

# KIC 009593773

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 009593773-01 | OBS      | 4240.01 | 3.133871      | 133.560606   | 216.2       | 5.869            | 18.0 | 19.5 | 1.02                        | 6137            | 2.70                   | 707.58                 |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments                                      |
|--------------|----------|------|-------|---|---|---|---|---|
| 009593773-01 | OBS      | FP   | 0.00  | 0 | 1 | 1 | 0 | MOD_SEC_DV—MOD_SEC_ALT—CENT_UNRESOLVED_OFFSET |

**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 009593773-01

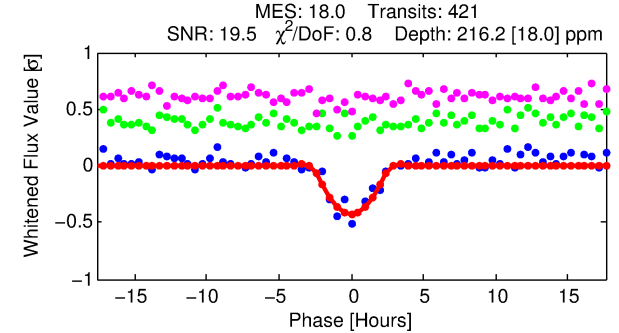
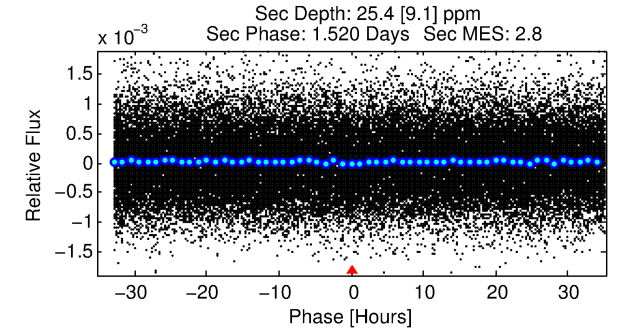
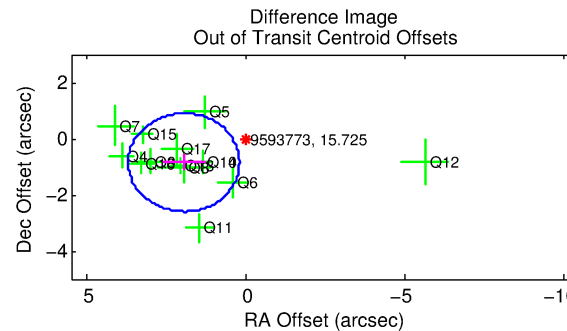
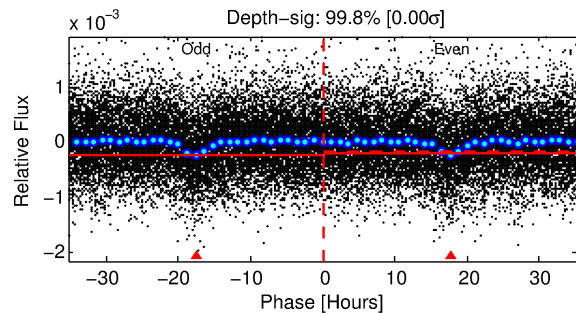
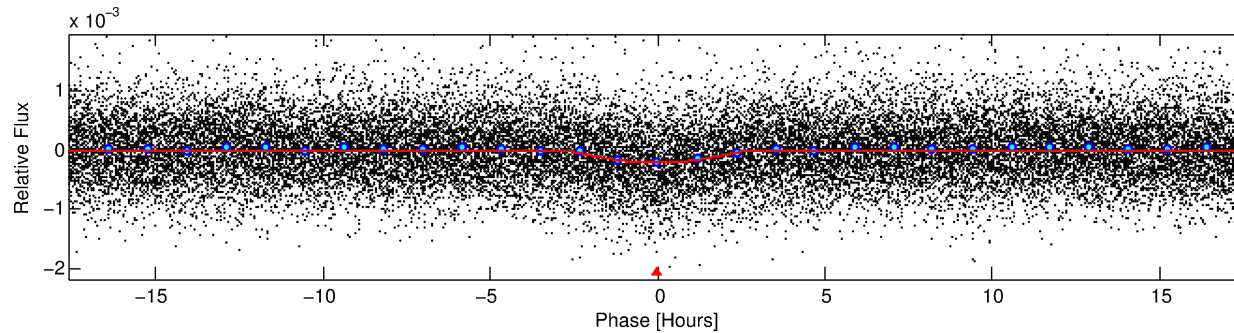
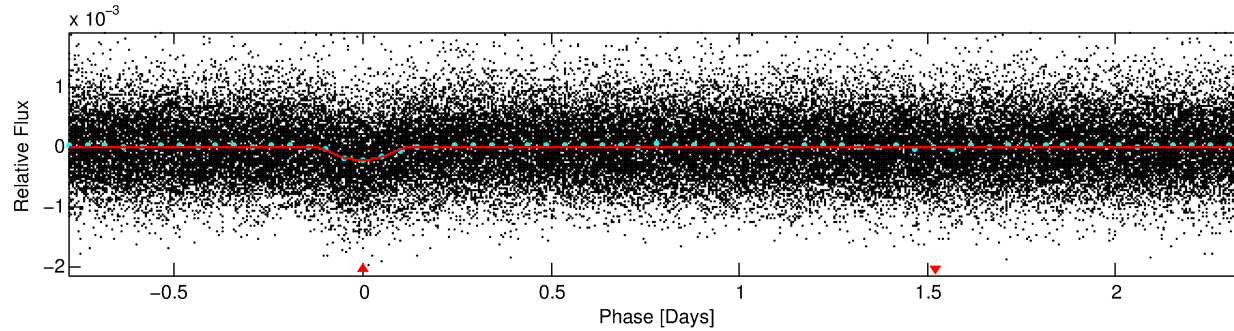
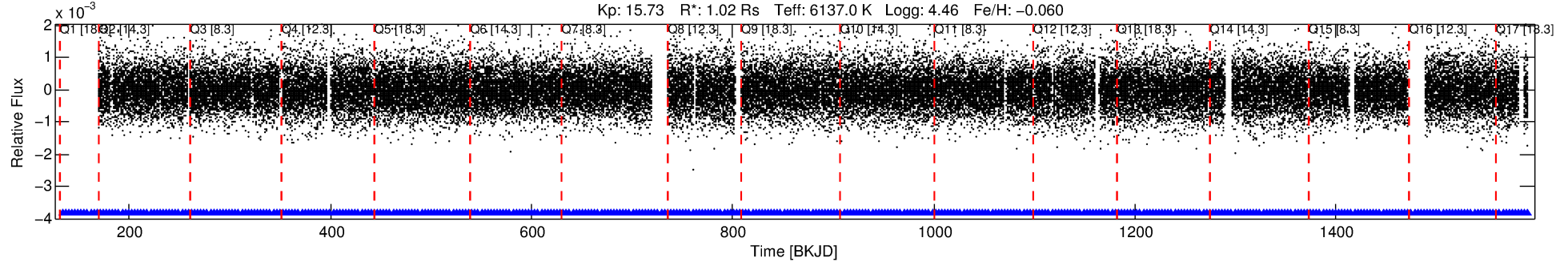
No Significant Match Found

# DV One-Page Summary

KIC: 9593773 Candidate: 1 of 1 Period: 3.134 d

KOI: K04240.01 Corr: 0.859

Kp: 15.73 R\*: 1.02 Rs Teff: 6137.0 K Logg: 4.46 Fe/H: -0.060



## DV Fit Results:

Period = 3.13387 [0.00003] d  
Epoch = 133.5606 [0.0070] BKJD  
Rp/R\* = 0.0243 [0.0323]  
a/R\* = 1.40 [0.26]  
b = 1.00 [0.05]  
Seff = 707.58 [303.08]  
Teq = 1315 [141] K  
Rp = 2.70 [3.70] Re  
a = 0.0431 [0.0120] AU  
Ag = 3.56 [9.64] [0.27σ]  
Teffp = 2794 [1872] K [0.79σ]

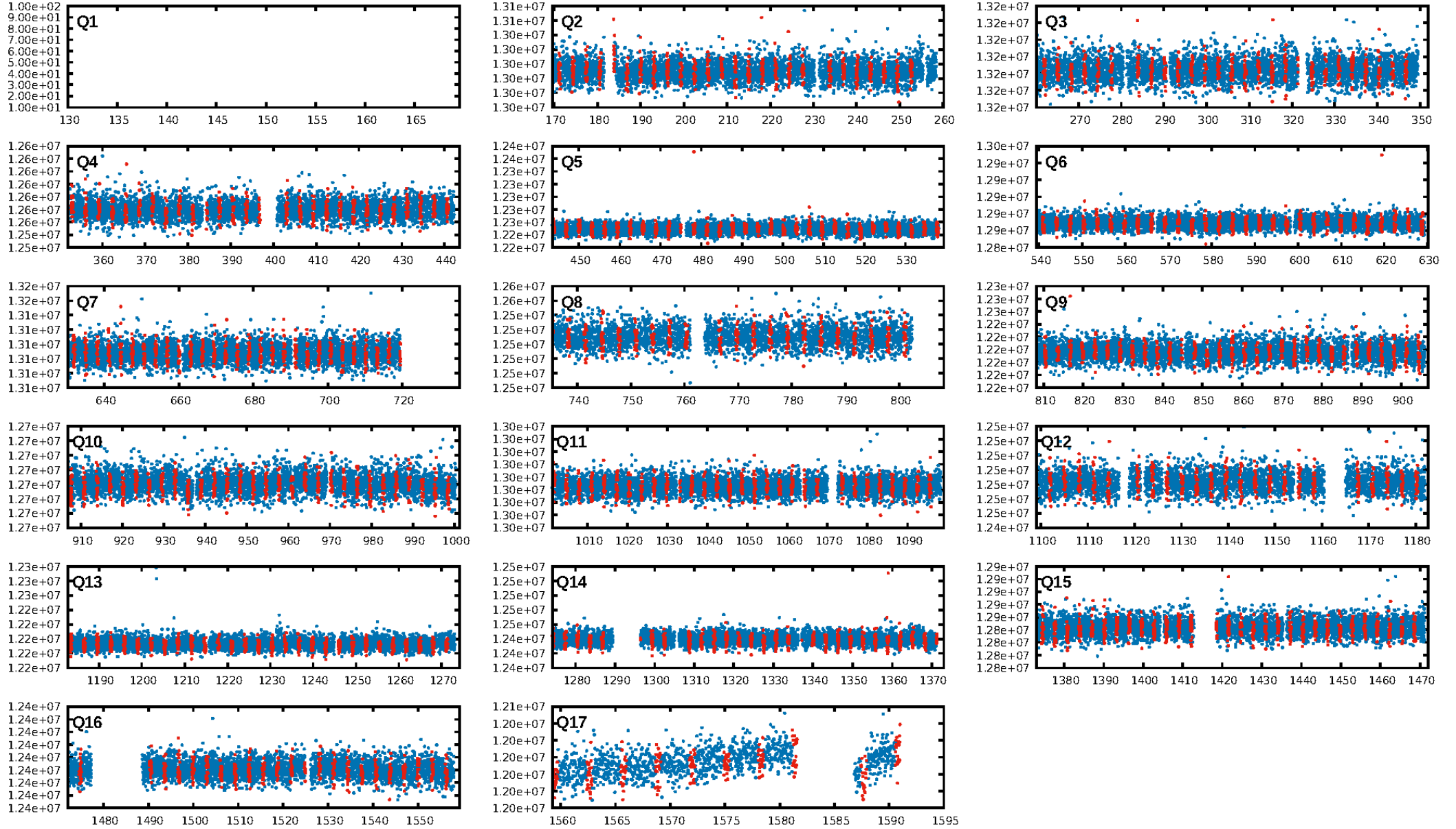
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.71e-71  
RollingBand-fgt: 1.00 [411/411]  
GhostDiagnostic-chr: 1.091  
Centroid-sig: 0.0%  
Centroid-so: 2.960 arcsec [3.78σ]  
OotOffset-rm: 2.131 arcsec [3.65σ]  
KicOffset-rm: 2.122 arcsec [3.96σ]  
OotOffset-st: 3/3/4/4 [14]  
KicOffset-st: 3/3/4/4 [14]  
DiffImageQuality-fgm: 0.79 [11/14]  
DiffImageOverlap-fno: 1.00 [16/16]

