

# KIC 009910685

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 009910685-01 | OBS      | No   | 367.669335    | 173.004305   | 1688.2      | 19.469           | 9.0 | 9.6 | 0.81                        | 5823            | 3.98                   | 0.80                   |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments  |
|--------------|----------|------|-------|---|---|---|---|---|
| 009910685-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_MARSHALL_SKYE_ZUMA—MOD_NONUNIQ_DV—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.

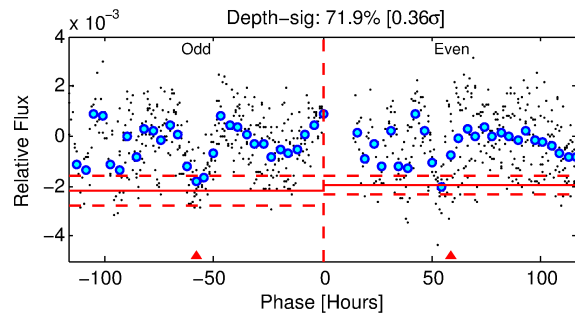
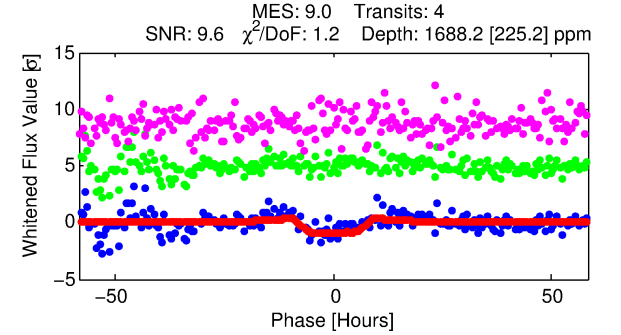
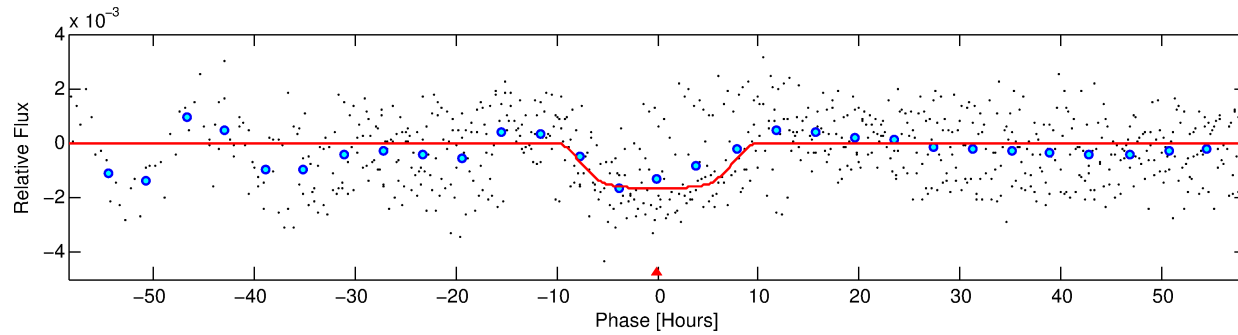
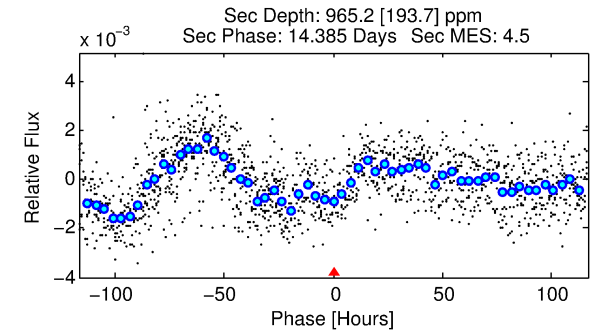
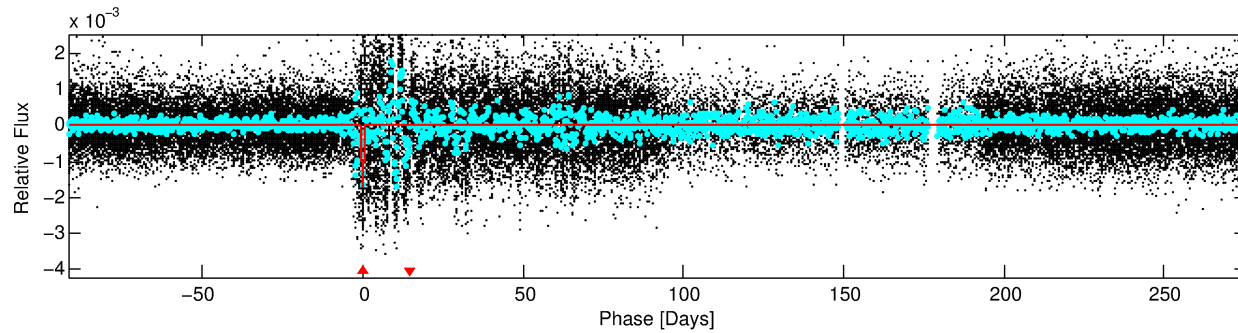
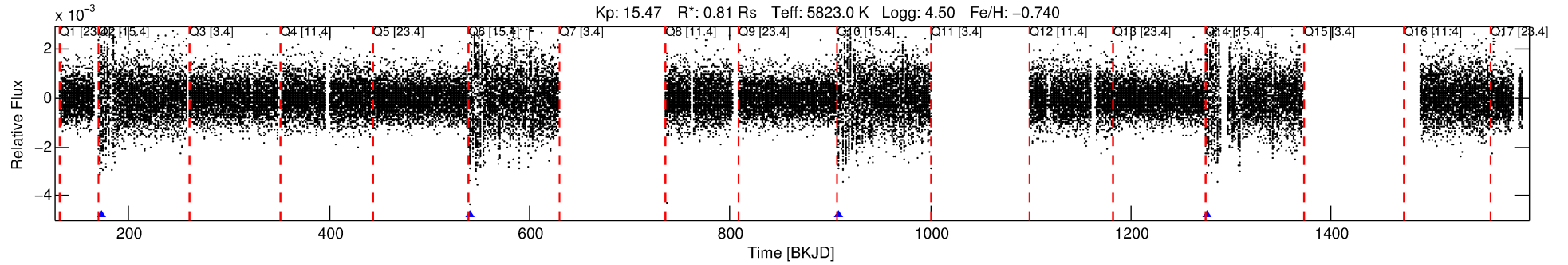
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009910685-01

No Significant Match Found

# DV One-Page Summary

KIC: 9910685 Candidate: 1 of 1 Period: 367.669 d



## DV Fit Results:

Period = 367.66934 [0.01787] d  
Epoch = 173.0043 [0.0298] BKJD  
Rp/R\* = 0.0450 [0.0040]  
a/R\* = 72.76 [15.95]  
b = 0.92 [0.04]  
Seff = 0.80 [0.23]  
Teq = 241 [17] K  
Rp = 3.98 [0.91] Re  
a = 0.9176 [0.1642] AU  
Ag = 28245.85 [10572.21] [2.67σ]  
Teffp = 4838 [354] K [12.97σ]

