

# KIC 009447063

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 009447063-01 | OBS      | No   | 538.069224    | 344.392042   | 445.7       | 9.844            | 9.2 | 8.1 | 0.85                        | 5413            | 2.15                   | 0.40                   |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments  |
|--------------|----------|------|-------|---|---|---|---|---|
| 009447063-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_MARSHALL_SKYE—INCONSISTENT_TRANS—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.

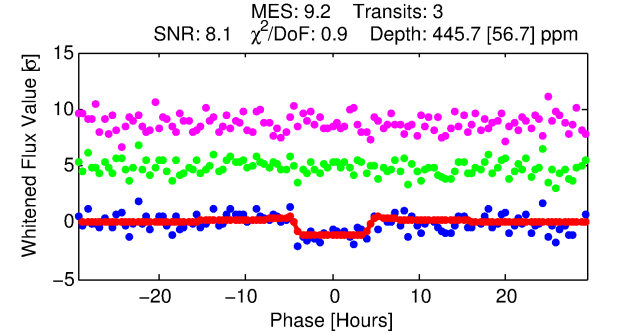
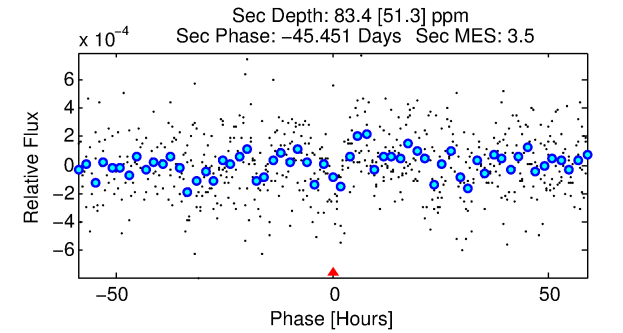
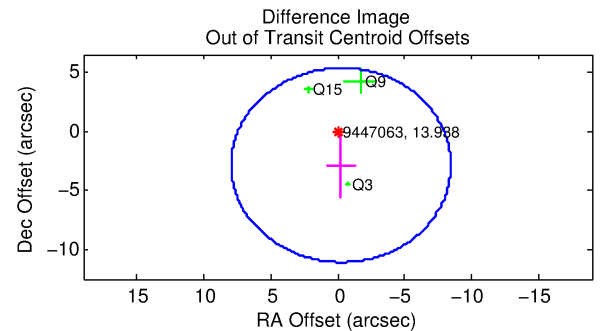
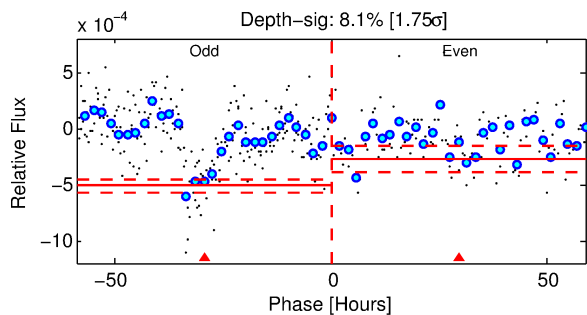
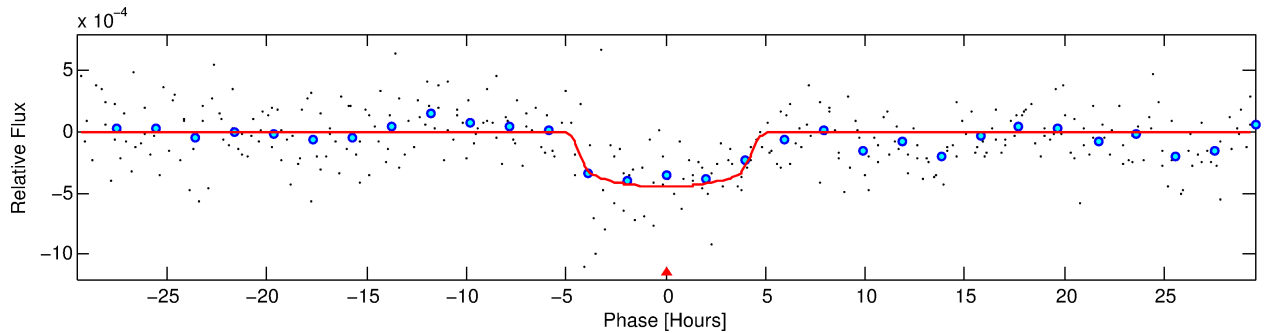
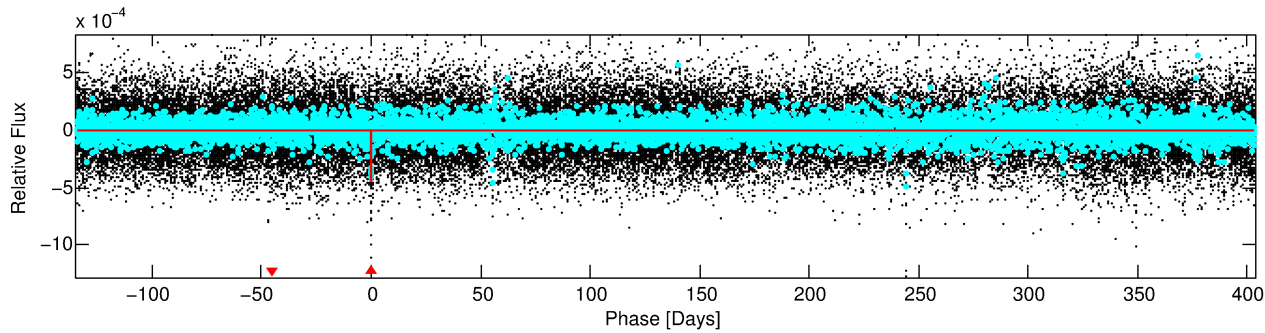
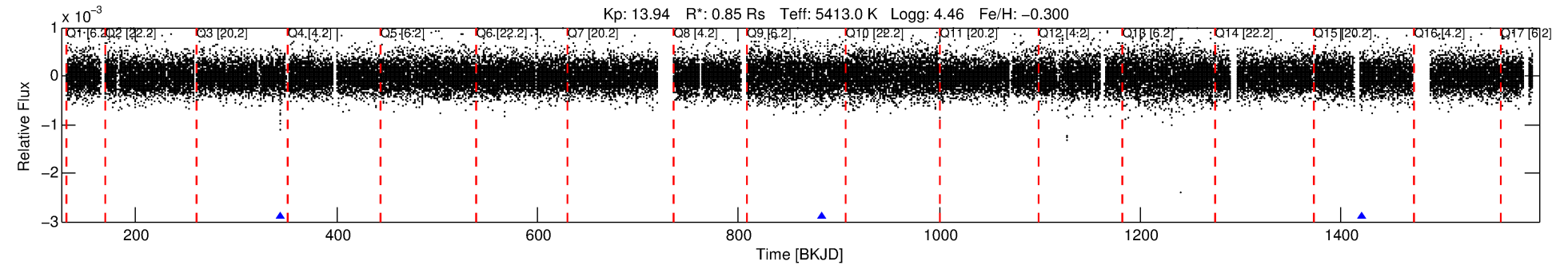
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009447063-01

No Significant Match Found

# DV One-Page Summary

KIC: 9447063 Candidate: 1 of 1 Period: 538.069 d



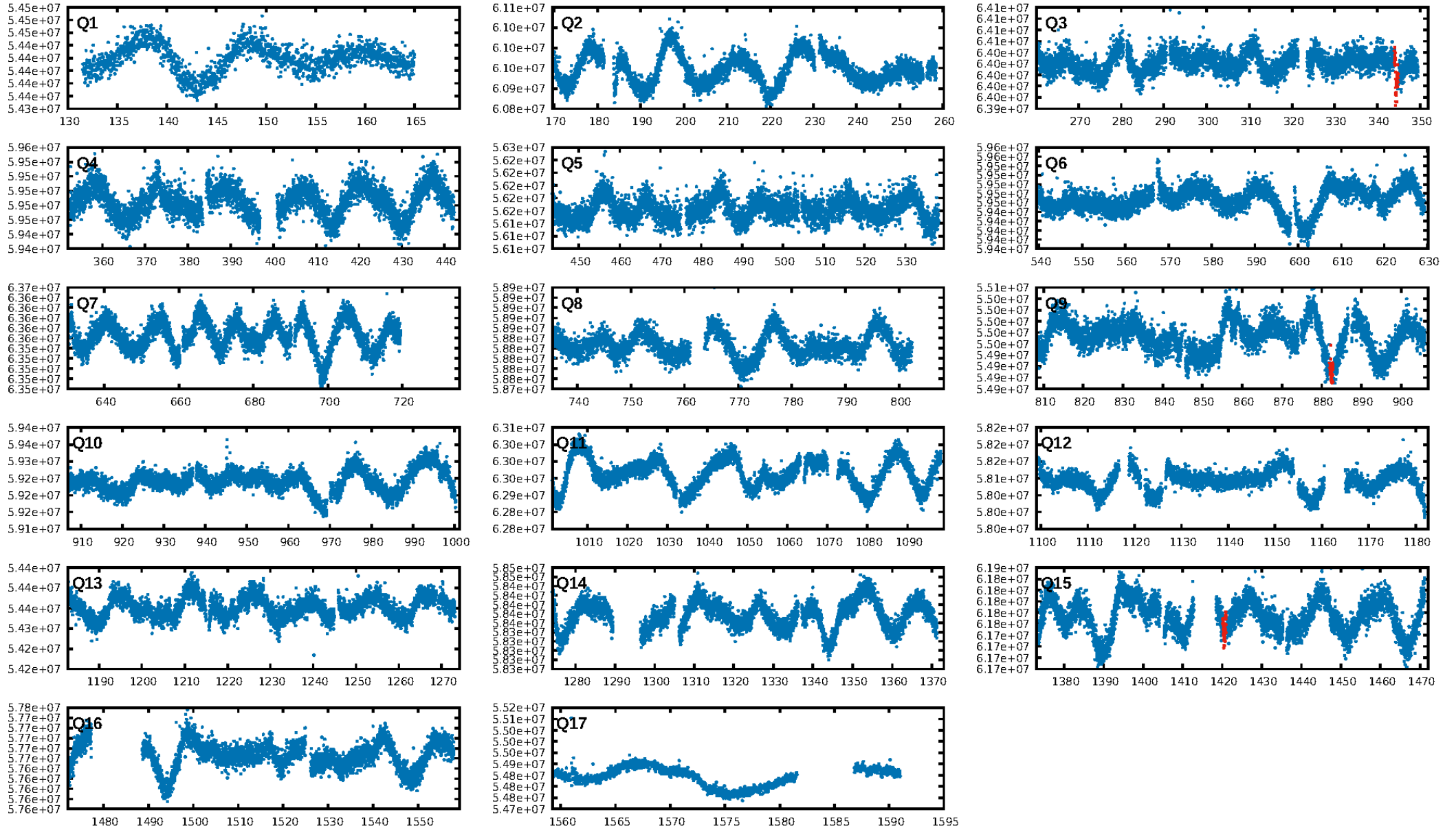
## DV Fit Results:

