

# V&V Reference Report

## L2 ASCDS Version : 8.4.5

Observation 103 - L2 Version 4  
Chandra X-Ray Center

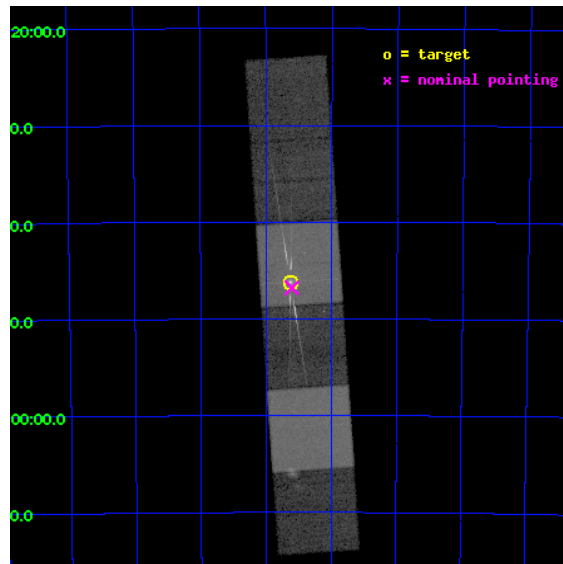
L2 Processing Date : Aug 29 2012

## Contents

|          |                               |           |
|----------|-------------------------------|-----------|
| <b>1</b> | <b>Front</b>                  | <b>2</b>  |
| <b>2</b> | <b>OBI</b>                    | <b>3</b>  |
| 2.1      | OBI . . . . .                 | 3         |
| 2.1.1    | Images . . . . .              | 3         |
| 2.1.2    | Bias . . . . .                | 3         |
| 2.1.3    | Parameters . . . . .          | 4         |
| 2.1.4    | Events . . . . .              | 4         |
| 2.2      | Compared Parameters . . . . . | 5         |
| 2.3      | Aspect . . . . .              | 6         |
| 2.4      | Star Slots . . . . .          | 9         |
| 2.4.1    | Slot 3 . . . . .              | 9         |
| 2.4.2    | Slot 4 . . . . .              | 10        |
| 2.4.3    | Slot 5 . . . . .              | 11        |
| 2.4.4    | Slot 6 . . . . .              | 12        |
| 2.4.5    | Slot 7 . . . . .              | 13        |
| 2.5      | FID Slots . . . . .           | 14        |
| 2.5.1    | Slot 0 . . . . .              | 14        |
| 2.5.2    | Slot 1 . . . . .              | 15        |
| 2.5.3    | Slot 2 . . . . .              | 16        |
| <b>3</b> | <b>Gratings</b>               | <b>17</b> |
| 3.1      | HEG Arm . . . . .             | 17        |
| 3.2      | MEG Arm . . . . .             | 19        |
| <b>A</b> | <b>Summary</b>                | <b>21</b> |
| A.1      | Status . . . . .              | 21        |
| A.2      | Comments . . . . .            | 21        |

# 1 Front

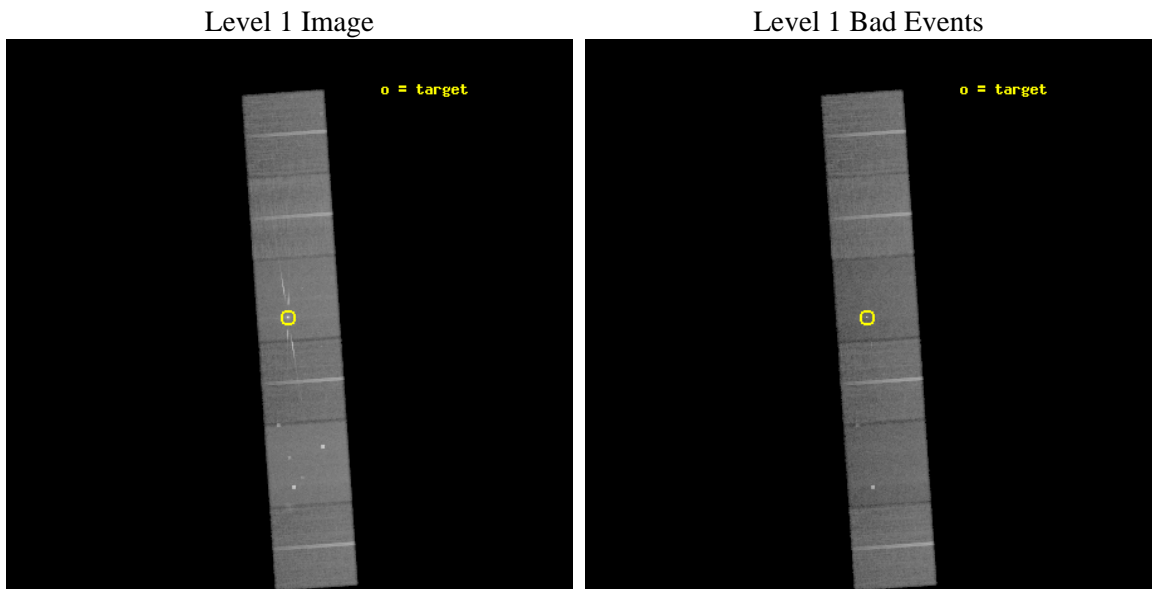
|          |                                     |   |
|----------|-------------------------------------|---|
| seq_num  | 400016                              | Sequence number                             |
| obs_id   | 103                                 | Observation id                              |
| title    | HETG OBSERVATIONS OF X-RAY BINARIES | Proposal title                              |
| observer | Prof Claude Canizares               | Principal investigator                      |
| object   | GX 301-2                            | Source name                                 |
| dtycycle | 0                                   | &#160                                       |
| cycle    | P                                   | events from which exps?<br>Prim/Second/Both |
| ra_targ  | 186.656667                          | Observer's specified target RA [deg]        |
| dec_targ | -62.770278                          | Observer's specified target Dec [deg]       |
| ra_nom   | 186.65121766546                     | Nominal RA [deg]                            |
| dec_nom  | -62.779938440471                    | Nominal Dec [deg]                           |
| roll_nom | 266.04547177237                     | Nominal Roll [deg]                          |
| revision | 4                                   | Processing version of data                  |
| ontime   | 40019.159077018                     | Sum of GTIs [s]                             |
| livetime | 39512.412388141                     | Livetime [s]                                |
| ontime4  | 40019.159096956                     | Sum of GTIs [s]                             |
| ontime5  | 40022.400037259                     | Sum of GTIs [s]                             |
| ontime6  | 40022.400037259                     | Sum of GTIs [s]                             |
| ontime7  | 40019.159077018                     | Sum of GTIs [s]                             |
| ontime8  | 40022.400037259                     | Sum of GTIs [s]                             |
| ontime9  | 40022.400037259                     | Sum of GTIs [s]                             |
| l2events | 405335                              | Number of level 2 events                    |



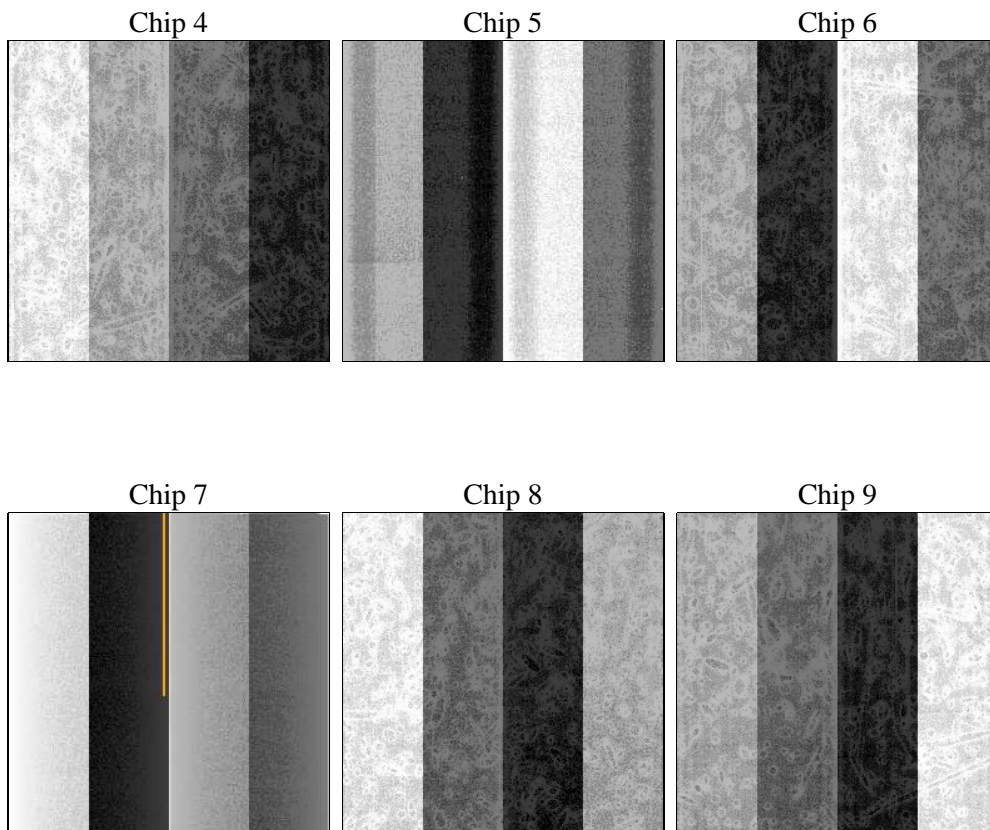
## 2 OBI

### 2.1 OBI

#### 2.1.1 Images



#### 2.1.2 Bias



### 2.1.3 Parameters

|          |                     |                                |                |                 |   |
|----------|---------------------|--------------------------------|----------------|-----------------|---|
| obi_num  | 1                   | Obi number                     | sched_exp_time | 40270.000000    | [s] Scheduled observation exposure time |
| ascdsver | 8.4.5               | Processing system revision     | ontime         | 40019.159077018 | Sum of GTIs [s]                         |
| caldbver | 4.5.1.1             | &#160                          | ontime4        | 40019.159096956 | Sum of GTIs [s]                         |
| date     | 2012-08-29T08:45:38 | Date and time of file creation | ontime5        | 40022.400037259 | Sum of GTIs [s]                         |
| revision | 4                   | Processing version of data     | ontime6        | 40022.400037259 | Sum of GTIs [s]                         |
|          |                     |                                | ontime7        | 40019.159077018 | Sum of GTIs [s]                         |
|          |                     |                                | ontime8        | 40022.400037259 | Sum of GTIs [s]                         |
|          |                     |                                | ontime9        | 40022.400037259 | Sum of GTIs [s]                         |
|          |                     |                                | l1events       | 1806867         | Number of level 1 events                |