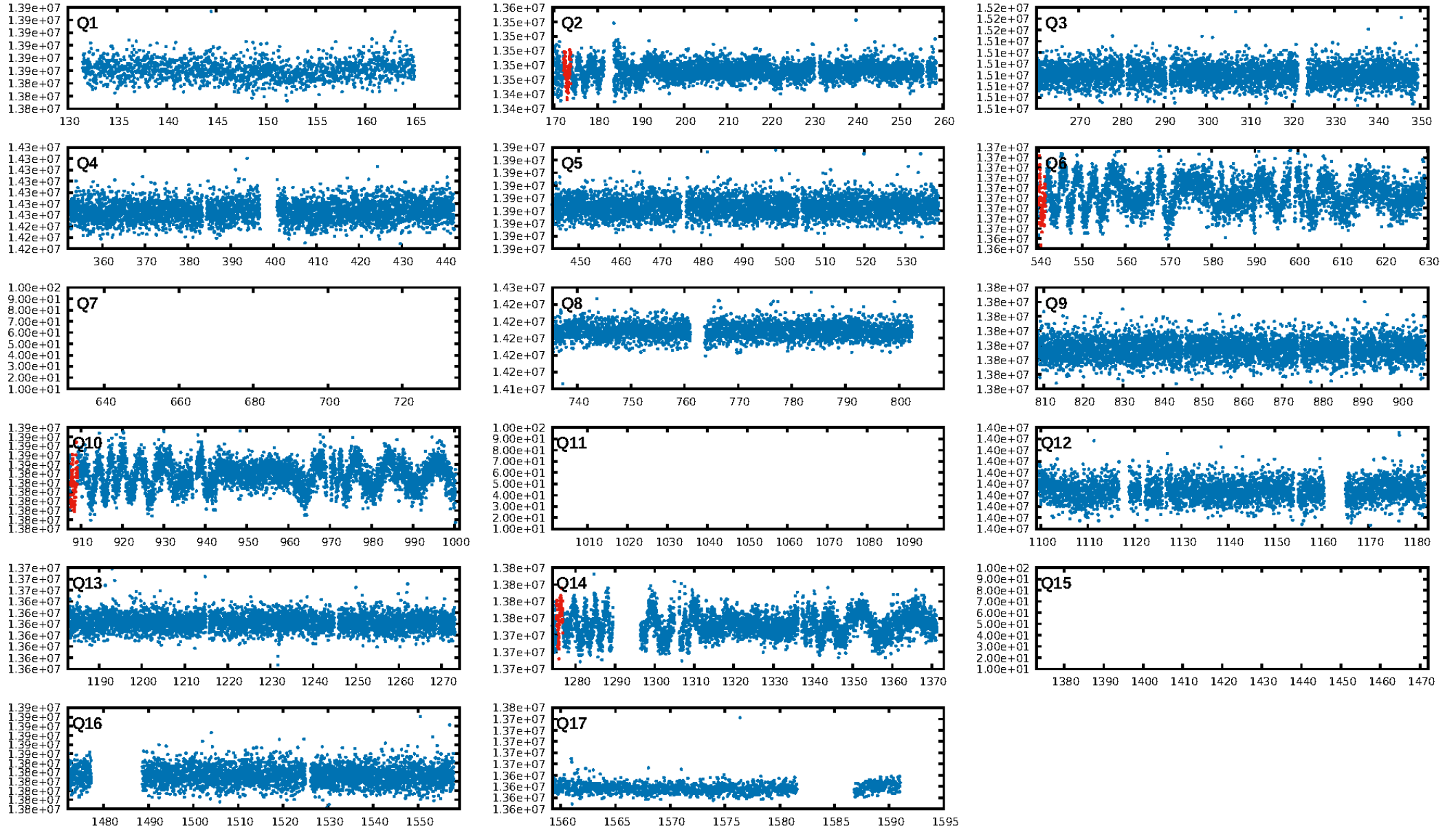
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 15.9%  
ModelChiSquareGof-sig: 99.8%  
**Bootstrap-pfa: 2.23e-10**  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -6.72  
Centroid-sig: 24.2%  
Centroid-so: 2.002 arcsec [1.28σ]  
OotOffset-rm: N/A  
KicOffset-rm: N/A  
OotOffset-st: 0/0/0/0 [0]  
KicOffset-st: 0/0/0/0 [0]  
DiffImageQuality-fgm: N/A  
DiffImageOverlap-fno: 1.00 [1/1]

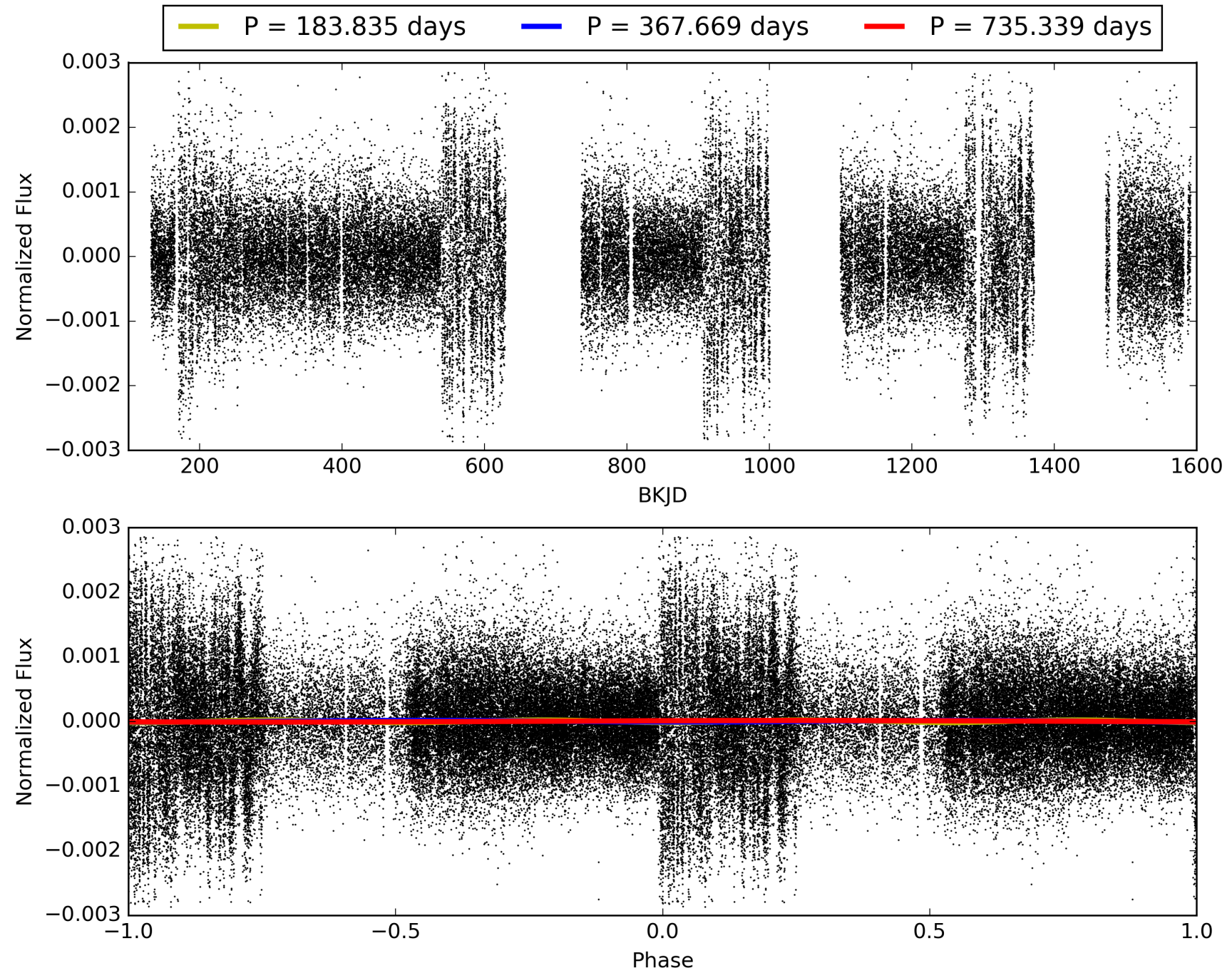
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 09:22:26 Z

