

# KIC 007464205

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|-----|-----------------------------|-----------------|------------------------|------------------------|
| 007464205-01 | OBS      | No   | 5.485041      | 132.027422   | 33.5        | 8.971            | 10.0 | 9.3 | 1.84                        | 6004            | 1.39                   | 1010.67                |
| 007464205-02 | OBS      | No   | 5.485398      | 135.633066   | 28.6        | 18.106           | 10.2 | 9.5 | 1.84                        | 6004            | 1.21                   | 1010.59                |
| 007464205-03 | OBS      | No   | 61.157994     | 176.744884   | 122.8       | 11.690           | 8.8  | 7.9 | 1.84                        | 6004            | 3.89                   | 40.57                  |
| 007464205-04 | OBS      | No   | 9.183550      | 134.131122   | 37.1        | 10.780           | 8.3  | 7.0 | 1.84                        | 6004            | 1.35                   | 508.36                 |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments  |
|--------------|----------|------|-------|---|---|---|---|---|
| 007464205-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                                       |
| 007464205-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—SAME_NTL_PERIOD                               |
| 007464205-03 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS |
| 007464205-04 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—LPP_DV                            |

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

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

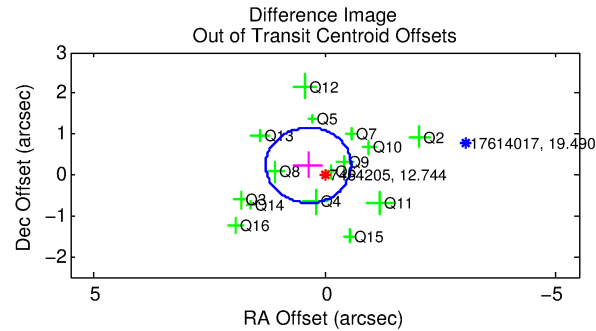
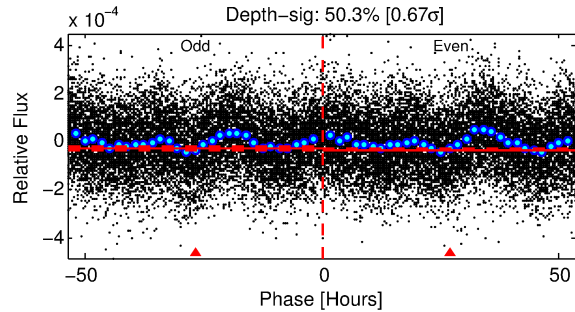
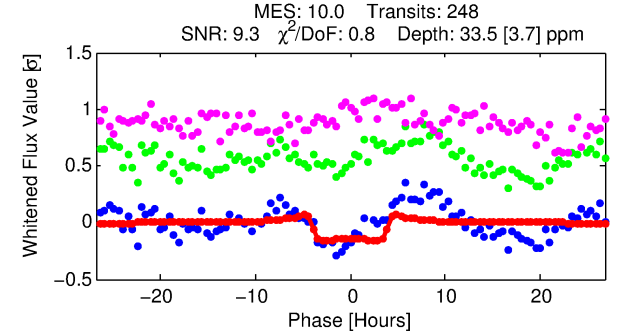
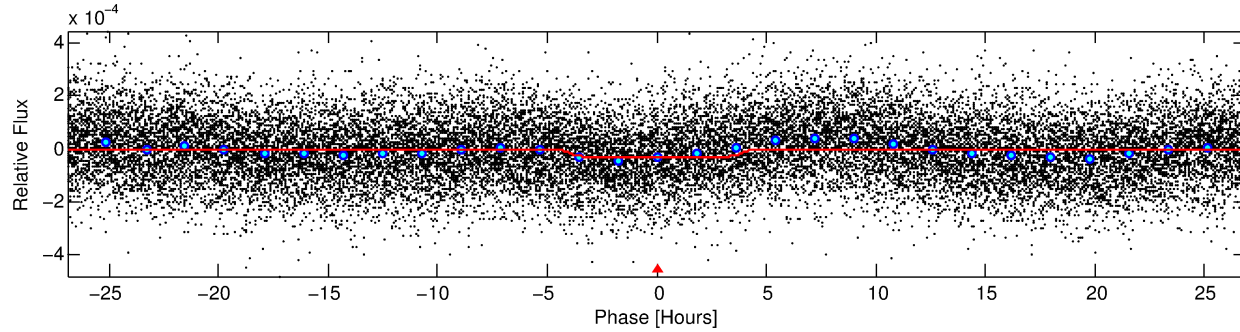
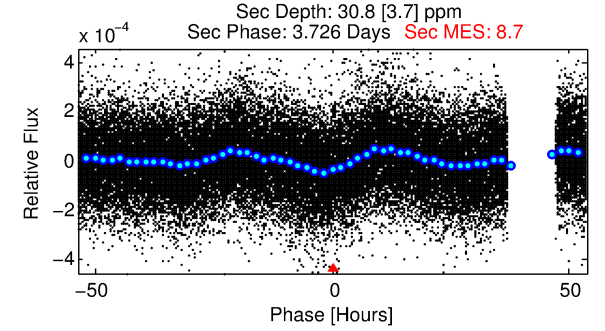
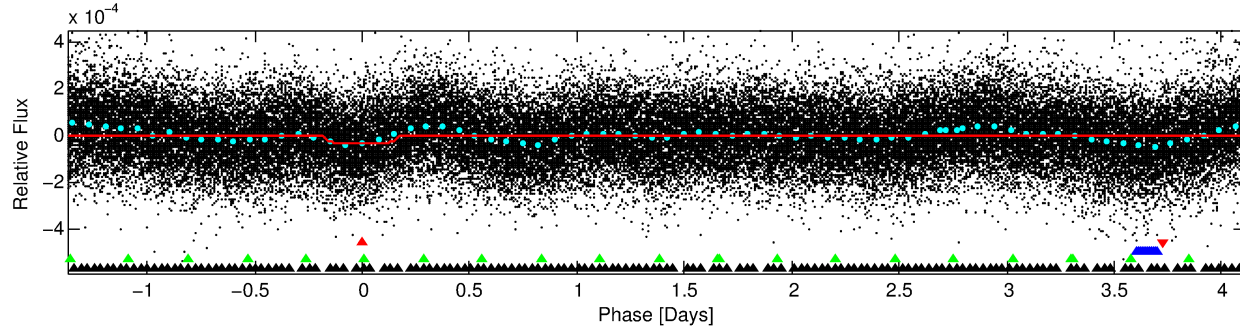
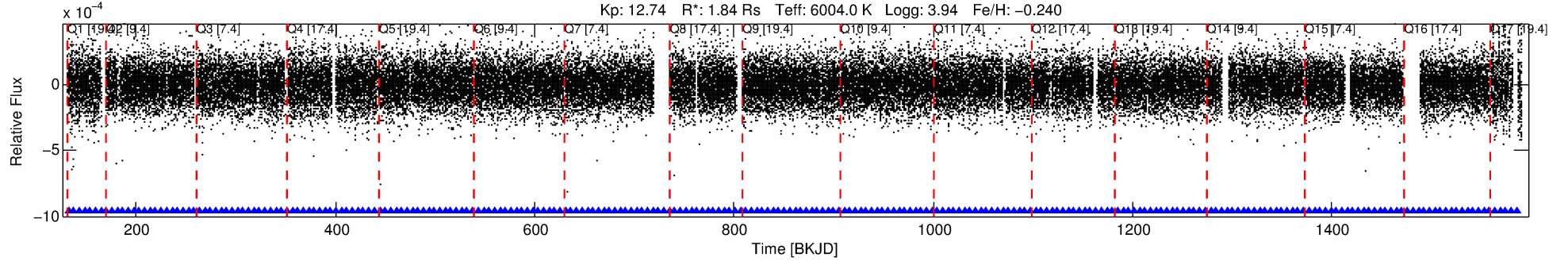
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 007464205-01

No Significant Match Found

# DV One-Page Summary

KIC: 7464205 Candidate: 1 of 4 Period: 5.485 d  
KOI: K06160 Corr: No Ephemeris Match



## DV Fit Results:

Period = 5.48504 [0.00008] d  
Epoch = 132.0274 [0.0101] BKJD  
Rp/R\* = 0.0069 [0.0006]  
a/R\* = 1.61 [0.34]  
b = 0.97 [0.02]  
Seff = 1010.67 [519.80]  
Teq = 1438 [185] K  
Rp = 1.39 [0.48] Re  
a = 0.0625 [0.0197] AU  
Ag = 34.41 [18.61] [1.79σ]  
Teffp = 5384 [321] K [10.65σ]

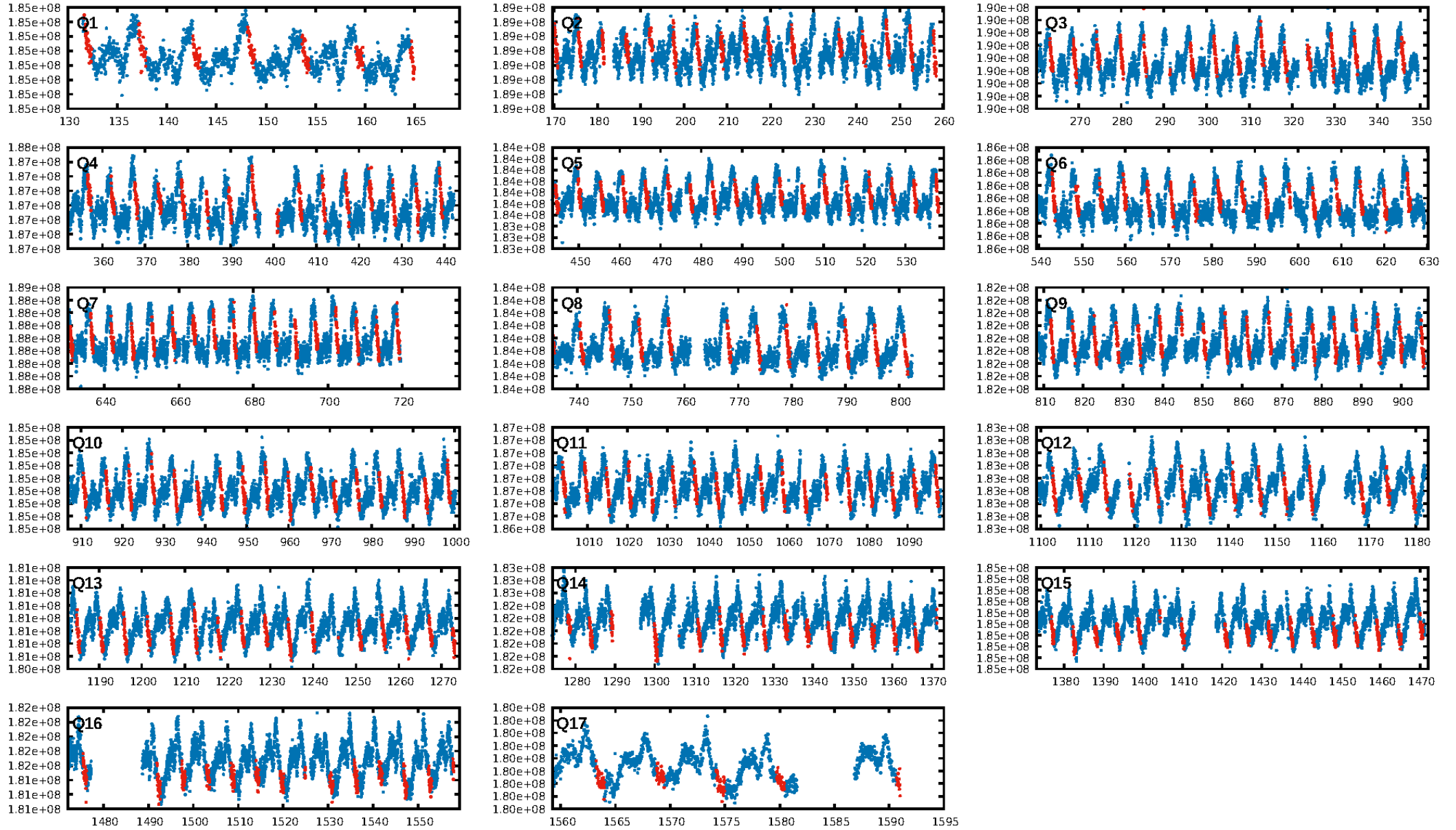
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.50e-13  
RollingBand-fgt: 1.00 [236/236]  
GhostDiagnostic-chr: 2.518  
Centroid-sig: 1.4%  
Centroid-so: 1.146 arcsec [1.58σ]  
OotOffset-rm: 0.423 arcsec [1.38σ]  
OotOffset-st: 4/4/4/3 [15]  
KicOffset-rm: 0.509 arcsec [1.67σ]  
KicOffset-st: 4/4/4/3 [15]  
DiffImageQuality-fgm: 1.00 [15/15]  
DiffImageOverlap-fno: 1.00 [17/17]

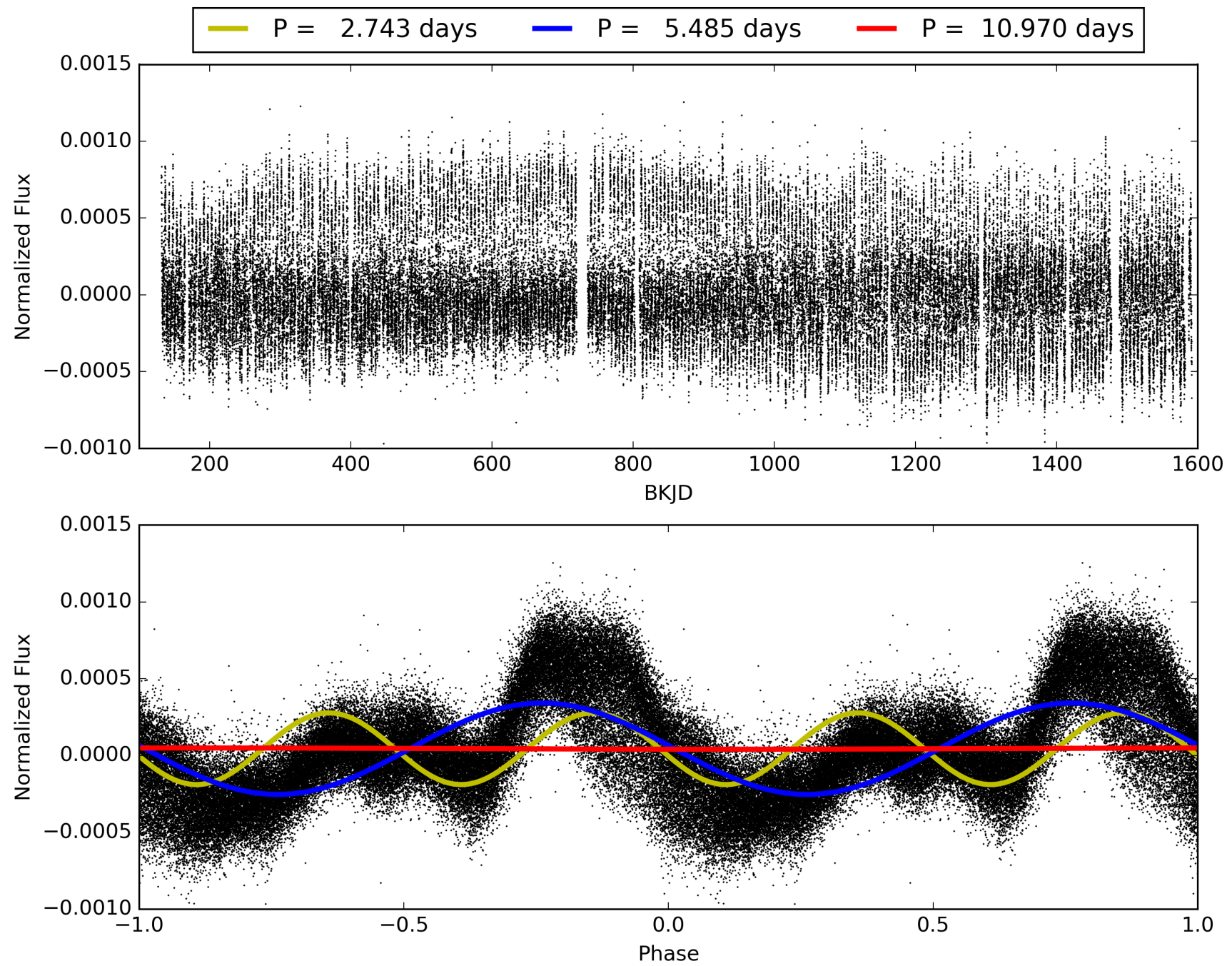
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 07:26:45 Z

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

# TCE 007464205-01, PDC Light Curves



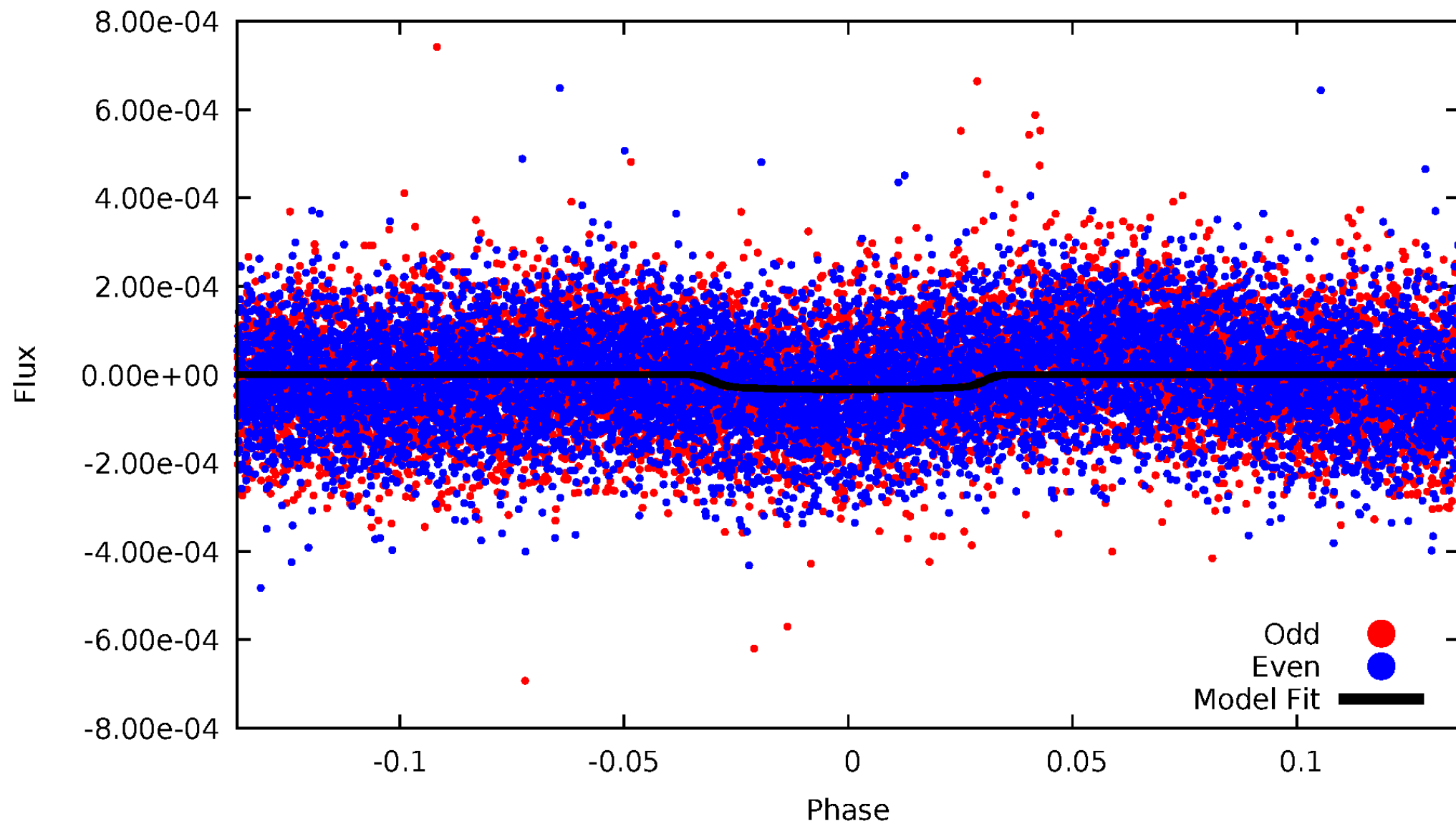
TCE 007464205-01





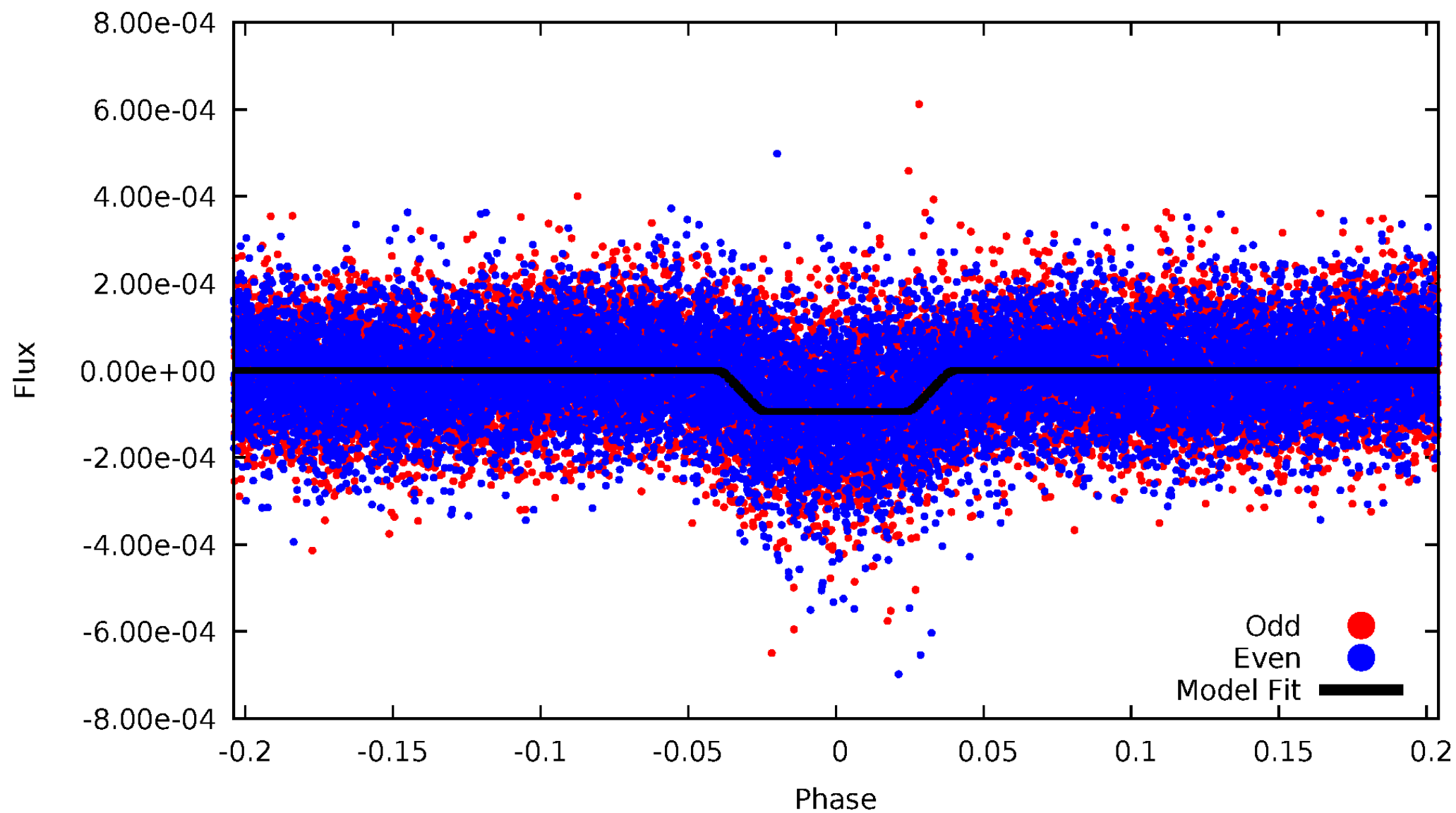
# DV Odd/Even

TCE 007464205-01

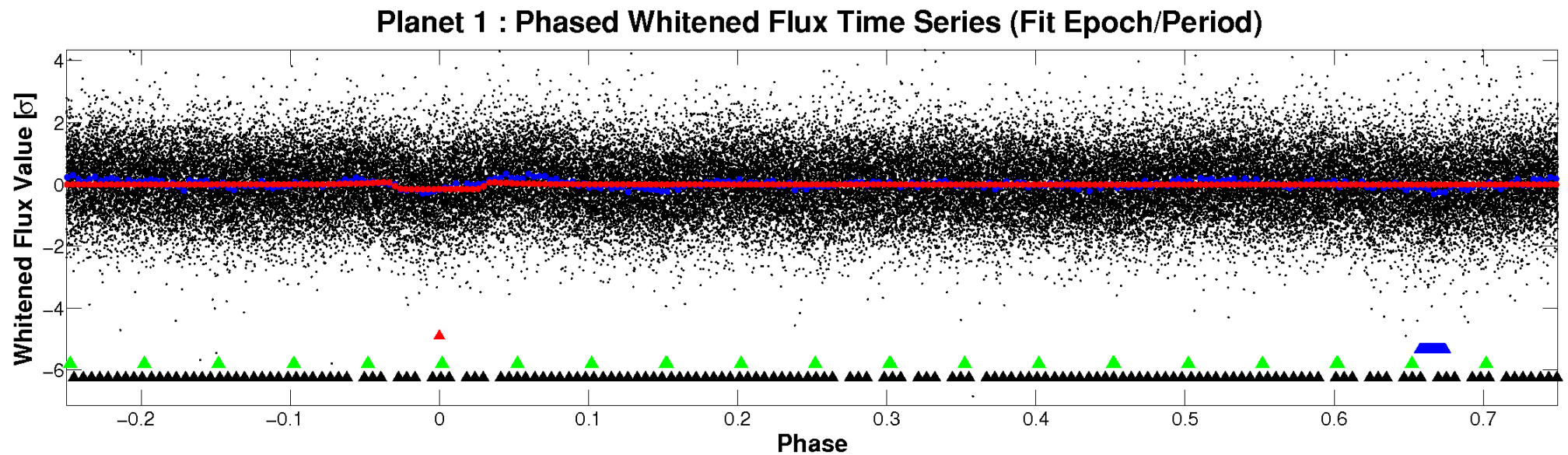
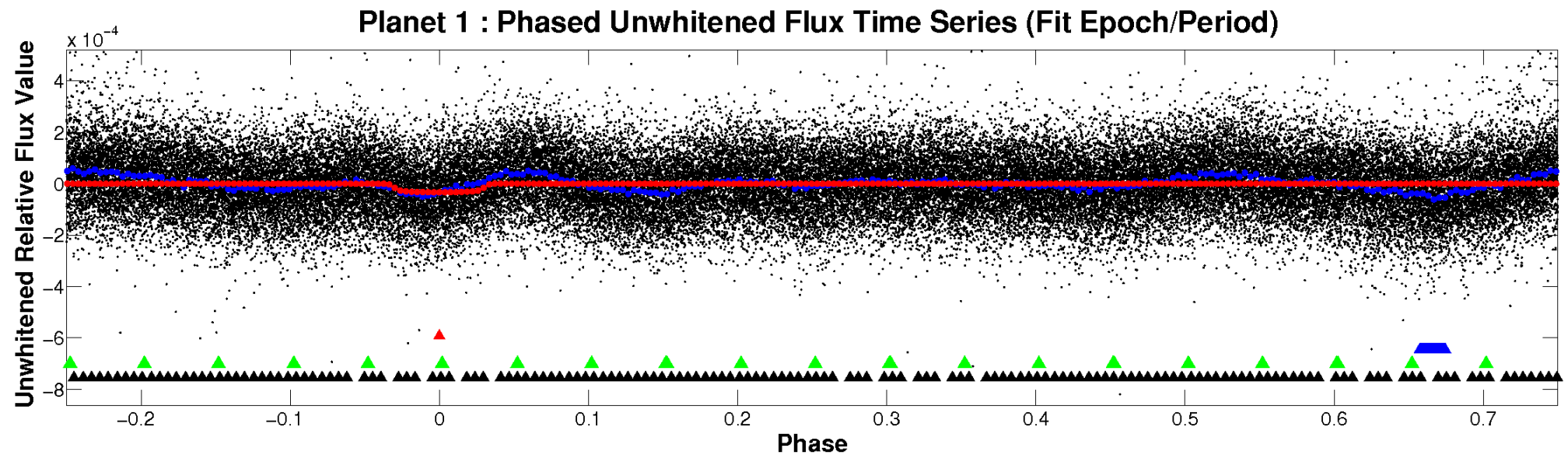


# ALT Odd/Even

TCE 007464205-01

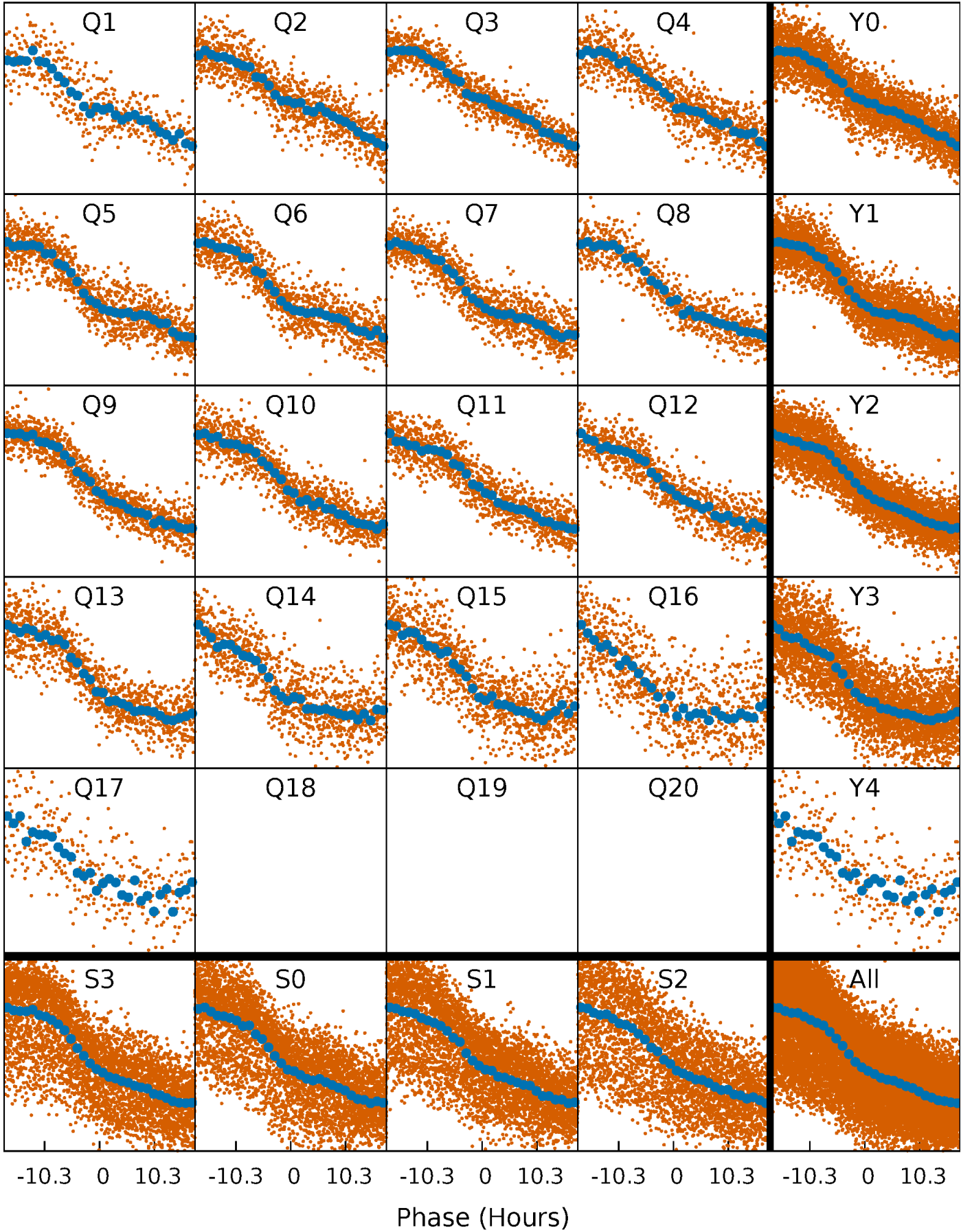


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

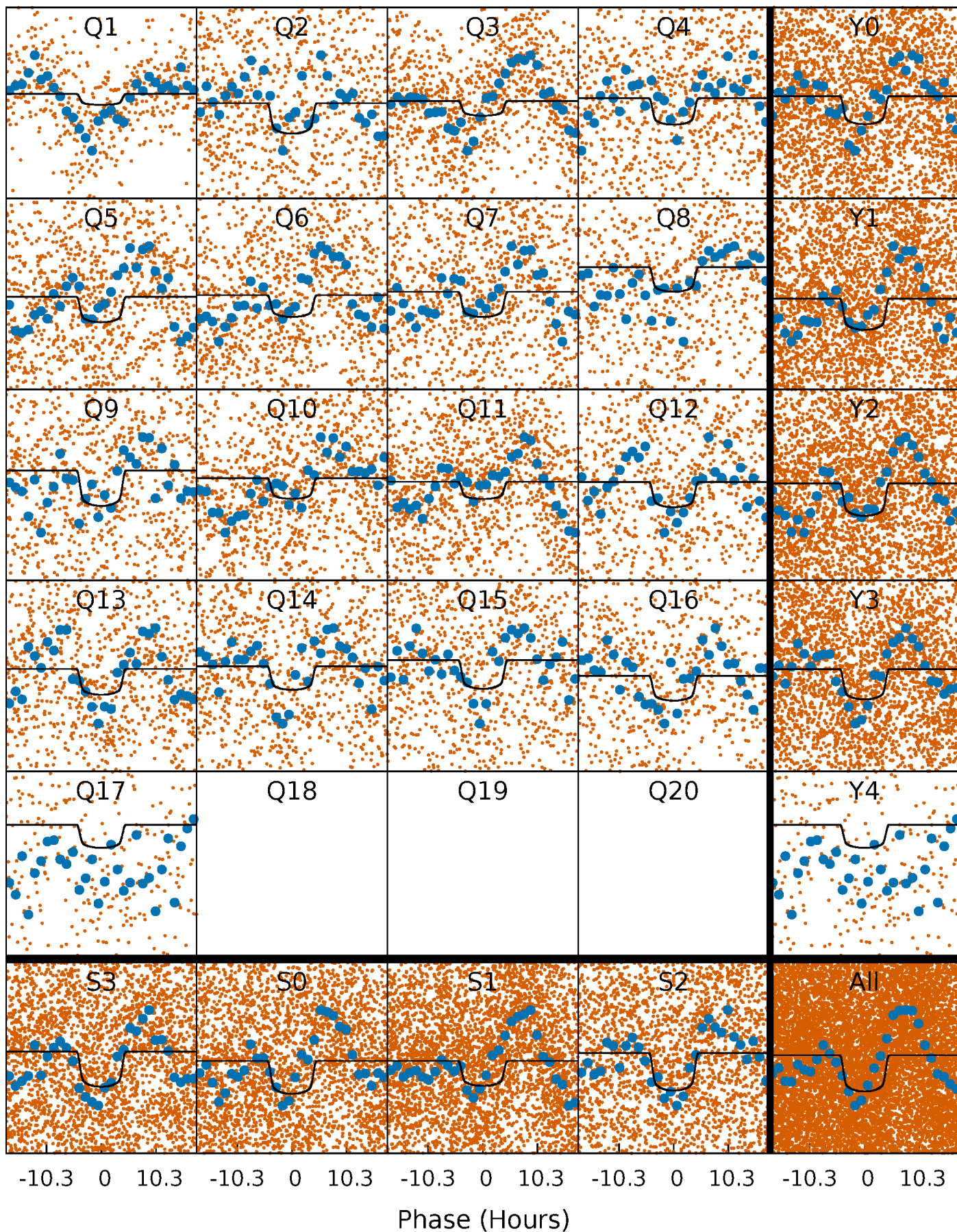
TCE 007464205-01   P= 5.485041 Days    $T_0=132.027422$  (BKJD)





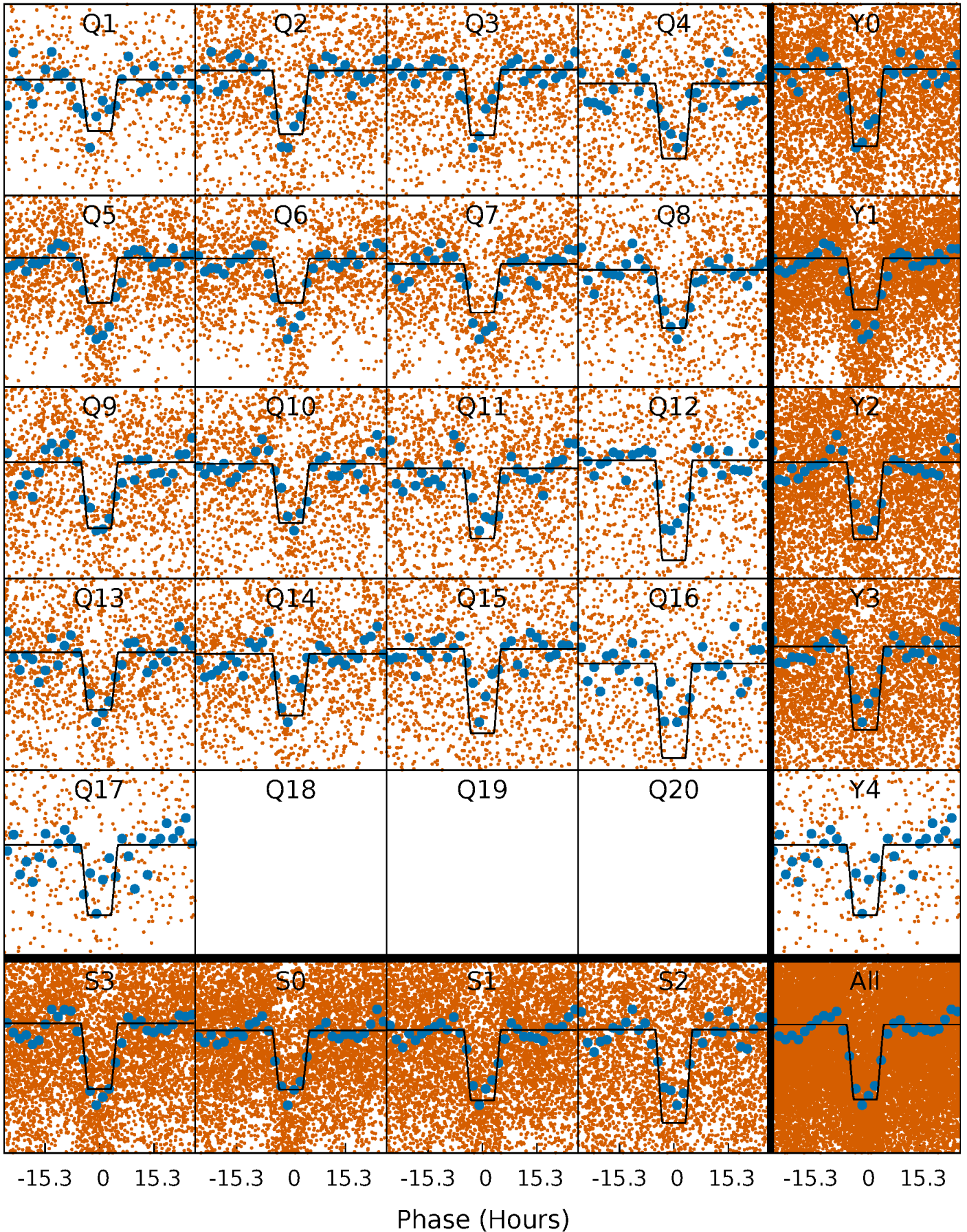
# DV Quarter-Phased Transit Curves

TCE 007464205-01 P= 5.485041 Days  $T_0=132.027422$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 007464205-01 P= 5.485035 Days  $T_0=132.031250$  (BKJD)

