

# KIC 010590203

## Q1-17 DR25 TCE Parameters

| TCE          | Run Type | KOI? | Period (Days) | Epoch (BKJD) | Depth (ppm) | Duration (Hours) | MES | SNR | $R_{\star}$ ( $R_{\odot}$ ) | $T_{\star}$ (K) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 010590203-01 | OBS      | No   | 515.041170    | 409.547853   | 388.2       | 14.919           | 7.3 | 6.9 | 1.10                        | 6187            | 2.34                   | 0.92                   |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments                            |
|--------------|----------|------|-------|---|---|---|---|-------------------------------------|
| 010590203-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_MARSHALL—CENT_FEW_DIFFS |

**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

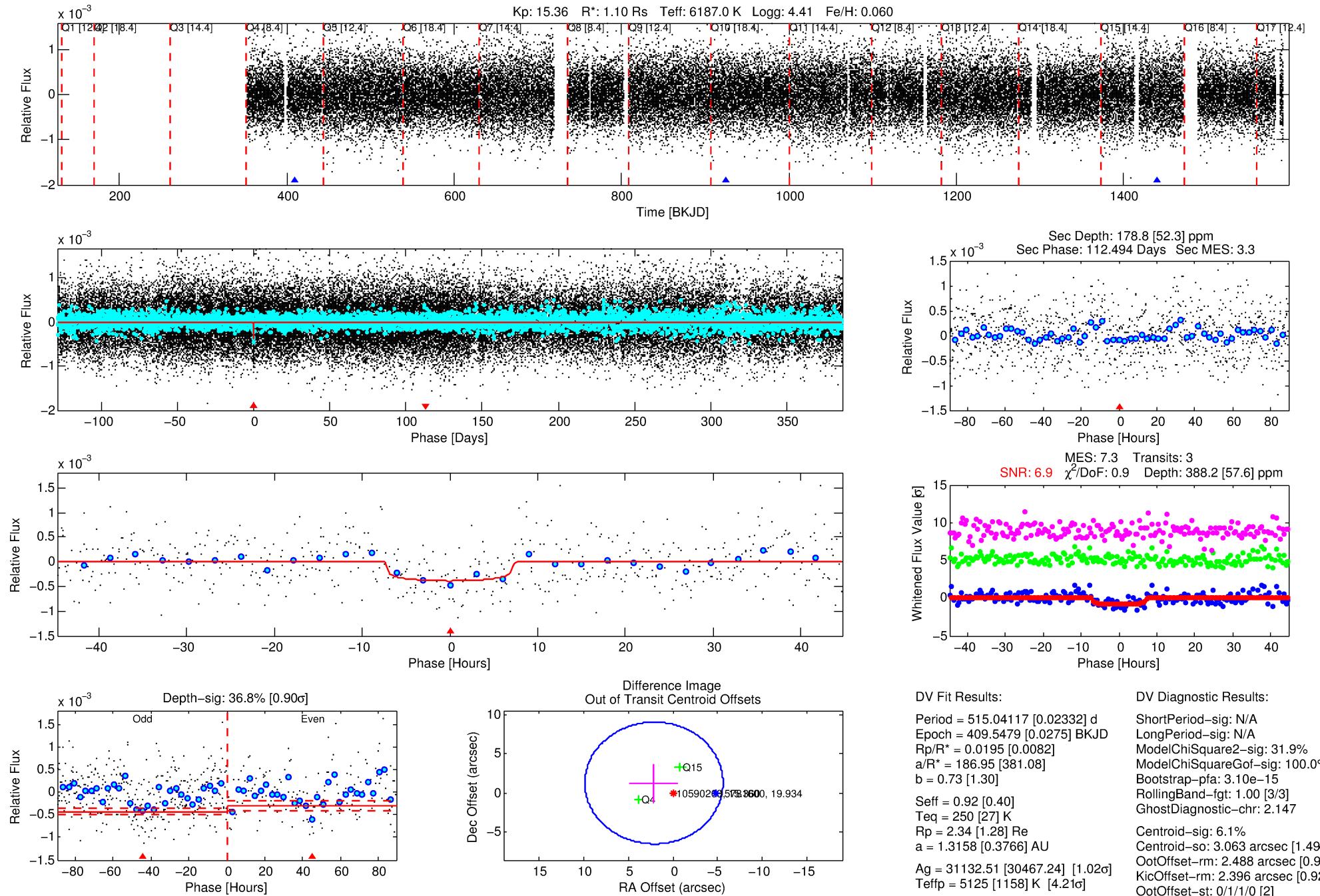
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010590203-01

No Significant Match Found

# DV One-Page Summary

KIC: 10590203 Candidate: 1 of 1 Period: 515.041 d



## DV Fit Results:

Period = 515.04117 [0.02332] d  
Epoch = 409.5479 [0.0275] BKJD  
Rp/R\* = 0.0195 [0.0082]  
a/R\* = 186.95 [381.08]  
b = 0.73 [1.30]  
Seff = 0.92 [0.40]  
Teff = 250 [27] K  
Rp = 2.34 [1.28] Re  
a = 1.3158 [0.3766] AU  
Ag = 31132.51 [30467.24] [1.02 $\sigma$ ]  
Teffp = 5125 [1158] K [4.21 $\sigma$ ]

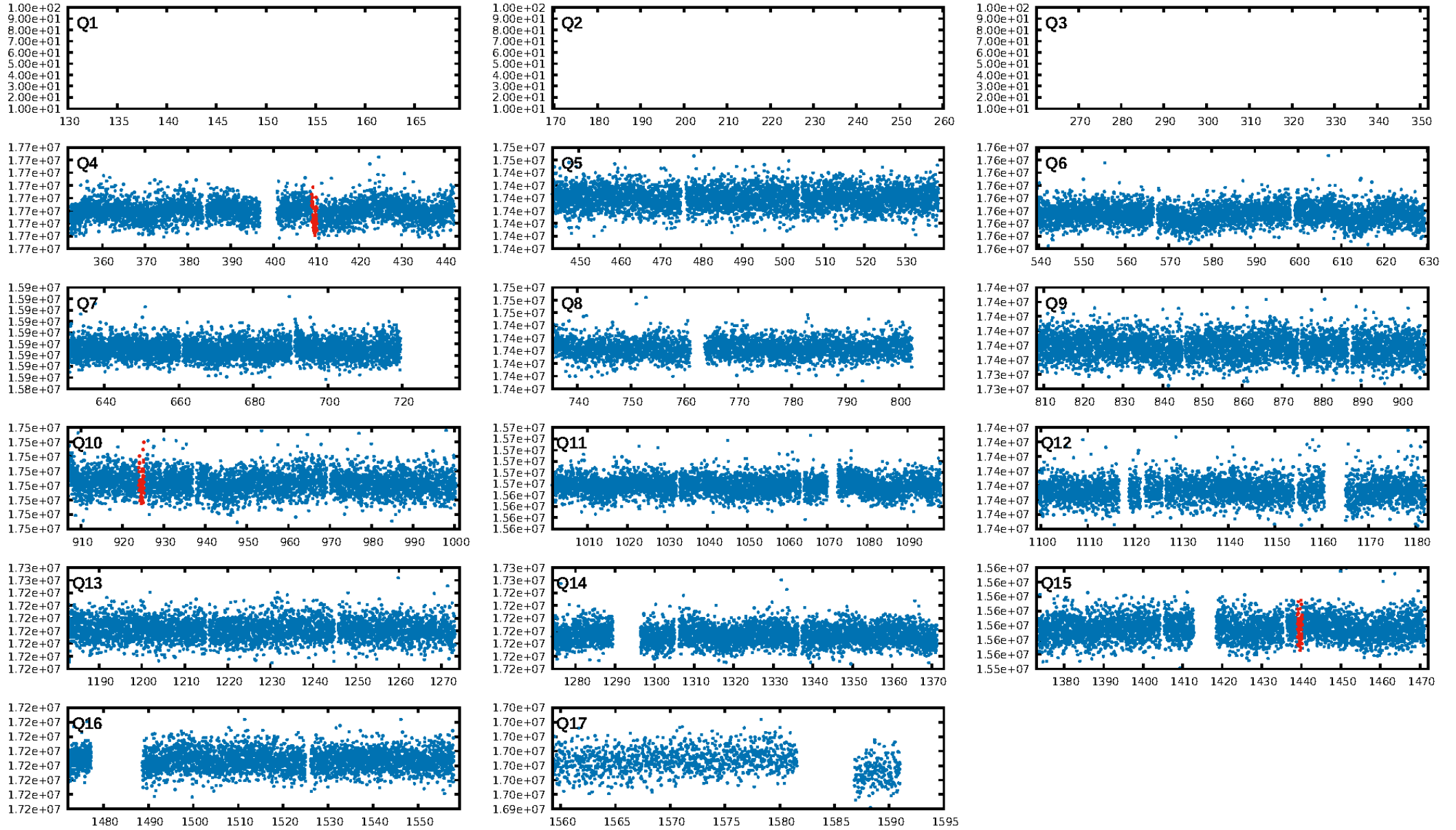
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 31.9%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 3.10e-15  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 2.147  
Centroid-sig: 6.1%  
Centroid-so: 3.063 arcsec [1.49 $\sigma$ ]  
OotOffset-rm: 2.488 arcsec [0.96 $\sigma$ ]  
KicOffset-rm: 2.396 arcsec [0.92 $\sigma$ ]  
OotOffset-st: 0/1/1/0 [2]  
KicOffset-st: 0/1/1/0 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 1.00 [3/3]

