

# V&V Reference Report

## L2 ASCDS Version : 7.6.7.1

Observation 4571 - L2 Version 3  
Chandra X-Ray Center

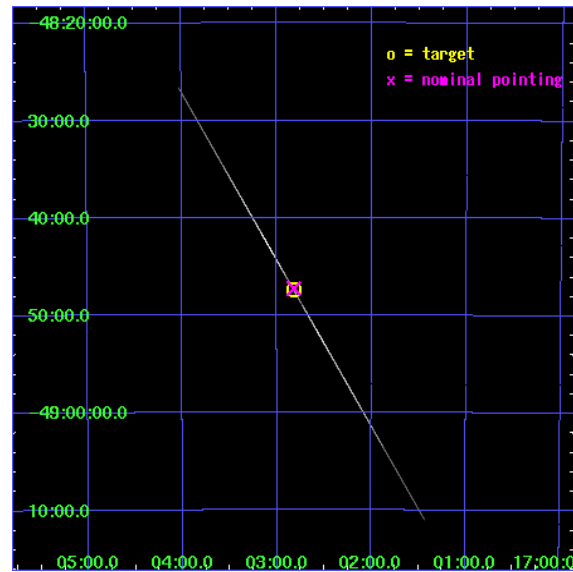
L2 Processing Date : Apr 13 2008

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# 1 Front

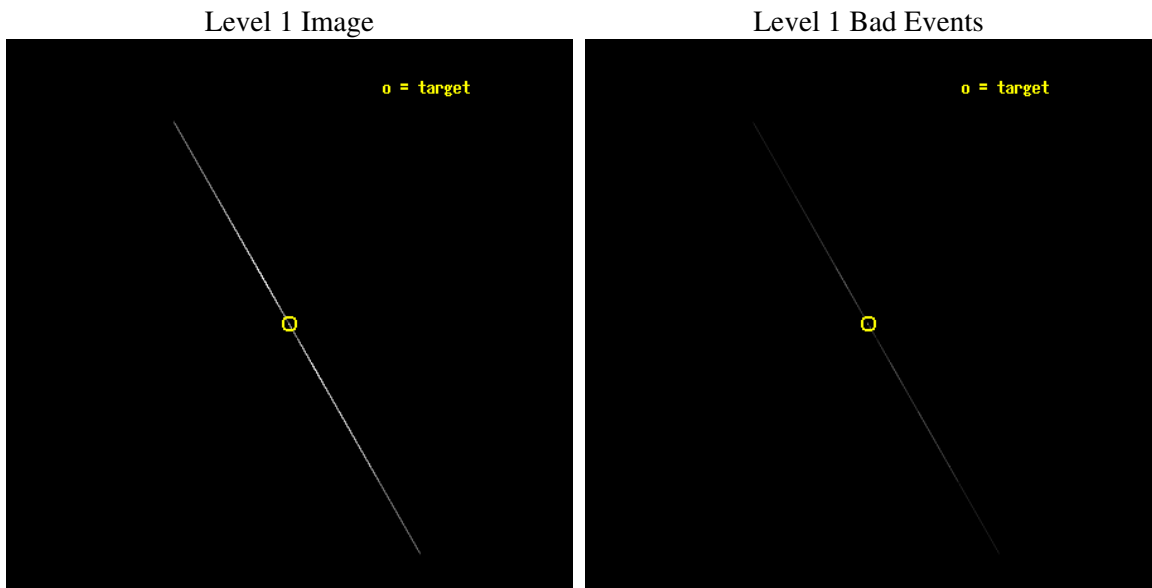
|          |                                                                                            |
|----------|--------------------------------------------------------------------------------------------|
| seq_num  | 400354                                                                                     |
| obs_id   | 4571                                                                                       |
| title    | Resolving Relativistic Effects and the Accretion Flow Geometry of a Black Hole in Outburst |
| observer | Dr Jon Miller                                                                              |
| object   | GX 339-4                                                                                   |
| ra_targ  | 255.70625                                                                                  |
| dec_targ | -48.789722                                                                                 |
| ra_nom   | 255.70521062439                                                                            |
| dec_nom  | -48.787600941866                                                                           |
| roll_nom | 239.93376351212                                                                            |
| revision | 3                                                                                          |
| ontime   | 35459.01348719                                                                             |
| livetime | 35320.501715756                                                                            |
| ontime4  | 50037.487001568                                                                            |
| ontime5  | 51167.0                                                                                    |
| ontime6  | 30628.499834269                                                                            |
| ontime7  | 35459.01348719                                                                             |
| ontime8  | 42715.268826455                                                                            |
| ontime9  | 51167.0                                                                                    |
| l2events | 17384601                                                                                   |



## 2 OBI

### 2.1 OBI

#### 2.1.1 Images



## 2.1.2 Parameters

|          |                     |
|----------|---------------------|
| obi_num  | 0                   |
| ascdsver | 7.6.11.6            |
| caldsver | 3.4.4               |
| date     | 2008-04-12T01:01:28 |
| revision | 3                   |

|                |                 |
|----------------|-----------------|
| sched_exp_time | 51000.000000    |
| ontime         | 35459.01348719  |
| ontime4        | 50037.487001568 |
| ontime5        | 51167.0         |
| ontime6        | 30628.499834269 |
| ontime7        | 35459.01348719  |
| ontime8        | 42715.268826455 |
| ontime9        | 51167.0         |
| l1events       | 18988827        |

## 2.1.3 Events

|                 | ccd 4  | ccd 5   | ccd 6   | ccd 7   | ccd 8   | ccd 9  |
|-----------------|--------|---------|---------|---------|---------|--------|
| level 1 events  | 396391 | 2865996 | 5395481 | 6127063 | 3575621 | 628275 |
| rejected events | 23171  | 88949   | 81216   | 128028  | 52967   | 23135  |
| rejected %      | 5%     | 3%      | 1%      | 2%      | 1%      | 3%     |

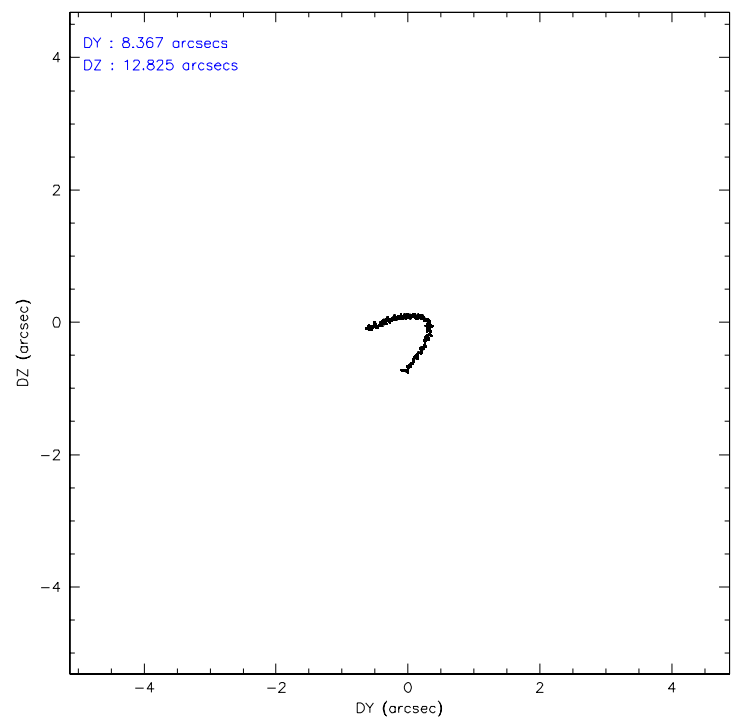
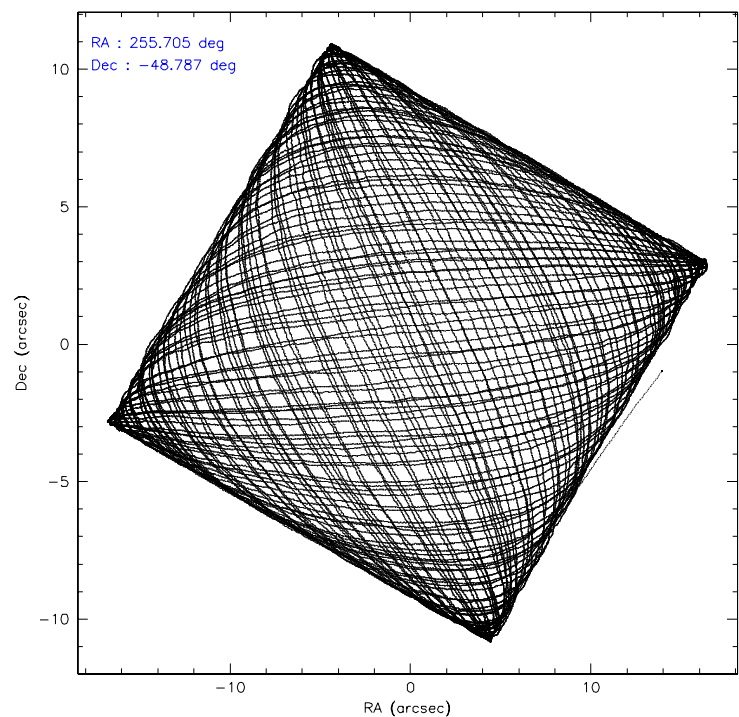
|                | ccd 4  | ccd 5   | ccd 6   | ccd 7   | ccd 8   | ccd 9  |
|----------------|--------|---------|---------|---------|---------|--------|
| grade 0 events | 18021  | 578574  | 2235542 | 1269340 | 2439365 | 66618  |
|                | 4%     | 20%     | 41%     | 20%     | 68%     | 10%    |
| grade 1 events | 298    | 952     | 8006    | 7983    | 7672    | 432    |
|                | 0%     | 0%      | 0%      | 0%      | 0%      | 0%     |
| grade 2 events | 307719 | 1208163 | 2629792 | 1754604 | 797201  | 467563 |
|                | 77%    | 42%     | 48%     | 28%     | 22%     | 74%    |
| grade 3 events | 9611   | 151980  | 100033  | 616876  | 97825   | 10558  |
|                | 2%     | 5%      | 1%      | 10%     | 2%      | 1%     |
| grade 4 events | 9890   | 149210  | 99229   | 613333  | 97310   | 11217  |
|                | 2%     | 5%      | 1%      | 10%     | 2%      | 1%     |
| grade 5 events | 15453  | 62287   | 39092   | 84336   | 30926   | 19370  |
|                | 3%     | 2%      | 0%      | 1%      | 0%      | 3%     |
| grade 6 events | 35399  | 714830  | 283787  | 1780591 | 105322  | 52517  |
|                | 8%     | 24%     | 5%      | 29%     | 2%      | 8%     |
| grade 7 events | 0      | 0       | 0       | 0       | 0       | 0      |
|                | 0%     | 0%      | 0%      | 0%      | 0%      | 0%     |

