

# V&V Reference Report

## L2 ASCDS Version : 8.4.5

Observation 12090 - L2 Version 3  
Chandra X-Ray Center

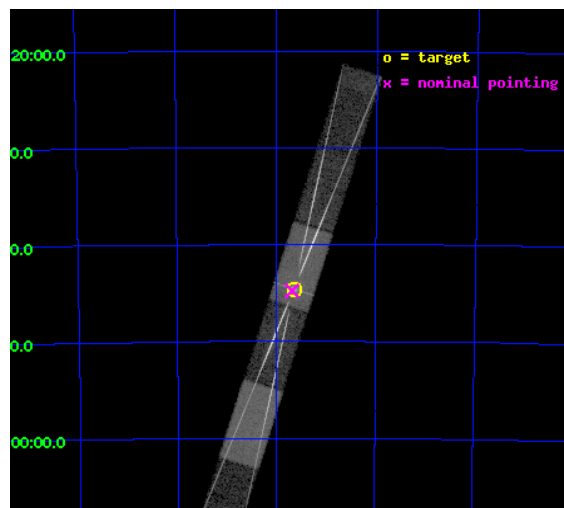
L2 Processing Date : Jun 22 2012

## Contents

<b>1</b>	<b>Front</b>	<b>2</b>
<b>2</b>	<b>OBI</b>	<b>3</b>
2.1	OBI . . . . .	3
2.1.1	Images . . . . .	3
2.1.2	Bias . . . . .	3
2.1.3	Parameters . . . . .	4
2.1.4	Events . . . . .	4
2.2	Compared Parameters . . . . .	5
2.3	Aspect . . . . .	6
2.4	Star Slots . . . . .	9
2.4.1	Slot 3 . . . . .	9
2.4.2	Slot 4 . . . . .	10
2.4.3	Slot 5 . . . . .	11
2.4.4	Slot 6 . . . . .	12
2.4.5	Slot 7 . . . . .	13
2.5	FID Slots . . . . .	14
2.5.1	Slot 0 . . . . .	14
2.5.2	Slot 1 . . . . .	15
2.5.3	Slot 2 . . . . .	16
<b>3</b>	<b>Gratings</b>	<b>17</b>
3.1	HEG Arm . . . . .	17
3.2	MEG Arm . . . . .	19
<b>A</b>	<b>Summary</b>	<b>21</b>
A.1	Status . . . . .	21
A.2	Comments . . . . .	21

# 1 Front

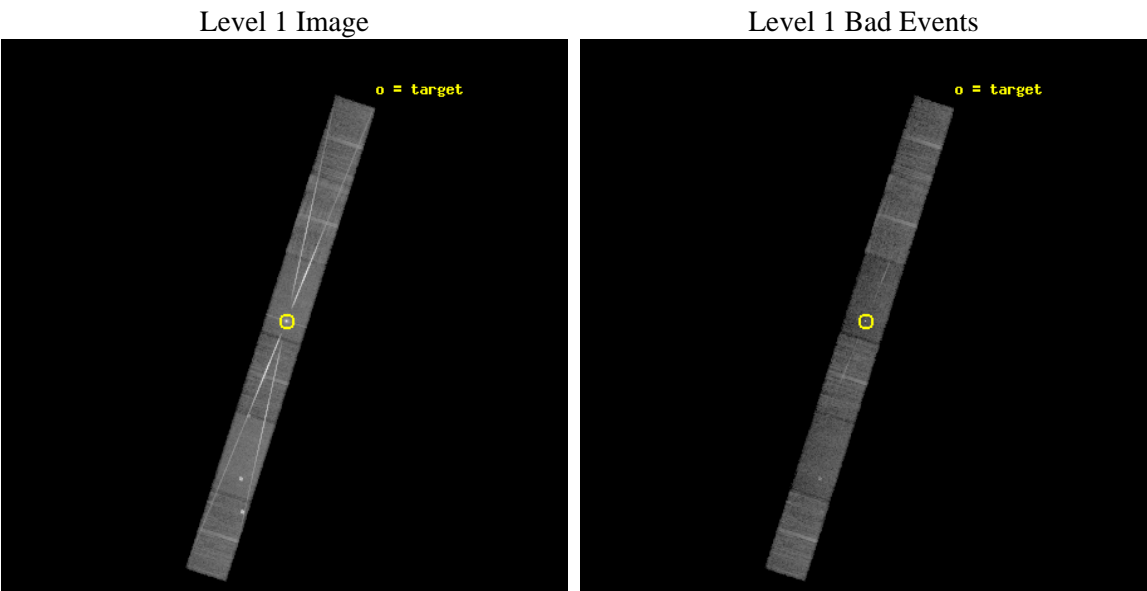
seq_num	401109	Sequence number
obs_id	12090	Observation id
title	Deep Chandra Observations of the Black Hole LMC X-1	Proposal title
observer	Dr. Michael Nowak	Principal investigator
object	LMC X-1	Source name
dtcycle	0	&#160
cycle	P	events from which exps? Prim/Second/Both
ra_targ	84.911667	Observer's specified target RA [deg]
dec_targ	-69.74325	Observer's specified target Dec [deg]
ra_nom	84.922191855661	Nominal RA [deg]
dec_nom	-69.746376455393	Nominal Dec [deg]
roll_nom	287.73962814594	Nominal Roll [deg]
revision	3	Processing version of data
ontime	13205.599907458	Sum of GTIs [s]
livetime	12894.315950626	Livetime [s]
ontime4	13205.599907458	Sum of GTIs [s]
ontime5	13205.599907458	Sum of GTIs [s]
ontime6	13205.599907458	Sum of GTIs [s]
ontime7	13205.599907458	Sum of GTIs [s]
ontime8	13205.599907458	Sum of GTIs [s]
ontime9	13205.599907458	Sum of GTIs [s]
l2events	301103	Number of level 2 events



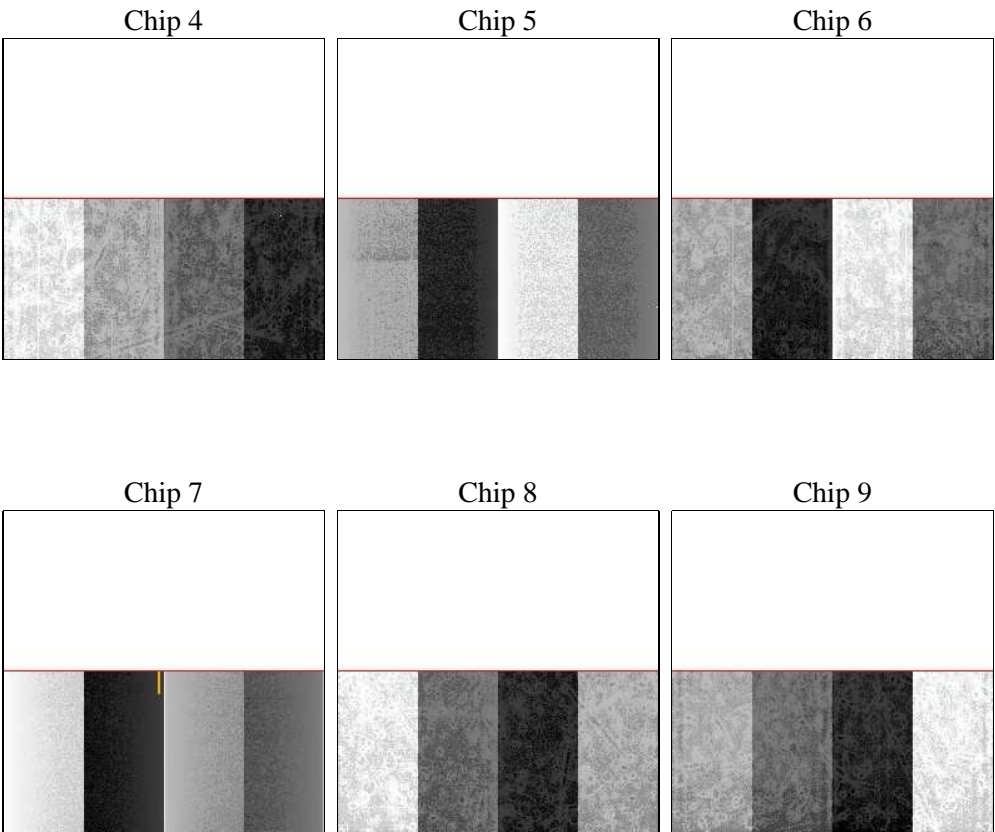
# 2 OBI

## 2.1 OBI

### 2.1.1 Images



### 2.1.2 Bias



### 2.1.3 Parameters

obi_num	2	Obi number	sched_exp_time	13040.696000	[s] Scheduled observation exposure time
ascdsver	8.4.5	Processing system revision	ontime	13205.599907458	Sum of GTIs [s]
caldsver	4.4.10	&#160	ontime4	13205.599907458	Sum of GTIs [s]
date	2012-06-22T03:32:42	Date and time of file creation	ontime5	13205.599907458	Sum of GTIs [s]
revision	2	Processing version of data	ontime6	13205.599907458	Sum of GTIs [s]
			ontime7	13205.599907458	Sum of GTIs [s]
			ontime8	13205.599907458	Sum of GTIs [s]
			ontime9	13205.599907458	Sum of GTIs [s]
			l1events	679450	Number of level 1 events