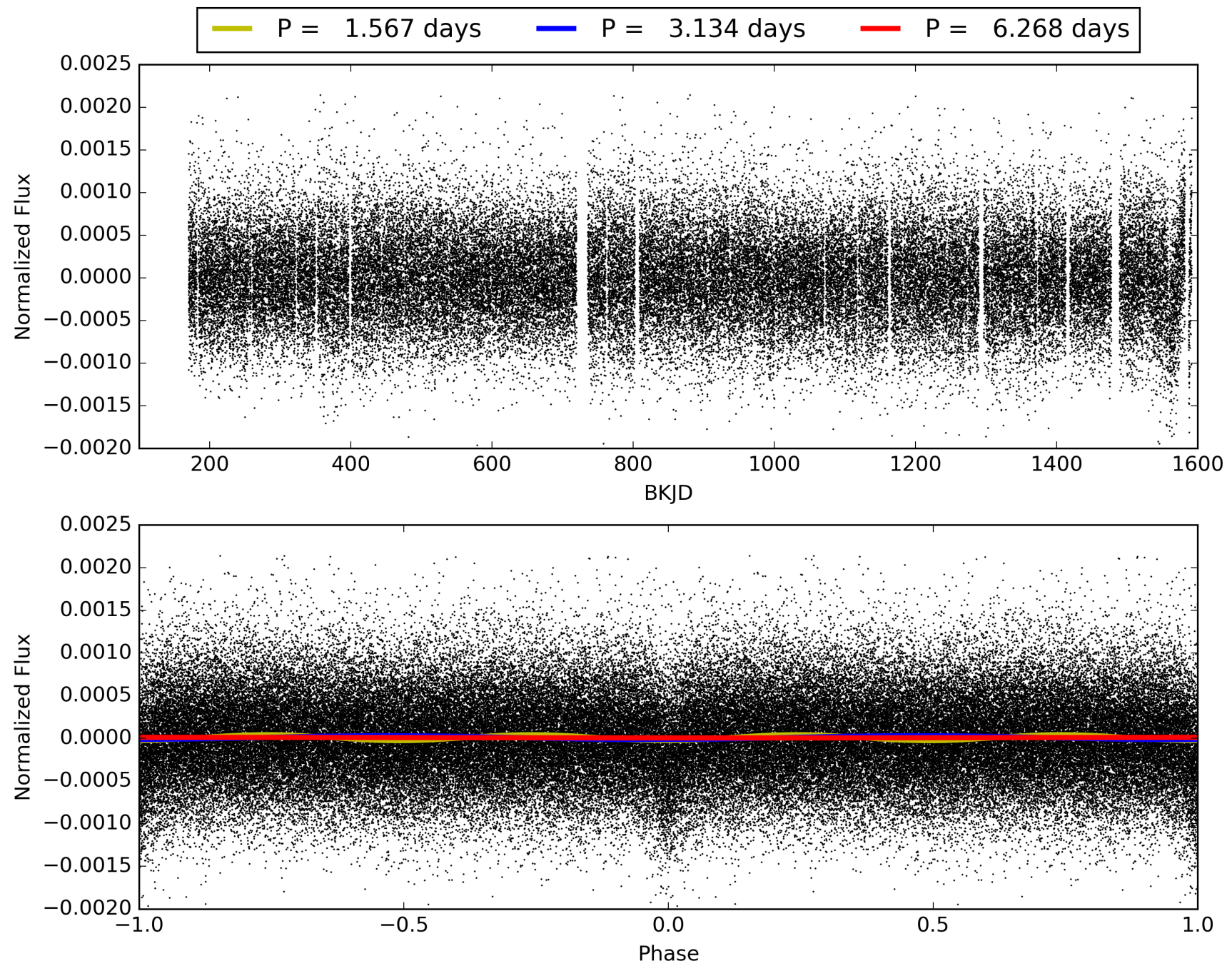
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 21:42:12 Z

