

# KIC 009881077

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 009881077-01 | OBS      | 2751.01 | 24.400322     | 135.626559   | 889.7       | 2.980            | 18.3 | 20.2 | 0.67                        | 4583            | 2.57                   | 8.66                   |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|------------|
| 009881077-01 | OBS      | PC   | 1.00  | 0 | 0 | 0 | 0 | NO_COMMENT |

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

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

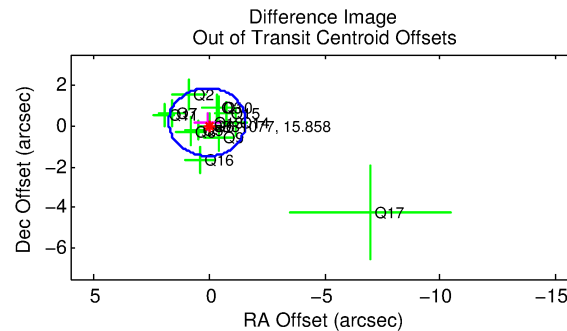
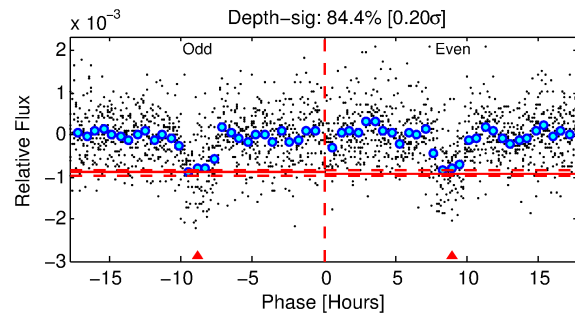
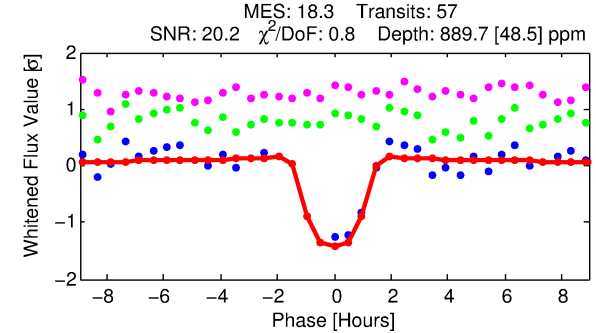
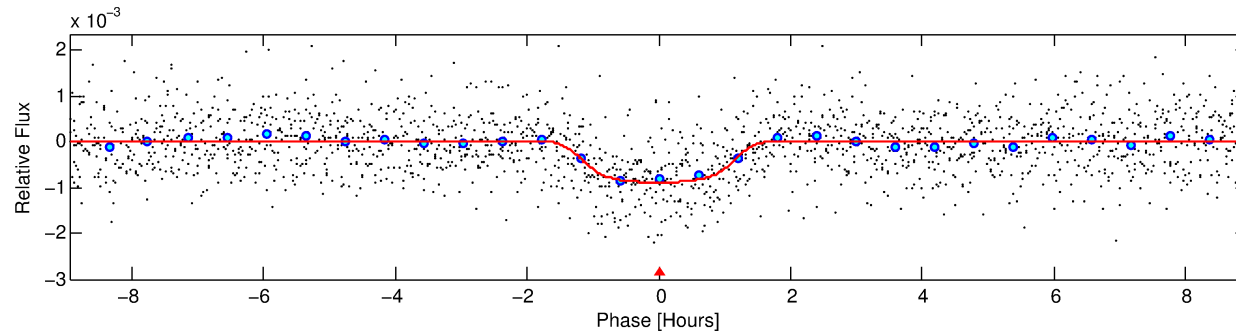
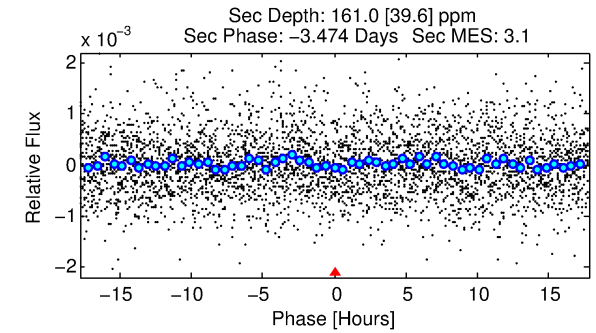
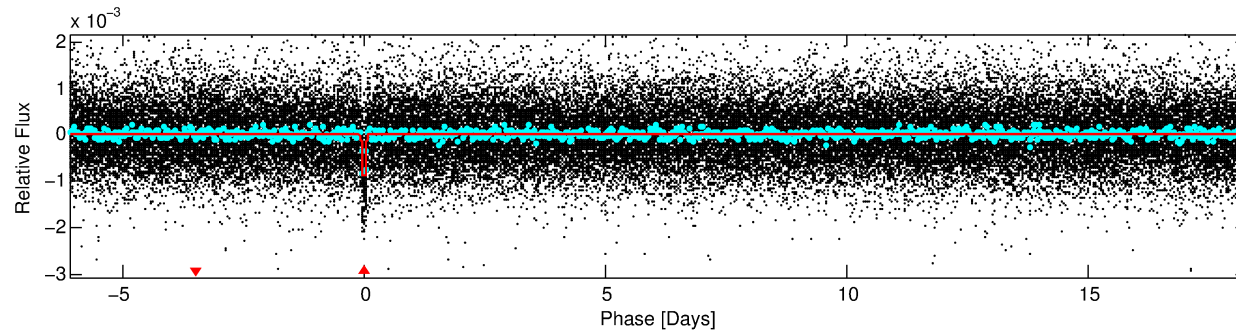
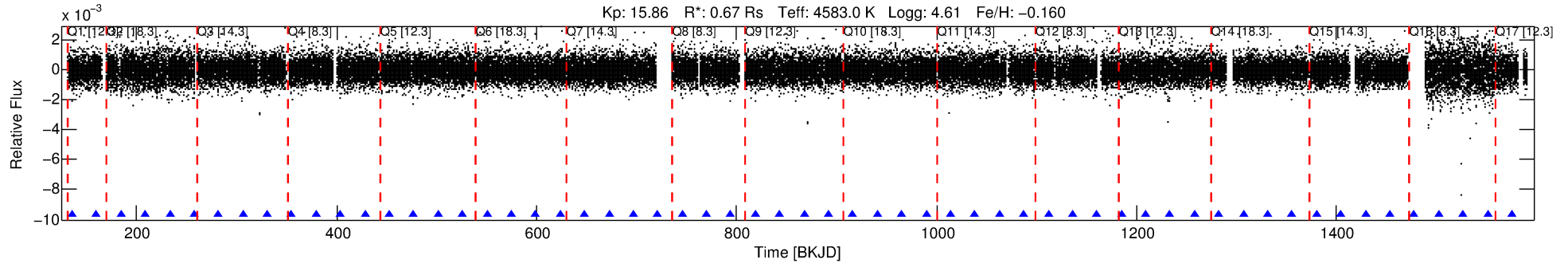
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009881077-01

No Significant Match Found

# DV One-Page Summary

KIC: 9881077 Candidate: 1 of 1 Period: 24.400 d  
KOI: K02751.01 Corr: 0.983



## DV Fit Results:

Period = 24.40032 [0.00010] d  
Epoch = 135.6266 [0.0033] BKJD  
Rp/R\* = 0.0350 [0.0030]  
a/R\* = 29.02 [8.11]  
b = 0.93 [0.05]  
Seff = 8.66 [1.33]  
Teq = 437 [17] K  
Rp = 2.57 [0.30] Re  
a = 0.1440 [0.0096] AU  
Ag = 277.57 [87.68] [3.15σ]  
Teffp = 2760 [223] K [10.37σ]

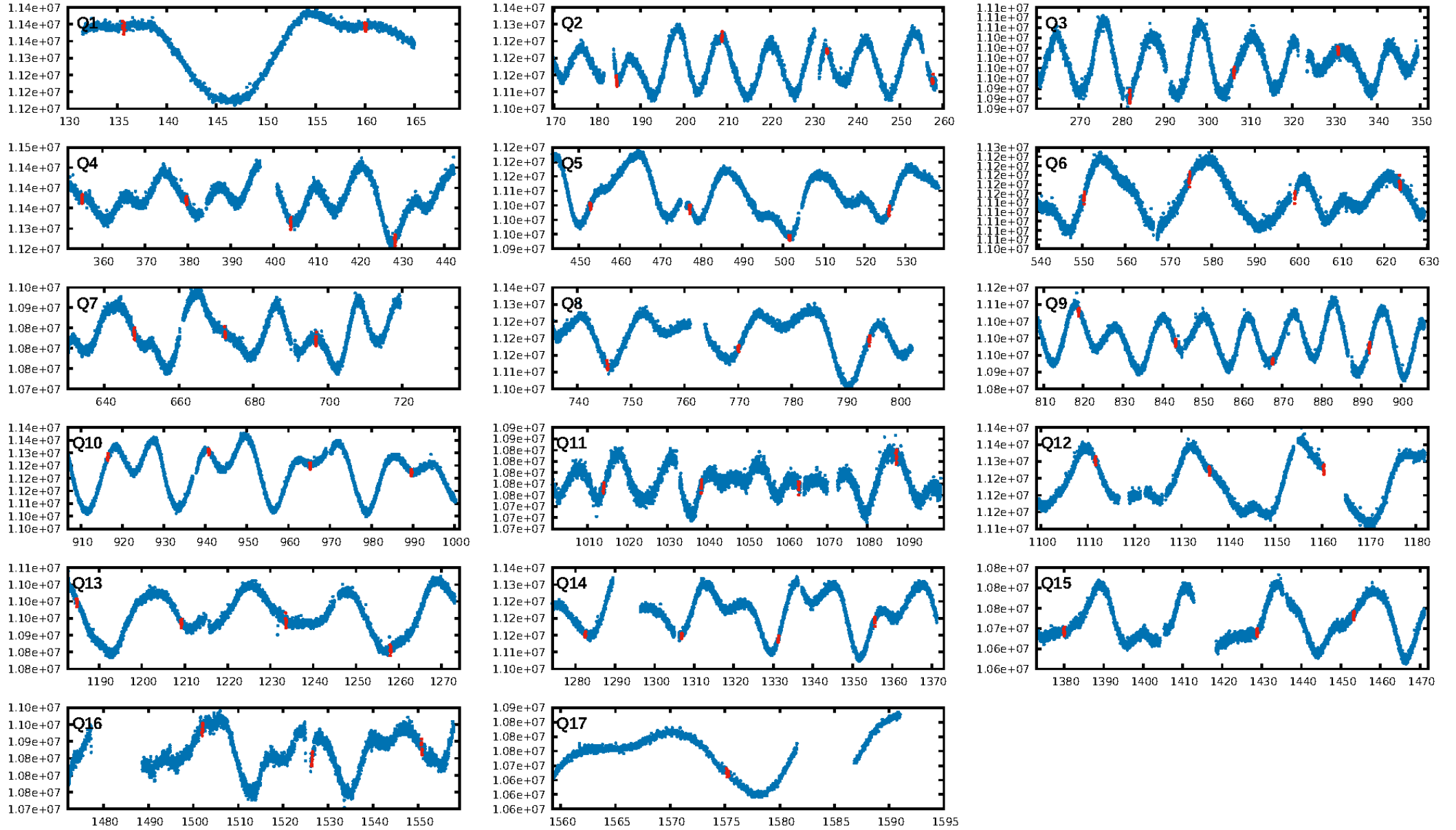
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 84.6%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 3.43e-71  
RollingBand-fgt: 1.00 [54/54]  
GhostDiagnostic-chr: 5.064  
Centroid-sig: 0.0%  
Centroid-so: 1.320 arcsec [2.06σ]  
OotOffset-rm: 0.198 arcsec [0.36σ]  
KicOffset-rm: 0.287 arcsec [0.61σ]  
OotOffset-st: 4/4/2/4 [14]  
KicOffset-st: 4/4/2/4 [14]  
DiffImageQuality-fgm: 0.93 [13/14]  
DiffImageOverlap-fno: 1.00 [17/17]

