V&V Reference Report
L2 ASCDS Version : 7.6.10

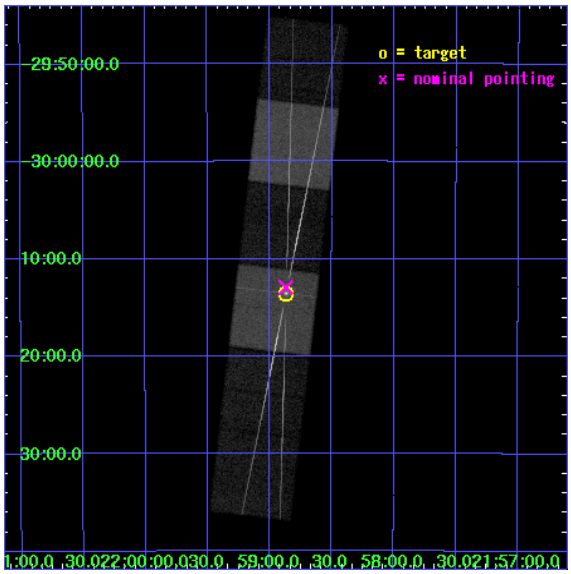
Observation 1705 - L2 Version 4
Chandra X-Ray Center

L2 Processing Date : Jul 23 2007

Contents

1 Front

seq_num	700263
obs_id	1705
title	HETG OBSERVATIONS OF VARIOUS ACTIVE GALACTIC NUCLEI
observer	Dr. CXC Calibration
object	PKS 2155-304
dtycycle	0
cycle	P
ra_targ	329.716667
dec_targ	-30.225556
ra_nom	329.71741438505
dec_nom	-30.215562362986
roll_nom	96.760314009829
revision	4
ontime	25827.200024053
livetime	25500.160466076
ontime4	25823.959173515
ontime5	25827.200024053
ontime6	25823.959173515
ontime7	25827.200024053
ontime8	25827.200024053
ontime9	25823.959033906
l2events	342746

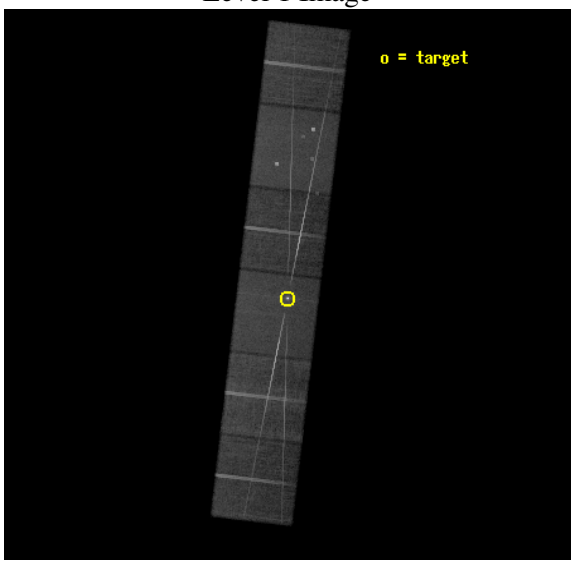


2 OBI

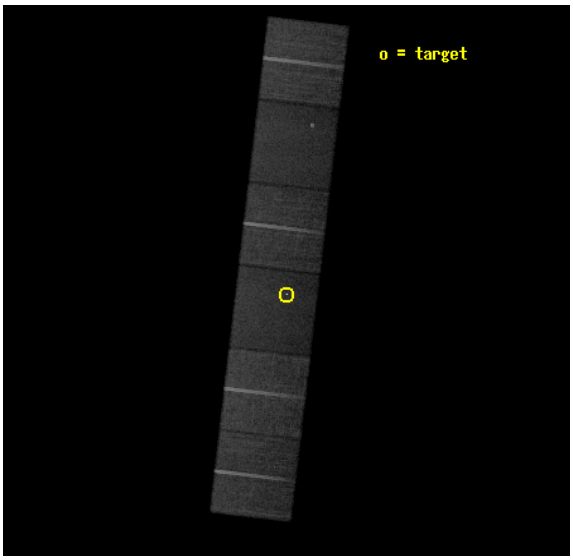
2.1 OBI

2.1.1 Images

Level 1 Image

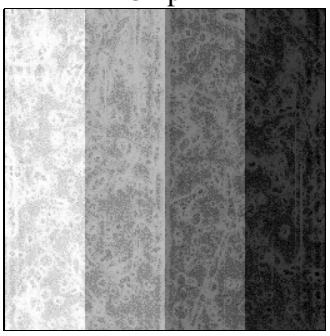


Level 1 Bad Events

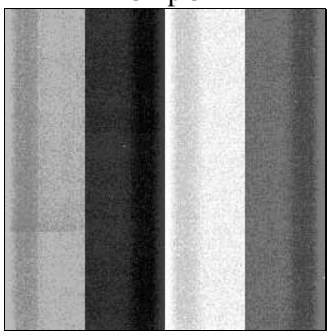


2.1.2 Bias

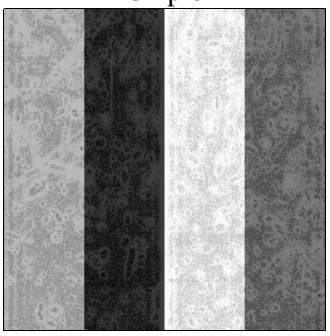
Chip 4



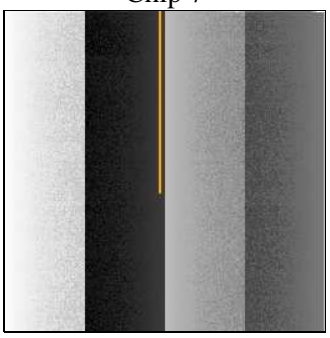
Chip 5



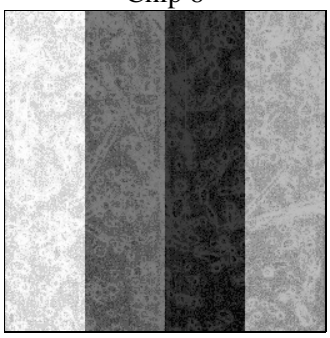
Chip 6



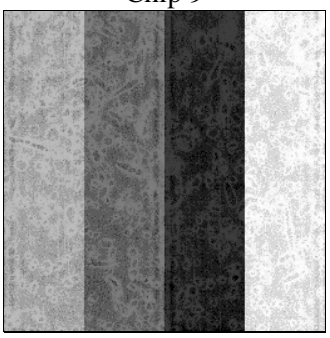
Chip 7



Chip 8



Chip 9



2.1.3 Parameters

obi_num	0
ascdsver	7.6.10
caldbver	3.4.0
date	2007-05-23T12:11:54
revision	3

sched_exp_time	26000.000000
ontime	25827.200024053
ontime4	25823.959173515
ontime5	25827.200024053
ontime6	25823.959173515
ontime7	25827.200024053
ontime8	25827.200024053
ontime9	25823.959033906
l1events	1292584

2.1.4 Events

	ccd 4	ccd 5	ccd 6	ccd 7	ccd 8	ccd 9
level 1 events	198121	243694	205818	233312	238413	173226
rejected events	176034	121712	155470	123696	174079	148945
rejected %	88%	49%	75%	53%	73%	85%

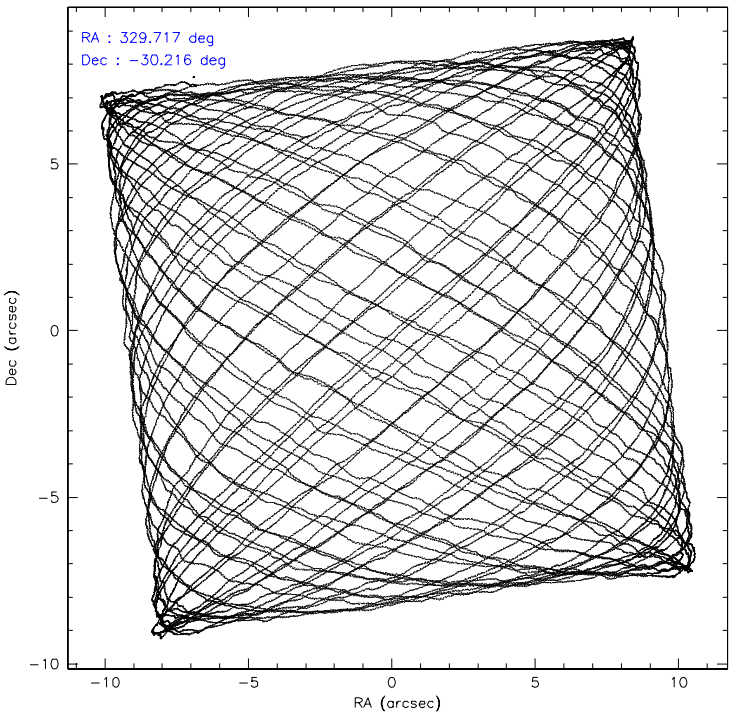
	ccd 4	ccd 5	ccd 6	ccd 7	ccd 8	ccd 9
grade 0 events	10312	20725	33293	14141	33618	12291
	5%	8%	16%	6%	14%	7%
grade 1 events	84	274	209	382	220	110
	0%	0%	0%	0%	0%	0%
grade 2 events	4809	34258	6978	22710	10745	4205
	2%	14%	3%	9%	4%	2%
grade 3 events	1867	6356	2950	10648	4900	2044
	0%	2%	1%	4%	2%	1%
grade 4 events	1846	5874	2883	10248	4611	1990
	0%	2%	1%	4%	1%	1%
grade 5 events	5386	17397	6640	20426	8263	6540
	2%	7%	3%	8%	3%	3%
grade 6 events	3259	54801	4259	51898	10495	3758
	1%	22%	2%	22%	4%	2%
grade 7 events	170558	104009	148606	102859	165561	142288
	86%	42%	72%	44%	69%	82%

