

# KIC 008440310

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 008440310-01 | OBS      | No   | 366.677396    | 182.967230   | 1380.5      | 12.698           | 7.3 | 8.8 | 1.04                        | 5722            | 7.33                   | 1.15                   |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments  |
|--------------|----------|------|-------|---|---|---|---|---|
| 008440310-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES_SKYE—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—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.

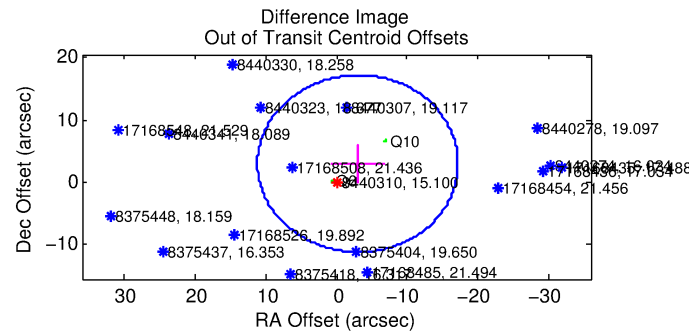
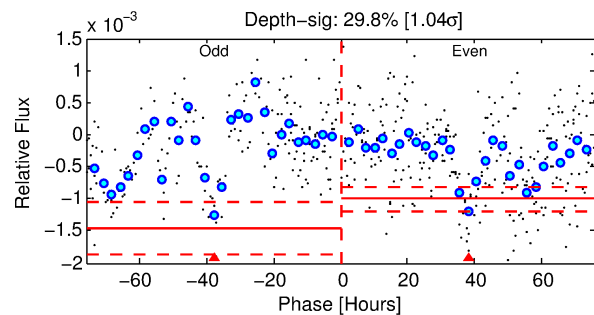
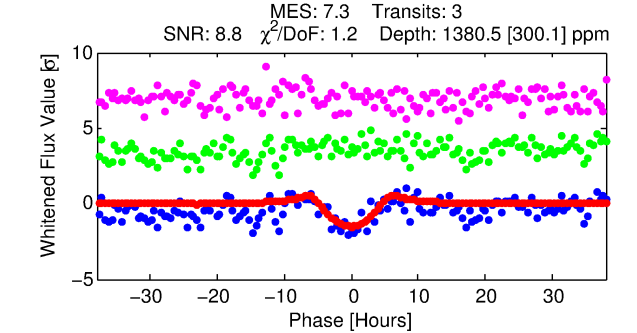
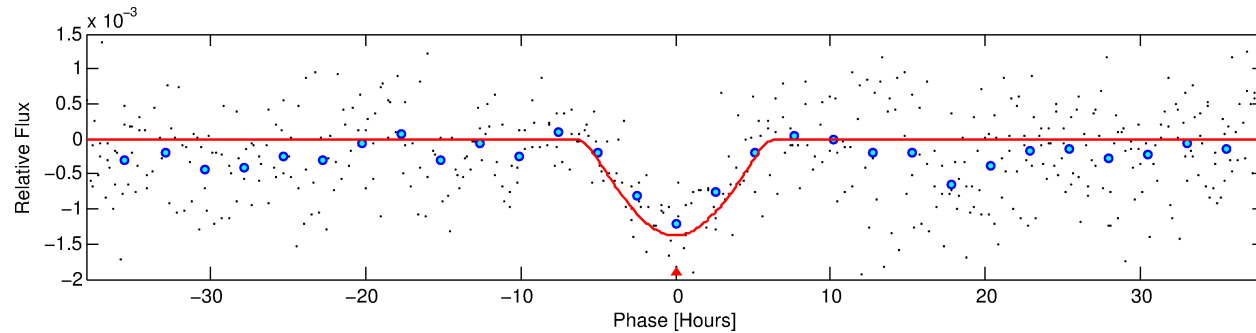
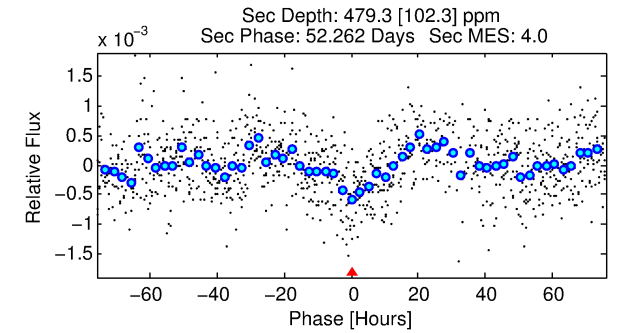
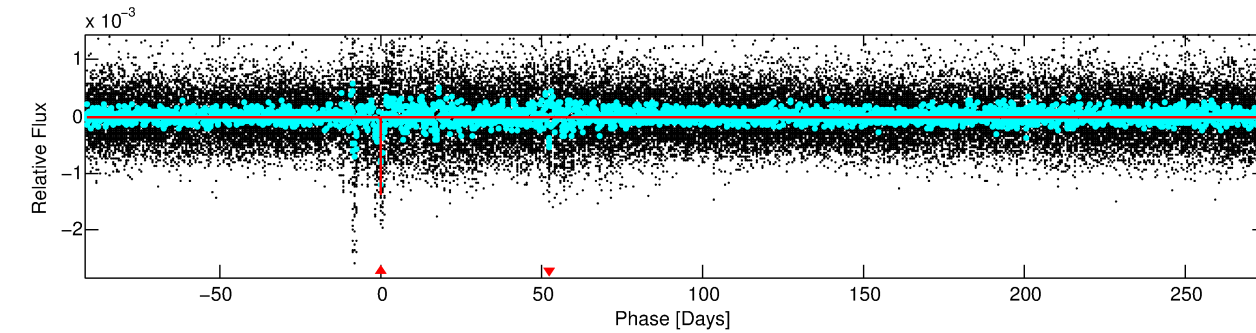
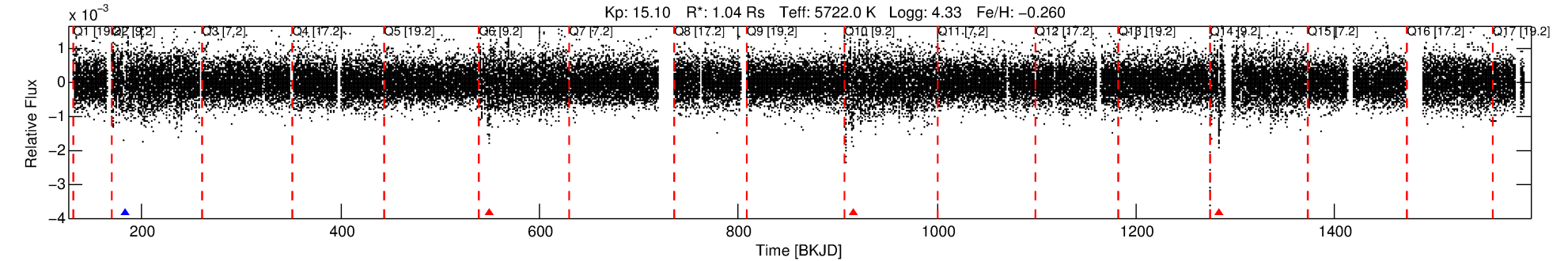
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008440310-01

No Significant Match Found

# DV One-Page Summary

KIC: 8440310 Candidate: 1 of 1 Period: 366.677 d



## DV Fit Results:

Period = 366.67740 [0.01785] d  
Epoch = 182.9672 [0.0349] BKJD  
Rp/R\* = 0.0648 [0.1836]  
a/R\* = 81.30 [52.82]  
b = 1.00 [0.27]  
Seff = 1.15 [0.42]  
Teq = 264 [24] K  
Rp = 7.33 [20.87] Re  
a = 0.9487 [0.2290] AU  
Ag = 4418.56 [25098.27] [0.18 $\sigma$ ]  
Teffp = 3325 [4714] K [0.65 $\sigma$ ]