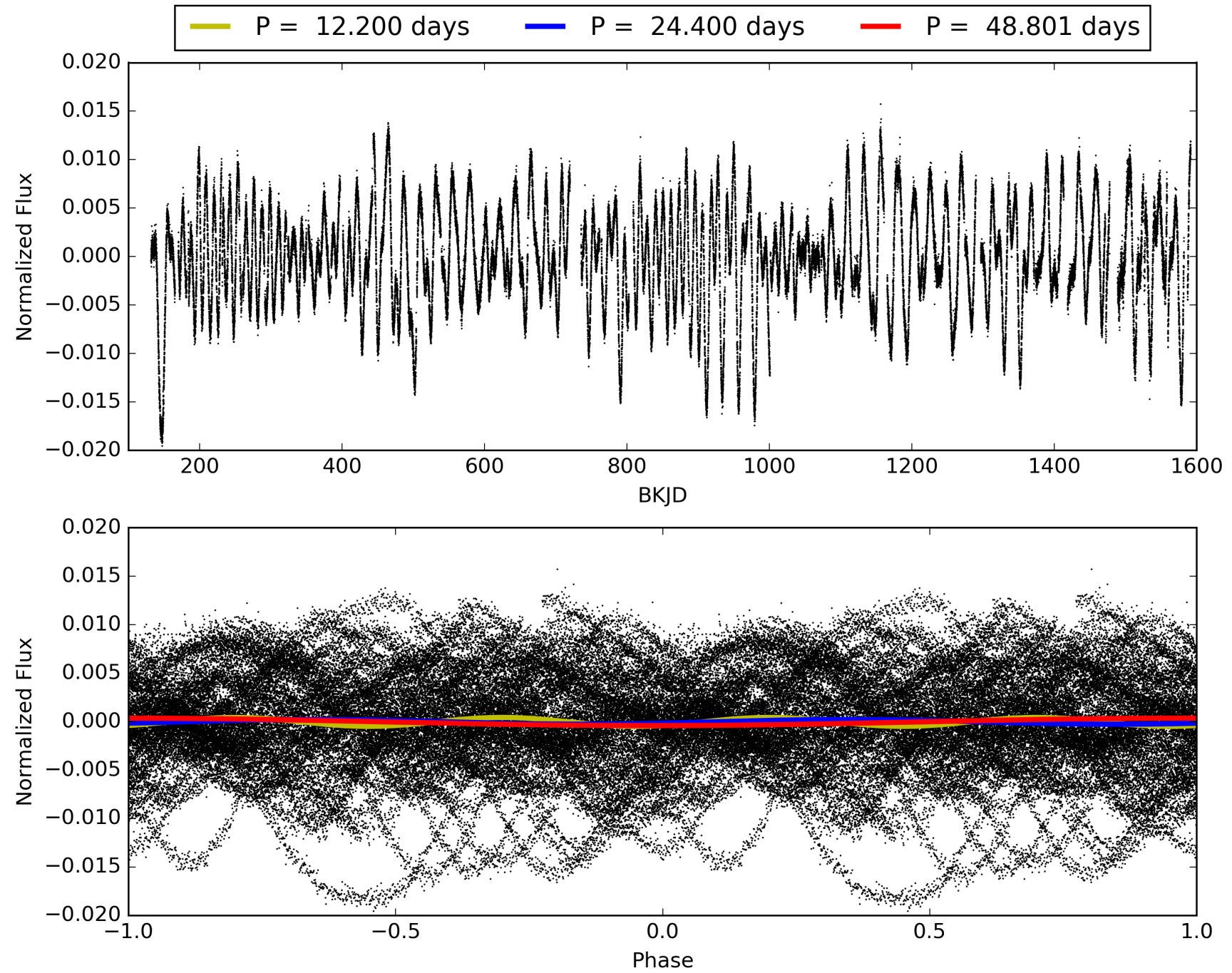
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 28-Jan-2016 20:37:34 Z

