

# KIC 005643103

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 005643103-01 | OBS      | No   | 2.945575      | 131.949671   | 127.8       | 4.834            | 11.7 | 13.2 | 5.51                        | 10449           | 7.14                   | 87321.27               |
| 005643103-02 | OBS      | No   | 2.945446      | 132.514032   | 105.5       | 4.380            | 10.1 | 10.8 | 5.51                        | 10449           | 6.48                   | 87326.39               |
| 005643103-03 | OBS      | No   | 2.945722      | 134.295101   | 100.4       | 5.730            | 11.9 | 12.6 | 5.51                        | 10449           | 6.32                   | 87315.48               |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|--|
| 005643103-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED                 |
| 005643103-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED |
| 005643103-03 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED                        |

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

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

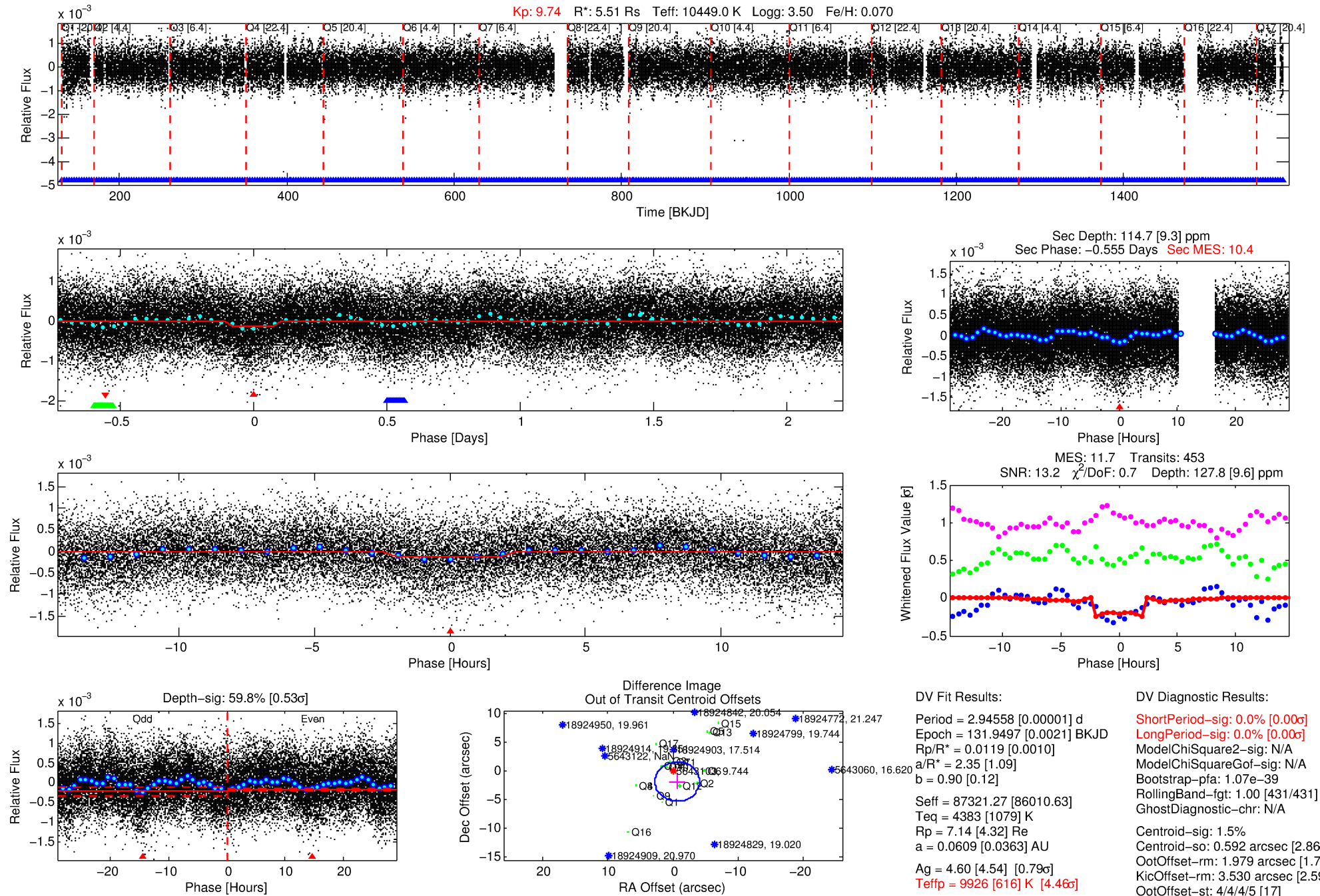
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005643103-01

No Significant Match Found

# DV One-Page Summary

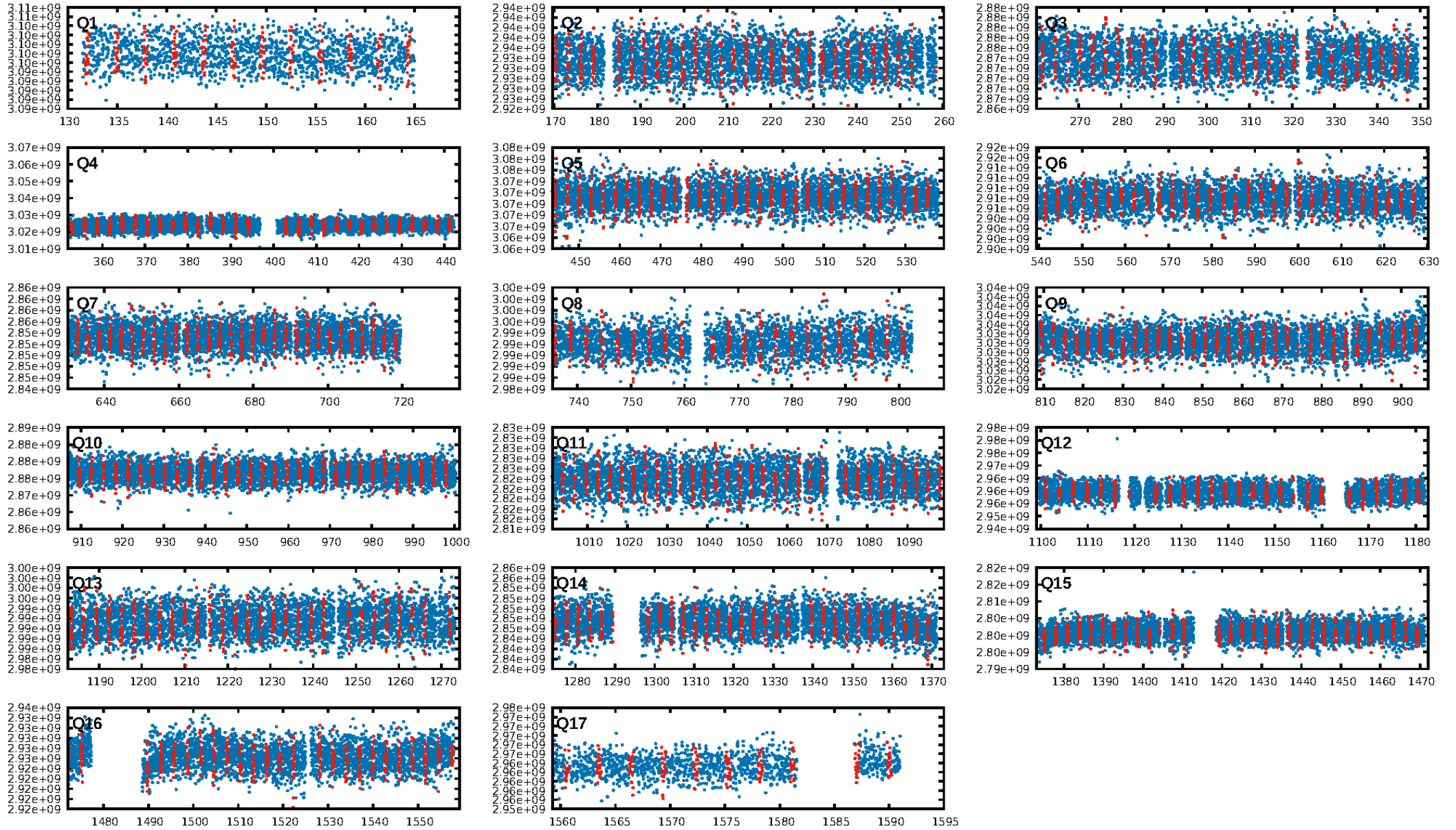
KIC: 5643103 Candidate: 1 of 3 Period: 2.946 d



Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 02:30:02 Z

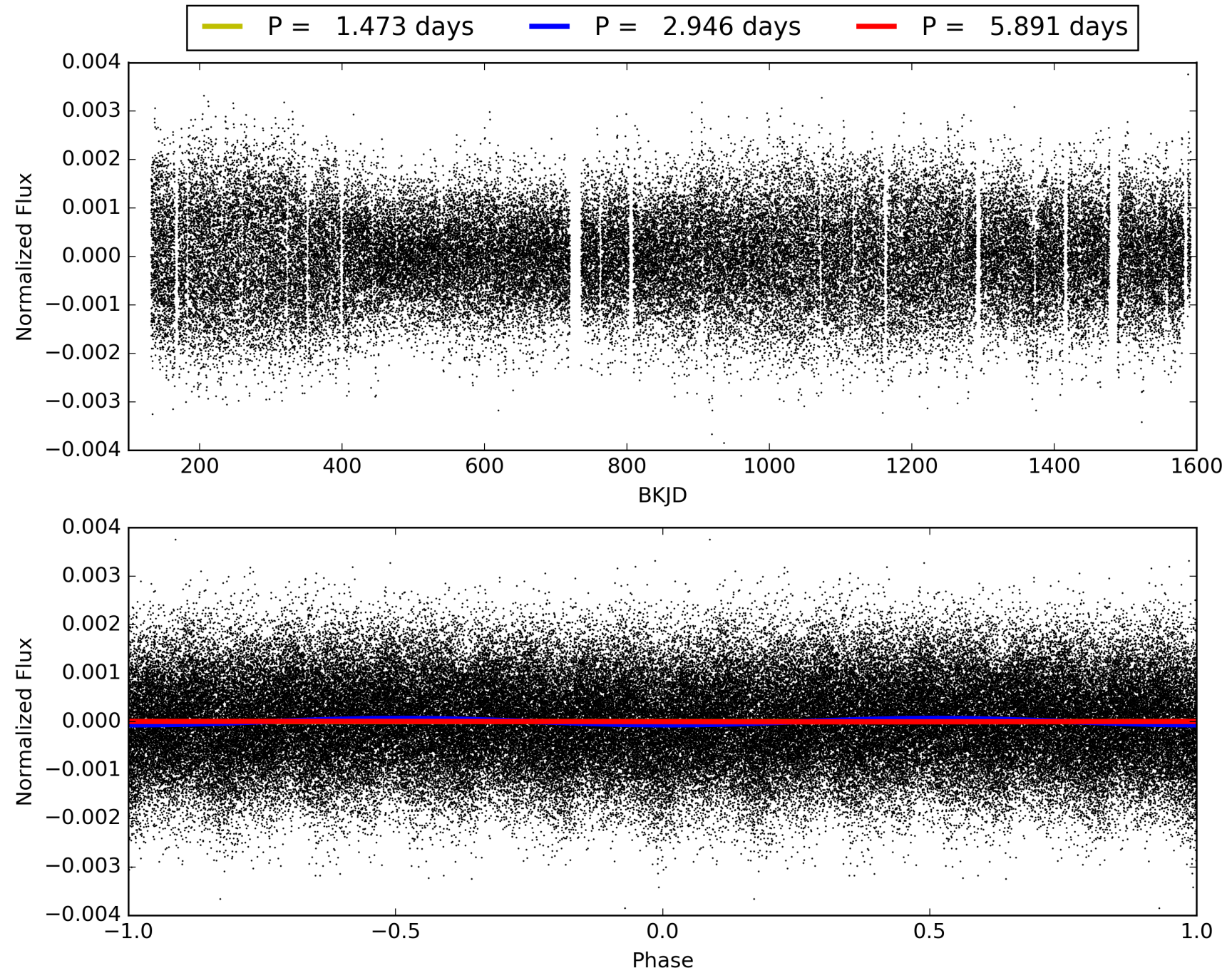
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005643103-01, PDC Light Curves





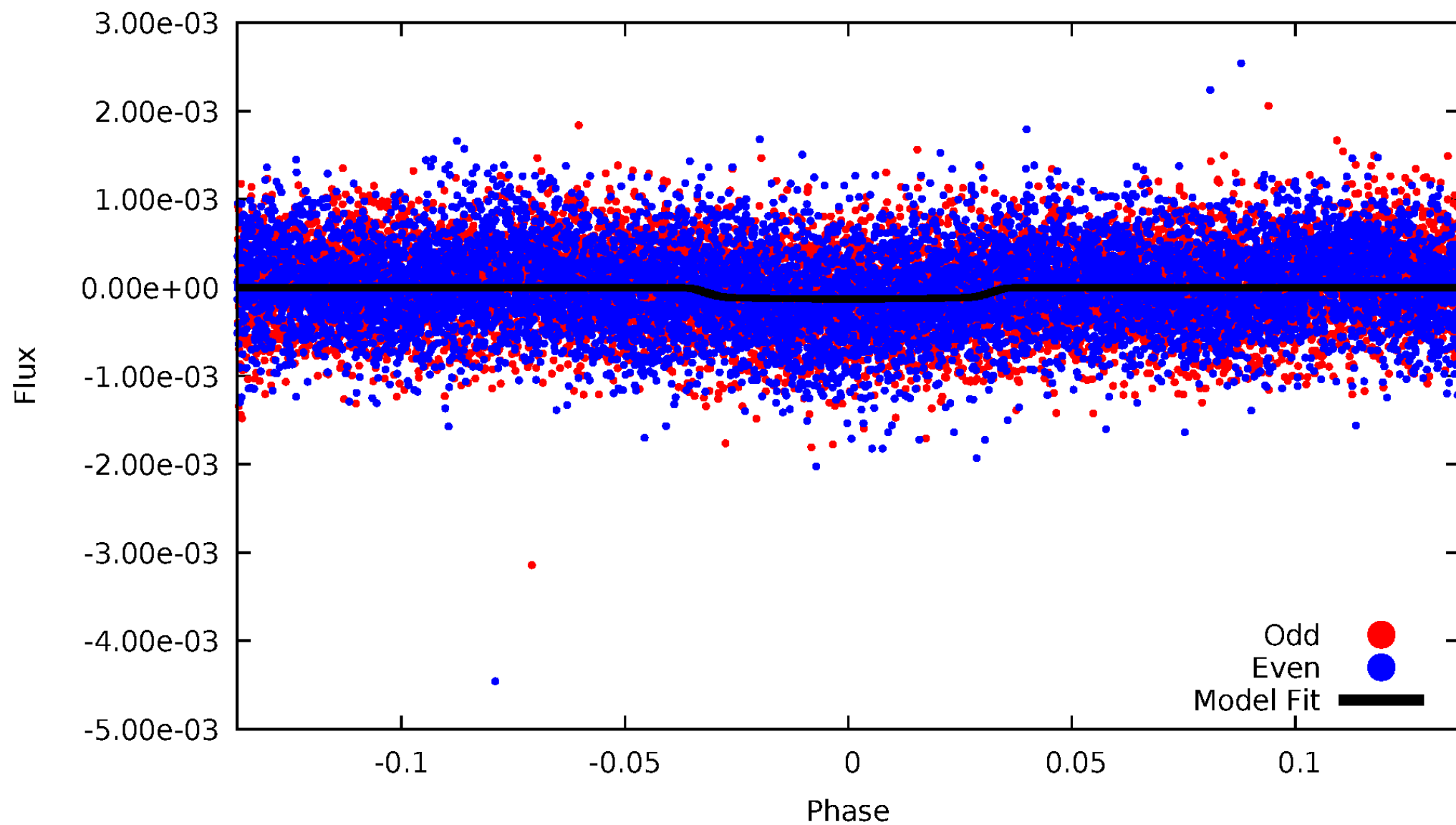
TCE 005643103-01





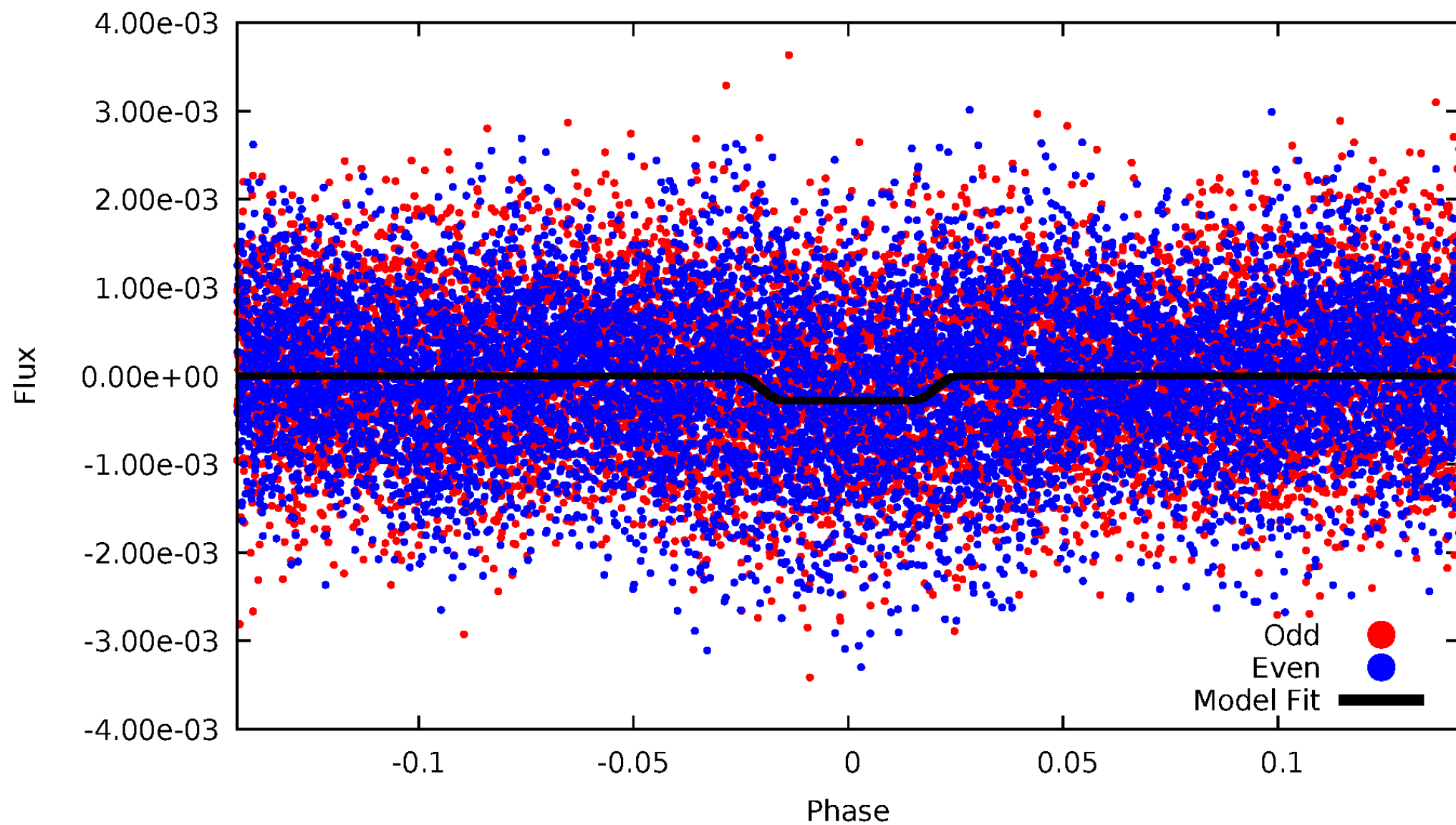
# DV Odd/Even

TCE 005643103-01

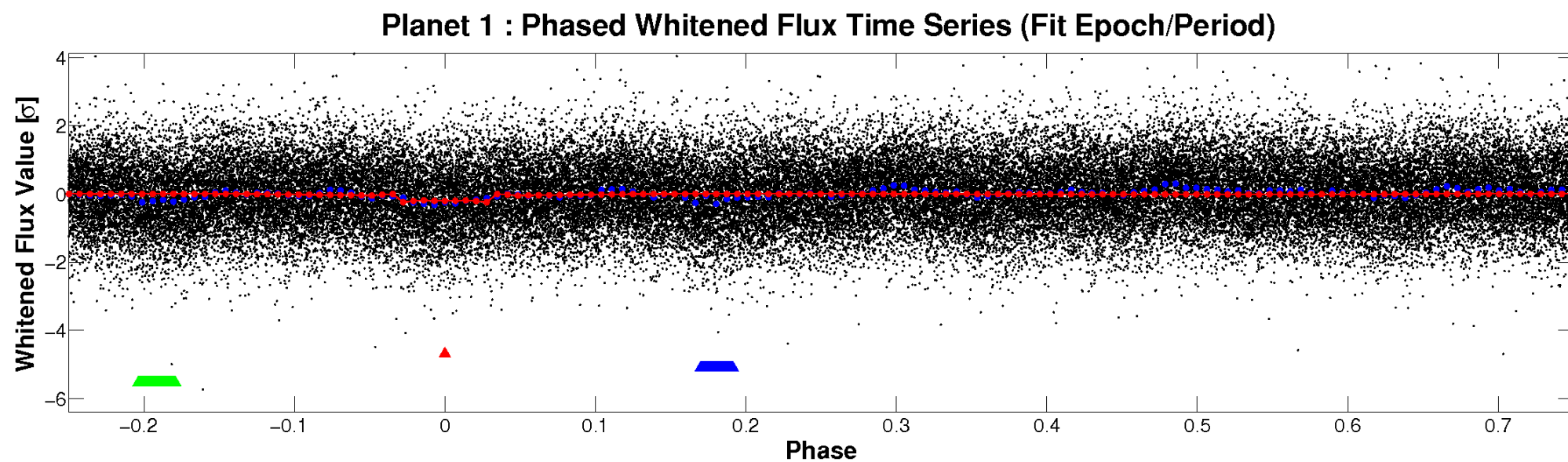
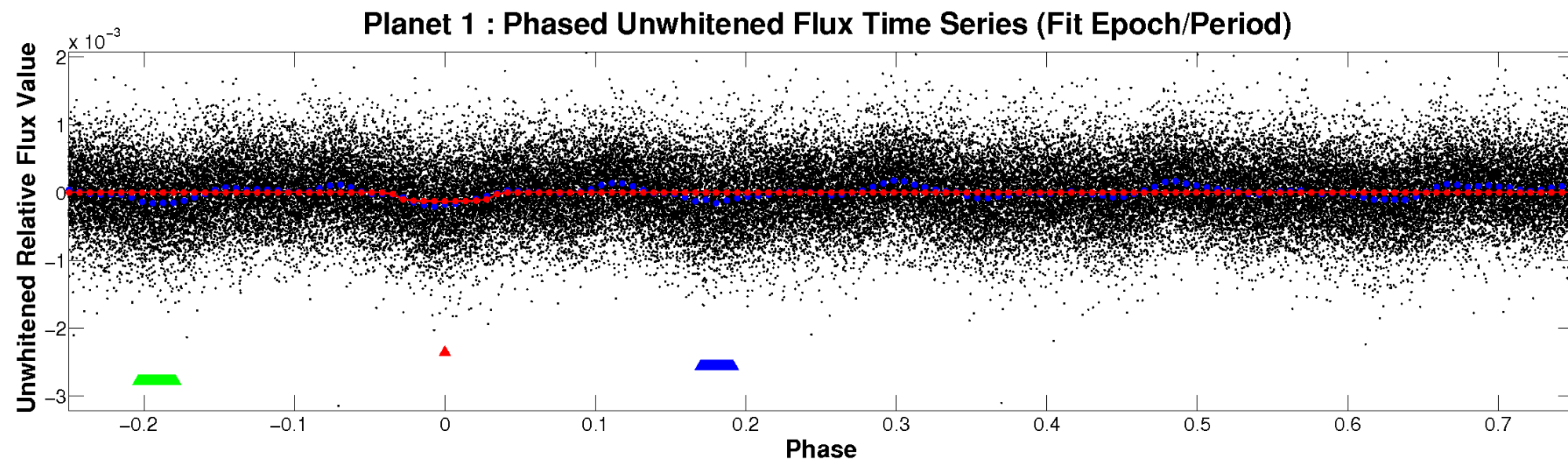