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

# TCE 009593773-01, PDC Light Curves



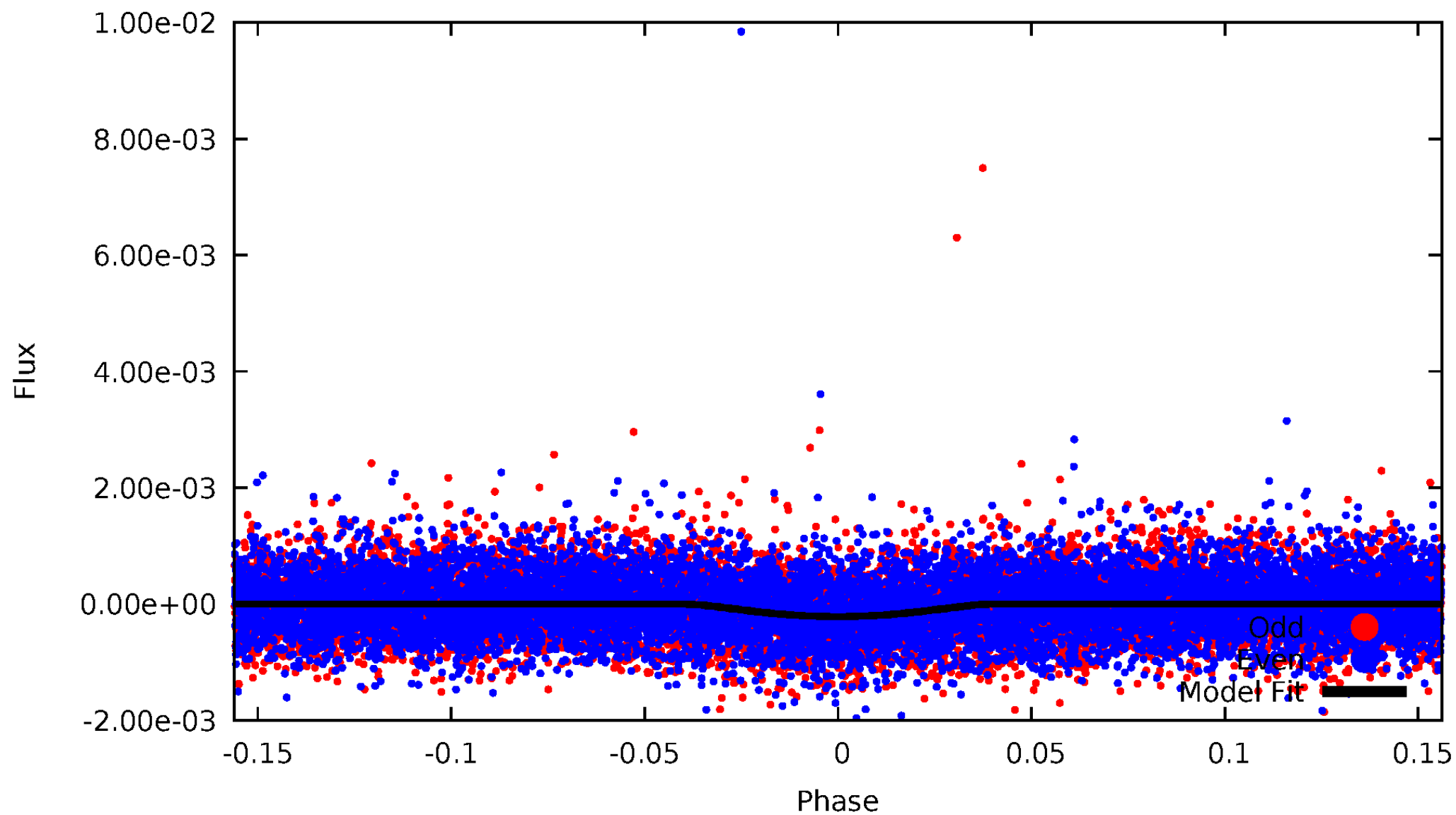
TCE 009593773-01





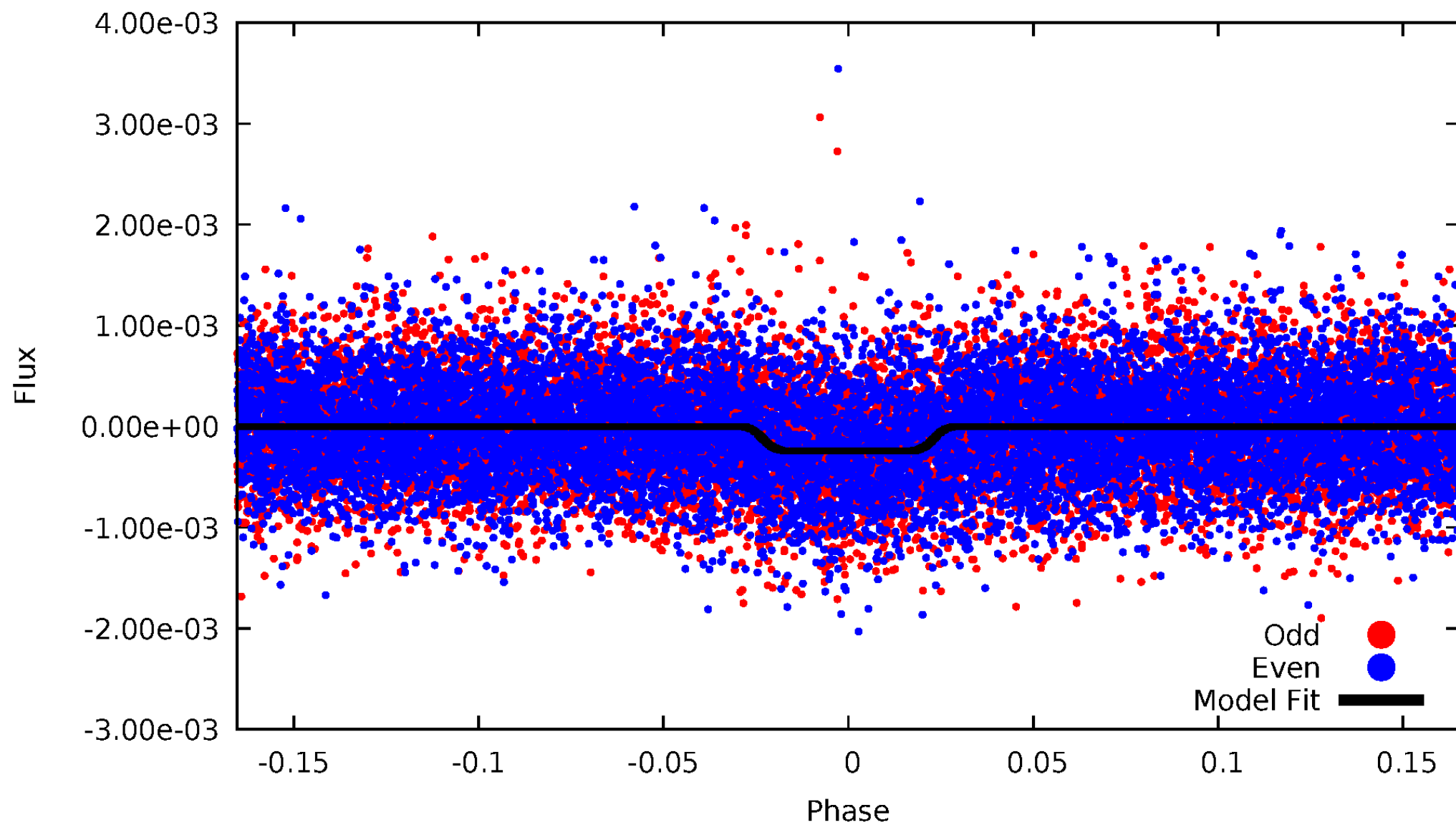
# DV Odd/Even

TCE 009593773-01



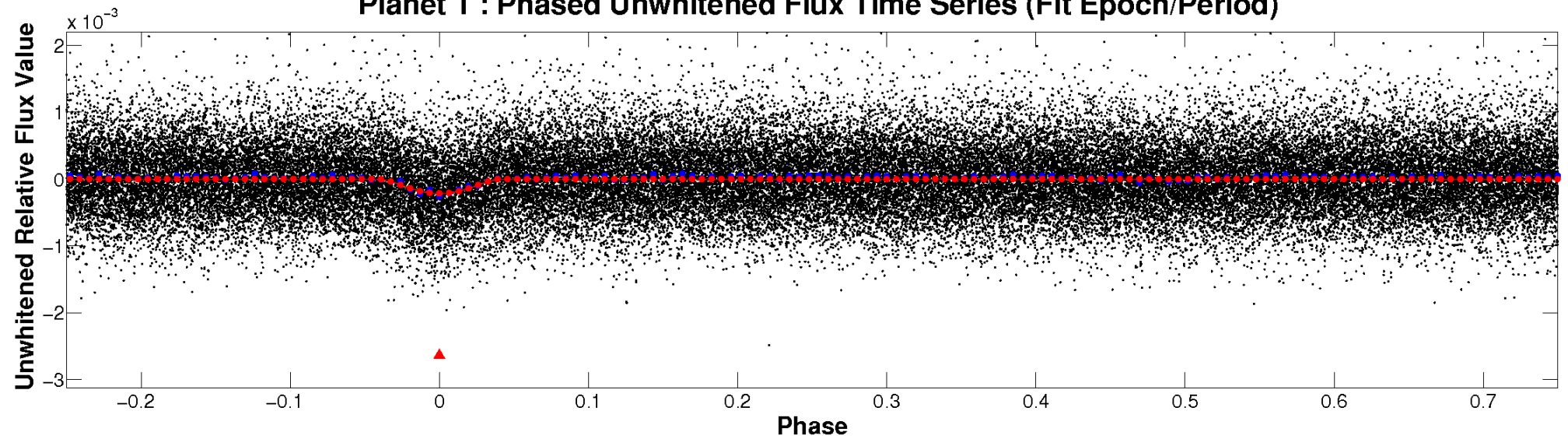
# ALT Odd/Even

TCE 009593773-01

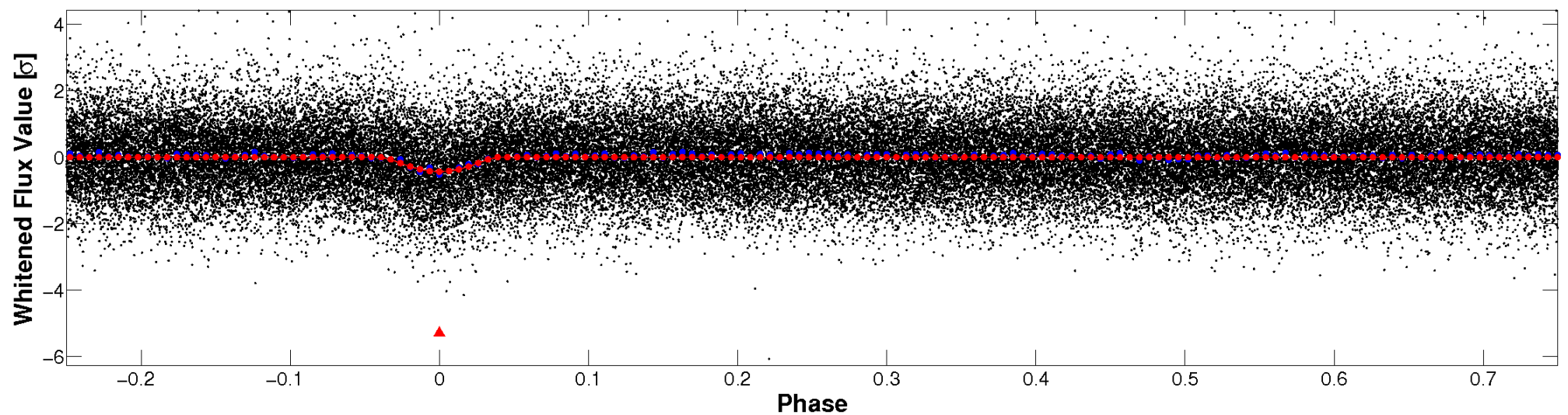


# Non-Whitened Vs. Whitened Light Curve

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