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

# TCE 009881077-01, PDC Light Curves

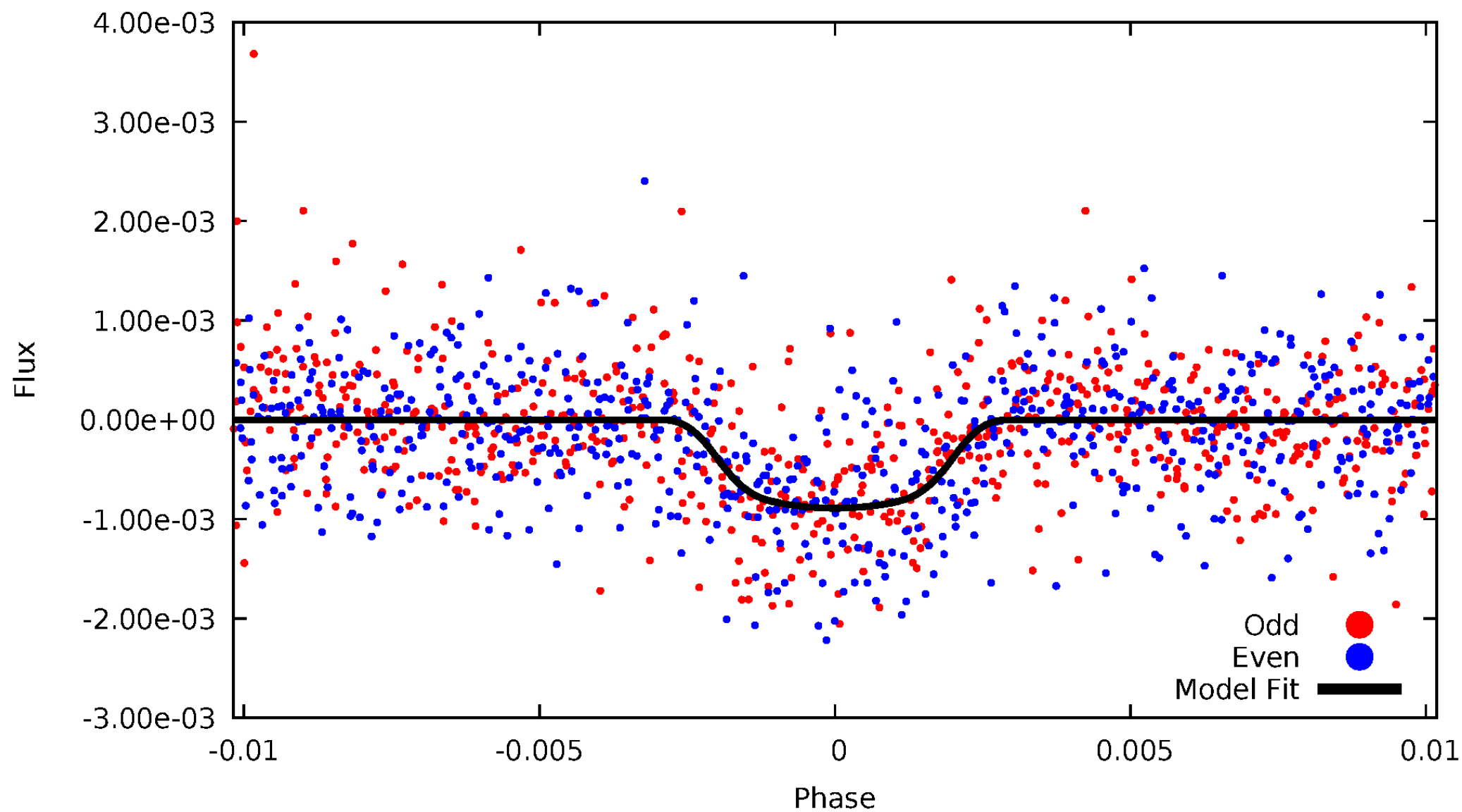


TCE 009881077-01



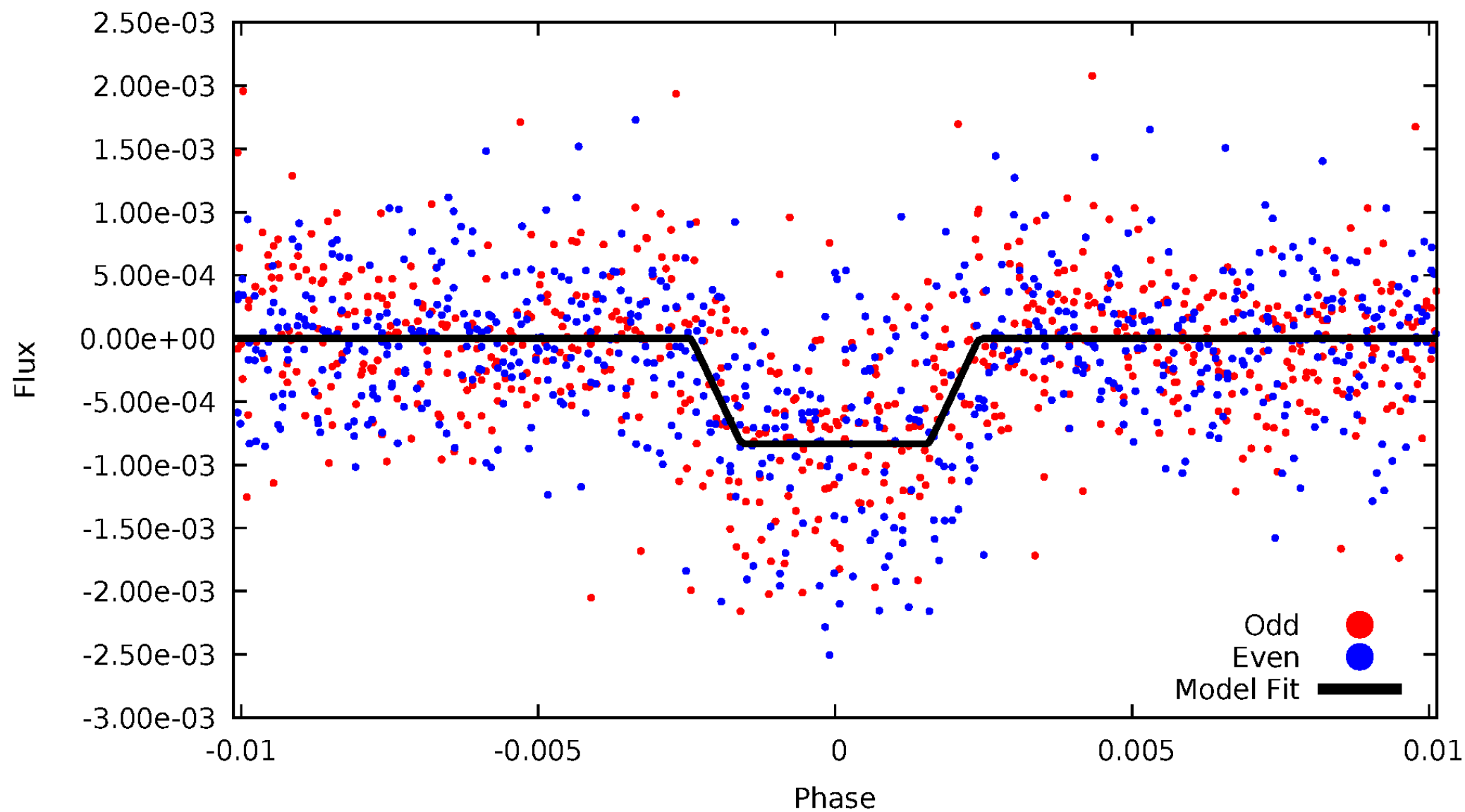
# DV Odd/Even

TCE 009881077-01



# ALT Odd/Even

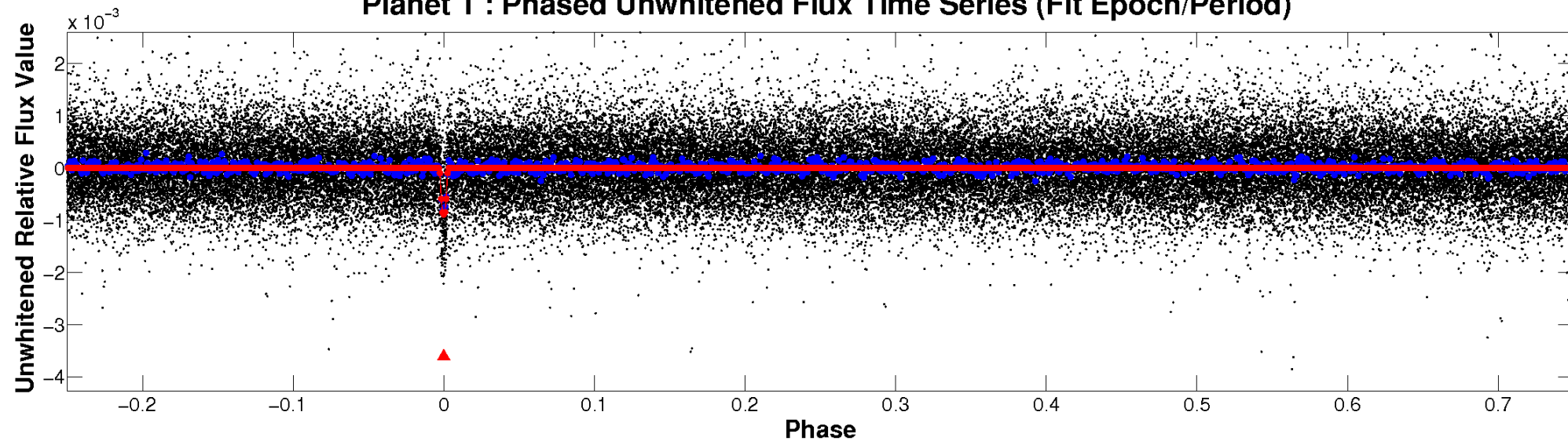
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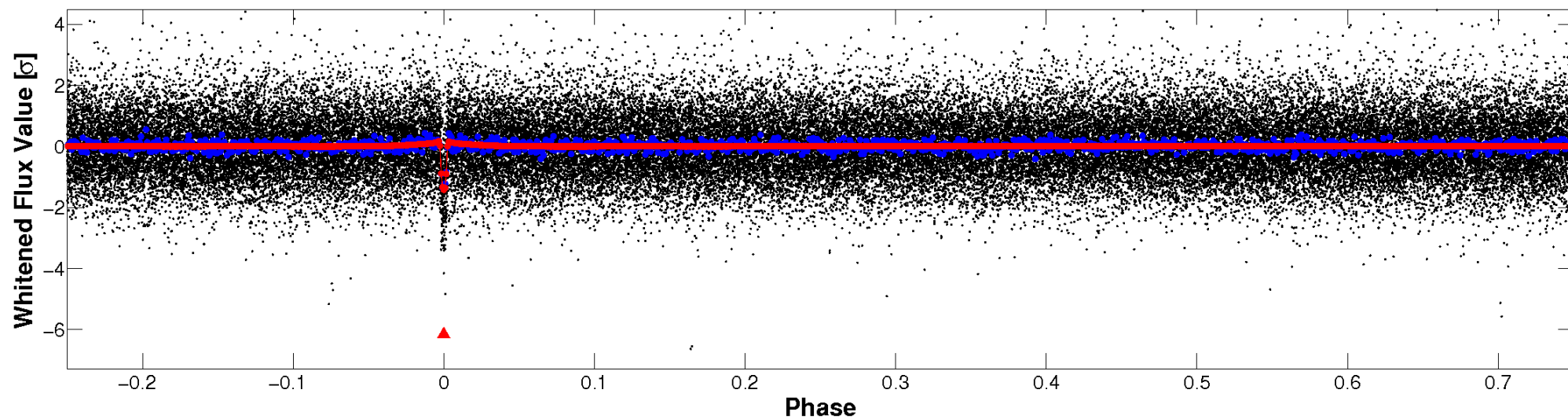