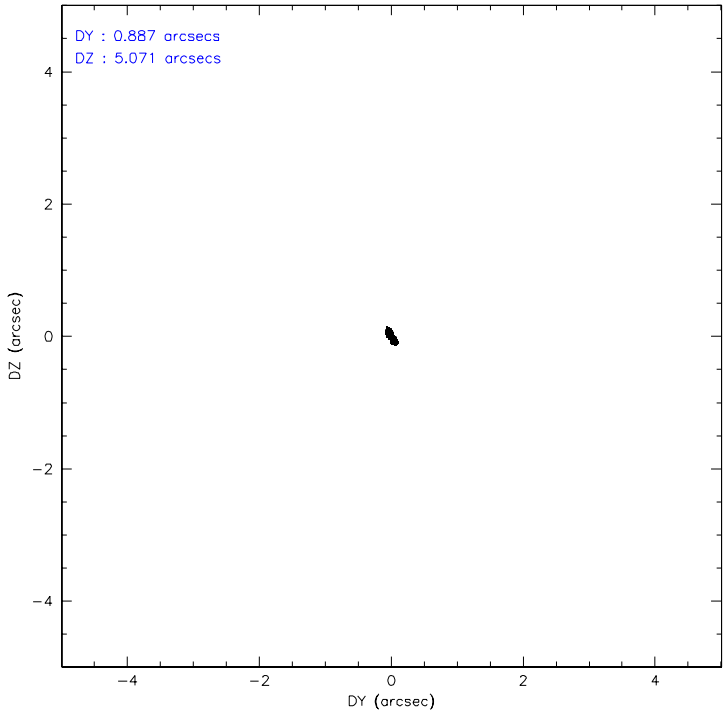
2.2 Compared Parameters

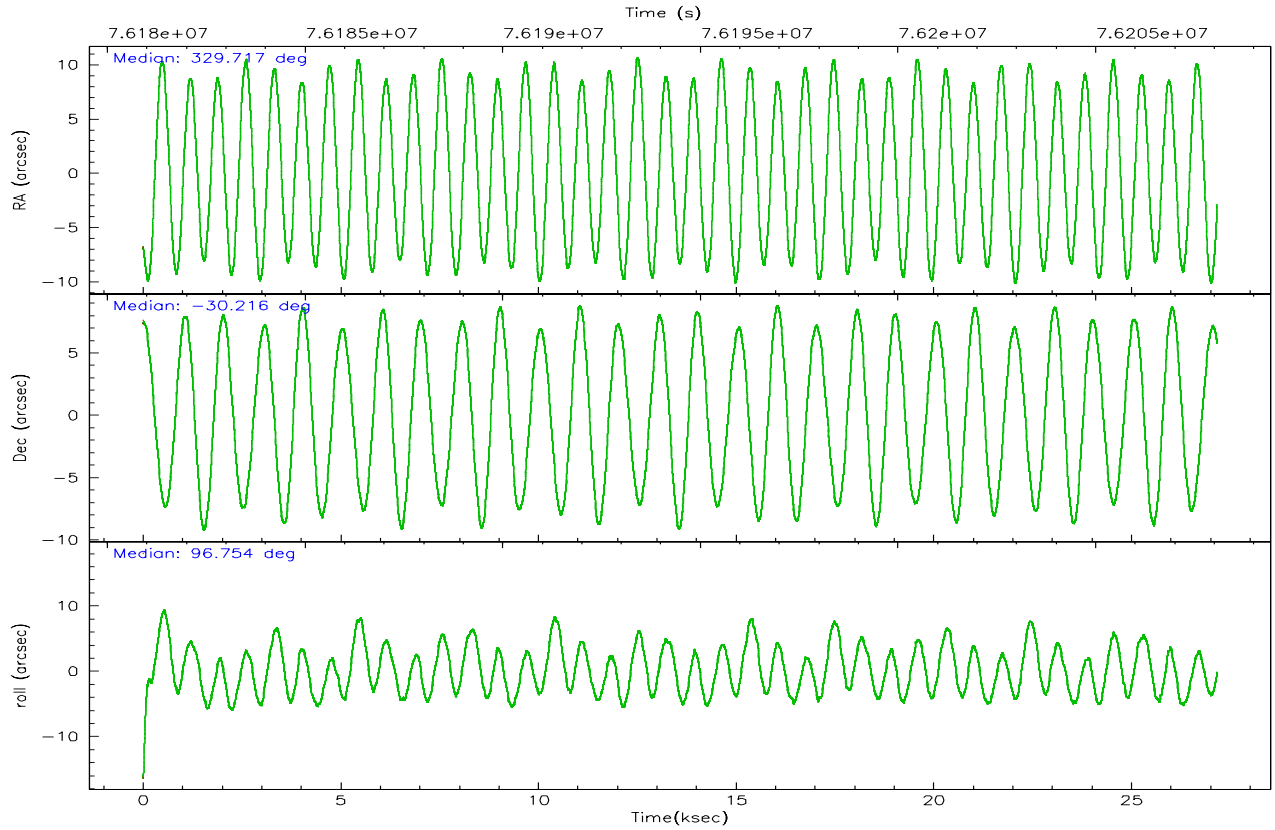
Parameter	Planned	Actual
Instrument	ACIS	ACIS
Detector	ACIS-456789	ACIS-456789
Grating	HETG	HETG
Data mode	FAINT	FAINT
Observation mode	POINTING	POINTING
Pointing RA	329.736515	329.7174143850501
Pointing Dec	-30.237497	-30.21556236298595
Pointing Roll	96.613309	96.7603140098286
SIM focus pos (mm)	-0.684267	-0.6828225247311905
SIM defocus (mm)	0	0.001444936568705701
SIM translation stage pos (mm)	-187.132523	-187.1228876879999
SIM translation stage offset (mm)	-3	-3.009634895007935
Observation start time	76182072.184000	76180317.030852
Observation start date	2000-05-31T17:40:08	2000-05-31T17:11:57
Observation end time	76208072.184000	76208385.63188501
Observation end date	2000-06-01T00:53:28	2000-06-01T00:59:45
Read mode	TIMED	TIMED

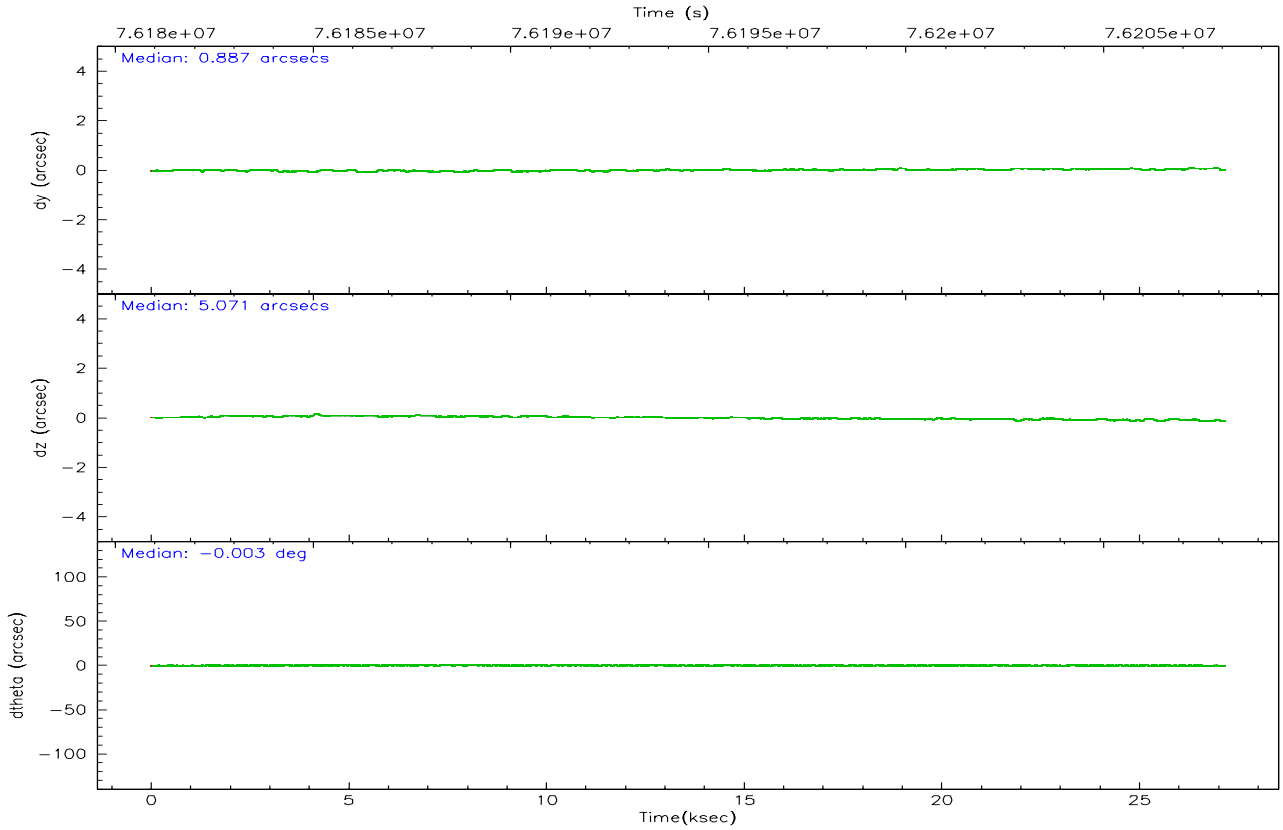
Parameter	Planned	Actual
Obspar format version number	6	6
Obspar file type	PREDICTED	ACTUAL
Obspar update status	NONE	UPDATED
Number of optional ACIS chips dropped	0	0
On-chip summing requested	N	N
Subarray requested	NONE	NONE
Alternating exposures requested	N	N
Primary exposure time	3.200000	3.2

2.3 Aspect


RA : 329.717 deg
Dec : −30.216 deg
Dec (arcsec)
RA (arcsec)
5
0
−5
−10
−10
−5
0
5
10


DY : 0.887 arcsecs
DZ : 5.071 arcsecs
DZ (arcsec)
DY (arcsec)
4
2
0
−2
−4
−4
−2
0
2
4


Time (s)
7.618e+07
7.6185e+07
7.619e+07
7.6195e+07
7.62e+07
7.6205e+07
Median: 329.717 deg
RA (arcsec)
Median: −30.216 deg
Dec (arcsec)
Median: 96.754 deg
roll (arcsec)
Time(ksec)

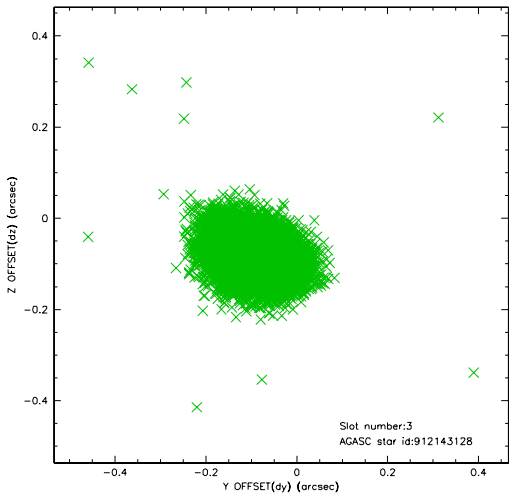

Time (s)
7.618e+07
7.6185e+07
7.619e+07
7.6195e+07
7.62e+07
7.6205e+07
Median: 0.887 arcsecs
dy (arcsec)
Median: 5.071 arcsecs
dz (arcsec)
Median: −0.003 deg
dtheta (arcsec)
Time(ksec)

