

# KIC 004647715

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 004647715-01 | OBS      | No   | 3.879075      | 131.835148   | 60.8        | 1.379            | 23.9 | 25.8 | 4.88                        | 9554            | 4.46                   | 34133.56               |
| 004647715-02 | OBS      | No   | 412.042472    | 517.165167   | 393.6       | 13.710           | 23.1 | 13.7 | 4.88                        | 9554            | 17.86                  | 67.85                  |
| 004647715-03 | OBS      | No   | 1.292996      | 131.687196   | 2.7         | 5.723            | 17.6 | 2.8  | 4.88                        | 9554            | 0.93                   | 147691.79              |
| 004647715-04 | OBS      | No   | 3.879084      | 132.631335   | 22.7        | 7.668            | 16.2 | 9.8  | 4.88                        | 9554            | 2.75                   | 34133.45               |
| 004647715-06 | OBS      | No   | 365.960393    | 185.167645   | 230.9       | 8.221            | 11.3 | 10.6 | 4.88                        | 9554            | 7.95                   | 79.48                  |
| 004647715-07 | OBS      | No   | 97.345971     | 164.122956   | 82.9        | 7.500            | 9.6  | -1.0 | 4.88                        | 9554            | 4.55                   | 464.58                 |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments  |
|--------------|----------|------|-------|---|---|---|---|---|
| 004647715-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | SWEET_NTL—LPP_DV—CENT_SATURATED   |
| 004647715-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED |
| 004647715-03 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED  |
| 004647715-04 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE_ZUMA—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED                         |
| 004647715-06 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_CHASES_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED                 |
| 004647715-07 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—INCONSISTENT_TRANS—CENT_SATURATED               |

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

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

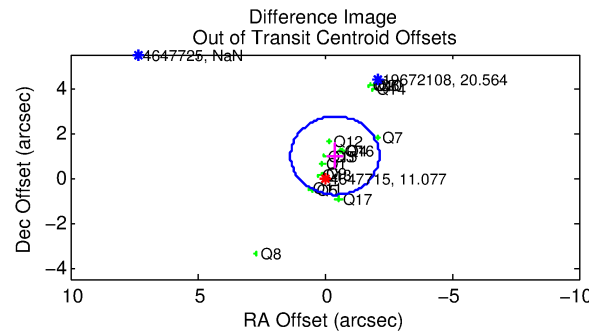
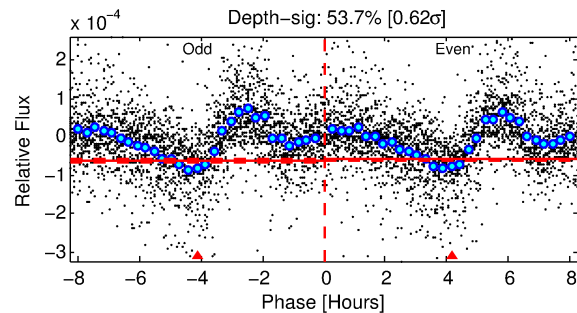
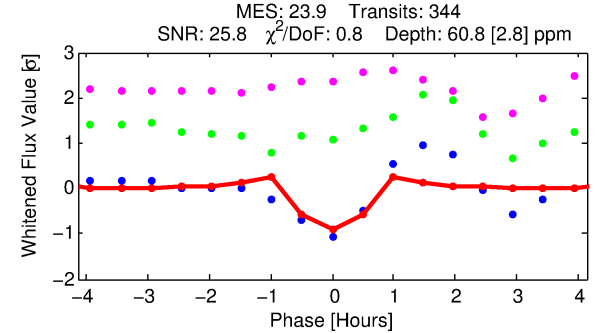
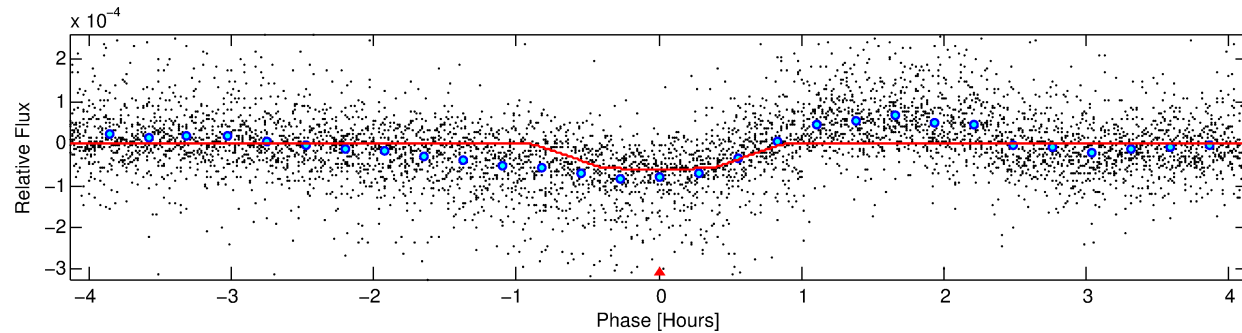
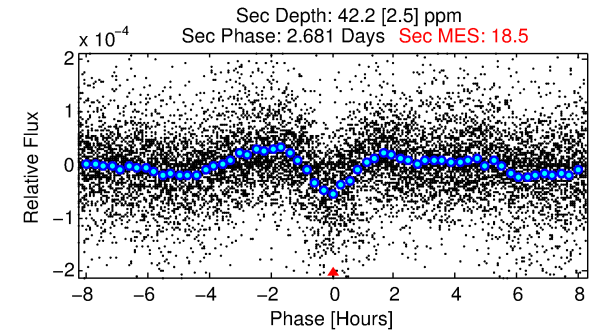
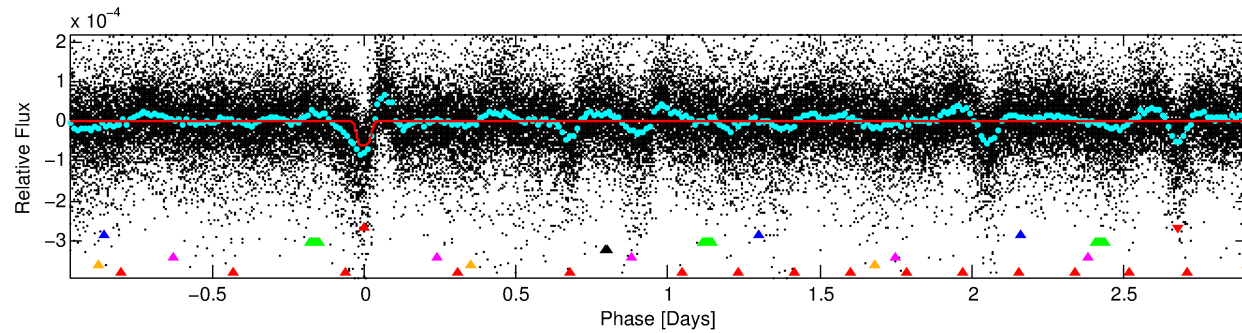
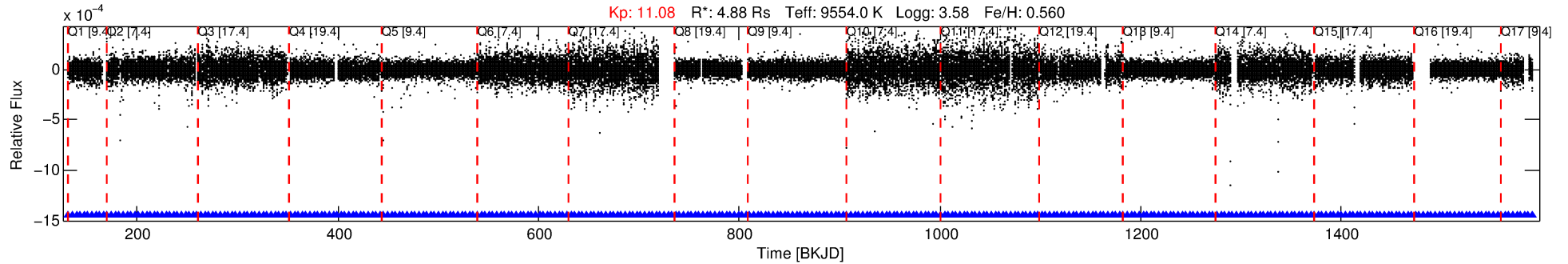
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 004647715-01

No Significant Match Found

# DV One-Page Summary

KIC: 4647715 Candidate: 1 of 7 Period: 3.879 d



## DV Fit Results:

Period = 3.87907 [0.00001] d  
Epoch = 131.8351 [0.0008] BKJD  
Rp/R\* = 0.0084 [0.0009]  
a/R\* = 8.83 [7.31]  
b = 0.92 [0.14]  
Seff = 34133.56 [35407.22]  
Teq = 3466 [899] K  
Rp = 4.46 [2.36] Re  
a = 0.0722 [0.0356] AU  
Ag = 6.08 [4.97] [1.02σ]  
Teffp = 8416 [1508] K [2.82σ]

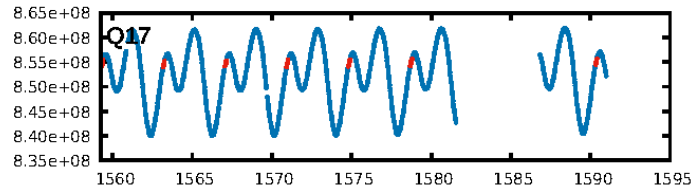
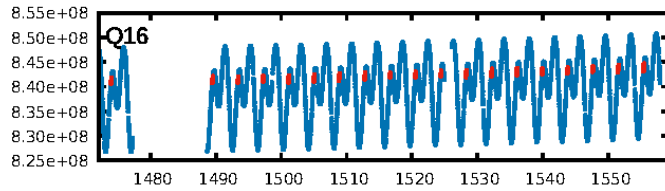
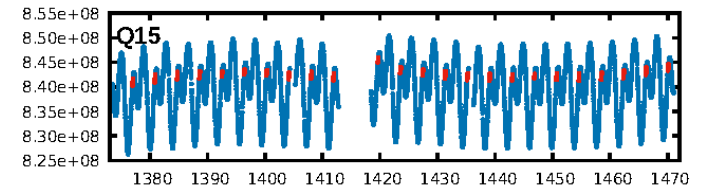
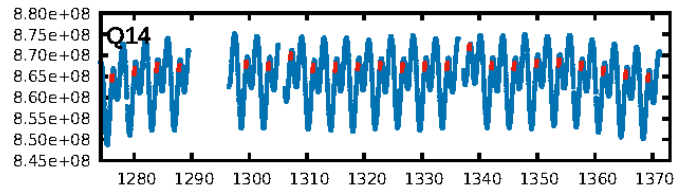
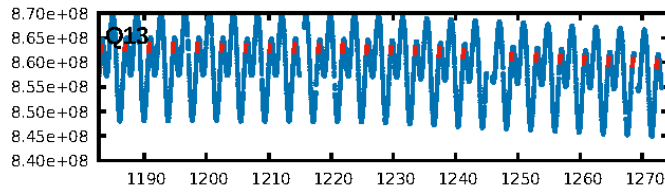
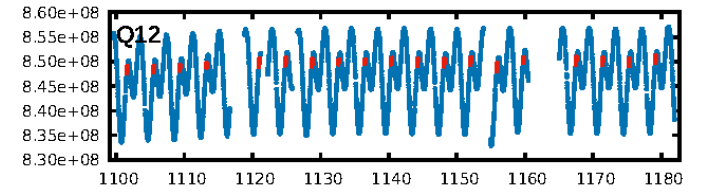
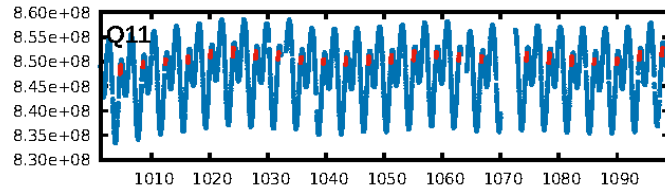
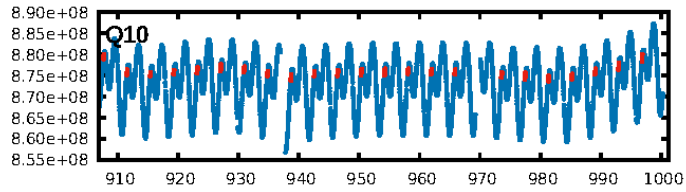
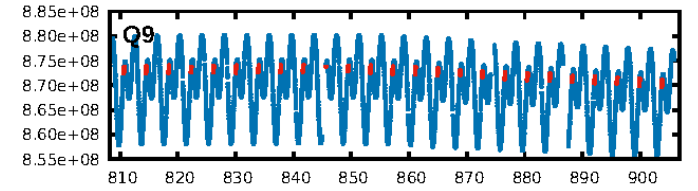
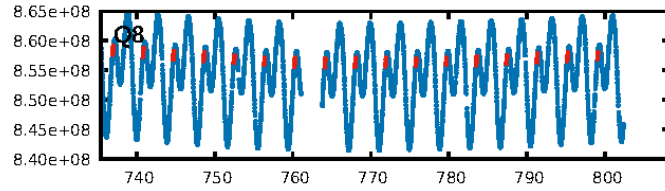
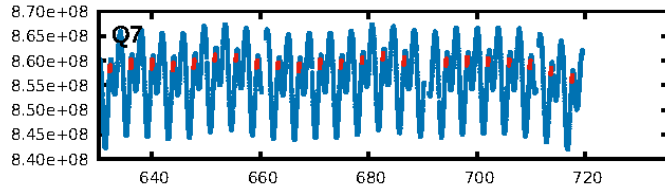
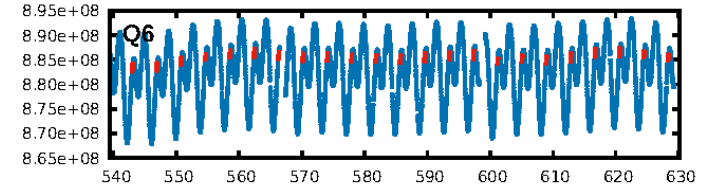
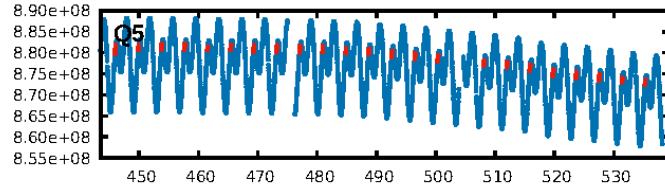
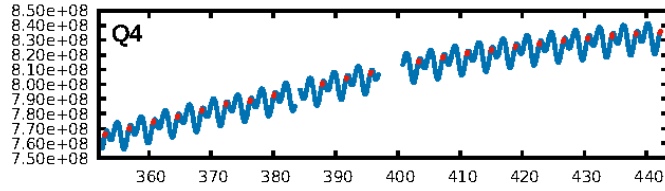
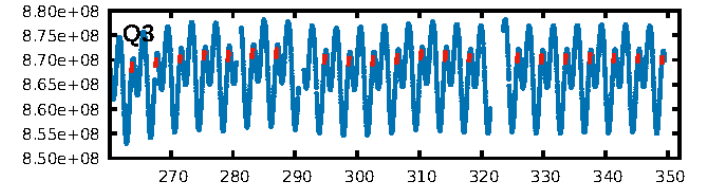
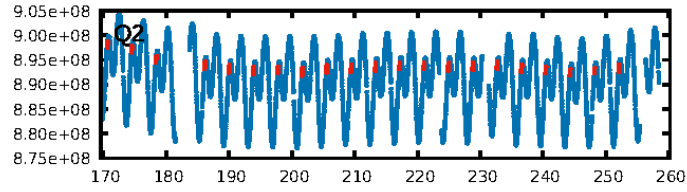
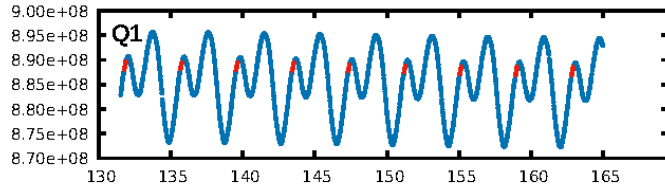
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [10.54σ]  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [328/328]  
GhostDiagnostic-chr: 1.572  
Centroid-sig: N/A  
Centroid-so: 0.769 arcsec [1.62σ]  
OotOffset-rm: 1.069 arcsec [1.84σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-rm: 1.078 arcsec [2.15σ]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.00 [0/17]  
DiffImageOverlap-fno: 0.00 [0/17]

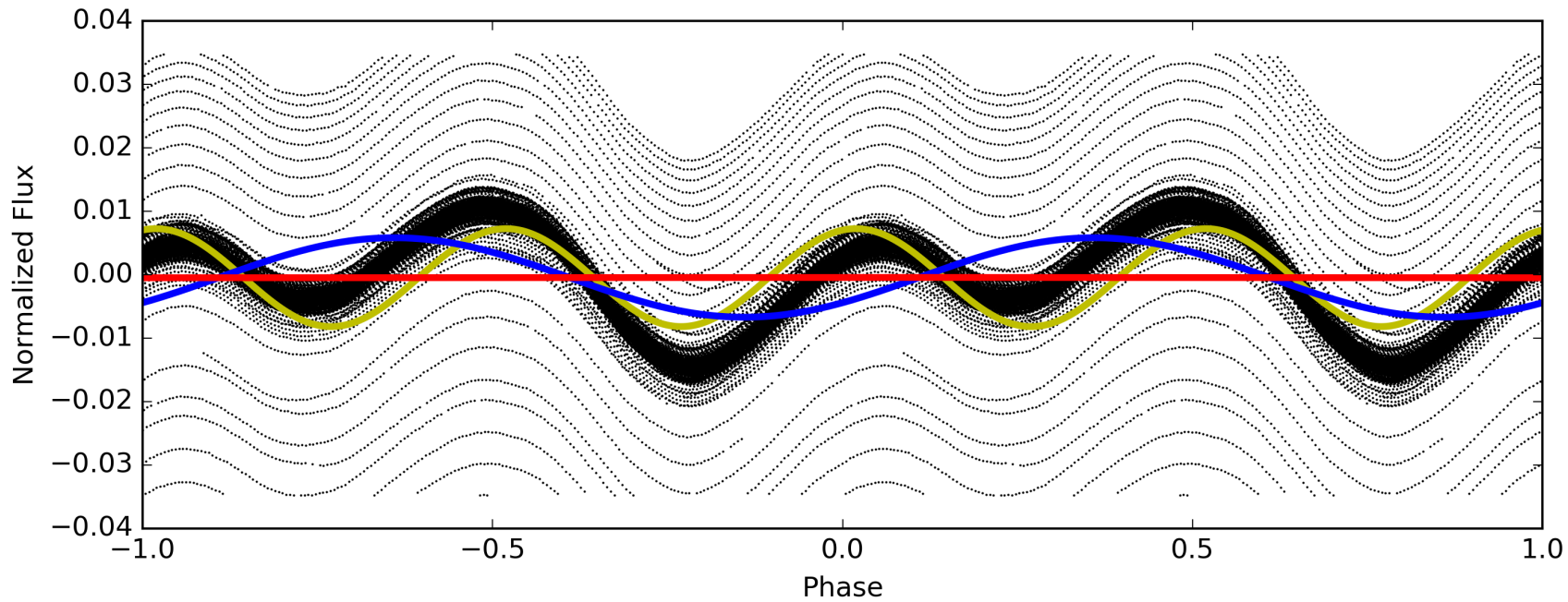
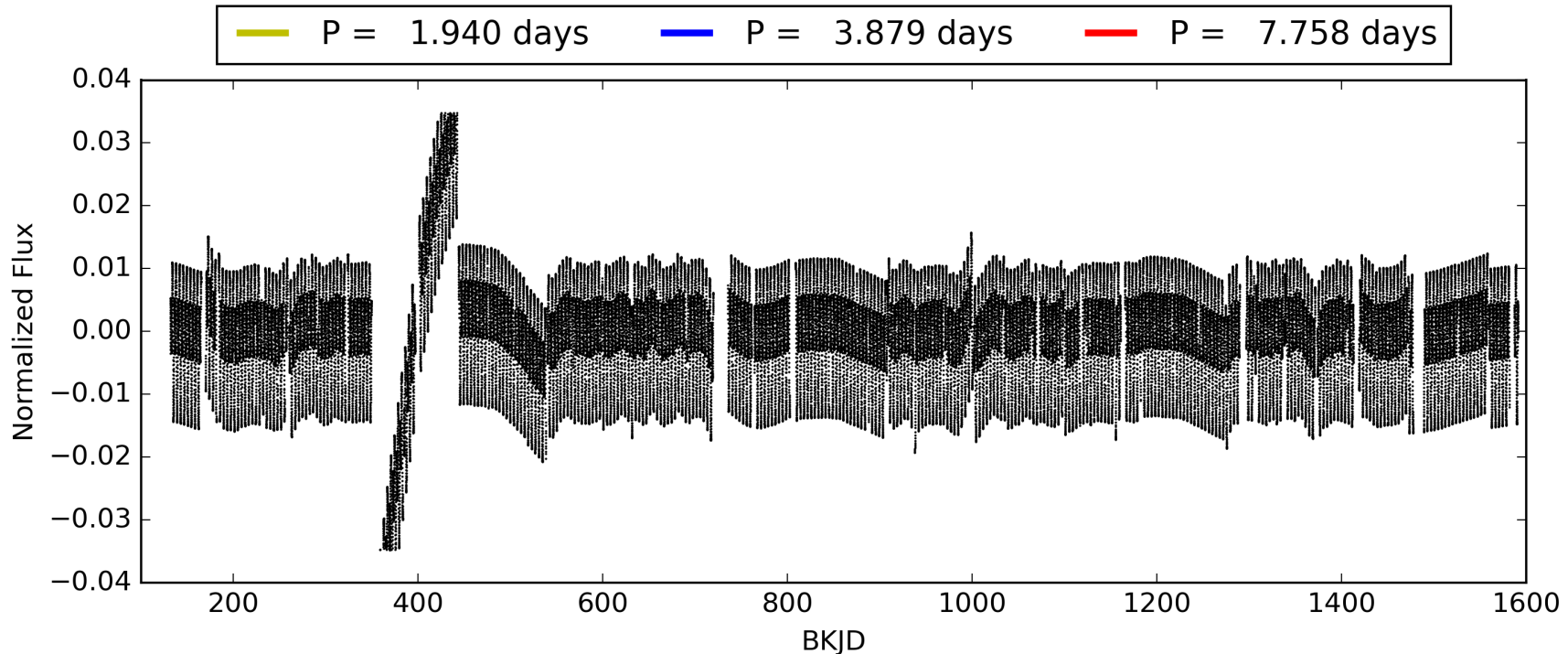
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 01:03:23 Z

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

# TCE 004647715-01, PDC Light Curves



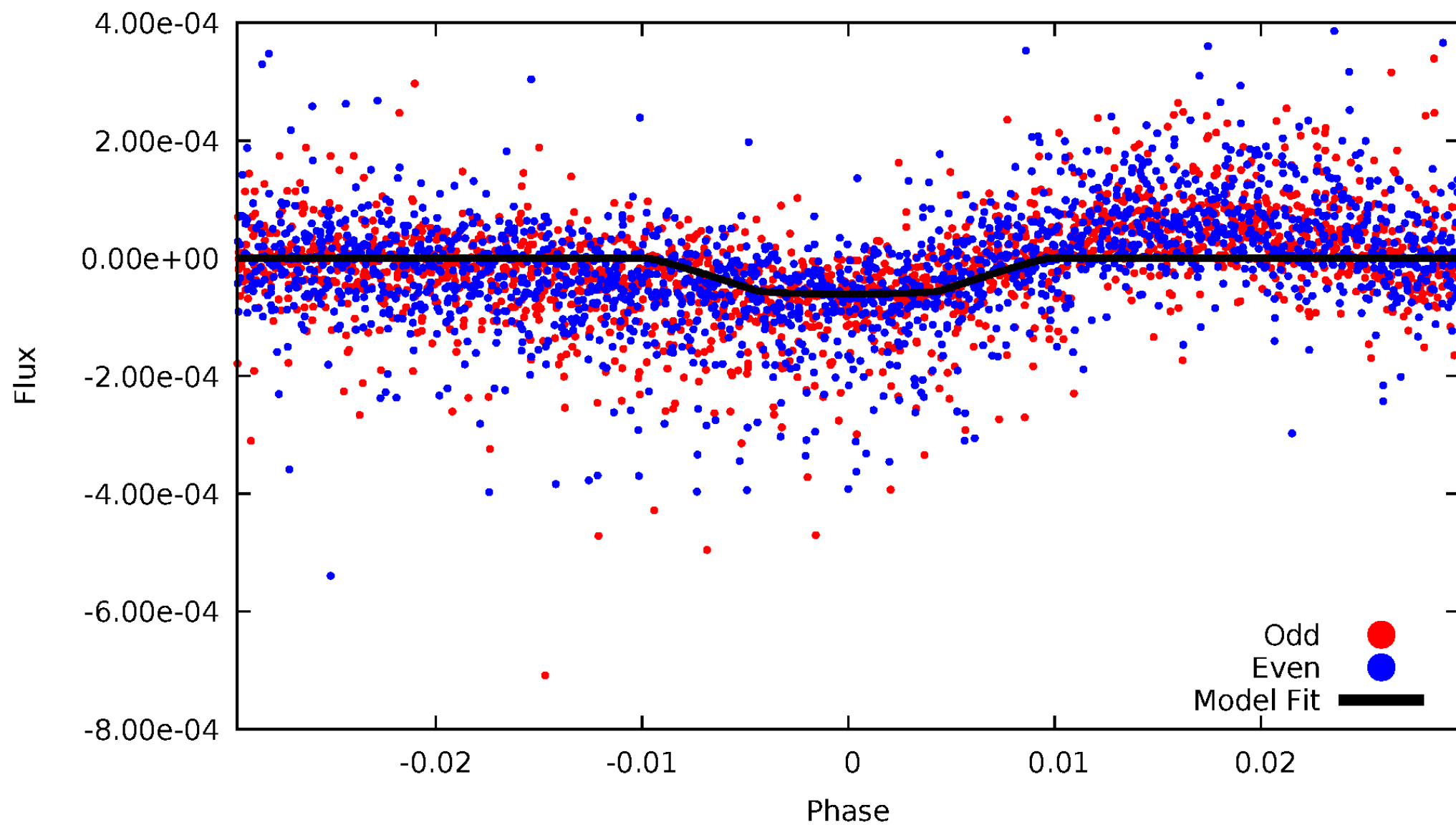
TCE 004647715-01





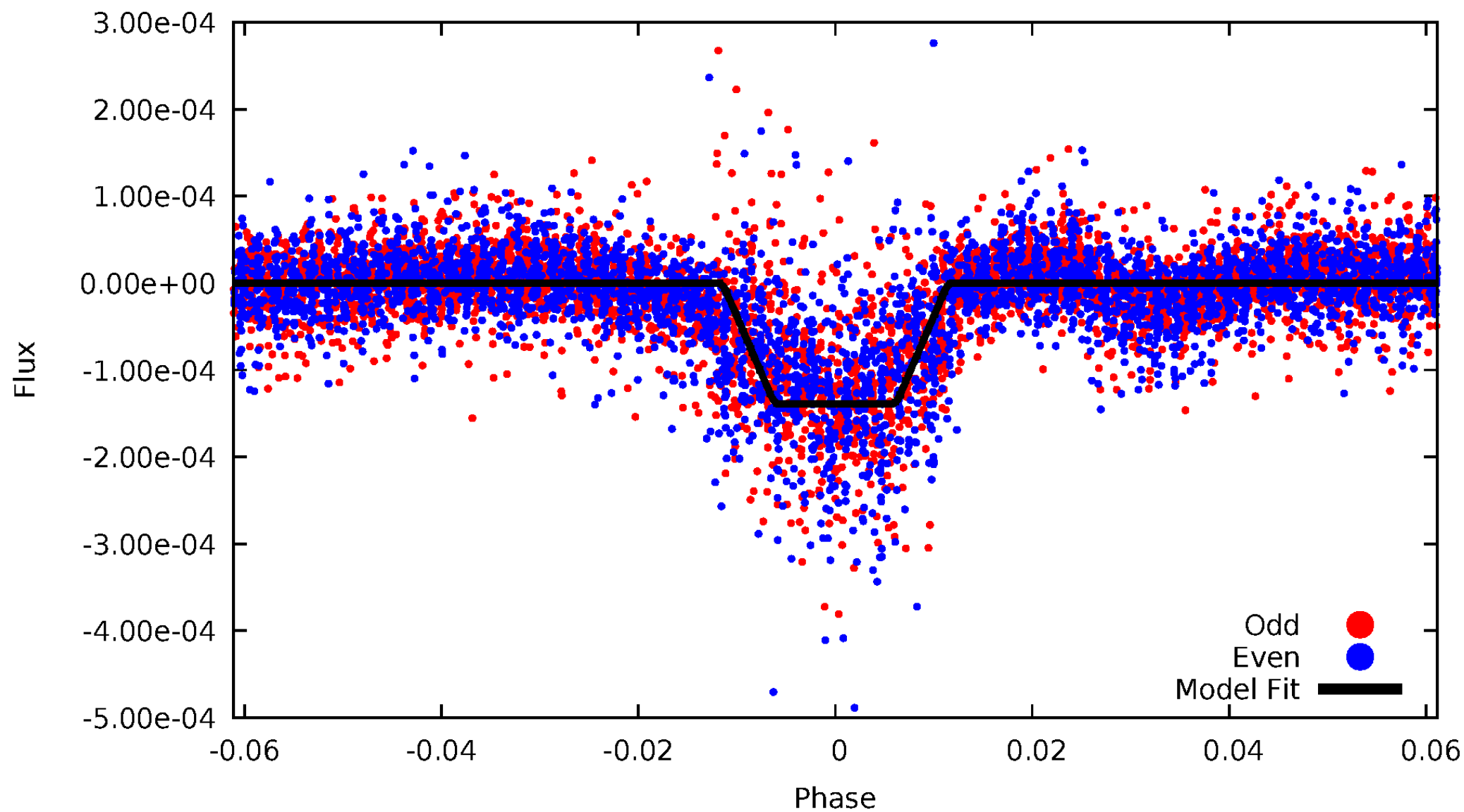
# DV Odd/Even

TCE 004647715-01



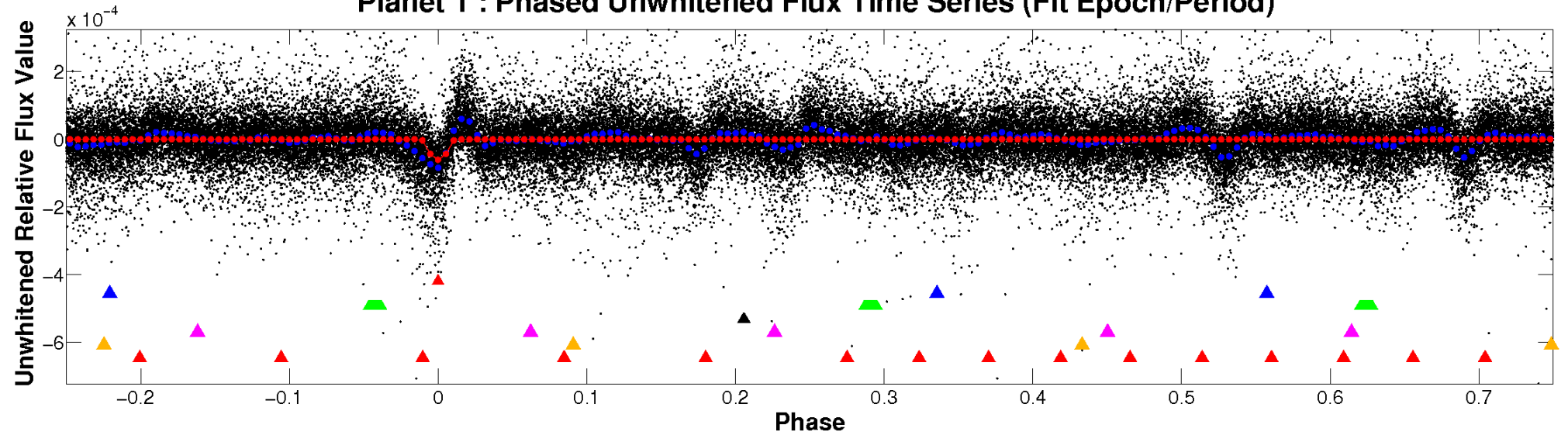
# ALT Odd/Even

TCE 004647715-01

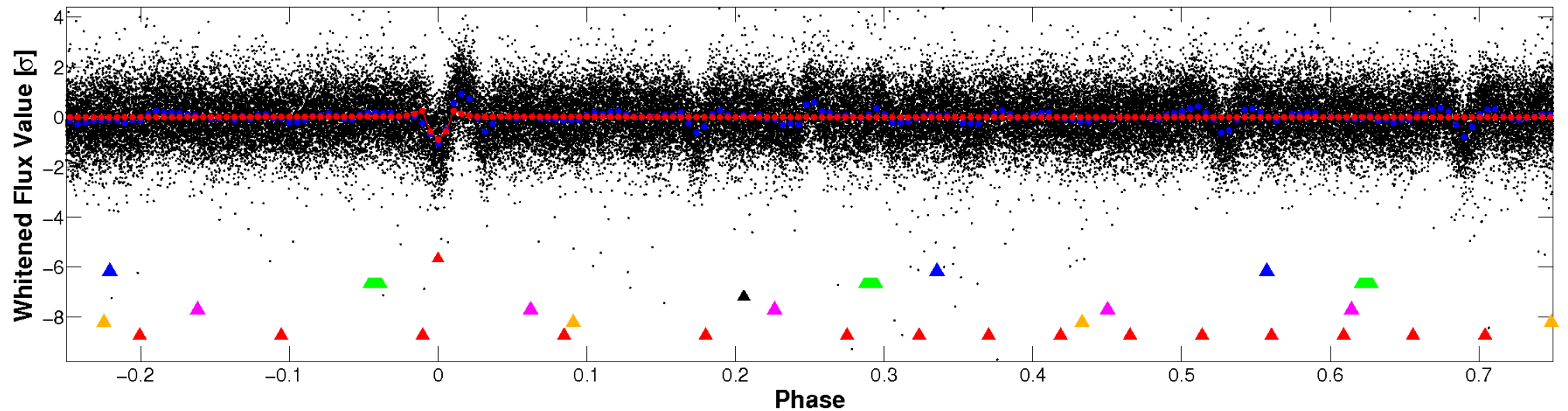


# Non-Whitened Vs. Whitened Light Curve

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

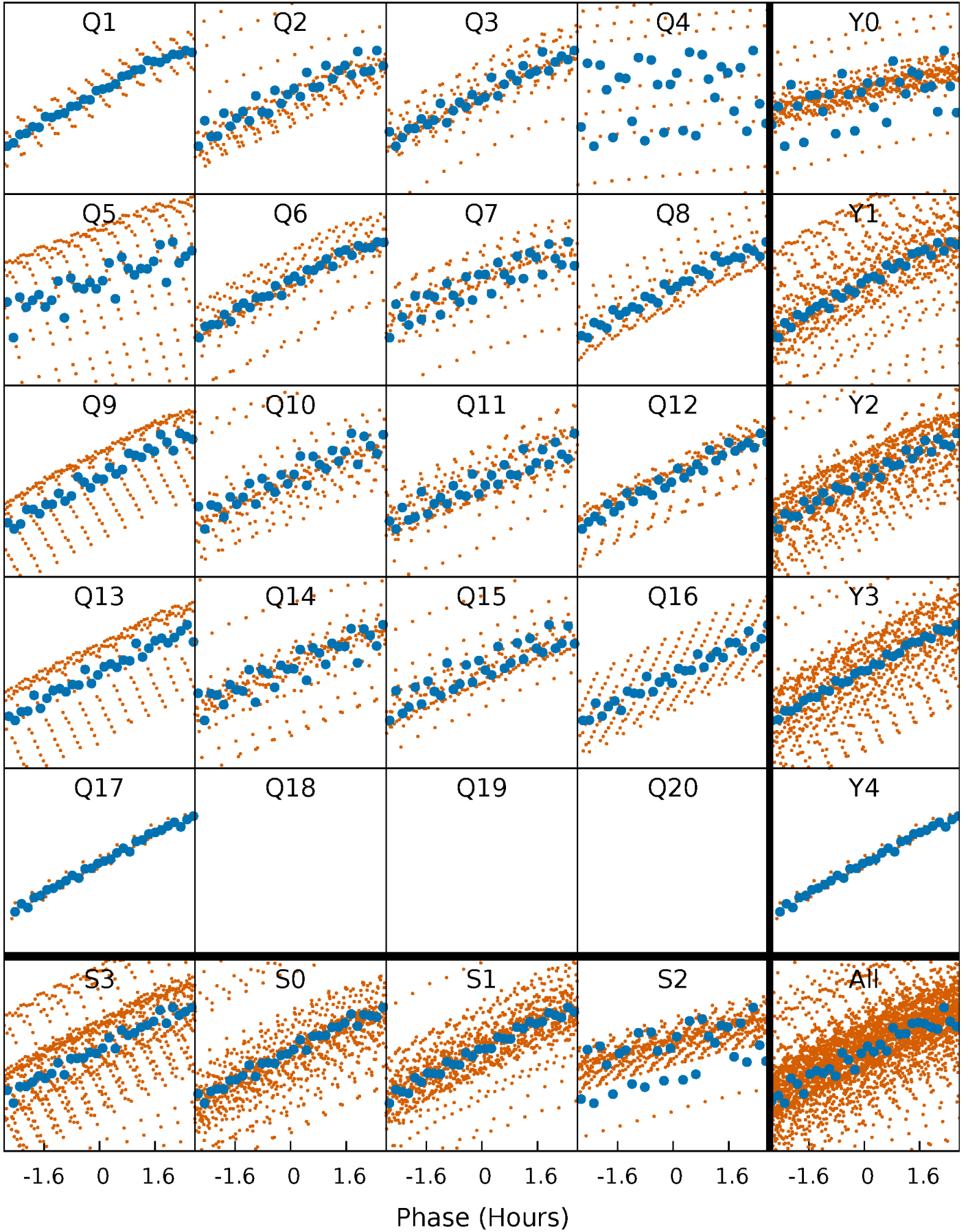


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



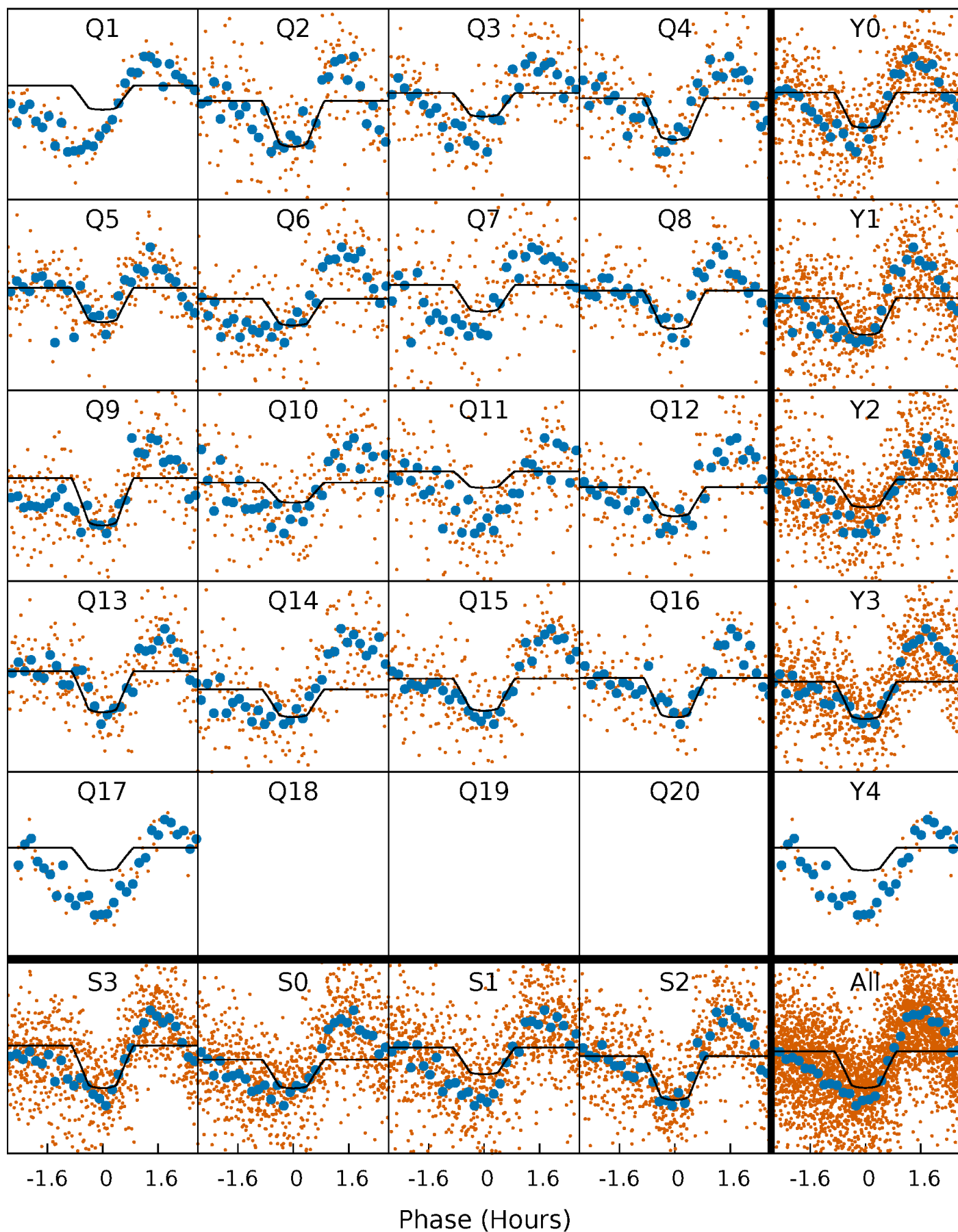
# PDC Quarter-Phased Transit Curves

TCE 004647715-01 P= 3.879075 Days  $T_0=131.835148$  (BKJD)



# DV Quarter-Phased Transit Curves

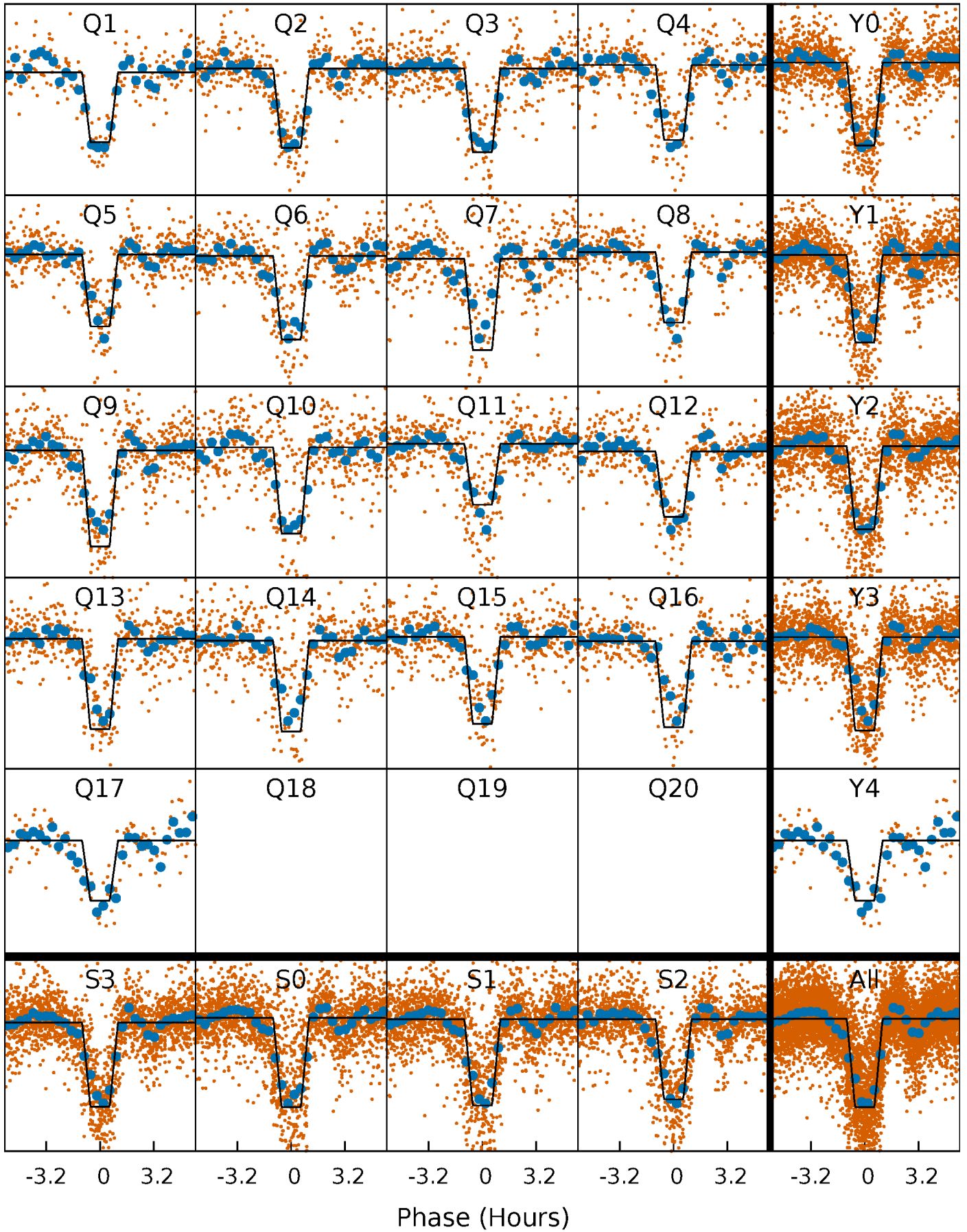
TCE 004647715-01 P= 3.879075 Days  $T_0=131.835148$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

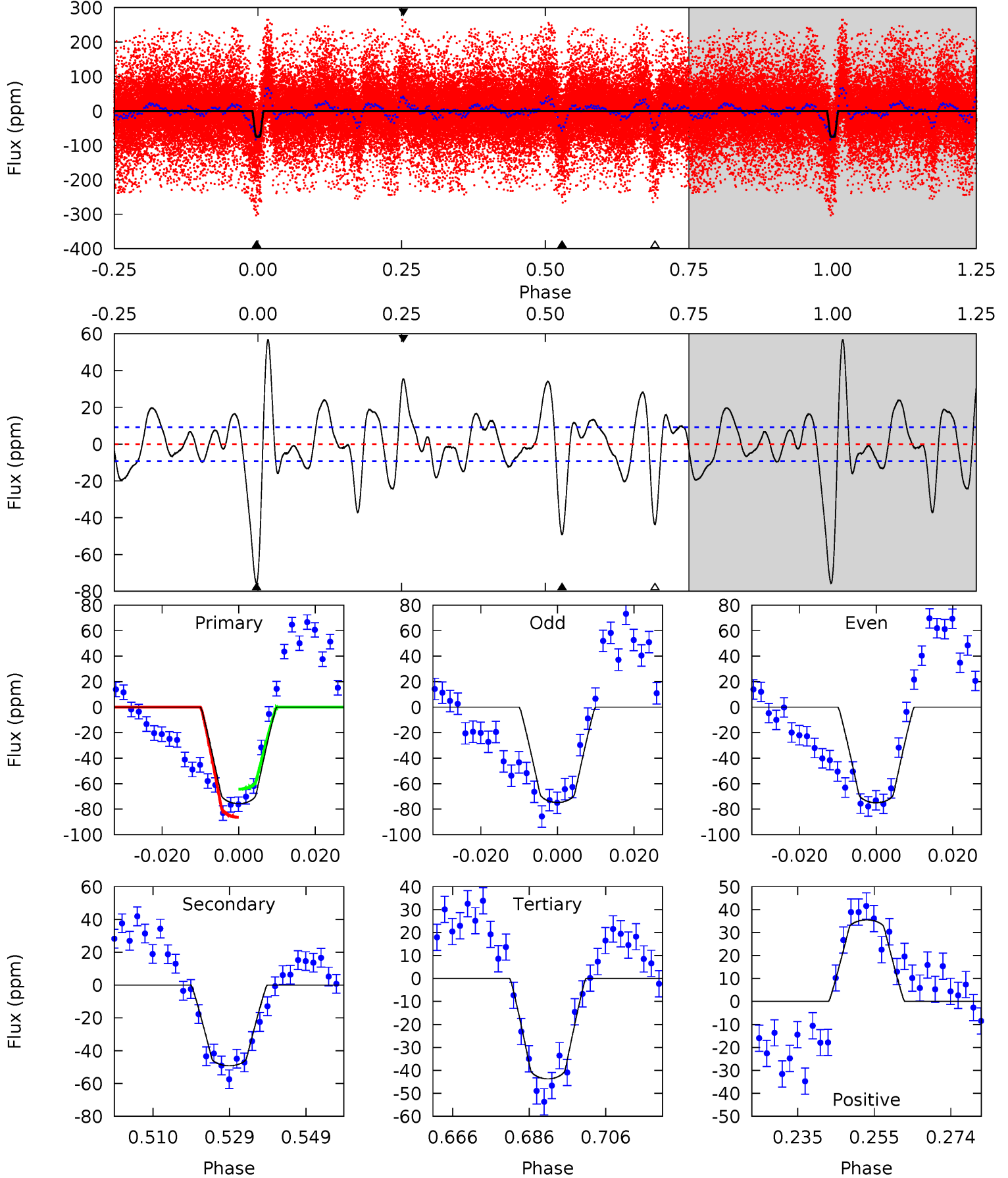
TCE 004647715-01 P= 3.879116 Days  $T_0=131.822023$  (BKJD)



# DV Model-Shift Uniqueness Test

004647715-01, P = 3.879075 Days, E = 127.956073 Days

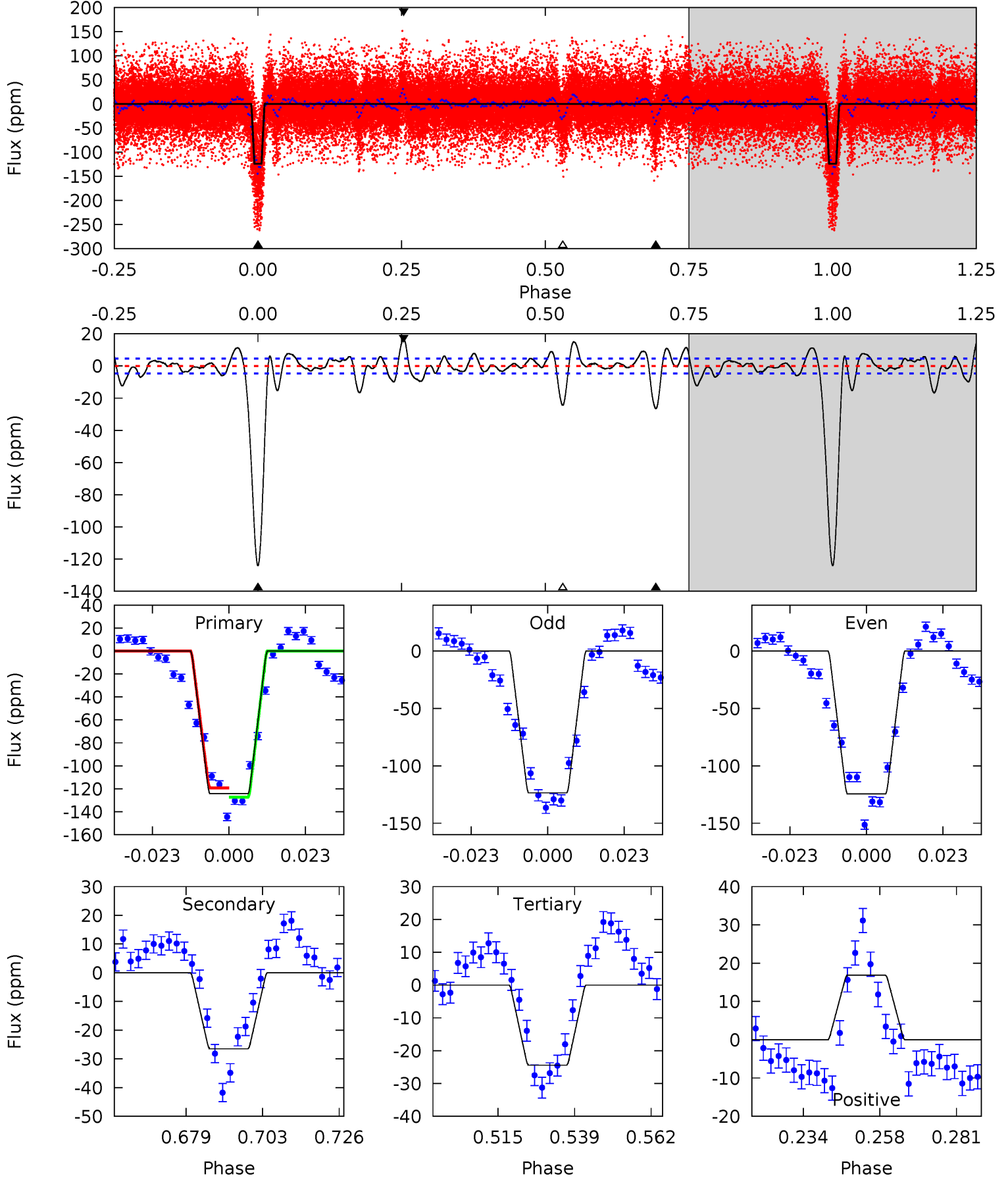
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 40.1 | 26.1 | 23.2 | 18.8 | 4.90            | 2.33            | 7.43             | 16.9    | 21.3    | 2.91    | 7.26    | 0.06    | 1.33 | 0.43  | 5.89 |



# Alt Model-Shift Uniqueness Test

004647715-01, P = 3.879116 Days, E = 127.942907 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  |
|-------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 130.9 | 27.9 | 25.7 | 17.8 | 4.86            | 2.27            | 6.16             | 105.1   | 113.1   | 2.18    | 10.2    | 0.47    | 0.99 | 0.12  | 4.23 |



### Stellar Parameters For KIC 004647715

|        | $T_{\text{eff}}(K)$   | $\log(g)$                 | [Fe/H]                    | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|-----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
|        | $9554^{+381}_{-1621}$ | $3.584^{+0.459}_{-0.081}$ | $0.560^{+0.050}_{-0.150}$ | $4.884^{+0.446}_{-2.527}$ | $3.340^{+0.063}_{-1.192}$ | $0.040^{+0.185}_{-0.010}$                 |
|        | +4%/-17%              | +13%/-2%                  | +9%/-27%                  | +9%/-52%                  | +2%/-36%                  | +459%/-26%                                |
| Source | SPE68                 | SPE68                     | SPE68                     | DSEP                      |                           |   |

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 004647715-01 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$     | $T_{max} (K)$        | $T_{obs} (K)$         | $A_{obs}$                 |
|---------|-------------|------------------------|----------------------|-----------------------|---------------------------|
| DV      | $-49 \pm 2$ | $4.10^{+0.77}_{-1.04}$ | $4487^{+555}_{-789}$ | $8155^{+968}_{-1098}$ | $8.160^{+5.538}_{-2.305}$ |
| Alt.    | $-26 \pm 1$ | $5.86^{+0.95}_{-1.62}$ | $4450^{+589}_{-768}$ | $5560^{+423}_{-559}$  | $2.144^{+1.467}_{-0.521}$ |

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

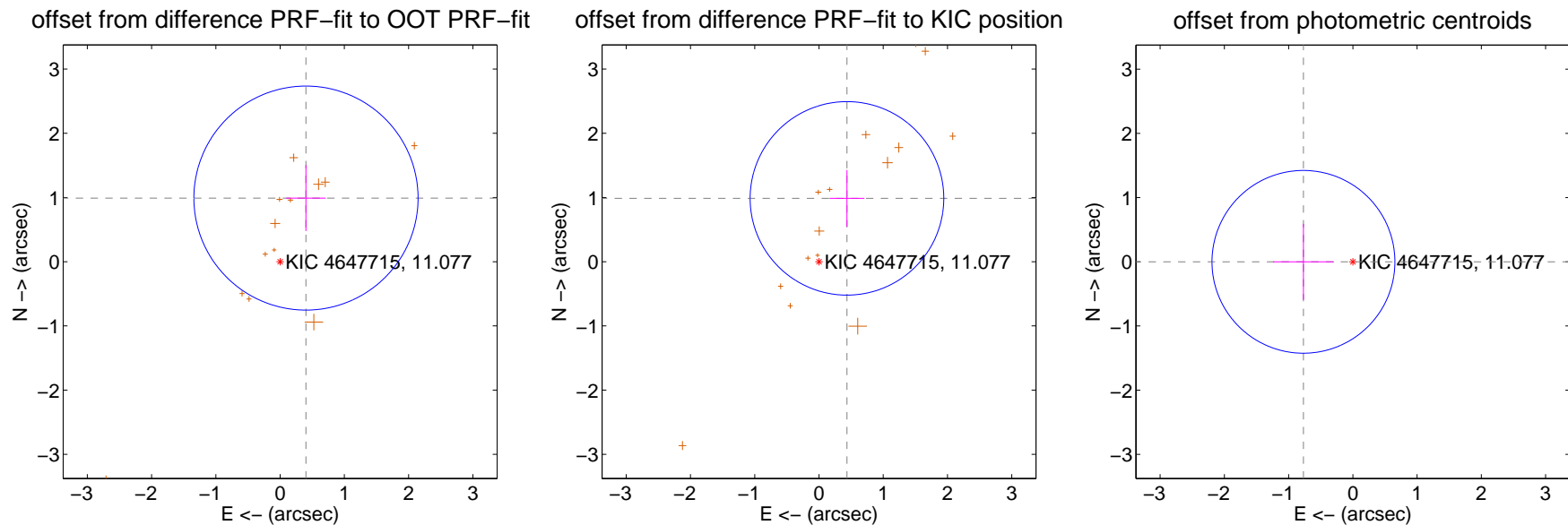
## DV Centroid Data

Supplemental centroid analysis for 004647715-01. **Kepler magnitude: 11.08.** Transit SNR 25.80

