V&V Reference Report
L2 ASCDS Version : 10.7

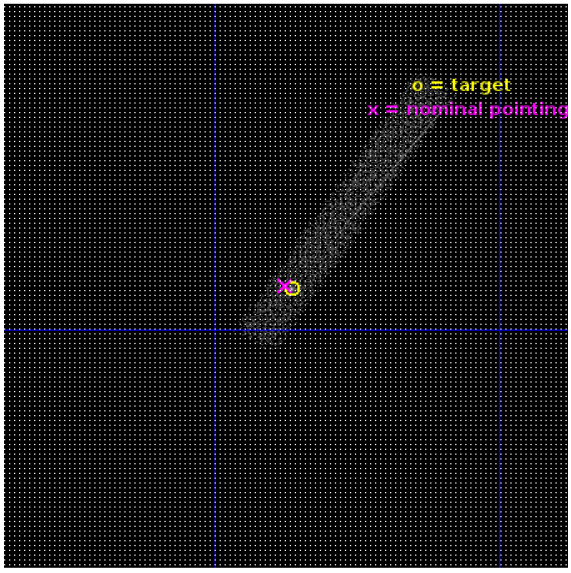
Observation 20186 - L2 Version 1
Chandra X-Ray Center

L2 Processing Date : Nov 19 2018

Contents

1 Front

seq_num	401913	Sequence number
obs_id	20186	Observation id
title	Following a black hole X-ray transient through the transition into quiescence	Proposal title
observer	Elena Gallo	Principal investigator
object	MAXI J1820+070	Source name
dtycycle	0	
cycle	P	events from which exps? Prim/Second/Both
ra_targ	275.091167	Observer's specified target RA [deg]
dec_targ	7.185639	Observer's specified target Dec [deg]
ra_nom	275.09402398275	Nominal RA [deg]
dec_nom	7.1867104182159	Nominal Dec [deg]
roll_nom	304.24780833867	Nominal Roll [deg]
revision	1	Processing version of data
ontime	9069.5351632833	Sum of GTIs [s]
livetime	8225.5896637796	Livetime [s]
ontime7	9069.5351632833	Sum of GTIs [s]
l2events	7980	Number of level 2 events

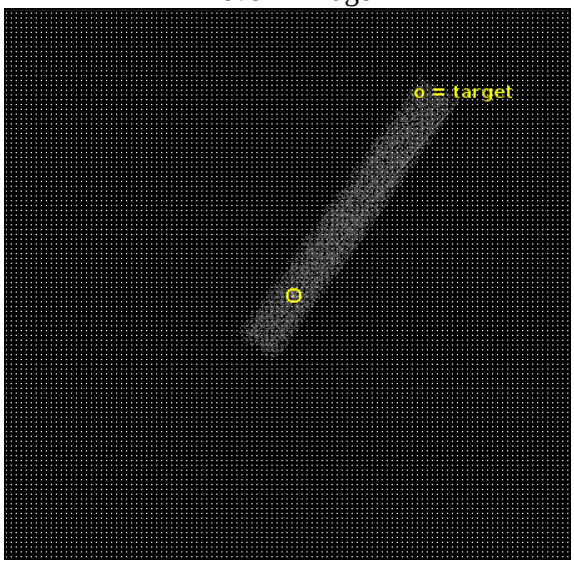


2 OBI

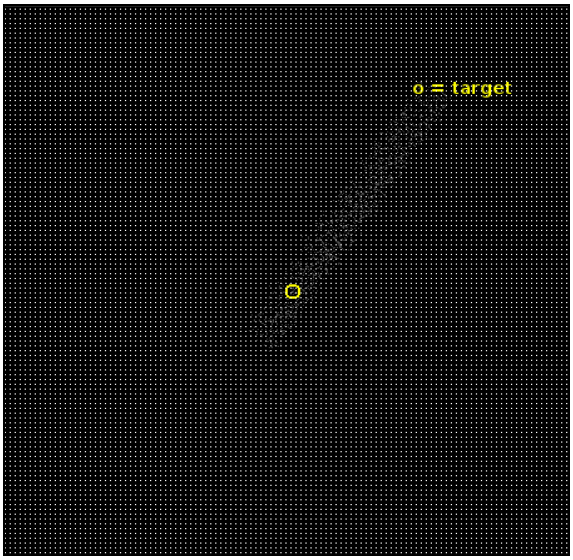
2.1 OBI

2.1.1 Images

Level 1 Image

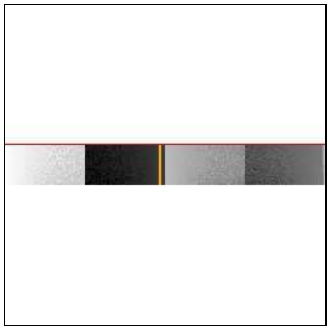


Level 1 Bad Events



2.1.2 Bias

Chip 7



2.1.3 Parameters

obi_num	0	Obi number
ascdsver	10.7	Processing system revision
caldbver	4.8.0.1	
date	2018-11-19T14:21:43	Date and time of file creation
revision	1	Processing version of data

sched_exp_time	9000.000000	[s] Scheduled observation exposure time
ontime	9069.5351632833	Sum of GTIs [s]
ontime7	9069.5351632833	Sum of GTIs [s]
l1events	14212	Number of level 1 events
tgmethod	TGDETECT	Method used to create src1a file
zo_pos	(4114.51, 4086.66)	src1a sky pixel position

2.1.4 Events

	ccd 7
level 1 events	14212
rejected events	5961
rejected %	41%

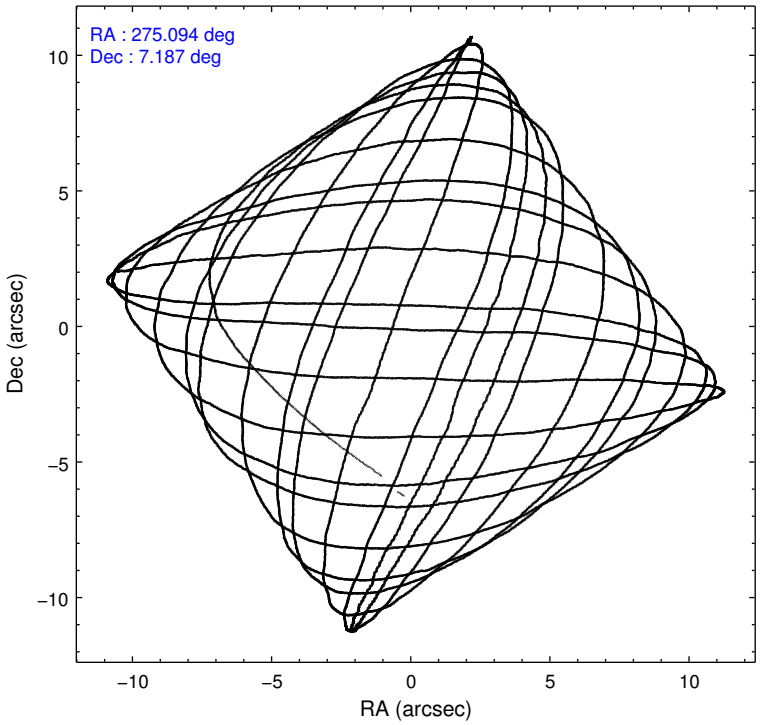
	ccd 7
grade 0 events	1126
	7%
grade 1 events	30
	0%
grade 2 events	1772
	12%
grade 3 events	1064
	7%
grade 4 events	1018
	7%
grade 5 events	1205
	8%
grade 6 events	3272
	23%
grade 7 events	4725
	33%

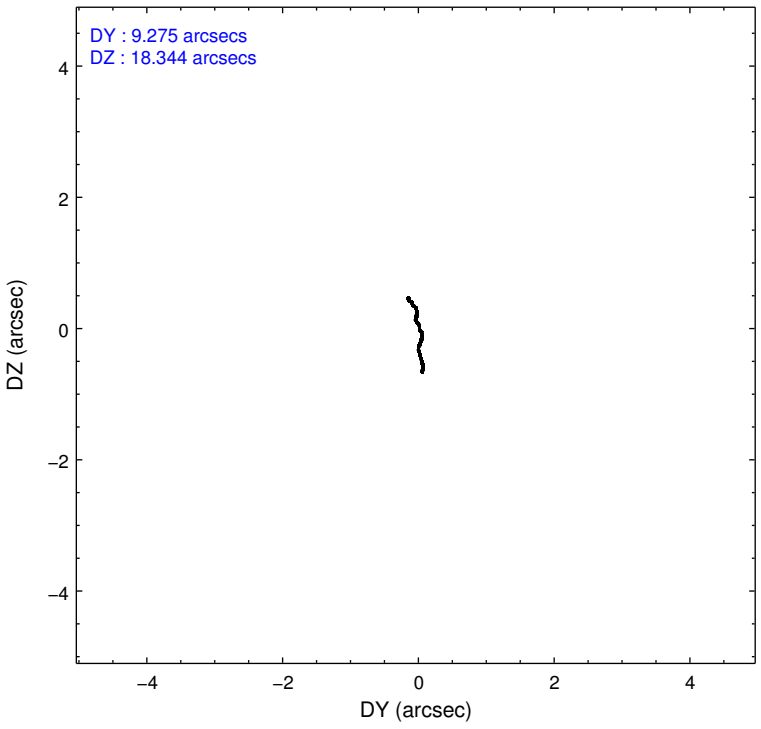
2.2 Compared Parameters

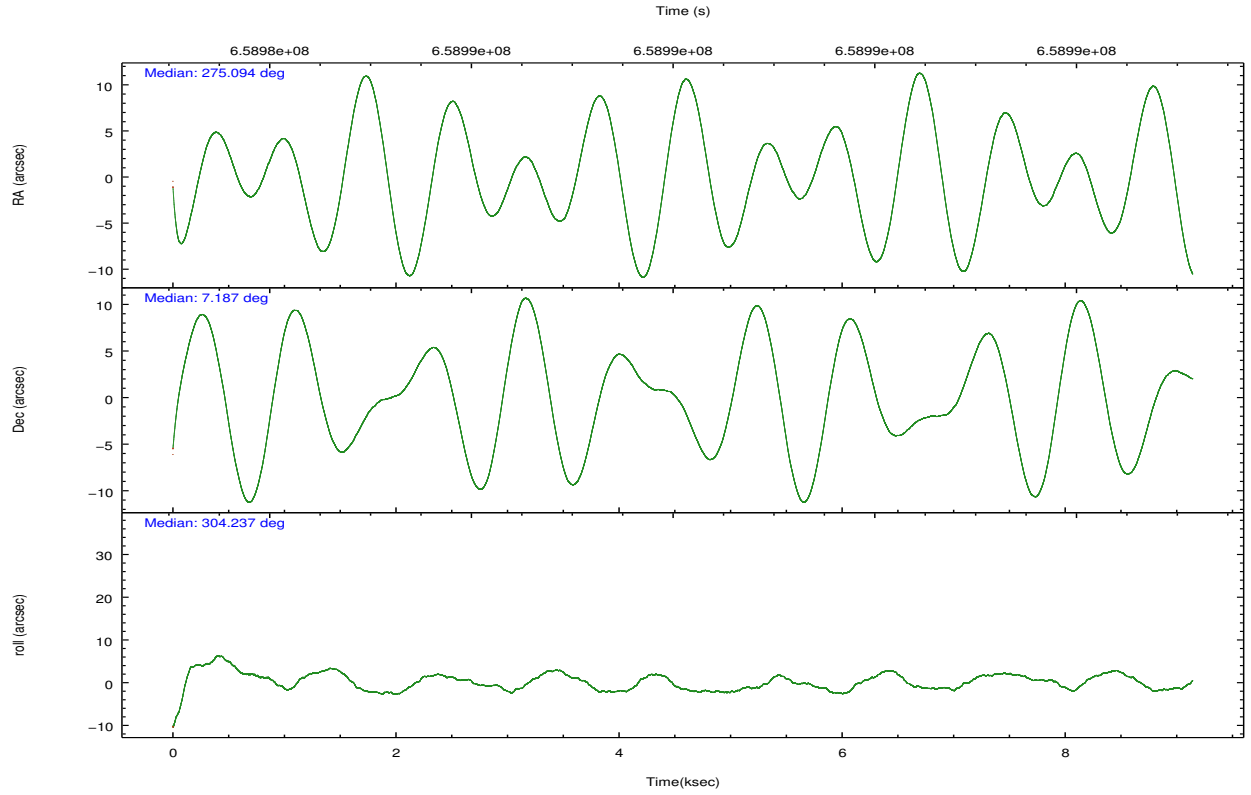
Parameter	Planned	Actual
Instrument	ACIS	ACIS
Detector	ACIS-7	ACIS-7
Grating	HETG	HETG
Data mode	FAINT	FAINT
Observation mode	POINTING	POINTING
[deg] Pointing RA	275.068950	275.0940239827524
[deg] Pointing Dec	7.198281	7.186710418215946
[deg] Pointing Roll	304.094333	304.2478083386679
[mm] SIM focus 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)	658983663.184000	658982627.30379
Observation start date	2018-11-19T02:59:54	2018-11-19T02:43:47
[s] Observation end time (MET)	658992663.184000	658993239.12942
Observation end date	2018-11-19T05:29:54	2018-11-19T05:40:39
Read mode	TIMED	TIMED

