

# V&V Reference Report

## L2 ASCDS Version : 7.6.9

Observation 1905 - L2 Version 001  
Chandra X-Ray Center

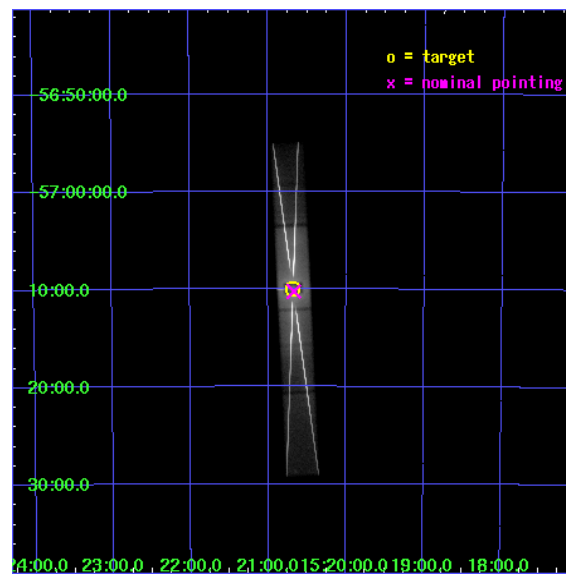
L2 Processing Date : Dec 27 2006

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# 1 Front

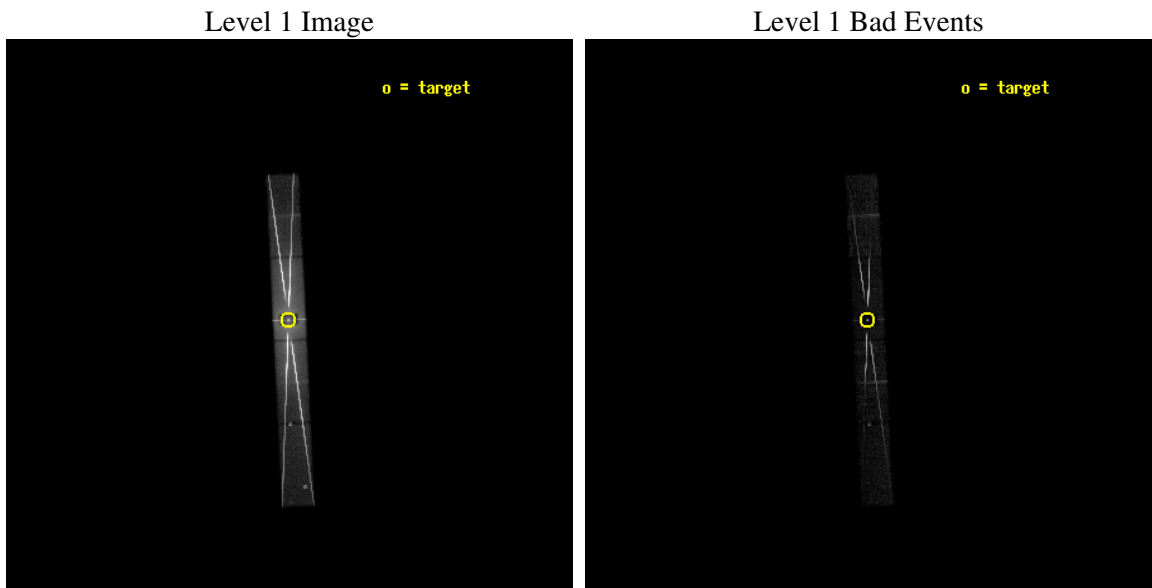
|          |   |
|----------|---|
| seq_num  | 400118  |
| obs_id   | 1905  |
| title    | PHASE RESOLVED SPECTROSCOPY OF THE X-RAY P-CYGNI PROFILES FROM CIRCINUS X-1 |
| observer | Prof. William Brandt  |
| object   | CIR X-1   |
| dtcycle  | 0   |
| cycle    | P   |
| ra_targ  | 230.170833  |
| dec_targ | -57.166667  |
| ra_nom   | 230.16737774602   |
| dec_nom  | -57.170710666225  |
| roll_nom | 267.23806350637   |
| revision | 4   |
| ontime   | 8156.199981302  |
| livetime | 7906.5948634587   |
| ontime5  | 8156.199981302  |
| ontime6  | 8156.199981302  |
| ontime7  | 8156.199981302  |
| ontime8  | 8156.199981302  |
| l2events | 1786795   |



## 2 OBI

### 2.1 OBI

#### 2.1.1 Images



### 2.1.2 Parameters

|          |                     |
|----------|---------------------|
| obi_num  | 0                   |
| ascdsver | 7.6.9               |
| caldbver | 3.2.4               |
| date     | 2006-12-16T00:03:04 |
| revision | 3                   |

|                |                 |
|----------------|-----------------|
| sched_exp_time | 8000.000000     |
| ontime         | 8877.573540166  |
| ontime5        | 8878.9115592241 |
| ontime6        | 8833.3192501068 |
| ontime7        | 8877.573540166  |
| ontime8        | 8852.0938100815 |
| llevents       | 2114072         |

### 2.1.3 Events

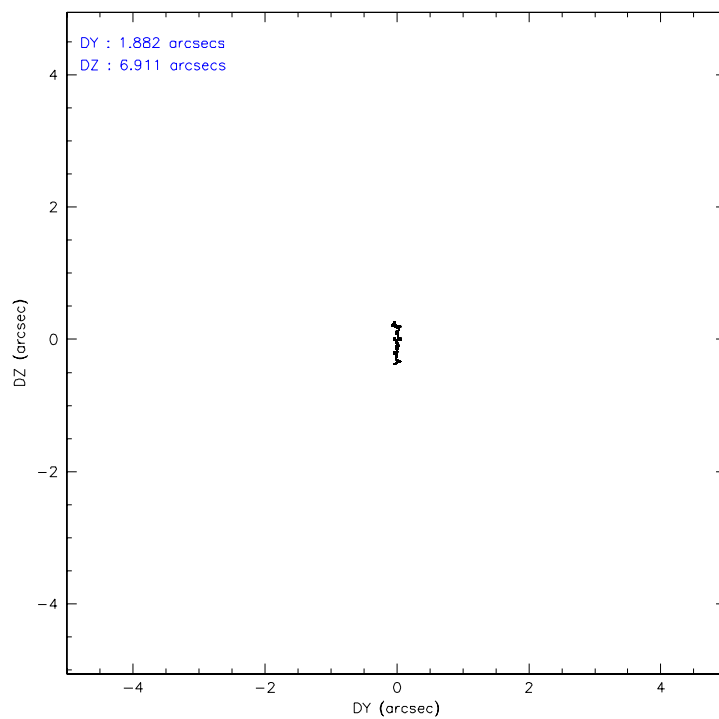
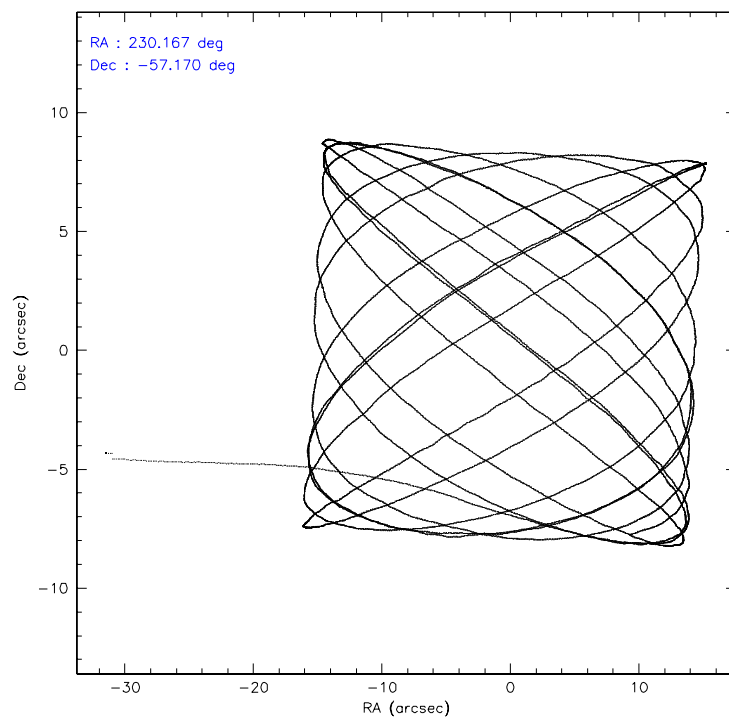
|                 | ccd 5  | ccd 6  | ccd 7  | ccd 8  |
|-----------------|--------|--------|--------|--------|
| level 1 events  | 126171 | 781945 | 966531 | 239425 |
| rejected events | 25375  | 78561  | 122218 | 34016  |
| rejected %      | 20%    | 10%    | 12%    | 14%    |

