V&V Reference Report
L2 ASCDS Version : 10

Observation 15651 - L2 Version 4
Chandra X-Ray Center

L2 Processing Date : Oct 7 2015

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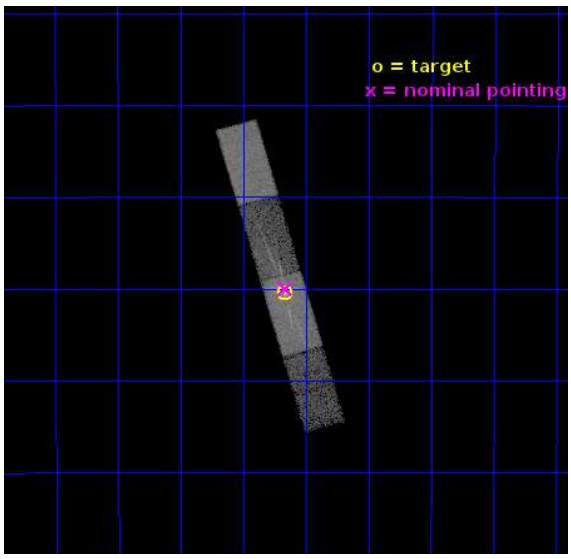
1 Front

seq_num	702847	Sequence number
obs_id	15651	Observation id
title	Joint Chandra/XMM/EVLA Monitoring of the Gas Cloud G2 as it Encounters Sgr A*	Proposal title
observer	Dr. Daryl Haggard	Principal investigator
object	Sgr A	Source name
dtycycle	0	
cycle	P	events from which exps? Prim/Second/Both
ra_targ	266.416837	Observer's specified target RA [deg]
dec_targ	-29.007811	Observer's specified target Dec [deg]
ra_nom	266.41635579909	Nominal RA [deg]
dec_nom	-28.999964555009	Nominal Dec [deg]
roll_nom	74.156402977295	Nominal Roll [deg]
revision	4	Processing version of data
ontime	14105.382824183	Sum of GTIs [s]
livetime	13752.627918084	Livetime [s]
ontime5	14105.341784179	Sum of GTIs [s]
ontime6	14105.300744176	Sum of GTIs [s]
ontime7	14105.382824183	Sum of GTIs [s]
ontime8	14105.259704173	Sum of GTIs [s]
l2events	78166	Number of level 2 events

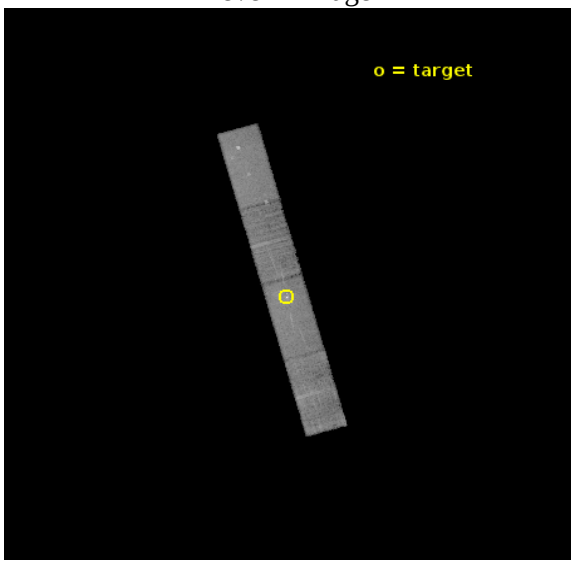


2 OBI

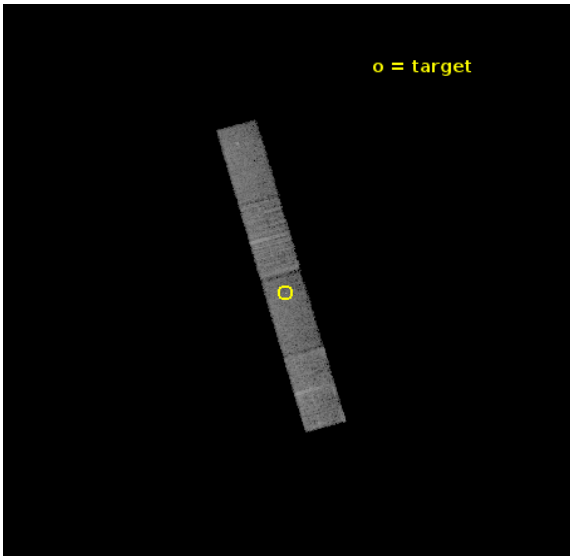
2.1 OBI

2.1.1 Images

Level 1 Image

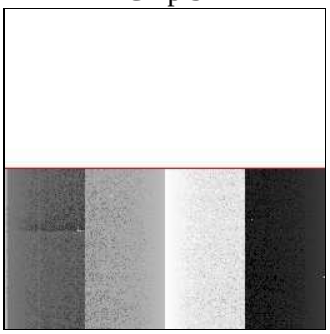


Level 1 Bad Events

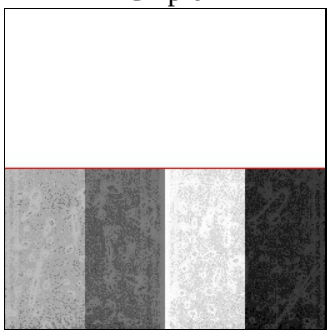


2.1.2 Bias

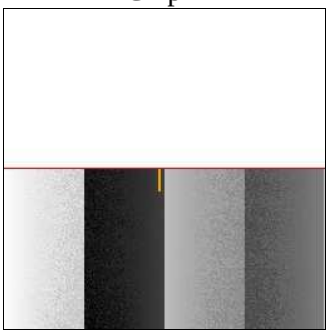
Chip 5



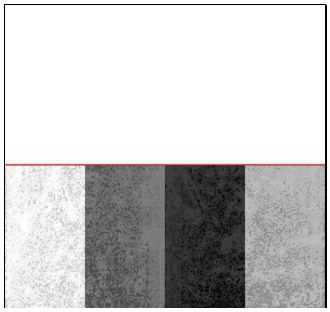
Chip 6



Chip 7



Chip 8



2.1.3 Parameters

obi_num	0	Obi number
ascdsver	10.3	Processing system revision
caldbver	4.6.4	
date	2014-12-03T12:23:16	Date and time of file creation
revision	2	Processing version of data

sched_exp_time	14046.307000	[s] Scheduled observation exposure time
ontime	14105.382824183	Sum of GTIs [s]
ontime5	14105.341784179	Sum of GTIs [s]
ontime6	14105.300744176	Sum of GTIs [s]
ontime7	14105.382824183	Sum of GTIs [s]
ontime8	14105.259704173	Sum of GTIs [s]
l1events	212773	Number of level 1 events
tgmethod	TGDETECT	Method used to create src1a file
zo_pos	(4094.46, 4039.16)	src1a sky pixel position

2.1.4 Events

	ccd 5	**ccd 6**	**ccd 7**	**ccd 8**
level 1 events	59584	43542	59548	50099
rejected events	28464	32698	25584	34794
rejected %	47%	75%	42%	69%

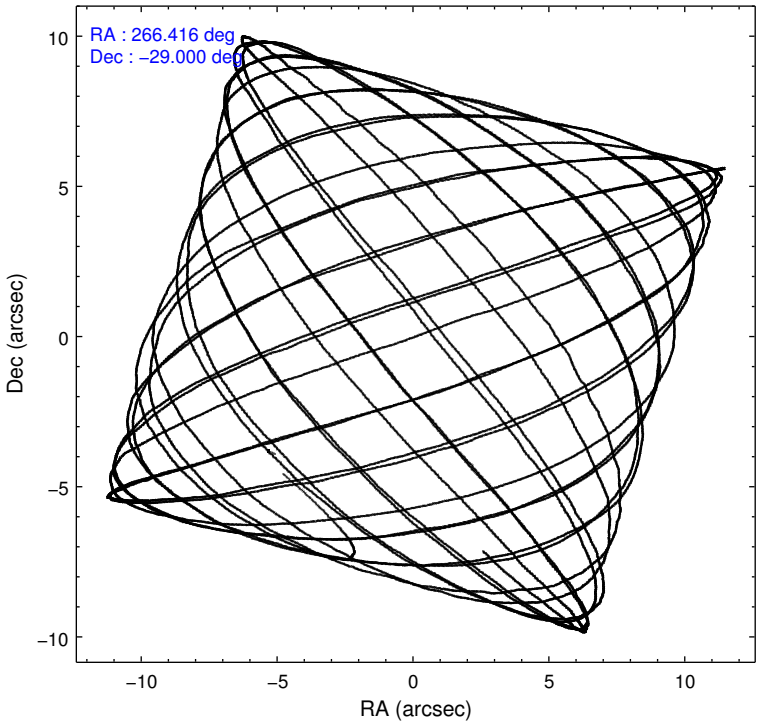
	ccd 5	**ccd 6**	**ccd 7**	**ccd 8**
grade 0 events	3703	5558	4303	5181
	6%	12%	7%	10%
grade 1 events	128	20	56	43
	0%	0%	0%	0%
grade 2 events	9227	1925	7387	3405
	15%	4%	12%	6%
grade 3 events	1753	907	3457	1572
	2%	2%	5%	3%
grade 4 events	1621	829	3332	1503
	2%	1%	5%	3%
grade 5 events	4815	1781	4901	2533
	8%	4%	8%	5%
grade 6 events	14823	1628	15498	3645
	24%	3%	26%	7%
grade 7 events	23514	30894	20614	32217
	39%	70%	34%	64%