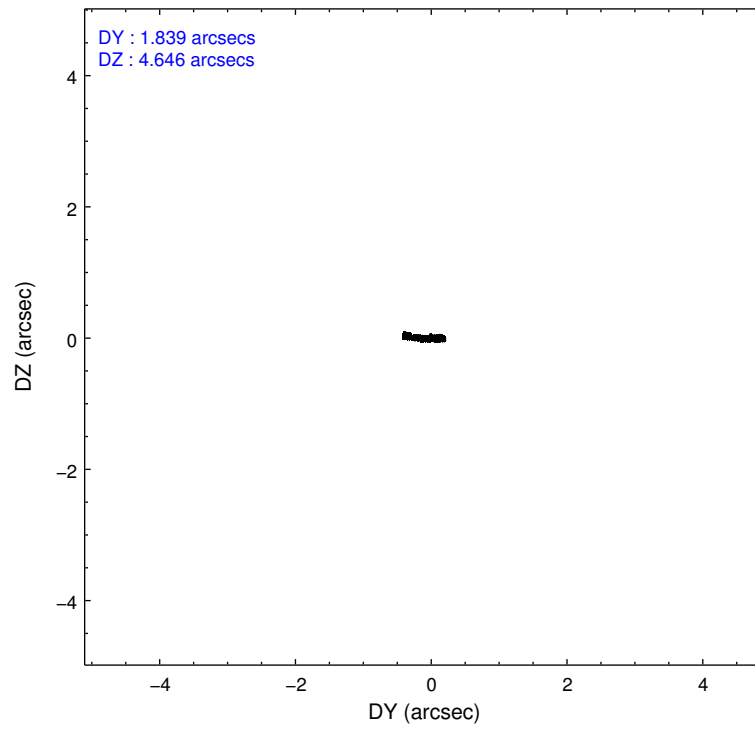
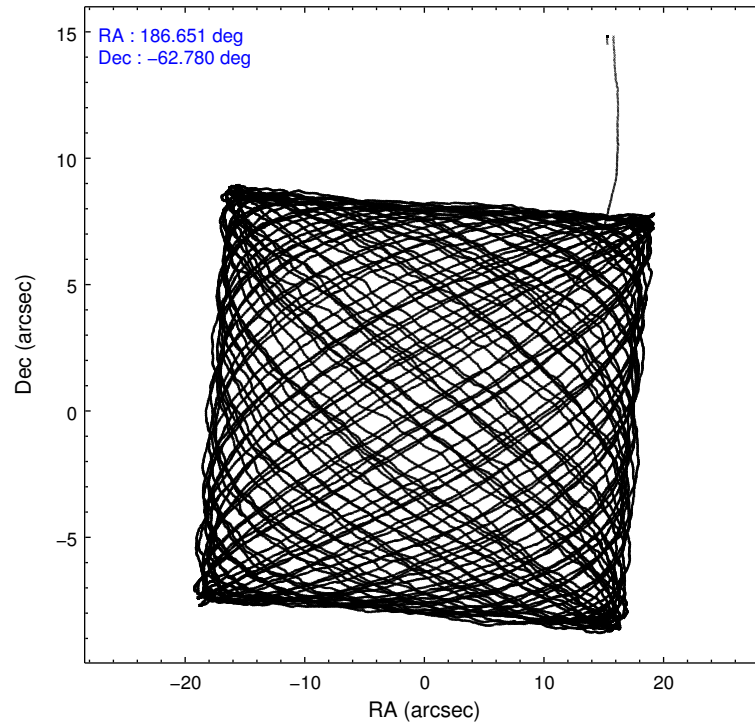
### 2.1.4 Events

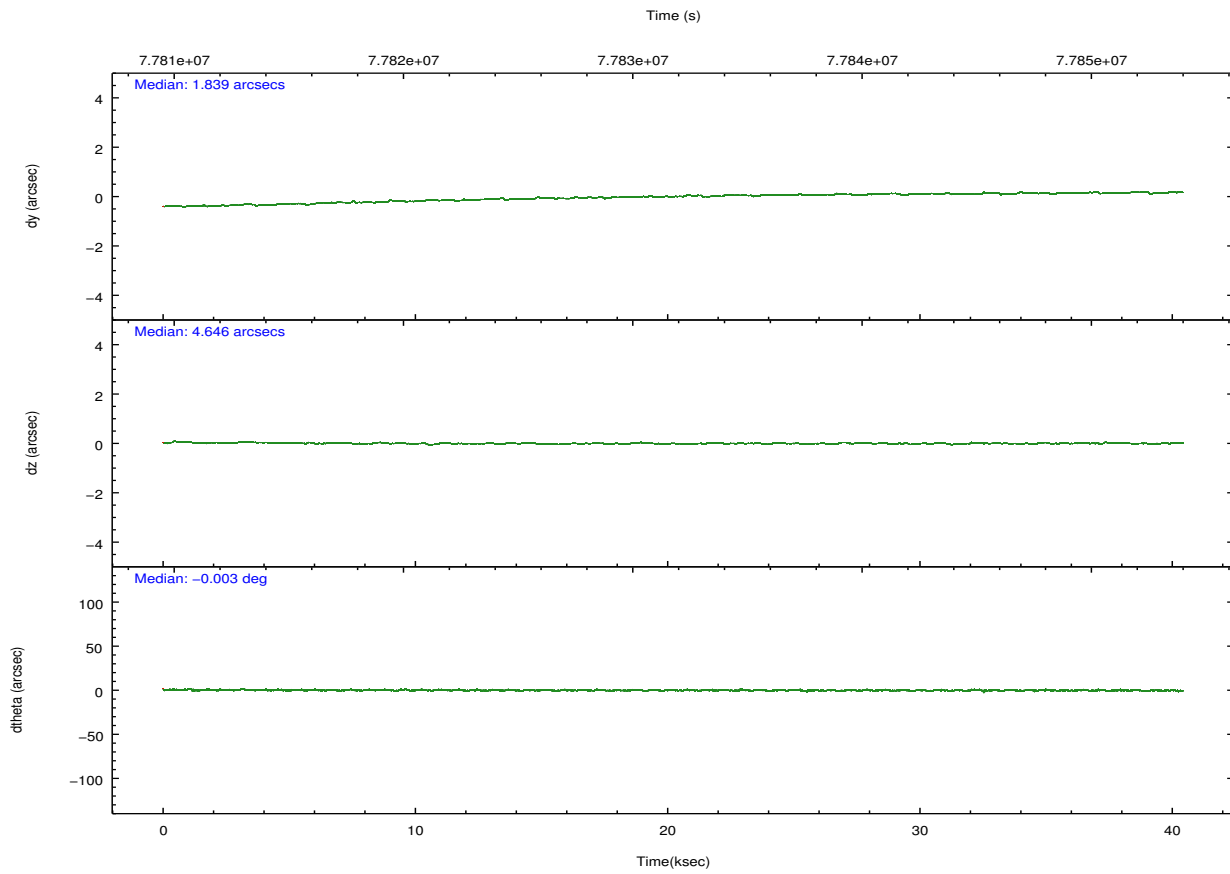
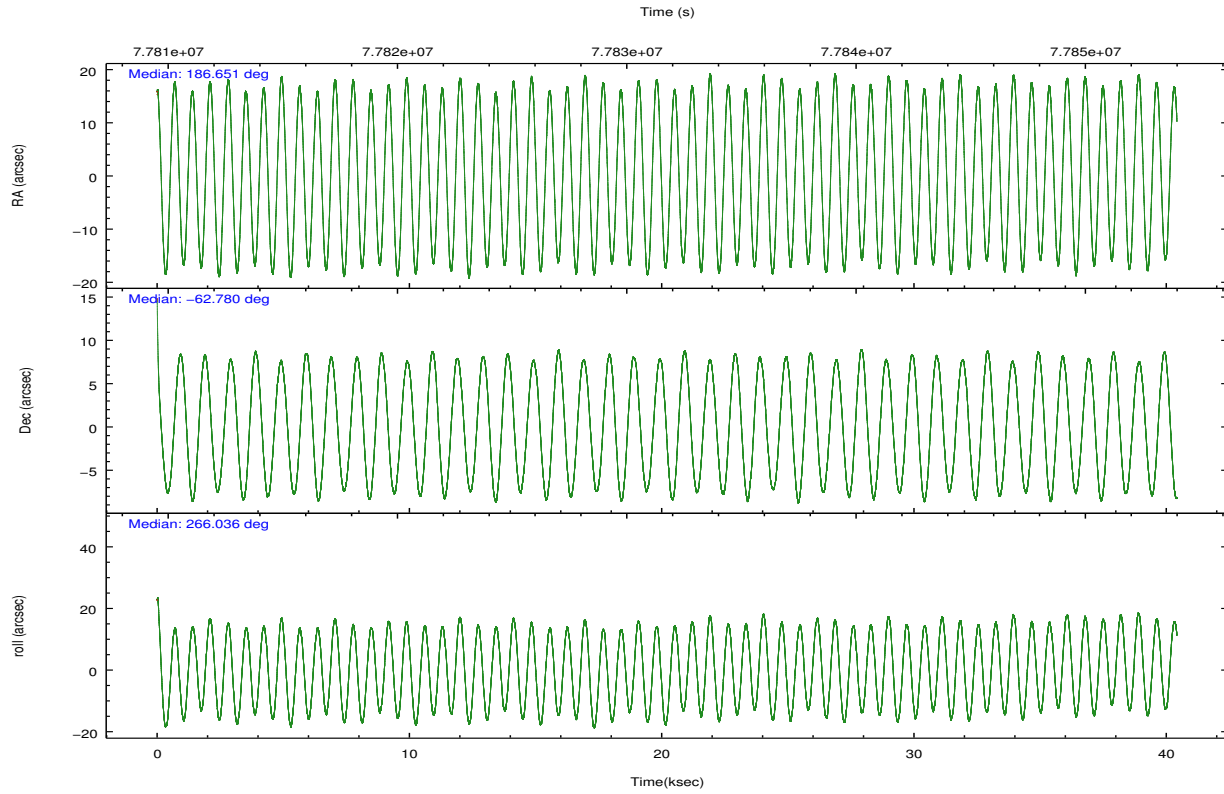
|                 | ccd 4  | ccd 5  | ccd 6  | ccd 7  | ccd 8  | ccd 9  |                | ccd 4  | ccd 5  | ccd 6  | ccd 7  | ccd 8  | ccd 9  |
|-----------------|--------|--------|--------|--------|--------|--------|----------------|--------|--------|--------|--------|--------|--------|
| level 1 events  | 284822 | 346702 | 263961 | 333449 | 325596 | 252337 | grade 0 events | 12907  | 24071  | 16132  | 18738  | 19452  | 11605  |
| rejected events | 254927 | 181845 | 226710 | 177387 | 262937 | 224007 |                | 4%     | 6%     | 6%     | 5%     | 5%     | 4%     |
| rejected %      | 89%    | 52%    | 85%    | 53%    | 80%    | 88%    | grade 1 events | 135    | 509    | 135    | 663    | 131    | 161    |
|                 |        |        |        |        |        |        |                | 0%     | 0%     | 0%     | 0%     | 0%     | 0%     |
|                 |        |        |        |        |        |        | grade 2 events | 6761   | 47669  | 7031   | 31085  | 13449  | 5598   |
|                 |        |        |        |        |        |        |                | 2%     | 13%    | 2%     | 9%     | 4%     | 2%     |
|                 |        |        |        |        |        |        | grade 3 events | 2792   | 7463   | 3470   | 14570  | 6941   | 2959   |
|                 |        |        |        |        |        |        |                | 0%     | 2%     | 1%     | 4%     | 2%     | 1%     |
|                 |        |        |        |        |        |        | grade 4 events | 2677   | 6978   | 3435   | 14131  | 6299   | 2799   |
|                 |        |        |        |        |        |        |                | 0%     | 2%     | 1%     | 4%     | 1%     | 1%     |
|                 |        |        |        |        |        |        | grade 5 events | 8083   | 26681  | 9764   | 30362  | 12341  | 9795   |
|                 |        |        |        |        |        |        |                | 2%     | 7%     | 3%     | 9%     | 3%     | 3%     |
|                 |        |        |        |        |        |        | grade 6 events | 4762   | 78697  | 7189   | 77557  | 16521  | 5371   |
|                 |        |        |        |        |        |        |                | 1%     | 22%    | 2%     | 23%    | 5%     | 2%     |
|                 |        |        |        |        |        |        | grade 7 events | 246705 | 154634 | 216805 | 146343 | 250462 | 214049 |
|                 |        |        |        |        |        |        |                | 86%    | 44%    | 82%    | 43%    | 76%    | 84%    |