Period = 538.06922 [0.01008] d  
Epoch = 344.3920 [0.0123] BKJD  
Rp/R\* = 0.0232 [0.0028]  
a/R\* = 200.46 [87.93]  
b = 0.90 [0.09]  
Seff = 0.40 [0.11]  
Teq = 202 [14] K  
Rp = 2.15 [0.46] Re  
a = 1.1826 [0.1898] AU  
Ag = 13880.37 [9818.08] [1.41 $\sigma$ ]  
Teffp = 3394 [571] K [5.59 $\sigma$ ]

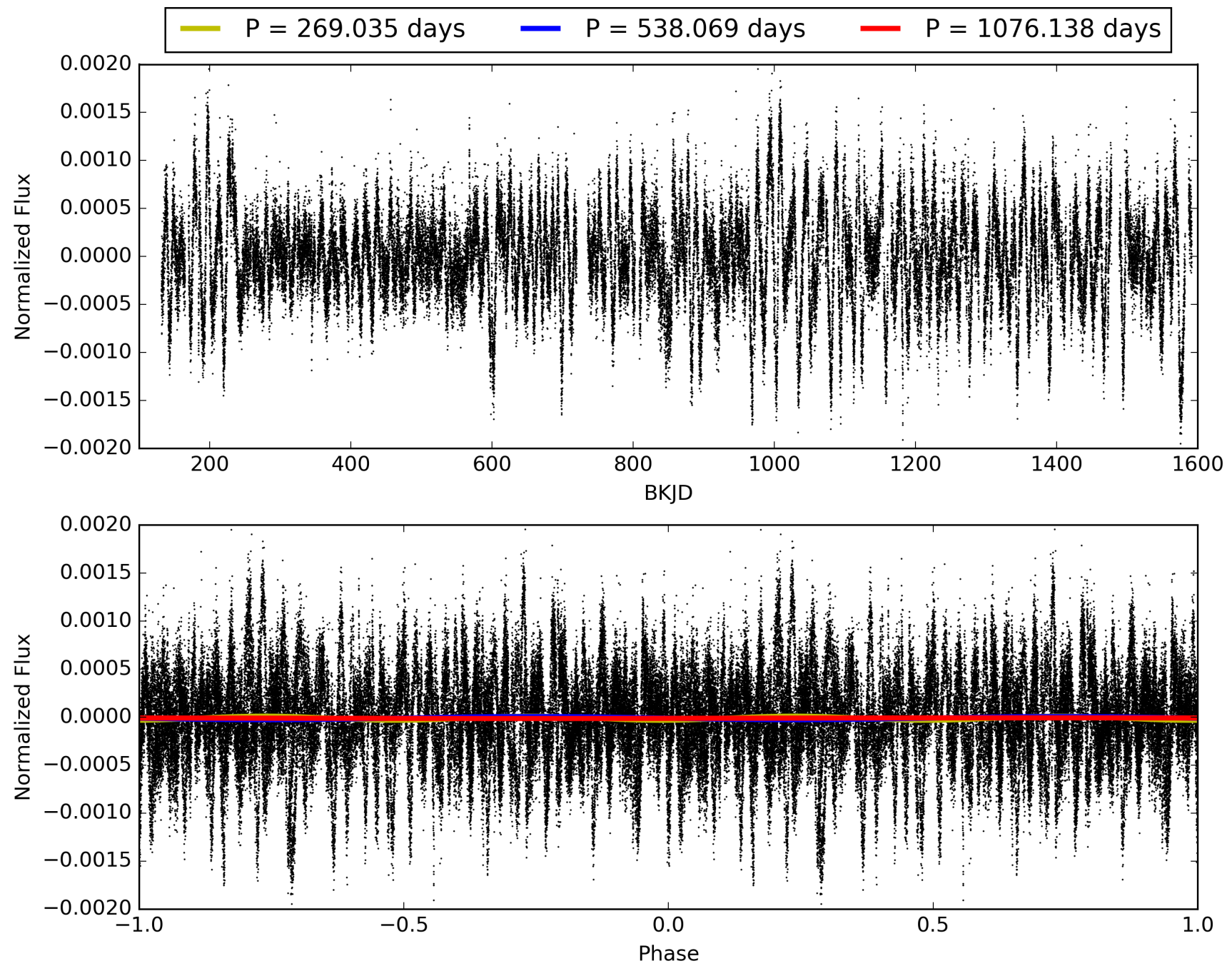
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 32.0%  
ModelChiSquareGof-sig: 99.9%  
Bootstrap-pfa: 6.70e-13  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.235  
Centroid-sig: 0.3%  
Centroid-so: 3.473 arcsec [2.67 $\sigma$ ]  
OotOffset-rm: 2.886 arcsec [1.05 $\sigma$ ]  
KicOffset-rm: 3.098 arcsec [1.28 $\sigma$ ]  
OotOffset-st: 0/2/0/1 [3]  
KicOffset-st: 0/2/0/1 [3]  
DiffImageQuality-fgm: 0.33 [1/3]  
DiffImageOverlap-fno: 1.00 [3/3]

