V&V Reference Report
L2 ASCDS Version : 7.6.9

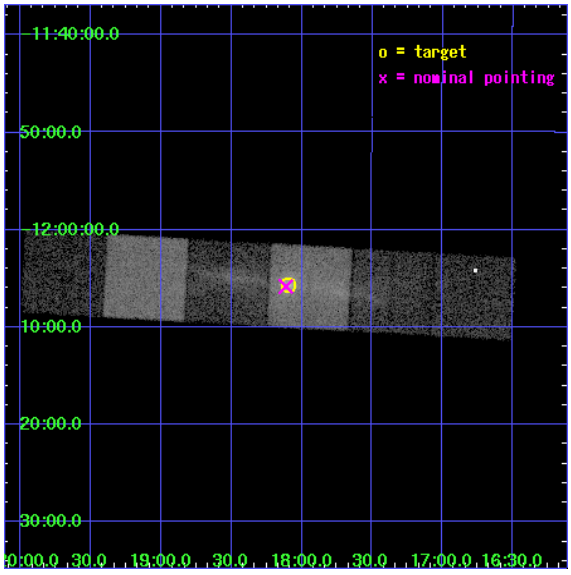
Observation 2331 - L2 Version 001
Chandra X-Ray Center

L2 Processing Date : Dec 28 2006

Contents

1 Front

seq_num	800174
obs_id	2331
title	ACIS-S/HETG OBSERVATIONS OF THE CENTRAL REGION OF THE HYDRA A CLUSTER OF GALAXIES
observer	Dr. J. Jernigan
object	HYDRA A
dtycycle	0
cycle	P
ra_targ	139.52375
dec_targ	-12.095833
ra_nom	139.52809426103
dec_nom	-12.097314705688
roll_nom	3.1924733071272
revision	2
ontime	9638.4000089765
livetime	9516.3527845151
ontime4	9638.4000089765
ontime5	9638.4000089765
ontime6	9638.4000089765
ontime7	9638.4000089765
ontime8	9638.4000089765
ontime9	9638.3646189719
l2events	106591

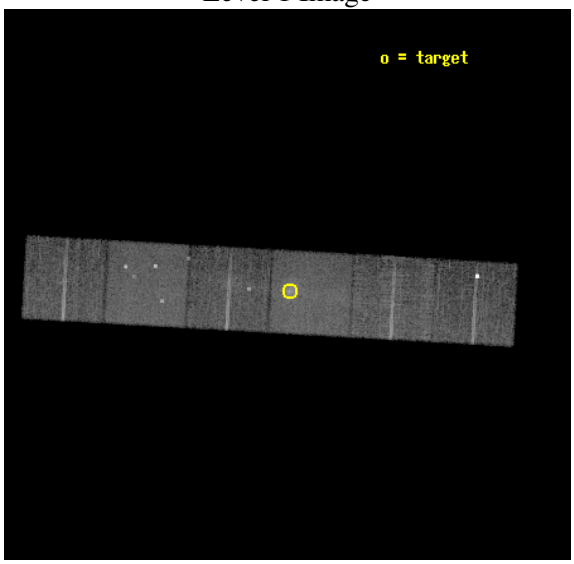


2 OBI

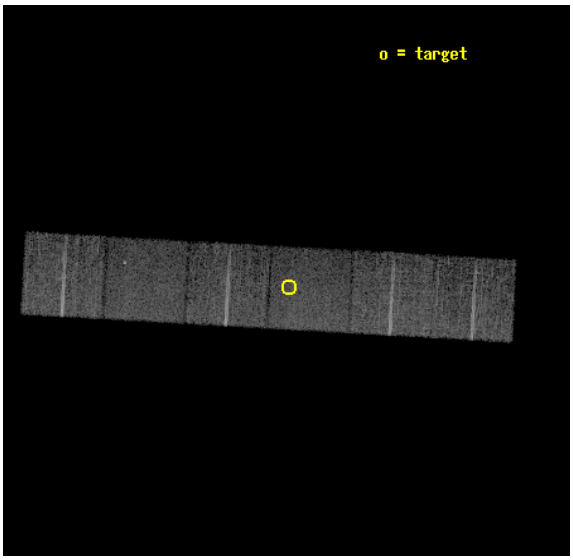
2.1 OBI

2.1.1 Images

Level 1 Image

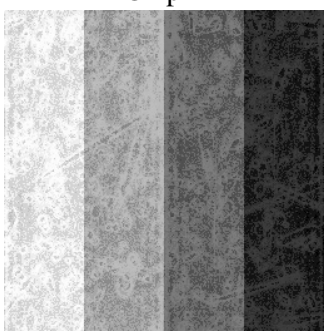


Level 1 Bad Events

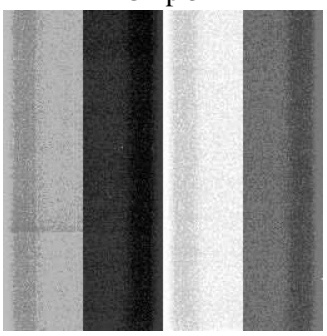


2.1.2 Bias

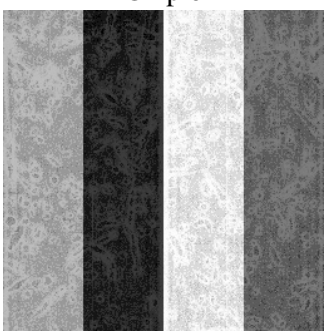
Chip 4



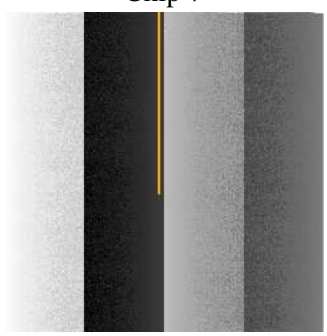
Chip 5



Chip 6



Chip 7



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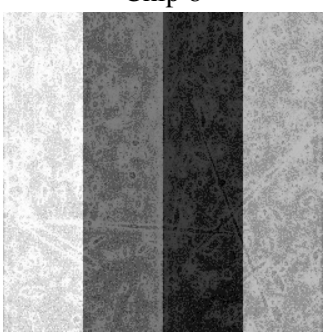
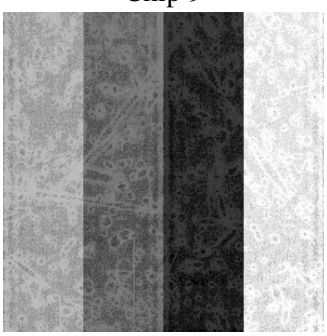


Chip 9



2.1.3 Parameters

obi_num	0
ascdsver	7.6.9
caldbver	3.2.3
date	2006-11-06T12:32:26
revision	2

sched_exp_time	9700.000000
ontime	9641.9775415808
ontime4	9641.9775216579
ontime5	9641.9775415808
ontime6	9641.9775216579
ontime7	9641.9775415808
ontime8	9641.9775216579
ontime9	9641.9775415808
l1events	444751

2.1.4 Events

	ccd 4	ccd 5	ccd 6	ccd 7	ccd 8	ccd 9
level 1 events	64768	83947	64754	85834	75836	69612
rejected events	57649	45489	52322	46676	58685	51916
rejected %	89%	54%	80%	54%	77%	74%

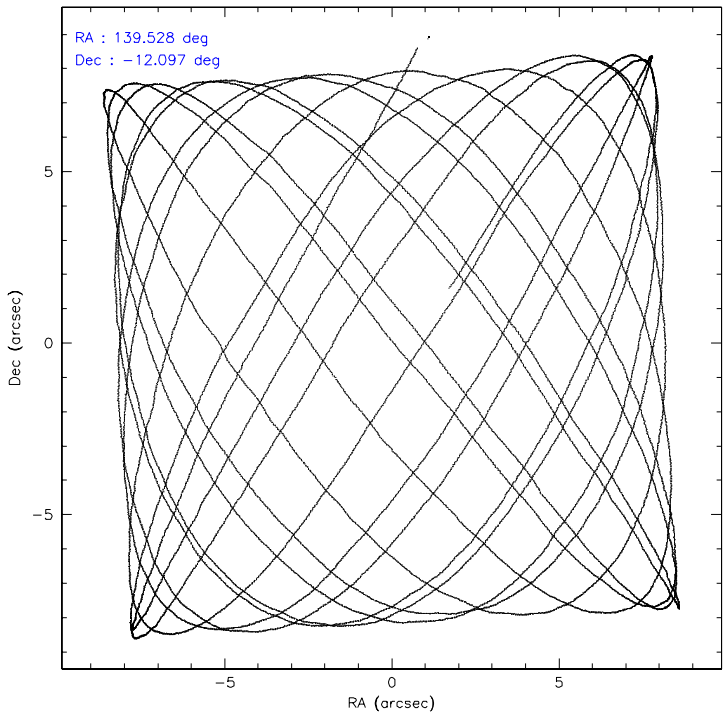
	ccd 4	ccd 5	ccd 6	ccd 7	ccd 8	ccd 9
grade 0 events	3011	5534	7460	4109	6789	7705
	4%	6%	11%	4%	8%	11%
grade 1 events	31	392	43	42	46	37
	0%	0%	0%	0%	0%	0%
grade 2 events	1647	11051	1888	9942	3358	7209
	2%	13%	2%	11%	4%	10%
grade 3 events	681	927	798	2609	1605	749
	1%	1%	1%	3%	2%	1%
grade 4 events	614	870	854	2618	1519	671
	0%	1%	1%	3%	2%	0%
grade 5 events	2105	3990	2391	5046	3191	2480
	3%	4%	3%	5%	4%	3%
grade 6 events	1168	20088	1435	19894	3881	1368
	1%	23%	2%	23%	5%	1%
grade 7 events	55511	41095	49885	41574	55447	49393
	85%	48%	77%	48%	73%	70%