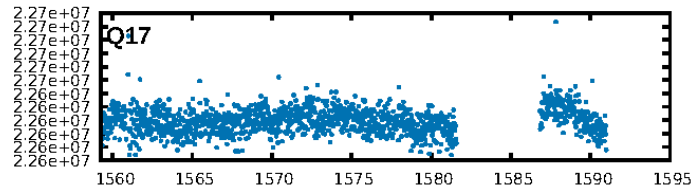
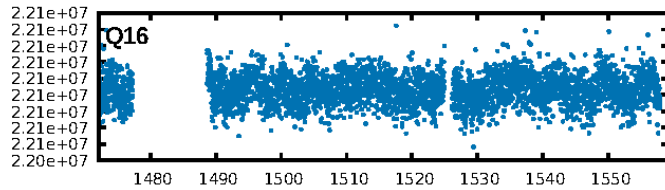
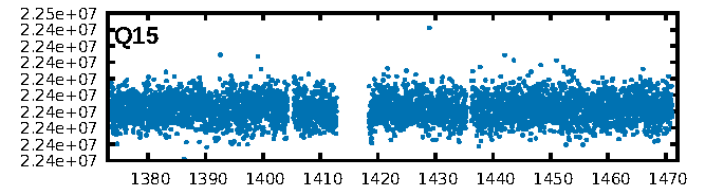
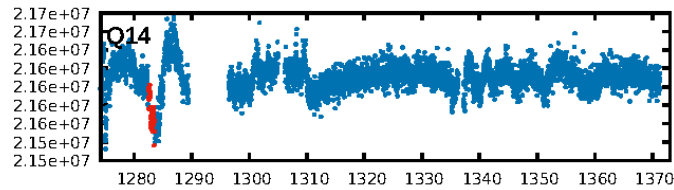
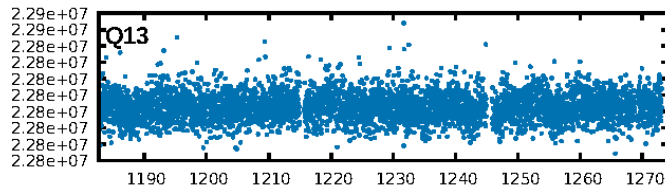
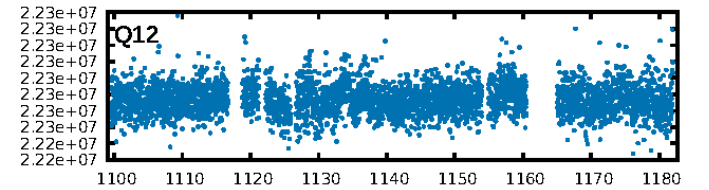
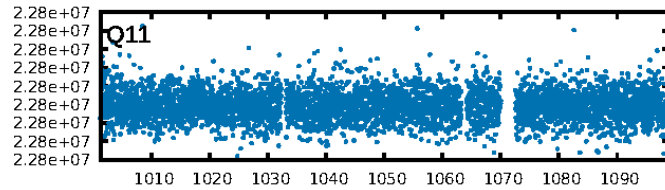
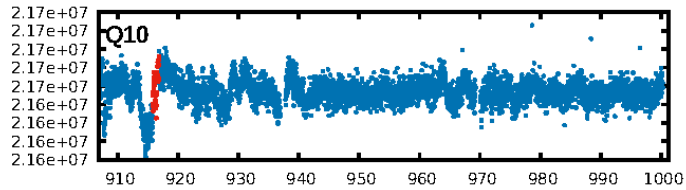
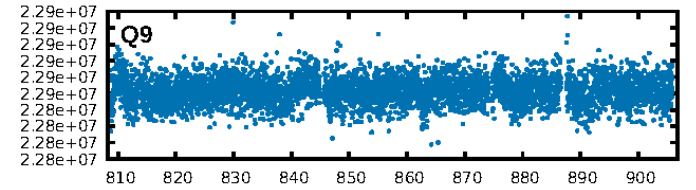
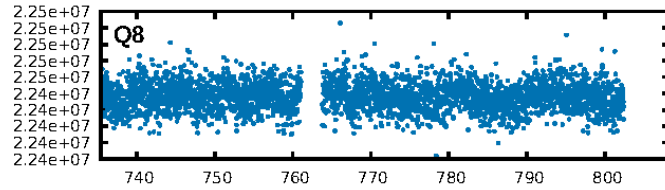
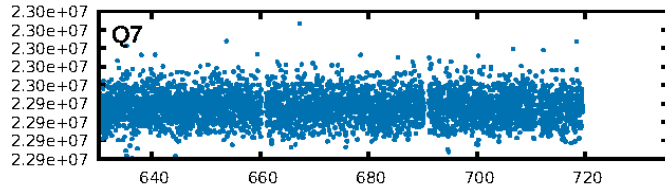
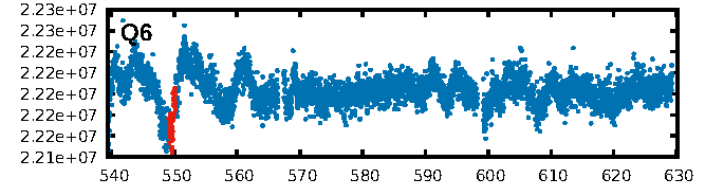
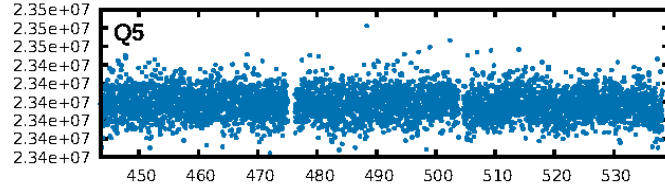
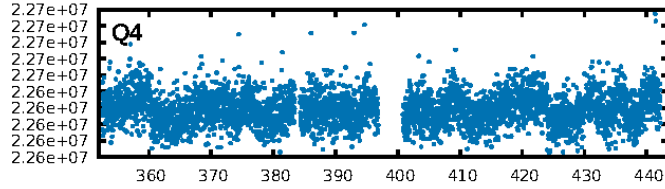
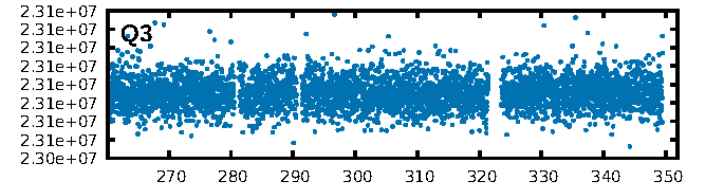
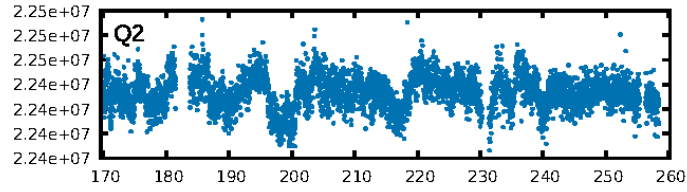
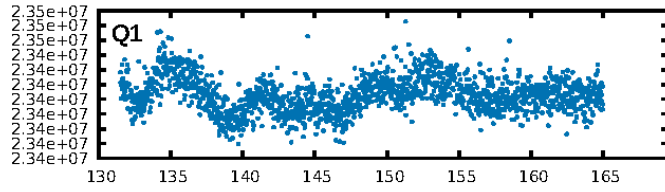
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 55.9%  
ModelChiSquareGof-sig: 99.9%  
**Bootstrap-pfa: 3.56e-10**  
**RollingBand-fgt: 0.00 [0/3]**  
GhostDiagnostic-chr: -3.505  
Centroid-sig: 55.8%  
Centroid-so: 1.536 arcsec [0.73 $\sigma$ ]  
OotOffset-rm: 4.244 arcsec [0.90 $\sigma$ ]  
OotOffset-st: 2/0/0/0 [2]  
KicOffset-rm: 4.349 arcsec [0.92 $\sigma$ ]  
KicOffset-st: 2/0/0/0 [2]  
DiffImageQuality-fgm: 0.00 [0/2]  
DiffImageOverlap-fno: 1.00 [2/2]

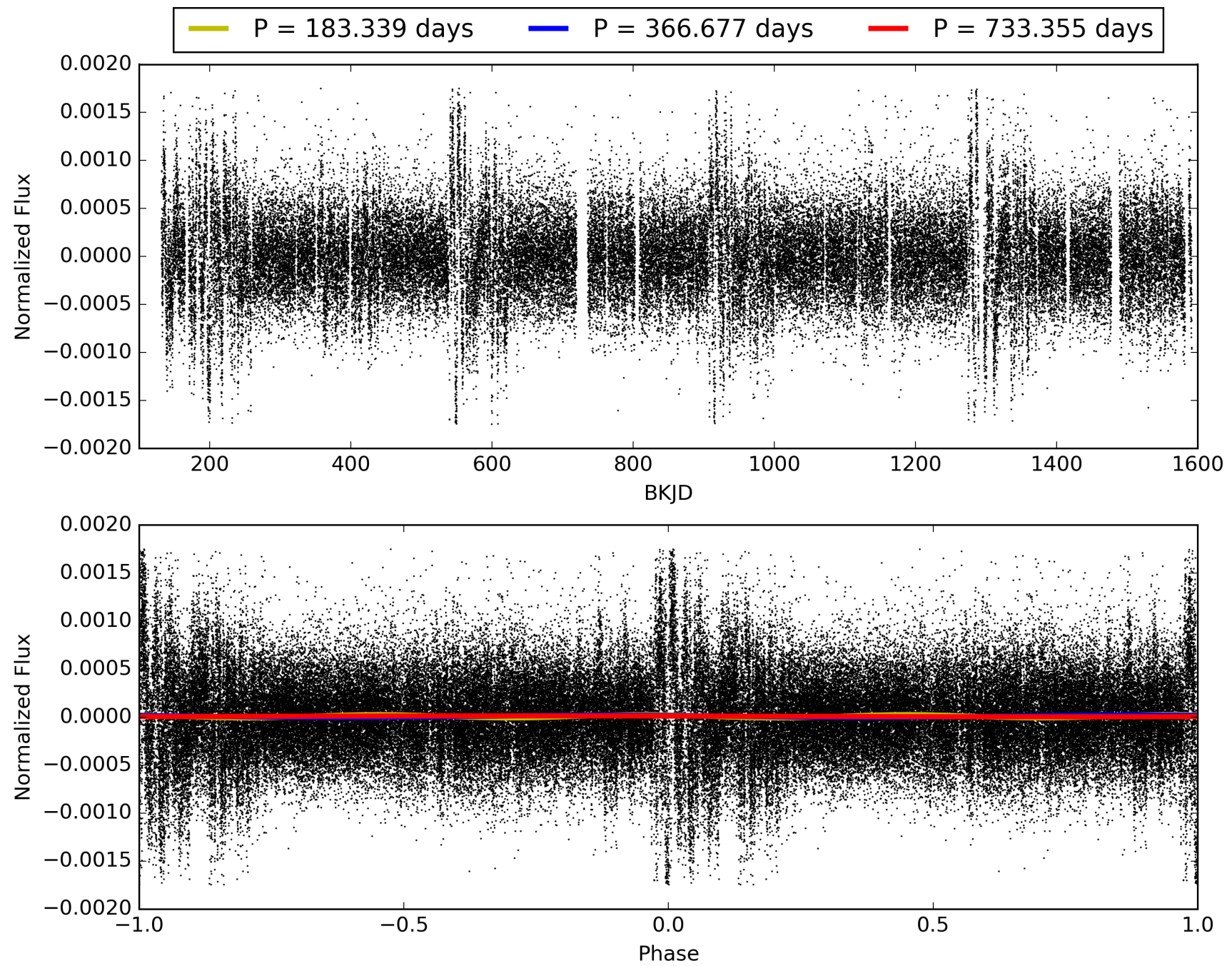
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 01:14:12 Z

