

# KIC 007124026

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 007124026-01 | OBS      | 2275.01 | 15.745573     | 145.537607   | 161.1       | 13.934           | 22.1 | 23.7 | 0.95                        | 6089            | 1.39                   | 72.11                  |
| 007124026-02 | OBS      | No      | 406.591416    | 209.634202   | 217.6       | 10.925           | 10.9 | 5.5  | 0.95                        | 6089            | 1.60                   | 0.94                   |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|--|
| 007124026-01 | OBS      | FP   | 0.01  | 0 | 0 | 1 | 0 | CENT_RESOLVED_OFFSET   |
| 007124026-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS |

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

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

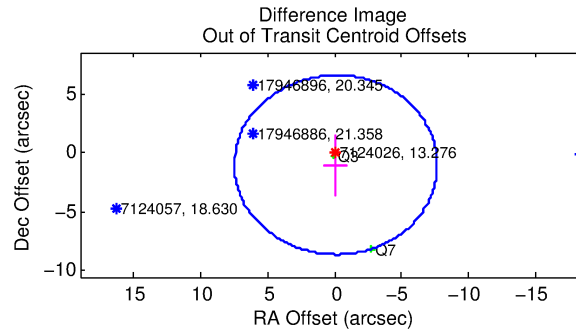
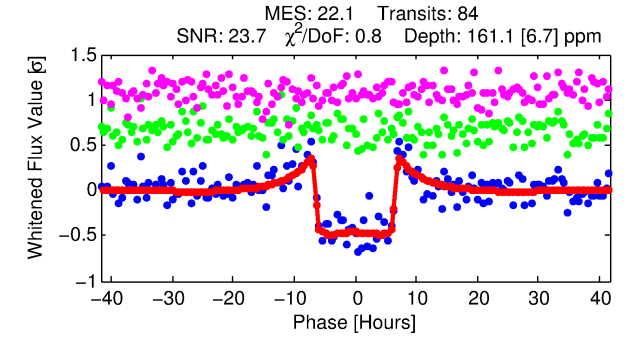
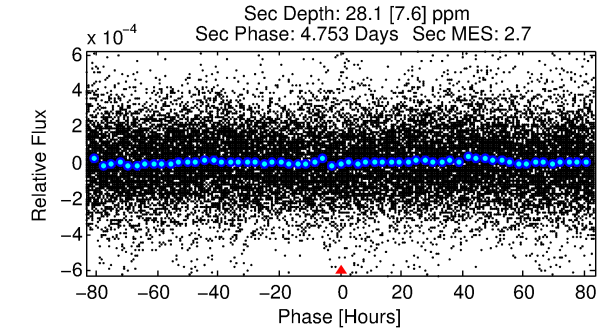
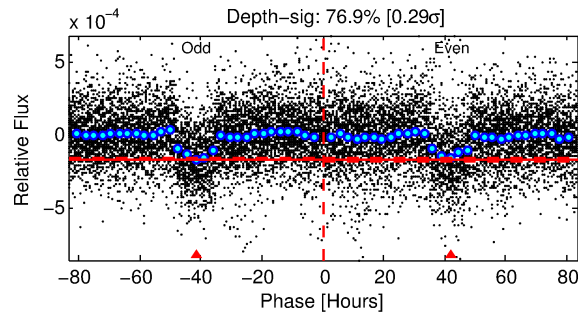
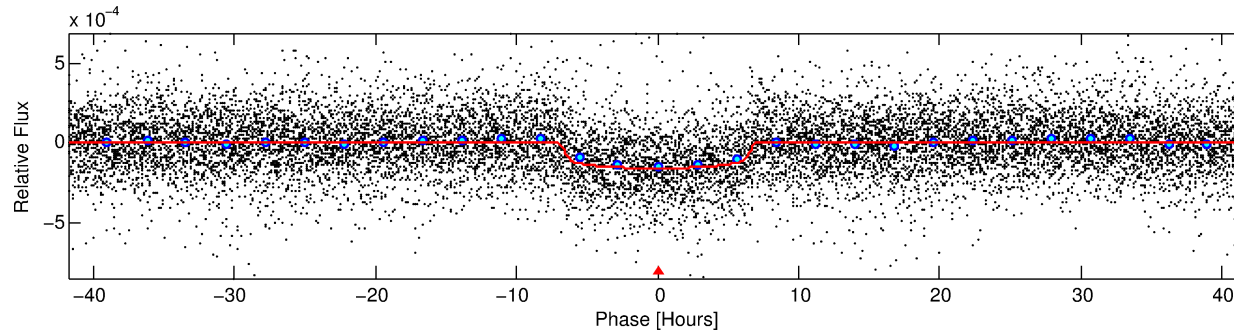
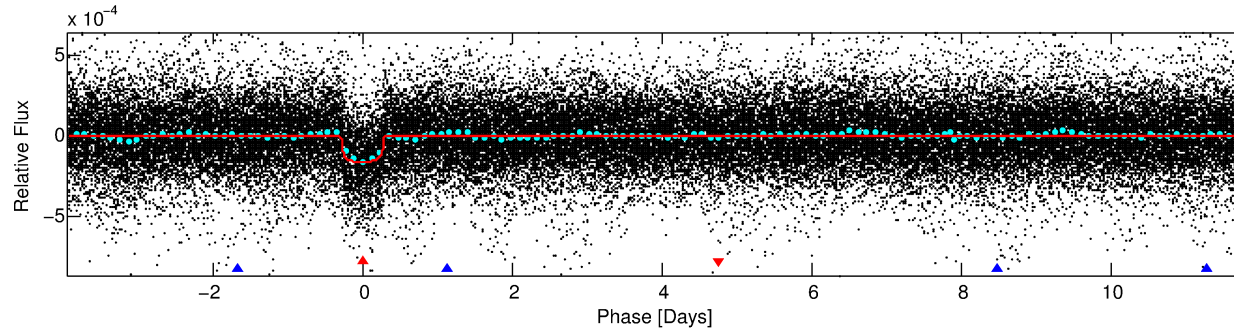
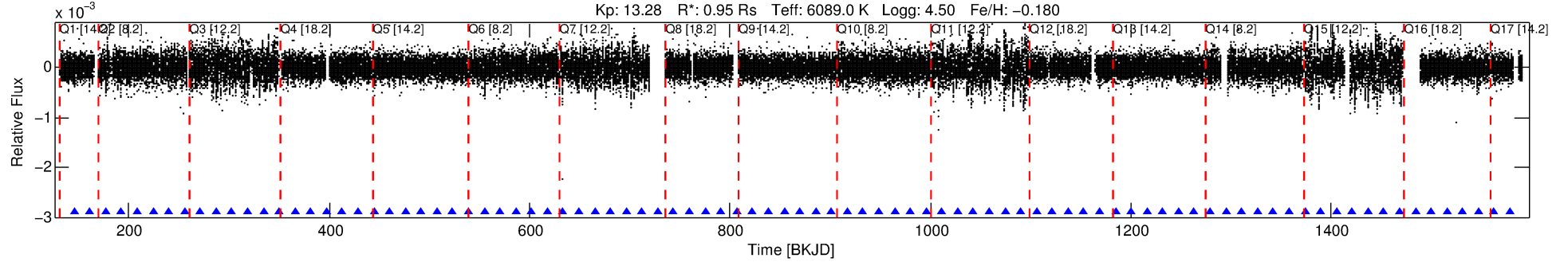
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 007124026-01

No Significant Match Found

# DV One-Page Summary

KIC: 7124026 Candidate: 1 of 2 Period: 15.746 d  
KOI: K02275.01 Corr: 0.995



## DV Fit Results:

Period = 15.74557 [0.00010] d  
Epoch = 145.5376 [0.0055] BKJD  
Rp/R\* = 0.0134 [0.0006]  
a/R\* = 4.48 [0.83]  
b = 0.88 [0.05]  
Seff = 72.11 [31.63]  
Teq = 743 [81] K  
Rp = 1.39 [0.48] Re  
a = 0.1242 [0.0357] AU  
Ag = 122.73 [62.22] [1.96 $\sigma$ ]  
Teff = 3824 [301] K [9.89 $\sigma$ ]

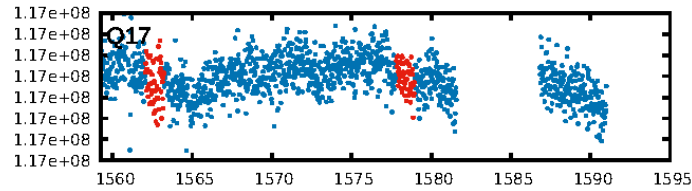
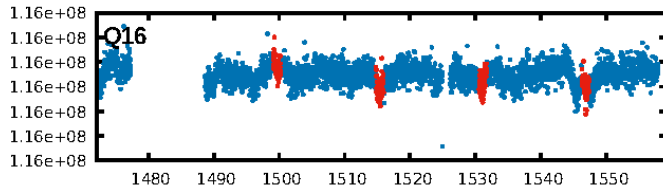
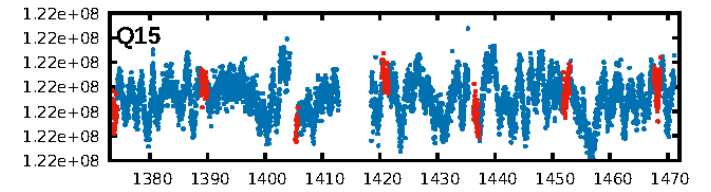
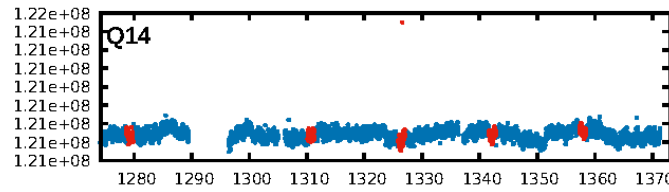
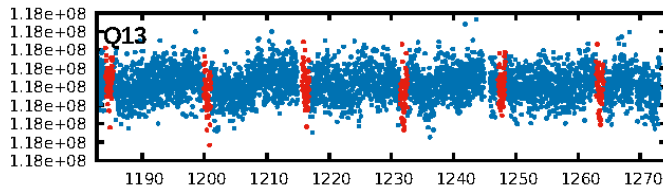
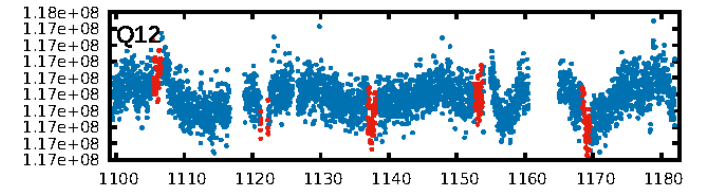
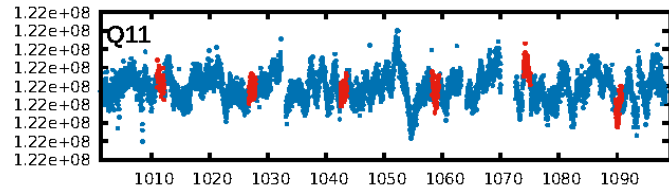
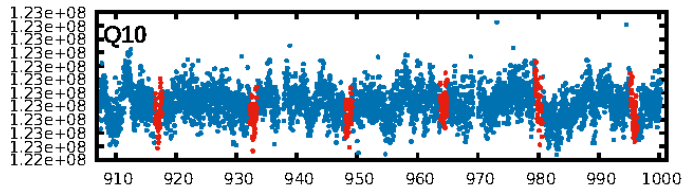
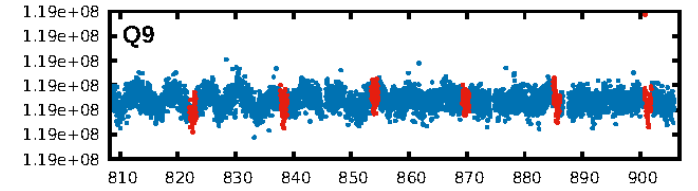
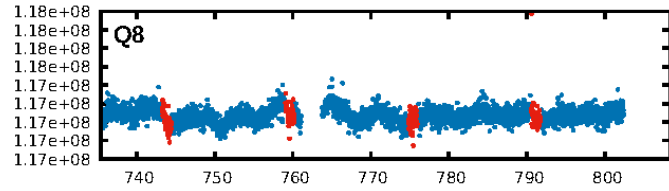
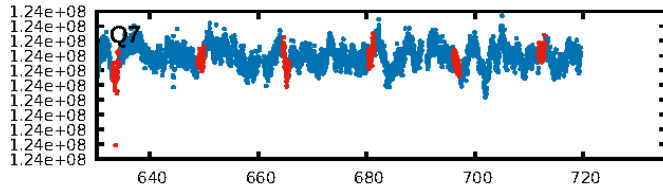
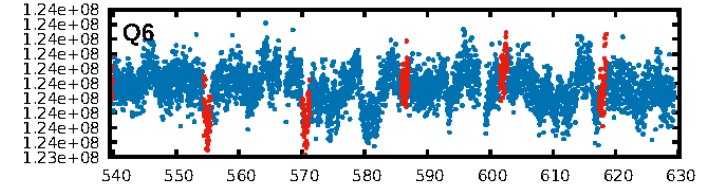
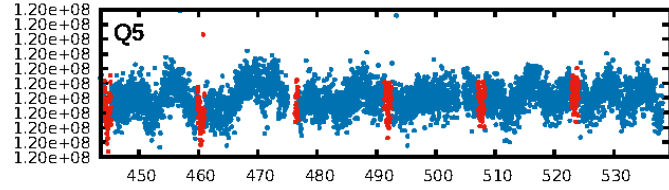
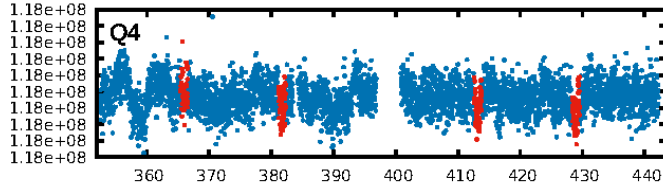
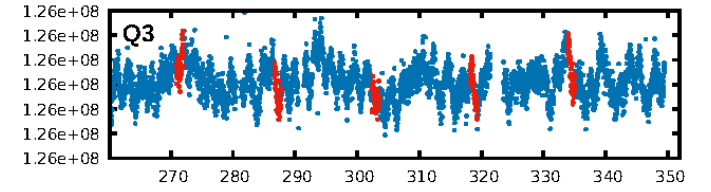
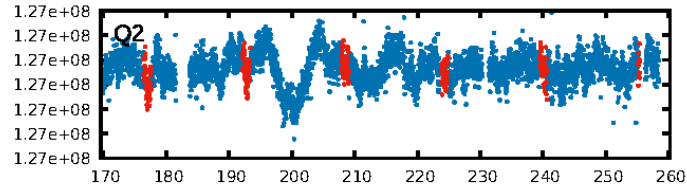
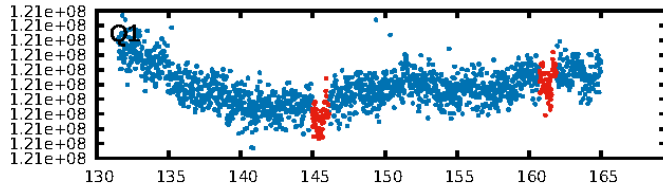
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [529.78 $\sigma$ ]  
ModelChiSquare2-sig: 32.3%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 2.18e-101  
RollingBand-fgt: 1.00 [80/80]  
GhostDiagnostic-chr: -4.129  
Centroid-sig: 83.5%  
Centroid-so: 3.699 arcsec [3.02 $\sigma$ ]  
OotOffset-rm: 1.026 arcsec [0.41 $\sigma$ ]  
KicOffset-rm: 0.952 arcsec [0.33 $\sigma$ ]  
OotOffset-st: 0/2/0/0 [2]  
KicOffset-st: 0/2/0/1 [3]  
DiffImageQuality-fgm: 0.33 [1/3]  
DiffImageOverlap-fno: 1.00 [17/17]

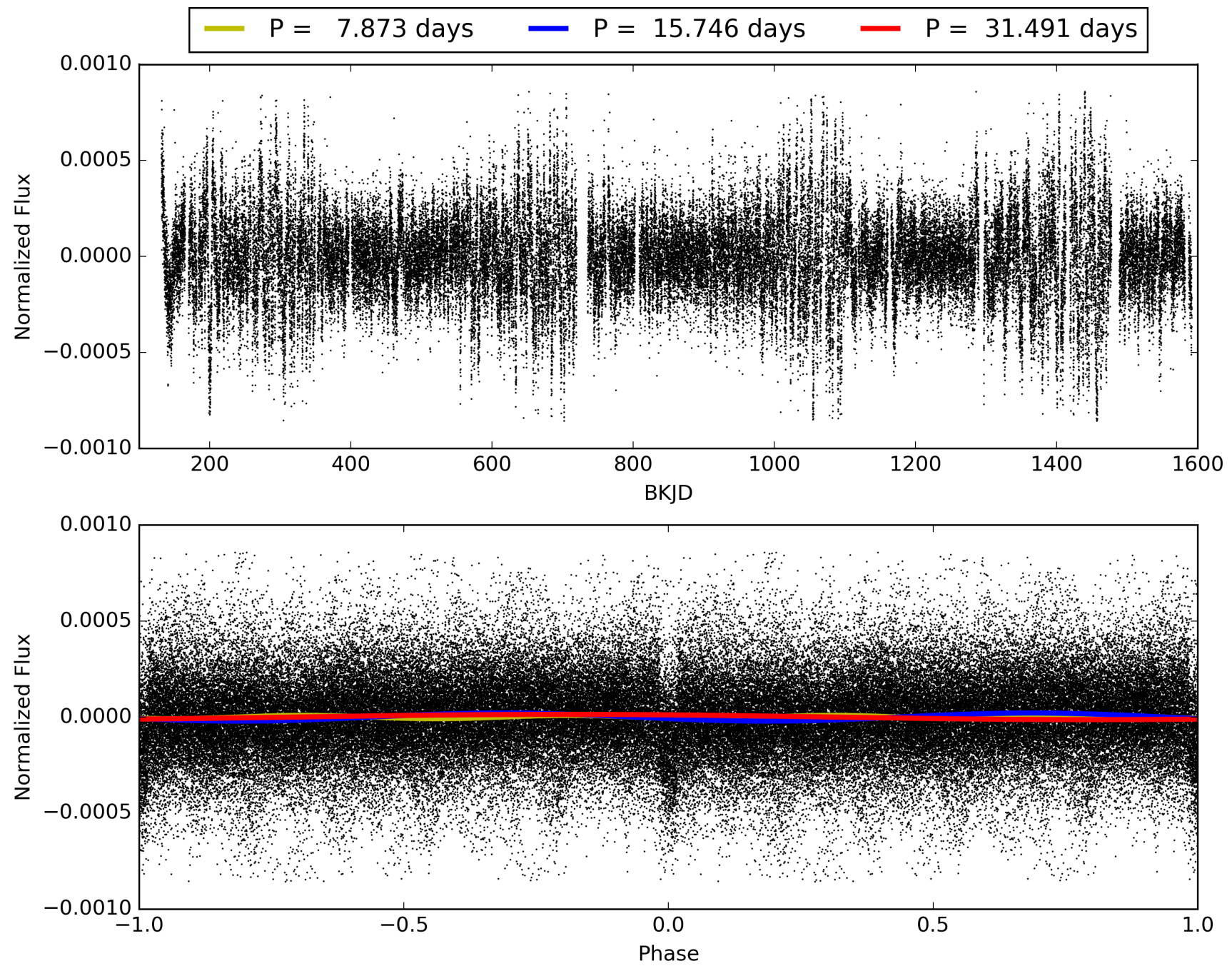
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 007124026-01, PDC Light Curves

