

# KIC 008196903

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|------|-----------------------------|-----------------|------------------------|------------------------|
| 008196903-01 | OBS      | No   | 0.864146      | 132.040412   | 57.5        | 2.575            | 9.9 | 12.4 | 2.56                        | 8419            | 2.25                   | 56417.51               |
| 008196903-02 | OBS      | No   | 0.648108      | 132.032228   | 33.3        | 2.641            | 8.5 | 7.5  | 2.56                        | 8419            | 1.71                   | 82794.24               |
| 008196903-03 | OBS      | No   | 142.059170    | 145.259913   | 452.1       | 5.463            | 8.5 | 8.5  | 2.56                        | 8419            | 6.22                   | 62.65                  |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments  |
|--------------|----------|------|-------|---|---|---|---|---|
| 008196903-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT   |
| 008196903-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT   |
| 008196903-03 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT |

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

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

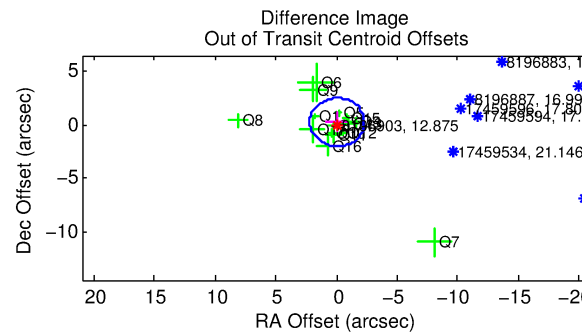
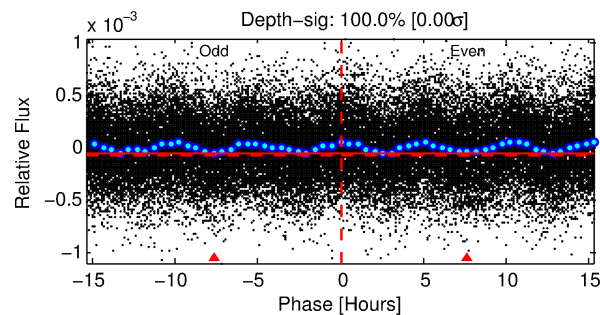
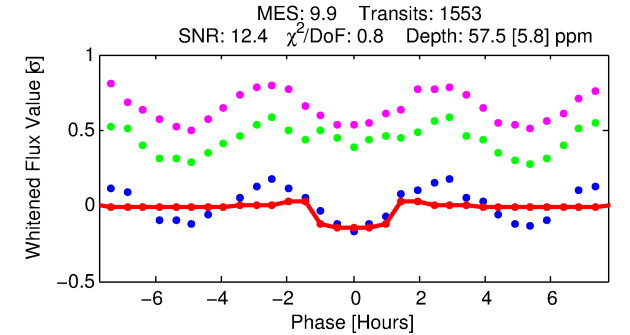
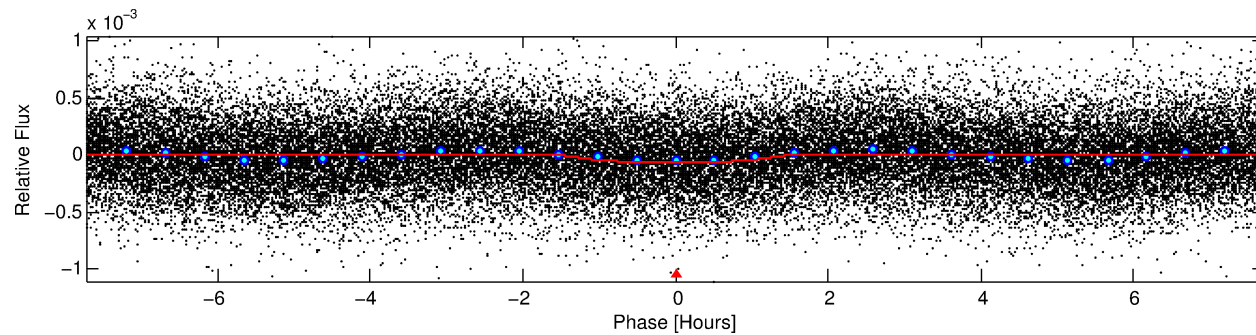
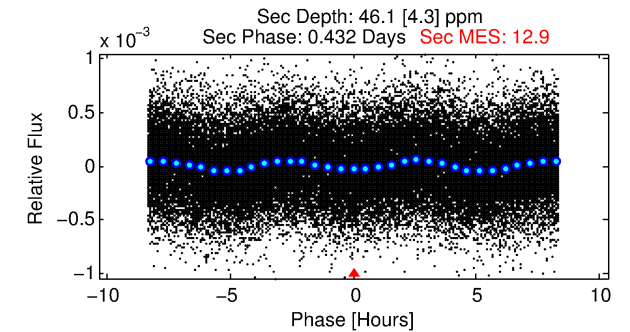
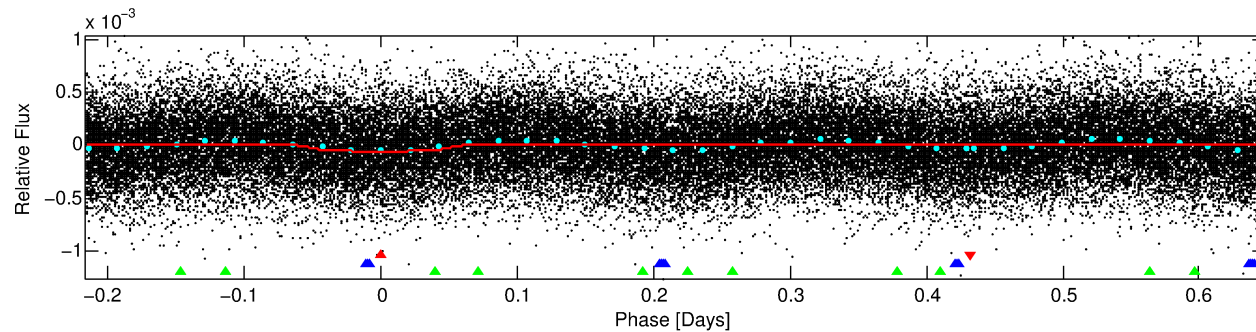
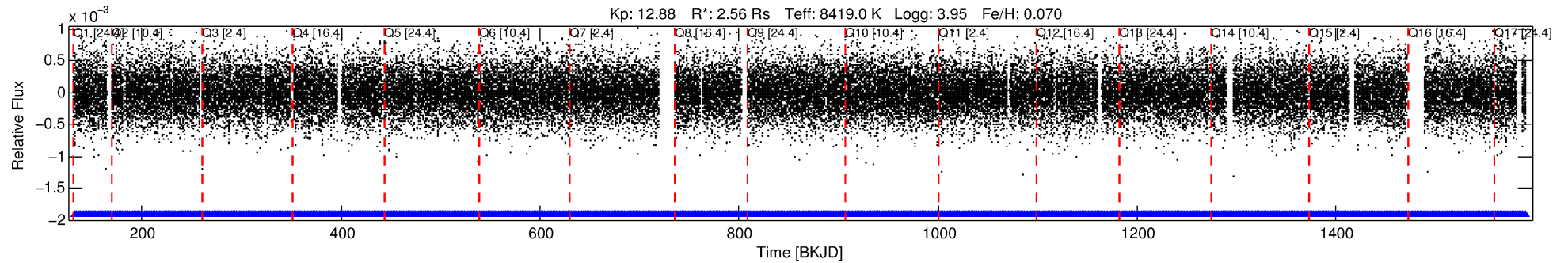
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008196903-01

No Significant Match Found

# DV One-Page Summary

KIC: 8196903 Candidate: 1 of 3 Period: 0.864 d



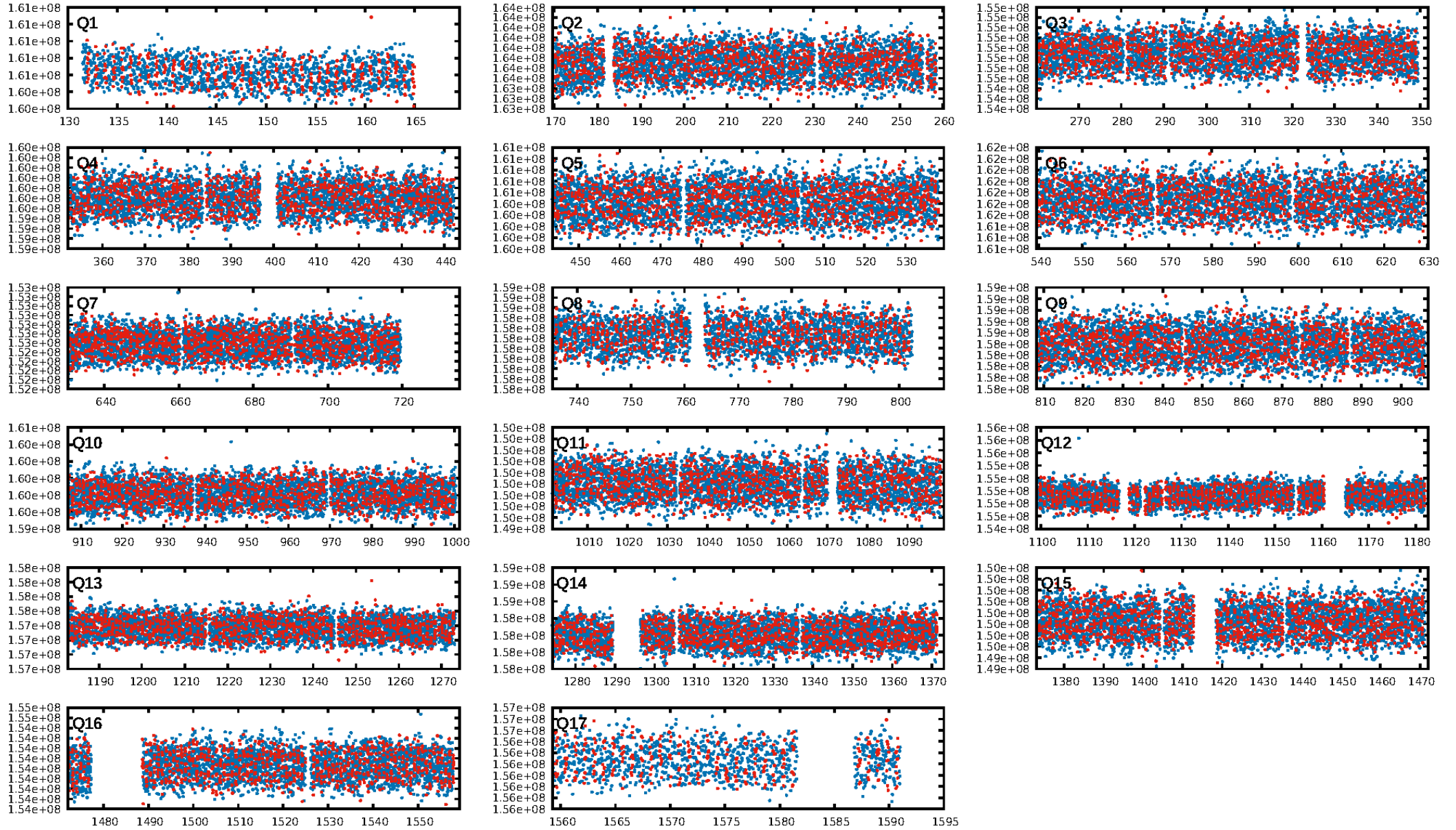
## DV Fit Results:

Period = 0.86415 [0.00001] d  
Epoch = 132.0404 [0.0018] BKJD  
Rp/R\* = 0.0081 [0.0022]  
a/R\* = 1.50 [1.43]  
b = 0.90 [0.37]  
Seff = 56417.51 [26273.21]  
Teff = 3930 [458] K  
Rp = 2.25 [0.95] Re  
a = 0.0228 [0.0065] AU  
Ag = 2.61 [1.81] [0.89σ]  
**Teffp = 7723 [1110] K [3.16σ]**

## DV Diagnostic Results:

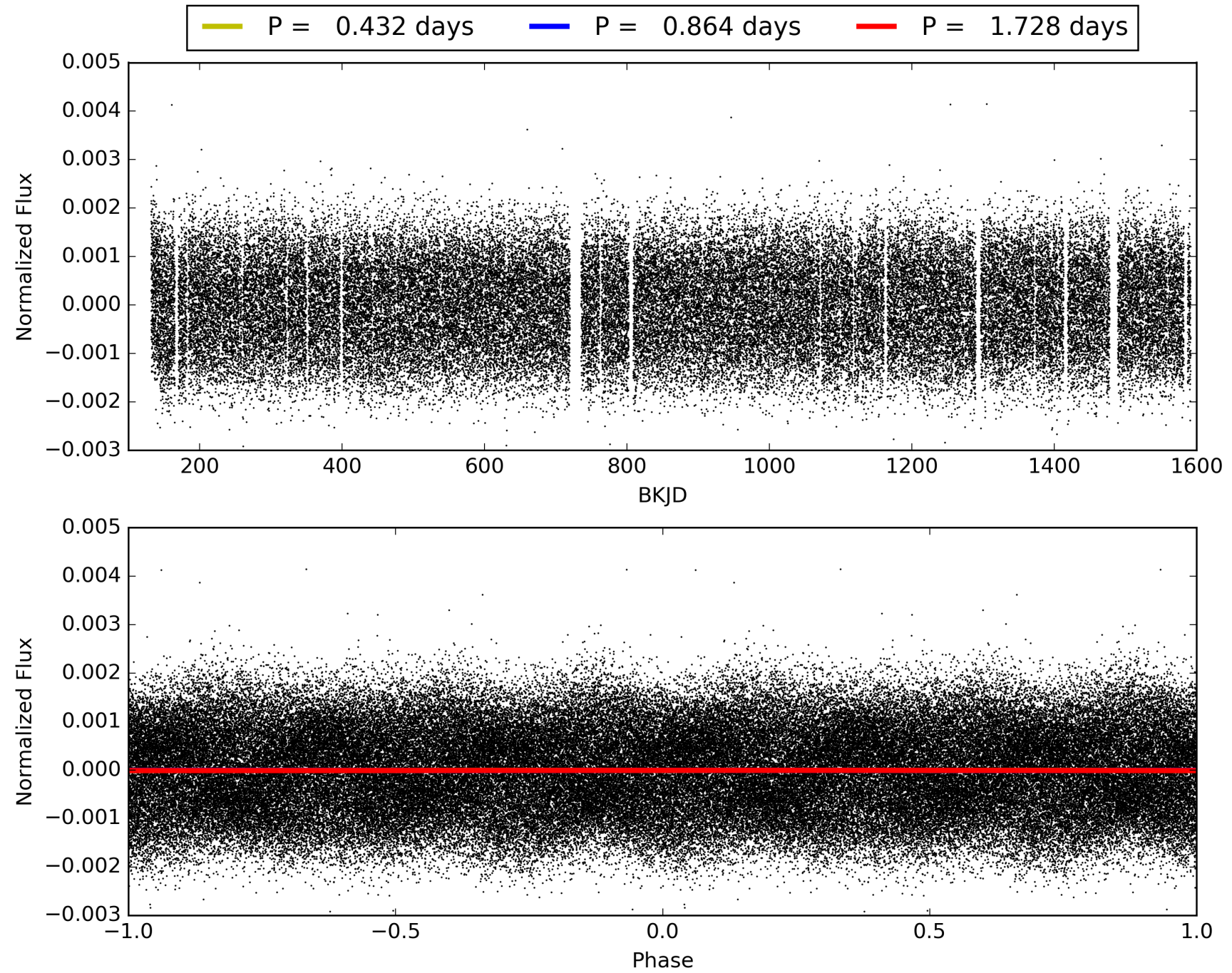
ShortPeriod-sig: 84.0% [1.41σ]  
LongPeriod-sig: 100.0% [561.10σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.14e-14  
RollingBand-fgt: 1.00 [1483/1483]  
GhostDiagnostic-chr: 1.761  
**Centroid-sig: 0.1%**  
Centroid-so: 0.302 arcsec [0.52σ]  
OotOffset-rm: 0.253 arcsec [0.34σ]  
KicOffset-rm: 0.416 arcsec [0.55σ]  
OotOffset-st: 3/4/3/5 [15]  
KicOffset-st: 3/4/3/5 [15]  
DiffImageQuality-fgm: 0.40 [6/15]  
DiffImageOverlap-fno: 0.00 [0/17]