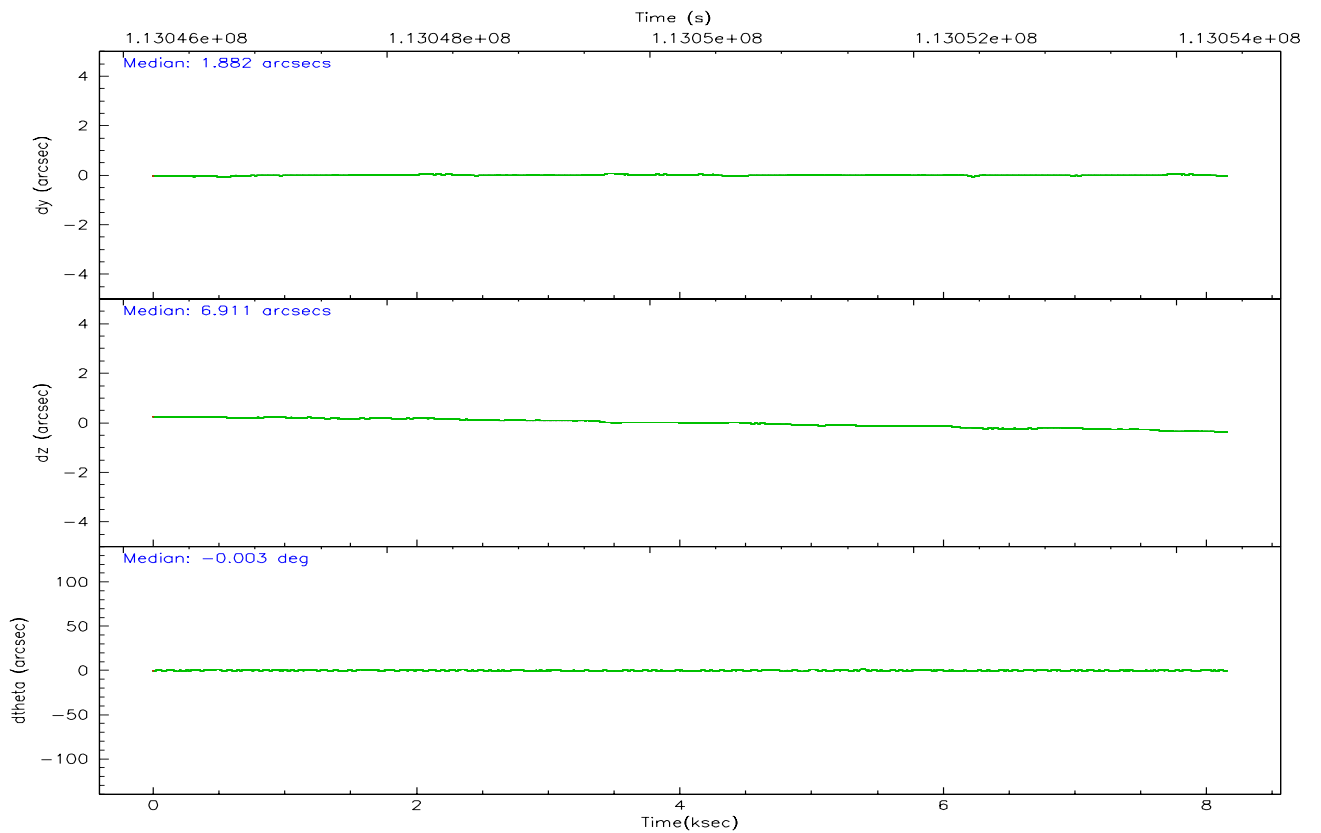
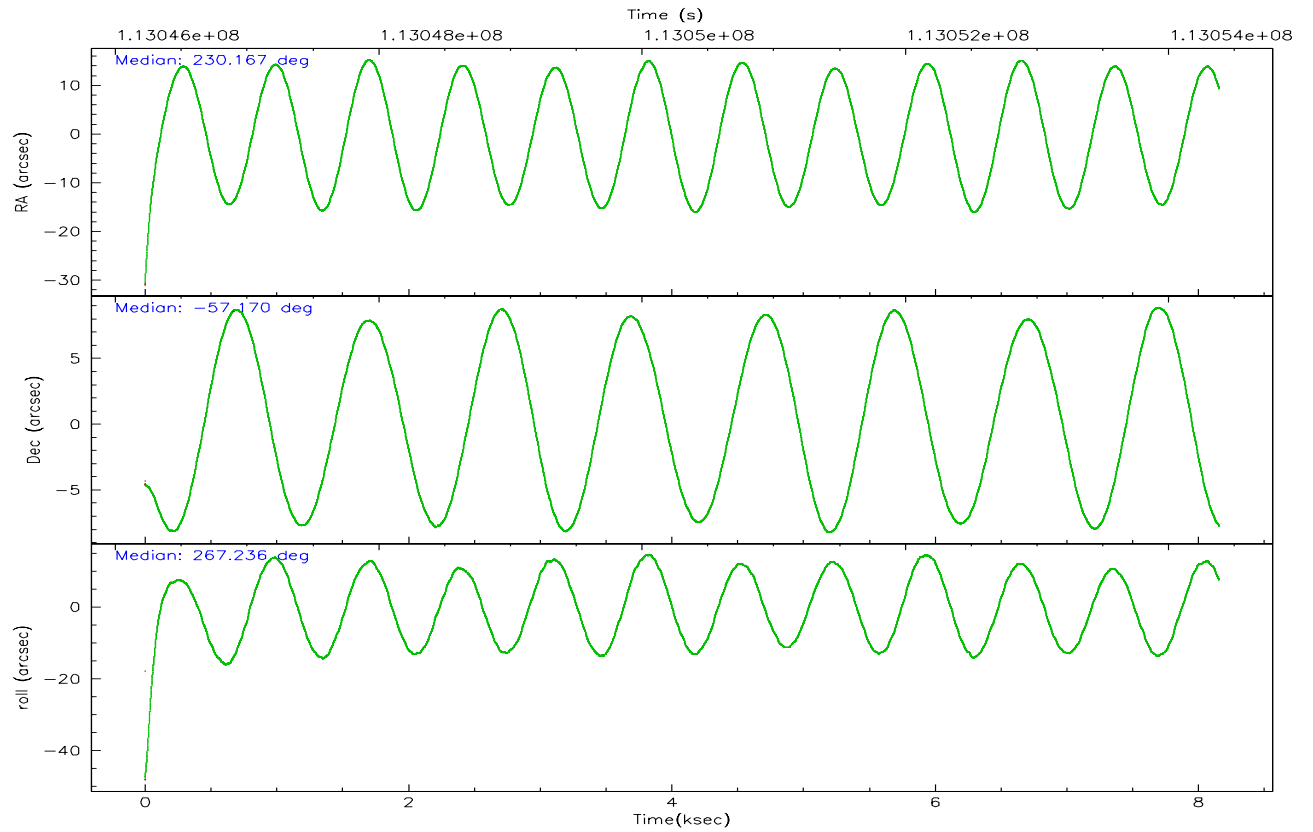
|                | ccd 5 | ccd 6  | ccd 7  | ccd 8  |
|----------------|-------|--------|--------|--------|
| grade 0 events | 26039 | 496959 | 140526 | 157802 |
|                | 20%   | 63%    | 14%    | 65%    |
| grade 1 events | 488   | 18578  | 5543   | 1675   |
|                | 0%    | 2%     | 0%     | 0%     |
| grade 2 events | 34733 | 99967  | 217799 | 25120  |
|                | 27%   | 12%    | 22%    | 10%    |
| grade 3 events | 7871  | 36918  | 83583  | 8805   |
|                | 6%    | 4%     | 8%     | 3%     |
| grade 4 events | 7691  | 36350  | 82597  | 8562   |
|                | 6%    | 4%     | 8%     | 3%     |
| grade 5 events | 3191  | 16582  | 31209  | 2150   |
|                | 2%    | 2%     | 3%     | 0%     |
| grade 6 events | 27707 | 43757  | 337507 | 8267   |
|                | 21%   | 5%     | 34%    | 3%     |
| grade 7 events | 18451 | 32834  | 67767  | 27044  |
|                | 14%   | 4%     | 7%     | 11%    |

## 2.2 Compared Parameters

| Parameter                         | Planned             | Actual               | Parameter                             | Planned   | Actual  |
|-----------------------------------|---------------------|----------------------|---------------------------------------|-----------|---------|
| Instrument                        | ACIS                | ACIS                 | Obspar format version number          | 6         | 6       |
| Detector                          | ACIS-5678           | ACIS-5678            | Obspar file type                      | PREDICTED | ACTUAL  |
| Grating                           | HETG                | HETG                 | Obspar update status                  | NONE      | UPDATED |
| Data mode                         | GRADED              | GRADED               | Number of optional ACIS chips dropped | 0         | 0       |
| Observation mode                  | POINTING            | POINTING             | On-chip summing requested             | N         | N       |
| Pointing RA                       | 230.143808          | 230.167377746019     | Subarray requested                    | CUSTOM    | CUSTOM  |
| Pointing Dec                      | -57.146559          | -57.17071066622461   | Subarray start row                    | 15        | 15      |
| Pointing Roll                     | 267.061667          | 267.2380635063726    | Subarray row count                    | 400       | 400     |
| SIM focus pos (mm)                | -0.684267           | -0.6828225247311905  | Alternating exposures requested       | N         | N       |
| SIM defocus (mm)                  | 0                   | 0.001444936568705701 | Primary exposure time                 | 0.000000  | 1.3     |
| SIM translation stage pos (mm)    | -182.832523         | -182.8410087294432   |                                       |           |         |
| SIM translation stage offset (mm) | -7.3                | -7.291513853564595   |                                       |           |         |
| Phase constraints                 | Y                   | Y                    |                                       |           |         |
| Phase period                      | 16.536700           | 16.536700            |                                       |           |         |
| Phase epoch                       | 52100.241000        | 52100.241000         |                                       |           |         |
| Phase start                       | 0.330000            | 0.330000             |                                       |           |         |
| Phase end                         | 0.370000            | 0.370000             |                                       |           |         |
| Phase start error                 | 0.020000            | 0.020000             |                                       |           |         |
| Phase end error                   | 0.020000            | 0.020000             |                                       |           |         |
| Observation start time            | 113046382.184000    | 113045285.47541      |                                       |           |         |
| Observation start date            | 2001-08-01T09:45:18 | 2001-08-01T09:28:05  |                                       |           |         |
| Observation end time              | 113054382.184000    | 113055866.55082      |                                       |           |         |
| Observation end date              | 2001-08-01T11:58:38 | 2001-08-01T12:24:26  |                                       |           |         |
| Read mode                         | TIMED               | TIMED                |                                       |           |         |