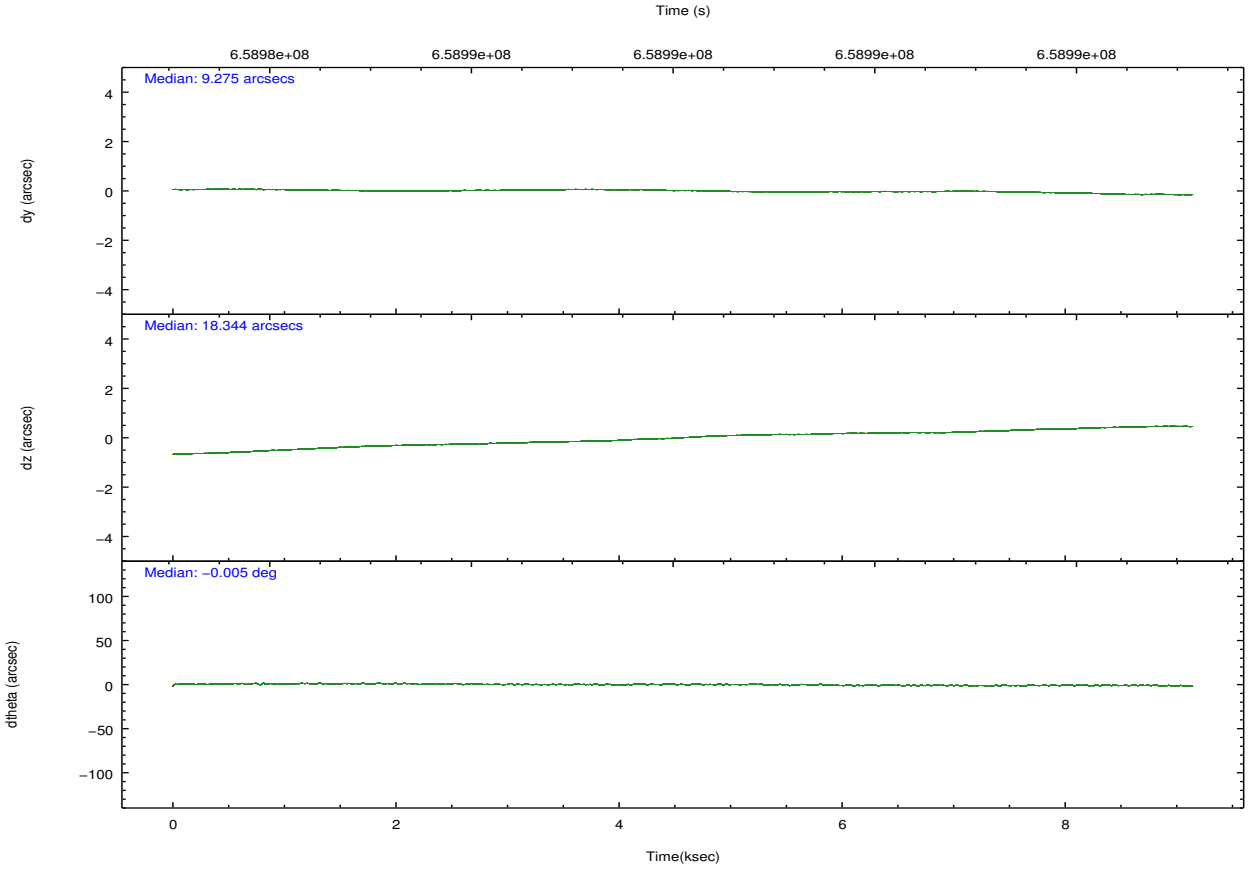
Parameter	Planned	Actual
Obspar format version number	7	7
Obspar file type	PREDICTED	ACTUAL
Obspar update status	NONE	UPDATED
Number of optional ACIS chips dropped	0	0
On-chip summing requested	N	N
Subarray requested	CUSTOM	1/8
Subarray start row	449	449
Subarray row count	128	128
Alternating exposures requested	N	N
[s] Primary exposure time	0.000000	0.4

2.3 Aspect


RA : 275.094 deg
Dec : 7.187 deg
Dec (arcsec)
RA (arcsec)
10
5
0
−5
−10
−10
−5
0
5
10


DY : 9.275 arcsecs
DZ : 18.344 arcsecs
DZ (arcsec)
DY (arcsec)
4
2
0
−2
−4
−4
−2
0
2
4


Time (s)
6.5898e+08
6.5899e+08
6.5899e+08
6.5899e+08
6.5899e+08
Median: 275.094 deg
RA (arcsec)
Median: 7.187 deg
Dec (arcsec)
Median: 304.237 deg
roll (arcsec)
Time(ksec)

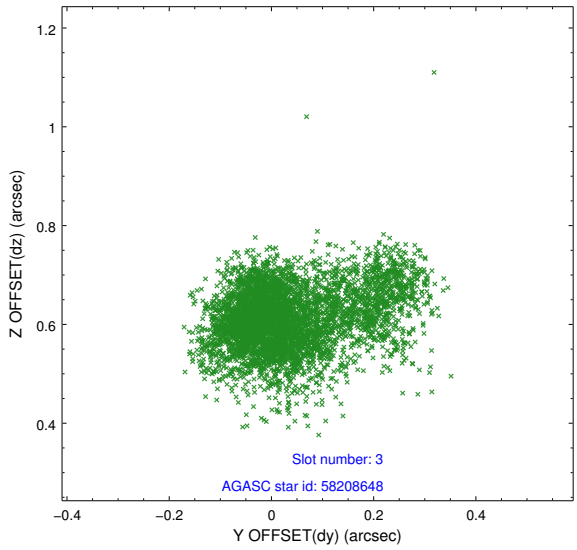

Time (s)
6.5898e+08
6.5899e+08
6.5899e+08
6.5899e+08
6.5899e+08
Median: 9.275 arcsecs
dy (arcsec)
Median: 18.344 arcsecs
dz (arcsec)
Median: −0.005 deg
dtheta (arcsec)
Time(ksec)

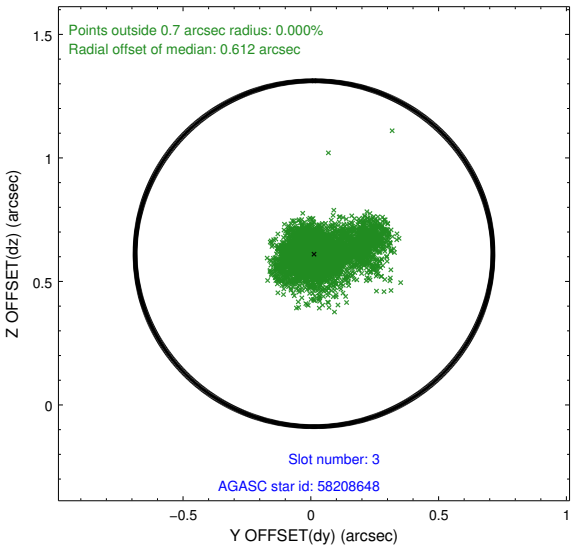
Slot Statistics

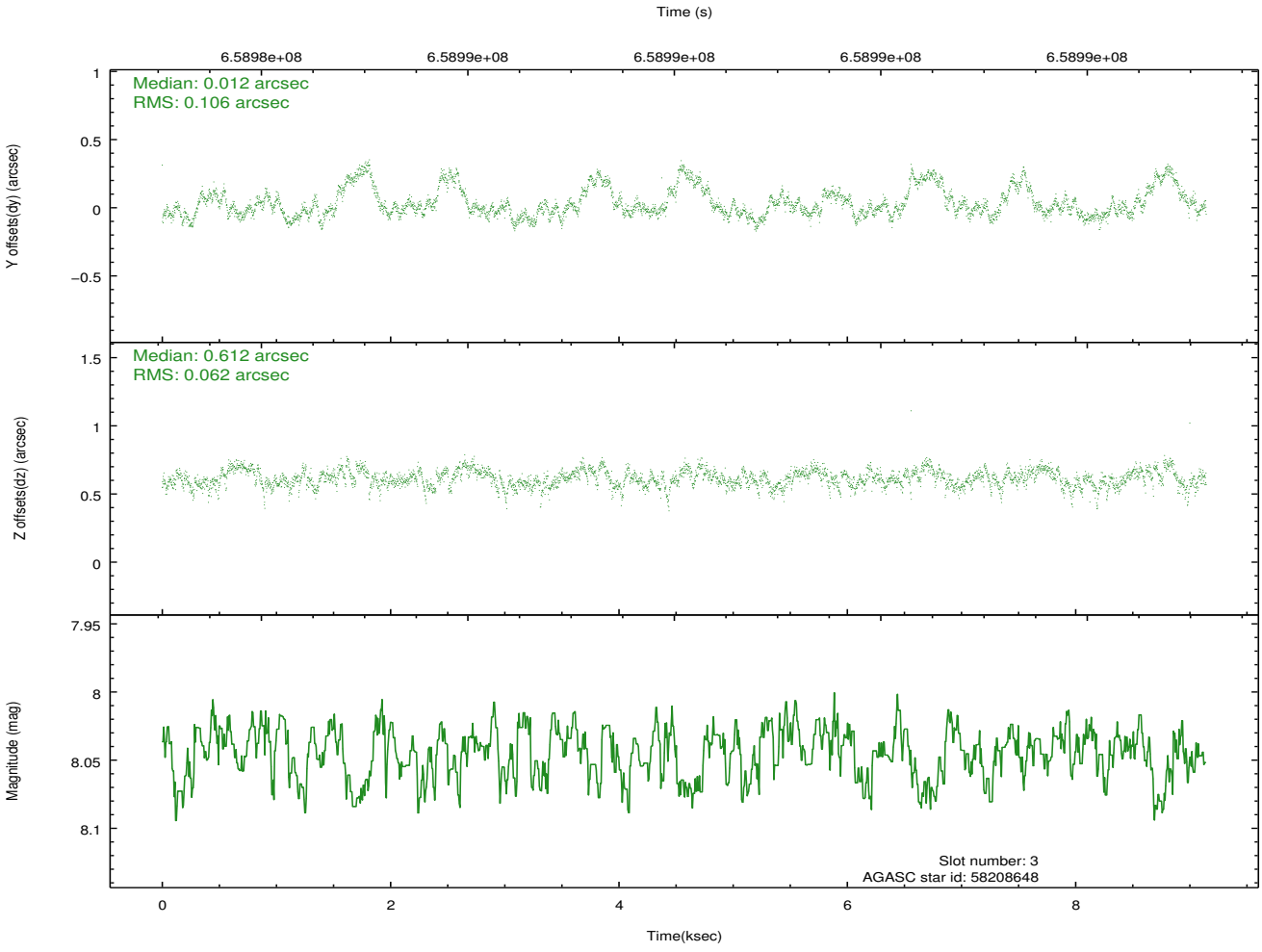
ot	status	used	id	mag	n_pts	frac_pts	med_dy	med_dz	dr1	dr2	ra	dec	mean_y	mea
0	FID		ACIS-S-2	6.99	2231	1.000	-0.258	-0.150	0.012	0.019	0.000000	0.000000	-762.30	-1739
1	FID		ACIS-S-4	7.11	2231	1.000	0.610	0.164	0.006	0.011	0.000000	0.000000	2151.53	168
2	FID		ACIS-S-5	7.10	2230	1.000	-0.385	-0.005	0.013	0.023	0.000000	0.000000	-1814.54	162
3	GUIDE	used	58208648	8.04	4460	1.000	0.012	0.612	0.115	0.245	274.402649	7.152383	-1197.90	-2062
4	GUIDE	used	58213856	8.36	4459	1.000	-0.210	-0.160	0.095	0.152	275.612553	7.226303	1003.56	1664
5	GUIDE	used	58218424	8.64	4460	1.000	0.029	-0.025	0.150	0.238	275.095675	6.544229	2004.61	-1239
6	GUIDE	used	58205920	9.00	4451	1.000	0.312	-0.322	0.250	0.438	274.867260	6.306052	2257.07	-2398
7	GUIDE	used	132401928	7.34	4459	1.000	-0.183	-0.112	0.127	0.206	275.575114	7.548927	-33.32	2201