# TCE 008196903-01, PDC Light Curves





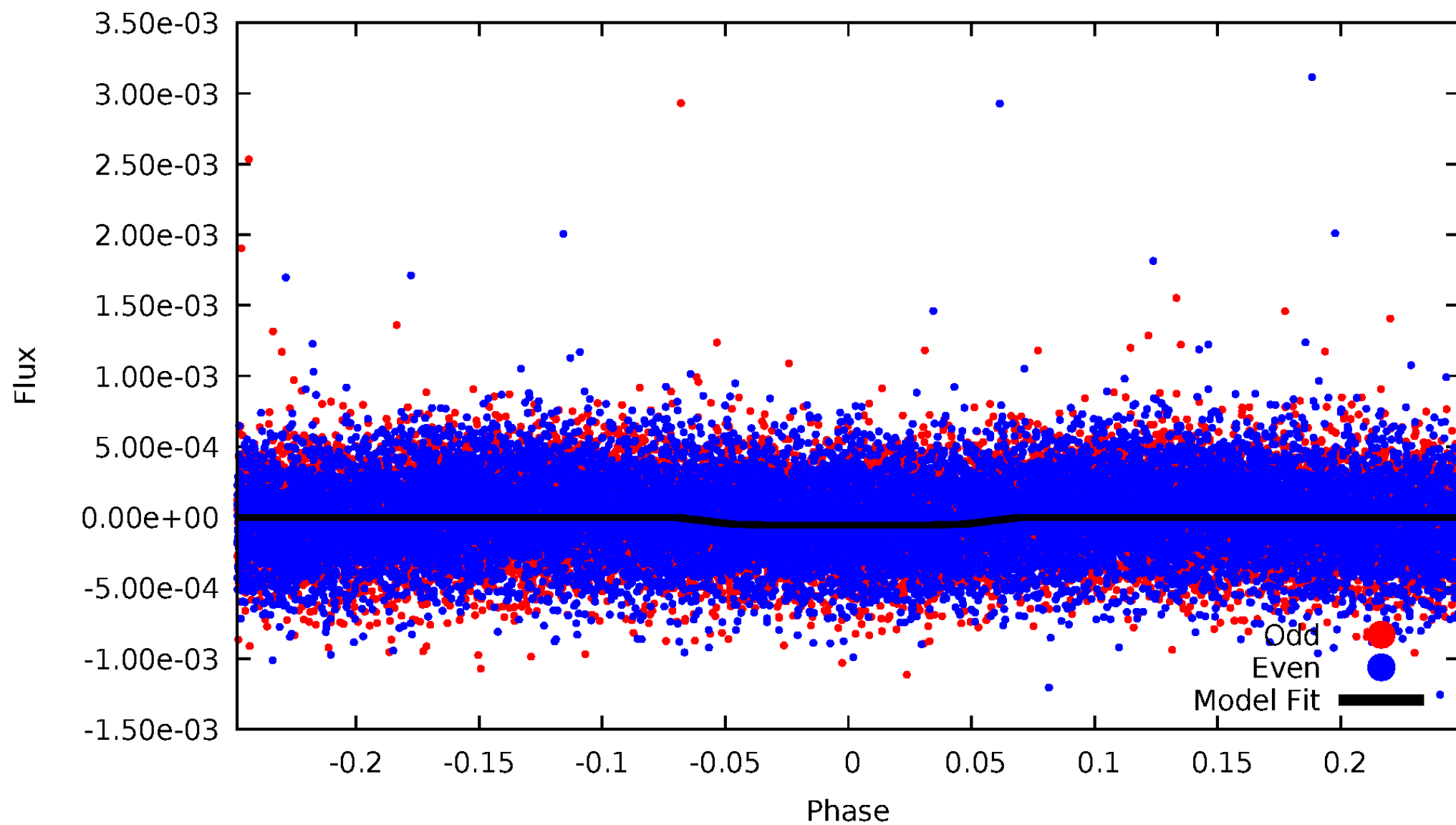
TCE 008196903-01





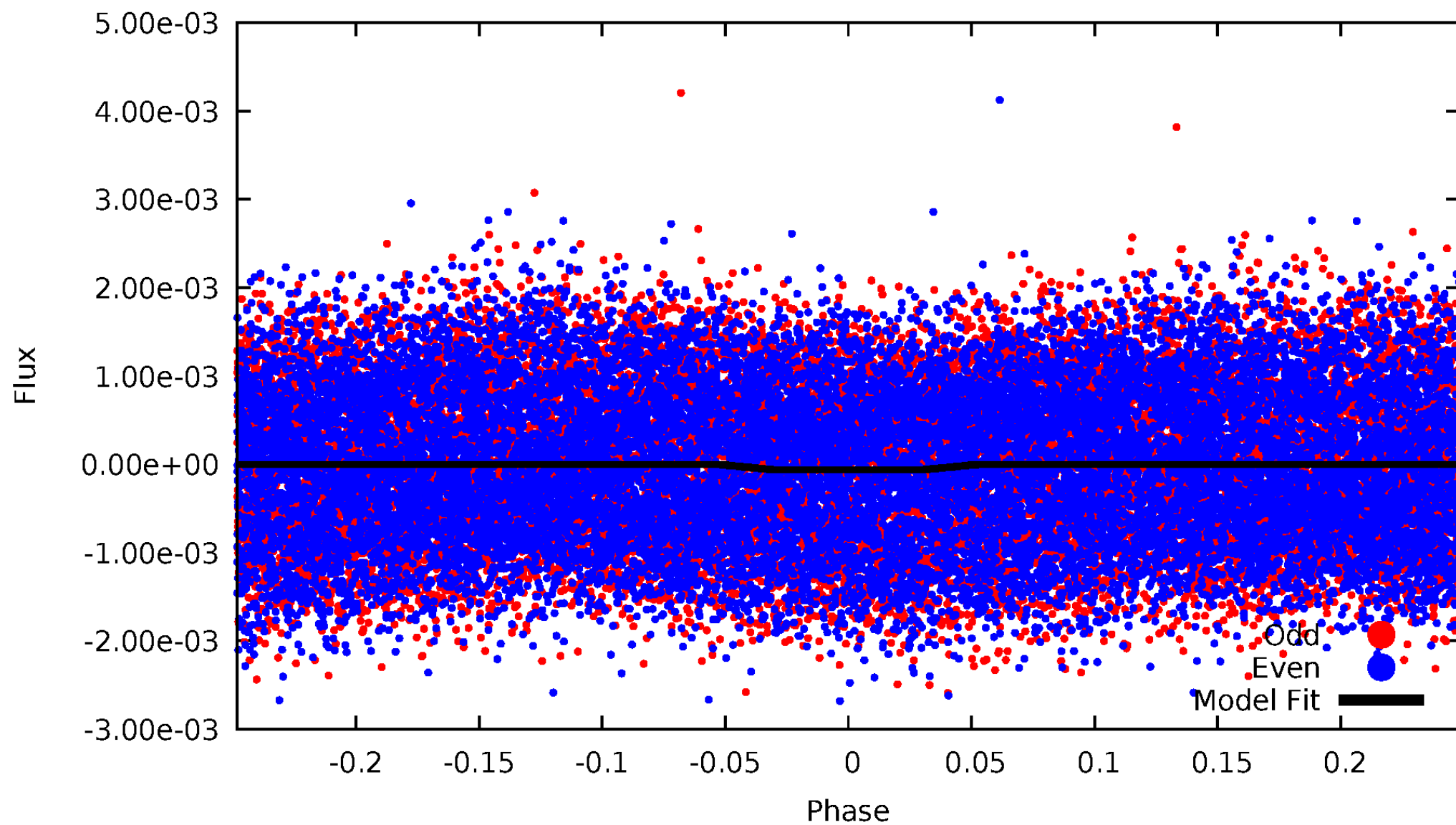
# DV Odd/Even

TCE 008196903-01



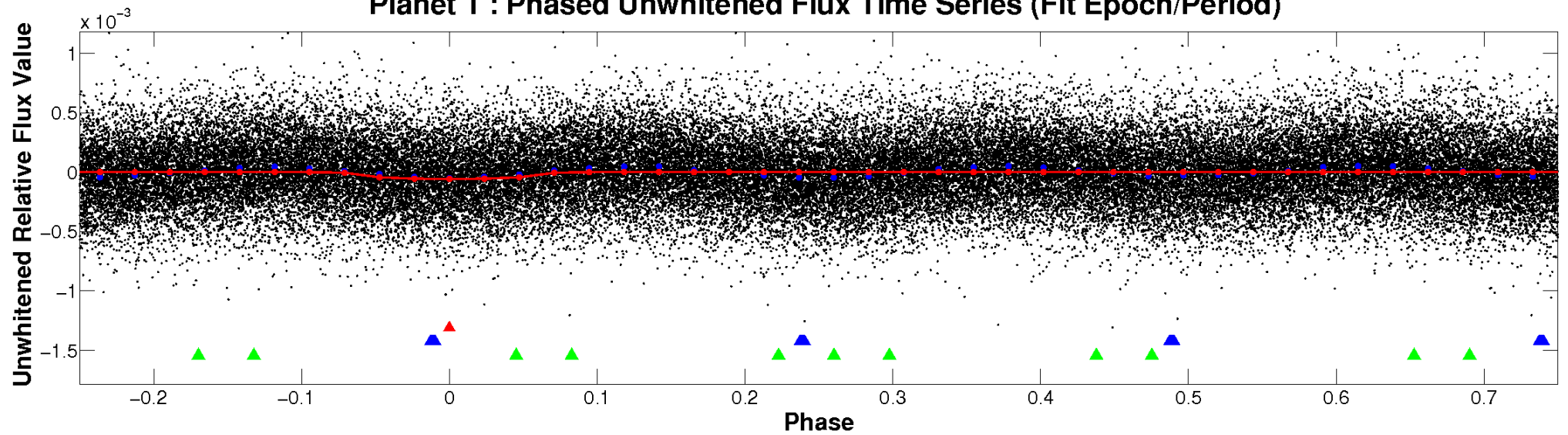
# ALT Odd/Even

TCE 008196903-01

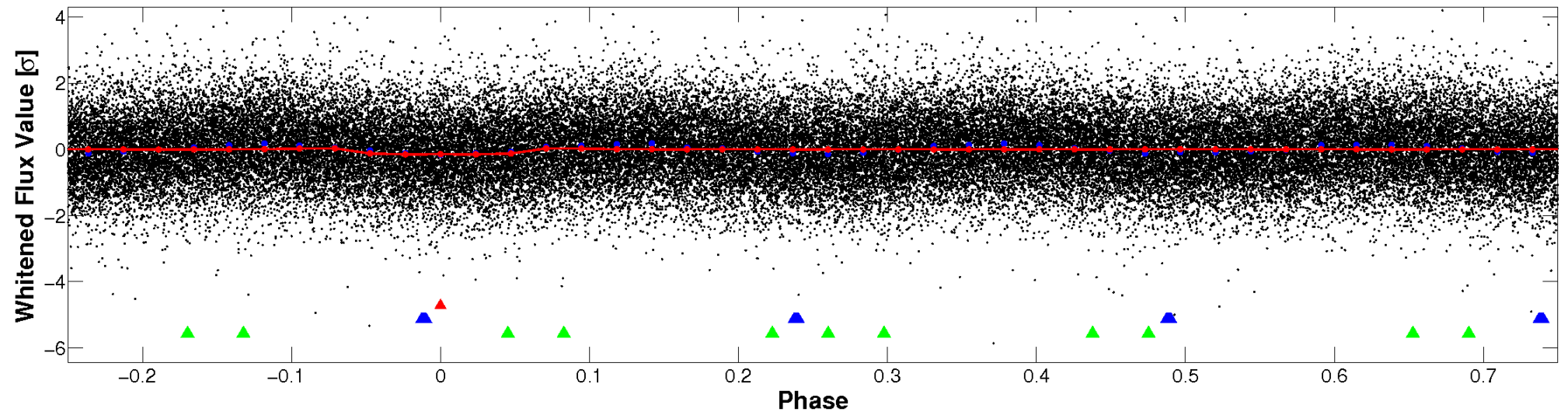


# Non-Whitened Vs. Whitened Light Curve

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



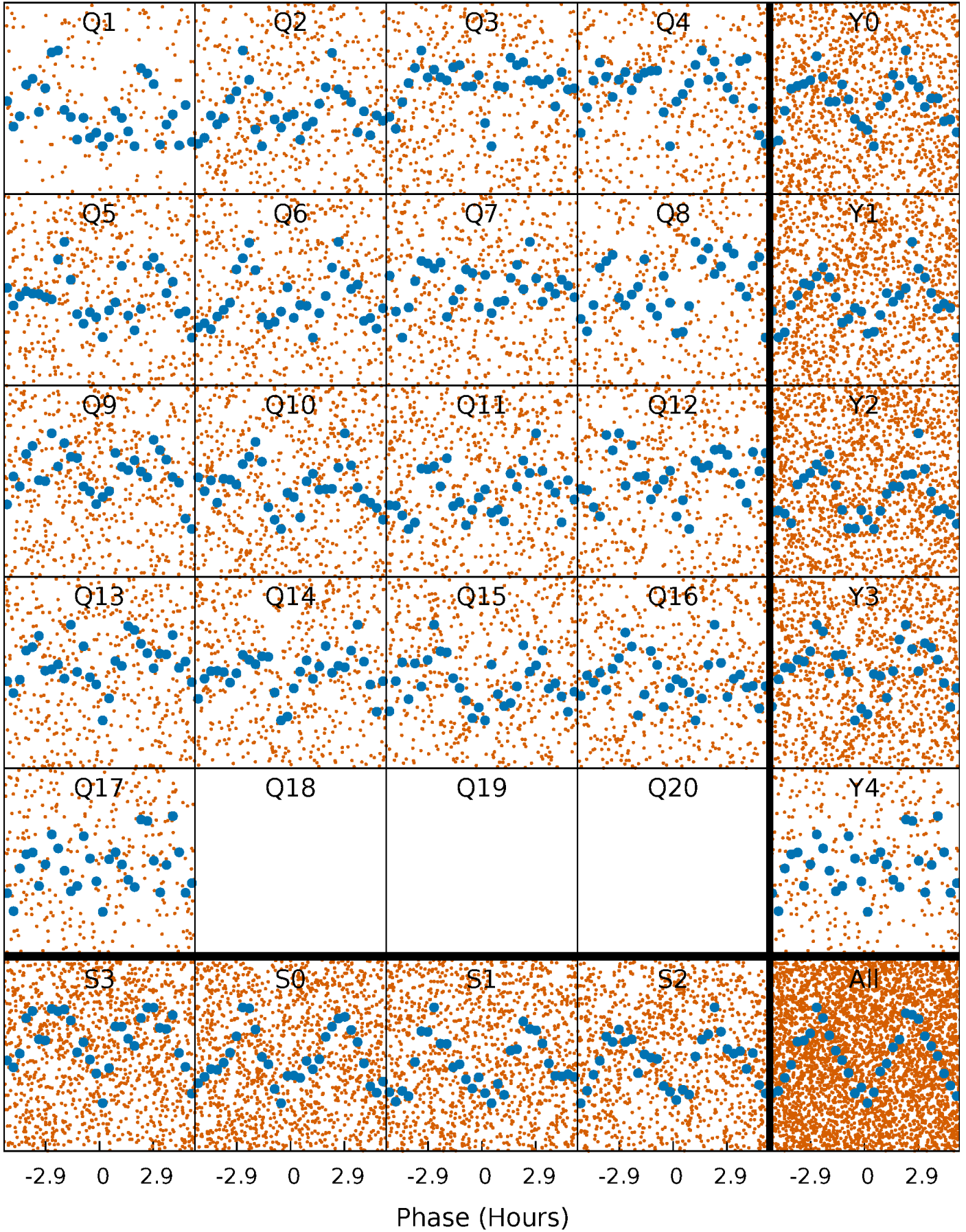
## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)





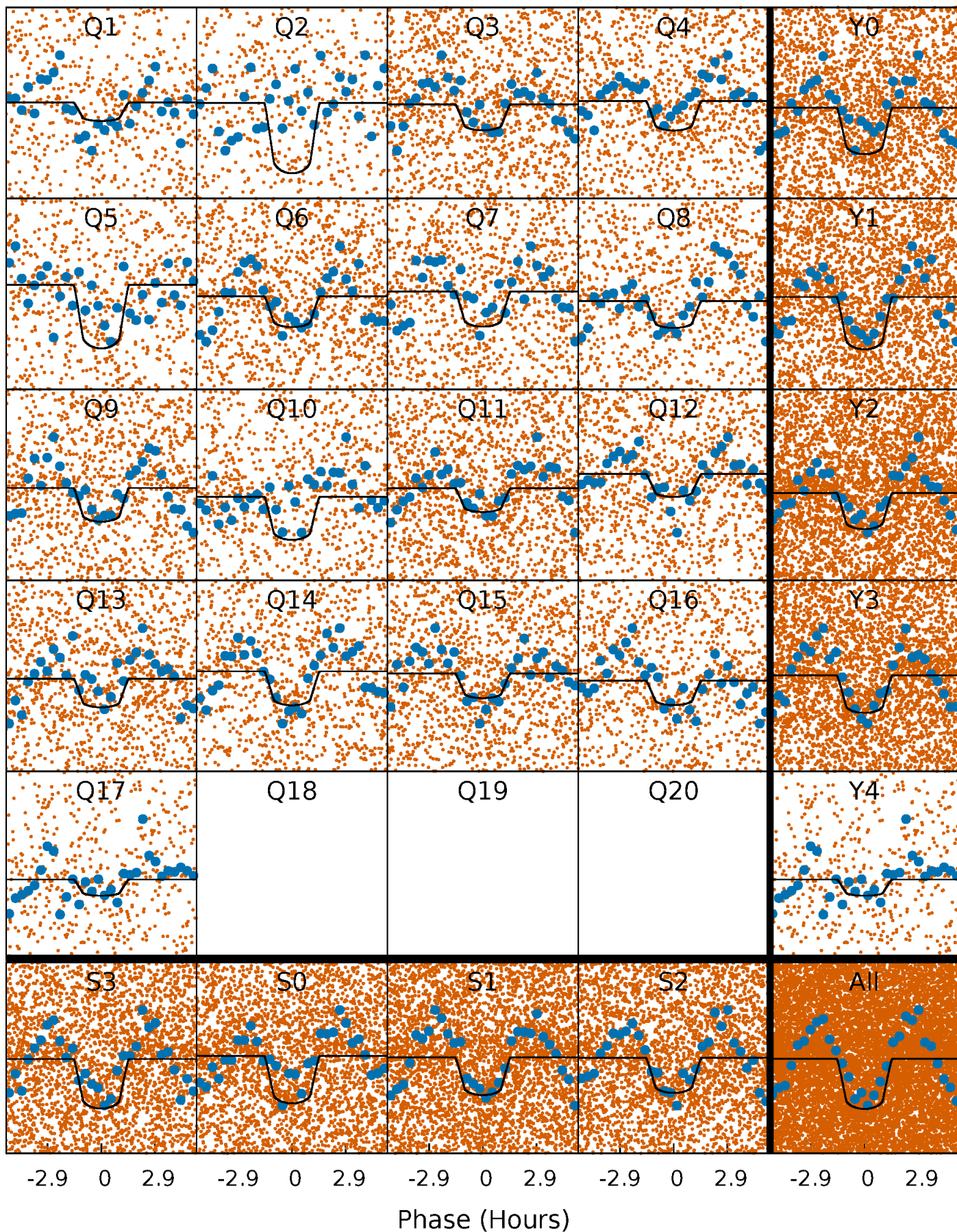
# PDC Quarter-Phased Transit Curves

TCE 008196903-01 P= 0.864146 Days  $T_0=132.040412$  (BKJD)



# DV Quarter-Phased Transit Curves

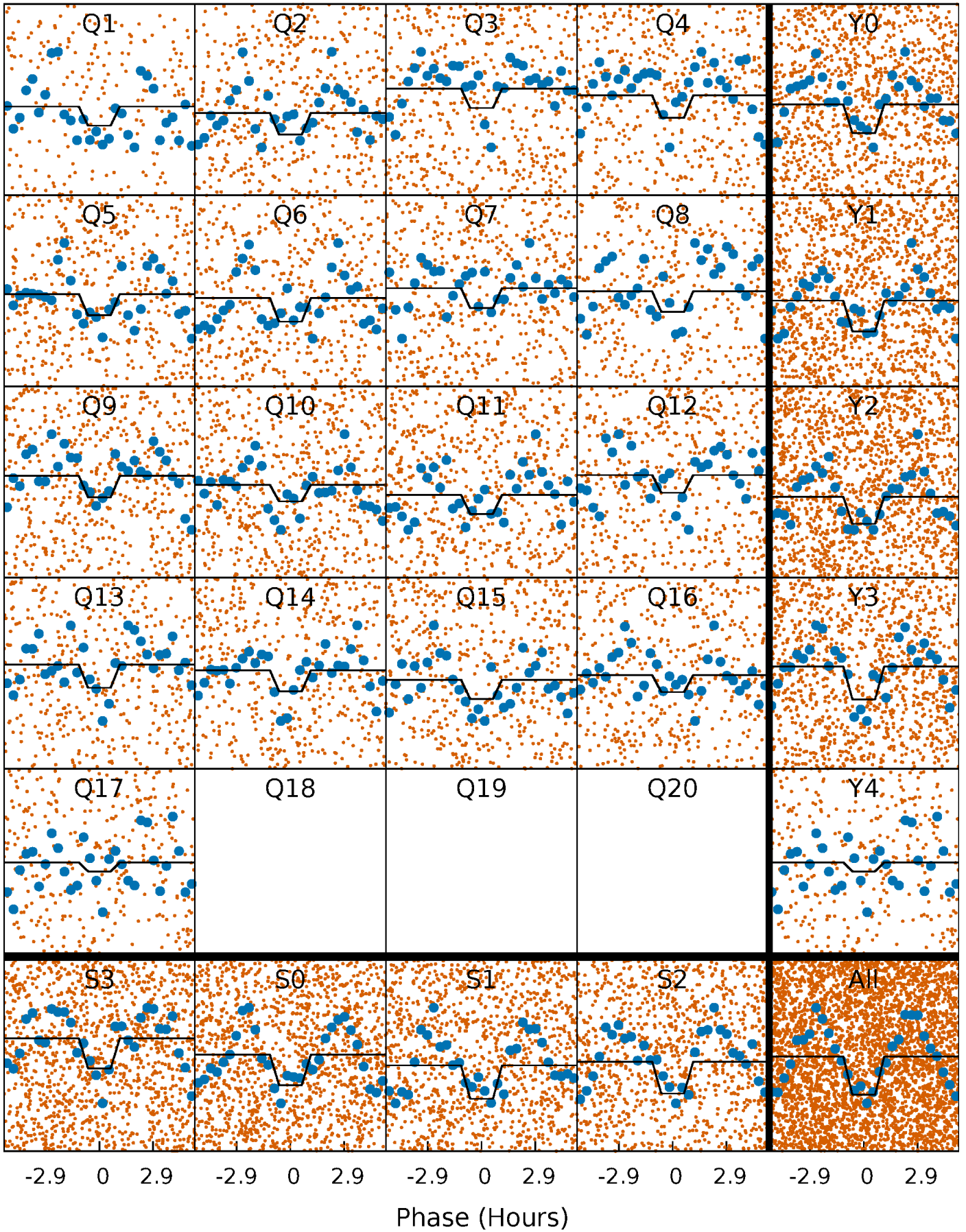
TCE 008196903-01 P= 0.864146 Days  $T_0=132.040412$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 008196903-01 P= 0.864146 Days  $T_0=132.040412$  (BKJD)

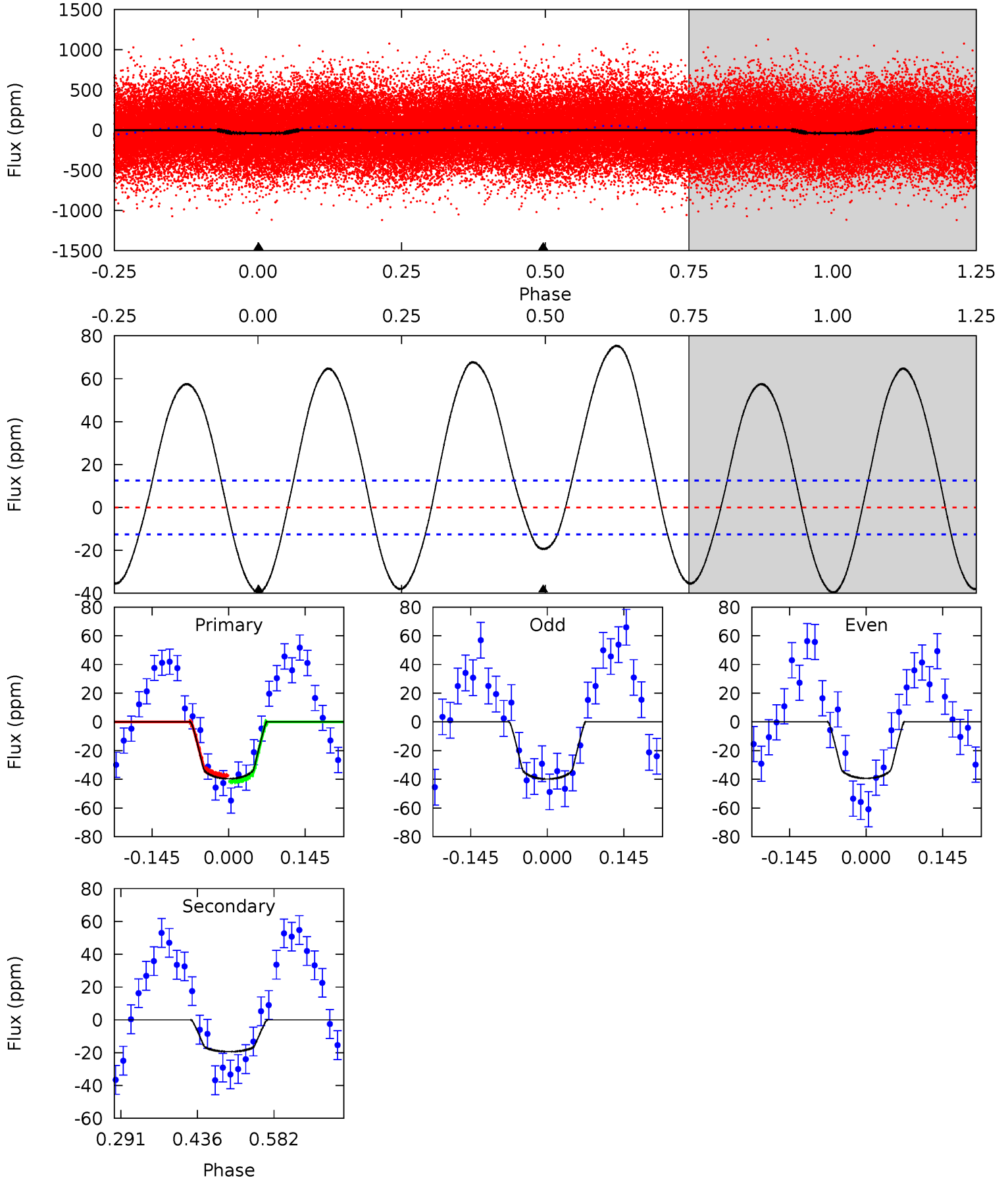




# DV Model-Shift Uniqueness Test

008196903-01, P = 0.864146 Days, E = 131.176266 Days

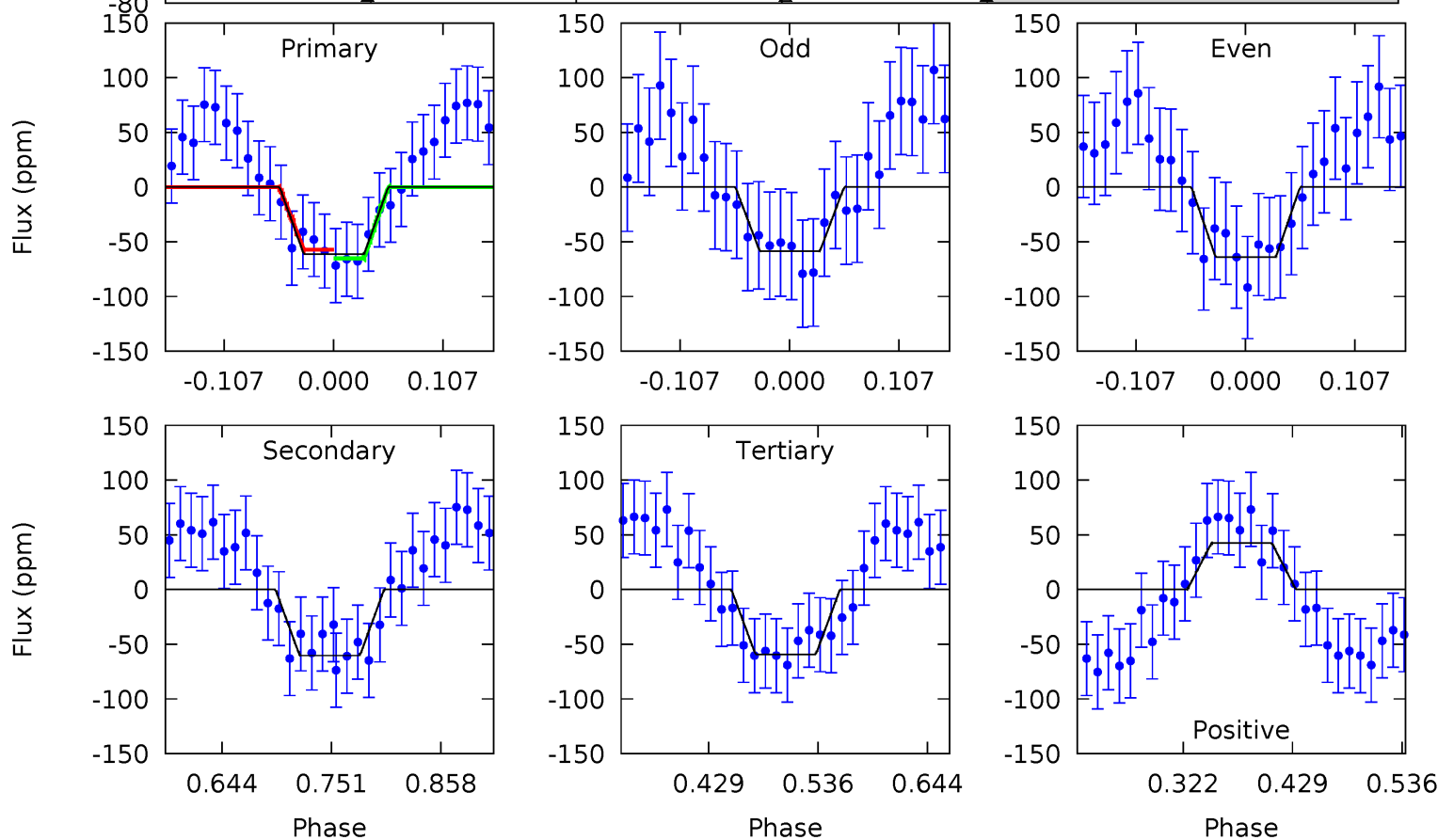
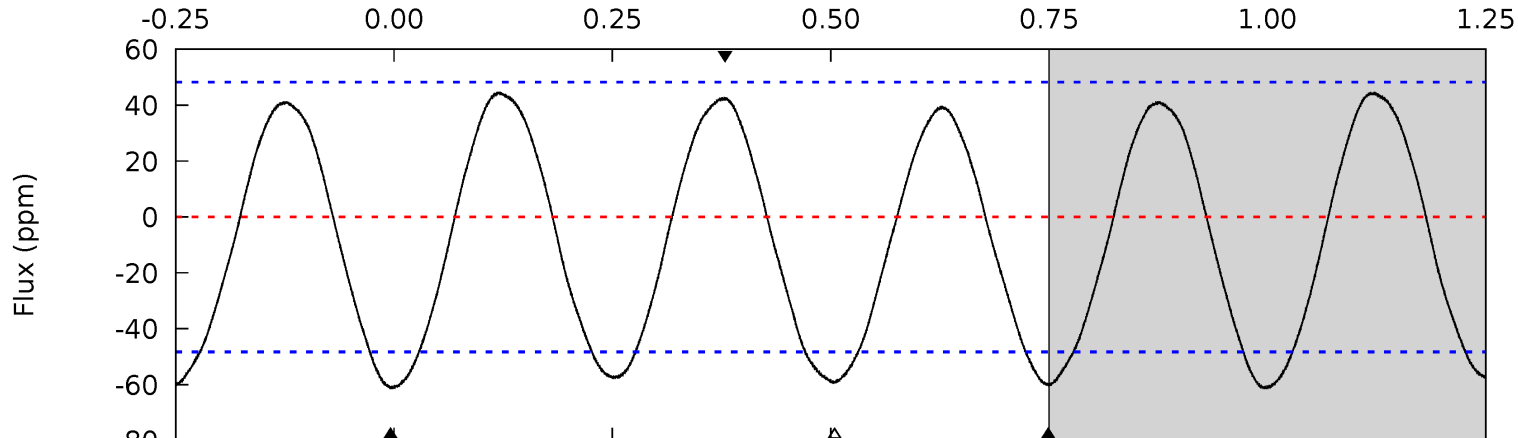
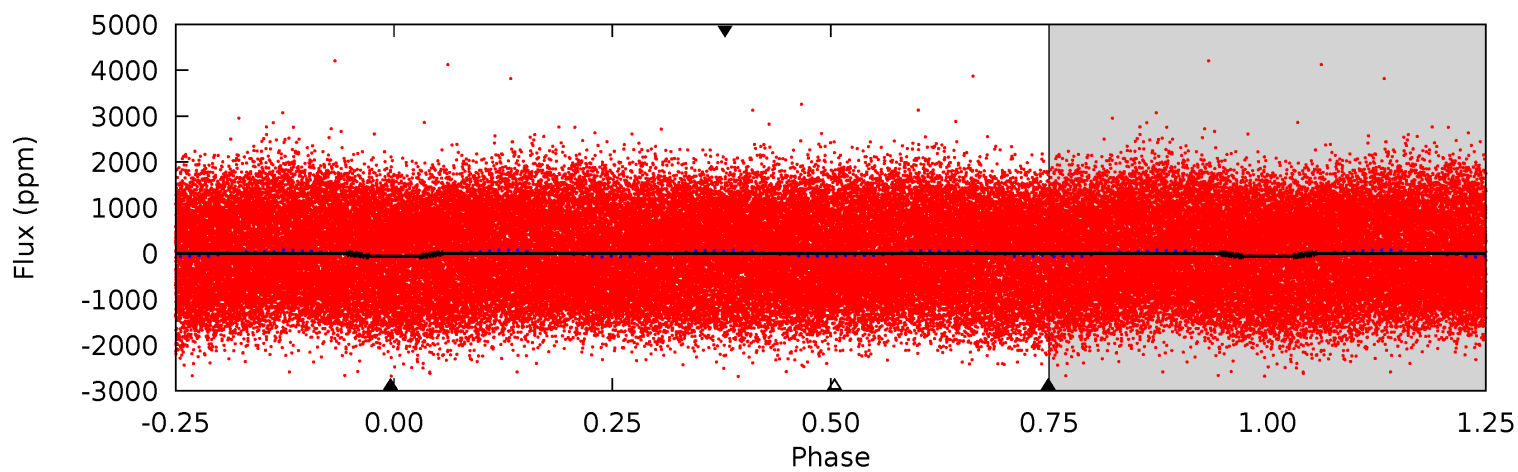
| Pri  | Sec  | Ter | Pos | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 14.1 | 6.92 | 0   | 0   | 4.49            | 1.46            | 11.3             | 14.1    | 14.1    | 6.92    | 6.92    | 0.09    | 0.98 | 0.66  | 0.68 |



# Alt Model-Shift Uniqueness Test

008196903-01, P = 0.864146 Days, E = 131.176266 Days

| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 5.77 | 5.68 | 5.59 | 4.01 | 4.55            | 1.61            | 3.49             | 0.18    | 1.77    | 0.09    | 1.67    | 0.26    | 0.81 | 0.42  | 0.38 |



