

V&V Reference Report

L2 ASCDS Version : 8.4.5

Observation 2742 - L2 Version 4
Chandra X-Ray Center

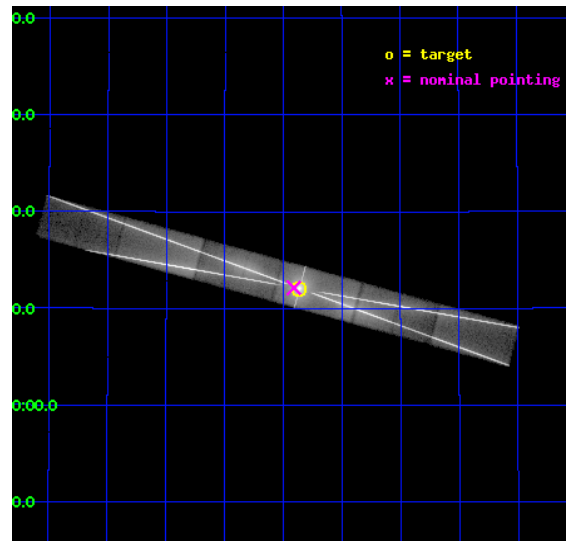
L2 Processing Date : Oct 1 2012

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1 Front

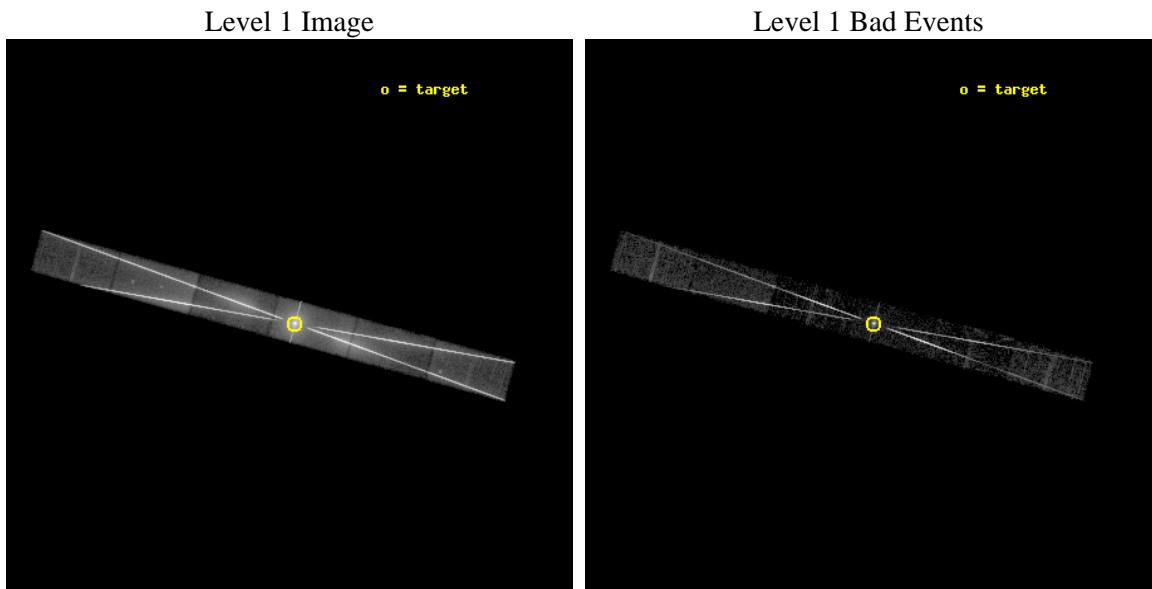
seq_num	400222	Sequence number
obs_id	2742	Observation id
title	PHASE RESOLVED HIGH ENERGY RESOLUTION SPECTROSCOPY OF THE BLACK HOLE X-RAY BAINARY CYGNUS X-1	Proposal title
observer	Dr. Shu Zhang	Principal investigator
object	CYG X-1	Source name
dtcycle	0	
cycle	P	events from which exps? Prim/Second/Both
ra_targ	299.590417	Observer's specified target RA [deg]
dec_targ	35.201611	Observer's specified target Dec [deg]
ra_nom	299.60231796869	Nominal RA [deg]
dec_nom	35.202531006003	Nominal Dec [deg]
roll_nom	15.235563222379	Nominal Roll [deg]
revision	4	Processing version of data
ontime	1917.8151067048	Sum of GTIs [s]
livetime	1872.6081430629	Livetime [s]
ontime4	4752.1376573592	Sum of GTIs [s]
ontime5	4133.7813646942	Sum of GTIs [s]
ontime6	1465.2273468226	Sum of GTIs [s]
ontime7	1917.8151067048	Sum of GTIs [s]
ontime8	1873.9452592283	Sum of GTIs [s]
ontime9	4142.4842921942	Sum of GTIs [s]
l2events	1691643	Number of level 2 events



2 OBI

2.1 OBI

2.1.1 Images



2.1.2 Parameters

obi_num	1	Obi number	sched_exp_time	5000.000000	[s] Scheduled observation exposure time
ascdsver	8.4.5	Processing system revision	ontime	1917.8151067048	Sum of GTIs [s]
caldsver	4.5.2	 	ontime4	4752.1376573592	Sum of GTIs [s]
date	2012-10-01T06:13:30	Date and time of file creation	ontime5	4133.7813646942	Sum of GTIs [s]
revision	3	Processing version of data	ontime6	1465.2273468226	Sum of GTIs [s]
			ontime7	1917.8151067048	Sum of GTIs [s]
			ontime8	1873.9452592283	Sum of GTIs [s]
			ontime9	4142.4842921942	Sum of GTIs [s]
			l1events	2156104	Number of level 1 events

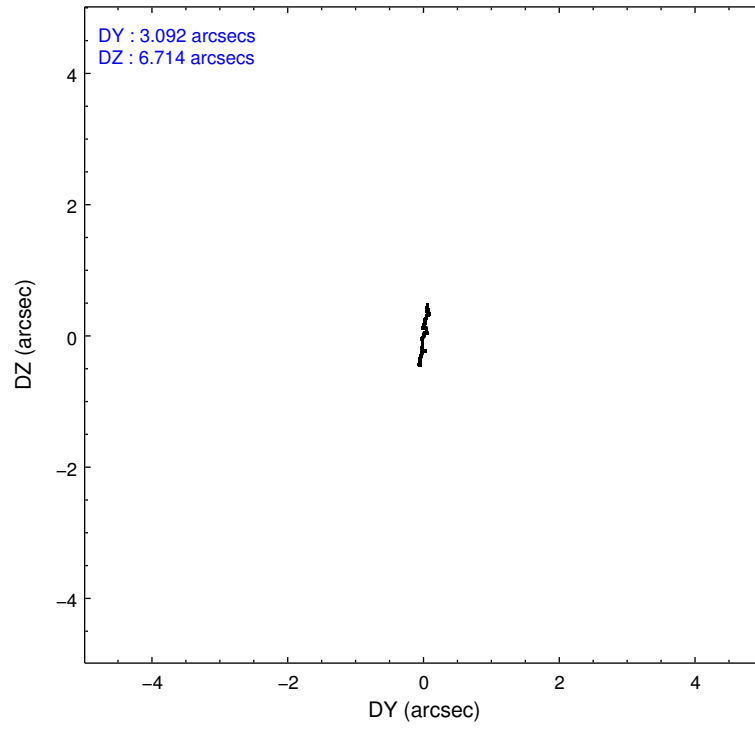
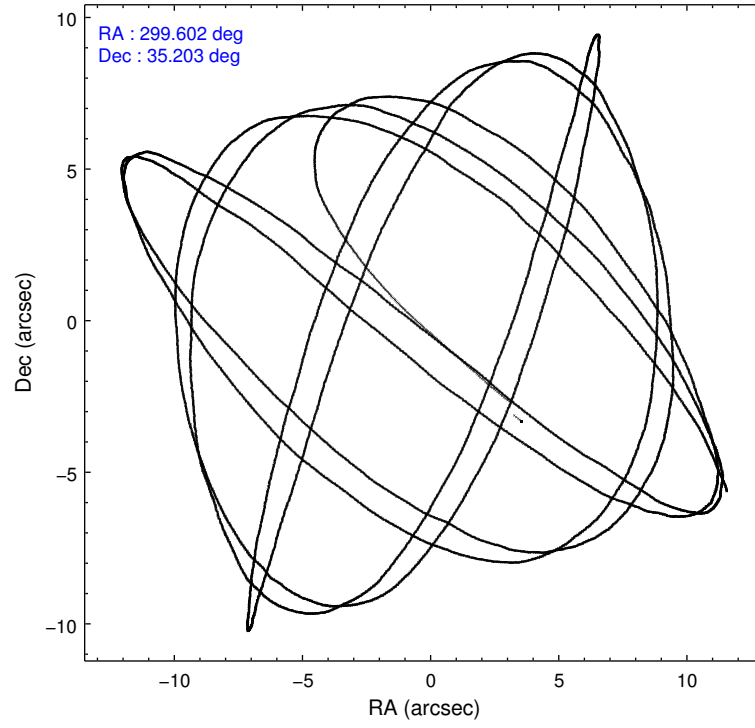
2.1.3 Events