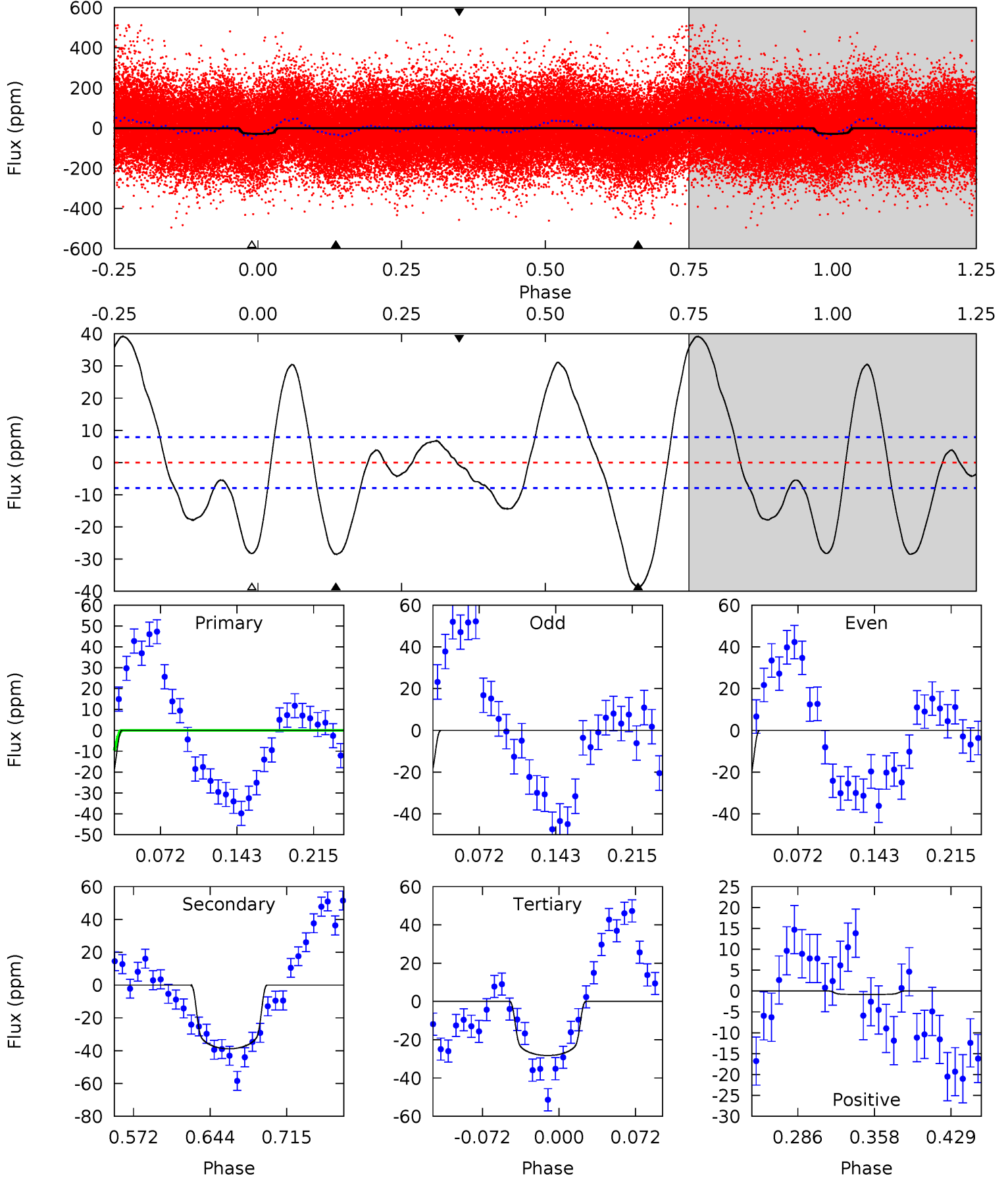




# DV Model-Shift Uniqueness Test

007464205-01, P = 5.485041 Days, E = 126.542381 Days

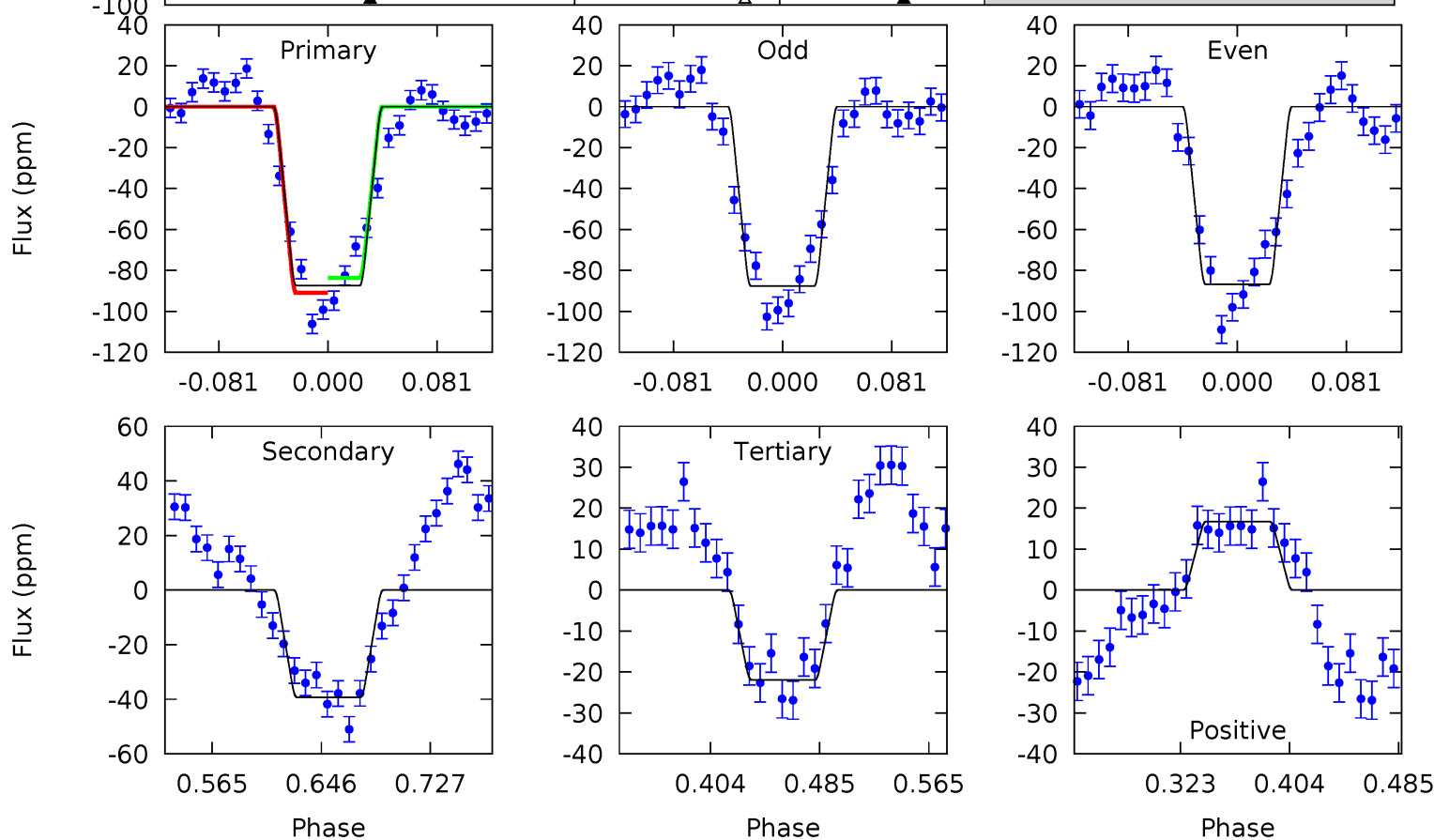
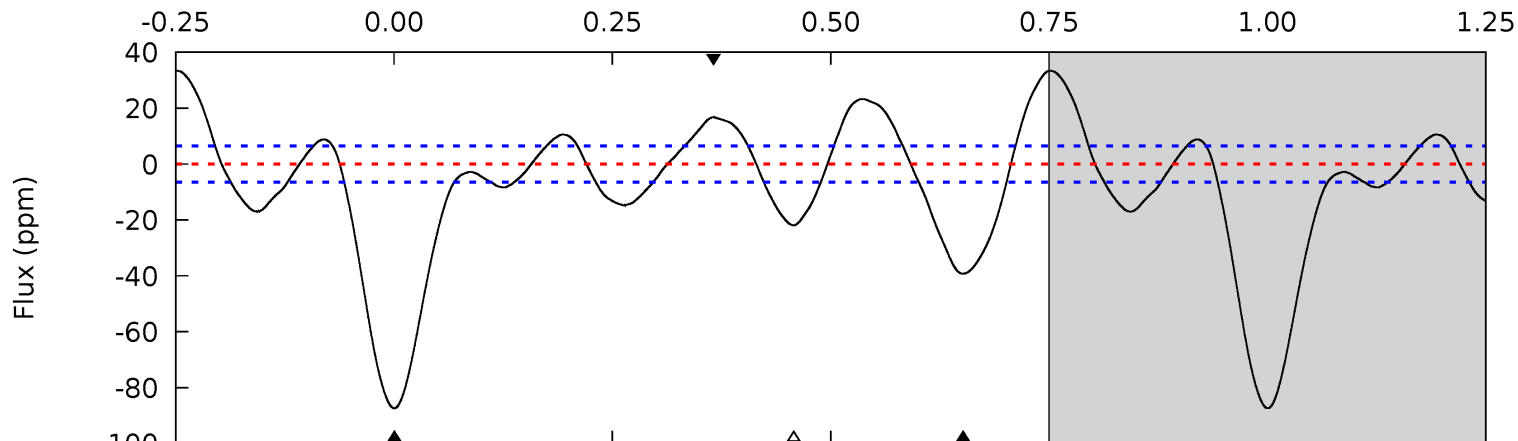
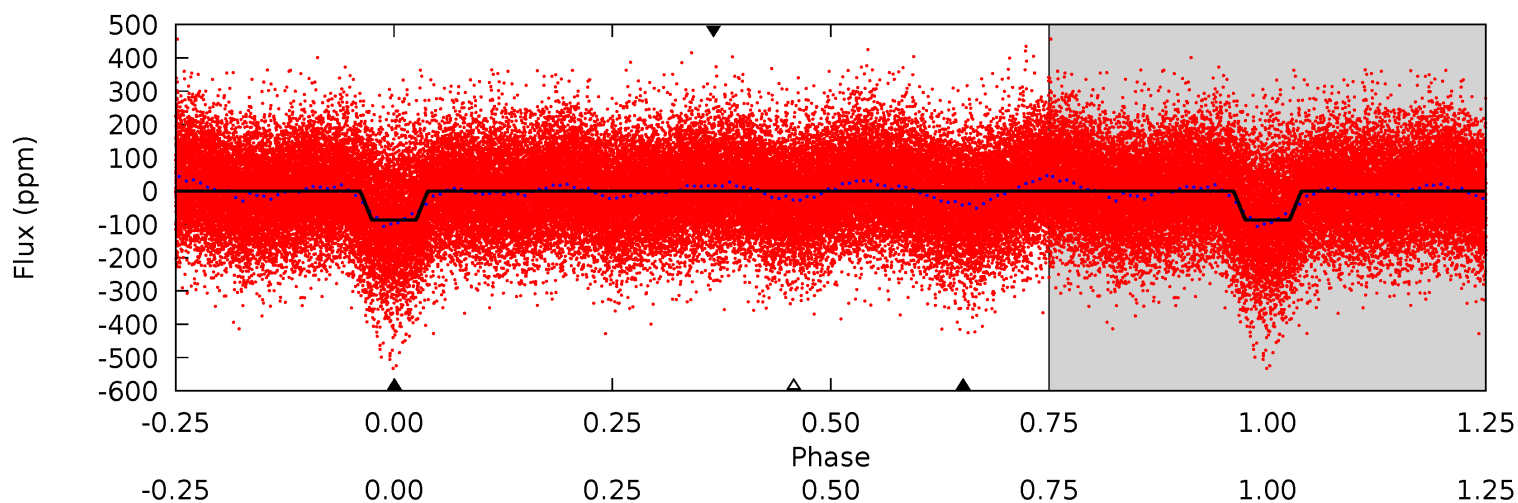
| Pri  | Sec  | Ter  | Pos   | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|-------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 16.7 | 22.8 | 16.5 | -0.50 | 4.63            | 1.80            | 10.1             | 0.16    | 17.2    | 6.23    | 23.3    | 0.76    | 1.05 | 0.50  | 8.37 |



# Alt Model-Shift Uniqueness Test

007464205-01, P = 5.485035 Days, E = 126.546215 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  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 62.0 | 27.8 | 15.6 | 11.9 | 4.61            | 1.75            | 9.81             | 46.4    | 50.1    | 12.3    | 16.0    | 0.29    | 1.03 | 0.28  | 2.57 |





### Stellar Parameters For KIC 007464205

|        | $T_{\text{eff}} (K)$ | $\log(g)$                 | $[\text{Fe}/\text{H}]$     | $R (R_{\odot})$           | $M (M_{\odot})$           | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
|        | $6004^{+180}_{-162}$ | $3.942^{+0.292}_{-0.097}$ | $-0.240^{+0.350}_{-0.250}$ | $1.842^{+0.377}_{-0.613}$ | $1.082^{+0.179}_{-0.179}$ | $0.244^{+0.455}_{-0.090}$                 |
|        | +3%/-3%              | +7%/-2%                   | +146%/-104%                | +20%/-33%                 | +17%/-17%                 | +186%/-37%                                |
| Source | PHO1                 | FLK73                     | KIC0                       | DSEP                      |                           |   |

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

### Secondary Eclipse Parameters for KIC 007464205-01 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$     | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | $A_{\text{obs}}$ |
|---------|-------------|------------------------|----------------------|----------------------|------------------|
| DV      | $-39 \pm 2$ | $1.33^{+0.24}_{-0.26}$ | $1974^{+128}_{-183}$ | $5699^{+320}_{-259}$ | $48^{+23}_{-12}$ |
| Alt.    | $-39 \pm 1$ | $1.88^{+0.28}_{-0.35}$ | $1959^{+133}_{-169}$ | $4910^{+187}_{-168}$ | $24^{+11}_{-6}$  |

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

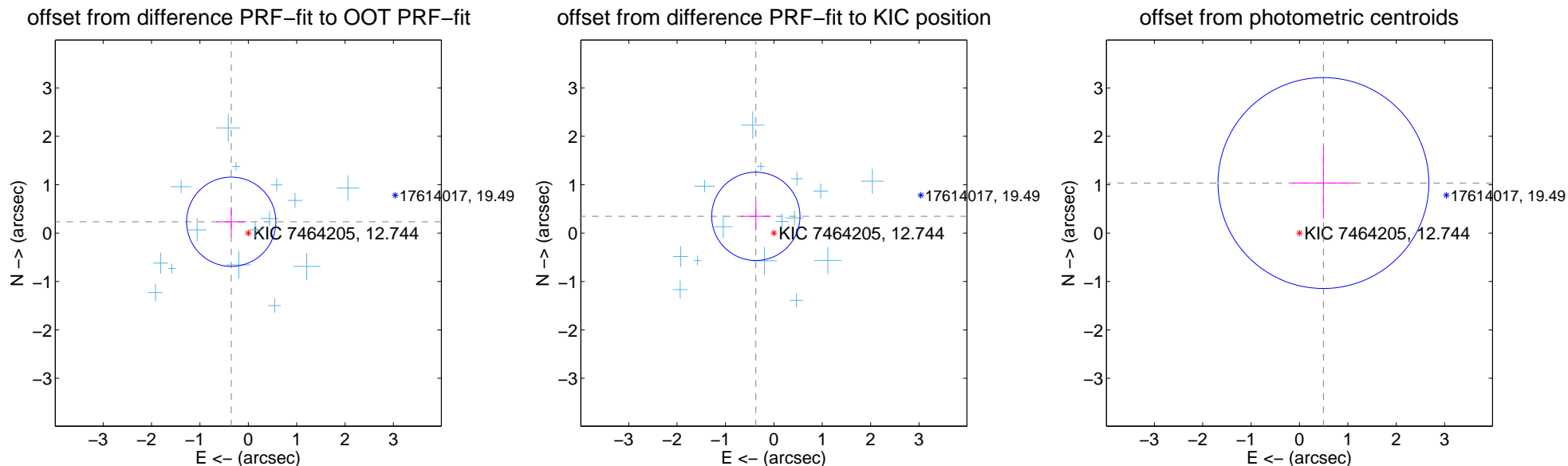
## DV Centroid Data

Supplemental centroid analysis for 007464205-01. Kepler magnitude: 12.74. Transit SNR 9.29

There are 15 quarters with good PRF difference image offsets

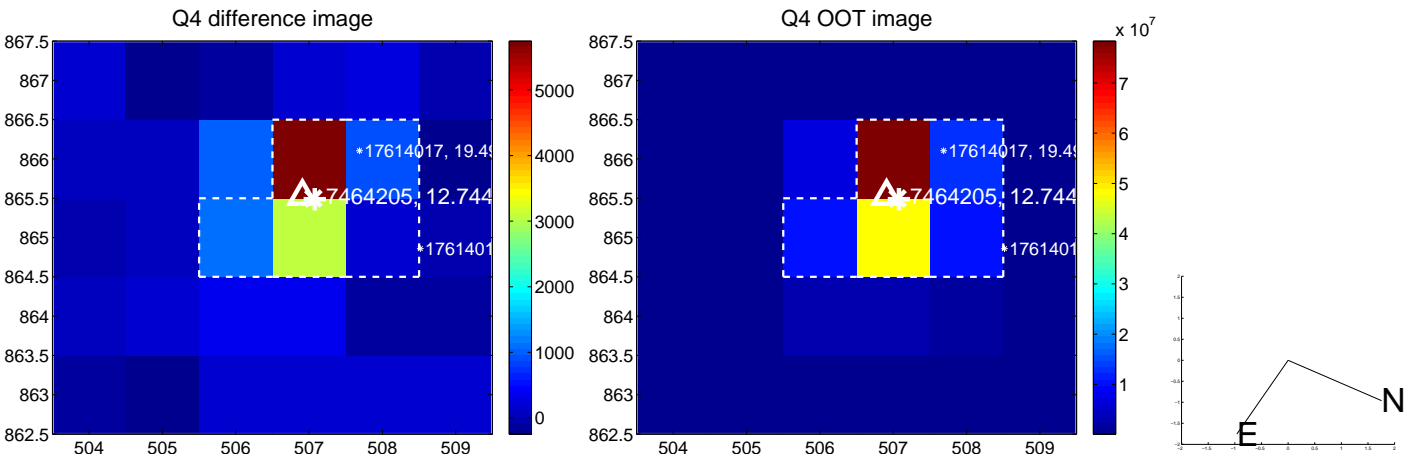
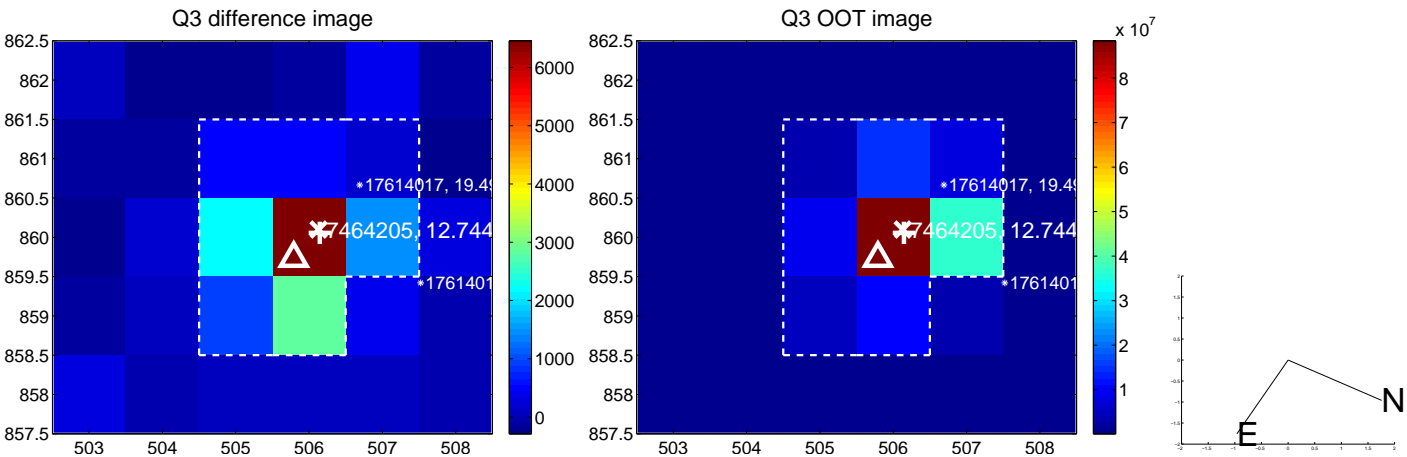
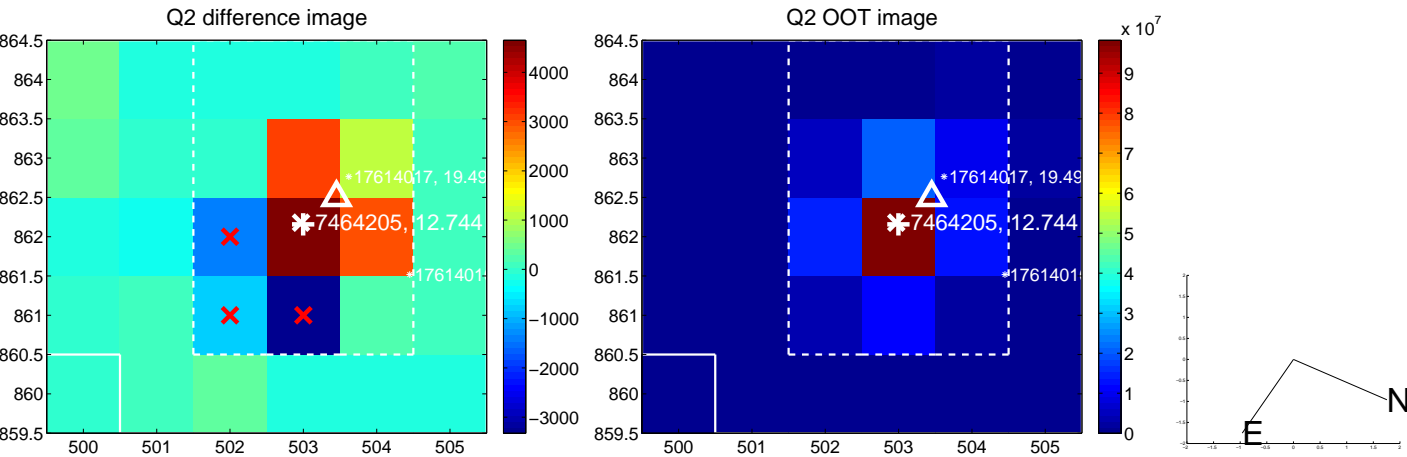
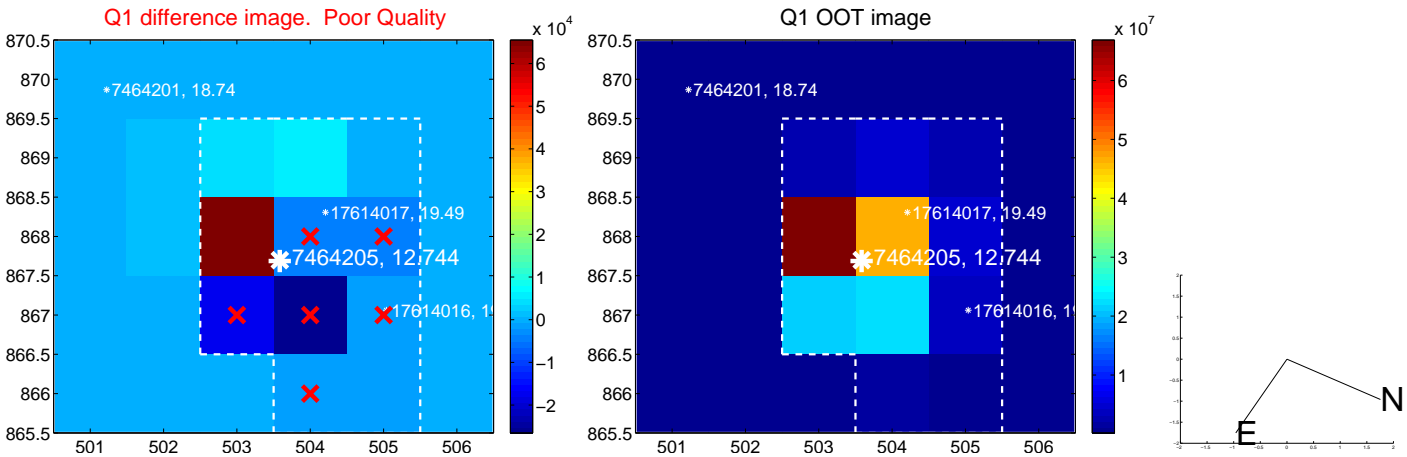
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA       | $\Delta$ Dec      |
|---|--------------------|---------------------|-------------------|-------------------|
| PRF-fit source offset from OOT          | $0.423 \pm 0.307$  | 1.38                | $0.352 \pm 0.310$ | $0.234 \pm 0.302$ |
| PRF-fit source offset from KIC position | $0.509 \pm 0.304$  | 1.67                | $0.373 \pm 0.311$ | $0.346 \pm 0.296$ |
| photometric centroid source offset      | $1.15 \pm 0.73$    | 1.58                | $-0.50 \pm 0.65$  | $1.03 \pm 0.74$   |

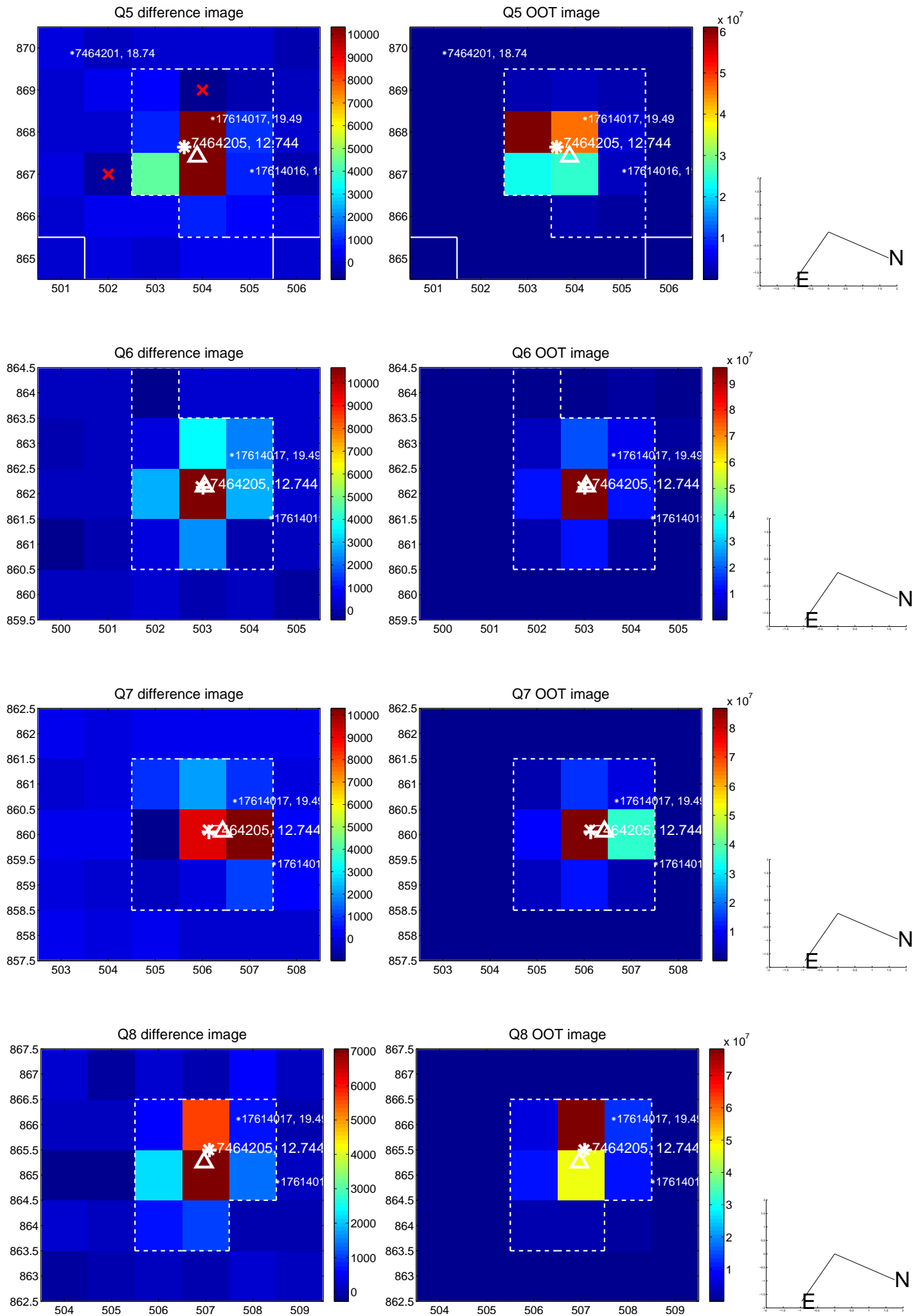


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

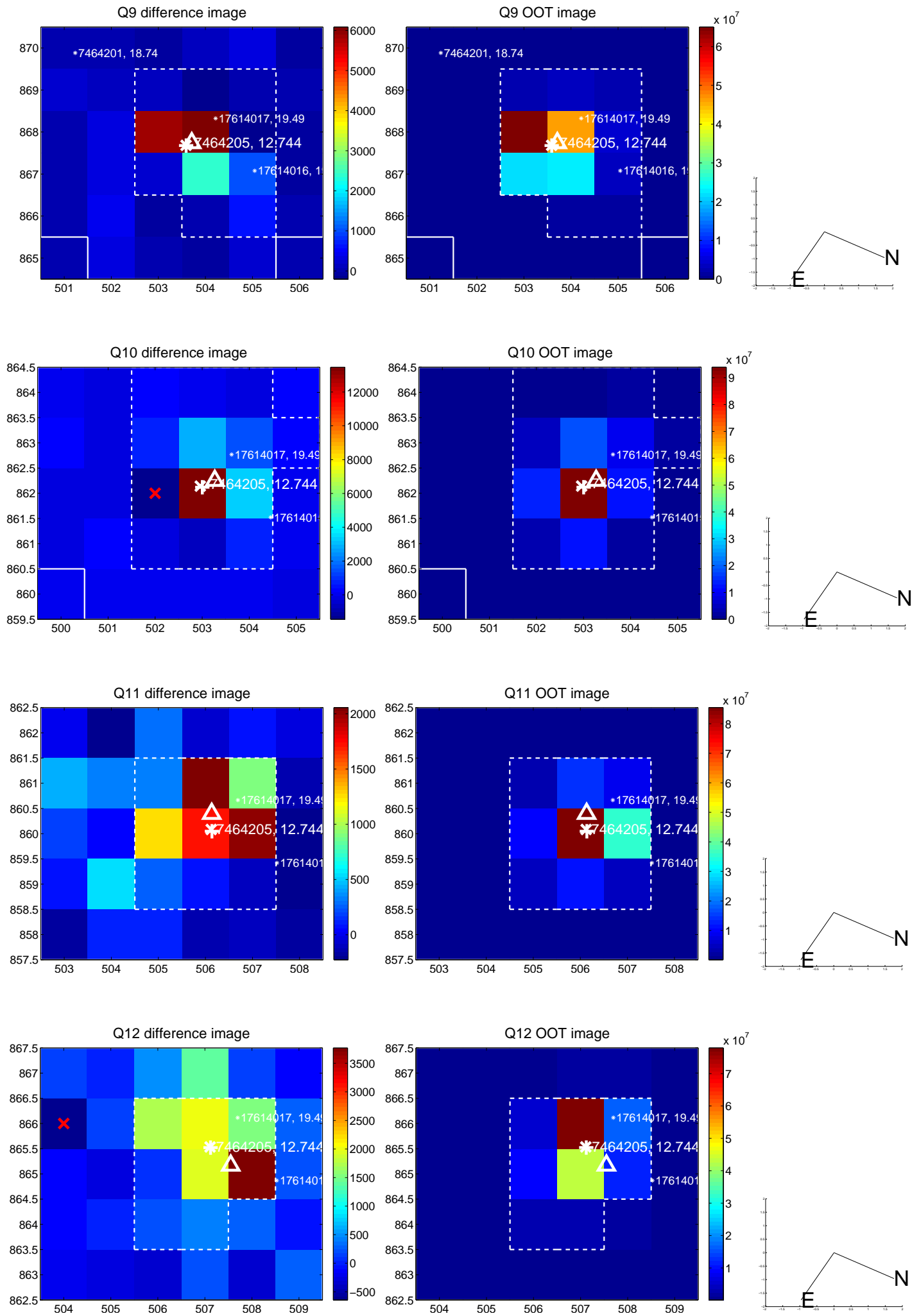


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

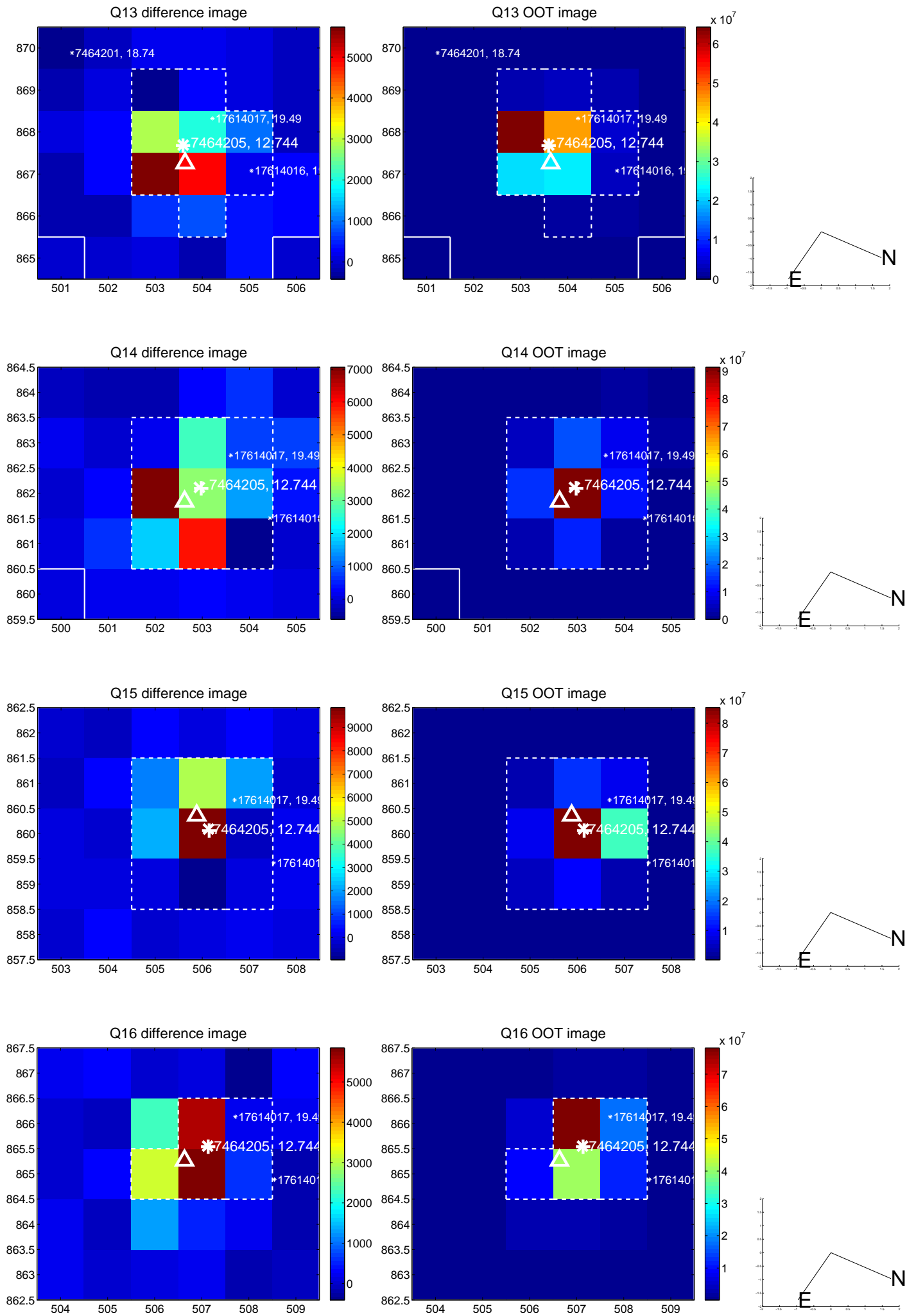




white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



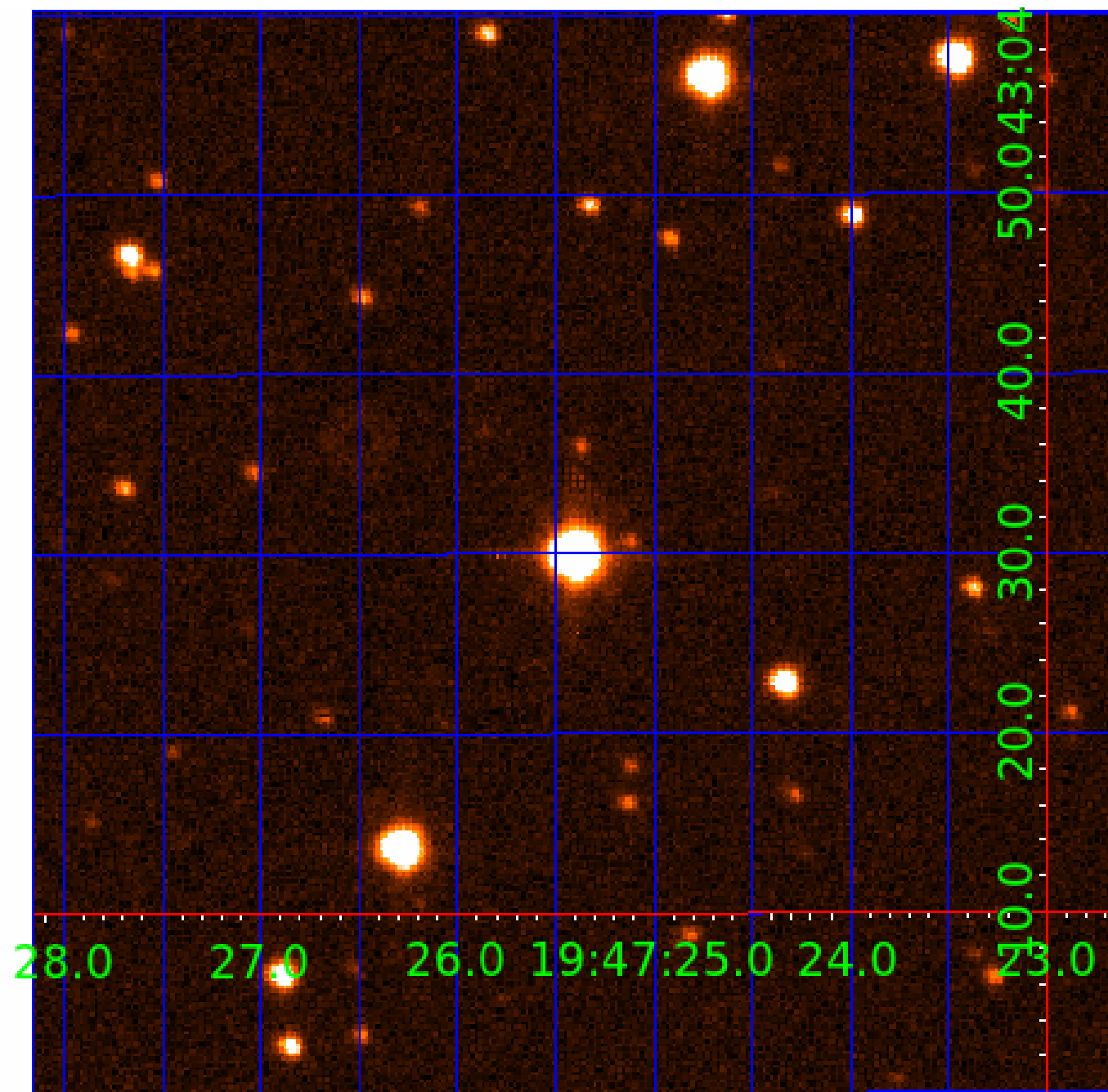
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination





# KIC 007464205

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|-----|-----------------------------|-----------------|------------------------|------------------------|
| 007464205-01 | OBS      | No   | 5.485041      | 132.027422   | 33.5        | 8.971            | 10.0 | 9.3 | 1.84                        | 6004            | 1.39                   | 1010.67                |
| 007464205-02 | OBS      | No   | 5.485398      | 135.633066   | 28.6        | 18.106           | 10.2 | 9.5 | 1.84                        | 6004            | 1.21                   | 1010.59                |
| 007464205-03 | OBS      | No   | 61.157994     | 176.744884   | 122.8       | 11.690           | 8.8  | 7.9 | 1.84                        | 6004            | 3.89                   | 40.57                  |
| 007464205-04 | OBS      | No   | 9.183550      | 134.131122   | 37.1        | 10.780           | 8.3  | 7.0 | 1.84                        | 6004            | 1.35                   | 508.36                 |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments  |
|--------------|----------|------|-------|---|---|---|---|---|
| 007464205-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                                       |
| 007464205-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—SAME_NTL_PERIOD                               |
| 007464205-03 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS |
| 007464205-04 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—LPP_DV                            |