2.4 Star Slots

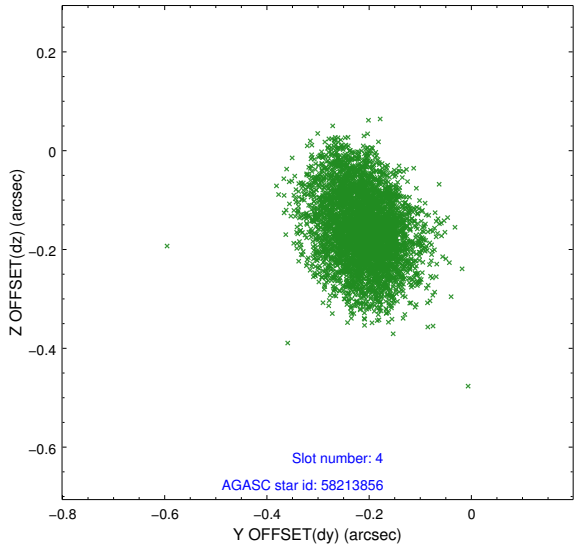
2.4.1 Slot 3

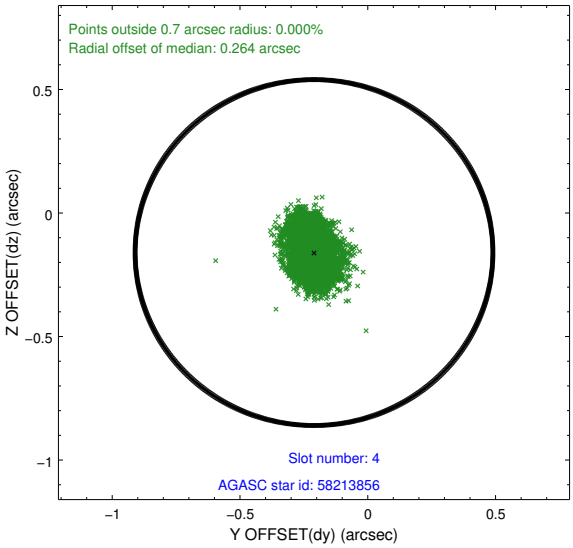


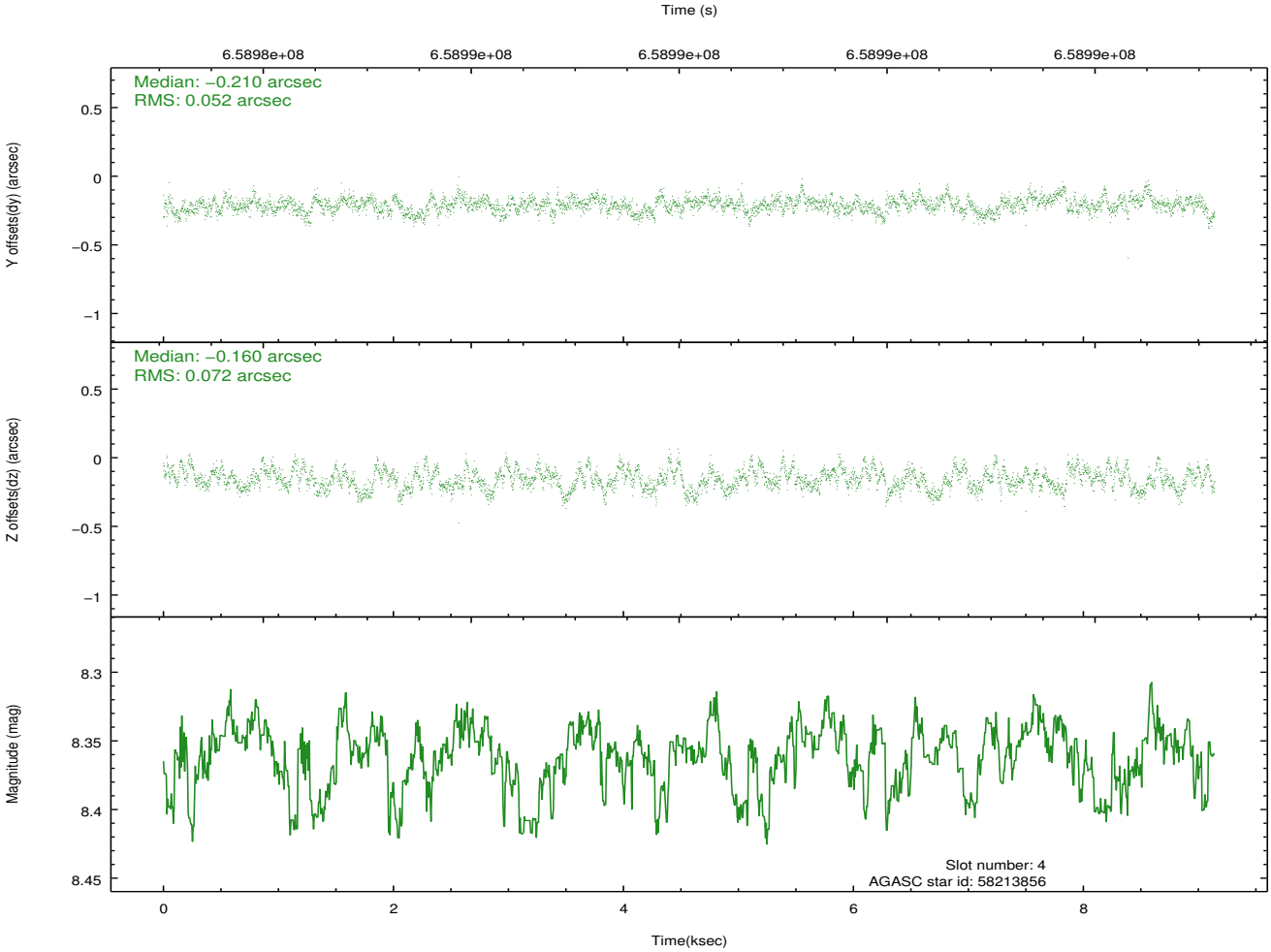




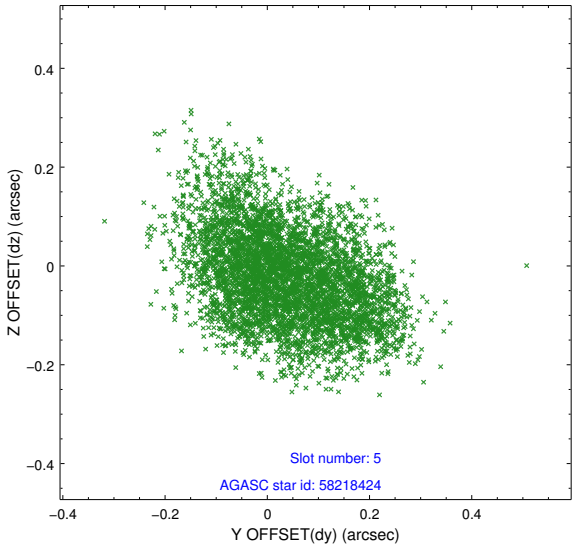
2.4.2 Slot 4

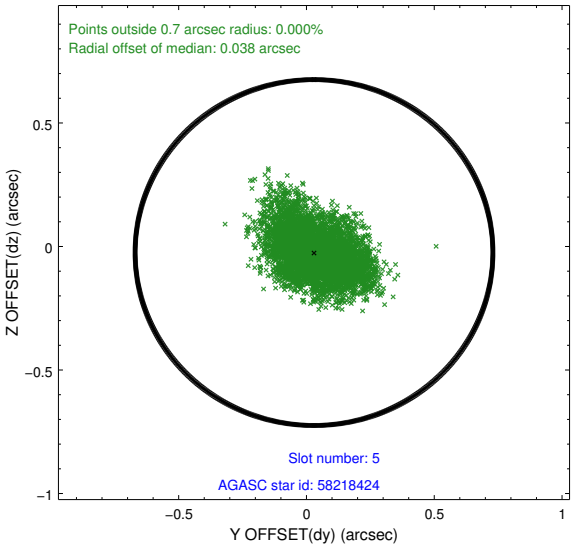

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 4
AGASC star id: 58213856

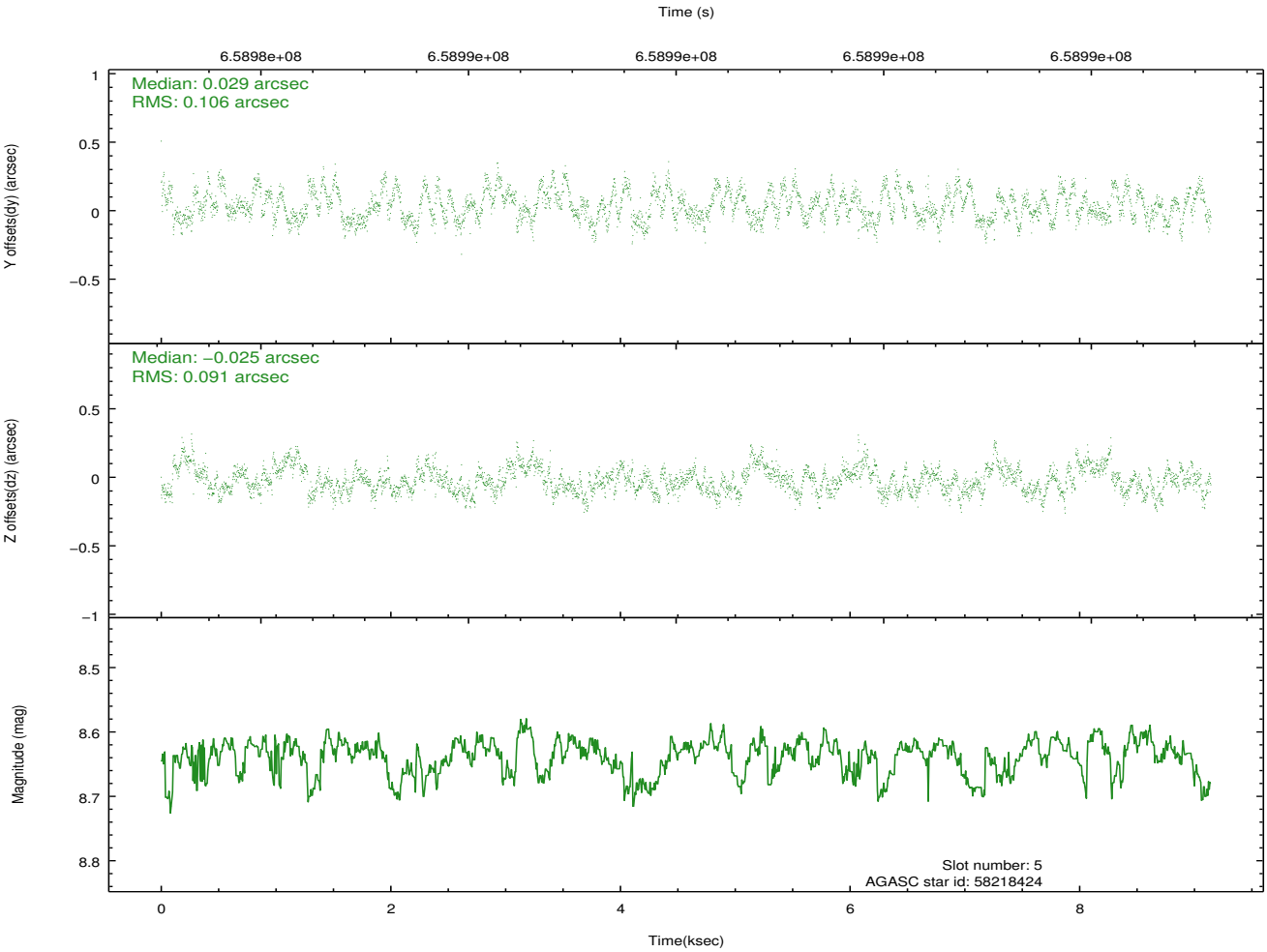

Points outside 0.7 arcsec radius: 0.000%
Radial offset of median: 0.264 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 4
AGASC star id: 58213856


Time (s)
6.5898e+08
6.5899e+08
6.5899e+08
6.5899e+08
6.5899e+08
Median: −0.210 arcsec
RMS: 0.052 arcsec
Y offsets(dy) (arcsec)
Median: −0.160 arcsec
