

# KIC 006544160

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|-----|-----------------------------|-----------------|------------------------|------------------------|
| 006544160-01 | OBS      | No   | 649.444809    | 147.659973   | 250.5       | 4.147            | 12.0 | 8.1 | 1.32                        | 5962            | 2.24                   | 1.03                   |
| 006544160-02 | OBS      | No   | 677.875820    | 188.831327   | 248.5       | 3.194            | 9.4  | 7.4 | 1.32                        | 5962            | 2.37                   | 0.97                   |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|--|
| 006544160-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_KIC_POS |
| 006544160-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_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.

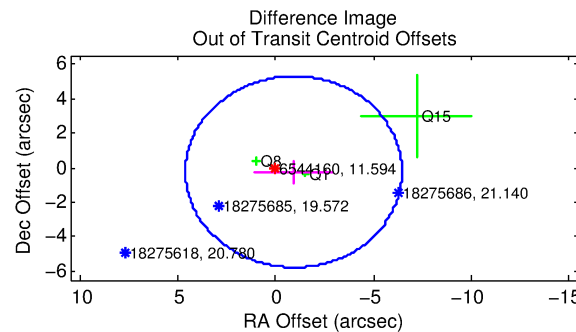
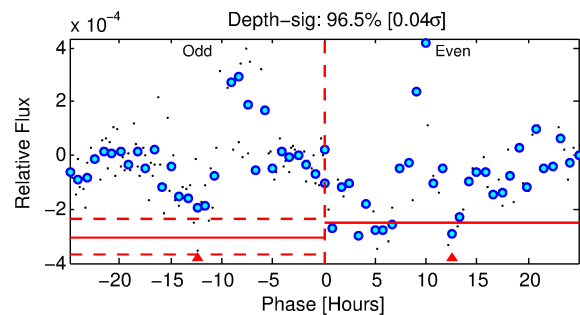
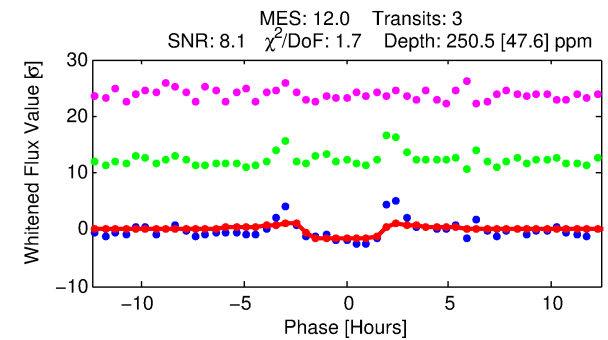
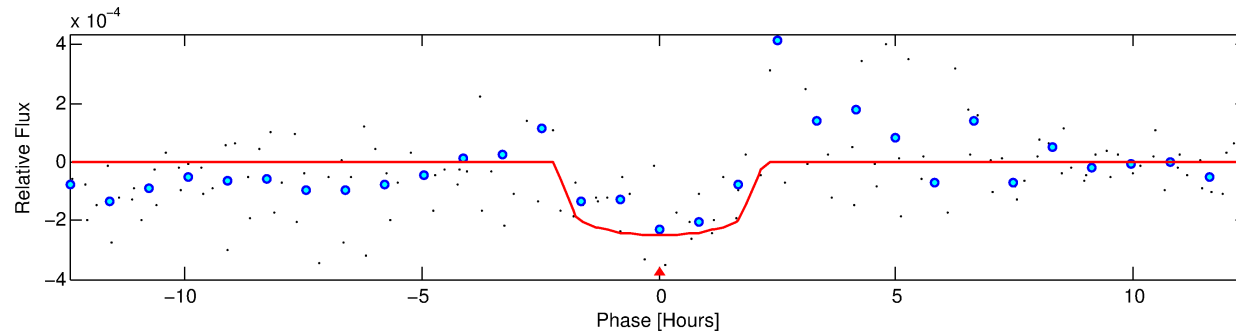
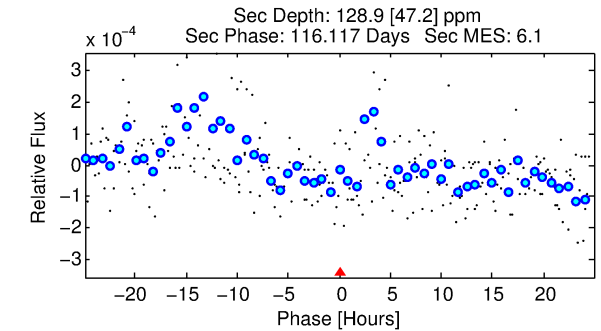
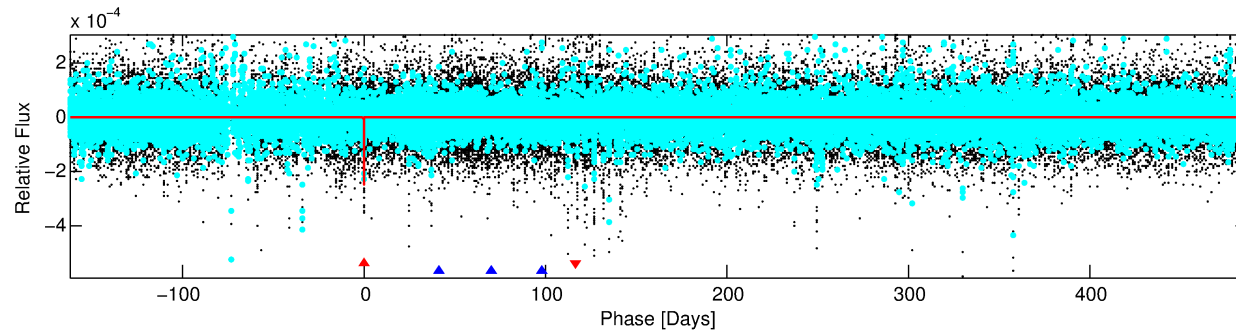
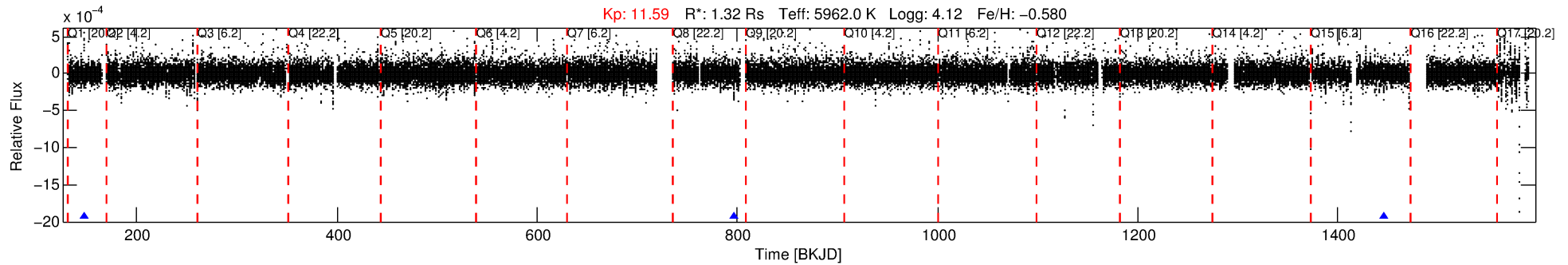
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 006544160-01

No Significant Match Found

# DV One-Page Summary

KIC: 6544160 Candidate: 1 of 2 Period: 649.445 d



## DV Fit Results:

Period = 649.44481 [0.00705] d  
Epoch = 147.6600 [0.0096] BKJD  
Rp/R\* = 0.0156 [0.0115]  
a/R\* = 871.23 [3163.88]  
b = 0.71 [2.61]  
Seff = 1.03 [0.51]  
Teq = 257 [32] K  
Rp = 2.24 [1.77] Re  
a = 1.3867 [0.4035] AU  
Ag = 27136.52 [43385.02] [0.63 $\sigma$ ]  
Teffp = 5094 [1944] K [2.49 $\sigma$ ]

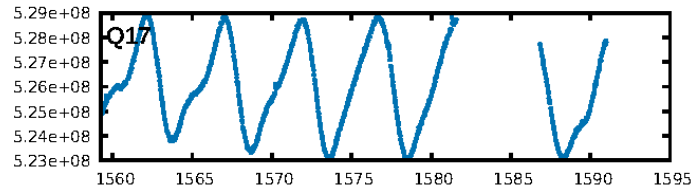
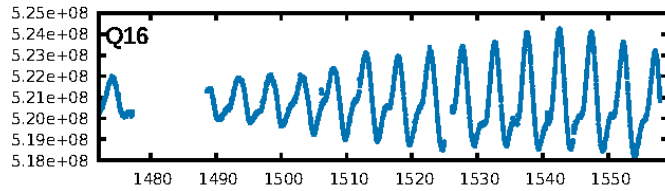
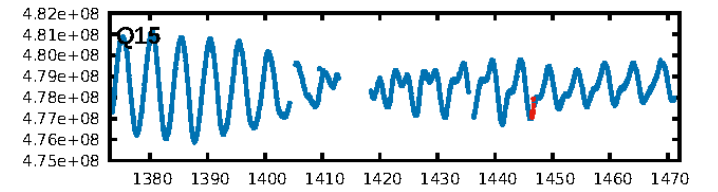
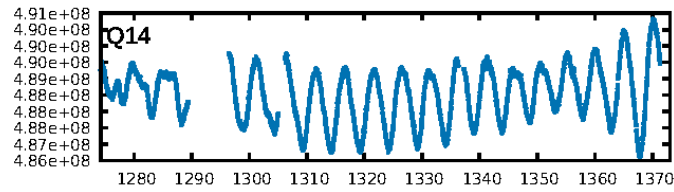
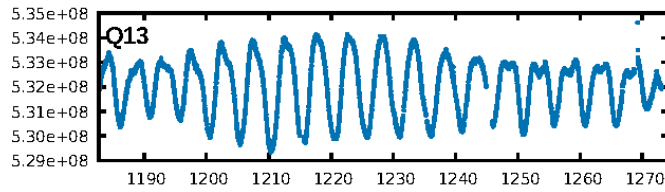
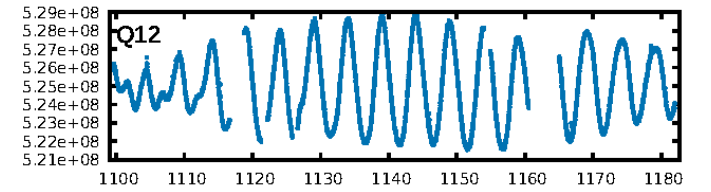
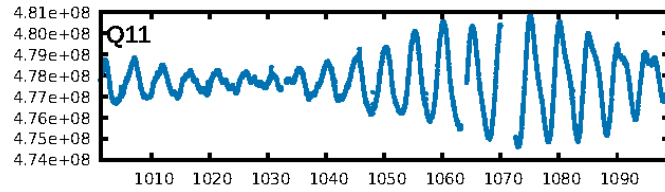
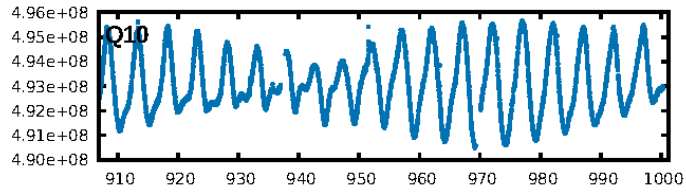
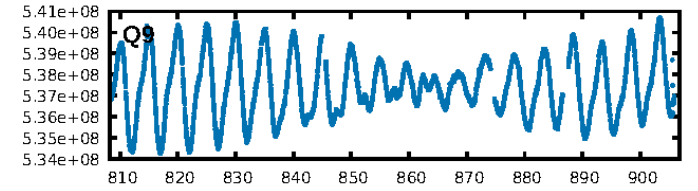
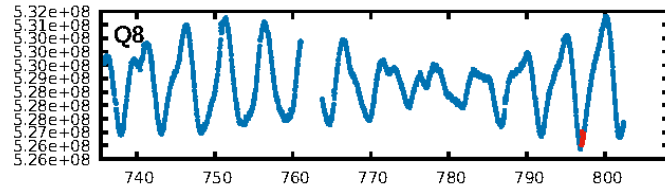
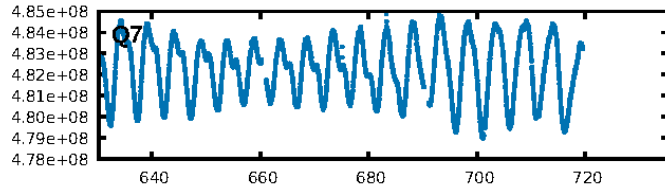
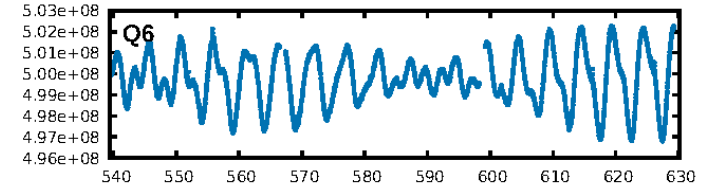
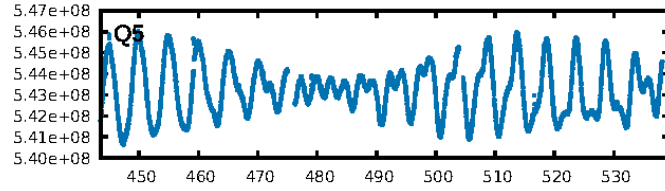
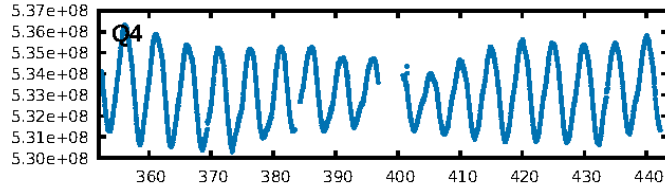
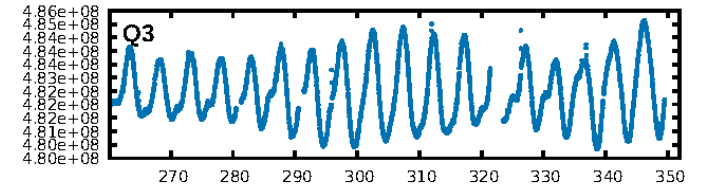
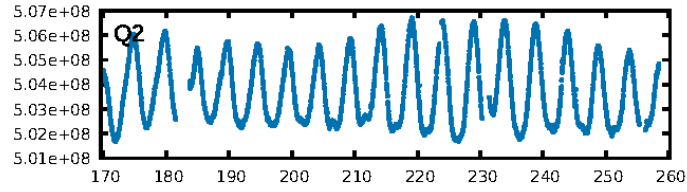
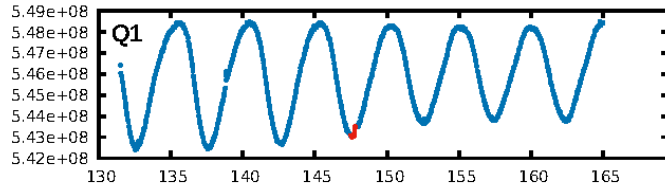
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [130.36 $\sigma$ ]  
ModelChiSquare2-sig: 55.5%  
ModelChiSquareGof-sig: 82.2%  
**Bootstrap-pfa: 2.85e-10**  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: 2.755  
Centroid-sig: 92.9%  
Centroid-so: 0.383 arcsec [0.46 $\sigma$ ]  
OotOffset-rm: 0.954 arcsec [0.52 $\sigma$ ]  
OotOffset-st: 0/1/1/1 [3]  
KicOffset-rm: 1.027 arcsec [0.38 $\sigma$ ]  
KicOffset-st: 0/1/1/1 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

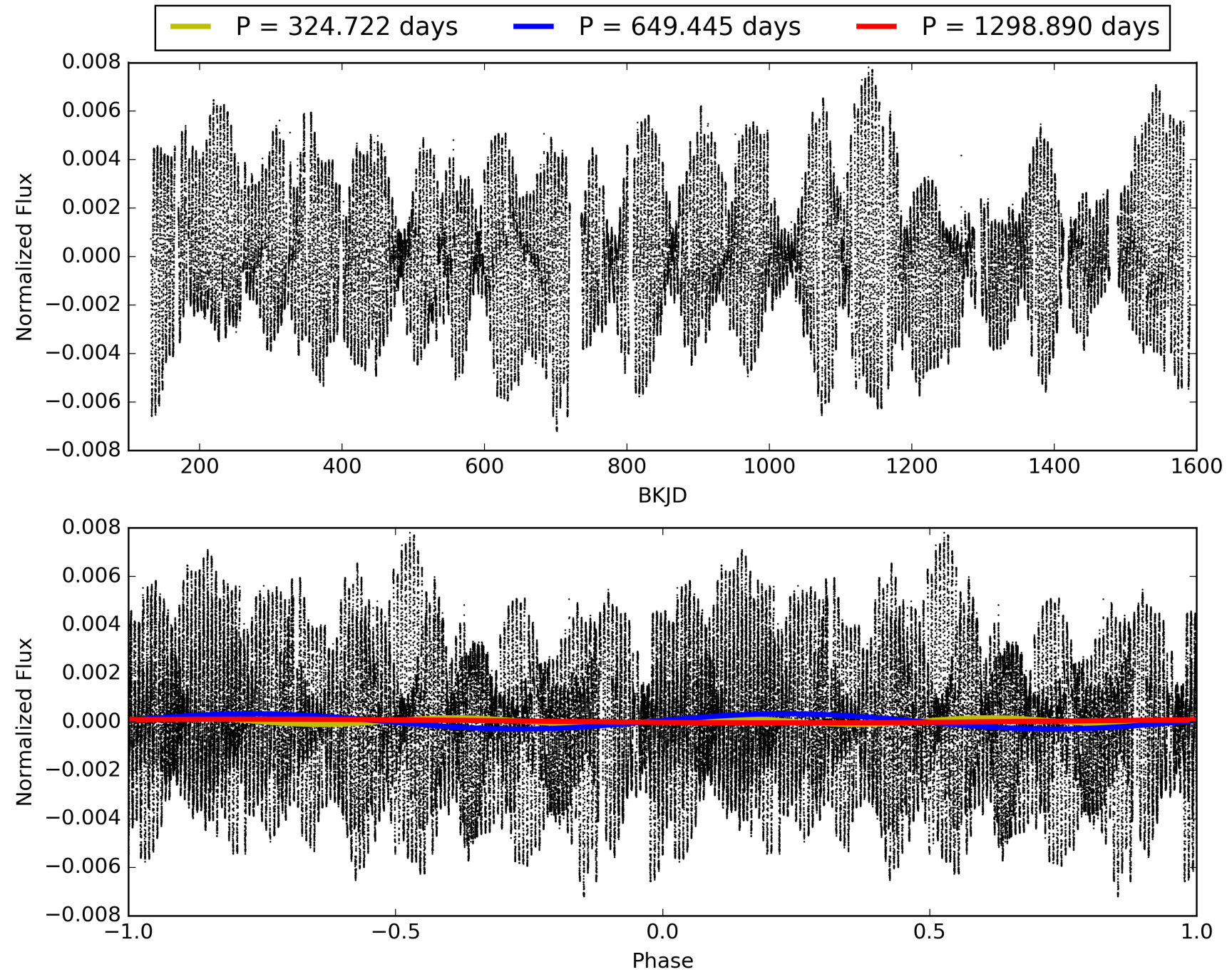
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:01:09 Z