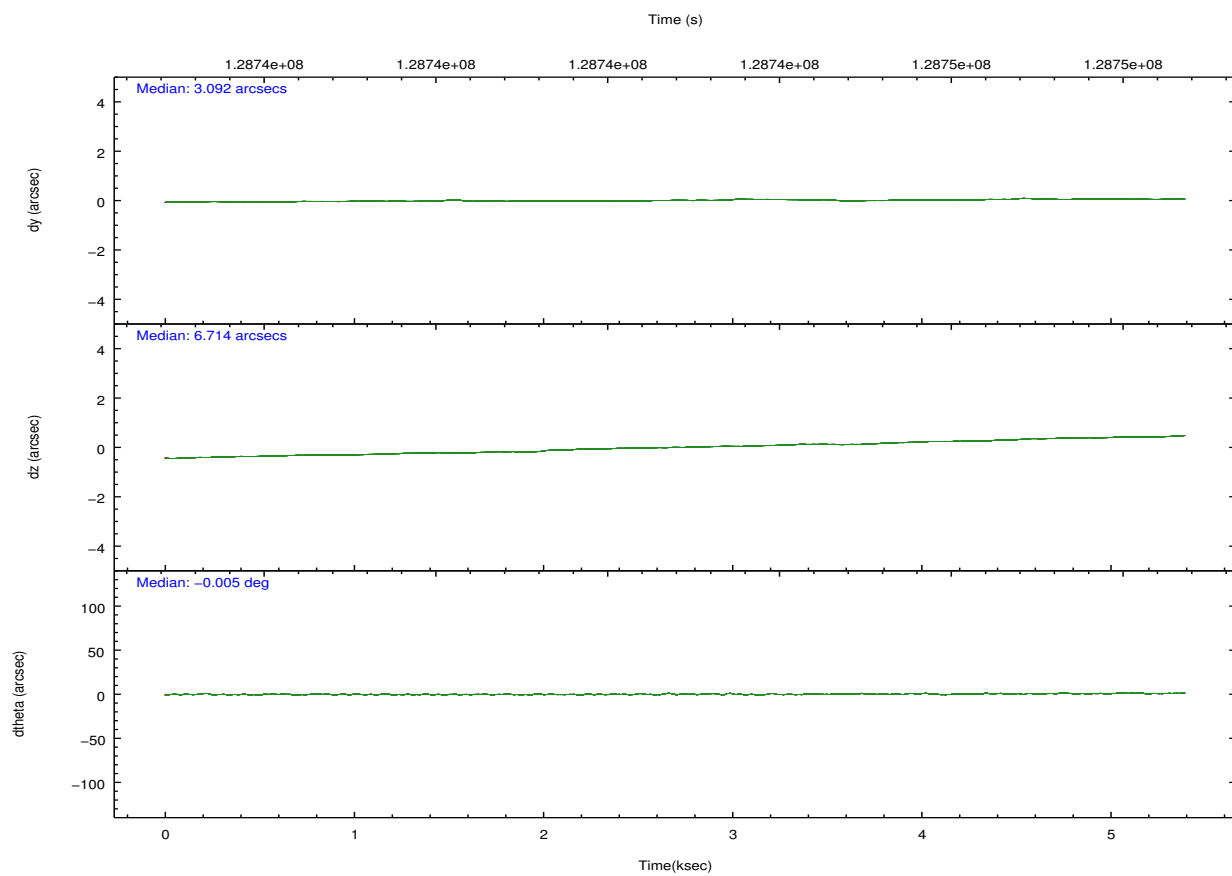
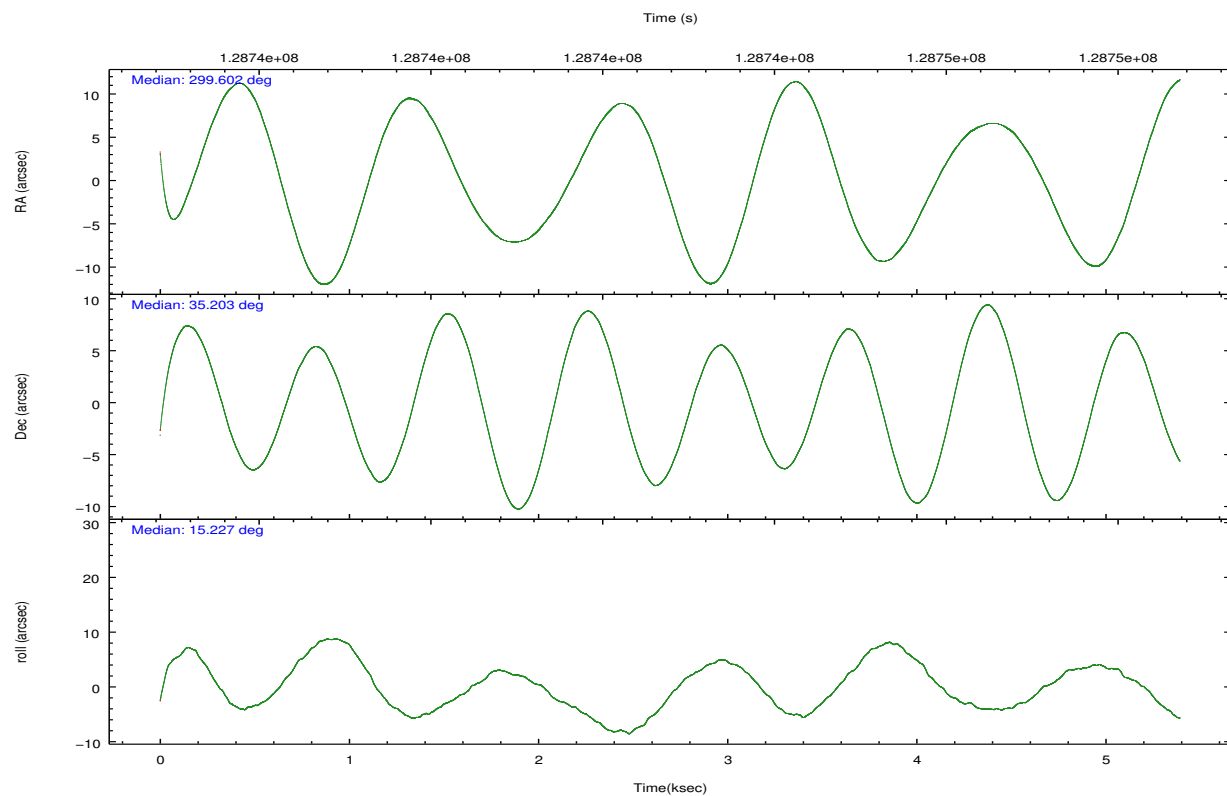
	ccd 4	ccd 5	ccd 6	ccd 7	ccd 8	ccd 9		ccd 4	ccd 5	ccd 6	ccd 7	ccd 8	ccd 9
level 1 events	108615	480048	430886	505750	404678	226127	grade 0 events	73511	120546	226248	70075	251304	167237
rejected events	17080	60796	96059	127866	63615	18644		67%	25%	52%	13%	62%	73%
rejected %	15%	12%	22%	25%	15%	8%	grade 1 events	678	5530	31436	4564	25919	2758
								0%	1%	7%	0%	6%	1%
							grade 2 events	10246	145248	49366	97896	44663	22958
								9%	30%	11%	19%	11%	10%
							grade 3 events	3035	35064	20878	38797	17812	6984
								2%	7%	4%	7%	4%	3%
							grade 4 events	3094	35121	20159	38116	17830	6877
								2%	7%	4%	7%	4%	3%
							grade 5 events	818	19552	25984	21355	16517	1810
								0%	4%	6%	4%	4%	0%
							grade 6 events	2027	85090	21879	136392	12731	4337
								1%	17%	5%	26%	3%	1%
							grade 7 events	15206	33897	34936	98555	17902	13166
								13%	7%	8%	19%	4%	5%

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	GRADED	GRADED	Number of optional ACIS chips dropped	0	0
Observation mode	POINTING	POINTING	On-chip summing requested	N	N
[deg] Pointing RA	299.579064	299.602317968695	Subarray requested	CUSTOM	1/2
[deg] Pointing Dec	35.182881	35.20253100600323	Subarray start row	1	1
[deg] Pointing Roll	15.092359	15.23556322237854	Subarray row count	512	512
[mm] SIM focus pos	-0.684267	-0.6828225247311905	Alternating exposures requested	N	N
[mm] SIM defocus	0	0.001444936568705701	[s] Primary exposure time	0.000000	1.7
[mm] SIM translation stage pos	-184.612523	-184.6110867017414			
[mm] SIM translation stage offset	-5.52	-5.52143588126637			
Phase constraints	Y	Y			
[d] Phase period	5.599847	5.599847			
[d] Phase epoch (MJD)	51998.668500	51998.668500			
Phase start	0.500000	0.500000			
Phase end	0.510000	0.510000			
Phase start error	0.050000	0.050000			
Phase end error	0.050000	0.050000			
[s] Observation start time (MET)	128742088.184000	128741011.67535			
Observation start date	2002-01-30T01:40:24	2002-01-30T01:23:31			
[s] Observation end time (MET)	128747088.184000	128747979.11313			
Observation end date	2002-01-30T03:03:44	2002-01-30T03:19:39			
Read mode	TIMED	TIMED			