# ALT Odd/Even

TCE 005643103-01



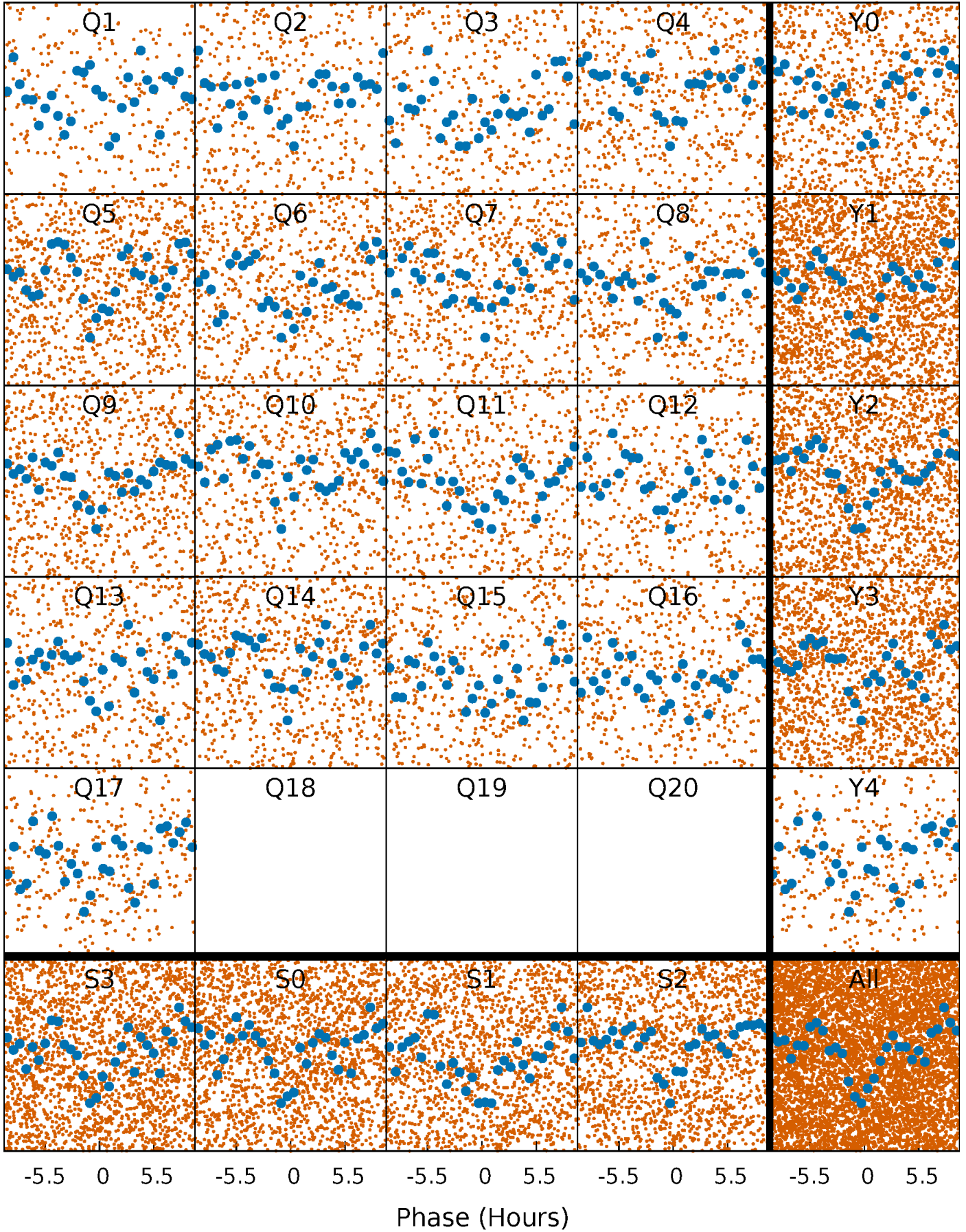
# Non-Whitened Vs. Whitened Light Curve





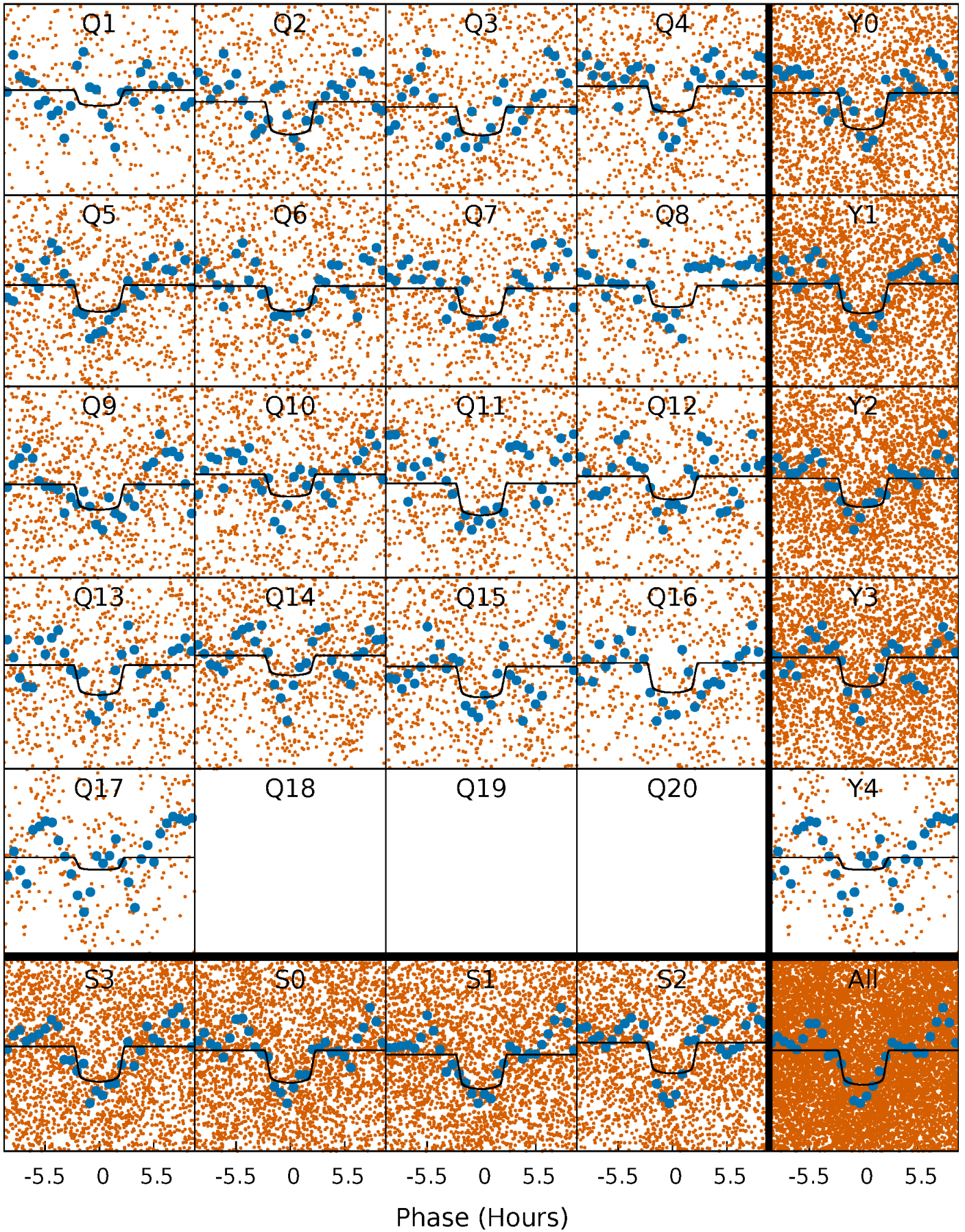
# PDC Quarter-Phased Transit Curves

TCE 005643103-01 P= 2.945575 Days  $T_0=131.949671$  (BKJD)



# DV Quarter-Phased Transit Curves

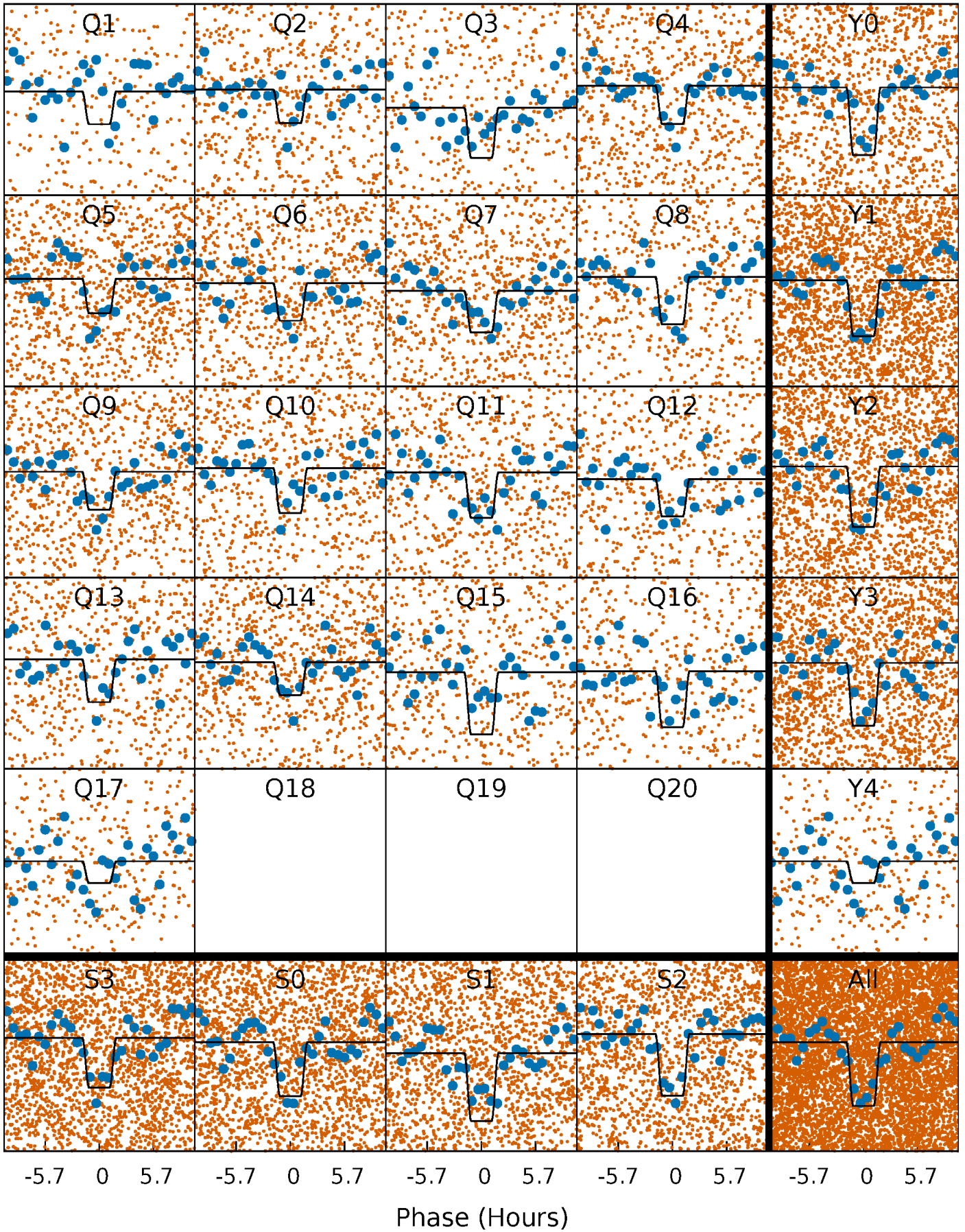
TCE 005643103-01 P= 2.945575 Days  $T_0=131.949671$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 005643103-01 P= 2.945514 Days  $T_0=131.948412$  (BKJD)

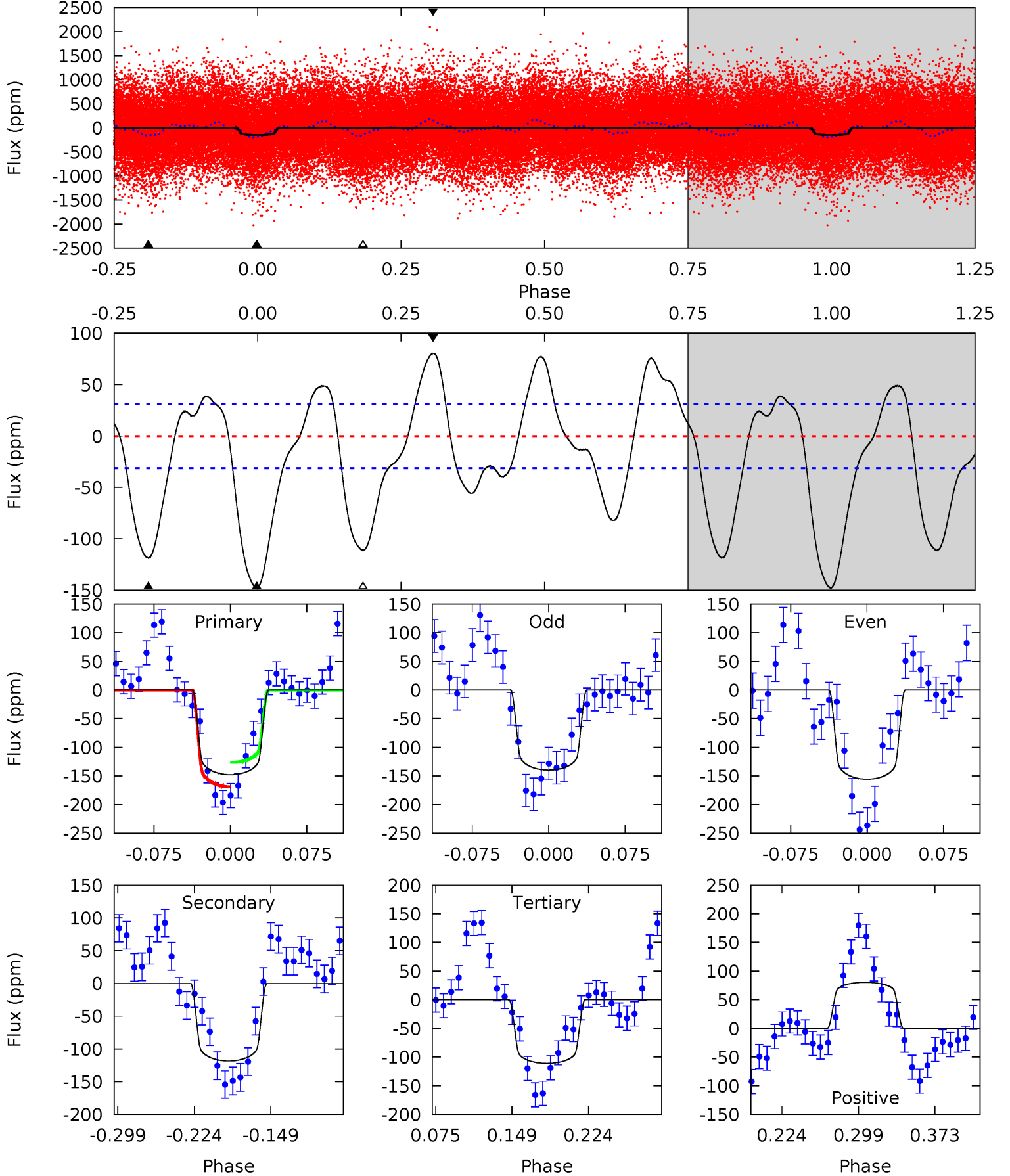




# DV Model-Shift Uniqueness Test

005643103-01, P = 2.945575 Days, E = 129.004096 Days

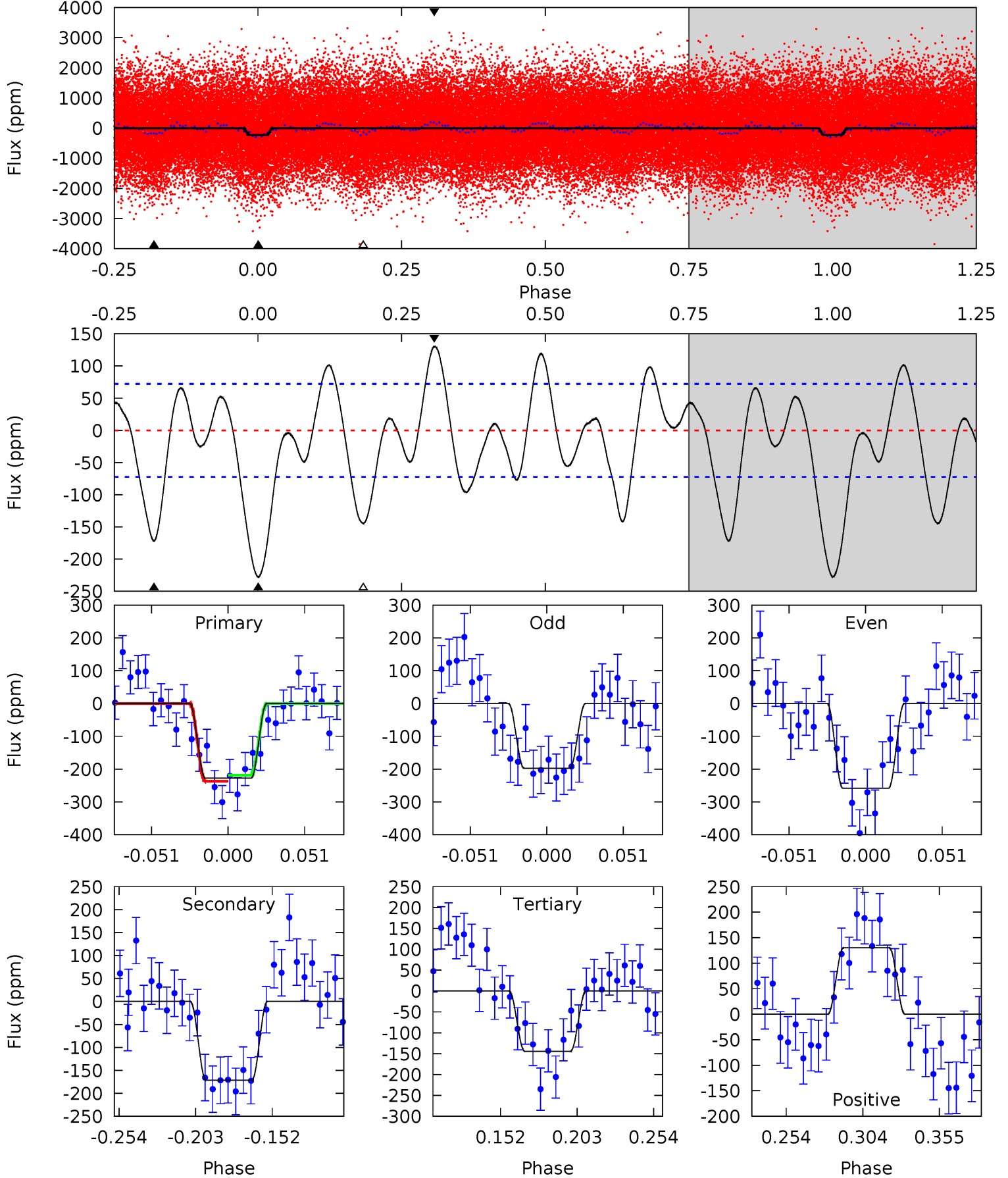
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 21.9 | 17.5 | 16.4 | 11.9 | 4.63            | 1.78            | 7.48             | 5.44    | 9.95    | 1.12    | 5.63    | 1.18    | 0.91 | 0.35  | 3.15 |



# Alt Model-Shift Uniqueness Test

005643103-01, P = 2.945514 Days, E = 129.002898 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  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 14.9 | 11.2 | 9.42 | 8.50 | 4.71            | 1.95            | 4.08             | 5.44    | 6.37    | 1.78    | 2.70    | 1.99    | 1.05 | 0.36  | 0.58 |



### Stellar Parameters For KIC 005643103

|        | $T_{\text{eff}} (K)$  | $\log(g)$                 | [Fe/H]                    | $R (R_{\odot})$           | $M (M_{\odot})$           | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|-----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
|        | $10449^{+293}_{-440}$ | $3.497^{+0.576}_{-0.064}$ | $0.070^{+0.150}_{-0.600}$ | $5.511^{+0.348}_{-3.307}$ | $3.473^{+0.060}_{-1.136}$ | $0.029^{+0.221}_{-0.006}$                 |
|        | +3%/-4%               | +16%/-2%                  | +214%/-857%               | +6%/-60%                  | +2%/-33%                  | +755%/-21%                                |
| Source | KIC0                  | KIC0                      | KIC0                      | DSEP                      |                           |   |

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

### Secondary Eclipse Parameters for KIC 005643103-01 / KOI

| Detrend | Depth (ppm)   | $R_p (R_{\oplus})$     | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | $A_{\text{obs}}$          |
|---------|---------------|------------------------|----------------------|----------------------|---------------------------|
| DV      | $-119 \pm 7$  | $6.73^{+0.95}_{-2.05}$ | $5949^{+356}_{-853}$ | $9576^{+732}_{-669}$ | $5.296^{+4.736}_{-1.266}$ |
| Alt.    | $-172 \pm 15$ | $9.43^{+1.18}_{-2.69}$ | $5935^{+377}_{-803}$ | $8543^{+594}_{-517}$ | $3.873^{+3.059}_{-0.856}$ |

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



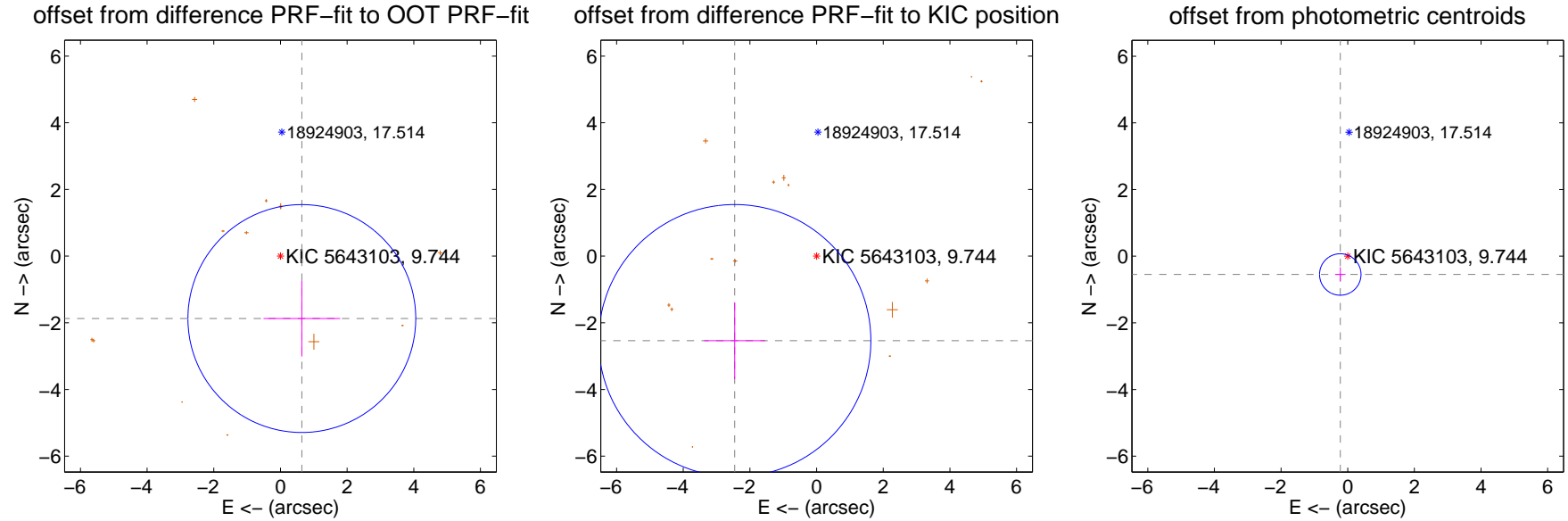
## DV Centroid Data

Supplemental centroid analysis for 005643103-01. **Kepler magnitude: 9.74.** Transit SNR 13.21

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

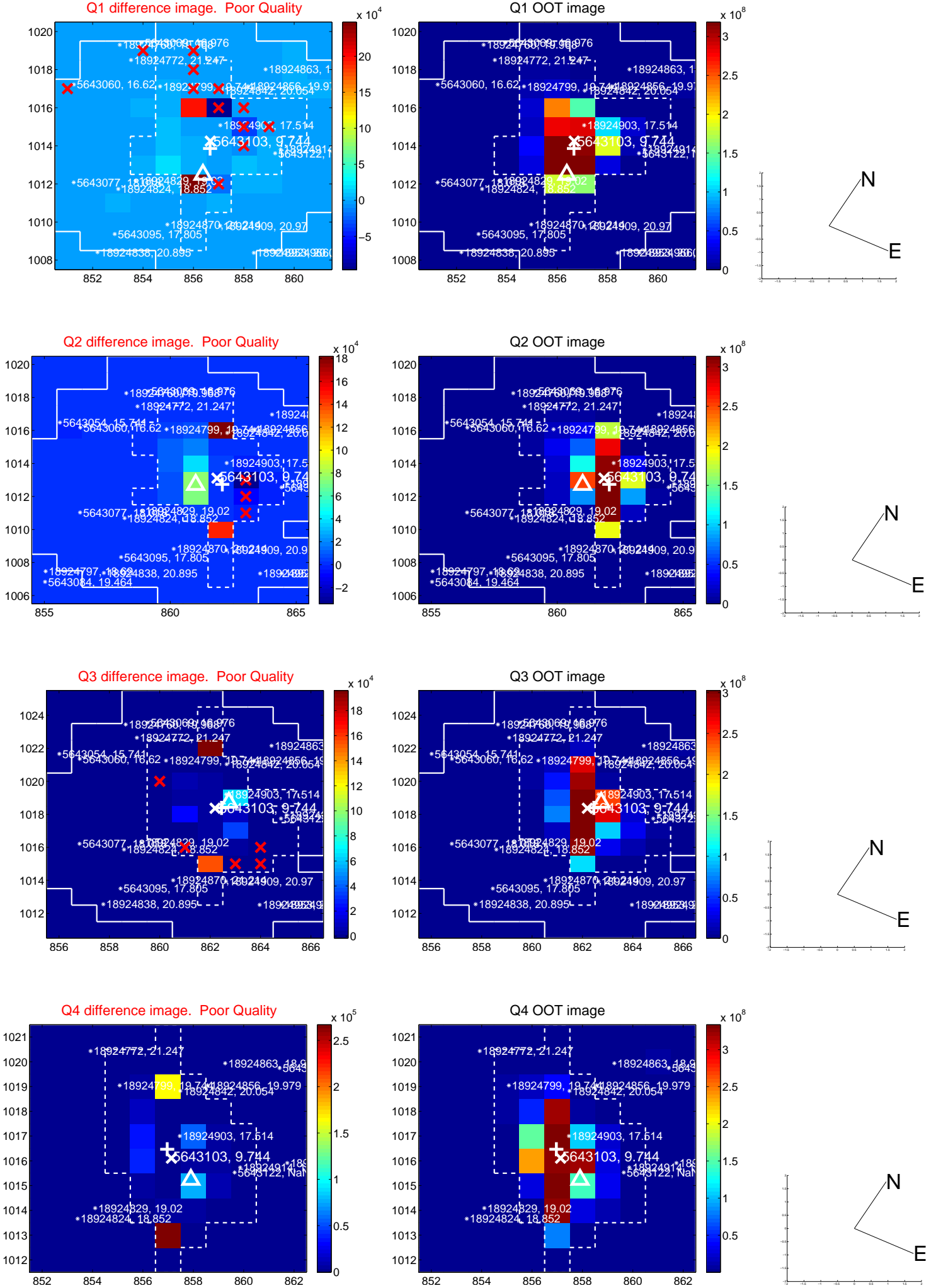
The direct PRF centroid is offset from the target star catalog position by about 1.46 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec       |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT          | $1.979 \pm 1.139$  | 1.74                | $-0.641 \pm 1.149$ | $-1.872 \pm 1.138$ |
| PRF-fit source offset from KIC position | $3.530 \pm 1.361$  | 2.59                | $2.455 \pm 0.917$  | $-2.537 \pm 1.150$ |
| photometric centroid source offset      | $0.59 \pm 0.21$    | 2.86                | $0.22 \pm 0.16$    | $-0.55 \pm 0.21$   |