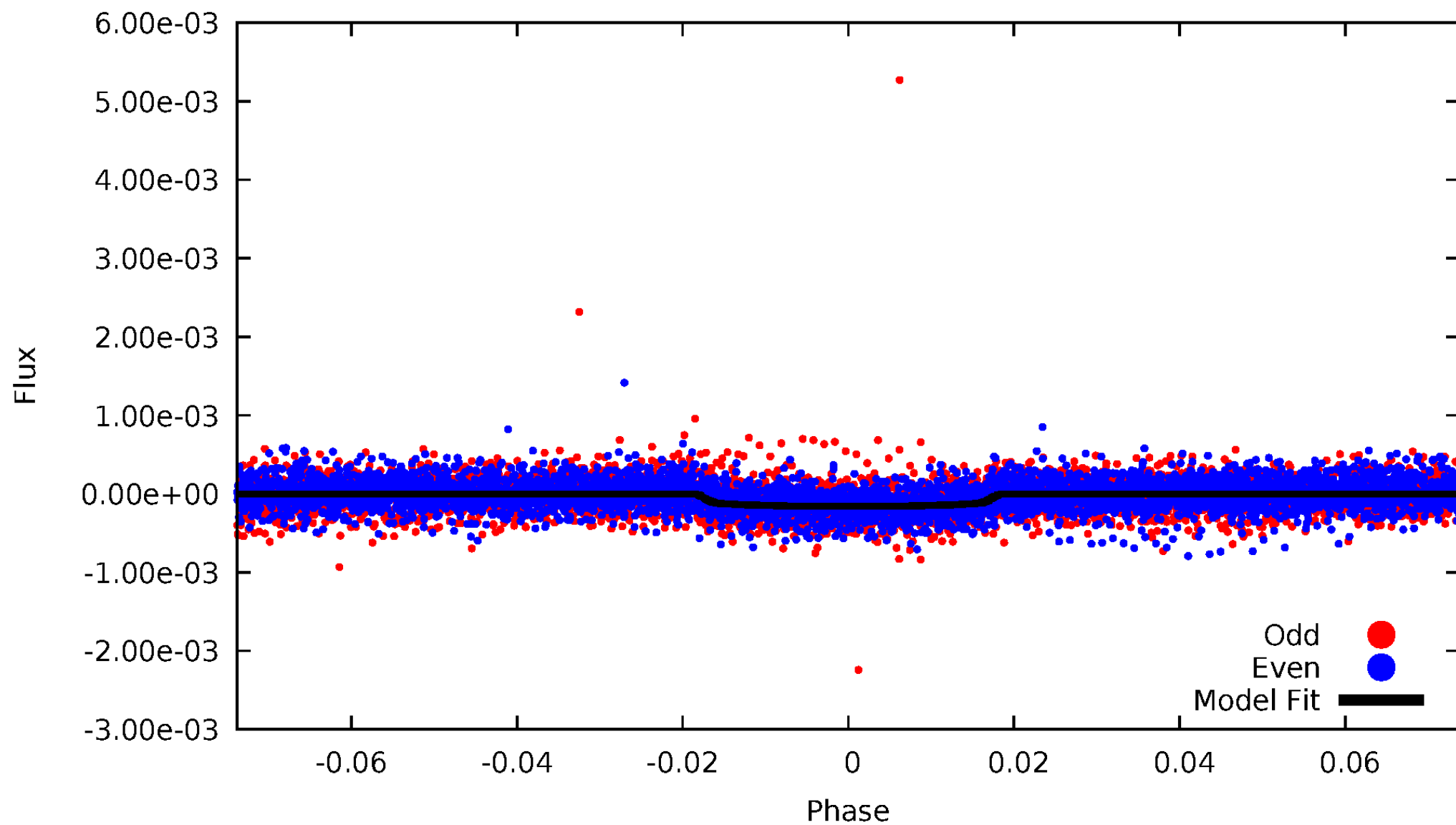


TCE 007124026-01



# DV Odd/Even

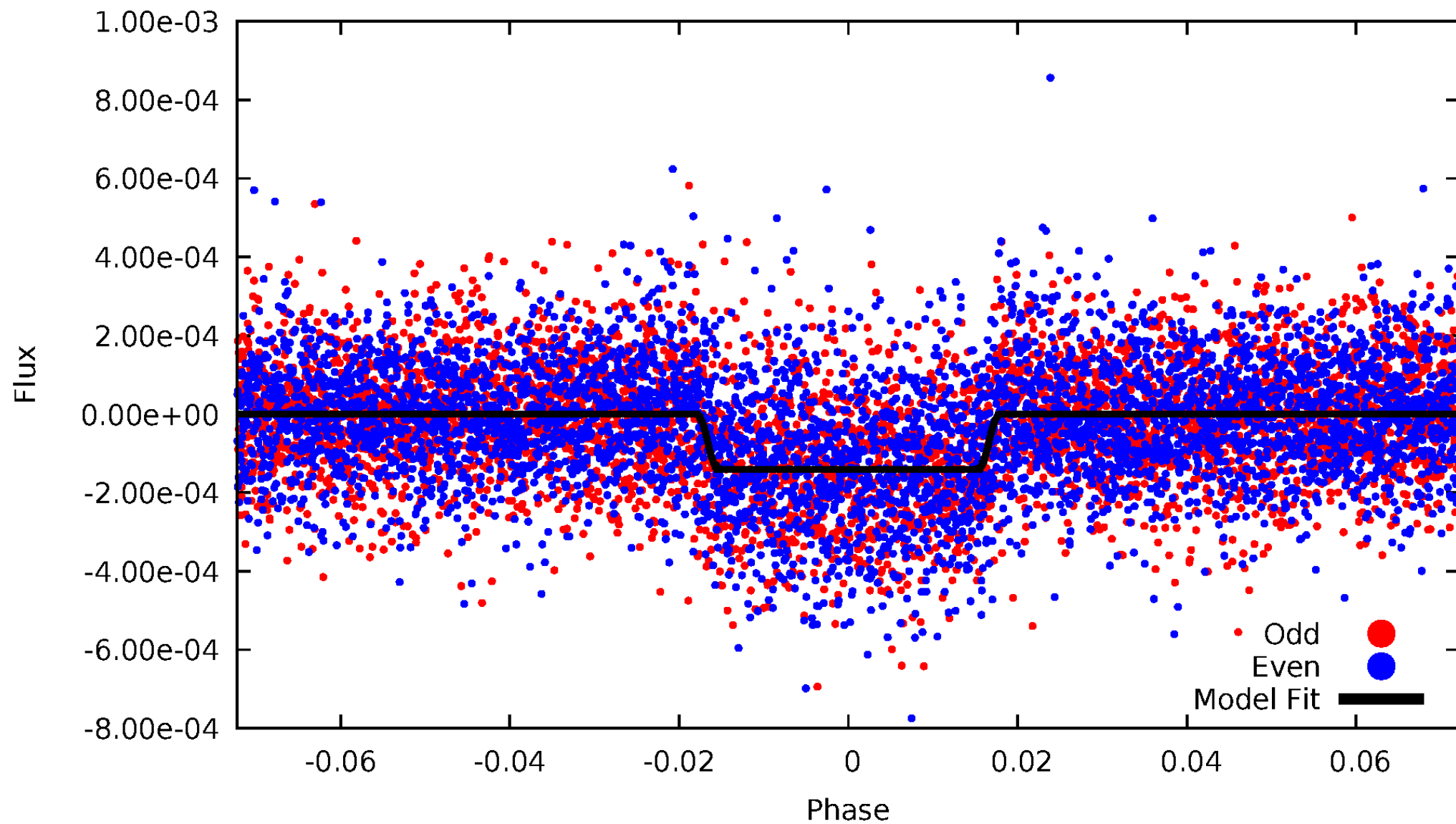
TCE 007124026-01





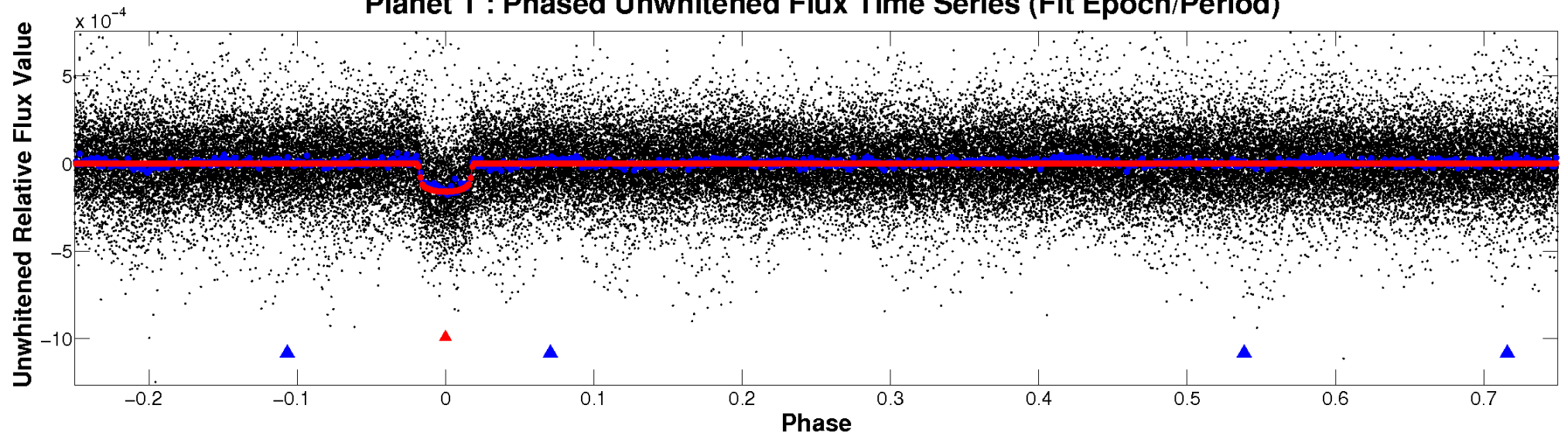
# ALT Odd/Even

TCE 007124026-01

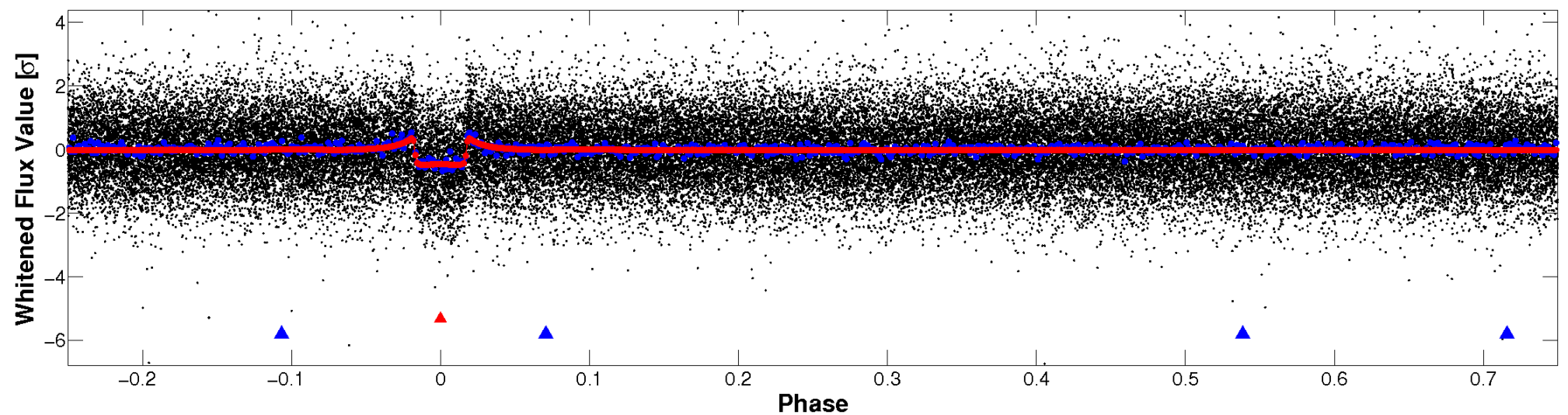


# Non-Whitened Vs. Whitened Light Curve

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

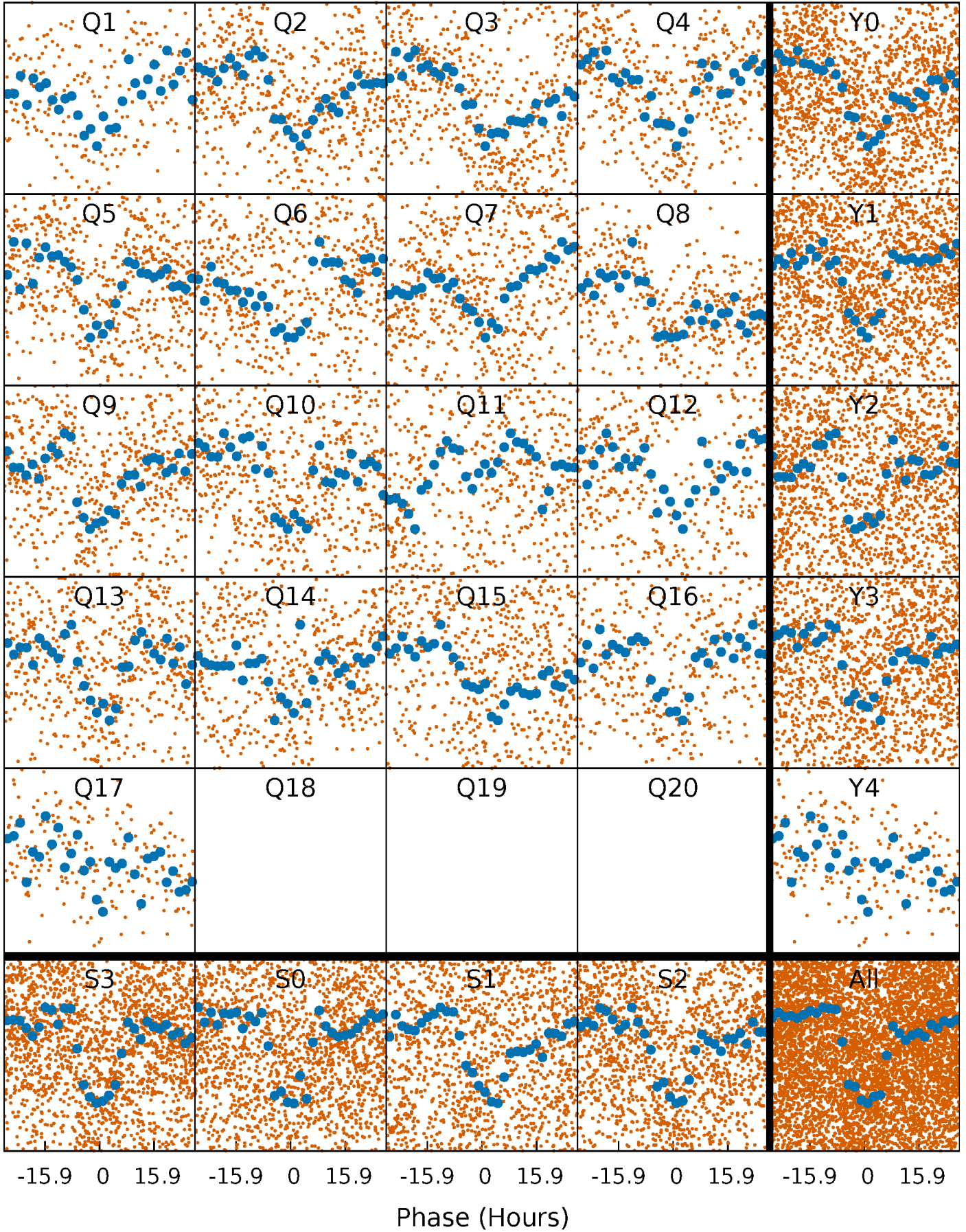


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

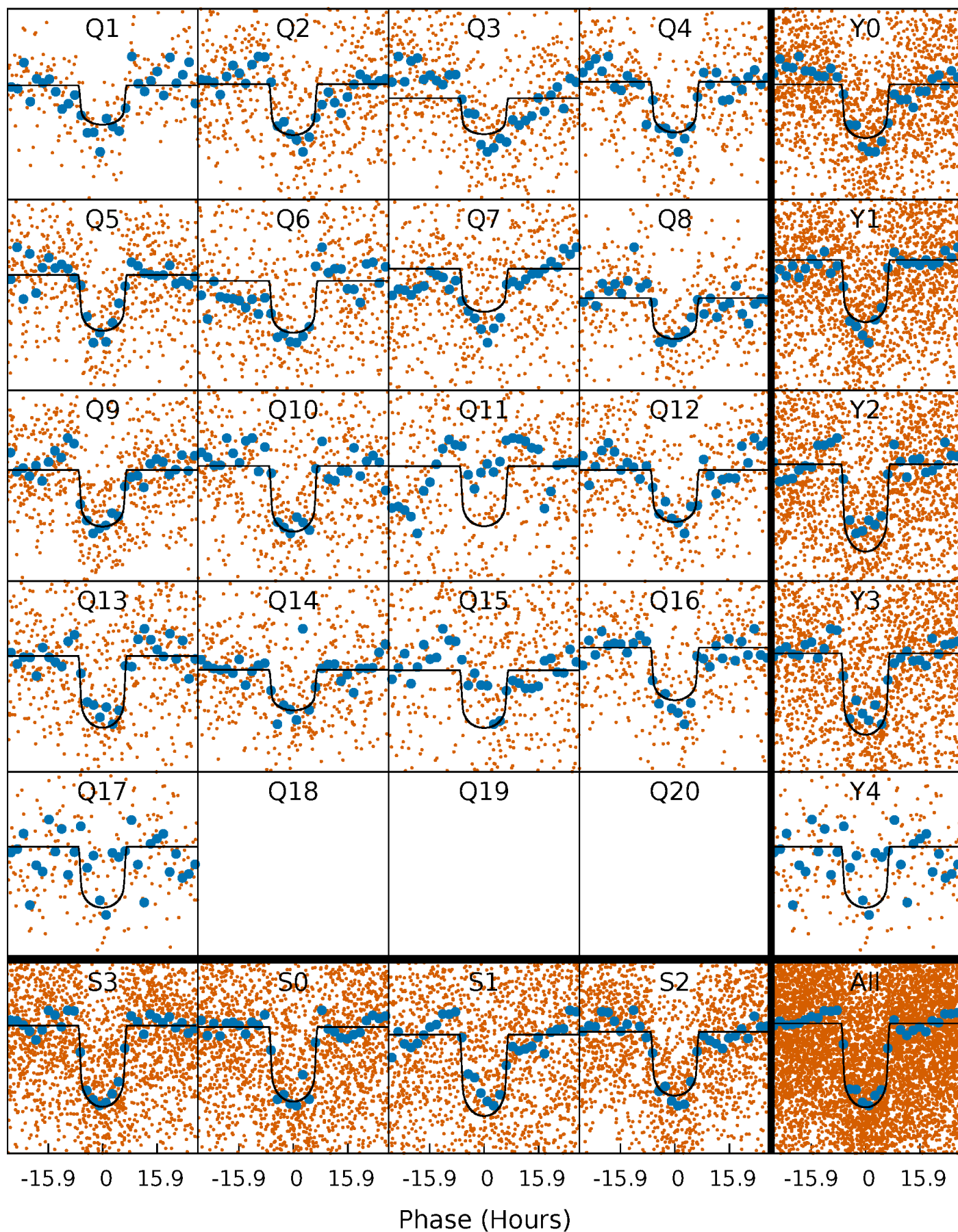
TCE 007124026-01 P= 15.745573 Days  $T_0=145.537607$  (BKJD)





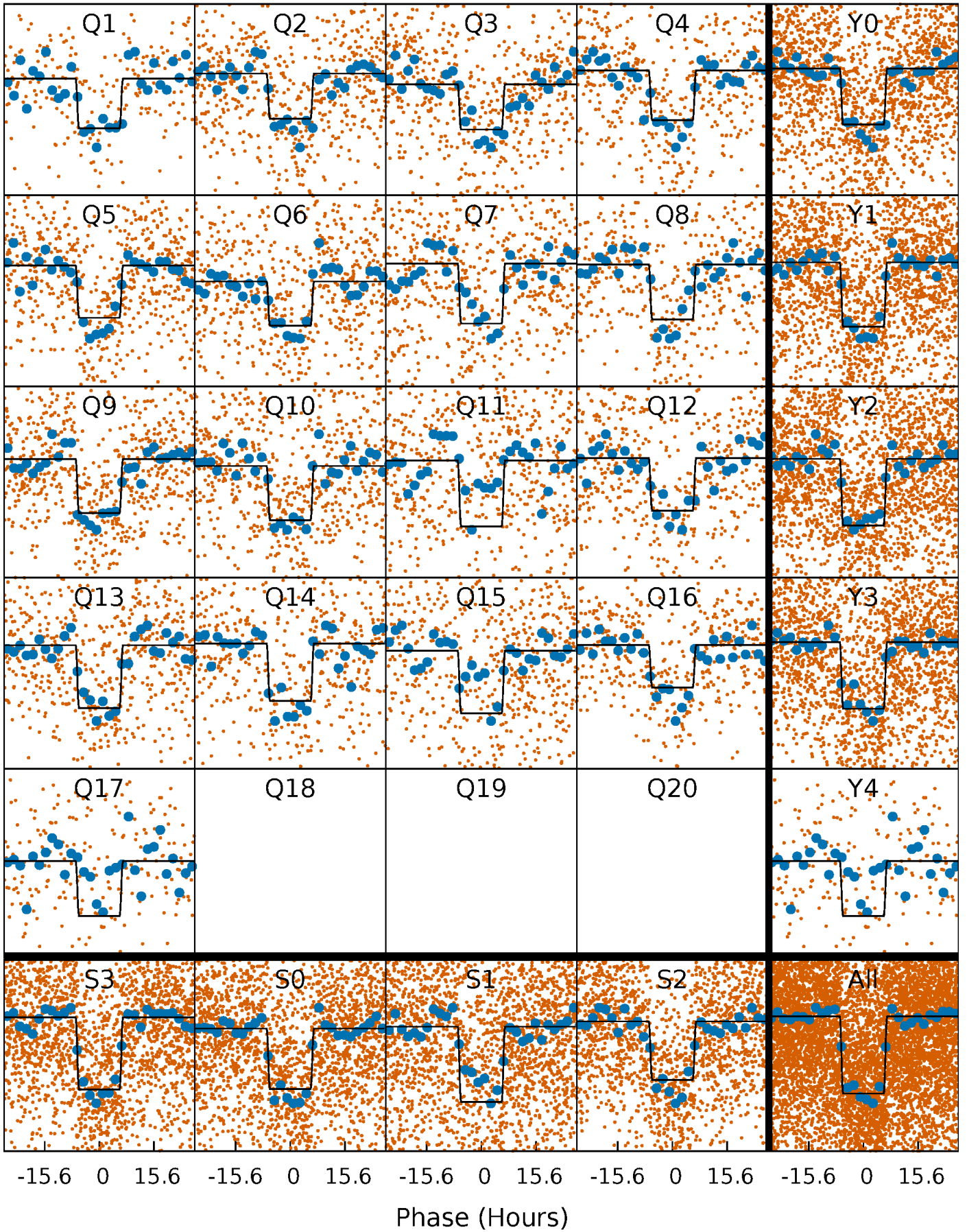
# DV Quarter-Phased Transit Curves

TCE 007124026-01 P= 15.745573 Days  $T_0=145.537607$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

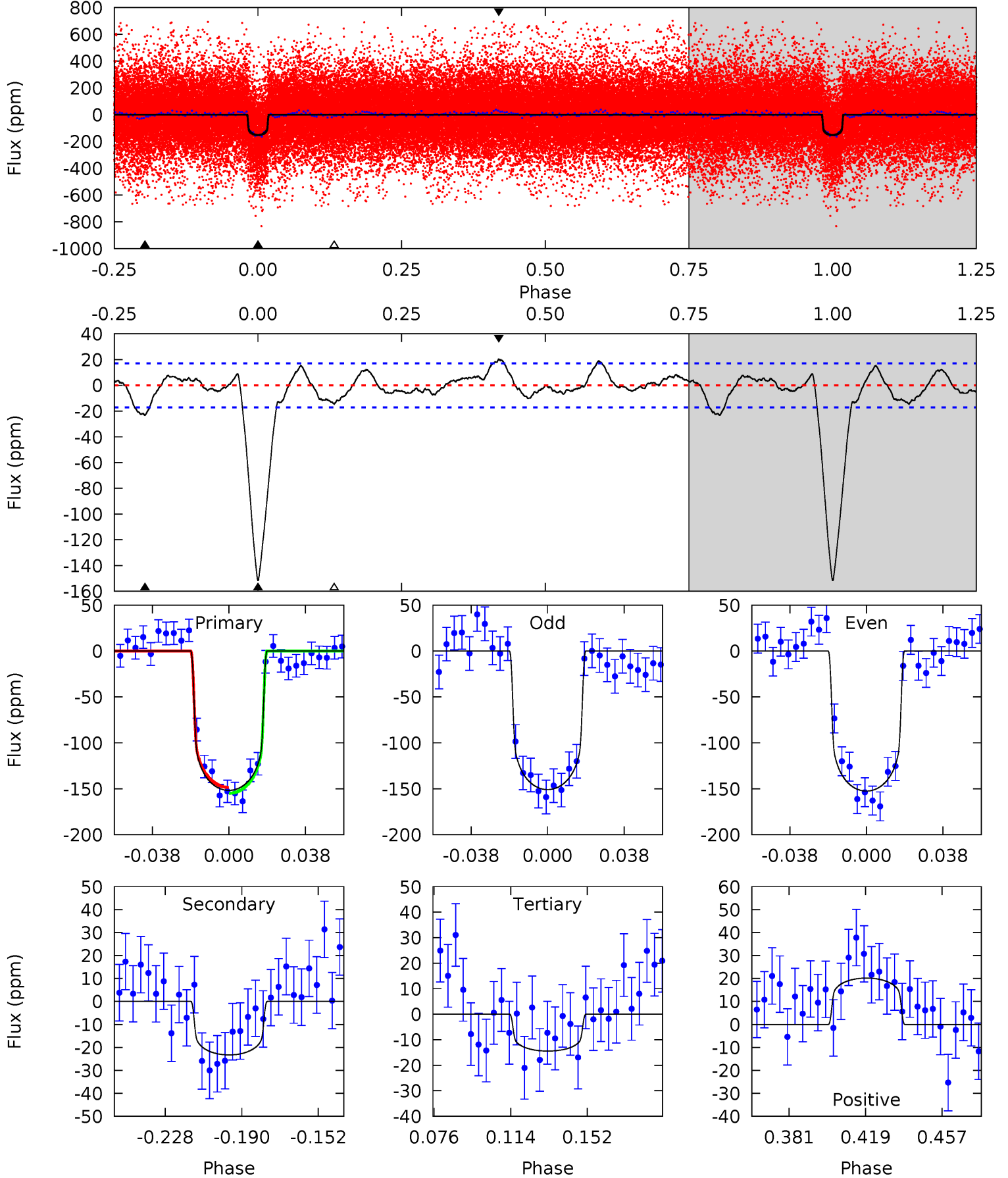
TCE 007124026-01 P= 15.745882 Days  $T_0=145.524470$  (BKJD)