RMS: 0.072 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number: 4
AGASC star id: 58213856
Time(ksec)

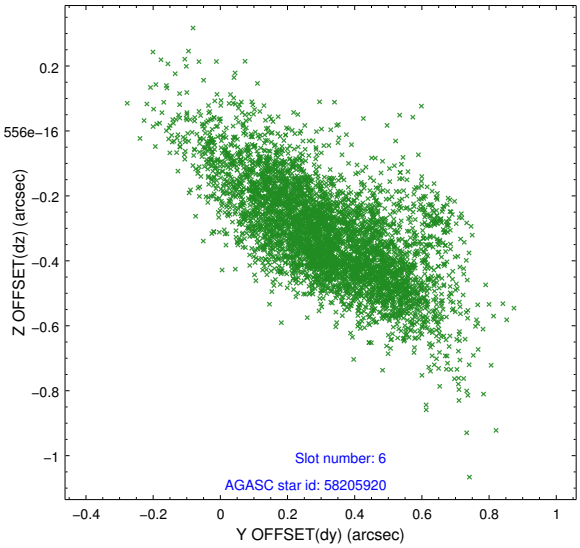
2.4.3 Slot 5

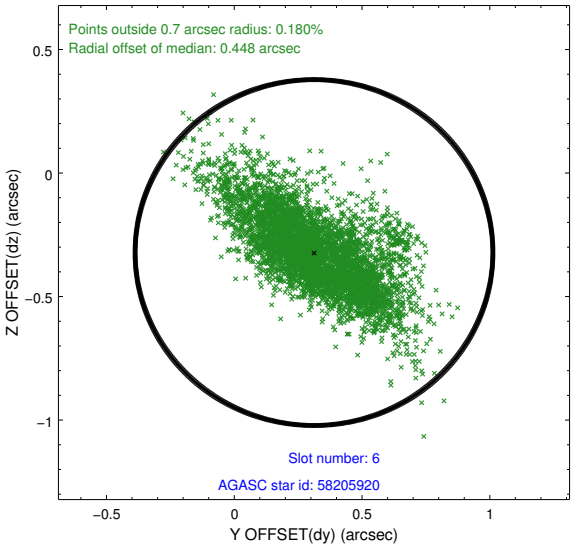

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 5
AGASC star id: 58218424

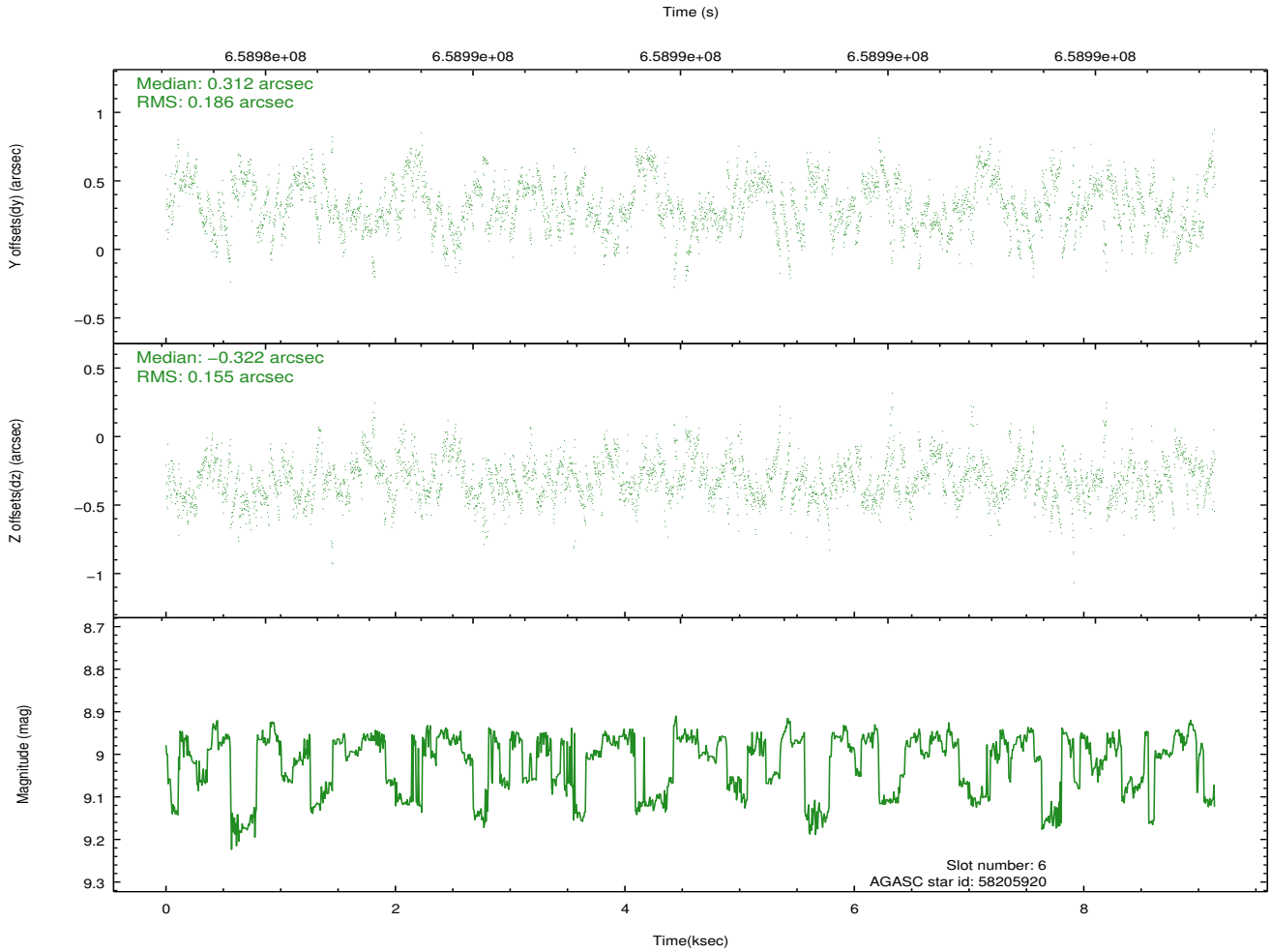

Points outside 0.7 arcsec radius: 0.000%
Radial offset of median: 0.038 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 5
AGASC star id: 58218424


Time (s)
6.5898e+08
6.5899e+08
6.5899e+08
6.5899e+08
6.5899e+08
Median: 0.029 arcsec
RMS: 0.106 arcsec
Y offsets(dy) (arcsec)
Median: −0.025 arcsec
RMS: 0.091 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number: 5
AGASC star id: 58218424
Time(ksec)