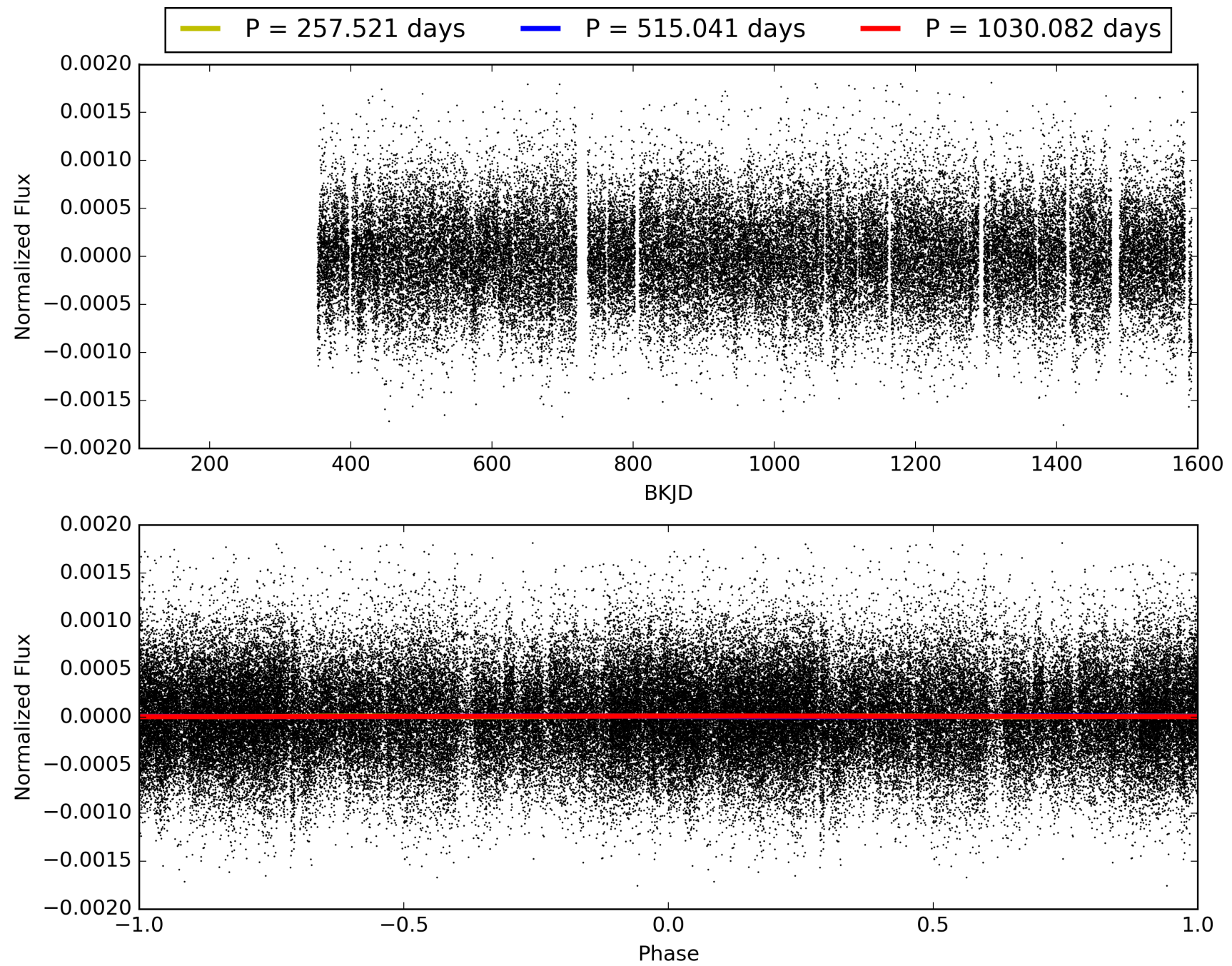
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 28-Jan-2016 20:36:28 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010590203-01, PDC Light Curves