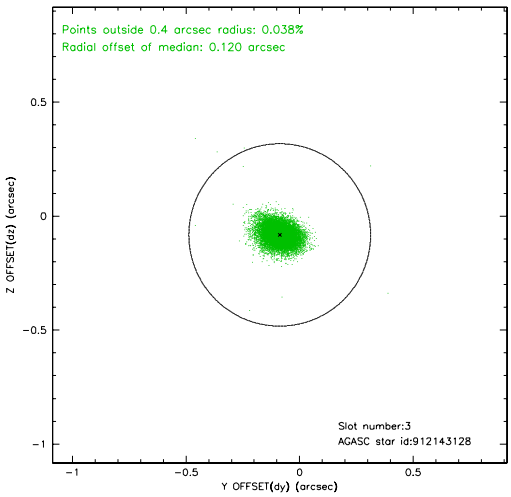
Slot Statistics

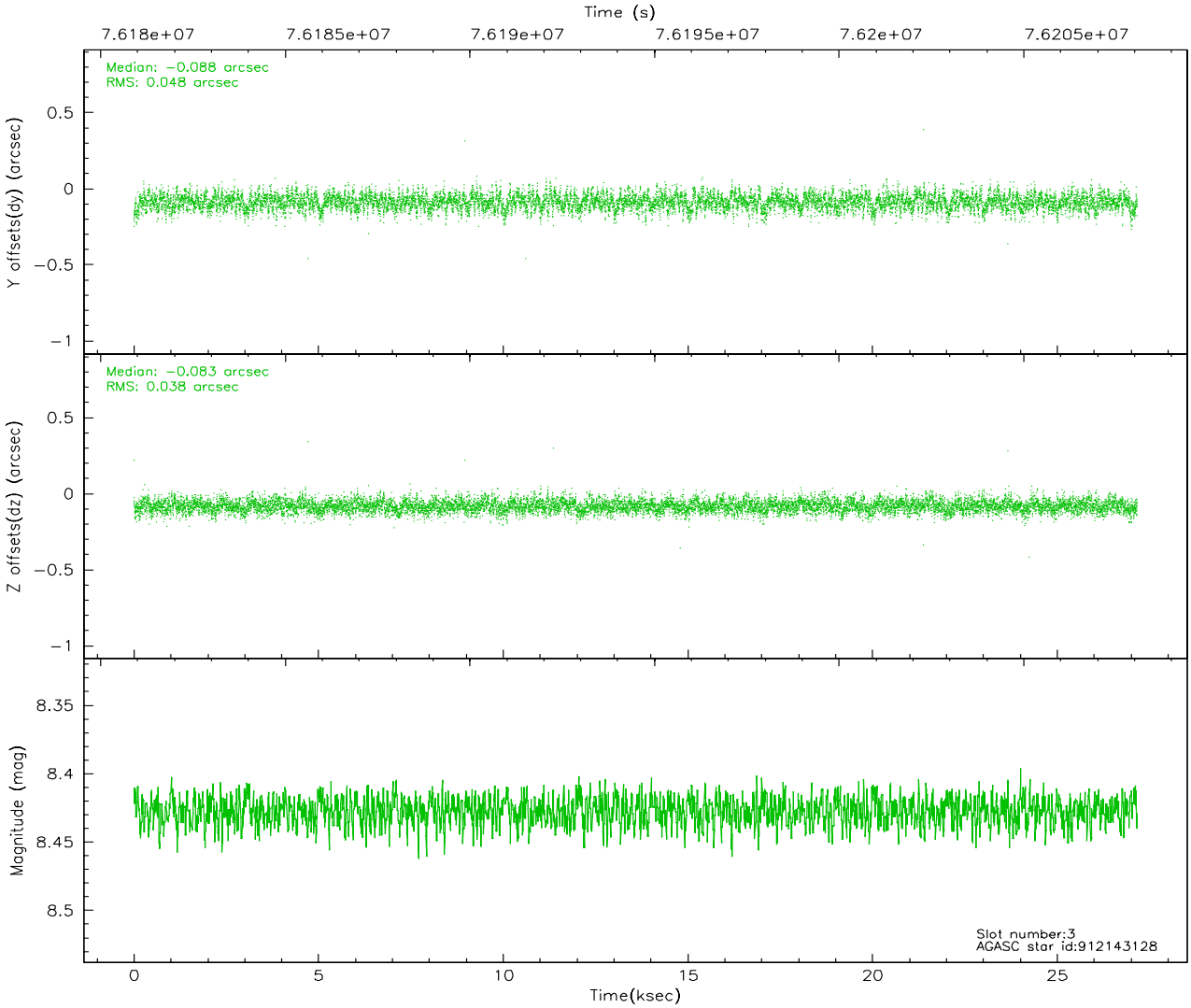
slot	status	id	mag	n_pts	med_dy	med_dz	dr1	dr2	ra	dec	mean_y	mean_z
0	FID	ACIS-S-2	7.10	6627	-0.018	-0.025	0.007	0.011	0.000000	0.000000	-753.32	-1788.33
1	FID	ACIS-S-4	7.20	6626	-0.037	0.015	0.005	0.008	0.000000	0.000000	2159.93	120.02
2	FID	ACIS-S-5	7.23	6626	0.024	0.018	0.006	0.010	0.000000	0.000000	-1805.96	113.89
3	GUIDE	912143128	8.43	13249	-0.088	-0.083	0.063	0.108	328.924992	-29.706140	2183.47	2301.31
4	GUIDE	912275088	9.06	13246	-0.079	-0.036	0.070	0.116	329.619228	-29.738698	1826.16	157.43
5	GUIDE	981478152	9.40	13241	0.012	-0.053	0.084	0.144	329.415589	-30.057192	758.93	918.46
6	GUIDE	981468128	9.36	13243	0.195	0.240	0.081	0.136	329.756350	-30.158334	276.56	-94.13
7	GUIDE	981469488	9.60	13245	-0.038	-0.070	0.094	0.156	329.261199	-30.045155	855.52	1391.67

2.4 Star Slots

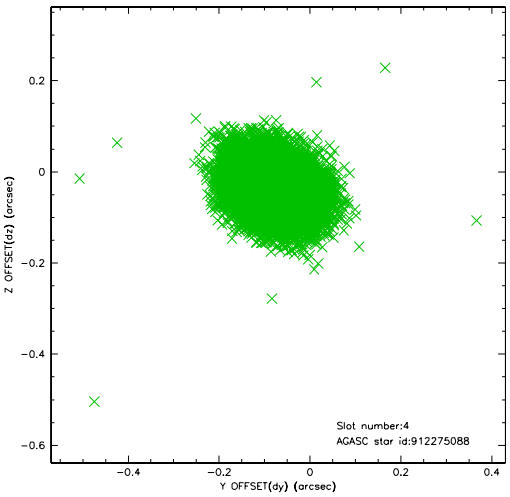
2.4.1 Slot 3

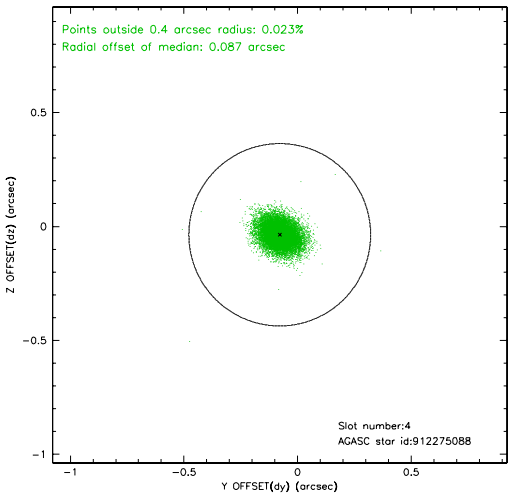


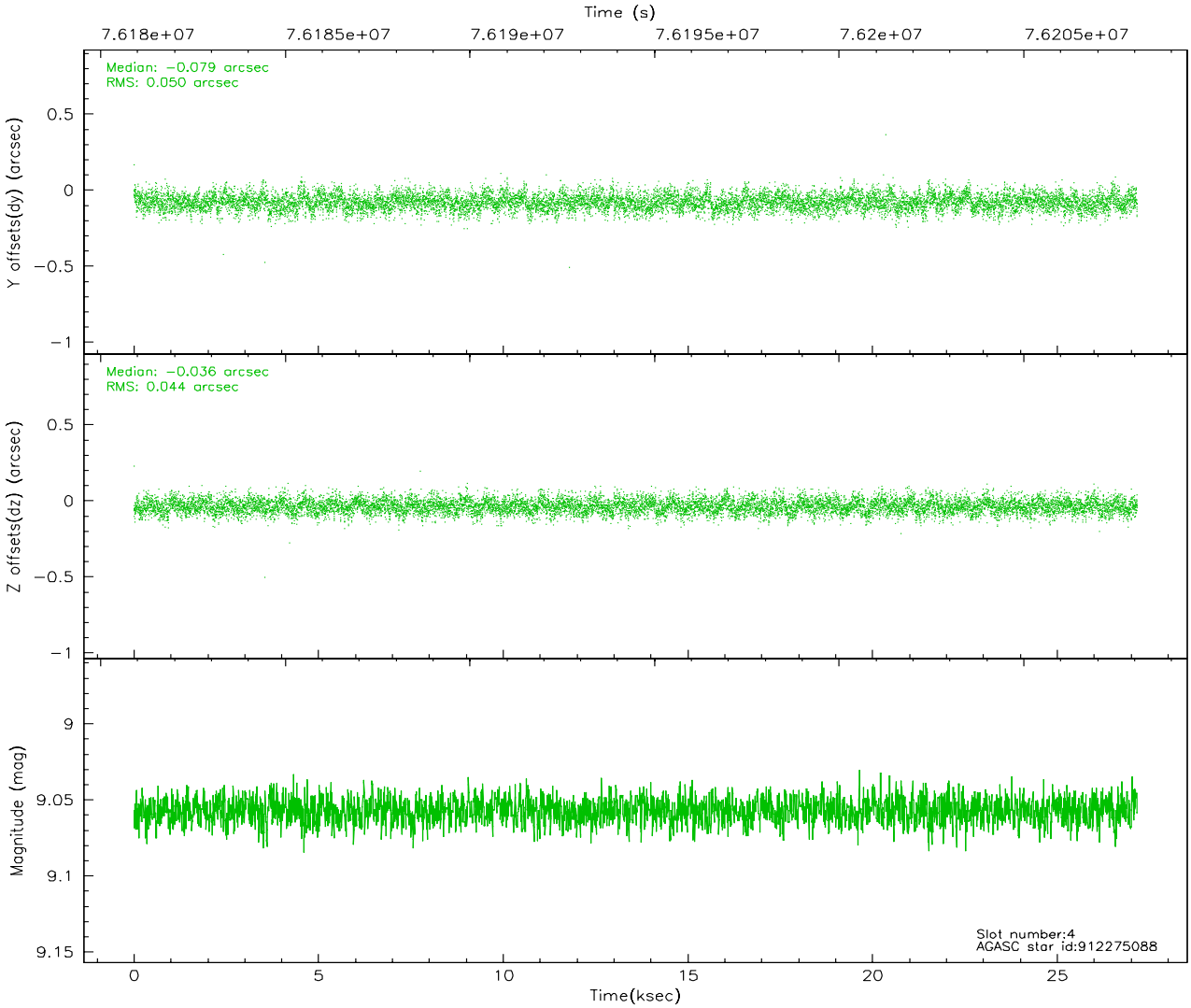




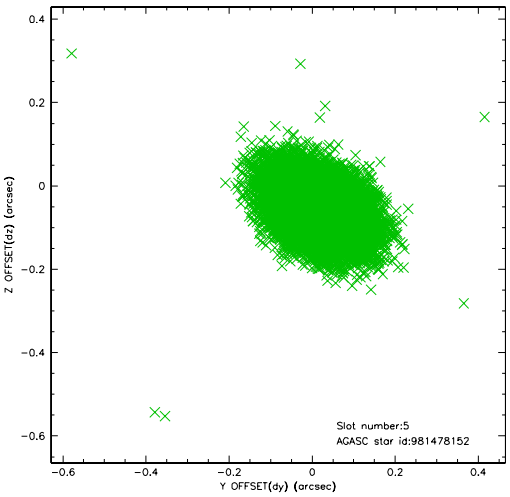
2.4.2 Slot 4

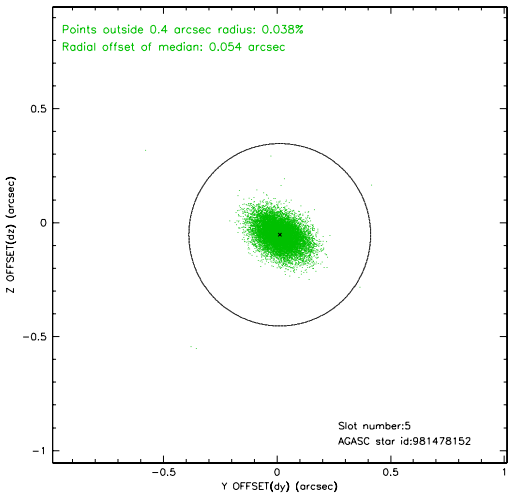

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number:4
AGASC star id:912275088