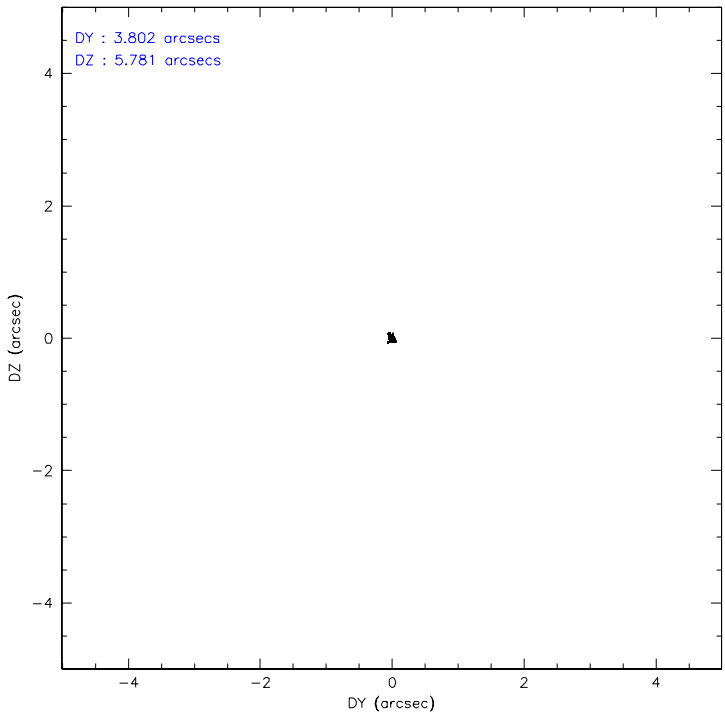
2.2 Compared Parameters

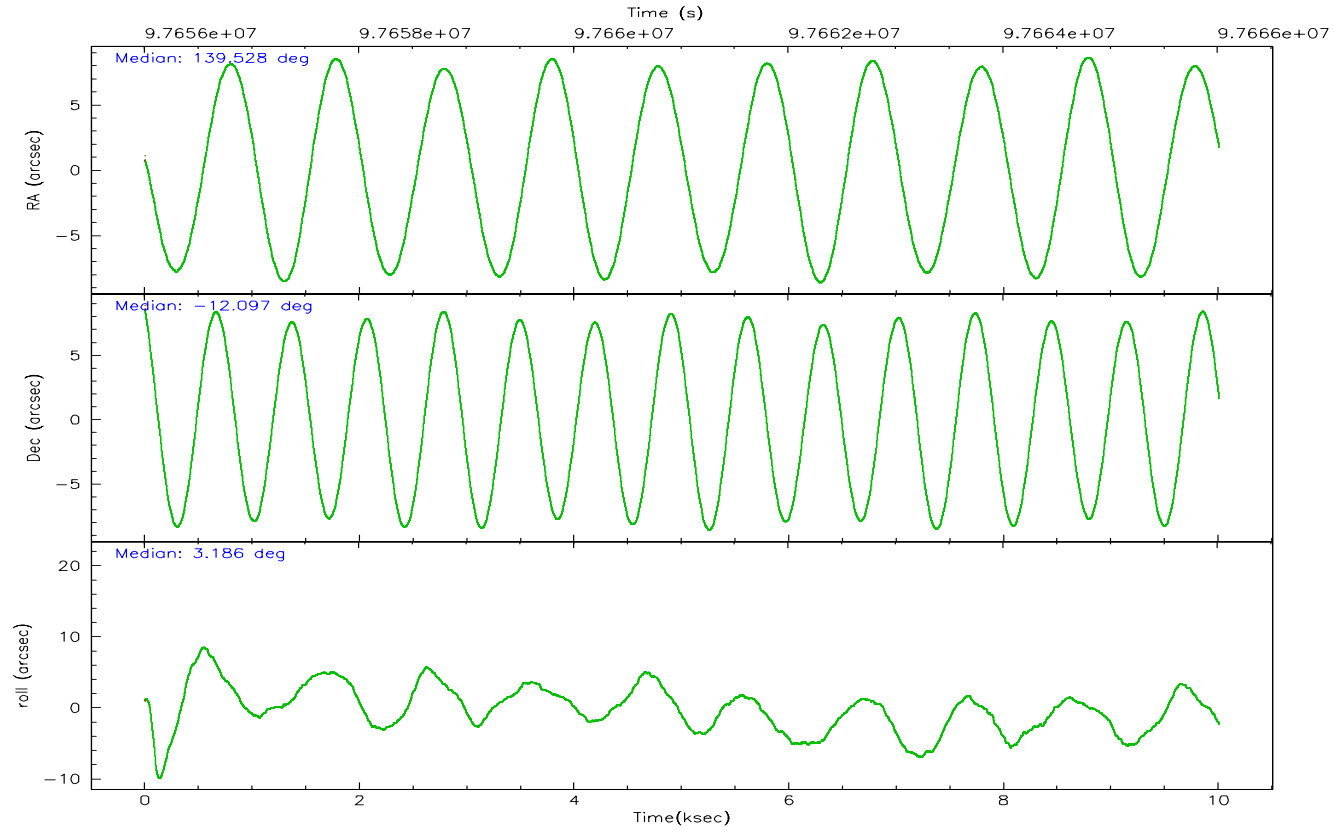
Parameter	Planned	Actual
Instrument	ACIS	ACIS
Detector	ACIS-456789	ACIS-456789
Grating	HETG	HETG
Data mode	FAINT	FAINT
Observation mode	POINTING	POINTING
Pointing RA	139.504853	139.5280942610297
Pointing Dec	-12.112497	-12.09731470568775
Pointing Roll	3.030971	3.192473307127168
SIM focus pos (mm)	-0.684267	-0.6828225247311905
SIM defocus (mm)	0	0.001444936568705701
SIM translation stage pos (mm)	-190.132523	-190.1400660498719
SIM translation stage offset (mm)	0	0.00754346686406393
Observation start time	97656319.184000	97655305.527536
Observation start date	2001-02-04T06:44:15	2001-02-04T06:28:25
Observation end time	97666019.184000	97667312.890498
Observation end date	2001-02-04T09:25:55	2001-02-04T09:48:32
Read mode	TIMED	TIMED

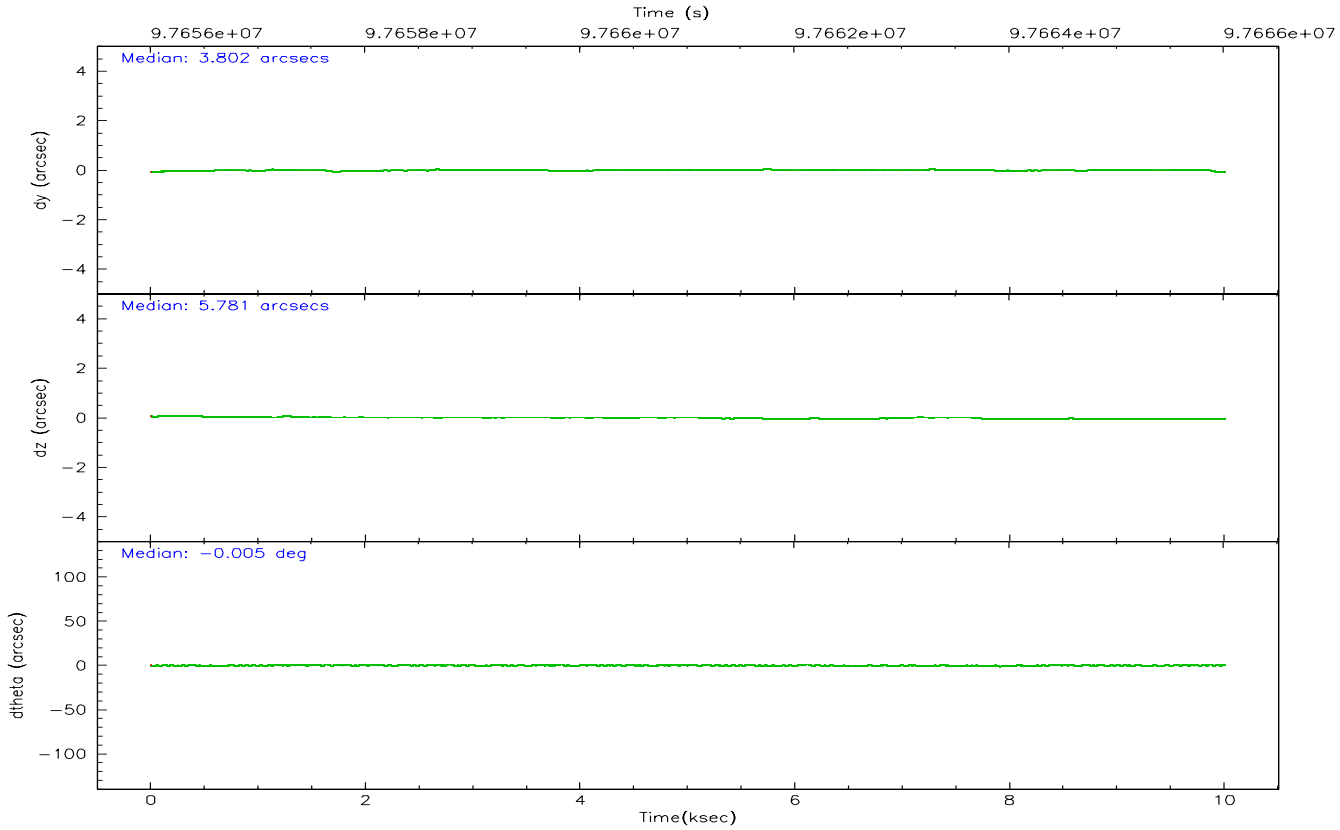
Parameter	Planned	Actual
Obspar format version number	6	6
Obspar file type	PREDICTED	ACTUAL
Obspar update status	NONE	UPDATED
Number of optional ACIS chips dropped	0	0
On-chip summing requested	N	N
Subarray requested	NONE	NONE
Alternating exposures requested	N	N
Primary exposure time	0.000000	3.2

2.3 Aspect


RA : 139.528 deg
Dec : −12.097 deg
Dec (arcsec)
RA (arcsec)
5
0
−5
−5
0
5


DY : 3.802 arcsecs
DZ : 5.781 arcsecs
DZ (arcsec)
DY (arcsec)
4
2
0
−2
−4
−4
−2
0
2
4


Time (s)
9.7656e+07
9.7658e+07
9.766e+07
9.7662e+07
9.7664e+07
9.7666e+07
Median: 139.528 deg
RA (arcsec)
Median: −12.097 deg
Dec (arcsec)
Median: 3.186 deg
roll (arcsec)
Time(ksec)

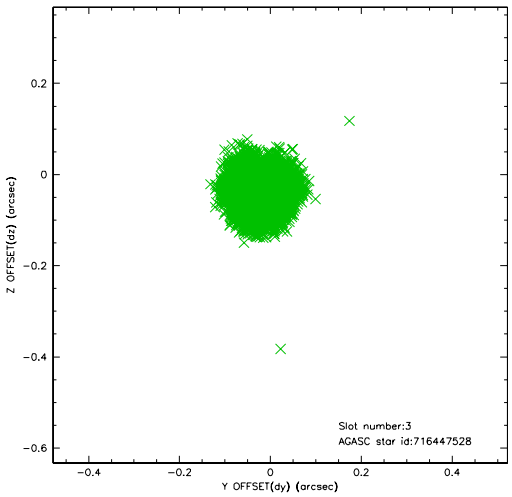

Time (s)
9.7656e+07
9.7658e+07
9.766e+07
9.7662e+07
9.7664e+07
9.7666e+07
Median: 3.802 arcsecs
dy (arcsec)
Median: 5.781 arcsecs
dz (arcsec)
Median: −0.005 deg
dtheta (arcsec)
Time(ksec)

