V&V Reference Report
L2 ASCDS Version : 8.4.5

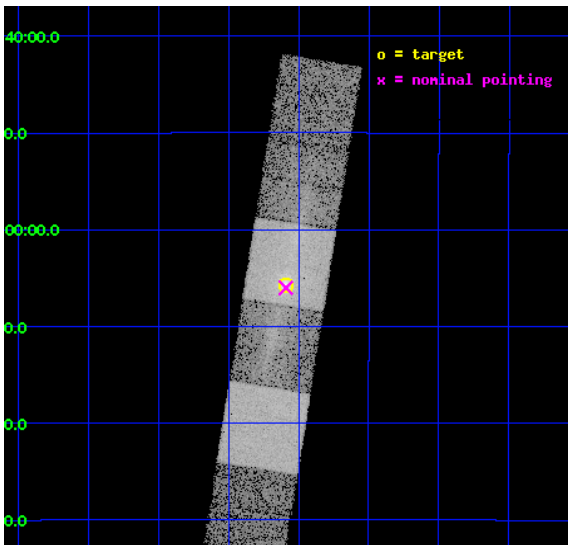
Observation 2332 - L2 Version 3
Chandra X-Ray Center

L2 Processing Date : Oct 11 2012

Contents

1 Front

seq_num	800175	Sequence number
obs_id	2332	Observation id
title	ACIS-S/HETG OBSERVATIONS OF THE CENTRAL REGION OF THE HYDRA A CLUSTER OF GALAXIES	Proposal title
observer	Dr. J. Jernigan	Principal investigator
object	HYDRA A	Source name
dtycycle	0	
cycle	P	events from which exps? Prim/Second/Both
ra_targ	139.52375	Observer's specified target RA [deg]
dec_targ	-12.095833	Observer's specified target Dec [deg]
ra_nom	139.52270780665	Nominal RA [deg]
dec_nom	-12.100226889286	Nominal Dec [deg]
roll_nom	279.08073025692	Nominal Roll [deg]
revision	3	Processing version of data
ontime	9875.2000091821	Sum of GTIs [s]
livetime	9750.1542805343	Livetime [s]
ontime4	9875.2000091821	Sum of GTIs [s]
ontime5	9875.2000091821	Sum of GTIs [s]
ontime6	9871.9590489268	Sum of GTIs [s]
ontime7	9875.2000091821	Sum of GTIs [s]
ontime8	9875.2000091821	Sum of GTIs [s]
ontime9	9875.2000091821	Sum of GTIs [s]
l2events	120433	Number of level 2 events

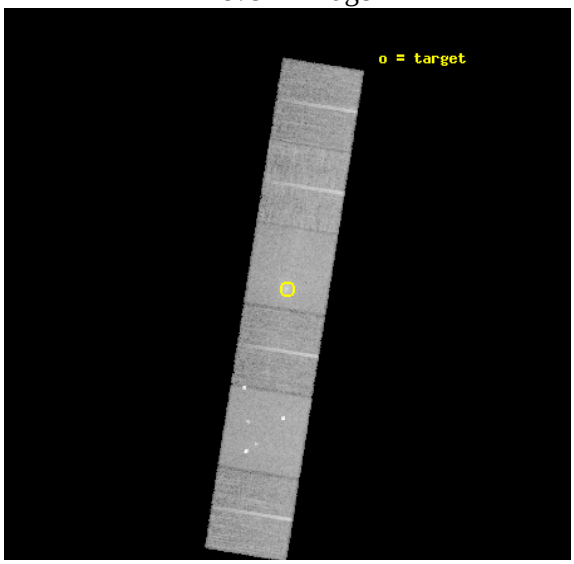


2 OBI

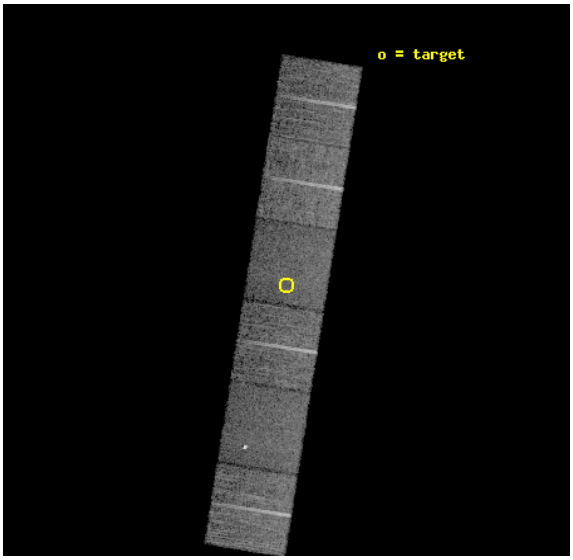
2.1 OBI

2.1.1 Images

Level 1 Image

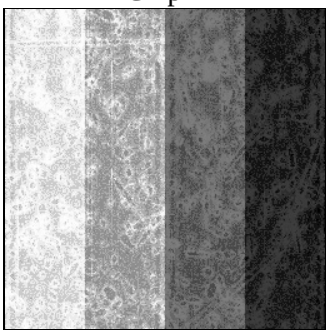


Level 1 Bad Events

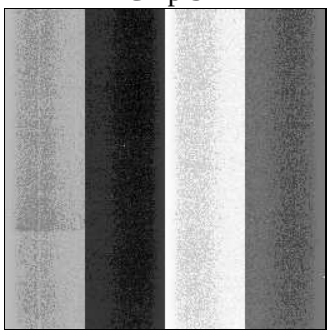


2.1.2 Bias

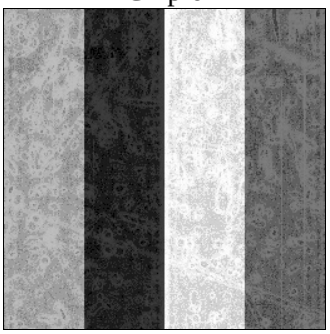
Chip 4



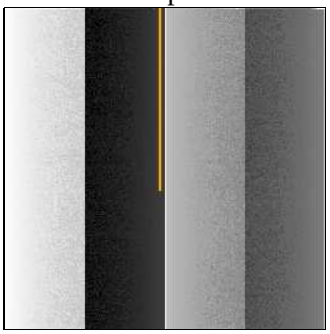
Chip 5



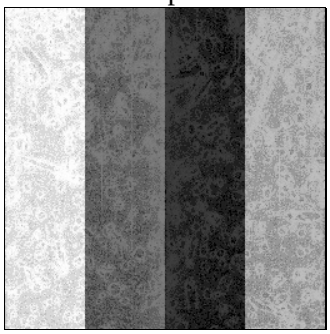
Chip 6



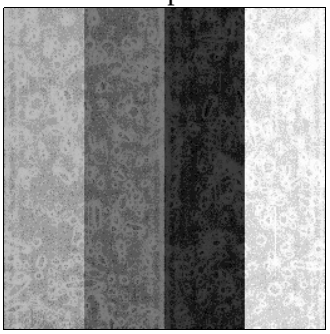
Chip 7



Chip 8



Chip 9



2.1.3 Parameters

obi_num	0	Obi number
ascdsver	8.4.5	Processing system revision
caldbver	4.5.1.1	
date	2012-09-14T06:37:42	Date and time of file creation
revision	3	Processing version of data

sched_exp_time	10000.000000	[s] Scheduled observation exposure time
ontime	9875.2000091821	Sum of GTIs [s]
ontime4	9875.2000091821	Sum of GTIs [s]
ontime5	9875.2000091821	Sum of GTIs [s]
ontime6	9871.9590489268	Sum of GTIs [s]
ontime7	9875.2000091821	Sum of GTIs [s]
ontime8	9875.2000091821	Sum of GTIs [s]
ontime9	9875.2000091821	Sum of GTIs [s]
l1events	492103	Number of level 1 events

2.1.4 Events

	ccd 4	**ccd 5**	**ccd 6**	**ccd 7**	**ccd 8**	**ccd 9**
level 1 events	75046	98682	71381	95020	87013	64961
rejected events	67135	50916	58562	48601	67954	56925
rejected %	89%	51%	82%	51%	78%	87%

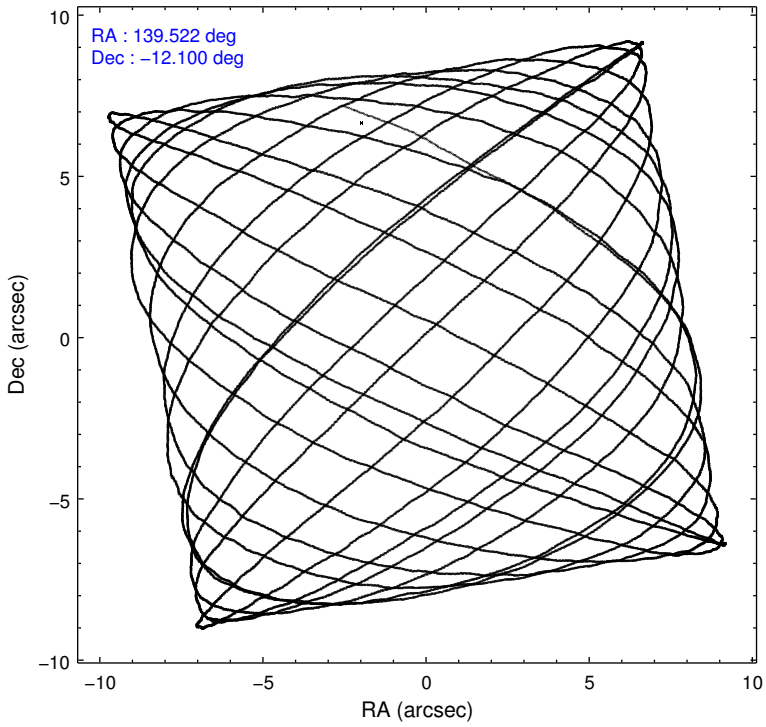
	ccd 4	**ccd 5**	**ccd 6**	**ccd 7**	**ccd 8**	**ccd 9**
grade 0 events	3283	7733	7323	6206	7378	3411
	4%	7%	10%	6%	8%	5%
grade 1 events	35	114	49	73	74	28
	0%	0%	0%	0%	0%	0%
grade 2 events	1952	13883	2033	10016	3732	1531
	2%	14%	2%	10%	4%	2%
grade 3 events	713	2160	890	4526	1796	808
	0%	2%	1%	4%	2%	1%
grade 4 events	651	1926	962	4456	1811	752
	0%	1%	1%	4%	2%	1%
grade 5 events	2305	7327	2788	8157	3474	2893
	3%	7%	3%	8%	3%	4%
grade 6 events	1313	22095	1615	21243	4346	1544
	1%	22%	2%	22%	4%	2%
grade 7 events	64794	43444	55721	40343	64402	53994
	86%	44%	78%	42%	74%	83%

