

# KIC 008813404

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 008813404-01 | OBS      | 8170.01 | 374.801838    | 457.306690   | 205.4       | 11.499           | 9.7 | 9.4 | 1.23                        | 5804            | 2.15                   | 1.59                   |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments                                          |
|--------------|----------|------|-------|---|---|---|---|---------------------------------------------------|
| 008813404-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | MOD_NONUNIQ_ALT—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.

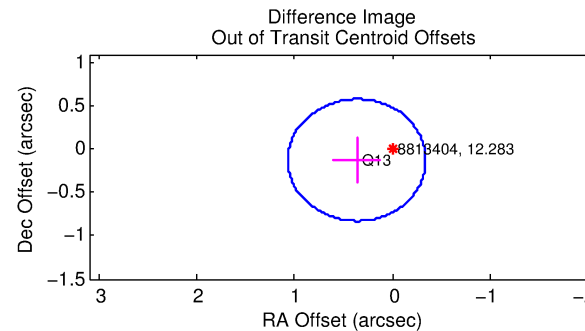
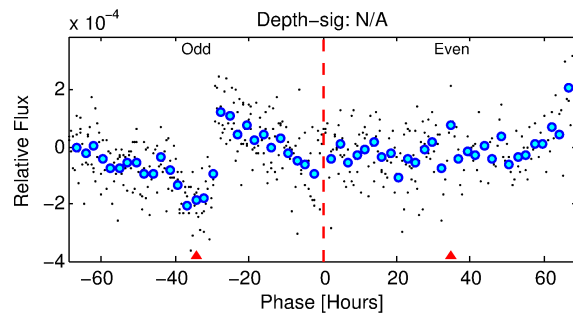
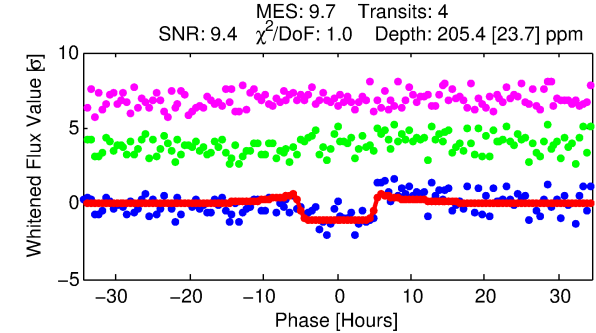
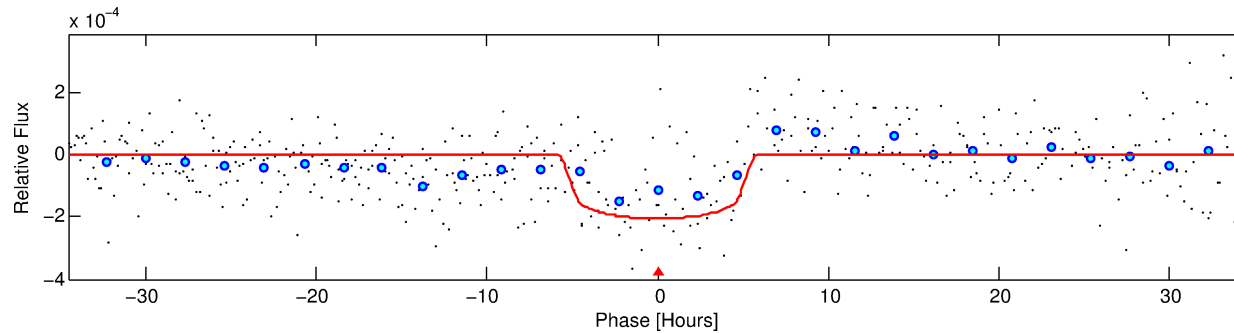
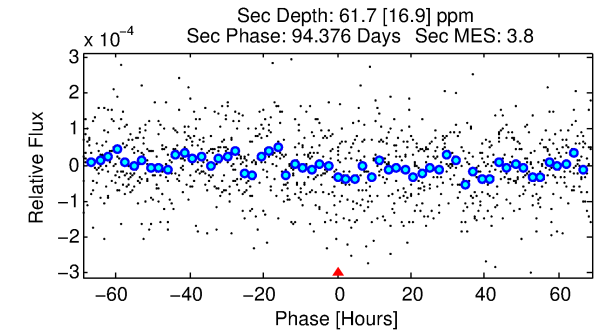
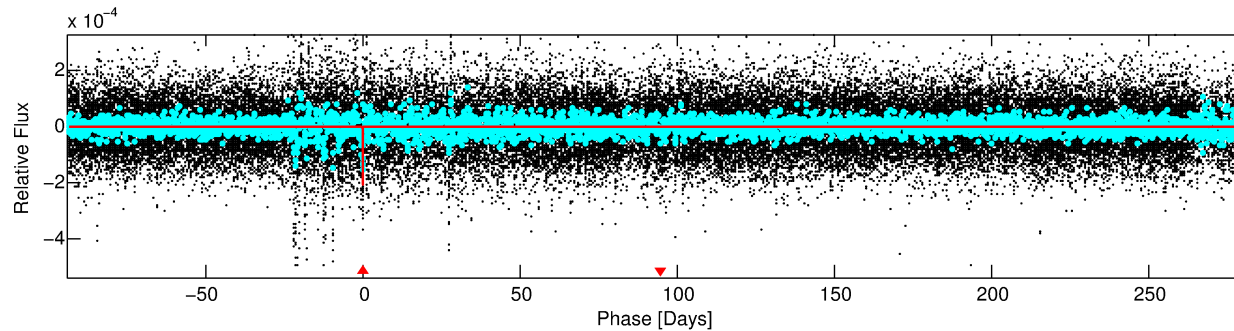
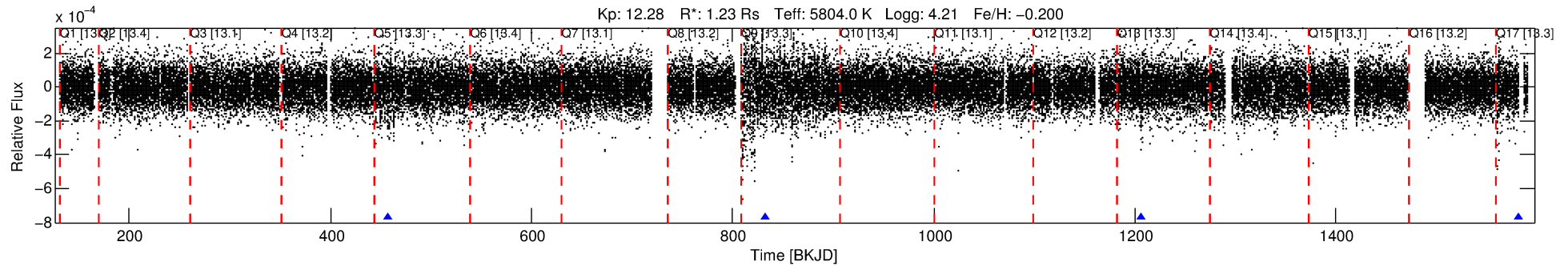
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008813404-01

No Significant Match Found

# DV One-Page Summary

KIC: 8813404 Candidate: 1 of 1 Period: 374.802 d



## DV Fit Results:

Period = 374.80184 [0.00732] d  
Epoch = 457.3067 [0.0121] BKJD  
Rp/R\* = 0.0160 [0.0016]  
a/R\* = 104.98 [38.32]  
b = 0.92 [0.06]  
Seff = 1.59 [0.63]  
Teq = 286 [29] K  
Rp = 2.15 [0.56] Re  
a = 0.9858 [0.2348] AU  
Ag = 7136.39 [3655.50] [1.95σ]  
Teffp = 4071 [358] K [10.53σ]

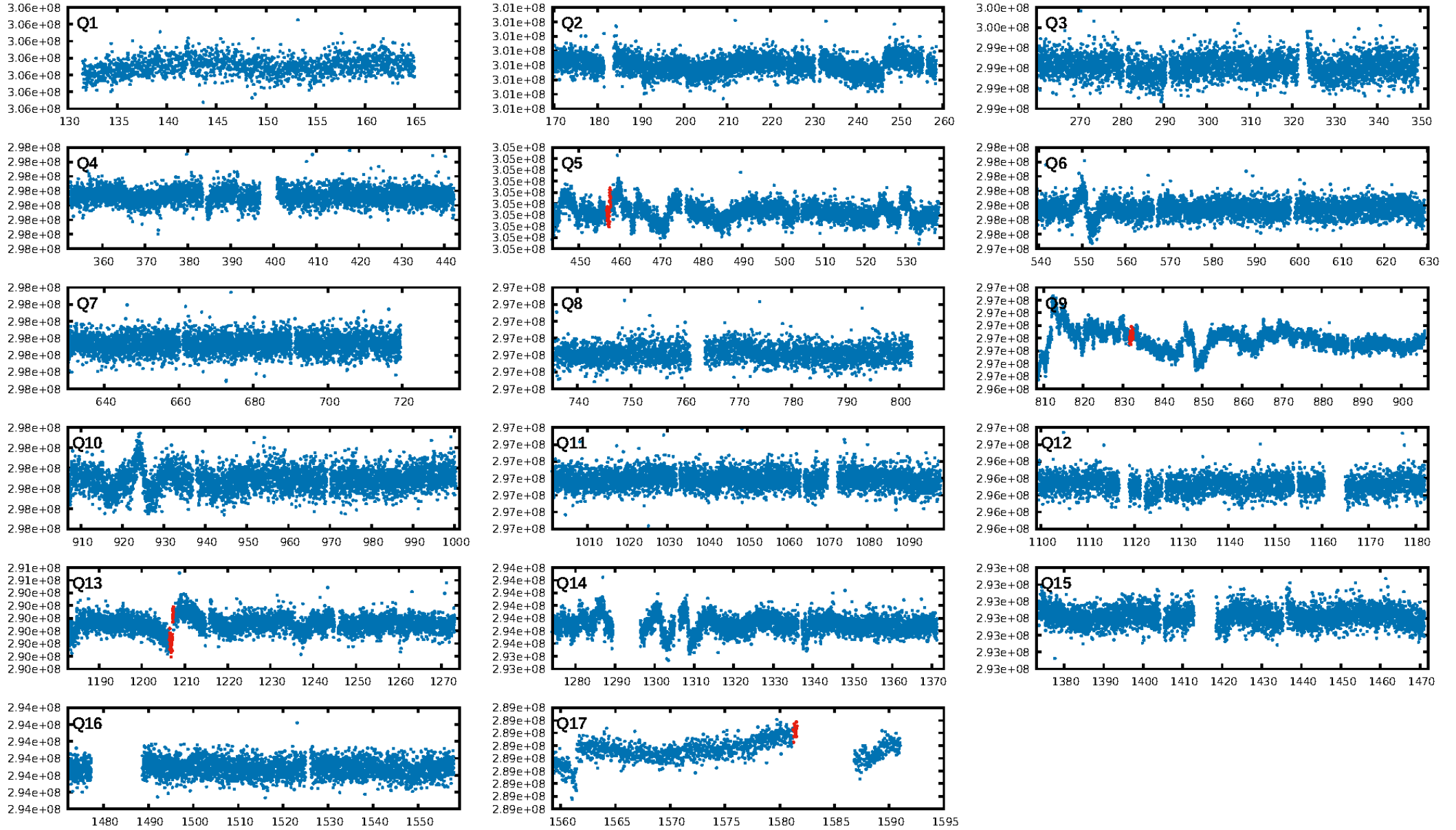
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.4%  
ModelChiSquareGof-sig: 99.9%  
Bootstrap-pfa: 1.27e-13  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 7.087  
Centroid-sig: 39.4%  
Centroid-so: 0.963 arcsec [0.90σ]  
OotOffset-rm: 0.385 arcsec [1.64σ]  
KicOffset-rm: 0.549 arcsec [2.34σ]  
OotOffset-st: 0/0/0/1 [1]  
KicOffset-st: 0/0/0/1 [1]  
DiffImageQuality-fgm: 1.00 [1/1]  
DiffImageOverlap-fno: 1.00 [3/3]