## 2.2 Compared Parameters

| Parameter                         | Planned             | Actual               | Parameter                             | Planned   | Actual  |
|-----------------------------------|---------------------|----------------------|---------------------------------------|-----------|---------|
| Instrument                        | ACIS                | ACIS                 | Obspar format version number          | 7         | 7       |
| 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       |
| [deg] Pointing RA                 | 186.624702          | 186.651217665457     | Subarray requested                    | NONE      | NONE    |
| [deg] Pointing Dec                | -62.755358          | -62.77993844047128   | Alternating exposures requested       | N         | N       |
| [deg] Pointing Roll               | 265.865269          | 266.0454717723732    | [s] Primary exposure time             | 0.000000  | 3.2     |
| [mm] SIM focus pos                | -0.684267           | -0.6828225247311905  |                                       |           |         |
| [mm] SIM defocus                  | 0                   | 0.001444936568705701 |                                       |           |         |
| [mm] SIM translation stage pos    | -187.132523         | -187.1228876879999   |                                       |           |         |
| [mm] SIM translation stage offset | -3                  | -3.009634895007935   |                                       |           |         |
| Phase constraints                 | Y                   | Y                    |                                       |           |         |
| [d] Phase period                  | 41.508000           | 41.508000            |                                       |           |         |
| [d] Phase epoch (MJD)             | 46105.984000        | 46105.984000         |                                       |           |         |
| Phase start                       | 0.100000            | 0.100000             |                                       |           |         |
| Phase end                         | 0.200000            | 0.200000             |                                       |           |         |
| Phase start error                 | 0.020000            | 0.020000             |                                       |           |         |
| Phase end error                   | 0.020000            | 0.020000             |                                       |           |         |
| [s] Observation start time (MET)  | 77811696.184000     | 77810246.46587799    |                                       |           |         |
| Observation start date            | 2000-06-19T14:20:32 | 2000-06-19T13:57:26  |                                       |           |         |
| [s] Observation end time (MET)    | 77851966.184000     | 77853292.36746401    |                                       |           |         |
| Observation end date              | 2000-06-20T01:31:42 | 2000-06-20T01:54:52  |                                       |           |         |
| Read mode                         | TIMED               | TIMED                |                                       |           |         |

## 2.3 Aspect



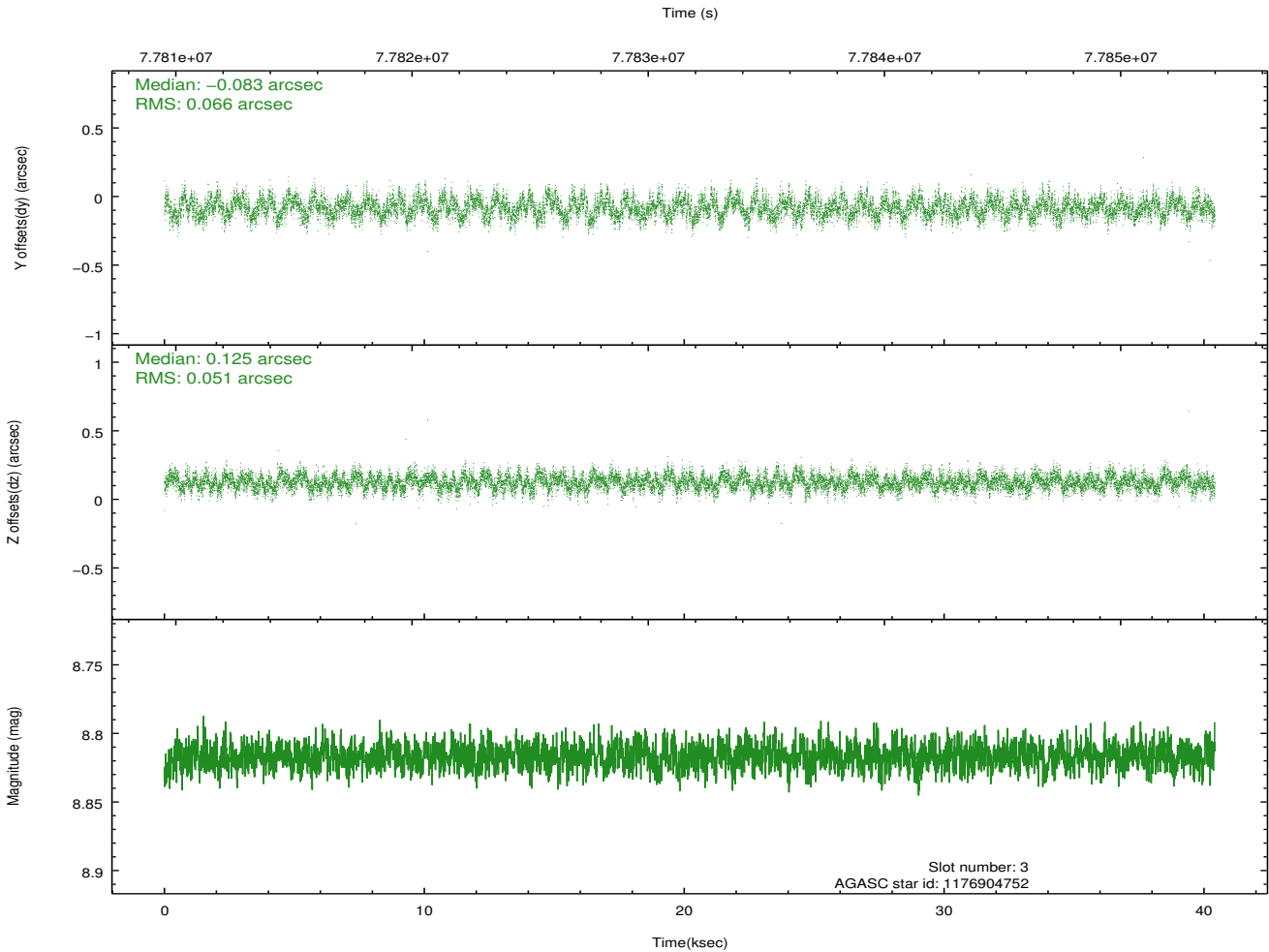
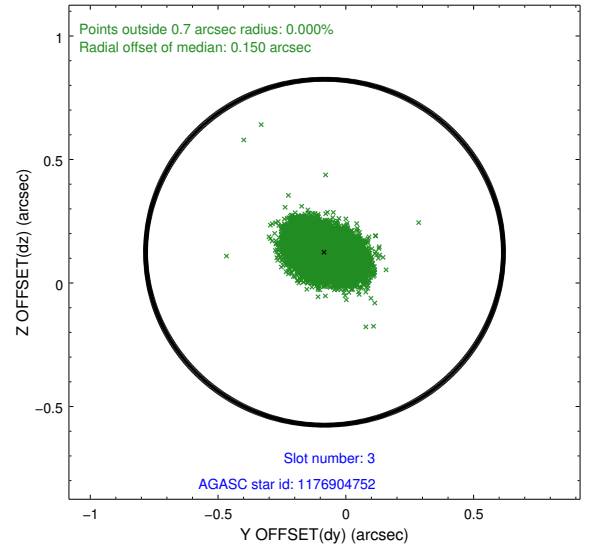
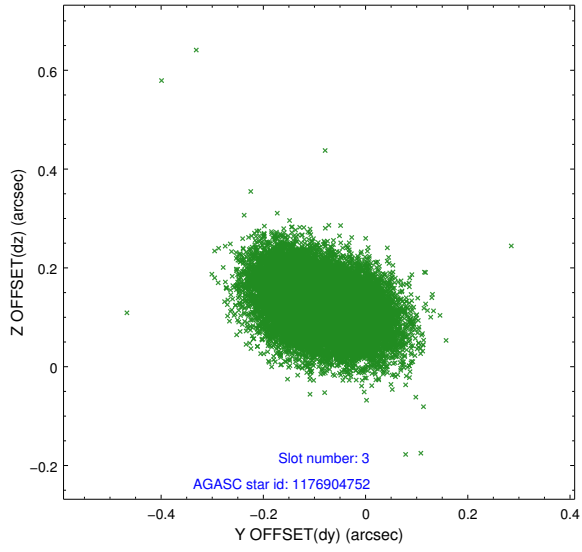


### Slot Statistics

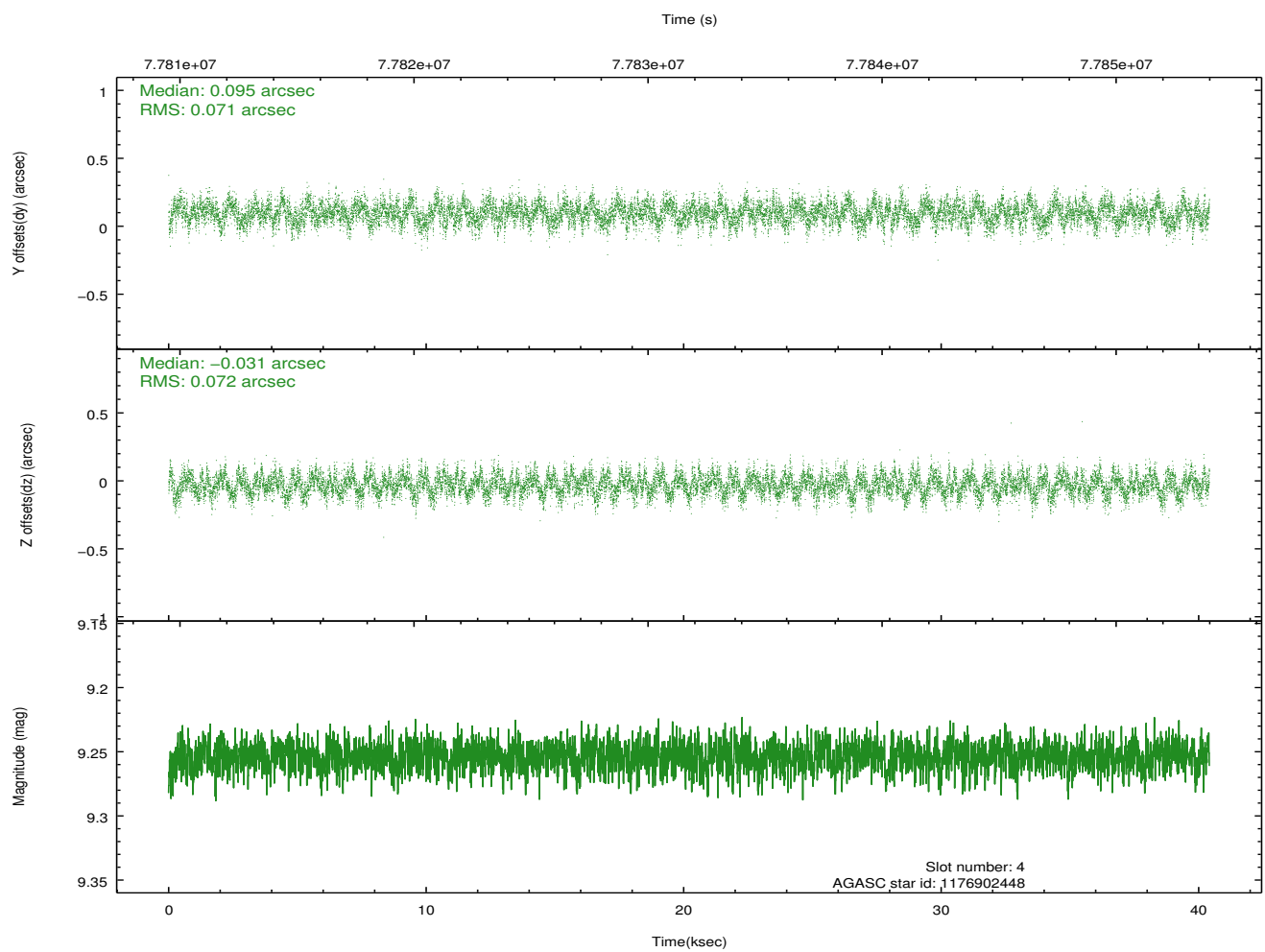
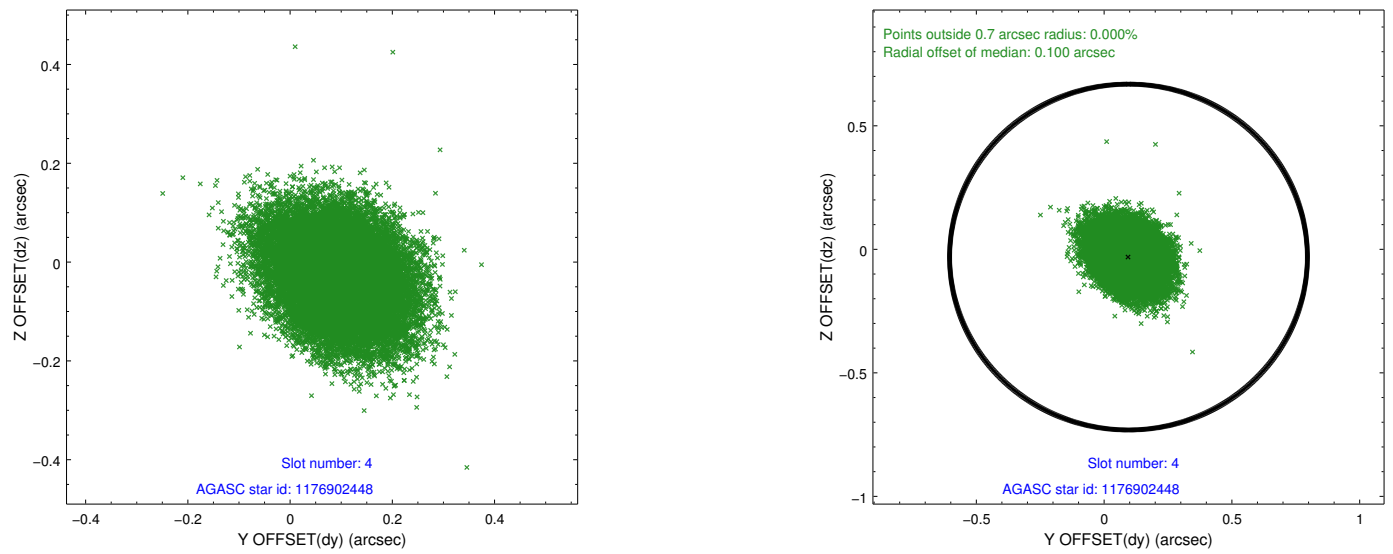
| slot | status | id         | mag  | n_pts | med_dy | med_dz | dr1   | dr2   | ra         | dec        | mean_y   | mean_z   |
|------|--------|------------|------|-------|--------|--------|-------|-------|------------|------------|----------|----------|
| 0    | FID    | ACIS-S-2   | 7.10 | 9856  | -0.043 | -0.042 | 0.008 | 0.012 | 0.000000   | 0.000000   | -754.26  | -1787.92 |
| 1    | FID    | ACIS-S-4   | 7.20 | 9855  | -0.003 | 0.032  | 0.007 | 0.012 | 0.000000   | 0.000000   | 2159.07  | 120.58   |
| 2    | FID    | ACIS-S-5   | 7.24 | 9856  | 0.014  | 0.019  | 0.007 | 0.014 | 0.000000   | 0.000000   | -1807.01 | 114.30   |
| 3    | GUIDE  | 1176904752 | 8.82 | 19708 | -0.083 | 0.125  | 0.088 | 0.144 | 187.035955 | -62.645951 | -439.00  | 650.31   |
| 4    | GUIDE  | 1176902448 | 9.25 | 19703 | 0.095  | -0.031 | 0.108 | 0.172 | 185.684465 | -63.252727 | 1908.04  | -1389.21 |
| 5    | GUIDE  | 1176908912 | 9.32 | 19699 | -0.030 | -0.045 | 0.088 | 0.147 | 185.695375 | -63.072611 | 1260.54  | -1427.91 |
| 6    | GUIDE  | 1176908712 | 9.26 | 19705 | 0.030  | -0.028 | 0.091 | 0.150 | 187.275007 | -62.466706 | -1108.19 | 1004.57  |
| 7    | GUIDE  | 1176895568 | 9.26 | 19709 | -0.012 | -0.022 | 0.093 | 0.154 | 186.914170 | -62.470395 | -1056.06 | 406.35   |