### 2.1.4 Events

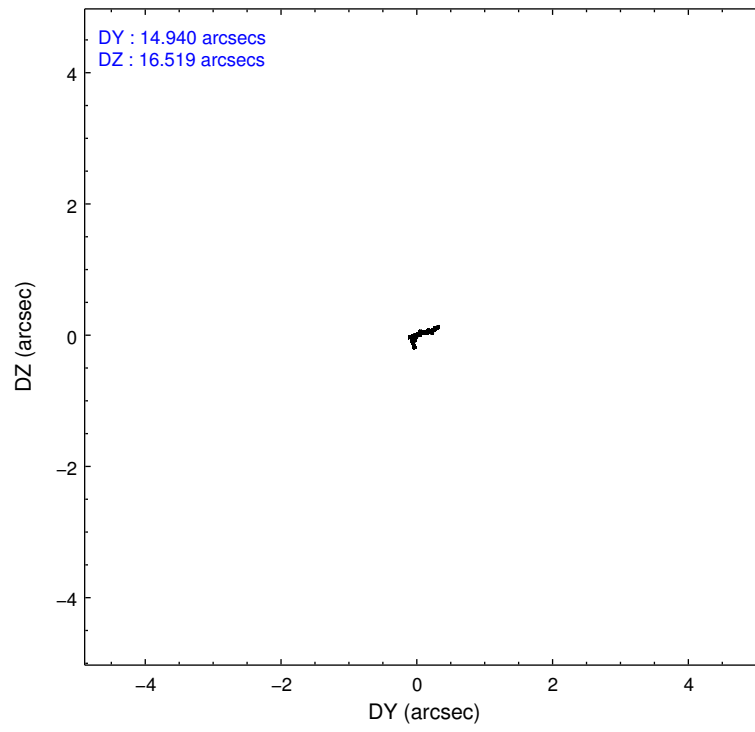
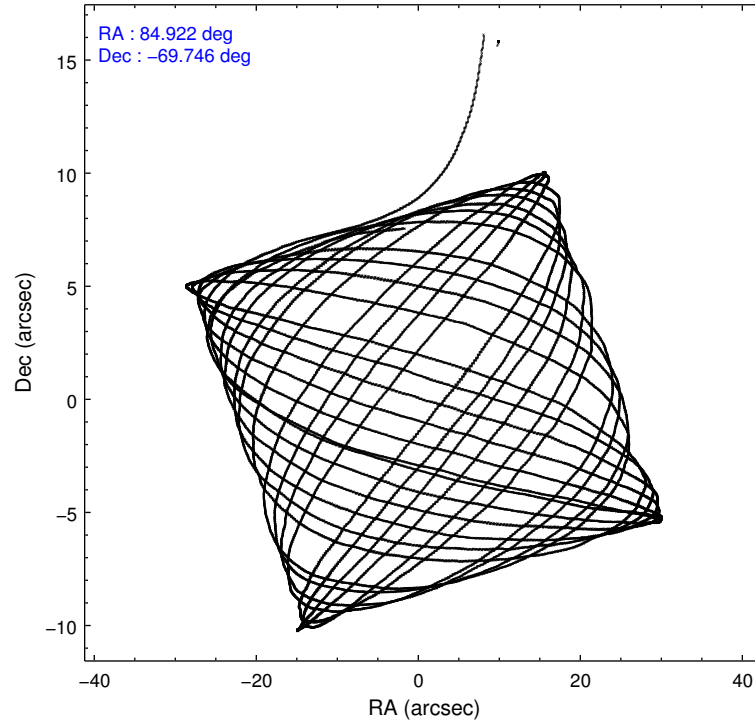
	ccd 4	ccd 5	ccd 6	ccd 7	ccd 8	ccd 9		ccd 4	ccd 5	ccd 6	ccd 7	ccd 8	ccd 9
level 1 events	81623	113923	142963	153328	118092	69521	grade 0 events	11773	12400	63927	20805	34364	8166
rejected events	65403	50003	59336	44662	64208	55857		14%	10%	44%	13%	29%	11%
rejected %	80%	43%	41%	29%	54%	80%	grade 1 events	77	352	482	358	164	50
								0%	0%	0%	0%	0%	0%
							grade 2 events	2321	22466	10535	27206	8474	2357
								2%	19%	7%	17%	7%	3%
							grade 3 events	989	4442	3735	12276	3307	1140
								1%	3%	2%	8%	2%	1%
							grade 4 events	997	4365	3751	12074	3081	1131
								1%	3%	2%	7%	2%	1%
							grade 5 events	2473	8179	2739	8706	3643	2634
								3%	7%	1%	5%	3%	3%
							grade 6 events	1419	25293	3529	40134	6878	1623
								1%	22%	2%	26%	5%	2%
							grade 7 events	61574	36426	54265	31769	58181	52420
								75%	31%	37%	20%	49%	75%

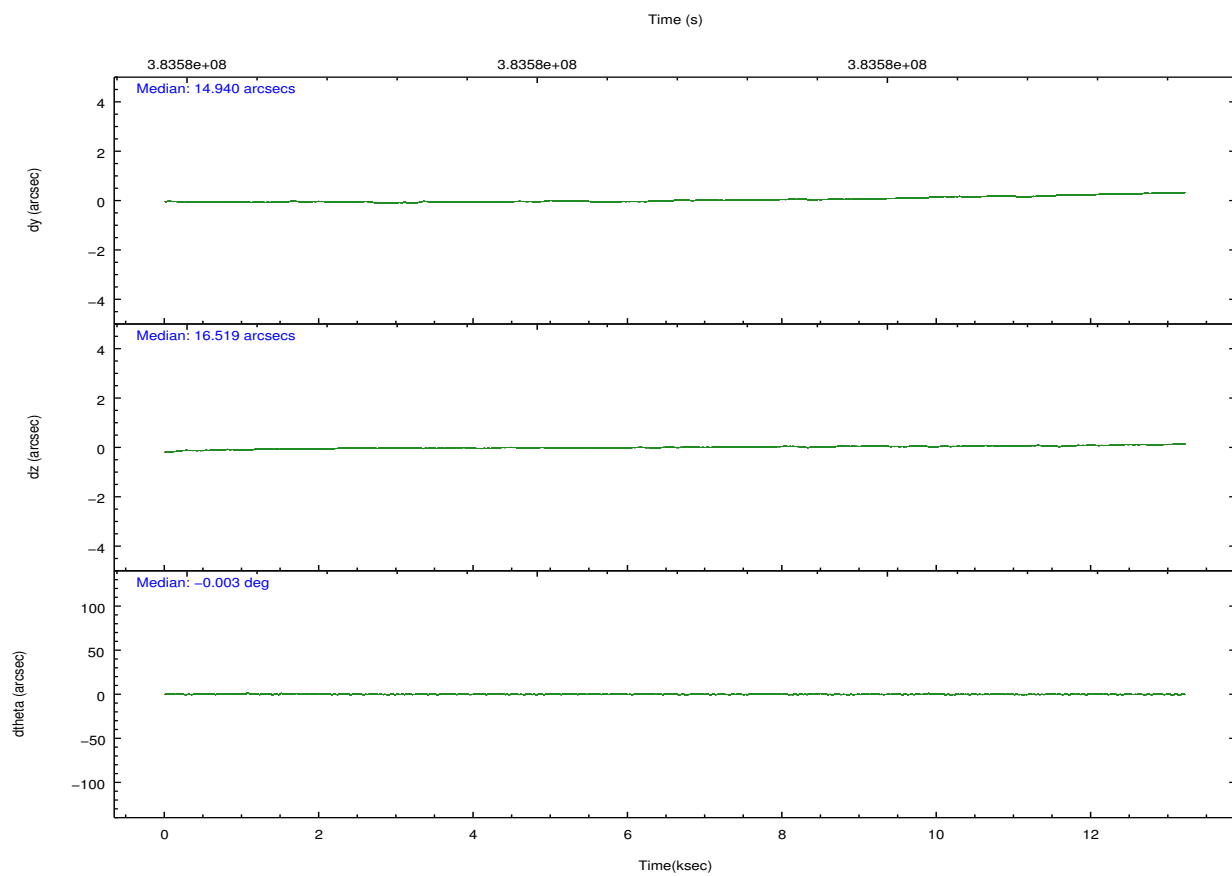
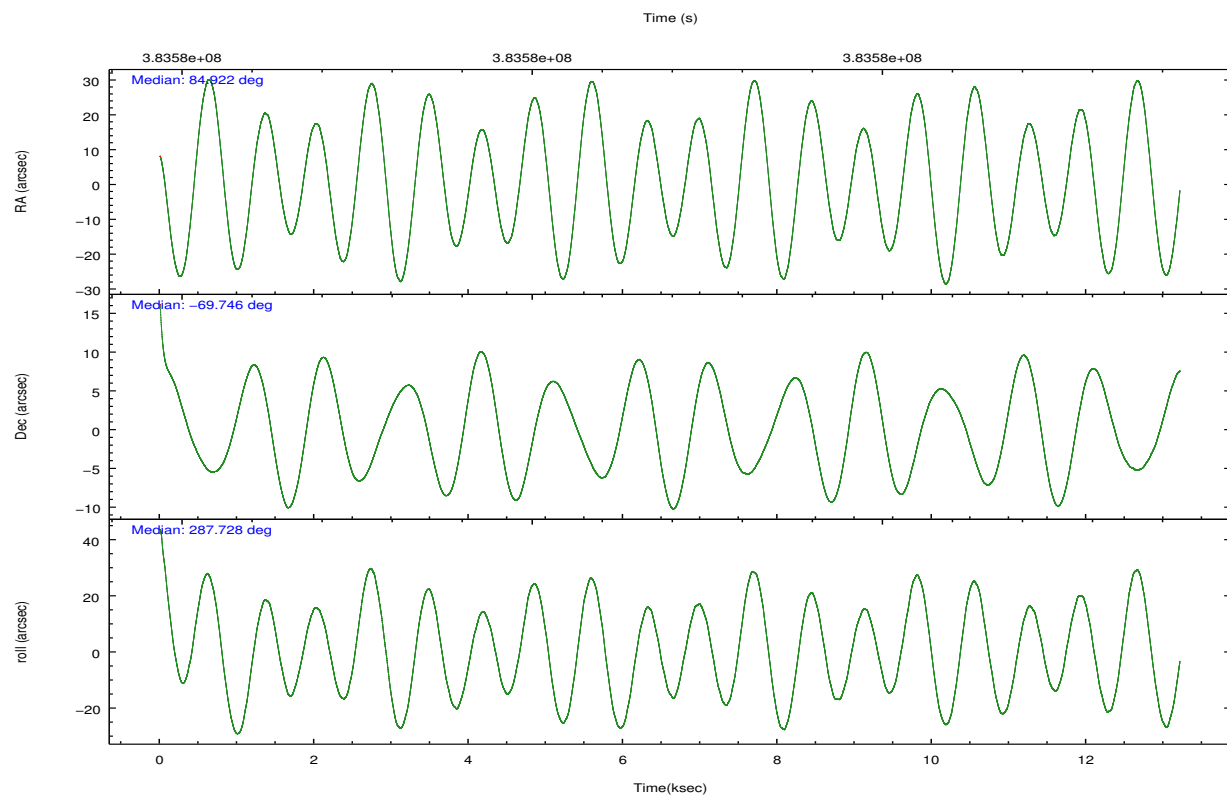


## 2.2 Compared Parameters

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	CCD I0 on	N	N
Observation mode	POINTING	POINTING	CCD I1 on	N	N
[deg] Pointing RA	84.863170	84.92219185566117	CCD I2 on	N	N
[deg] Pointing Dec	-69.728295	-69.74637645539264	CCD I3 on	N	N
[deg] Pointing Roll	287.527622	287.7396281459418	CCD S0 on	O1	Y
[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	-183.992523	-183.985022191653	CCD S3 on	Y	Y
[mm] SIM translation stage offset	-6.14	-6.147500391354811	CCD S4 on	Y	Y
[s] Observation start time (MET)	383575541.184000	383574058.05897	CCD S5 on	Y	Y
Observation start date	2010-02-26T12:44:35	2010-02-26T12:20:58	Number of optional ACIS chips dropped	0	0
[s] Observation end time (MET)	383588582.184000	383588810.37221	On-chip summing requested	N	N
Observation end date	2010-02-26T16:21:56	2010-02-26T16:26:50	Subarray requested	CUSTOM	1/2
Read mode	TIMED	TIMED	Subarray start row	1	1
			Subarray row count	512	512
			Alternating exposures requested	N	N
			[s] Primary exposure time	0.000000	1.7