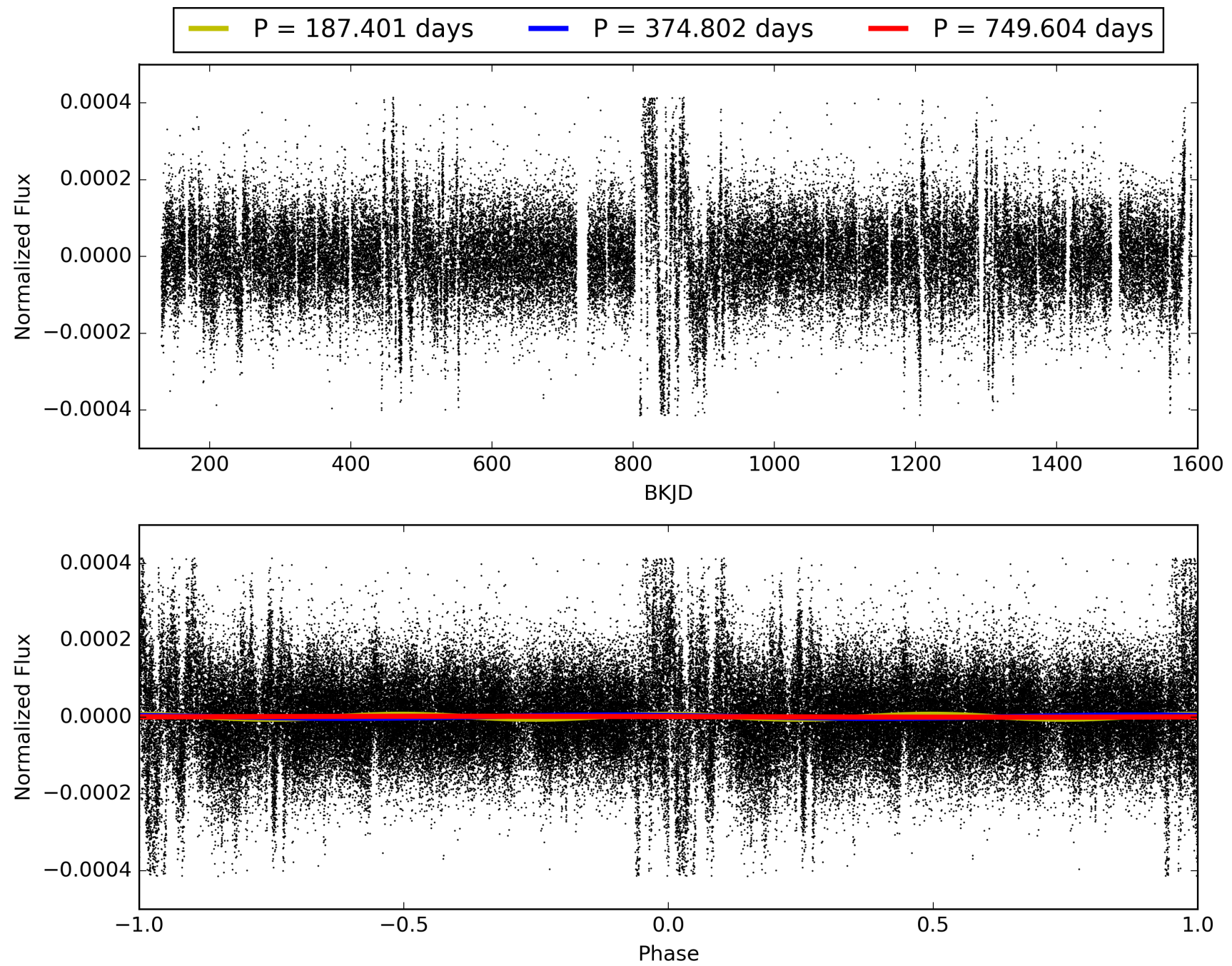
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 15:47:35 Z