## 2.4 Star Slots

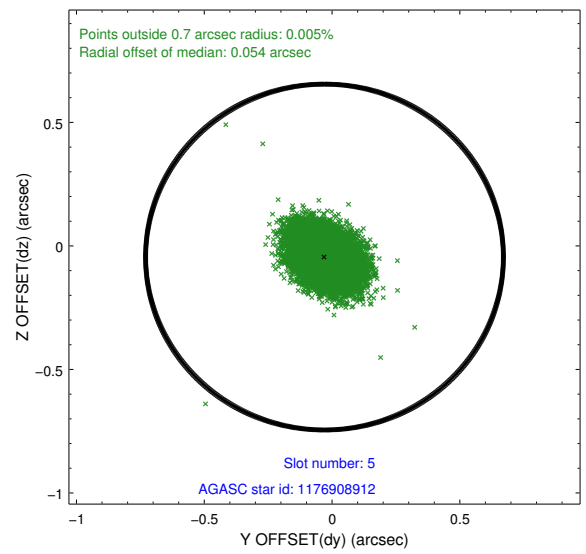
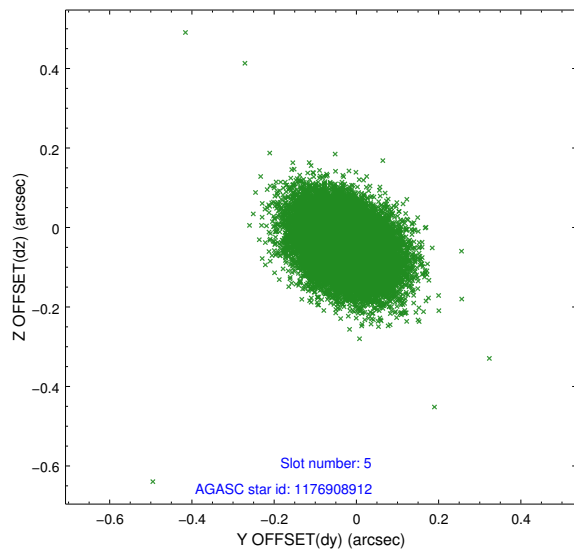
### 2.4.1 Slot 3