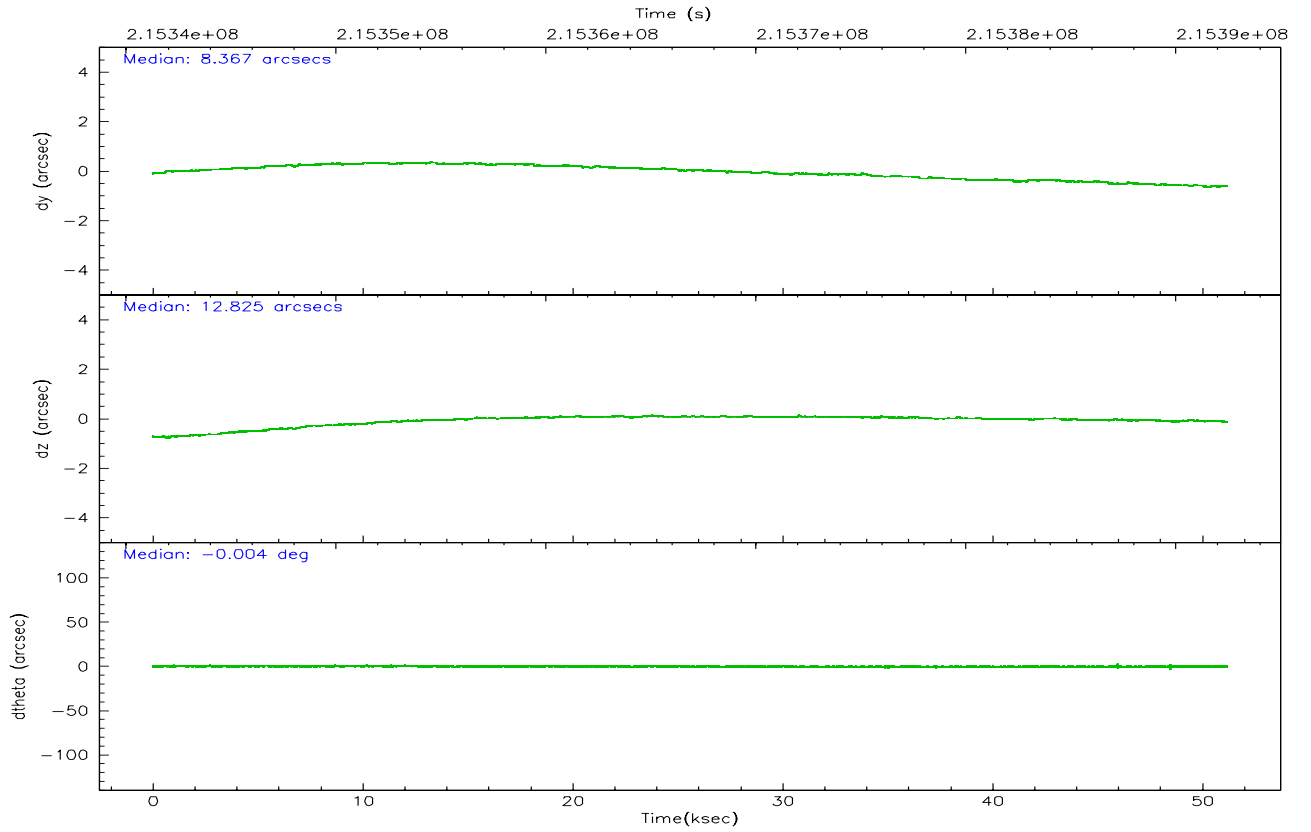
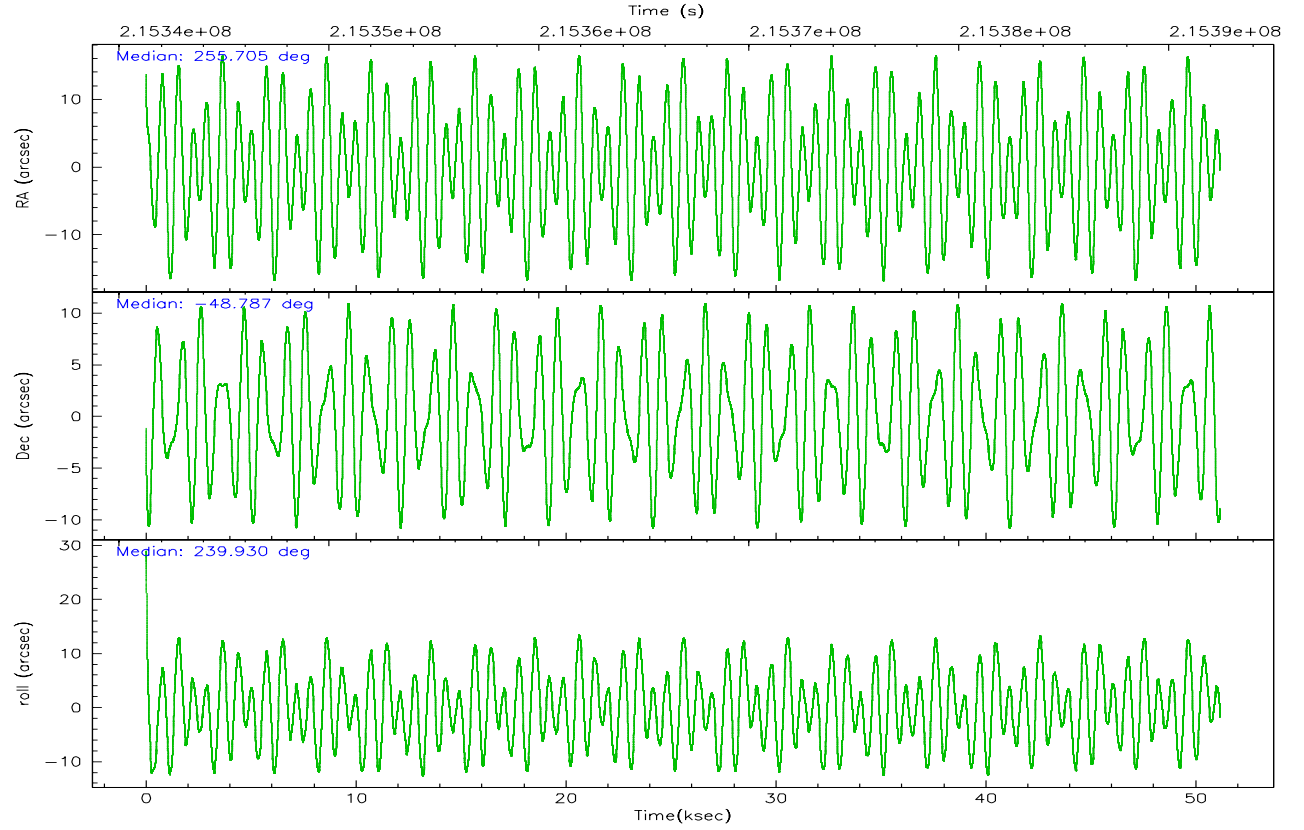


## 2.2 Compared Parameters

| Parameter                         | Planned             | Actual               | Parameter                       | Planned   | Actual  |
|-----------------------------------|---------------------|----------------------|---------------------------------|-----------|---------|
| Instrument                        | ACIS                | ACIS                 | Obspar format version number    | 6         | 6       |
| Detector                          | ACIS-456789         | ACIS-456789          | Obspar file type                | PREDICTED | ACTUAL  |
| Grating                           | HETG                | HETG                 | Obspar update status            | NONE      | UPDATED |
| Data mode                         | CC33_GRADED         | CC33_GRADED          | On-chip summing requested       | N         | N       |
| Observation mode                  | POINTING            | POINTING             | Subarray requested              | NONE      | NONE    |
| Pointing RA                       | 255.704672          | 255.7052106243856    | Alternating exposures requested | N         | N       |
| Pointing Dec                      | -48.760379          | -48.78760094186649   | Primary exposure time           | 0.000000  | 0       |
| Pointing Roll                     | 239.776728          | 239.9337635121232    |                                 |           |         |
| SIM focus pos (mm)                | -0.684267           | -0.6828225247311905  |                                 |           |         |
| SIM defocus (mm)                  | 0                   | 0.001444936568705701 |                                 |           |         |
| SIM translation stage pos (mm)    | -182.632523         | -182.6398635053184   |                                 |           |         |
| SIM translation stage offset (mm) | -7.5                | -7.49265907768941    |                                 |           |         |
| Observation start time            | 215341447.184000    | 215340225.72353      |                                 |           |         |
| Observation start date            | 2004-10-28T09:03:03 | 2004-10-28T08:43:45  |                                 |           |         |
| Observation end time              | 215392447.184000    | 215393335.58842      |                                 |           |         |
| Observation end date              | 2004-10-28T23:13:03 | 2004-10-28T23:28:55  |                                 |           |         |
| Read mode                         | CONTINUOUS          | CONTINUOUS           |                                 |           |         |

