

# KIC 010473272

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|-----|------|-----------------------------|-----------------|------------------------|------------------------|
| 010473272-01 | OBS      | 4648.01 | 17.660807     | 137.378897   | 290.8       | 3.041            | 9.6 | 10.4 | 0.94                        | 5910            | 1.67                   | 53.70                  |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments                        |
|--------------|----------|------|-------|---|---|---|---|---------------------------------|
| 010473272-01 | OBS      | FP   | 0.00  | 0 | 0 | 1 | 0 | CENT_RESOLVED_OFFSET—HALO_GHOST |

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

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

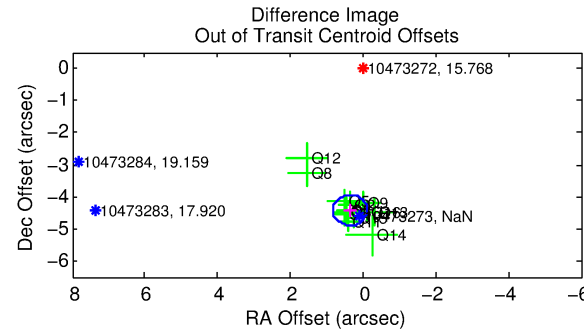
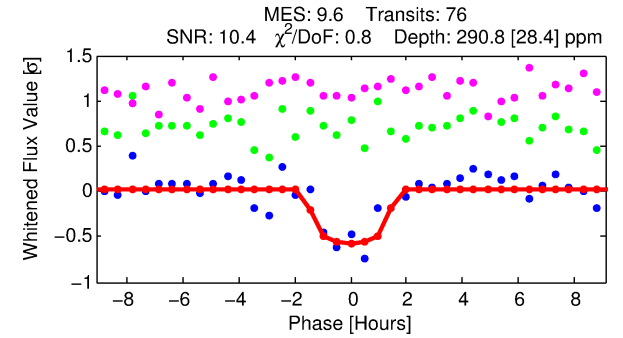
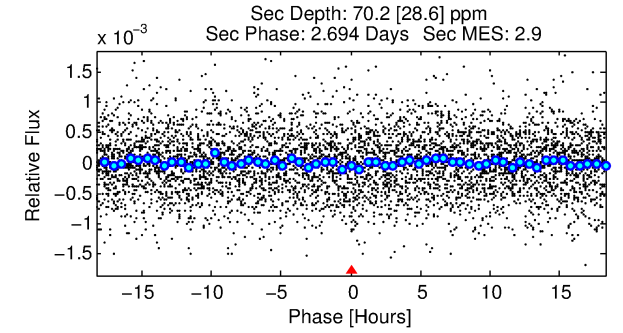
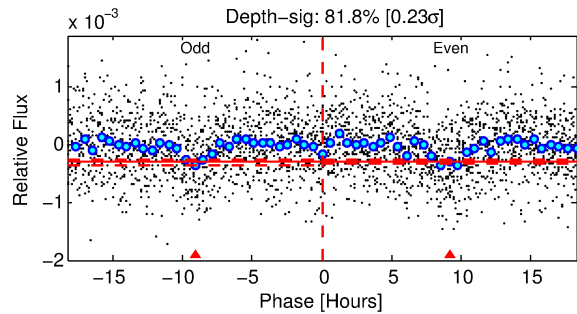
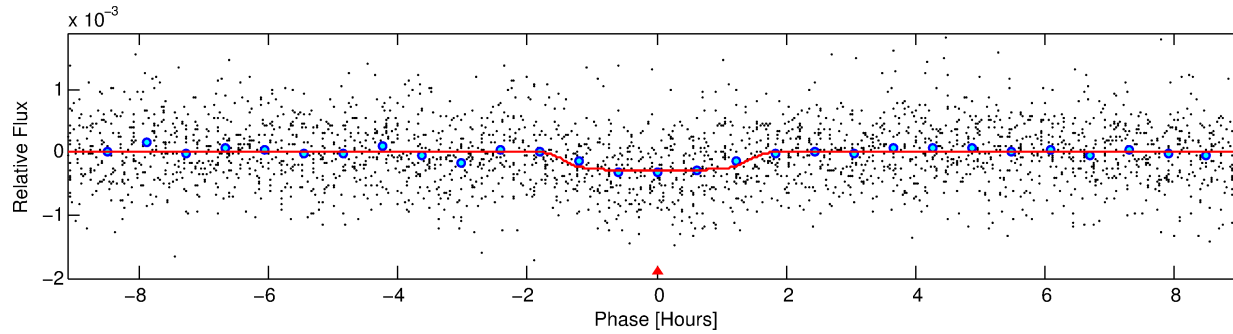
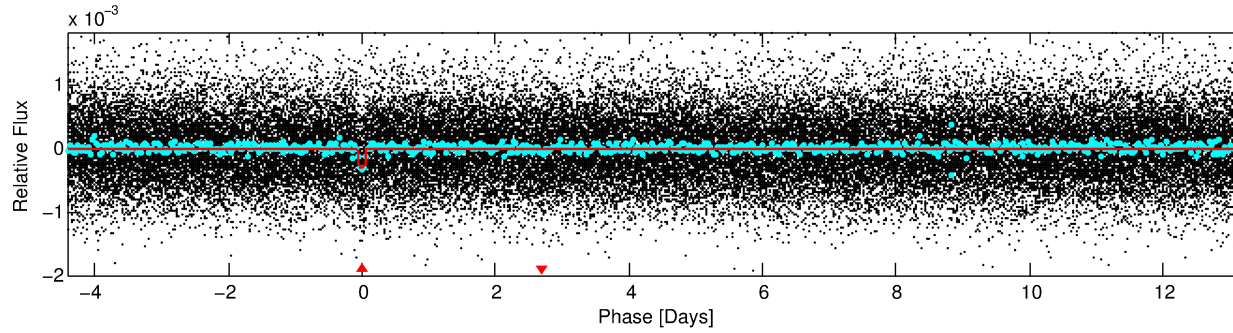
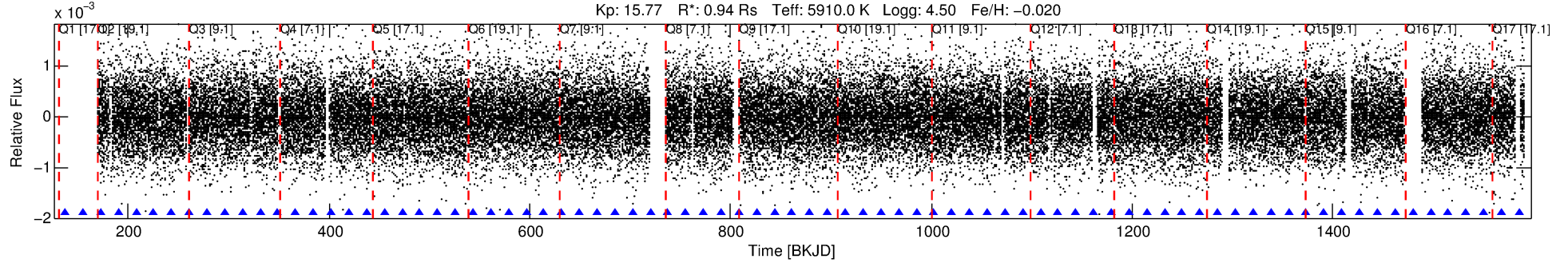
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010473272-01

No Significant Match Found

# DV One-Page Summary

KIC: 10473272 Candidate: 1 of 1 Period: 17.661 d  
KOI: K04648.01 Corr: 0.946



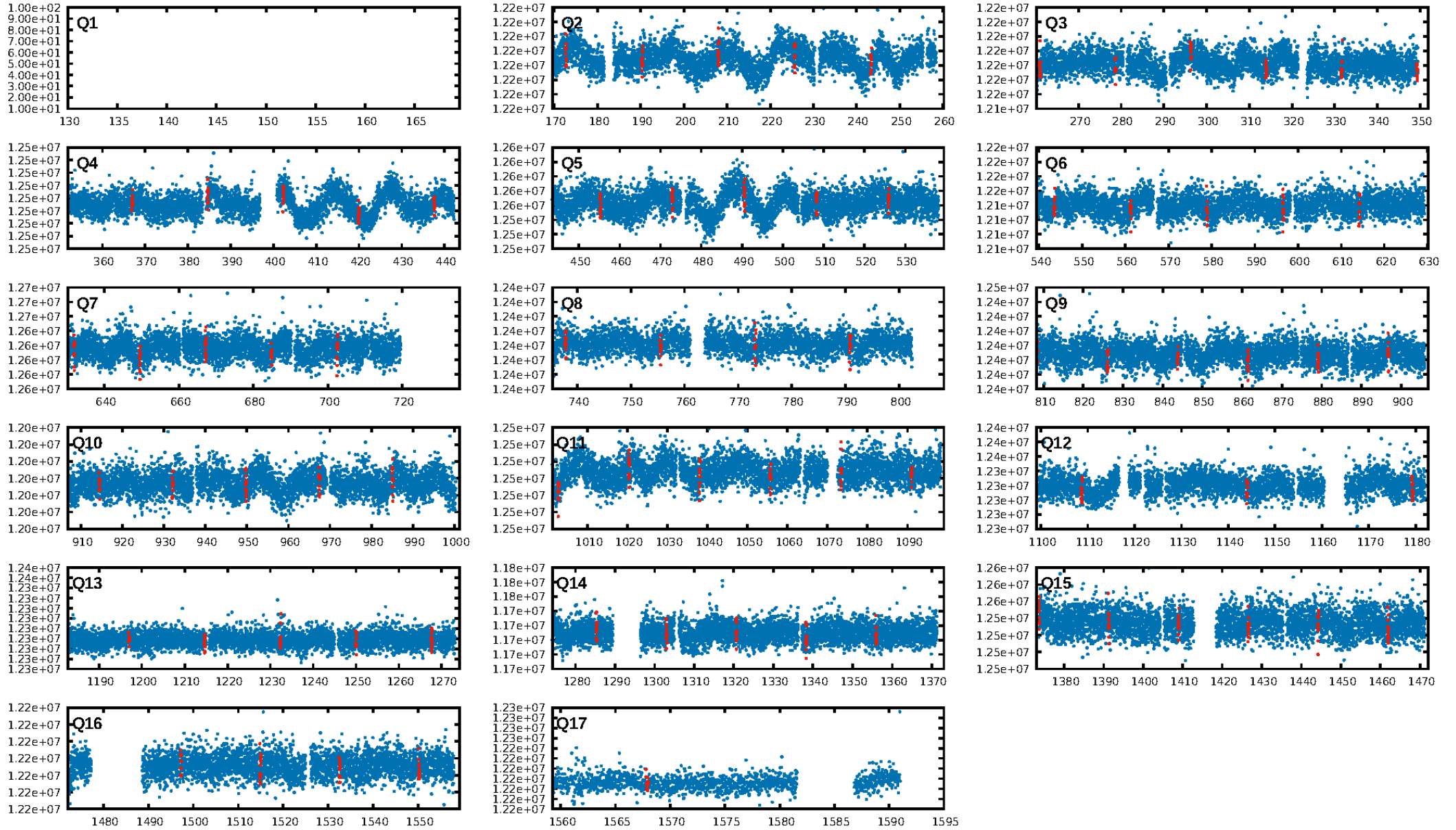
## DV Fit Results:

