

# V&V Reference Report

## L2 ASCDS Version : 8.4.4

Observation 10833 - L2 Version 3  
Chandra X-Ray Center

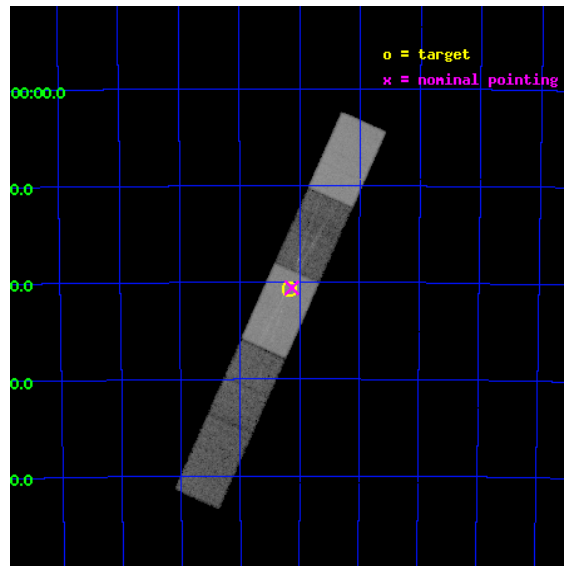
L2 Processing Date : May 30 2012

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# 1 Front

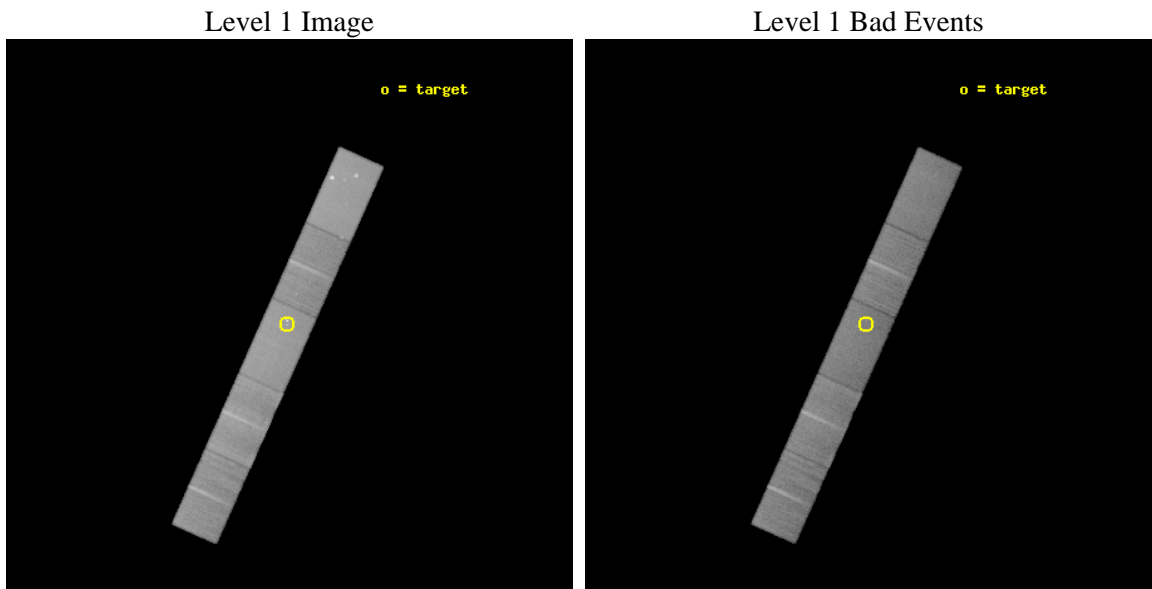
|          |  |   |
|----------|--|---|
| seq_num  | 501150   | Sequence number                             |
| obs_id   | 10833  | Observation id                              |
| title    | A Deep HETG Probe of the CSM Interaction in SN1996cr | Proposal titl                               |
| observer | Dr. Franz Bauer                                      | Principal investigator                      |
| object   | SN1996cr   | Source name                                 |
| dtycycle | 0  | &#160                                       |
| cycle    | P  | events from which exps?<br>Prim/Second/Both |
| ra_targ  | 213.291667   | Observer's specified target RA [deg]        |
| dec_targ | -65.345694   | Observer's specified target Dec [deg]       |
| ra_nom   | 213.28207090056                                      | Nominal RA [deg]                            |
| dec_nom  | -65.342972597265                                     | Nominal Dec [deg]                           |
| roll_nom | 114.14789756374                                      | Nominal Roll [deg]                          |
| revision | 3  | Processing version of data                  |
| ontime   | 28976.899636388                                      | Sum of GTIs [s]                             |
| livetime | 28364.232220427                                      | Livetime [s]                                |
| ontime5  | 28976.899636388                                      | Sum of GTIs [s]                             |
| ontime6  | 28974.958646238                                      | Sum of GTIs [s]                             |
| ontime7  | 28976.899636388                                      | Sum of GTIs [s]                             |
| ontime8  | 28976.899636388                                      | Sum of GTIs [s]                             |
| ontime9  | 28974.958606362                                      | Sum of GTIs [s]                             |
| l2events | 294349   | Number of level 2 events                    |



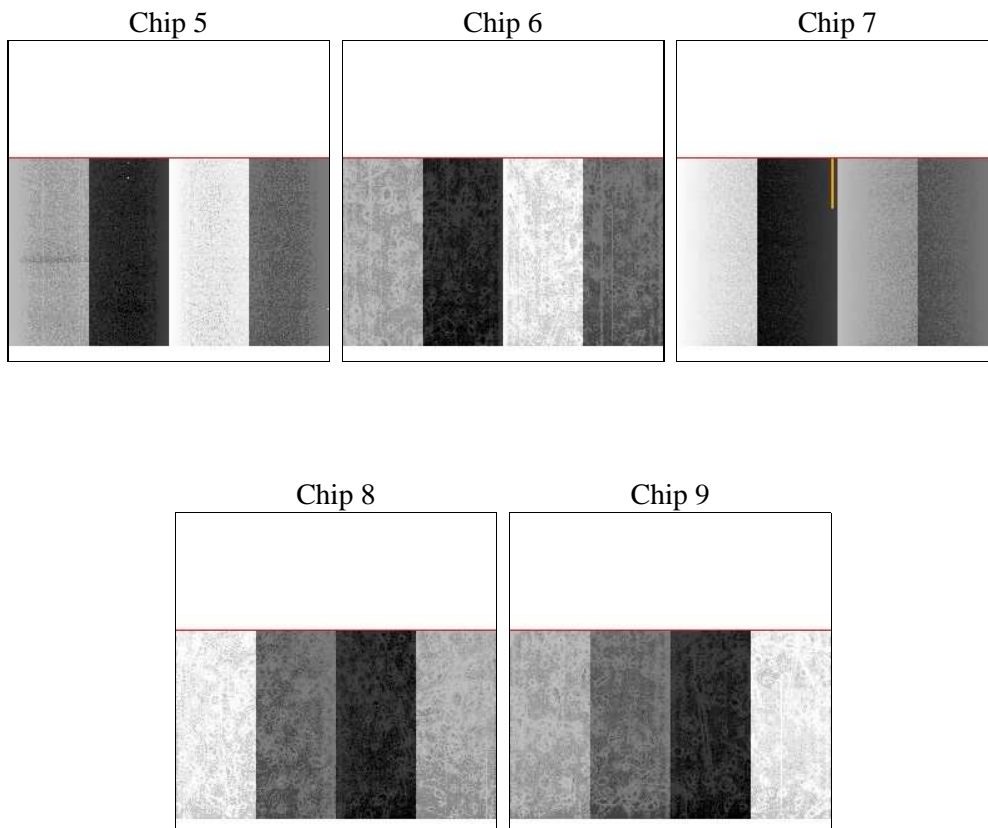
## 2 OBI

### 2.1 OBI

#### 2.1.1 Images



#### 2.1.2 Bias



### 2.1.3 Parameters

|          |                     |                                |                |                 |   |
|----------|---------------------|--------------------------------|----------------|-----------------|---|
| obi_num  | 1                   | Obi number                     | sched_exp_time | 28794.810000    | [s] Scheduled observation exposure time |
| ascdsver | 8.4.4               | Processing system revision     | ontime         | 28976.899636388 | Sum of GTIs [s]                         |
| caldsver | 4.4.9               | &#160                          | ontime5        | 28976.899636388 | Sum of GTIs [s]                         |
| date     | 2012-05-29T15:04:59 | Date and time of file creation | ontime6        | 28974.958646238 | Sum of GTIs [s]                         |
| revision | 2                   | Processing version of data     | ontime7        | 28976.899636388 | Sum of GTIs [s]                         |
|          |                     |                                | ontime8        | 28976.899636388 | Sum of GTIs [s]                         |
|          |                     |                                | ontime9        | 28974.958606362 | Sum of GTIs [s]                         |
|          |                     |                                | l1events       | 1155340         | Number of level 1 events                |

### 2.1.4 Events

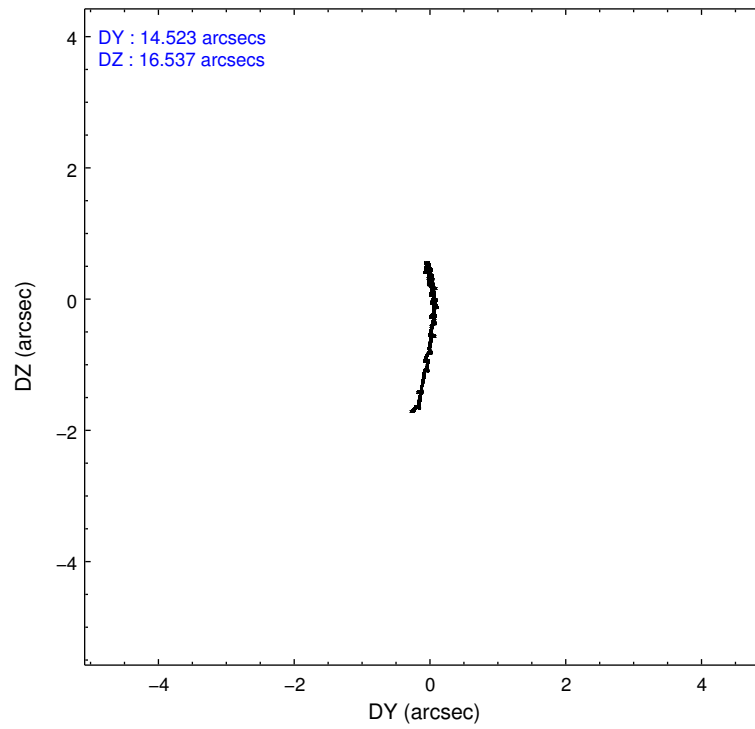
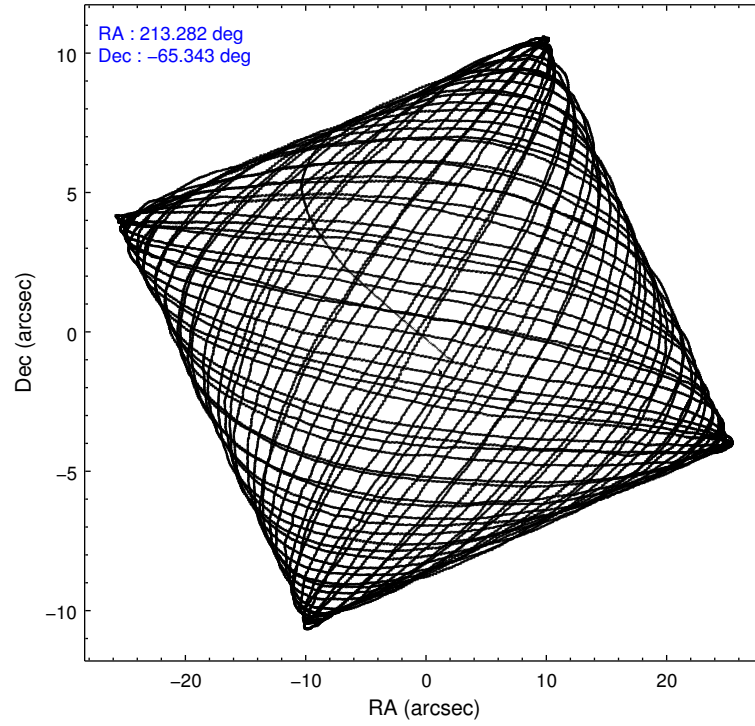
|                 | ccd 5  | ccd 6  | ccd 7  | ccd 8  | ccd 9  |
|-----------------|--------|--------|--------|--------|--------|
| level 1 events  | 288529 | 187016 | 258381 | 238960 | 182454 |
| rejected events | 153905 | 162533 | 146614 | 183406 | 159208 |
| rejected %      | 53%    | 86%    | 56%    | 76%    | 87%    |