# DV Model-Shift Uniqueness Test

007124026-01, P = 15.745573 Days, E = 129.792034 Days

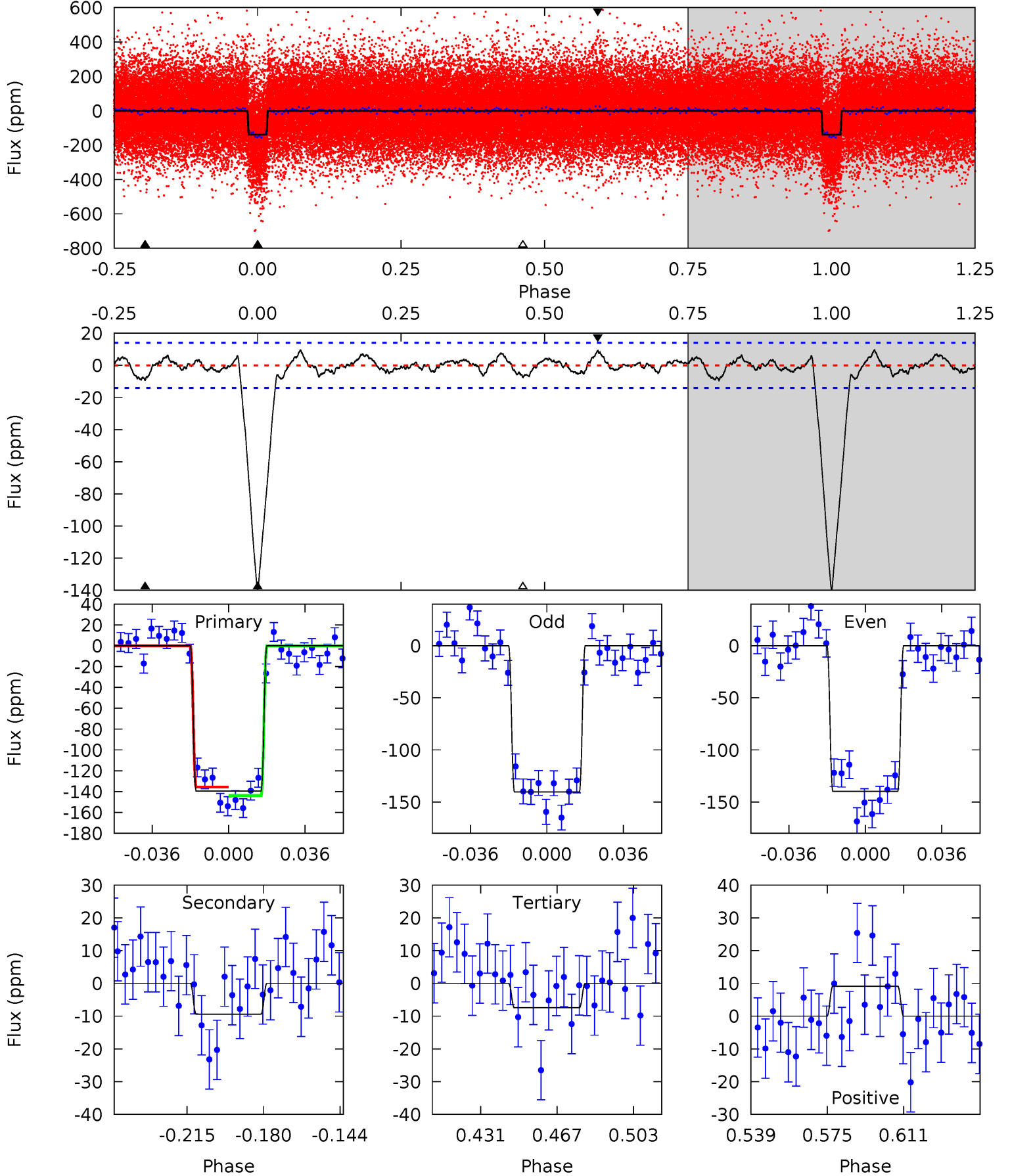
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 42.3 | 6.50 | 4.03 | 5.63 | 4.76            | 2.07            | 2.01             | 38.3    | 36.7    | 2.47    | 0.87    | 0.23    | 0.98 | 0.12  | 0.89 |



# Alt Model-Shift Uniqueness Test

007124026-01,  $P = 15.745882$  Days,  $E = 129.778588$  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  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 47.5 | 3.19 | 2.54 | 3.11 | 4.78            | 2.10            | 1.14             | 45.0    | 44.4    | 0.65    | 0.08    | 0.11    | 0.91 | 0.06  | 1.36 |





### Stellar Parameters For KIC 007124026

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                     | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
|        | $6089^{+163}_{-199}$ | $4.495^{+0.054}_{-0.229}$ | $-0.180^{+0.300}_{-0.300}$ | $0.950^{+0.324}_{-0.101}$ | $1.031^{+0.140}_{-0.126}$ | $1.692^{+0.382}_{-0.943}$                 |
|        | +3%/-3%              | +1%/-5%                   | +167%/-167%                | +34%/-11%                 | +14%/-12%                 | +23%/-56%                                 |
| Source | PHO1                 | KIC0                      | KIC0                       | DSEP                      |                           |   |

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

### Secondary Eclipse Parameters for KIC 007124026-01 / KOI 2275.01

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$     | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | $A_{\text{obs}}$ |
|---------|-------------|------------------------|----------------------|----------------------|------------------|
| DV      | -23±4       | $1.44^{+0.26}_{-0.14}$ | $1060^{+87}_{-52}$   | $3976^{+138}_{-150}$ | $91^{+27}_{-27}$ |
| Alt.    | -9±3        | $1.28^{+0.24}_{-0.12}$ | $1059^{+89}_{-53}$   | $3545^{+168}_{-220}$ | $45^{+20}_{-16}$ |

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

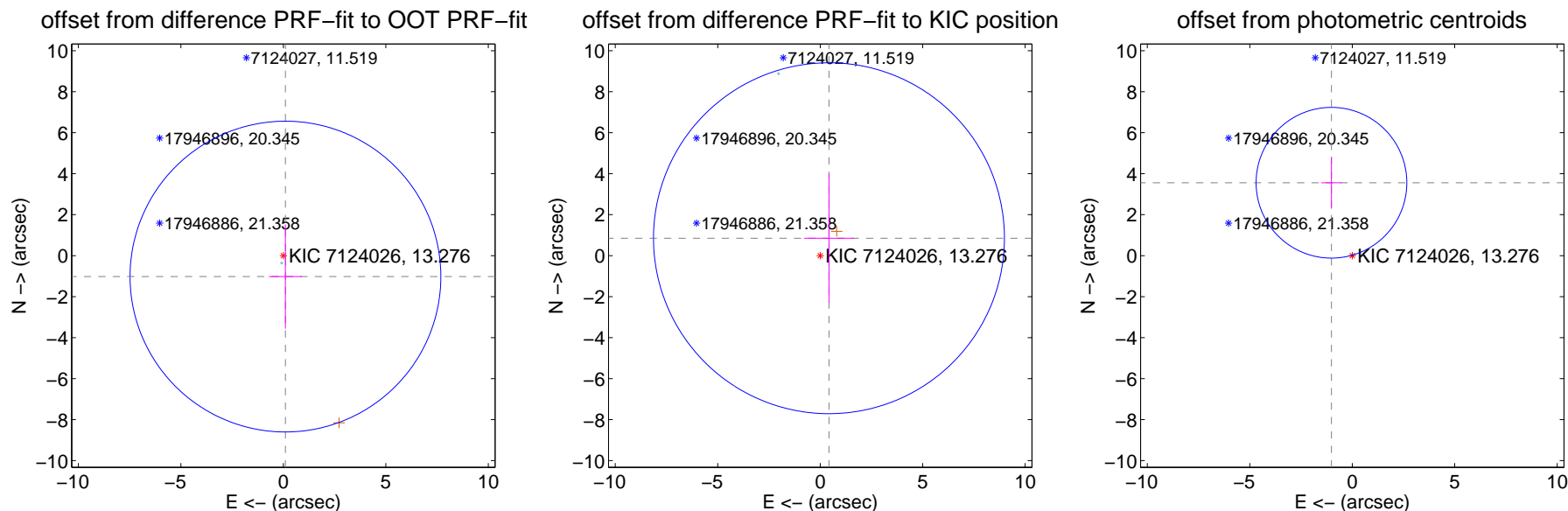
## DV Centroid Data

Supplemental centroid analysis for 007124026-01. Kepler magnitude: 13.28. Transit SNR 23.69

There are 1 quarters with good PRF difference image offsets

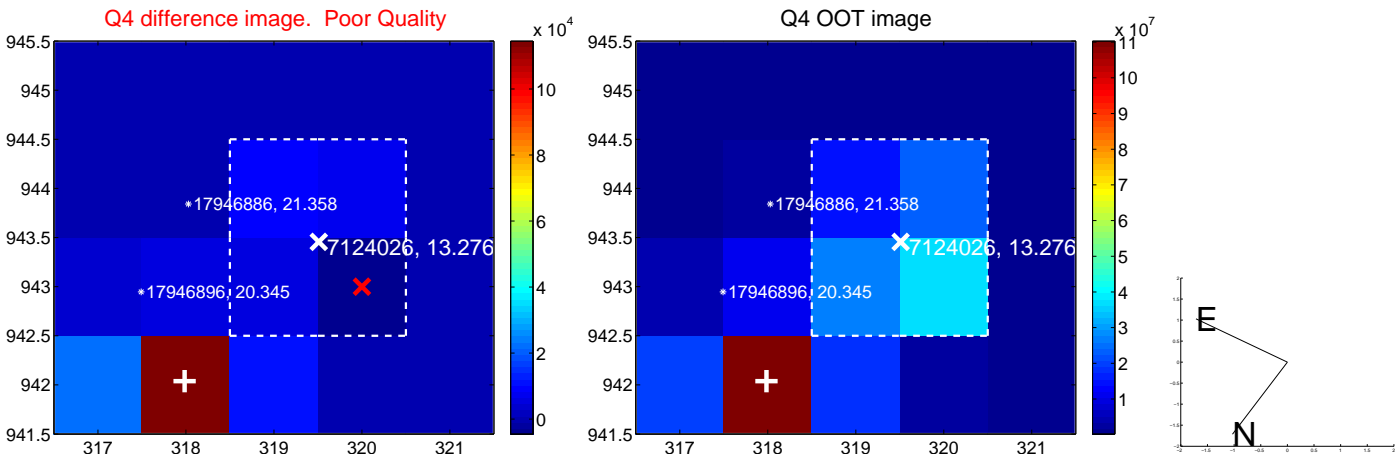
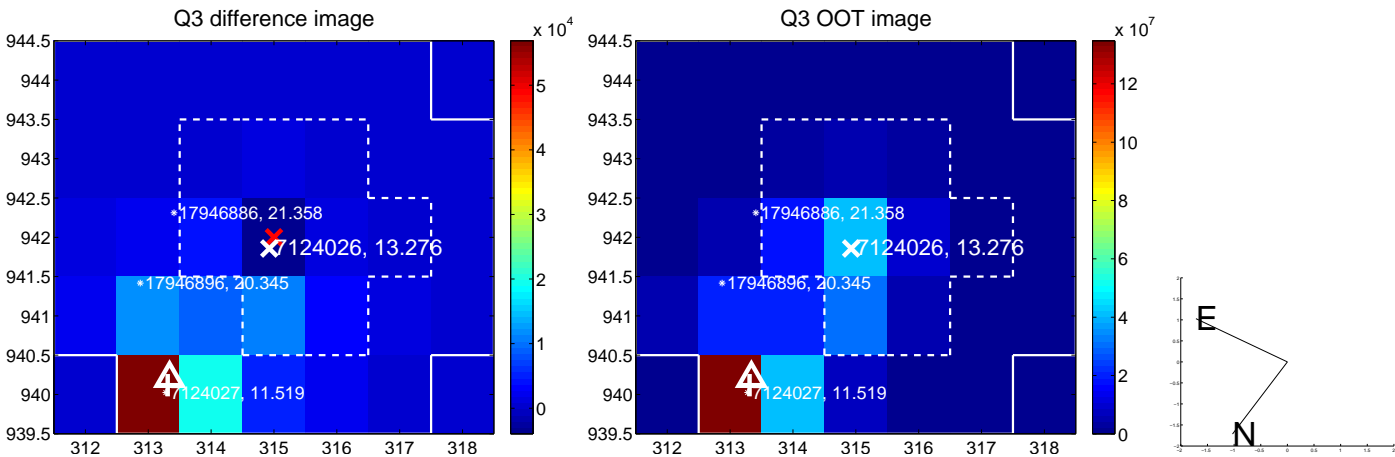
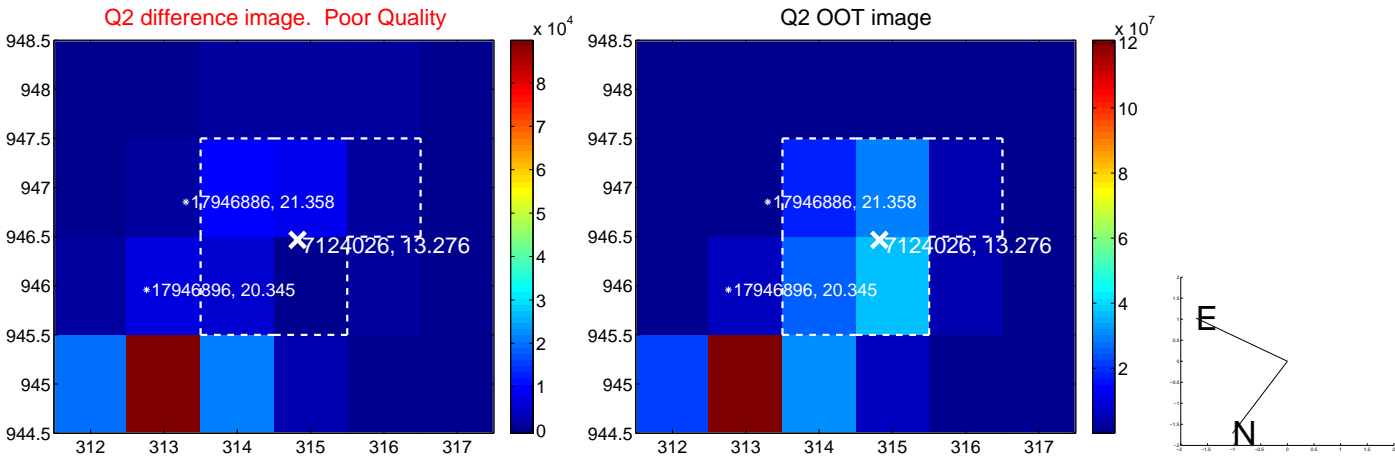
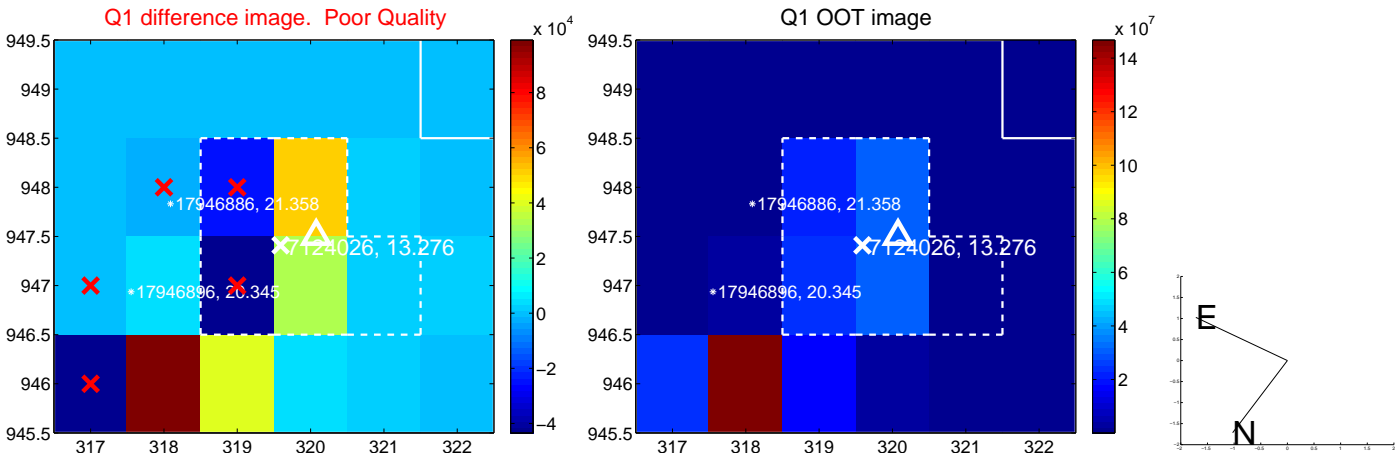
The OOT PRF centroid is offset from the target star catalog position by about 9.54 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec       |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT          | $1.026 \pm 2.527$  | 0.41                | $-0.102 \pm 0.807$ | $-1.021 \pm 2.538$ |
| PRF-fit source offset from KIC position | $0.952 \pm 2.854$  | 0.33                | $-0.427 \pm 1.214$ | $0.850 \pm 3.134$  |
| photometric centroid source offset      | $3.70 \pm 1.23$    | 3.02                | $1.01 \pm 0.49$    | $3.56 \pm 1.27$    |