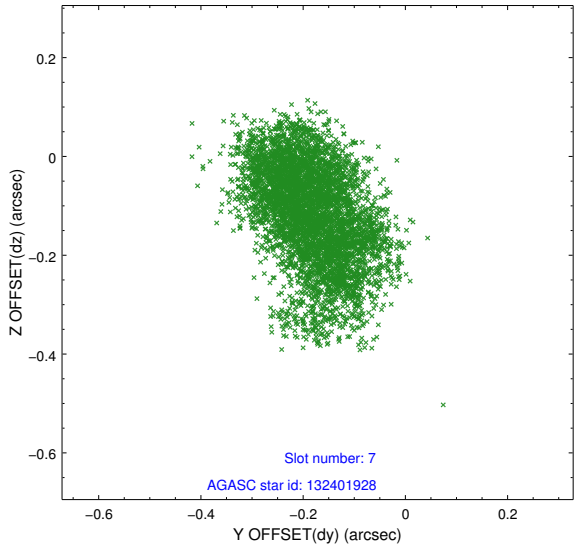
2.4.4 Slot 6

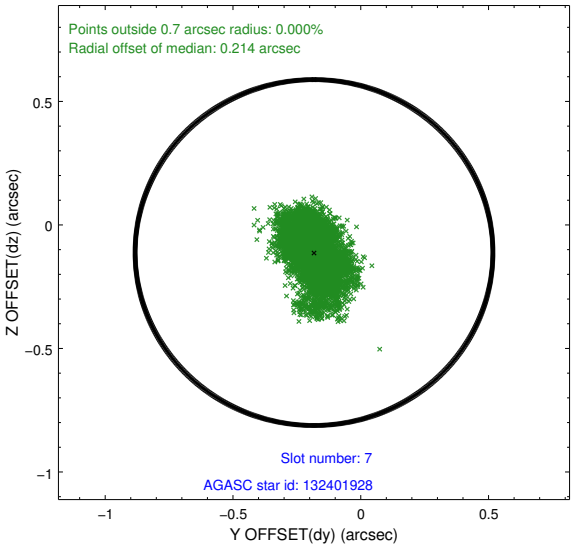

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 6
AGASC star id: 58205920

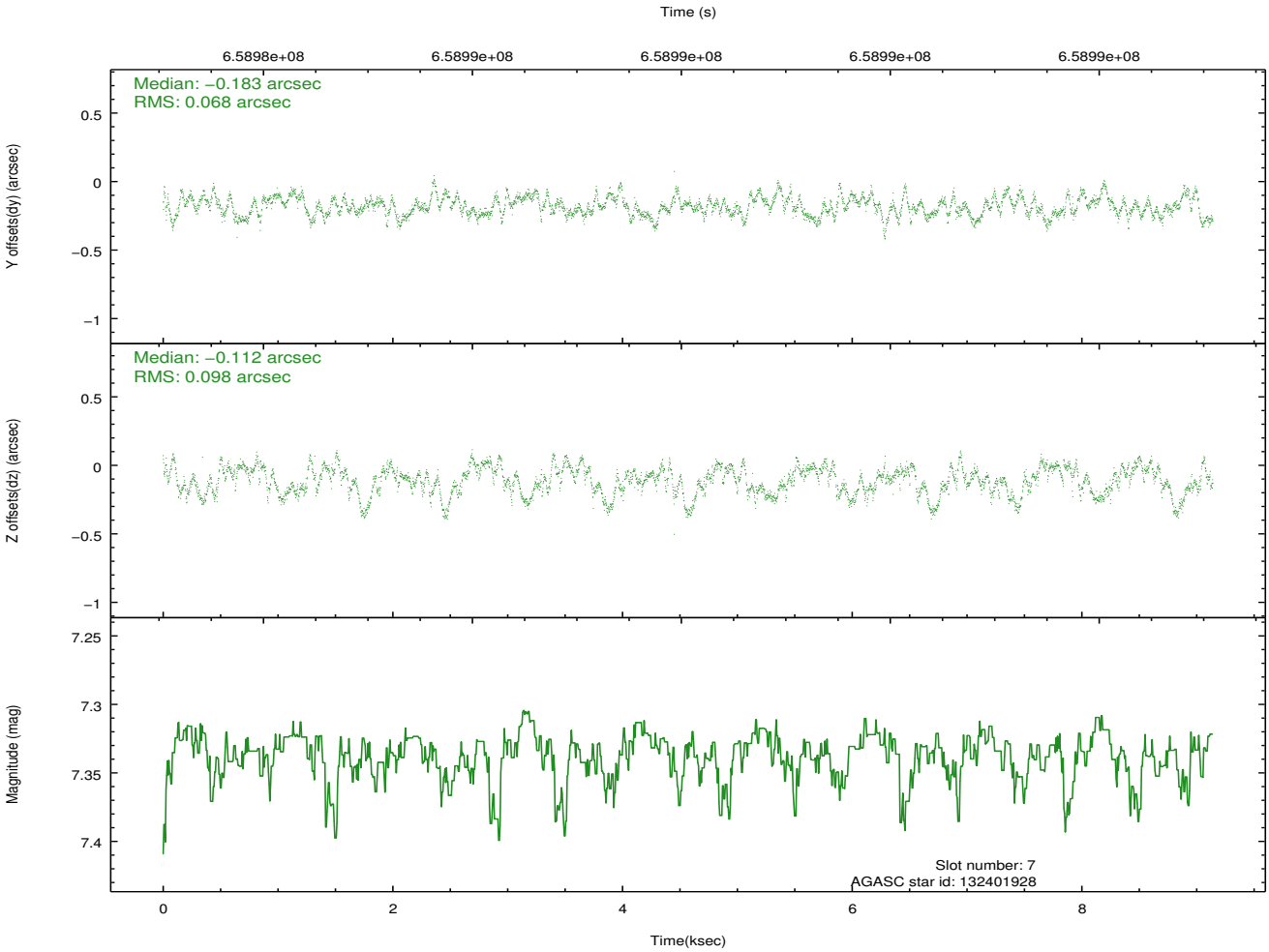

Points outside 0.7 arcsec radius: 0.180%
Radial offset of median: 0.448 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 6
AGASC star id: 58205920


Time (s)
Median: 0.312 arcsec
RMS: 0.186 arcsec
Y offsets(dy) (arcsec)
Median: −0.322 arcsec
RMS: 0.155 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number: 6
AGASC star id: 58205920
Time(ksec)

2.4.5 Slot 7

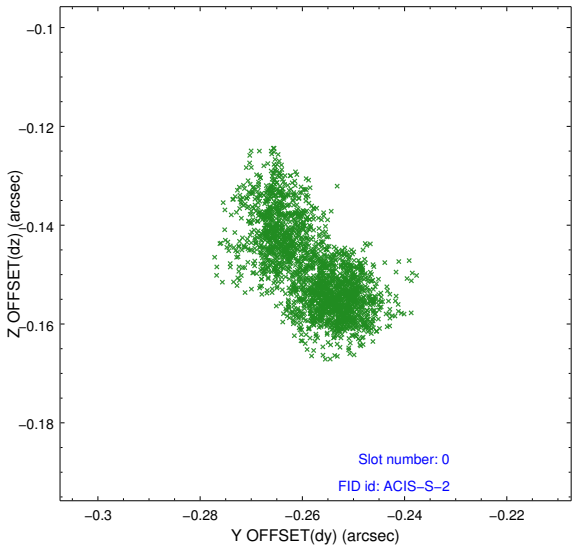

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 7
AGASC star id: 132401928

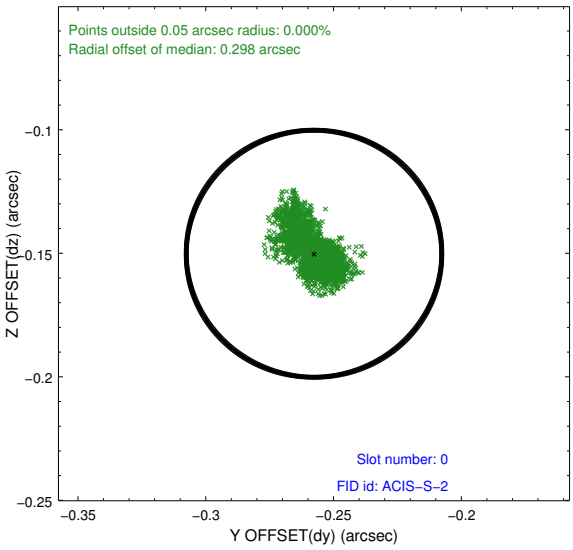

Points outside 0.7 arcsec radius: 0.000%
Radial offset of median: 0.214 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 7
AGASC star id: 132401928

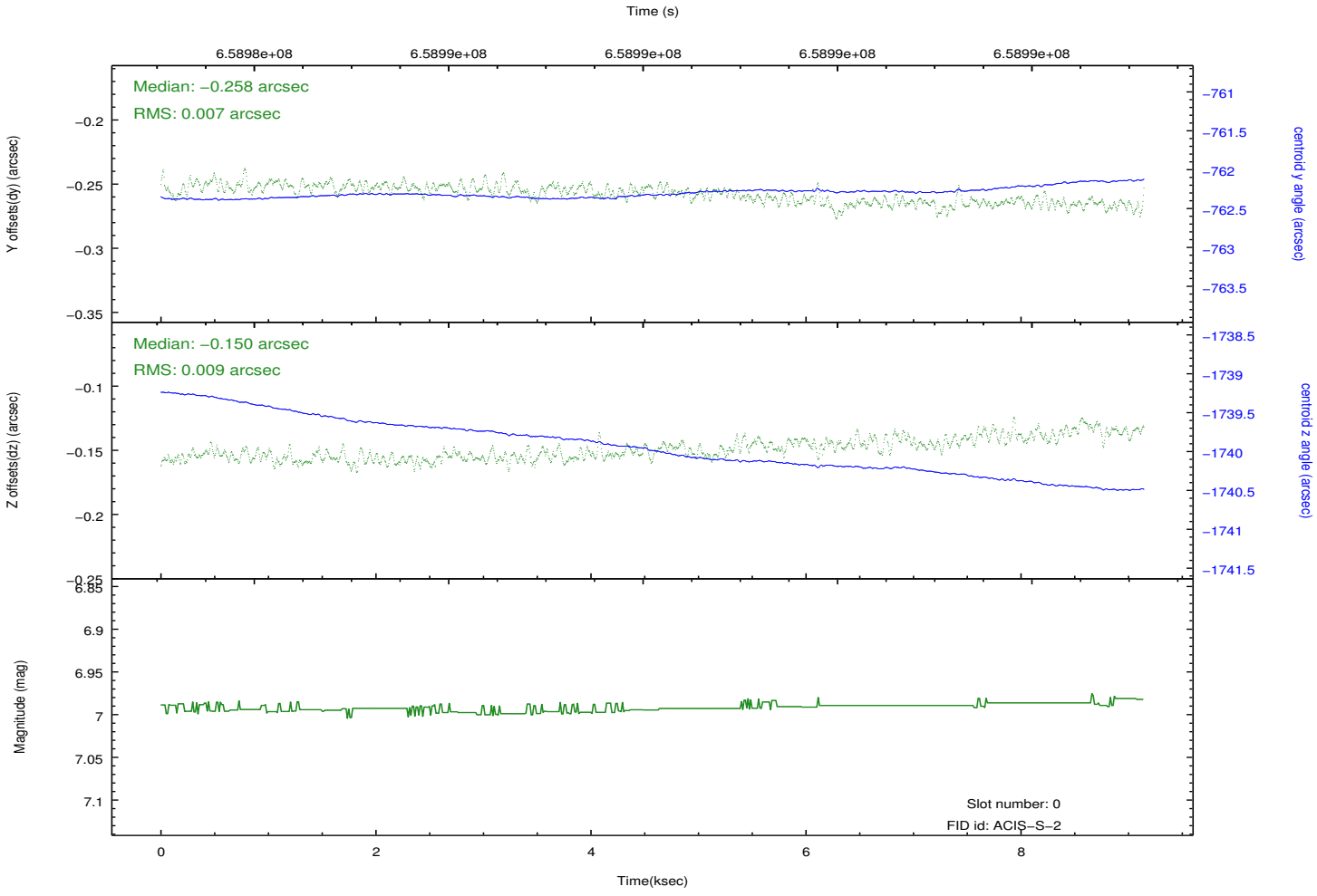

Time (s)
6.5898e+08
6.5899e+08
6.5899e+08
6.5899e+08
6.5899e+08
Median: −0.183 arcsec
RMS: 0.068 arcsec
Y offsets(dy) (arcsec)
Median: −0.112 arcsec
RMS: 0.098 arcsec
Z offsets(dz) (arcsec)
Magnitude (mag)
Slot number: 7
AGASC star id: 132401928
Time(ksec)