## 2.3 Aspect



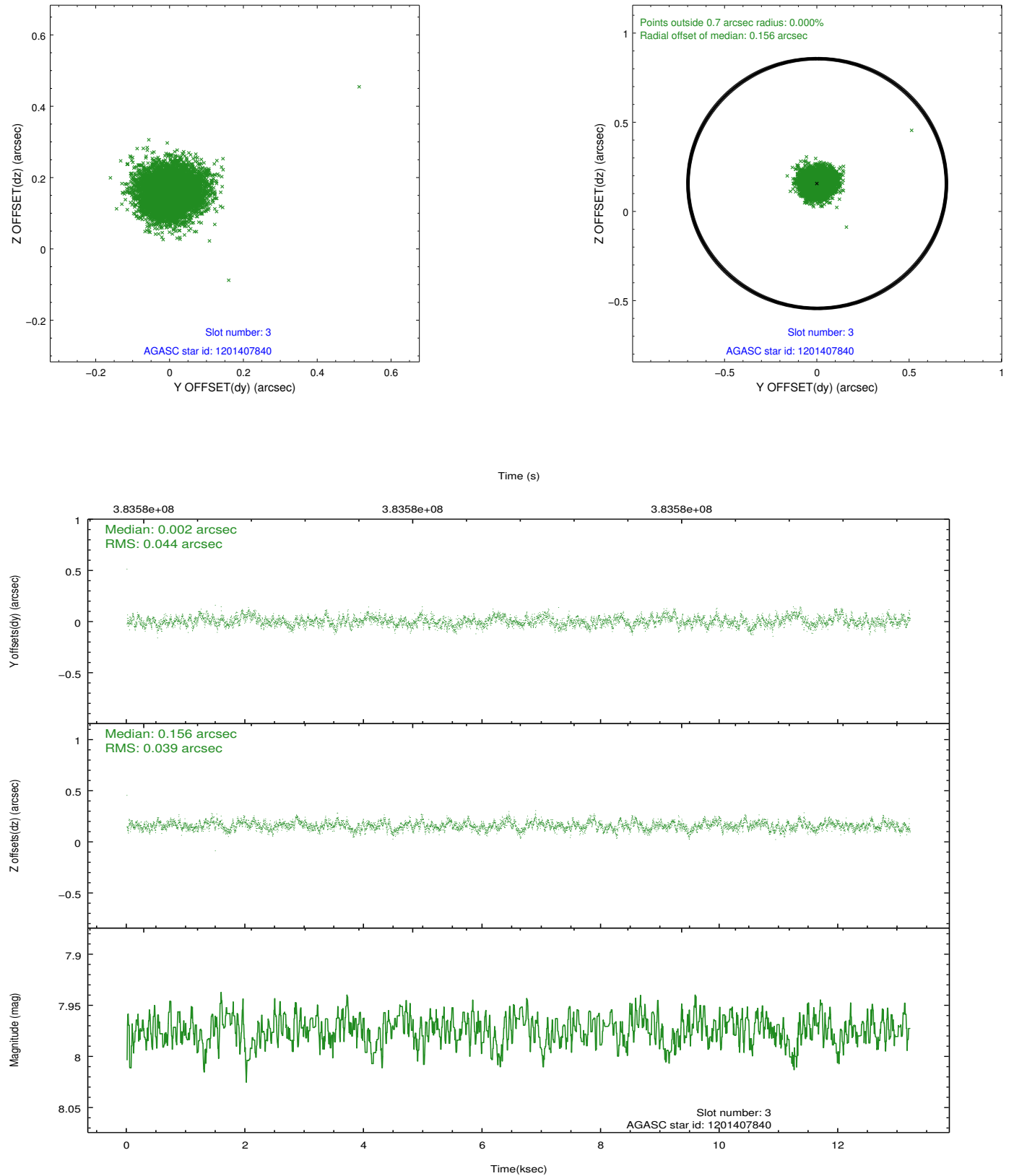


### Slot Statistics

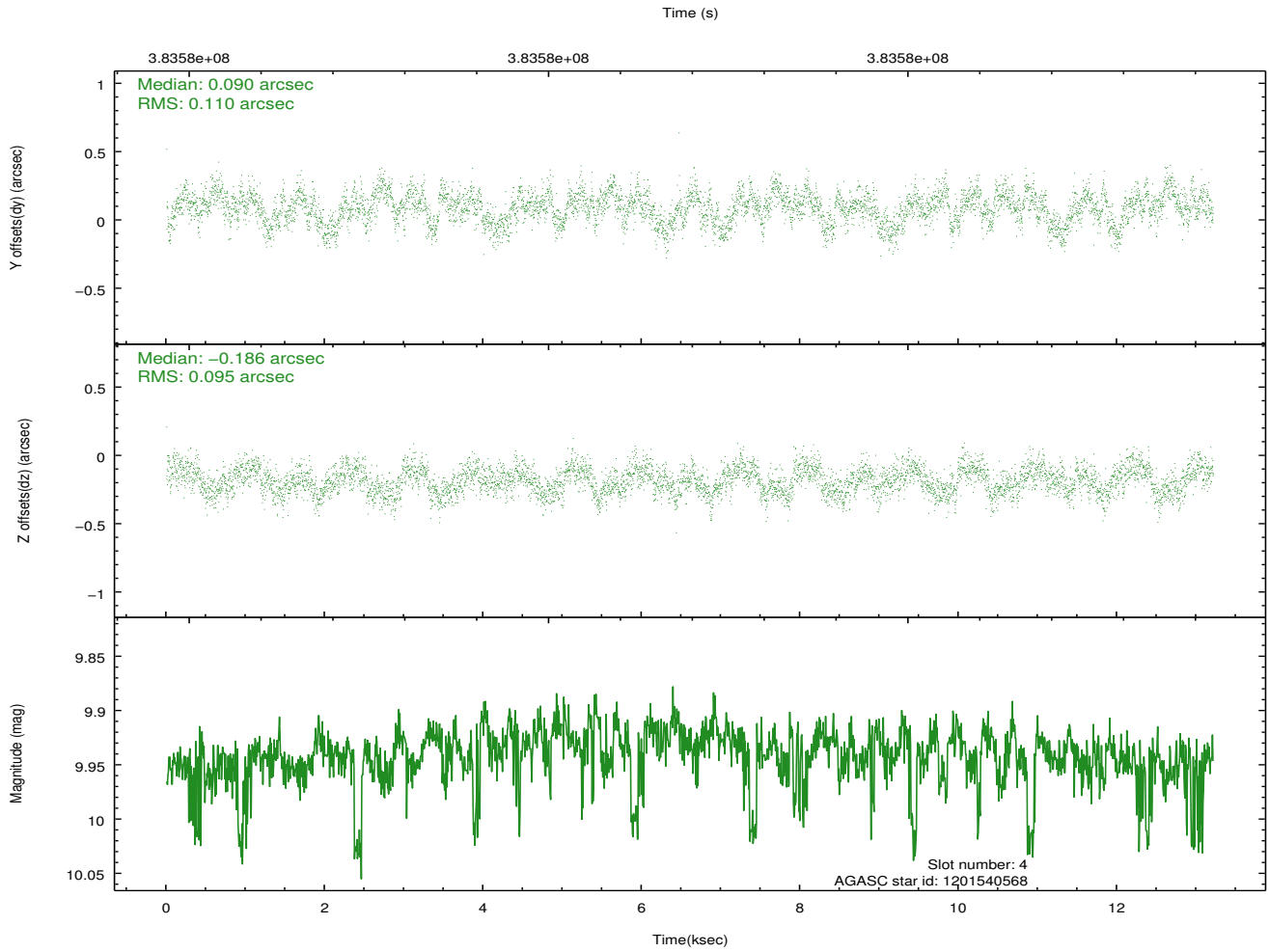
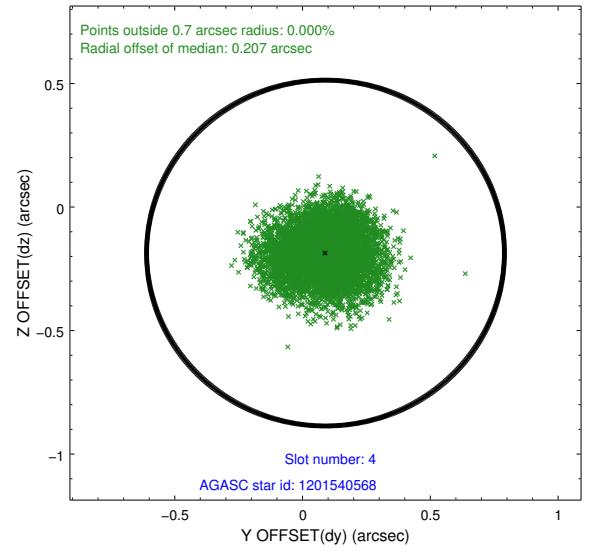
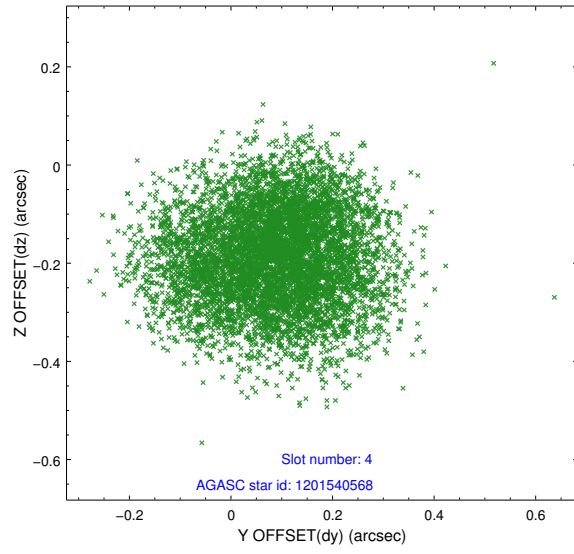
slot	status	id	mag	n_pts	med_dy	med_dz	dr1	dr2	ra	dec	mean_y	mean_z
0	FID	ACIS-S-2	6.87	3223	-0.089	-0.103	0.007	0.012	0.000000	0.000000	-767.65	-1864.74
1	FID	ACIS-S-4	6.93	3223	0.209	0.071	0.006	0.011	0.000000	0.000000	2145.80	43.43
2	FID	ACIS-S-5	6.99	3223	-0.150	0.040	0.006	0.011	0.000000	0.000000	-1820.04	37.57
3	GUIDE	1201407840	7.97	6441	0.002	0.156	0.062	0.100	83.696303	-70.172201	1108.89	-1843.74
4	GUIDE	1201540568	9.94	6439	0.090	-0.186	0.157	0.244	85.901764	-70.070643	1570.01	840.71
5	GUIDE	1201540760	8.55	6429	-0.003	0.135	0.086	0.140	84.403691	-70.419249	2207.98	-1277.51
6	GUIDE	1201541752	7.36	6445	-0.123	-0.164	0.055	0.089	85.373891	-70.033762	1240.91	266.64
7	GUIDE	1201542672	8.19	6442	0.036	0.061	0.061	0.100	84.492488	-69.957531	649.95	-683.74