Period = 17.66081 [0.00015] d  
Epoch = 137.3789 [0.0069] BKJD  
Rp/R\* = 0.0163 [0.0199]  
a/R\* = 36.65 [203.99]  
b = 0.59 [6.18]  
Seff = 53.70 [20.10]  
Teq = 690 [65] K  
Rp = 1.67 [2.10] Re  
a = 0.1341 [0.0323] AU  
Ag = 249.34 [625.91] [0.40 $\sigma$ ]  
Teff = 4241 [2639] K [1.35 $\sigma$ ]

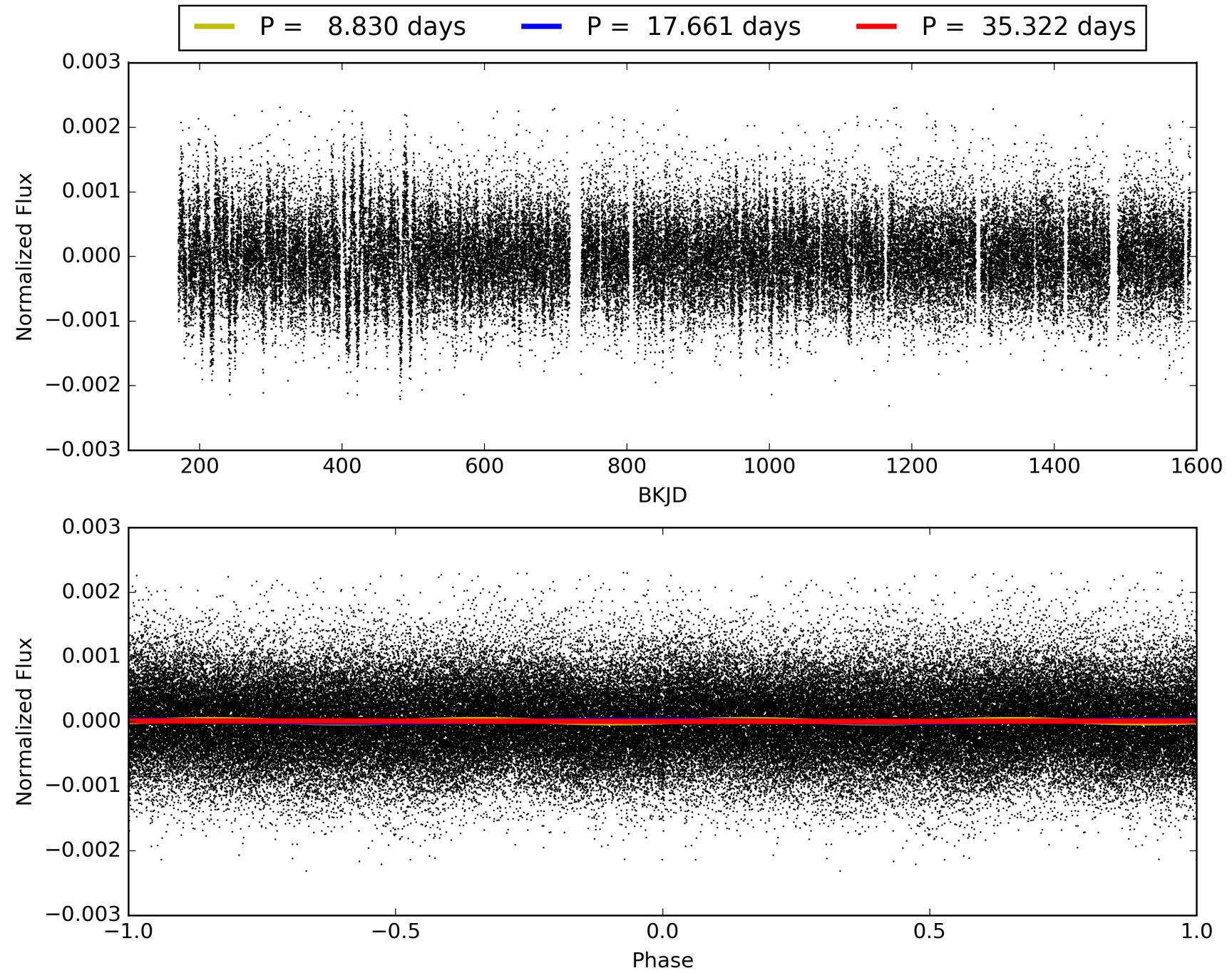
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 99.9%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.12e-21  
RollingBand-fgt: 1.00 [75/75]  
GhostDiagnostic-chr: -0.2198  
Centroid-sig: 0.0%  
Centroid-so: 8.574 arcsec [6.70 $\sigma$ ]  
OotOffset-rm: 4.433 arcsec [28.19 $\sigma$ ]  
KicOffset-rm: 4.679 arcsec [26.52 $\sigma$ ]  
OotOffset-st: 3/4/3/3 [13]  
KicOffset-st: 3/4/3/3 [13]  
DiffImageQuality-fgm: 1.00 [13/13]  
DiffImageOverlap-fno: 1.00 [16/16]