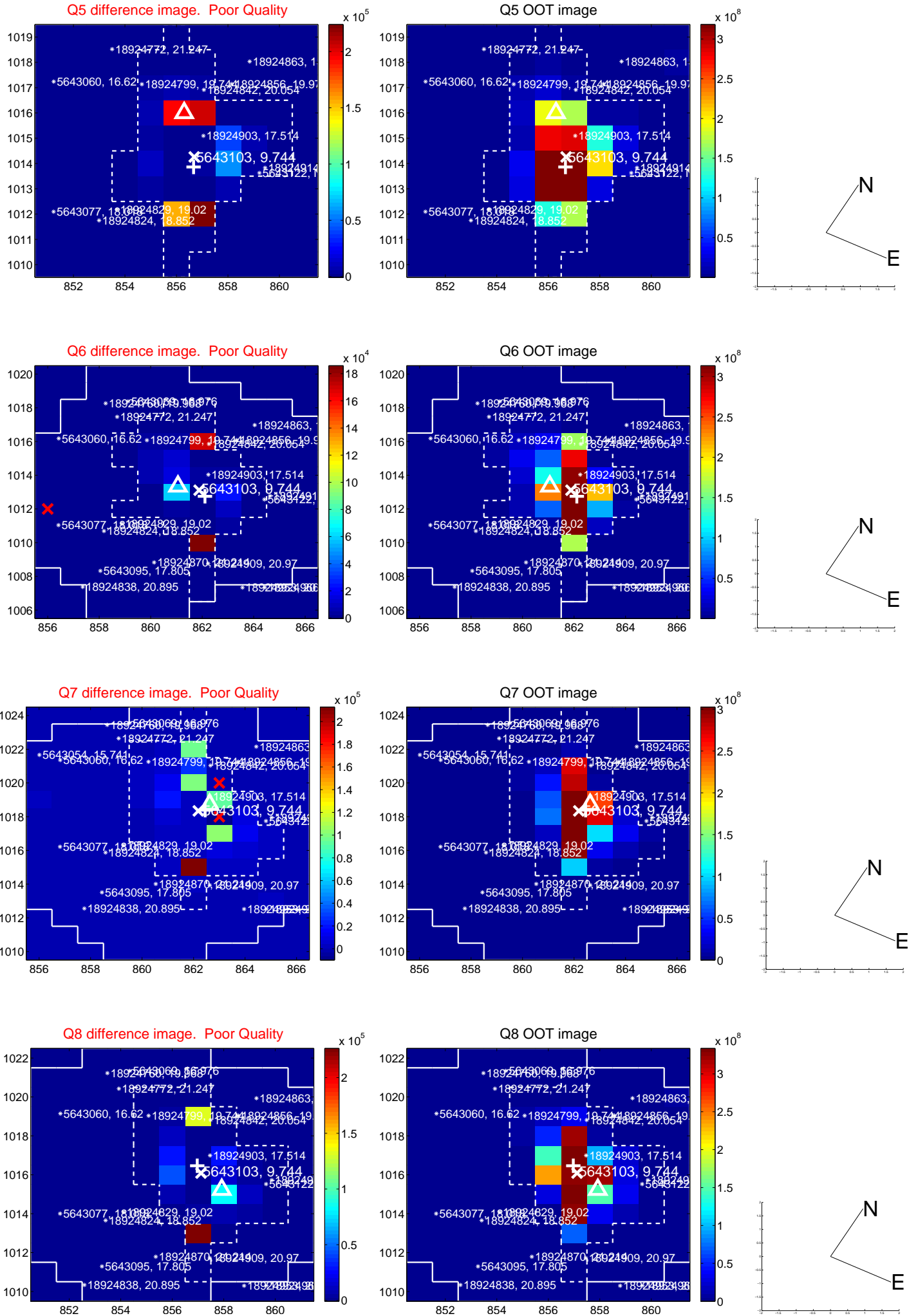


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

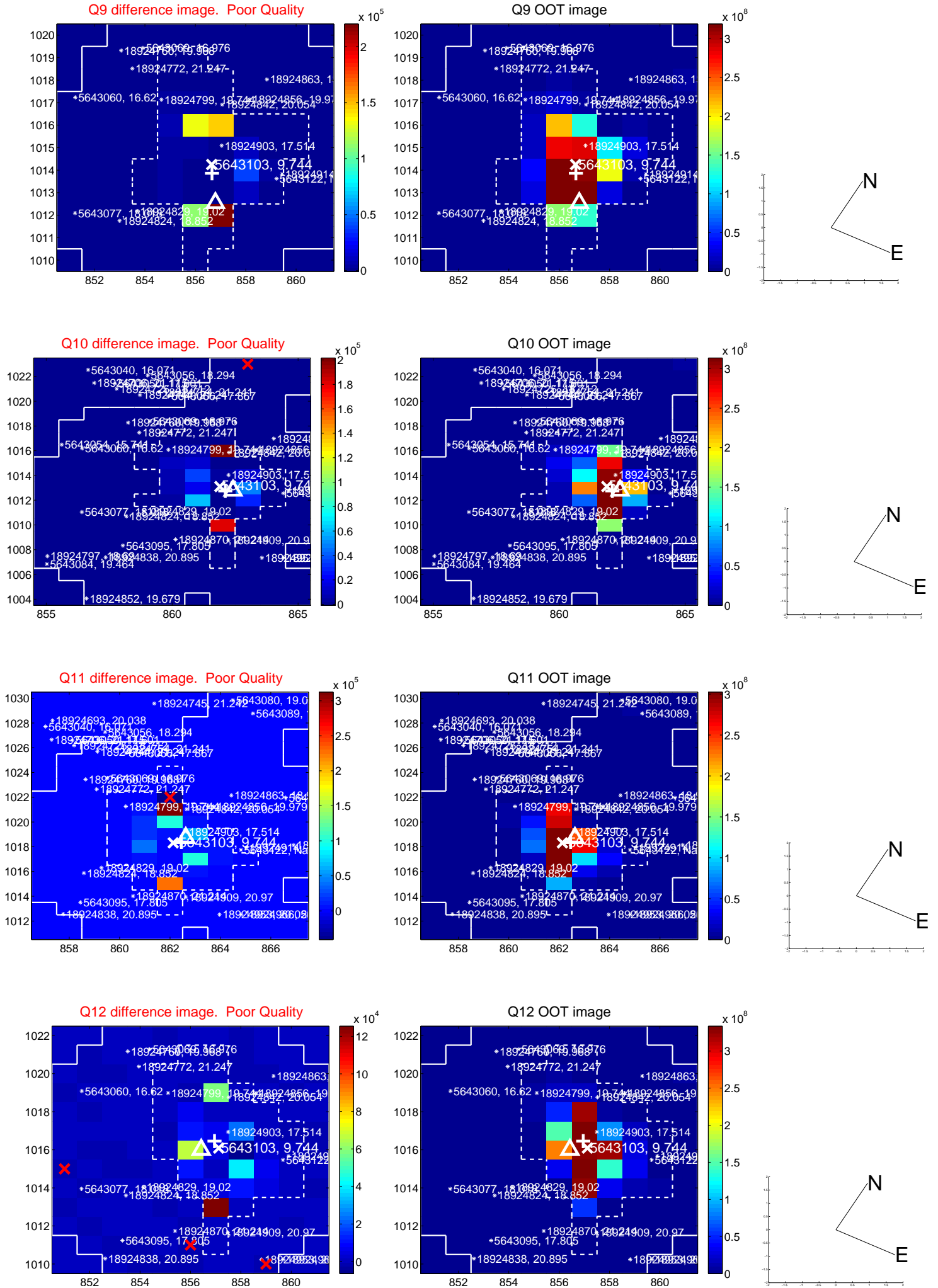


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

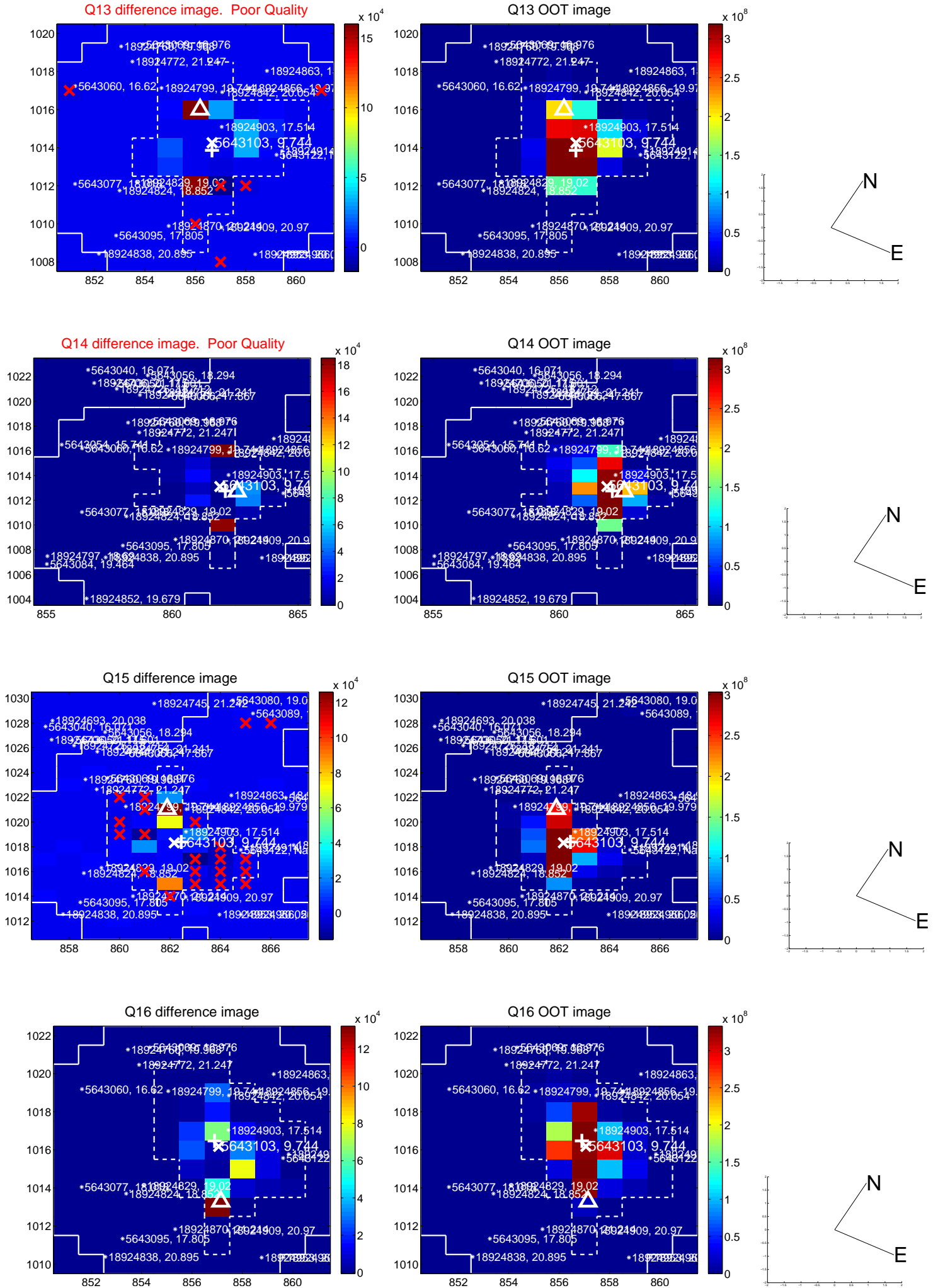




white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



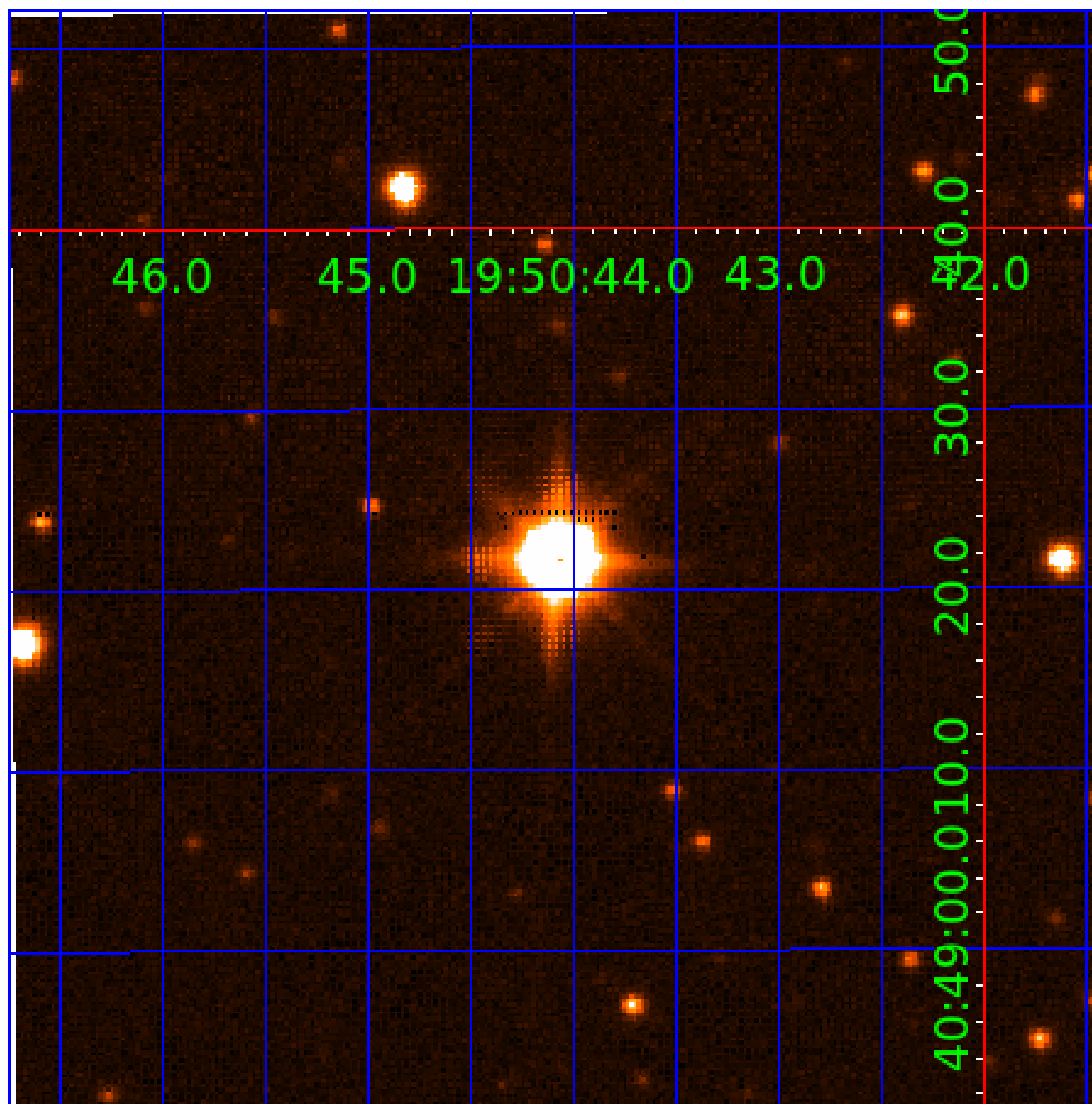
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 005643103

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 005643103-01 | OBS      | No   | 2.945575      | 131.949671   | 127.8       | 4.834            | 11.7 | 13.2 | 5.51                        | 10449           | 7.14                   | 87321.27               |
| 005643103-02 | OBS      | No   | 2.945446      | 132.514032   | 105.5       | 4.380            | 10.1 | 10.8 | 5.51                        | 10449           | 6.48                   | 87326.39               |
| 005643103-03 | OBS      | No   | 2.945722      | 134.295101   | 100.4       | 5.730            | 11.9 | 12.6 | 5.51                        | 10449           | 6.32                   | 87315.48               |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|--|
| 005643103-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED                 |
| 005643103-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED |
| 005643103-03 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—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.

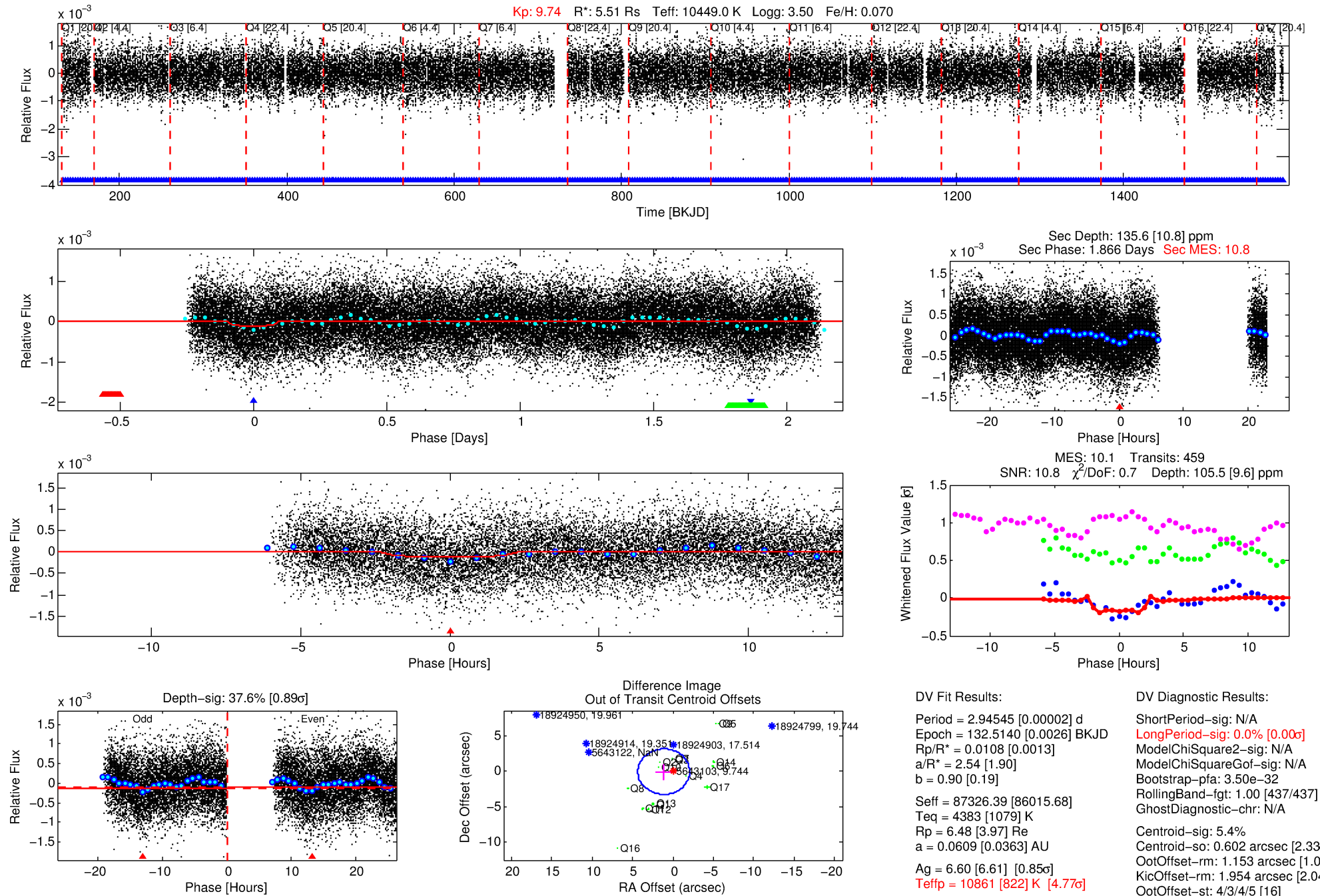
## Ephemeris Match Information For 005643103-02

No Significant Match Found



# DV One-Page Summary

KIC: 5643103 Candidate: 2 of 3 Period: 2.945 d



## DV Fit Results:

Period = 2.94545 [0.00002] d  
 Epoch = 132.5140 [0.0026] BKJD  
 Rp/R\* = 0.0108 [0.0013]  
 a/R\* = 2.54 [1.90]  
 b = 0.90 [0.19]  
 Seff = 87326.39 [86015.68]  
 Teq = 4383 [1079] K  
 Rp = 6.48 [3.97] Re  
 a = 0.0609 [0.0363] AU  
 Ag = 6.60 [6.61] [0.85σ]  
 Teffp = 10861 [822] K [4.77σ]

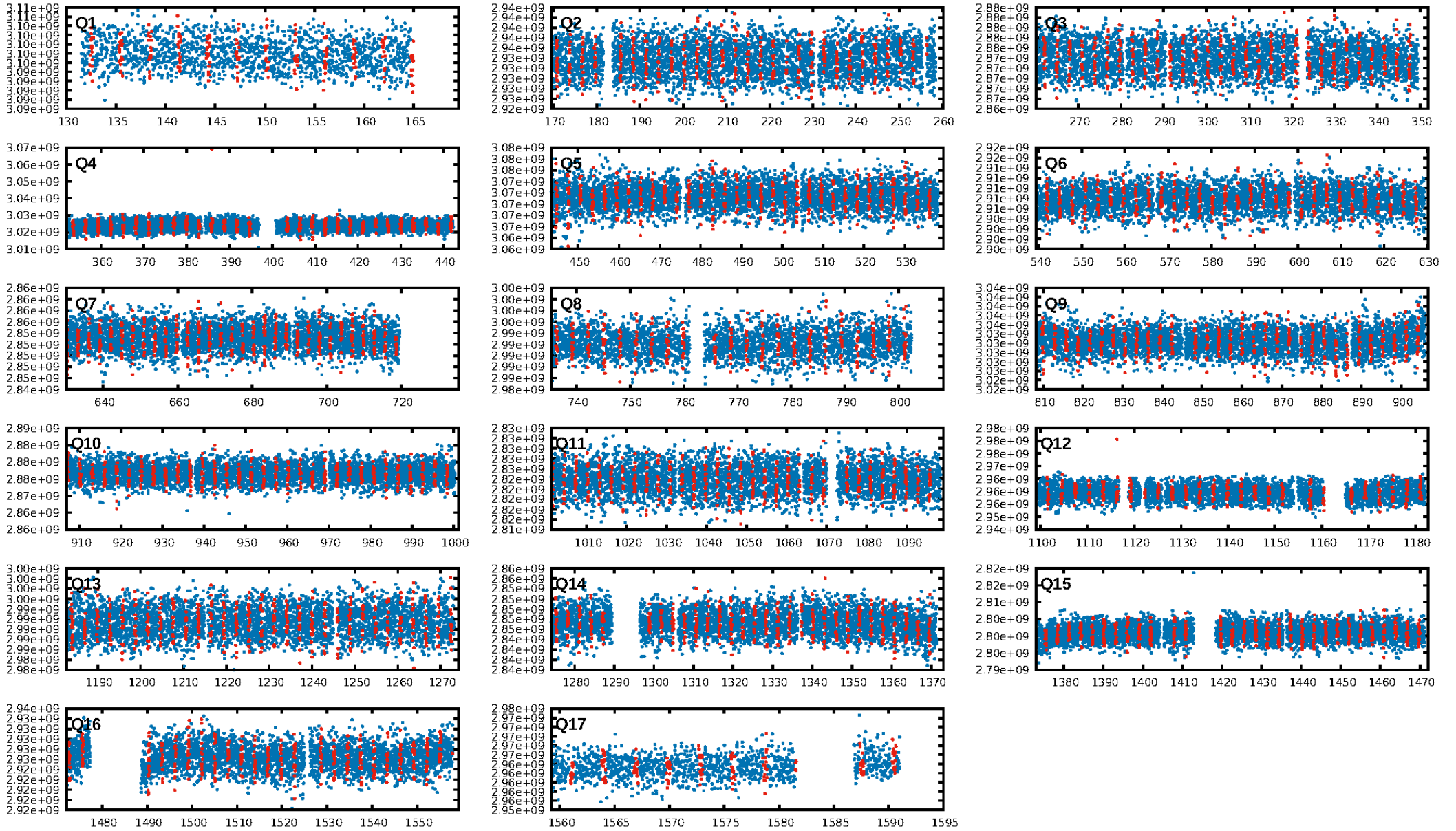
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
 LongPeriod-sig: 0.0% [0.00σ]  
 ModelChiSquare2-sig: N/A  
 ModelChiSquareGof-sig: N/A  
 Bootstrap-pfa: 3.50e-32  
 RollingBand-fgt: 1.00 [437/437]  
 GhostDiagnostic-chr: N/A  
 Centroid-sig: 5.4%  
 Centroid-so: 0.602 arcsec [2.33σ]  
 OotOffset-rm: 1.153 arcsec [1.08σ]  
 KicOffset-rm: 1.954 arcsec [2.04σ]  
 OotOffset-st: 4/3/4/5 [16]  
 KicOffset-st: 4/3/4/5 [16]  
 DiffImageQuality-fgm: 0.06 [1/16]  
 DiffImageOverlap-fno: 1.00 [17/17]

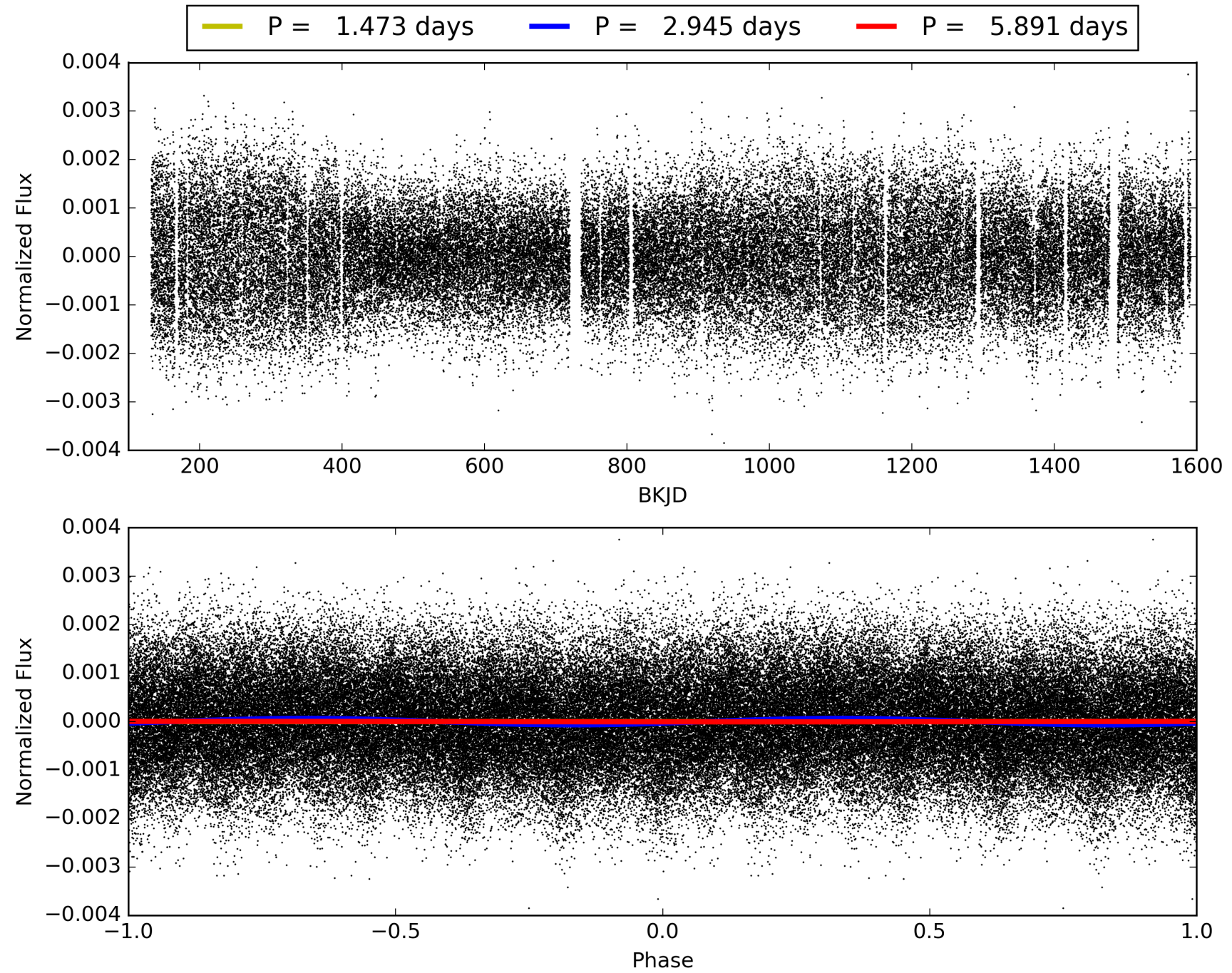
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 02:30:11 Z