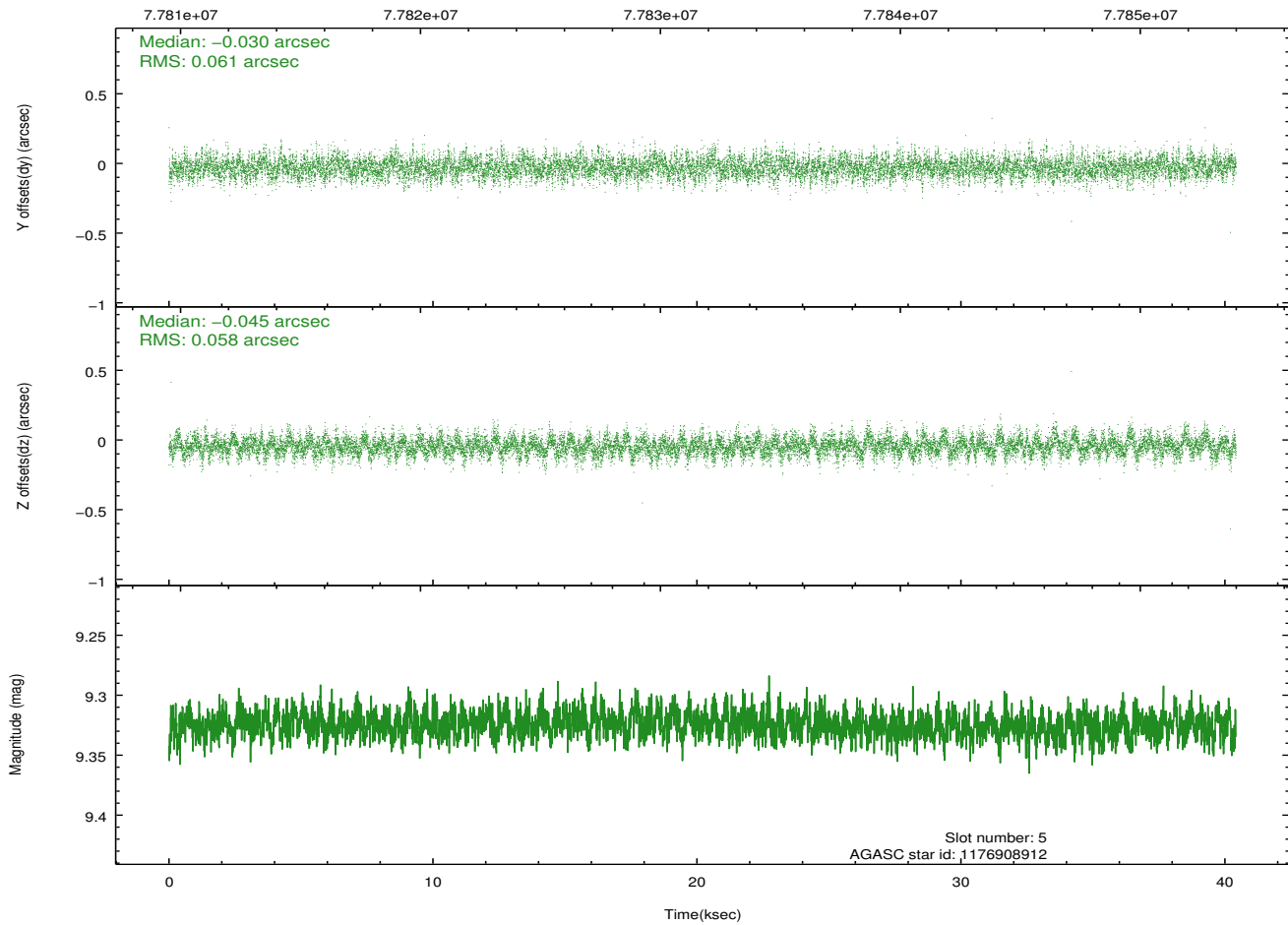
## 2.4.2 Slot 4



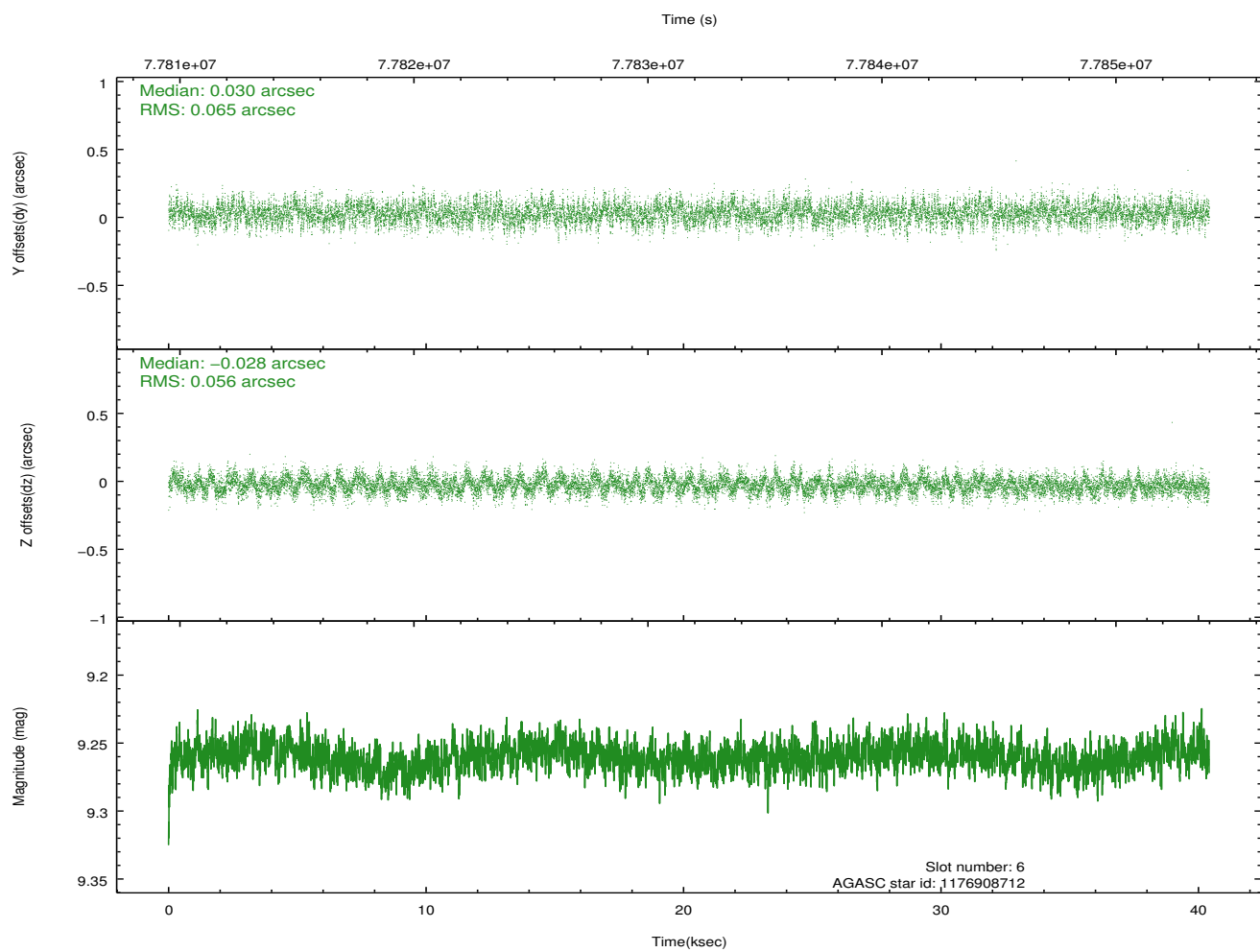
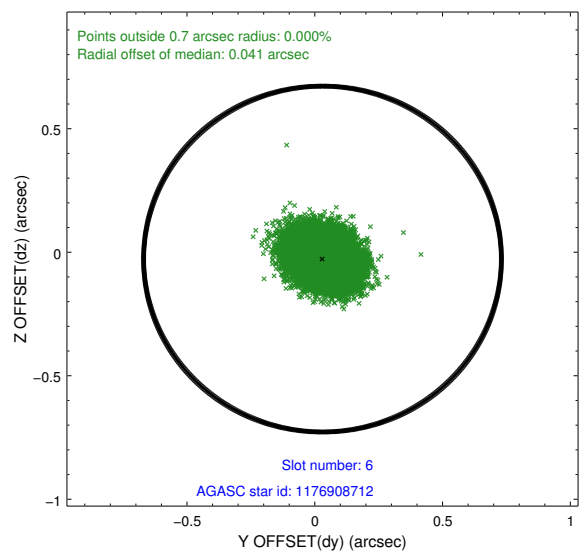
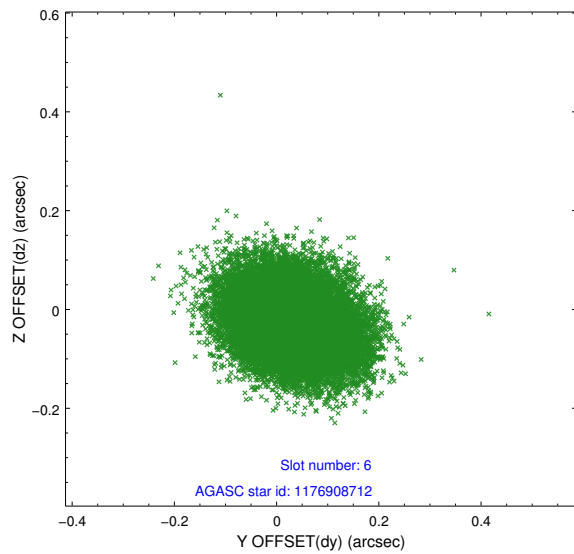
### 2.4.3 Slot 5



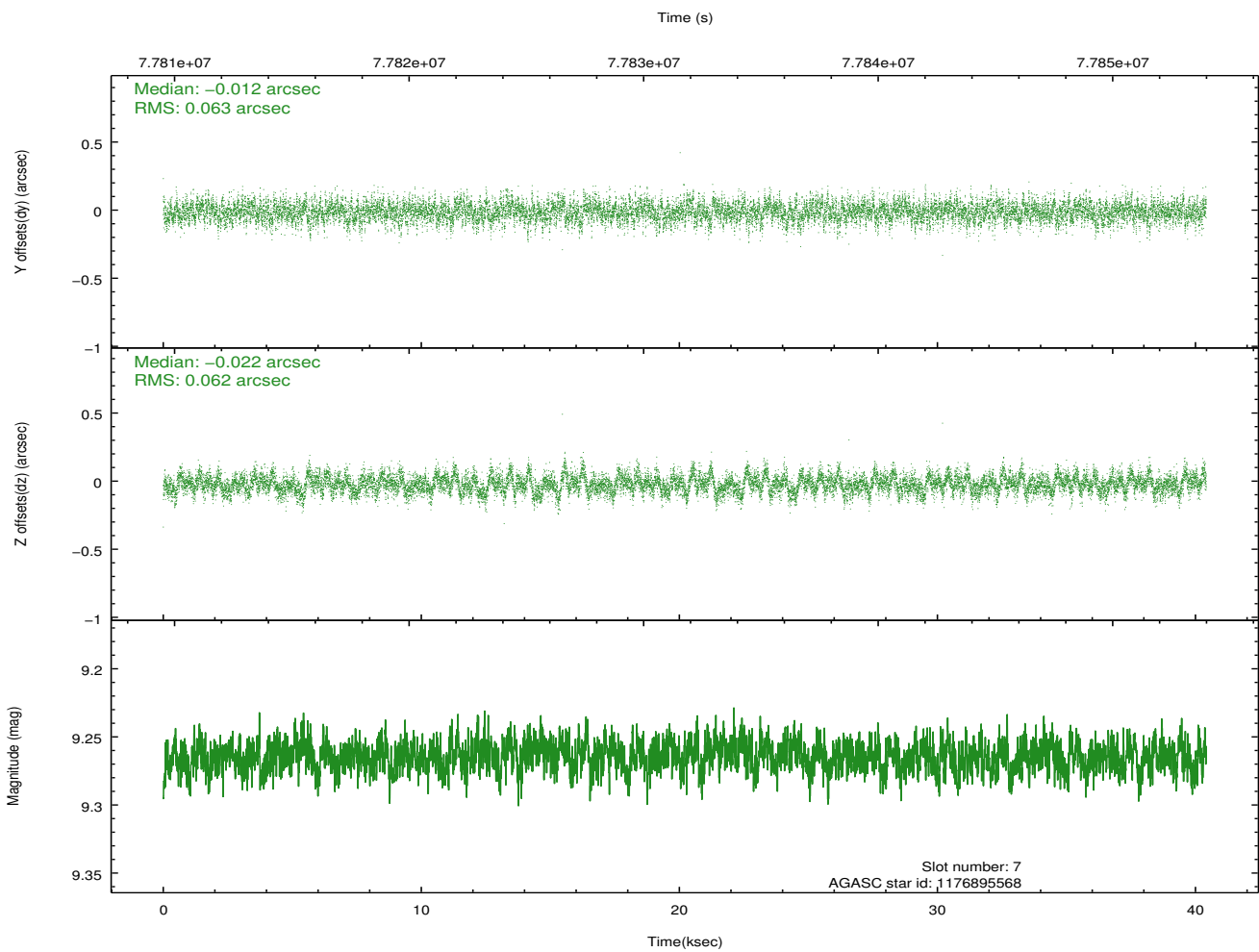
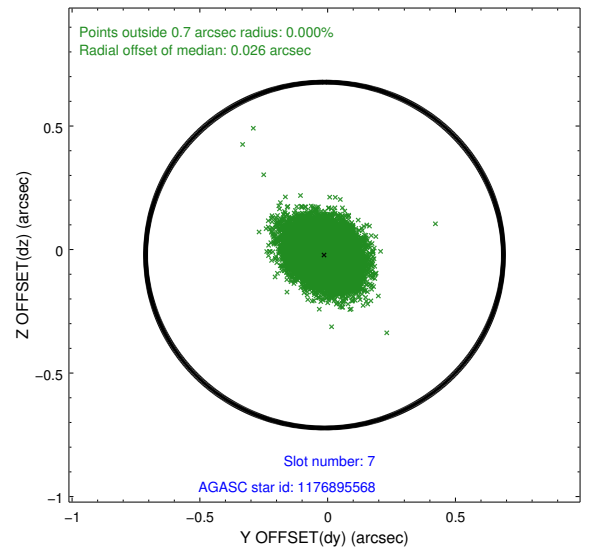
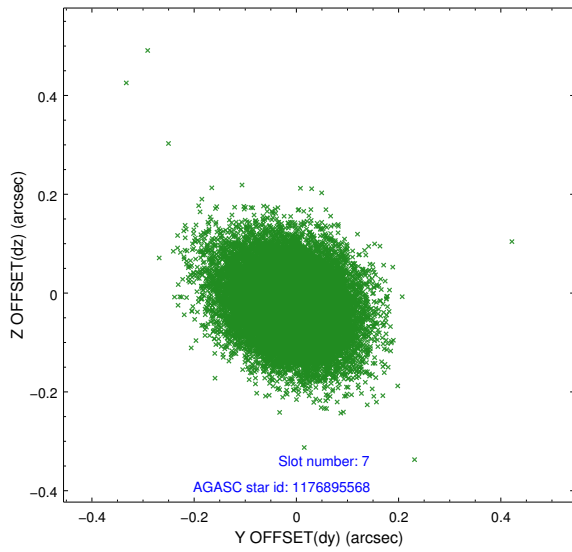
Time (s)