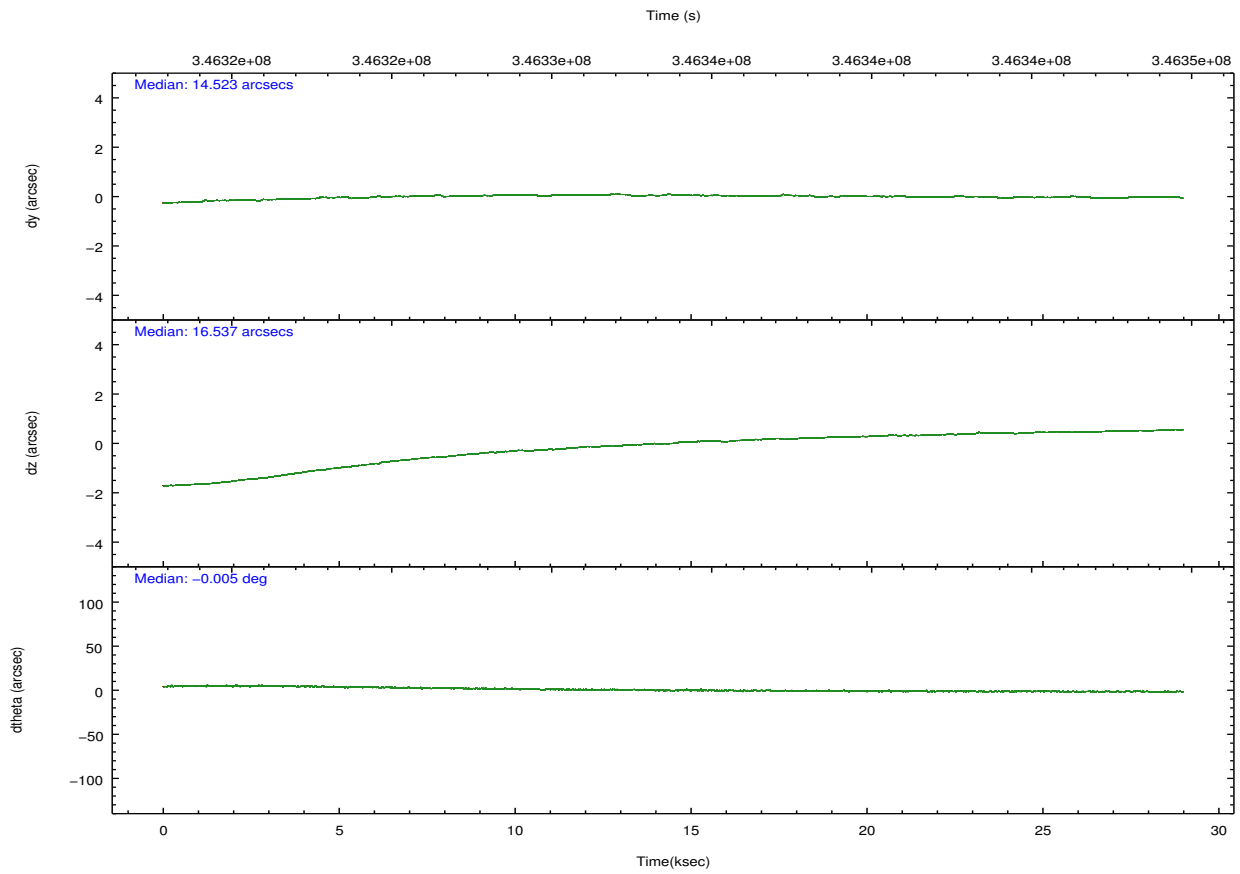
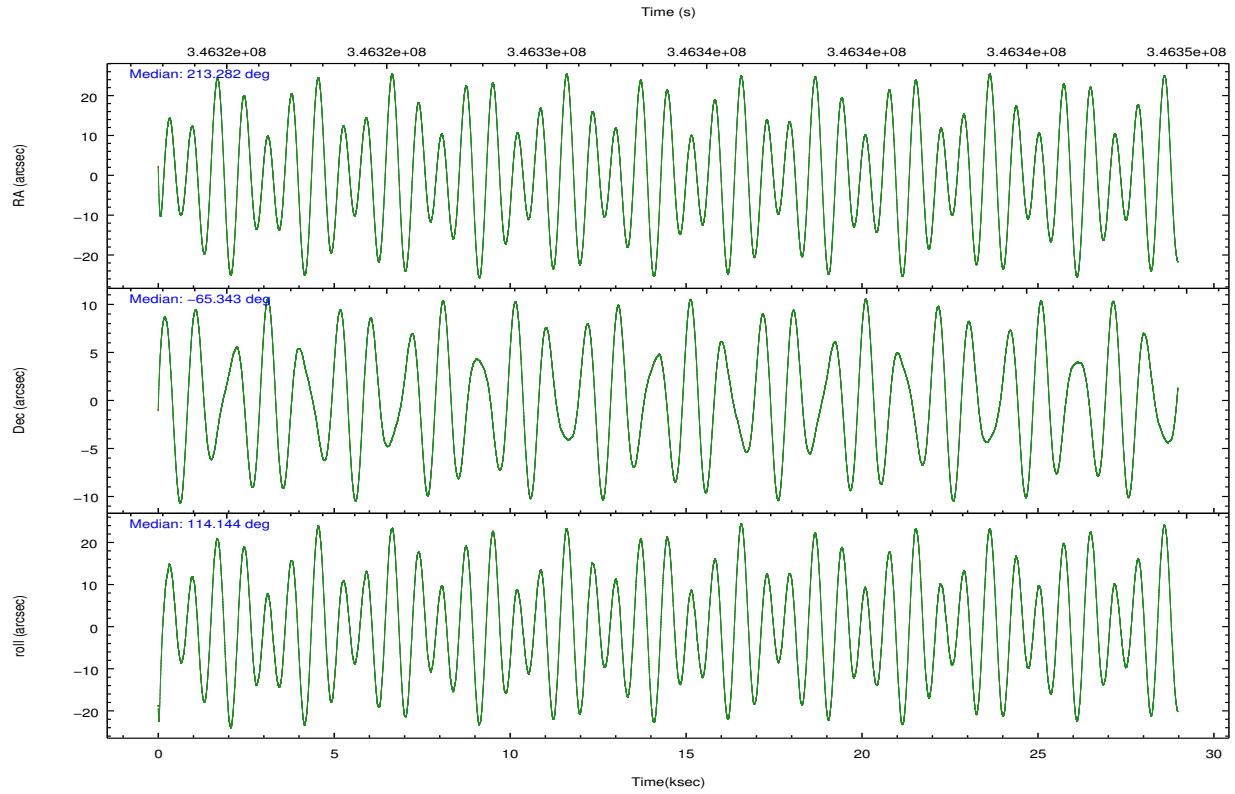
|                | ccd 5  | ccd 6  | ccd 7  | ccd 8  | ccd 9  |
|----------------|--------|--------|--------|--------|--------|
| grade 0 events | 20171  | 10114  | 10866  | 17473  | 9531   |
|                | 6%     | 5%     | 4%     | 7%     | 5%     |
| grade 1 events | 565    | 80     | 328    | 146    | 104    |
|                | 0%     | 0%     | 0%     | 0%     | 0%     |
| grade 2 events | 38148  | 5126   | 23815  | 12578  | 4619   |
|                | 13%    | 2%     | 9%     | 5%     | 2%     |
| grade 3 events | 5919   | 2497   | 10447  | 5984   | 2614   |
|                | 2%     | 1%     | 4%     | 2%     | 1%     |
| grade 4 events | 5843   | 2461   | 10279  | 5601   | 2394   |
|                | 2%     | 1%     | 3%     | 2%     | 1%     |
| grade 5 events | 21259  | 8518   | 23472  | 11329  | 9261   |
|                | 7%     | 4%     | 9%     | 4%     | 5%     |
| grade 6 events | 67784  | 4814   | 58799  | 15030  | 4613   |
|                | 23%    | 2%     | 22%    | 6%     | 2%     |
| grade 7 events | 128840 | 153406 | 120375 | 170819 | 149318 |
|                | 44%    | 82%    | 46%    | 71%    | 81%    |

## 2.2 Compared Parameters

| Parameter                         | Planned             | Actual               | Parameter                             | Planned   | Actual  |
|-----------------------------------|---------------------|----------------------|---------------------------------------|-----------|---------|
| Instrument                        | ACIS                | ACIS                 | Obspar format version number          | 7         | 7       |
| Detector                          | ACIS-56789          | ACIS-56789           | Obspar file type                      | PREDICTED | ACTUAL  |
| Grating                           | HETG                | HETG                 | Obspar update status                  | NONE      | UPDATED |
| Data mode                         | VFAINT              | VFAINT               | CCD I0 on                             | N         | N       |
| Observation mode                  | POINTING            | POINTING             | CCD I1 on                             | N         | N       |
| [deg] Pointing RA                 | 213.335719          | 213.2820709005649    | CCD I2 on                             | N         | N       |
| [deg] Pointing Dec                | -65.358678          | -65.34297259726483   | CCD I3 on                             | N         | N       |
| [deg] Pointing Roll               | 114.040042          | 114.1478975637408    | CCD S0 on                             | O1        | N       |
| [mm] SIM focus pos                | -0.684267           | -0.6828225247311905  | CCD S1 on                             | Y         | Y       |
| [mm] SIM defocus                  | 0                   | 0.001444936568705701 | CCD S2 on                             | Y         | Y       |
| [mm] SIM translation stage pos    | -186.132523         | -186.1397904050899   | CCD S3 on                             | Y         | Y       |
| [mm] SIM translation stage offset | -4                  | -3.992732177917873   | CCD S4 on                             | Y         | Y       |
| [s] Observation start time (MET)  | 346319480.184000    | 346318239.7438       | CCD S5 on                             | Y         | Y       |
| Observation start date            | 2008-12-22T07:50:15 | 2008-12-22T07:30:39  | Number of optional ACIS chips dropped | 1         | 1       |
| [s] Observation end time (MET)    | 346348275.184000    | 346348489.0328       | On-chip summing requested             | N         | N       |
| Observation end date              | 2008-12-22T15:50:10 | 2008-12-22T15:54:49  | Subarray requested                    | CUSTOM    | CUSTOM  |
| Read mode                         | TIMED               | TIMED                | Subarray start row                    | 50        | 50      |
|                                   |                     |                      | Subarray row count                    | 600       | 600     |
|                                   |                     |                      | Alternating exposures requested       | N         | N       |
|                                   |                     |                      | [s] Primary exposure time             | 0.000000  | 1.9     |