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

# TCE 008813404-01, PDC Light Curves

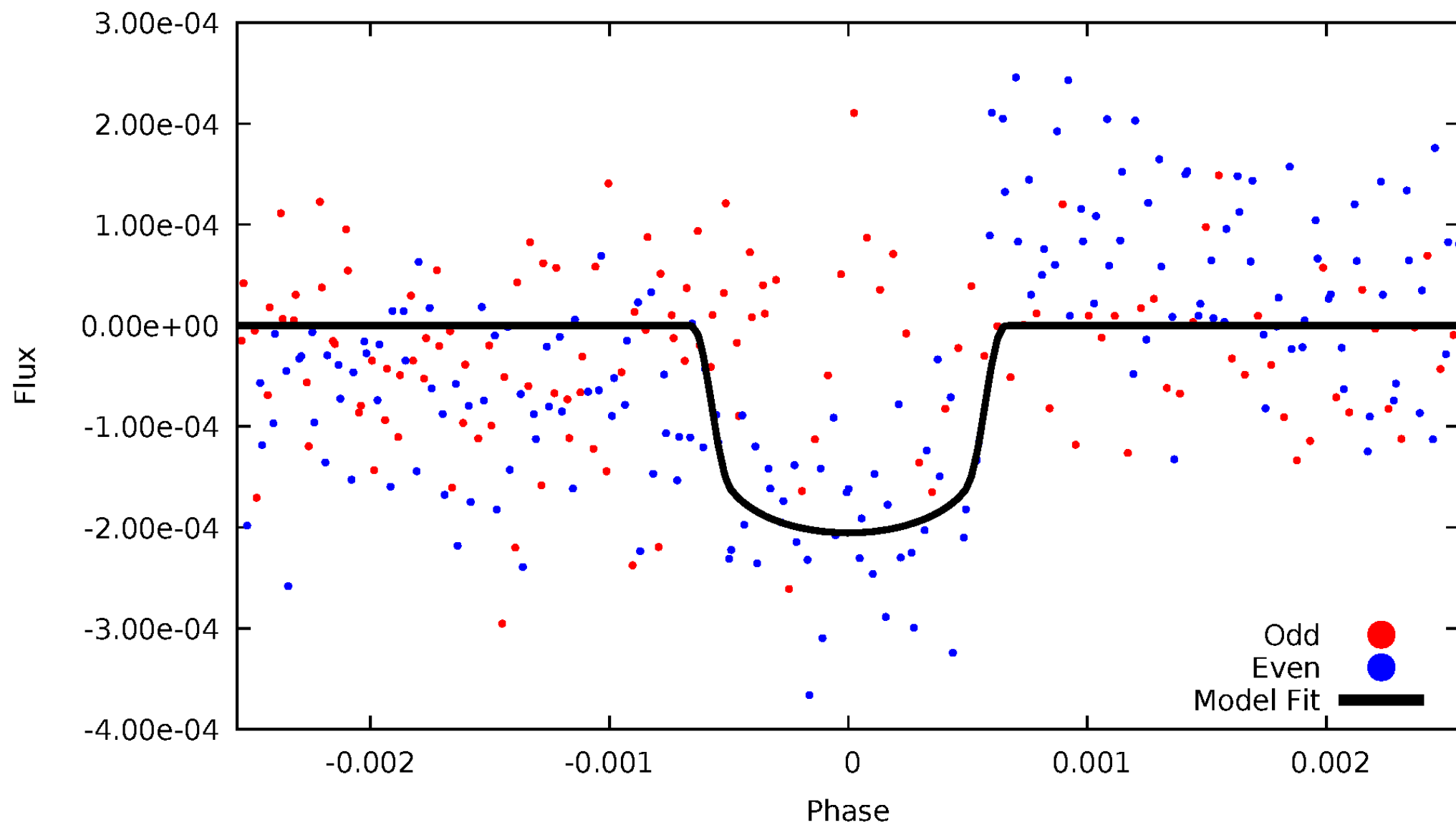


TCE 008813404-01



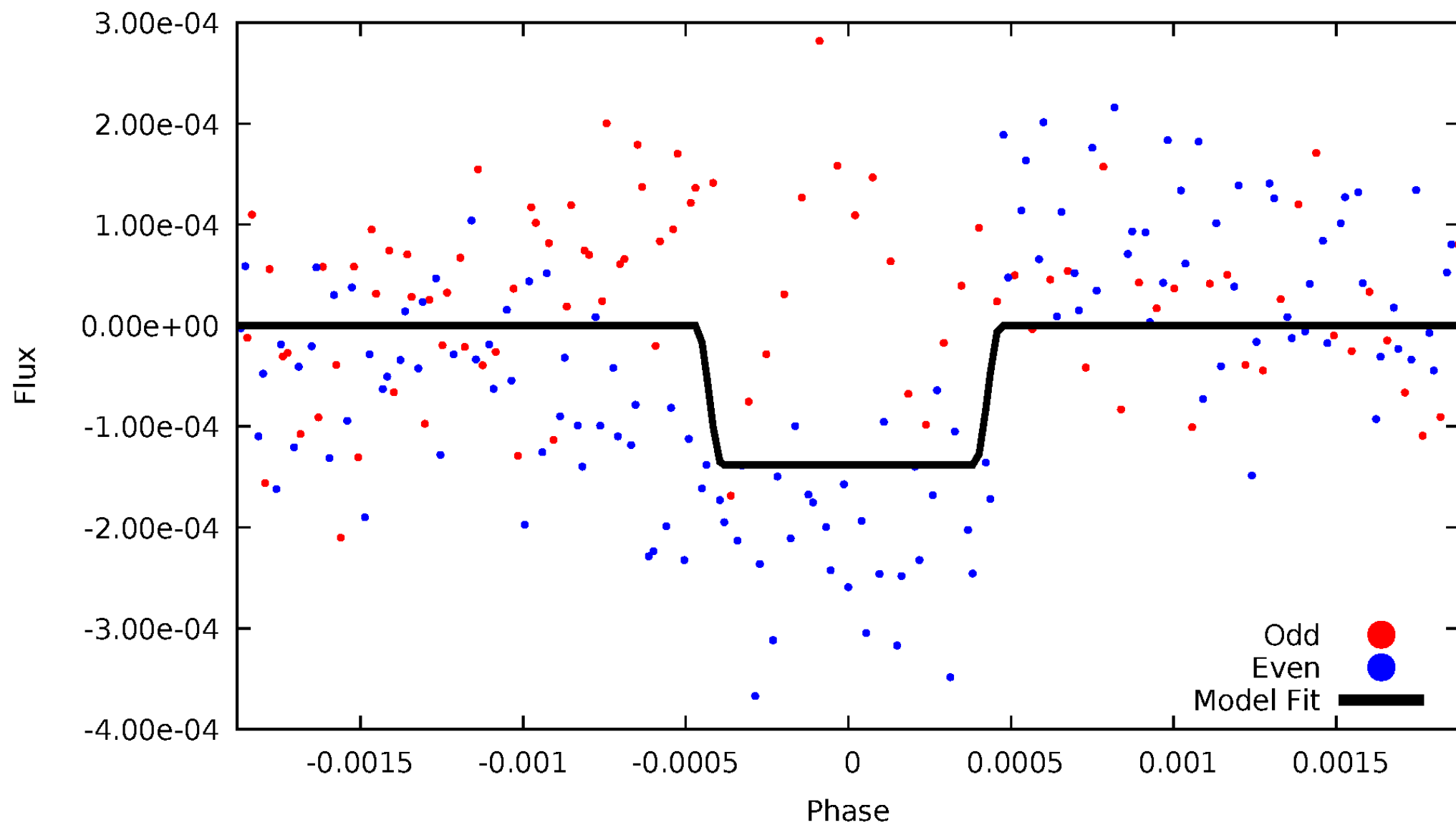
# DV Odd/Even

TCE 008813404-01



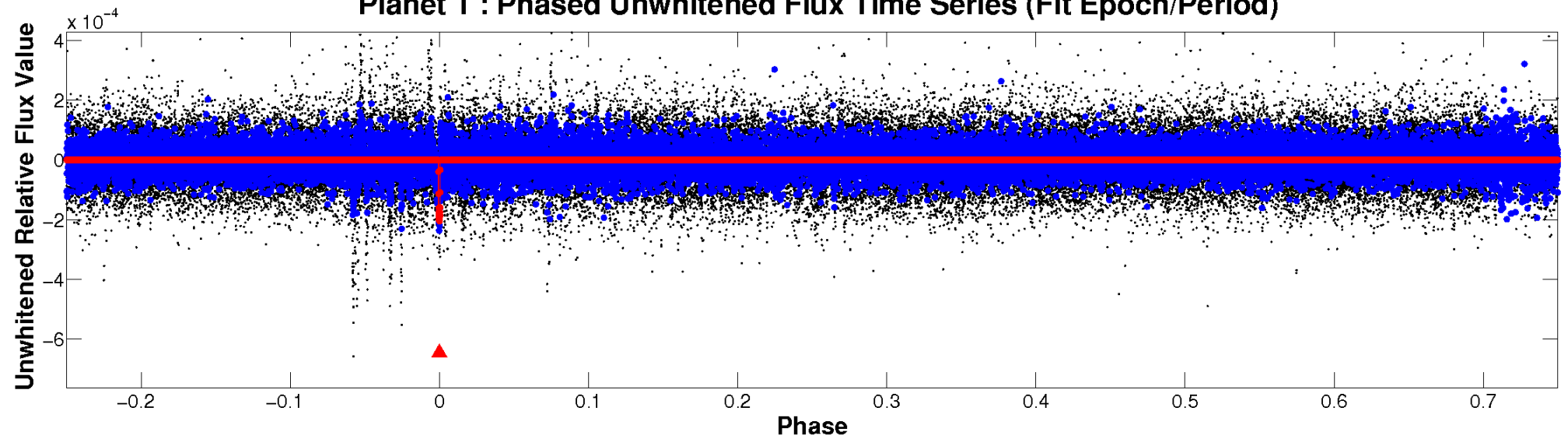
# ALT Odd/Even

TCE 008813404-01

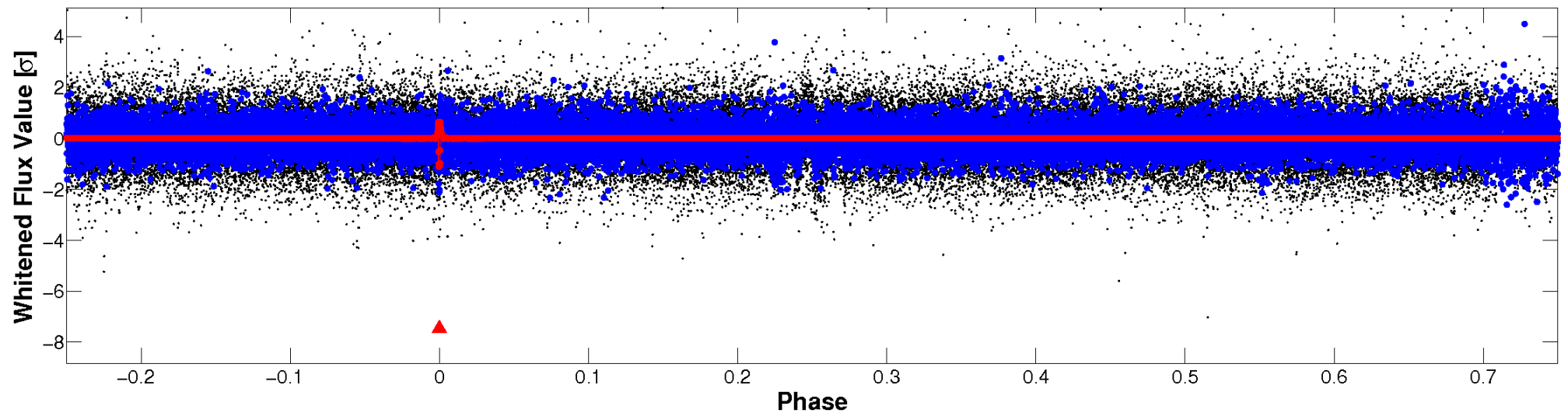


# Non-Whitened Vs. Whitened Light Curve

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



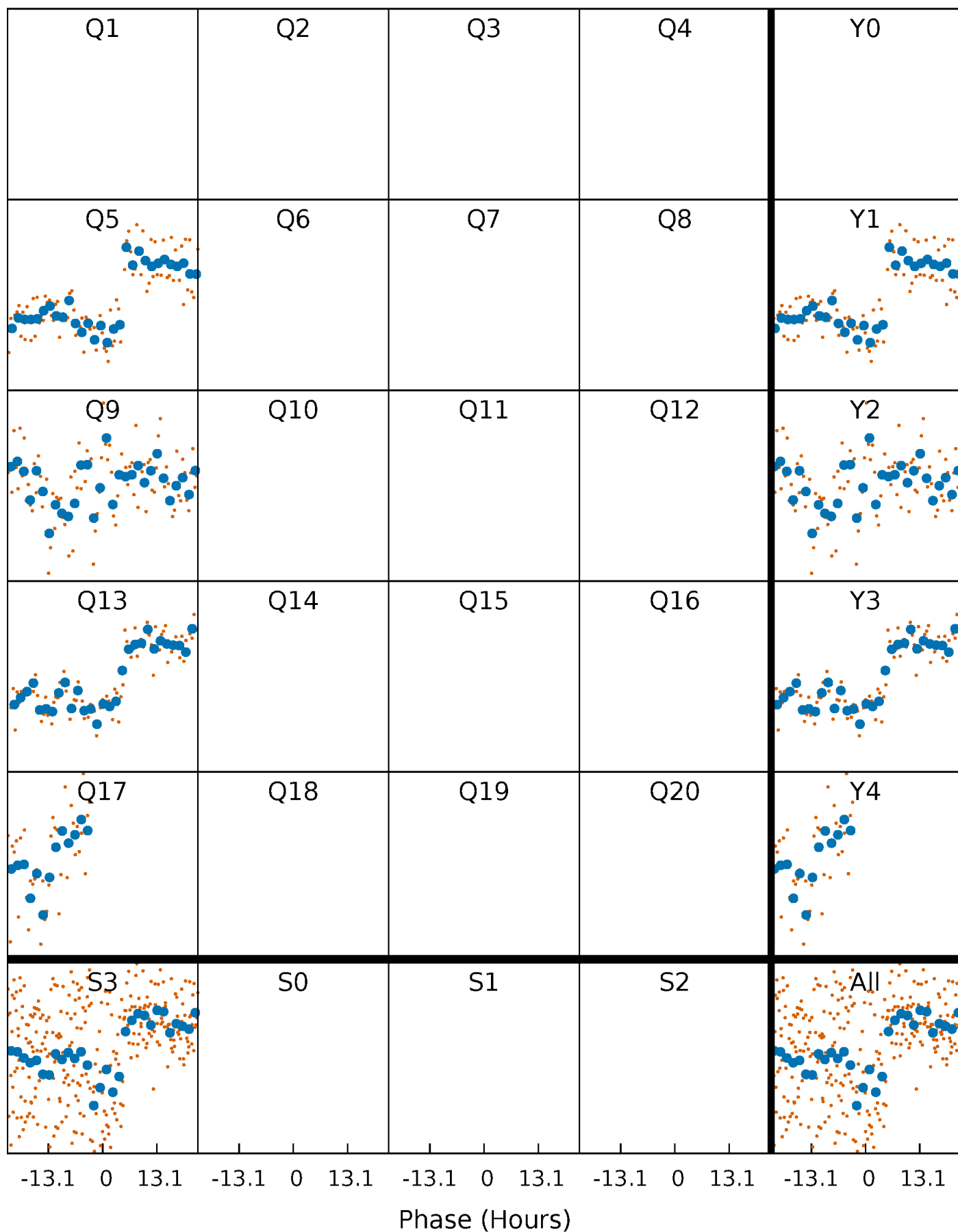
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