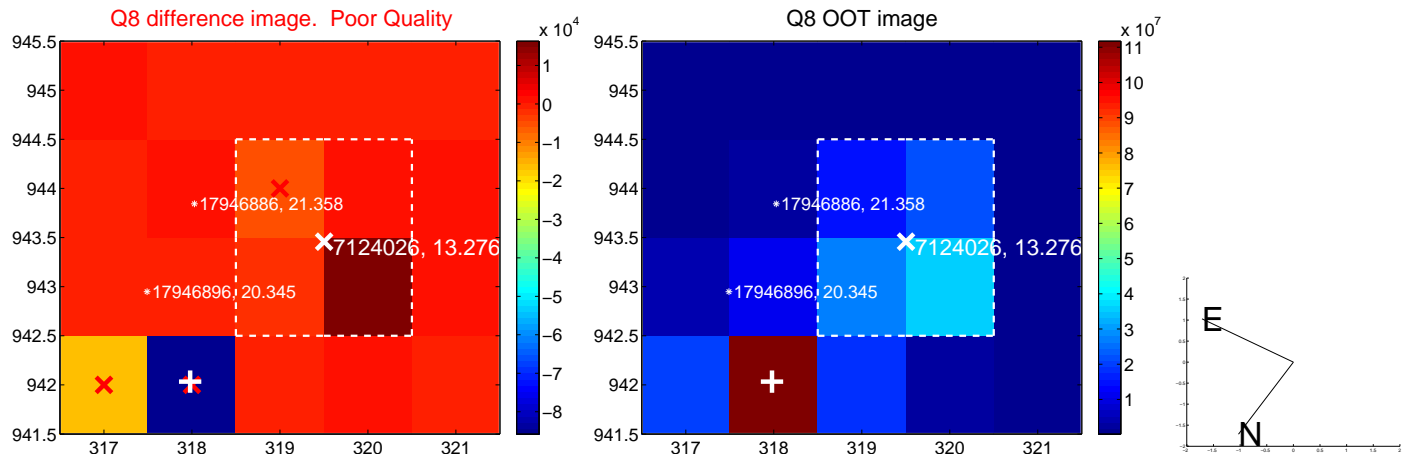
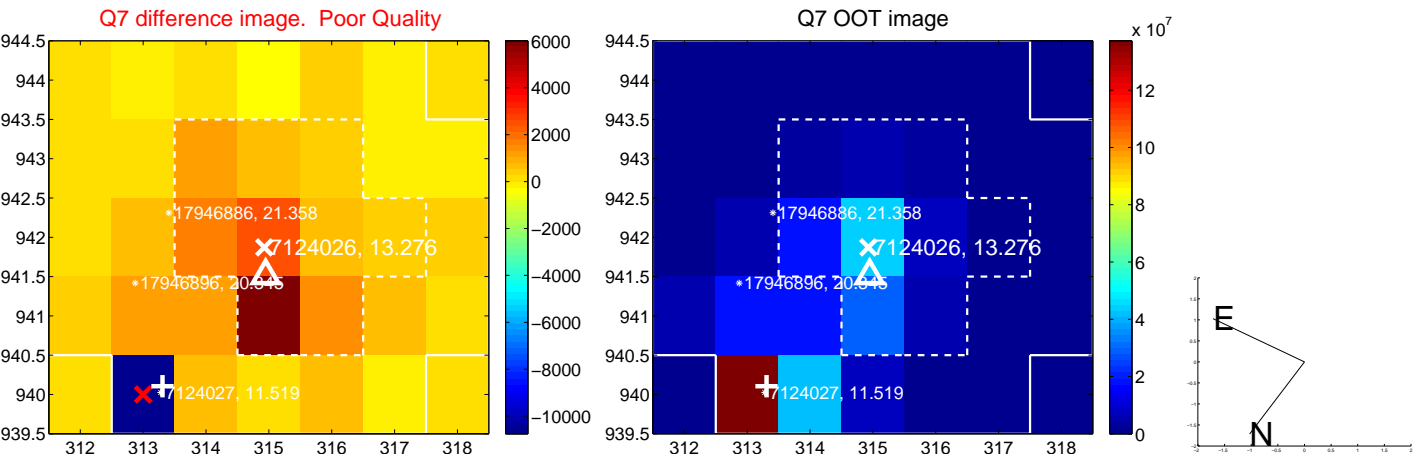
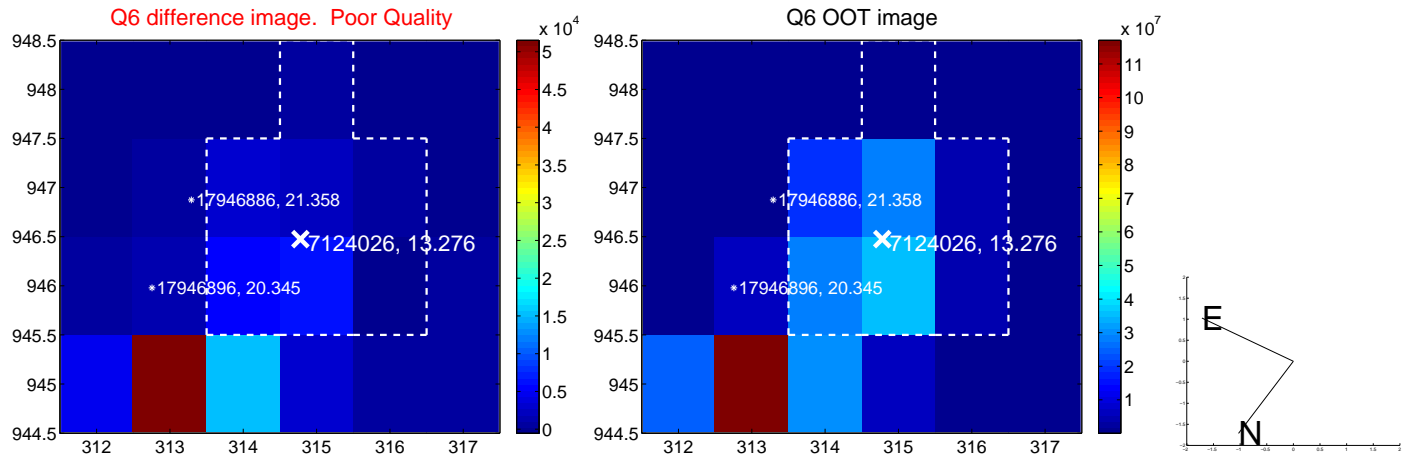
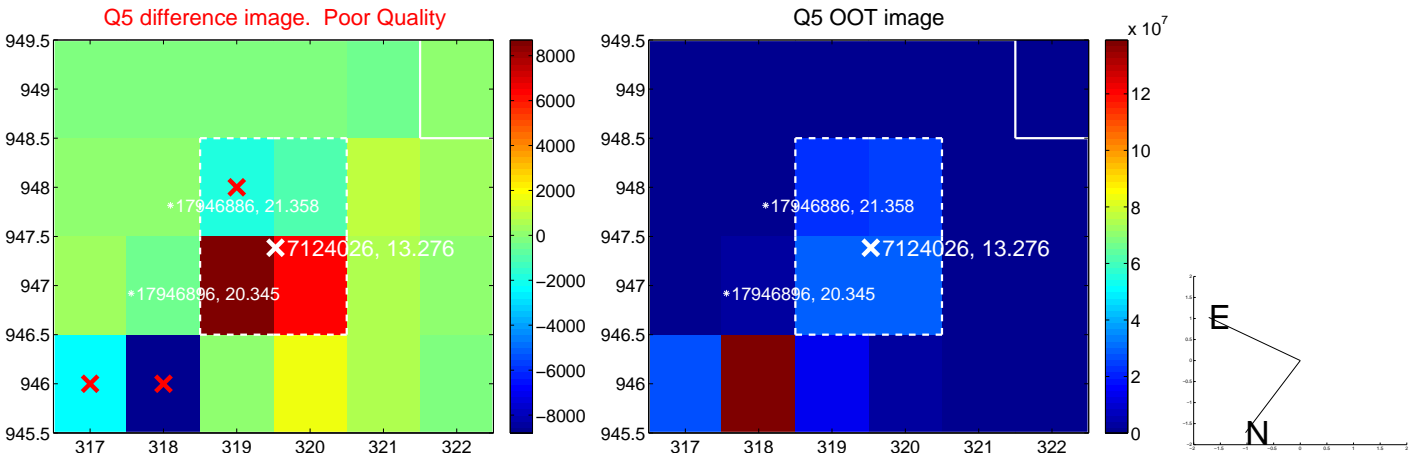


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

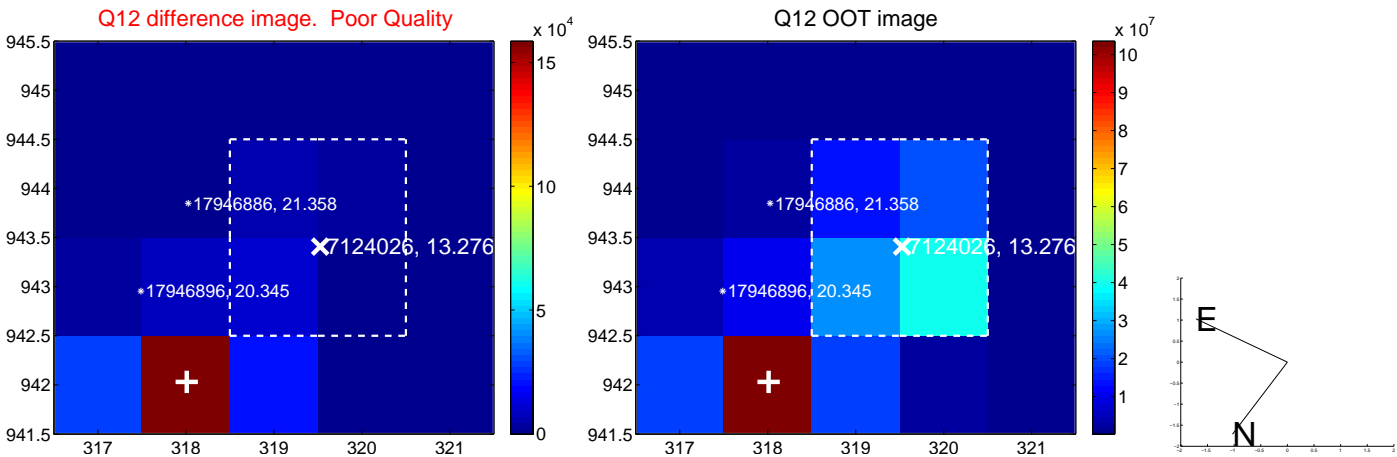
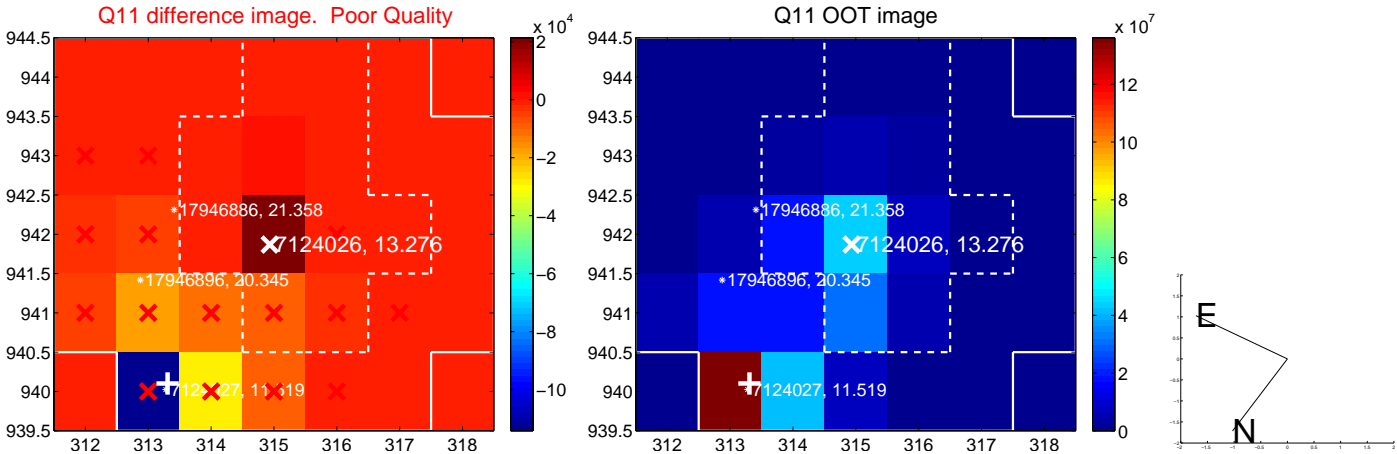
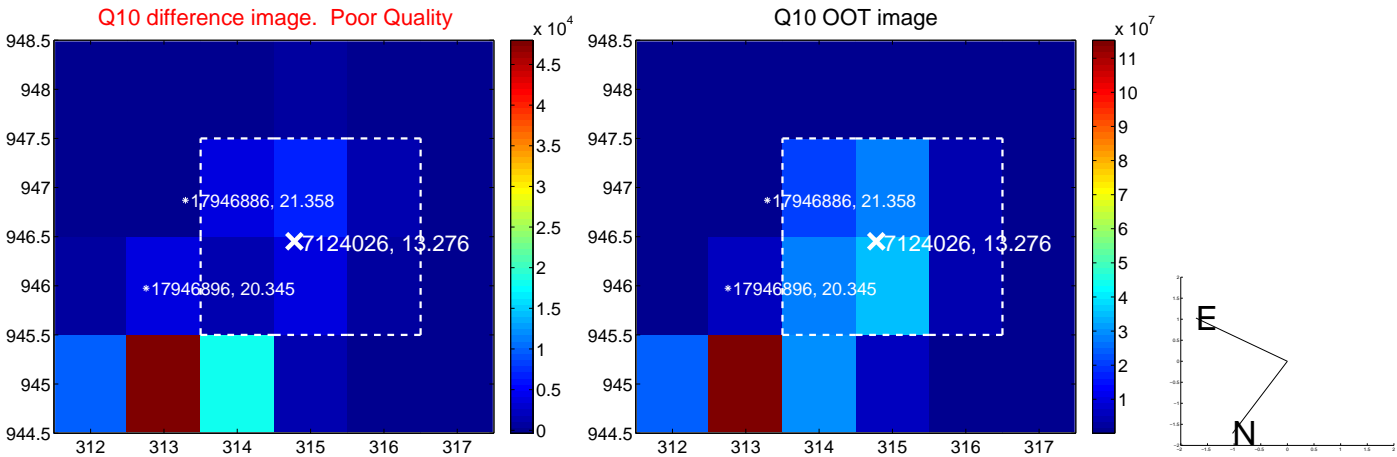
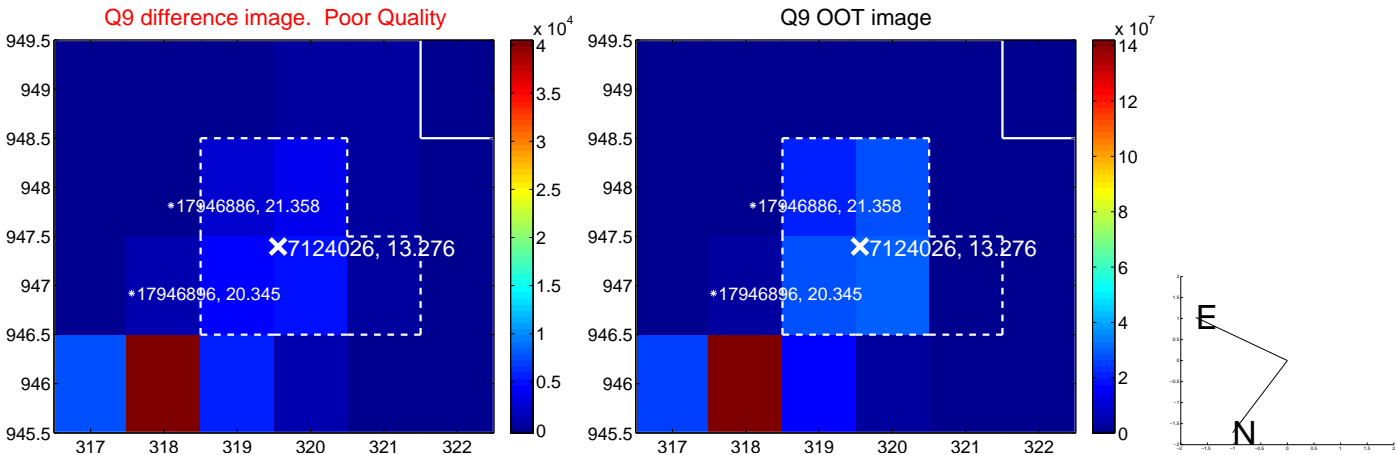


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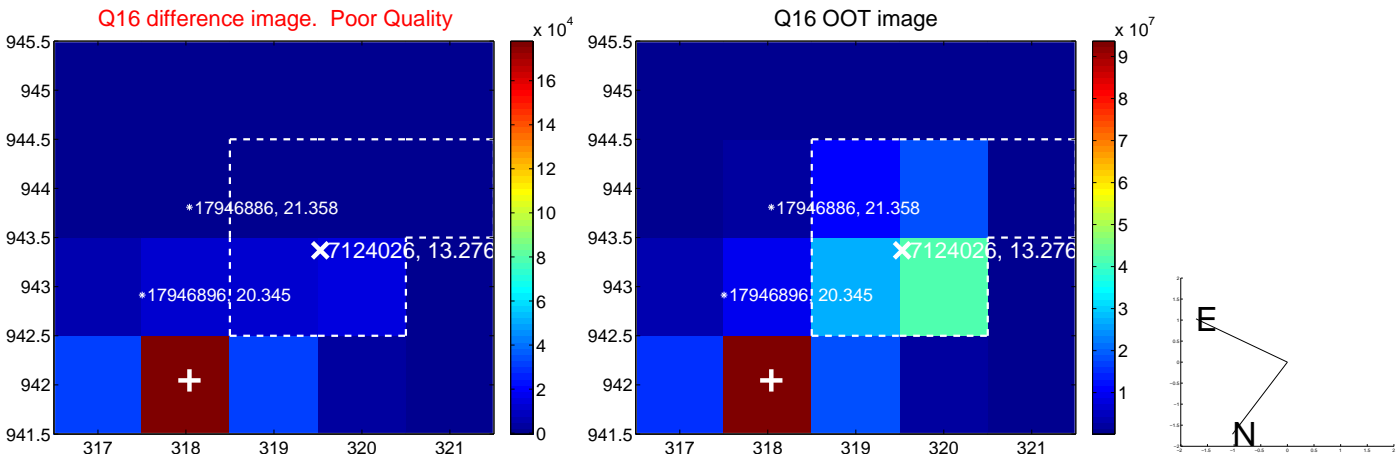
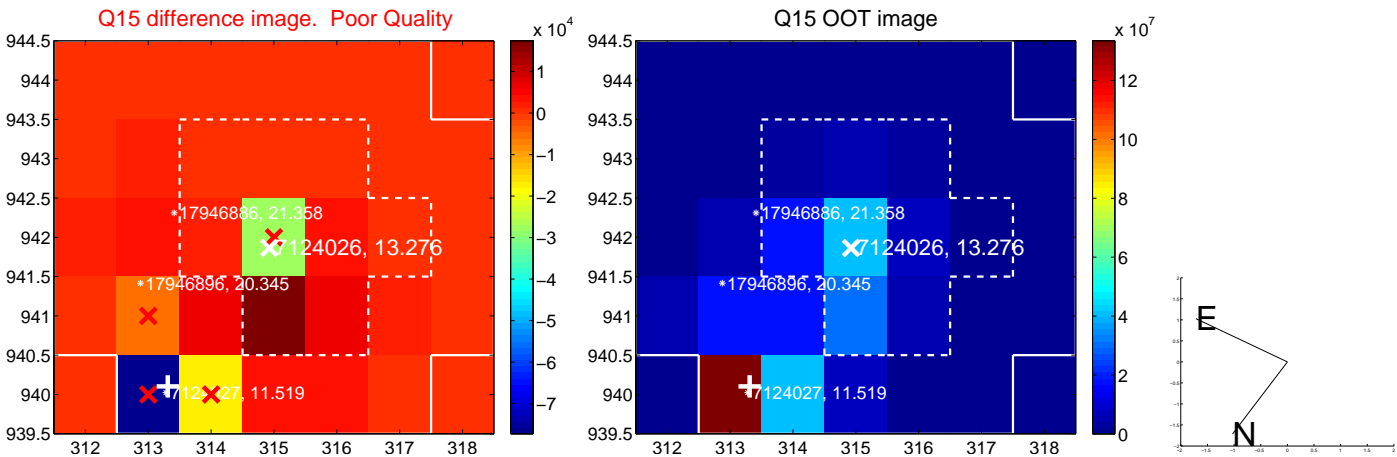
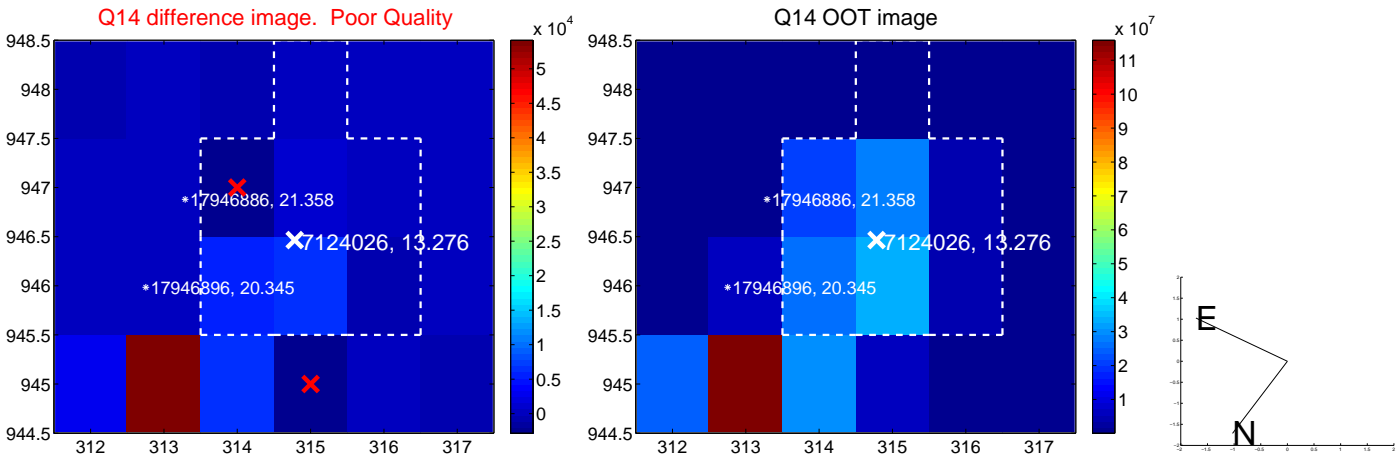
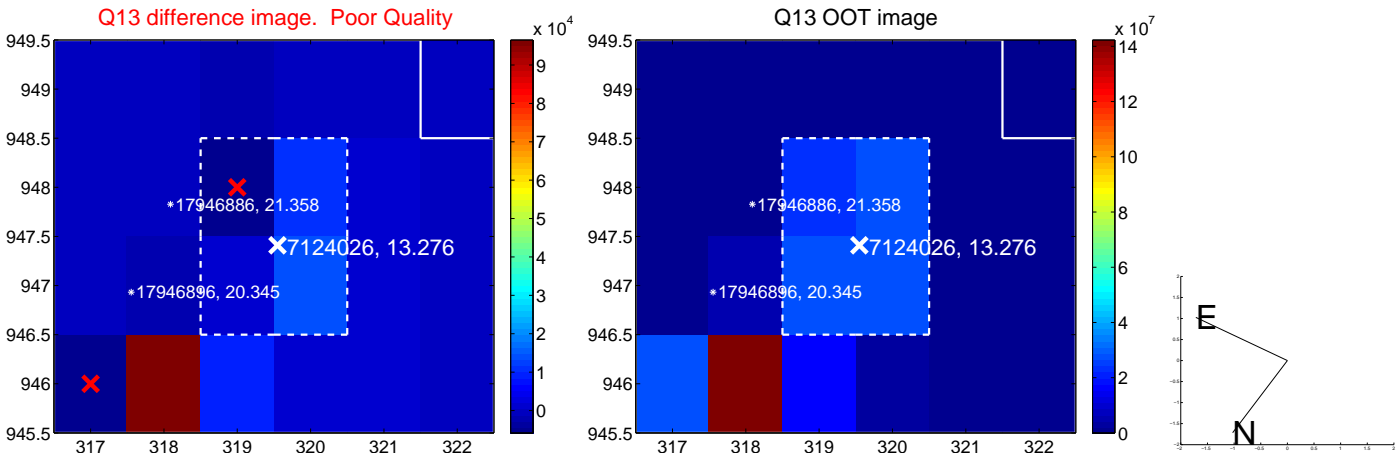