## 2.4 Star Slots

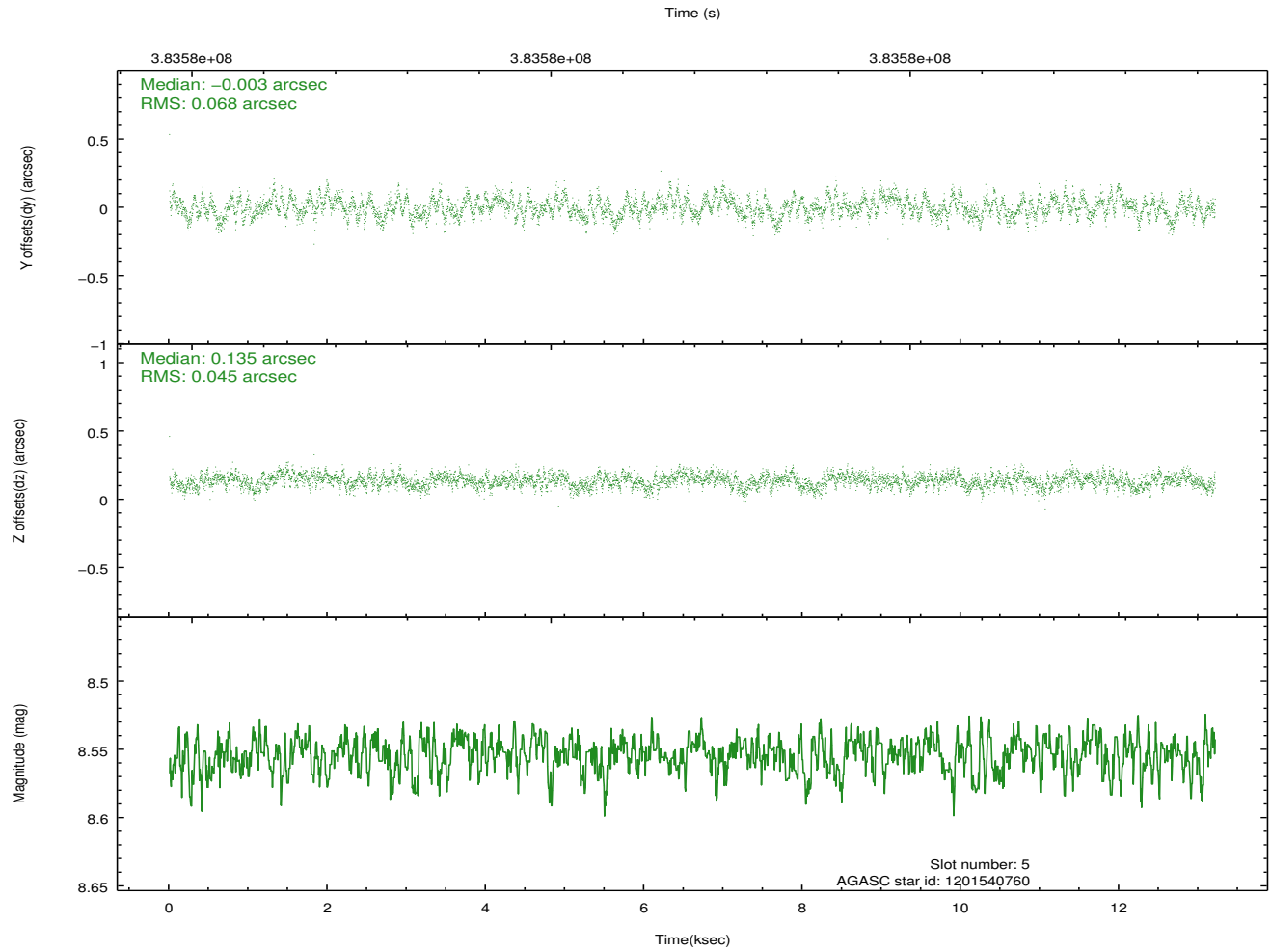
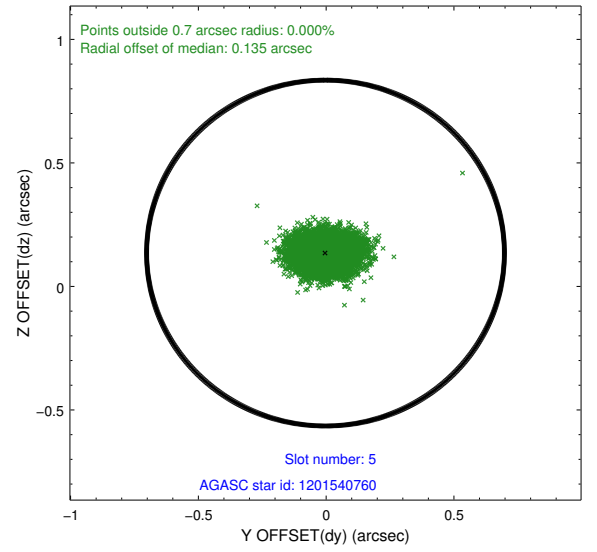
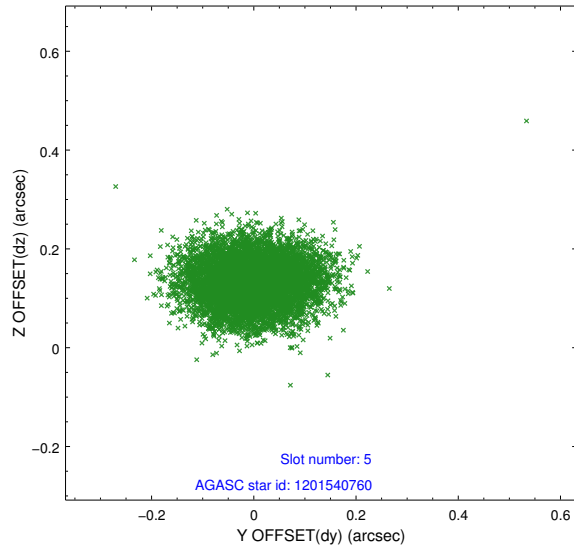
### 2.4.1 Slot 3



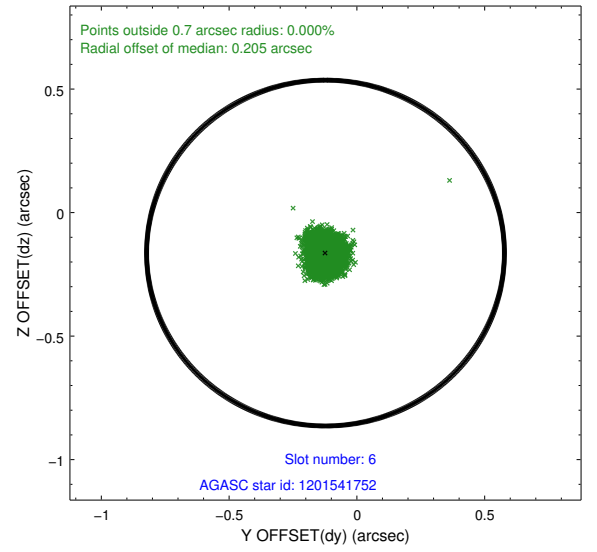
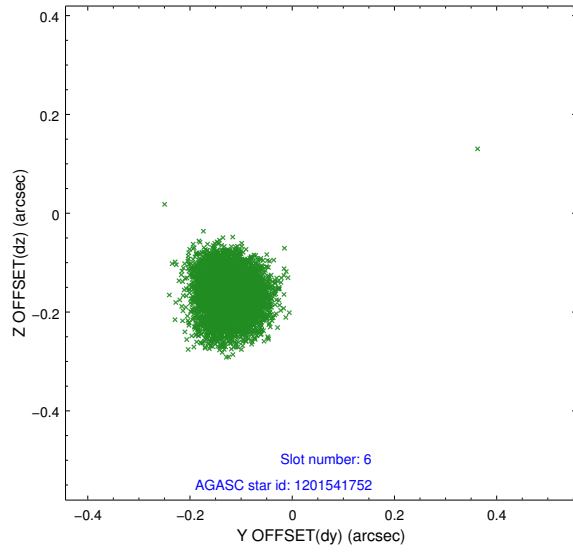
## 2.4.2 Slot 4



