

# V&V Reference Report

## L2 ASCDS Version : 7.6.8.1

Observation 2741 - L2 Version 001  
Chandra X-Ray Center

L2 Processing Date : Sep 26 2006

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# 1 Front

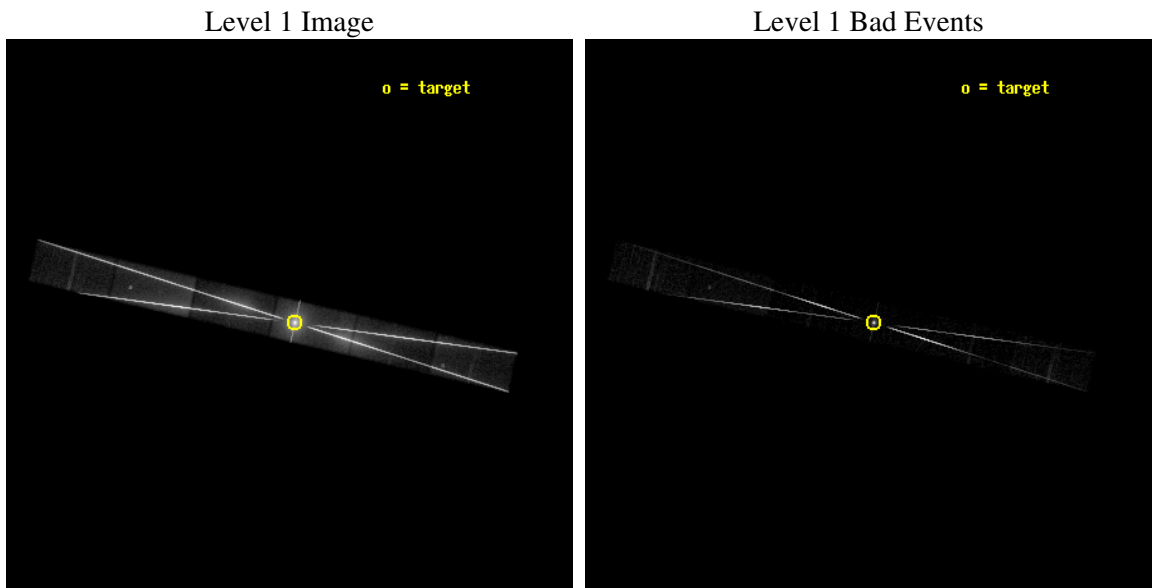
seq_num	400221
obs_id	2741
title	PHASE RESOLVED HIGH ENERGY RESOLUTION SPECTROSCOPY OF THE BLACK HOLE X-RAY BAINARY CYGNUS X-1
observer	Prof. Shuang Nan Zhang
object	CYG X-1
dtcycle	0
cycle	P
ra_targ	299.590417
dec_targ	35.201611
ra_nom	299.60224098141
dec_nom	35.202019215554
roll_nom	12.940152018754
revision	3
ontime	1931.2180001438
livetime	1885.6951019186
ontime4	4484.4839387387
ontime5	4091.020369783
ontime6	1450.7735905796
ontime7	1931.2180001438
ontime8	1851.2529318184
ontime9	4033.5653625429
l2events	1613785



## 2 OBI

### 2.1 OBI

#### 2.1.1 Images



### 2.1.2 Parameters

obi_num	0
ascdsver	7.6.8.1
caldsver	3.2.3
date	2006-08-29T15:22:41
revision	2

sched_exp_time	5000.000000
ontime	1934.2936468124
ontime4	4491.832847029
ontime5	4098.3692780733
ontime6	1453.7671572566
ontime7	1934.2936468124
ontime8	1854.205458492
ontime9	4040.9142907262
l1events	2049001

### 2.1.3 Events

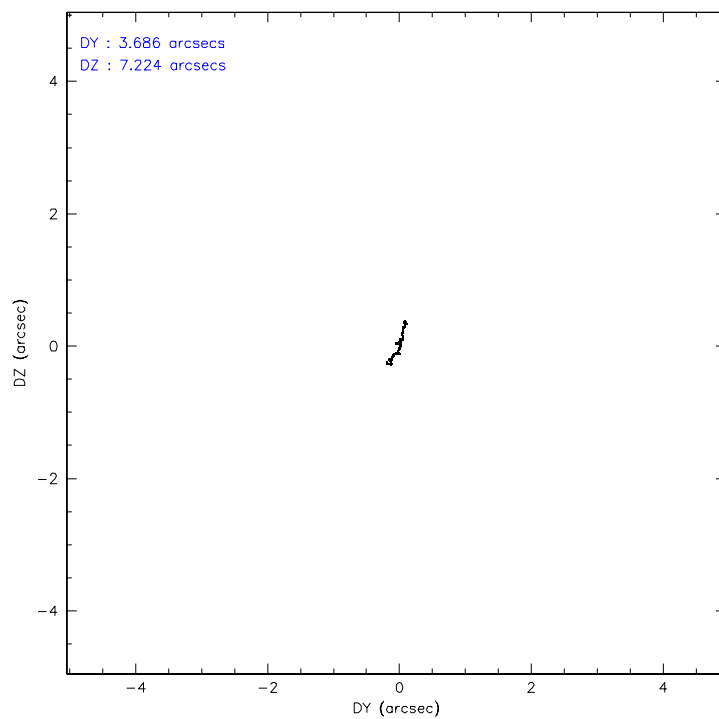
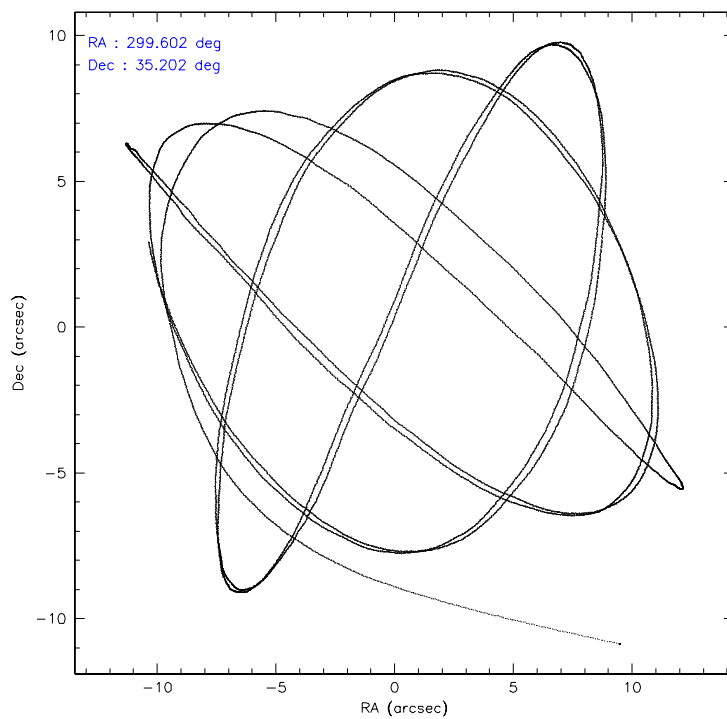
	ccd 4	ccd 5	ccd 6	ccd 7	ccd 8	ccd 9
level 1 events	101272	460121	408877	486403	382082	210246
rejected events	16507	58075	87650	122363	57394	16316
rejected %	16%	12%	21%	25%	15%	7%