# TCE 010473272-01, PDC Light Curves

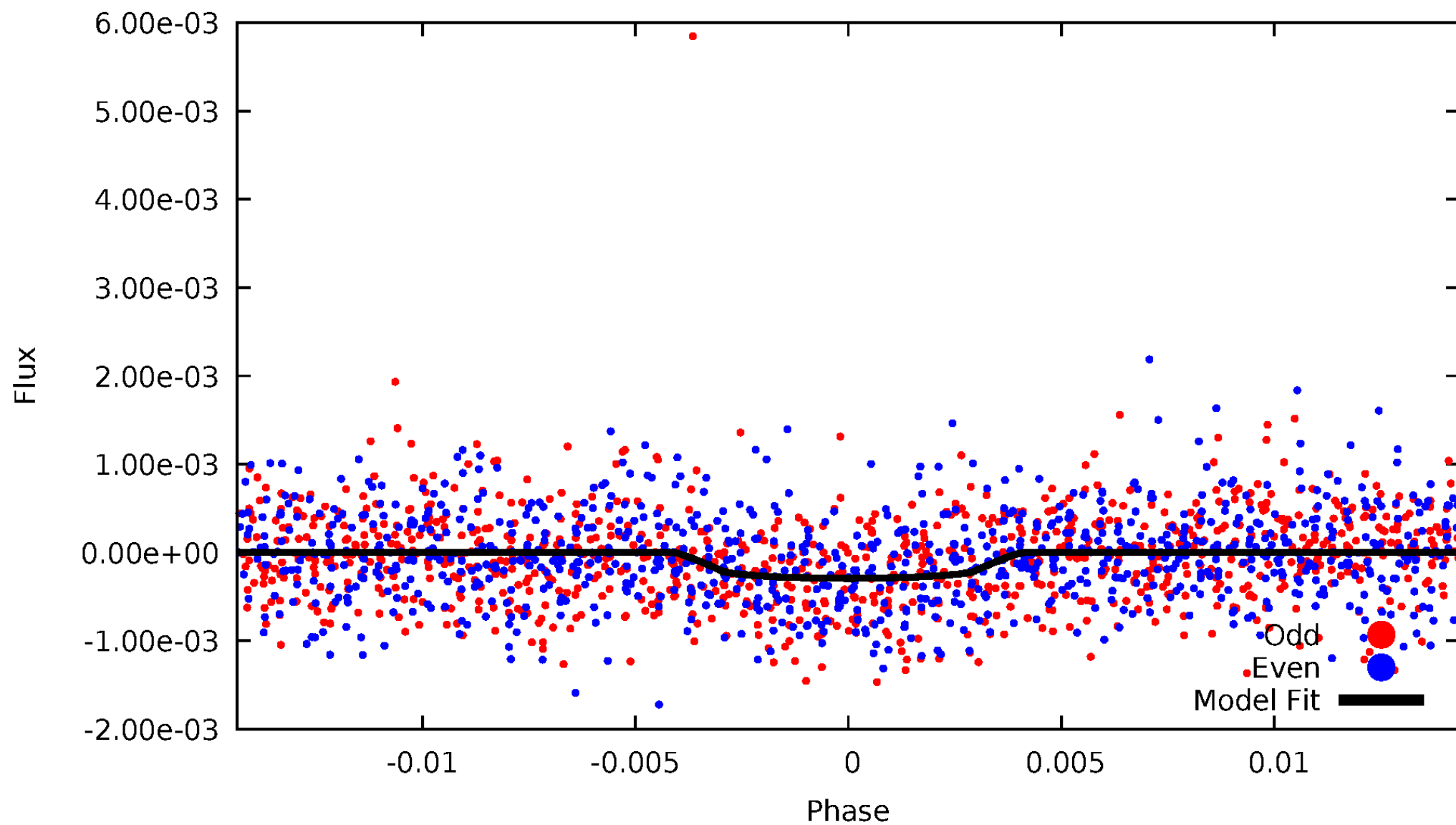


TCE 010473272-01



# DV Odd/Even

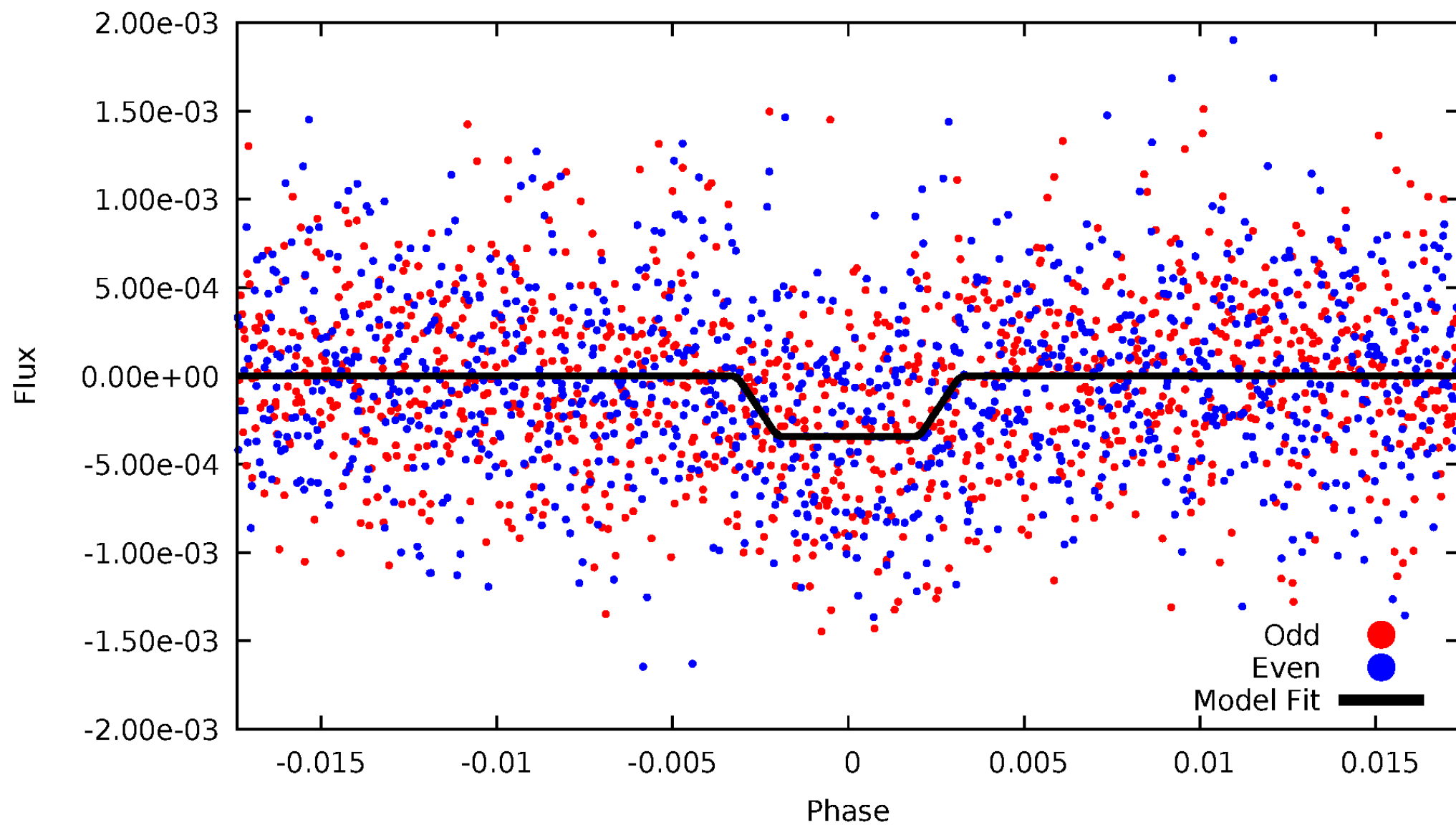
TCE 010473272-01





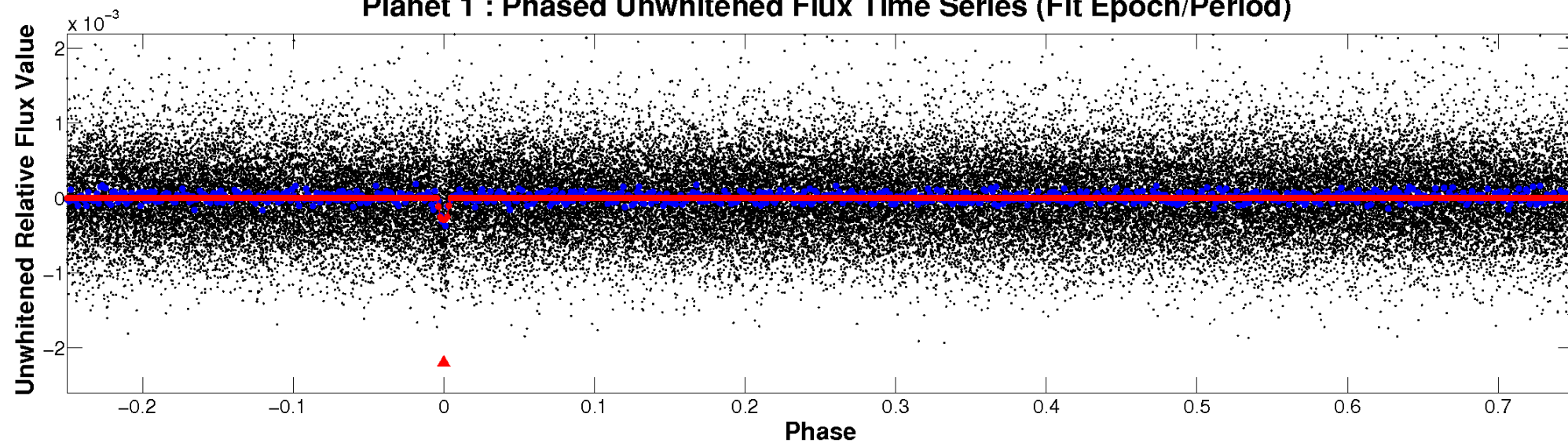
# ALT Odd/Even

TCE 010473272-01

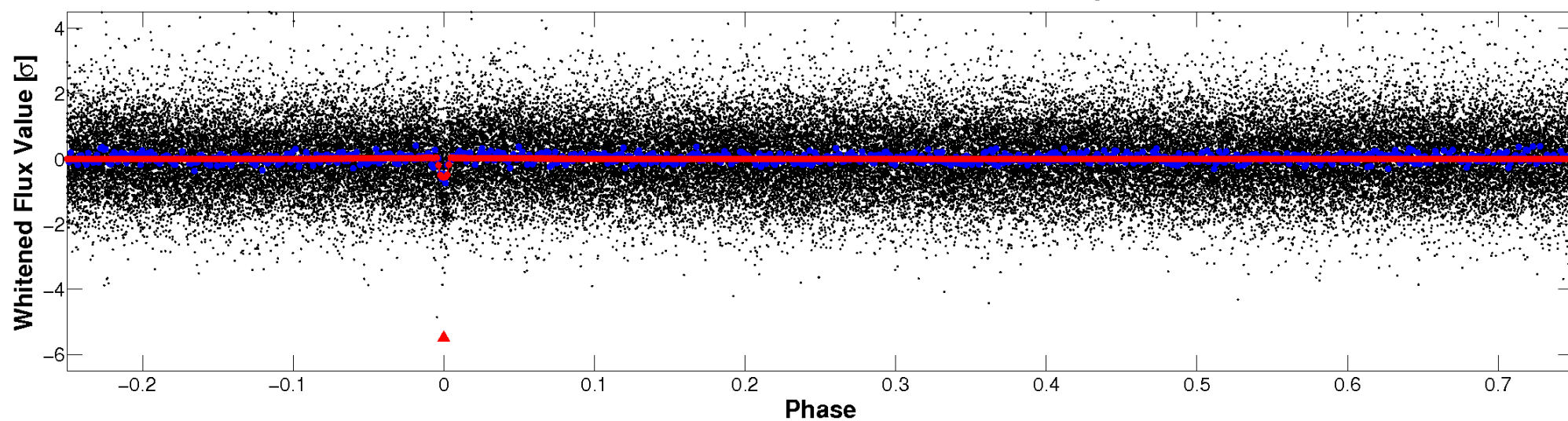


# Non-Whitened Vs. Whitened Light Curve

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

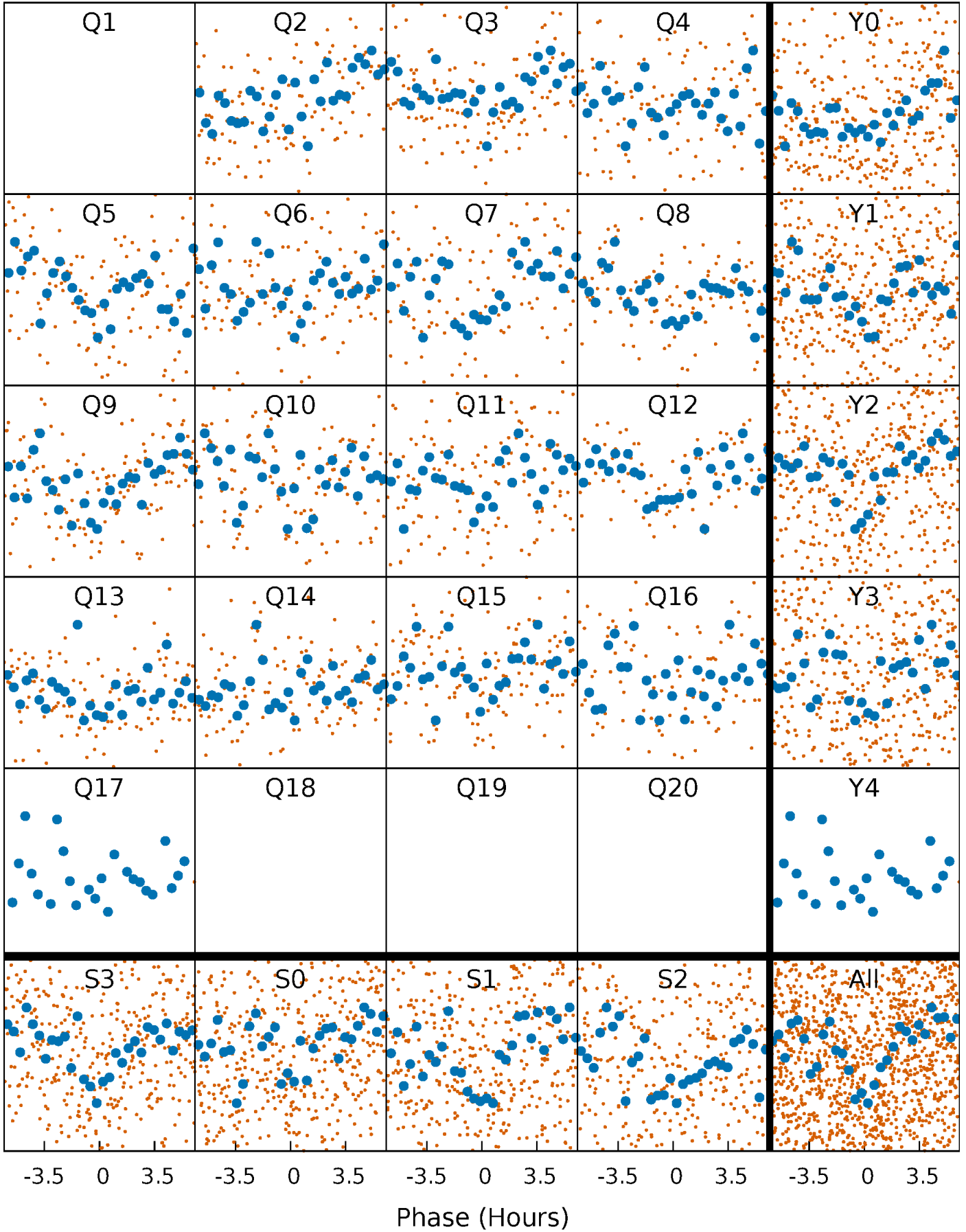