## 2.3 Aspect



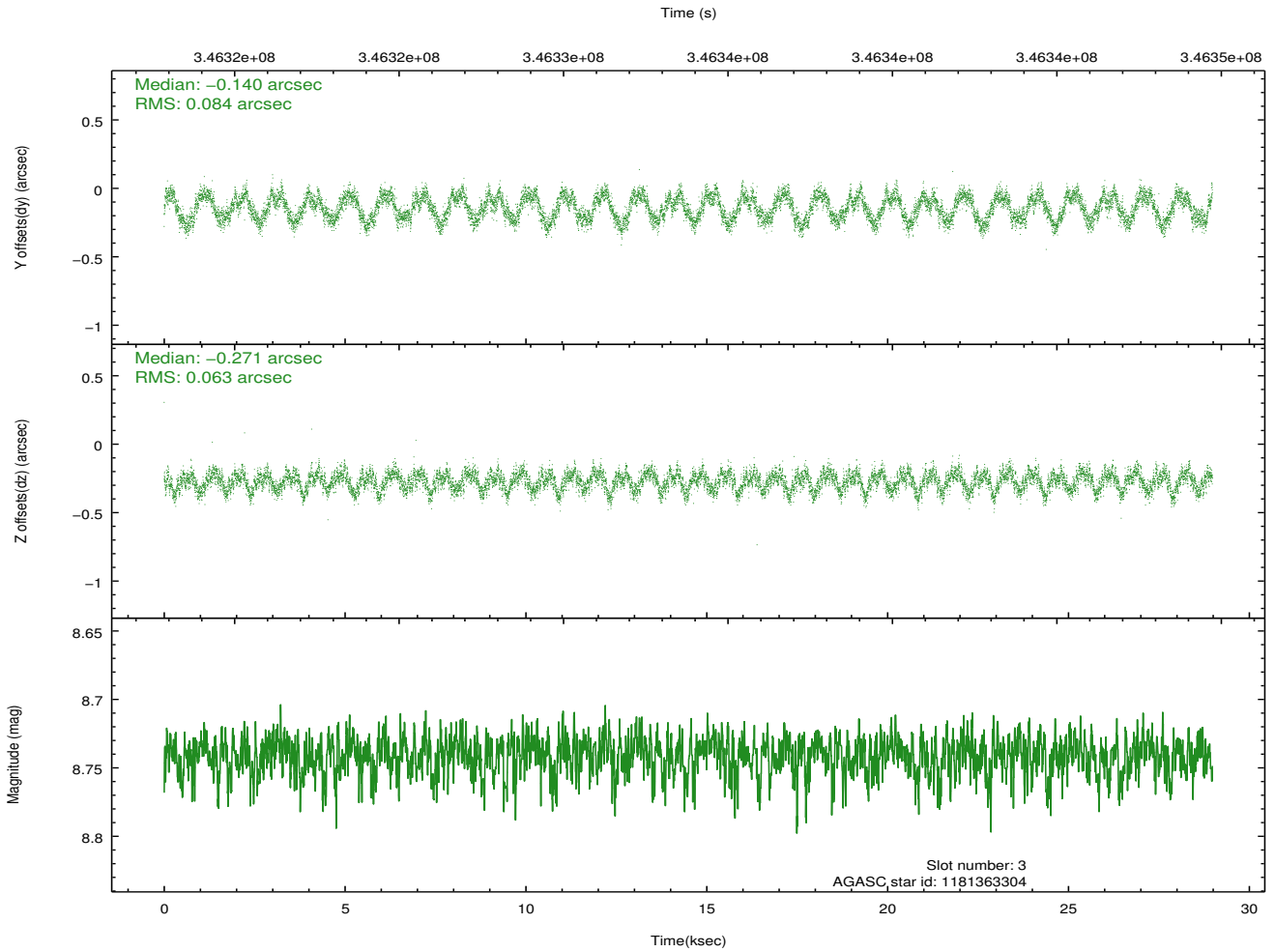
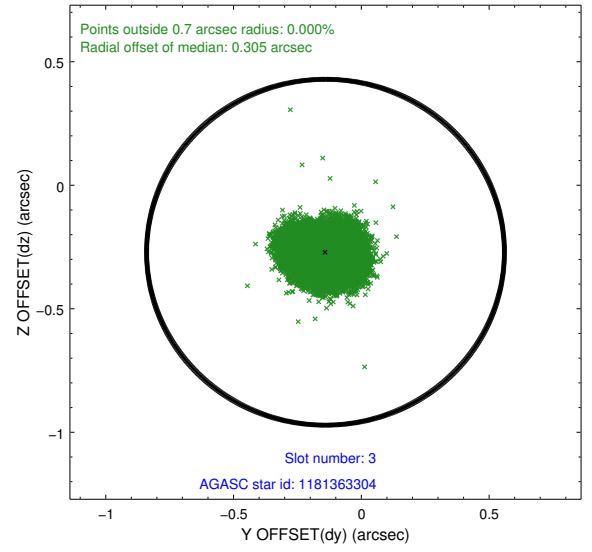
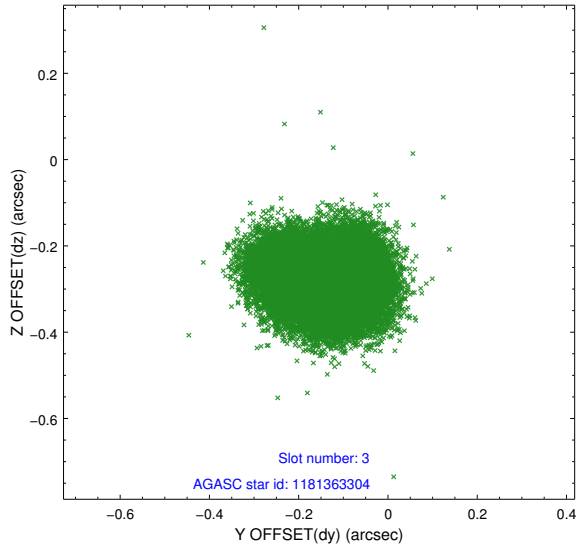


### Slot Statistics

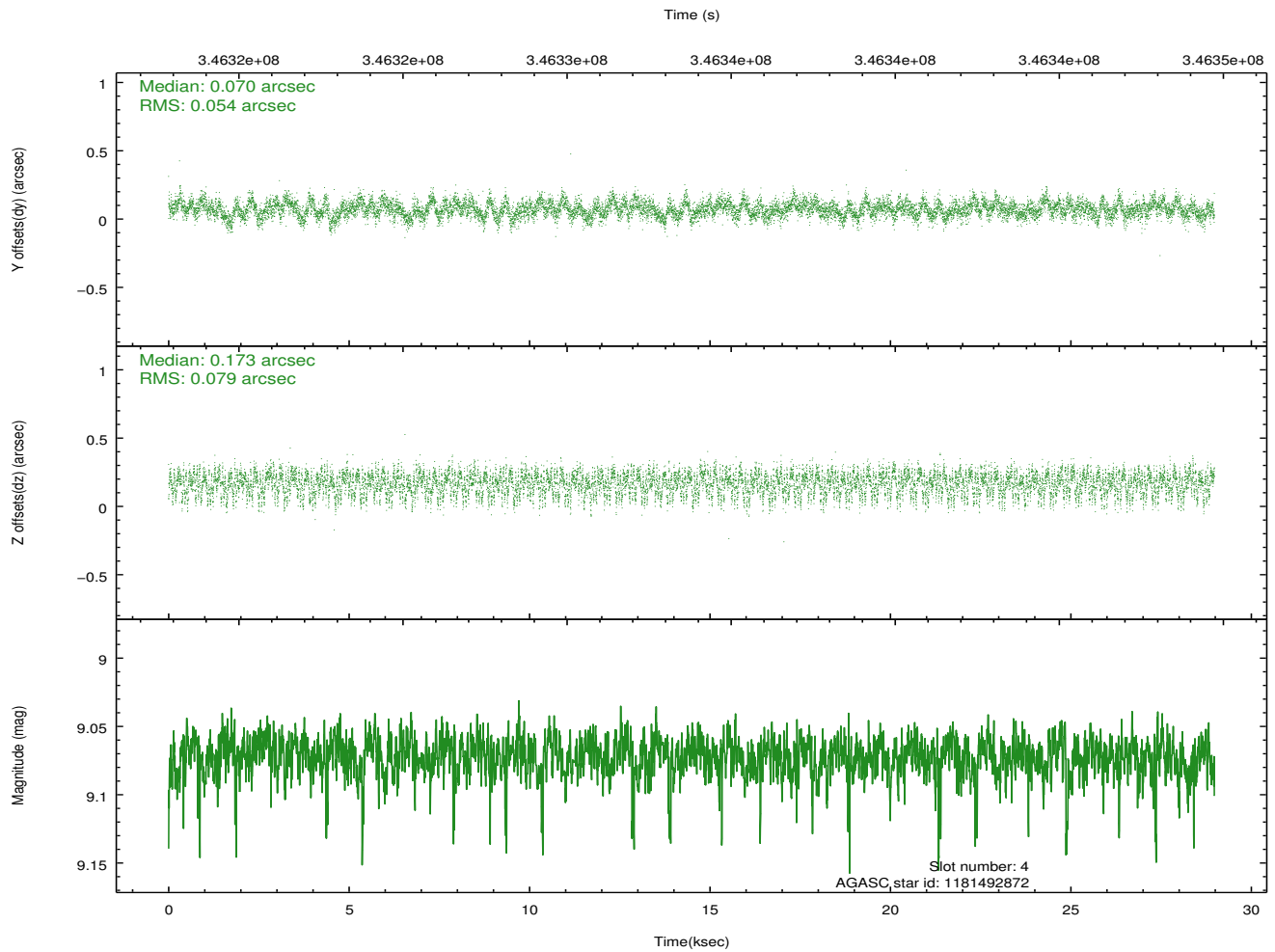
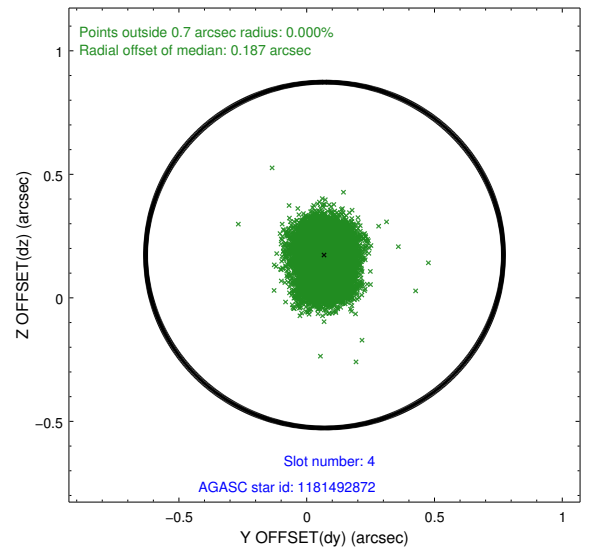
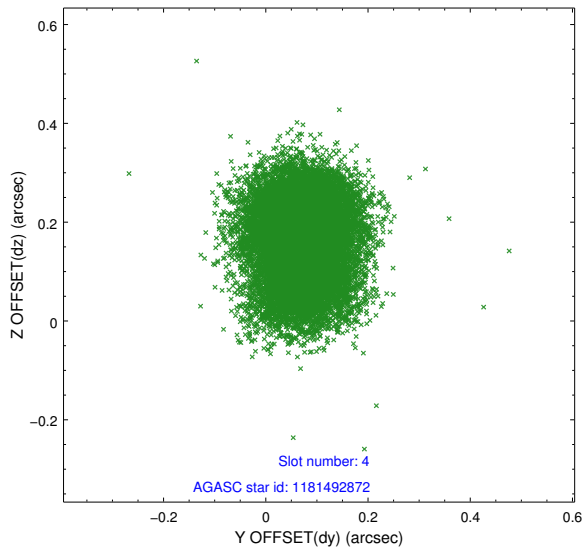
| slot | status | id         | mag  | n_pts | med_dy | med_dz | dr1   | dr2   | ra         | dec        | mean_y   | mean_z   |
|------|--------|------------|------|-------|--------|--------|-------|-------|------------|------------|----------|----------|
| 0    | FID    | ACIS-S-2   | 6.92 | 7069  | -0.090 | -0.066 | 0.025 | 0.046 | 0.000000   | 0.000000   | -767.26  | -1820.19 |
| 1    | FID    | ACIS-S-4   | 7.00 | 7068  | 0.207  | 0.060  | 0.009 | 0.027 | 0.000000   | 0.000000   | 2146.26  | 88.34    |
| 2    | FID    | ACIS-S-5   | 7.04 | 7069  | -0.150 | 0.012  | 0.022 | 0.041 | 0.000000   | 0.000000   | -1820.08 | 82.03    |
| 3    | GUIDE  | 1181363304 | 8.74 | 14124 | -0.140 | -0.271 | 0.116 | 0.166 | 212.741873 | -65.071033 | 1309.11  | 403.29   |
| 4    | GUIDE  | 1181492872 | 9.07 | 14116 | 0.070  | 0.173  | 0.103 | 0.165 | 214.965330 | -65.517798 | -1541.63 | -1973.52 |
| 5    | GUIDE  | 1181885760 | 9.39 | 14125 | 0.111  | -0.075 | 0.104 | 0.166 | 213.150845 | -65.847105 | -1495.11 | 965.93   |
| 6    | GUIDE  | 1181888328 | 9.12 | 14128 | 0.061  | -0.025 | 0.084 | 0.135 | 213.100875 | -66.006078 | -1988.91 | 1263.93  |
| 7    | GUIDE  | 1181356824 | 8.93 | 14128 | -0.093 | 0.208  | 0.102 | 0.163 | 213.100076 | -64.682630 | 2369.94  | -659.22  |