### Stellar Parameters For KIC 008196903

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                    | $R (R_{\odot})$           | $M(M_{\odot})$            | $\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|--|
|        | $8419^{+204}_{-379}$ | $3.950^{+0.241}_{-0.111}$ | $0.070^{+0.250}_{-0.550}$ | $2.555^{+0.487}_{-0.836}$ | $2.120^{+0.304}_{-0.564}$ | $0.179^{+0.318}_{-0.064}$                    |
|        | +2%/-5%              | +6%/-3%                   | +357%/-786%               | +19%/-33%                 | +14%/-27%                 | +177%/-36%                                   |
| Source | KIC0                 | KIC0                      | KIC0                      | DSEP                      |                           |  |

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

### Secondary Eclipse Parameters for KIC 008196903-01 / KOI

| Detrend | Depth (ppm)  | $R_p (R_{\oplus})$     | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$   | $A_{\text{obs}}$          |
|---------|--------------|------------------------|----------------------|------------------------|---------------------------|
| DV      | $-19 \pm 3$  | $2.13^{+0.70}_{-0.65}$ | $5367^{+349}_{-448}$ | $5591^{+1106}_{-916}$  | $1.236^{+1.132}_{-0.557}$ |
| Alt.    | $-60 \pm 11$ | $2.15^{+0.70}_{-0.70}$ | $5396^{+328}_{-457}$ | $8049^{+2006}_{-1295}$ | $3.846^{+4.032}_{-1.703}$ |

$T_{\text{max}}$  = 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

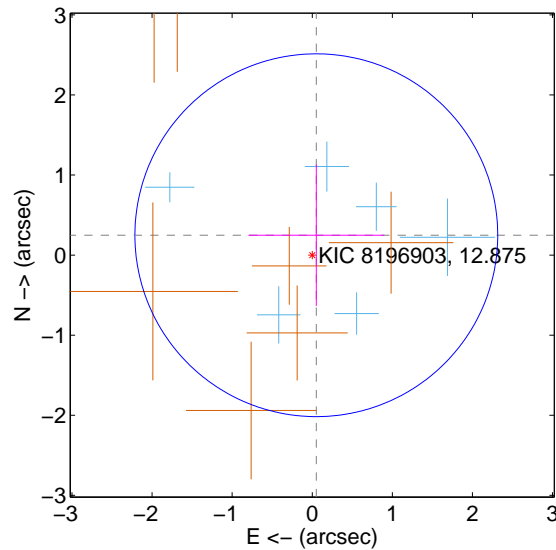
Supplemental centroid analysis for 008196903-01. Kepler magnitude: 12.88. Transit SNR 12.42

There are 6 quarters with good PRF difference image offsets

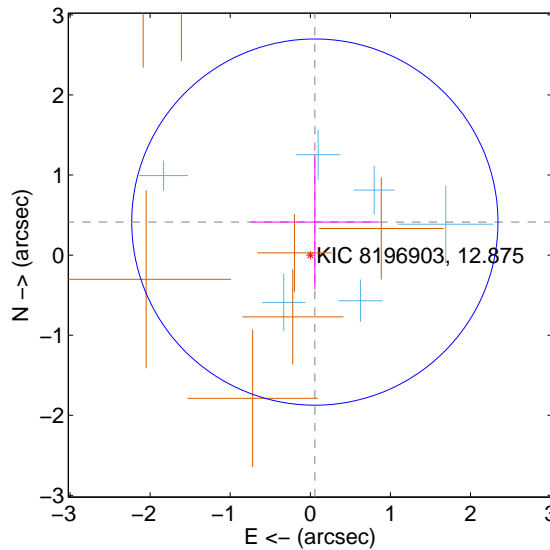
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec      |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT          | $0.253 \pm 0.755$  | 0.34                | $-0.051 \pm 0.849$ | $0.248 \pm 0.882$ |
| PRF-fit source offset from KIC position | $0.416 \pm 0.762$  | 0.55                | $-0.056 \pm 0.798$ | $0.412 \pm 0.843$ |
| photometric centroid source offset      | $0.30 \pm 0.58$    | 0.52                | $-0.14 \pm 0.76$   | $-0.27 \pm 0.52$  |

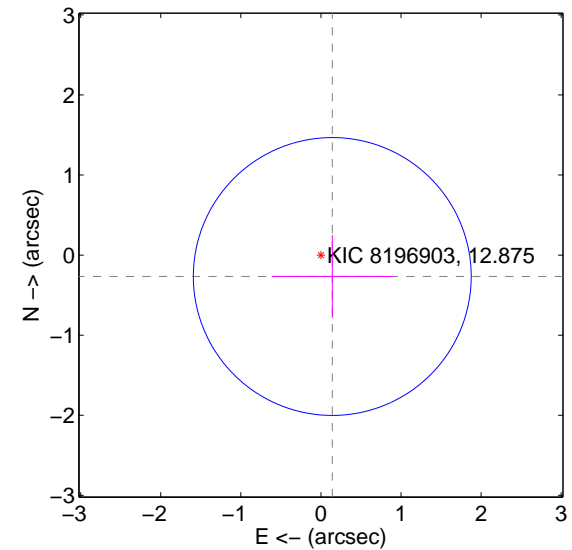
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

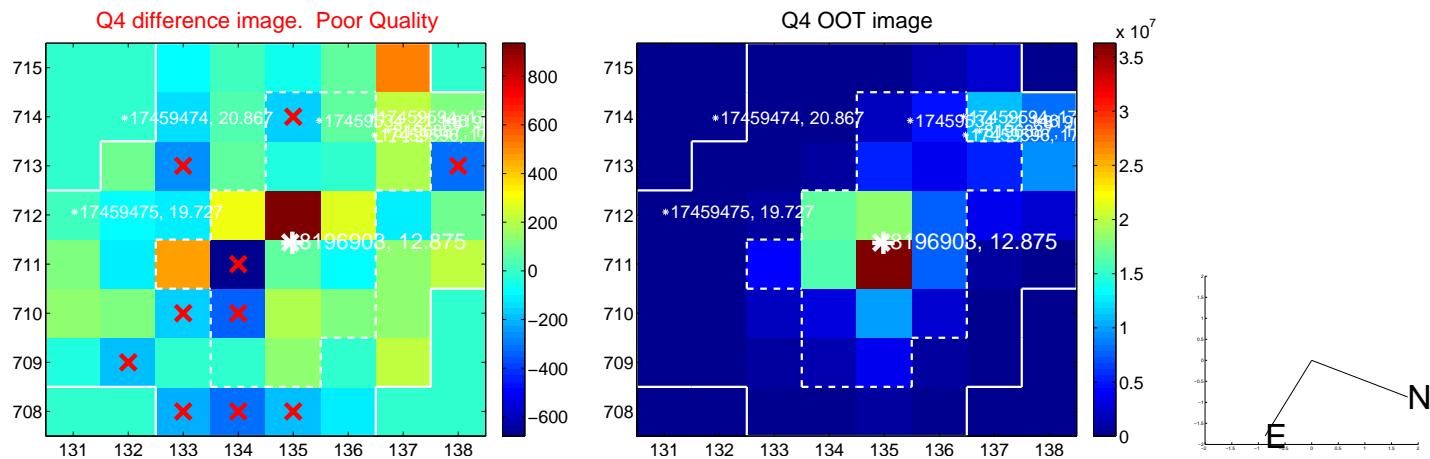
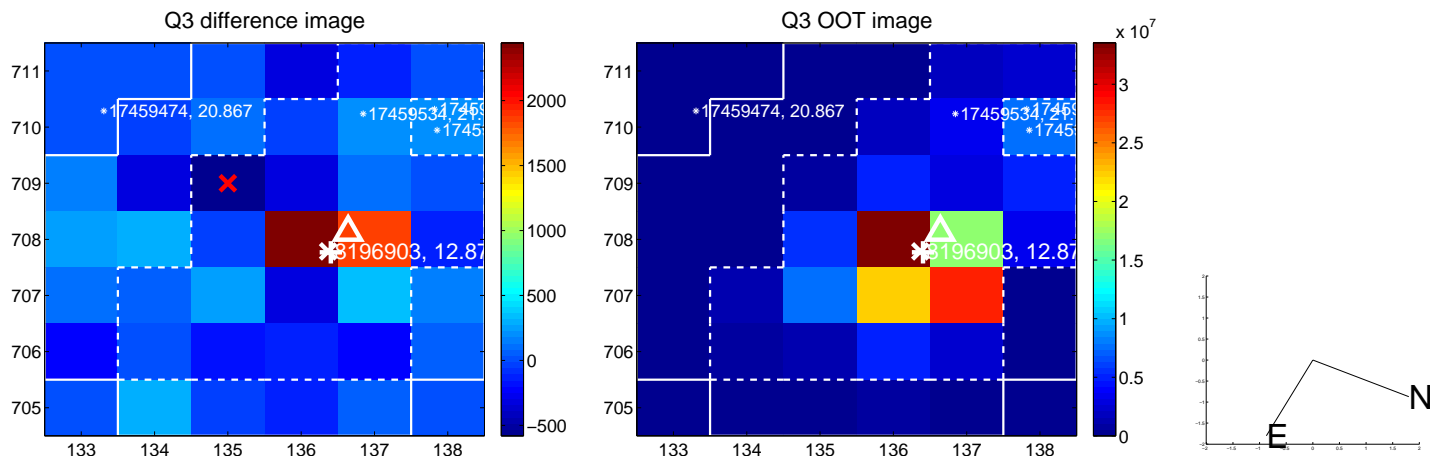
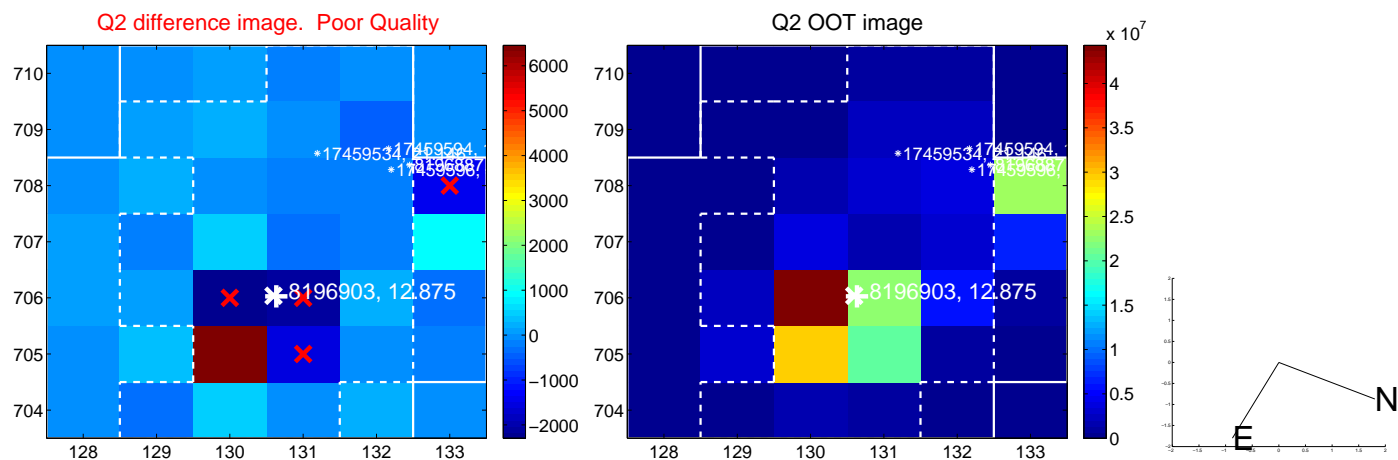
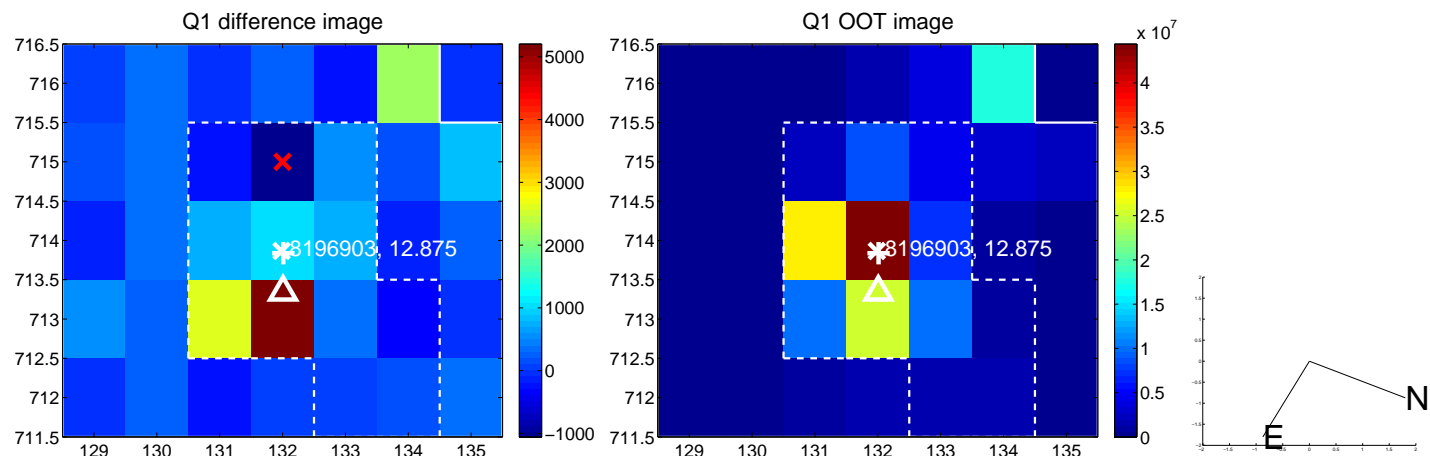


offset from photometric centroids

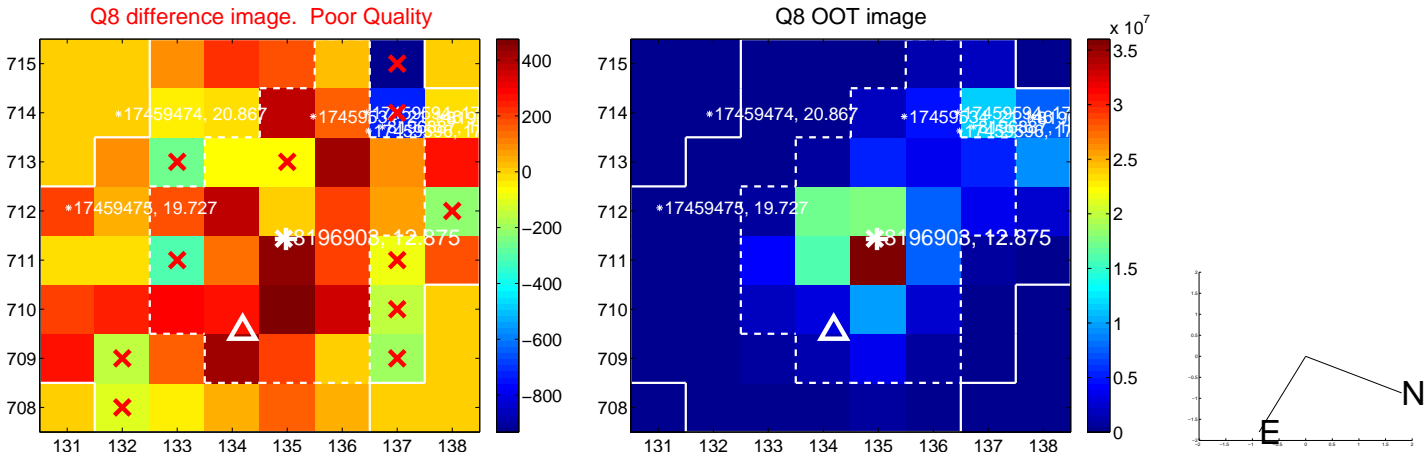
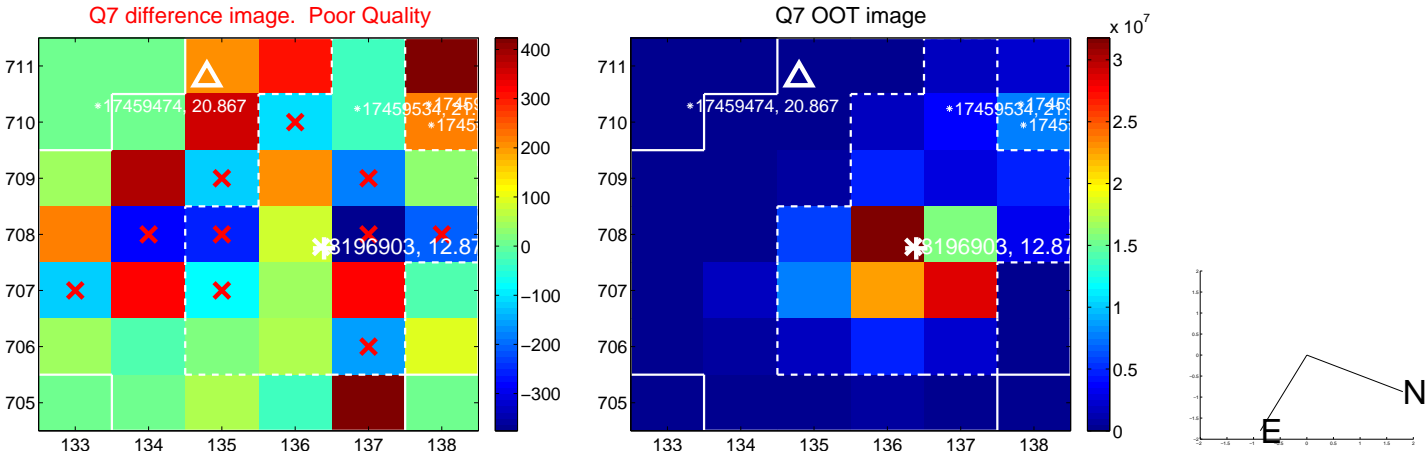
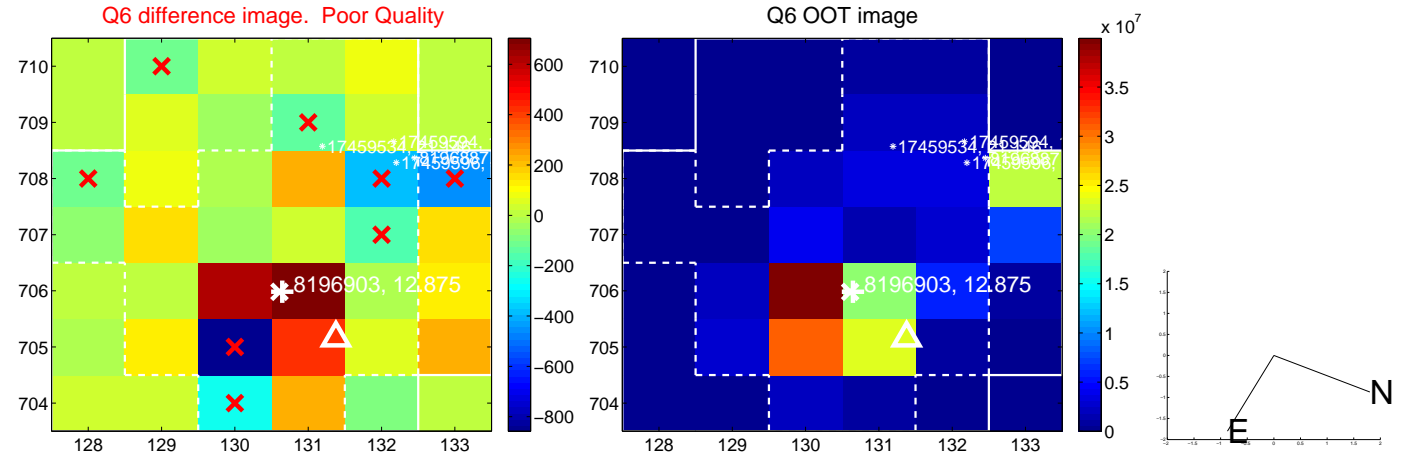
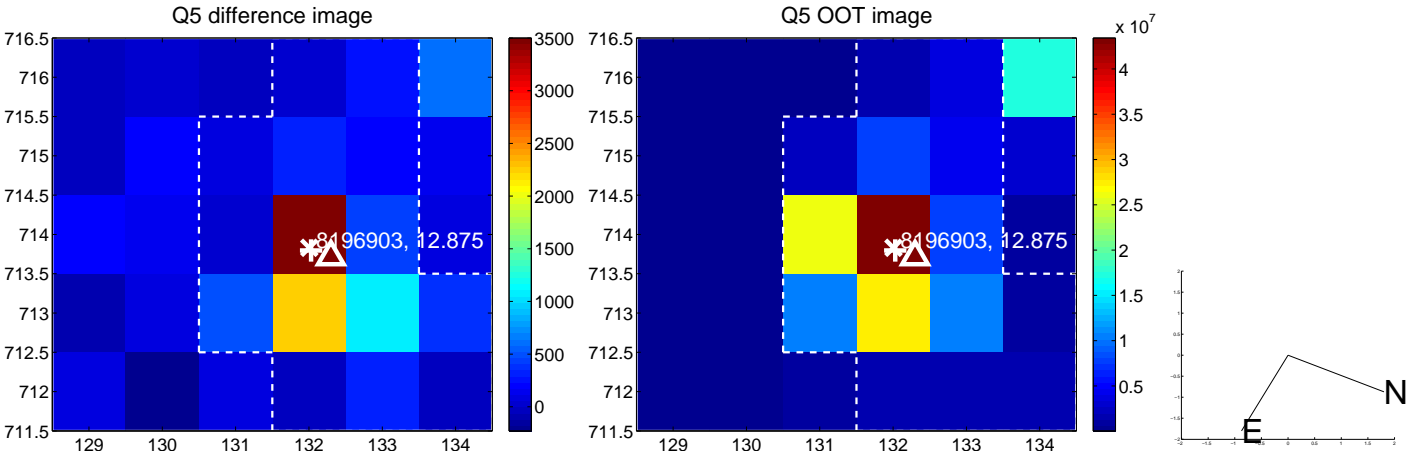


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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