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

# TCE 008440310-01, PDC Light Curves

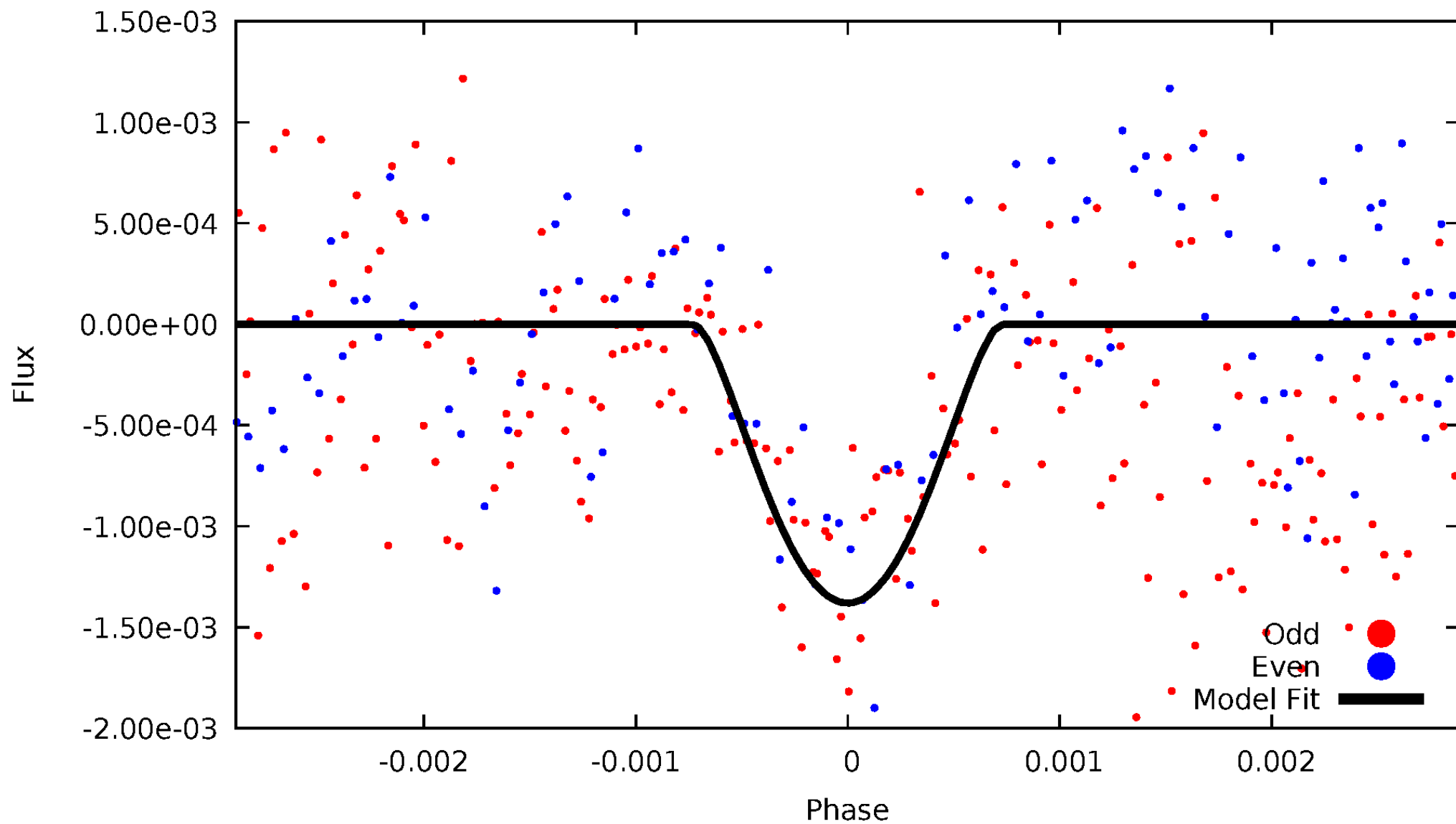


TCE 008440310-01



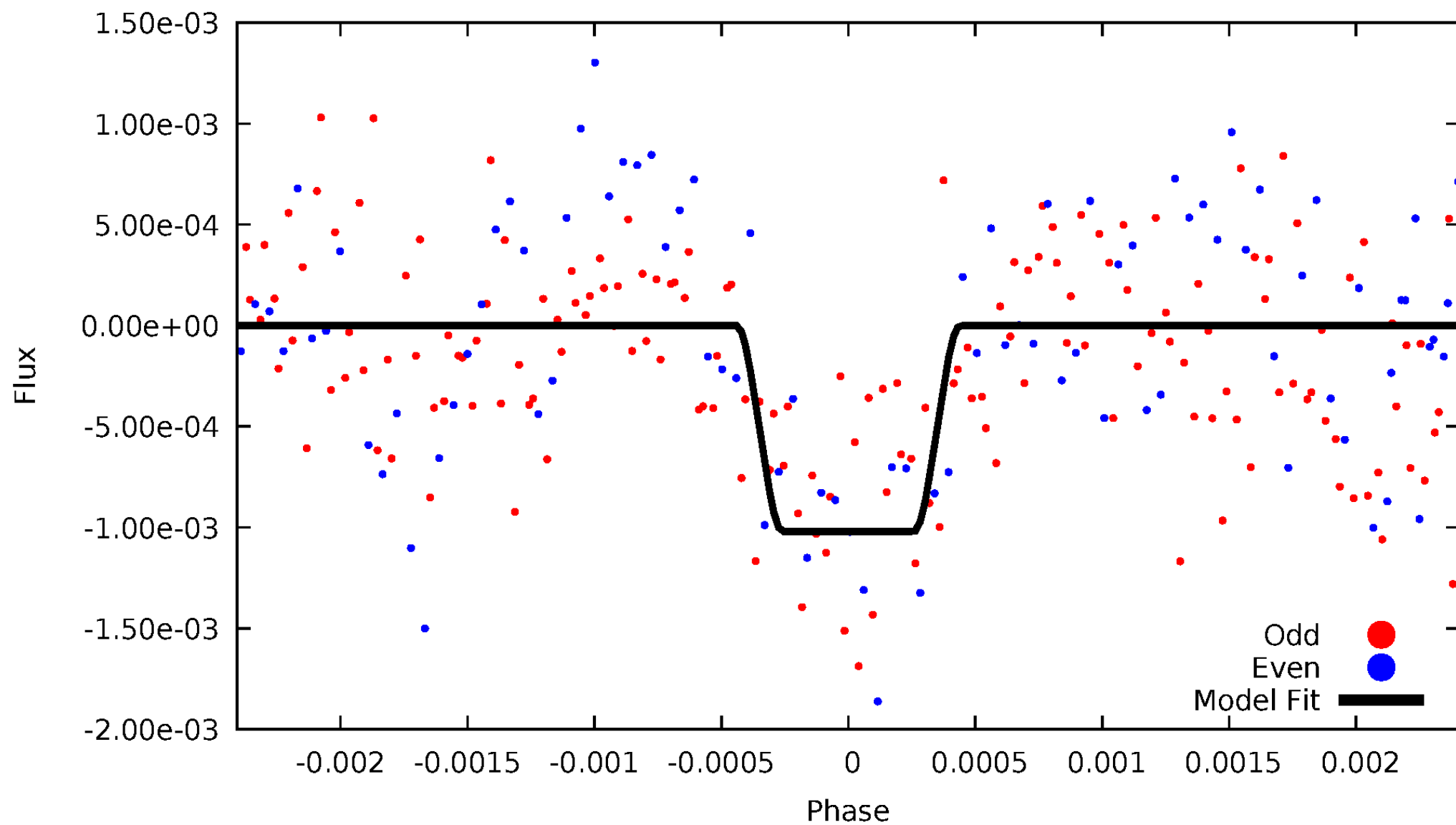
# DV Odd/Even

TCE 008440310-01



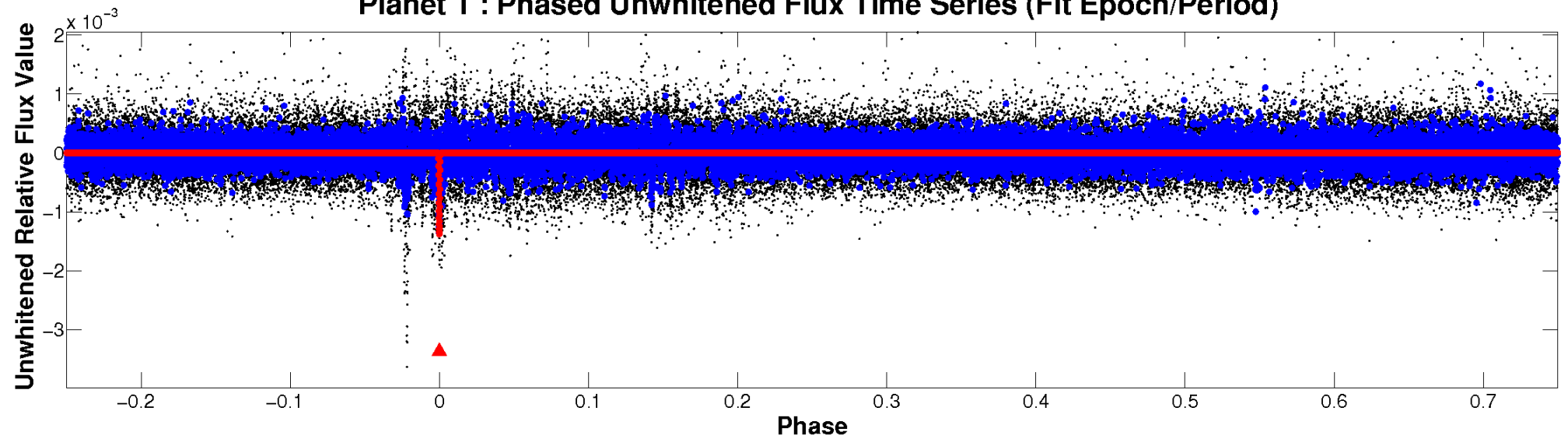
# ALT Odd/Even

TCE 008440310-01

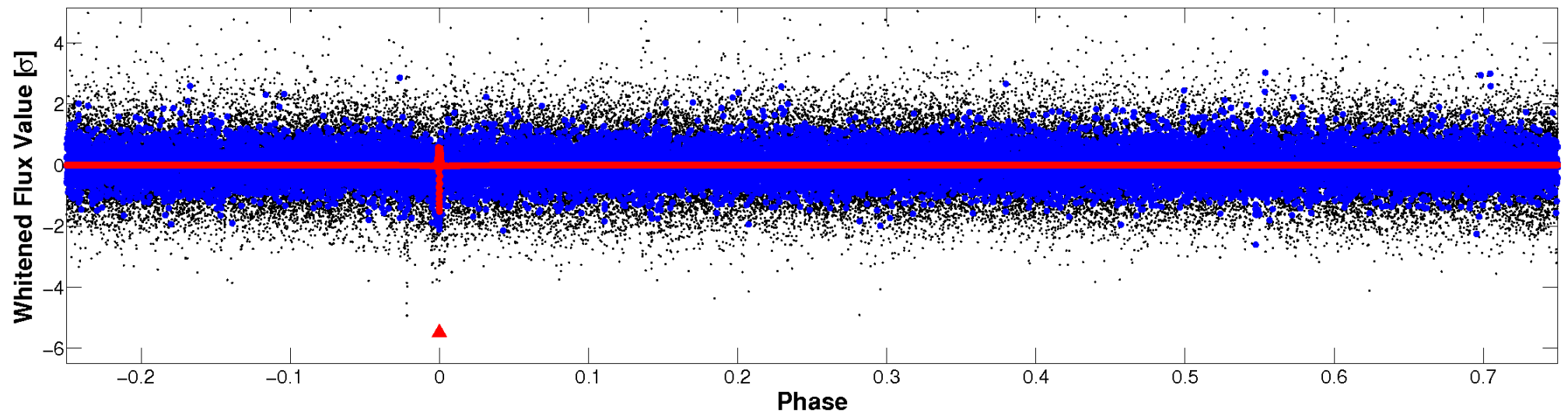