## 2.4 Star Slots

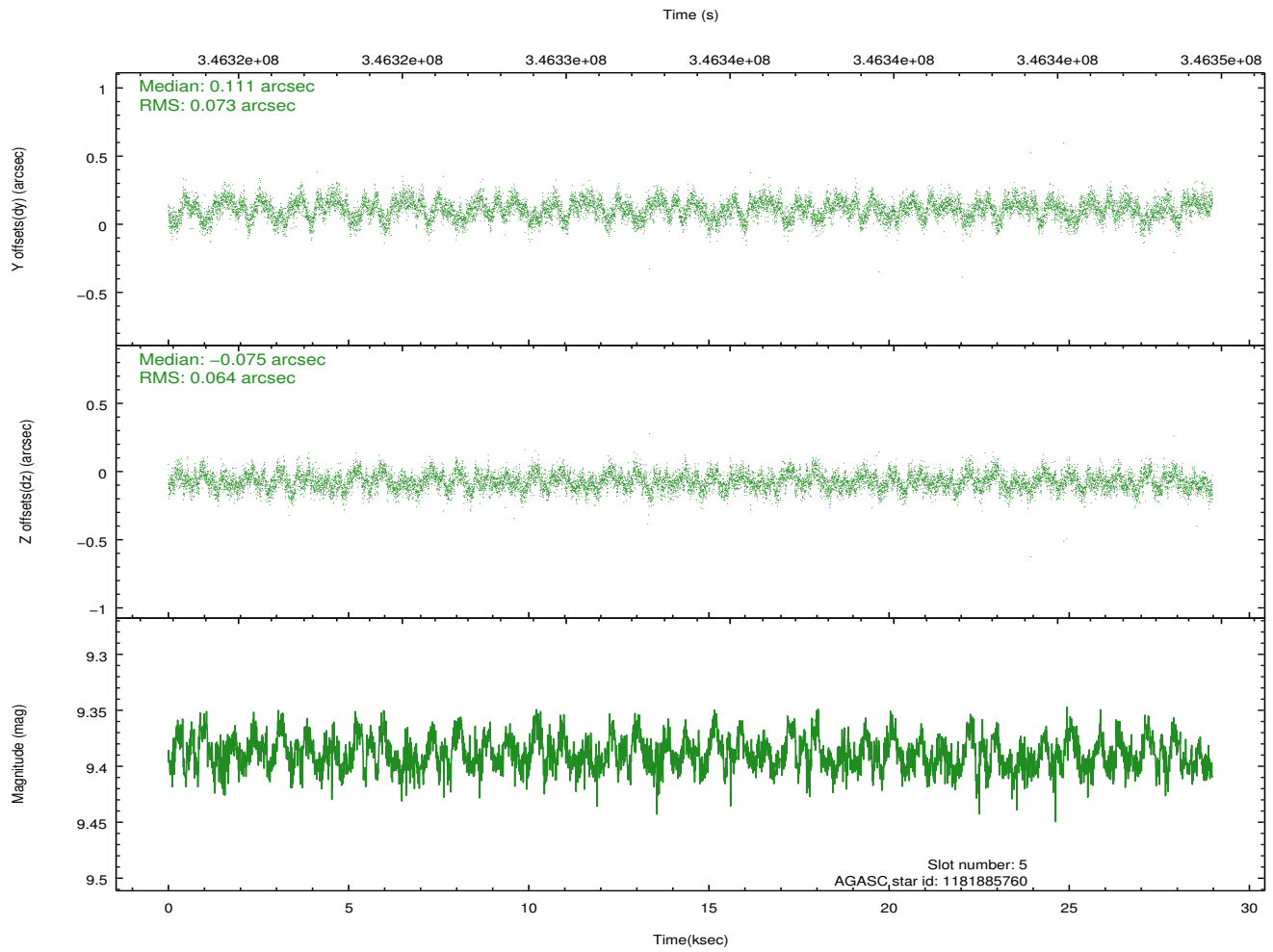
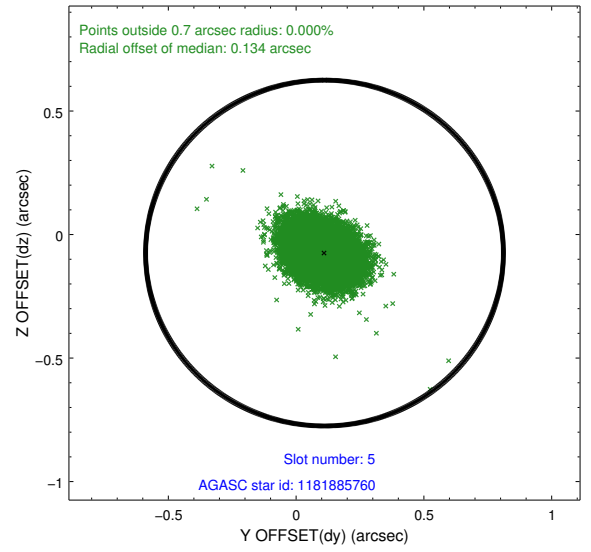
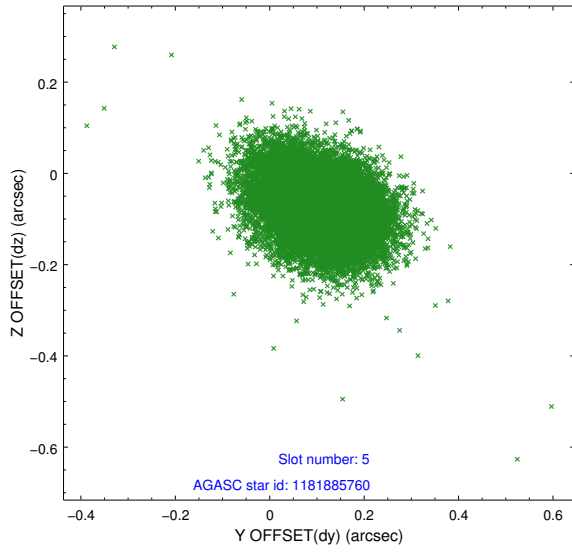
### 2.4.1 Slot 3



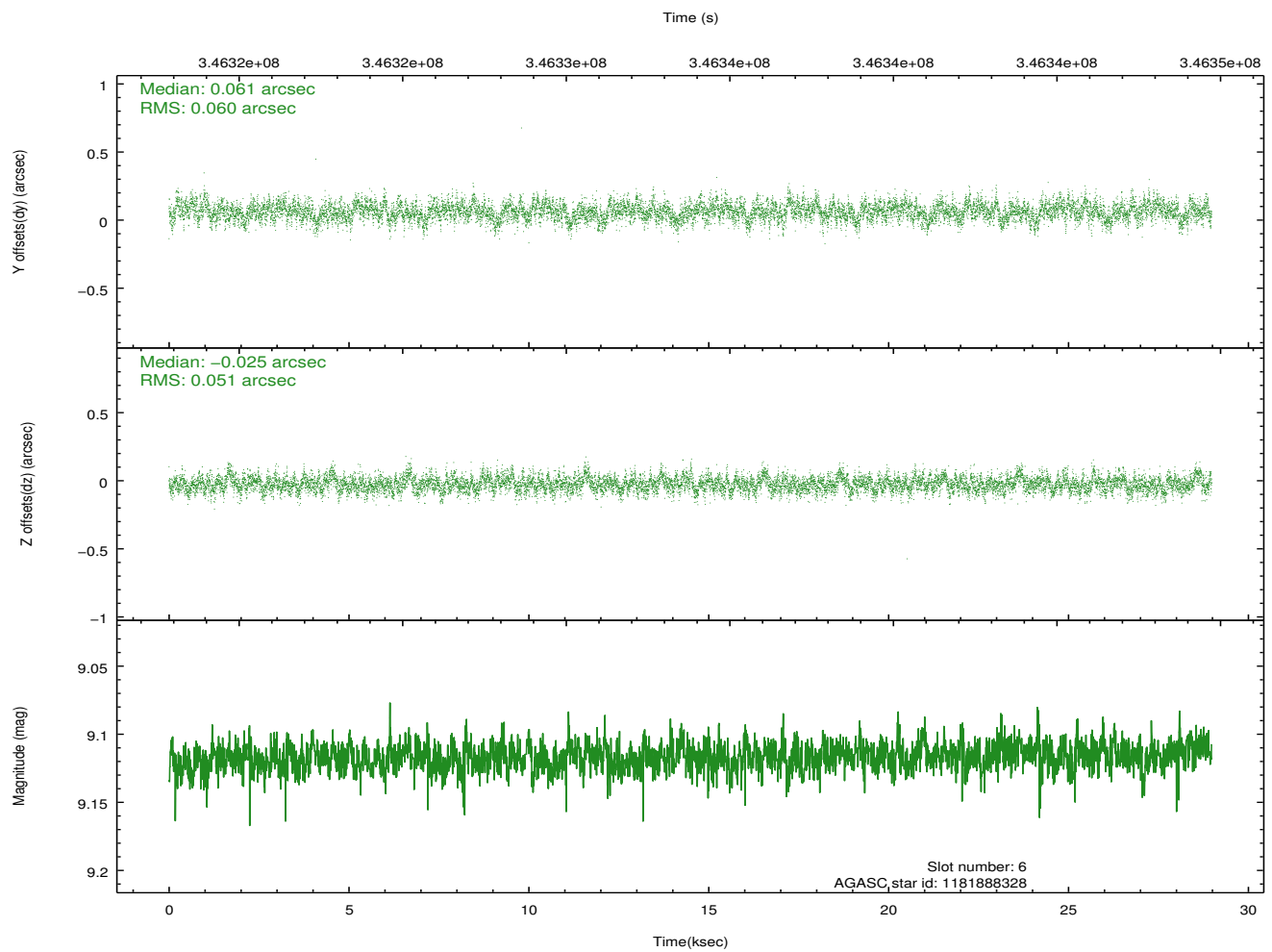
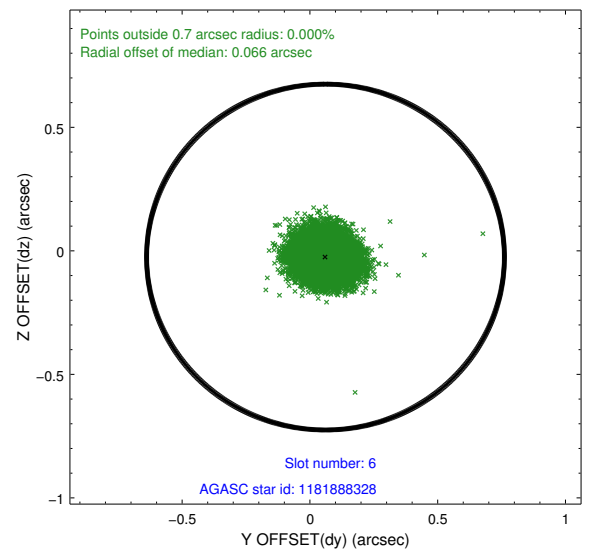
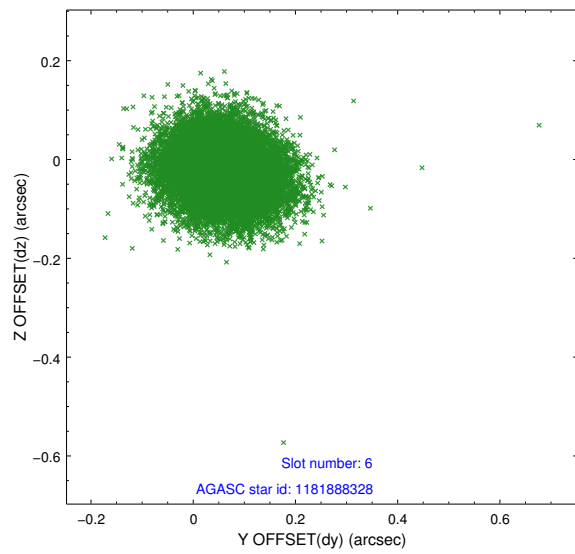
### 2.4.2 Slot 4