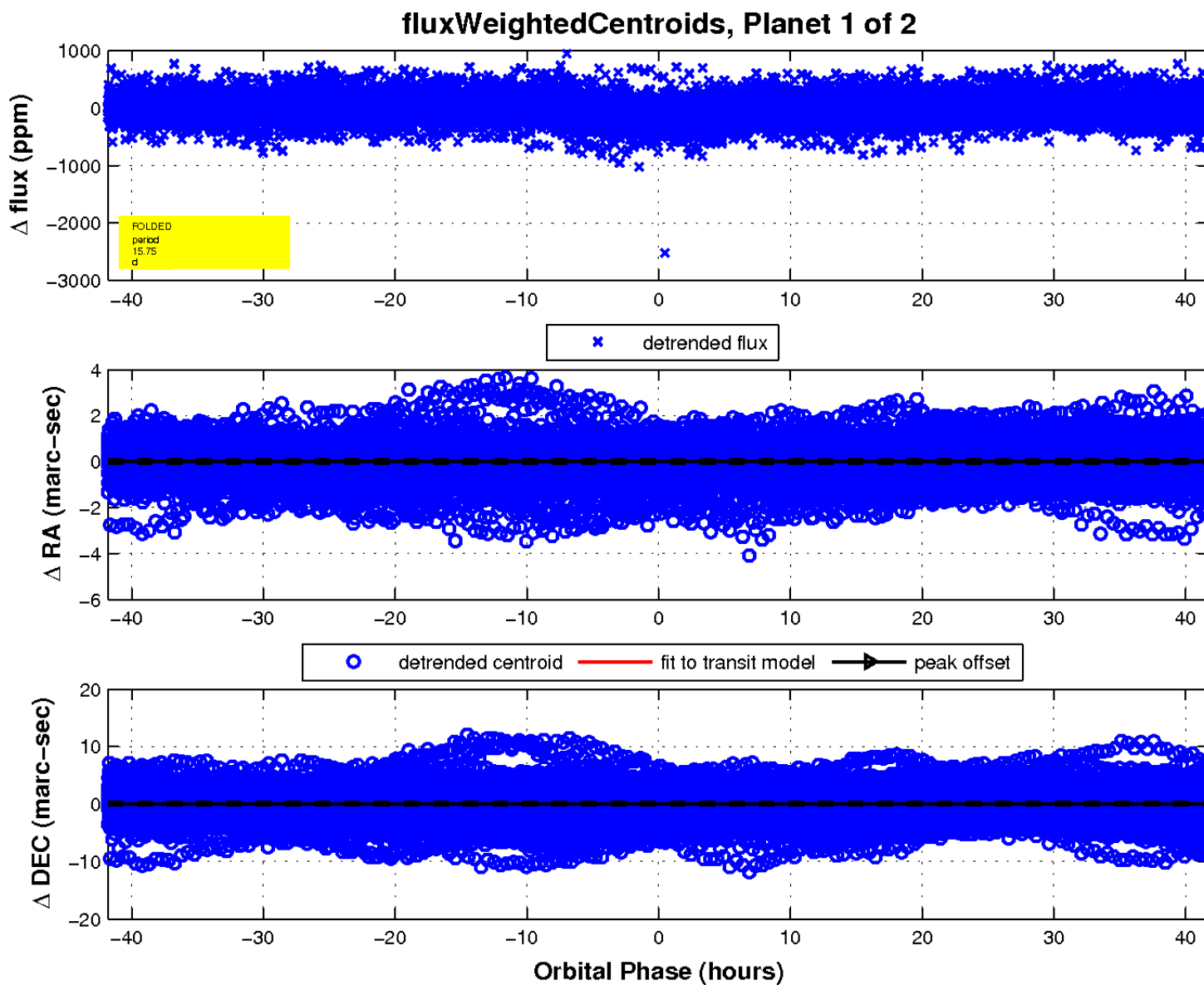
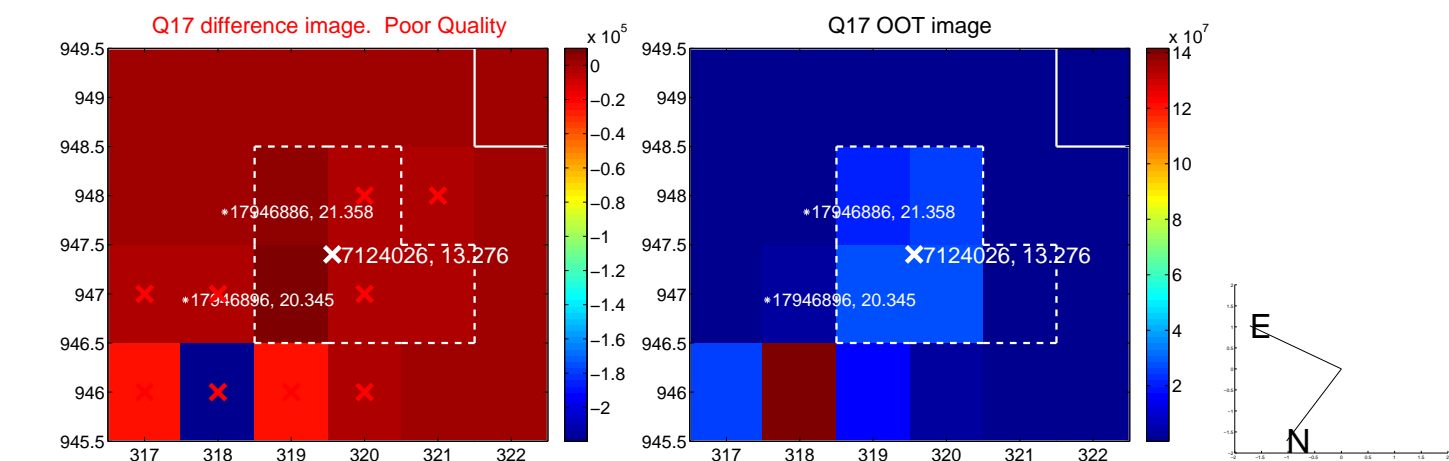
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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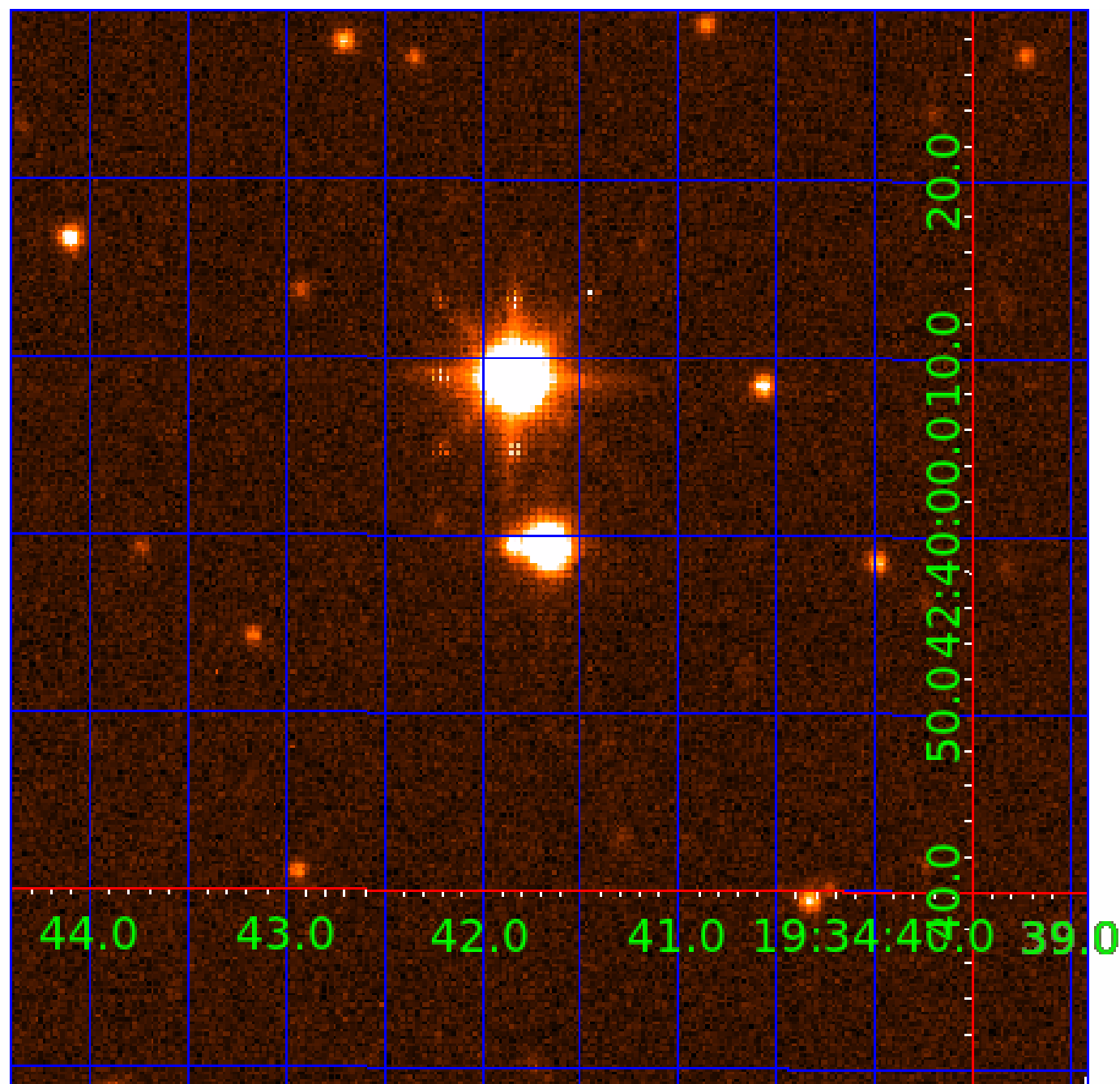


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 007124026

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
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| 007124026-02 | OBS      | No      | 406.591416    | 209.634202   | 217.6       | 10.925           | 10.9 | 5.5  | 0.95                        | 6089            | 1.60                   | 0.94                   |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|--|
| 007124026-01 | OBS      | FP   | 0.01  | 0 | 0 | 1 | 0 | CENT_RESOLVED_OFFSET   |
| 007124026-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS |

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

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

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

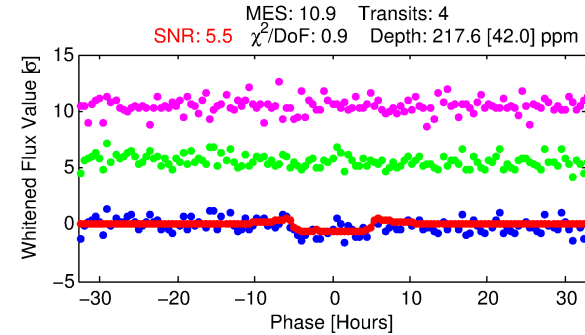
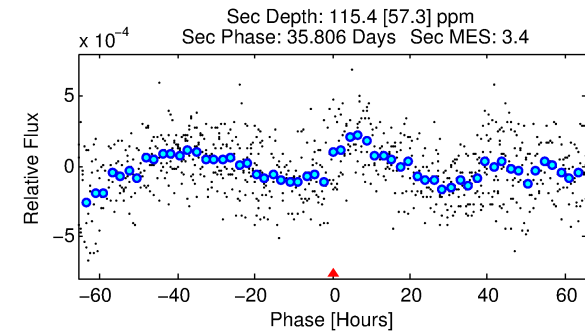
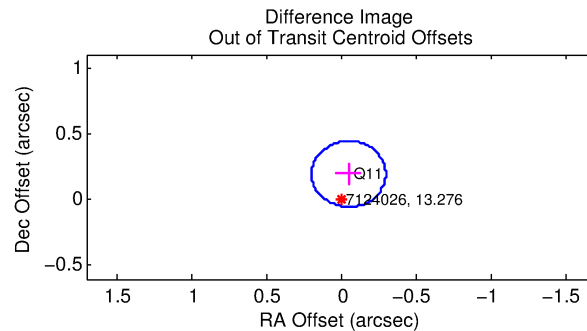
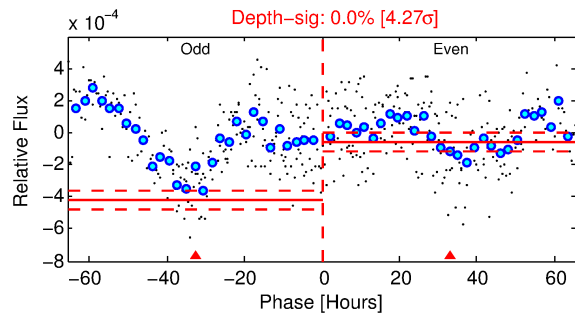
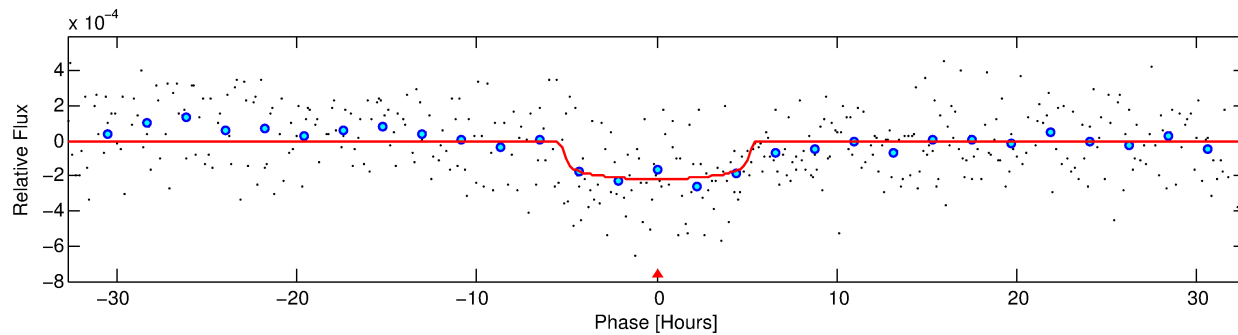
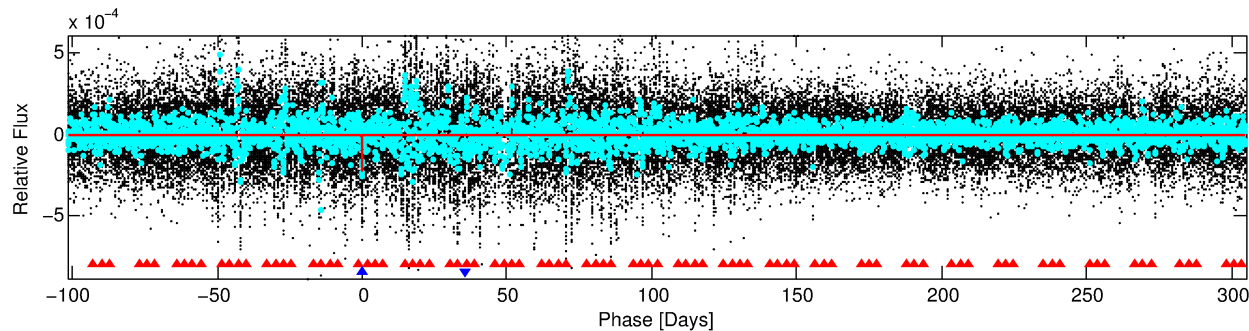
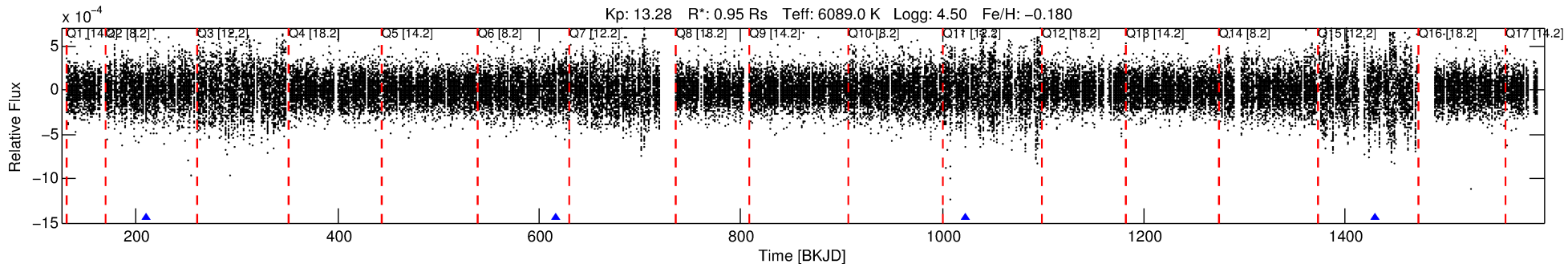
## Ephemeris Match Information For 007124026-02

No Significant Match Found

# DV One-Page Summary

KIC: 7124026 Candidate: 2 of 2 Period: 406.591 d  
KOI: K02275 Corr: No Ephemeris Match

Kp: 13.28 R\*: 0.95 Rs Teff: 6089.0 K Logg: 4.50 Fe/H: -0.180



## DV Fit Results:

Period = 406.59142 [0.00920] d  
Epoch = 209.6342 [0.0172] BKJD  
Rp/R\* = 0.0154 [0.0040]  
a/R\* = 153.39 [177.71]  
b = 0.86 [0.35]  
Seff = 0.94 [0.41]  
Teq = 251 [28] K  
Rp = 1.60 [0.68] Re  
a = 1.0846 [0.3117] AU  
Ag = 29159.59 [24145.28] [1.21σ]  
Teff = 5079 [922] K [5.23σ]

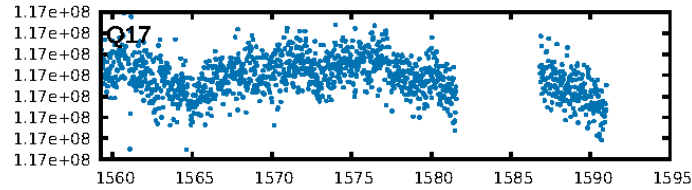
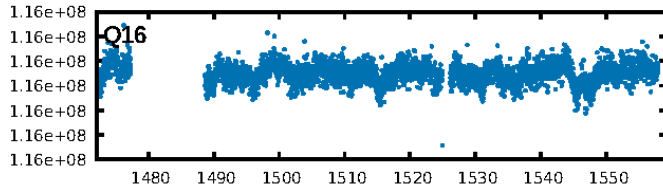
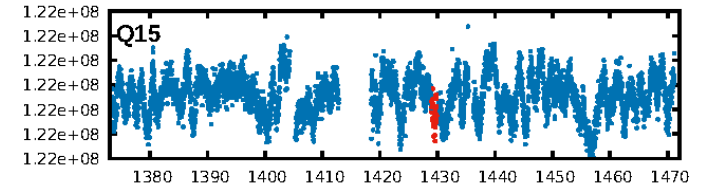
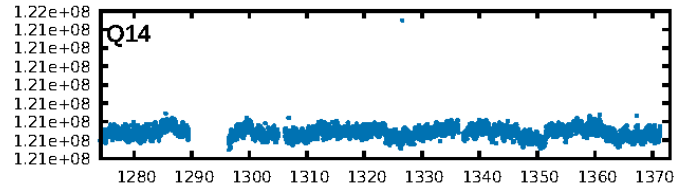
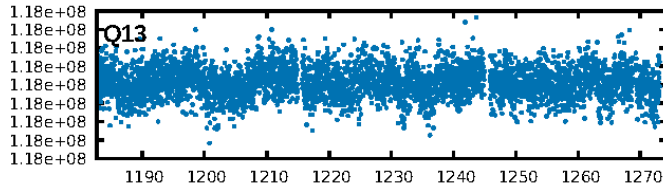
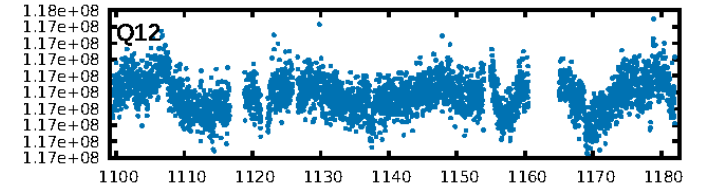
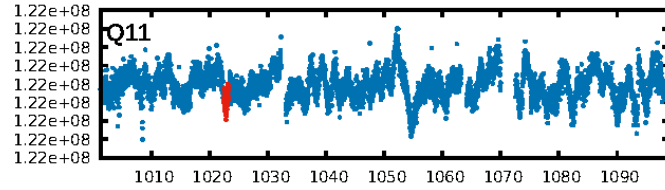
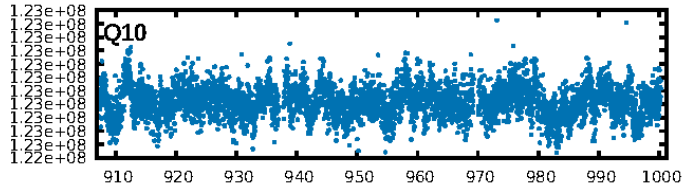
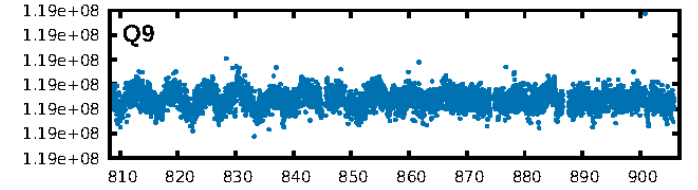
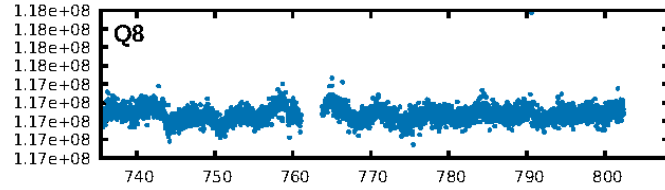
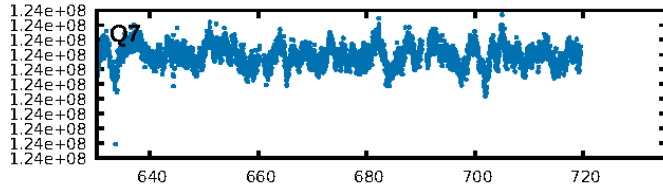
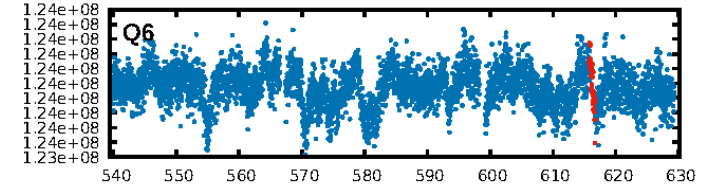
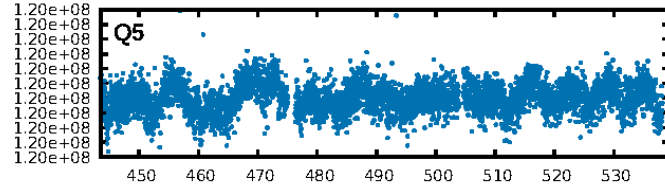
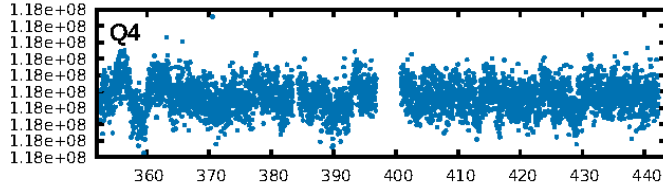
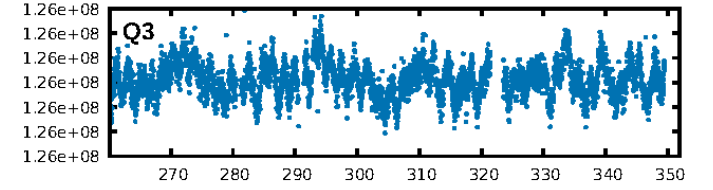
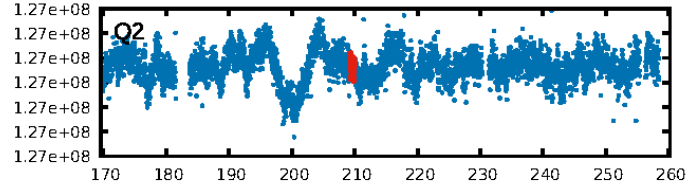
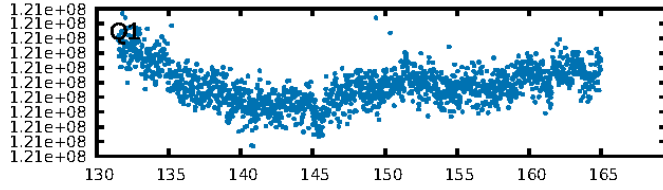
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [529.78σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 96.6%  
Bootstrap-pfa: 1.75e-23  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 1.174  
Centroid-sig: 37.7%  
Centroid-so: 2.118 arcsec [0.57σ]  
OotOffset-rm: 0.201 arcsec [2.43σ]  
OotOffset-st: 0/1/0/0 [1]  
KicOffset-rm: 9.940 arcsec [119.51σ]  
KicOffset-st: 0/1/0/0 [1]  
DiffImageQuality-fgm: 1.00 [1/1]  
DiffImageOverlap-fno: 1.00 [4/4]