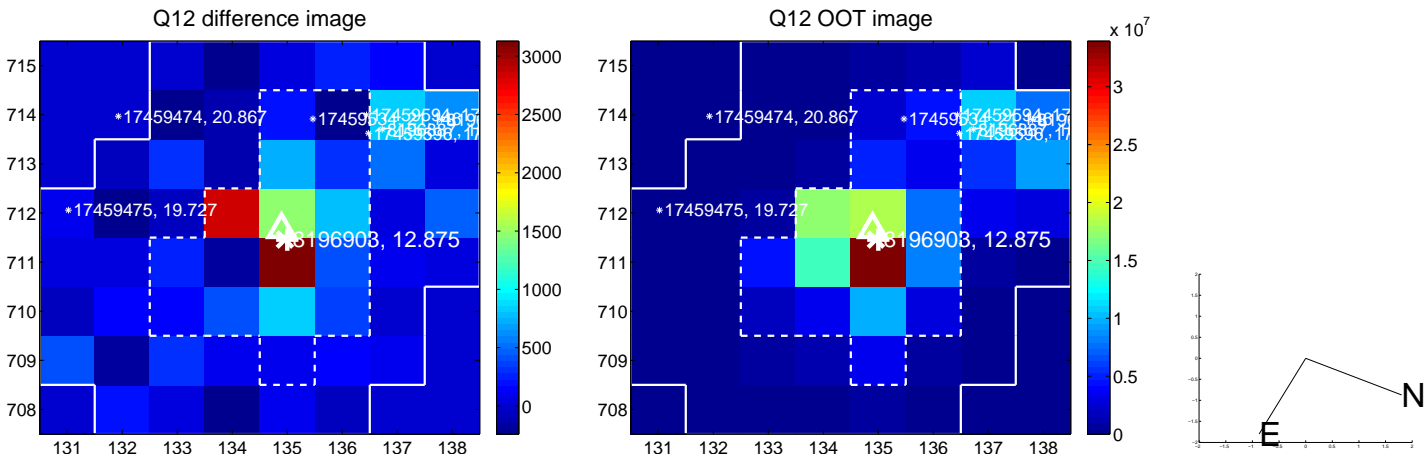
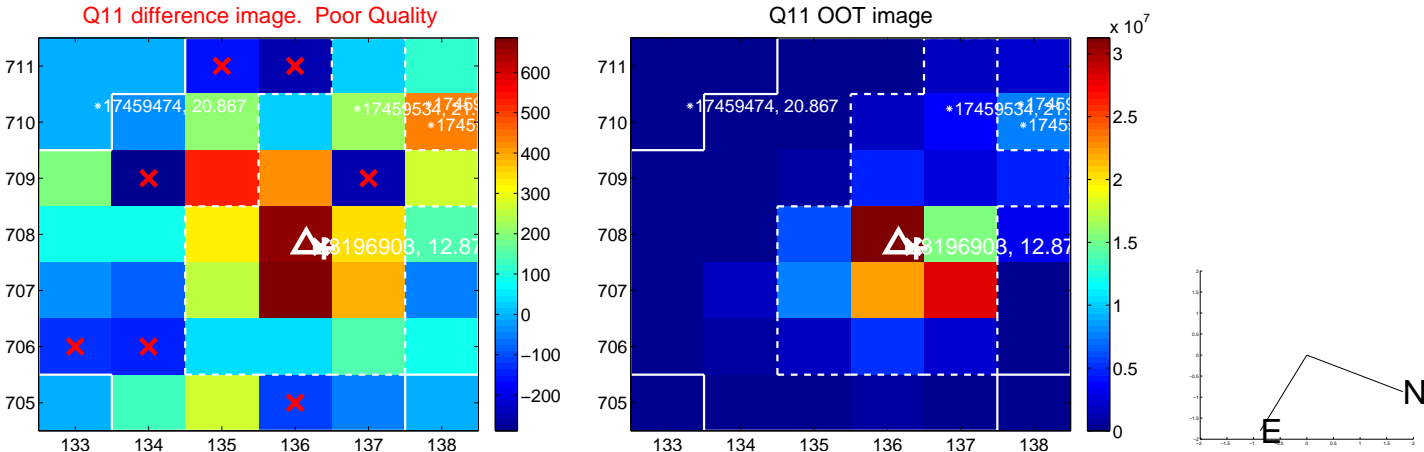
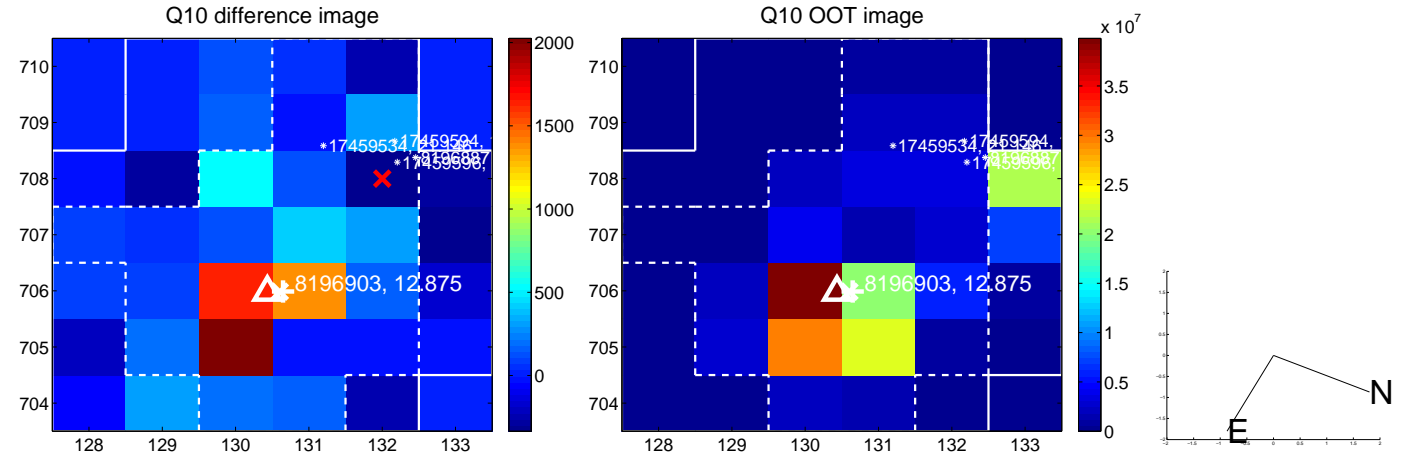
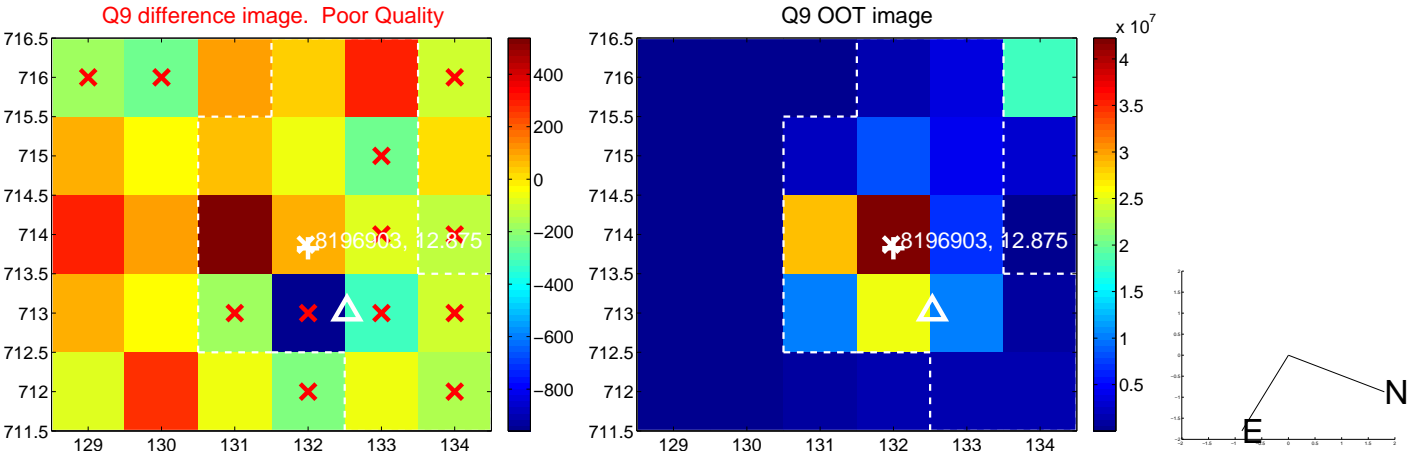


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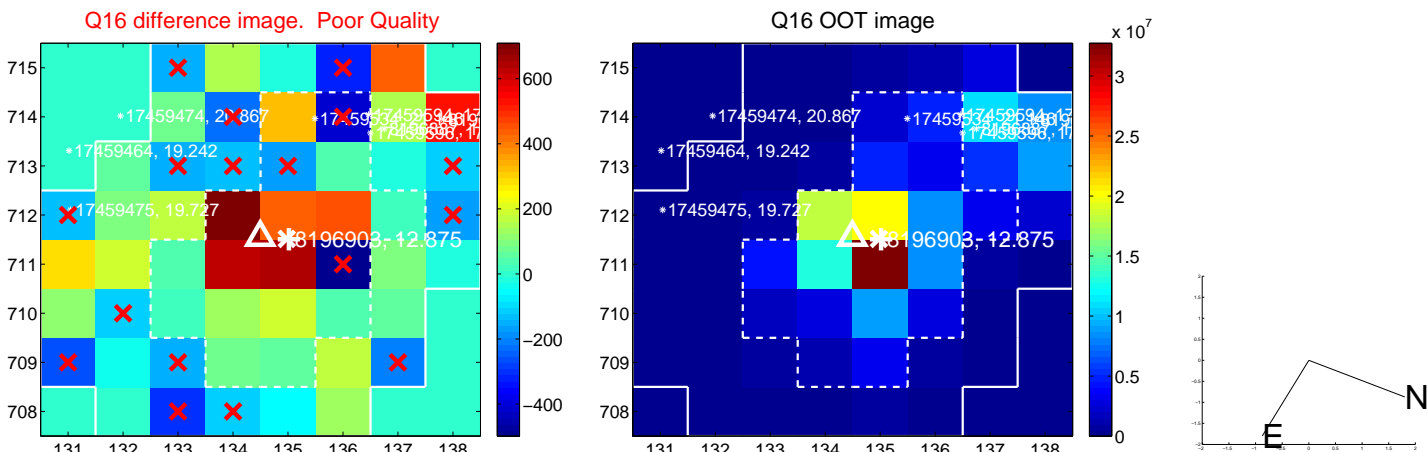
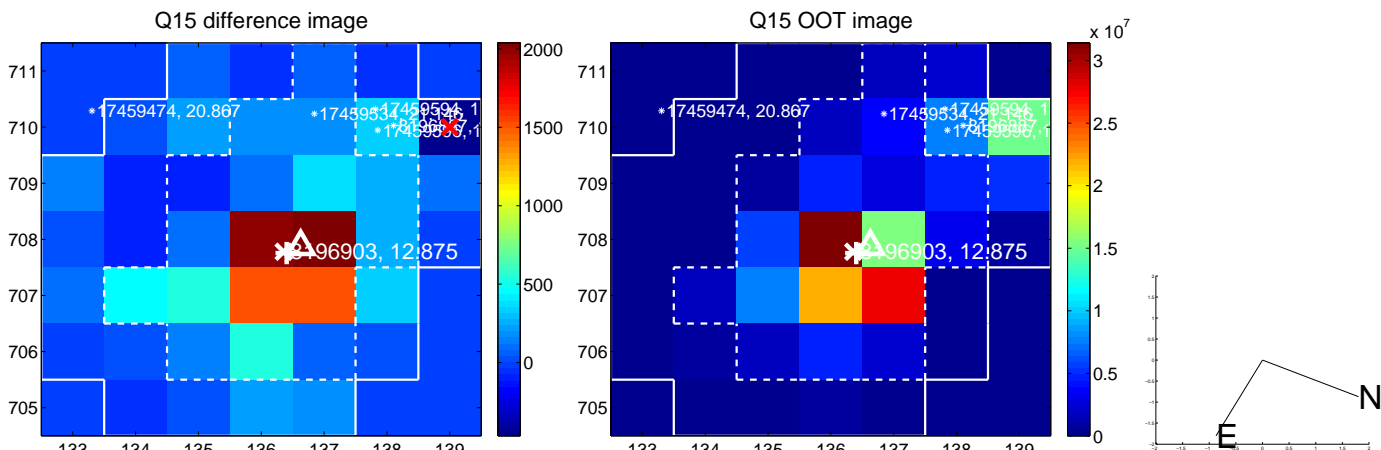
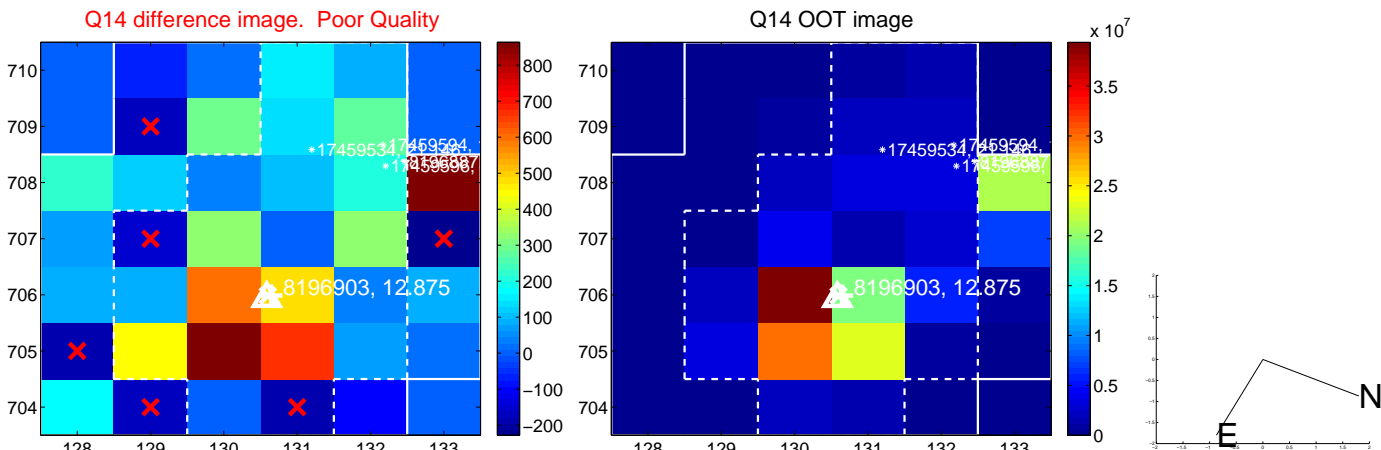
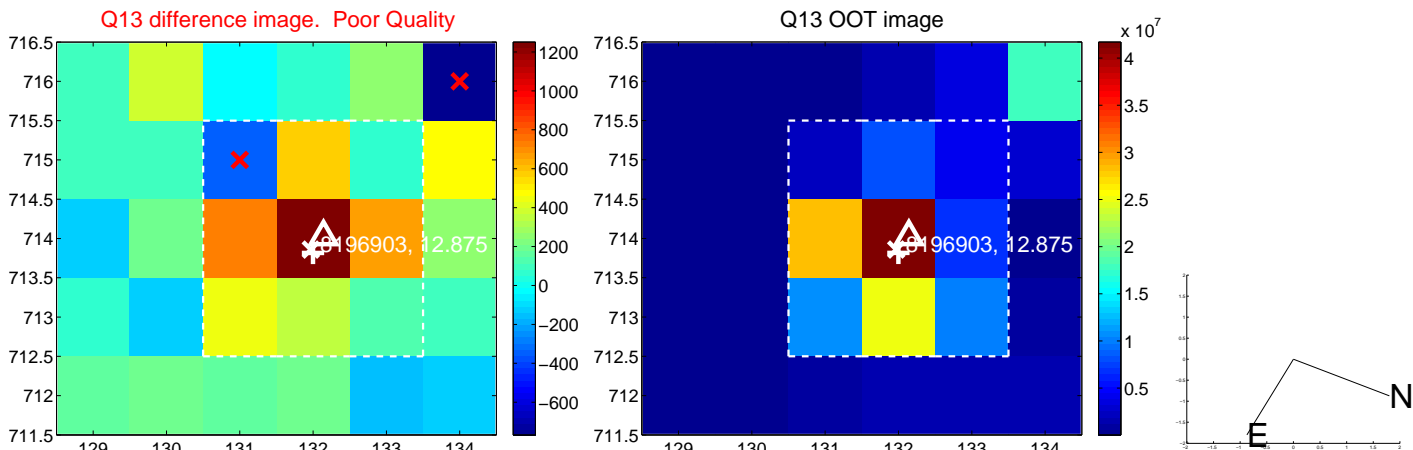




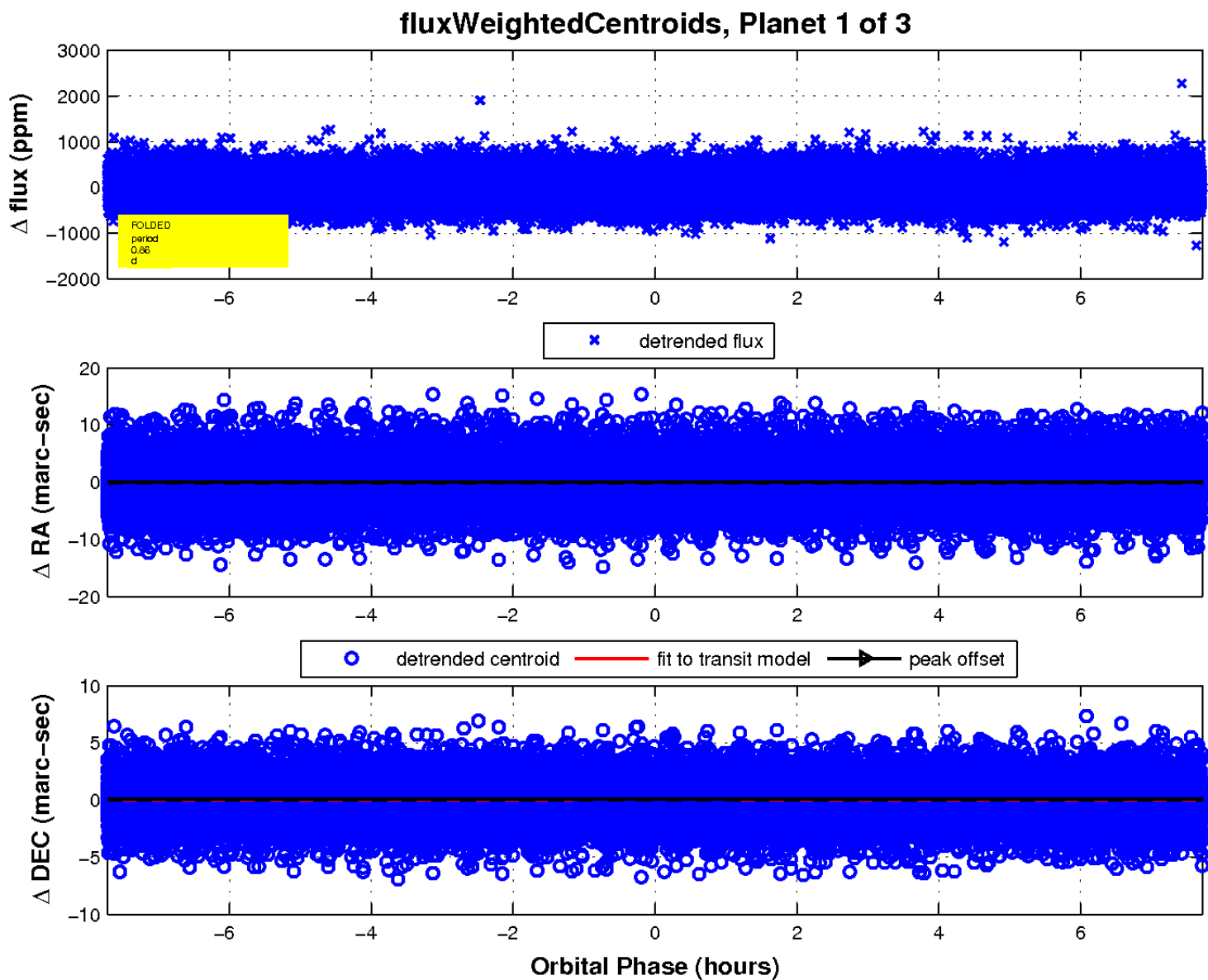
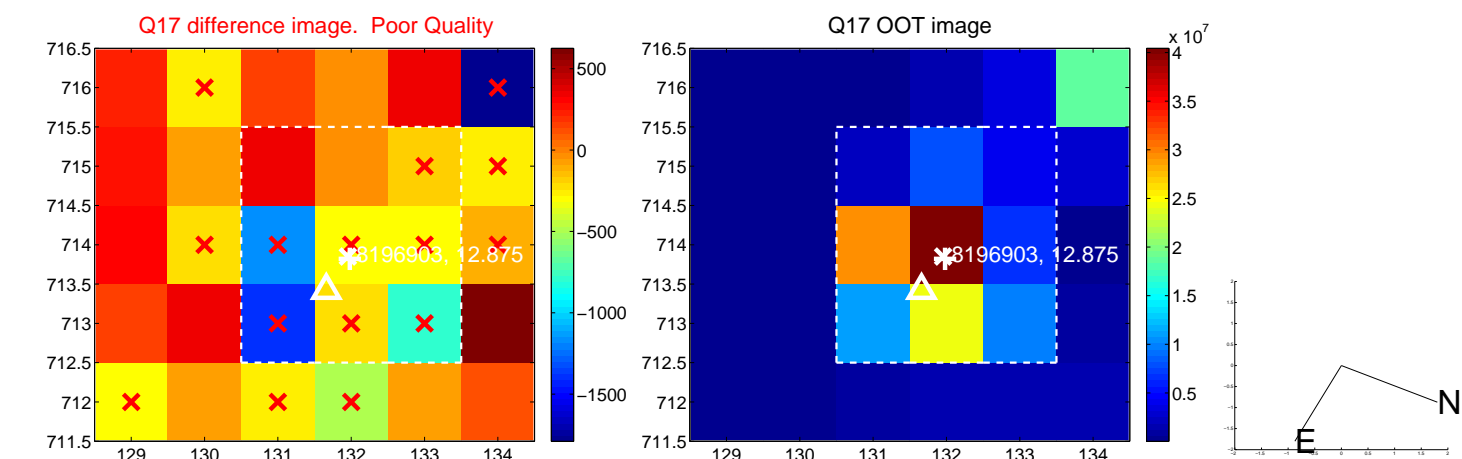
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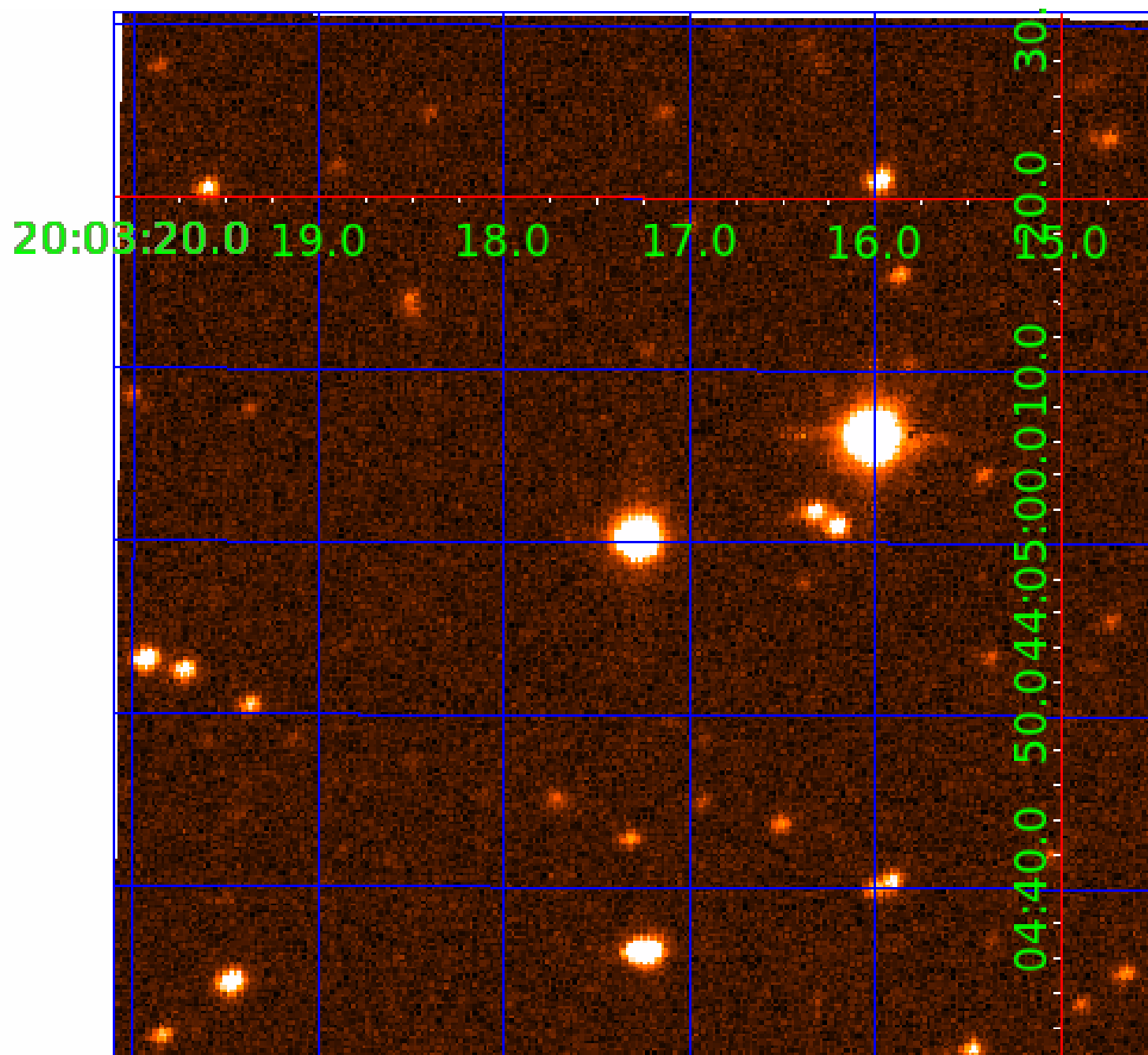


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 008196903

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|------|-----------------------------|-----------------|------------------------|------------------------|
| 008196903-01 | OBS      | No   | 0.864146      | 132.040412   | 57.5        | 2.575            | 9.9 | 12.4 | 2.56                        | 8419            | 2.25                   | 56417.51               |
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| 008196903-03 | OBS      | No   | 142.059170    | 145.259913   | 452.1       | 5.463            | 8.5 | 8.5  | 2.56                        | 8419            | 6.22                   | 62.65                  |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments  |
|--------------|----------|------|-------|---|---|---|---|---|
| 008196903-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT   |
| 008196903-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT   |
| 008196903-03 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT |