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

# TCE 006544160-01, PDC Light Curves

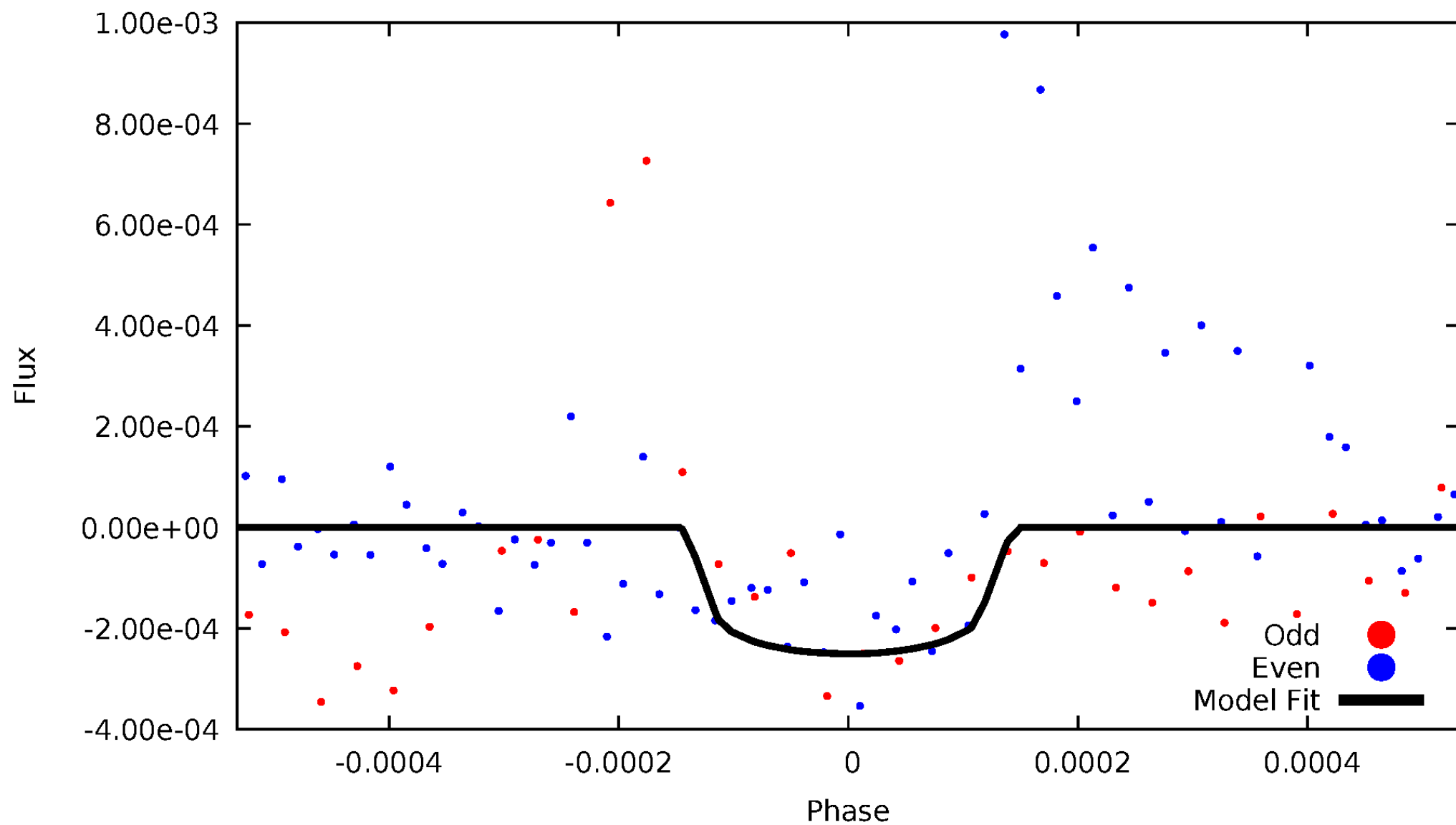


# TCE 006544160-01



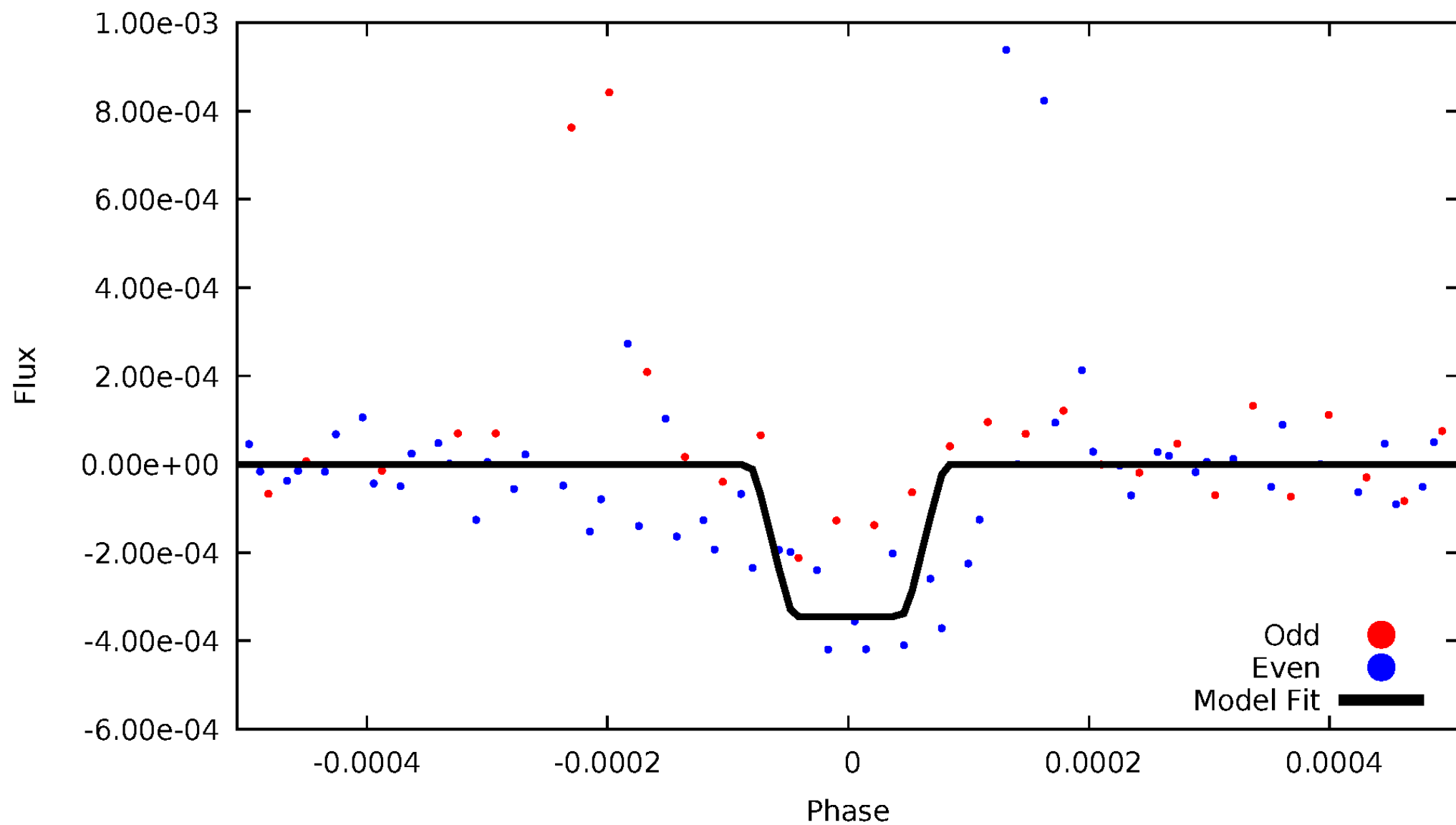
# DV Odd/Even

TCE 006544160-01



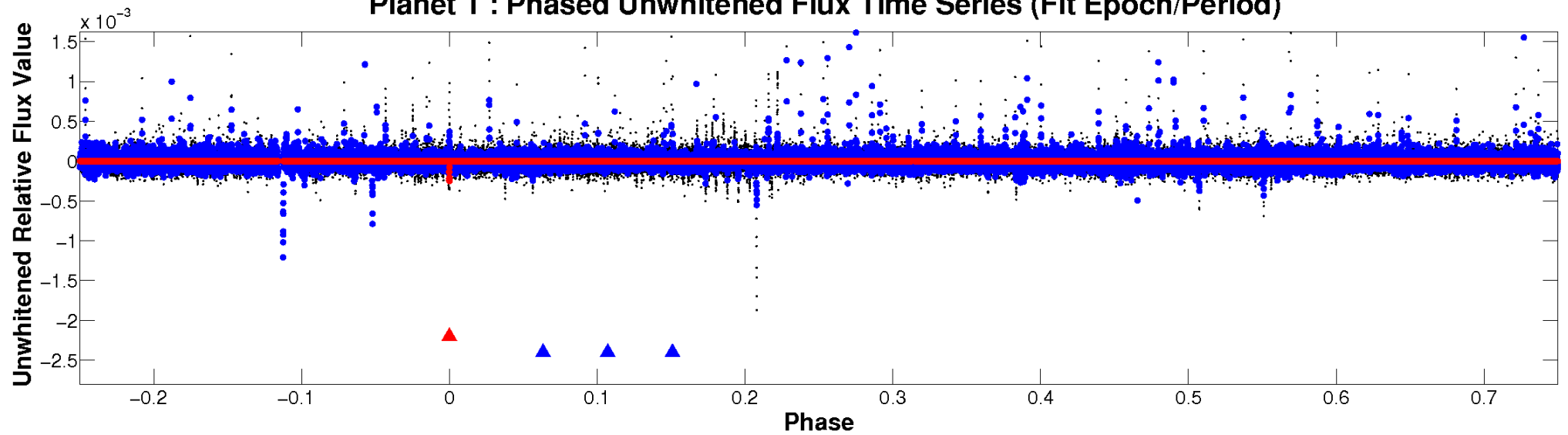
# ALT Odd/Even

TCE 006544160-01

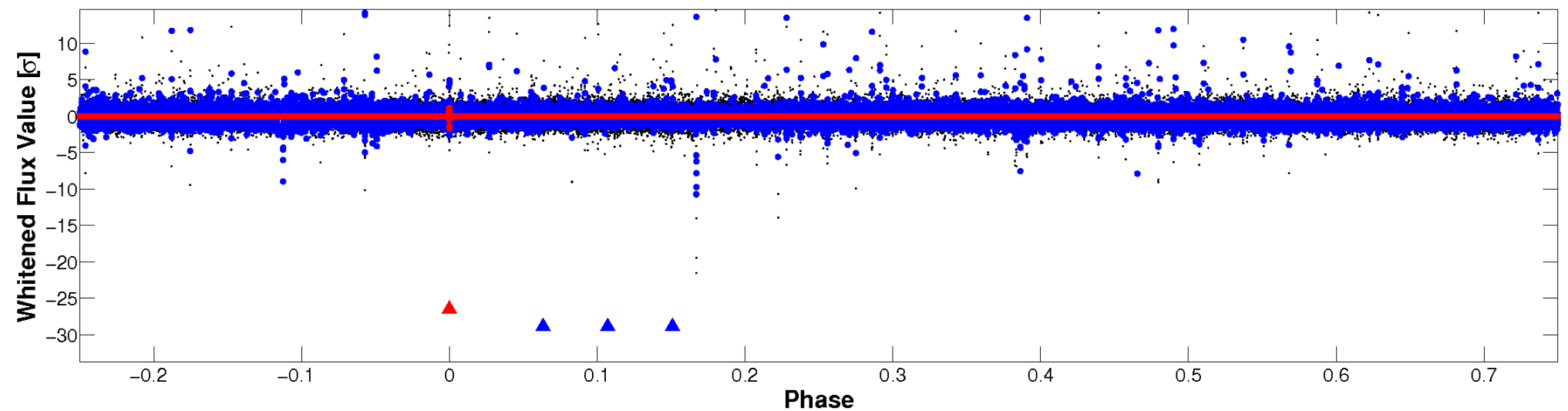


# Non-Whitened Vs. Whitened Light Curve

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



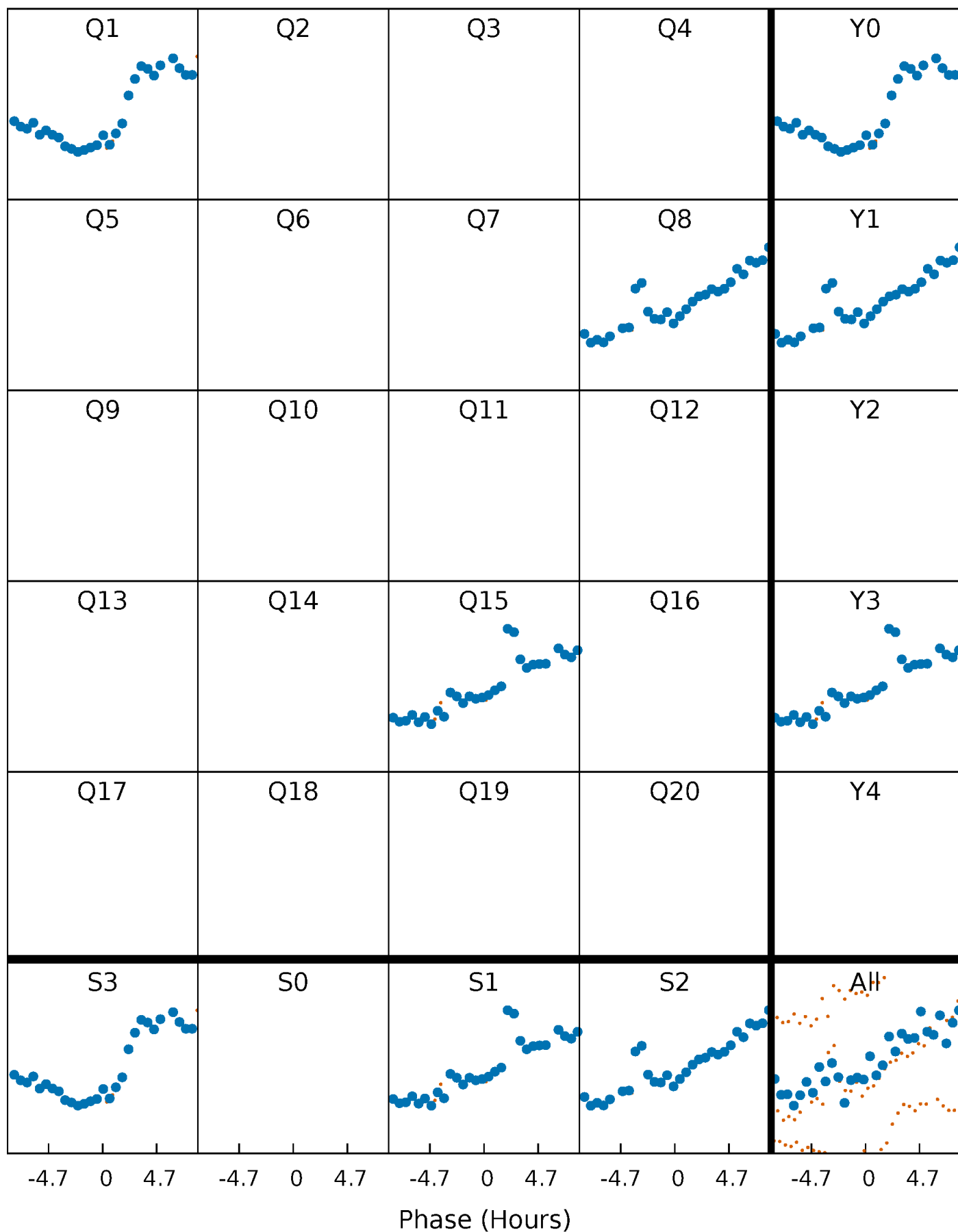
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