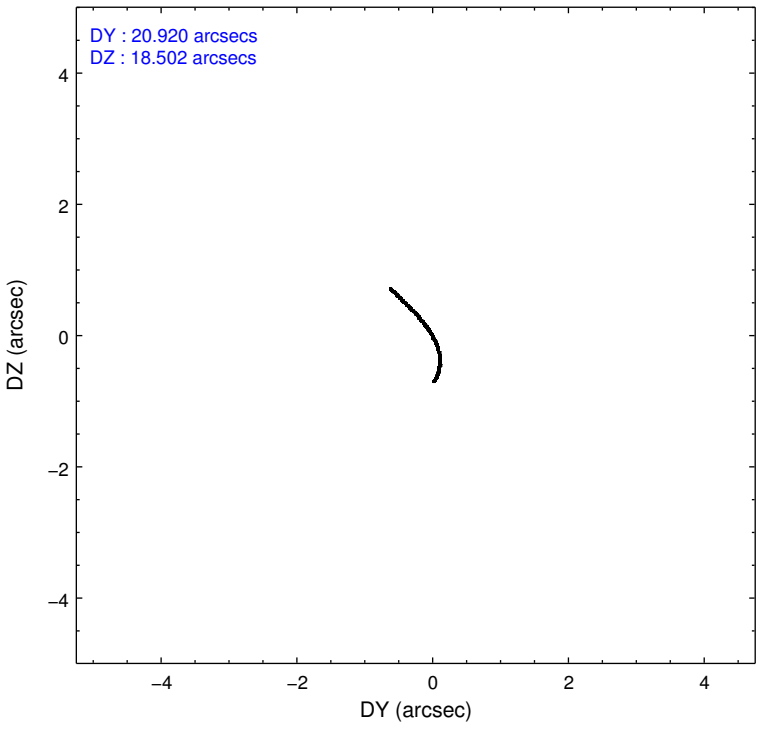
2.2 Compared Parameters

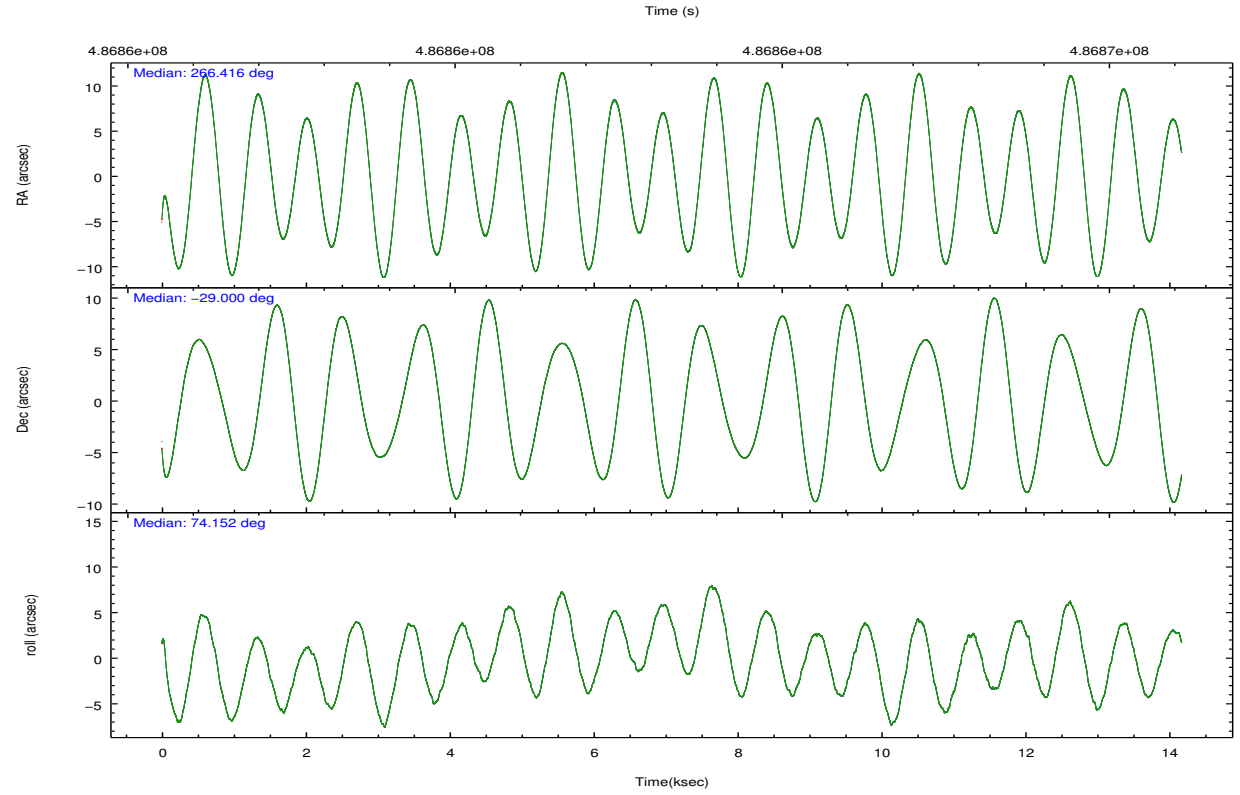
Parameter	Planned	Actual
Instrument	ACIS	ACIS
Detector	ACIS-5678	ACIS-5678
Grating	HETG	HETG
Data mode	FAINT	FAINT
Observation mode	POINTING	POINTING
[deg] Pointing RA	266.424431	266.4163557990905
[deg] Pointing Dec	-29.026361	-28.99996455500868
[deg] Pointing Roll	74.003682	74.15640297729506
[s] Window start time (MET)	486432067.184000	486432067.184000
[s] Window stop time (MET)	488073607.184000	488073607.184000
[mm] SIM focus pos	-0.684267	-0.6828225247311905
[mm] SIM defocus	0	0.001444936568705701
[mm] SIM translation stage pos	-183.992523	-183.9875365069546
[mm] SIM translation stage offset	-6.14	-6.144986076053243
[s] Observation start time (MET)	486856341.184000	486855158.50732
Observation start date	2013-06-05T21:51:14	2013-06-05T21:32:38
[s] Observation end time (MET)	486870388.184000	486870611.92066
Observation end date	2013-06-06T01:45:21	2013-06-06T01:50:11
Read mode	TIMED	TIMED

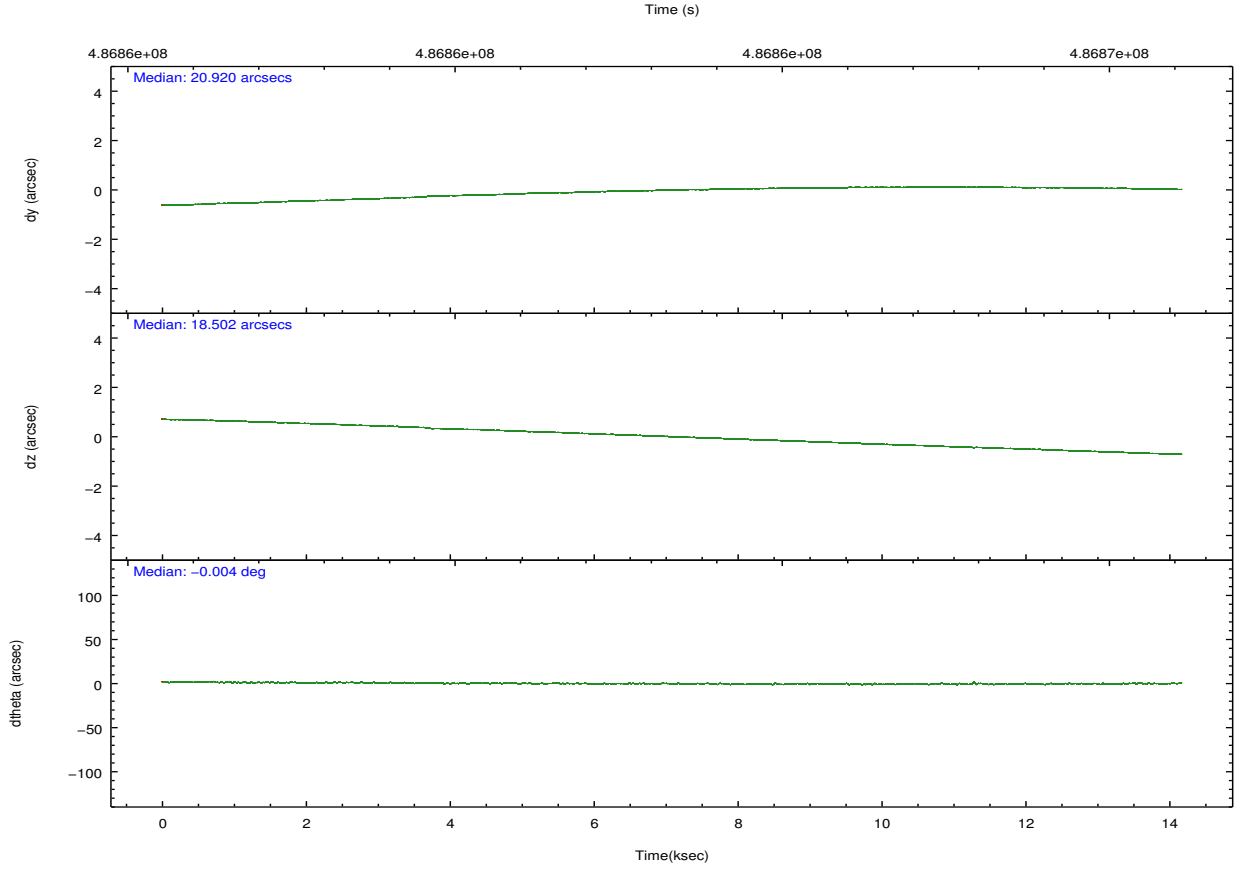
Parameter	Planned	Actual
Obspar format version number	7	7
Obspar file type	PREDICTED	ACTUAL
Obspar update status	NONE	UPDATED
Number of optional ACIS chips dropped	0	0
On-chip summing requested	N	N
Subarray requested	CUSTOM	1/2
Subarray start row	1	1
Subarray row count	512	512
Alternating exposures requested	N	N
[s] Primary exposure time	0.000000	1.6

2.3 Aspect


RA : 266.416 deg
Dec : −29.000 deg
Dec (arcsec)
RA (arcsec)
10
5
0
−5
−10
−10
−5
0
5
10


DY : 20.920 arcsecs
DZ : 18.502 arcsecs
DZ (arcsec)
DY (arcsec)
4
2
0
−2
−4
−4
−2
0
2
4


Time (s)
4.8686e+08
4.8686e+08
4.8686e+08
4.8687e+08
Median: 266.416 deg
RA (arcsec)
Median: −29.000 deg
Dec (arcsec)
Median: 74.152 deg
roll (arcsec)
Time(ksec)

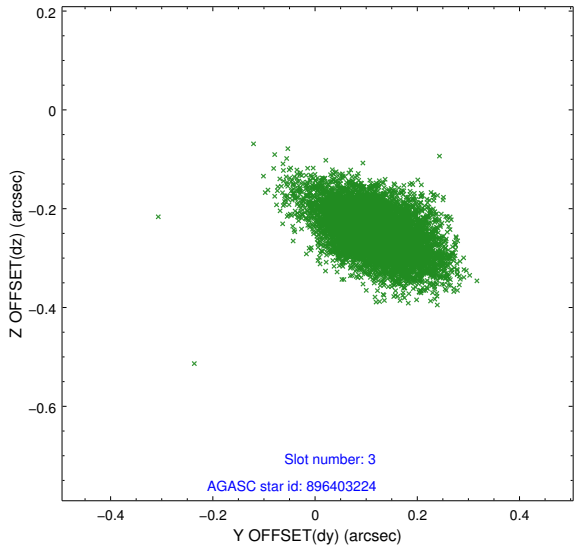

Time (s)
4.8686e+08
4.8686e+08
4.8686e+08
4.8687e+08
Median: 20.920 arcsecs
dy (arcsec)
Median: 18.502 arcsecs
dz (arcsec)
Median: −0.004 deg
dtheta (arcsec)
Time(ksec)