# Non-Whitened Vs. Whitened Light Curve

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

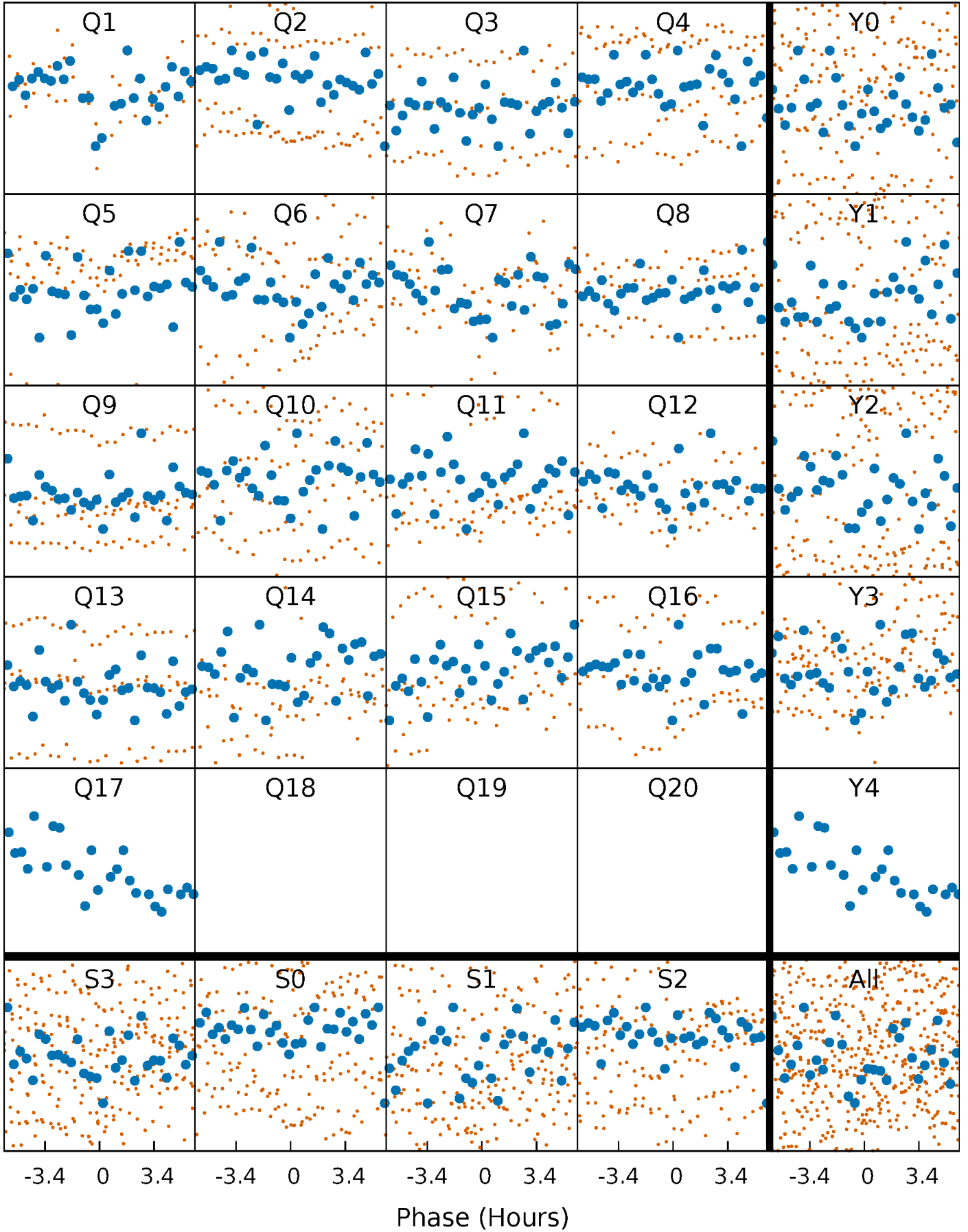


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

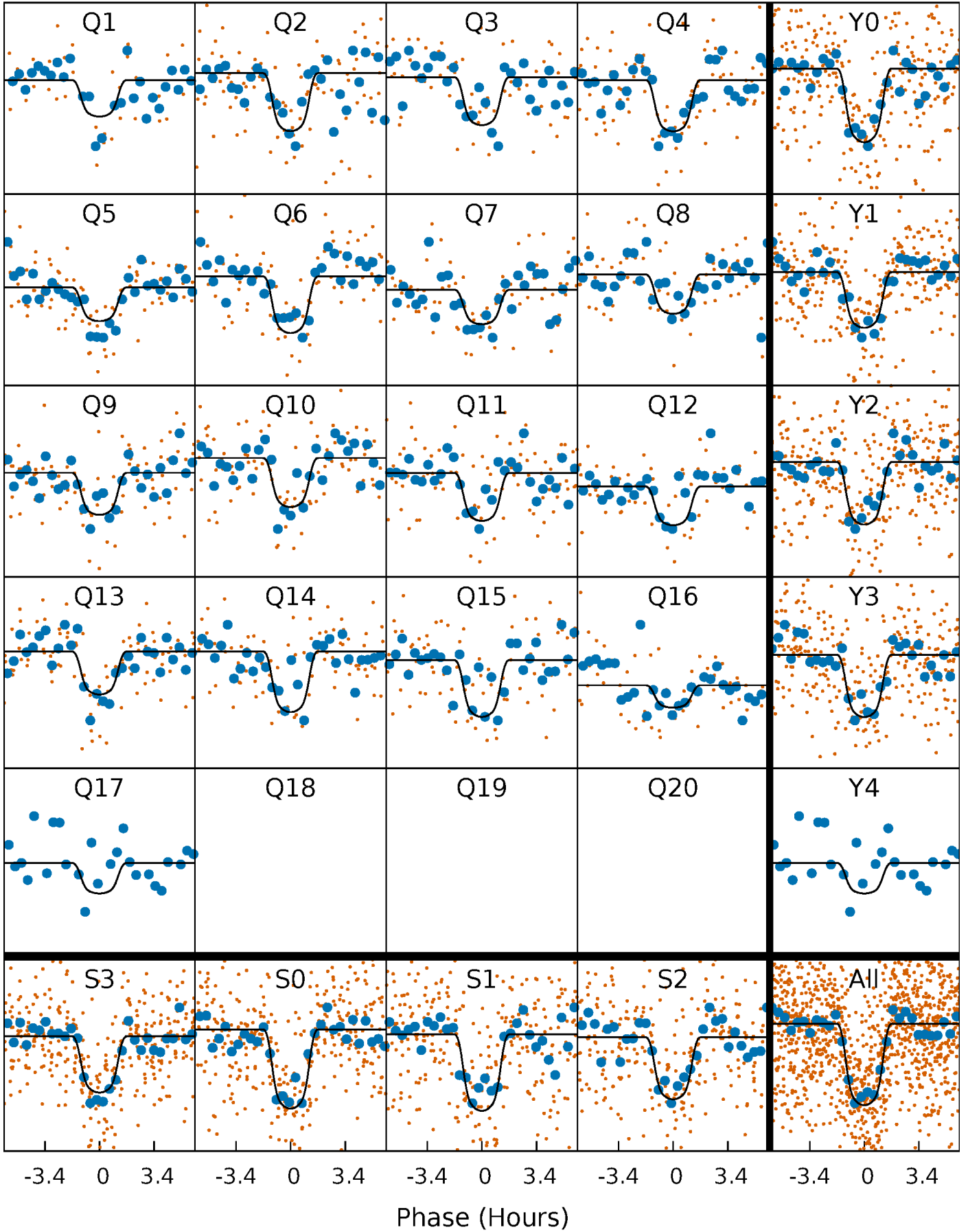
TCE 009881077-01 P= 24.400322 Days  $T_0=135.626559$  (BKJD)





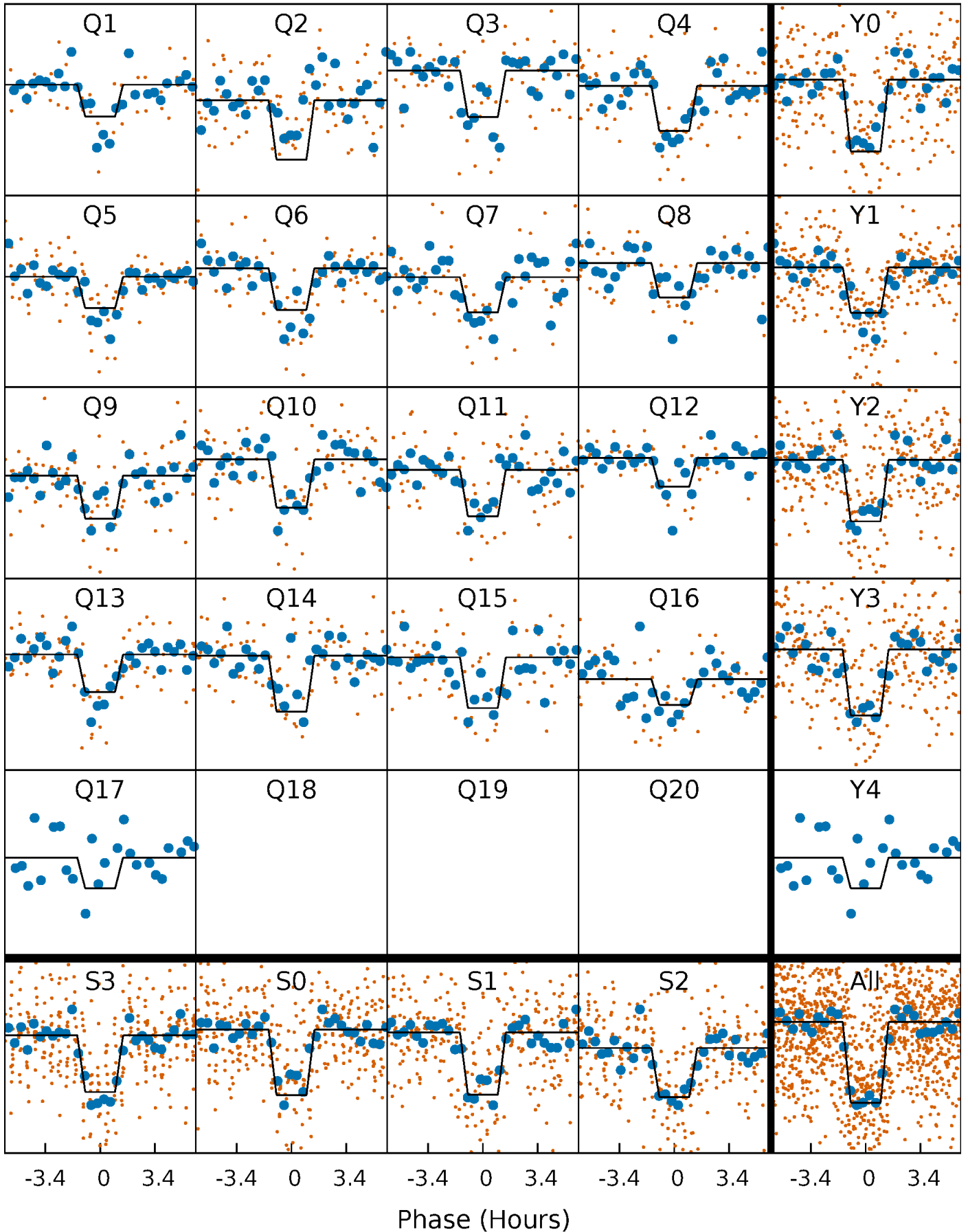
# DV Quarter-Phased Transit Curves

TCE 009881077-01 P= 24.400322 Days  $T_0=135.626559$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

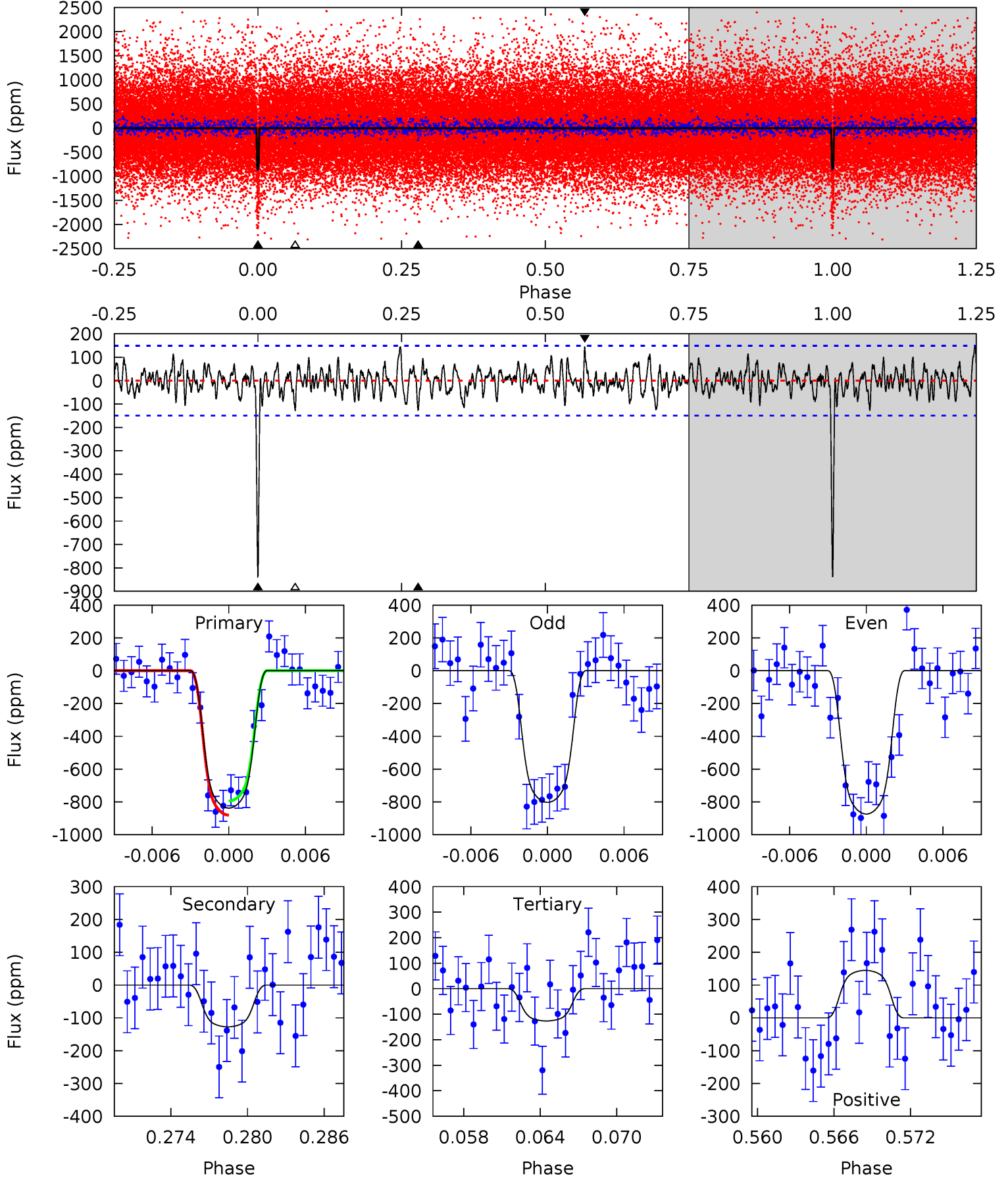
TCE 009881077-01 P= 24.400428 Days  $T_0=135.623802$  (BKJD)



