

# KIC 009823487

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 009823487-01 | OBS      | 1489.01 | 16.004581     | 140.480497   | 838.5       | 4.039            | 27.3 | 30.3 | 0.77                        | 5180            | 2.41                   | 27.45                  |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|------------|
| 009823487-01 | 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.

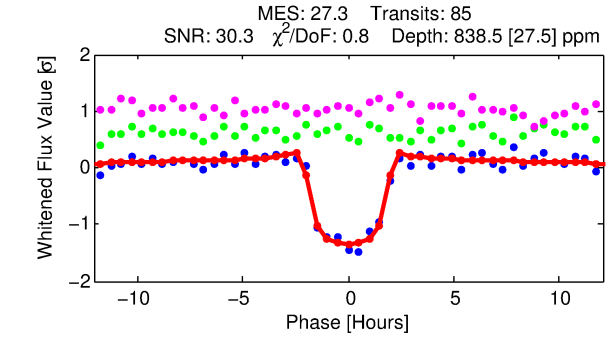
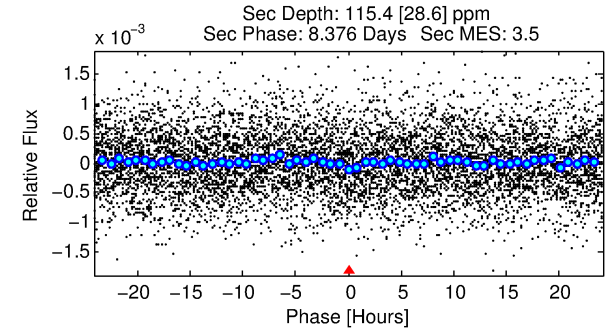
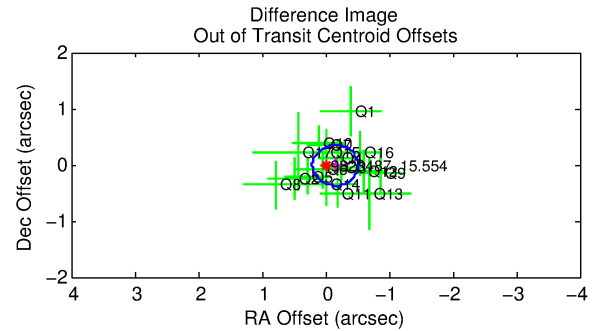
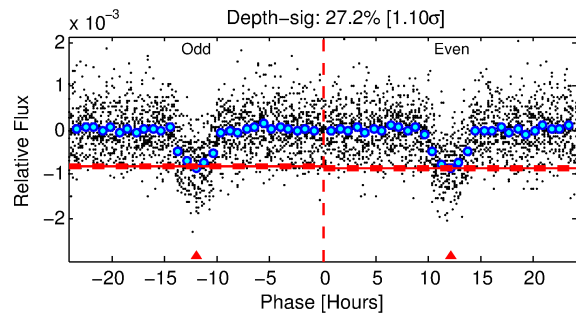
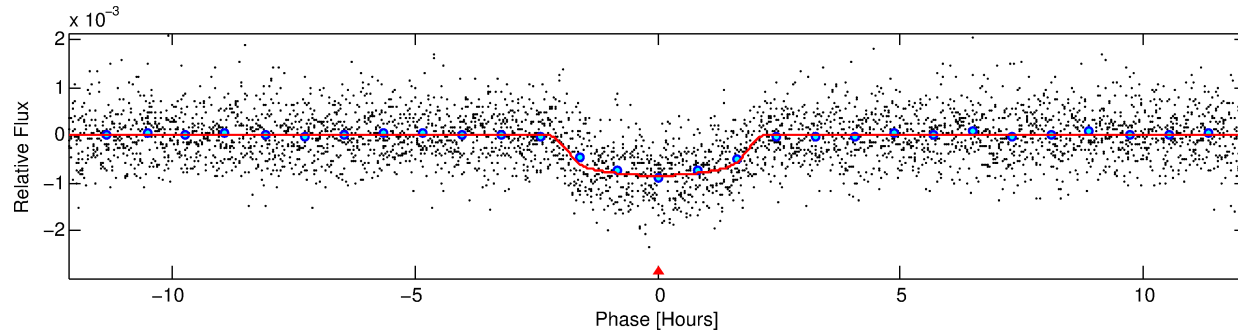
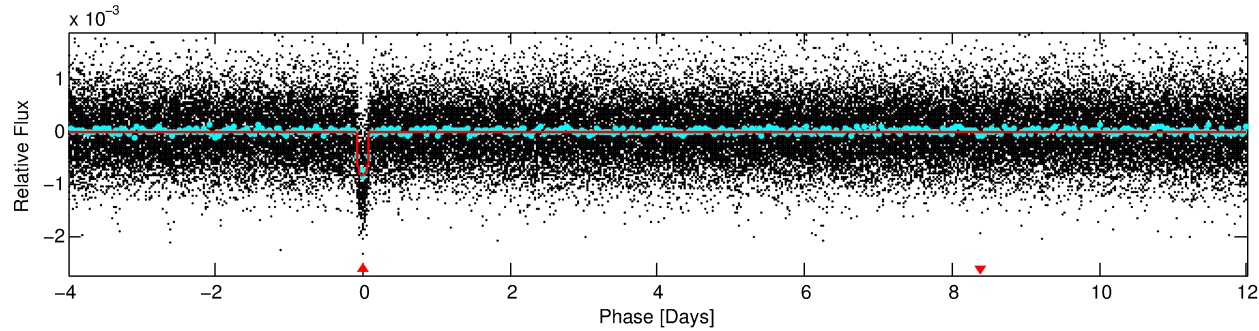
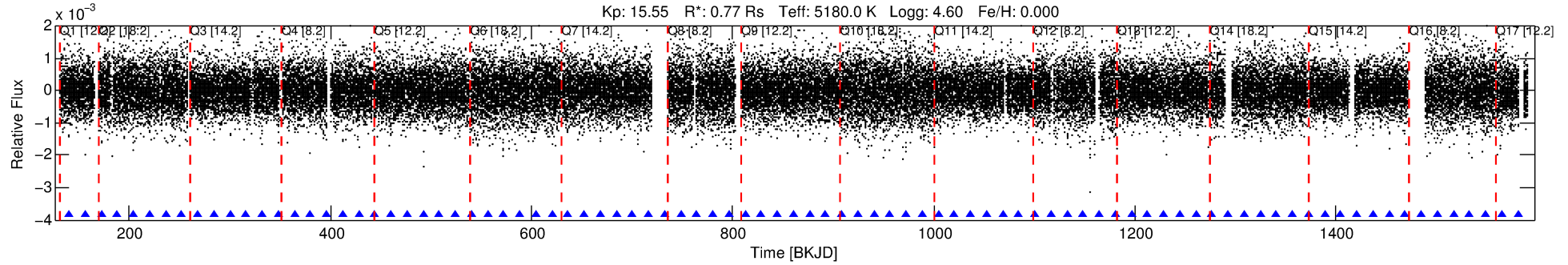
## Ephemeris Match Information For 009823487-01

No Significant Match Found

# DV One-Page Summary

KIC: 9823487 Candidate: 1 of 1 Period: 16.005 d

KOI: K01489.01 Corr: 0.989



## DV Fit Results:

Period = 16.00458 [0.00005] d  
Epoch = 140.4805 [0.0025] BKJD  
Rp/R\* = 0.0288 [0.0081]  
a/R\* = 21.67 [22.45]  
b = 0.74 [0.65]  
Seff = 27.45 [5.87]  
Teq = 584 [31] K  
Rp = 2.41 [0.77] Re  
a = 0.1179 [0.0143] AU  
Ag = 151.43 [97.26] [1.55 $\sigma$ ]  
Teffp = 3166 [498] K [5.18 $\sigma$ ]