2.5 FID Slots

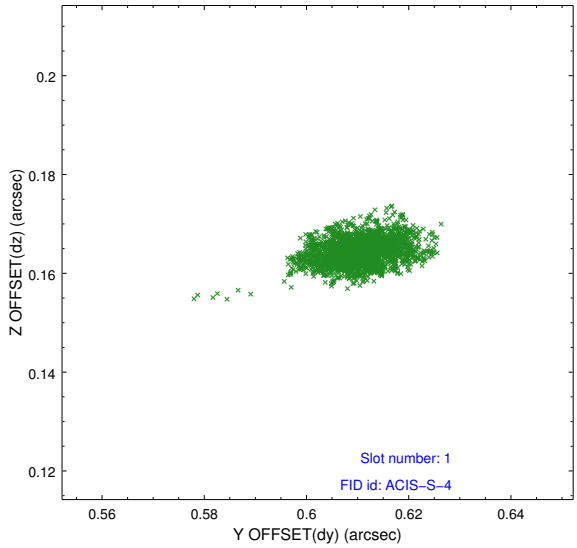
2.5.1 Slot 0

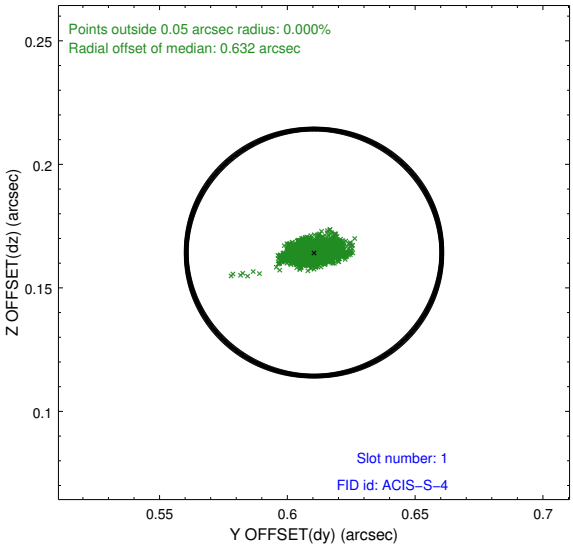


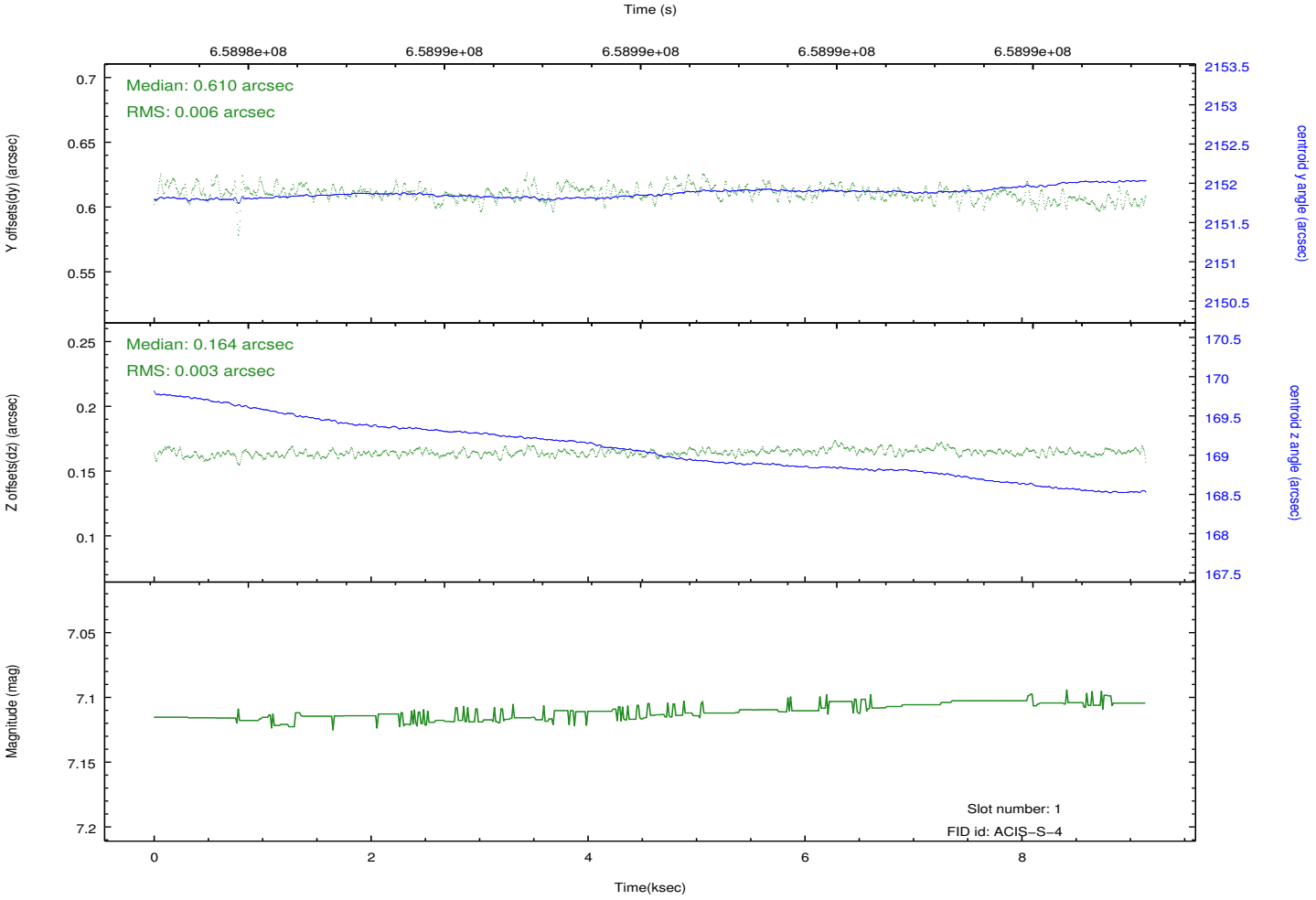




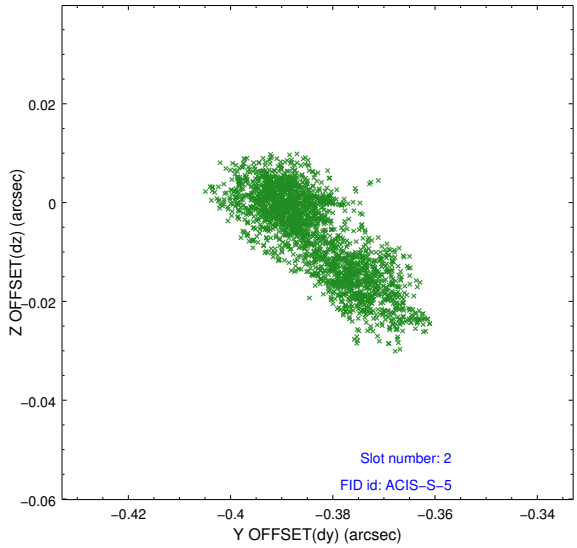
2.5.2 Slot 1

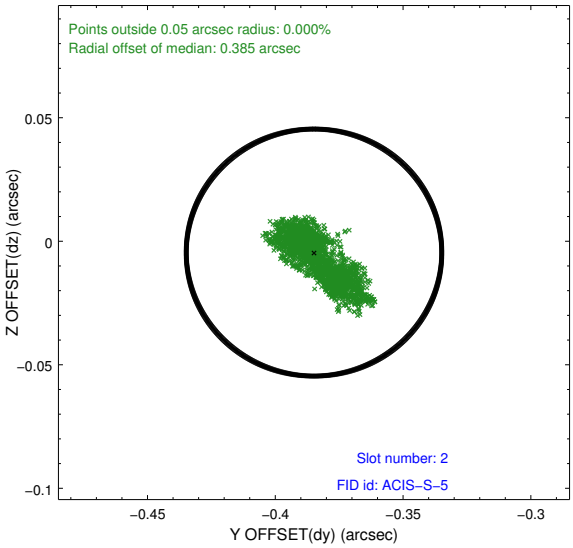

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 1
FID id: ACIS−S−4

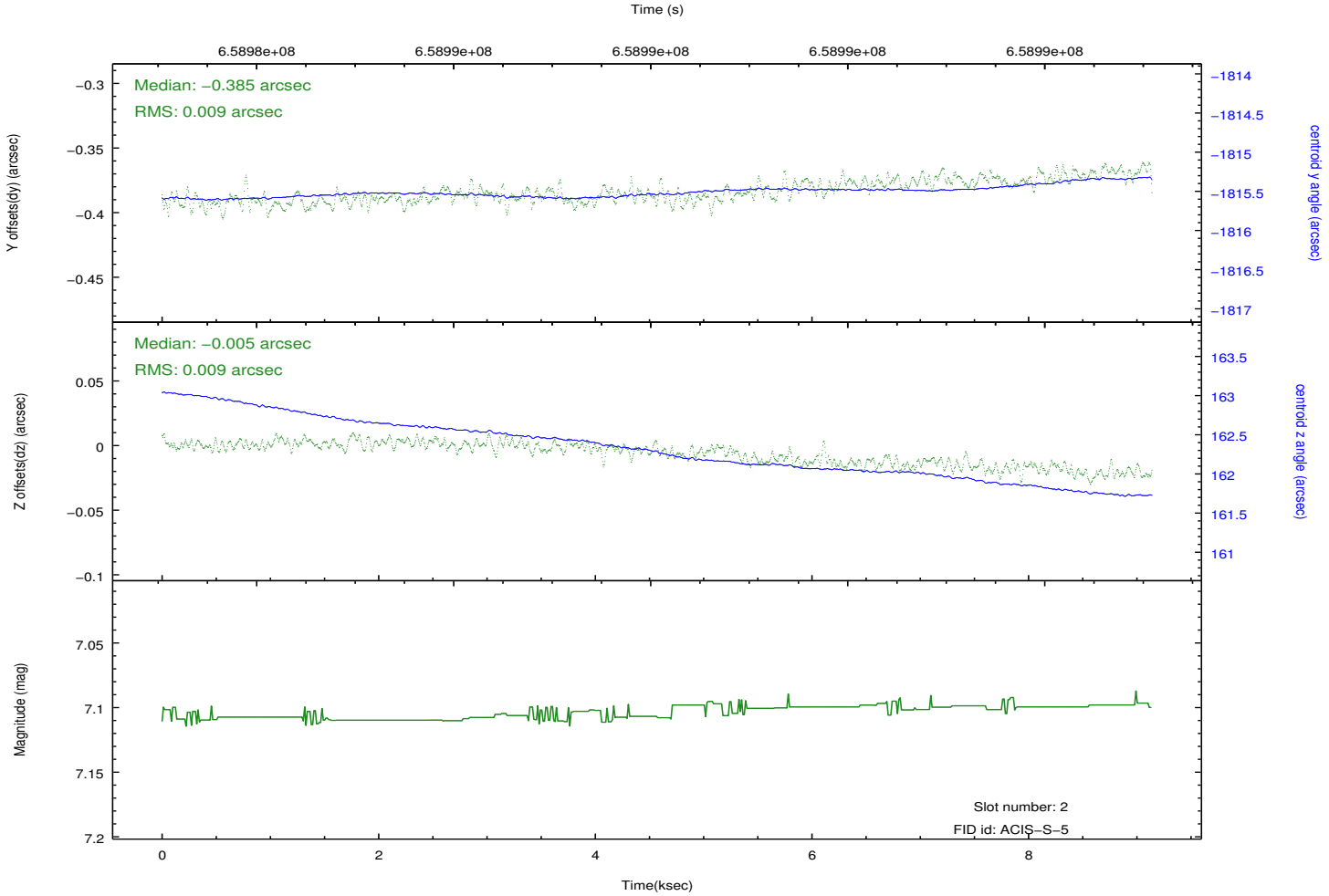

Points outside 0.05 arcsec radius: 0.000%
Radial offset of median: 0.632 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 1
FID id: ACIS−S−4


Time (s)
Median: 0.610 arcsec
RMS: 0.006 arcsec
Y offsets(dy) (arcsec)
centroid y angle (arcsec)
Median: 0.164 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

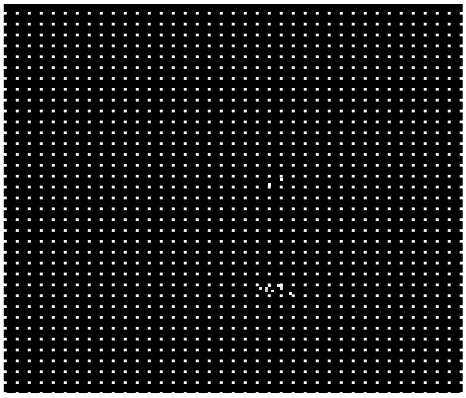

Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 2
FID id: ACIS−S−5


Points outside 0.05 arcsec radius: 0.000%
Radial offset of median: 0.385 arcsec
Z OFFSET(dz) (arcsec)
Y OFFSET(dy) (arcsec)
Slot number: 2
FID id: ACIS−S−5

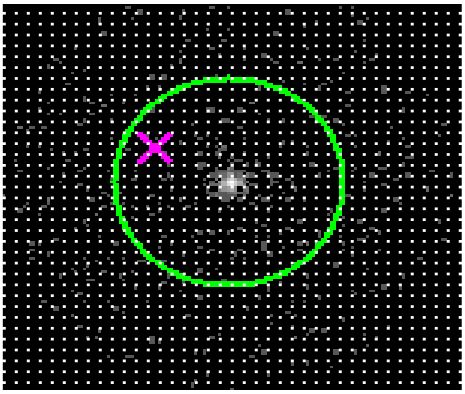

Time (s)
Median: −0.385 arcsec
RMS: 0.009 arcsec
Y offsets(dy) (arcsec)
centroid y angle (arcsec)
Median: −0.005 arcsec
RMS: 0.009 arcsec
Z offsets(dz) (arcsec)
centroid z angle (arcsec)
Magnitude (mag)
Slot number: 2
FID id: ACIS−S−5
Time(ksec)

