

# V&V Reference Report

## L2 ASCDS Version : 10.7

Observation 21954 - L2 Version 1  
Chandra X-Ray Center

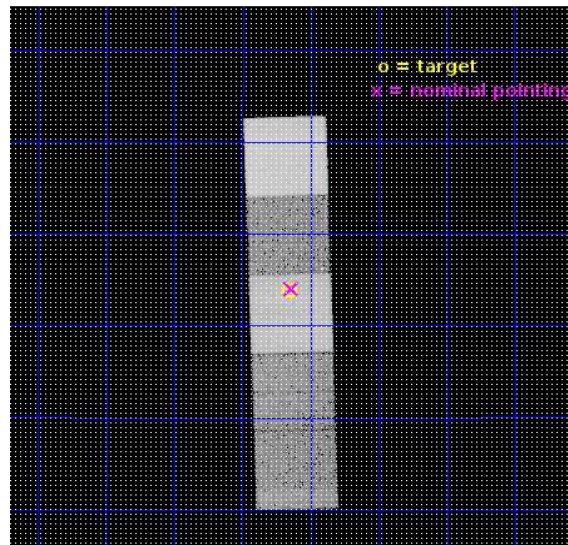
L2 Processing Date : Nov 13 2018

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# 1 Front

seq_num	201178	Sequence number
obs_id	21954	Observation id
title	An (X-ray Gratings) Tale of Two Young Stellar Objects	Proposal tit
observer	David Principe	Principal investigator
object	XZ Tau and HL Tau	Source name
dtcycle	0	&#160
cycle	P	events from which exps? Prim/Second/Both
ra_targ	67.91375	Observer's specified target RA [deg]
dec_targ	18.232028	Observer's specified target Dec [deg]
ra_nom	67.910008005395	Nominal RA [deg]
dec_nom	18.234345848152	Nominal Dec [deg]
roll_nom	88.157769584875	Nominal Roll [deg]
revision	1	Processing version of data
ontime	23023.700177193	Sum of GTIs [s]
livetime	22722.878584576	Livetime [s]
ontime5	23023.700177193	Sum of GTIs [s]
ontime6	23014.277046561	Sum of GTIs [s]
ontime7	23023.700177193	Sum of GTIs [s]
ontime8	23023.700177193	Sum of GTIs [s]
ontime9	23023.700177193	Sum of GTIs [s]
l2events	270074	Number of level 2 events

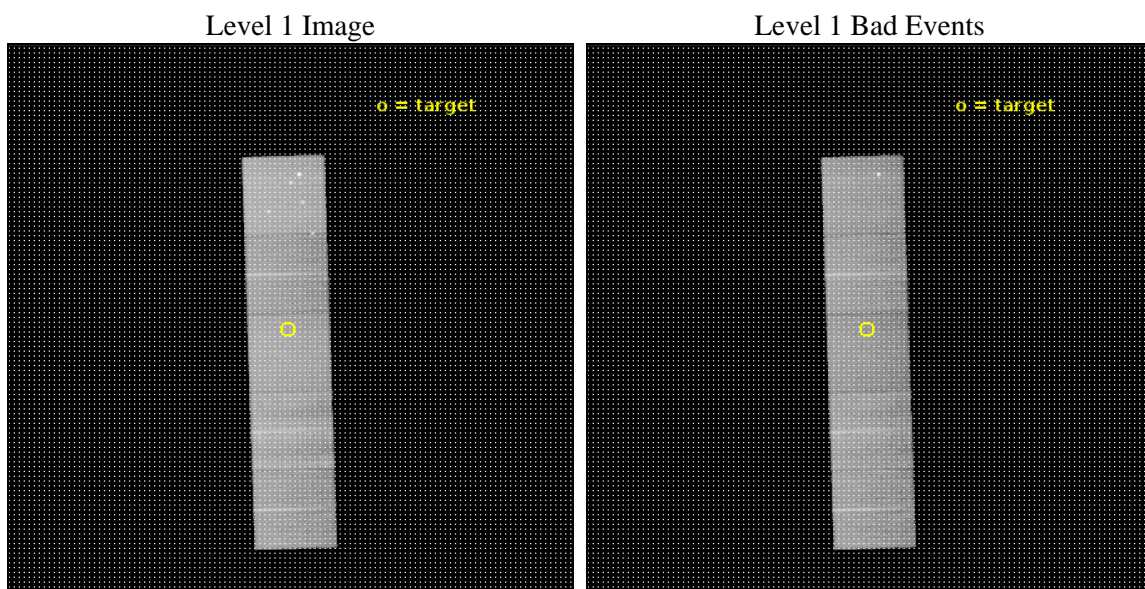




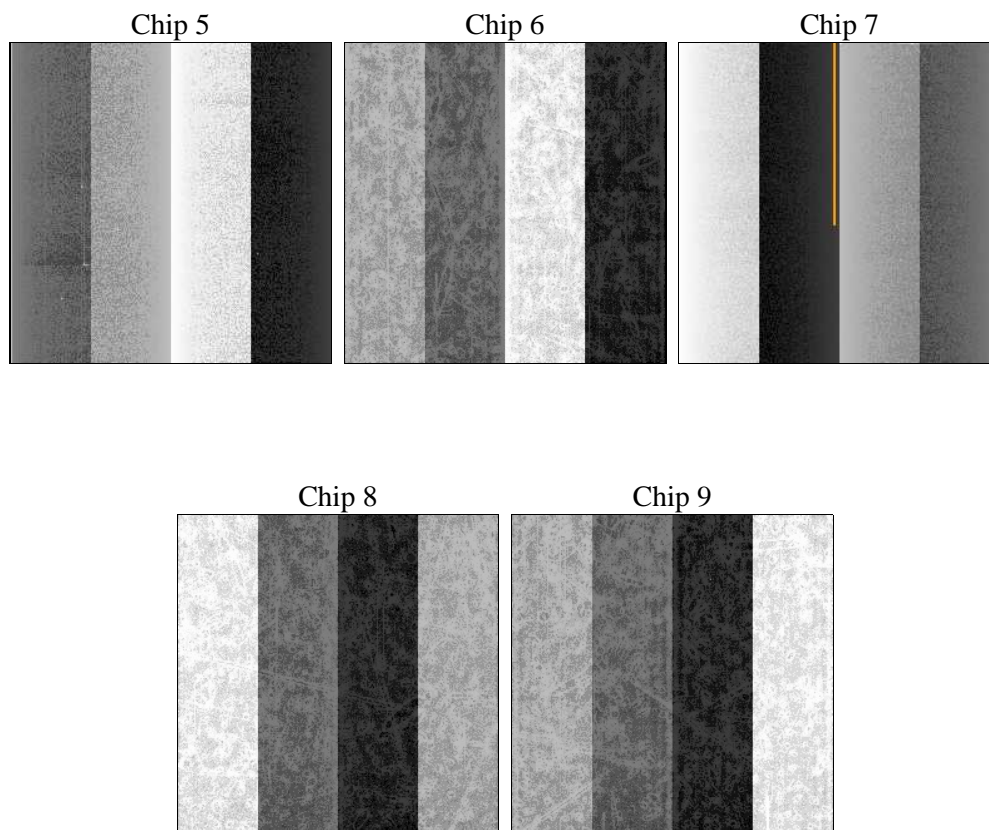
## 2 OBI

### 2.1 OBI

#### 2.1.1 Images



#### 2.1.2 Bias



### 2.1.3 Parameters

obi_num	0	Obi number	sched_exp_time	23000.000000	[s] Scheduled observation exposure time
ascdsver	10.7	Processing system revision	ontime	23023.700177193	Sum of GTIs [s]
caldbver	4.8.0.1	&#160	ontime5	23023.700177193	Sum of GTIs [s]
date	2018-11-12T03:51:45	Date and time of file creation	ontime6	23014.277046561	Sum of GTIs [s]
revision	1	Processing version of data	ontime7	23023.700177193	Sum of GTIs [s]
			ontime8	23023.700177193	Sum of GTIs [s]
			ontime9	23023.700177193	Sum of GTIs [s]
			l1events	1078363	Number of level 1 events
			tgmetho	DEADRECKONING	Method used to create src1a file

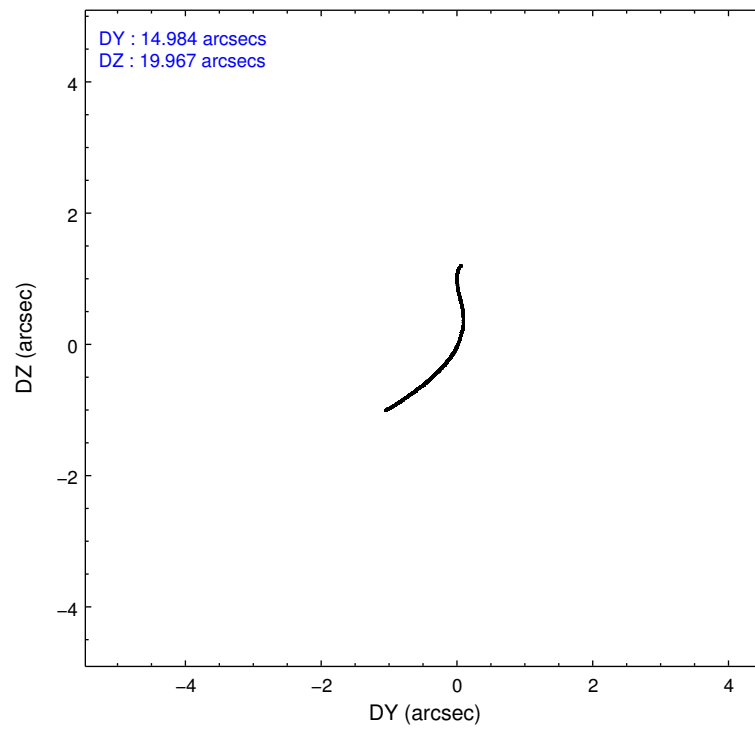
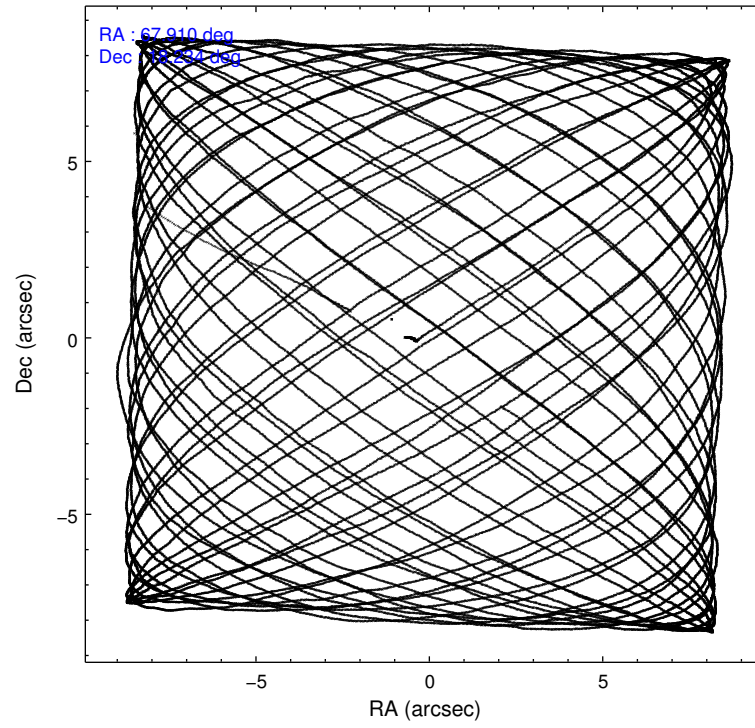
### 2.1.4 Events