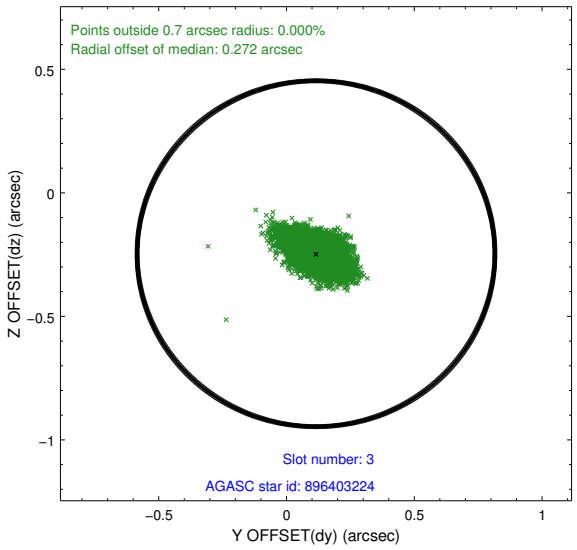
Slot Statistics

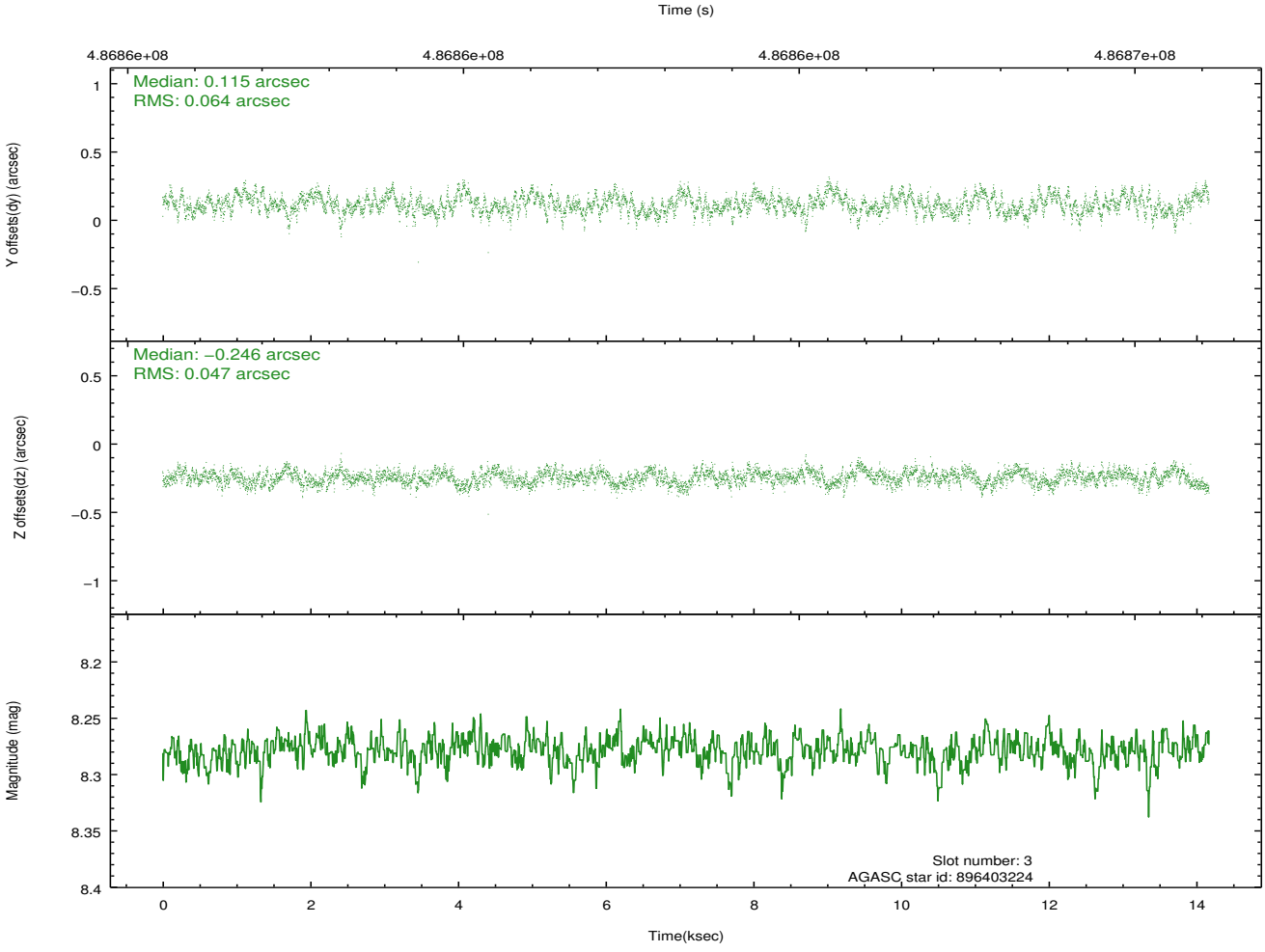
slot	status	used	id	mag	n_pts	med_dy	med_dz	dr1	dr2	ra	dec	mean_y	mean_z
0	FID		ACIS-S-2	6.92	3457	-0.130	-0.051	0.014	0.031	0.000000	0.000000	-773.63	-1866.69
1	FID		ACIS-S-4	7.01	3457	0.265	0.077	0.008	0.014	0.000000	0.000000	2139.89	41.53
2	FID		ACIS-S-5	7.06	3457	-0.165	-0.018	0.012	0.029	0.000000	0.000000	-1826.09	35.49
3	GUIDE	used	896403224	8.28	6914	0.115	-0.246	0.083	0.142	265.612825	-29.438915	-2137.44	2033.86
4	GUIDE	used	896537776	7.52	6914	0.235	0.257	0.059	0.094	266.655684	-29.665673	-2013.46	-1329.39
5	GUIDE	used	896538696	6.84	6913	-0.420	-0.319	0.066	0.109	266.298470	-28.325572	2314.45	1078.72
6	GUIDE	used	896533888	7.05	6914	0.116	0.136	0.058	0.091	266.666434	-29.392757	-1058.72	-1093.08
7	GUIDE	used	896538208	8.00	6913	-0.047	0.173	0.076	0.131	267.176969	-28.671626	1875.66	-1934.86