# Non-Whitened Vs. Whitened Light Curve

**Planet 1 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)**

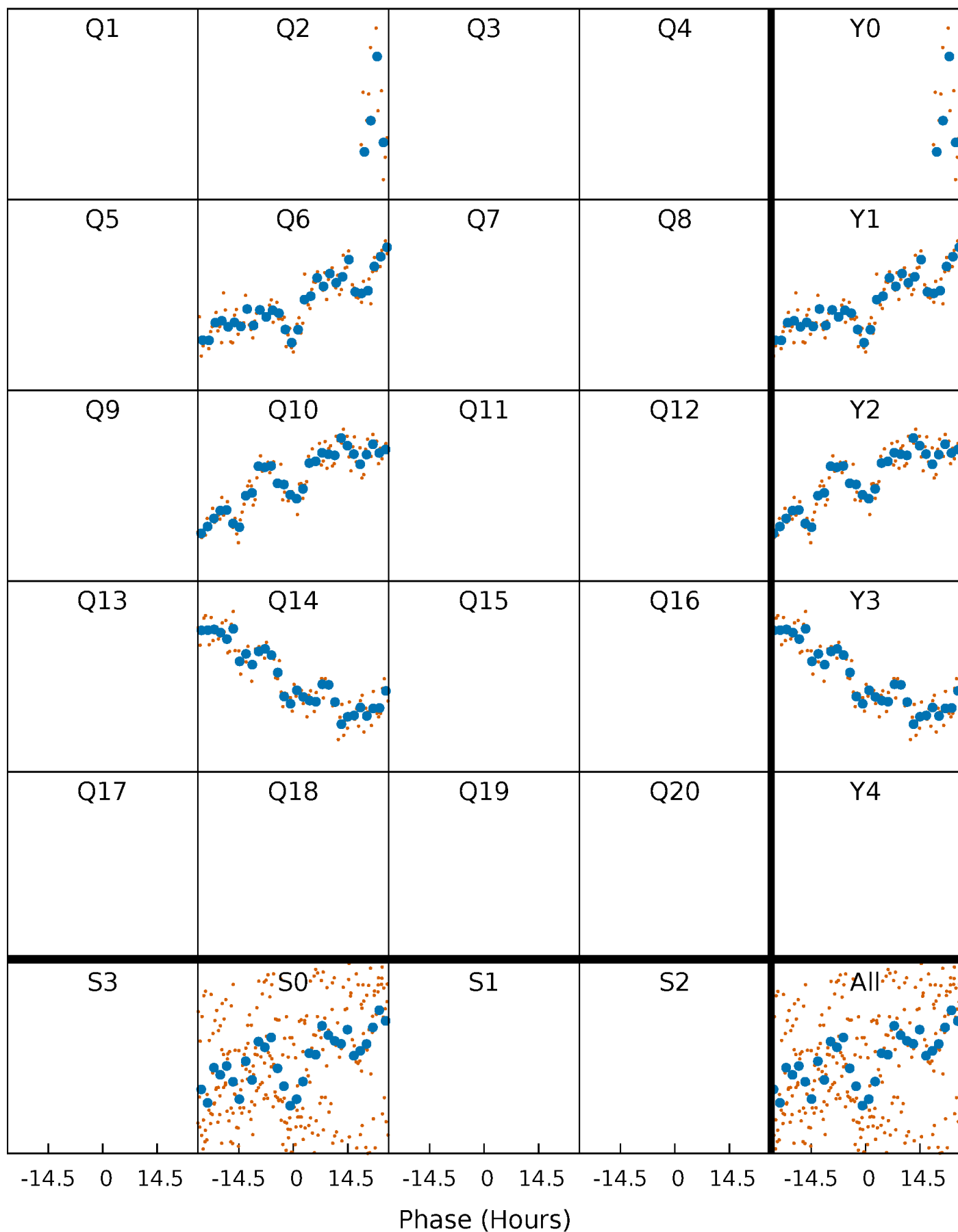


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



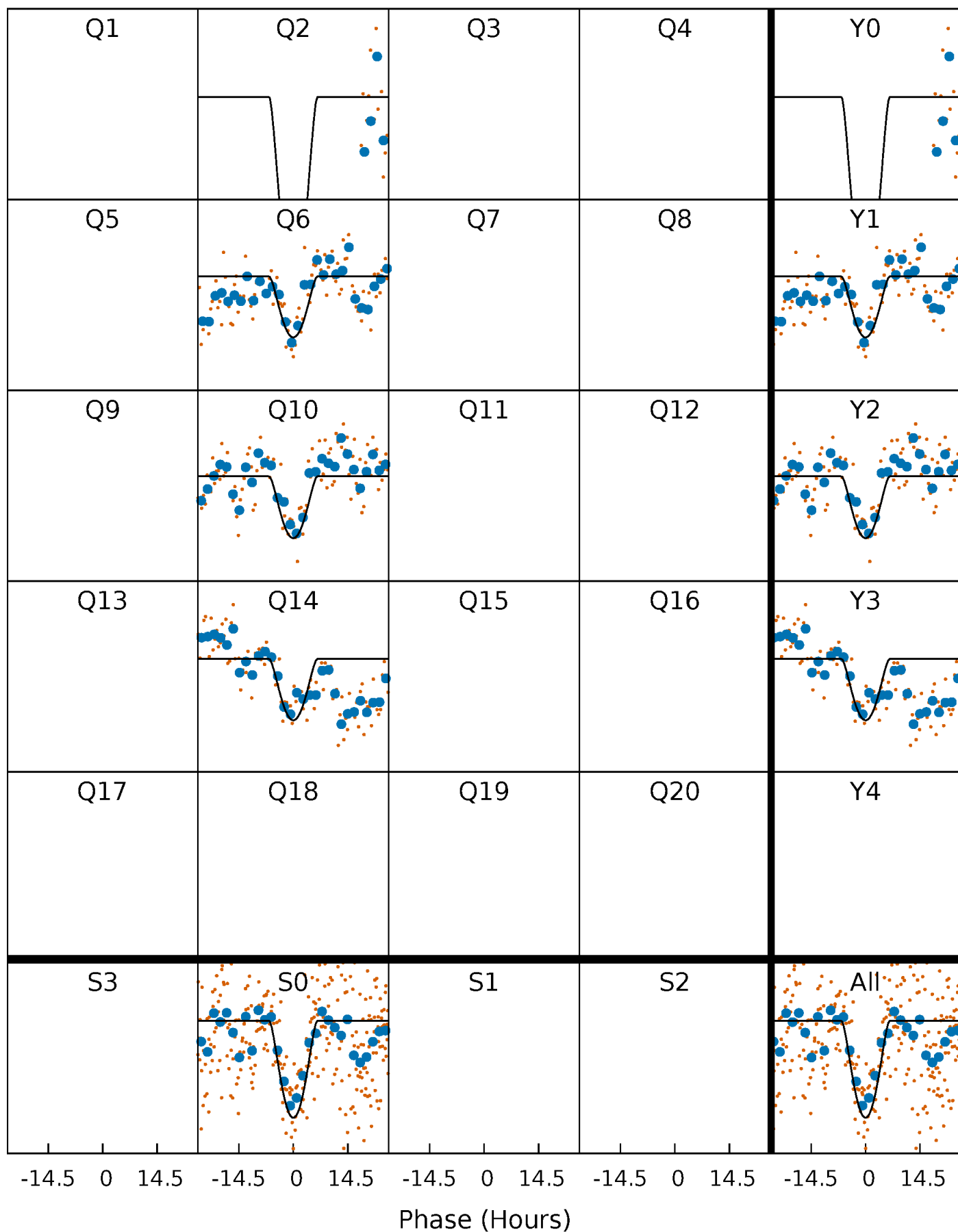
# PDC Quarter-Phased Transit Curves

TCE 008440310-01 P=366.677396 Days  $T_0=182.967230$  (BKJD)