## 2.4.4 Slot 6

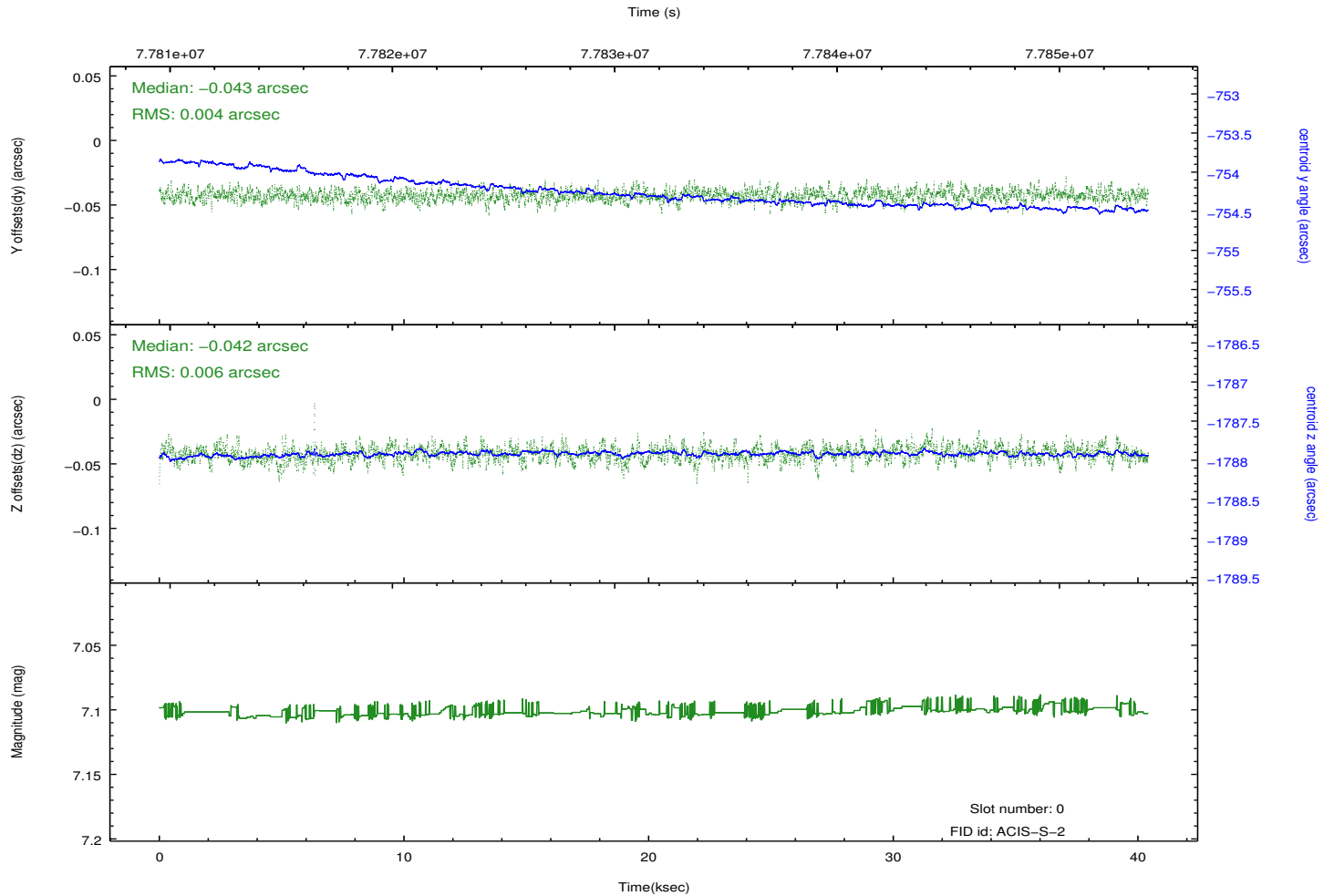
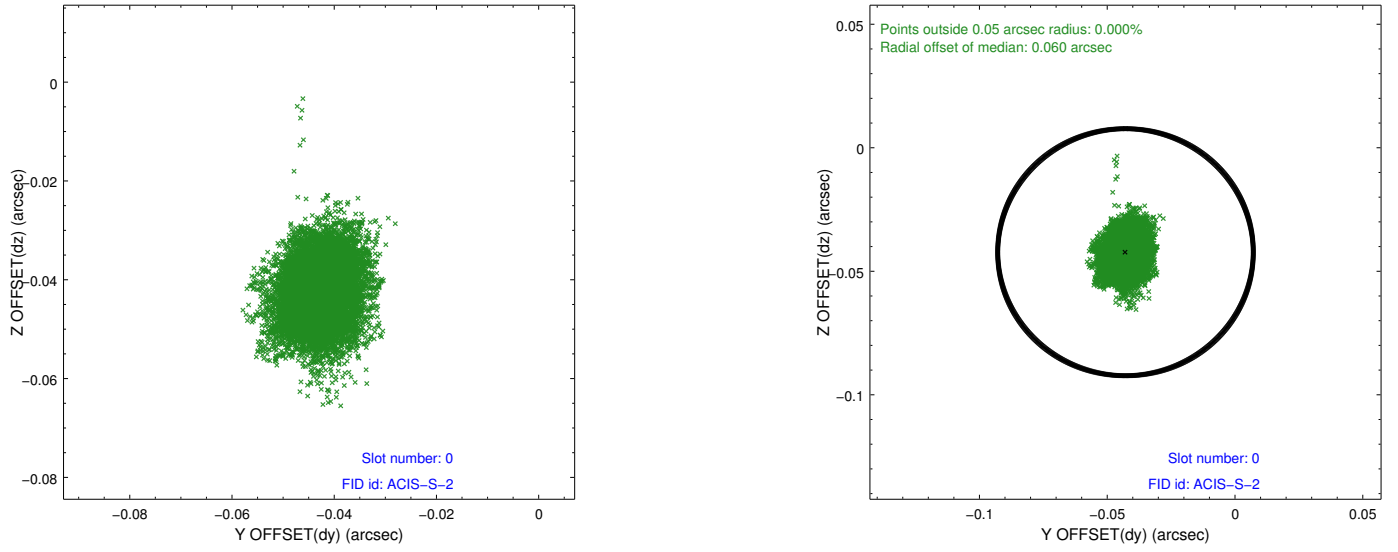


## 2.4.5 Slot 7

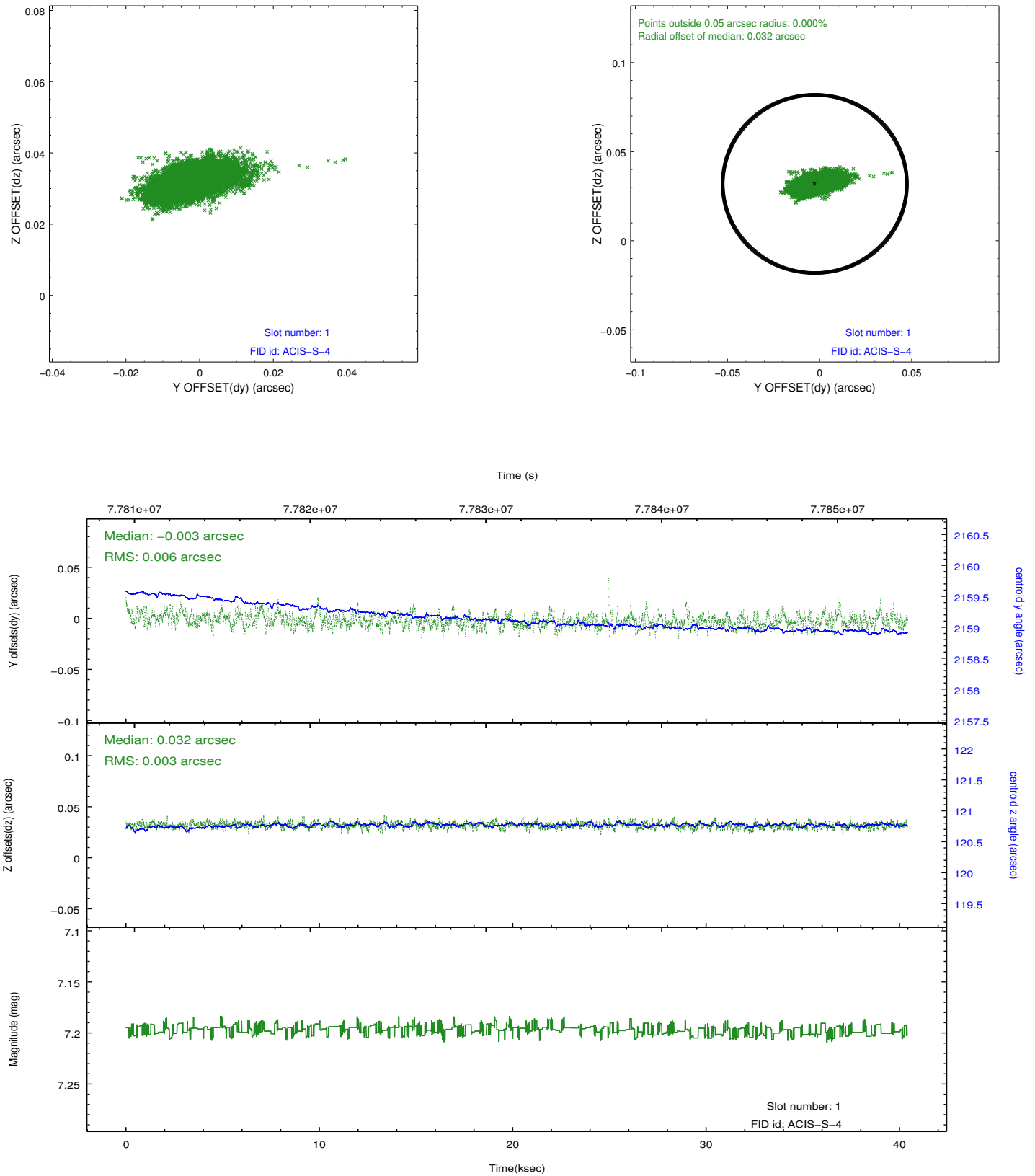


## 2.5 FID Slots

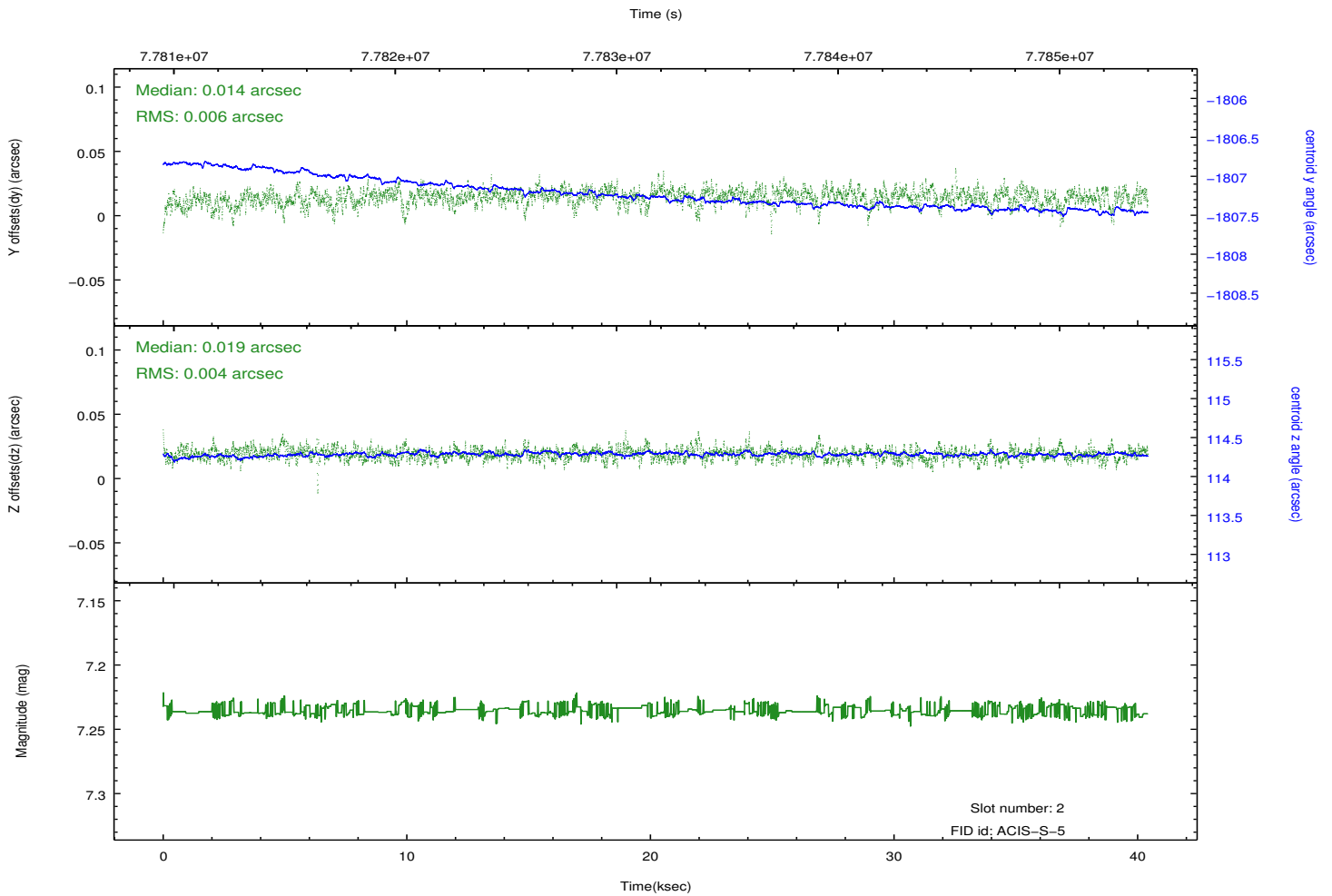
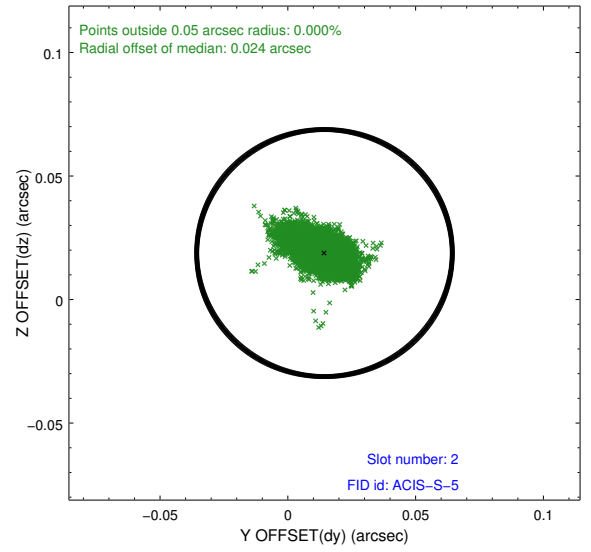
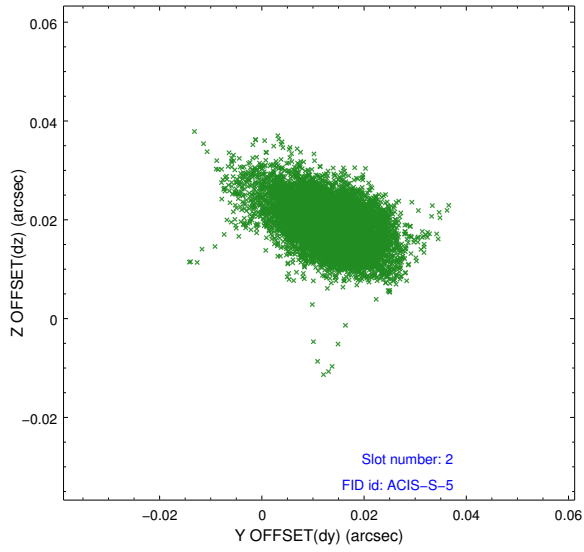
### 2.5.1 Slot 0



