

# KIC 009324246

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 009324246-01 | OBS      | No   | 370.307941    | 308.389860   | 361.6       | 13.723           | 7.5 | 7.8 | 0.69                        | 5421            | 1.41                   | 0.48                   |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments  |
|--------------|----------|------|-------|---|---|---|---|---|
| 009324246-01 | OBS      | FP   | 0.00  | 1 | 0 | 1 | 0 | INDIV_TRANS_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—CENT_FEW_DIFFS—HALO_GHOST |

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

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

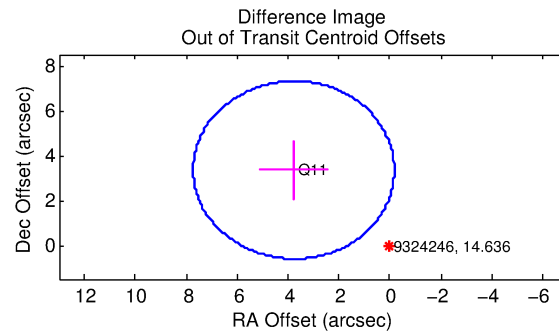
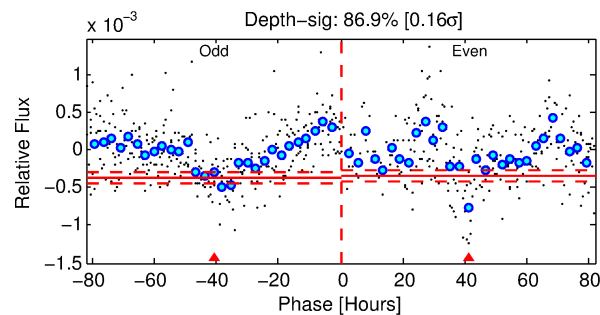
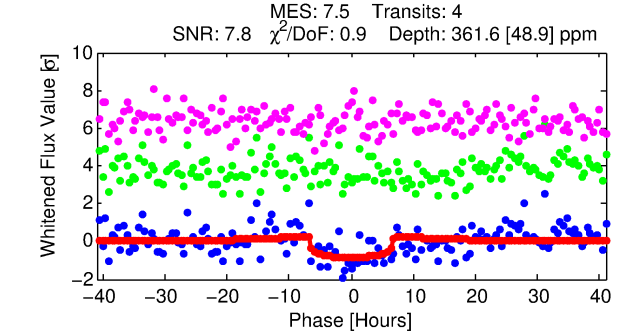
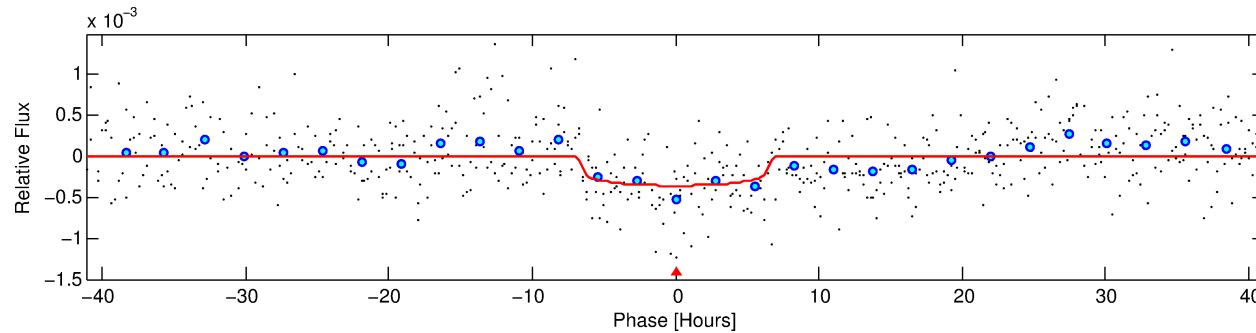
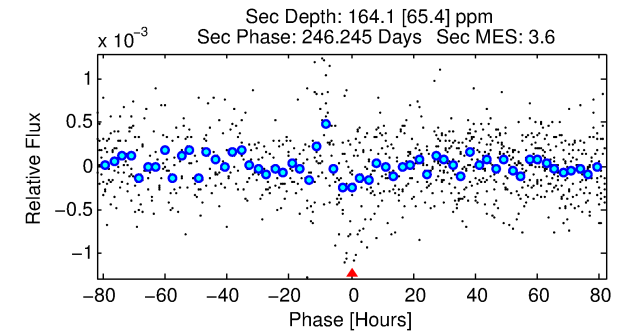
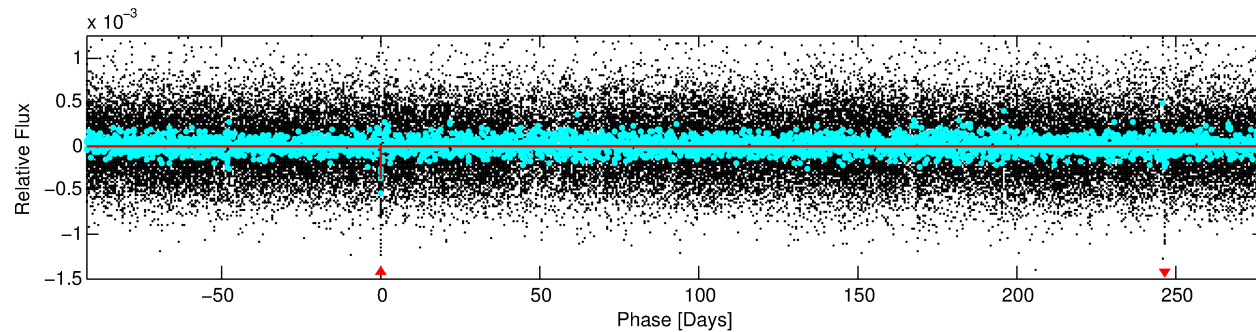
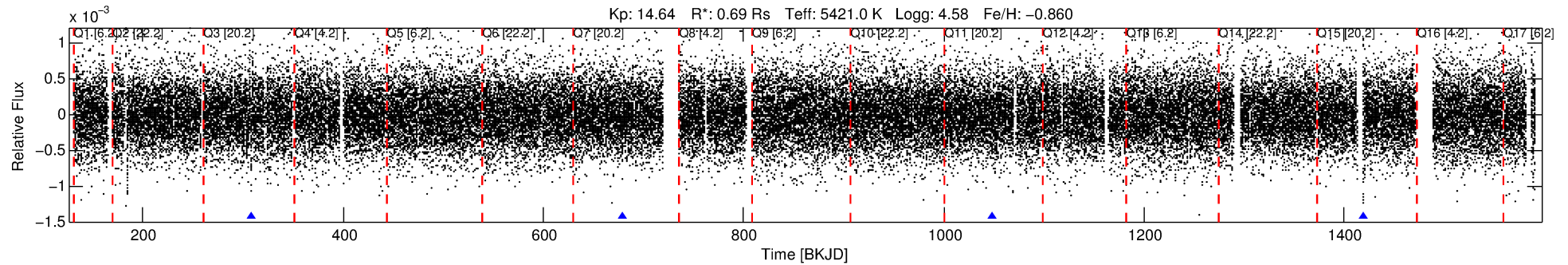
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009324246-01

No Significant Match Found

# DV One-Page Summary

KIC: 9324246 Candidate: 1 of 1 Period: 370.308 d



## DV Fit Results:

Period = 370.30794 [0.01170] d  
Epoch = 308.3899 [0.0209] BKJD  
Rp/R\* = 0.0187 [0.0086]  
a/R\* = 149.99 [313.30]  
b = 0.71 [1.45]  
Seff = 0.48 [0.09]  
Teq = 212 [10] K  
Rp = 1.41 [0.67] Re  
a = 0.8802 [0.0867] AU  
Ag = 35073.35 [35418.35] [0.99 $\sigma$ ]  
Teff = 4490 [1130] K [3.79 $\sigma$ ]