2.3 Aspect



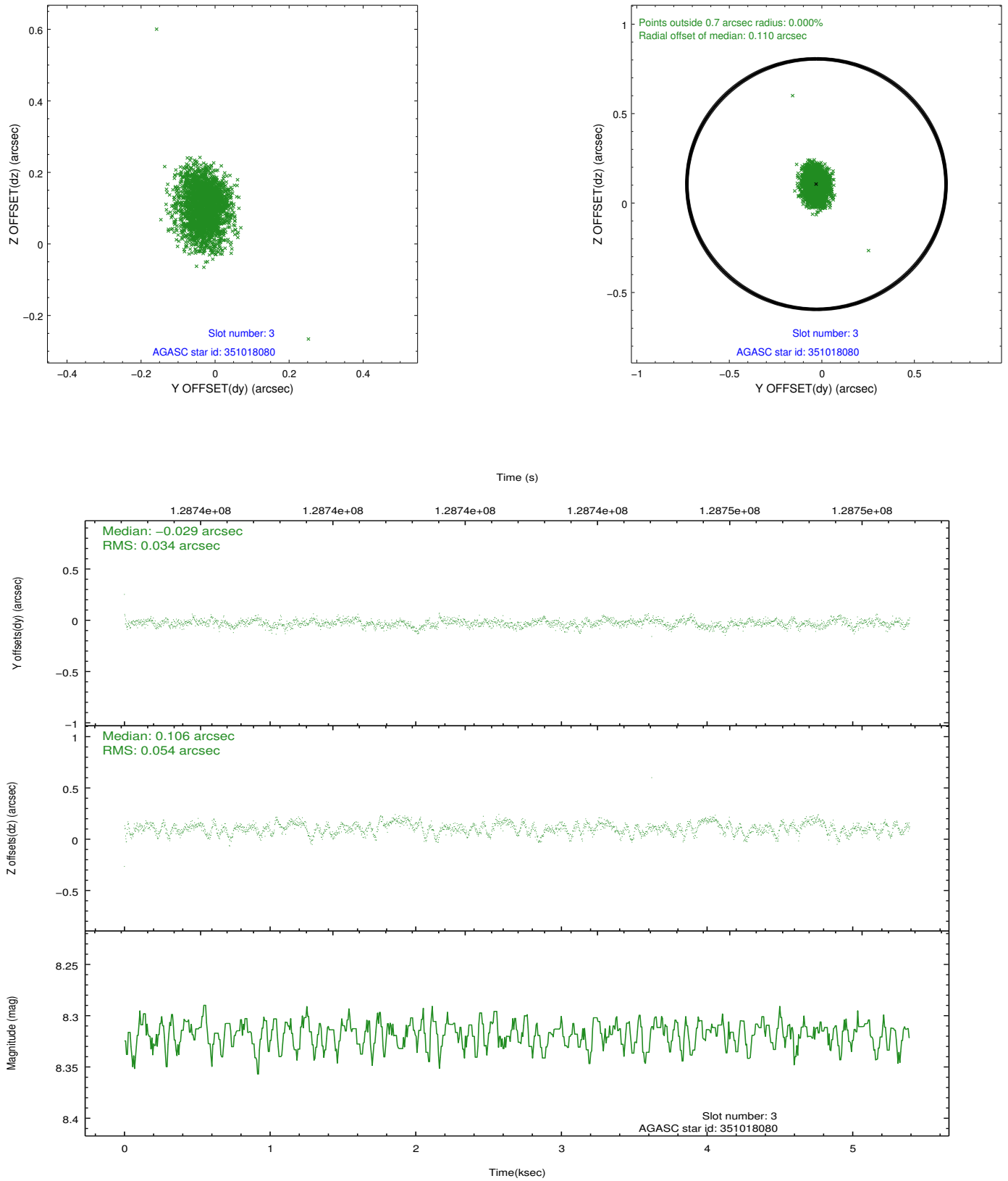


Slot Statistics

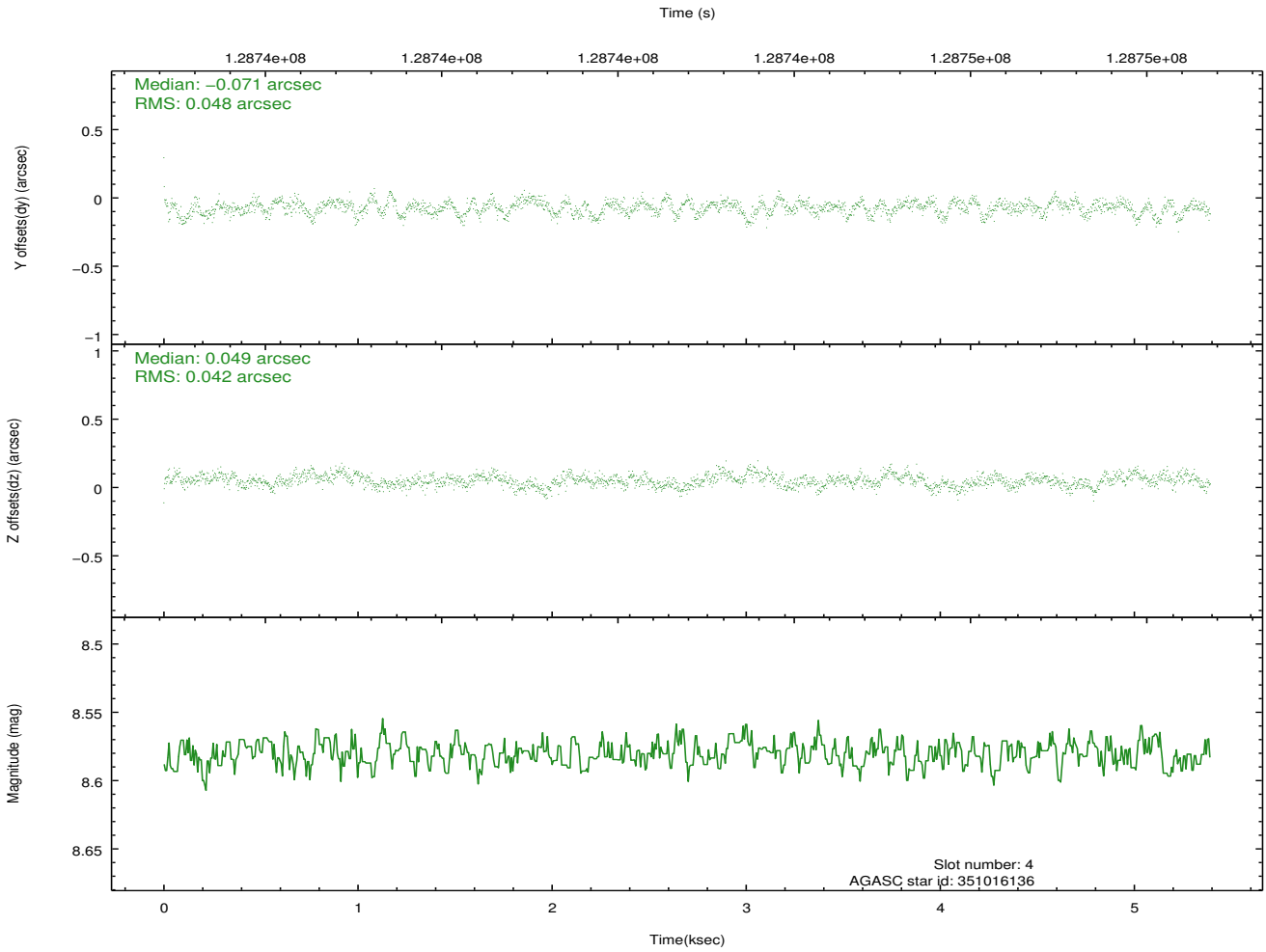
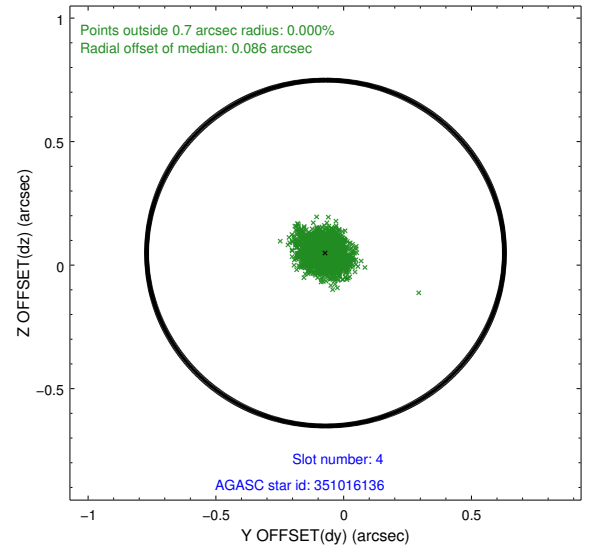
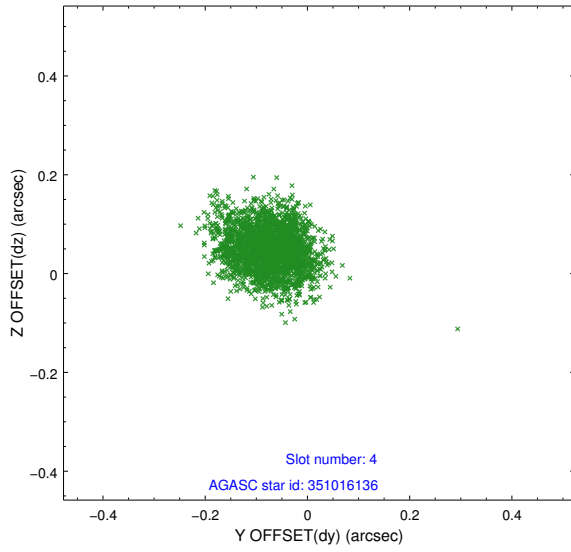
slot	status	id	mag	n_pts	med_dy	med_dz	dr1	dr2	ra	dec	mean_y	mean_z
0	FID	ACIS-S-2	7.10	1316	-0.048	-0.050	0.007	0.012	0.000000	0.000000	-755.38	-1841.76
1	FID	ACIS-S-4	7.19	1316	0.002	0.036	0.006	0.012	0.000000	0.000000	2157.42	65.60
2	FID	ACIS-S-5	7.23	1316	0.014	0.022	0.007	0.012	0.000000	0.000000	-1806.74	60.48
3	GUIDE	351018080	8.32	2629	-0.029	0.106	0.066	0.111	299.327312	34.581247	-1283.84	-1896.77
4	GUIDE	351016136	8.58	2631	-0.071	0.049	0.067	0.109	300.302636	34.786391	1695.78	-1928.81
5	GUIDE	351024856	8.55	2631	-0.029	0.142	0.064	0.100	300.374482	35.139033	2222.98	-754.08
6	GUIDE	351406096	8.91	2629	0.057	-0.153	0.075	0.117	299.076637	35.711249	-921.14	2221.26
7	GUIDE	351406432	8.86	2630	0.066	-0.143	0.089	0.139	299.163921	35.698316	-688.58	2109.94