**There are 0 quarters with good PRF difference image offsets**

The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

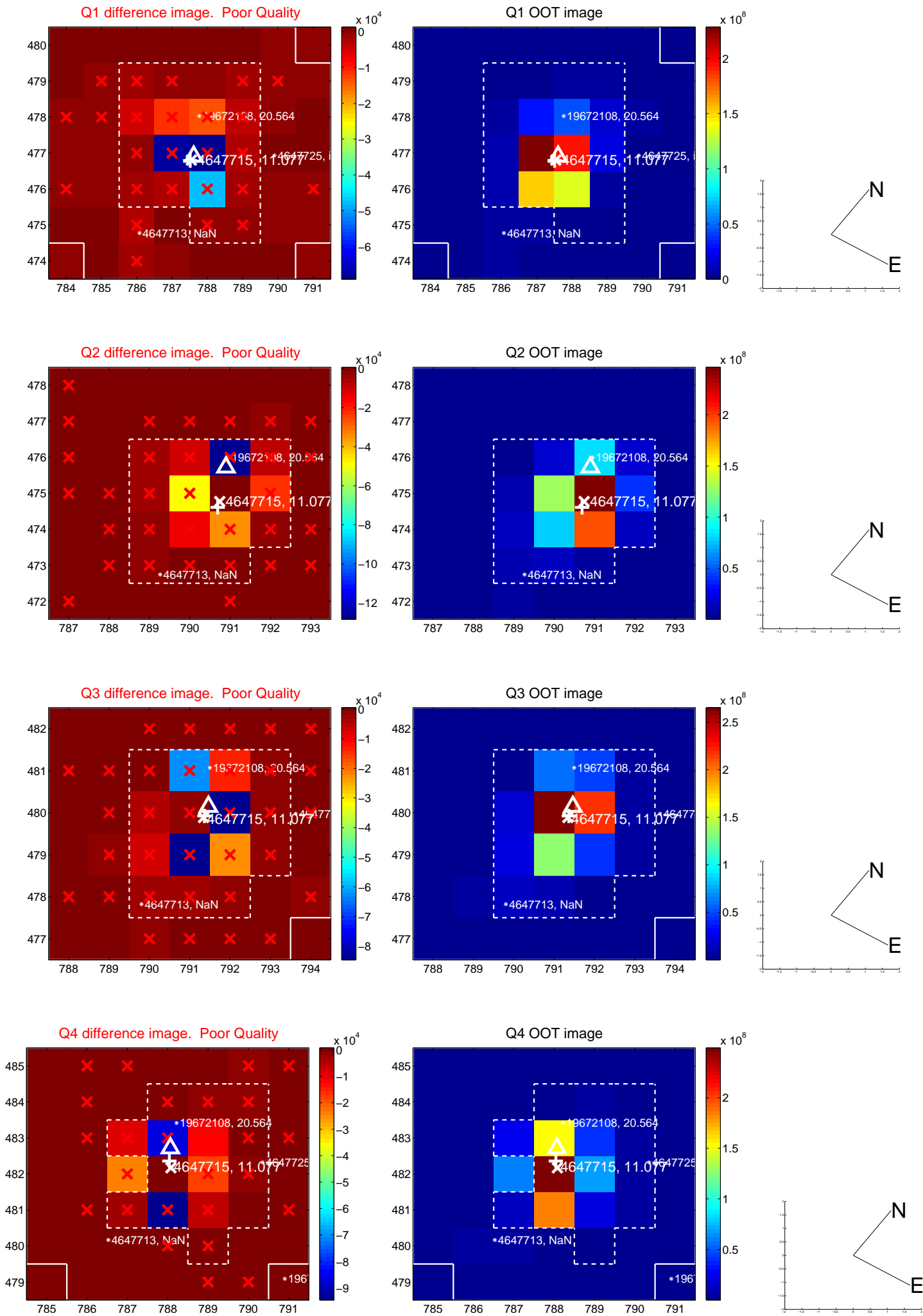
|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec      |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT          | $1.069 \pm 0.581$  | 1.84                | $-0.402 \pm 0.308$ | $0.990 \pm 0.514$ |
| PRF-fit source offset from KIC position | $1.078 \pm 0.502$  | 2.15                | $-0.435 \pm 0.271$ | $0.986 \pm 0.442$ |
| photometric centroid source offset      | $0.77 \pm 0.47$    | 1.62                | $0.77 \pm 0.47$    | $-0.00 \pm 0.59$  |



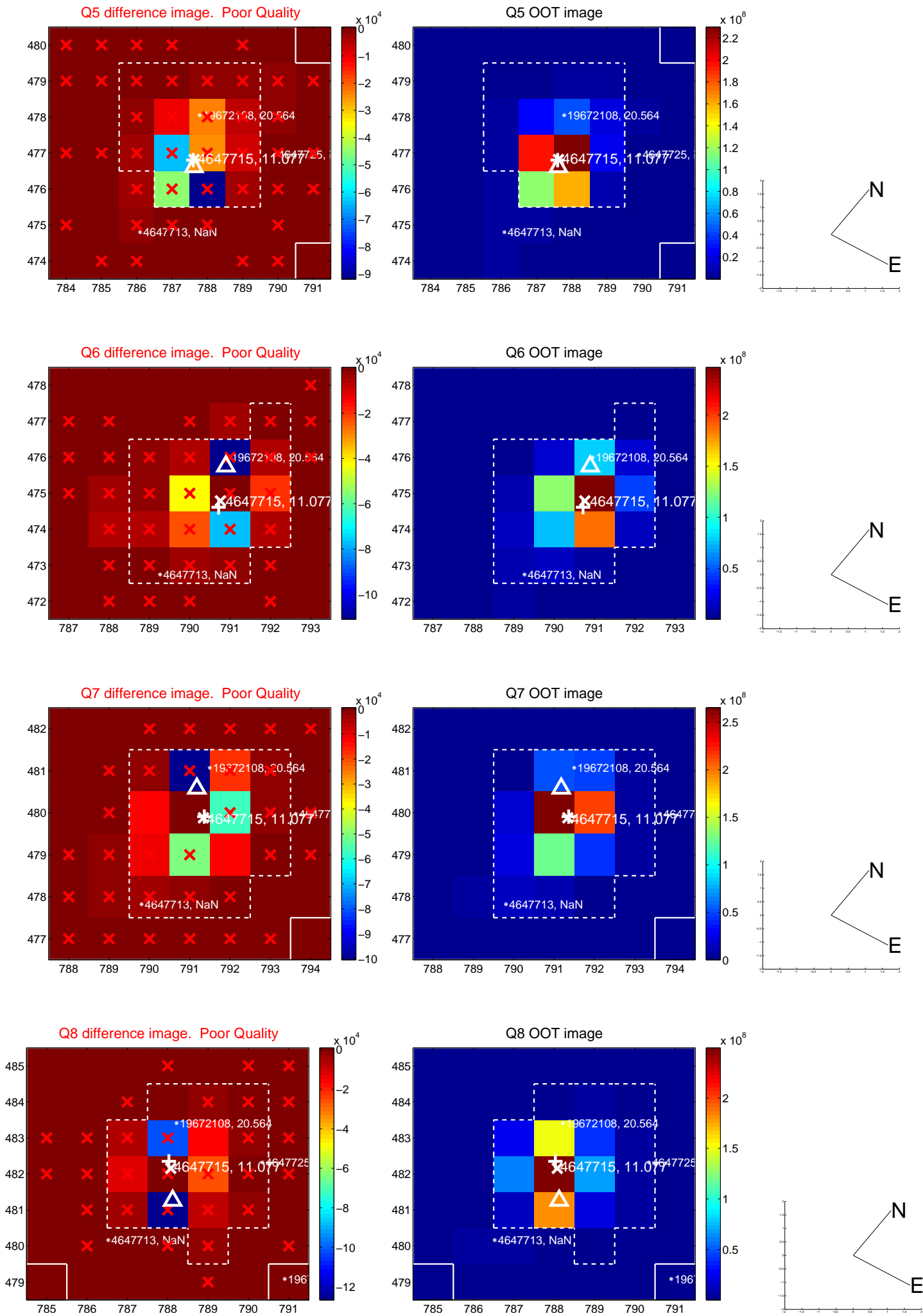
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



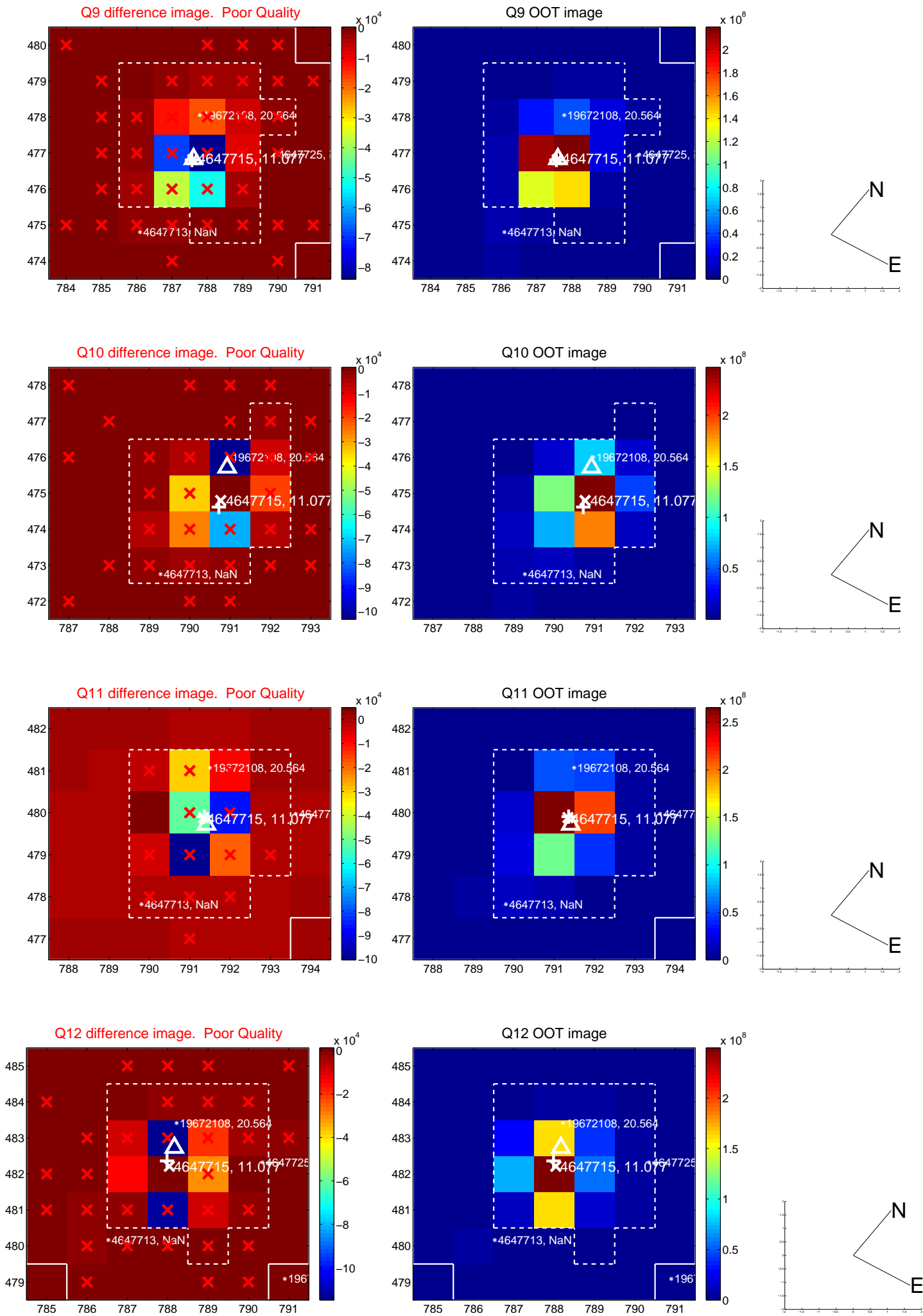
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



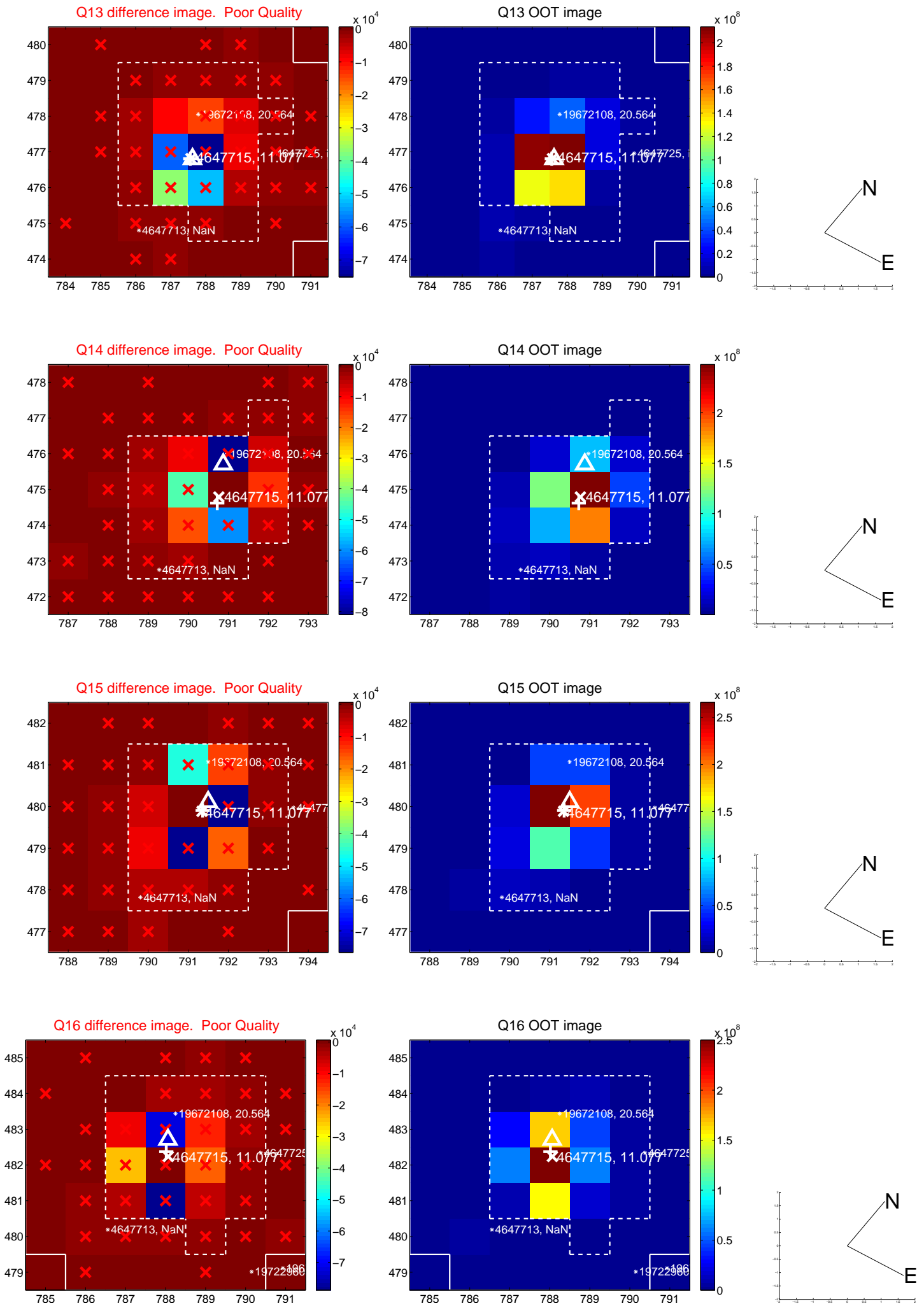
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



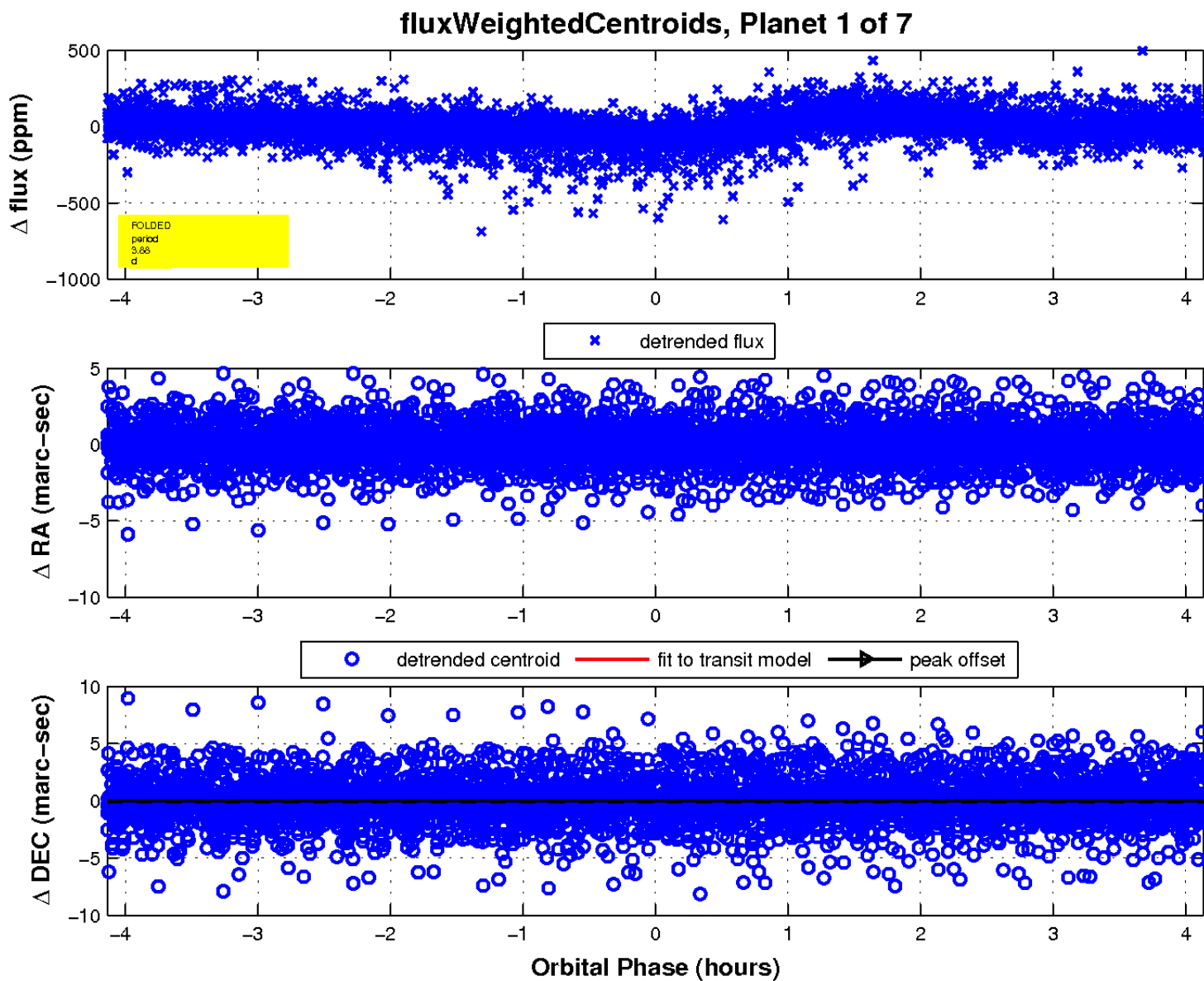
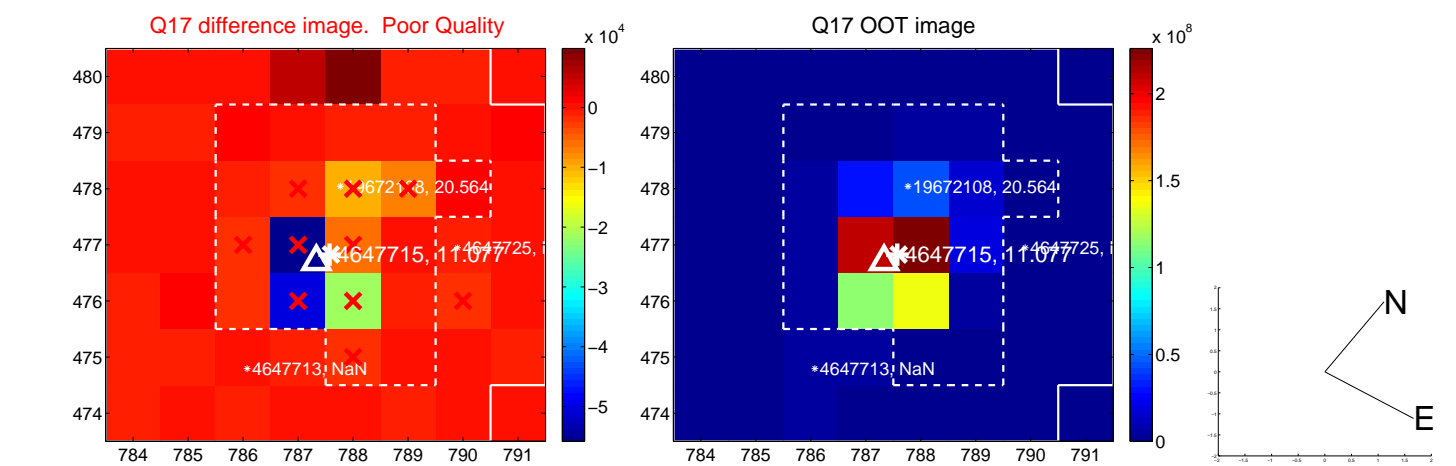
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.





This astronomical image displays a field of stars against a black background. A blue grid is overlaid on the image. Green text labels provide coordinates for the grid lines. The horizontal axis (Right Ascension) is labeled at the top with values 19:18:40.0, 39.0, 38.0, 37.0, and 36.0. The vertical axis (Declination) is labeled on the left with values 10.0, 20.0, 30.0, 40.0, and 50.0. A prominent bright star is visible near the center-left, and several other stars of varying brightness are scattered across the field.

Declination

# KIC 004647715

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 004647715-01 | OBS      | No   | 3.879075      | 131.835148   | 60.8        | 1.379            | 23.9 | 25.8 | 4.88                        | 9554            | 4.46                   | 34133.56               |
| 004647715-02 | OBS      | No   | 412.042472    | 517.165167   | 393.6       | 13.710           | 23.1 | 13.7 | 4.88                        | 9554            | 17.86                  | 67.85                  |
| 004647715-03 | OBS      | No   | 1.292996      | 131.687196   | 2.7         | 5.723            | 17.6 | 2.8  | 4.88                        | 9554            | 0.93                   | 147691.79              |
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## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments  |
|--------------|----------|------|-------|---|---|---|---|---|
| 004647715-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | SWEET_NTL—LPP_DV—CENT_SATURATED   |
| 004647715-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED |
| 004647715-03 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED  |
| 004647715-04 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE_ZUMA—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED                         |
| 004647715-06 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_CHASES_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED                 |
| 004647715-07 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—INCONSISTENT_TRANS—CENT_SATURATED               |

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

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

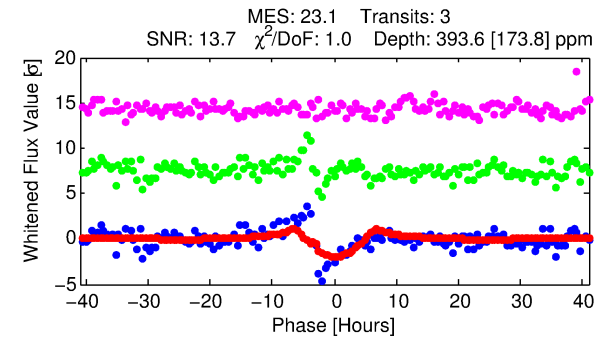
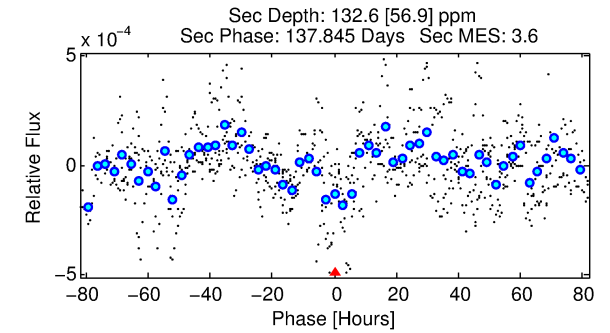
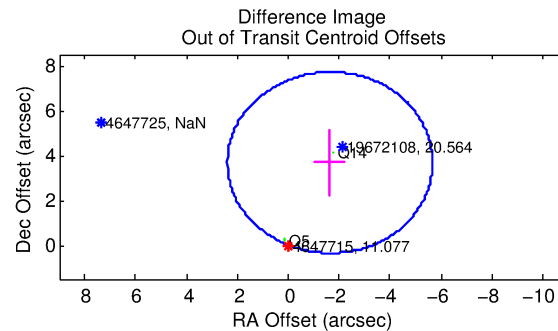
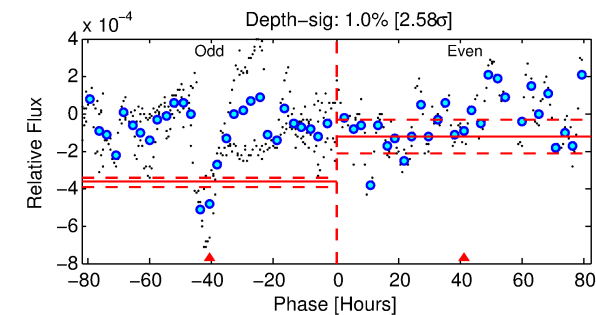
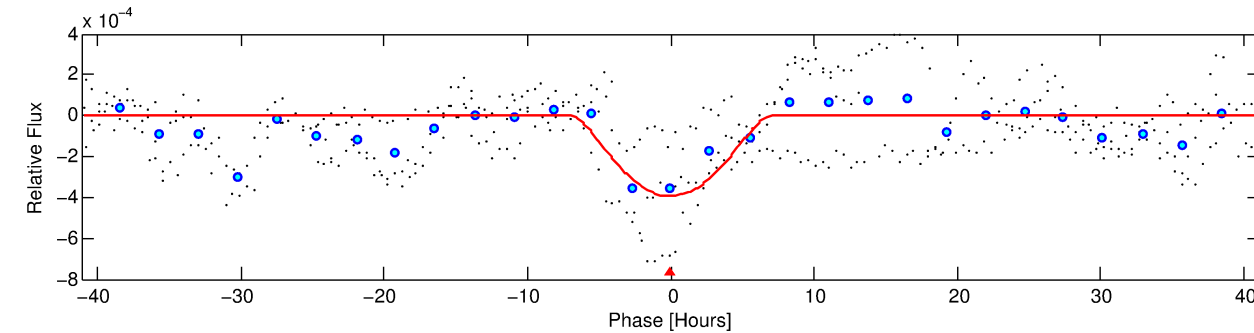
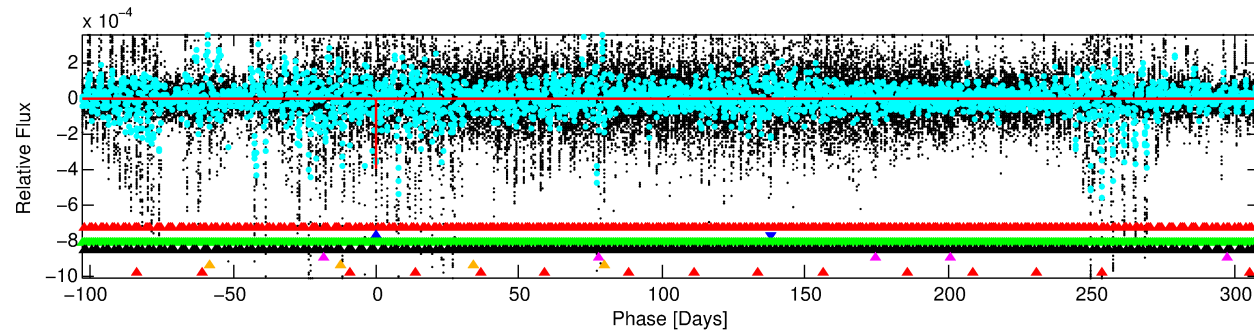
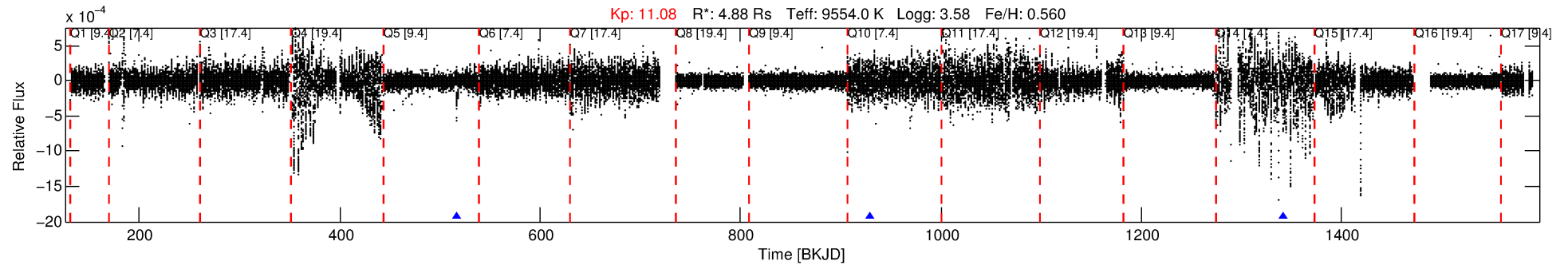
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 004647715-02

No Significant Match Found

# DV One-Page Summary

KIC: 4647715 Candidate: 2 of 7 Period: 412.042 d



## DV Fit Results:

Period = 412.04247 [0.01873] d  
Epoch = 517.1652 [0.0089] BKJD  
Rp/R\* = 0.0335 [0.0412]  
a/R\* = 59.96 [19.58]  
b = 1.00 [0.05]  
Seff = 67.85 [70.38]  
Teq = 732 [190] K  
Rp = 17.86 [23.81] Re  
a = 1.6200 [0.7987] AU  
Ag = 599.76 [1568.21] [0.38 $\sigma$ ]  
Teff = 5600 [3619] K [1.34 $\sigma$ ]

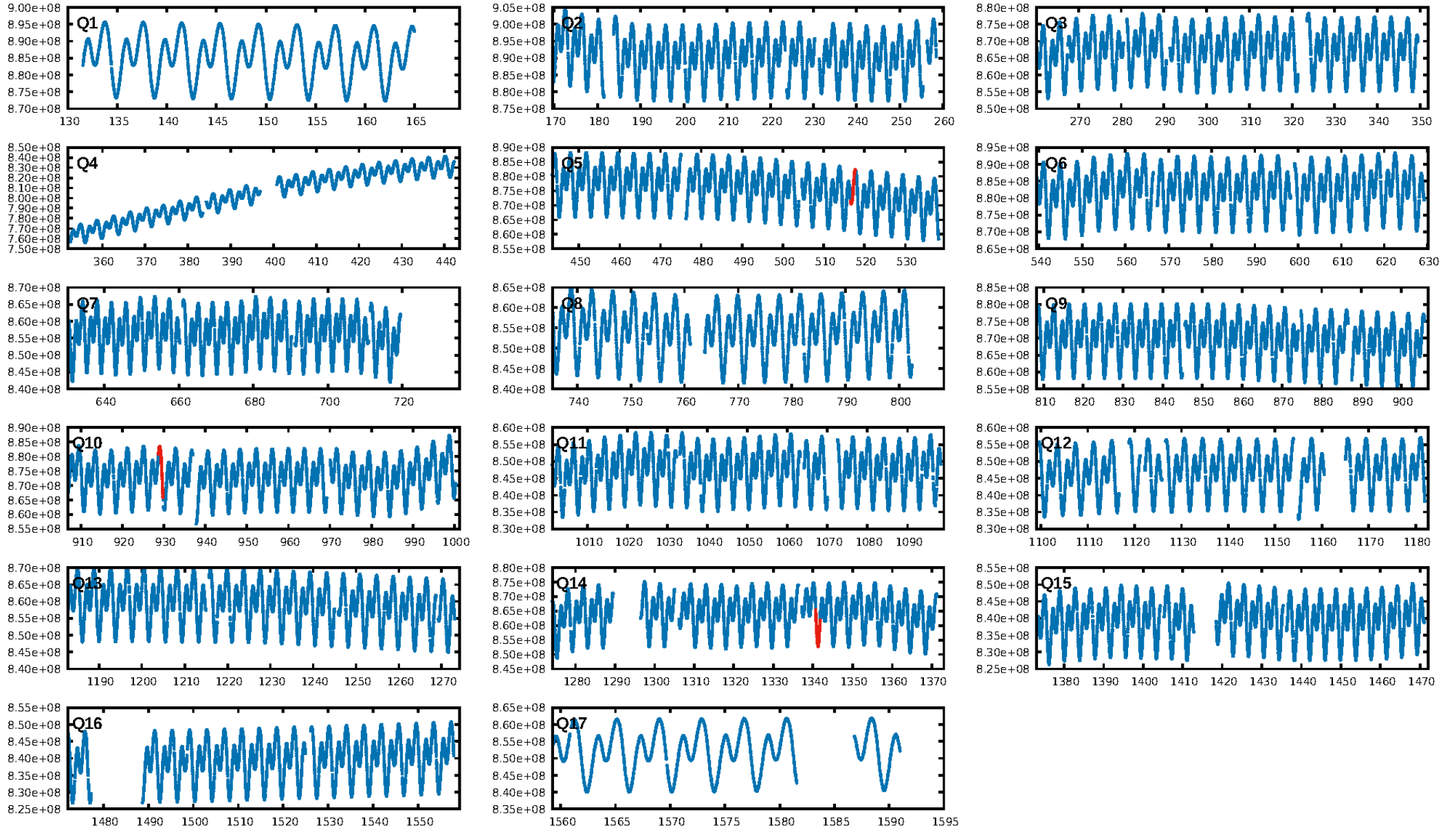
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [69.19 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 1.0%  
ModelChiSquareGof-sig: 99.2%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.18  
Centroid-sig: N/A  
Centroid-so: 10.135 arcsec [3.90 $\sigma$ ]  
OotOffset-rm: 4.031 arcsec [3.00 $\sigma$ ]  
KicOffset-rm: 3.505 arcsec [2.27 $\sigma$ ]  
OotOffset-st: 1/0/0/1 [2]  
KicOffset-st: 1/0/0/1 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 0.00 [0/2]

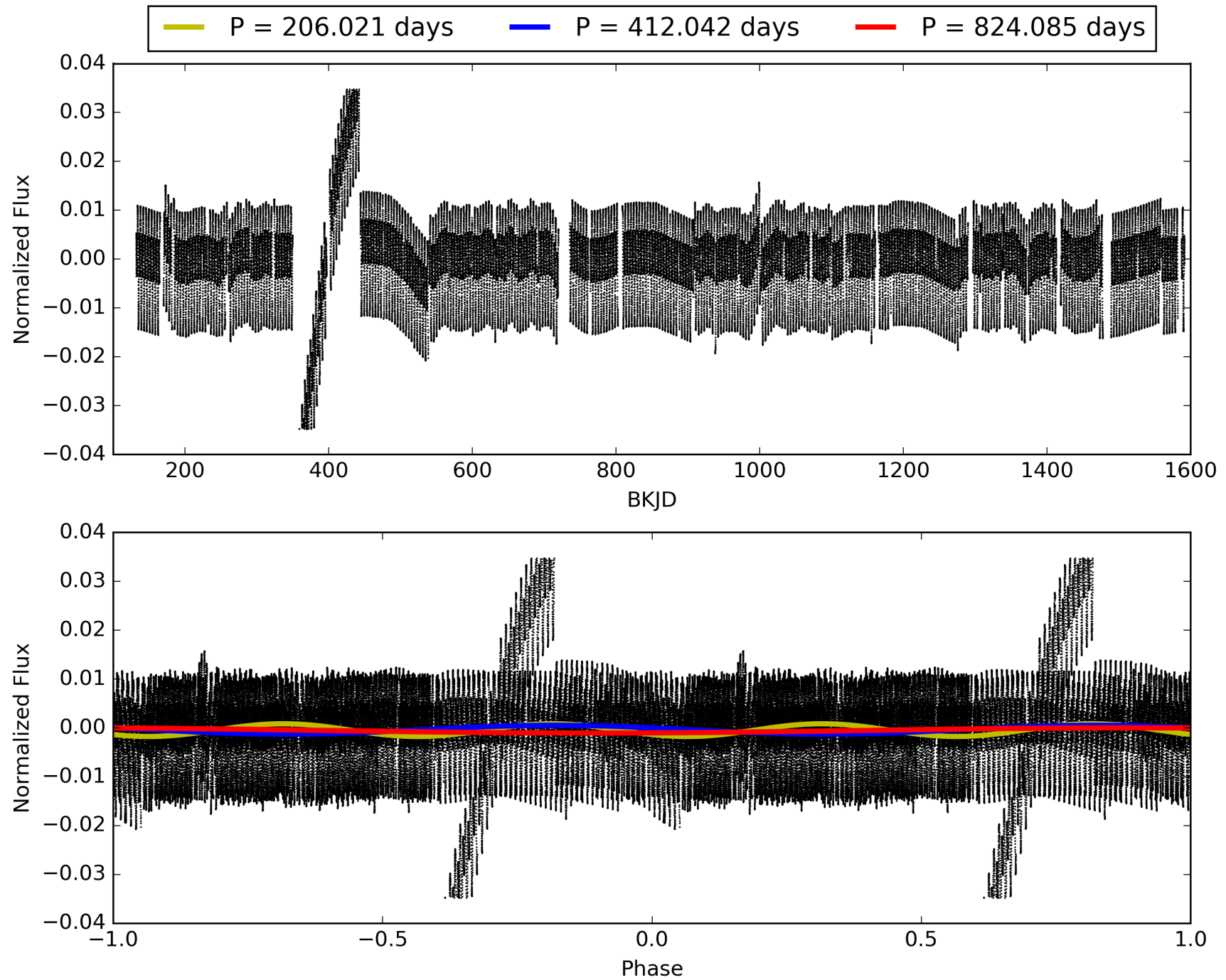
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 01:03:33 Z

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

# TCE 004647715-02, PDC Light Curves



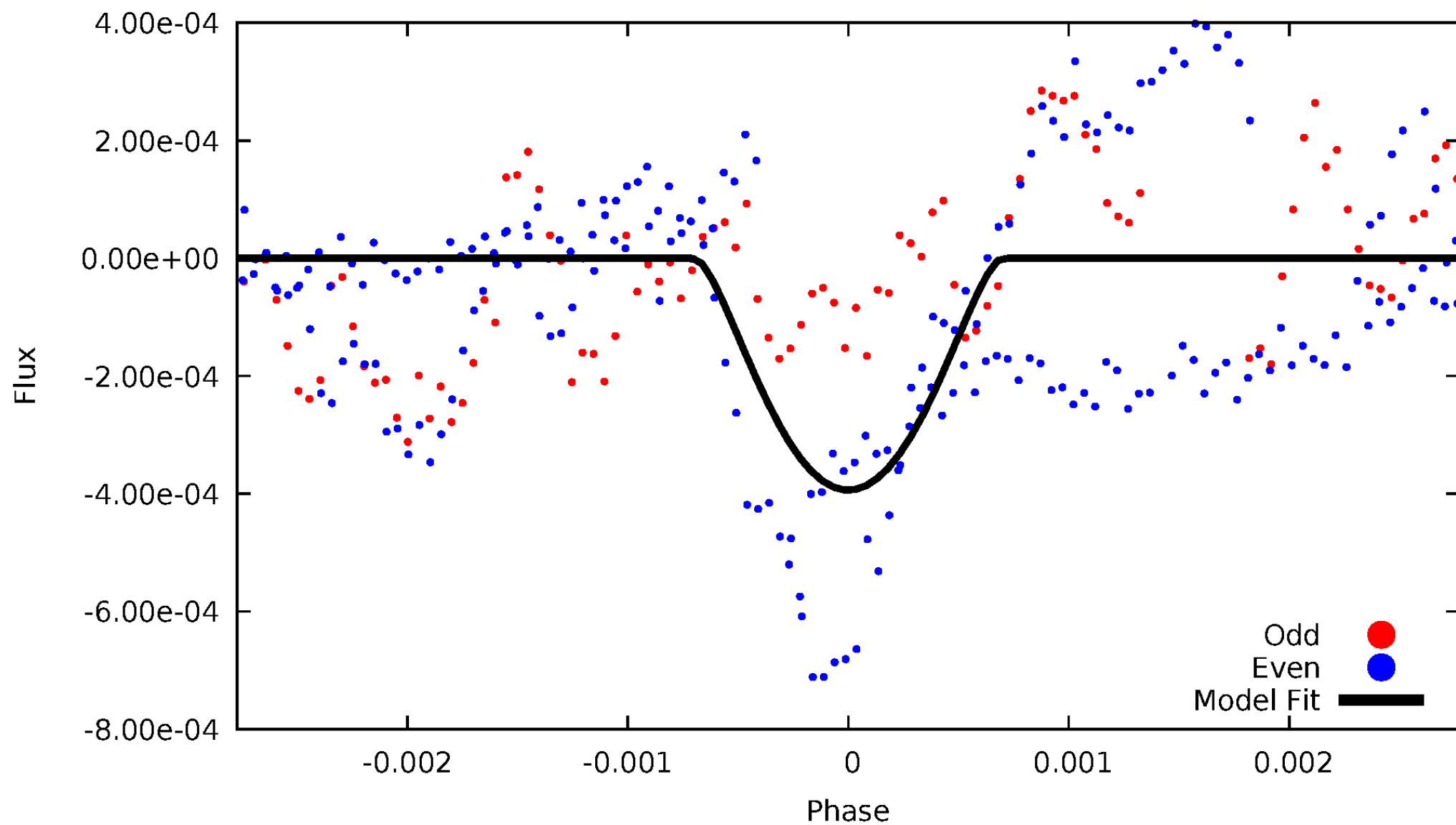
TCE 004647715-02





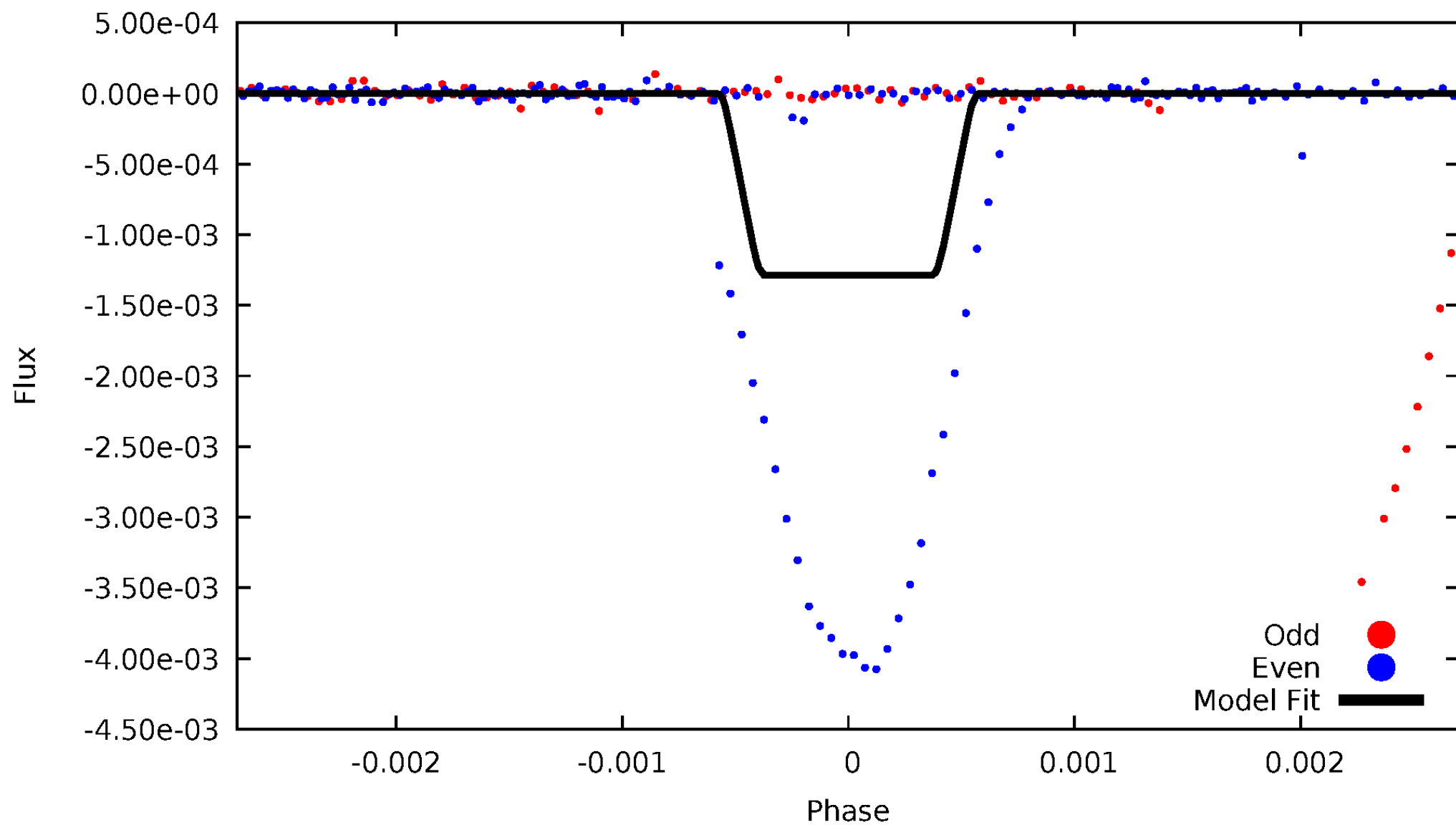
# DV Odd/Even

TCE 004647715-02



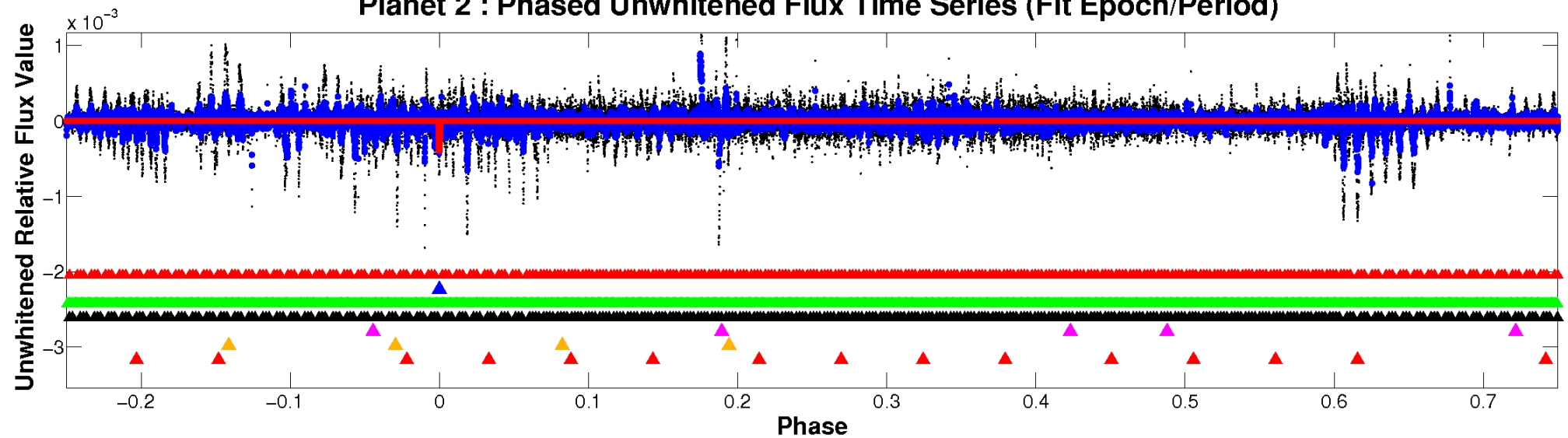
# ALT Odd/Even

TCE 004647715-02

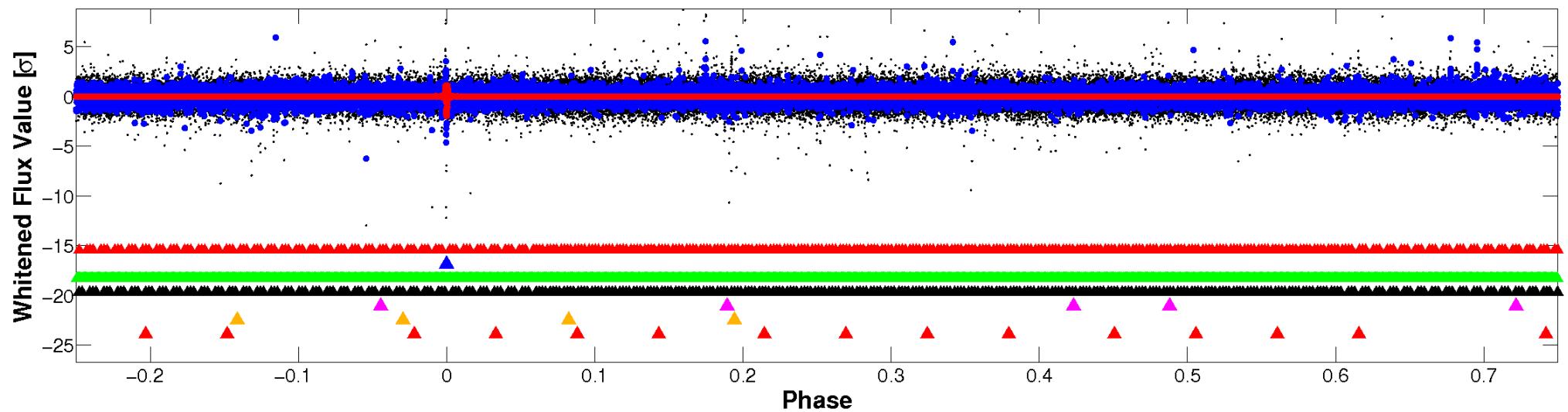


# Non-Whitened Vs. Whitened Light Curve

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

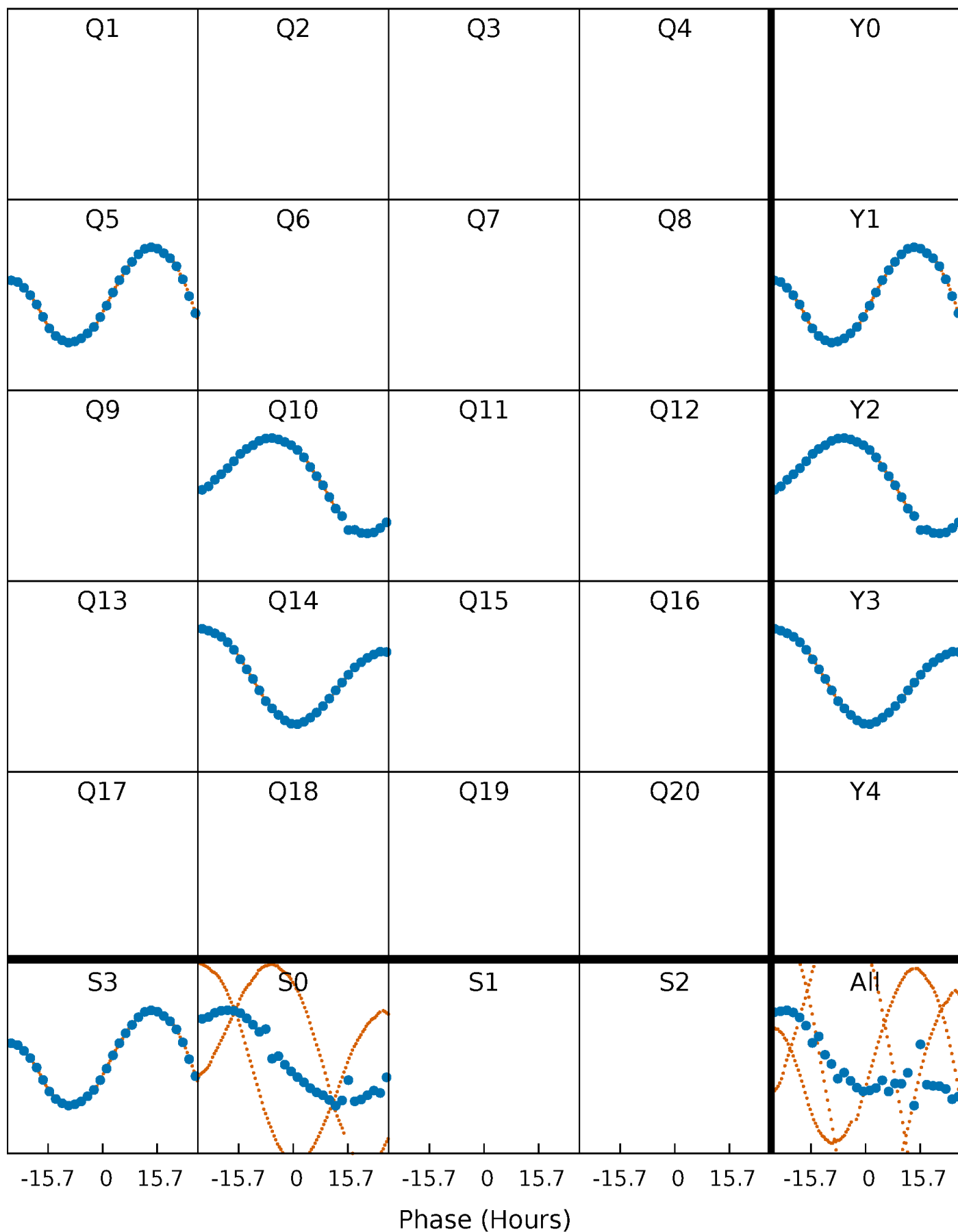


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



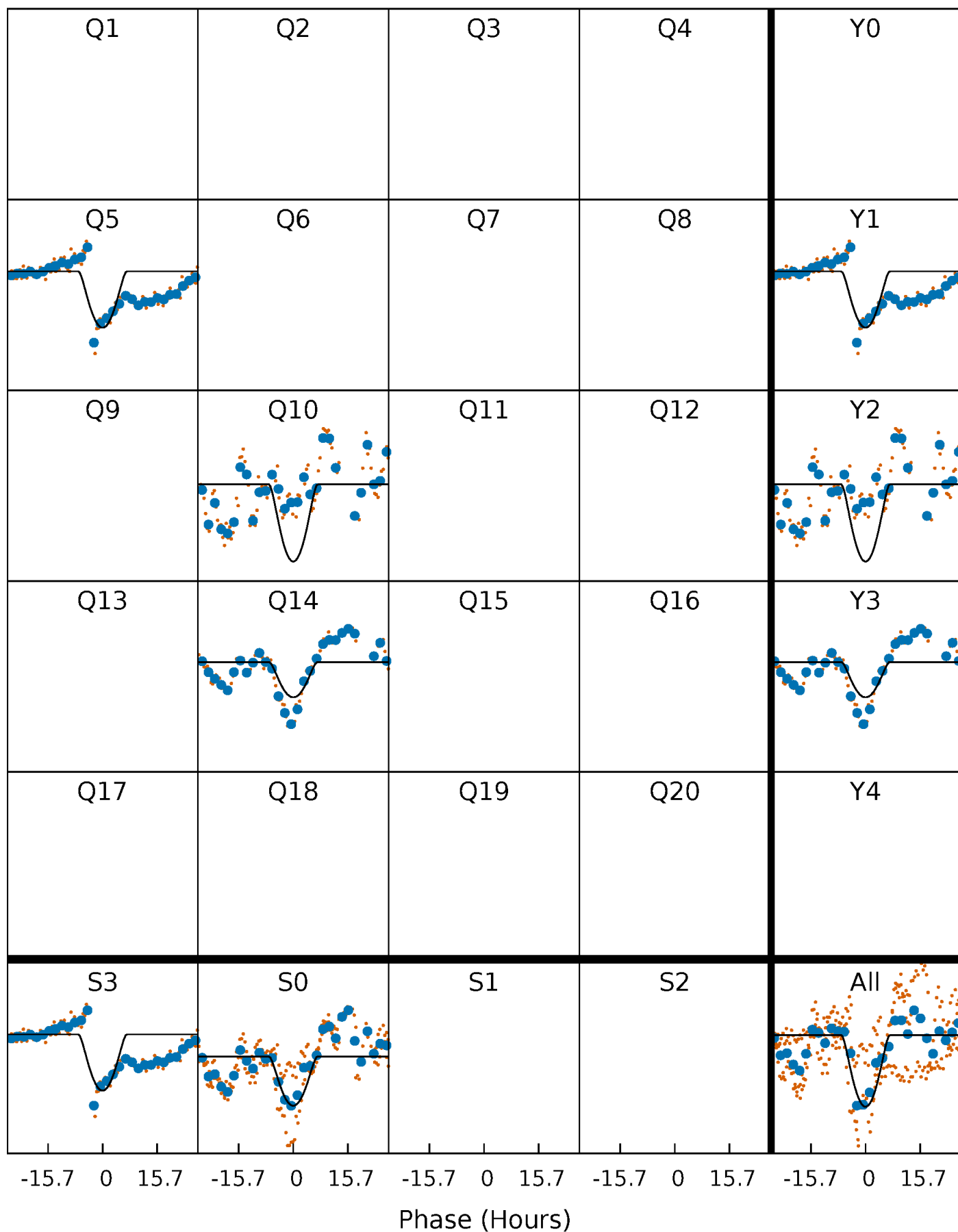
# PDC Quarter-Phased Transit Curves

TCE 004647715-02 P=412.042472 Days  $T_0=517.165167$  (BKJD)



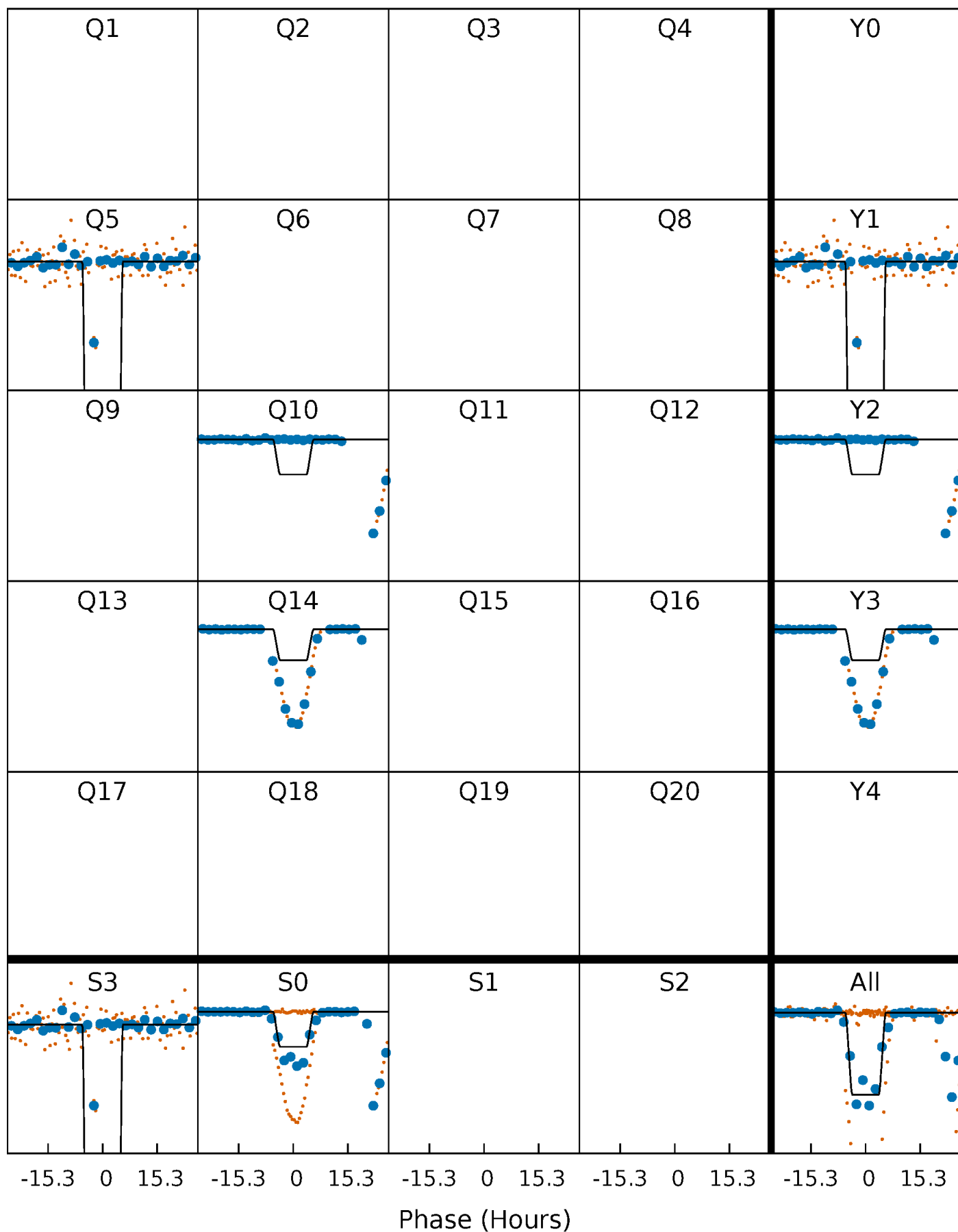
# DV Quarter-Phased Transit Curves

TCE 004647715-02     $P=412.042472$  Days     $T_0=517.165167$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 004647715-02 P=411.988248 Days  $T_0=517.156297$  (BKJD)