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

# TCE 009910685-01, PDC Light Curves

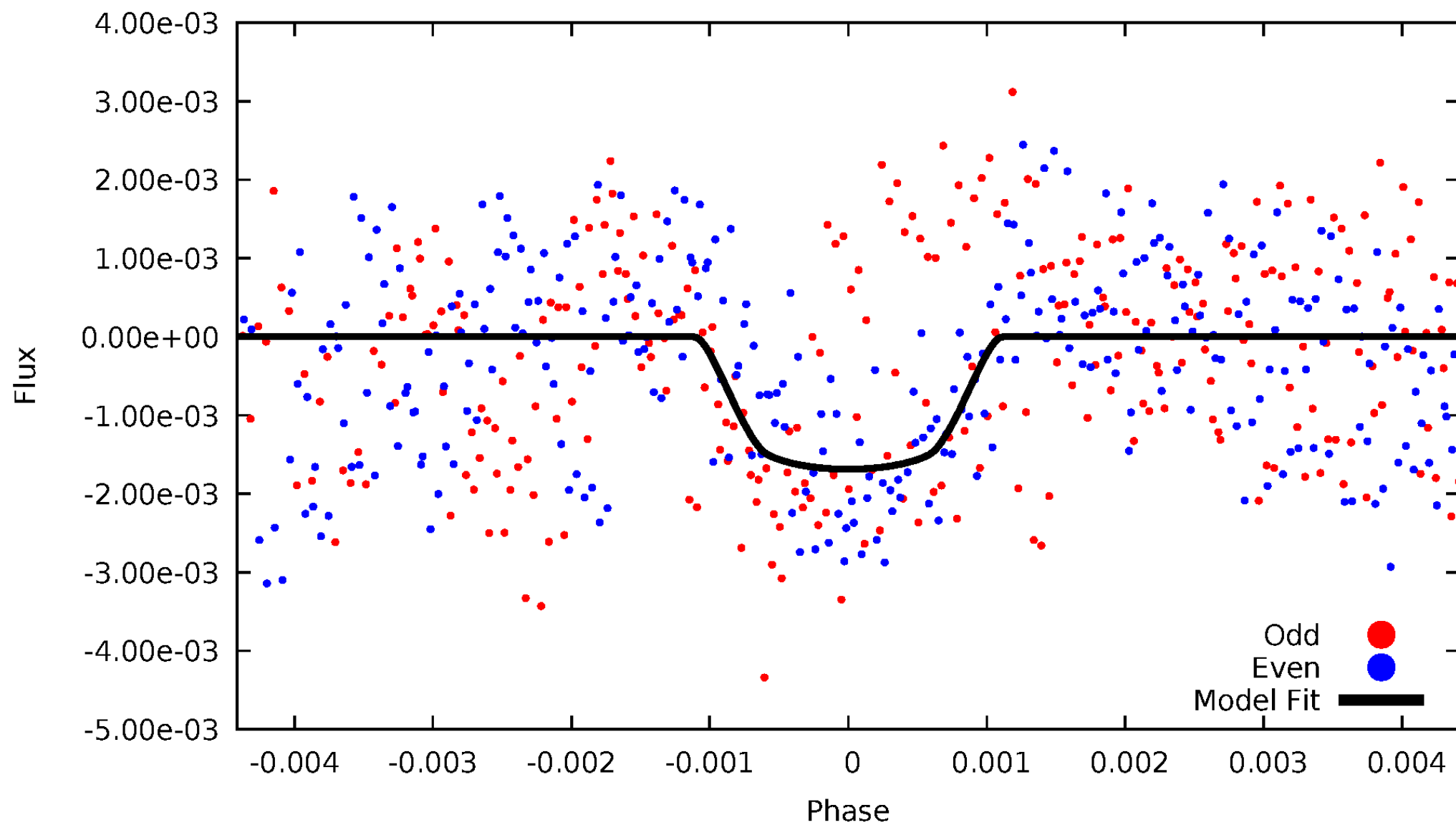


TCE 009910685-01



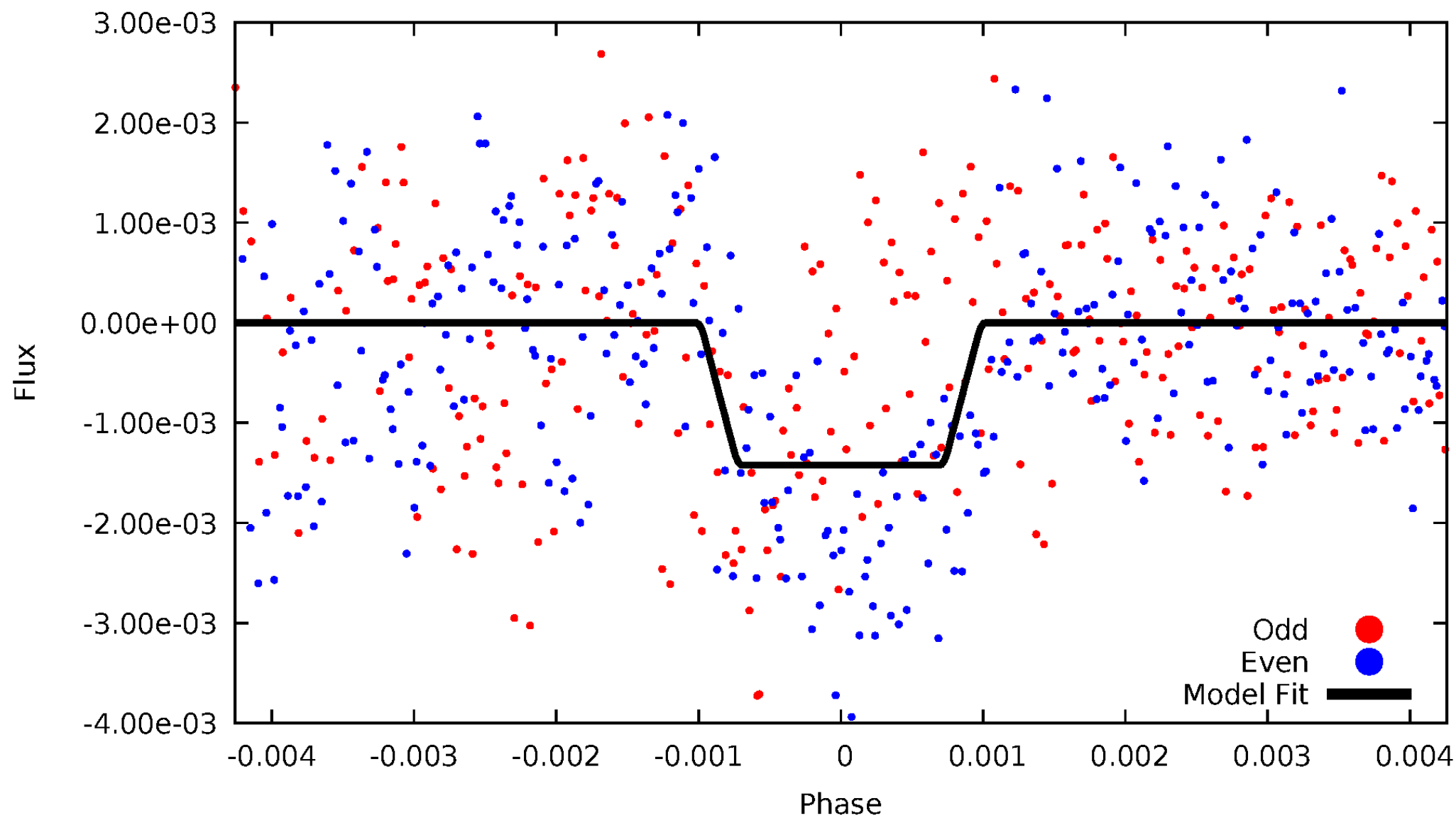
# DV Odd/Even

TCE 009910685-01



# ALT Odd/Even

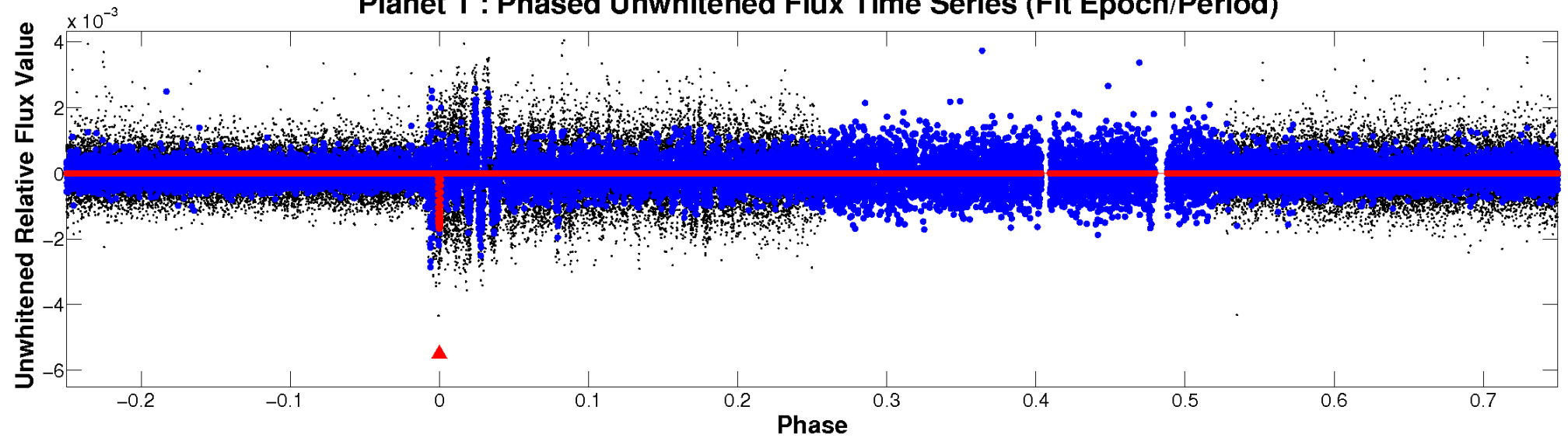