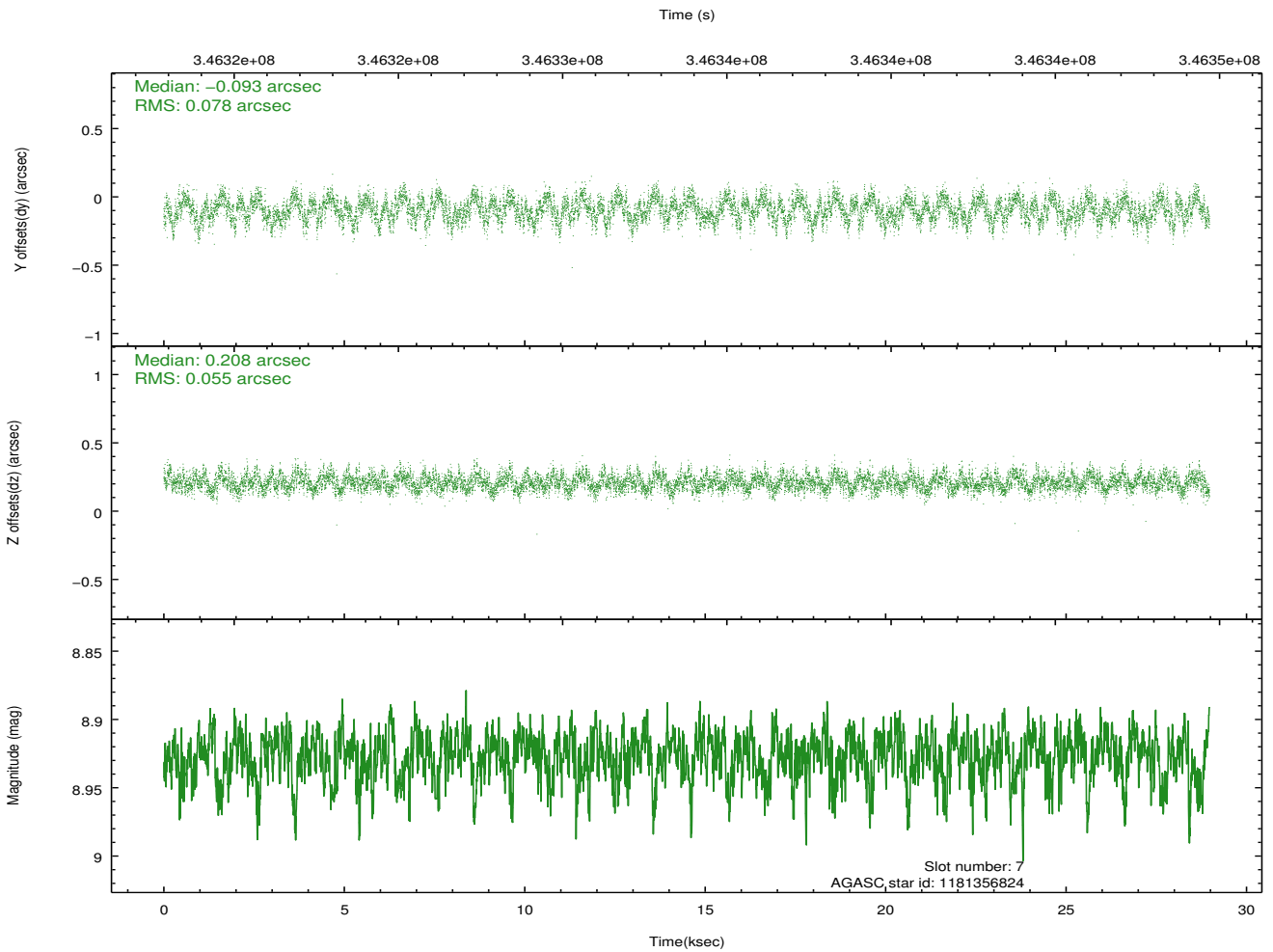
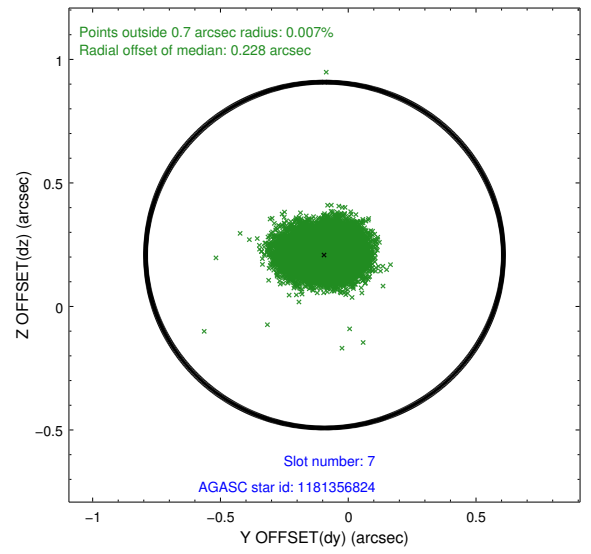
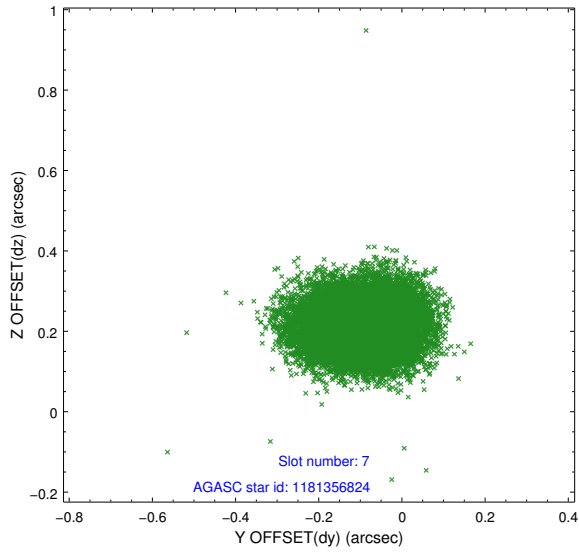
### 2.4.3 Slot 5