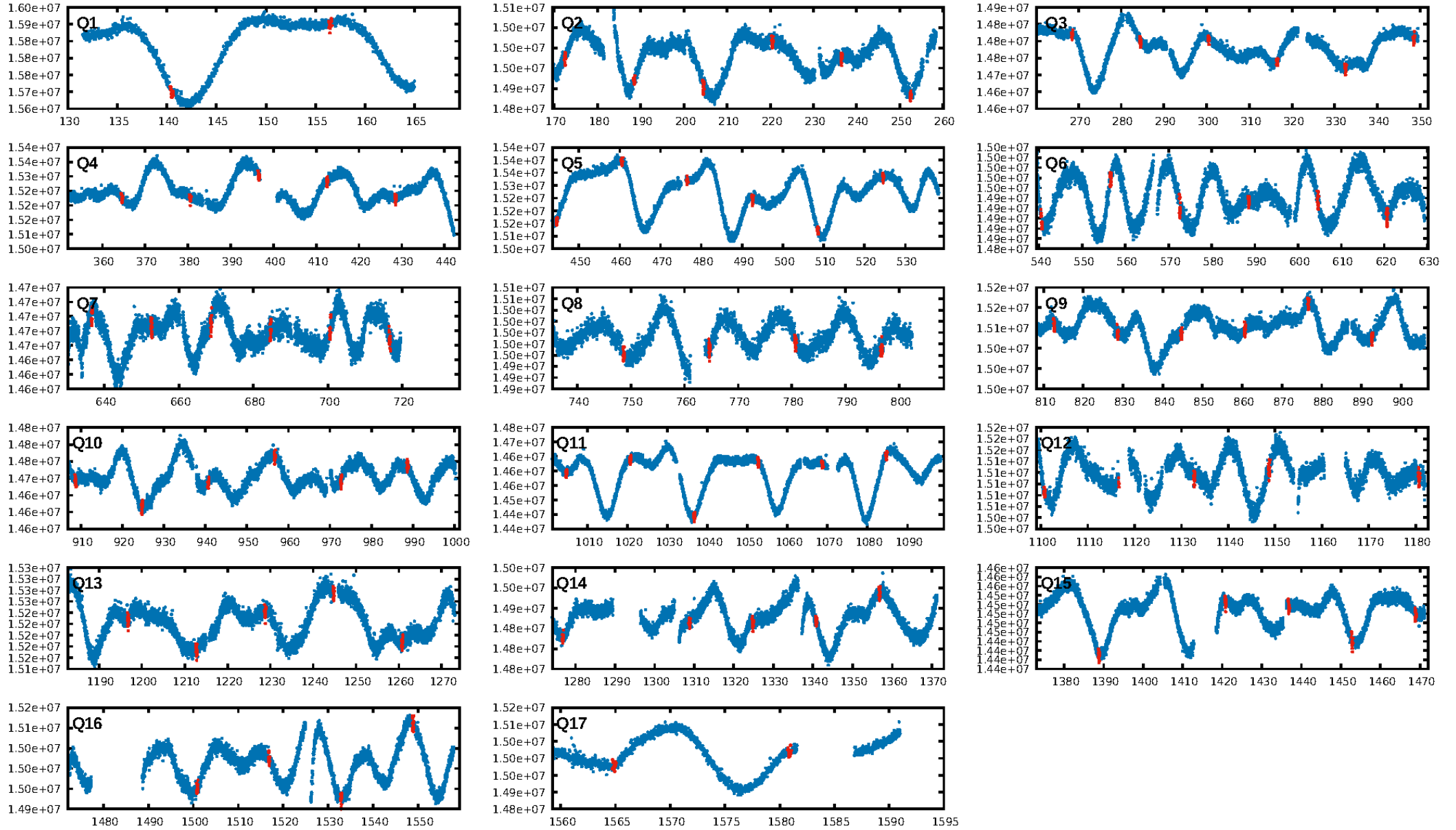
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 92.4%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.55e-157  
RollingBand-fgt: 1.00 [81/81]  
GhostDiagnostic-chr: 5.765  
Centroid-sig: 9.3%  
Centroid-so: 0.681 arcsec [1.60 $\sigma$ ]  
OotOffset-rm: 0.153 arcsec [1.27 $\sigma$ ]  
KicOffset-rm: 0.153 arcsec [1.21 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

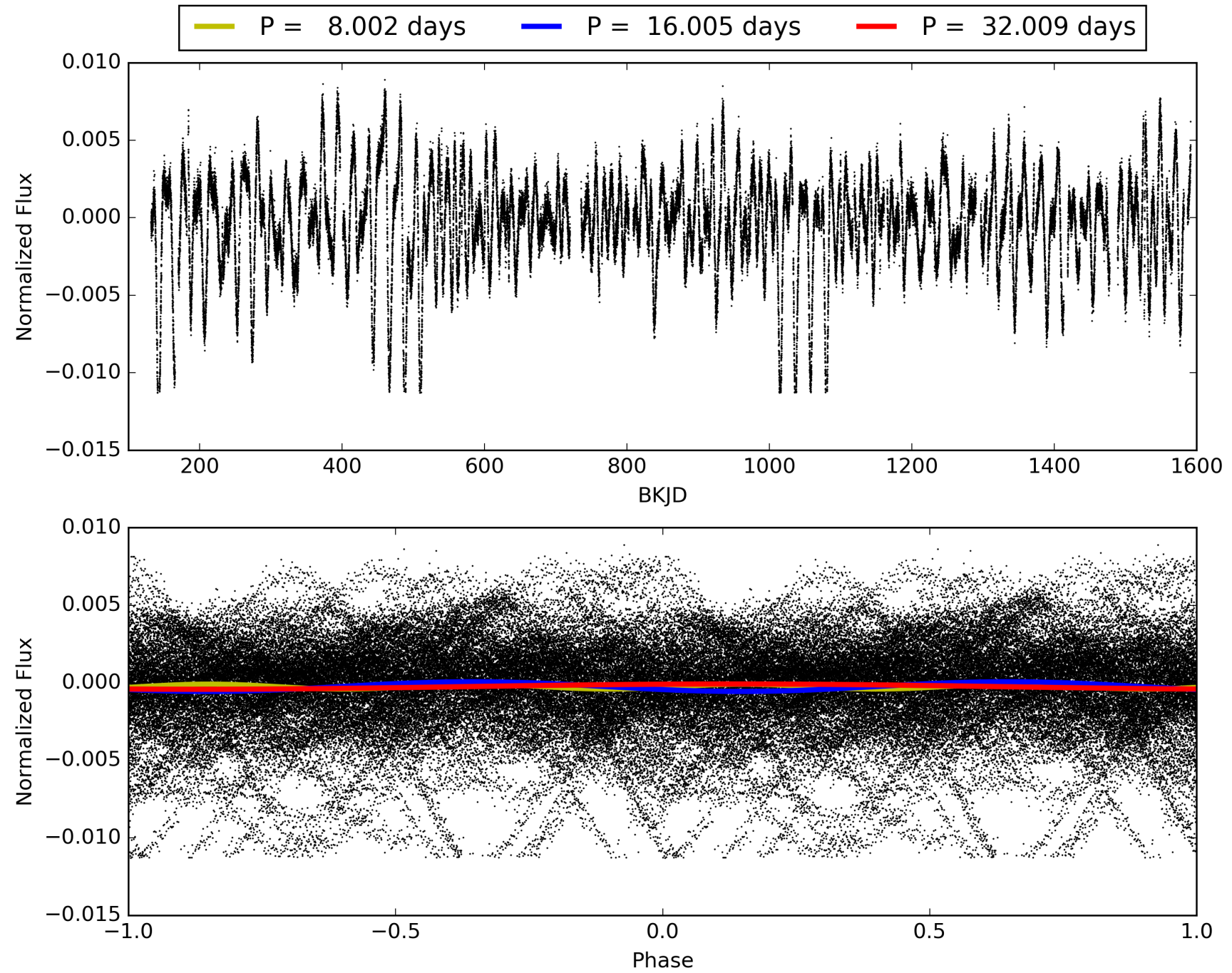
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 28-Jan-2016 21:50:53 Z