## 2.3 Aspect





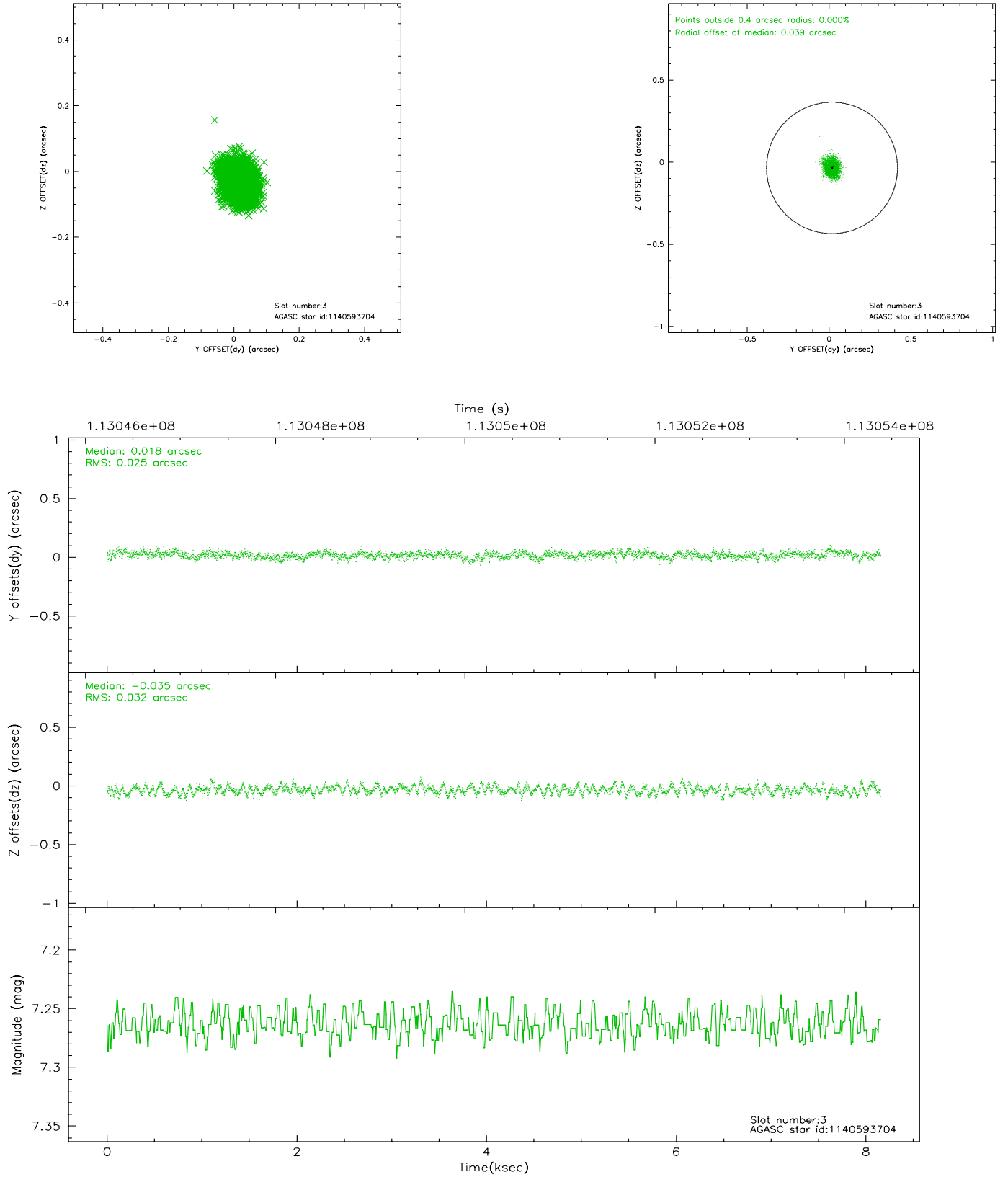
### Slot Statistics

| slot | status | id         | mag  | n_pts | med_dy | med_dz | dr1   | dr2   | ra         | dec        | mean_y   | mean_z   |
|------|--------|------------|------|-------|--------|--------|-------|-------|------------|------------|----------|----------|
| 0    | FID    | ACIS-S-2   | 7.09 | 1991  | -0.038 | -0.087 | 0.007 | 0.012 | 0.000000   | 0.000000   | -754.05  | -1878.37 |
| 1    | FID    | ACIS-S-4   | 7.18 | 1991  | -0.037 | 0.042  | 0.005 | 0.009 | 0.000000   | 0.000000   | 2158.96  | 29.39    |
| 2    | FID    | ACIS-S-5   | 7.23 | 1991  | 0.044  | 0.054  | 0.007 | 0.010 | 0.000000   | 0.000000   | -1805.89 | 23.93    |
| 3    | GUIDE  | 1140593704 | 7.26 | 3981  | 0.018  | -0.035 | 0.044 | 0.071 | 229.741417 | -57.540991 | 1461.24  | -703.70  |
| 4    | GUIDE  | 1140592936 | 8.02 | 3980  | 0.076  | 0.053  | 0.057 | 0.092 | 228.953111 | -57.013969 | -335.24  | -2354.32 |
| 5    | GUIDE  | 1140722888 | 8.11 | 3981  | -0.036 | -0.047 | 0.048 | 0.075 | 230.457489 | -57.599243 | 1598.70  | 687.18   |
| 6    | GUIDE  | 1140723840 | 8.59 | 3981  | -0.002 | -0.090 | 0.055 | 0.088 | 230.379592 | -56.994965 | -566.59  | 433.71   |
| 7    | GUIDE  | 1140726312 | 8.89 | 3978  | -0.057 | 0.120  | 0.092 | 0.145 | 231.010622 | -56.676215 | -1767.31 | 1625.77  |