# DV Model-Shift Uniqueness Test

009881077-01, P = 24.400322 Days, E = 111.226237 Days

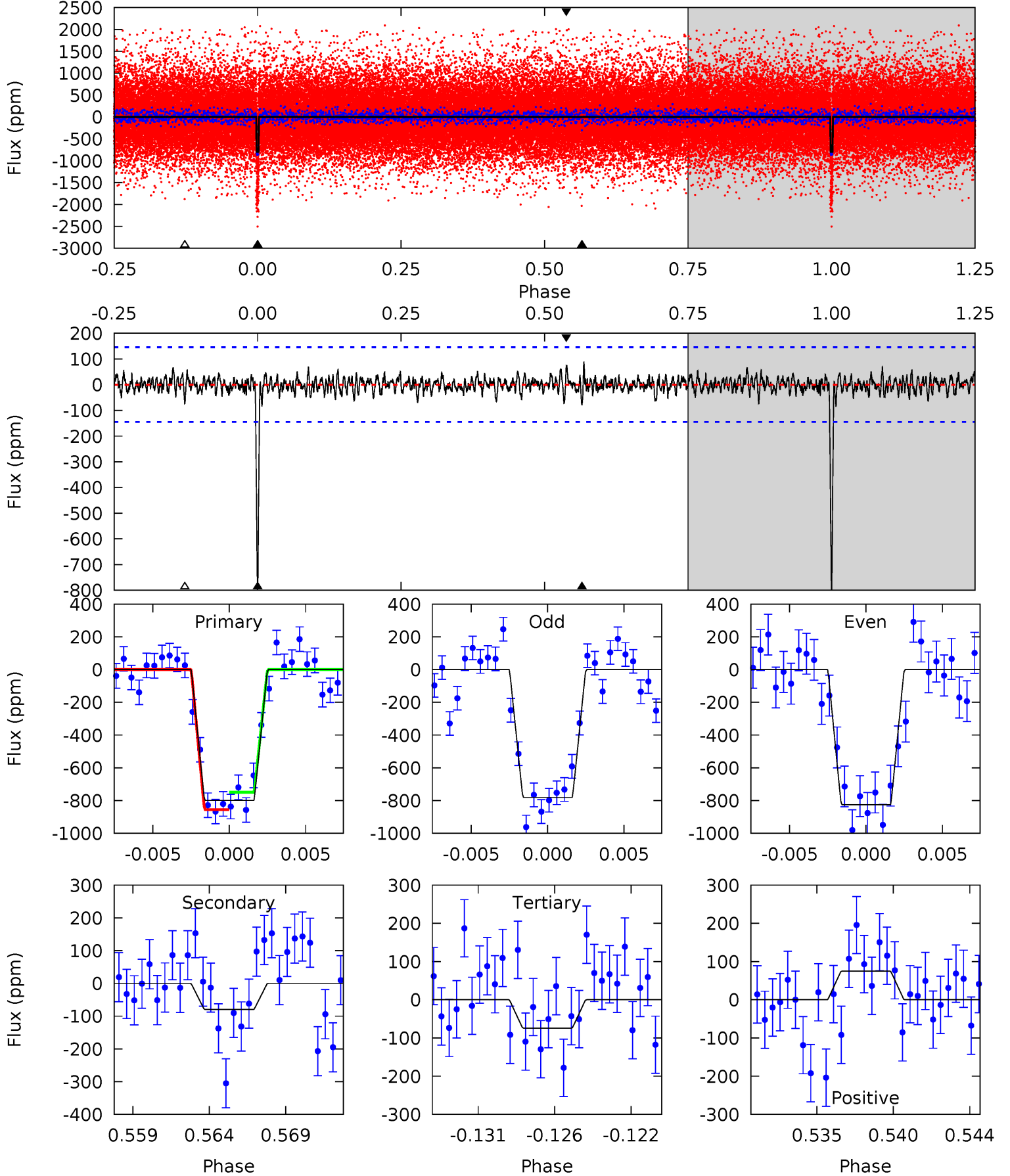
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 28.9 | 4.39 | 4.36 | 4.98 | 5.13            | 2.76            | 1.50             | 24.5    | 23.9    | 0.03    | -0.60   | 1.23    | 1.00 | 0.15  | 1.48 |



# Alt Model-Shift Uniqueness Test

009881077-01, P = 24.400428 Days, E = 111.223374 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  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 28.4 | 2.83 | 2.63 | 2.65 | 5.16            | 2.82            | 0.80             | 25.8    | 25.7    | 0.20    | 0.18    | 0.77    | 0.96 | 0.10  | 1.88 |



### Stellar Parameters For KIC 009881077

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                     | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} \text{ (g}\cdot\text{cm}^{-3}\text{)}$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
|        | $4583^{+137}_{-137}$ | $4.606^{+0.052}_{-0.028}$ | $-0.160^{+0.300}_{-0.300}$ | $0.674^{+0.048}_{-0.054}$ | $0.669^{+0.073}_{-0.055}$ | $3.083^{+0.707}_{-0.350}$                         |
|        | +3%/-3%              | +1%/-1%                   | +188%/-188%                | +7%/-8%                   | +11%/-8%                  | +23%/-11%   |
| 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 009881077-01 / KOI 2751.01

| Detrend | Depth (ppm)   | $R_p (R_{\oplus})$     | $T_{max} (K)$     | $T_{obs} (K)$        | $A_{obs}$         |
|---------|---------------|------------------------|-------------------|----------------------|-------------------|
| DV      | $-127 \pm 29$ | $2.58^{+0.26}_{-0.25}$ | $607^{+21}_{-18}$ | $3120^{+141}_{-143}$ | $219^{+68}_{-54}$ |
| Alt.    | $-80 \pm 28$  | $2.11^{+0.22}_{-0.26}$ | $608^{+21}_{-21}$ | $3097^{+184}_{-210}$ | $209^{+96}_{-79}$ |

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

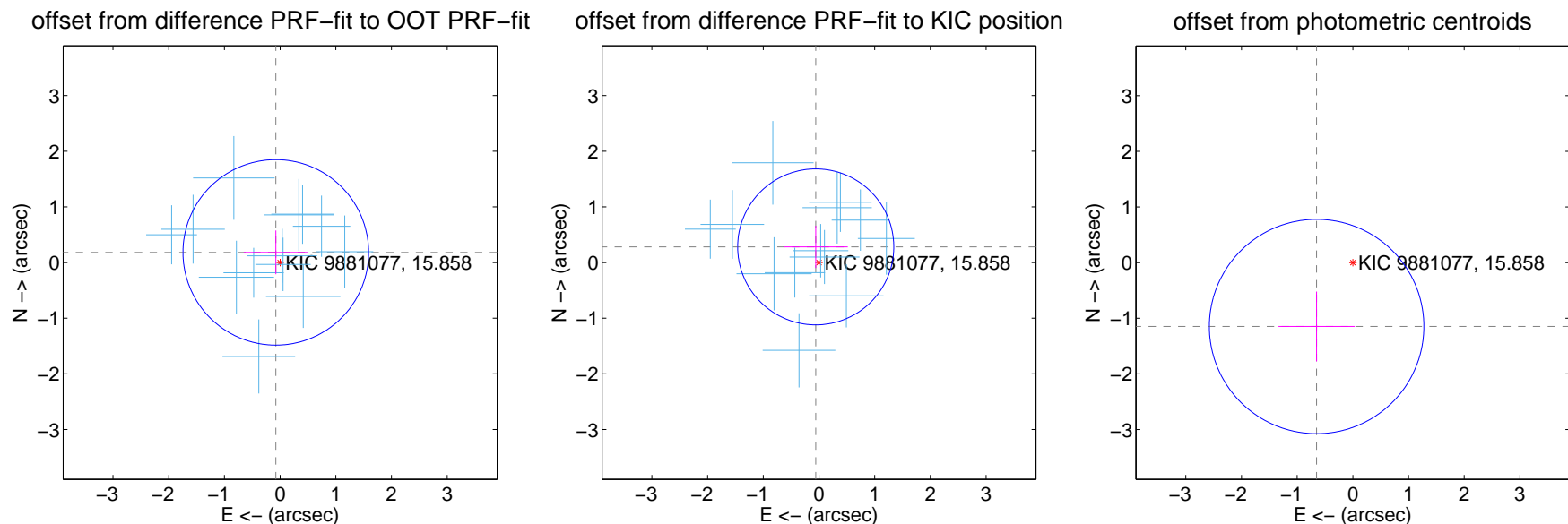
## DV Centroid Data

Supplemental centroid analysis for 009881077-01. Kepler magnitude: 15.86. Transit SNR 20.16

