

# V&V Reference Report

## L2 ASCDS Version : 7.6.10

Observation 3417 - L2 Version <sub>e</sub>1  
Chandra X-Ray Center

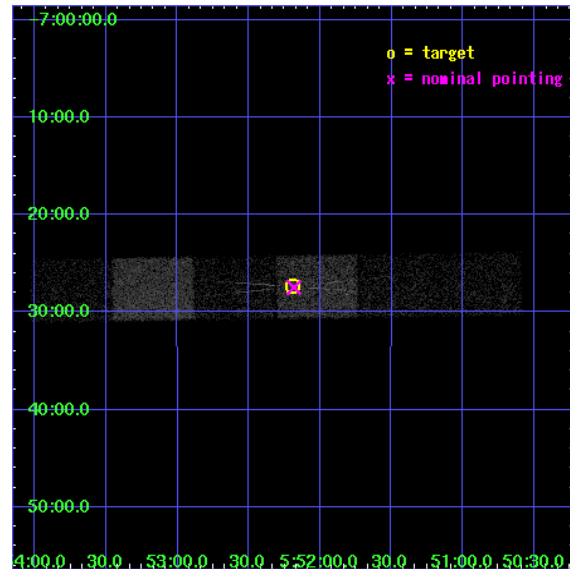
L2 Processing Date : Jan 18 2007

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# 1 Front

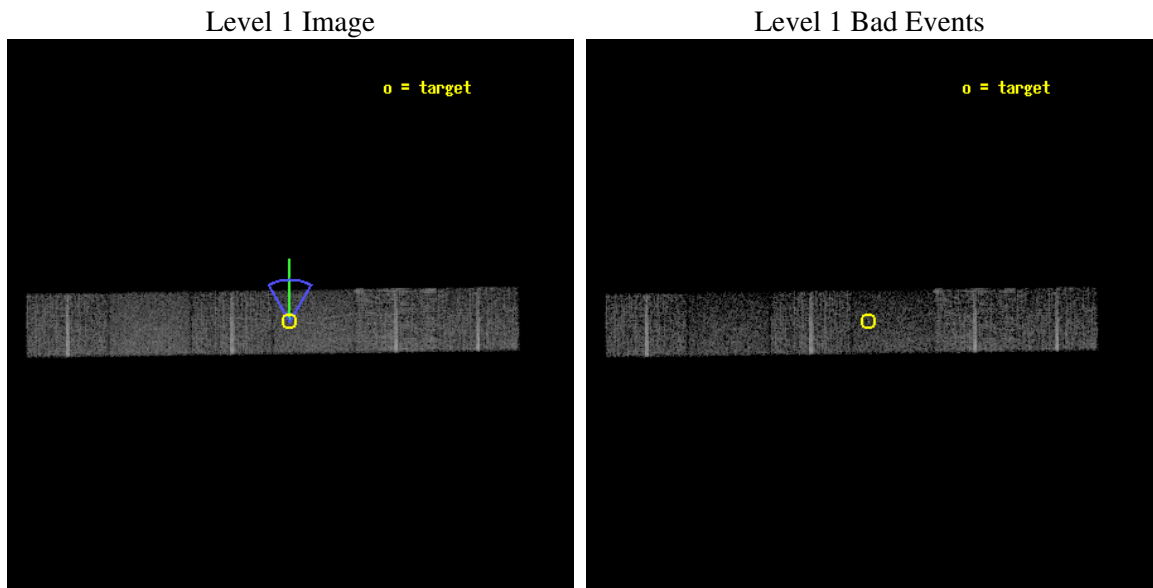
|          |  |
|----------|--|
| seq_num  | 700582   |
| obs_id   | 3417   |
| title    | PROBING UNIFICATION WITH ACIS-HETG OBSERVATION OF COMPTON-THIN SEYFERT 2<br>NGC 2110 |
| observer | Prof Julia Lee   |
| object   | NGC2110  |
| dtcycle  | 0  |
| cycle    | P  |
| ra_targ  | 88.0475  |
| dec_targ | -7.456111  |
| ra_nom   | 88.046030833565  |
| dec_nom  | -7.4577829934781   |
| roll_nom | 359.15643505397  |
| revision | 3  |
| ontime   | 8405.7084281296  |
| livetime | 2038.4516901304  |
| ontime4  | 8405.6673881263  |
| ontime5  | 8405.7494681329  |
| ontime6  | 8405.7905081213  |
| ontime7  | 8405.7084281296  |
| ontime8  | 8405.8161029667  |
| ontime9  | 8405.8161029667  |
| l2events | 23601  |



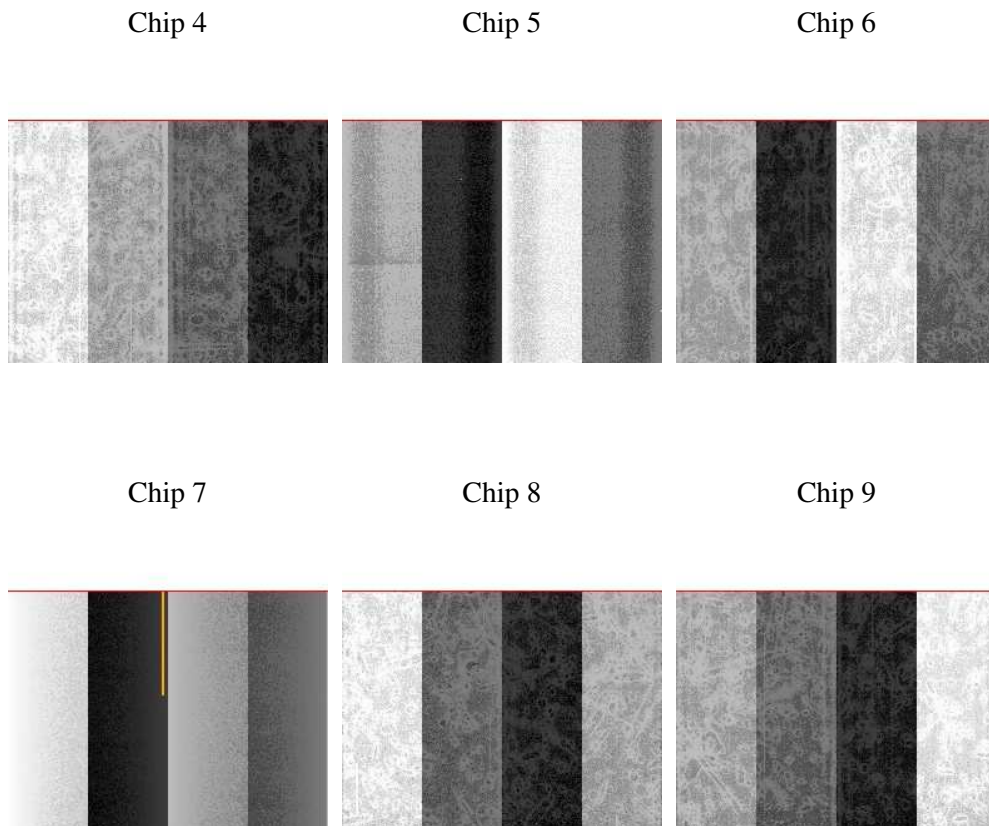
## 2 OBI Primary

### 2.1 OBI

#### 2.1.1 Images



#### 2.1.2 Bias



### 2.1.3 Parameters

|          |                     |
|----------|---------------------|
| obi_num  | 0                   |
| ascdsver | 7.6.10              |
| caldbver | 3.3.0               |
| date     | 2007-01-18T08:08:09 |
| revision | 3                   |

|                |                 |
|----------------|-----------------|
| sched_exp_time | 33137.886000    |
| ontime         | 8405.7084281296 |
| ontime4        | 8405.6673881263 |
| ontime5        | 8405.7494681329 |
| ontime6        | 8405.7905081213 |
| ontime7        | 8405.7084281296 |
| ontime8        | 8405.8161029667 |
| ontime9        | 8405.8161029667 |
| l1events       | 146625          |

### 2.1.4 Events

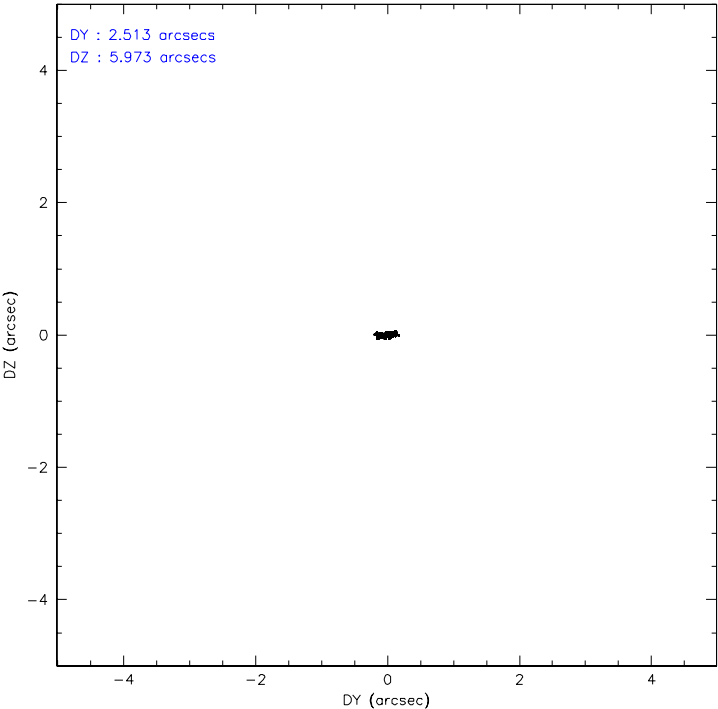
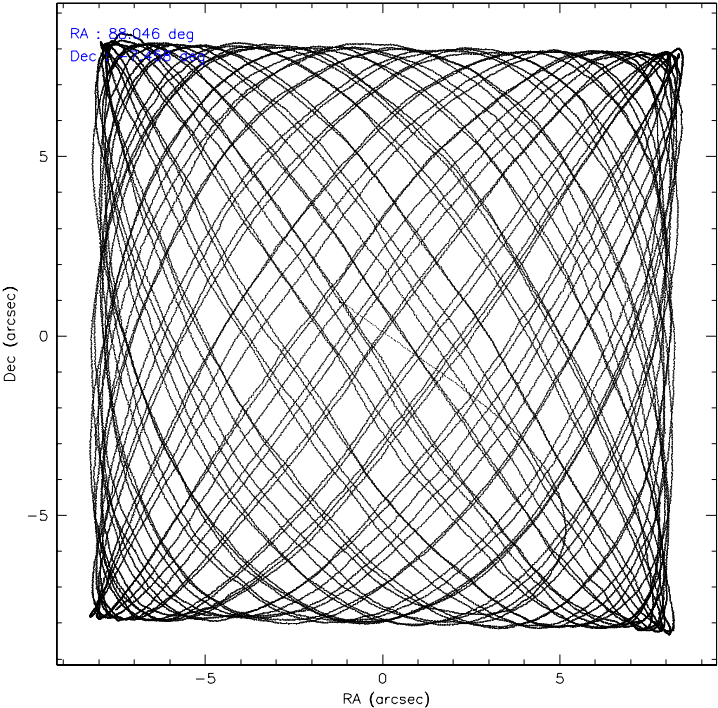
|                 | ccd 4 | ccd 5 | ccd 6 | ccd 7 | ccd 8 | ccd 9 |
|-----------------|-------|-------|-------|-------|-------|-------|
| level 1 events  | 24346 | 22962 | 24254 | 23047 | 29210 | 22806 |
| rejected events | 22341 | 14148 | 21959 | 14656 | 24790 | 20816 |
| rejected %      | 91%   | 61%   | 90%   | 63%   | 84%   | 91%   |