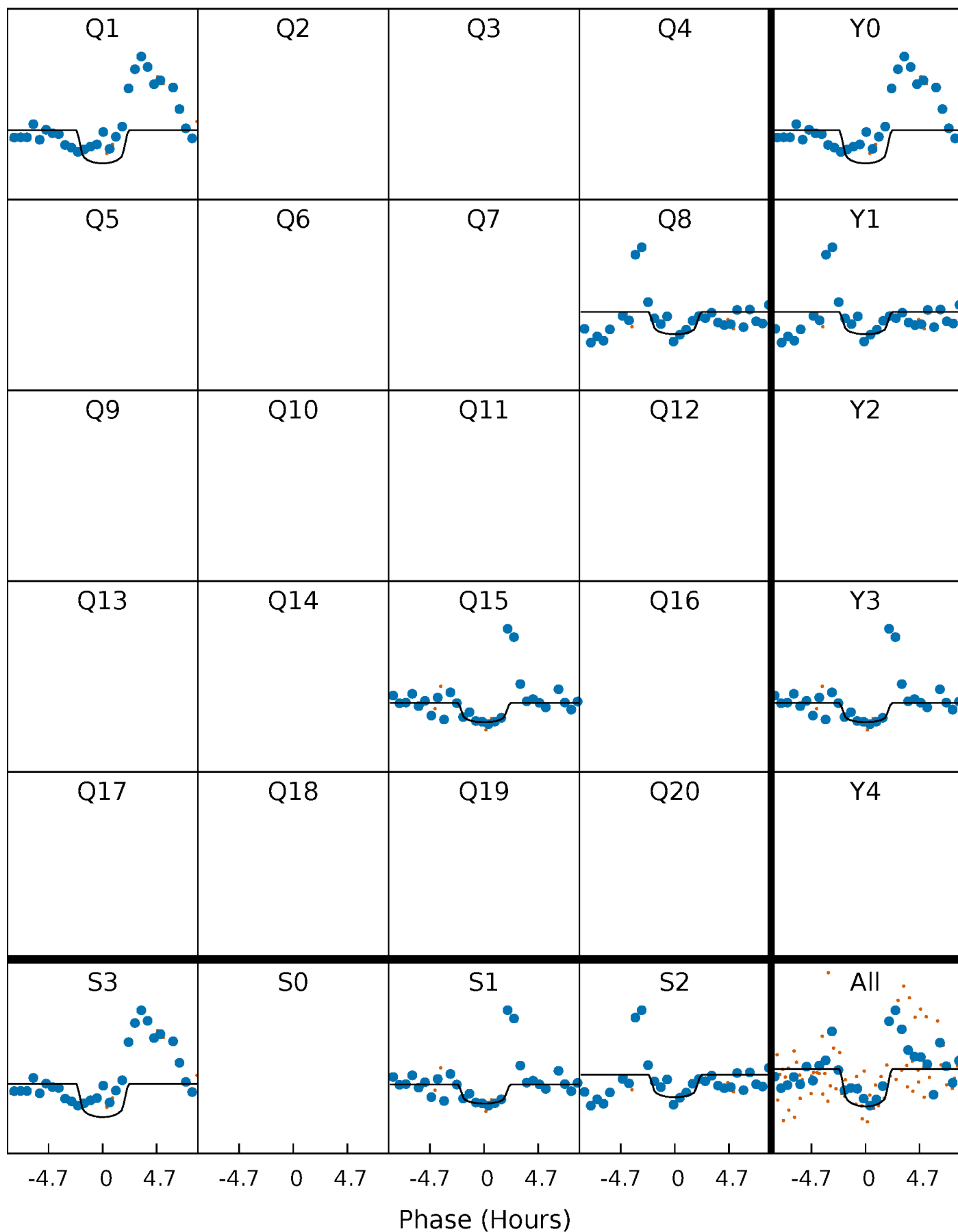
TCE 006544160-01 P=649.444809 Days  $T_0=147.659973$  (BKJD)





# DV Quarter-Phased Transit Curves

TCE 006544160-01 P=649.444809 Days  $T_0=147.659973$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

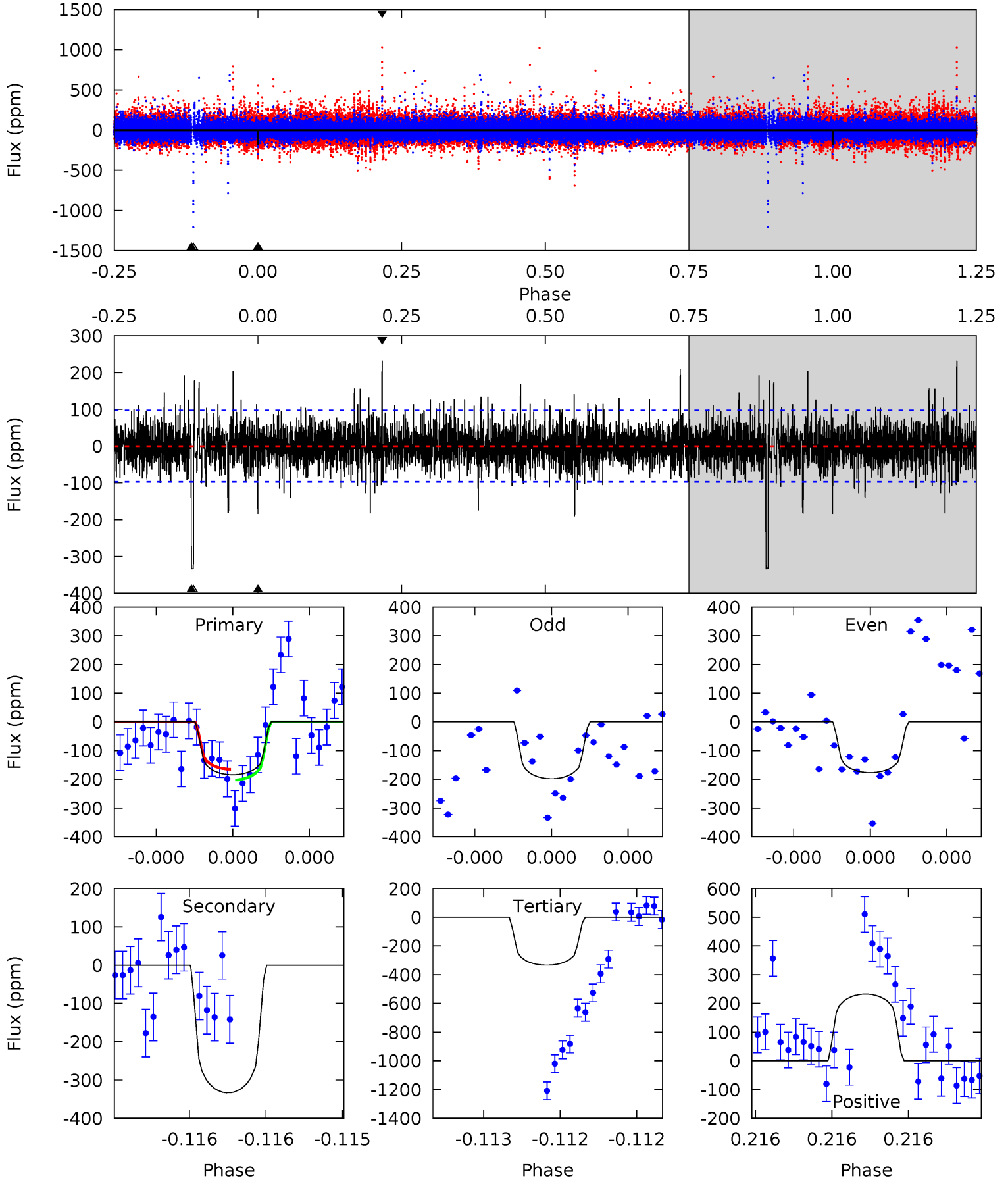
TCE 006544160-01 P=649.433026 Days  $T_0=147.686606$  (BKJD)



# DV Model-Shift Uniqueness Test

006544160-01, P = 649.444809 Days, E = 147.659973 Days

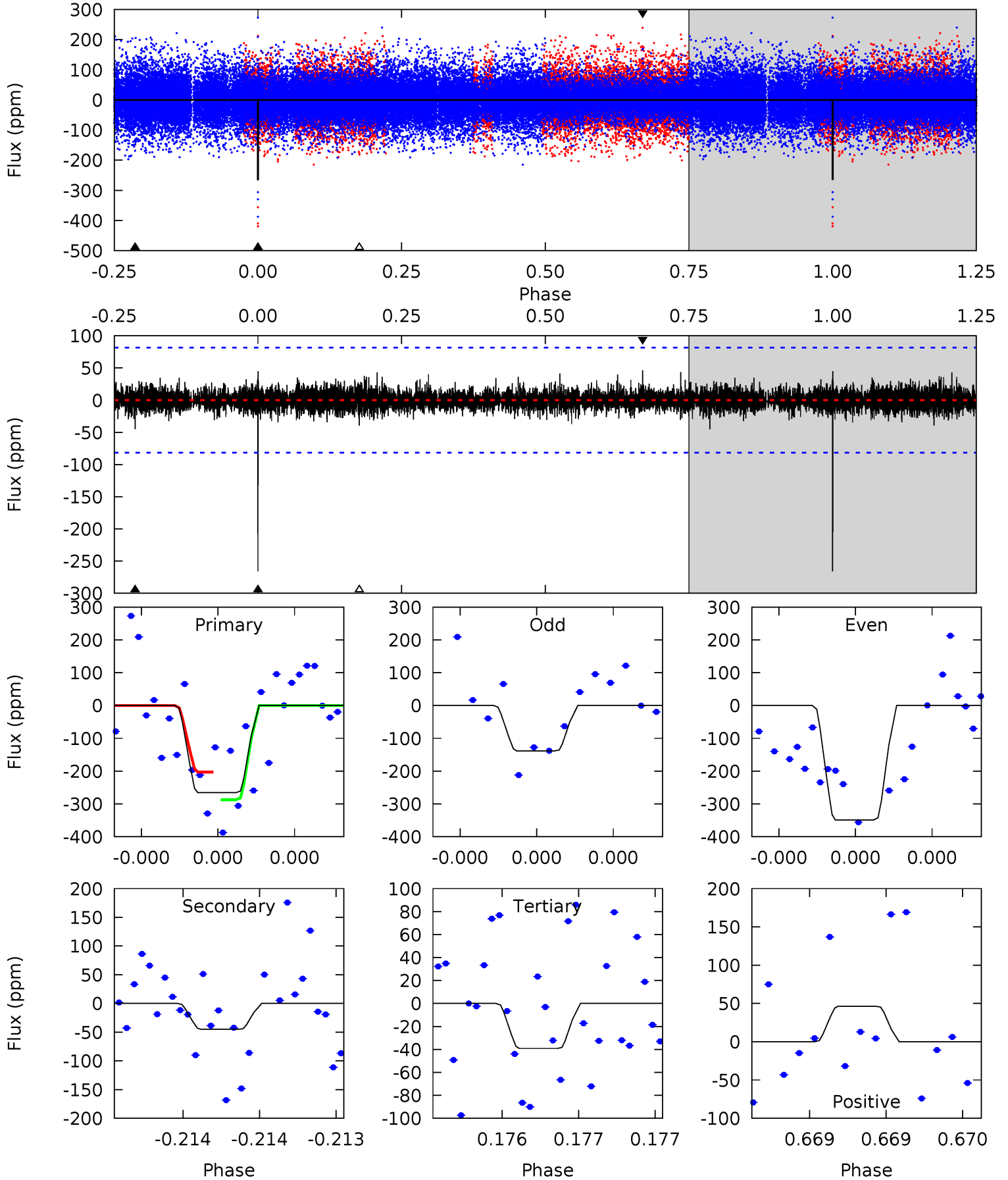
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 10.7 | 19.5 | 19.4 | 13.6 | 5.66            | 3.62            | 2.16             | -8.69   | -2.83   | 0.03    | 5.89    | 0.56    | 0.88 | 0.41  | 1.09 |



# Alt Model-Shift Uniqueness Test

006544160-01, P = 649.433026 Days, E = 147.686606 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  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 18.8 | 3.18 | 2.77 | 3.27 | 5.77            | 3.78            | 0.58             | 16.0    | 15.5    | 0.41    | -0.09   | 6.70    | 0.94 | 0.15  | 2.83 |



### Stellar Parameters For KIC 006544160

|        | $T_{\text{eff}} (K)$ | $\log(g)$                 | $[\text{Fe}/\text{H}]$     | $R (R_{\odot})$           | $M (M_{\odot})$           | $\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|--|
|        | $5962^{+163}_{-134}$ | $4.122^{+0.294}_{-0.126}$ | $-0.580^{+0.350}_{-0.200}$ | $1.321^{+0.265}_{-0.364}$ | $0.844^{+0.117}_{-0.058}$ | $0.515^{+0.893}_{-0.218}$                    |
|        | +3%/-2%              | +7%/-3%                   | +60%/-34%                  | +20%/-28%                 | +14%/-7%                  | +173%/-42%                                   |
| Source | PHO1                 | FLK73                     | 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 006544160-01 / KOI

| Detrend | Depth (ppm)   | $R_p (R_{\oplus})$     | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$   | $A_{\text{obs}}$           |
|---------|---------------|------------------------|----------------------|------------------------|----------------------------|
| DV      | $-333 \pm 17$ | $2.36^{+1.56}_{-1.36}$ | $355^{+23}_{-29}$    | $6239^{+4213}_{-1304}$ | $64899^{+303213}_{-41768}$ |
| Alt.    | $-45 \pm 14$  | $2.67^{+1.76}_{-1.45}$ | $356^{+24}_{-30}$    | $3870^{+1297}_{-599}$  | $6531^{+23668}_{-4251}$    |

$T_{\text{max}}$  = 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

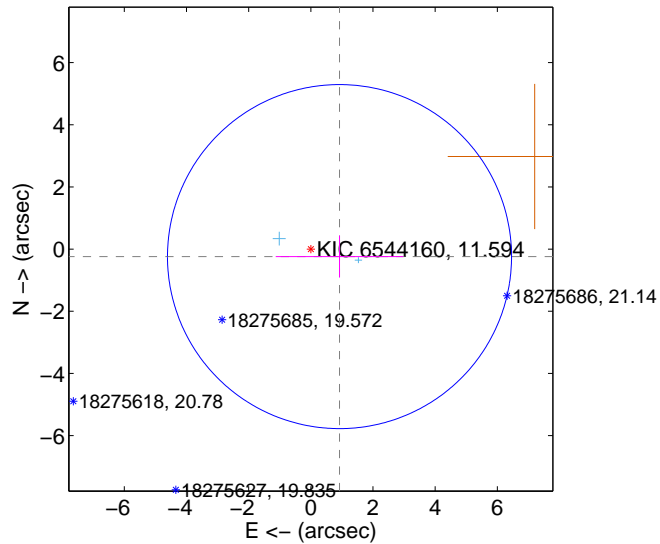
Supplemental centroid analysis for 006544160-01. **Kepler magnitude: 11.59.** Transit SNR 8.13

**There are 2 quarters with good PRF difference image offsets**

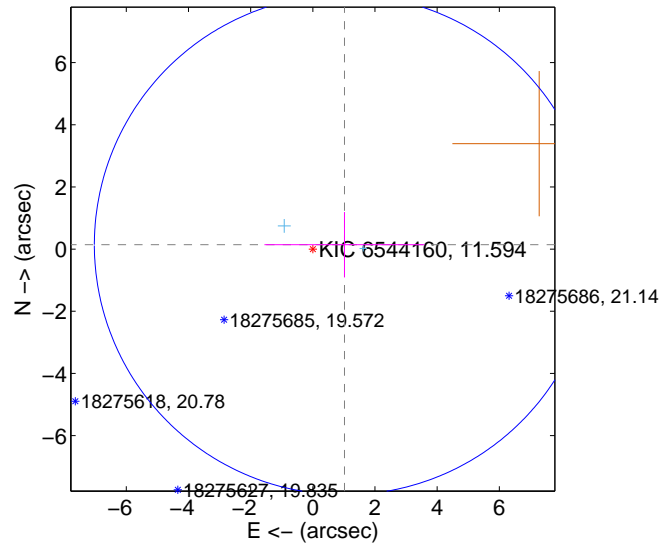
The direct PRF centroid is offset from the target star catalog position by about 0.42 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec       |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT          | $0.954 \pm 1.844$  | 0.52                | $-0.923 \pm 2.052$ | $-0.241 \pm 0.673$ |
| PRF-fit source offset from KIC position | $1.027 \pm 2.681$  | 0.38                | $-1.017 \pm 2.572$ | $0.140 \pm 1.053$  |
| photometric centroid source offset      | $0.38 \pm 0.84$    | 0.46                | $0.19 \pm 0.87$    | $0.33 \pm 0.83$    |

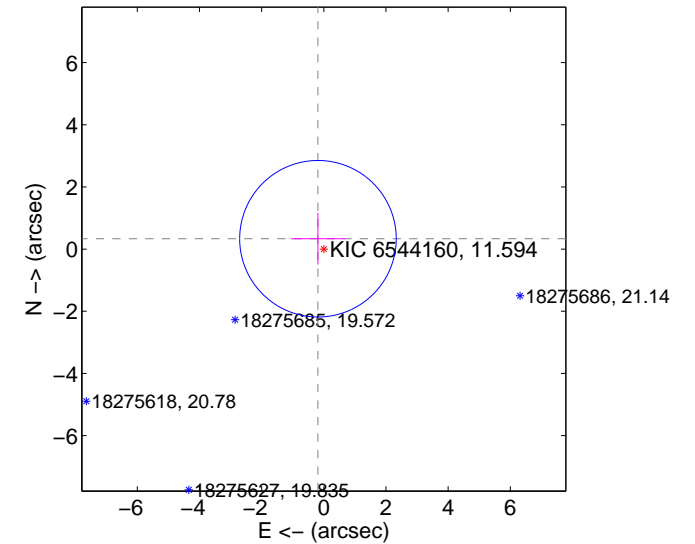
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