2.4 Star Slots

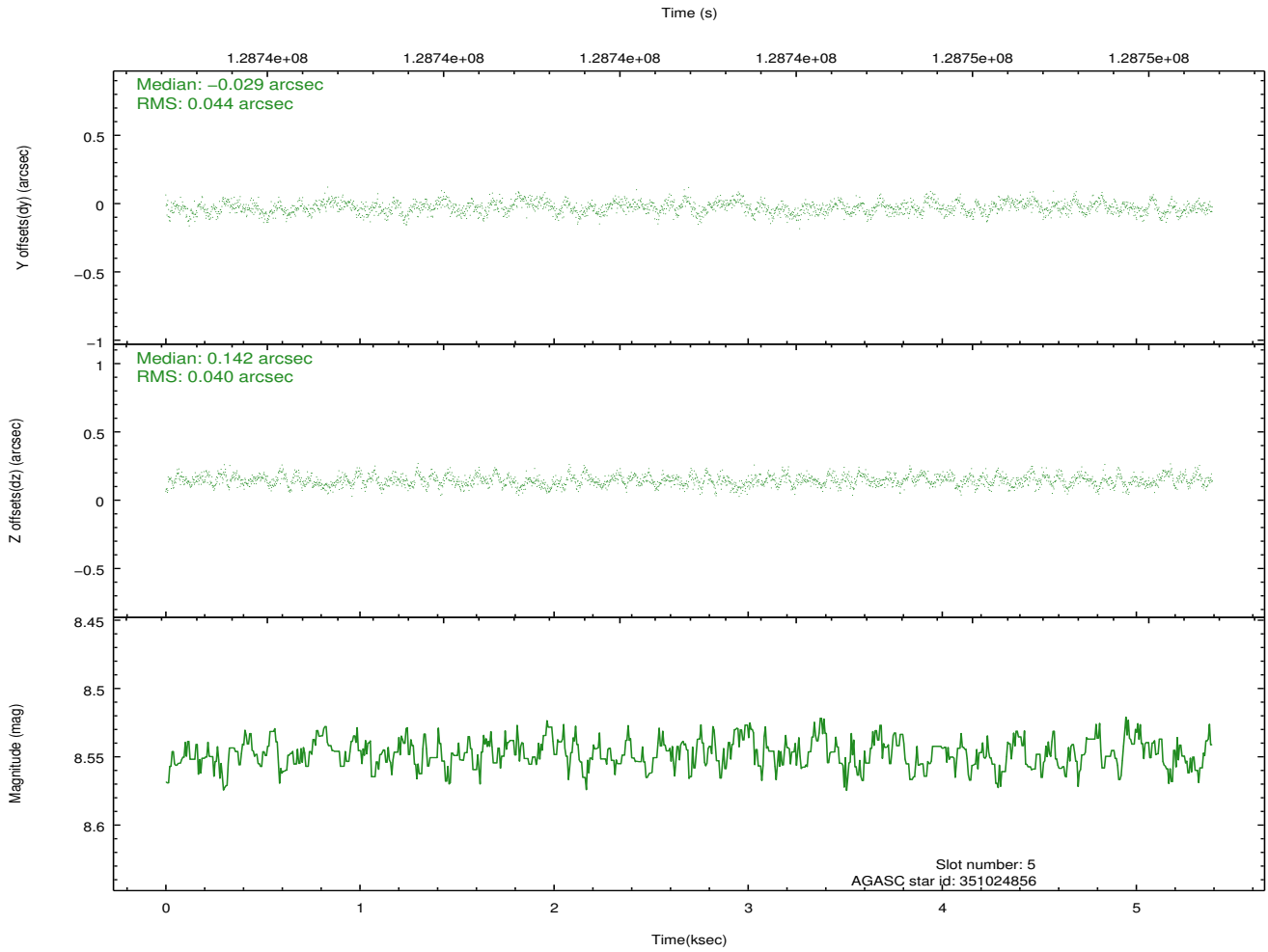
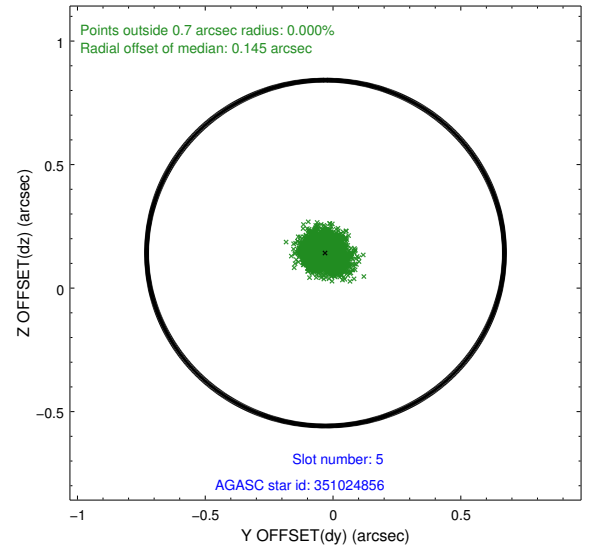
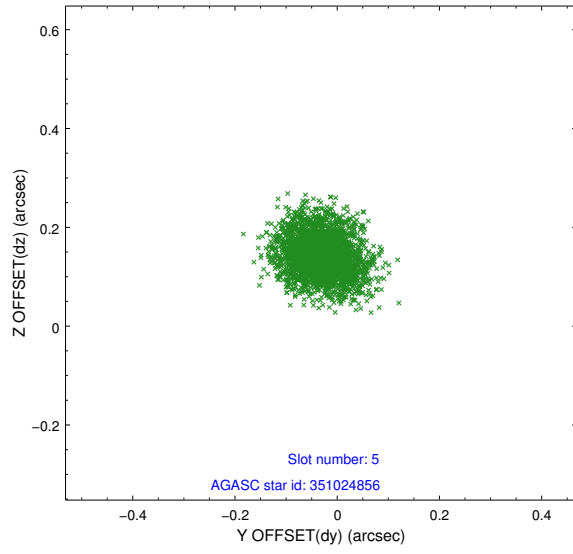
2.4.1 Slot 3



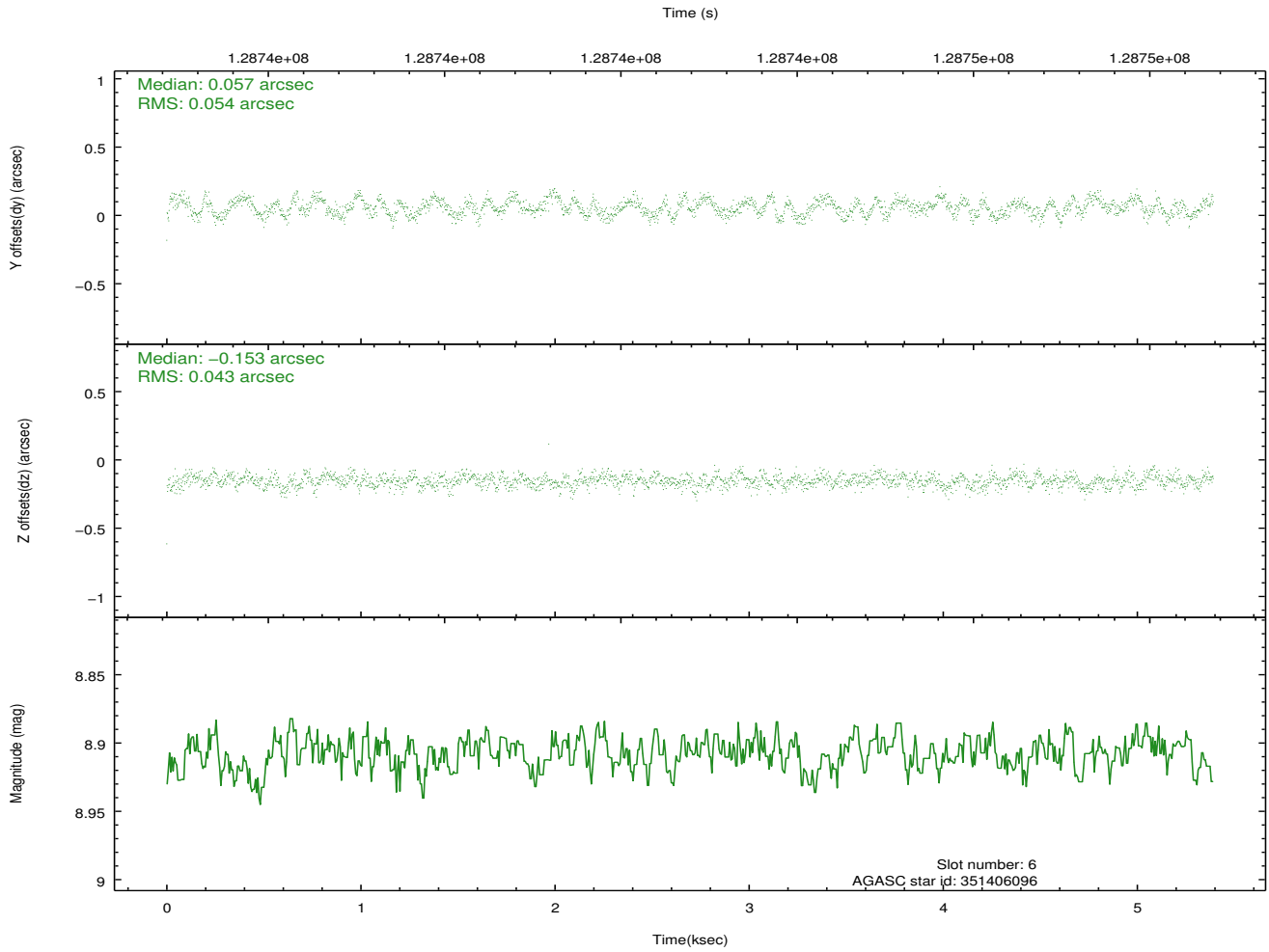
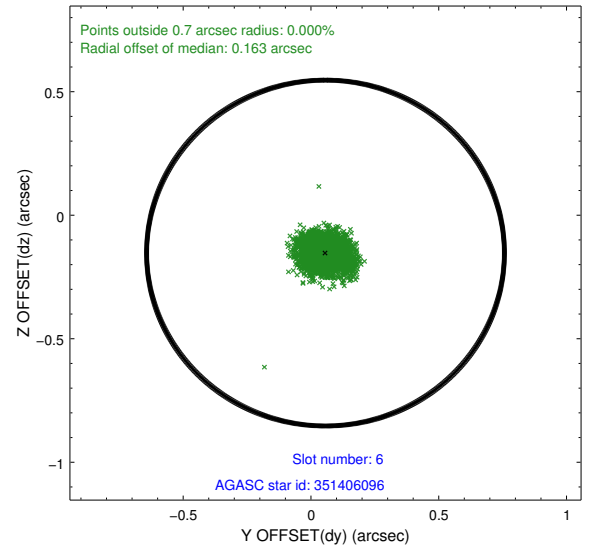
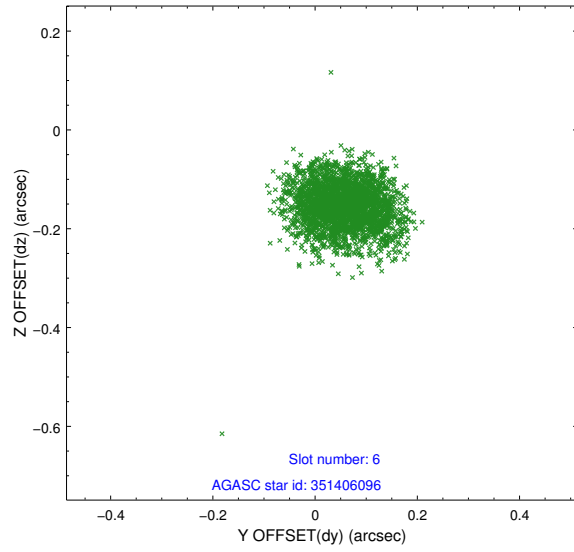
2.4.2 Slot 4