# TCE 009447063-01, PDC Light Curves

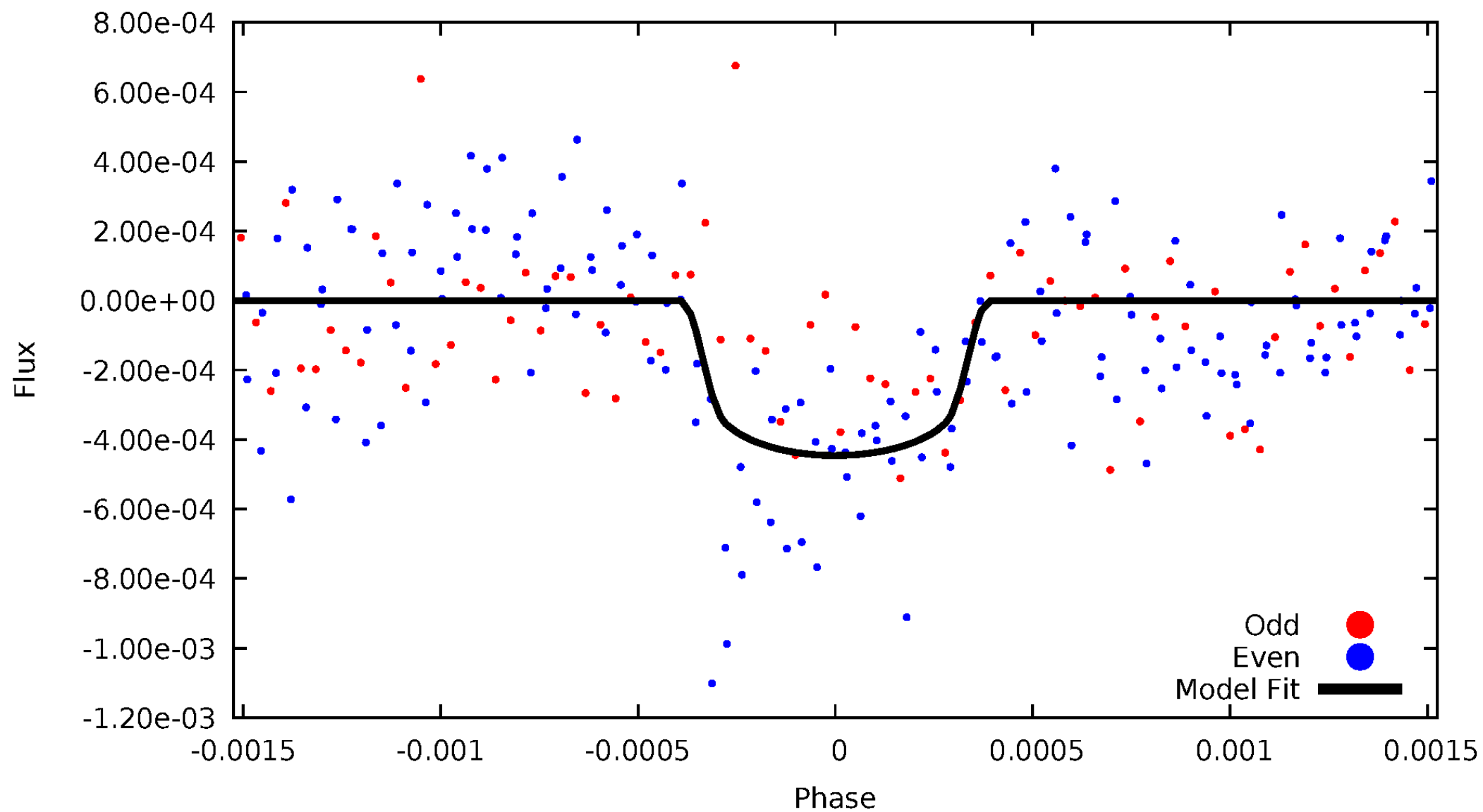


TCE 009447063-01



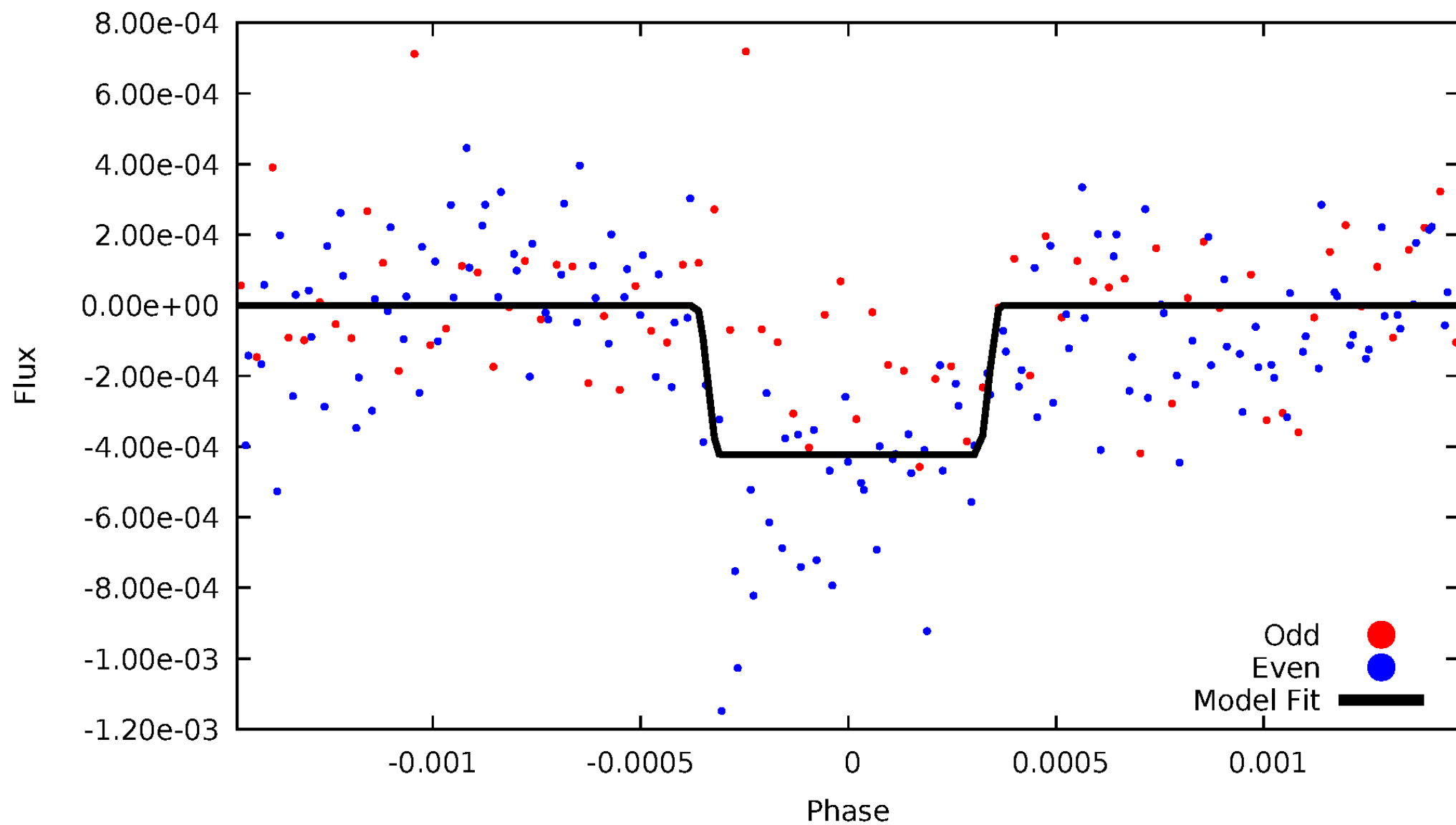
# DV Odd/Even

TCE 009447063-01

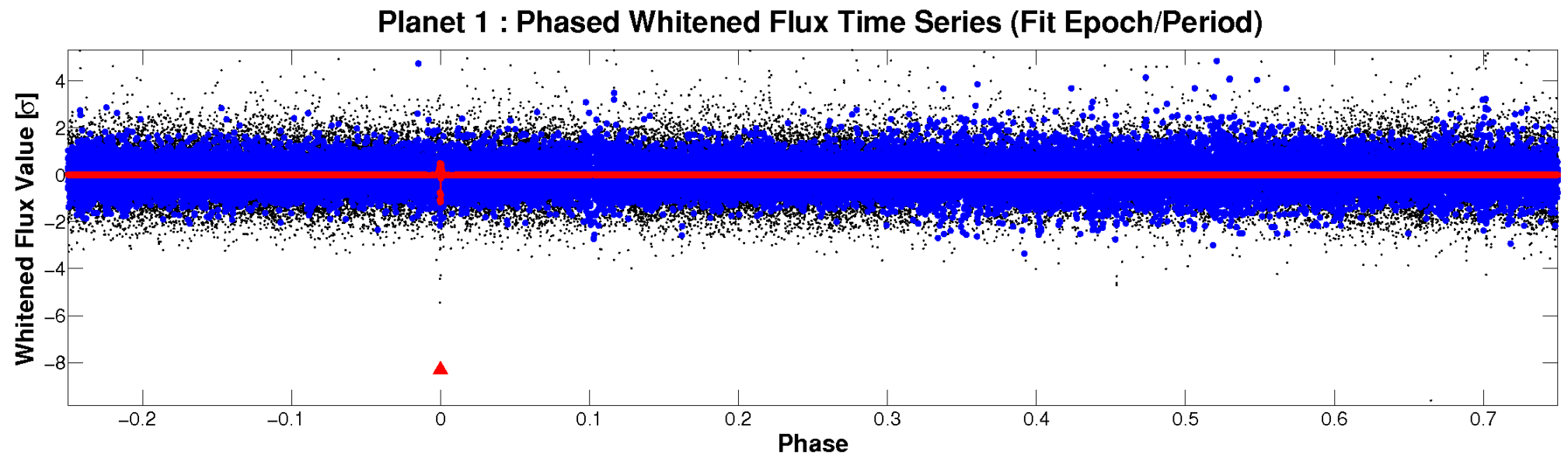
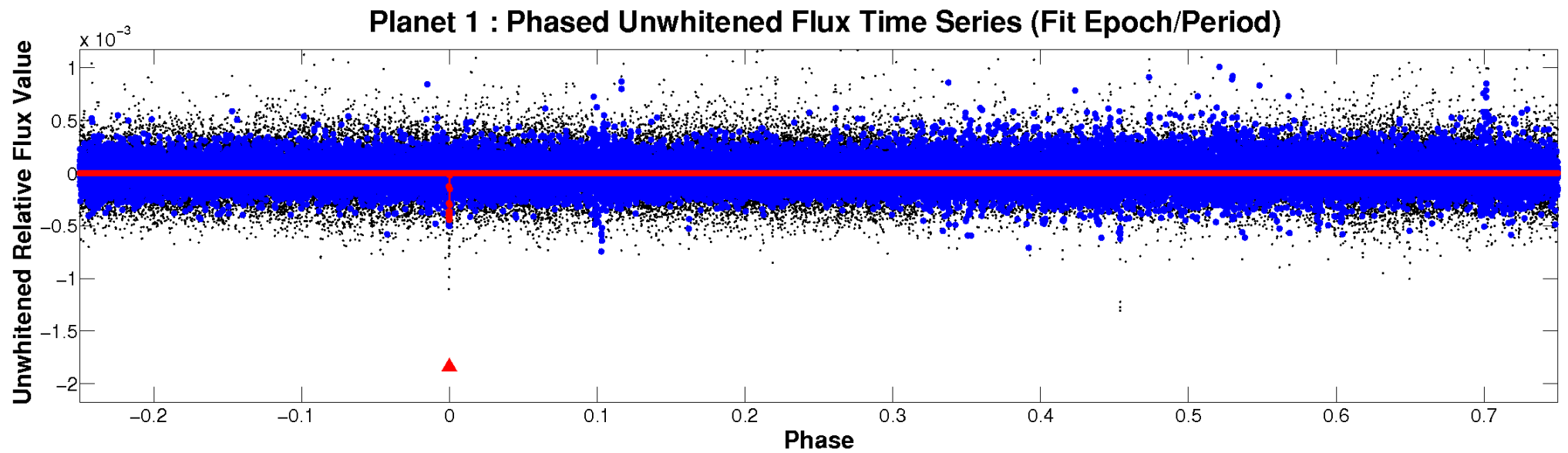