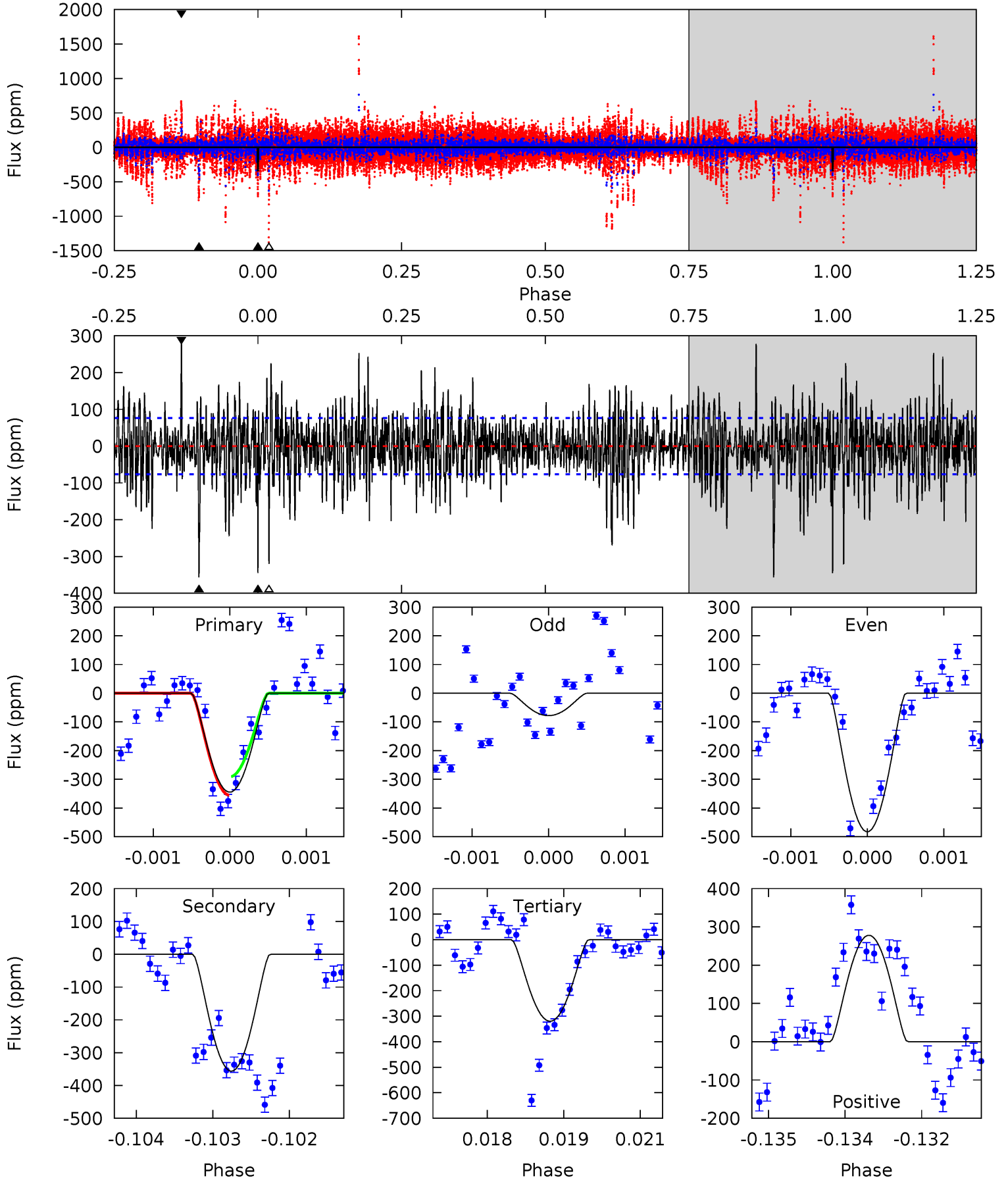




# DV Model-Shift Uniqueness Test

004647715-02, P = 412.042472 Days, E = 105.122695 Days

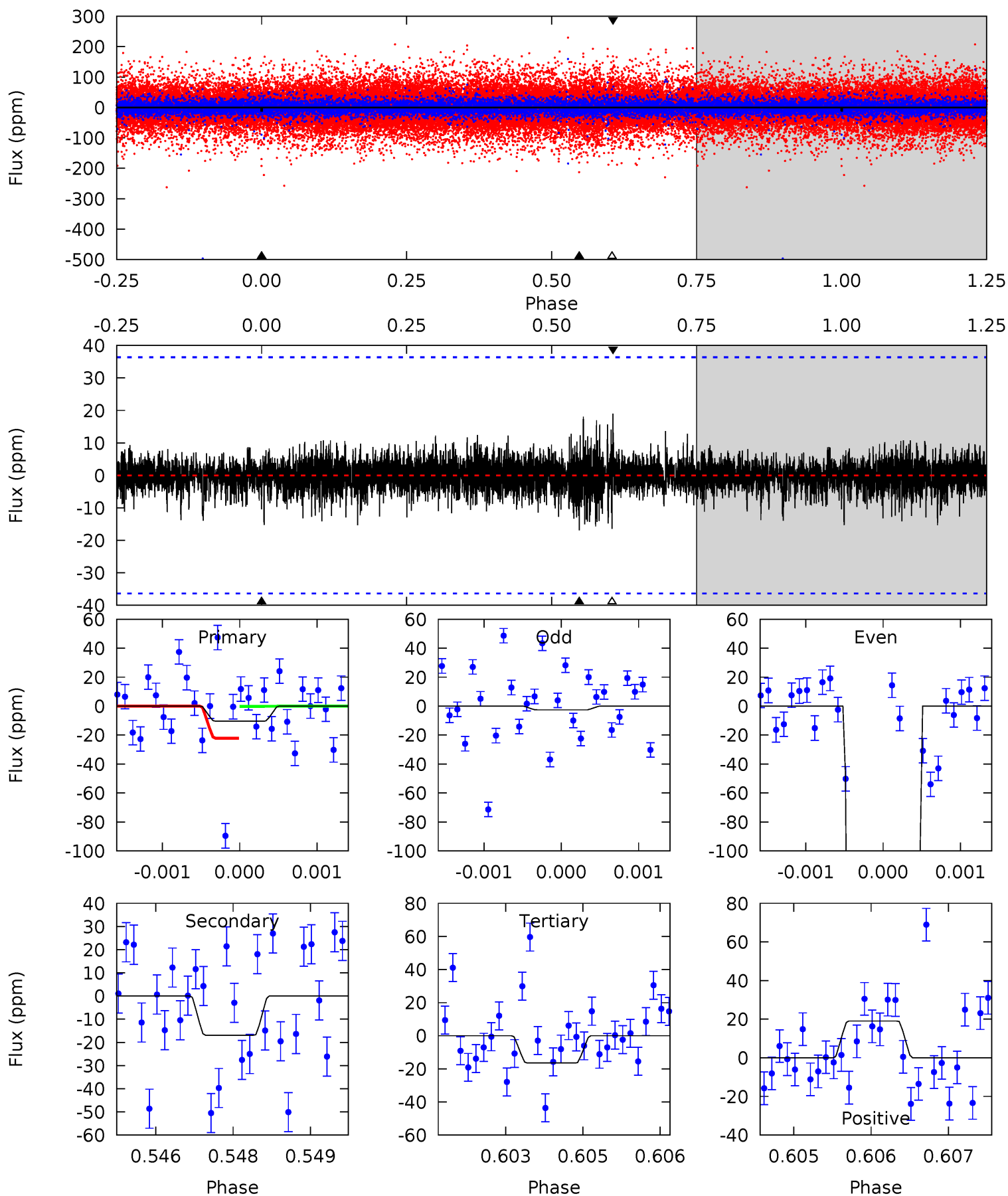
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 24.3 | 25.1 | 22.5 | 19.6 | 5.39            | 3.20            | 4.58             | 1.77    | 4.71    | 2.57    | 5.52    | 11.9    | 0.92 | 0.44  | 2.29 |



# Alt Model-Shift Uniqueness Test

004647715-02, P = 411.988248 Days, E = 105.168049 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  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 1.55 | 2.53 | 2.46 | 2.84 | 5.43            | 3.25            | 0.52             | -0.91   | -1.29   | 0.07    | -0.32   | 94.3    | 53.1 | 0.53  | 1.65 |



### Stellar Parameters For KIC 004647715

|        | $T_{\text{eff}} (K)$  | $\log(g)$                 | $[\text{Fe}/\text{H}]$    | $R (R_{\odot})$           | $M (M_{\odot})$           | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|-----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
|        | $9554^{+381}_{-1621}$ | $3.584^{+0.459}_{-0.081}$ | $0.560^{+0.050}_{-0.150}$ | $4.884^{+0.446}_{-2.527}$ | $3.340^{+0.063}_{-1.192}$ | $0.040^{+0.185}_{-0.010}$                 |
|        | +4%/-17%              | +13%/-2%                  | +9%/-27%                  | +9%/-52%                  | +2%/-36%                  | +459%/-26%                                |
| Source | SPE68                 | SPE68                     | SPE68                     | DSEP                      |                           |   |

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 004647715-02 / KOI

| Detrend | Depth (ppm)   | $R_p (R_{\oplus})$        | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$   | $A_{\text{obs}}$      |
|---------|---------------|---------------------------|----------------------|------------------------|-----------------------|
| DV      | $-356 \pm 14$ | $19.56^{+20.04}_{-12.88}$ | $948^{+122}_{-153}$  | $5709^{+4964}_{-1420}$ | $1255^{+9304}_{-932}$ |
| Alt.    | $-17 \pm 7$   | $22.25^{+18.42}_{-13.91}$ | $953^{+114}_{-165}$  | $3131^{+1163}_{-548}$  | $45^{+276}_{-34}$     |

$T_{\text{max}}$  = 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

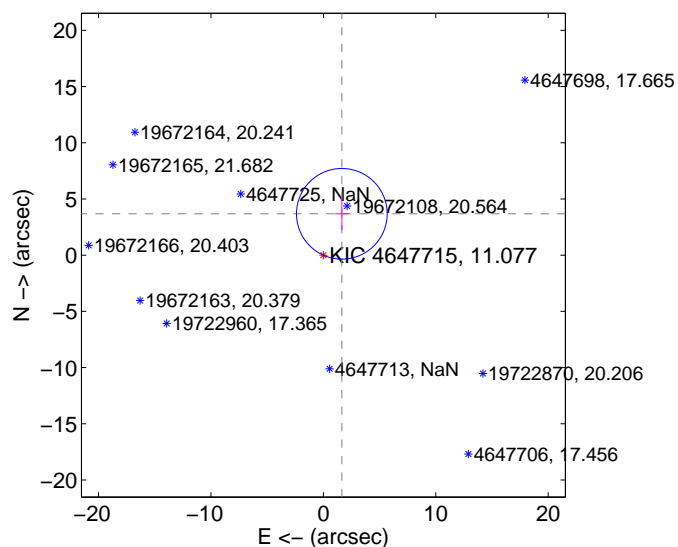
Supplemental centroid analysis for 004647715-02. **Kepler magnitude: 11.08.** Transit SNR 13.68

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

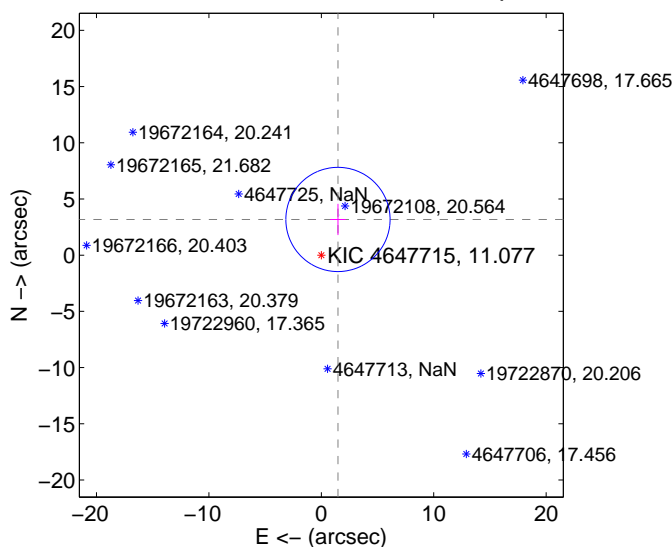
The direct PRF centroid is offset from the target star catalog position by about 0.59 arcsec

|   | Distance in arcsec                 | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec      |
|---|------------------------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT          | $4.031 \pm 1.344$                  | 3.00                | $-1.644 \pm 0.599$ | $3.680 \pm 1.448$ |
| PRF-fit source offset from KIC position | $3.505 \pm 1.545$                  | 2.27                | $-1.480 \pm 0.682$ | $3.177 \pm 1.388$ |
| photometric centroid source offset      | <b><math>10.13 \pm 2.60</math></b> | <b>3.90</b>         | $3.65 \pm 1.81$    | $9.46 \pm 2.70$   |

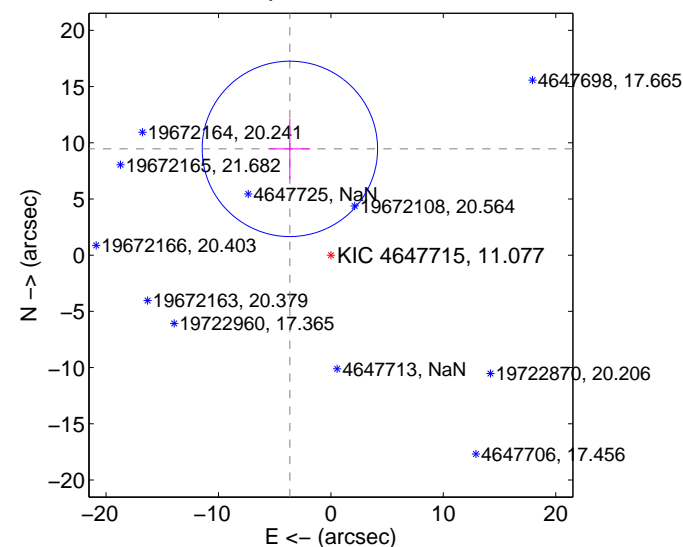
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

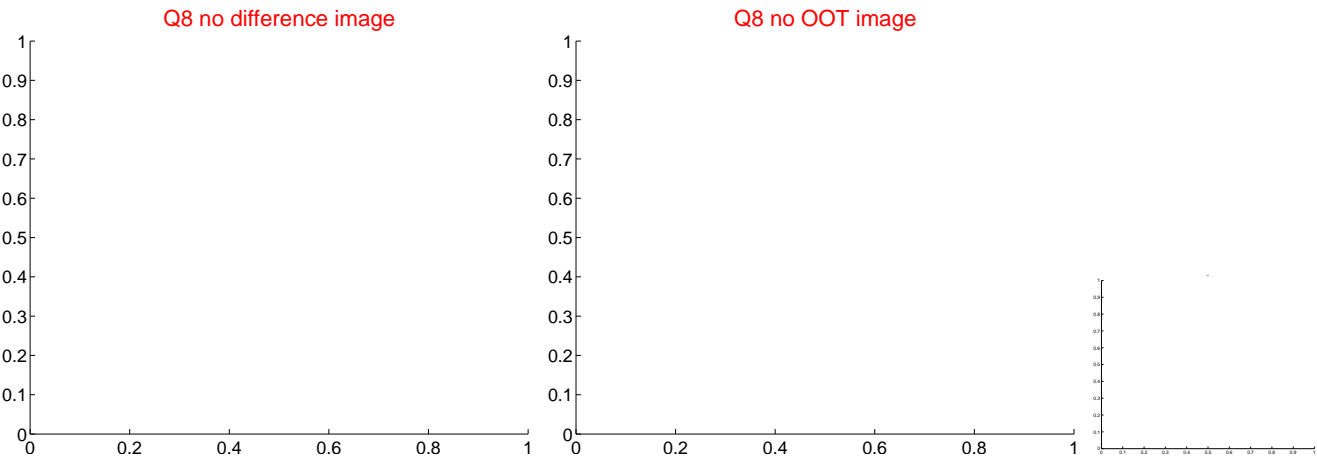
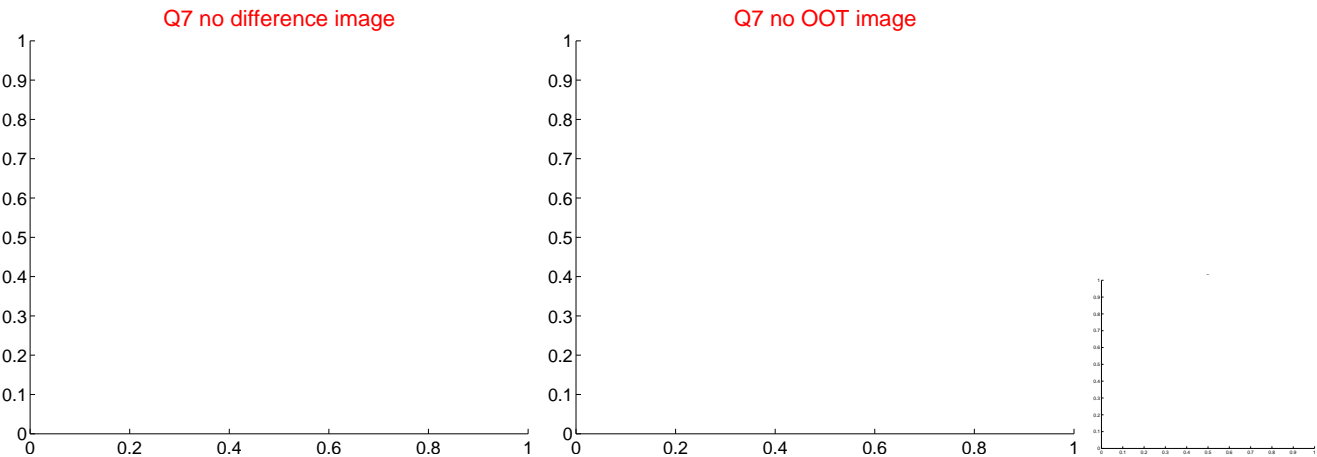
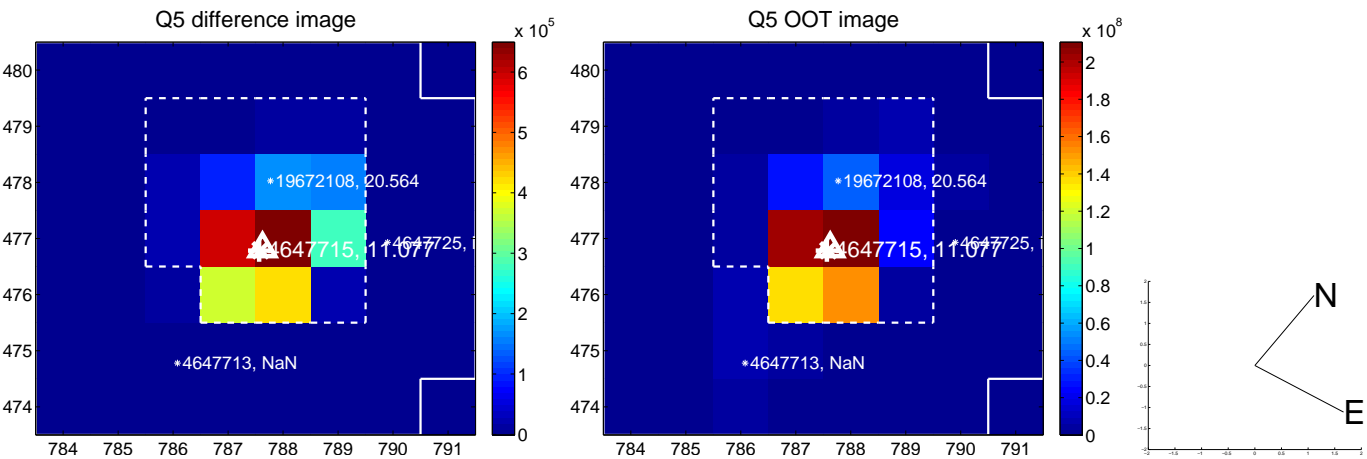


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: 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 ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

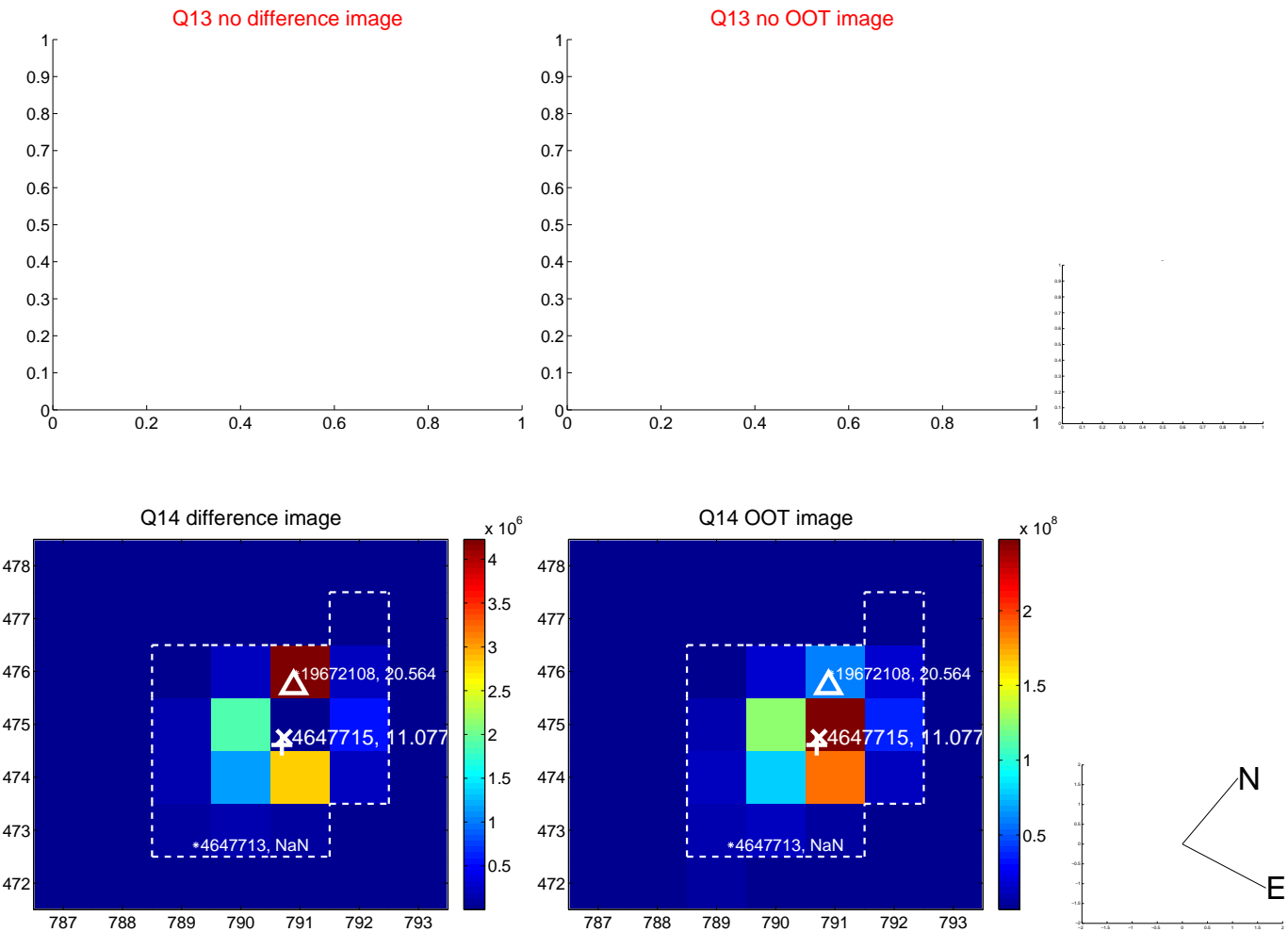




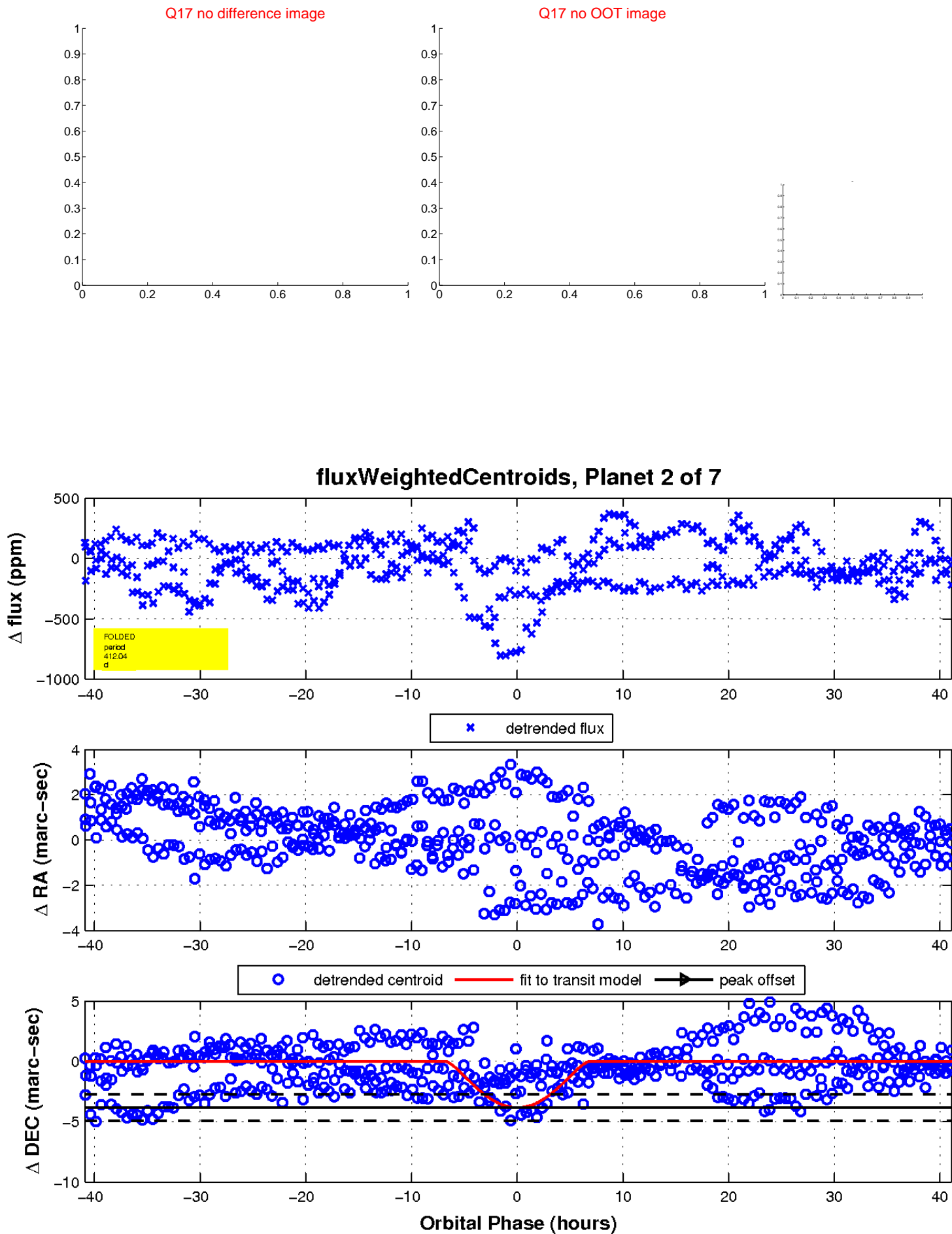
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



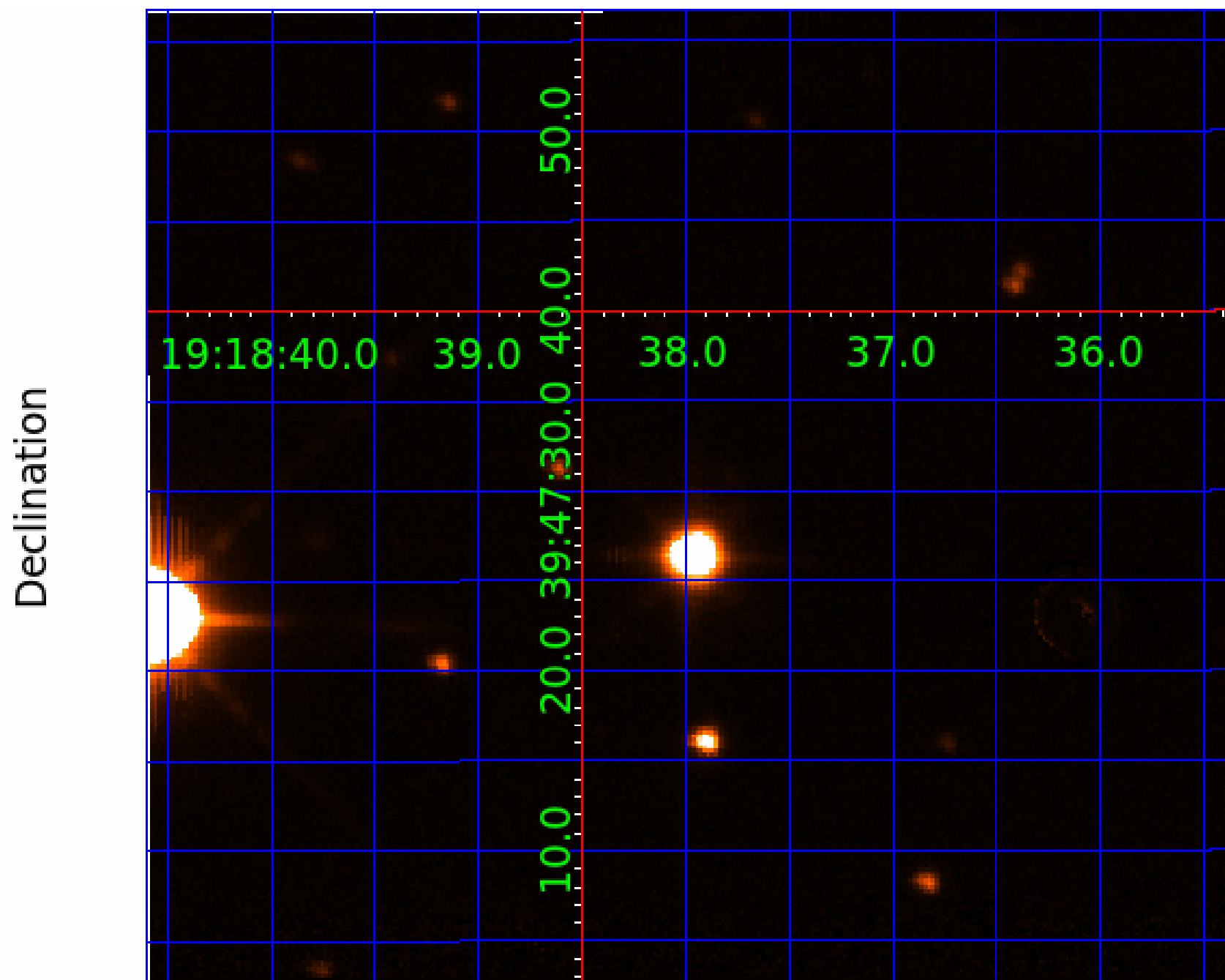
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 004647715

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 004647715-01 | OBS      | No   | 3.879075      | 131.835148   | 60.8        | 1.379            | 23.9 | 25.8 | 4.88                        | 9554            | 4.46                   | 34133.56               |
| 004647715-02 | OBS      | No   | 412.042472    | 517.165167   | 393.6       | 13.710           | 23.1 | 13.7 | 4.88                        | 9554            | 17.86                  | 67.85                  |
| 004647715-03 | OBS      | No   | 1.292996      | 131.687196   | 2.7         | 5.723            | 17.6 | 2.8  | 4.88                        | 9554            | 0.93                   | 147691.79              |
| 004647715-04 | OBS      | No   | 3.879084      | 132.631335   | 22.7        | 7.668            | 16.2 | 9.8  | 4.88                        | 9554            | 2.75                   | 34133.45               |
| 004647715-06 | OBS      | No   | 365.960393    | 185.167645   | 230.9       | 8.221            | 11.3 | 10.6 | 4.88                        | 9554            | 7.95                   | 79.48                  |
| 004647715-07 | OBS      | No   | 97.345971     | 164.122956   | 82.9        | 7.500            | 9.6  | -1.0 | 4.88                        | 9554            | 4.55                   | 464.58                 |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments  |
|--------------|----------|------|-------|---|---|---|---|---|
| 004647715-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | SWEET_NTL—LPP_DV—CENT_SATURATED   |
| 004647715-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED |
| 004647715-03 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED  |
| 004647715-04 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE_ZUMA—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED                         |
| 004647715-06 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_CHASES_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED                 |
| 004647715-07 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—INCONSISTENT_TRANS—CENT_SATURATED               |

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

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

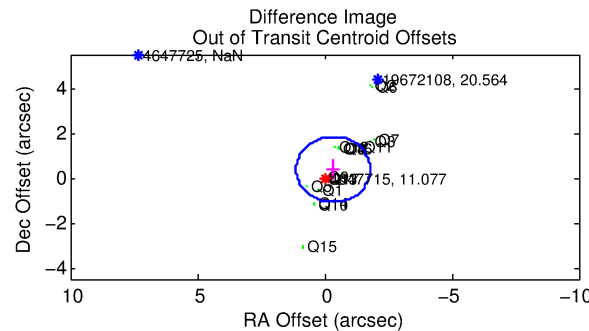
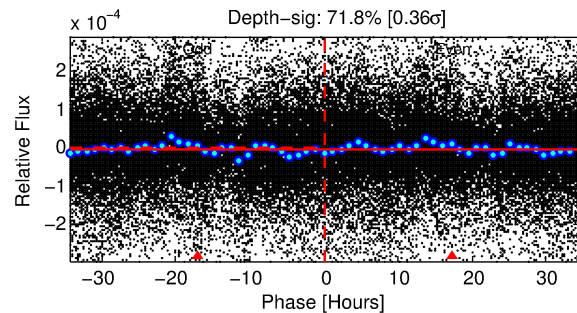
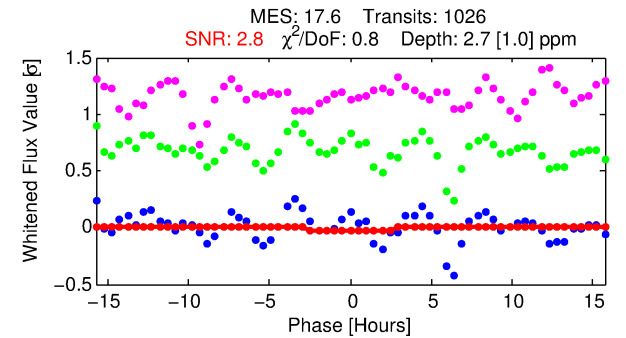
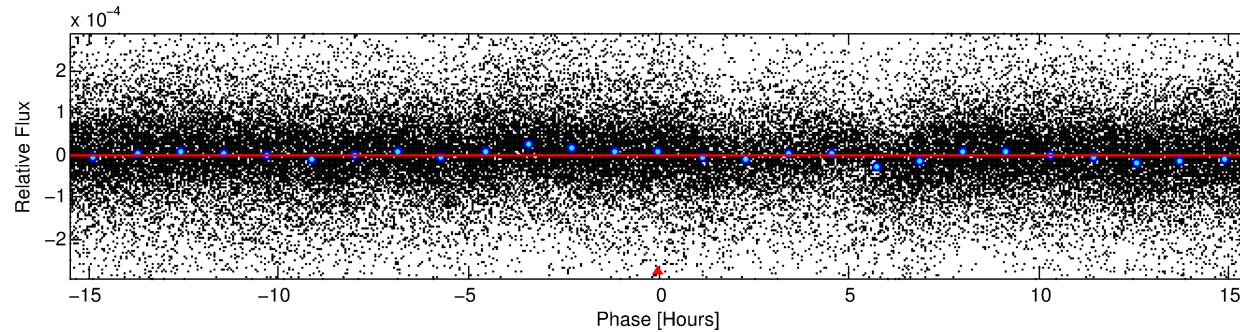
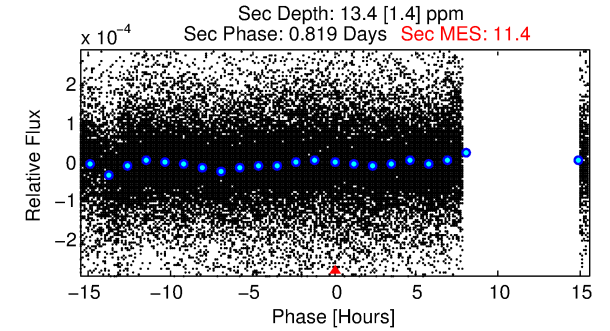
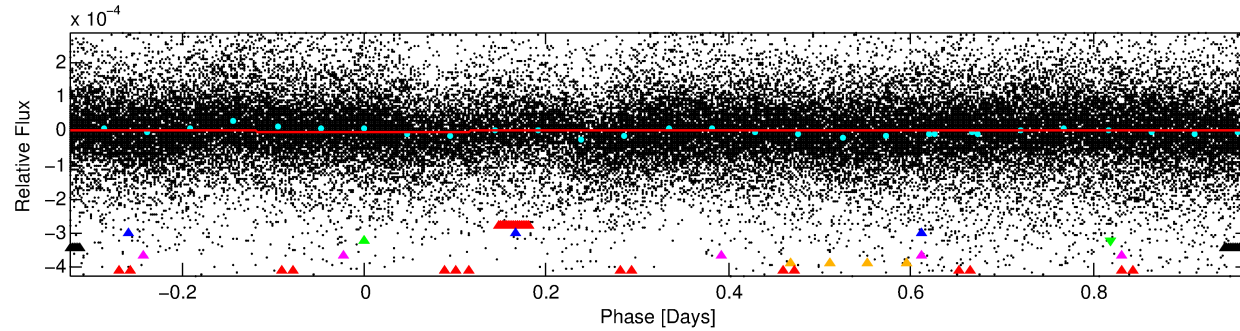
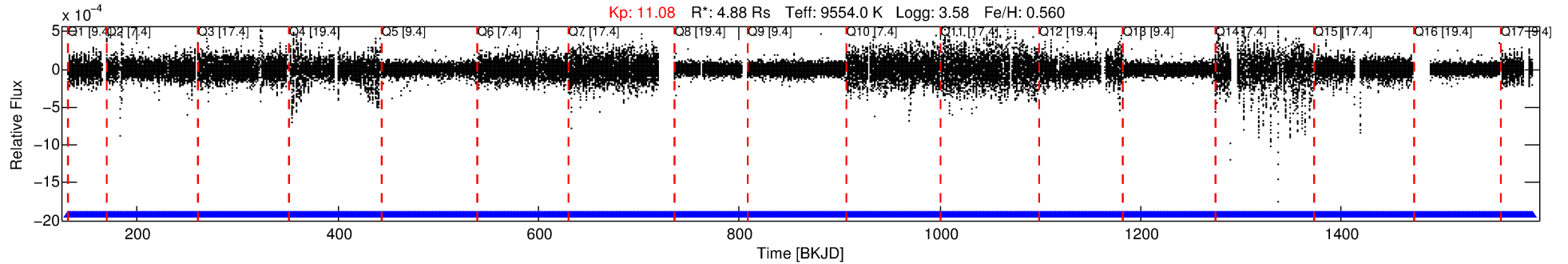
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 004647715-03

No Significant Match Found

# DV One-Page Summary

KIC: 4647715 Candidate: 3 of 7 Period: 1.293 d



## DV Fit Results:

Period = 1.29300 [0.00005] d  
Epoch = 131.6872 [0.0117] BKJD  
Rp/R\* = 0.0017 [0.0005]  
a/R\* = 1.20 [0.61]  
b = 0.90 [0.34]  
Seff = 147691.79 [153202.77]  
Teq = 4999 [1296] K  
Rp = 0.93 [0.55] Re  
a = 0.0347 [0.0171] AU  
Ag = 10.34 [10.14] [0.92σ]  
Teffp = 13860 [3113] K [2.63σ]

## DV Diagnostic Results:

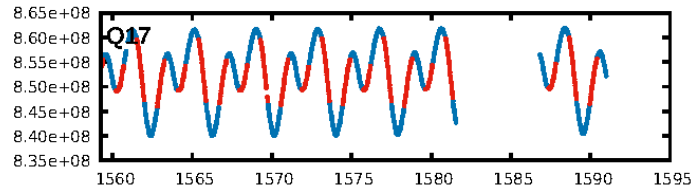
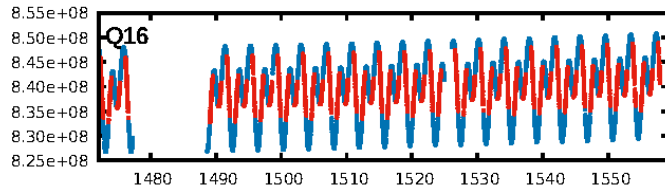
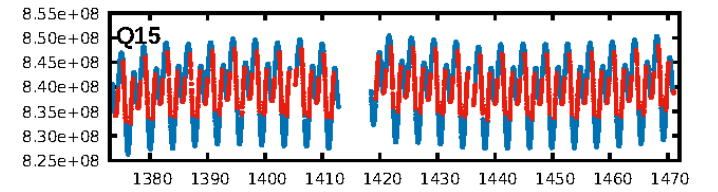
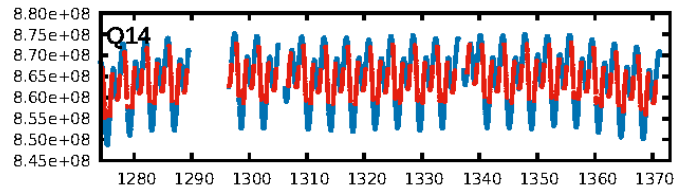
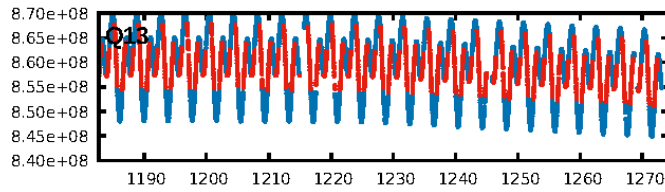
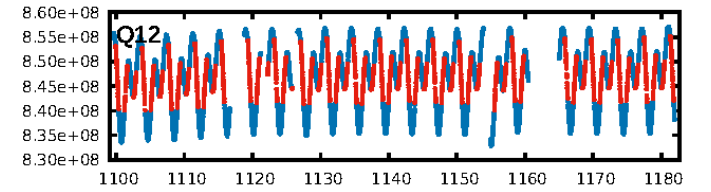
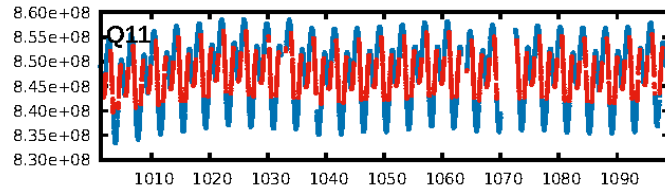
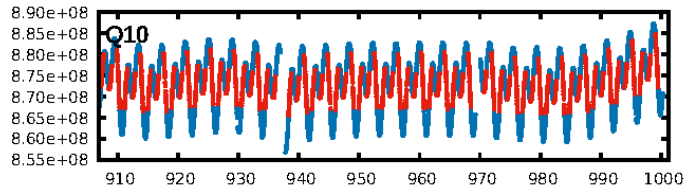
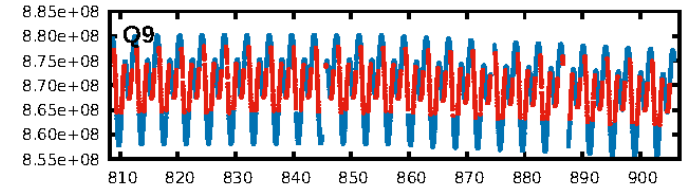
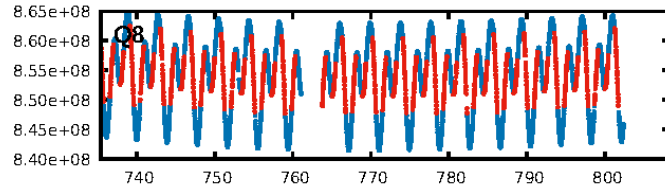
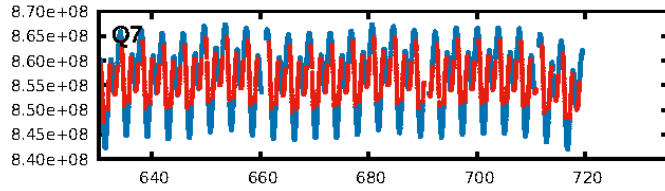
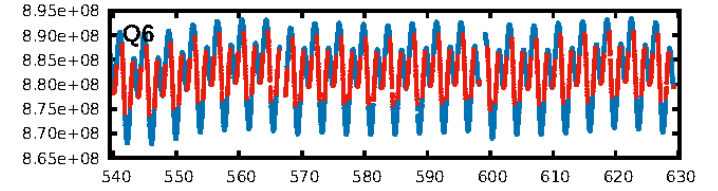
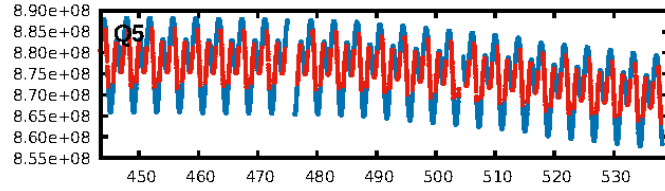
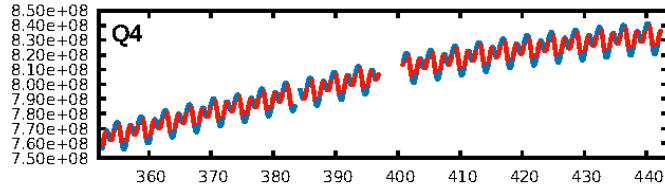
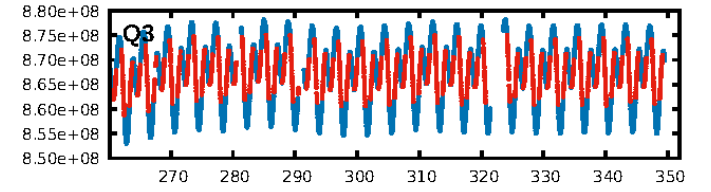
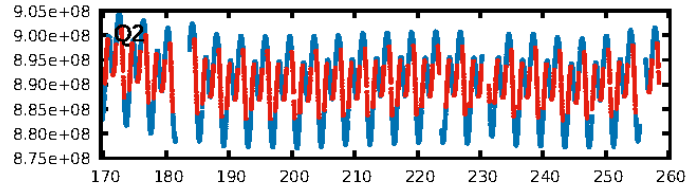
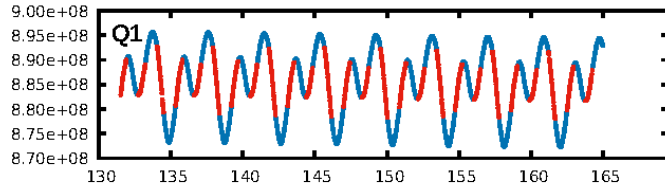
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [10.54σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [980/980]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: 0.500 arcsec [1.03σ]  
KicOffset-rm: 0.516 arcsec [1.20σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.00 [0/17]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 01:03:41 Z

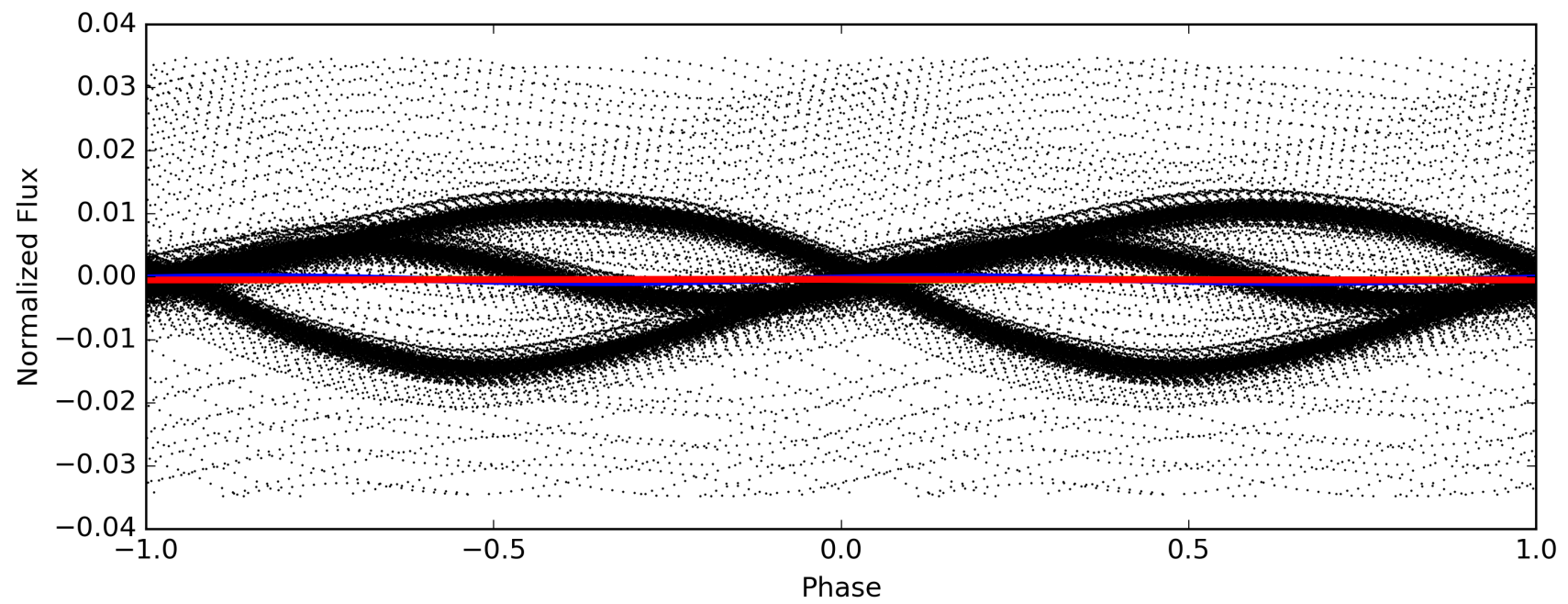
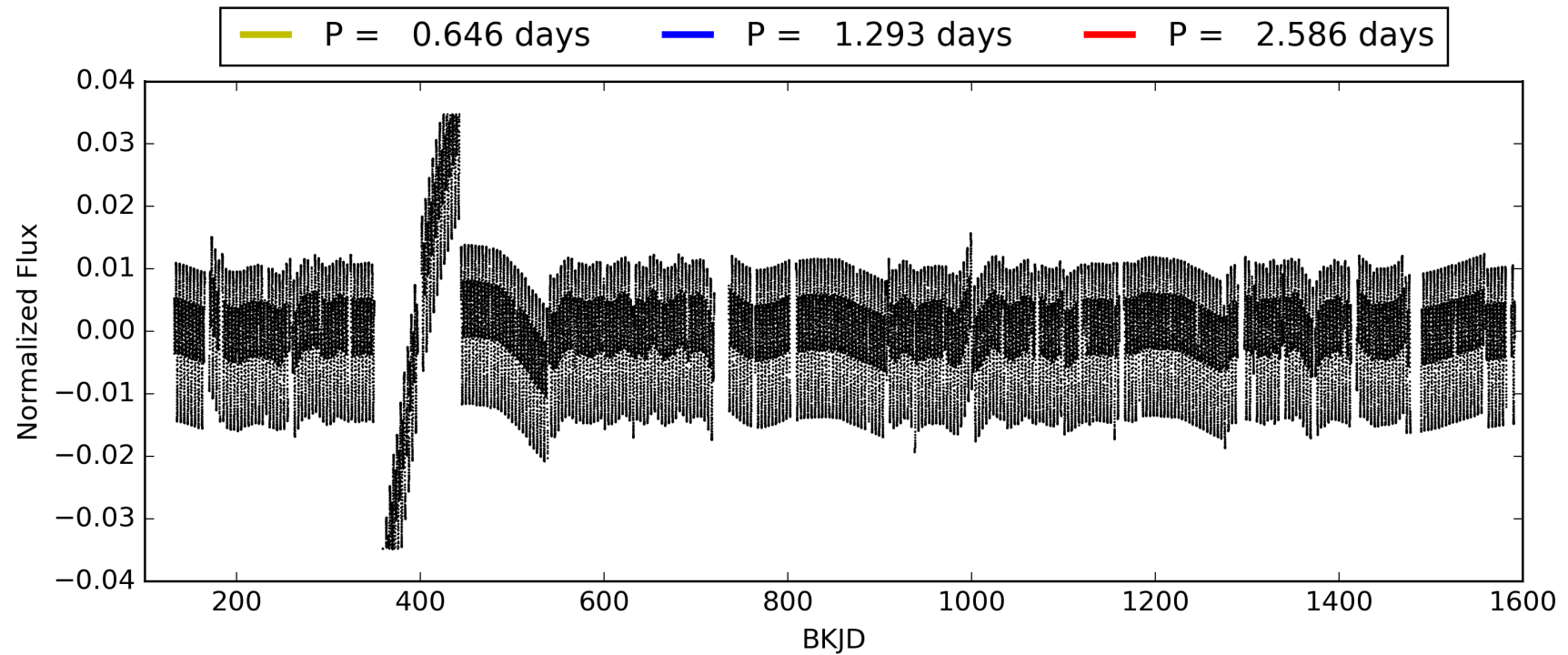
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 004647715-03, PDC Light Curves