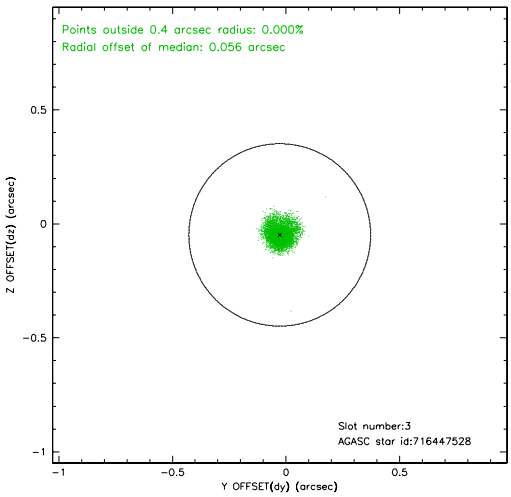
Slot Statistics

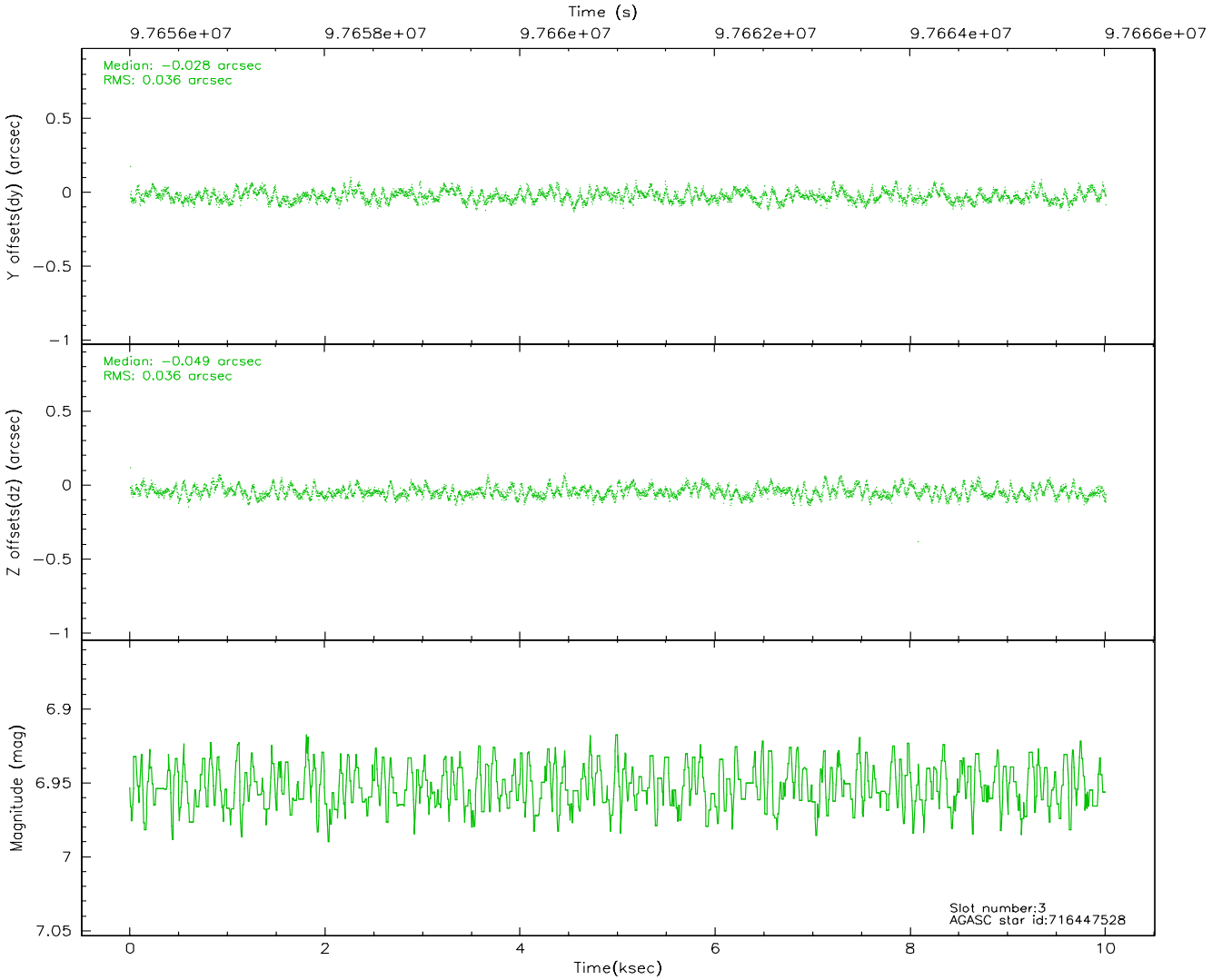
slot	status	id	mag	n_pts	med_dy	med_dz	dr1	dr2	ra	dec	mean_y	mean_z
0	FID	ACIS-S-2	7.12	2442	-0.016	0.023	0.007	0.010	0.000000	0.000000	-756.44	-1726.90
1	FID	ACIS-S-4	7.20	2442	-0.041	0.002	0.006	0.011	0.000000	0.000000	2156.53	181.08
2	FID	ACIS-S-5	7.24	2442	0.026	-0.016	0.007	0.011	0.000000	0.000000	-1808.59	175.25
3	GUIDE	716447528	6.95	4882	-0.028	-0.049	0.055	0.088	139.371683	-11.961966	-439.49	565.64
4	GUIDE	716447608	8.44	4883	0.027	0.032	0.067	0.111	139.107687	-11.923612	-1360.93	751.95
5	GUIDE	716578656	9.09	4878	-0.013	0.019	0.093	0.147	140.216745	-12.561448	2412.65	-1749.24
6	GUIDE	716578888	9.25	4881	-0.073	-0.041	0.082	0.131	139.858876	-11.605741	1343.72	1754.67
7	GUIDE	716452568	9.32	4881	0.076	0.039	0.075	0.122	139.317316	-12.008019	-638.96	410.57

2.4 Star Slots

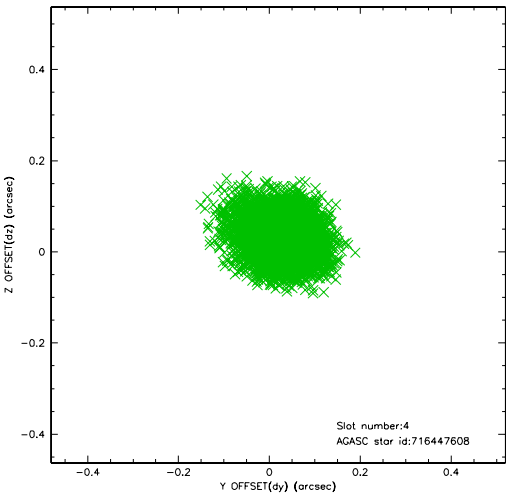
2.4.1 Slot 3

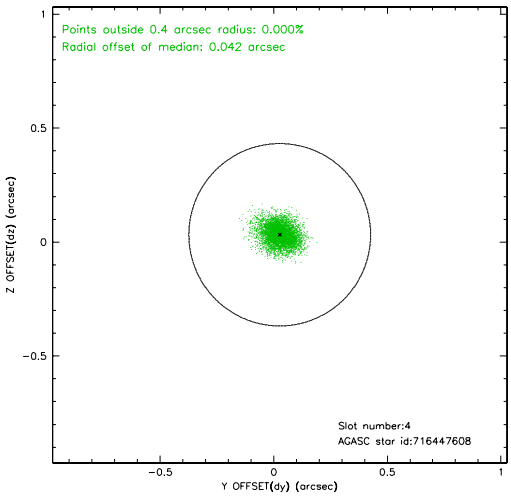


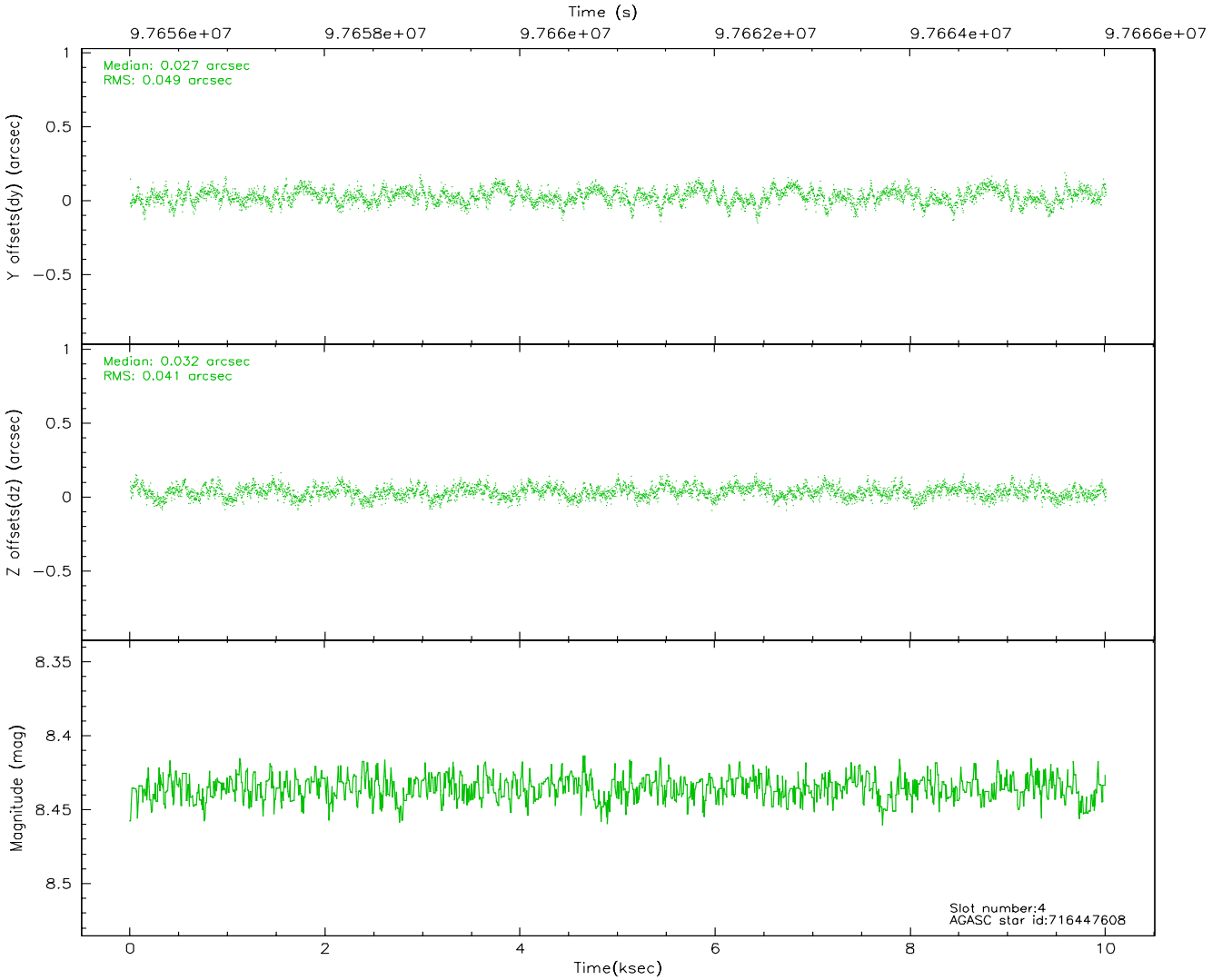




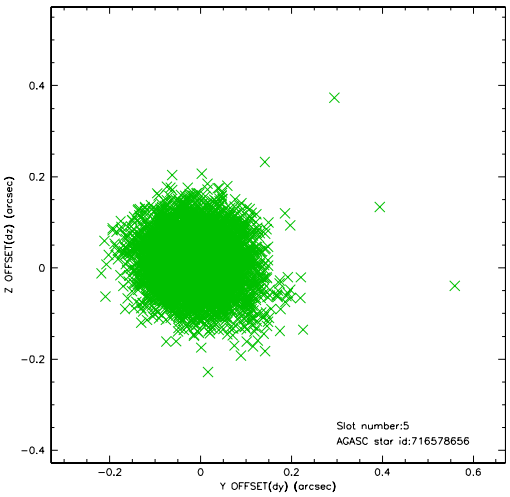
2.4.2 Slot 4

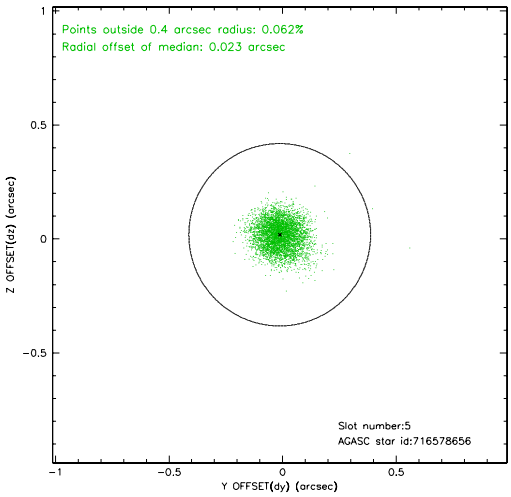

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number:4
AGASC star id:716447608