# ALT Odd/Even

TCE 009447063-01



# Non-Whitened Vs. Whitened Light Curve



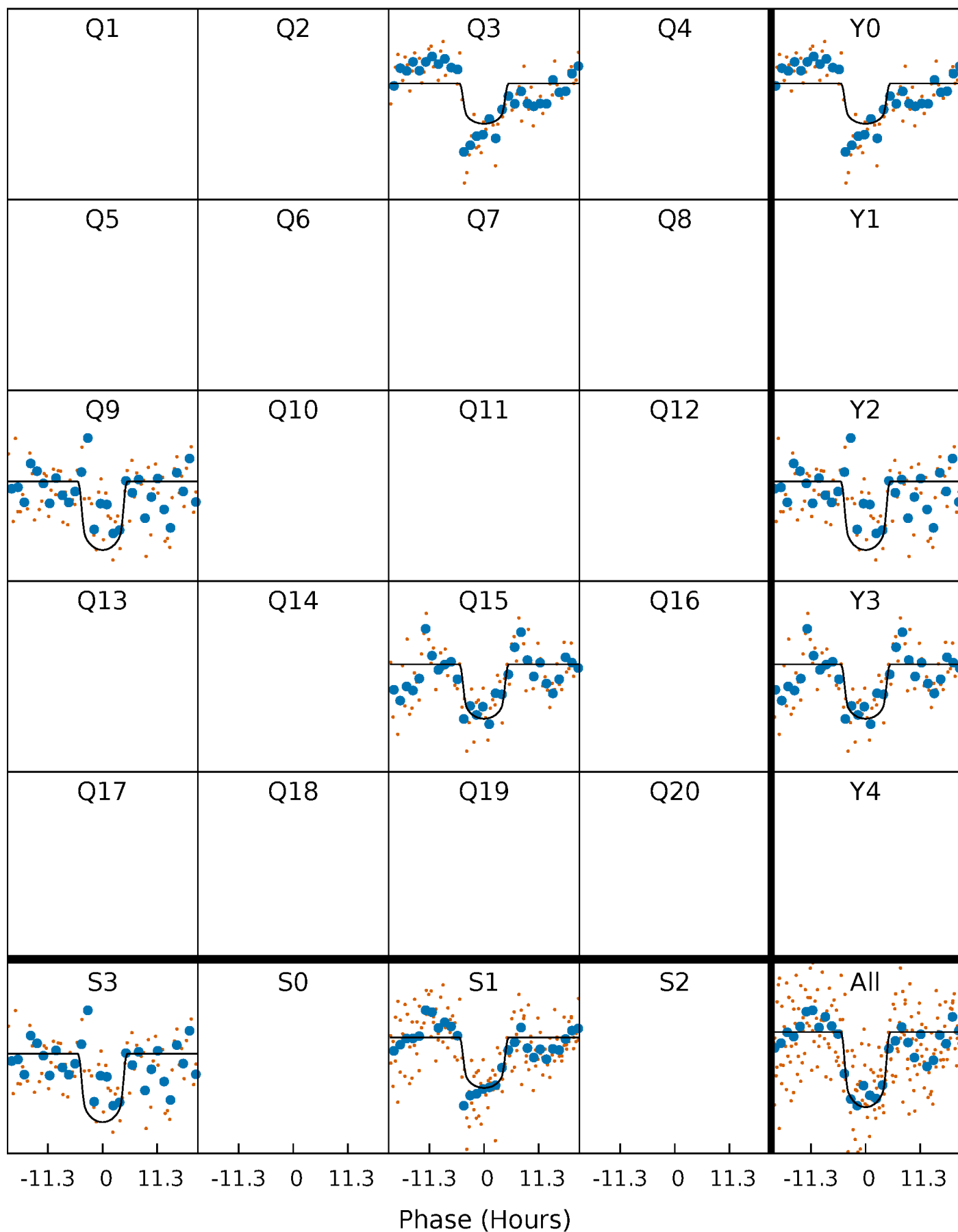
# PDC Quarter-Phased Transit Curves

TCE 009447063-01 P=538.069224 Days  $T_0=344.392042$  (BKJD)



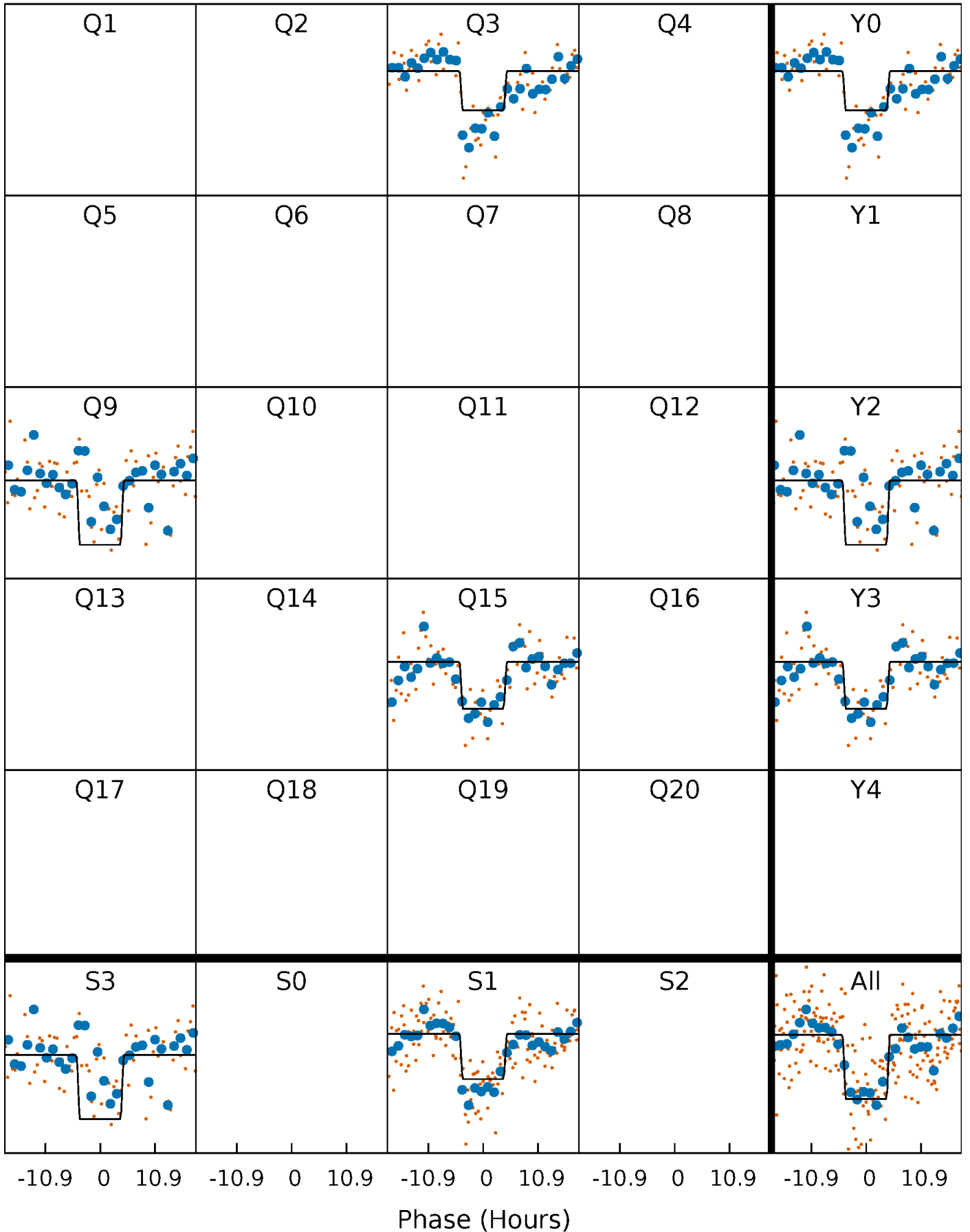
# DV Quarter-Phased Transit Curves

TCE 009447063-01     $P=538.069224$  Days     $T_0=344.392042$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