2.3 Aspect



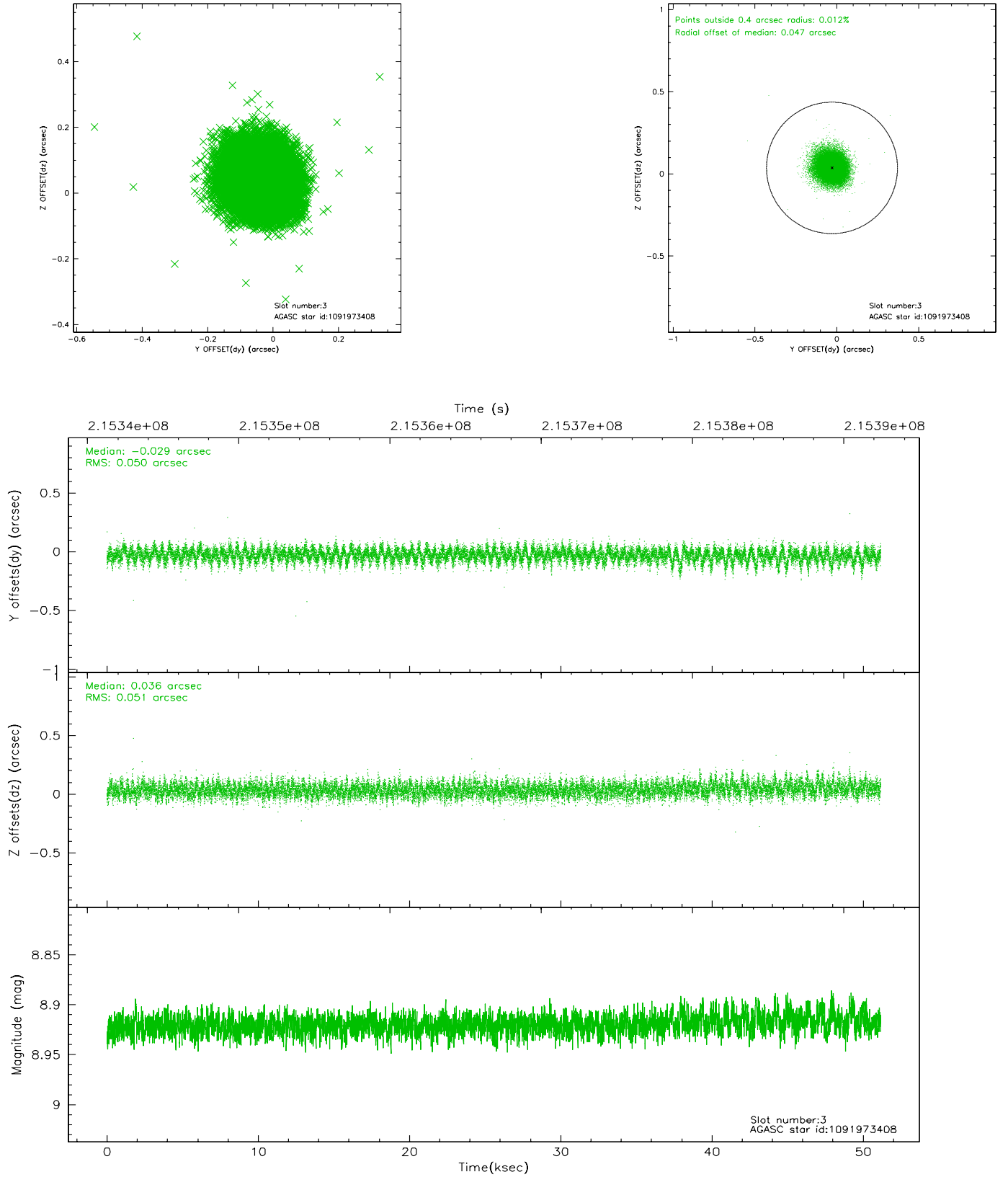


### Slot Statistics

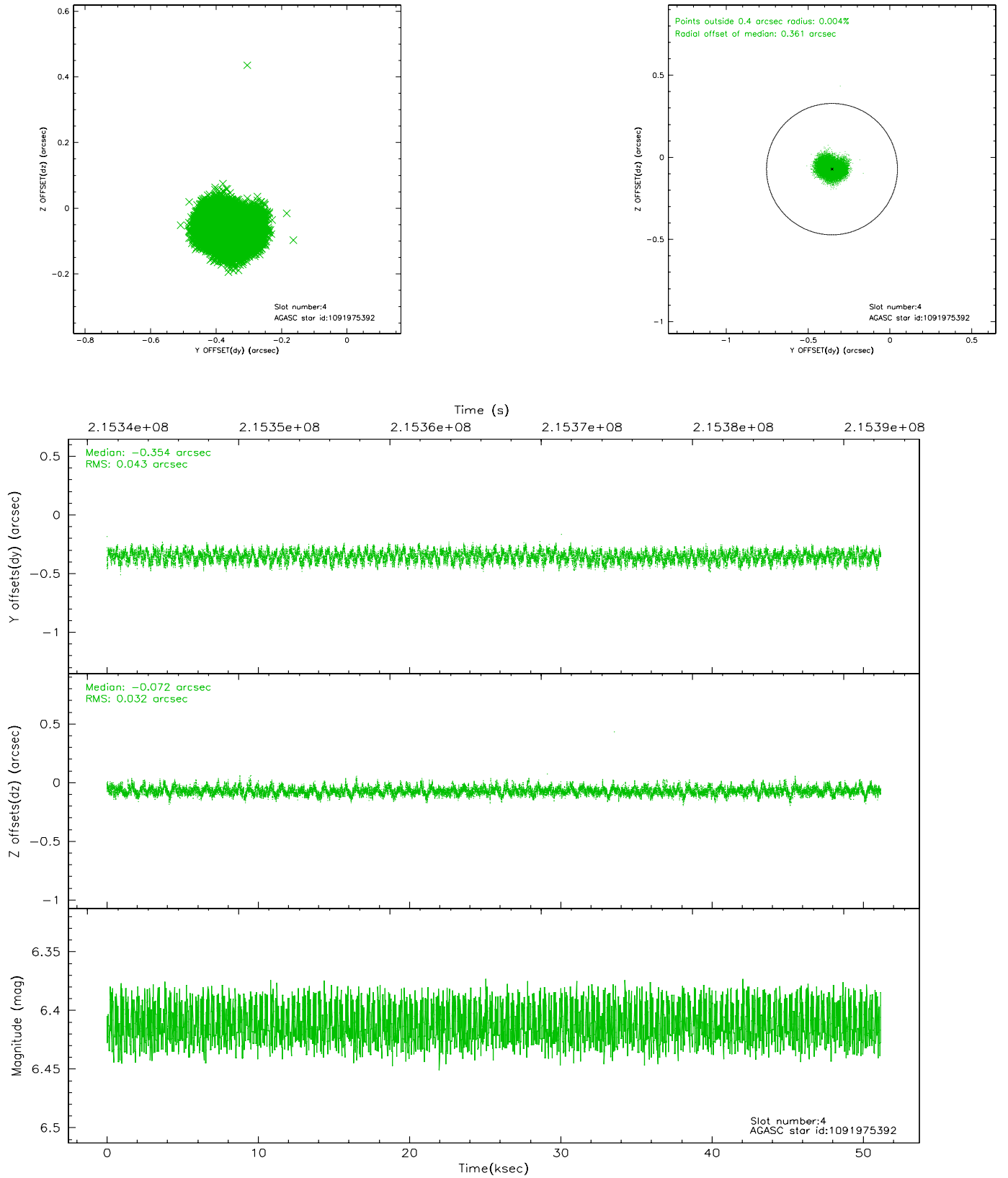
| slot | status | id         | mag  | n_pts | med_dy | med_dz | dr1   | dr2   | ra         | dec        | mean_y   | mean_z   |
|------|--------|------------|------|-------|--------|--------|-------|-------|------------|------------|----------|----------|
| 0    | FID    | ACIS-S-2   | 7.08 | 12481 | -0.091 | -0.085 | 0.010 | 0.017 | 0.000000   | 0.000000   | -760.65  | -1888.53 |
| 1    | FID    | ACIS-S-4   | 7.17 | 12480 | 0.068  | 0.040  | 0.008 | 0.013 | 0.000000   | 0.000000   | 2152.78  | 20.09    |
| 2    | FID    | ACIS-S-6   | 7.39 | 12481 | -0.005 | 0.053  | 0.009 | 0.014 | 0.000000   | 0.000000   | 401.37   | 657.47   |
| 3    | GUIDE  | 1091973408 | 8.92 | 24952 | -0.029 | 0.036  | 0.076 | 0.125 | 255.800233 | -48.601800 | -607.36  | -90.59   |
| 4    | GUIDE  | 1091975392 | 6.41 | 24963 | -0.354 | -0.072 | 0.058 | 0.091 | 255.805002 | -48.336791 | -1438.37 | -560.09  |
| 5    | GUIDE  | 1092111344 | 9.97 | 24924 | 0.075  | 0.043  | 0.135 | 0.228 | 256.132869 | -48.213784 | -2214.48 | -101.47  |
| 6    | GUIDE  | 1092485728 | 6.91 | 24957 | 0.059  | 0.109  | 0.071 | 0.116 | 254.773222 | -48.875124 | 1479.15  | -1690.58 |
| 7    | GUIDE  | 1092491384 | 9.14 | 24947 | 0.246  | -0.117 | 0.091 | 0.147 | 254.923973 | -49.184437 | 2252.65  | -814.06  |