## 2.5.2 Slot 1



### 2.5.3 Slot 2

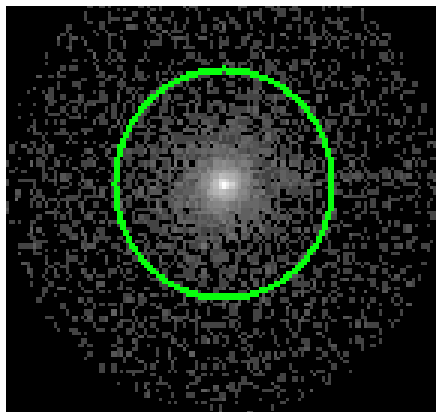


### 3 Gratings

#### 3.1 HEG Arm



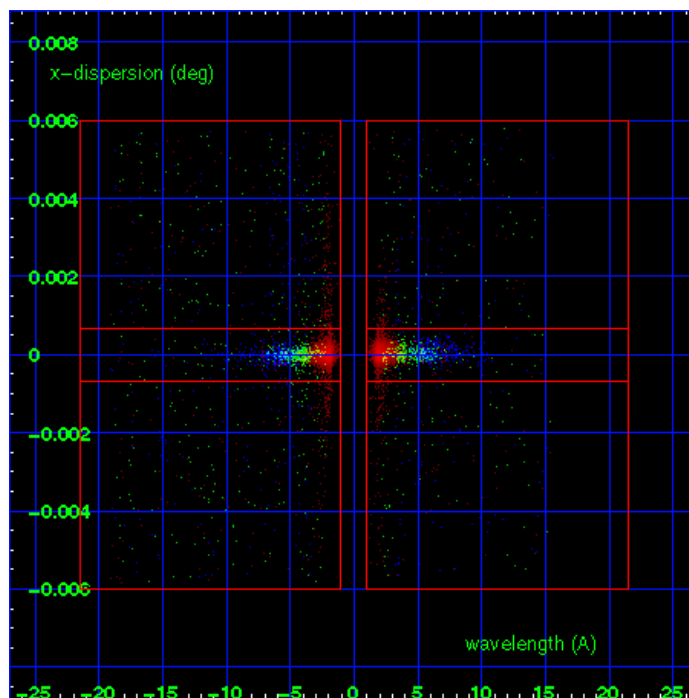
HEG Order Sort 123



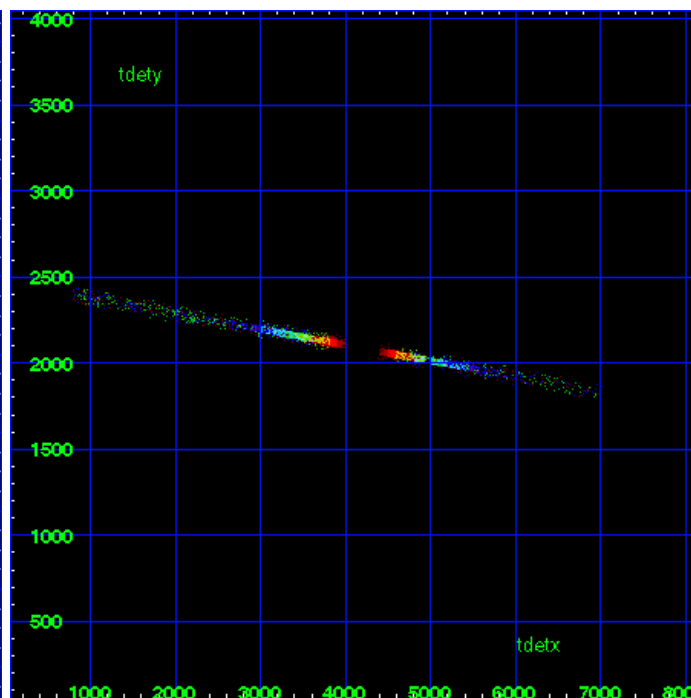
HEG Zero Order



HEG Order Sort ALL

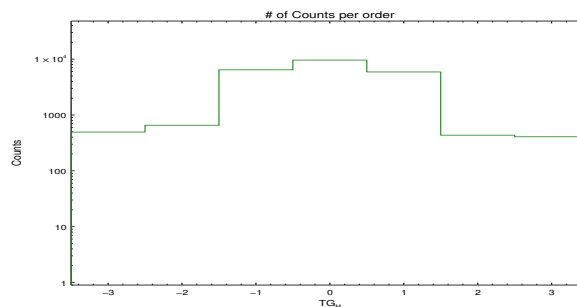


Spot Image HEG

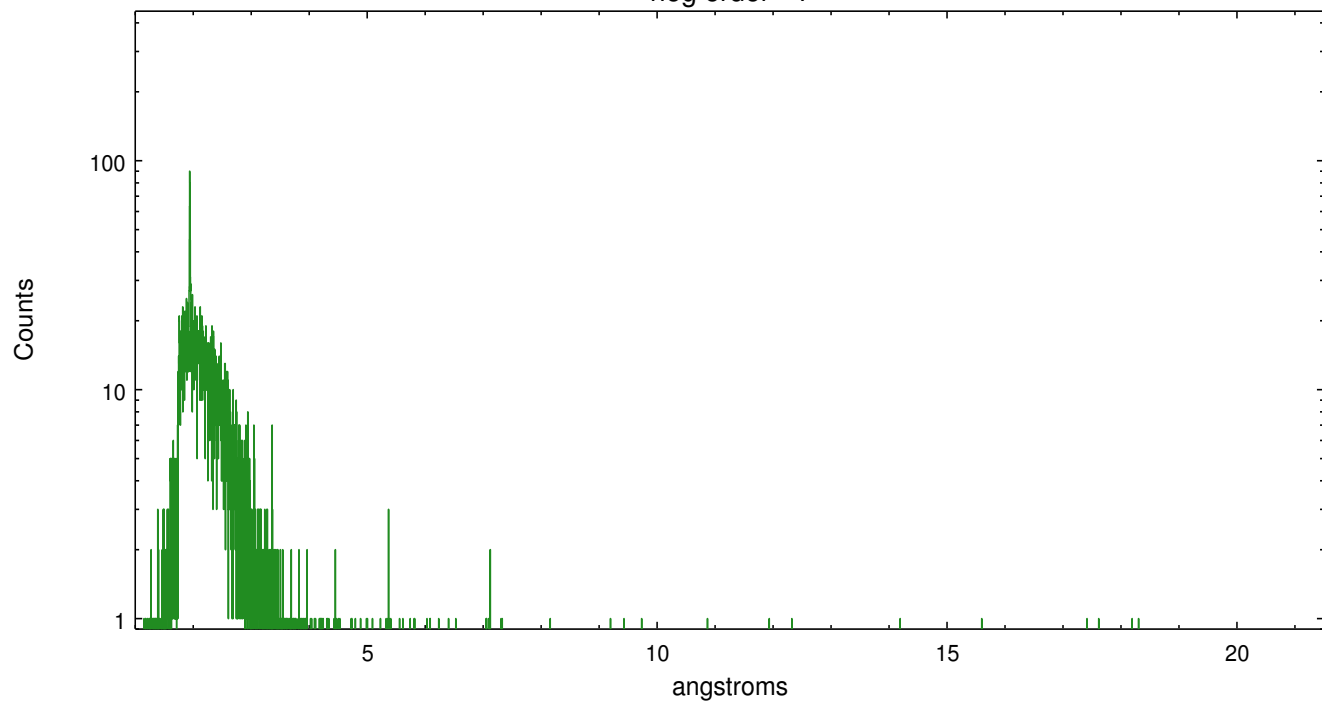


Full Detector HEG

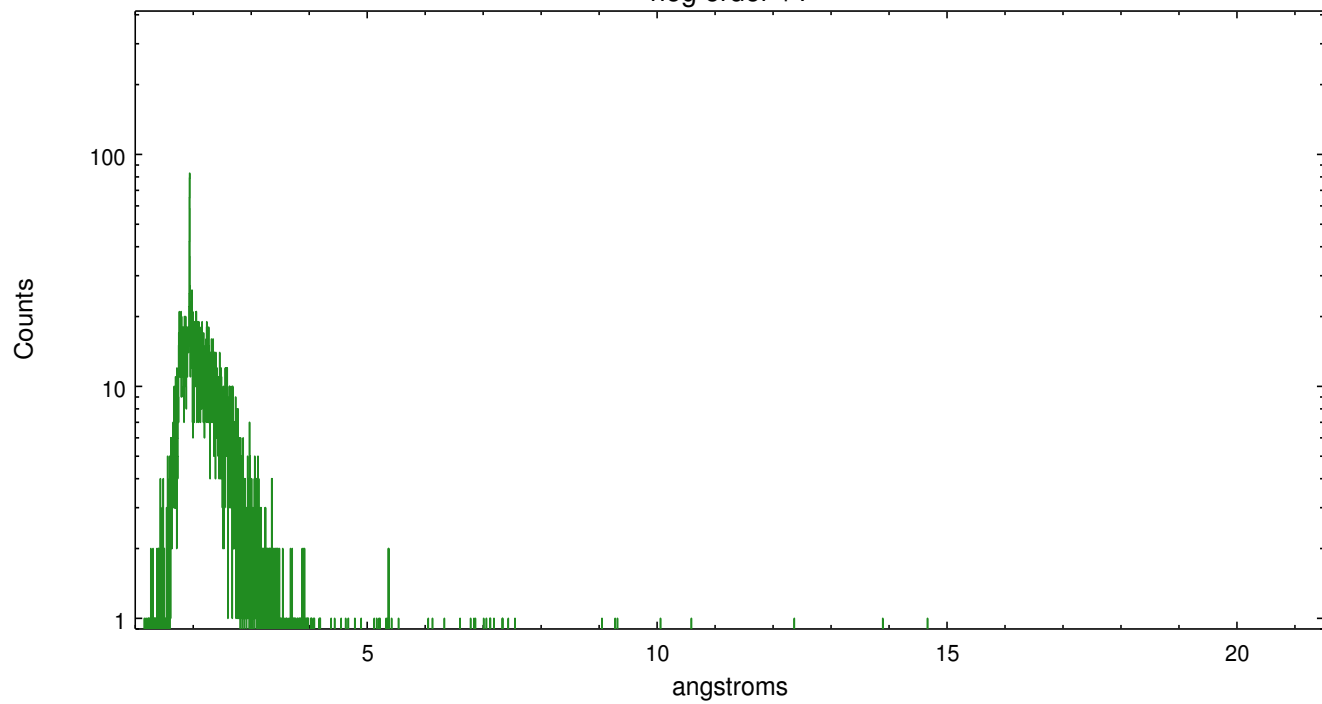
|        | order<br>-3 | order<br>-2 | order<br>-1 | order<br>0 | order<br>1 | order<br>2 | order<br>3 |
|--------|-------------|-------------|-------------|------------|------------|------------|------------|
| Events | 494         | 654         | 6440        | 9614       | 5894       | 434        | 407        |