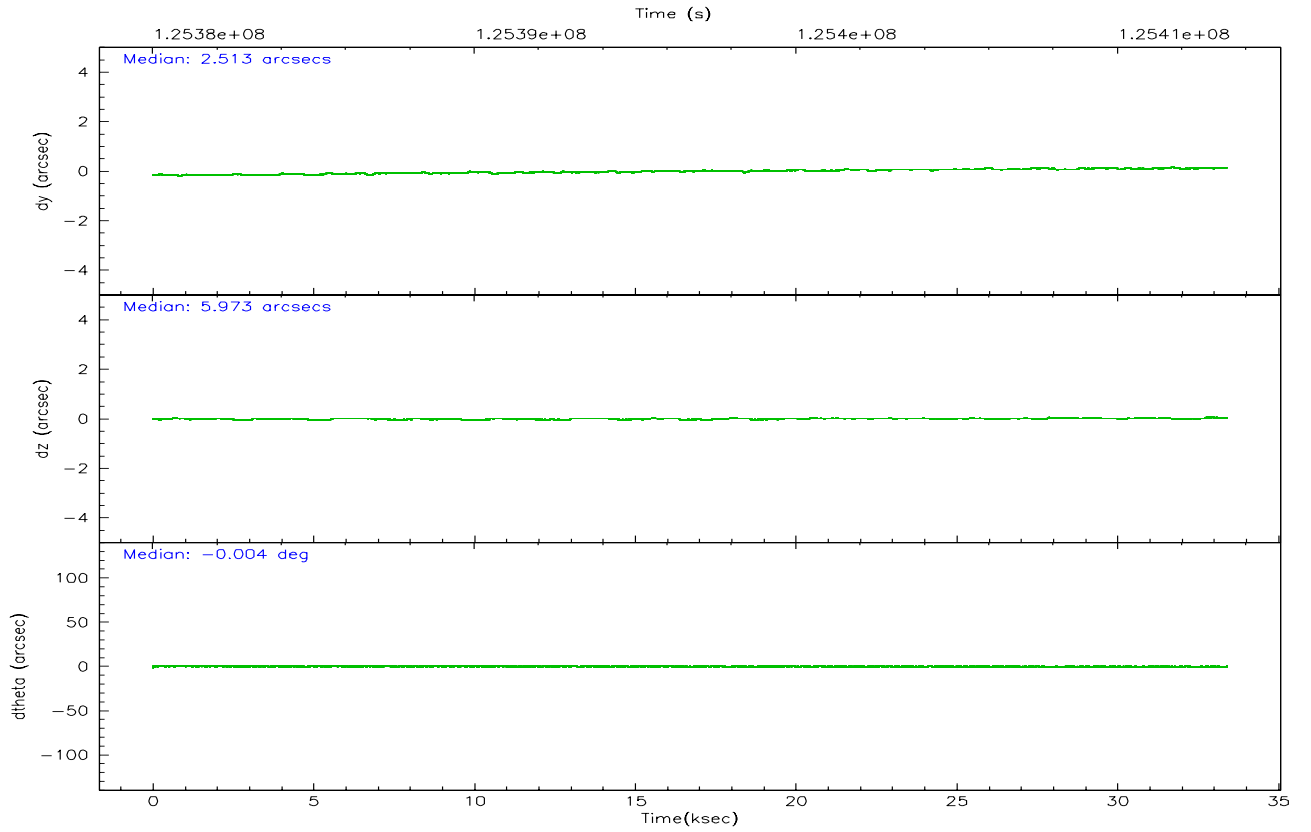
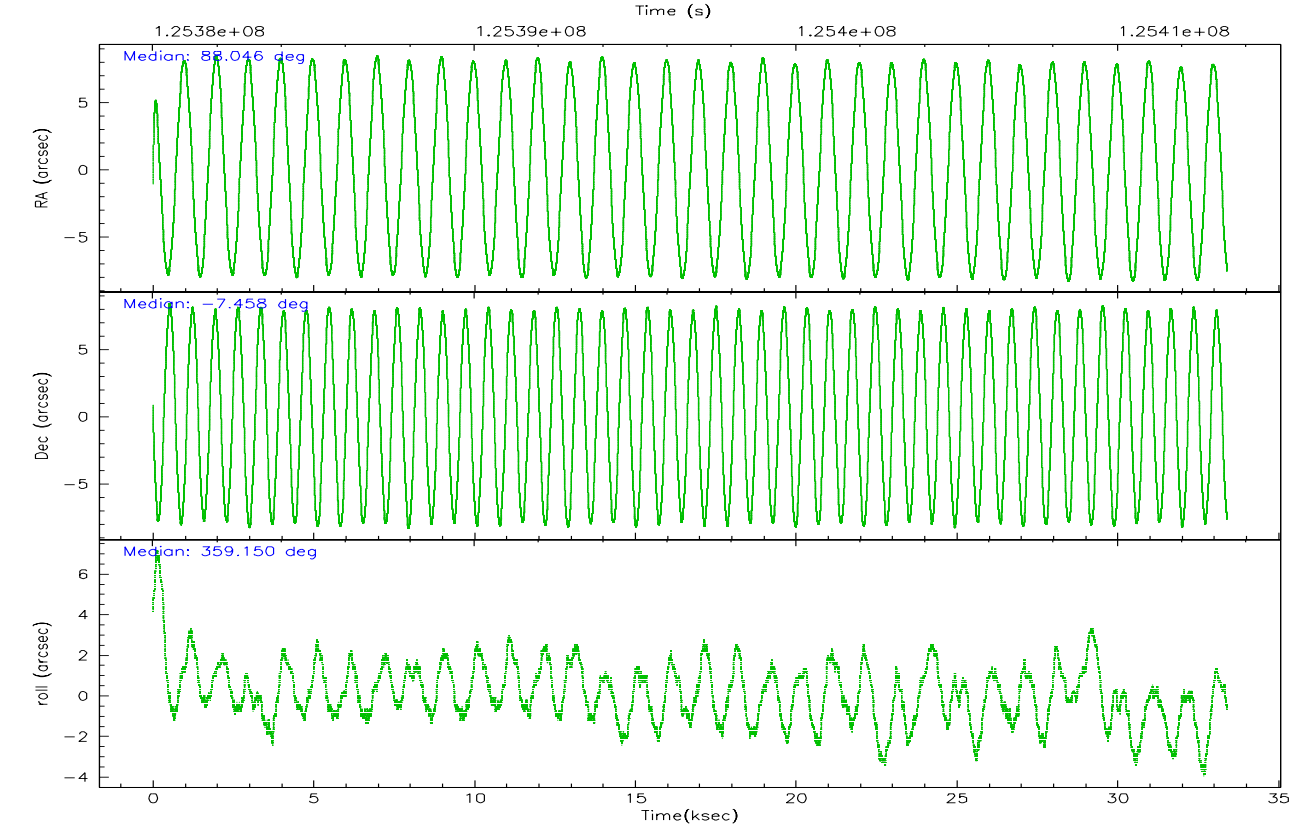
|                | ccd 4 | ccd 5 | ccd 6 | ccd 7 | ccd 8 | ccd 9 |
|----------------|-------|-------|-------|-------|-------|-------|
| grade 0 events | 646   | 522   | 889   | 899   | 1165  | 628   |
|                | 2%    | 2%    | 3%    | 3%    | 3%    | 2%    |
| grade 1 events | 8     | 28    | 3     | 21    | 9     | 10    |
|                | 0%    | 0%    | 0%    | 0%    | 0%    | 0%    |
| grade 2 events | 465   | 2438  | 456   | 1806  | 976   | 398   |
|                | 1%    | 10%   | 1%    | 7%    | 3%    | 1%    |
| grade 3 events | 285   | 507   | 259   | 815   | 529   | 285   |
|                | 1%    | 2%    | 1%    | 3%    | 1%    | 1%    |
| grade 4 events | 242   | 510   | 275   | 841   | 484   | 269   |
|                | 0%    | 2%    | 1%    | 3%    | 1%    | 1%    |
| grade 5 events | 690   | 1787  | 694   | 1902  | 924   | 689   |
|                | 2%    | 7%    | 2%    | 8%    | 3%    | 3%    |
| grade 6 events | 367   | 4844  | 416   | 4035  | 1268  | 414   |
|                | 1%    | 21%   | 1%    | 17%   | 4%    | 1%    |
| grade 7 events | 21643 | 12326 | 21262 | 12728 | 23855 | 20113 |
|                | 88%   | 53%   | 87%   | 55%   | 81%   | 88%   |