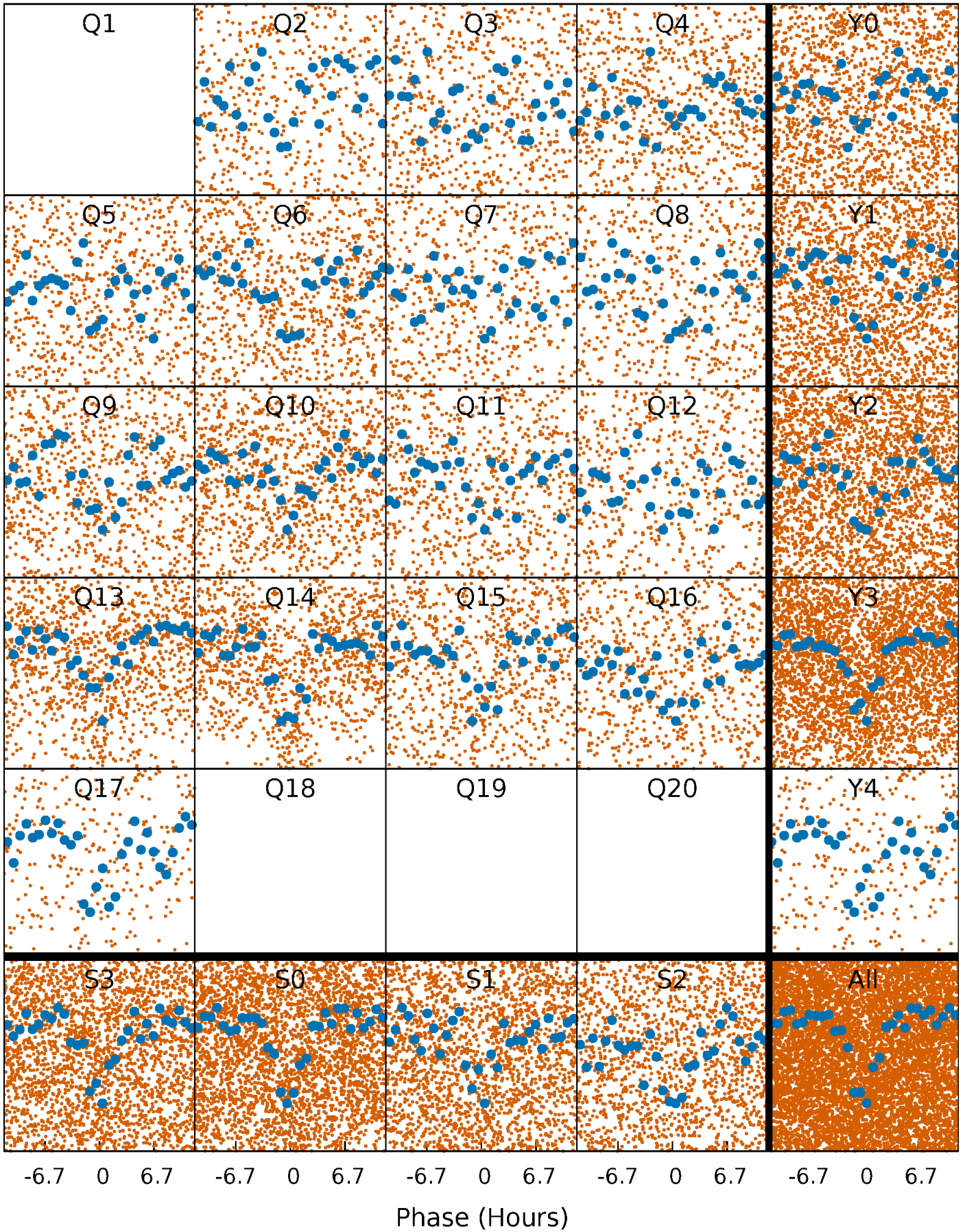


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

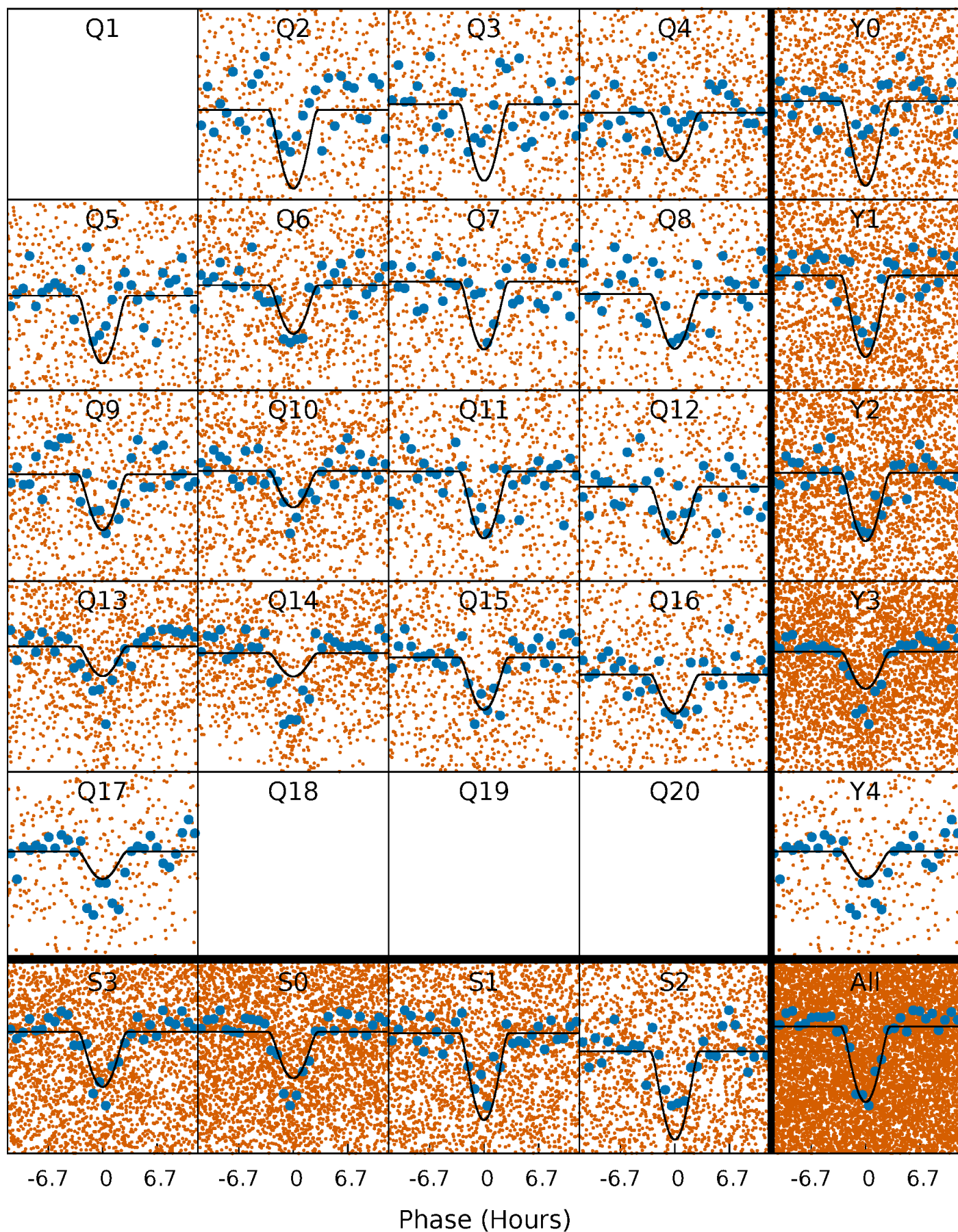
TCE 009593773-01 P= 3.133871 Days  $T_0=133.560607$  (BKJD)





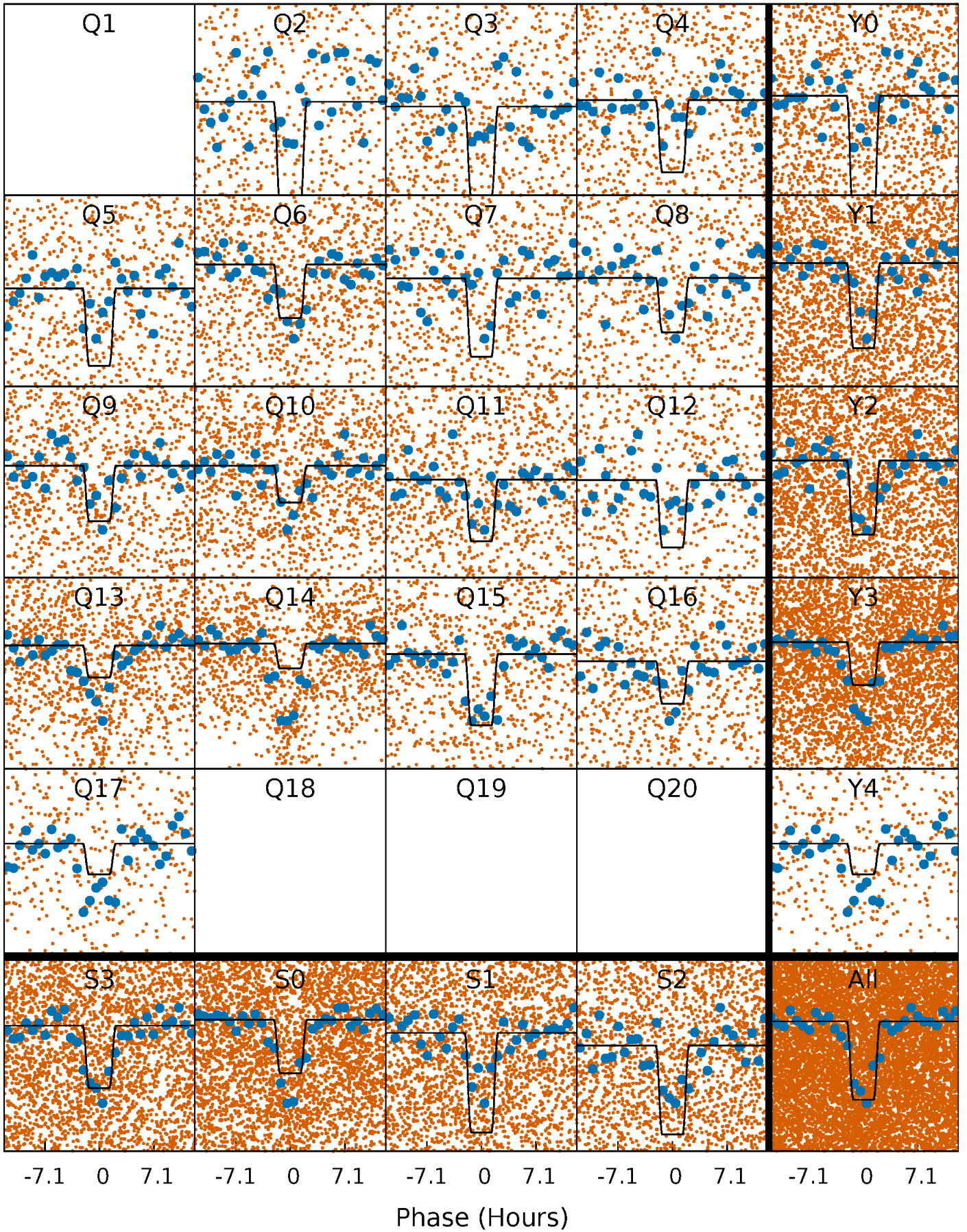
# DV Quarter-Phased Transit Curves

TCE 009593773-01 P= 3.133871 Days  $T_0=133.560607$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

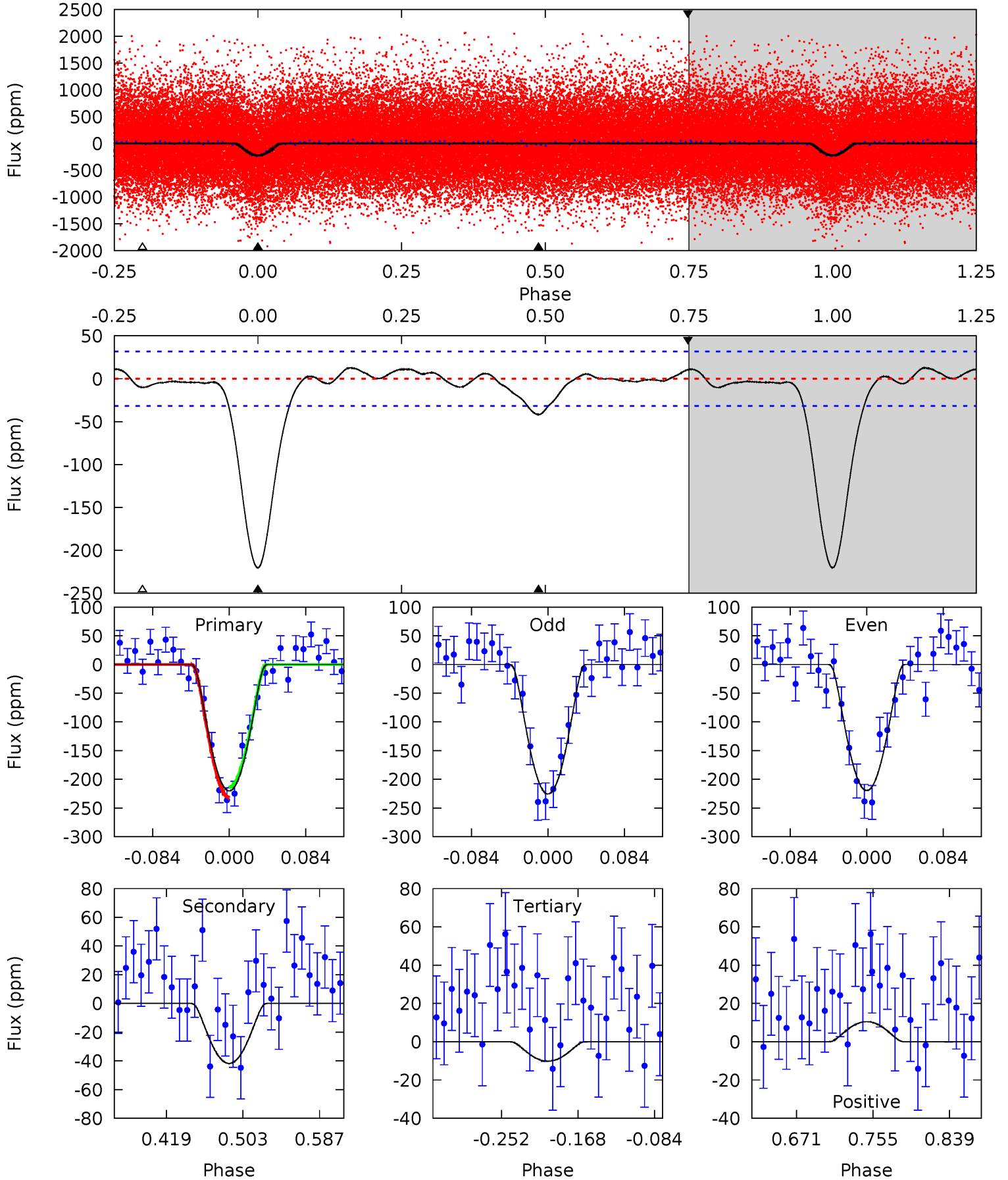
TCE 009593773-01 P= 3.133948 Days  $T_0=133.538151$  (BKJD)