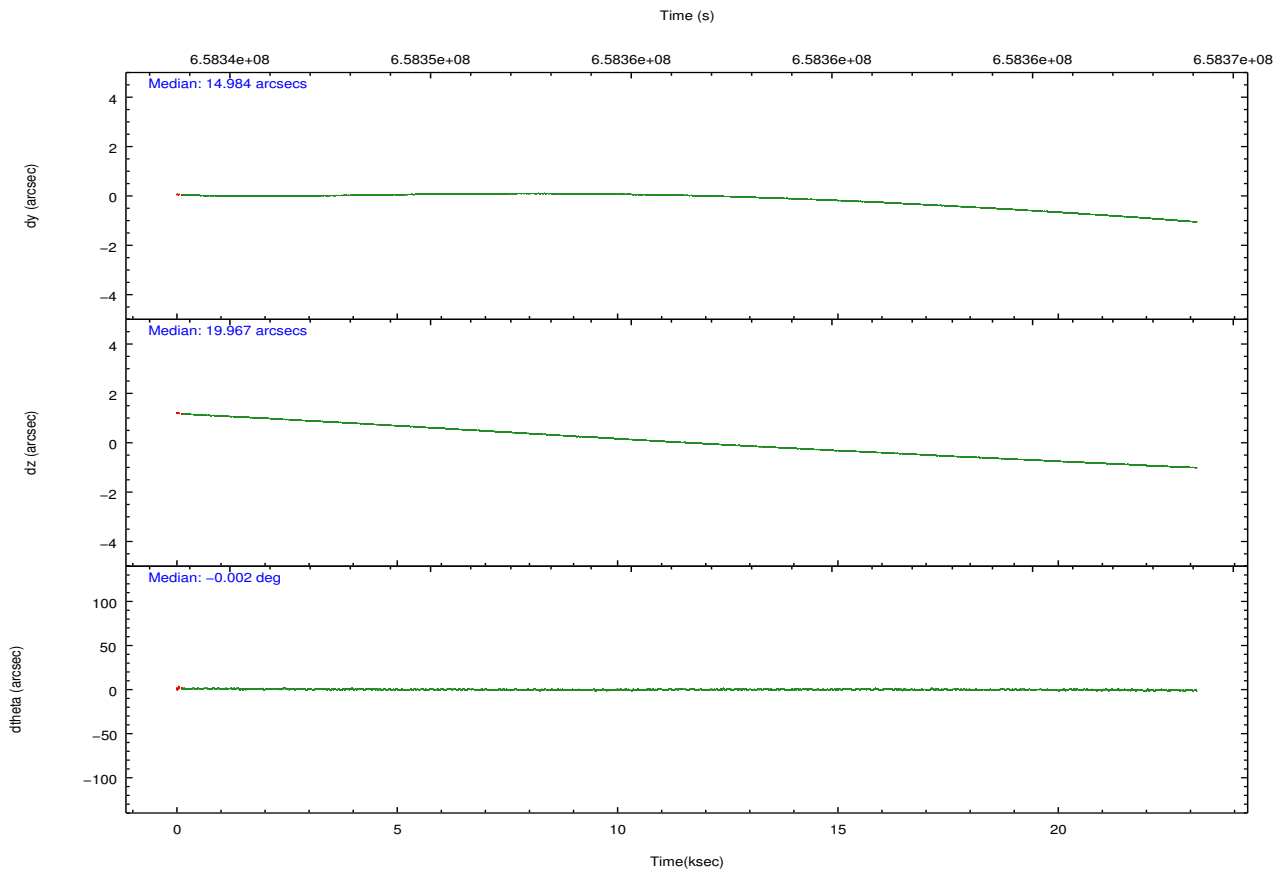
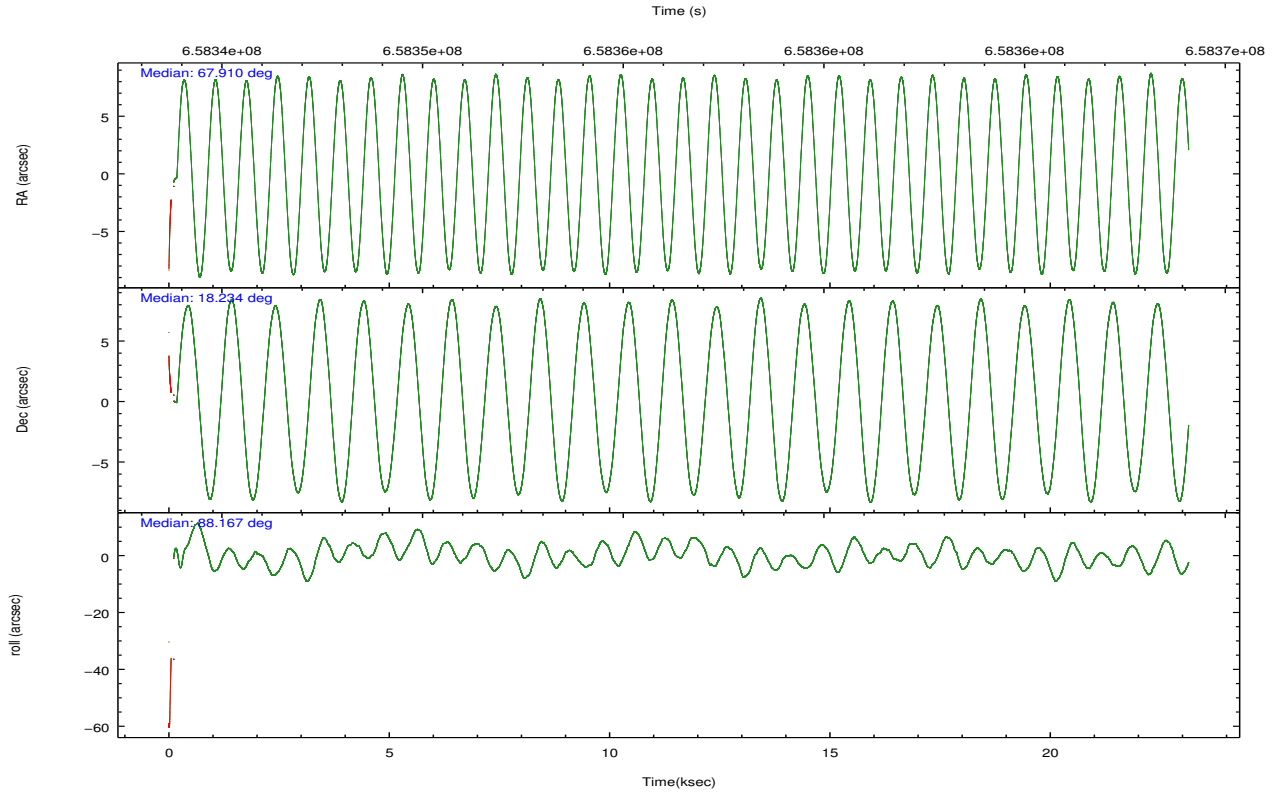
	ccd 5	ccd 6	ccd 7	ccd 8	ccd 9		ccd 5	ccd 6	ccd 7	ccd 8	ccd 9
level 1 events	284074	174957	219730	226122	173480	grade 0 events	13654	6375	7874	15944	6846
rejected events	147398	155342	125593	167746	153267		4%	3%	3%	7%	3%
rejected %	51%	88%	57%	74%	88%	grade 1 events	698	72	317	172	99
							0%	0%	0%	0%	0%
						grade 2 events	42311	4759	19783	14601	4612
							14%	2%	9%	6%	2%
						grade 3 events	3913	1862	7326	5958	2134
							1%	1%	3%	2%	1%
						grade 4 events	4041	1862	7073	5544	2016
							1%	1%	3%	2%	1%
						grade 5 events	17852	7717	21277	12112	9117
							6%	4%	9%	5%	5%
						grade 6 events	72954	4782	52210	16435	4629
							25%	2%	23%	7%	2%
						grade 7 events	128651	147528	103870	155356	144027
							45%	84%	47%	68%	83%

## 2.2 Compared Parameters

Parameter	Planned	Actual	Parameter	Planned	Actual
Instrument	ACIS	ACIS	Obspar format version number	7	7
Detector	ACIS-56789	ACIS-56789	Obspar file type	PREDICTED	ACTUAL
Grating	HETG	HETG	Obspar update status	NONE	UPDATED
Data mode	VFAINT	VFAINT	CCD I0 on	N	N
Observation mode	POINTING	POINTING	CCD I1 on	N	N
[deg] Pointing RA	67.923965	67.91000800539545	CCD I2 on	N	N
[deg] Pointing Dec	18.210320	18.23434584815231	CCD I3 on	N	N
[deg] Pointing Roll	87.996812	88.15776958487491	CCD S0 on	O1	N
[mm] SIM focus pos	-0.684267	-0.6828225247311905	CCD S1 on	Y	Y
[mm] SIM defocus	0	0.001444936568705701	CCD S2 on	Y	Y
[mm] SIM translation stage pos	-190.132523	-190.1425803651734	CCD S3 on	Y	Y
[mm] SIM translation stage offset	0	0.01005778216563158	CCD S4 on	Y	Y
[s] Observation start time (MET)	658344959.184000	658343847.26572	CCD S5 on	O2	Y
Observation start date	2018-11-11T17:34:50	2018-11-11T17:17:27	Number of optional ACIS chips dropped	1	1
[s] Observation end time (MET)	658367959.184000	658369041.76722	On-chip summing requested	N	N
Observation end date	2018-11-11T23:58:10	2018-11-12T00:17:21	Subarray requested	NONE	NONE
Read mode	TIMED	TIMED	Alternating exposures requested	N	N
			[s] Primary exposure time	0.000000	3.1