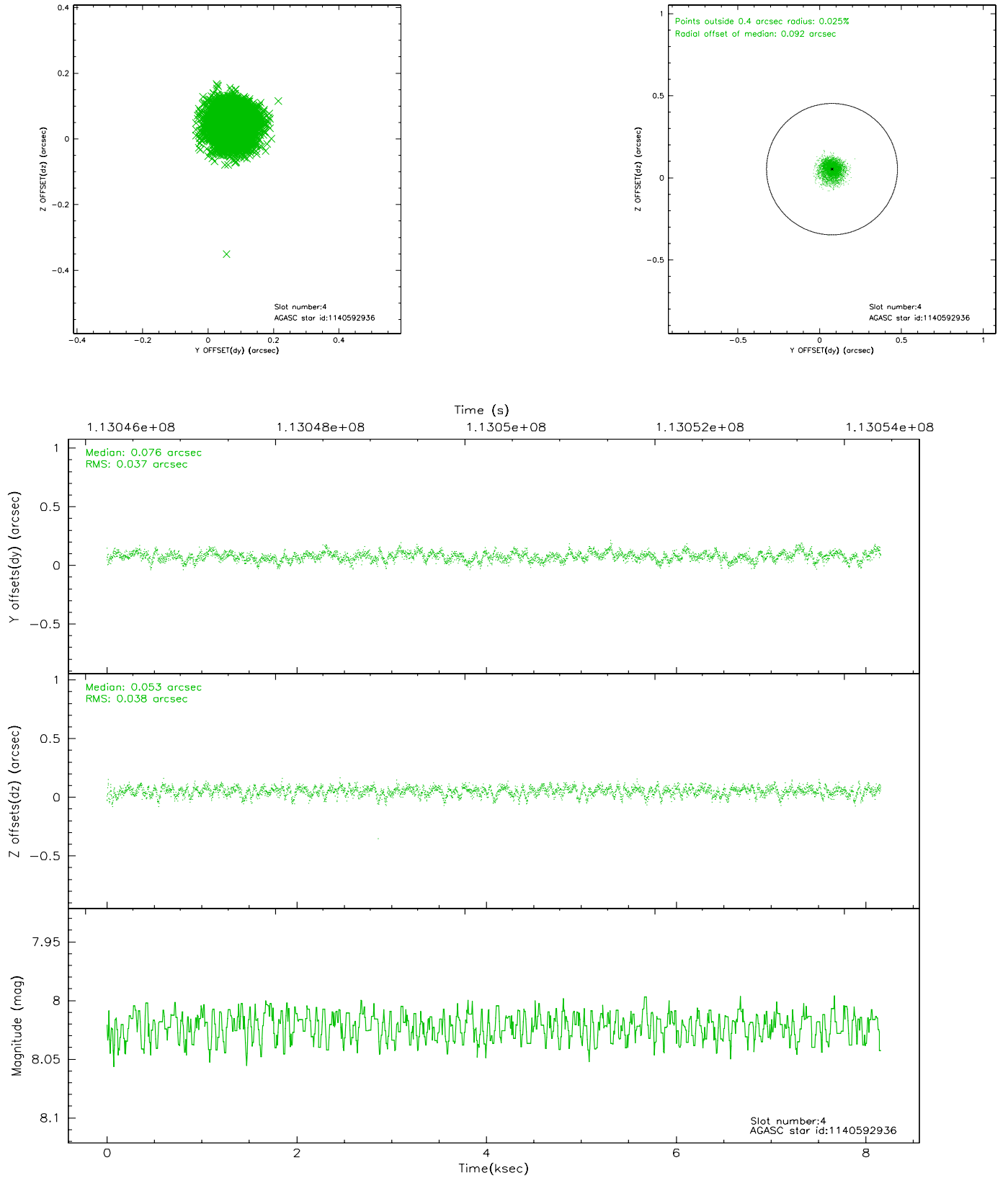


## 2.4 Star Slots

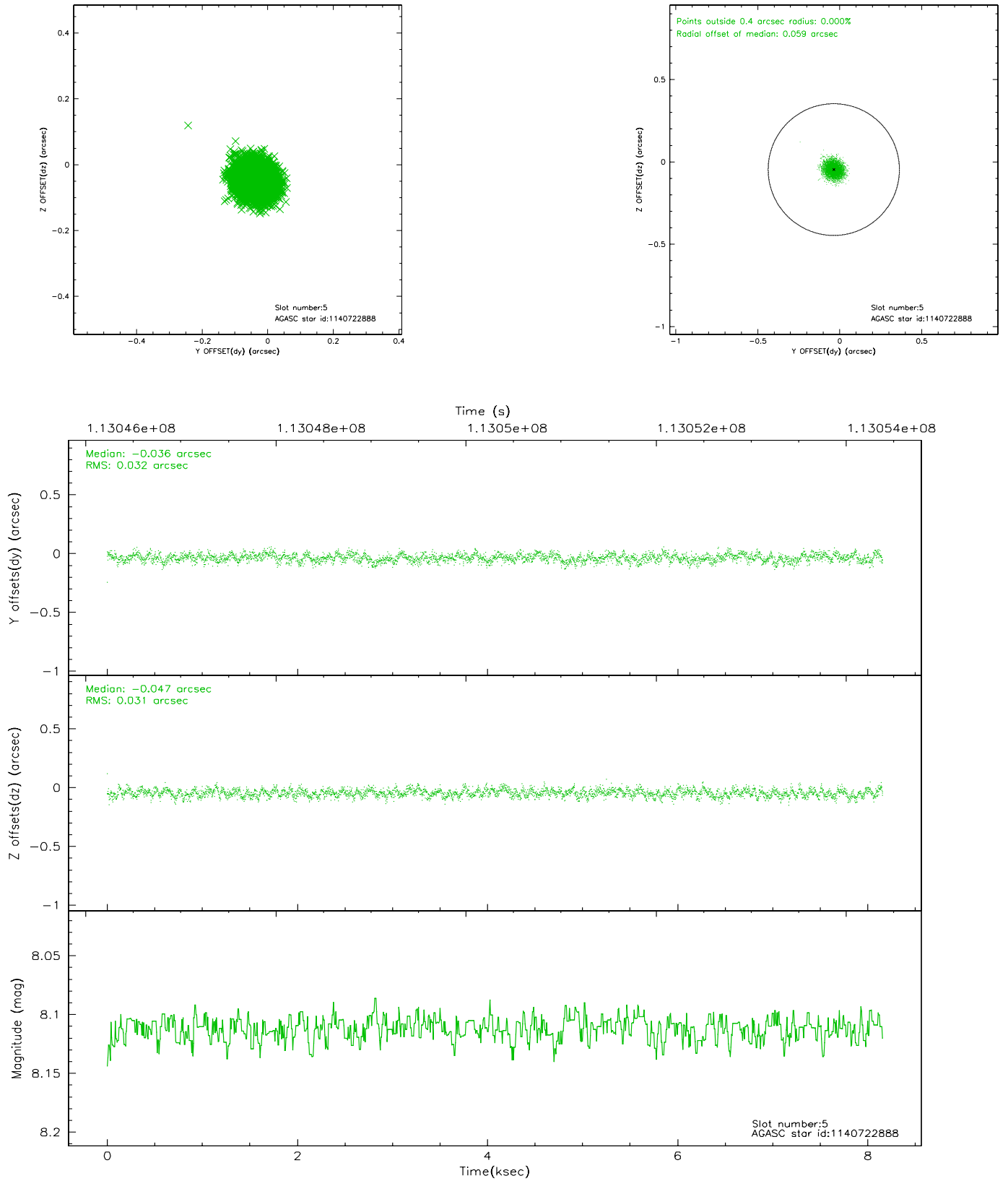
### 2.4.1 Slot 3



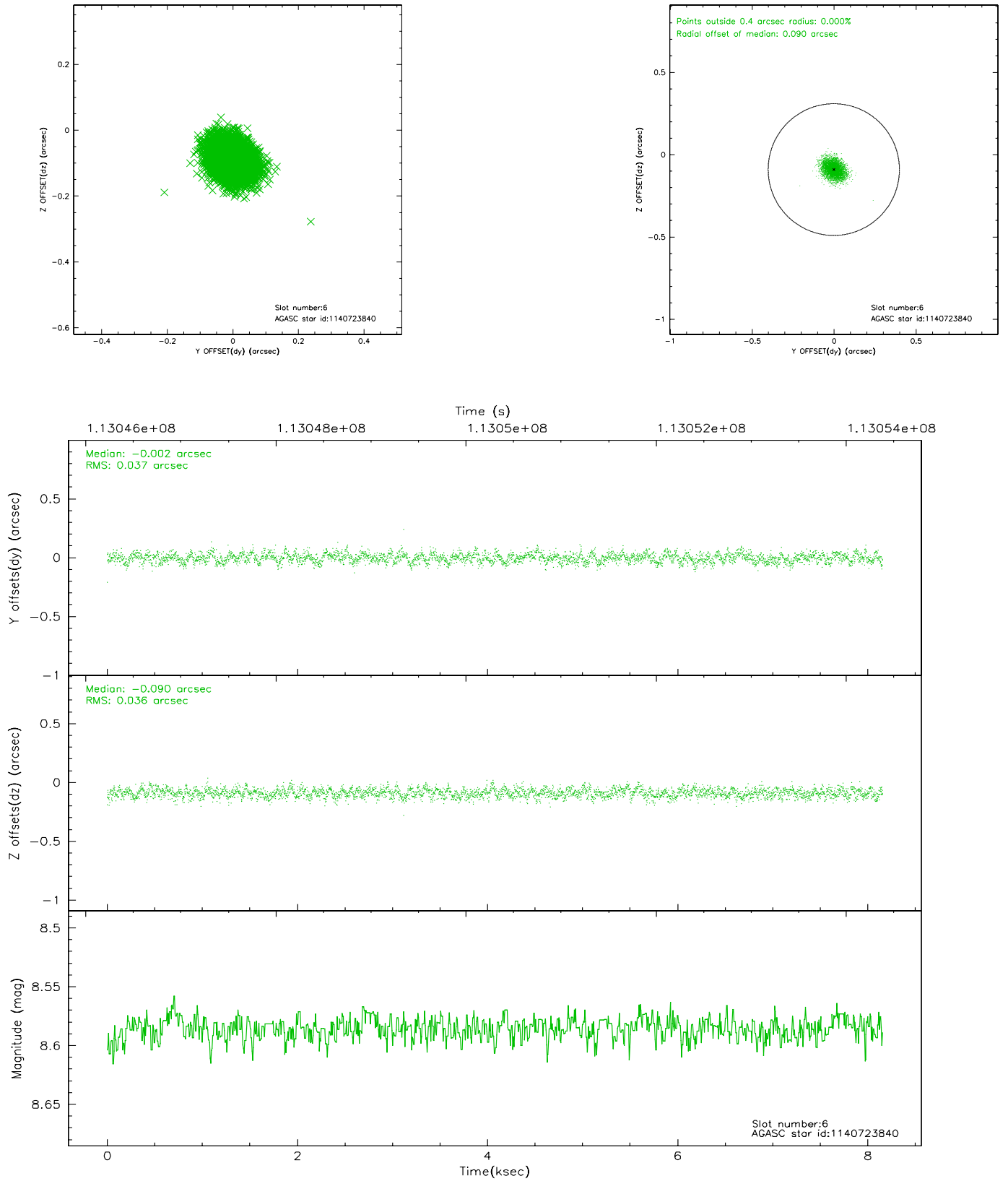
## 2.4.2 Slot 4



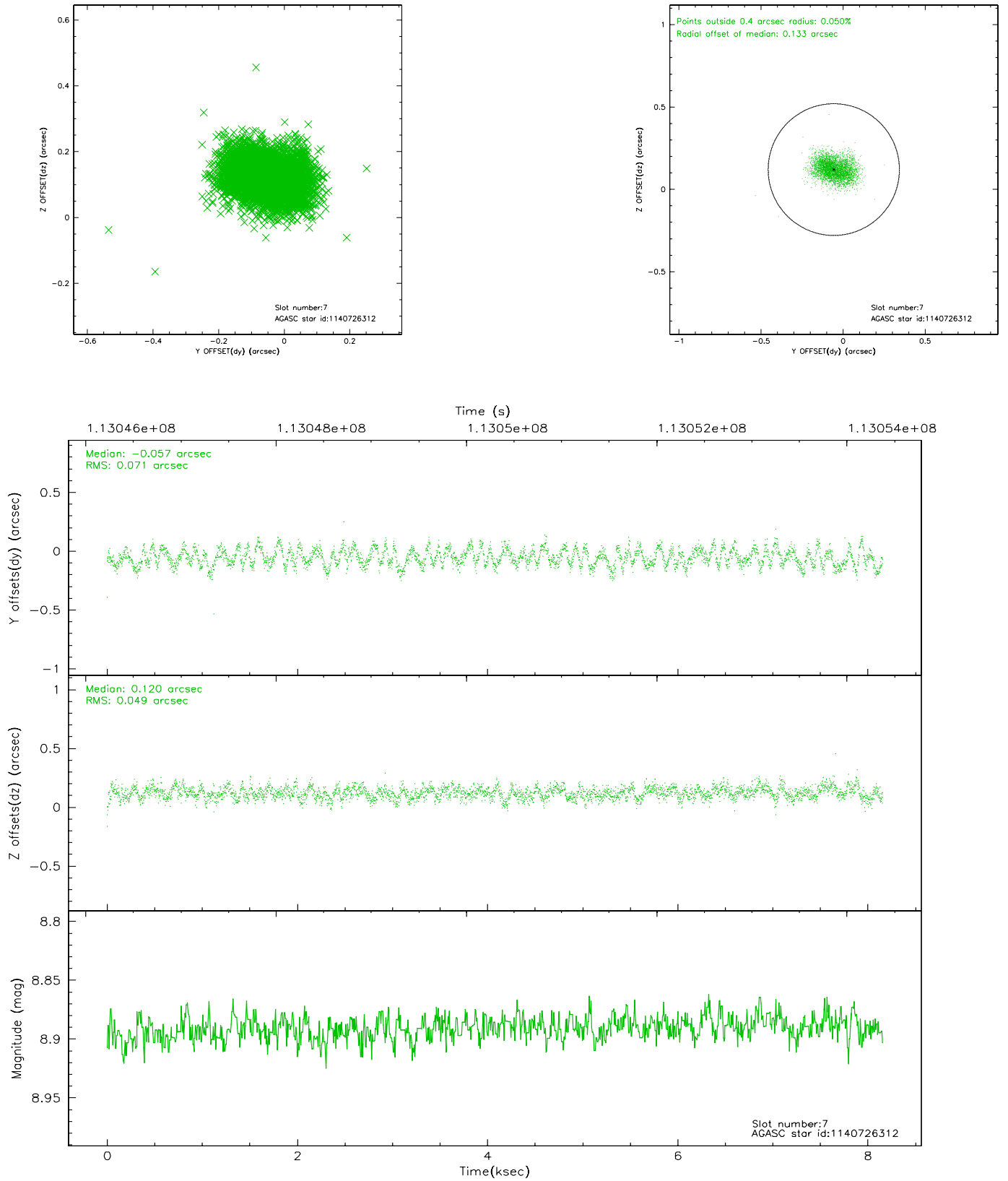
### 2.4.3 Slot 5



## 2.4.4 Slot 6

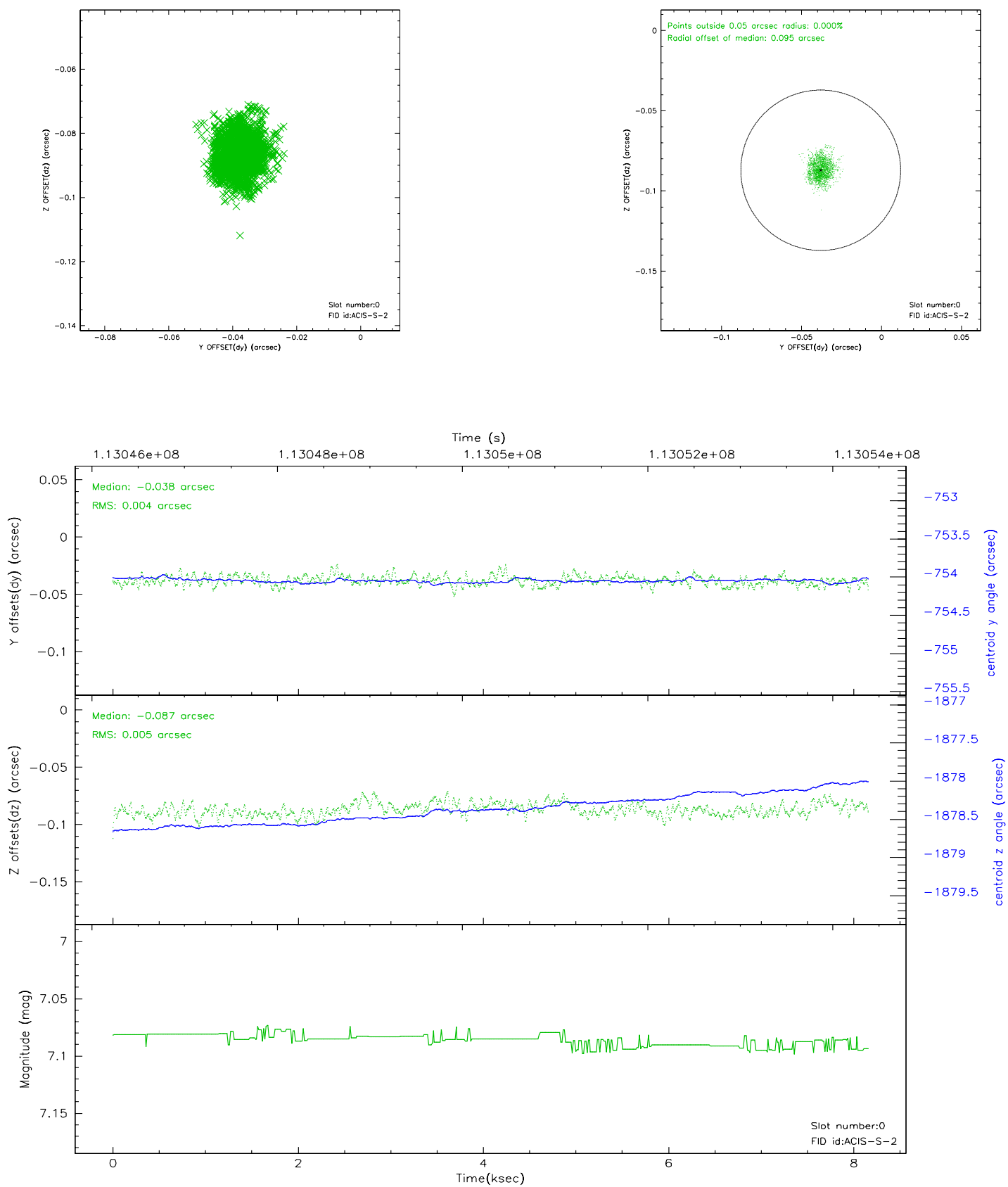