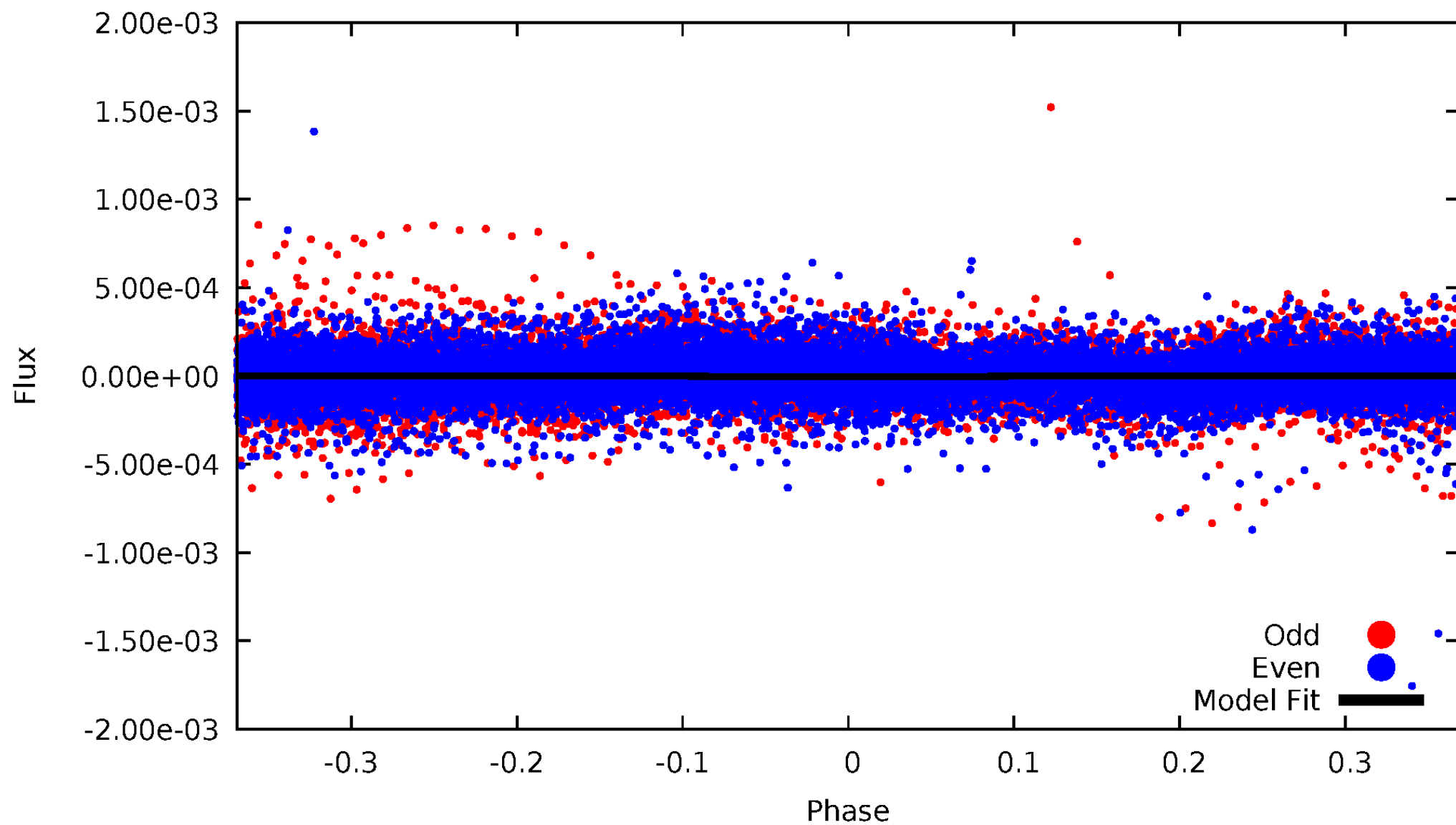


TCE 004647715-03



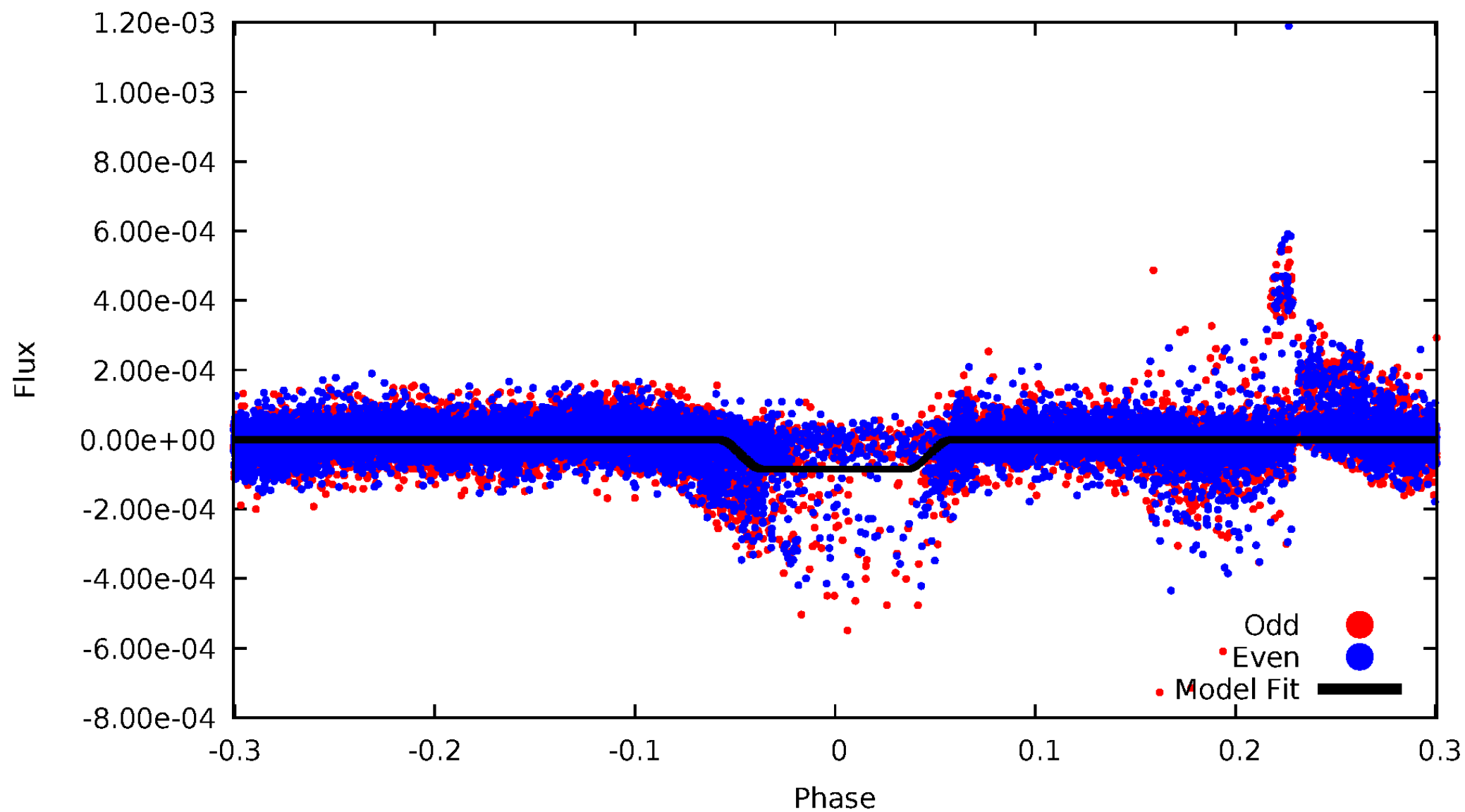
# DV Odd/Even

TCE 004647715-03



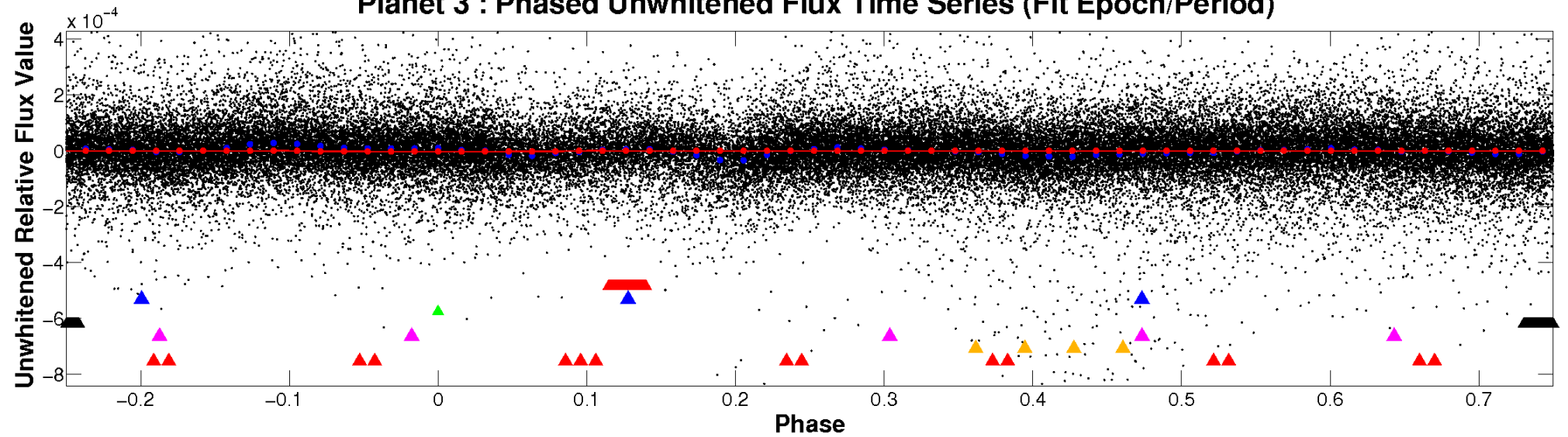
# ALT Odd/Even

TCE 004647715-03

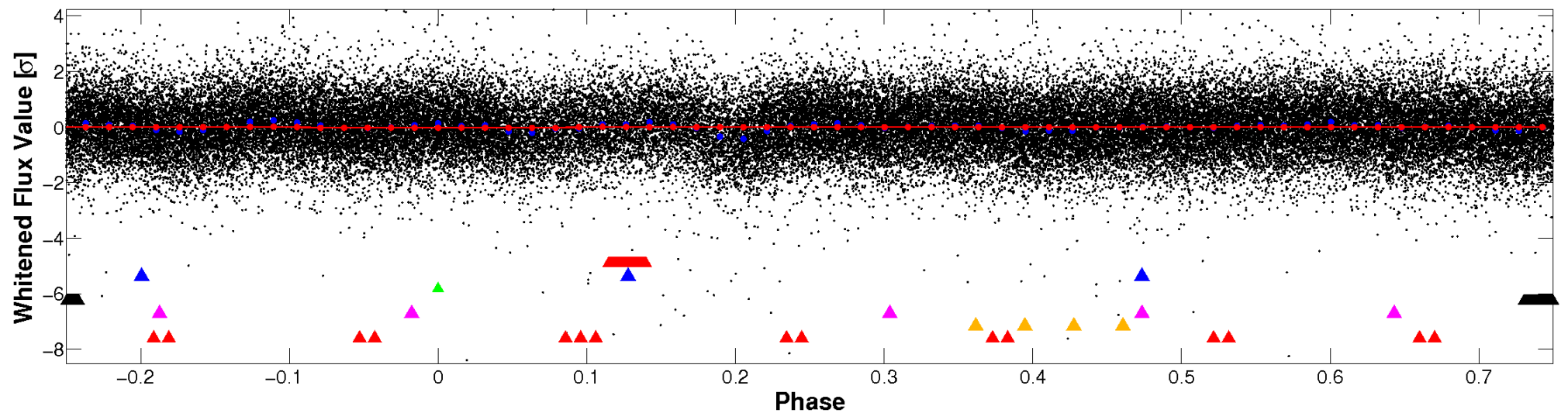


# Non-Whitened Vs. Whitened Light Curve

**Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)**



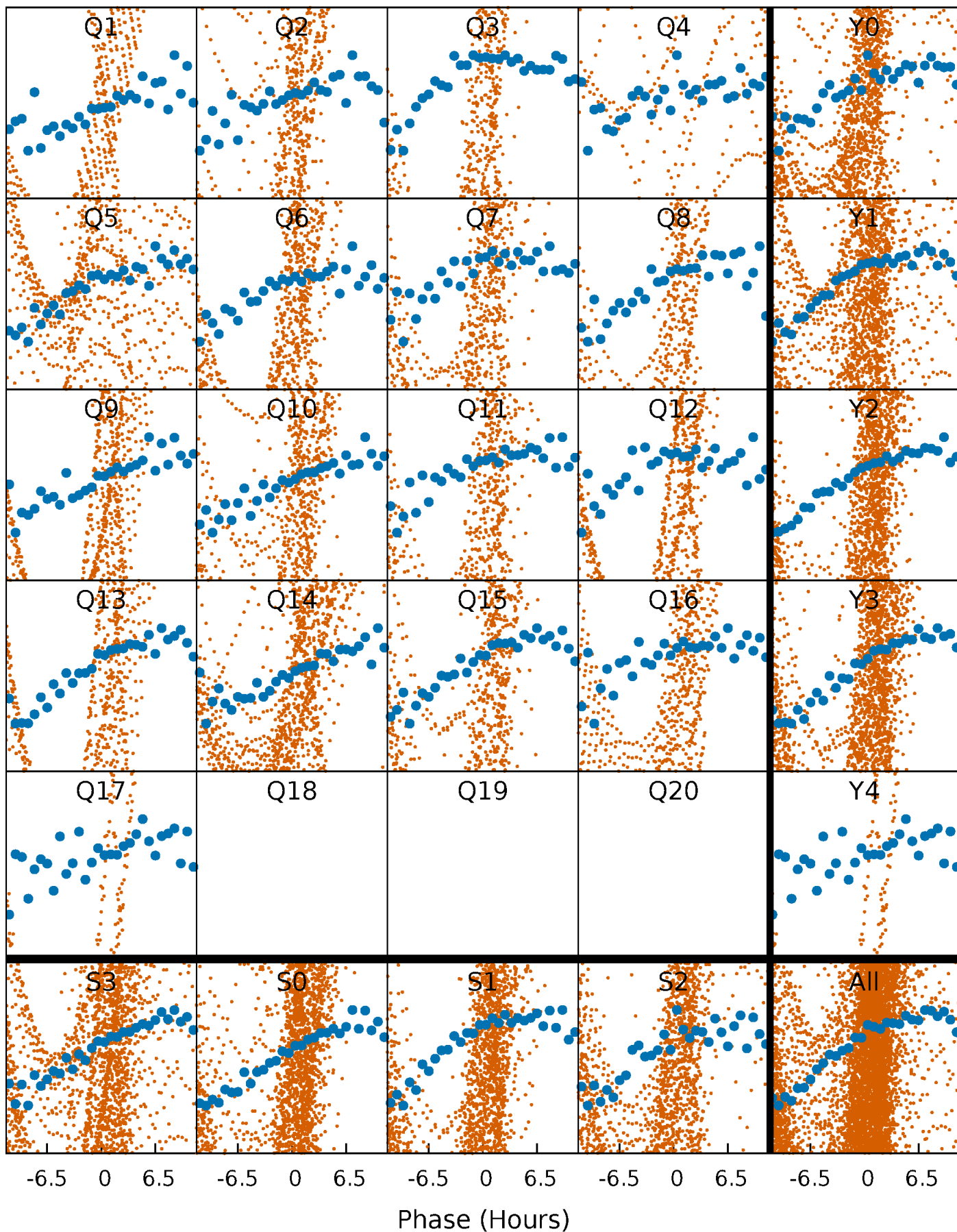
**Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

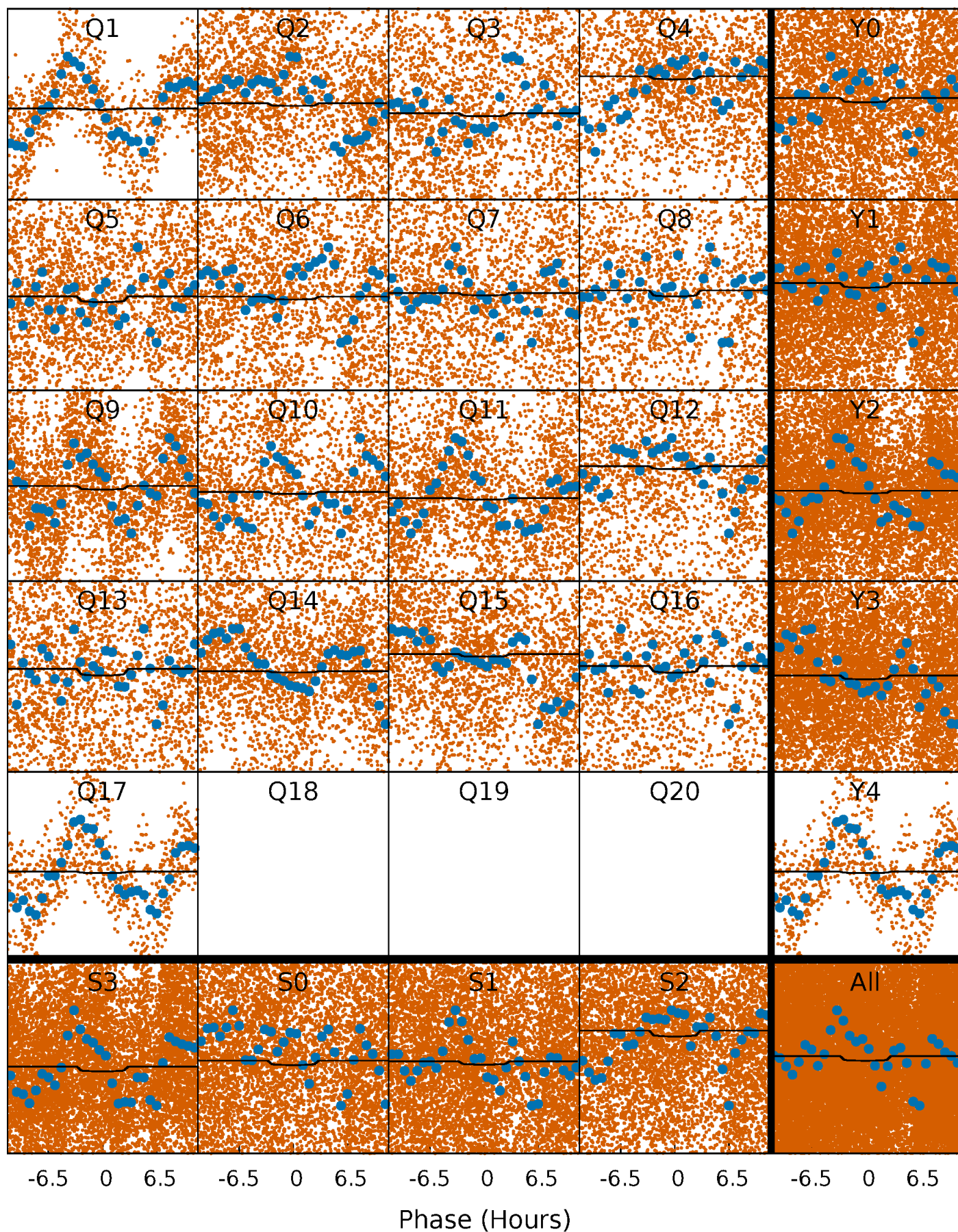
TCE 004647715-03 P= 1.292996 Days  $T_0=131.687196$  (BKJD)





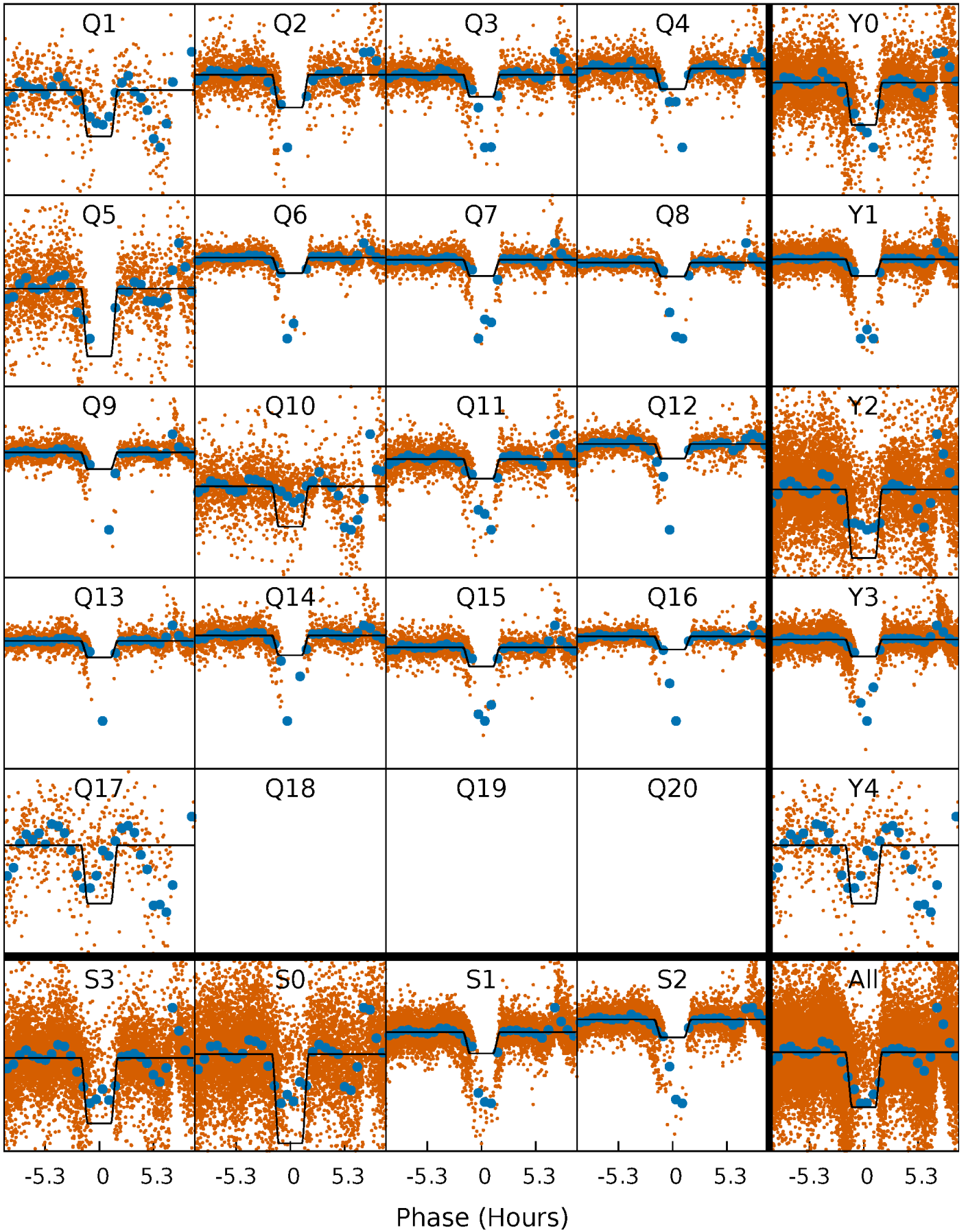
# DV Quarter-Phased Transit Curves

TCE 004647715-03     $P = 1.292996$  Days     $T_0 = 131.687196$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

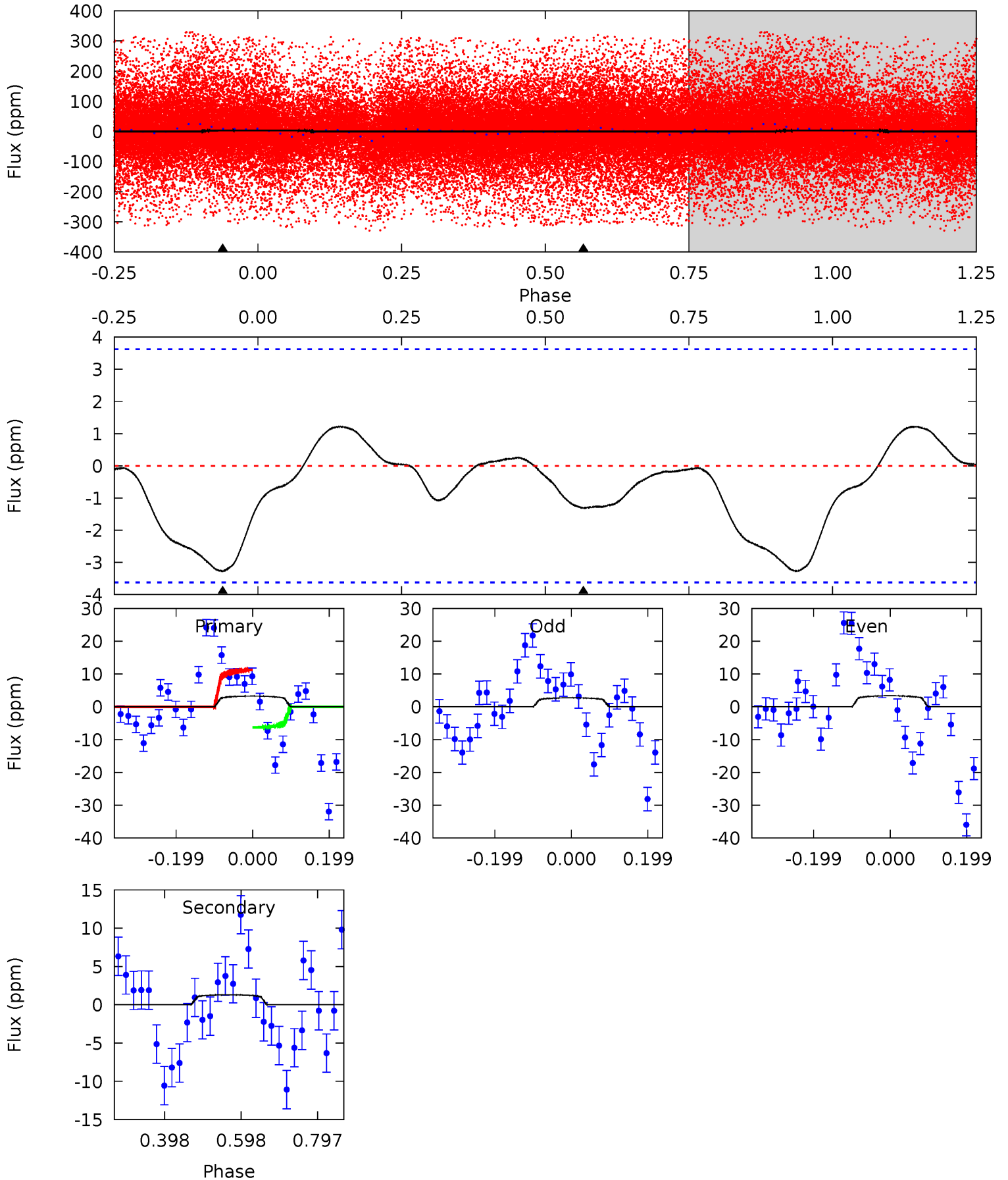
TCE 004647715-03 P= 1.293035 Days  $T_0=131.672528$  (BKJD)



# DV Model-Shift Uniqueness Test

004647715-03, P = 1.292996 Days, E = 130.394200 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  |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 3.98 | 1.60 | 0   | 0   | 4.42            | 1.28            | 0.83             | 3.98    | 3.98    | 1.60    | 1.60    | 0.38    | 2.12 | 0.27  | 2.93 |

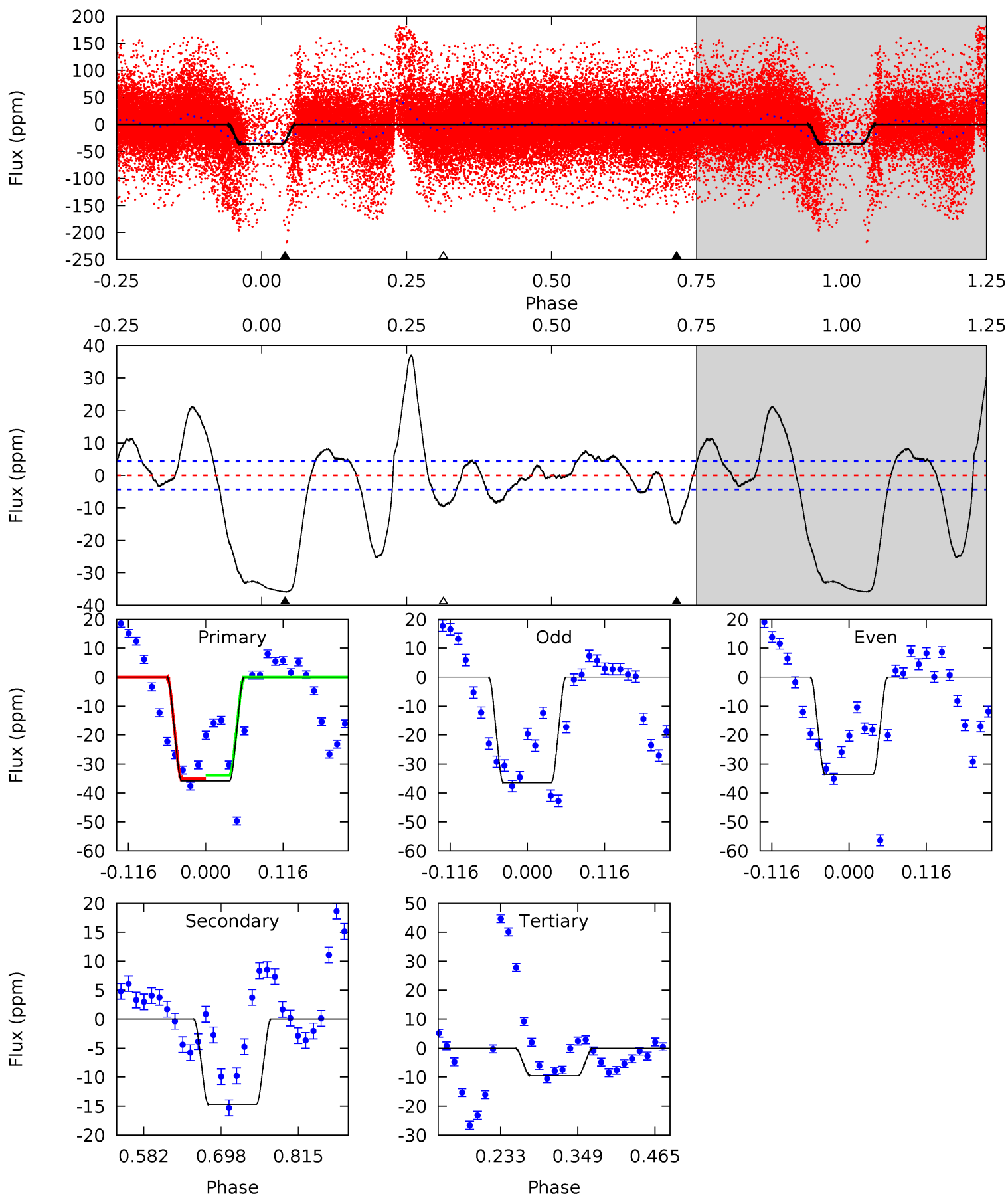




# Alt Model-Shift Uniqueness Test

004647715-03, P = 1.293035 Days, E = 130.379493 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  |
|------|------|------|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 37.2 | 15.3 | 9.92 | 0   | 4.53            | 1.57            | 11.0             | 27.3    | 37.2    | 5.37    | 15.3    | 1.50    | 2.58 | 0.51  | 0.48 |



### Stellar Parameters For KIC 004647715

|        | $T_{\text{eff}}(K)$   | $\log(g)$                 | [Fe/H]                    | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|-----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
|        | $9554^{+381}_{-1621}$ | $3.584^{+0.459}_{-0.081}$ | $0.560^{+0.050}_{-0.150}$ | $4.884^{+0.446}_{-2.527}$ | $3.340^{+0.063}_{-1.192}$ | $0.040^{+0.185}_{-0.010}$                 |
|        | +4%/-17%              | +13%/-2%                  | +9%/-27%                  | +9%/-52%                  | +2%/-36%                  | +459%/-26%                                |
| Source | SPE68                 | SPE68                     | SPE68                     | DSEP                      |                           |   |

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 004647715-03 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$     | $T_{max} (K)$         | $T_{obs} (K)$          | $A_{obs}$                 |
|---------|-------------|------------------------|-----------------------|------------------------|---------------------------|
| DV      | $-1 \pm 1$  | $0.82^{+0.32}_{-0.32}$ | $6477^{+780}_{-1248}$ | $6390^{+2428}_{-2492}$ | $1.206^{+2.112}_{-0.817}$ |
| Alt.    | $-15 \pm 1$ | $4.71^{+0.54}_{-1.18}$ | $6508^{+767}_{-1191}$ | $4338^{+687}_{-761}$   | $0.431^{+0.287}_{-0.086}$ |

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

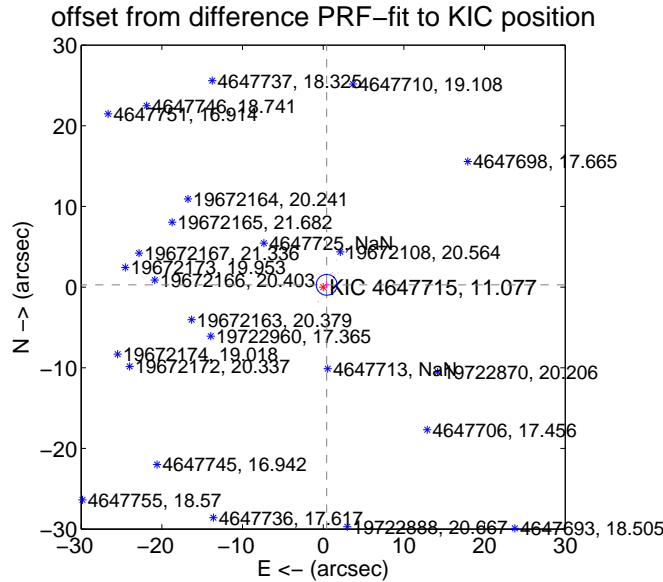
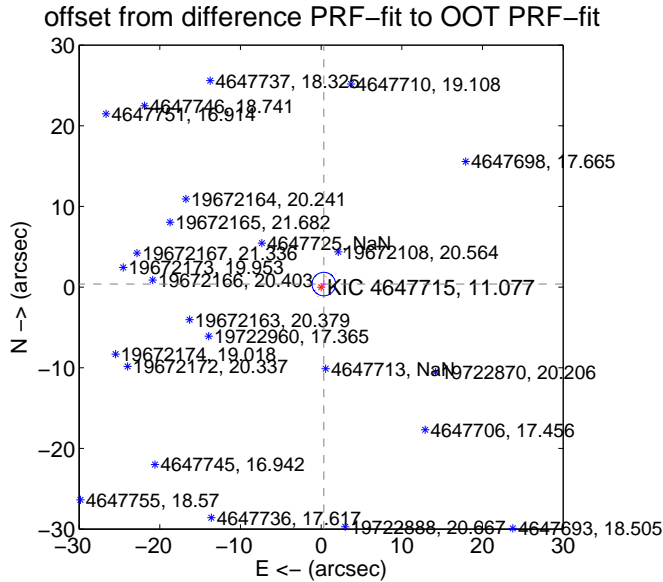
## DV Centroid Data

Supplemental centroid analysis for 004647715-03. **Kepler magnitude: 11.08.** Transit SNR 2.80

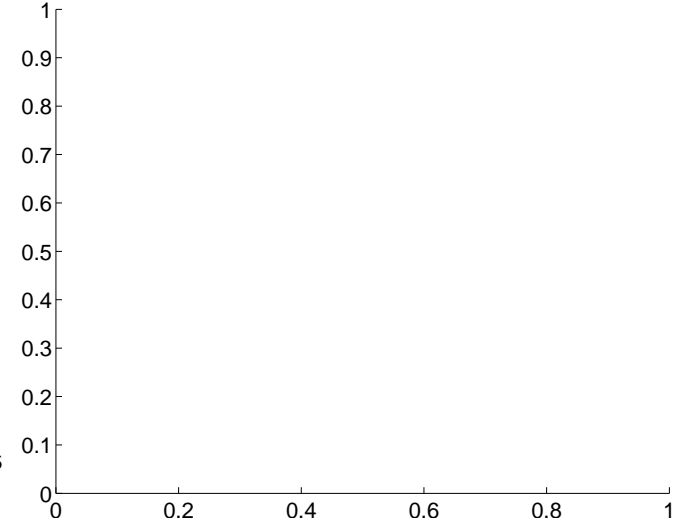
**There are 0 quarters with good PRF difference image offsets**

The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec      |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT          | $0.500 \pm 0.486$  | 1.03                | $-0.330 \pm 0.244$ | $0.376 \pm 0.453$ |
| PRF-fit source offset from KIC position | $0.516 \pm 0.430$  | 1.20                | $-0.433 \pm 0.239$ | $0.281 \pm 0.444$ |
| photometric centroid source offset      | —                  | —                   | —                  | —                 |

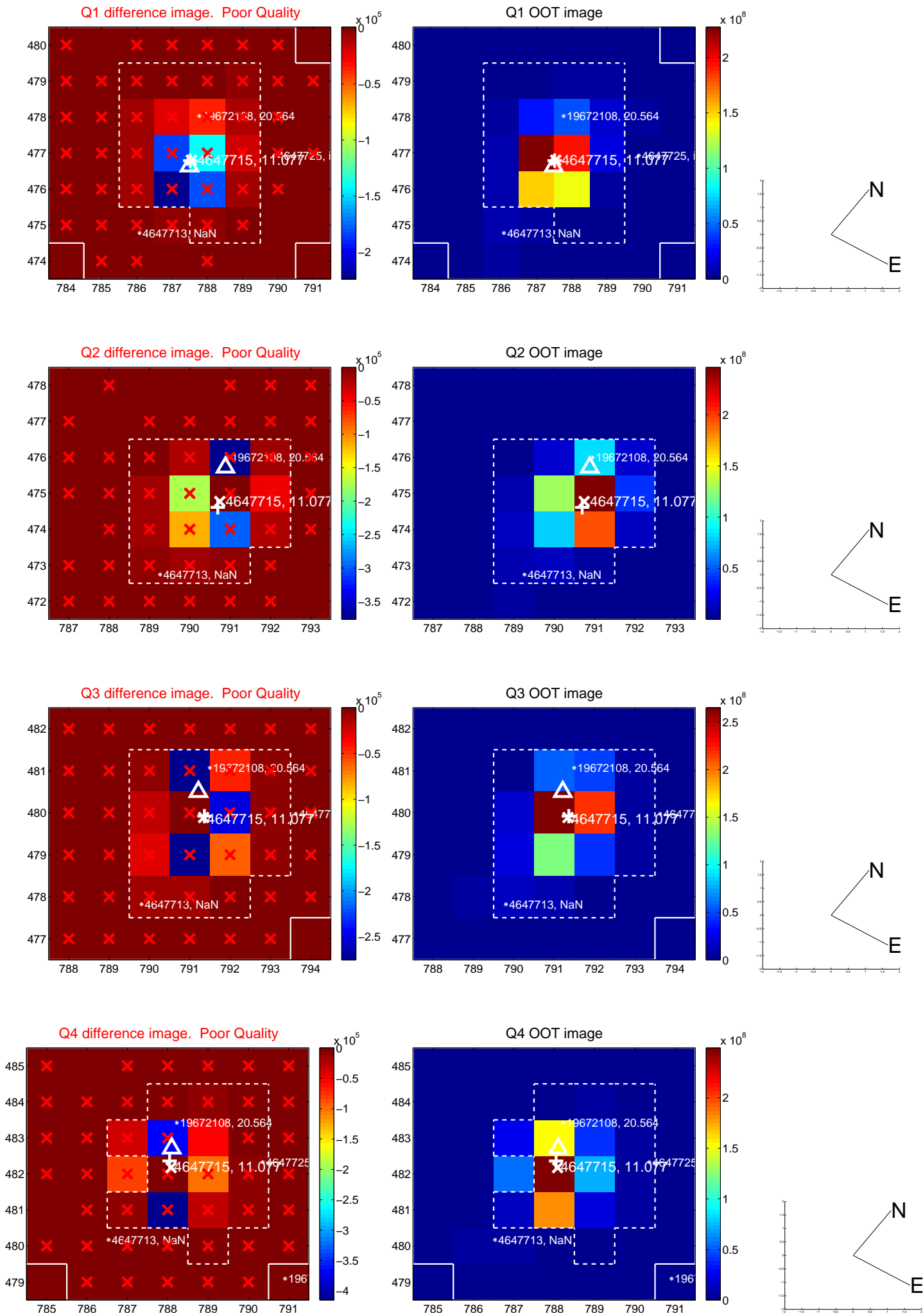


**There are no photometric centroids**

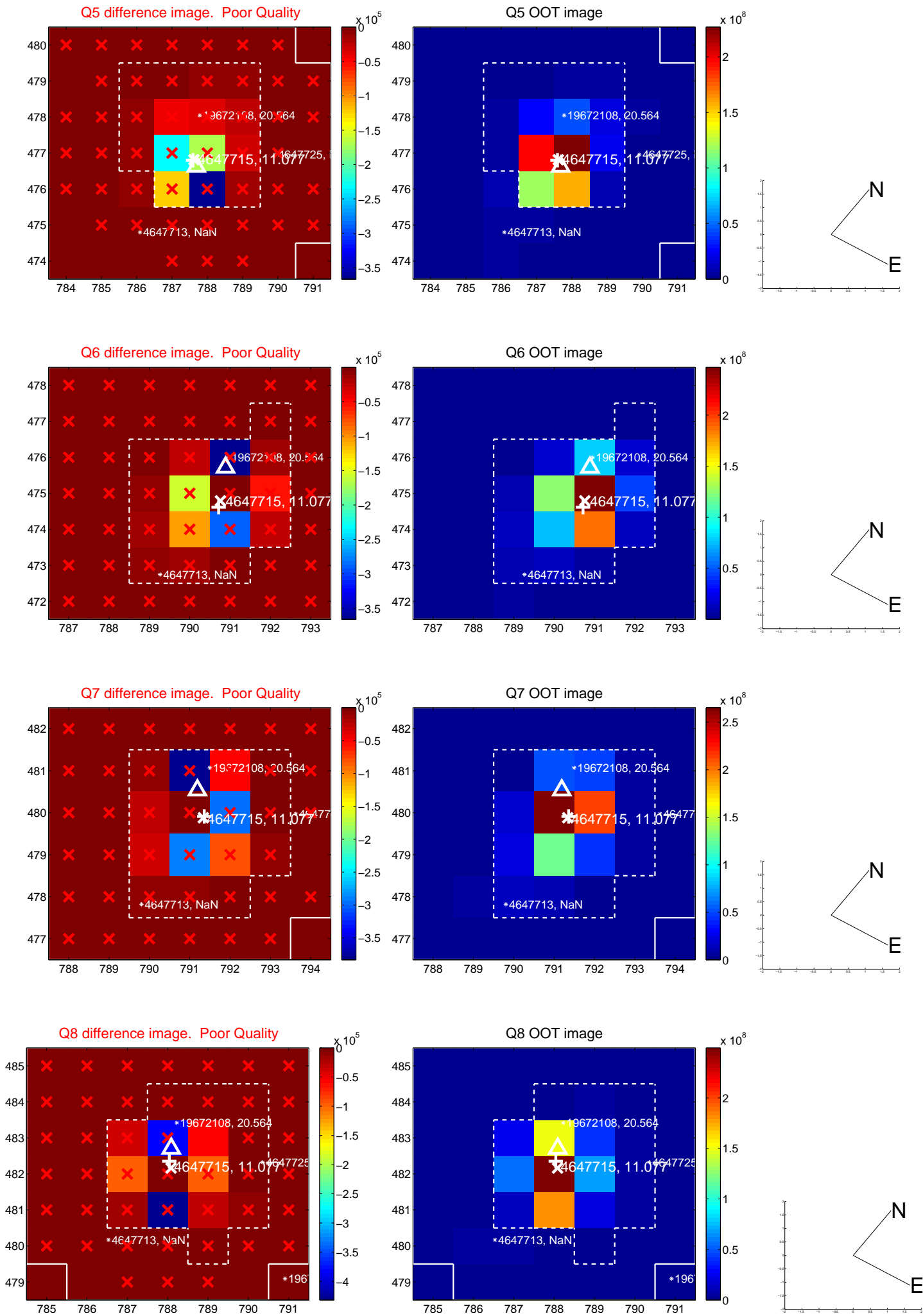


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

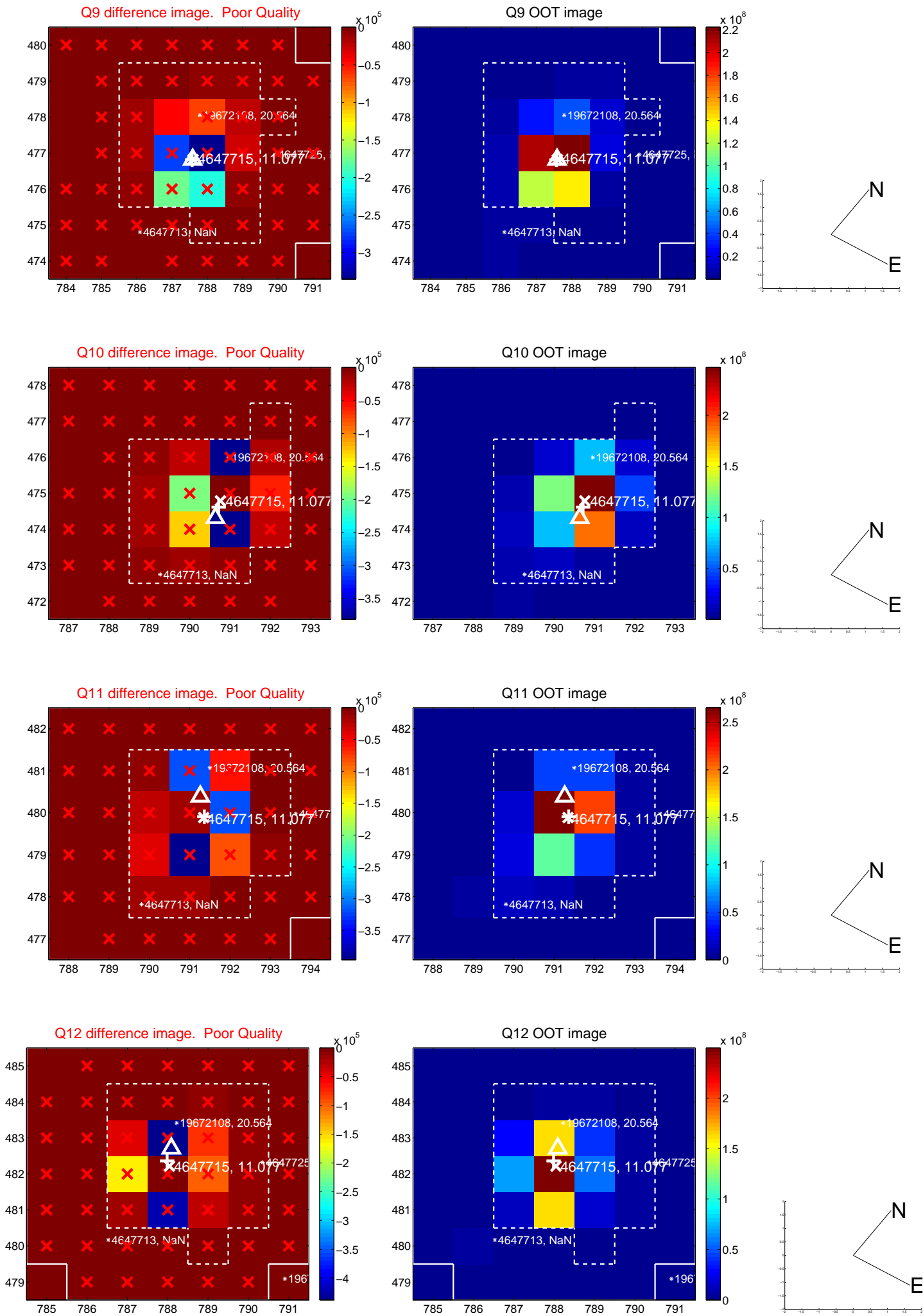


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

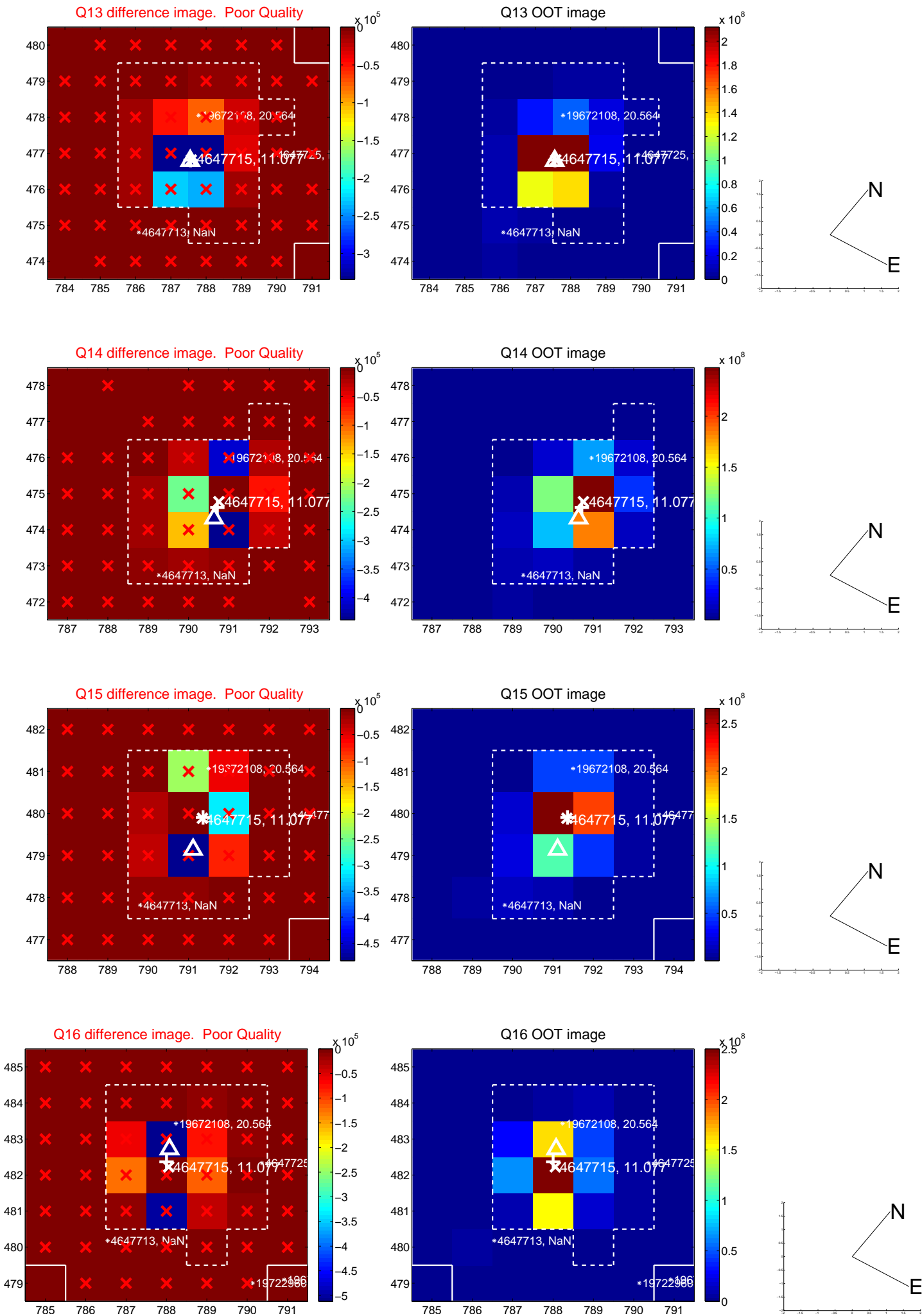




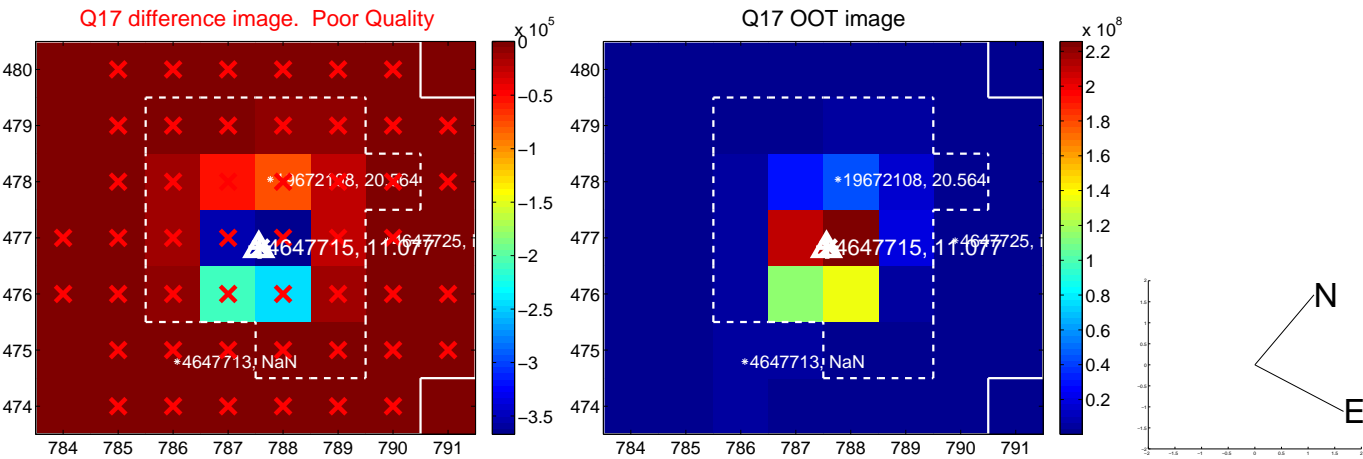
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

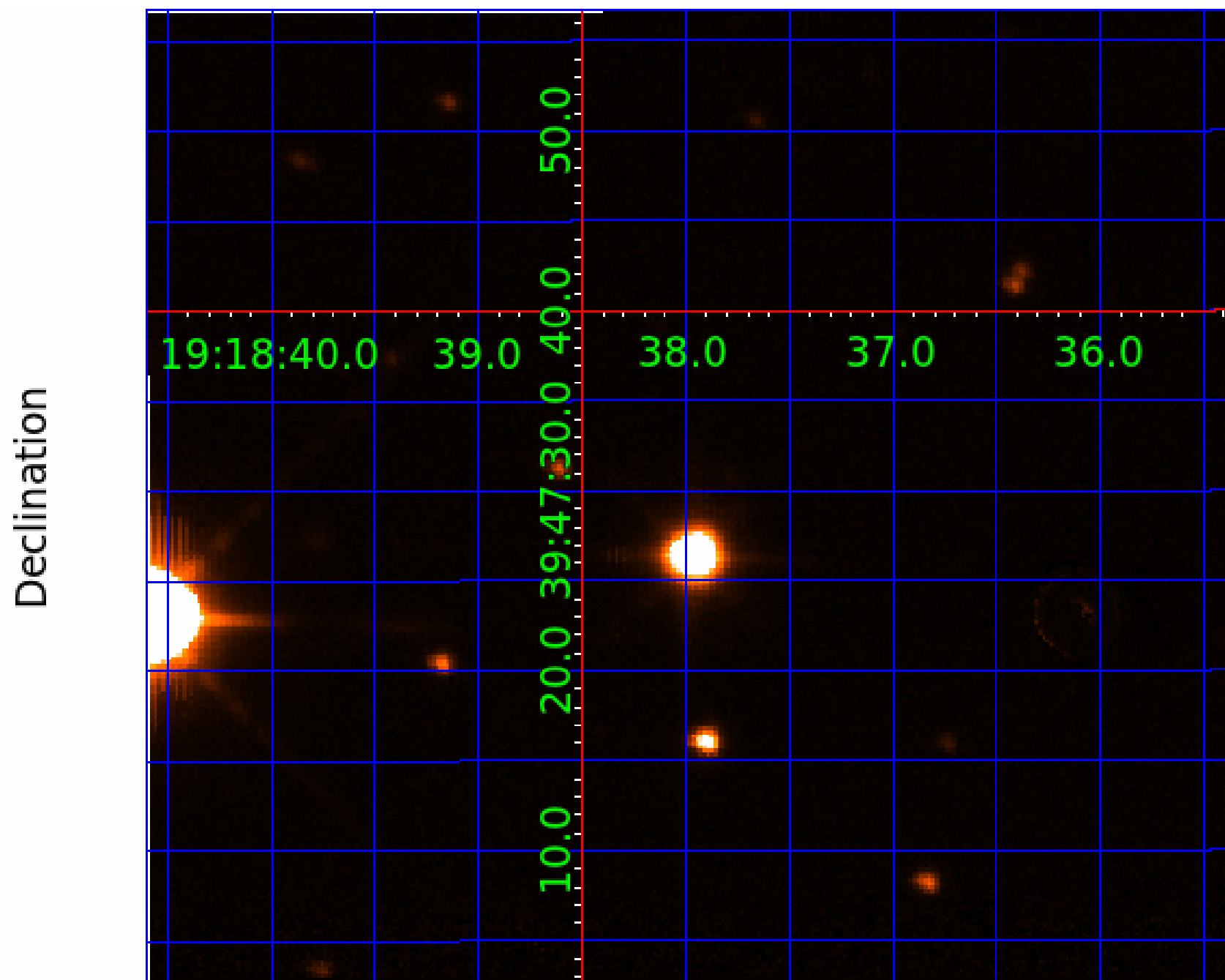


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



folded centroid time series figure for this object.