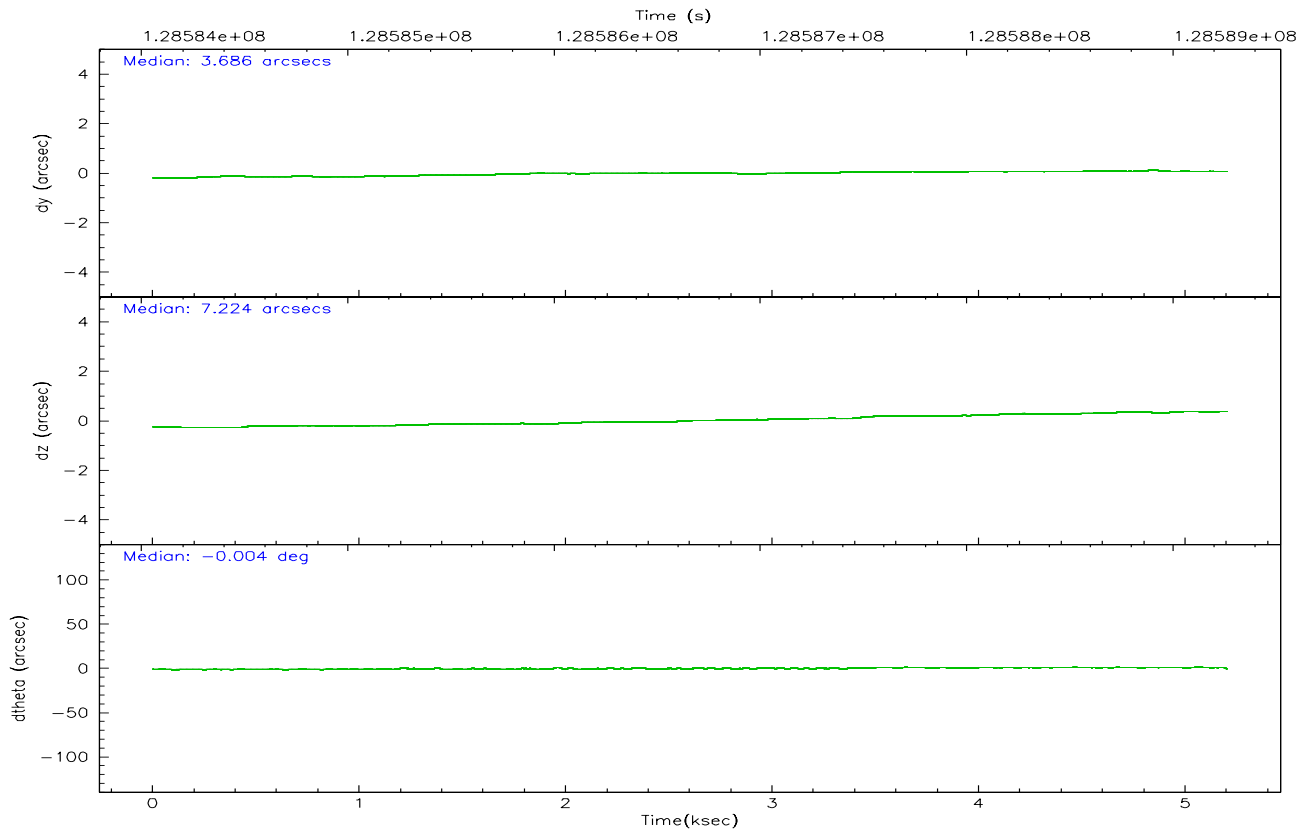
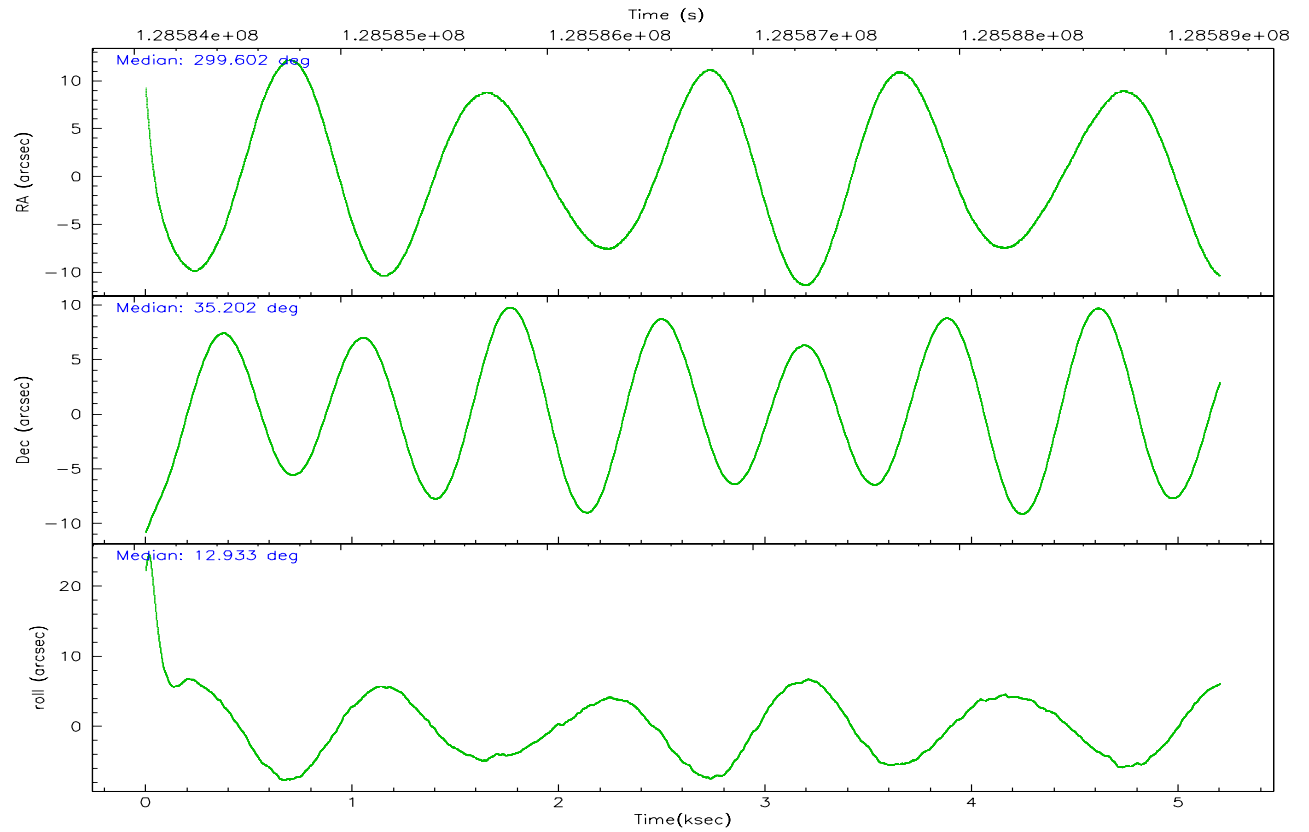
	ccd 4	ccd 5	ccd 6	ccd 7	ccd 8	ccd 9
grade 0 events	67866	114295	214483	66033	236980	155348
	67%	24%	52%	13%	62%	73%
grade 1 events	619	5193	29780	4289	24470	2579
	0%	1%	7%	0%	6%	1%
grade 2 events	9419	139717	47053	93790	42686	21575
	9%	30%	11%	19%	11%	10%
grade 3 events	2938	33412	20139	37151	16856	6679
	2%	7%	4%	7%	4%	3%
grade 4 events	2858	33206	19314	36465	16755	6690
	2%	7%	4%	7%	4%	3%
grade 5 events	803	18620	24663	21180	15367	1666
	0%	4%	6%	4%	4%	0%
grade 6 events	1820	82129	21001	131250	12037	4085
	1%	17%	5%	26%	3%	1%
grade 7 events	14949	33549	32444	96245	16931	11624
	14%	7%	7%	19%	4%	5%

## 2.2 Compared Parameters

Parameter	Planned	Actual	Parameter	Planned	Actual
Instrument	ACIS	ACIS	Obspar format version number	6	6
Detector	ACIS-456789	ACIS-456789	Obspar file type	PREDICTED	ACTUAL
Grating	HETG	HETG	Obspar update status	NONE	UPDATED
Data mode	GRADED	GRADED	On-chip summing requested	N	N
Observation mode	POINTING	POINTING	Subarray requested	CUSTOM	1/2
Pointing RA	299.578160	299.6022409814087	Subarray start row	1	1
Pointing Dec	35.183271	35.20201921555367	Subarray row count	512	512
Pointing Roll	12.797349	12.94015201875409	Alternating exposures requested	N	N
SIM focus pos (mm)	-0.684267	-0.6828225247311905	Primary exposure time	0.000000	1.7
SIM defocus (mm)	0	0.001444936568705701			
SIM translation stage pos (mm)	-184.612523	-184.6110867017414			
SIM translation stage offset (mm)	-5.52	-5.52143588126637			
Phase constraints	Y	Y			
Phase period	5.599847	5.599847			
Phase epoch	51998.668500	51998.668500			
Phase start	0.250000	0.250000			
Phase end	0.260000	0.260000			
Phase start error	0.050000	0.050000			
Phase end error	0.050000	0.050000			
Observation start time	128584261.184000	128583271.8565			
Observation start date	2002-01-28T05:49:57	2002-01-28T05:34:31			
Observation end time	128589261.184000	128590228.01928			
Observation end date	2002-01-28T07:13:17	2002-01-28T07:30:28			
Read mode	TIMED	TIMED			