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

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

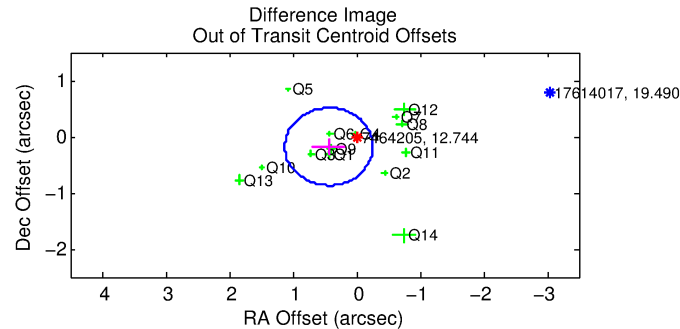
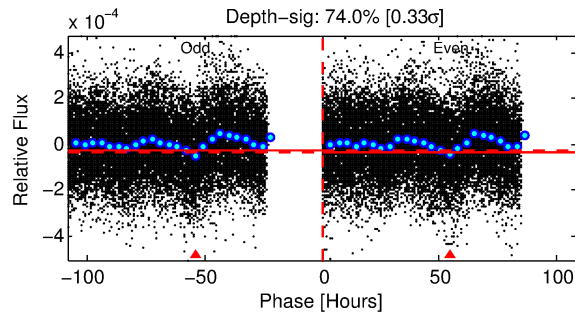
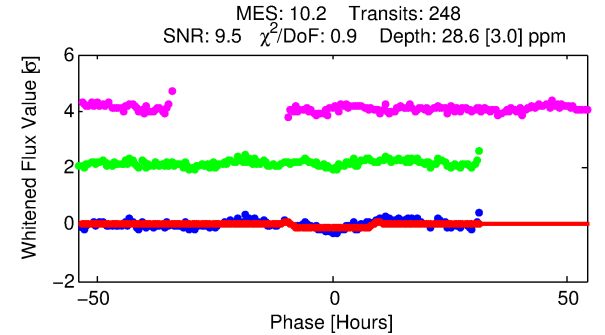
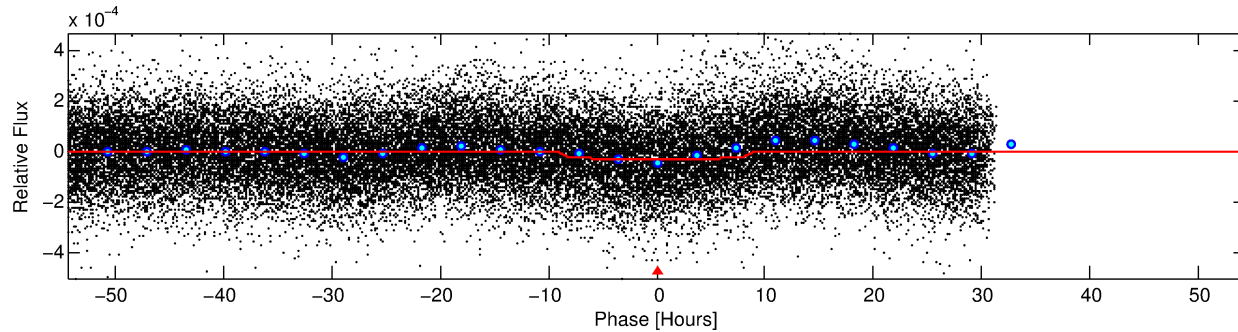
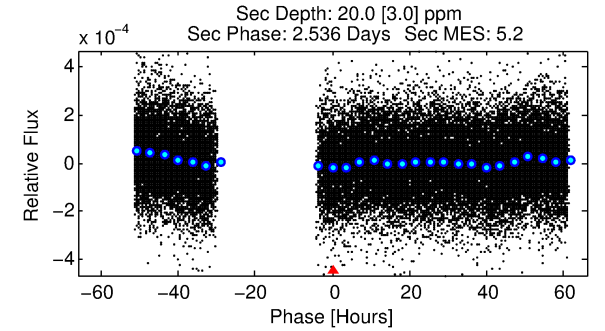
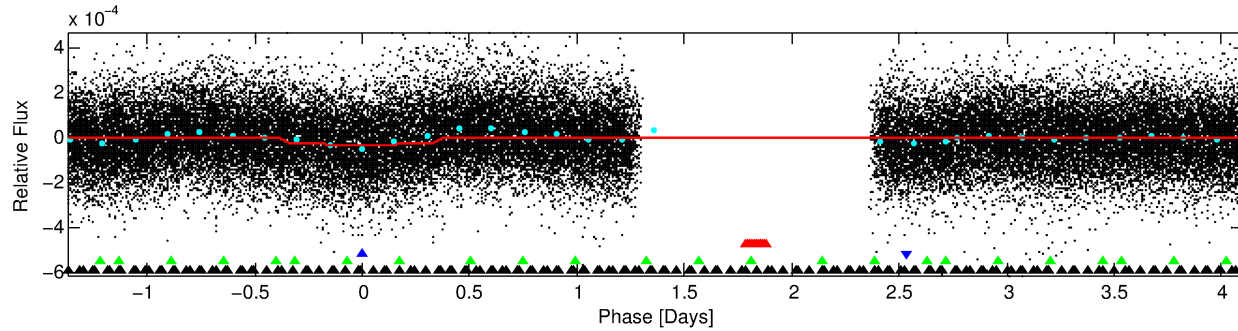
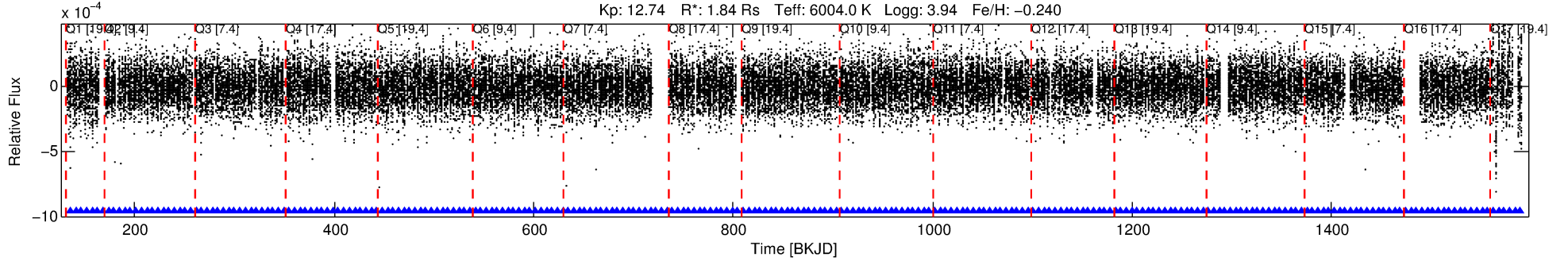
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 007464205-02

No Significant Match Found

# DV One-Page Summary

KIC: 7464205 Candidate: 2 of 4 Period: 5.485 d  
KOI: K06160 Corr: No Ephemeris Match



## DV Fit Results:

Period = 5.48540 [0.00010] d  
Epoch = 135.6331 [0.0134] BKJD  
Rp/R\* = 0.0060 [0.0005]  
a/R\* = 1.28 [0.18]  
b = 0.94 [0.05]  
Seff = 1010.58 [519.76]  
Teq = 1438 [185] K  
Rp = 1.21 [0.42] Re  
a = 0.0625 [0.0197] AU  
Ag = 29.42 [16.19] [1.75σ]  
Teffp = 5177 [336] K [9.75σ]

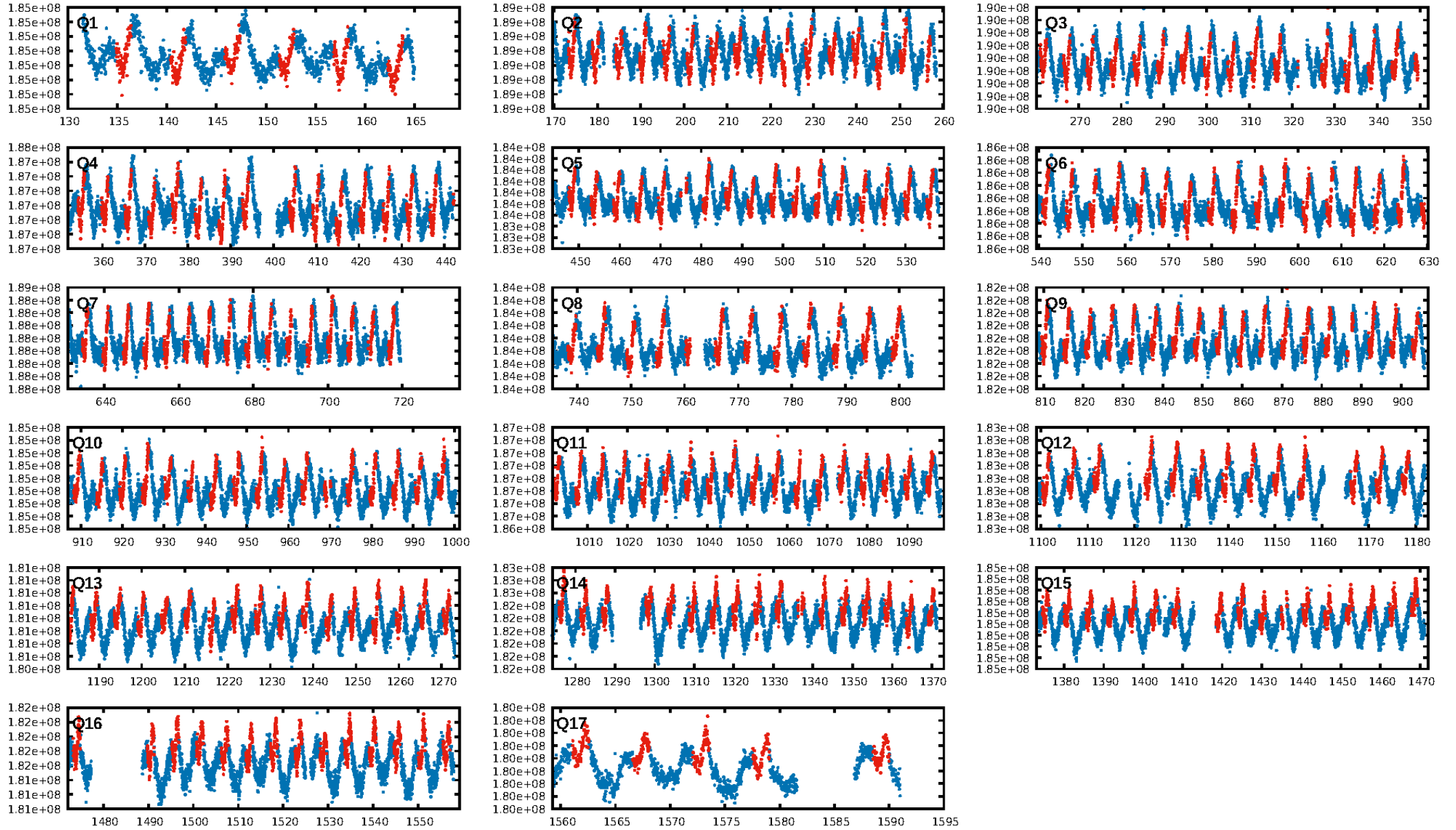
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: 100.0% [4.21σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 5.25e-16  
RollingBand-fgt: 1.00 [237/237]  
GhostDiagnostic-chr: 1.662  
Centroid-sig: 0.0%  
Centroid-so: 1.721 arcsec [2.80σ]  
OotOffset-rm: 0.470 arcsec [2.04σ]  
KicOffset-rm: 0.479 arcsec [2.03σ]  
OotOffset-st: 4/3/3/4 [14]  
KicOffset-st: 4/3/3/4 [14]  
DiffImageQuality-fgm: 0.93 [13/14]  
DiffImageOverlap-fno: 1.00 [17/17]

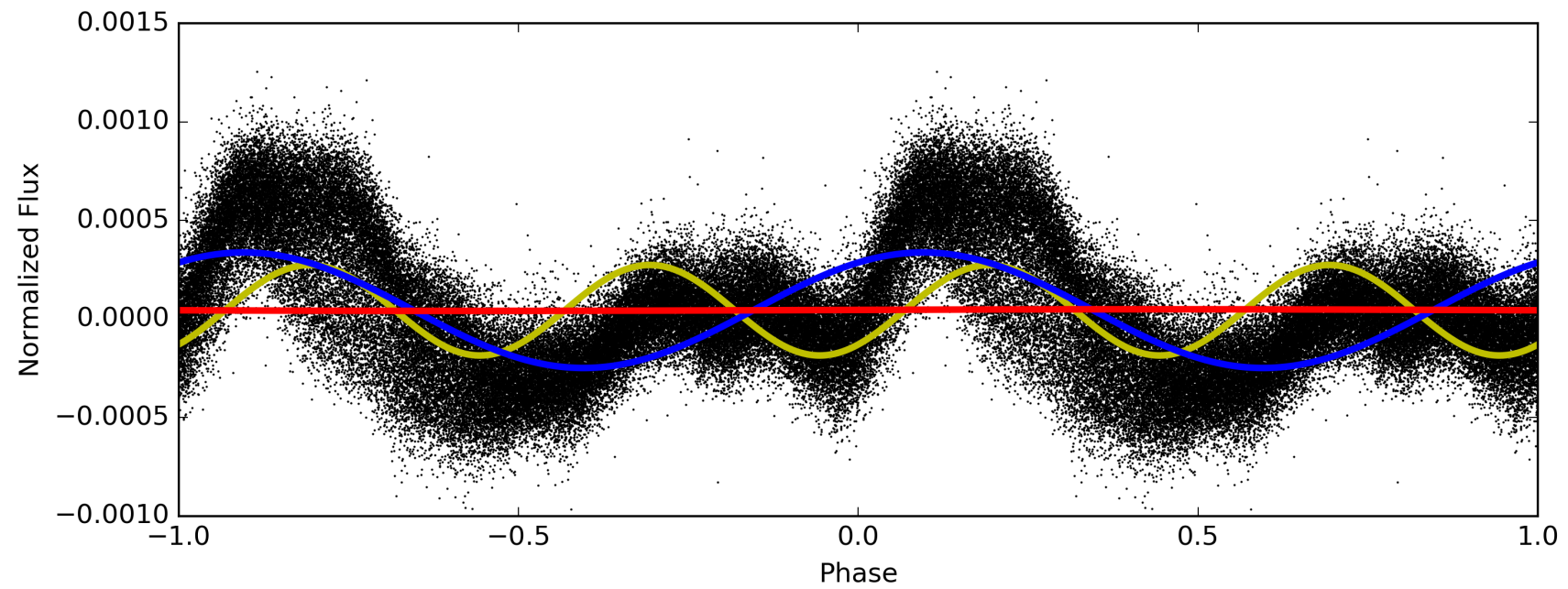
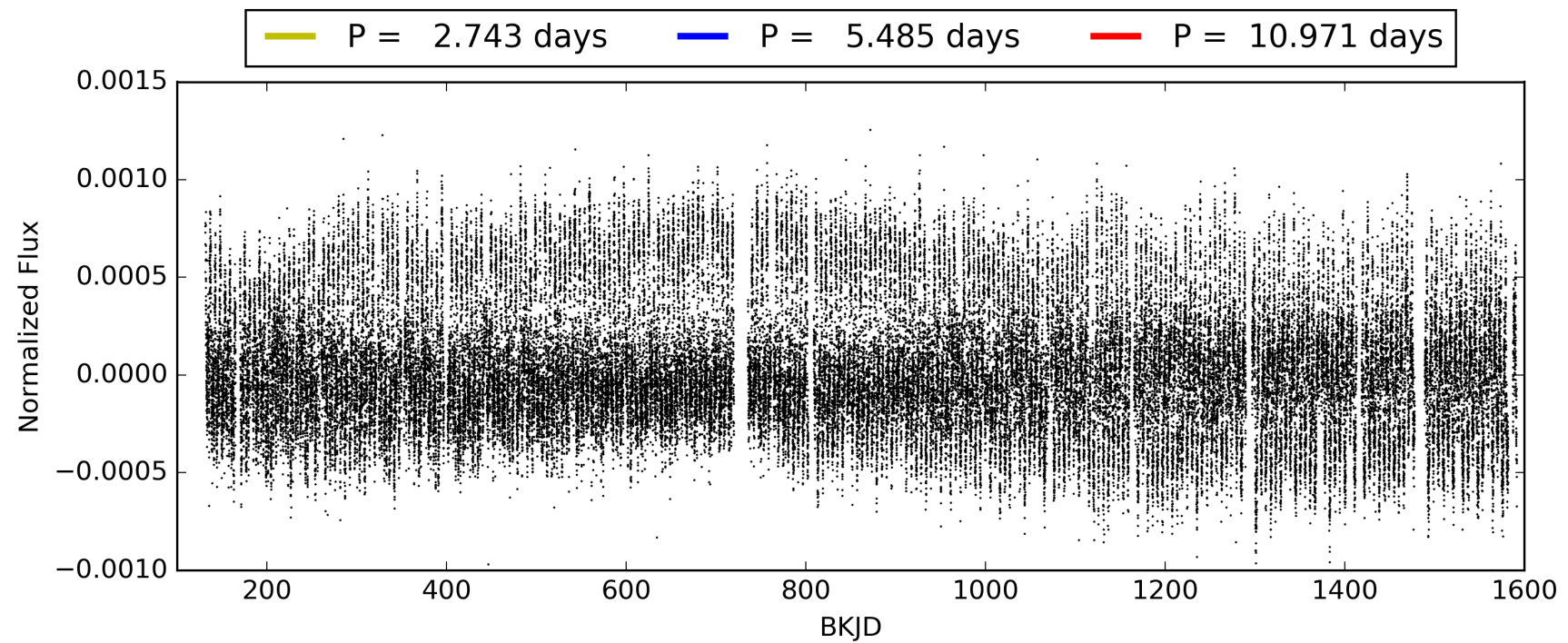
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 007464205-02, PDC Light Curves



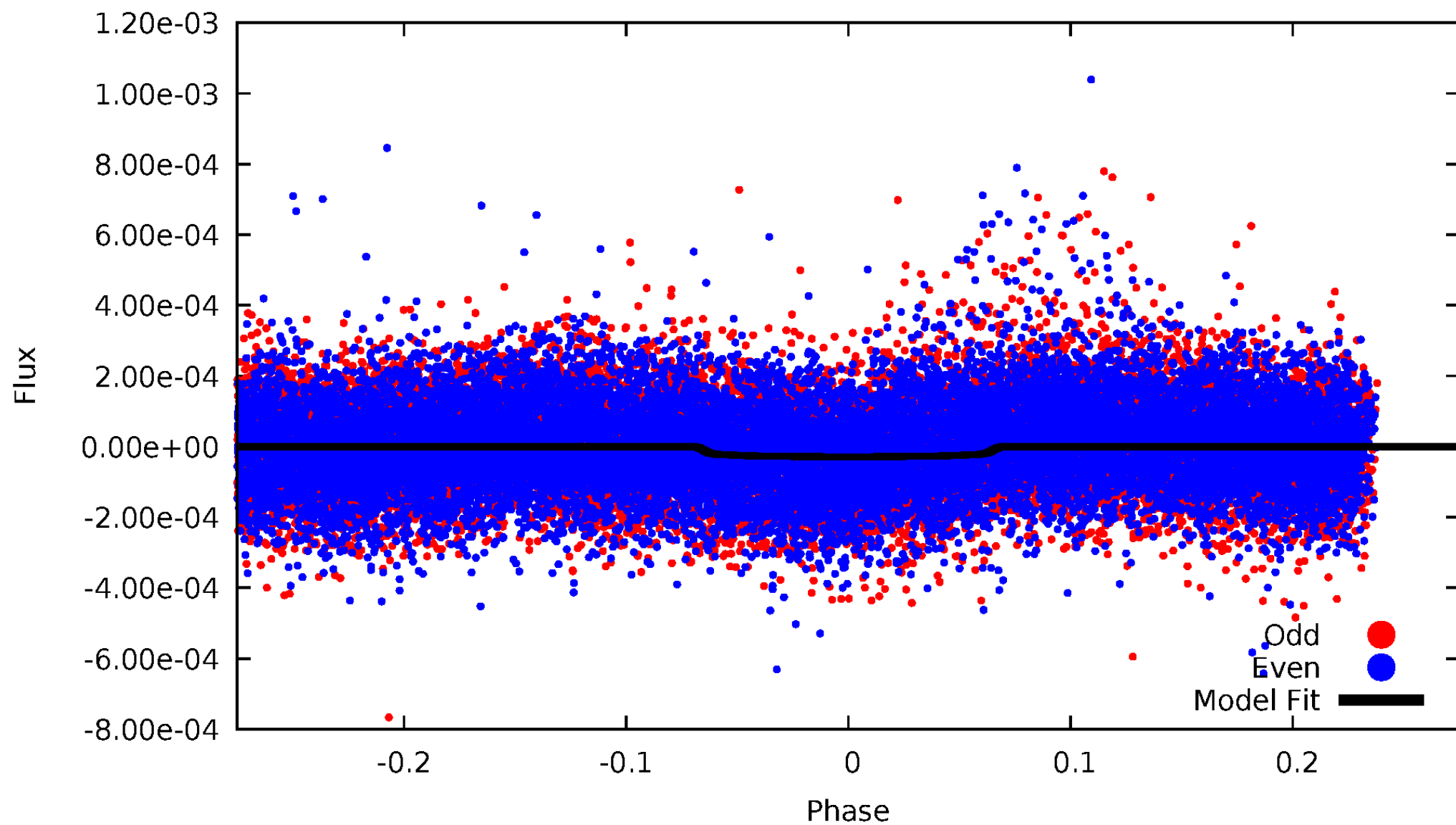
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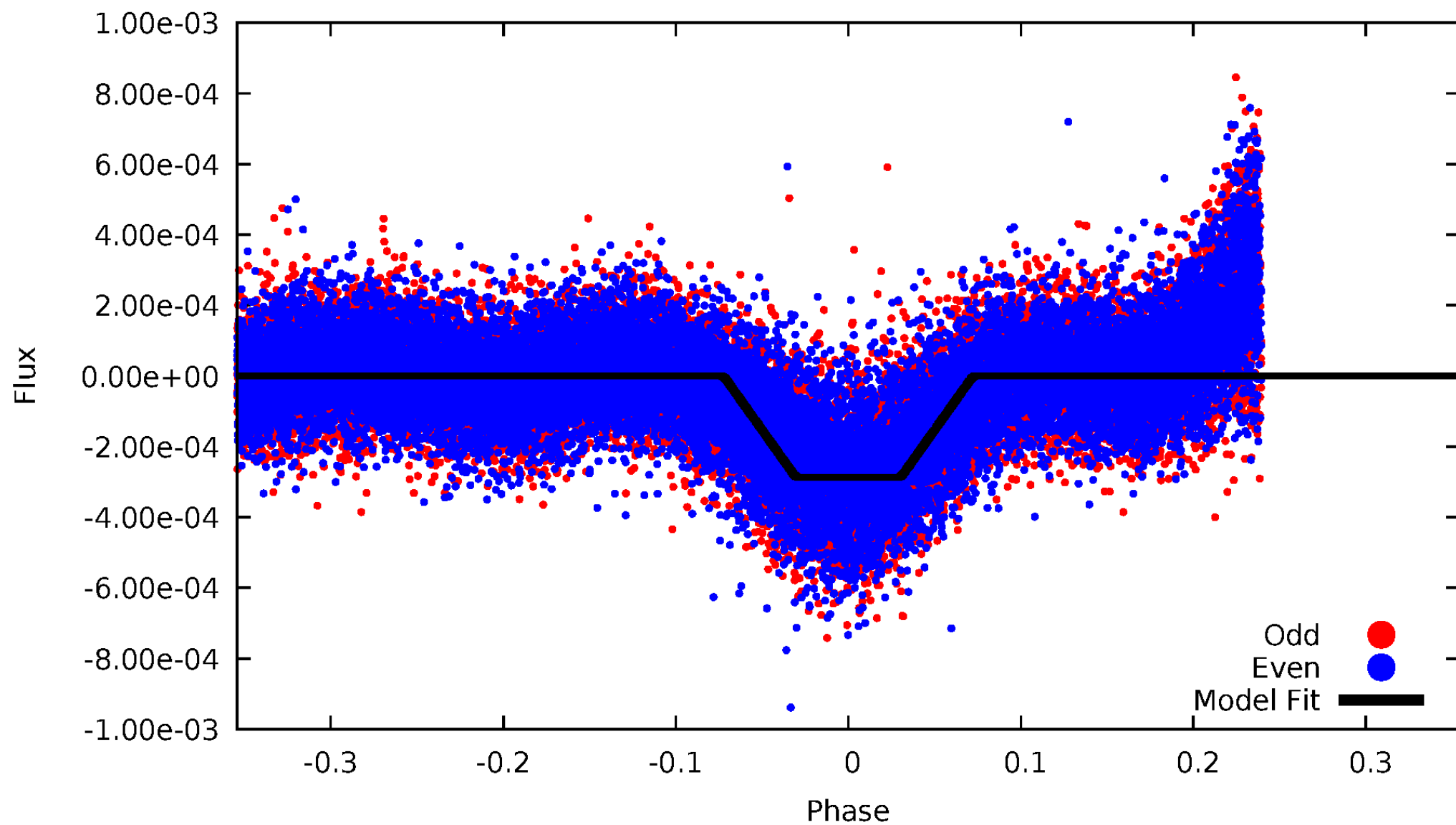
# DV Odd/Even

TCE 007464205-02



# ALT Odd/Even

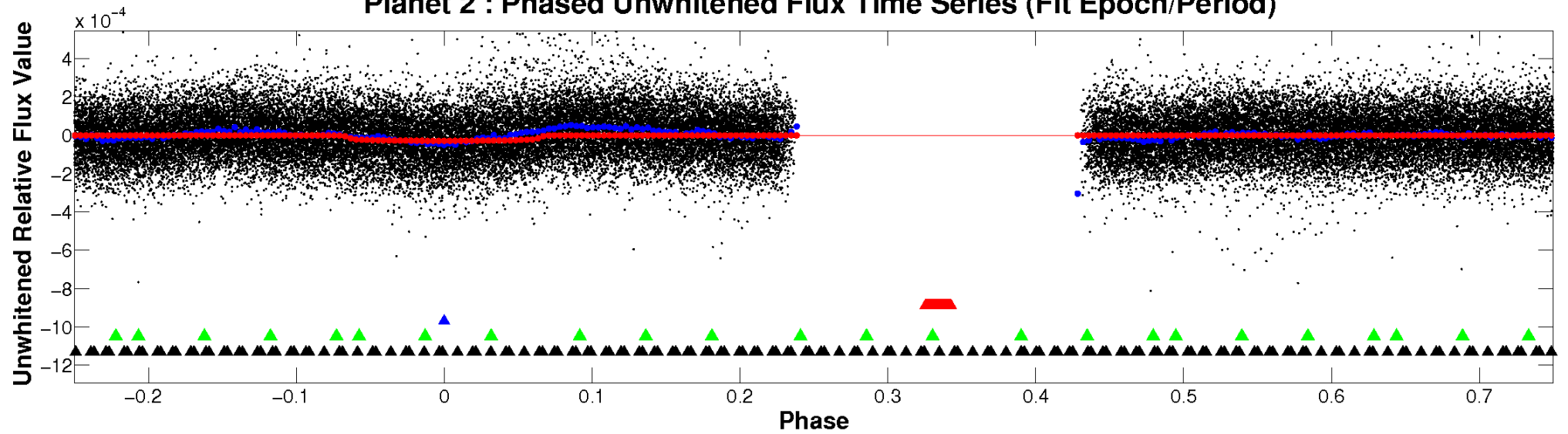
TCE 007464205-02



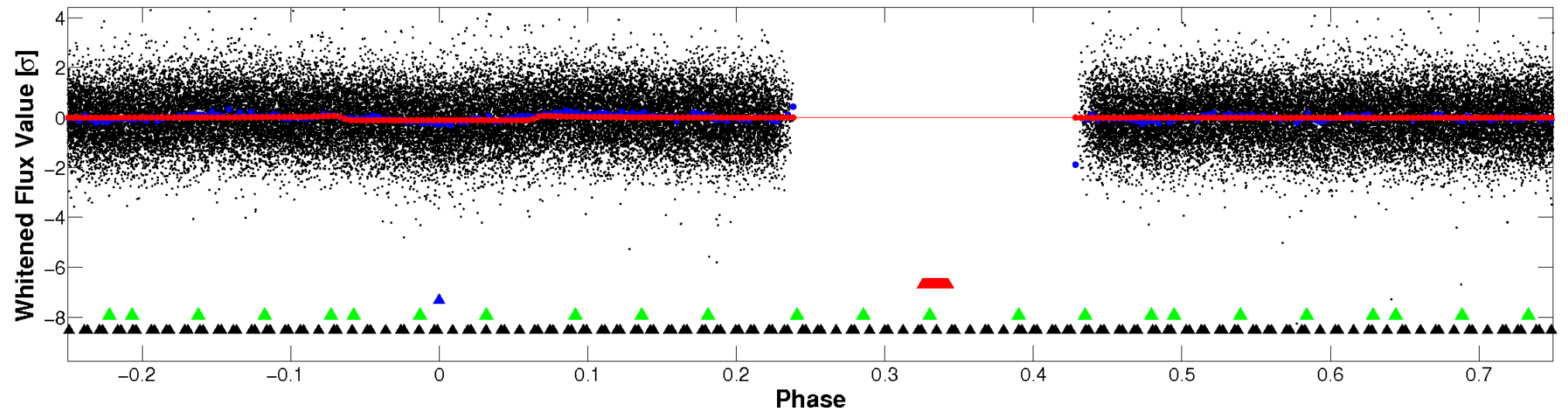


# Non-Whitened Vs. Whitened Light Curve

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

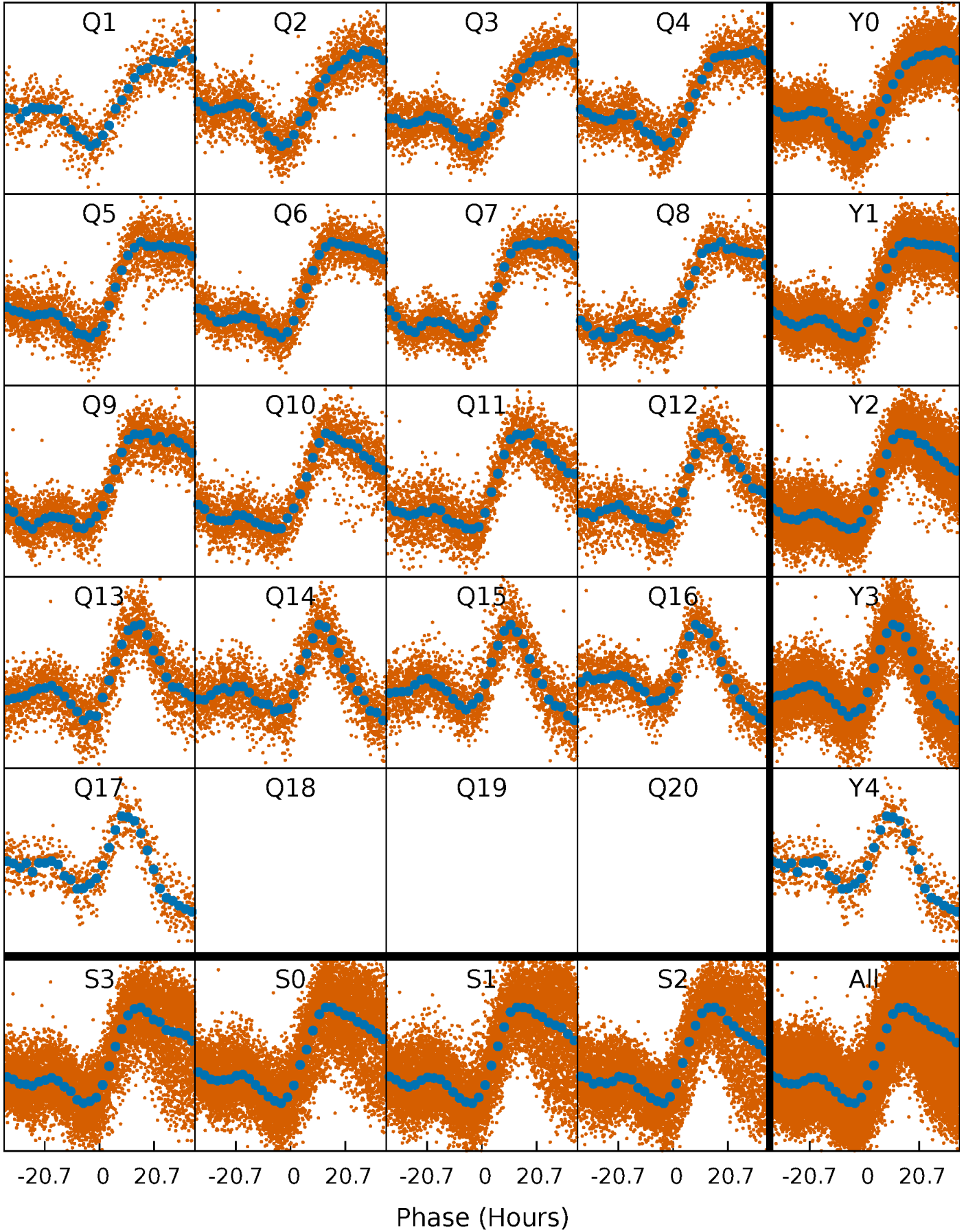


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



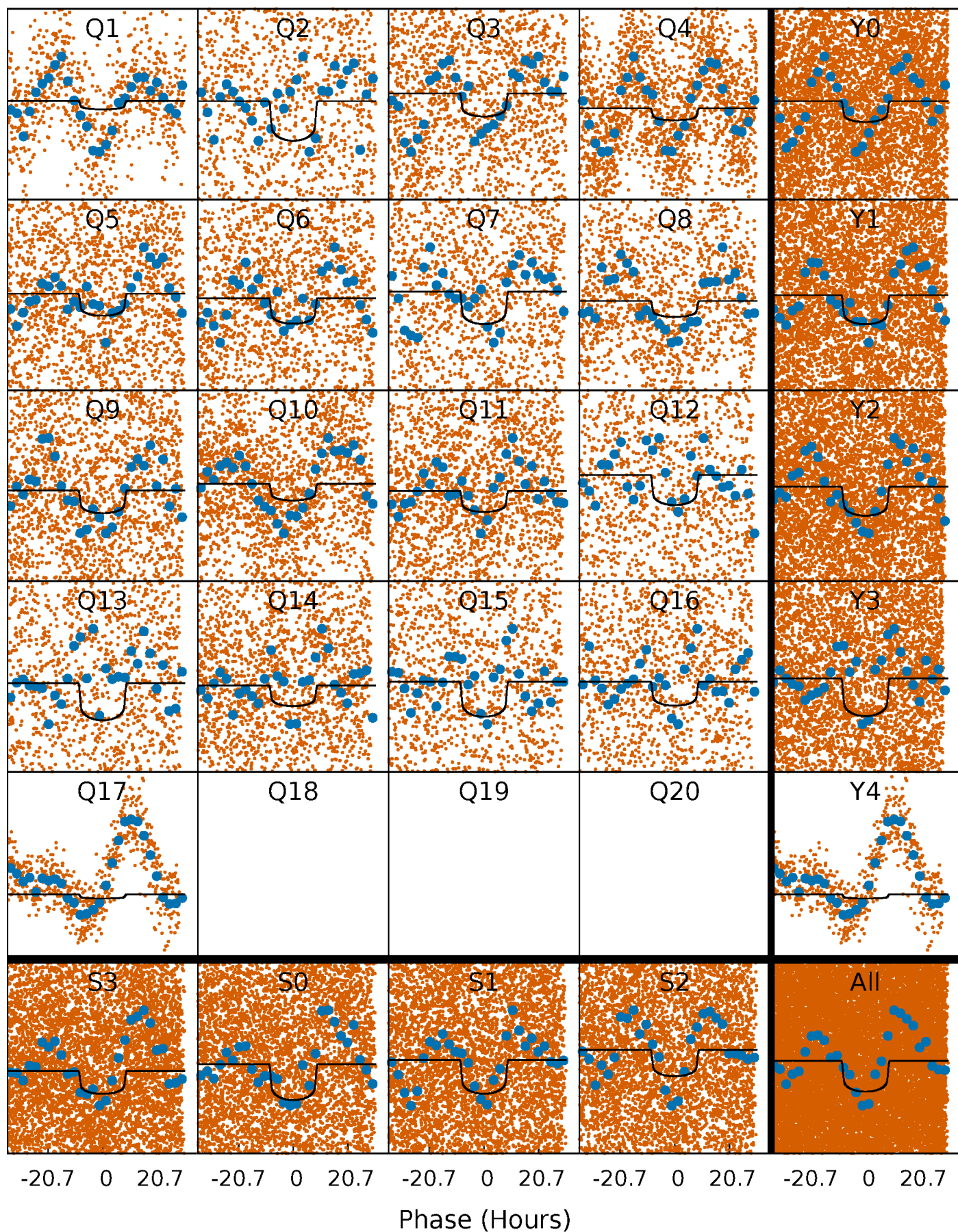
# PDC Quarter-Phased Transit Curves

TCE 007464205-02   P= 5.485398 Days    $T_0=135.633066$  (BKJD)



# DV Quarter-Phased Transit Curves

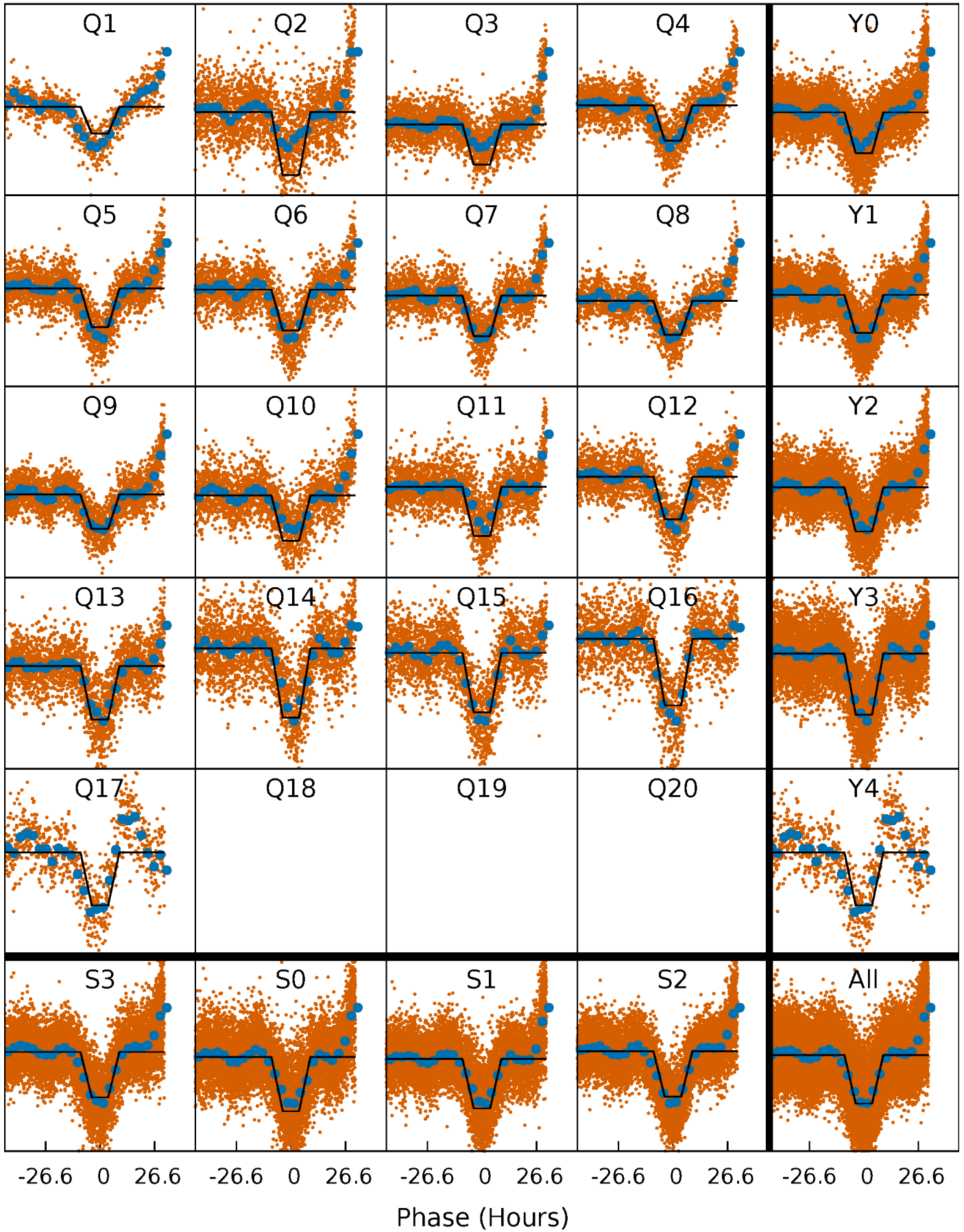
TCE 007464205-02   P= 5.485398 Days    $T_0=135.633066$  (BKJD)