2.4 Star Slots

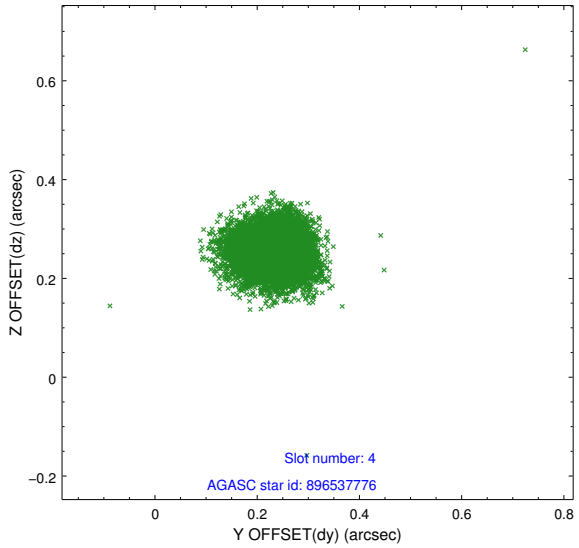
2.4.1 Slot 3

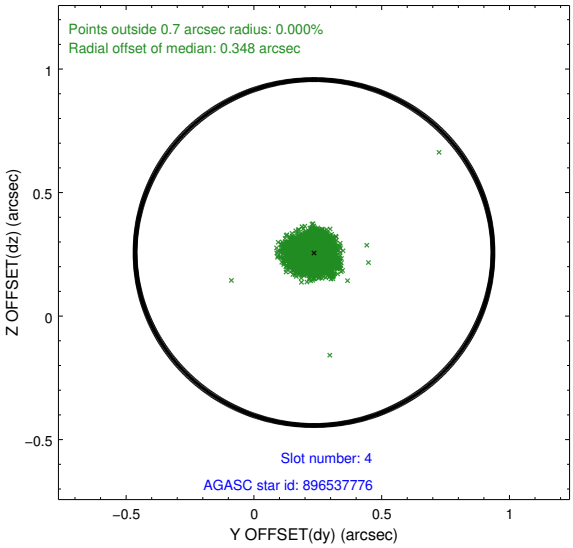


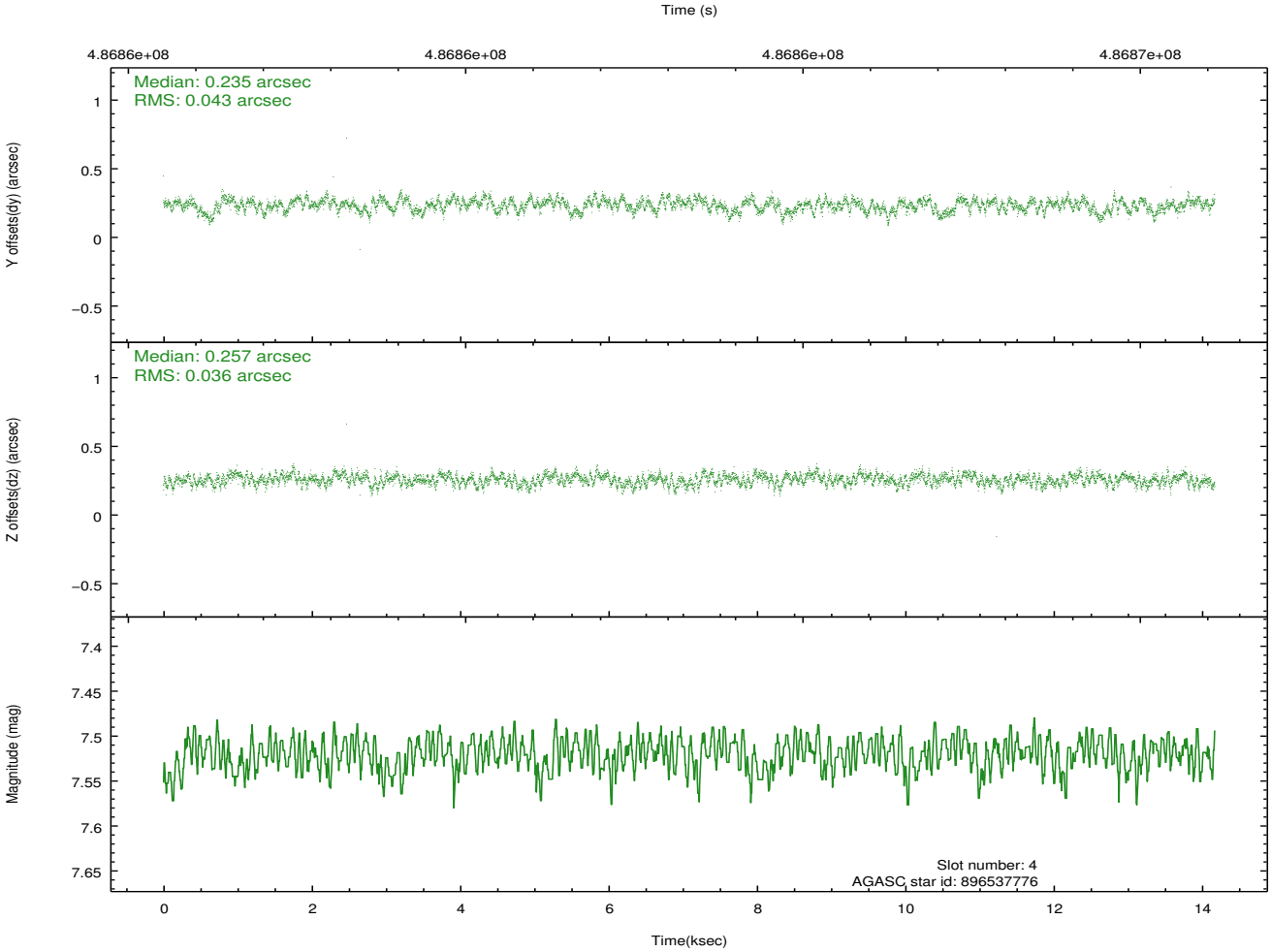




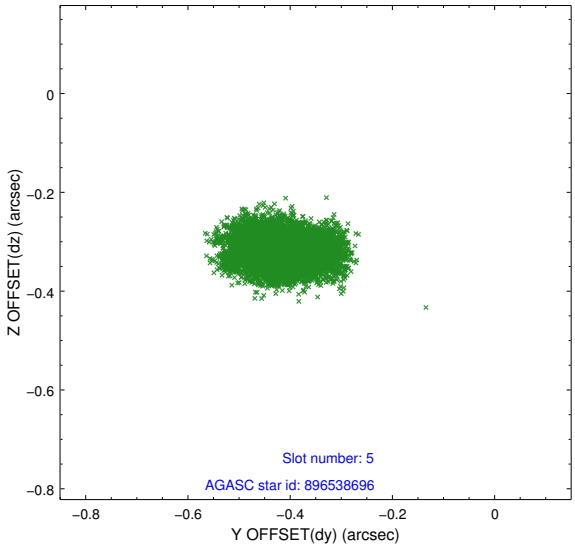
2.4.2 Slot 4

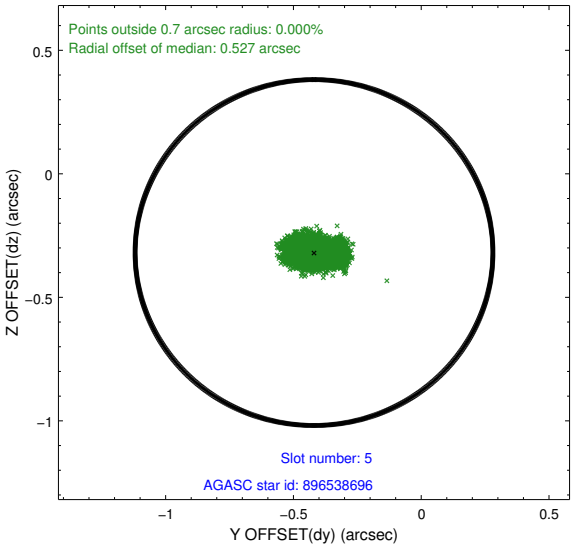

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 4
AGASC star id: 896537776

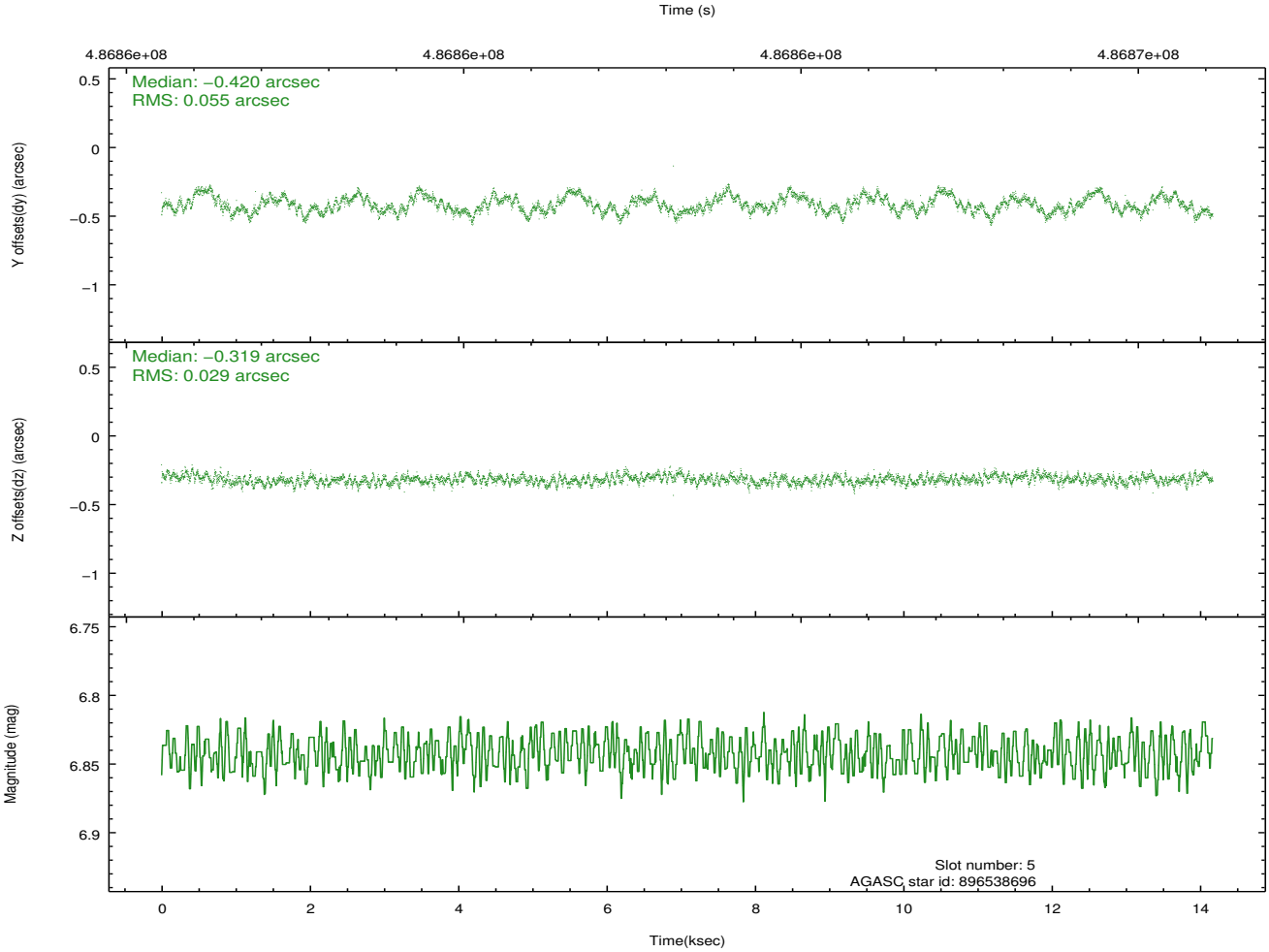

Points outside 0.7 arcsec radius: 0.000%
Radial offset of median: 0.348 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 4
AGASC star id: 896537776


Time (s)
Median: 0.235 arcsec
RMS: 0.043 arcsec
Y offsets(dy) (arcsec)
Median: 0.257 arcsec
RMS: 0.036 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number: 4
AGASC star id: 896537776
Time(ksec)

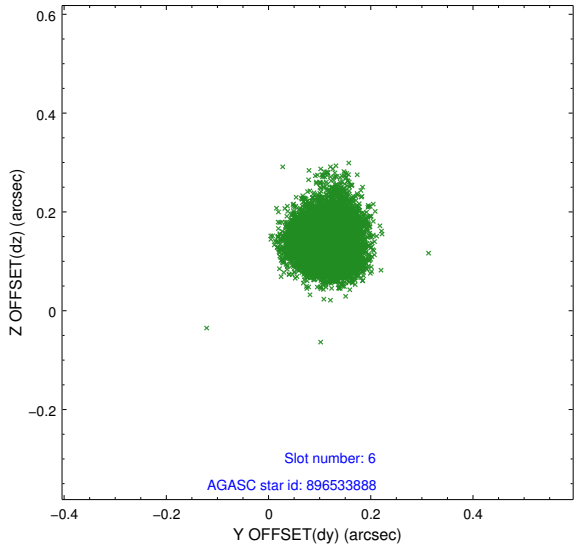
2.4.3 Slot 5

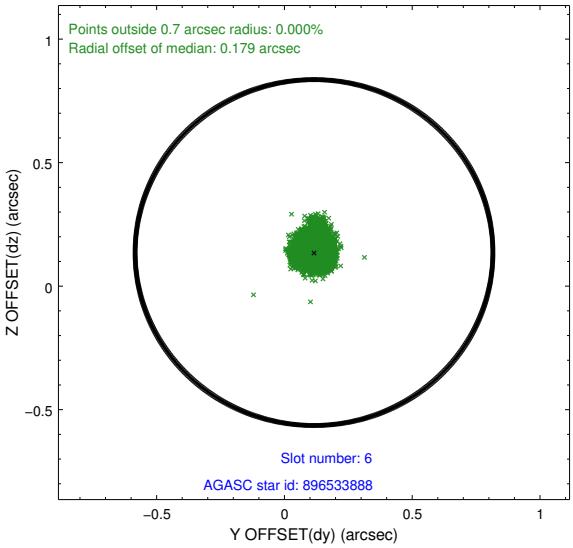

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 5
AGASC star id: 896538696

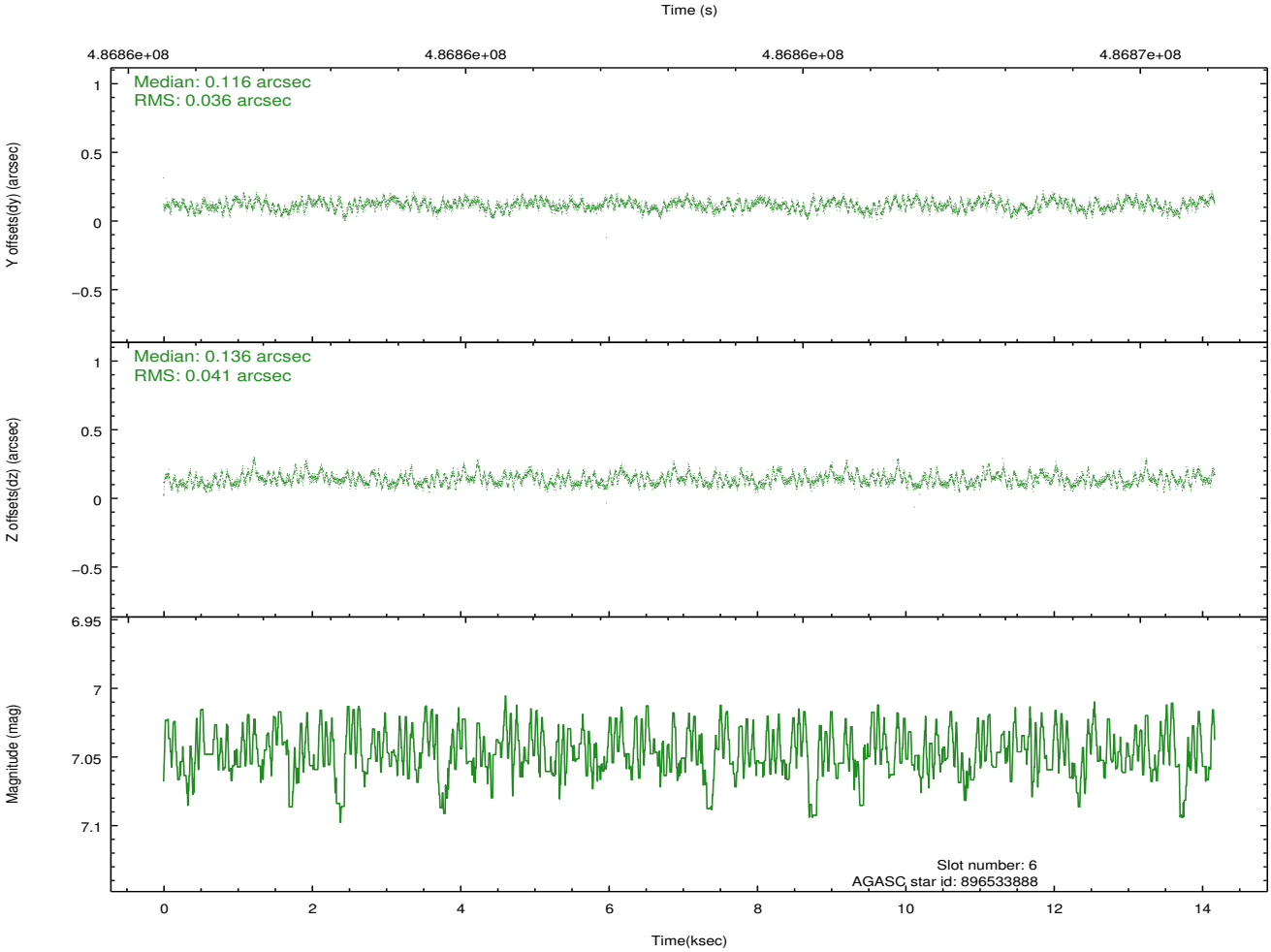

Points outside 0.7 arcsec radius: 0.000%
Radial offset of median: 0.527 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 5
AGASC star id: 896538696


Time (s)
Median: −0.420 arcsec
RMS: 0.055 arcsec
Y offsets(dy) (arcsec)
Median: −0.319 arcsec
RMS: 0.029 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number: 5
AGASC star id: 896538696
Time(ksec)