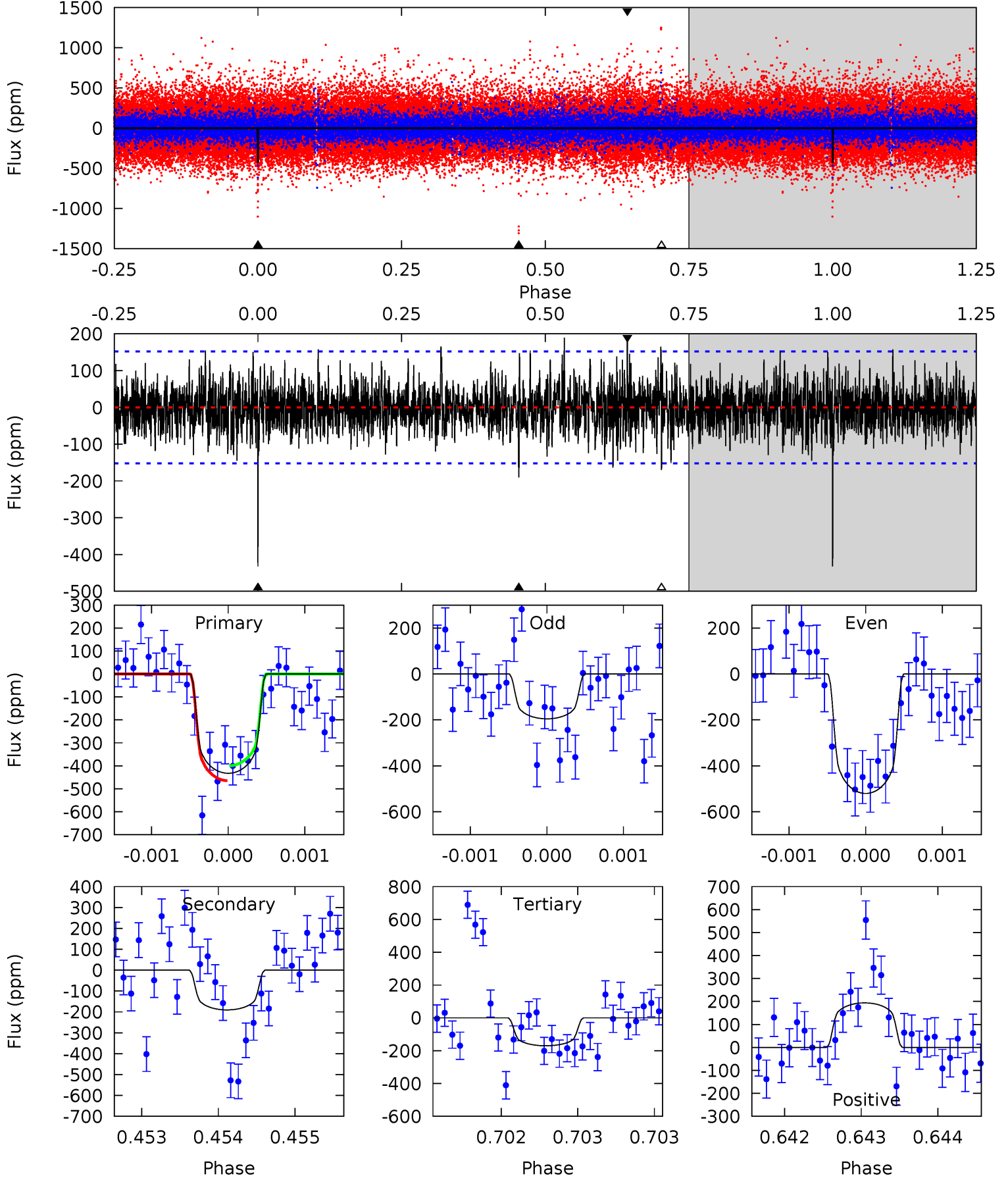
TCE 009447063-01 P=538.070124 Days  $T_0=344.387623$  (BKJD)



# DV Model-Shift Uniqueness Test

009447063-01, P = 538.069224 Days, E = 344.392042 Days

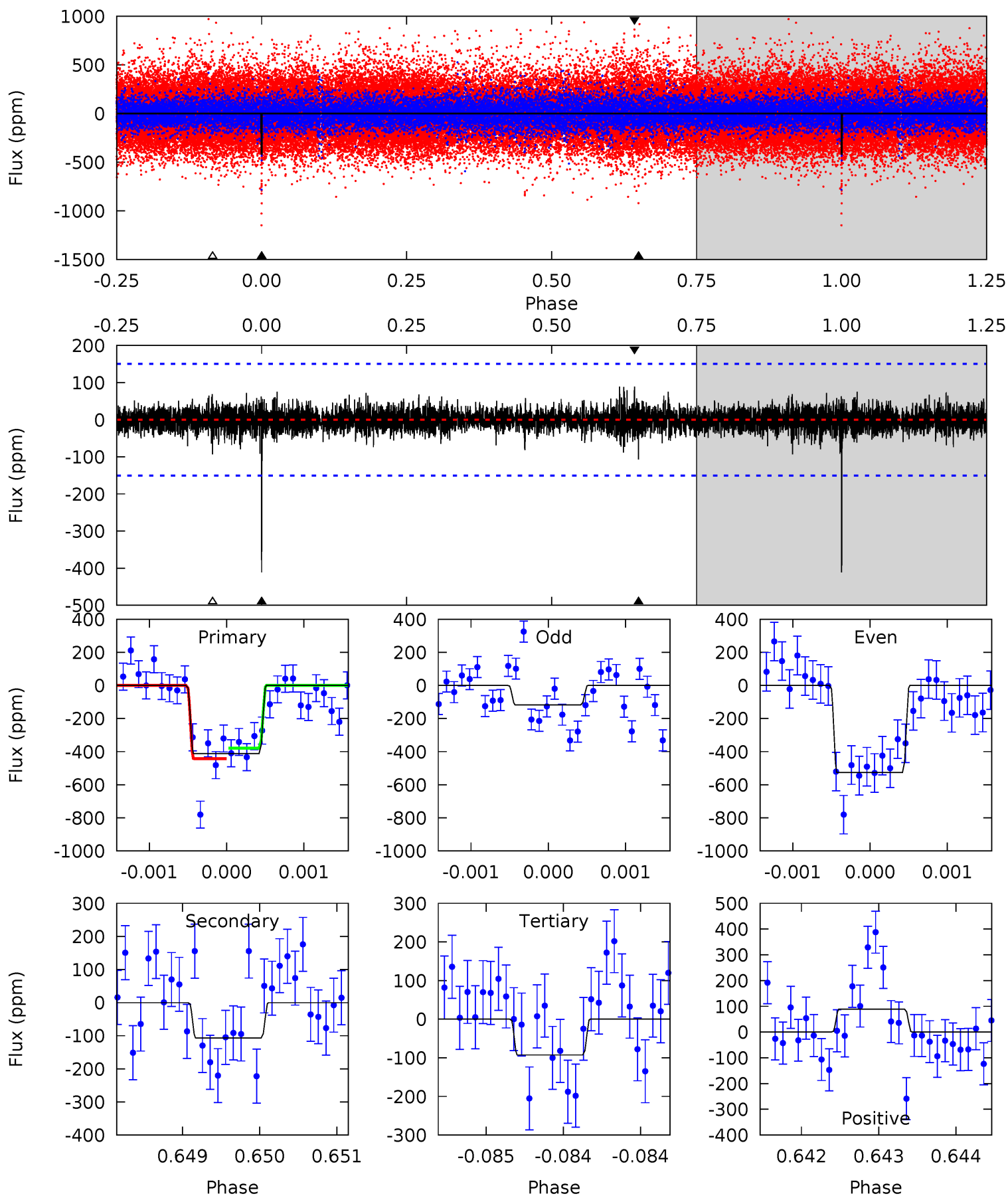
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 15.6 | 6.88 | 6.15 | 7.00 | 5.49            | 3.35            | 1.67             | 9.48    | 8.62    | 0.73    | -0.12   | 5.58    | 1.02 | 0.31  | 1.17 |



# Alt Model-Shift Uniqueness Test

009447063-01, P = 538.070124 Days, E = 344.387623 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  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 15.0 | 3.91 | 3.39 | 3.27 | 5.51            | 3.38            | 0.74             | 11.7    | 11.8    | 0.52    | 0.64    | 7.12    | 0.90 | 0.18  | 1.17 |



### Stellar Parameters For KIC 009447063

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                     | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
|        | $5413^{+162}_{-145}$ | $4.463^{+0.117}_{-0.143}$ | $-0.300^{+0.350}_{-0.300}$ | $0.848^{+0.149}_{-0.122}$ | $0.762^{+0.119}_{-0.055}$ | $1.758^{+1.010}_{-0.686}$                 |
|        | +3%/-3%              | +3%/-3%                   | +117%/-100%                | +18%/-14%                 | +16%/-7%                  | +57%/-39%                                 |
| 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 009447063-01 / KOI

| Detrend | Depth (ppm)   | $R_p (R_{\oplus})$     | $T_{max} (K)$     | $T_{obs} (K)$        | $A_{obs}$                |
|---------|---------------|------------------------|-------------------|----------------------|--------------------------|
| DV      | $-190 \pm 28$ | $2.21^{+0.33}_{-0.34}$ | $284^{+16}_{-15}$ | $4362^{+267}_{-227}$ | $30949^{+12420}_{-8944}$ |
| Alt.    | $-107 \pm 27$ | $1.91^{+0.35}_{-0.30}$ | $283^{+17}_{-15}$ | $4116^{+317}_{-279}$ | $22681^{+12197}_{-8103}$ |

$T_{max}$  = 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

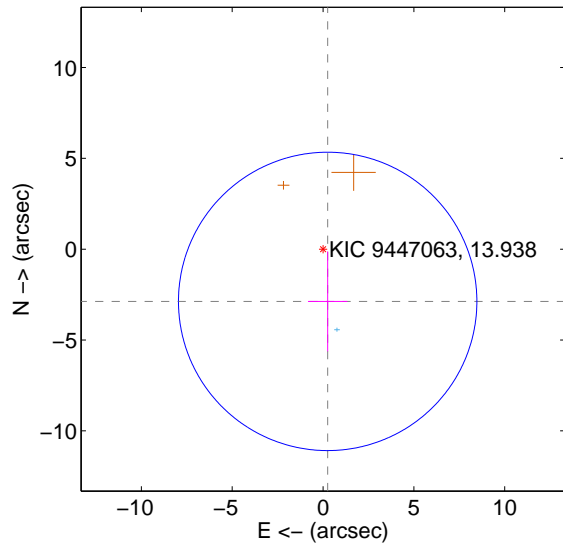
Supplemental centroid analysis for 009447063-01. Kepler magnitude: 13.94. Transit SNR 8.08