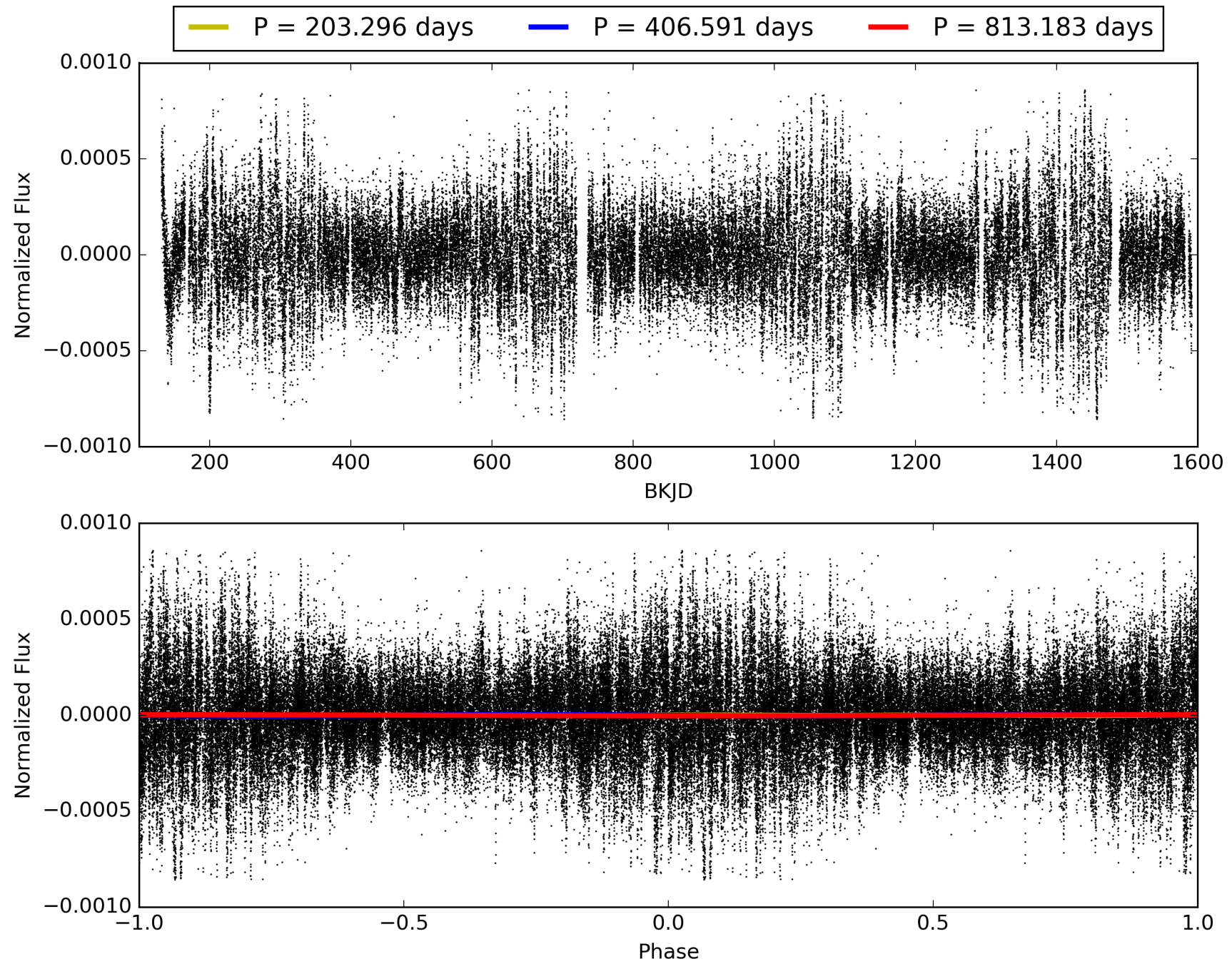
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 07:59:29 Z

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

# TCE 007124026-02, PDC Light Curves



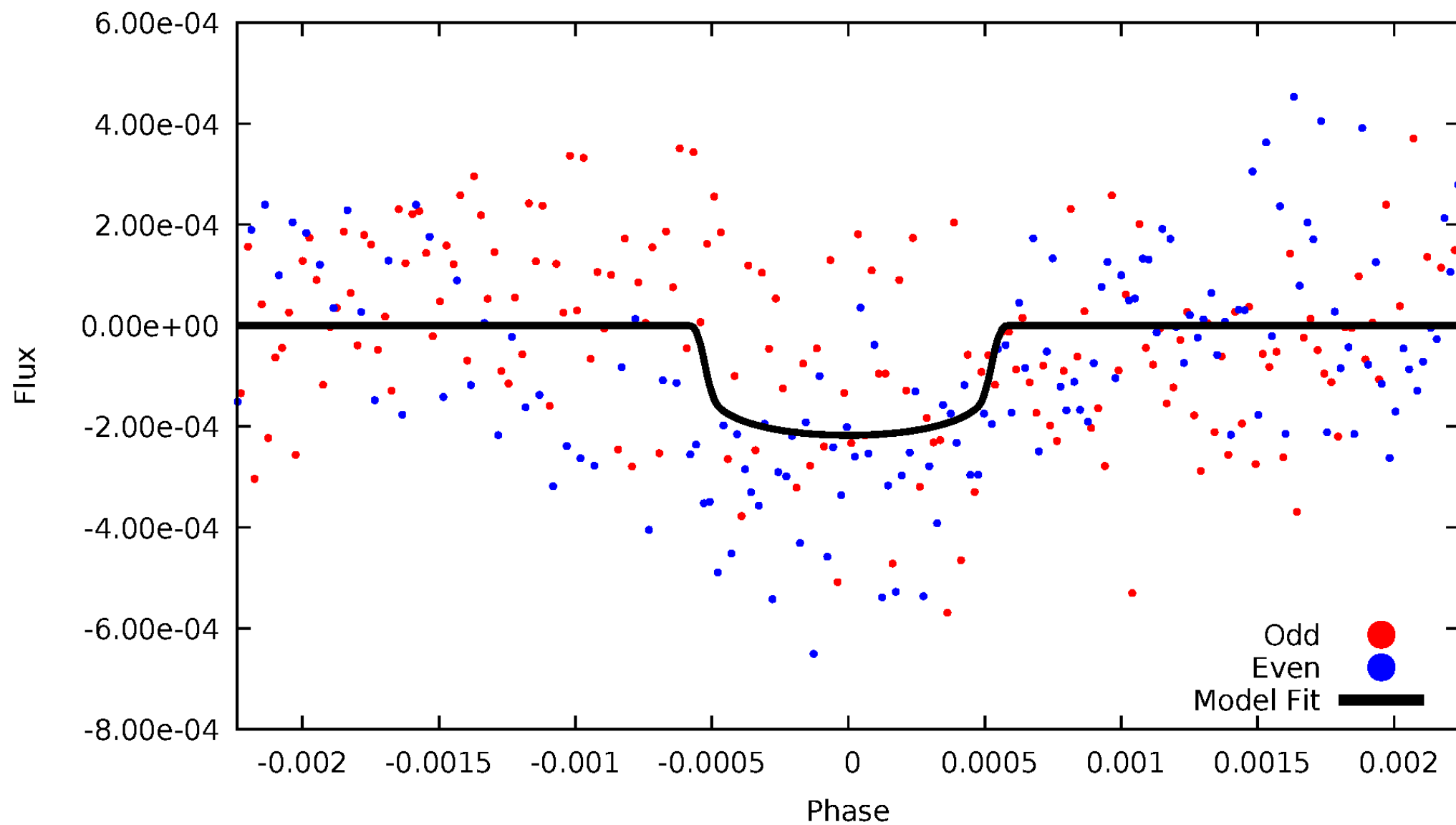
TCE 007124026-02





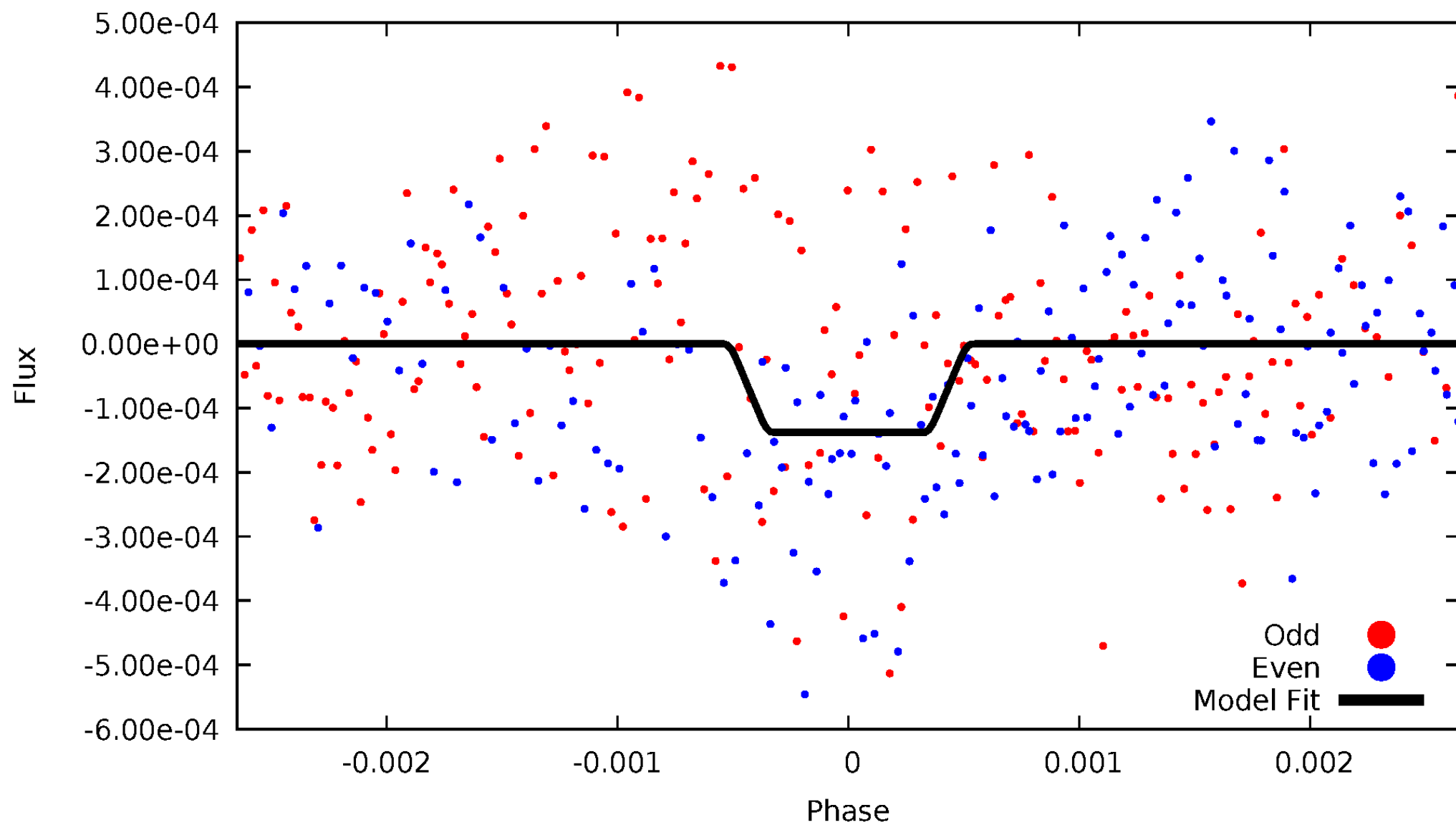
# DV Odd/Even

TCE 007124026-02



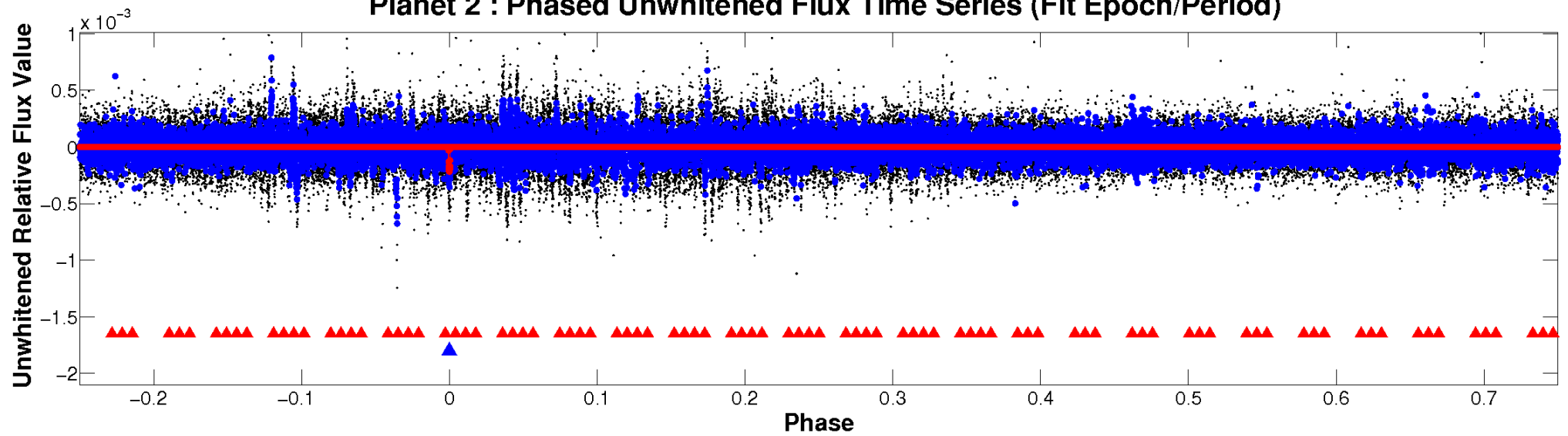
# ALT Odd/Even

TCE 007124026-02

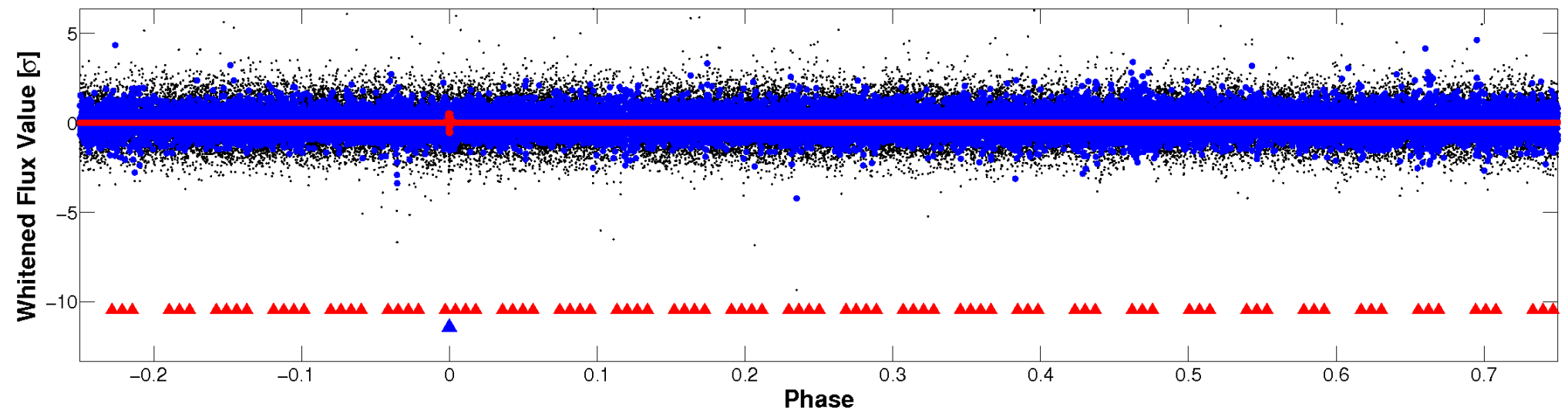


# Non-Whitened Vs. Whitened Light Curve

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

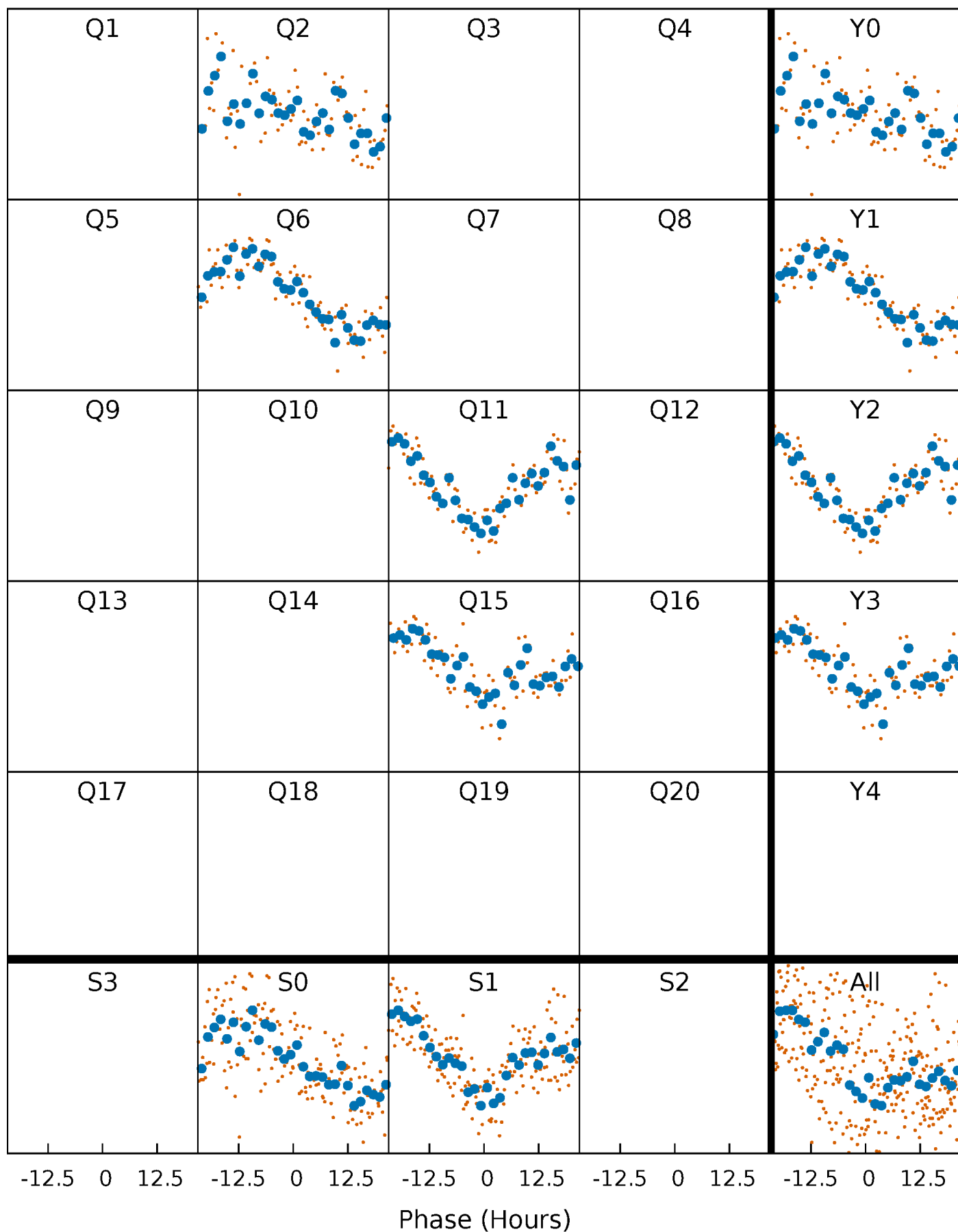


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



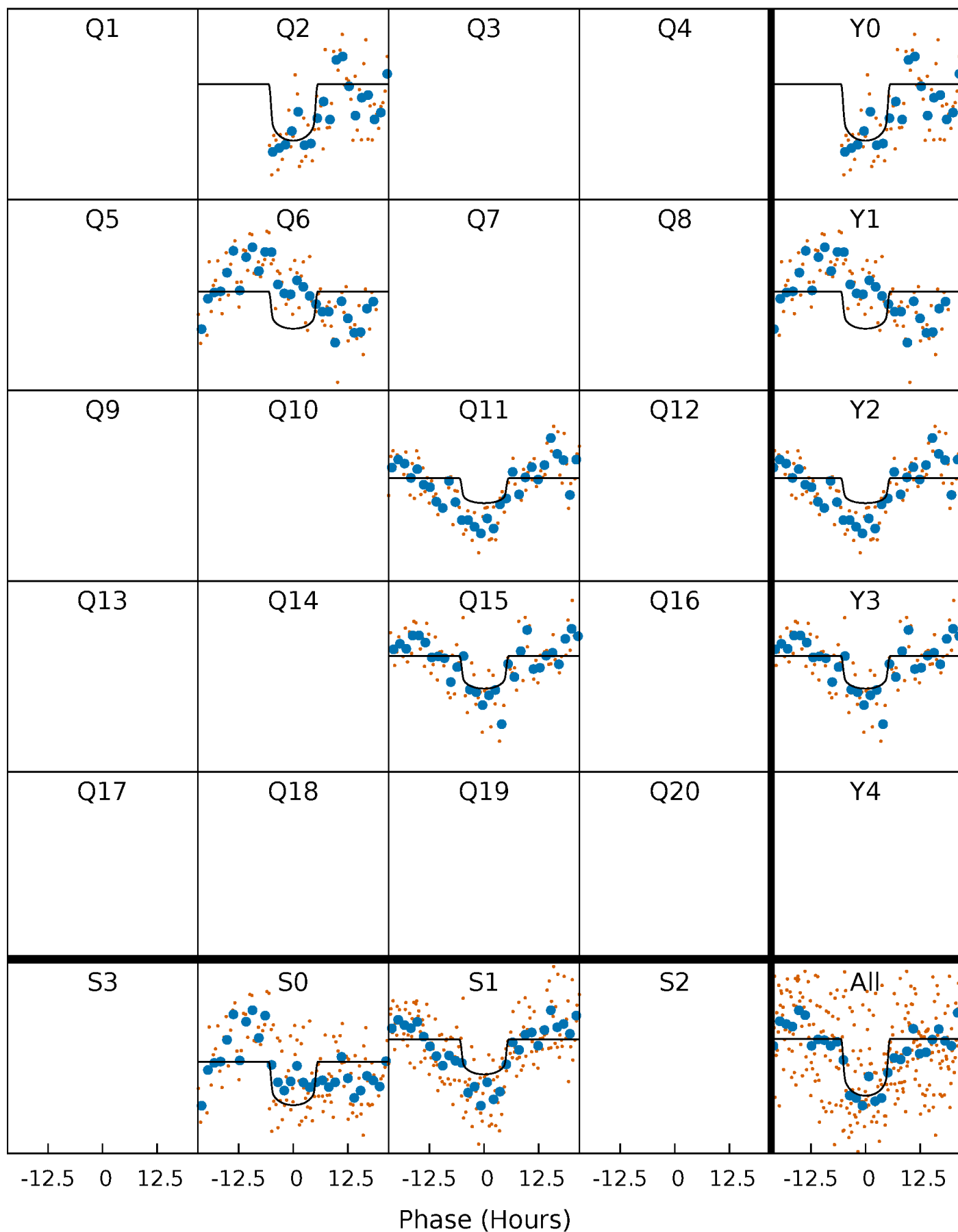
# PDC Quarter-Phased Transit Curves

TCE 007124026-02     $P=406.591416$  Days     $T_0=209.634202$  (BKJD)