TCE 009910685-01



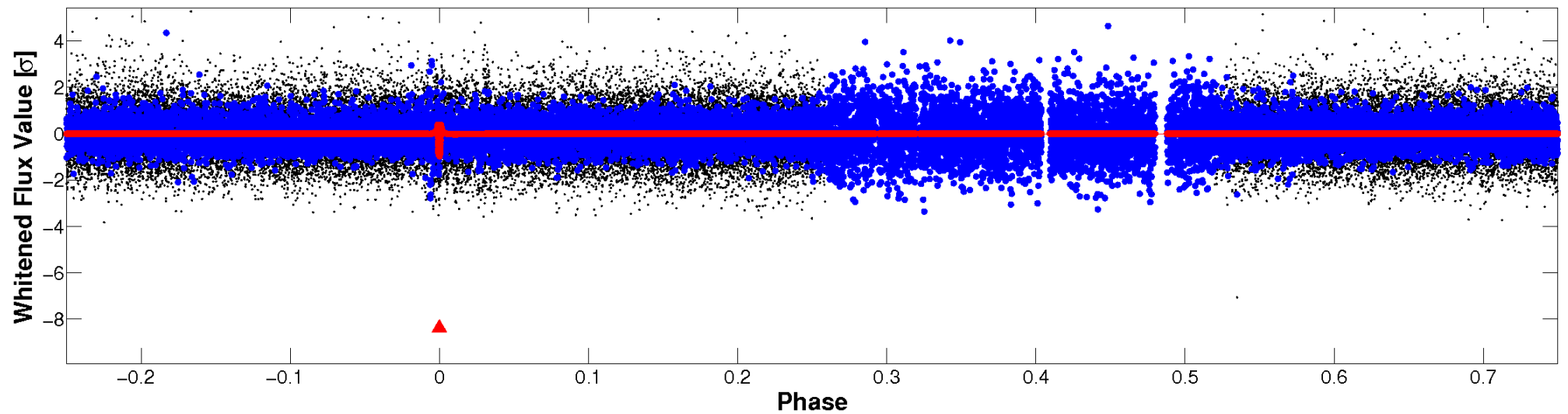


# Non-Whitened Vs. Whitened Light Curve

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

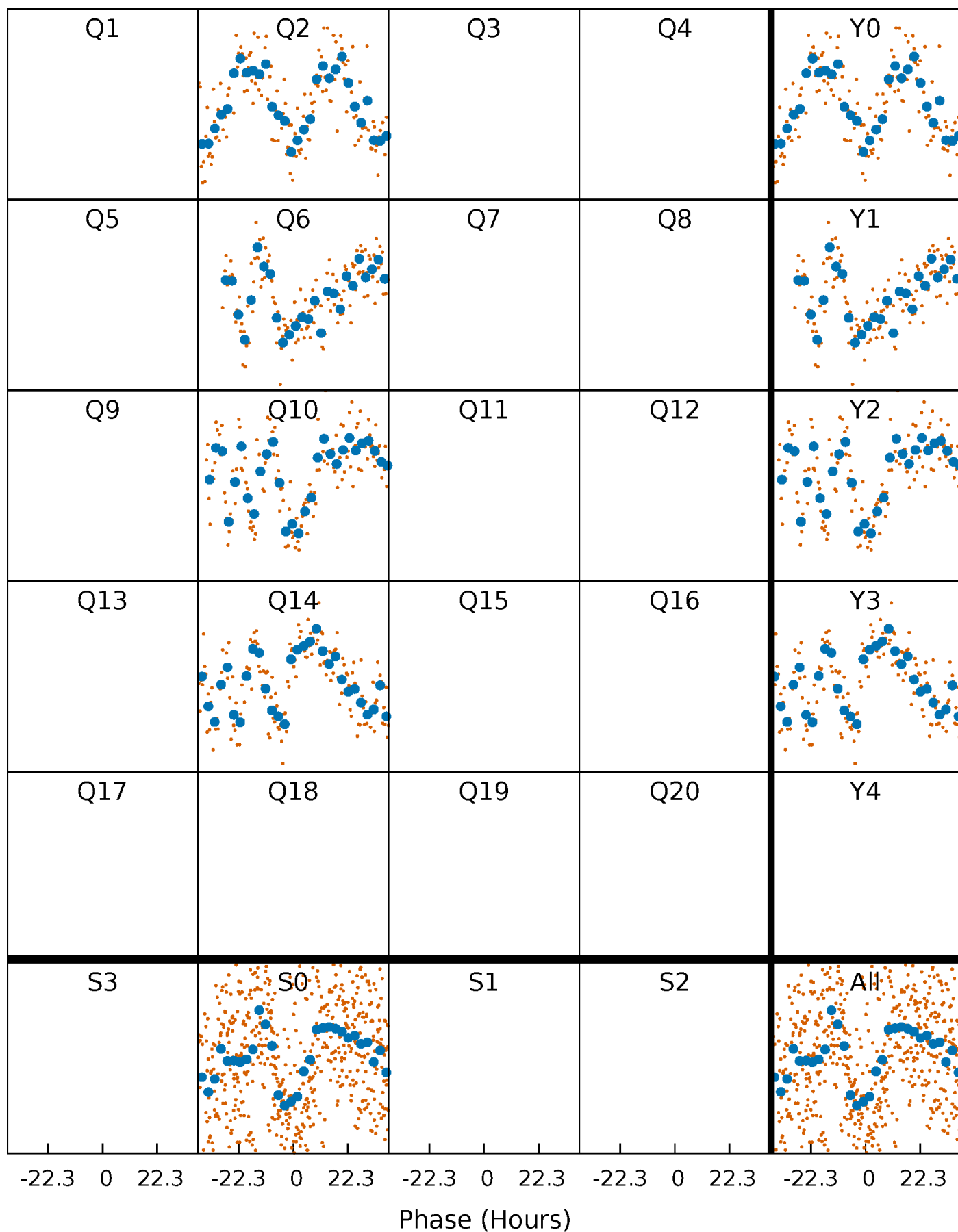


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