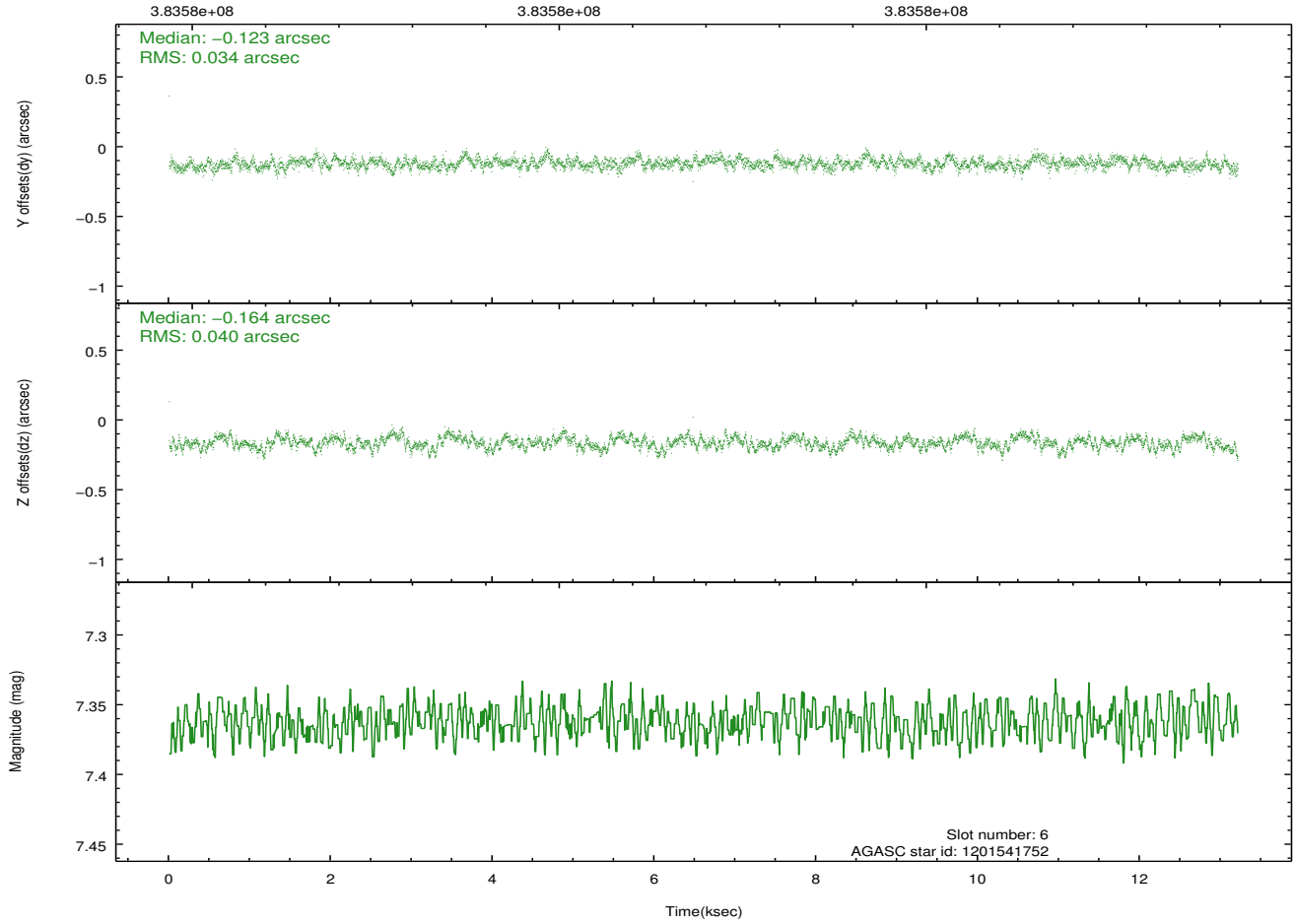
### 2.4.3 Slot 5



## 2.4.4 Slot 6

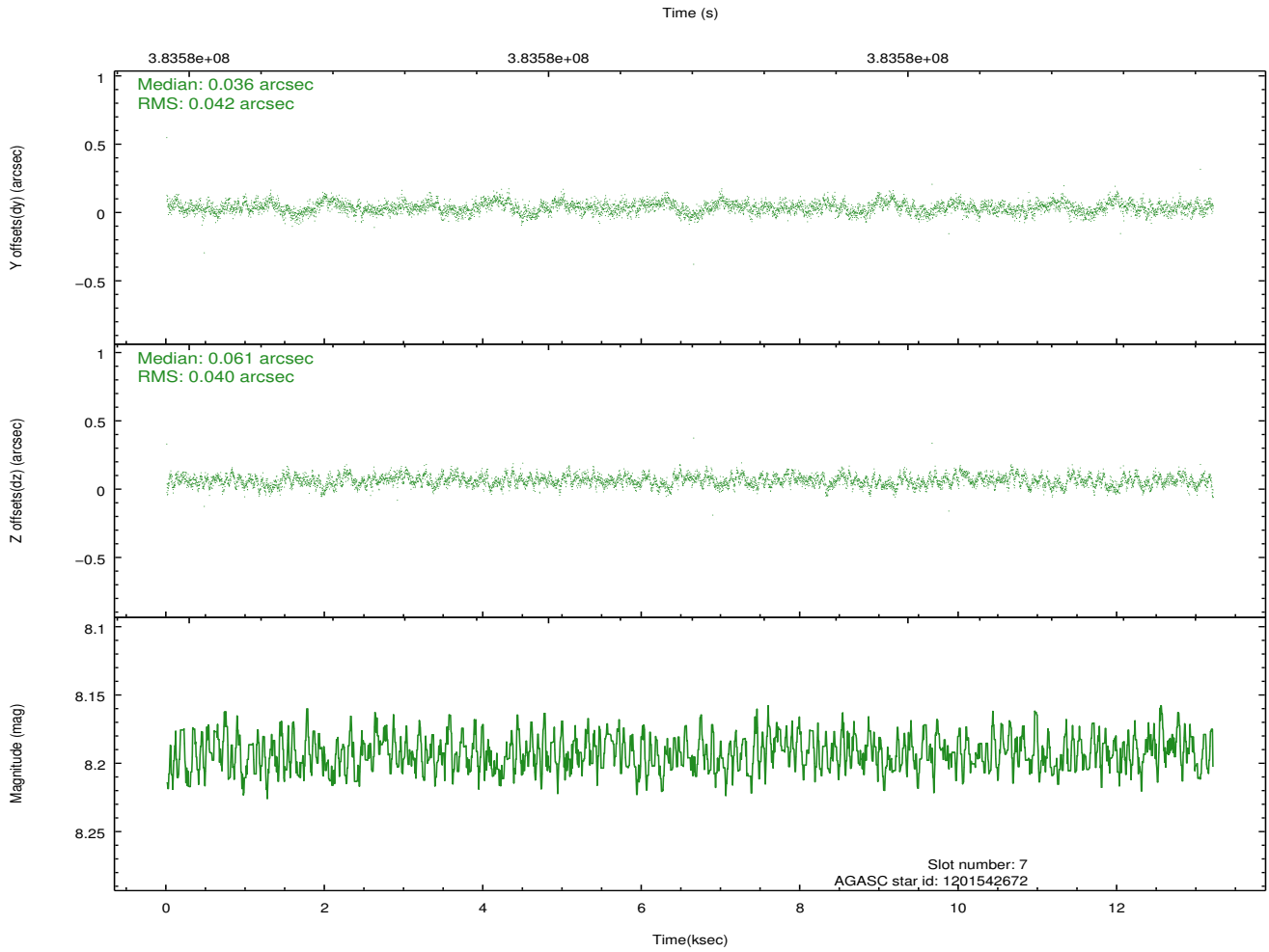
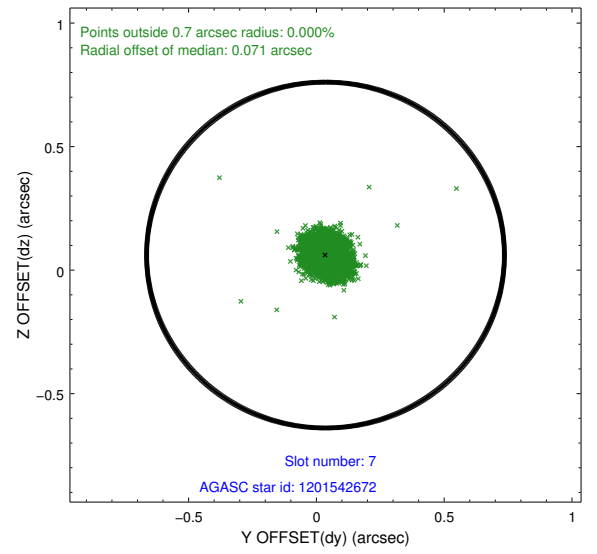
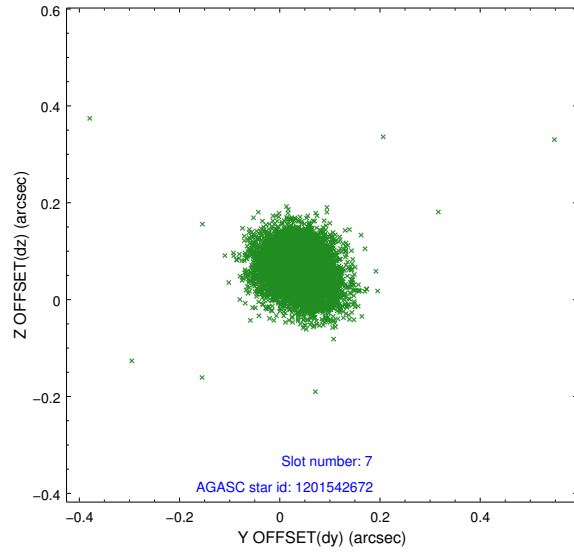


Time (s)