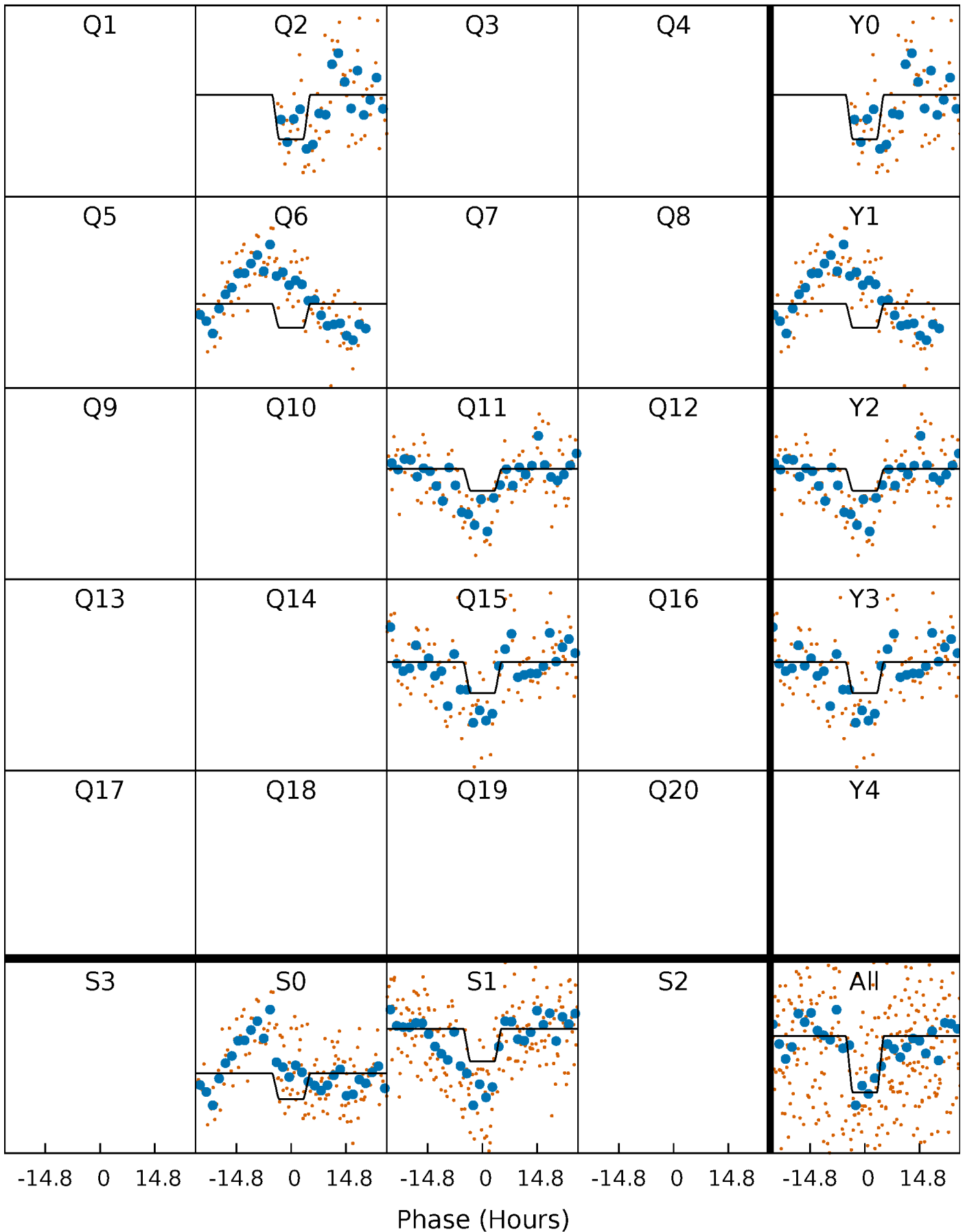
# DV Quarter-Phased Transit Curves

TCE 007124026-02 P=406.591416 Days  $T_0=209.634202$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 007124026-02     $P=406.641466$  Days     $T_0=209.558647$  (BKJD)

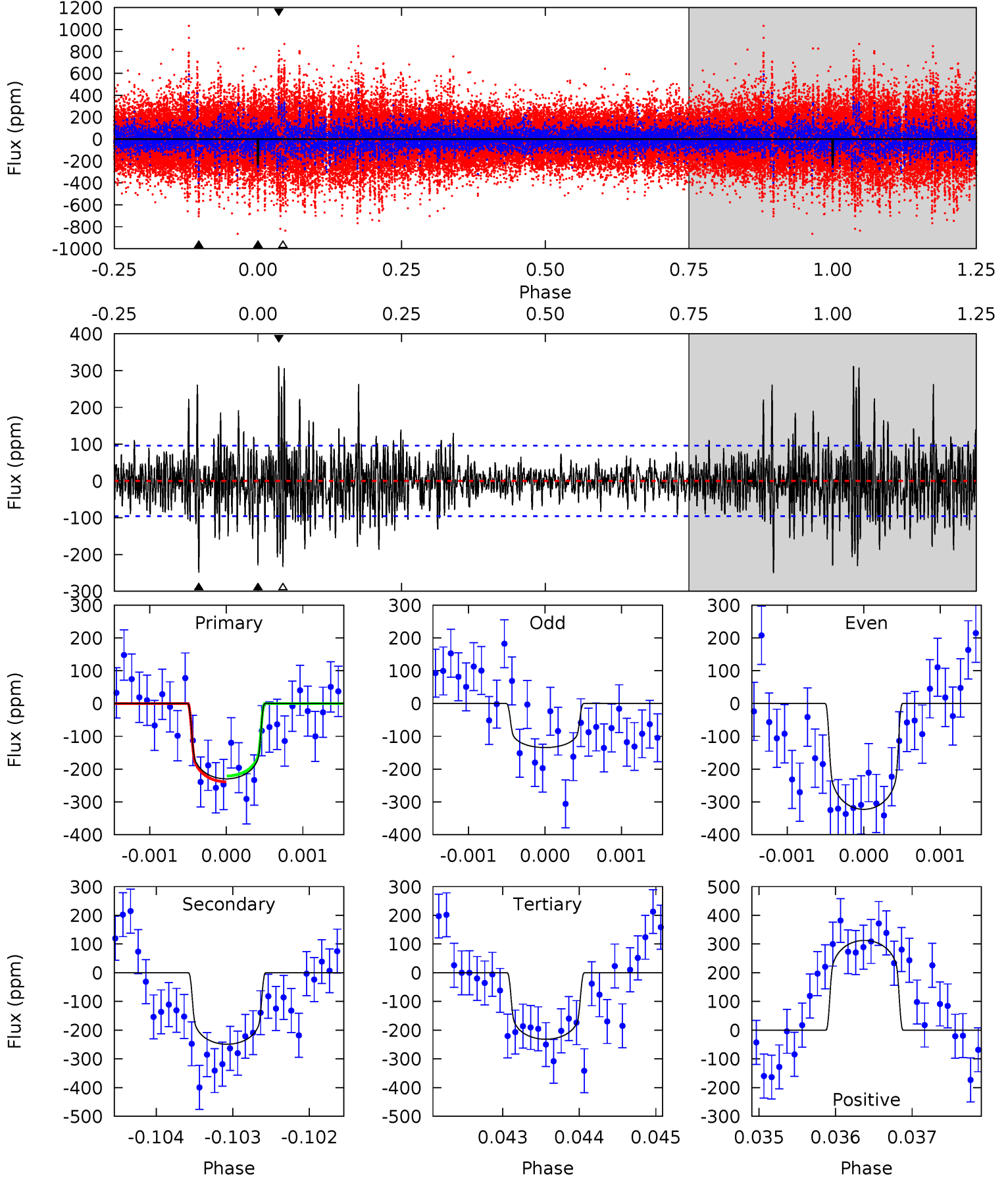




# DV Model-Shift Uniqueness Test

007124026-02, P = 406.591416 Days, E = 209.634202 Days

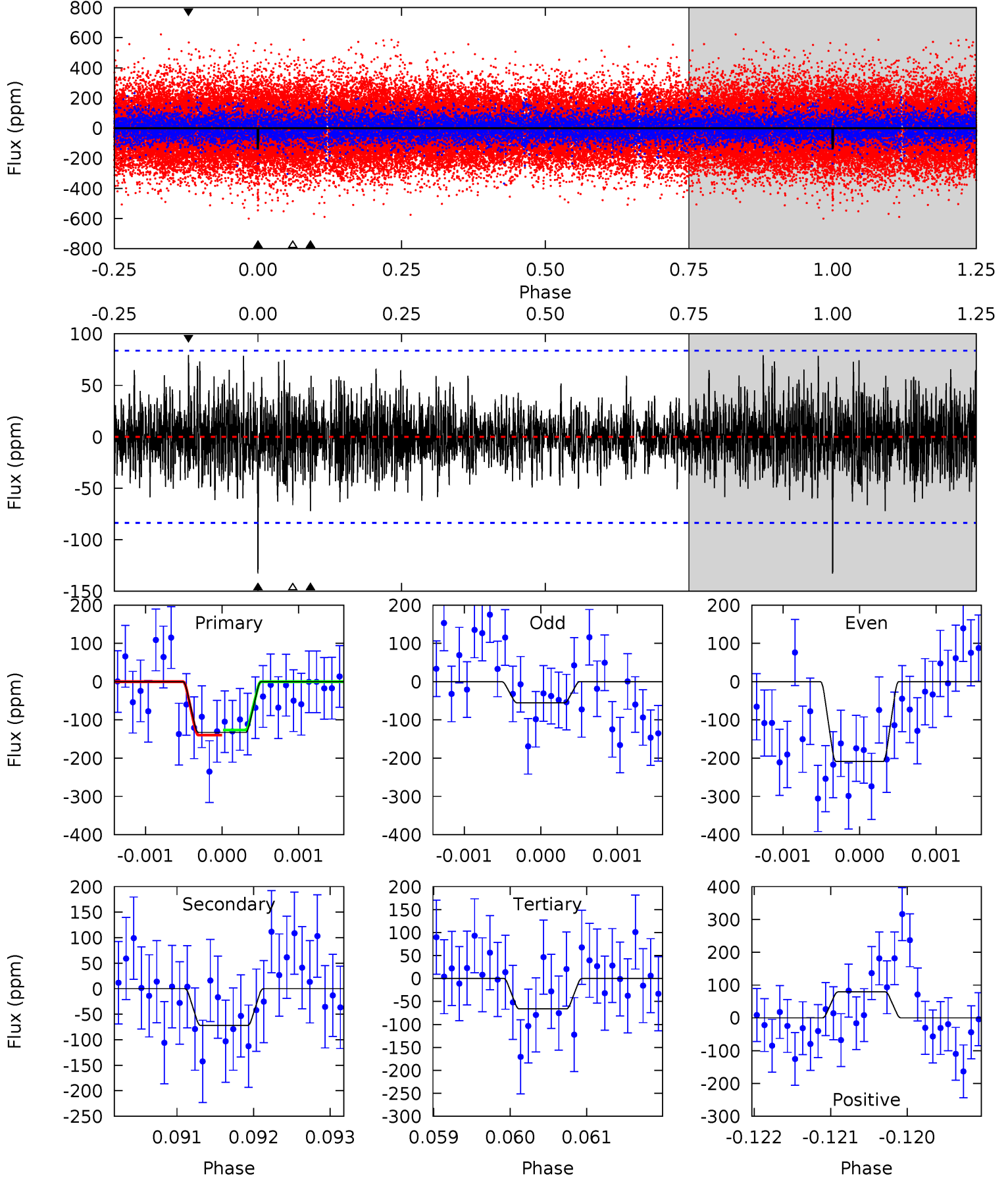
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 13.0 | 14.1 | 13.1 | 17.7 | 5.43            | 3.25            | 3.09             | -0.10   | -4.68   | 0.98    | -3.60   | 5.31    | 0.89 | 0.56  | 0.50 |



# Alt Model-Shift Uniqueness Test

007124026-02, P = 406.641466 Days, E = 209.558647 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  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 8.65 | 4.69 | 4.31 | 5.16 | 5.44            | 3.28            | 1.37             | 4.34    | 3.49    | 0.38    | -0.47   | 4.98    | 0.78 | 0.37  | 0.43 |



### Stellar Parameters For KIC 007124026

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                     | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
|        | $6089^{+163}_{-199}$ | $4.495^{+0.054}_{-0.229}$ | $-0.180^{+0.300}_{-0.300}$ | $0.950^{+0.324}_{-0.101}$ | $1.031^{+0.140}_{-0.126}$ | $1.692^{+0.382}_{-0.943}$                 |
|        | +3%/-3%              | +1%/-5%                   | +167%/-167%                | +34%/-11%                 | +14%/-12%                 | +23%/-56%                                 |
| Source | PHO1                 | KIC0                      | KIC0                       | DSEP                      |                           |   |

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

### Secondary Eclipse Parameters for KIC 007124026-02 / KOI

| Detrend | Depth (ppm)   | $R_p (R_{\oplus})$     | $T_{max} (K)$     | $T_{obs} (K)$         | $A_{obs}$                 |
|---------|---------------|------------------------|-------------------|-----------------------|---------------------------|
| DV      | $-249 \pm 18$ | $1.67^{+0.53}_{-0.43}$ | $362^{+27}_{-18}$ | $6212^{+1092}_{-742}$ | $55835^{+48314}_{-22778}$ |
| Alt.    | $-72 \pm 15$  | $1.29^{+0.49}_{-0.45}$ | $359^{+26}_{-18}$ | $5172^{+1270}_{-631}$ | $26801^{+38235}_{-12811}$ |

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

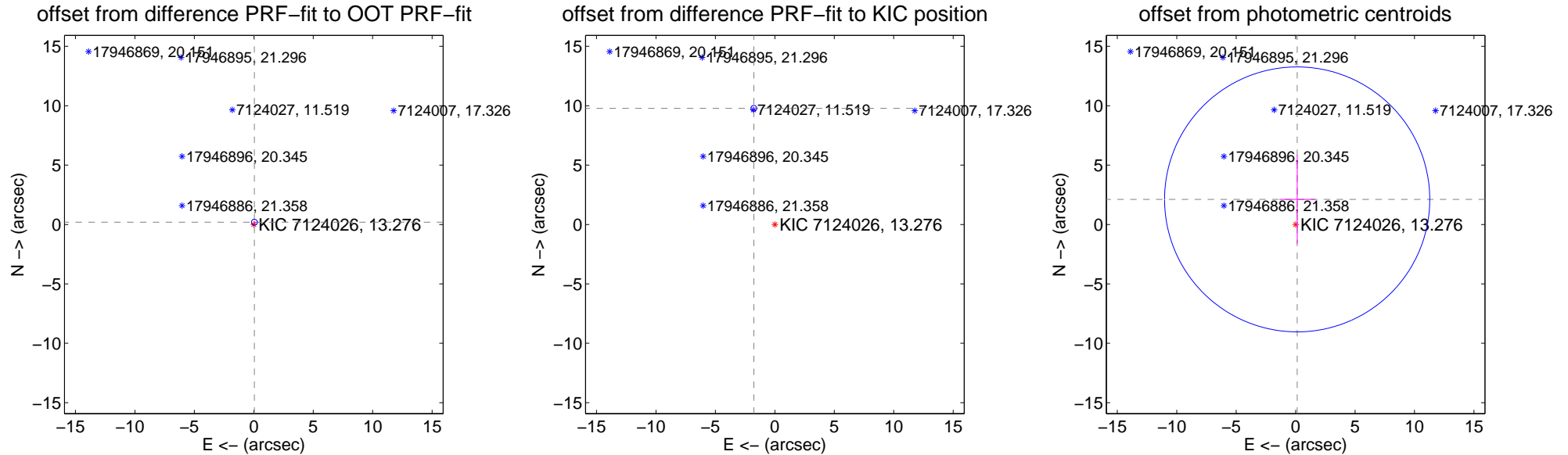
## DV Centroid Data

Supplemental centroid analysis for 007124026-02. Kepler magnitude: 13.28. Transit SNR 5.49