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

# TCE 009823487-01, PDC Light Curves

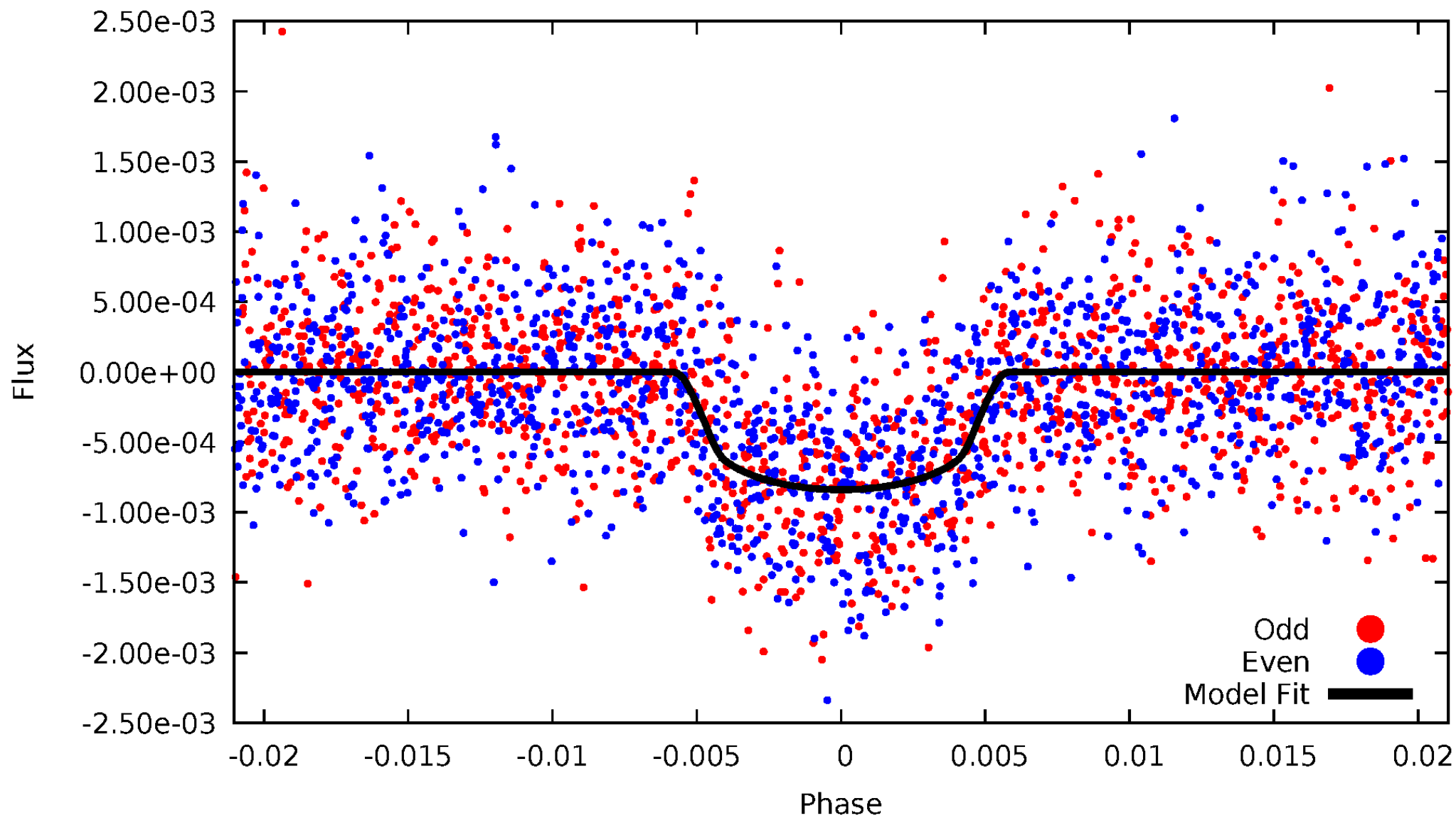


TCE 009823487-01



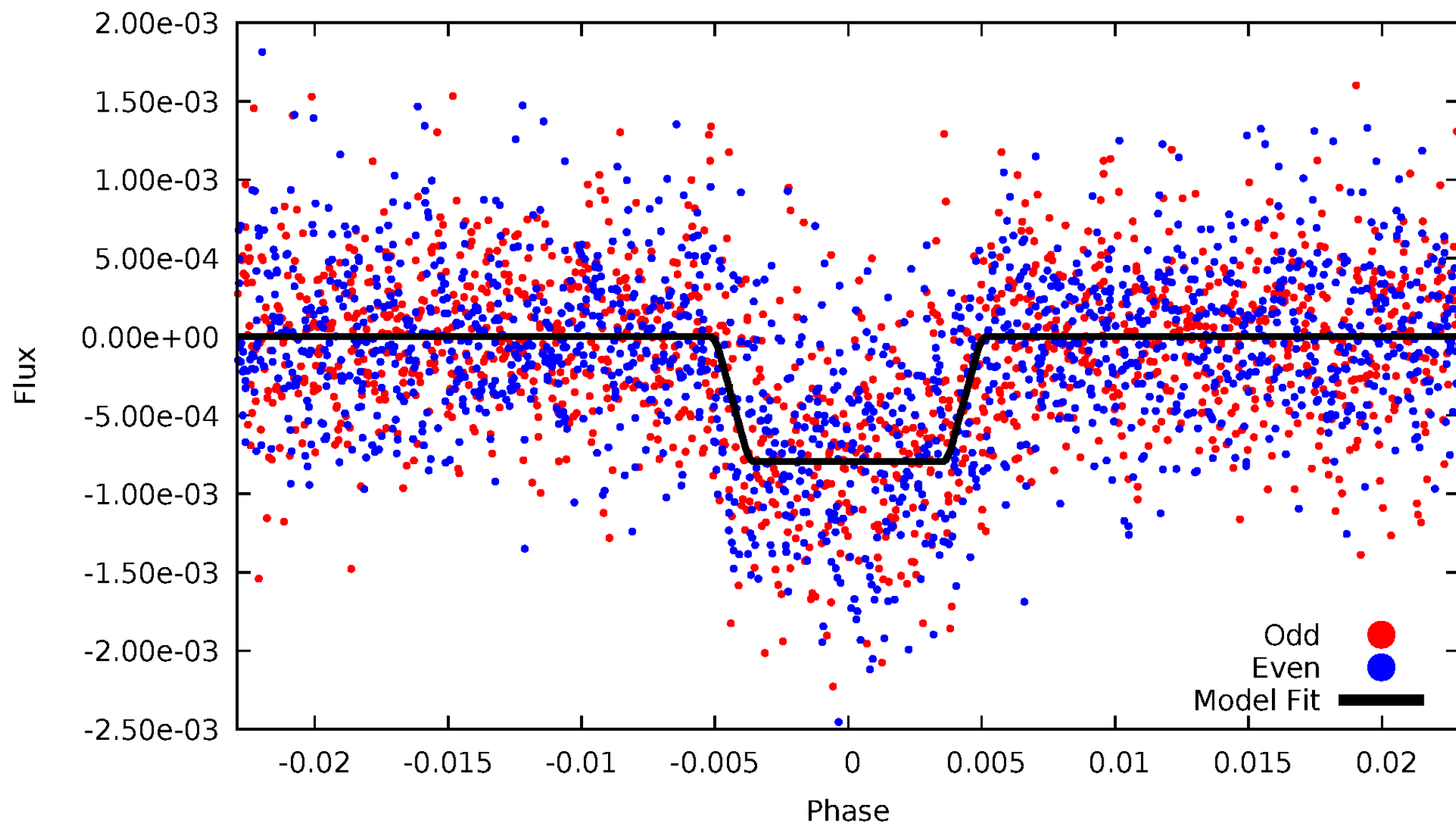
# DV Odd/Even

TCE 009823487-01



# ALT Odd/Even

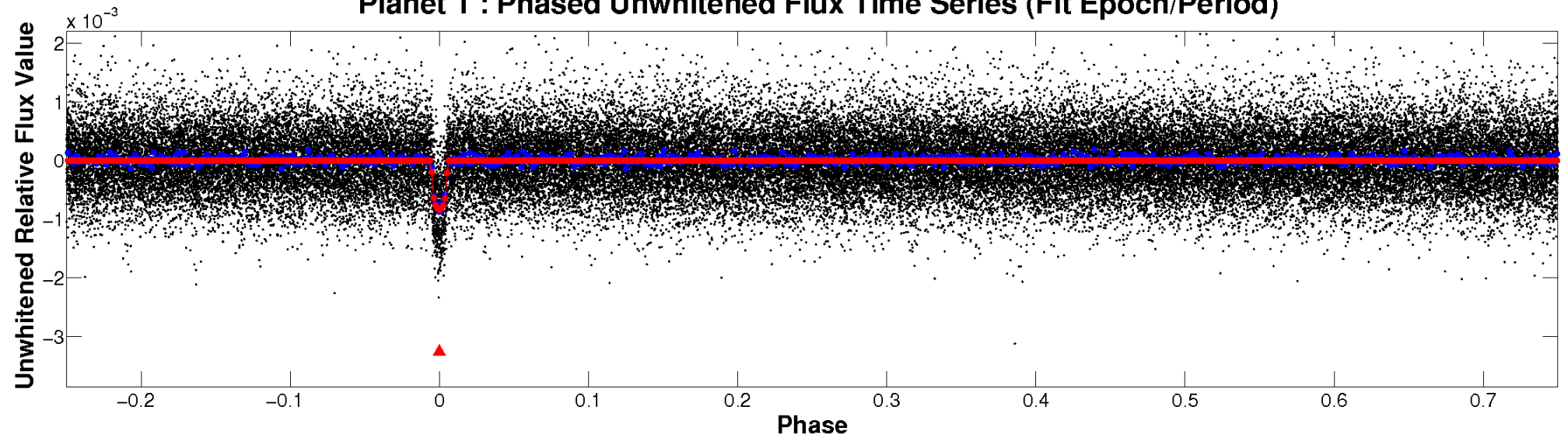
TCE 009823487-01



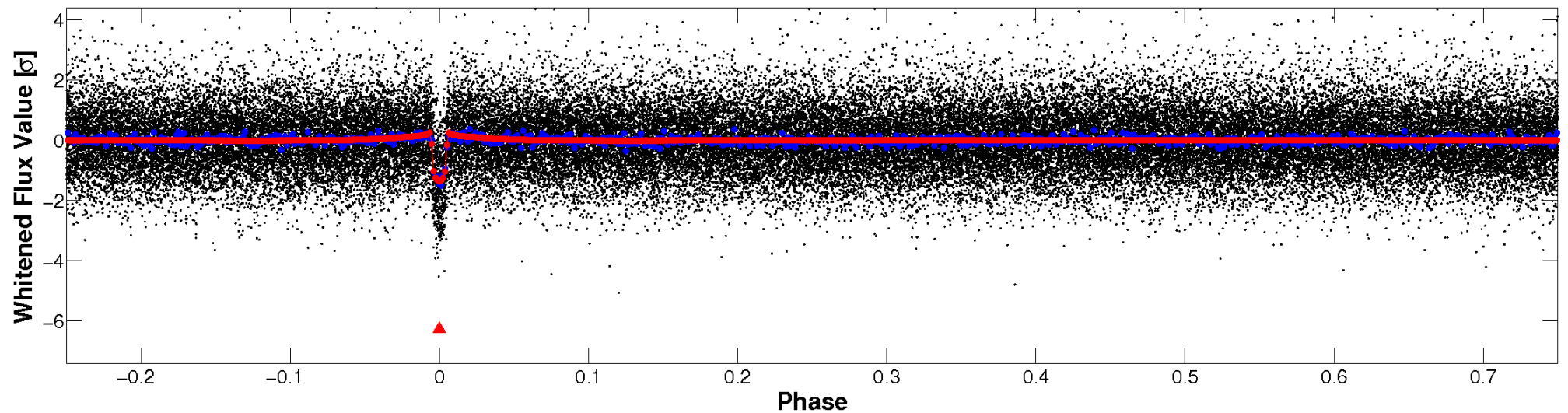


# Non-Whitened Vs. Whitened Light Curve

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