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

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

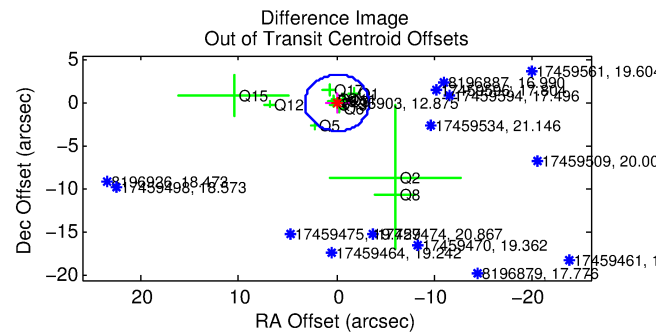
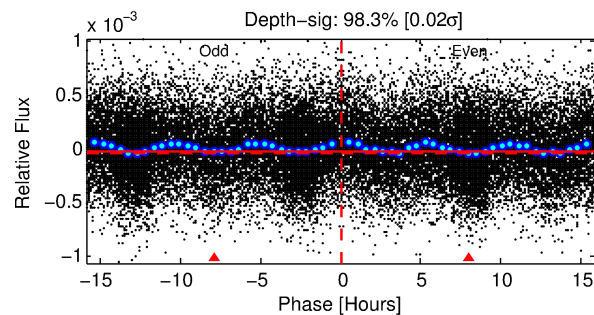
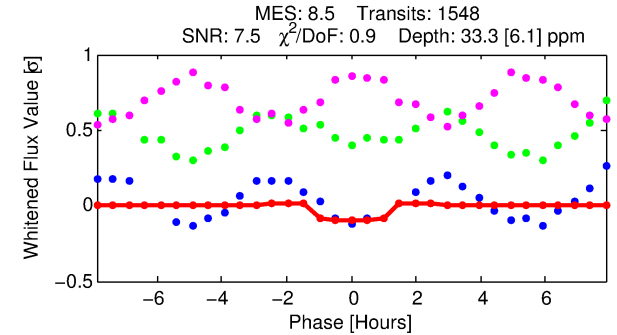
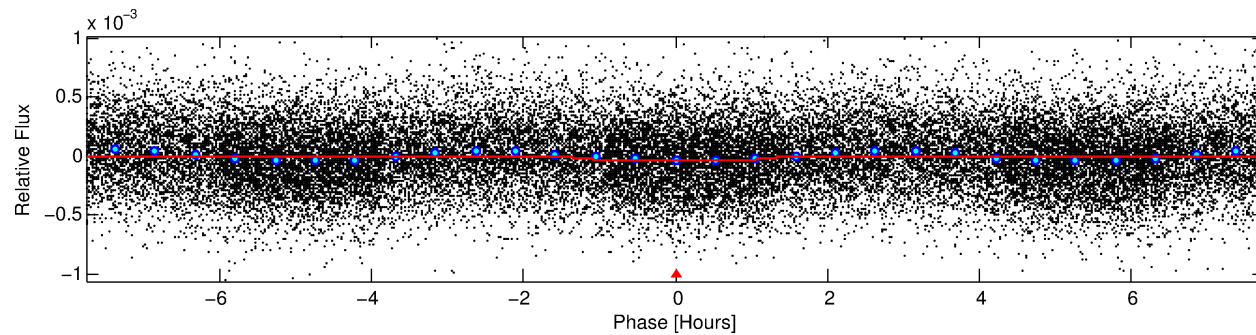
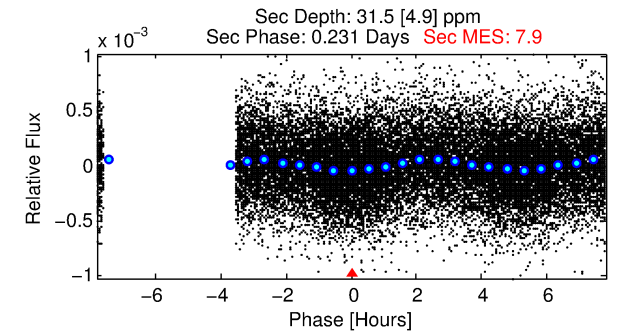
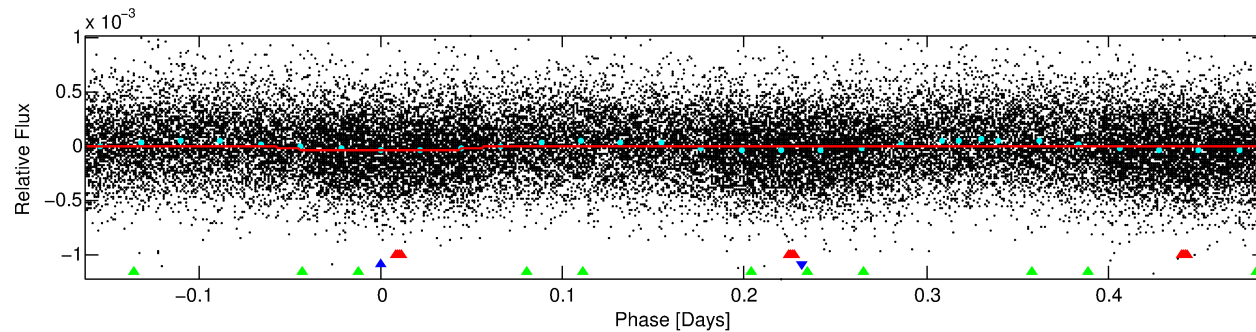
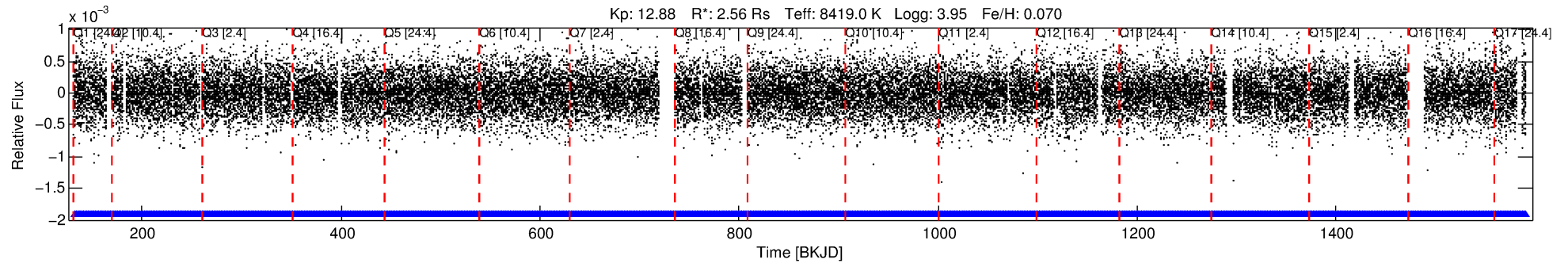
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008196903-02

No Significant Match Found

# DV One-Page Summary

KIC: 8196903 Candidate: 2 of 3 Period: 0.648 d



## DV Fit Results:

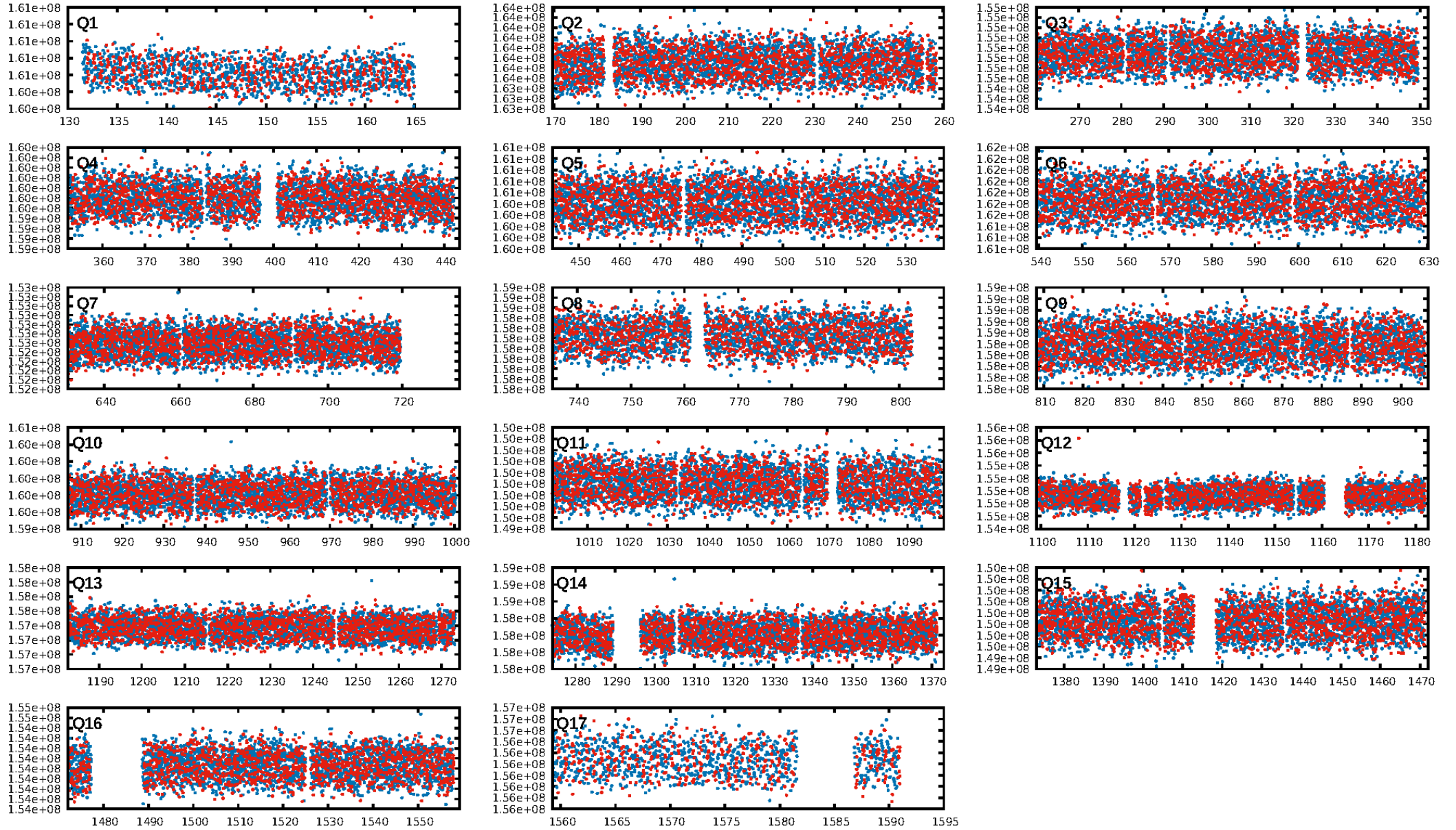
Period = 0.64811 [0.00001] d  
Epoch = 132.0322 [0.0036] BKJD  
Rp/R\* = 0.0061 [0.0027]  
a/R\* = 1.26 [1.33]  
b = 0.90 [0.61]  
Seff = 82794.24 [38556.65]  
Teff = 4325 [504] K  
Rp = 1.71 [0.94] Re  
a = 0.0188 [0.0054] AU  
Ag = 2.10 [2.08] [0.53σ]  
Teffp = 8050 [1835] K [1.96σ]

## DV Diagnostic Results:

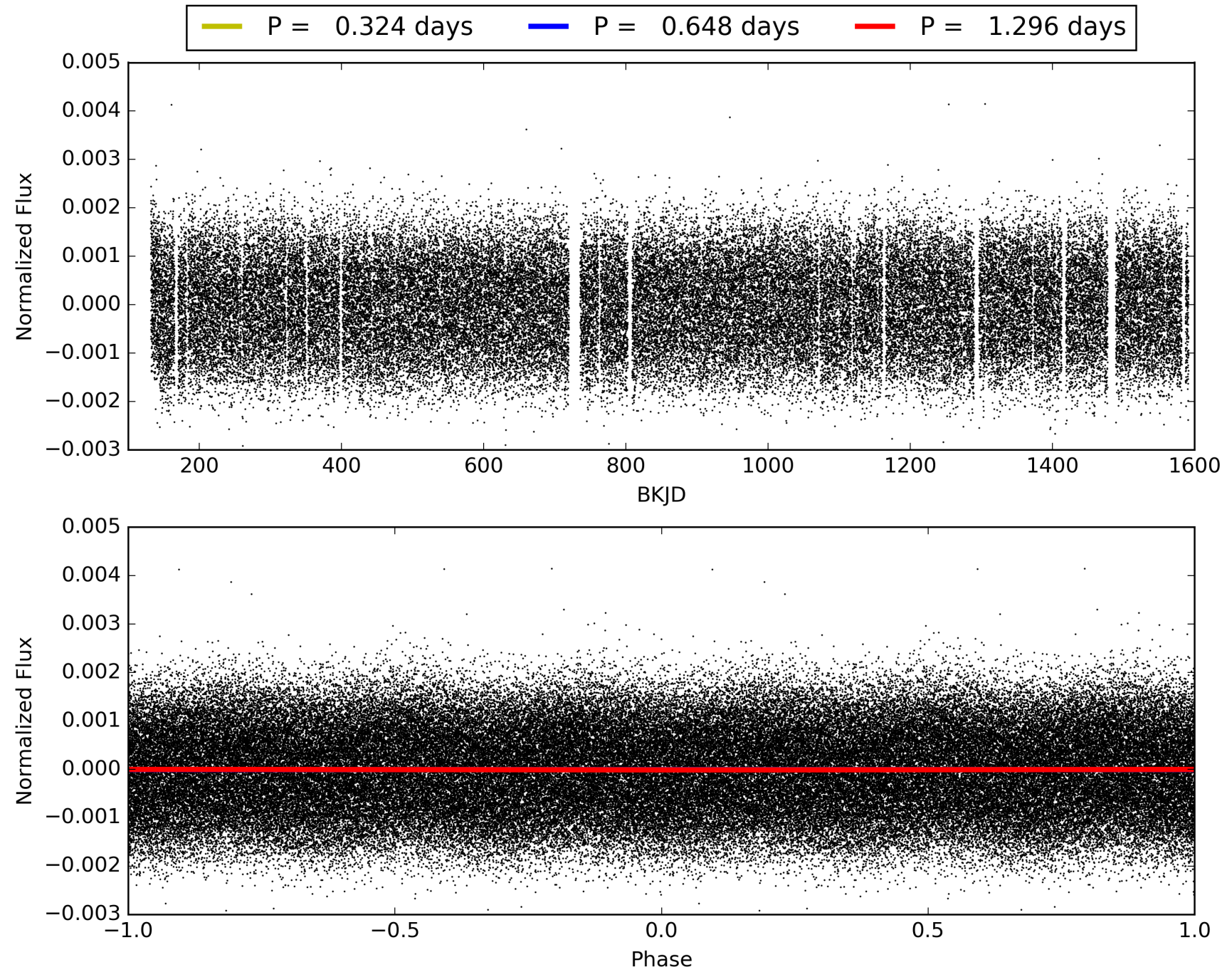
ShortPeriod-sig: N/A  
LongPeriod-sig: 84.0% [1.41σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
**Bootstrap-pfa: 2.14e-11**  
RollingBand-fgt: 1.00 [1479/1479]  
**GhostDiagnostic-chr: 12.31**  
Centroid-sig: 0.9%  
Centroid-so: 0.554 arcsec [0.66σ]  
OotOffset-rm: 0.044 arcsec [0.04σ]  
KicOffset-rm: 0.179 arcsec [0.14σ]  
OotOffset-st: 2/3/3/5 [13]  
KicOffset-st: 2/3/3/5 [13]  
DiffImageQuality-fgm: 0.46 [6/13]  
DiffImageOverlap-fno: 1.00 [17/17]