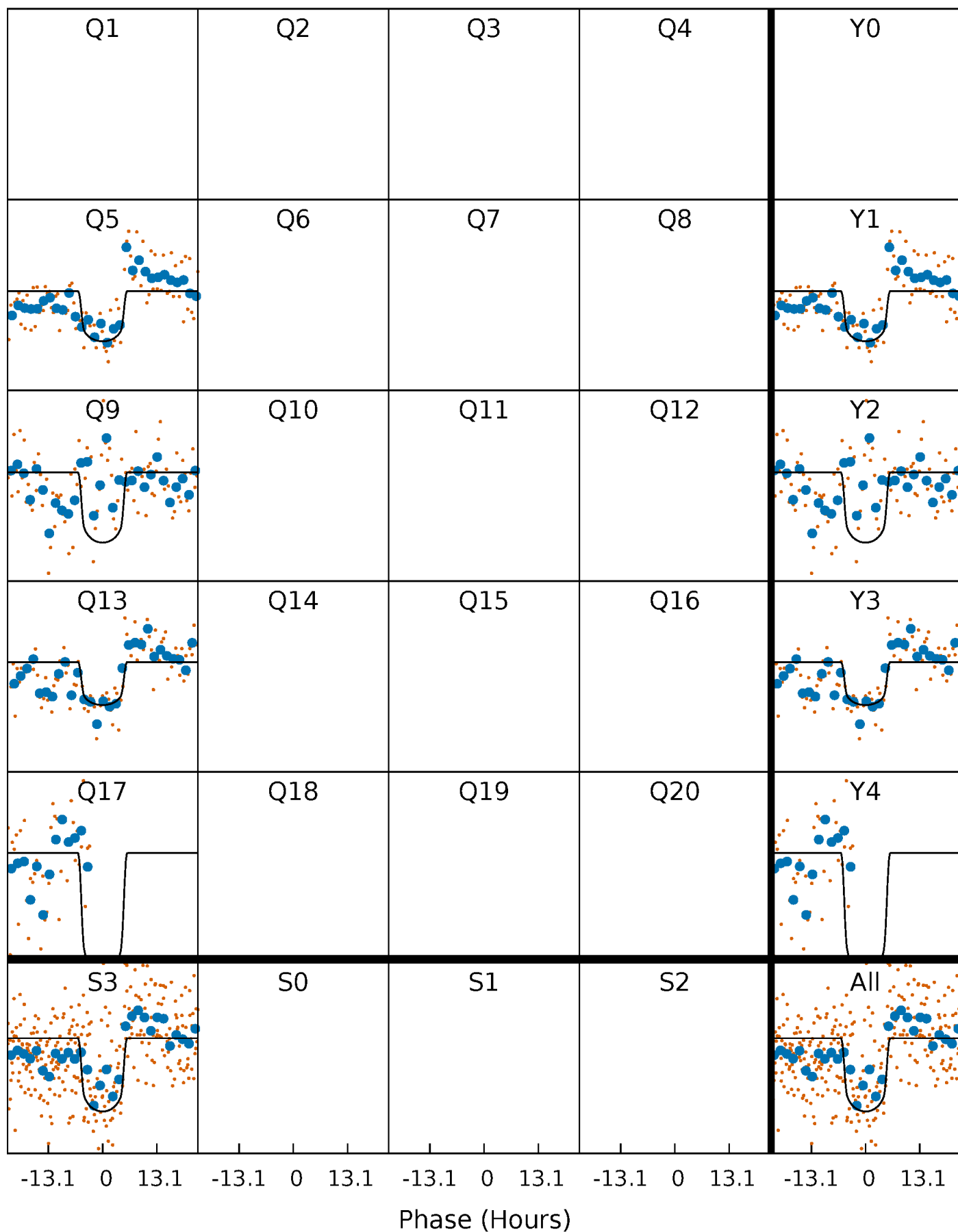
TCE 008813404-01     $P=374.801838$  Days     $T_0=457.306690$  (BKJD)





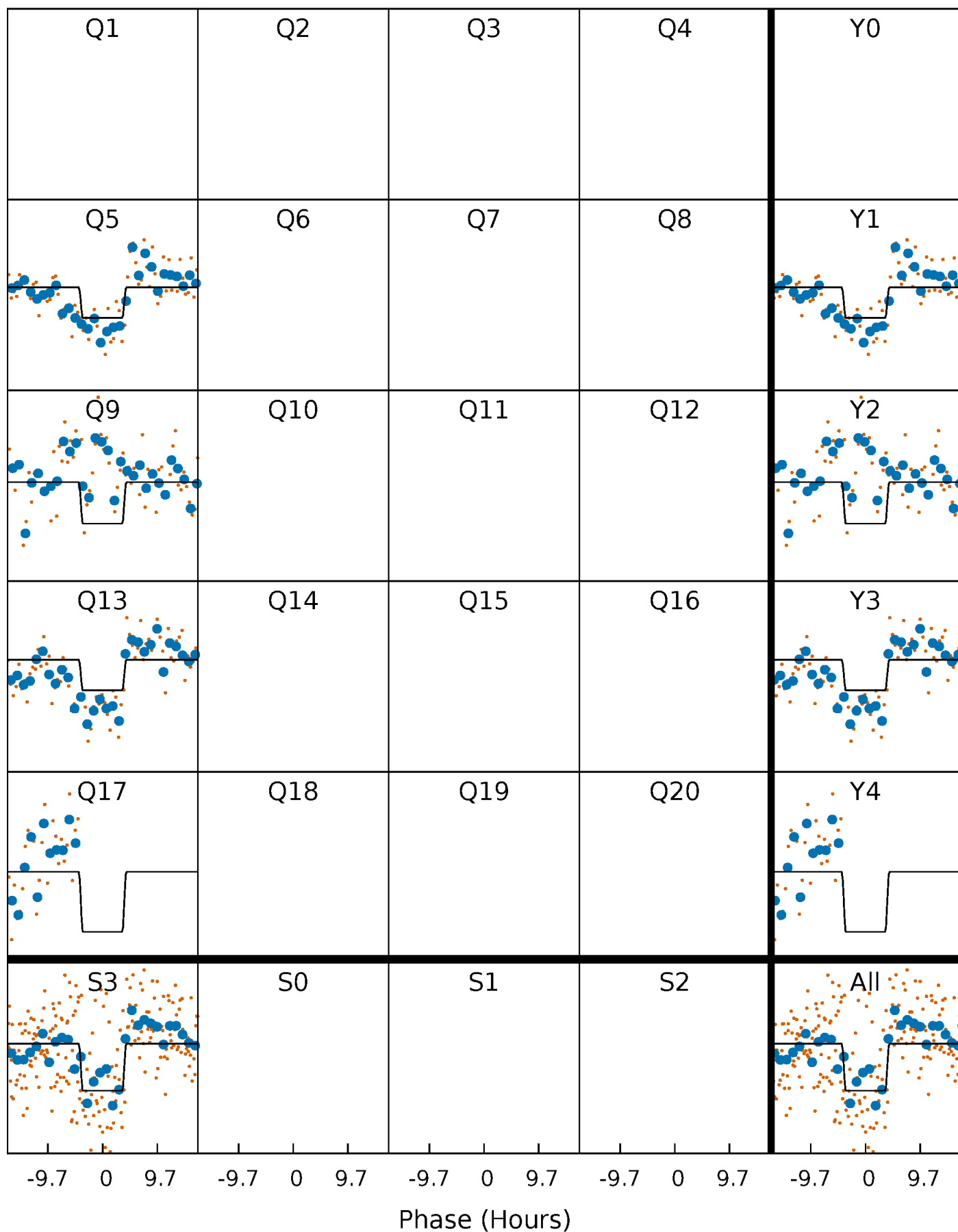
# DV Quarter-Phased Transit Curves

TCE 008813404-01   P=374.801838 Days    $T_0=457.306690$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