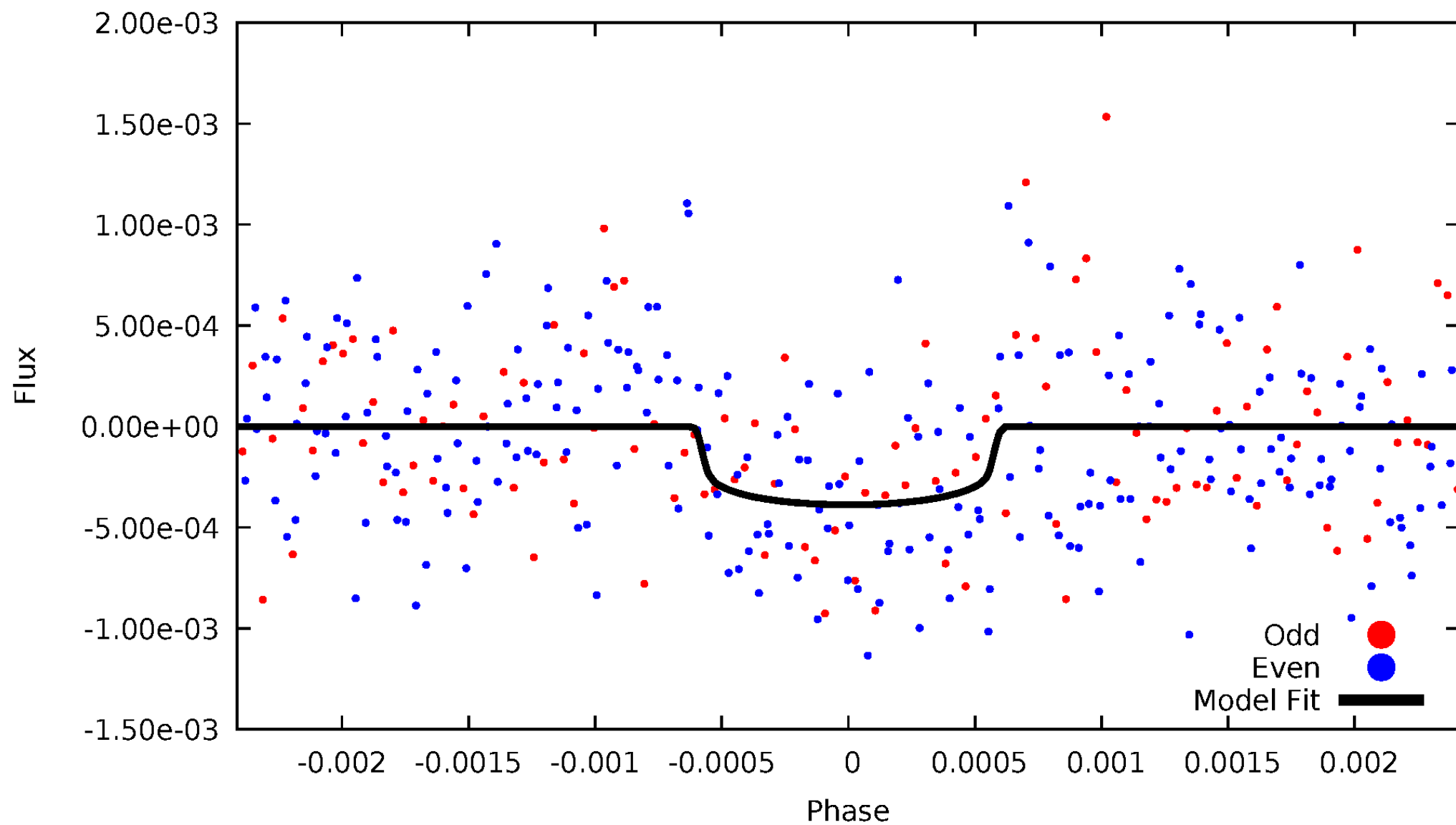


TCE 010590203-01



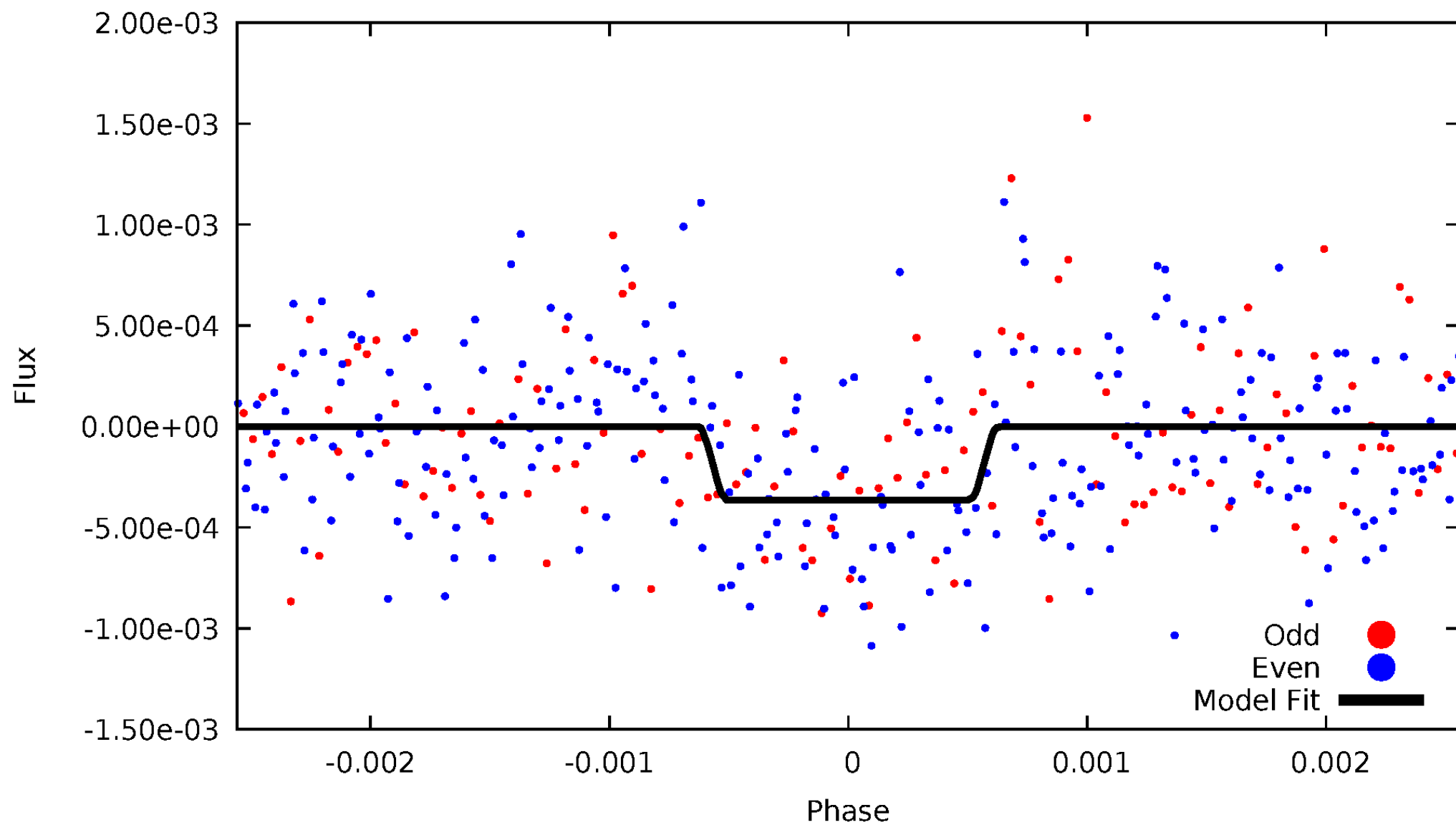
# DV Odd/Even

TCE 010590203-01



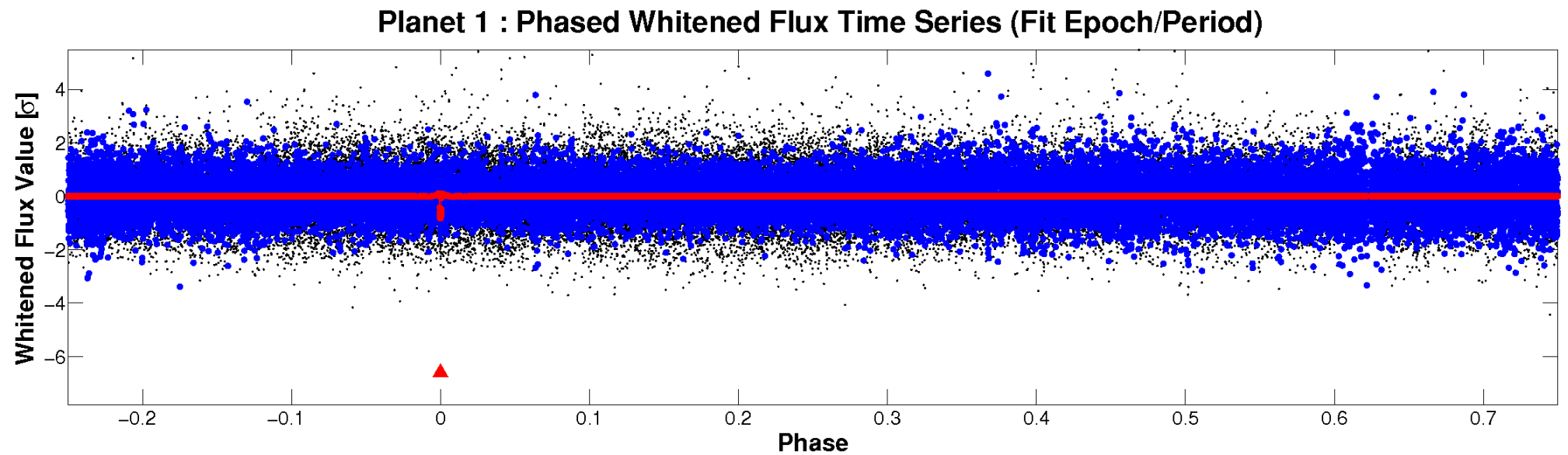
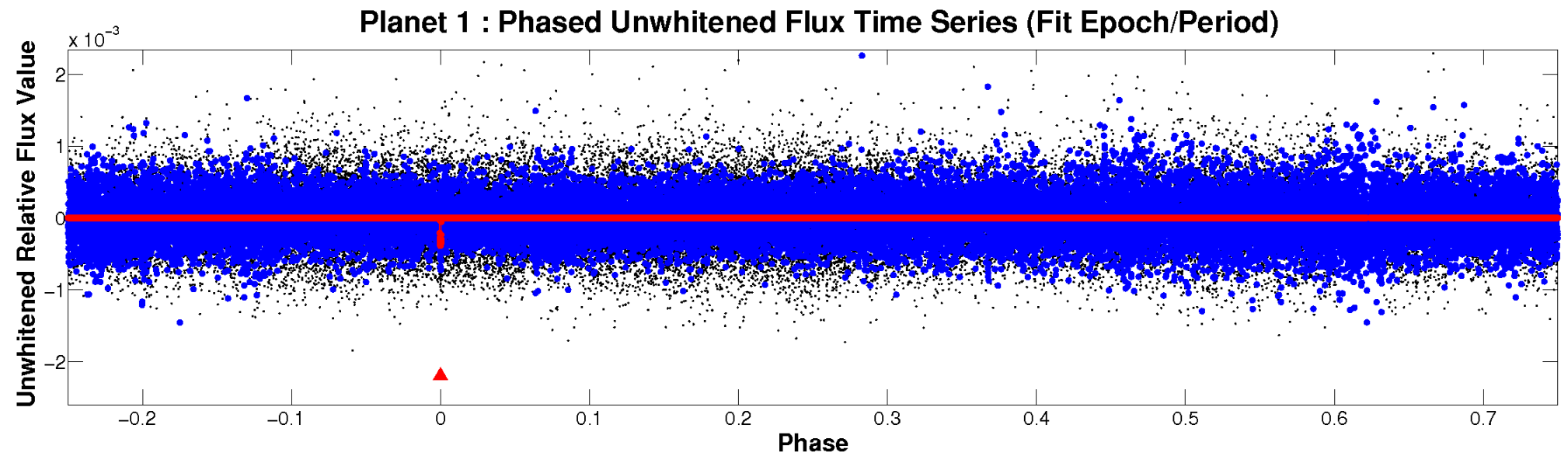