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

# TCE 005643103-02, PDC Light Curves



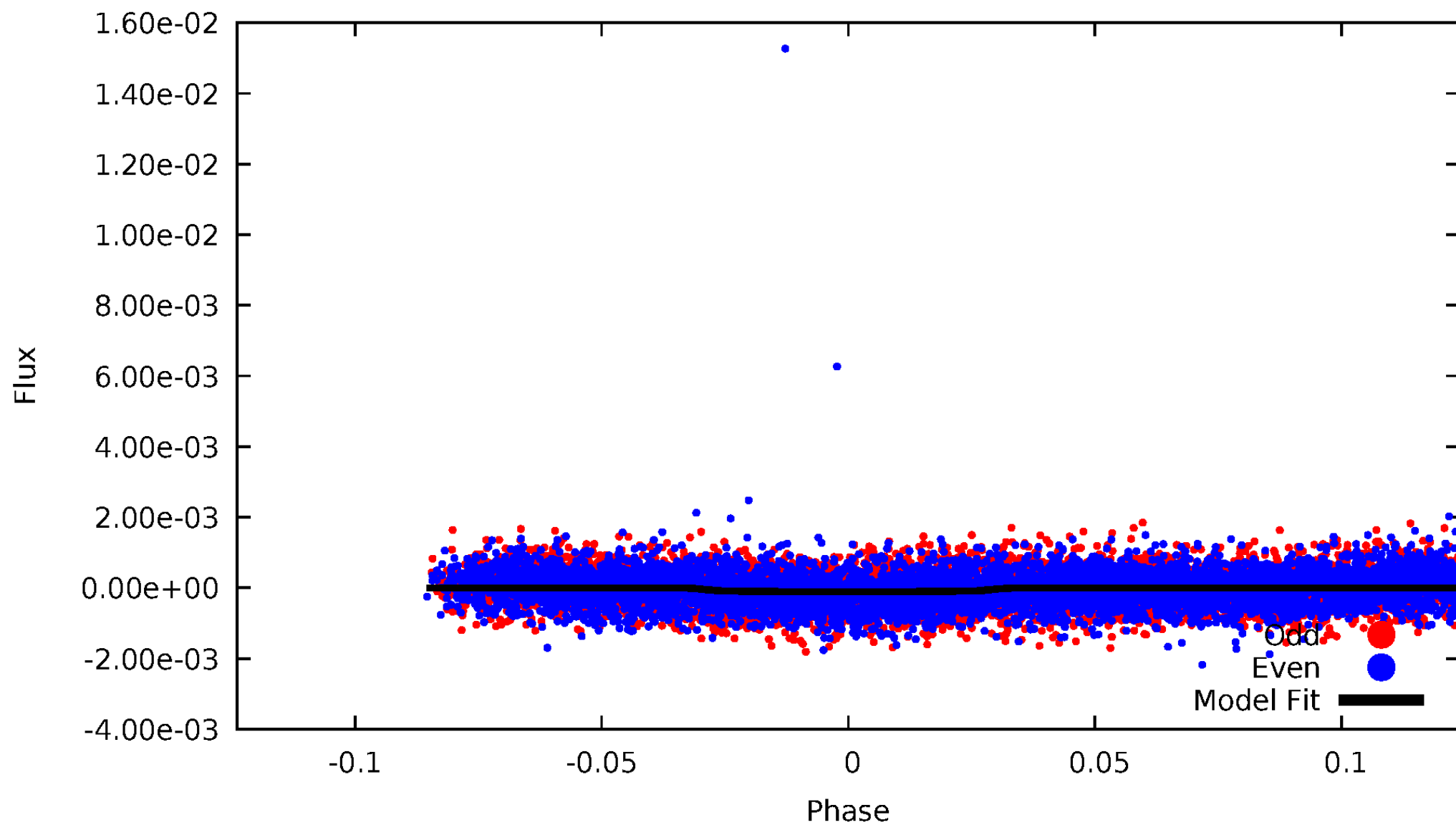
# TCE 005643103-02





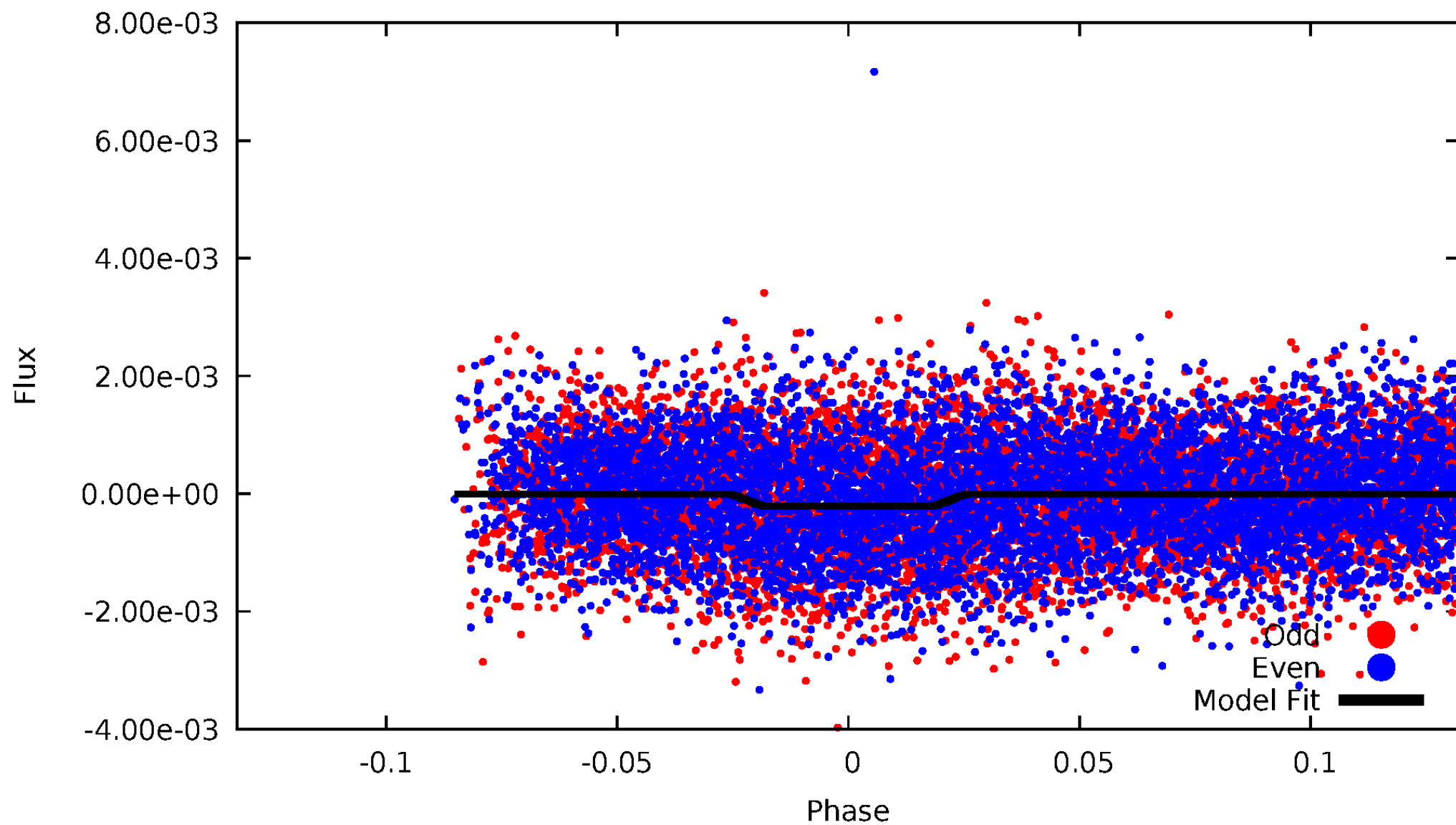
# DV Odd/Even

TCE 005643103-02



# ALT Odd/Even

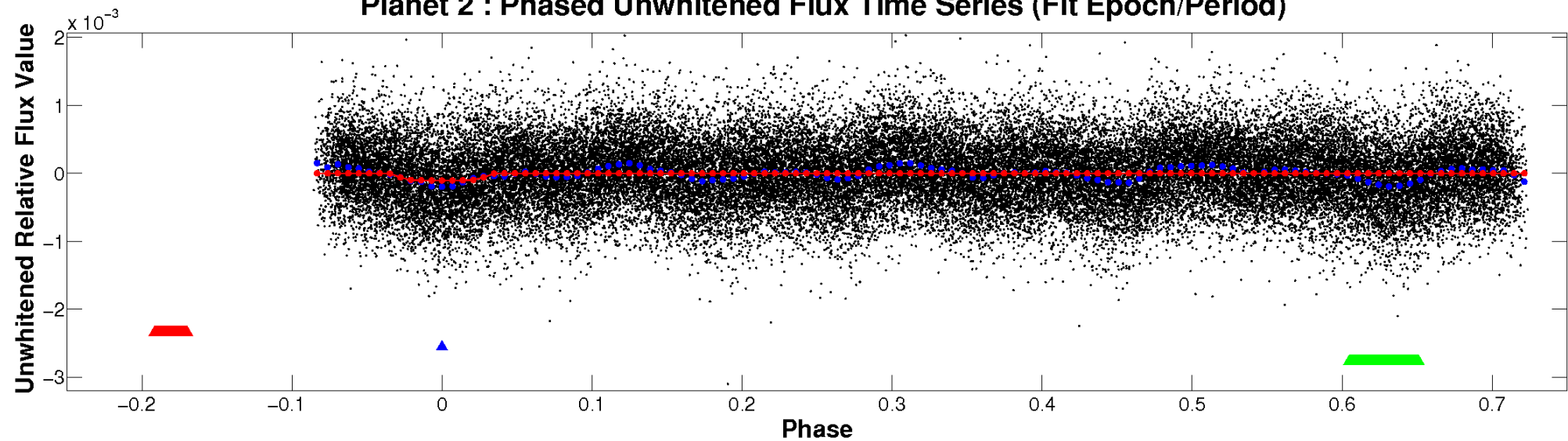
TCE 005643103-02



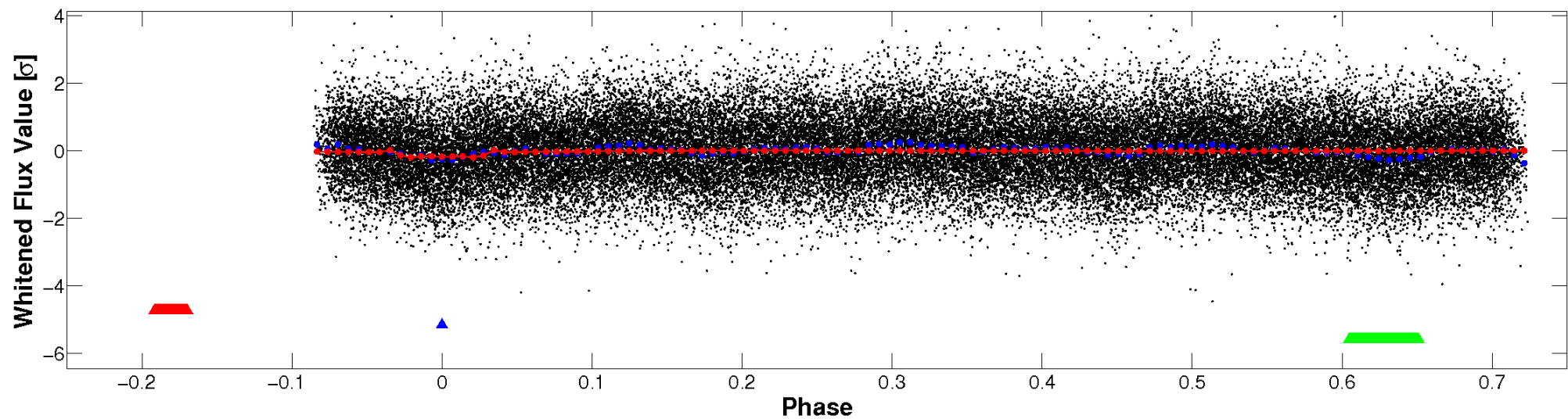


# Non-Whitened Vs. Whitened Light Curve

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

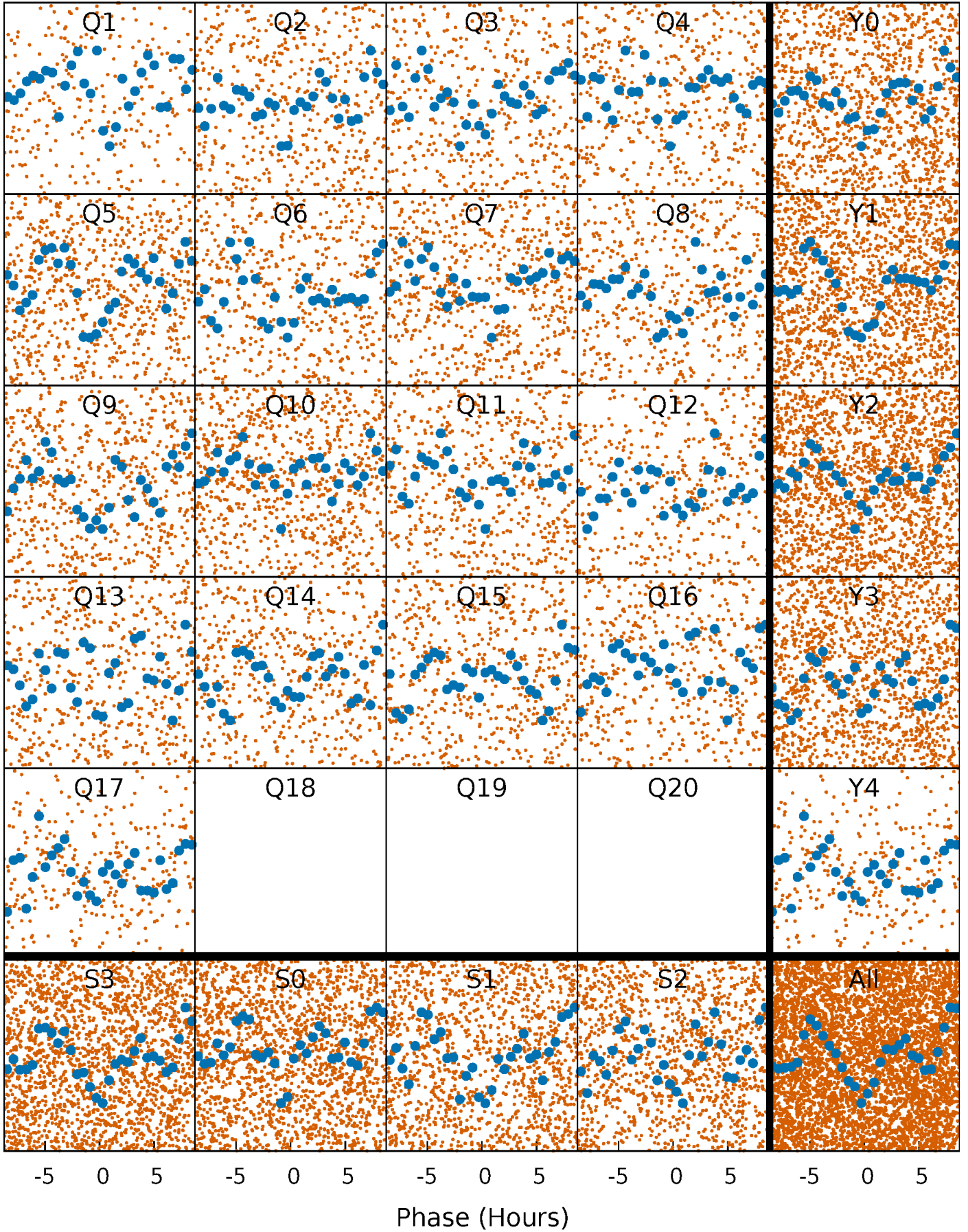


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



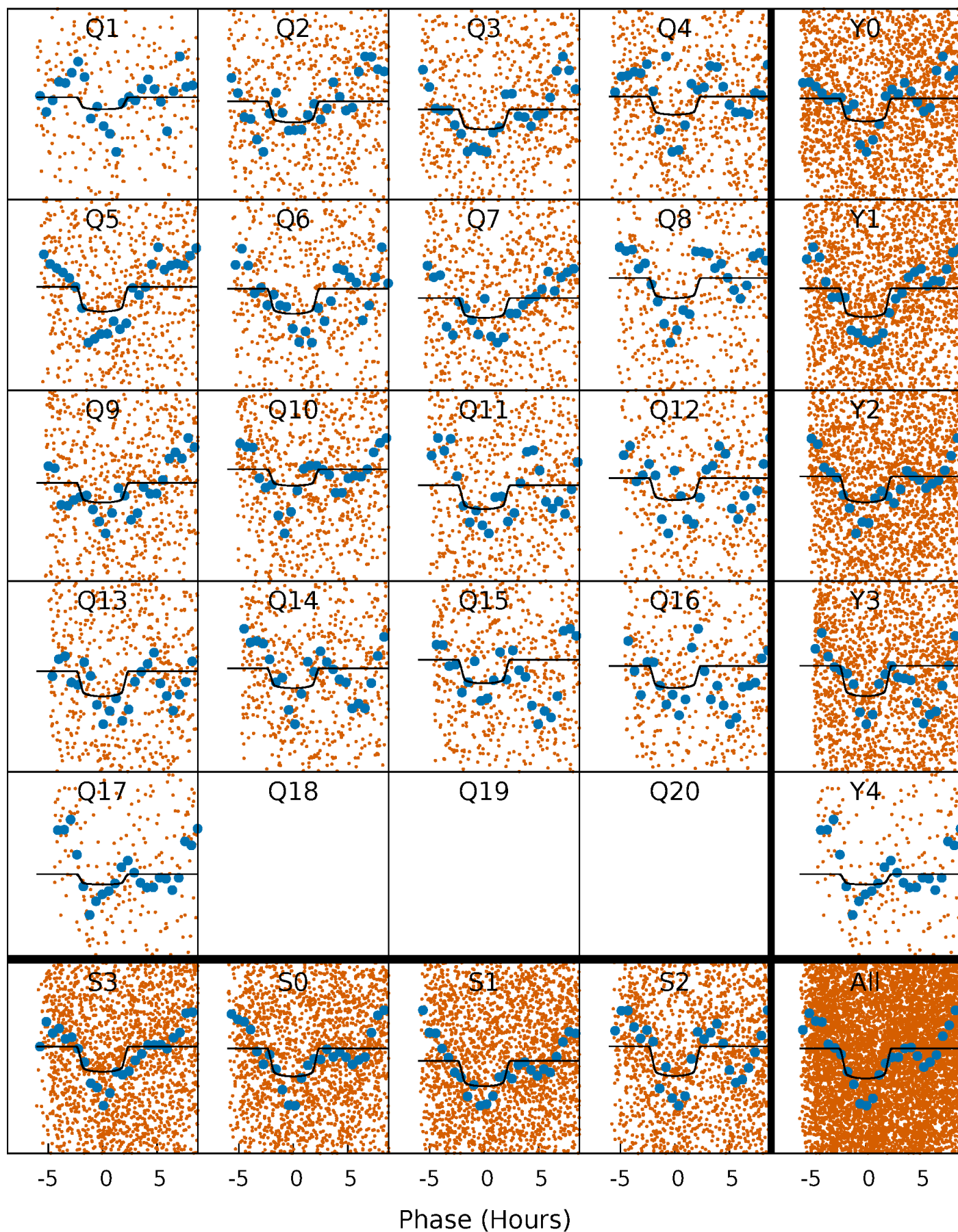
# PDC Quarter-Phased Transit Curves

TCE 005643103-02   P= 2.945446 Days    $T_0=132.514032$  (BKJD)



# DV Quarter-Phased Transit Curves

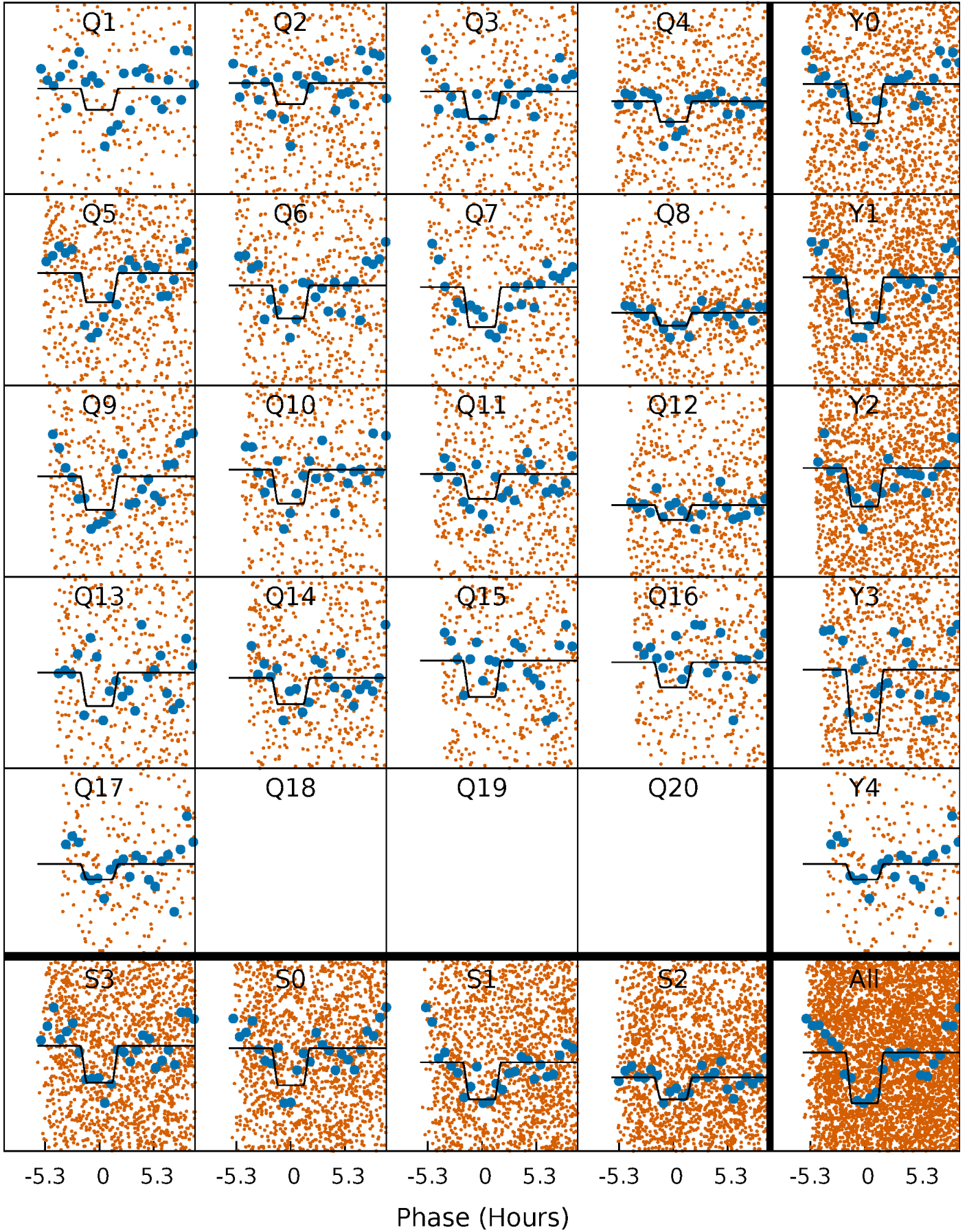
TCE 005643103-02   P= 2.945446 Days    $T_0=132.514032$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 005643103-02   P= 2.945378 Days    $T_0=132.513424$  (BKJD)