## 2.3 Aspect





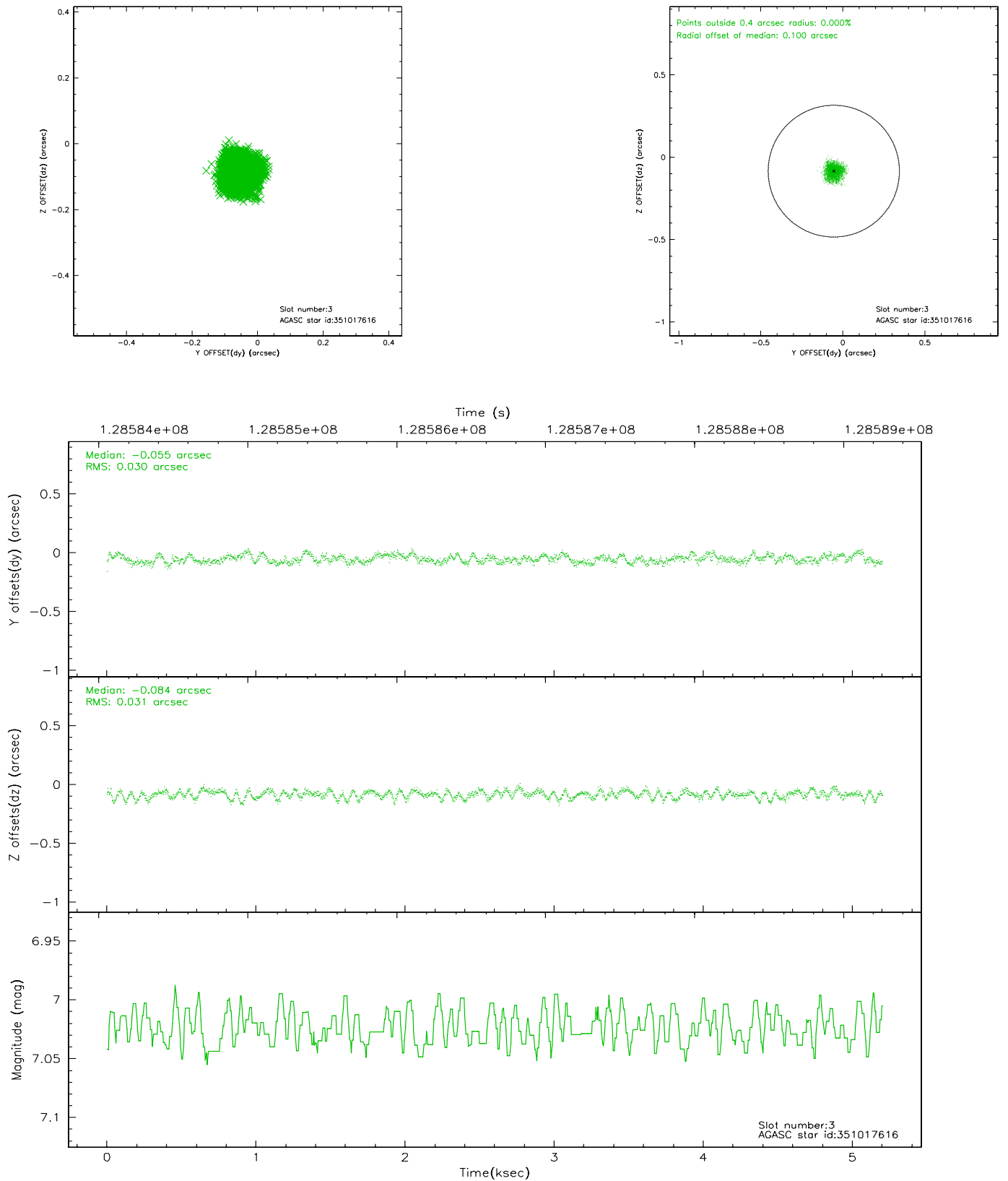
### Slot Statistics

slot	status	id	mag	n_pts	med_dy	med_dz	dr1	dr2	ra	dec	mean_y	mean_z
0	FID	ACIS-S-2	7.10	1269	-0.026	-0.047	0.011	0.019	0.000000	0.000000	-755.96	-1842.30
1	FID	ACIS-S-4	7.19	1269	-0.020	0.025	0.005	0.008	0.000000	0.000000	2156.79	64.96
2	FID	ACIS-S-5	7.23	1269	0.014	0.030	0.010	0.017	0.000000	0.000000	-1807.27	59.95
3	GUIDE	351017616	7.03	2539	-0.055	-0.084	0.047	0.072	300.079295	35.358356	1576.07	292.21
4	GUIDE	351014304	8.40	2538	-0.047	0.012	0.068	0.111	299.690883	35.621541	672.56	1465.64
5	GUIDE	351018080	8.32	2539	0.011	-0.010	0.065	0.104	299.327312	34.581247	-1203.47	-1947.72
6	GUIDE	351016136	8.59	2532	0.009	0.073	0.061	0.098	300.302636	34.786391	1774.82	-1860.95
7	GUIDE	350889888	9.13	2533	0.086	0.004	0.080	0.125	299.019639	35.534865	-1312.67	1600.08