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

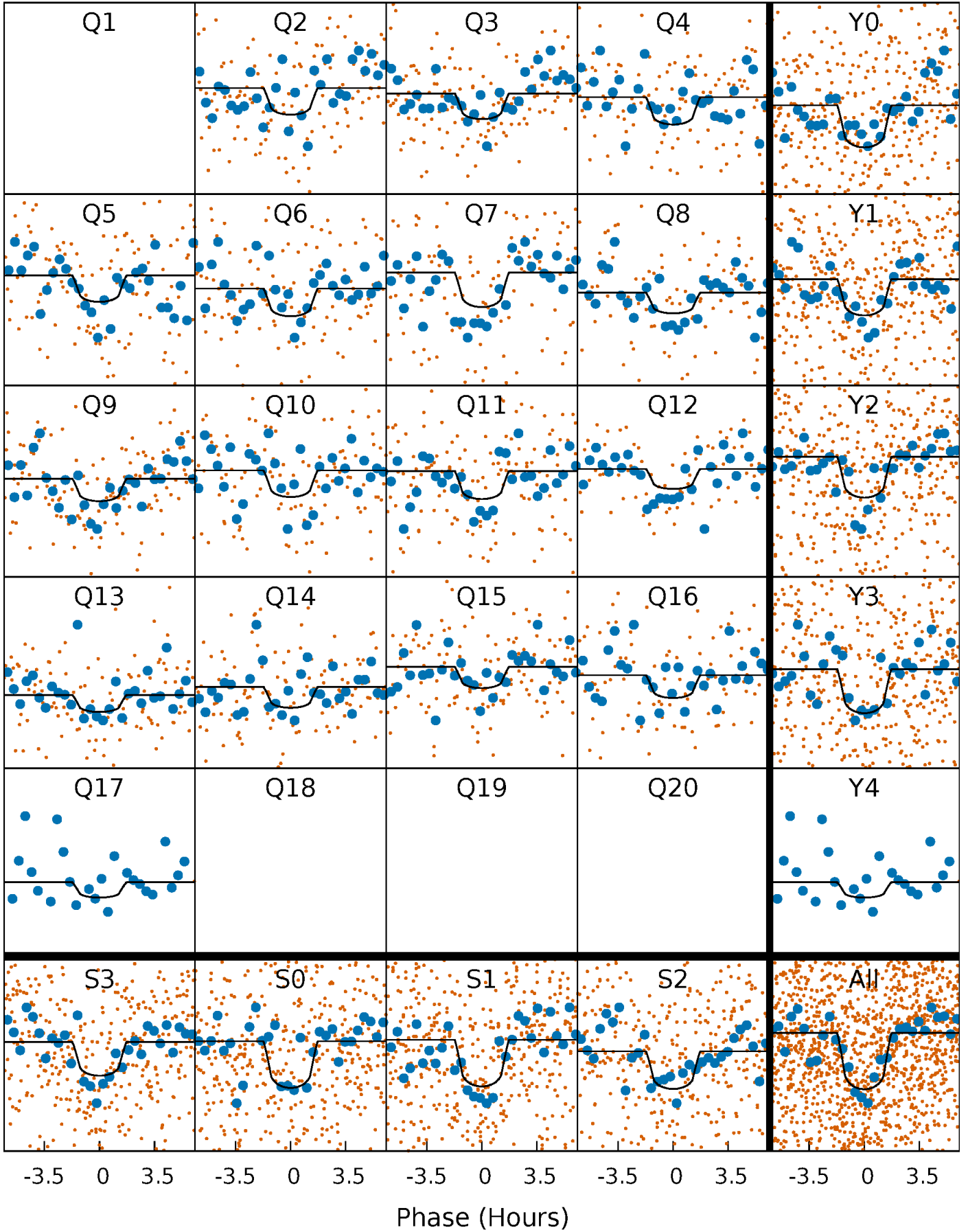
TCE 010473272-01 P= 17.660807 Days  $T_0=137.378896$  (BKJD)





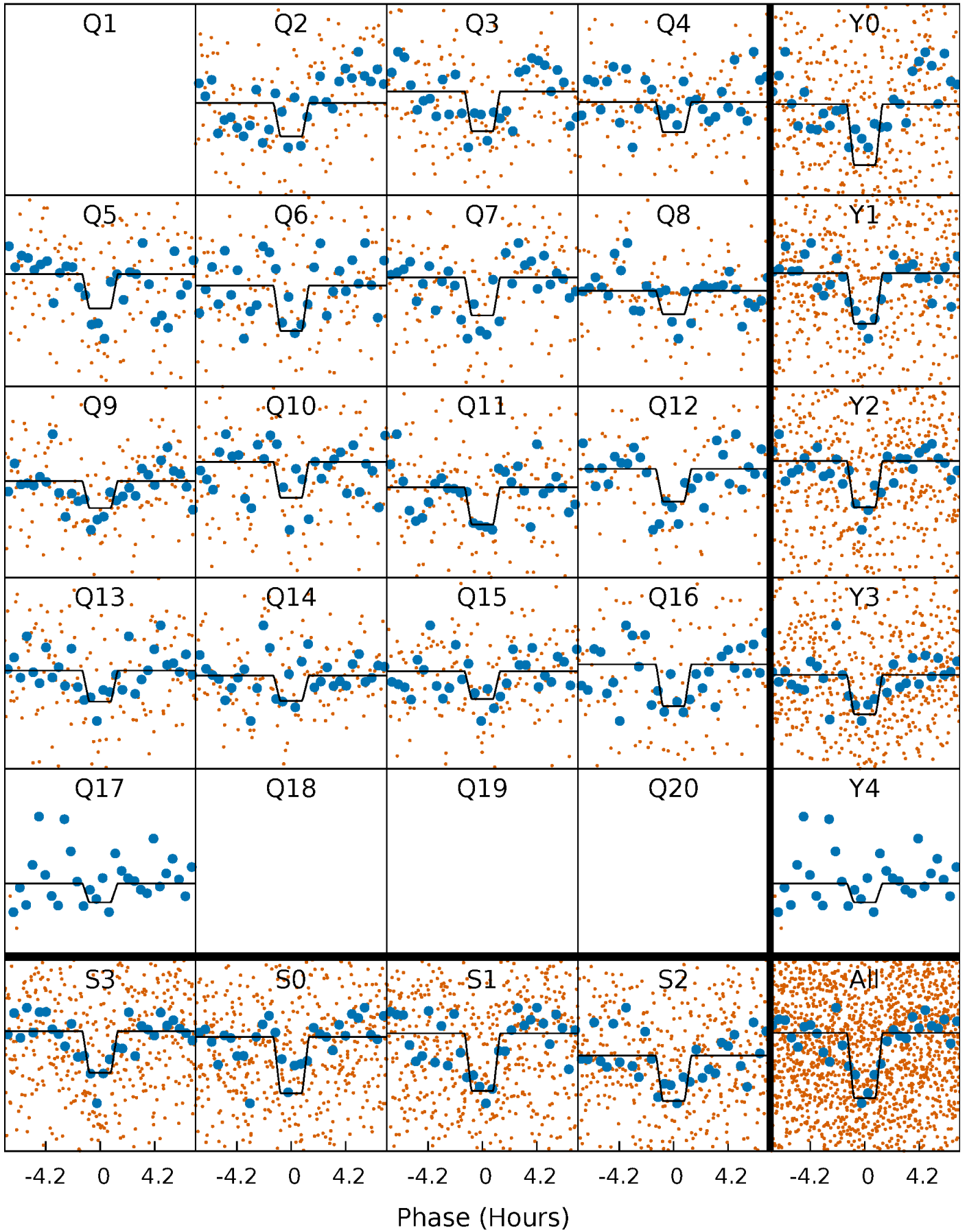
# DV Quarter-Phased Transit Curves

TCE 010473272-01   P= 17.660807 Days    $T_0=137.378896$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

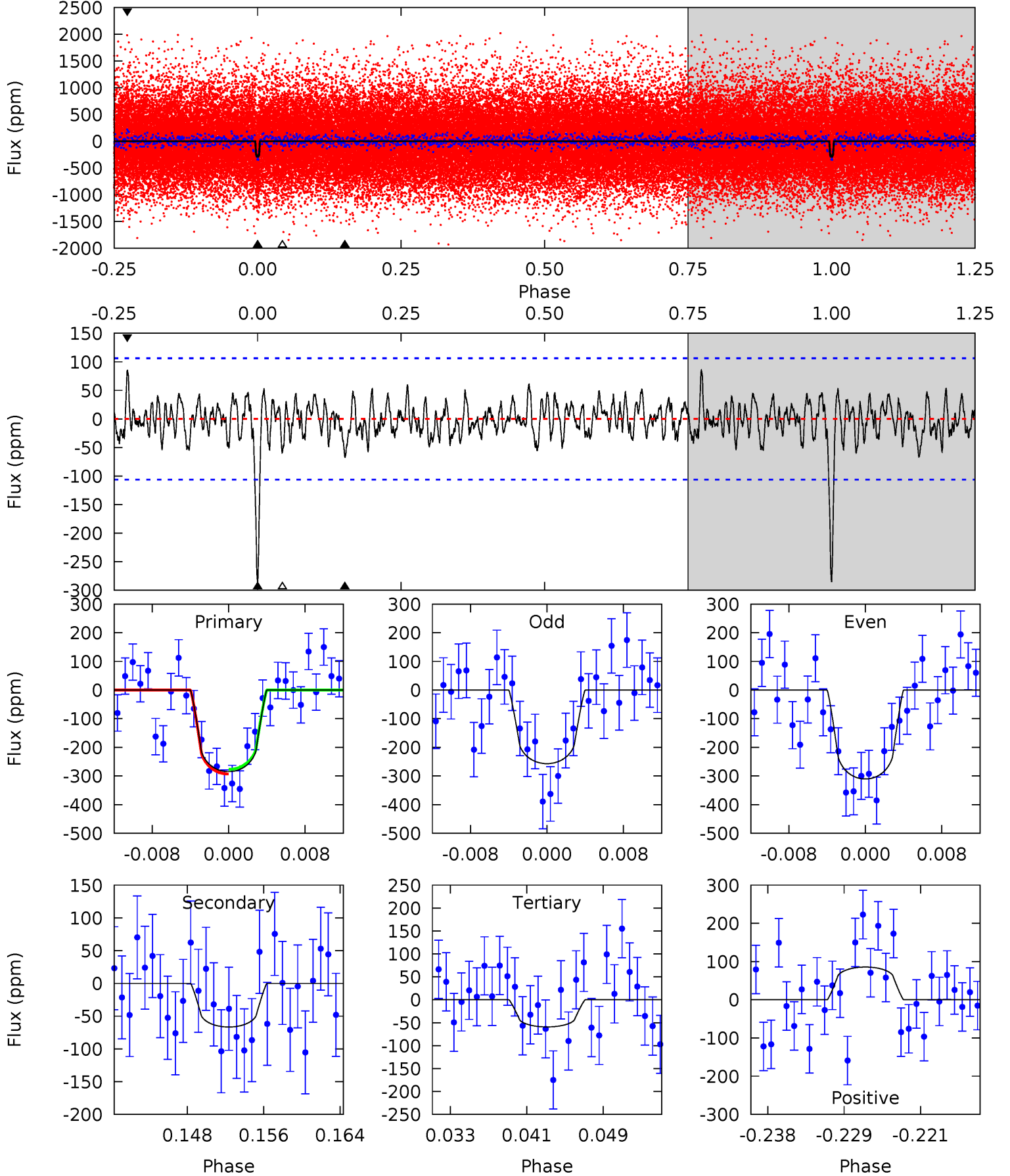
TCE 010473272-01 P= 17.660572 Days  $T_0=137.386279$  (BKJD)