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

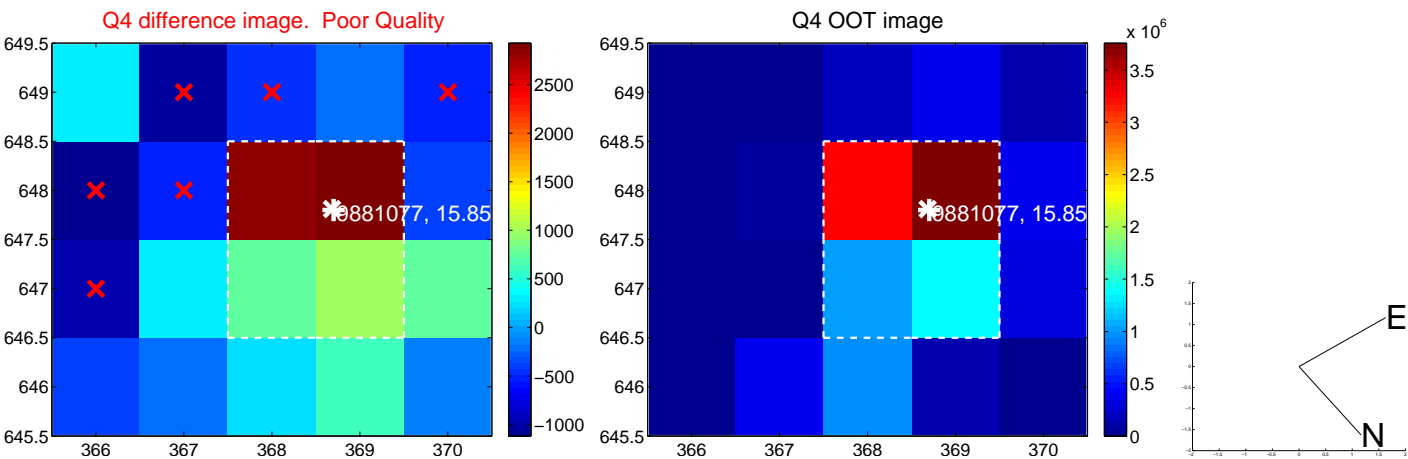
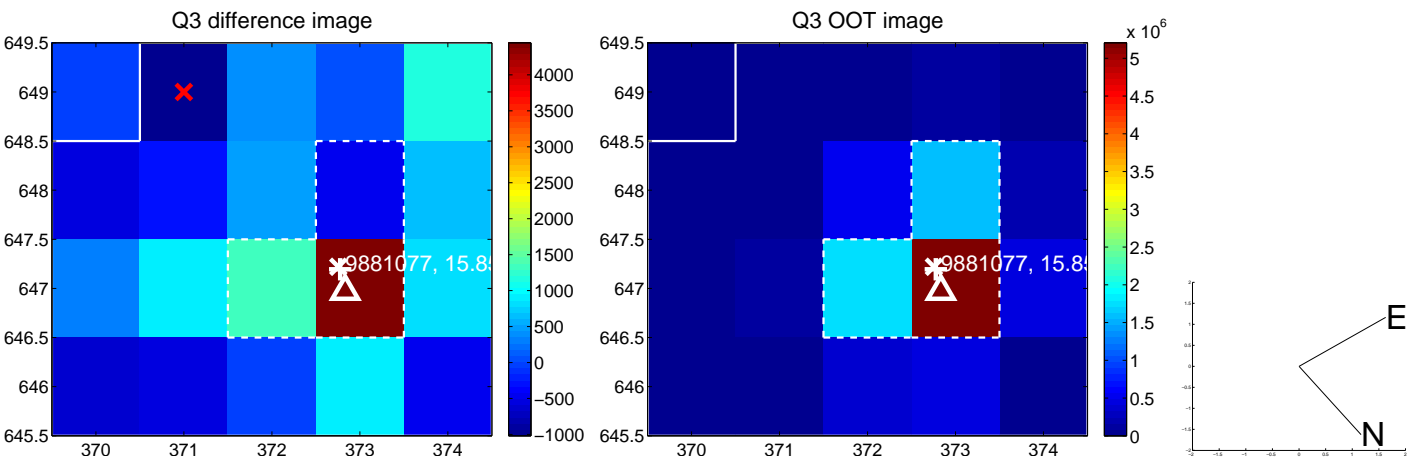
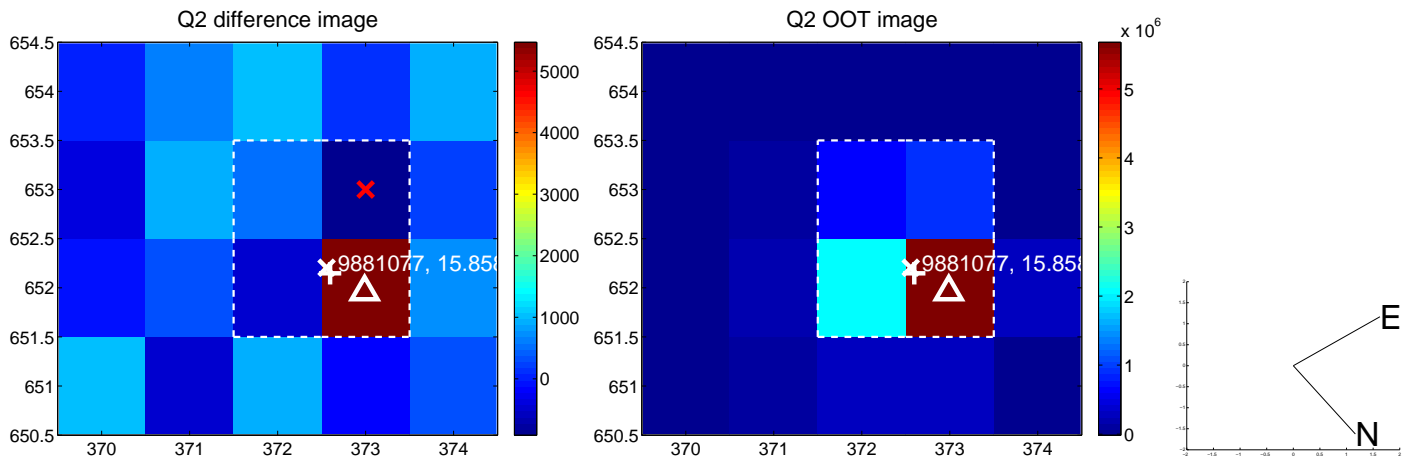
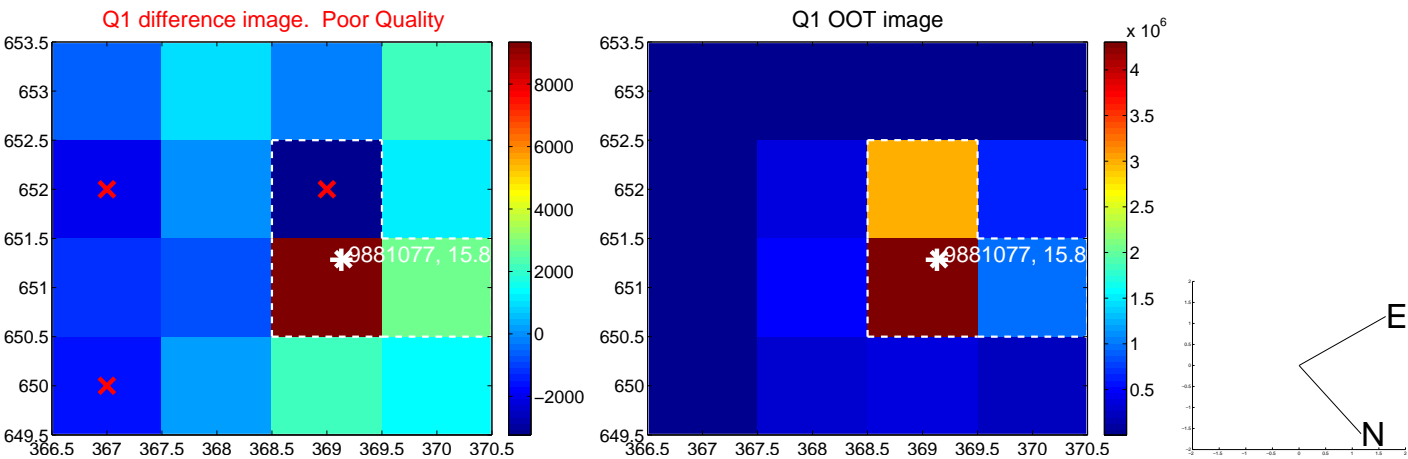
|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA       | $\Delta$ Dec      |
|---|--------------------|---------------------|-------------------|-------------------|
| PRF-fit source offset from OOT          | $0.198 \pm 0.556$  | 0.36                | $0.077 \pm 0.576$ | $0.182 \pm 0.393$ |
| PRF-fit source offset from KIC position | $0.287 \pm 0.467$  | 0.61                | $0.058 \pm 0.576$ | $0.281 \pm 0.380$ |
| photometric centroid source offset      | $1.32 \pm 0.64$    | 2.06                | $0.65 \pm 0.69$   | $-1.15 \pm 0.63$  |



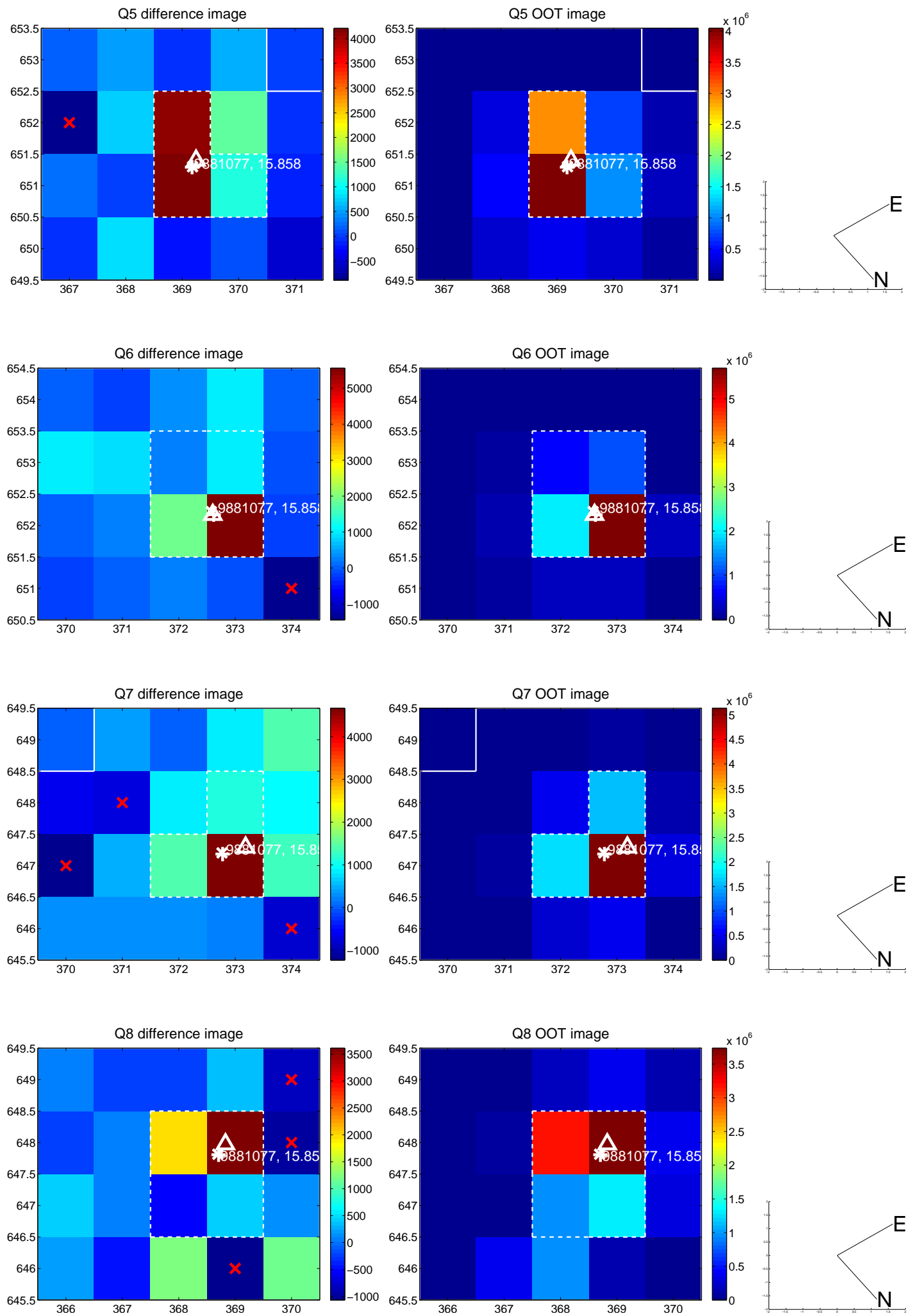
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