# ALT Odd/Even

TCE 010590203-01





# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

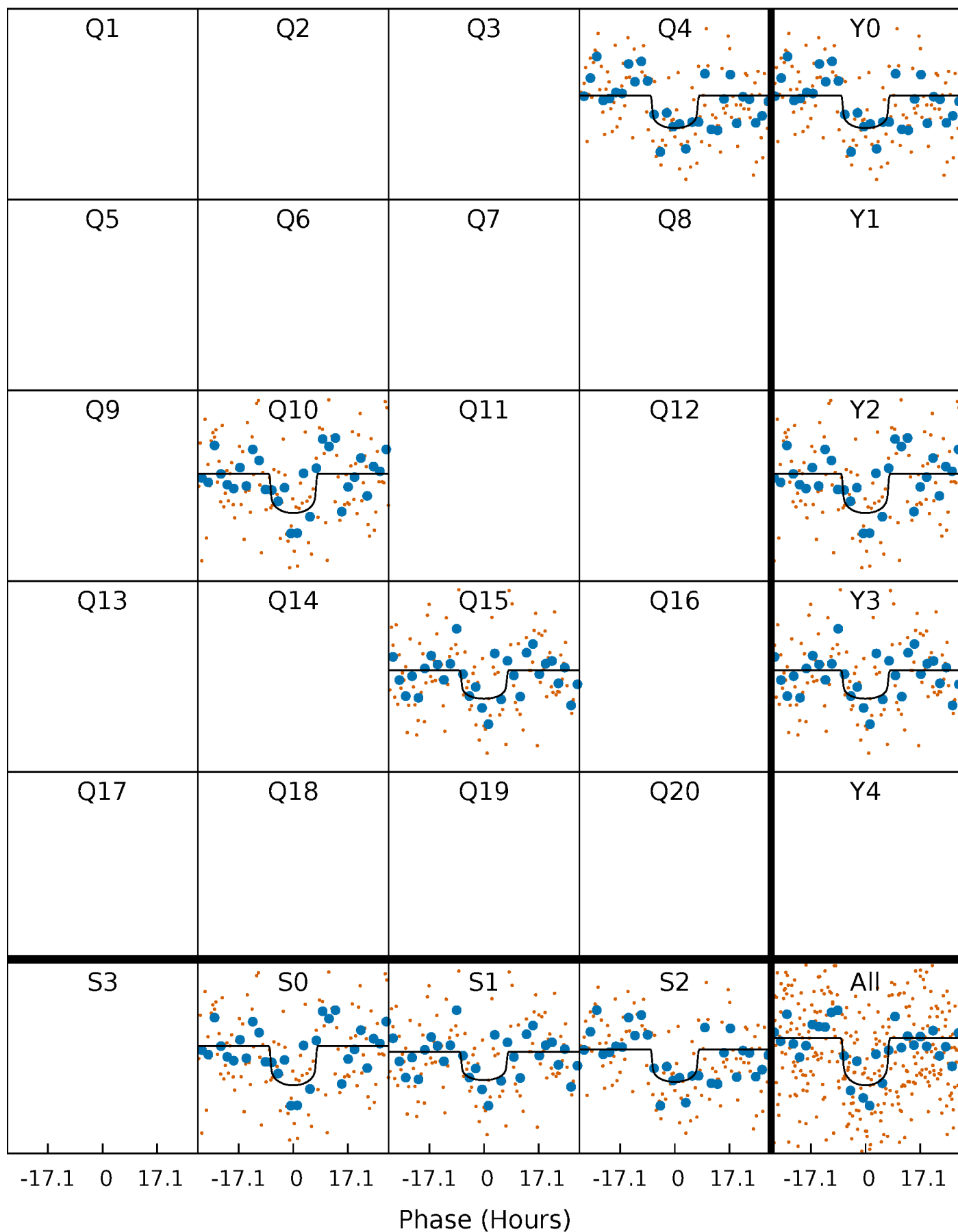
TCE 010590203-01 P=515.041170 Days  $T_0=409.547853$  (BKJD)