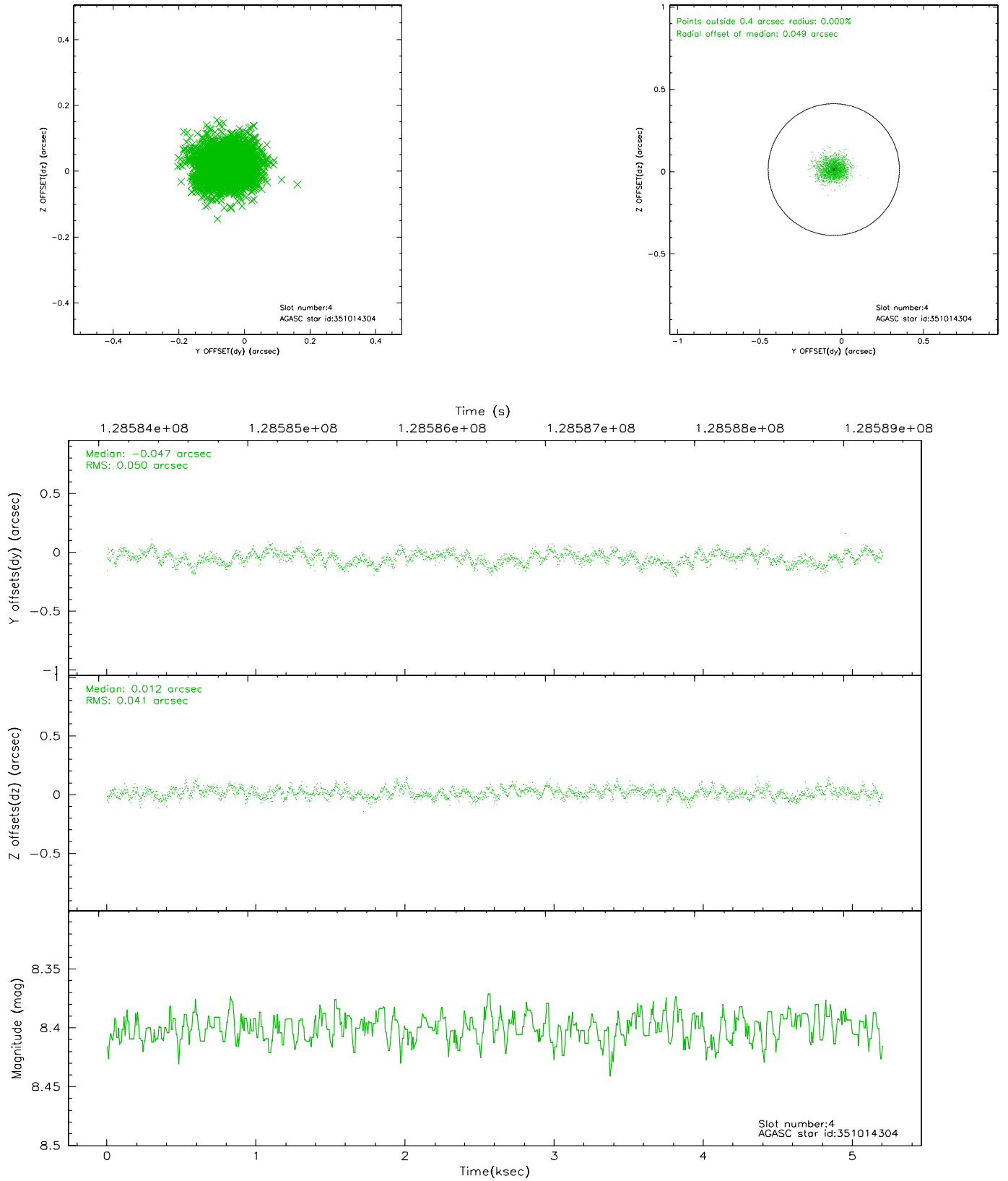


## 2.4 Star Slots

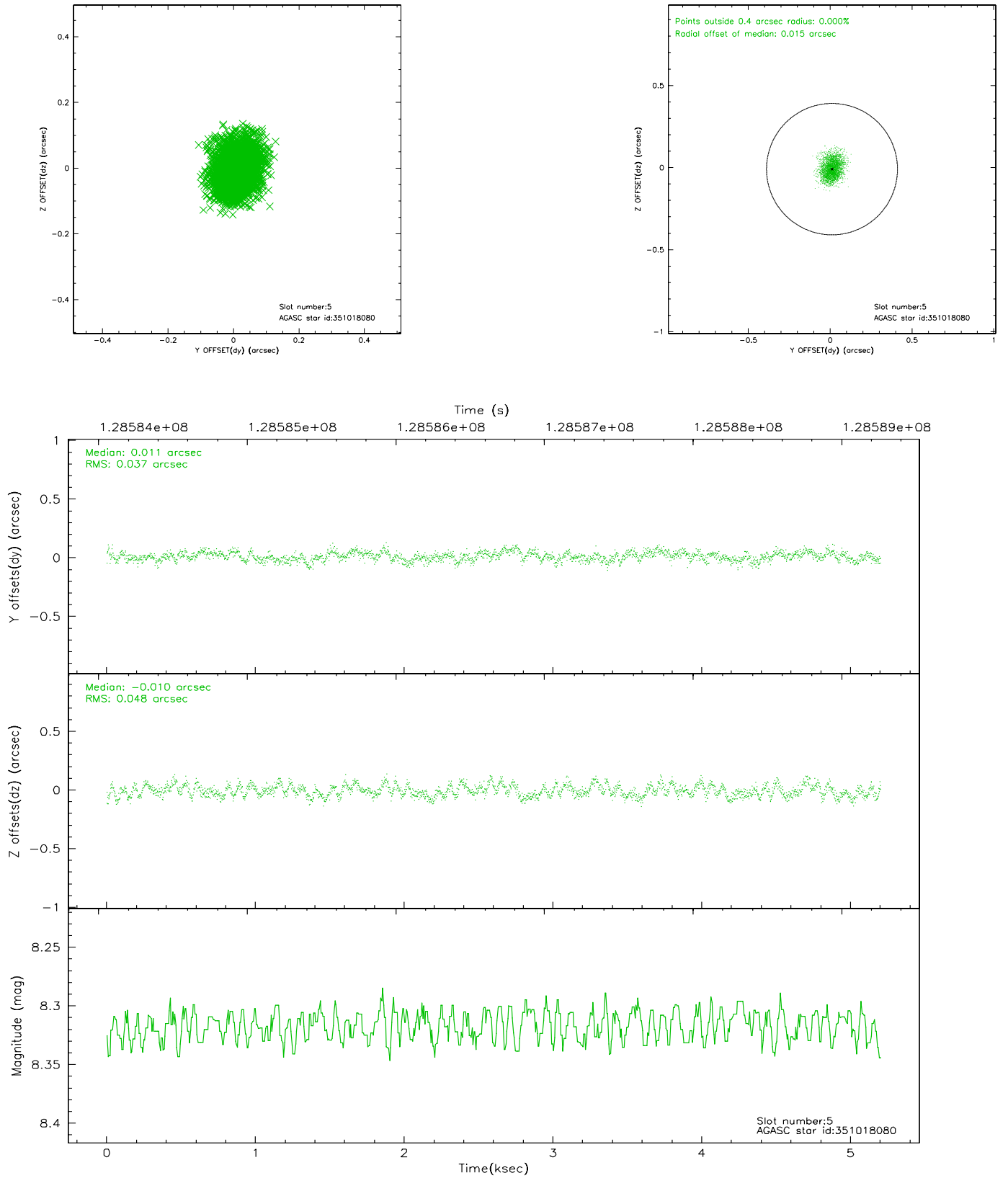
### 2.4.1 Slot 3



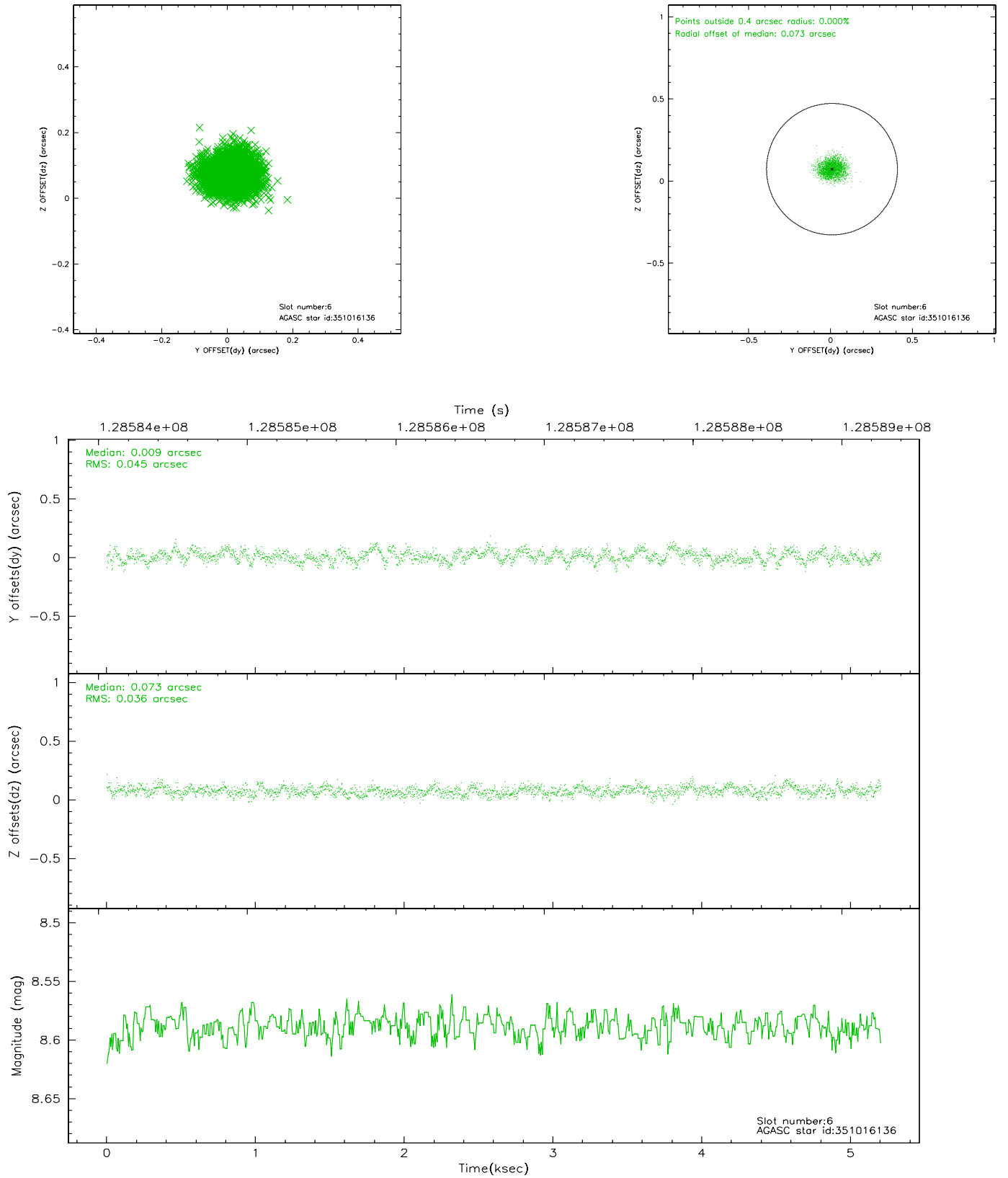
## 2.4.2 Slot 4