## 2.4 Star Slots

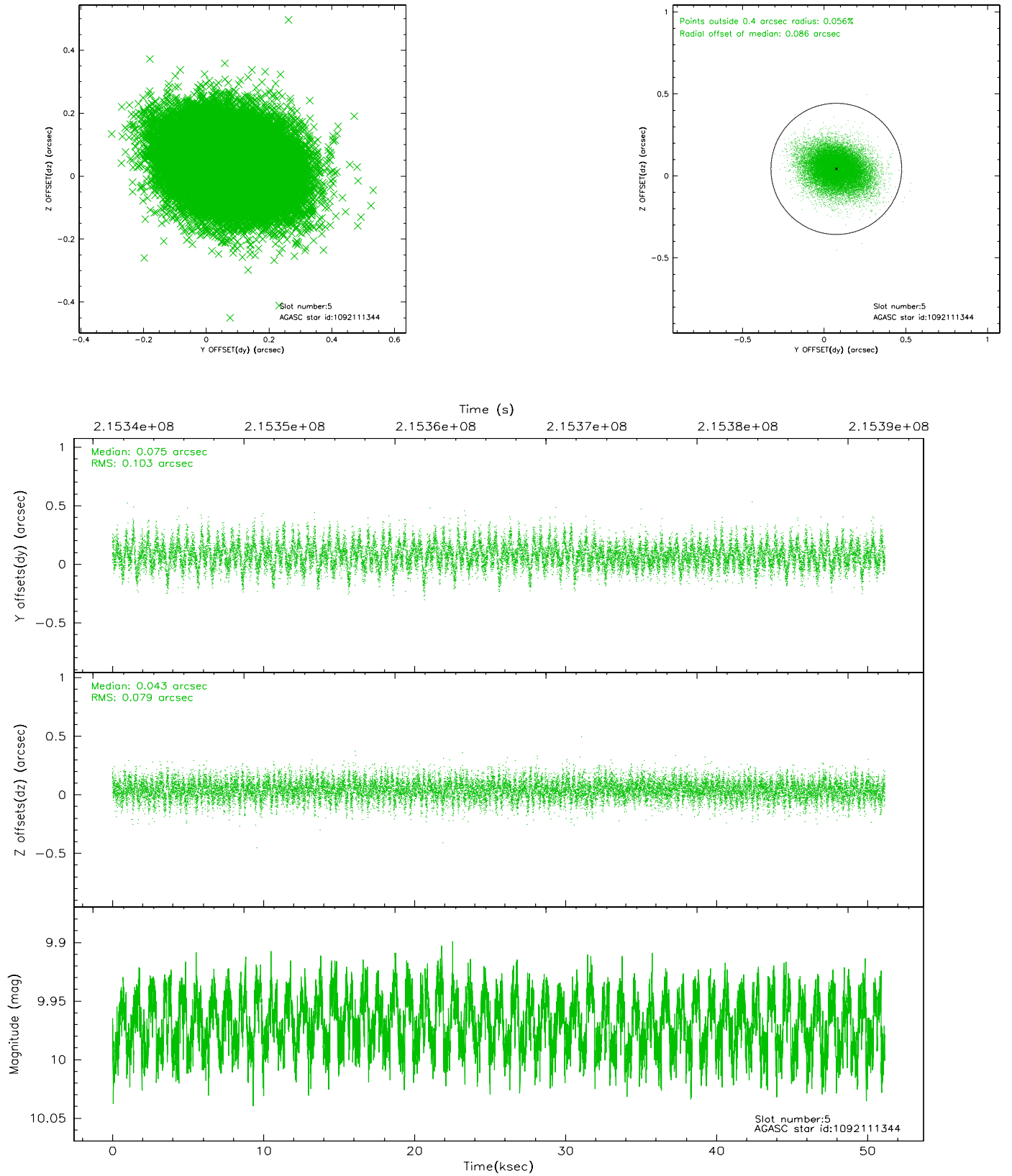
### 2.4.1 Slot 3



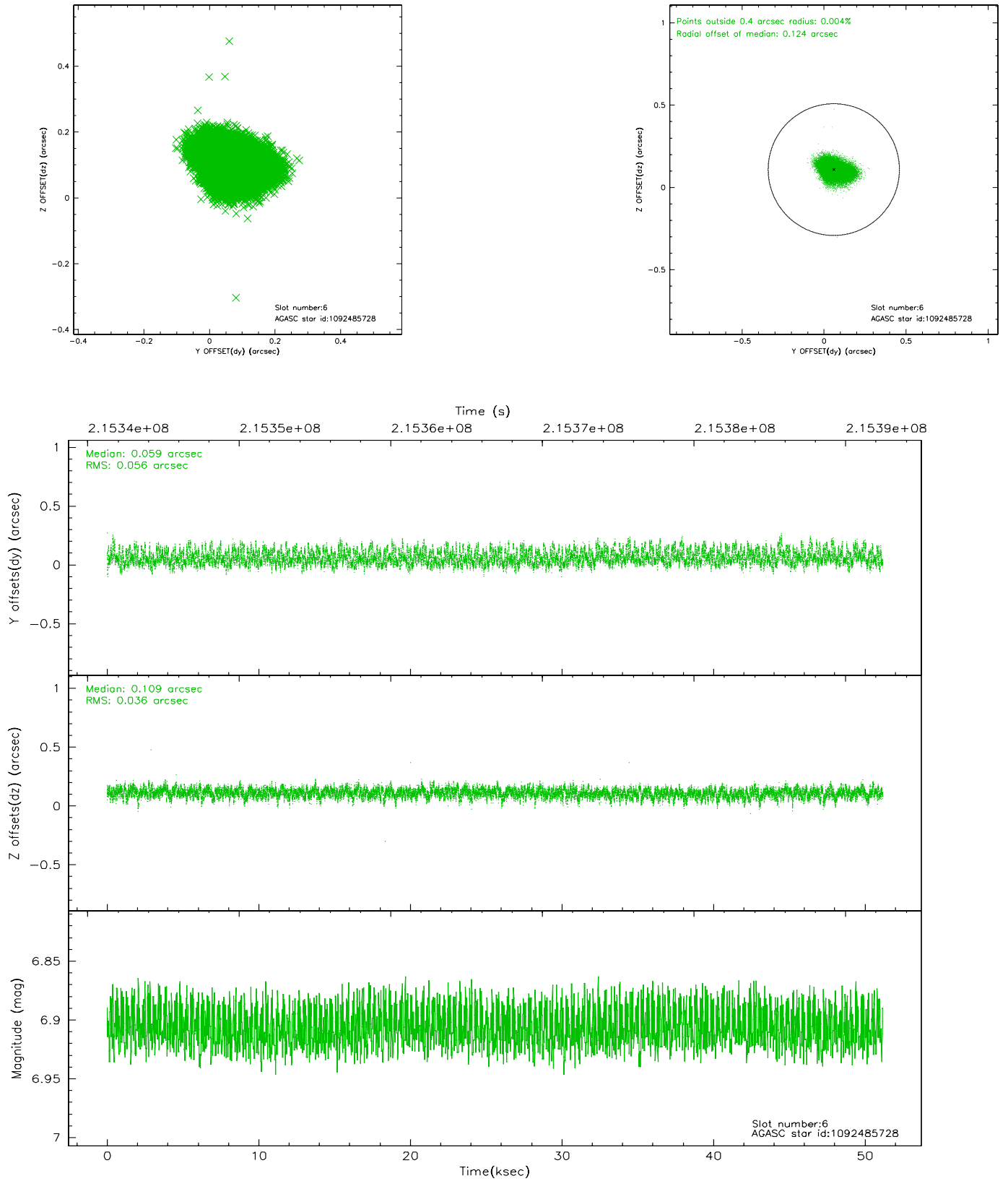
## 2.4.2 Slot 4



### 2.4.3 Slot 5