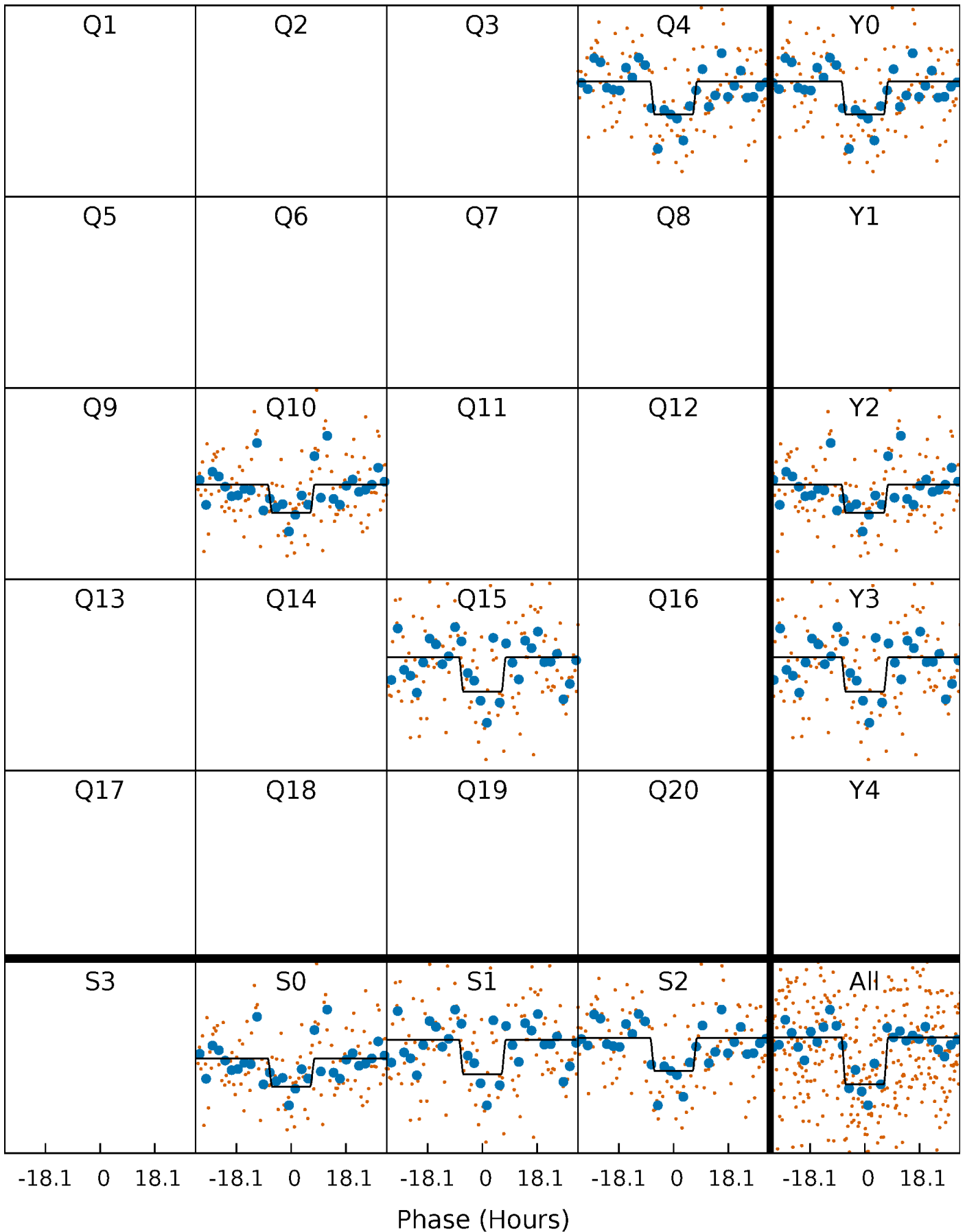
# DV Quarter-Phased Transit Curves

TCE 010590203-01 P=515.041170 Days  $T_0=409.547853$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

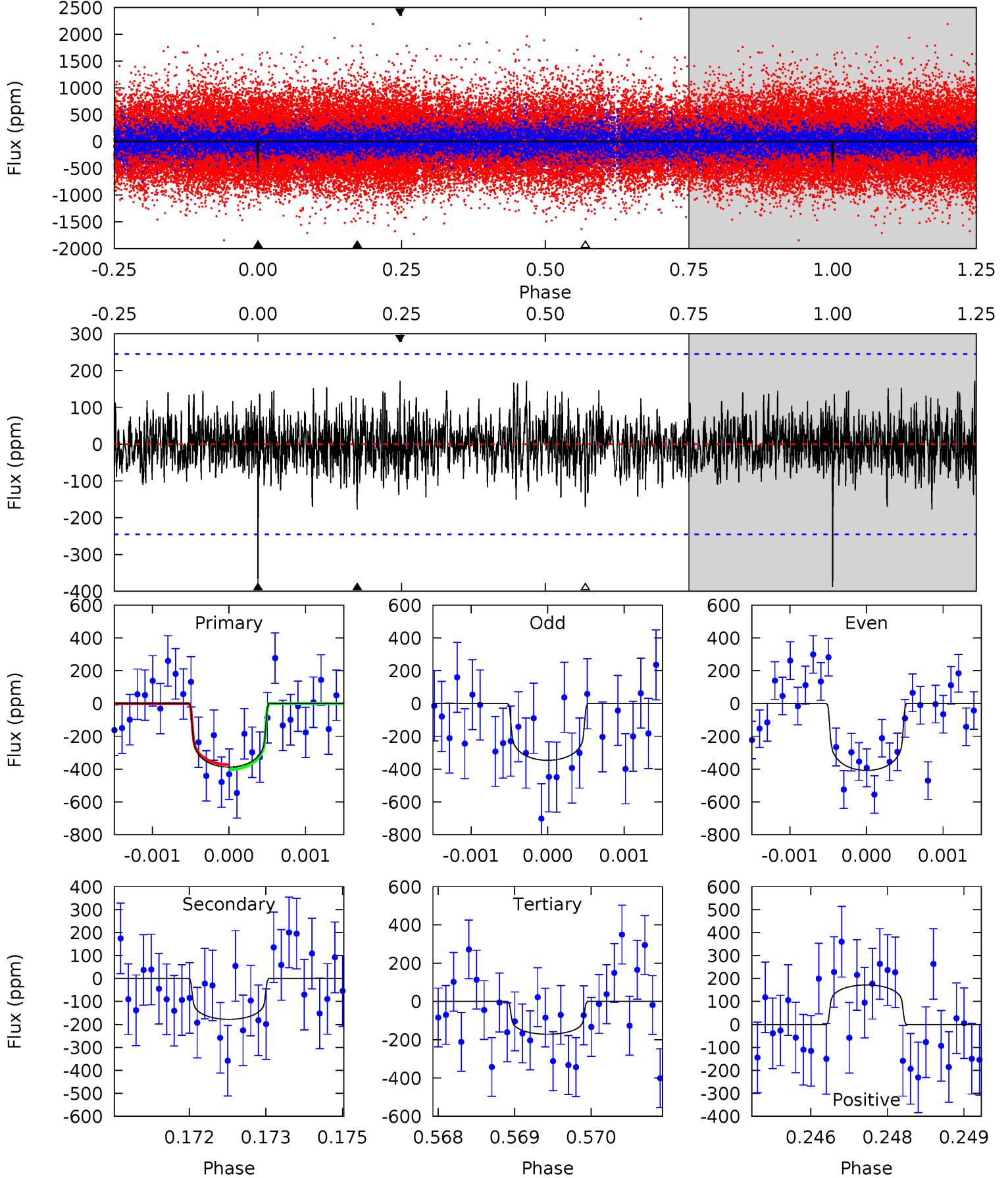
TCE 010590203-01 P=515.021069 Days  $T_0=409.578076$  (BKJD)