There are 1 quarters with good PRF difference image offsets

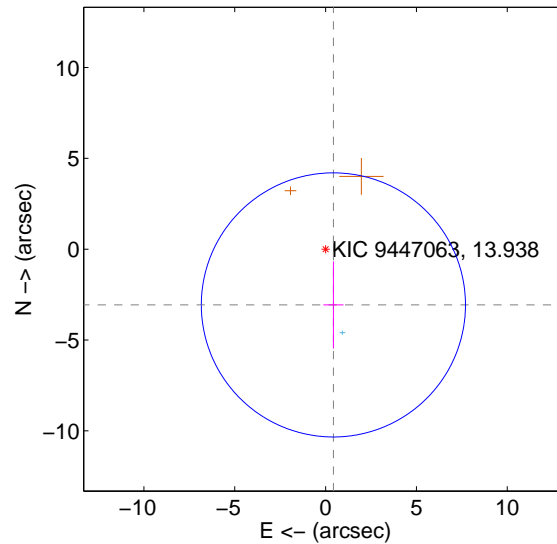
The direct PRF centroid is offset from the target star catalog position by about 0.39 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec       |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT          | $2.886 \pm 2.737$  | 1.05                | $-0.255 \pm 1.083$ | $-2.875 \pm 2.749$ |
| PRF-fit source offset from KIC position | $3.098 \pm 2.423$  | 1.28                | $-0.430 \pm 0.554$ | $-3.068 \pm 2.399$ |
| photometric centroid source offset      | $3.47 \pm 1.30$    | 2.67                | $-2.83 \pm 1.30$   | $-2.01 \pm 1.30$   |

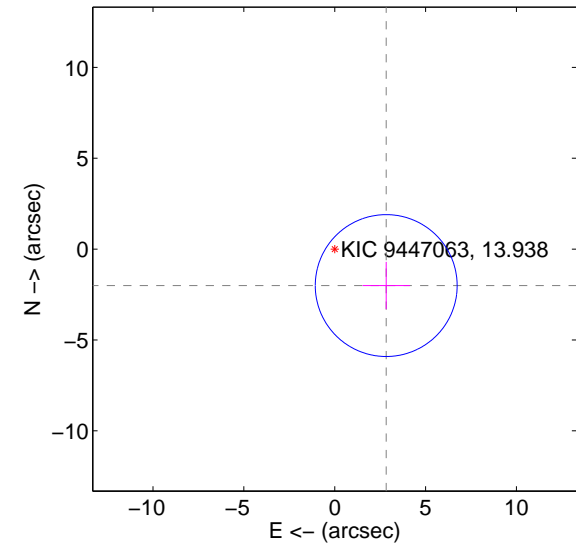
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



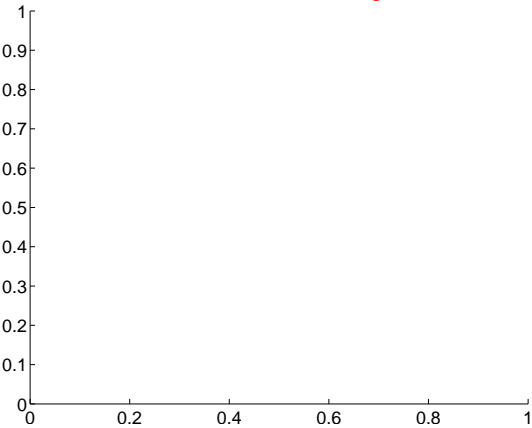
offset from photometric centroids



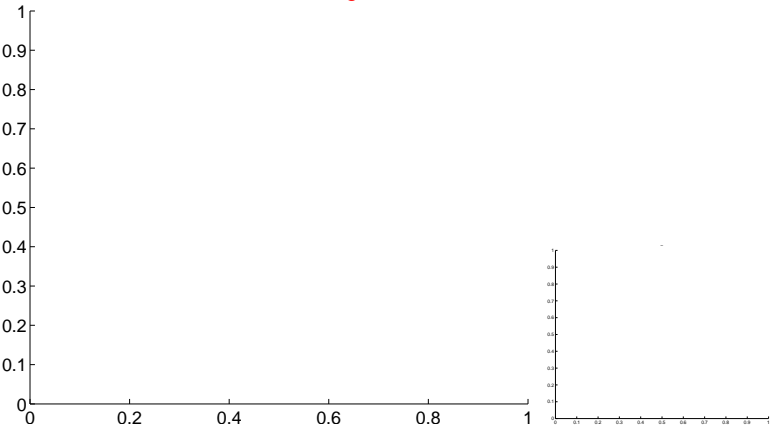
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