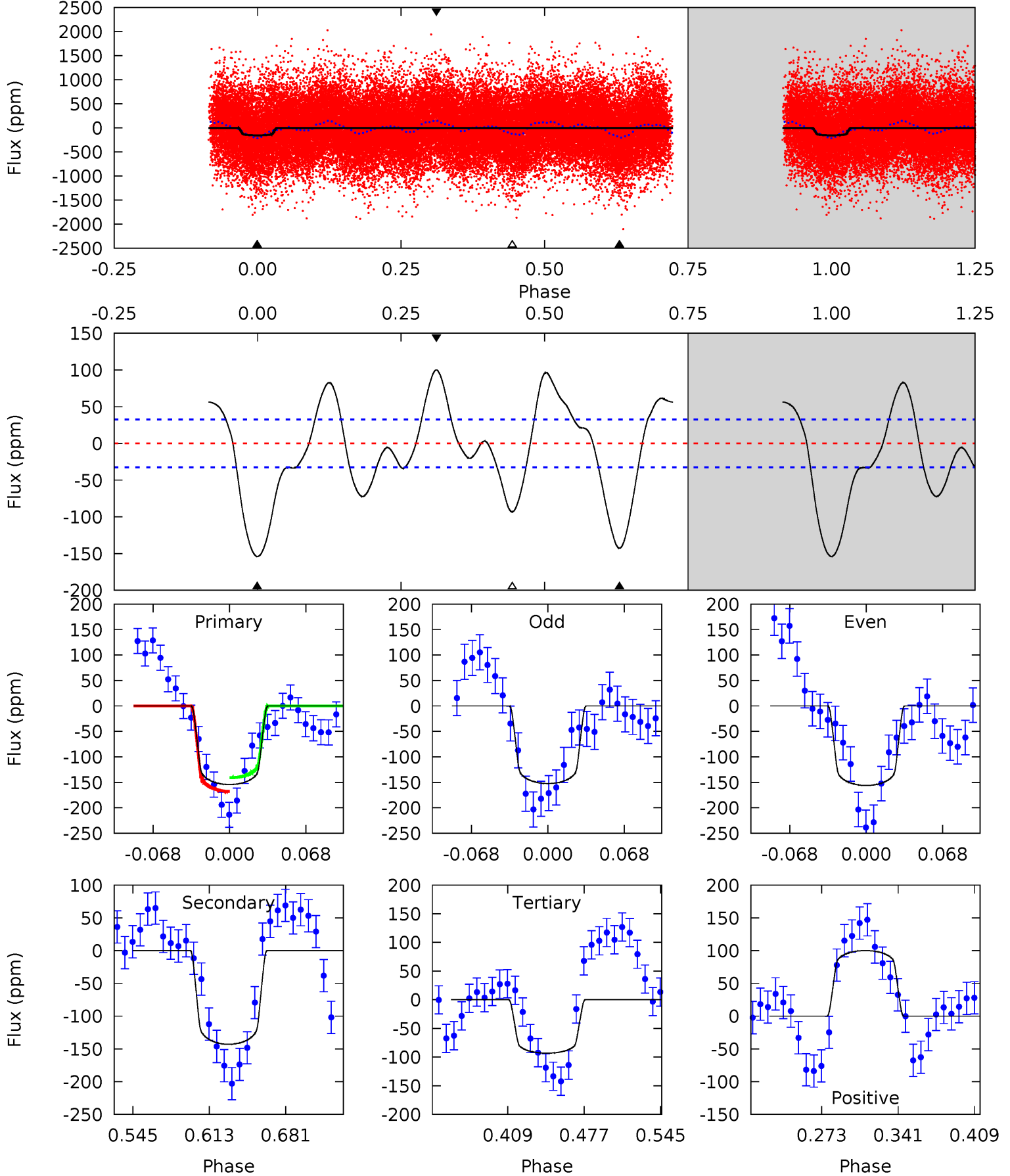




# DV Model-Shift Uniqueness Test

005643103-02, P = 2.945446 Days, E = 129.568586 Days

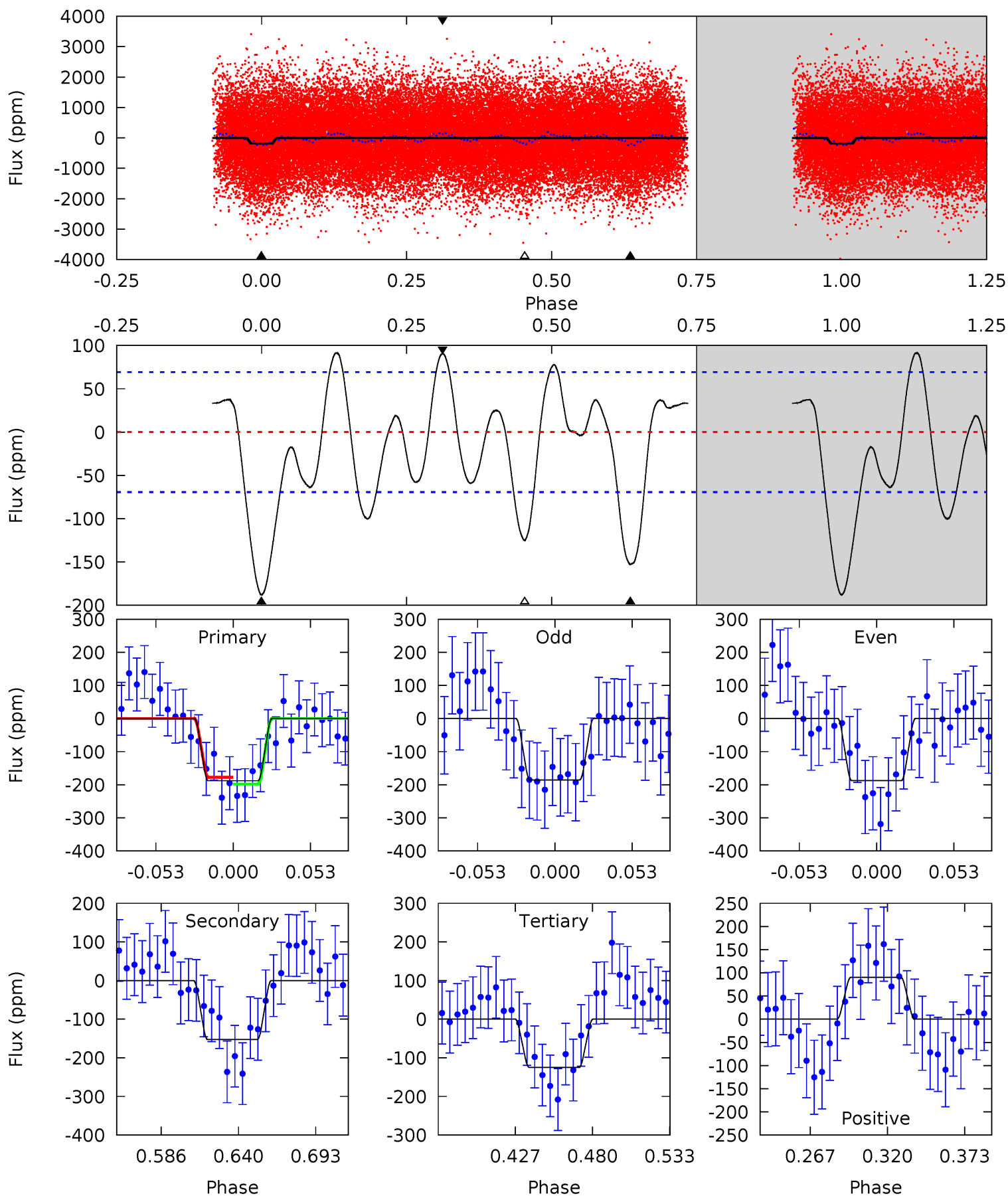
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 22.0 | 20.4 | 13.3 | 14.2 | 4.64            | 1.82            | 7.37             | 8.69    | 7.71    | 7.09    | 6.11    | 0.27    | 0.86 | 0.39  | 1.92 |



# Alt Model-Shift Uniqueness Test

005643103-02, P = 2.945378 Days, E = 129.568046 Days

| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 12.7 | 10.4 | 8.48 | 6.14 | 4.70            | 1.93            | 3.64             | 4.27    | 6.61    | 1.88    | 4.22    | 0.06    | 1.09 | 0.33  | 0.68 |



### Stellar Parameters For KIC 005643103

|        | $T_{\text{eff}} (K)$  | $\log(g)$                 | [Fe/H]                    | $R (R_{\odot})$           | $M (M_{\odot})$           | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|-----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
|        | $10449^{+293}_{-440}$ | $3.497^{+0.576}_{-0.064}$ | $0.070^{+0.150}_{-0.600}$ | $5.511^{+0.348}_{-3.307}$ | $3.473^{+0.060}_{-1.136}$ | $0.029^{+0.221}_{-0.006}$                 |
|        | +3%/-4%               | +16%/-2%                  | +214%/-857%               | +6%/-60%                  | +2%/-33%                  | +755%/-21%                                |
| Source | KIC0                  | KIC0                      | KIC0                      | DSEP                      |                           |   |

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

### Secondary Eclipse Parameters for KIC 005643103-02 / KOI

| Detrend | Depth (ppm)   | $R_p (R_{\oplus})$     | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$    | $A_{\text{obs}}$          |
|---------|---------------|------------------------|----------------------|-------------------------|---------------------------|
| DV      | $-143 \pm 7$  | $5.92^{+1.28}_{-1.71}$ | $5930^{+367}_{-852}$ | $11051^{+1356}_{-1064}$ | $8.041^{+6.751}_{-2.439}$ |
| Alt.    | $-153 \pm 15$ | $8.18^{+1.32}_{-2.24}$ | $5947^{+337}_{-859}$ | $9015^{+777}_{-685}$    | $4.612^{+3.698}_{-1.243}$ |

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

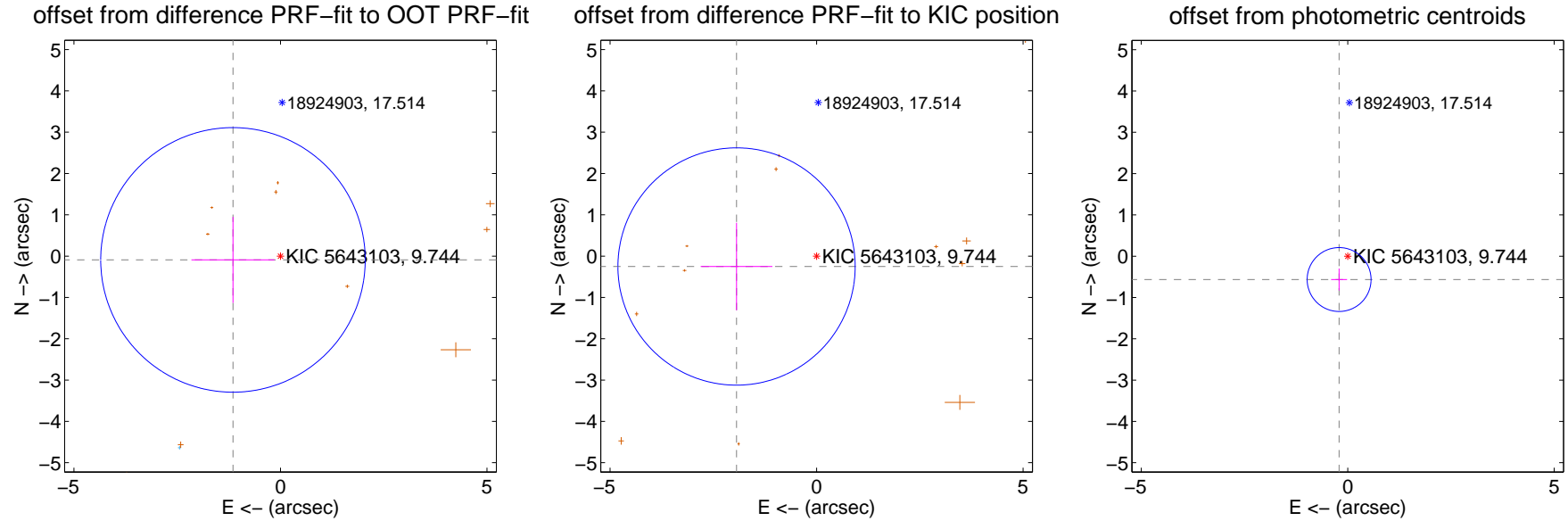
## DV Centroid Data

Supplemental centroid analysis for 005643103-02. **Kepler magnitude: 9.74.** Transit SNR 10.78

**There are 1 quarters with good PRF difference image offsets**

The direct PRF centroid is offset from the target star catalog position by about 1.49 arcsec

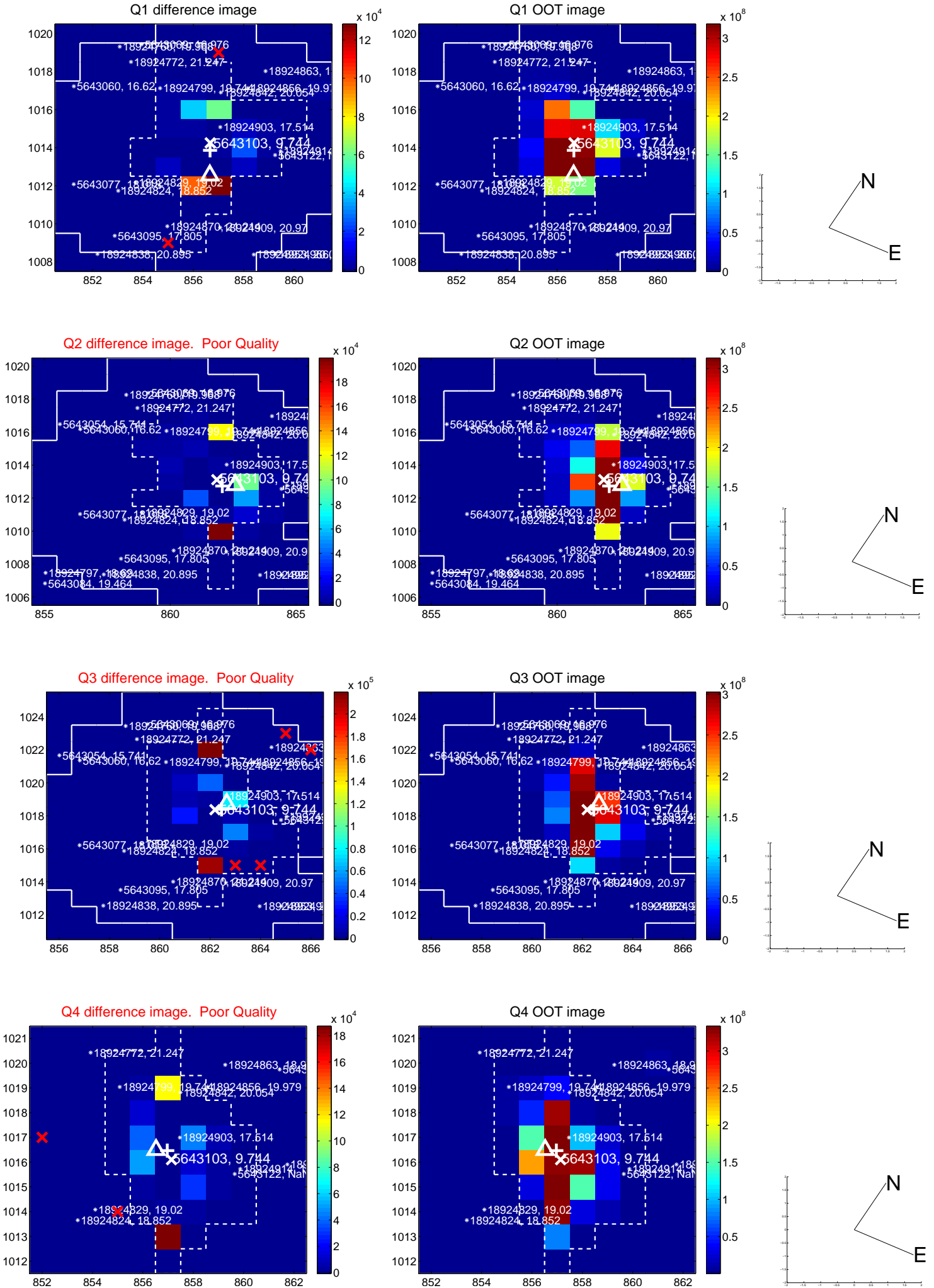
|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA       | $\Delta$ Dec       |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT          | $1.153 \pm 1.067$  | 1.08                | $1.149 \pm 1.006$ | $-0.091 \pm 1.040$ |
| PRF-fit source offset from KIC position | $1.954 \pm 0.957$  | 2.04                | $1.937 \pm 0.869$ | $-0.251 \pm 1.059$ |
| photometric centroid source offset      | $0.60 \pm 0.26$    | 2.33                | $0.21 \pm 0.19$   | $-0.56 \pm 0.27$   |



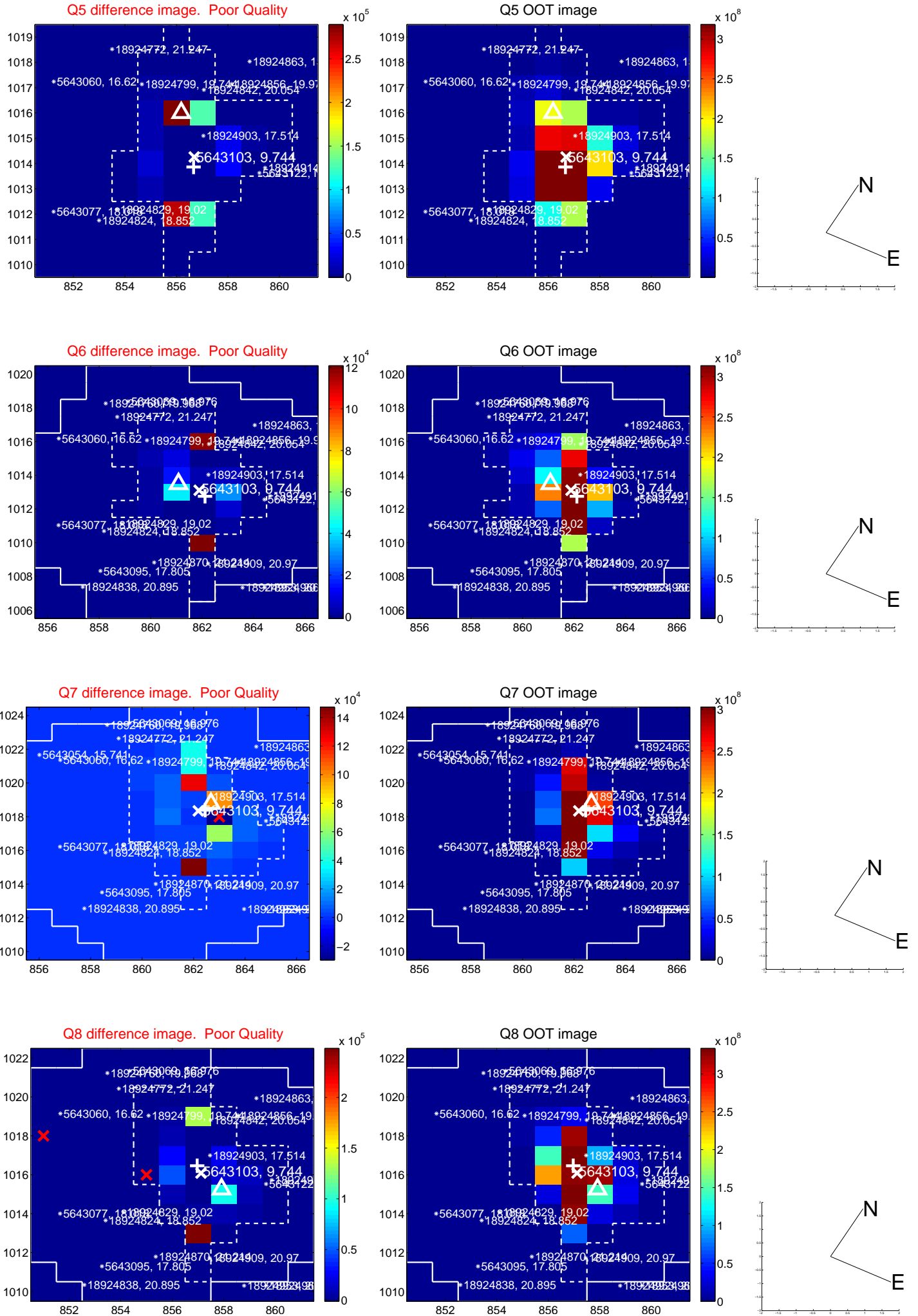
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.



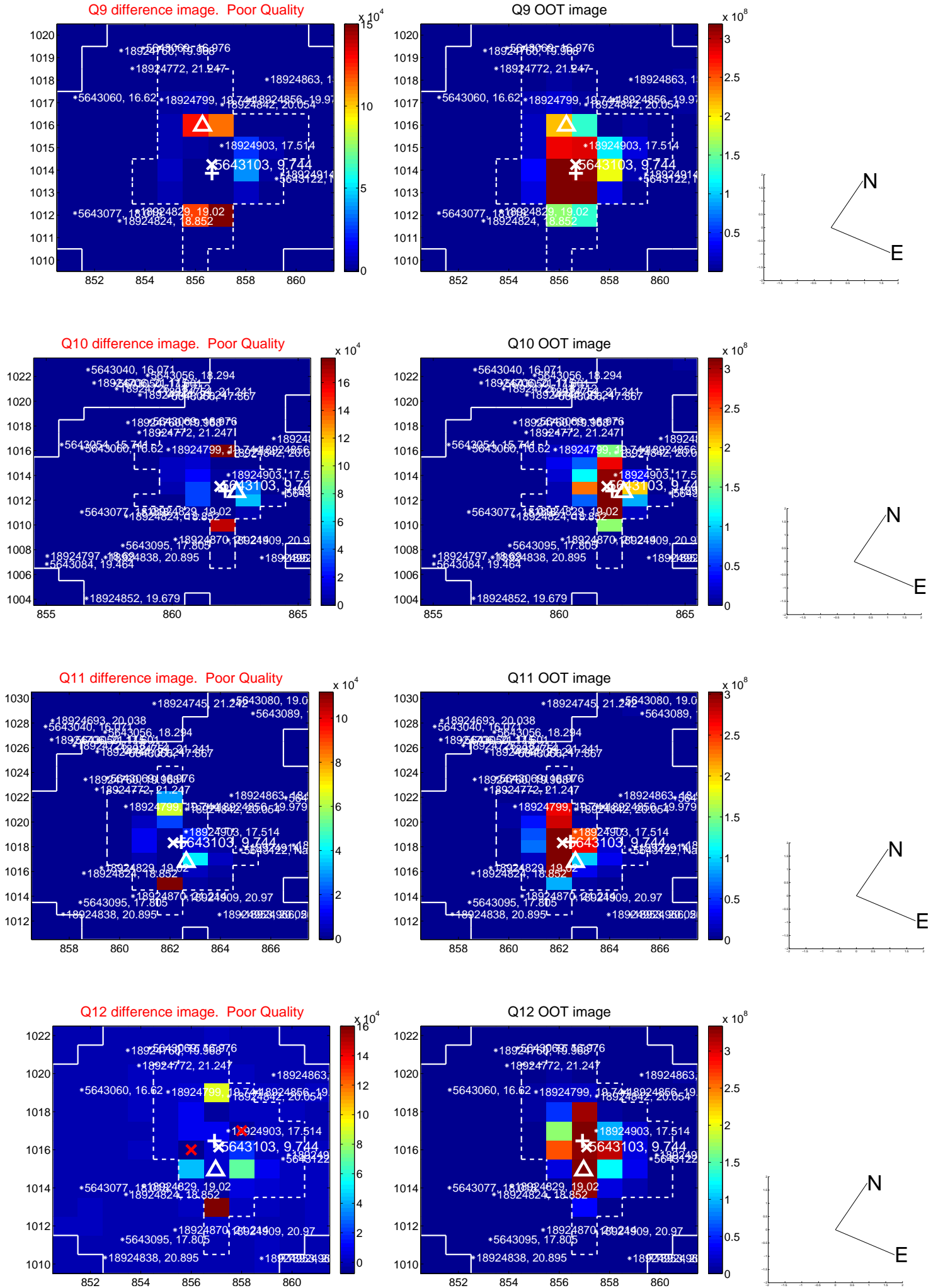
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



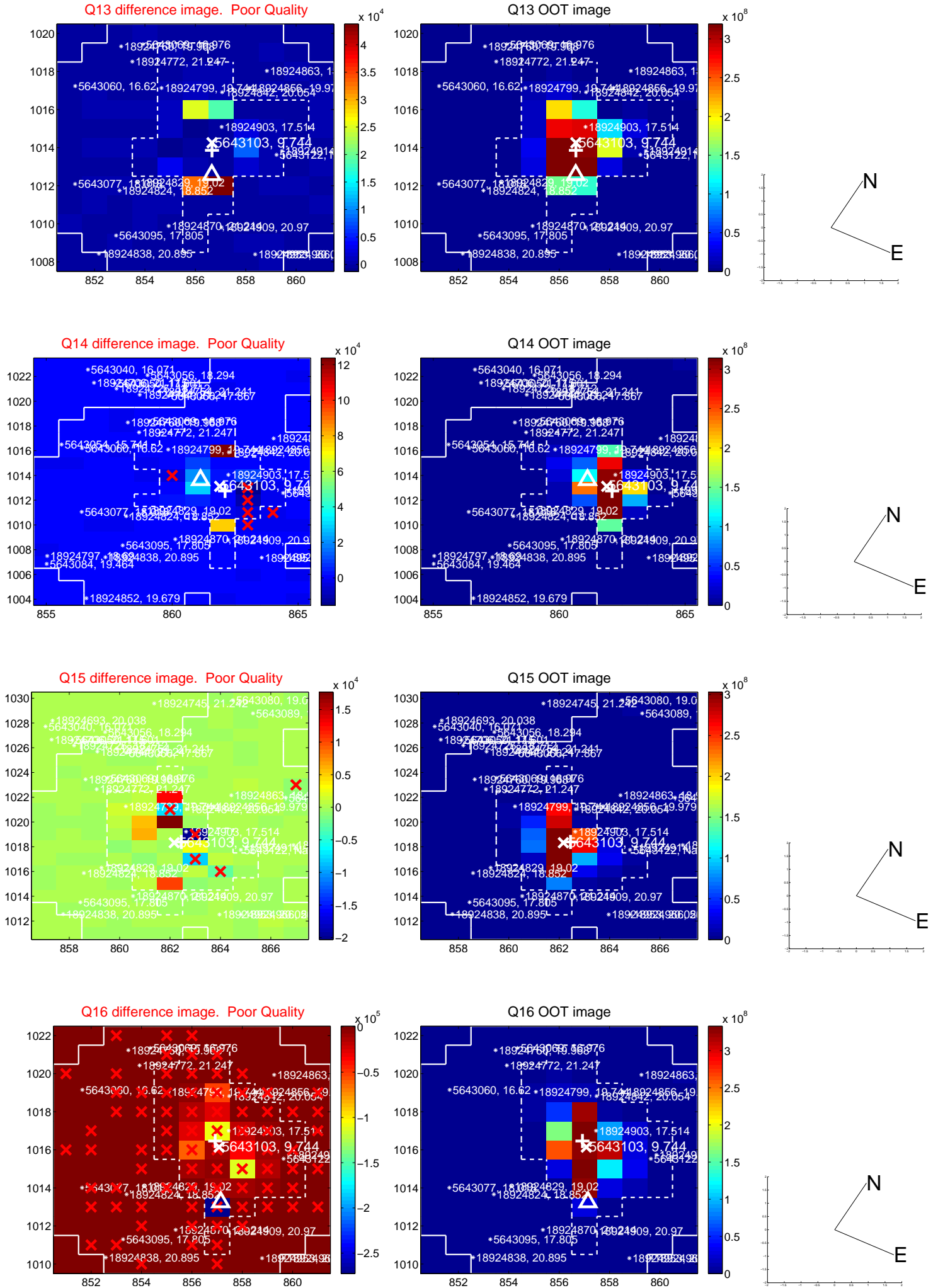
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



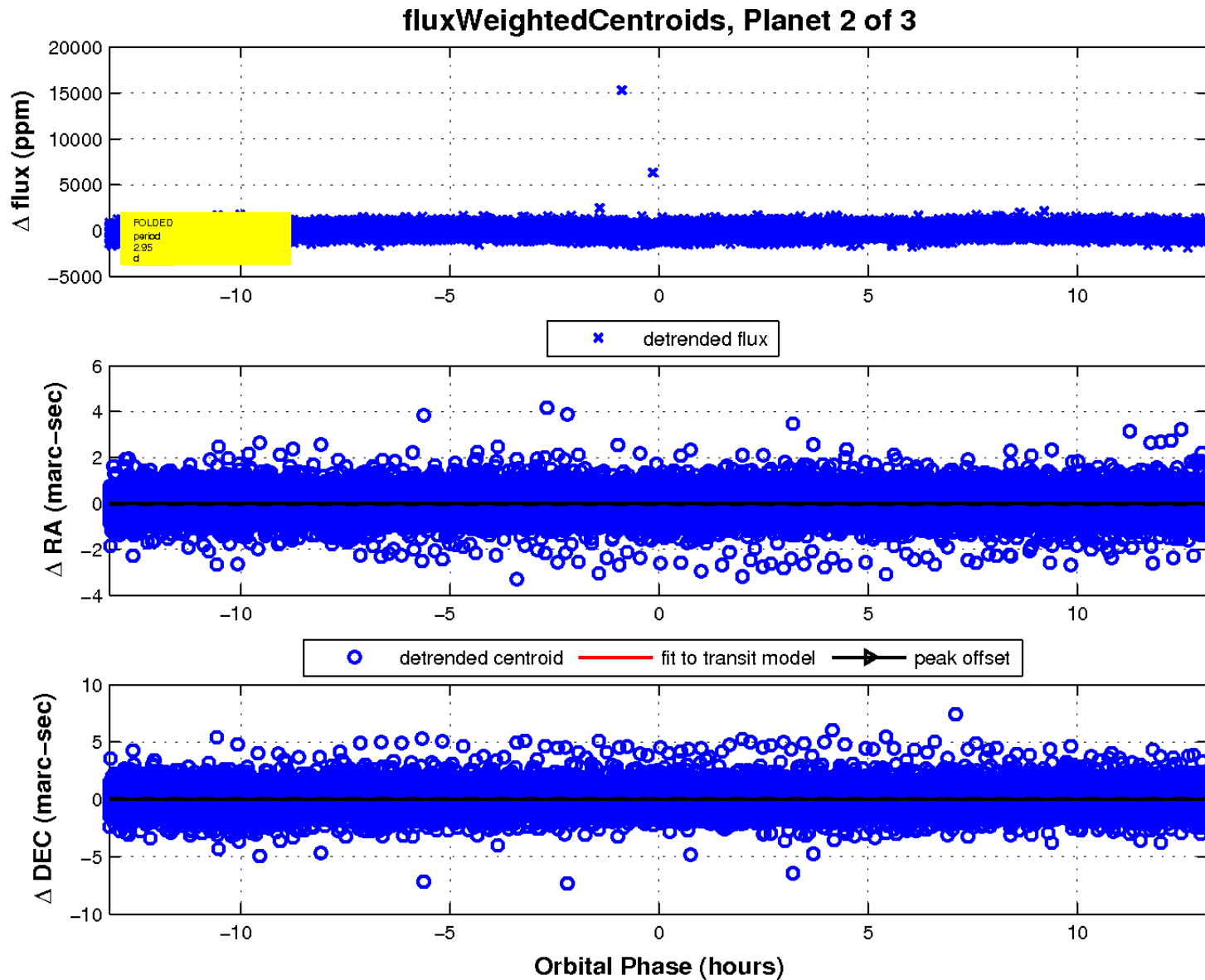
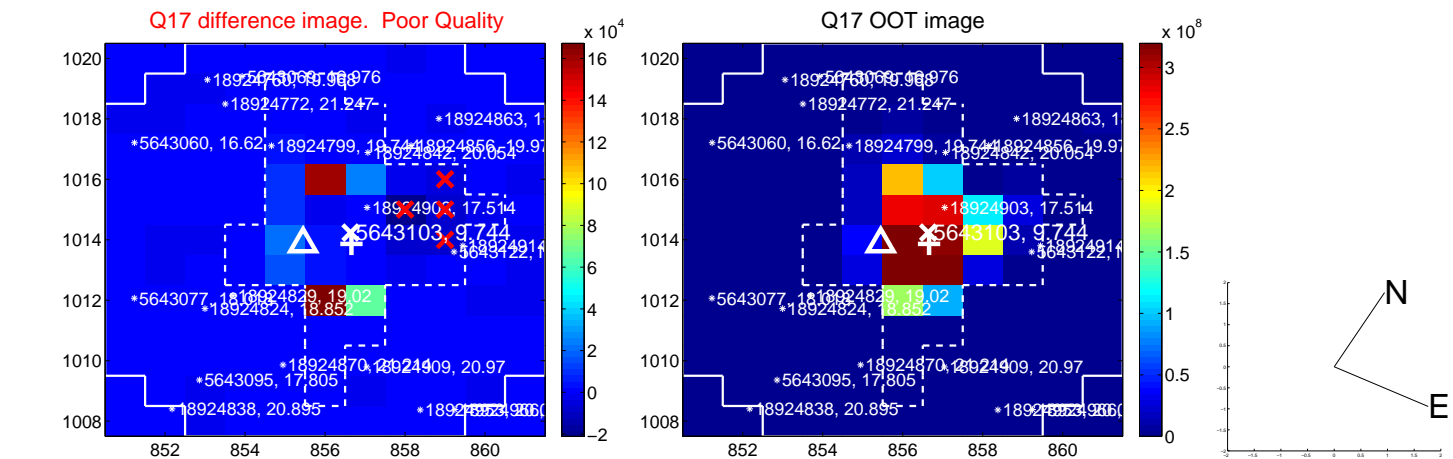
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