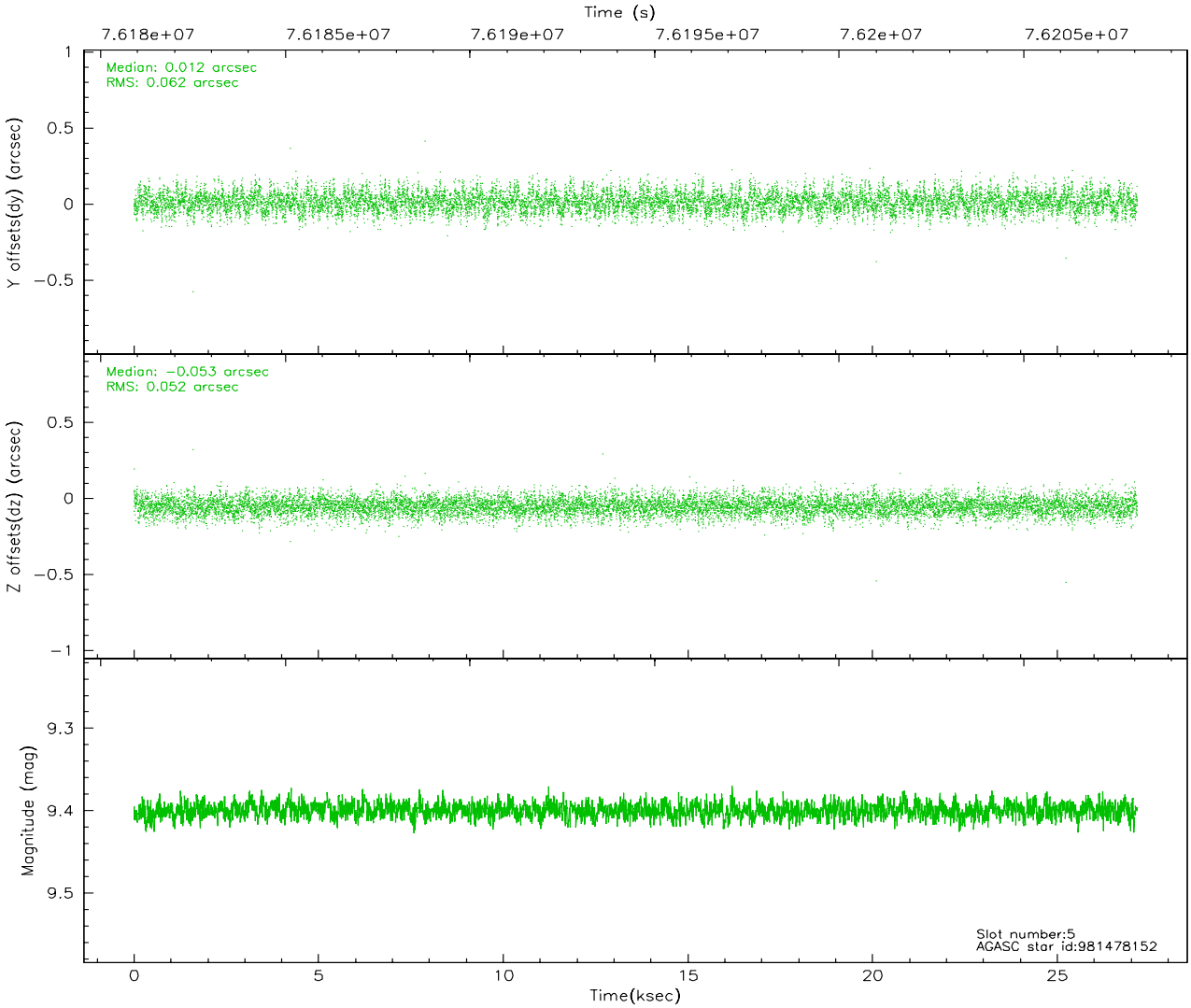

Points outside 0.4 arcsec radius: 0.023%
Radial offset of median: 0.087 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number:4
AGASC star id:912275088


Time (s)
7.618e+07
7.6185e+07
7.619e+07
7.6195e+07
7.62e+07
7.6205e+07
Median: −0.079 arcsec
RMS: 0.050 arcsec
Y offsets(dy) (arcsec)
Median: −0.036 arcsec
RMS: 0.044 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number:4
AGASC star id:912275088
Time(ksec)

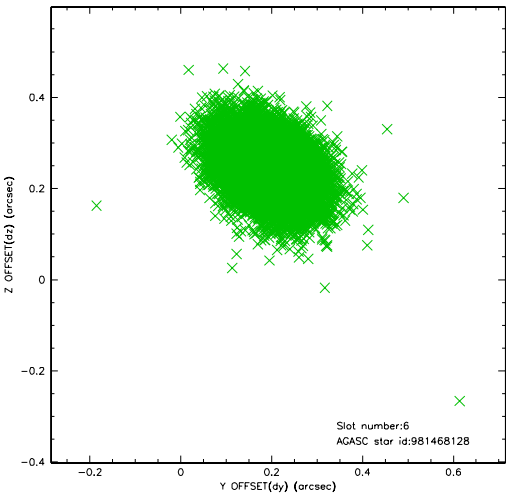
2.4.3 Slot 5

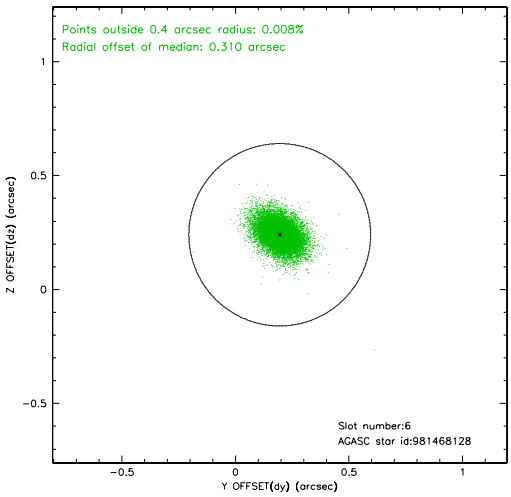

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number:5
AGASC star id:981478152

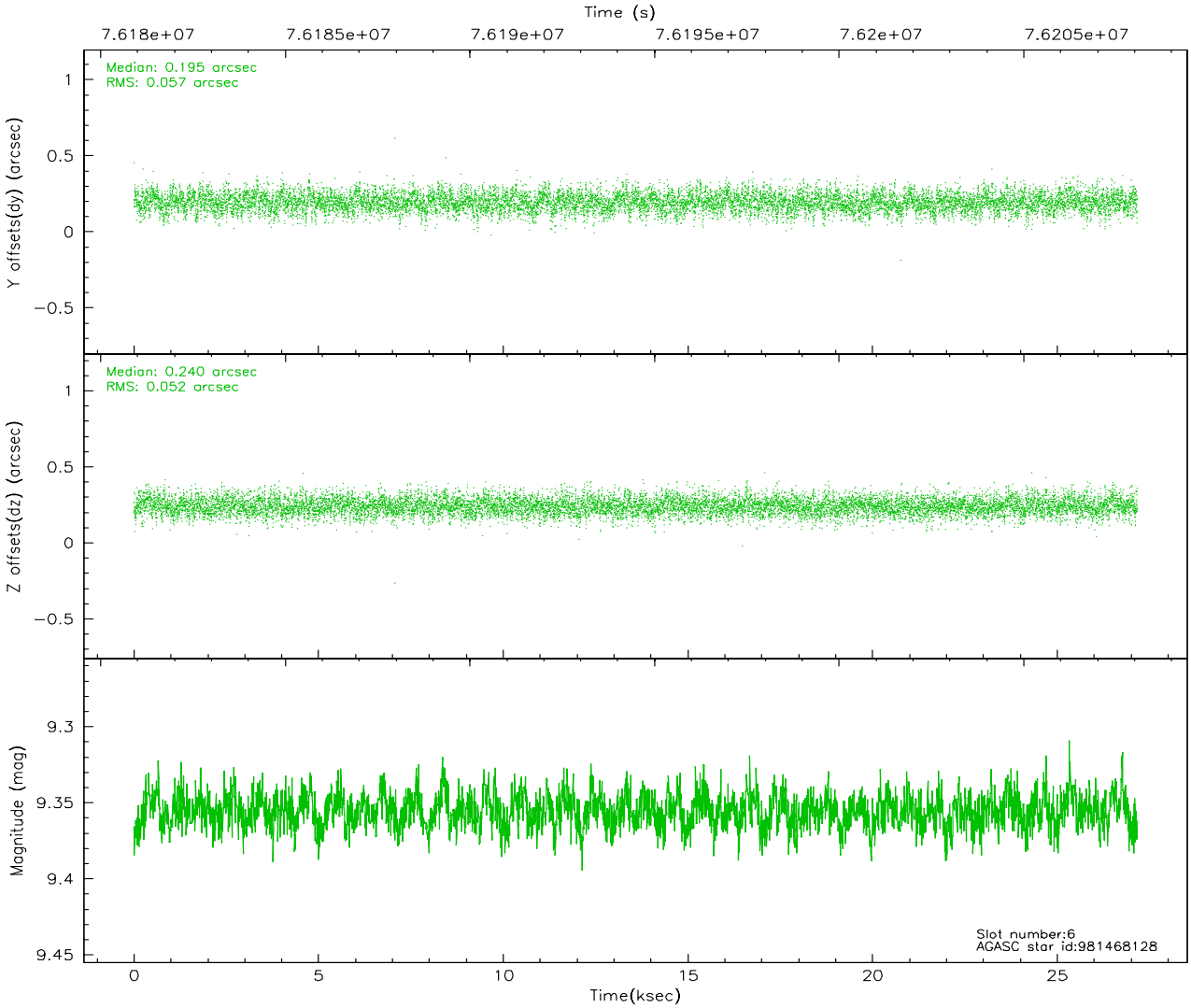

Points outside 0.4 arcsec radius: 0.038%
Radial offset of median: 0.054 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number:5
AGASC star id:981478152


Time (s)
Median: 0.012 arcsec
RMS: 0.062 arcsec
Y offsets(dy) (arcsec)
Median: −0.053 arcsec
RMS: 0.052 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number:5
AGASC star id:981478152
Time(ksec)