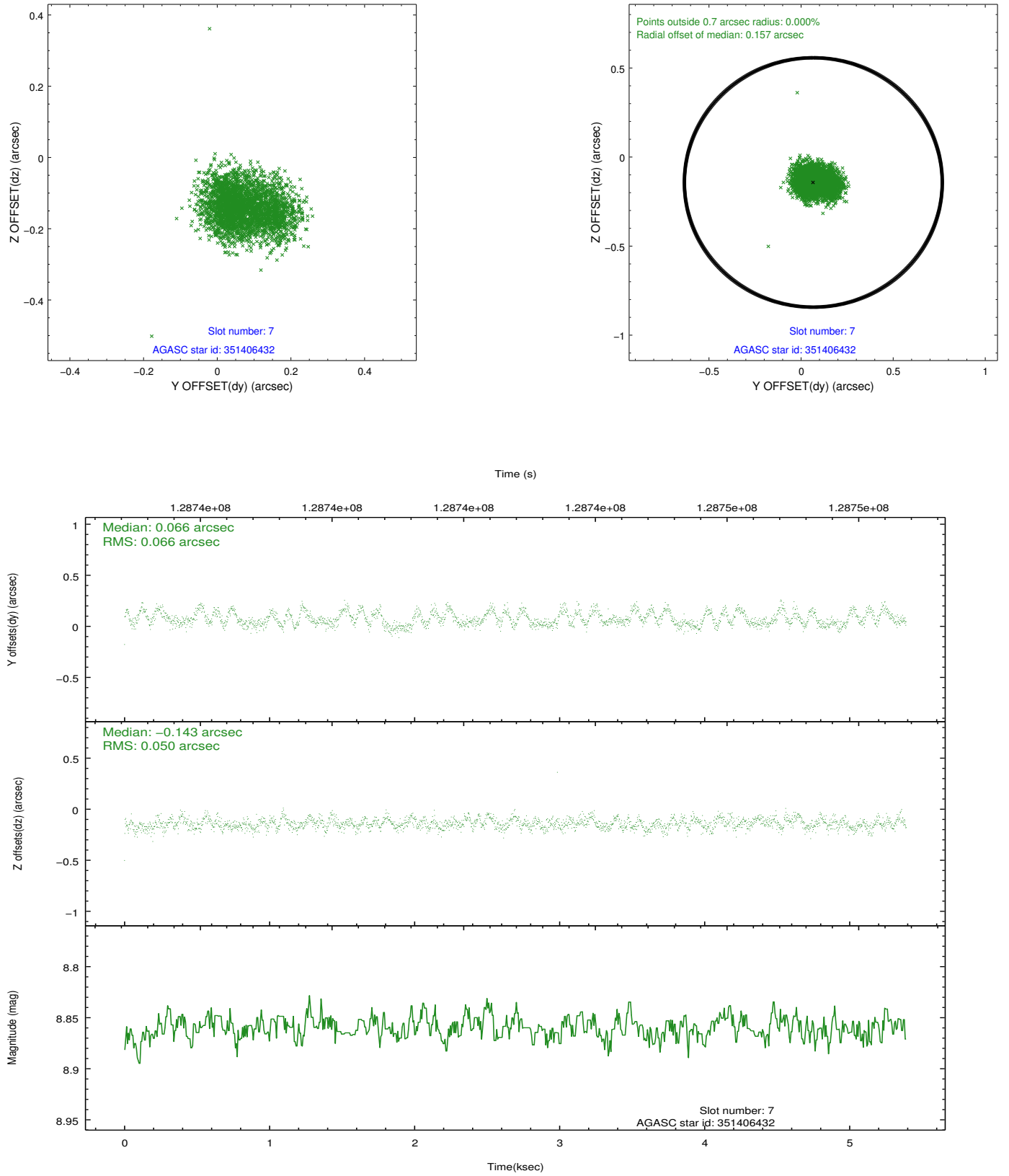
2.4.3 Slot 5



2.4.4 Slot 6

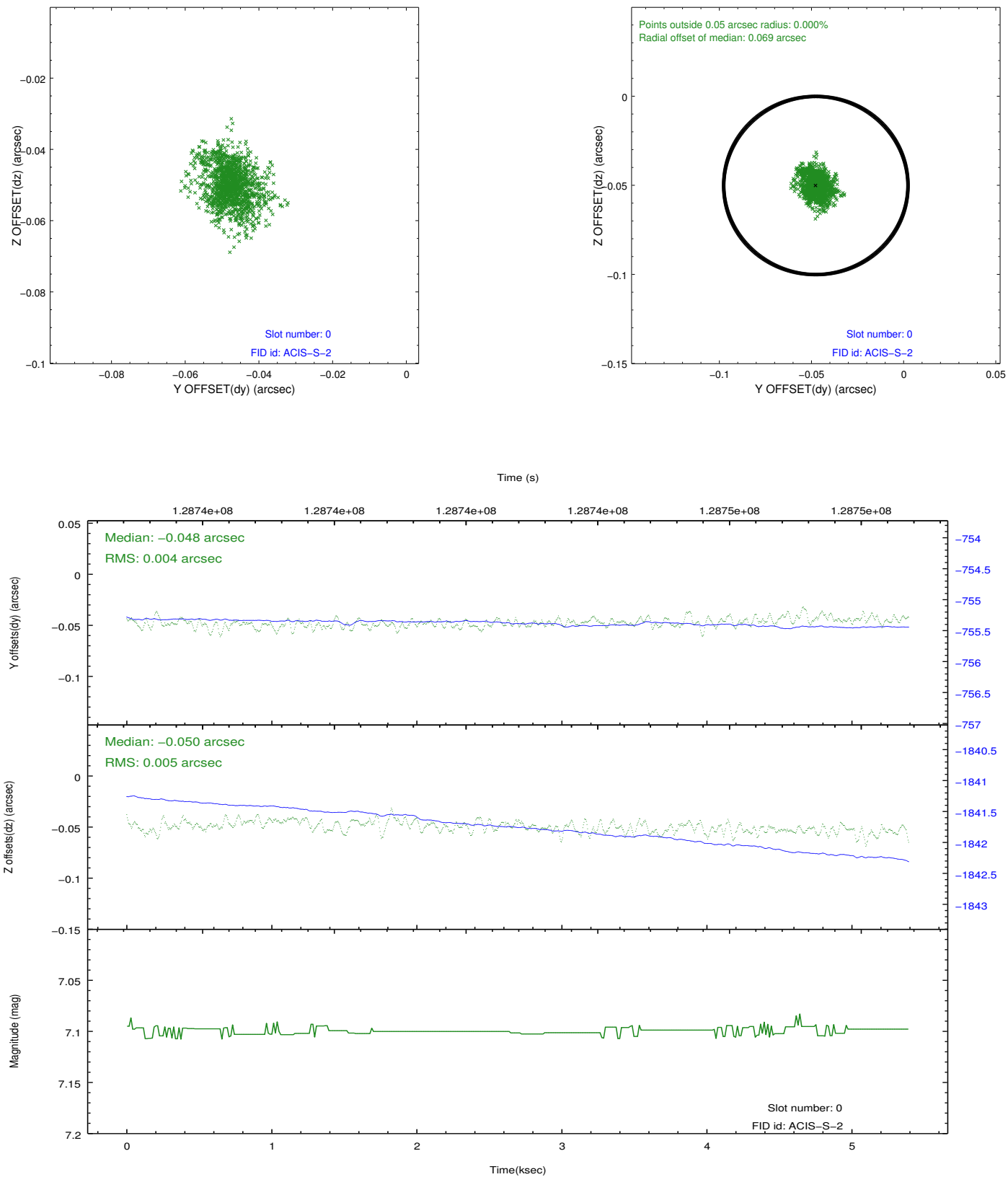


2.4.5 Slot 7

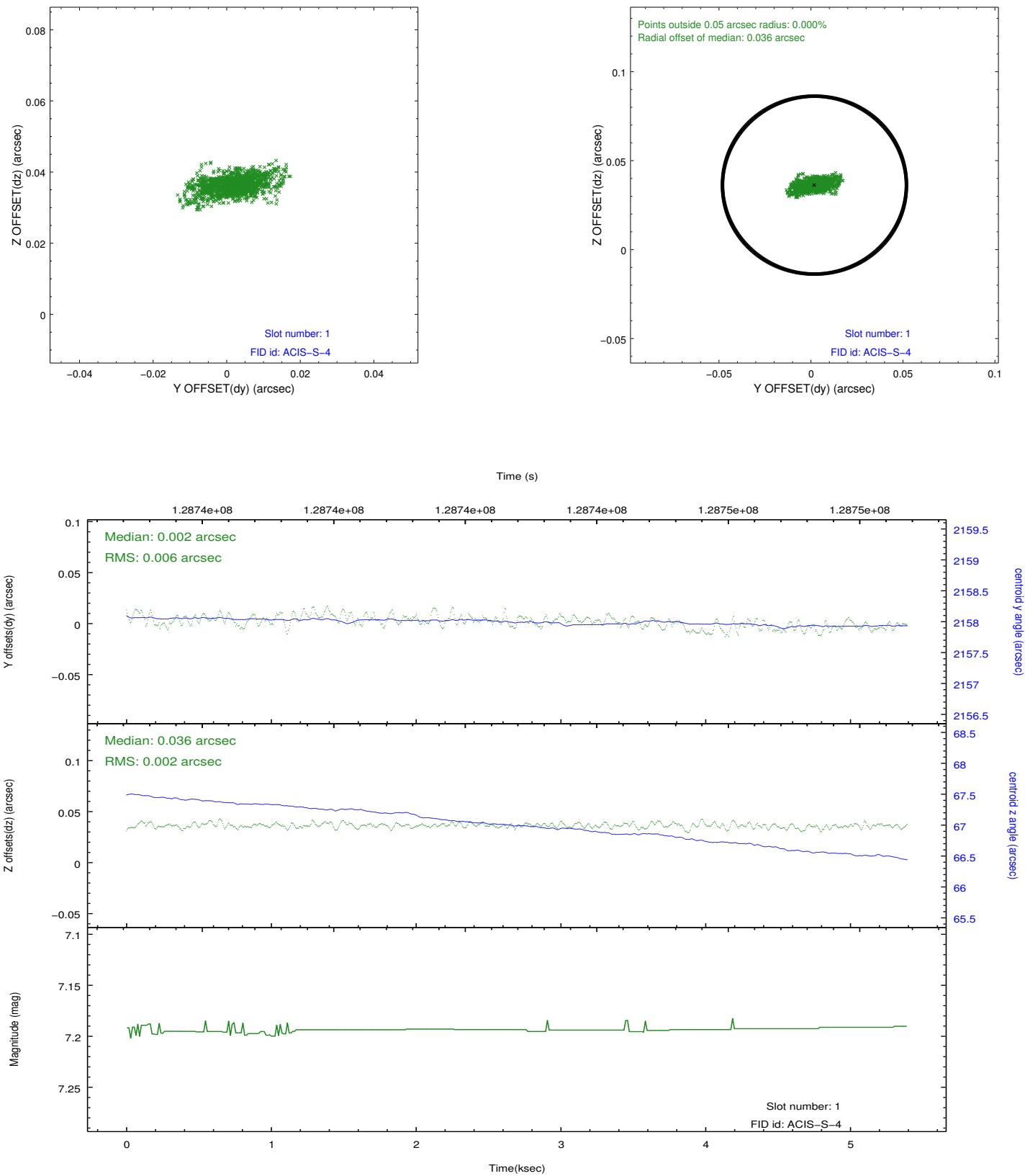


2.5 FID Slots

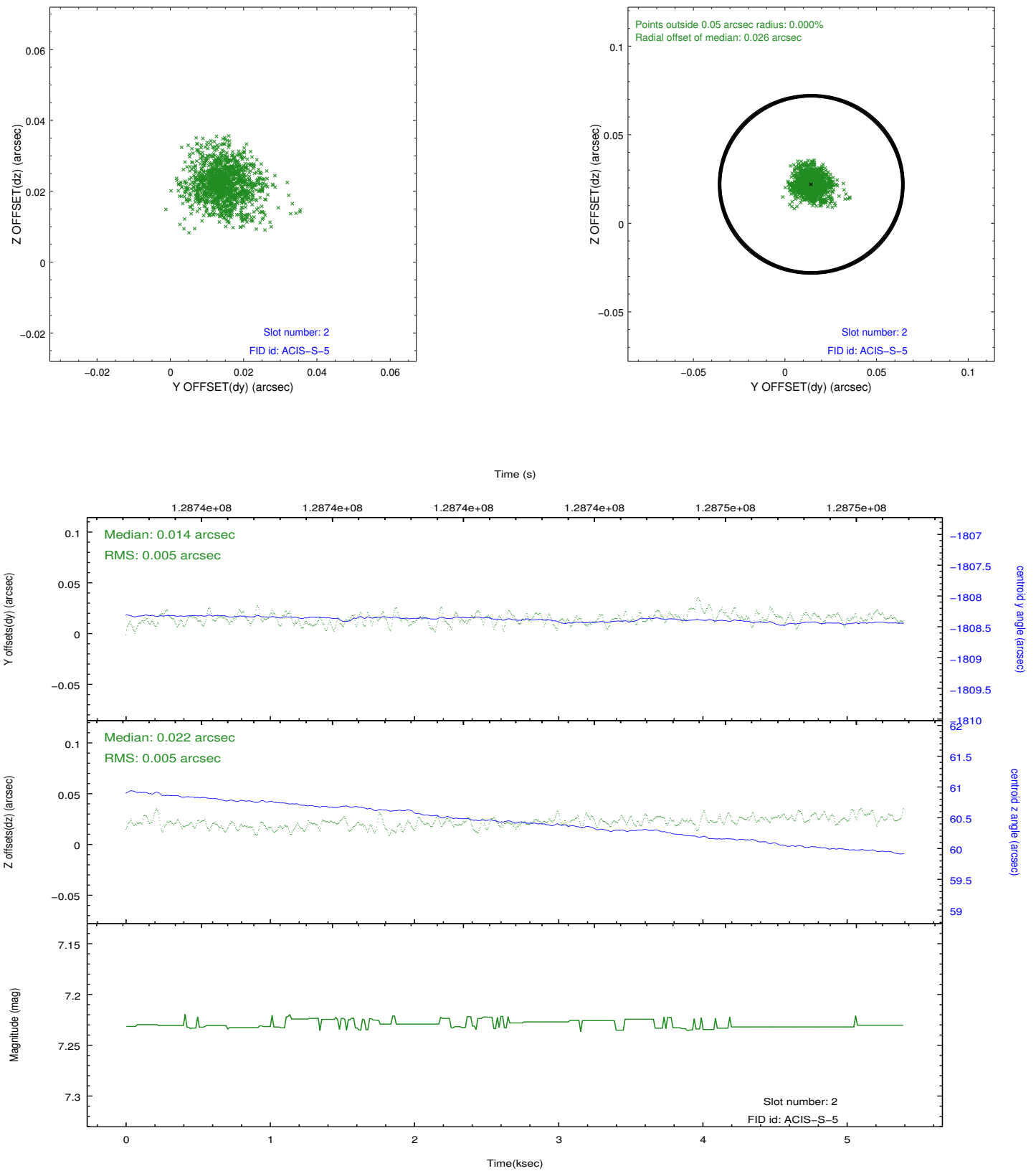
2.5.1 Slot 0



2.5.2 Slot 1

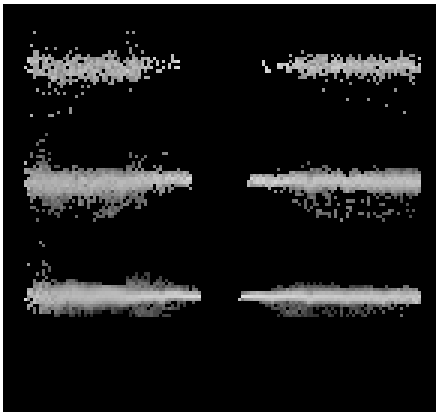