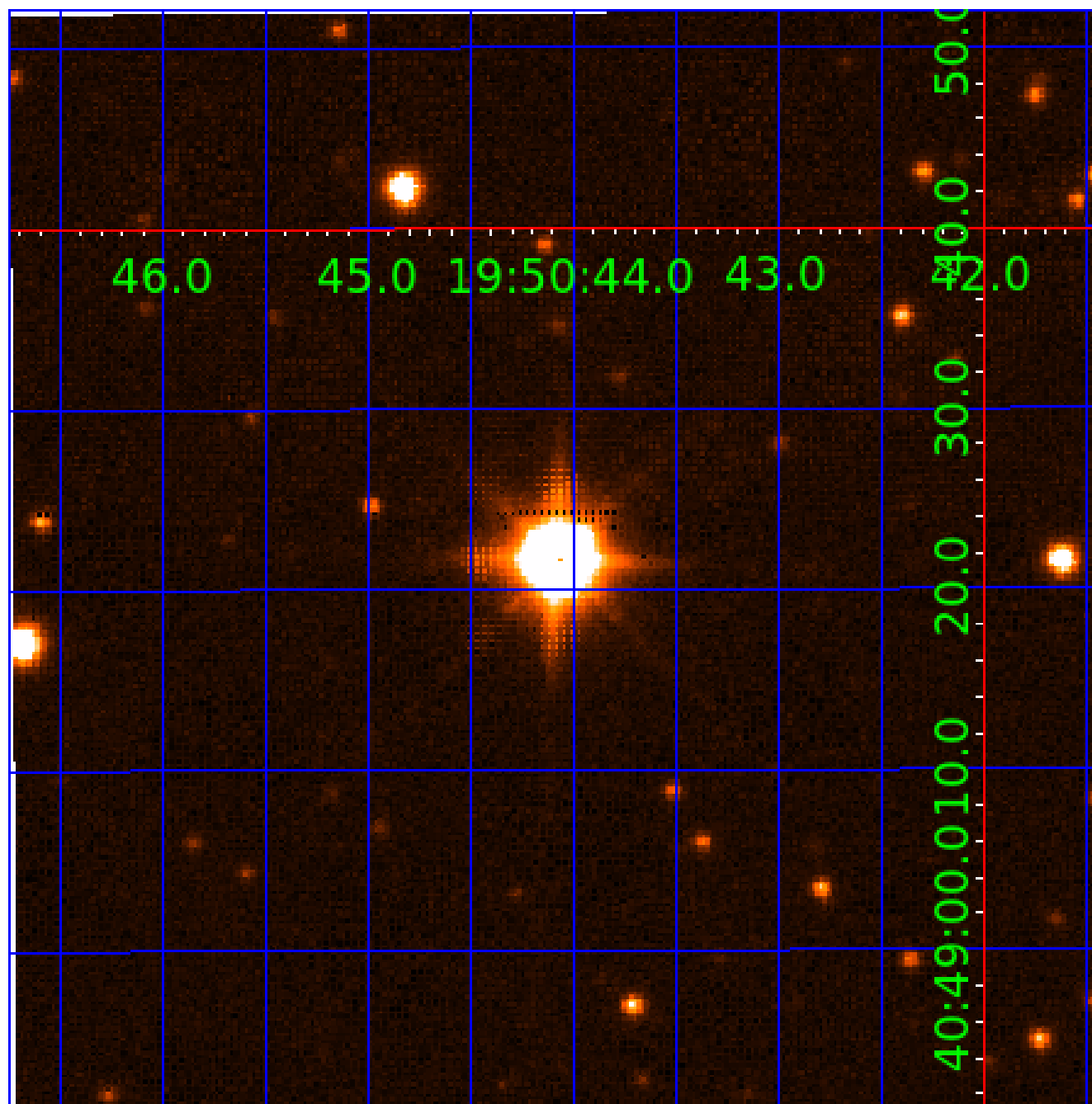
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 005643103

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 005643103-01 | OBS      | No   | 2.945575      | 131.949671   | 127.8       | 4.834            | 11.7 | 13.2 | 5.51                        | 10449           | 7.14                   | 87321.27               |
| 005643103-02 | OBS      | No   | 2.945446      | 132.514032   | 105.5       | 4.380            | 10.1 | 10.8 | 5.51                        | 10449           | 6.48                   | 87326.39               |
| 005643103-03 | OBS      | No   | 2.945722      | 134.295101   | 100.4       | 5.730            | 11.9 | 12.6 | 5.51                        | 10449           | 6.32                   | 87315.48               |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|--|
| 005643103-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED                 |
| 005643103-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED |
| 005643103-03 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED                        |

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

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

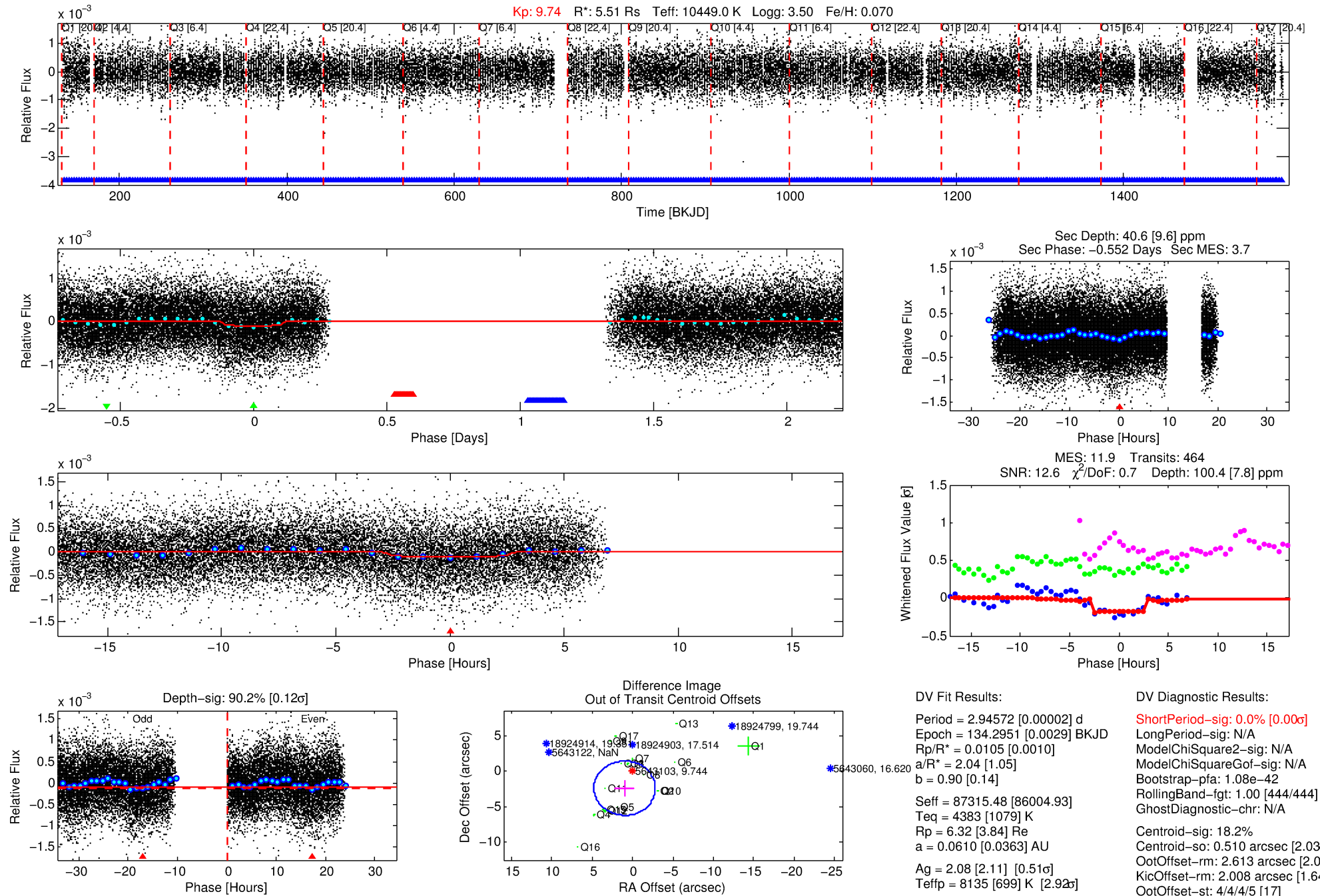
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005643103-03

No Significant Match Found

# DV One-Page Summary

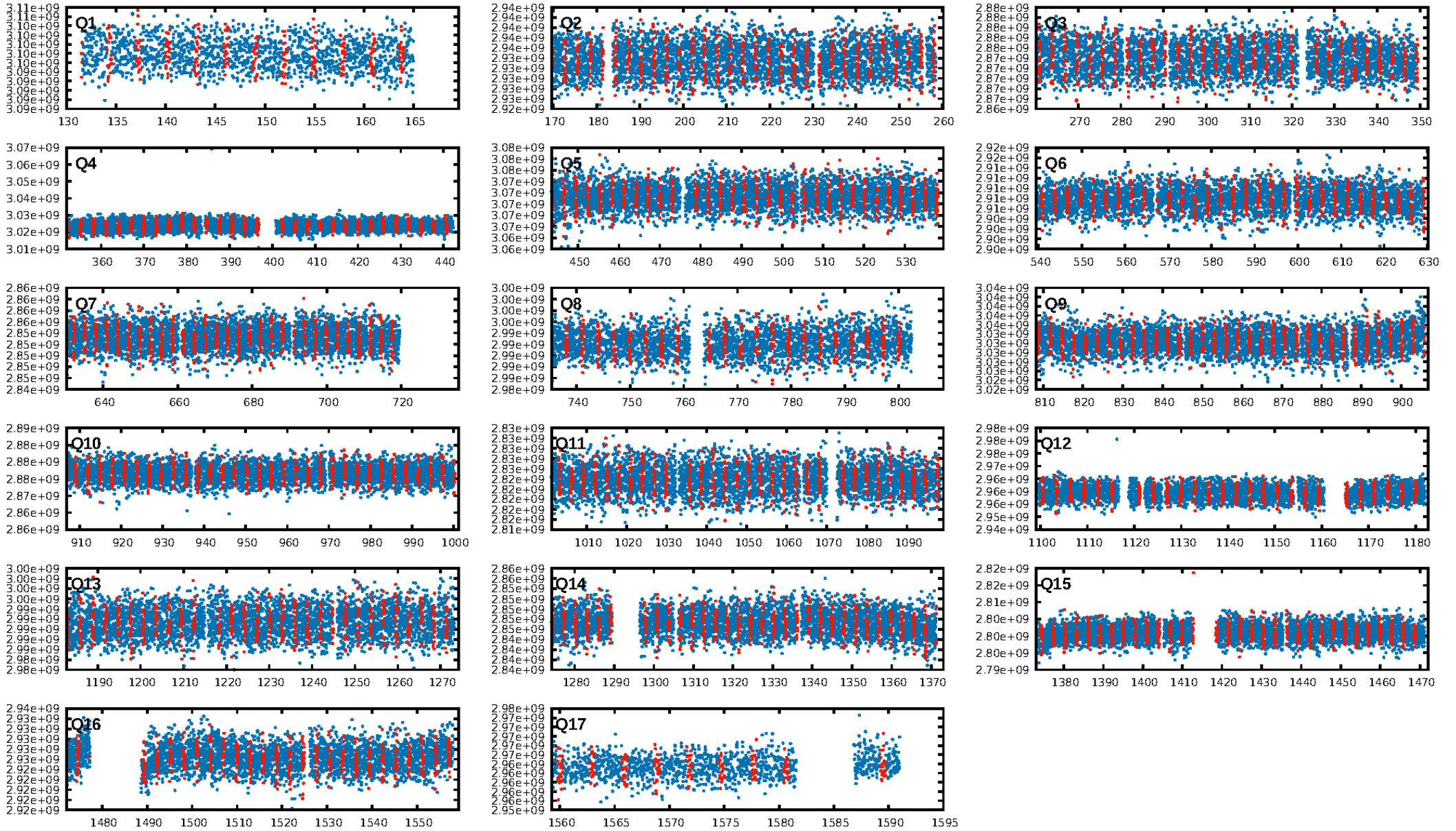
KIC: 5643103 Candidate: 3 of 3 Period: 2.946 d



Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 02:30:19 Z

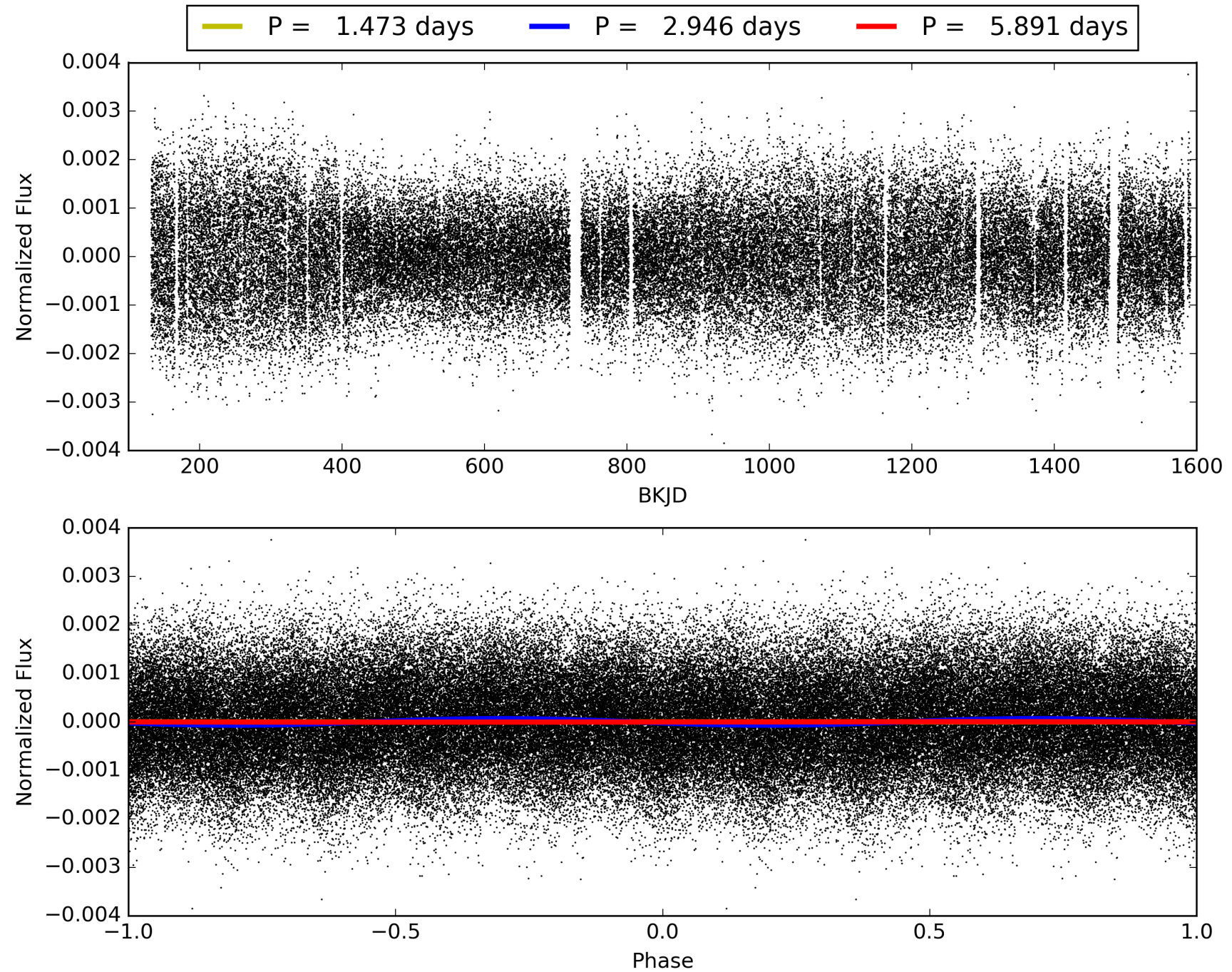
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005643103-03, PDC Light Curves