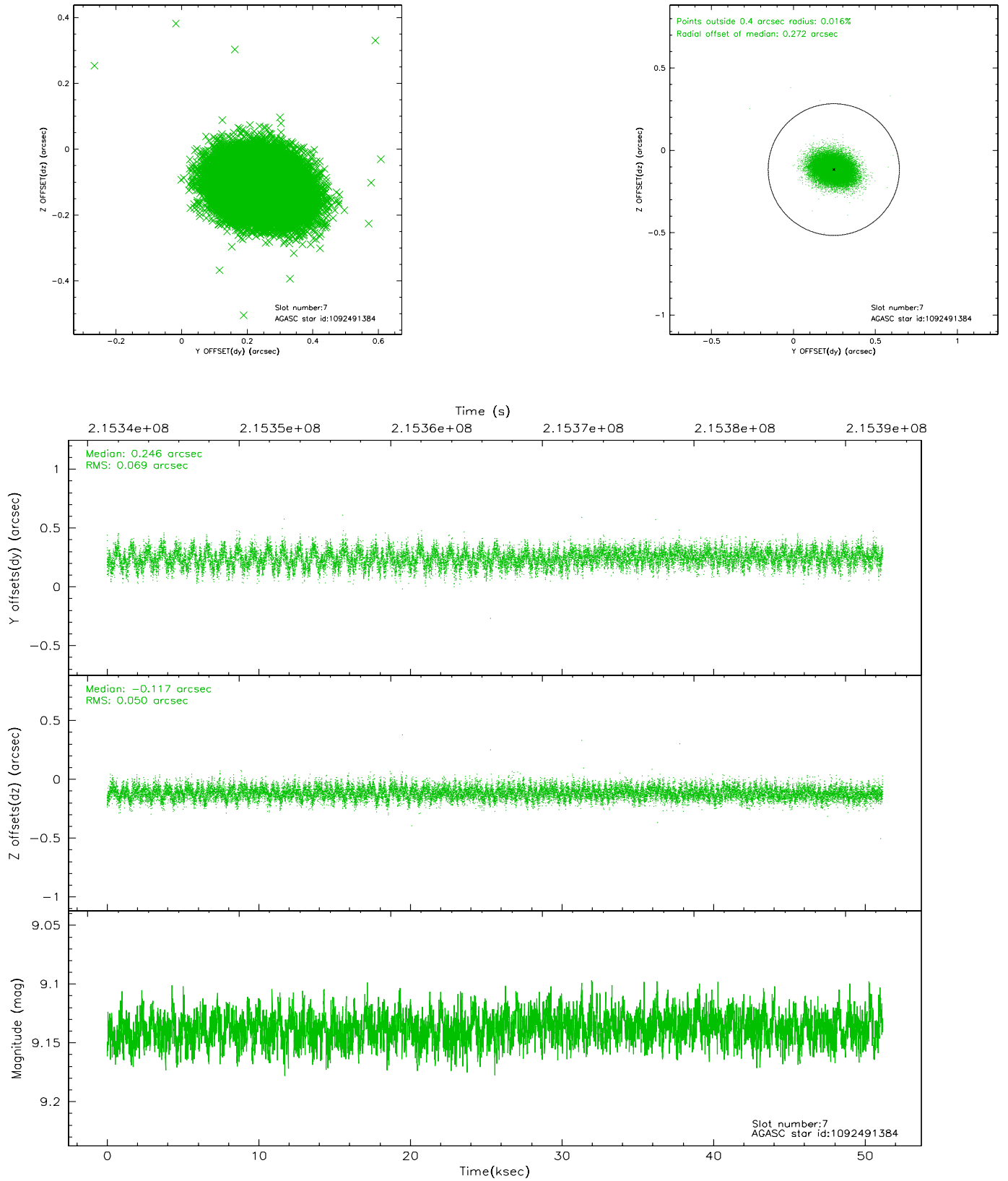


## 2.4.4 Slot 6



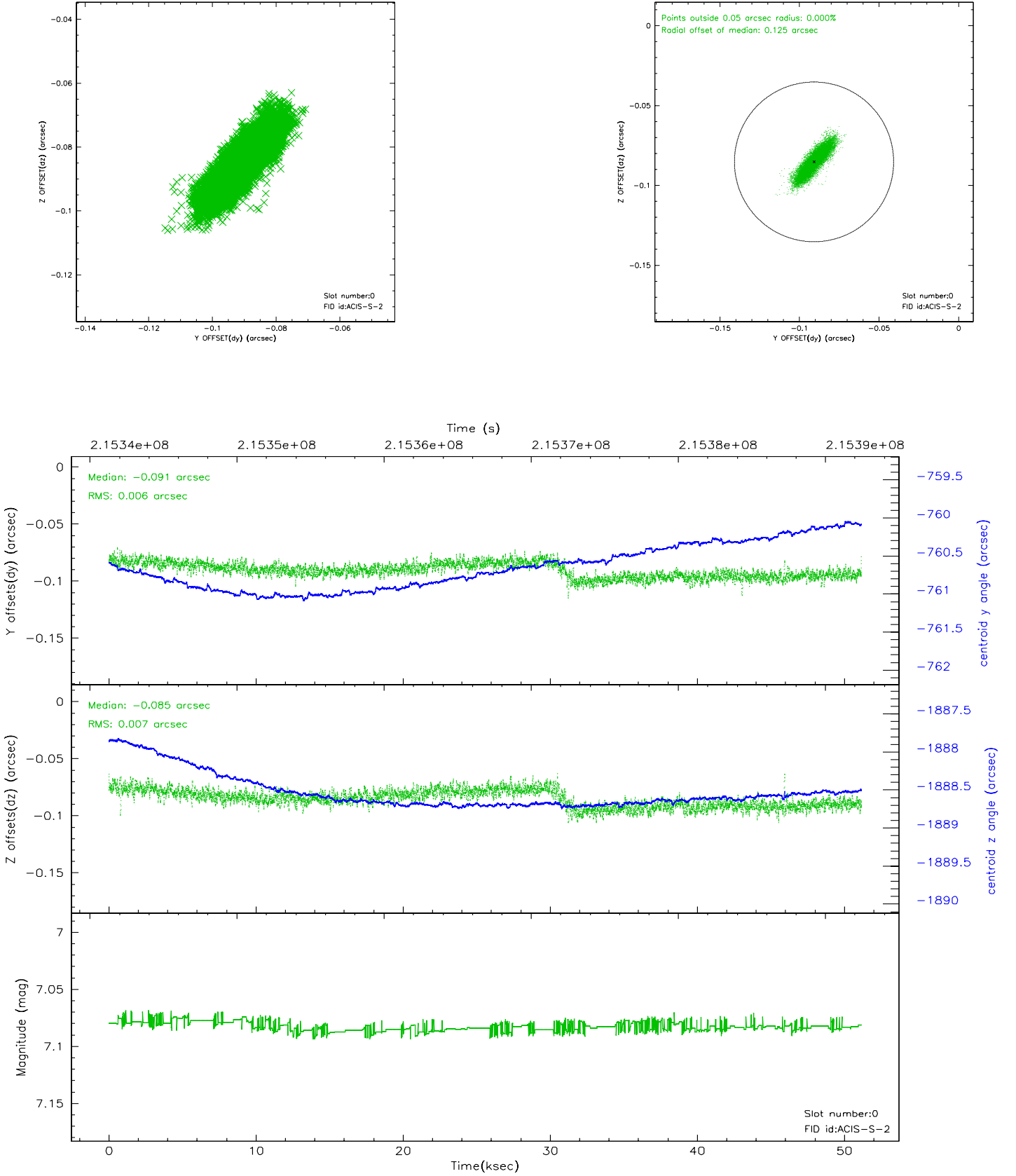


## 2.4.5 Slot 7

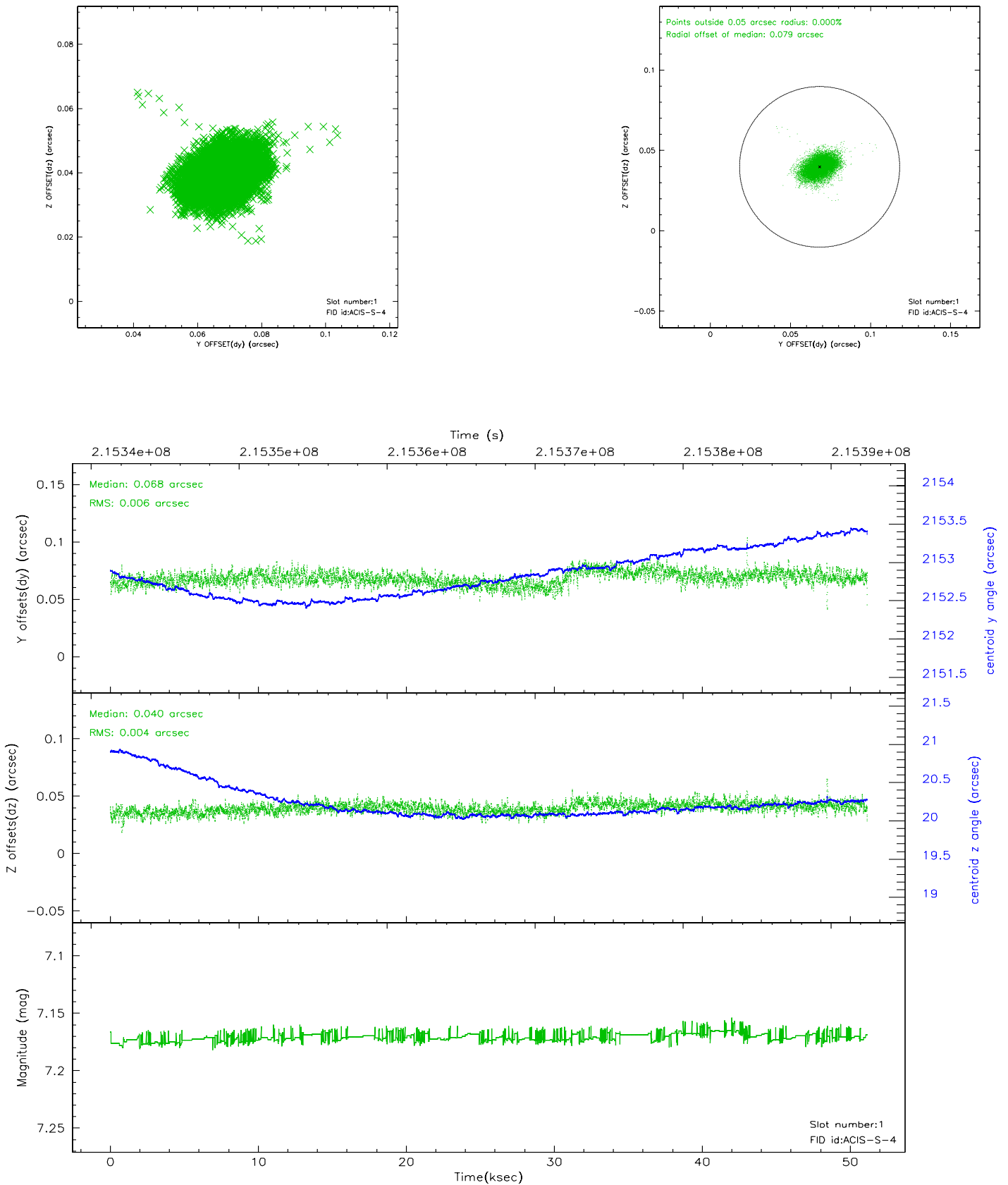