# DV Model-Shift Uniqueness Test

010473272-01,  $P = 17.660807$  Days,  $E = 137.378896$  Days

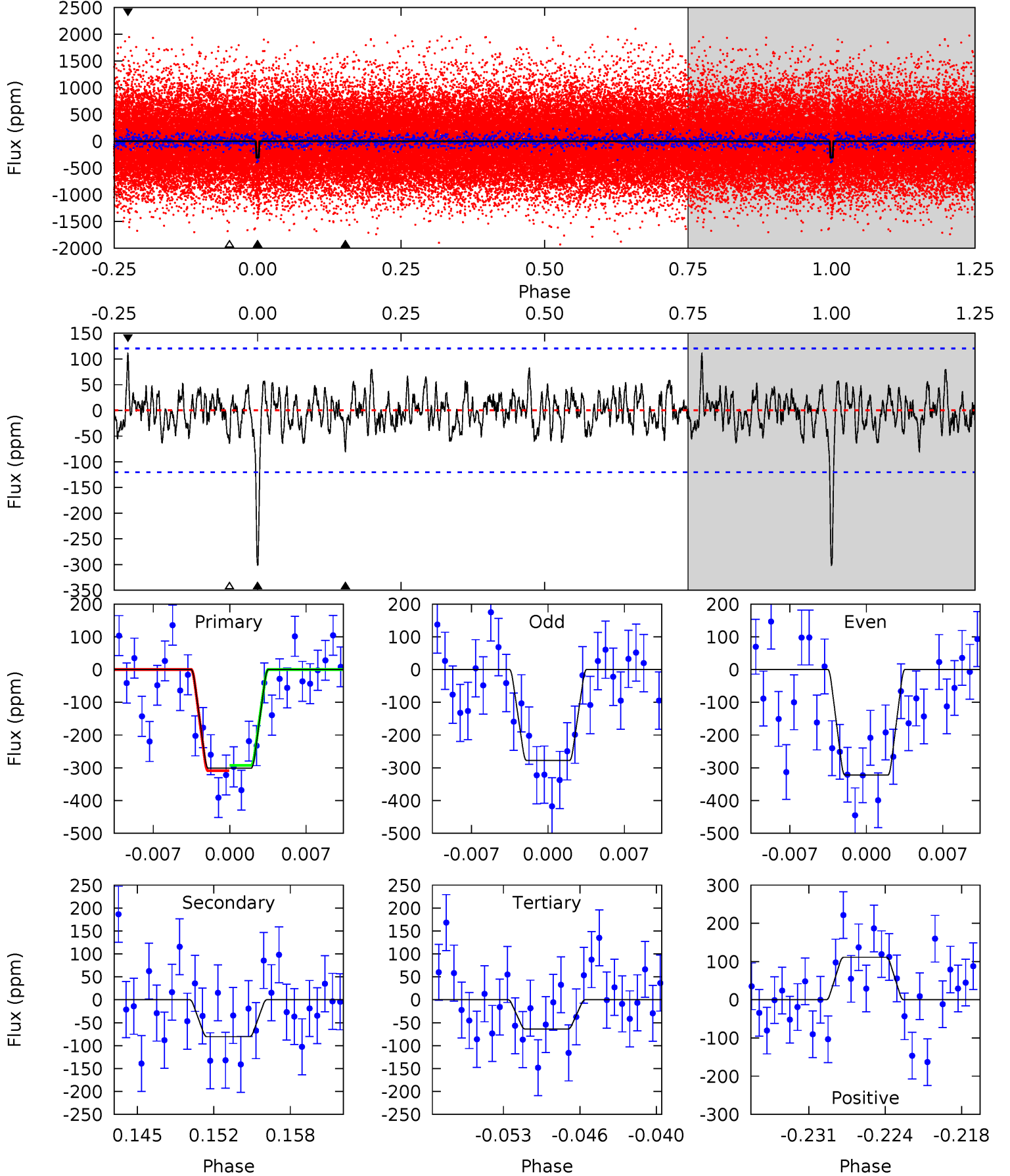
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 13.6 | 3.17 | 2.82 | 4.08 | 5.06            | 2.64            | 1.15             | 10.7    | 9.49    | 0.35    | -0.90   | 1.28    | 0.94 | 0.23  | 0.39 |



# Alt Model-Shift Uniqueness Test

010473272-01, P = 17.660572 Days, E = 137.386279 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  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 12.8 | 3.41 | 2.71 | 4.71 | 5.11            | 2.72            | 1.18             | 10.1    | 8.06    | 0.70    | -1.30   | 0.95    | 0.85 | 0.27  | 0.35 |



### Stellar Parameters For KIC 010473272

|        | $T_{\text{eff}} (K)$ | $\log(g)$                 | [Fe/H]                     | $R (R_{\odot})$           | $M (M_{\odot})$           | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
|        | $5910^{+158}_{-193}$ | $4.505^{+0.048}_{-0.192}$ | $-0.020^{+0.250}_{-0.300}$ | $0.940^{+0.268}_{-0.089}$ | $1.032^{+0.115}_{-0.140}$ | $1.750^{+0.437}_{-0.850}$                 |
|        | +3%/-3%              | +1%/-4%                   | +1250%/-1500%              | +29%/-9%                  | +11%/-14%                 | +25%/-49%                                 |
| 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 010473272-01 / KOI 4648.01

| Detrend | Depth (ppm)  | $R_p (R_{\oplus})$     | $T_{max} (K)$     | $T_{obs} (K)$         | $A_{obs}$          |
|---------|--------------|------------------------|-------------------|-----------------------|--------------------|
| DV      | $-67 \pm 21$ | $2.34^{+1.81}_{-1.52}$ | $986^{+58}_{-51}$ | $3947^{+2080}_{-720}$ | $118^{+884}_{-85}$ |
| Alt.    | $-80 \pm 24$ | $2.47^{+1.87}_{-1.56}$ | $982^{+65}_{-46}$ | $4022^{+2035}_{-733}$ | $129^{+838}_{-91}$ |

$T_{max}$  = 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

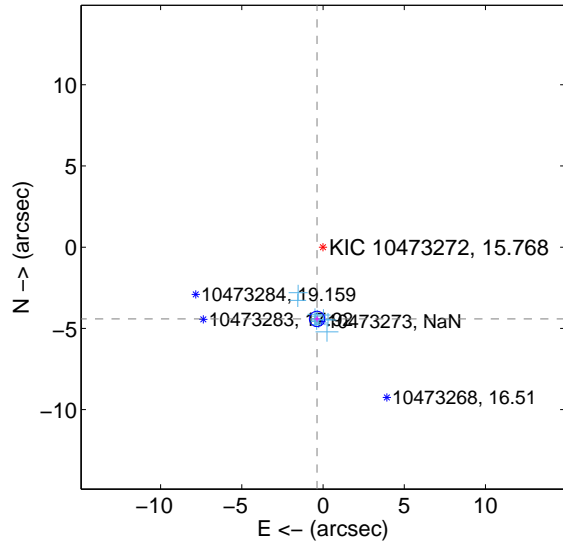
Supplemental centroid analysis for 010473272-01. Kepler magnitude: 15.77. Transit SNR 10.36

There are 13 quarters with good PRF difference image offsets

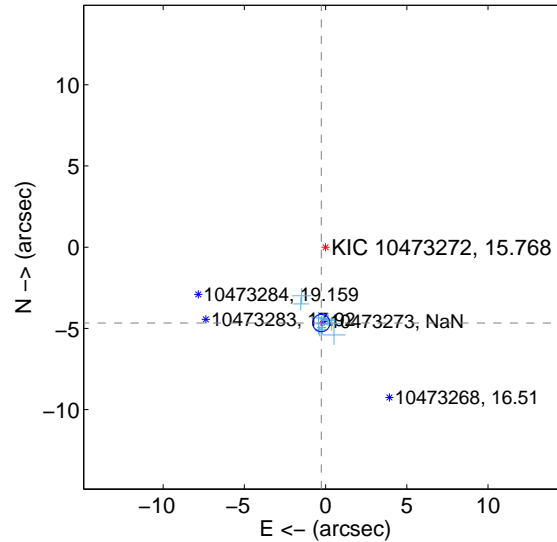
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA       | $\Delta$ Dec       |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT          | $4.433 \pm 0.157$  | 28.19               | $0.369 \pm 0.155$ | $-4.418 \pm 0.166$ |
| PRF-fit source offset from KIC position | $4.679 \pm 0.176$  | 26.52               | $0.262 \pm 0.131$ | $-4.672 \pm 0.177$ |
| photometric centroid source offset      | $8.57 \pm 1.28$    | 6.70                | $-2.15 \pm 1.15$  | $-8.30 \pm 1.29$   |

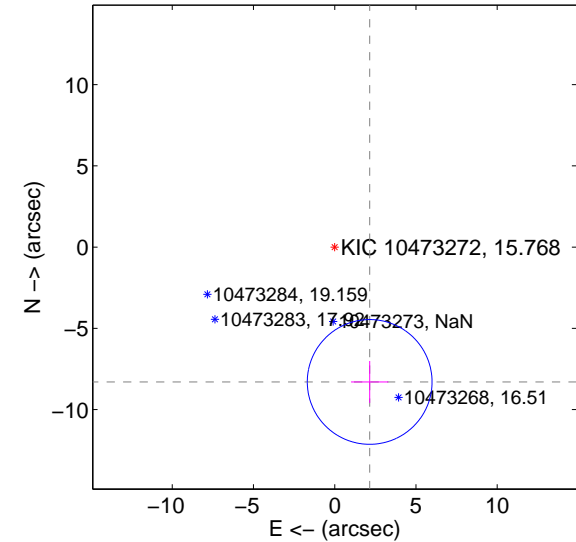
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