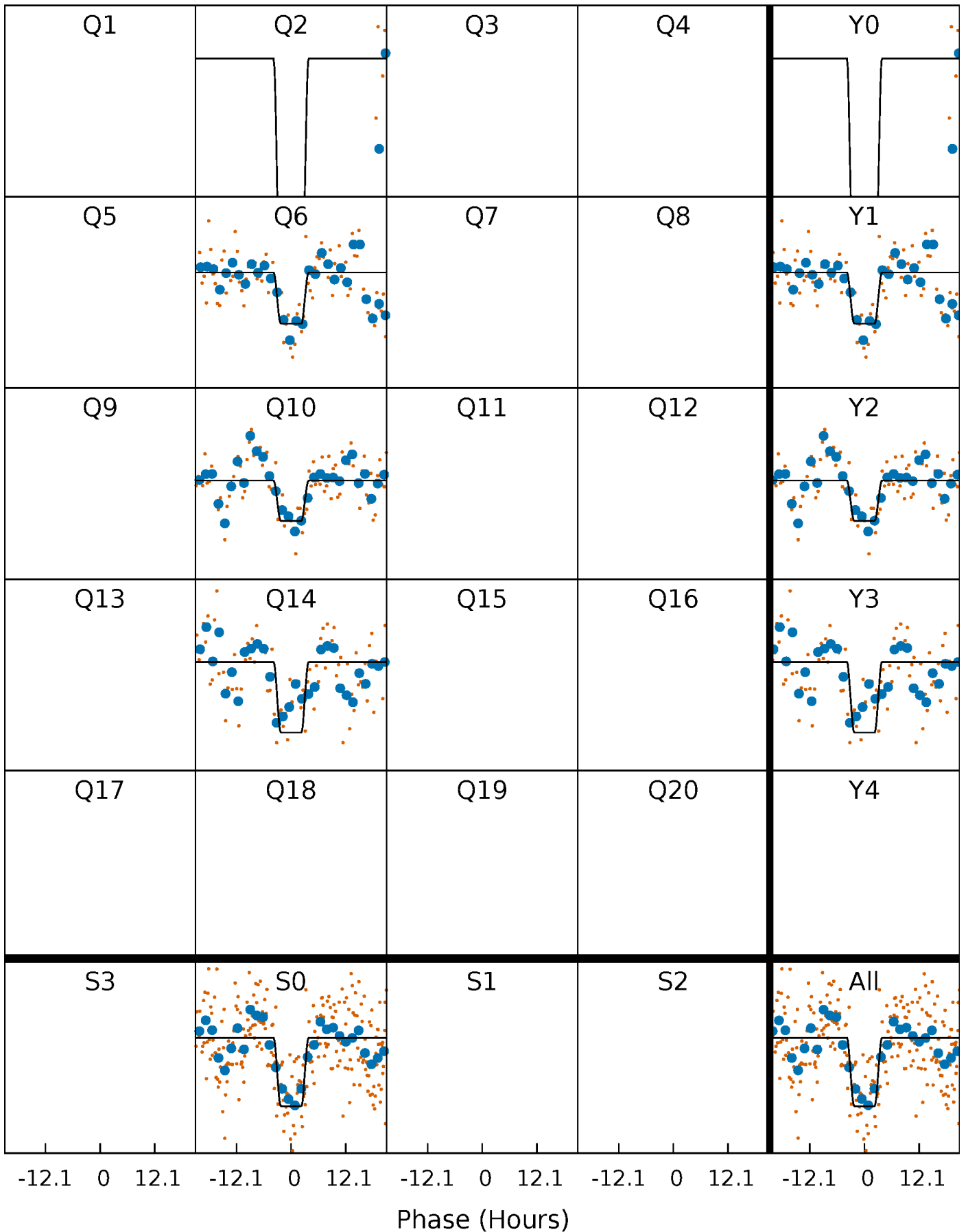
# DV Quarter-Phased Transit Curves

TCE 008440310-01 P=366.677396 Days  $T_0=182.967230$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

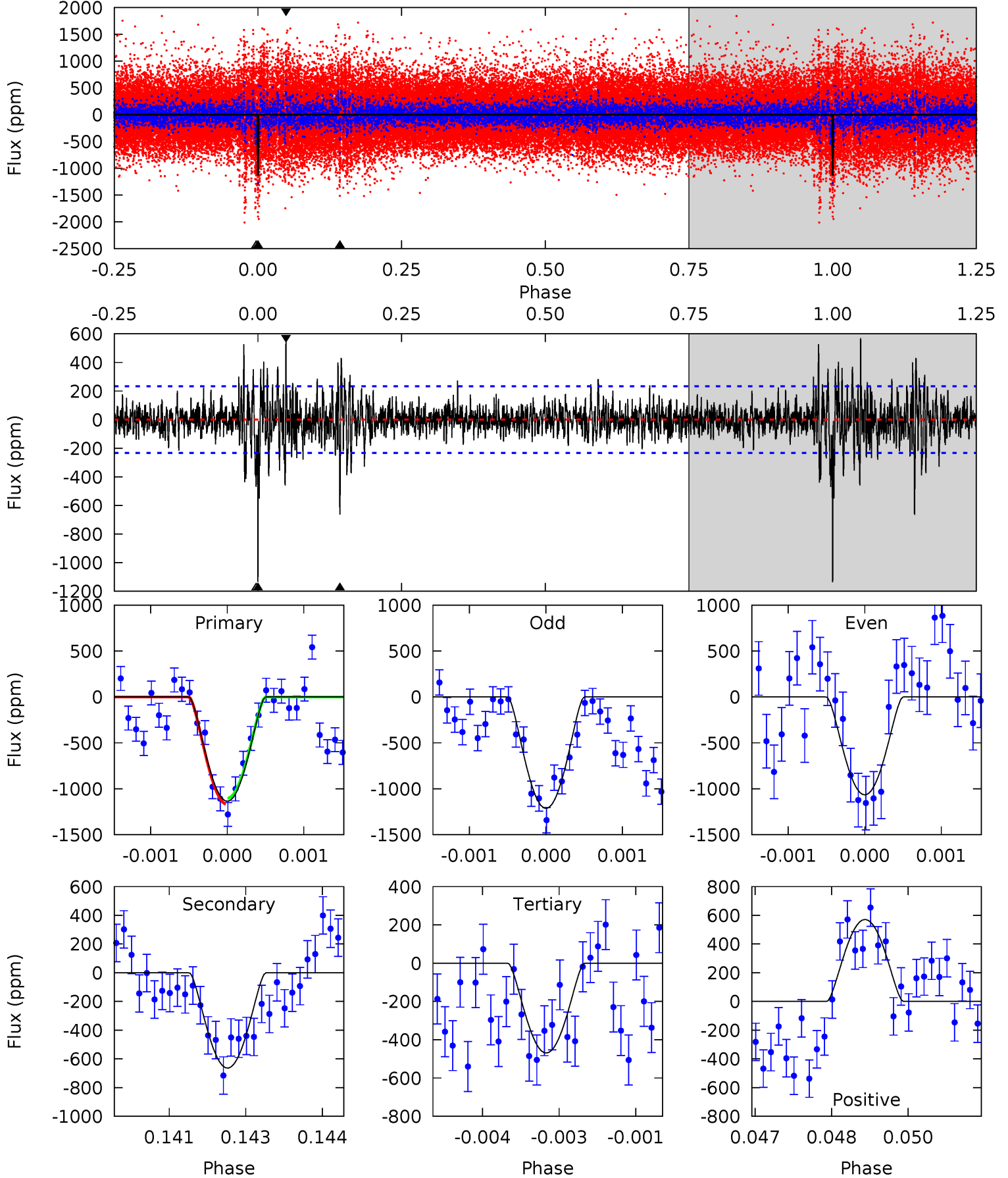
TCE 008440310-01 P=366.693857 Days  $T_0=182.937817$  (BKJD)



# DV Model-Shift Uniqueness Test

008440310-01, P = 366.677396 Days, E = 182.967230 Days

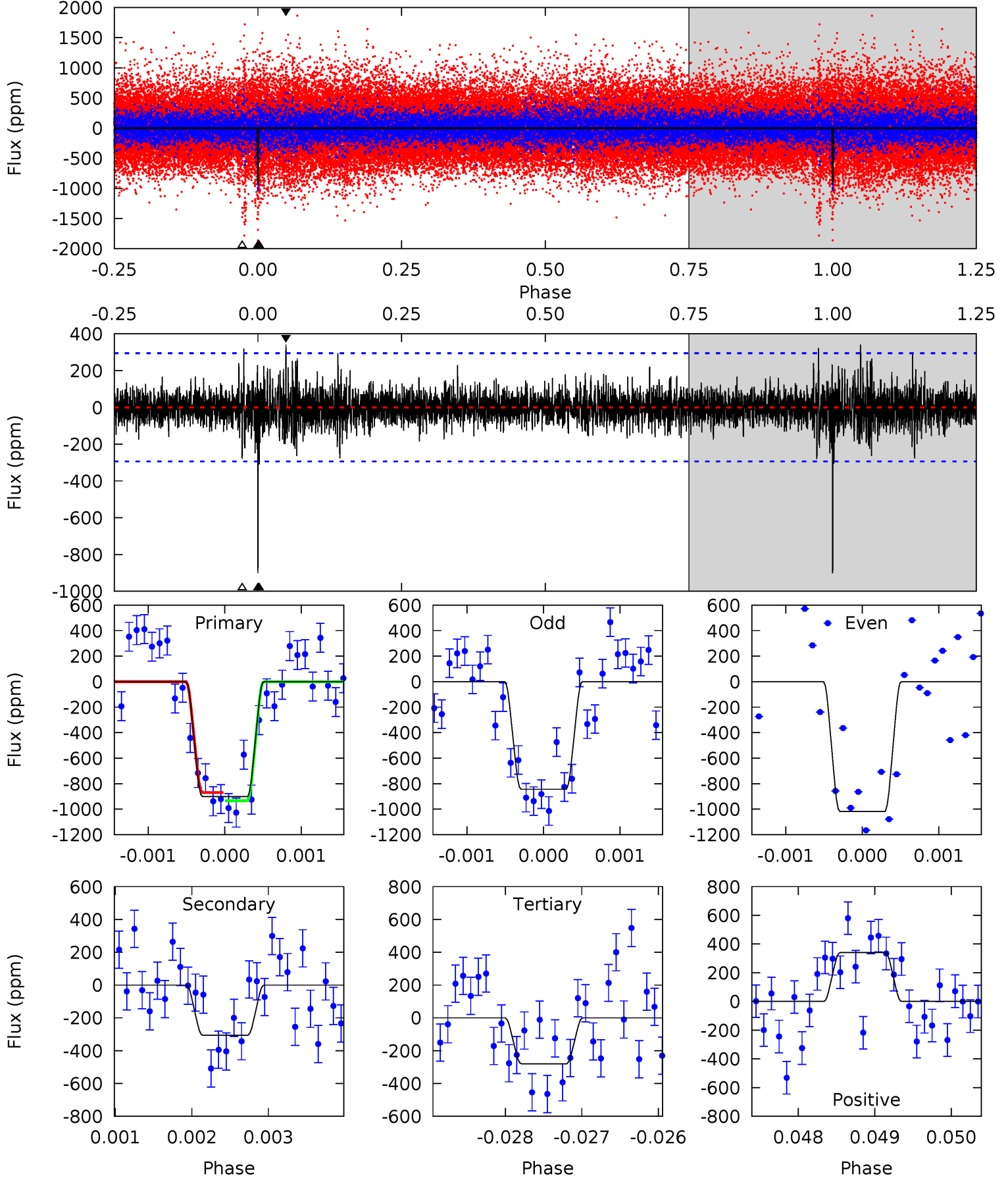
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 26.2 | 15.3 | 10.8 | 13.2 | 5.38            | 3.18            | 2.23             | 15.4    | 13.0    | 4.50    | 2.15    | 1.59    | 0.97 | 0.33  | 0.74 |