## 2.5 FID Slots

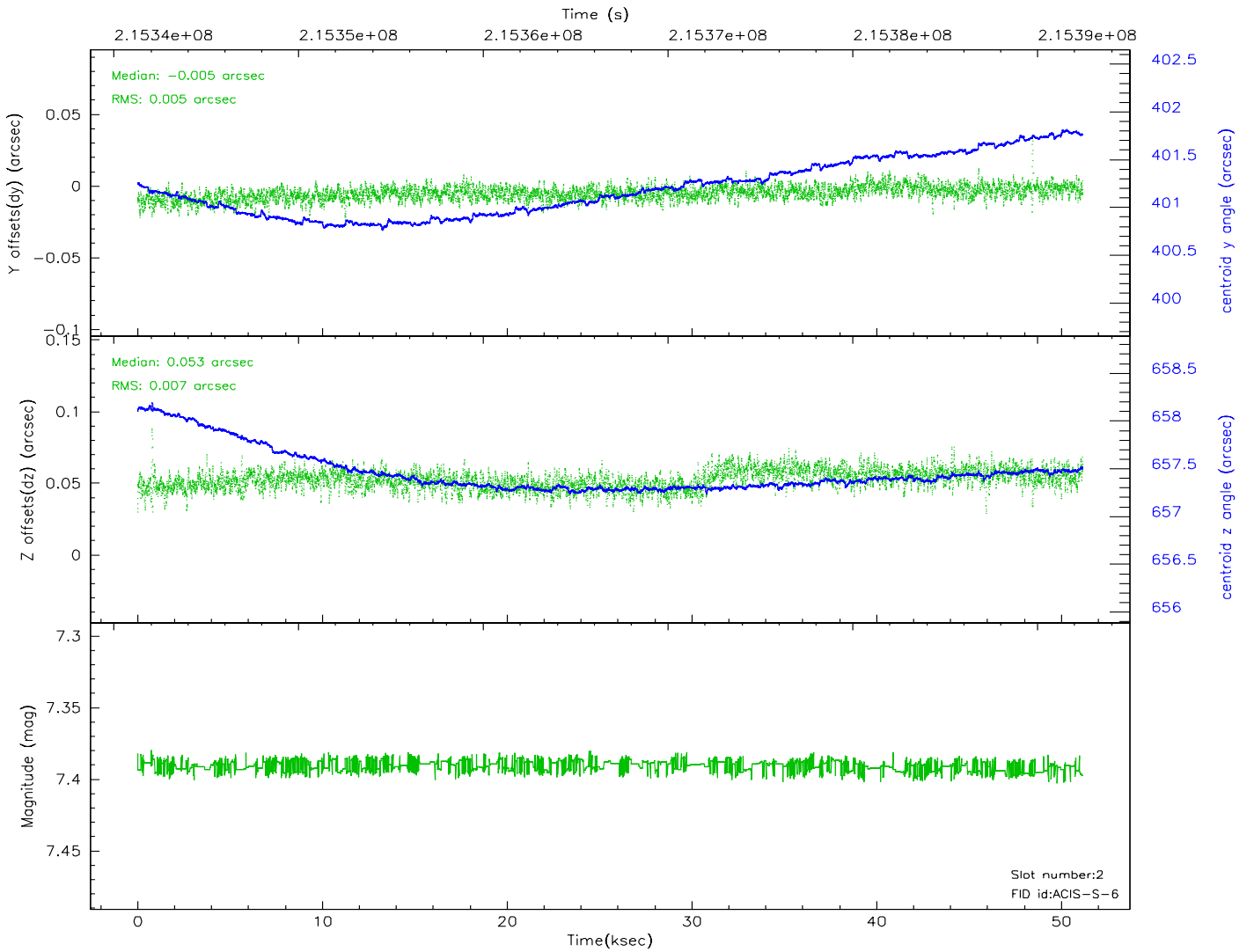
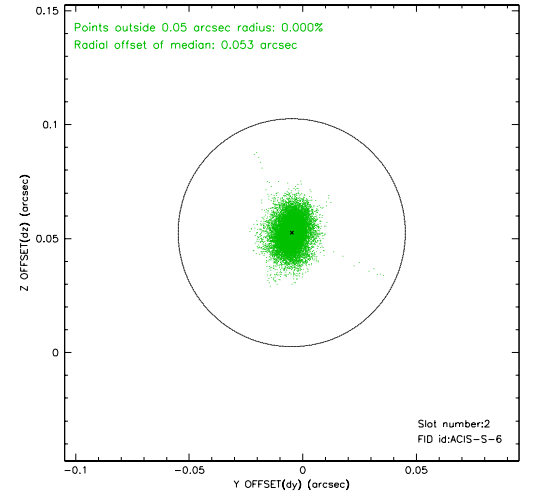
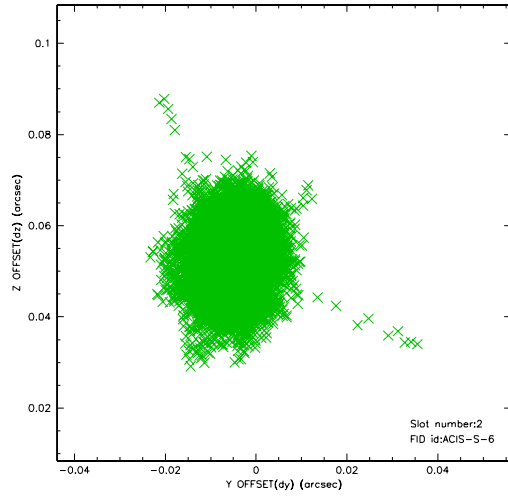
### 2.5.1 Slot 0