## Alt. Detrend Quarter-Phased Transit Curves

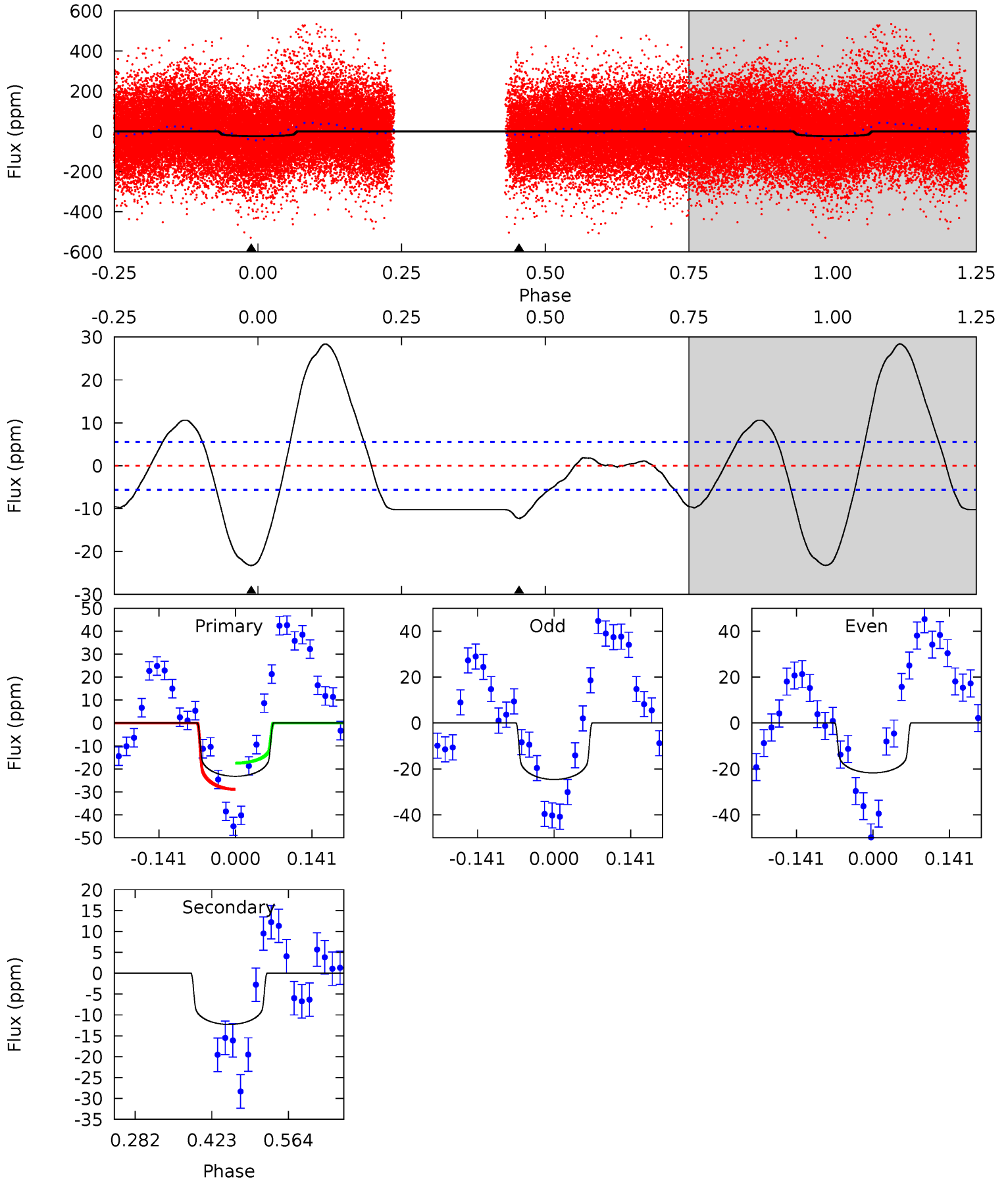
TCE 007464205-02   P= 5.484994 Days    $T_0=135.639125$  (BKJD)



# DV Model-Shift Uniqueness Test

007464205-02, P = 5.485398 Days, E = 130.147668 Days

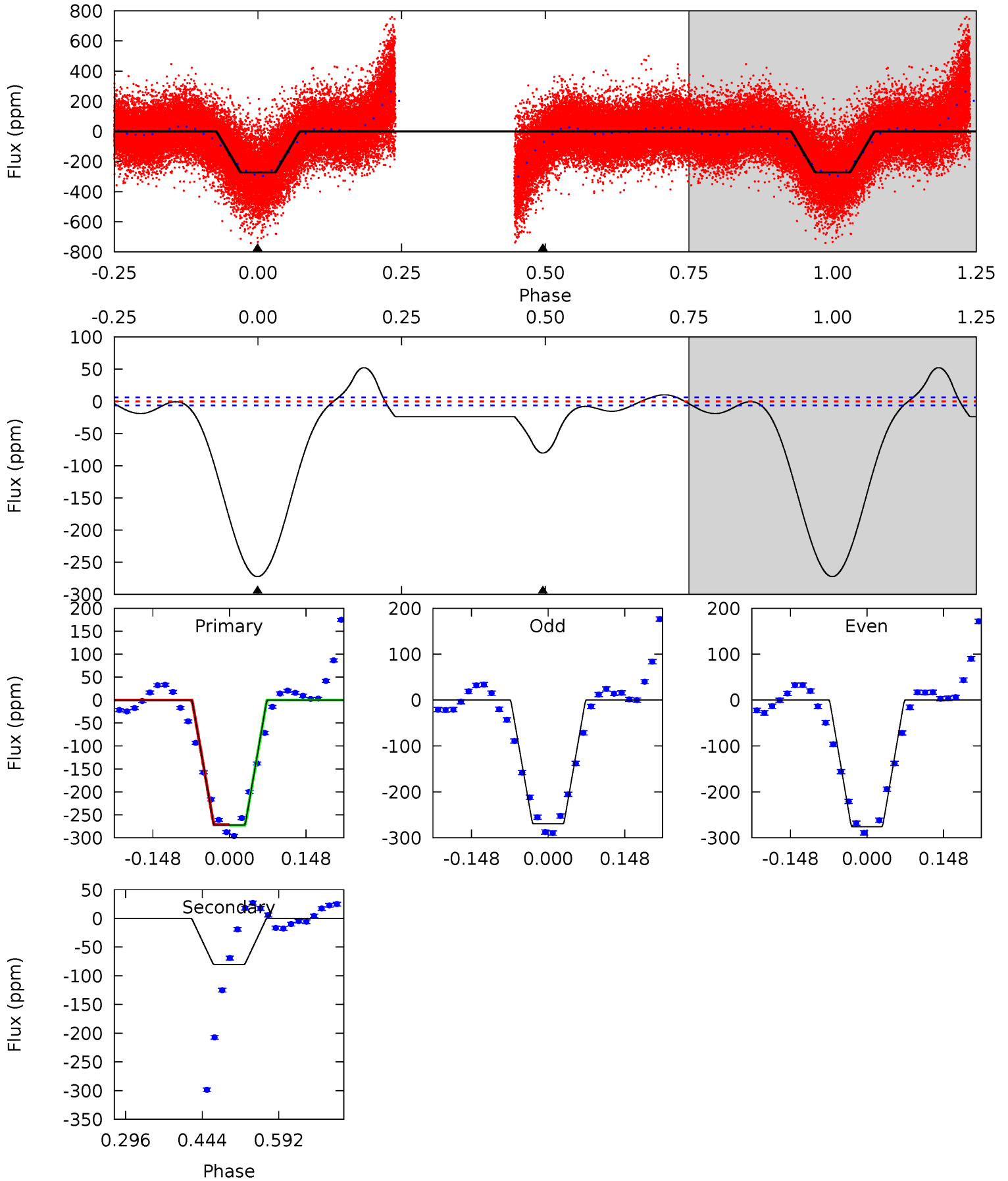
| Pri  | Sec  | Ter | Pos | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 18.7 | 9.87 | 0   | 0   | 4.49            | 1.47            | 6.86             | 18.7    | 18.7    | 9.87    | 9.87    | 1.16    | 1.11 | 0.55  | 4.43 |



# Alt Model-Shift Uniqueness Test

007464205-02, P = 5.484994 Days, E = 130.154131 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  |
|-------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 196.6 | 57.9 | 0   | 0   | 4.48            | 1.45            | 14.4             | 196.6   | 196.6   | 57.9    | 57.9    | 2.28    | 0.98 | 0.16  | 0.47 |



### Stellar Parameters For KIC 007464205

|        | $T_{\text{eff}} (K)$ | $\log(g)$                 | $[\text{Fe}/\text{H}]$     | $R (R_{\odot})$           | $M (M_{\odot})$           | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
|        | $6004^{+180}_{-162}$ | $3.942^{+0.292}_{-0.097}$ | $-0.240^{+0.350}_{-0.250}$ | $1.842^{+0.377}_{-0.613}$ | $1.082^{+0.179}_{-0.179}$ | $0.244^{+0.455}_{-0.090}$                 |
|        | +3%/-3%              | +7%/-2%                   | +146%/-104%                | +20%/-33%                 | +17%/-17%                 | +186%/-37%                                |
| Source | PHO1                 | FLK73                     | KIC0                       | DSEP                      |                           |   |

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

### Secondary Eclipse Parameters for KIC 007464205-02 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$     | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | $A_{\text{obs}}$ |
|---------|-------------|------------------------|----------------------|----------------------|------------------|
| DV      | $-12 \pm 1$ | $1.16^{+0.21}_{-0.22}$ | $1964^{+135}_{-167}$ | $4698^{+241}_{-202}$ | $20^{+10}_{-5}$  |
| Alt.    | $-80 \pm 1$ | $3.32^{+0.42}_{-0.56}$ | $1980^{+117}_{-155}$ | $4532^{+119}_{-118}$ | $16^{+6}_{-3}$   |

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



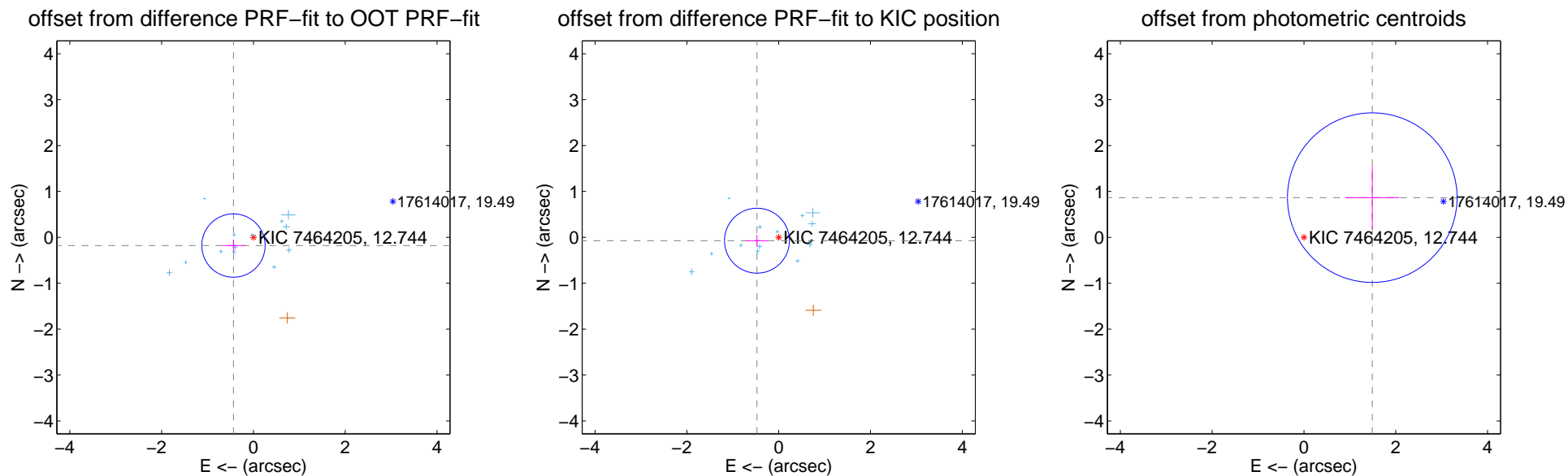
## DV Centroid Data

Supplemental centroid analysis for 007464205-02. Kepler magnitude: 12.74. Transit SNR 9.51

There are 13 quarters with good PRF difference image offsets

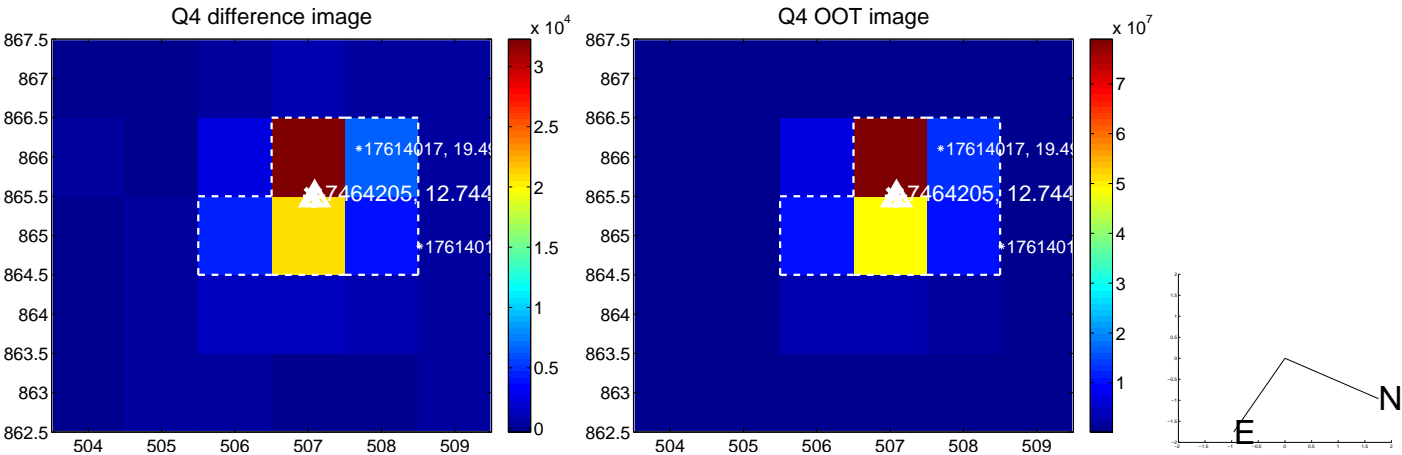
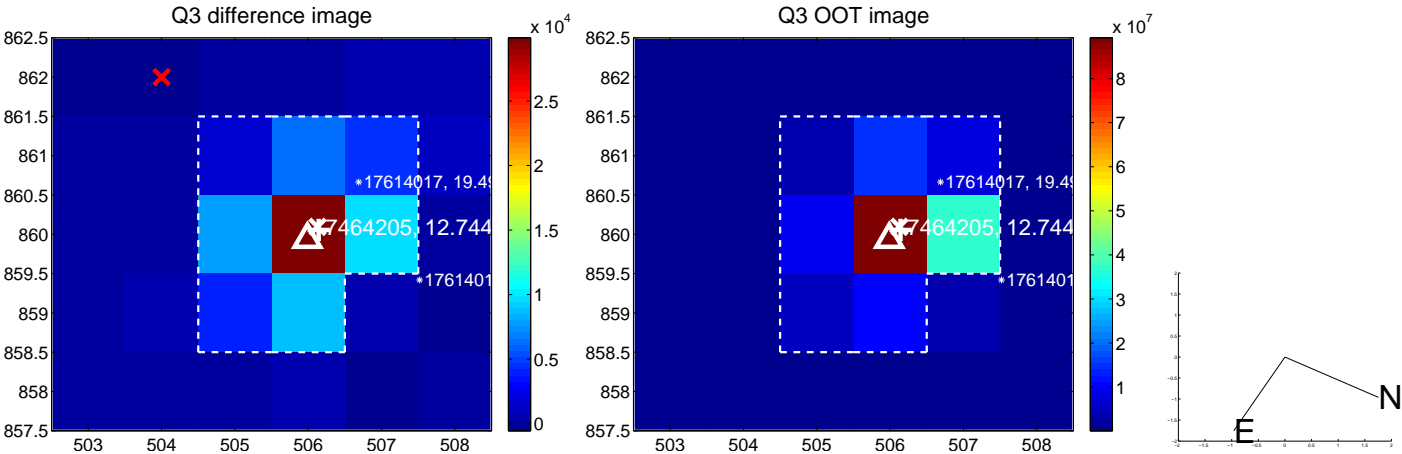
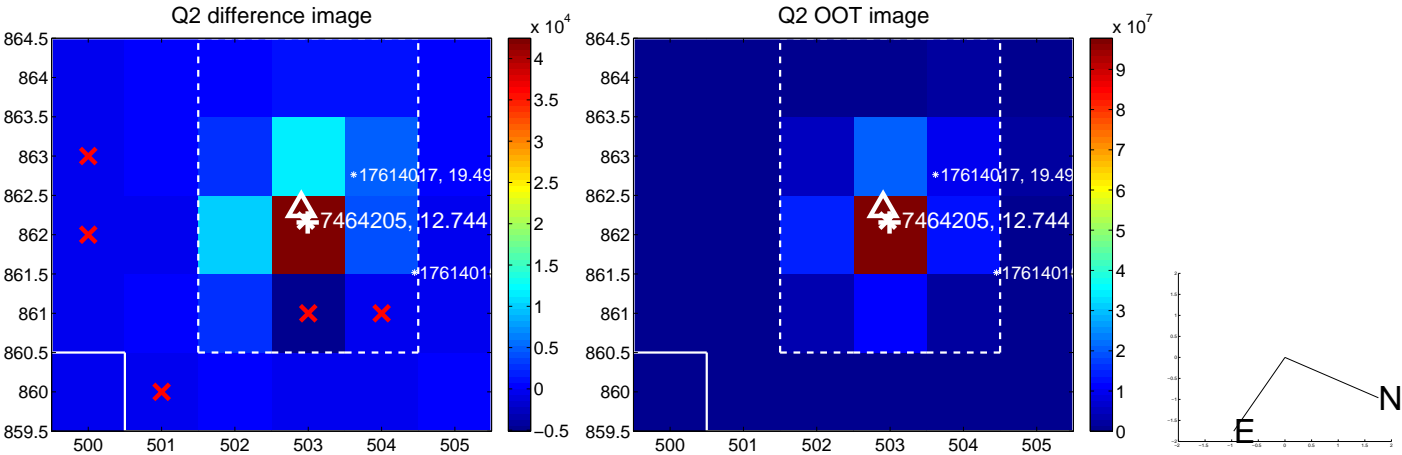
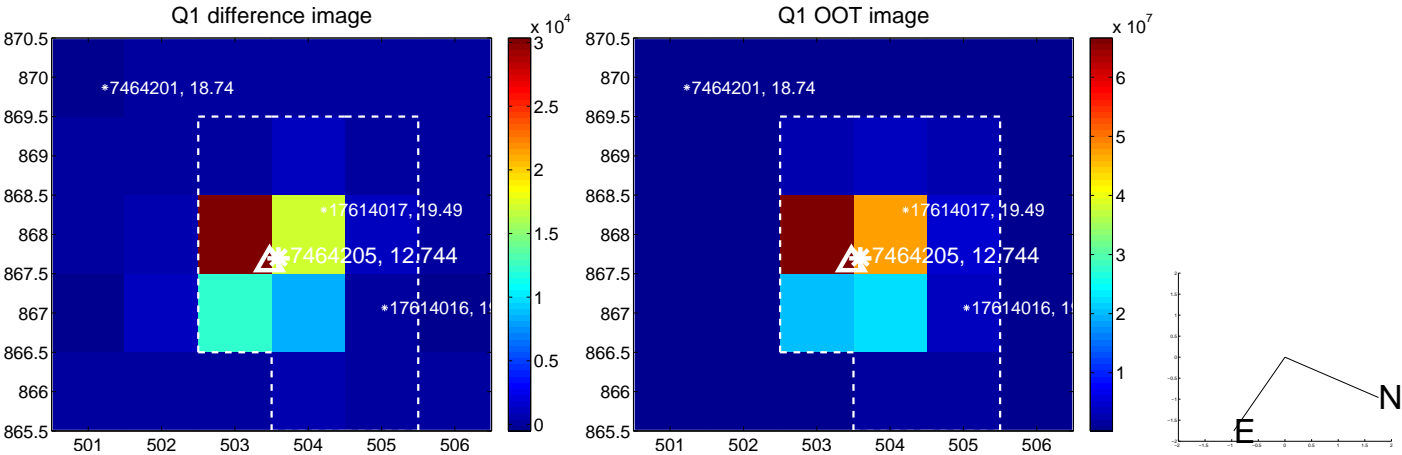
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA       | $\Delta$ Dec       |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT          | $0.470 \pm 0.230$  | 2.04                | $0.435 \pm 0.243$ | $-0.179 \pm 0.130$ |
| PRF-fit source offset from KIC position | $0.479 \pm 0.236$  | 2.03                | $0.473 \pm 0.238$ | $-0.073 \pm 0.128$ |
| photometric centroid source offset      | $1.72 \pm 0.62$    | 2.80                | $-1.49 \pm 0.59$  | $0.86 \pm 0.69$    |

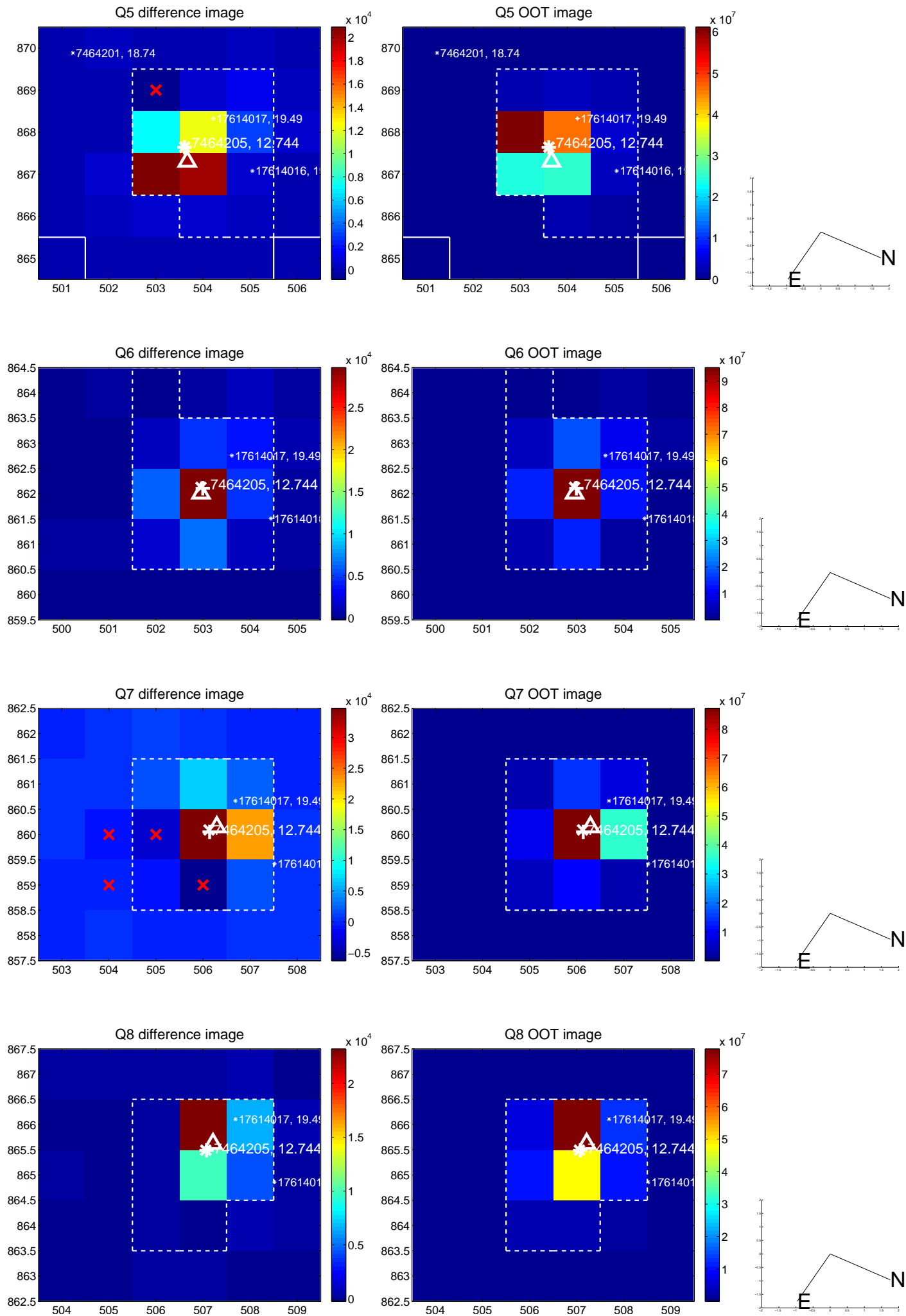


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

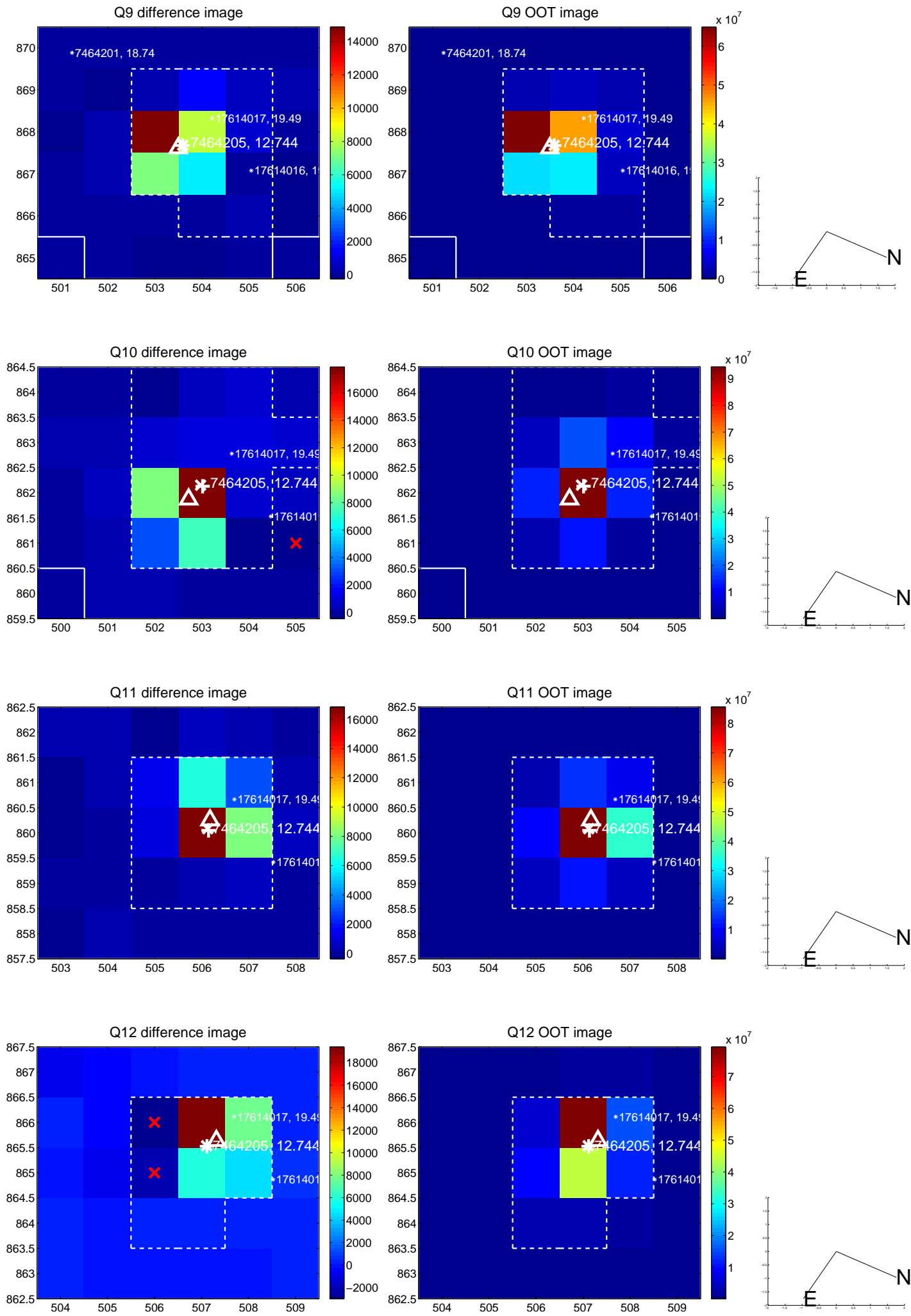
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



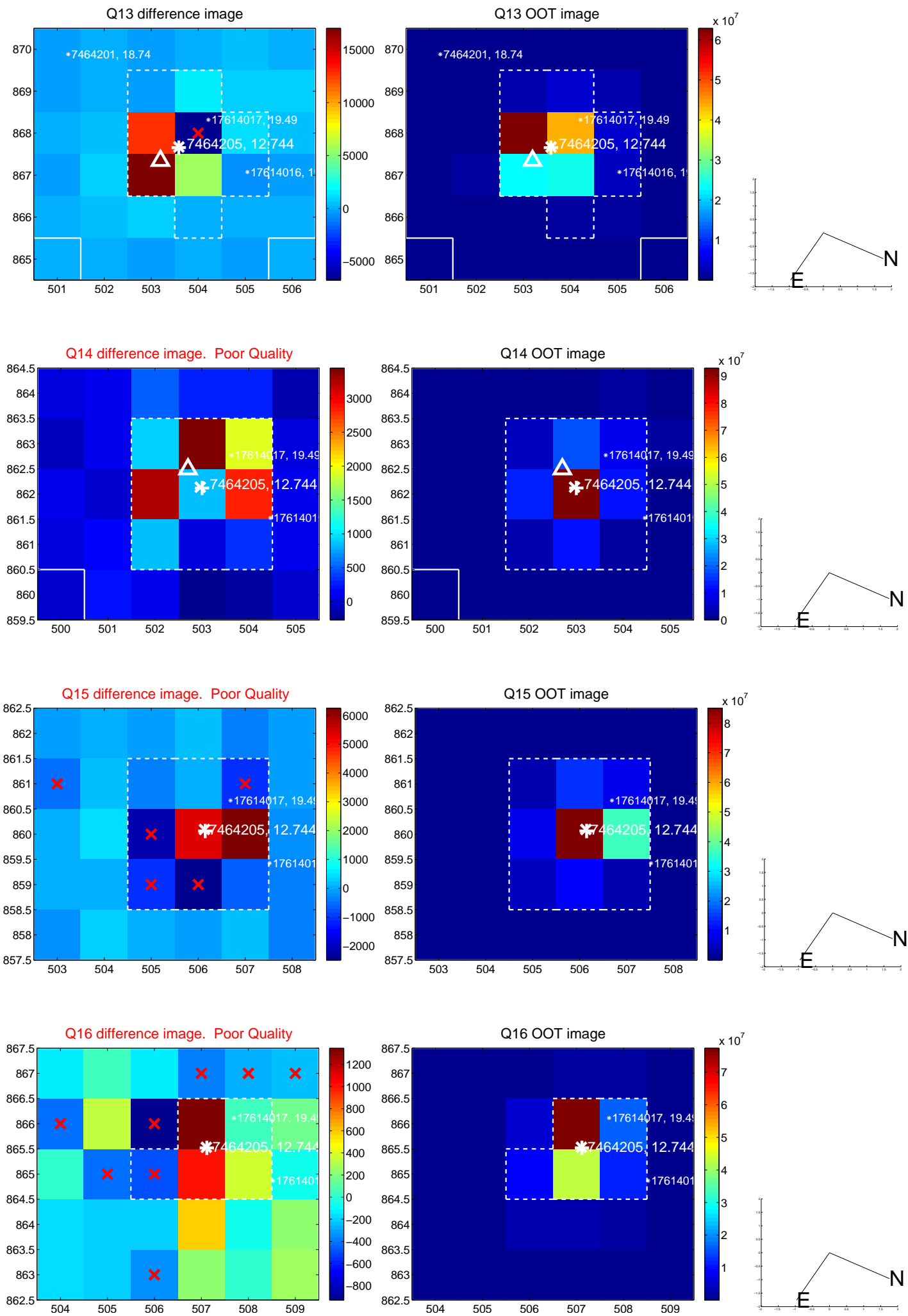
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

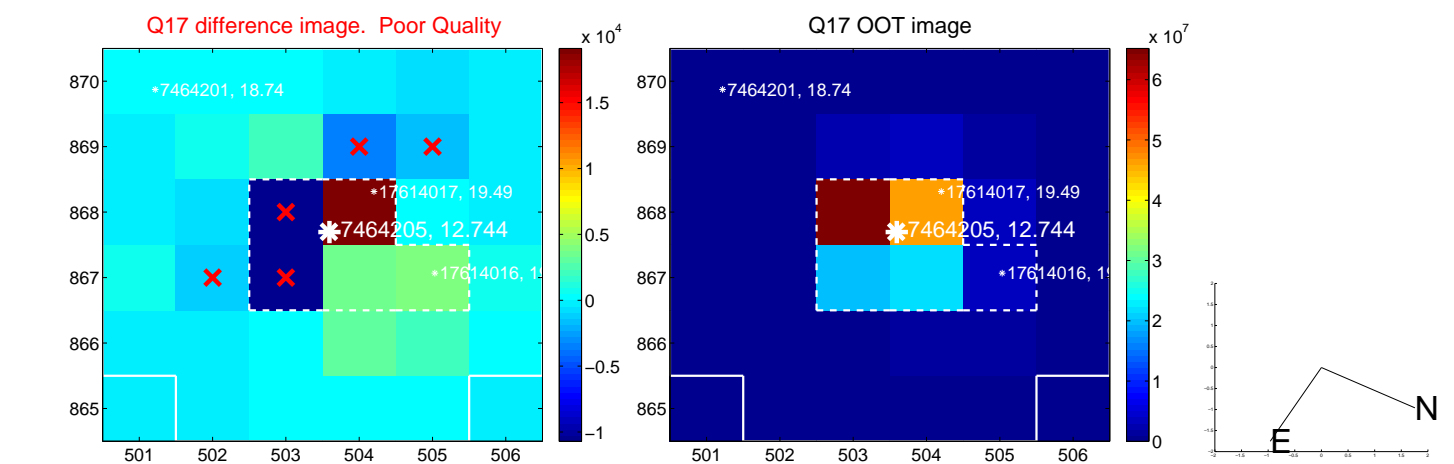


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

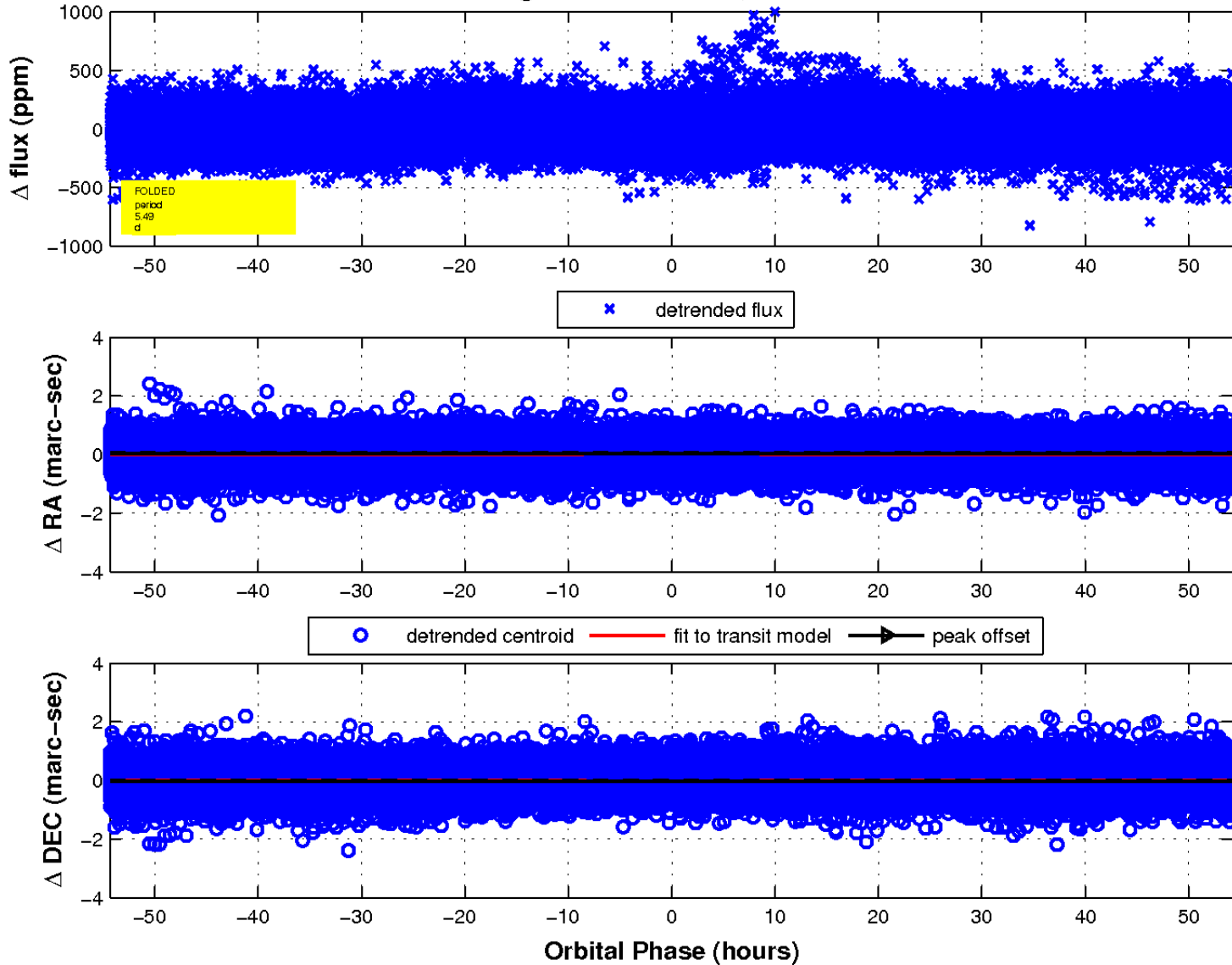




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

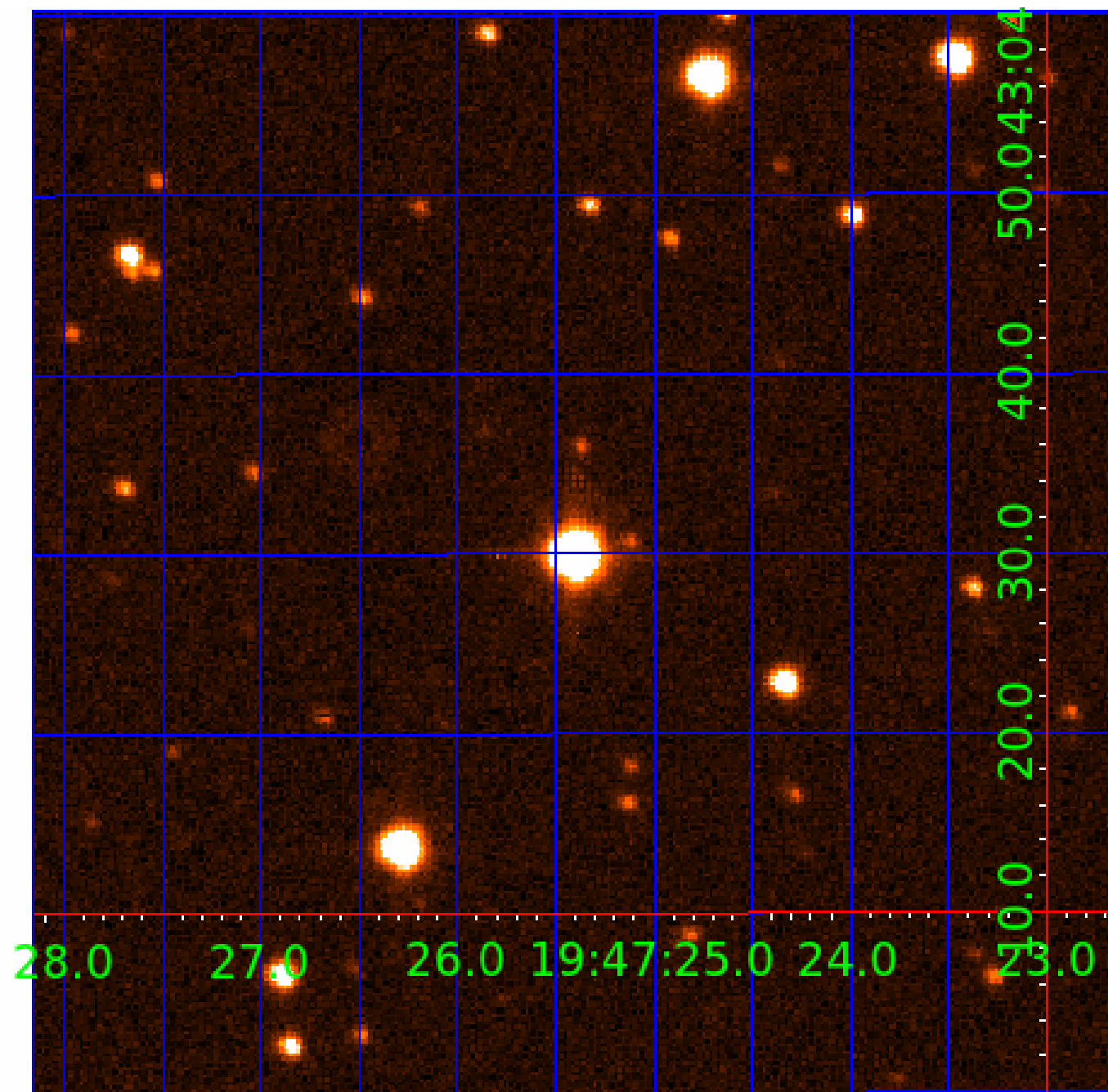


fluxWeightedCentroids, Planet 2 of 4



UKIRT Image

Declination



# KIC 007464205

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|-----|-----------------------------|-----------------|------------------------|------------------------|
| 007464205-01 | OBS      | No   | 5.485041      | 132.027422   | 33.5        | 8.971            | 10.0 | 9.3 | 1.84                        | 6004            | 1.39                   | 1010.67                |
| 007464205-02 | OBS      | No   | 5.485398      | 135.633066   | 28.6        | 18.106           | 10.2 | 9.5 | 1.84                        | 6004            | 1.21                   | 1010.59                |
| 007464205-03 | OBS      | No   | 61.157994     | 176.744884   | 122.8       | 11.690           | 8.8  | 7.9 | 1.84                        | 6004            | 3.89                   | 40.57                  |
| 007464205-04 | OBS      | No   | 9.183550      | 134.131122   | 37.1        | 10.780           | 8.3  | 7.0 | 1.84                        | 6004            | 1.35                   | 508.36                 |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments  |
|--------------|----------|------|-------|---|---|---|---|---|
| 007464205-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                                       |
| 007464205-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—SAME_NTL_PERIOD                               |
| 007464205-03 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS |
| 007464205-04 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—LPP_DV                            |