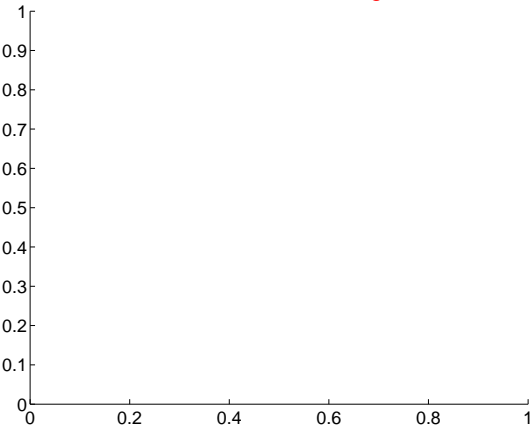
Q1 no difference image



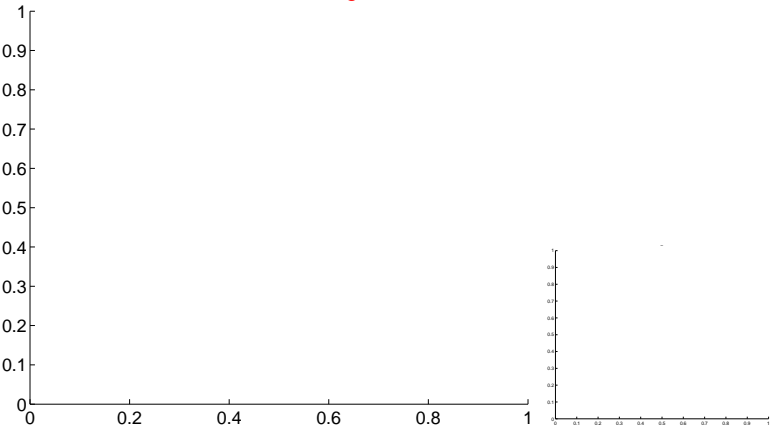
Q1 no OOT image



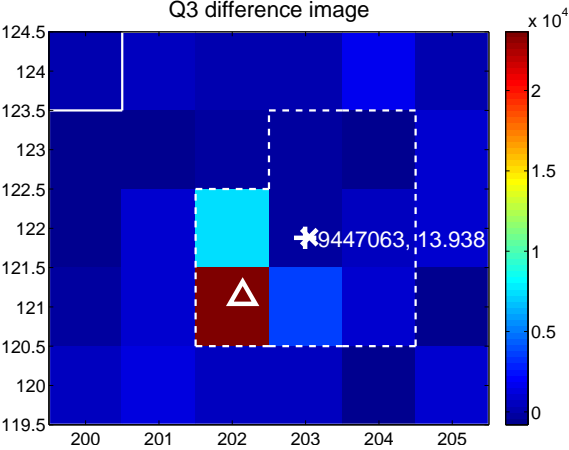
Q2 no difference image



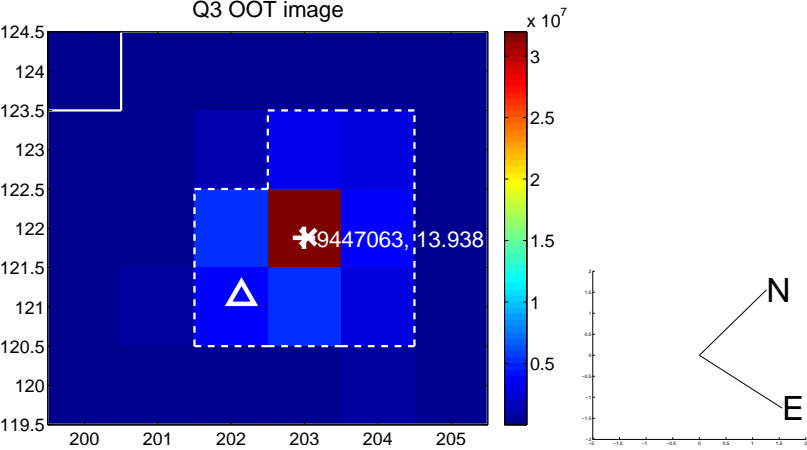
Q2 no OOT image



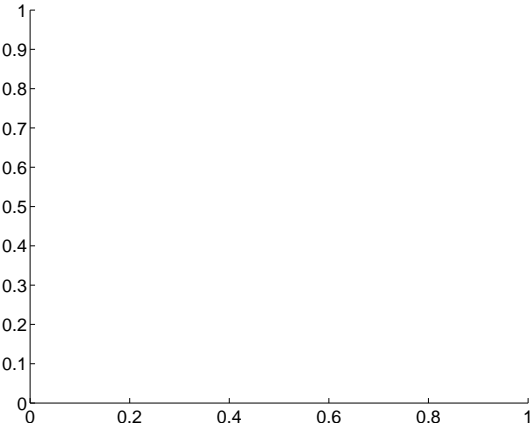
Q3 difference image



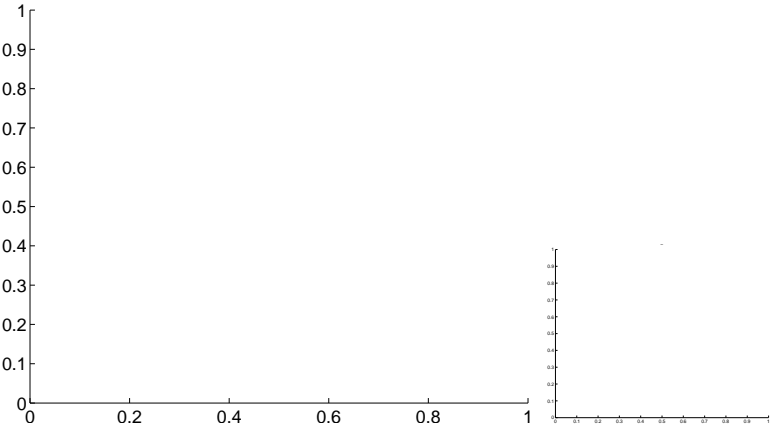
Q3 OOT image



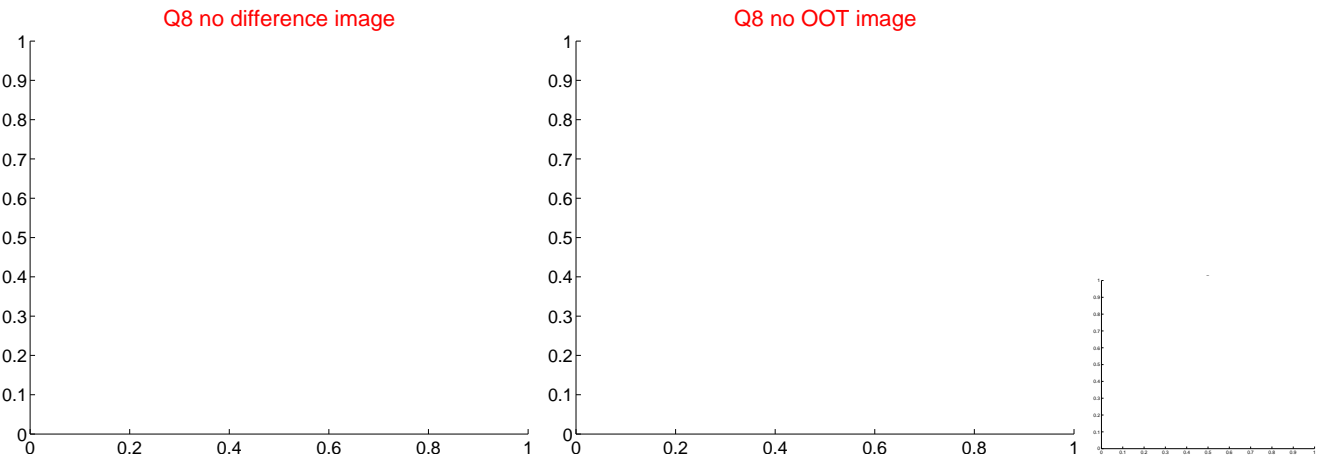
Q4 no difference image



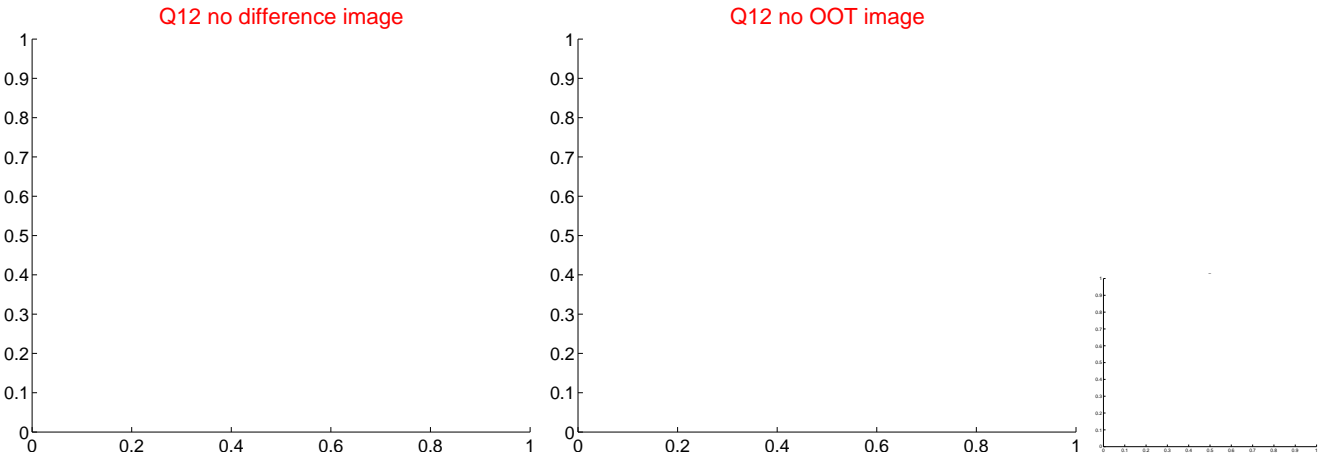
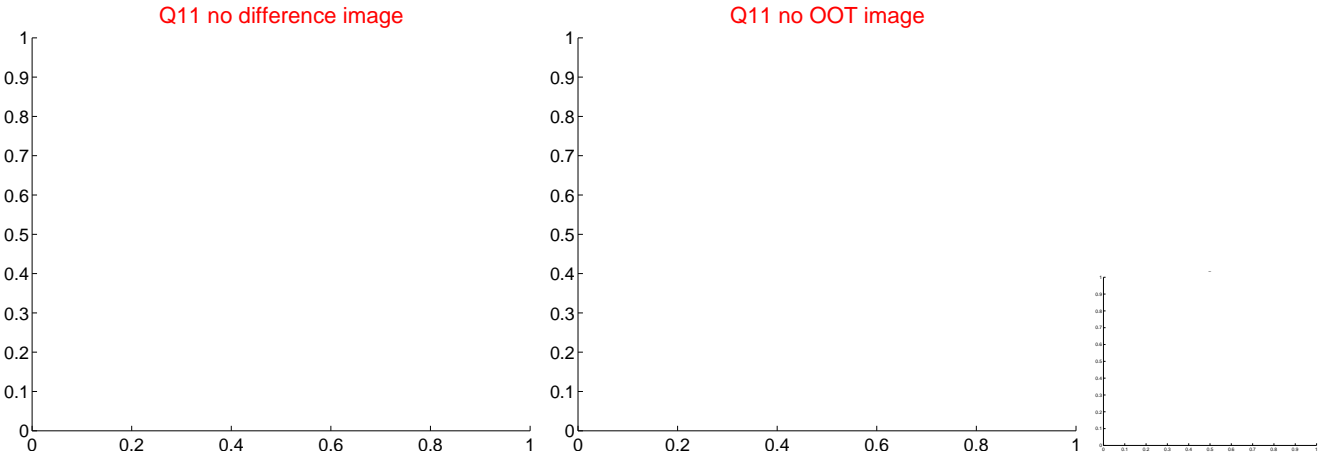
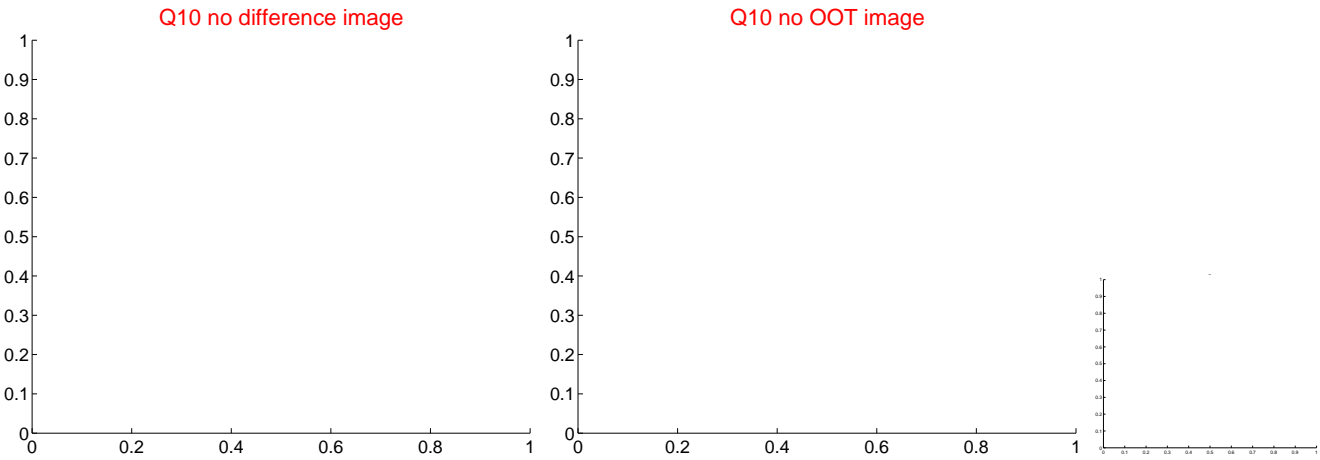
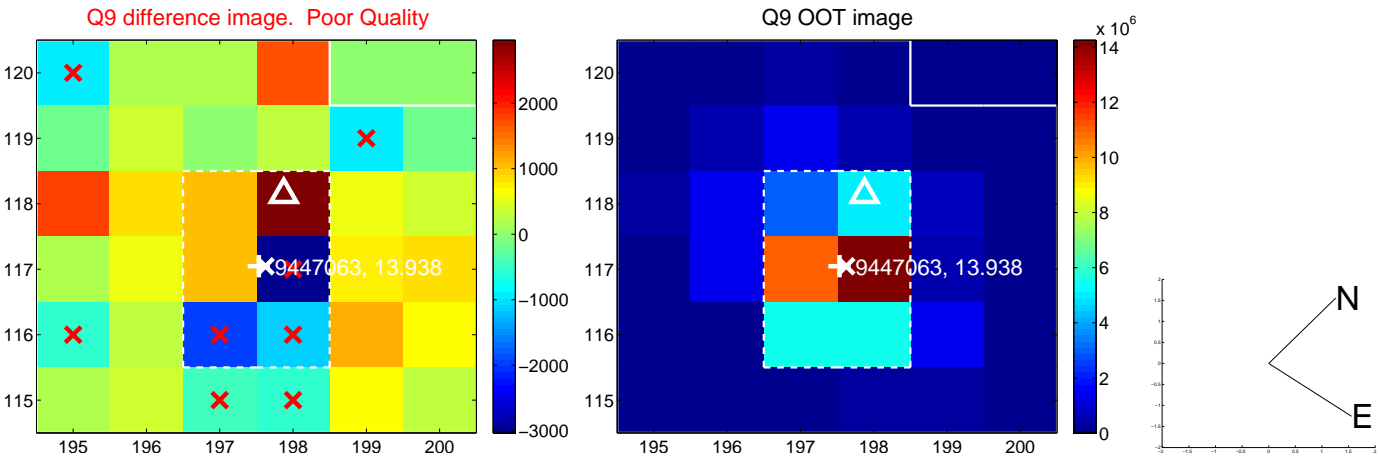
Q4 no OOT image