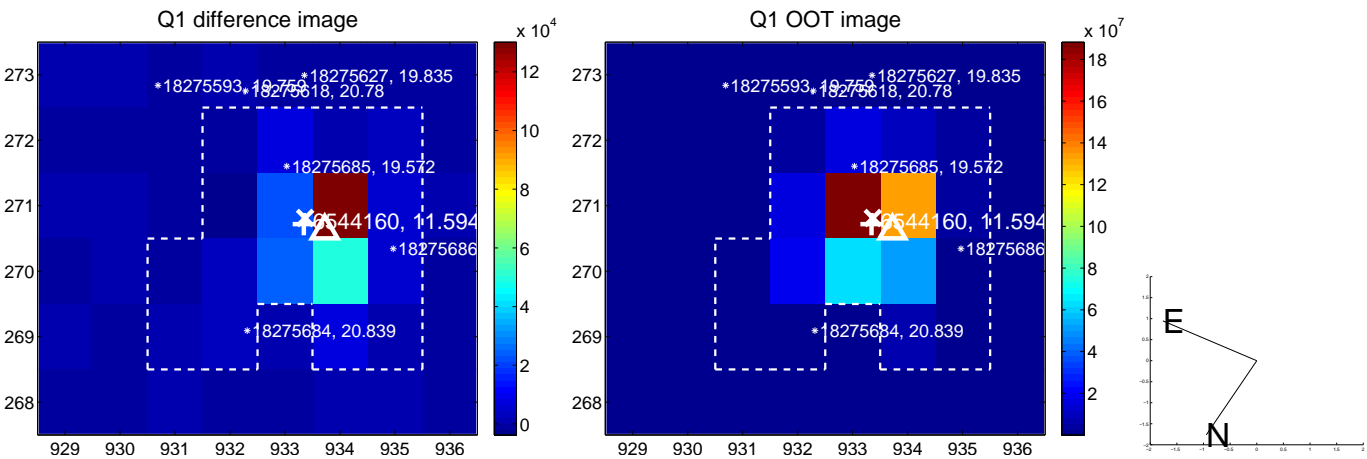


offset from photometric centroids



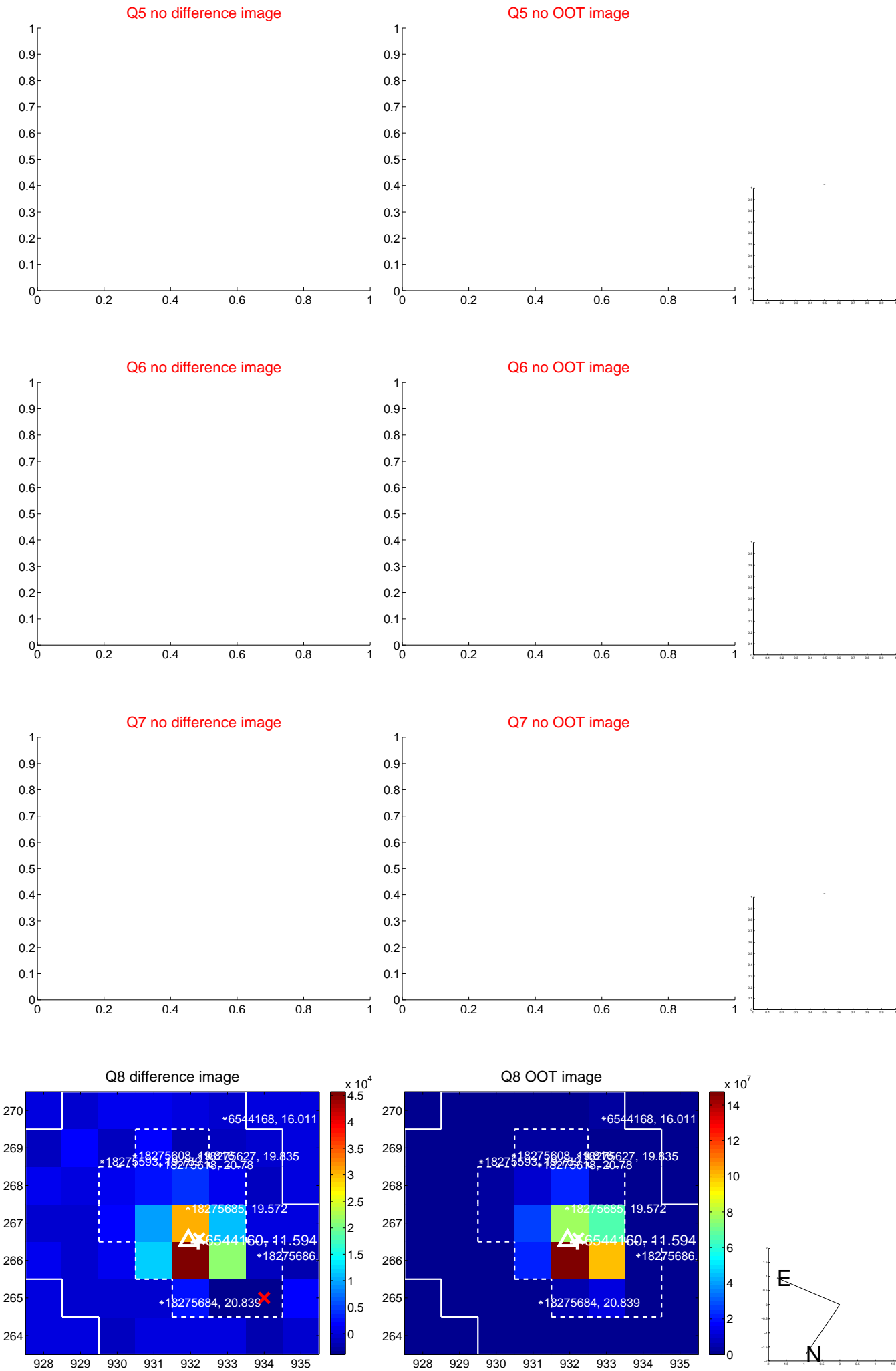
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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





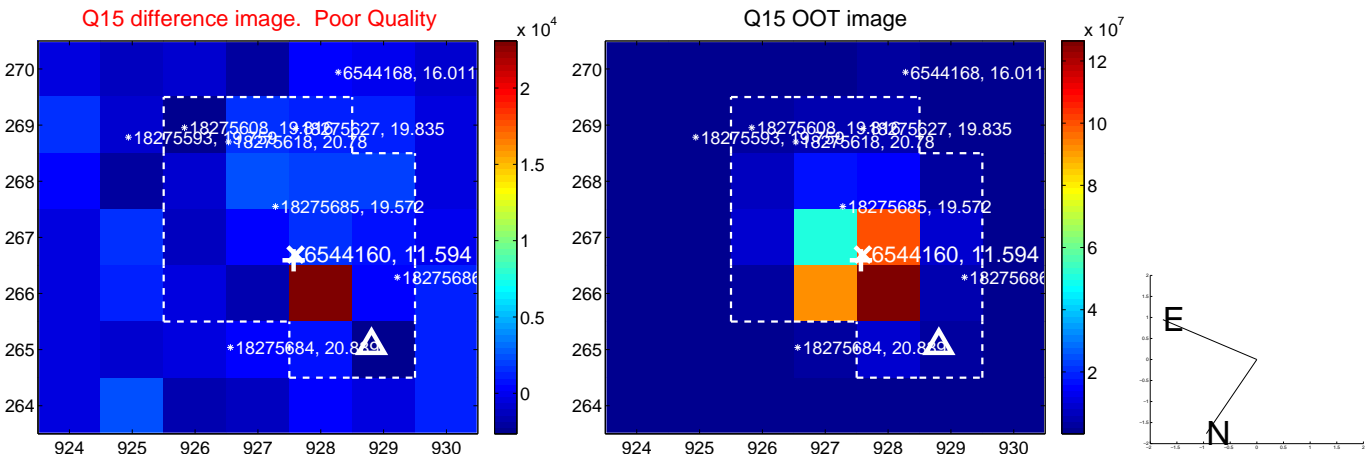
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



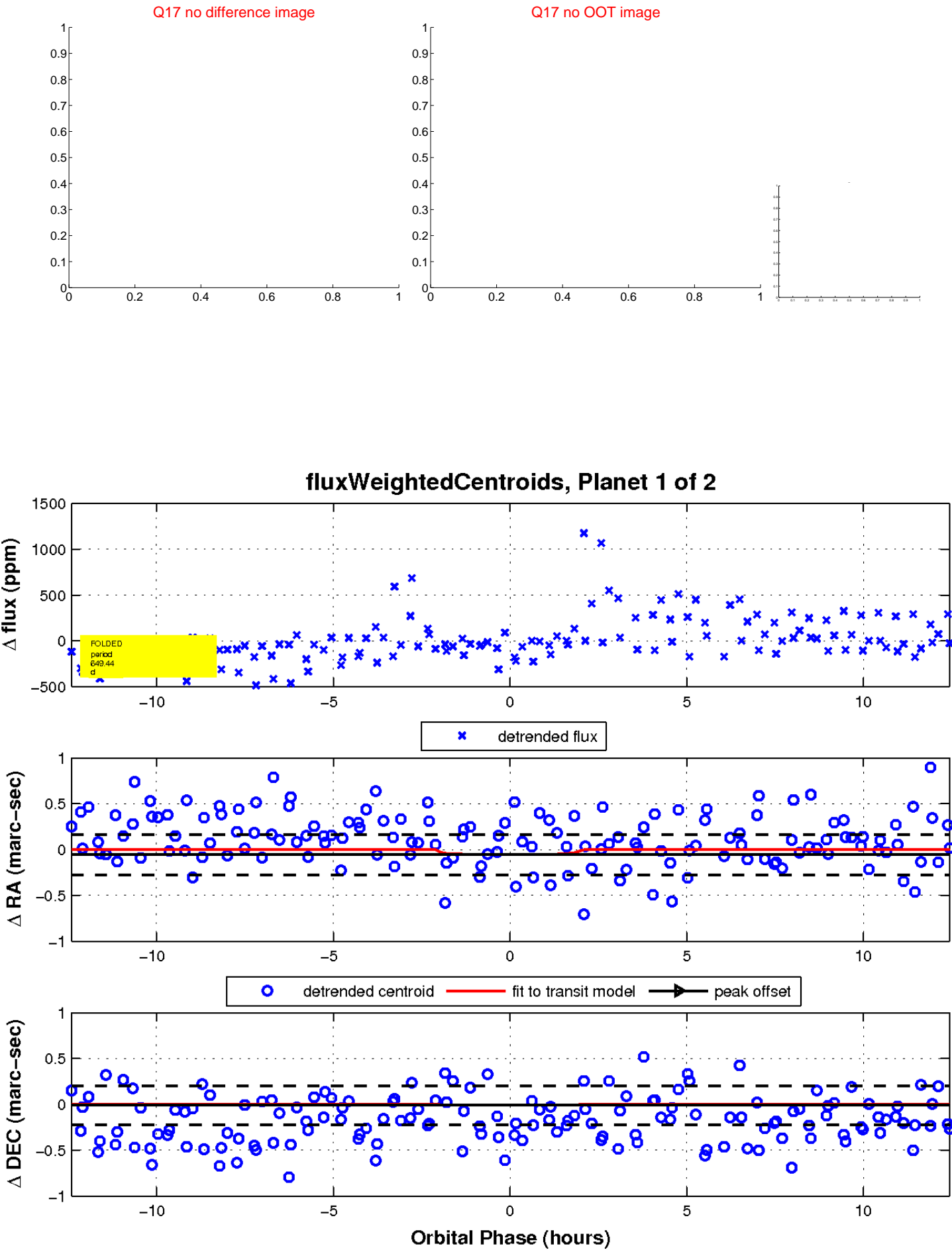
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

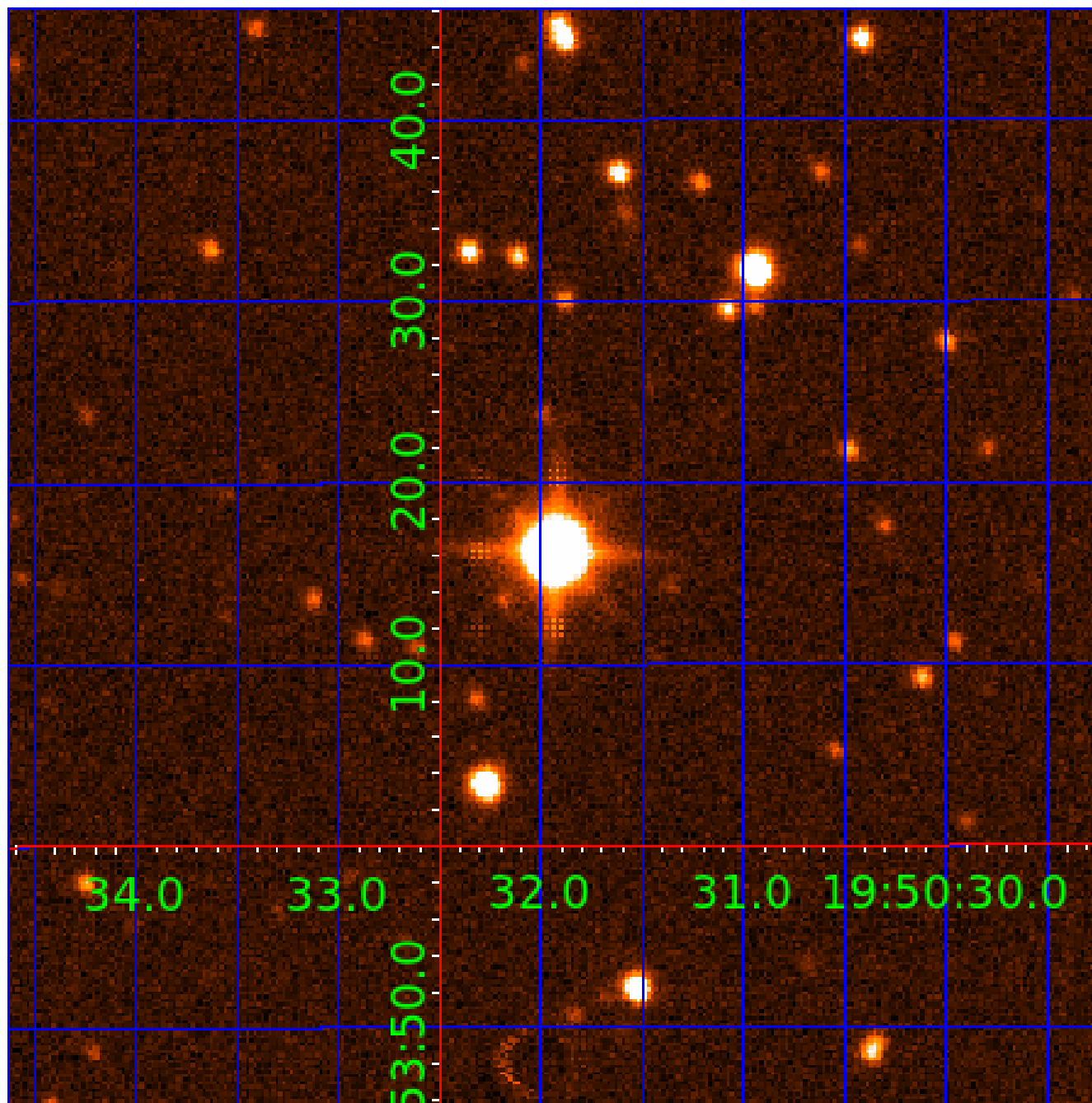


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 006544160

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|-----|-----------------------------|-----------------|------------------------|------------------------|
| 006544160-01 | OBS      | No   | 649.444809    | 147.659973   | 250.5       | 4.147            | 12.0 | 8.1 | 1.32                        | 5962            | 2.24                   | 1.03                   |
| 006544160-02 | OBS      | No   | 677.875820    | 188.831327   | 248.5       | 3.194            | 9.4  | 7.4 | 1.32                        | 5962            | 2.37                   | 0.97                   |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|--|
| 006544160-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_KIC_POS |
| 006544160-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_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.