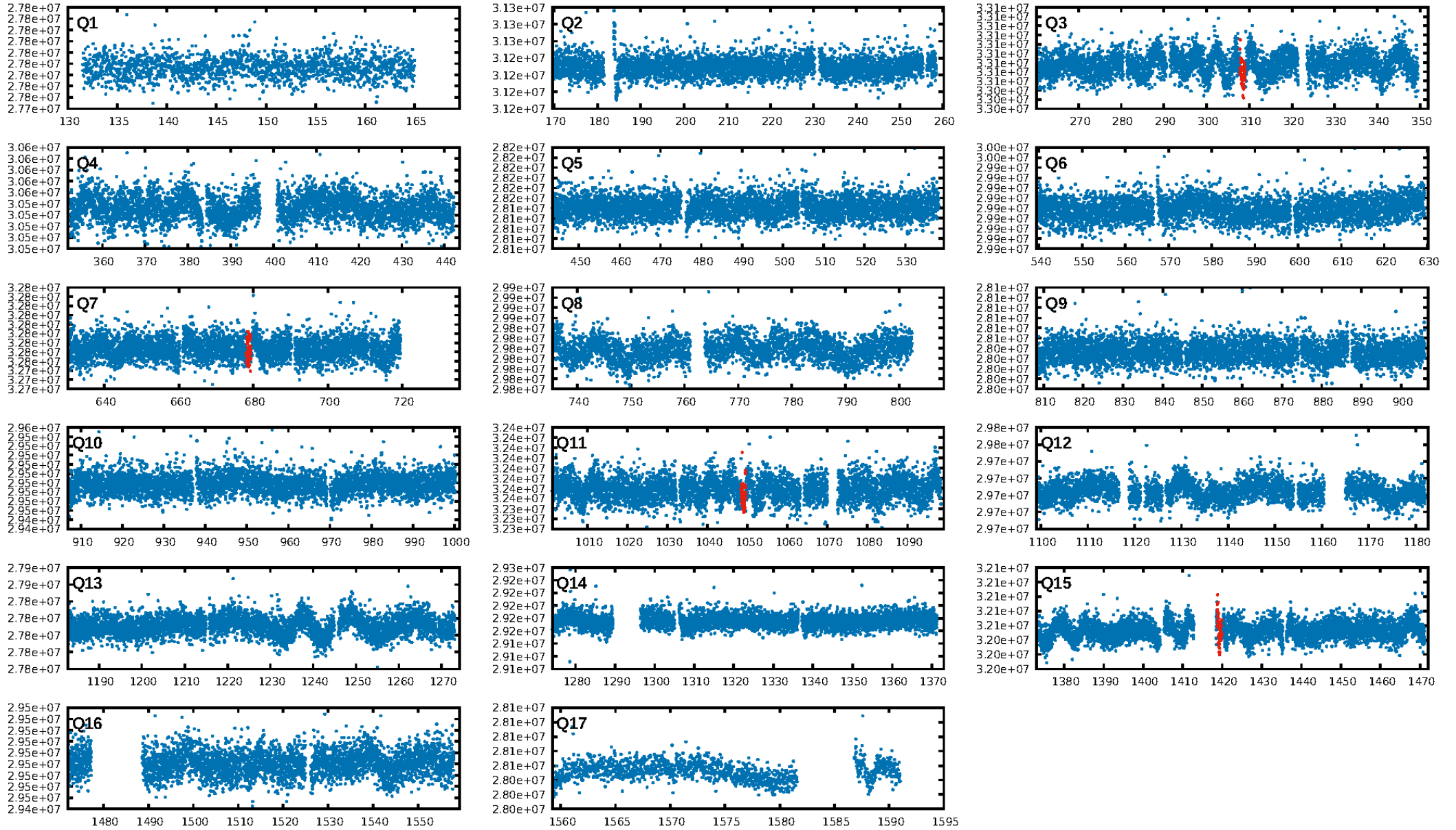
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 22.0%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 1.83e-11**  
RollingBand-fgt: 1.00 [4/4]  
**GhostDiagnostic-chr: -0.06661**  
Centroid-sig: 36.7%  
Centroid-so: 2.532 arcsec [1.07 $\sigma$ ]  
**OotOffset-rm: 5.044 arcsec [3.83 $\sigma$ ]**  
**KicOffset-rm: 5.147 arcsec [3.90 $\sigma$ ]**  
OotOffset-st: 0/1/0/0 [1]  
KicOffset-st: 0/1/0/0 [1]  
DiffImageQuality-fgm: 0.00 [0/1]  
DiffImageOverlap-fno: 1.00 [3/3]

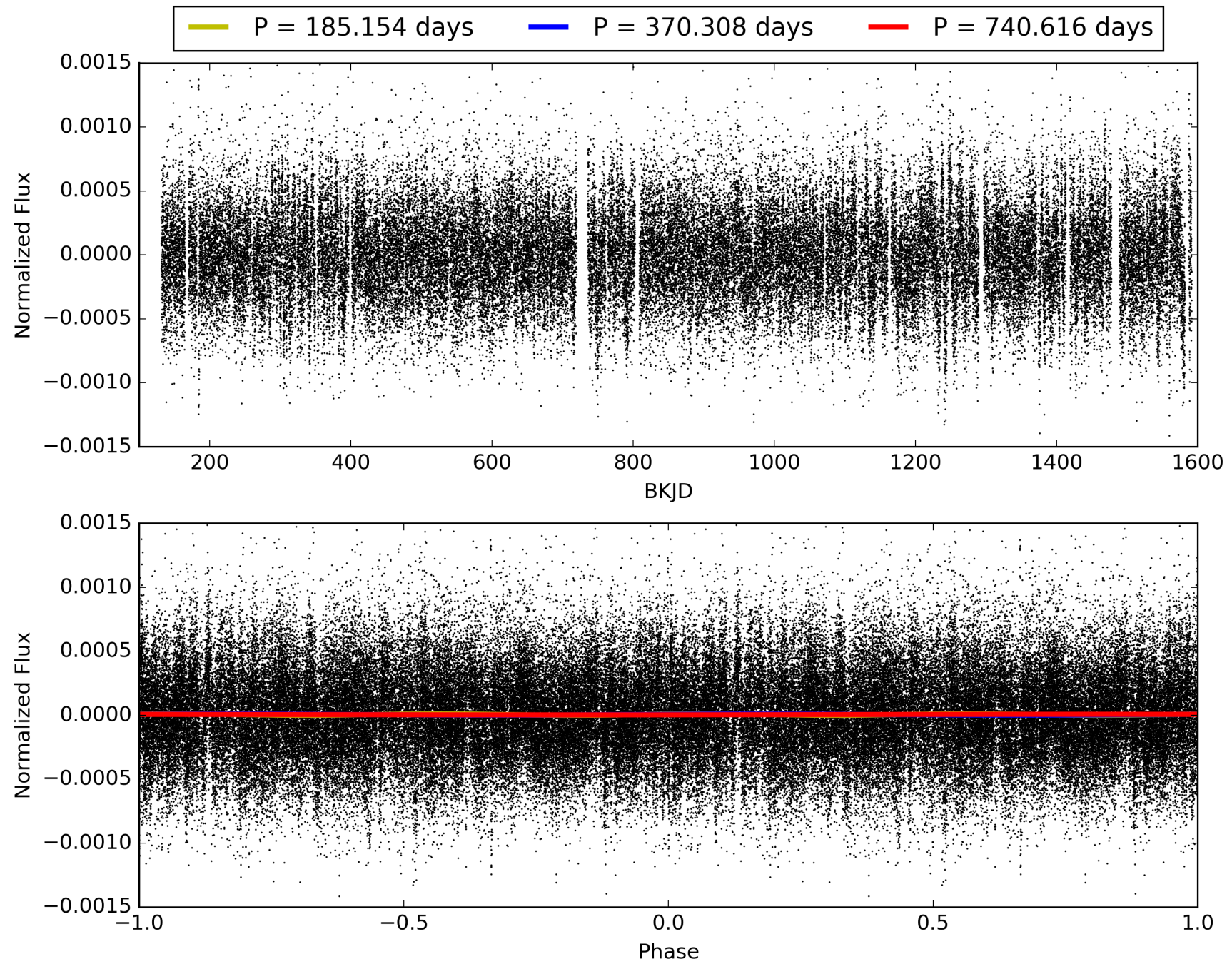
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 28-Jan-2016 21:17:45 Z