# DV Model-Shift Uniqueness Test

010590203-01, P = 515.041170 Days, E = 409.547853 Days

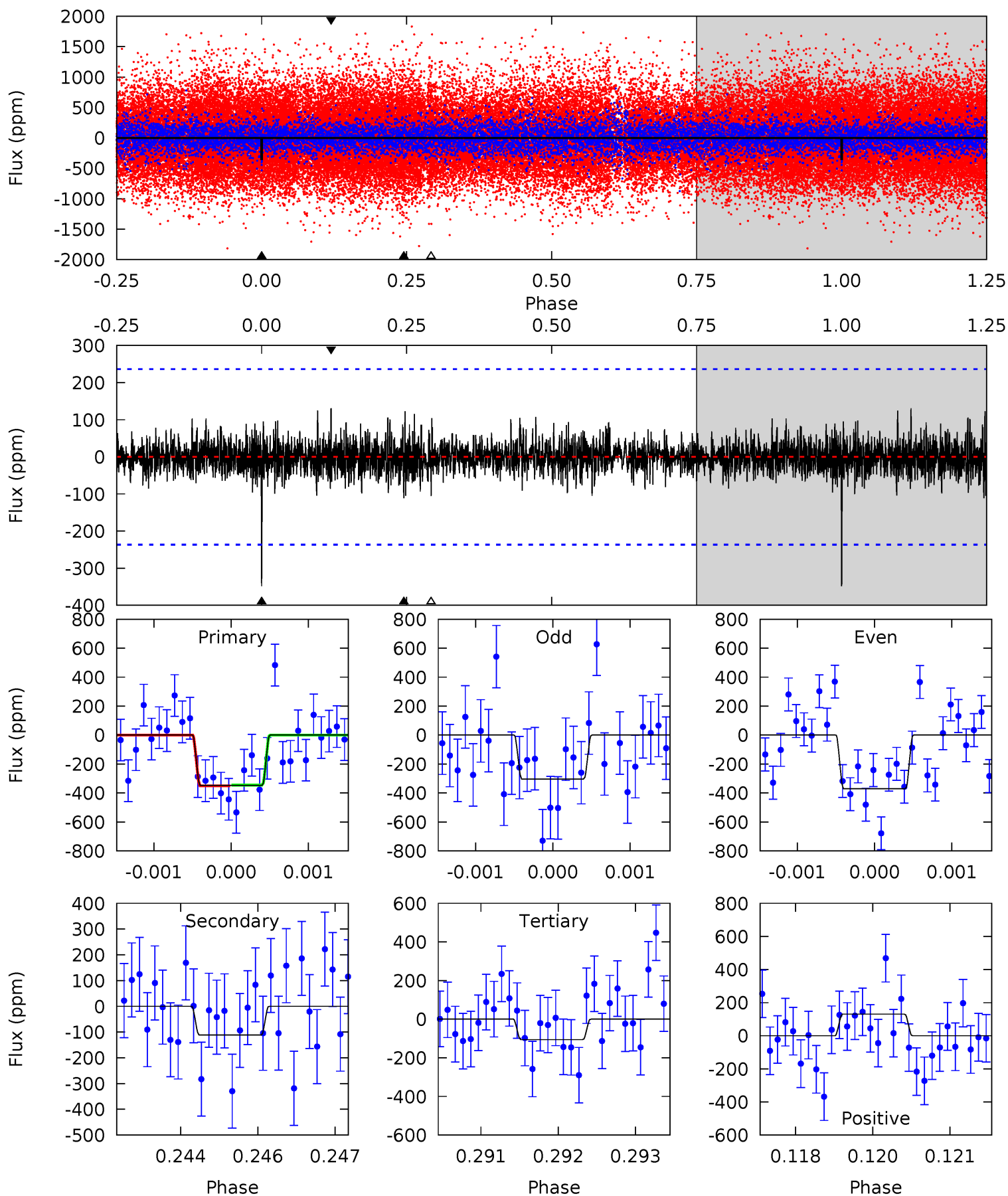
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 8.57 | 3.93 | 3.78 | 3.80 | 5.42            | 3.24            | 1.07             | 4.78    | 4.77    | 0.15    | 0.13    | 0.65    | 1.08 | 0.31  | 0.33 |



# Alt Model-Shift Uniqueness Test

010590203-01, P = 515.021069 Days, E = 409.578076 Days

| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 7.96 | 2.55 | 2.43 | 2.99 | 5.41            | 3.23            | 0.71             | 5.54    | 4.97    | 0.13    | -0.44   | 0.72    | 1.15 | 0.27  | 0.05 |



### Stellar Parameters For KIC 010590203

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                    | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
|        | $6187^{+195}_{-239}$ | $4.414^{+0.058}_{-0.217}$ | $0.060^{+0.250}_{-0.300}$ | $1.100^{+0.384}_{-0.128}$ | $1.146^{+0.153}_{-0.170}$ | $1.213^{+0.379}_{-0.677}$                 |
|        | +3%/-4%              | +1%/-5%                   | +417%/-500%               | +35%/-12%                 | +13%/-15%                 | +31%/-56%                                 |
| Source | KIC0                 | KIC0                      | KIC0                      | DSEP                      |                           |   |

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 010590203-01 / KOI

| Detrend | Depth (ppm)   | $R_p (R_{\oplus})$     | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$  | $A_{\text{obs}}$          |
|---------|---------------|------------------------|----------------------|-----------------------|---------------------------|
| DV      | $-178 \pm 45$ | $2.45^{+1.14}_{-1.01}$ | $357^{+27}_{-18}$    | $5117^{+1552}_{-720}$ | $26089^{+52181}_{-14063}$ |
| Alt.    | $-112 \pm 44$ | $2.34^{+1.13}_{-0.95}$ | $357^{+26}_{-20}$    | $4723^{+1391}_{-727}$ | $18282^{+36890}_{-11100}$ |

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature  
 $T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )  
 $A_{\text{obs}}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{\text{obs}} \gg T_{\text{max}}$  AND  $A_{\text{obs}} \gg 1.0$

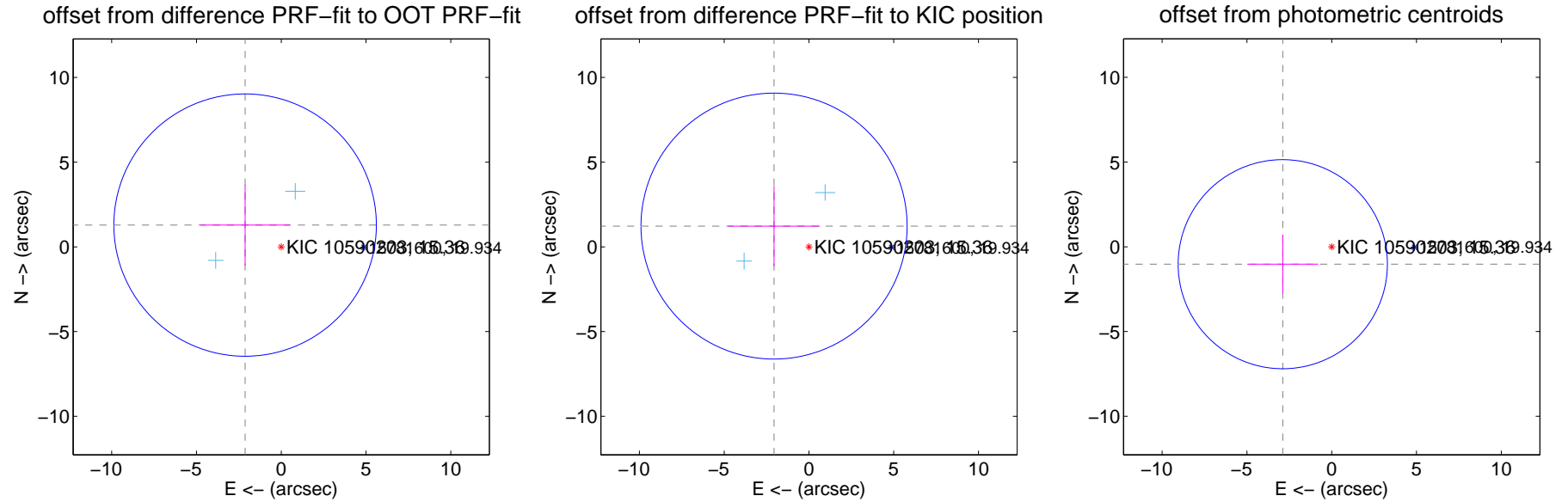
## DV Centroid Data

Supplemental centroid analysis for 010590203-01. Kepler magnitude: 15.36. Transit SNR 6.91