## 2.3 Aspect



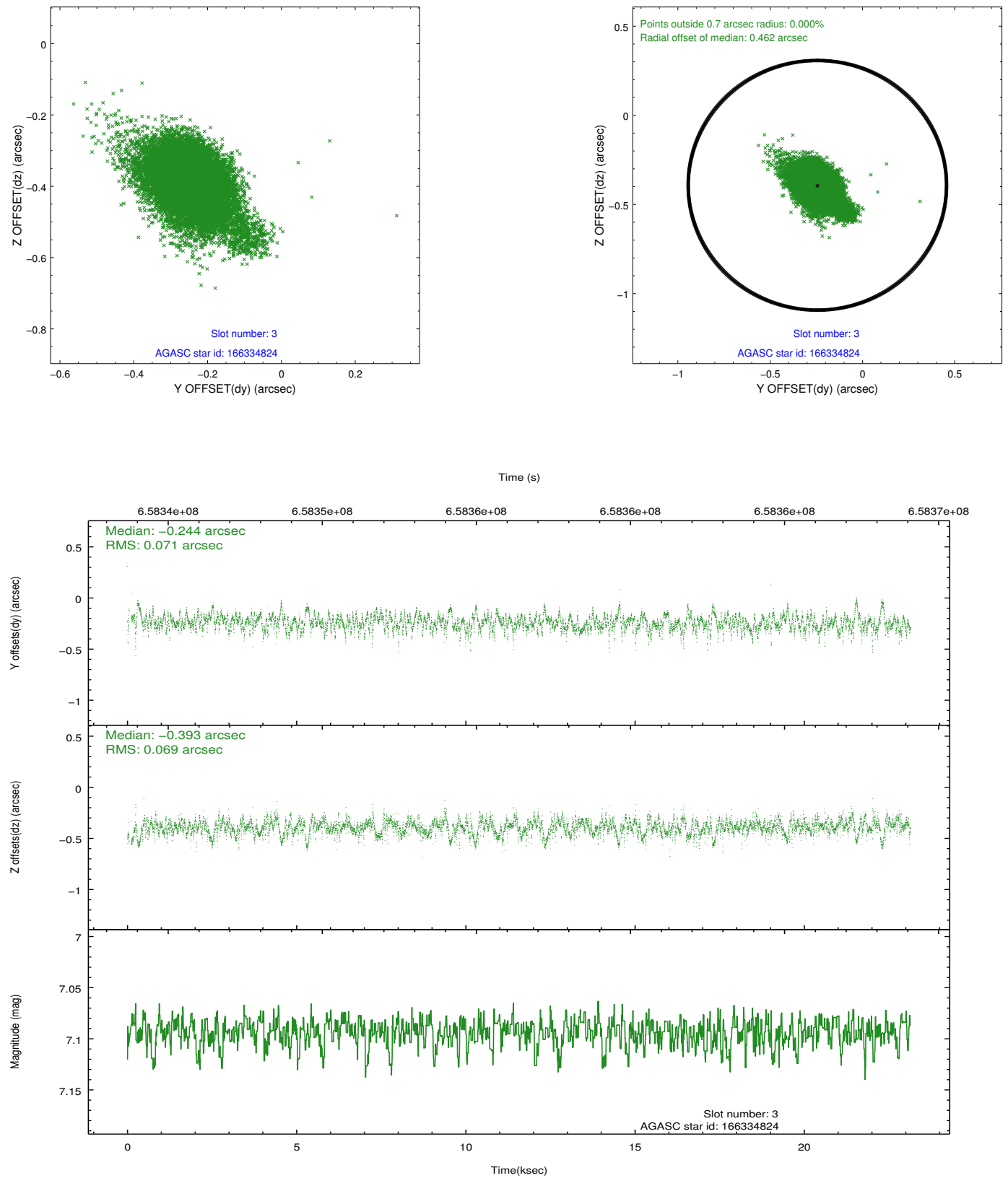


Slot Statistics

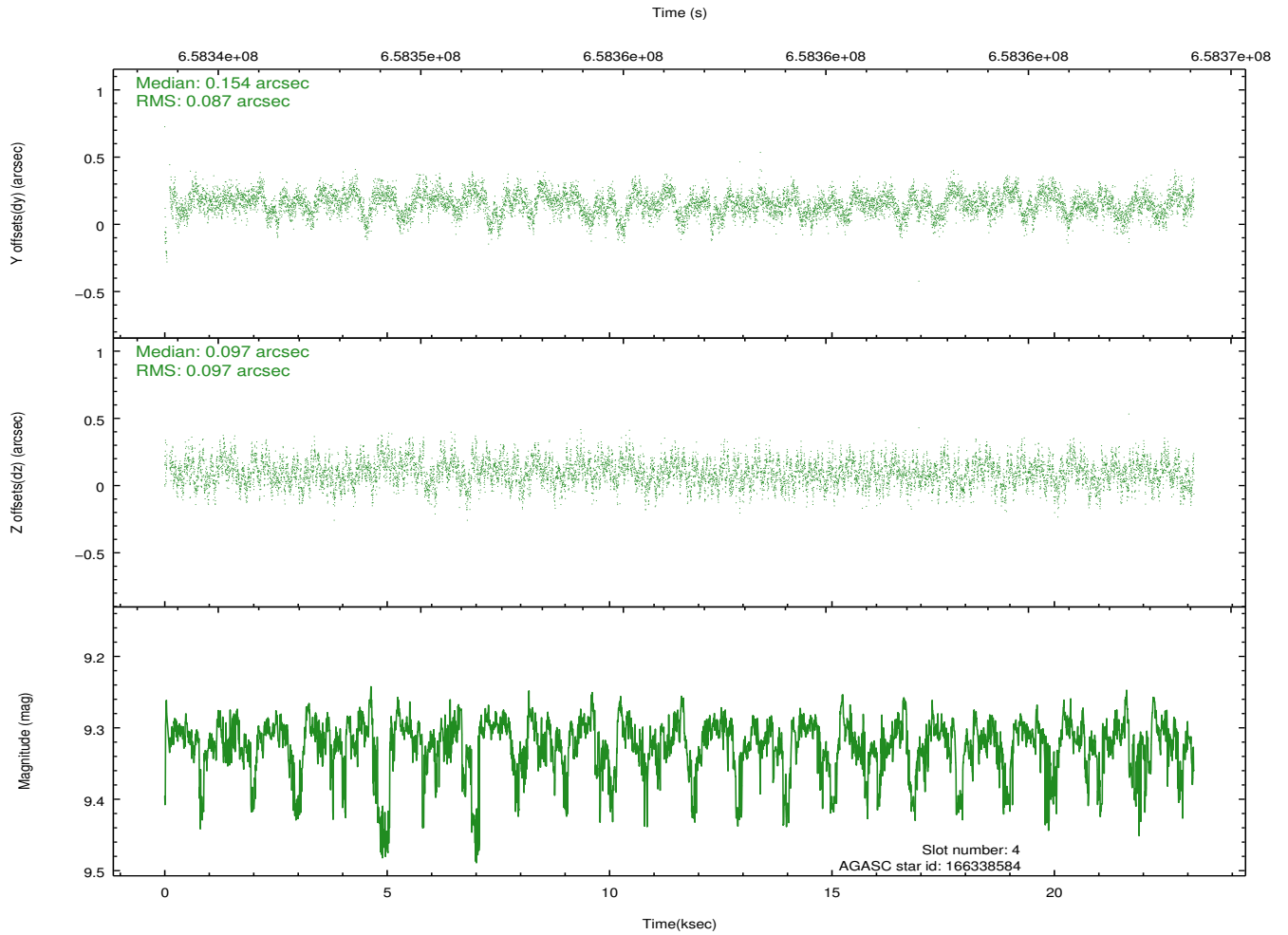
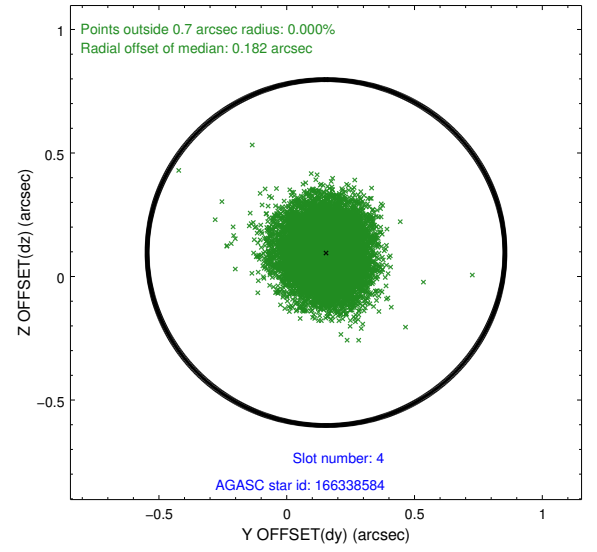
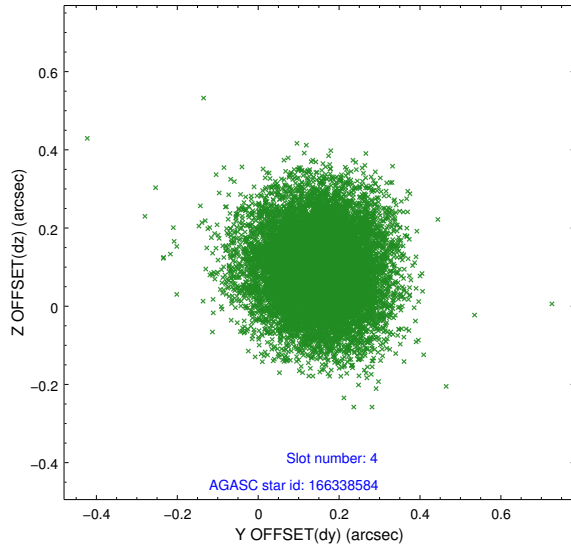
pt	status	used	id	mag	n_pts	frac_pts	med_dy	med_dz	dr1	dr2	ra	dec	mean_y	mea
0	FID		ACIS-S-2	7.10	5630	1.000	-0.539	-0.372	0.012	0.029	0.000000	0.000000	-768.36	-1741
1	FID		ACIS-S-4	7.21	5631	1.000	0.555	0.322	0.011	0.024	0.000000	0.000000	2146.01	167
2	FID		ACIS-S-6	7.35	5631	1.000	-0.044	0.057	0.014	0.027	0.000000	0.000000	394.39	804
3	GUIDE	used	166334824	7.09	11260	1.000	-0.244	-0.393	0.099	0.183	67.376458	17.863163	-1311.74	1829
4	GUIDE	used	166338584	9.32	11244	1.000	0.154	0.097	0.140	0.223	67.904616	17.709782	-1803.05	1
5	GUIDE	used	166468240	9.02	11242	1.000	0.459	0.507	0.135	0.216	68.167699	17.861525	-1224.74	-877
6	GUIDE	used	166996584	9.12	11235	1.000	-0.364	-0.214	0.137	0.217	68.020035	18.861675	2355.04	-245
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