**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.

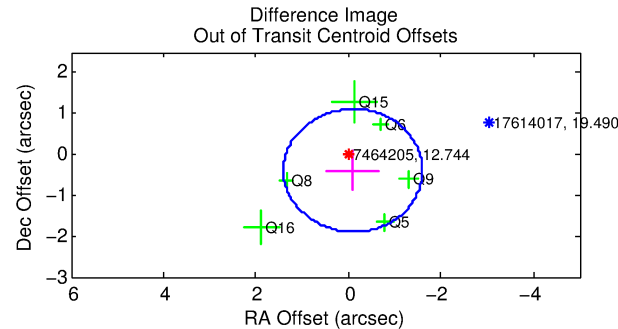
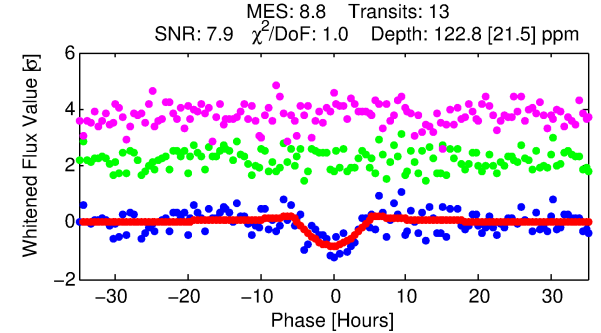
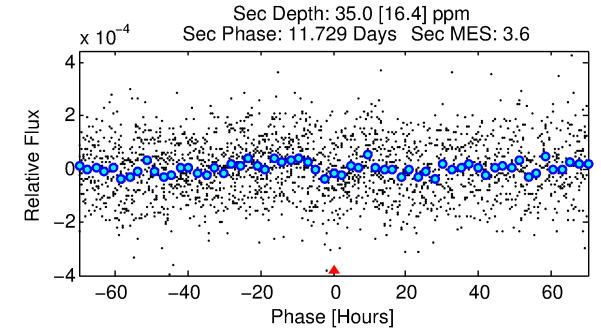
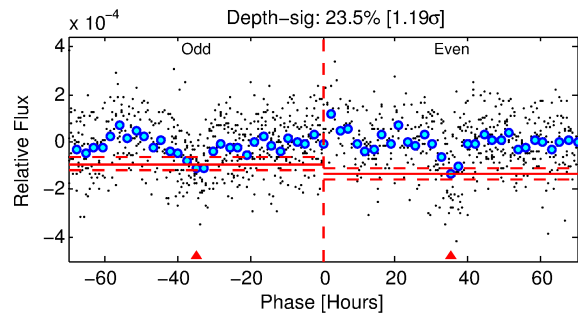
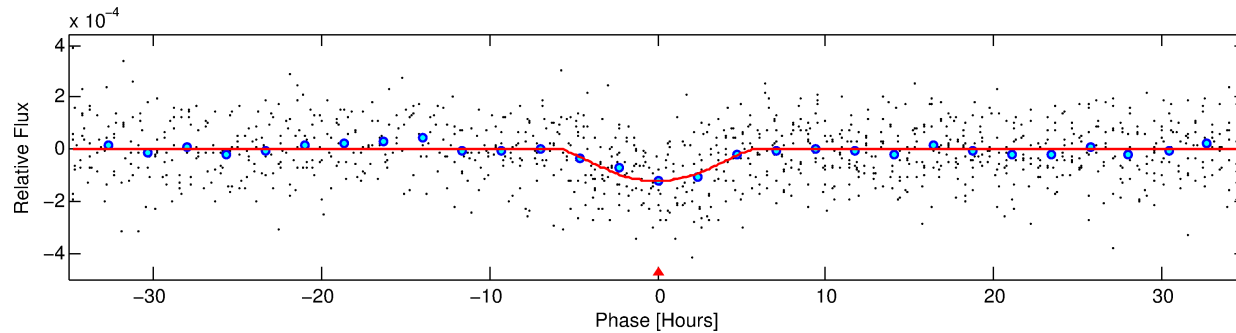
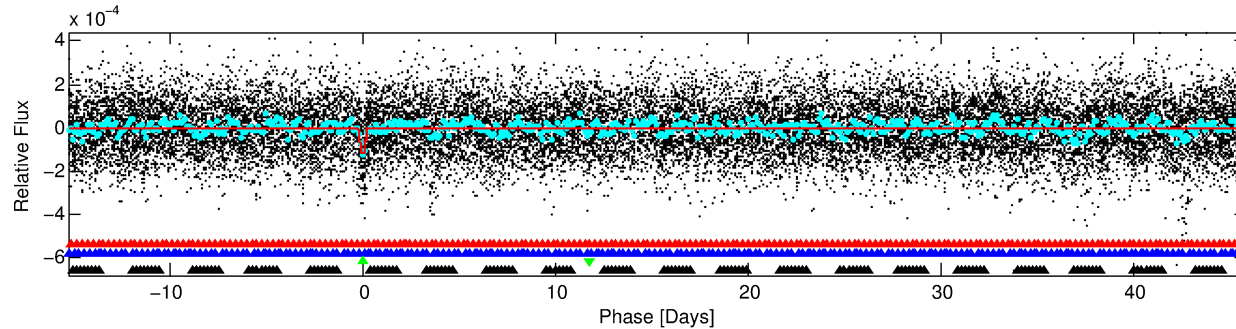
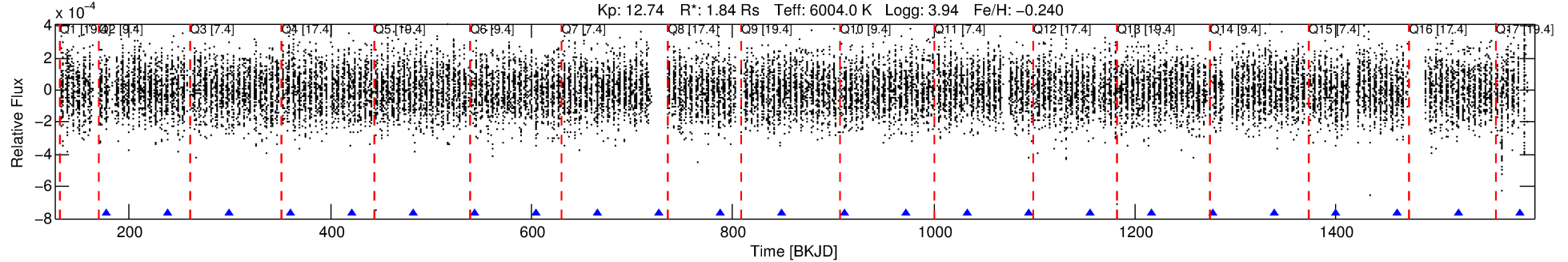
Ephemeris Match Information For 007464205-03

No Significant Match Found

# DV One-Page Summary

KIC: 7464205 Candidate: 3 of 4 Period: 61.158 d  
KOI: K06160 Corr: No Ephemeris Match

Kp: 12.74 R\*: 1.84 Rs Teff: 6004.0 K Logg: 3.94 Fe/H: -0.240



## DV Fit Results:

Period = 61.15799 [0.00201] d  
Epoch = 176.7449 [0.0266] BKJD  
Rp/R\* = 0.0194 [0.0496]  
a/R\* = 8.38 [6.32]  
b = 1.00 [0.08]  
Seff = 40.57 [20.87]  
Teq = 644 [83] K  
Rp = 3.89 [10.06] Re  
a = 0.3120 [0.0984] AU  
Ag = 123.82 [640.41] [0.19σ]  
Teffp = 3319 [4273] K [0.63σ]

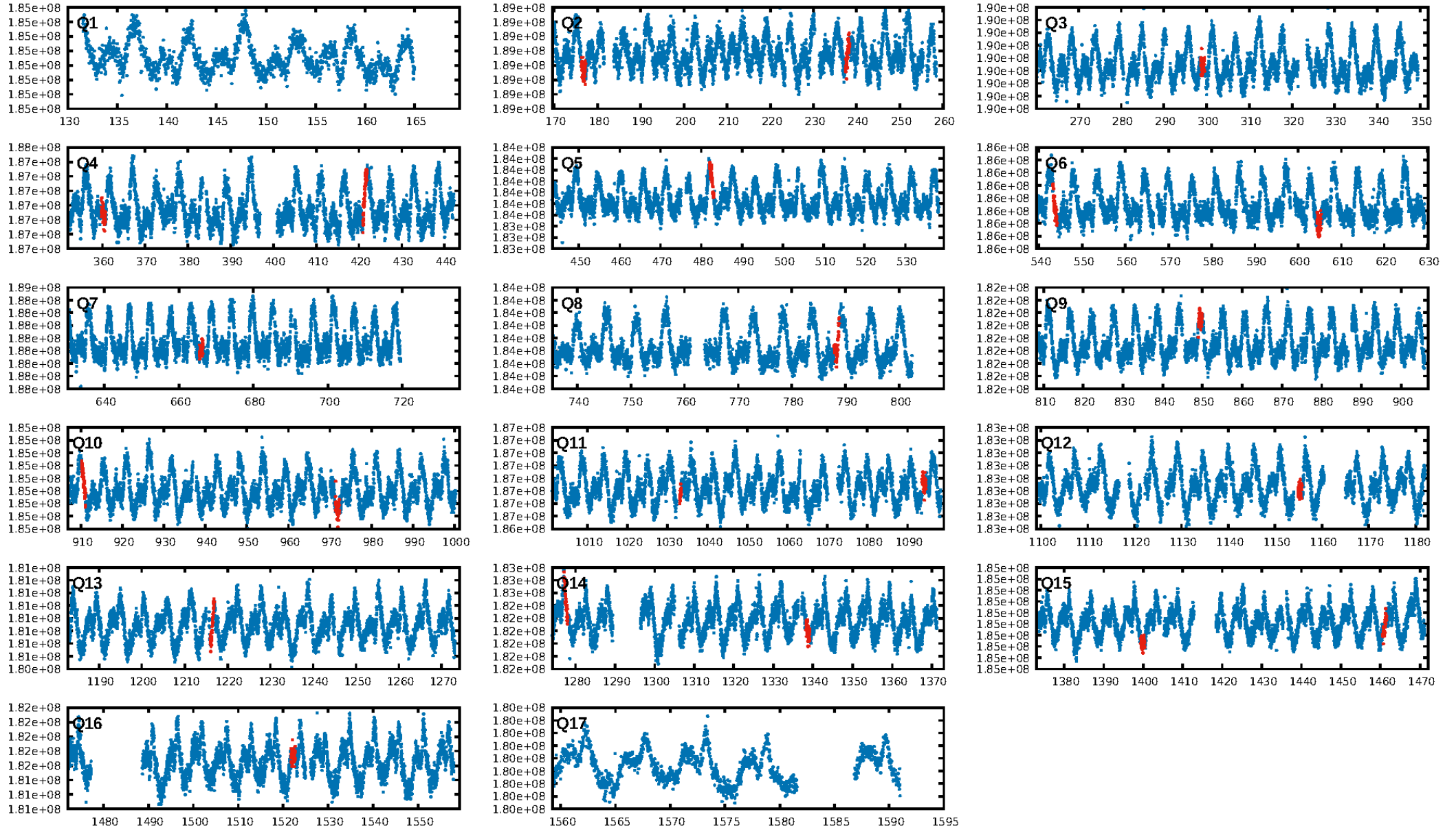
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [78.44σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 4.8%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 1.62e-11**  
RollingBand-fgt: 1.00 [13/13]  
**GhostDiagnostic-chr: 0.4571**  
Centroid-sig: 89.5%  
Centroid-so: 0.194 arcsec [0.24σ]  
OotOffset-rm: 0.403 arcsec [0.80σ]  
OotOffset-st: 1/1/2/2 [6]  
KicOffset-rm: 0.374 arcsec [0.70σ]  
KicOffset-st: 1/1/2/2 [6]  
DiffImageQuality-fgm: 0.50 [3/6]  
DiffImageOverlap-fno: 0.25 [3/12]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 07:27:05 Z

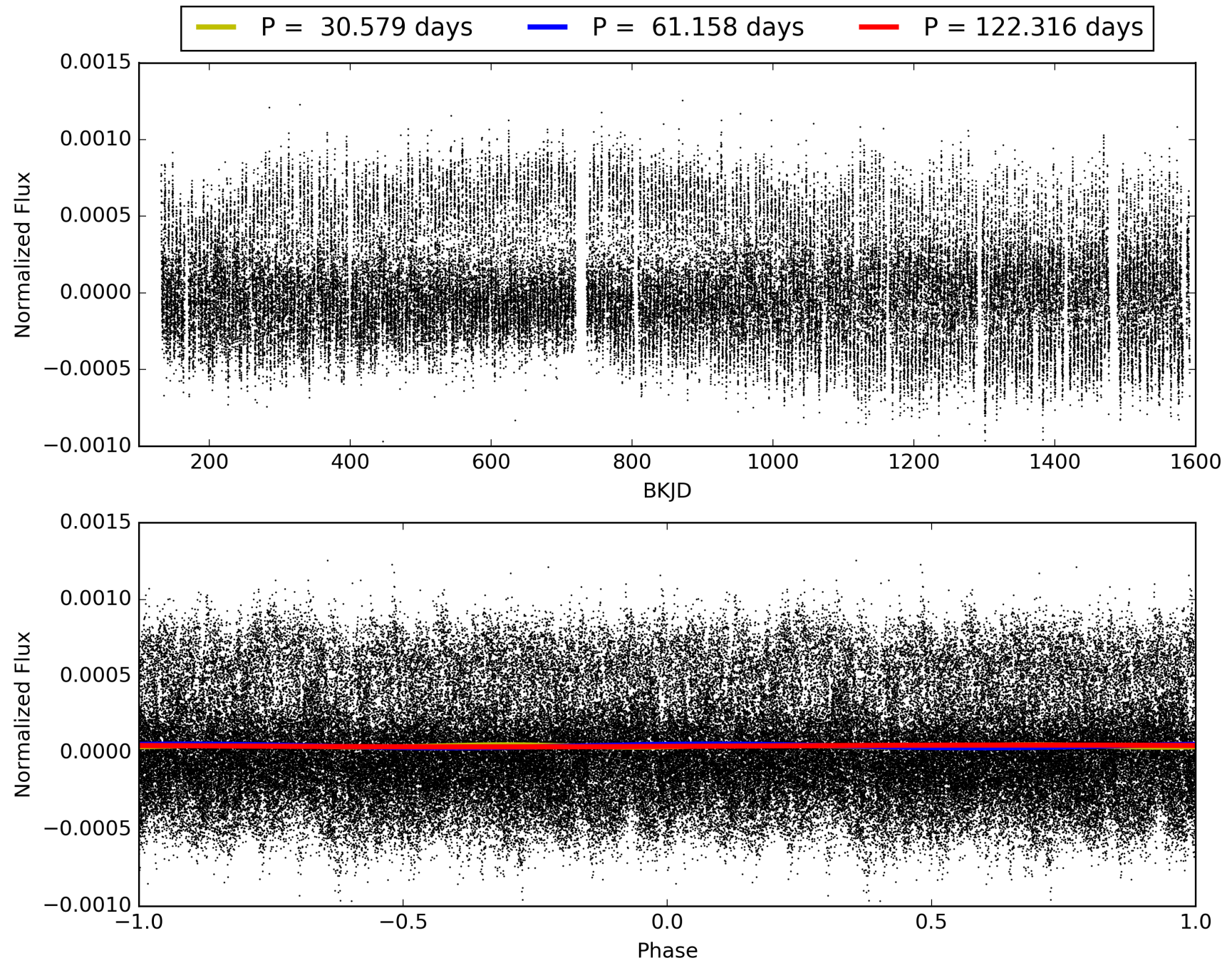
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 007464205-03, PDC Light Curves



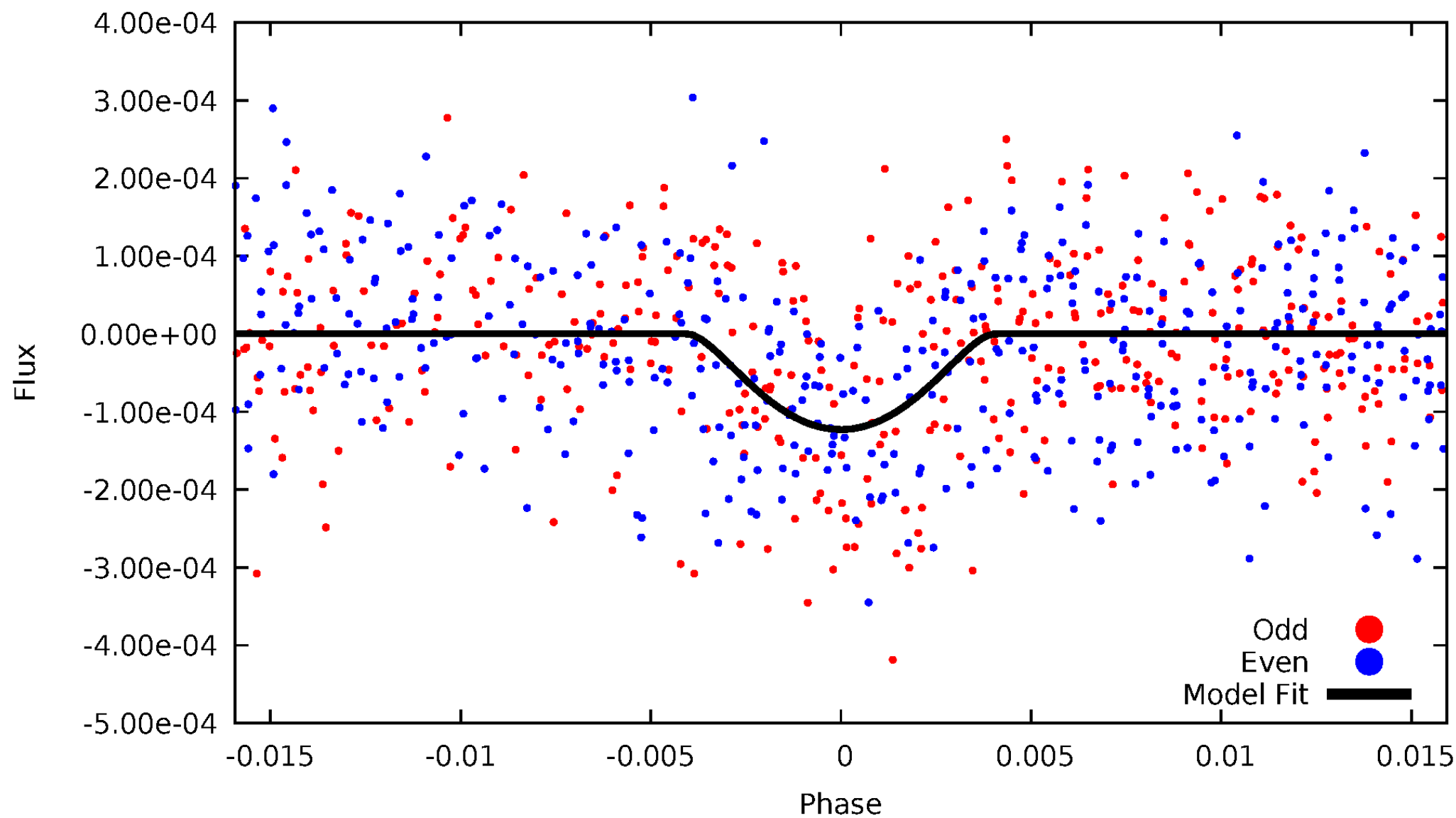


TCE 007464205-03



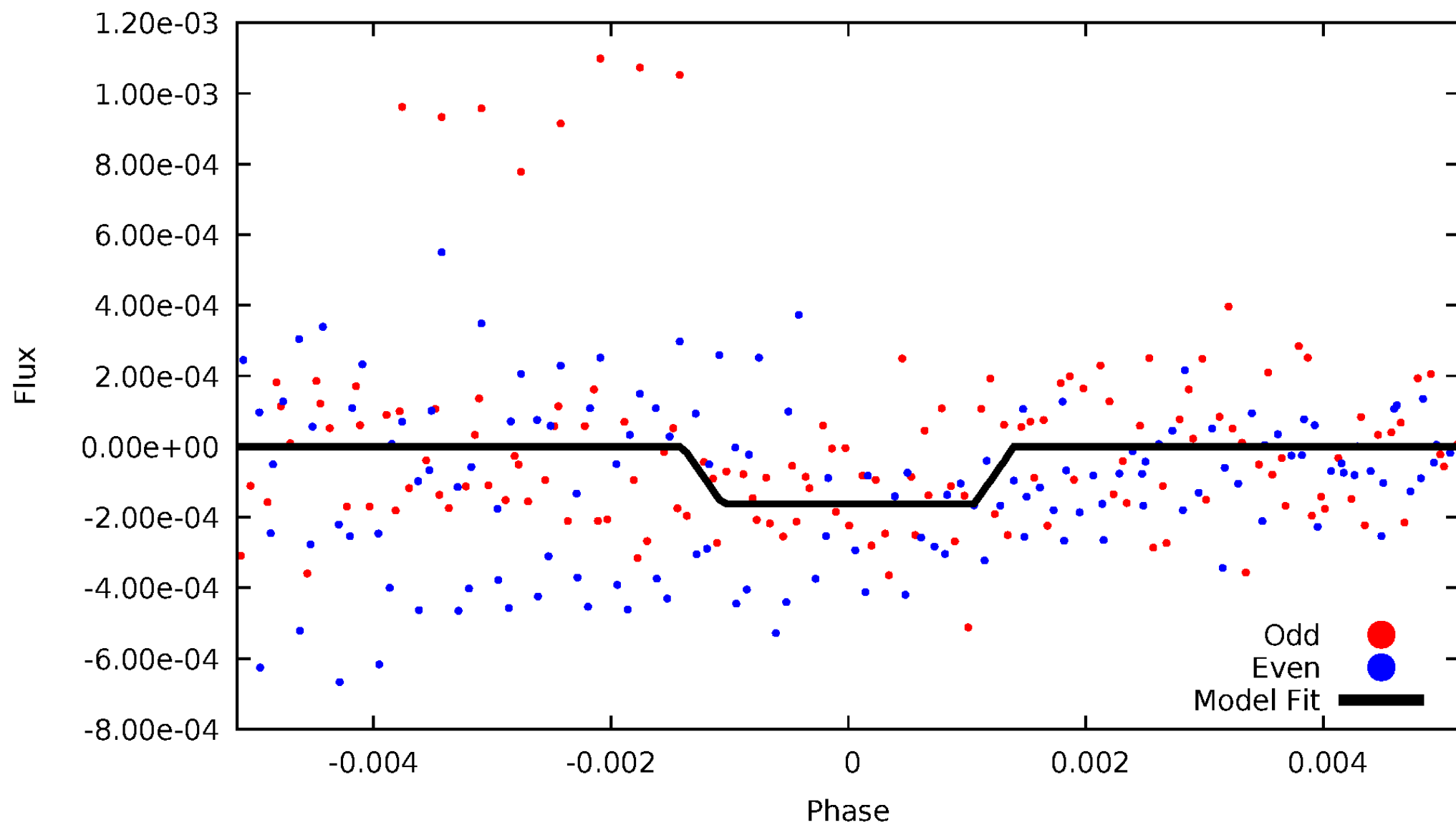
# DV Odd/Even

TCE 007464205-03



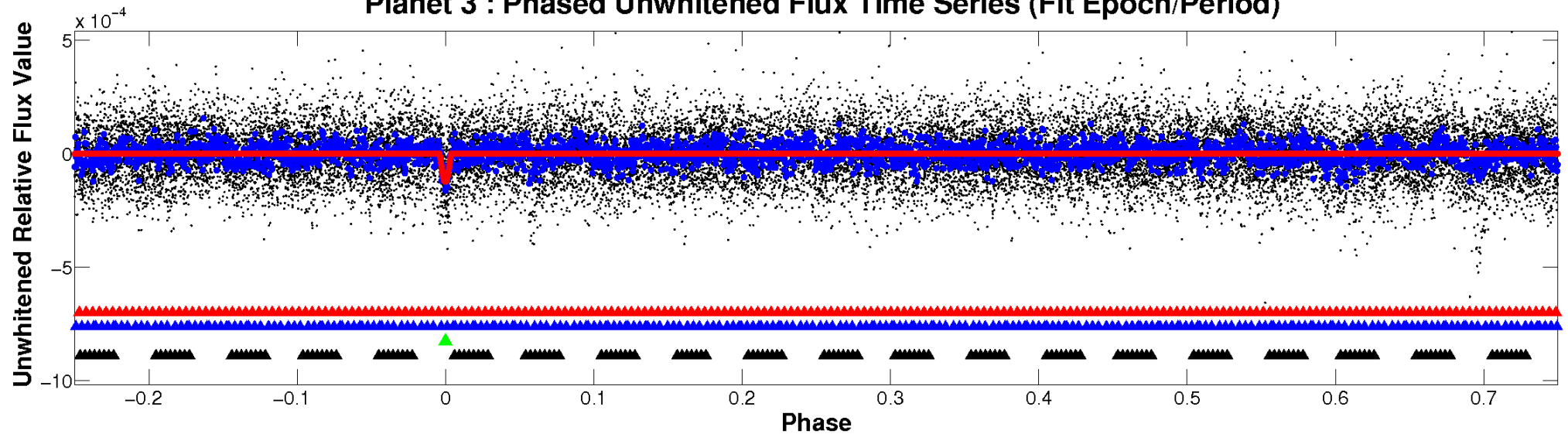
# ALT Odd/Even

TCE 007464205-03

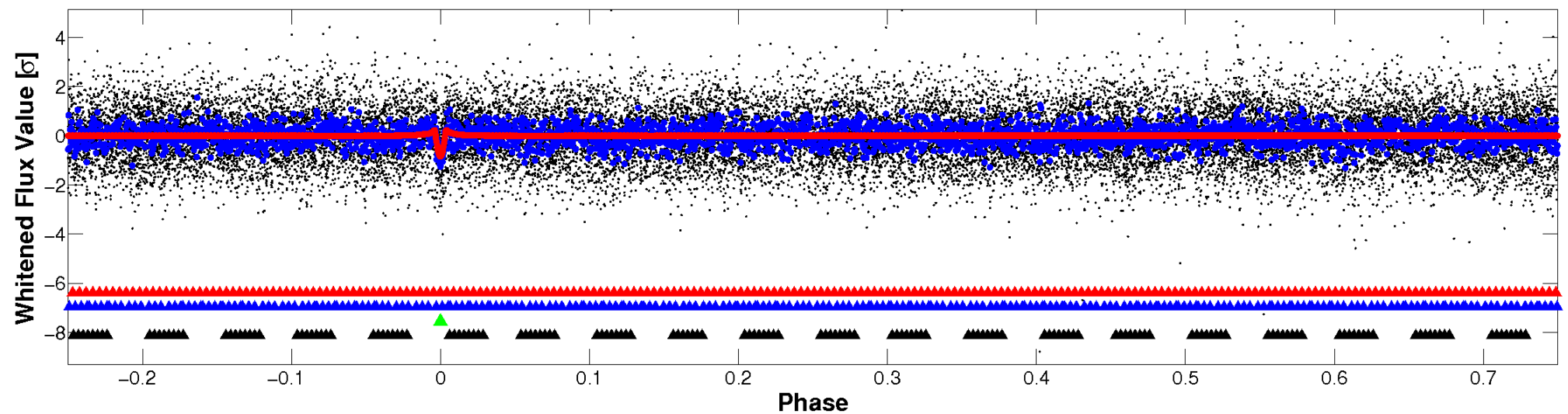


# Non-Whitened Vs. Whitened Light Curve

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

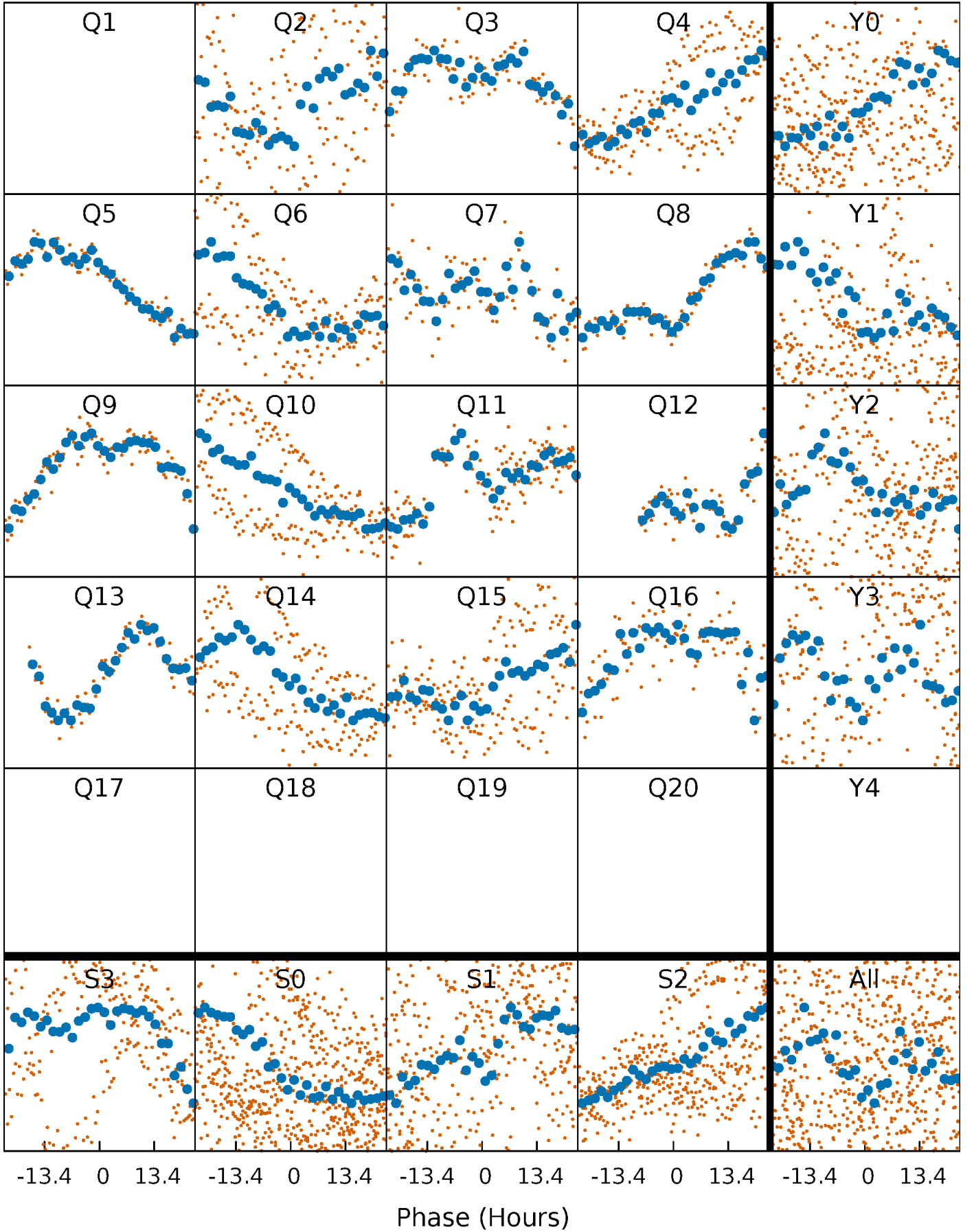


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



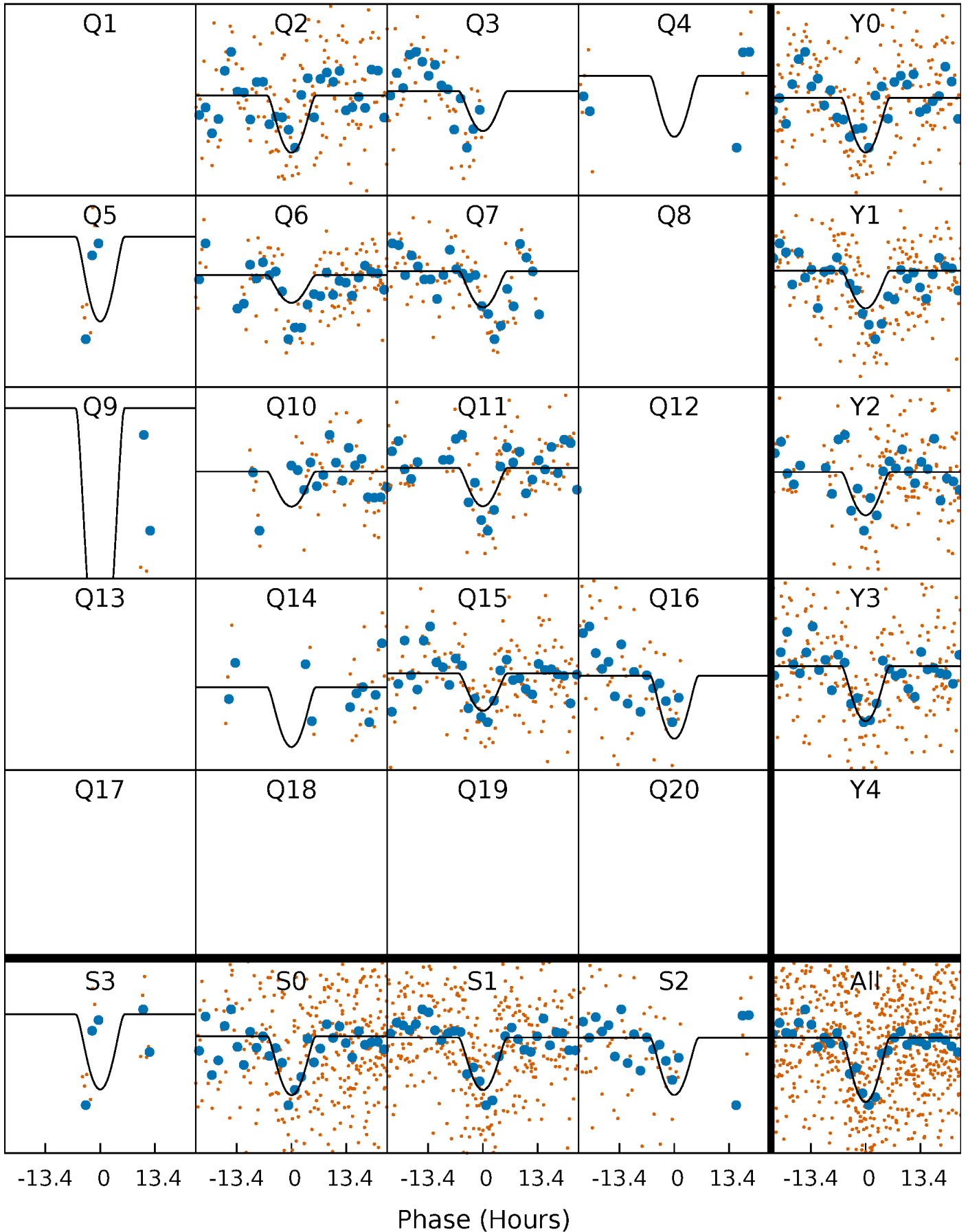
# PDC Quarter-Phased Transit Curves

TCE 007464205-03     $P = 61.157994$  Days     $T_0 = 176.744884$  (BKJD)



# DV Quarter-Phased Transit Curves

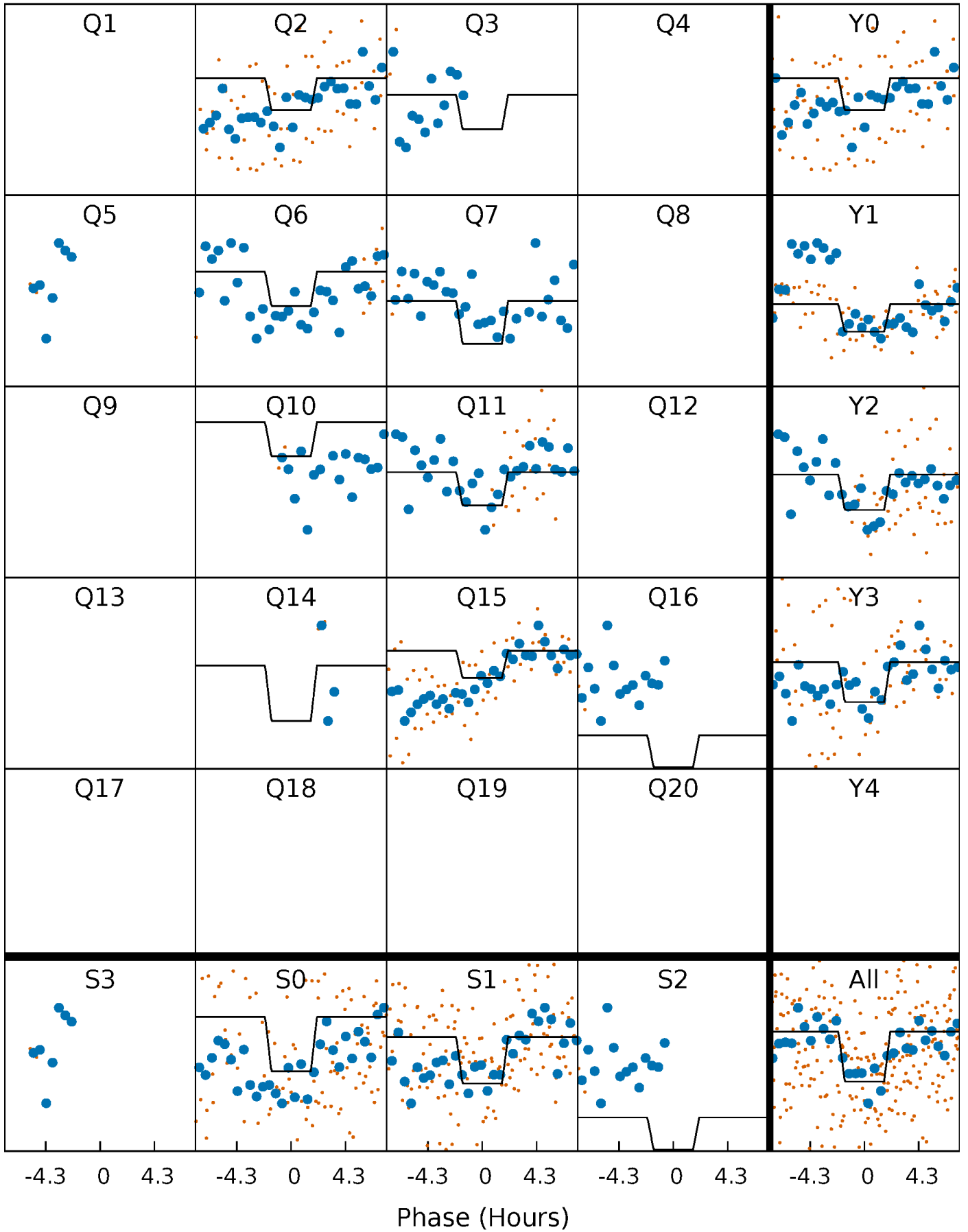
TCE 007464205-03     $P = 61.157994$  Days     $T_0 = 176.744884$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