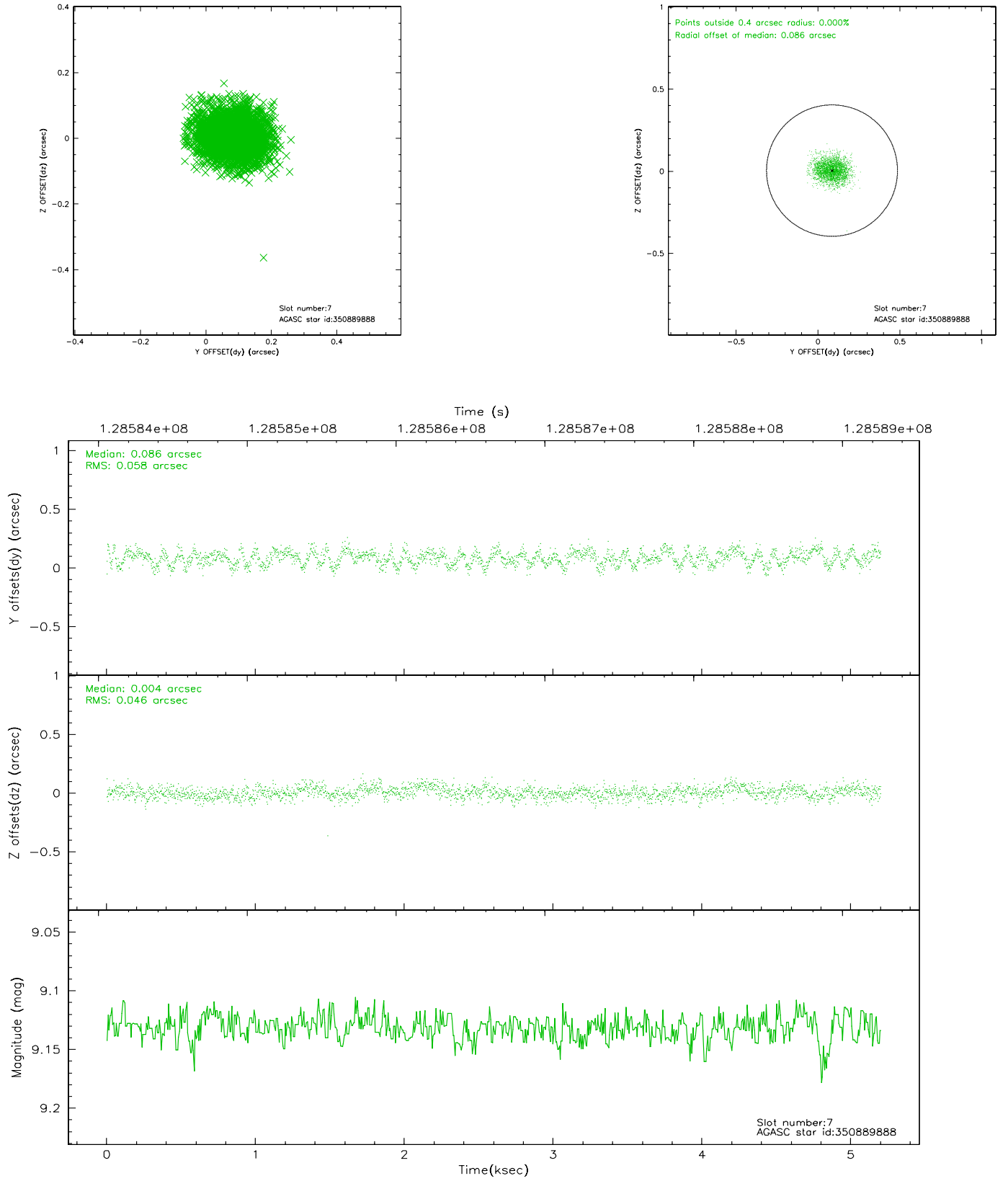
### 2.4.3 Slot 5



## 2.4.4 Slot 6

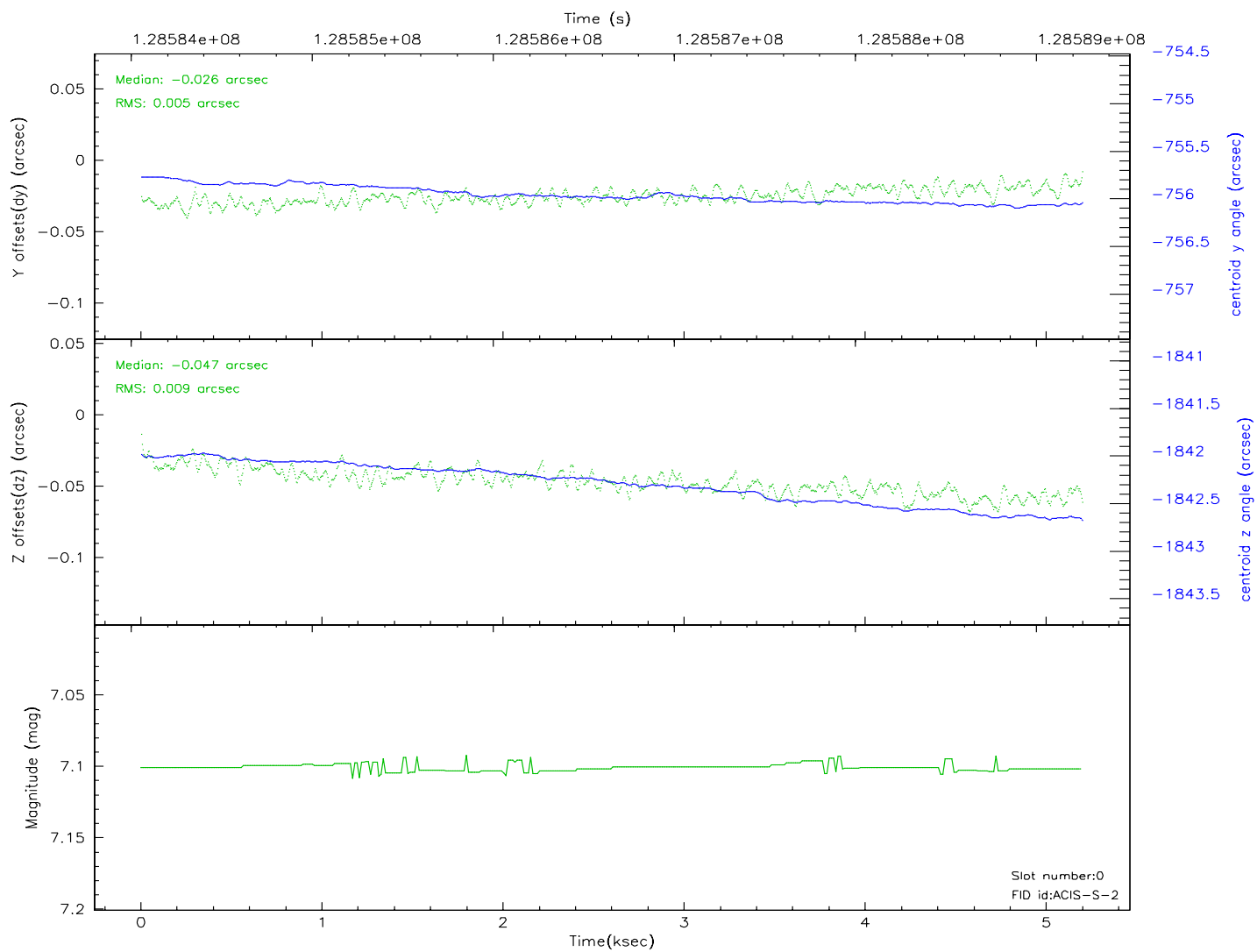
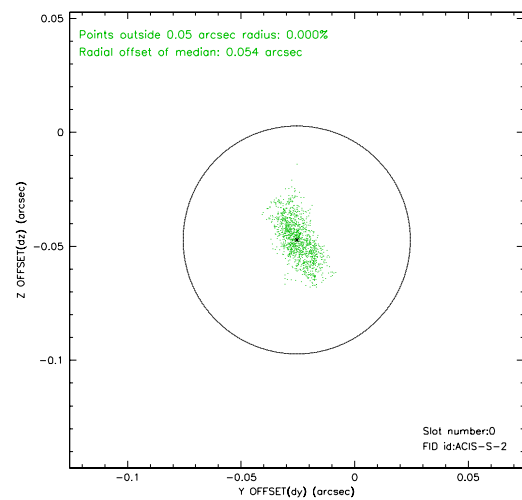
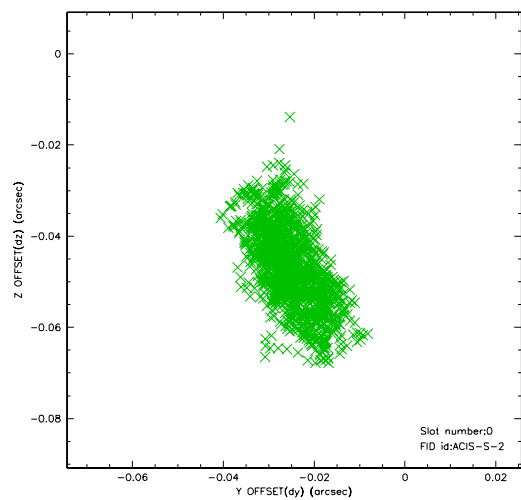