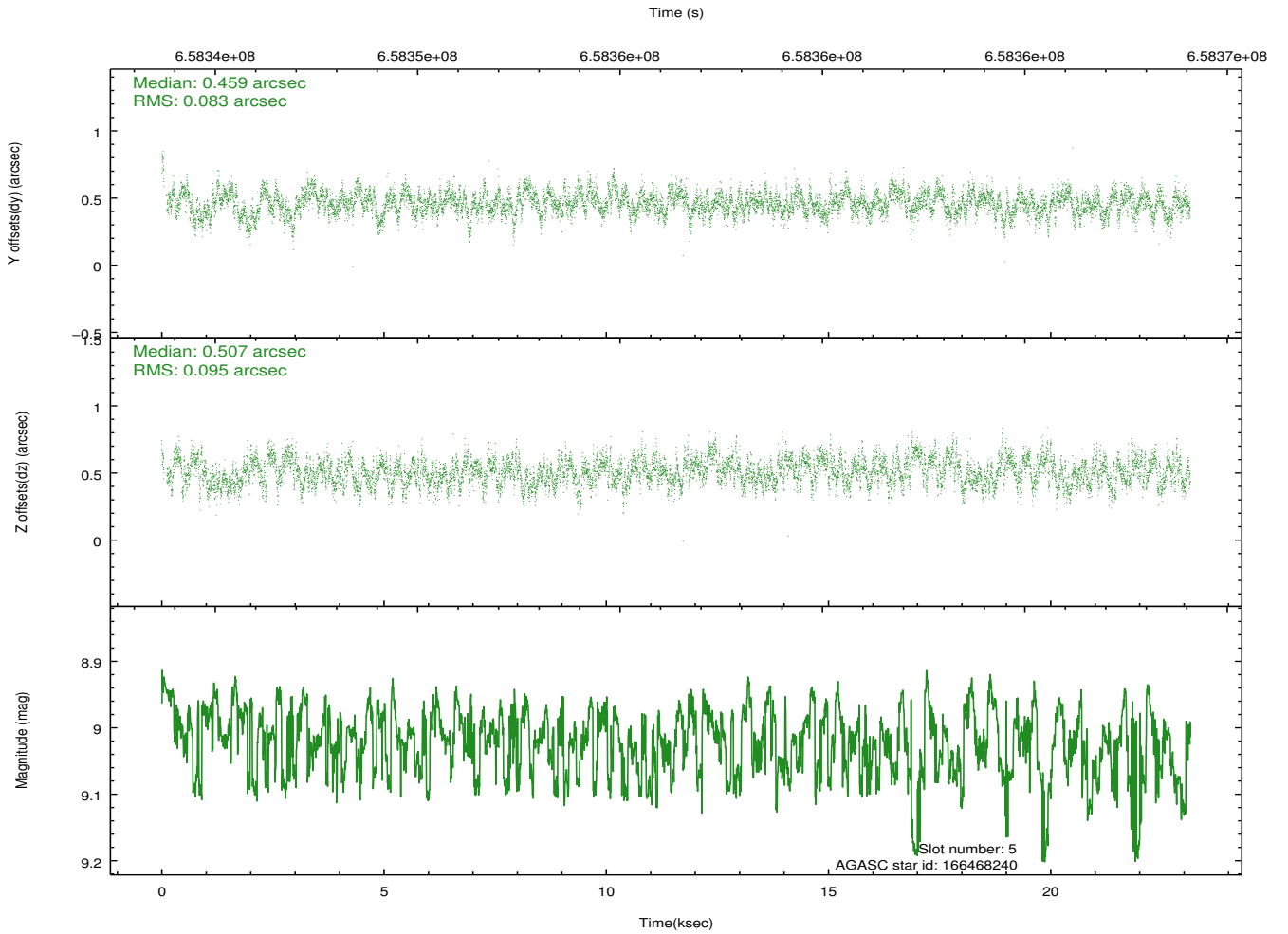
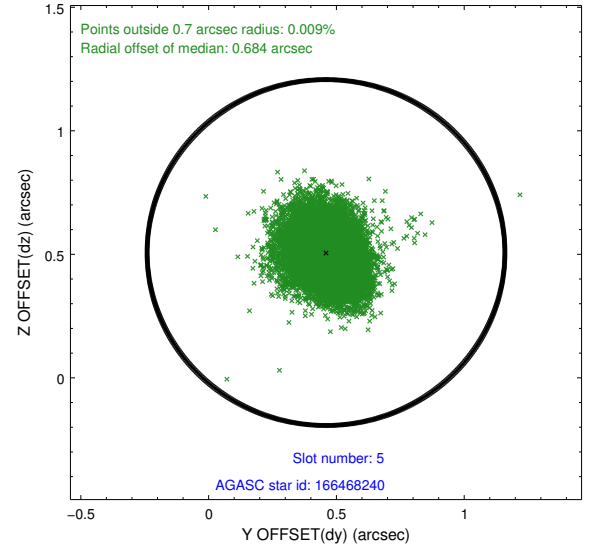
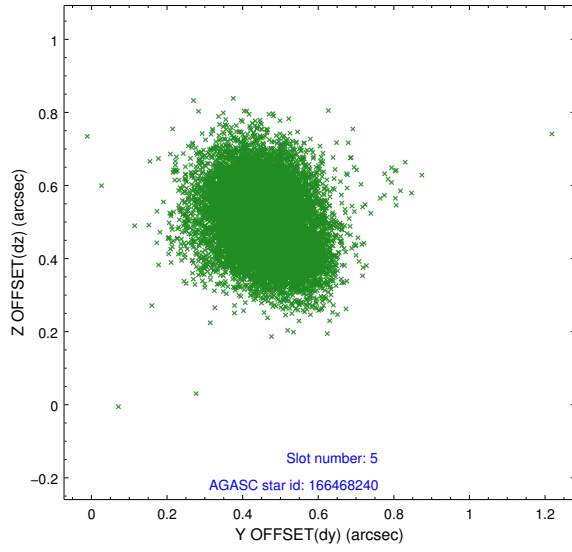


## 2.4.2 Slot 4

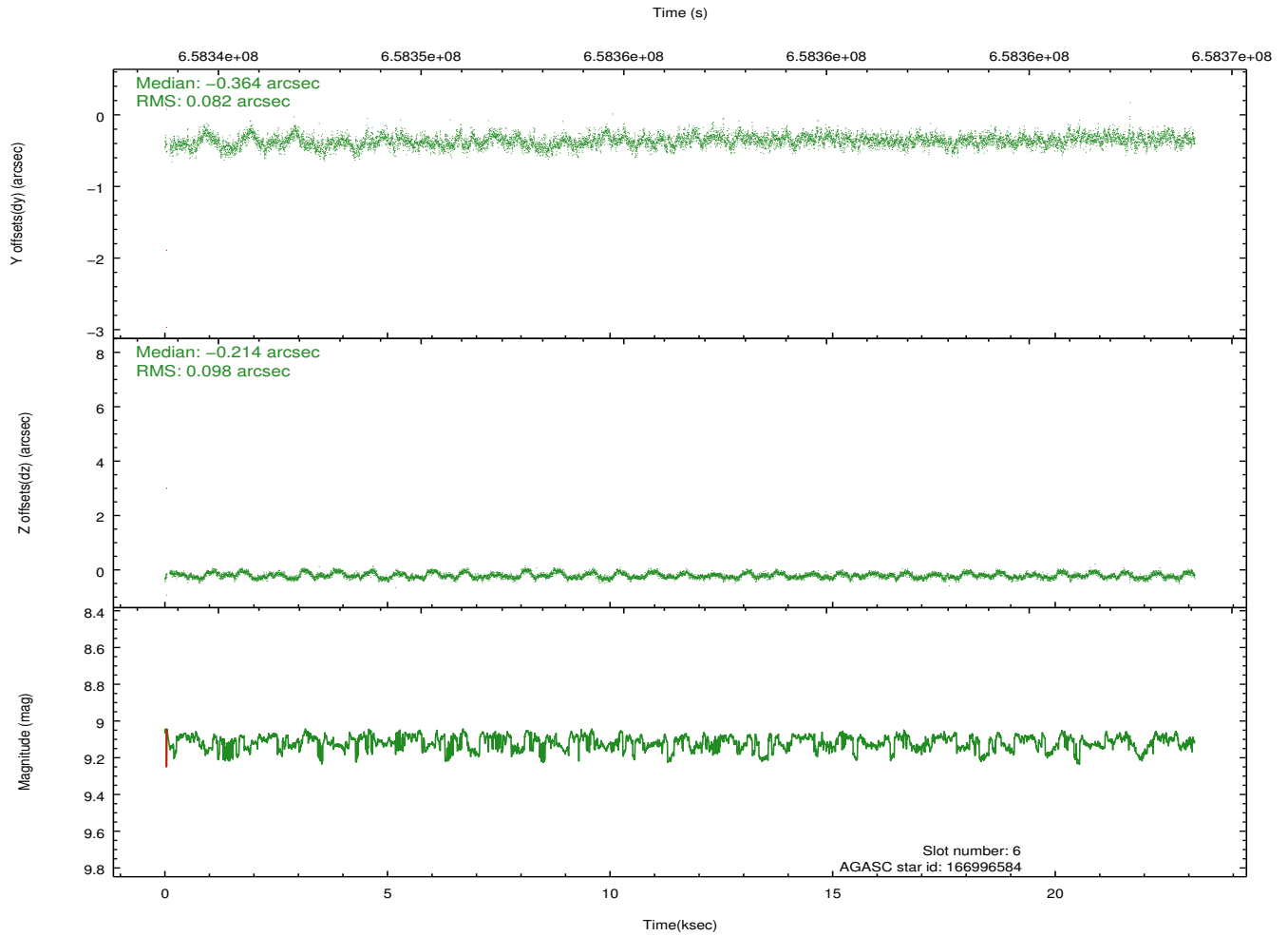
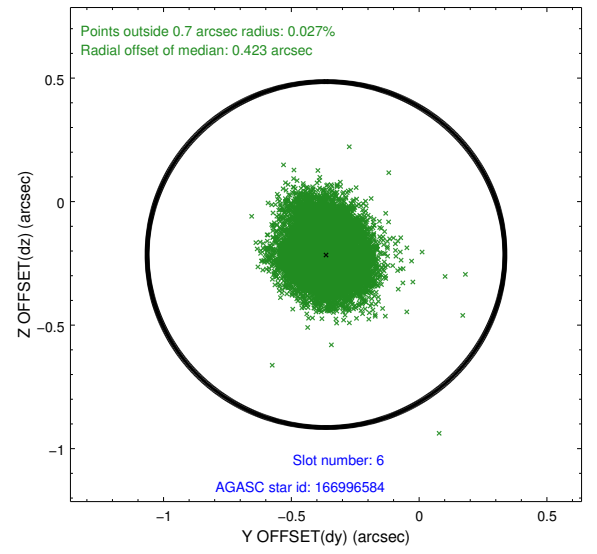
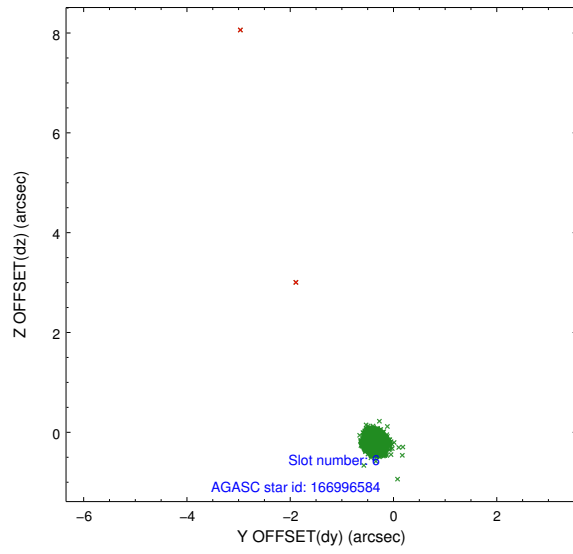