## 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                            | FAINT               | FAINT                | Number of optional ACIS chips dropped | 0         | 0       |
| Observation mode                     | POINTING            | POINTING             | On-chip summing requested             | N         | N       |
| Pointing RA                          | 88.022184           | 88.04603083356524    | Subarray requested                    | CUSTOM    | CUSTOM  |
| Pointing Dec                         | -7.471345           | -7.457782993478113   | Subarray start row                    | 1         | 1       |
| Pointing Roll                        | 358.996706          | 359.1564350539737    | Subarray row count                    | 774       | 774     |
| Roll angle                           | 0.000000            | 0.000000             | Alternating exposures requested       | Y         | Y       |
| Roll tolerance                       | 30.000000           | 30.000000            | Primary exposure time                 | 0.800000  | 0.8     |
| Roll constraint allows 180D rotation | N                   | N                    | Secondary exposure time               | 0.000000  | 3.2     |
| SIM focus pos (mm)                   | -0.684267           | -0.6828225247311905  | Duty cycle                            | 3         | 3       |
| 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               | 125380279.184000    | 125379280.09019      |                                       |           |         |
| Observation start date               | 2001-12-22T03:50:15 | 2001-12-22T03:34:40  |                                       |           |         |
| Observation end time                 | 125413417.184000    | 125413731.36657      |                                       |           |         |
| Observation end date                 | 2001-12-22T13:02:33 | 2001-12-22T13:08:51  |                                       |           |         |
| Read mode                            | TIMED               | TIMED                |                                       |           |         |

2.3 Aspect





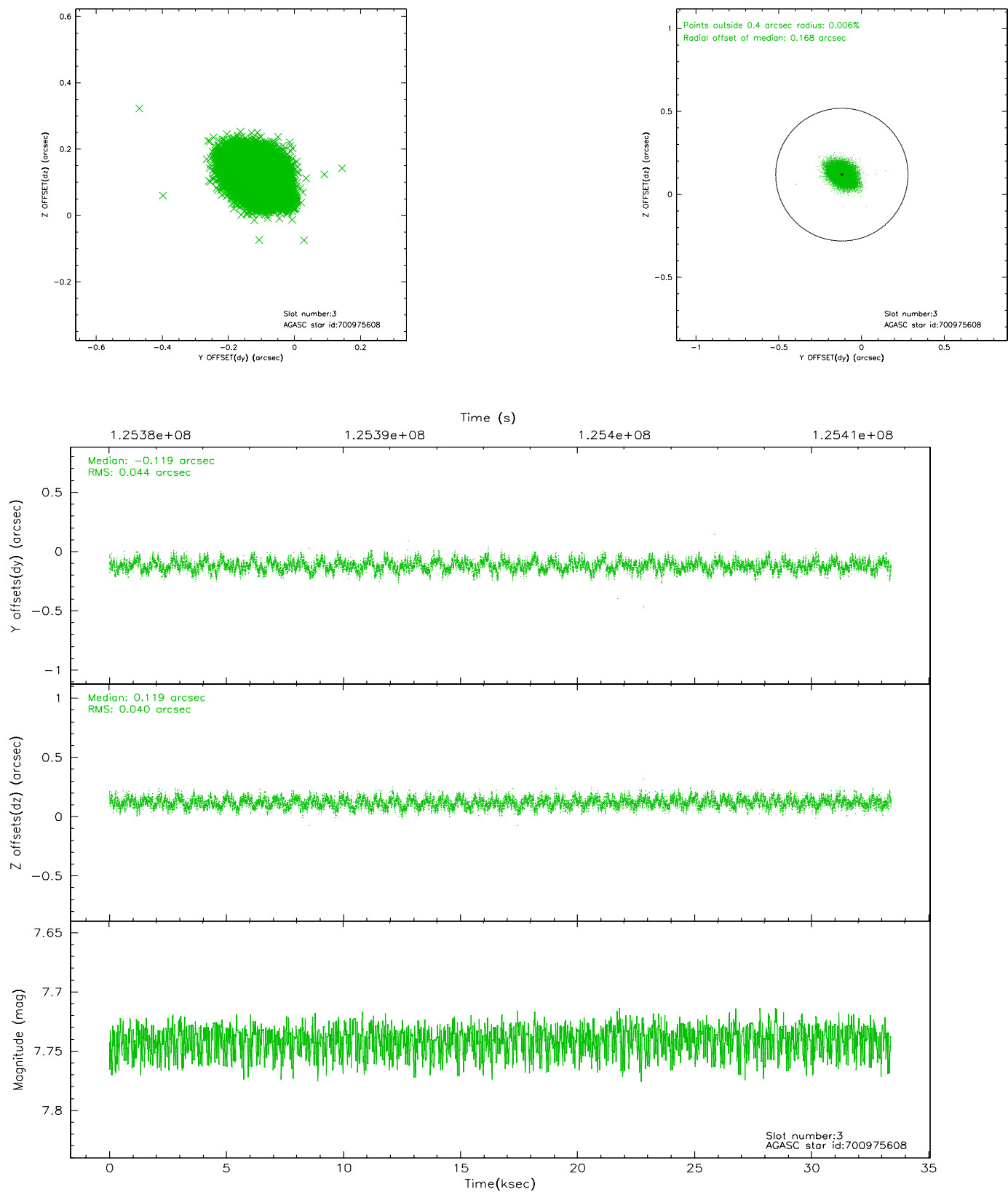
### Slot Statistics

| slot | status | id        | mag  | n_pts | med_dy | med_dz | dr1   | dr2   | ra        | dec       | mean_y   | mean_z   |
|------|--------|-----------|------|-------|--------|--------|-------|-------|-----------|-----------|----------|----------|
| 0    | FID    | ACIS-S-2  | 7.10 | 8145  | -0.019 | -0.044 | 0.006 | 0.010 | 0.000000  | 0.000000  | -754.95  | -1789.29 |
| 1    | FID    | ACIS-S-4  | 7.20 | 8143  | -0.040 | 0.021  | 0.005 | 0.009 | 0.000000  | 0.000000  | 2158.29  | 119.19   |
| 2    | FID    | ACIS-S-5  | 7.23 | 8144  | 0.028  | 0.032  | 0.006 | 0.011 | 0.000000  | 0.000000  | -1807.68 | 112.94   |
| 3    | GUIDE  | 700975608 | 7.74 | 16290 | -0.119 | 0.119  | 0.063 | 0.103 | 88.344260 | -8.111712 | 1188.30  | -2285.38 |
| 4    | GUIDE  | 626524448 | 8.66 | 16291 | -0.012 | 0.028  | 0.078 | 0.130 | 87.380980 | -6.987266 | -2321.34 | 1700.04  |
| 5    | GUIDE  | 700844704 | 8.71 | 16291 | 0.094  | -0.036 | 0.080 | 0.130 | 87.931803 | -7.921073 | -293.72  | -1624.73 |
| 6    | GUIDE  | 626527888 | 9.39 | 16218 | 0.005  | -0.116 | 0.103 | 0.169 | 87.940640 | -6.806336 | -333.67  | 2387.99  |
| 7    | GUIDE  | 626656280 | 9.52 | 16272 | 0.025  | 0.002  | 0.111 | 0.183 | 88.685870 | -7.378153 | 2363.28  | 375.24   |