# Alt Model-Shift Uniqueness Test

008440310-01, P = 366.693857 Days, E = 182.937817 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  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 16.8 | 5.70 | 5.21 | 6.35 | 5.48            | 3.33            | 1.16             | 11.6    | 10.4    | 0.49    | -0.65   | 1.55    | 0.89 | 0.27  | 0.60 |



### Stellar Parameters For KIC 008440310

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                     | $R$ ( $R_{\odot}$ )       | $M$ ( $M_{\odot}$ )       | $p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ ) |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
|        | $5722^{+155}_{-172}$ | $4.335^{+0.190}_{-0.190}$ | $-0.260^{+0.300}_{-0.300}$ | $1.036^{+0.299}_{-0.199}$ | $0.849^{+0.130}_{-0.070}$ | $1.074^{+1.020}_{-0.517}$                     |
|        | +3%/-3%              | +4%/-4%                   | +115%/-115%                | +29%/-19%                 | +15%/-8%                  | +95%/-48%                                     |
| Source | PHO1                 | 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 008440310-01 / KOI

| Detrend | Depth (ppm)   | $R_p$ ( $R_{\oplus}$ )    | $T_{max}$ (K)     | $T_{obs}$ (K)         | $A_{obs}$              |
|---------|---------------|---------------------------|-------------------|-----------------------|------------------------|
| DV      | $-664 \pm 43$ | $16.41^{+17.24}_{-11.26}$ | $367^{+25}_{-23}$ | $3046^{+1425}_{-504}$ | $1224^{+11759}_{-934}$ |
| Alt.    | $-306 \pm 54$ | $15.77^{+16.46}_{-10.82}$ | $367^{+32}_{-24}$ | $2760^{+1172}_{-460}$ | $621^{+5274}_{-487}$   |

$T_{max}$  = Theoretical Maximum Planetary Temperature

$T_{obs}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{obs}$  = Observed Albedo (Assuming  $T=0$ )

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

## DV Centroid Data

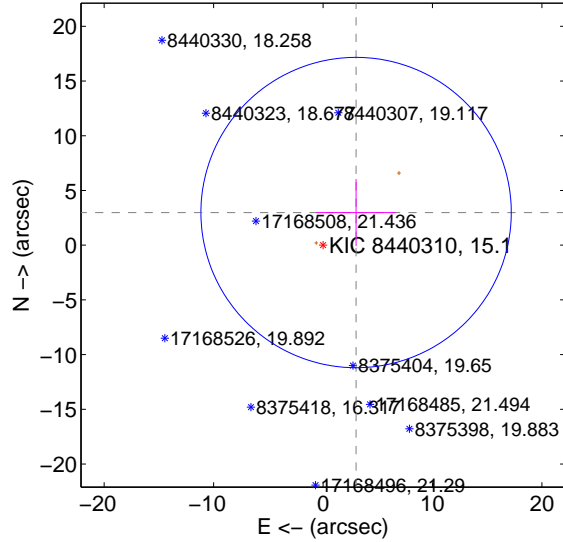
Supplemental centroid analysis for 008440310-01. Kepler magnitude: 15.10. Transit SNR 8.80

There are 0 quarters with good PRF difference image offsets

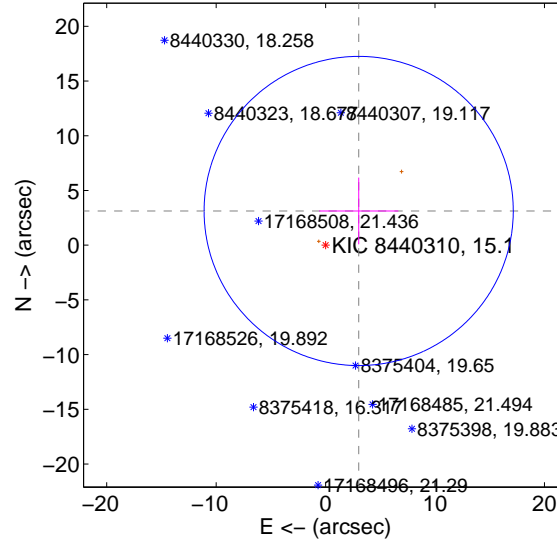
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec      |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT          | $4.244 \pm 4.726$  | 0.90                | $-3.020 \pm 3.621$ | $2.982 \pm 3.060$ |
| PRF-fit source offset from KIC position | $4.349 \pm 4.708$  | 0.92                | $-3.025 \pm 3.620$ | $3.125 \pm 3.049$ |
| photometric centroid source offset      | $1.54 \pm 2.11$    | 0.73                | $1.22 \pm 2.12$    | $-0.93 \pm 2.08$  |

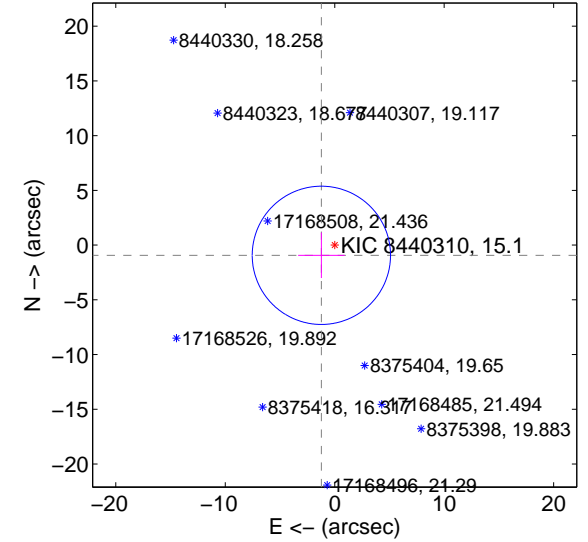
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