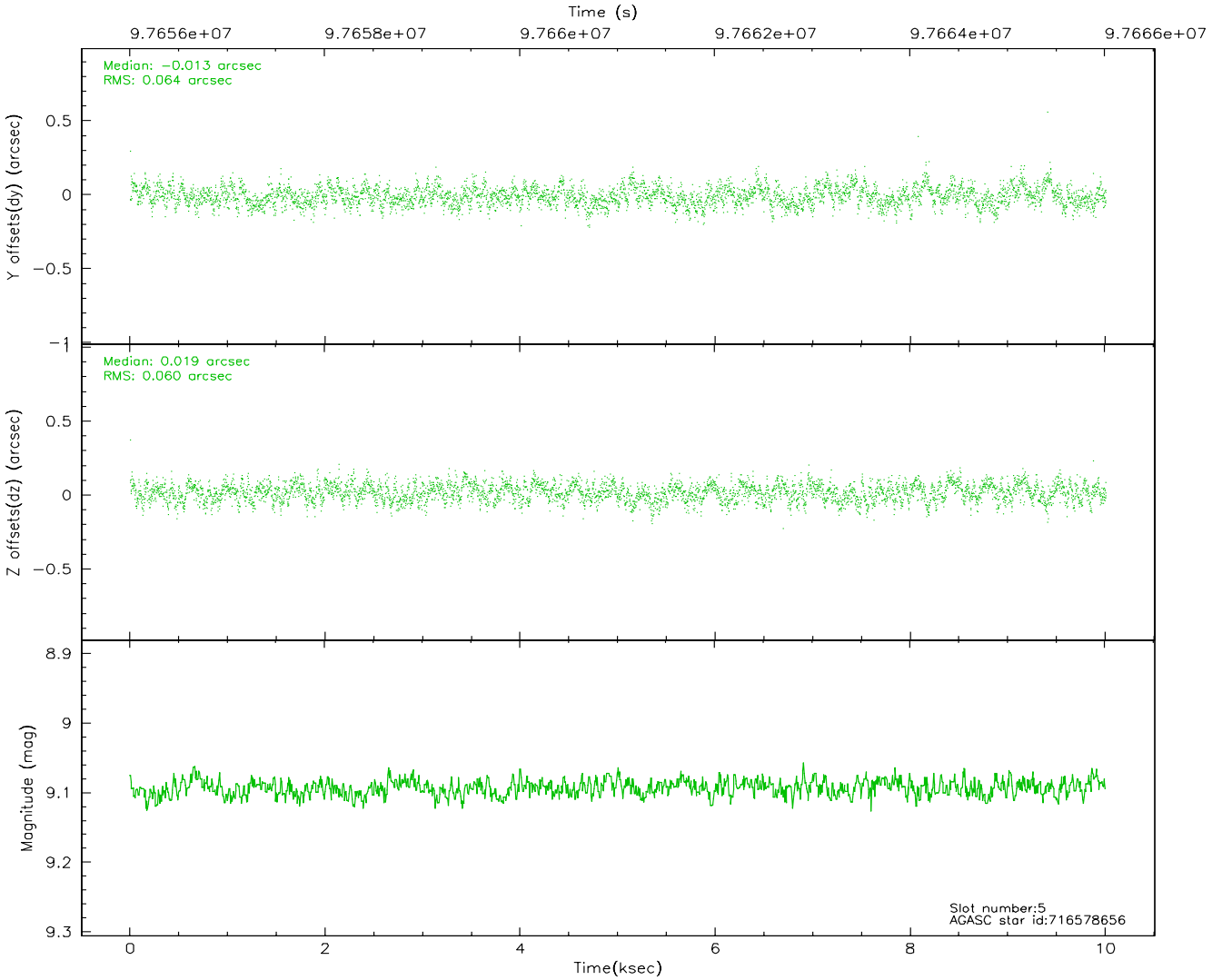

Points outside 0.4 arcsec radius: 0.000%
Radial offset of median: 0.042 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number:4
AGASC star id:716447608


Time (s)
Median: 0.027 arcsec
RMS: 0.049 arcsec
Y offsets(dy) (arcsec)
Median: 0.032 arcsec
RMS: 0.041 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number:4
AGASC star id:716447608
Time(ksec)

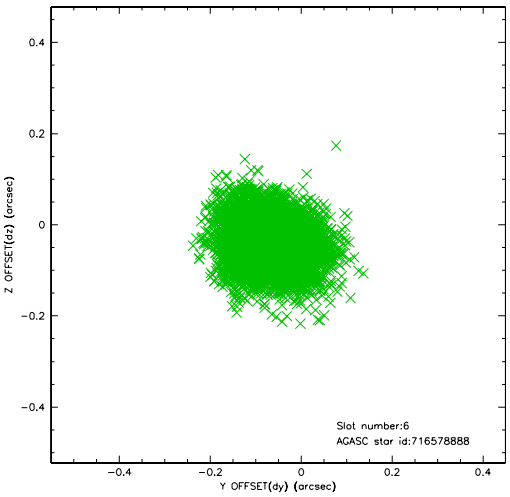
2.4.3 Slot 5

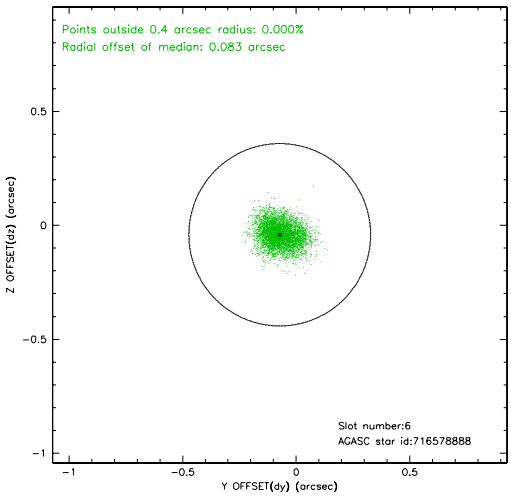

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number:5
AGASC star id:716578656

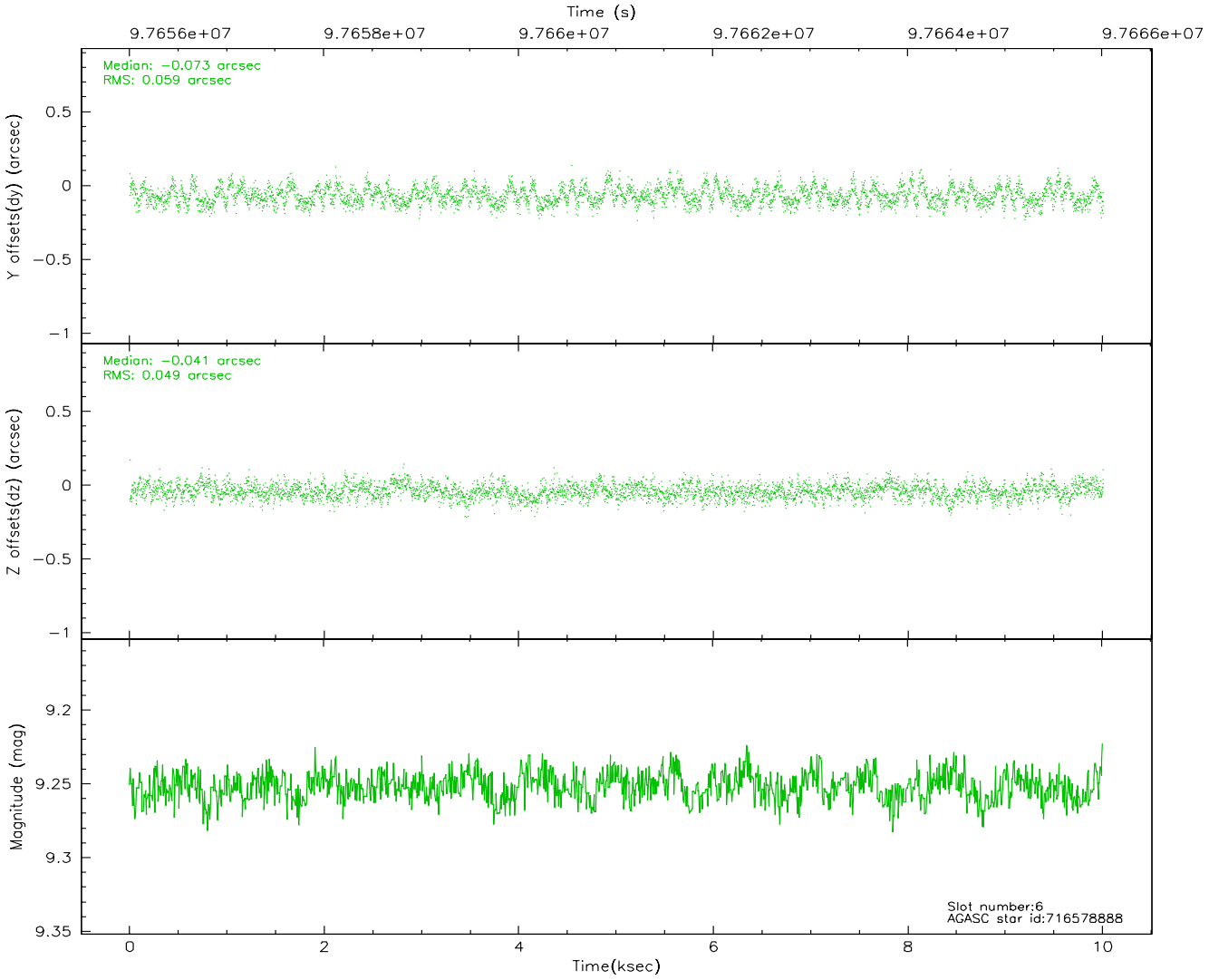

Points outside 0.4 arcsec radius: 0.062%
Radial offset of median: 0.023 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number:5
AGASC star id:716578656


Time (s)
Median: −0.013 arcsec
RMS: 0.064 arcsec
Y offsets(dy) (arcsec)
Median: 0.019 arcsec
RMS: 0.060 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number:5
AGASC star id:716578656
Time(ksec)