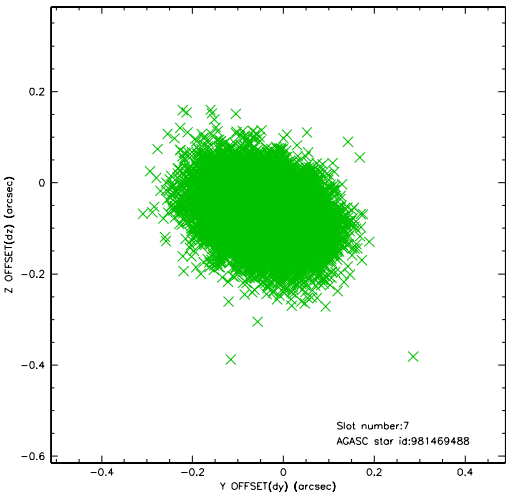
2.4.4 Slot 6

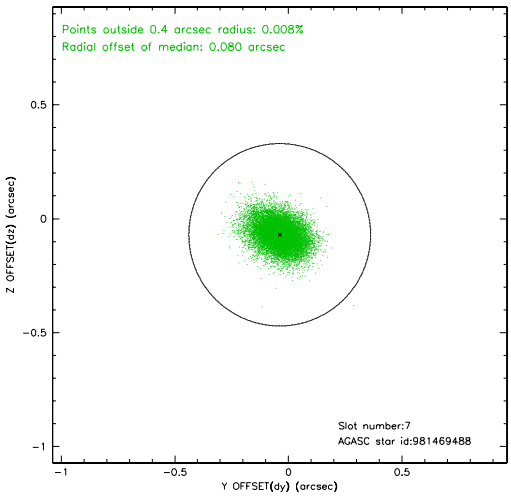

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number:6
AGASC star id:981468128

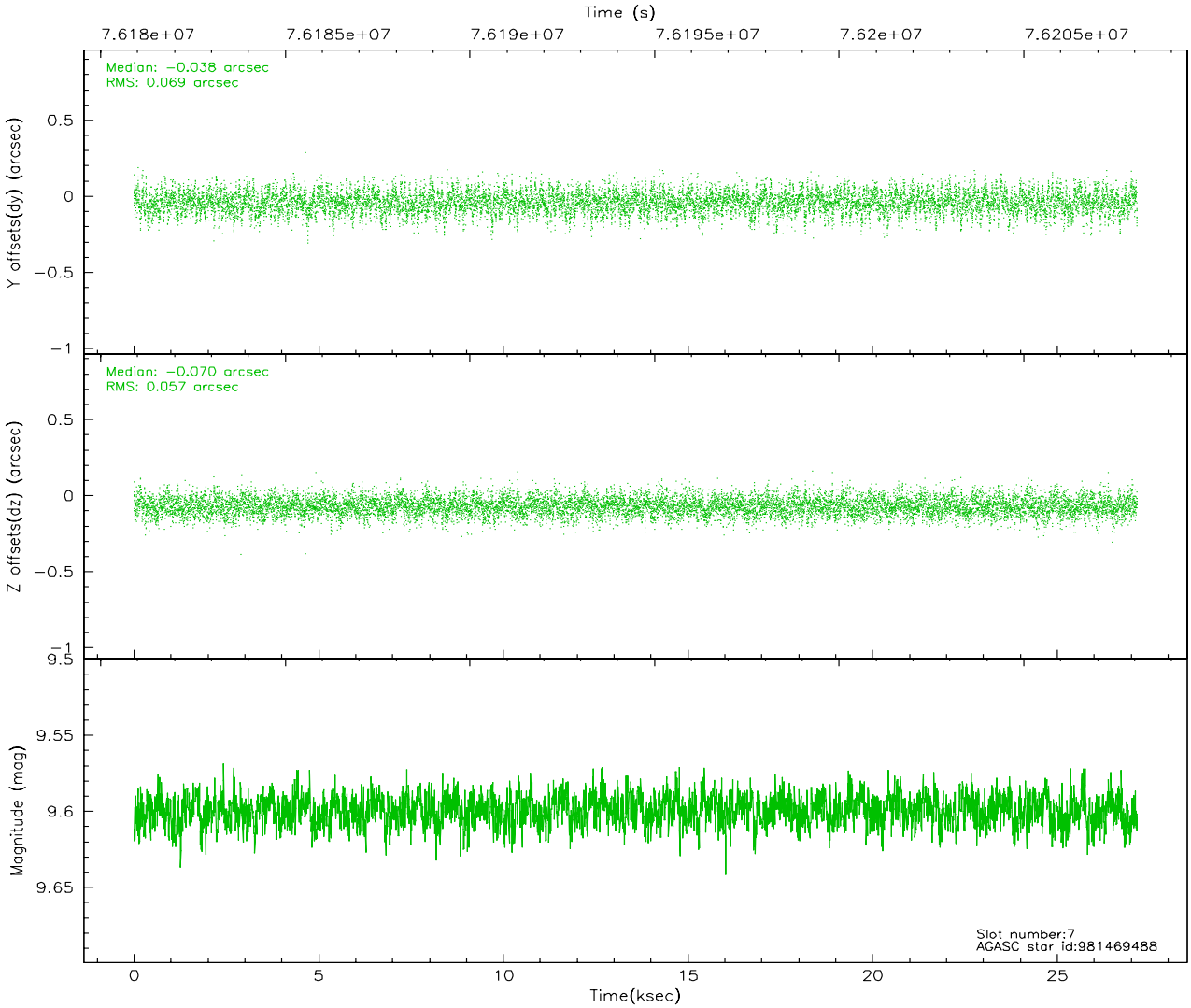

Points outside 0.4 arcsec radius: 0.008%
Radial offset of median: 0.310 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number:6
AGASC star id:981468128


Time (s)
Median: 0.195 arcsec
RMS: 0.057 arcsec
Y offsets(dy) (arcsec)
Median: 0.240 arcsec
RMS: 0.052 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number:6
AGASC star id:981468128
Time(ksec)

2.4.5 Slot 7

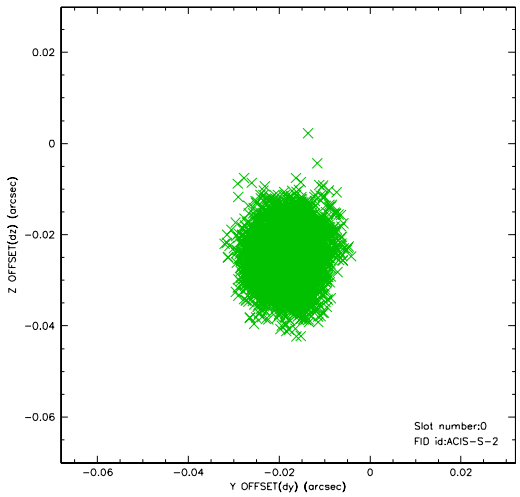

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number:7
AGASC star id:981469488

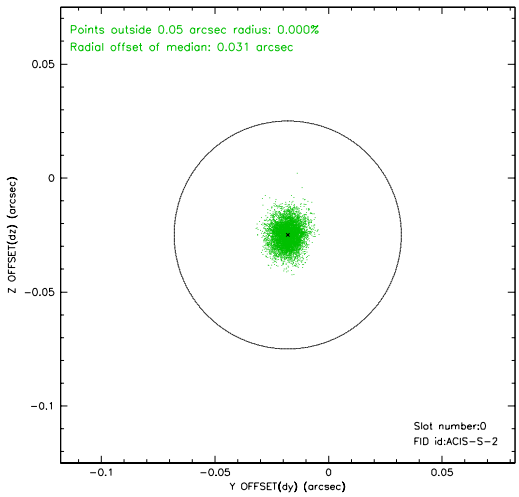

Points outside 0.4 arcsec radius: 0.008%
Radial offset of median: 0.080 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number:7
AGASC star id:981469488

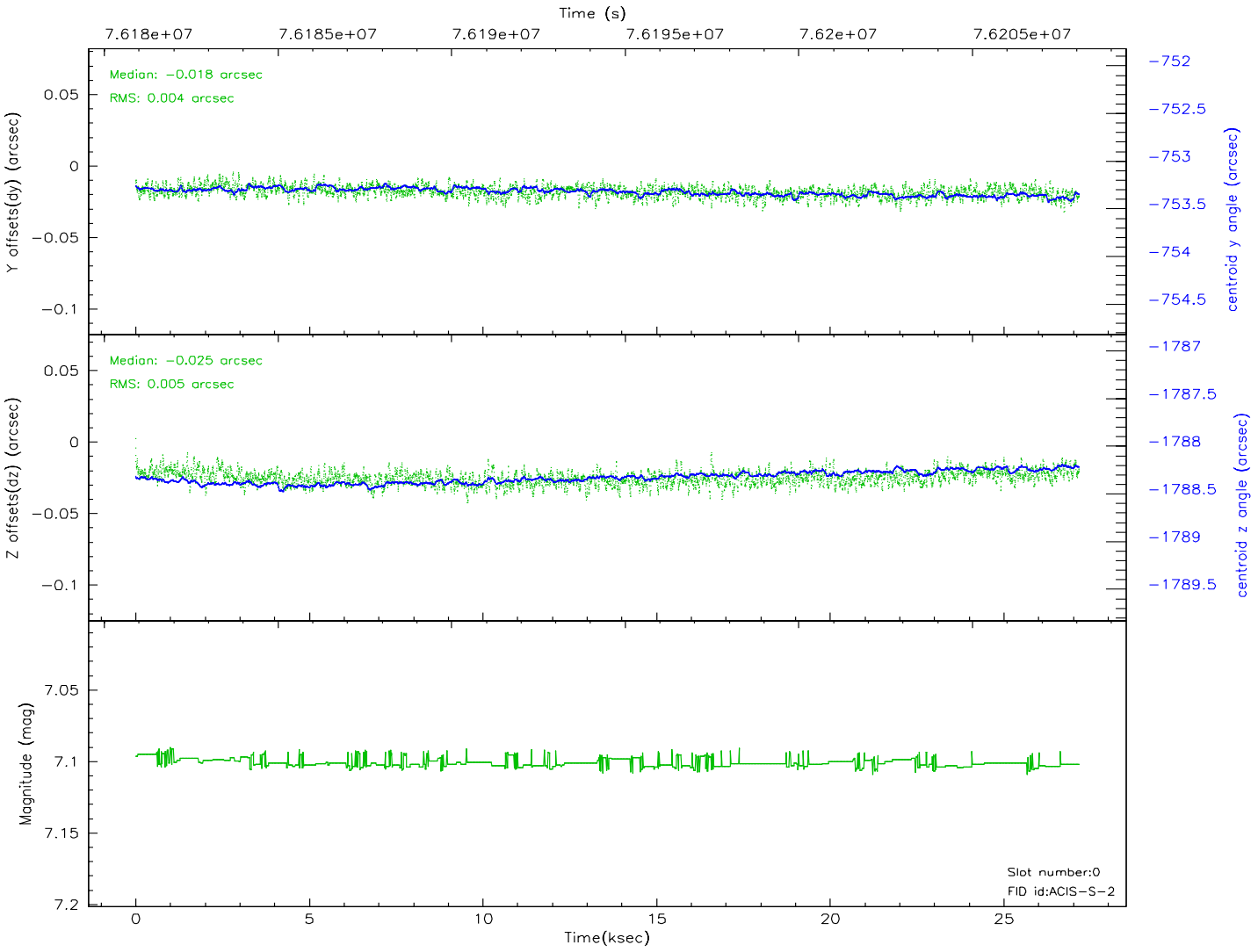

Time (s)
Median: −0.038 arcsec
RMS: 0.069 arcsec
Y offsets(dy) (arcsec)
Median: −0.070 arcsec
RMS: 0.057 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number:7
AGASC star id:981469488
Time(ksec)