## 2.5.2 Slot 1

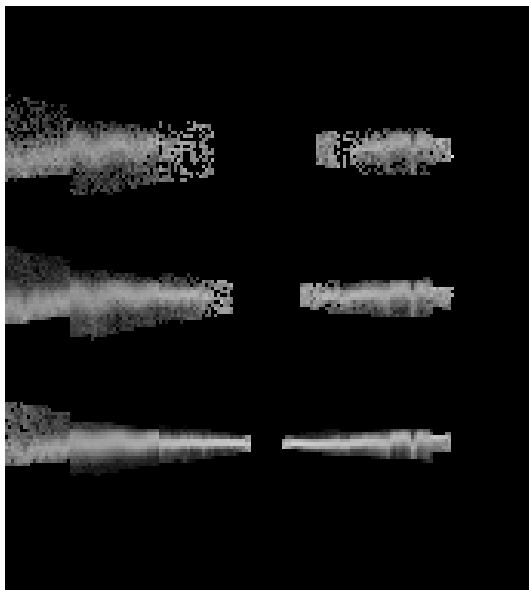


### 2.5.3 Slot 2



# 3 Gratings

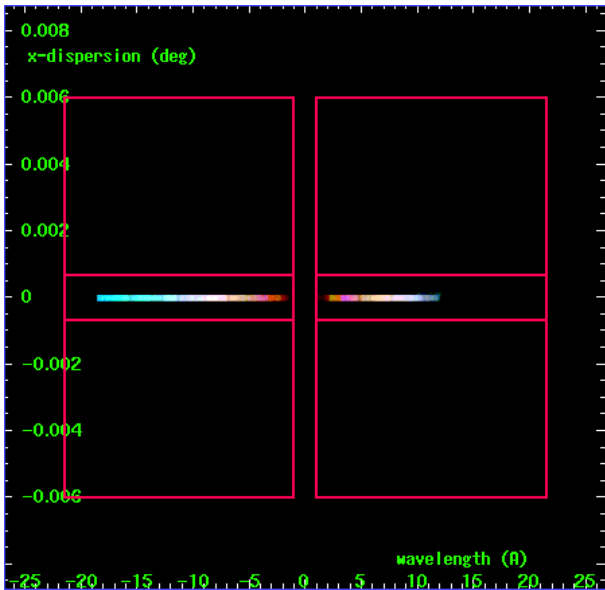
## 3.1 HEG Arm



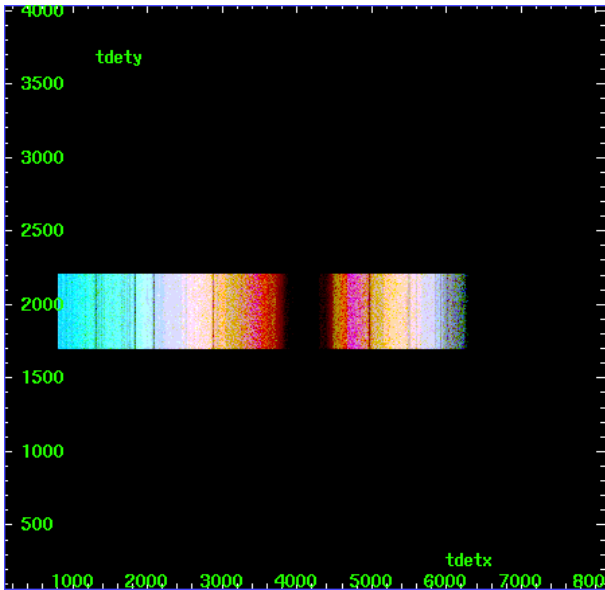
HEG Order Sort 123



HEG Order Sort ALL

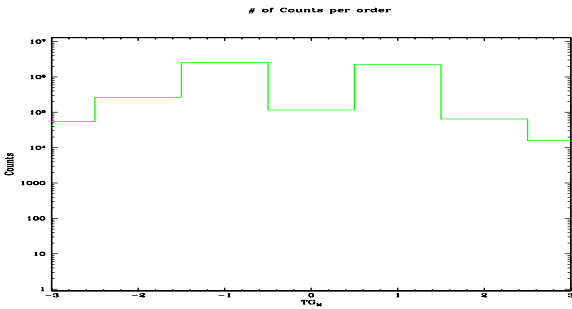


Spot Image HEG

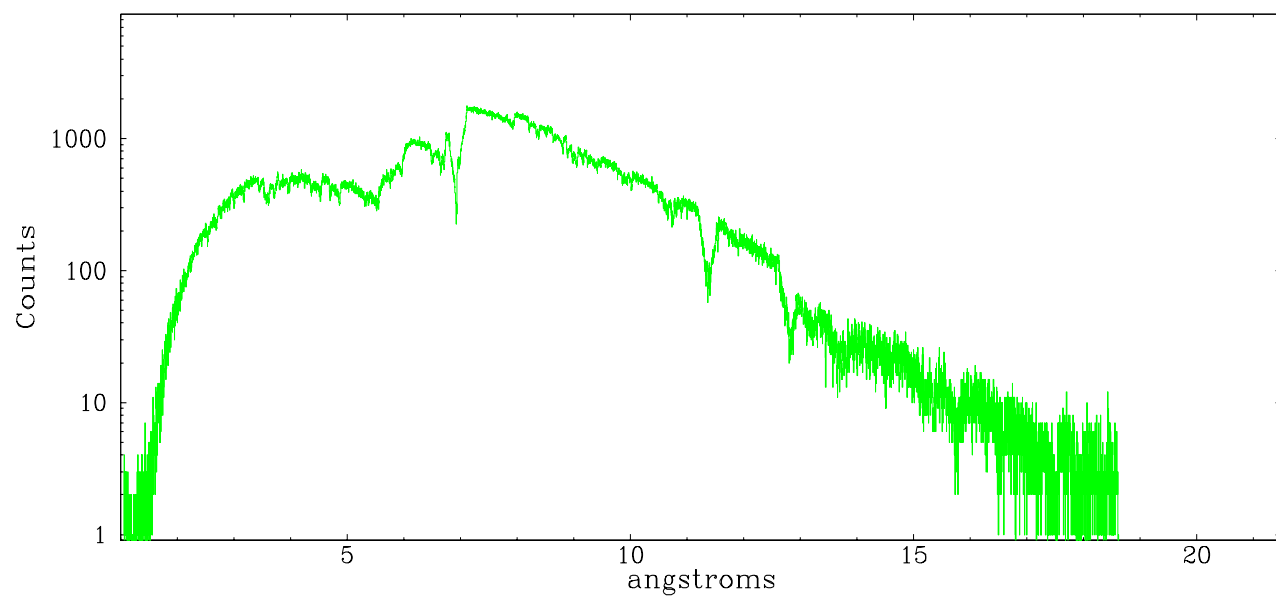


Full Detector HEG

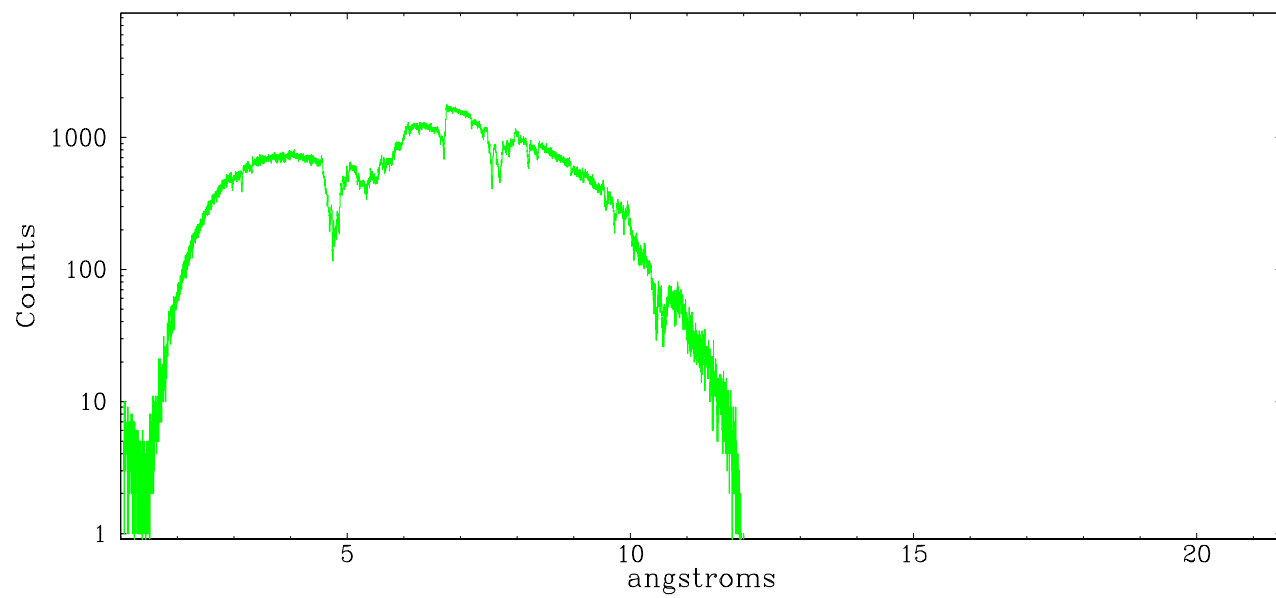
|        | order<br>-3 | order<br>-2 | order -1 | order<br>0 | order 1 | order<br>2 | order<br>3 |
|--------|-------------|-------------|----------|------------|---------|------------|------------|
| Events | 55313       | 266136      | 2545041  | 115756     | 2263949 | 65236      | 15760      |