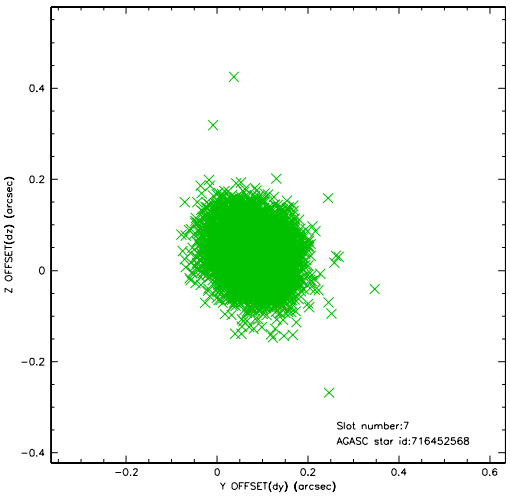
2.4.4 Slot 6

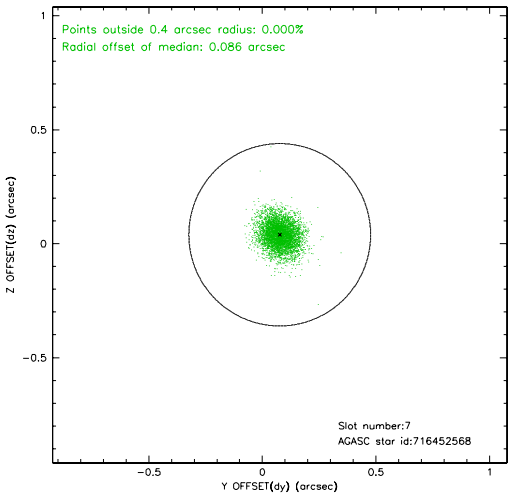

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number:6
AGASC star id:716578888

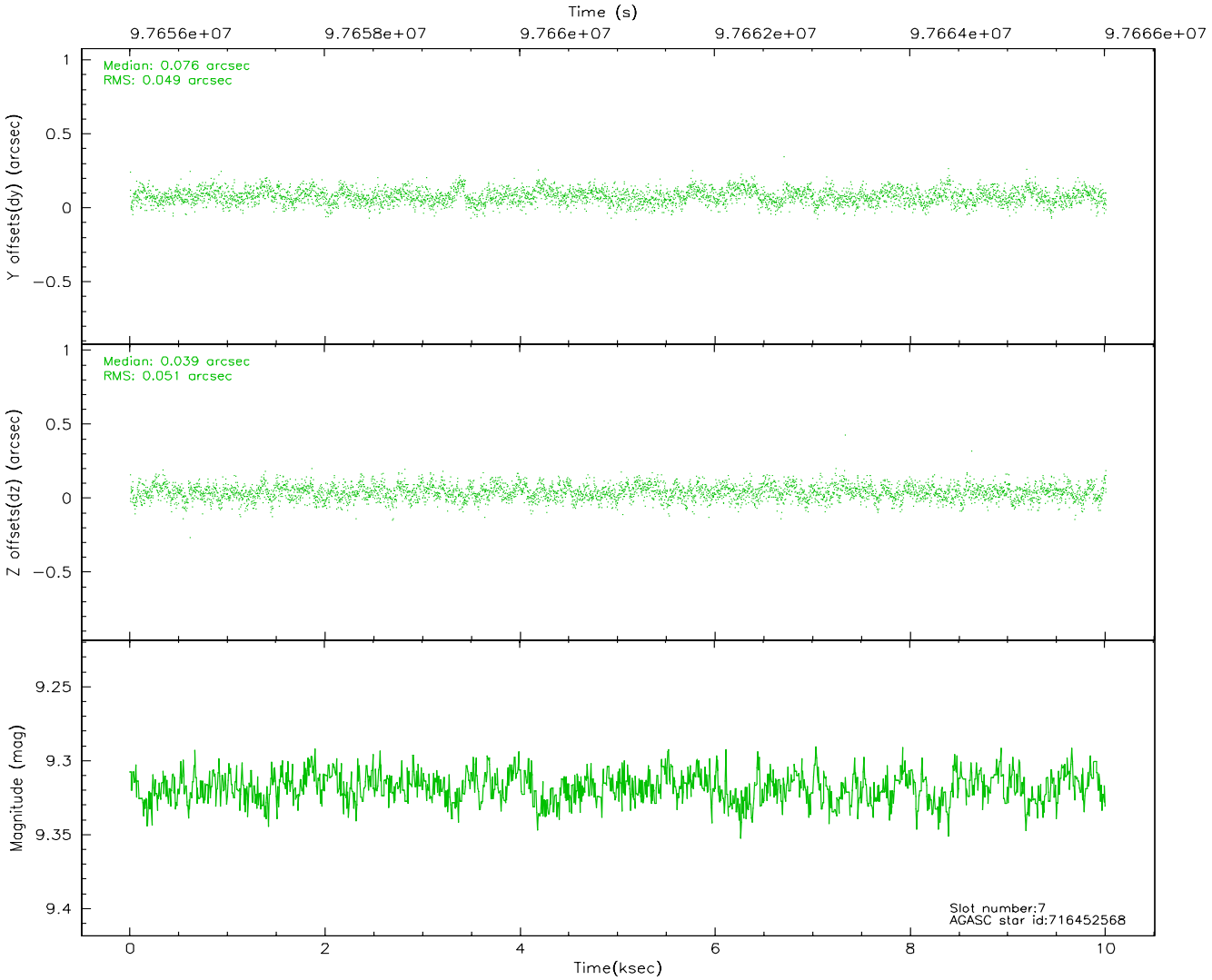

Points outside 0.4 arcsec radius: 0.000%
Radial offset of median: 0.083 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number:6
AGASC star id:716578888


Time (s)
Median: −0.073 arcsec
RMS: 0.059 arcsec
Y offsets(dy) (arcsec)
Median: −0.041 arcsec
RMS: 0.049 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number:6
AGASC star id:716578888
Time(ksec)

2.4.5 Slot 7

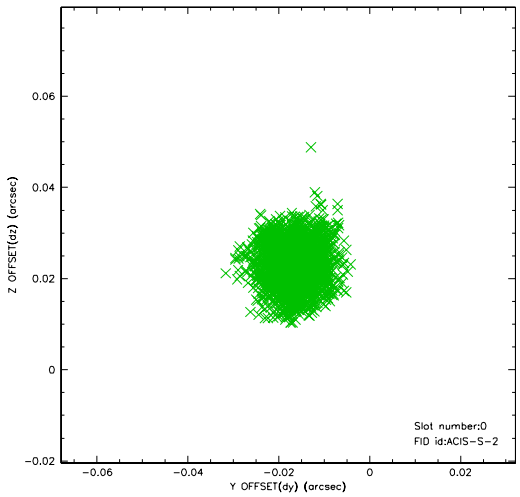

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number:7
AGASC star id:716452568

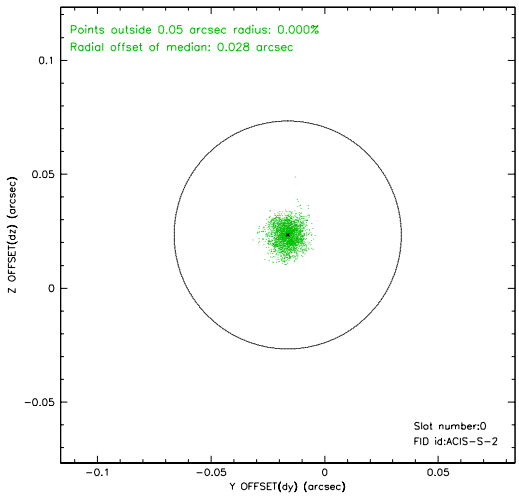

Points outside 0.4 arcsec radius: 0.000%
Radial offset of median: 0.086 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number:7
AGASC star id:716452568

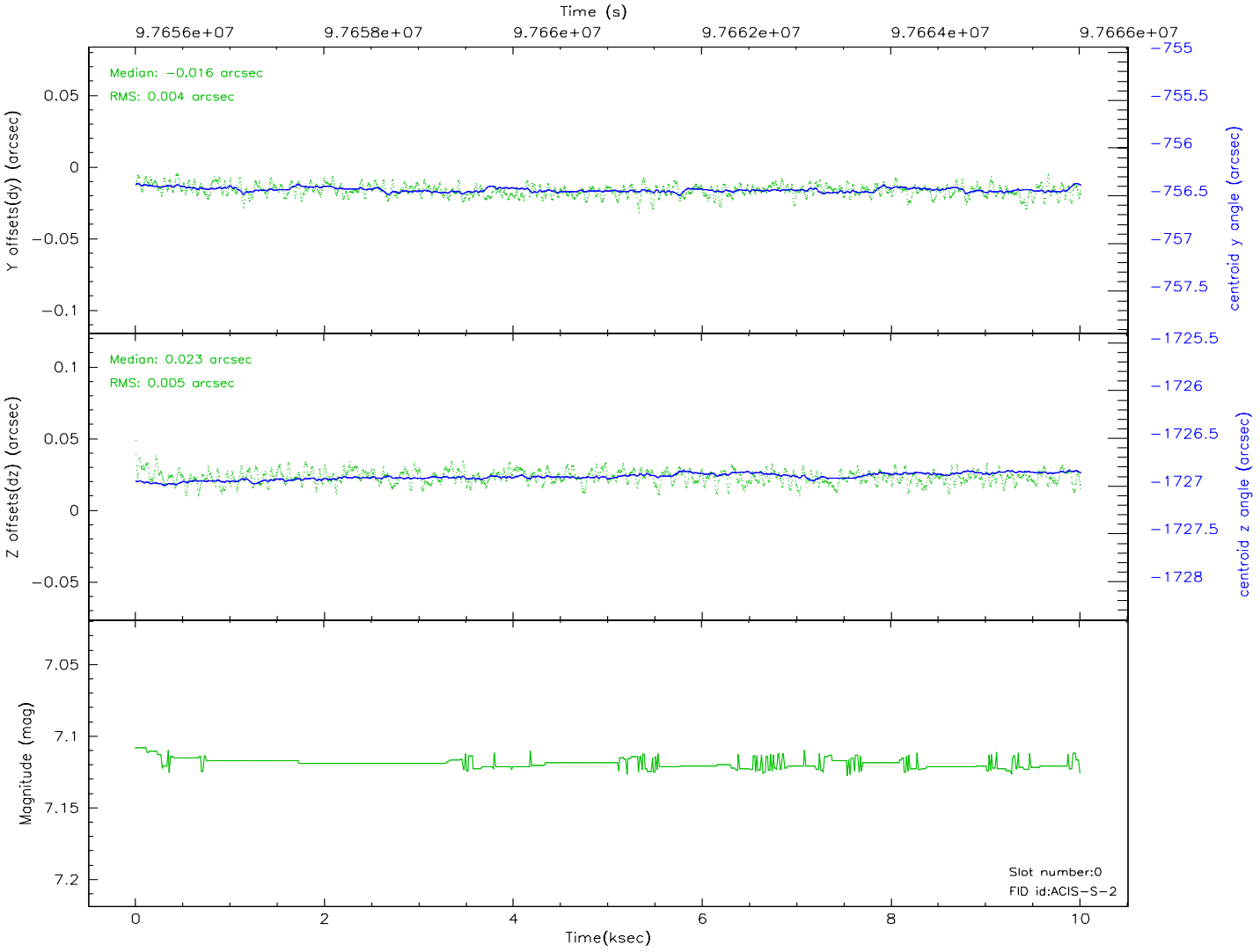

Time (s)
Median: 0.076 arcsec
RMS: 0.049 arcsec
Y offsets(dy) (arcsec)
Median: 0.039 arcsec
RMS: 0.051 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number:7
AGASC star id:716452568
Time(ksec)