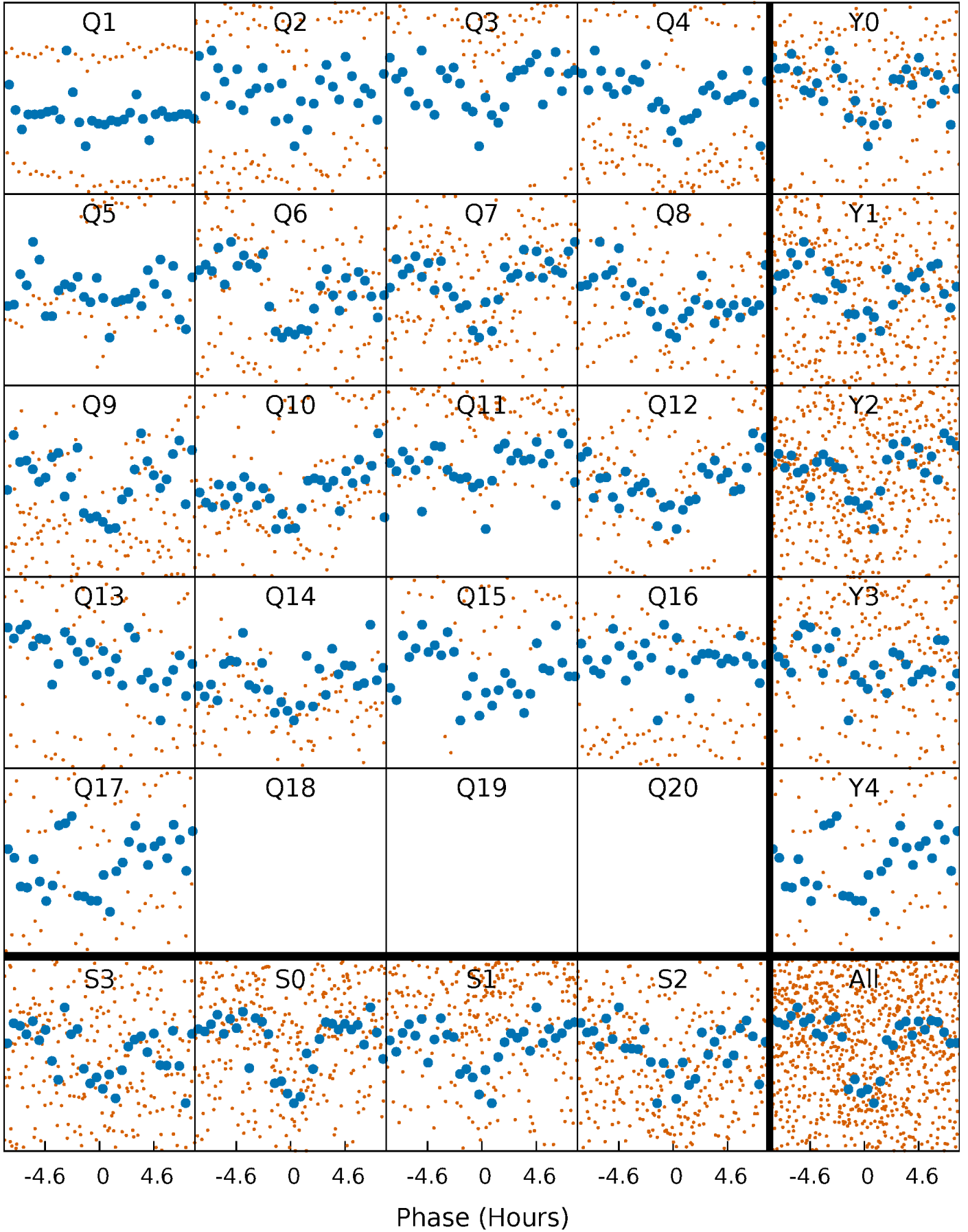


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

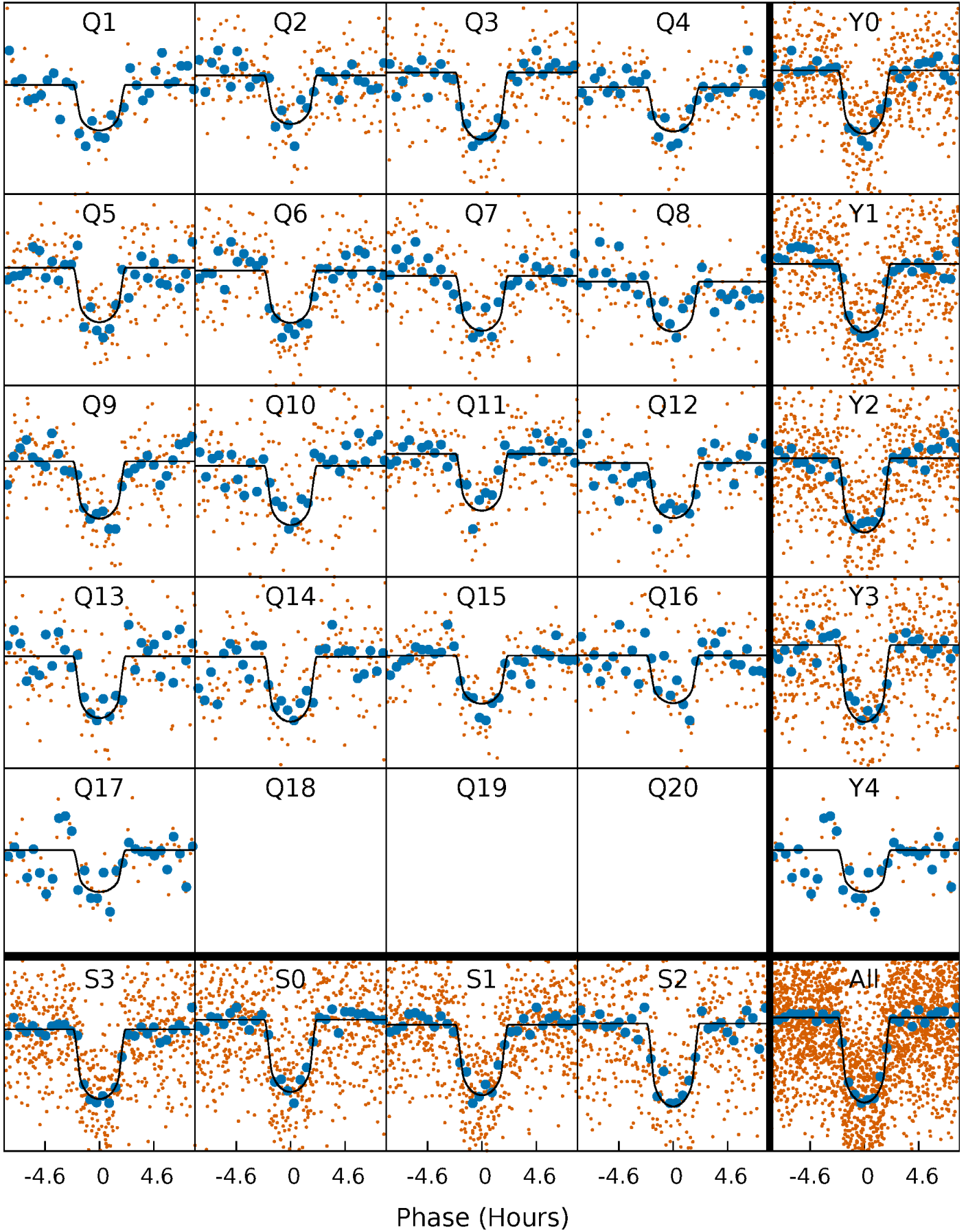
TCE 009823487-01   P= 16.004581 Days    $T_0=140.480497$  (BKJD)





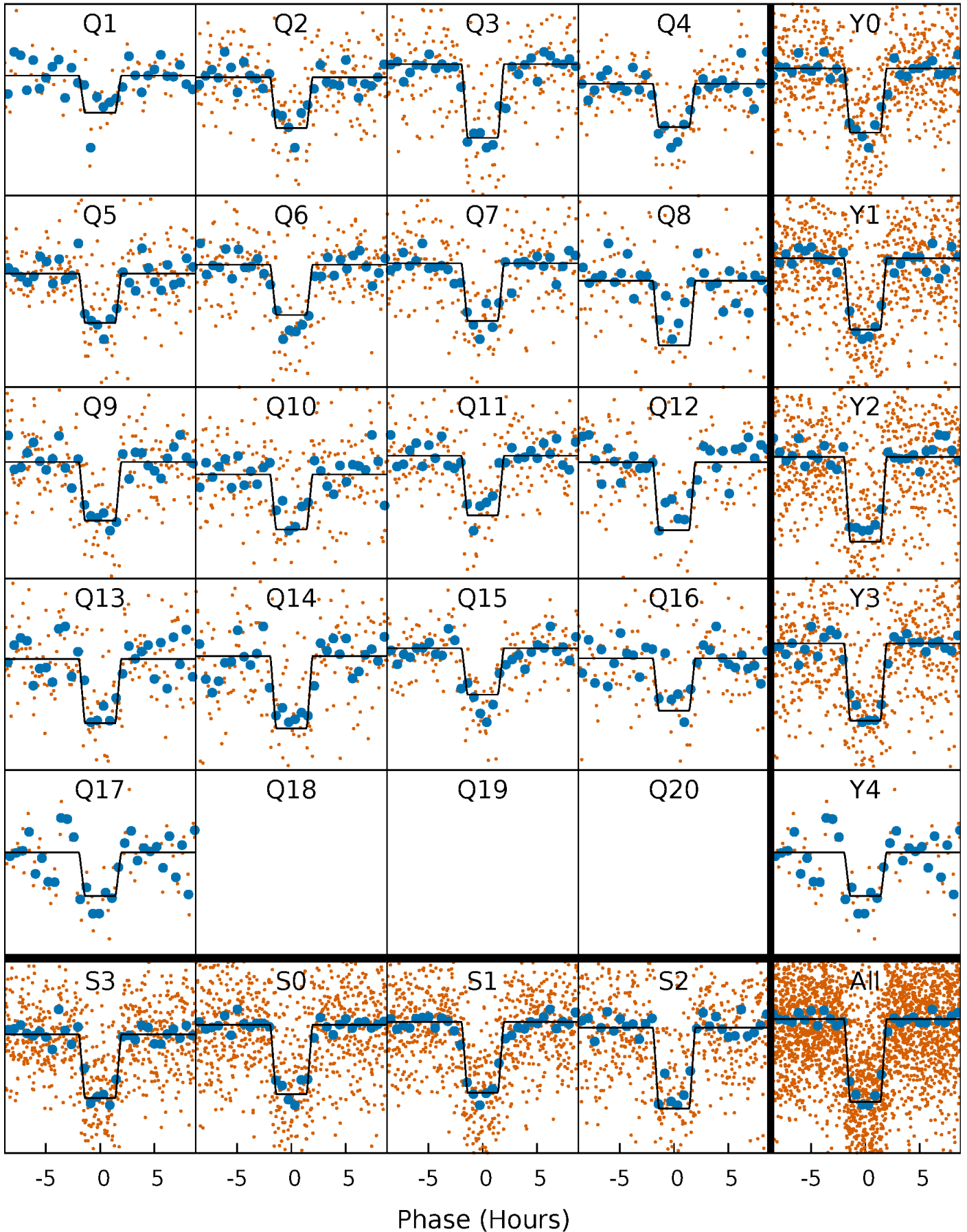
# DV Quarter-Phased Transit Curves

TCE 009823487-01   P= 16.004581 Days    $T_0=140.480497$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