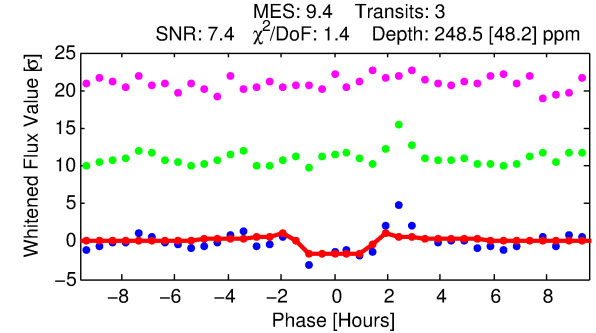
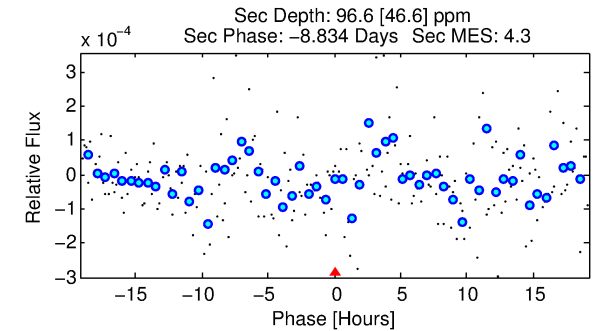
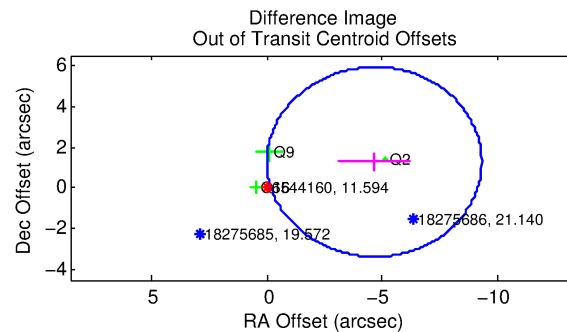
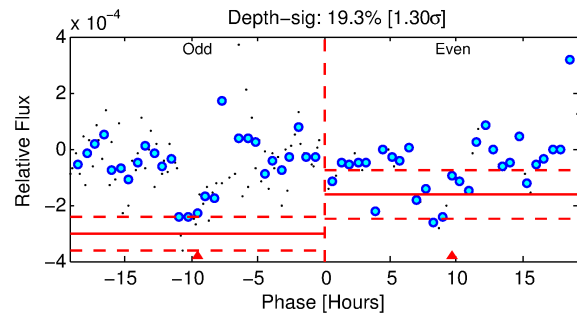
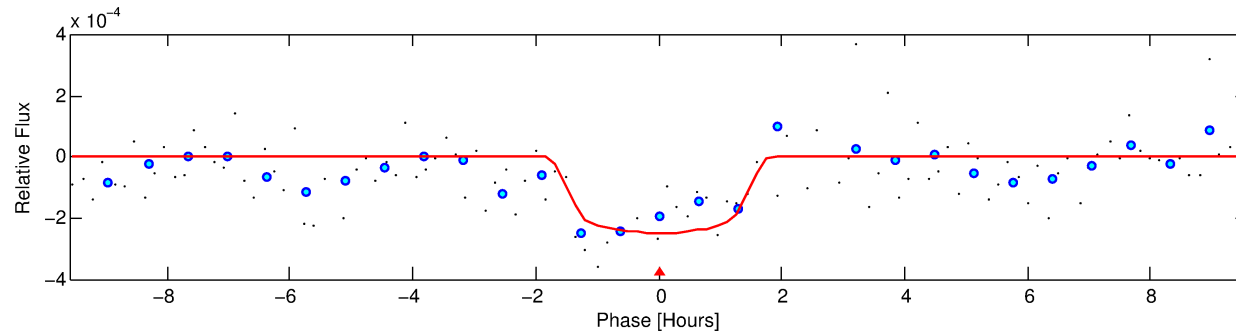
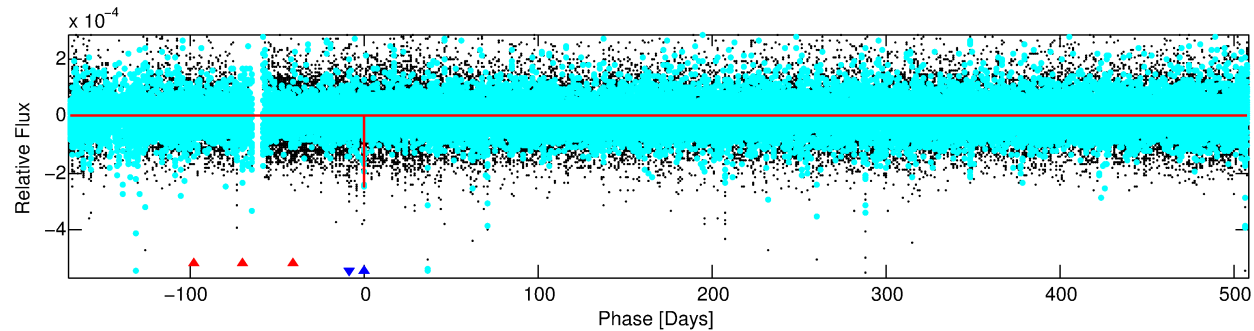
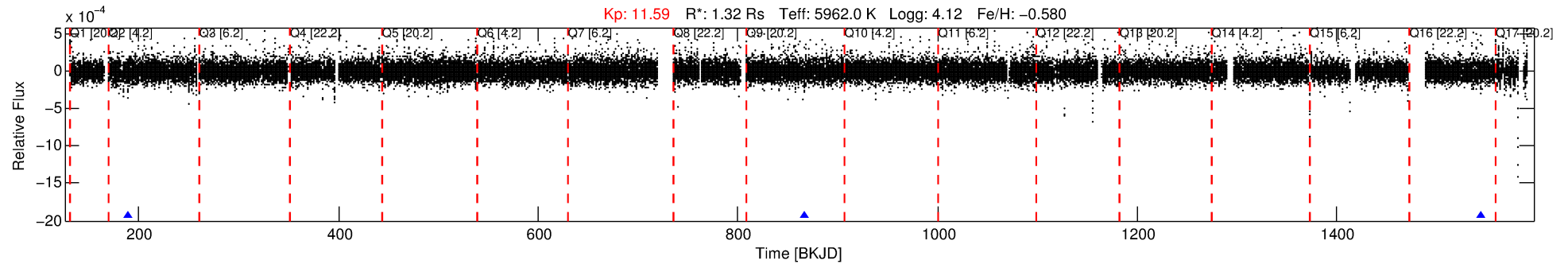
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 006544160-02

No Significant Match Found

# DV One-Page Summary

KIC: 6544160 Candidate: 2 of 2 Period: 677.876 d



## DV Fit Results:

Period = 677.87582 [0.00589] d  
Epoch = 188.8313 [0.0065] BKJD  
Rp/R\* = 0.0164 [0.0131]  
a/R\* = 895.08 [3659.44]  
b = 0.85 [1.32]  
Seff = 0.97 [0.48]  
Teq = 253 [32] K  
Rp = 2.37 [1.99] Re  
a = 1.4269 [0.4152] AU  
Ag = 19315.02 [33457.43] [0.58 $\sigma$ ]  
Teffp = 4613 [1921] K [2.27 $\sigma$ ]

## DV Diagnostic Results:

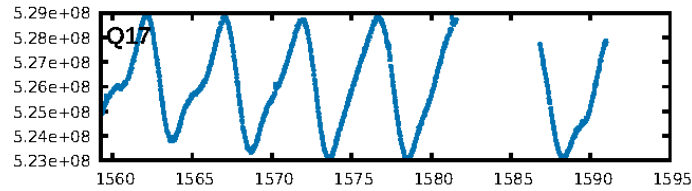
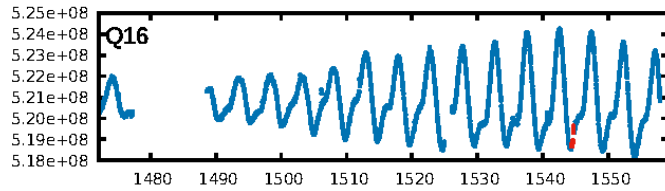
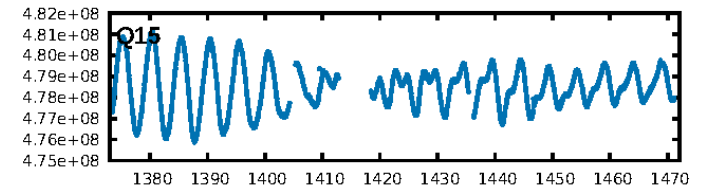
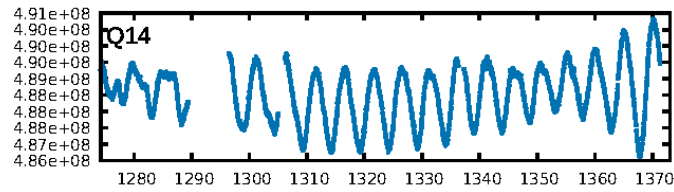
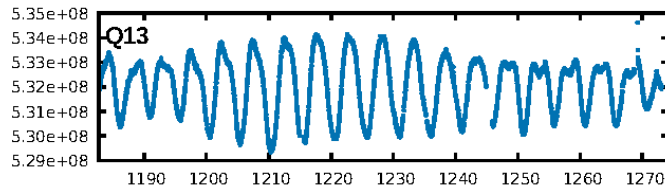
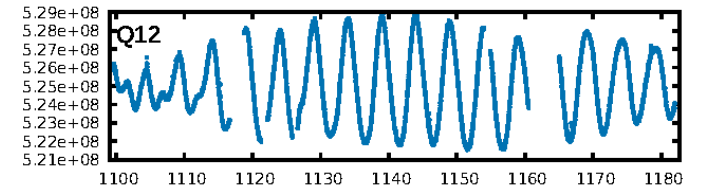
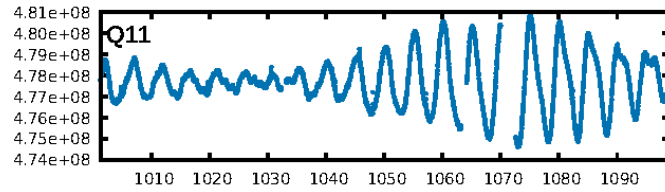
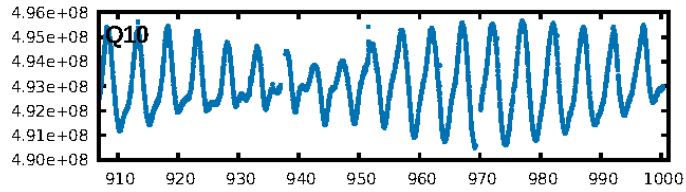
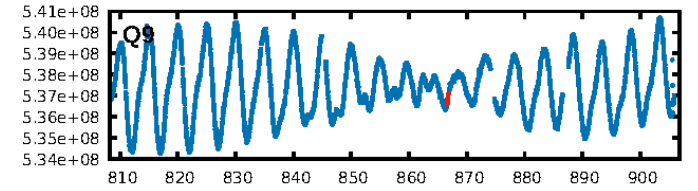
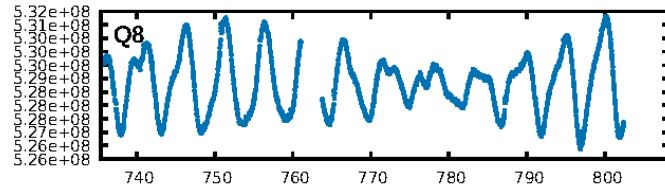
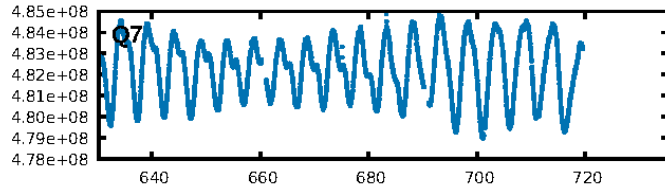
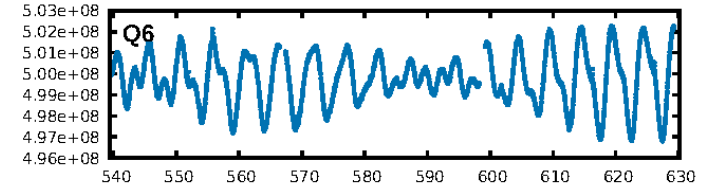
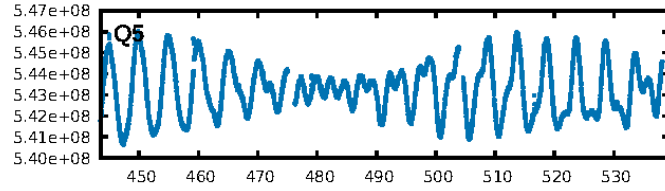
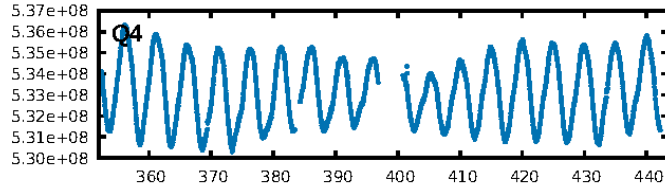
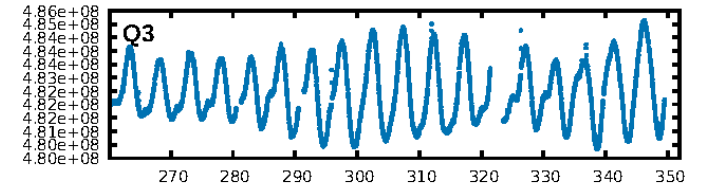
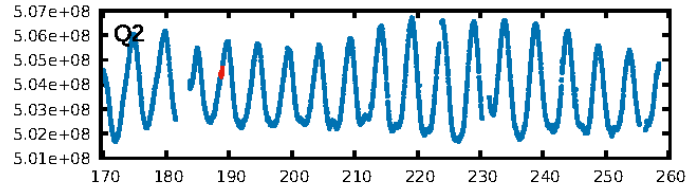
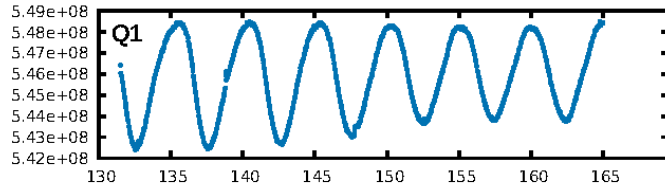
ShortPeriod-sig: 100.0% [130.36 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 24.0%  
ModelChiSquareGof-sig: 82.3%  
**Bootstrap-pfa: 2.77e-07**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -1.258  
**Centroid-sig: 0.3%**  
Centroid-so: 2.659 arcsec [2.46 $\sigma$ ]  
**OotOffset-rm: 4.824 arcsec [3.12 $\sigma$ ]**  
**KicOffset-rm: 5.051 arcsec [3.57 $\sigma$ ]**  
OotOffset-st: 1/0/1/1 [3]  
KicOffset-st: 1/0/1/1 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [3/3]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:01:37 Z

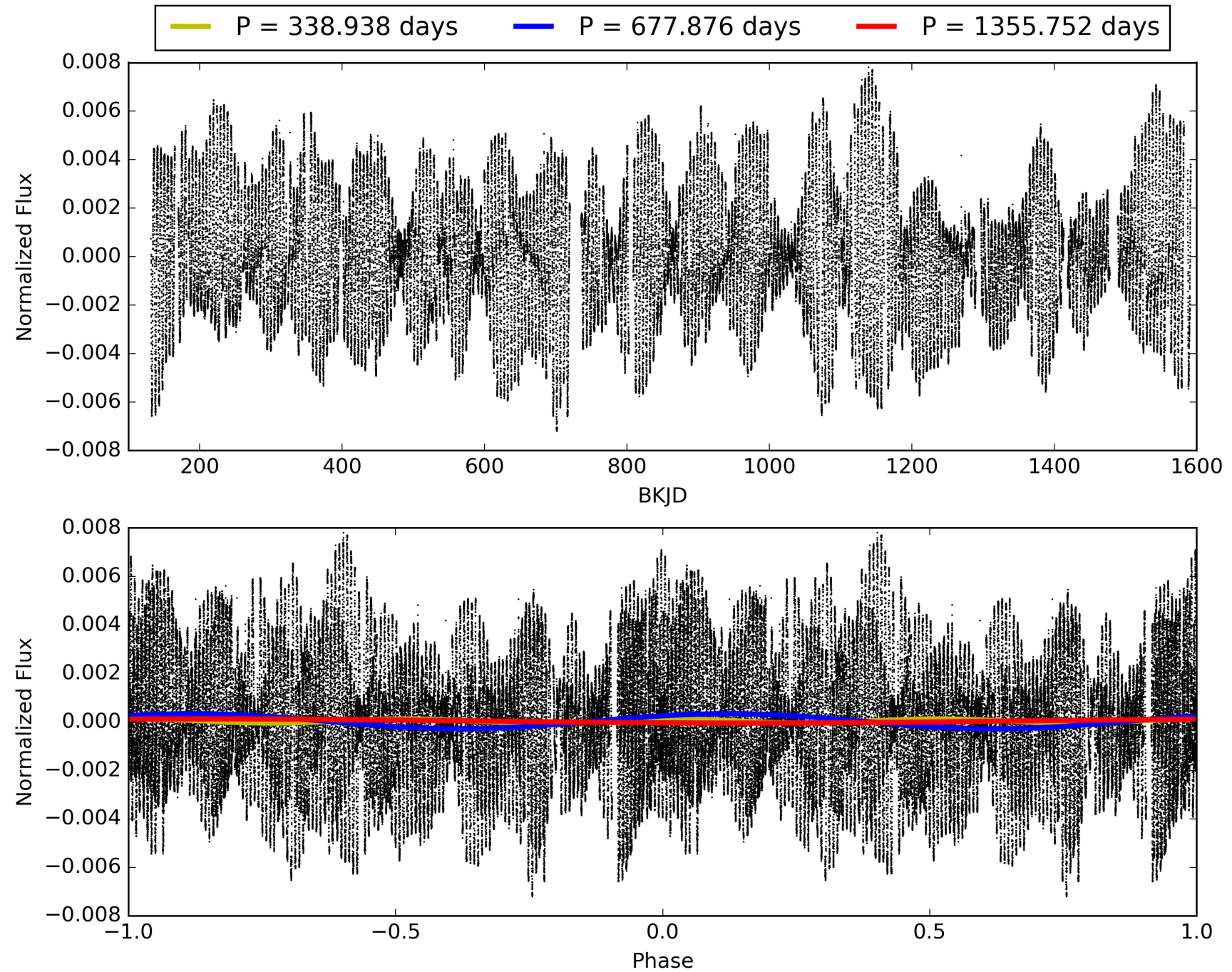
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 006544160-02, PDC Light Curves