2.5 FID Slots

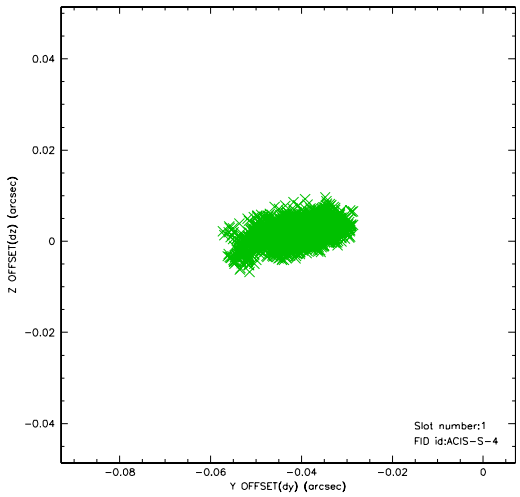
2.5.1 Slot 0

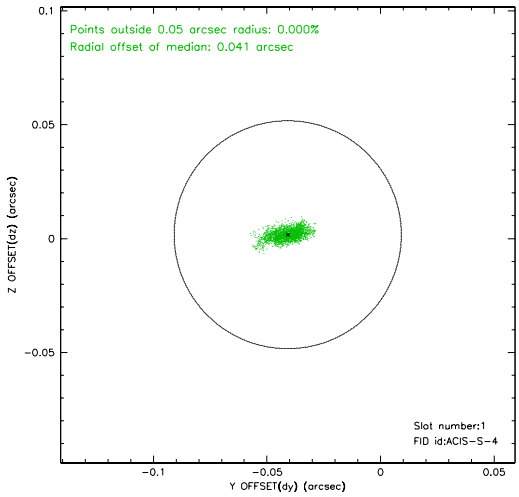


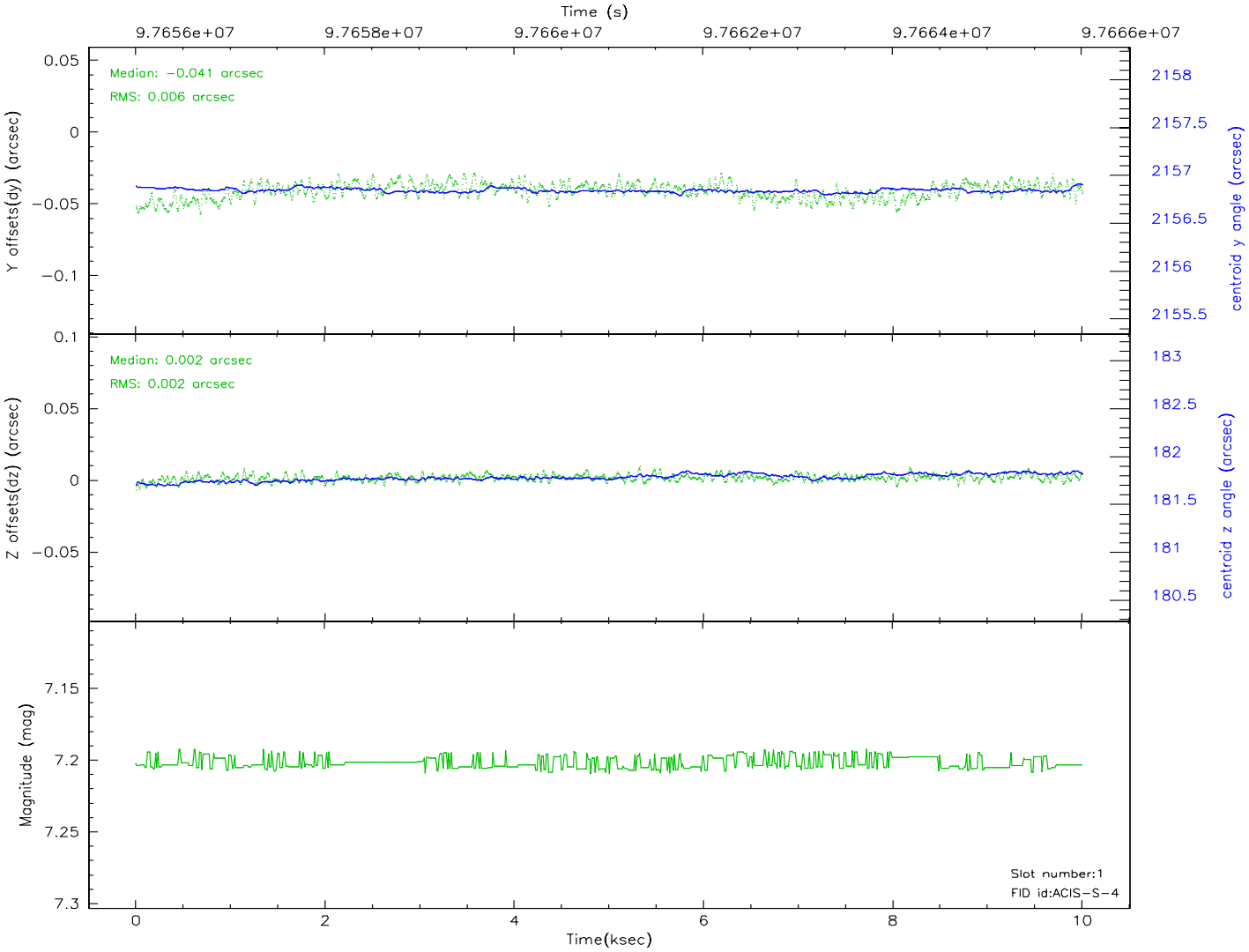




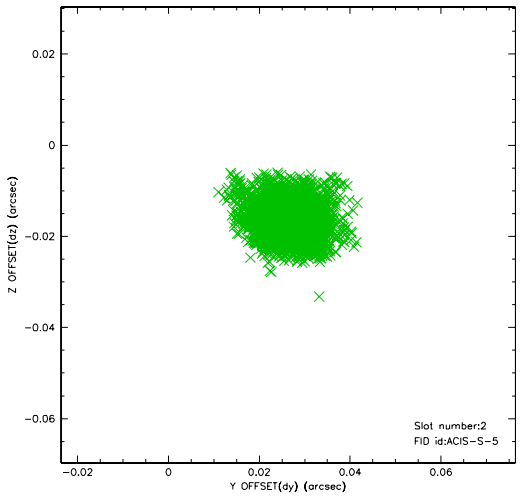
2.5.2 Slot 1

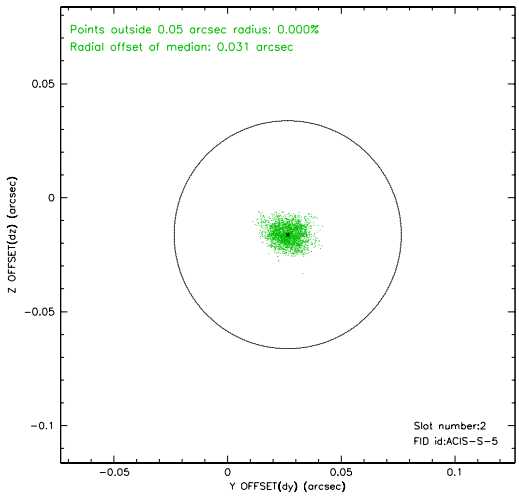

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number:1
FID id:ACIS-S-4

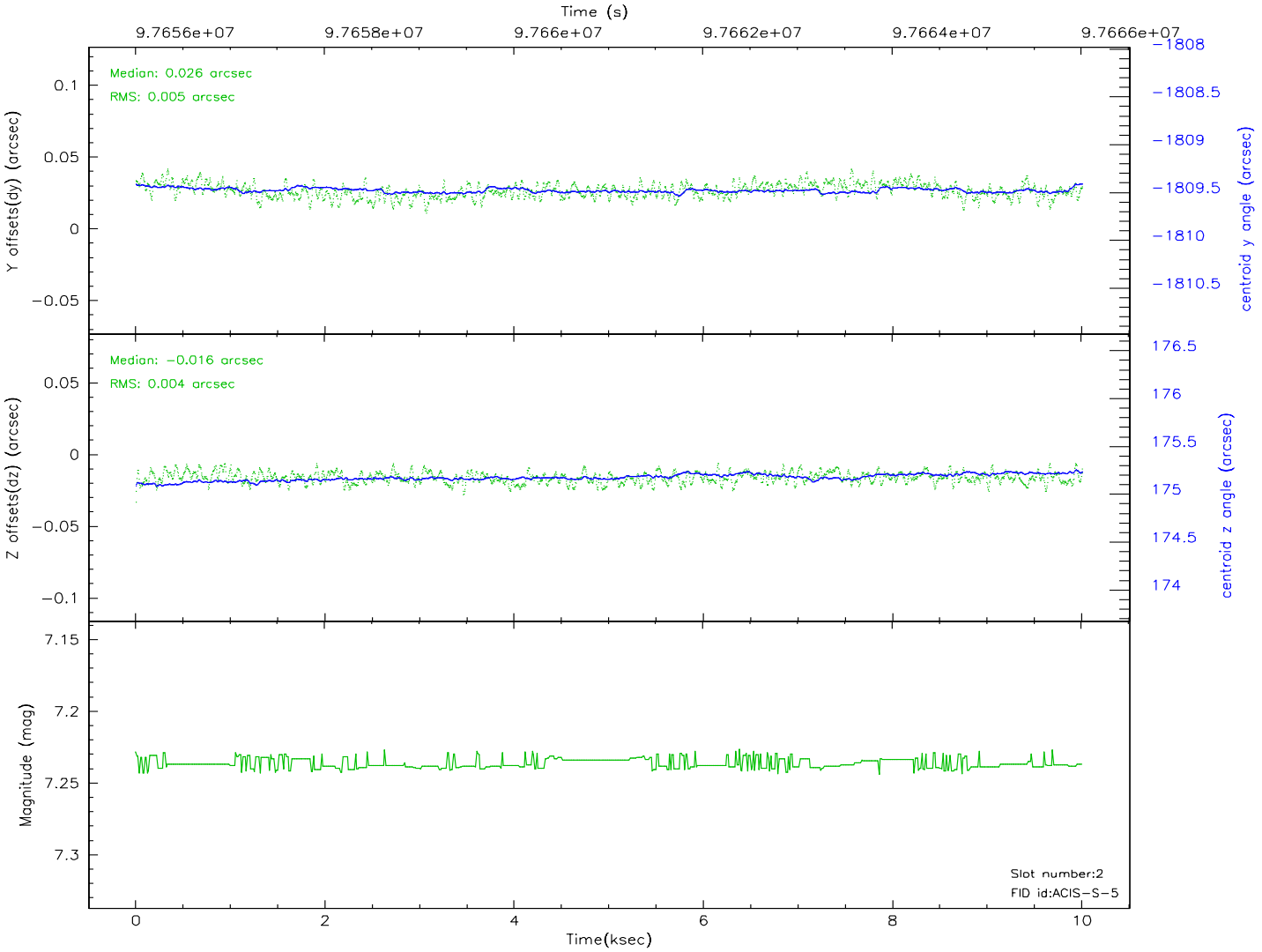

Points outside 0.05 arcsec radius: 0.000%
Radial offset of median: 0.041 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number:1
FID id:ACIS-S-4