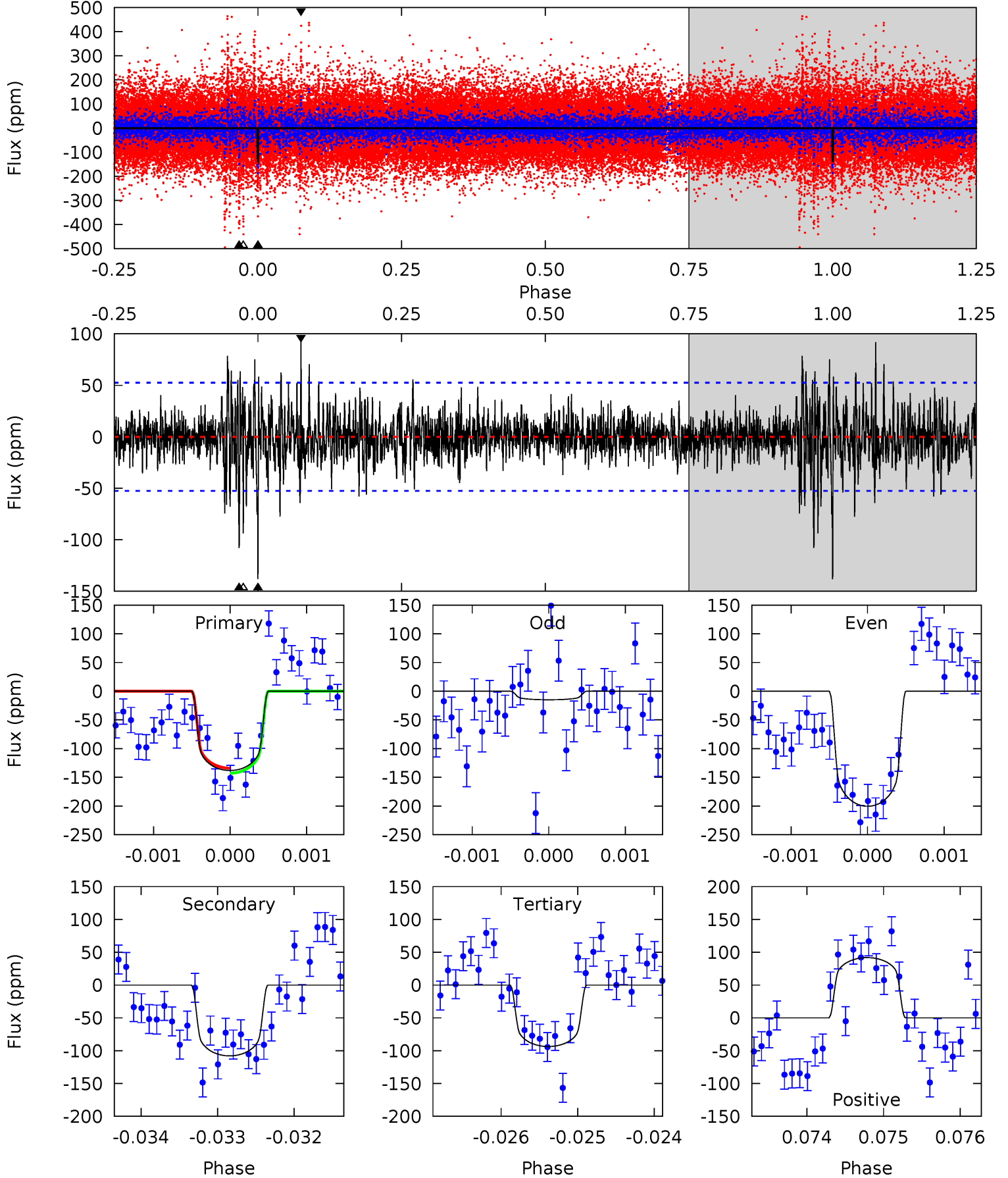
TCE 008813404-01 P=374.805980 Days  $T_0=457.344700$  (BKJD)



# DV Model-Shift Uniqueness Test

008813404-01,  $P = 374.801838$  Days,  $E = 82.504852$  Days

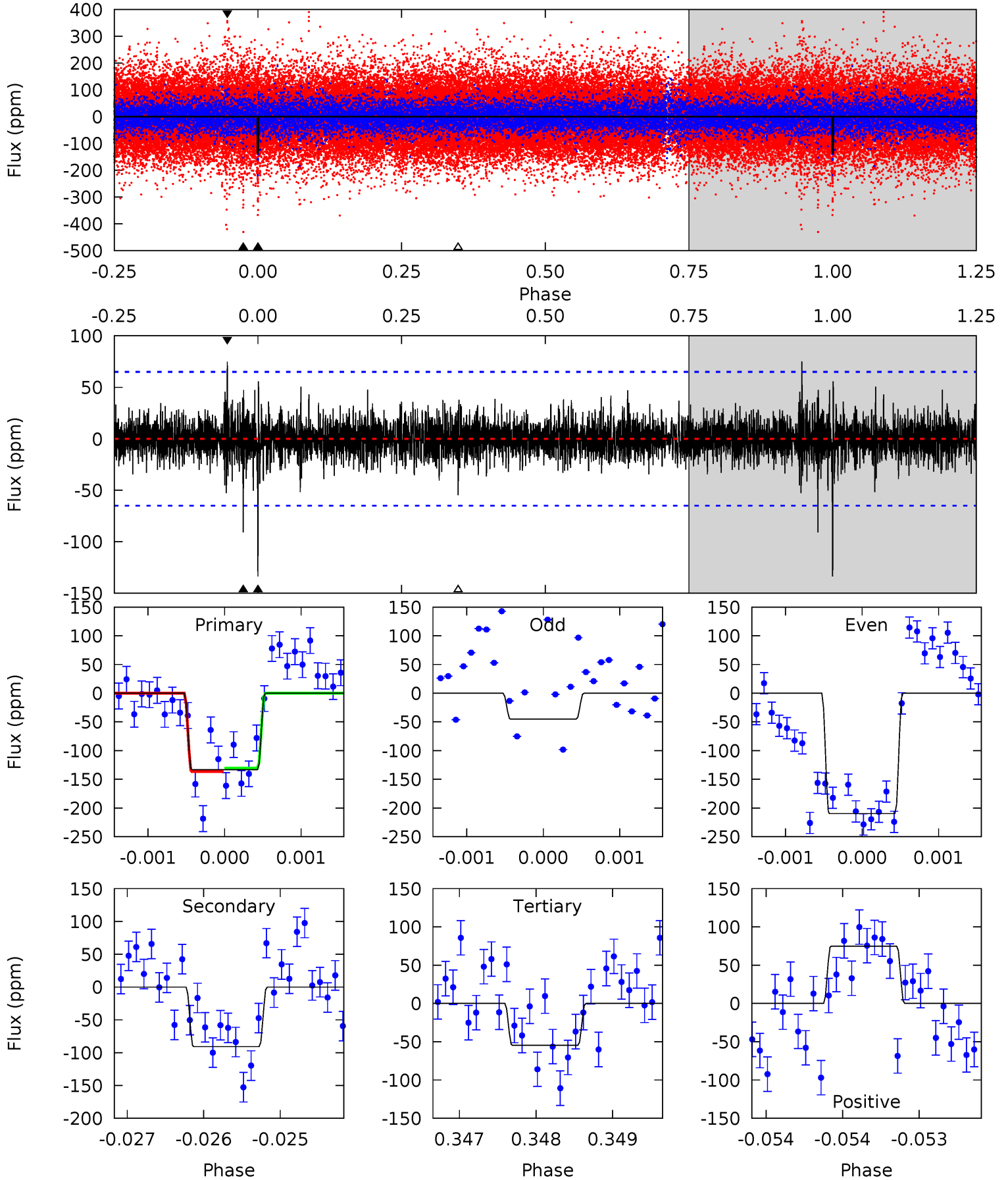
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 14.2 | 11.1 | 9.63 | 9.44 | 5.40            | 3.21            | 1.74             | 4.57    | 4.76    | 1.47    | 1.66    | 9.28    | 1.05 | 0.40  | 0.45 |



# Alt Model-Shift Uniqueness Test

008813404-01,  $P = 374.805980$  Days,  $E = 82.538720$  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  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 11.3 | 7.65 | 4.61 | 6.31 | 5.47            | 3.32            | 1.05             | 6.64    | 4.95    | 3.04    | 1.34    | 6.59    | 0.66 | 0.36  | 0.26 |



### Stellar Parameters For KIC 008813404

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                     | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|-------------------------------------------|
|        | $5804^{+146}_{-146}$ | $4.214^{+0.228}_{-0.123}$ | $-0.200^{+0.300}_{-0.250}$ | $1.234^{+0.244}_{-0.299}$ | $0.909^{+0.130}_{-0.080}$ | $0.681^{+0.773}_{-0.273}$                 |
|        | +3%/-3%              | +5%/-3%                   | +150%/-125%                | +20%/-24%                 | +14%/-9%                  | +114%/-40%                                |
| Source | PHO1                 | FLK73                     | 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 008813404-01 / KOI 8170.01

| Detrend | Depth (ppm)   | $R_p (R_{\oplus})$     | $T_{max} (K)$     | $T_{obs} (K)$        | $A_{obs}$                |
|---------|---------------|------------------------|-------------------|----------------------|--------------------------|
| DV      | $-108 \pm 10$ | $2.10^{+0.32}_{-0.32}$ | $398^{+22}_{-28}$ | $4808^{+267}_{-223}$ | $13183^{+5472}_{-3481}$  |
| Alt.    | $-91 \pm 12$  | $1.55^{+0.30}_{-0.27}$ | $395^{+25}_{-25}$ | $5258^{+403}_{-344}$ | $20652^{+10139}_{-6446}$ |

$T_{max}$  = 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

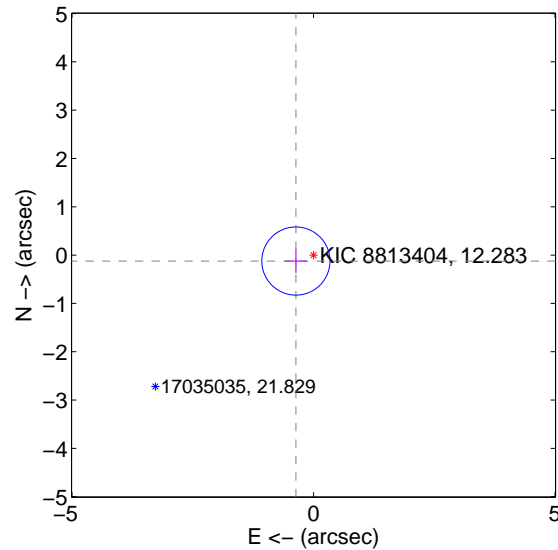
Supplemental centroid analysis for 008813404-01. Kepler magnitude: 12.28. Transit SNR 9.42