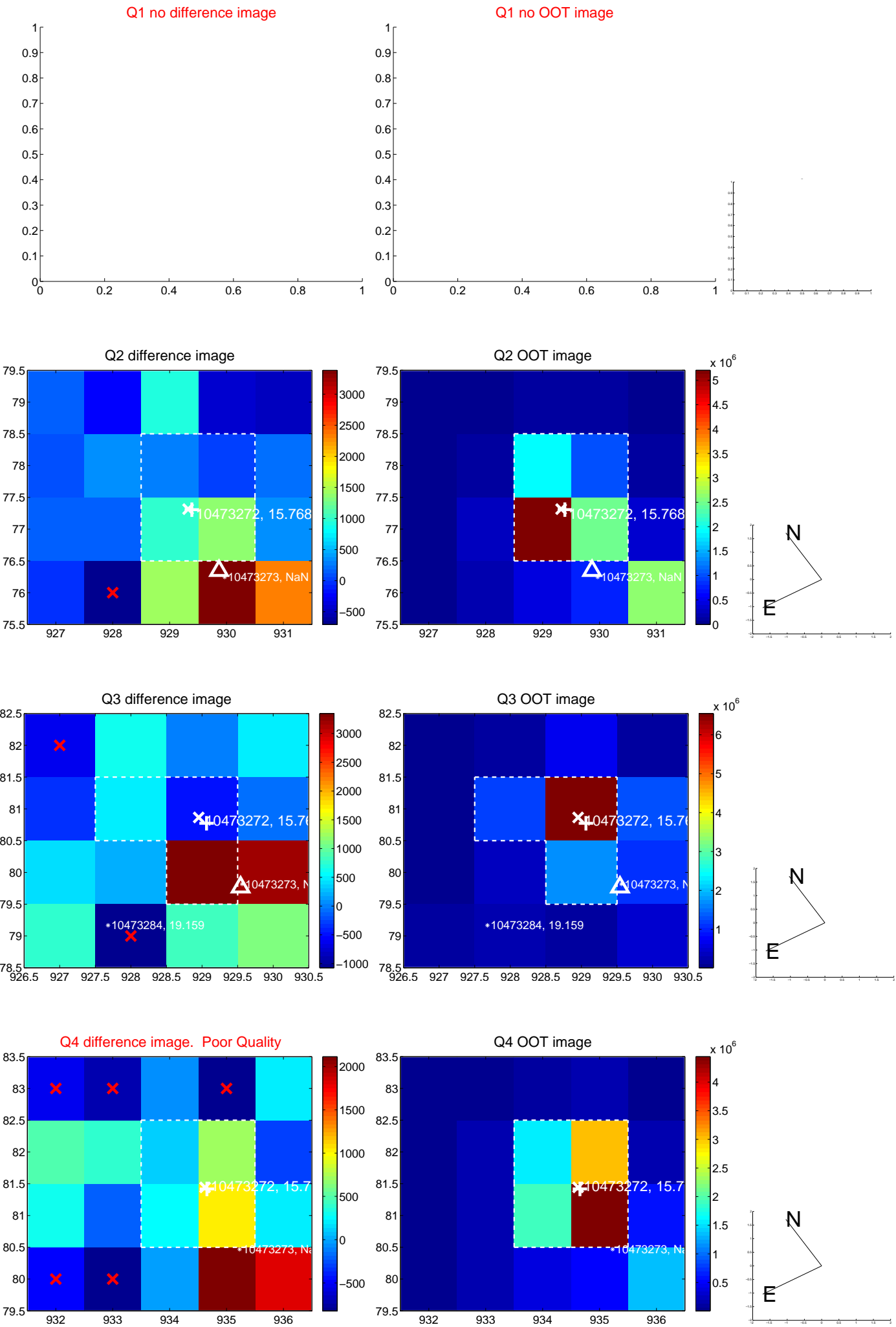


offset from photometric centroids

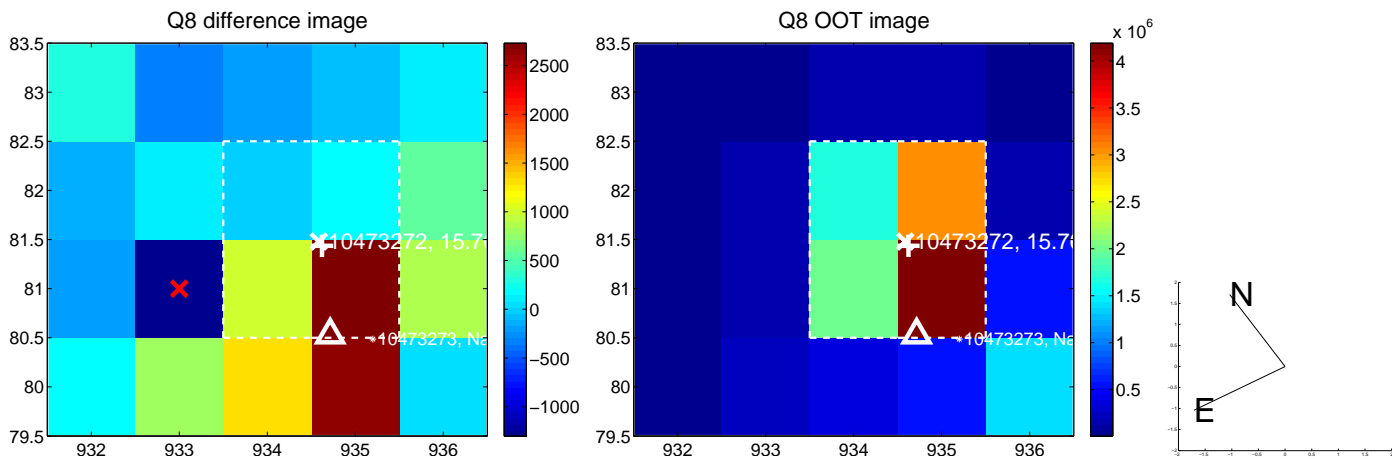
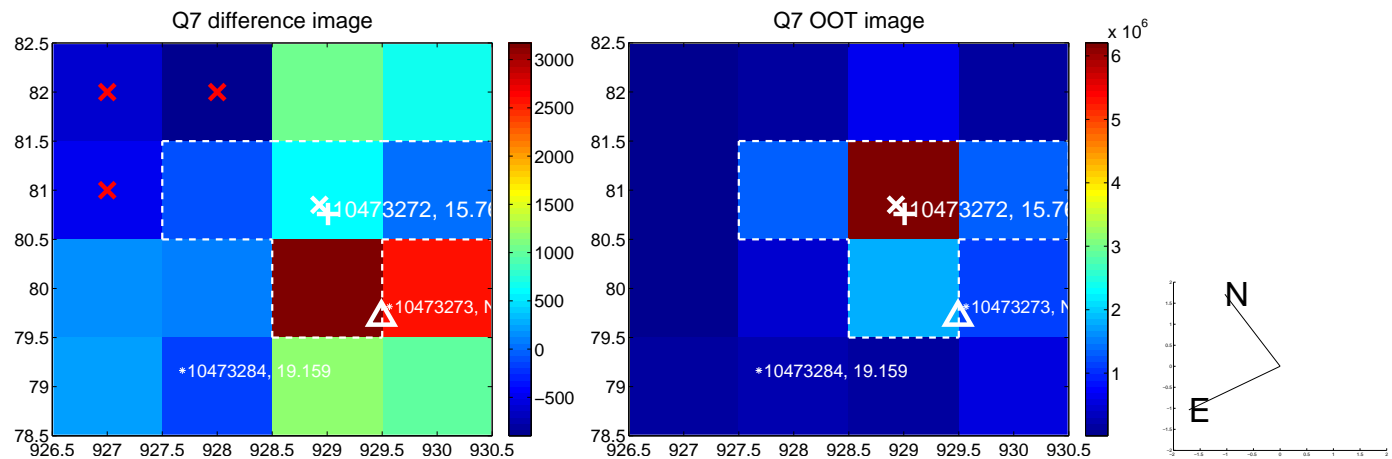
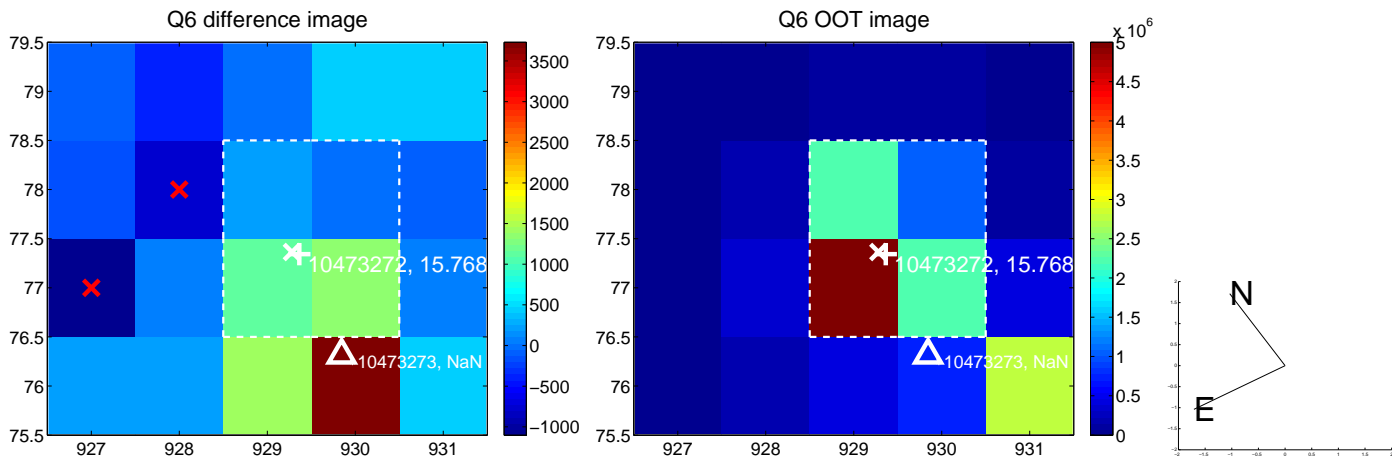
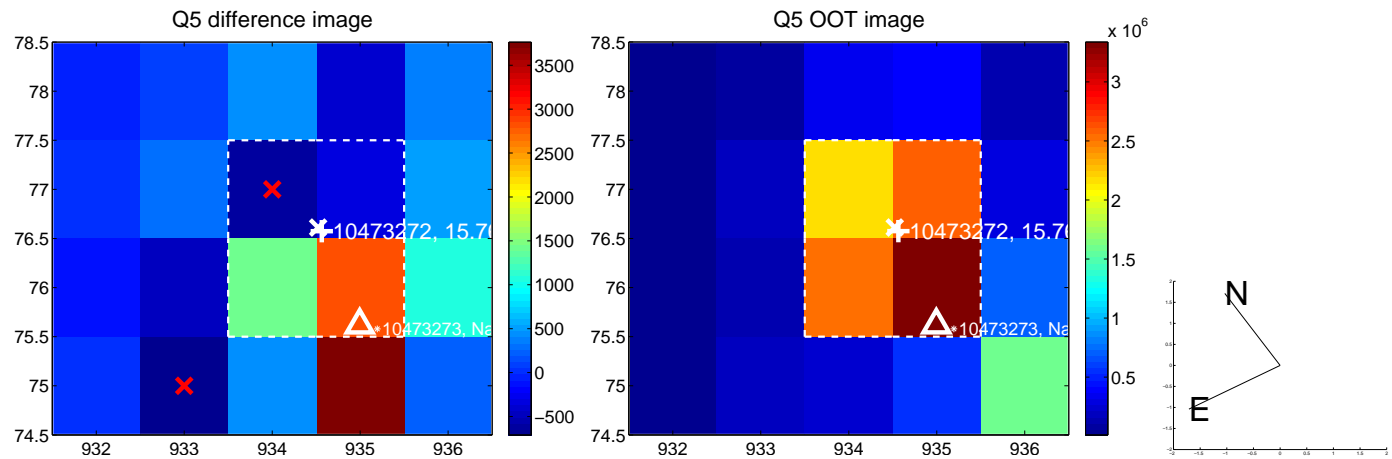