Time (s)
Median: −0.041 arcsec
RMS: 0.006 arcsec
Y offsets(dy) (arcsec)
centroid y angle (arcsec)
Median: 0.002 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

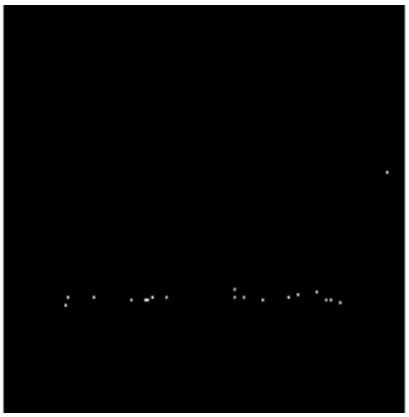

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number:2
FID id:ACIS-S-5


Points outside 0.05 arcsec radius: 0.000%
Radial offset of median: 0.031 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number:2
FID id:ACIS-S-5

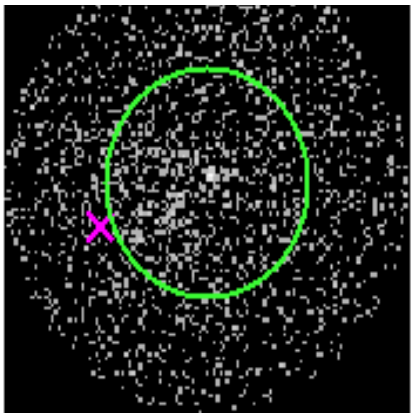

Time (s)
Median: 0.026 arcsec
RMS: 0.005 arcsec
Y offsets(dy) (arcsec)
centroid y angle (arcsec)
Median: −0.016 arcsec
RMS: 0.004 arcsec
Z offsets(dz) (arcsec)
centroid z angle (arcsec)
Magnitude (mag)
Slot number:2
FID id:ACIS-S-5
Time(ksec)