There are 1 quarters with good PRF difference image offsets

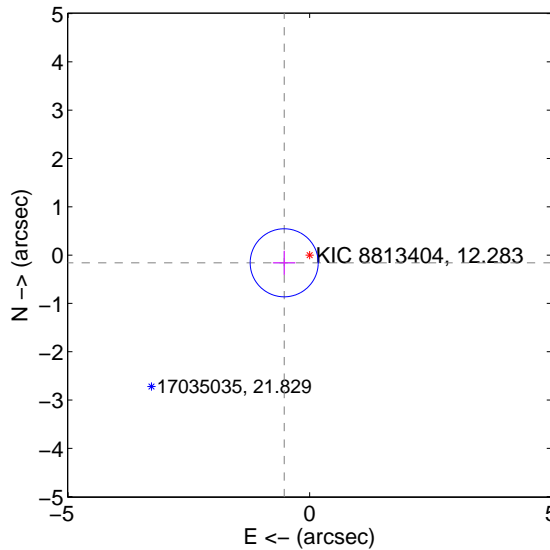
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

|                                         | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA       | $\Delta$ Dec       |
|-----------------------------------------|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT          | $0.385 \pm 0.235$  | 1.64                | $0.365 \pm 0.233$ | $-0.123 \pm 0.251$ |
| PRF-fit source offset from KIC position | $0.549 \pm 0.235$  | 2.34                | $0.526 \pm 0.233$ | $-0.159 \pm 0.251$ |
| photometric centroid source offset      | $0.96 \pm 1.07$    | 0.90                | $0.68 \pm 0.89$   | $-0.68 \pm 1.22$   |

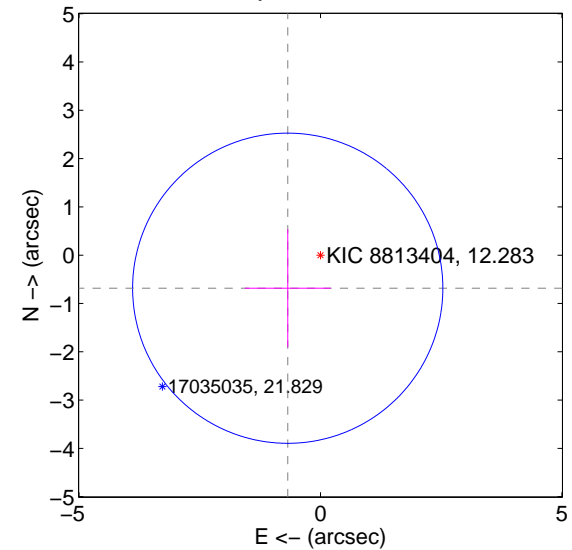
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids



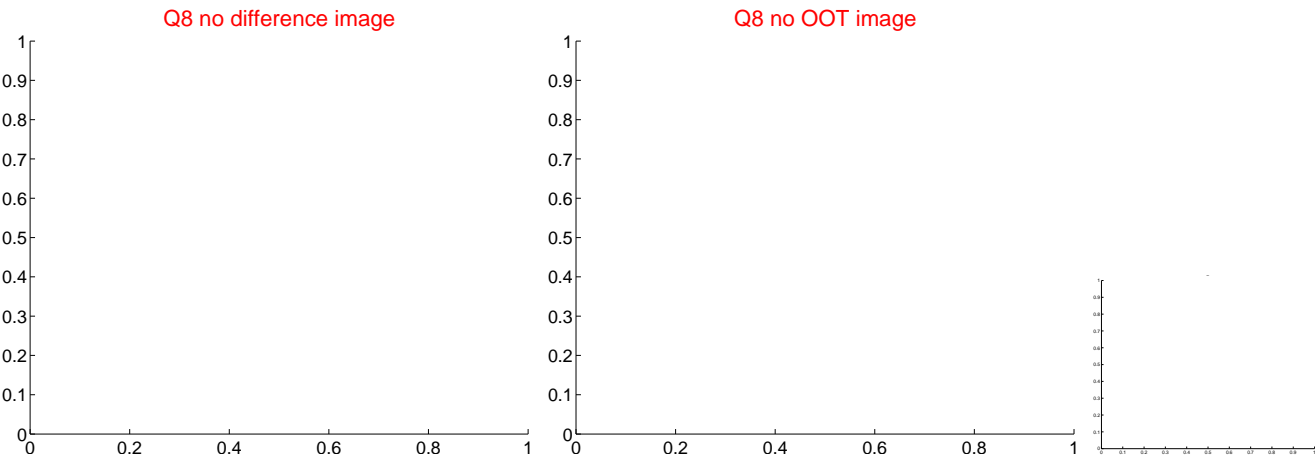
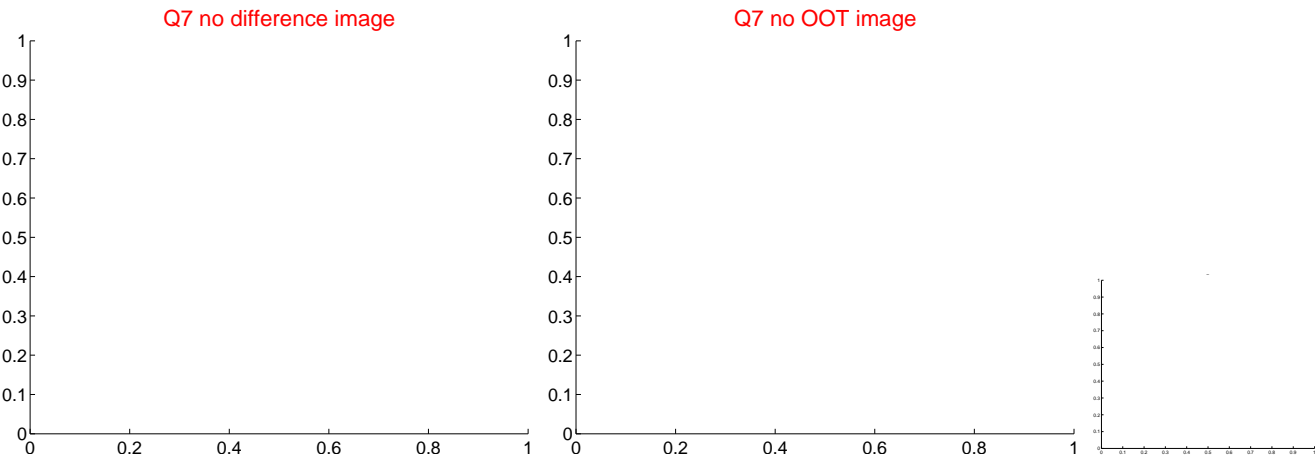
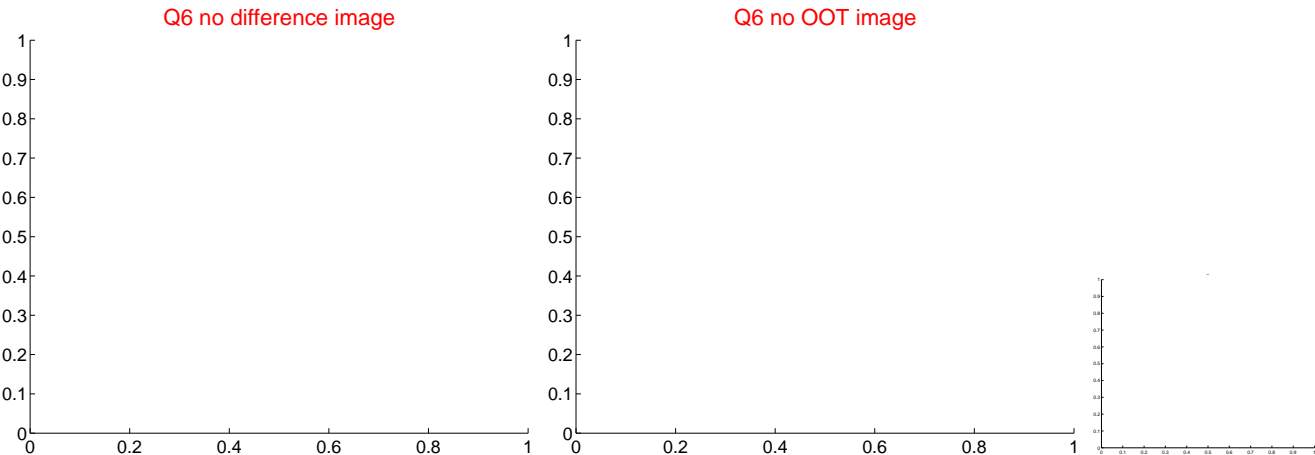
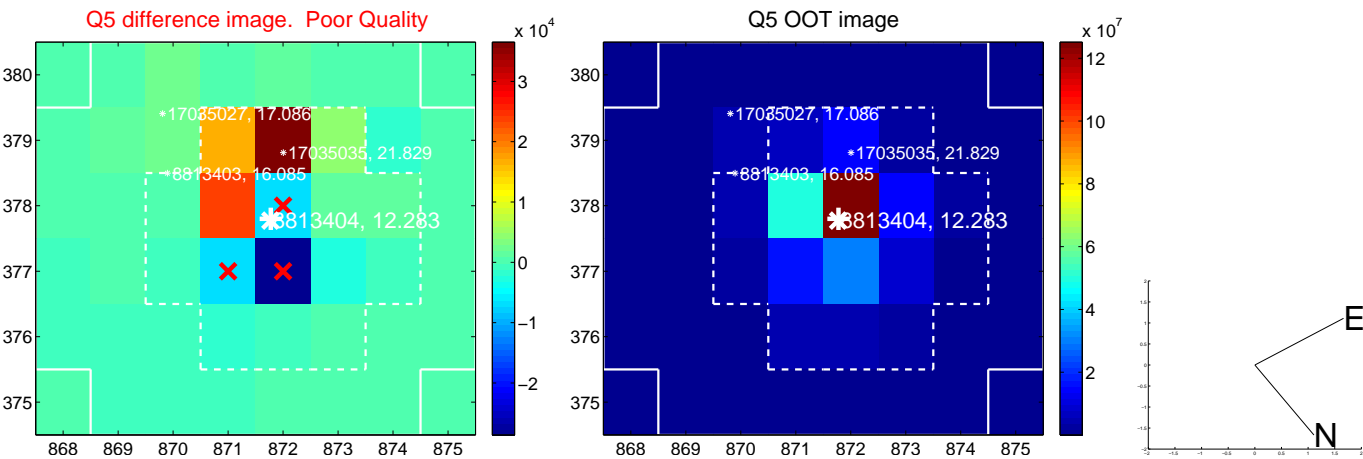
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