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

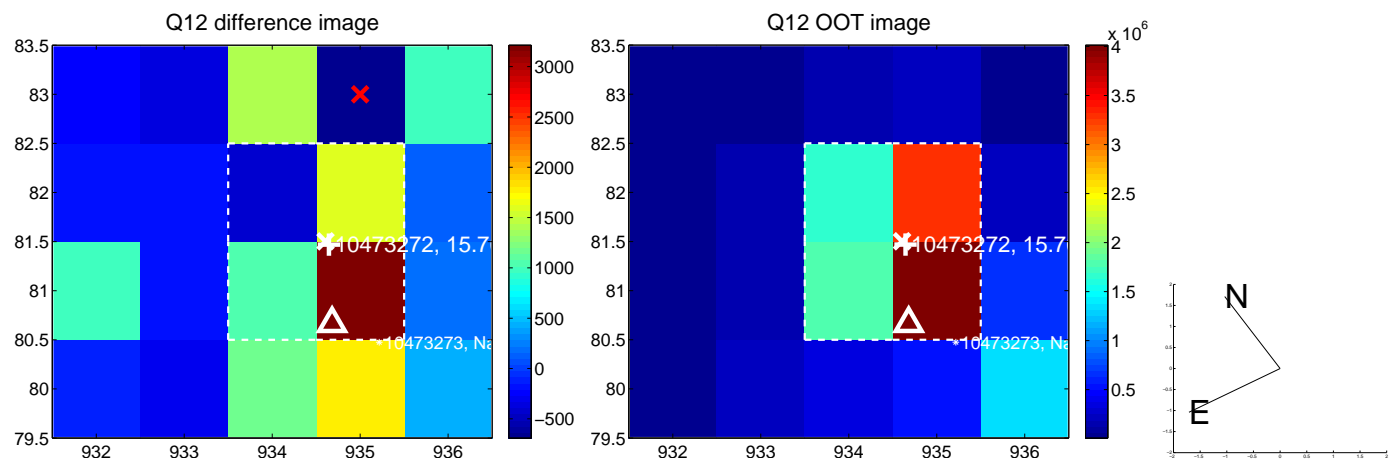
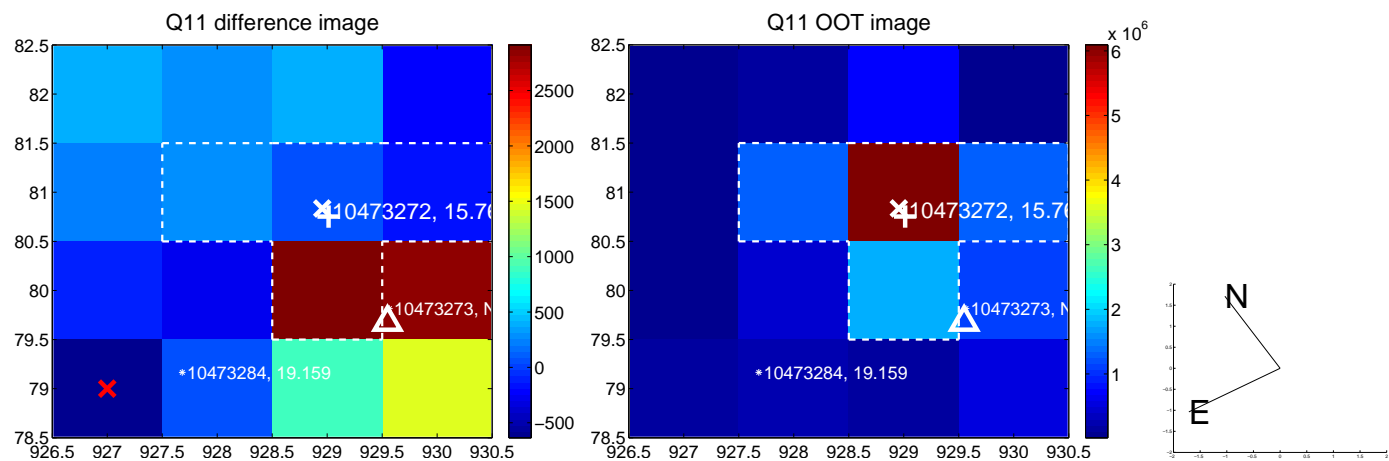
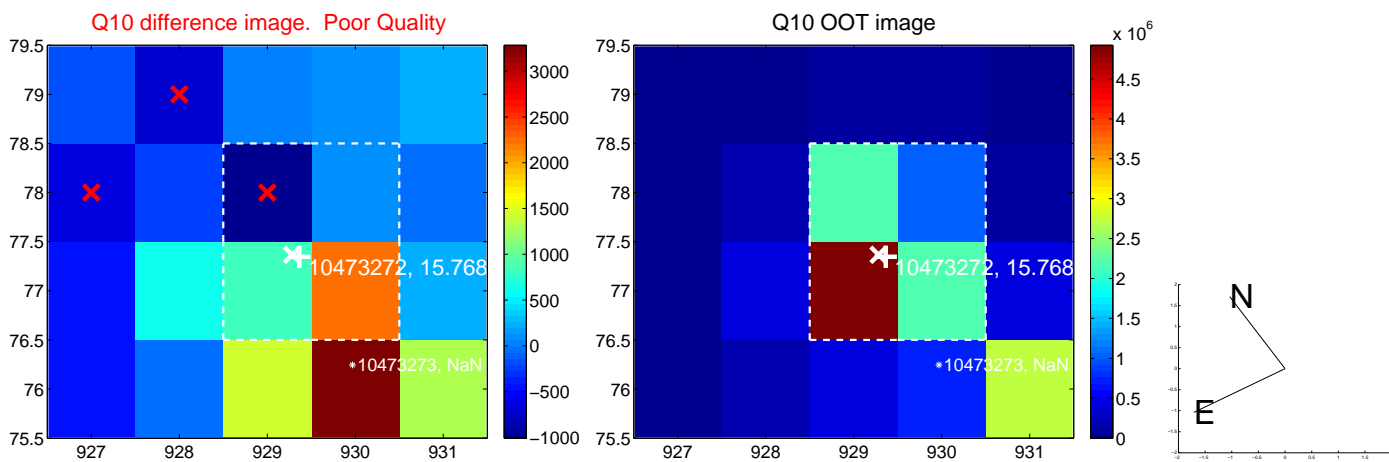
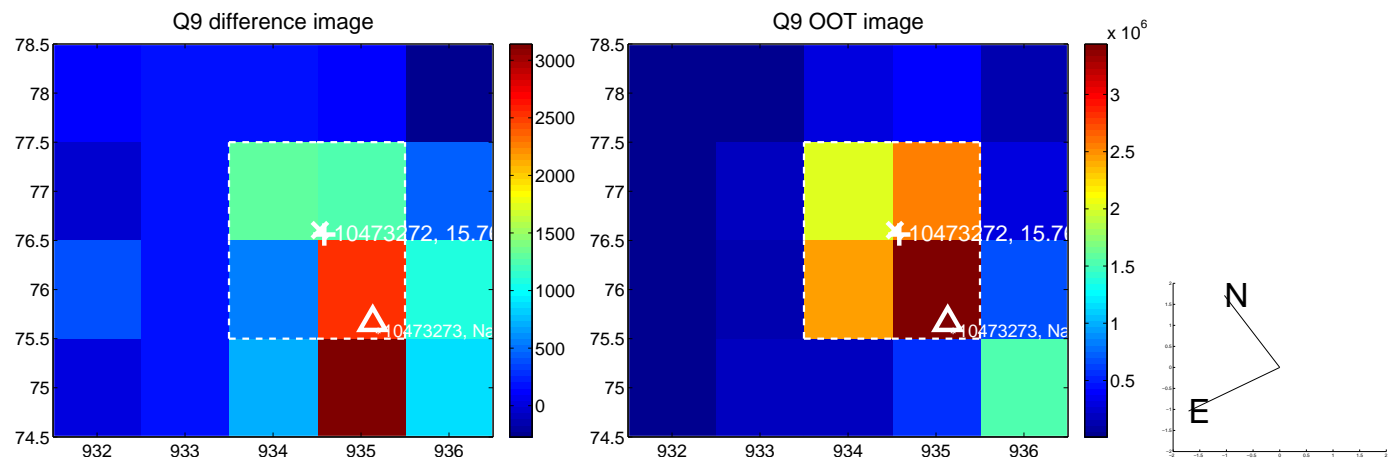
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