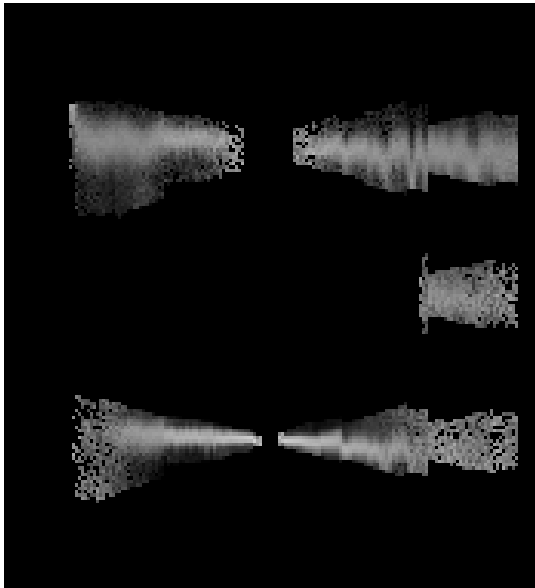
heg order -1



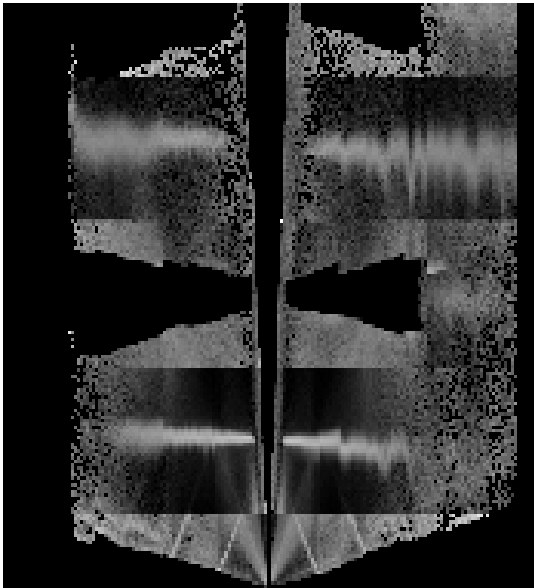
heg order +1



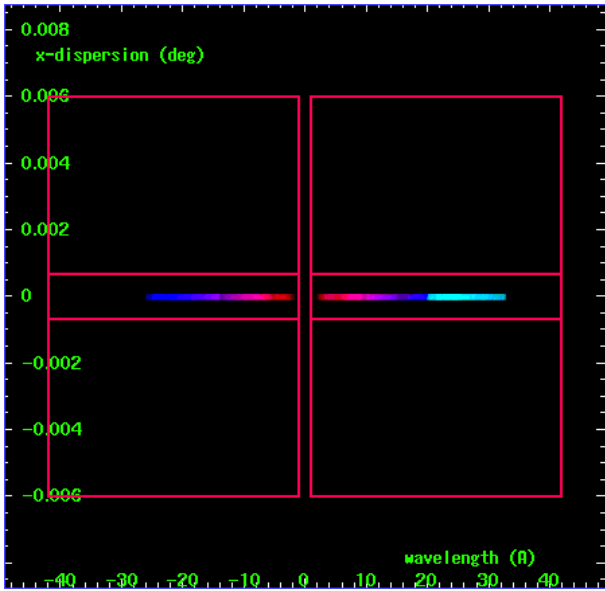
3.2 MEG Arm



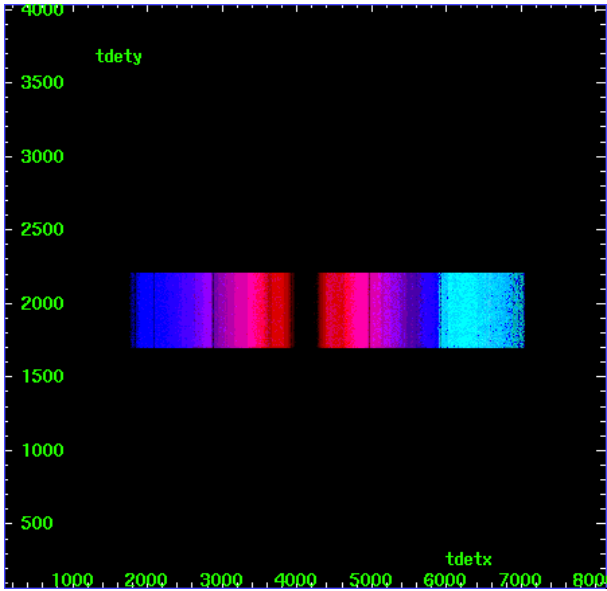
MEG Order Sort 123



MEG Order Sort ALL

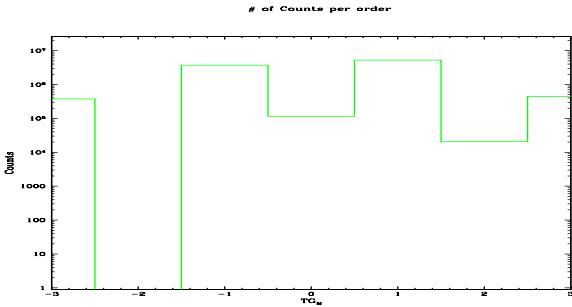


Spot Image MEG

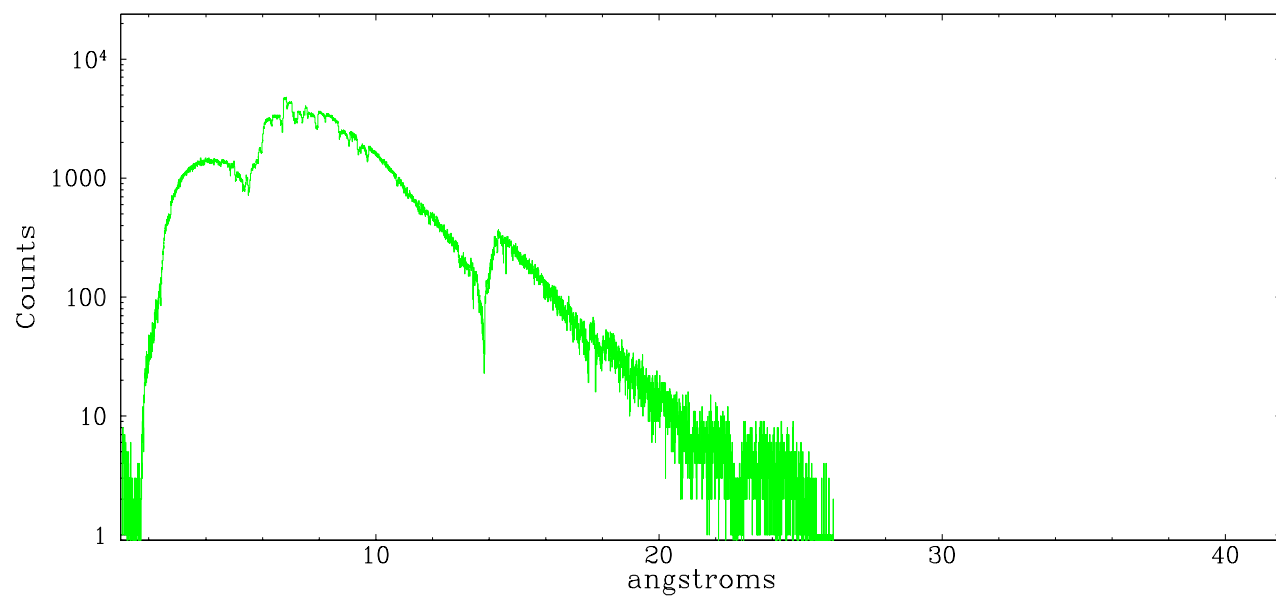


Full Detector MEG

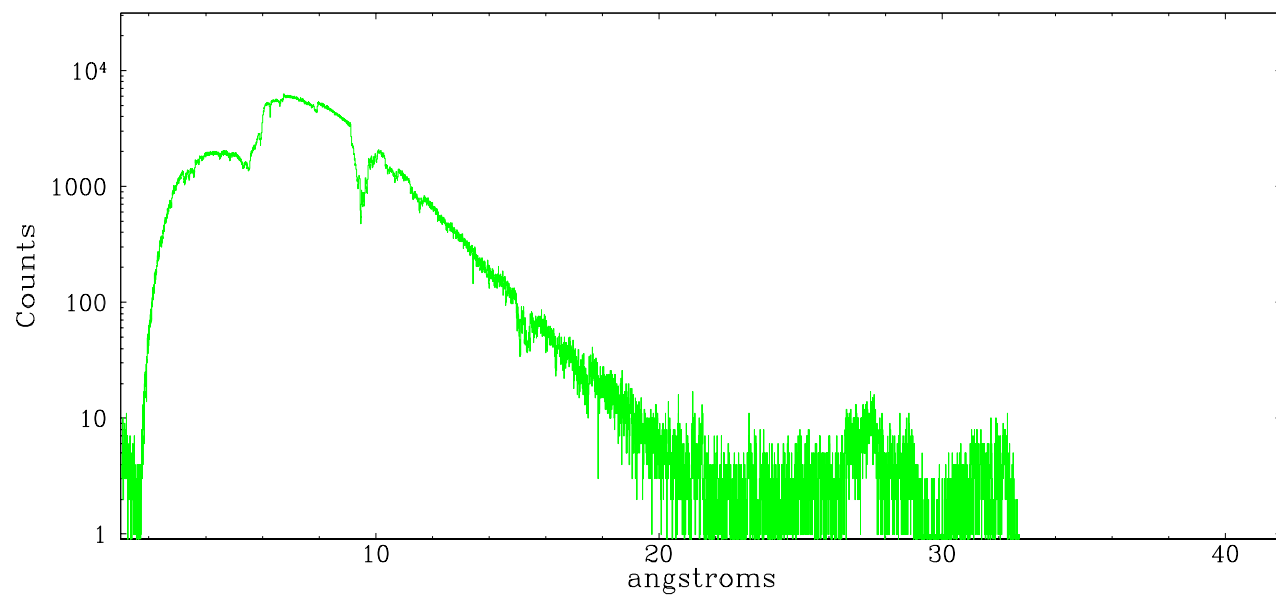
|        | order -3 | order -2 | order -1 | order 0 | order 1 | order 2 | order 3 |
|--------|----------|----------|----------|---------|---------|---------|---------|
| Events | 374287   | 0        | 3712693  | 115756  | 5209617 | 20603   | 448722  |



meg order -1



meg order +1





# A Summary

## A.1 Status

|                            |             |
|----------------------------|-------------|
| V&V Scientist              | Joy Nichols |
| V&V Date (YYYY-MM-DD)      | 2008.04.24  |
| V&V Edition                | 1           |
| V&V Disposition and Status | OK          |
| V&V Charge Time            | 51.167      |

## A.2 Comments

Charge time: Variance in time with chip is due to telemetry saturation.  
Appropriate time for HETG spectra is the chip 5 (unsaturated) time.

=====

Zeroth order is in a 100 column wide count exclusion window with a  
sampling

rate of 1/20.=====

Gain and CTI correction are not well calibrated in CC-mode.

Default order sorting can clip some regions, particularly in high  
orders. User-specified custom processing parameters may be required  
in tg\_resolve\_events (osipfile=none, osort\_lo, osort\_hi ~0.3)

though this can allow more zeroth order background at short

wavelengths.=====

For ACIS/CC-mode w/ HETG, there are no MEG even order counts. MEG  
even orders overlap with HEG orders in energy, but MEG even order  
efficiencies are very low. Since HEG and MEG cannot be spatially  
separated, events are preferentially assigned to HEG. (MEG odd  
orders can be resolved.)