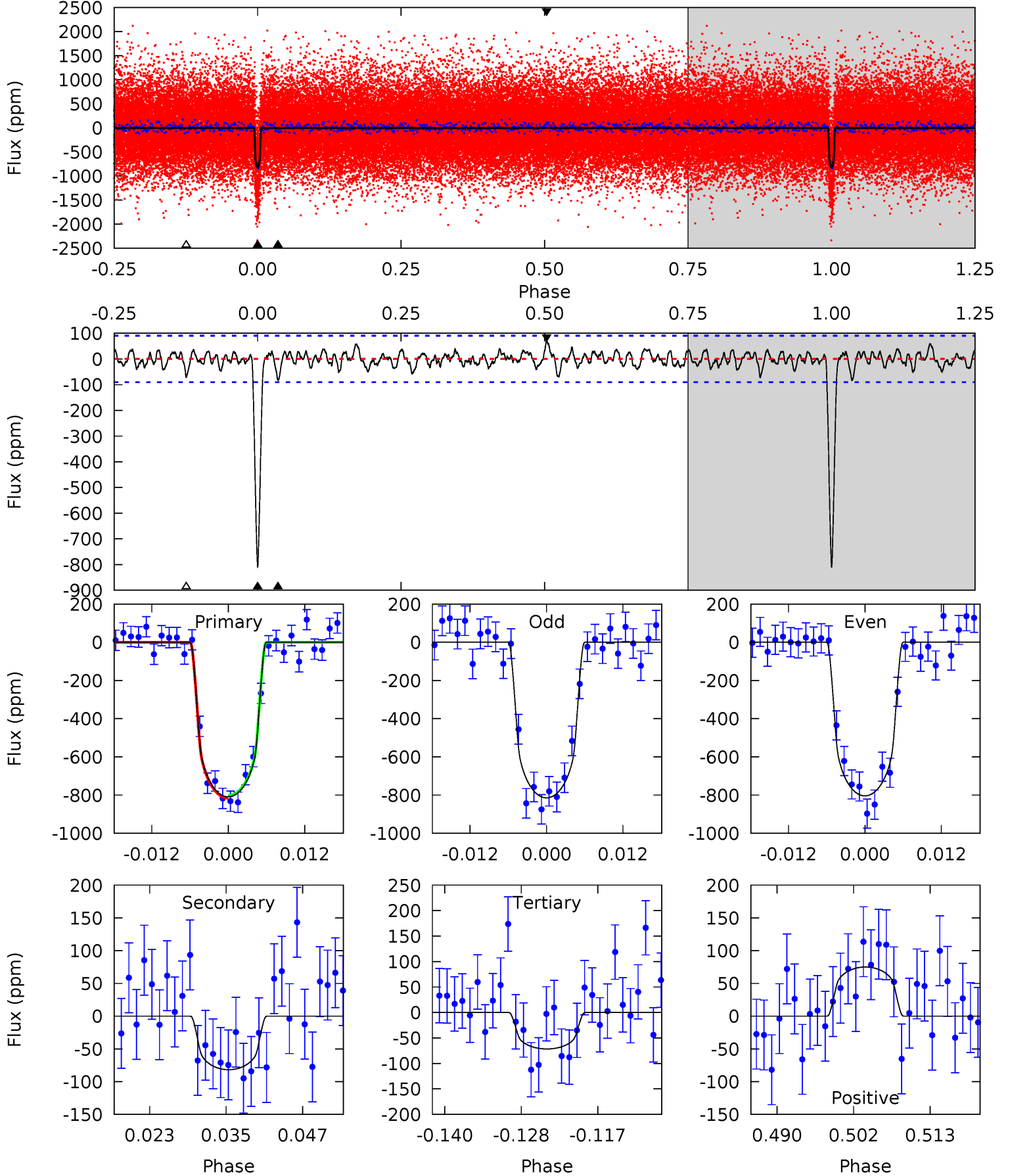
TCE 009823487-01     $P = 16.004668$  Days     $T_0 = 140.476769$  (BKJD)



# DV Model-Shift Uniqueness Test

009823487-01,  $P = 16.004581$  Days,  $E = 124.475916$  Days

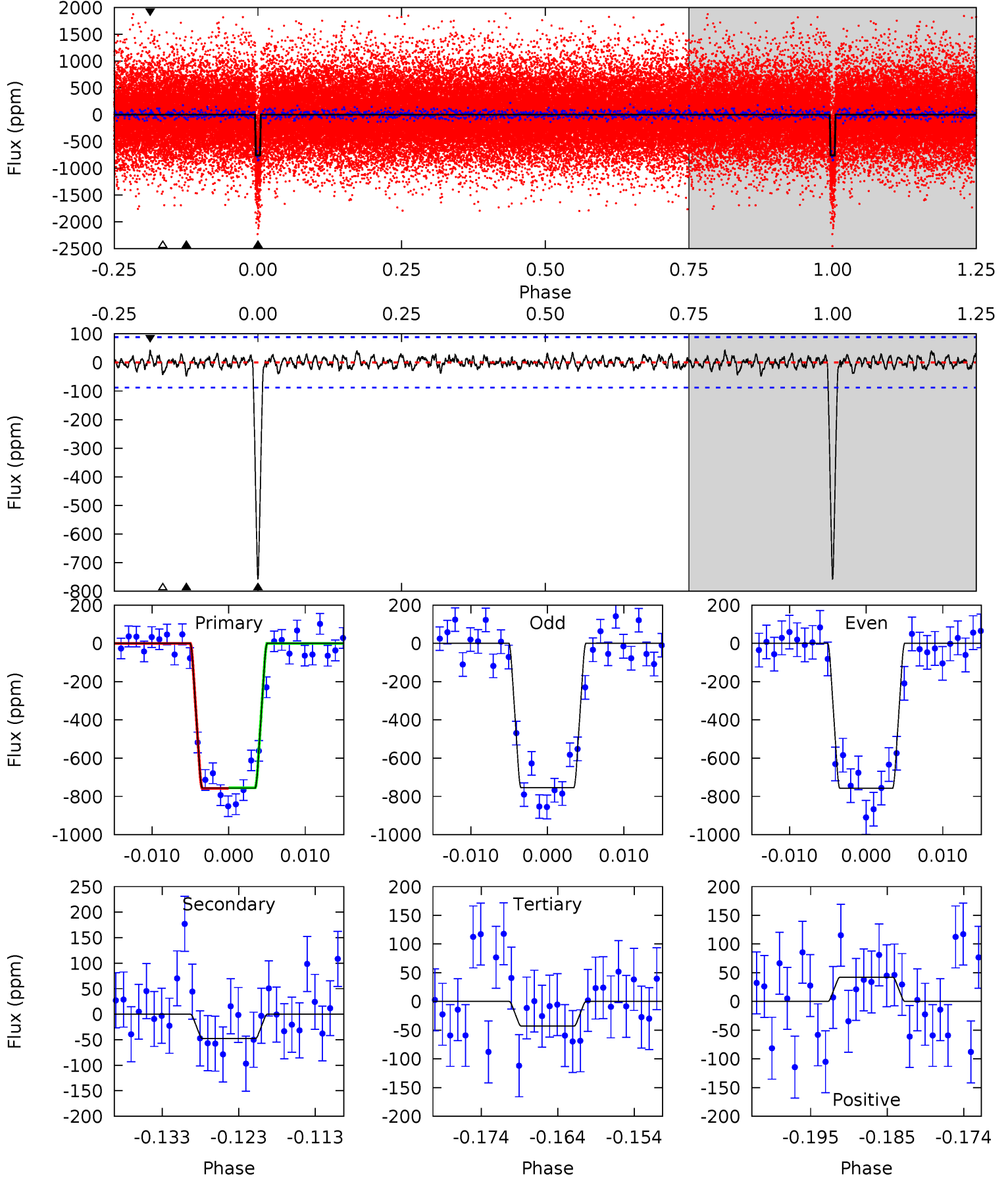
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 44.8 | 4.52 | 3.96 | 4.15 | 5.00            | 2.52            | 1.23             | 40.8    | 40.6    | 0.56    | 0.37    | 0.29    | 1.00 | 0.08  | 0.34 |



# Alt Model-Shift Uniqueness Test

009823487-01, P = 16.004668 Days, E = 124.472101 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  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 43.0 | 2.73 | 2.44 | 2.40 | 5.02            | 2.57            | 0.78             | 40.6    | 40.6    | 0.28    | 0.33    | 0.10    | 0.94 | 0.05  | 0.08 |



### Stellar Parameters For KIC 009823487

|        | $T_{\text{eff}} (K)$ | $\log(g)$                 | $[\text{Fe}/\text{H}]$    | $R (R_{\odot})$           | $M (M_{\odot})$           | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
|        | $5180^{+155}_{-155}$ | $4.597^{+0.026}_{-0.097}$ | $0.000^{+0.250}_{-0.300}$ | $0.769^{+0.111}_{-0.056}$ | $0.860^{+0.057}_{-0.092}$ | $2.662^{+0.438}_{-0.797}$                 |
|        | +3%/-3%              | +1%/-2%                   | +inf%/-inf%               | +14%/-7%                  | +7%/-11%                  | +16%/-30%                                 |
| 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 009823487-01 / KOI 1489.01

| Detrend | Depth (ppm)  | $R_p (R_{\oplus})$     | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | $A_{\text{obs}}$ |
|---------|--------------|------------------------|----------------------|----------------------|------------------|
| DV      | $-82 \pm 18$ | $2.49^{+0.72}_{-0.67}$ | $829^{+33}_{-32}$    | $3371^{+386}_{-284}$ | $96^{+87}_{-41}$ |
| Alt.    | $-48 \pm 18$ | $2.38^{+0.79}_{-0.70}$ | $829^{+32}_{-33}$    | $3149^{+408}_{-299}$ | $62^{+74}_{-32}$ |