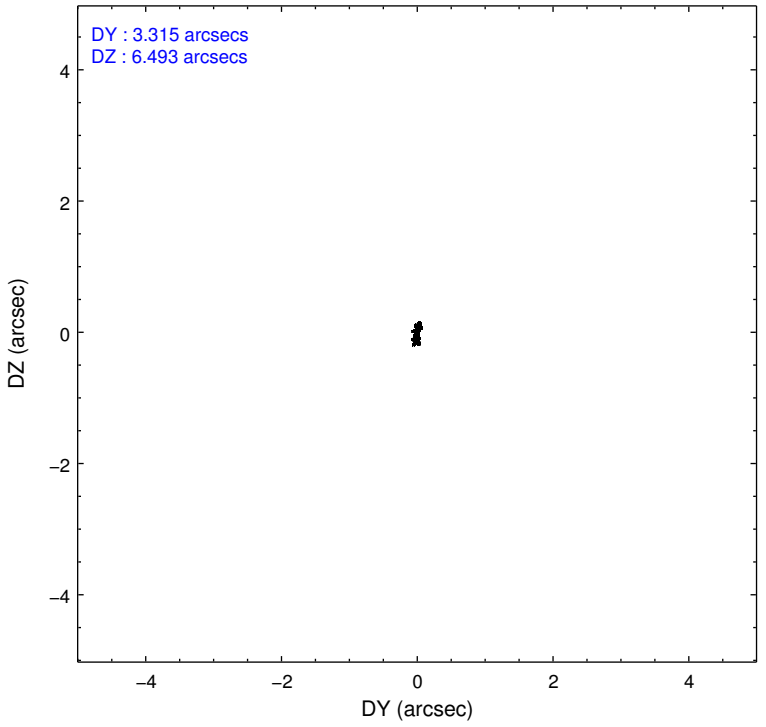
2.2 Compared Parameters

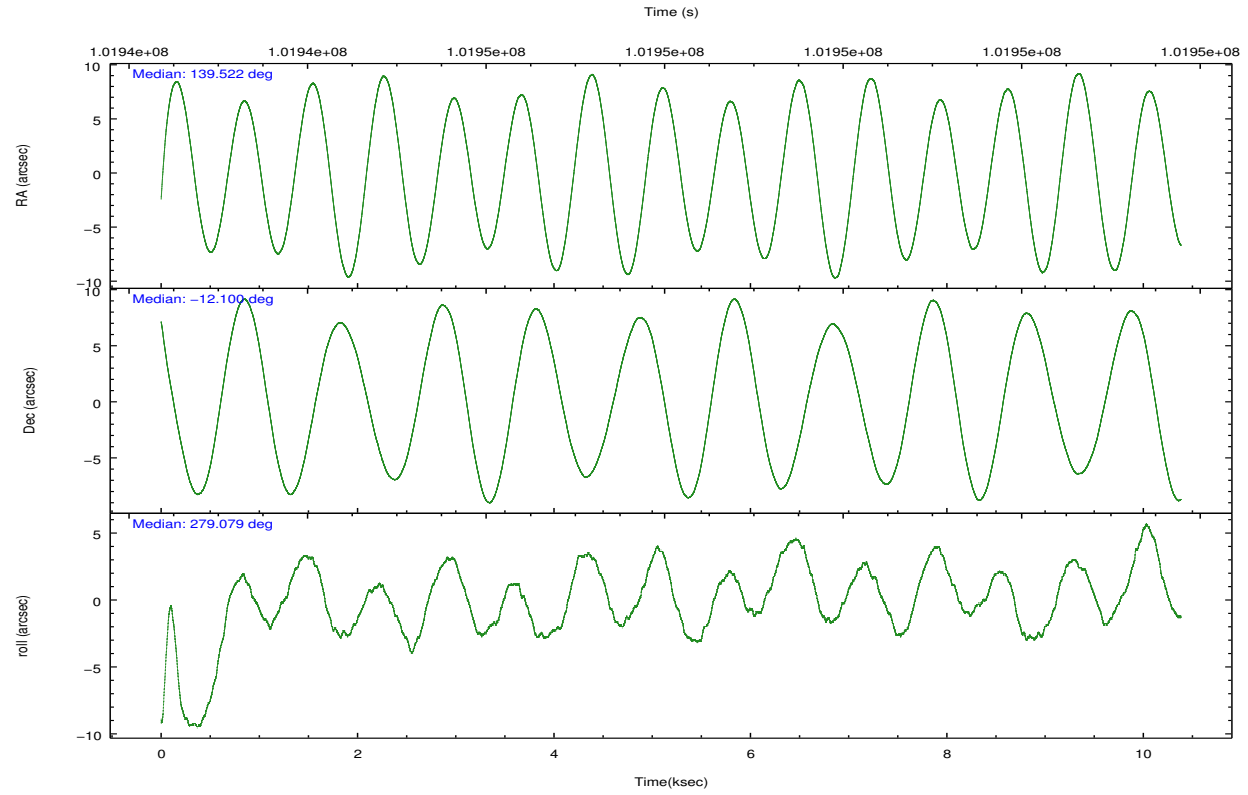
Parameter	Planned	Actual
Instrument	ACIS	ACIS
Detector	ACIS-456789	ACIS-456789
Grating	HETG	HETG
Data mode	FAINT	FAINT
Observation mode	POINTING	POINTING
[deg] Pointing RA	139.504858	139.5227078066471
[deg] Pointing Dec	-12.079167	-12.10022688928564
[deg] Pointing Roll	278.920365	279.0807302569159
[mm] SIM focus pos	-0.684267	-0.6828225247311905
[mm] SIM defocus	0	0.001444936568705701
[mm] SIM translation stage pos	-190.132523	-190.1400660498719
[mm] SIM translation stage offset	0	0.00754346686406393
[s] Observation start time (MET)	101943237.184000	101942190.35555
Observation start date	2001-03-25T21:32:53	2001-03-25T21:16:30
[s] Observation end time (MET)	101953237.184000	101953669.8435
Observation end date	2001-03-26T00:19:33	2001-03-26T00:27:49
Read mode	TIMED	TIMED

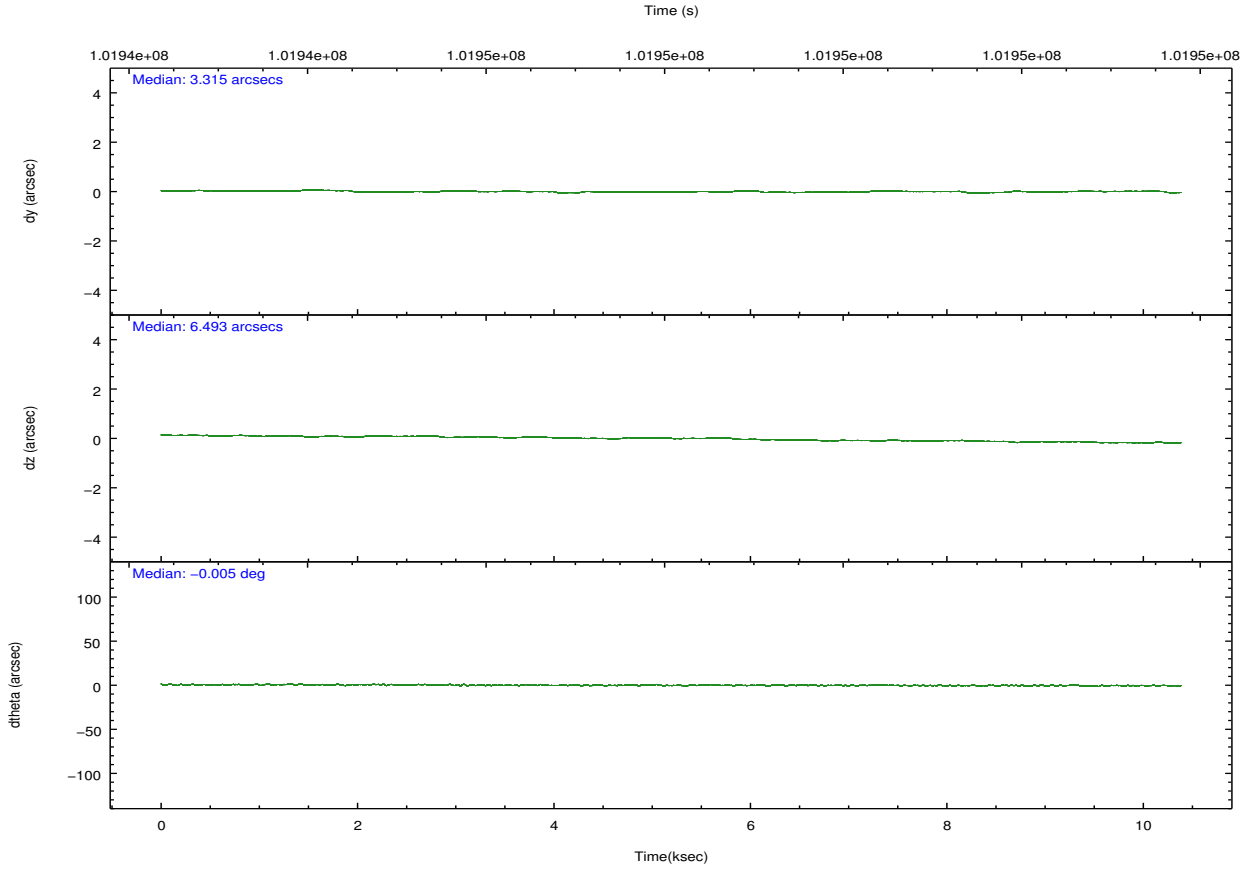
Parameter	Planned	Actual
Obspar format version number	7	7
Obspar file type	PREDICTED	ACTUAL
Obspar update status	NONE	UPDATED
Number of optional ACIS chips dropped	0	0
On-chip summing requested	N	N
Subarray requested	NONE	NONE
Alternating exposures requested	N	N
[s] Primary exposure time	0.000000	3.2

2.3 Aspect


RA : 139.522 deg
Dec : −12.100 deg
Dec (arcsec)
RA (arcsec)
10
5
0
−5
−10
−10
−5
0
5
10


DY : 3.315 arcsecs
DZ : 6.493 arcsecs
DZ (arcsec)
DY (arcsec)
4
2
0
−2
−4
−4
−2
0
2
4


Time (s)
1.0194e+08
1.0194e+08
1.0195e+08
1.0195e+08
1.0195e+08
1.0195e+08
1.0195e+08
RA (arcsec)
Median: 139.522 deg
Dec (arcsec)
Median: −12.100 deg
roll (arcsec)
Median: 279.079 deg
Time(ksec)

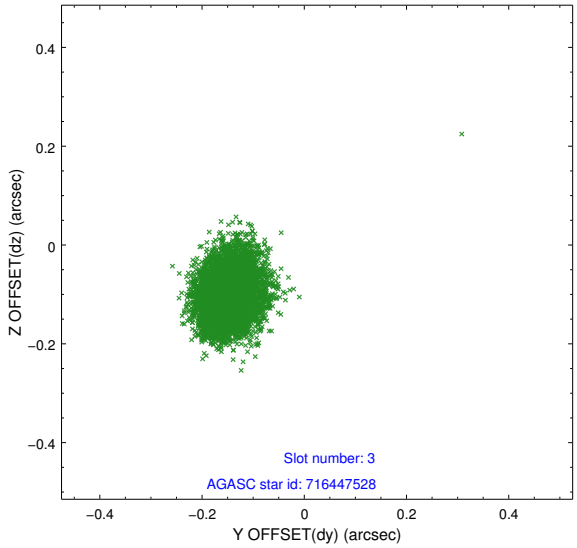

Time (s)
1.0194e+08
1.0194e+08
1.0195e+08
1.0195e+08
1.0195e+08
1.0195e+08
1.0195e+08
dy (arcsec)
Median: 3.315 arcsecs
dz (arcsec)
Median: 6.493 arcsecs
dtheta (arcsec)
Median: −0.005 deg
Time(ksec)