### 2.4.3 Slot 5

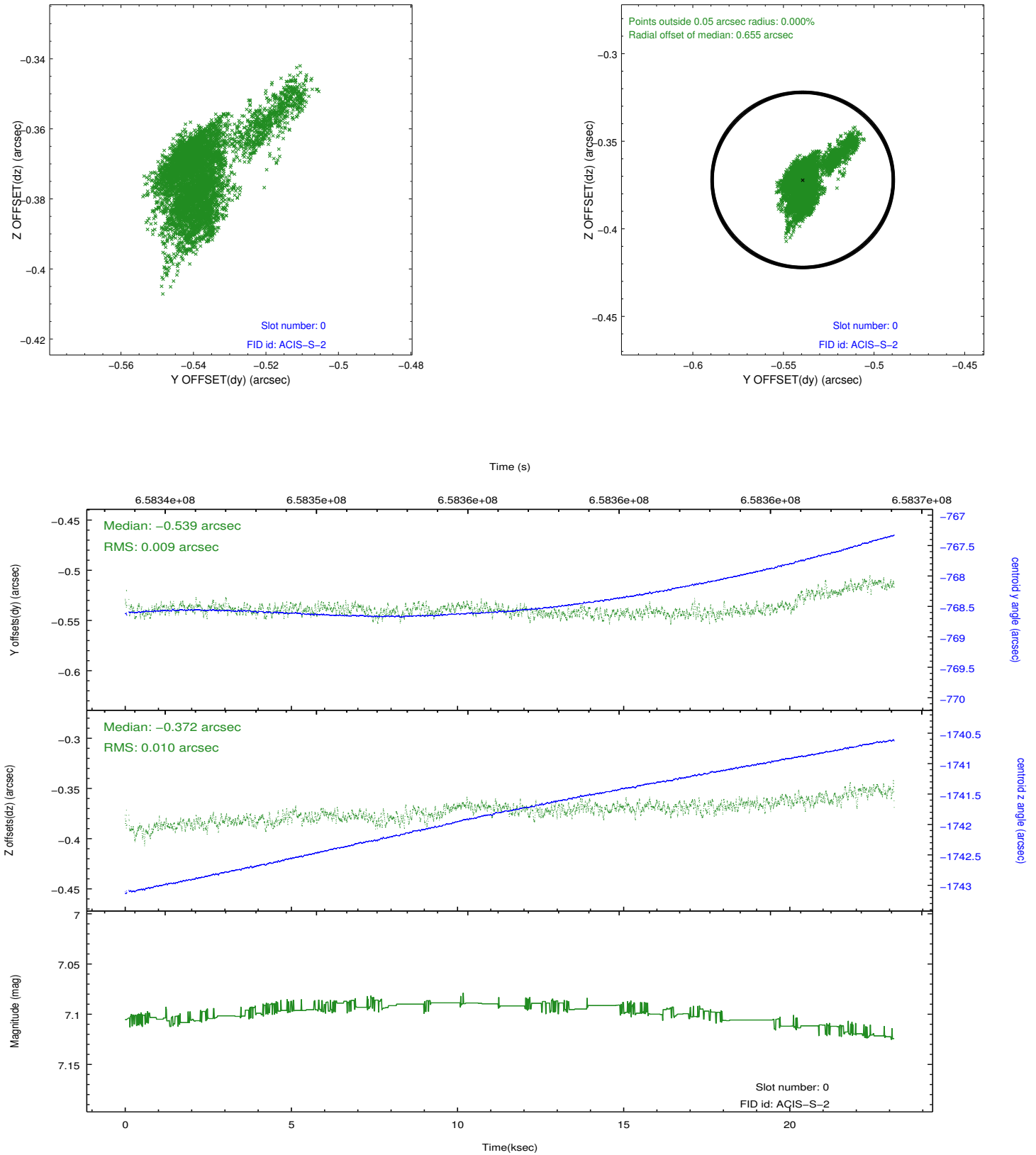


## 2.4.4 Slot 6

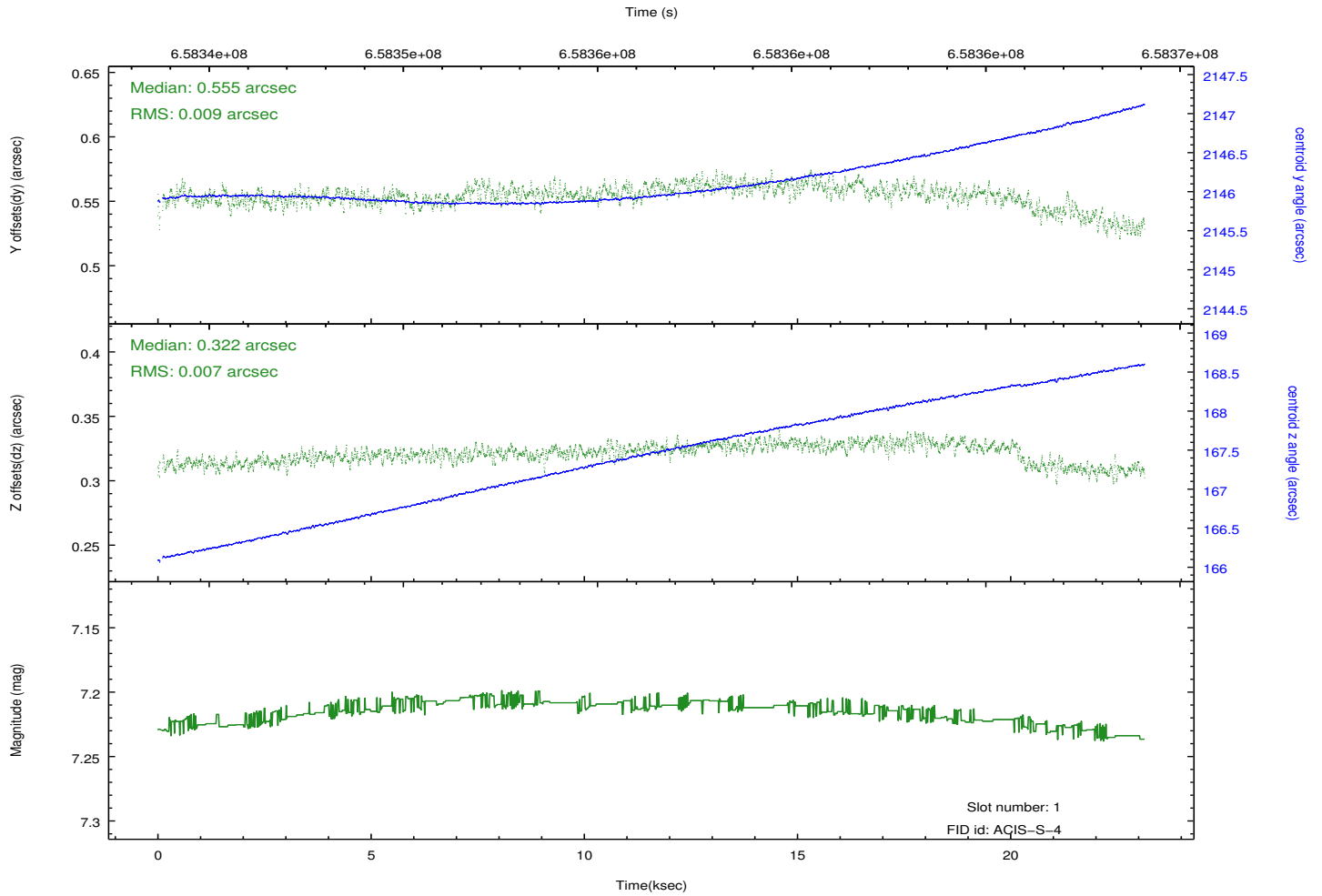
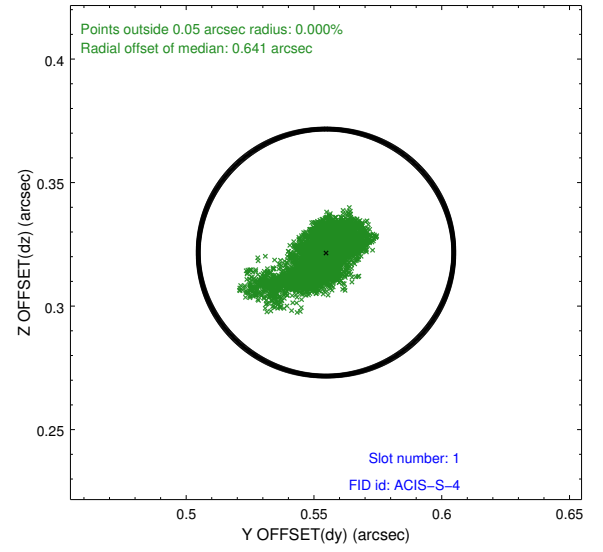
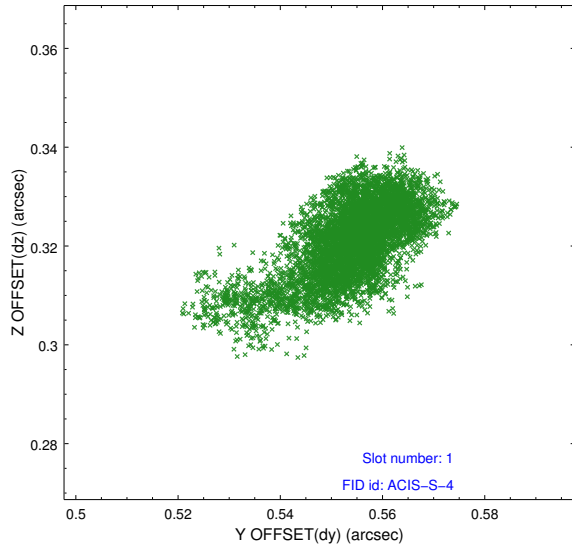