## 2.4.5 Slot 7

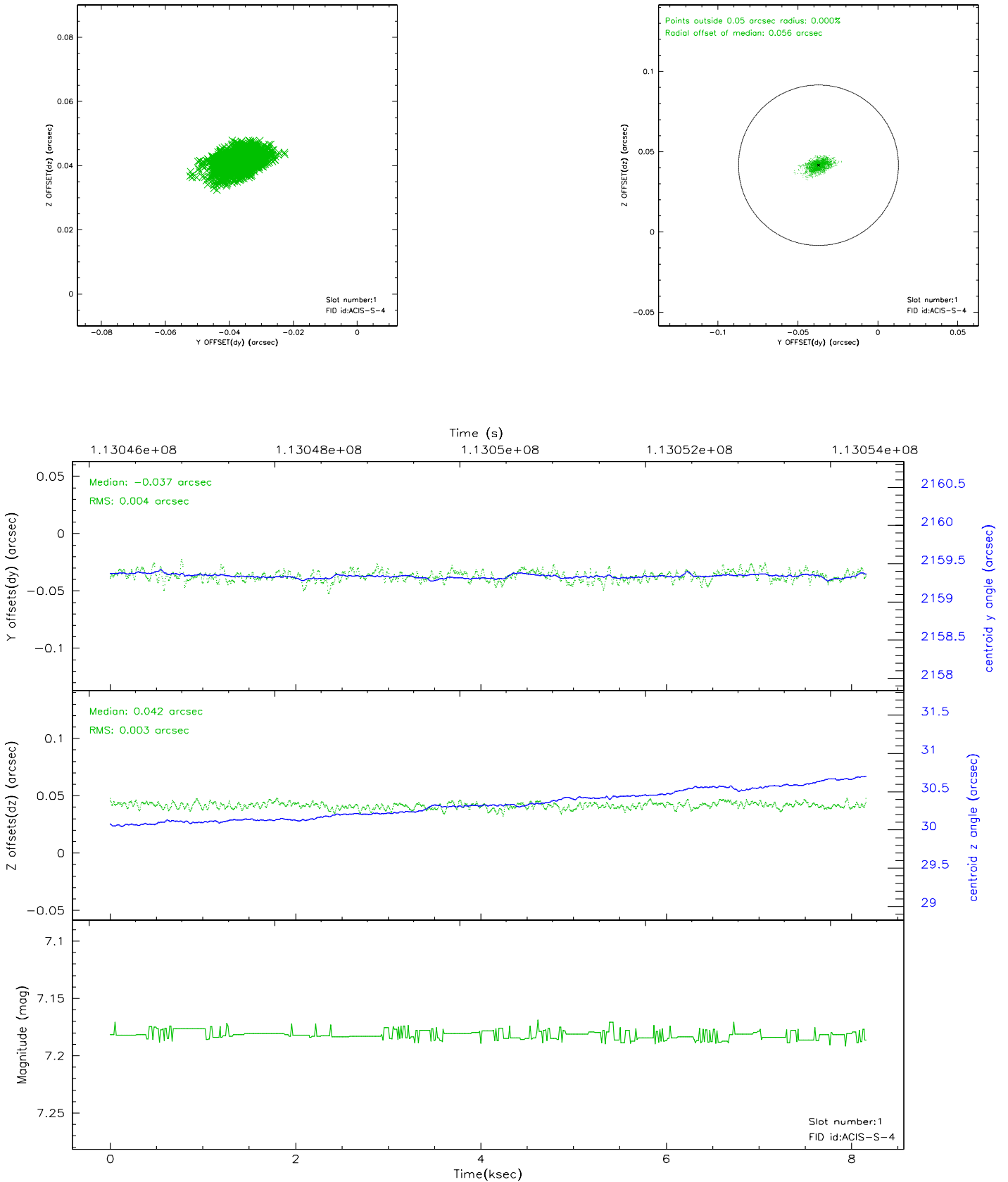


## 2.5 FID Slots

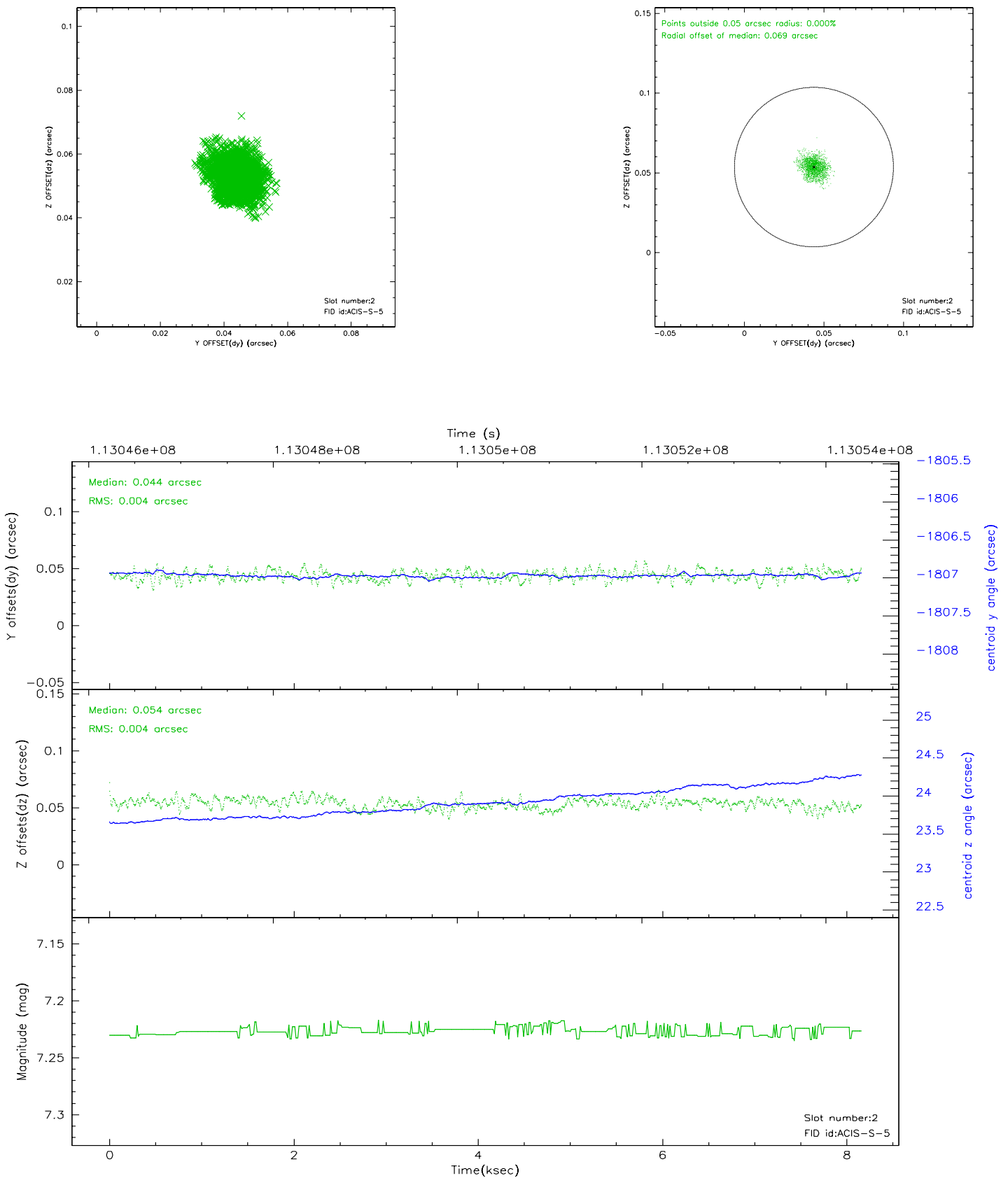
### 2.5.1 Slot 0



## 2.5.2 Slot 1



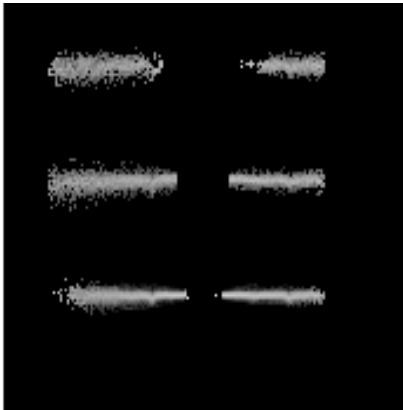
### 2.5.3 Slot 2



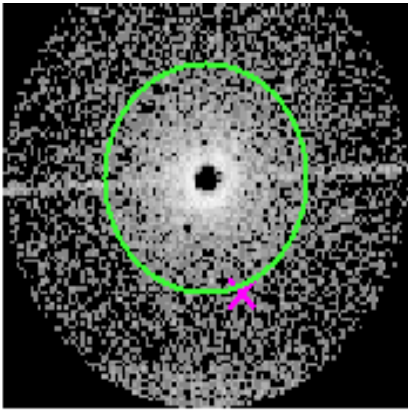


# 3 Gratings

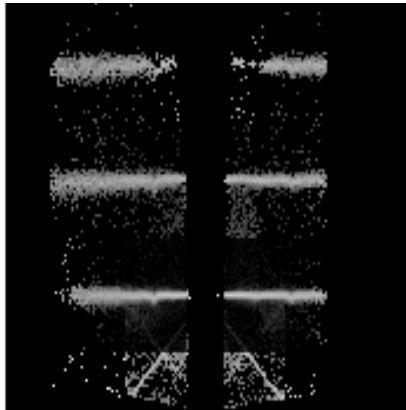