2.5 FID Slots

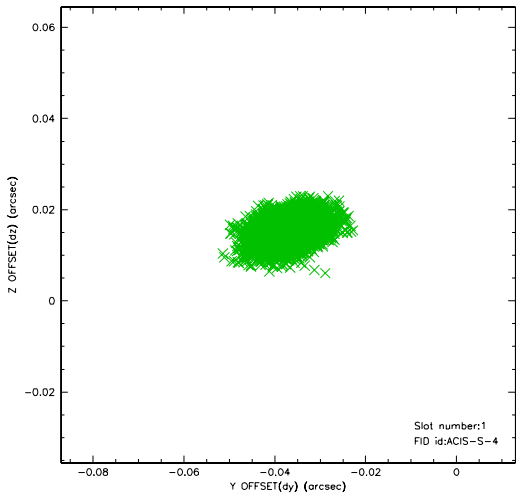
2.5.1 Slot 0

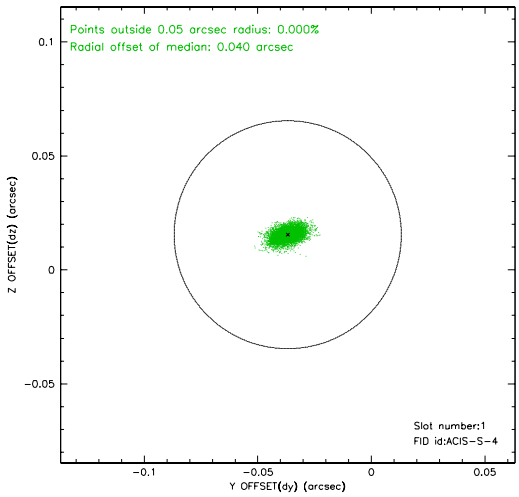


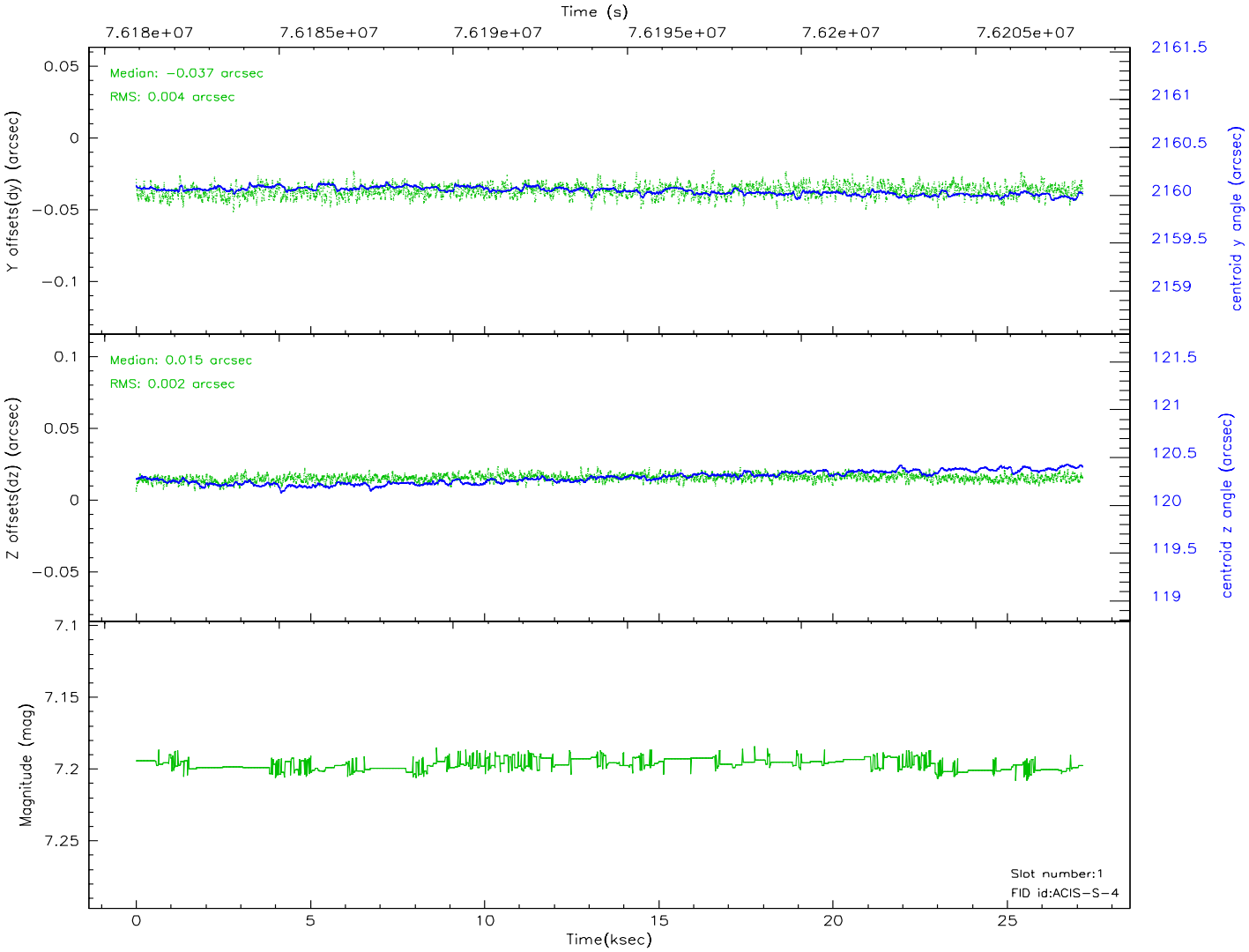




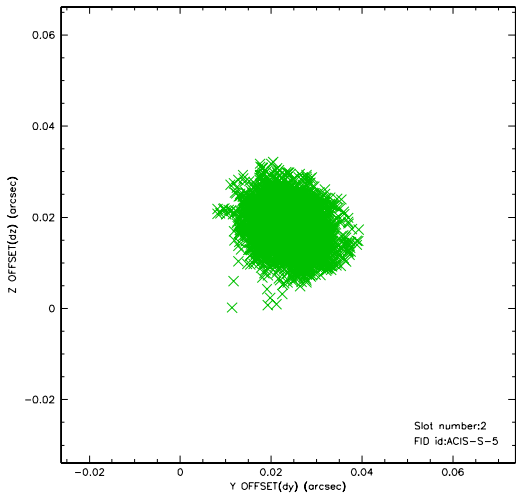
2.5.2 Slot 1

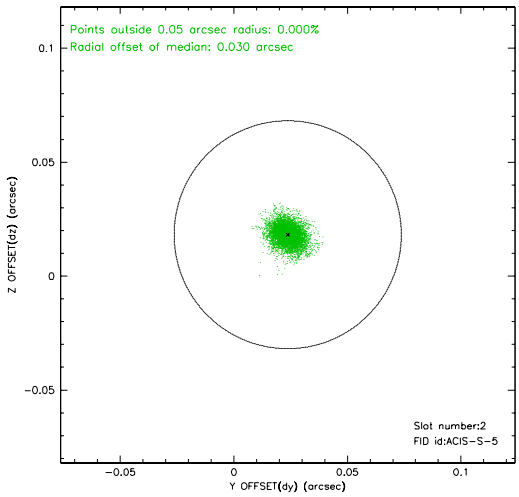

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number:1
FID id:ACIS-S-4

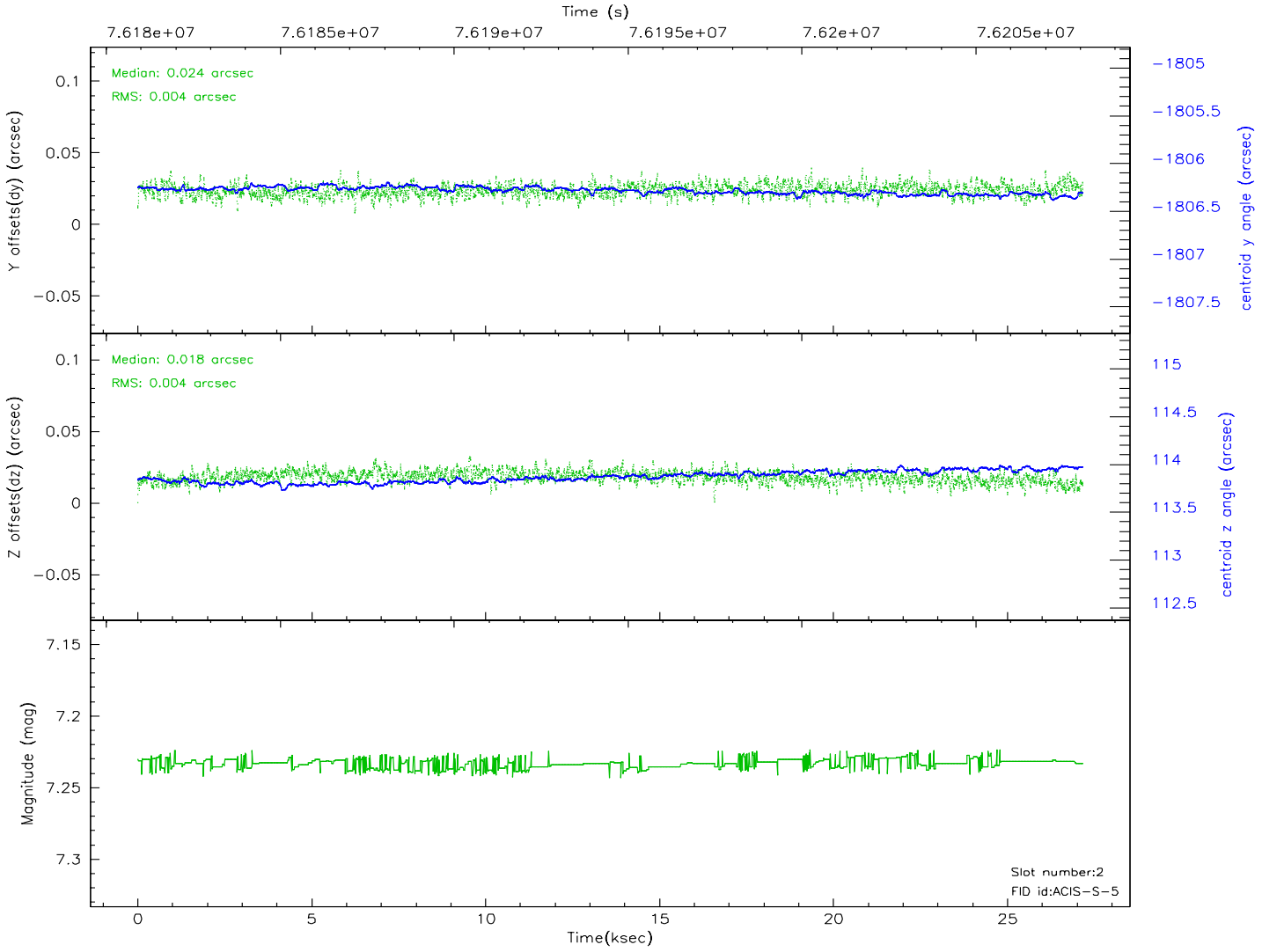

Points outside 0.05 arcsec radius: 0.000%
Radial offset of median: 0.040 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number:1
FID id:ACIS-S-4


Time (s)
Median: −0.037 arcsec
RMS: 0.004 arcsec
Y offsets(dy) (arcsec)
centroid y angle (arcsec)
Median: 0.015 arcsec
RMS: 0.002 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