## 2.5 FID Slots

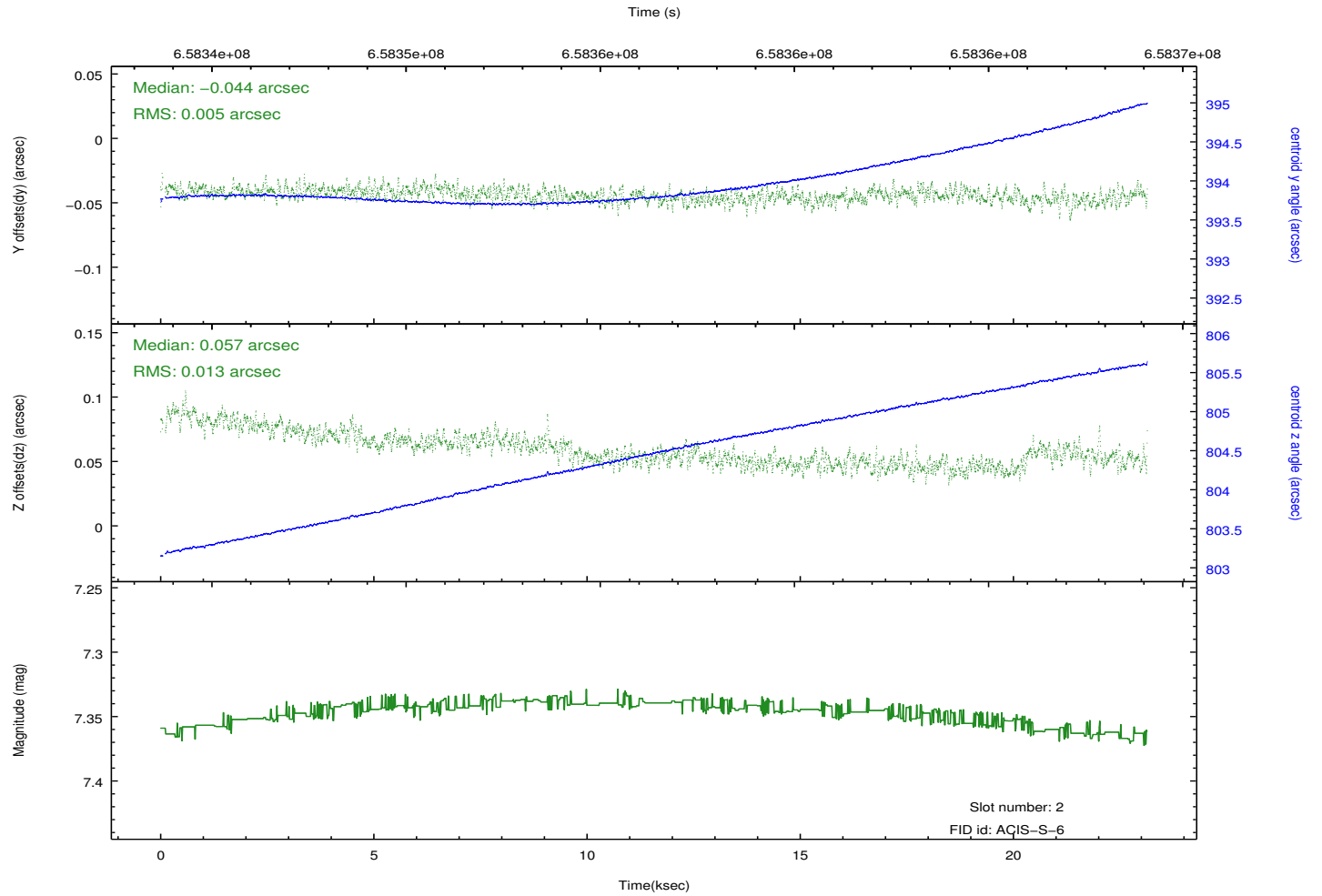
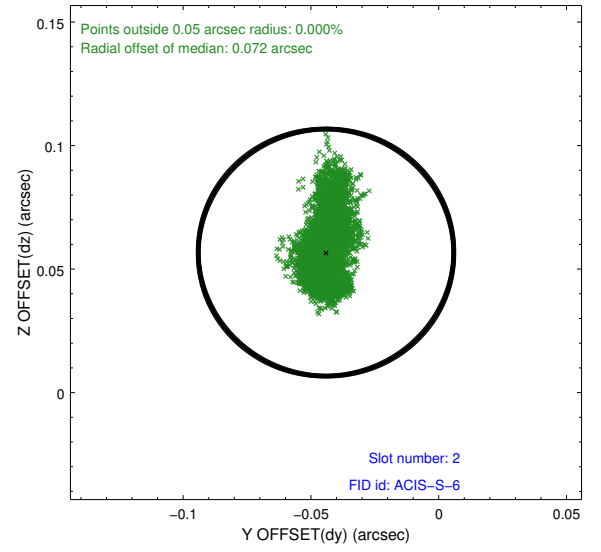
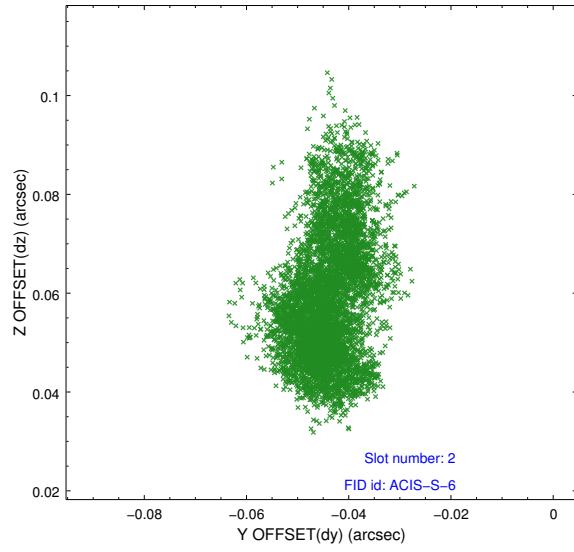
### 2.5.1 Slot 0



