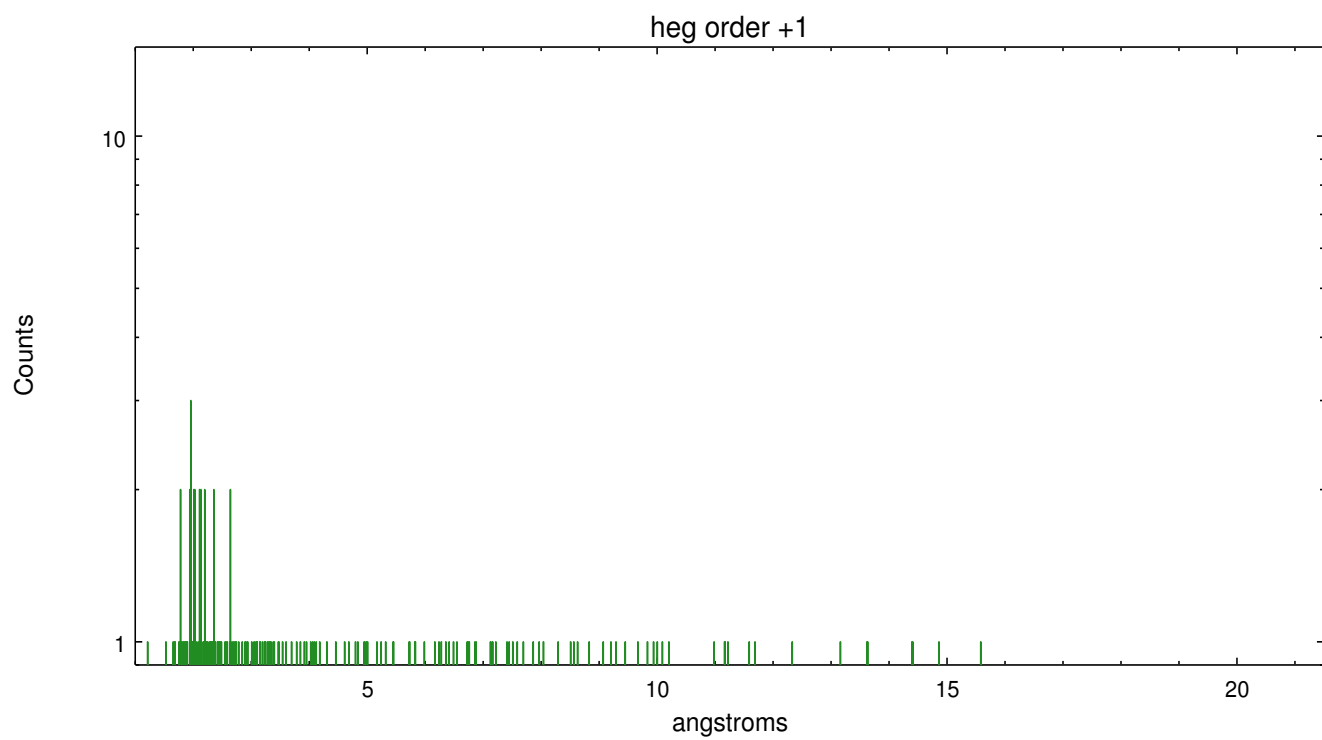
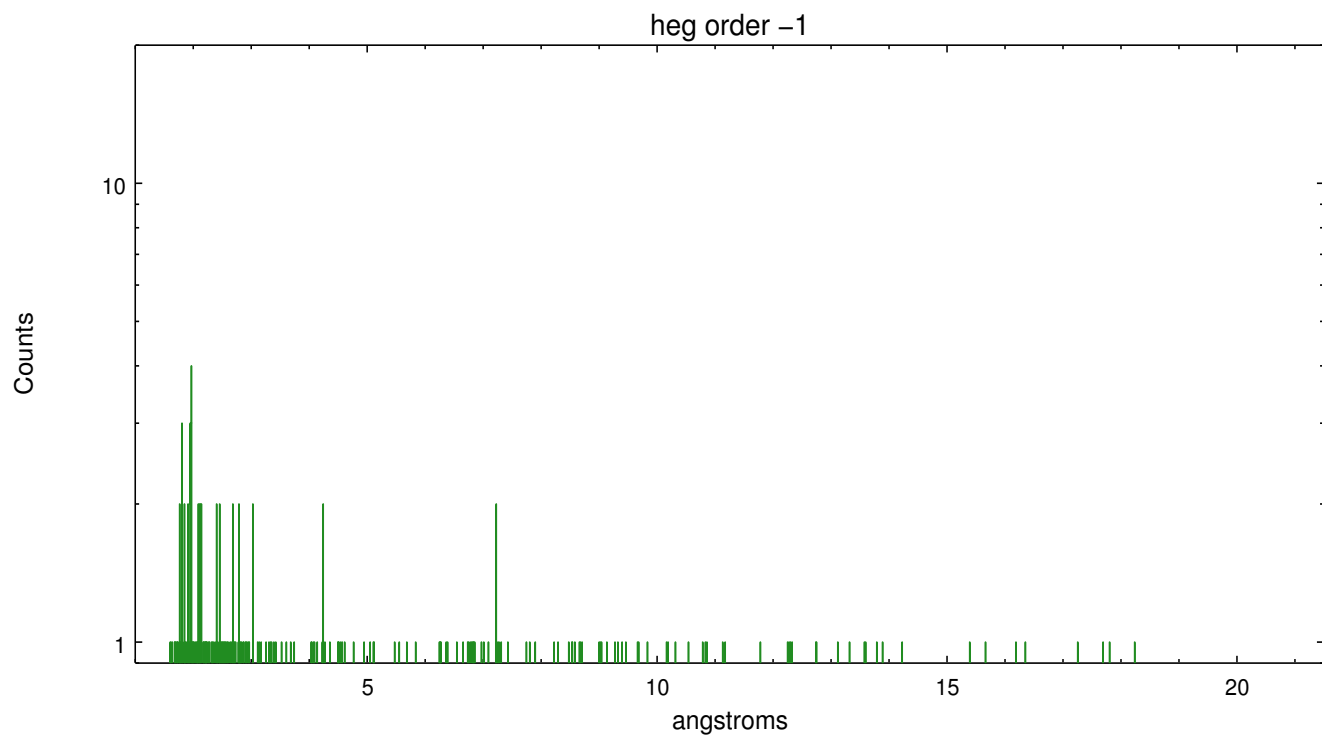
Spot Image HEG