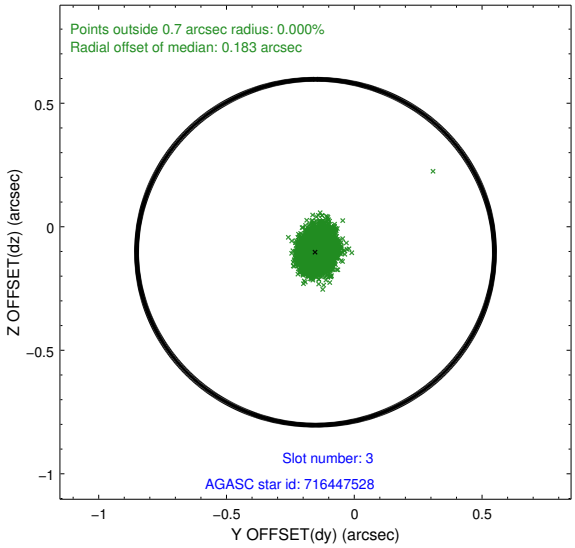
Slot Statistics

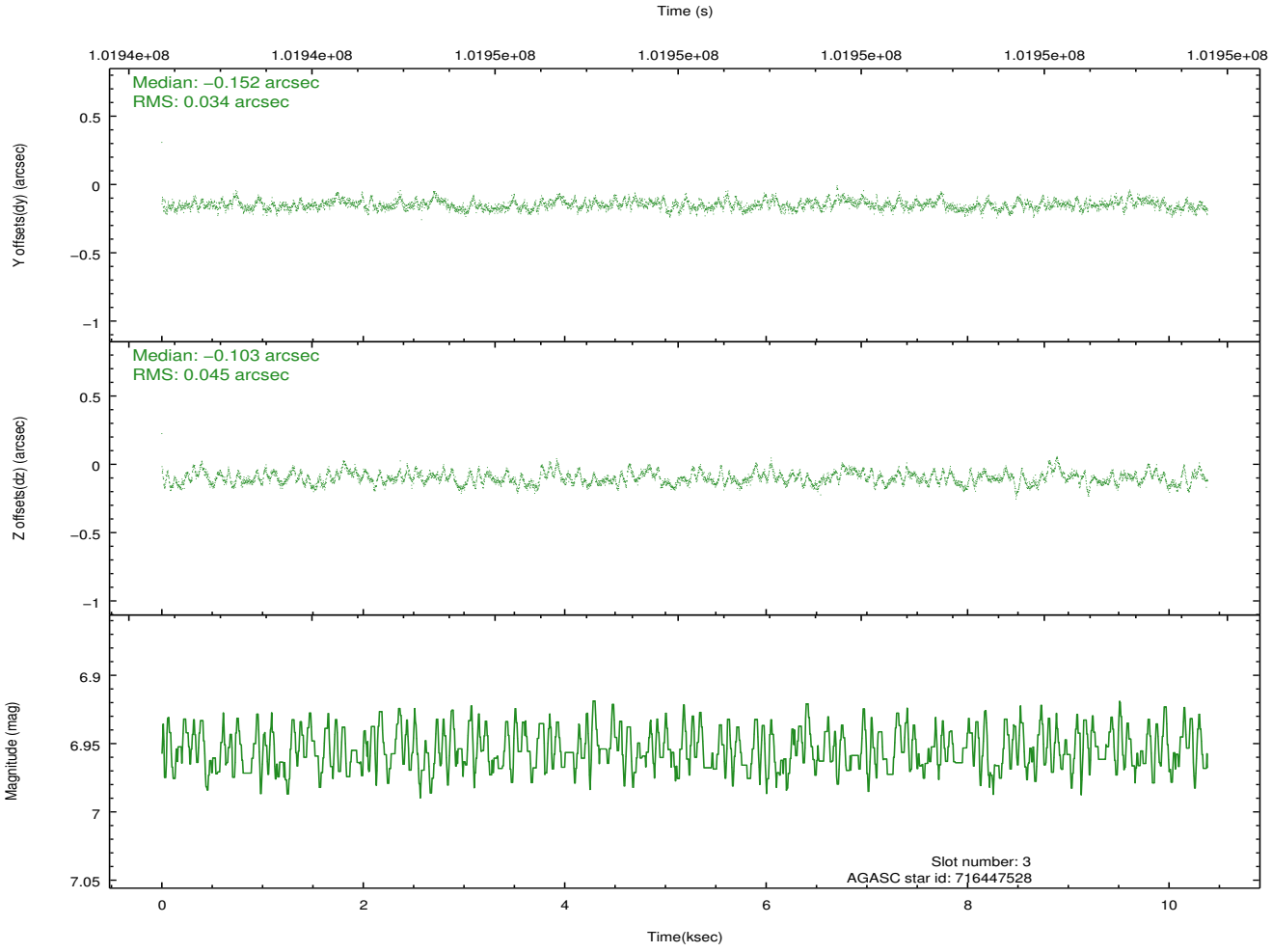
slot	status	id	mag	n_pts	med_dy	med_dz	dr1	dr2	ra	dec	mean_y	mean_z
0	FID	ACIS-S-2	7.12	2532	-0.015	0.011	0.007	0.012	0.000000	0.000000	-755.96	-1727.63
1	FID	ACIS-S-4	7.20	2533	-0.037	0.004	0.006	0.010	0.000000	0.000000	2157.04	180.37
2	FID	ACIS-S-5	7.23	2533	0.021	-0.006	0.007	0.012	0.000000	0.000000	-1808.14	174.55
3	GUIDE	716447528	6.96	5066	-0.152	-0.103	0.059	0.095	139.371683	-11.961966	-489.76	-397.04
4	GUIDE	716447608	8.44	5064	-0.129	-0.206	0.057	0.093	139.107687	-11.923612	-769.60	-1294.65
5	GUIDE	716578656	9.09	5065	0.189	-0.017	0.079	0.133	140.216745	-12.561448	2106.17	2202.41
6	GUIDE	716578888	9.26	5061	-0.029	-0.057	0.082	0.135	139.858876	-11.605741	-1489.26	1498.90
7	GUIDE	716454552	9.01	5061	0.116	0.385	0.069	0.112	139.524204	-12.319370	864.44	-65.12