## 2.5.2 Slot 1

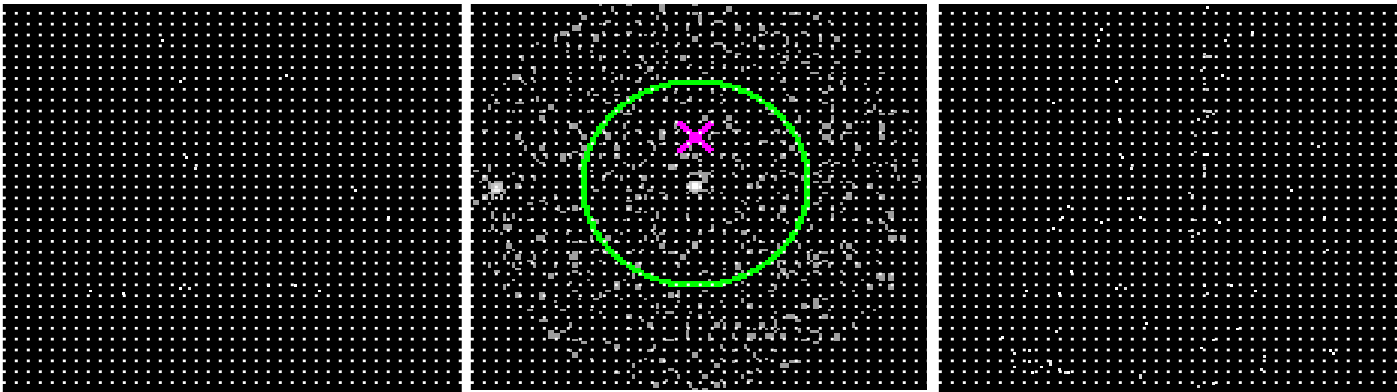


### 2.5.3 Slot 2



# 3 Gratings

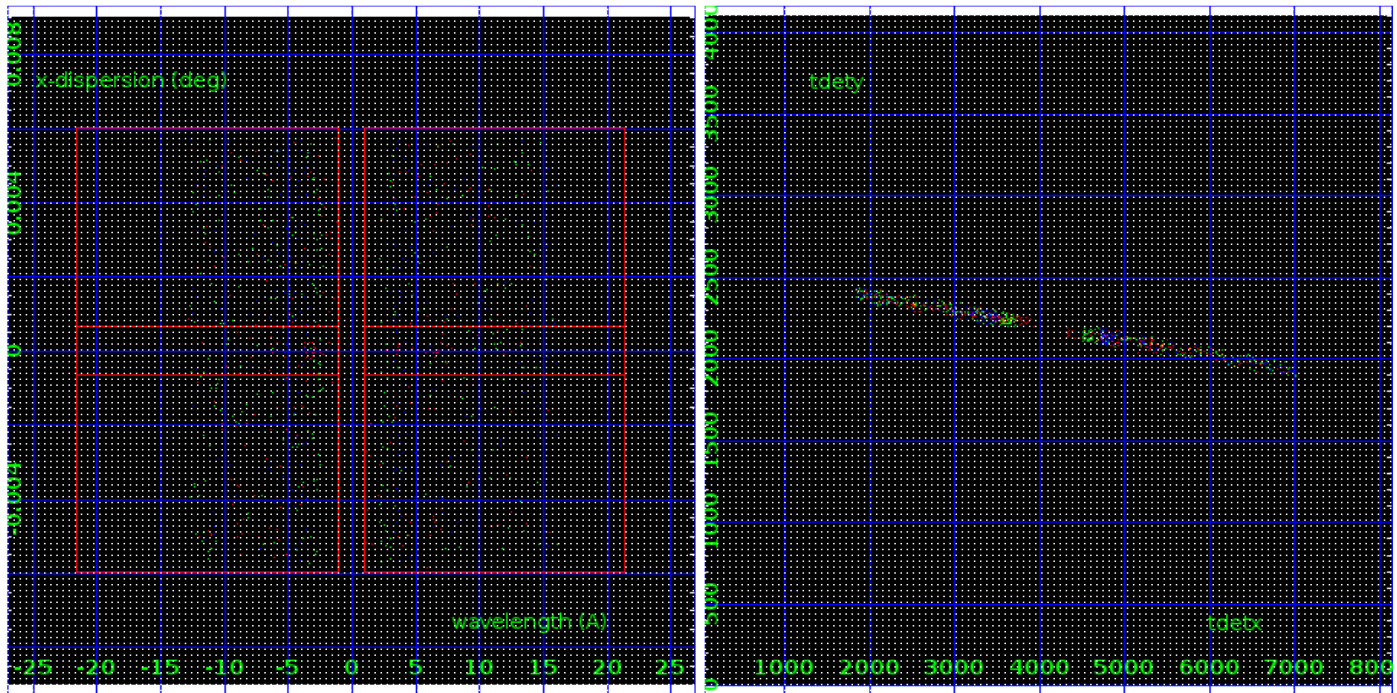
## 3.1 HEG Arm



HEG Order Sort 123

HEG Zero Order

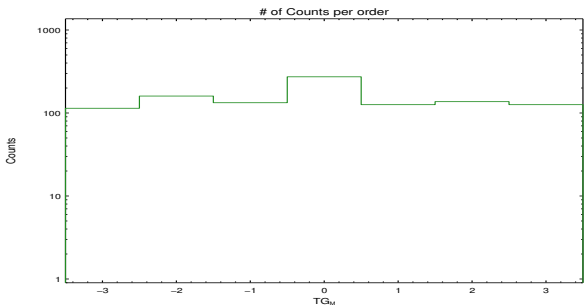
HEG Order Sort ALL

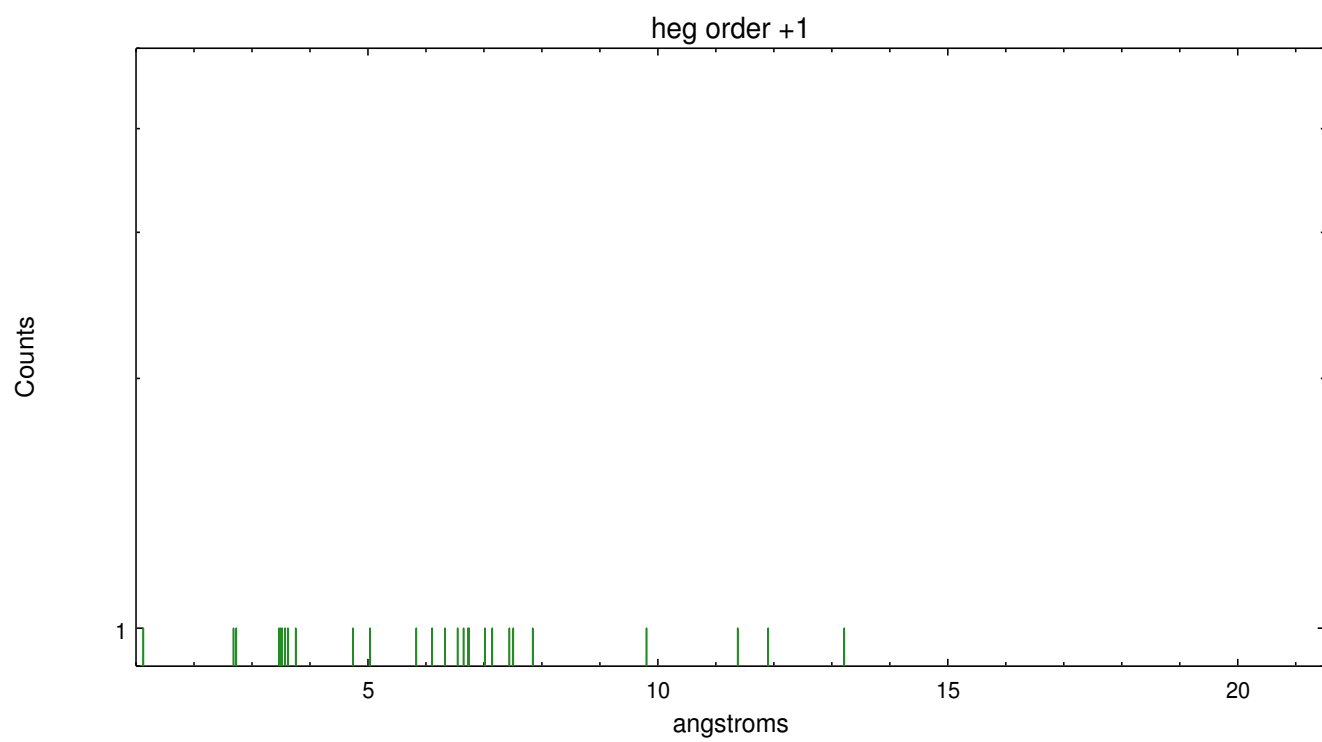
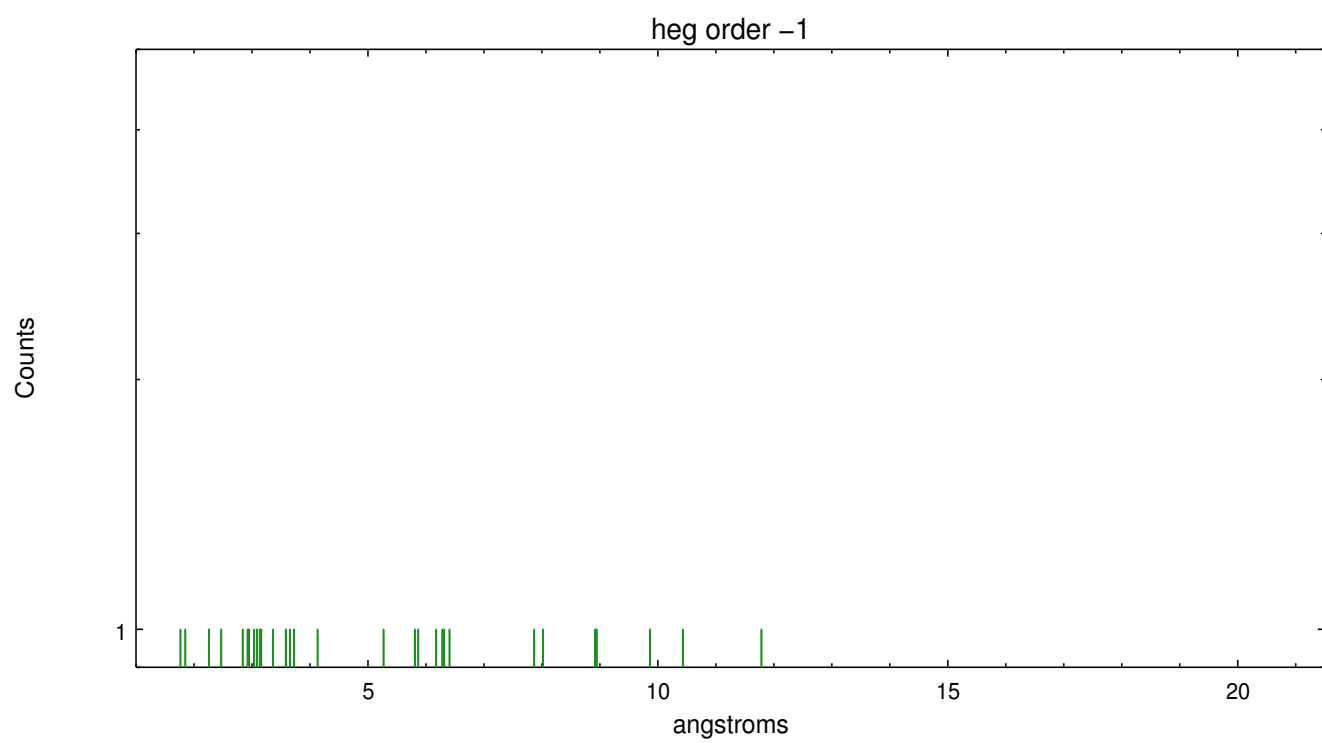


Spot Image HEG

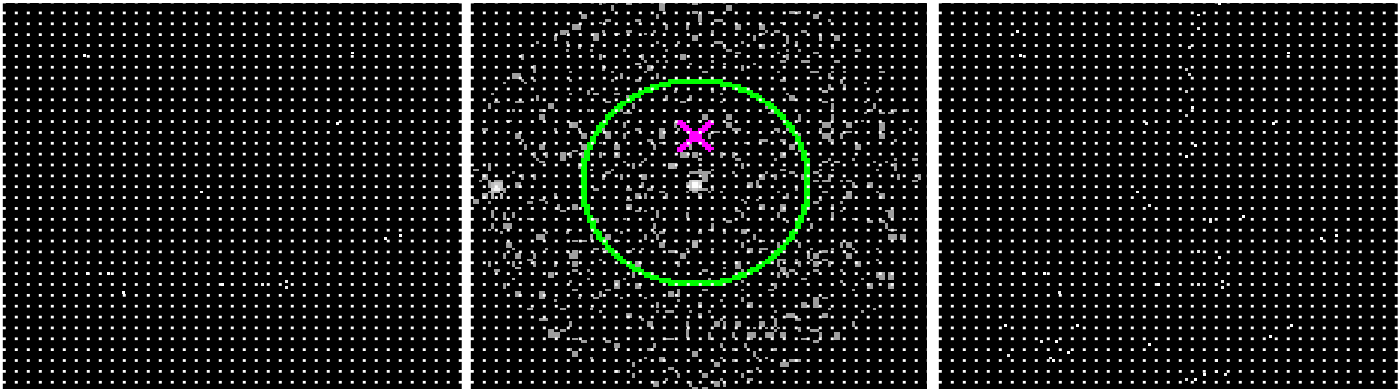
Full Detector HEG

	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	114	160	133	273	126	137	126