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

$T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{\text{obs}}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{\text{obs}} \gg T_{\text{max}}$  AND  $A_{\text{obs}} \gg 1.0$



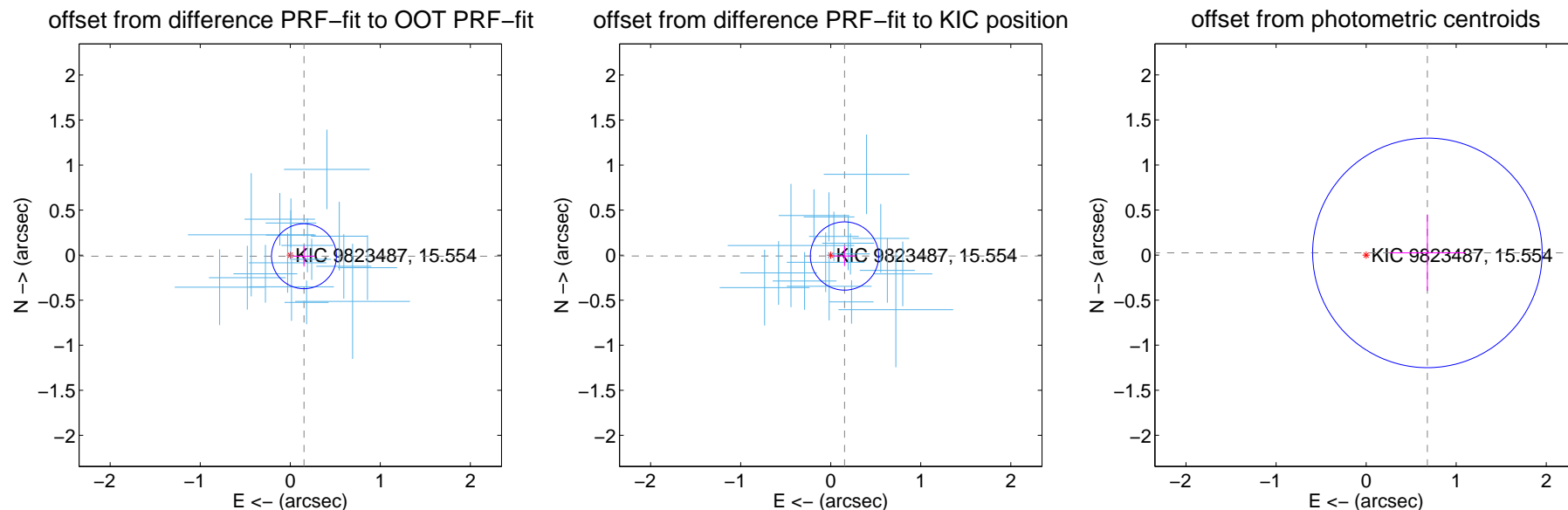
## DV Centroid Data

Supplemental centroid analysis for 009823487-01. Kepler magnitude: 15.55. Transit SNR 30.30

There are 17 quarters with good PRF difference image offsets

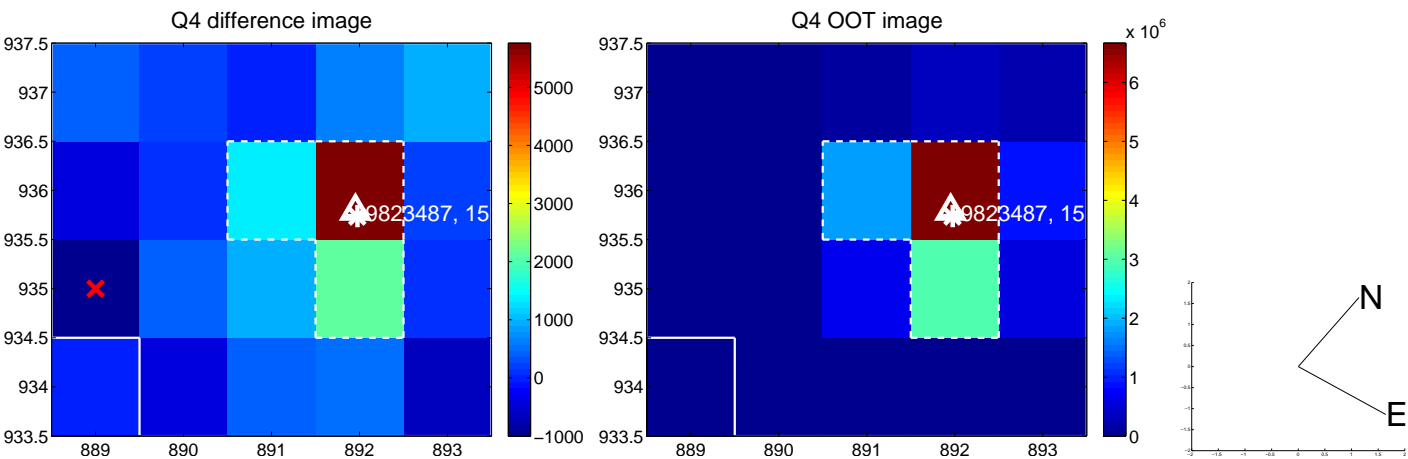
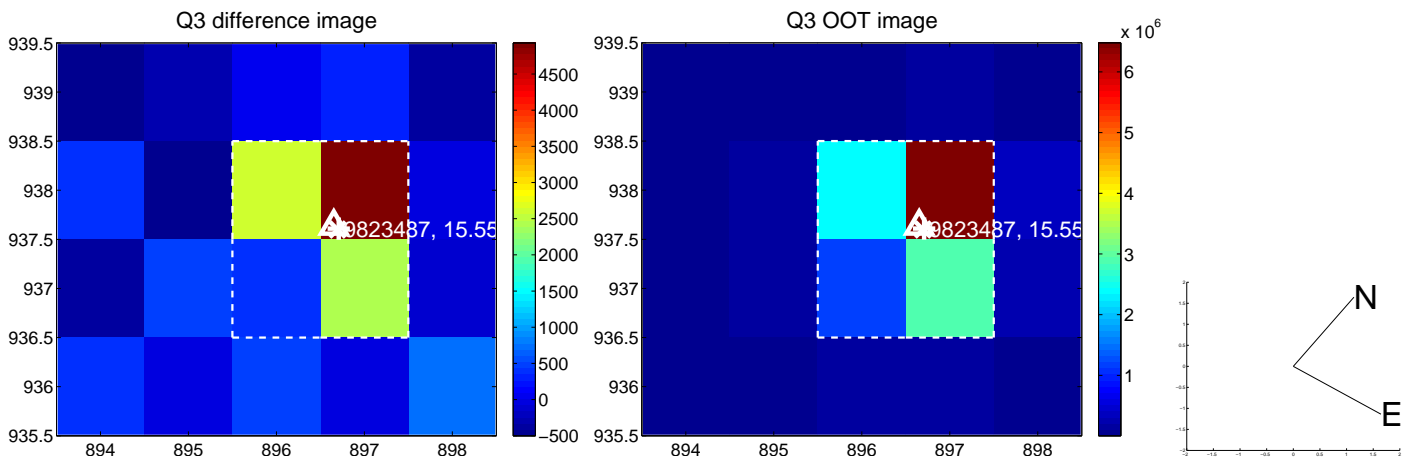
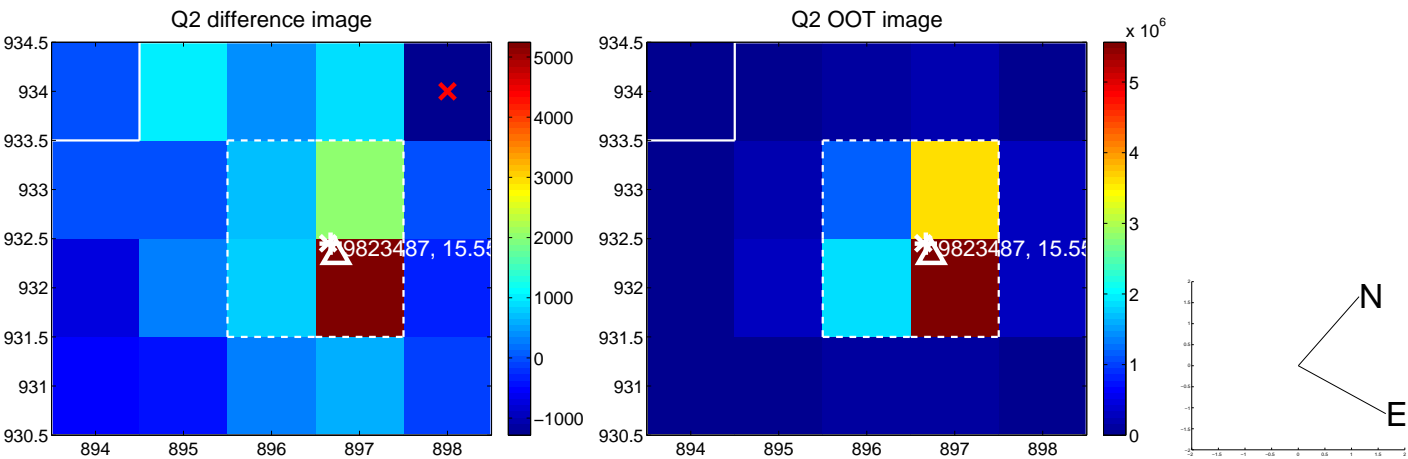
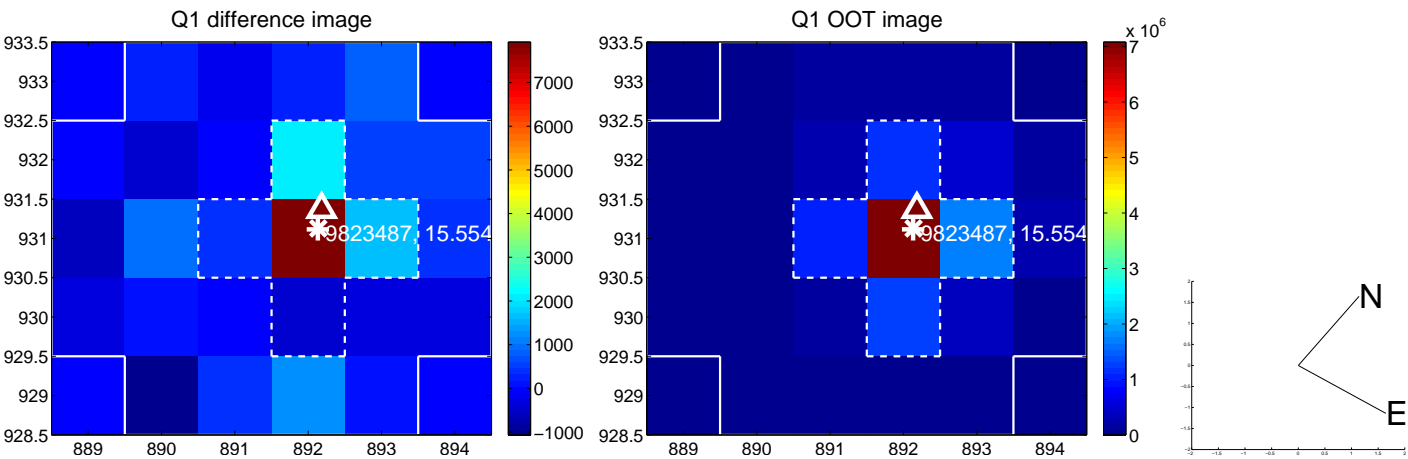
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec       |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT          | $0.153 \pm 0.120$  | 1.27                | $-0.152 \pm 0.120$ | $-0.012 \pm 0.115$ |
| PRF-fit source offset from KIC position | $0.153 \pm 0.126$  | 1.21                | $-0.153 \pm 0.127$ | $-0.009 \pm 0.112$ |
| photometric centroid source offset      | $0.68 \pm 0.42$    | 1.60                | $-0.68 \pm 0.42$   | $0.02 \pm 0.42$    |