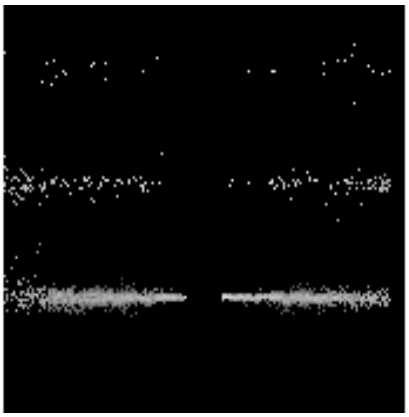

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number:2
FID id:ACIS-S-5


Points outside 0.05 arcsec radius: 0.000%
Radial offset of median: 0.030 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number:2
FID id:ACIS-S-5

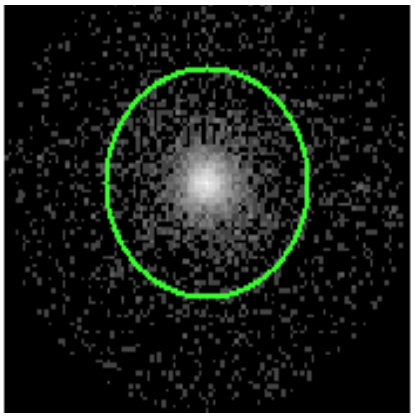

Time (s)
Median: 0.024 arcsec
RMS: 0.004 arcsec
Y offsets(dy) (arcsec)
centroid y angle (arcsec)
Median: 0.018 arcsec
RMS: 0.004 arcsec
Z offsets(dz) (arcsec)
centroid z angle (arcsec)
Magnitude (mag)
Slot number:2
FID id:ACIS-S-5
Time(ksec)

3 Gratings

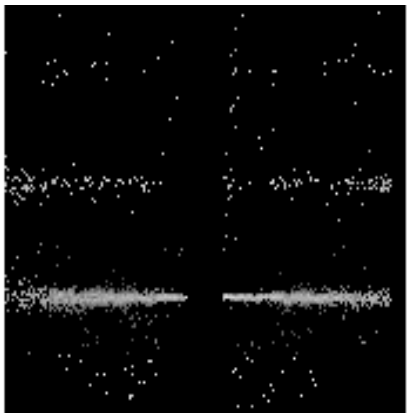
3.1 HEG Arm



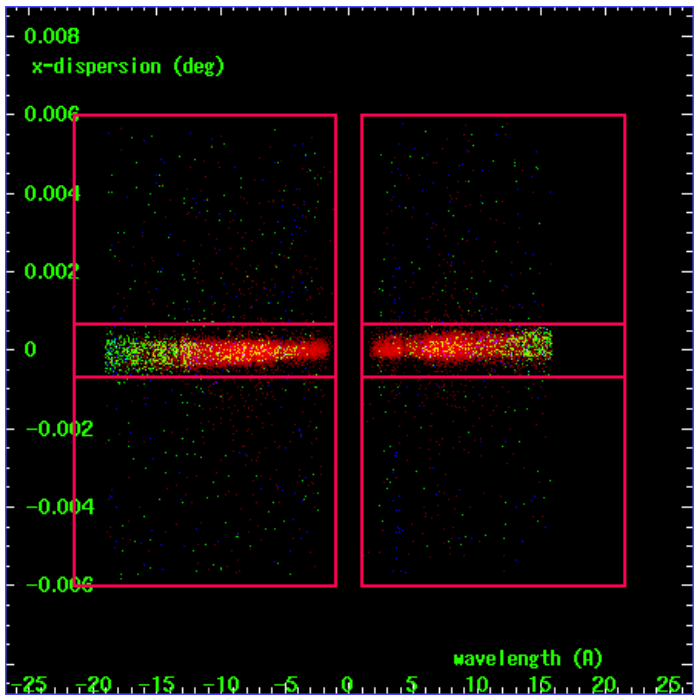
HEG Order Sort 123



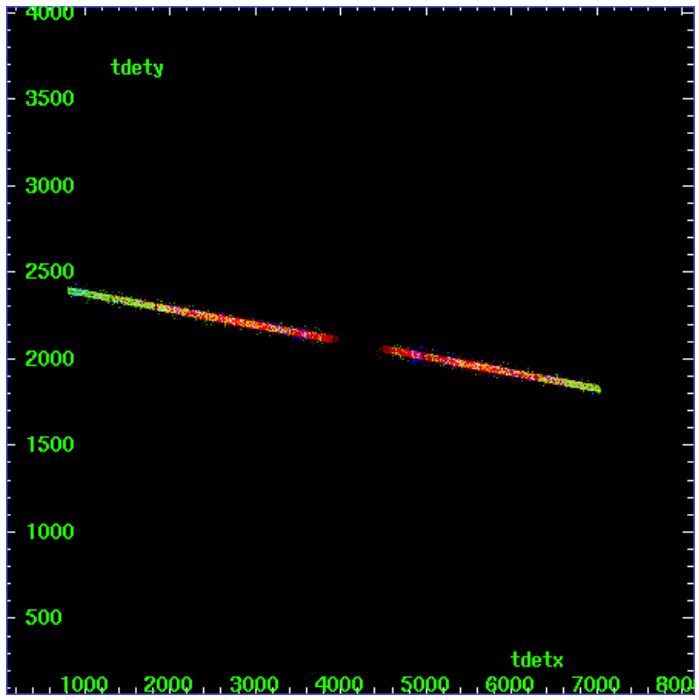
HEG Zero Order



HEG Order Sort ALL

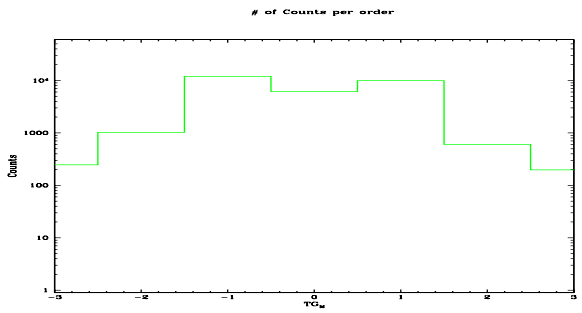


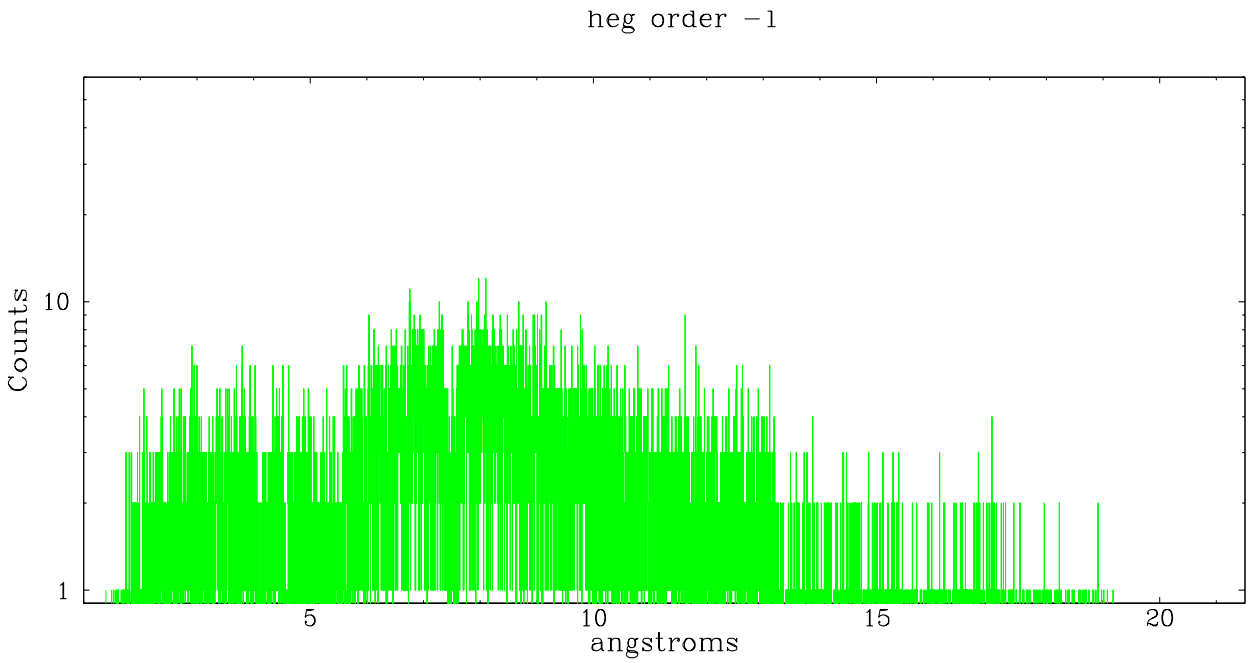
Spot Image HEG

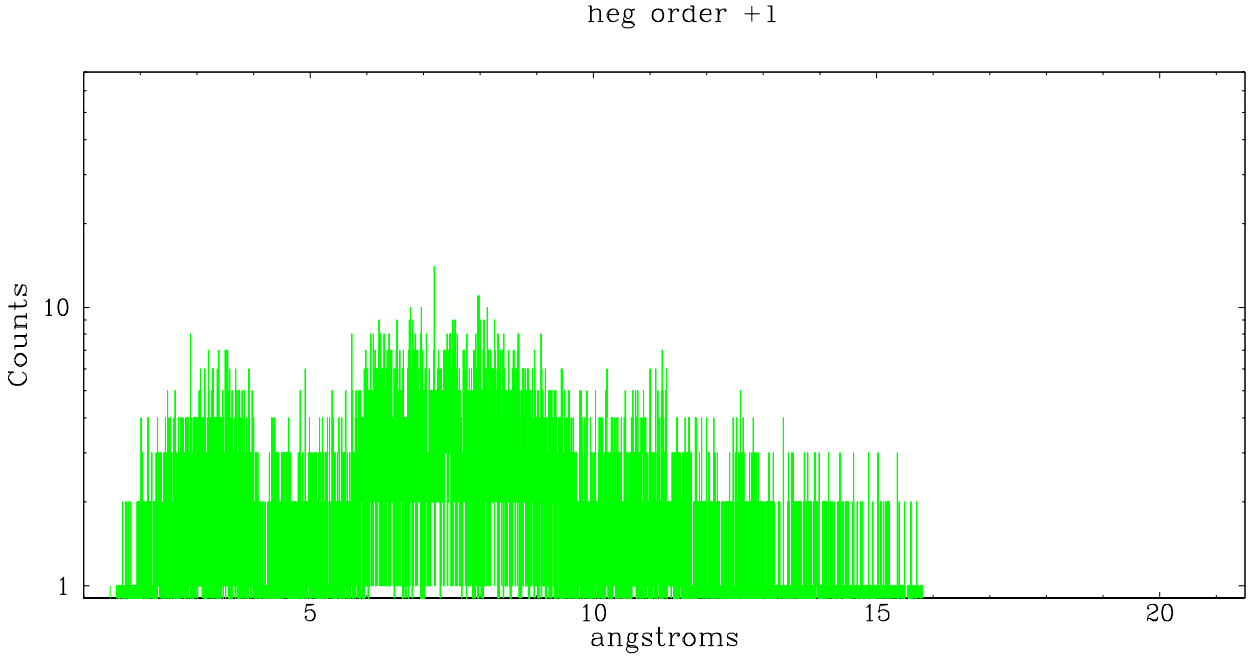


Full Detector HEG

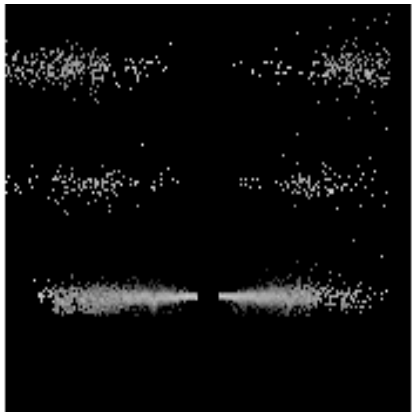
	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	246	1021	11994	6164	9901	603	197