# DV Model-Shift Uniqueness Test

009593773-01, P = 3.133871 Days, E = 133.560607 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  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 31.9 | 6.06 | 1.47 | 1.52 | 4.60            | 1.73            | 0.86             | 30.5    | 30.4    | 4.59    | 4.54    | 0.43    | 1.07 | 0.05  | 1.29 |

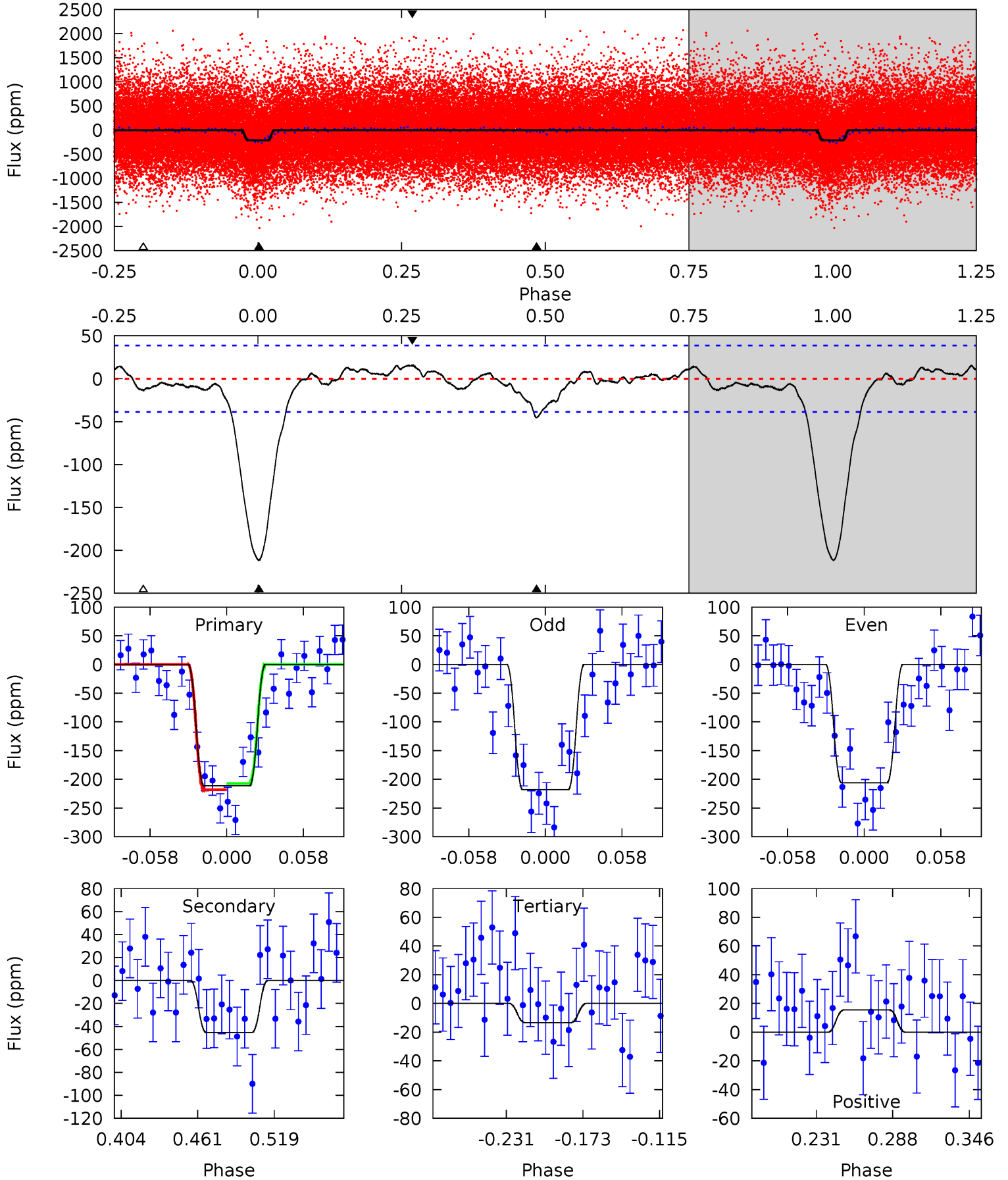




# Alt Model-Shift Uniqueness Test

009593773-01, P = 3.133948 Days, E = 133.538151 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  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 25.6 | 5.49 | 1.62 | 1.87 | 4.68            | 1.90            | 0.94             | 24.0    | 23.7    | 3.87    | 3.62    | 0.72    | 1.08 | 0.07  | 0.64 |





### Stellar Parameters For KIC 009593773

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                     | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
|        | $6137^{+193}_{-236}$ | $4.460^{+0.054}_{-0.216}$ | $-0.060^{+0.250}_{-0.300}$ | $1.018^{+0.341}_{-0.114}$ | $1.086^{+0.153}_{-0.153}$ | $1.452^{+0.422}_{-0.771}$                 |
|        | +3%/-4%              | +1%/-5%                   | +417%/-500%                | +33%/-11%                 | +14%/-14%                 | +29%/-53%                                 |
| 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 009593773-01 / KOI 4240.01

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$     | $T_{max} (K)$        | $T_{obs} (K)$         | $A_{obs}$                  |
|---------|-------------|------------------------|----------------------|-----------------------|----------------------------|
| DV      | $-42 \pm 7$ | $3.93^{+3.27}_{-2.51}$ | $1879^{+150}_{-102}$ | $3203^{+1392}_{-633}$ | $2.675^{+18.478}_{-1.893}$ |
| Alt.    | $-45 \pm 8$ | $3.35^{+3.10}_{-2.17}$ | $1866^{+153}_{-96}$  | $3415^{+1631}_{-674}$ | $4.083^{+29.940}_{-3.005}$ |

$T_{max}$  = 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  $A_{obs} \gg 1.0$

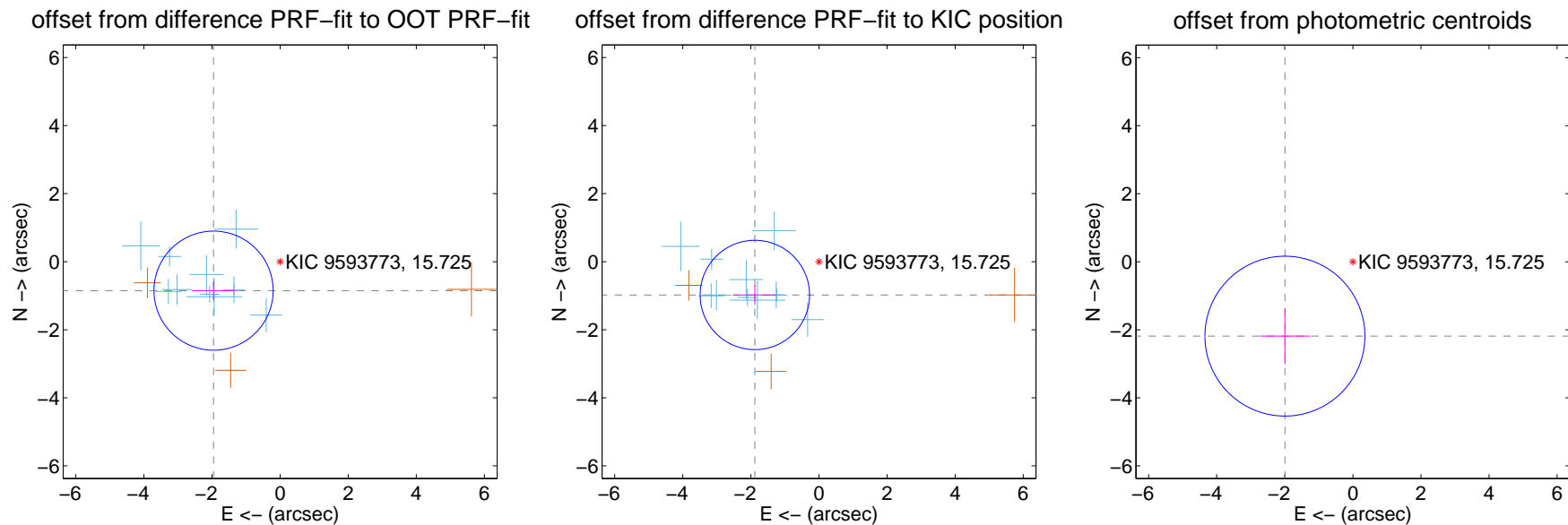
## DV Centroid Data

Supplemental centroid analysis for 009593773-01. Kepler magnitude: 15.72. Transit SNR 19.49

There are 11 quarters with good PRF difference image offsets

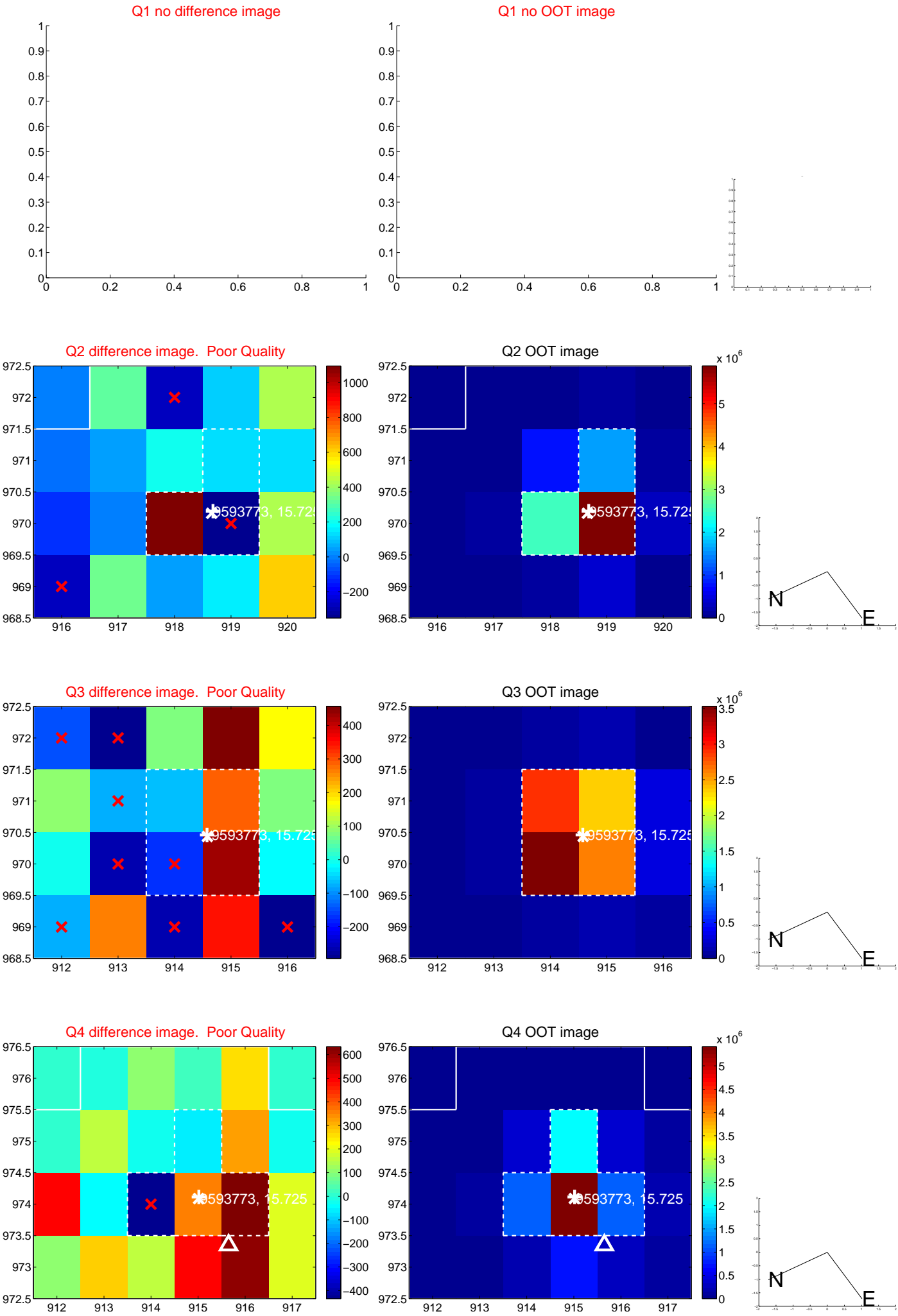
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA       | $\Delta$ Dec       |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT          | $2.131 \pm 0.583$  | $3.65$              | $1.954 \pm 0.636$ | $-0.851 \pm 0.258$ |
| PRF-fit source offset from KIC position | $2.122 \pm 0.535$  | $3.96$              | $1.883 \pm 0.624$ | $-0.978 \pm 0.292$ |
| photometric centroid source offset      | $2.96 \pm 0.78$    | $3.78$              | $2.00 \pm 0.73$   | $-2.19 \pm 0.82$   |