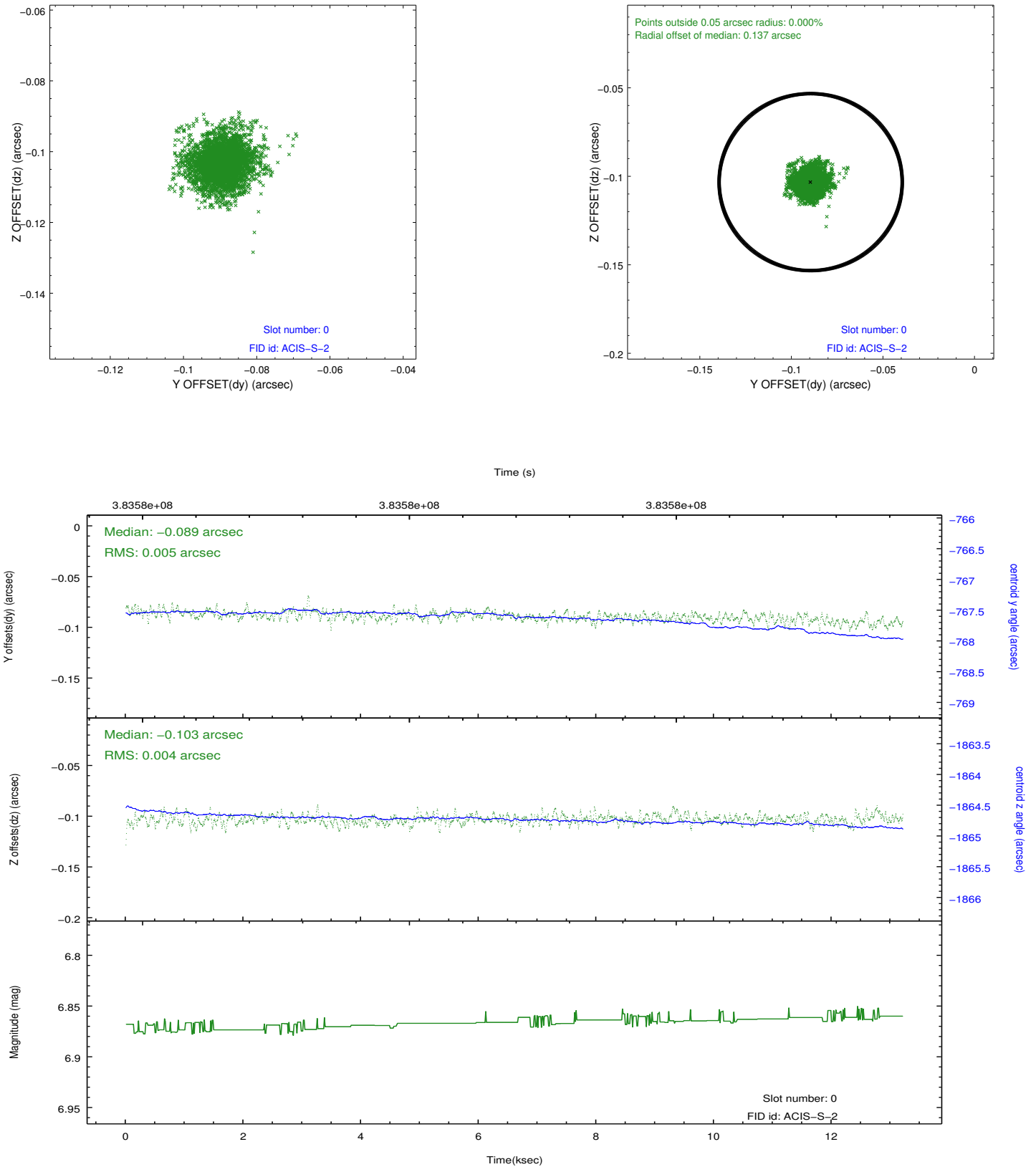


## 2.4.5 Slot 7

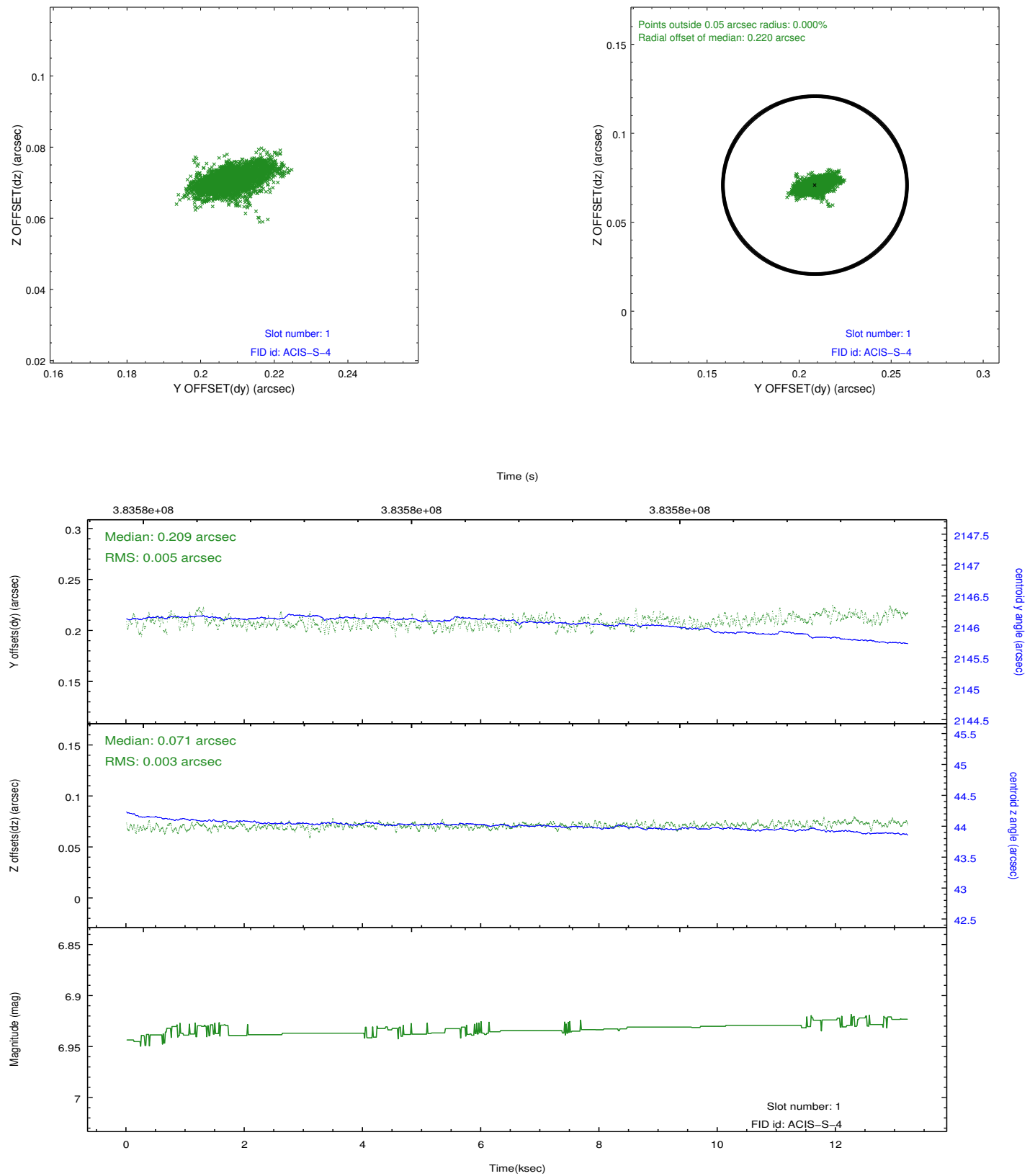


## 2.5 FID Slots

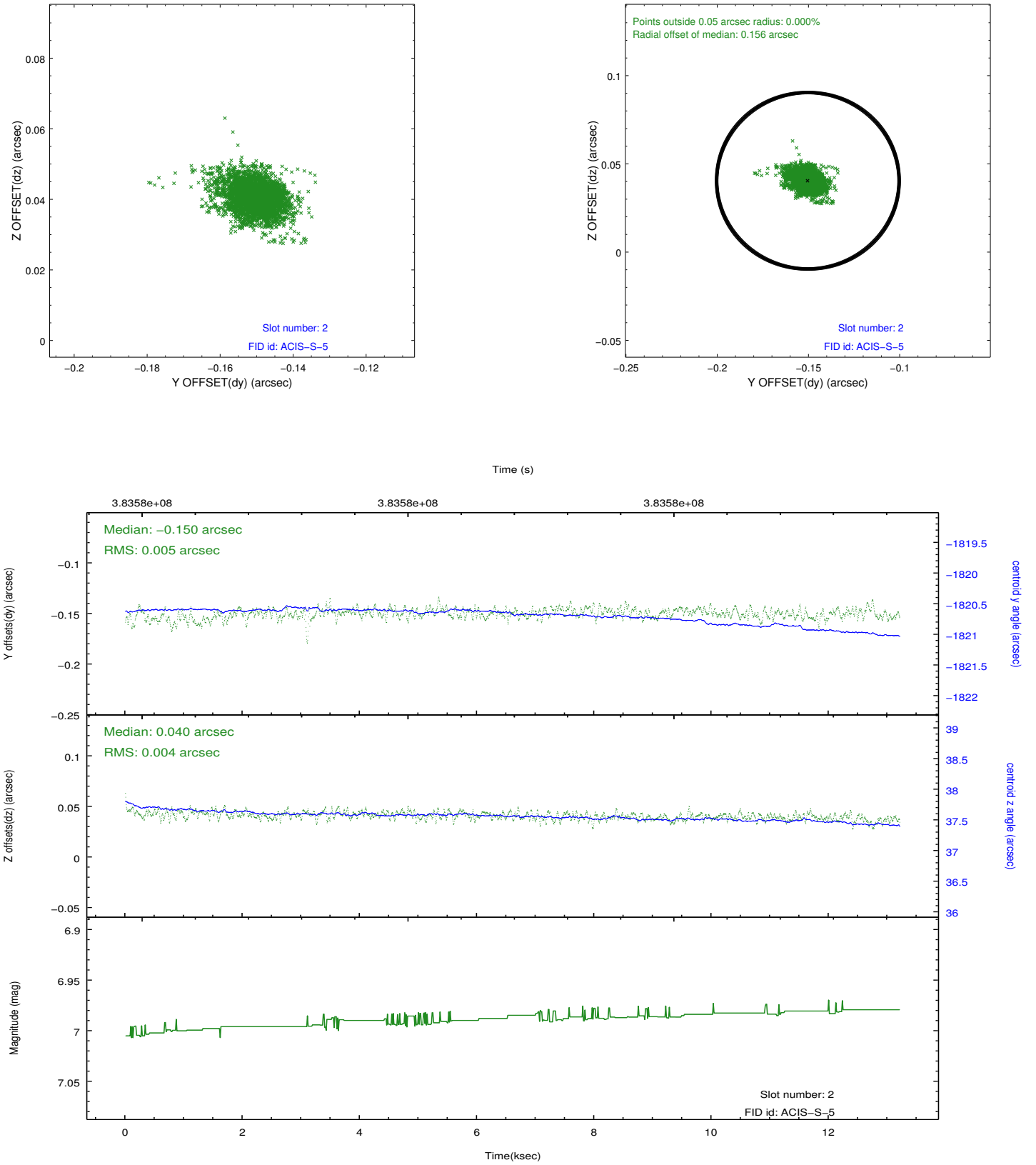
### 2.5.1 Slot 0



## 2.5.2 Slot 1

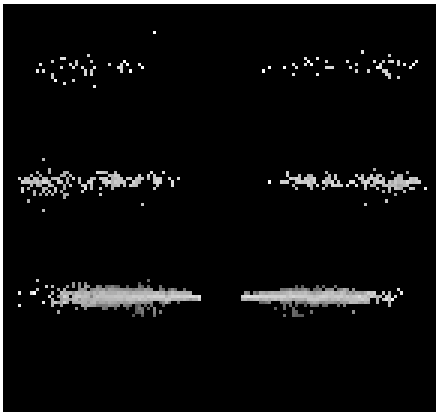


### 2.5.3 Slot 2

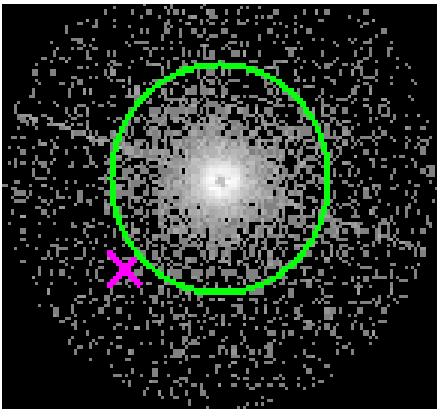


# 3 Gratings

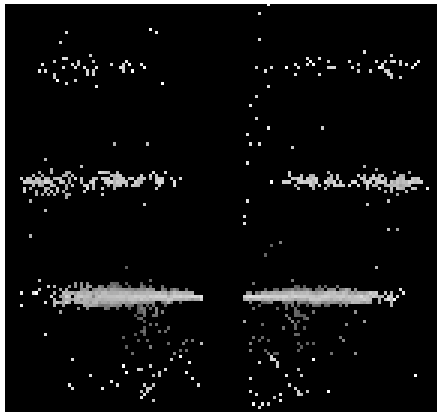
## 3.1 HEG Arm



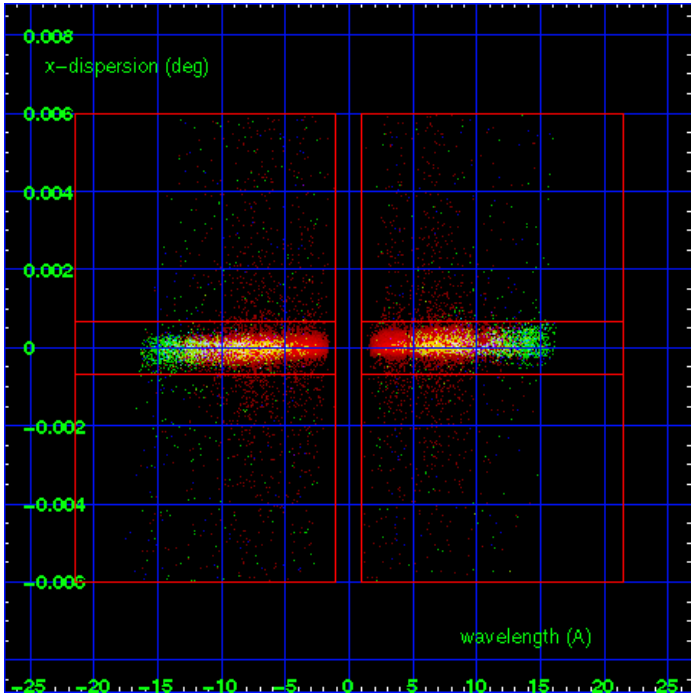