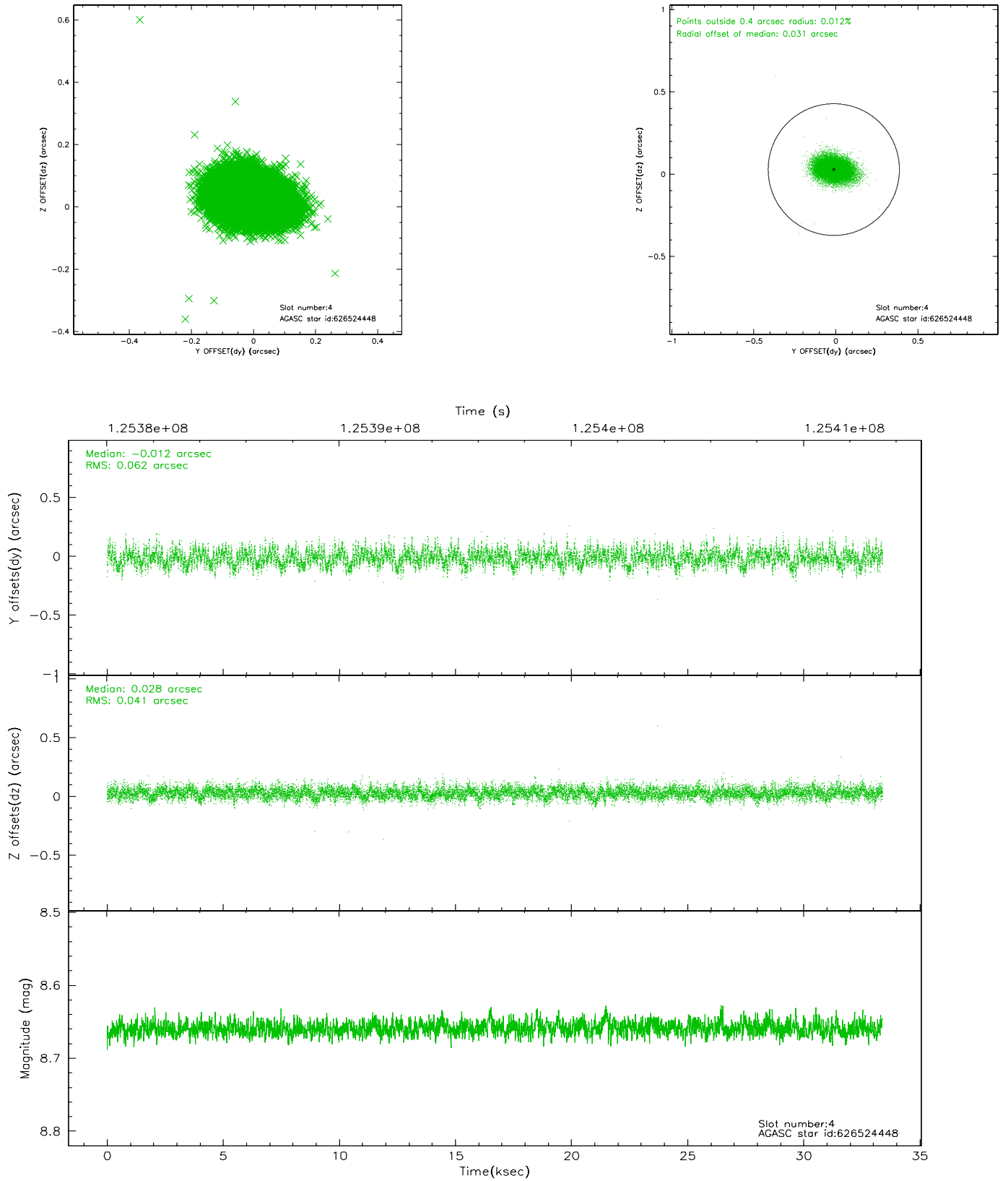


## 2.4 Star Slots

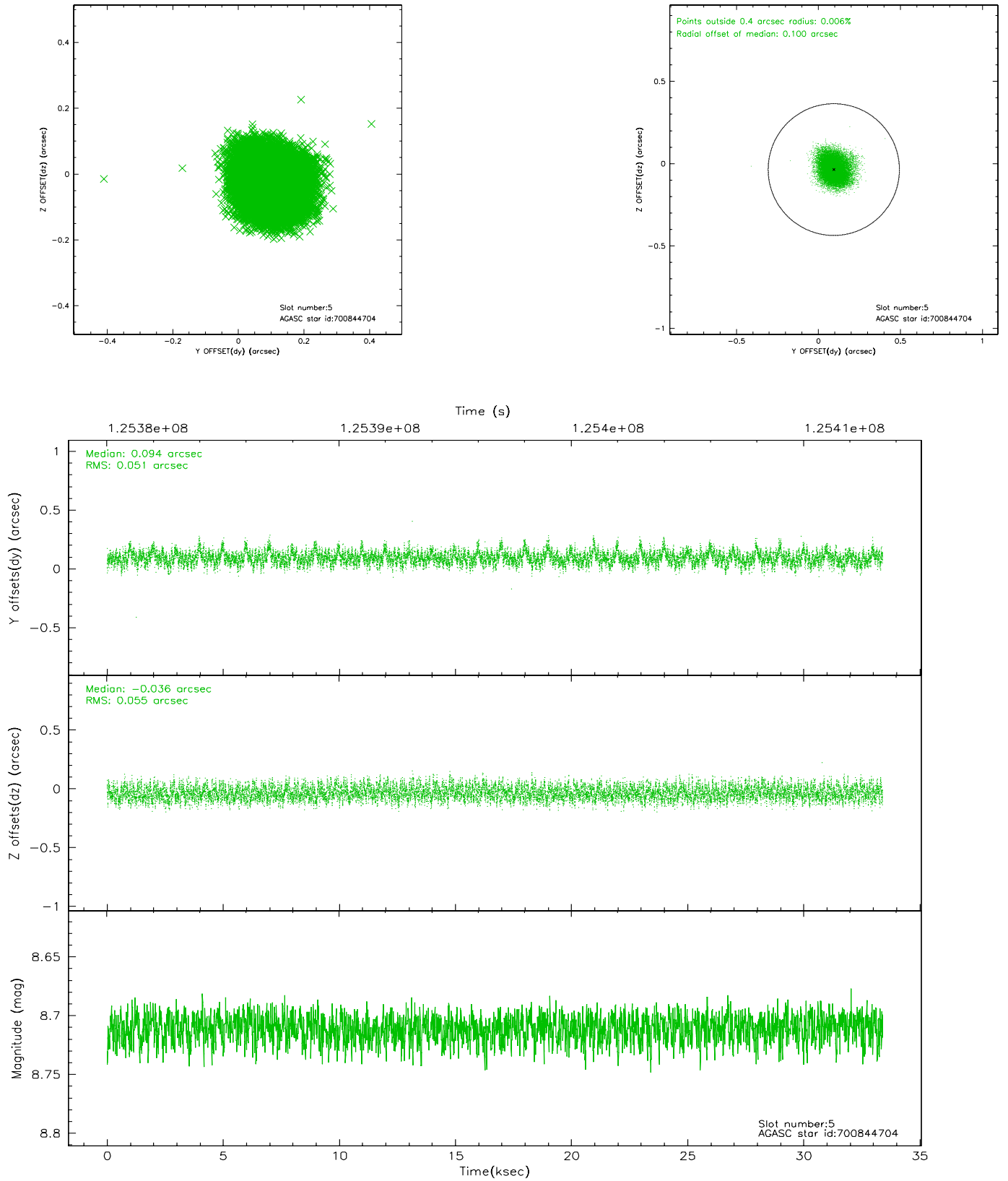
### 2.4.1 Slot 3



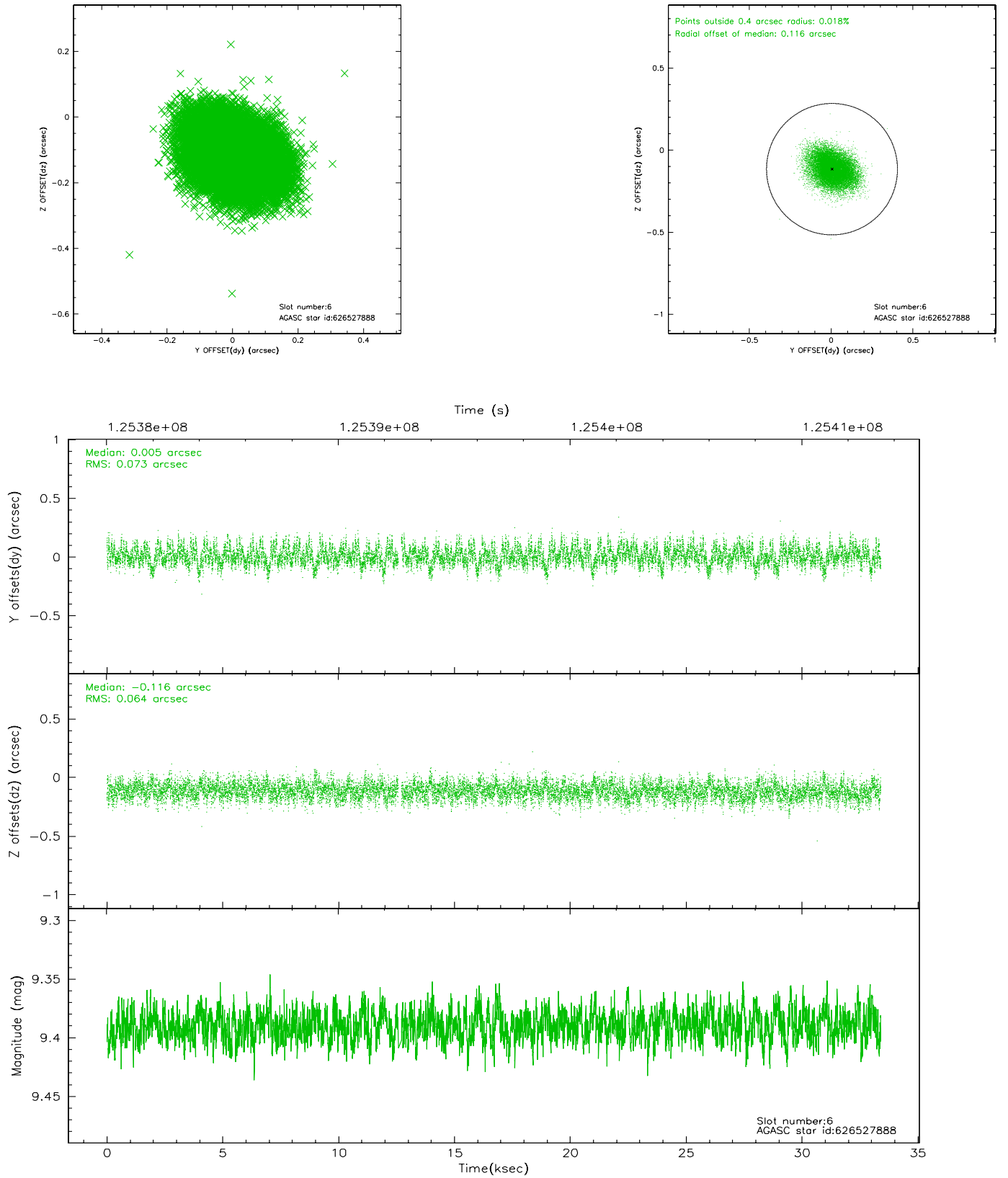
## 2.4.2 Slot 4



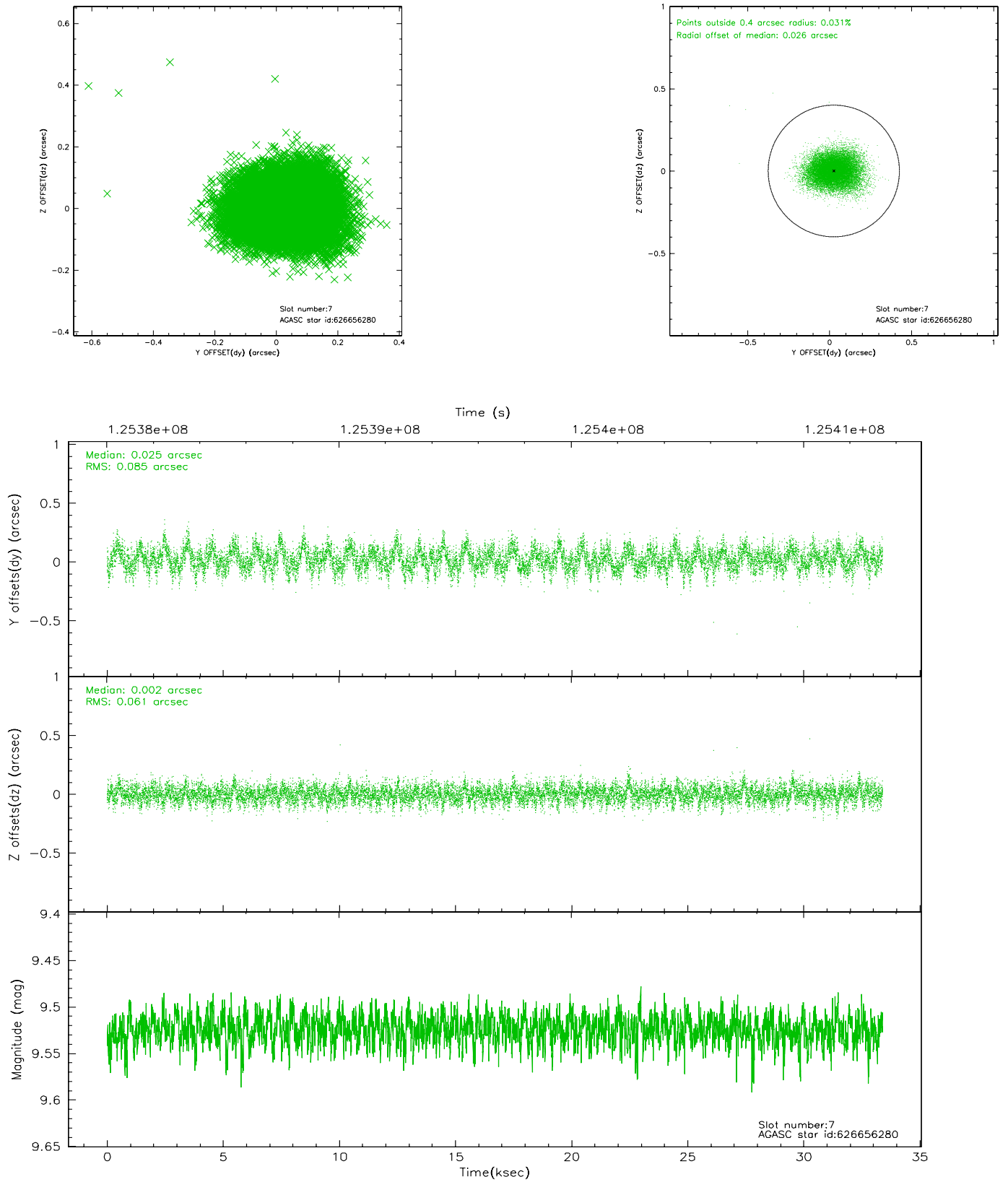
### 2.4.3 Slot 5



## 2.4.4 Slot 6

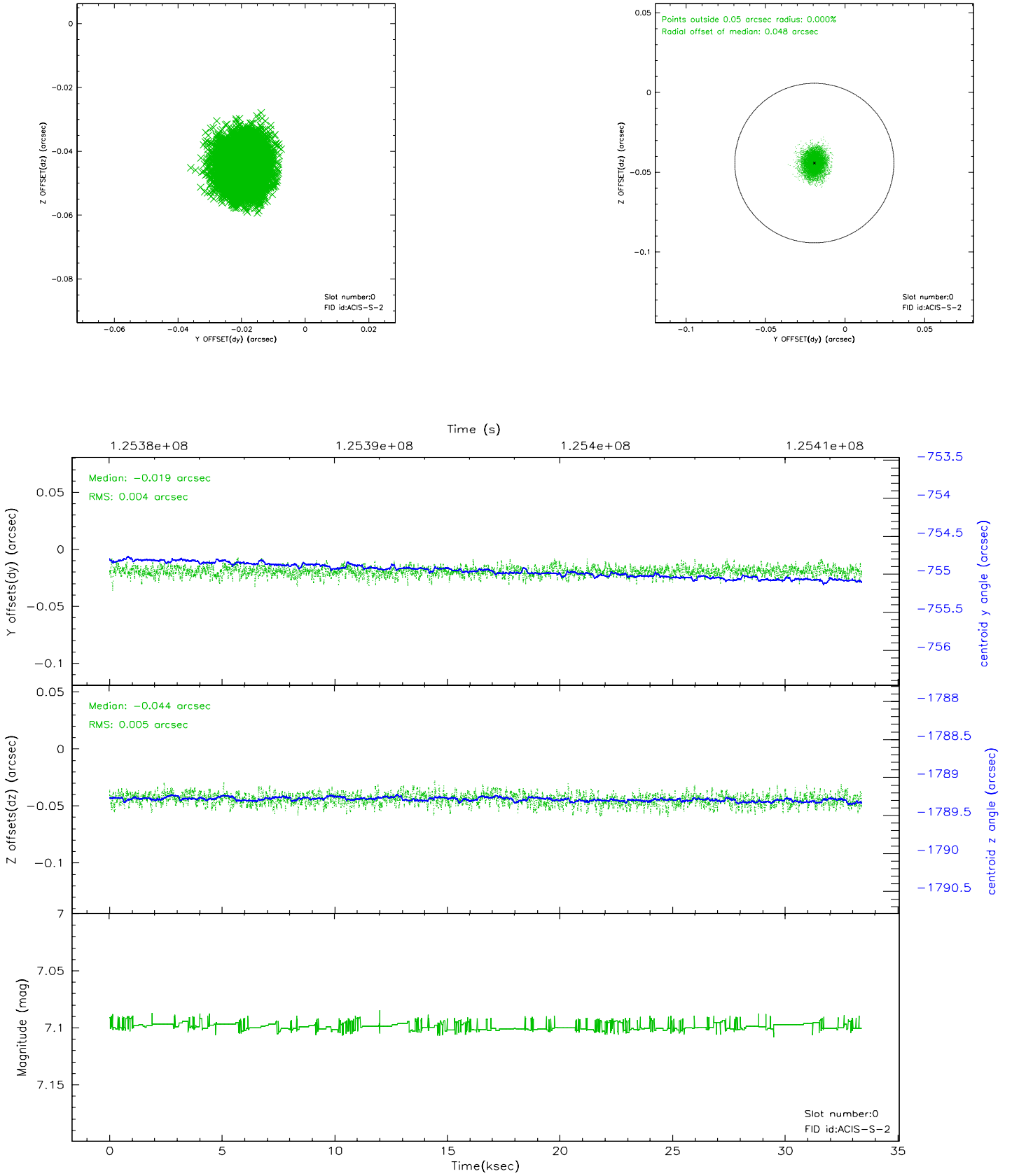


## 2.4.5 Slot 7

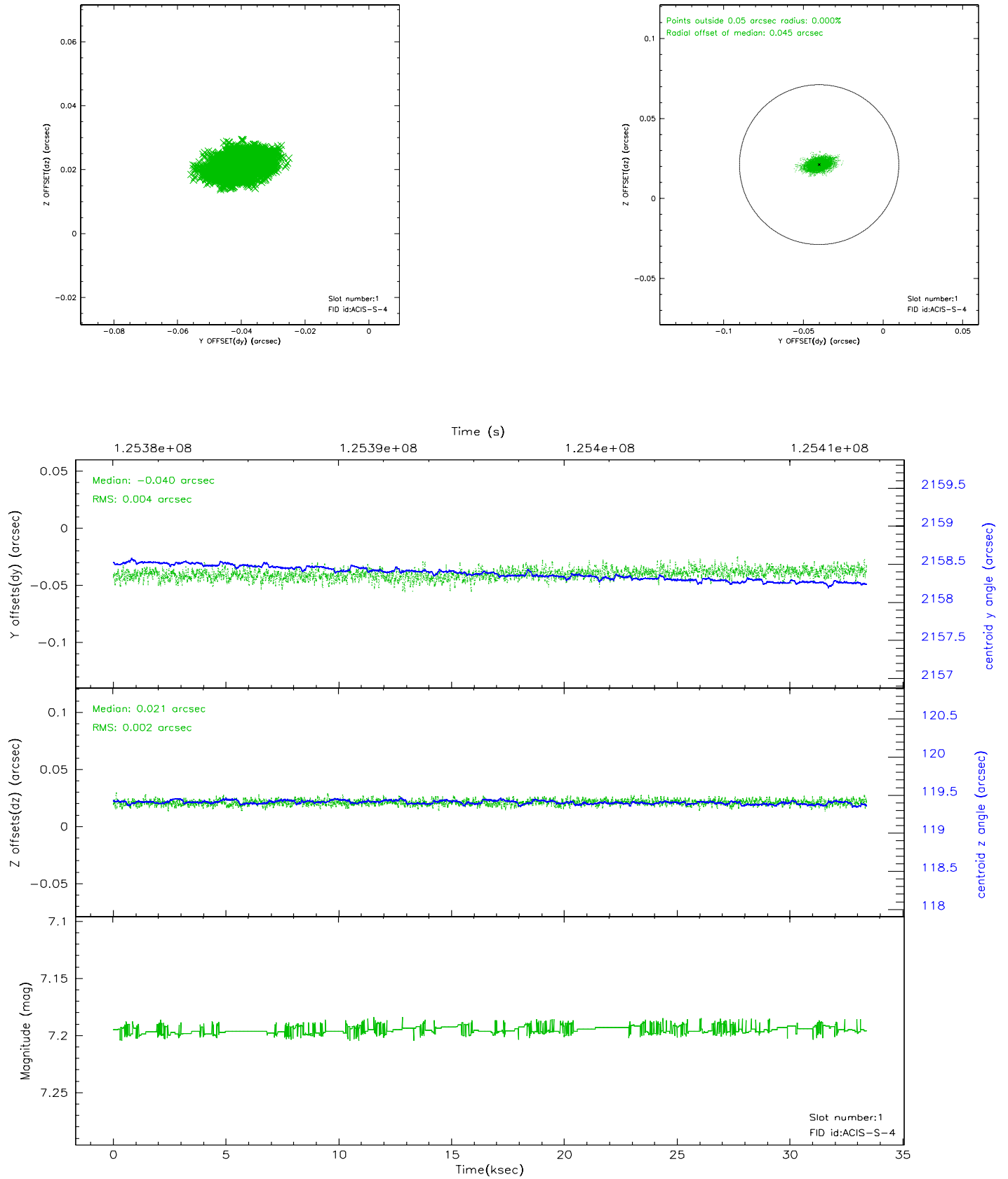


## 2.5 FID Slots

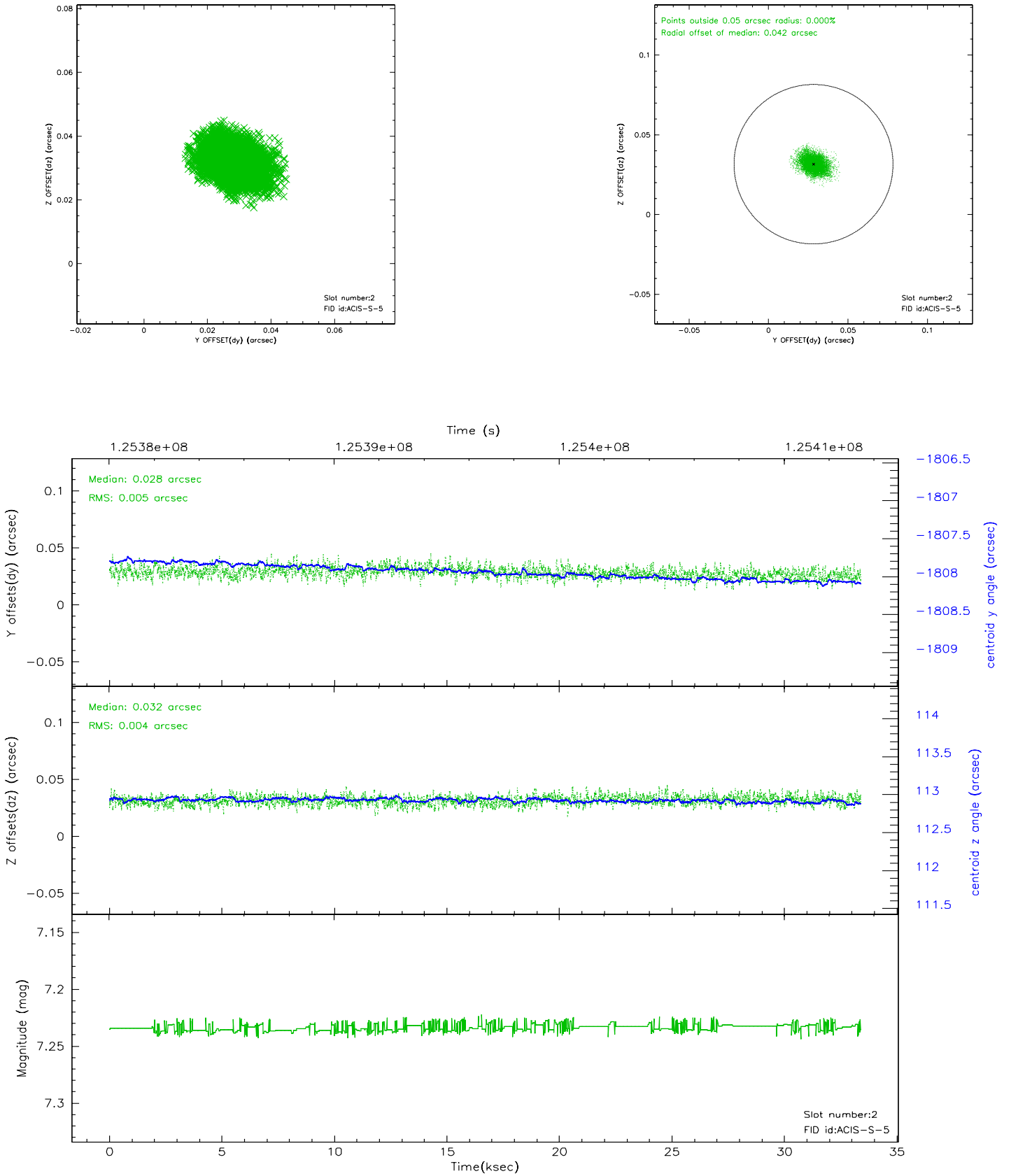
### 2.5.1 Slot 0



## 2.5.2 Slot 1



## 2.5.3 Slot 2

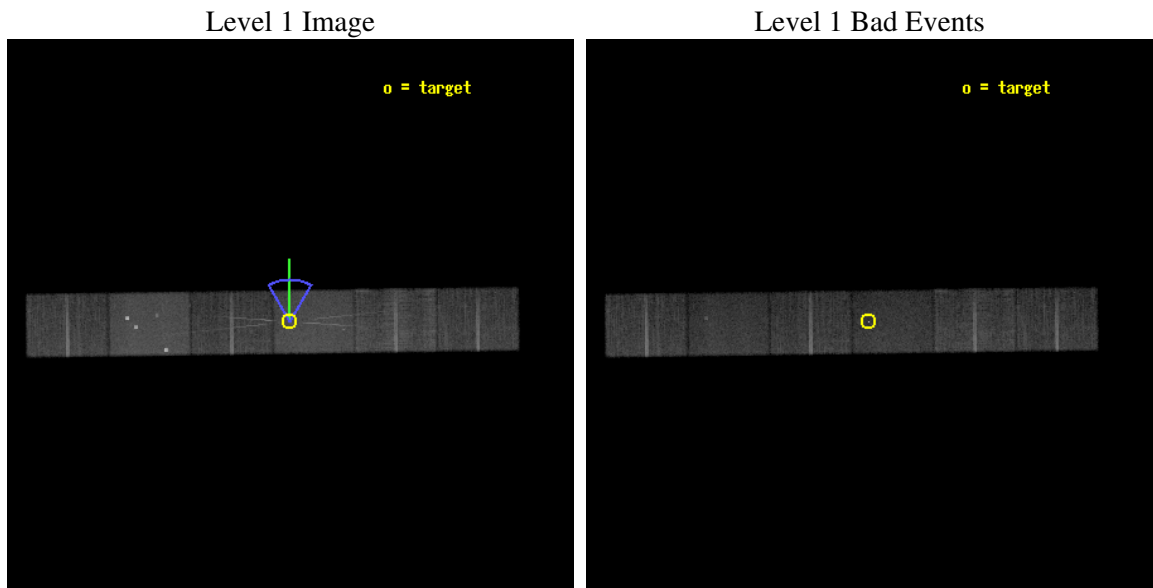




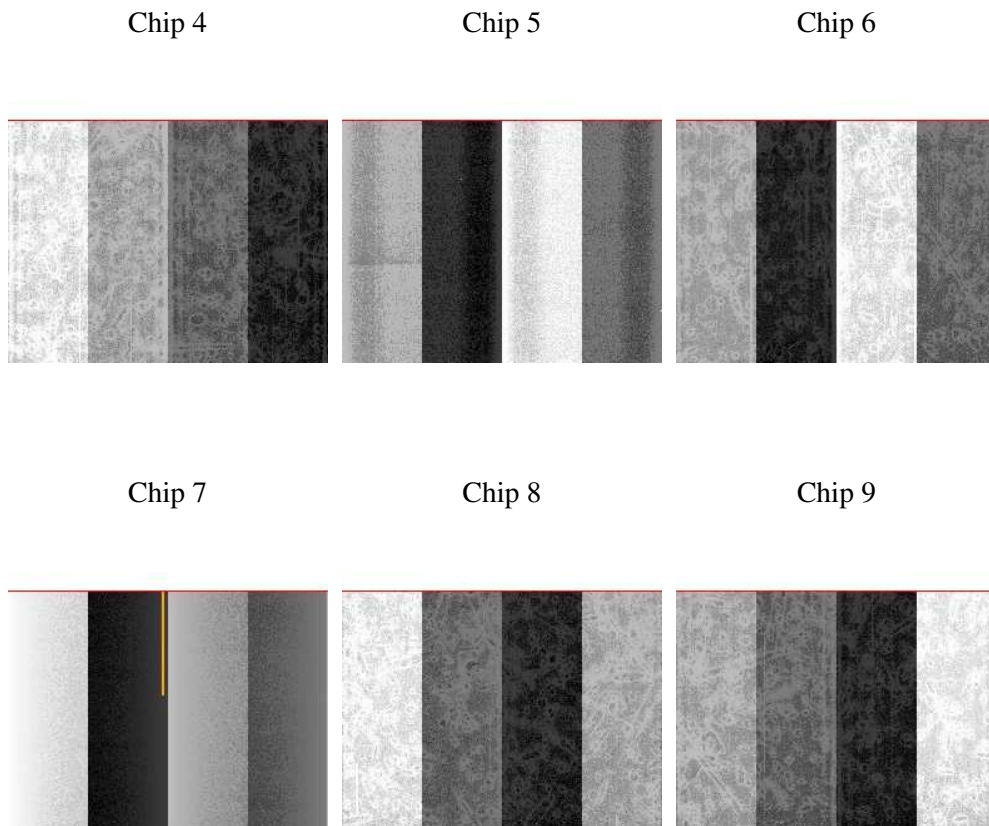
## 3 OBI Secondary

### 3.1 OBI

#### 3.1.1 Images



#### 3.1.2 Bias



### 3.1.3 Parameters

|          |                     |
|----------|---------------------|
| obi_num  | 0                   |
| ascdsver | 7.6.10              |
| caldsver | 3.3.0               |
| date     | 2007-01-18T08:14:52 |
| revision | 3                   |

|                |                 |
|----------------|-----------------|