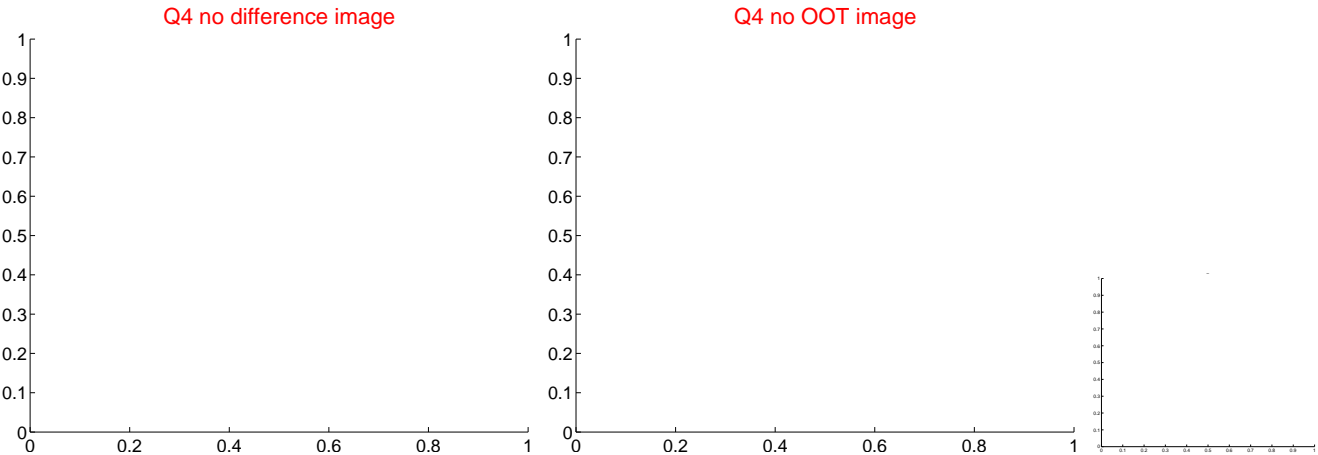
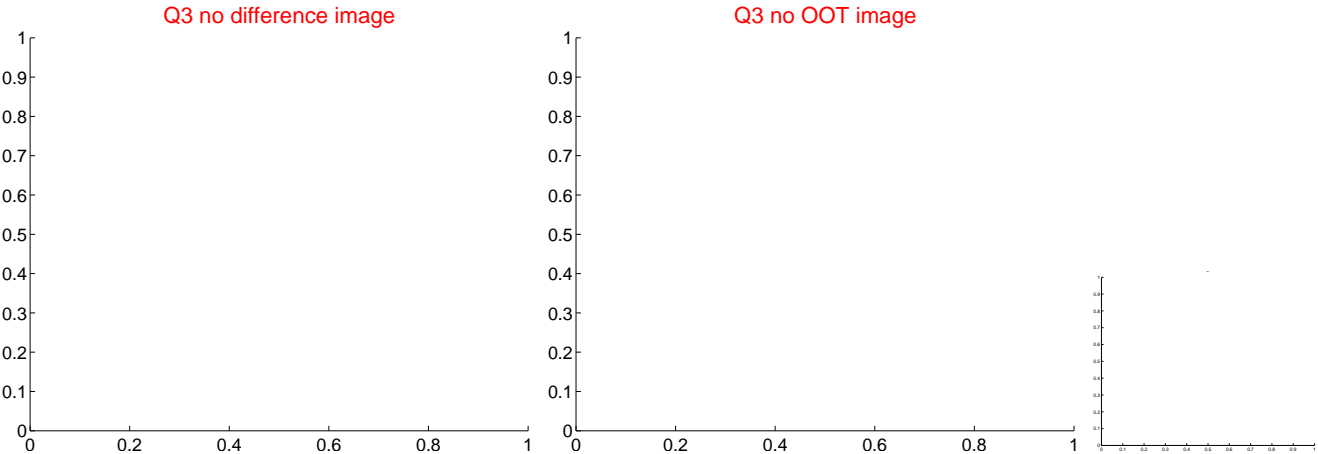
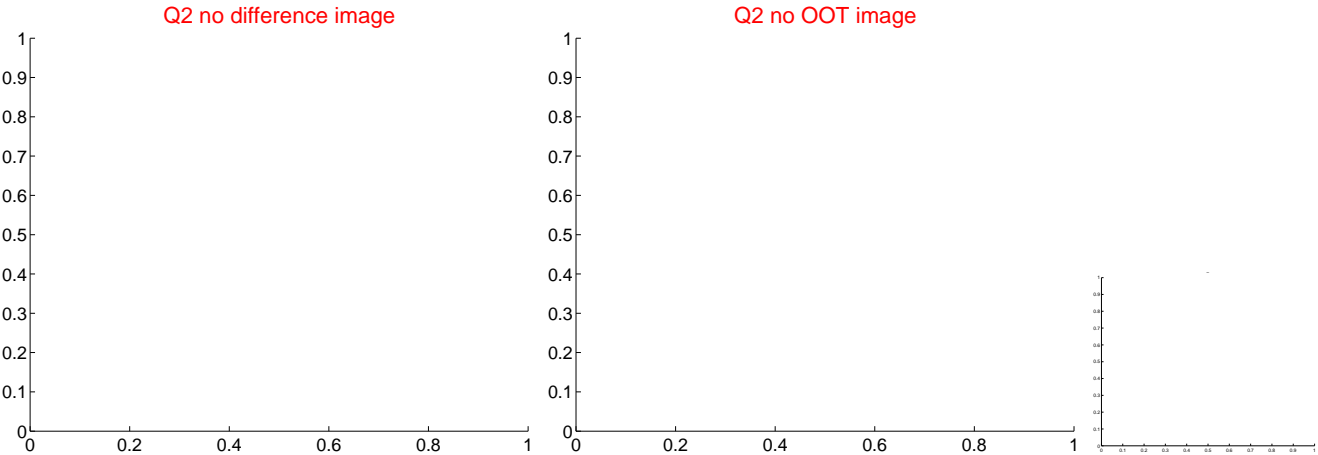
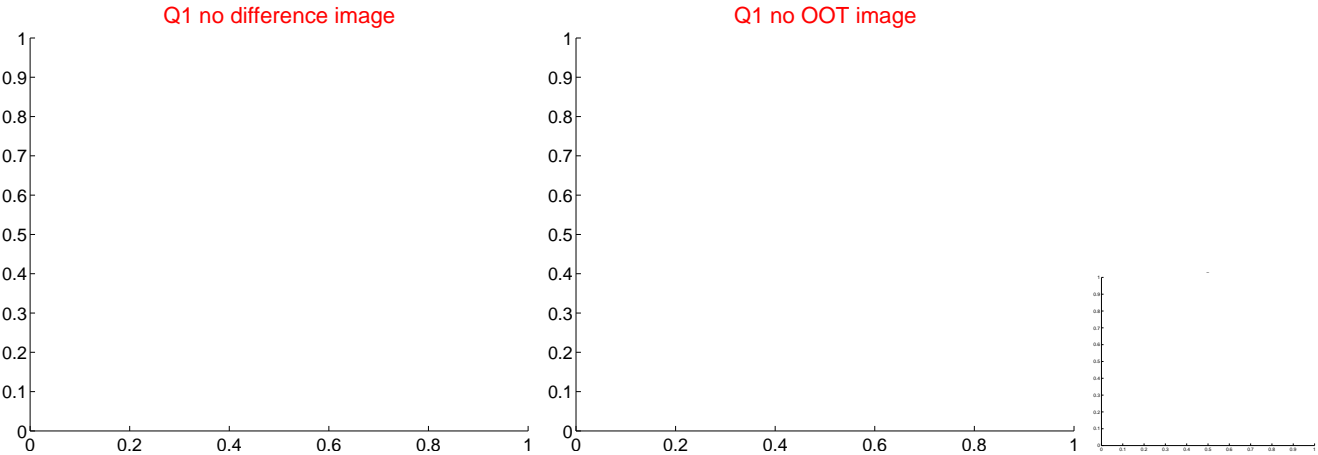


offset from photometric centroids

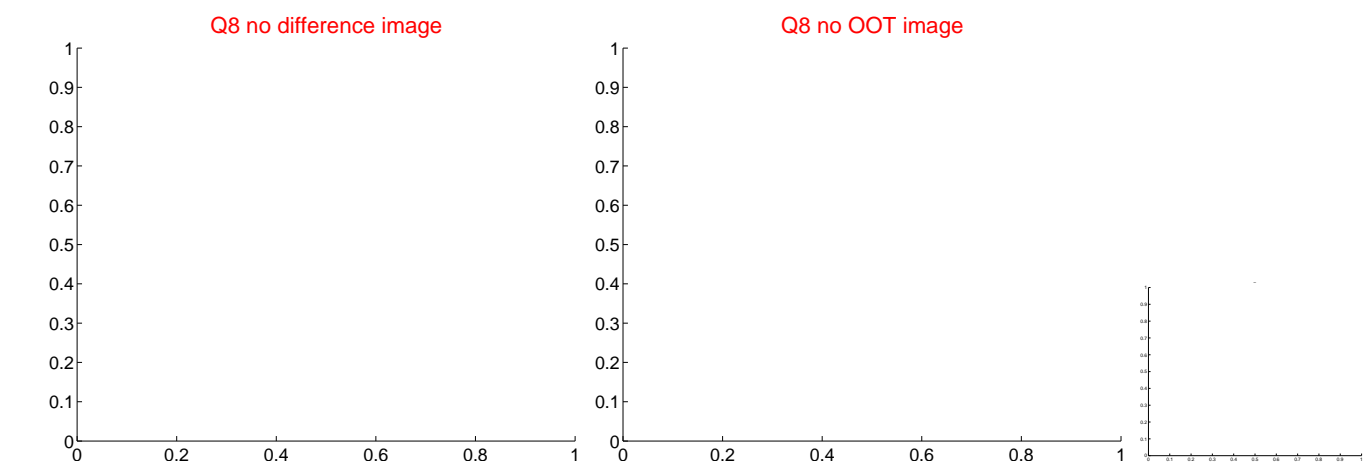
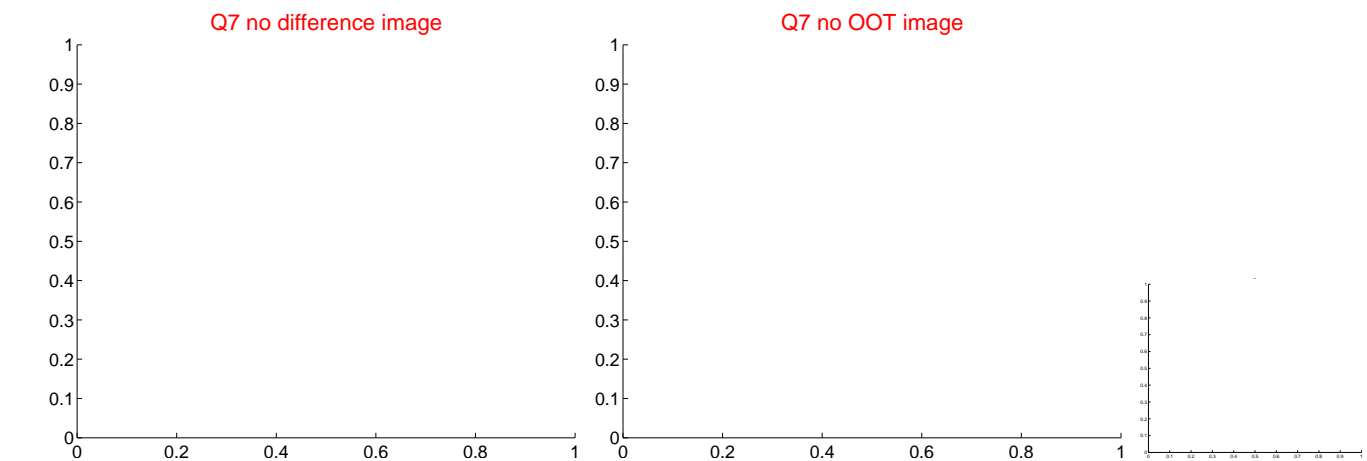
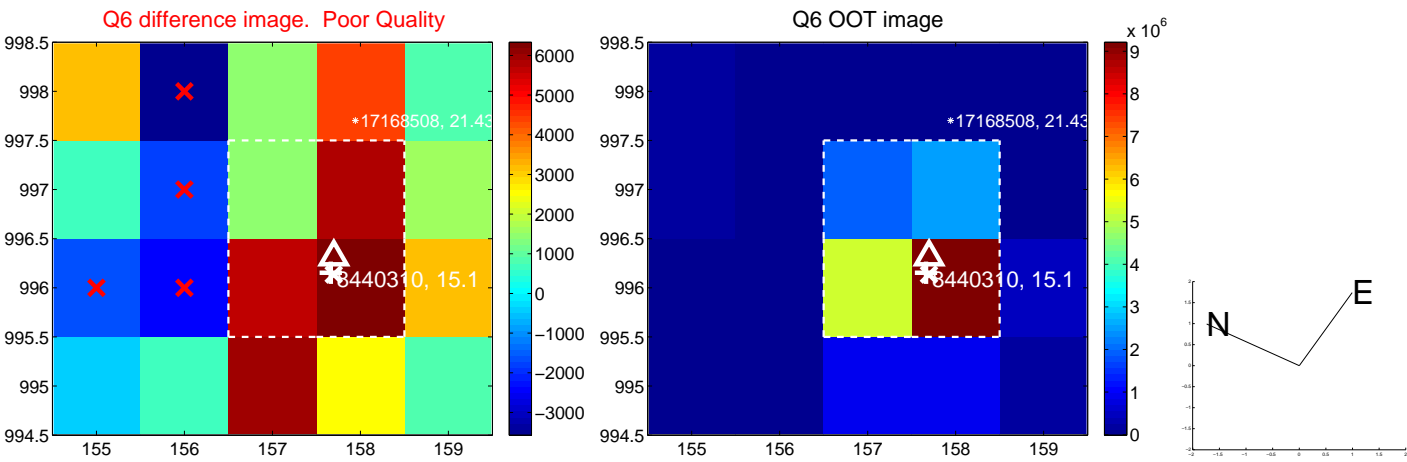
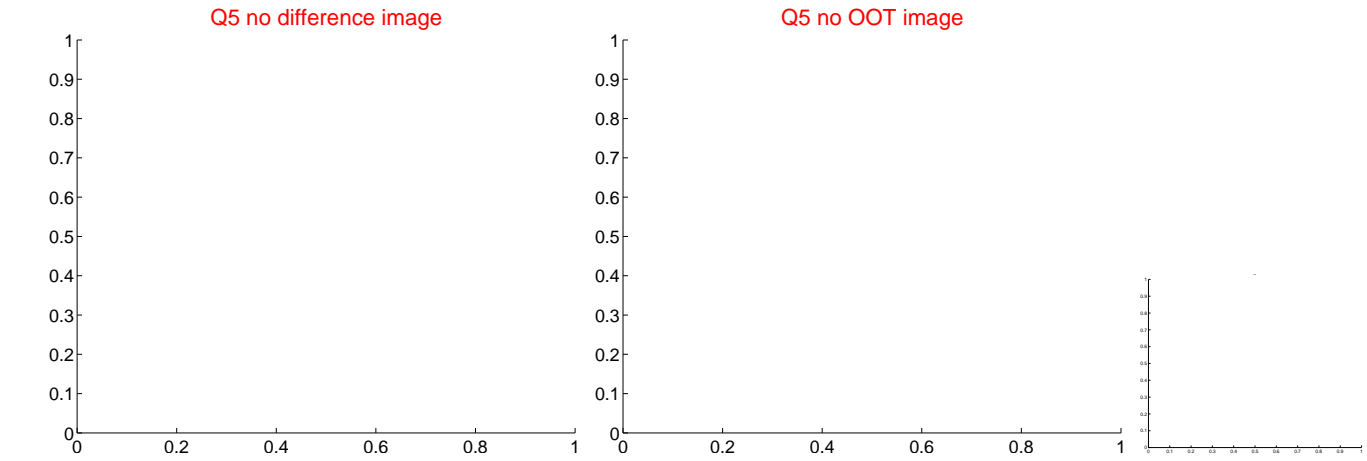