## 3.1 HEG Arm



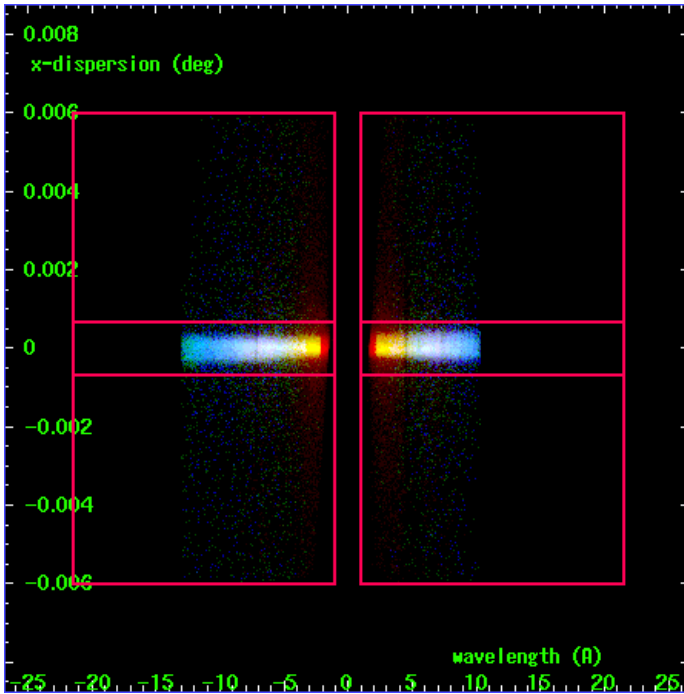
HEG Order Sort 123



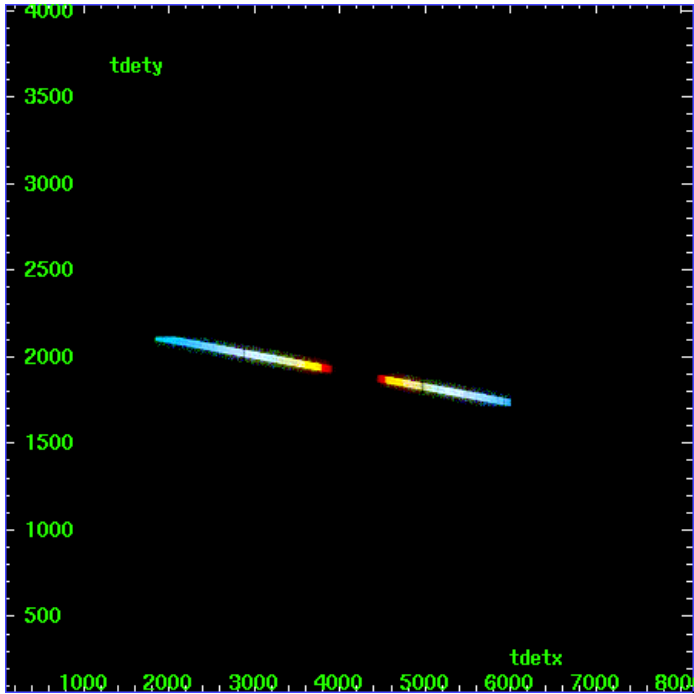
HEG Zero Order



HEG Order Sort ALL

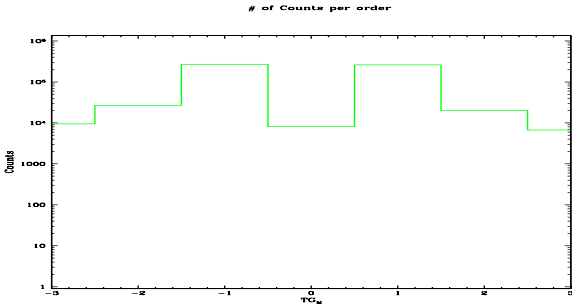


Spot Image HEG

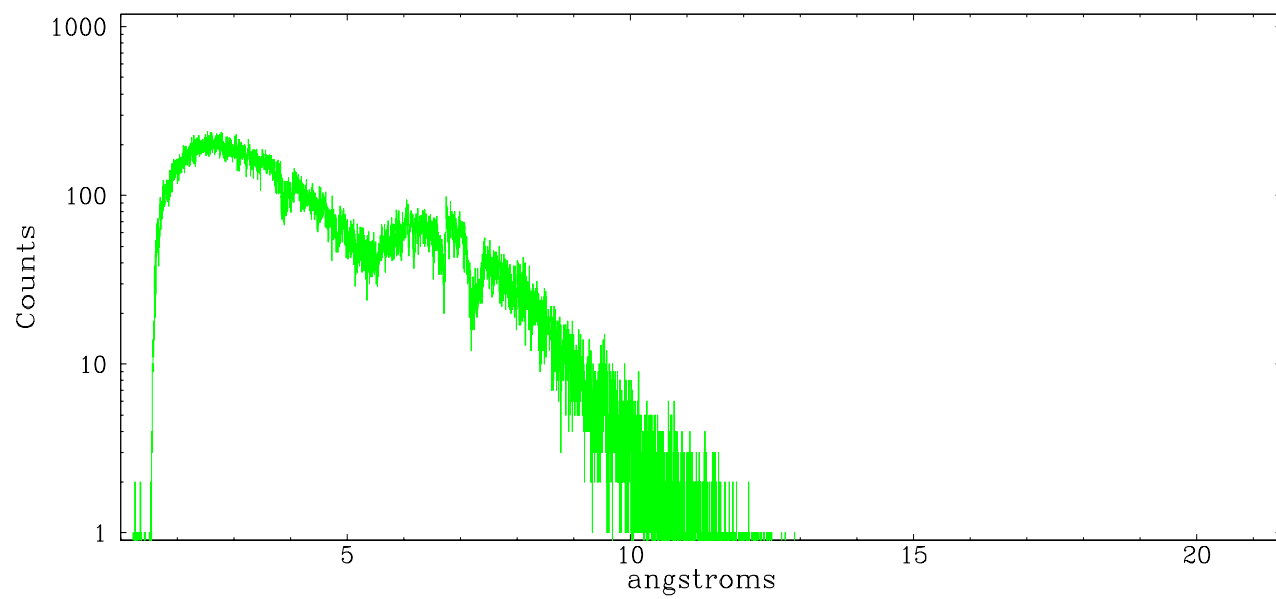


Full Detector HEG

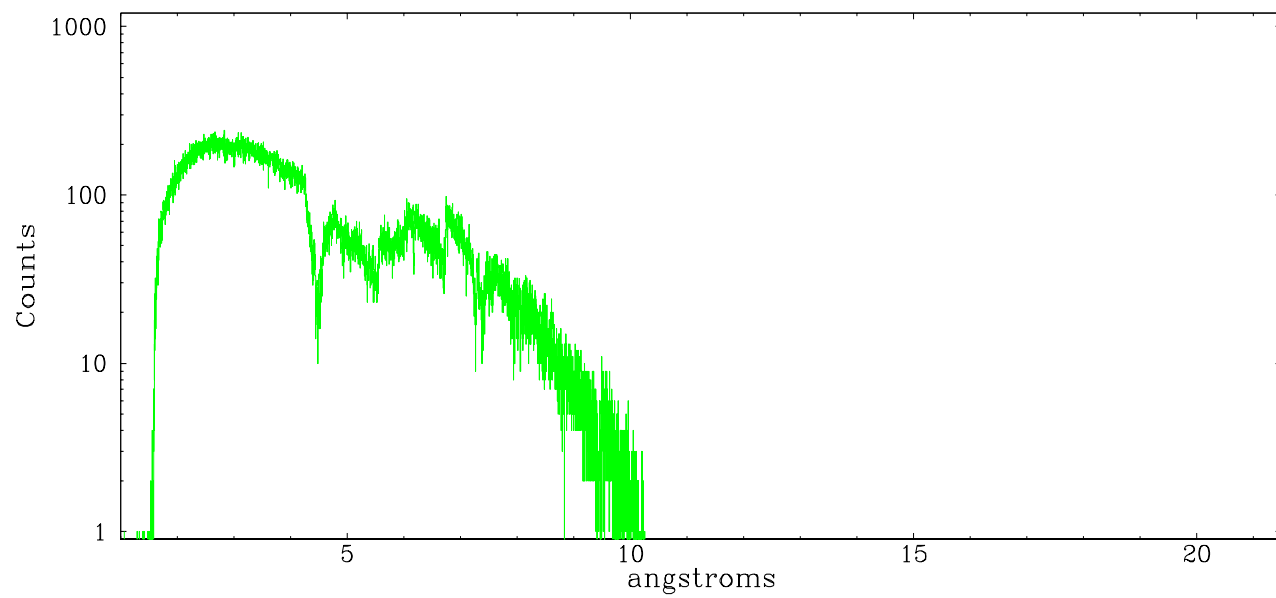
|        | order<br>-3 | order<br>-2 | order<br>-1 | order<br>0 | order 1 | order<br>2 | order<br>3 |
|--------|-------------|-------------|-------------|------------|---------|------------|------------|
| Events | 9513        | 26757       | 270219      | 8090       | 261783  | 20175      | 6728       |