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

# TCE 009324246-01, PDC Light Curves

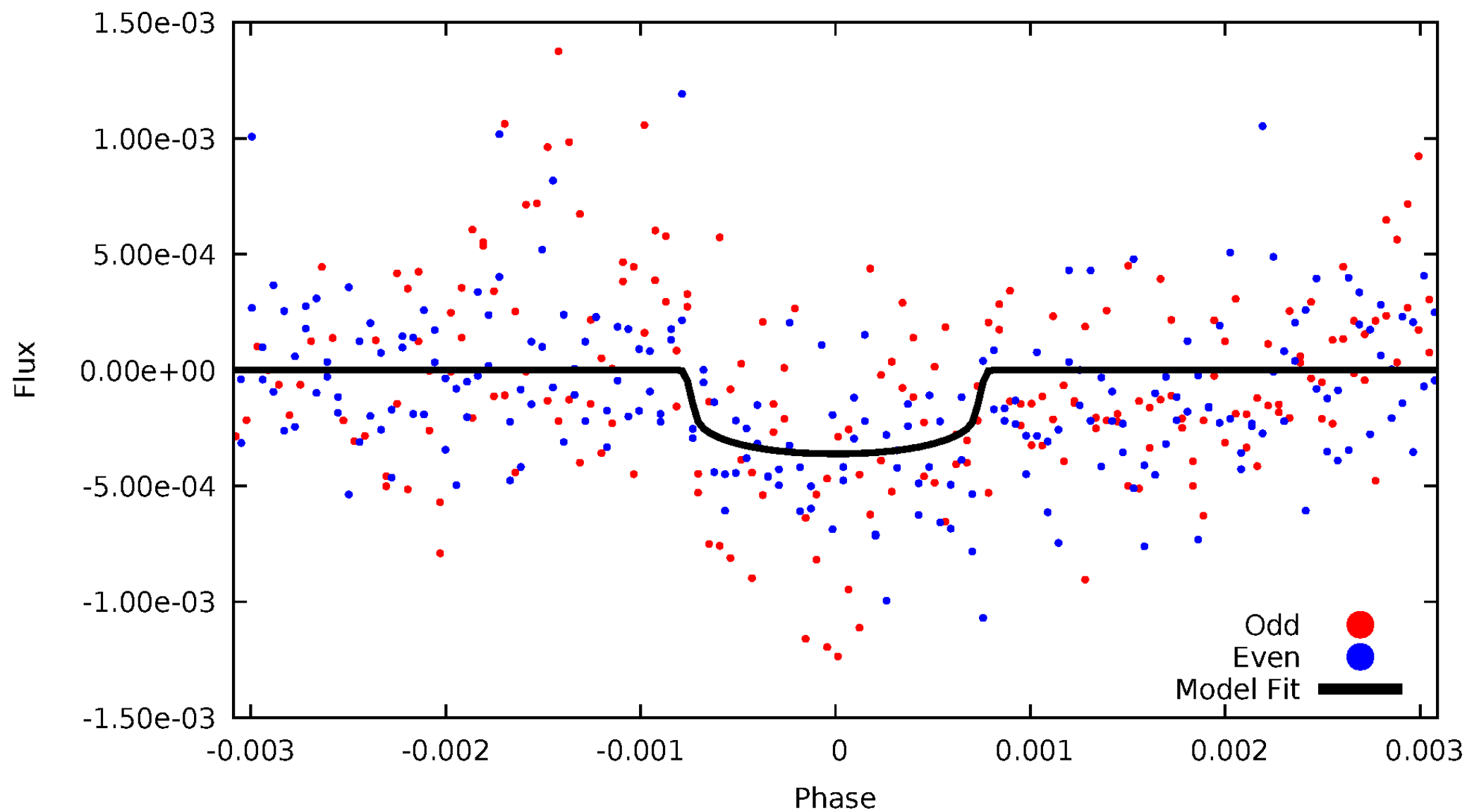


TCE 009324246-01



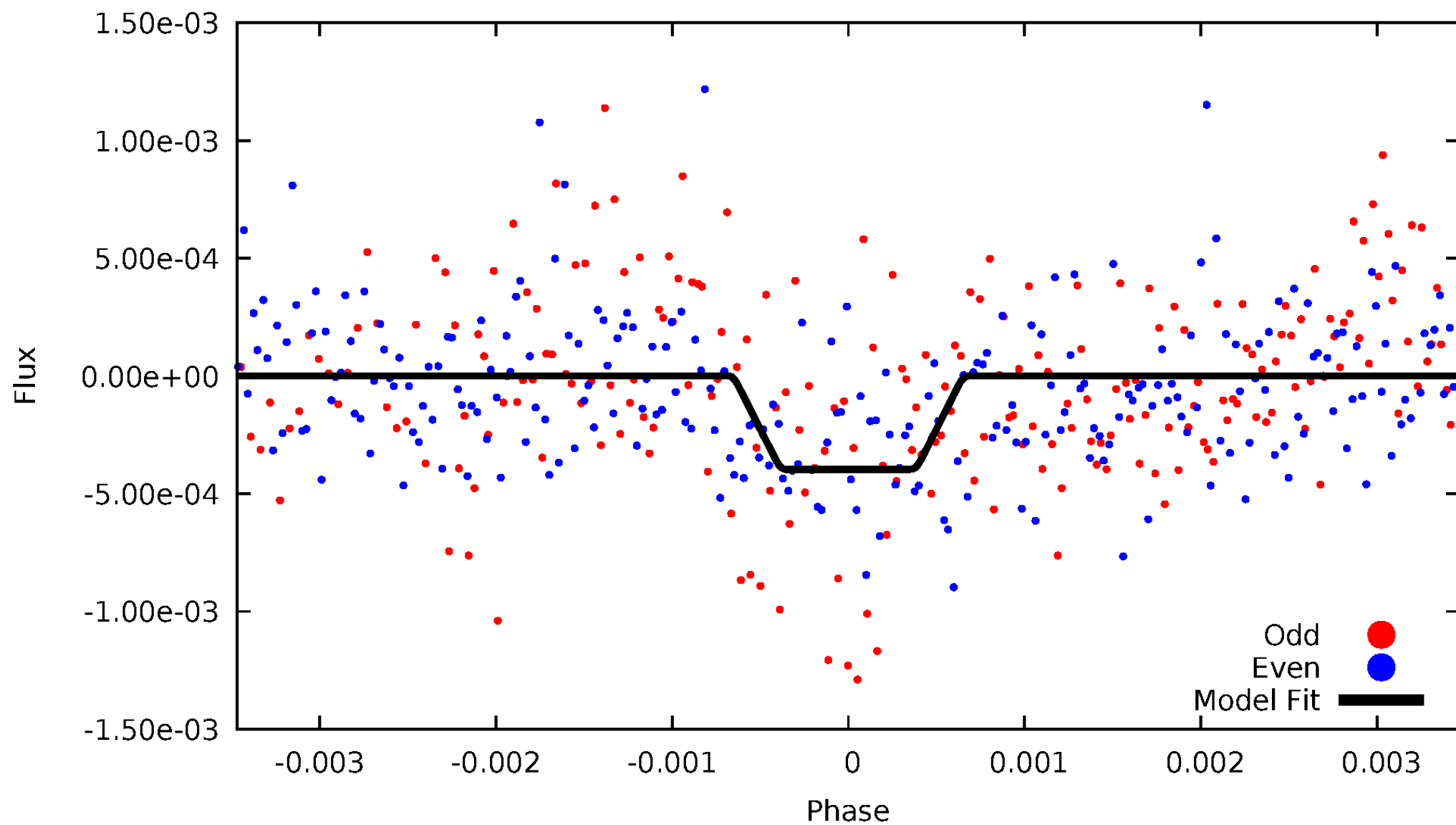
# DV Odd/Even

TCE 009324246-01



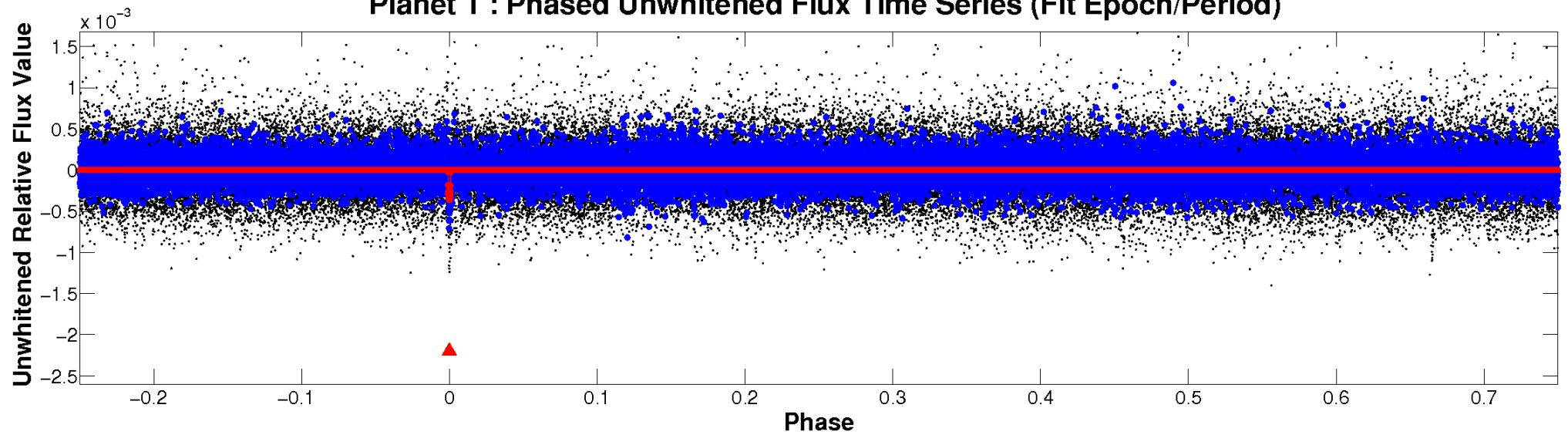
# ALT Odd/Even

TCE 009324246-01

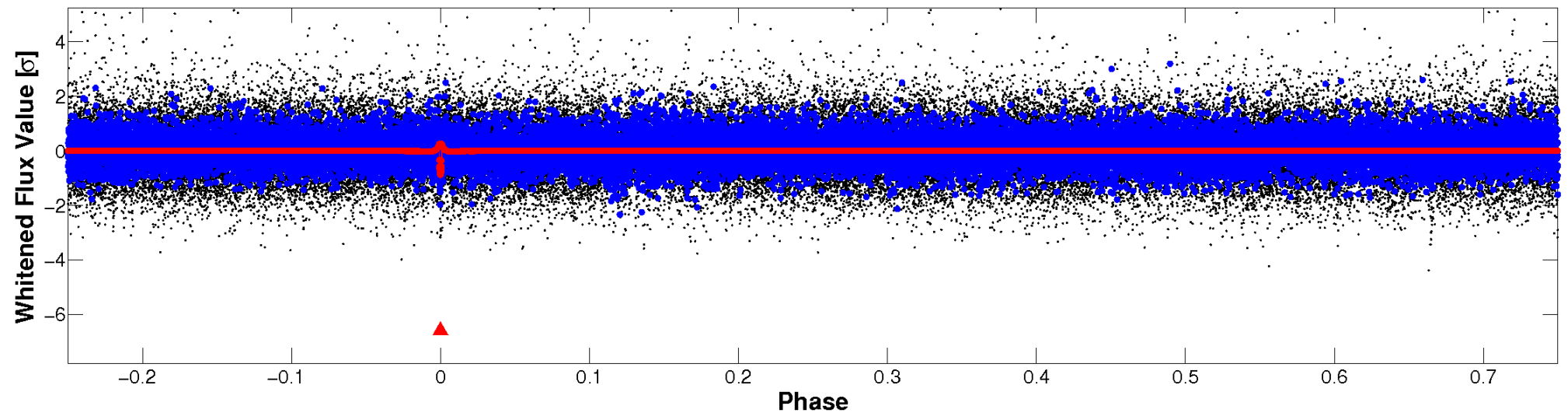


# Non-Whitened Vs. Whitened Light Curve

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