2.4 Star Slots

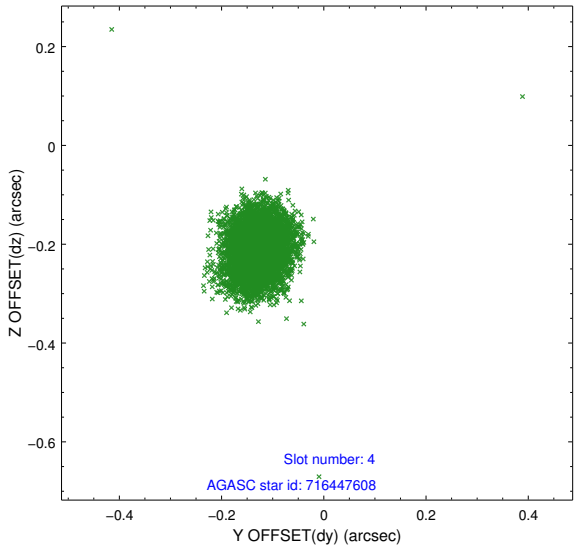
2.4.1 Slot 3

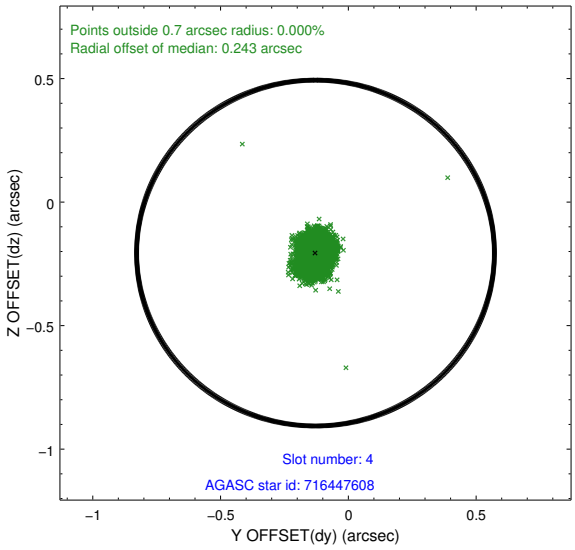


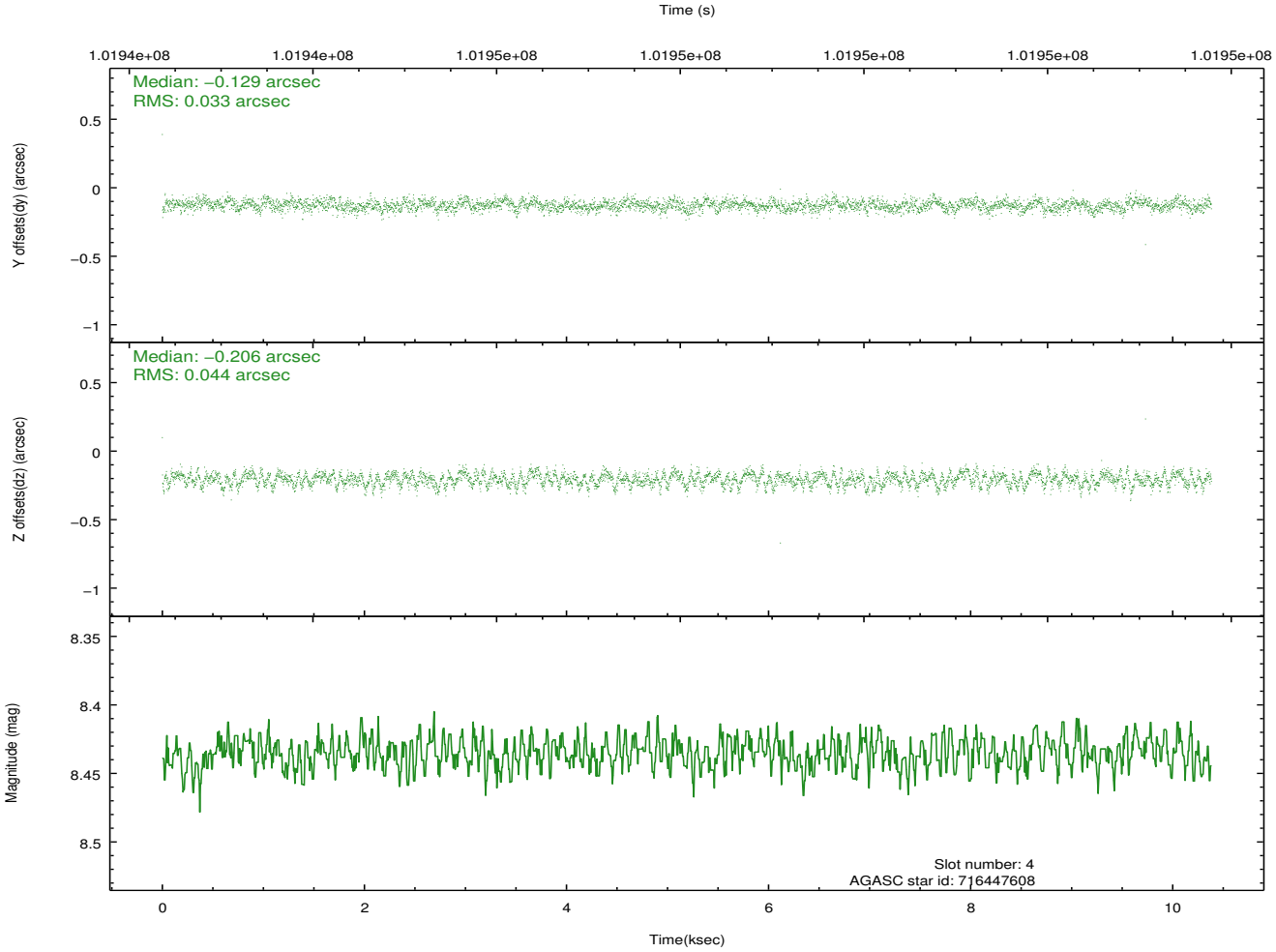




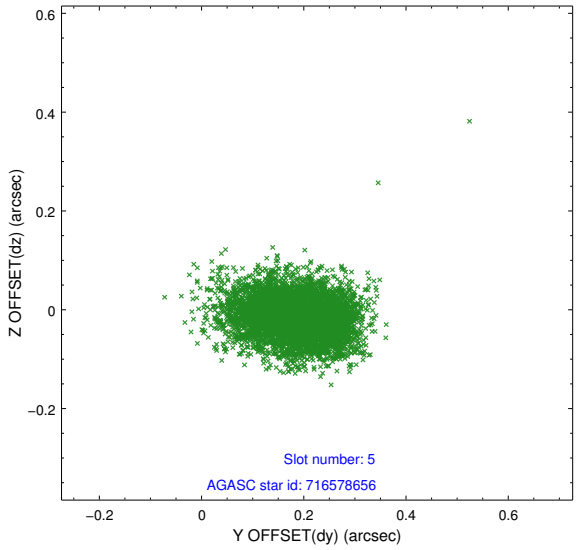
2.4.2 Slot 4

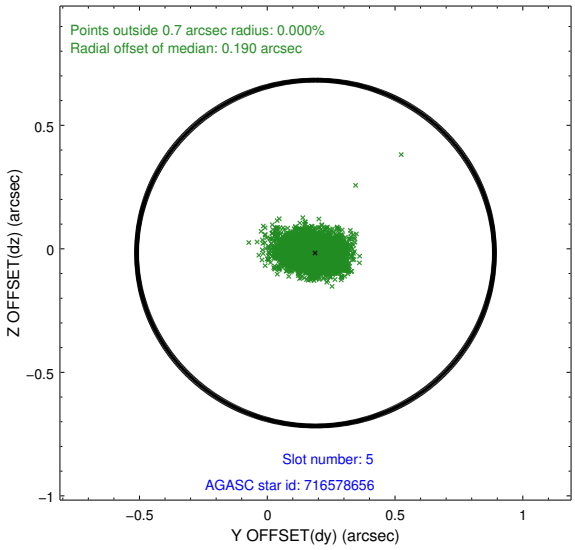

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 4
AGASC star id: 716447608

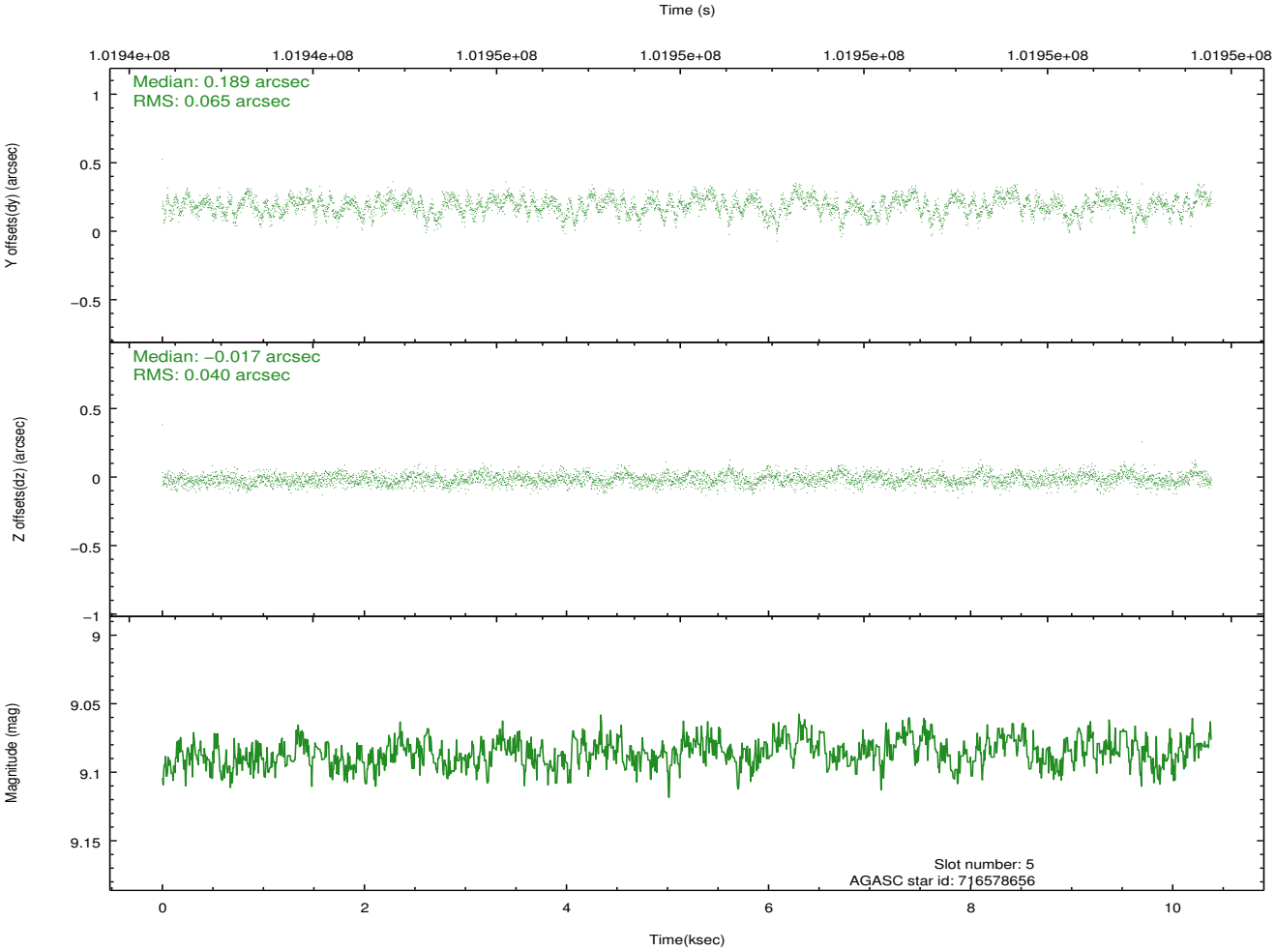

Points outside 0.7 arcsec radius: 0.000%
Radial offset of median: 0.243 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 4
AGASC star id: 716447608


Time (s)
Median: −0.129 arcsec
RMS: 0.033 arcsec
Y offsets(dy) (arcsec)
Median: −0.206 arcsec
RMS: 0.044 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number: 4
AGASC star id: 716447608
Time(ksec)

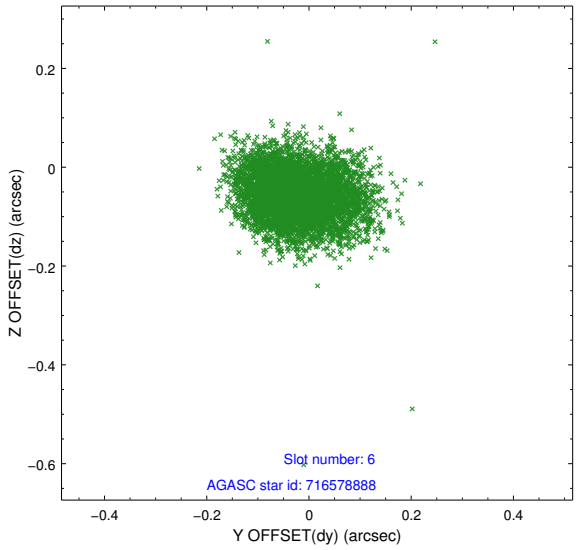
2.4.3 Slot 5

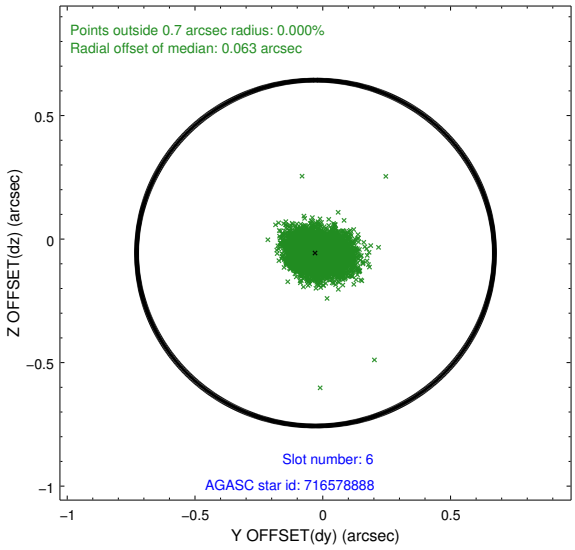

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 5
AGASC star id: 716578656

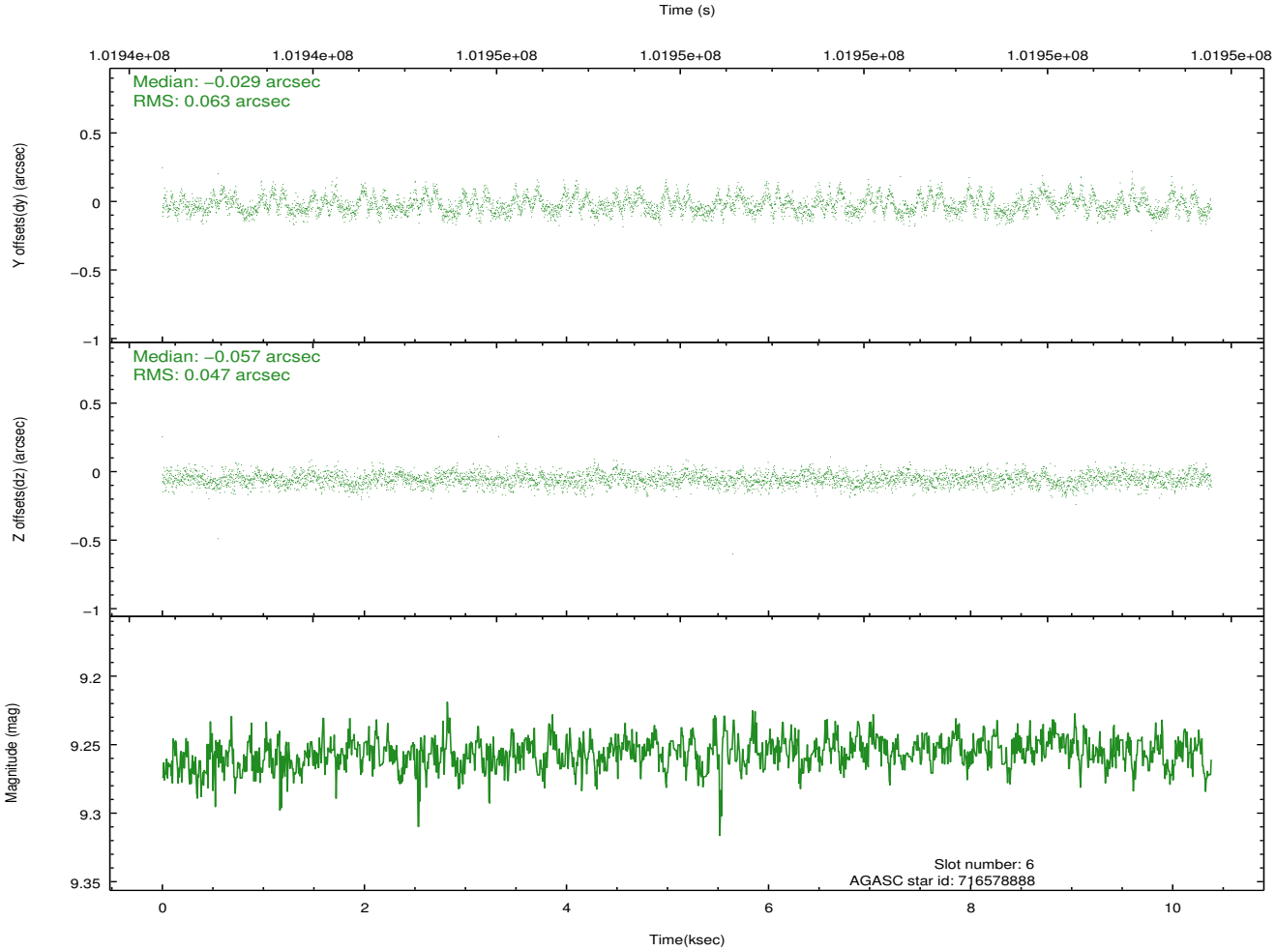

Points outside 0.7 arcsec radius: 0.000%
Radial offset of median: 0.190 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 5
AGASC star id: 716578656


Time (s)
Median: 0.189 arcsec
RMS: 0.065 arcsec
Y offsets(dy) (arcsec)
Median: −0.017 arcsec
RMS: 0.040 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number: 5
AGASC star id: 716578656
Time(ksec)