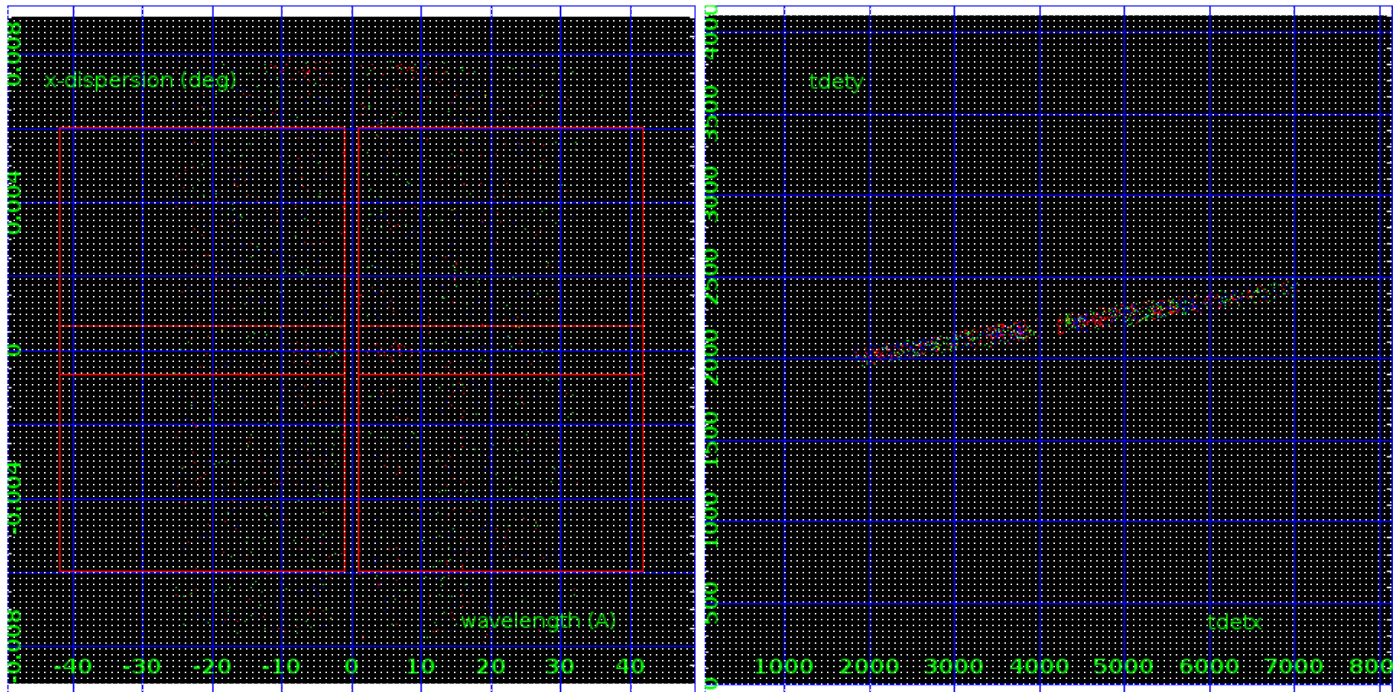
3.2 MEG Arm



MEG Order Sort 123

MEG Zero Order

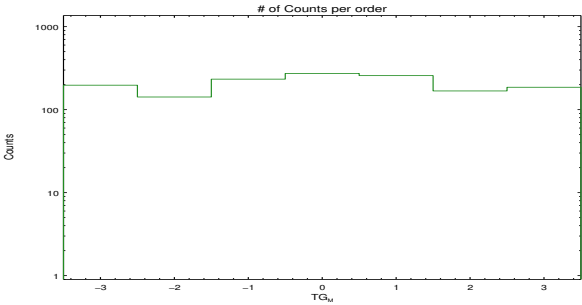
MEG Order Sort ALL



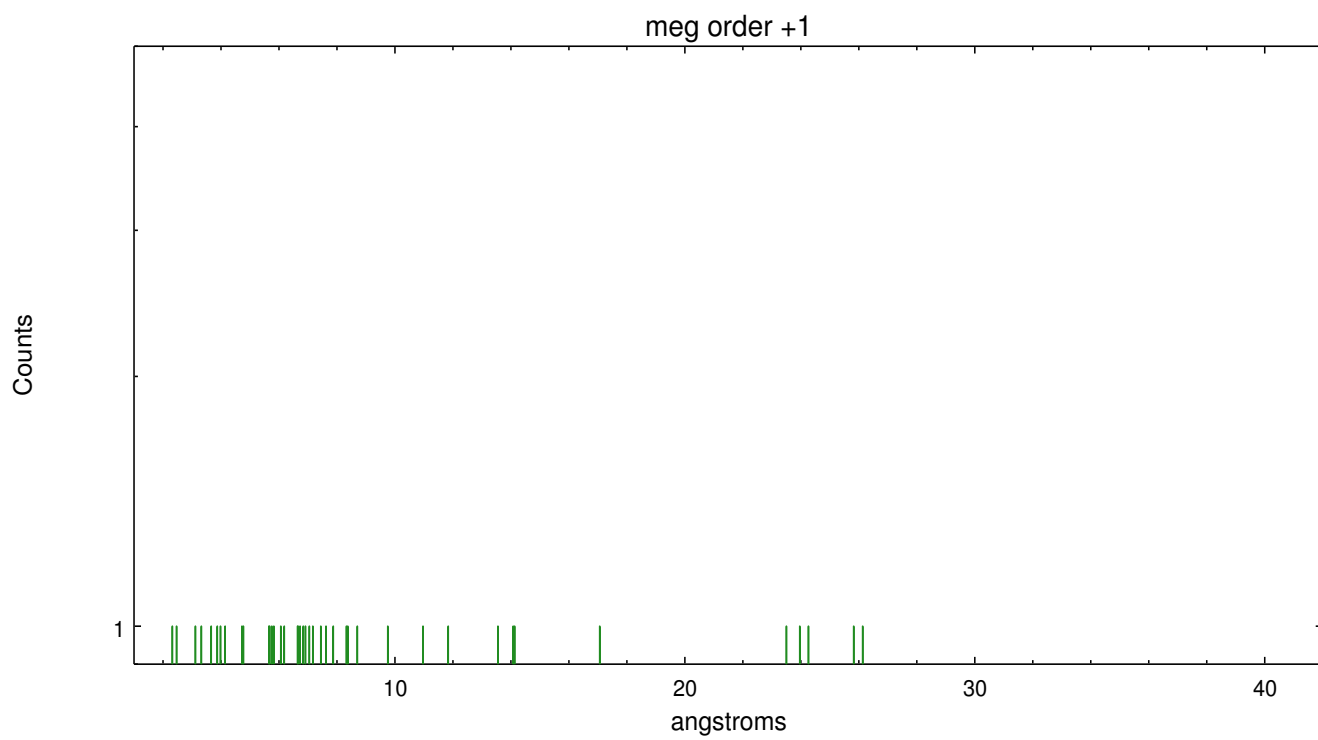
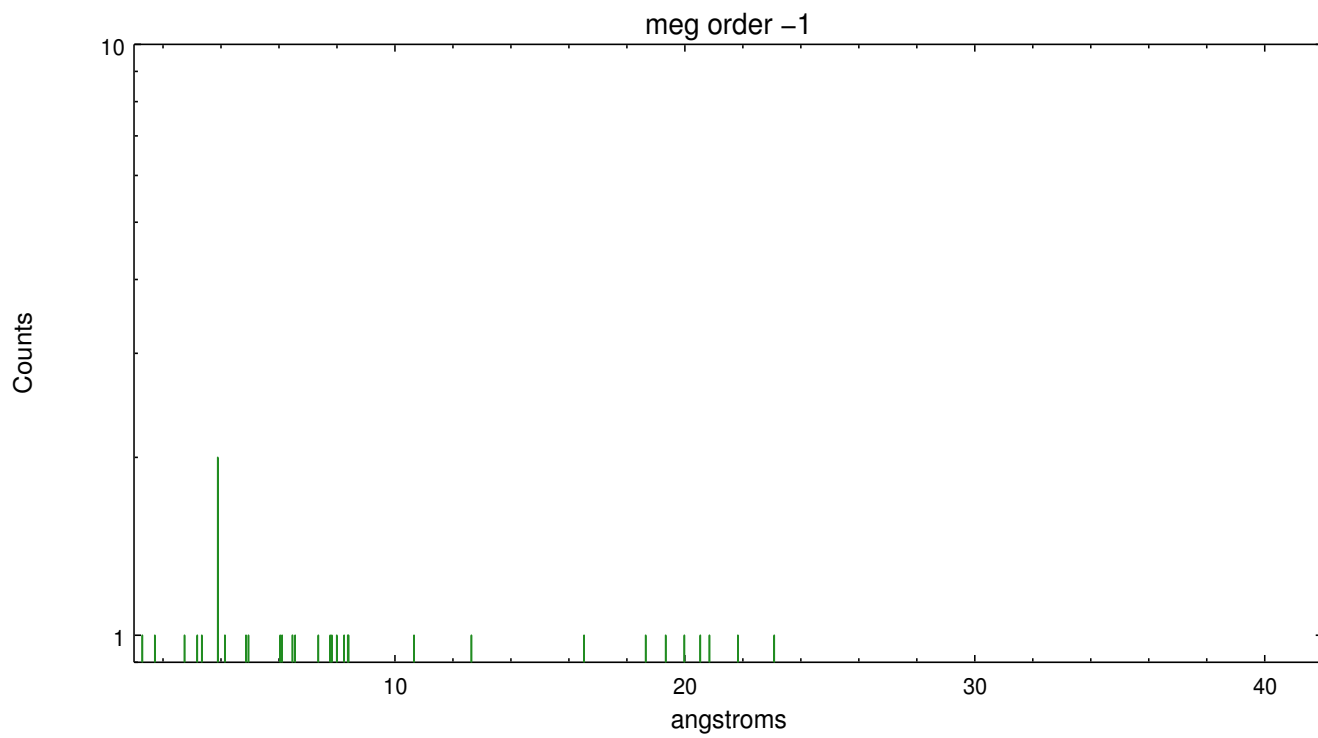
Spot Image MEG

Full Detector MEG

	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	197	142	233	273	257	168	186







# A Summary

## A.1 Status

V&V Scientist	Joy Nichols
V&V Date (YYYY-MM-DD)	2018.11.13
V&V Edition	1
V&V Disposition and Status	OK
V&V Charge Time	23.023700177193

## A.2 Comments

Standard software processing technique using the tools tgdetect and findzo could not locate a target near the aim point, because the aimpoint was placed between 2 stars of interest. The star HL Tau was chosen as the source for the spectral extraction in this processing of the data. The zeroth order position was specified manually as the brightest X-ray emission in the source. The investigator will want to verify that the zeroth order position is at the desired position for extraction of the spectrum. The nearby star XZ Tau can also be the source for a spectral extraction using TGCat or CIAO tools.

====

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.