| sched_exp_time | 33137.886000    |
| ontime         | 24780.970064208 |
| ontime4        | 24780.969725385 |
| ontime5        | 24780.970213249 |
| ontime6        | 24780.969585985 |
| ontime7        | 24780.970064208 |
| ontime8        | 24780.970163077 |
| ontime9        | 24780.969894856 |
| l1events       | 843929          |

### 3.1.4 Events

|                 | ccd 4  | ccd 5  | ccd 6  | ccd 7  | ccd 8  | ccd 9  |
|-----------------|--------|--------|--------|--------|--------|--------|
| level 1 events  | 123228 | 178962 | 118272 | 163627 | 147110 | 112730 |
| rejected events | 108816 | 87902  | 100064 | 87678  | 114854 | 98702  |
| rejected %      | 88%    | 49%    | 84%    | 53%    | 78%    | 87%    |

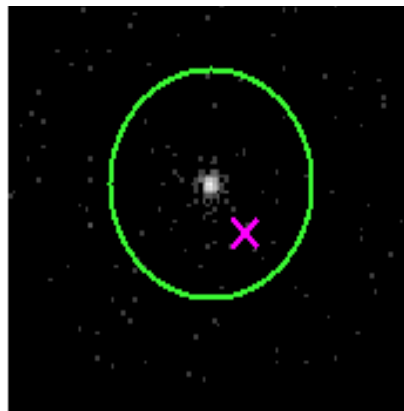
|                | ccd 4  | ccd 5 | ccd 6 | ccd 7 | ccd 8  | ccd 9 |
|----------------|--------|-------|-------|-------|--------|-------|
| grade 0 events | 5778   | 18735 | 8731  | 7843  | 10321  | 5725  |
|                | 4%     | 10%   | 7%    | 4%    | 7%     | 5%    |
| grade 1 events | 48     | 569   | 76    | 251   | 84     | 51    |
|                | 0%     | 0%    | 0%    | 0%    | 0%     | 0%    |
| grade 2 events | 3404   | 24968 | 3370  | 15408 | 6847   | 2751  |
|                | 2%     | 13%   | 2%    | 9%    | 4%     | 2%    |
| grade 3 events | 1430   | 3668  | 1565  | 7163  | 3369   | 1454  |
|                | 1%     | 2%    | 1%    | 4%    | 2%     | 1%    |
| grade 4 events | 1325   | 3708  | 1553  | 7086  | 3248   | 1389  |
|                | 1%     | 2%    | 1%    | 4%    | 2%     | 1%    |
| grade 5 events | 4239   | 13089 | 4983  | 15239 | 6378   | 5095  |
|                | 3%     | 7%    | 4%    | 9%    | 4%     | 4%    |
| grade 6 events | 2476   | 40000 | 2992  | 38459 | 8483   | 2712  |
|                | 2%     | 22%   | 2%    | 23%   | 5%     | 2%    |
| grade 7 events | 104528 | 74225 | 95002 | 72178 | 108380 | 93553 |
|                | 84%    | 41%   | 80%   | 44%   | 73%    | 82%   |