Full Detector HEG

	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	206	280	485	2009	365	203	165

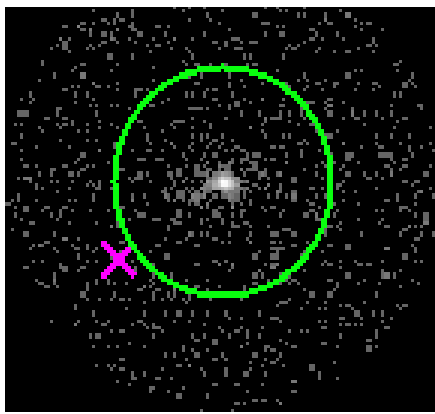




### 3.2 MEG Arm



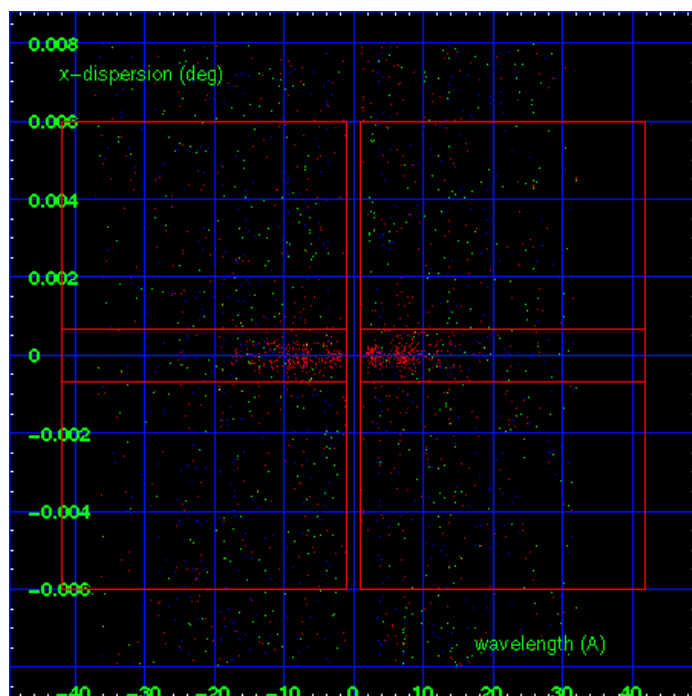
MEG Order Sort 123



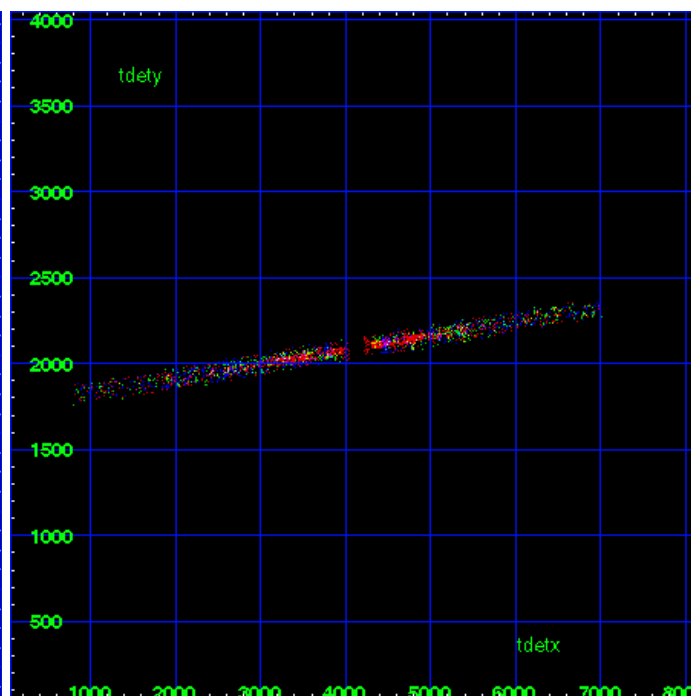
MEG Zero Order



MEG Order Sort ALL