2.5.3 Slot 2

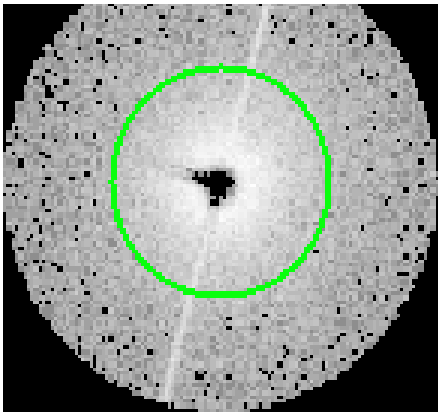


3 Gratings

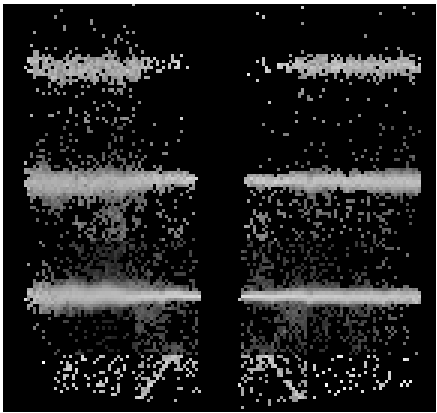
3.1 HEG Arm



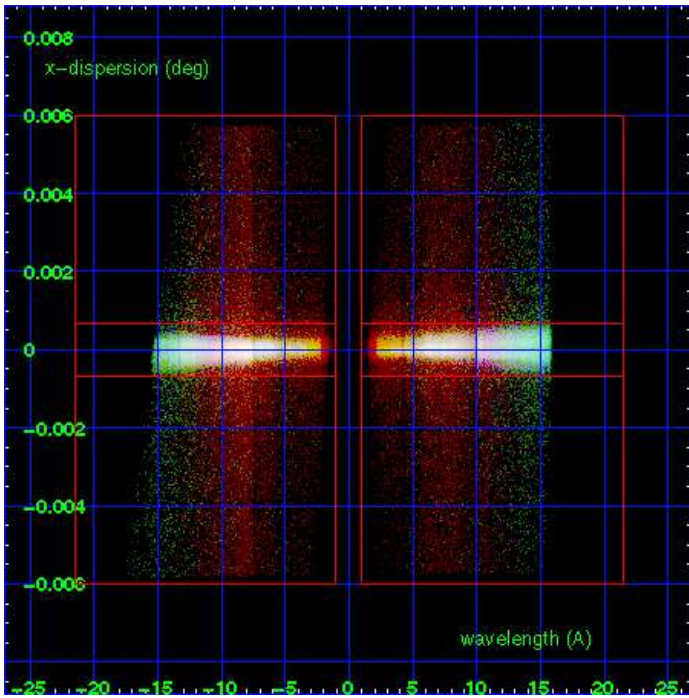
HEG Order Sort 123



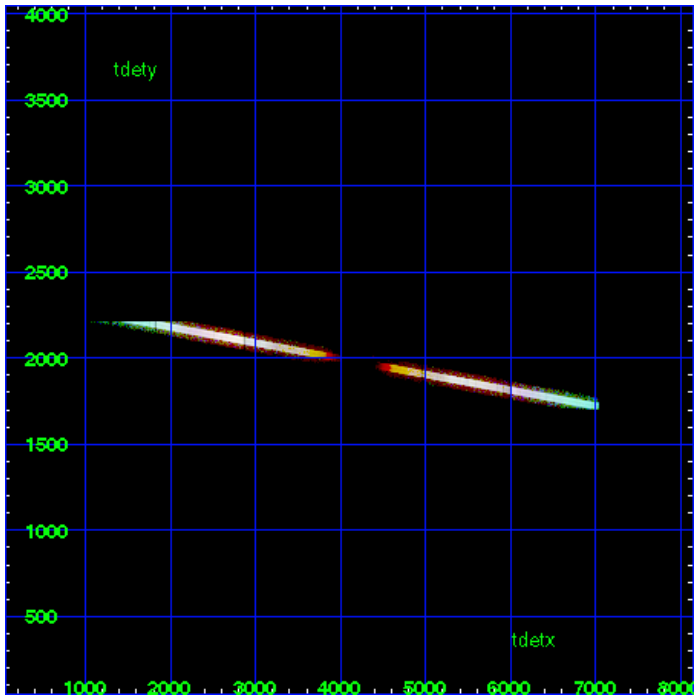
HEG Zero Order



HEG Order Sort ALL