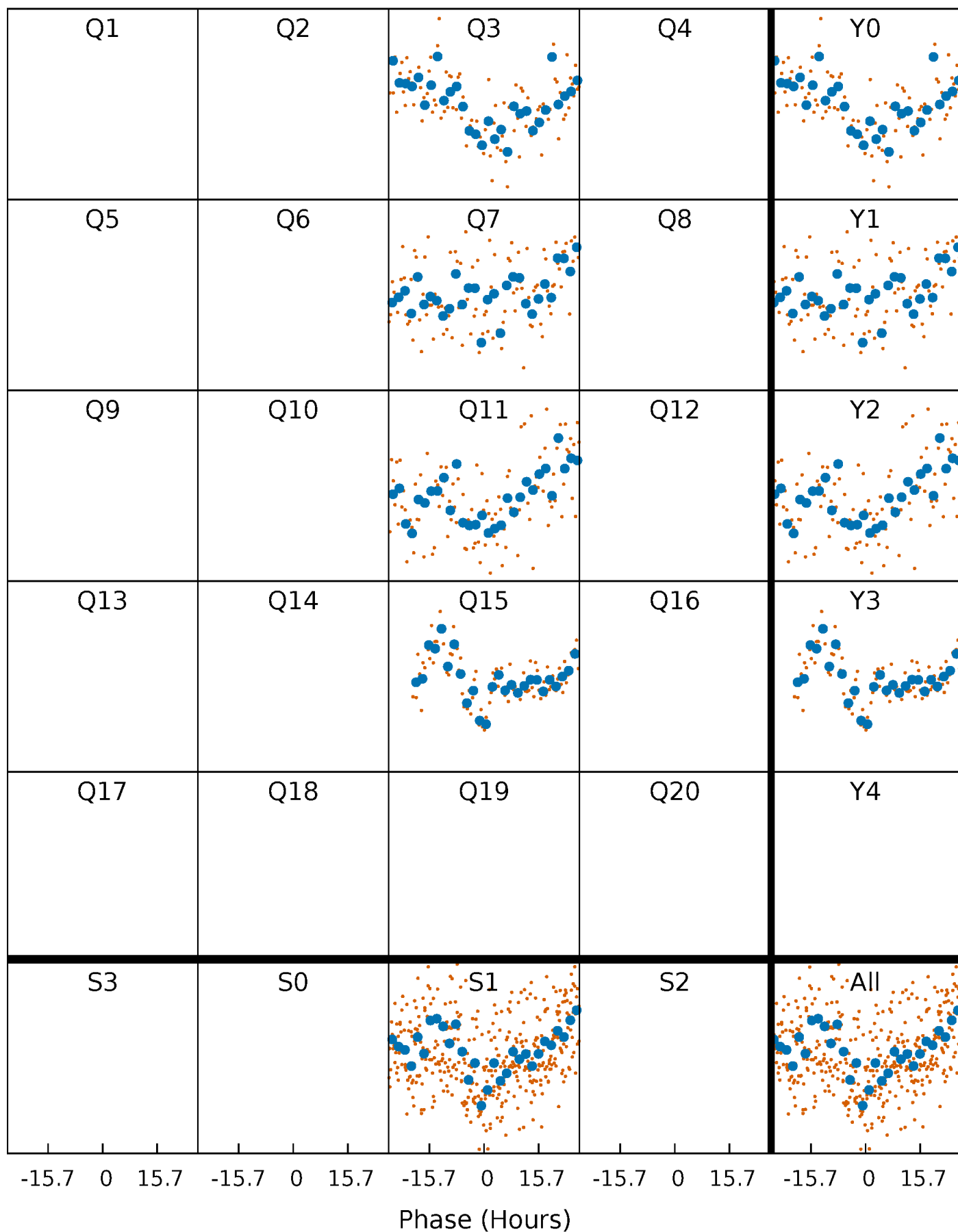


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



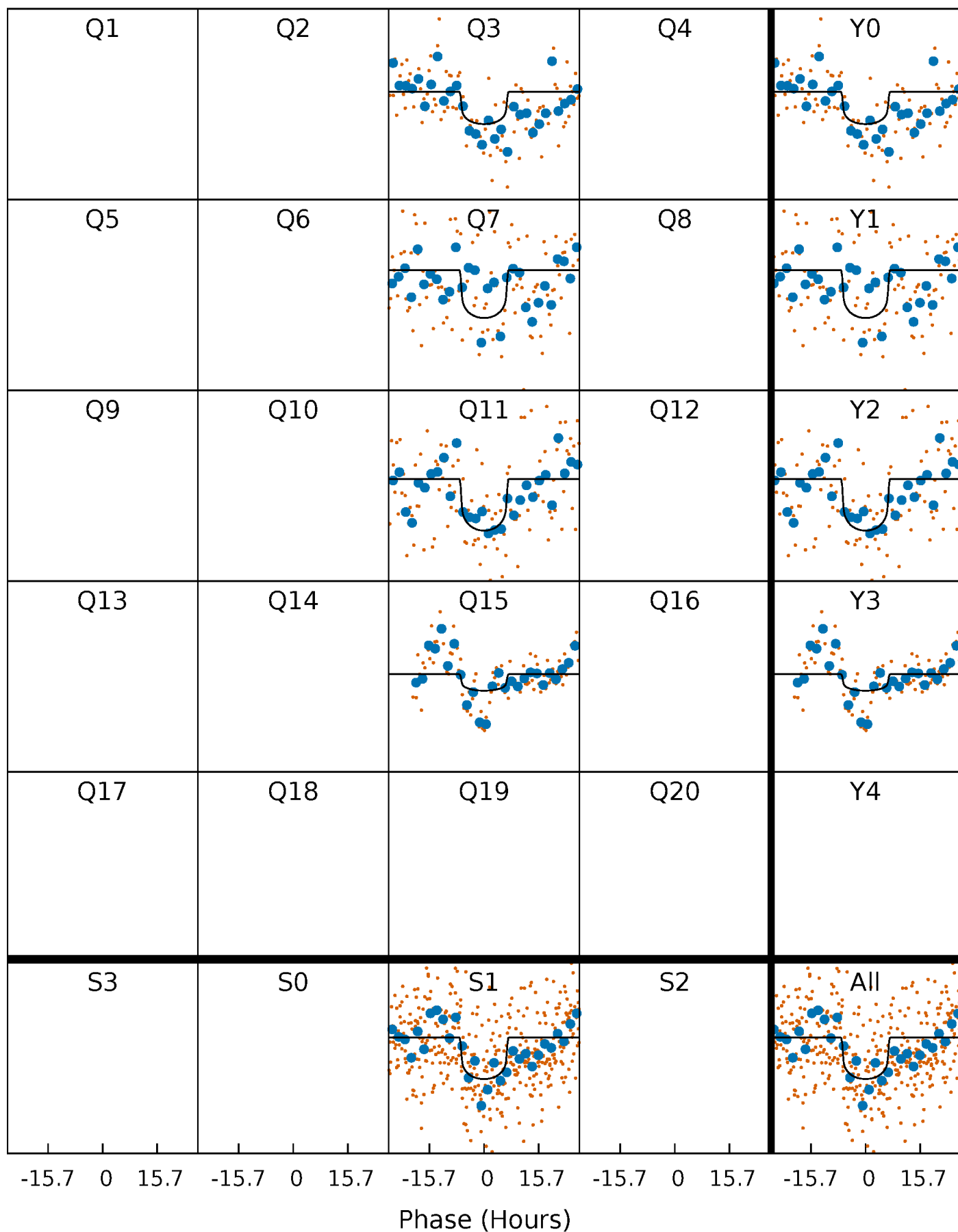
# PDC Quarter-Phased Transit Curves

TCE 009324246-01 P=370.307941 Days  $T_0=308.389860$  (BKJD)



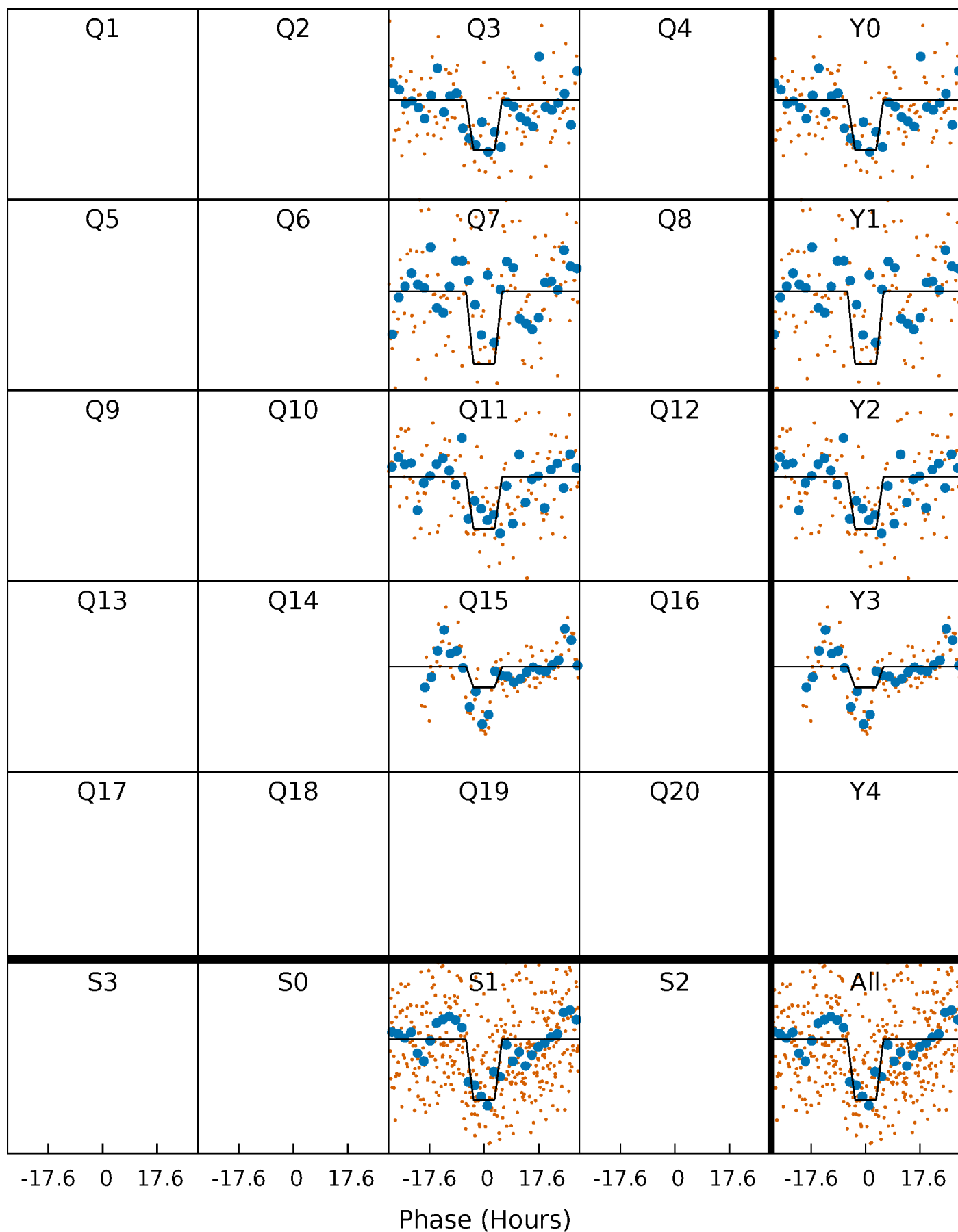
# DV Quarter-Phased Transit Curves

TCE 009324246-01 P=370.307941 Days  $T_0=308.389860$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