UKIRT Image



# KIC 004647715

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 004647715-01 | OBS      | No   | 3.879075      | 131.835148   | 60.8        | 1.379            | 23.9 | 25.8 | 4.88                        | 9554            | 4.46                   | 34133.56               |
| 004647715-02 | OBS      | No   | 412.042472    | 517.165167   | 393.6       | 13.710           | 23.1 | 13.7 | 4.88                        | 9554            | 17.86                  | 67.85                  |
| 004647715-03 | OBS      | No   | 1.292996      | 131.687196   | 2.7         | 5.723            | 17.6 | 2.8  | 4.88                        | 9554            | 0.93                   | 147691.79              |
| 004647715-04 | OBS      | No   | 3.879084      | 132.631335   | 22.7        | 7.668            | 16.2 | 9.8  | 4.88                        | 9554            | 2.75                   | 34133.45               |
| 004647715-06 | OBS      | No   | 365.960393    | 185.167645   | 230.9       | 8.221            | 11.3 | 10.6 | 4.88                        | 9554            | 7.95                   | 79.48                  |
| 004647715-07 | OBS      | No   | 97.345971     | 164.122956   | 82.9        | 7.500            | 9.6  | -1.0 | 4.88                        | 9554            | 4.55                   | 464.58                 |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments  |
|--------------|----------|------|-------|---|---|---|---|---|
| 004647715-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | SWEET_NTL—LPP_DV—CENT_SATURATED   |
| 004647715-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED |
| 004647715-03 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED  |
| 004647715-04 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE_ZUMA—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED                         |
| 004647715-06 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_CHASES_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED                 |
| 004647715-07 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—INCONSISTENT_TRANS—CENT_SATURATED               |

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

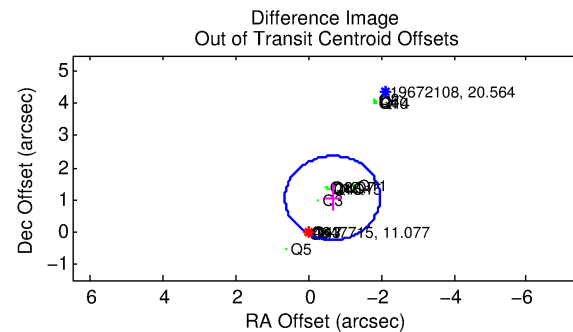
N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

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 004647715-04

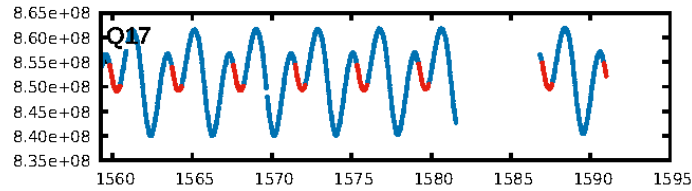
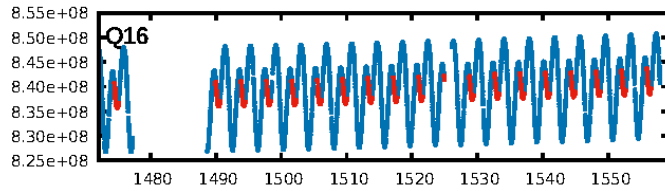
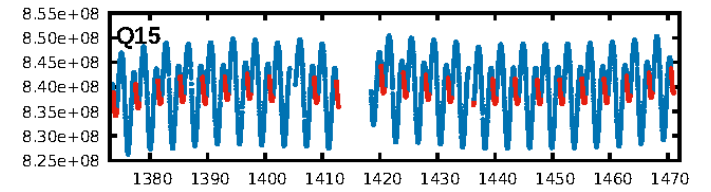
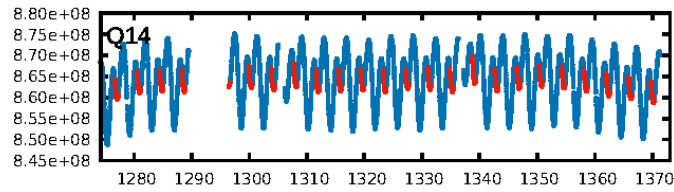
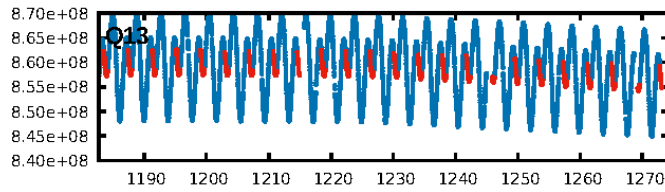
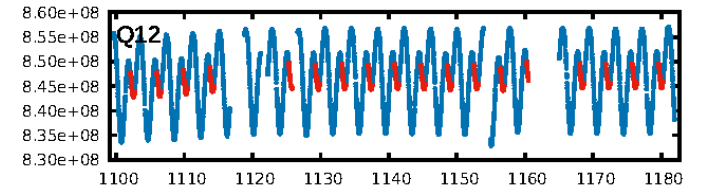
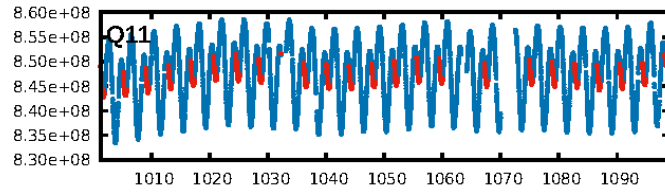
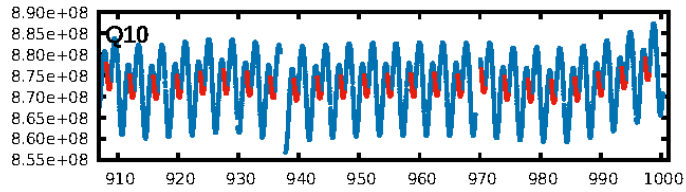
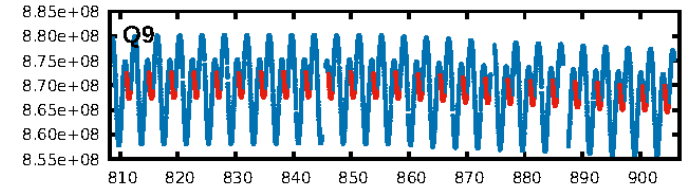
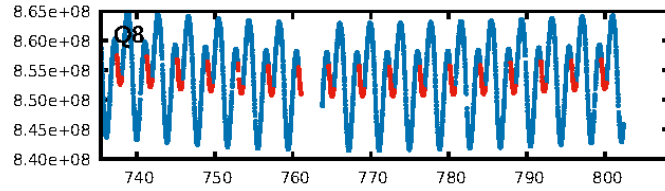
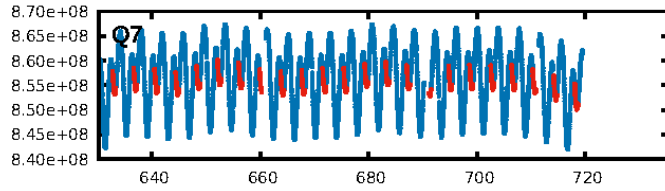
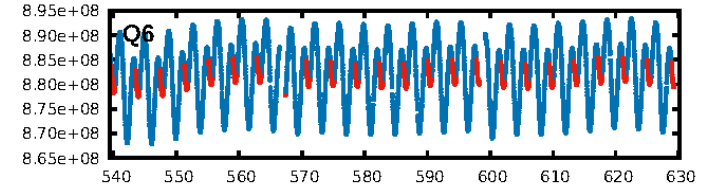
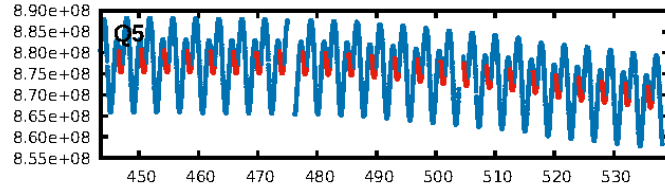
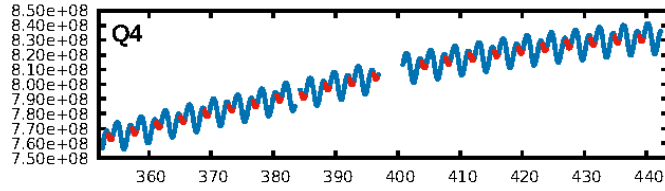
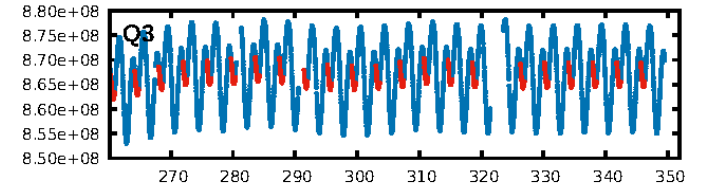
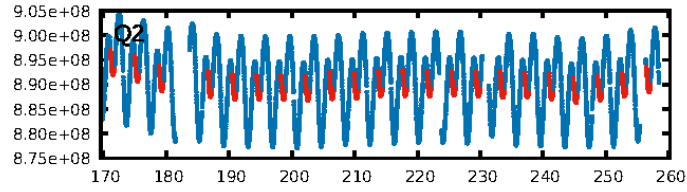
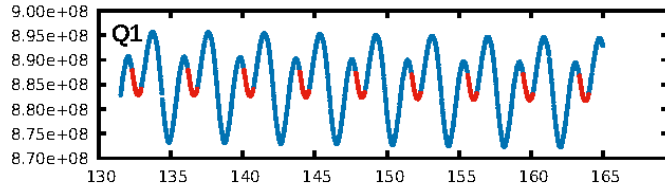
No Significant Match Found

## KIC: 4647715    Candidate: 4 of 7    Period: 3.879 d



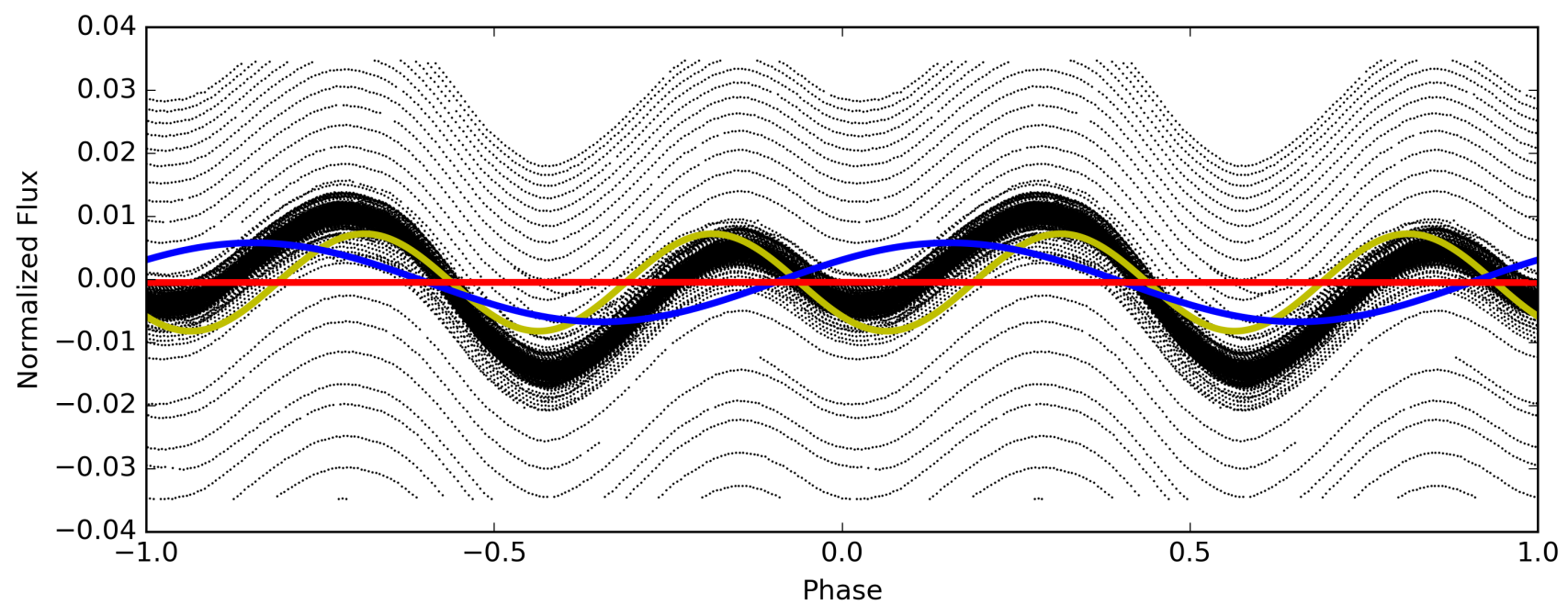
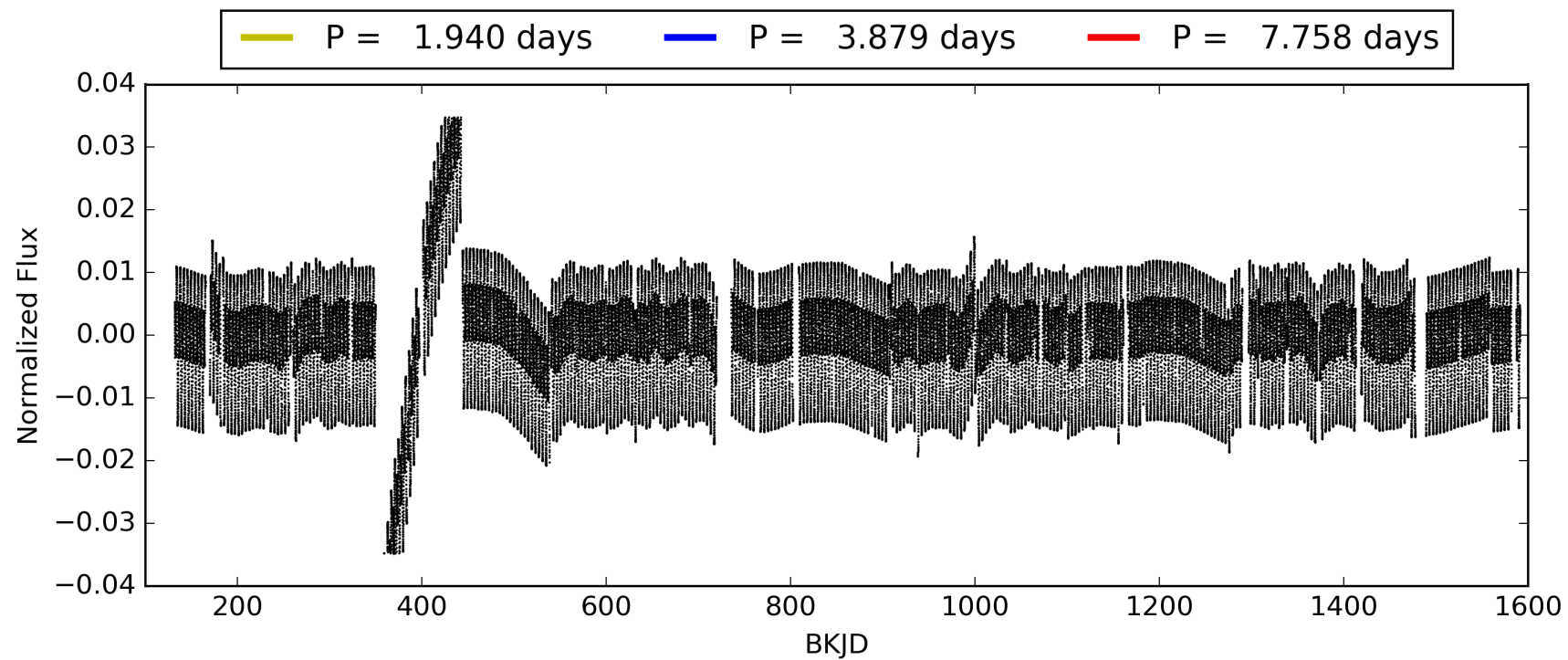
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 004647715-04, PDC Light Curves





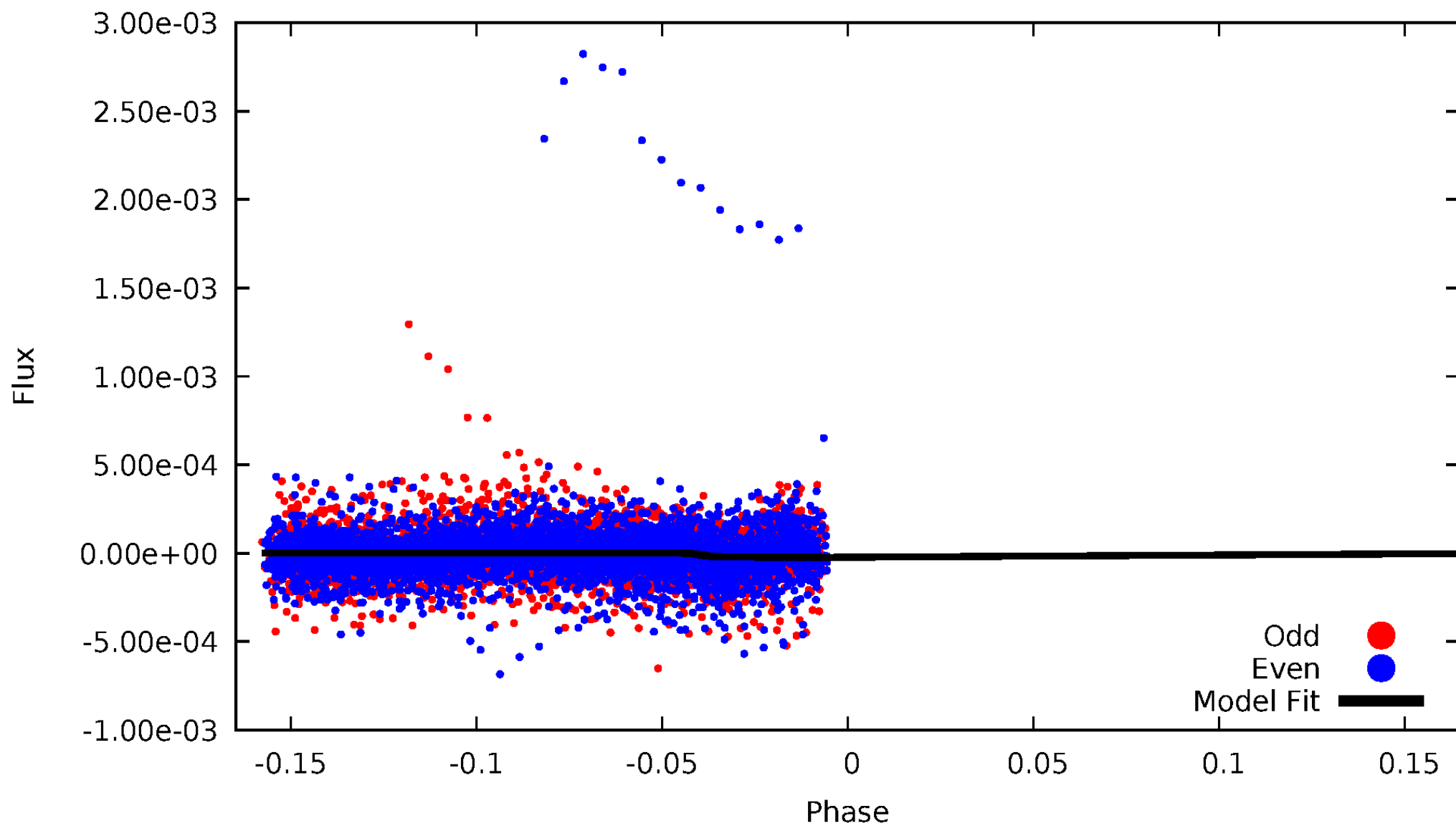
TCE 004647715-04





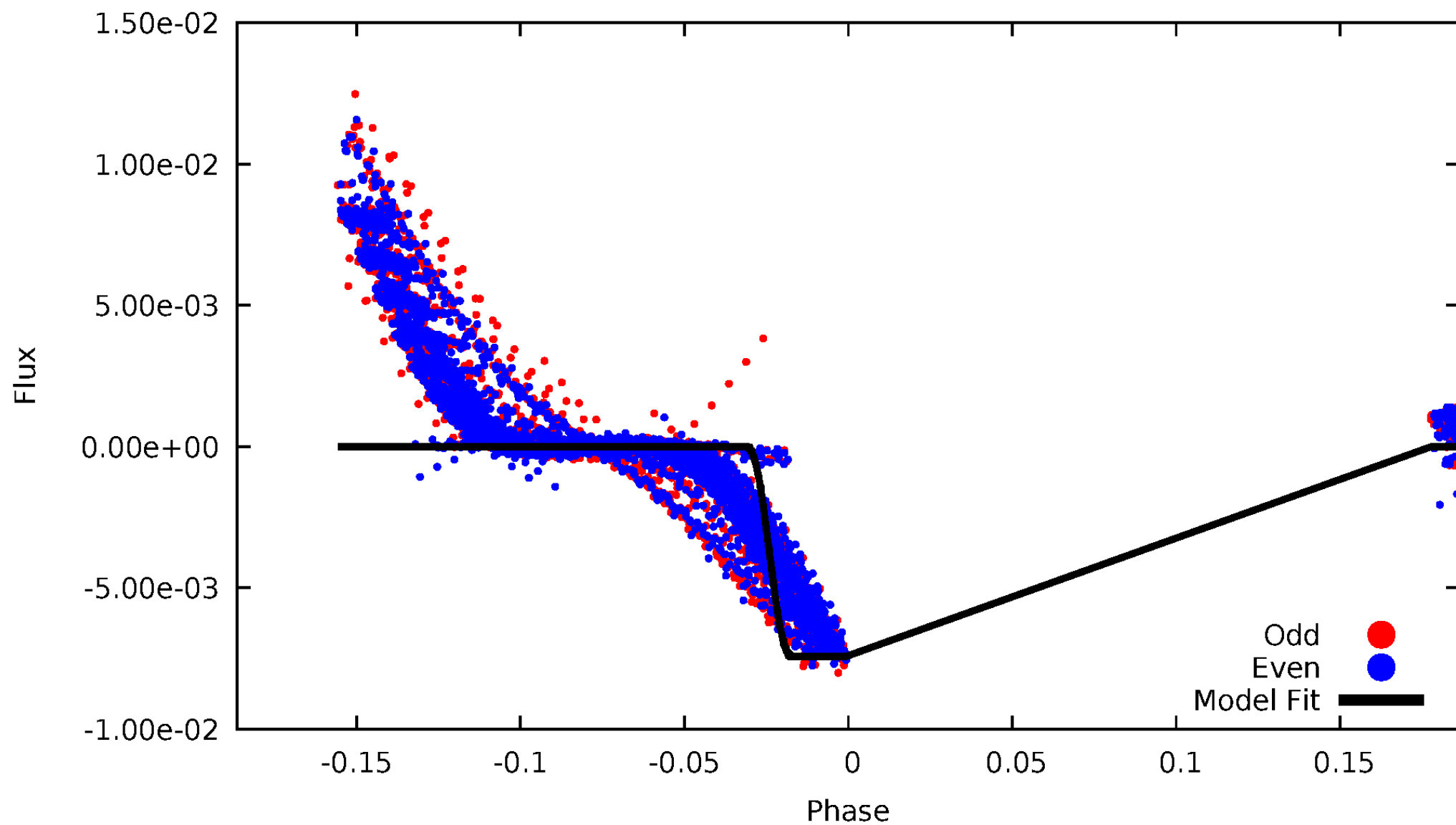
# DV Odd/Even

TCE 004647715-04



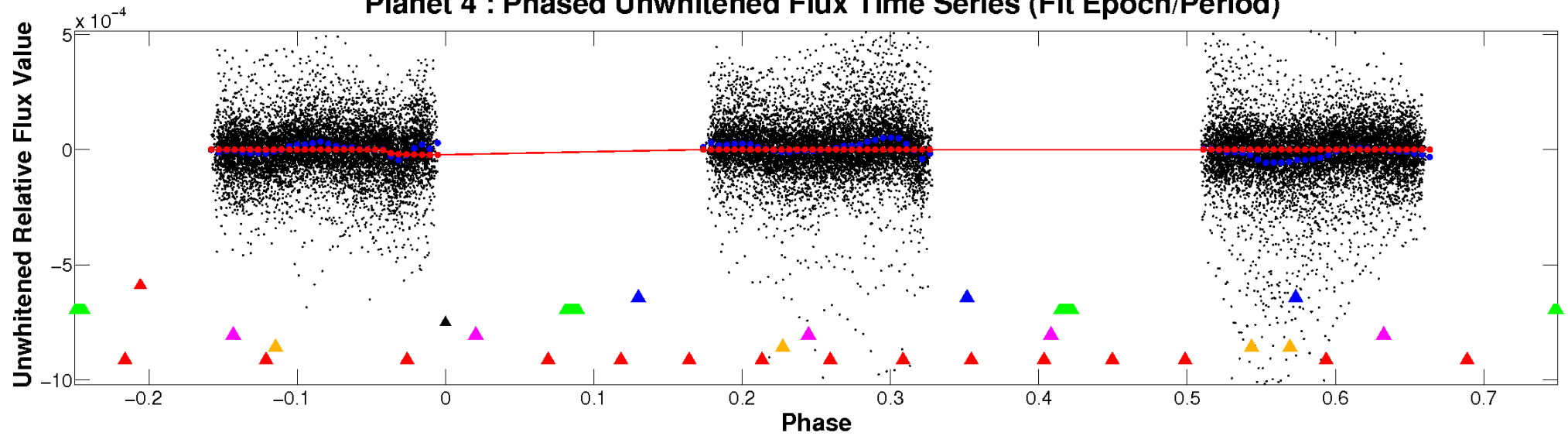
# ALT Odd/Even

TCE 004647715-04

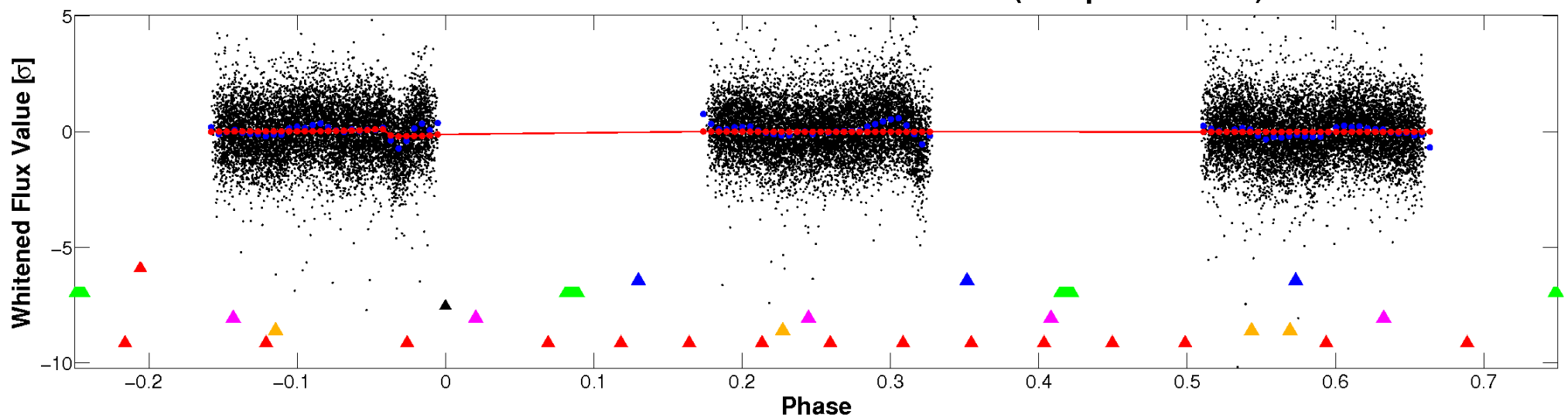


# Non-Whitened Vs. Whitened Light Curve

## Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

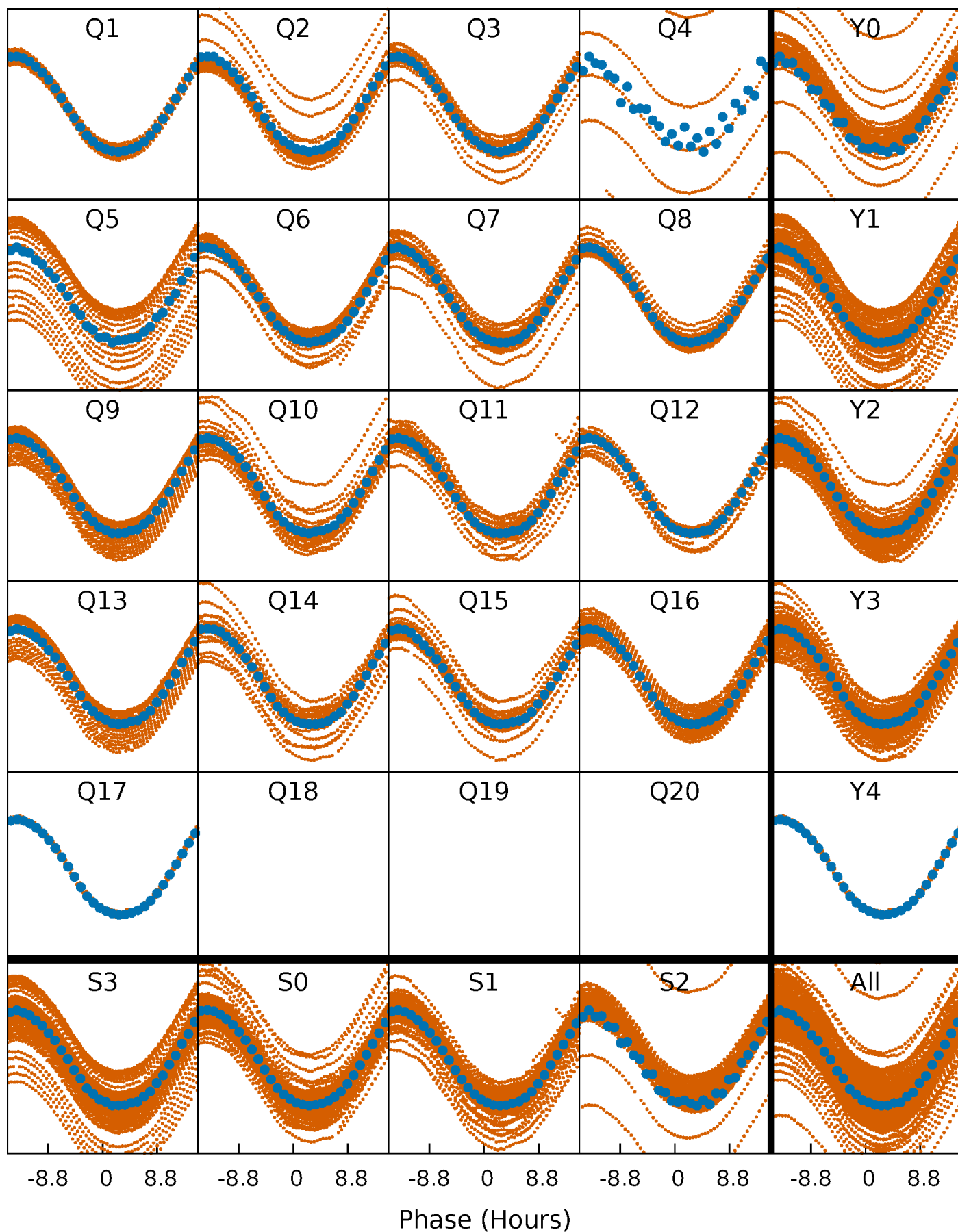


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



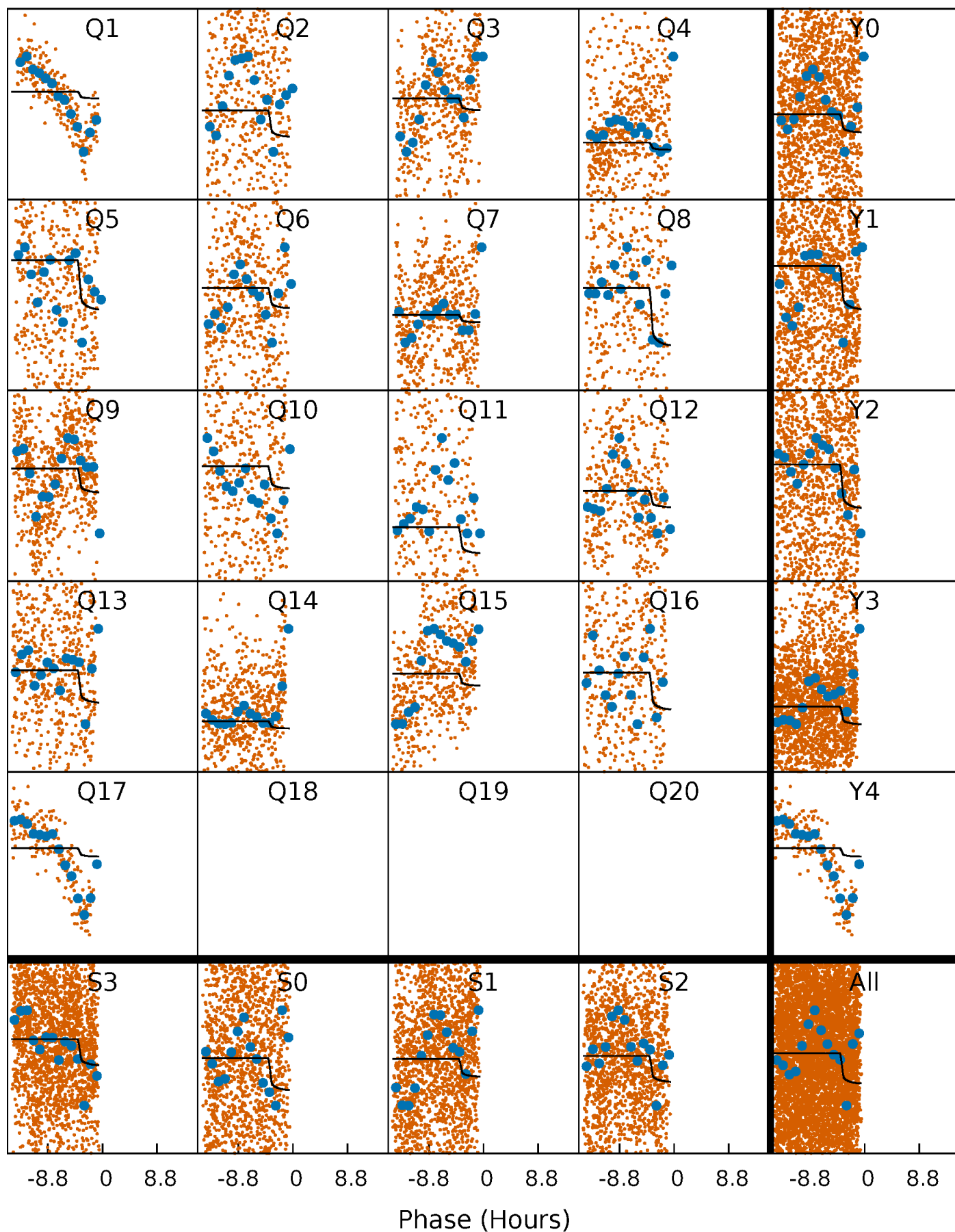
# PDC Quarter-Phased Transit Curves

TCE 004647715-04 P= 3.879084 Days  $T_0=132.631335$  (BKJD)



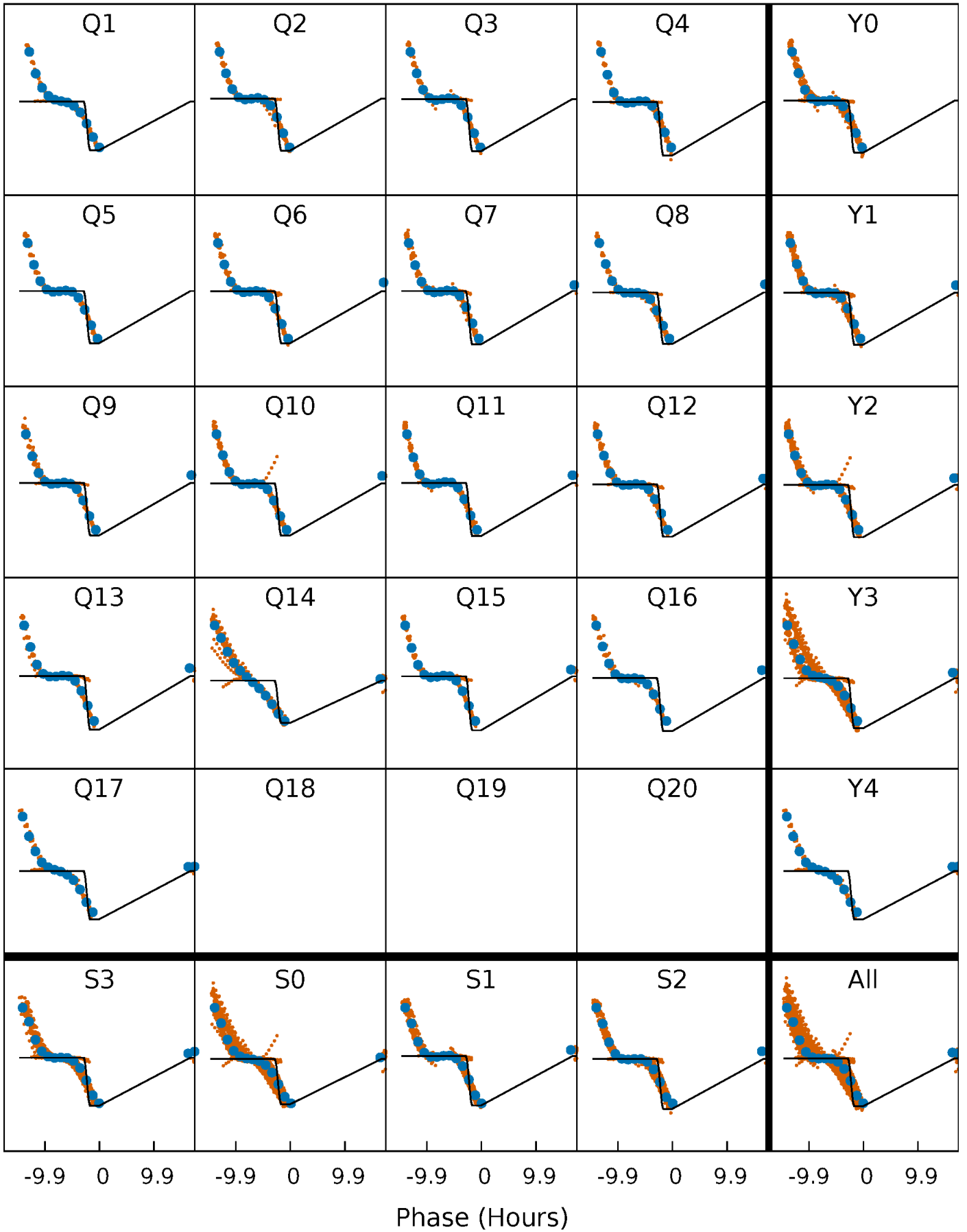
# DV Quarter-Phased Transit Curves

TCE 004647715-04     $P = 3.879084$  Days     $T_0 = 132.631335$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

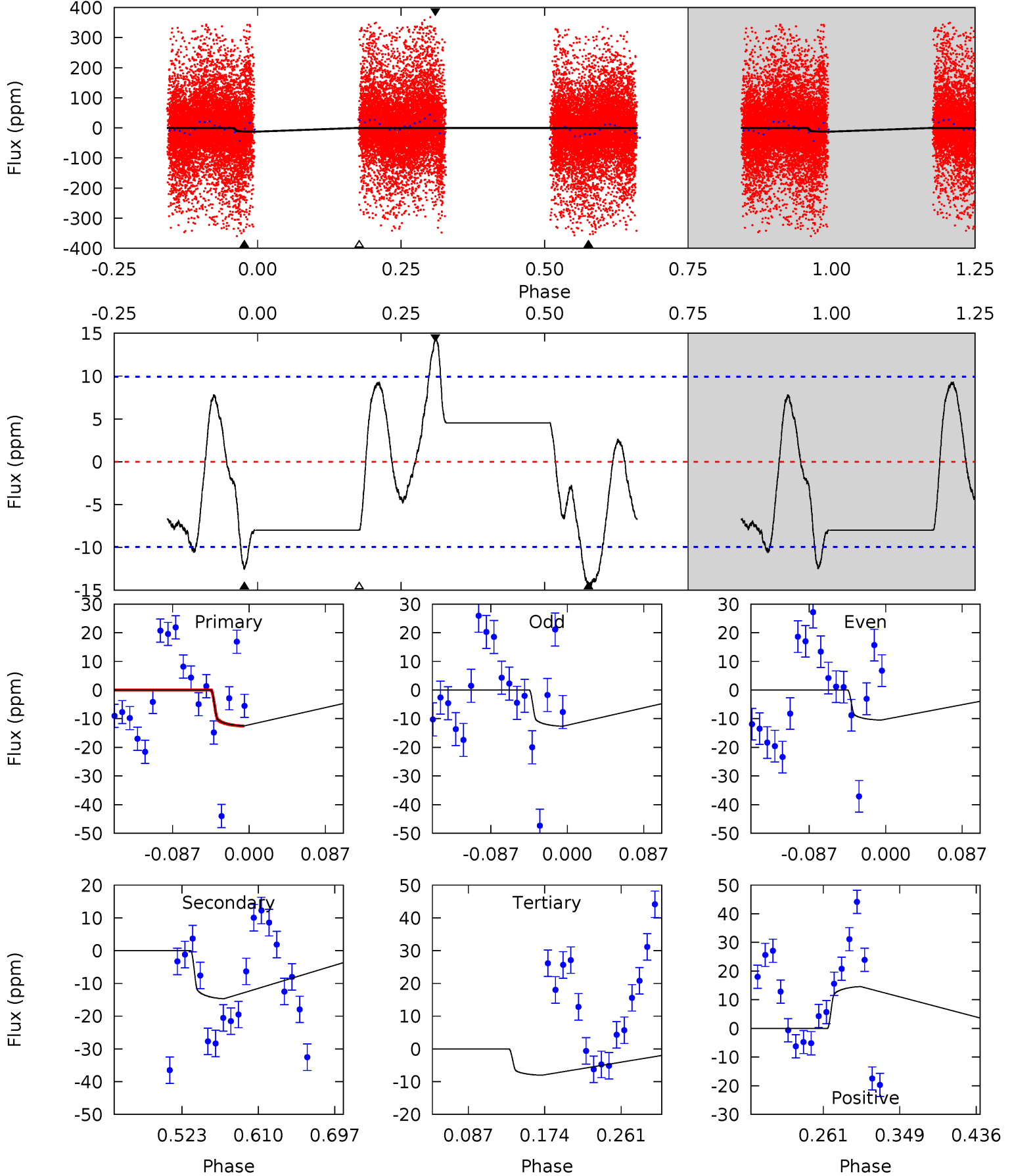
TCE 004647715-04 P= 3.879116 Days  $T_0=132.611807$  (BKJD)



# DV Model-Shift Uniqueness Test

004647715-04, P = 3.879084 Days, E = 128.752251 Days

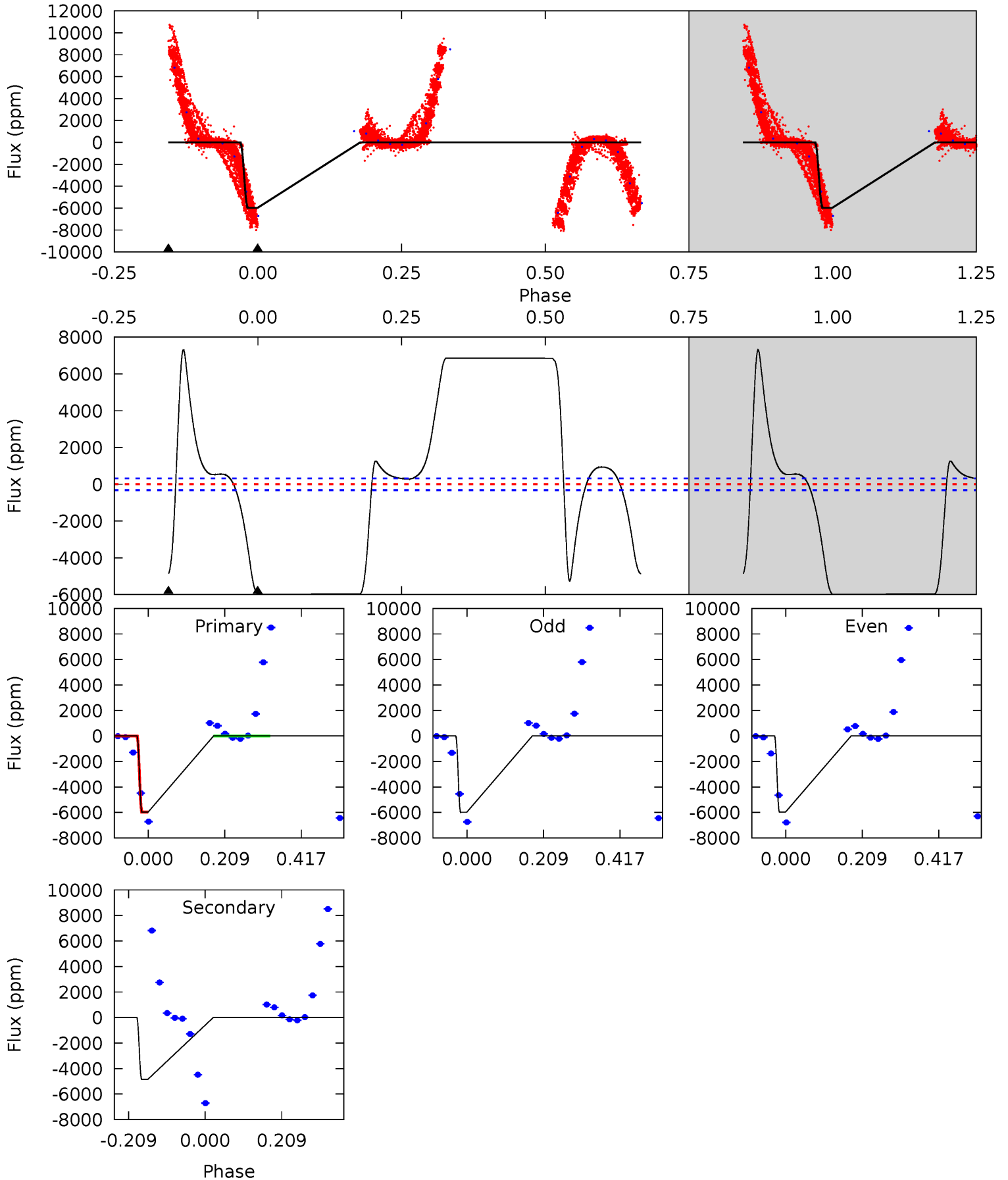
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|-----|-------|-----|
| 5.79 | 6.79 | 3.72 | 6.75 | 4.59            | 1.71            | 3.30             | 2.07    | -0.96   | 3.07    | 0.04    | 0.50    | 0   | 0.50  | 0   |



# Alt Model-Shift Uniqueness Test

004647715-04, P = 3.879116 Days, E = 128.732691 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 |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|-----|-------|-----|
| 81.5 | 66.2 | 0   | 0   | 4.41            | 1.26            | 30.4             | 81.5    | 81.5    | 66.2    | 66.2    | 0.15    | 0   | 0.55  | 0   |





### Stellar Parameters For KIC 004647715

|        | $T_{\text{eff}}(K)$   | $\log(g)$                 | [Fe/H]                    | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|-----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
|        | $9554^{+381}_{-1621}$ | $3.584^{+0.459}_{-0.081}$ | $0.560^{+0.050}_{-0.150}$ | $4.884^{+0.446}_{-2.527}$ | $3.340^{+0.063}_{-1.192}$ | $0.040^{+0.185}_{-0.010}$                 |
|        | +4%/-17%              | +13%/-2%                  | +9%/-27%                  | +9%/-52%                  | +2%/-36%                  | +459%/-26%                                |
| Source | SPE68                 | SPE68                     | SPE68                     | DSEP                      |                           |   |

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 004647715-04 / KOI

| Detrend | Depth (ppm)    | $R_p (R_{\oplus})$       | $T_{max} (K)$        | $T_{obs} (K)$          | $A_{obs}$                 |
|---------|----------------|--------------------------|----------------------|------------------------|---------------------------|
| DV      | $-15 \pm 2$    | $2.54^{+0.56}_{-0.70}$   | $4485^{+557}_{-802}$ | $7434^{+1057}_{-1002}$ | $6.382^{+5.375}_{-2.152}$ |
| Alt.    | $-4846 \pm 73$ | $44.08^{+4.46}_{-11.15}$ | $4486^{+568}_{-780}$ | $8162^{+346}_{-1210}$  | $7.006^{+4.801}_{-1.109}$ |

$T_{max}$  = 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

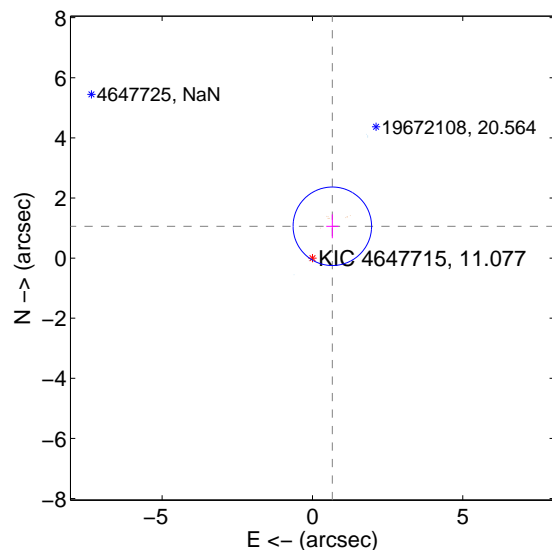
Supplemental centroid analysis for 004647715-04. **Kepler magnitude: 11.08.** Transit SNR 9.79

There are 9 quarters with good PRF difference image offsets

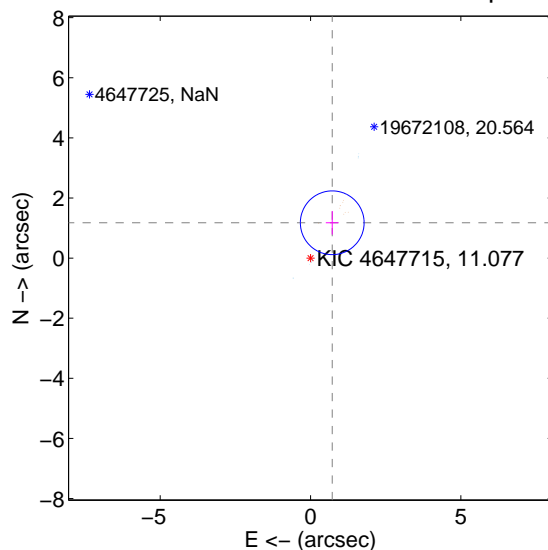
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

|   | Distance in arcsec                  | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec      |
|---|-------------------------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT          | $1.249 \pm 0.435$                   | 2.87                | $-0.662 \pm 0.205$ | $1.059 \pm 0.396$ |
| PRF-fit source offset from KIC position | <b><math>1.380 \pm 0.354</math></b> | <b>3.90</b>         | $-0.723 \pm 0.213$ | $1.176 \pm 0.394$ |
| photometric centroid source offset      | <b><math>3.41 \pm 1.10</math></b>   | <b>3.10</b>         | $-0.18 \pm 0.77$   | $3.40 \pm 1.10$   |

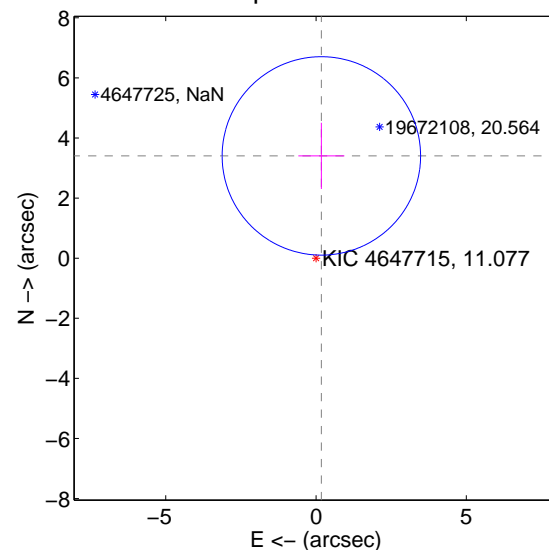
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

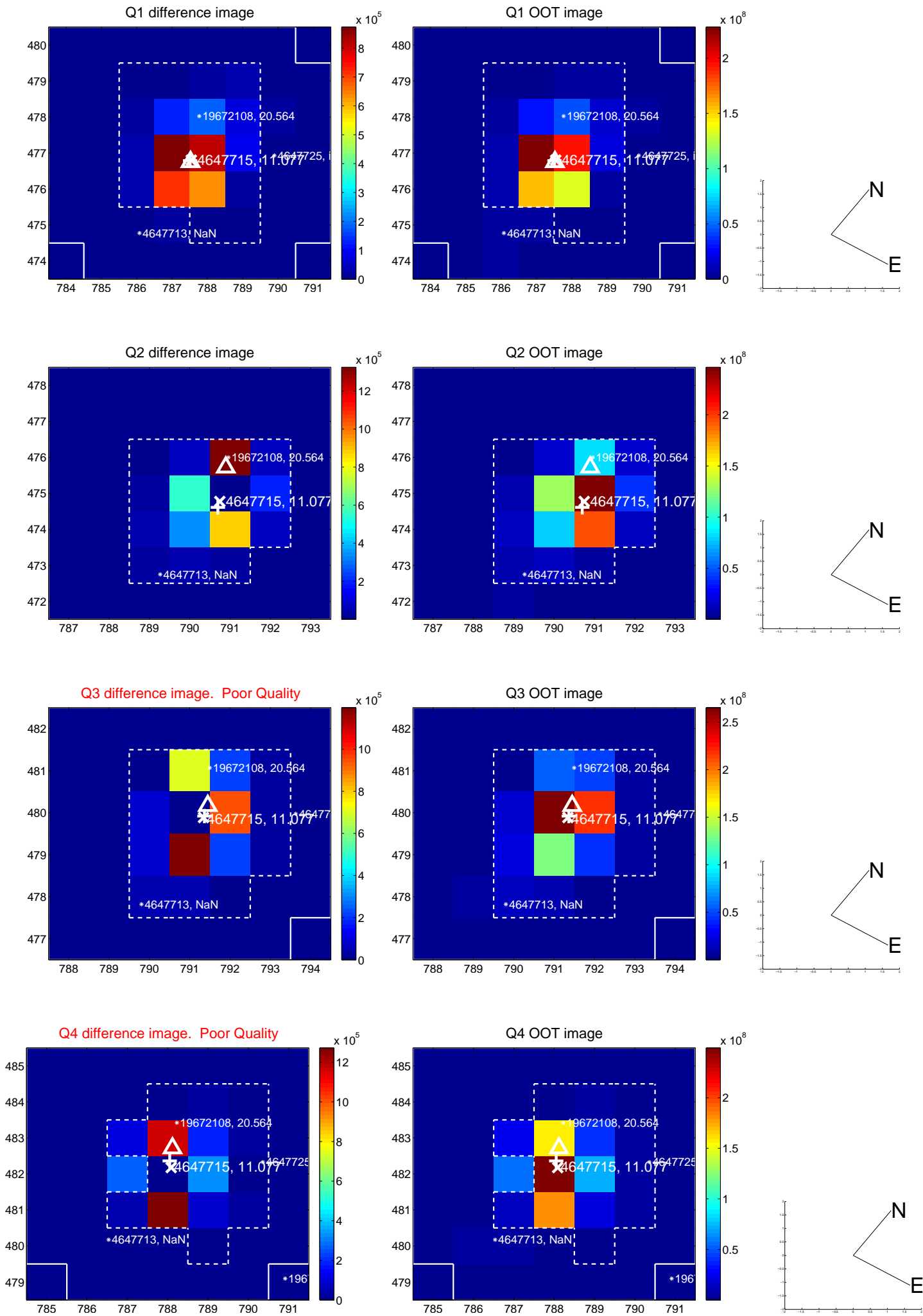


offset from photometric centroids

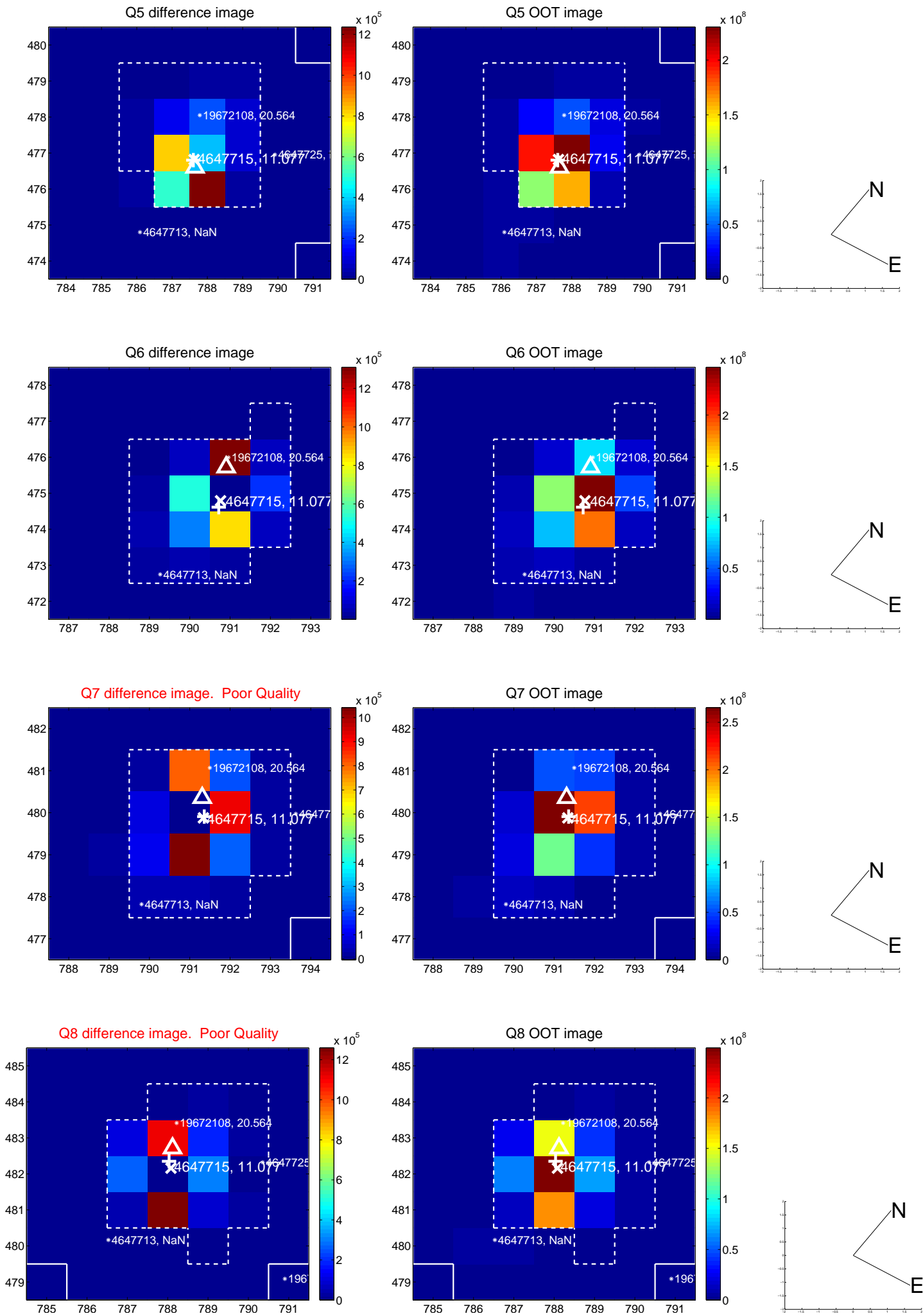


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

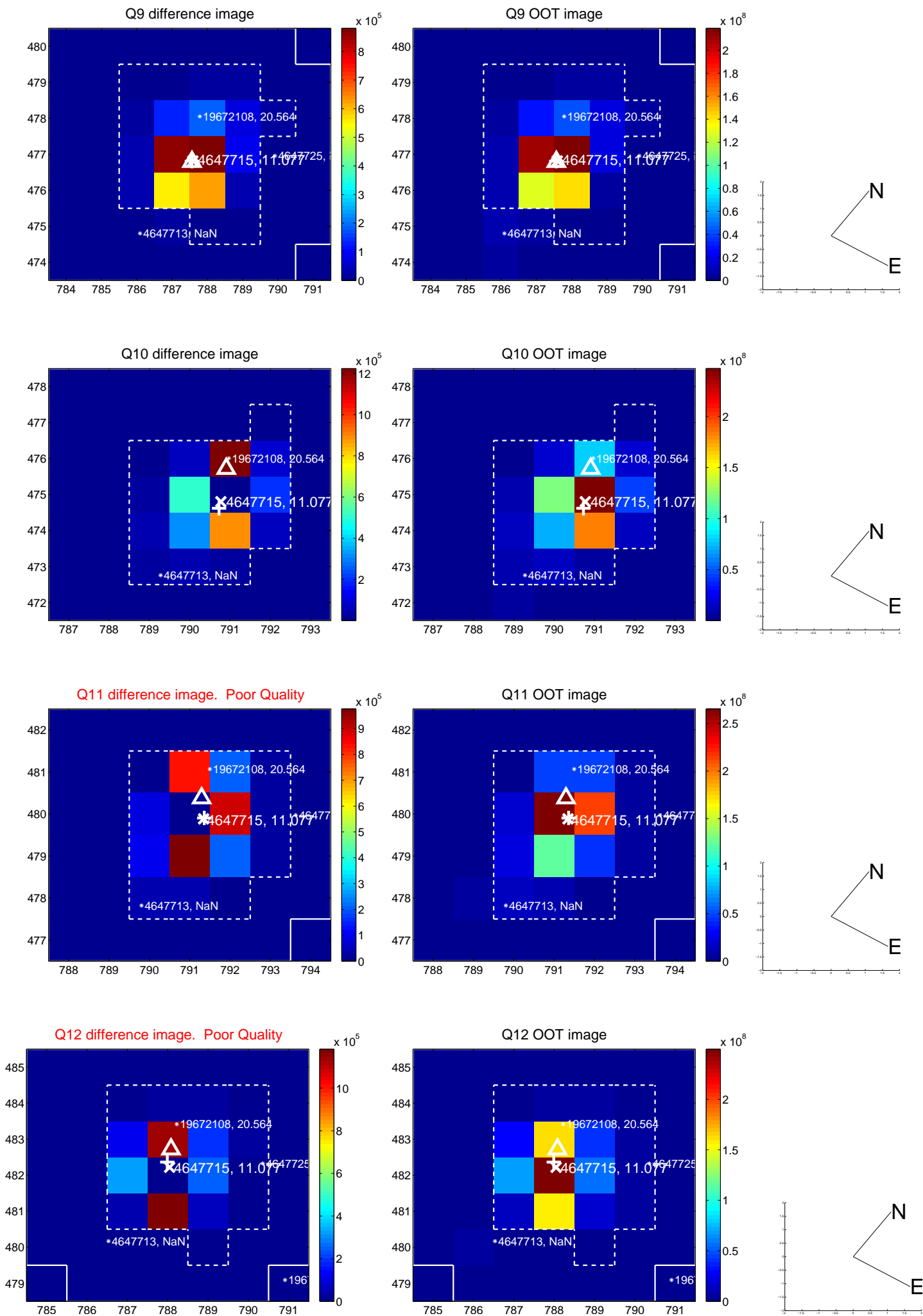
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