HEG Order Sort 123



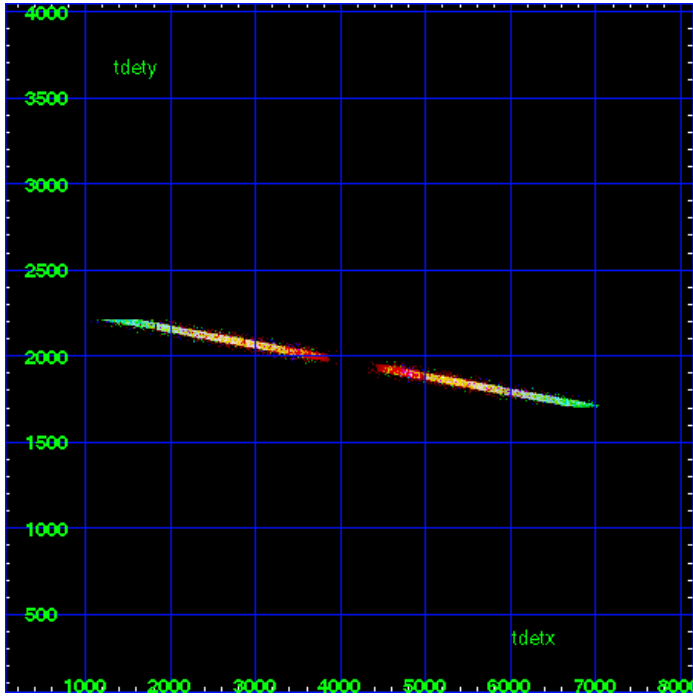
HEG Zero Order



HEG Order Sort ALL

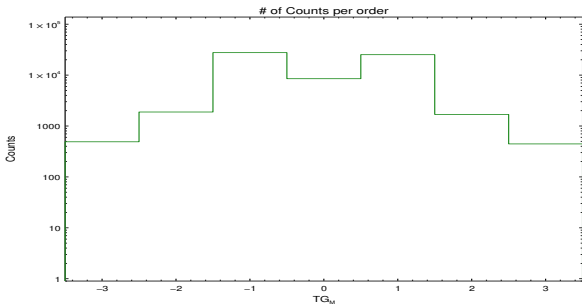


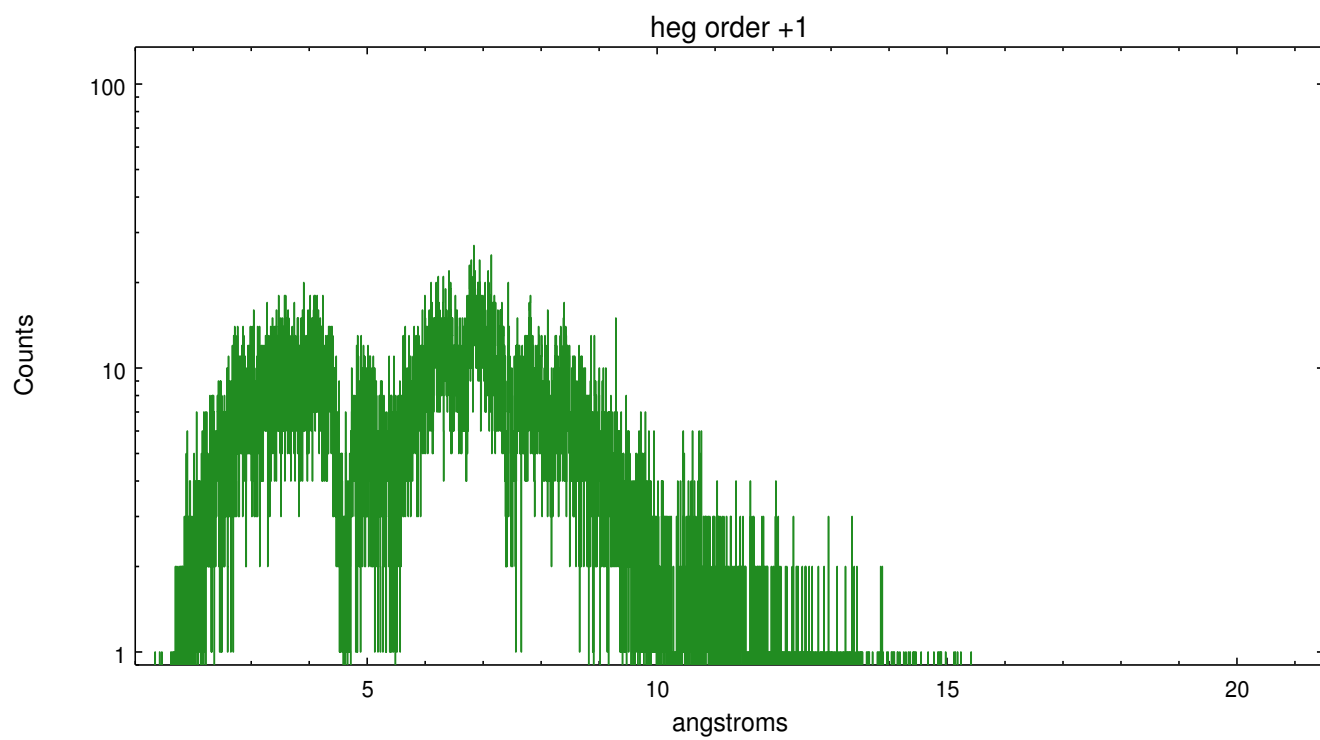
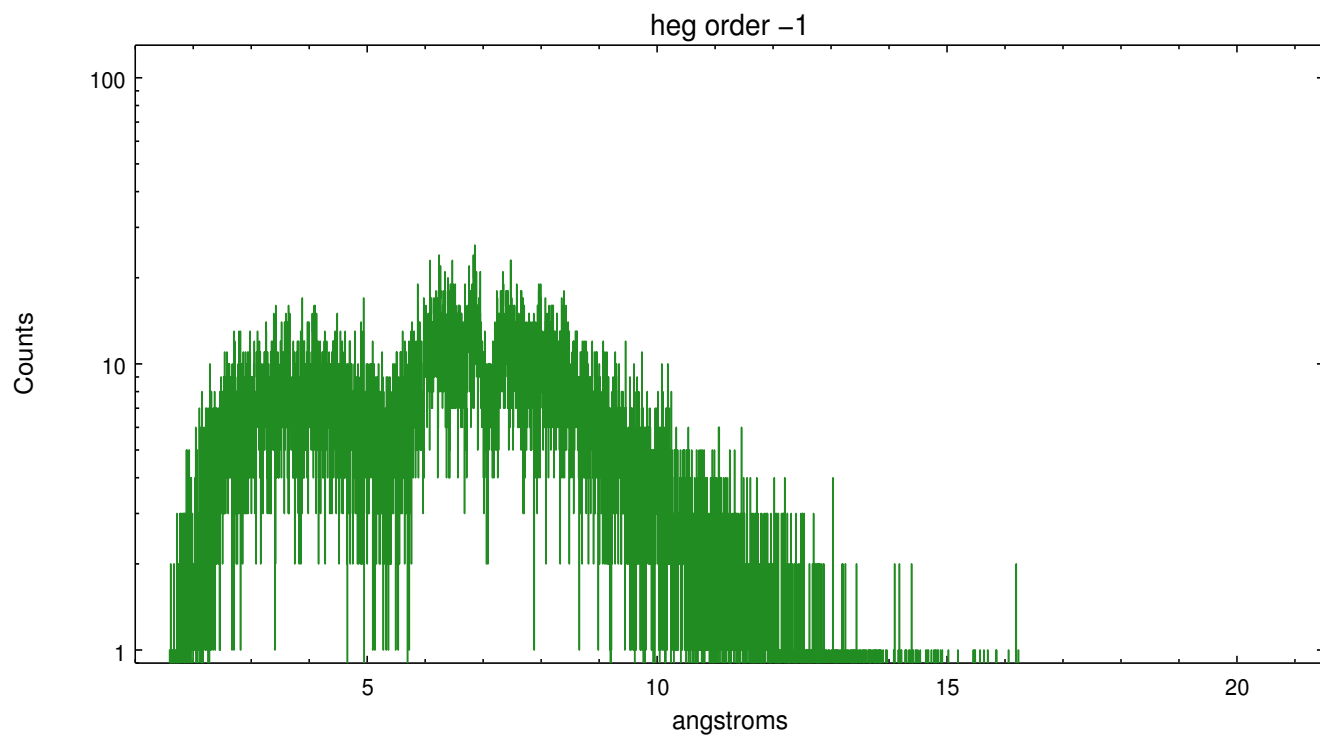
Spot Image HEG



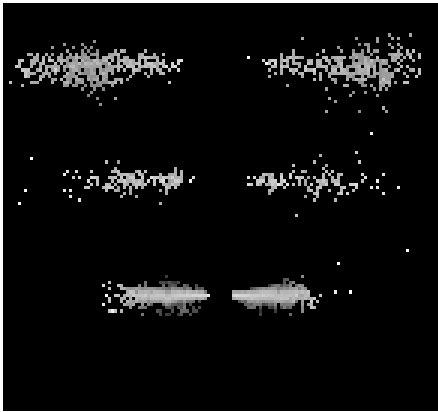
Full Detector HEG

	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	490	1884	27648	8506	25213	1688	445