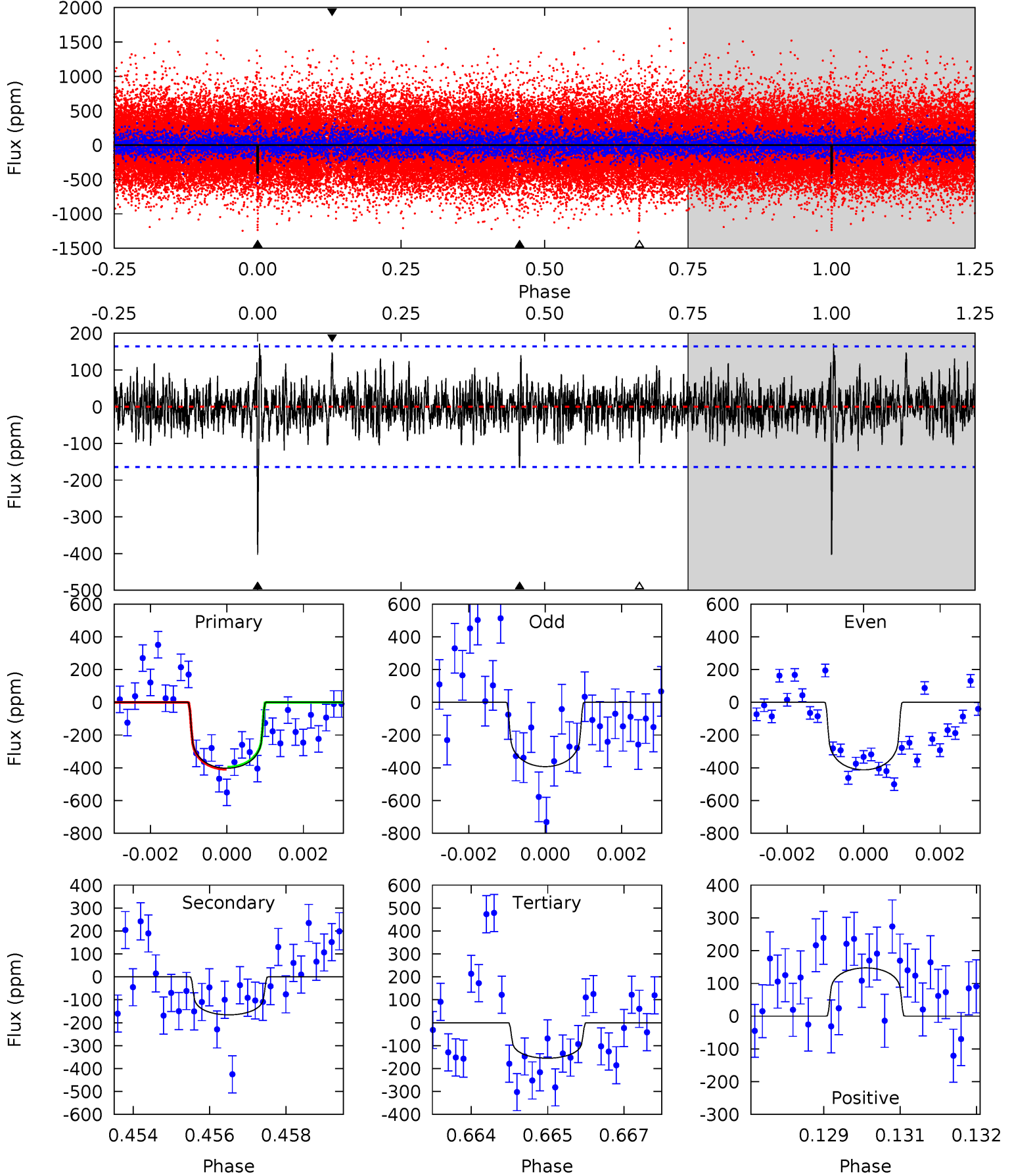
TCE 009324246-01     $P=370.283352$  Days     $T_0=308.448934$  (BKJD)



# DV Model-Shift Uniqueness Test

009324246-01, P = 370.307941 Days, E = 308.389860 Days

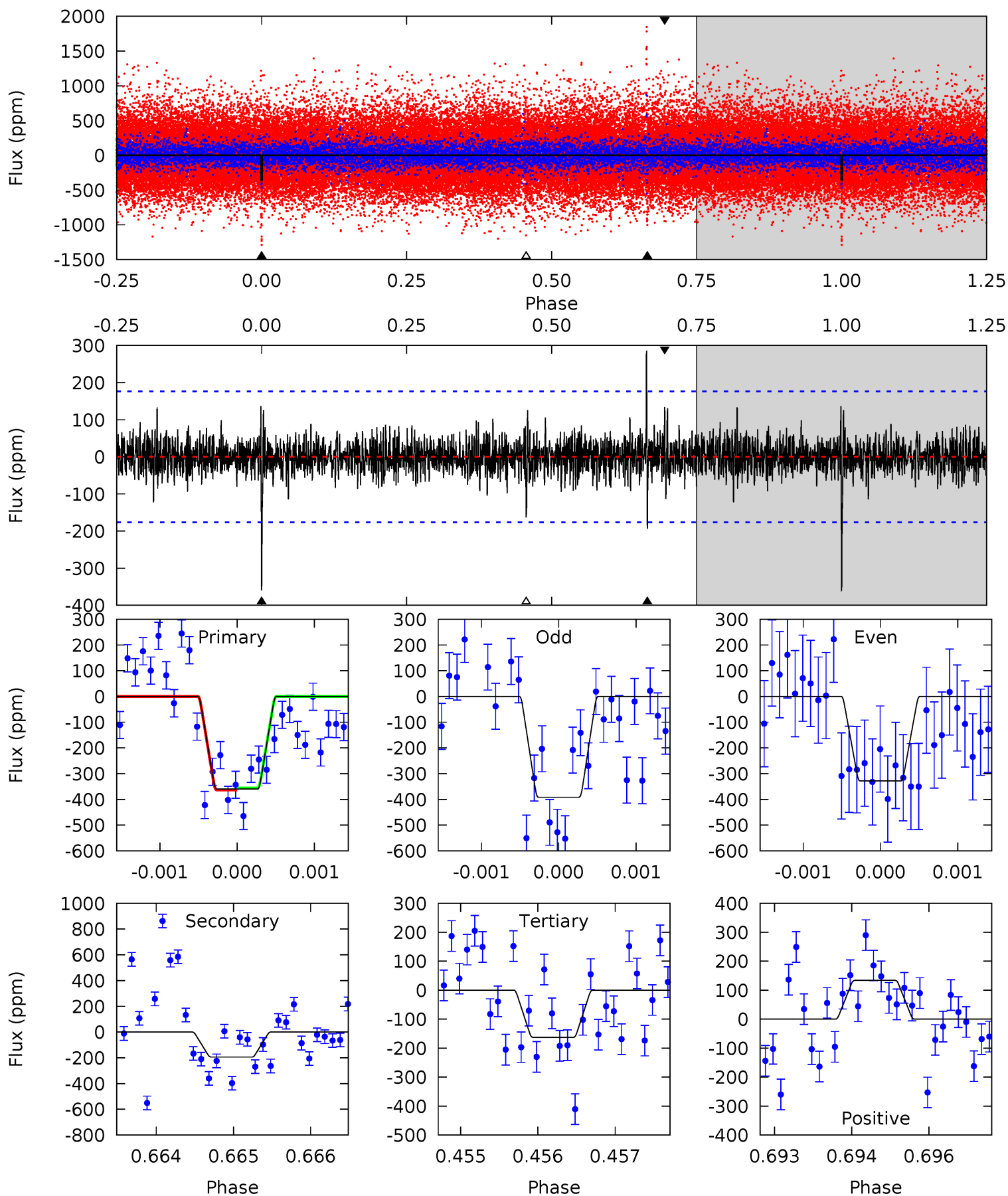
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 13.2 | 5.42 | 5.06 | 4.81 | 5.37            | 3.16            | 1.27             | 8.10    | 8.35    | 0.35    | 0.60    | 0.32    | 0.98 | 0.30  | 0.19 |



# Alt Model-Shift Uniqueness Test

009324246-01, P = 370.283352 Days, E = 308.448934 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  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 11.0 | 5.94 | 4.97 | 4.09 | 5.40            | 3.21            | 1.05             | 6.03    | 6.91    | 0.96    | 1.84    | 0.98    | 1.11 | 0.44  | 0.11 |



### Stellar Parameters For KIC 009324246

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                     | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (g \cdot \text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|--------------------------------------|
|        | $5421^{+163}_{-147}$ | $4.578^{+0.080}_{-0.064}$ | $-0.860^{+0.350}_{-0.300}$ | $0.693^{+0.080}_{-0.065}$ | $0.662^{+0.073}_{-0.028}$ | $2.807^{+0.988}_{-0.612}$            |
|        | +3%/-3%              | +2%/-1%                   | +41%/-35%                  | +12%/-9%                  | +11%/-4%                  | +35%/-22%                            |
| 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 009324246-01 / KOI

| Detrend | Depth (ppm)   | $R_p (R_{\oplus})$     | $T_{max} (K)$     | $T_{obs} (K)$         | $A_{obs}$                 |
|---------|---------------|------------------------|-------------------|-----------------------|---------------------------|
| DV      | $-166 \pm 31$ | $1.45^{+0.67}_{-0.69}$ | $295^{+13}_{-11}$ | $4597^{+1456}_{-623}$ | $34855^{+83049}_{-19073}$ |
| Alt.    | $-194 \pm 33$ | $1.49^{+0.68}_{-0.59}$ | $297^{+11}_{-12}$ | $4708^{+1104}_{-655}$ | $38729^{+63872}_{-21443}$ |