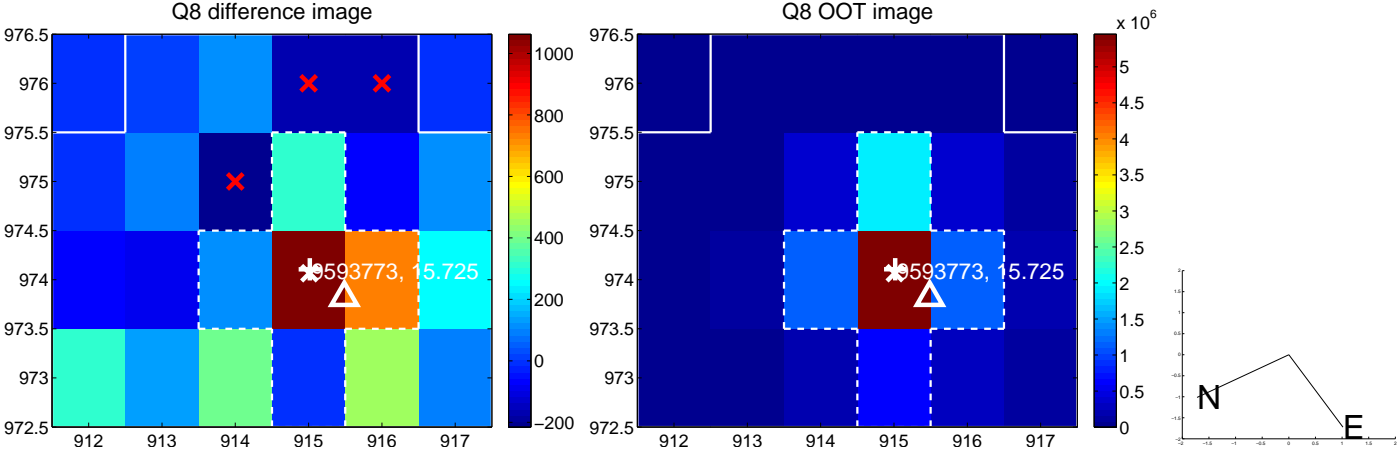
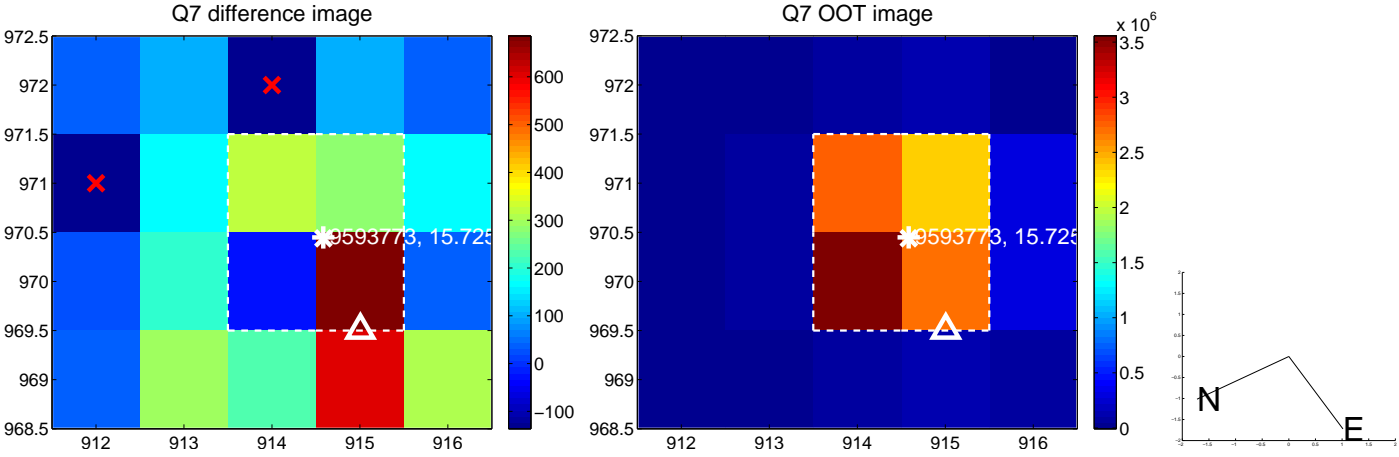
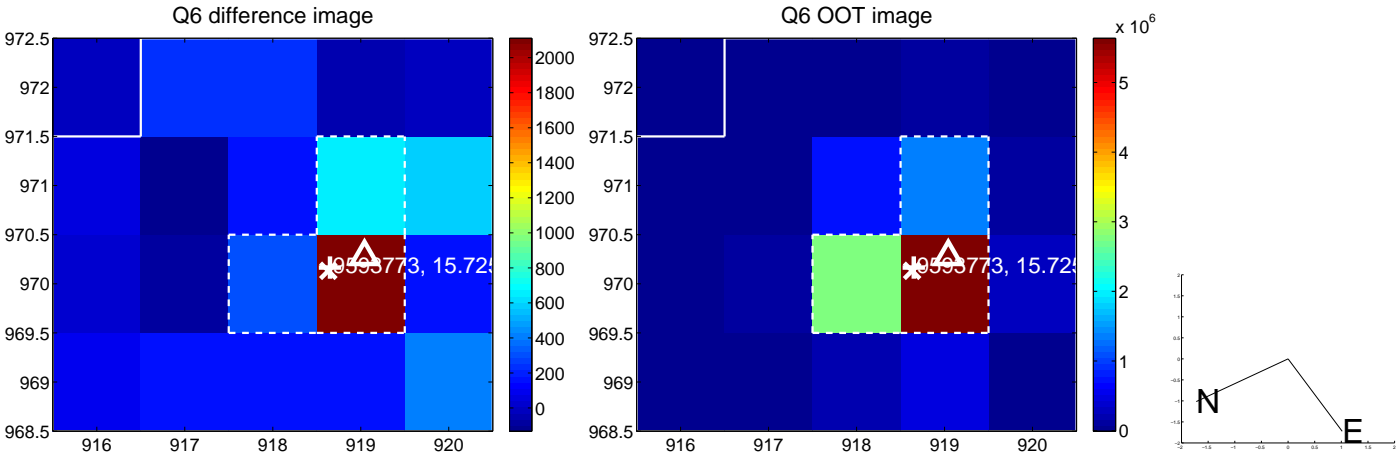
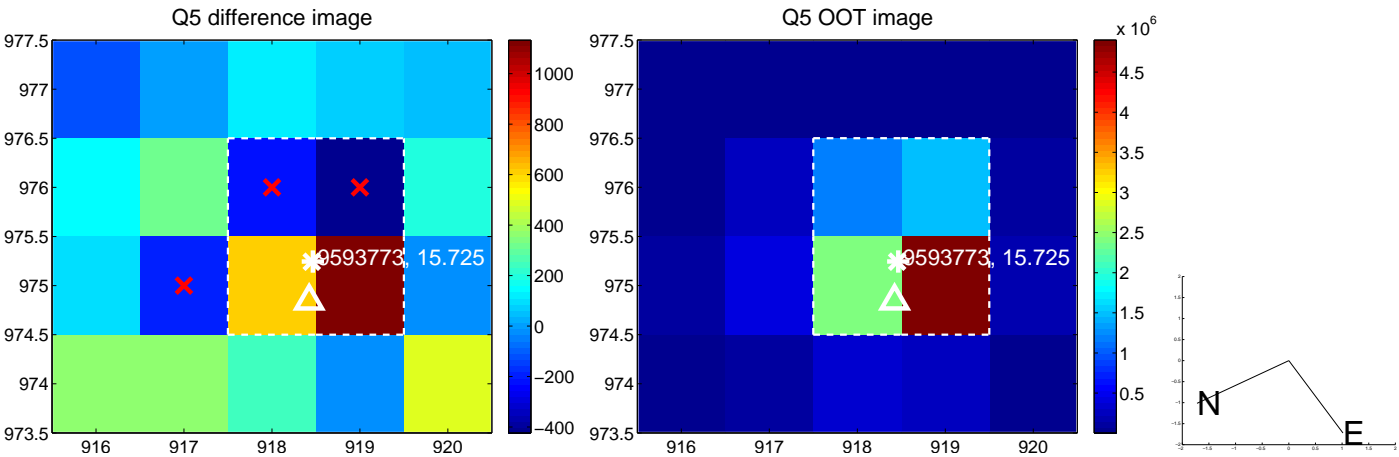