heg order -1



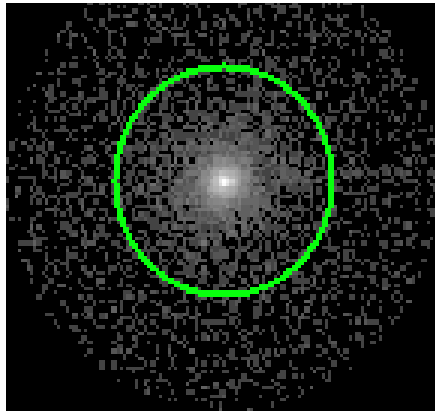
heg order +1



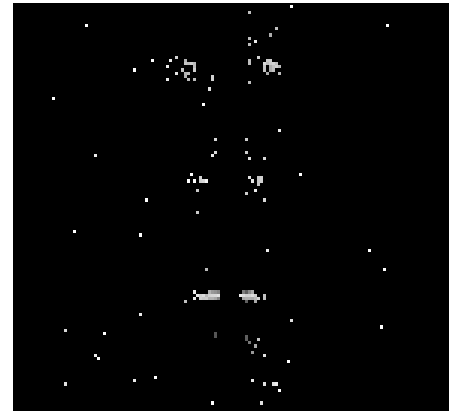
### 3.2 MEG Arm



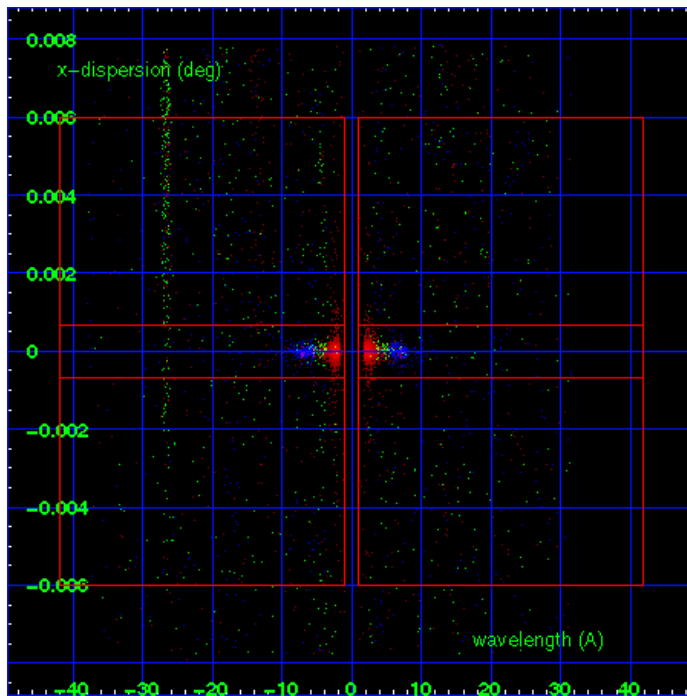
MEG Order Sort 123



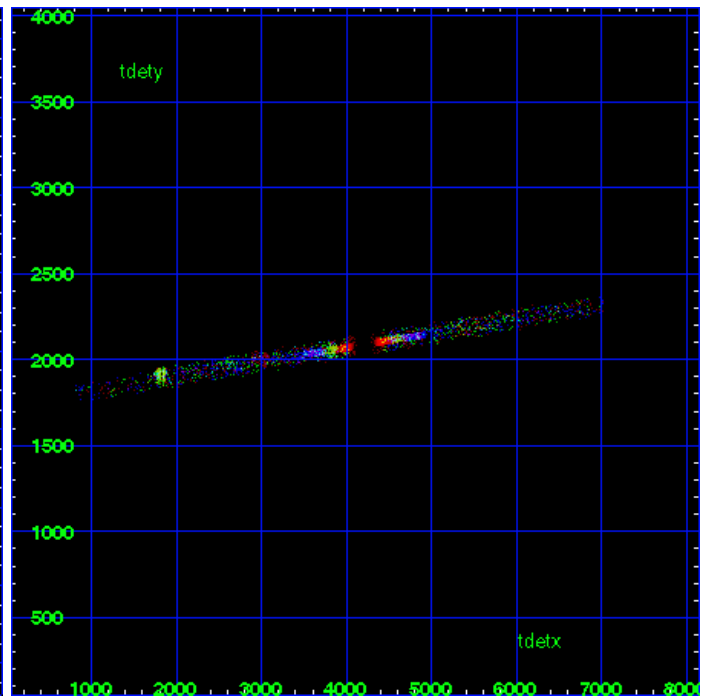
MEG Zero Order



MEG Order Sort ALL

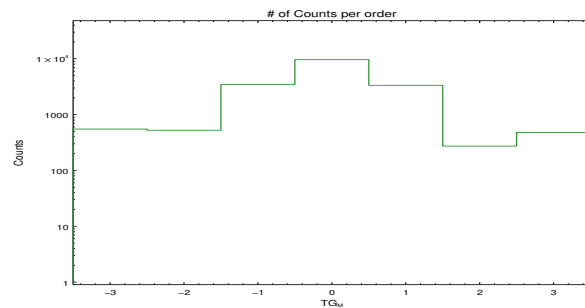


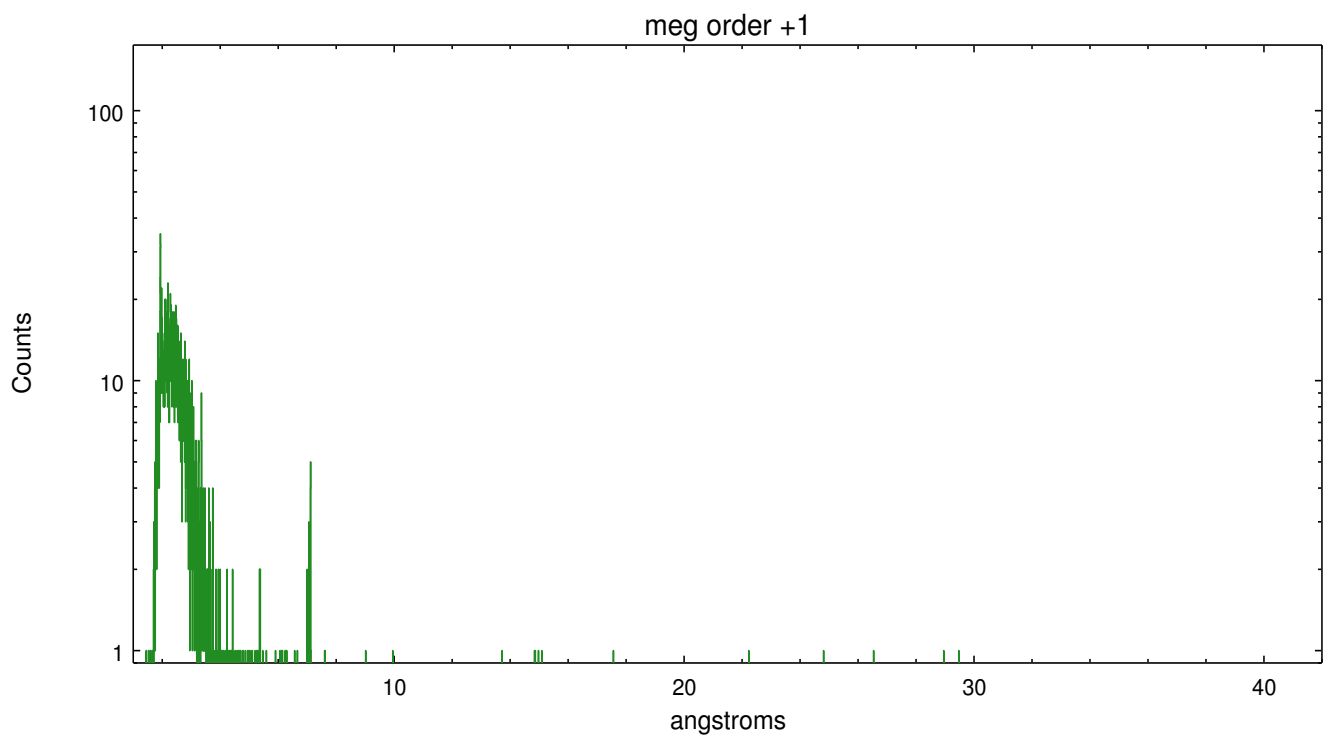
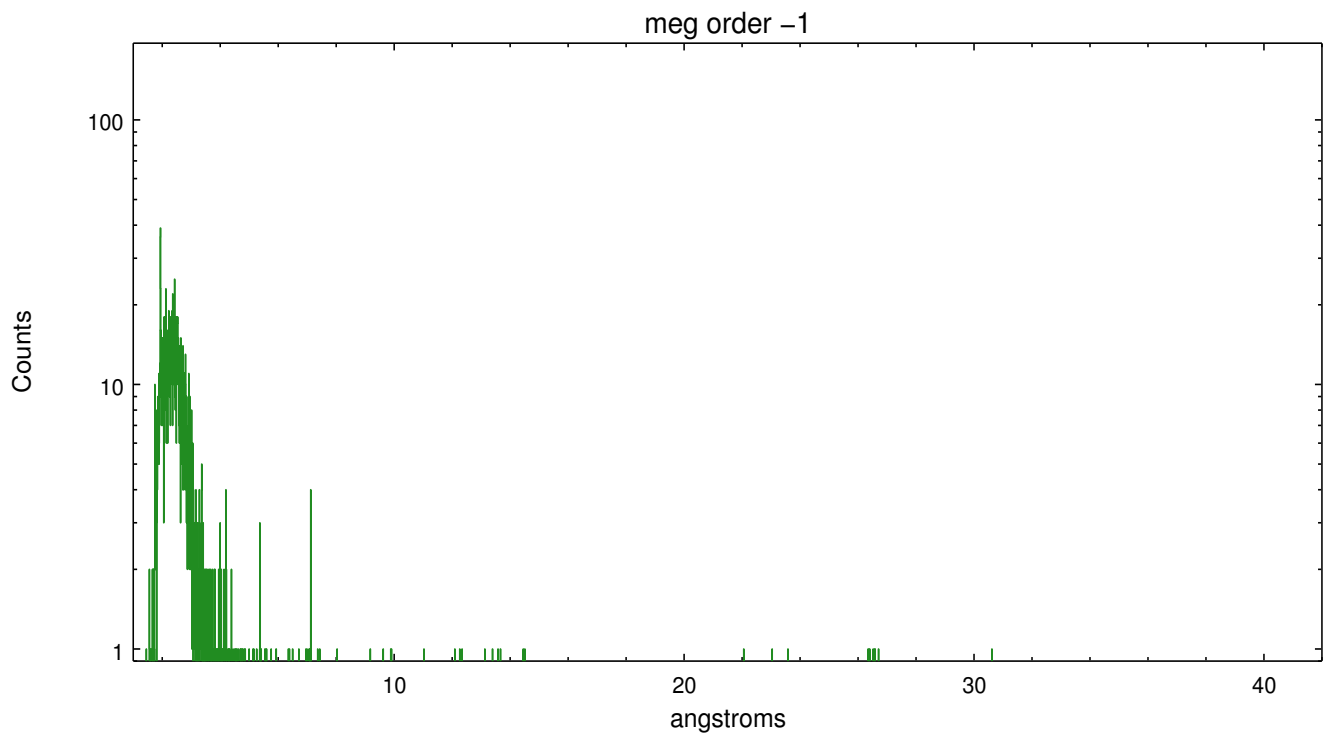
Spot Image MEG



Full Detector MEG

|        | order<br>-3 | order<br>-2 | order<br>-1 | order<br>0 | order<br>1 | order<br>2 | order<br>3 |
|--------|-------------|-------------|-------------|------------|------------|------------|------------|
| Events | 551         | 525         | 3478        | 9614       | 3346       | 273        | 479        |





# A Summary

## A.1 Status

|                            |             |
|----------------------------|-------------|
| V&V Scientist              | Joy Nichols |
| V&V Date (YYYY-MM-DD)      | 2012.08.30  |
| V&V Edition                | 1           |
| V&V Disposition and Status | OK          |
| V&V Charge Time            | 40.022      |

## A.2 Comments