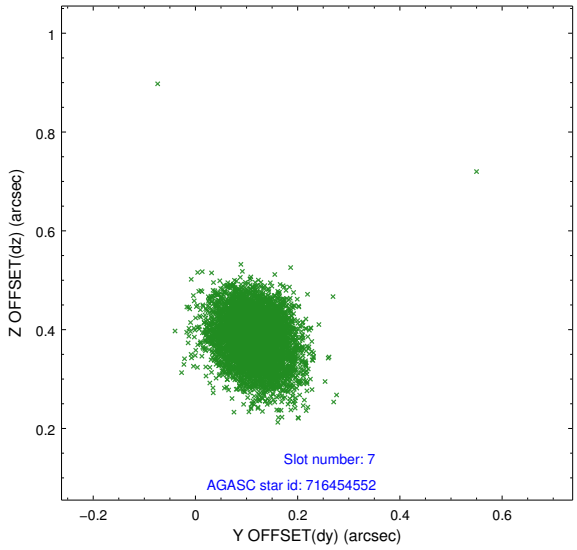
2.4.4 Slot 6

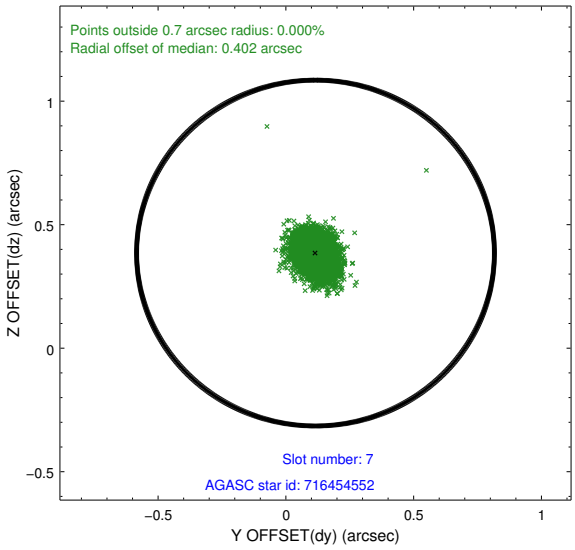

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 6
AGASC star id: 716578888

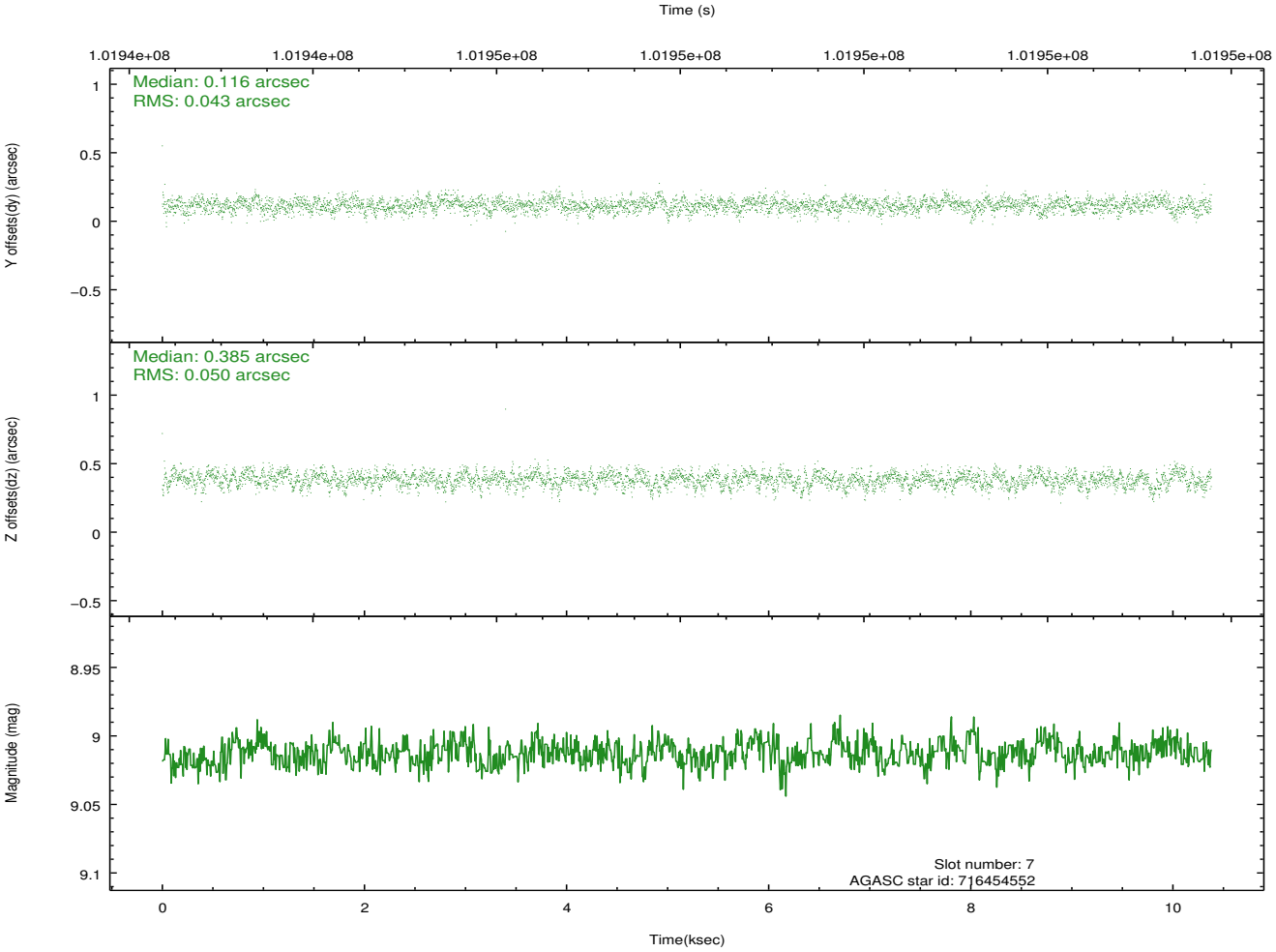

Points outside 0.7 arcsec radius: 0.000%
Radial offset of median: 0.063 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 6
AGASC star id: 716578888


Time (s)
Median: −0.029 arcsec
RMS: 0.063 arcsec
Y offsets(dy) (arcsec)
Median: −0.057 arcsec
RMS: 0.047 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number: 6
AGASC star id: 716578888
Time(ksec)

2.4.5 Slot 7

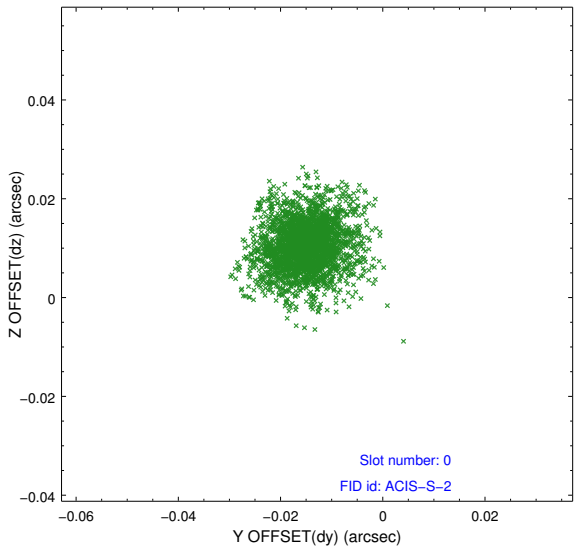

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 7
AGASC star id: 716454552

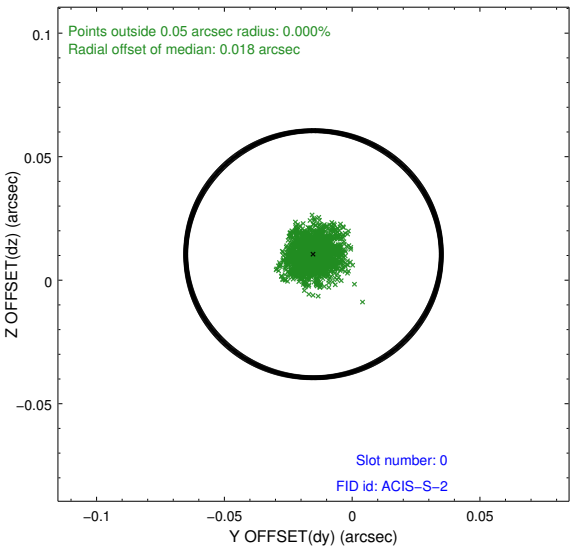

Points outside 0.7 arcsec radius: 0.000%
Radial offset of median: 0.402 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 7
AGASC star id: 716454552

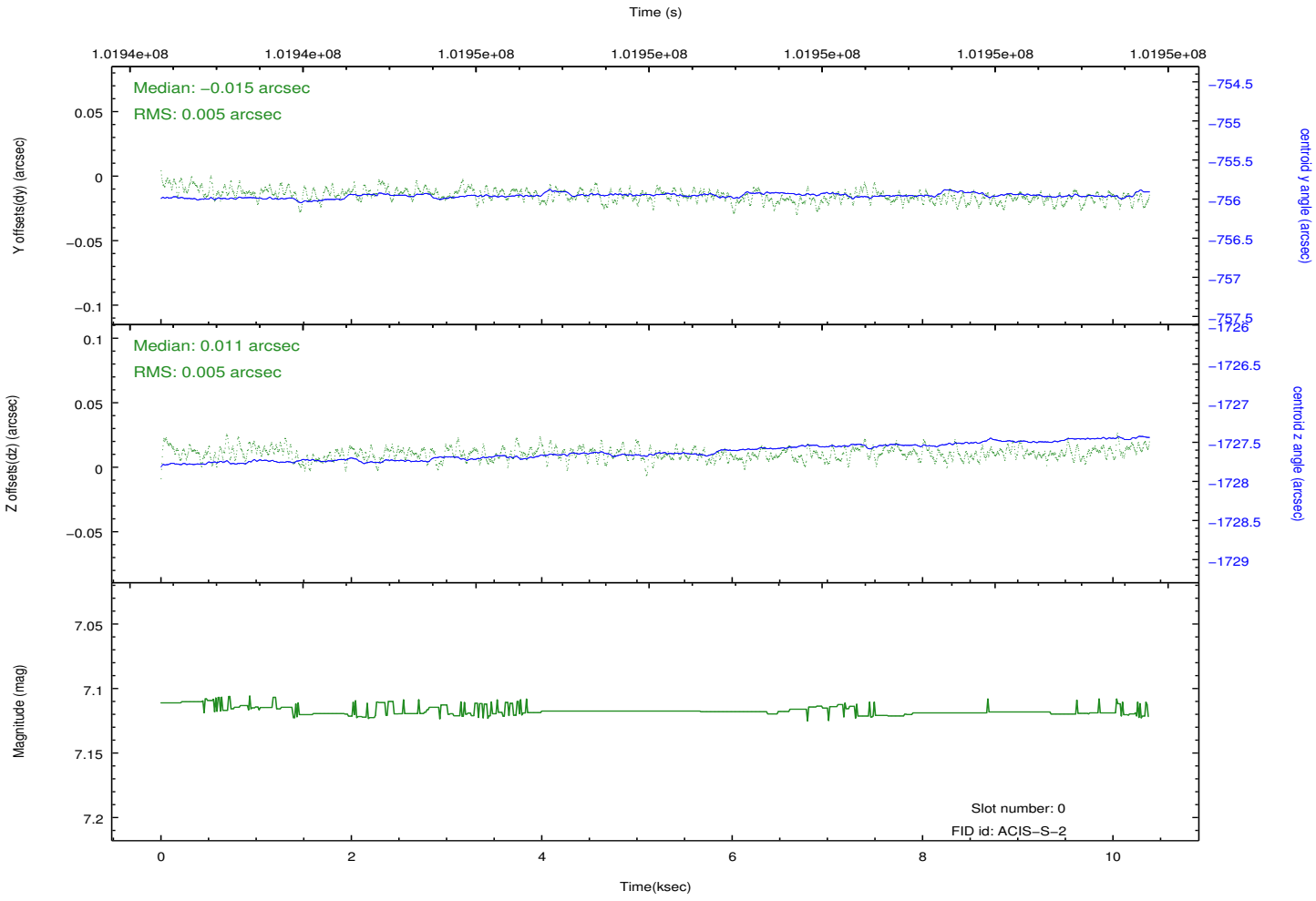

Time (s)
Median: 0.116 arcsec
RMS: 0.043 arcsec
Y offsets(dy) (arcsec)
Median: 0.385 arcsec
RMS: 0.050 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number: 7
AGASC star id: 716454552
Time(ksec)