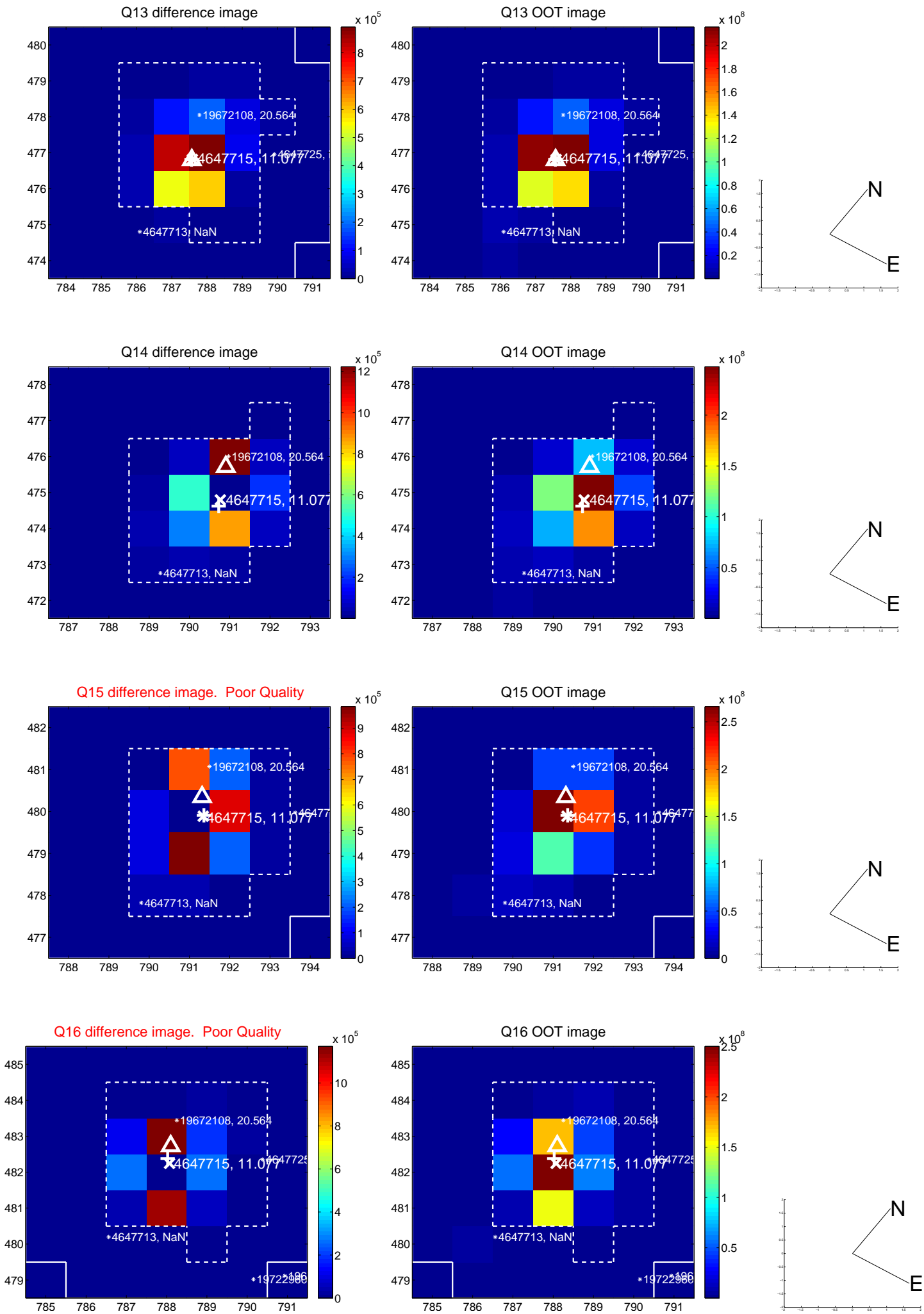
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



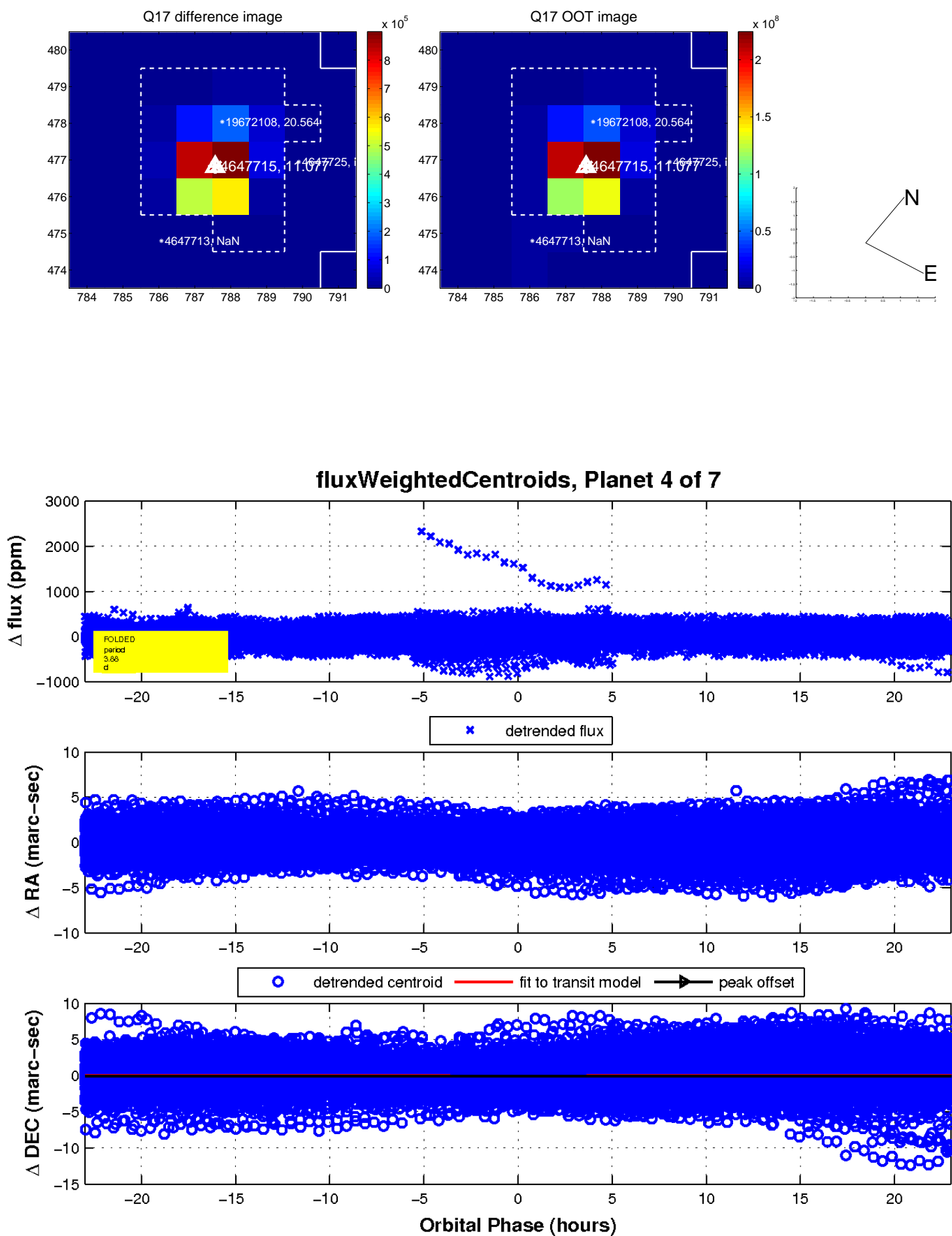
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

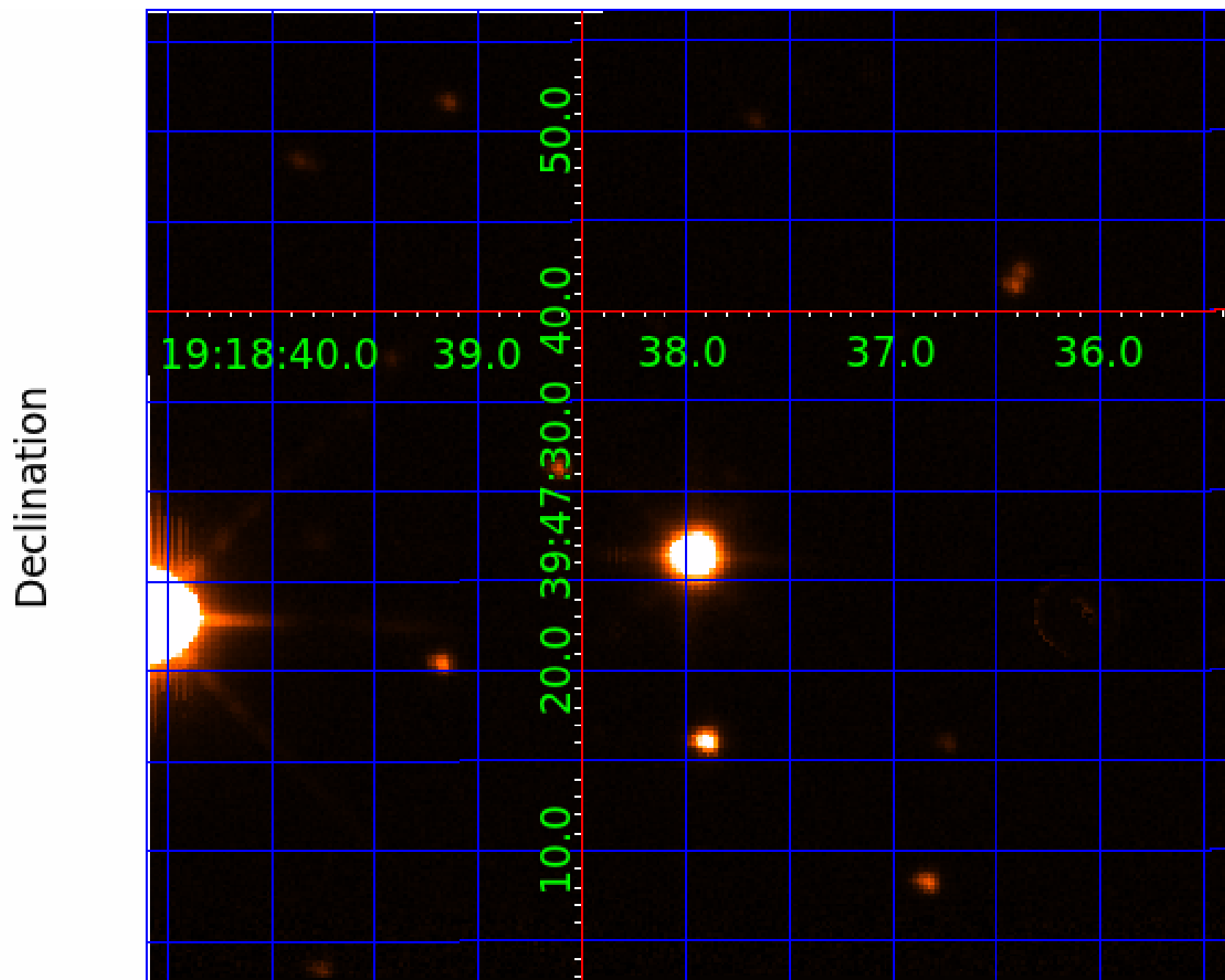


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image



# KIC 004647715

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 004647715-01 | OBS      | No   | 3.879075      | 131.835148   | 60.8        | 1.379            | 23.9 | 25.8 | 4.88                        | 9554            | 4.46                   | 34133.56               |
| 004647715-02 | OBS      | No   | 412.042472    | 517.165167   | 393.6       | 13.710           | 23.1 | 13.7 | 4.88                        | 9554            | 17.86                  | 67.85                  |
| 004647715-03 | OBS      | No   | 1.292996      | 131.687196   | 2.7         | 5.723            | 17.6 | 2.8  | 4.88                        | 9554            | 0.93                   | 147691.79              |
| 004647715-04 | OBS      | No   | 3.879084      | 132.631335   | 22.7        | 7.668            | 16.2 | 9.8  | 4.88                        | 9554            | 2.75                   | 34133.45               |
| 004647715-06 | OBS      | No   | 365.960393    | 185.167645   | 230.9       | 8.221            | 11.3 | 10.6 | 4.88                        | 9554            | 7.95                   | 79.48                  |
| 004647715-07 | OBS      | No   | 97.345971     | 164.122956   | 82.9        | 7.500            | 9.6  | -1.0 | 4.88                        | 9554            | 4.55                   | 464.58                 |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments  |
|--------------|----------|------|-------|---|---|---|---|---|
| 004647715-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | SWEET_NTL—LPP_DV—CENT_SATURATED   |
| 004647715-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED |
| 004647715-03 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED  |
| 004647715-04 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE_ZUMA—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED                         |
| 004647715-06 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_CHASES_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED                 |
| 004647715-07 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—INCONSISTENT_TRANS—CENT_SATURATED               |

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

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

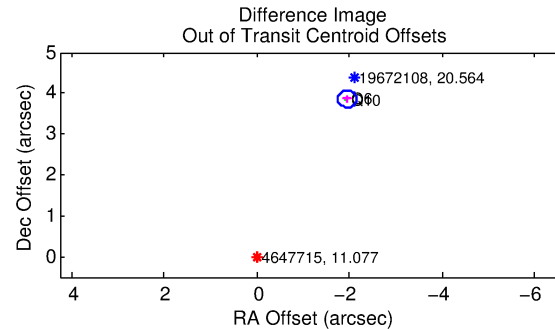
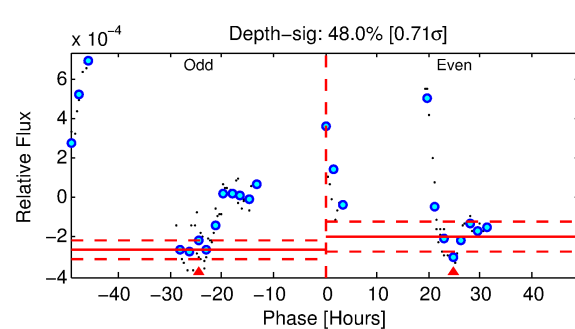
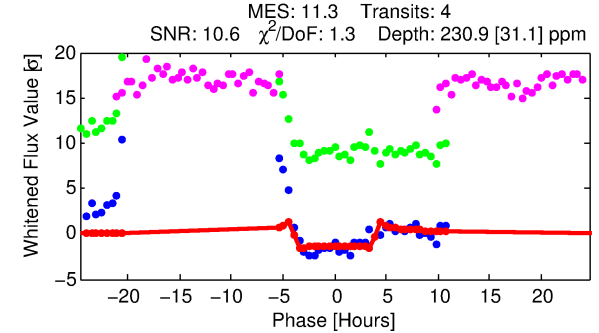
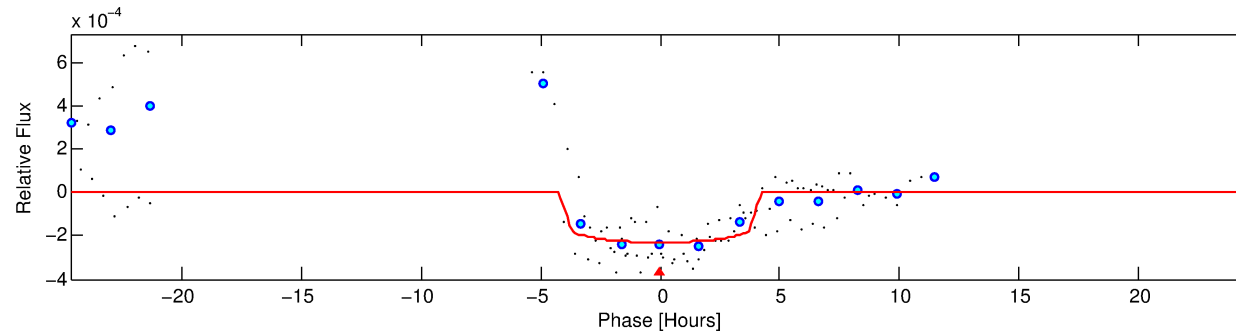
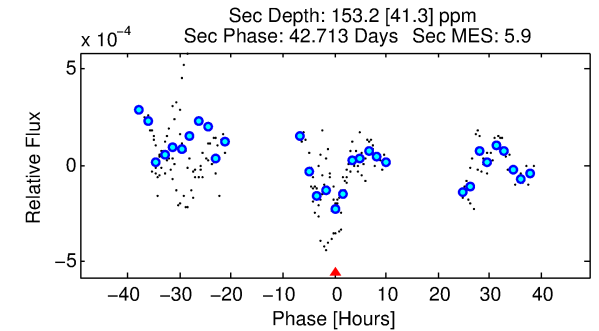
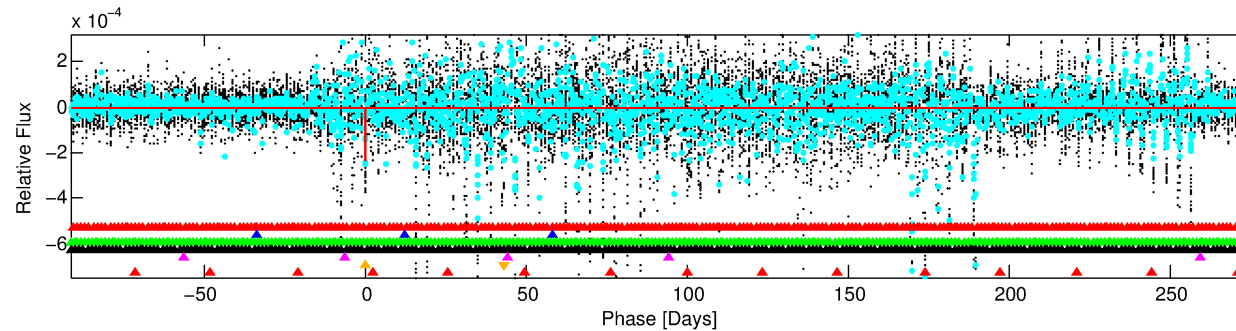
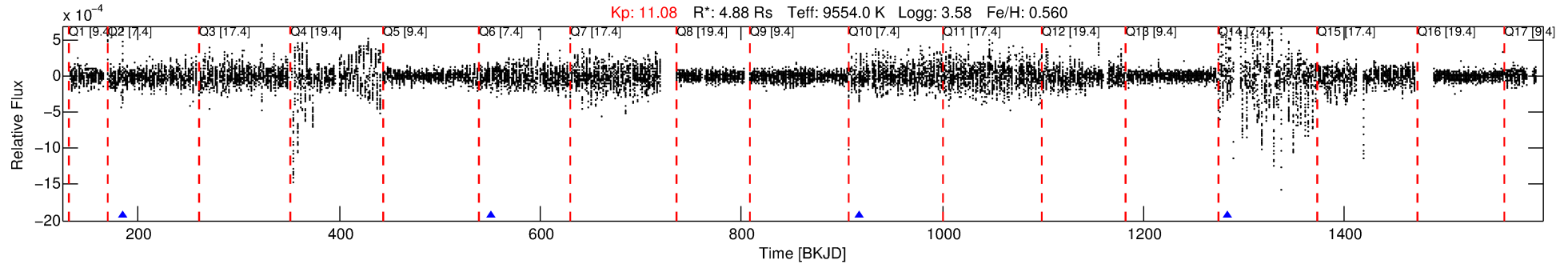
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 004647715-06

No Significant Match Found

# DV One-Page Summary

KIC: 4647715 Candidate: 6 of 7 Period: 365.960 d



## DV Fit Results:

Period = 365.96039 [0.00565] d  
Epoch = 185.1676 [0.0132] BKJD  
Rp/R\* = 0.0149 [0.0099]  
a/R\* = 254.61 [1179.03]  
b = 0.69 [3.59]  
Seff = 79.48 [82.44]  
Teq = 761 [197] K  
Rp = 7.95 [6.67] Re  
a = 1.4968 [0.7380] AU  
Ag = 2989.46 [4664.02] [0.64σ]  
Teffp = 8704 [3285] K [2.41σ]

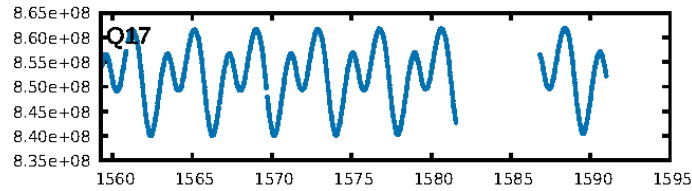
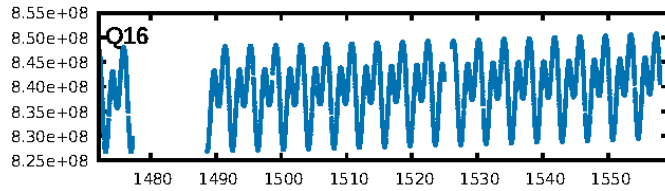
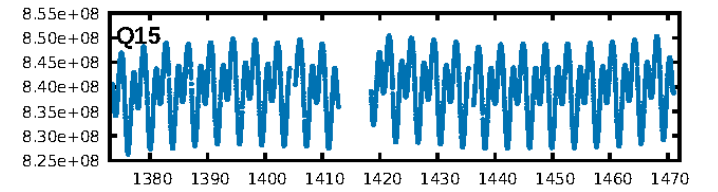
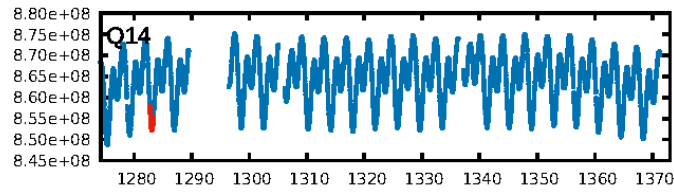
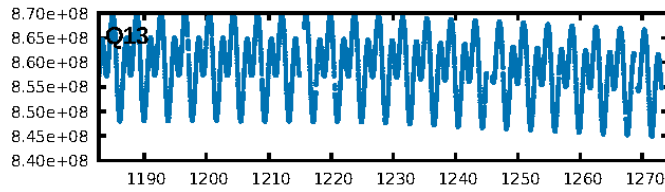
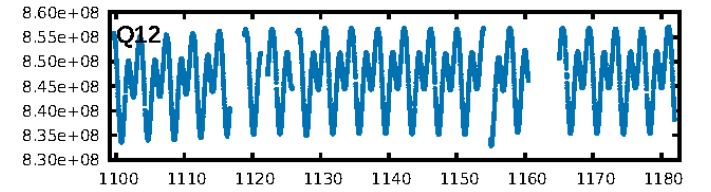
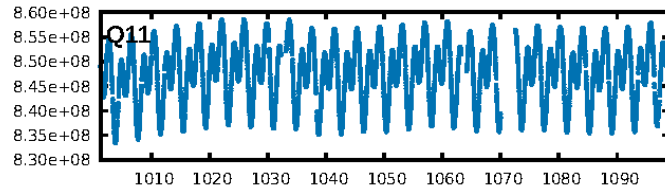
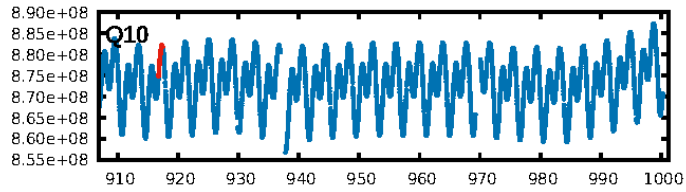
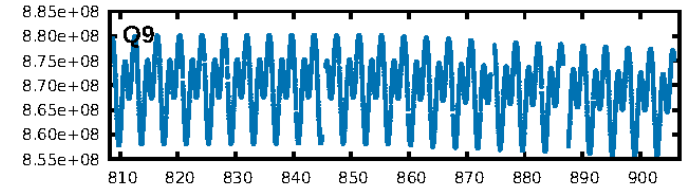
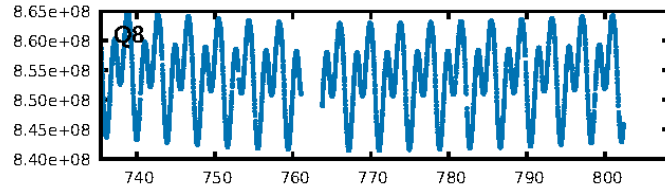
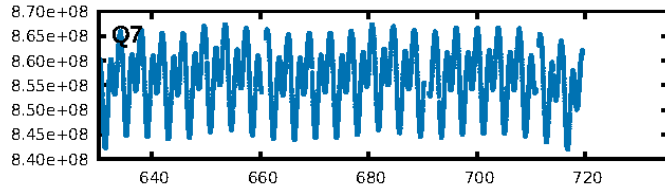
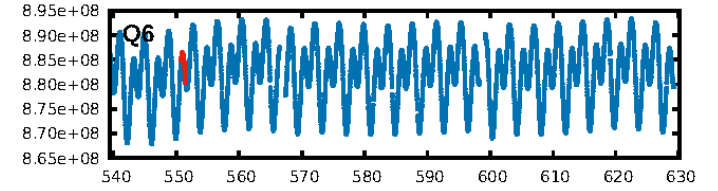
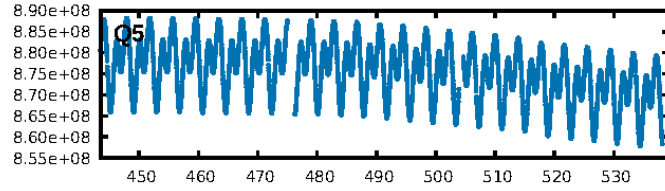
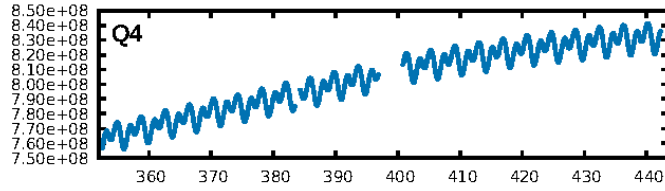
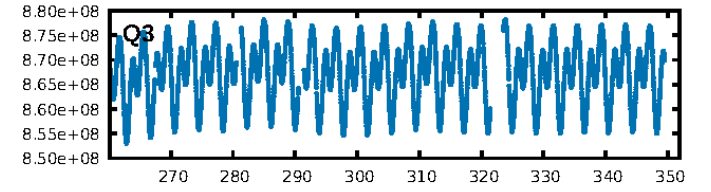
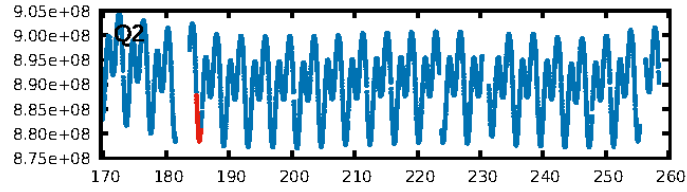
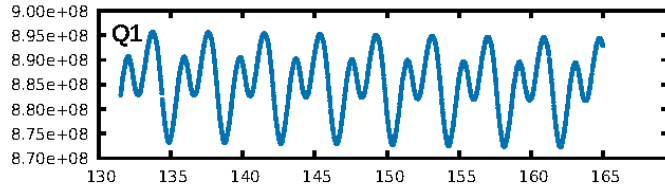
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [102.59σ]  
LongPeriod-sig: 100.0% [69.19σ]  
ModelChiSquare2-sig: 67.1%  
ModelChiSquareGof-sig: 93.6%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 0.5423  
Centroid-sig: N/A  
Centroid-so: 2.039 arcsec [0.99σ]  
OotOffset-rm: 4.324 arcsec [63.14σ]  
KicOffset-rm: 3.379 arcsec [47.72σ]  
OotOffset-st: 2/0/0/0 [2]  
KicOffset-st: 2/0/0/0 [2]  
DiffImageQuality-fgm: 0.00 [0/2]  
DiffImageOverlap-fno: 0.00 [0/2]

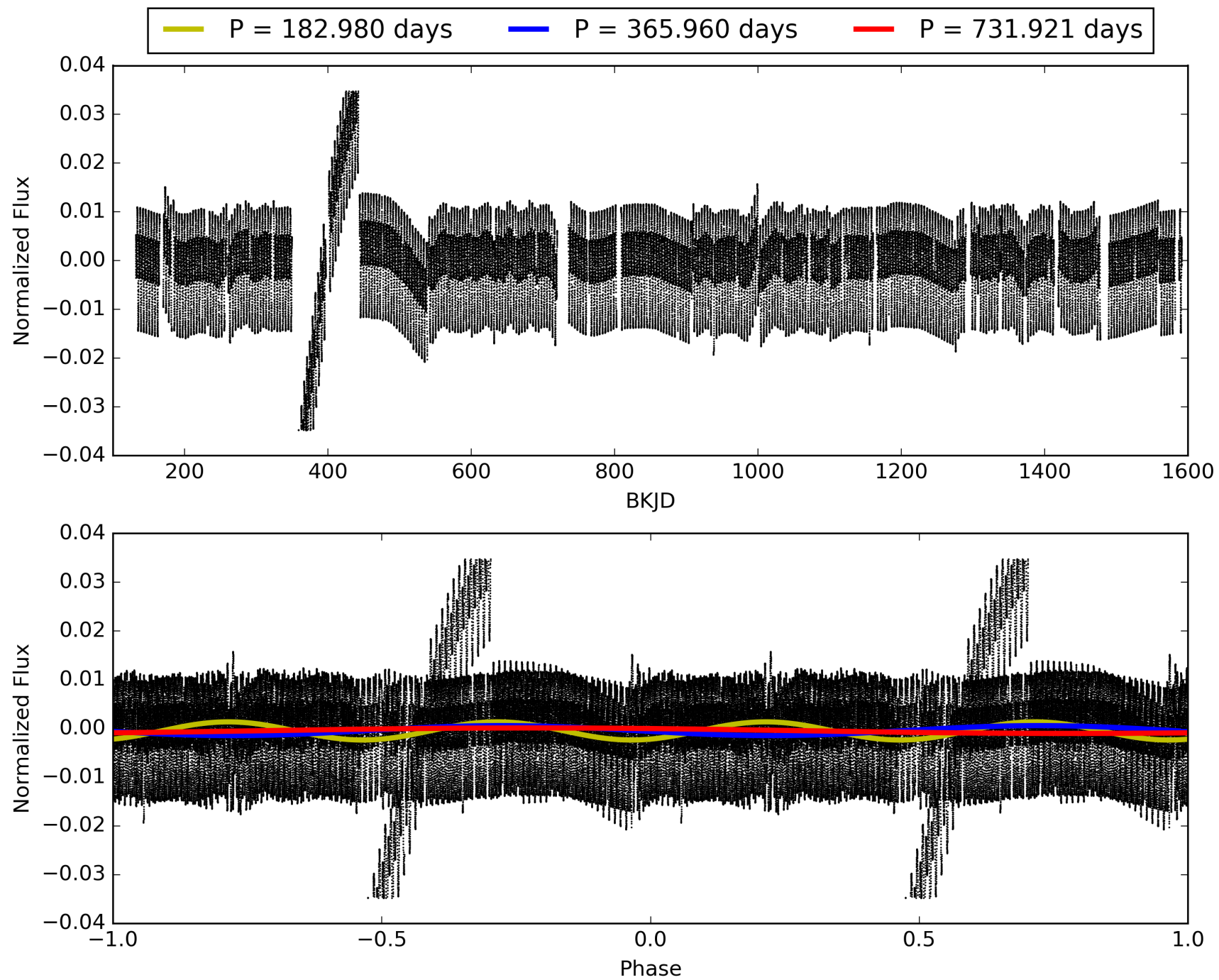
Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 01:04:04 Z

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

# TCE 004647715-06, PDC Light Curves

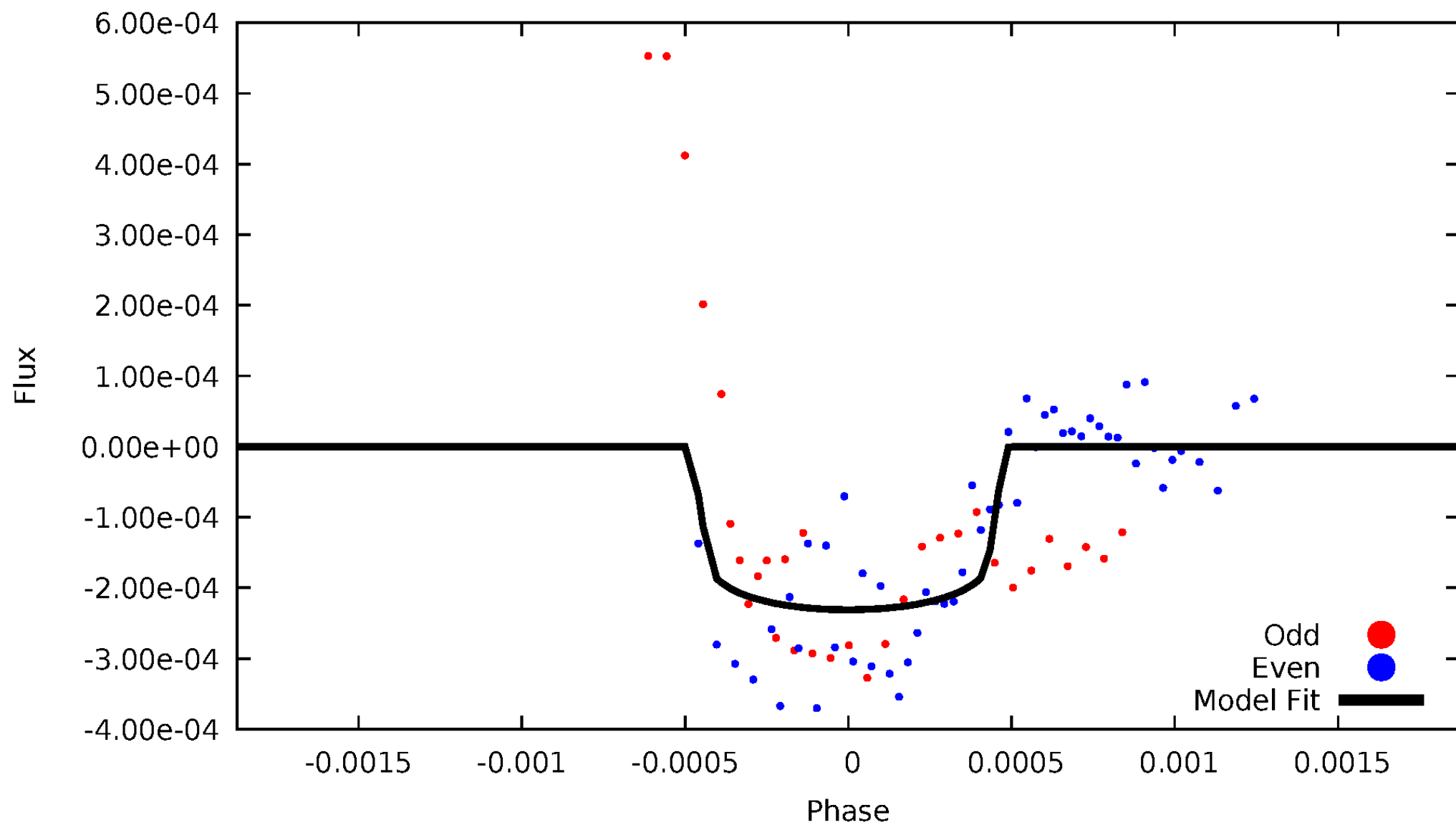


TCE 004647715-06



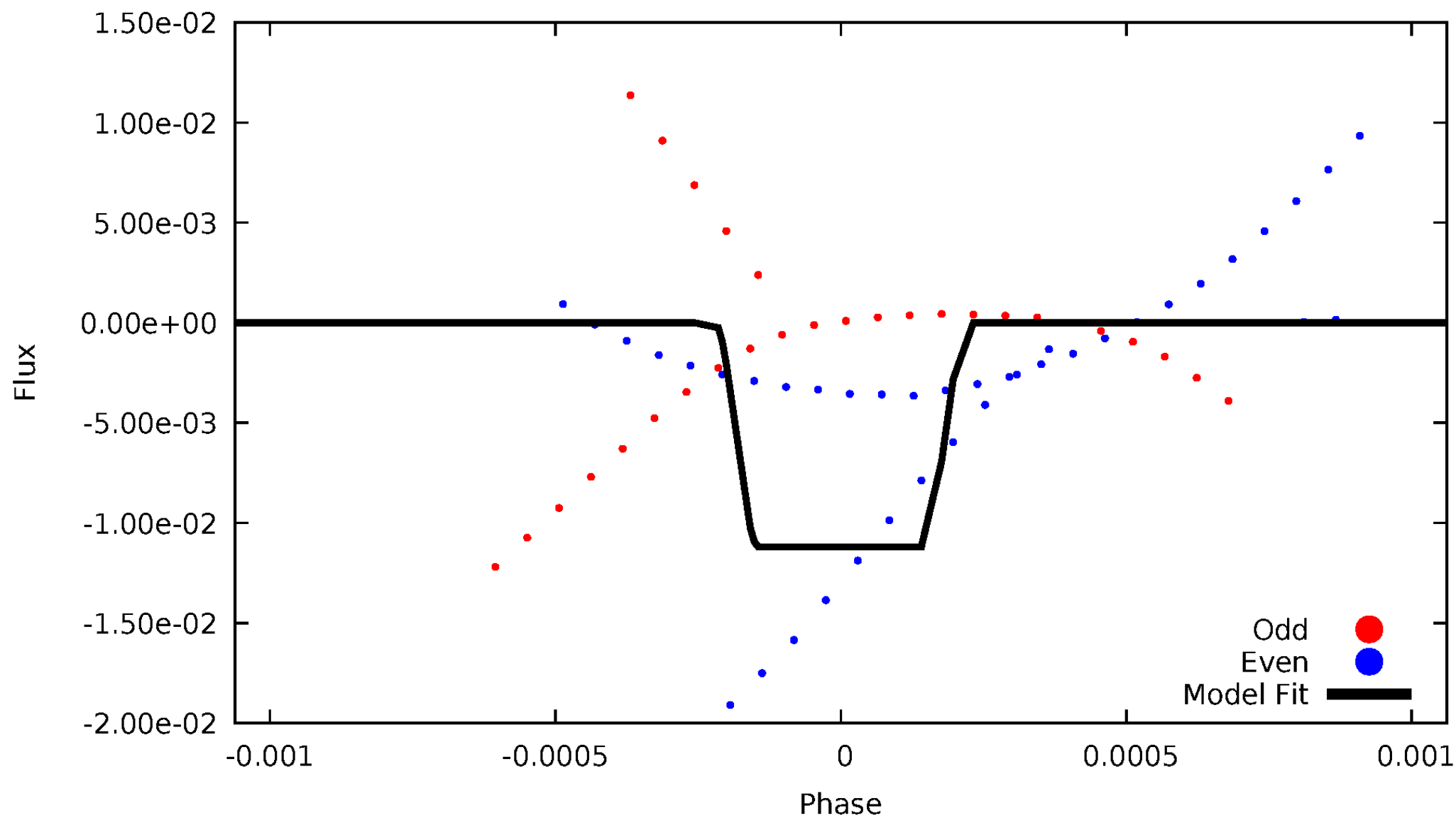
# DV Odd/Even

TCE 004647715-06



# ALT Odd/Even

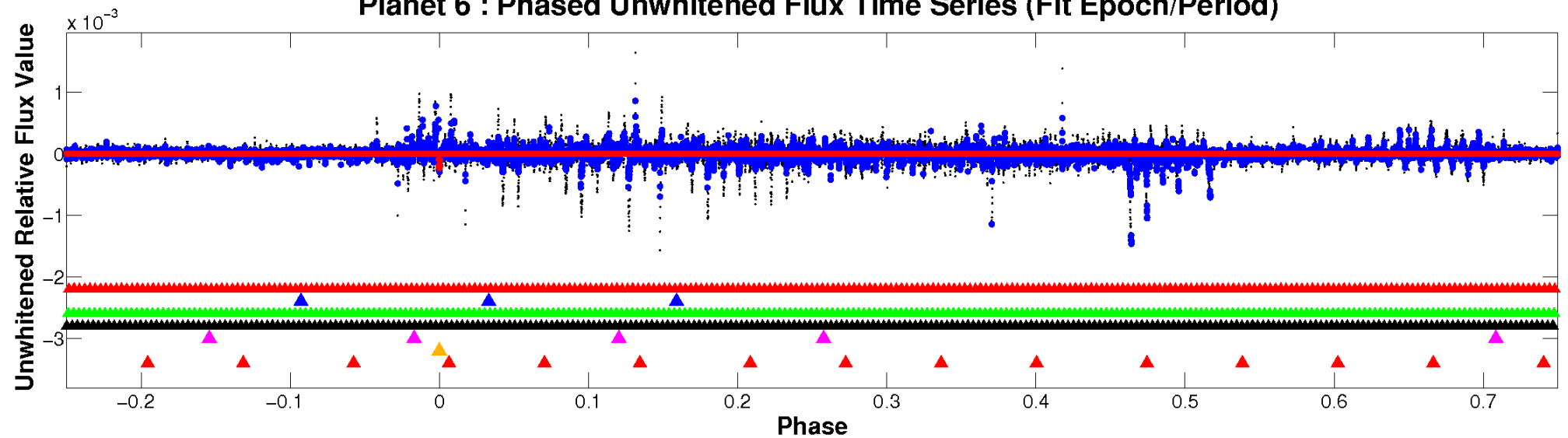
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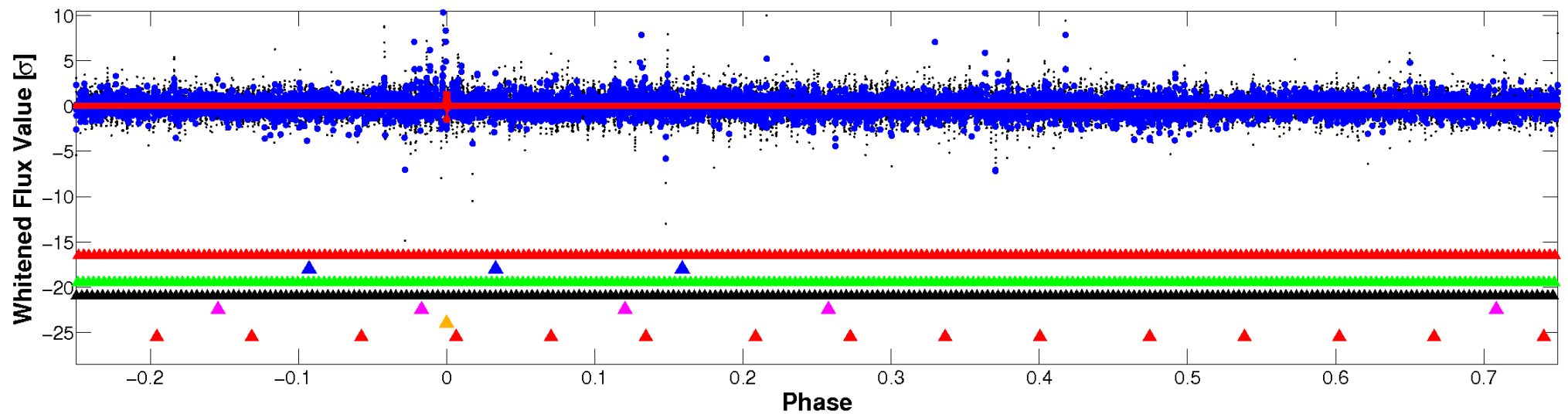


# Non-Whitened Vs. Whitened Light Curve

## Planet 6 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

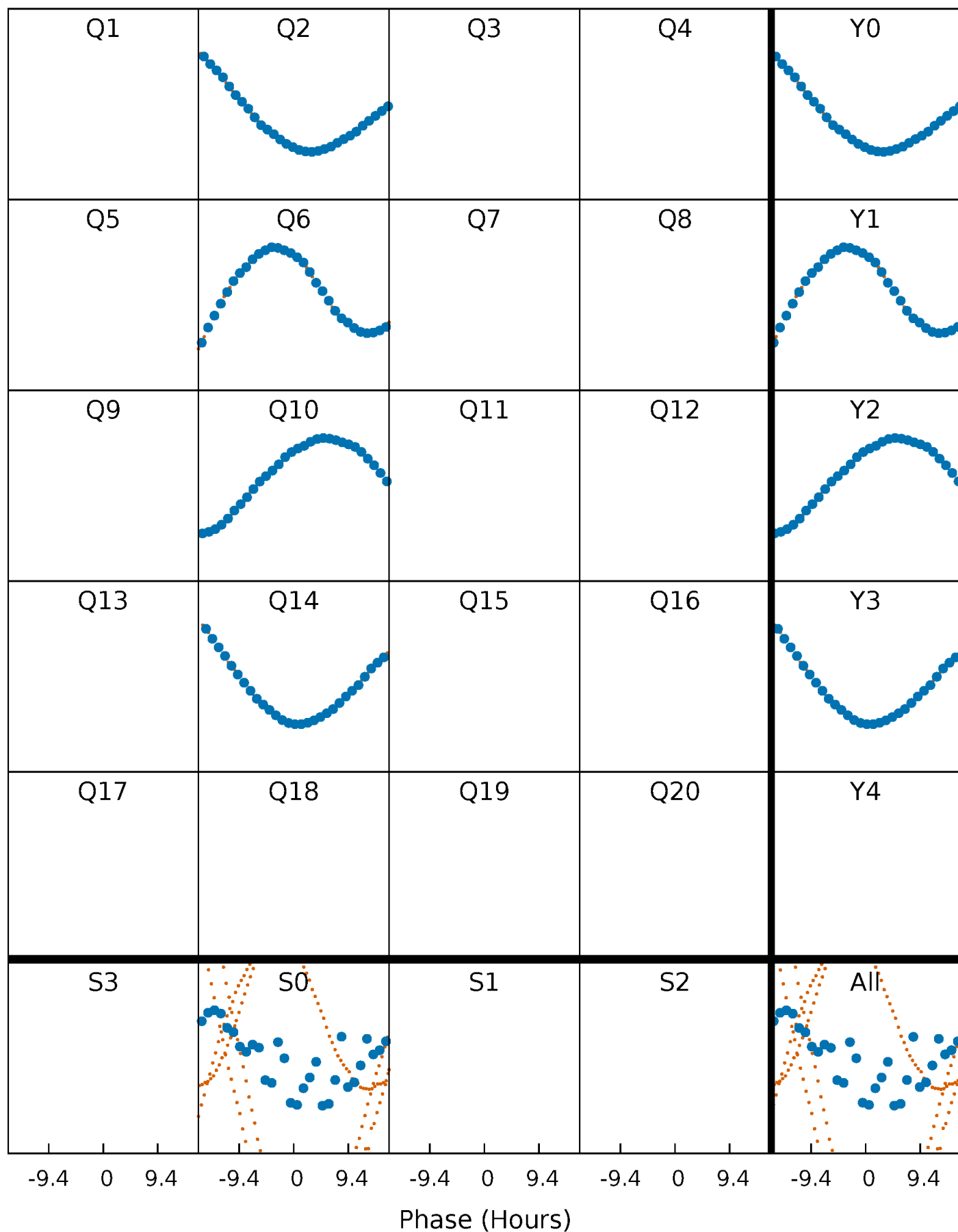


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



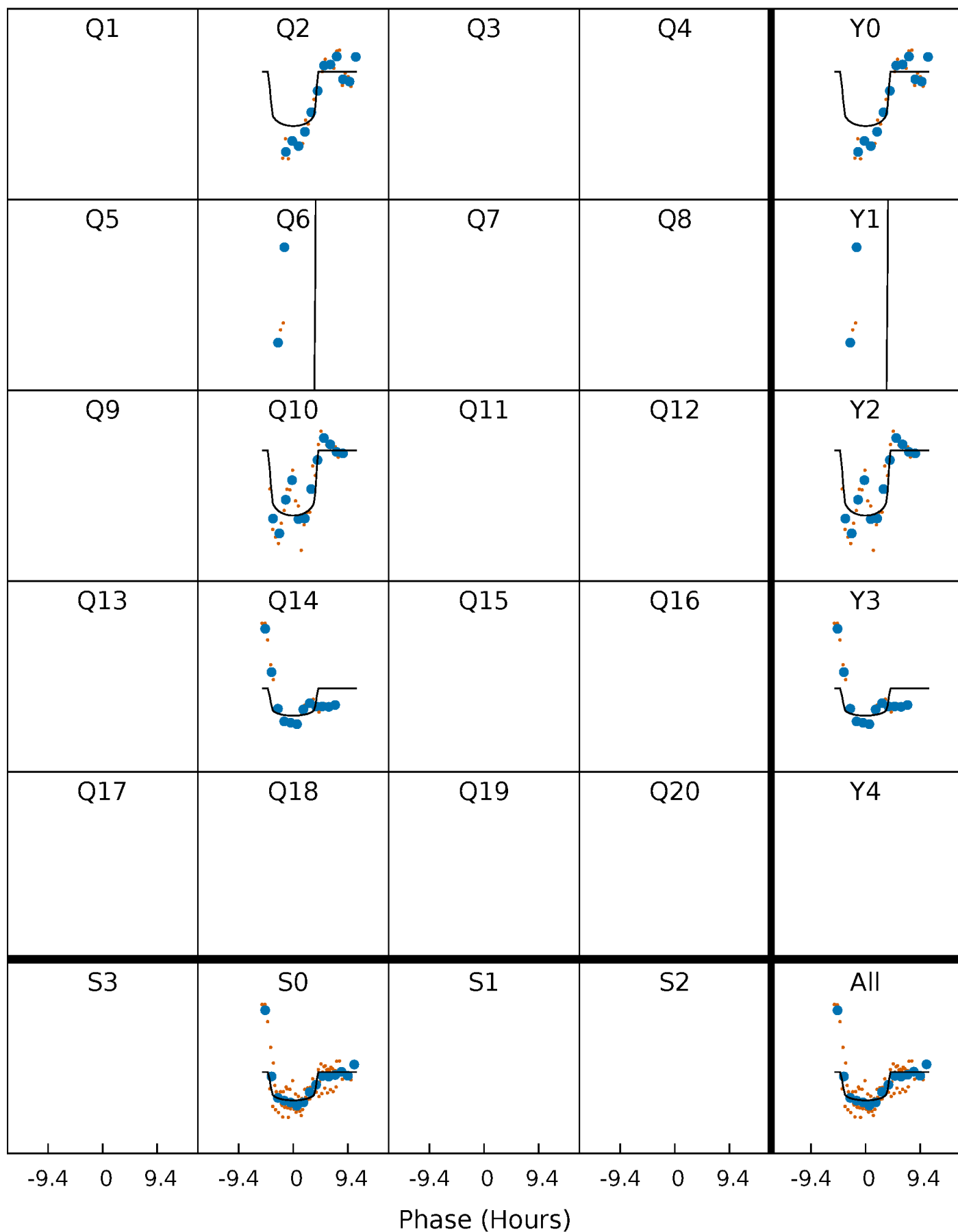
# PDC Quarter-Phased Transit Curves

TCE 004647715-06 P=365.960393 Days  $T_0=185.167645$  (BKJD)



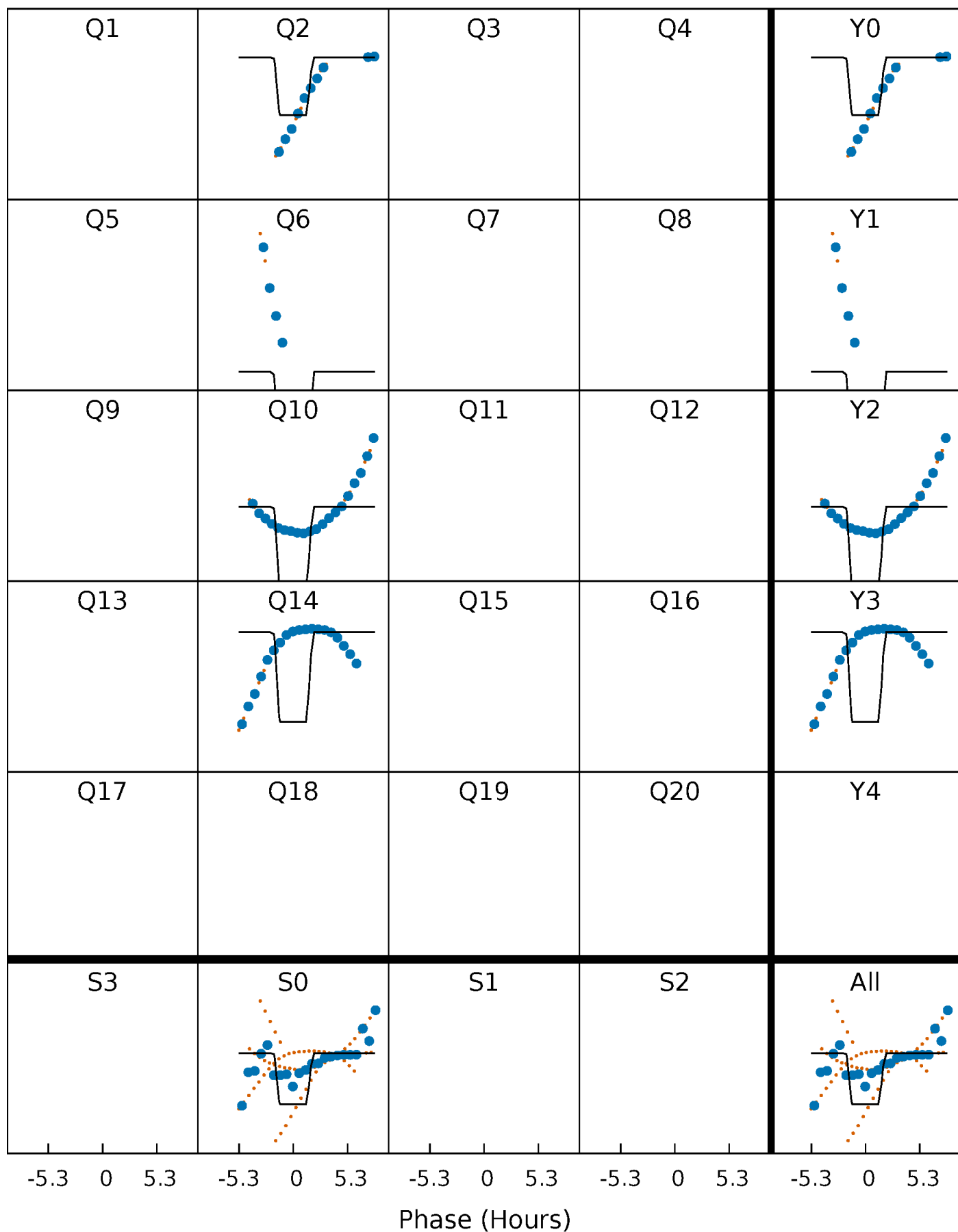
# DV Quarter-Phased Transit Curves

TCE 004647715-06 P=365.960393 Days  $T_0=185.167645$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

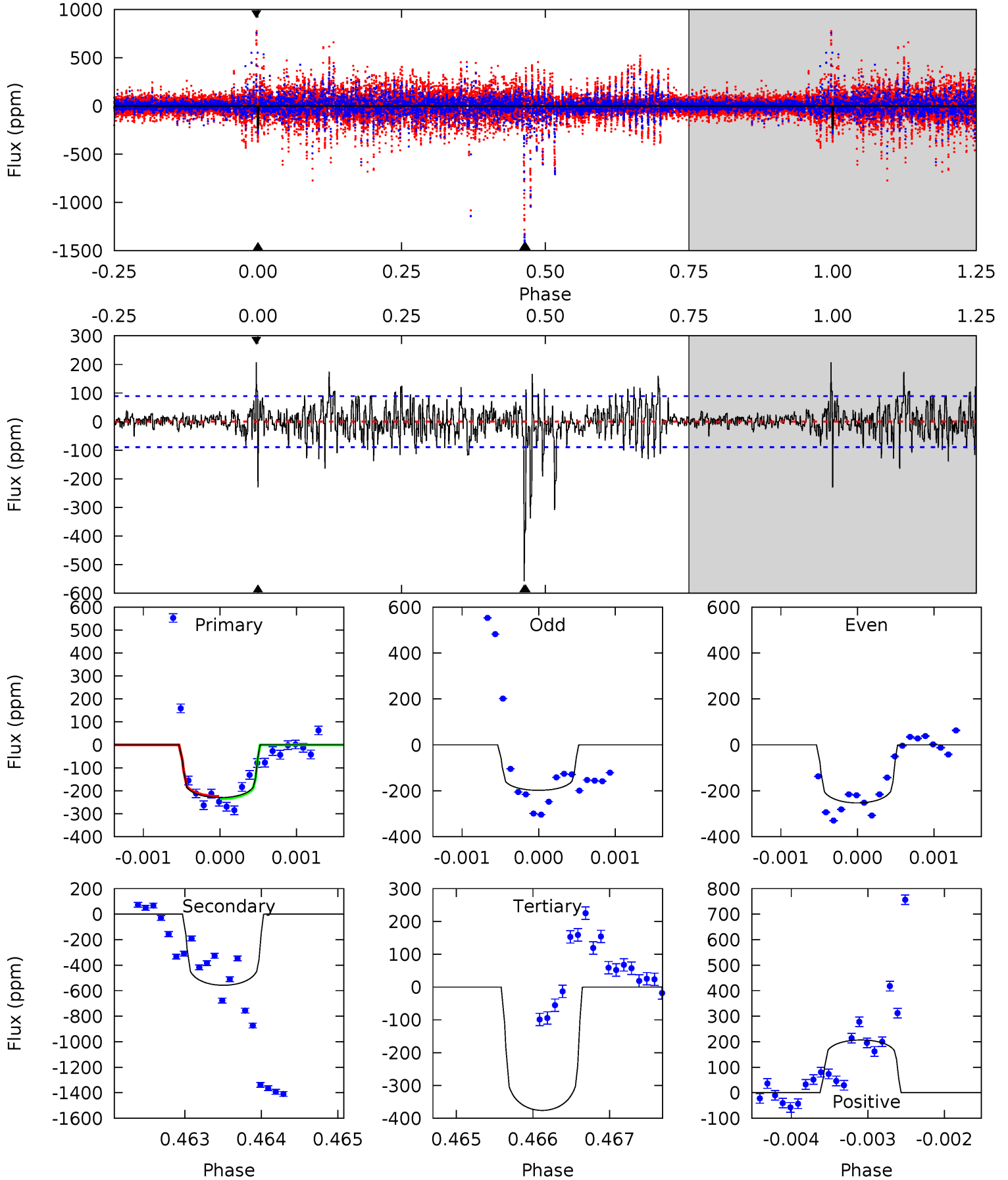
TCE 004647715-06 P=365.968134 Days  $T_0=185.162318$  (BKJD)