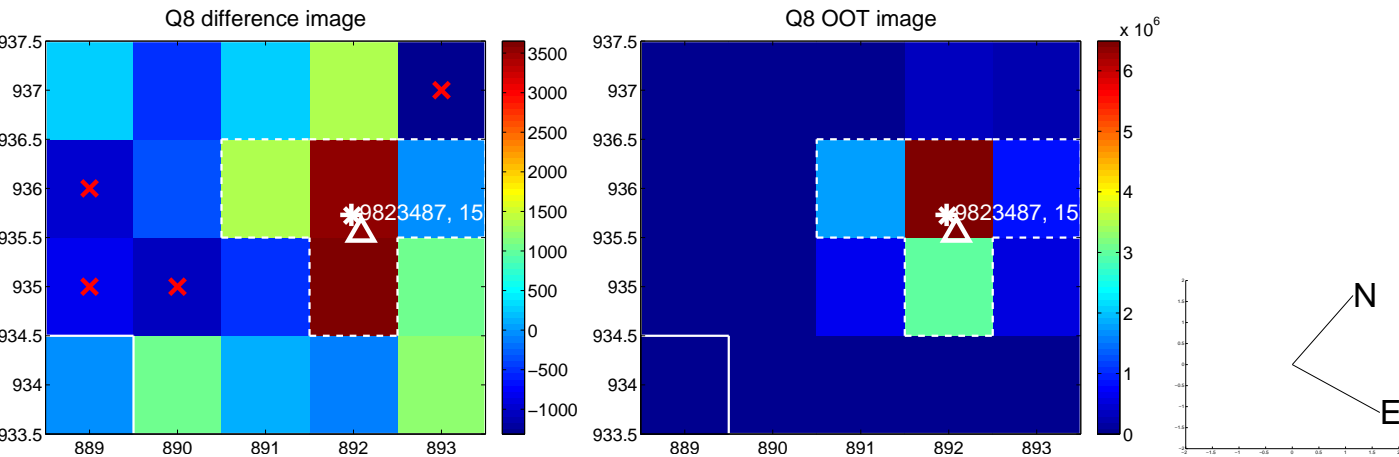
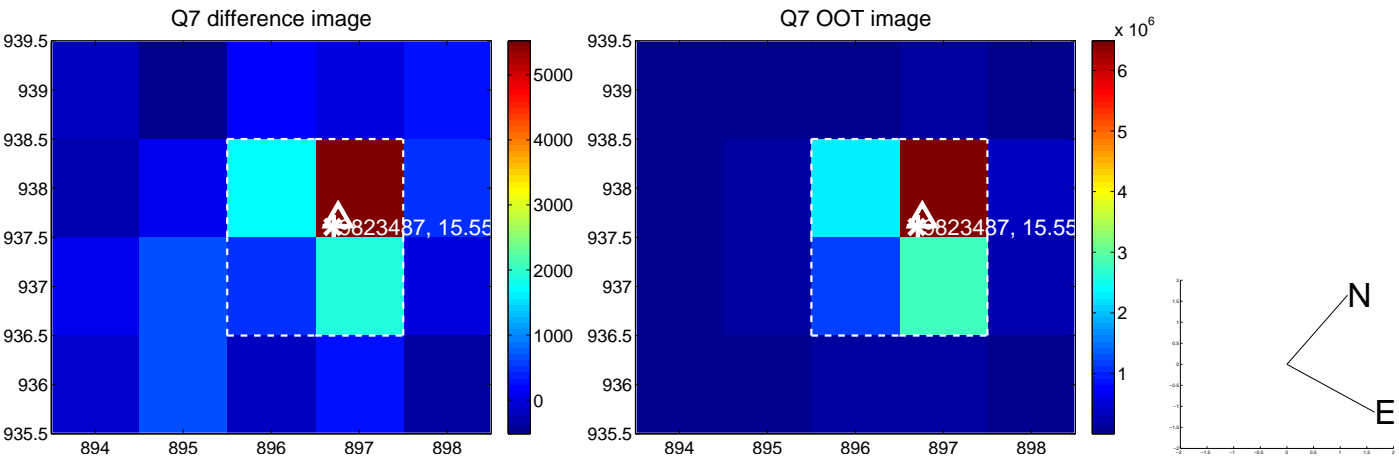
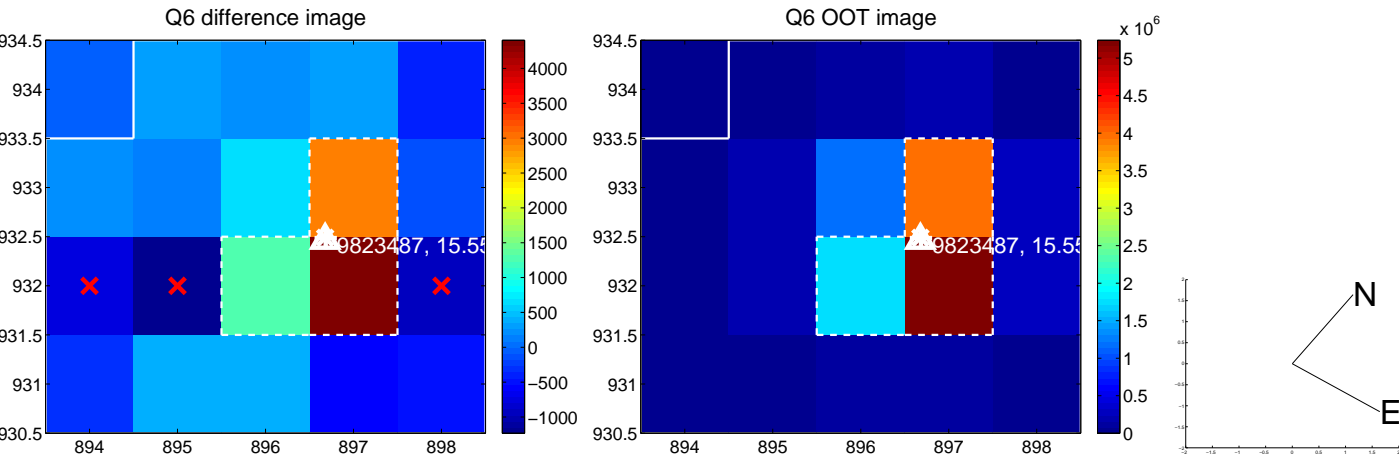
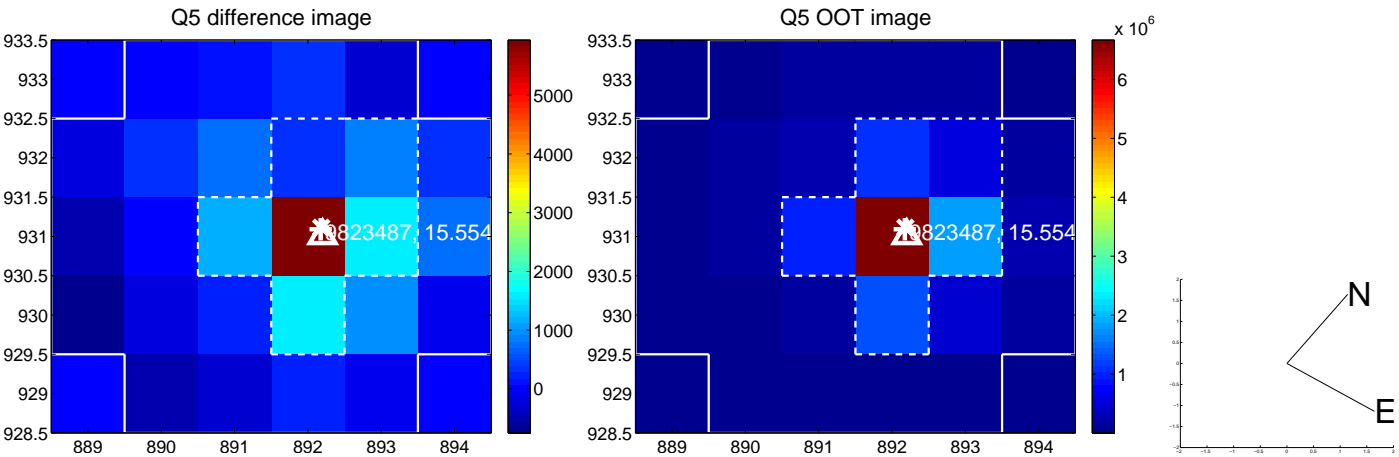