2.5 FID Slots

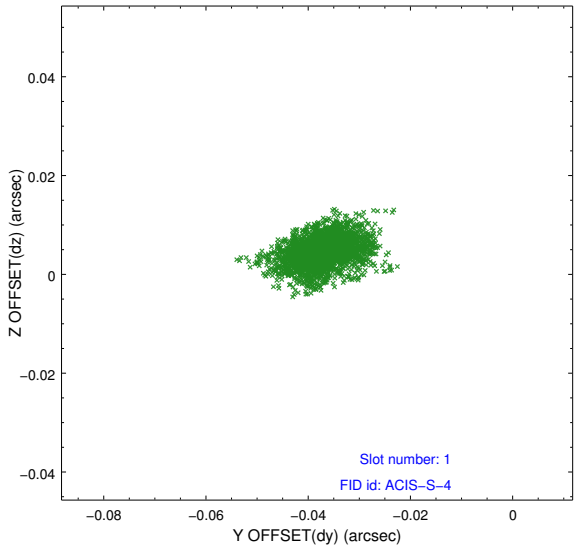
2.5.1 Slot 0

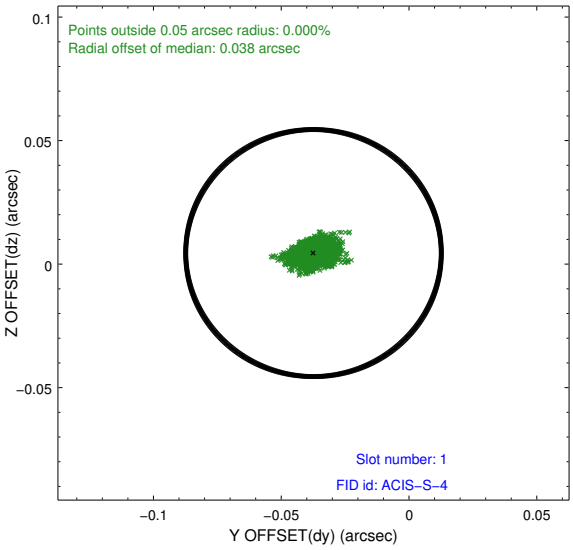


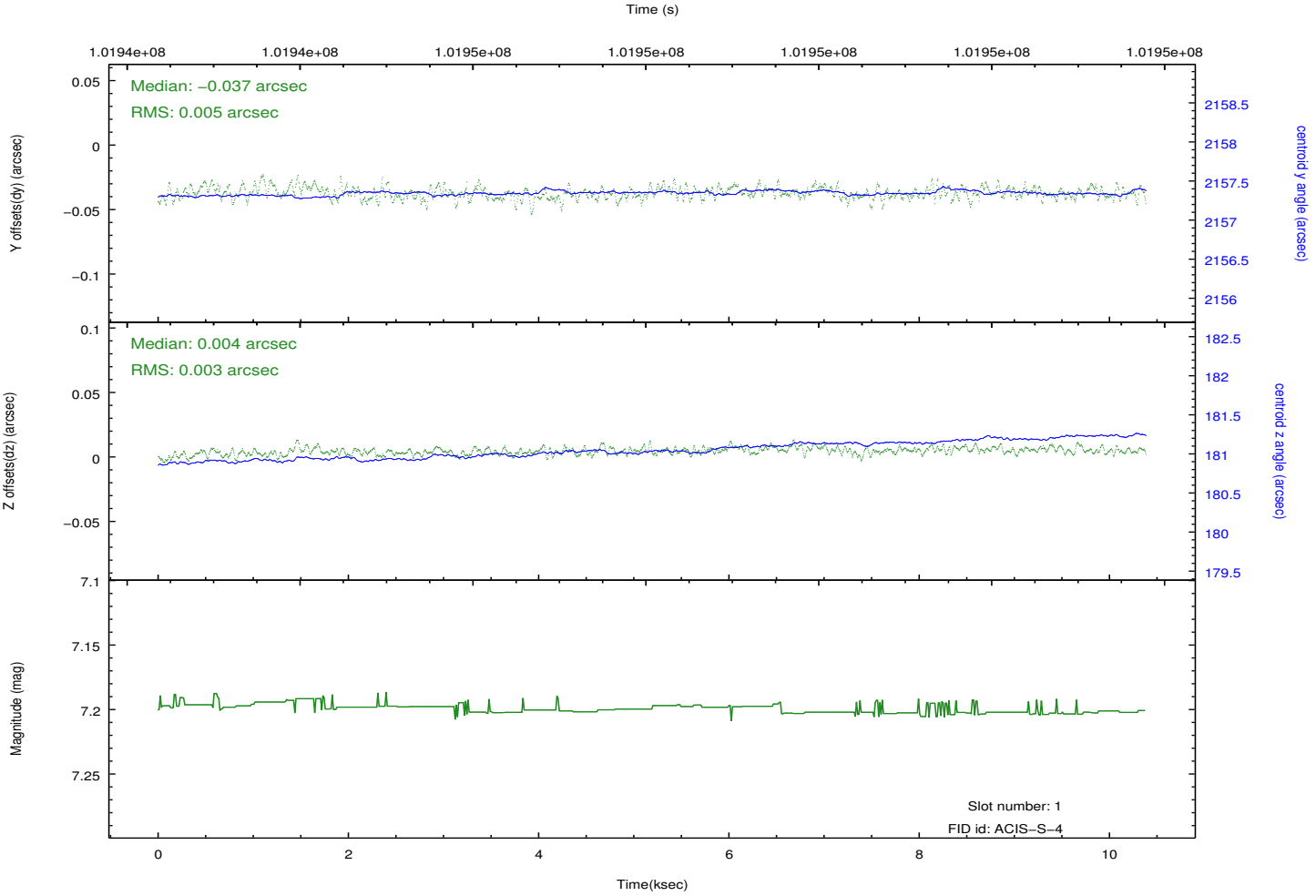




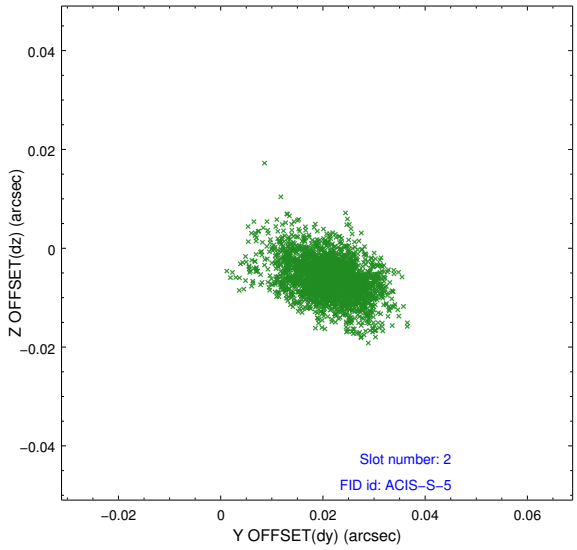
2.5.2 Slot 1

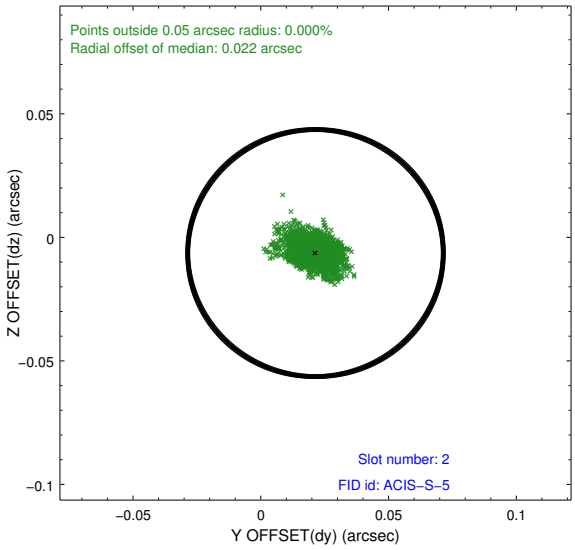

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 1
FID id: ACIS−S−4

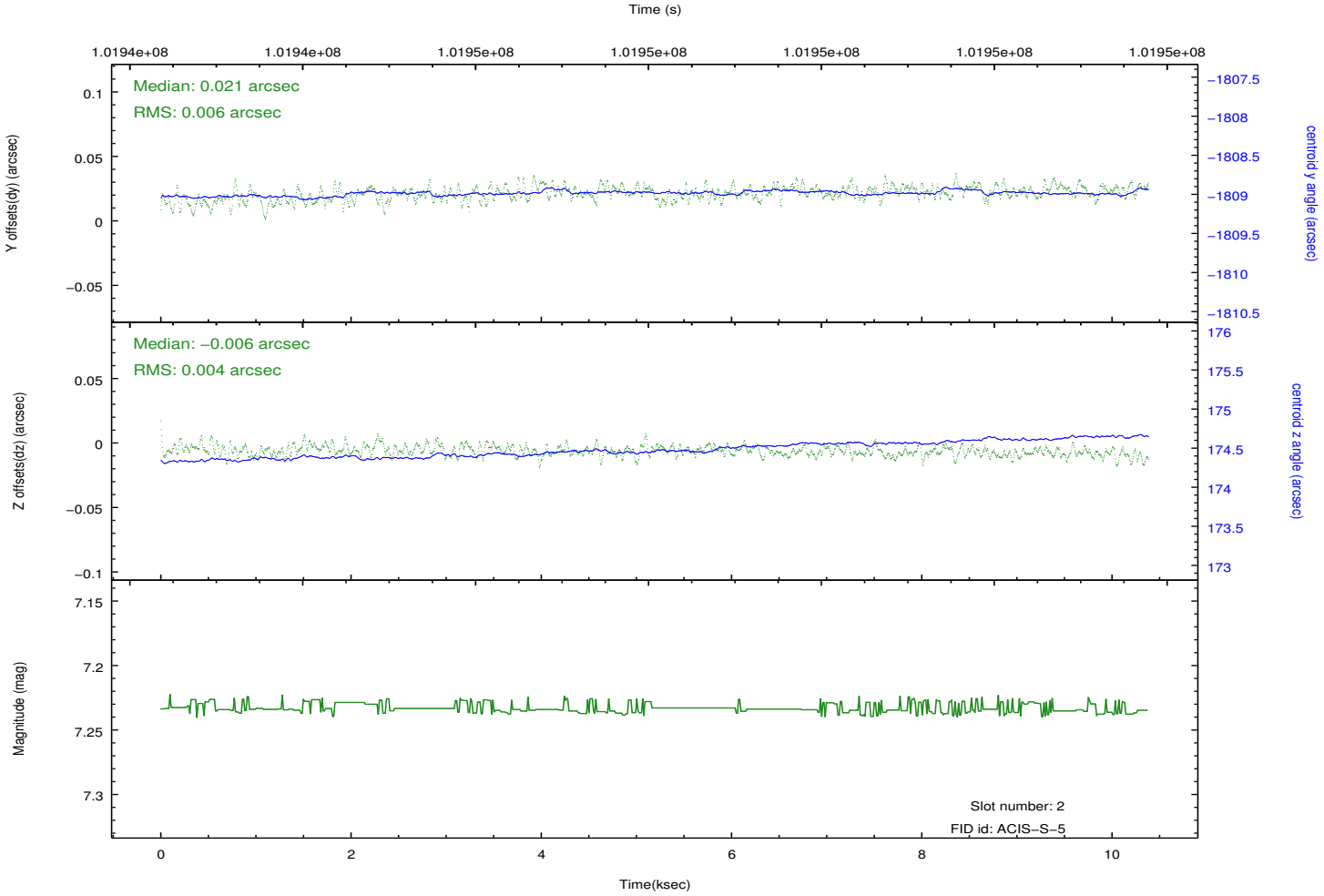

Points outside 0.05 arcsec radius: 0.000%
Radial offset of median: 0.038 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 1
FID id: ACIS−S−4