There are 1 quarters with good PRF difference image offsets

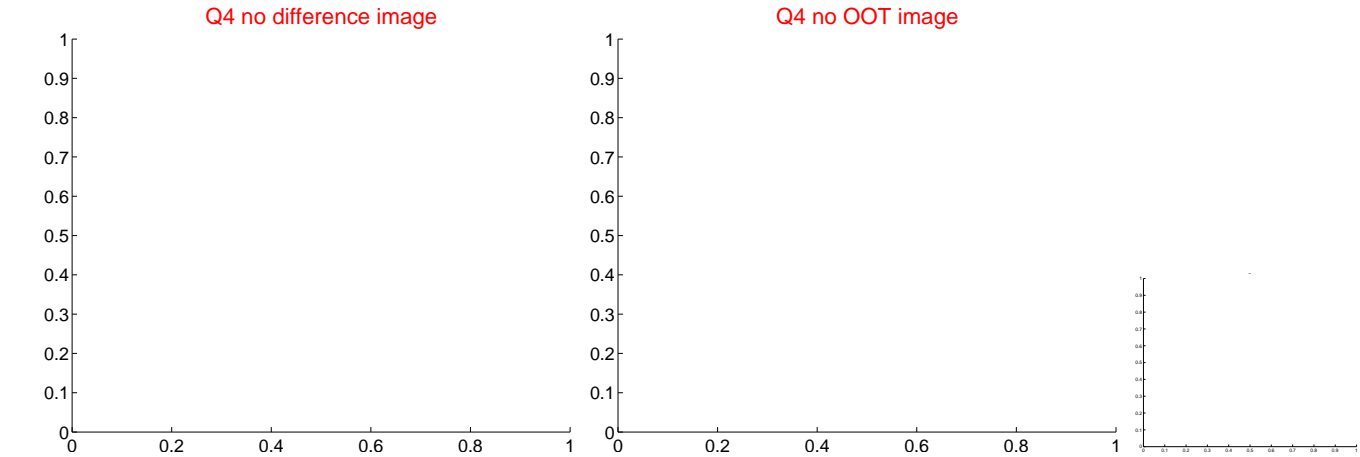
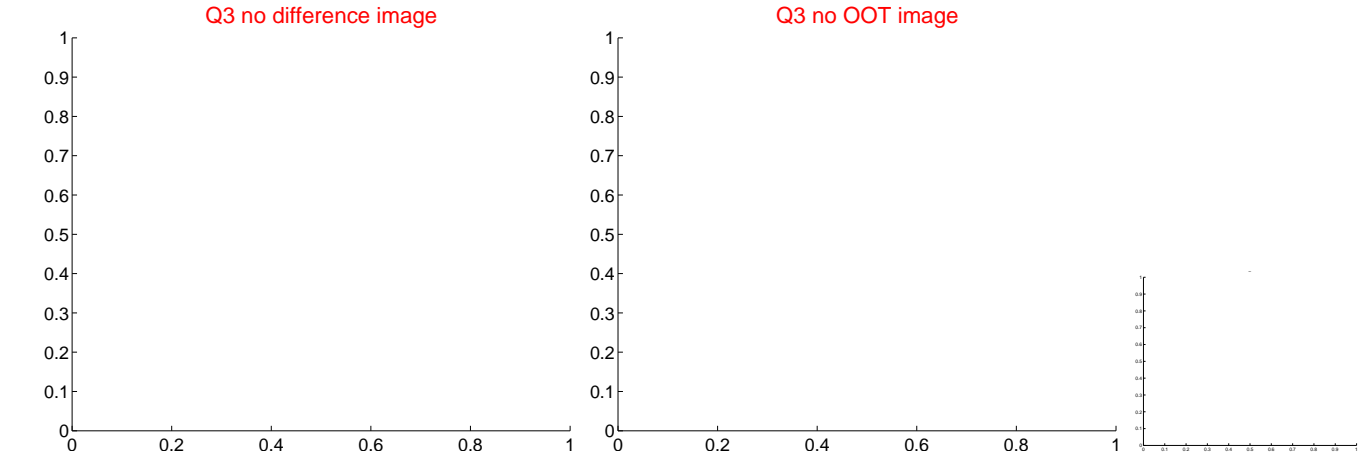
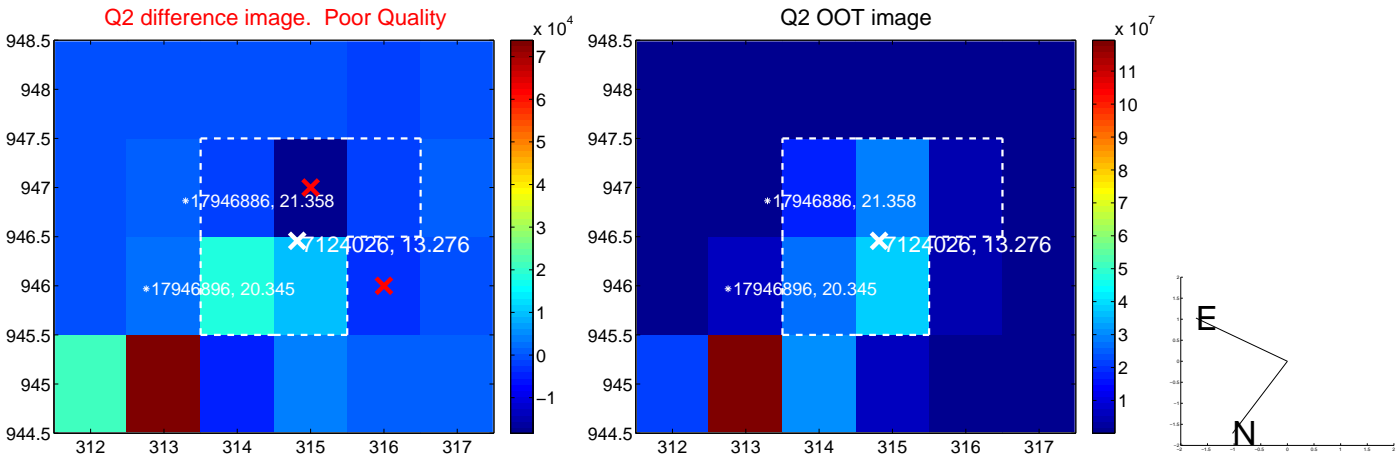
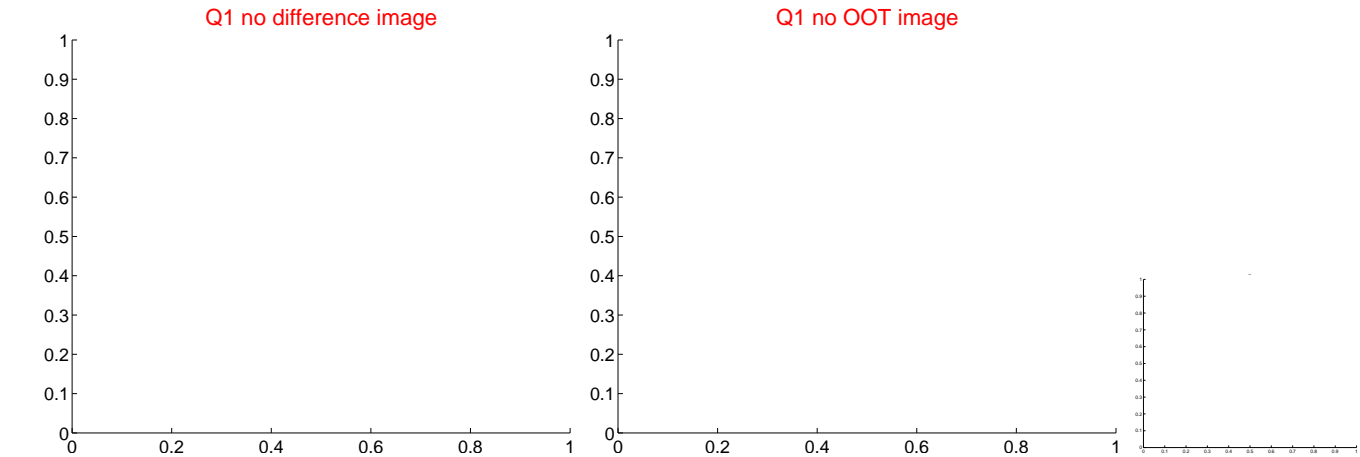
The OOT PRF centroid is offset from the target star catalog position by about 9.76 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

|   | Distance in arcsec                  | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec      |
|---|-------------------------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT          | $0.201 \pm 0.083$                   | 2.43                | $-0.053 \pm 0.078$ | $0.194 \pm 0.083$ |
| PRF-fit source offset from KIC position | <b><math>9.940 \pm 0.083</math></b> | <b>119.51</b>       | $1.771 \pm 0.078$  | $9.781 \pm 0.083$ |
| photometric centroid source offset      | $2.12 \pm 3.72$                     | 0.57                | $-0.13 \pm 1.50$   | $2.11 \pm 3.72$   |

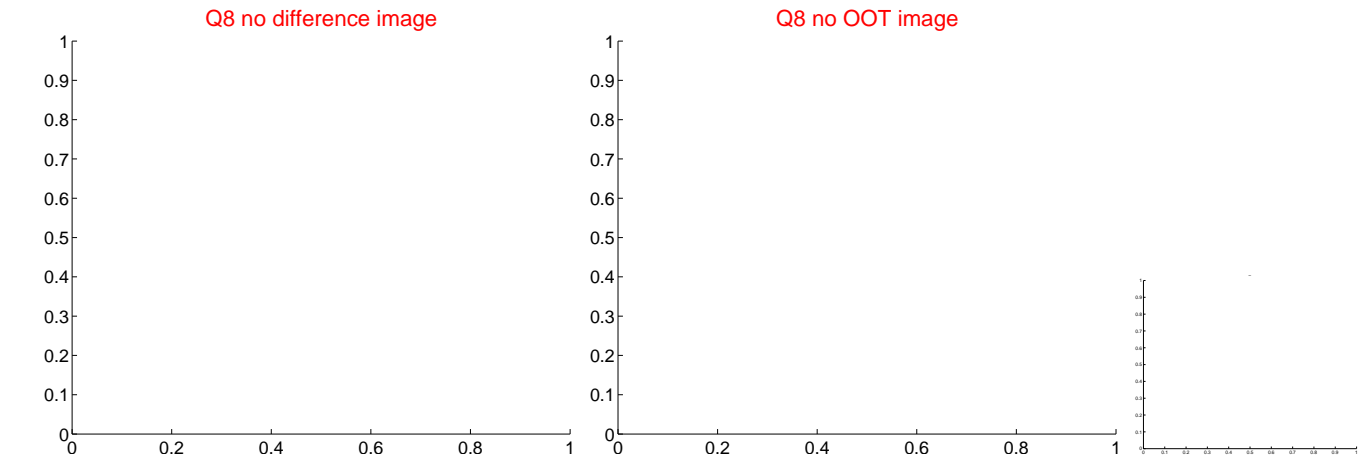
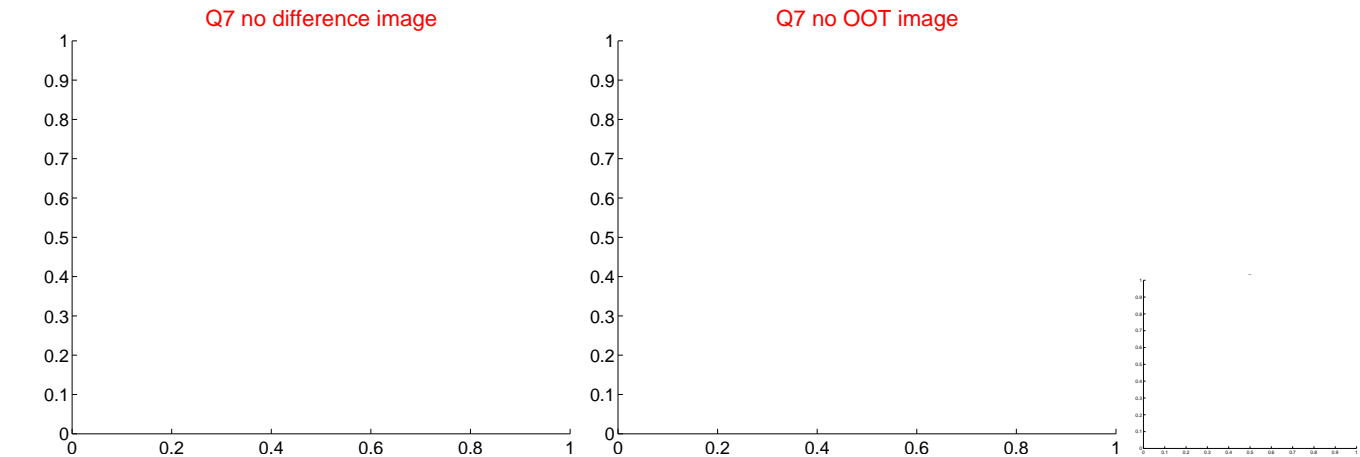
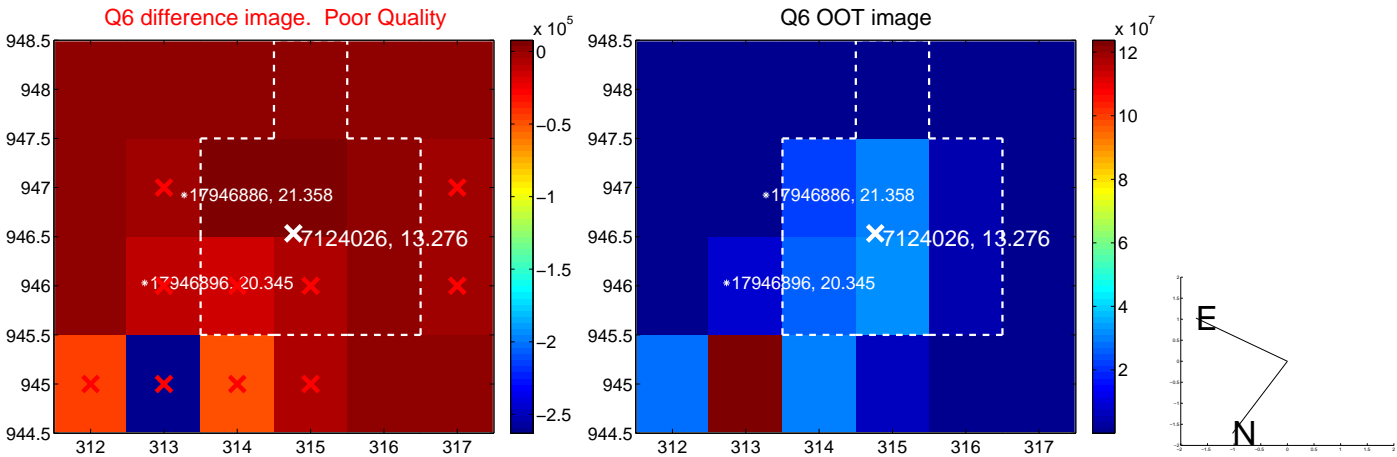
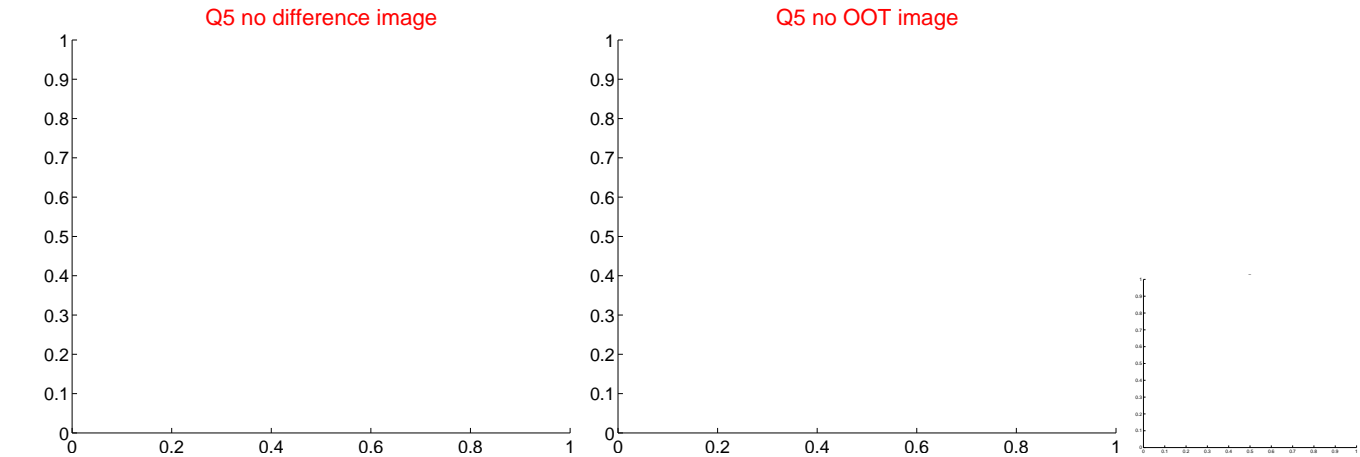


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



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





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

Q9 no difference image



Q9 no OOT image



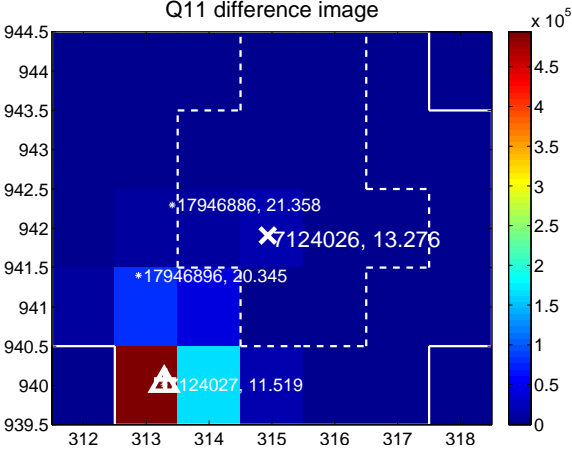
Q10 no difference image



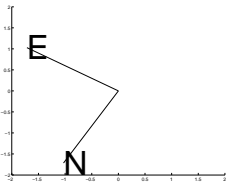
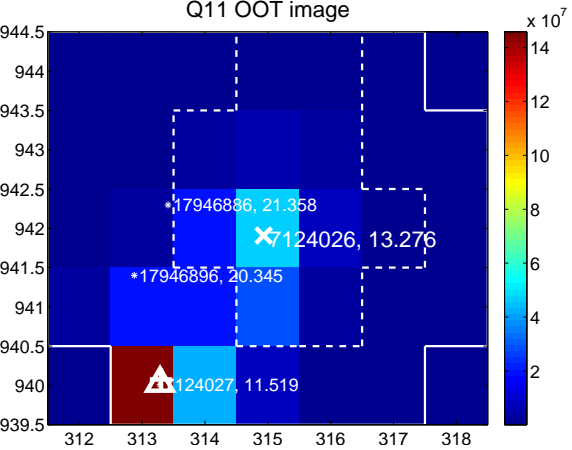
Q10 no OOT image



Q11 difference image



Q11 OOT image



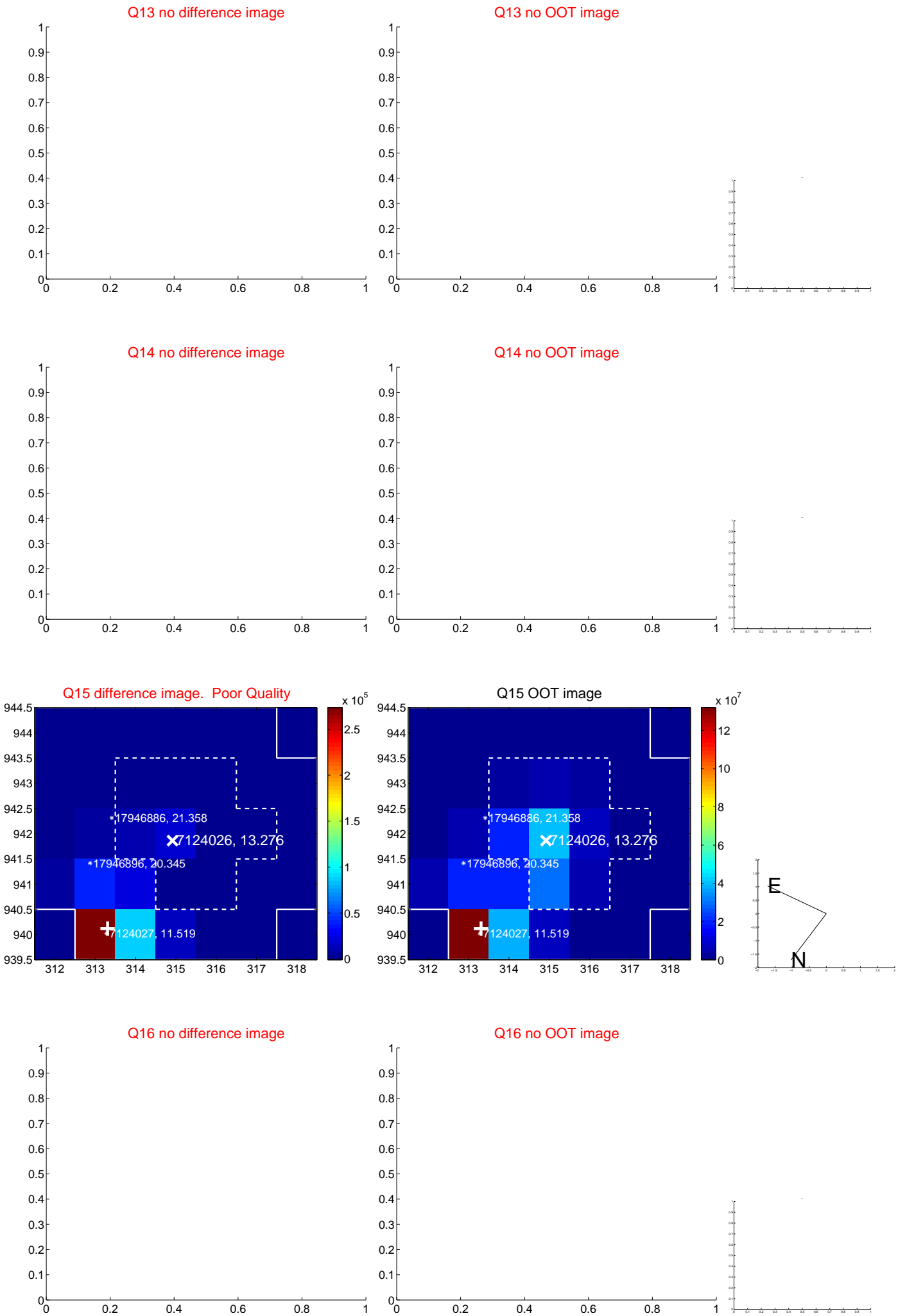
Q12 no difference image



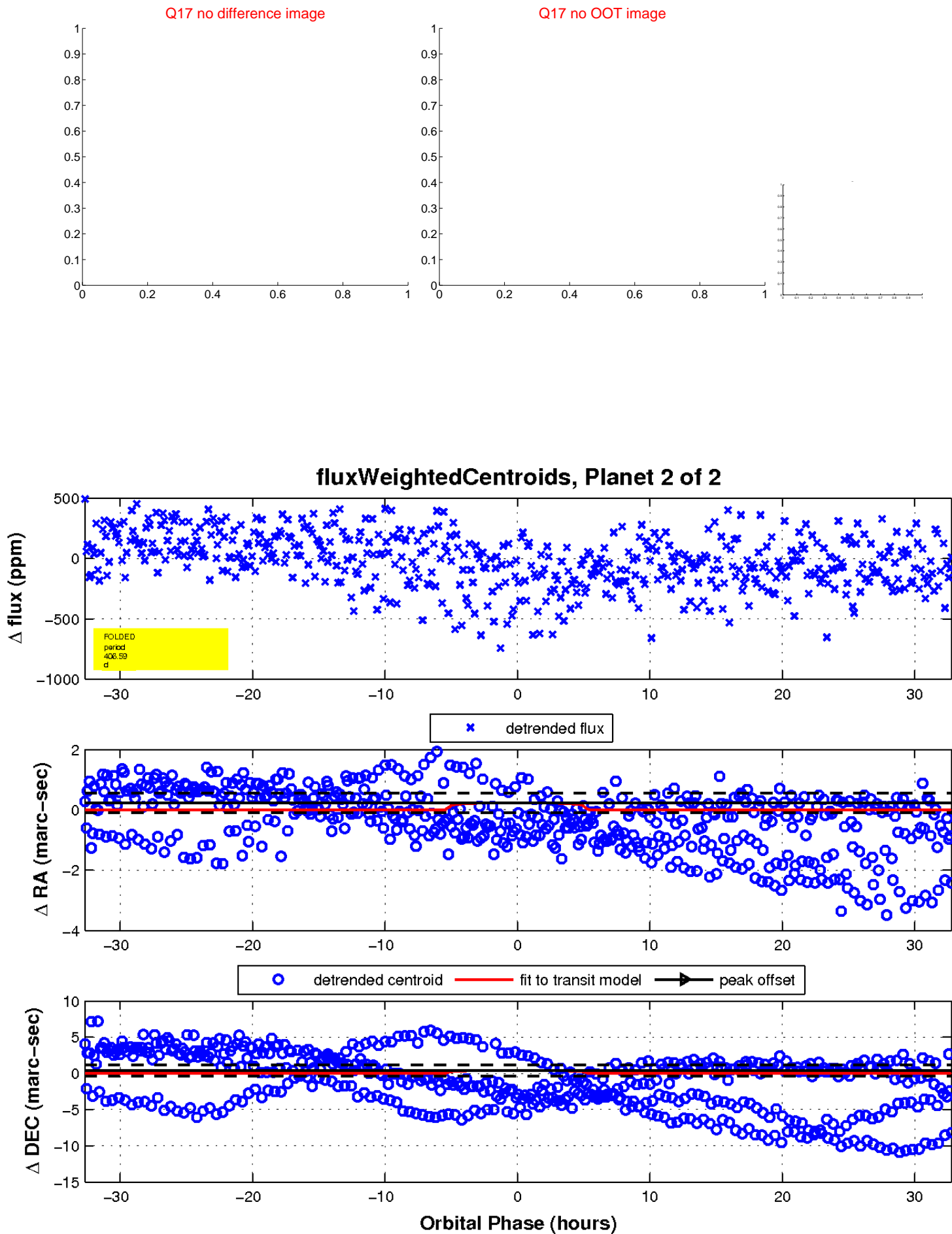
Q12 no OOT image



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



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



UKIRT Image

Declination