3 Gratings

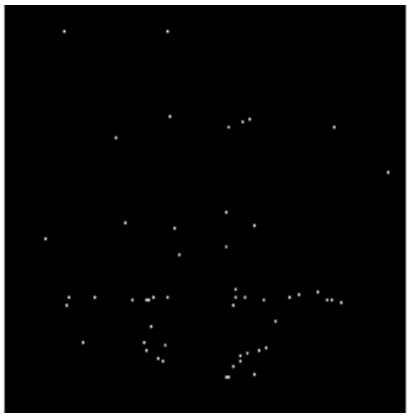
3.1 HEG Arm



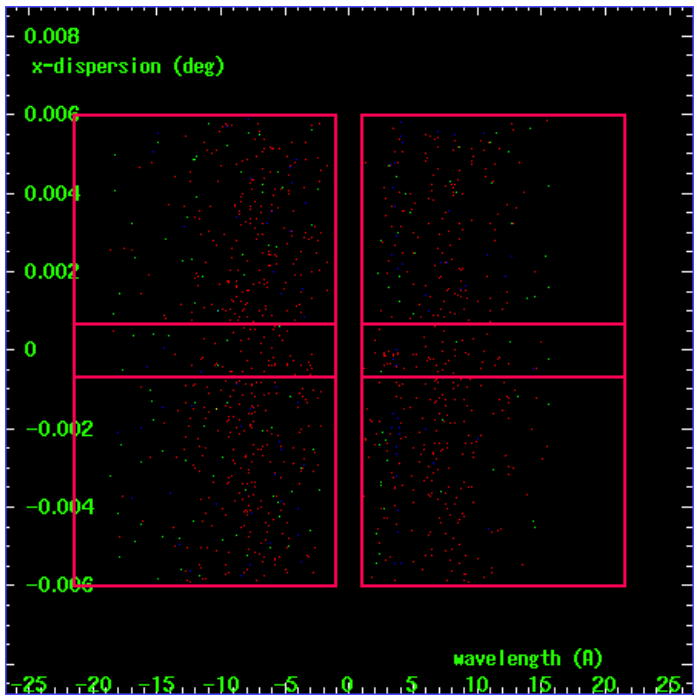
HEG Order Sort 123



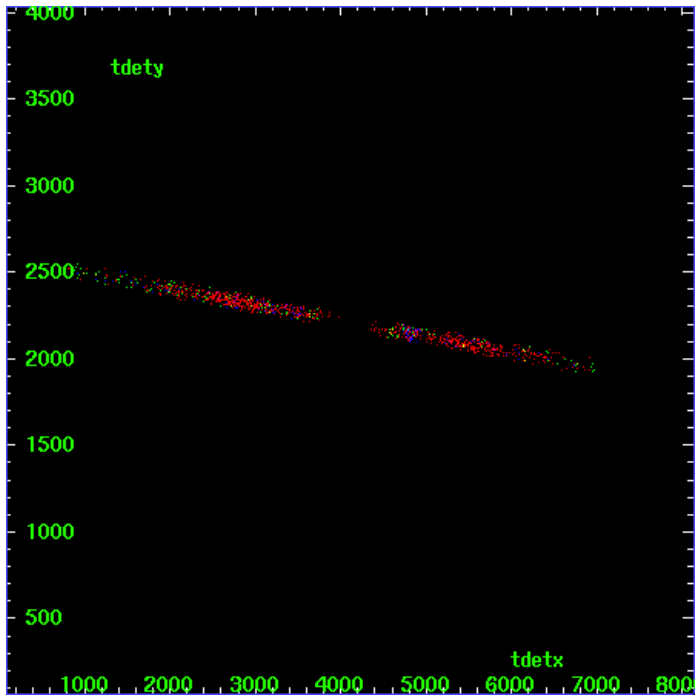
HEG Zero Order



HEG Order Sort ALL

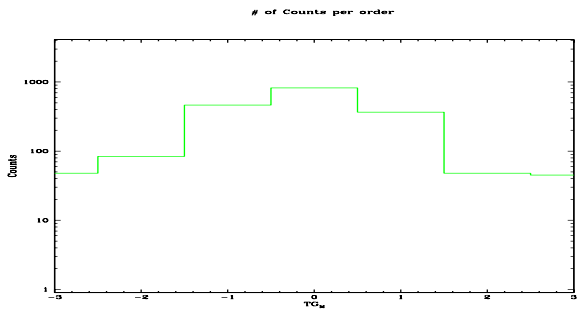


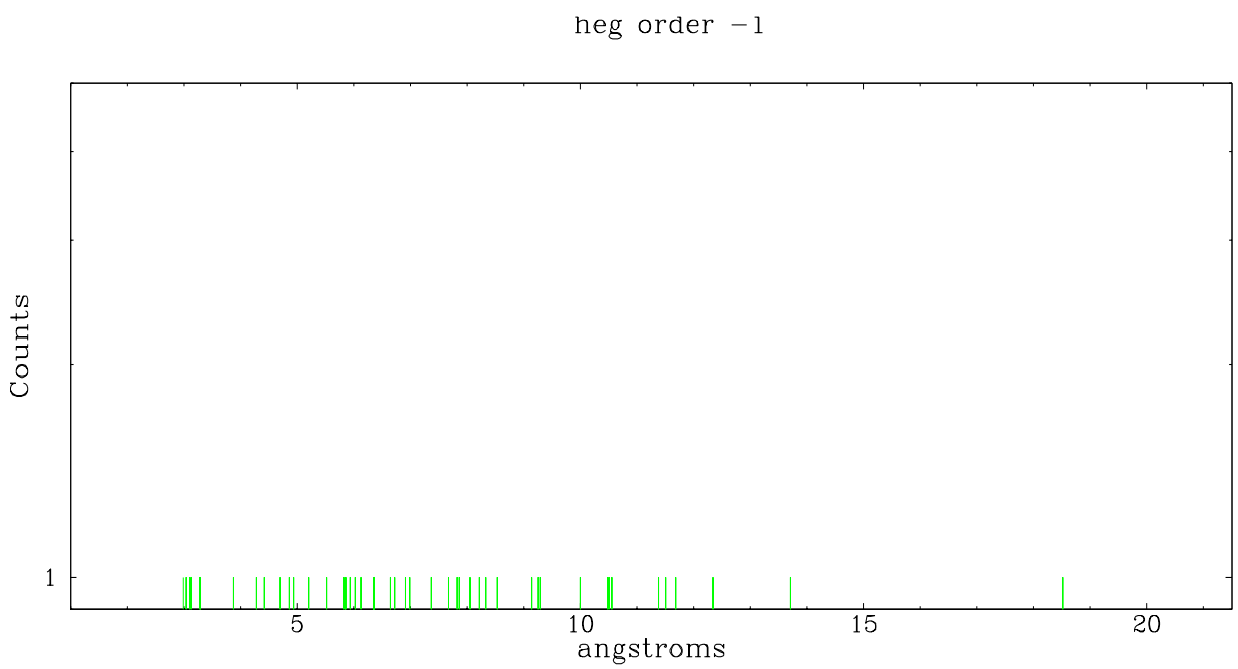
Spot Image HEG

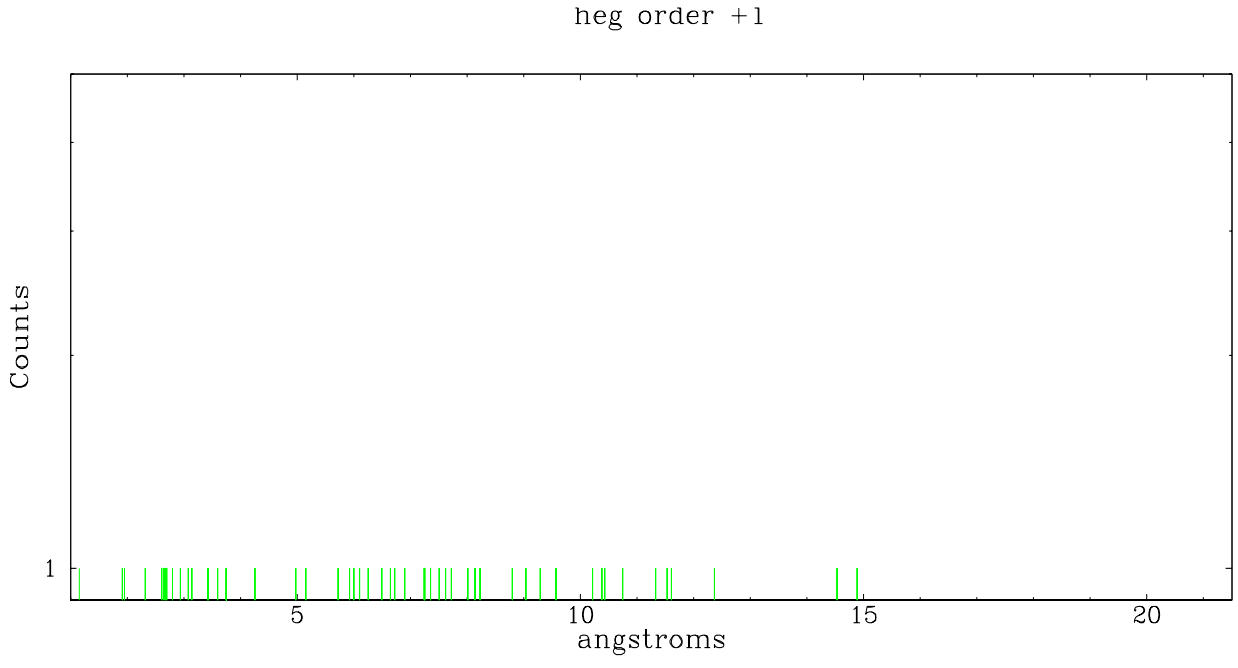


Full Detector HEG

	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	48	84	463	819	365	48	45

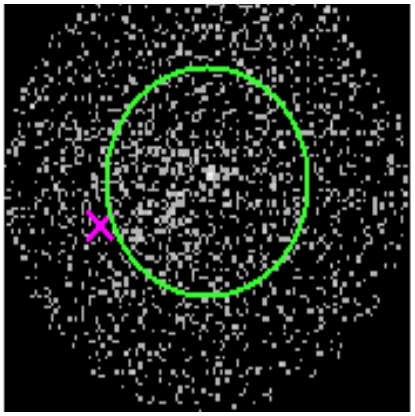



heg order −1
Counts
1
5
10
15
20
angstroms


heg order +1
Counts
1
5
10
15
20
angstroms

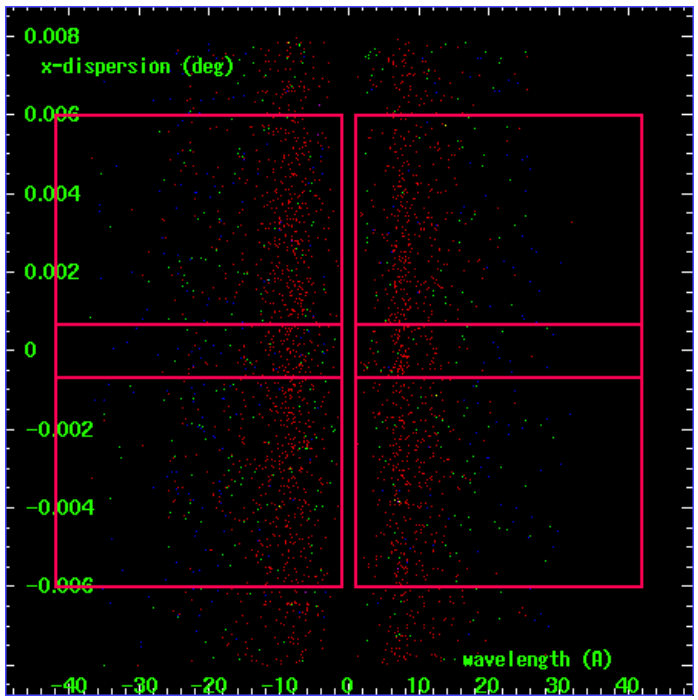
3.2 MEG Arm

MEG Order Sort 123

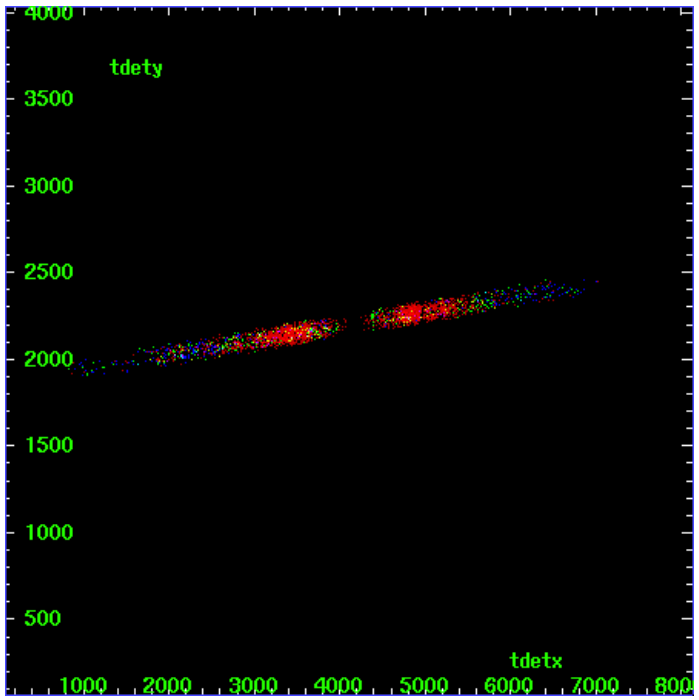


MEG Zero Order

MEG Order Sort ALL

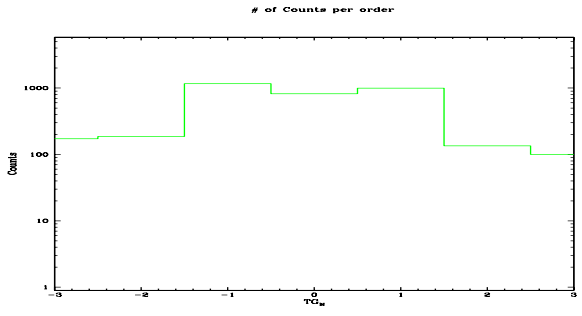


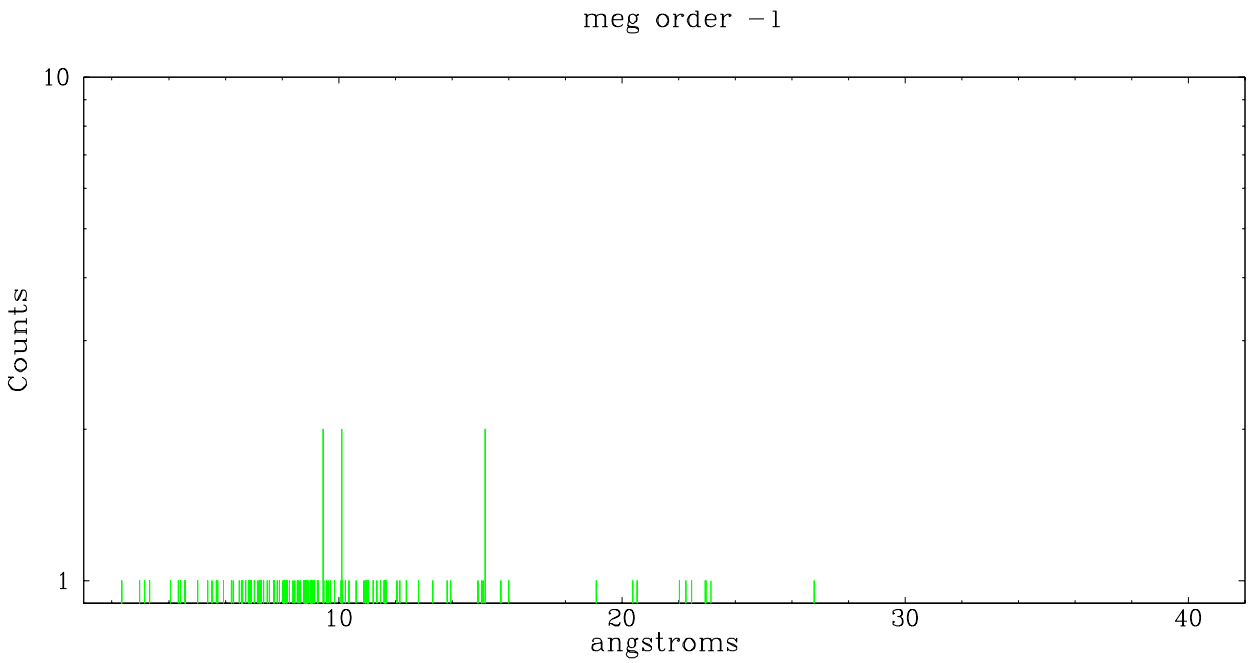
Spot Image MEG

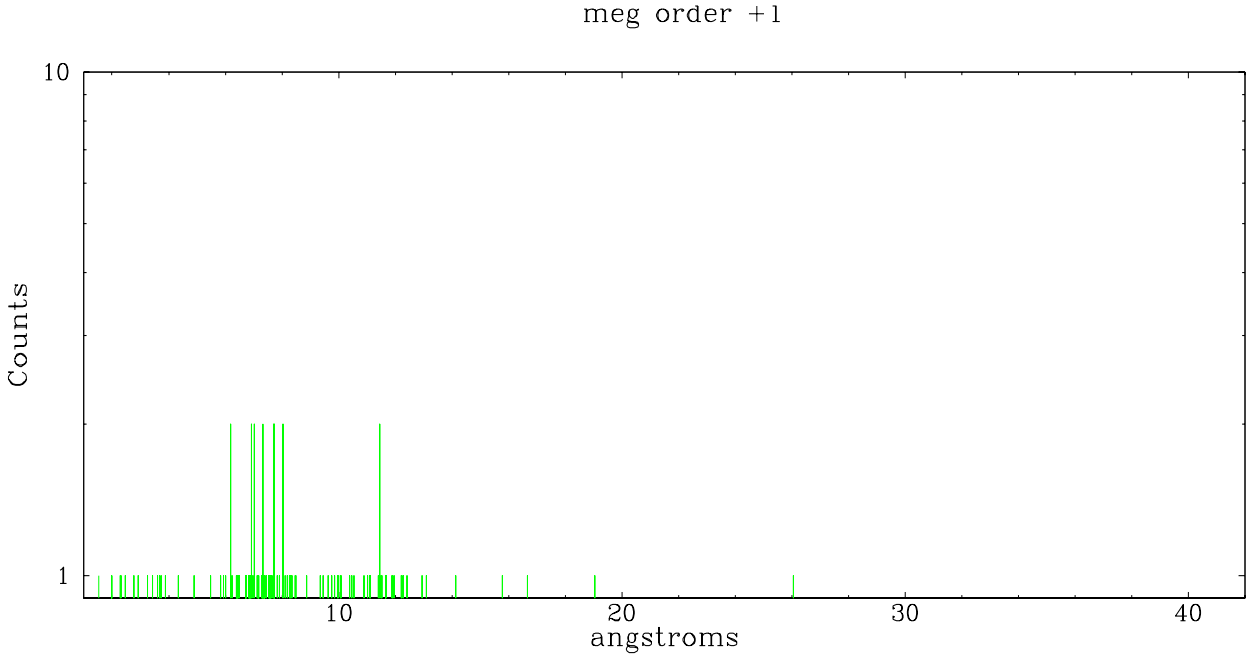


Full Detector MEG

	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	172	186	1164	819	996	135	100




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


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

A Summary

A.1 Status

V&V Scientist	Joy Nichols
V&V Date (YYYY-MM-DD)	2007.01.12
V&V Edition	1
V&V Disposition and Status	OK
V&V Charge Time	9.638

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 and assymetric. The processing
software defaulted to the coordinates supplied by the user as the
position of
the zeroth order for the grating spectral extraction. For grating
analysis of localized X-ray emission withing 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.

Coordinates used as zeroth order position for extracting dispersed
spectra
in this processing:
ra=09:18:05.699, dec=-12:05:45.00

Hot pixel on chip S5 not removed in processing.
```