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

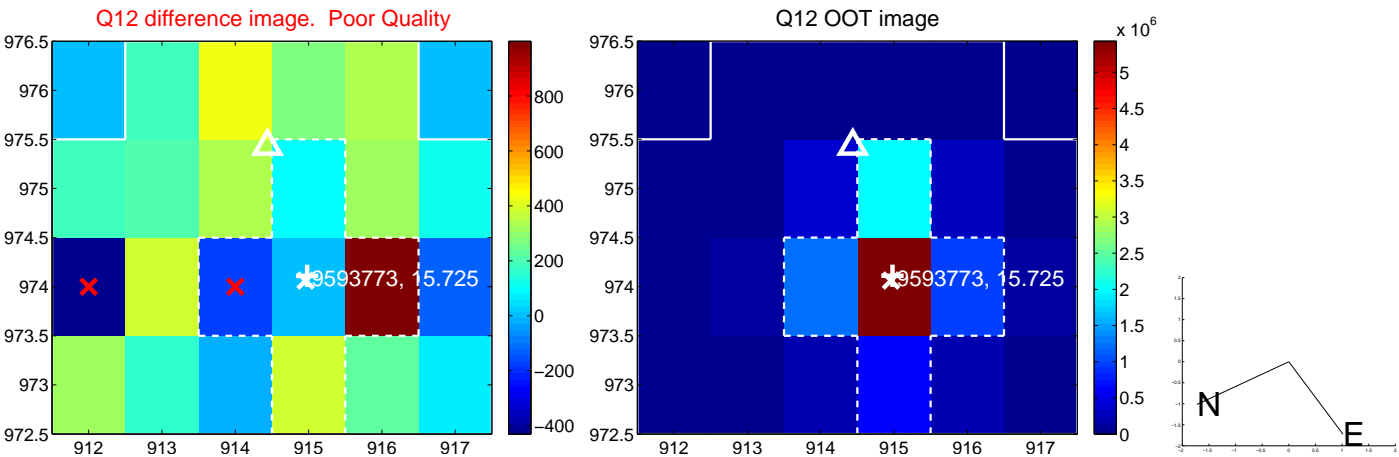
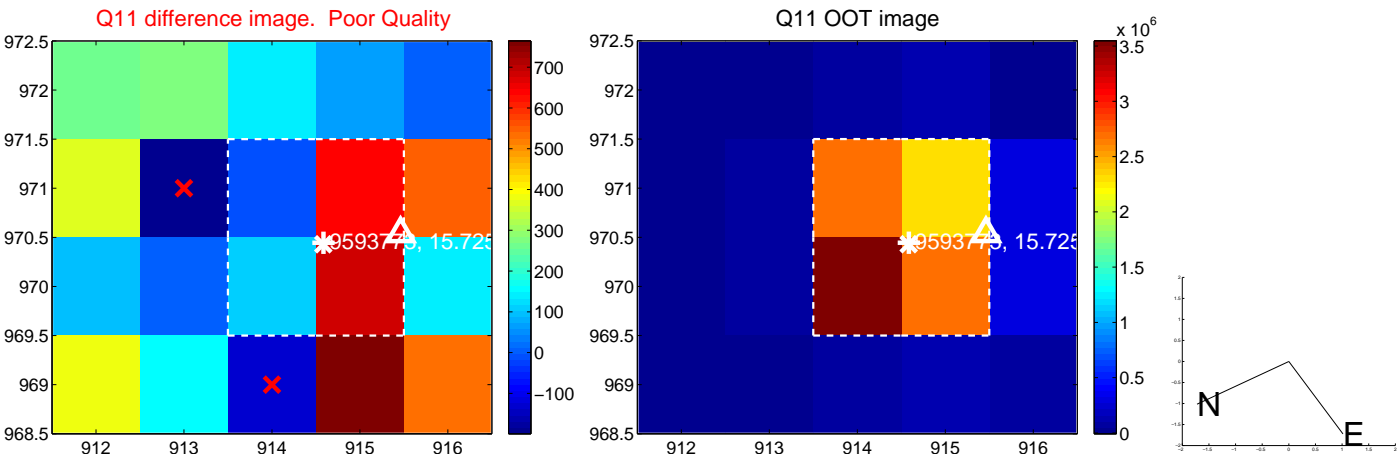
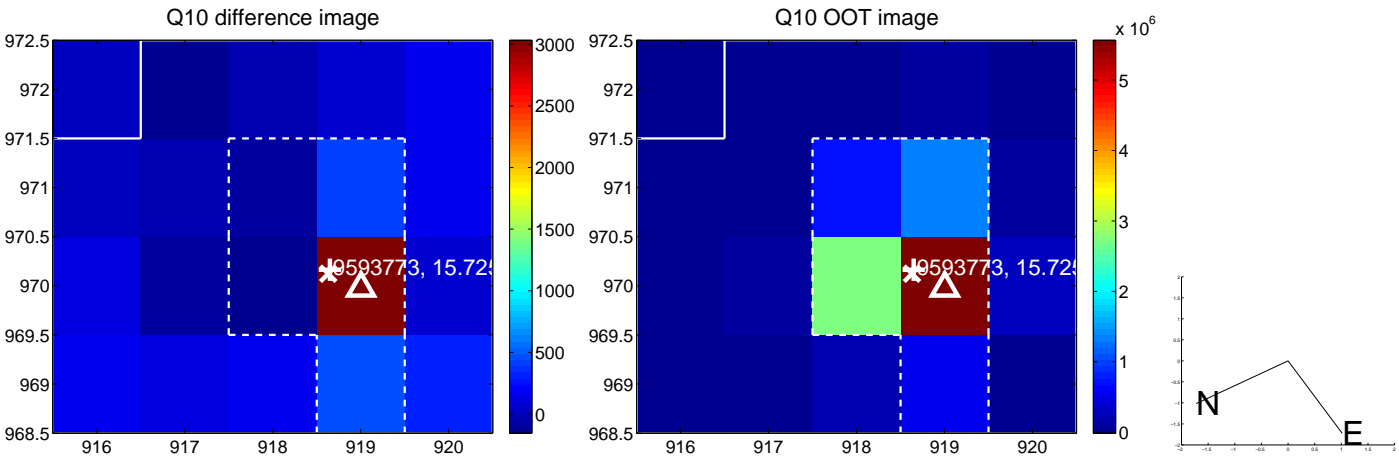
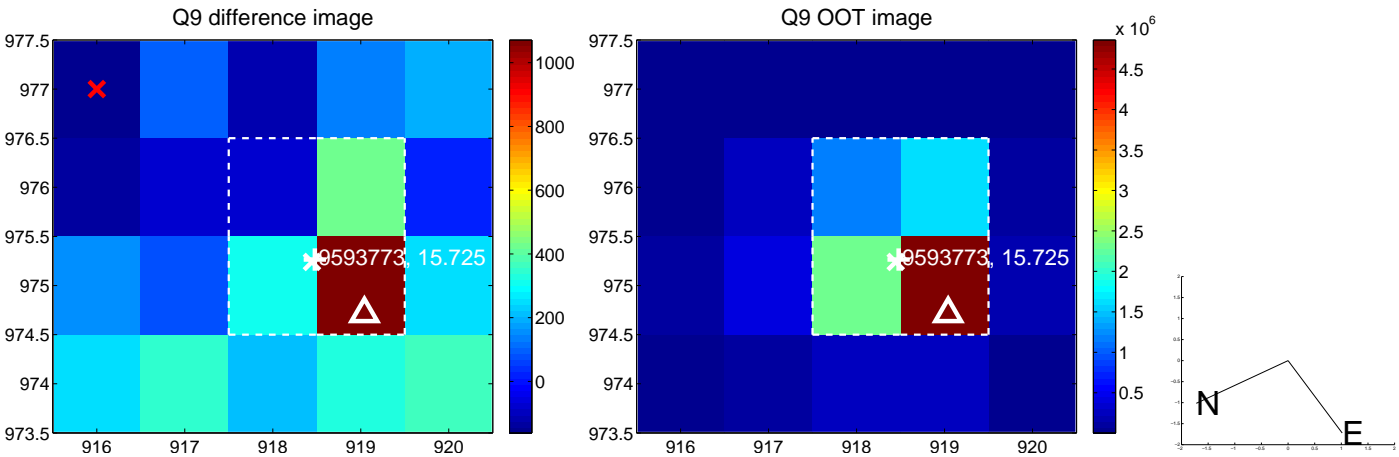