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

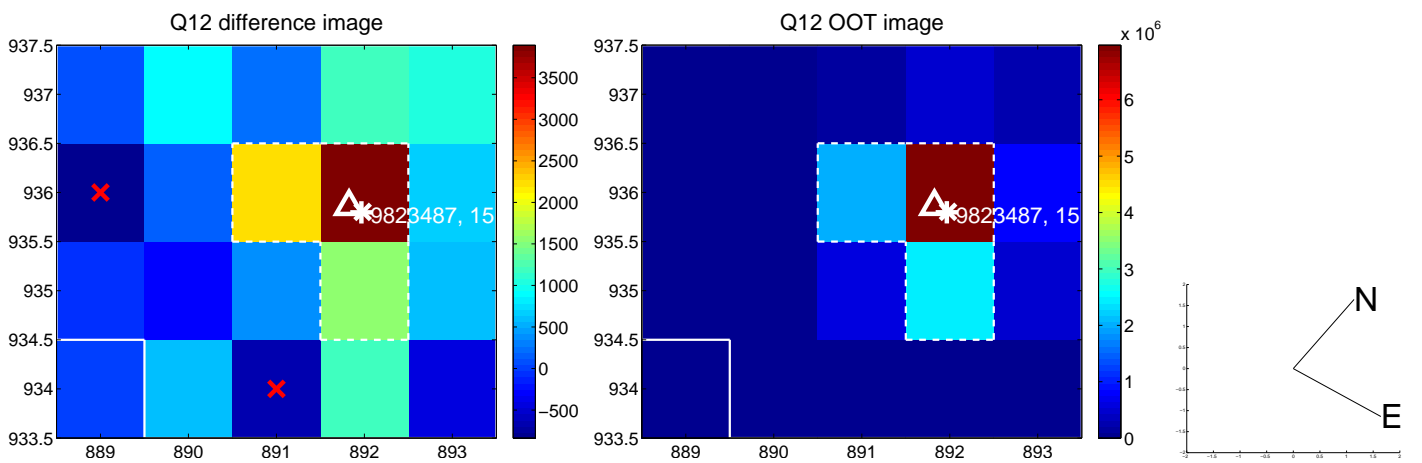
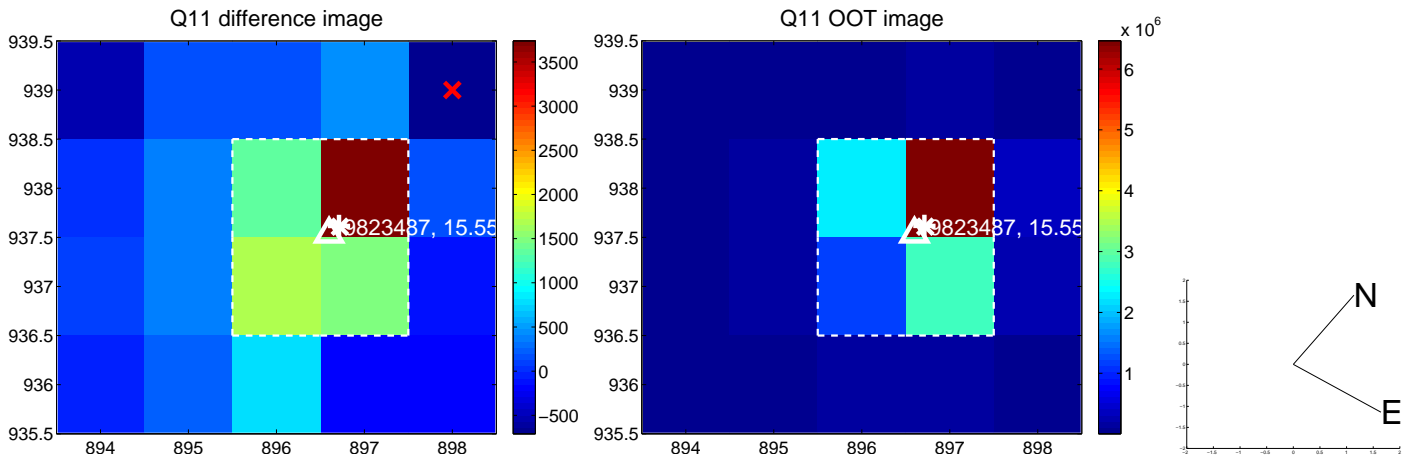
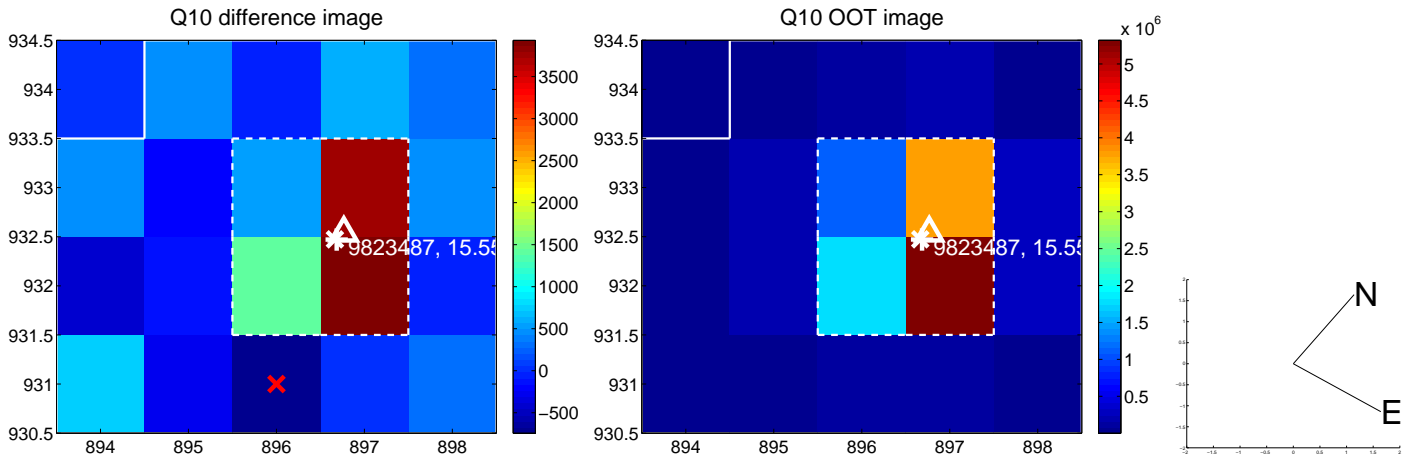
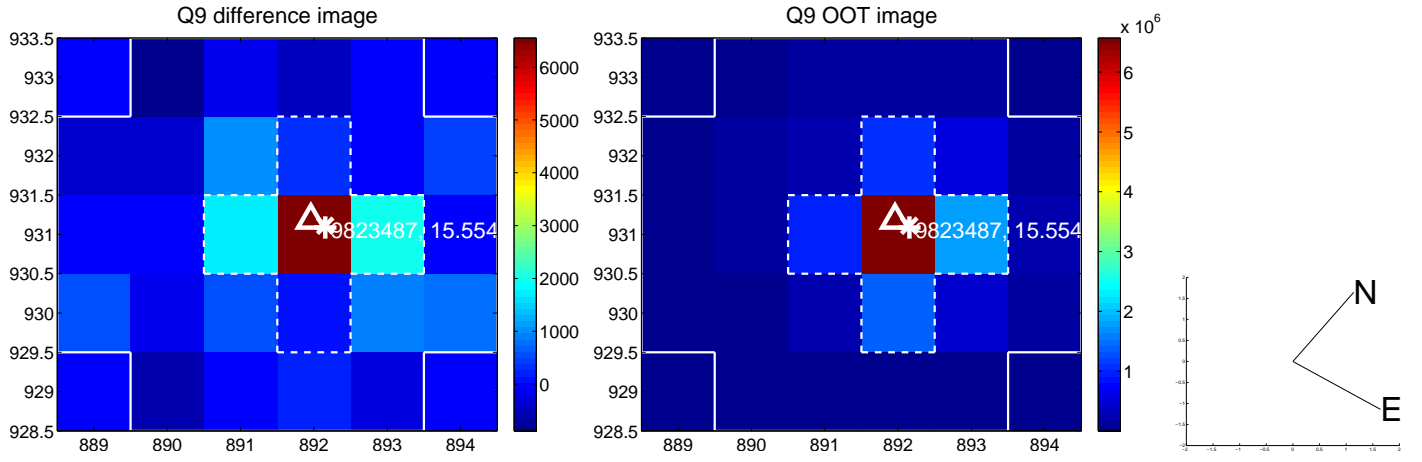
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.









# UKIRT Image

Declination