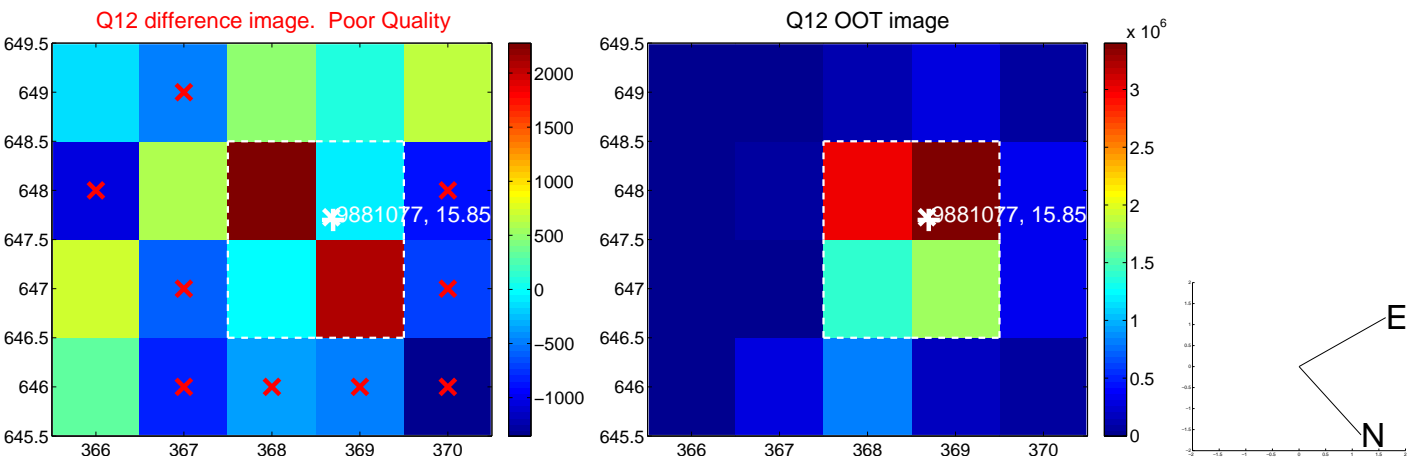
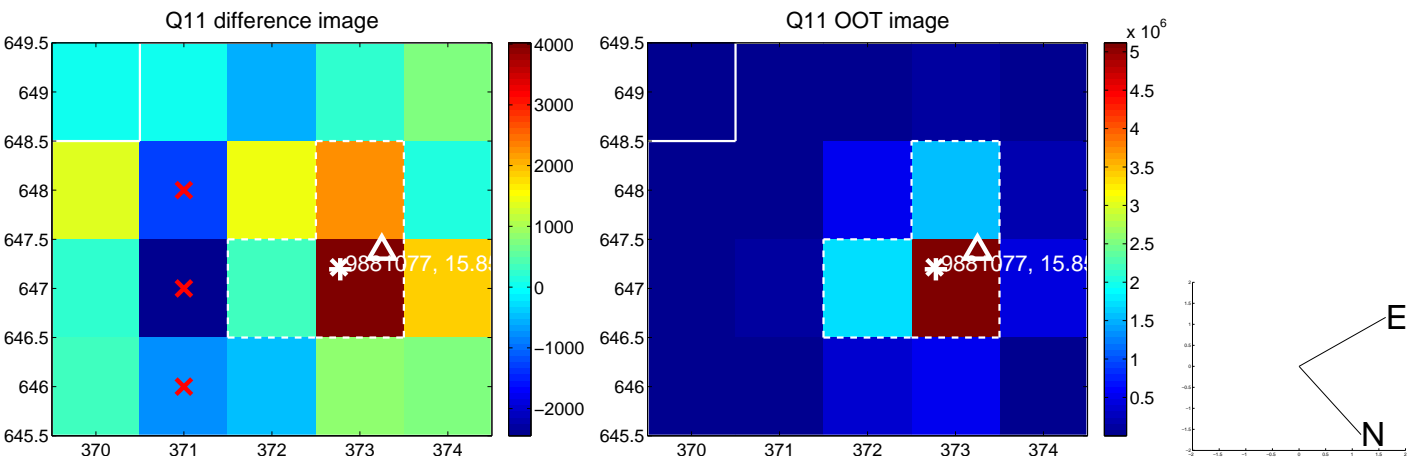
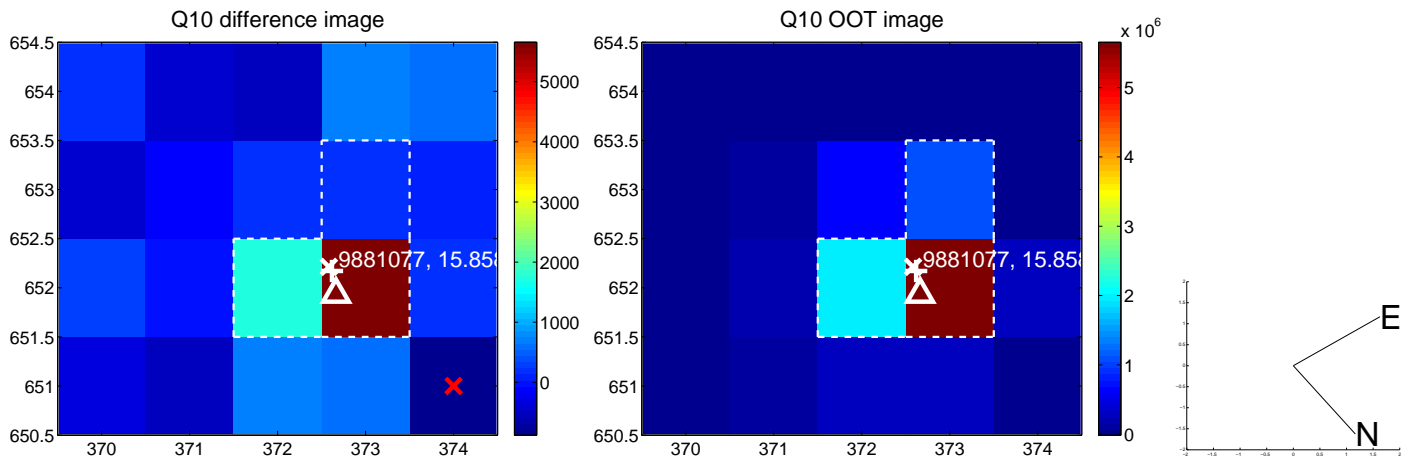
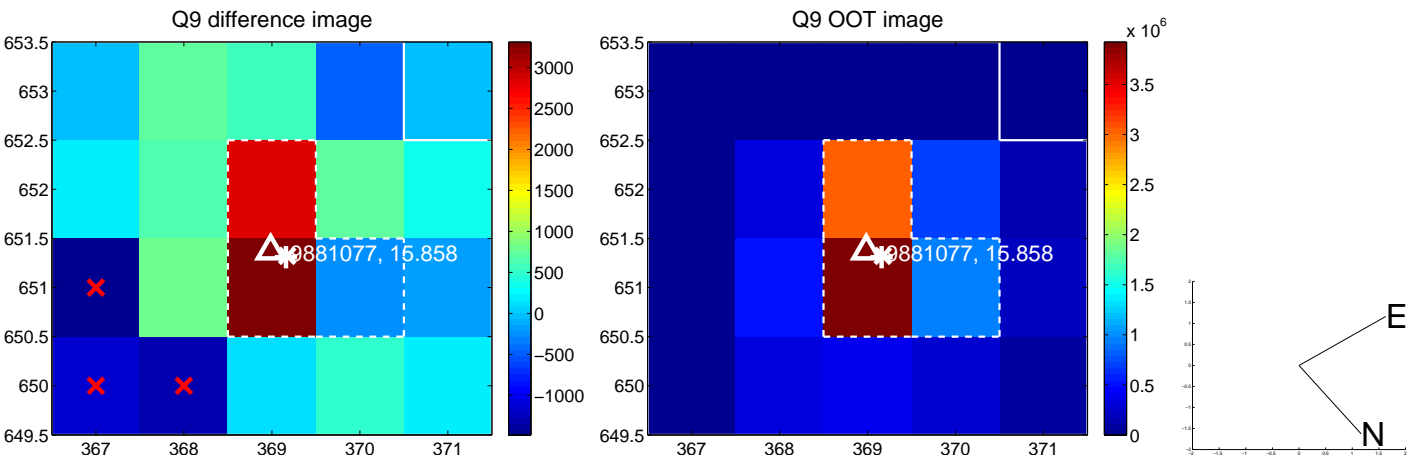
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