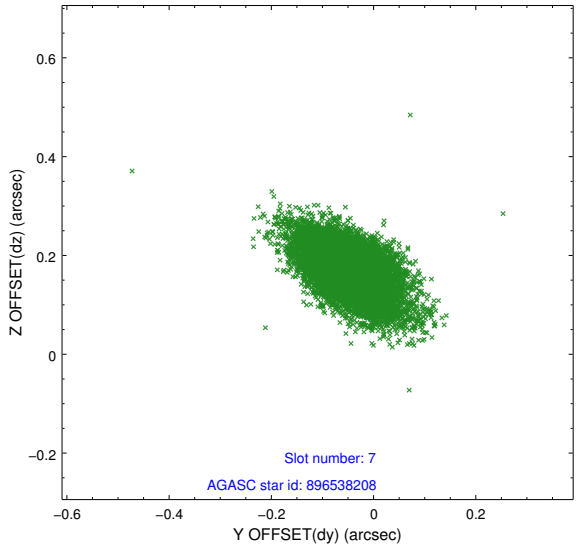
2.4.4 Slot 6

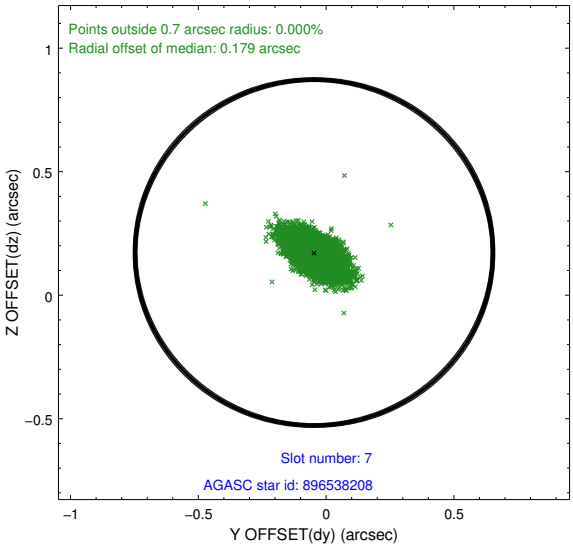

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 6
AGASC star id: 896533888

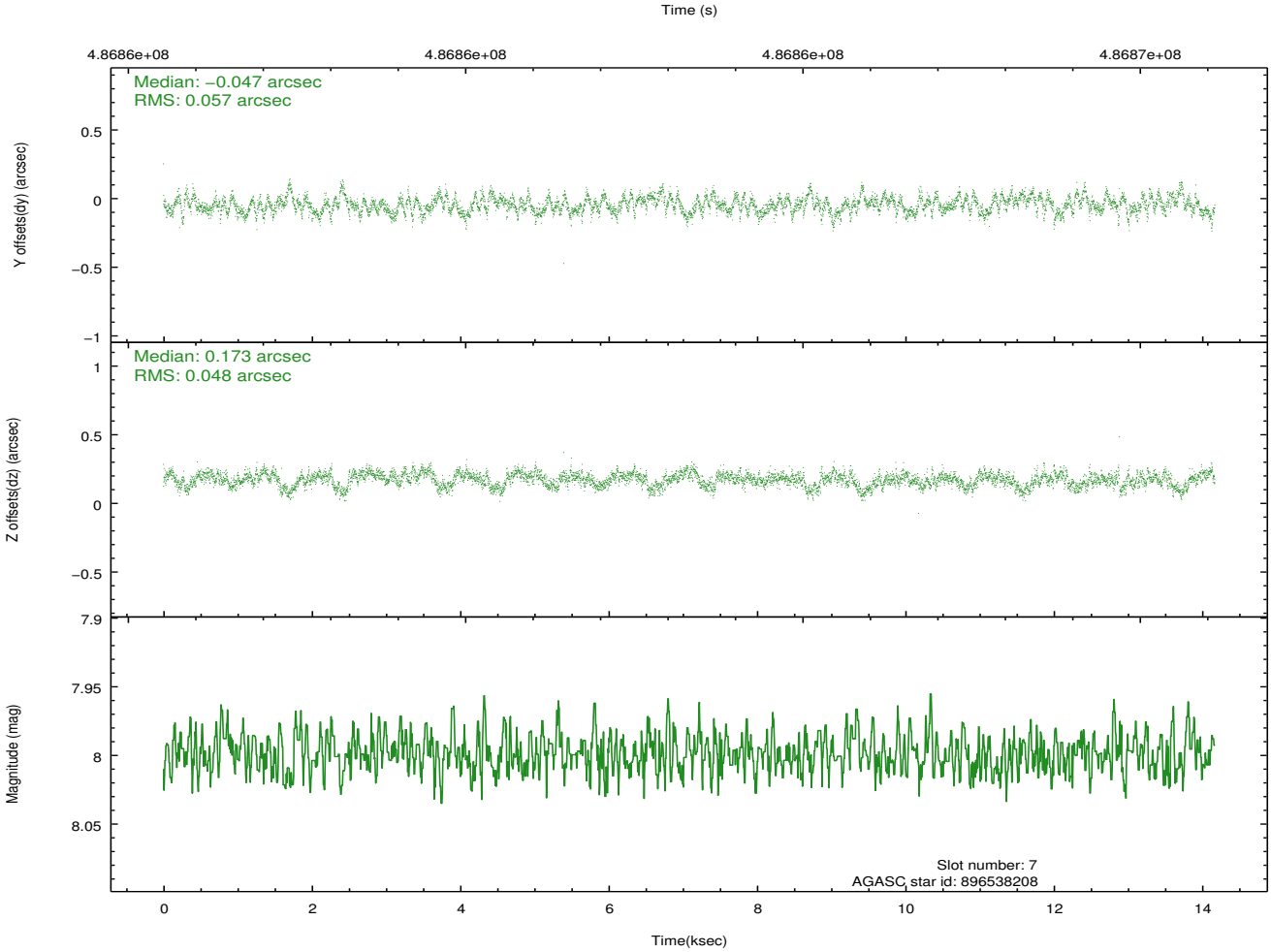

Points outside 0.7 arcsec radius: 0.000%
Radial offset of median: 0.179 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 6
AGASC star id: 896533888


Time (s)
Median: 0.116 arcsec
RMS: 0.036 arcsec
Y offsets(dy) (arcsec)
Median: 0.136 arcsec
RMS: 0.041 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number: 6
AGASC star id: 896533888
Time(ksec)

2.4.5 Slot 7

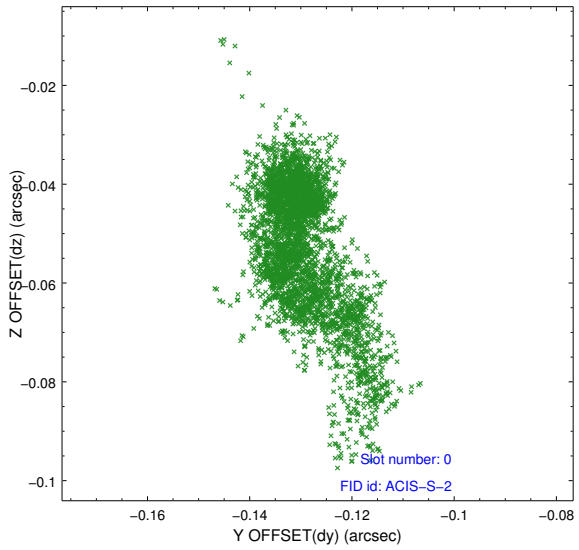

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 7
AGASC star id: 896538208

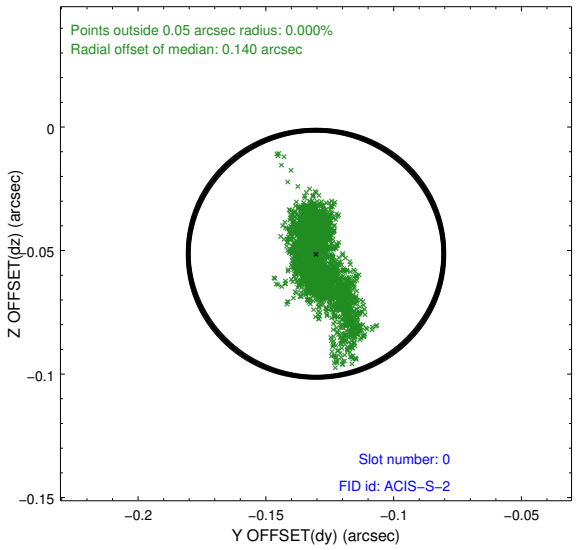

Points outside 0.7 arcsec radius: 0.000%
Radial offset of median: 0.179 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 7
AGASC star id: 896538208

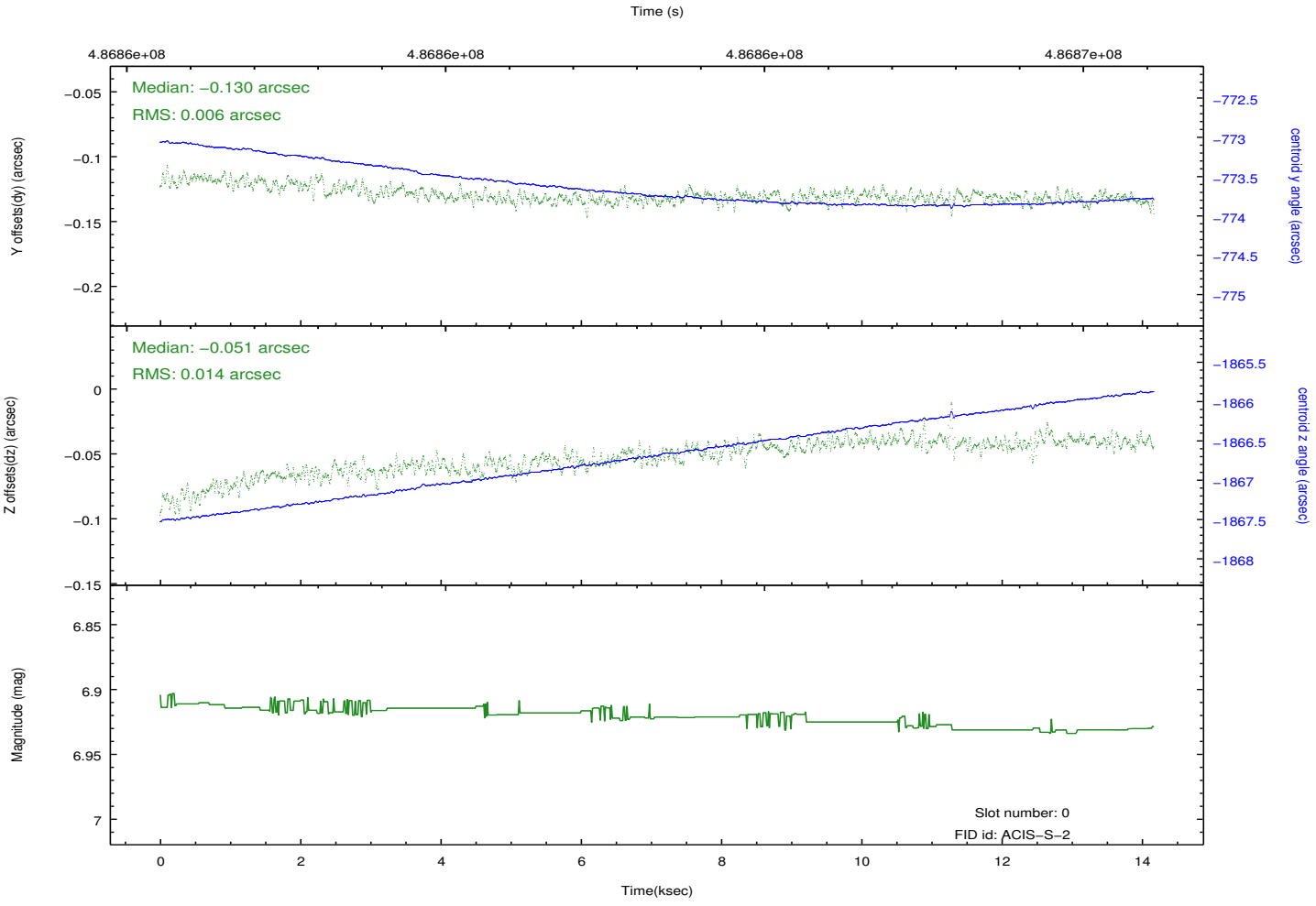

Time (s)
Median: −0.047 arcsec
RMS: 0.057 arcsec
Y offsets(dy) (arcsec)
Median: 0.173 arcsec
RMS: 0.048 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number: 7
AGASC star id: 896538208
Time(ksec)