# TCE 008196903-02, PDC Light Curves

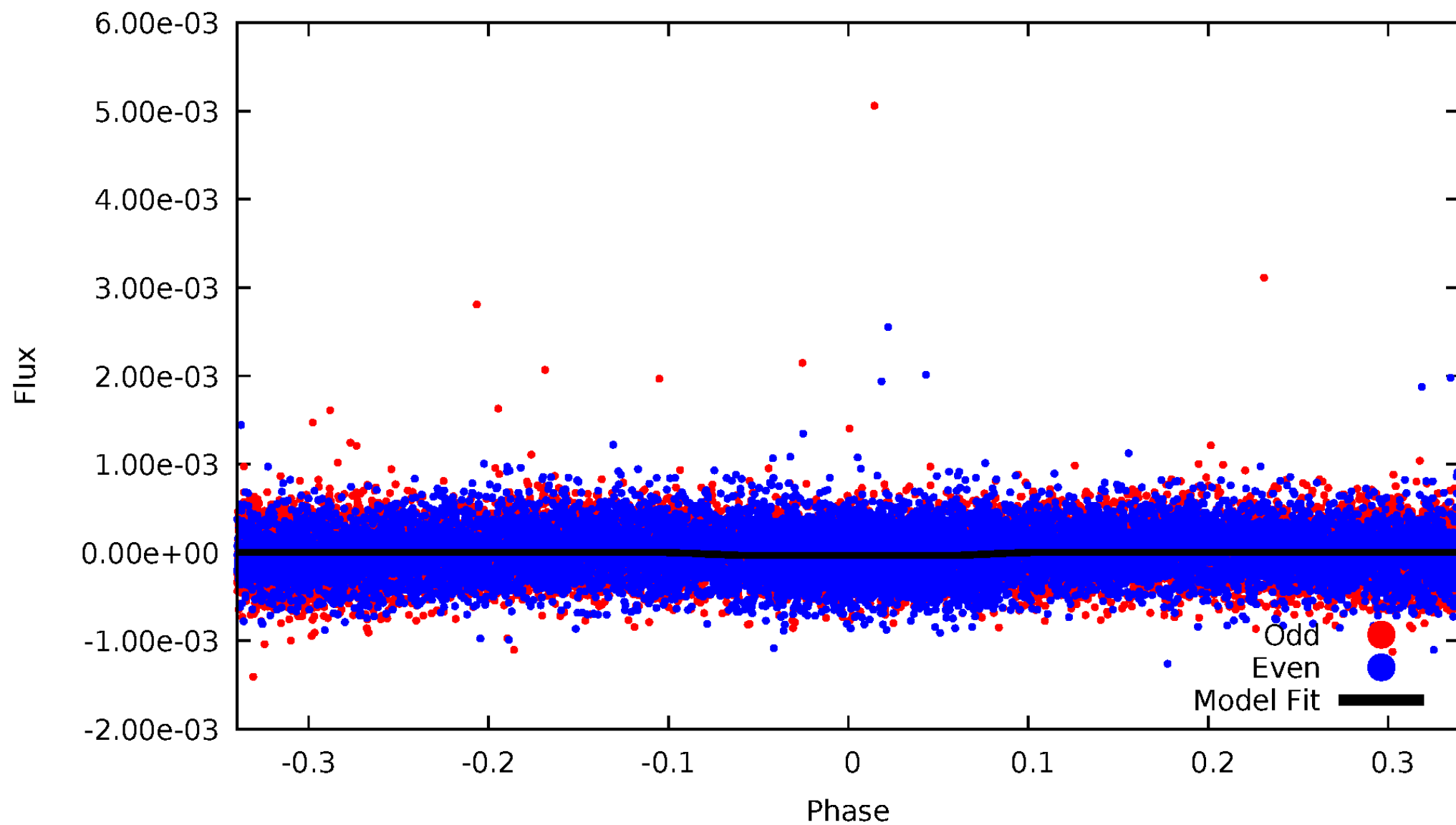


# TCE 008196903-02



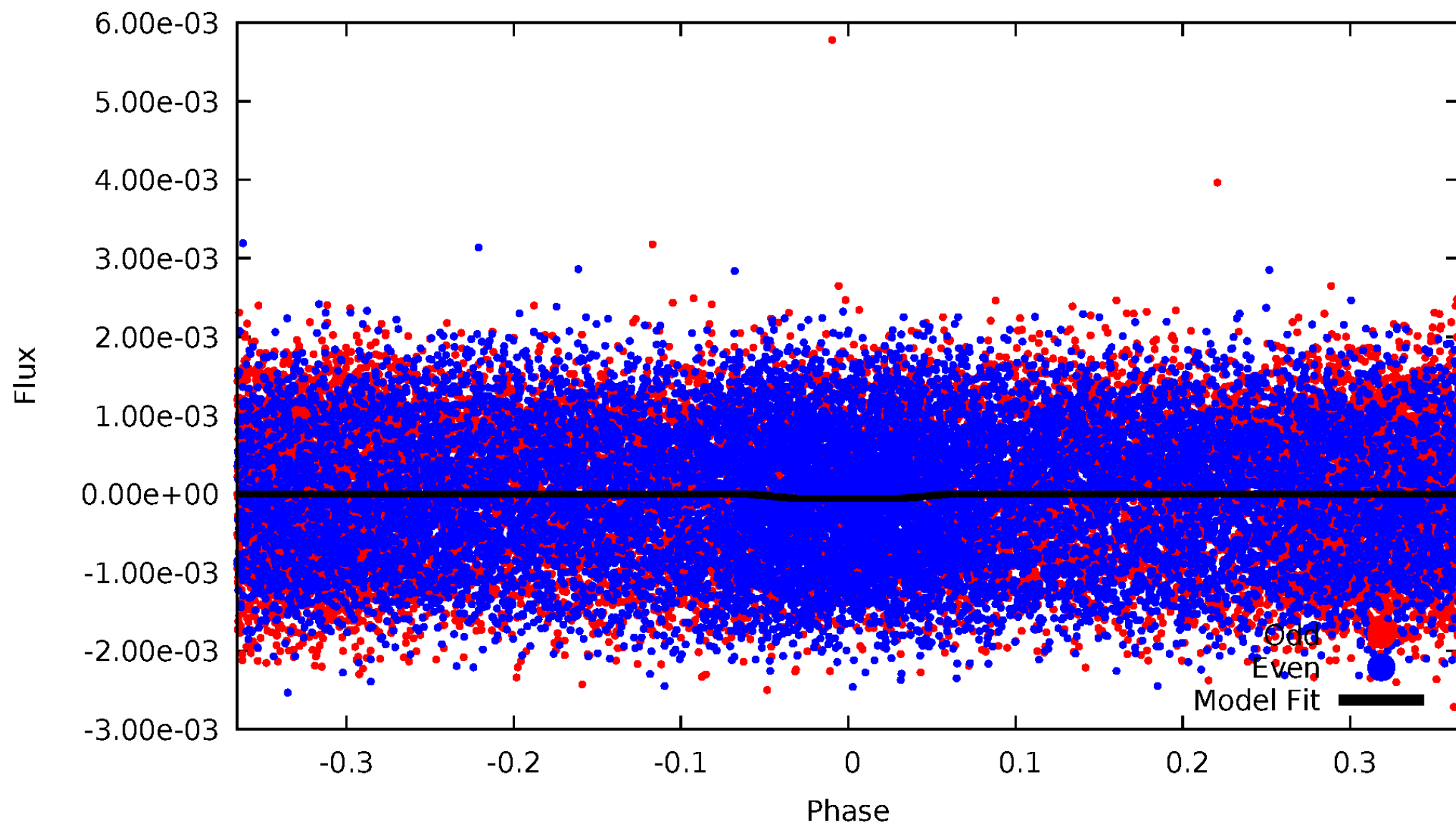
# DV Odd/Even

TCE 008196903-02



# ALT Odd/Even

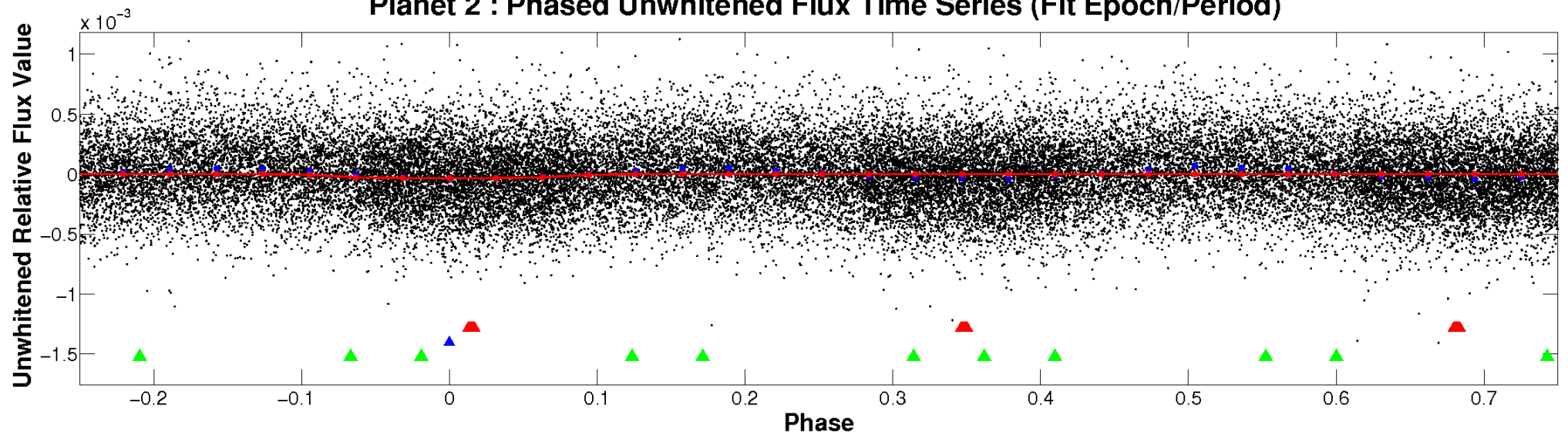
TCE 008196903-02



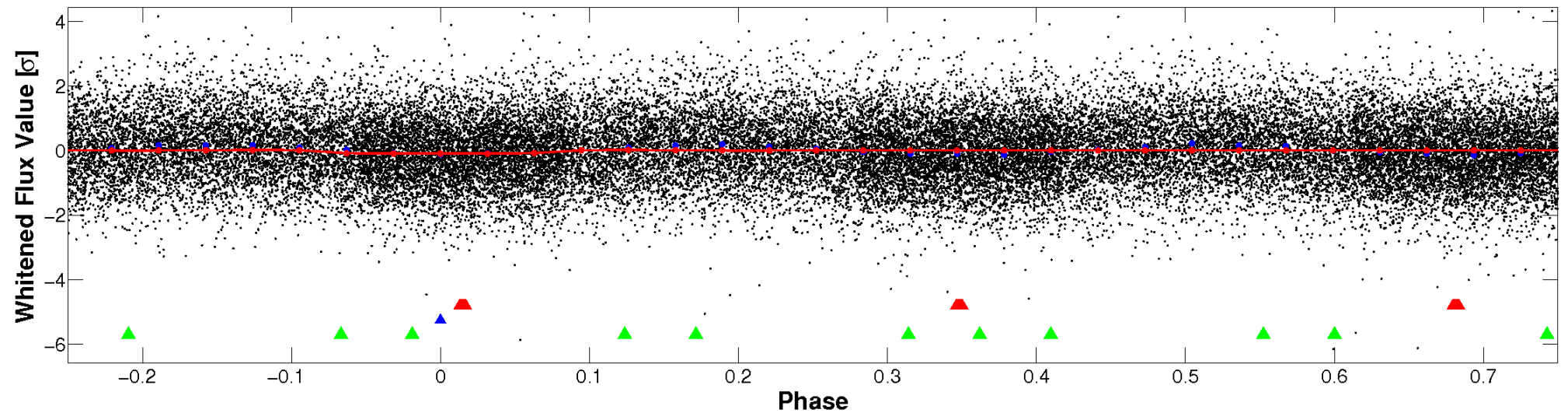


# Non-Whitened Vs. Whitened Light Curve

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

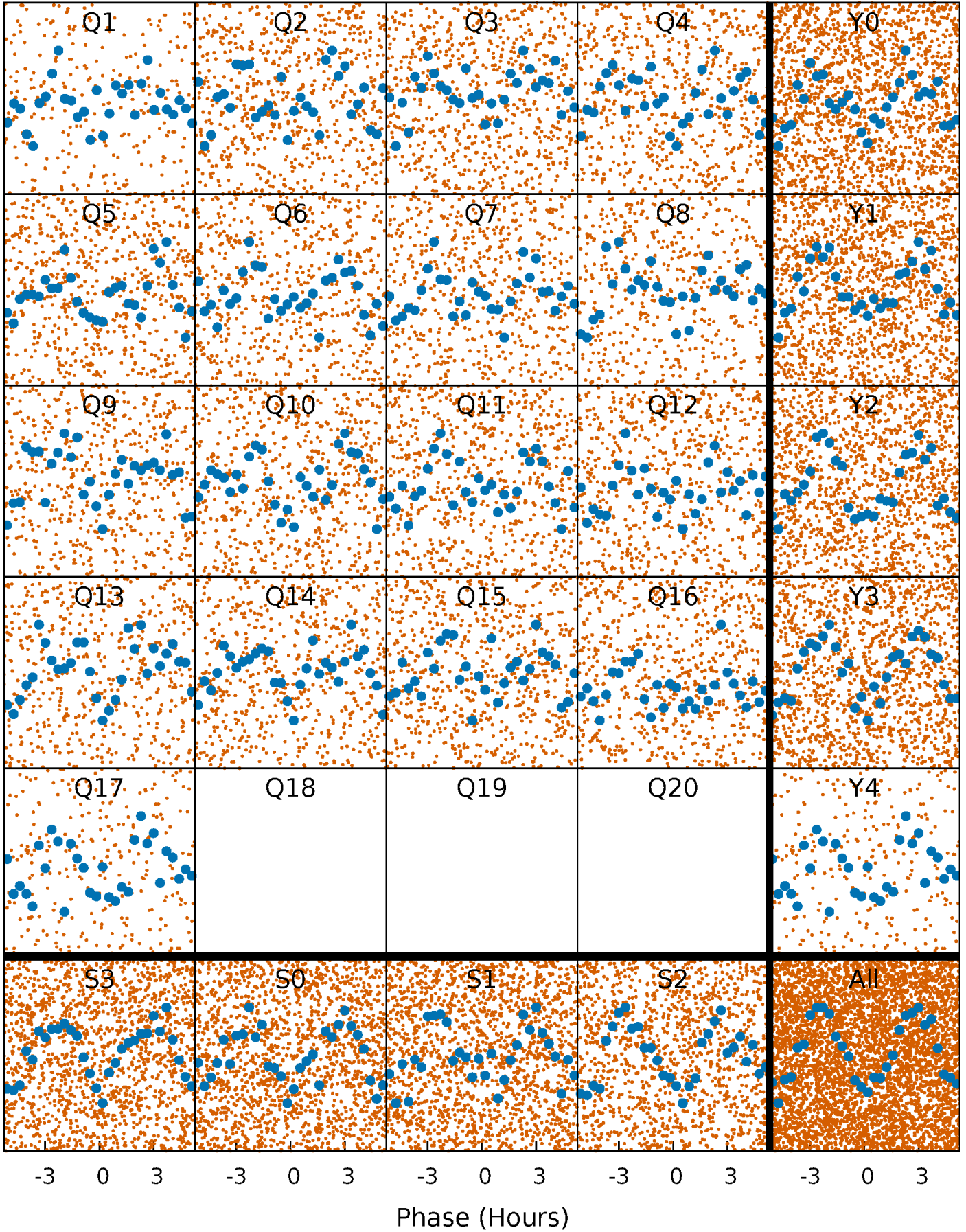


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

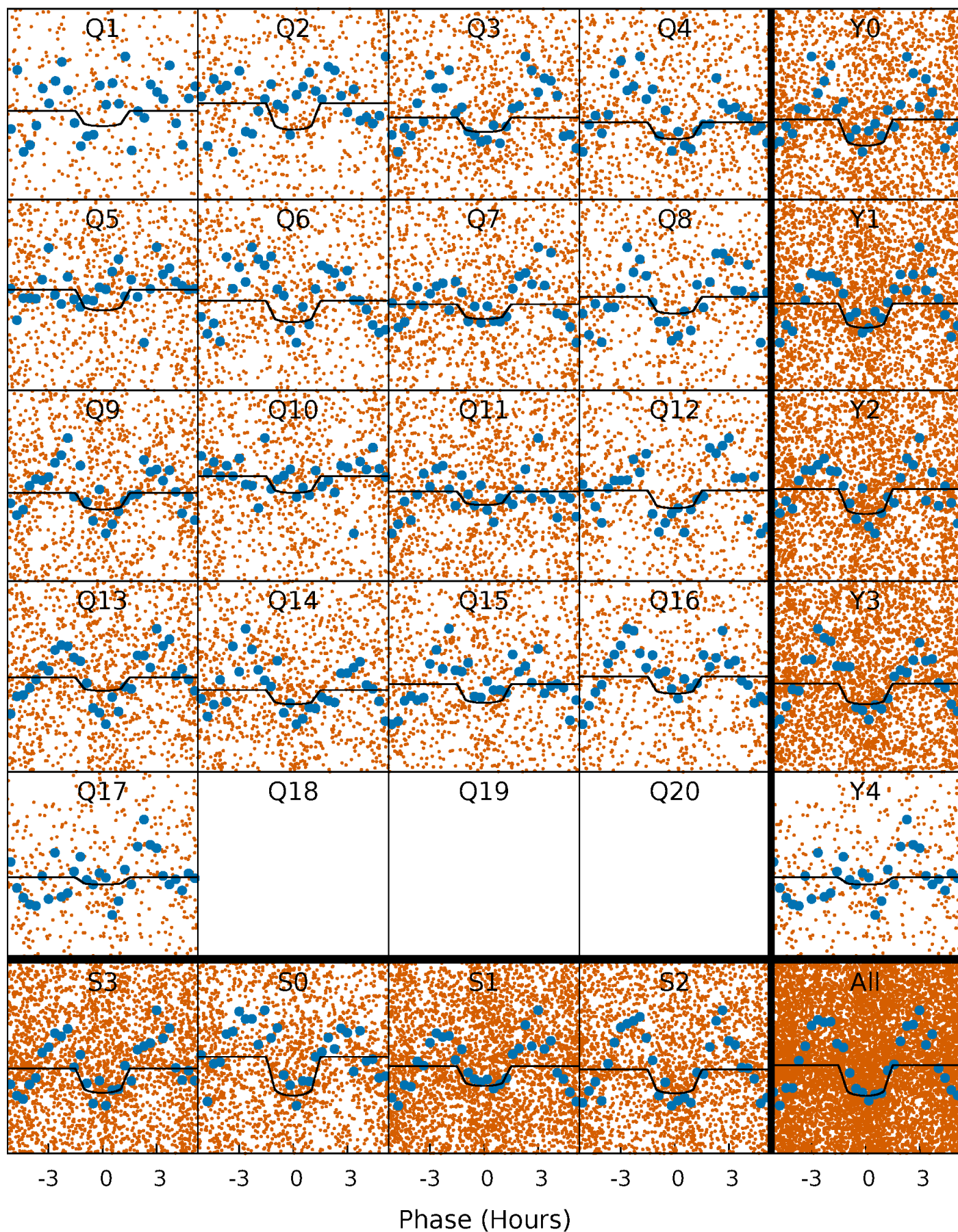
TCE 008196903-02   P= 0.648108 Days    $T_0=132.032228$  (BKJD)





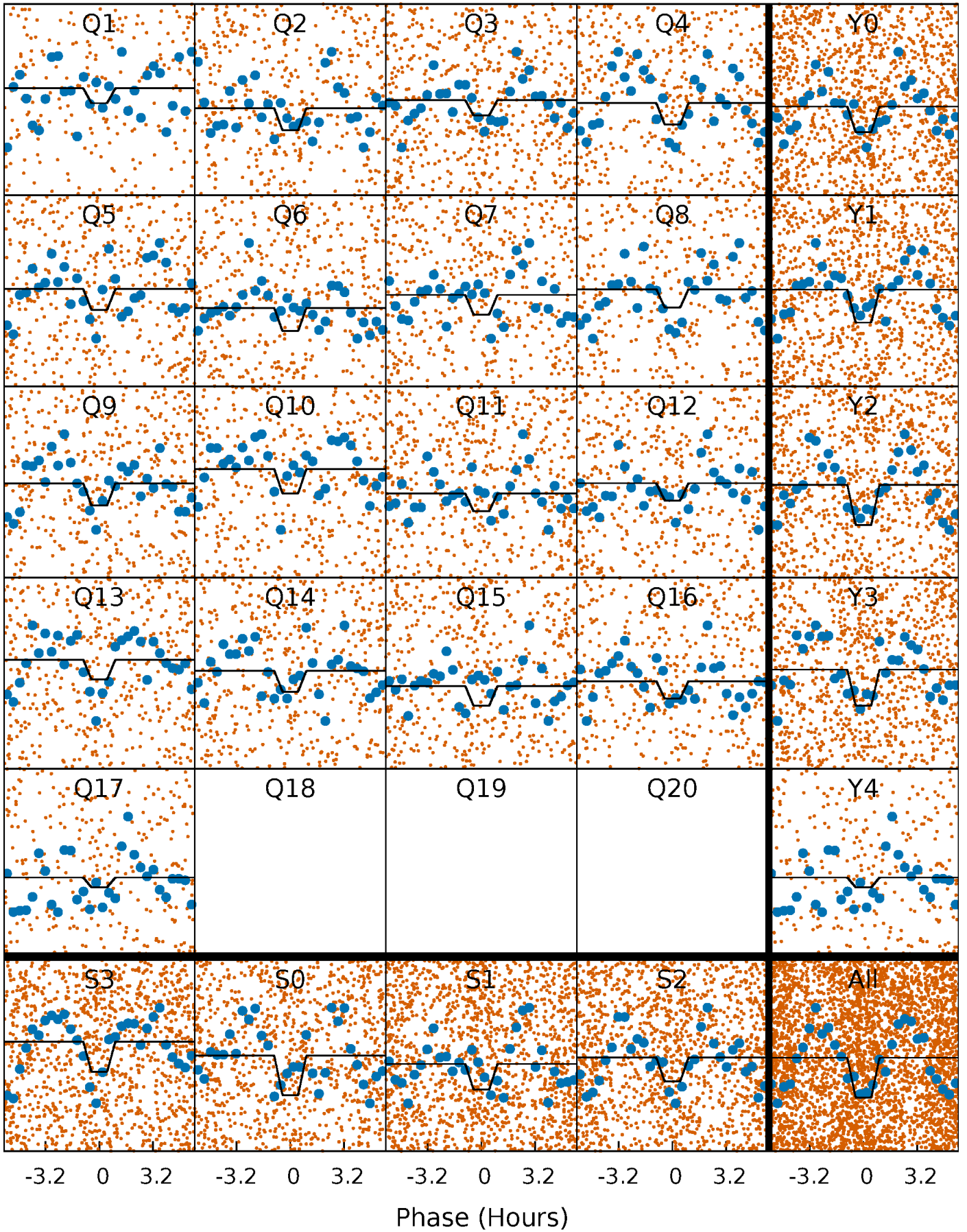
# DV Quarter-Phased Transit Curves

TCE 008196903-02 P= 0.648108 Days  $T_0=132.032228$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

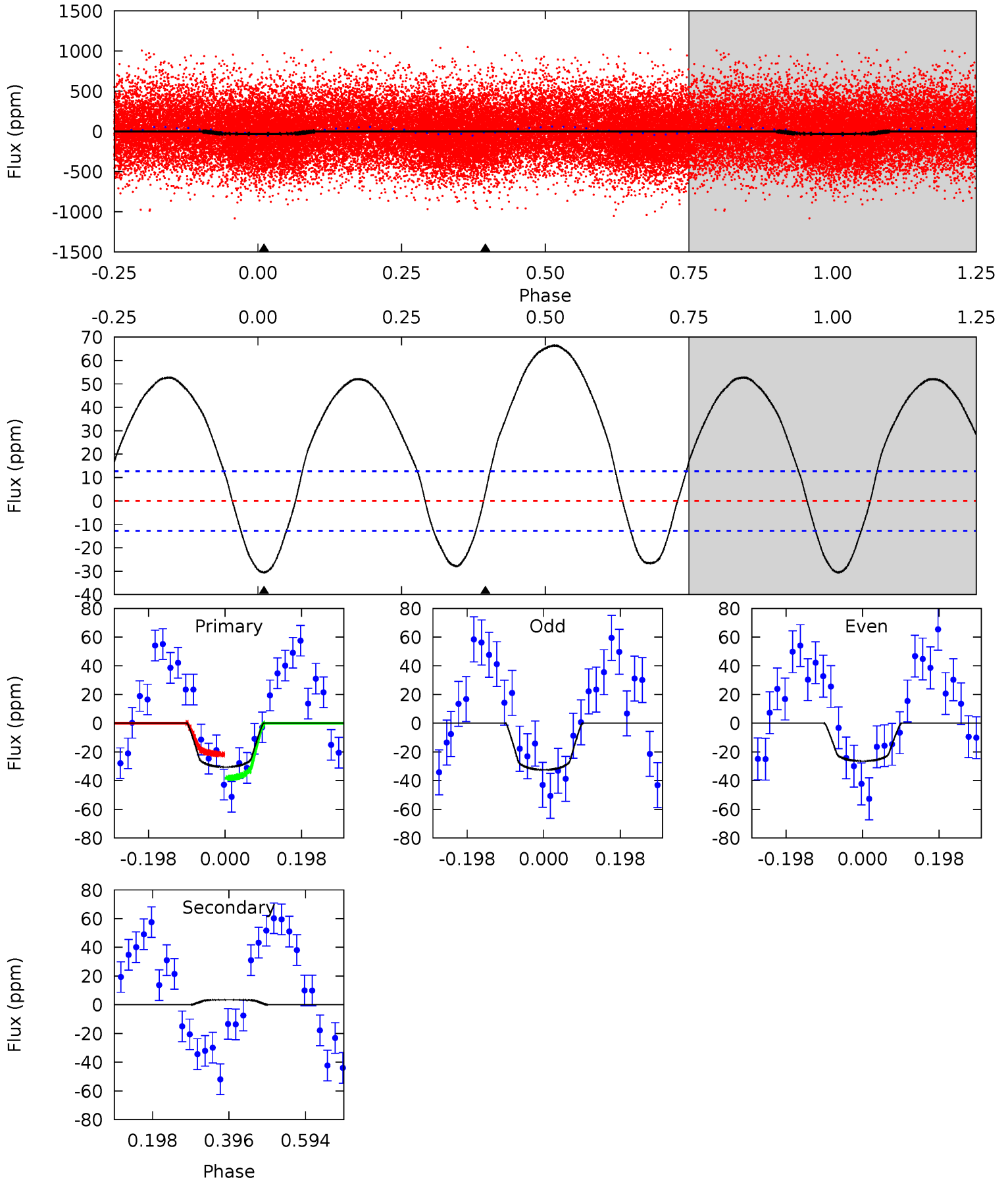
TCE 008196903-02 P= 0.648121 Days  $T_0=132.028539$  (BKJD)



# DV Model-Shift Uniqueness Test

008196903-02, P = 0.648108 Days, E = 131.384120 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  |
|------|-------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 10.6 | -1.21 | 0   | 0   | 4.42            | 1.29            | 8.15             | 10.6    | 10.6    | -1.21   | -1.21   | 1.03    | 0.93 | 0.69  | 2.90 |

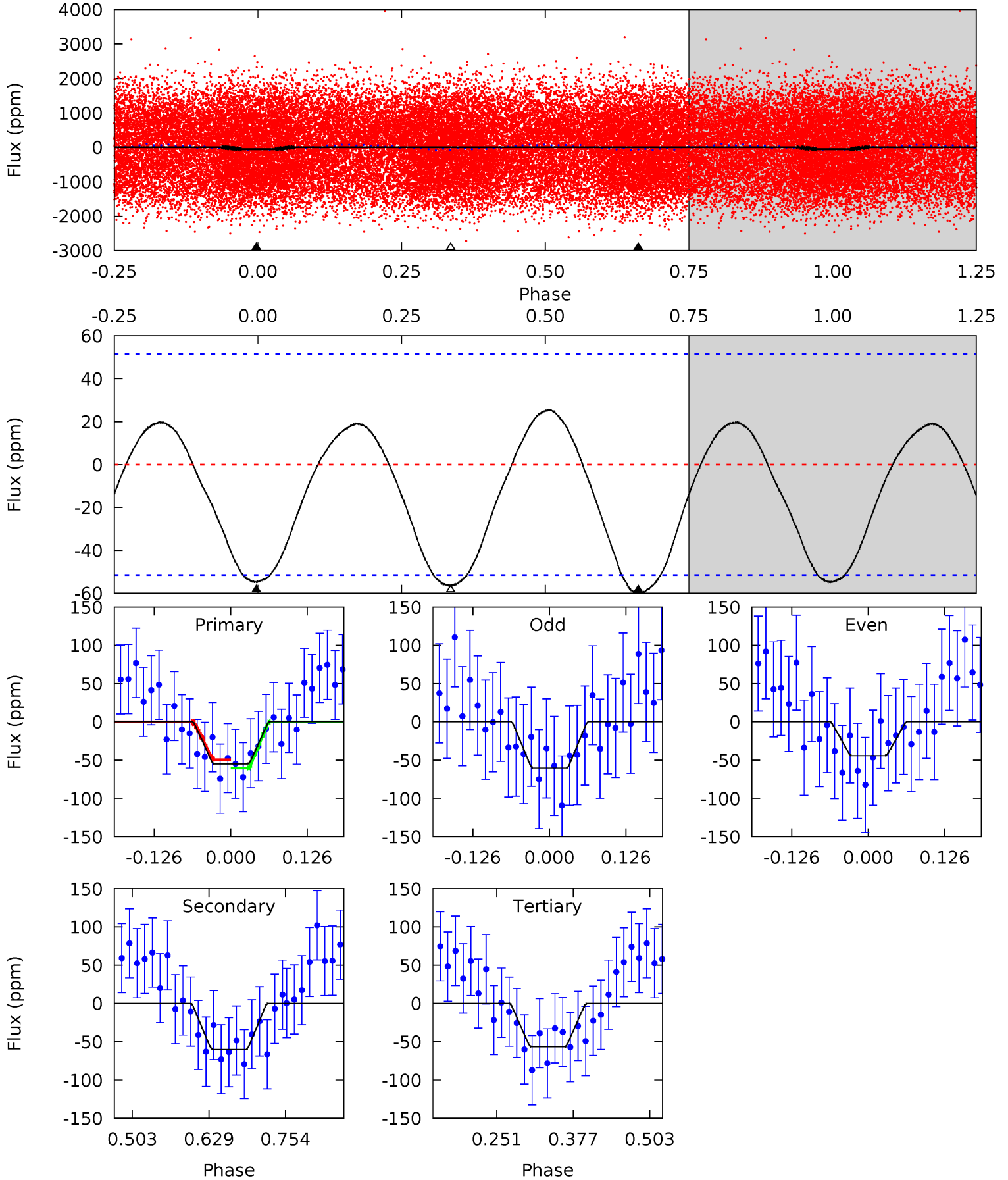




# Alt Model-Shift Uniqueness Test

008196903-02, P = 0.648121 Days, E = 131.380418 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  |
|------|------|------|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 4.82 | 5.26 | 4.96 | 0   | 4.52            | 1.53            | 2.59             | -0.14   | 4.82    | 0.30    | 5.26    | 0.68    | 0.82 | 0.30  | 0.48 |





### Stellar Parameters For KIC 008196903

|        | $T_{\text{eff}} (K)$ | $\log(g)$                 | $[\text{Fe}/\text{H}]$    | $R (R_{\odot})$           | $M (M_{\odot})$           | $\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|--|
|        | $8419^{+204}_{-379}$ | $3.950^{+0.241}_{-0.111}$ | $0.070^{+0.250}_{-0.550}$ | $2.555^{+0.487}_{-0.836}$ | $2.120^{+0.304}_{-0.564}$ | $0.179^{+0.318}_{-0.064}$                    |
|        | +2%/-5%              | +6%/-3%                   | +357%/-786%               | +19%/-33%                 | +14%/-27%                 | +177%/-36%                                   |
| Source | KIC0                 | KIC0                      | KIC0                      | DSEP                      |                           |  |

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

### Secondary Eclipse Parameters for KIC 008196903-02 / KOI

| Detrend | Depth (ppm)  | $R_p (R_{\oplus})$     | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$   | $A_{\text{obs}}$           |
|---------|--------------|------------------------|----------------------|------------------------|----------------------------|
| DV      | $3 \pm 3$    | $1.63^{+0.81}_{-0.69}$ | $5962^{+375}_{-503}$ | $-5436^{+592}_{-1087}$ | $-0.218^{+0.181}_{-0.616}$ |
| Alt.    | $-60 \pm 11$ | $2.10^{+0.87}_{-0.74}$ | $5944^{+376}_{-538}$ | $7891^{+2678}_{-1508}$ | $2.618^{+3.578}_{-1.335}$  |

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

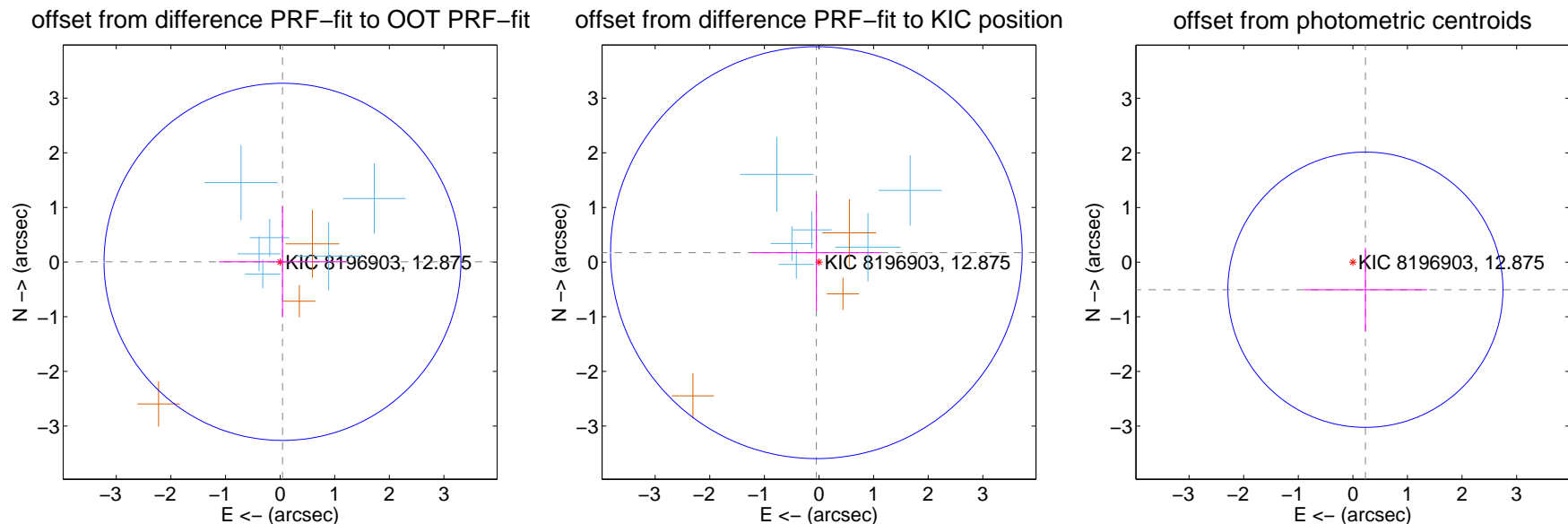
## DV Centroid Data

Supplemental centroid analysis for 008196903-02. Kepler magnitude: 12.88. Transit SNR 7.48