## 2.4.4 Slot 6

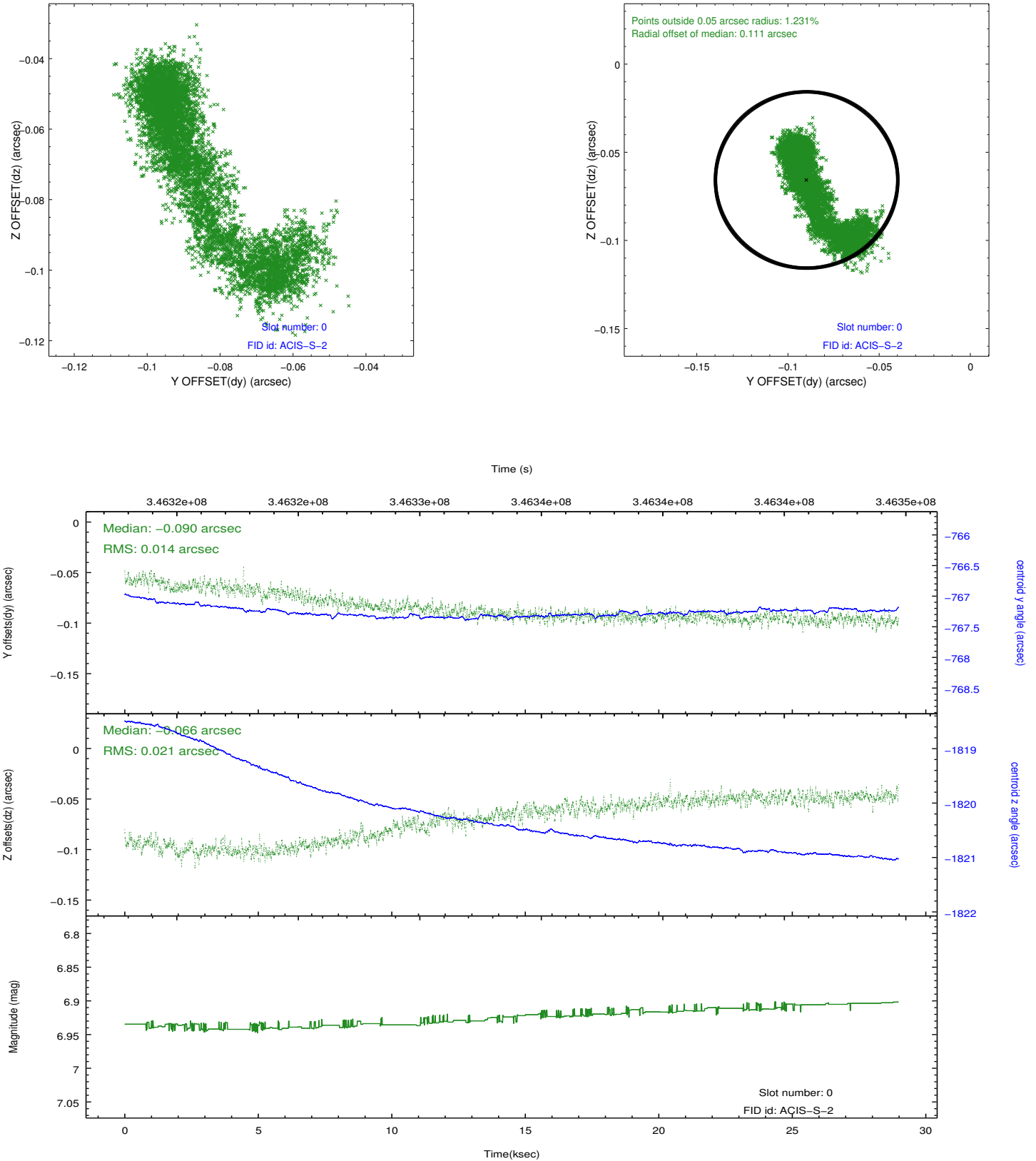


### 2.4.5 Slot 7

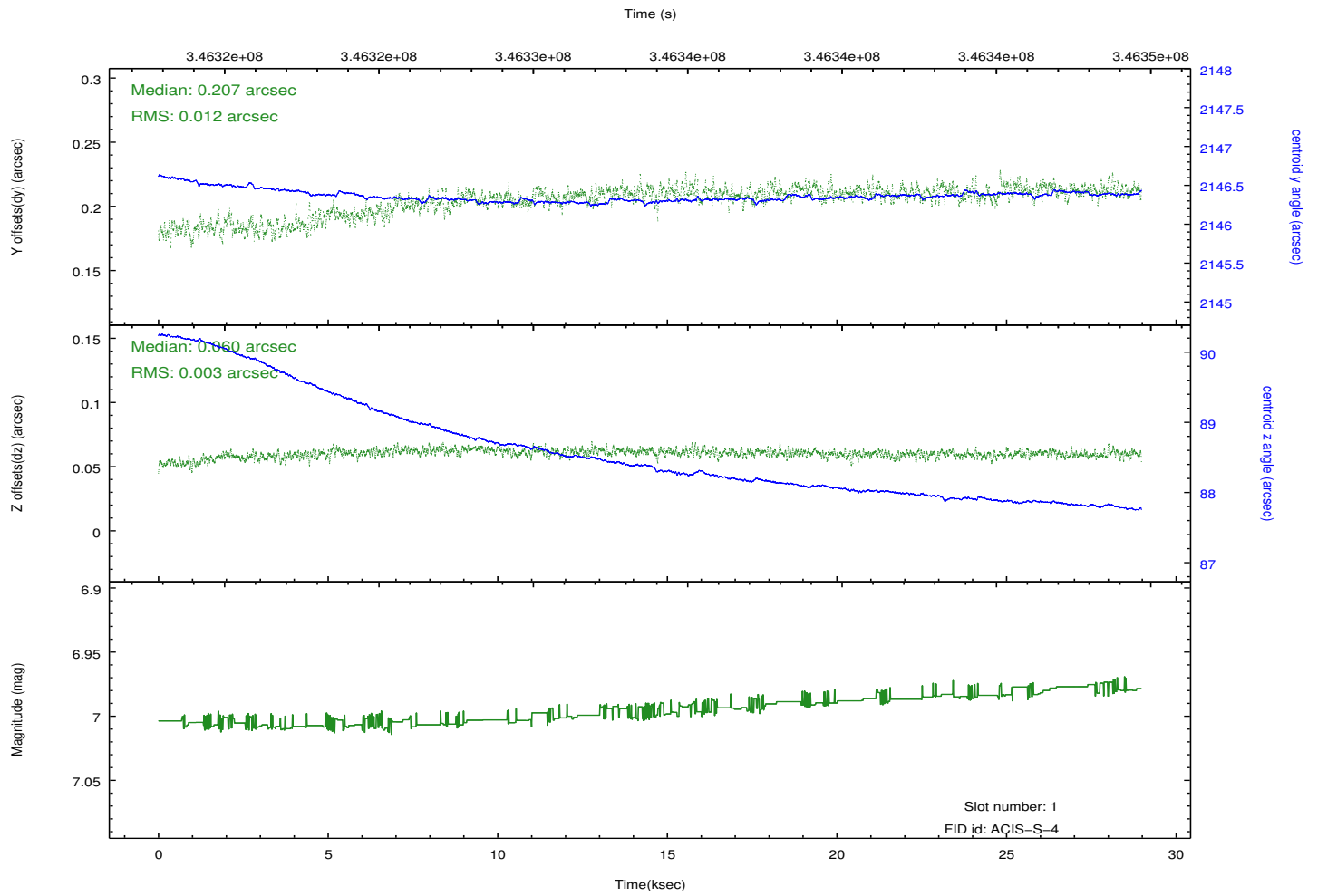
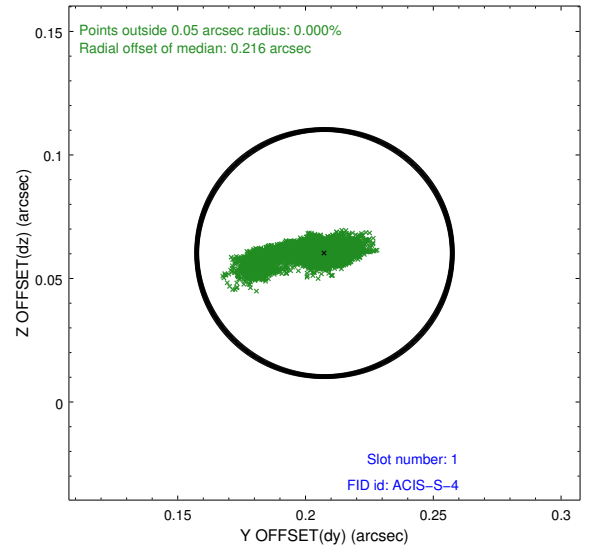
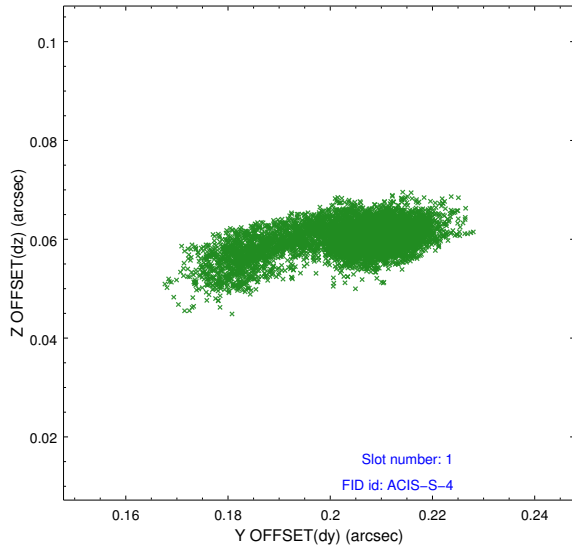


## 2.5 FID Slots

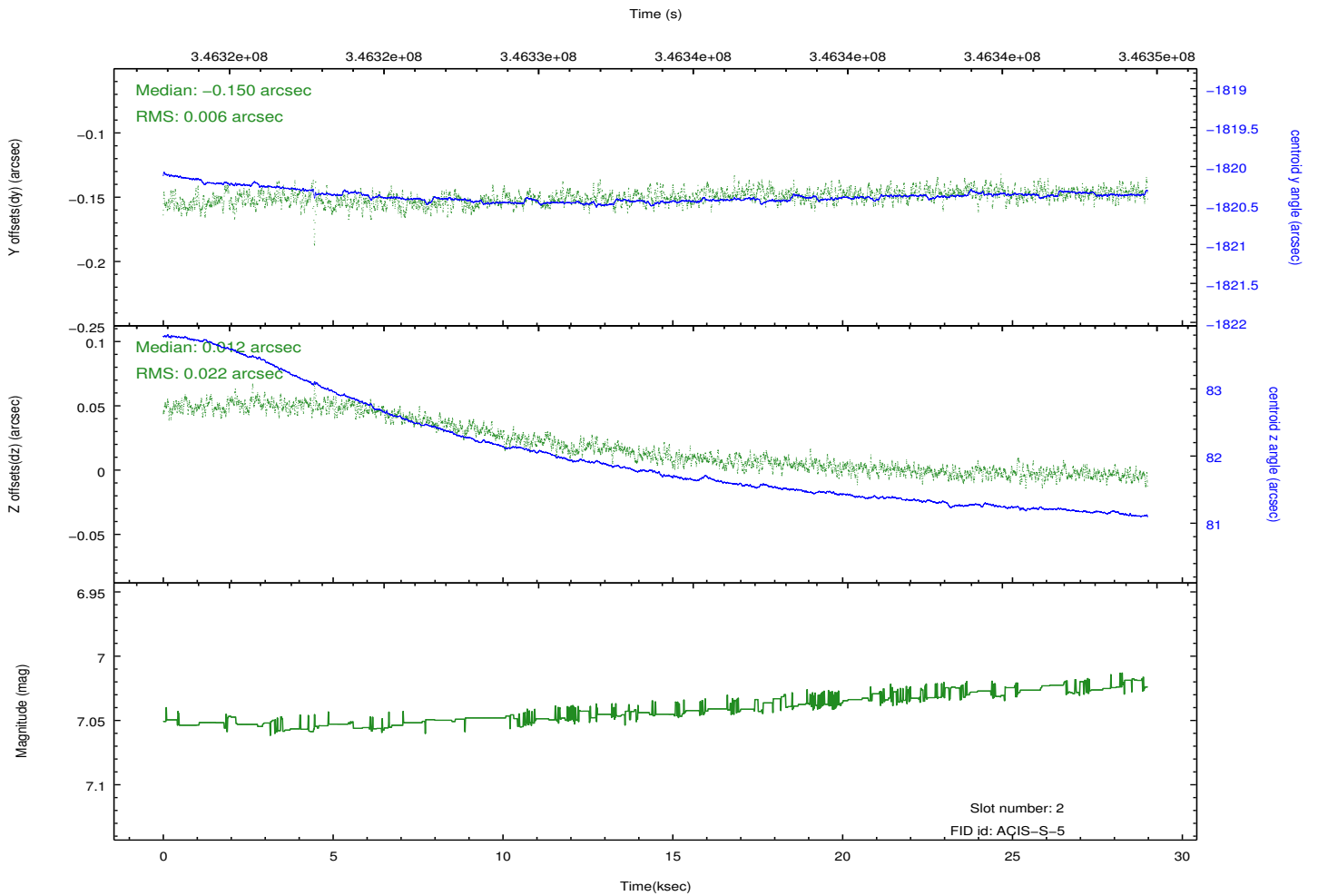
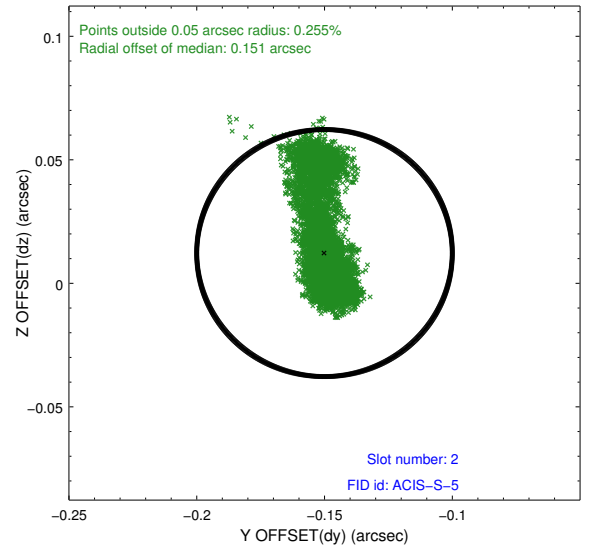
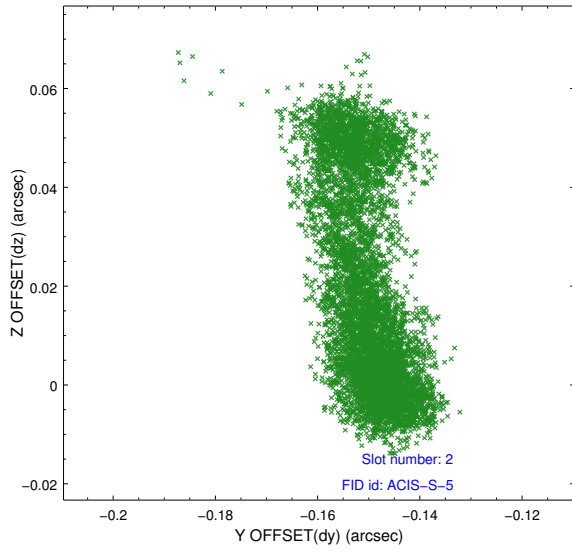
### 2.5.1 Slot 0