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

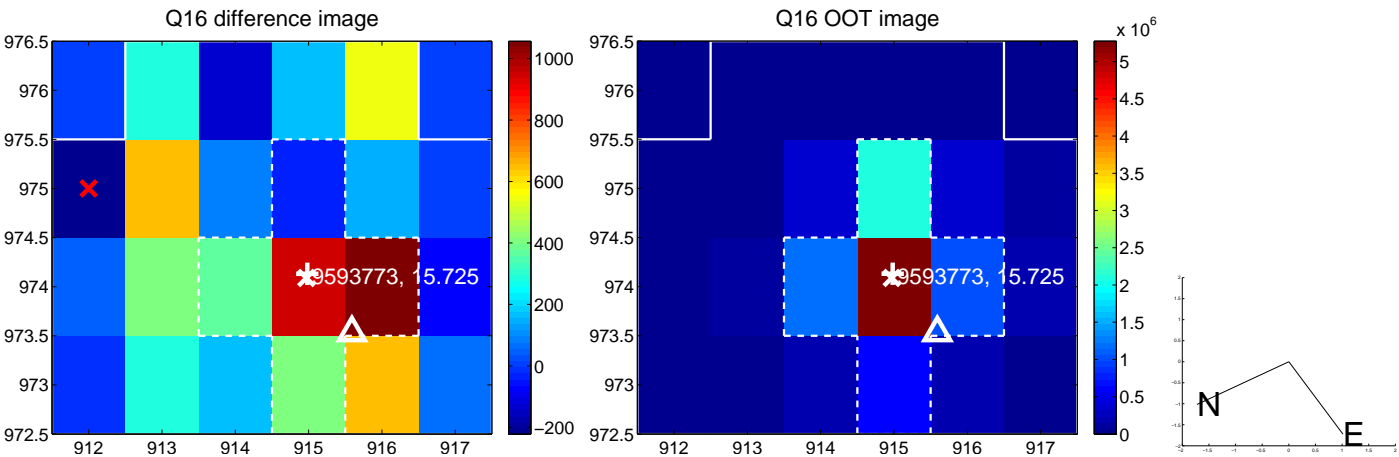
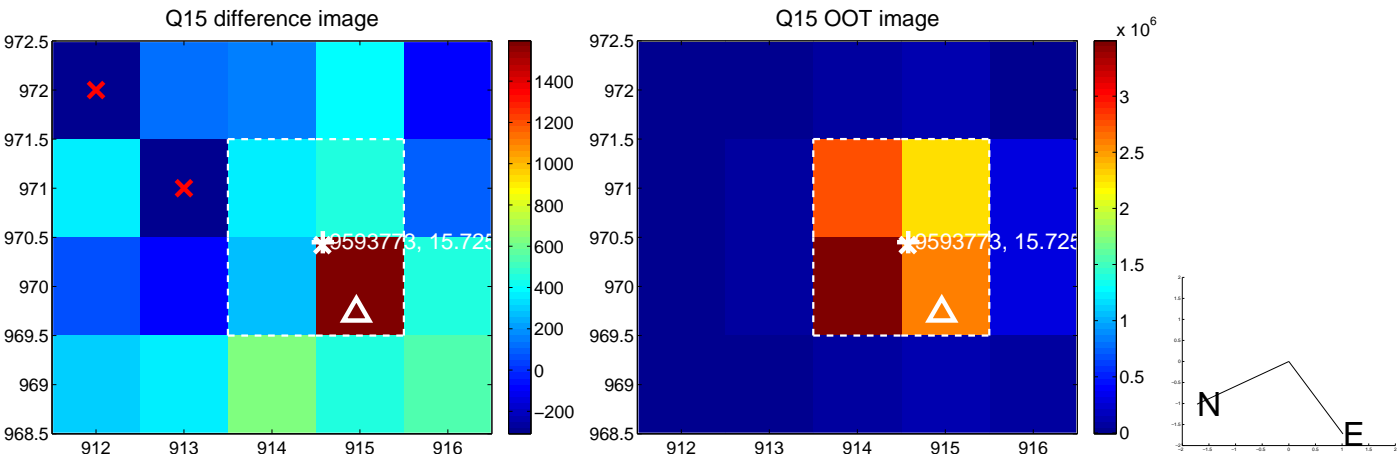
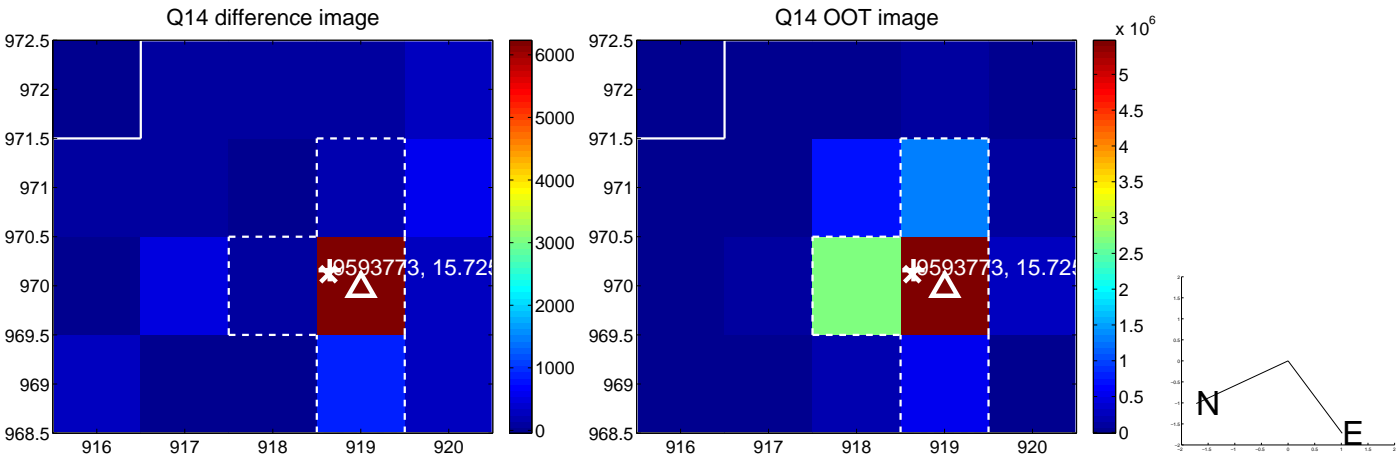
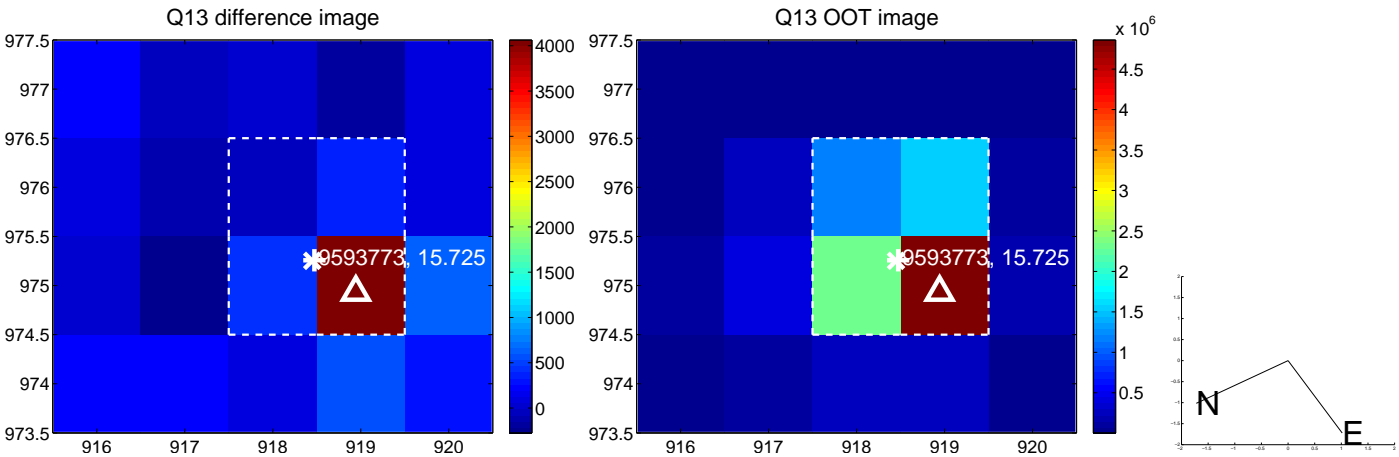




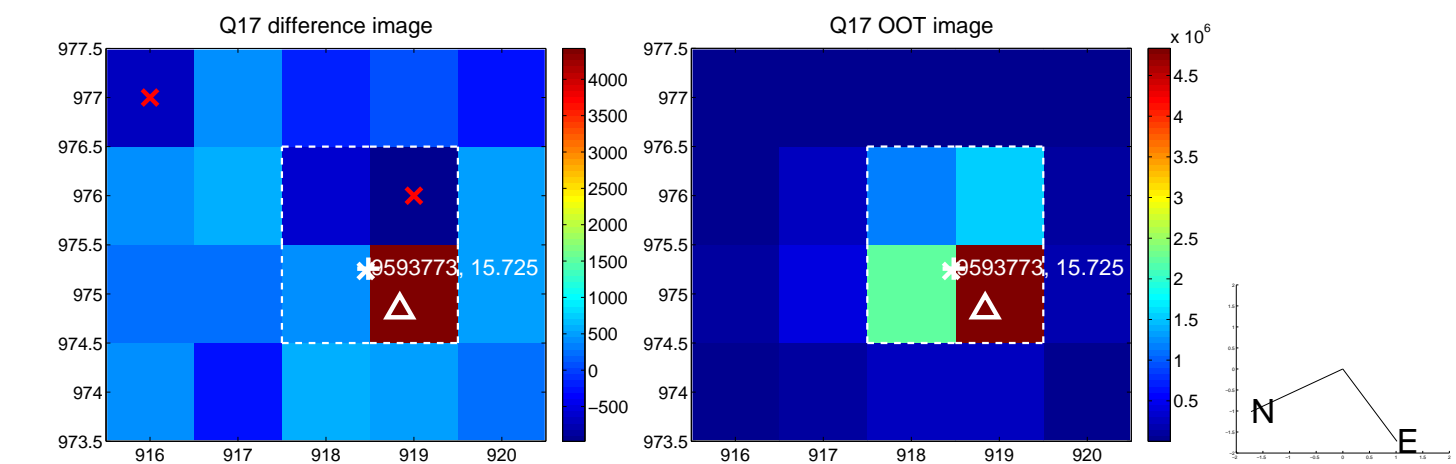
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



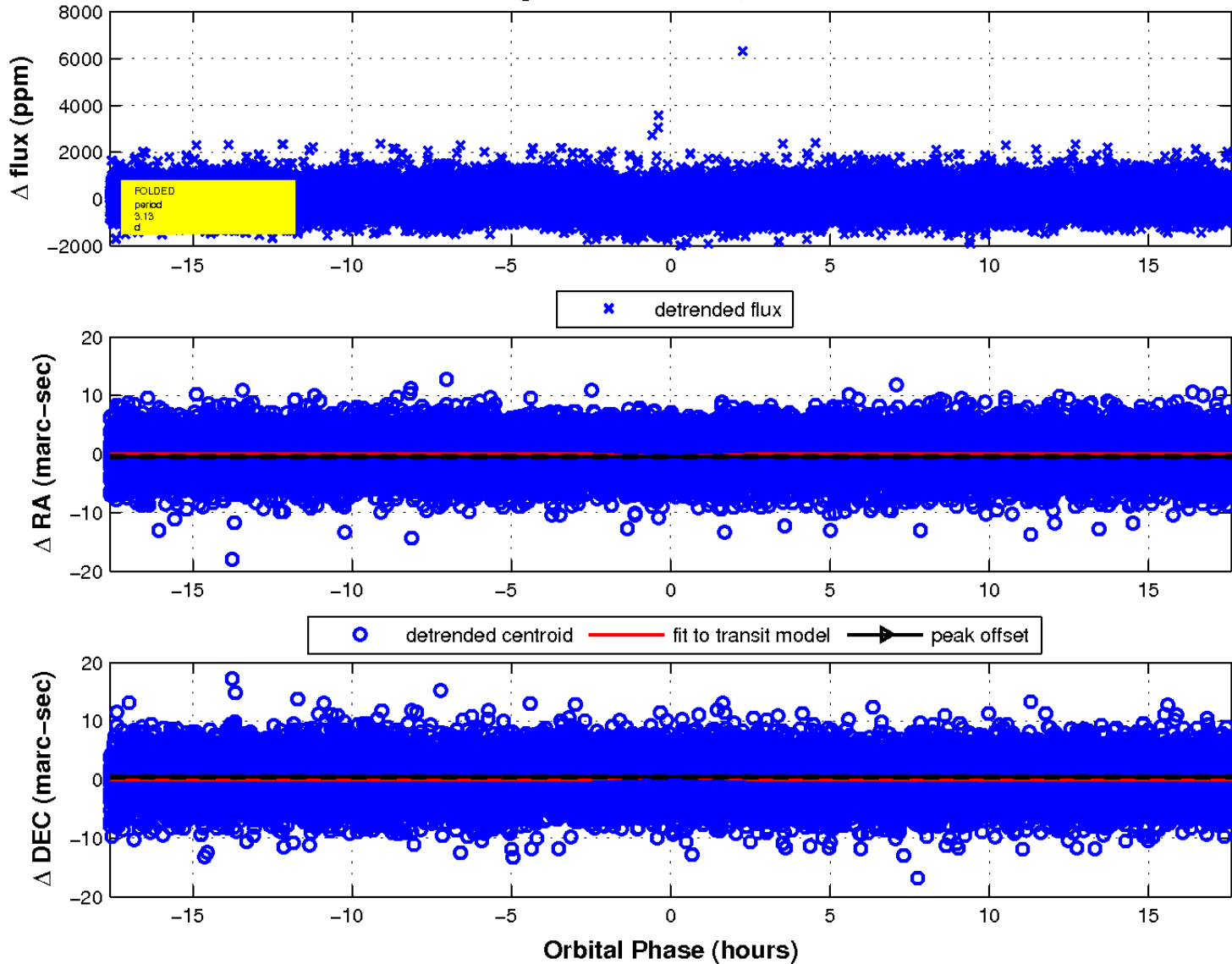
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 1 of 1



UKIRT Image

Declination