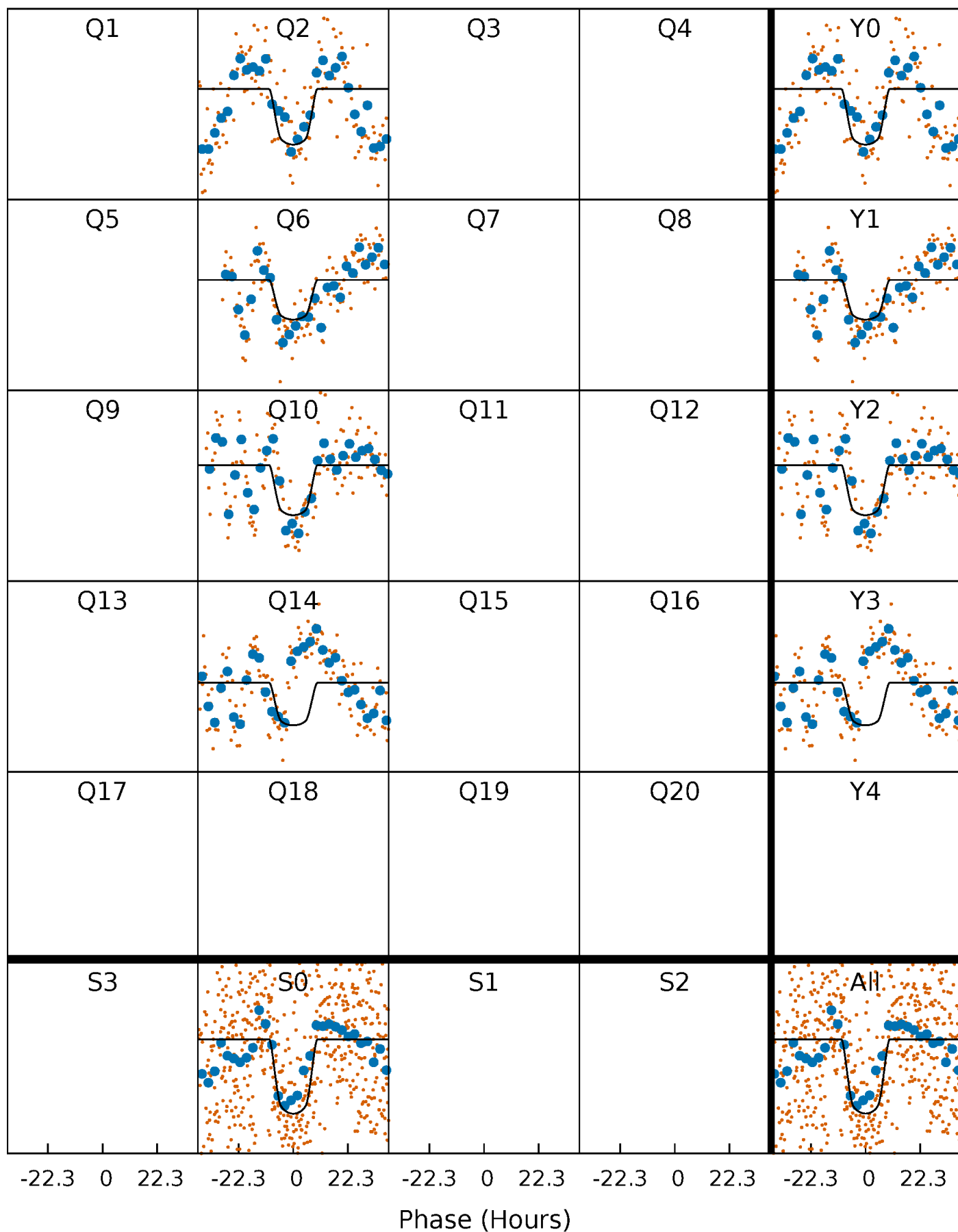
TCE 009910685-01 P=367.669335 Days  $T_0=173.004305$  (BKJD)





# DV Quarter-Phased Transit Curves

TCE 009910685-01 P=367.669335 Days  $T_0=173.004305$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