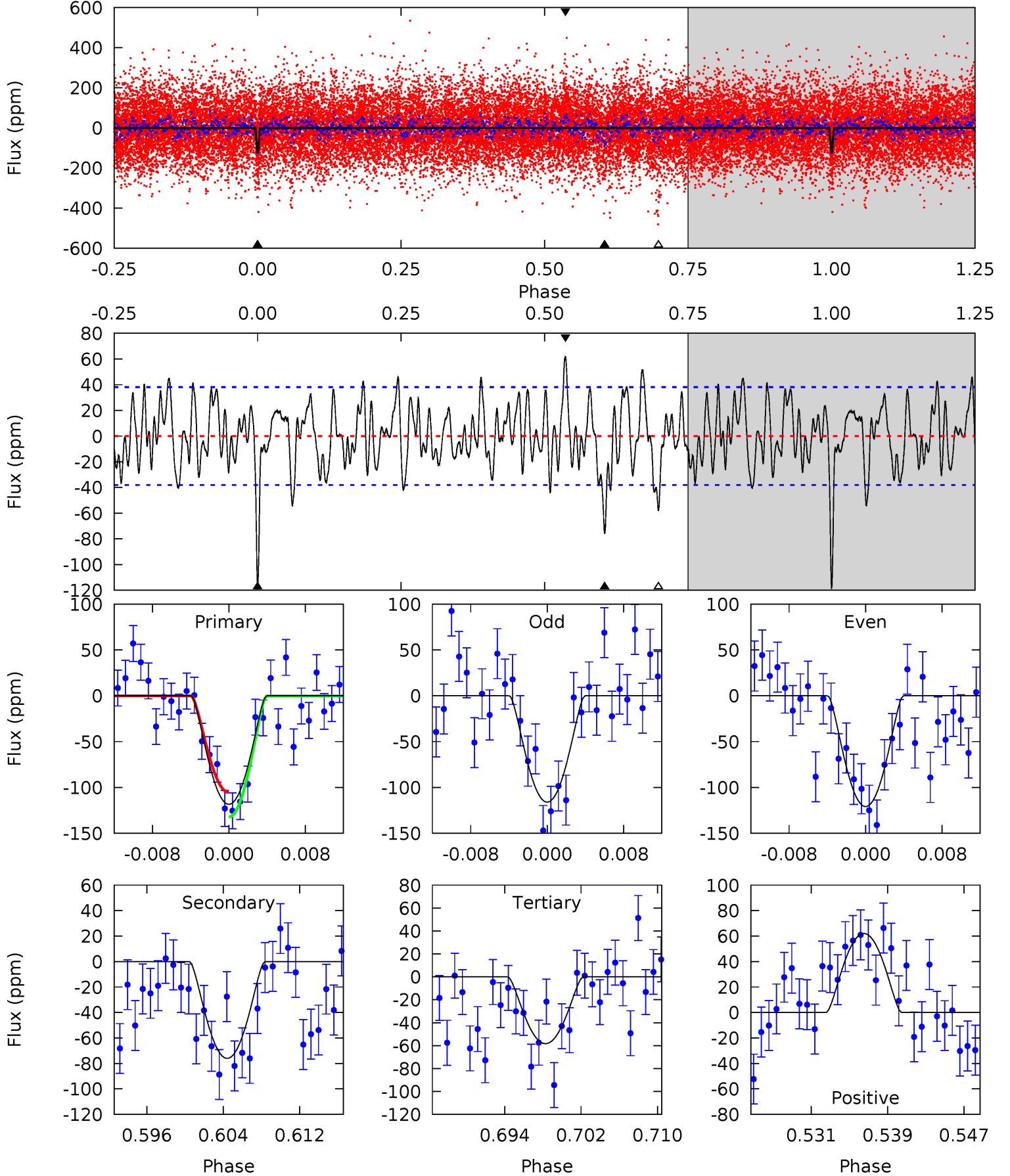
TCE 007464205-03 P= 61.160043 Days  $T_0=176.785703$  (BKJD)



# DV Model-Shift Uniqueness Test

007464205-03, P = 61.157994 Days, E = 115.586890 Days

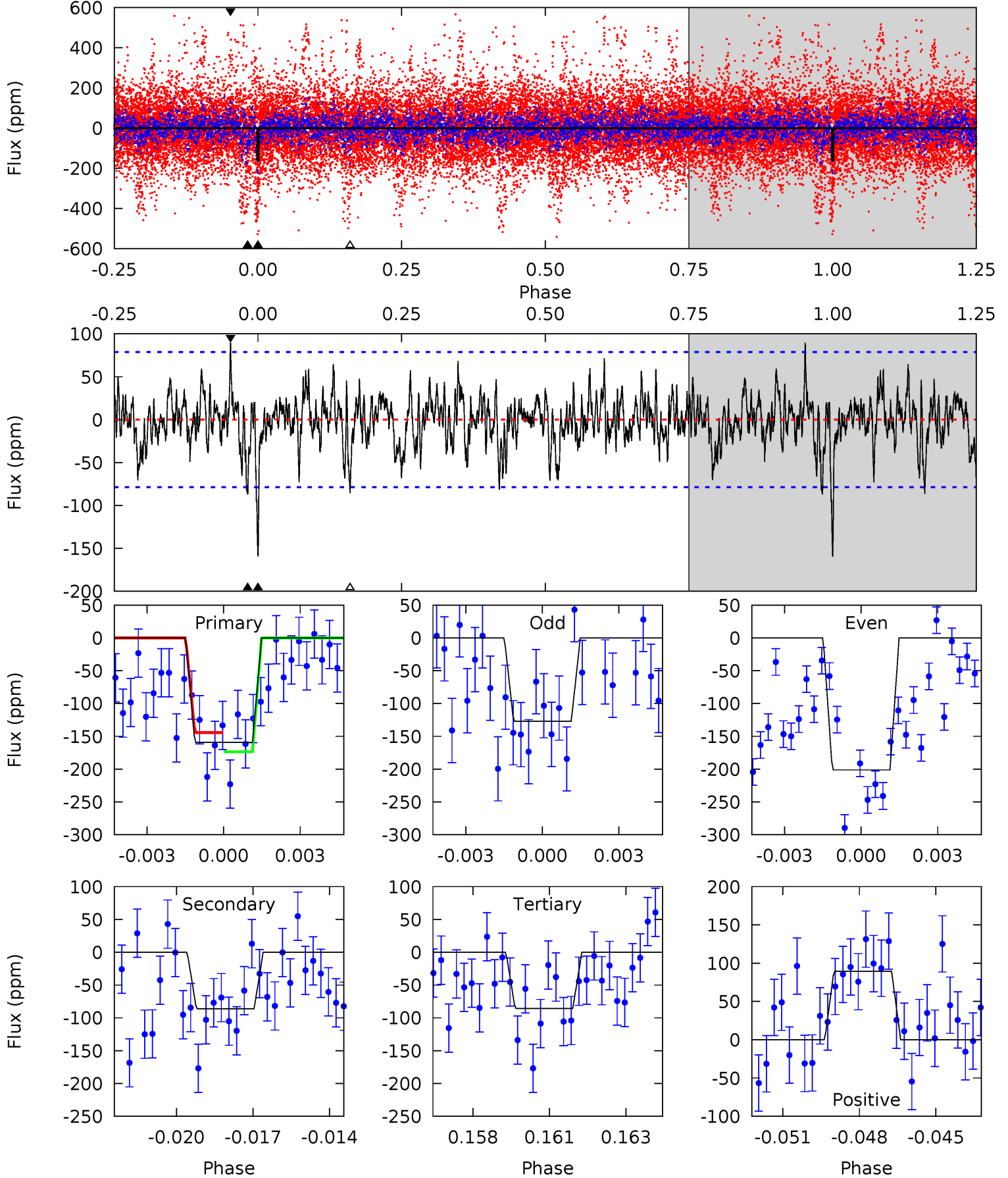
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 15.8 | 10.1 | 7.76 | 8.26 | 5.07            | 2.65            | 2.78             | 8.00    | 7.50    | 2.36    | 1.86    | 0.32    | 0.87 | 0.34  | 1.78 |



# Alt Model-Shift Uniqueness Test

007464205-03, P = 61.160043 Days, E = 115.625660 Days

| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 10.7 | 5.77 | 5.72 | 5.99 | 5.26            | 2.99            | 1.63             | 4.93    | 4.67    | 0.05    | -0.22   | 2.43    | 1.28 | 0.36  | 0.99 |



### Stellar Parameters For KIC 007464205

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                     | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
|        | $6004^{+180}_{-162}$ | $3.942^{+0.292}_{-0.097}$ | $-0.240^{+0.350}_{-0.250}$ | $1.842^{+0.377}_{-0.613}$ | $1.082^{+0.179}_{-0.179}$ | $0.244^{+0.455}_{-0.090}$                 |
|        | +3%/-3%              | +7%/-2%                   | +146%/-104%                | +20%/-33%                 | +17%/-17%                 | +186%/-37%                                |
| Source | PHO1                 | FLK73                     | KIC0                       | DSEP                      |                           |   |

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

### Secondary Eclipse Parameters for KIC 007464205-03 / KOI

| Detrend | Depth (ppm)  | $R_p (R_{\oplus})$     | $T_{max} (K)$     | $T_{obs} (K)$         | $A_{obs}$         |
|---------|--------------|------------------------|-------------------|-----------------------|-------------------|
| DV      | $-76 \pm 8$  | $7.73^{+7.90}_{-5.28}$ | $883^{+55}_{-76}$ | $3326^{+1717}_{-602}$ | $68^{+668}_{-51}$ |
| Alt.    | $-86 \pm 15$ | $7.47^{+7.85}_{-5.15}$ | $882^{+57}_{-81}$ | $3411^{+1821}_{-624}$ | $84^{+780}_{-64}$ |

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

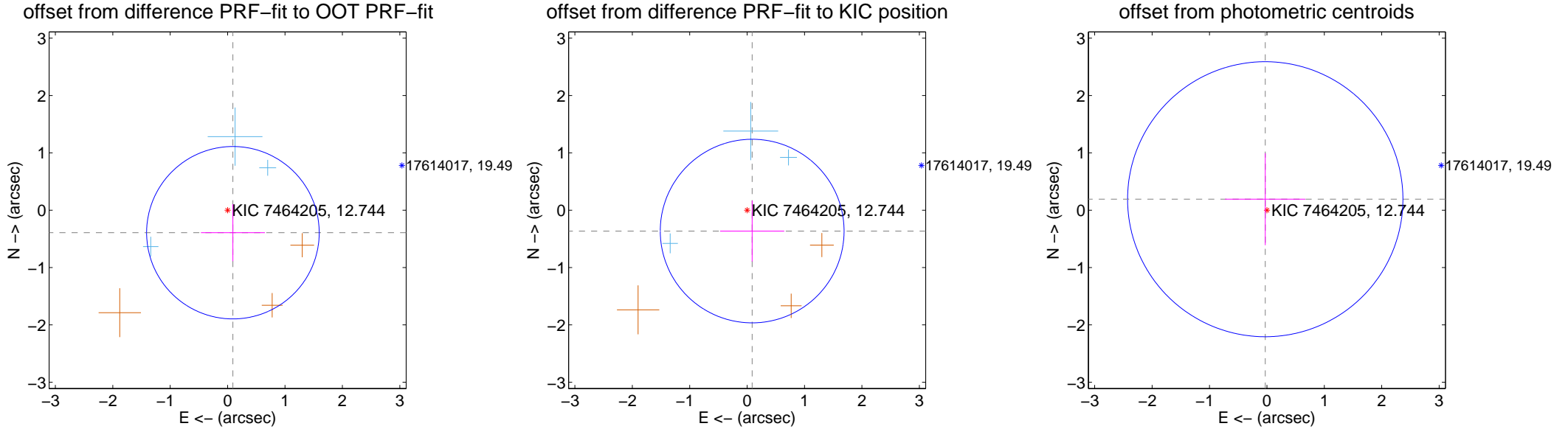
## DV Centroid Data

Supplemental centroid analysis for 007464205-03. Kepler magnitude: 12.74. Transit SNR 7.95

There are 3 quarters with good PRF difference image offsets

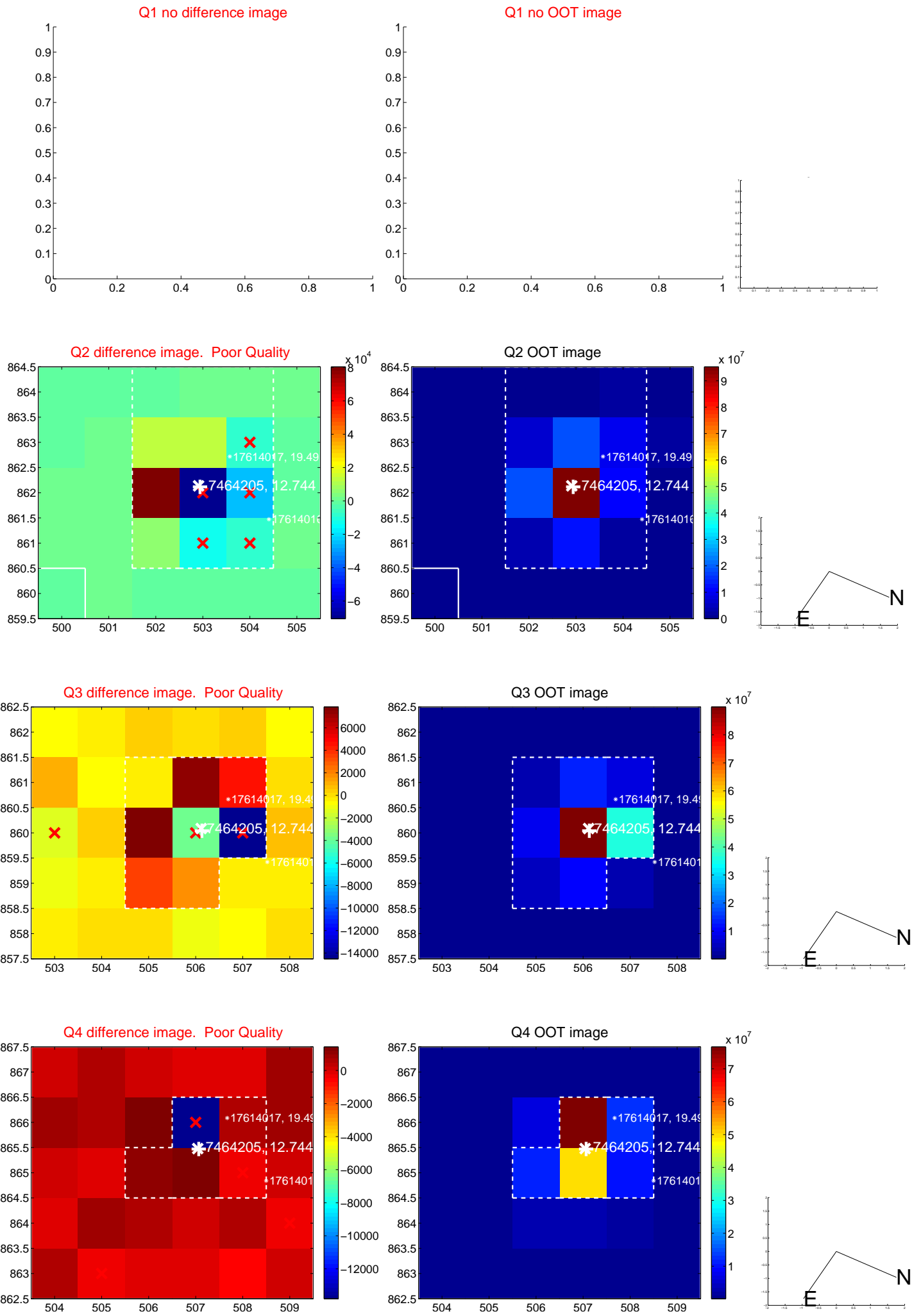
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec       |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT          | $0.403 \pm 0.501$  | 0.80                | $-0.093 \pm 0.558$ | $-0.393 \pm 0.498$ |
| PRF-fit source offset from KIC position | $0.374 \pm 0.534$  | 0.70                | $-0.088 \pm 0.559$ | $-0.364 \pm 0.532$ |
| photometric centroid source offset      | $0.19 \pm 0.80$    | 0.24                | $0.03 \pm 0.70$    | $0.19 \pm 0.80$    |



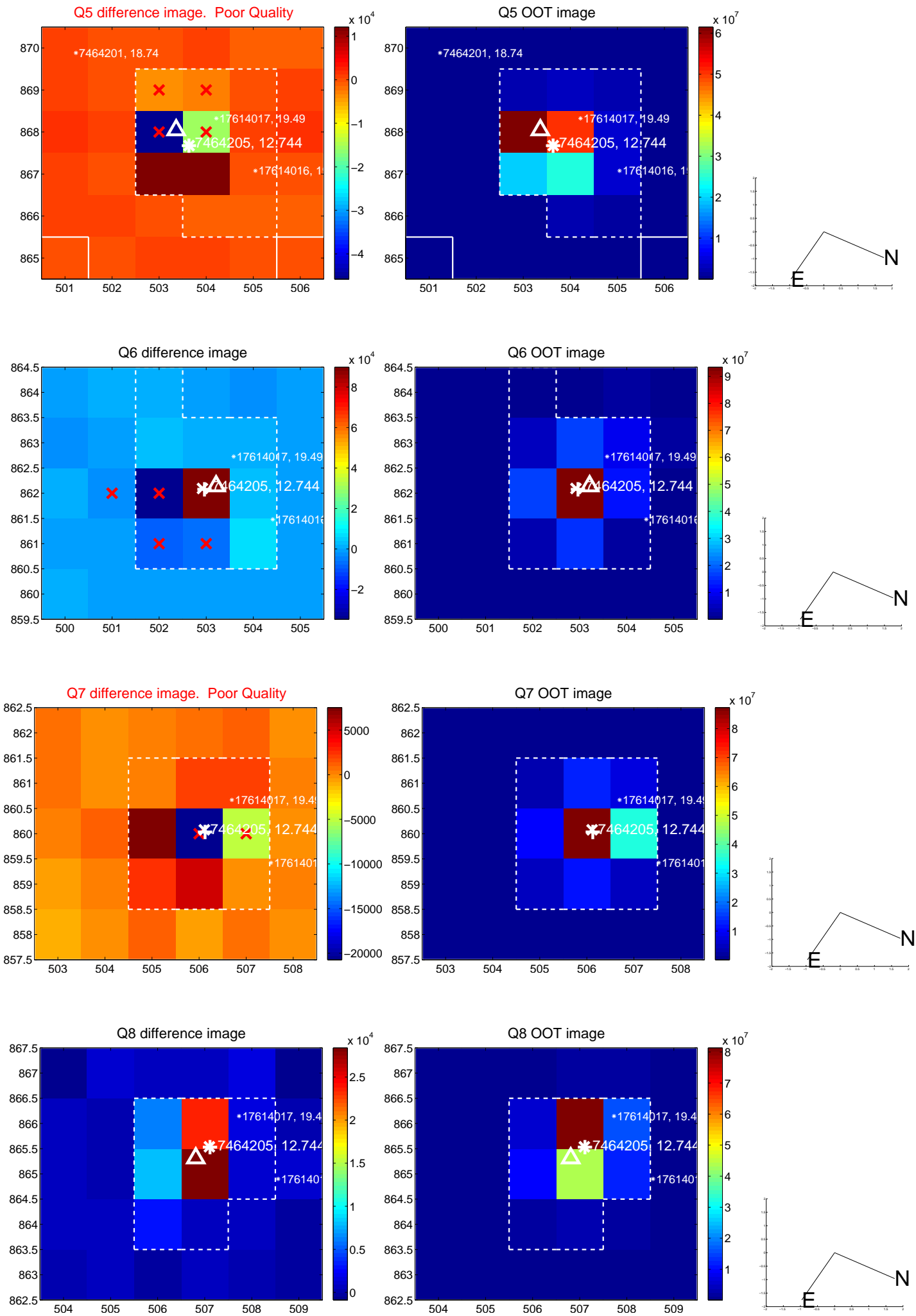
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

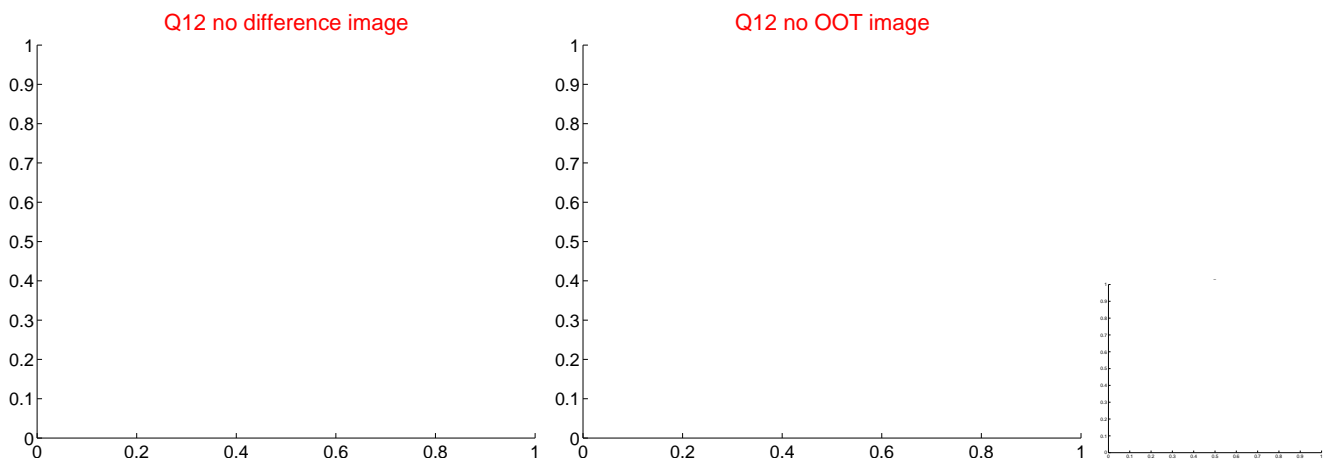
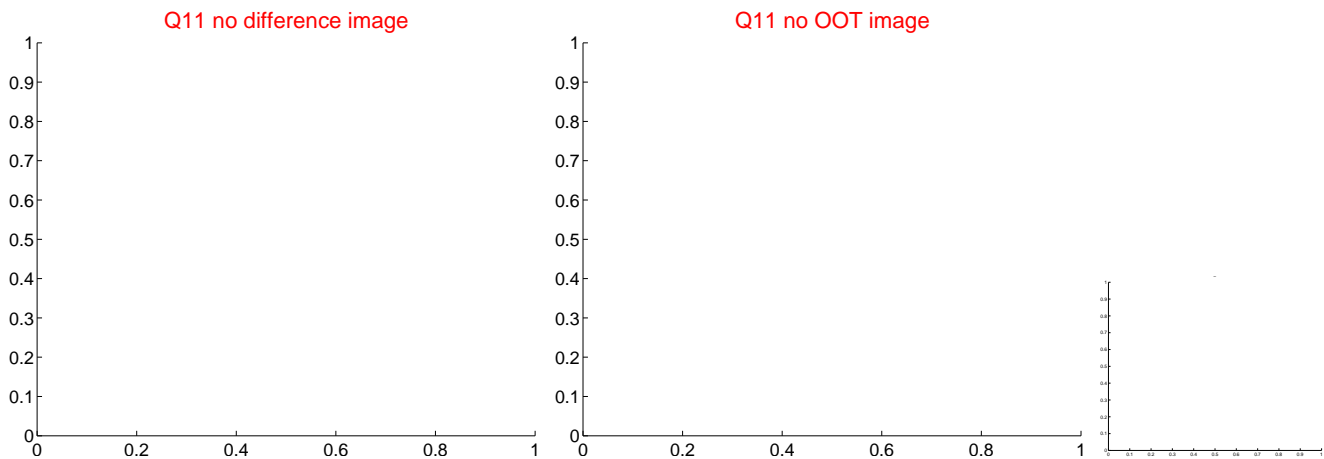
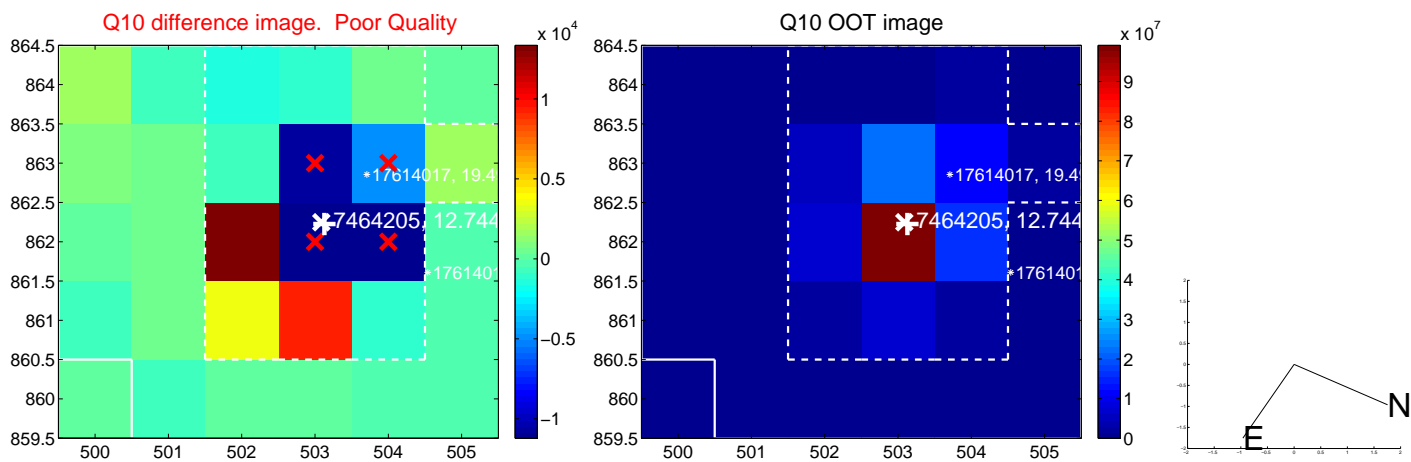
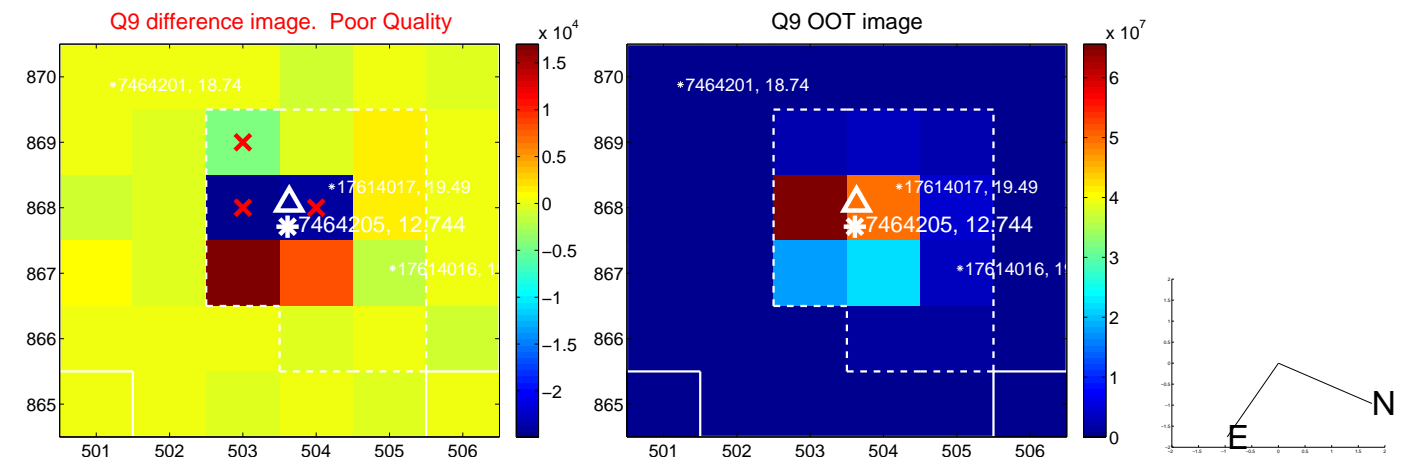




white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.

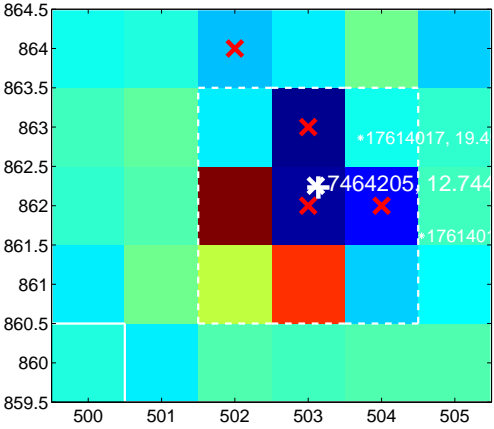
Q13 no difference image



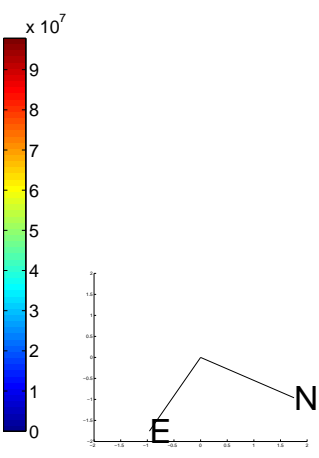
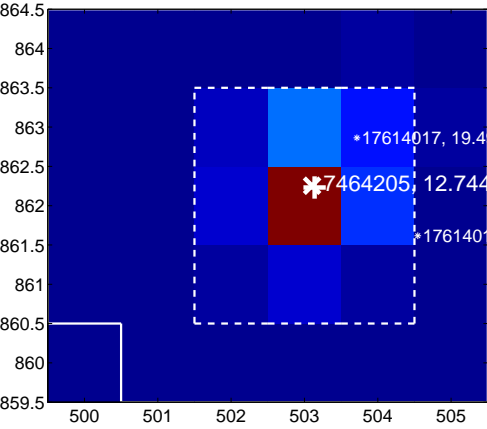
Q13 no OOT image



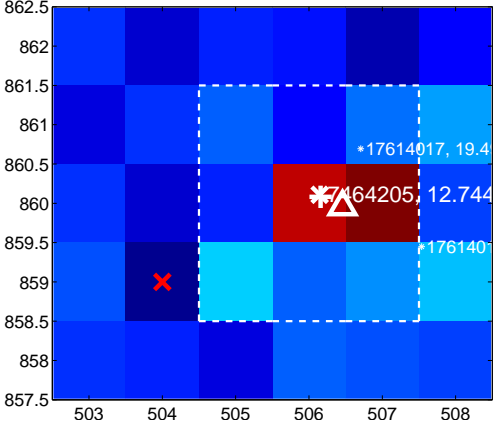
Q14 difference image. Poor Quality



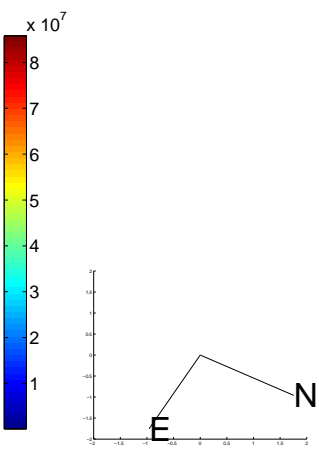
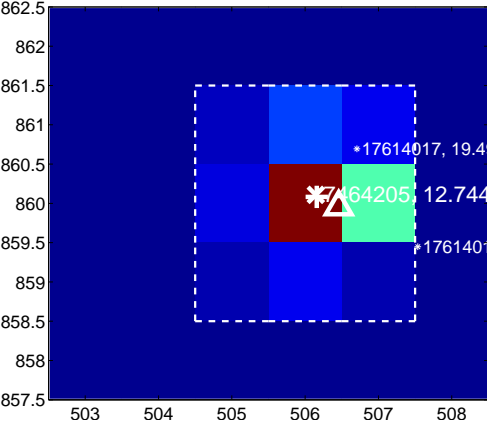
Q14 OOT image



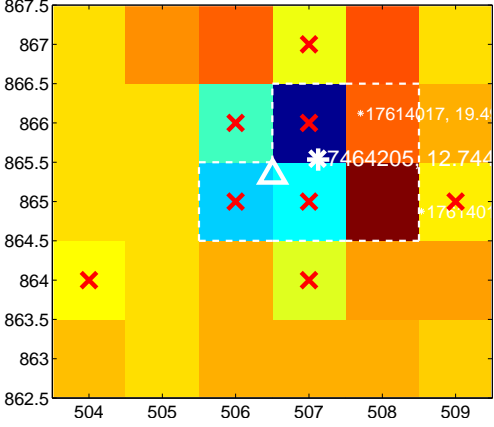
Q15 difference image



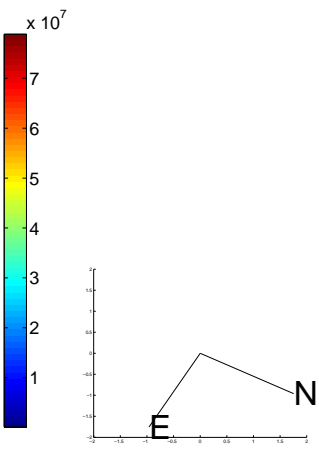
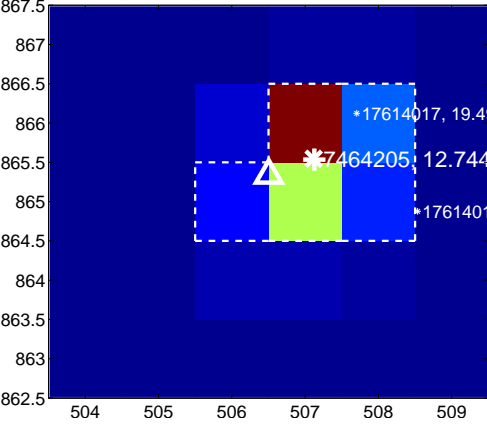
Q15 OOT image



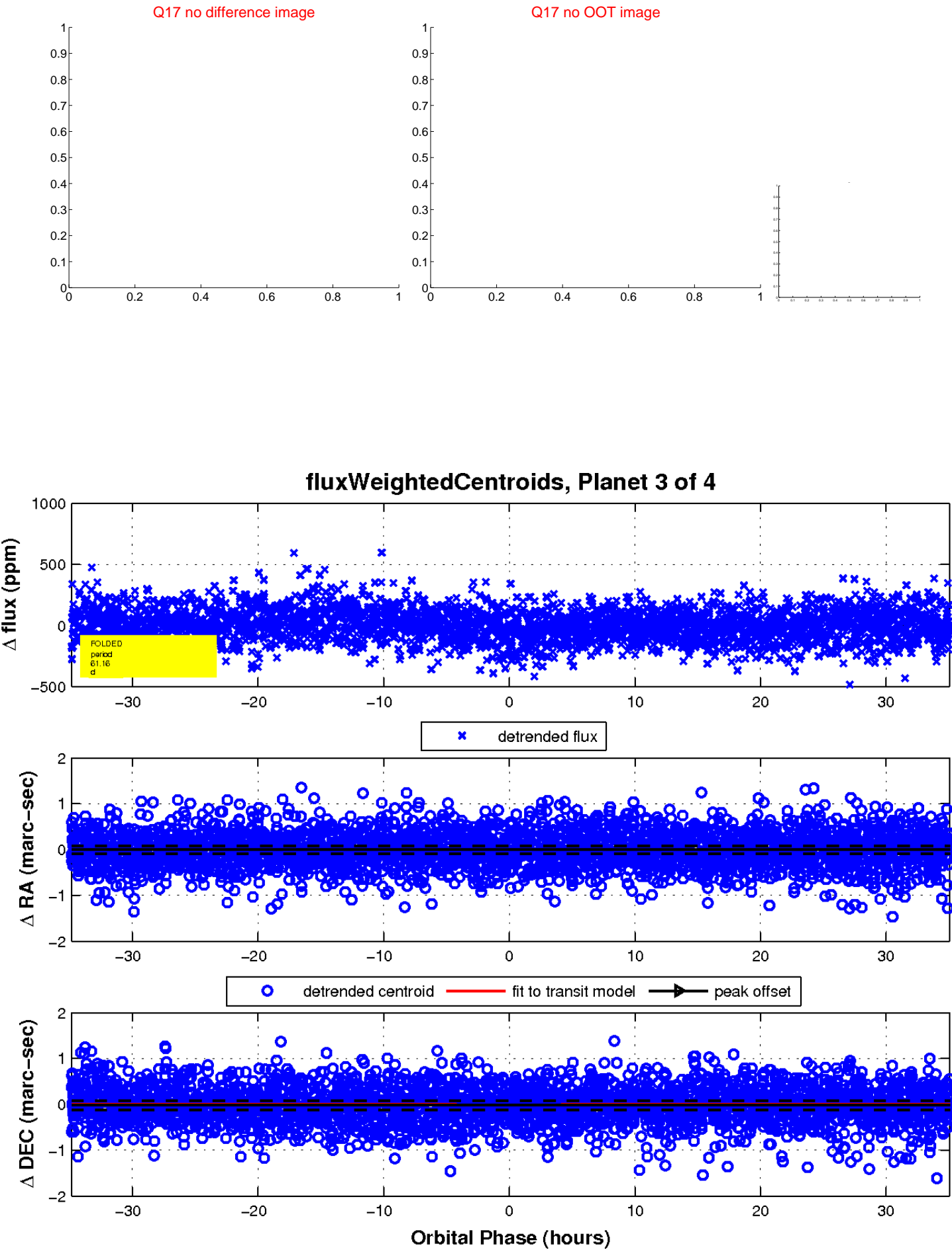
Q16 difference image. Poor Quality



Q16 OOT image

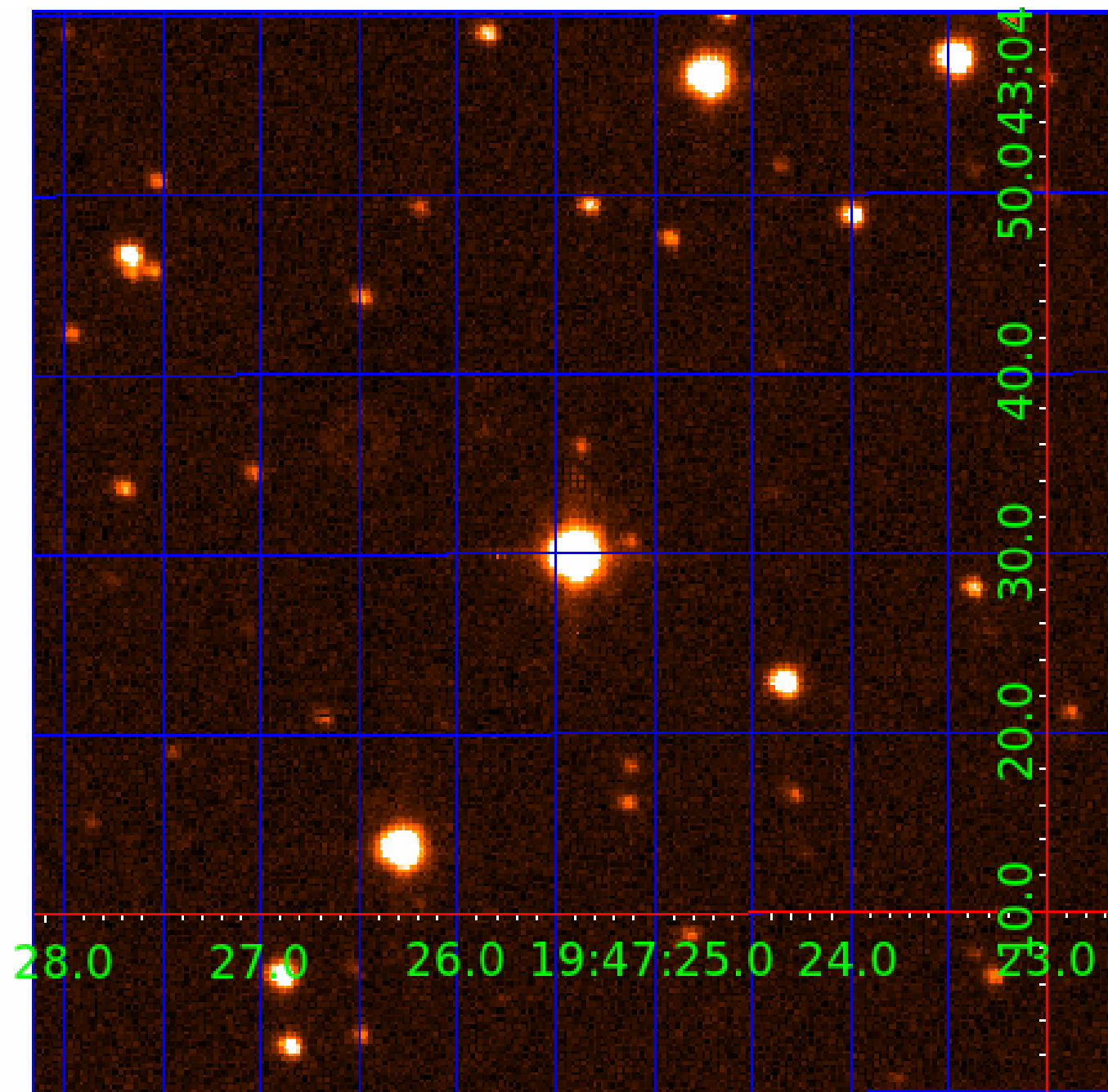


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination



# KIC 007464205

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|-----|-----------------------------|-----------------|------------------------|------------------------|
| 007464205-01 | OBS      | No   | 5.485041      | 132.027422   | 33.5        | 8.971            | 10.0 | 9.3 | 1.84                        | 6004            | 1.39                   | 1010.67                |
| 007464205-02 | OBS      | No   | 5.485398      | 135.633066   | 28.6        | 18.106           | 10.2 | 9.5 | 1.84                        | 6004            | 1.21                   | 1010.59                |
| 007464205-03 | OBS      | No   | 61.157994     | 176.744884   | 122.8       | 11.690           | 8.8  | 7.9 | 1.84                        | 6004            | 3.89                   | 40.57                  |
| 007464205-04 | OBS      | No   | 9.183550      | 134.131122   | 37.1        | 10.780           | 8.3  | 7.0 | 1.84                        | 6004            | 1.35                   | 508.36                 |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments  |
|--------------|----------|------|-------|---|---|---|---|---|
| 007464205-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                                       |
| 007464205-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—SAME_NTL_PERIOD                               |
| 007464205-03 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS |
| 007464205-04 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—LPP_DV                            |