2.5 FID Slots

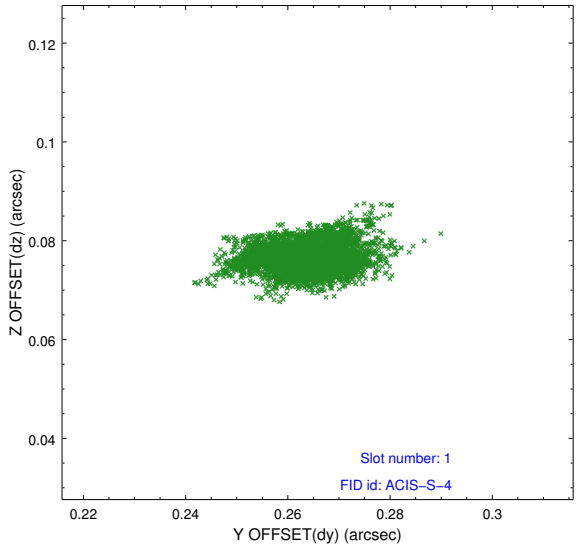
2.5.1 Slot 0

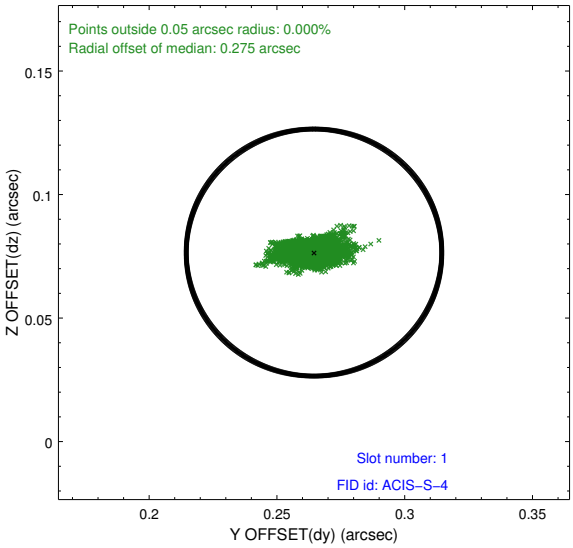


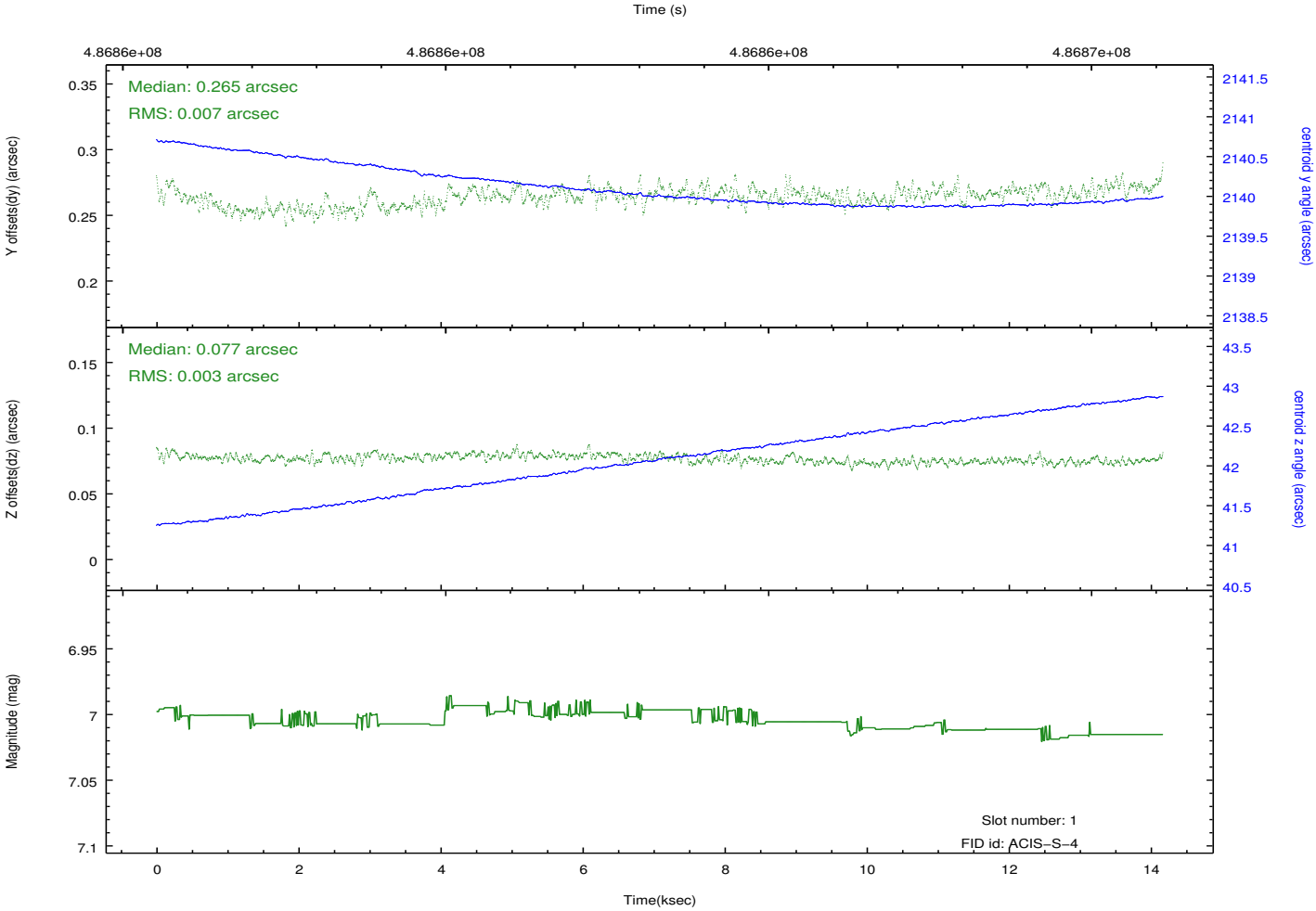




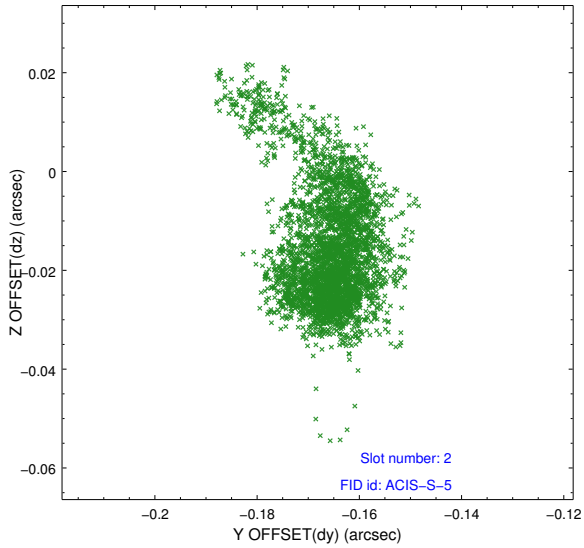
2.5.2 Slot 1

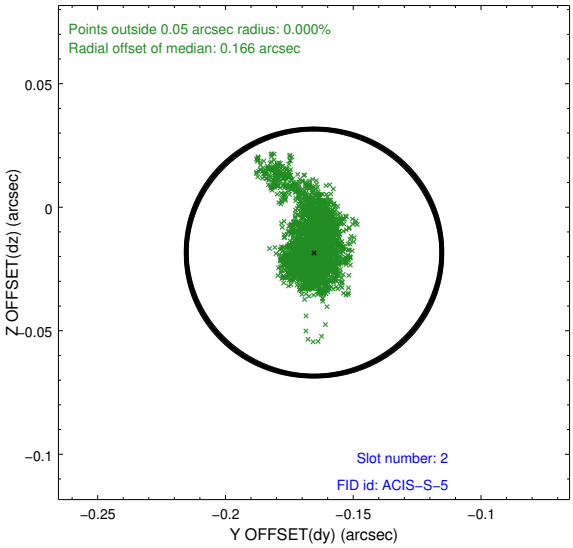

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 1
FID id: ACIS–S–4

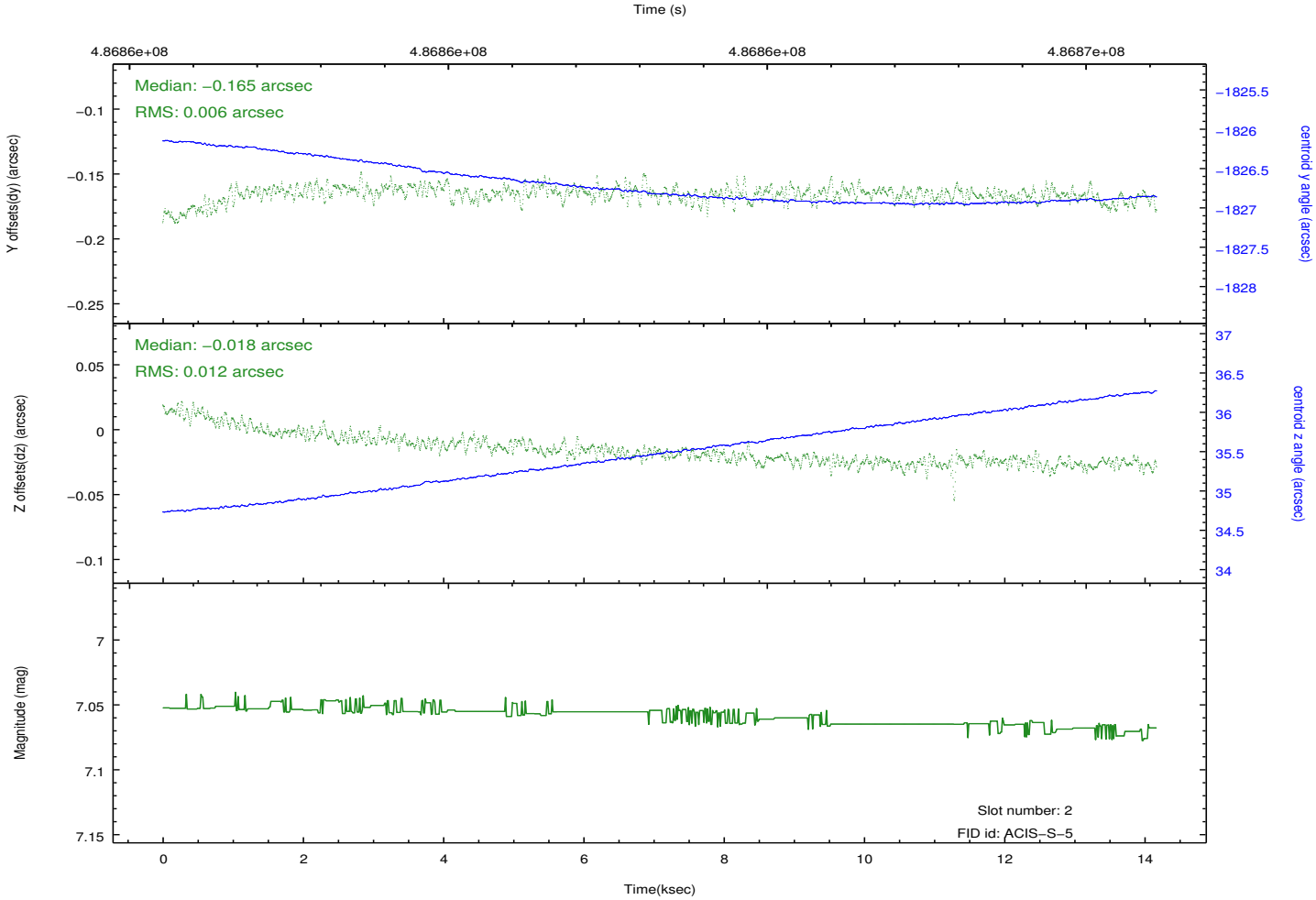

Points outside 0.05 arcsec radius: 0.000%
Radial offset of median: 0.275 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 1
FID id: ACIS–S–4


Time (s)
Median: 0.265 arcsec
RMS: 0.007 arcsec
Y offsets(dy) (arcsec)
centroid y angle (arcsec)
Median: 0.077 arcsec
RMS: 0.003 arcsec
Z offsets(dz) (arcsec)
centroid z angle (arcsec)
Magnitude (mag)
Slot number: 1
FID id: ACIS–S–4
Time(ksec)

2.5.3 Slot 2


Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 2
FID id: ACIS−S−5

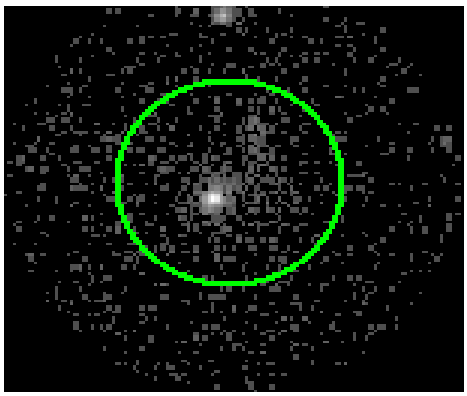

Points outside 0.05 arcsec radius: 0.000%
Radial offset of median: 0.166 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 2
FID id: ACIS−S−5