There are 6 quarters with good PRF difference image offsets

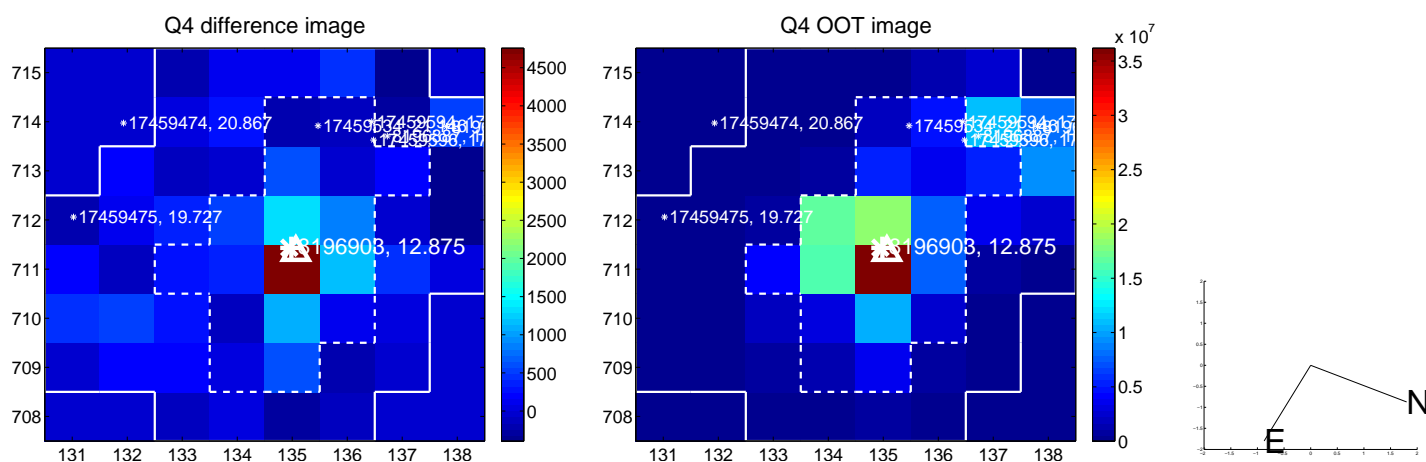
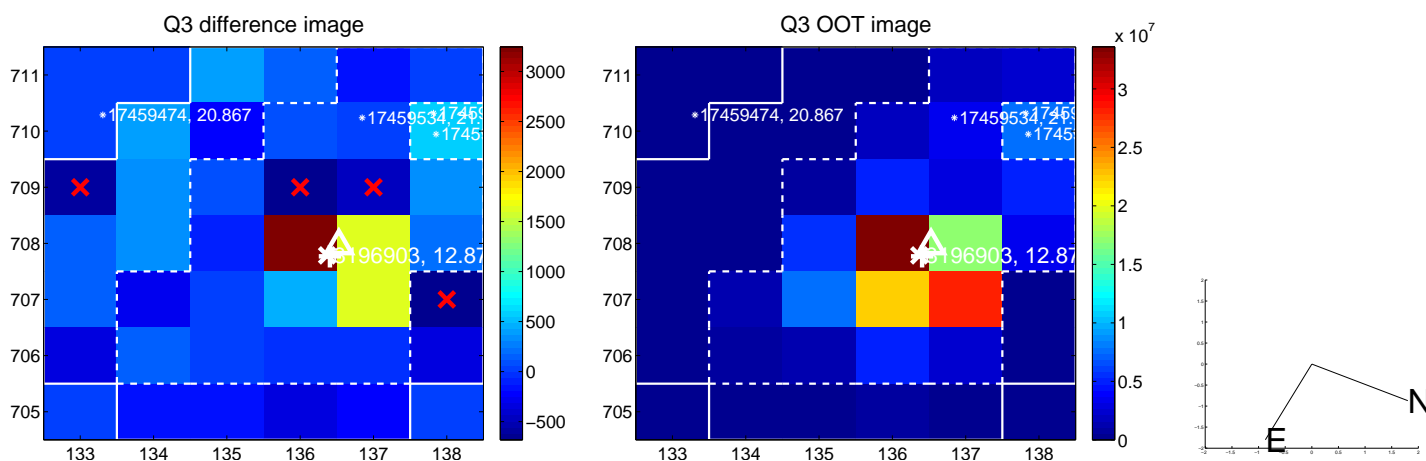
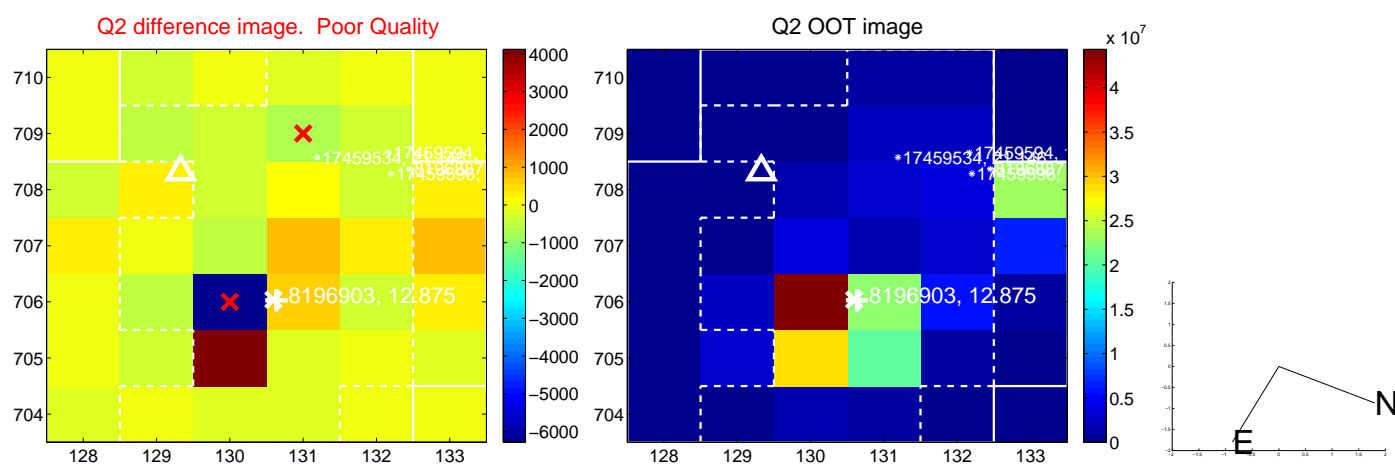
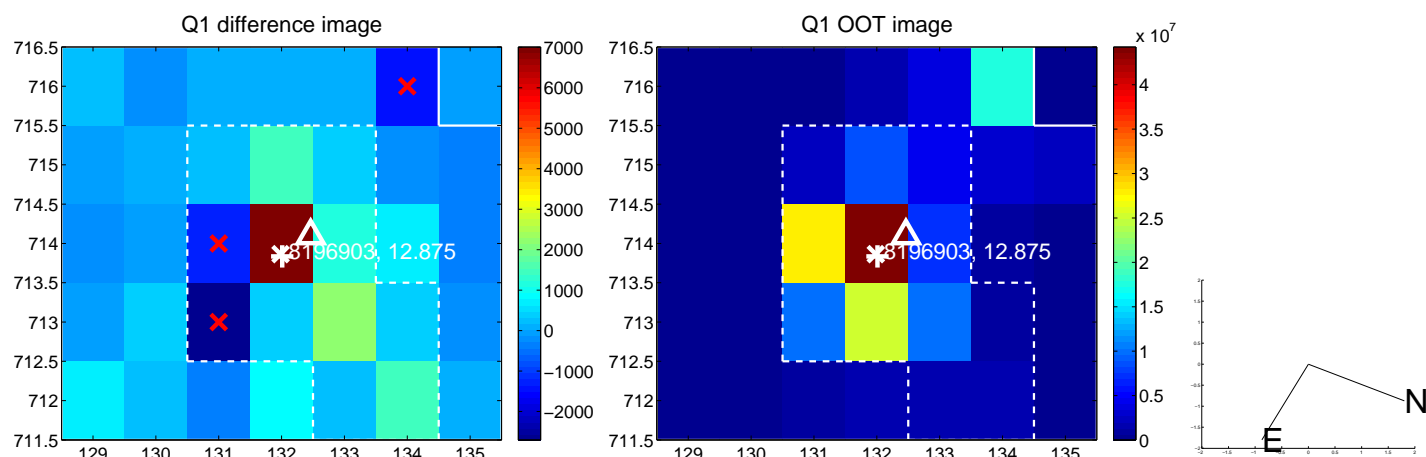
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec      |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT          | $0.044 \pm 1.089$  | 0.04                | $-0.043 \pm 1.163$ | $0.005 \pm 1.010$ |
| PRF-fit source offset from KIC position | $0.179 \pm 1.256$  | 0.14                | $0.048 \pm 1.181$  | $0.173 \pm 1.071$ |
| photometric centroid source offset      | $0.55 \pm 0.84$    | 0.66                | $-0.23 \pm 1.13$   | $-0.50 \pm 0.77$  |

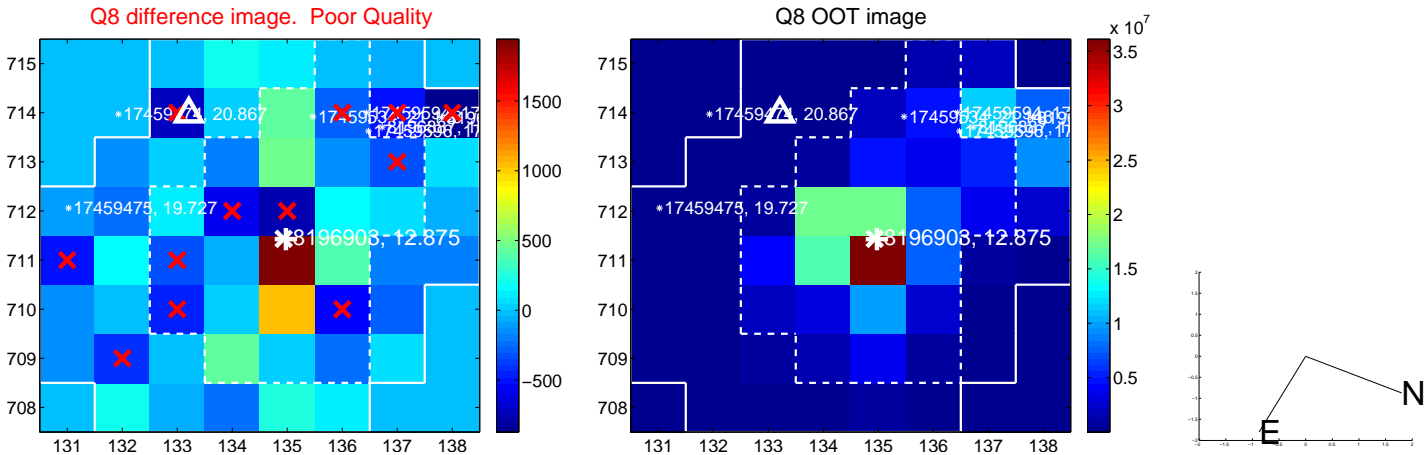
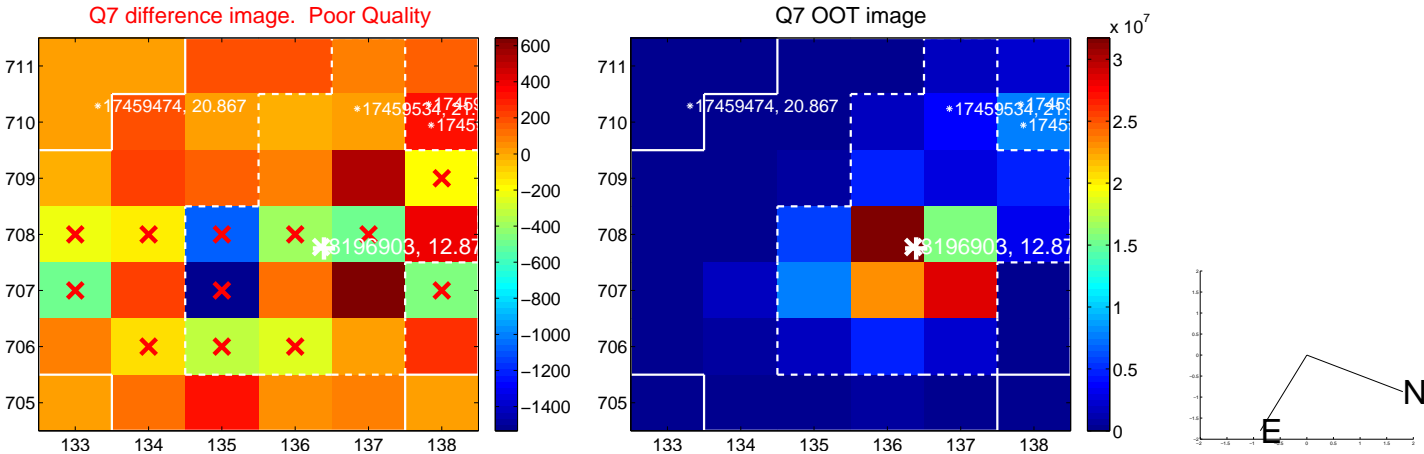
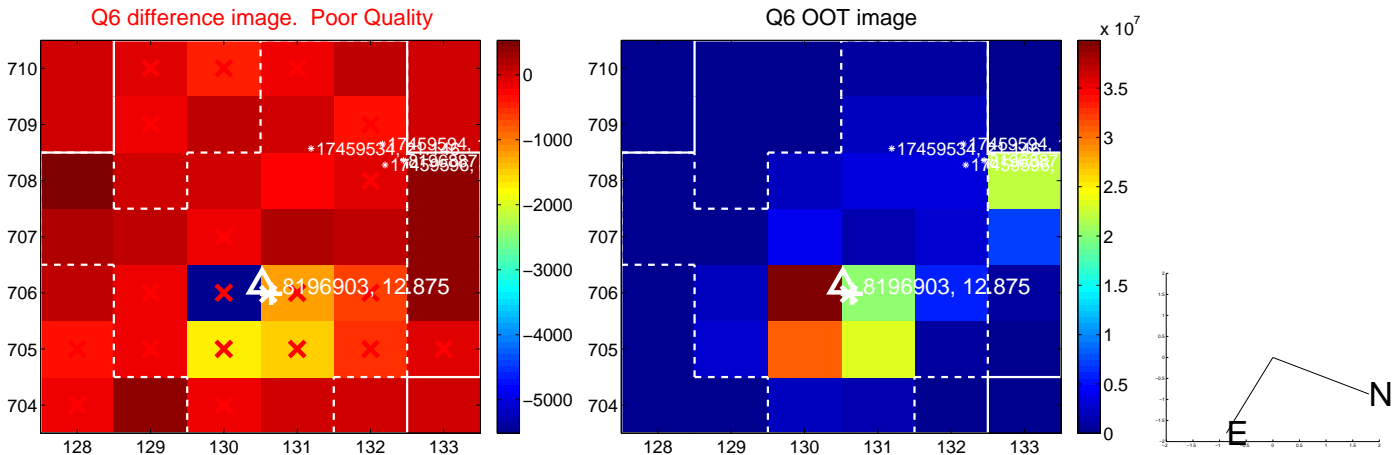
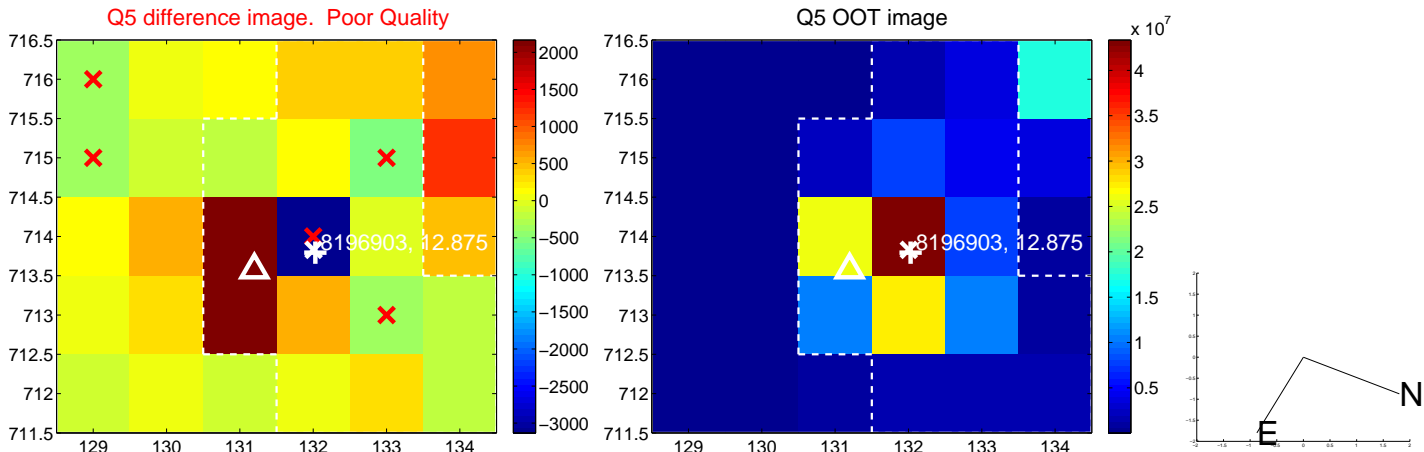


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

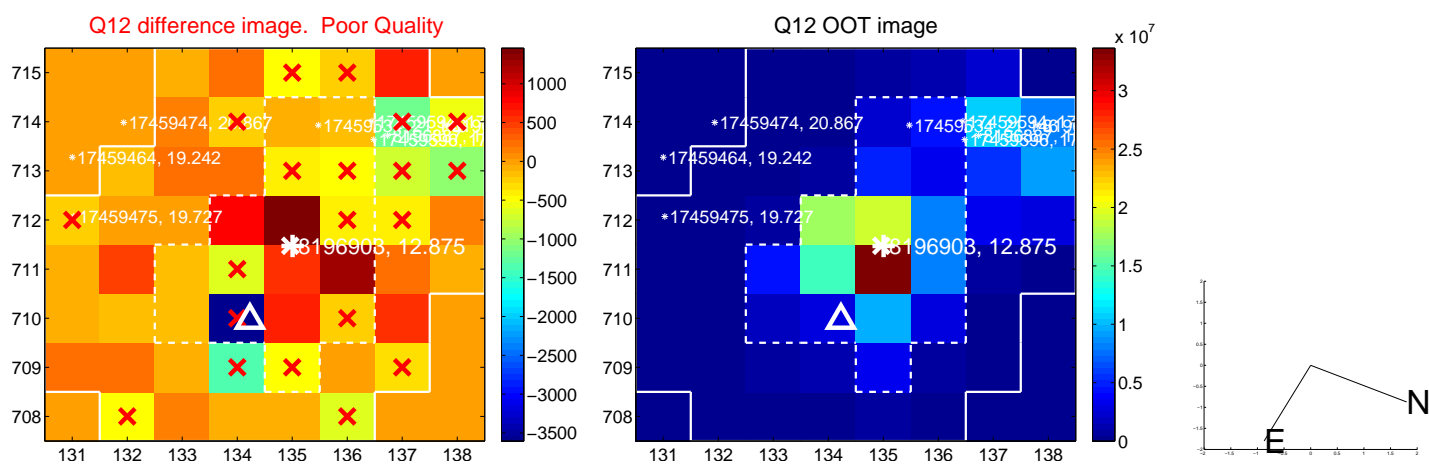
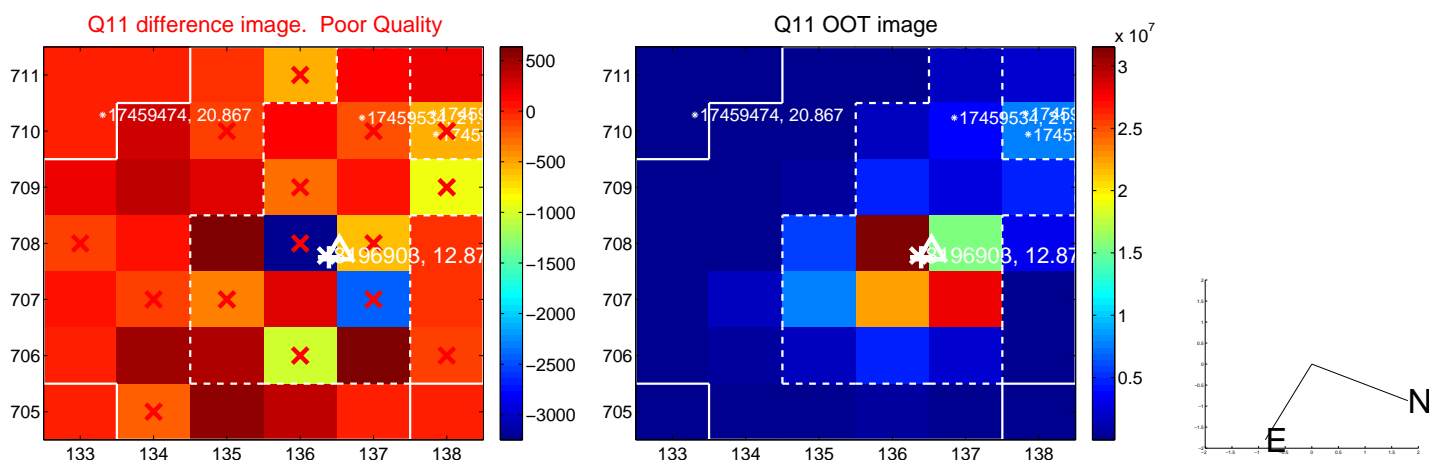
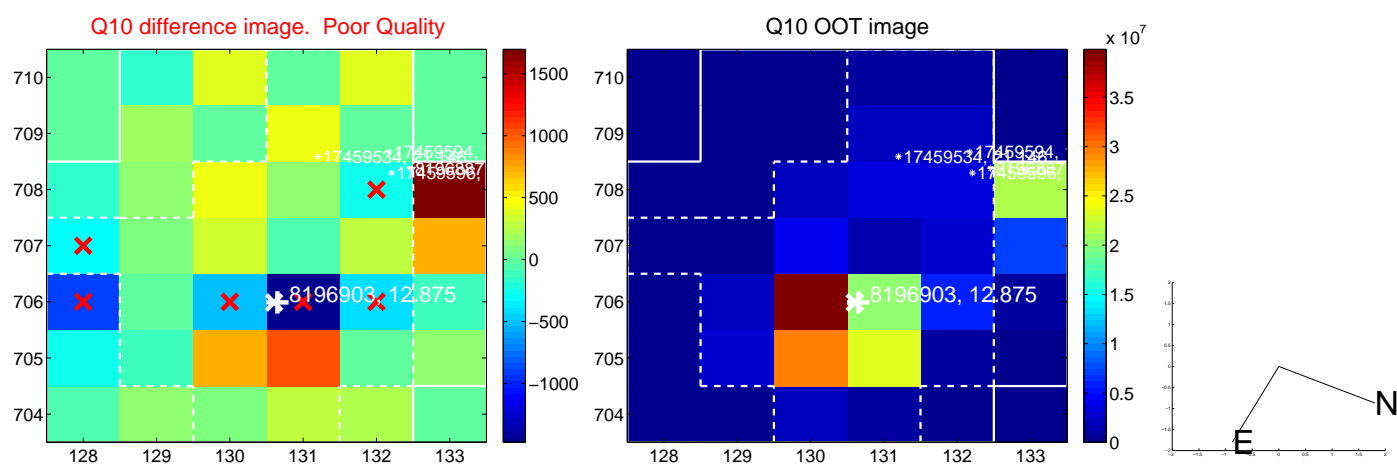
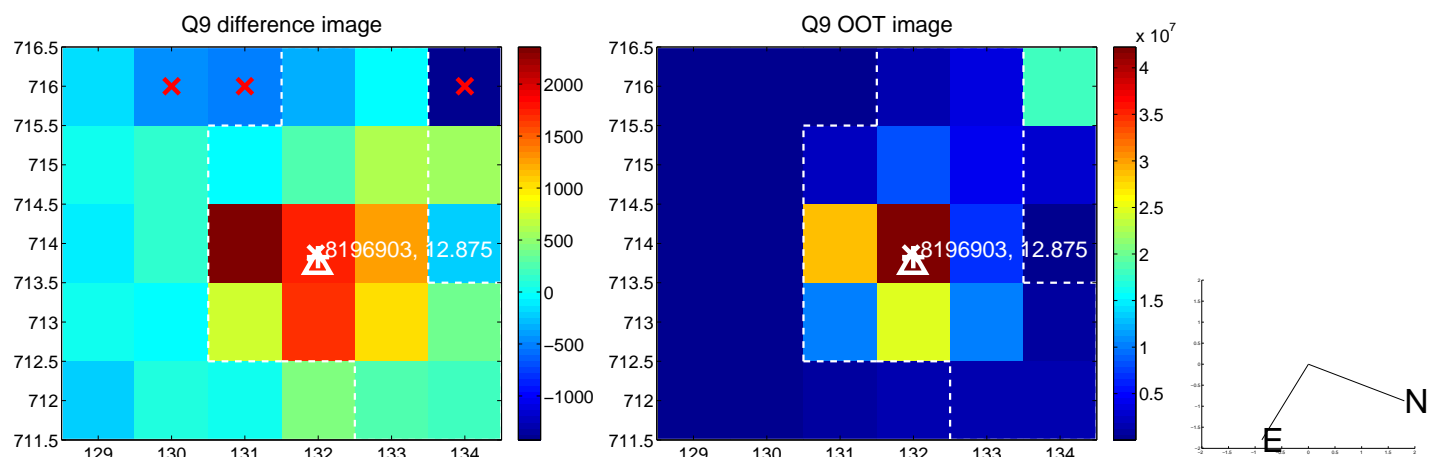


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

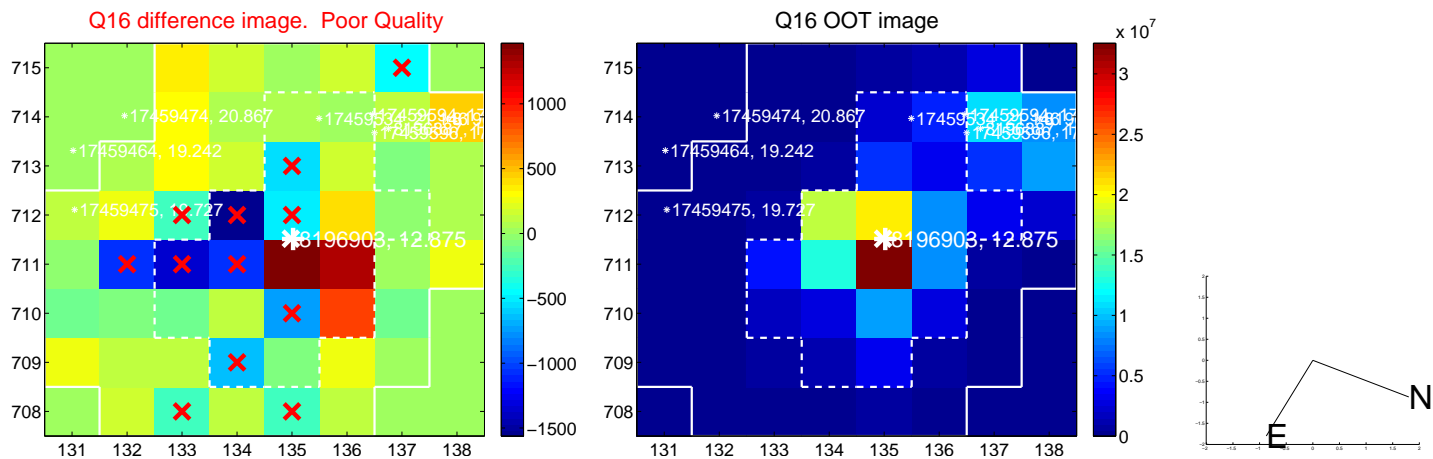
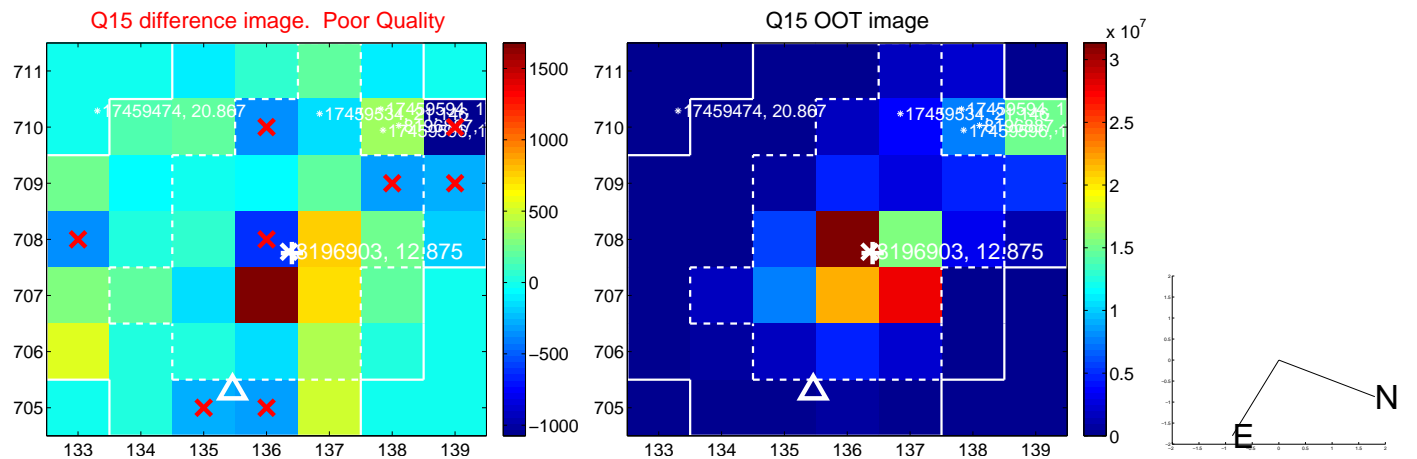
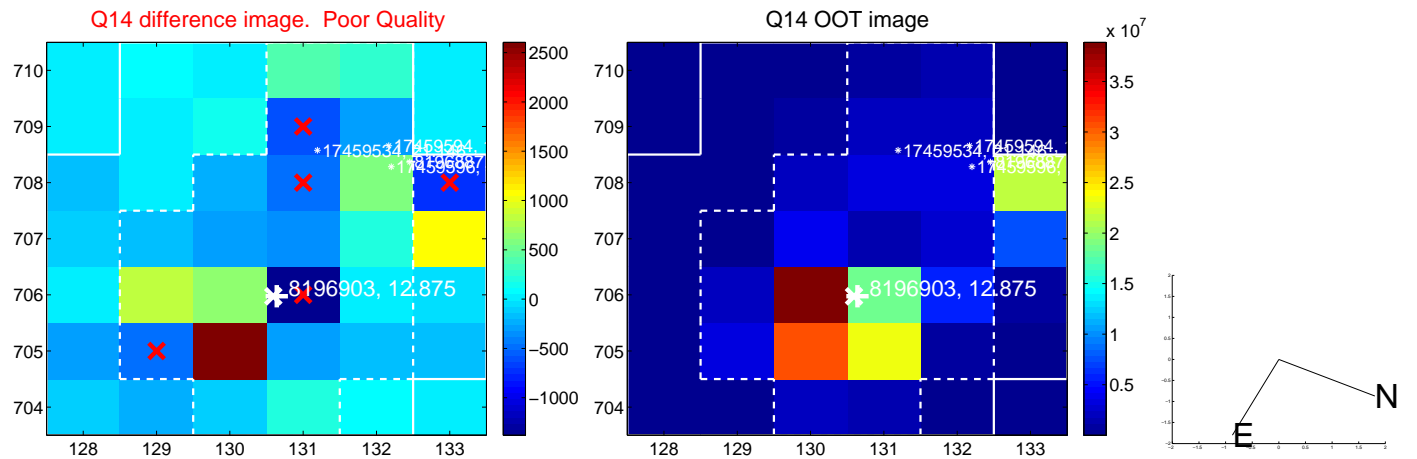
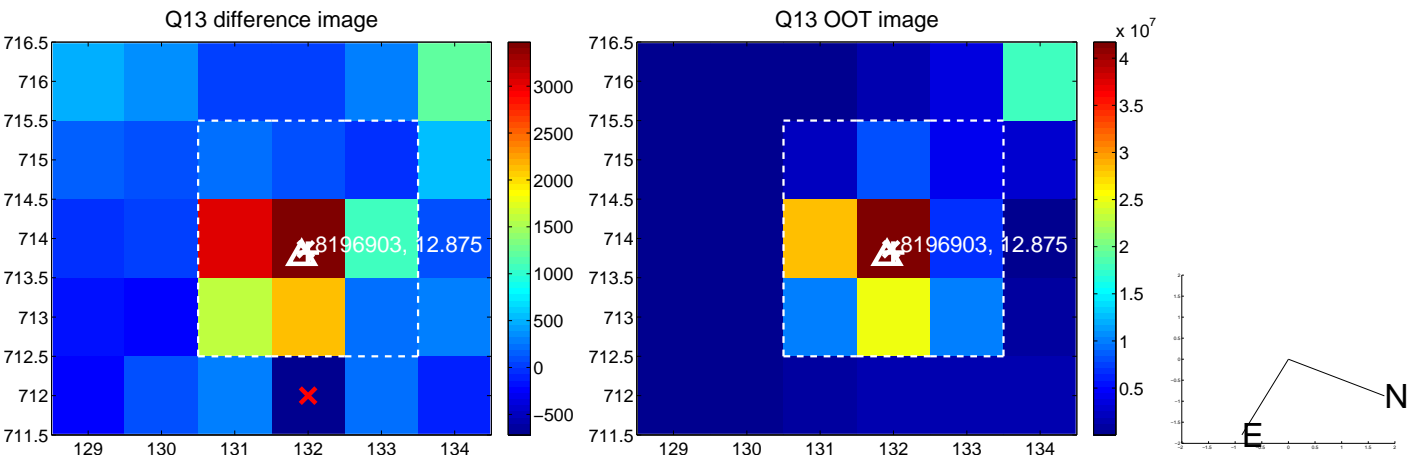