There are 2 quarters with good PRF difference image offsets

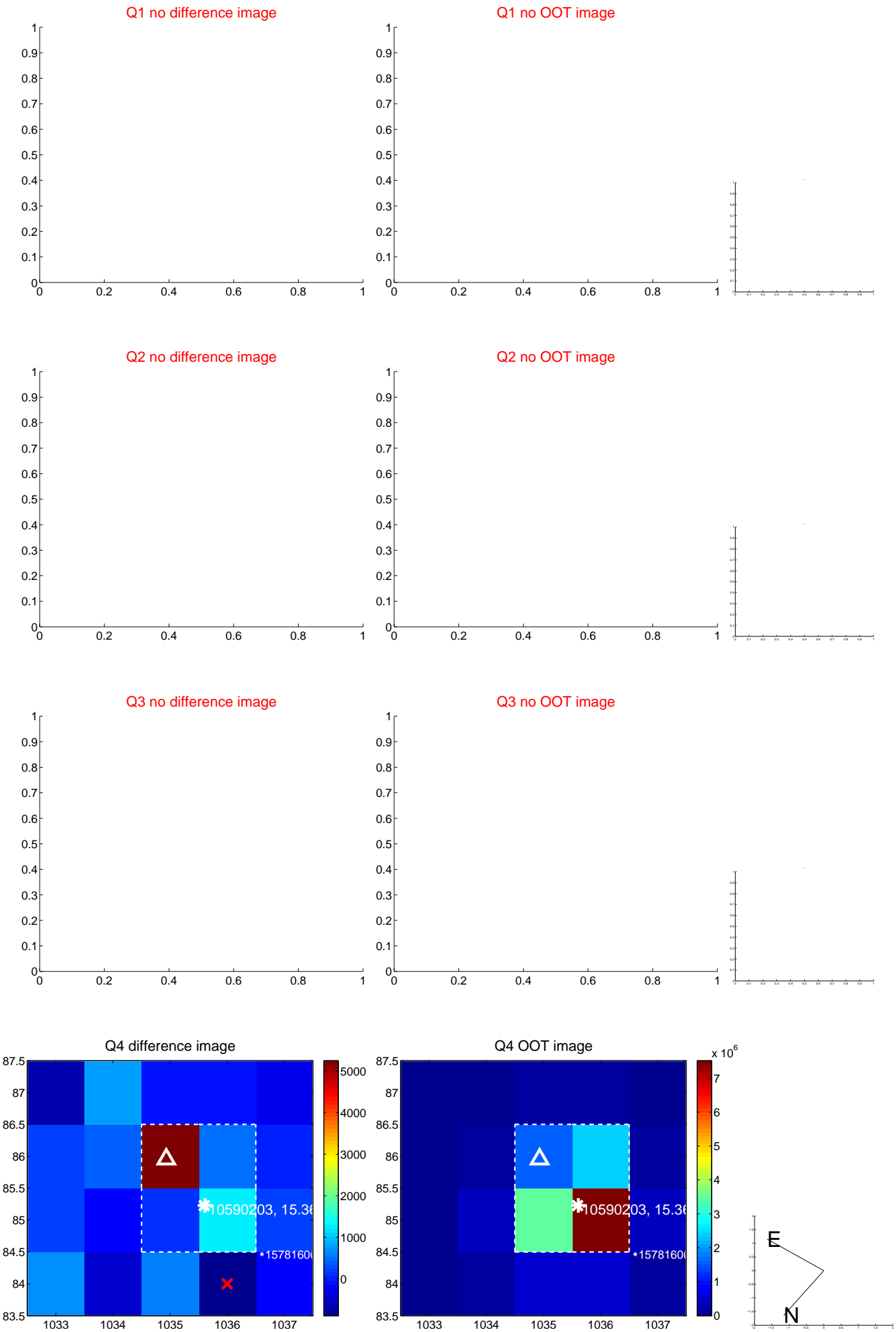
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA       | $\Delta$ Dec      |
|---|--------------------|---------------------|-------------------|-------------------|
| PRF-fit source offset from OOT          | $2.488 \pm 2.580$  | 0.96                | $2.131 \pm 2.648$ | $1.284 \pm 2.384$ |
| PRF-fit source offset from KIC position | $2.396 \pm 2.616$  | 0.92                | $2.059 \pm 2.700$ | $1.226 \pm 2.366$ |
| photometric centroid source offset      | $3.06 \pm 2.06$    | 1.49                | $2.89 \pm 2.09$   | $-1.03 \pm 1.75$  |



Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

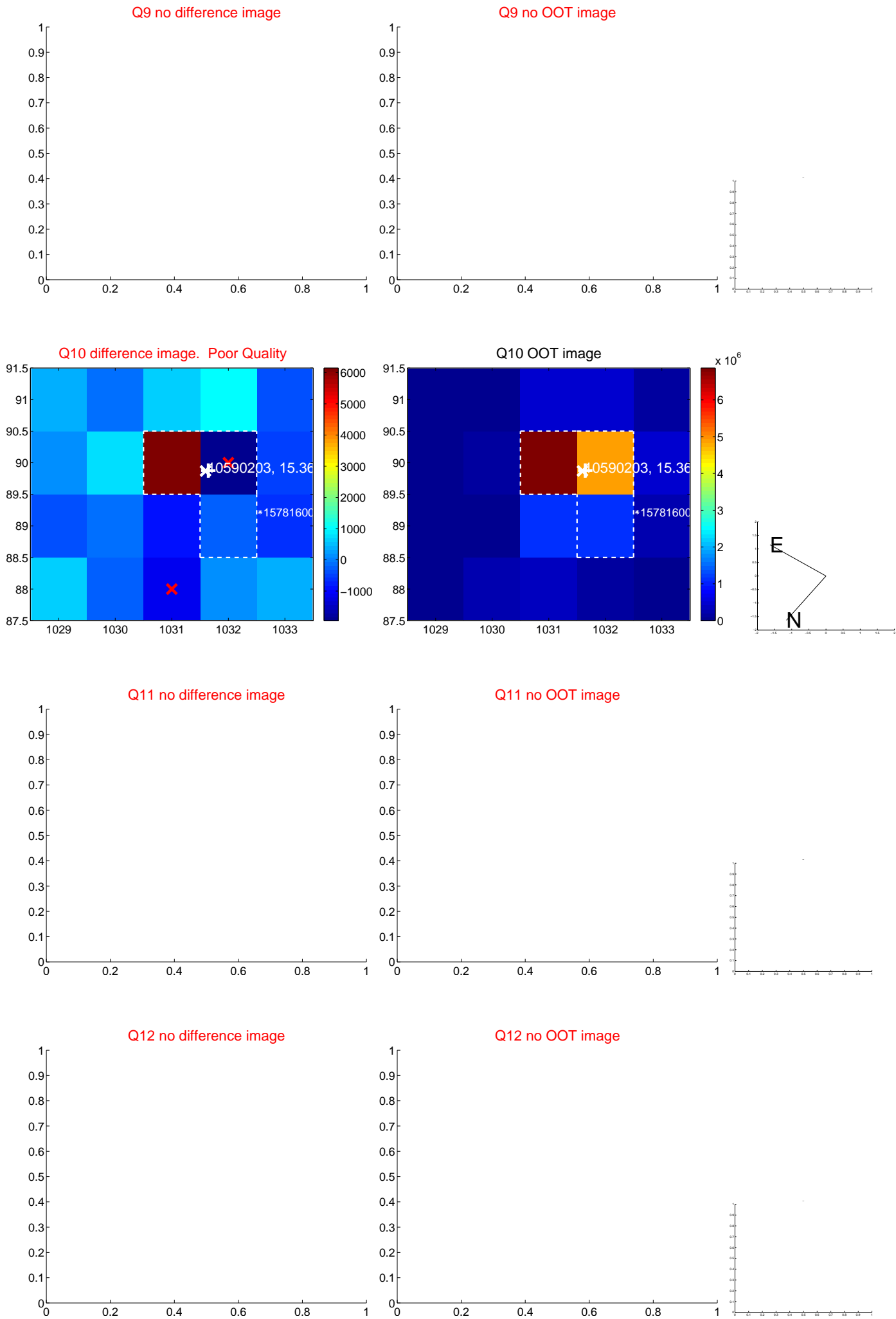




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

Q13 no difference image



Q13 no OOT image



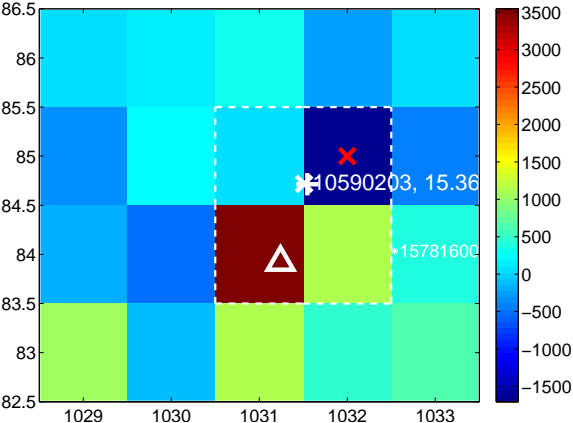
Q14 no difference image



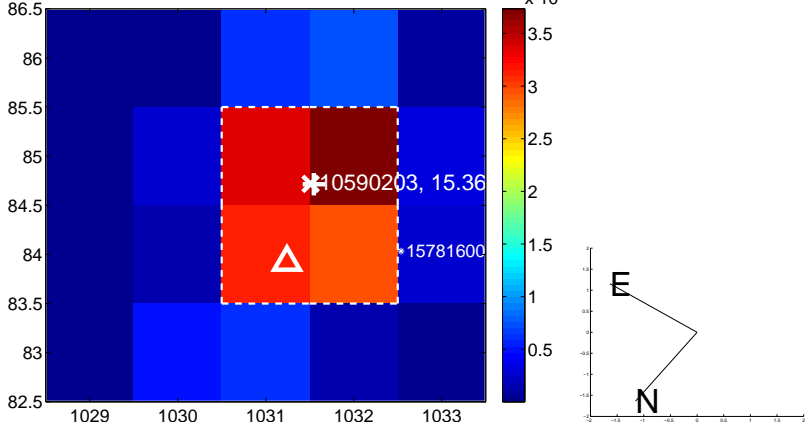
Q14 no OOT image



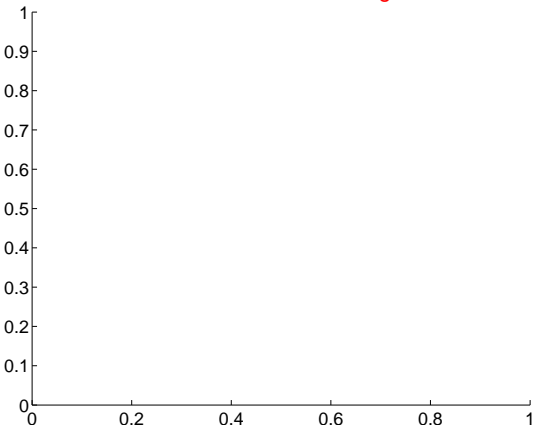
Q15 difference image



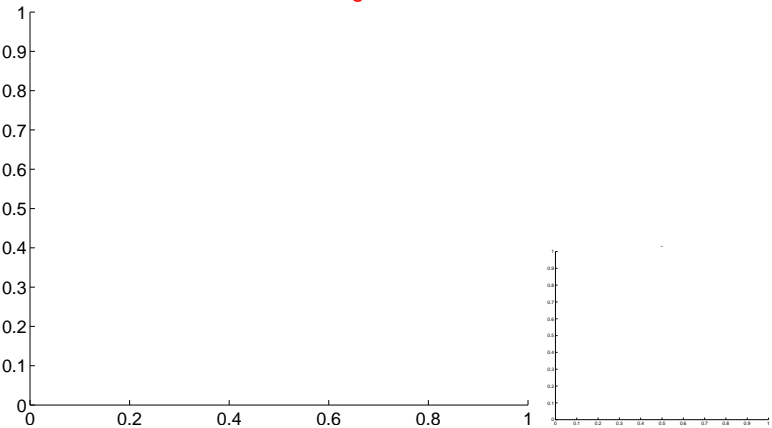
Q15 OOT image



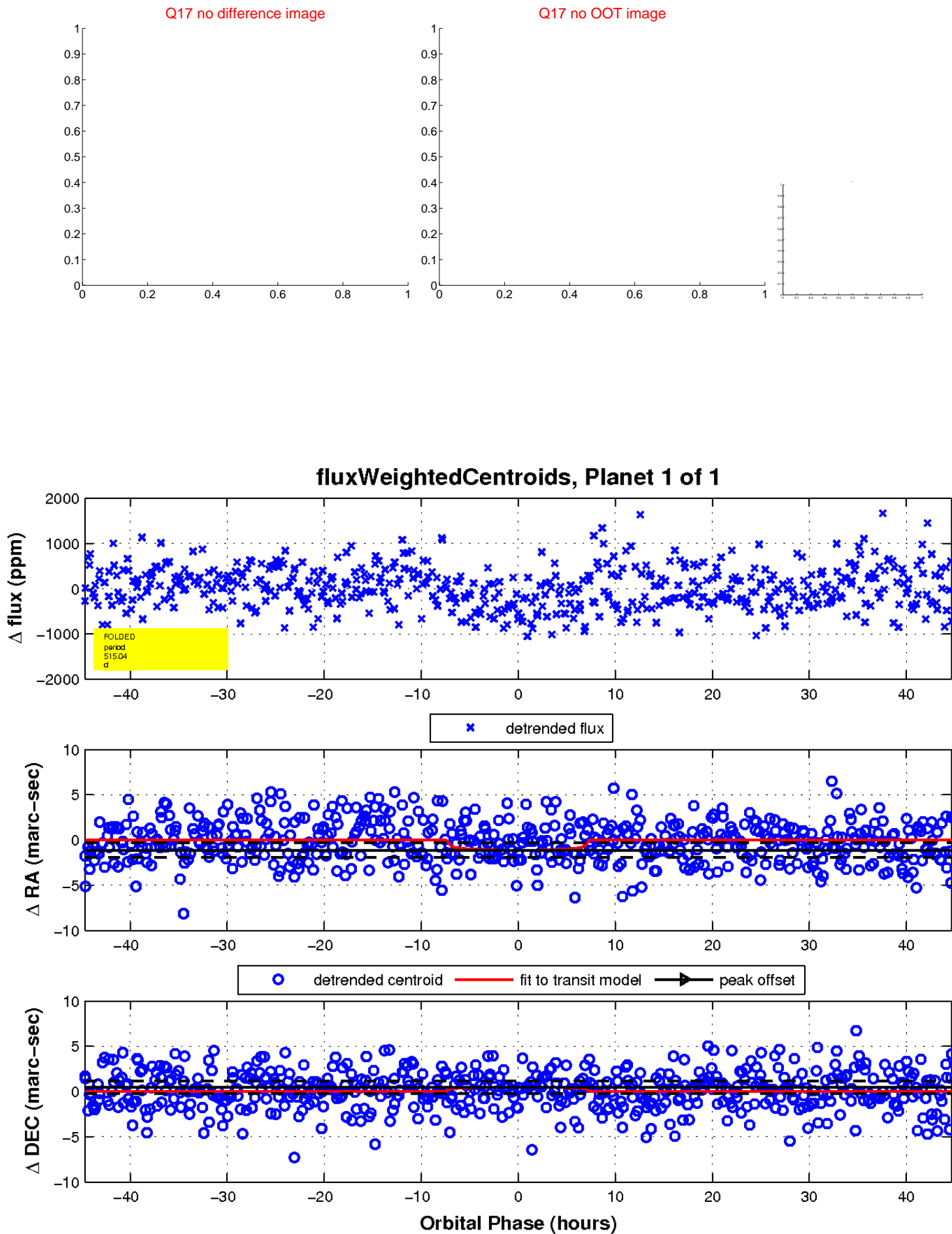
Q16 no difference image



Q16 no OOT image



white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination