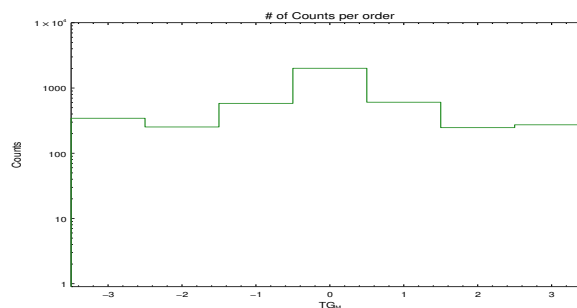


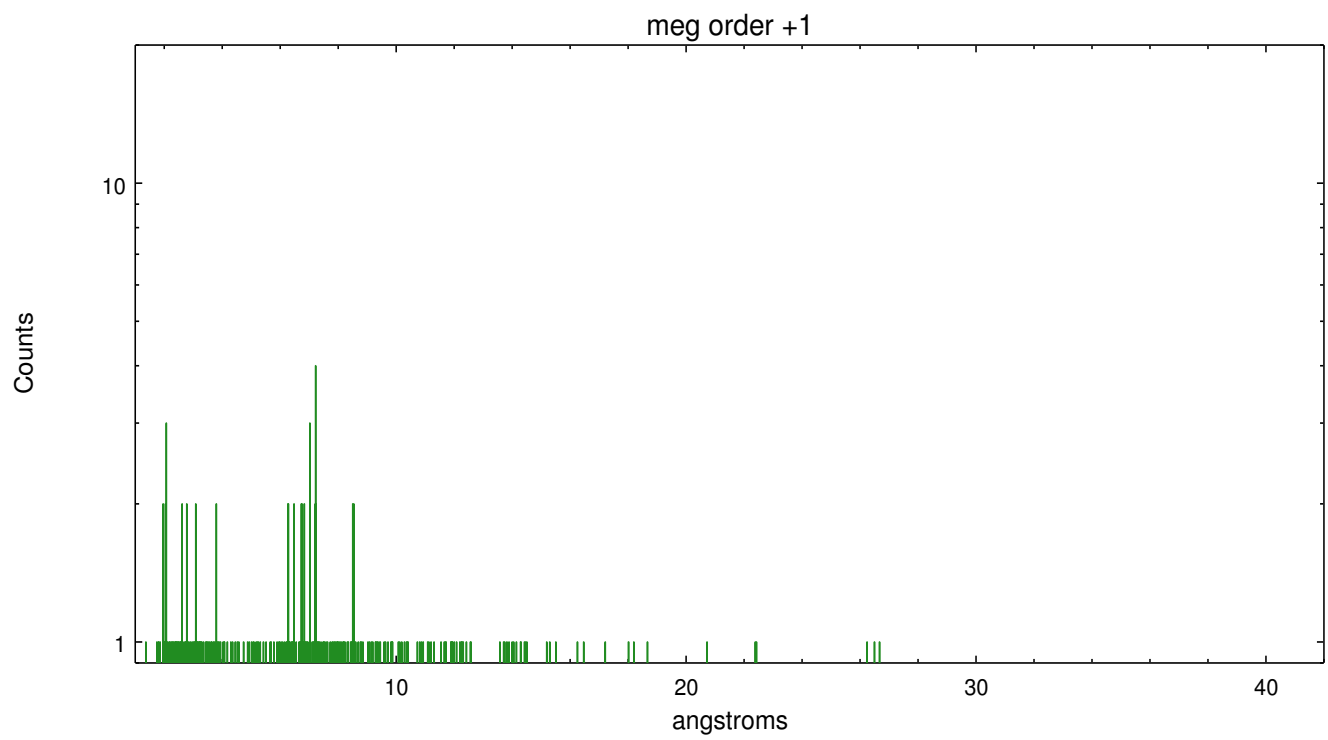
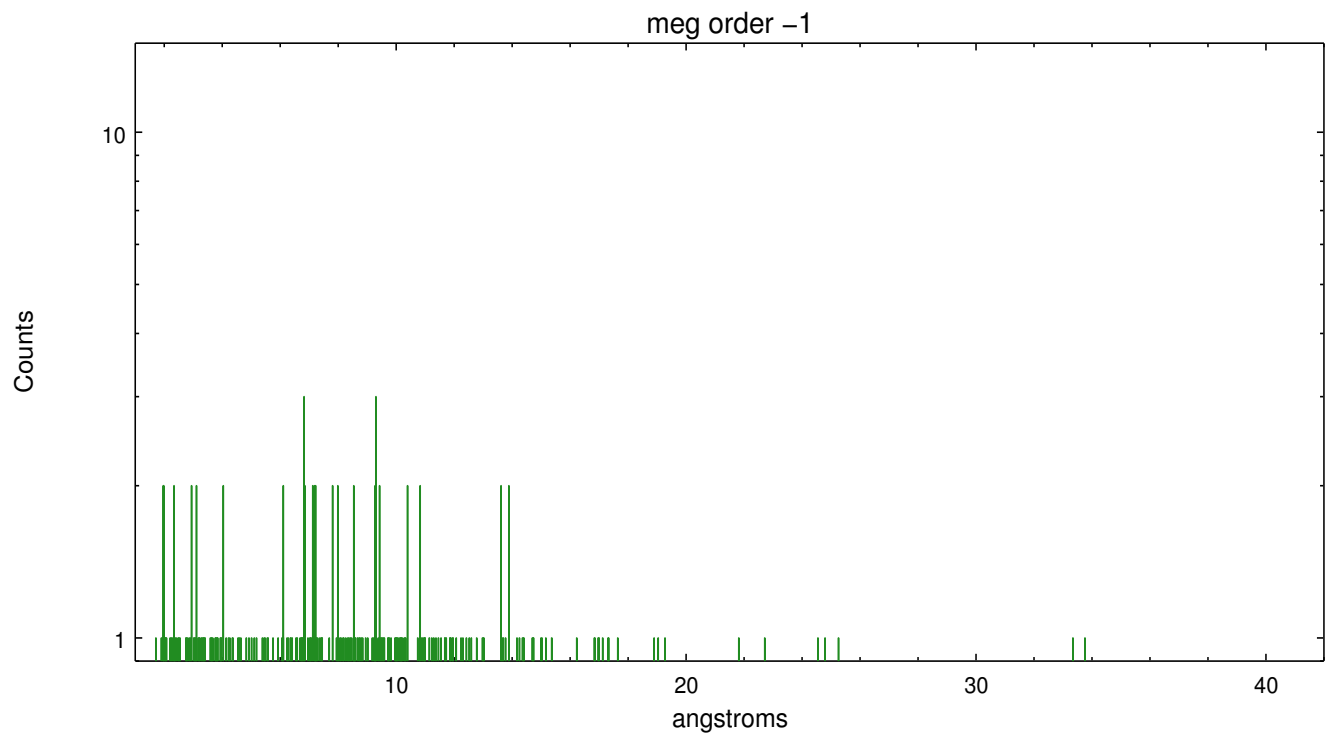
Spot Image MEG



Full Detector MEG

	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	344	253	582	2009	606	247	273





# A Summary

## A.1 Status

V&V Scientist	Joy Nichols
V&V Date (YYYY-MM-DD)	2012.02.09
V&V Edition	1
V&V Disposition and Status	OK
V&V Charge Time	30.35242541647

## 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.

===

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.

===

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.