Time (s)
Median: −0.037 arcsec
RMS: 0.005 arcsec
Y offsets(dy) (arcsec)
centroid y angle (arcsec)
Median: 0.004 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

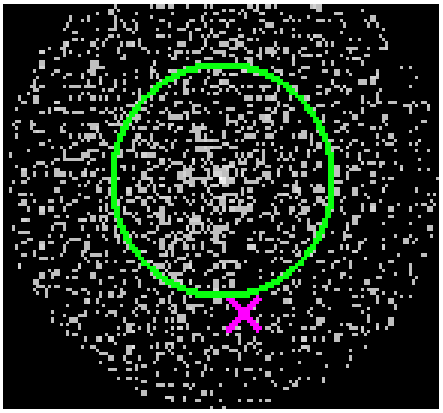

Points outside 0.05 arcsec radius: 0.000%
Radial offset of median: 0.022 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 2
FID id: ACIS−S−5


Time (s)
Median: 0.021 arcsec
RMS: 0.006 arcsec
Y offsets(dy) (arcsec)
centroid y angle (arcsec)
Median: −0.006 arcsec
RMS: 0.004 arcsec
Z offsets(dz) (arcsec)
centroid z angle (arcsec)
Magnitude (mag)
Slot number: 2
FID id: ACIS−S−5
Time(ksec)