## 4 Gratings

## 4.1 HEG Arm



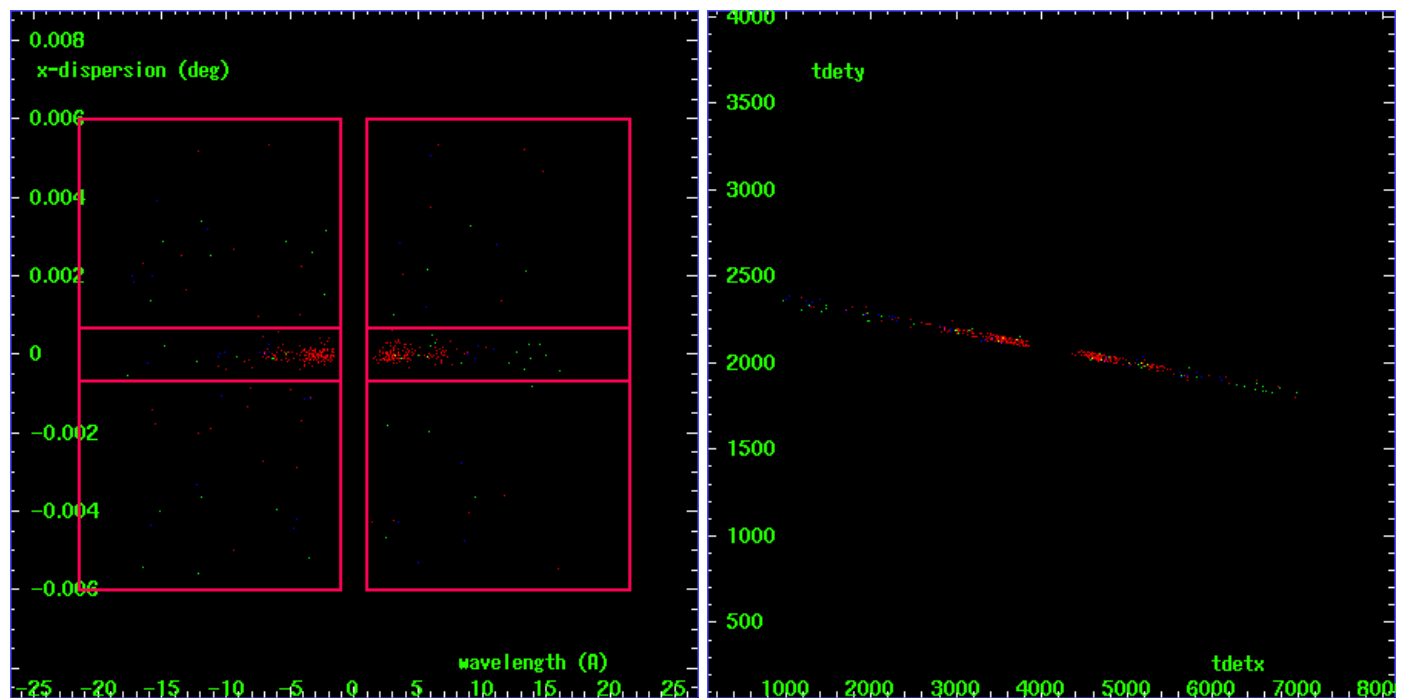
HEG Order Sort 123



HEG Zero Order



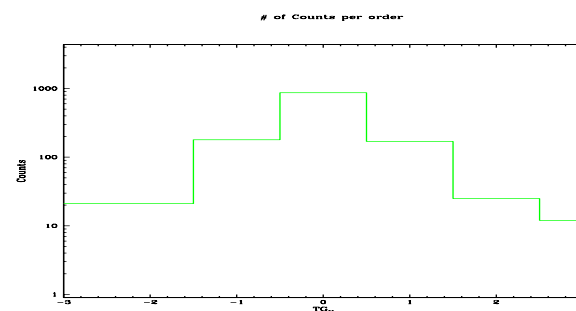
HEG Order Sort ALL

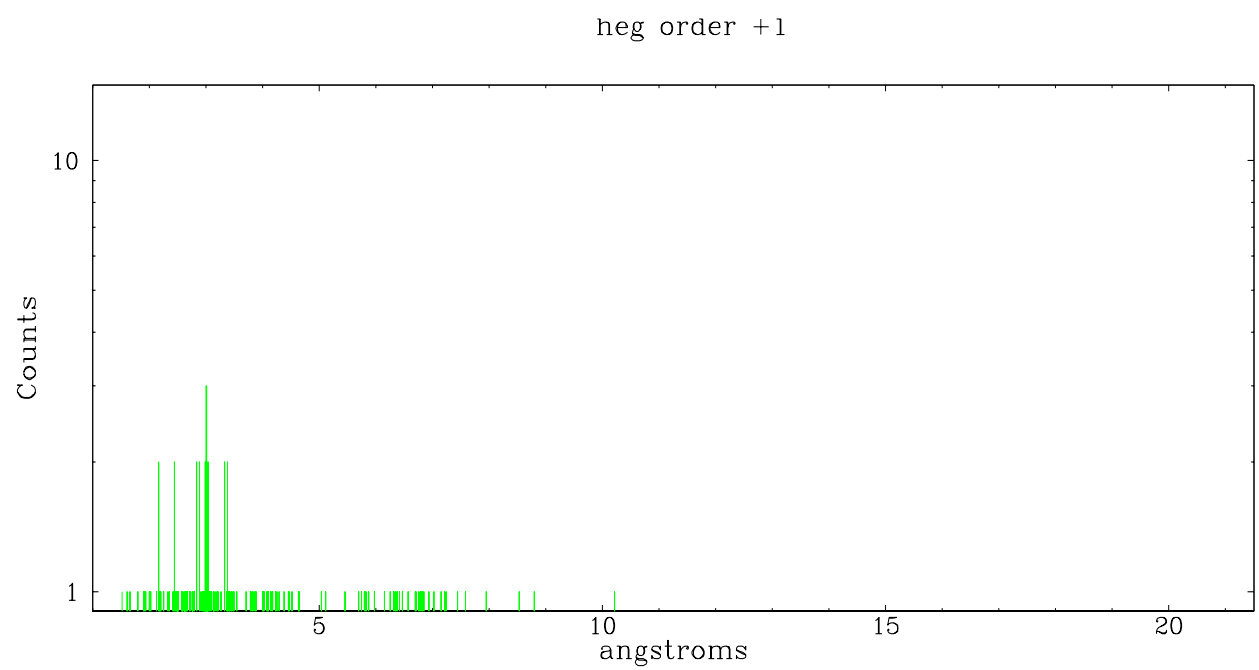
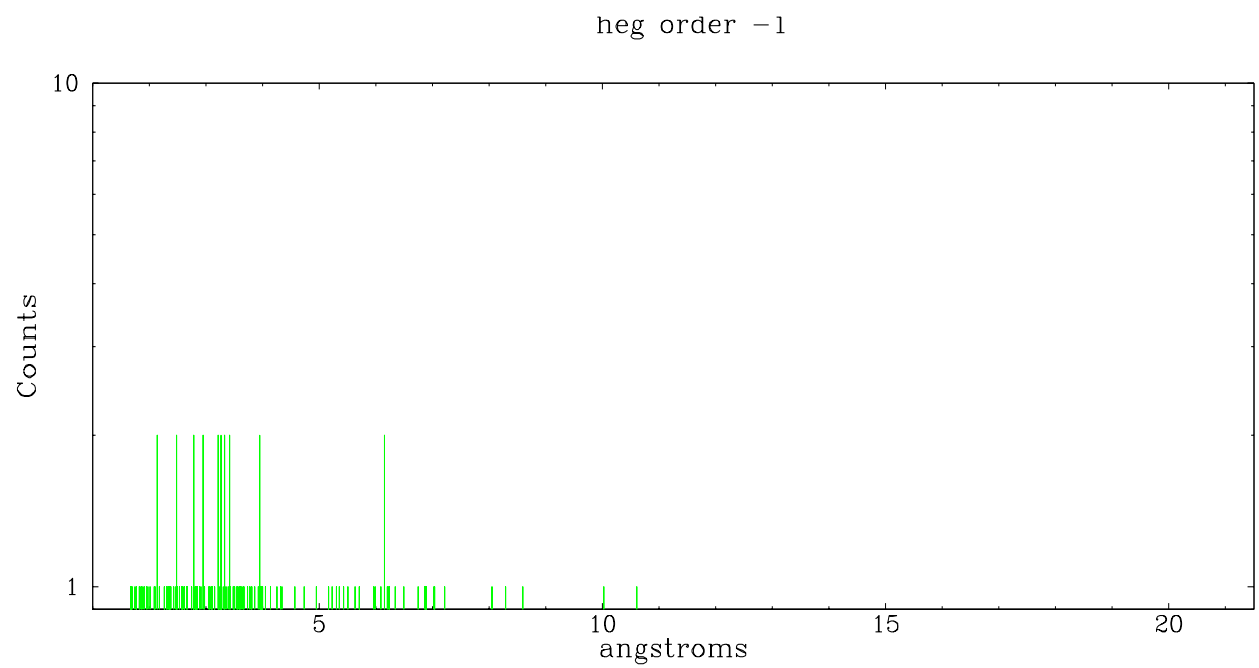


Spot Image HEG

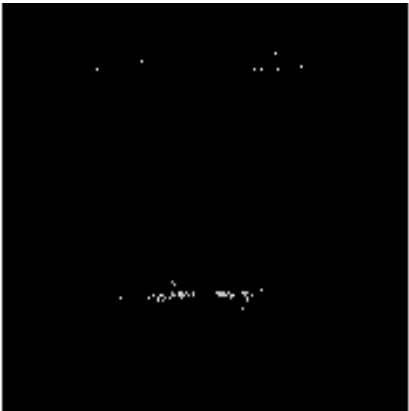
Full Detector HEG

|        | order<br>-3 | order<br>-2 | order<br>-1 | order<br>0 | order<br>1 | order<br>2 | order<br>3 |
|--------|-------------|-------------|-------------|------------|------------|------------|------------|
| Events | 21          | 21          | 179         | 870        | 169        | 25         | 12         |