## 2.4.5 Slot 7

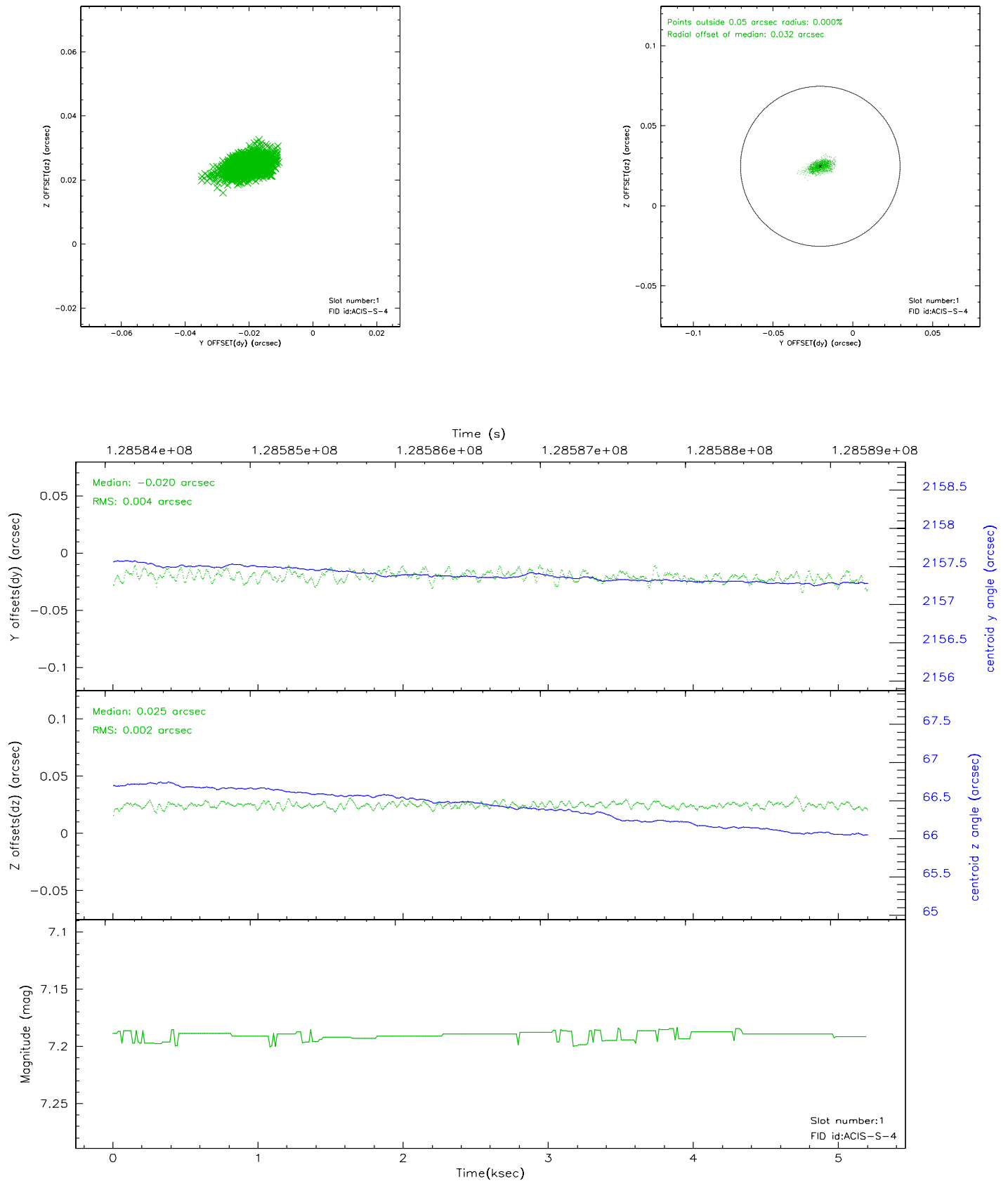


## 2.5 FID Slots

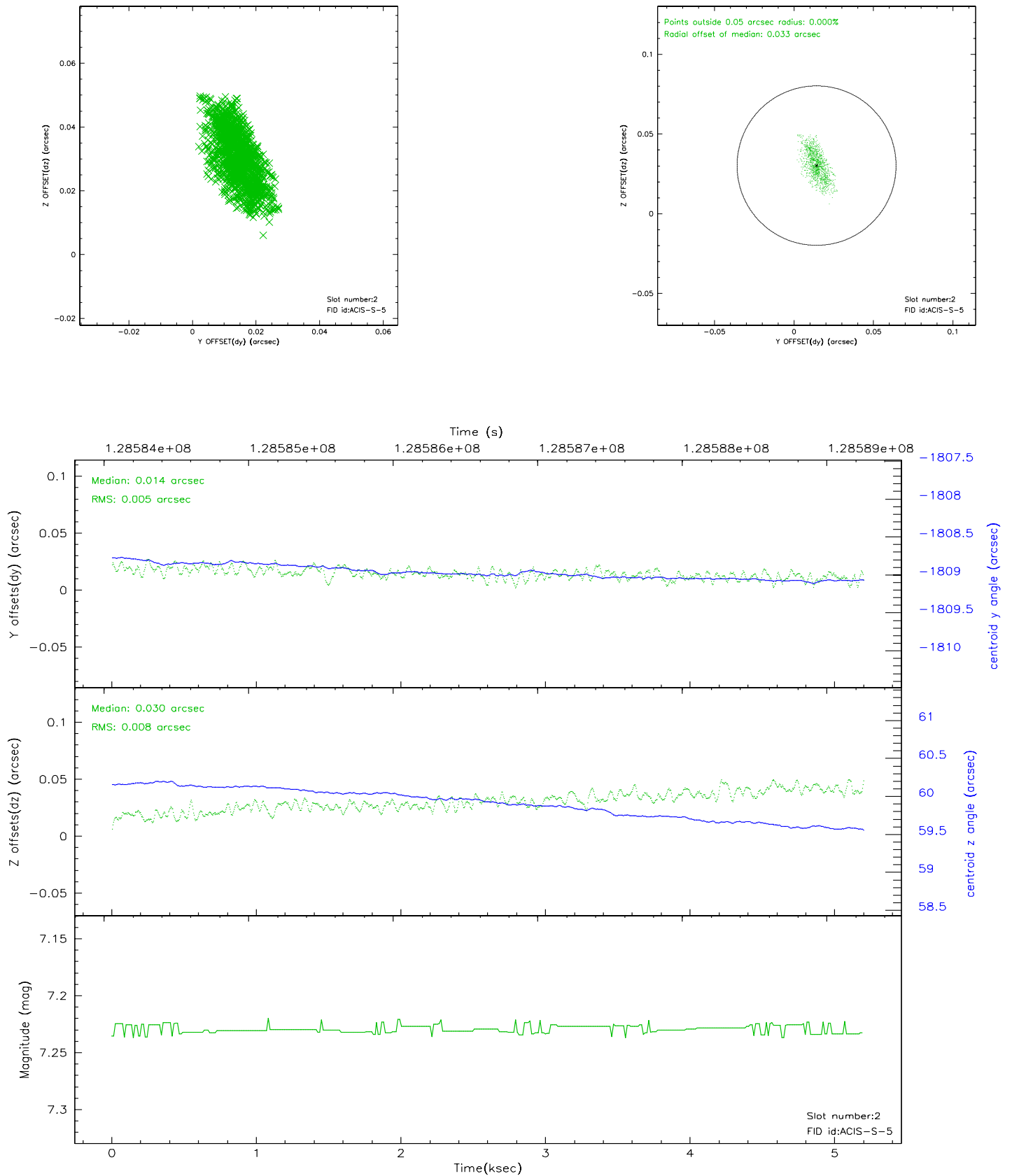
### 2.5.1 Slot 0



## 2.5.2 Slot 1



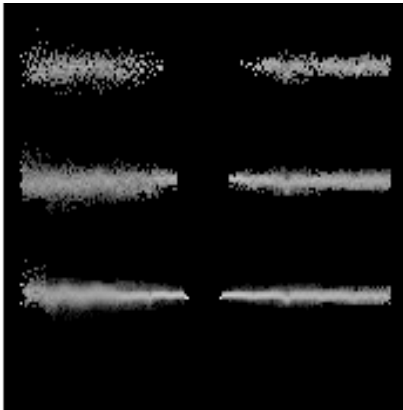
### 2.5.3 Slot 2



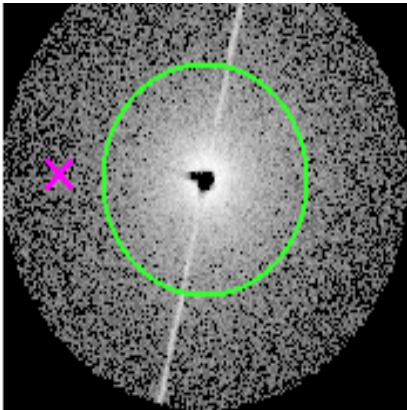


# 3 Gratings

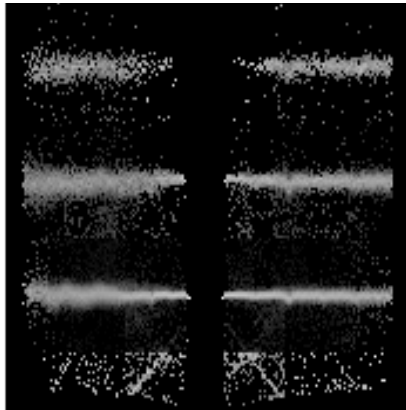
## 3.1 HEG Arm



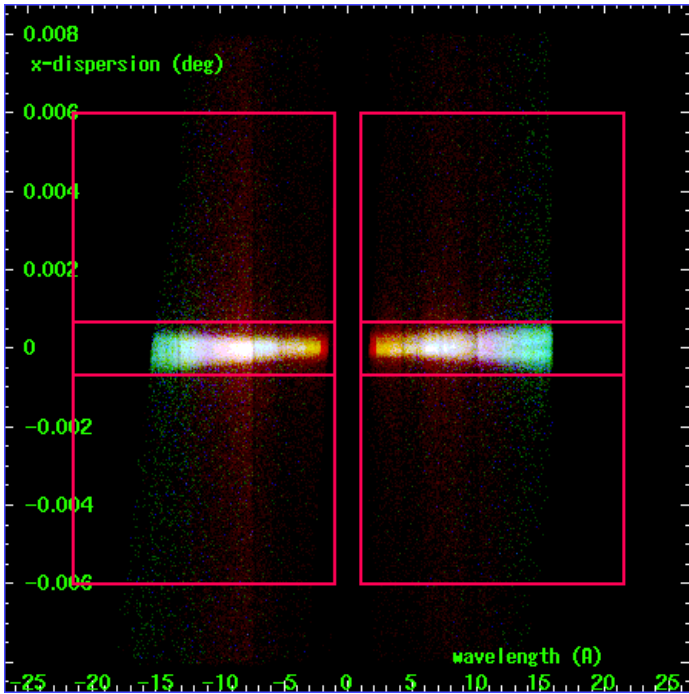