3 Gratings

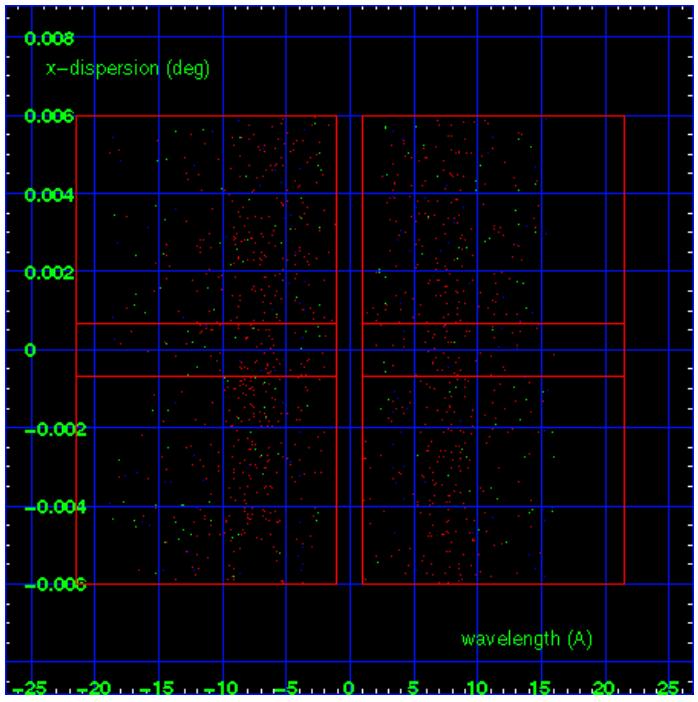
3.1 HEG Arm

HEG Order Sort 123

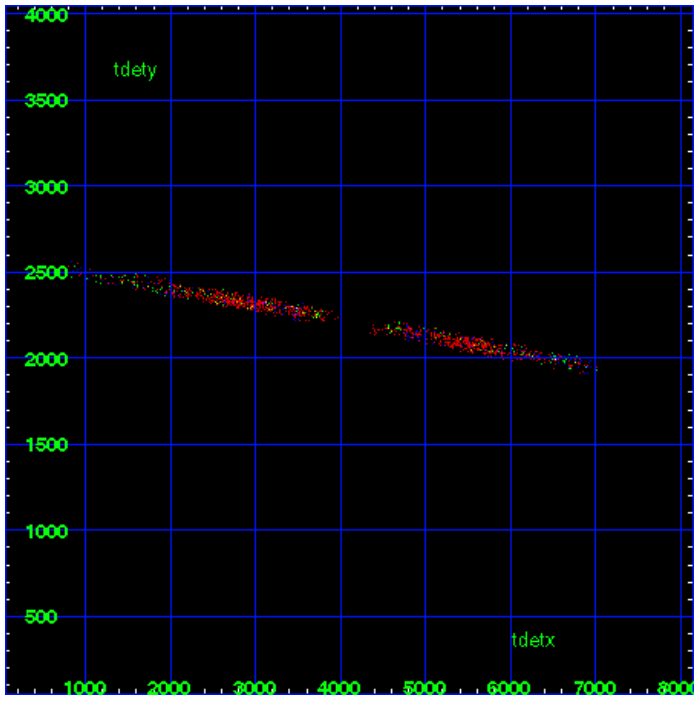


HEG Zero Order

HEG Order Sort ALL

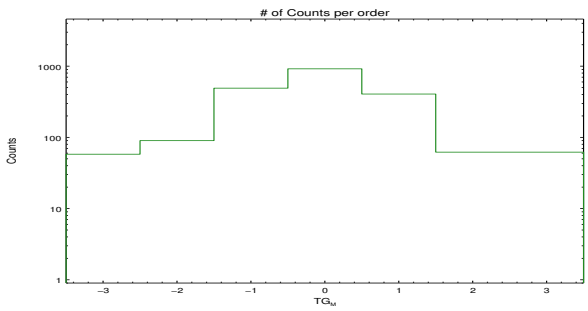


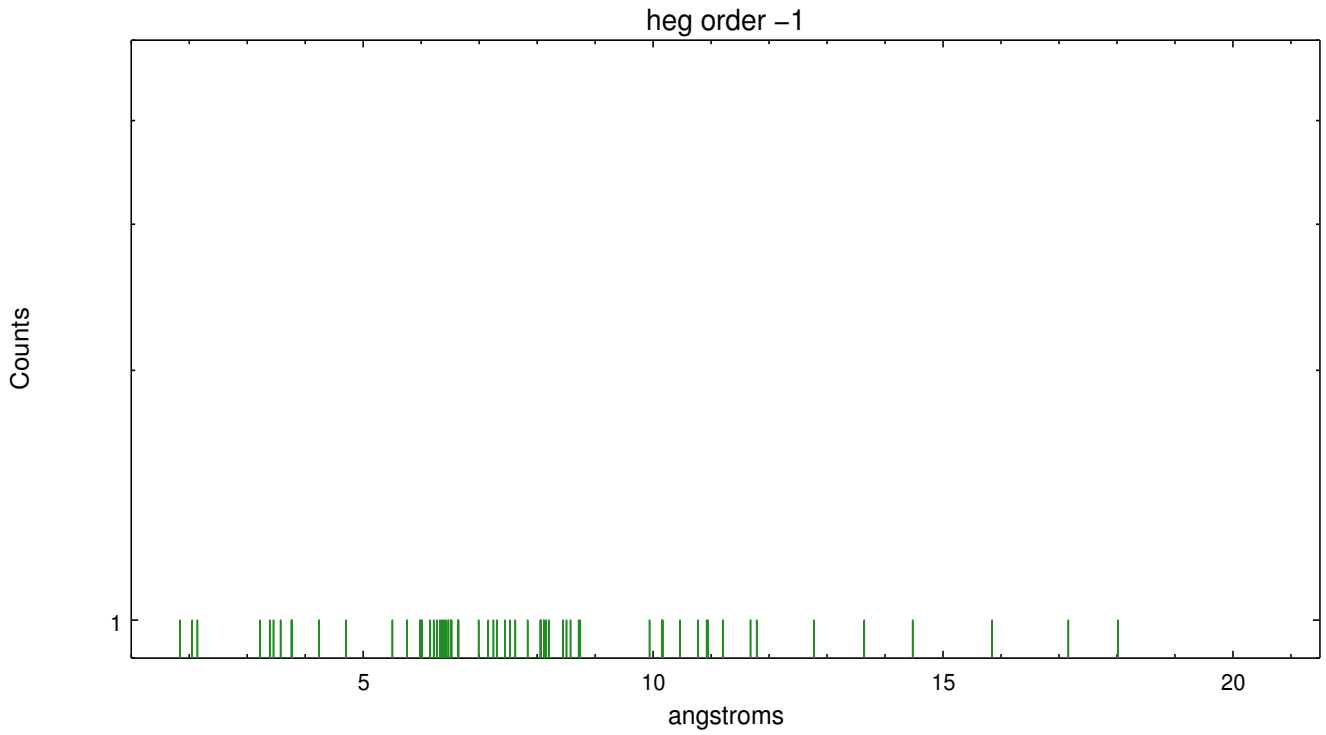
Spot Image HEG

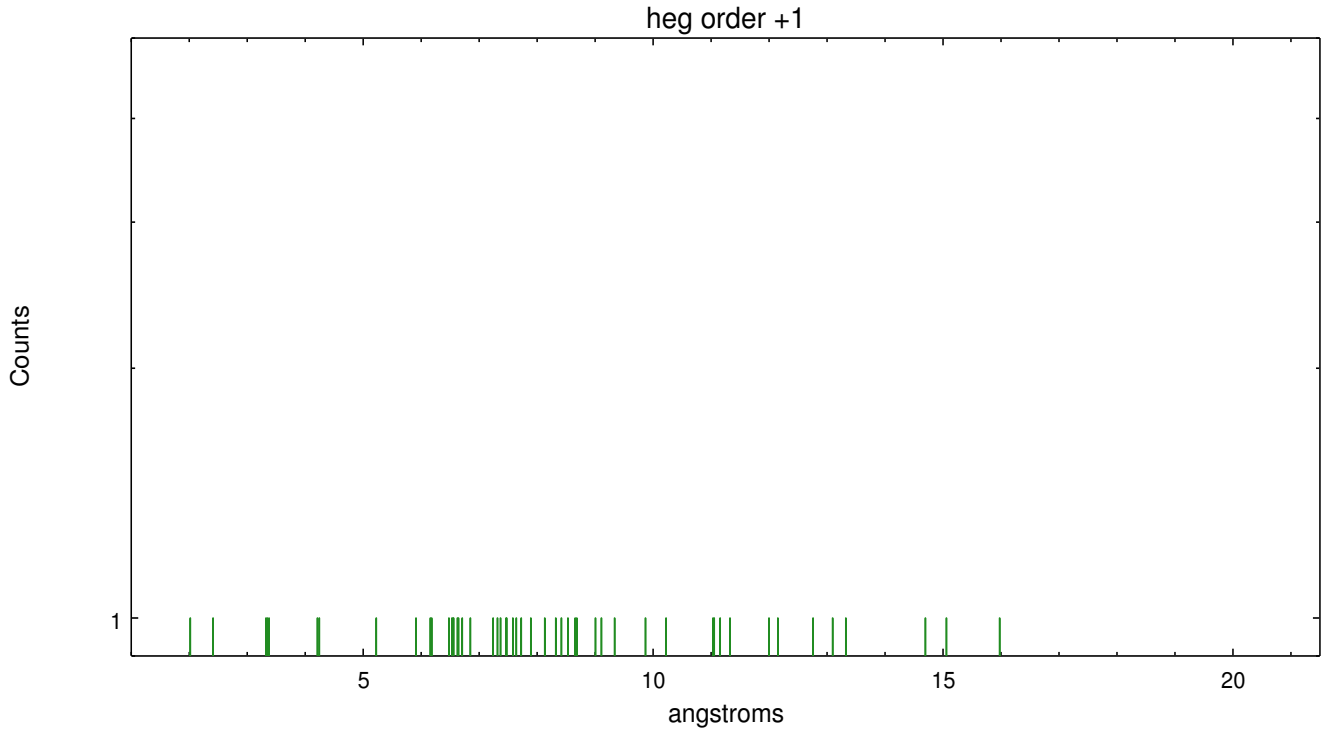


Full Detector HEG

	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	58	90	491	918	406	62	62

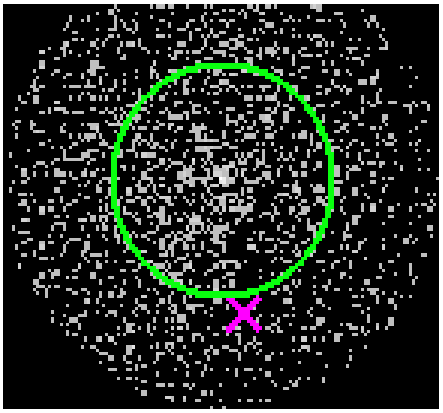



heg order −1
Counts
1
5
10
15
20
angstroms

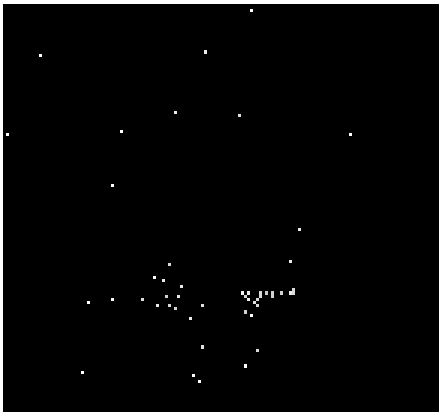

heg order +1
Counts
1
5
10
15
20
angstroms

3.2 MEG Arm

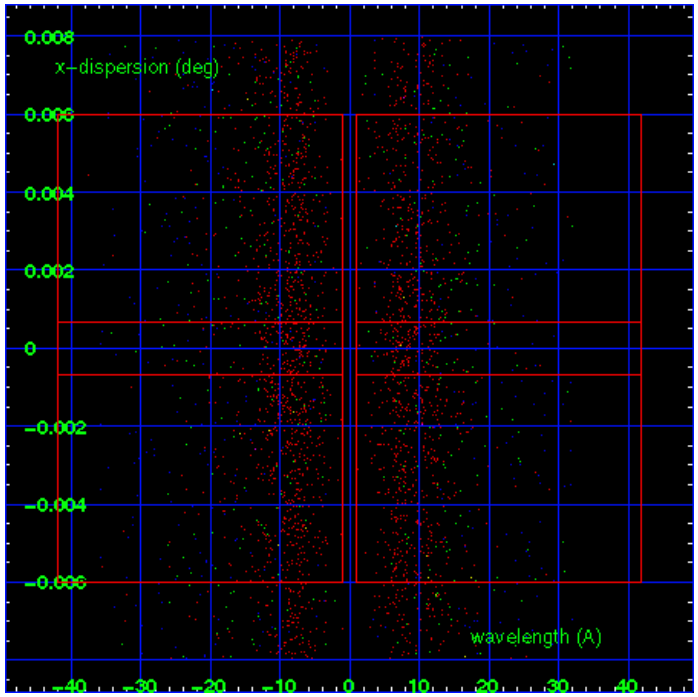
MEG Order Sort 123



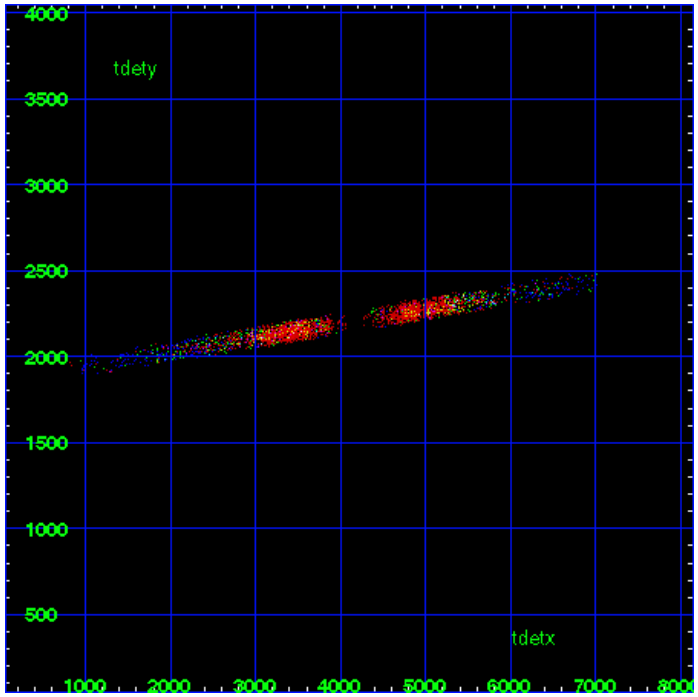
MEG Zero Order



MEG Order Sort ALL

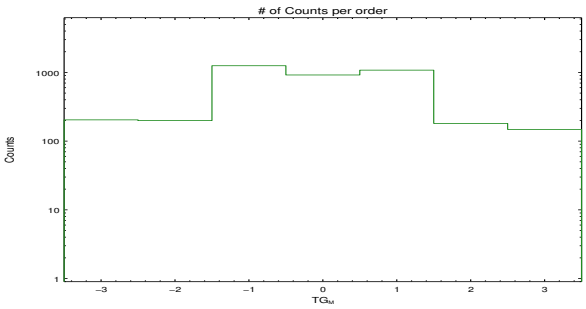


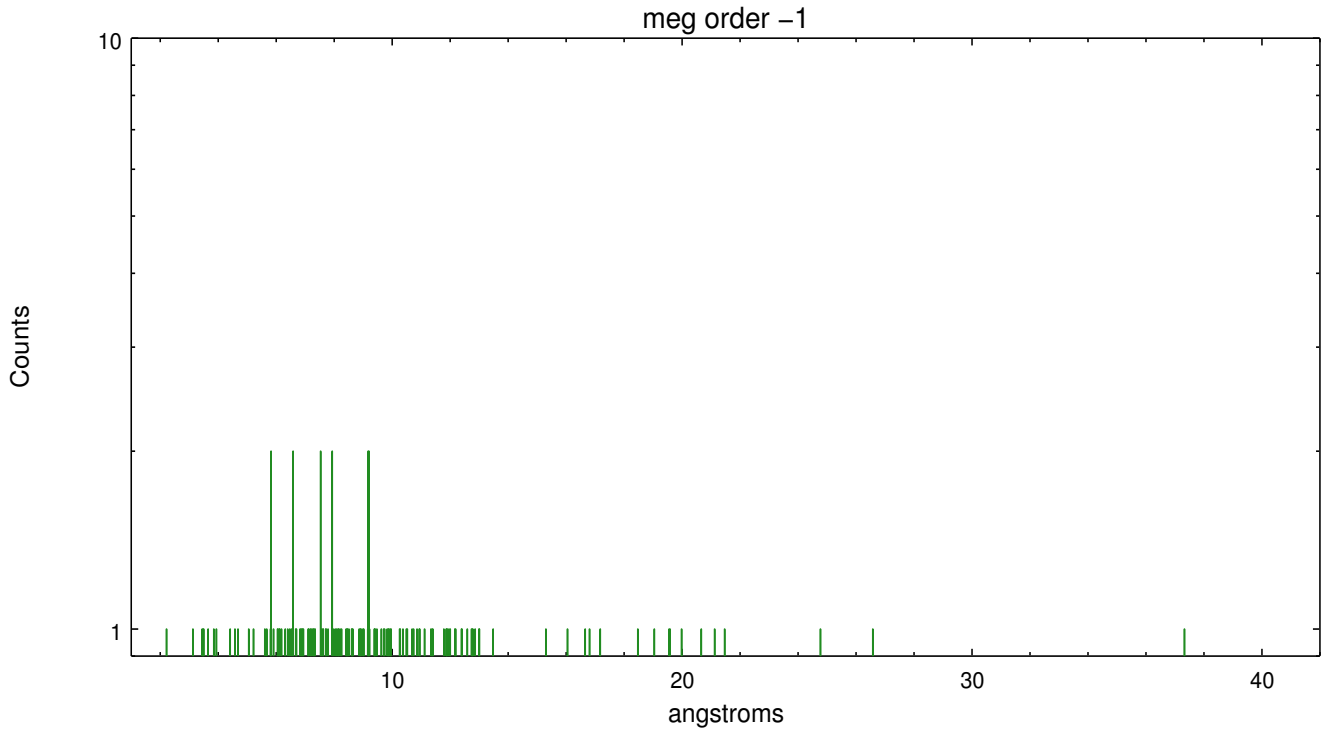
Spot Image MEG

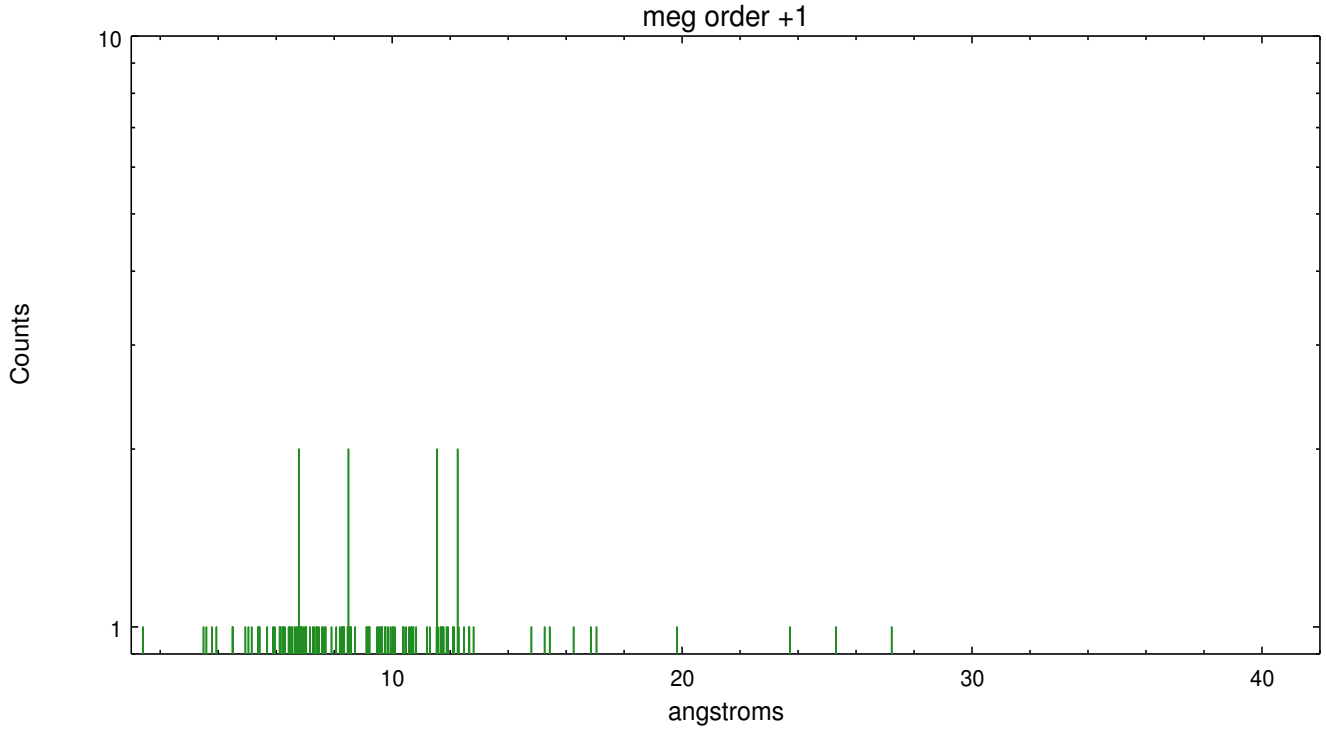


Full Detector MEG

	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	204	199	1252	918	1079	181	148




meg order −1
Counts
10
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)	2012.10.12
V&V Edition	1
V&V Disposition and Status	OK
V&V Charge Time	9.878

A.2 Comments

Standard software processing technique using the tool tgdetect failed to determine an accurate position for the zeroth order for this observation. The source is extended. The position of the zeroth order was chosen to be the same as in TGCat and is at the position of the brightest emission (sky coordinates x=4090.51, y=4131.02). For grating analysis of localized X-ray emission within the extended emission, the investigator will need to extract one or more dispersed spectra using user-defined zeroth order positions for all positions of interest. === The spectral data supplied in this processing are only energy-calibrated for the particular zeroth order position selected. 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. === The spectral lines are spatially-broadened and the rmfs are not valid.