$T_{max}$  = 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

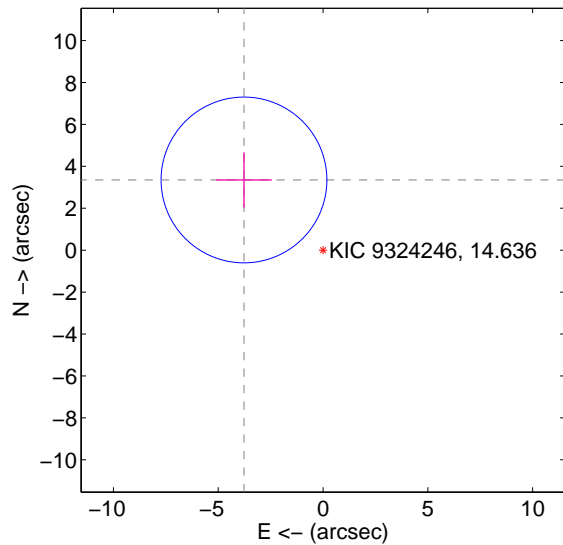
Supplemental centroid analysis for 009324246-01. Kepler magnitude: 14.64. Transit SNR 7.83

There are 0 quarters with good PRF difference image offsets

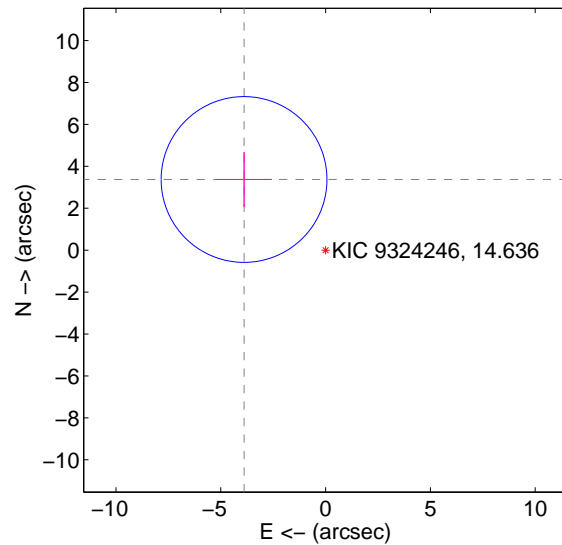
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA       | $\Delta$ Dec      |
|---|--------------------|---------------------|-------------------|-------------------|
| PRF-fit source offset from OOT          | $5.044 \pm 1.318$  | 3.83                | $3.771 \pm 1.323$ | $3.349 \pm 1.312$ |
| PRF-fit source offset from KIC position | $5.147 \pm 1.318$  | 3.90                | $3.889 \pm 1.323$ | $3.372 \pm 1.312$ |
| photometric centroid source offset      | $2.53 \pm 2.36$    | 1.07                | $-2.43 \pm 2.35$  | $-0.70 \pm 2.46$  |

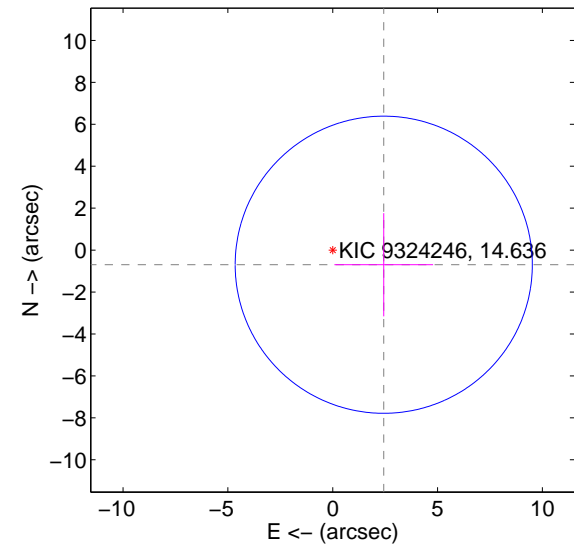
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



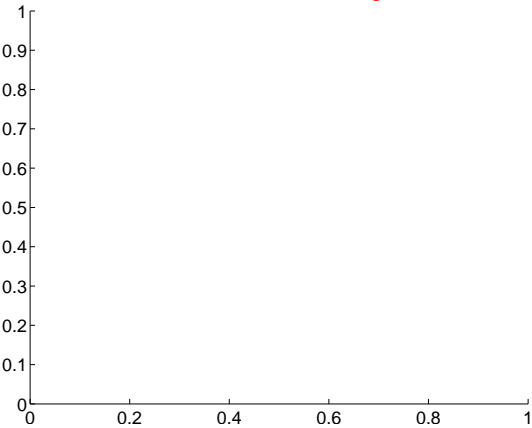
offset from photometric centroids



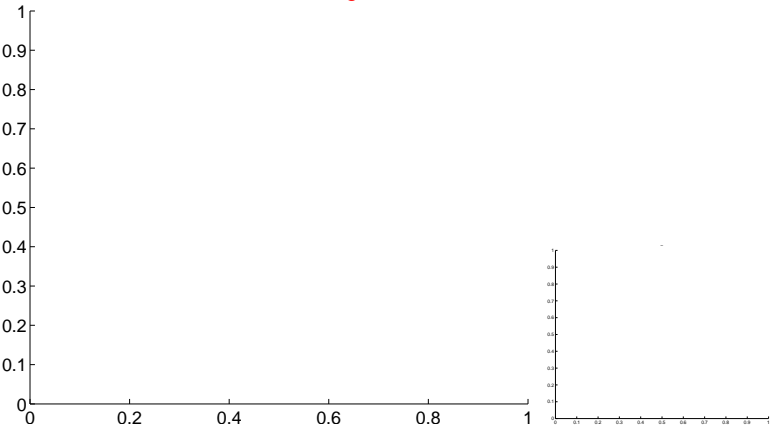
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