## 2.5.2 Slot 1

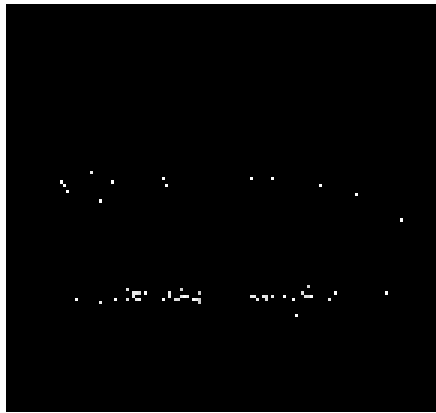


### 2.5.3 Slot 2

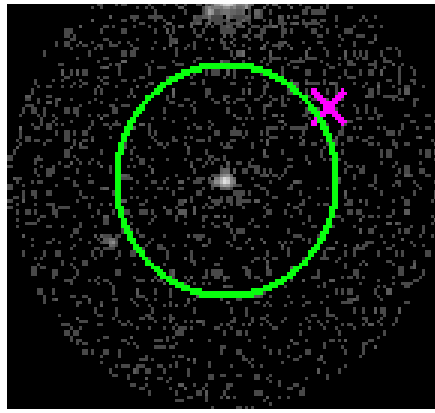


### 3 Gratings

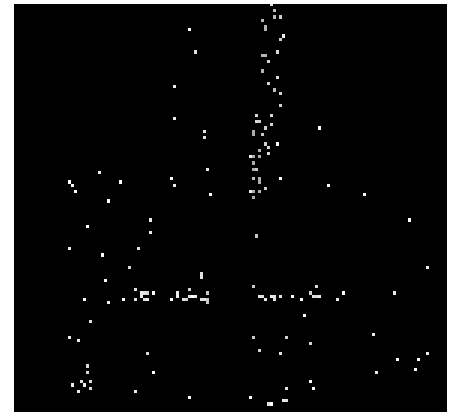
#### 3.1 HEG Arm



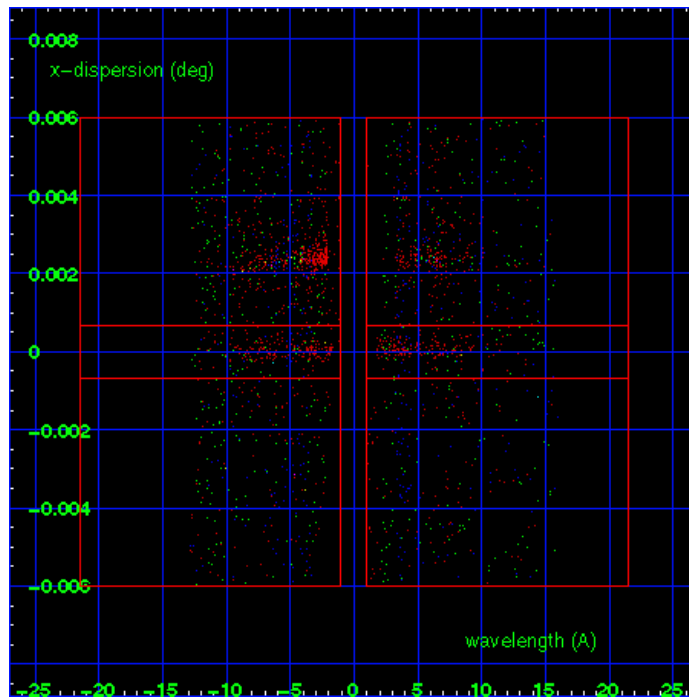
HEG Order Sort 123



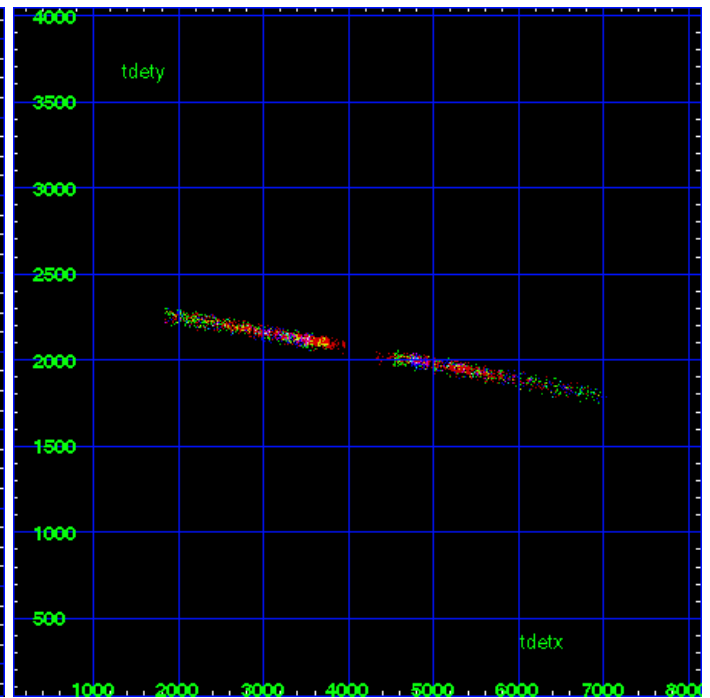
HEG Zero Order



HEG Order Sort ALL

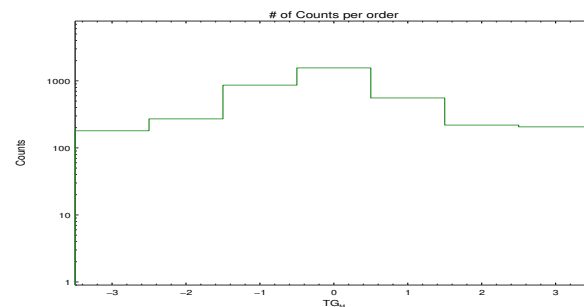


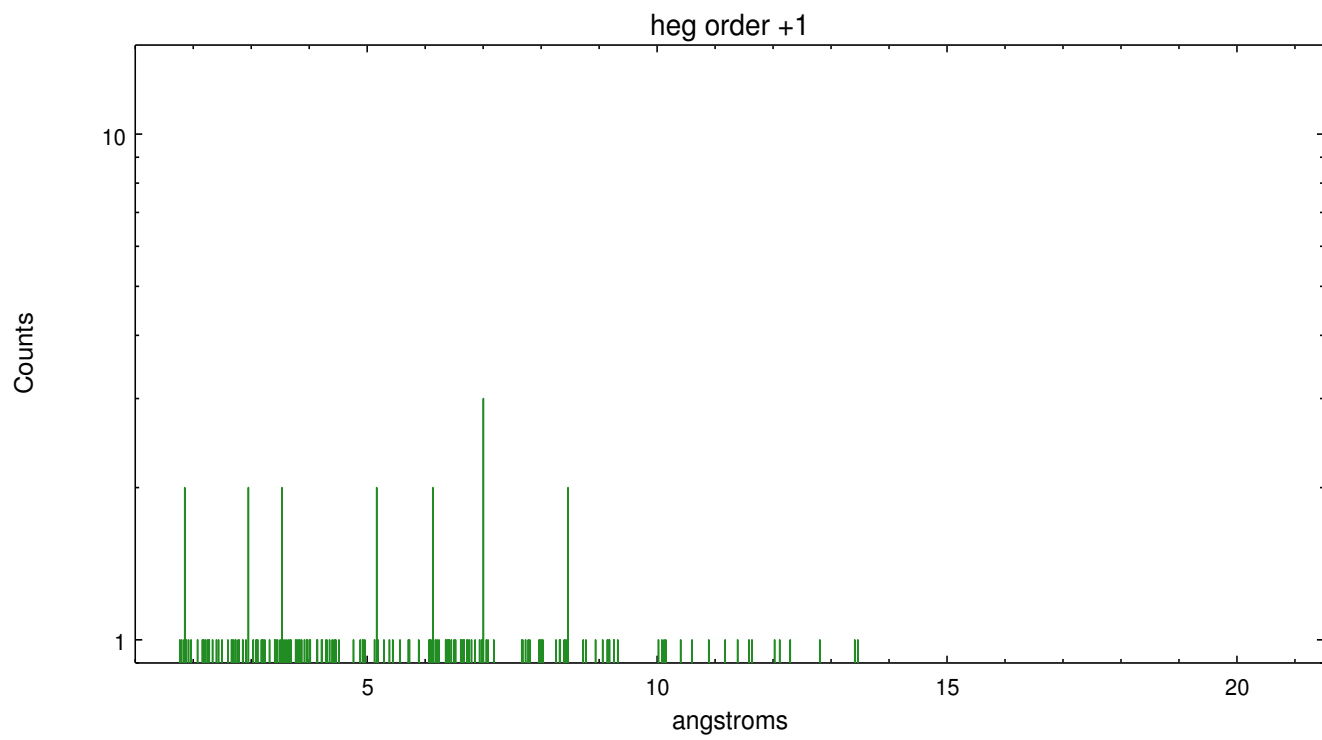
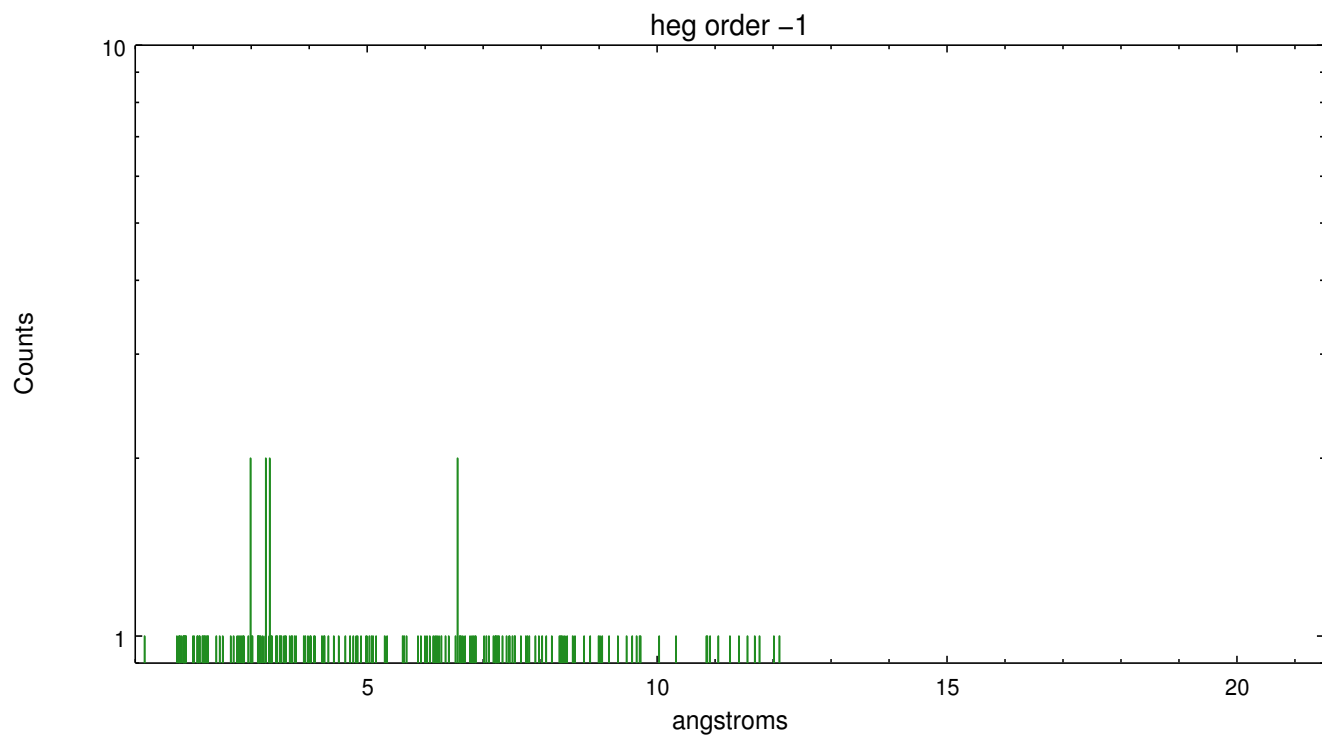
Spot Image HEG



Full Detector HEG

|        | order<br>-3 | order<br>-2 | order<br>-1 | order<br>0 | order<br>1 | order<br>2 | order<br>3 |
|--------|-------------|-------------|-------------|------------|------------|------------|------------|
| Events | 180         | 271         | 864         | 1561       | 556        | 219        | 206        |