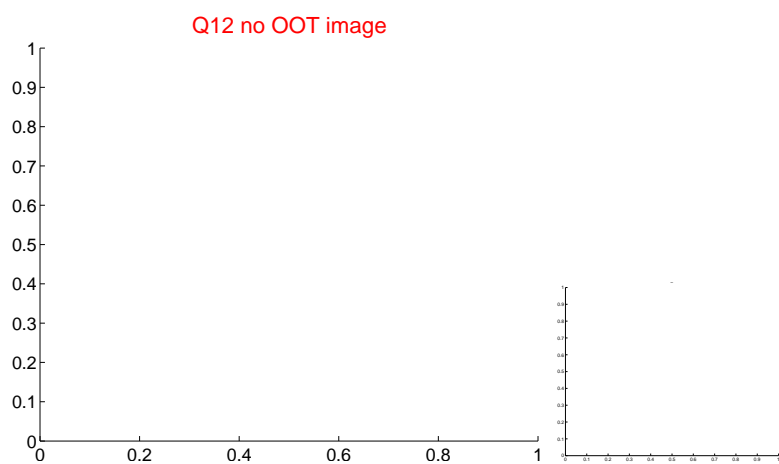
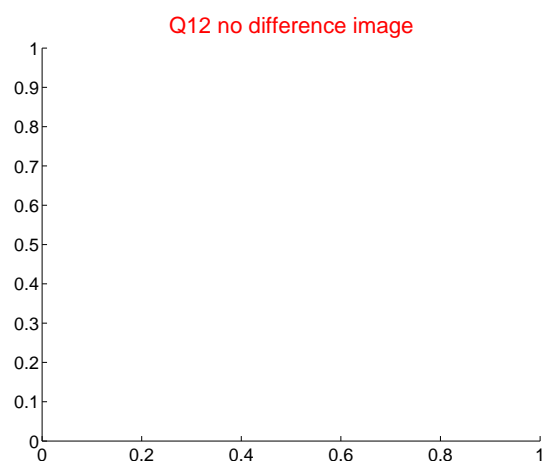
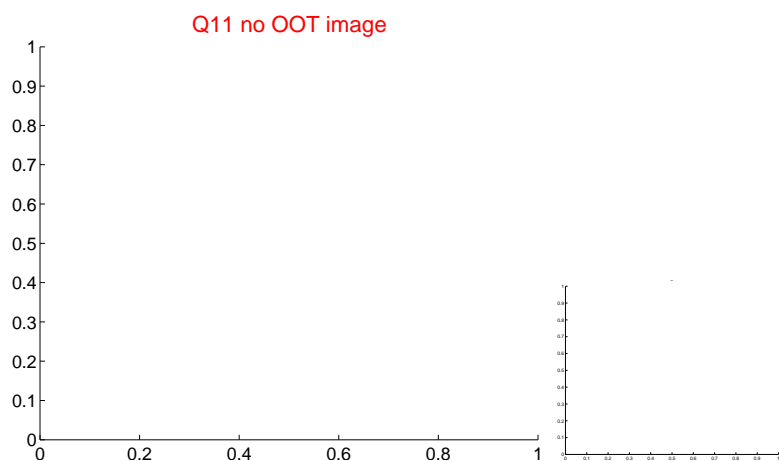
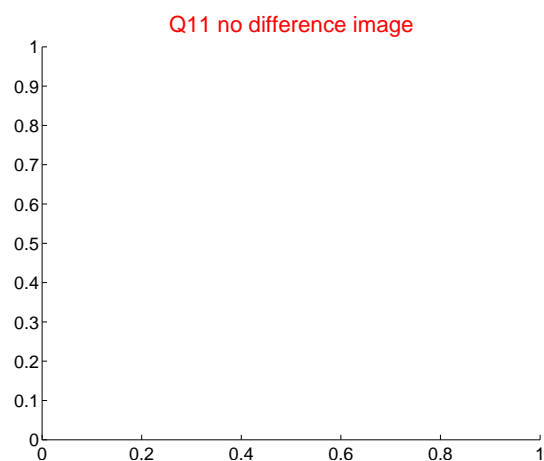
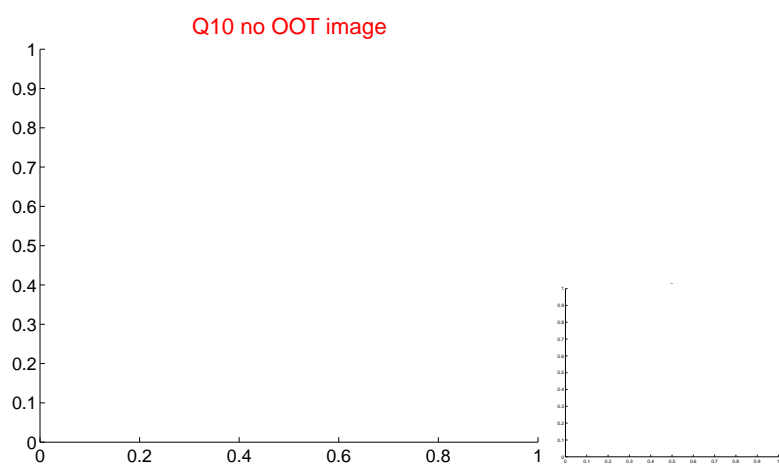
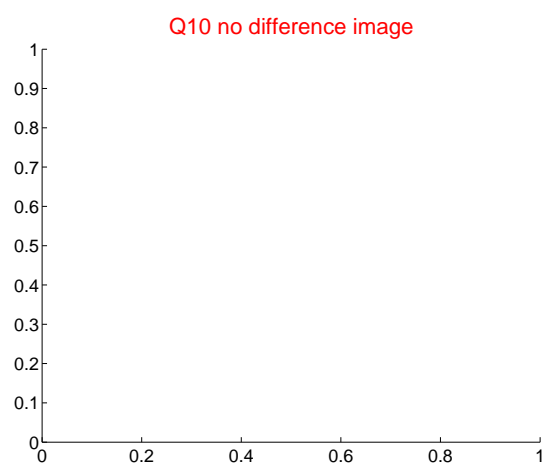
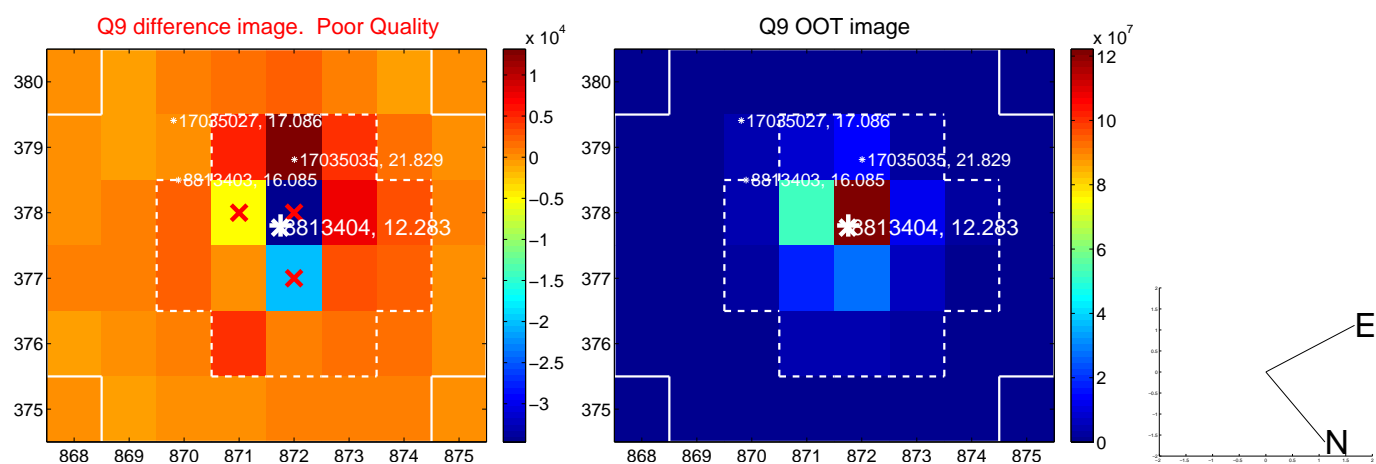