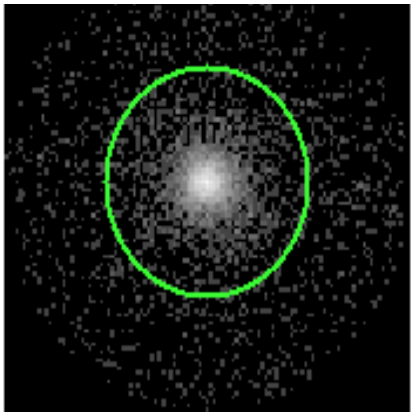

heg order −1
Counts
10
1
5
10
15
20
angstroms


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

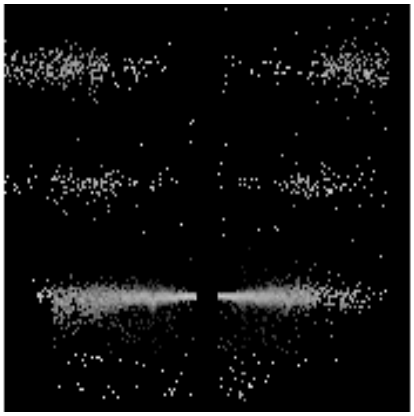
3.2 MEG Arm



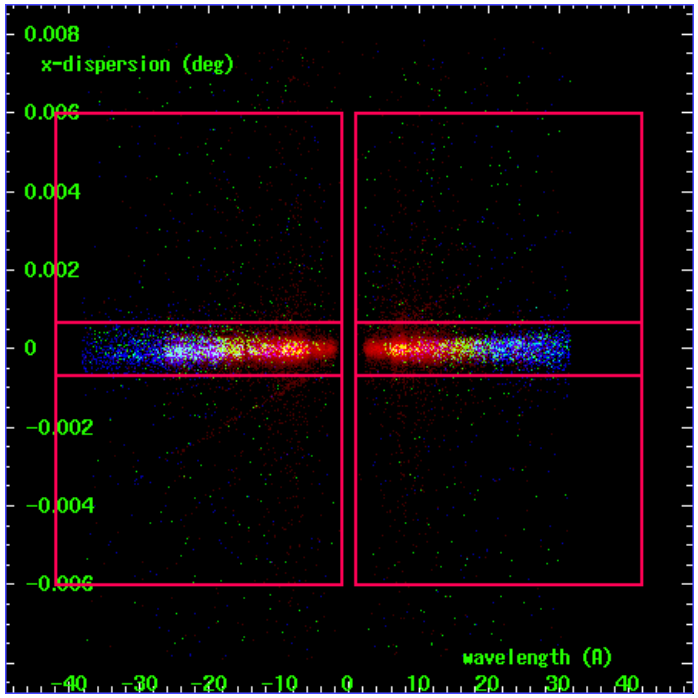
MEG Order Sort 123



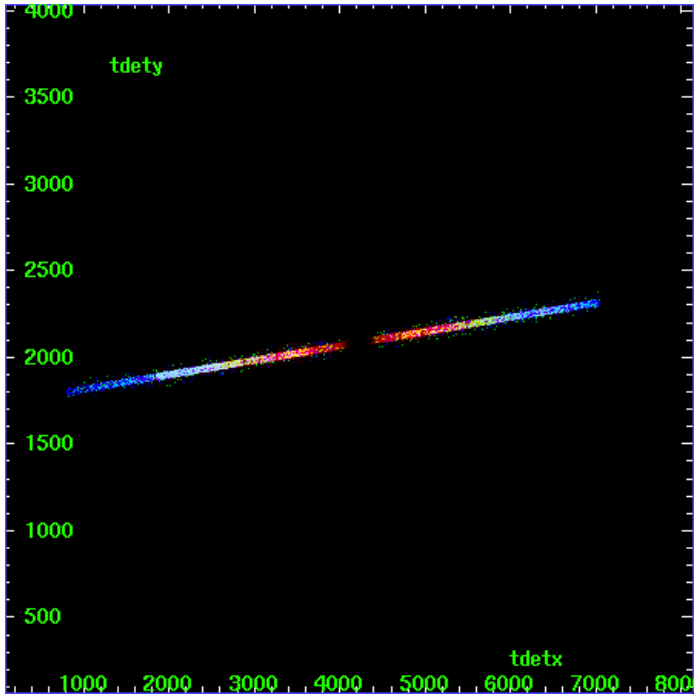
MEG Zero Order



MEG Order Sort ALL

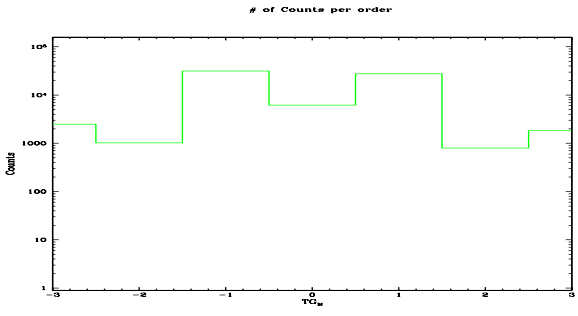


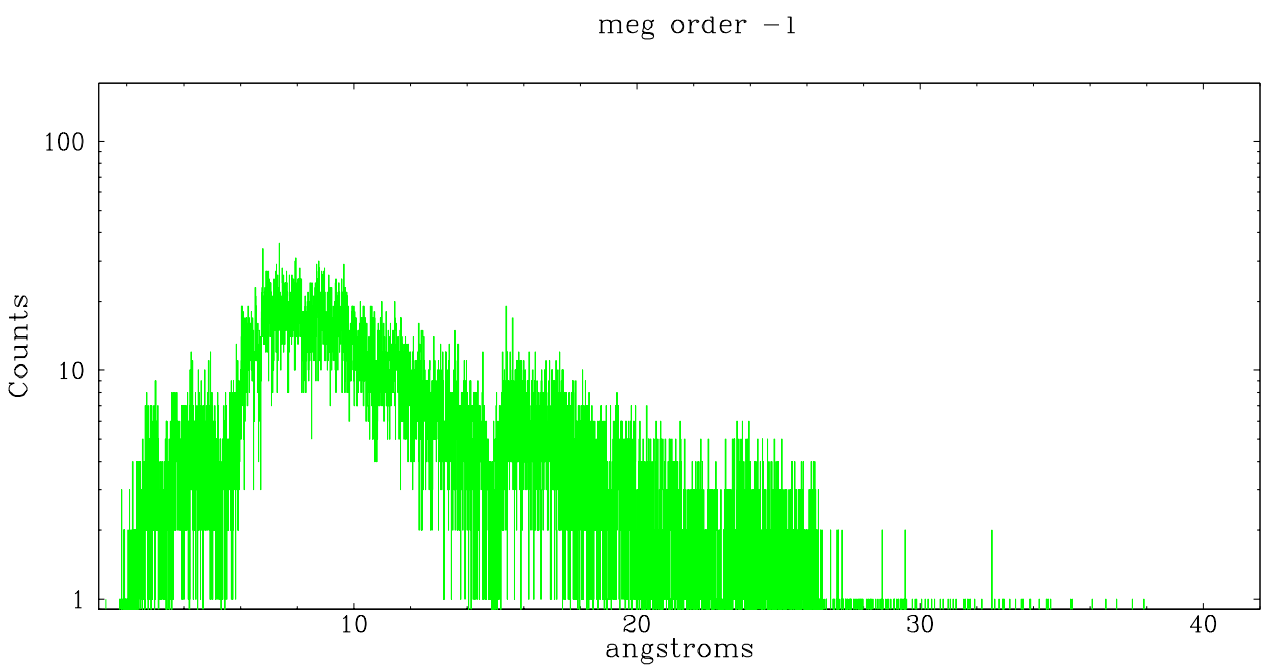
Spot Image MEG

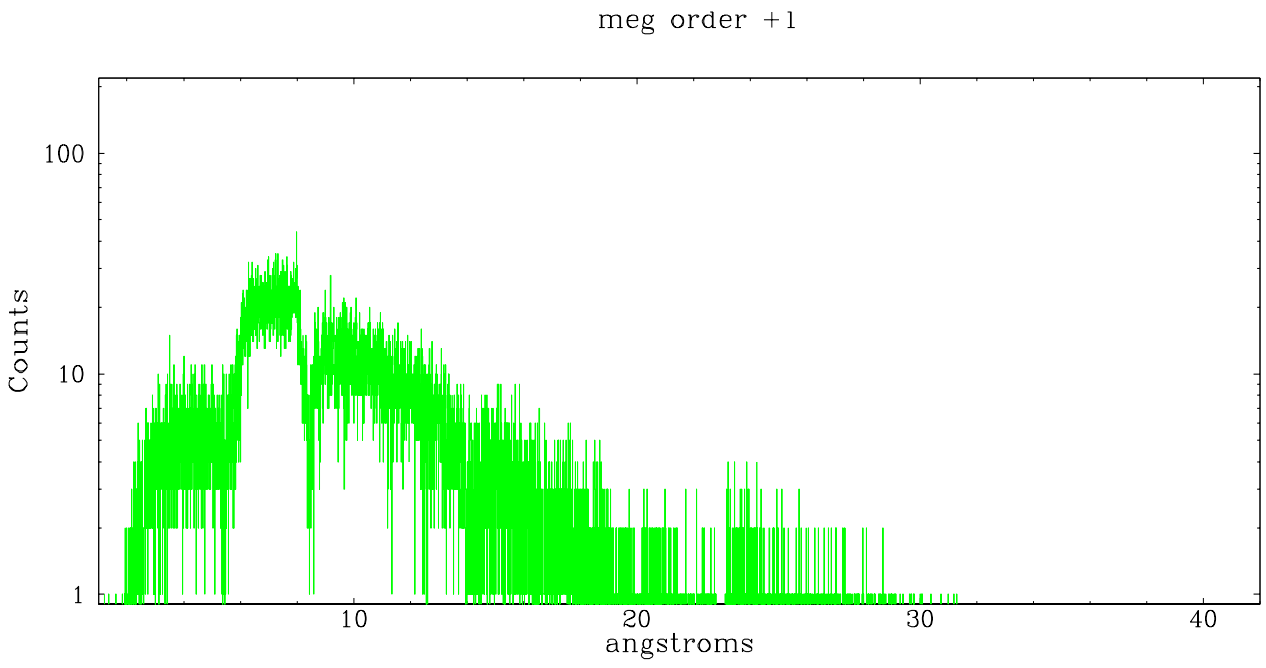


Full Detector MEG

	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	2494	1018	31493	6164	27489	798	1831




meg order −1
100
10
1
Counts
10
20
30
40
angstroms


meg order +1
100
10
1
Counts
10
20
30
40
angstroms

A Summary

A.1 Status

V&V Scientist	Joy Nichols
V&V Date (YYYY-MM-DD)	2007.08.01
V&V Edition	1
V&V Disposition and Status	OK
V&V Charge Time	25.83

A.2 Comments

```
Zeroth order piled up and there is visible structure in the AGN.
Standard data processing software did not correctly
locate the zeroth order. Manual intervention was used
to input the correct sky coordinates (x=4099.63; y=4023.37) 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. 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.
```