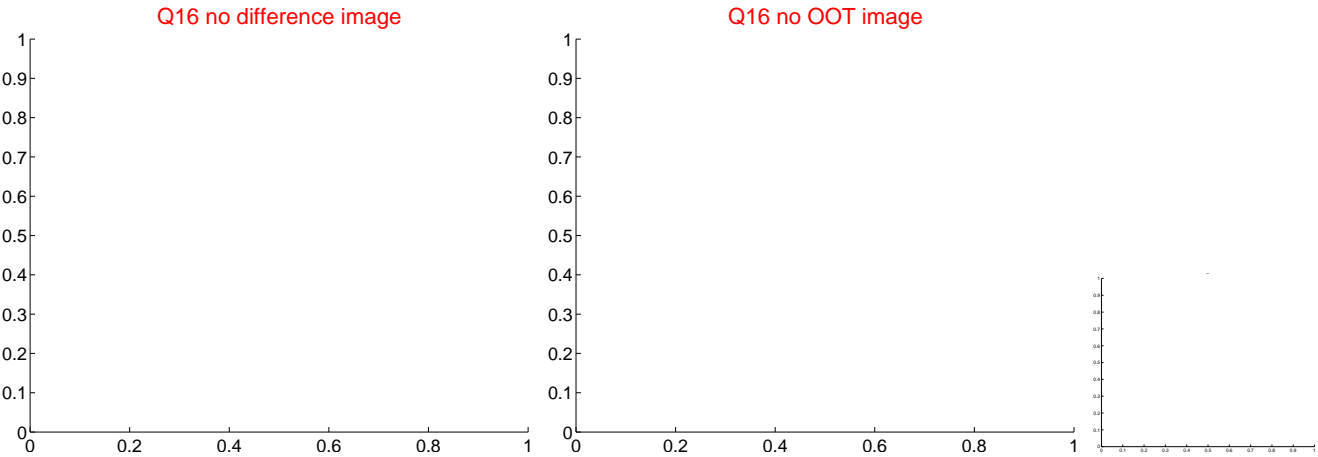
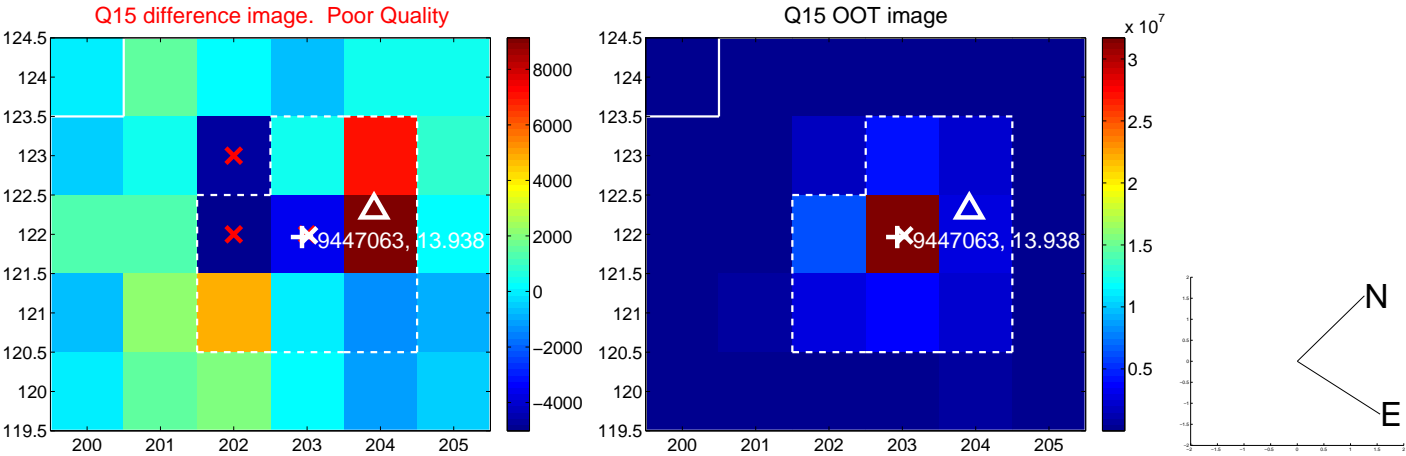
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



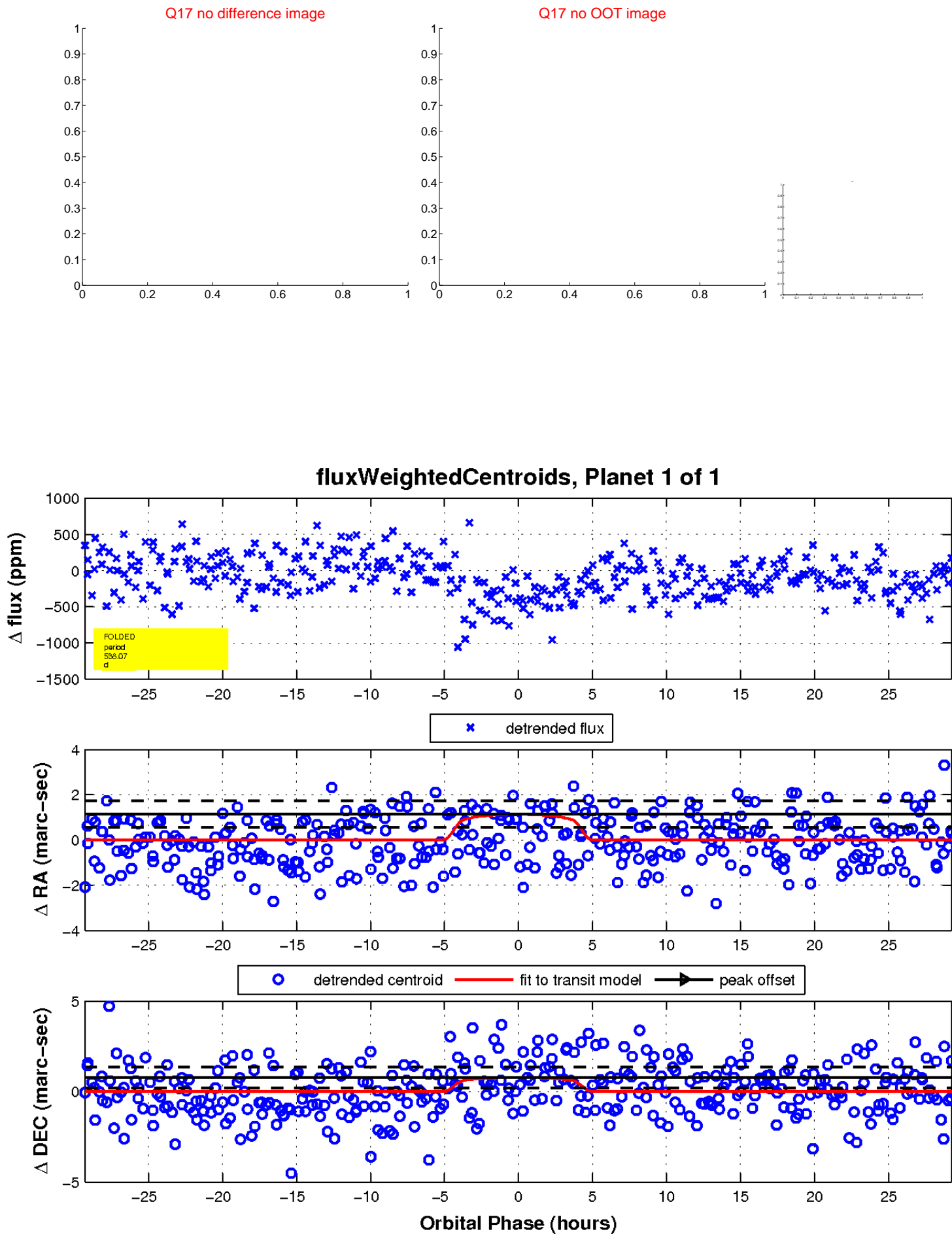
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.



UKIRT Image

Declination