**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 007464205-04

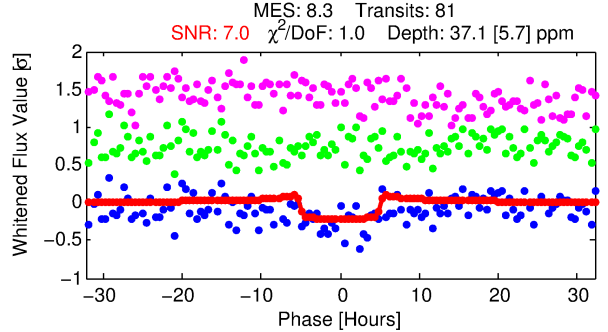
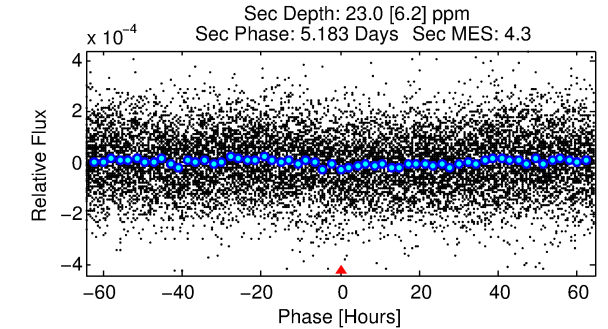
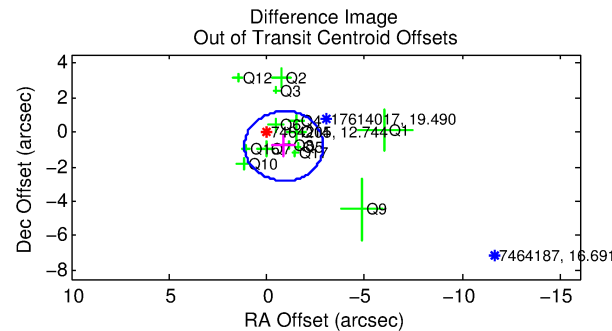
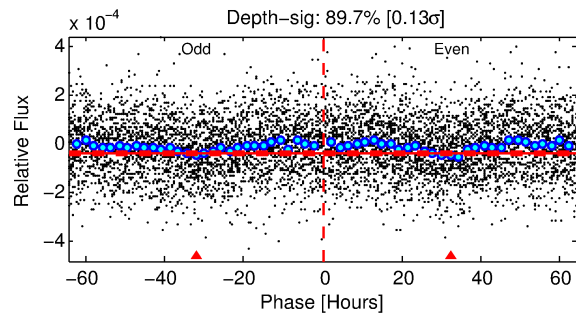
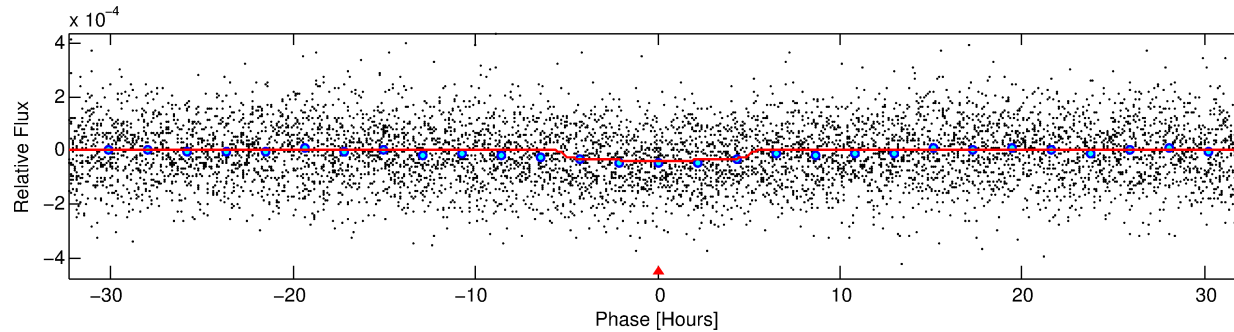
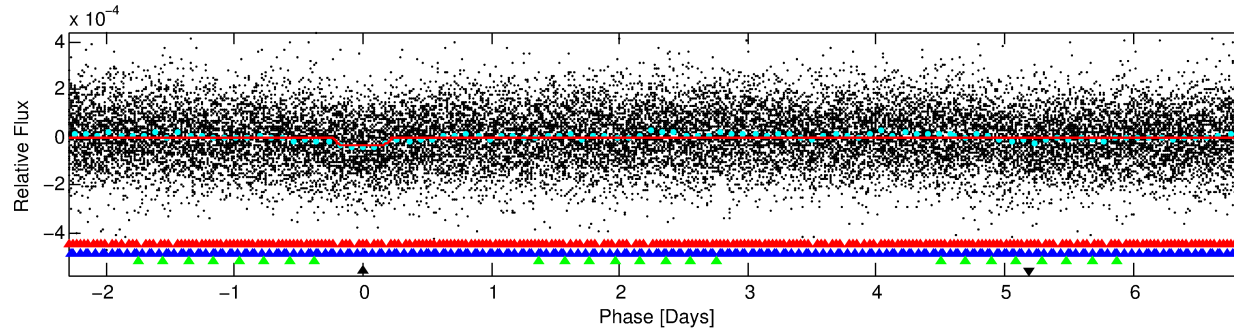
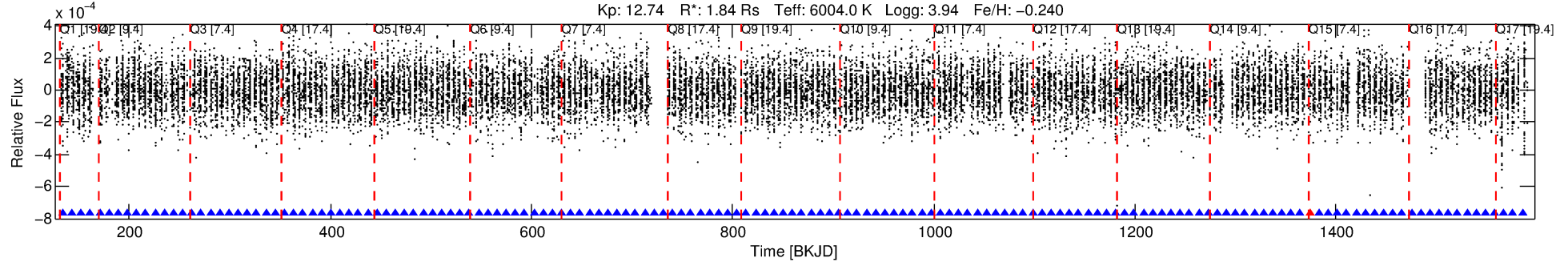
No Significant Match Found



# DV One-Page Summary

KIC: 7464205 Candidate: 4 of 4 Period: 9.184 d  
KOI: K06160 Corr: No Ephemeris Match

Kp: 12.74 R\*: 1.84 Rs Teff: 6004.0 K Logg: 3.94 Fe/H: -0.240



## DV Fit Results:

Period = 9.18355 [0.00020] d  
Epoch = 134.1311 [0.0177] BKJD  
Rp/R\* = 0.0067 [0.0016]  
a/R\* = 2.75 [2.80]  
b = 0.93 [0.18]  
Seff = 508.36 [261.46]  
Teq = 1211 [156] K  
Rp = 1.35 [0.55] Re  
a = 0.0882 [0.0278] AU  
Ag = 53.64 [39.35] [1.34σ]  
Teffp = 5066 [696] K [5.40σ]

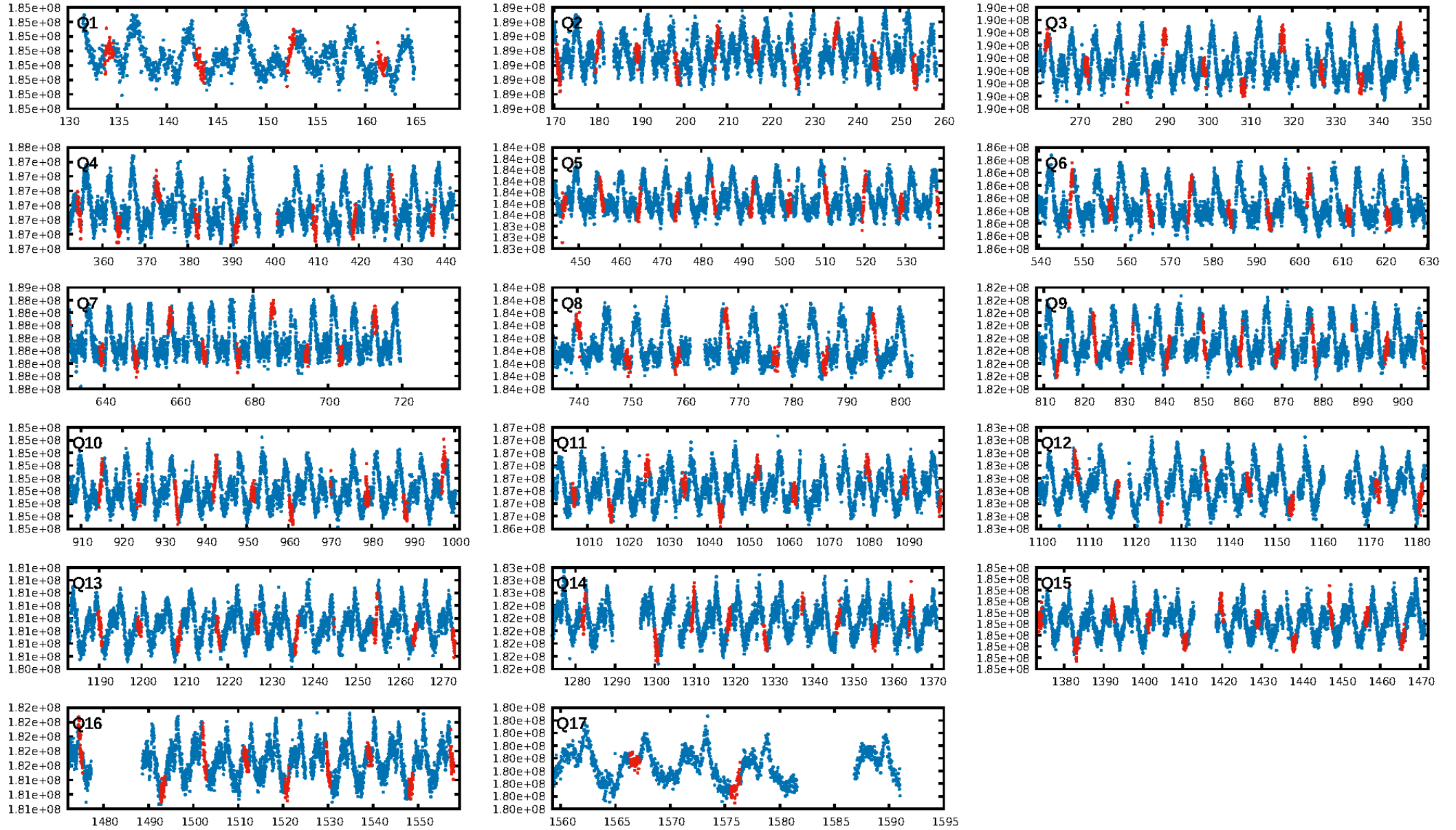
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [4.21σ]  
LongPeriod-sig: 100.0% [78.44σ]  
ModelChiSquare2-sig: 39.6%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 1.38e-10**  
RollingBand-fgt: 0.99 [77/78]  
GhostDiagnostic-chr: -3.864  
Centroid-sig: 34.2%  
Centroid-so: 0.743 arcsec [1.02σ]  
OotOffset-rm: 1.189 arcsec [1.77σ]  
KicOffset-rm: 1.124 arcsec [1.80σ]  
OotOffset-st: 4/2/4/4 [14]  
KicOffset-st: 4/2/4/4 [14]  
DiffImageQuality-fgm: 0.50 [7/14]  
DiffImageOverlap-fno: 1.00 [17/17]

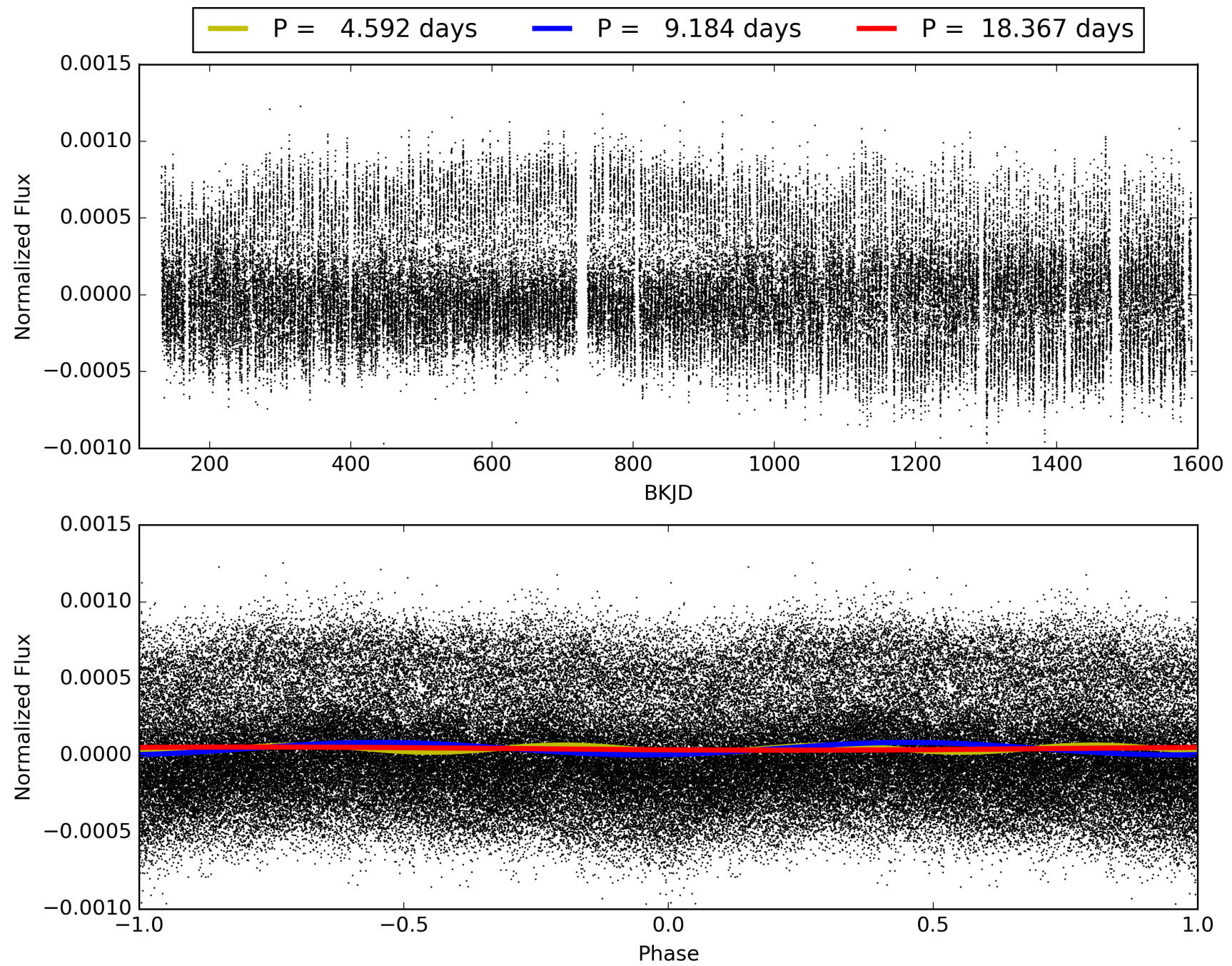
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 07:27:09 Z

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

# TCE 007464205-04, PDC Light Curves



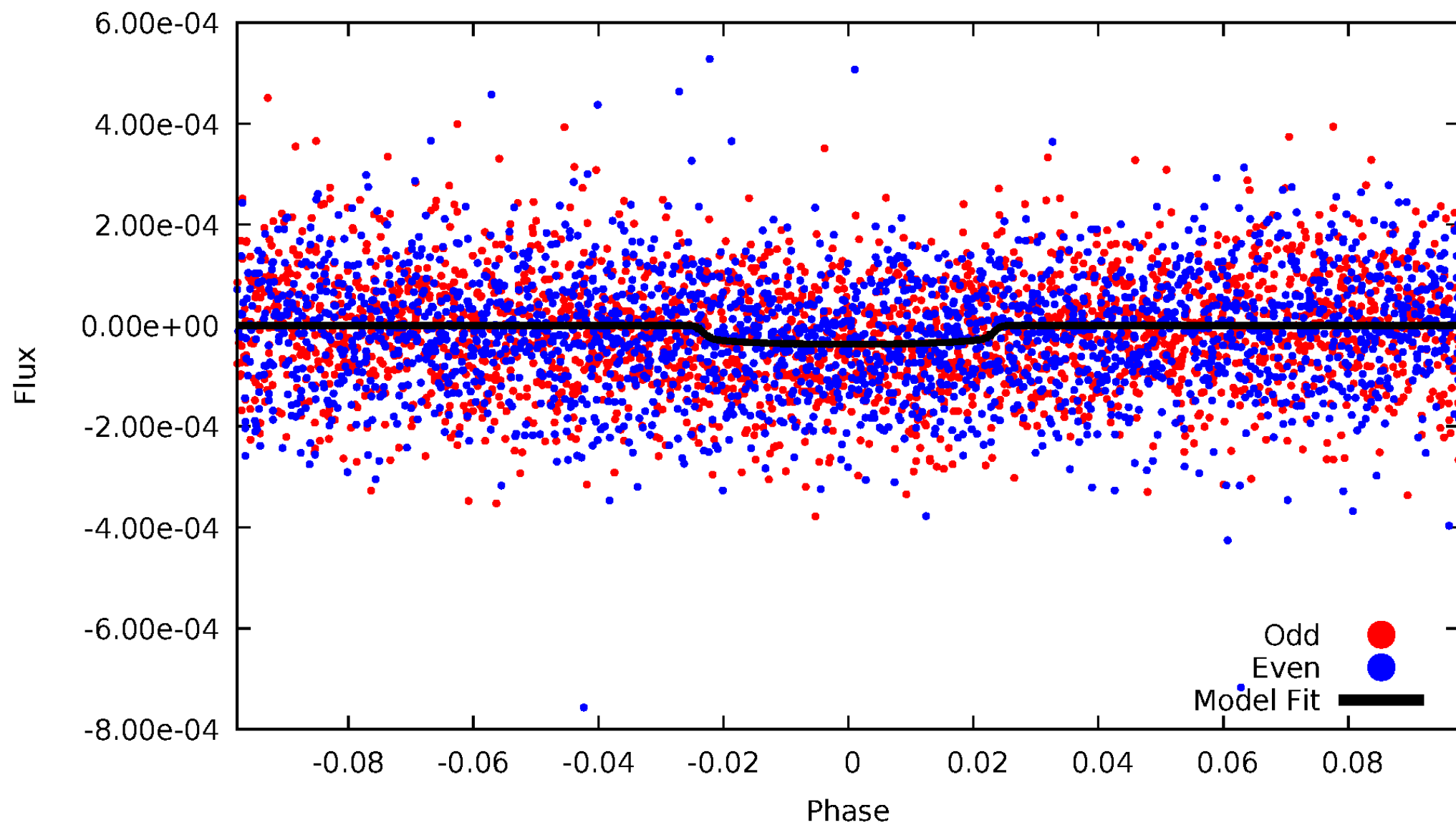
TCE 007464205-04





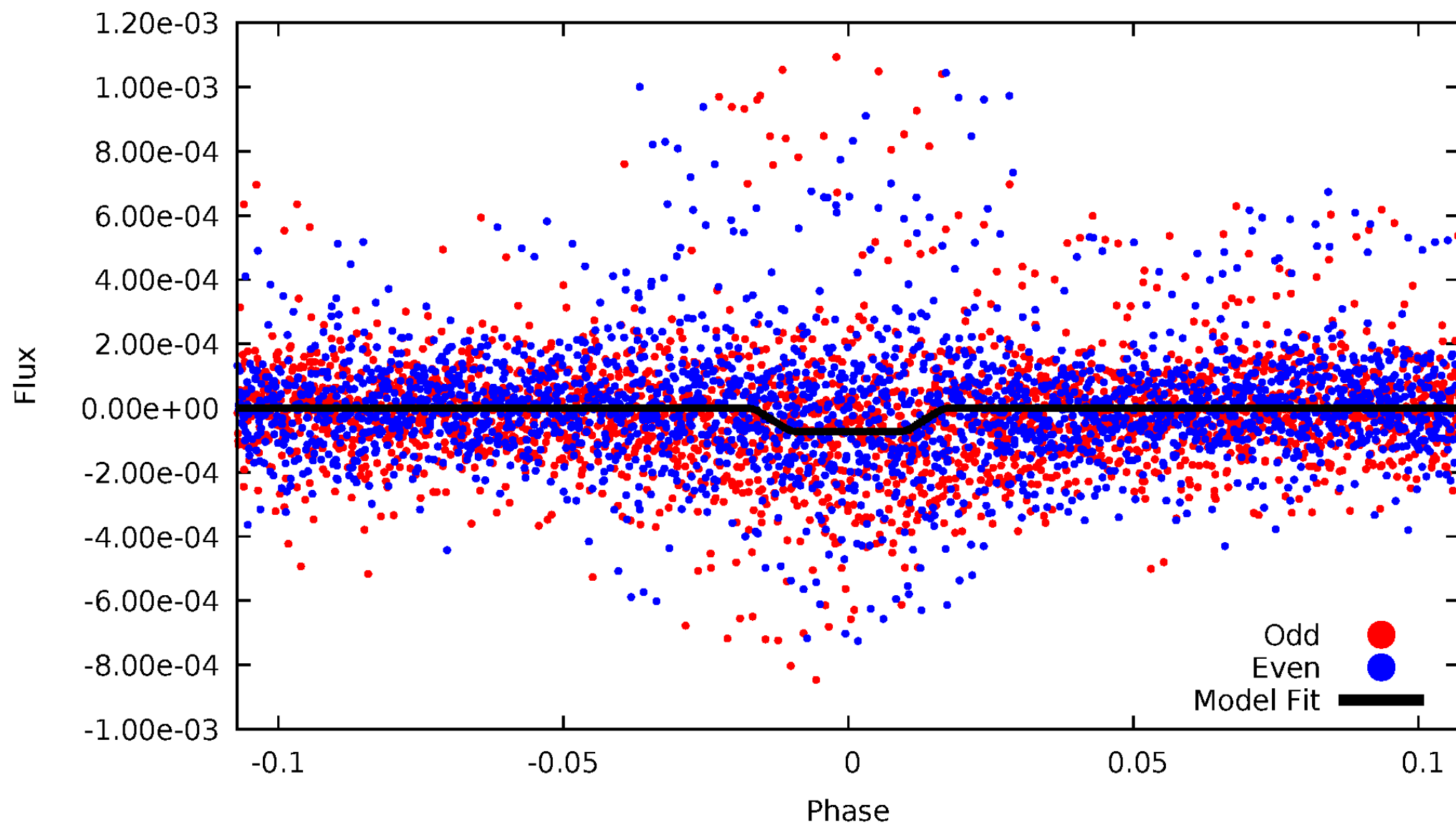
# DV Odd/Even

TCE 007464205-04



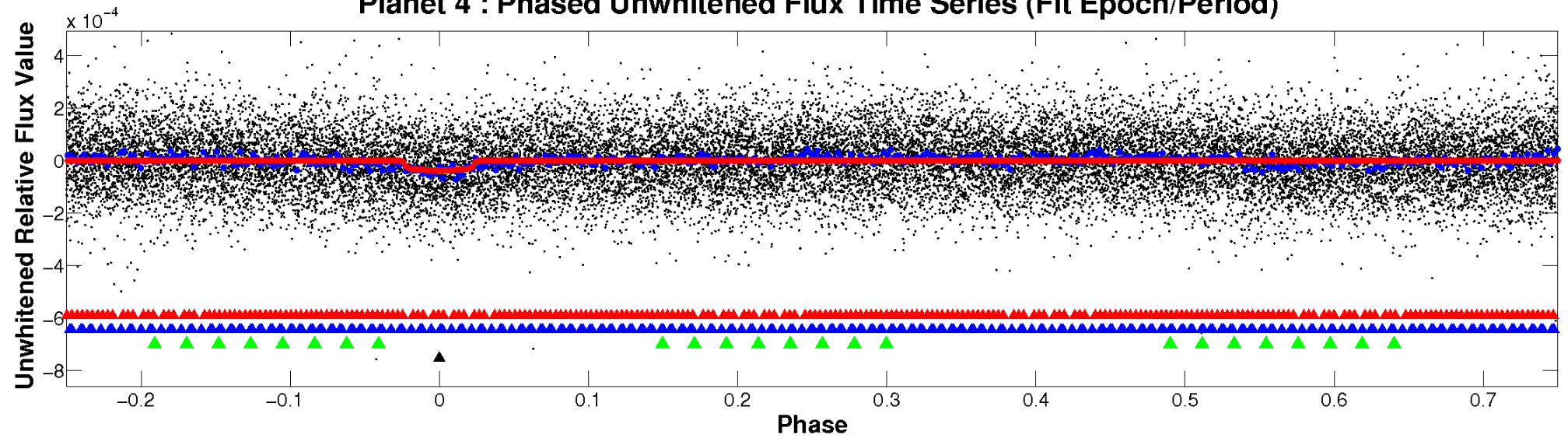
# ALT Odd/Even

TCE 007464205-04

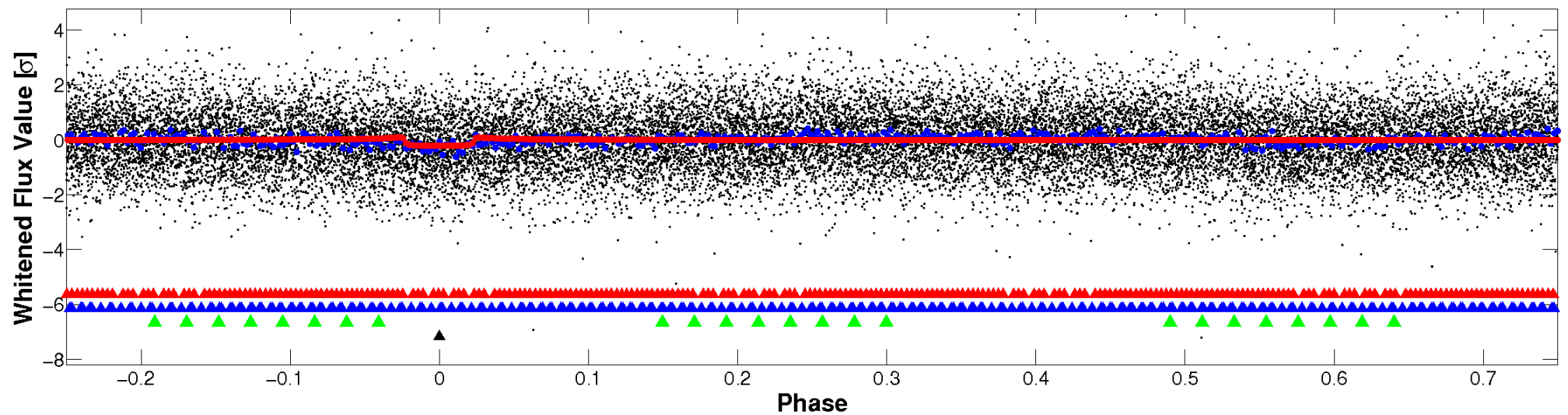


# Non-Whitened Vs. Whitened Light Curve

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



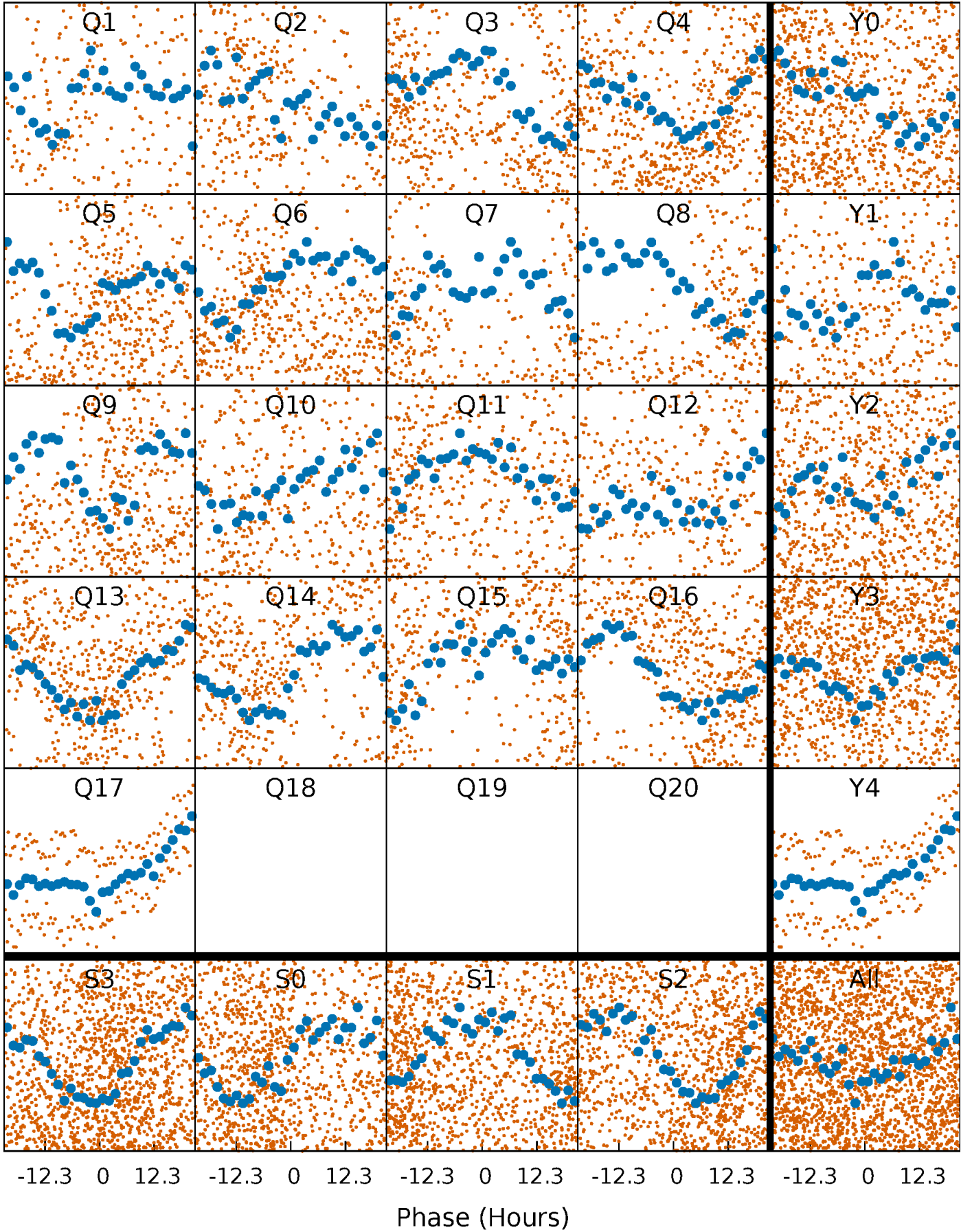
## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)





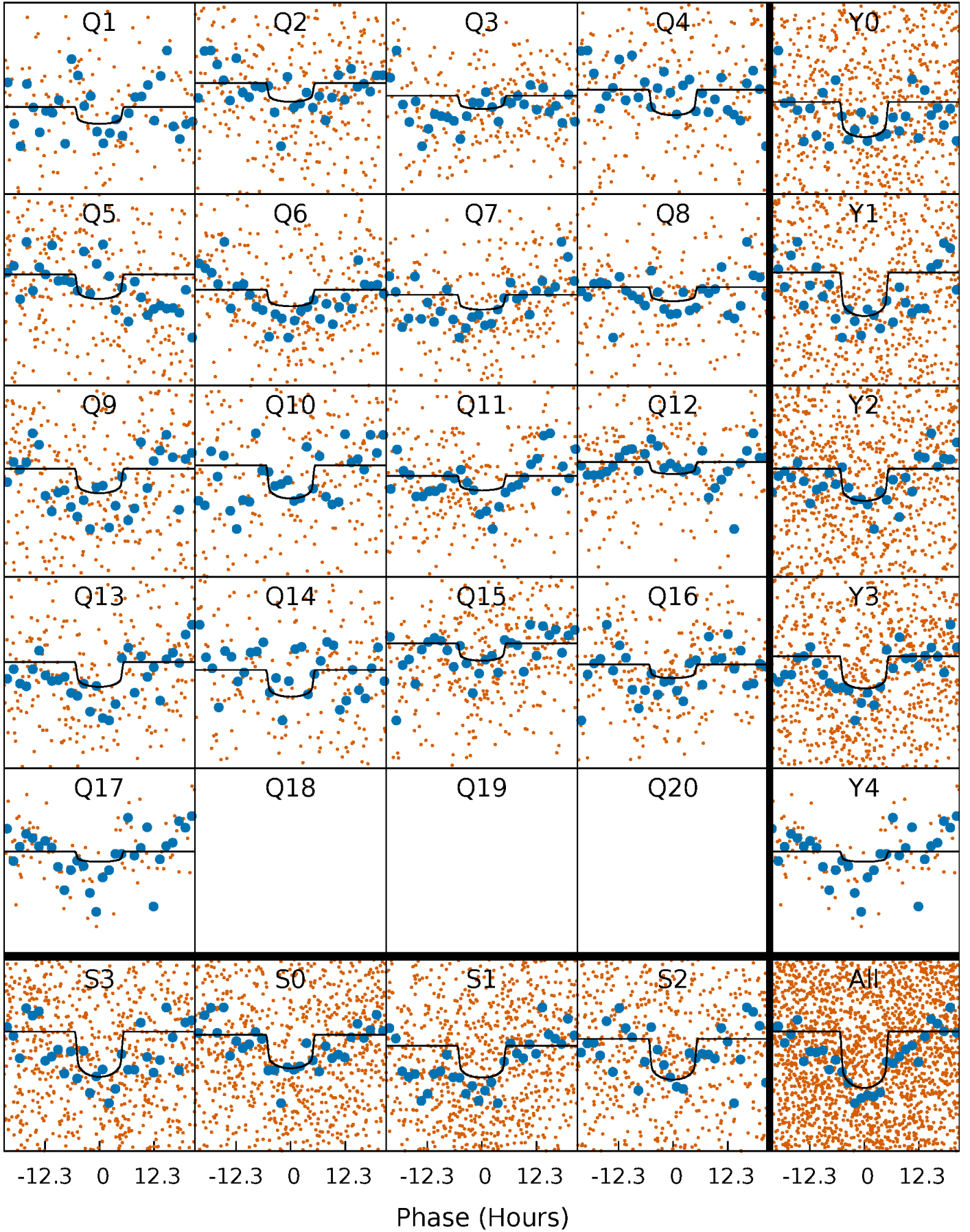
# PDC Quarter-Phased Transit Curves

TCE 007464205-04    P= 9.183550 Days     $T_0=134.131122$  (BKJD)



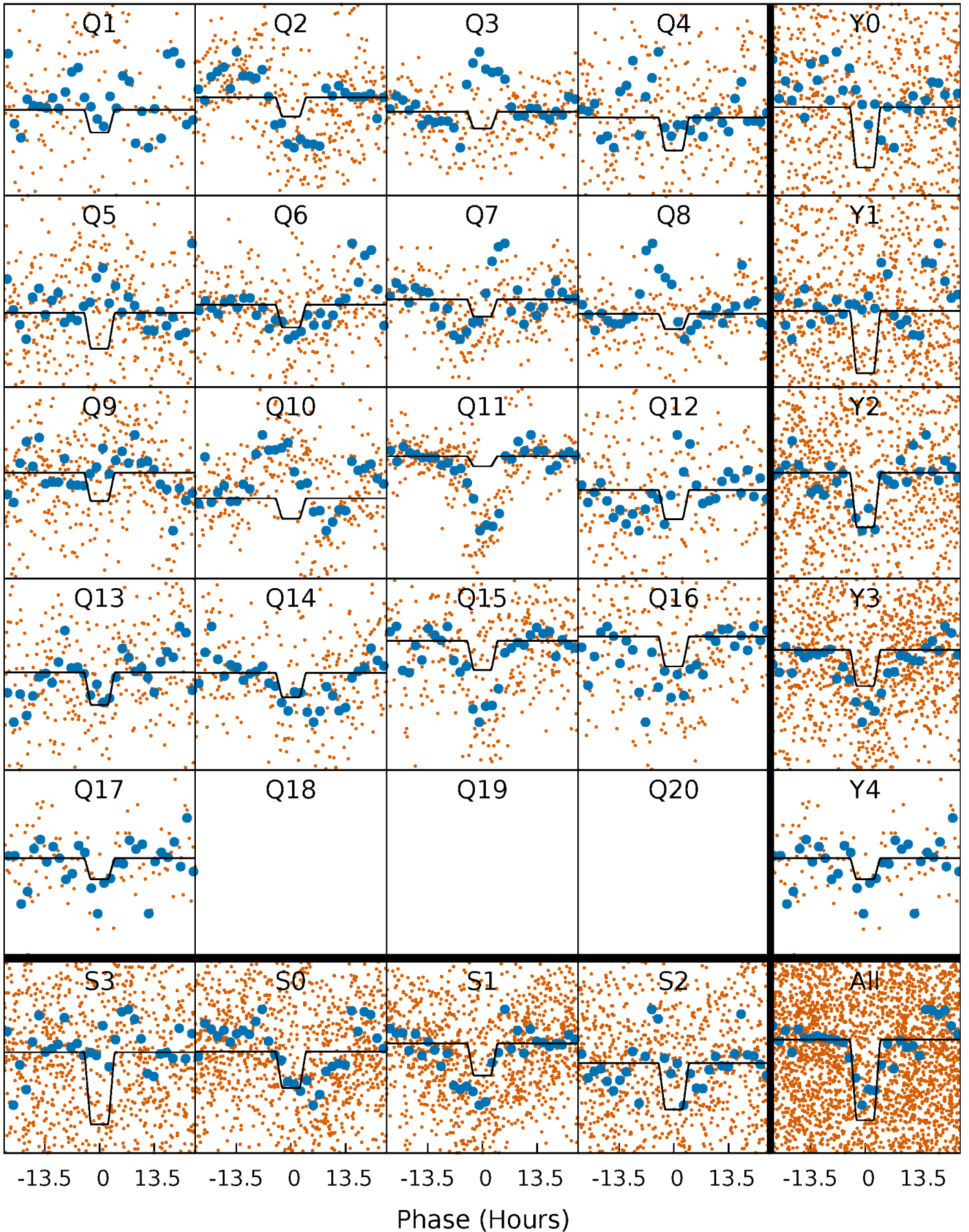
# DV Quarter-Phased Transit Curves

TCE 007464205-04   P= 9.183550 Days    $T_0=134.131122$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