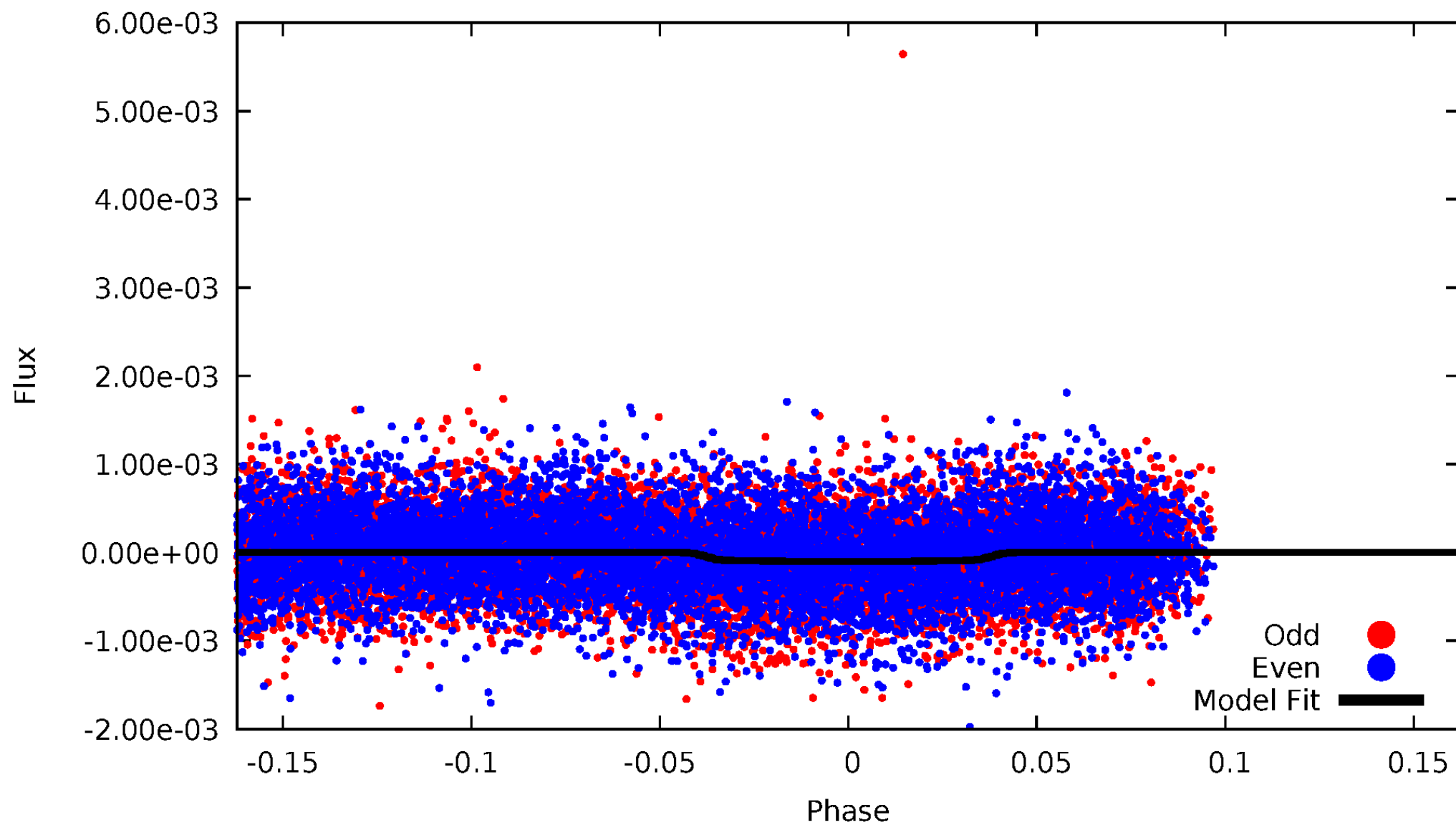


# TCE 005643103-03



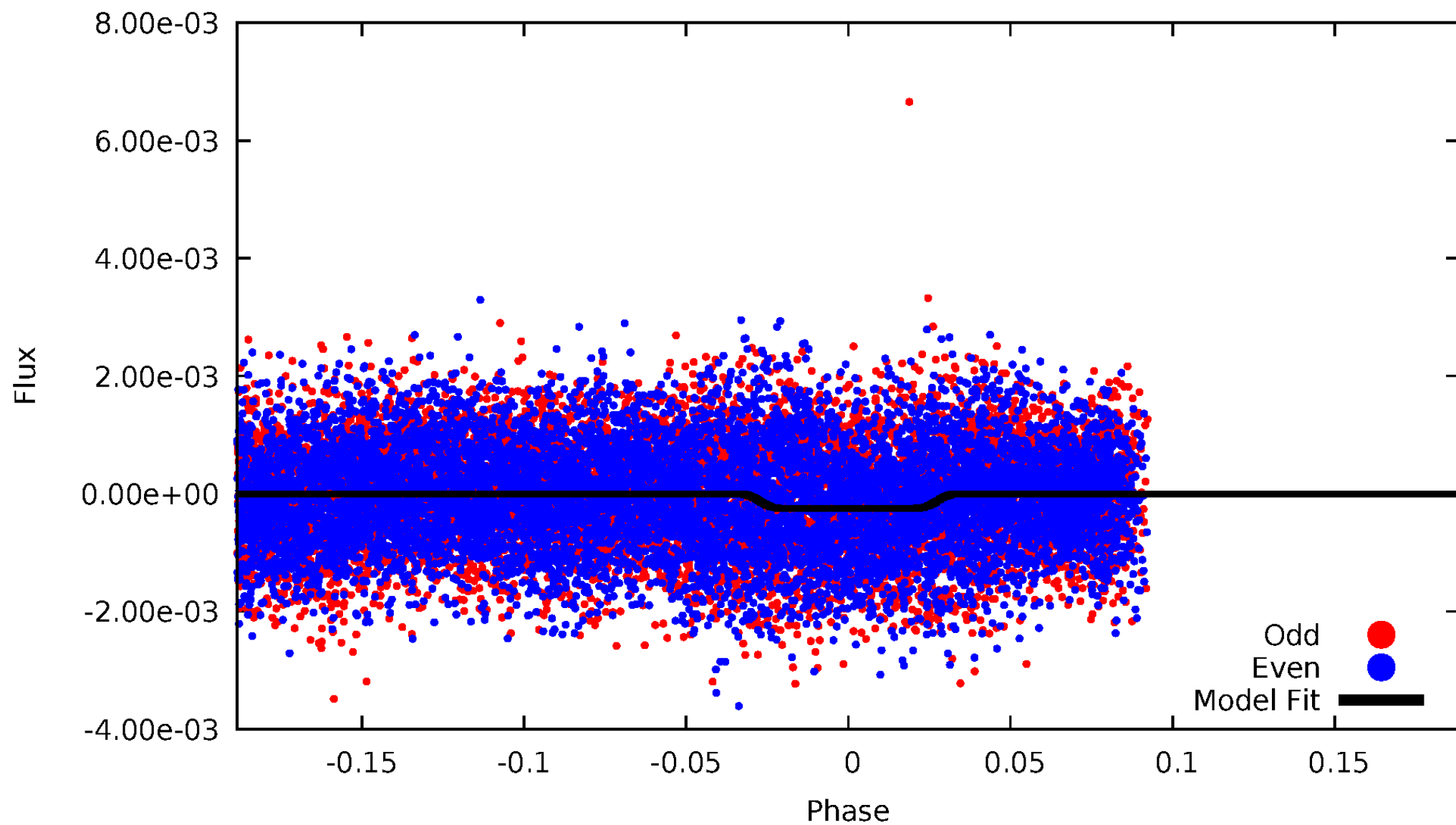
DV Odd/Even

TCE 005643103-03



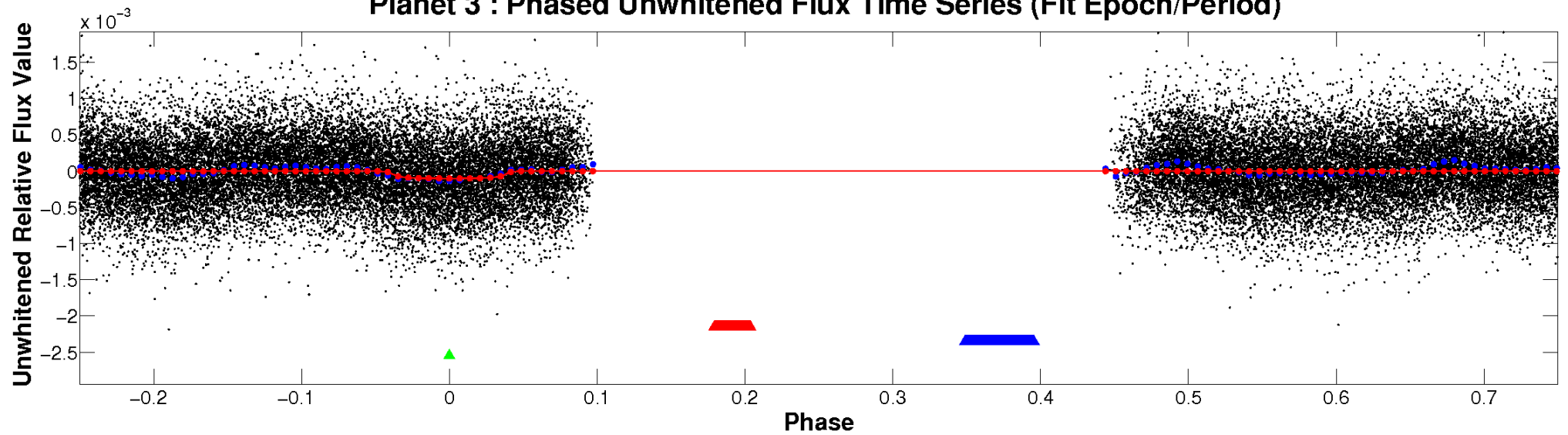
# ALT Odd/Even

TCE 005643103-03

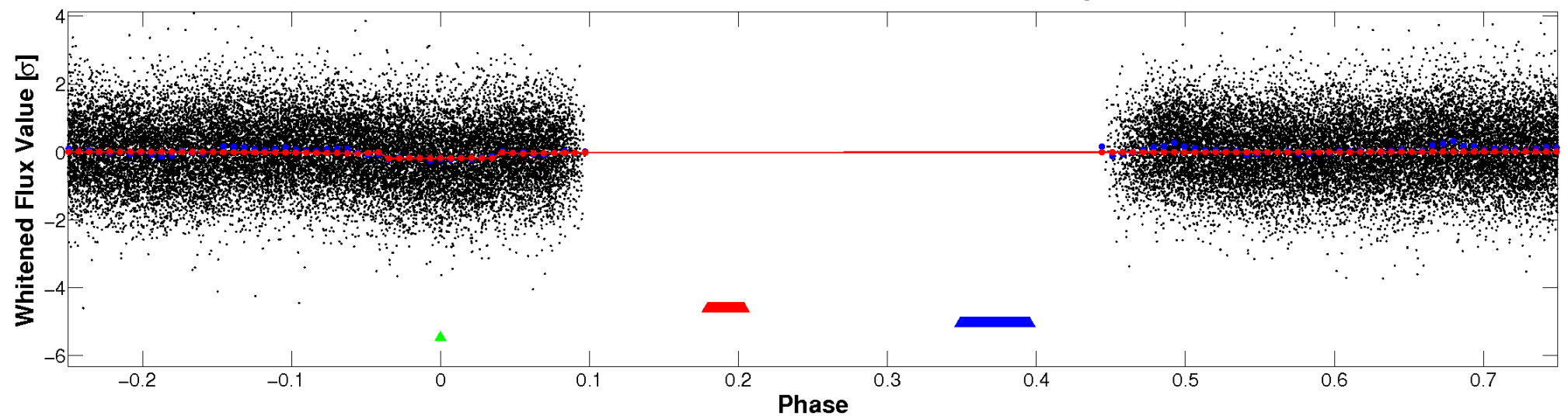


# Non-Whitened Vs. Whitened Light Curve

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



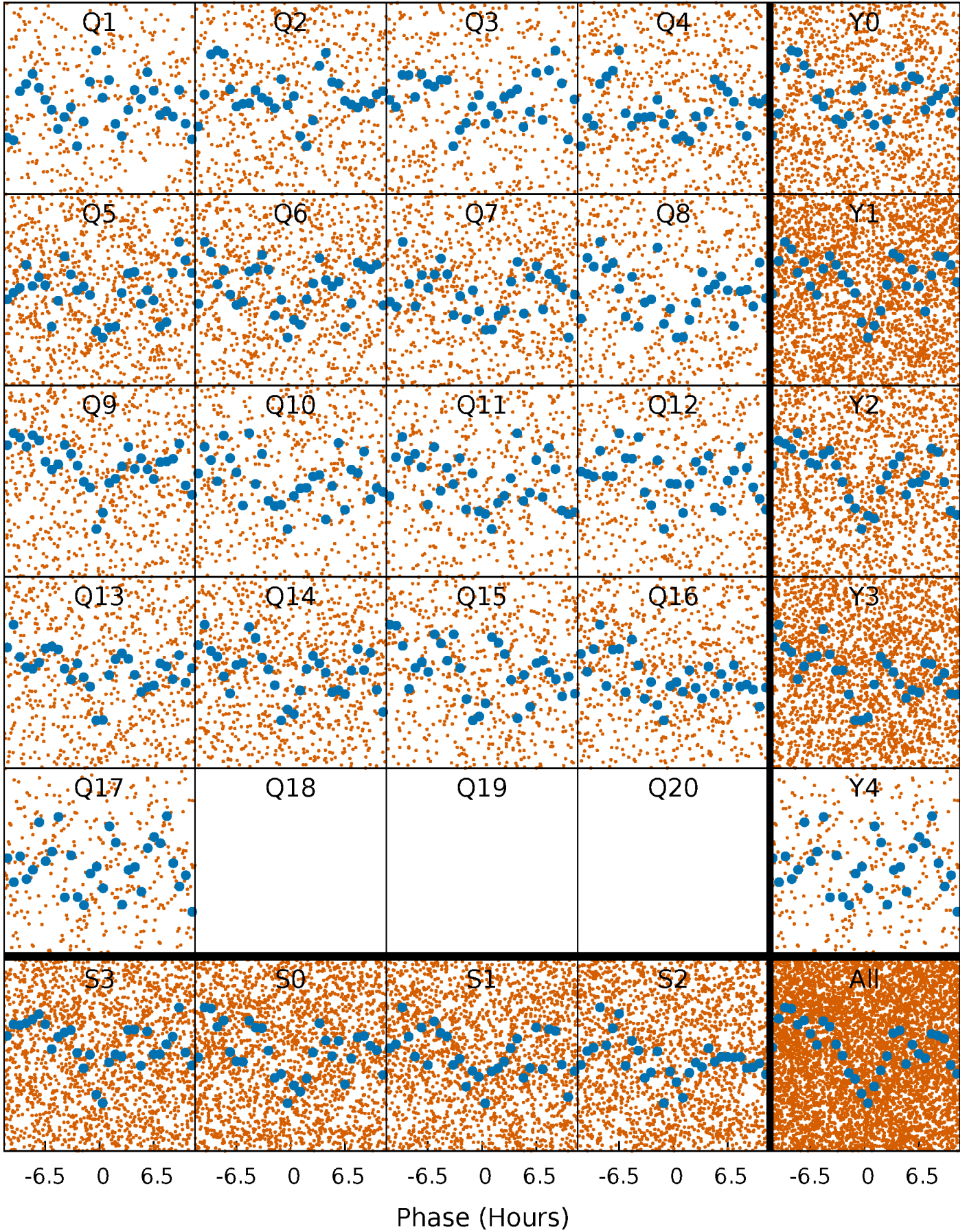
## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)





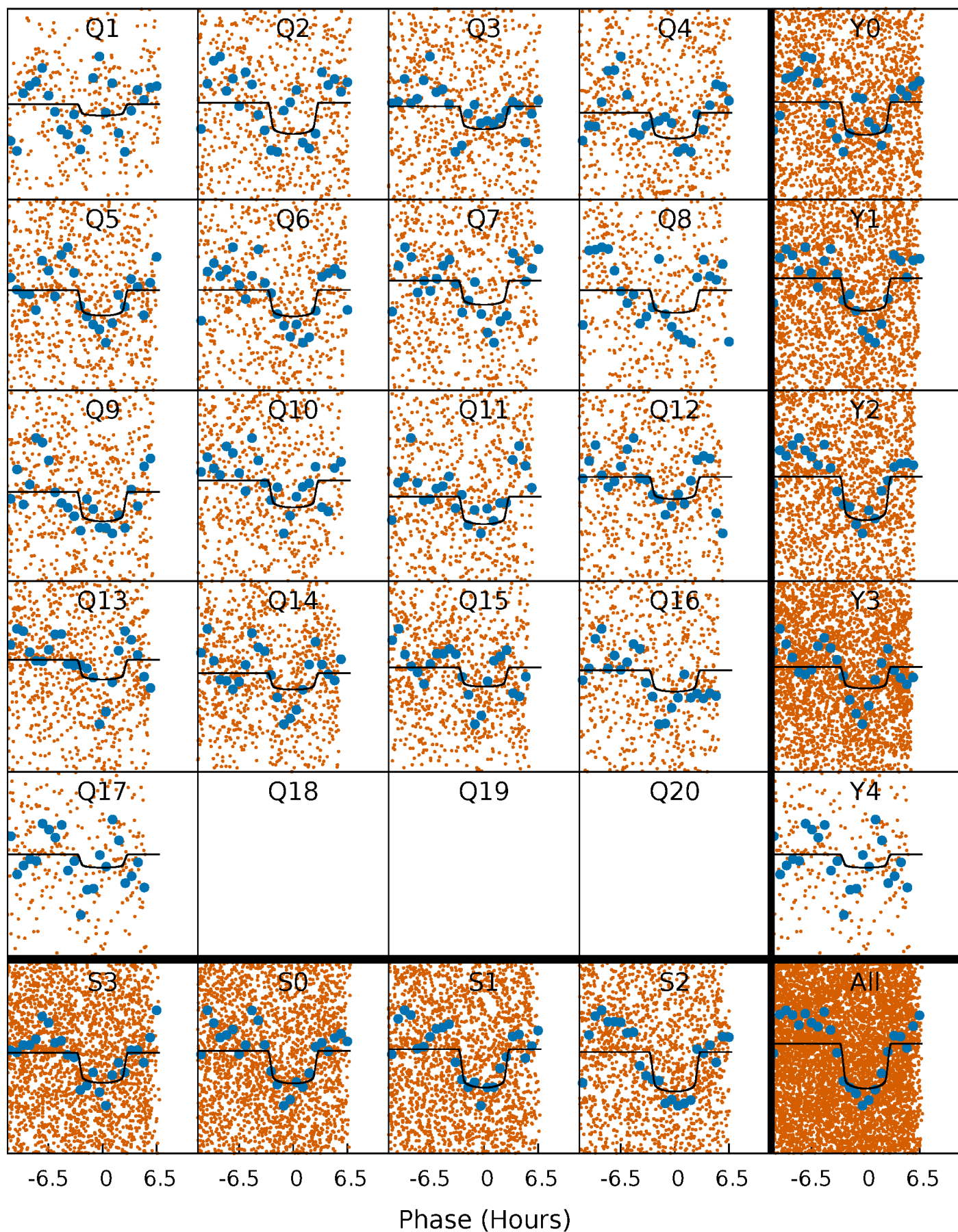
# PDC Quarter-Phased Transit Curves

TCE 005643103-03 P= 2.945722 Days  $T_0=134.295101$  (BKJD)



# DV Quarter-Phased Transit Curves

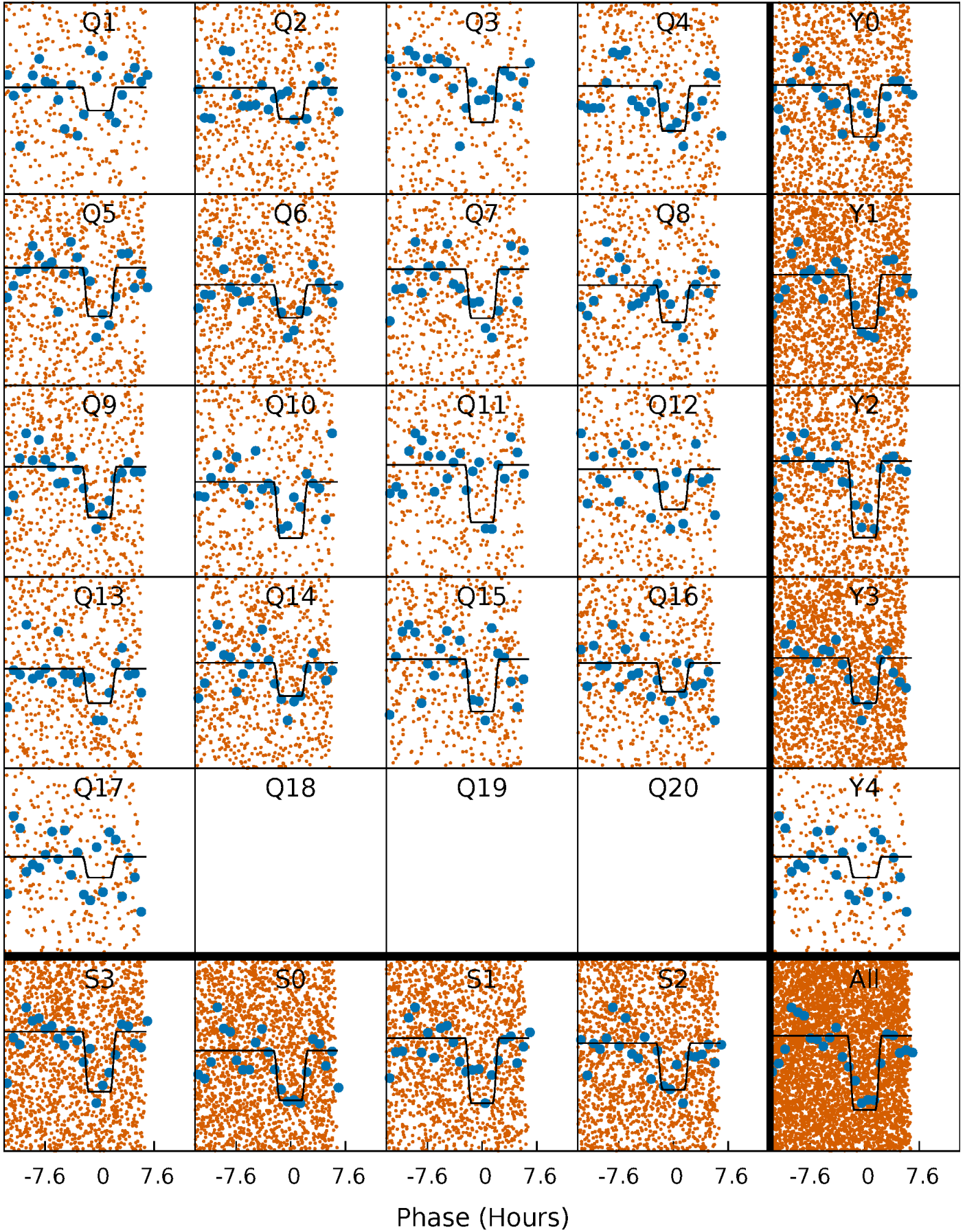
TCE 005643103-03   P= 2.945722 Days    $T_0=134.295101$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

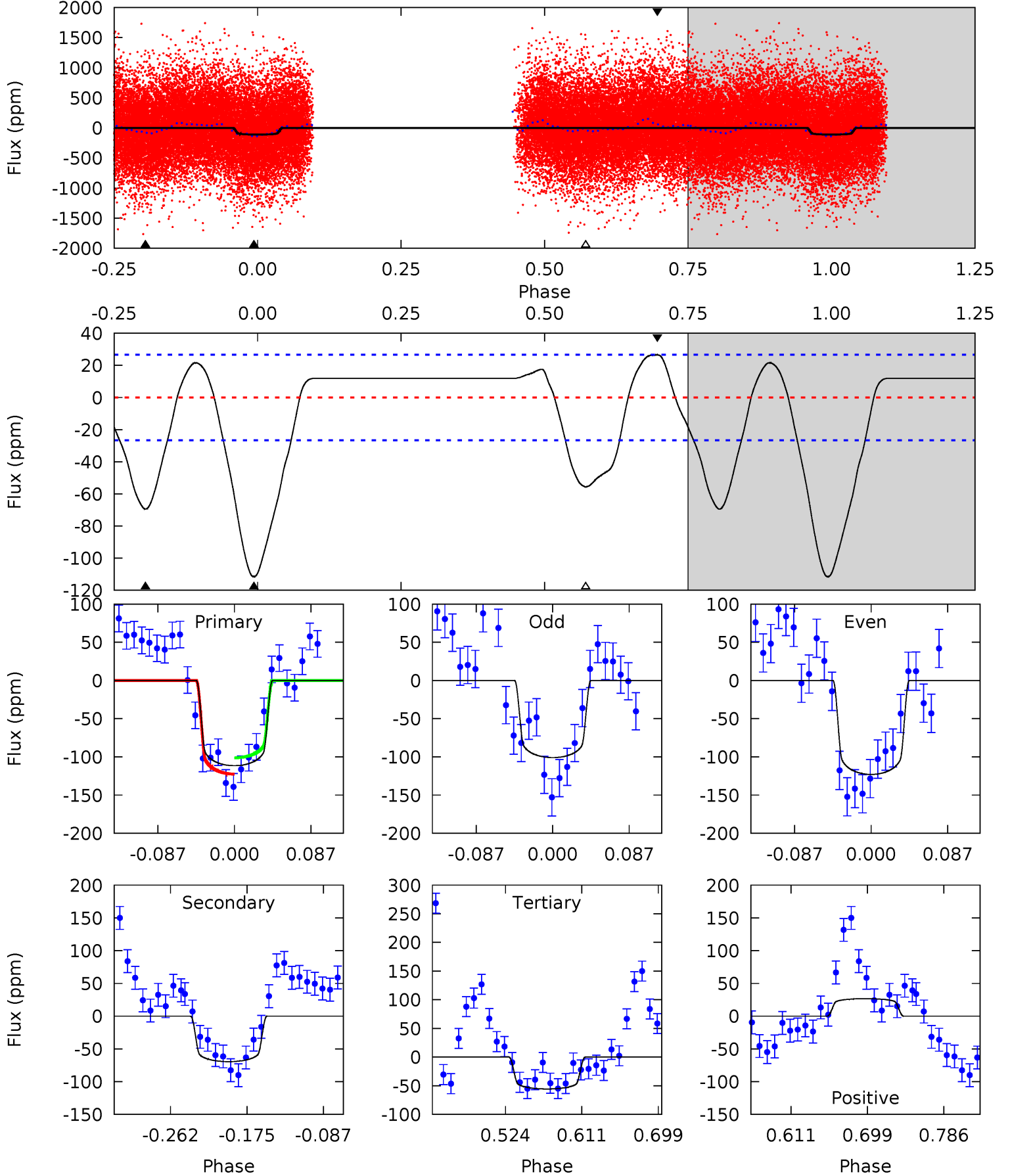
TCE 005643103-03 P= 2.945660 Days  $T_0=134.309058$  (BKJD)



# DV Model-Shift Uniqueness Test

005643103-03, P = 2.945722 Days, E = 131.349379 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  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 19.2 | 12.0 | 9.59 | 4.59 | 4.59            | 1.71            | 4.92             | 9.62    | 14.6    | 2.38    | 7.39    | 1.90    | 1.04 | 0.19  | 1.89 |

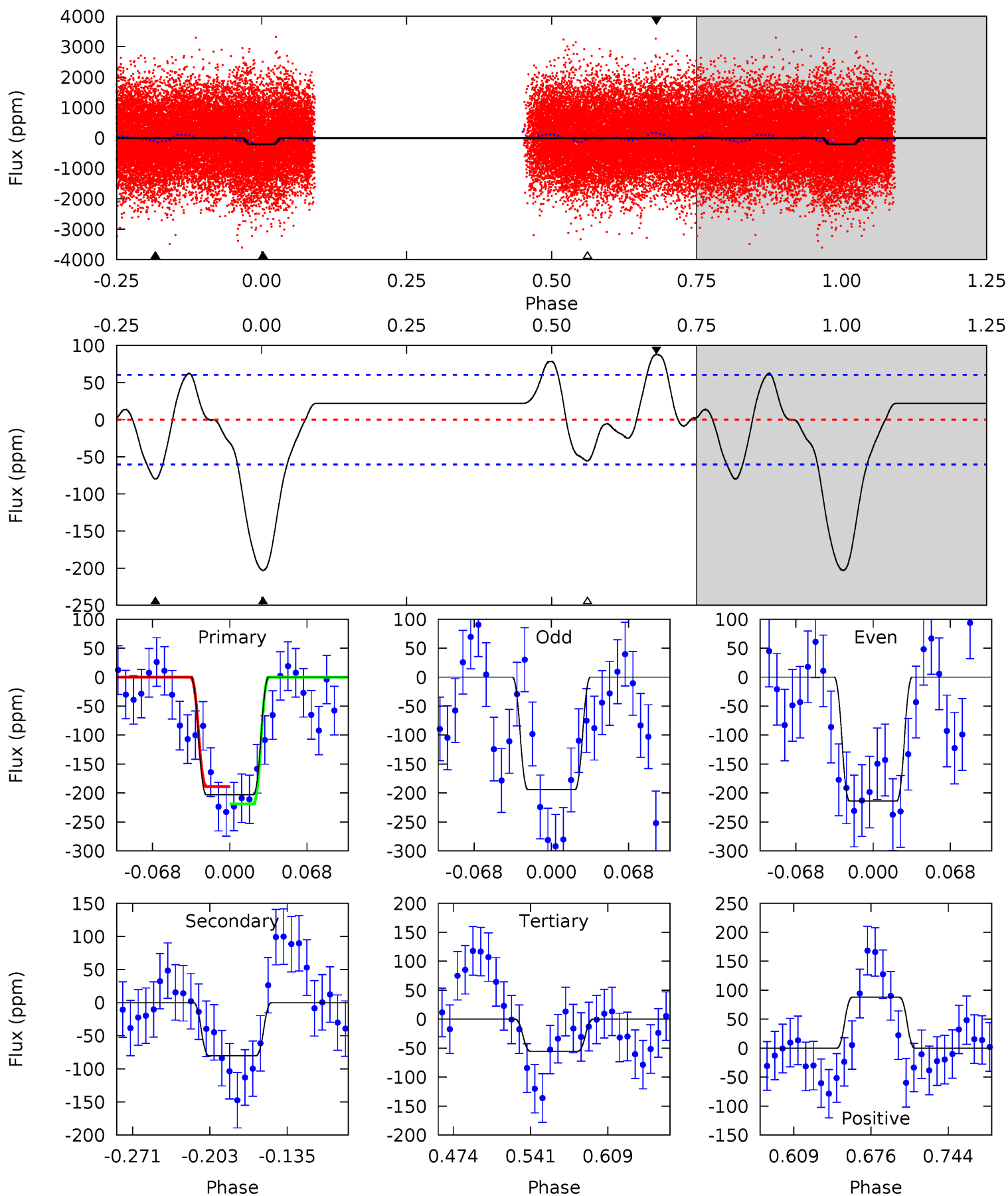




# Alt Model-Shift Uniqueness Test

005643103-03, P = 2.945660 Days, E = 131.363398 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  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 15.6 | 6.16 | 4.27 | 6.76 | 4.65            | 1.83            | 3.07             | 11.3    | 8.85    | 1.88    | -0.60   | 0.77    | 0.96 | 0.30  | 1.20 |



### Stellar Parameters For KIC 005643103

|        | $T_{\text{eff}}(K)$   | $\log(g)$                 | [Fe/H]                    | $R$ ( $R_{\odot}$ )       | $M$ ( $M_{\odot}$ )       | $p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ ) |
|--------|-----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
|        | $10449^{+293}_{-440}$ | $3.497^{+0.576}_{-0.064}$ | $0.070^{+0.150}_{-0.600}$ | $5.511^{+0.348}_{-3.307}$ | $3.473^{+0.060}_{-1.136}$ | $0.029^{+0.221}_{-0.006}$                     |
|        | +3%/-4%               | +16%/-2%                  | +214%/-857%               | +6%/-60%                  | +2%/-33%                  | +755%/-21%                                    |
| Source | KIC0                  | KIC0                      | KIC0                      | DSEP                      |                           |   |

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

### Secondary Eclipse Parameters for KIC 005643103-03 / KOI

| Detrend | Depth (ppm)  | $R_p$ ( $R_{\oplus}$ ) | $T_{\text{max}}$ (K) | $T_{\text{obs}}$ (K) | $A_{\text{obs}}$          |
|---------|--------------|------------------------|----------------------|----------------------|---------------------------|
| DV      | $-70 \pm 6$  | $5.92^{+0.99}_{-1.73}$ | $5971^{+358}_{-869}$ | $8620^{+805}_{-619}$ | $3.984^{+3.644}_{-1.044}$ |
| Alt.    | $-80 \pm 13$ | $8.96^{+1.14}_{-2.69}$ | $5968^{+348}_{-903}$ | $6924^{+522}_{-490}$ | $2.100^{+1.873}_{-0.572}$ |

$T_{\text{max}}$  = 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

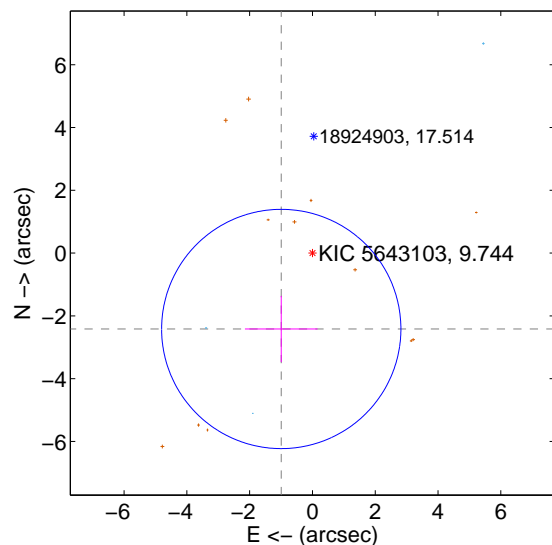
Supplemental centroid analysis for 005643103-03. **Kepler magnitude: 9.74.** Transit SNR 12.57

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

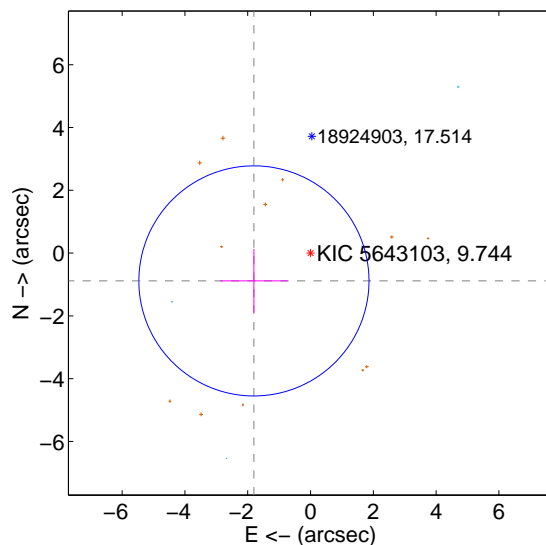
The direct PRF centroid is offset from the target star catalog position by about 1.45 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA       | $\Delta$ Dec       |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT          | $2.613 \pm 1.270$  | 2.06                | $0.993 \pm 1.155$ | $-2.416 \pm 1.053$ |
| PRF-fit source offset from KIC position | $2.008 \pm 1.221$  | 1.64                | $1.803 \pm 1.076$ | $-0.885 \pm 1.015$ |
| photometric centroid source offset      | $0.51 \pm 0.25$    | 2.03                | $0.22 \pm 0.19$   | $-0.46 \pm 0.26$   |