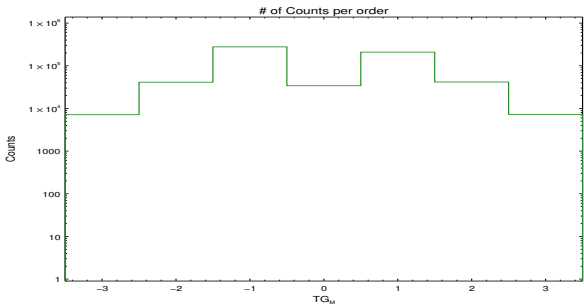


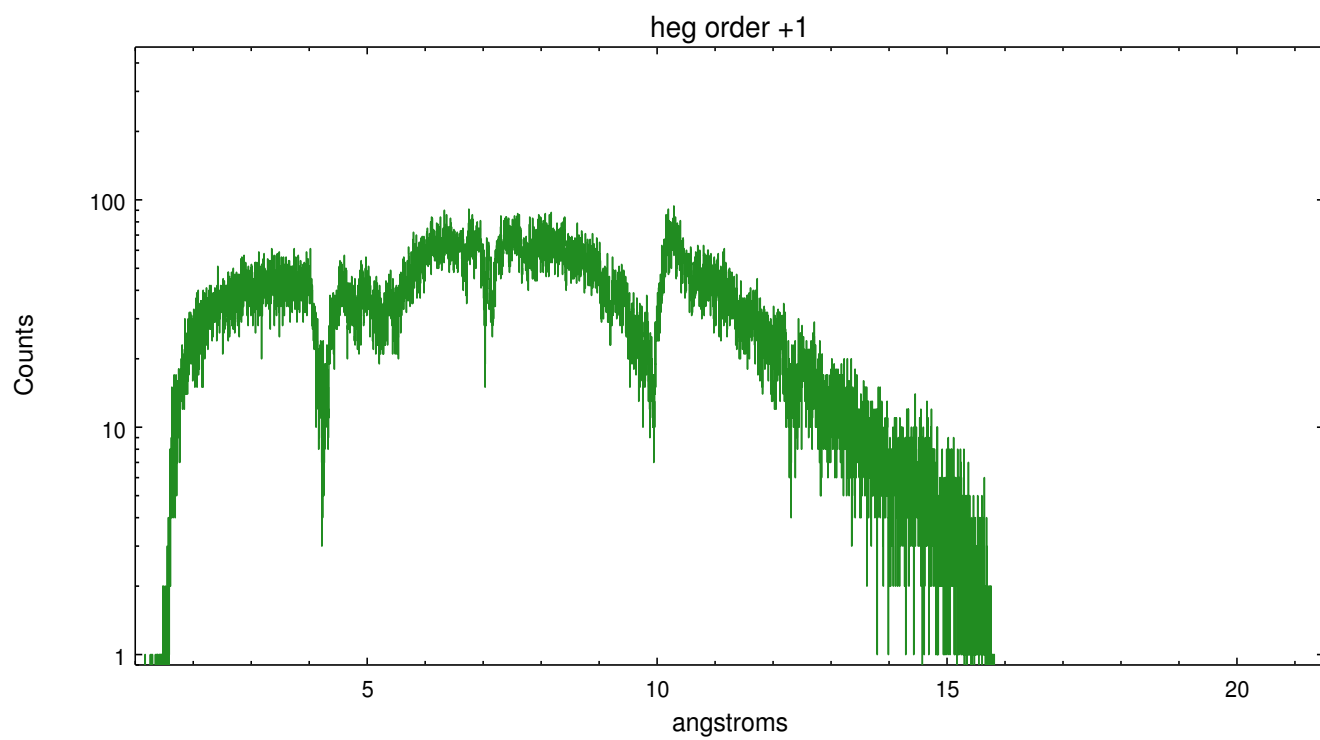
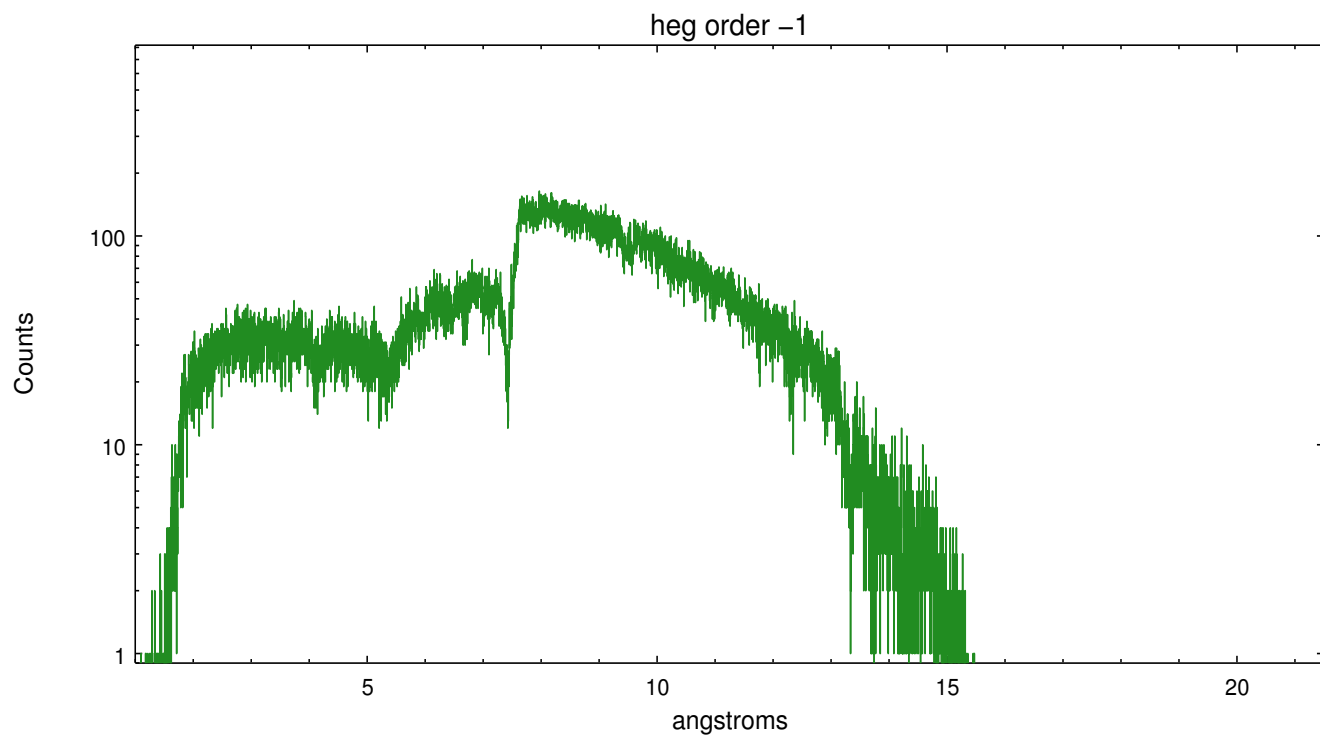
Spot Image HEG



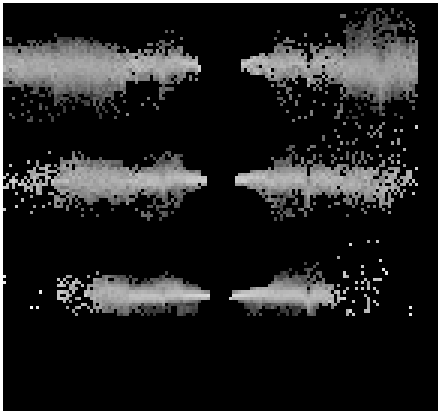
Full Detector HEG

	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	7132	41218	277598	34078	209187	41597	7214