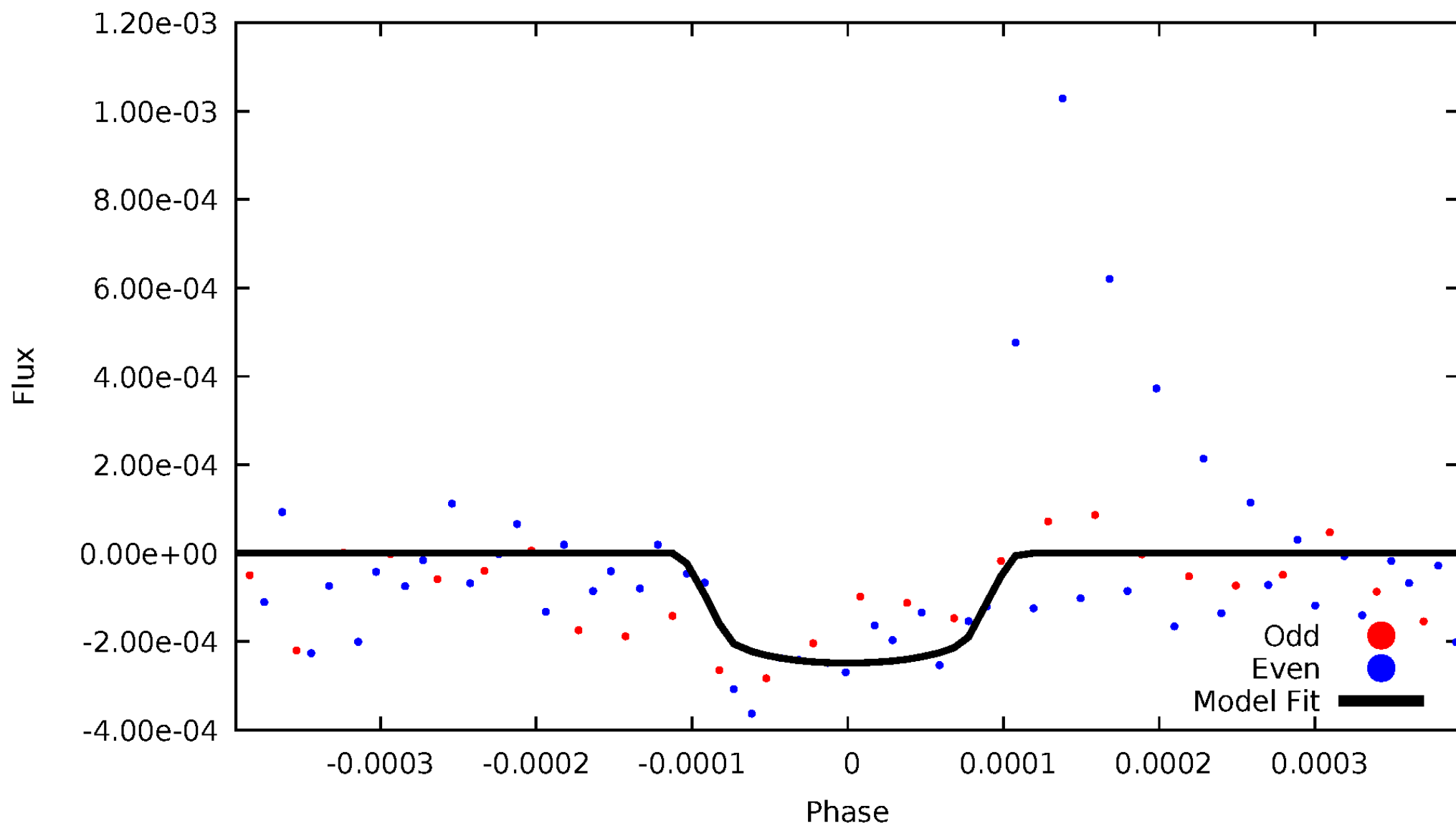


TCE 006544160-02



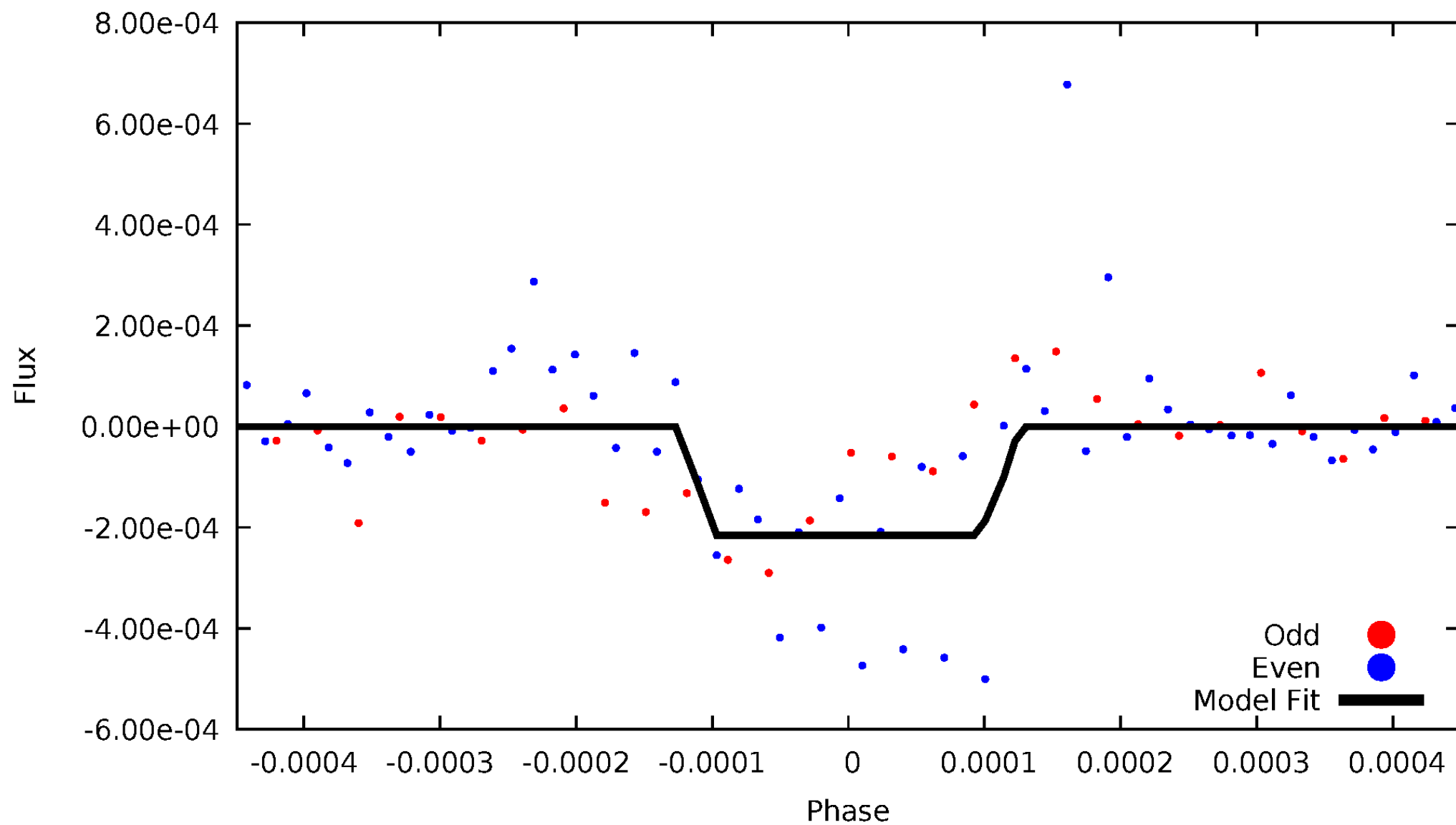
# DV Odd/Even

TCE 006544160-02



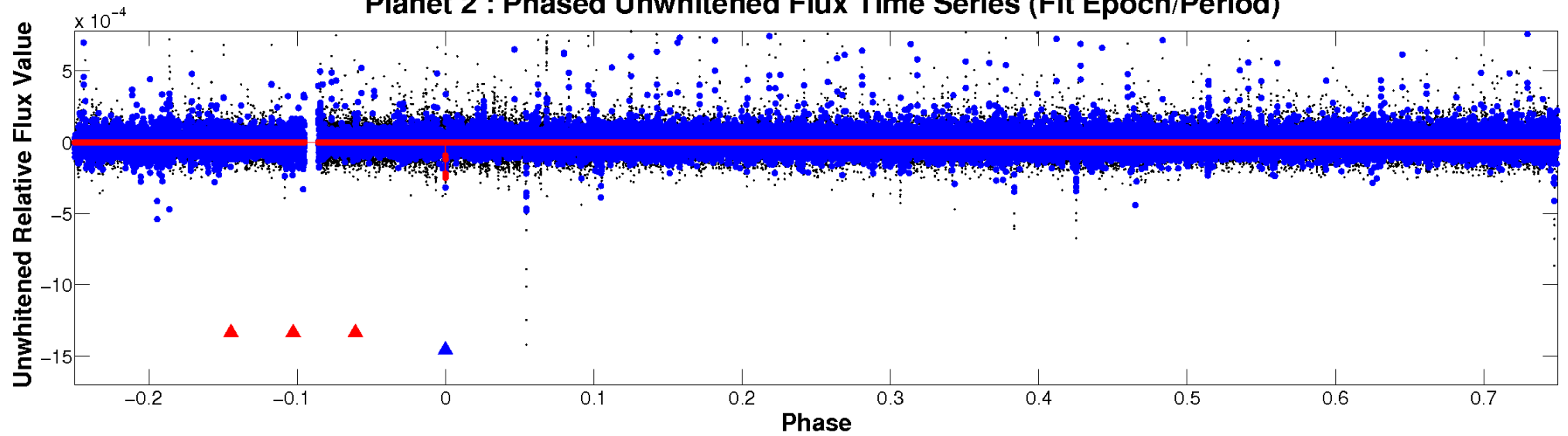
# ALT Odd/Even

TCE 006544160-02

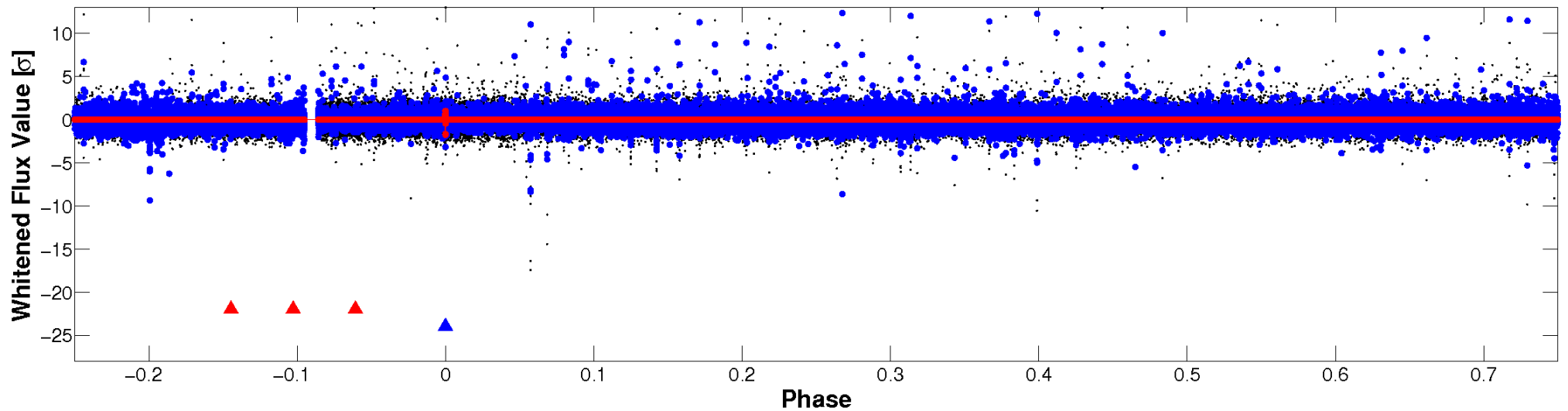


# Non-Whitened Vs. Whitened Light Curve

## Planet 2 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

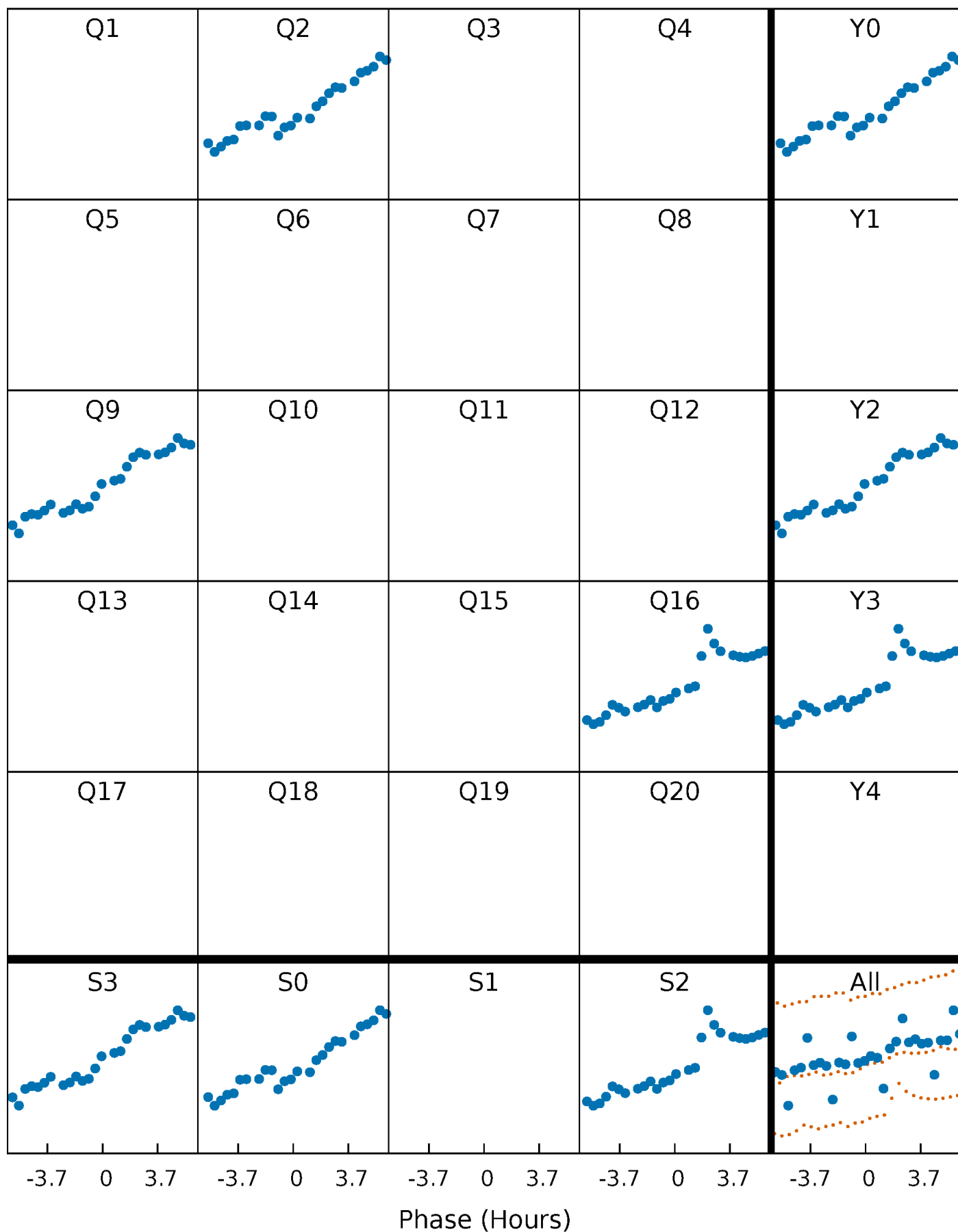


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



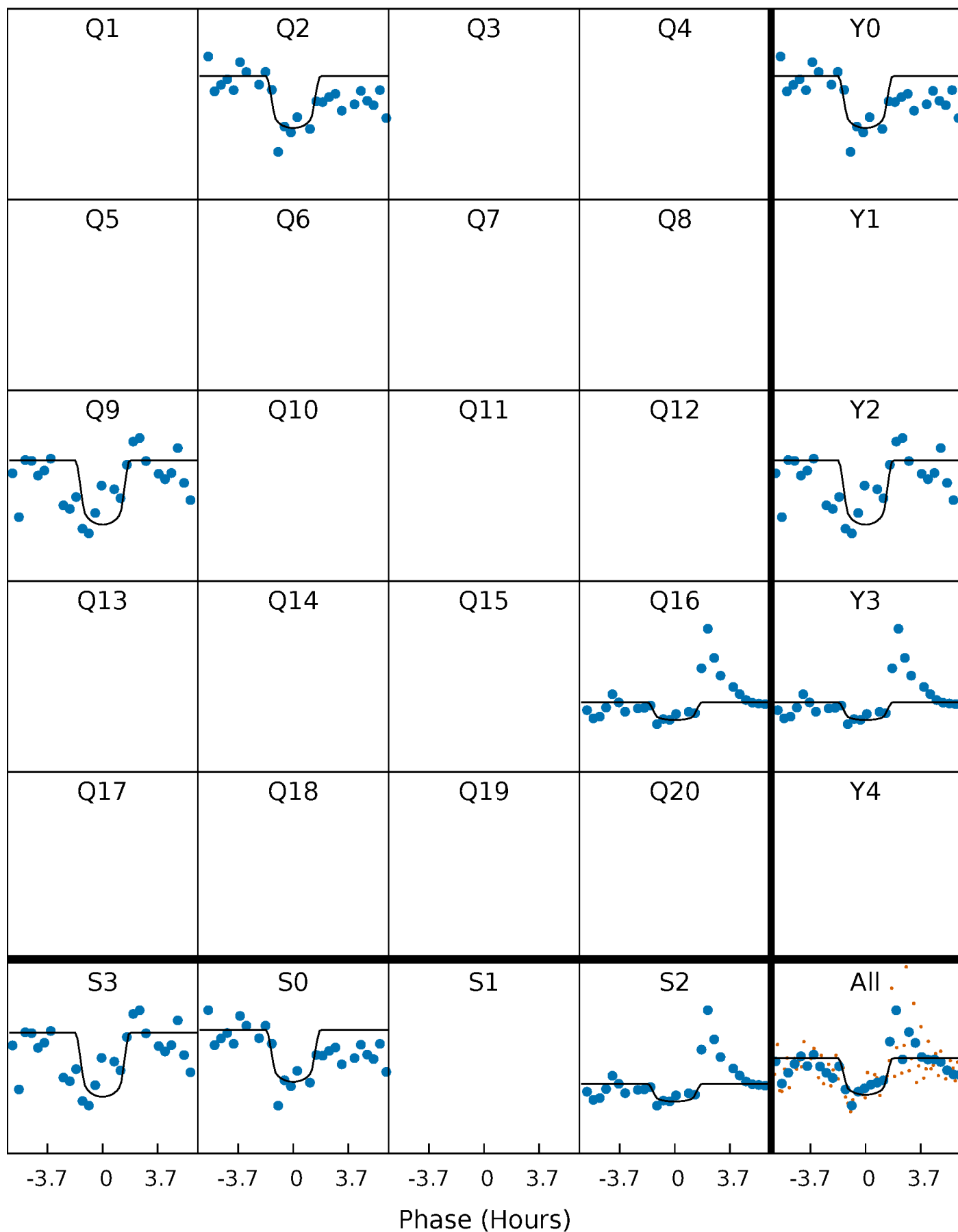
# PDC Quarter-Phased Transit Curves

TCE 006544160-02 P=677.875820 Days  $T_0=188.831327$  (BKJD)