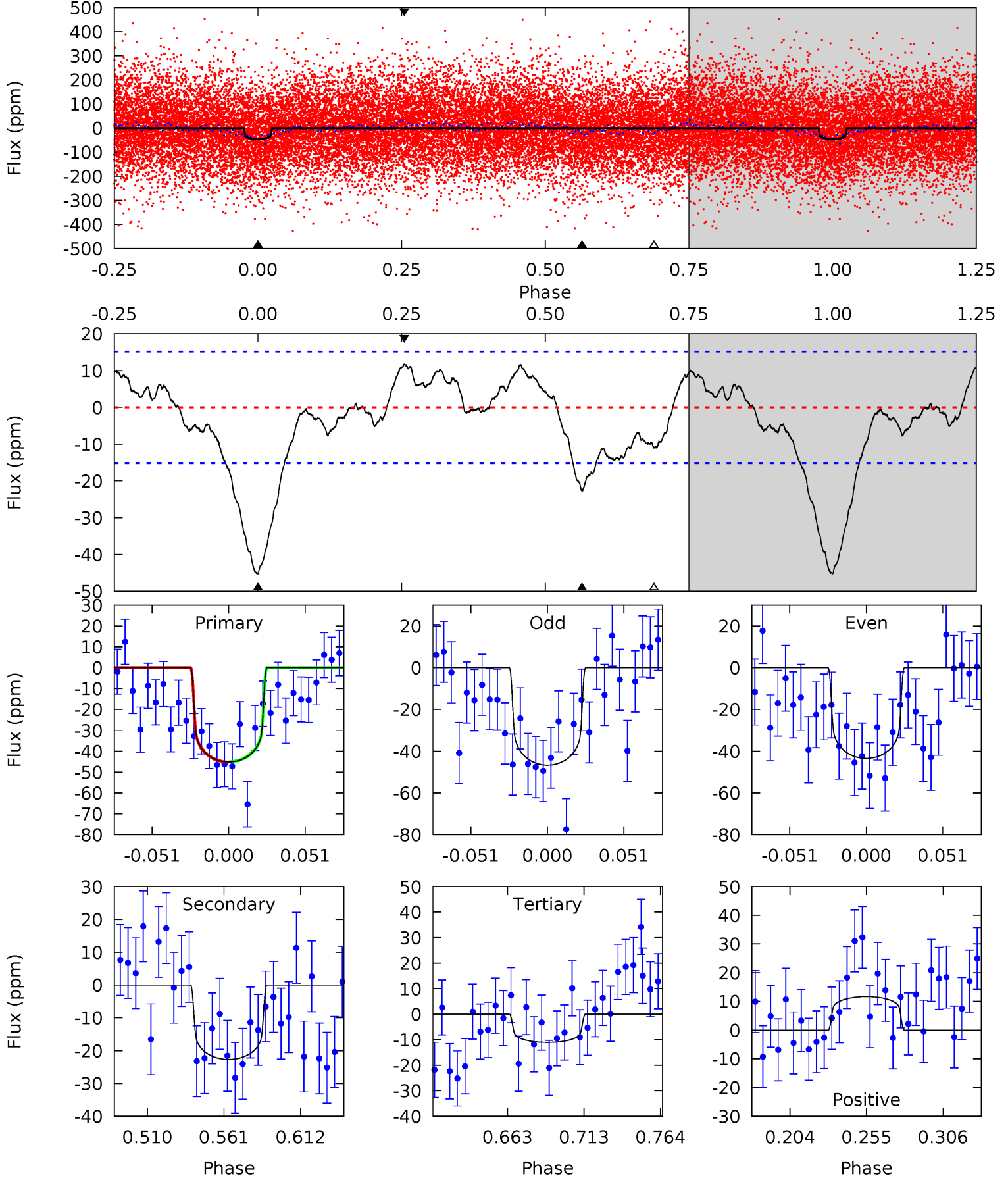
TCE 007464205-04     $P = 9.183209$  Days     $T_0 = 134.173846$  (BKJD)



# DV Model-Shift Uniqueness Test

007464205-04, P = 9.183550 Days, E = 124.947572 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  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 14.0 | 7.03 | 3.42 | 3.62 | 4.70            | 1.95            | 2.13             | 10.6    | 10.4    | 3.61    | 3.41    | 0.51    | 0.96 | 0.21  | 0.02 |

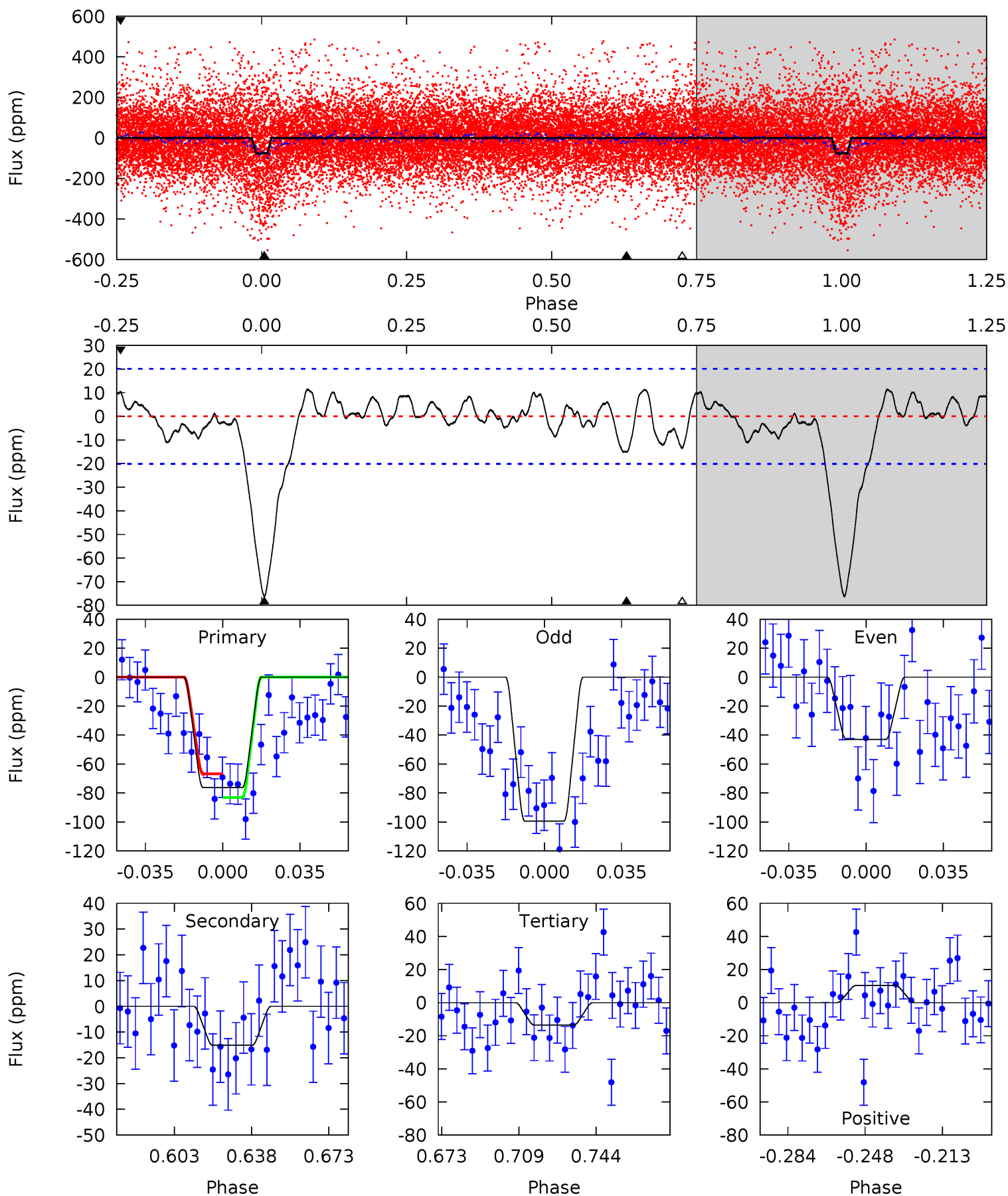




# Alt Model-Shift Uniqueness Test

007464205-04, P = 9.183209 Days, E = 124.990637 Days

| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM   | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|-------|-------|------|
| 18.1 | 3.59 | 3.21 | 2.46 | 4.78            | 2.10            | 1.43             | 14.9    | 15.6    | 0.38    | 1.13    | 6.73    | -0.18 | 0.13  | 1.96 |



### Stellar Parameters For KIC 007464205

|        | $T_{\text{eff}} (K)$ | $\log(g)$                 | $[\text{Fe}/\text{H}]$     | $R (R_{\odot})$           | $M (M_{\odot})$           | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
|        | $6004^{+180}_{-162}$ | $3.942^{+0.292}_{-0.097}$ | $-0.240^{+0.350}_{-0.250}$ | $1.842^{+0.377}_{-0.613}$ | $1.082^{+0.179}_{-0.179}$ | $0.244^{+0.455}_{-0.090}$                 |
|        | +3%/-3%              | +7%/-2%                   | +146%/-104%                | +20%/-33%                 | +17%/-17%                 | +186%/-37%                                |
| Source | PHO1                 | FLK73                     | KIC0                       | DSEP                      |                           |   |

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

### Secondary Eclipse Parameters for KIC 007464205-04 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$     | $T_{max} (K)$        | $T_{obs} (K)$        | $A_{obs}$        |
|---------|-------------|------------------------|----------------------|----------------------|------------------|
| DV      | $-23 \pm 3$ | $1.27^{+0.40}_{-0.33}$ | $1658^{+107}_{-136}$ | $5100^{+645}_{-464}$ | $59^{+51}_{-24}$ |
| Alt.    | $-15 \pm 4$ | $1.66^{+0.43}_{-0.39}$ | $1666^{+101}_{-131}$ | $4266^{+454}_{-376}$ | $24^{+19}_{-10}$ |

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



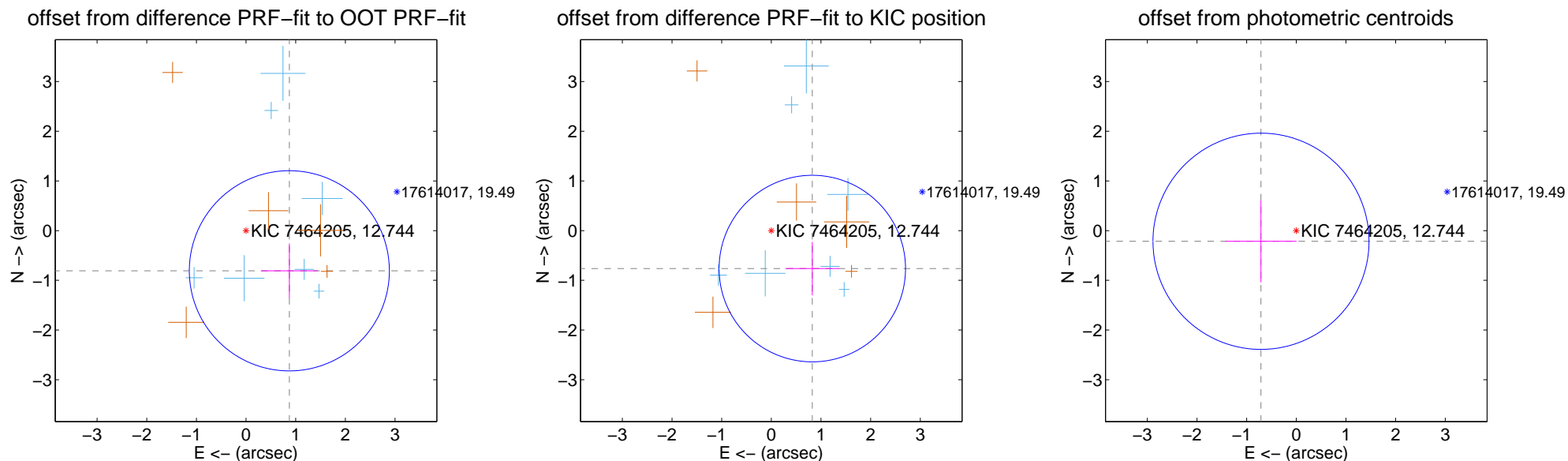
## DV Centroid Data

Supplemental centroid analysis for 007464205-04. Kepler magnitude: 12.74. Transit SNR 6.95

There are 7 quarters with good PRF difference image offsets

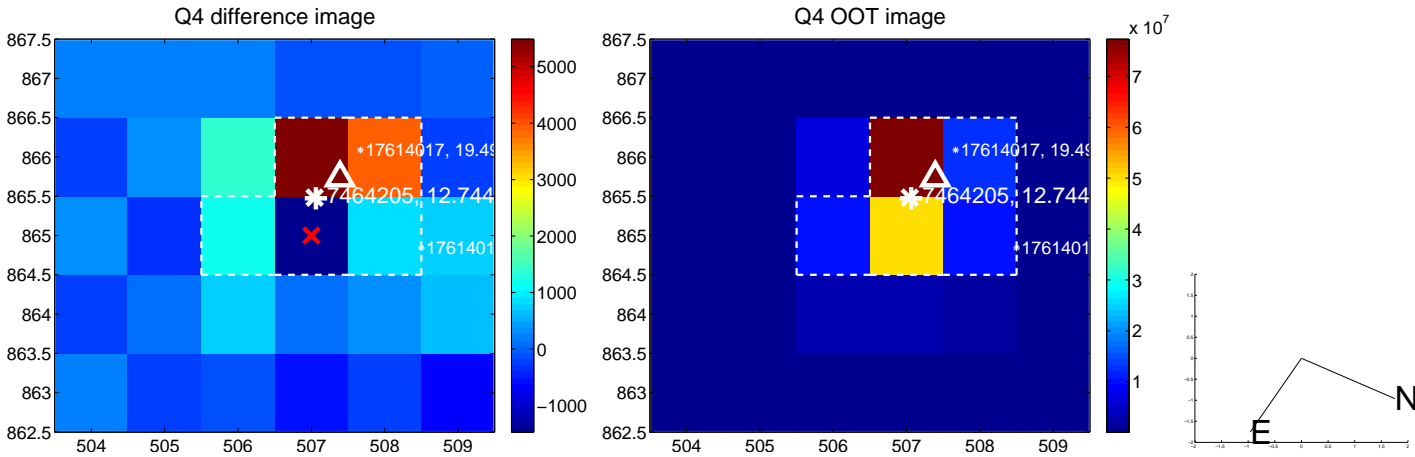
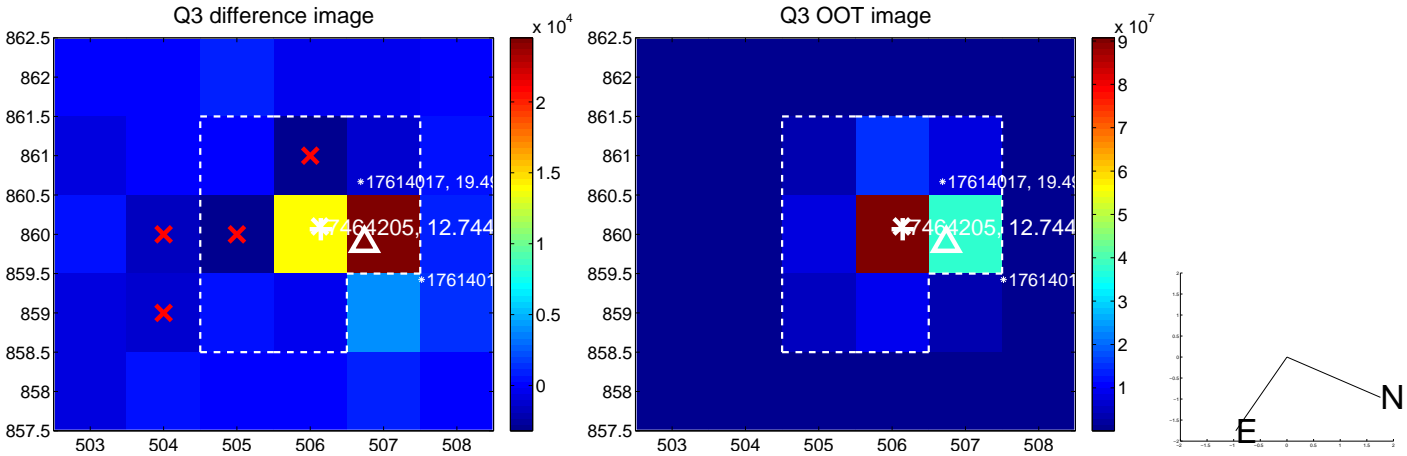
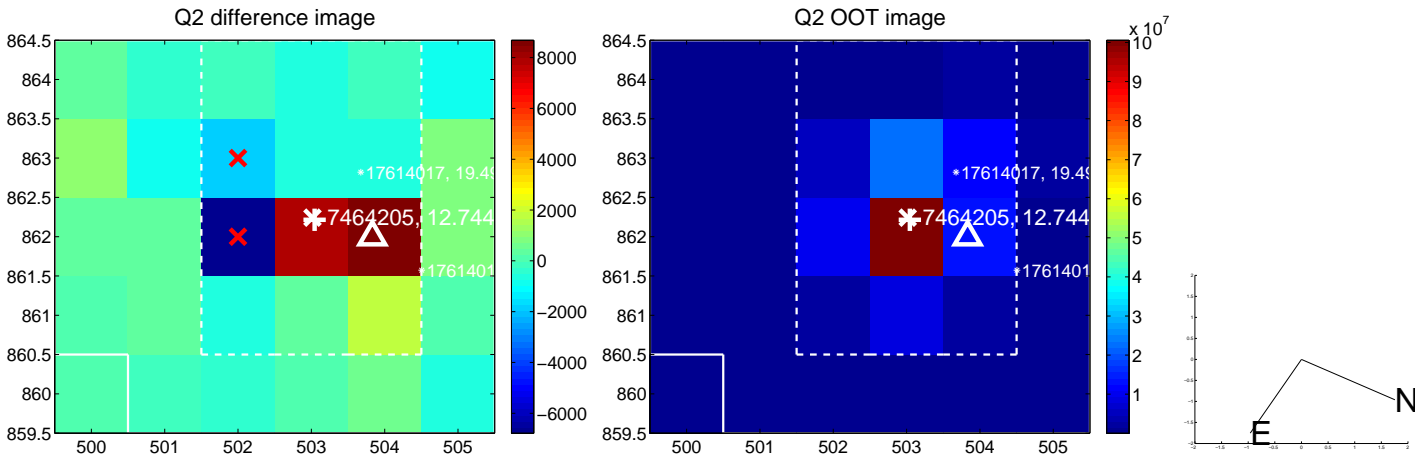
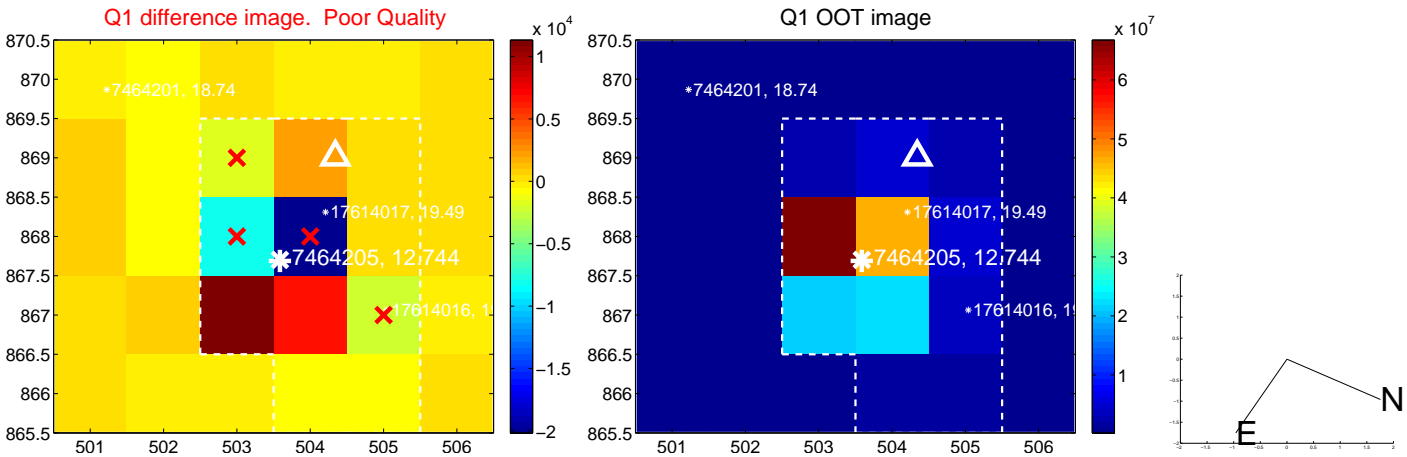
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec       |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT          | $1.189 \pm 0.672$  | 1.77                | $-0.872 \pm 0.572$ | $-0.808 \pm 0.549$ |
| PRF-fit source offset from KIC position | $1.124 \pm 0.626$  | 1.80                | $-0.825 \pm 0.541$ | $-0.763 \pm 0.537$ |
| photometric centroid source offset      | $0.74 \pm 0.73$    | 1.02                | $0.71 \pm 0.72$    | $-0.21 \pm 0.83$   |

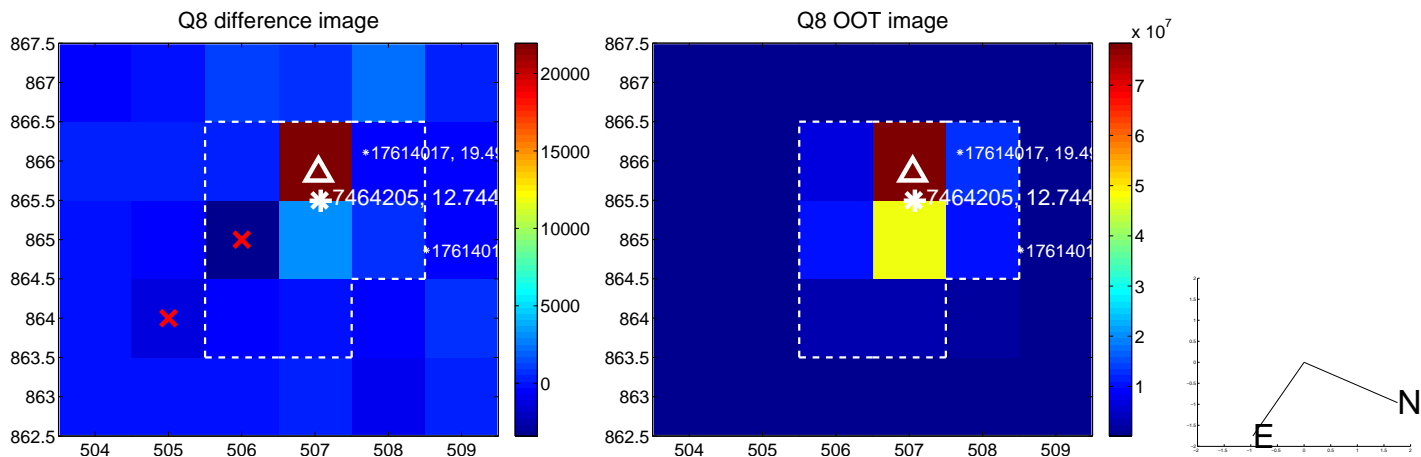
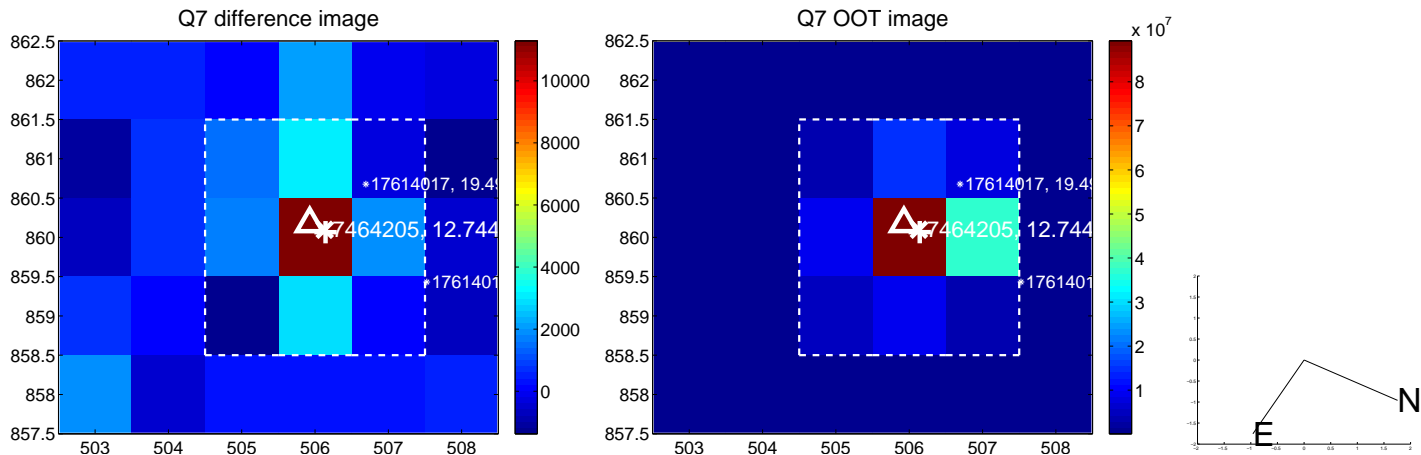
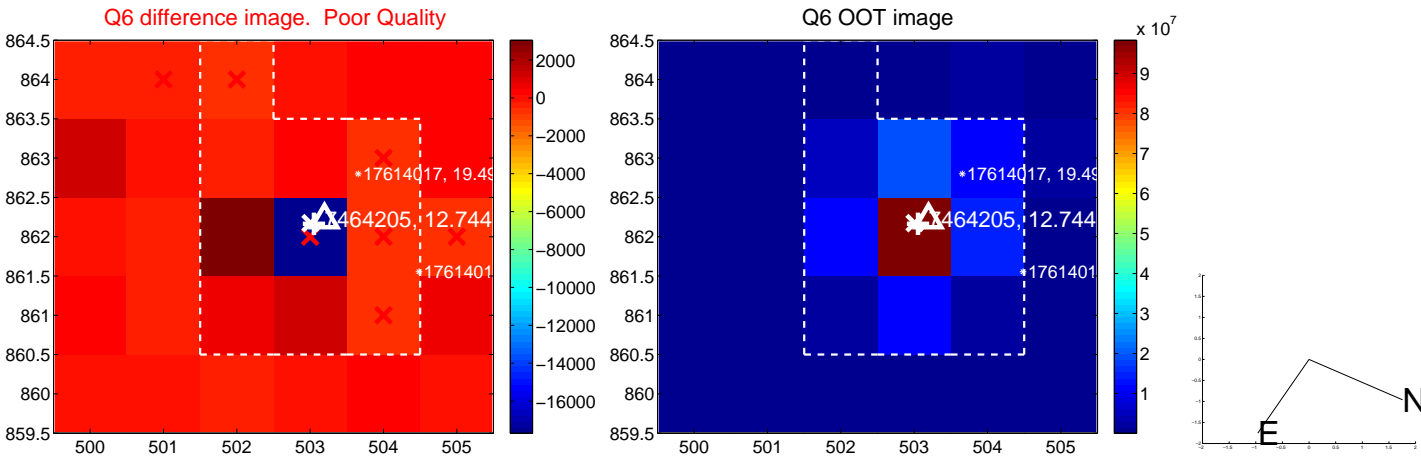
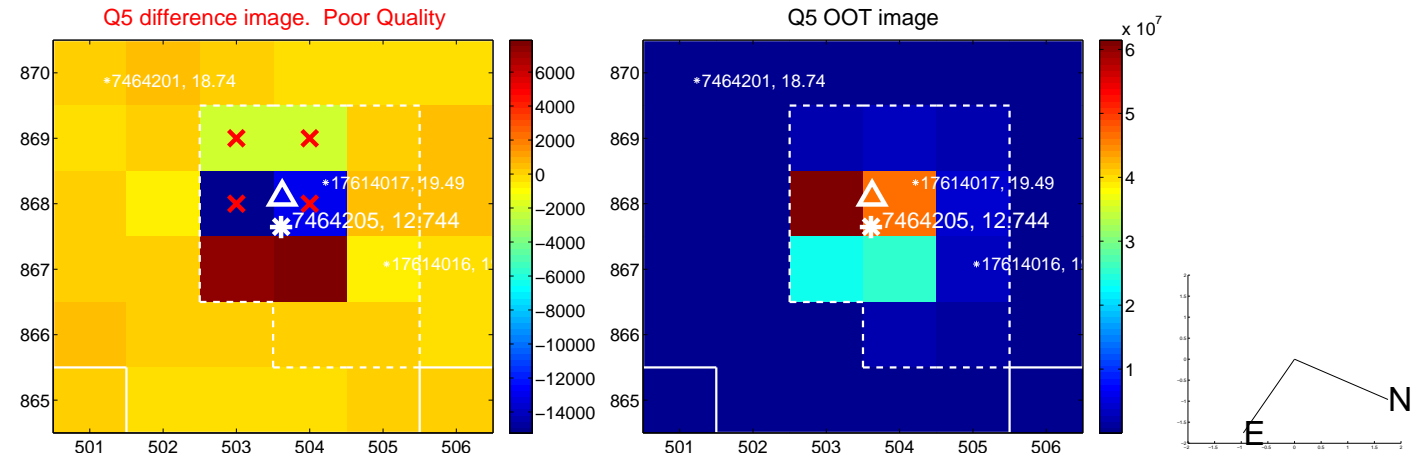


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

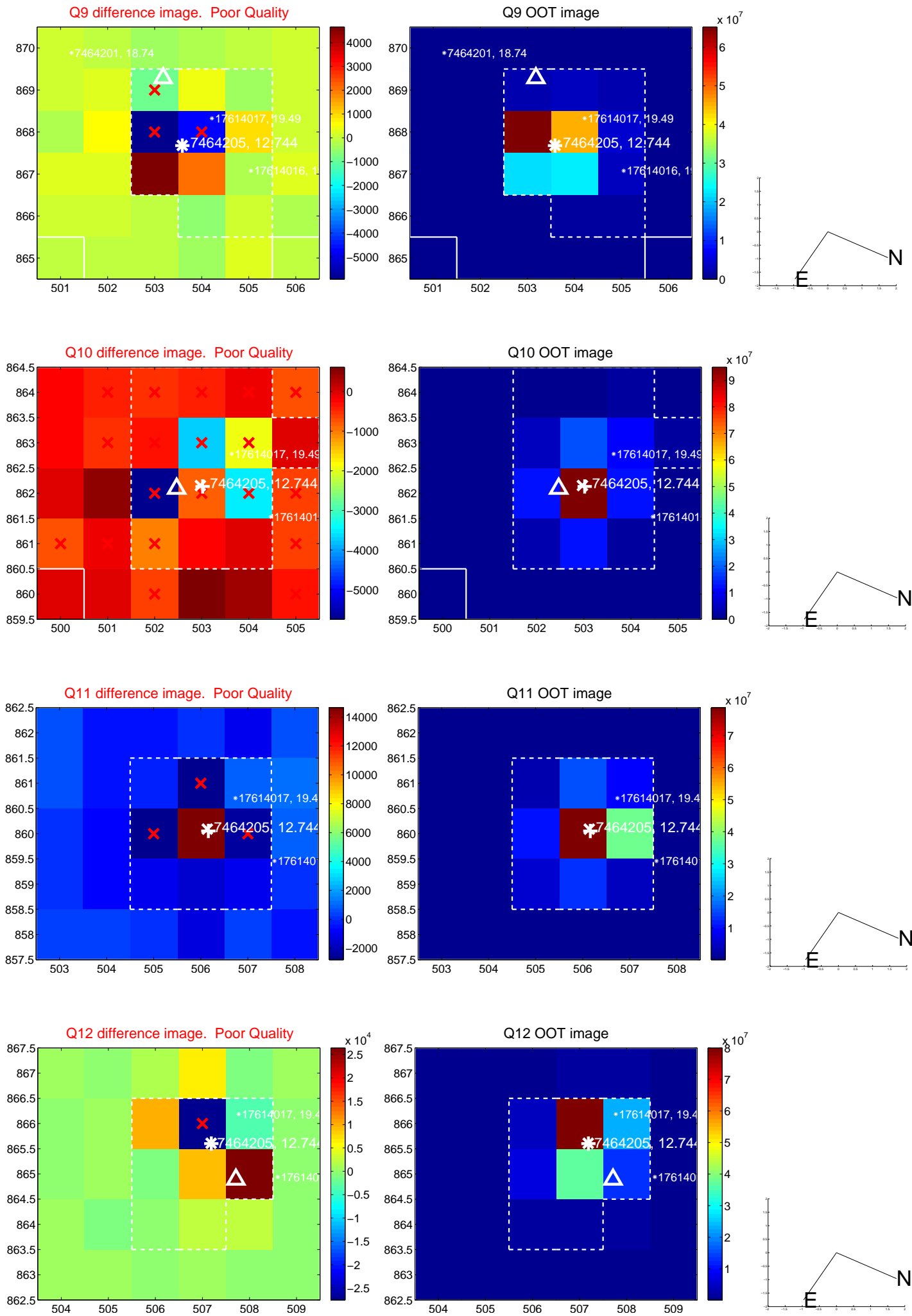
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



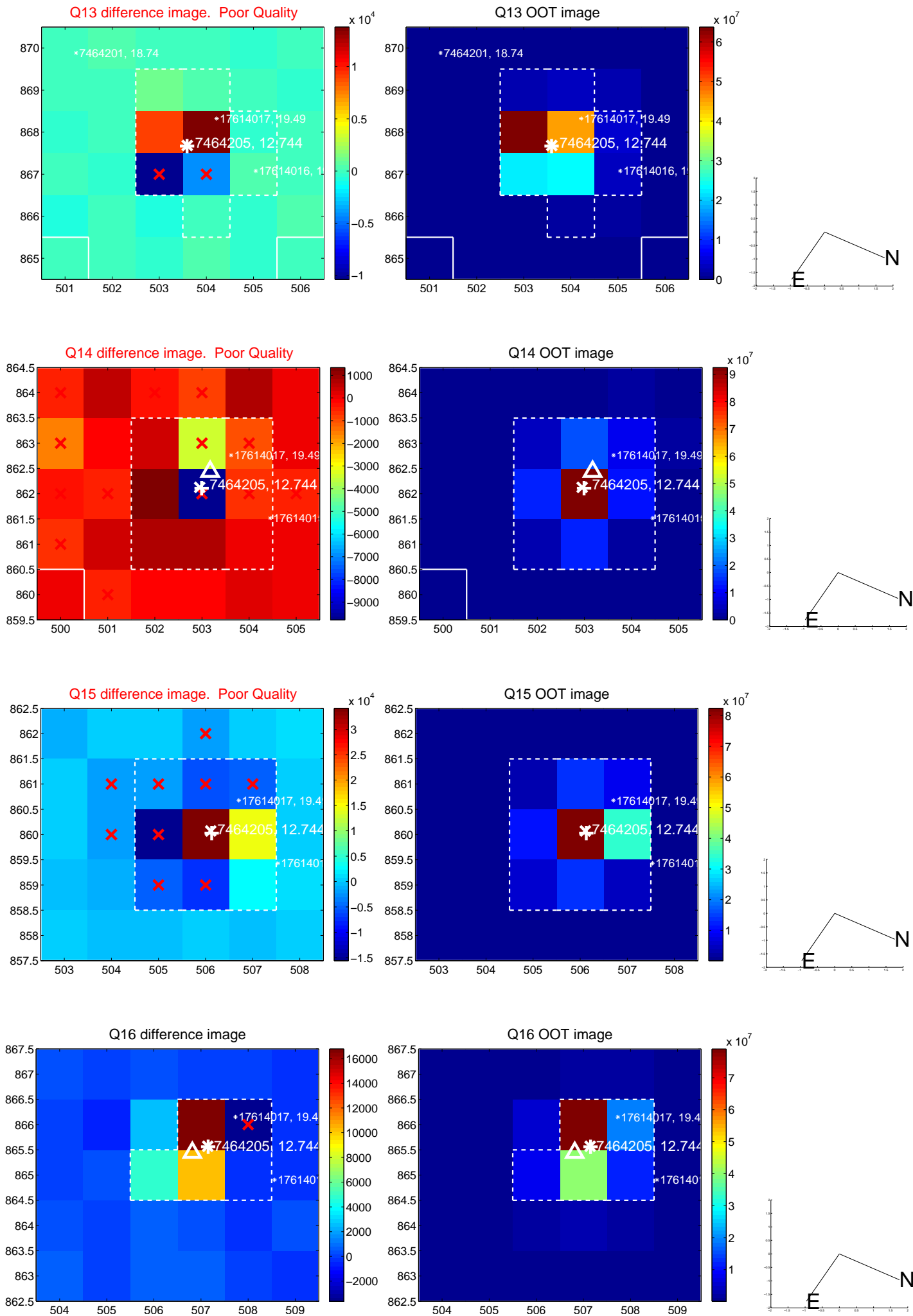
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



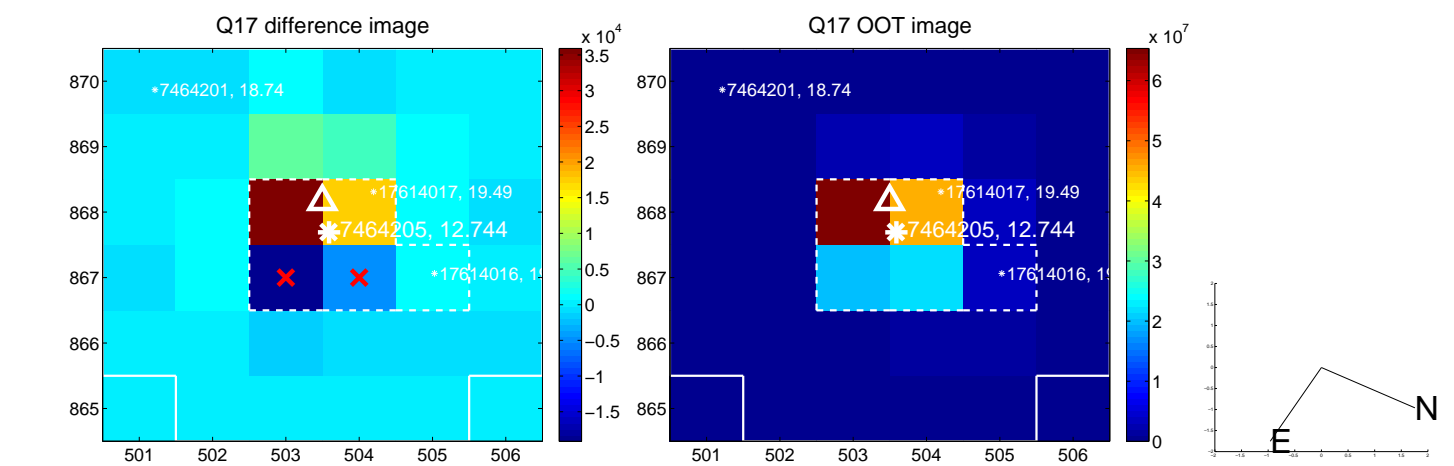
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



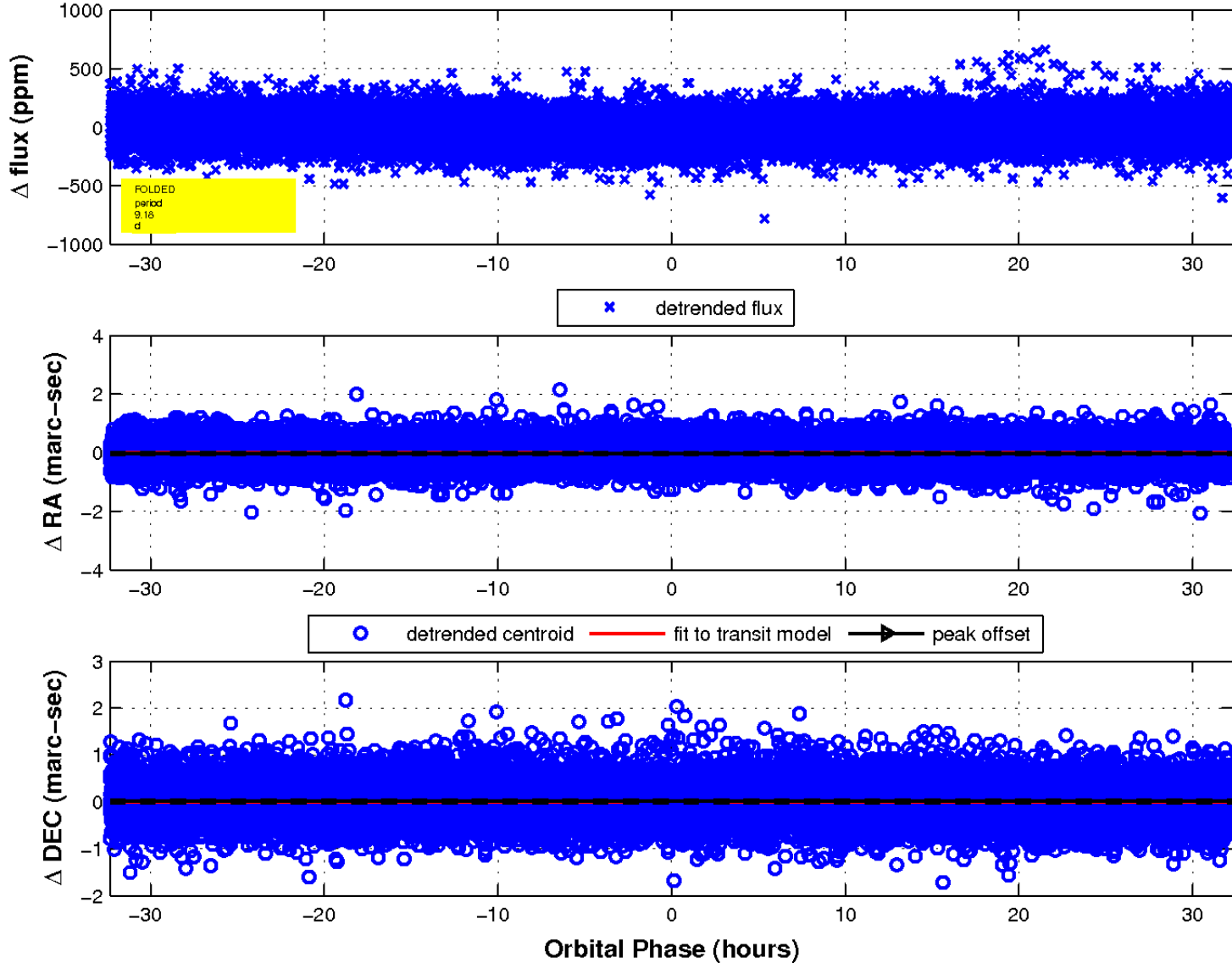
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 4 of 4





UKIRT Image

Declination