3 Gratings

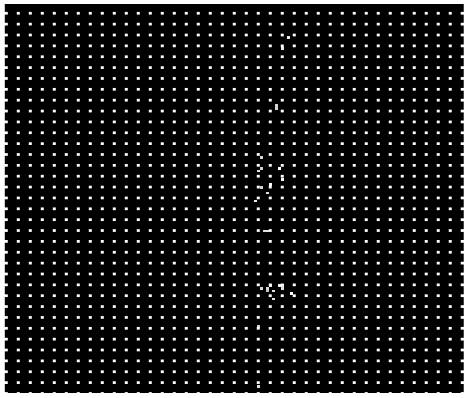
3.1 HEG Arm



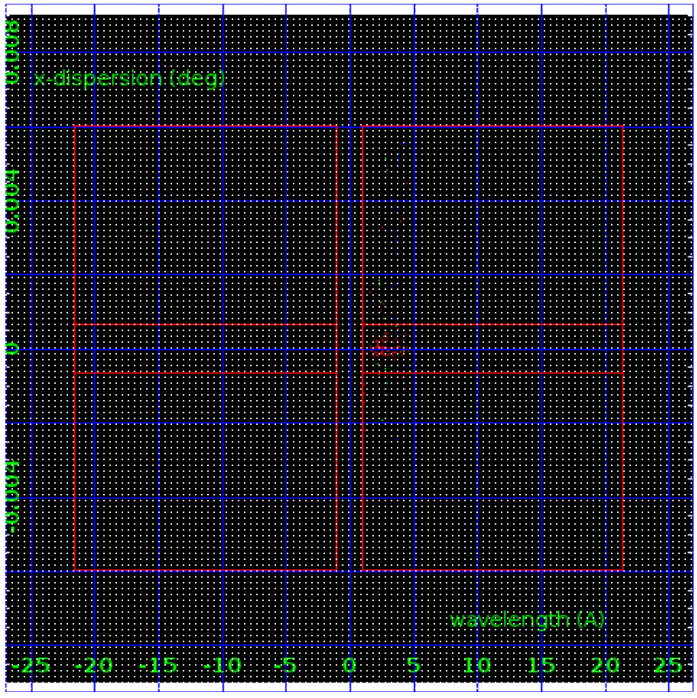
HEG Order Sort 123



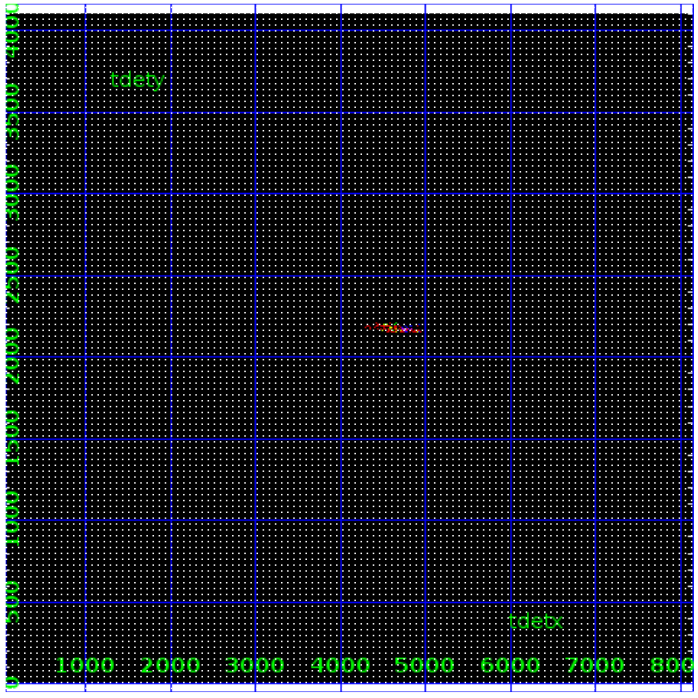
HEG Zero Order



HEG Order Sort ALL

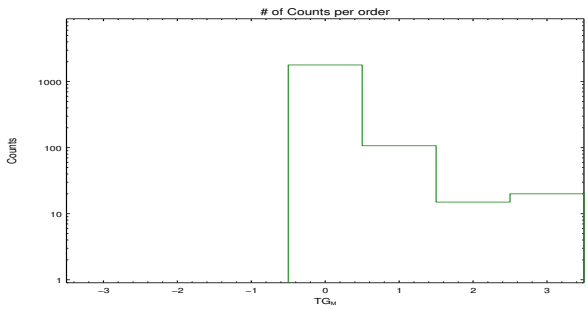


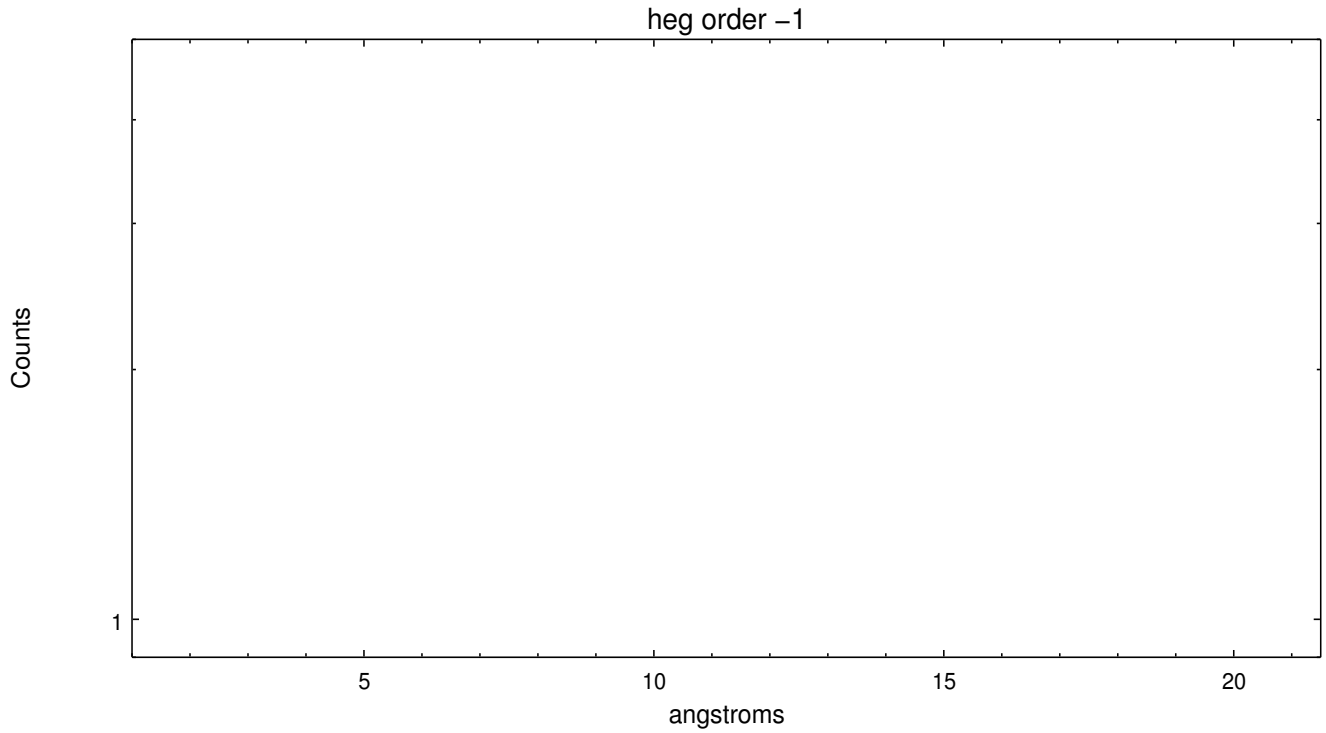
Spot Image HEG

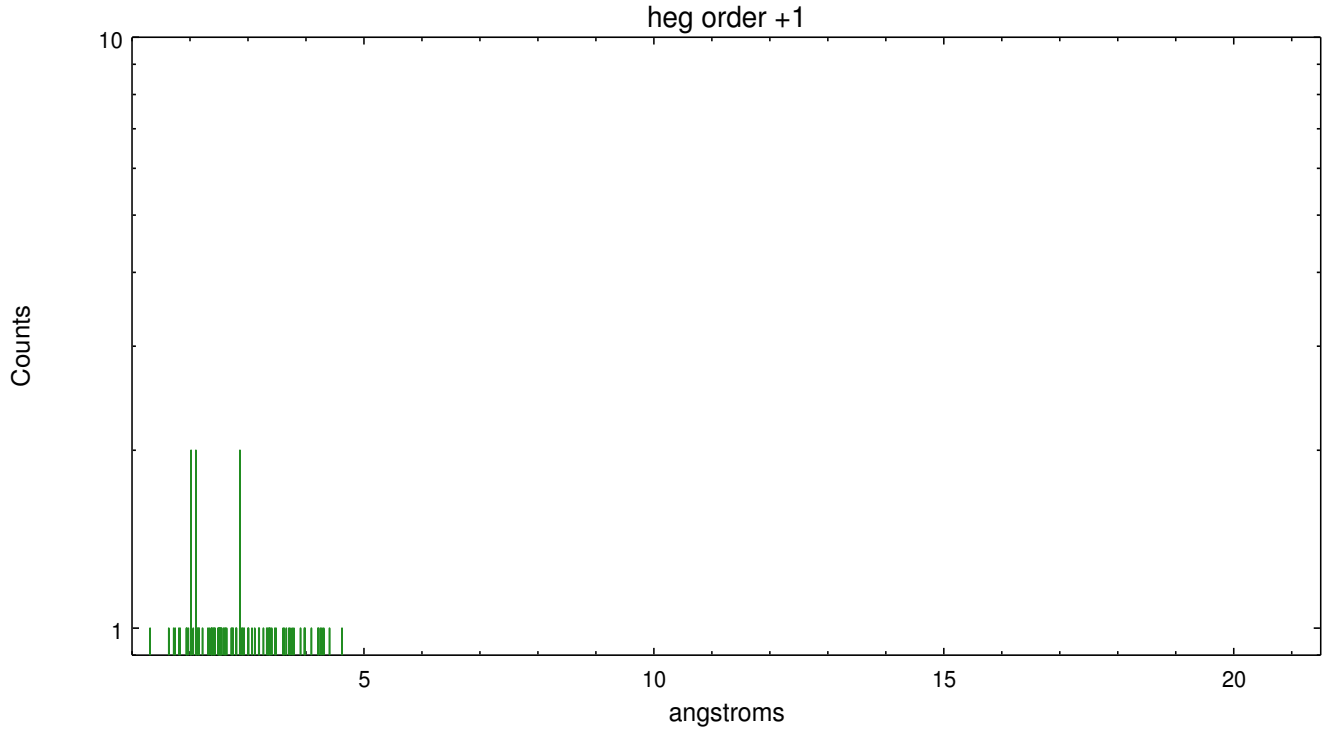


Full Detector HEG

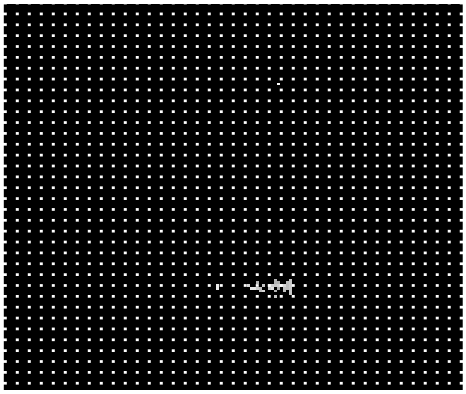
	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	0	0	0	1788	107	15	20