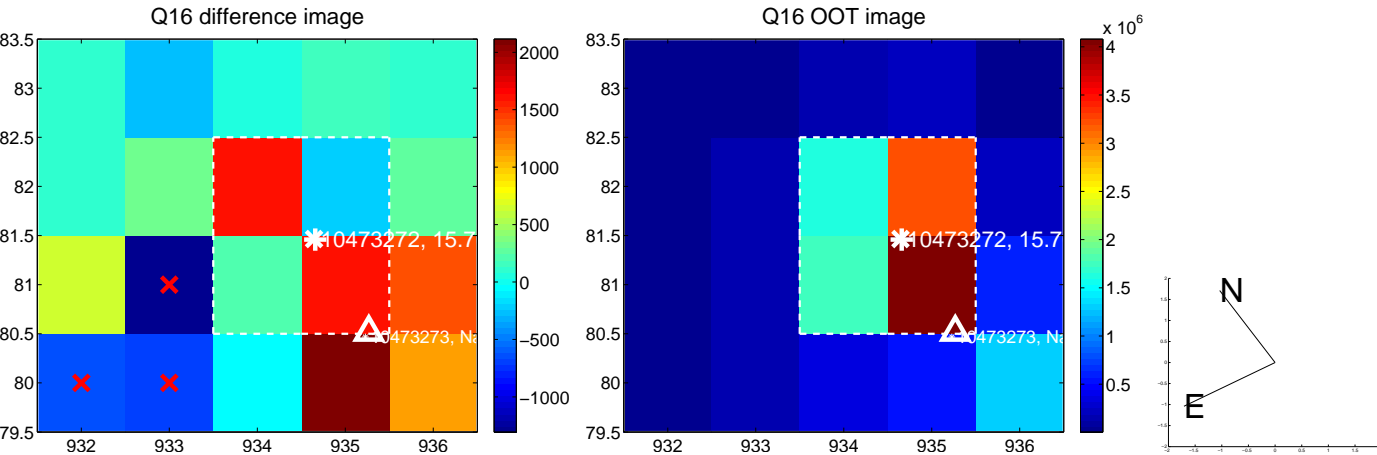
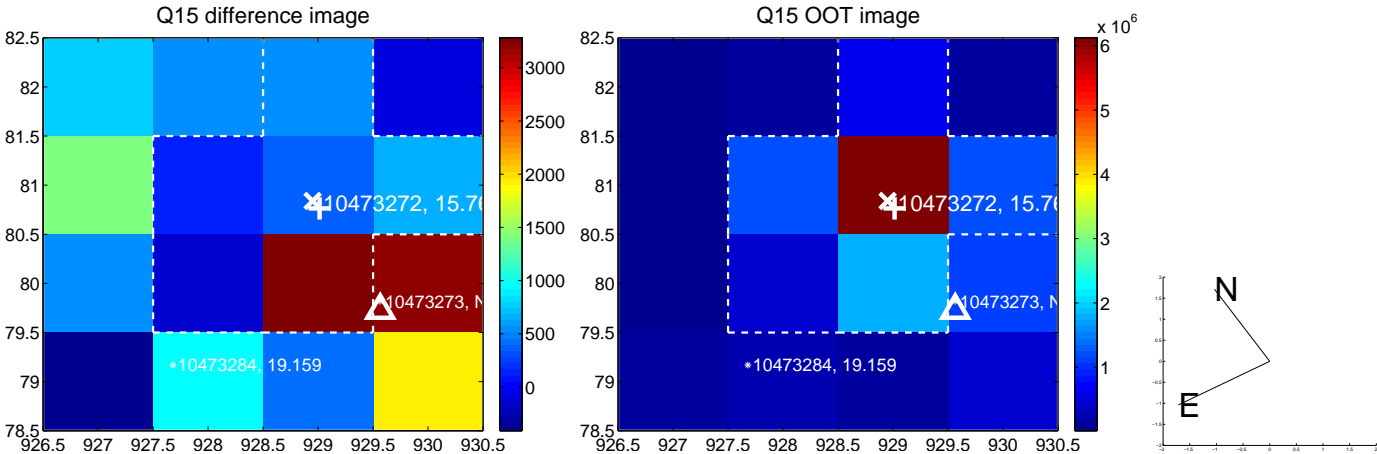
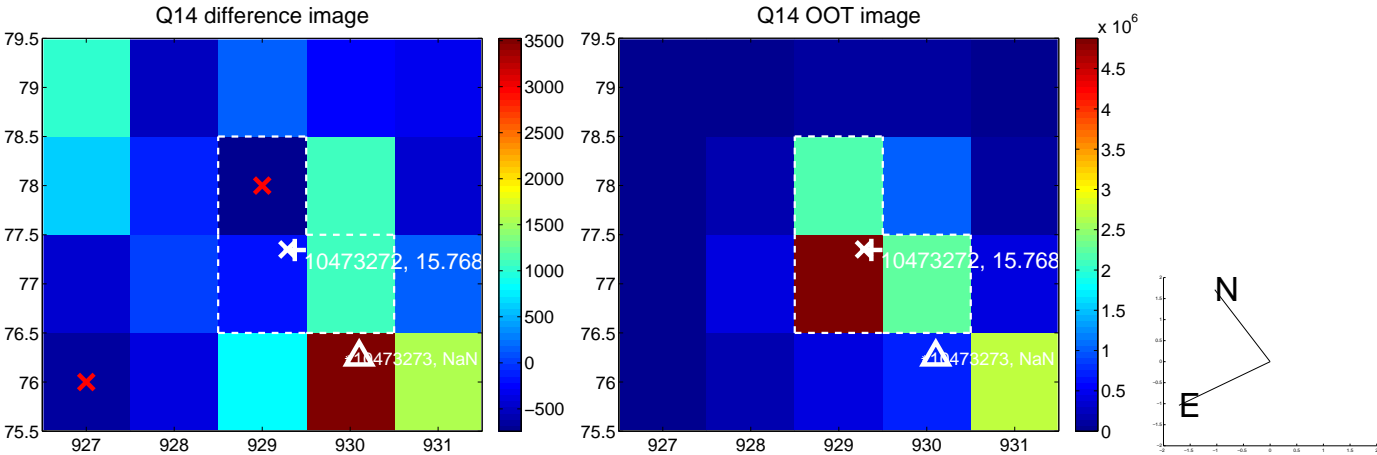
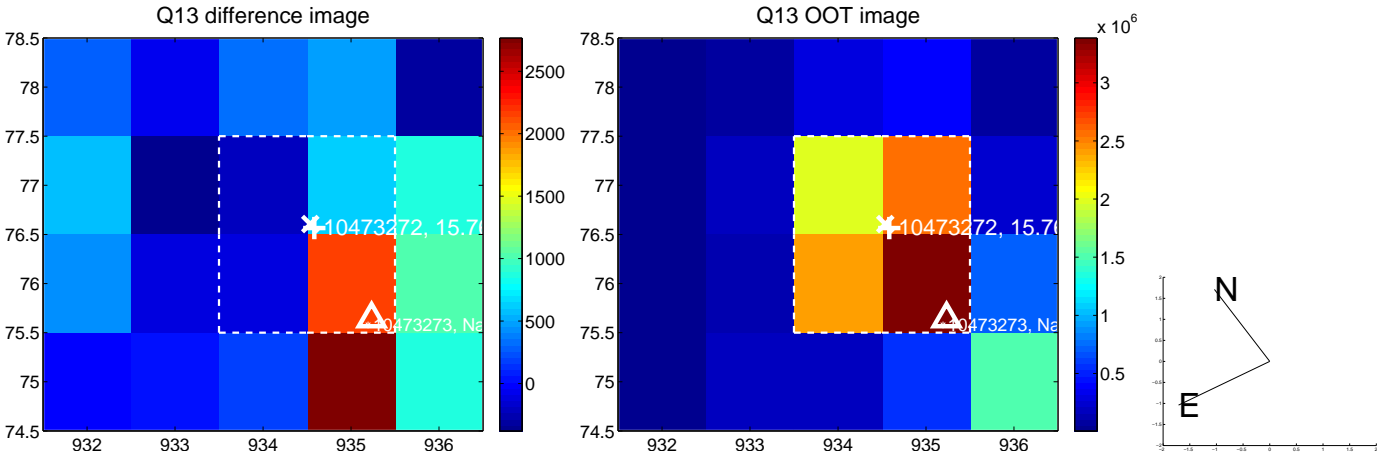
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

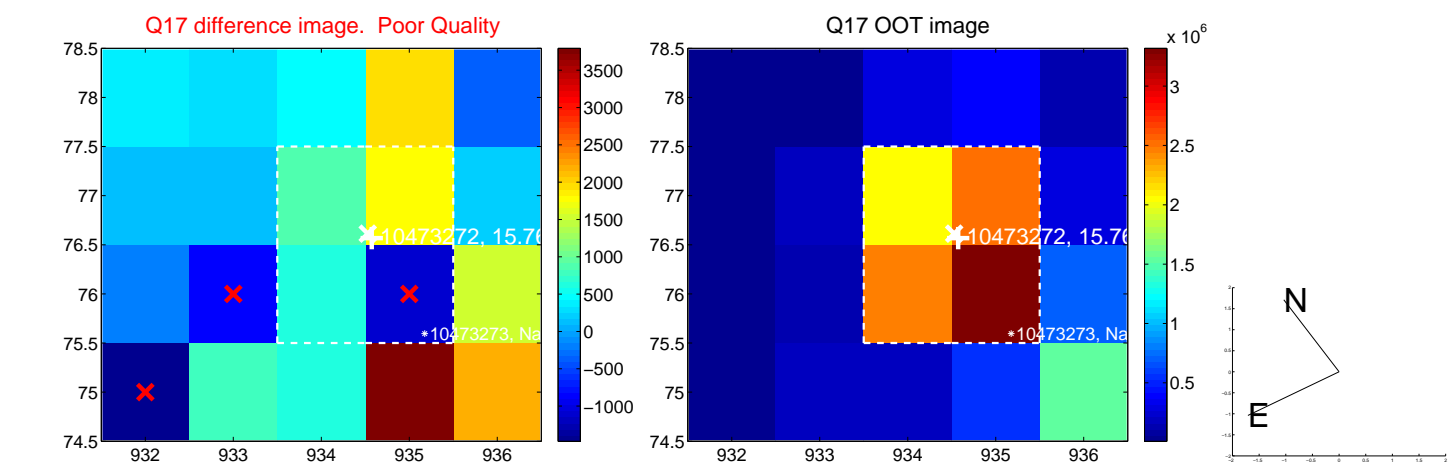


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

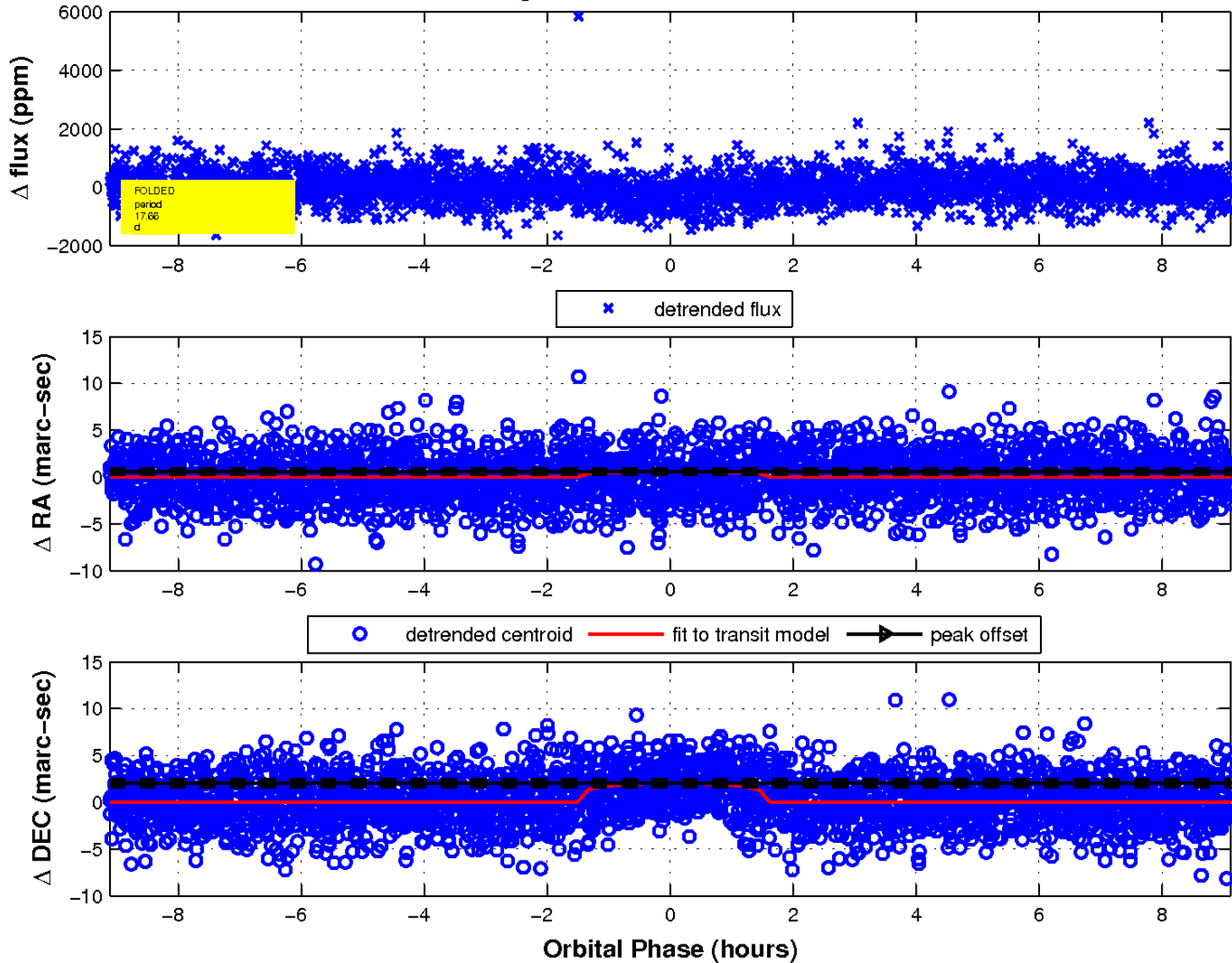




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 1 of 1



UKIRT Image

Declination