# DV Model-Shift Uniqueness Test

004647715-06, P = 365.960393 Days, E = 185.167645 Days

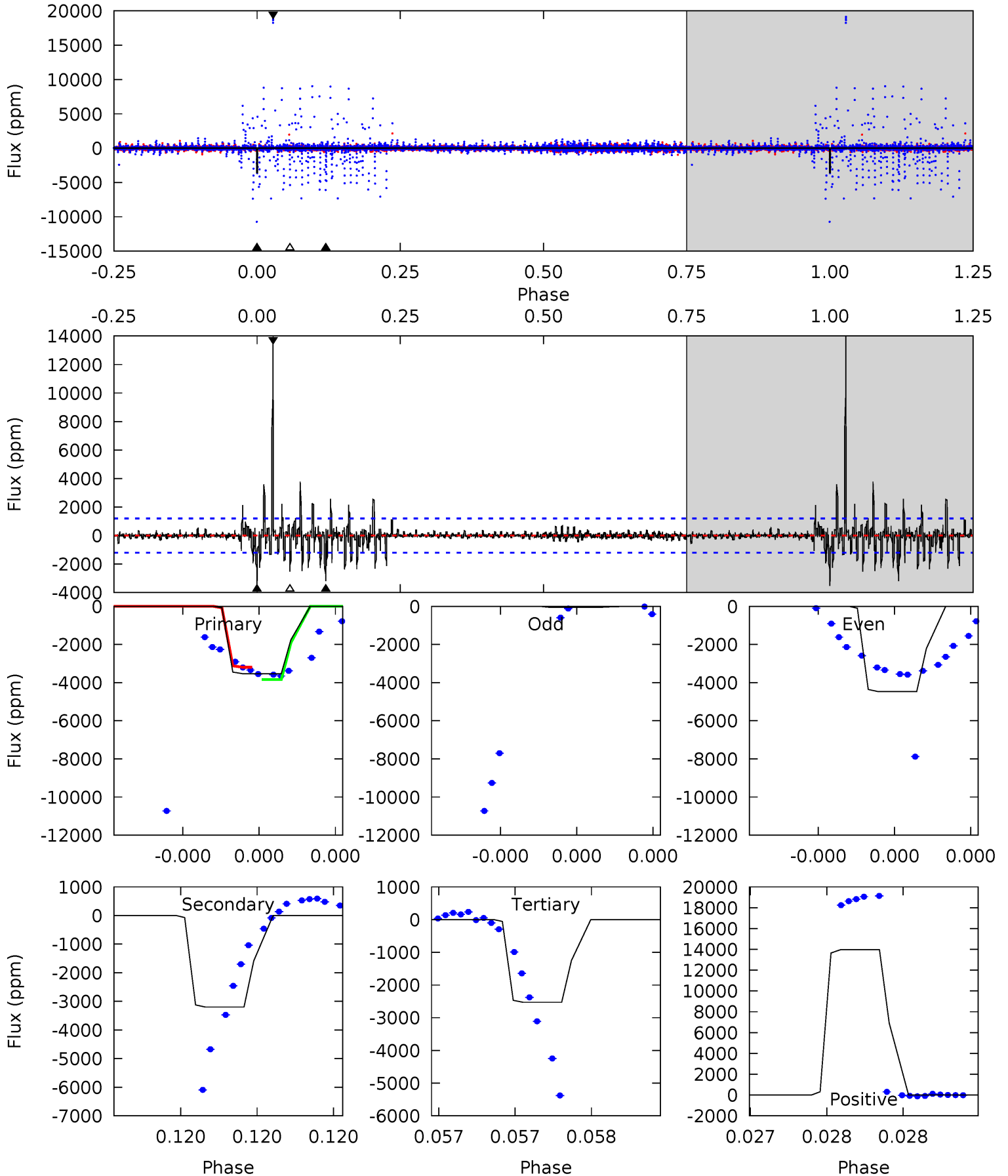
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 14.1 | 34.2 | 23.0 | 12.7 | 5.46            | 3.31            | 2.83             | -8.97   | 1.40    | 11.1    | 21.5    | 1.35    | 1.02 | 0.27  | 0.31 |



# Alt Model-Shift Uniqueness Test

004647715-06, P = 365.968134 Days, E = 185.162318 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 |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|-----|
| 16.4 | 14.9 | 11.7 | 64.9 | 5.60            | 3.52            | 1.53             | 4.67    | -48.5   | 3.12    | -50.0   | 10.0    | 1.92 | 0.80  | 0   |



### Stellar Parameters For KIC 004647715

|        | $T_{\text{eff}}(K)$   | $\log(g)$                 | [Fe/H]                    | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|-----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
|        | $9554^{+381}_{-1621}$ | $3.584^{+0.459}_{-0.081}$ | $0.560^{+0.050}_{-0.150}$ | $4.884^{+0.446}_{-2.527}$ | $3.340^{+0.063}_{-1.192}$ | $0.040^{+0.185}_{-0.010}$                 |
|        | +4%/-17%              | +13%/-2%                  | +9%/-27%                  | +9%/-52%                  | +2%/-36%                  | +459%/-26%                                |
| Source | SPE68                 | SPE68                     | SPE68                     | DSEP                      |                           |   |

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 004647715-06 / KOI

| Detrend | Depth (ppm)     | $R_p (R_{\oplus})$       | $T_{max} (K)$       | $T_{obs} (K)$            | $A_{obs}$                |
|---------|-----------------|--------------------------|---------------------|--------------------------|--------------------------|
| DV      | $-558 \pm 16$   | $6.94^{+5.18}_{-4.05}$   | $993^{+119}_{-190}$ | $12650^{+20656}_{-4218}$ | $13270^{+60162}_{-8704}$ |
| Alt.    | $-3198 \pm 215$ | $52.85^{+8.32}_{-12.88}$ | $998^{+111}_{-193}$ | $6400^{+496}_{-754}$     | $1377^{+890}_{-346}$     |

$T_{max}$  = 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

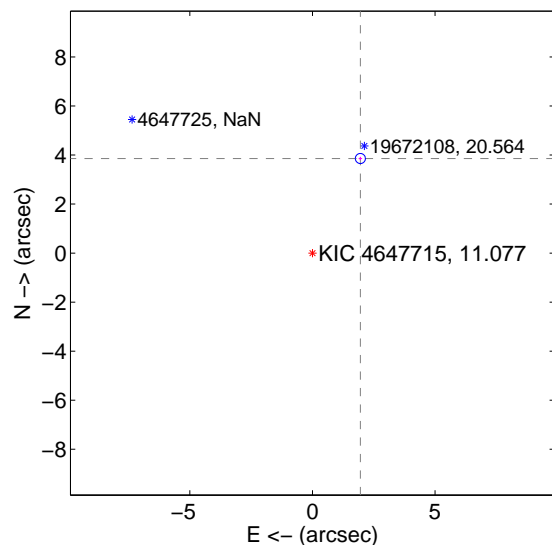
Supplemental centroid analysis for 004647715-06. **Kepler magnitude: 11.08.** Transit SNR 10.64

**There are 0 quarters with good PRF difference image offsets**

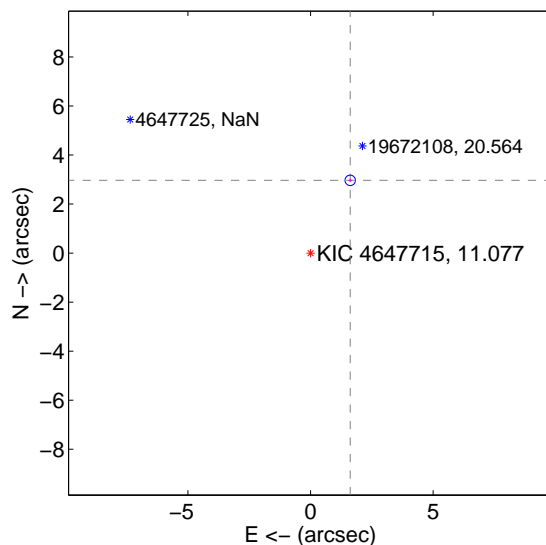
The direct PRF centroid is offset from the target star catalog position by about 0.96 arcsec

|   | Distance in arcsec                  | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec      |
|---|-------------------------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT          | <b>4.324 <math>\pm</math> 0.068</b> | <b>63.14</b>        | -1.955 $\pm$ 0.068 | 3.857 $\pm$ 0.067 |
| PRF-fit source offset from KIC position | <b>3.379 <math>\pm</math> 0.071</b> | <b>47.72</b>        | -1.618 $\pm$ 0.069 | 2.966 $\pm$ 0.071 |
| photometric centroid source offset      | 2.04 $\pm$ 2.06                     | 0.99                | -1.72 $\pm$ 1.66   | 1.10 $\pm$ 2.81   |

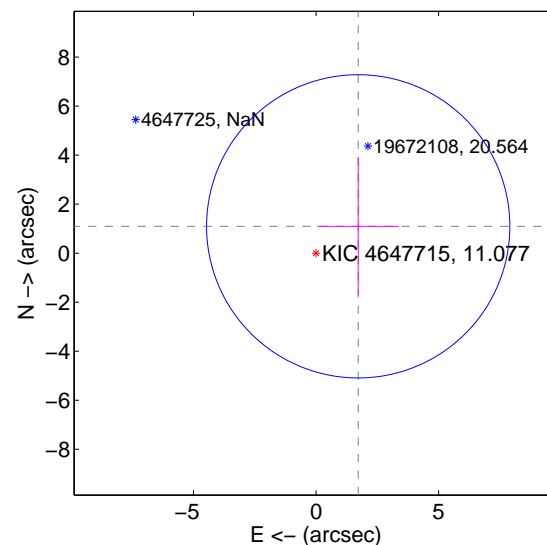
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids



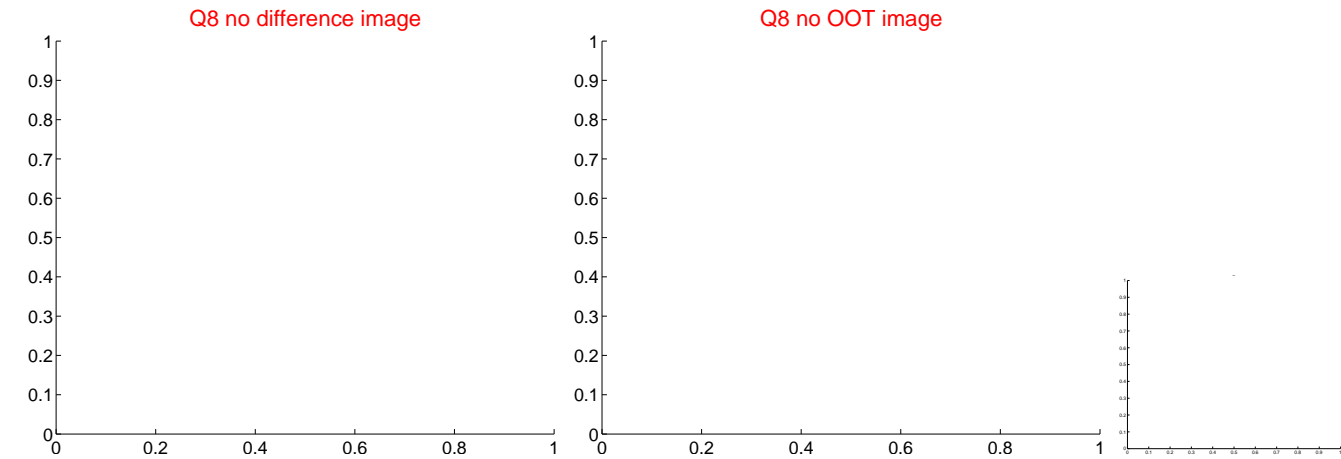
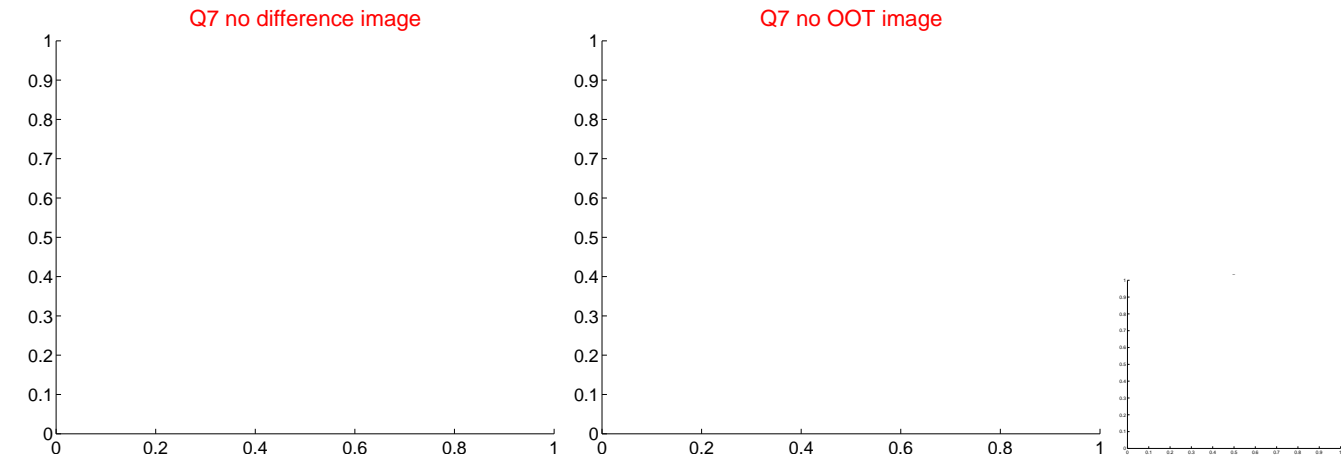
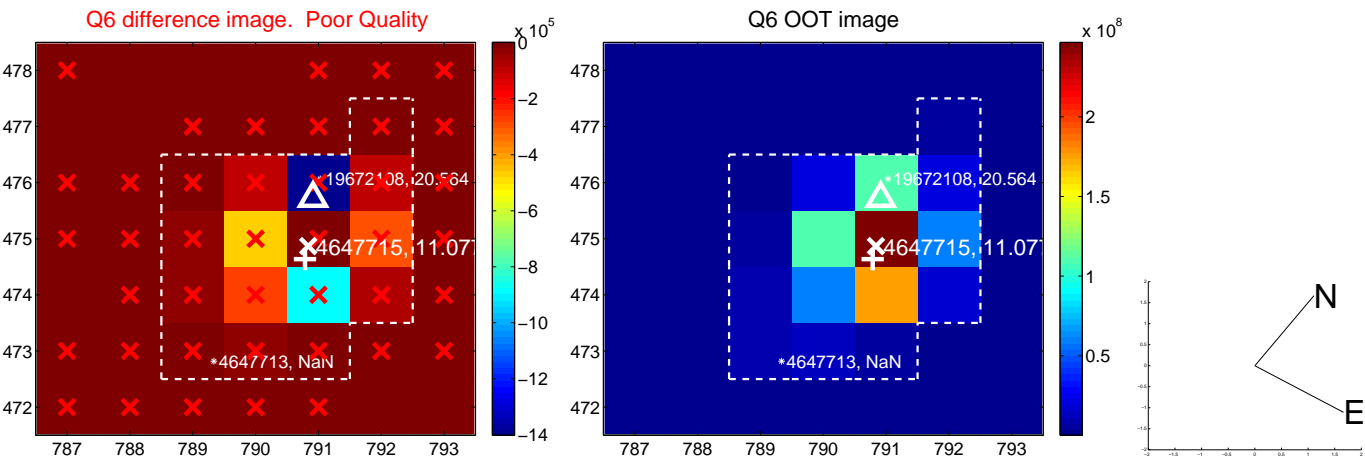
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



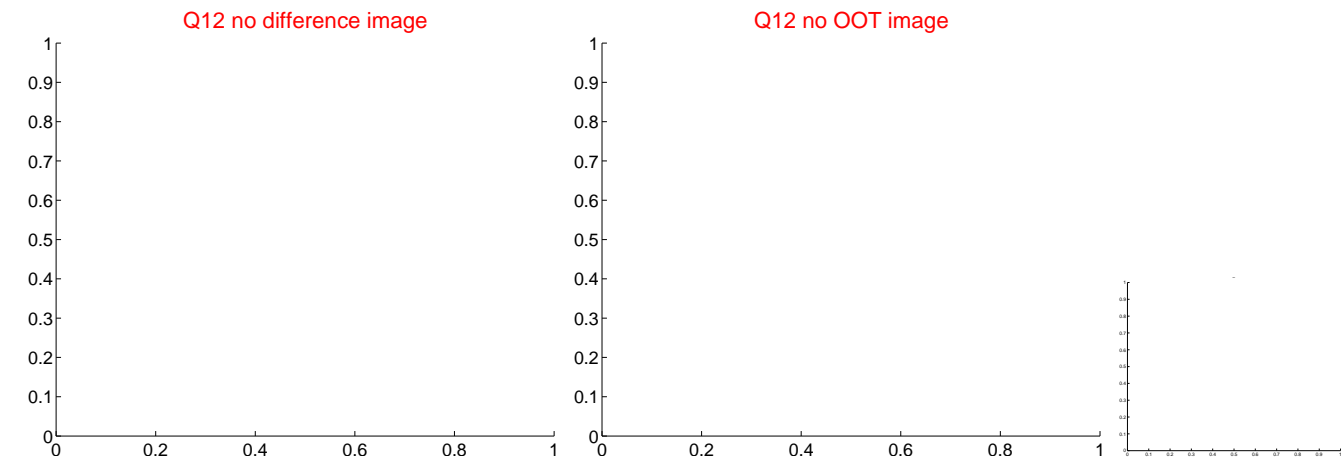
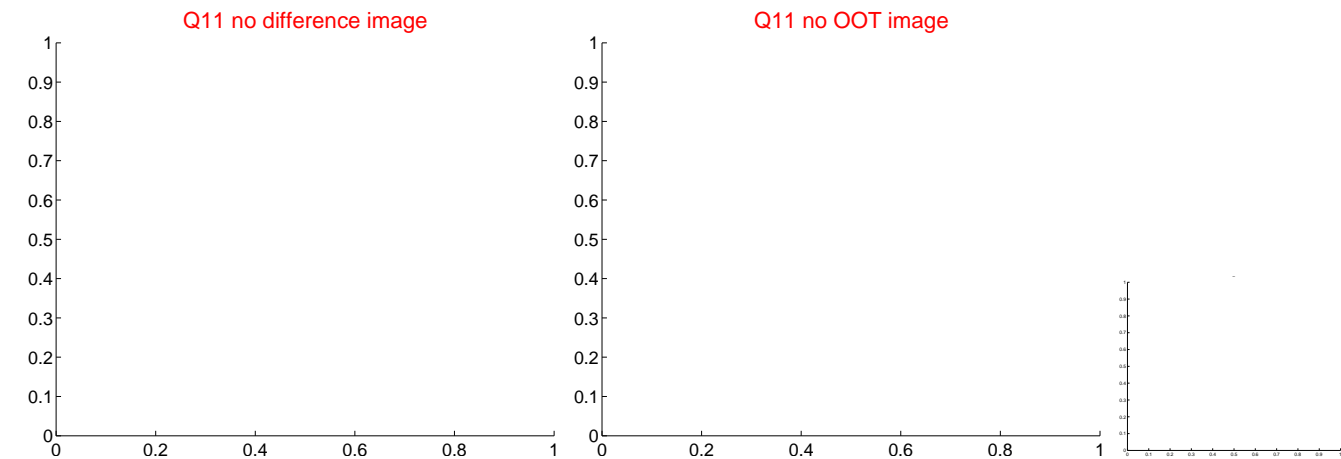
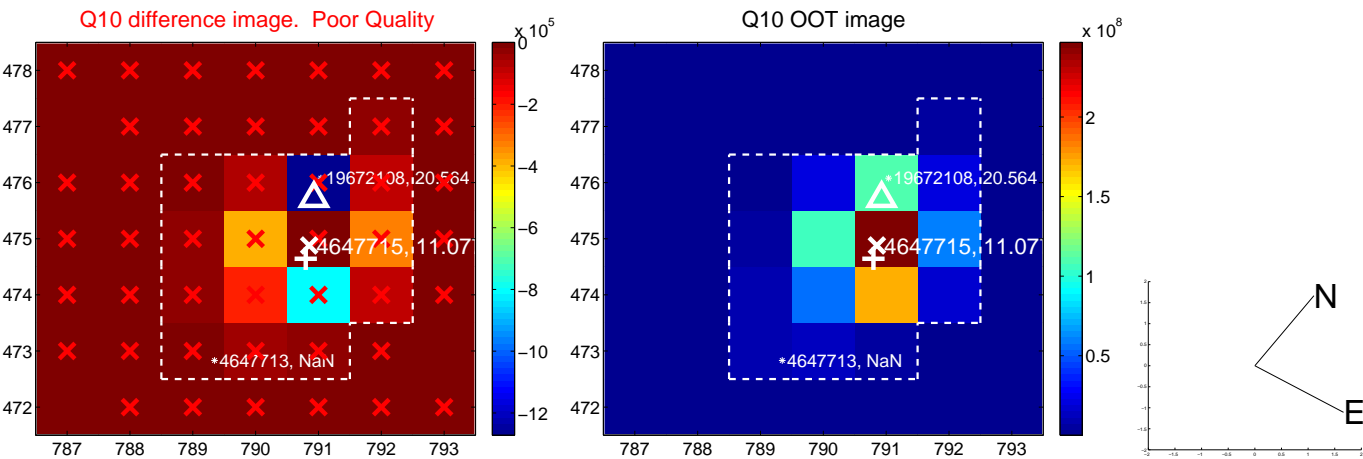
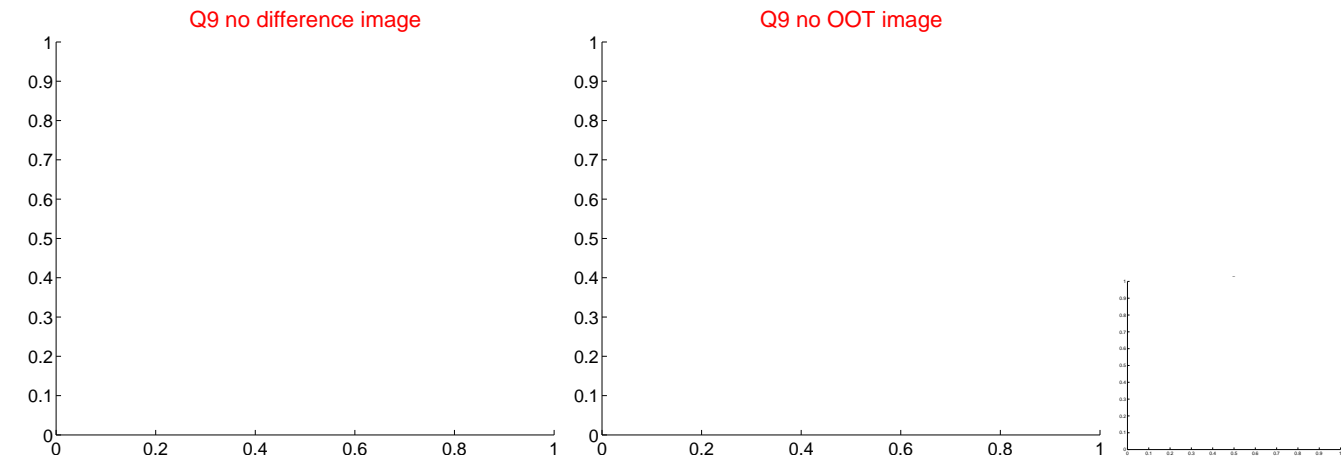
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



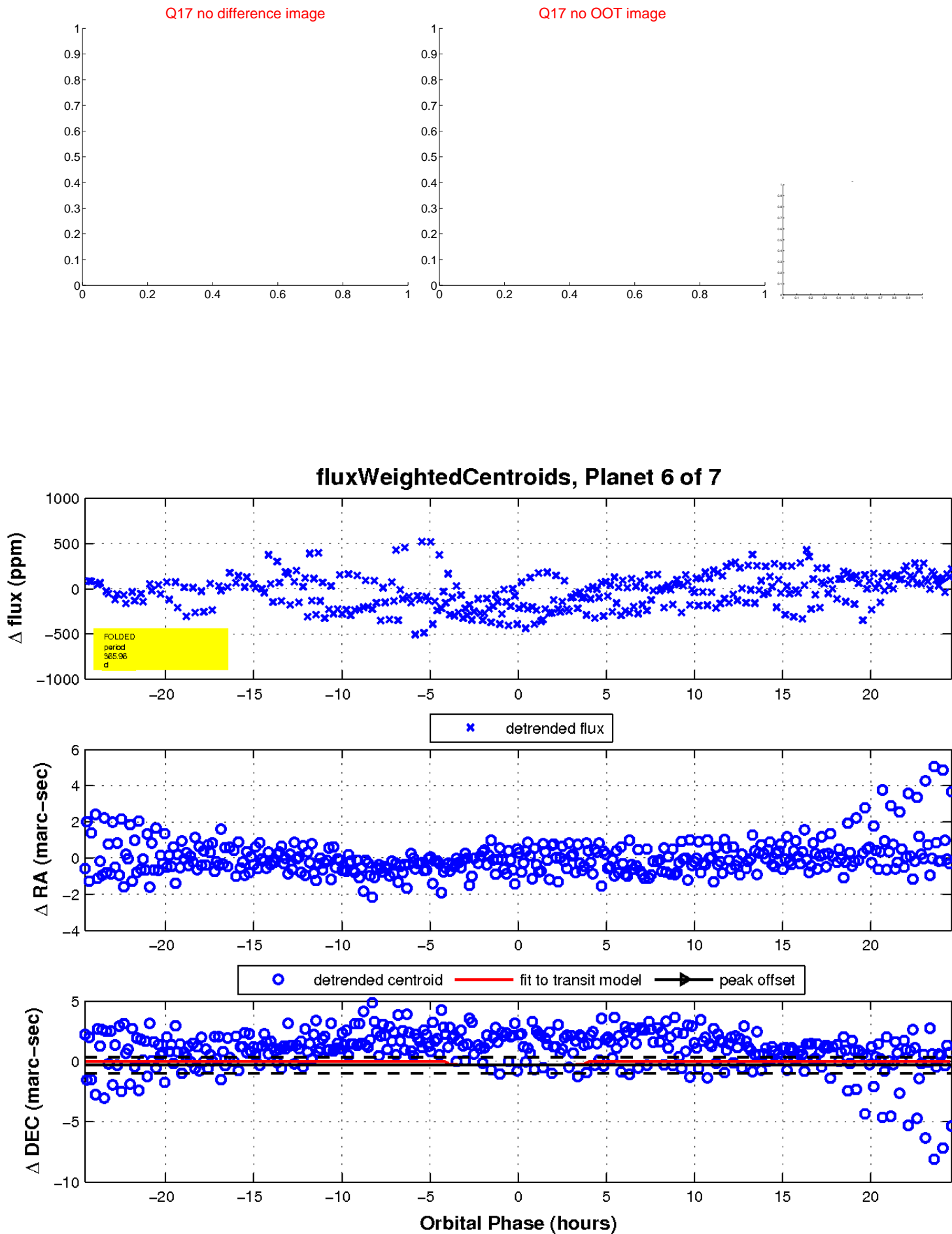
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



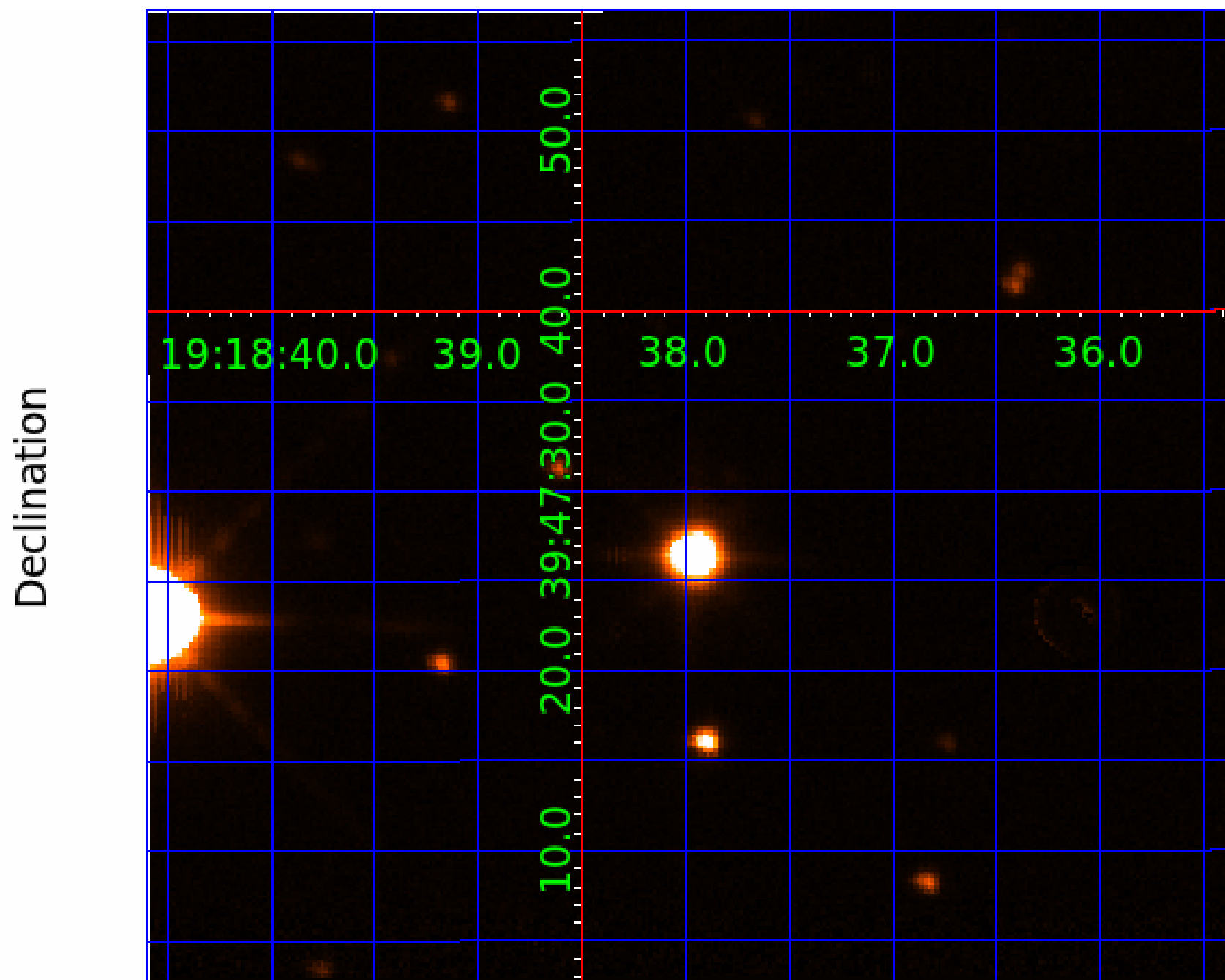
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 004647715

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 004647715-01 | OBS      | No   | 3.879075      | 131.835148   | 60.8        | 1.379            | 23.9 | 25.8 | 4.88                        | 9554            | 4.46                   | 34133.56               |
| 004647715-02 | OBS      | No   | 412.042472    | 517.165167   | 393.6       | 13.710           | 23.1 | 13.7 | 4.88                        | 9554            | 17.86                  | 67.85                  |
| 004647715-03 | OBS      | No   | 1.292996      | 131.687196   | 2.7         | 5.723            | 17.6 | 2.8  | 4.88                        | 9554            | 0.93                   | 147691.79              |
| 004647715-04 | OBS      | No   | 3.879084      | 132.631335   | 22.7        | 7.668            | 16.2 | 9.8  | 4.88                        | 9554            | 2.75                   | 34133.45               |
| 004647715-06 | OBS      | No   | 365.960393    | 185.167645   | 230.9       | 8.221            | 11.3 | 10.6 | 4.88                        | 9554            | 7.95                   | 79.48                  |
| 004647715-07 | OBS      | No   | 97.345971     | 164.122956   | 82.9        | 7.500            | 9.6  | -1.0 | 4.88                        | 9554            | 4.55                   | 464.58                 |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments  |
|--------------|----------|------|-------|---|---|---|---|---|
| 004647715-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | SWEET_NTL—LPP_DV—CENT_SATURATED   |
| 004647715-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED |
| 004647715-03 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED  |
| 004647715-04 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE_ZUMA—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED                         |
| 004647715-06 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_CHASES_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED                 |
| 004647715-07 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—INCONSISTENT_TRANS—CENT_SATURATED               |

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

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

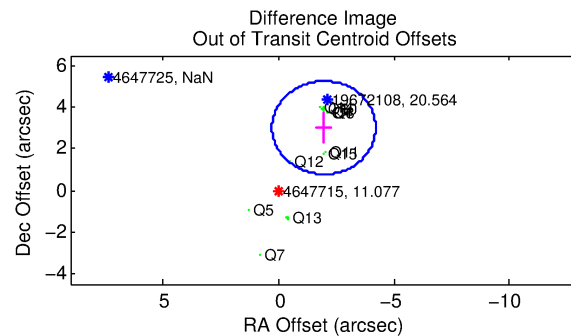
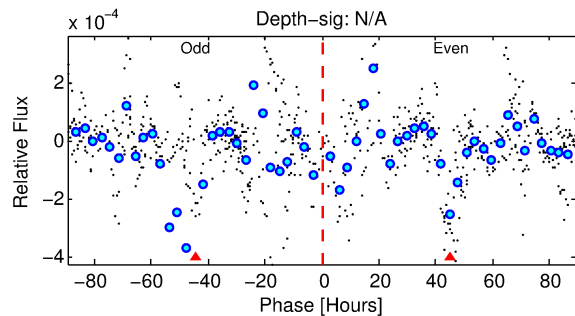
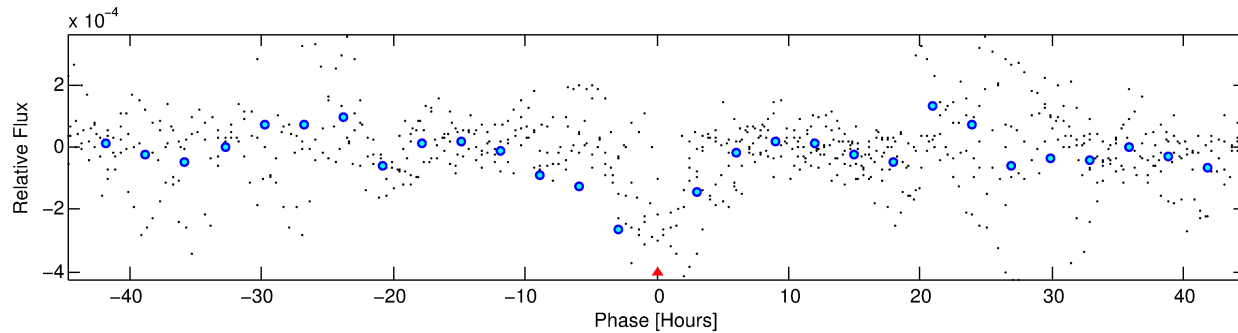
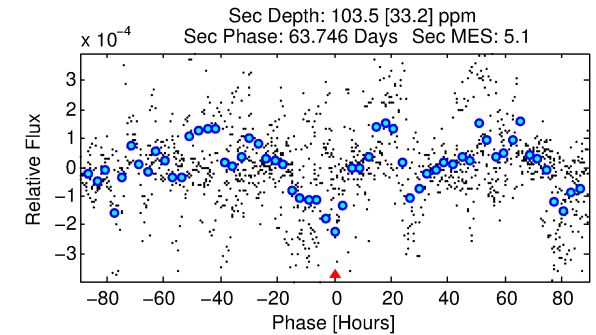
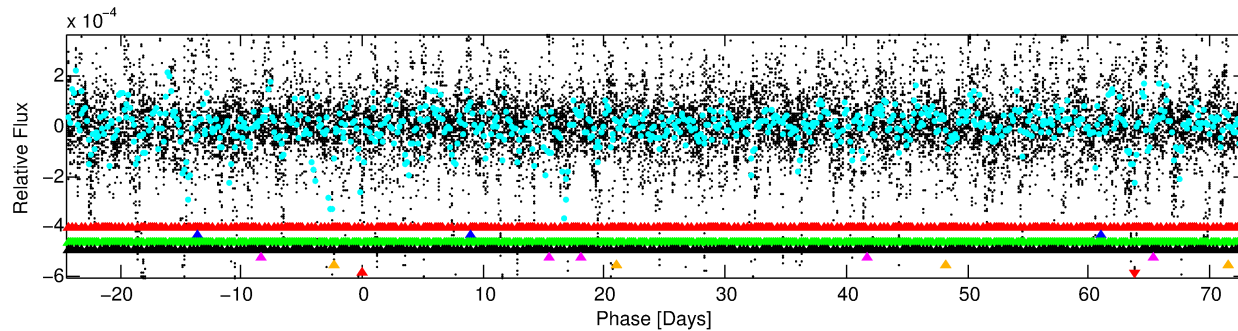
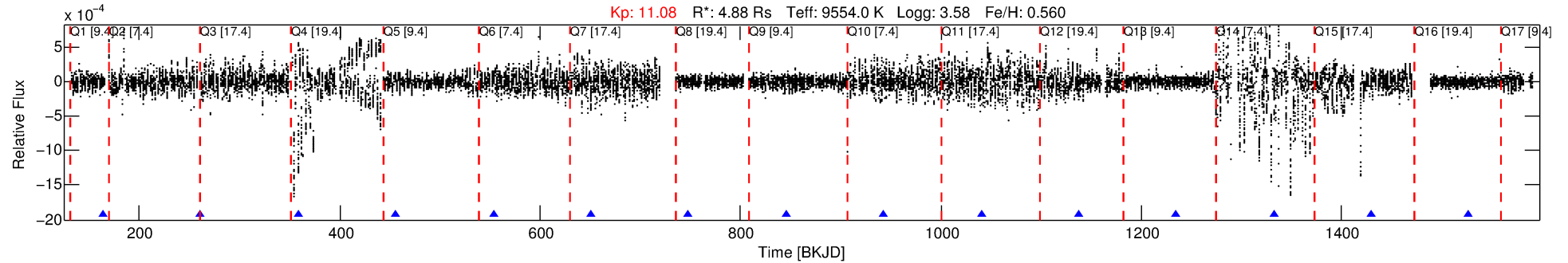
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 004647715-07

No Significant Match Found

# DV One-Page Summary

KIC: 4647715 Candidate: 7 of 7 Period: 97.346 d



## TPS TCE Results:

Period = 97.34597 d  
Epoch = 164.1230 BKJD

DV fit results are unavailable

## DV Diagnostic Results:

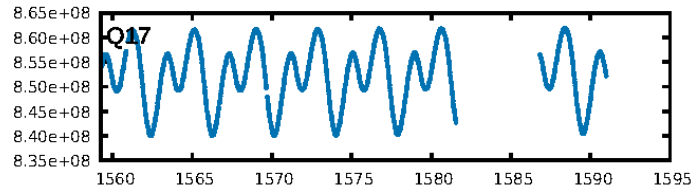
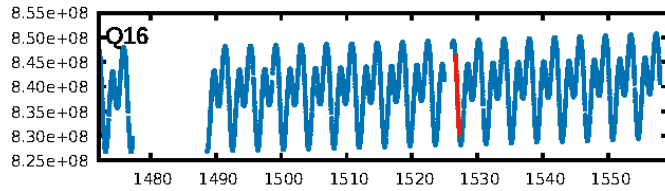
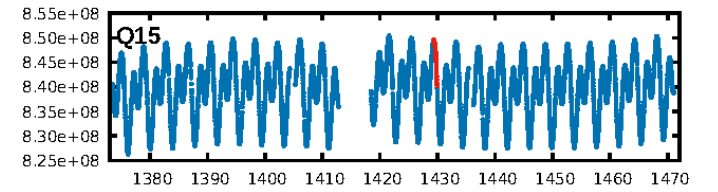
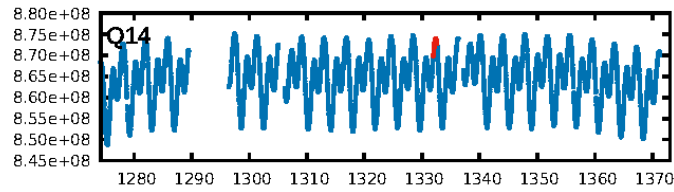
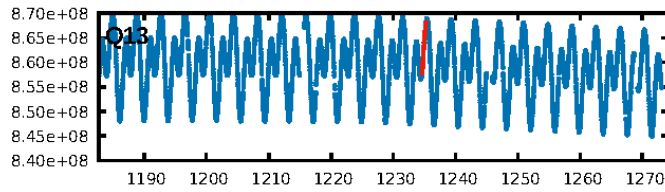
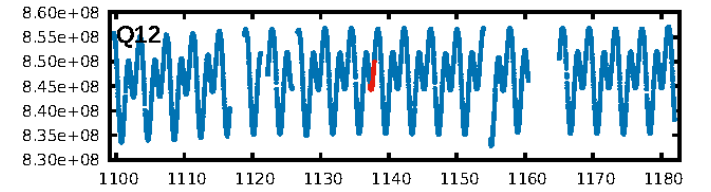
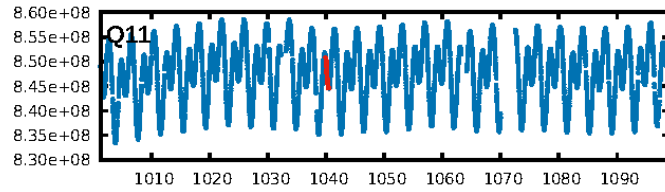
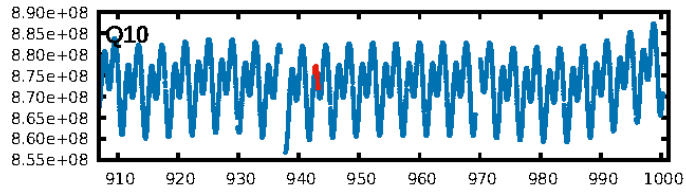
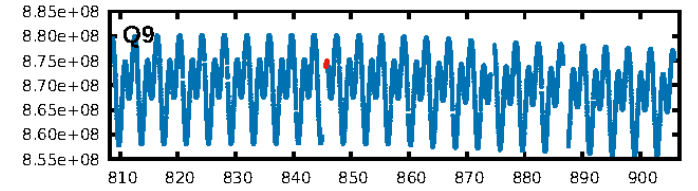
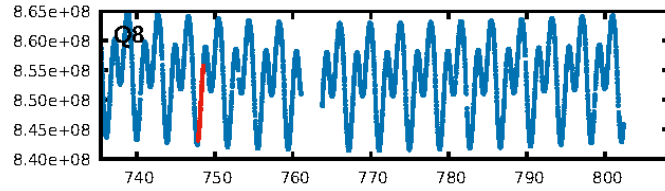
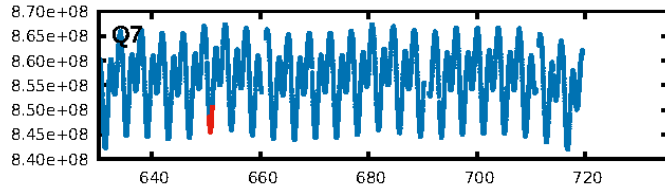
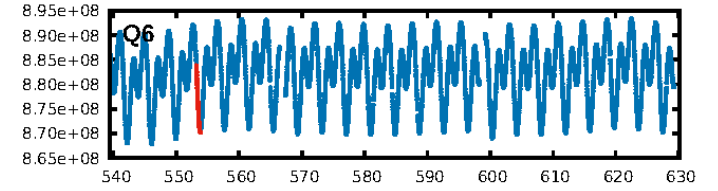
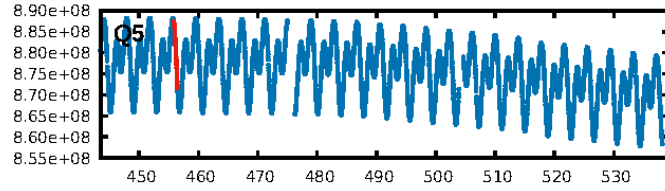
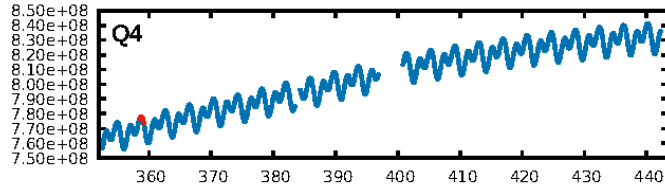
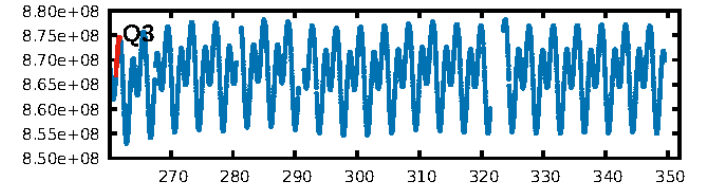
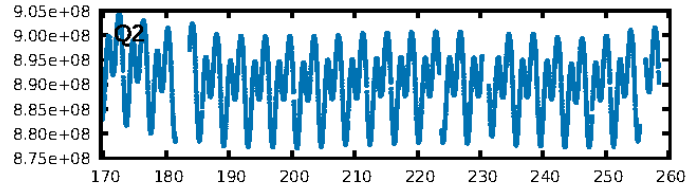
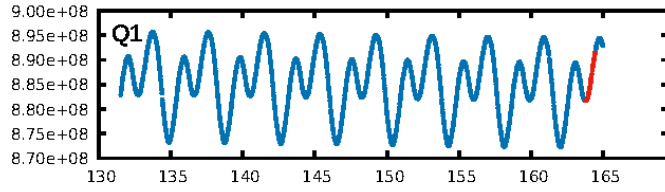
ShortPeriod-sig: 100.0% [209.14 $\sigma$ ]  
LongPeriod-sig: 100.0% [465.29 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [12/12]  
GhostDiagnostic-chr: 0.277  
Centroid-sig: N/A  
Centroid-so: 4.183 arcsec [2.17 $\sigma$ ]  
OotOffset-rm: 3.608 arcsec [4.83 $\sigma$ ]  
KicOffset-rm: 2.918 arcsec [4.48 $\sigma$ ]  
OotOffset-st: 3/3/2 [11]  
KicOffset-st: 3/3/2 [11]  
DiffImageQuality-fgm: 0.27 [3/11]  
DiffImageOverlap-fno: 0.00 [0/11]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 01:04:08 Z

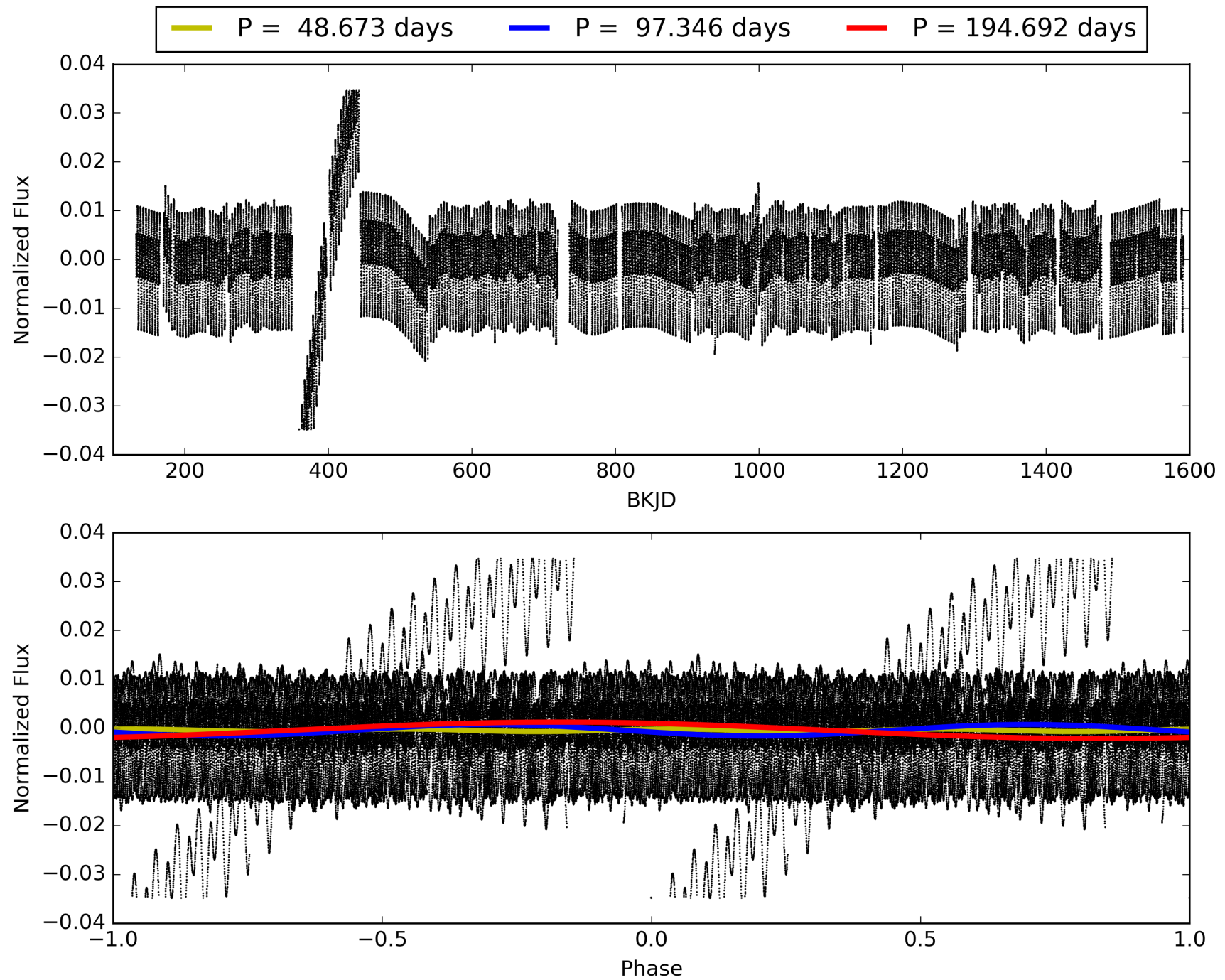
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 004647715-07, PDC Light Curves

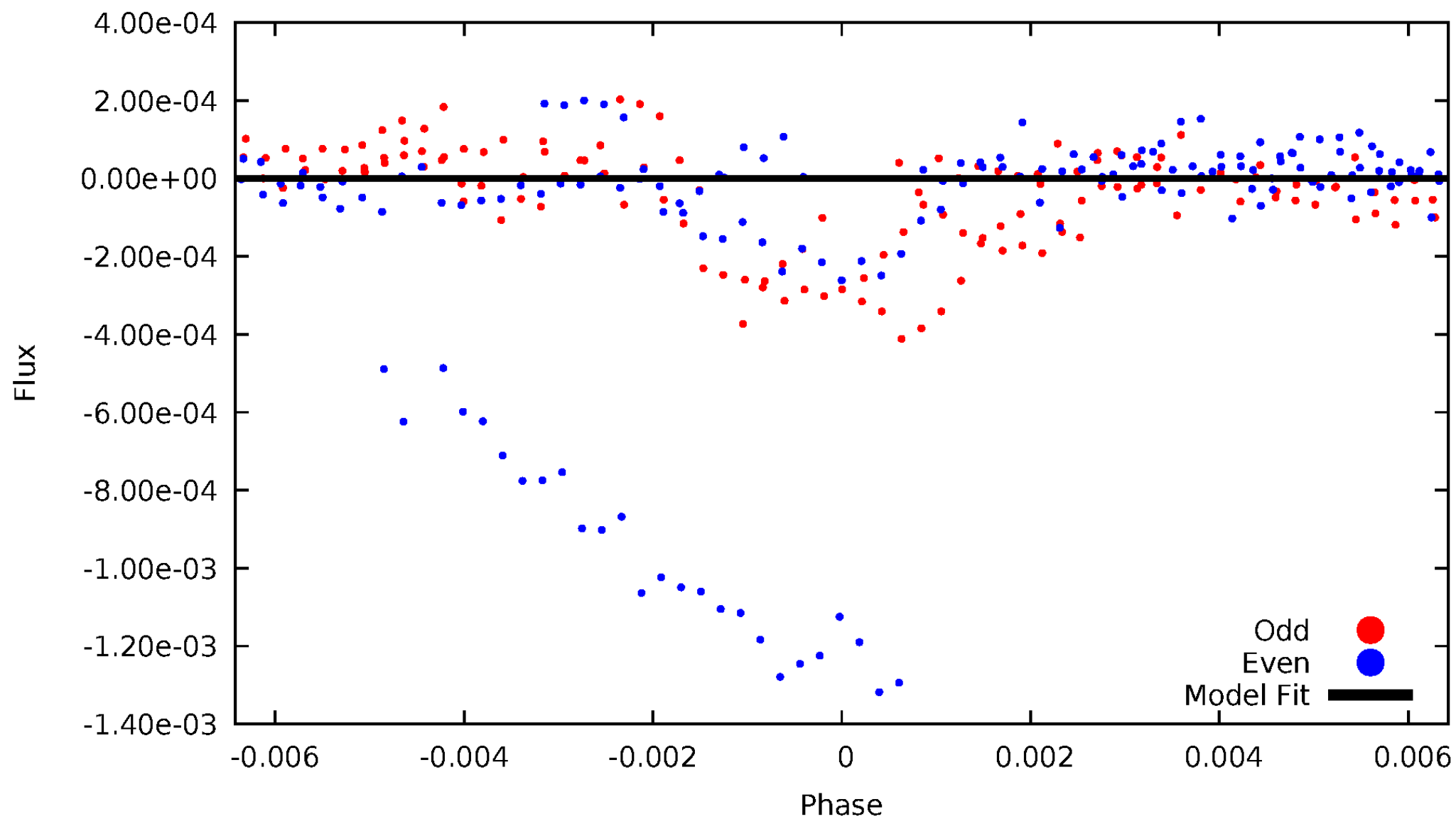


TCE 004647715-07



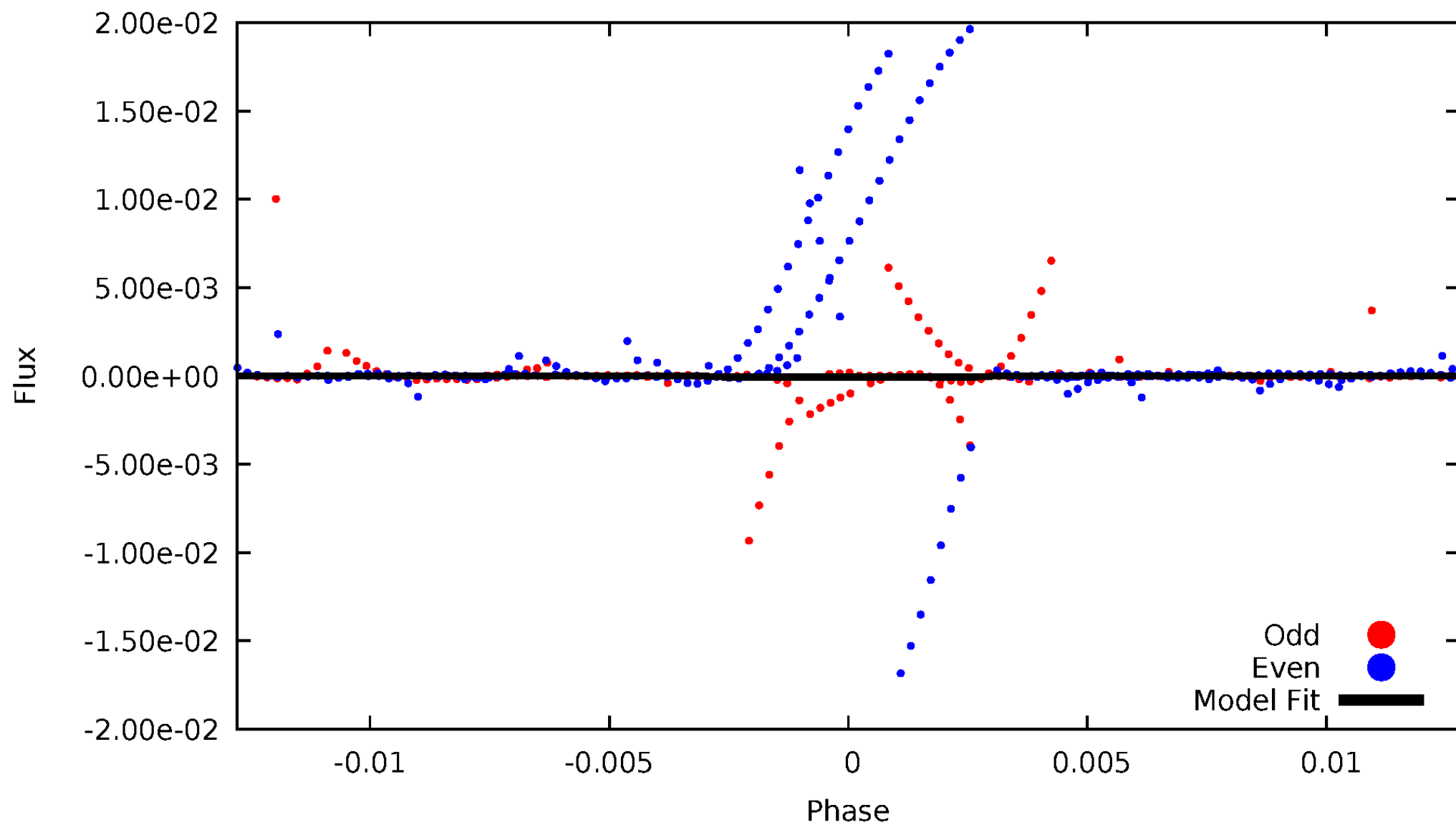
# DV Odd/Even

TCE 004647715-07

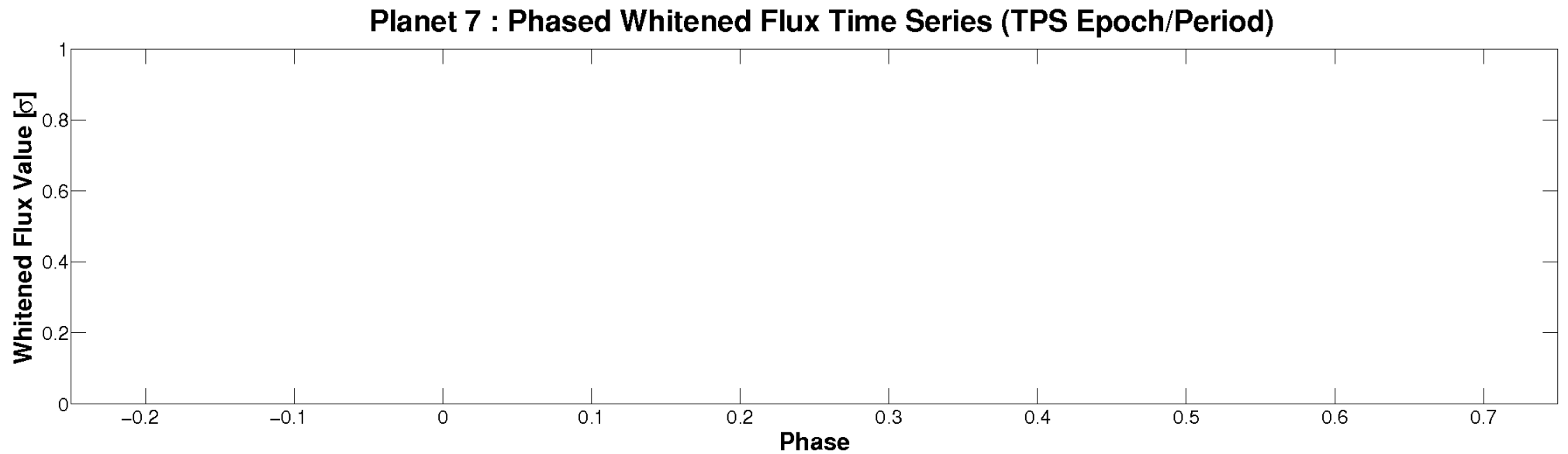
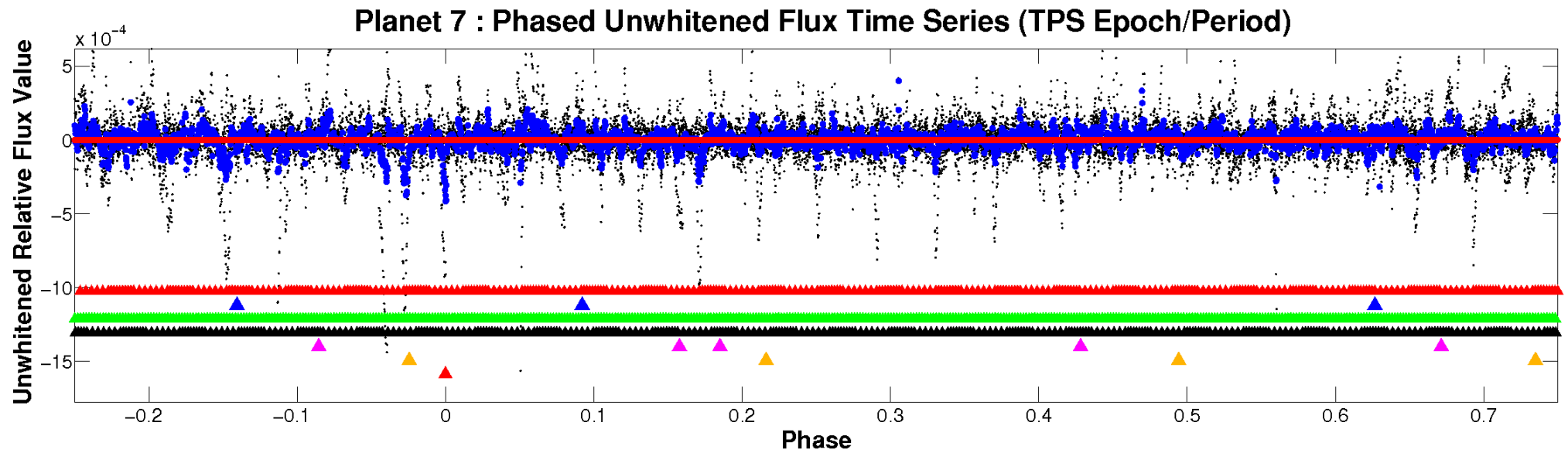