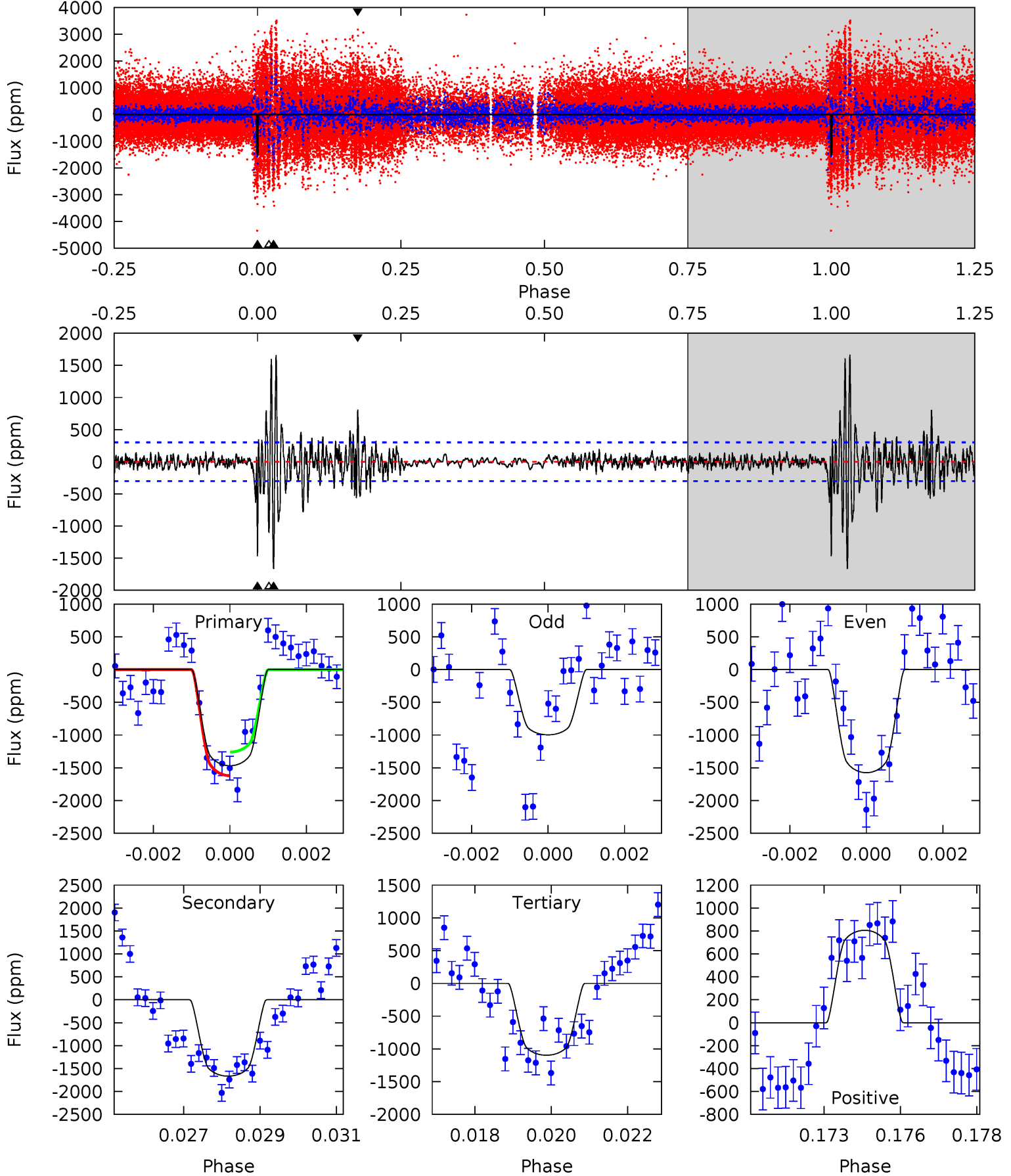
TCE 009910685-01 P=367.695101 Days  $T_0=172.966189$  (BKJD)



# DV Model-Shift Uniqueness Test

009910685-01, P = 367.669335 Days, E = 173.004305 Days

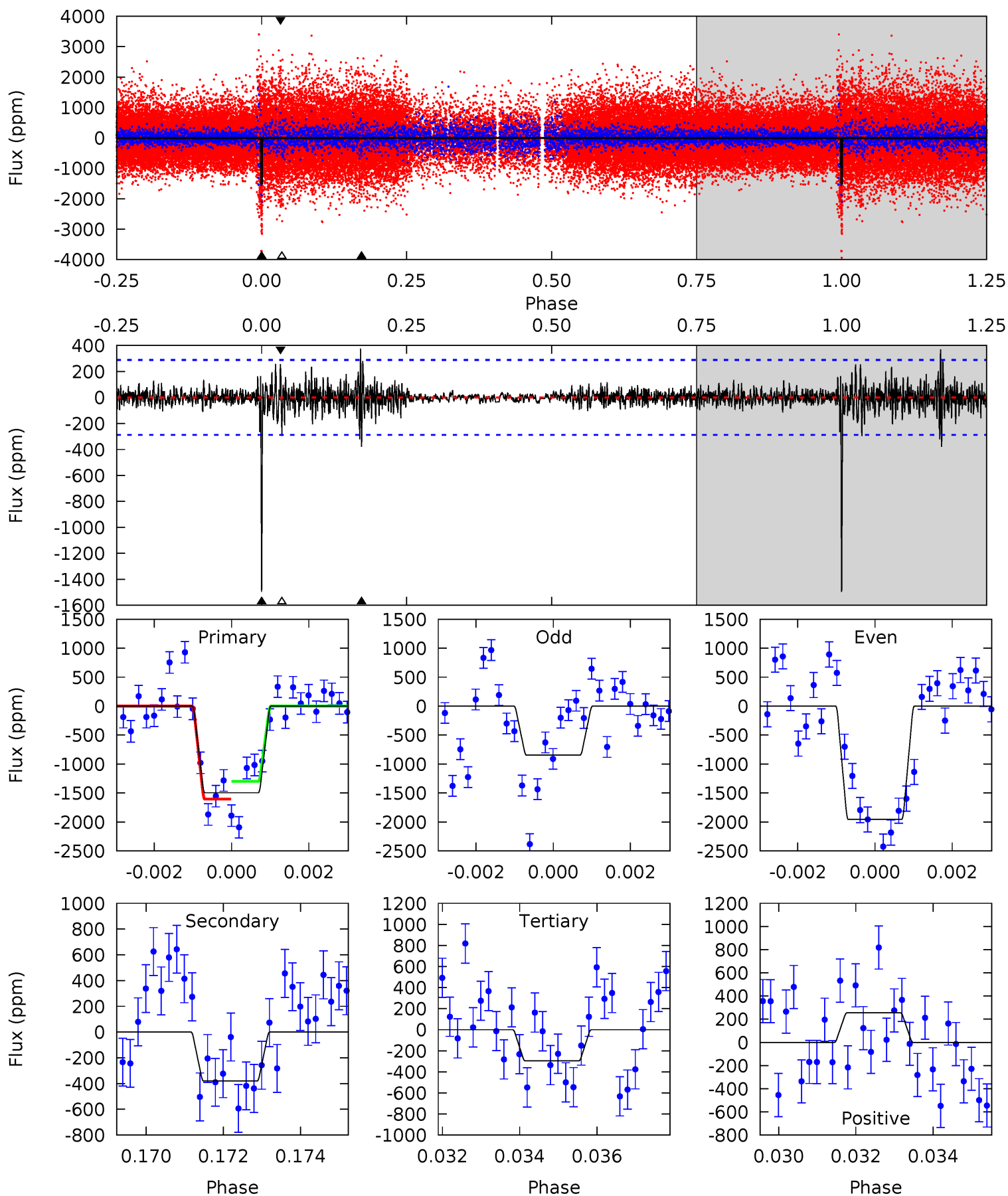
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 25.8 | 29.3 | 19.3 | 14.2 | 5.31            | 3.06            | 3.57             | 6.54    | 11.7    | 10.0    | 15.1    | 5.17    | 0.81 | 0.50  | 3.03 |