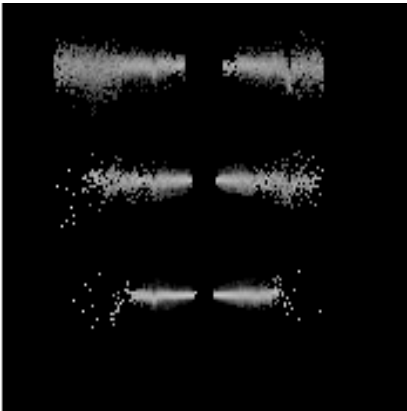
heg order -1



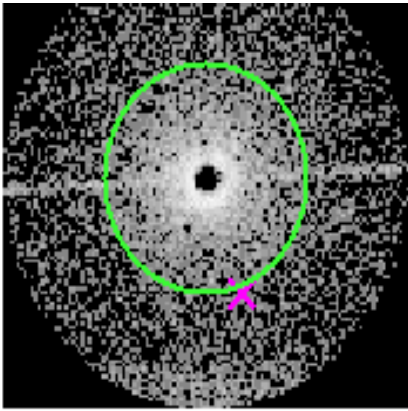
heg order +1



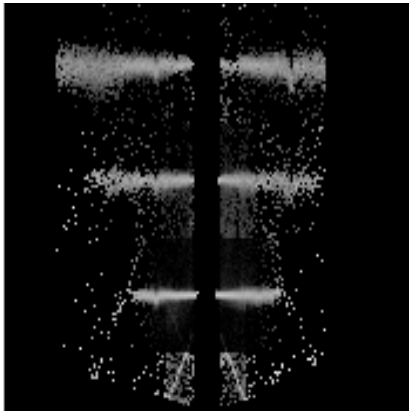
3.2 MEG Arm



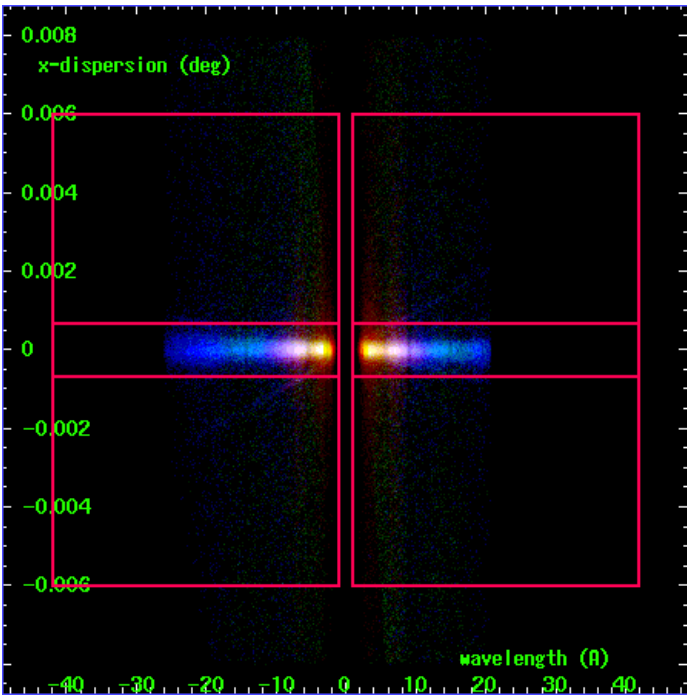
MEG Order Sort 123



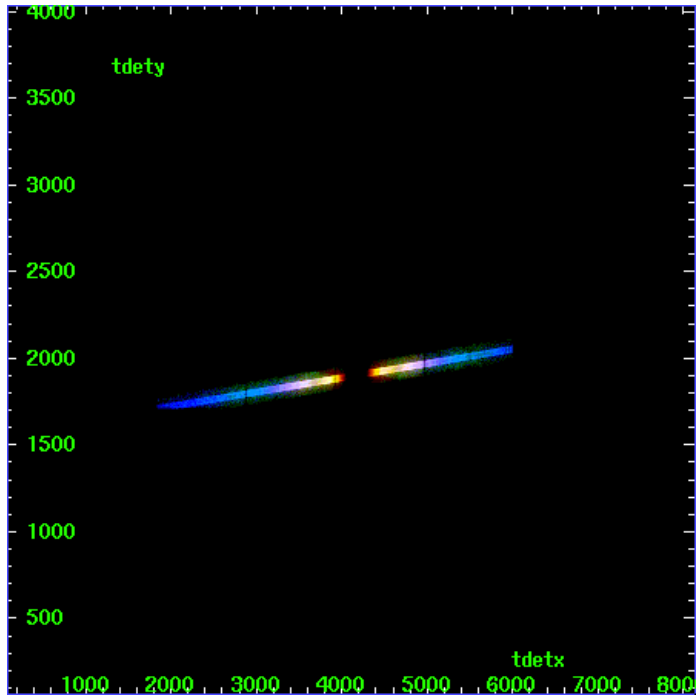
MEG Zero Order



MEG Order Sort ALL

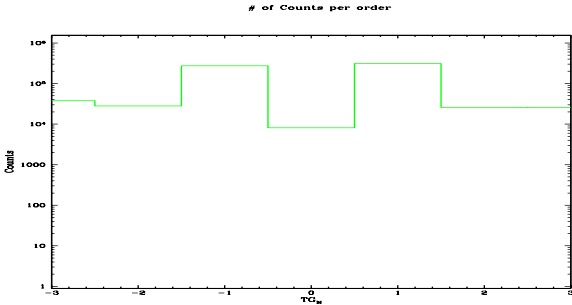


Spot Image MEG

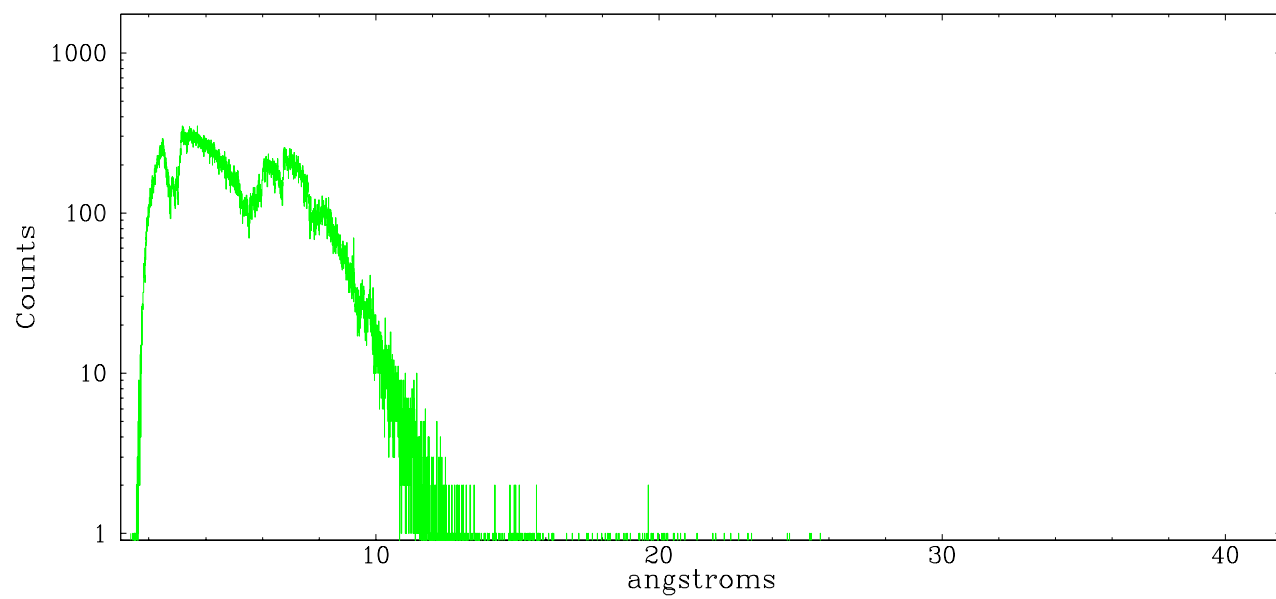


Full Detector MEG

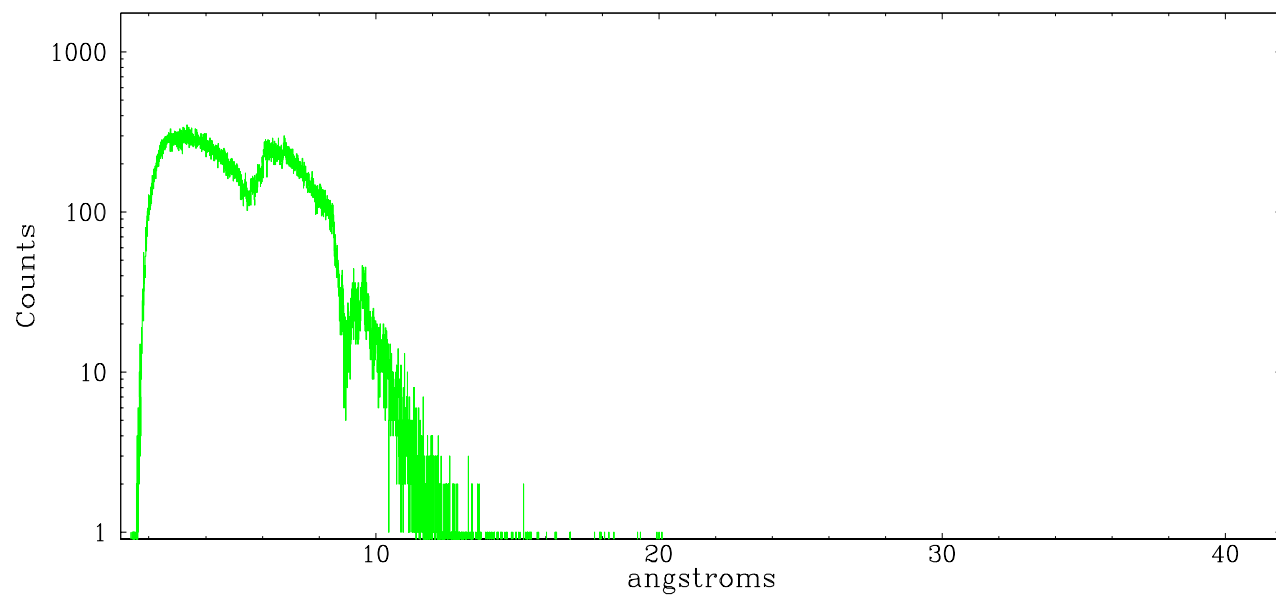
|        | order<br>-3 | order<br>-2 | order<br>-1 | order<br>0 | order 1 | order<br>2 | order<br>3 |
|--------|-------------|-------------|-------------|------------|---------|------------|------------|
| Events | 37624       | 28048       | 271931      | 8090       | 309111  | 25711      | 25394      |



meg order -1



meg order +1



# A Summary

## A.1 Status

|                            |                    |
|----------------------------|--------------------|
| V&V Scientist              | David Huenemoerder |
| V&V Date (YYYY-MM-DD)      | 2006.12.29         |
| V&V Edition                | 1                  |
| V&V Disposition and Status | OK                 |
| V&V Charge Time            | 8.156              |

## A.2 Comments

Due to pileup of the zeroth order, tgdetect did not appear to give the correct position. Findzero results for meg of  $x_0=4085.07$ ;  $y_0=4125.64$  were used as the zeroth order position.

Dispersed spectra are also probably piled, since they show clearly in an image made from bad events.

Phase constraint: met; observed  $0.340 - 0.347$