# ALT Odd/Even

TCE 004647715-07

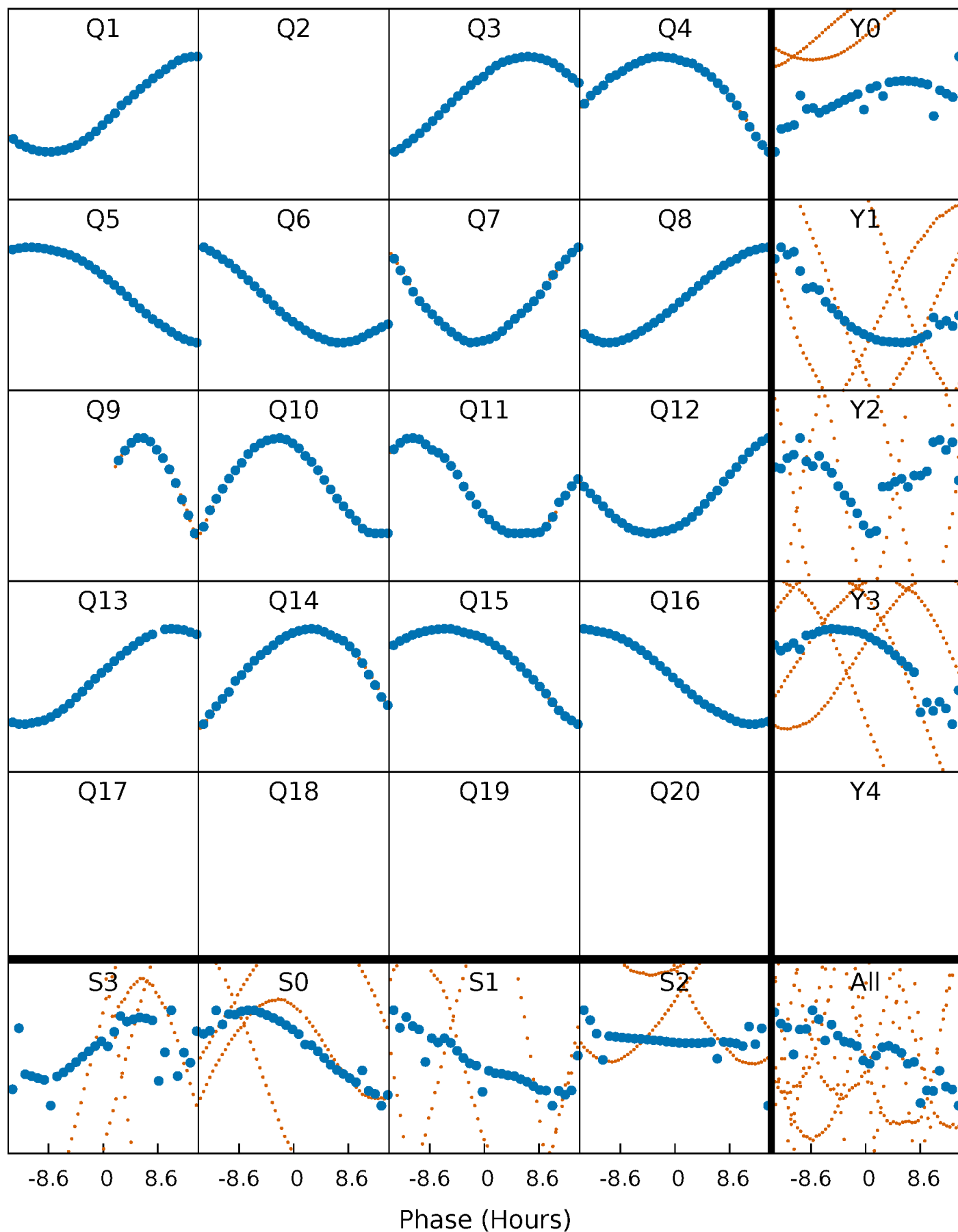


# Non-Whitened Vs. Whitened Light Curve



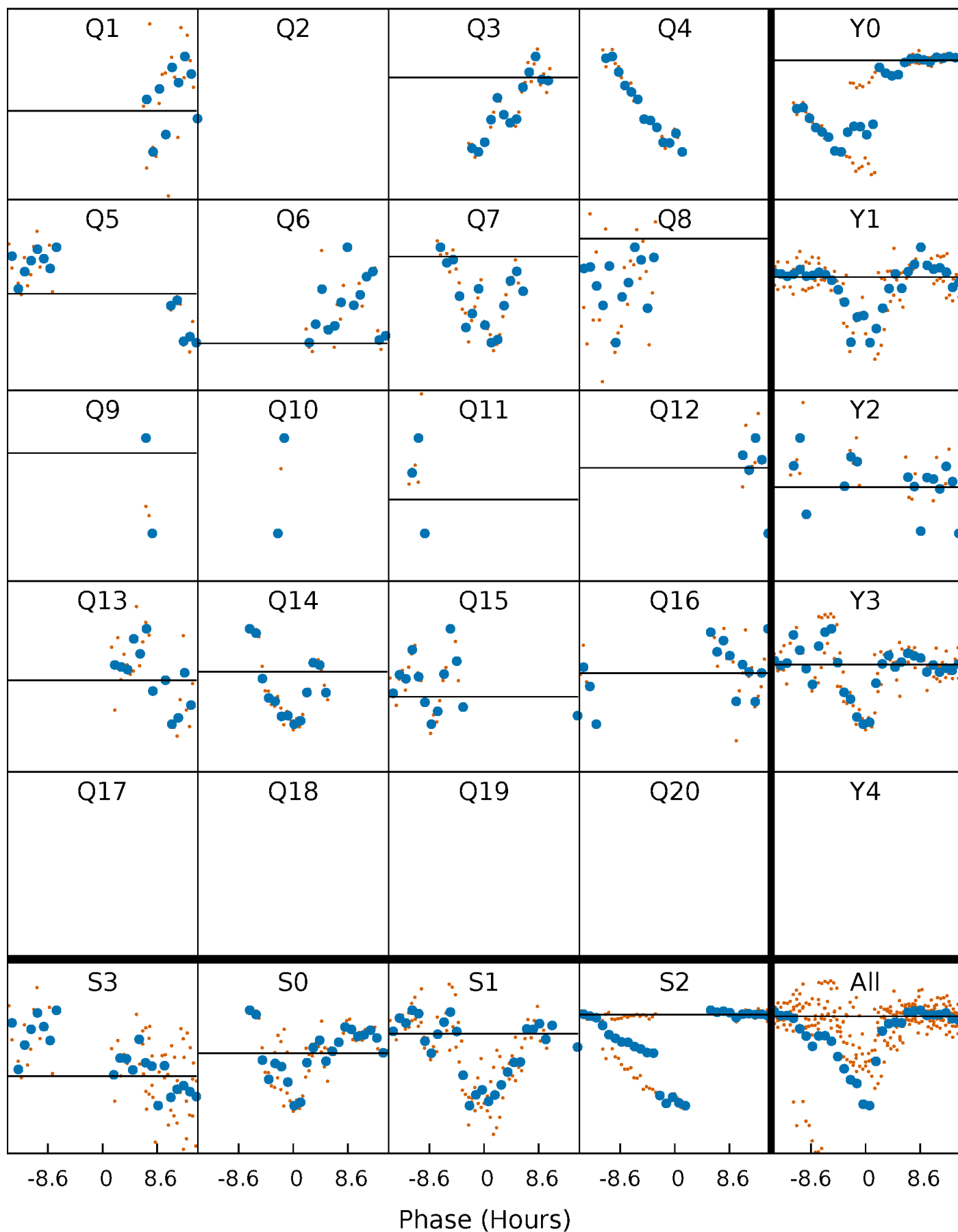
# PDC Quarter-Phased Transit Curves

TCE 004647715-07 P= 97.345971 Days  $T_0=164.122956$  (BKJD)



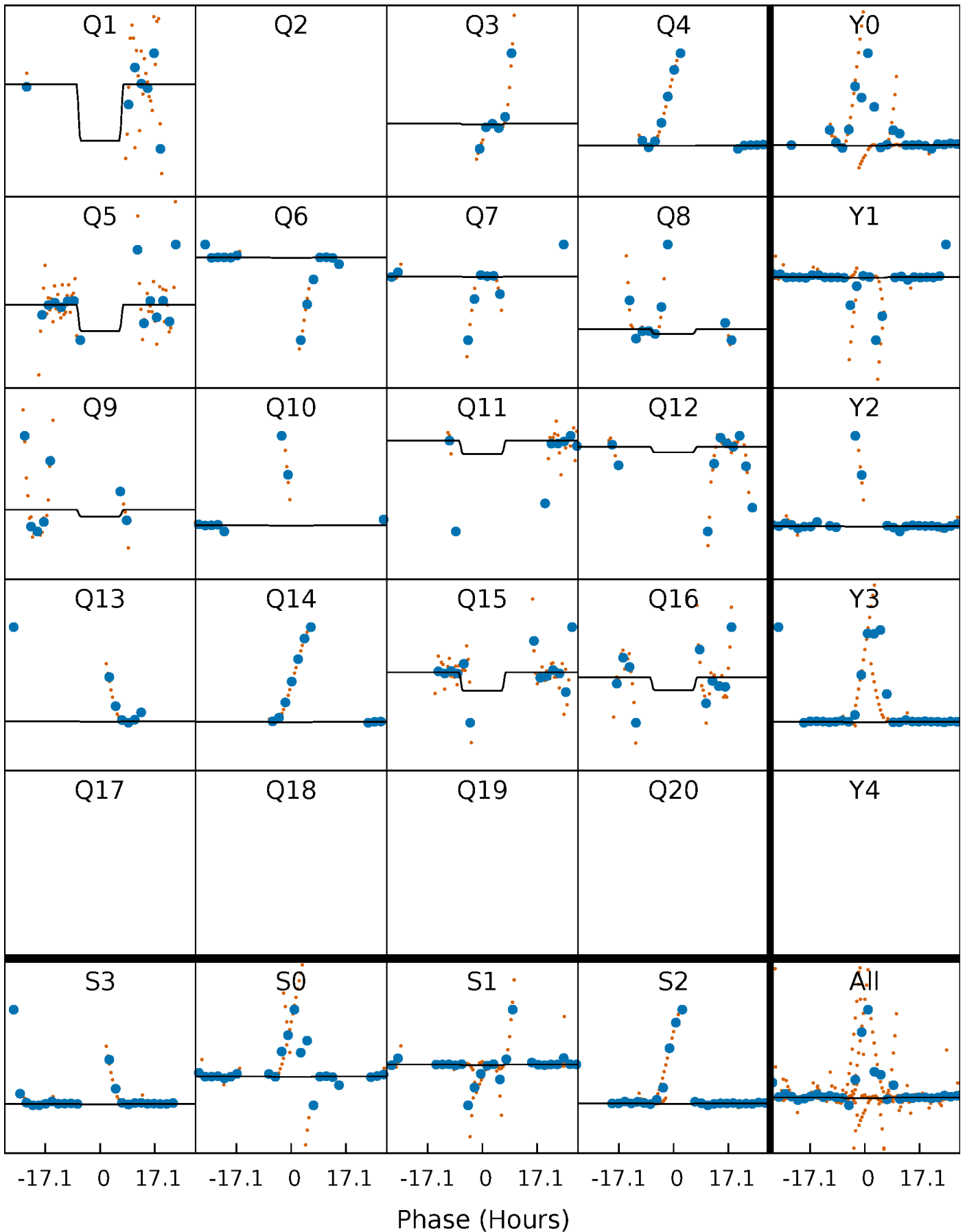
# DV Quarter-Phased Transit Curves

TCE 004647715-07 P= 97.345971 Days  $T_0=164.122956$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 004647715-07 P= 97.345971 Days  $T_0=164.100493$  (BKJD)

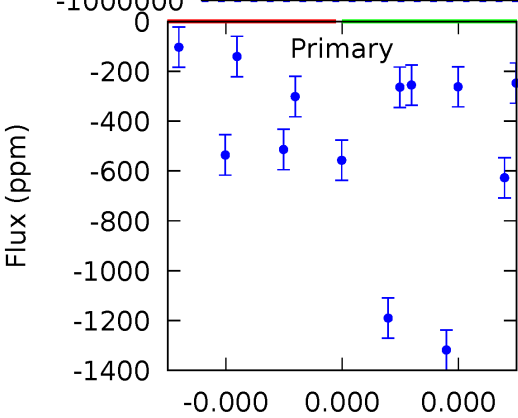
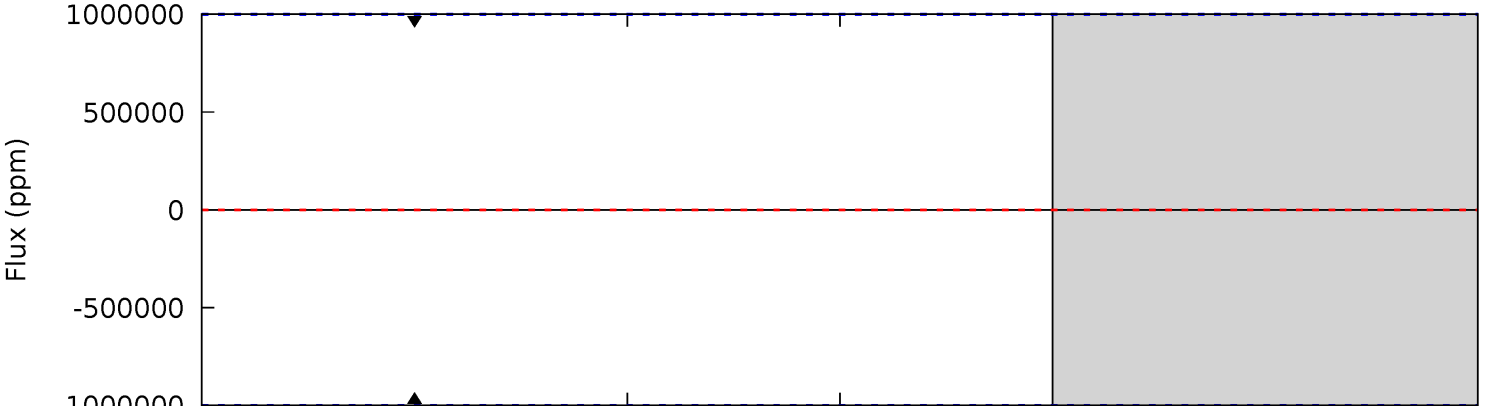
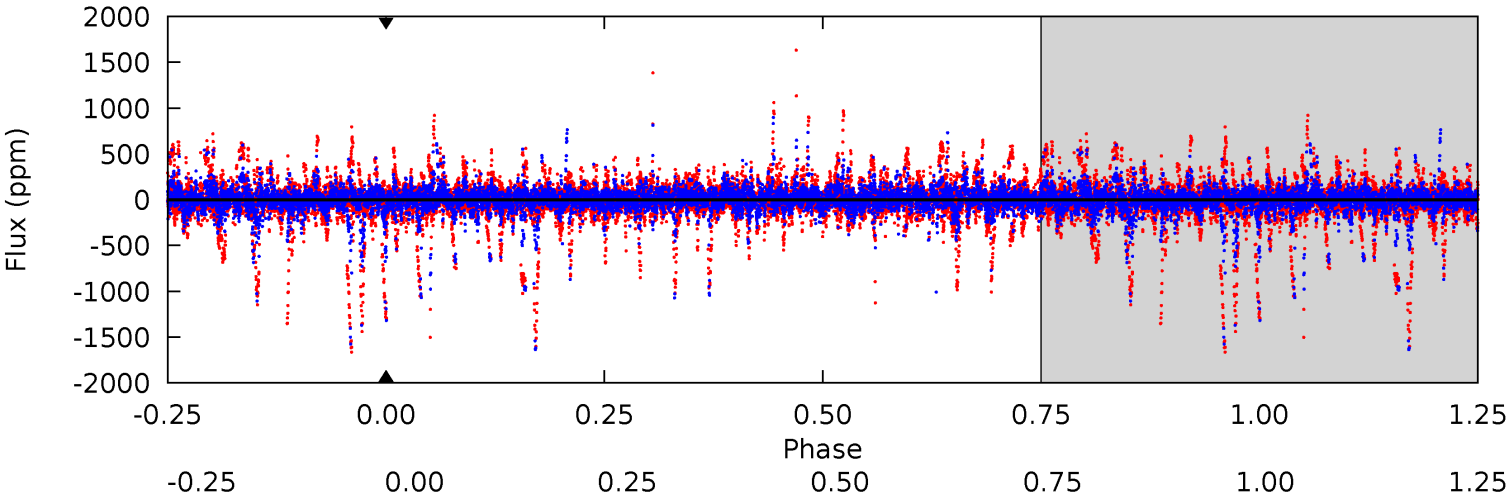




# DV Model-Shift Uniqueness Test

004647715-07, P = 97.345971 Days, E = 66.776985 Days

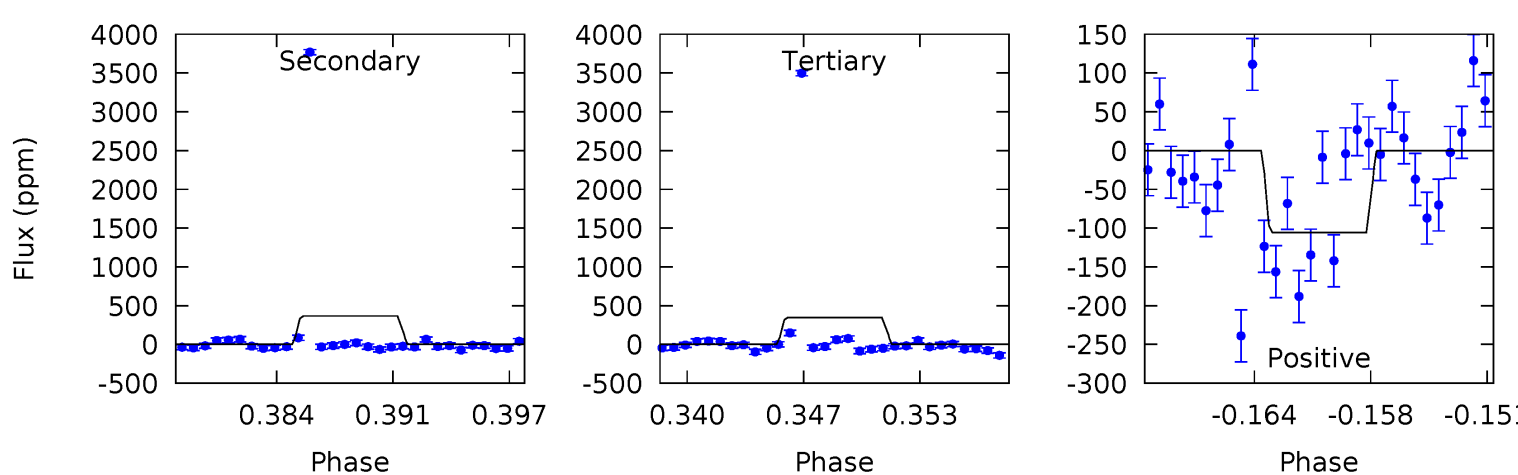
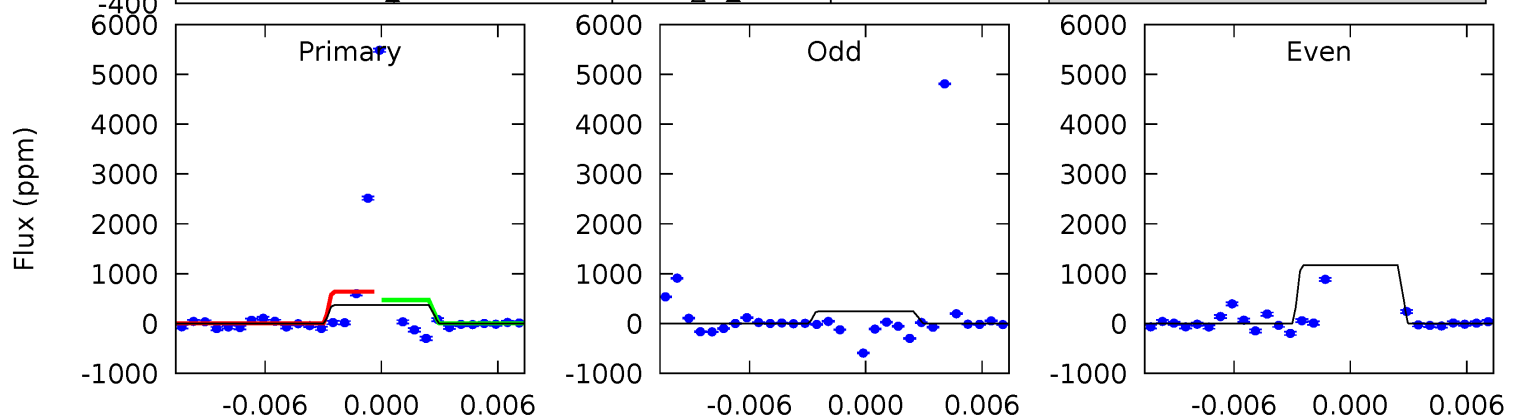
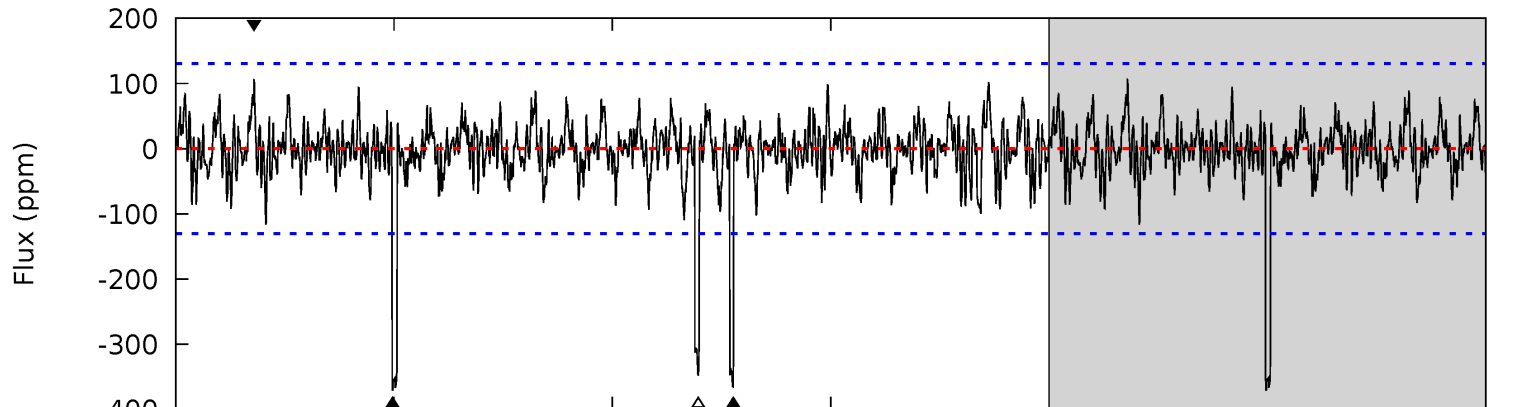
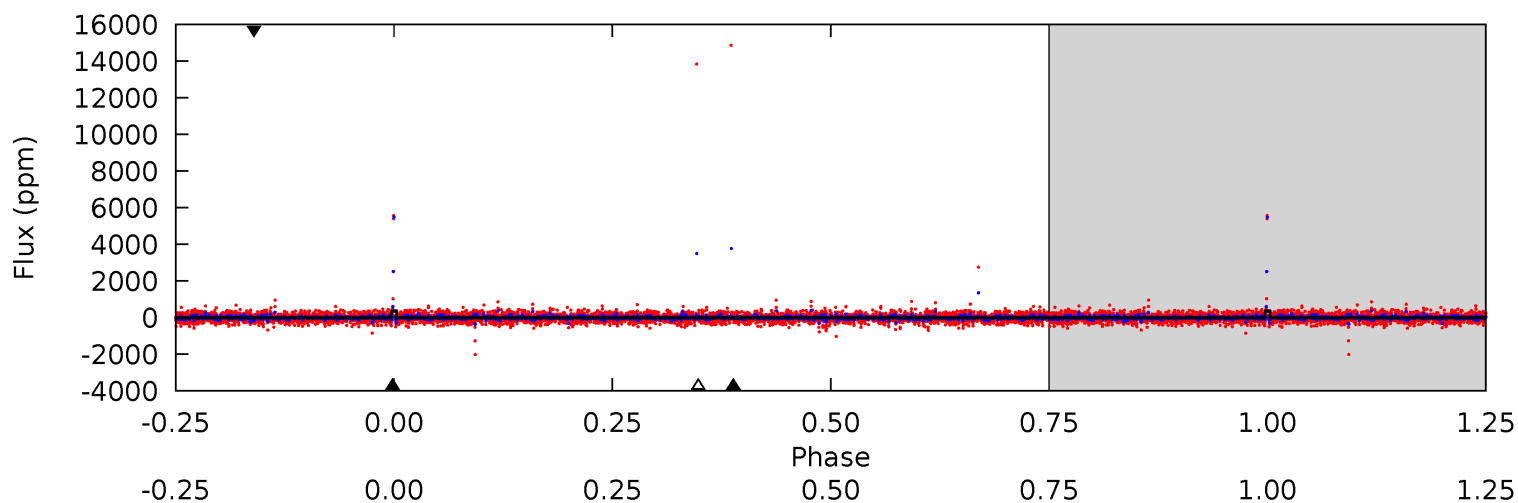
| Pri | Sec | Ter | Pos | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|-----|-----|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|-----|-------|-----|
| 0   | 0   | 0   | 0   | 1.00            | 1.00            | 1.00             | 0       | 0       | 0       | 0       | 0       | 0   | 0     | 0   |



# Alt Model-Shift Uniqueness Test

004647715-07, P = 97.345971 Days, E = 66.754522 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 |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|-----|
| 14.5 | 14.4 | 13.6 | 4.13 | 5.11            | 2.73            | 1.46             | 0.95    | 10.4    | 0.78    | 10.2    | 6.50    | 6.30 | 0.22  | 0   |



### Stellar Parameters For KIC 004647715

|        | $T_{\text{eff}} (K)$  | $\log(g)$                 | $[\text{Fe}/\text{H}]$    | $R (R_{\odot})$           | $M (M_{\odot})$           | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|-----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
|        | $9554^{+381}_{-1621}$ | $3.584^{+0.459}_{-0.081}$ | $0.560^{+0.050}_{-0.150}$ | $4.884^{+0.446}_{-2.527}$ | $3.340^{+0.063}_{-1.192}$ | $0.040^{+0.185}_{-0.010}$                 |
|        | +4%/-17%              | +13%/-2%                  | +9%/-27%                  | +9%/-52%                  | +2%/-36%                  | +459%/-26%                                |
| Source | SPE68                 | SPE68                     | SPE68                     | DSEP                      |                           |   |

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 004647715-07 / KOI

| Detrend | Depth (ppm)     | $R_p (R_{\oplus})$        | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$     | $A_{\text{obs}}$       |
|---------|-----------------|---------------------------|----------------------|--------------------------|------------------------|
| DV      | $0 \pm 1000000$ | $31.31^{+35.01}_{-21.81}$ | $1521^{+200}_{-286}$ | $3719^{+76223}_{-66815}$ | $30^{+44530}_{-31853}$ |
| Alt.    | $-367 \pm 26$   | $32.55^{+39.61}_{-22.24}$ | $1538^{+182}_{-276}$ | $4618^{+3612}_{-1094}$   | $68^{+591}_{-53}$      |

$T_{\text{max}}$  = 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

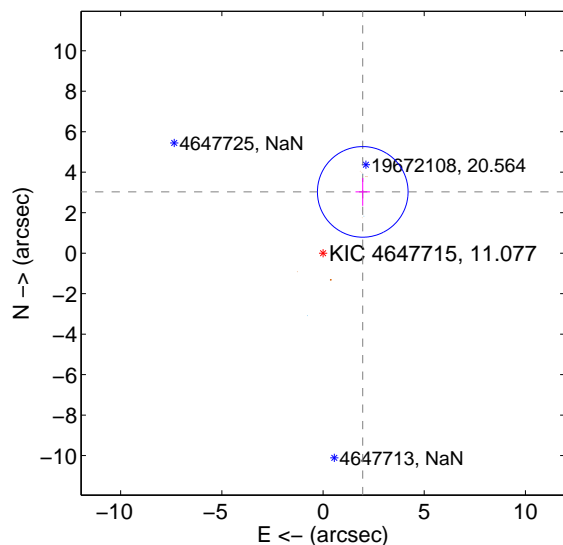
Supplemental centroid analysis for 004647715-07. **Kepler magnitude: 11.08.** Transit SNR -1.00

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

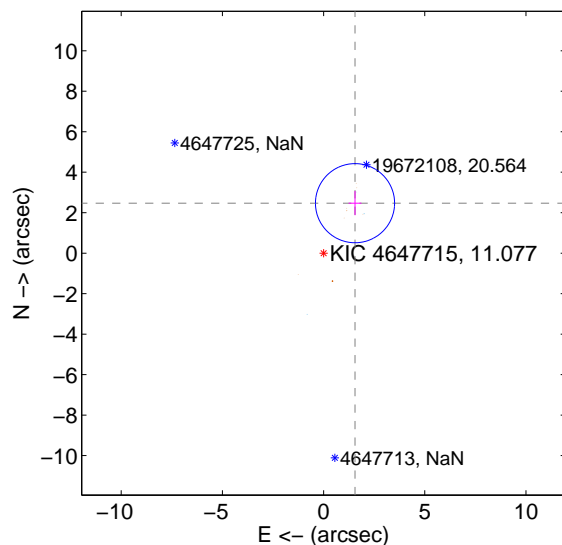
The direct PRF centroid is offset from the target star catalog position by about 0.18 arcsec

|   | Distance in arcsec                  | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec      |
|---|-------------------------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT          | <b><math>3.608 \pm 0.746</math></b> | <b>4.83</b>         | $-1.962 \pm 0.357$ | $3.028 \pm 0.687$ |
| PRF-fit source offset from KIC position | <b><math>2.918 \pm 0.652</math></b> | <b>4.48</b>         | $-1.553 \pm 0.318$ | $2.470 \pm 0.597$ |
| photometric centroid source offset      | $4.18 \pm 1.93$                     | 2.17                | $0.34 \pm 1.21$    | $-4.17 \pm 1.93$  |

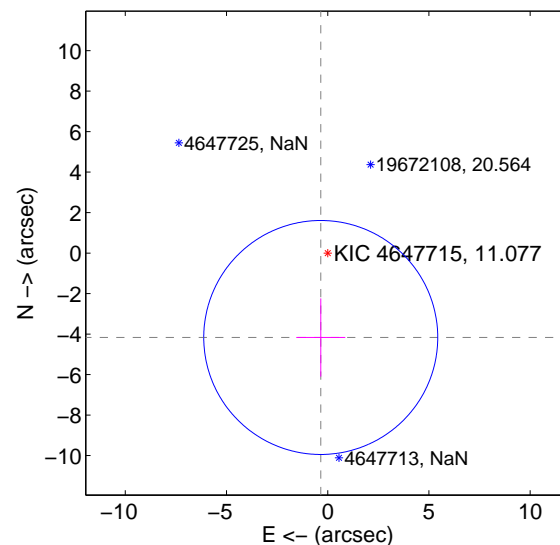
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

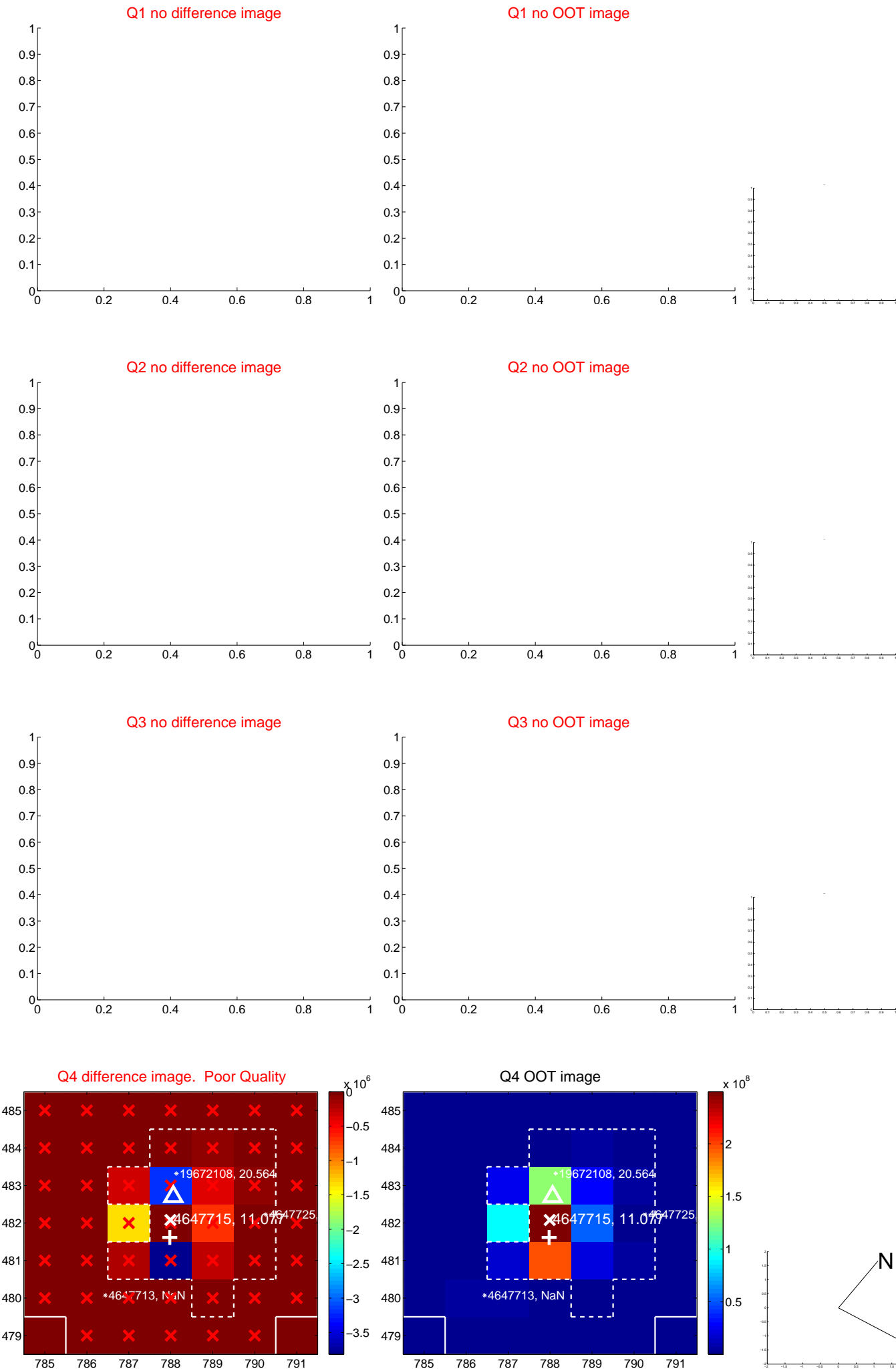


offset from photometric centroids

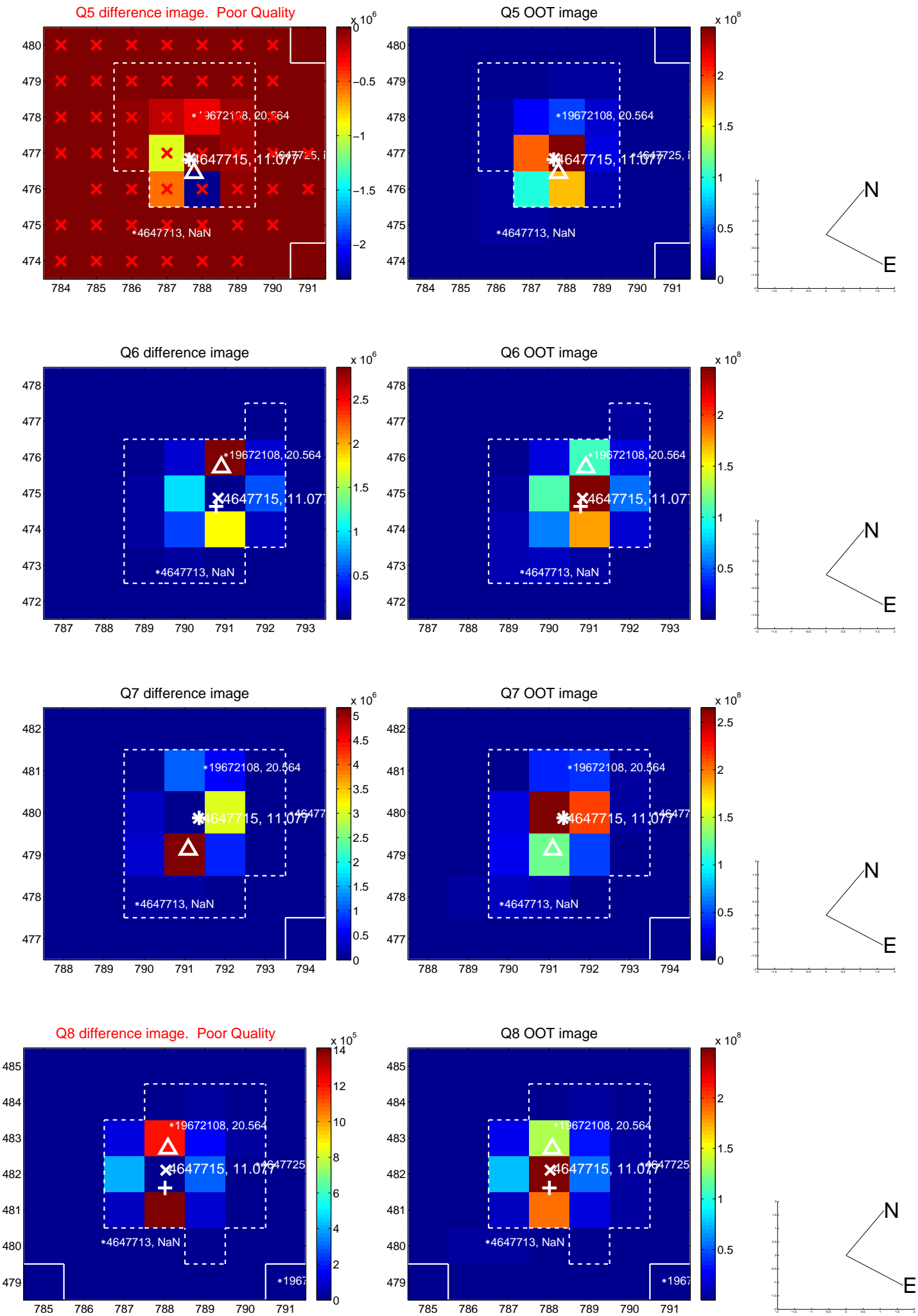


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

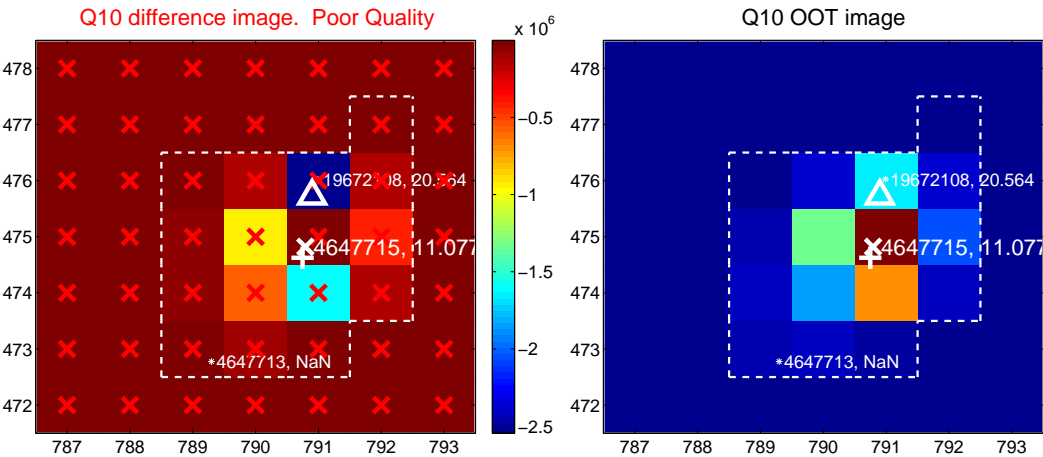
Q9 no difference image



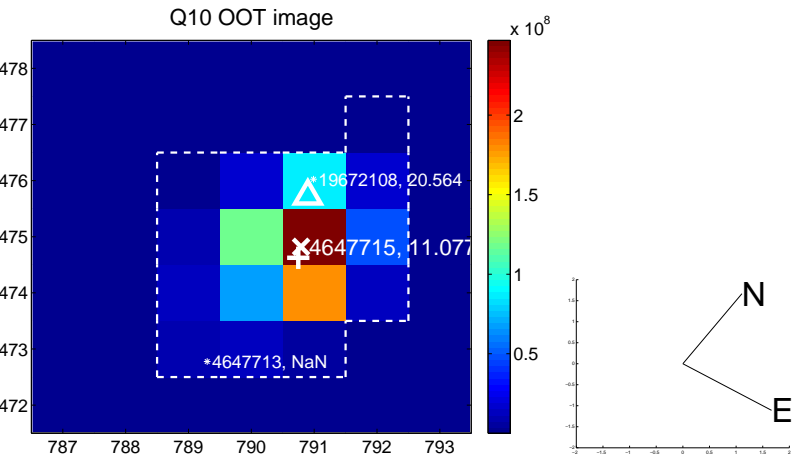
Q9 no OOT image



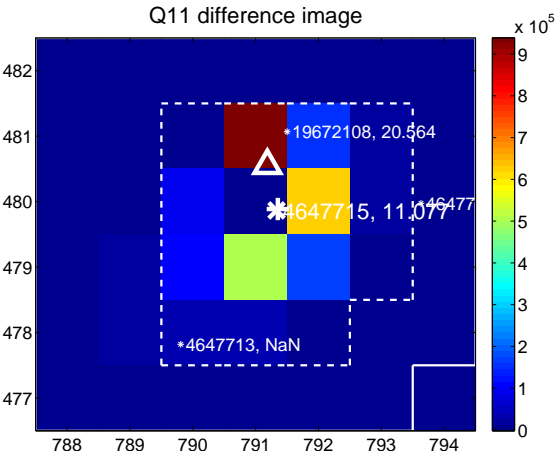
Q10 difference image. Poor Quality



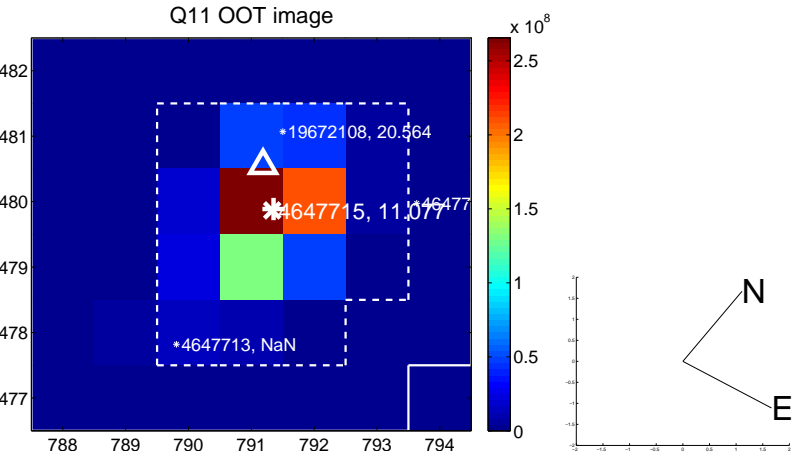
Q10 OOT image



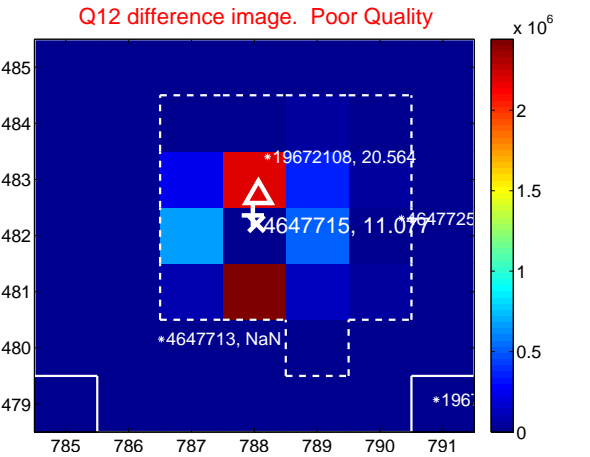
Q11 difference image



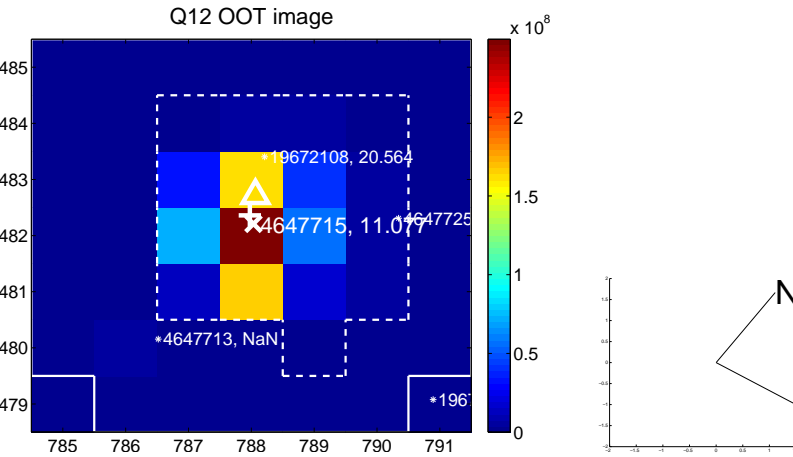
Q11 OOT image



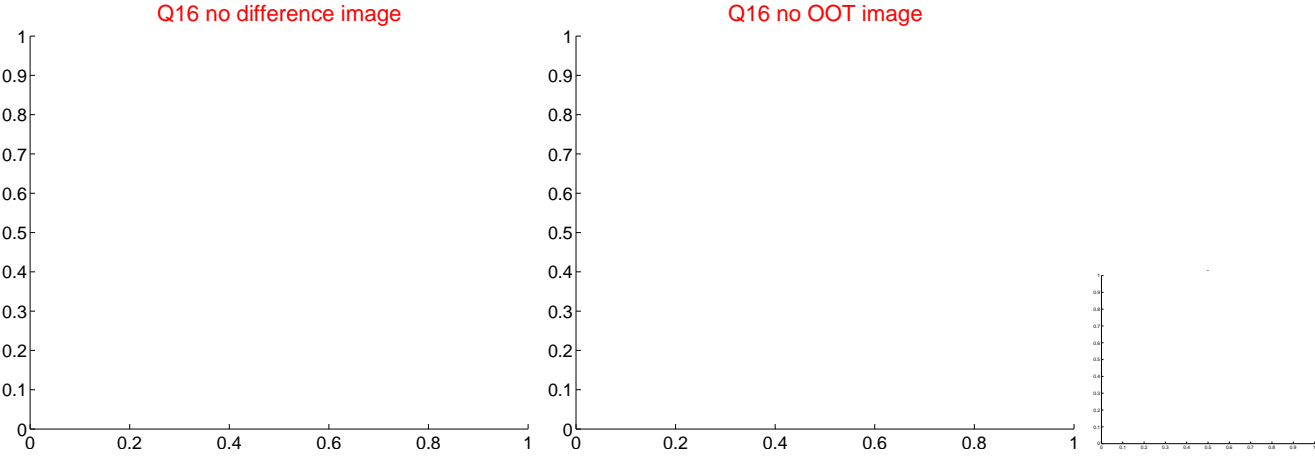
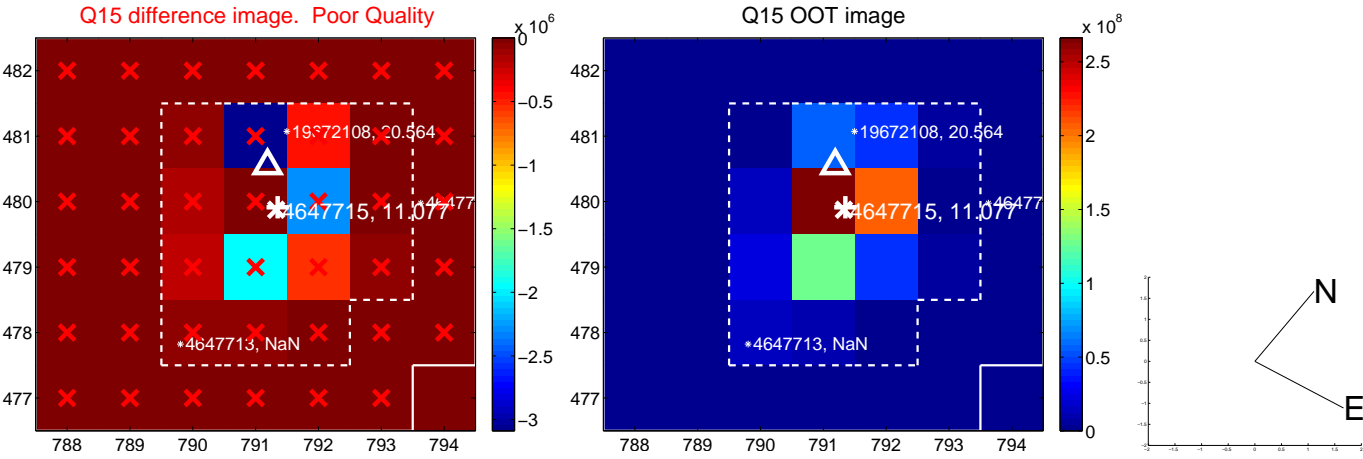
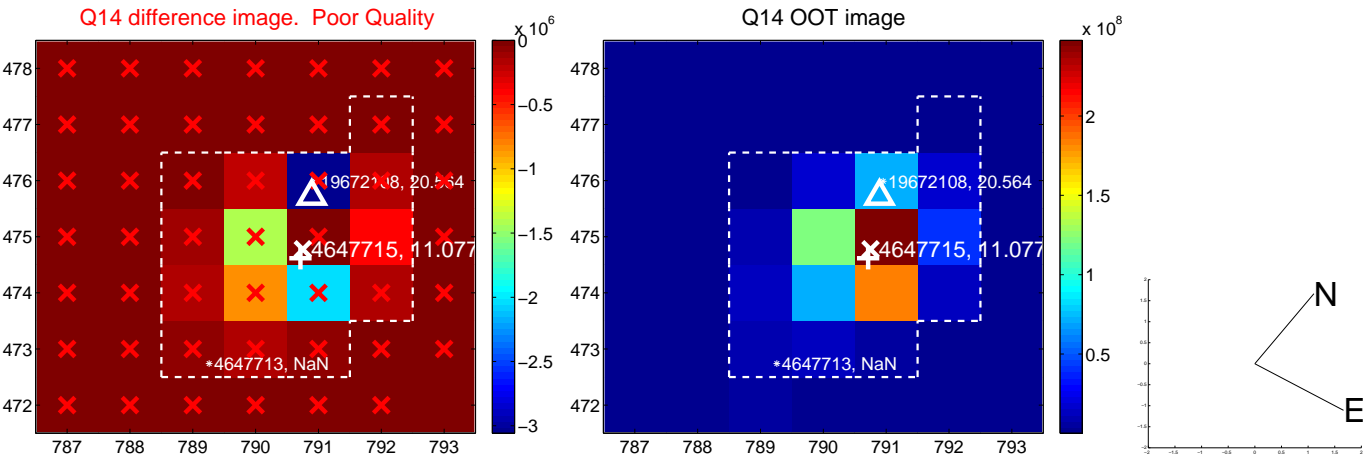
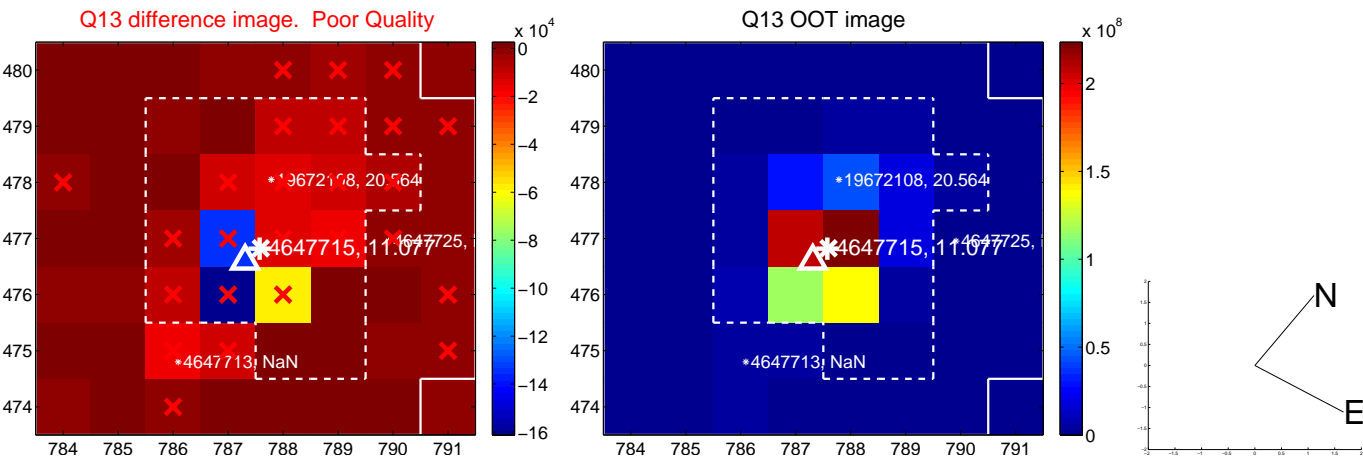
Q12 difference image. Poor Quality



Q12 OOT image

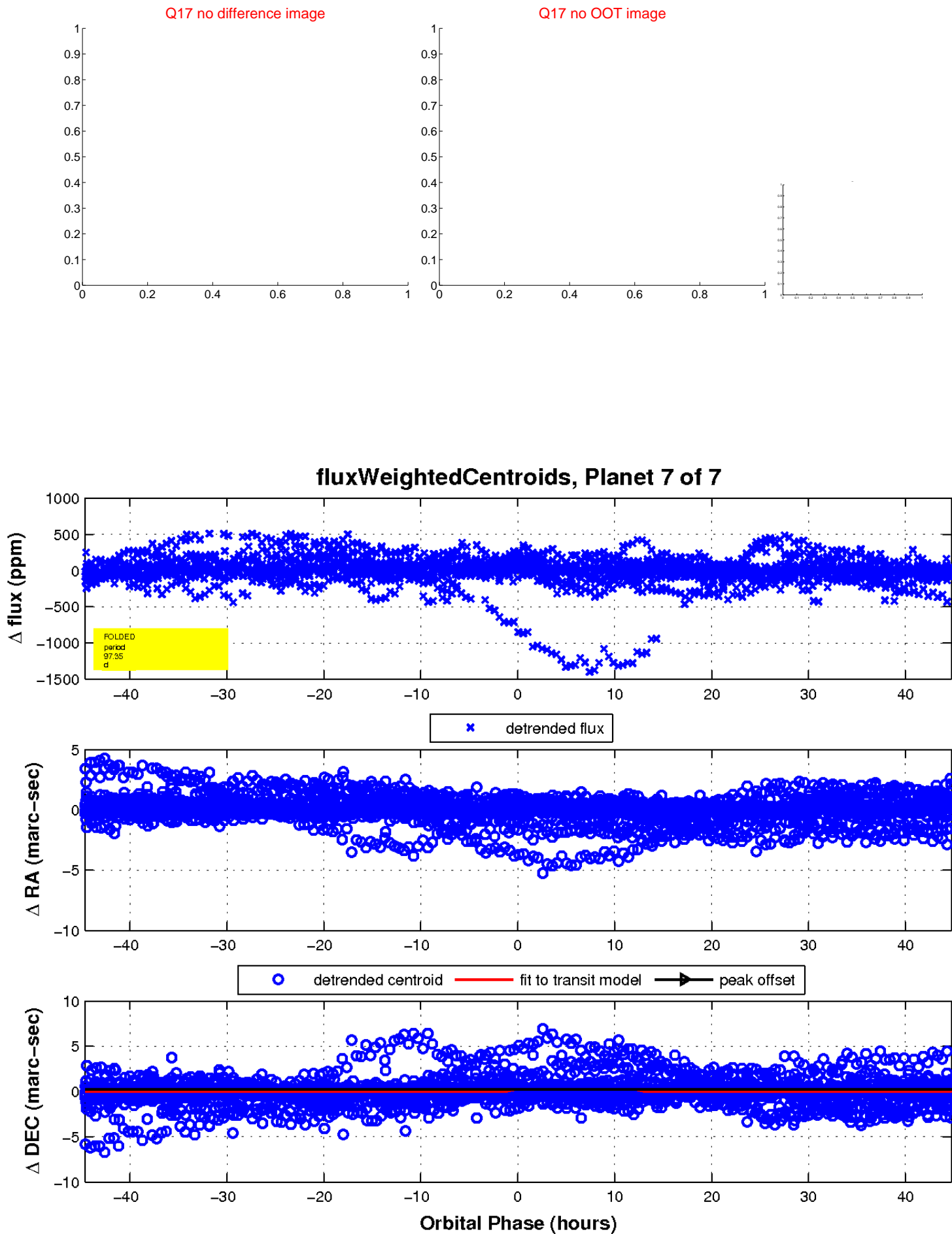


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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



UKIRT Image