HEG Order Sort 123



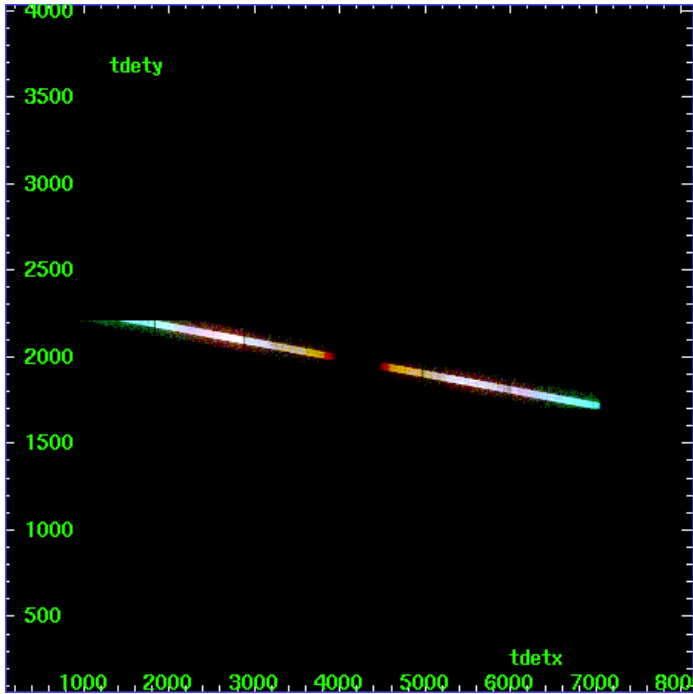
HEG Zero Order



HEG Order Sort ALL

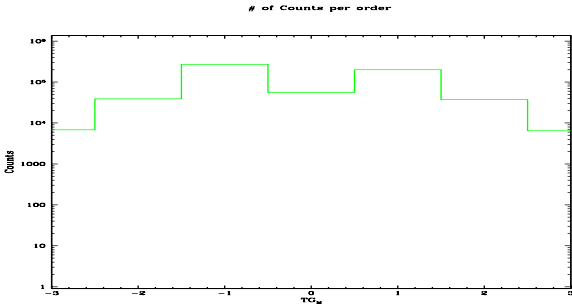


Spot Image HEG

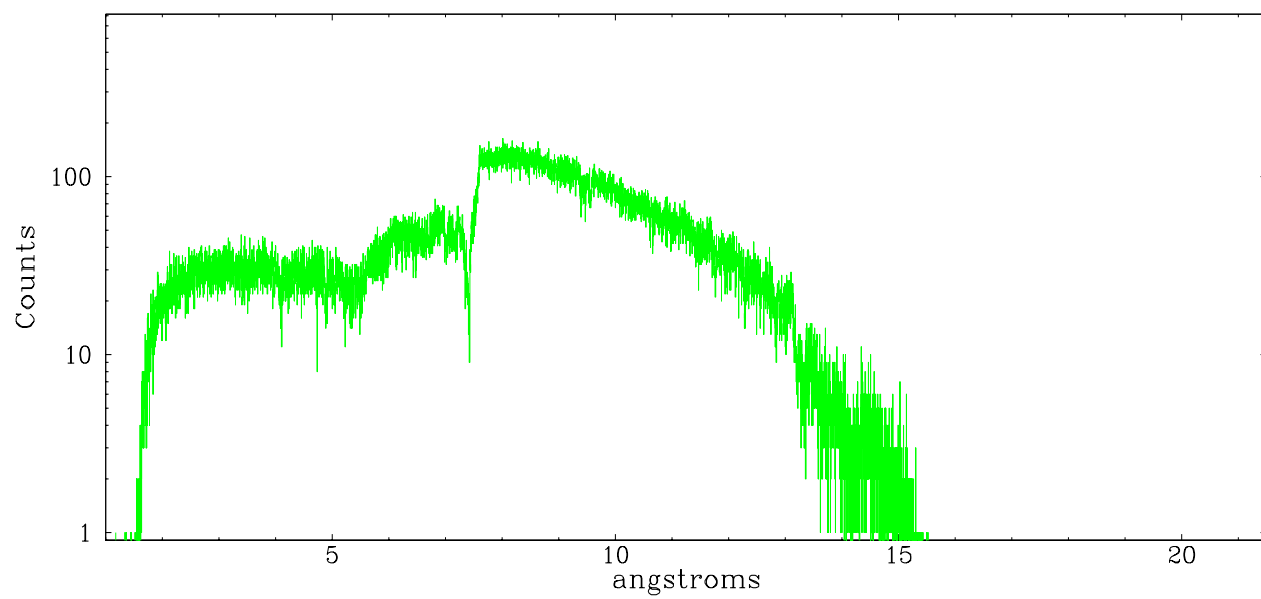


Full Detector HEG

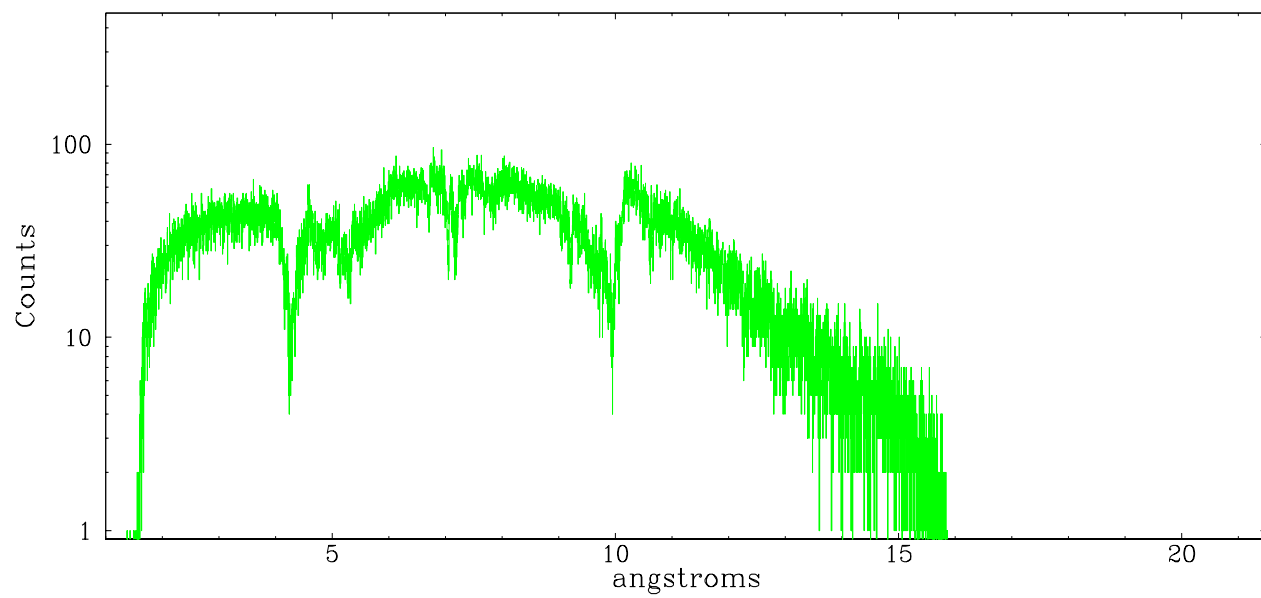
	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	6772	38875	271757	55516	200321	37404	6468