Time (s)
Median: −0.165 arcsec
RMS: 0.006 arcsec
Y offsets(dy) (arcsec)
centroid y angle (arcsec)
Median: −0.018 arcsec
RMS: 0.012 arcsec
Z offsets(dz) (arcsec)
centroid z angle (arcsec)
Magnitude (mag)
Slot number: 2
FID id: ACIS−S−5
Time(ksec)

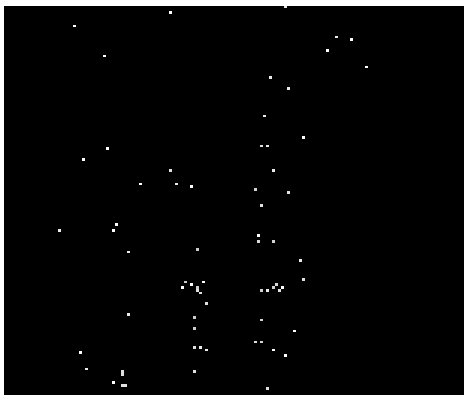
3 Gratings

3.1 HEG Arm

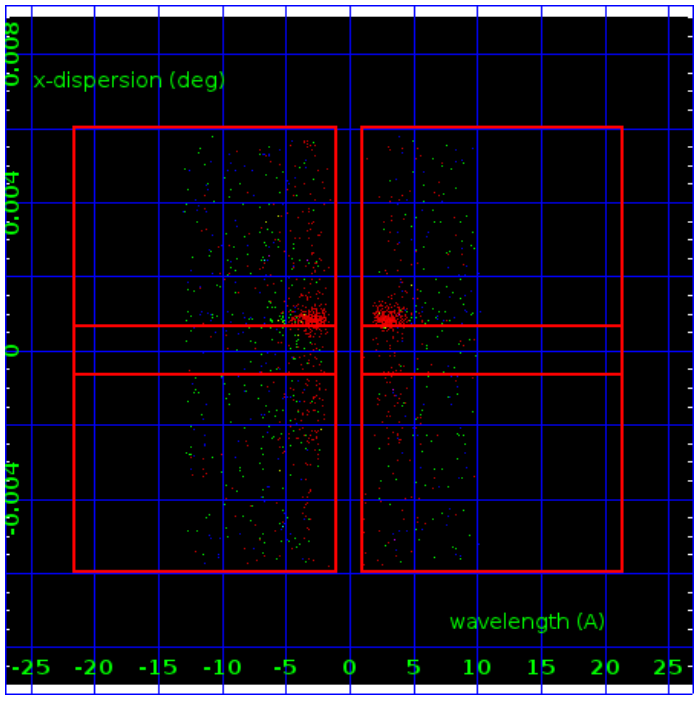
HEG Order Sort 123



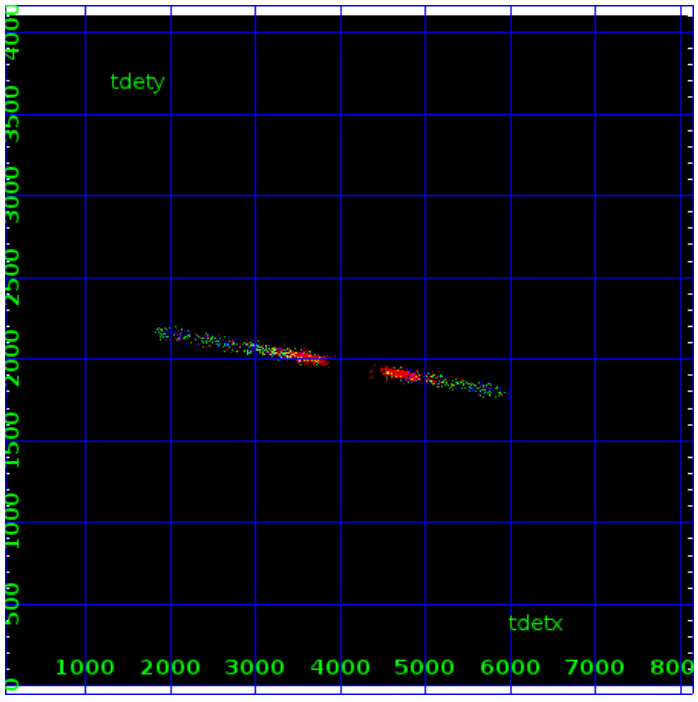
HEG Zero Order



HEG Order Sort ALL

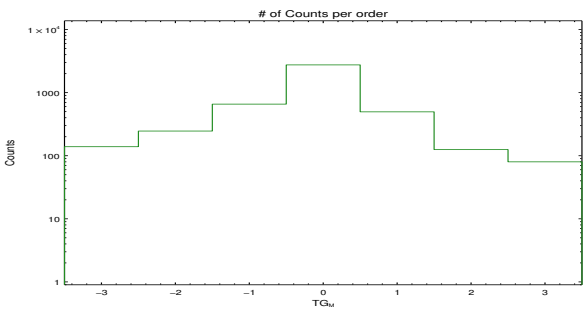


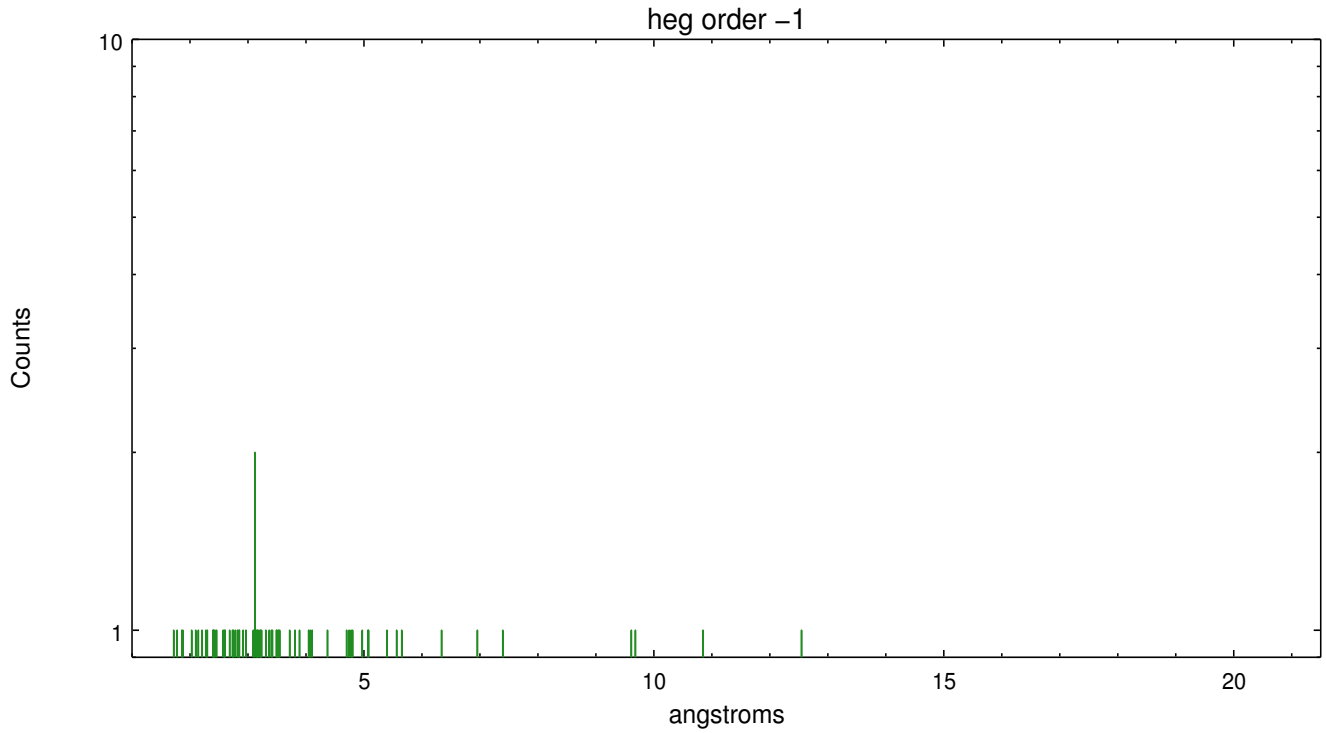
Spot Image HEG

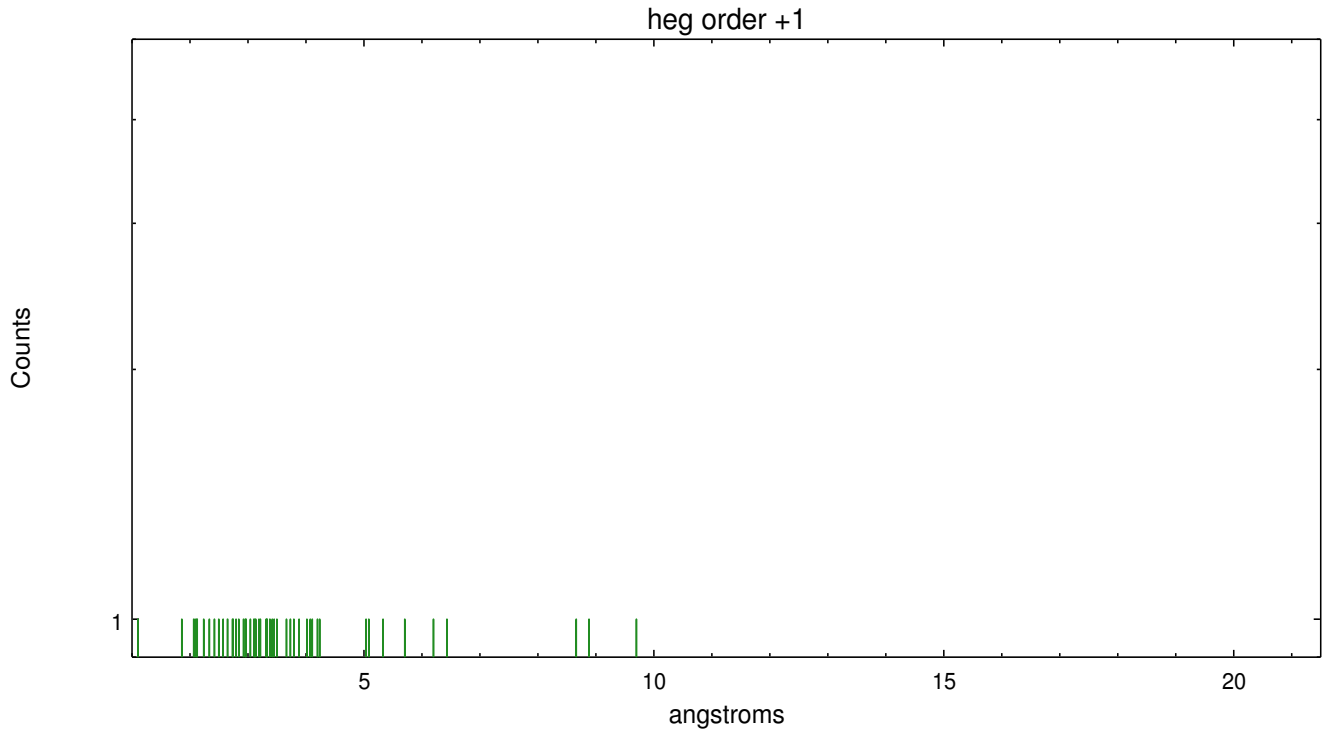


Full Detector HEG

	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	139	246	657	2752	496	125	80