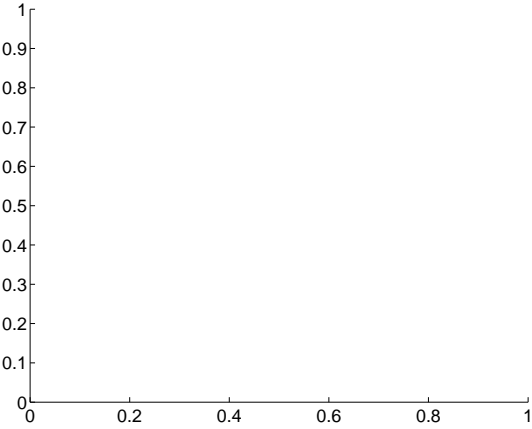
Q1 no difference image



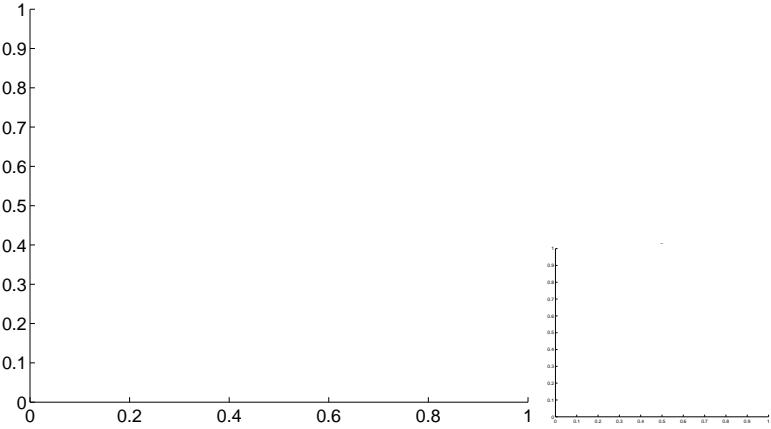
Q1 no OOT image



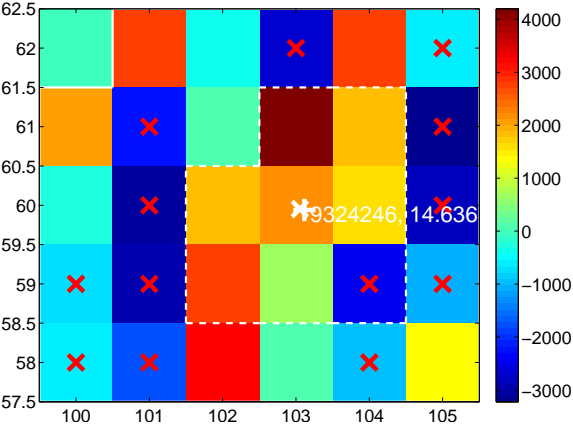
Q2 no difference image



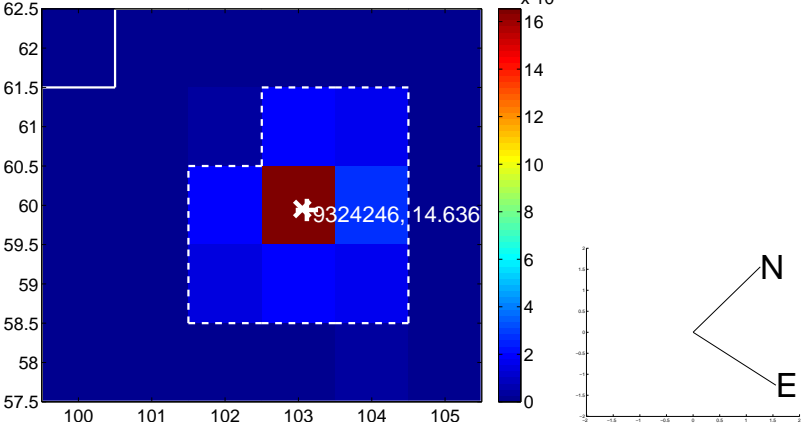
Q2 no OOT image



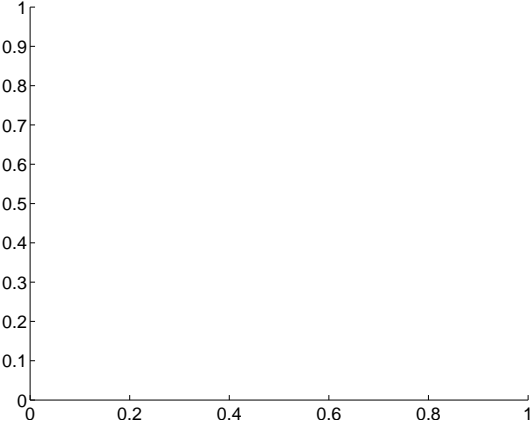
Q3 difference image. Poor Quality



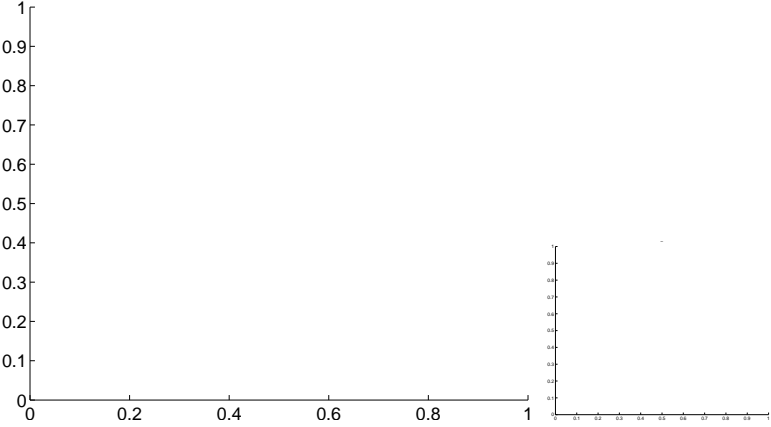
Q3 OOT image



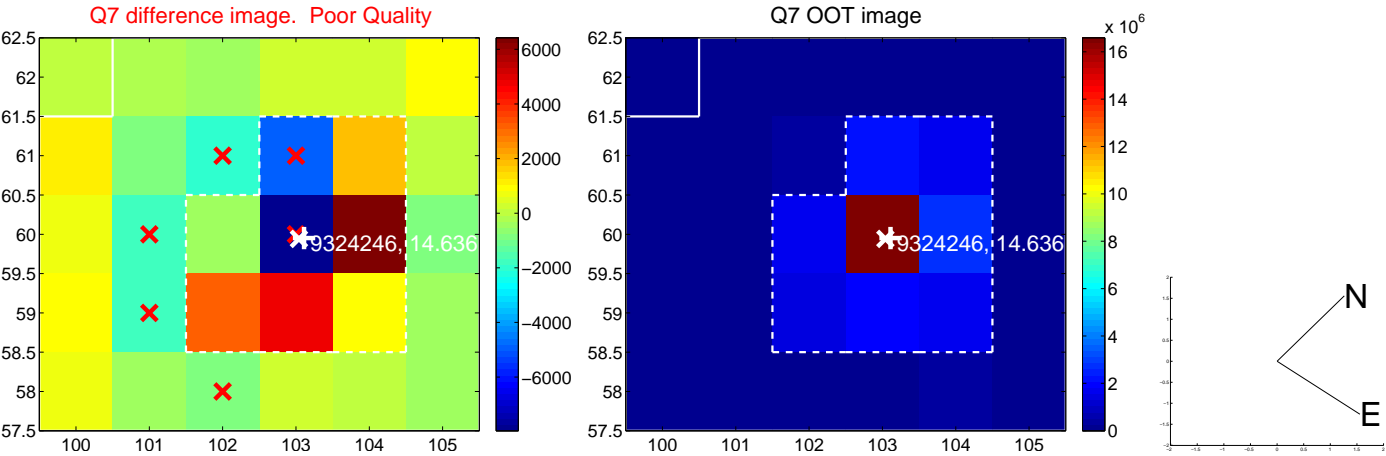
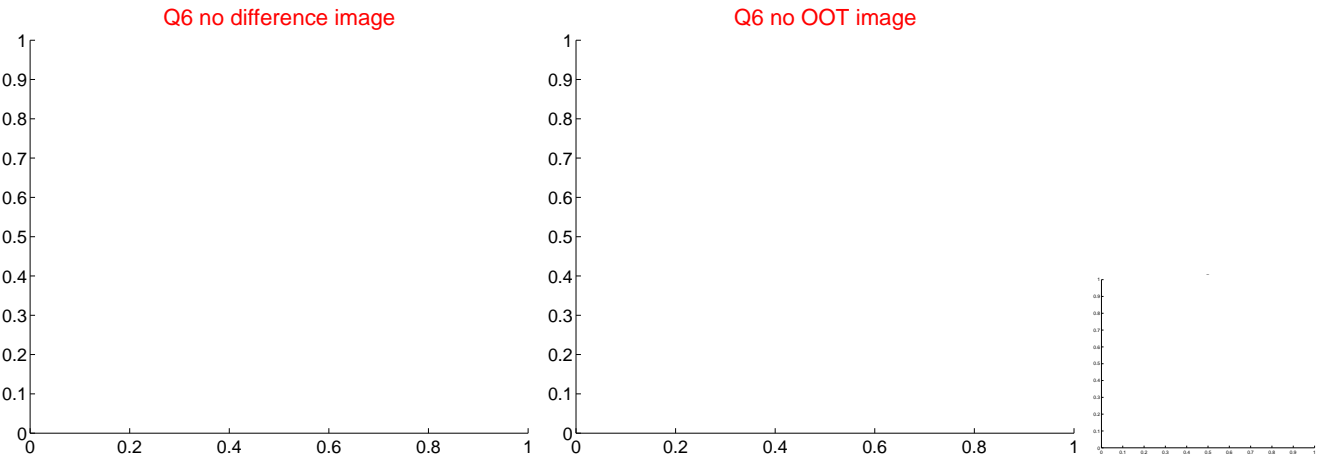
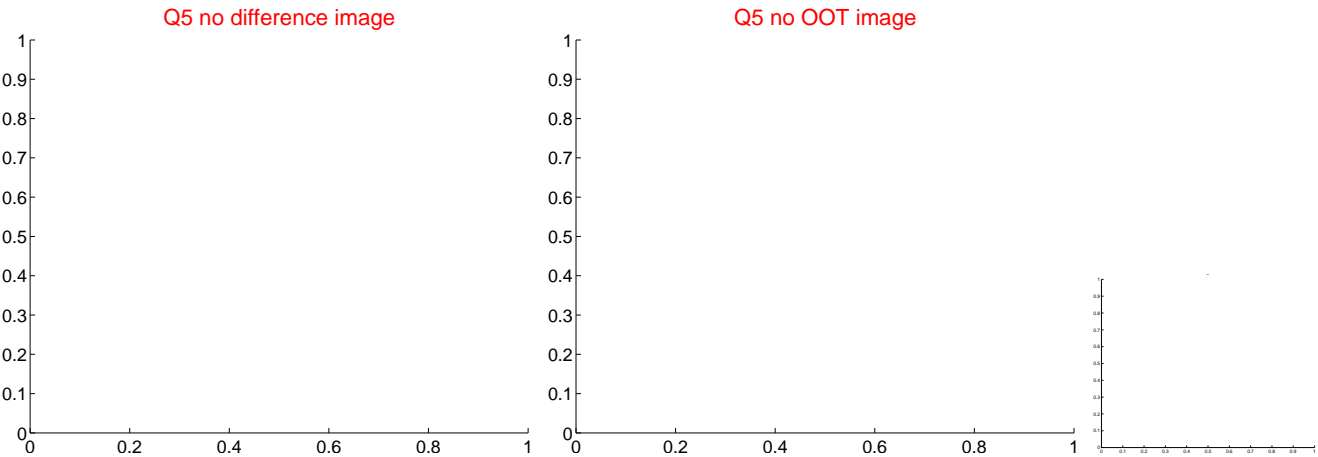
Q4 no difference image