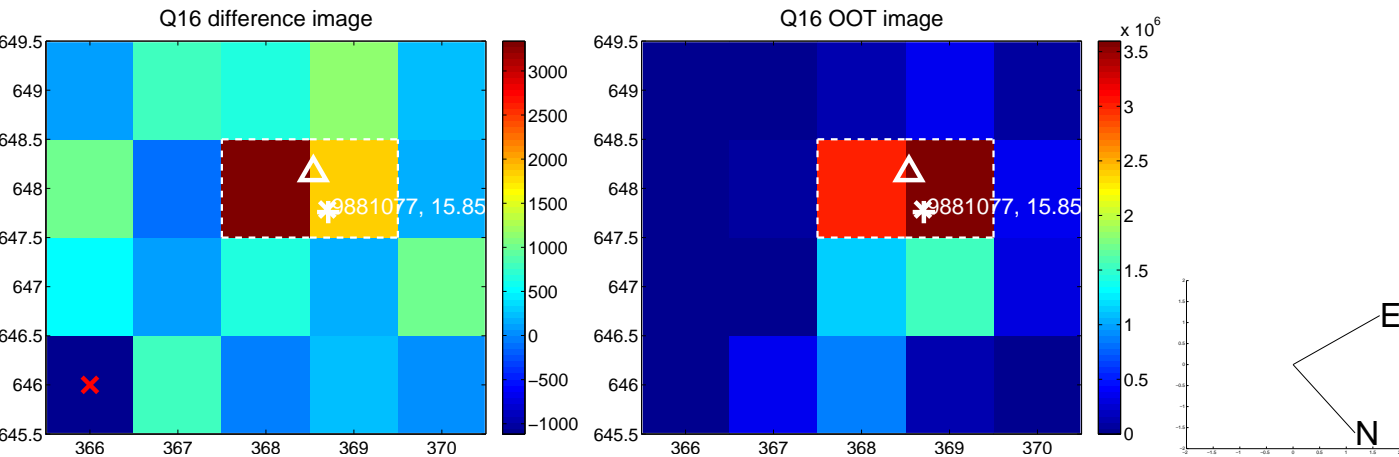
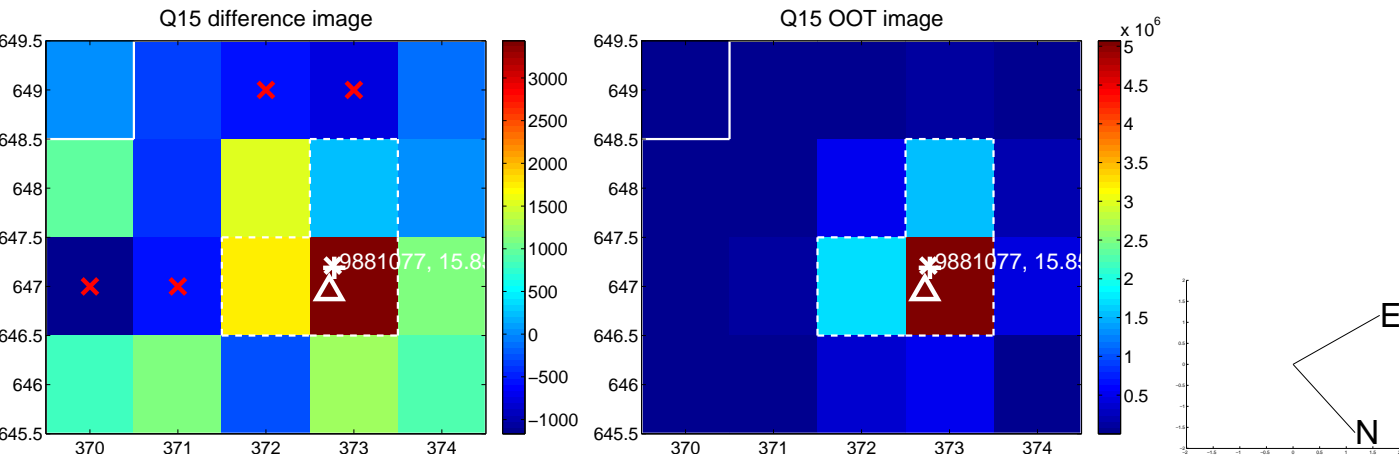
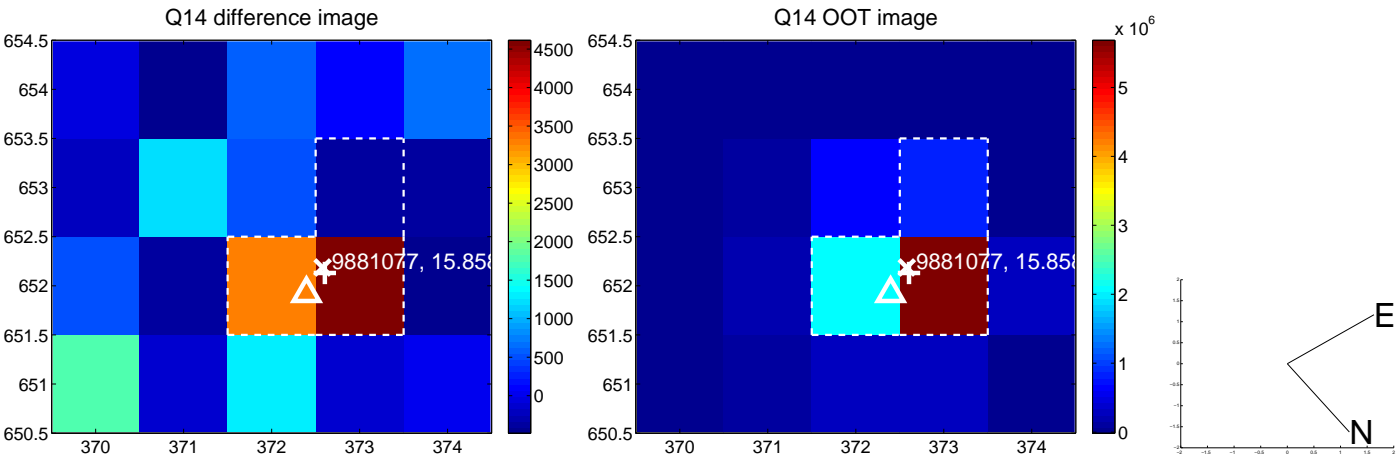
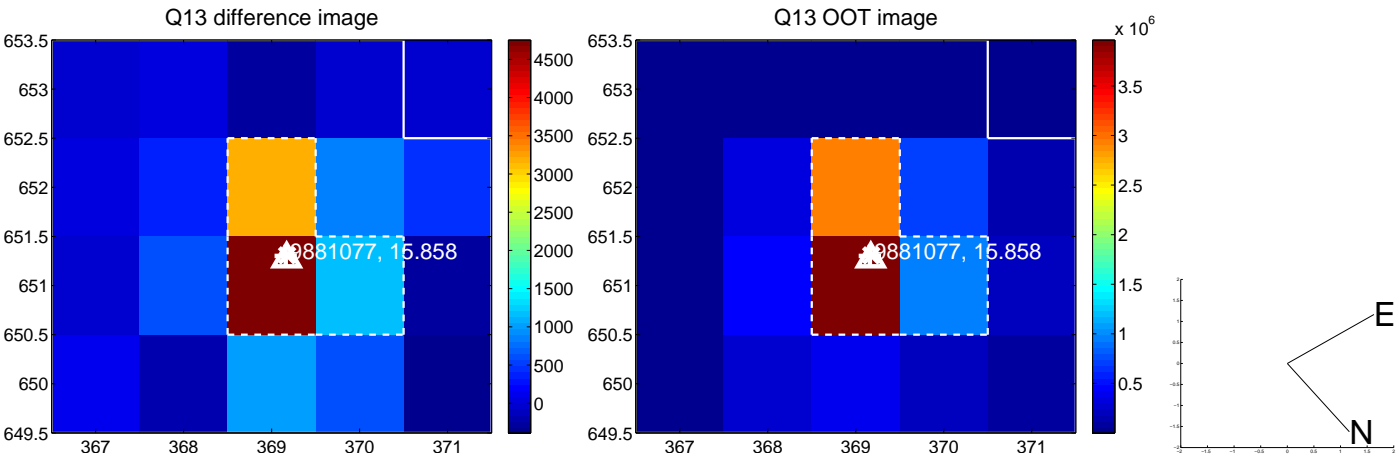
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



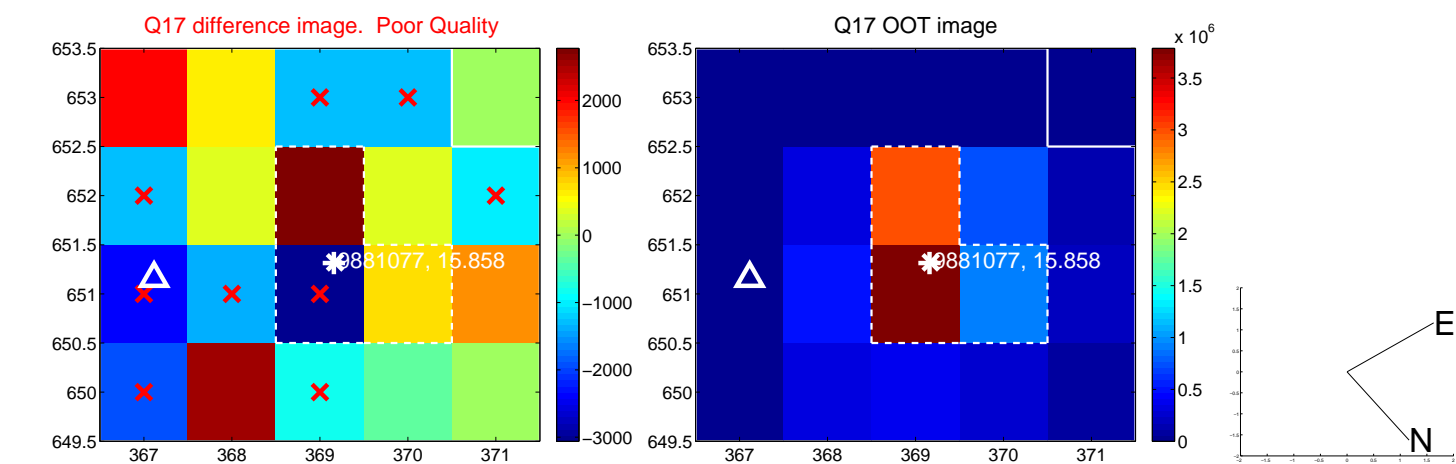
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



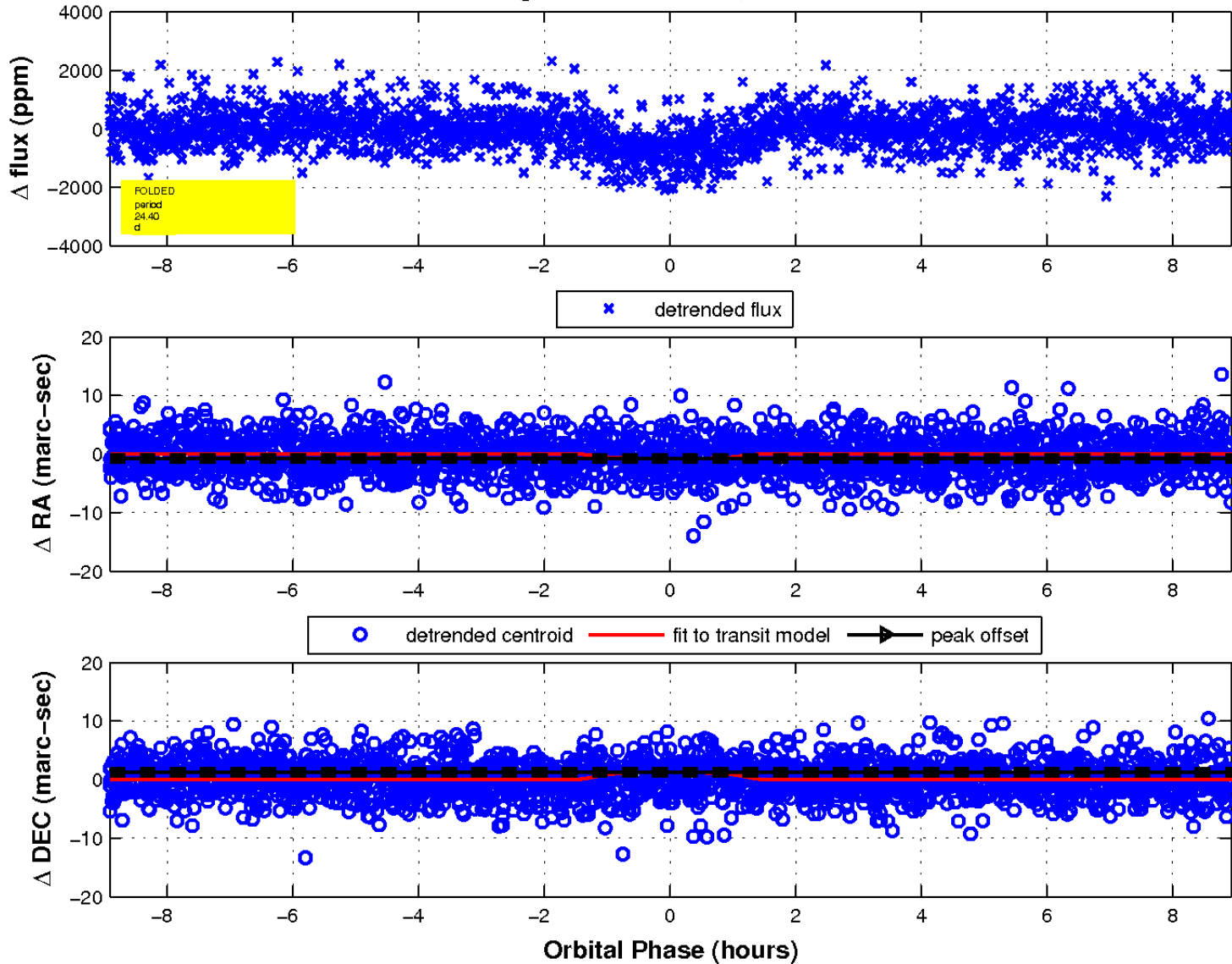
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 1 of 1



# UKIRT Image

Declination