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . 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.

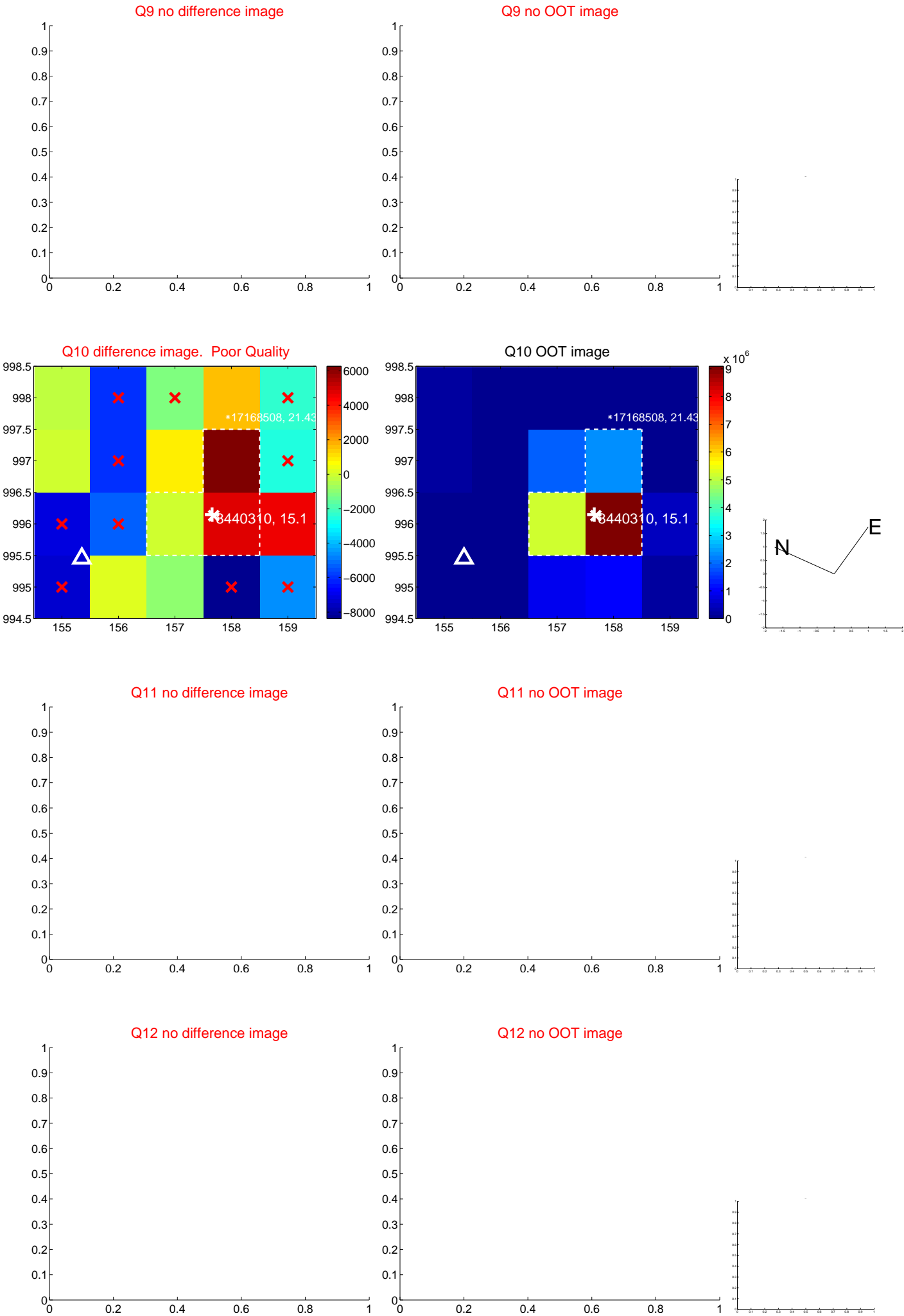
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



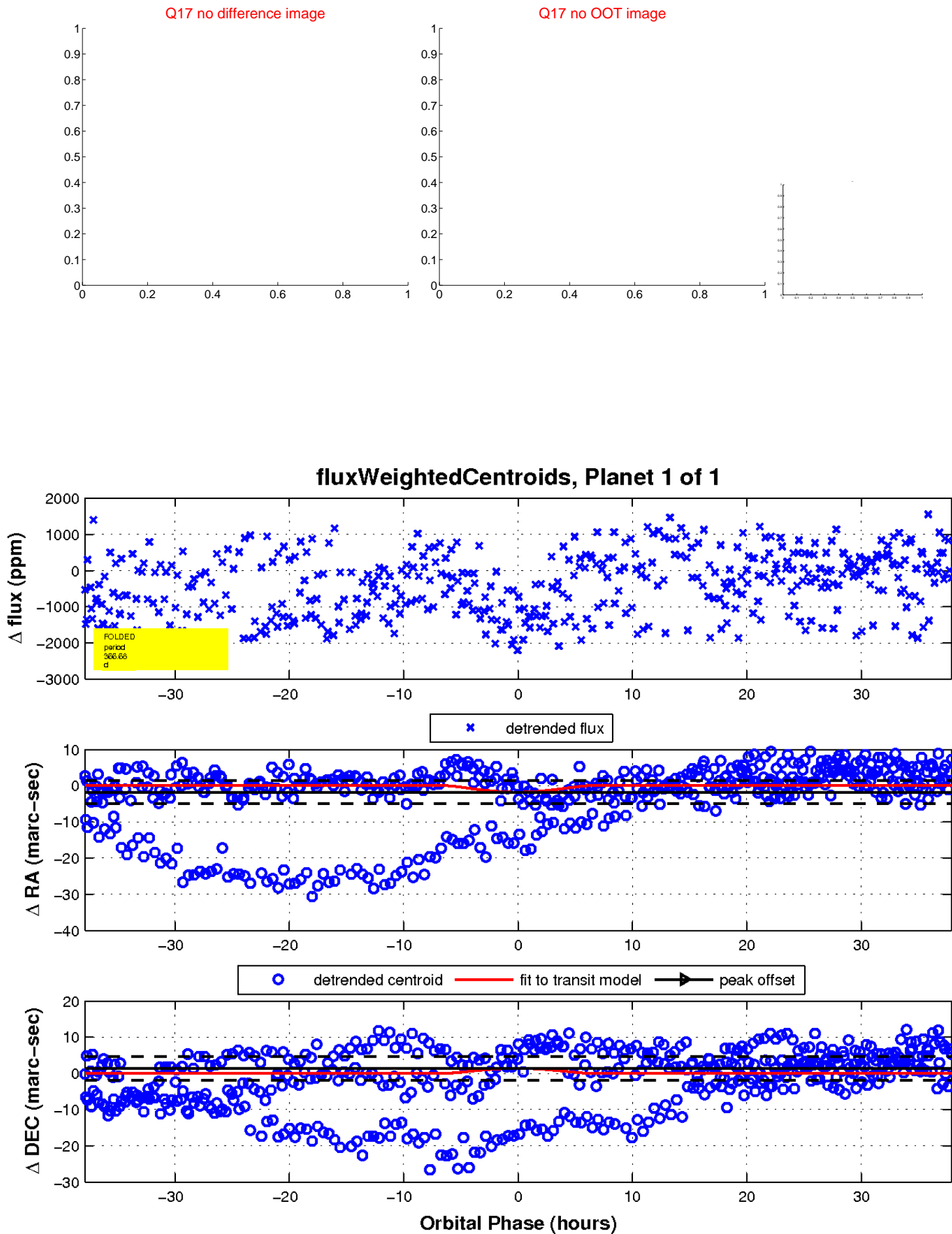
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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



UKIRT Image

Declination