Q4 no OOT image

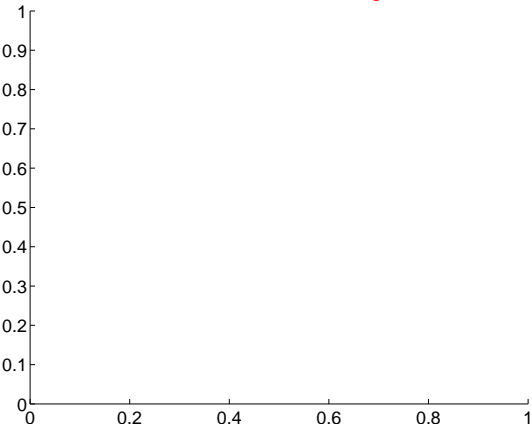


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

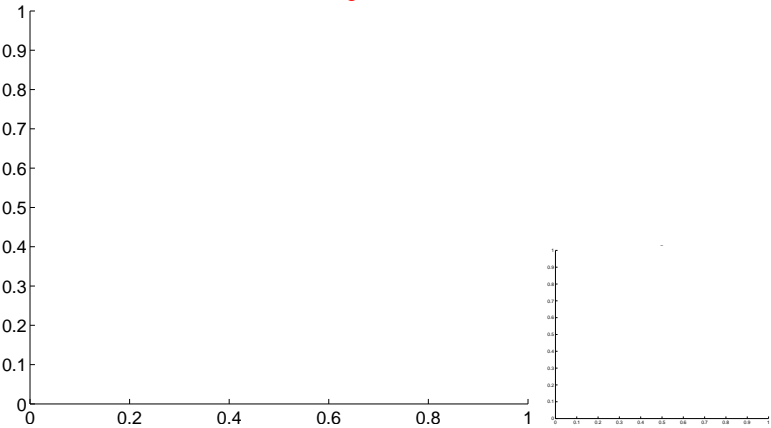


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

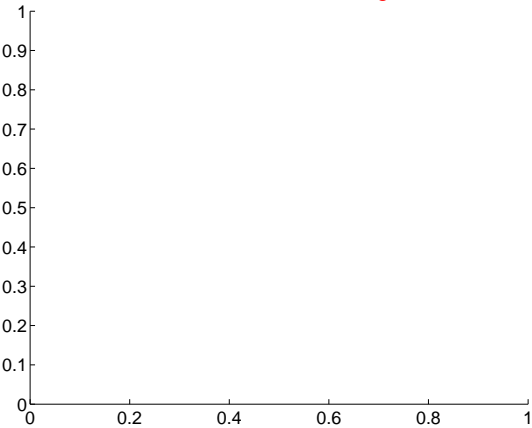
Q9 no difference image



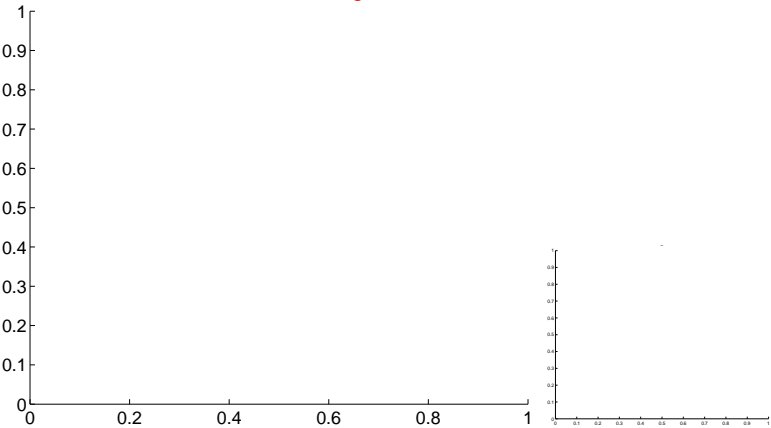
Q9 no OOT image



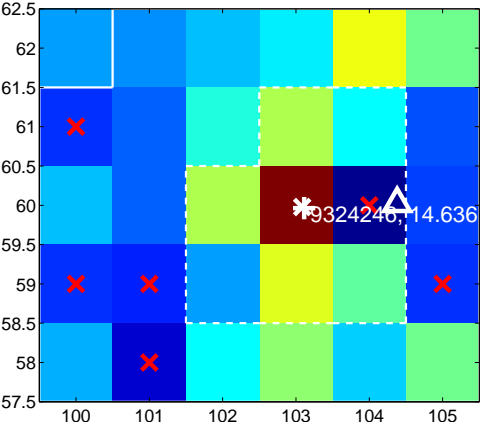
Q10 no difference image



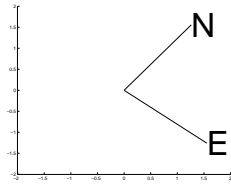
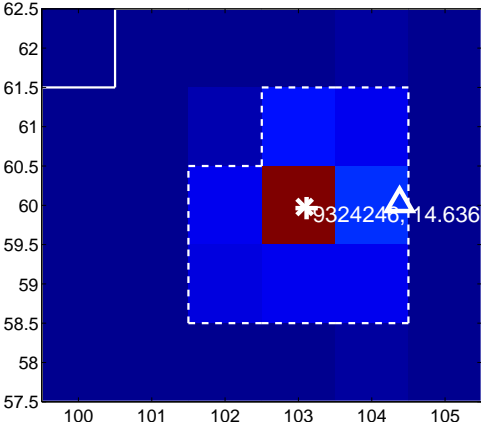
Q10 no OOT image



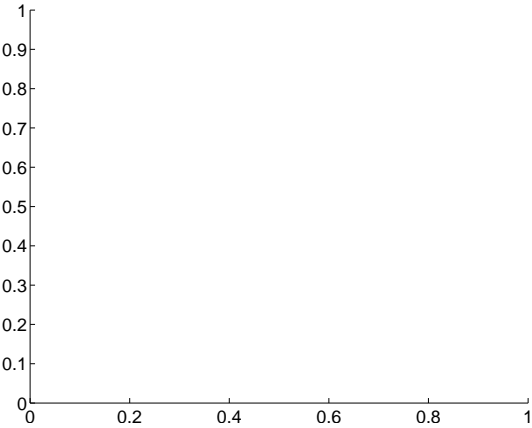
Q11 difference image. Poor Quality



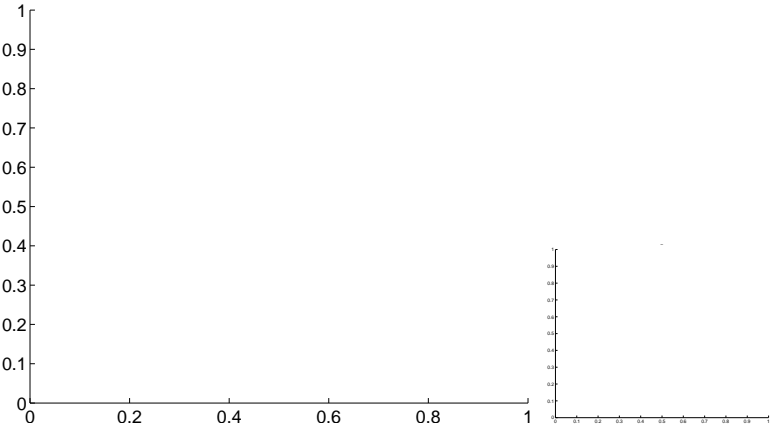
Q11 OOT image



Q12 no difference image



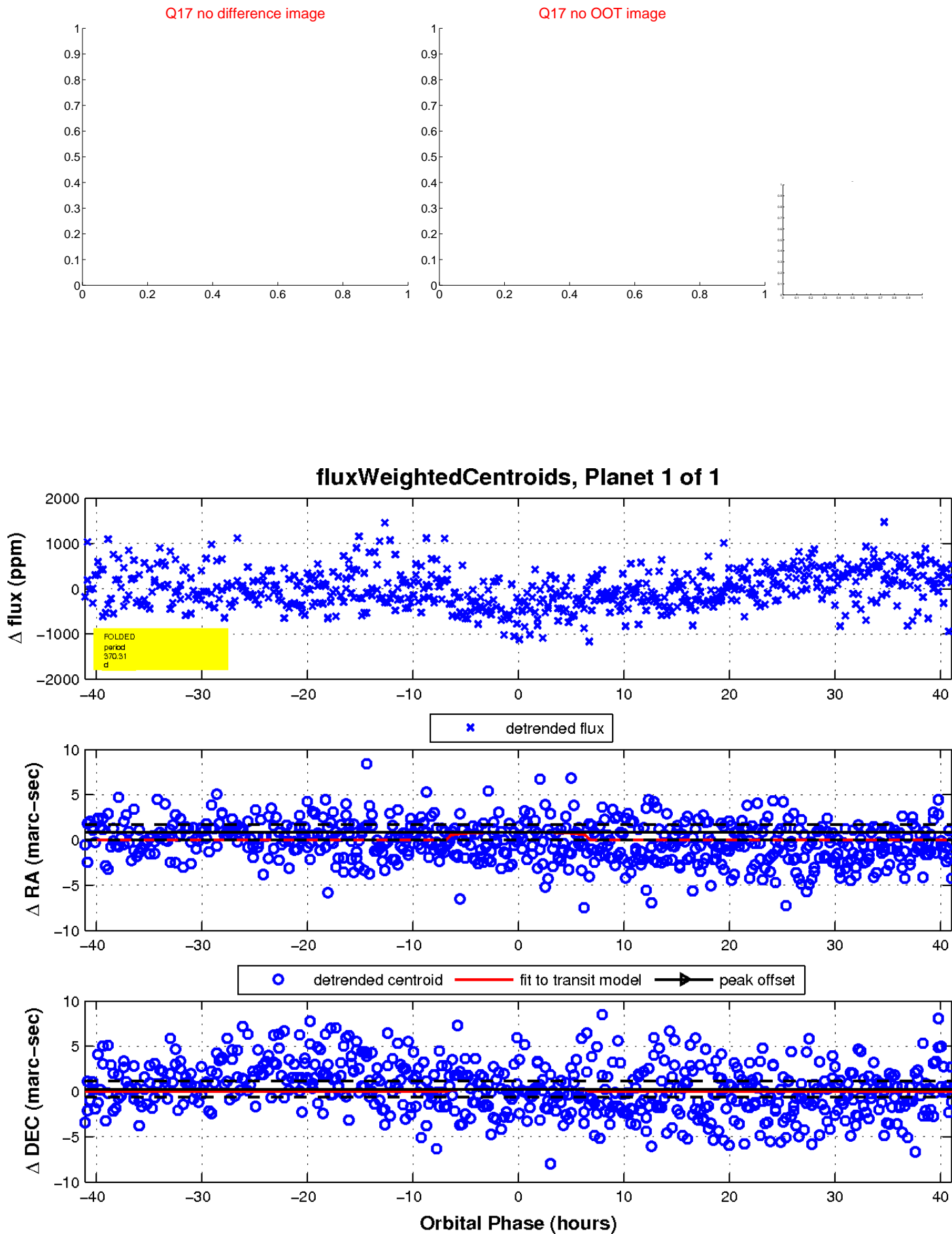
Q12 no OOT image



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.



UKIRT Image

Declination