# DV Quarter-Phased Transit Curves

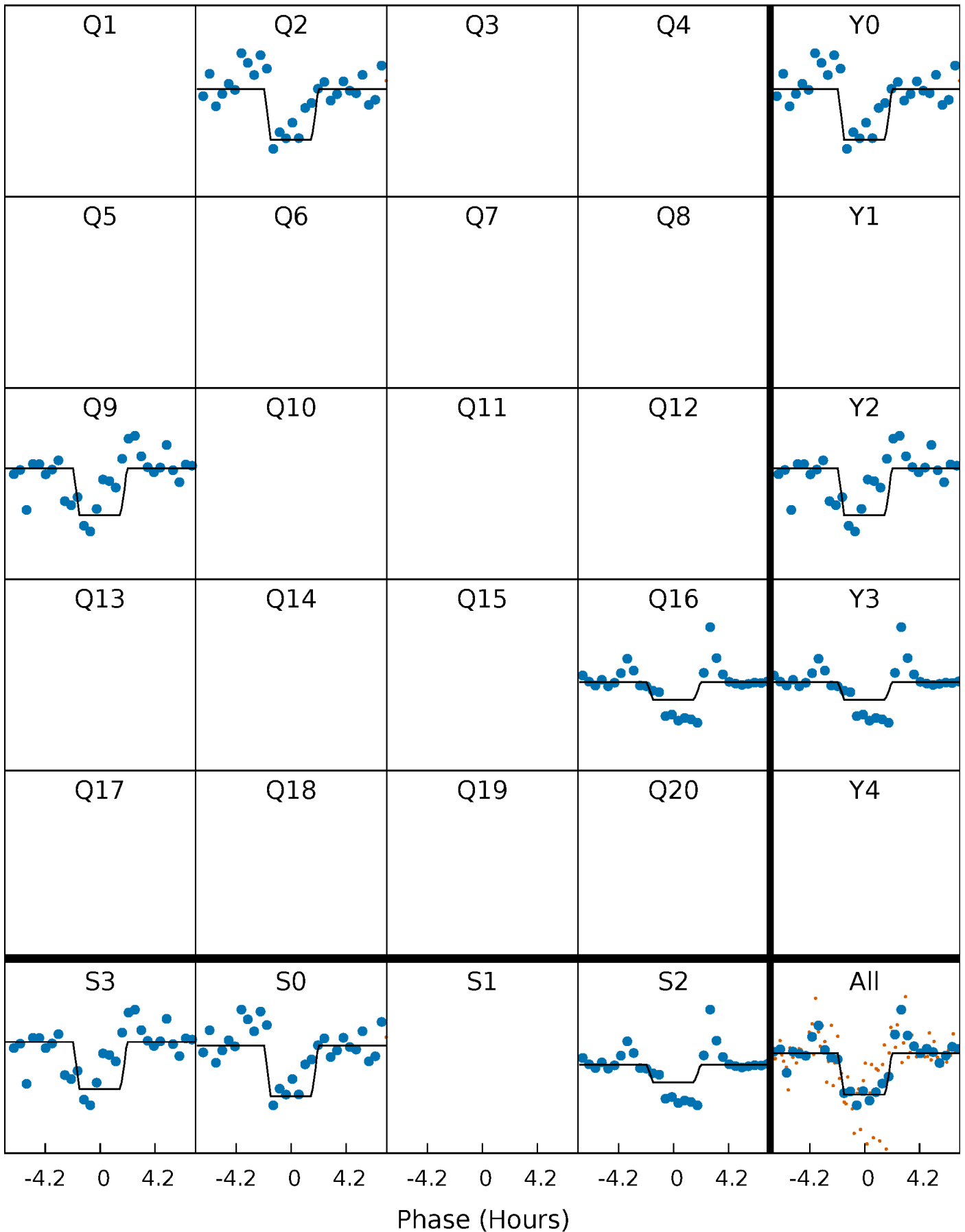
TCE 006544160-02 P=677.875820 Days  $T_0=188.831327$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

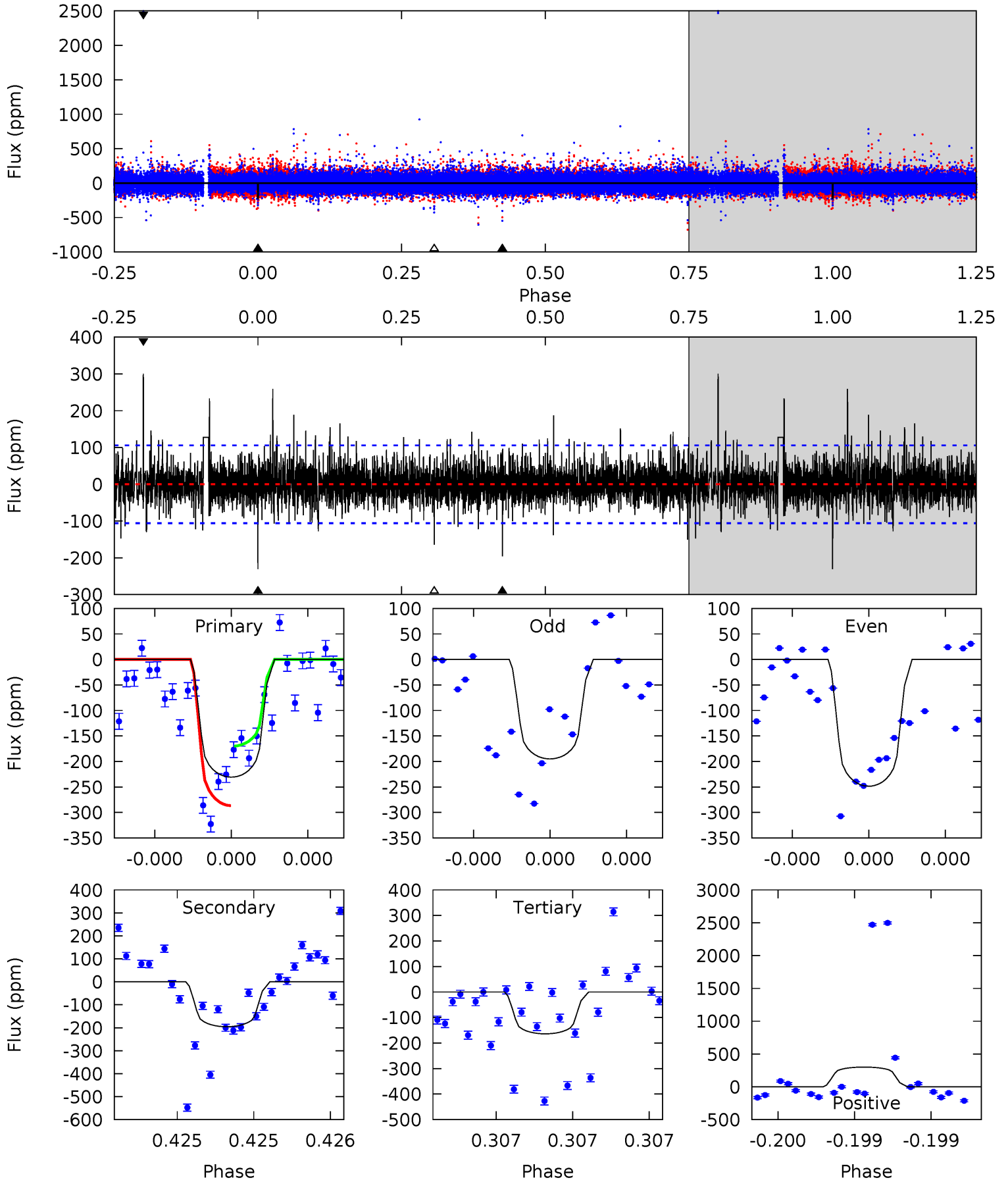
TCE 006544160-02 P=677.856108 Days  $T_0=188.855173$  (BKJD)



# DV Model-Shift Uniqueness Test

006544160-02, P = 677.875820 Days, E = 188.831327 Days

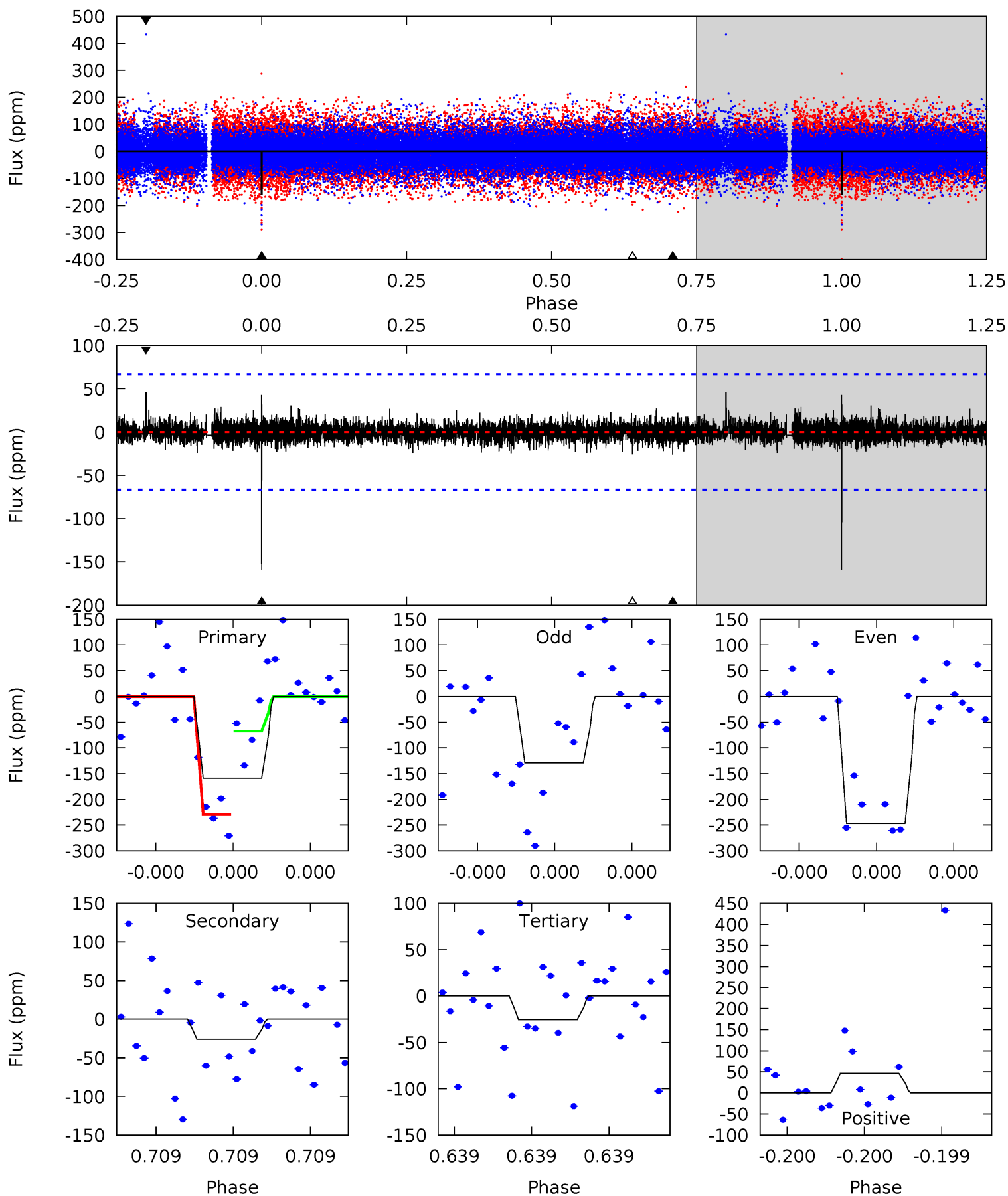
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 12.5 | 10.6 | 8.87 | 16.3 | 5.72            | 3.71            | 1.80             | 3.61    | -3.78   | 1.72    | -5.67   | 1.27    | 1.03 | 0.57  | 3.16 |



# Alt Model-Shift Uniqueness Test

006544160-02, P = 677.856108 Days, E = 188.855173 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 | 2.22 | 2.19 | 3.95 | 5.69            | 3.66            | 0.49             | 11.4    | 9.62    | 0.03    | -1.73   | 5.25    | 1.45 | 0.23  | 6.96 |



### Stellar Parameters For KIC 006544160

|        | $T_{\text{eff}} (K)$ | $\log(g)$                 | $[\text{Fe}/\text{H}]$     | $R (R_{\odot})$           | $M (M_{\odot})$           | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
|        | $5962^{+163}_{-134}$ | $4.122^{+0.294}_{-0.126}$ | $-0.580^{+0.350}_{-0.200}$ | $1.321^{+0.265}_{-0.364}$ | $0.844^{+0.117}_{-0.058}$ | $0.515^{+0.893}_{-0.218}$                 |
|        | +3%/-2%              | +7%/-3%                   | +60%/-34%                  | +20%/-28%                 | +14%/-7%                  | +173%/-42%                                |
| Source | PHO1                 | FLK73                     | 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 006544160-02 / KOI

| Detrend | Depth (ppm)   | $R_p (R_{\oplus})$     | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$   | $A_{\text{obs}}$           |
|---------|---------------|------------------------|----------------------|------------------------|----------------------------|
| DV      | $-196 \pm 18$ | $2.48^{+1.81}_{-1.42}$ | $351^{+22}_{-29}$    | $5299^{+3107}_{-1002}$ | $36319^{+169189}_{-23974}$ |
| Alt.    | $-26 \pm 12$  | $2.37^{+1.90}_{-1.41}$ | $349^{+23}_{-29}$    | $3626^{+1673}_{-618}$  | $4820^{+31255}_{-3464}$    |

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

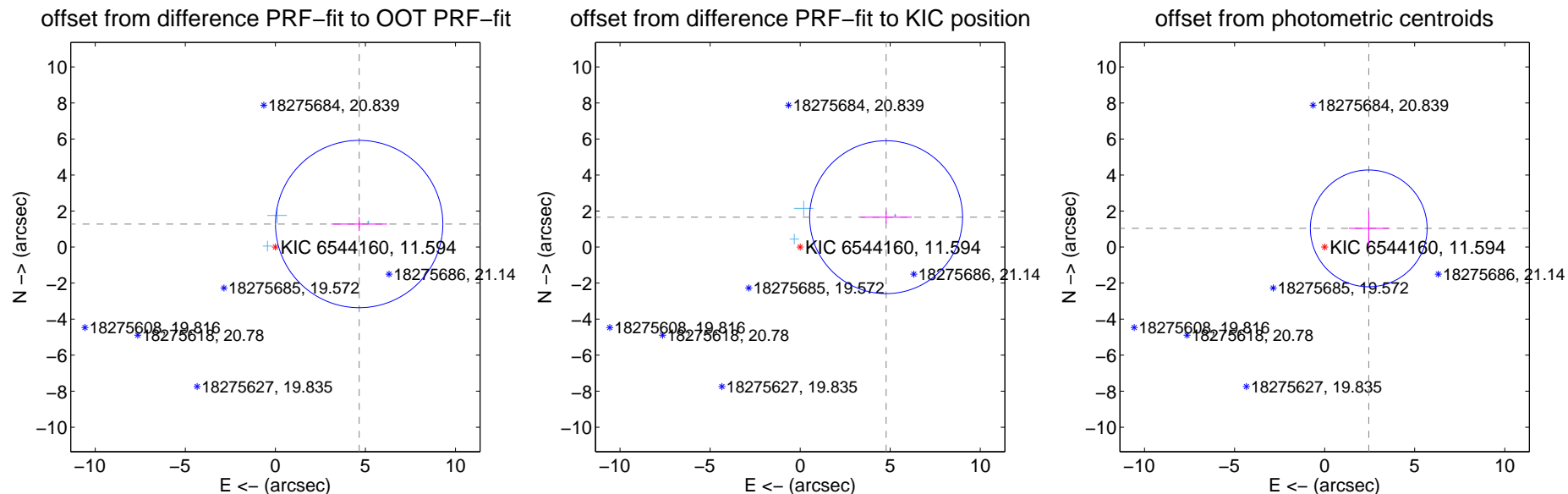
## DV Centroid Data

Supplemental centroid analysis for 006544160-02. **Kepler magnitude: 11.59.** Transit SNR 7.38