# Alt Model-Shift Uniqueness Test

009910685-01, P = 367.695101 Days, E = 172.966189 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  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 27.6 | 7.03 | 5.46 | 4.71 | 5.33            | 3.09            | 1.01             | 22.2    | 22.9    | 1.56    | 2.32    | 10.4    | 0.95 | 0.20  | 2.76 |



### Stellar Parameters For KIC 009910685

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                     | $R$ ( $R_{\odot}$ )       | $M(M_{\odot})$            | $p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ ) |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
|        | $5823^{+174}_{-174}$ | $4.503^{+0.096}_{-0.144}$ | $-0.740^{+0.300}_{-0.300}$ | $0.810^{+0.171}_{-0.092}$ | $0.763^{+0.093}_{-0.050}$ | $2.018^{+0.927}_{-0.794}$                     |
|        | +3%/-3%              | +2%/-3%                   | +41%/-41%                  | +21%/-11%                 | +12%/-7%                  | +46%/-39%                                     |
| 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 009910685-01 / KOI

| Detrend | Depth (ppm)    | $R_p$ ( $R_{\oplus}$ ) | $T_{\text{max}}$ (K) | $T_{\text{obs}}$ (K) | $A_{\text{obs}}$          |
|---------|----------------|------------------------|----------------------|----------------------|---------------------------|
| DV      | $-1666 \pm 57$ | $4.06^{+0.60}_{-0.49}$ | $340^{+18}_{-16}$    | $5563^{+289}_{-278}$ | $47188^{+13990}_{-10757}$ |
| Alt.    | $-380 \pm 54$  | $3.36^{+0.53}_{-0.42}$ | $340^{+19}_{-17}$    | $4395^{+259}_{-219}$ | $15507^{+5362}_{-4320}$   |

$T_{\text{max}}$  = 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

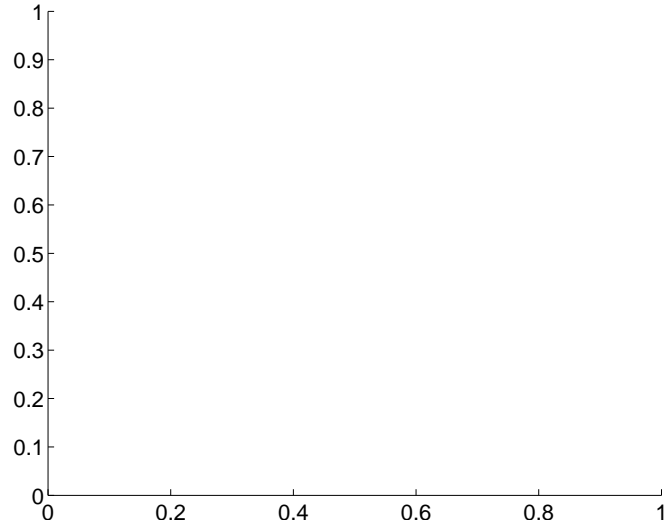
Supplemental centroid analysis for 009910685-01. Kepler magnitude: 15.47. Transit SNR 9.59

There are 0 quarters with good PRF difference image offsets

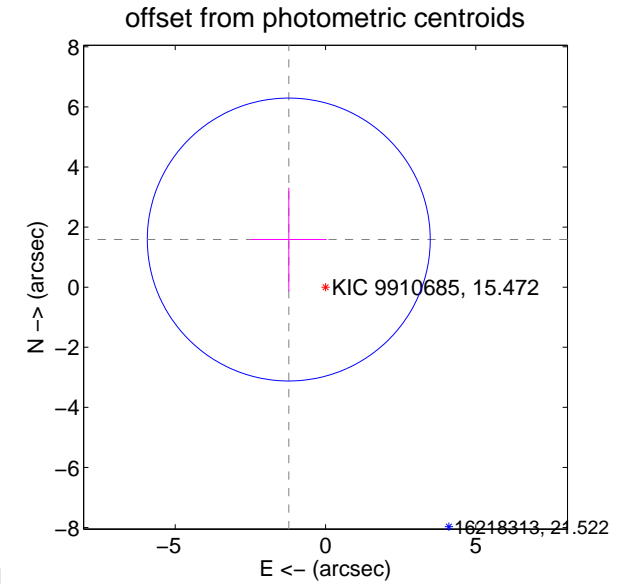
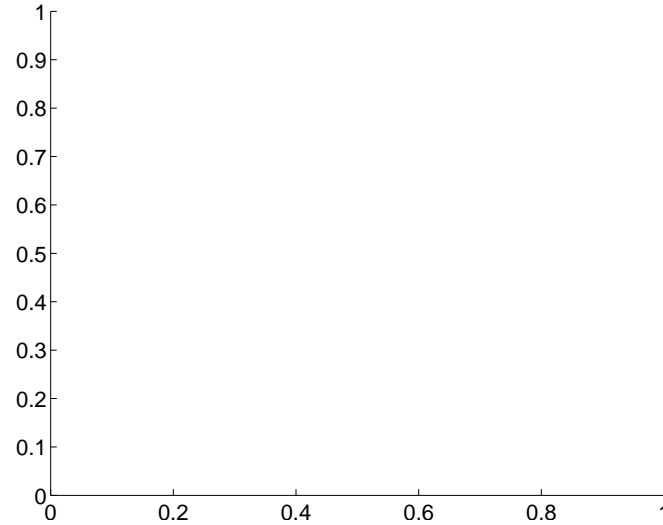
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA     | $\Delta$ Dec    |
|---|--------------------|---------------------|-----------------|-----------------|
| PRF-fit source offset from OOT          | —                  | —                   | —               | —               |
| PRF-fit source offset from KIC position | —                  | —                   | —               | —               |
| photometric centroid source offset      | $2.00 \pm 1.57$    | 1.28                | $1.22 \pm 1.26$ | $1.59 \pm 1.73$ |

There is no PRF-fit offset from OOT-fit



There is no PRF-fit offset from KIC



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.