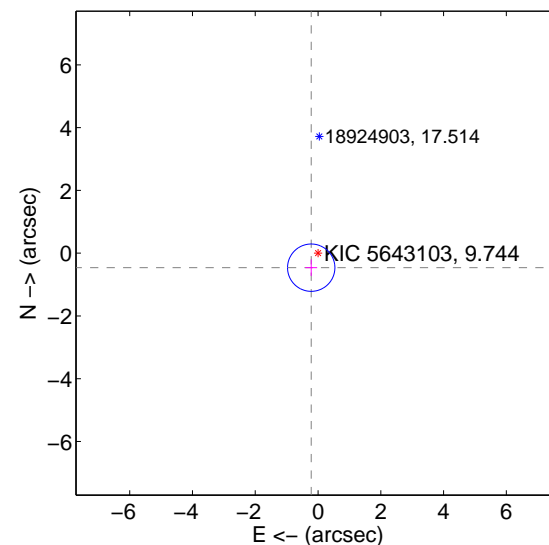
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

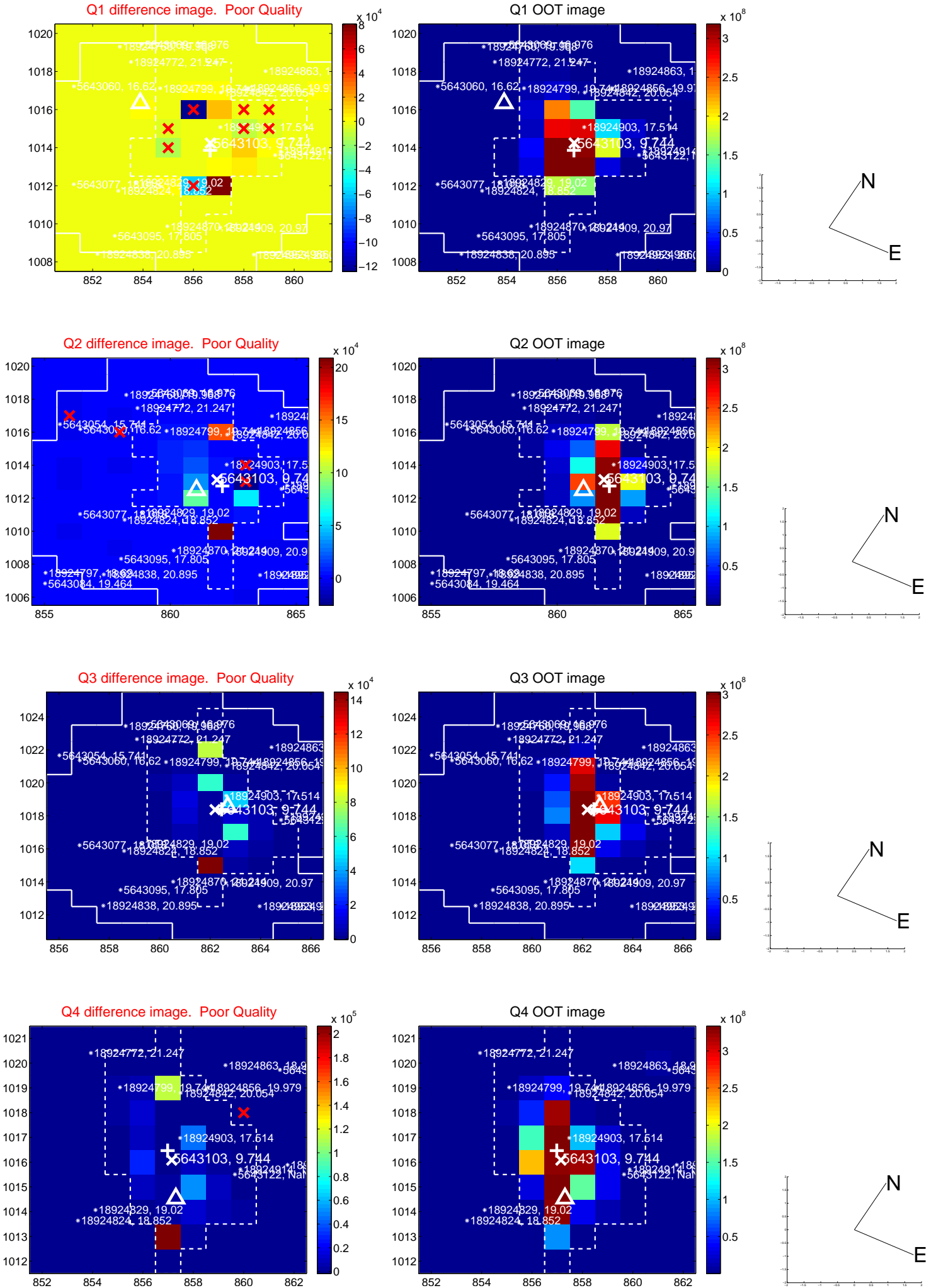


offset from photometric centroids

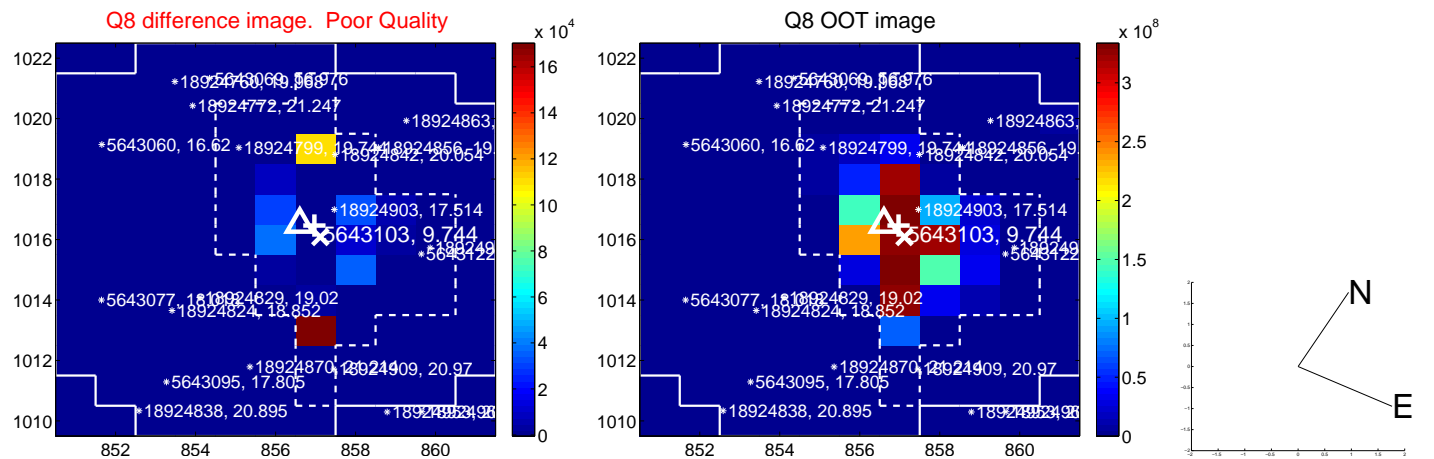
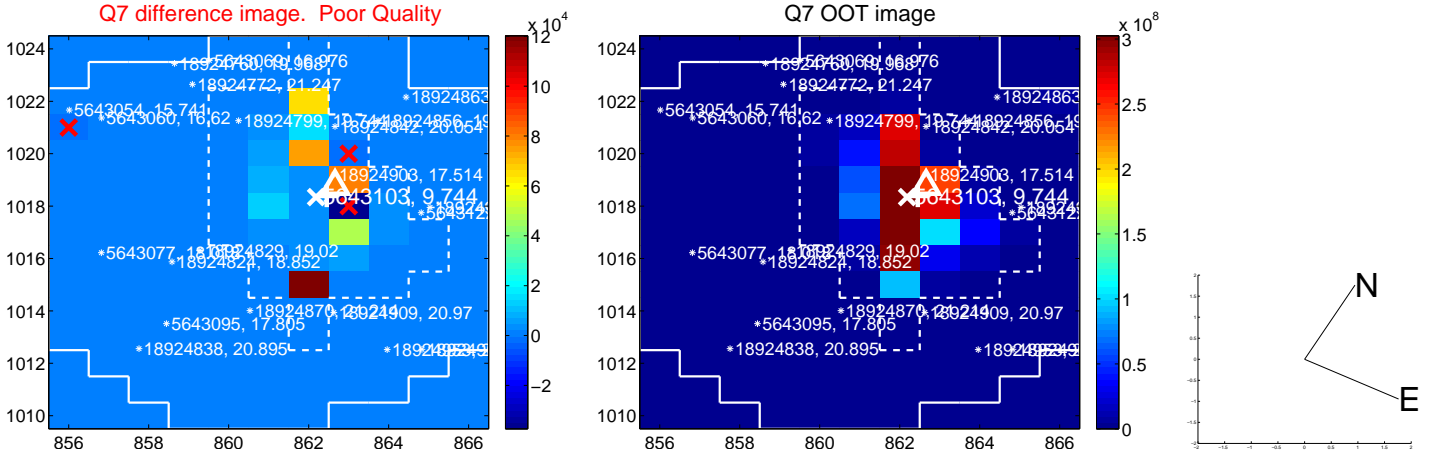
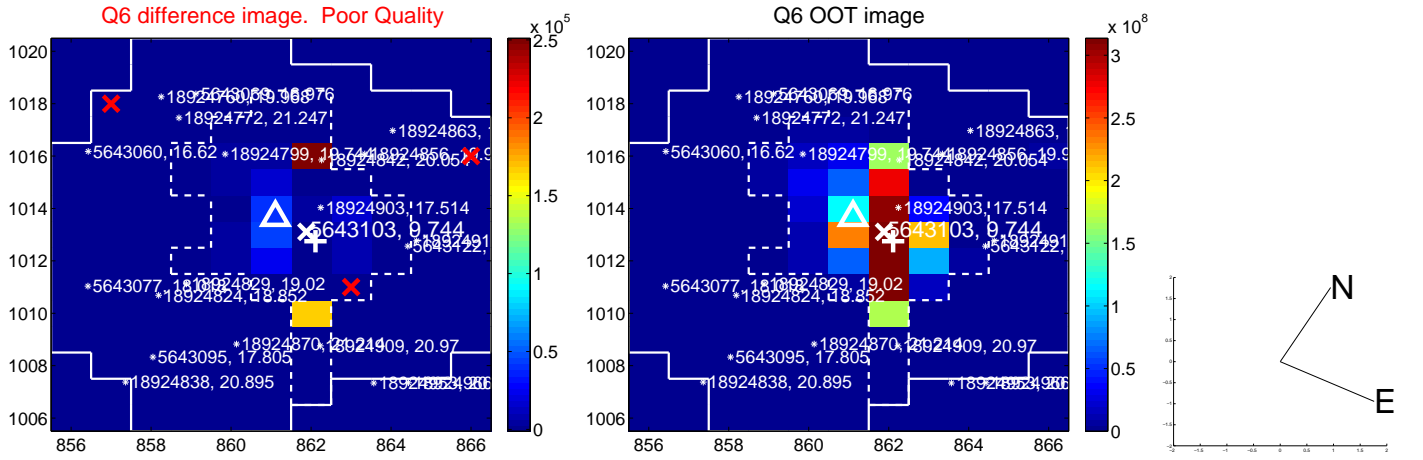
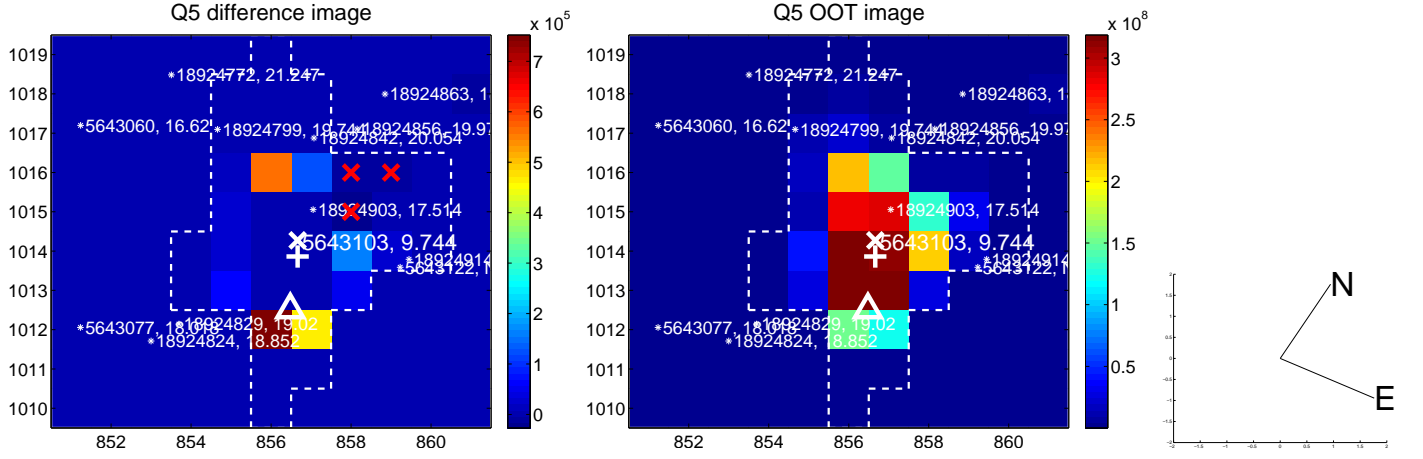


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

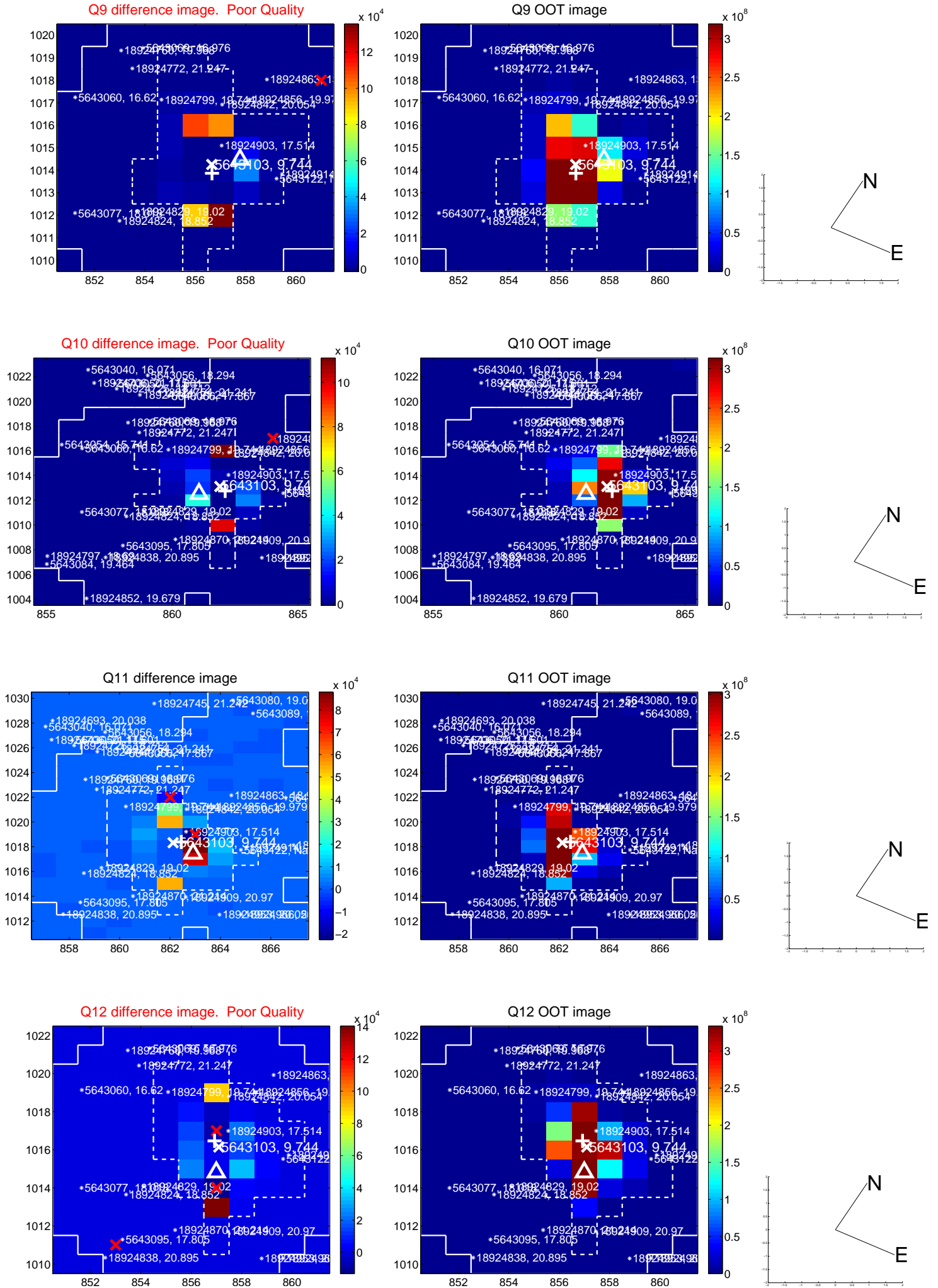


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

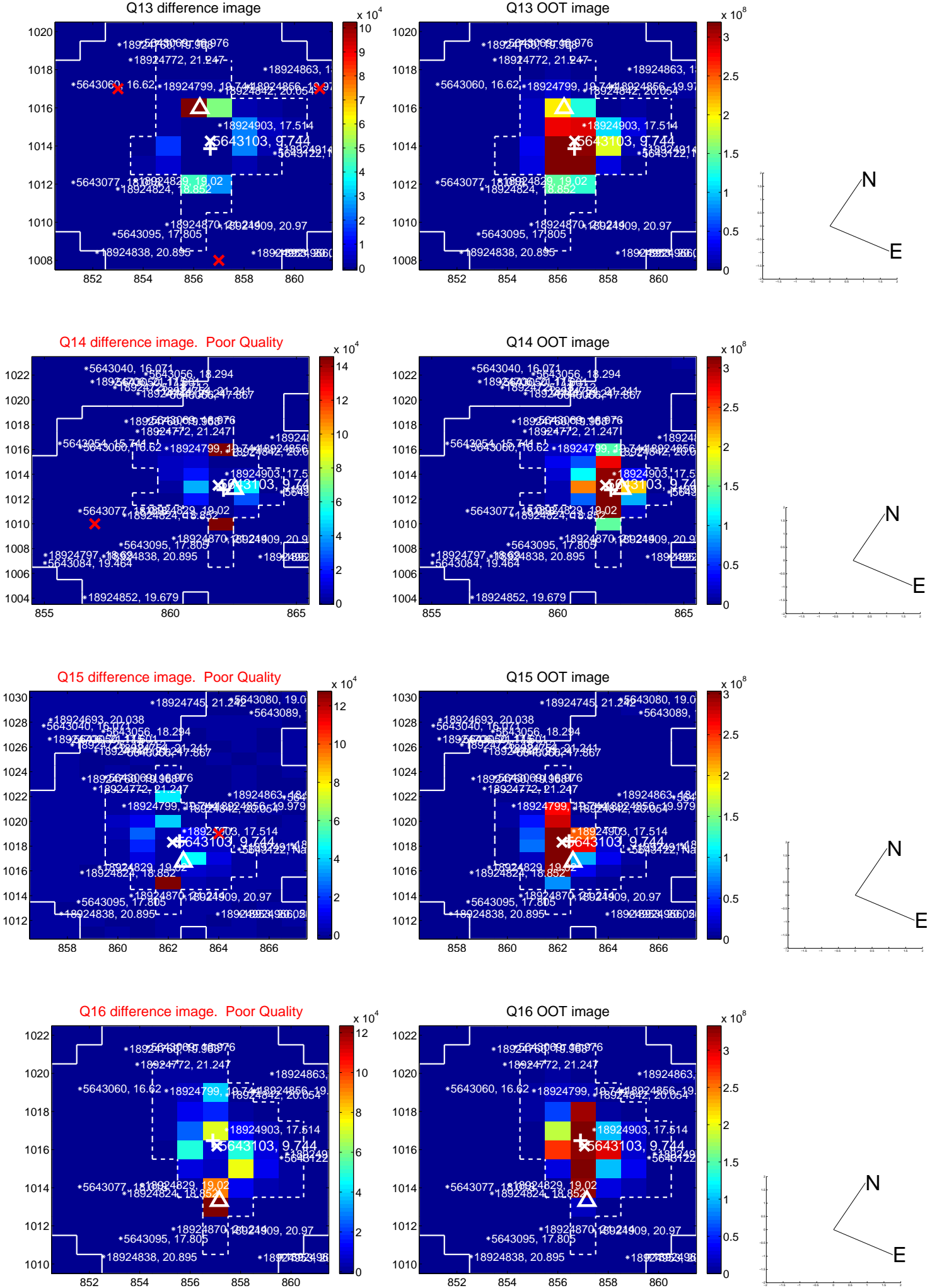




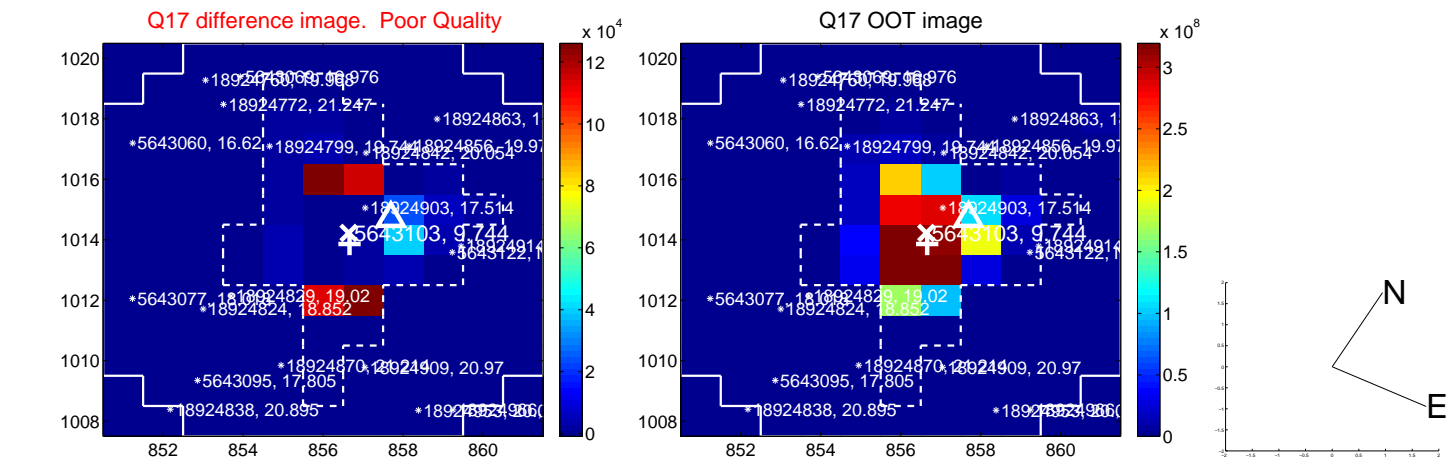
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



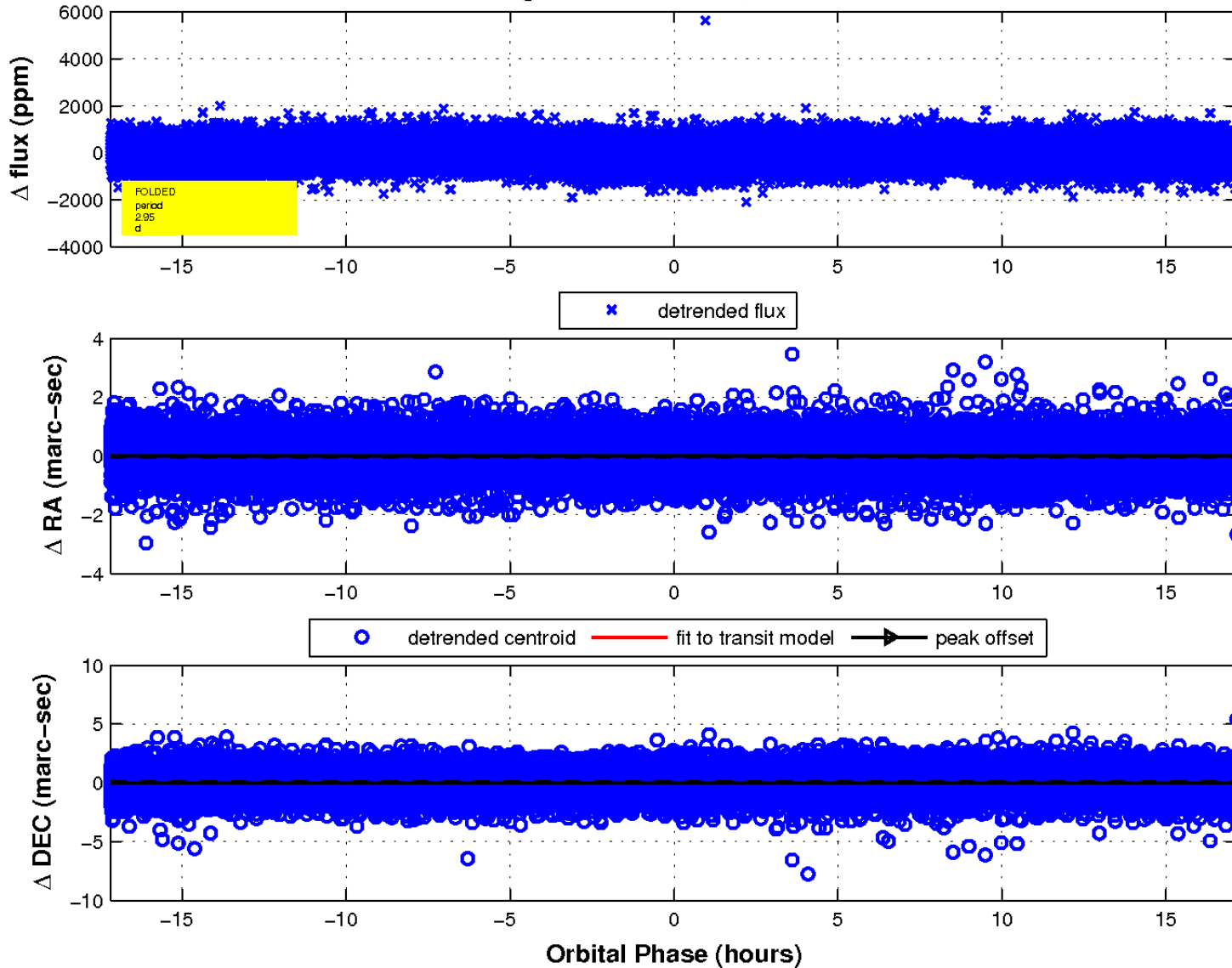
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 3 of 3



UKIRT Image

Declination