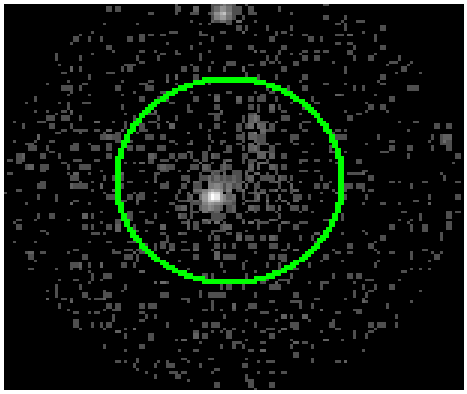



heg order −1
10
1
Counts
5
10
15
20
angstroms

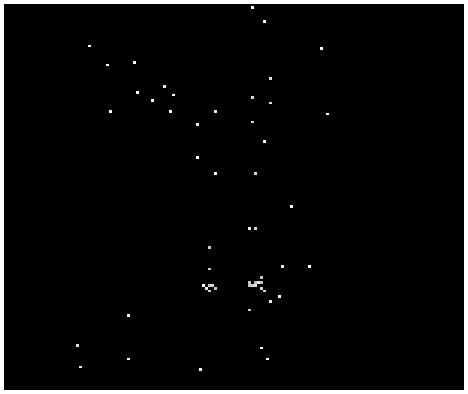

heg order +1
1
Counts
5
10
15
20
angstroms

3.2 MEG Arm

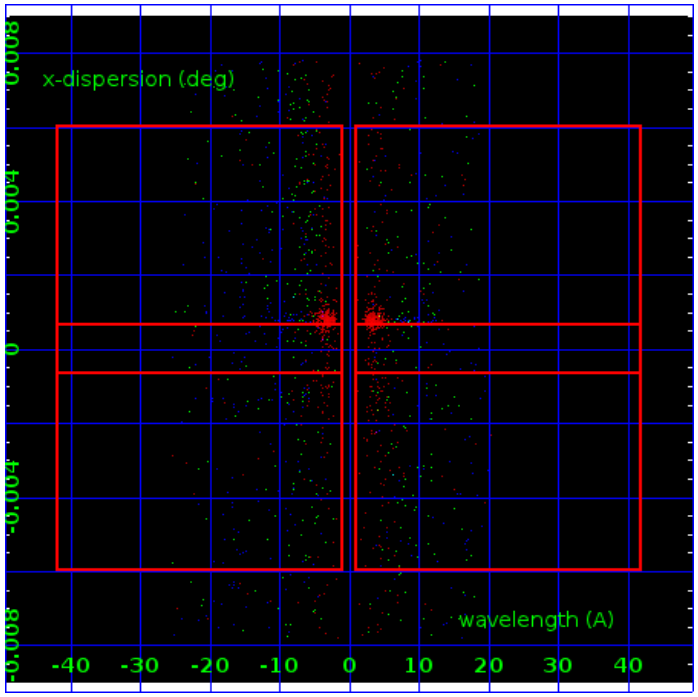
MEG Order Sort 123



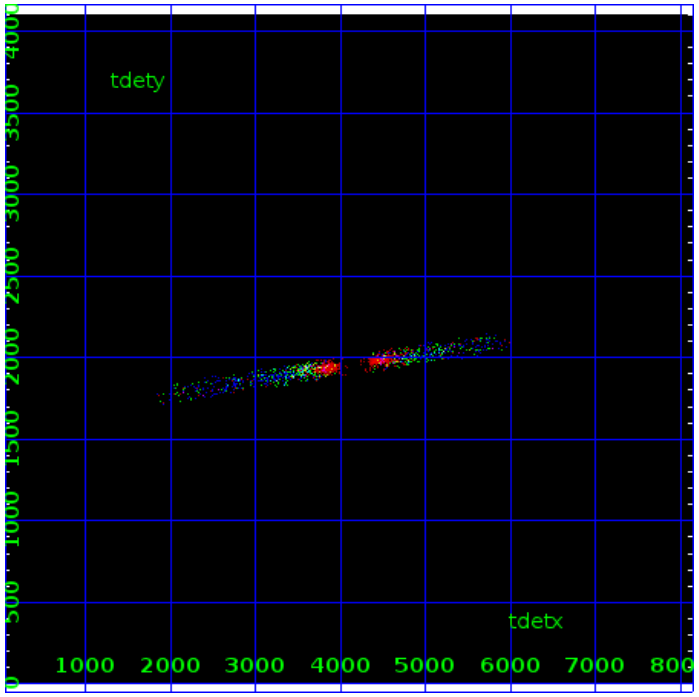
MEG Zero Order



MEG Order Sort ALL

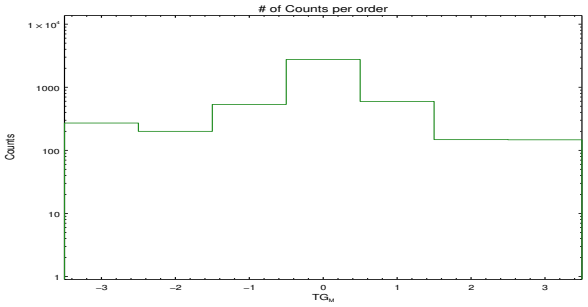


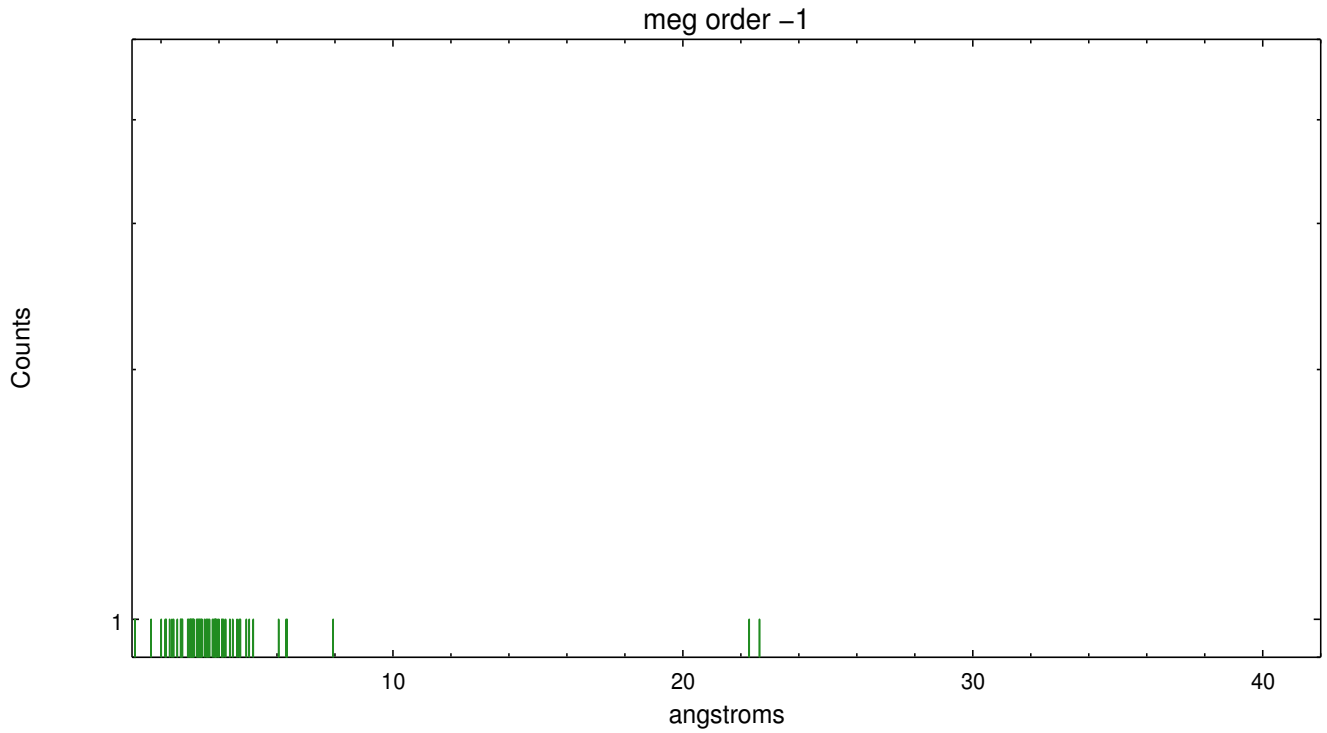
Spot Image MEG

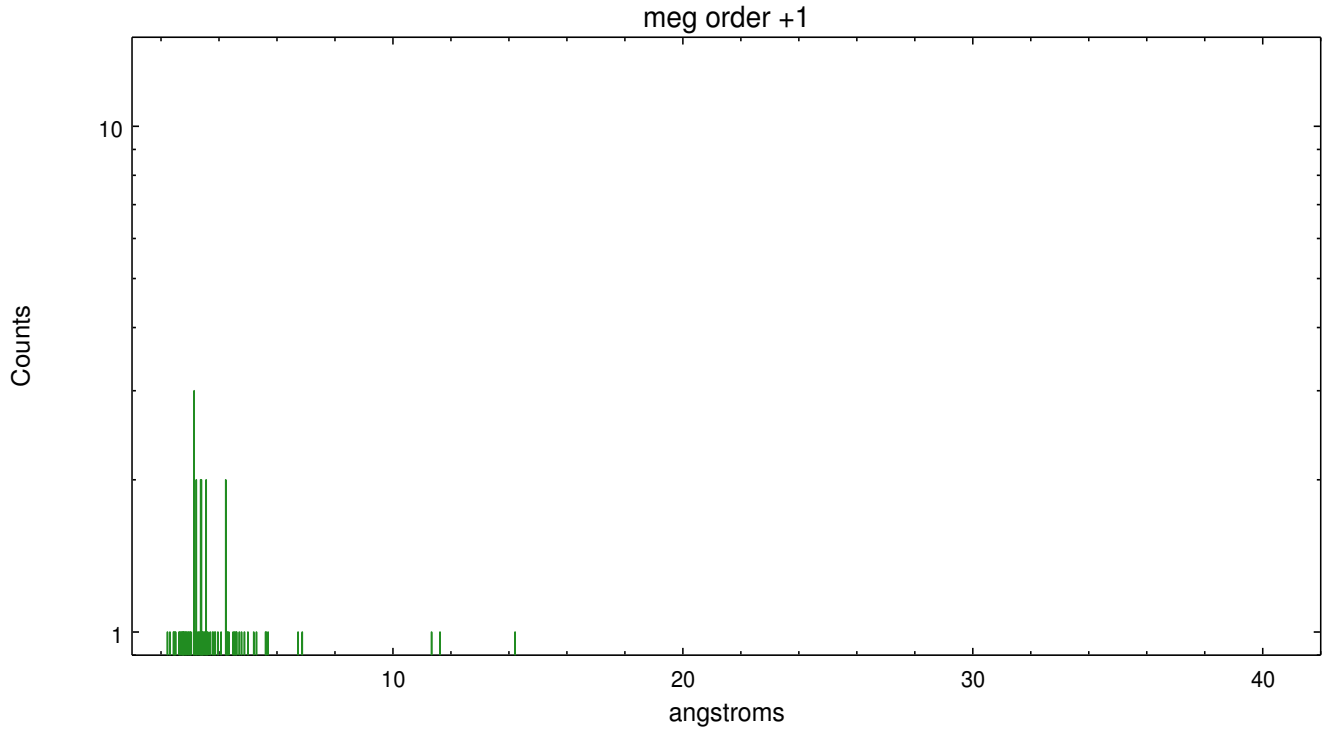


Full Detector MEG

	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	271	200	535	2752	596	148	147




meg order −1
Counts
1
10
20
30
40
angstroms


meg order +1
Counts
10
1
10
20
30
40
angstroms

A Summary

A.1 Status

V&V Scientist	Joy Nichols
V&V Date (YYYY-MM-DD)	2015.10.08
V&V Edition	1
V&V Disposition and Status	OK
V&V Charge Time	14.105382

A.2 Comments

These data have been reprocessed with new aspect alignment calibration files that correct small mean offsets (up to 0.4 arcsecs) and improve overall astrometric accuracy. The new calibration was determined using data from the time period being reprocessed and was performed using cross-correlation of X-ray sources with radio and optical counterparts.

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Note: spatially complex region with multiple point sources and extended emission. The spectral extraction was centered on the nominal Sgr A* coordinates: (RA, DEC) = (266.41667, -29.00780)[deg]. === The user should select a region or source of interest, then use software tools such as CIAO to specify the coordinates of the zeroth order source of interest before running the tools to resolve the dispersed events. The spectral data supplied in this processing are only energy-calibrated for the nominal position of Sgr A* as defined above. === 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.