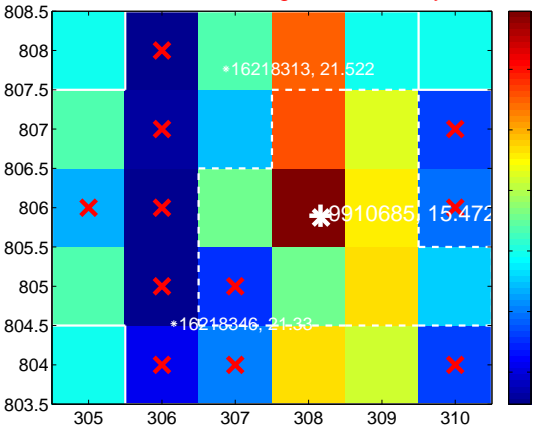
Q1 no difference image



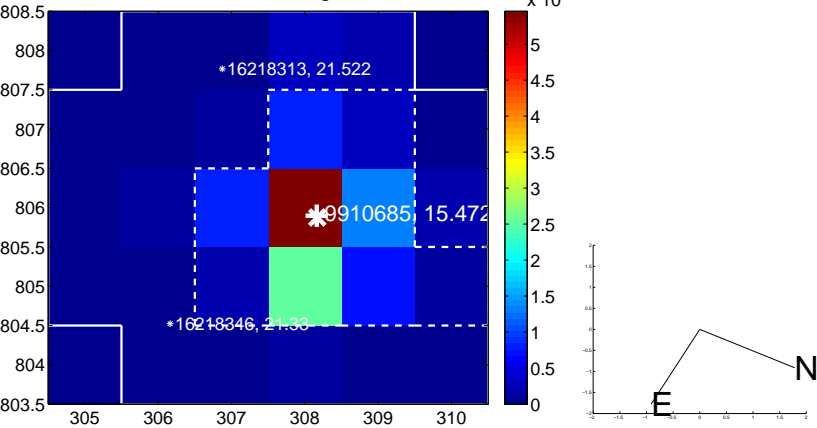
Q1 no OOT image



Q2 difference image. Poor Quality



Q2 OOT image



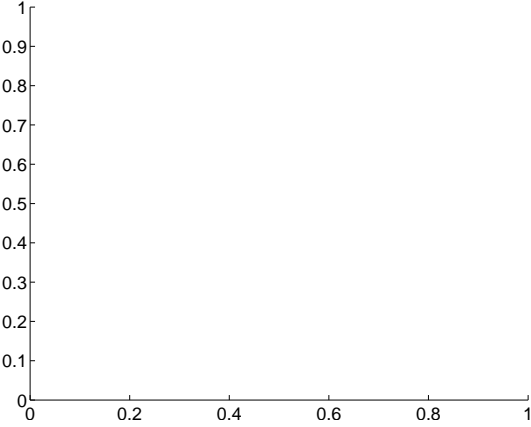
Q3 no difference image



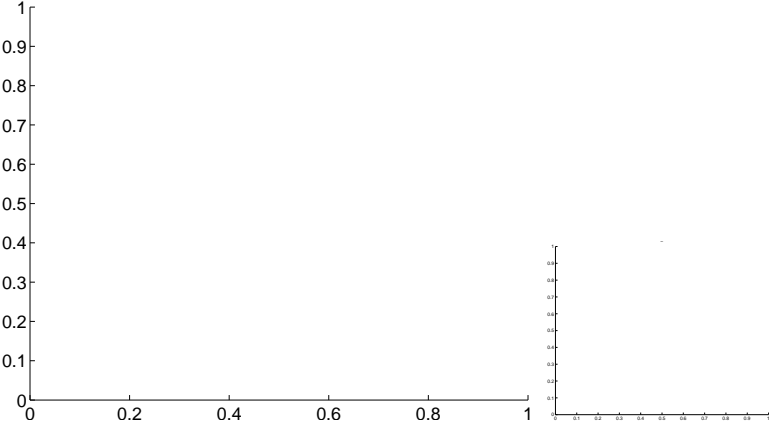
Q3 no OOT image



Q4 no difference image



Q4 no OOT image





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



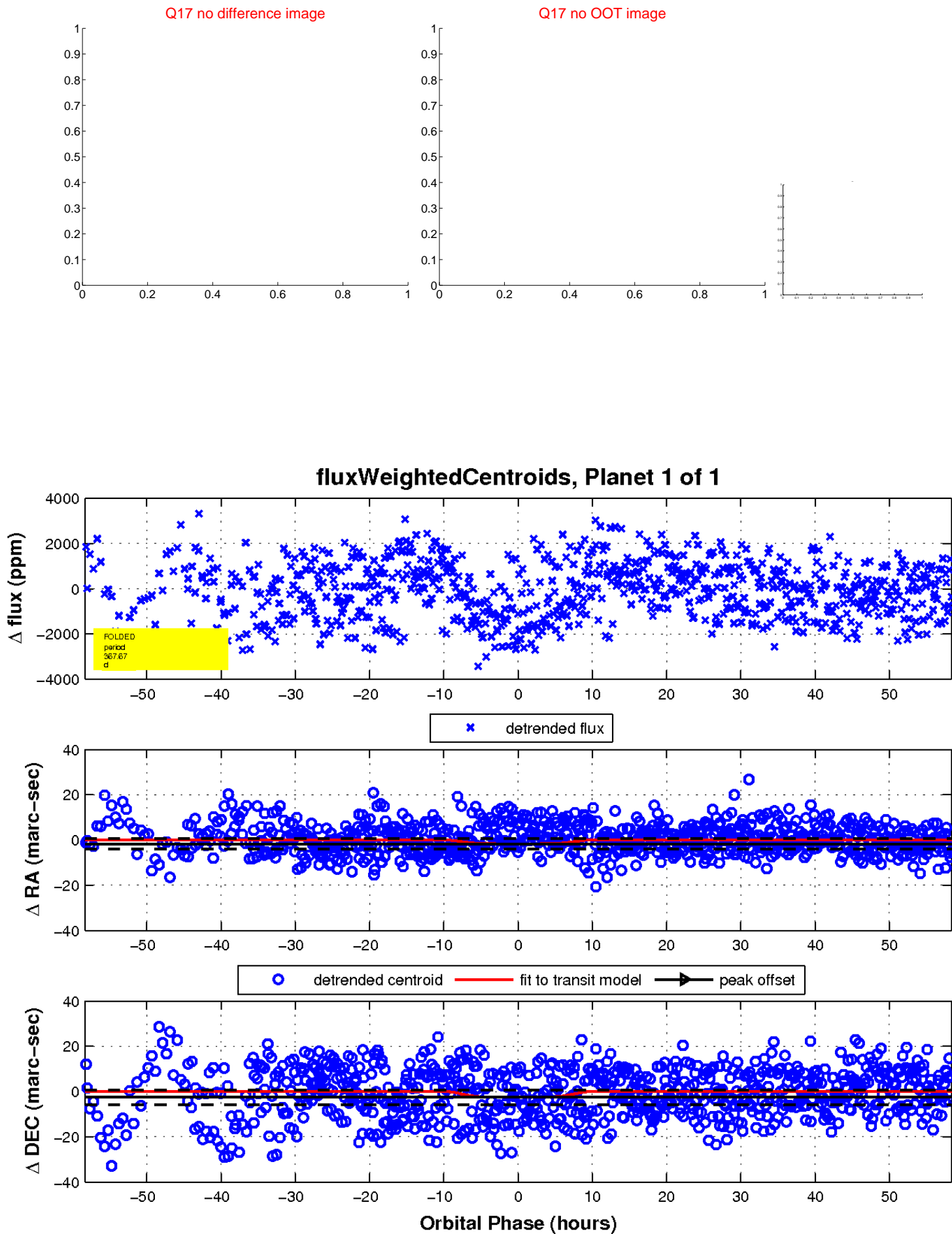
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.



UKIRT Image

Declination