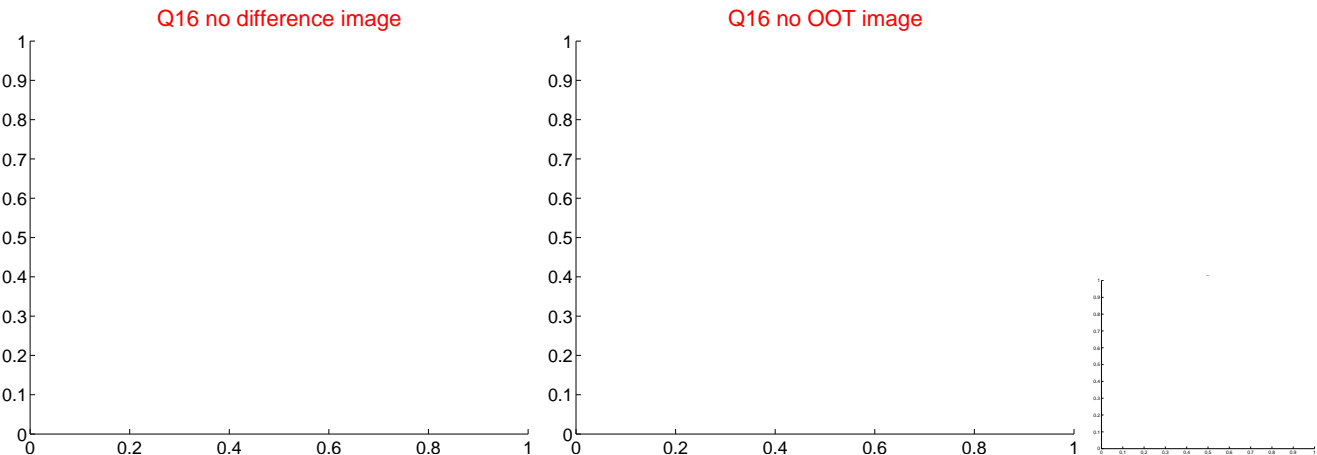
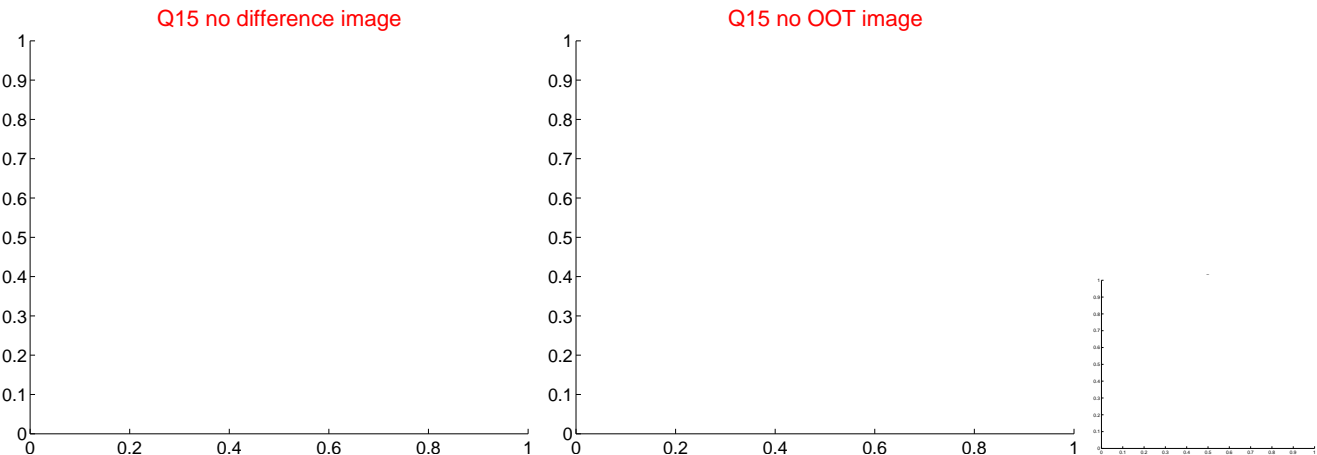
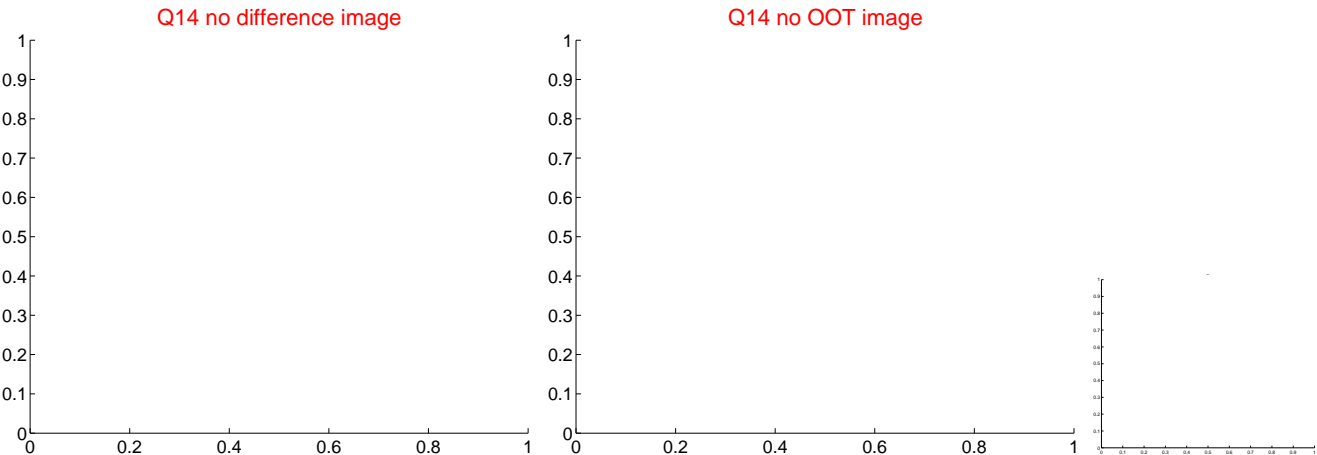
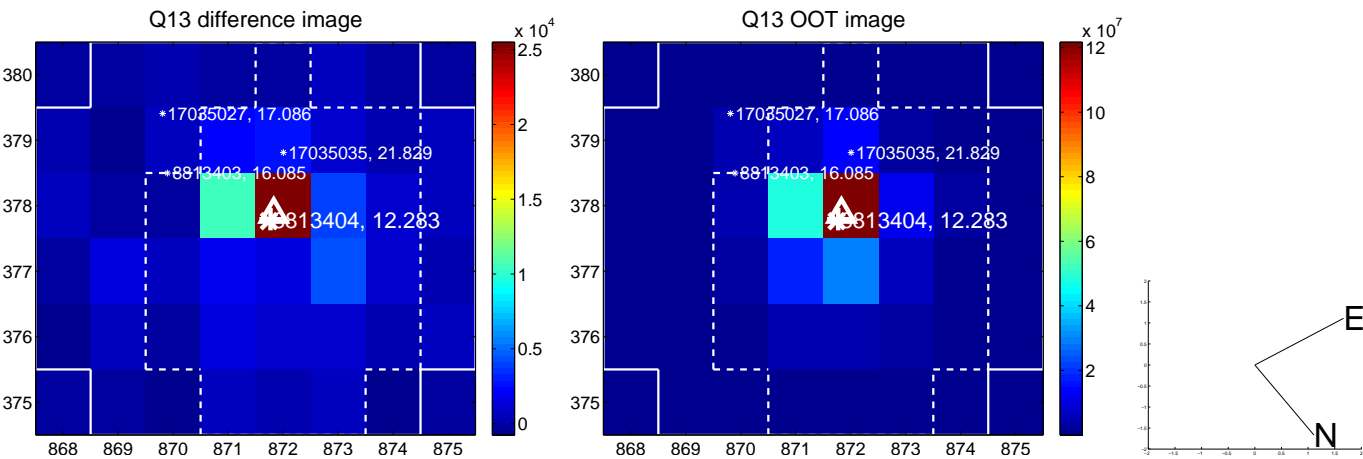
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



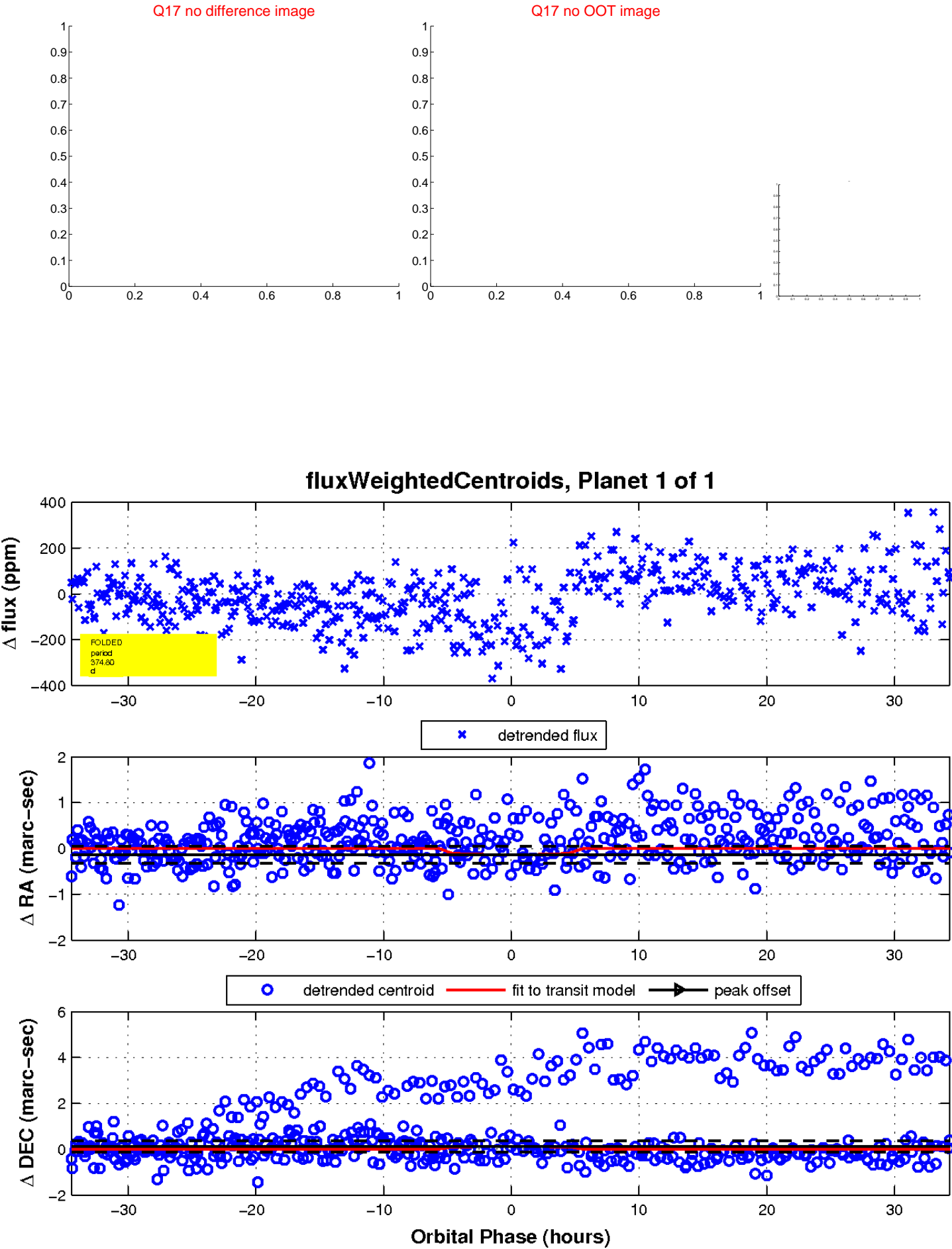
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



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



UKIRT Image

Declination