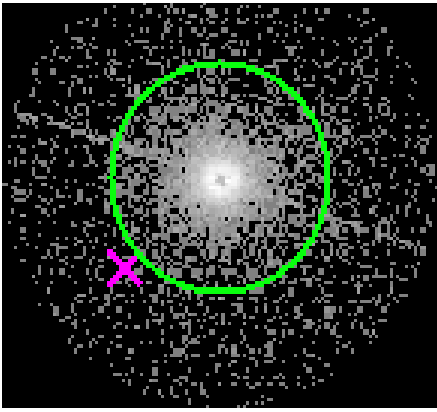




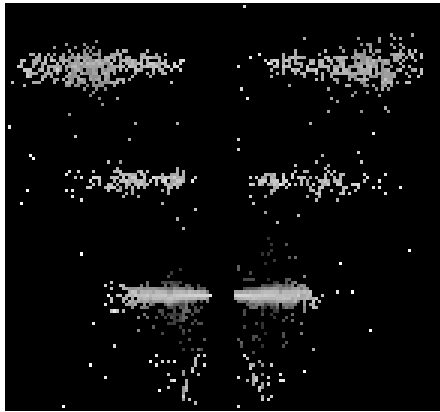
3.2 MEG Arm



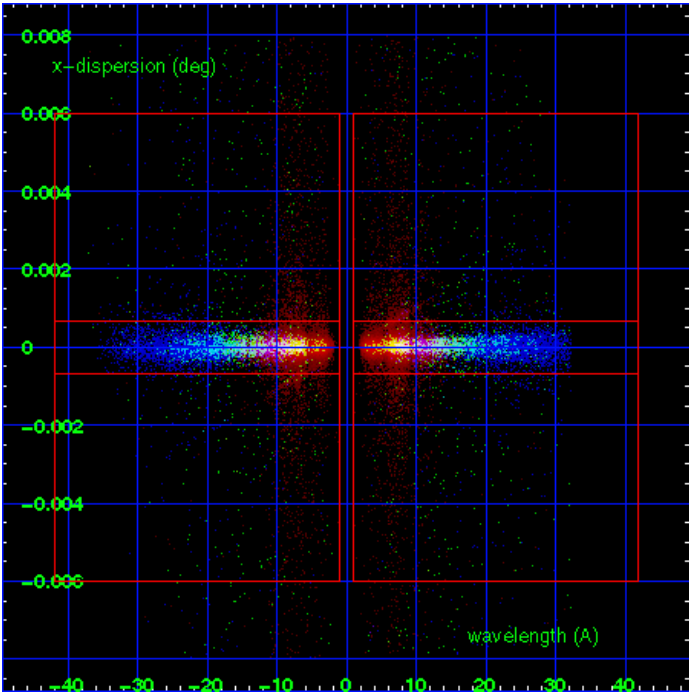
MEG Order Sort 123



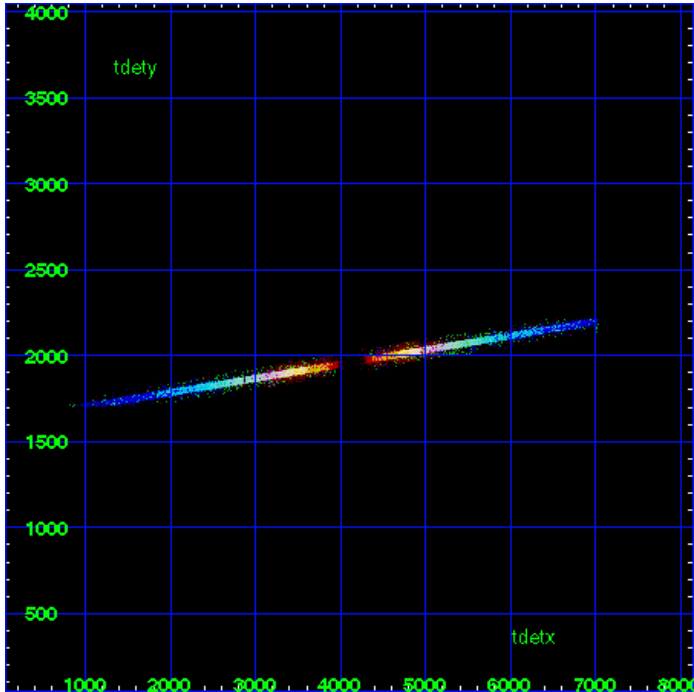
MEG Zero Order



MEG Order Sort ALL

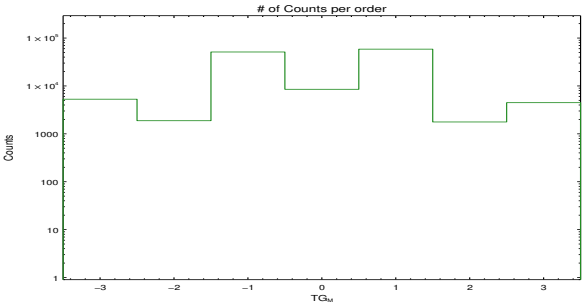


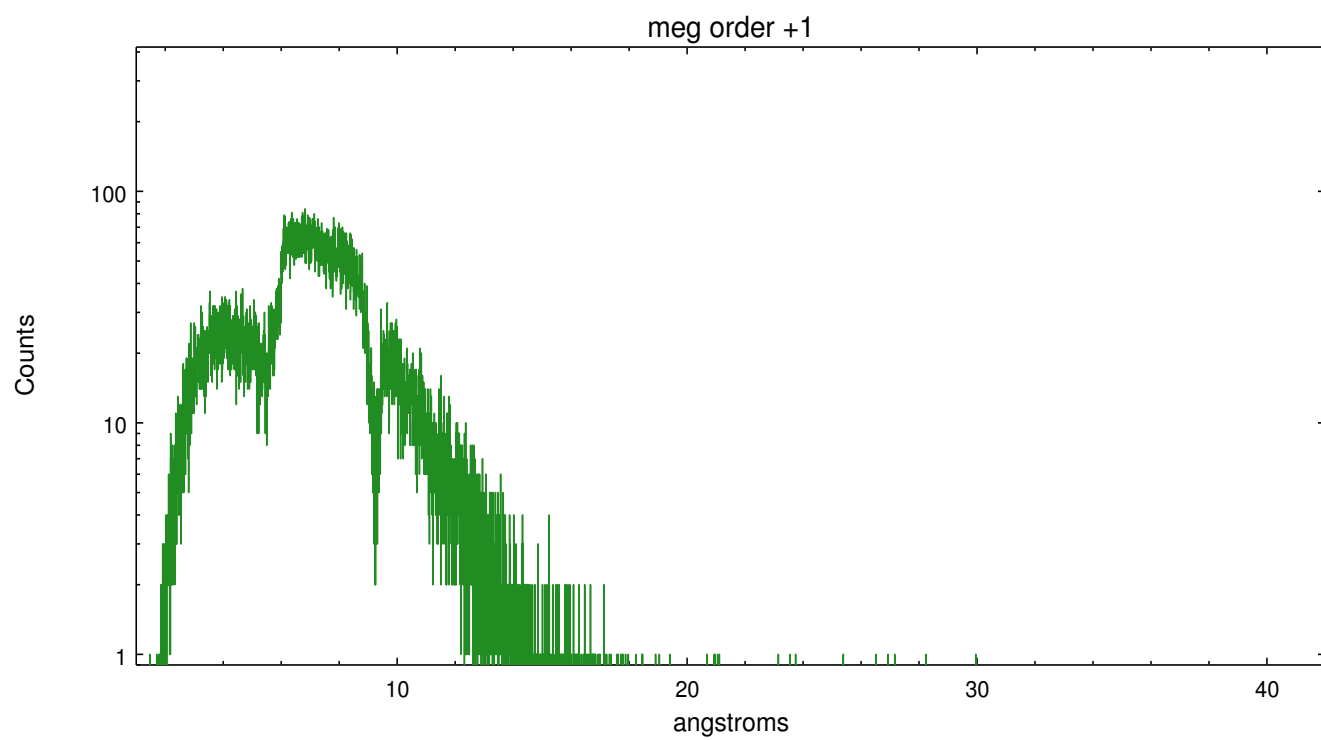
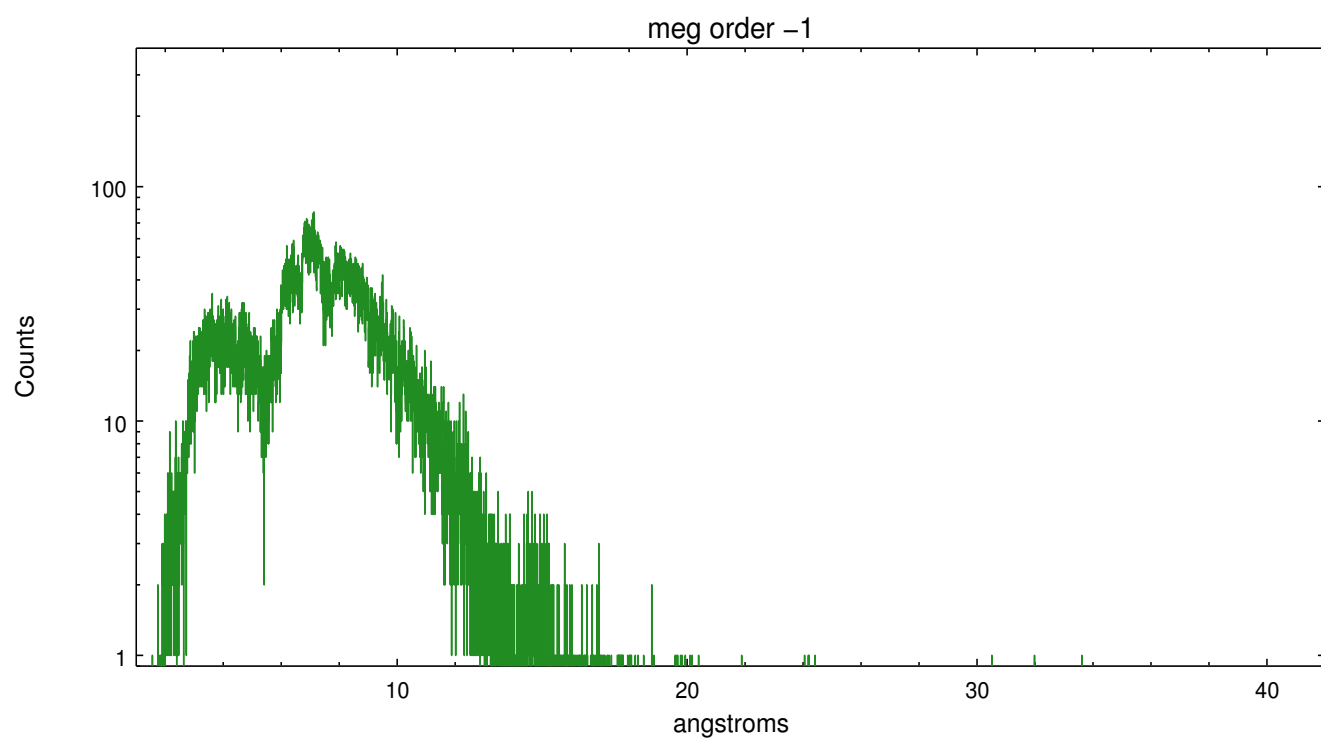
Spot Image MEG



Full Detector MEG

	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	5285	1880	51176	8506	58621	1769	4476







# A Summary

## A.1 Status

V&V Scientist	Joy Nichols
V&V Date (YYYY-MM-DD)	2012.06.25
V&V Edition	1
V&V Disposition and Status	OK
V&V Charge Time	13.205599907458

## A.2 Comments

Zeroth order piled up. Standard data processing software did not correctly locate the zeroth order due to pileup. Manual intervention was used to input the correct sky coordinates (x=4122.77, y=4119.49) into the \*src1a.fits file table. These corrected coordinates were determined using a software tool developed by CXC called findzero, which is expected to be released in CIAO (currently in ISIS). The tool calculates the point of intersection of the readout streak and the meg arm (preferred position), or the readout streak and the heg arm. The zeroth order source position determined by the standard pipeline processing using the tool tgdetect was not used in this processing. The newly determined zeroth order coordinates have been placed in the \*src1a.fits file, replacing the coordinates determined by tgdetect. Note that these corrected coordinates of the zeroth order cannot be reproduced by running tgdetect on the data.