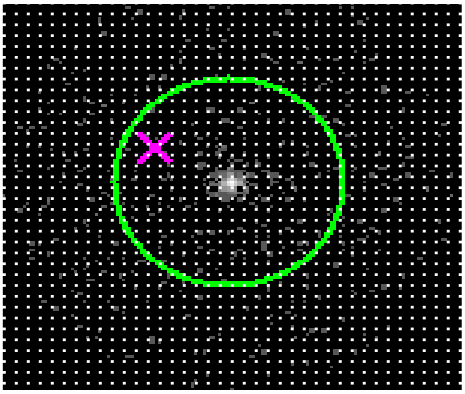

heg order −1
Counts
1
5
10
15
20
angstroms


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

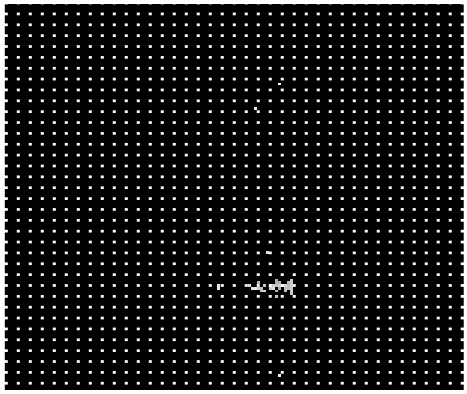
3.2 MEG Arm



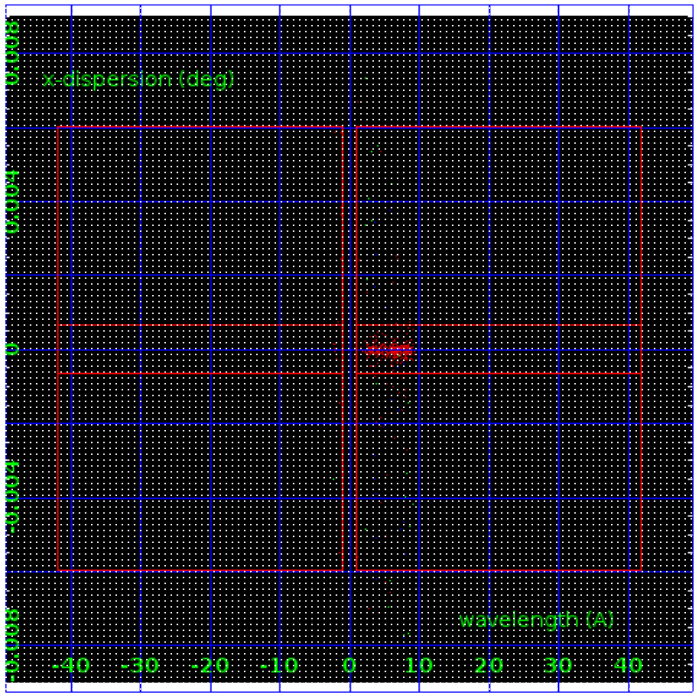
MEG Order Sort 123



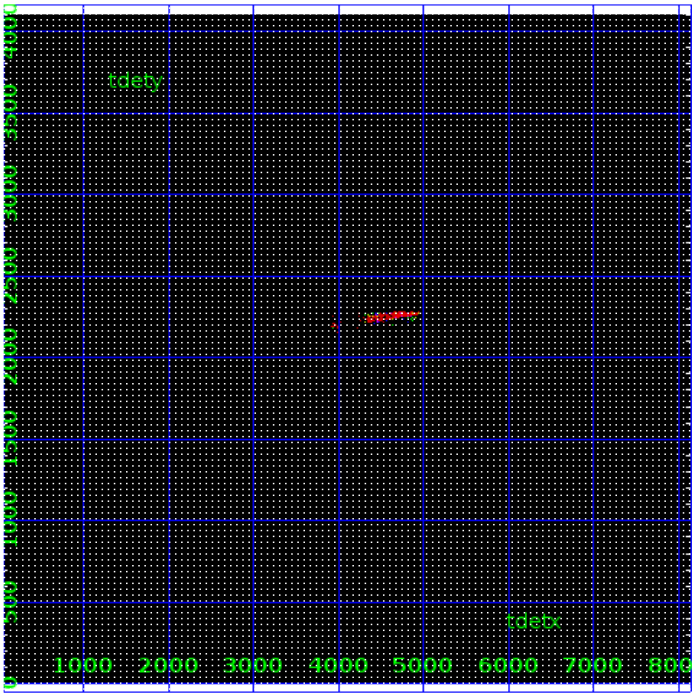
MEG Zero Order



MEG Order Sort ALL

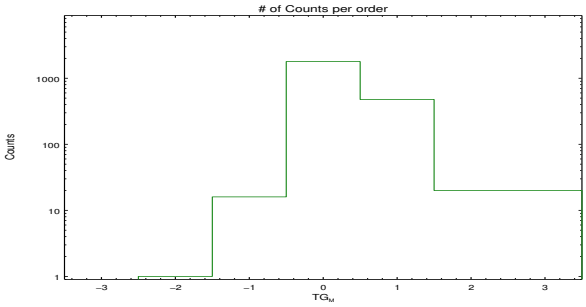


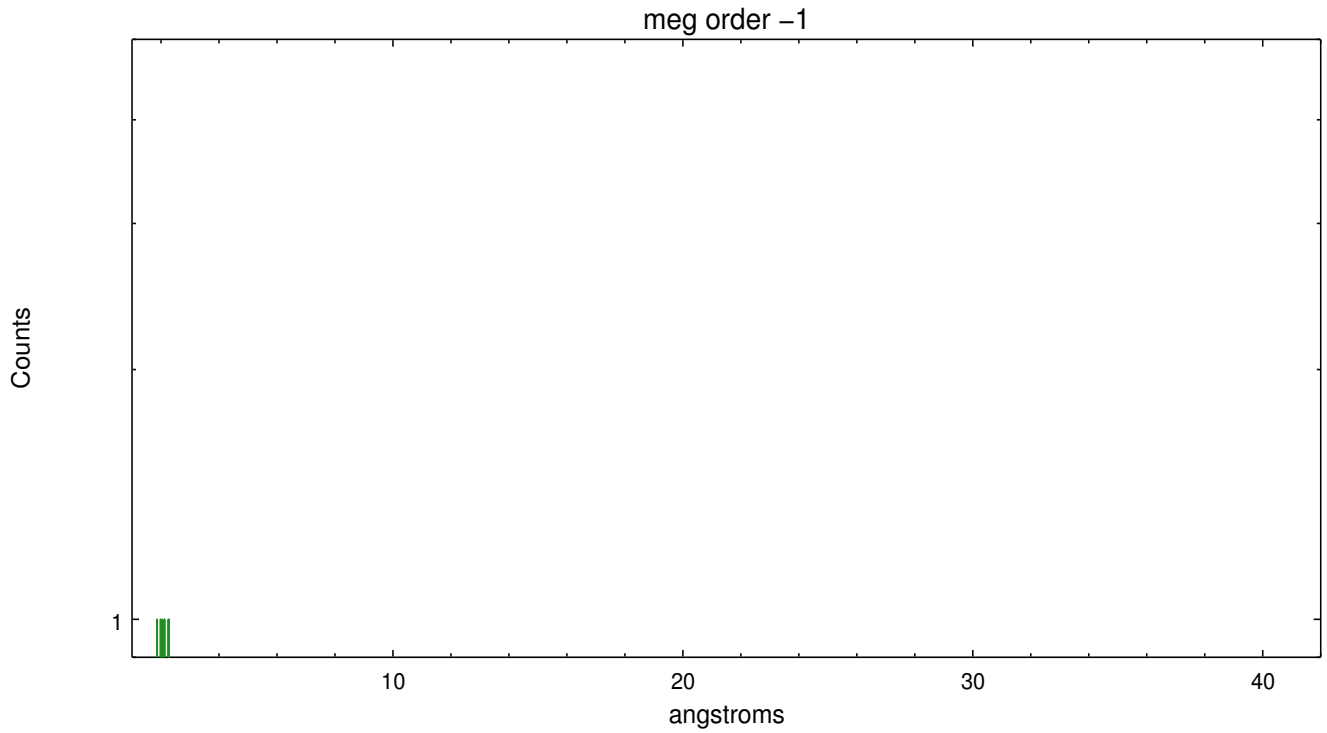
Spot Image MEG

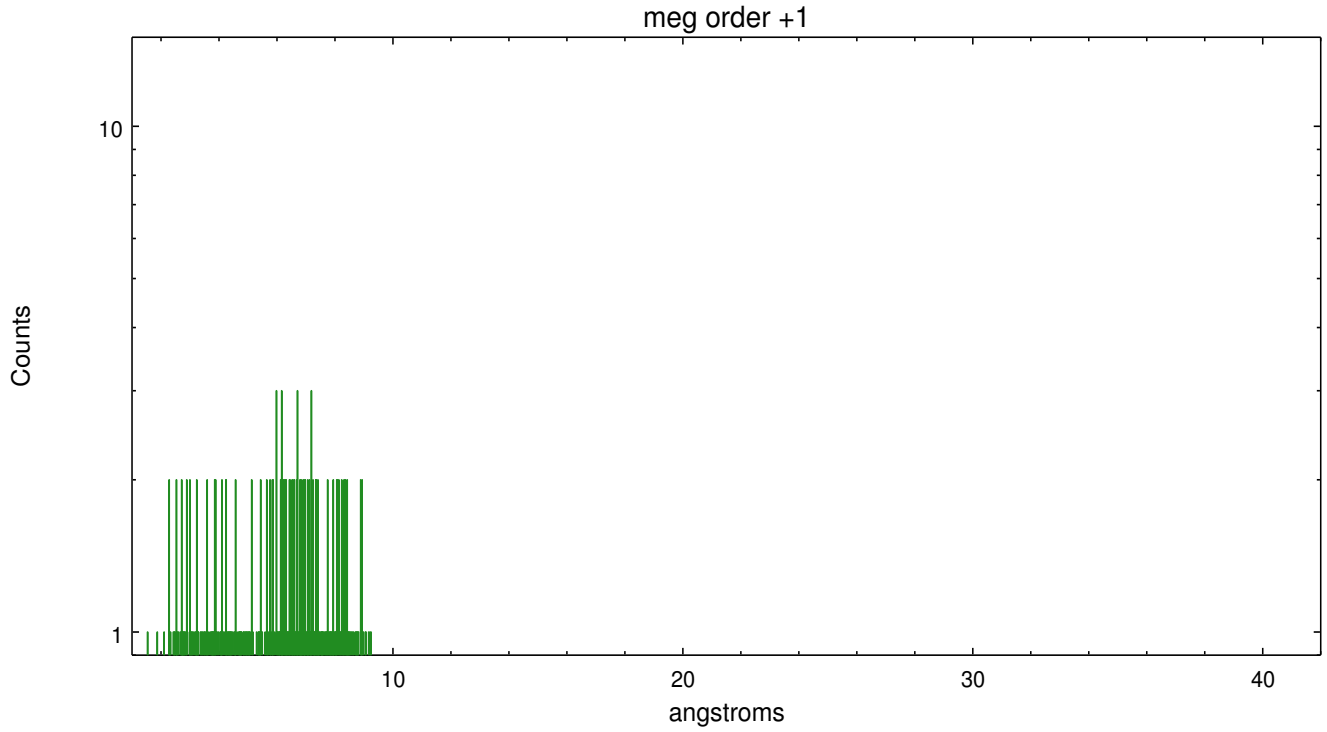


Full Detector MEG

	order -3	order -2	order -1	order 0	order 1	order 2	order 3
Events	0	1	16	1788	477	20	20




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)	2018.11.19
V&V Edition	1
V&V Disposition and Status	OK
V&V Charge Time	9.0695351632833

A.2 Comments

```
The EXPOSURE (and LIVETIME) are <8225.59> s, which is <90.69>% (DTCOR)
of the ONTIME of <9069.5> s. The reason that DTCOR is about 0.91 instead
of about 0.99 is that the frame time is only 0.4 s. Since the frame
transfer time is 0.04104 s, the fraction of the time spent in the static
exposure is 0.4 / (0.4 + 0.04104) = 0.906947. The EXPOSURE is consistent
with the exposure expected if one counts the total number of valid
frames (<20567>) and multiplies by the static exposure time (<20567> axaff20186N001_VV001_v
0.4 s = <8226.8> s).
====
HETG was inserted as a filter only. While a limited amount of high
energy spectral data is available in this observation, the primary
purpose of the observation was a study of the zeroth order (the target).
```