**There are 3 quarters with good PRF difference image offsets**

The direct PRF centroid is offset from the target star catalog position by about 0.41 arcsec

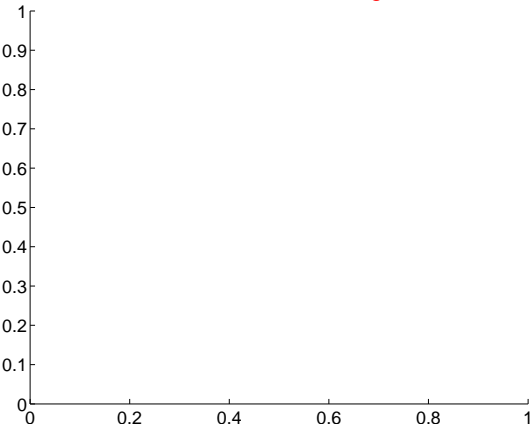
|   | Distance in arcsec                  | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec      |
|---|-------------------------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT          | <b><math>4.824 \pm 1.548</math></b> | <b>3.12</b>         | $-4.651 \pm 1.551$ | $1.279 \pm 0.391$ |
| PRF-fit source offset from KIC position | <b><math>5.051 \pm 1.414</math></b> | <b>3.57</b>         | $-4.771 \pm 1.420$ | $1.660 \pm 0.338$ |
| photometric centroid source offset      | $2.66 \pm 1.08$                     | 2.46                | $-2.45 \pm 1.10$   | $1.04 \pm 0.96$   |



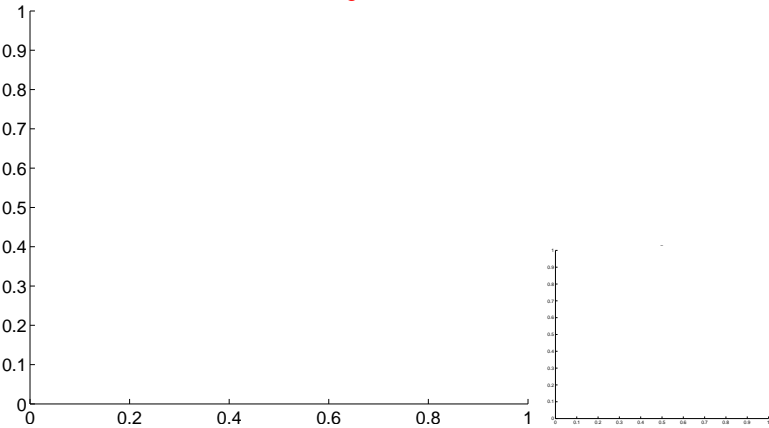
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

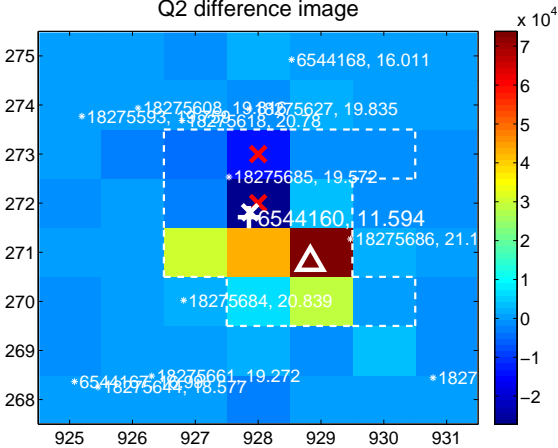
Q1 no difference image



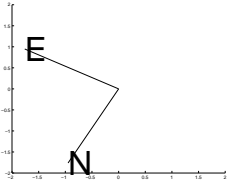
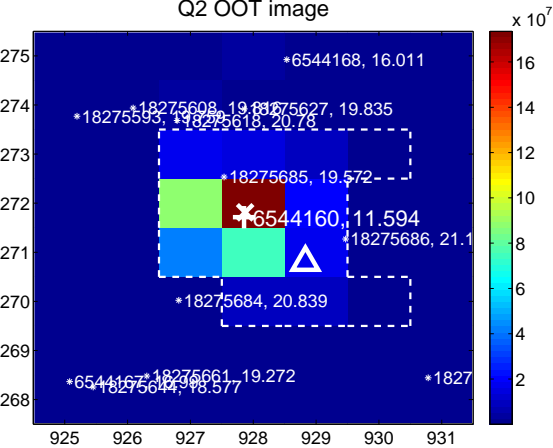
Q1 no OOT image



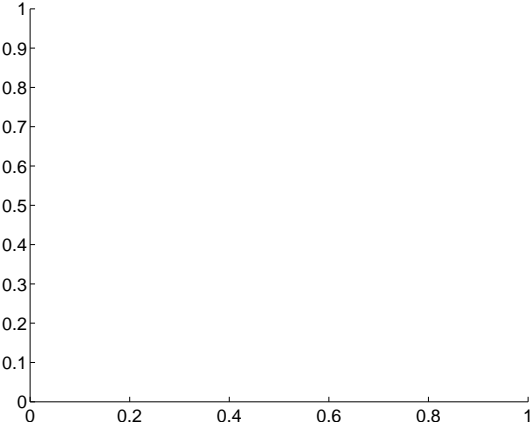
Q2 difference image



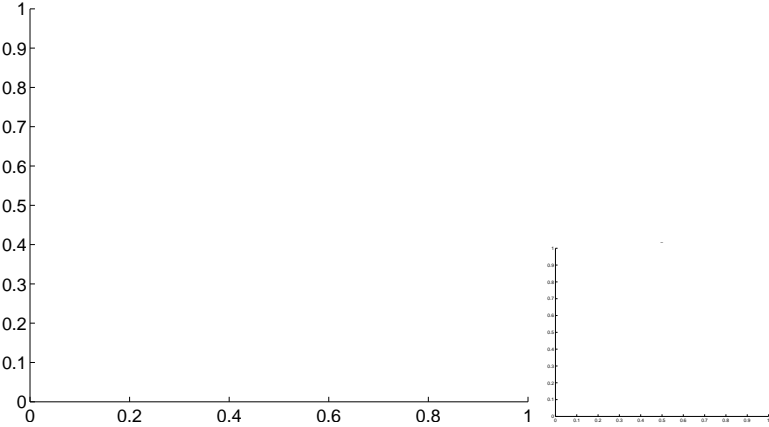
Q2 OOT image



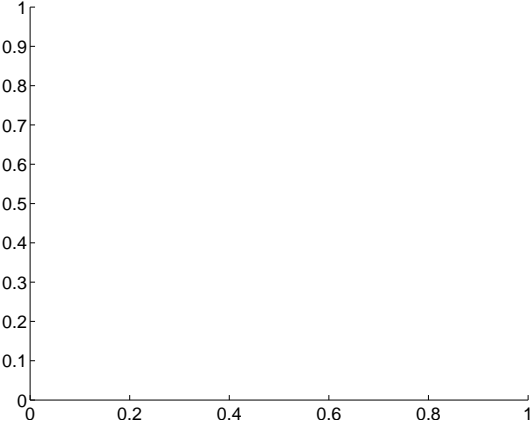
Q3 no difference image



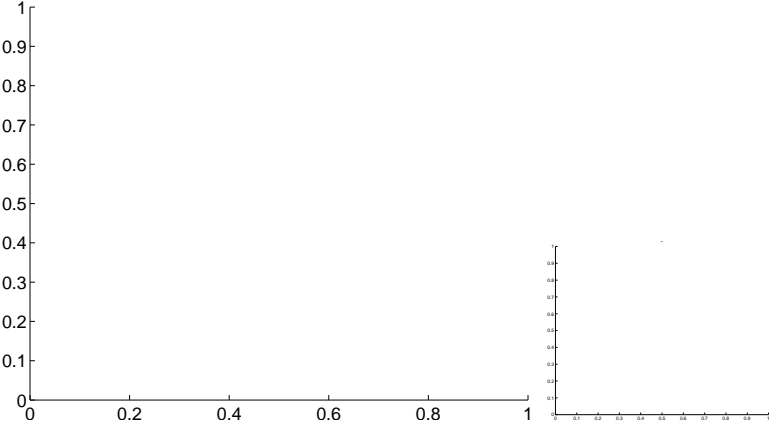
Q3 no OOT image



Q4 no difference image



Q4 no OOT image

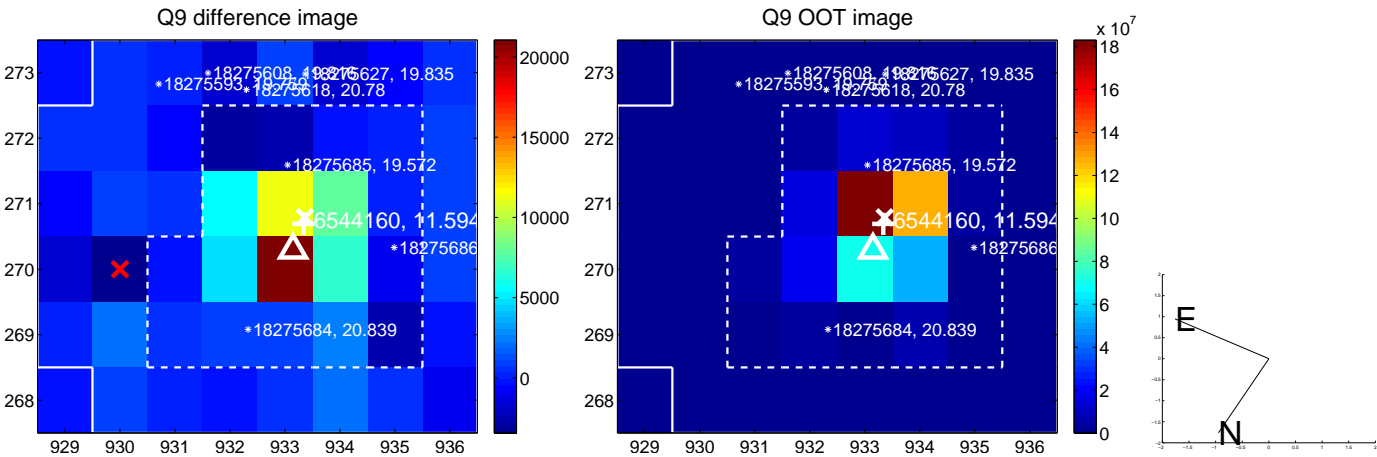


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

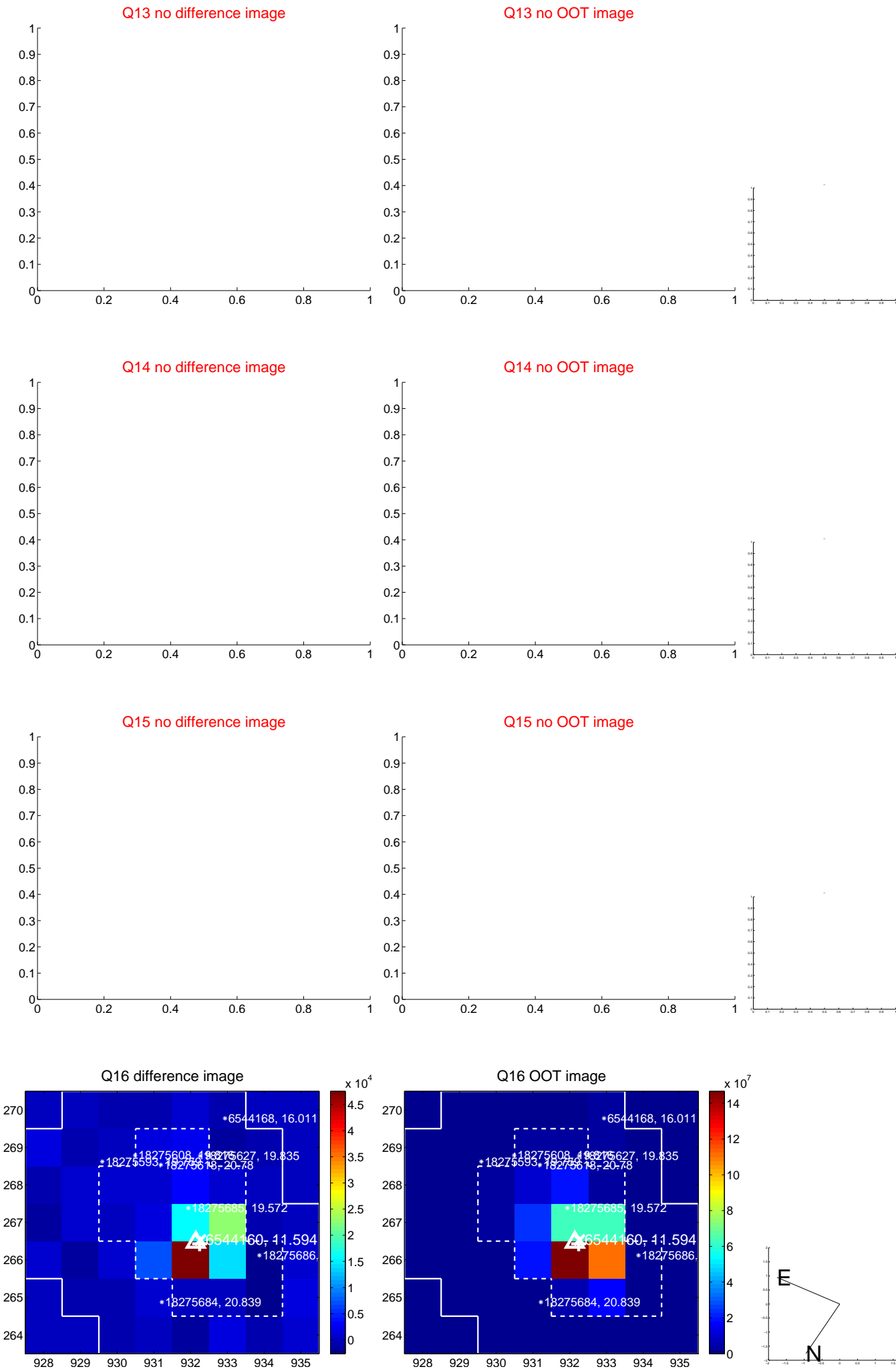




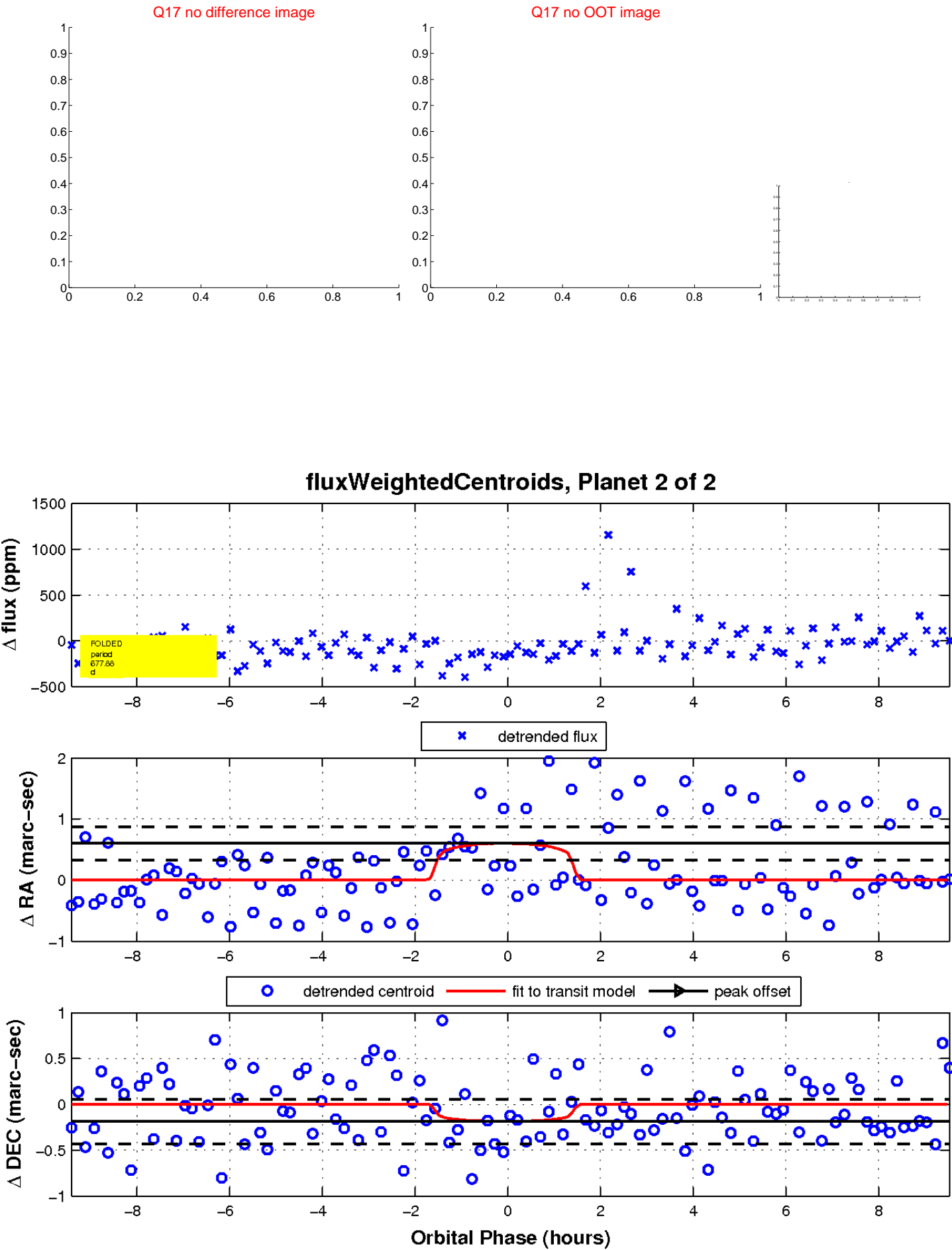
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