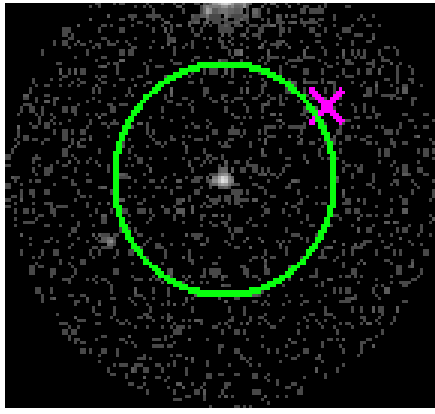




### 3.2 MEG Arm



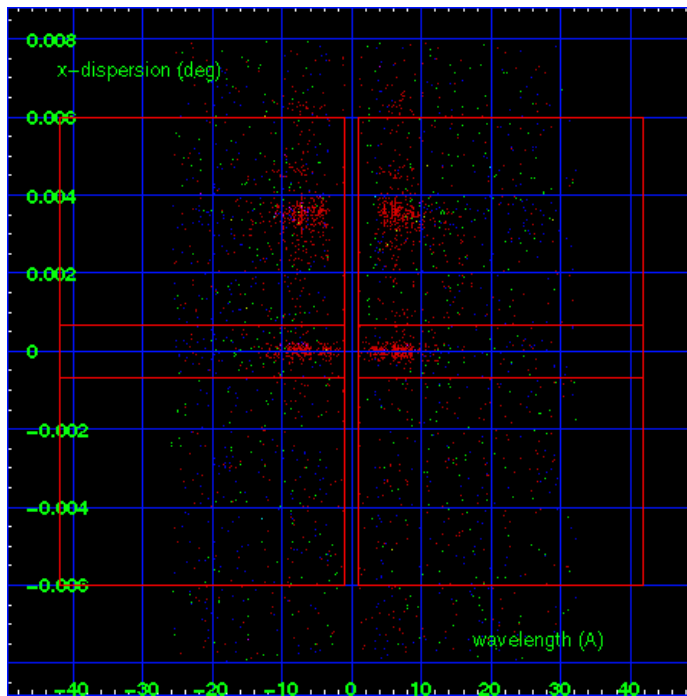
MEG Order Sort 123



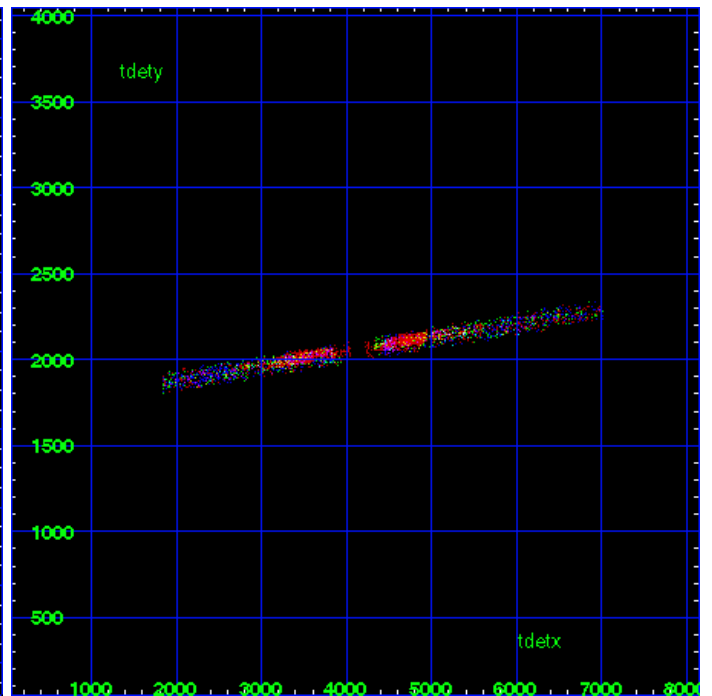
MEG Zero Order



MEG Order Sort ALL

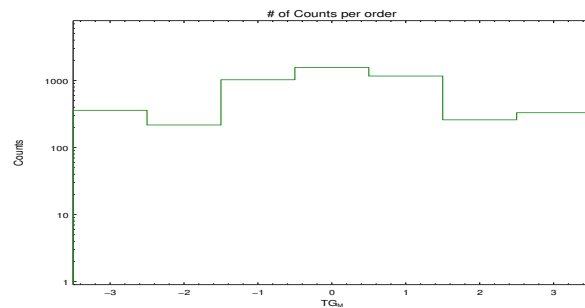


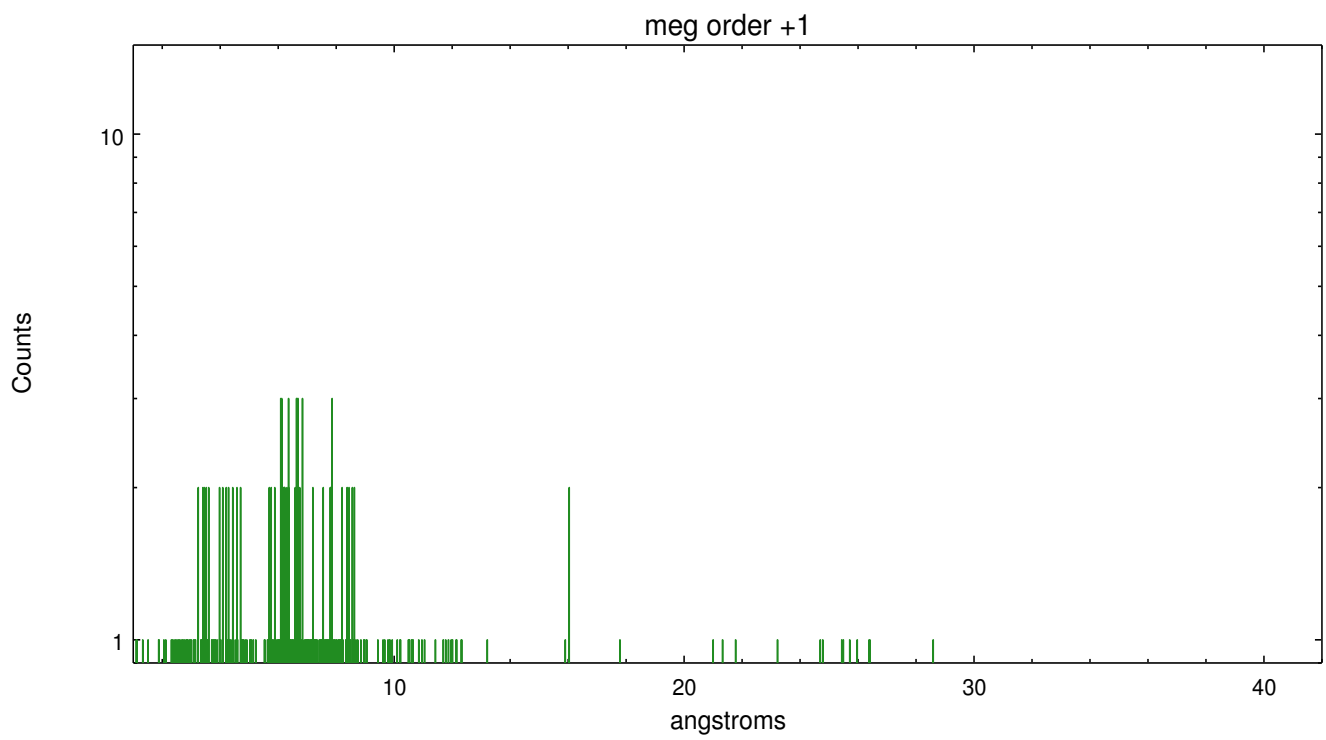
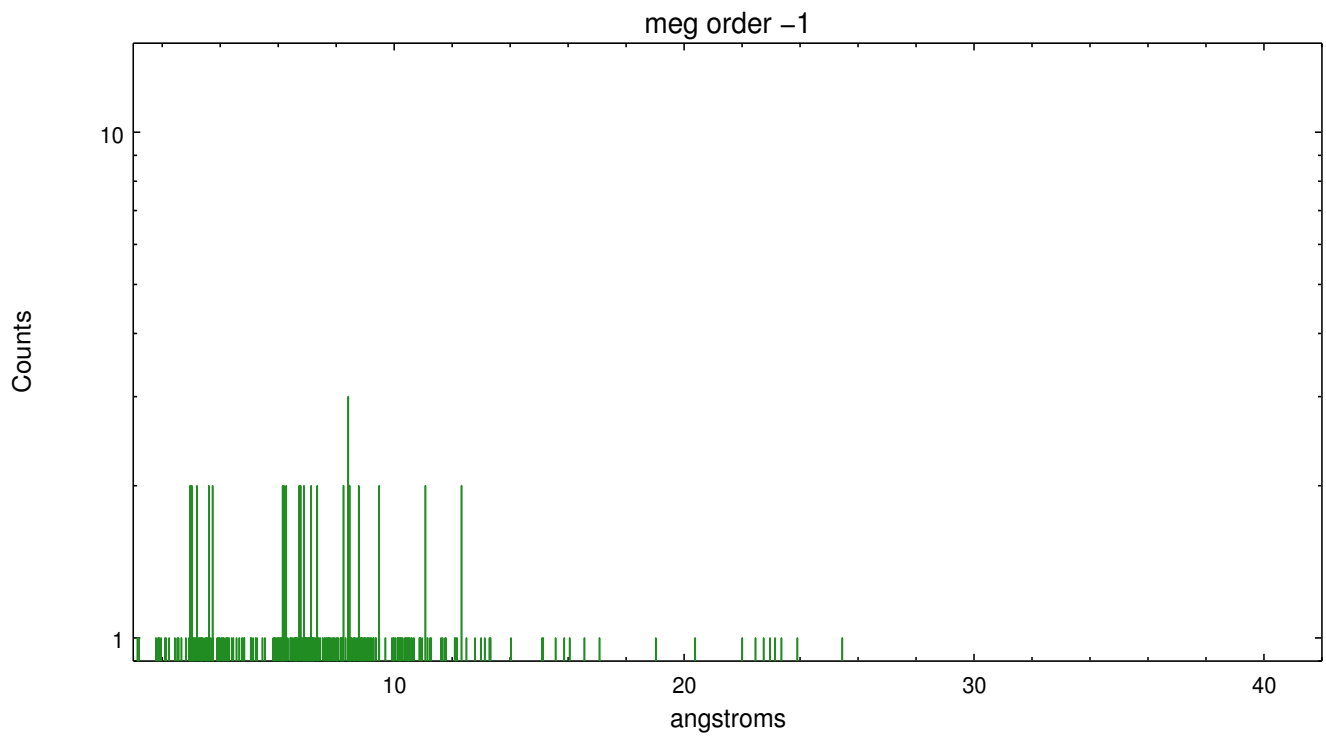
Spot Image MEG



Full Detector MEG

|        | order<br>-3 | order<br>-2 | order<br>-1 | order<br>0 | order<br>1 | order<br>2 | order<br>3 |
|--------|-------------|-------------|-------------|------------|------------|------------|------------|
| Events | 359         | 217         | 1026        | 1561       | 1166       | 259        | 331        |





# A Summary

## A.1 Status

|                            |             |
|----------------------------|-------------|
| V&V Scientist              | Joy Nichols |
| V&V Date (YYYY-MM-DD)      | 2012.05.30  |
| V&V Edition                | 1           |
| V&V Disposition and Status | OK          |
| V&V Charge Time            | 28.9768996  |

## A.2 Comments

The HETG dispersed spectra for these data products have been extracted using the position of SN1996cr as the position of the zeroth order. The sky coordinates x=4067.22, y=4076.58 were manually input to the tg\_create\_mask tool. The newly determined zeroth order coordinates have been placed in the \*src1a.fits file, replacing the coordinates determined by tgdetect. Therefore the extracted spectra correspond to the supernova remnant, not the center of the galaxy. There are multiple dispersed spectra associated with different sources in this observation. The ciao tool tgextract2 can be used to create non-standard background regions. ===== In future analysis, if the ciao tool tgdetect is used on this observation to locate the zeroth order source, the center of the Cir galaxy will be found, not SN 1996cr, which is not as X-ray-bright.

===

Data products for spectral extractions of other targets in this field can be found in TGCat.