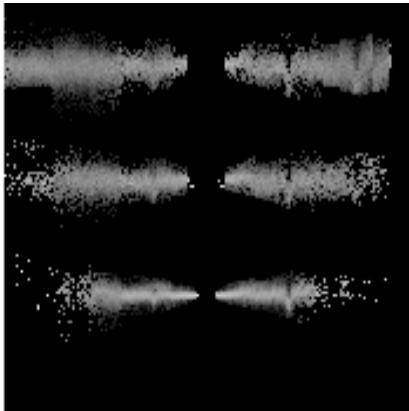
heg order -1



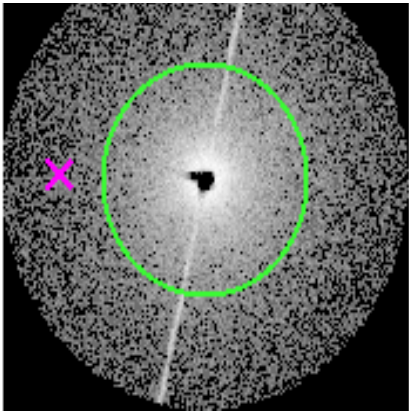
heg order +1



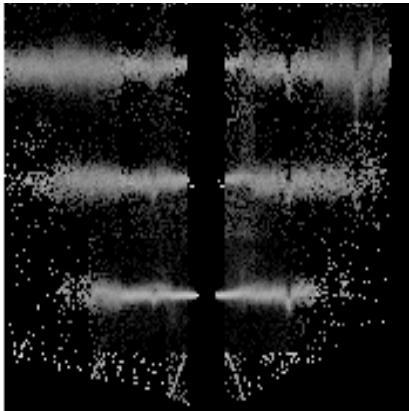
3.2 MEG Arm



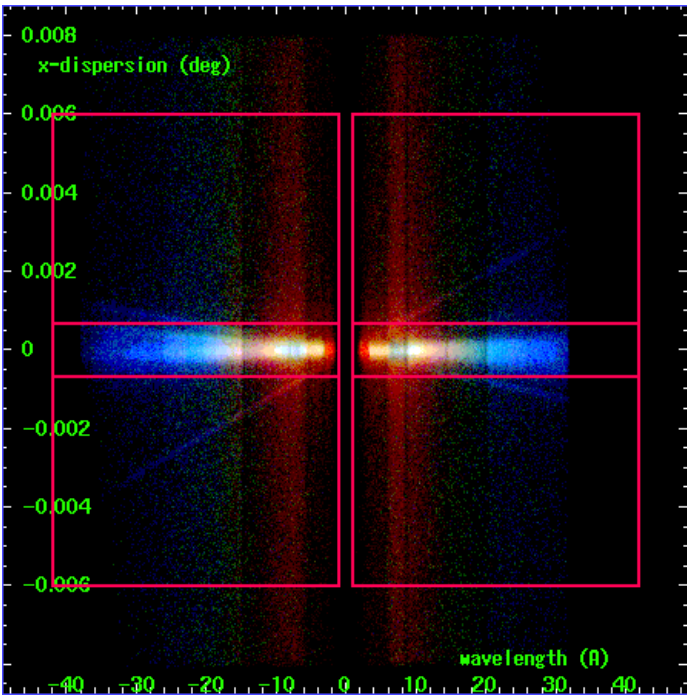
MEG Order Sort 123



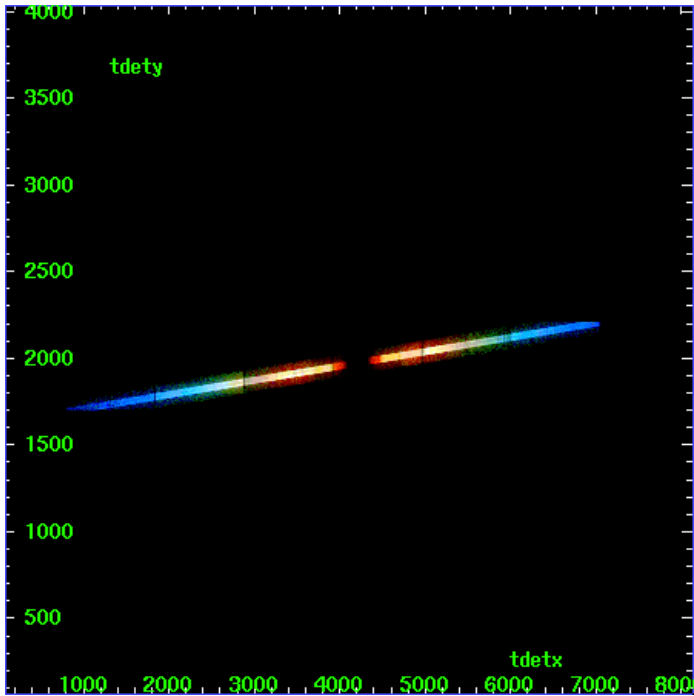
MEG Zero Order



MEG Order Sort ALL

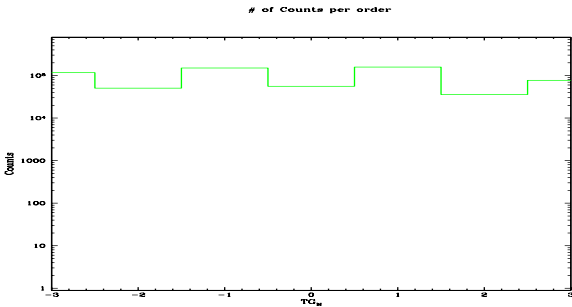


Spot Image MEG

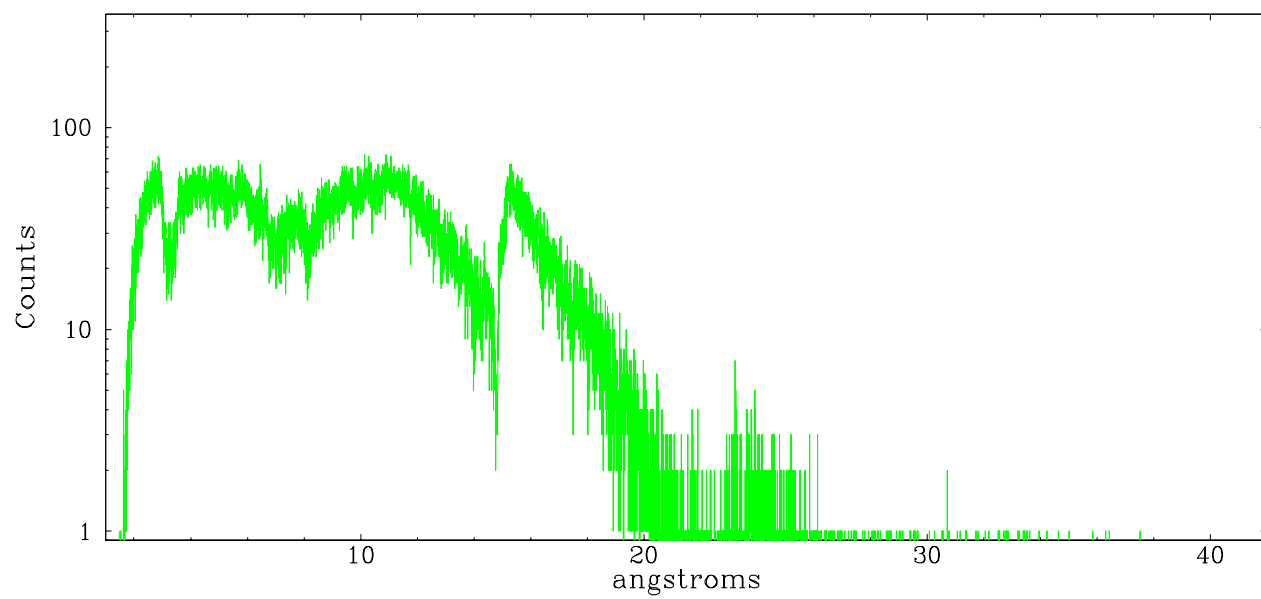


Full Detector MEG

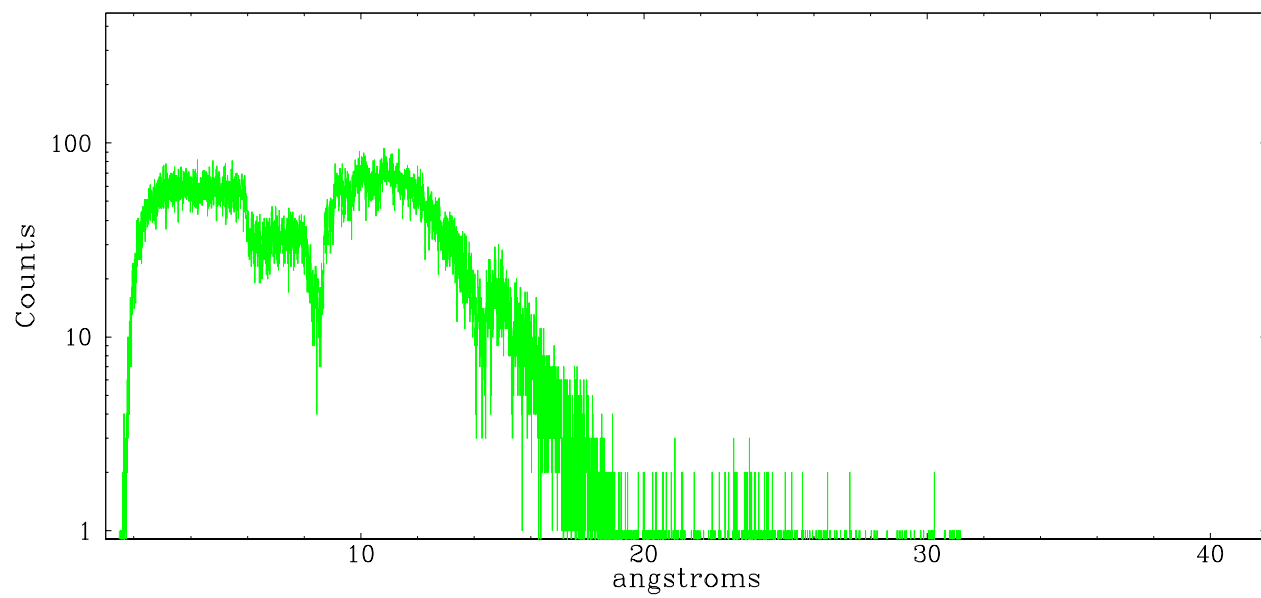
	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	117140	50375	150633	55516	158151	35659	77369



meg order -1



meg order +1



# A Summary

## A.1 Status

V&V Scientist	Joy Nichols
V&V Date (YYYY-MM-DD)	2006.09.27
V&V Edition	1
V&V Disposition and Status	OK
V&V Charge Time	4.486

## 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 in the tool `tg_create_mask` to input the correct sky coordinates: `x=4167.81`, `y=4093.48`, using the user-supplied coordinate option (see CIAO description of this tool). The zeroth order source position determined by the software in the tool `tgdetect` were not used in this processing, although the `*scr1a.fits` file contains the erroneous coordinates determined by `tgdetect`. The `*evt1a.fits` file has the corrected coordinates, which were used to produce the extracted spectral data.

Charge time for this ObsId remains at original value of 4.486 ks, although with the current processing the charge time would have been 1.912 ksec, due to telemetry saturation and dropped exposures on some chips.

Variation in Chips > 15% threshold.  
Low Chip 6, ONTIME=1450.773591 seconds  
High Chip 4, ONTIME=4484.483939 seconds  
Chip 8, ONTIME=1851.252932 seconds is less than 80% of scheduled time=5000.000000 seconds  
Chip 7, ONTIME=1931.218000 seconds is less than 80% of scheduled time=5000.000000 seconds  
Chip 6, ONTIME=1450.773591 seconds is less than 80% of scheduled time=5000.000000 seconds

The temperature-dependent gain calibration is applied to this graded mode observation, although the gain is not well-calibrated for fron-illuminated chips with no CTI correction applied. Graded mode observations do not have a CTI correction applied. The result is that the order sorting algorithm is not as precise as it is in other modes.