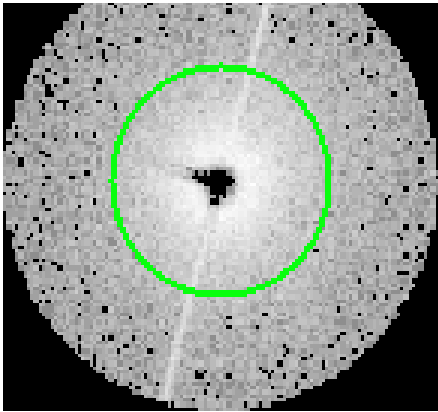




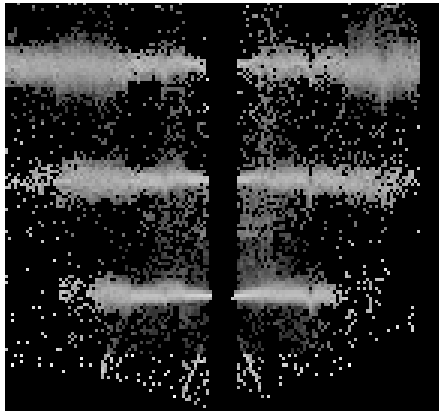
3.2 MEG Arm



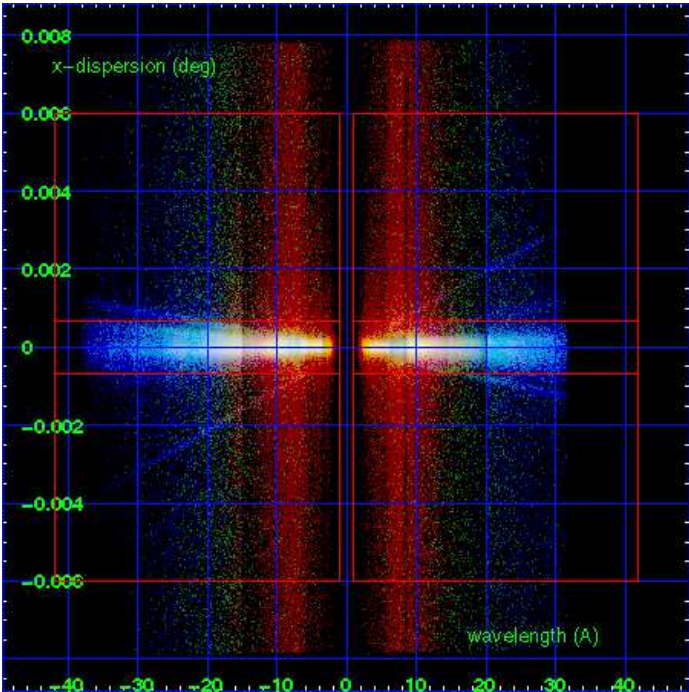
MEG Order Sort 123



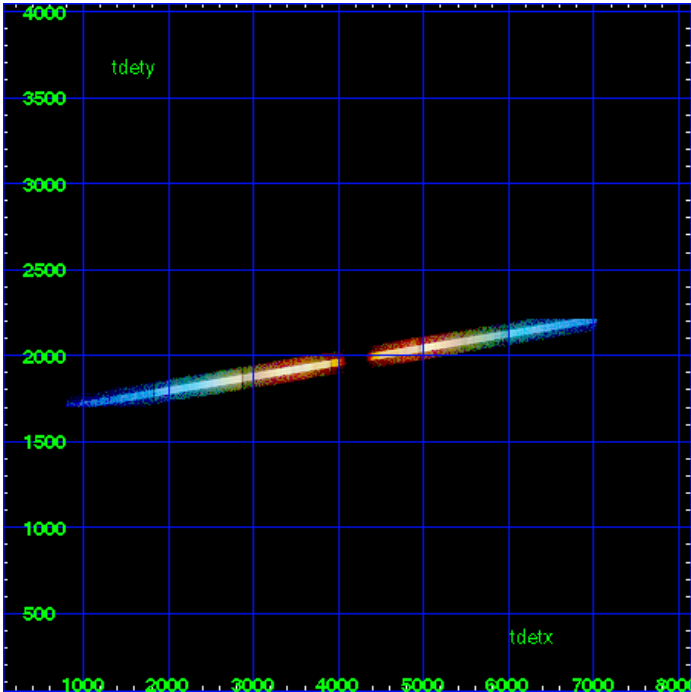
MEG Zero Order



MEG Order Sort ALL

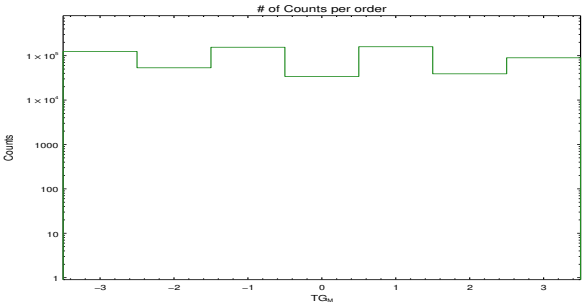


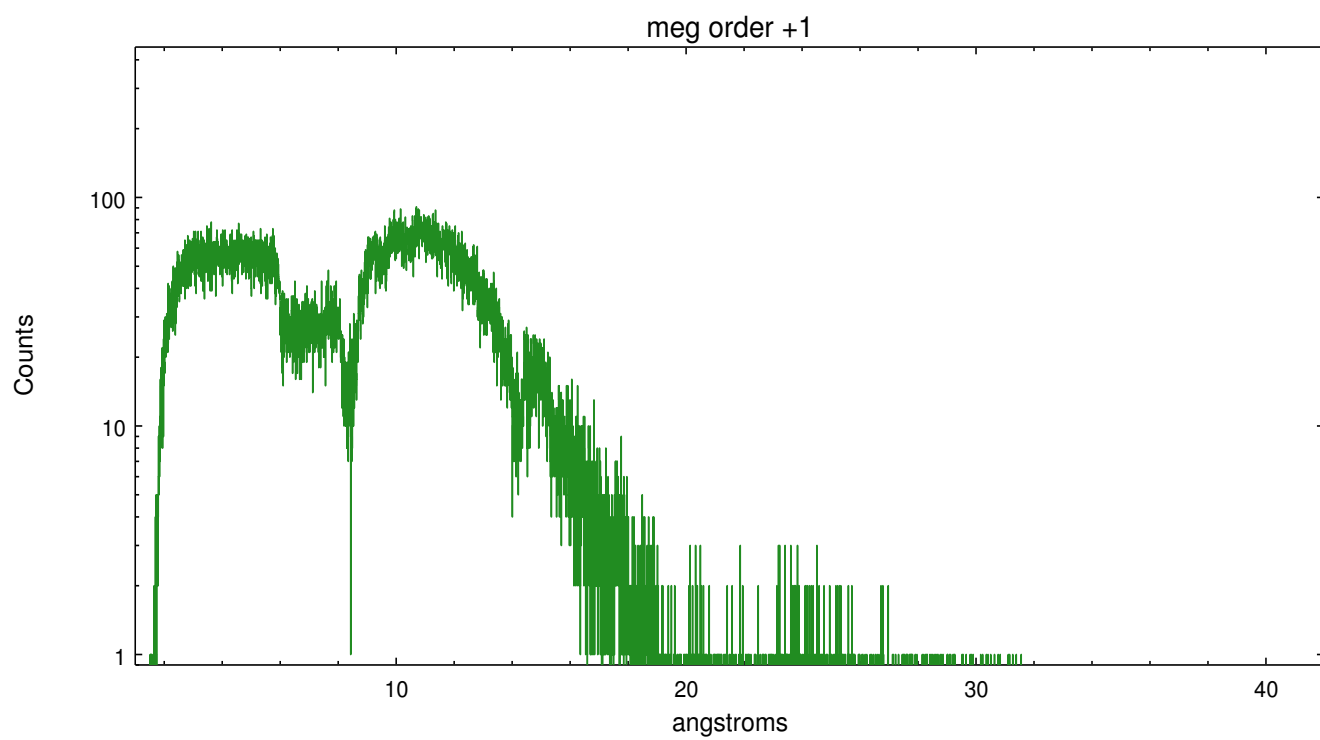
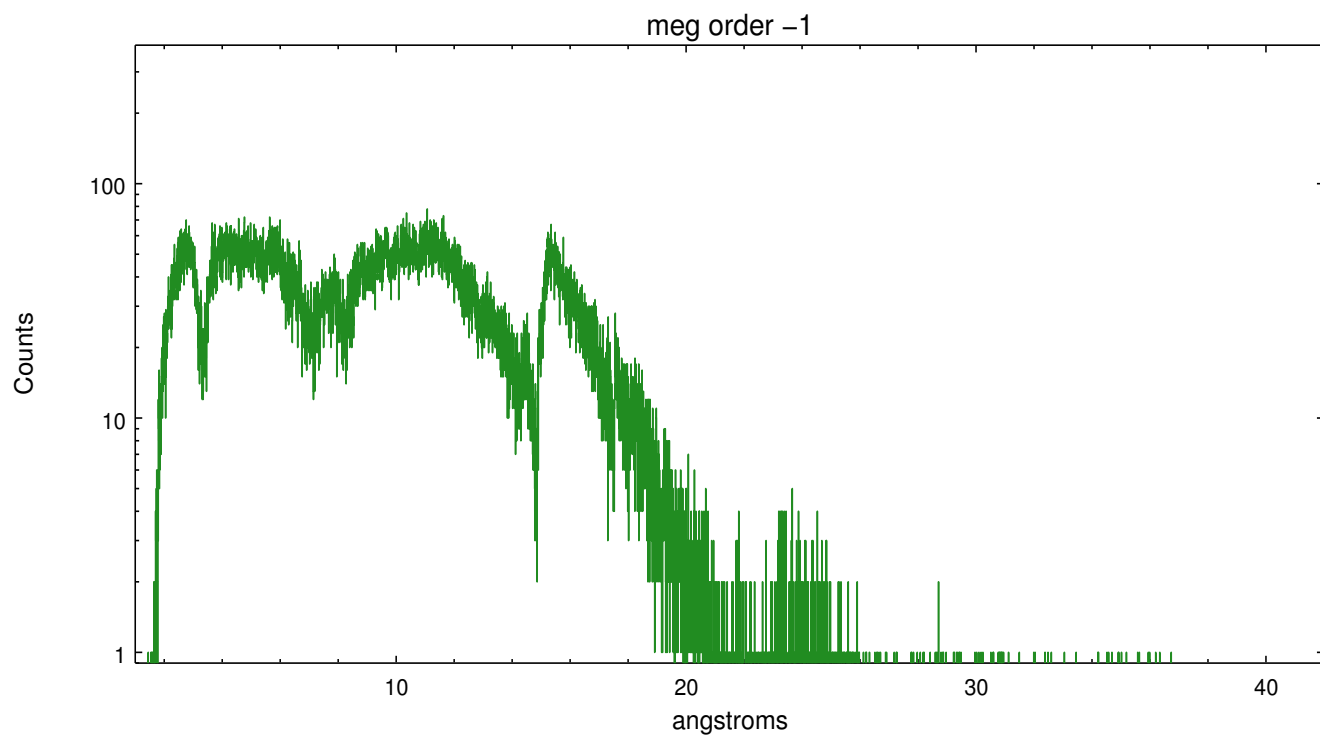
Spot Image MEG



Full Detector MEG

	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	124254	53377	154708	34078	159135	39042	89661





A Summary

A.1 Status

V&V Scientist	Joy Nichols
V&V Date (YYYY-MM-DD)	2012.10.10
V&V Edition	1
V&V Disposition and Status	OK
V&V Charge Time	4.752

A.2 Comments

Zeroth order piled up and cratered. 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=4168.1, y=4089.83) 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 as tg_findzo (currently in ISIS as findzo). The tool calculates the point of intersection of the readout streak and the meg 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.

===

The spectrum is clearly visible in an image of bad events. This is likely due to pileup which causes grade migration into bad event grades.

===

The charge time is based on CCD_ID=4 (S0), which had the fewest dropped frames. Other chips have dropped frames due to telemetry saturation by the zeroth order (no mitigating zero order sample-cycle or exclusion region was requested) and dispersed spectra. Their effective exposures range from 1.465-4.142 ks.

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For analysis of orders 3 and above, the data should be re-extracted using custom order-sorting boundaries (osort_lo, osort_hi in tg_resolve_events) to bypass the ccd response. For high orders, residual calibration uncertainties in the response are magnified, and MEG 3rd orders are clipped in PHA-space somewhat near the ends of the spectrum.