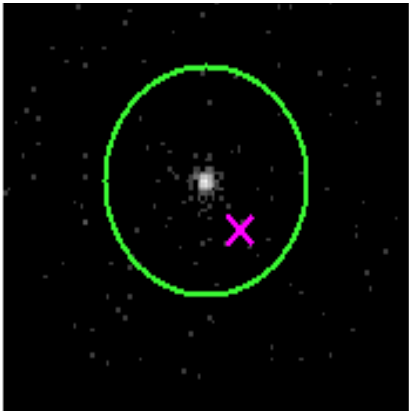




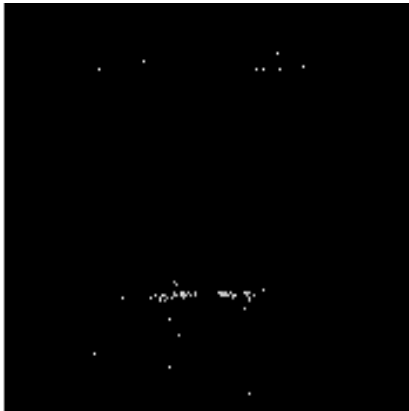
4.2 MEG Arm



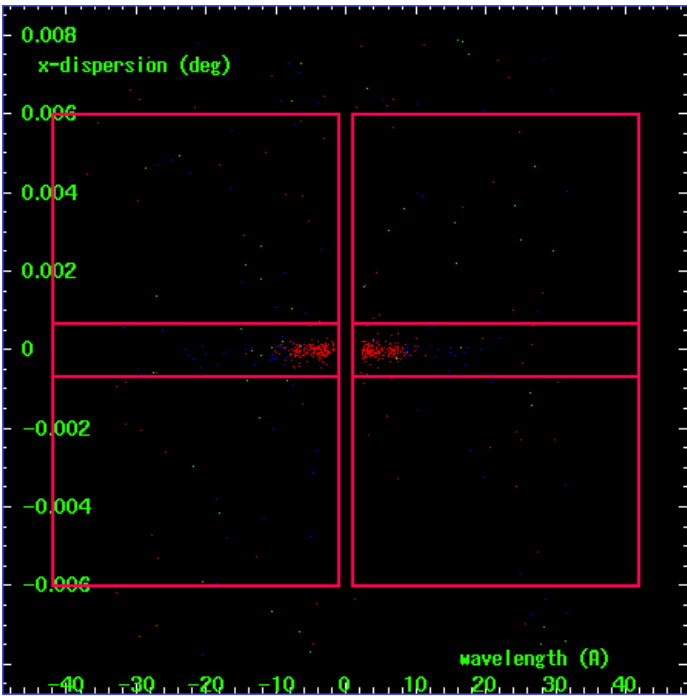
MEG Order Sort 123



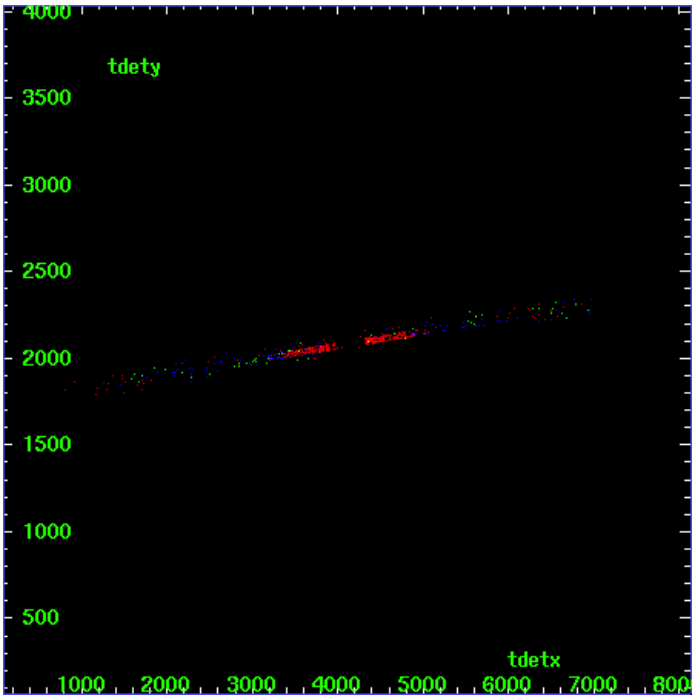
MEG Zero Order



MEG Order Sort ALL

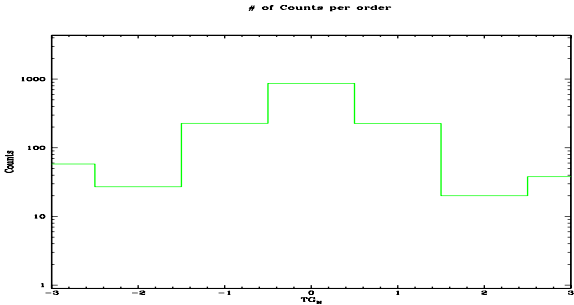


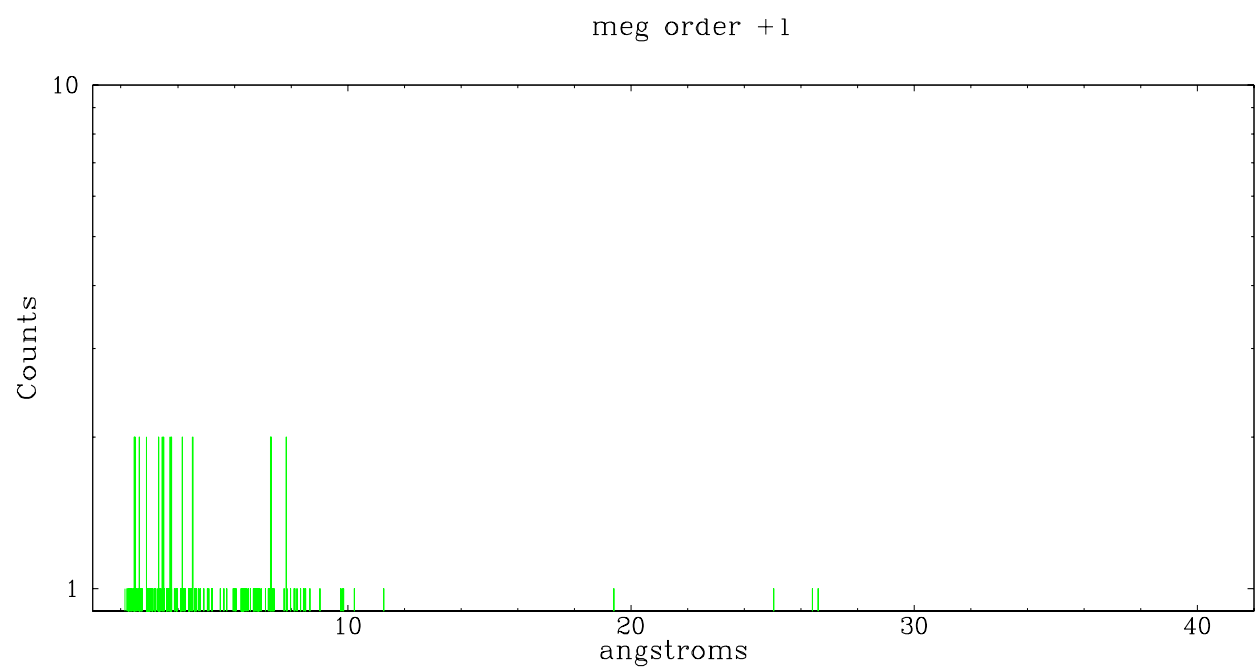
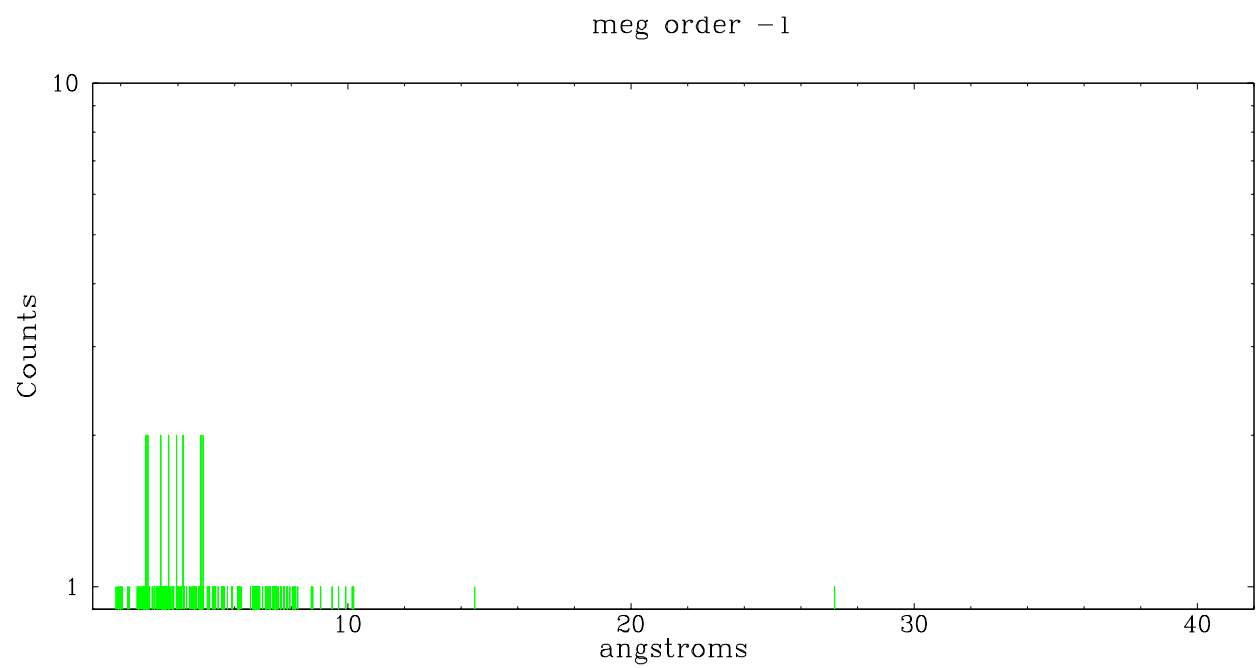
Spot Image MEG



Full Detector MEG

|        | order<br>-3 | order<br>-2 | order<br>-1 | order<br>0 | order<br>1 | order<br>2 | order<br>3 |
|--------|-------------|-------------|-------------|------------|------------|------------|------------|
| Events | 58          | 27          | 227         | 870        | 226        | 20         | 38         |





## A Summary

### A.1 Status

|                            |                    |
|----------------------------|--------------------|
| V&V Scientist              | David Huenemoerder |
| V&V Date (YYYY-MM-DD)      | 2007.03.19         |
| V&V Edition                | 1                  |
| V&V Disposition and Status | OK                 |
| V&V Charge Time            | 33.189             |

### A.2 Comments