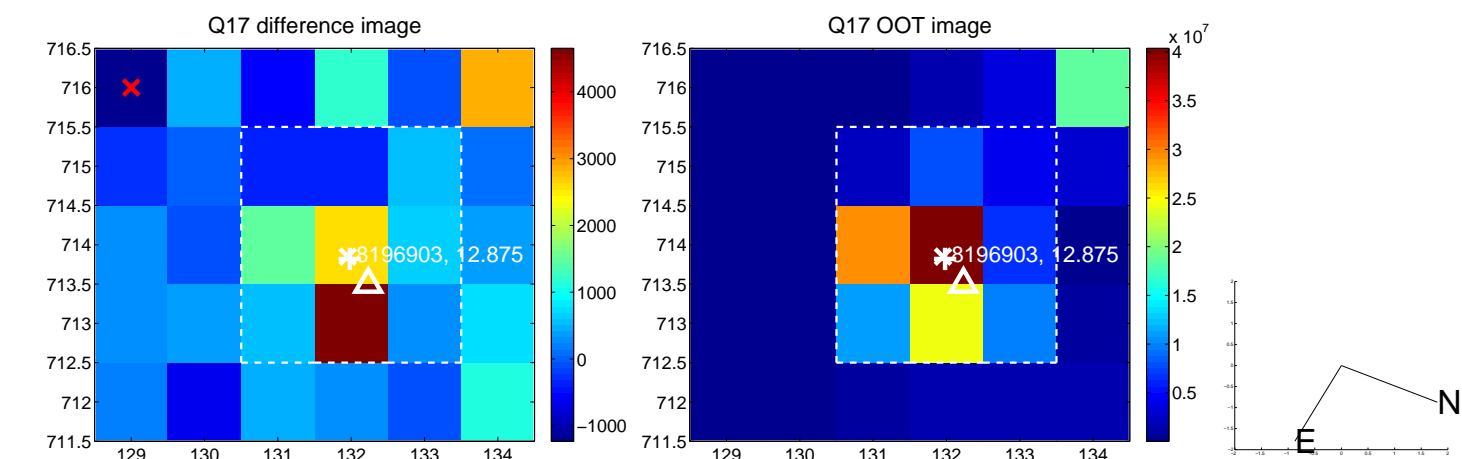
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



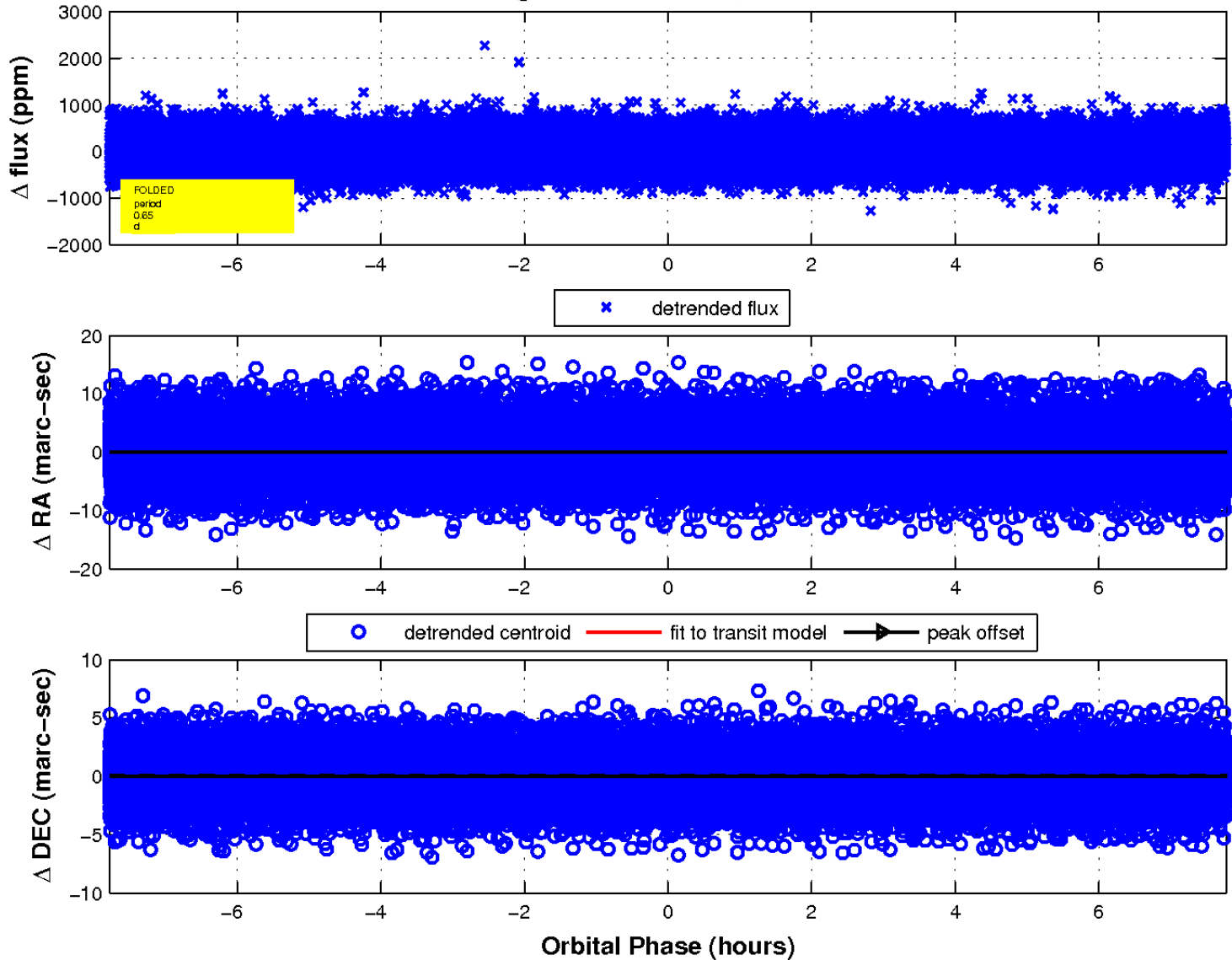
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

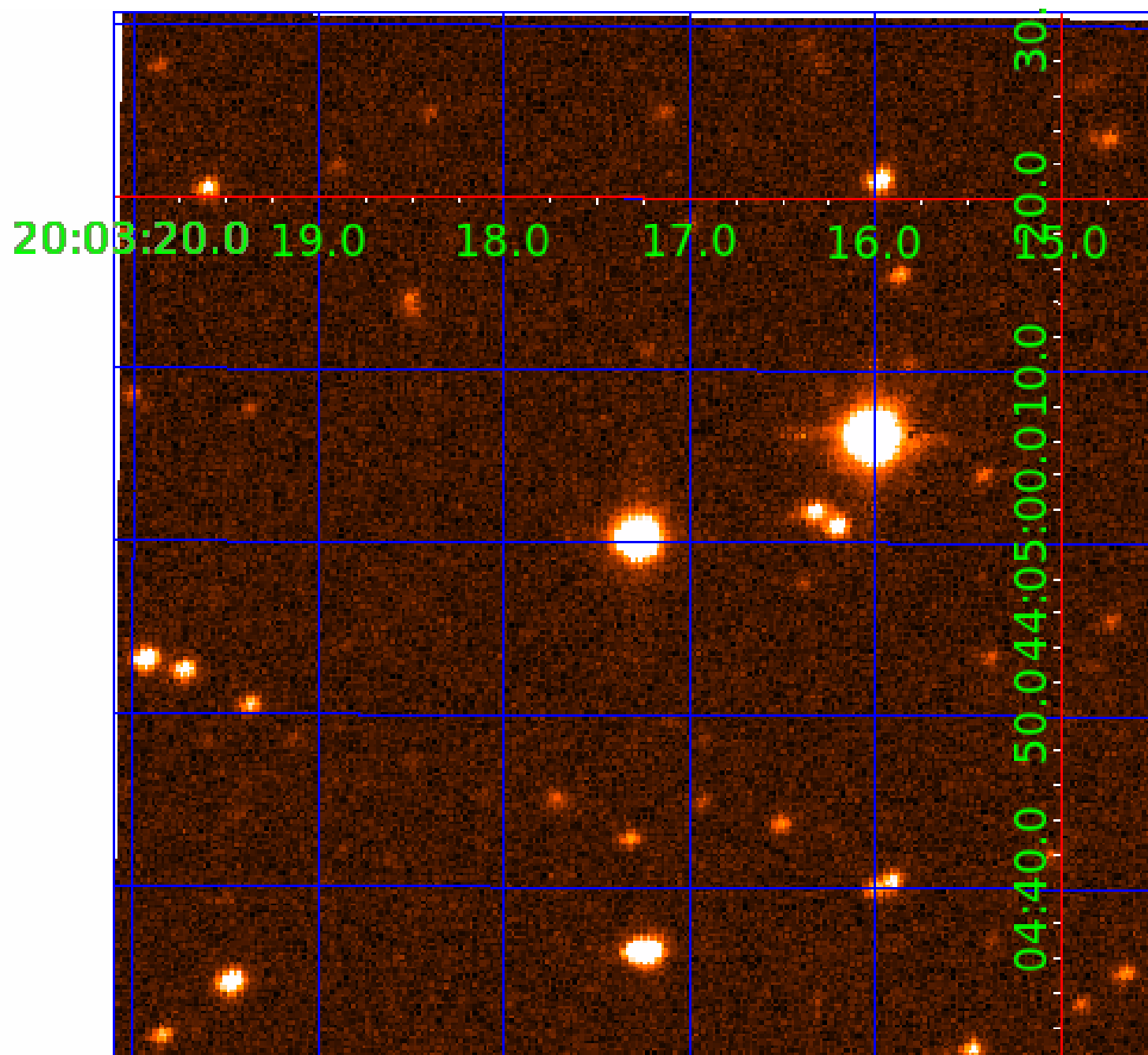


fluxWeightedCentroids, Planet 2 of 3



UKIRT Image

Declination



# KIC 008196903

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|------|-----------------------------|-----------------|------------------------|------------------------|
| 008196903-01 | OBS      | No   | 0.864146      | 132.040412   | 57.5        | 2.575            | 9.9 | 12.4 | 2.56                        | 8419            | 2.25                   | 56417.51               |
| 008196903-02 | OBS      | No   | 0.648108      | 132.032228   | 33.3        | 2.641            | 8.5 | 7.5  | 2.56                        | 8419            | 1.71                   | 82794.24               |
| 008196903-03 | OBS      | No   | 142.059170    | 145.259913   | 452.1       | 5.463            | 8.5 | 8.5  | 2.56                        | 8419            | 6.22                   | 62.65                  |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments  |
|--------------|----------|------|-------|---|---|---|---|---|
| 008196903-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT   |
| 008196903-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT   |
| 008196903-03 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT |

**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.

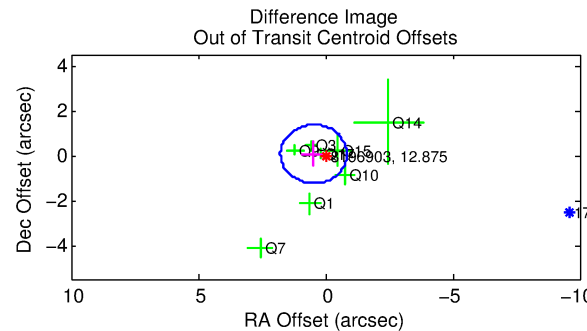
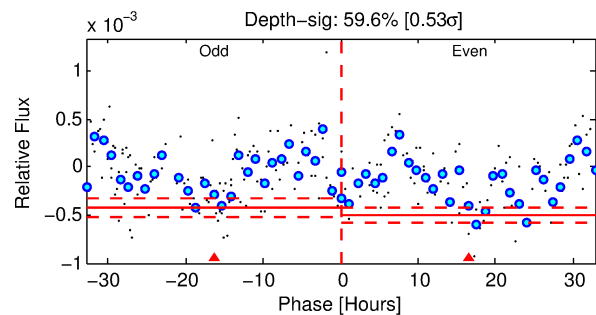
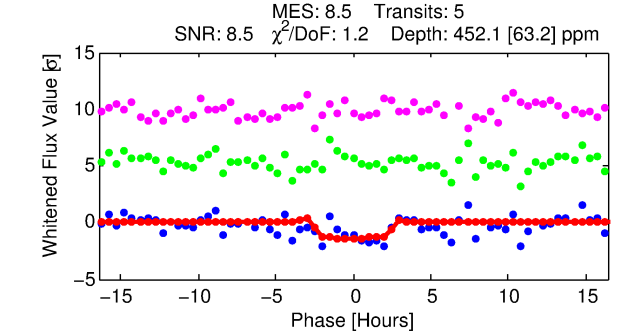
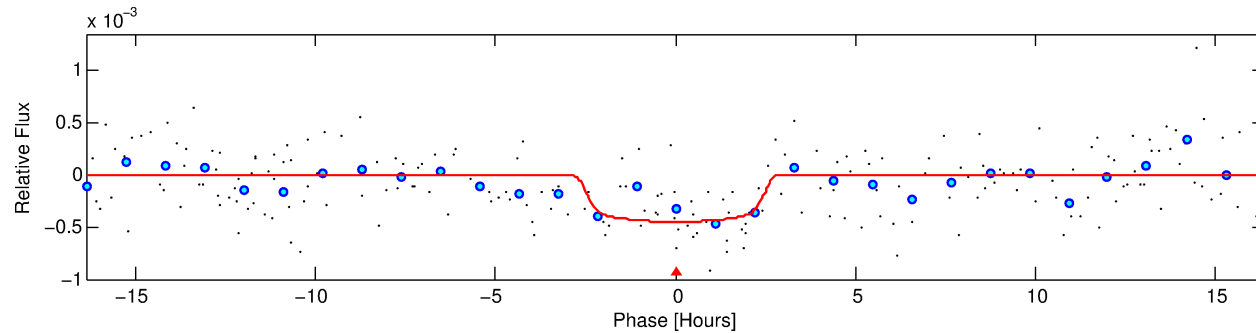
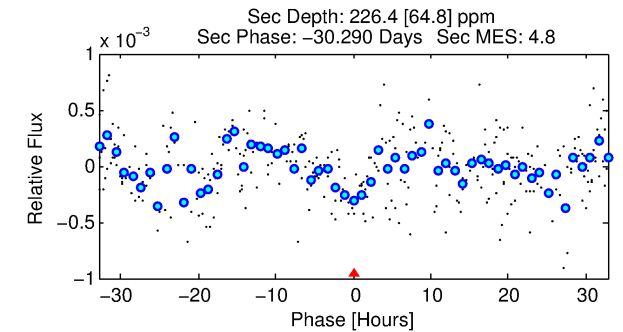
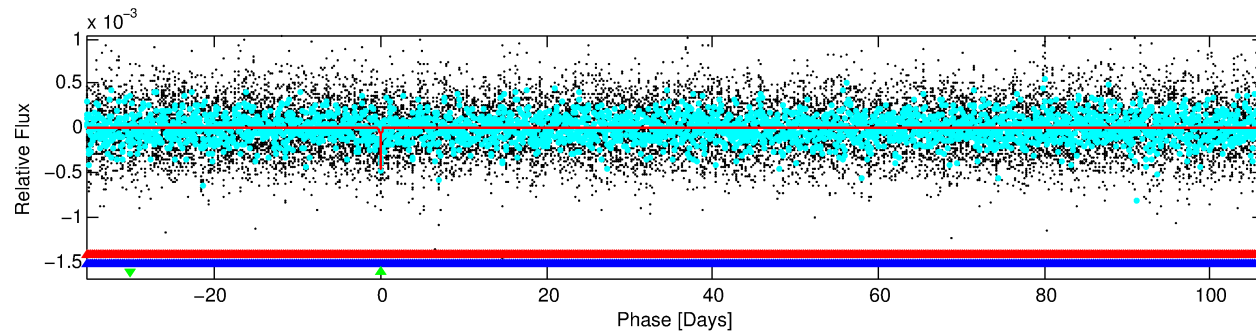
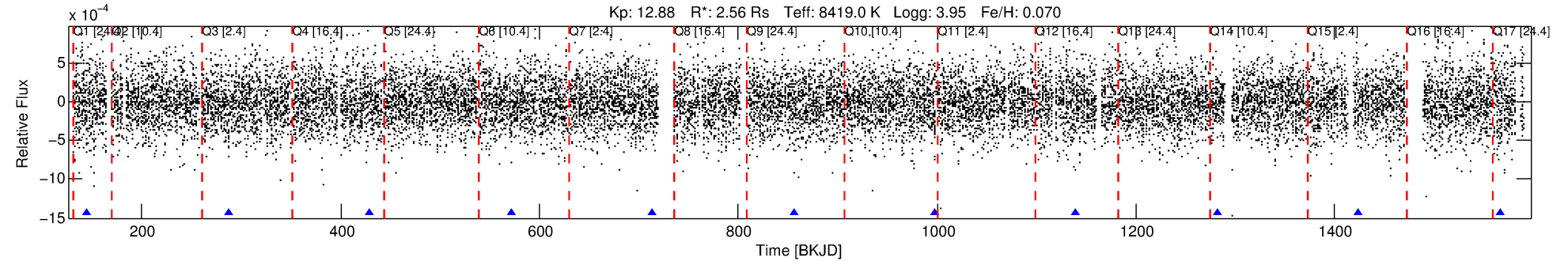
## Ephemeris Match Information For 008196903-03

No Significant Match Found



# DV One-Page Summary

KIC: 8196903 Candidate: 3 of 3 Period: 142.059 d



## DV Fit Results:

Period = 142.05917 [0.00294] d  
Epoch = 145.2599 [0.0131] BKJD  
Rp/R\* = 0.0223 [0.0112]  
a/R\* = 103.61 [329.66]  
b = 0.88 [0.83]  
Seff = 62.65 [29.17]  
Reff = 717 [84] K  
Rp = 6.22 [3.73] Re  
a = 0.6849 [0.1959] AU  
Ag = 1510.12 [1707.69] [0.88σ]  
Teff = 6914 [1835] K [3.37σ]

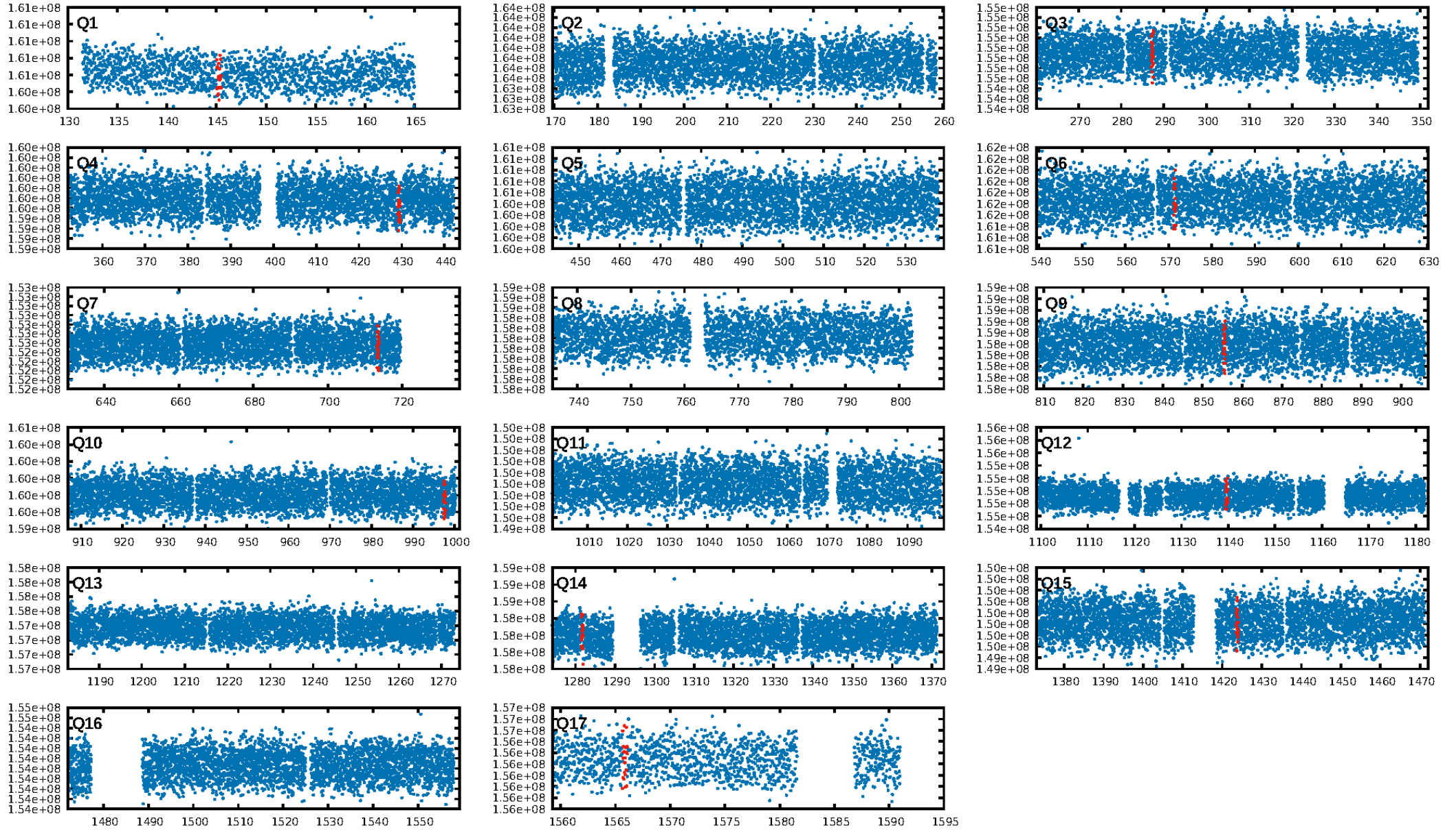
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [561.10σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 93.5%  
ModelChiSquareGof-sig: 99.9%  
**Bootstrap-pfa: 7.58e-11**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -2.753  
Centroid-sig: 76.7%  
Centroid-so: 1.746 arcsec [1.81σ]  
OotOffset-rm: 0.471 arcsec [1.08σ]  
OotOffset-st: 2/3/0/3 [8]  
KicOffset-rm: 0.500 arcsec [1.35σ]  
KicOffset-st: 2/3/0/3 [8]  
DiffImageQuality-fgm: 0.50 [4/8]  
DiffImageOverlap-fno: 0.00 [0/11]

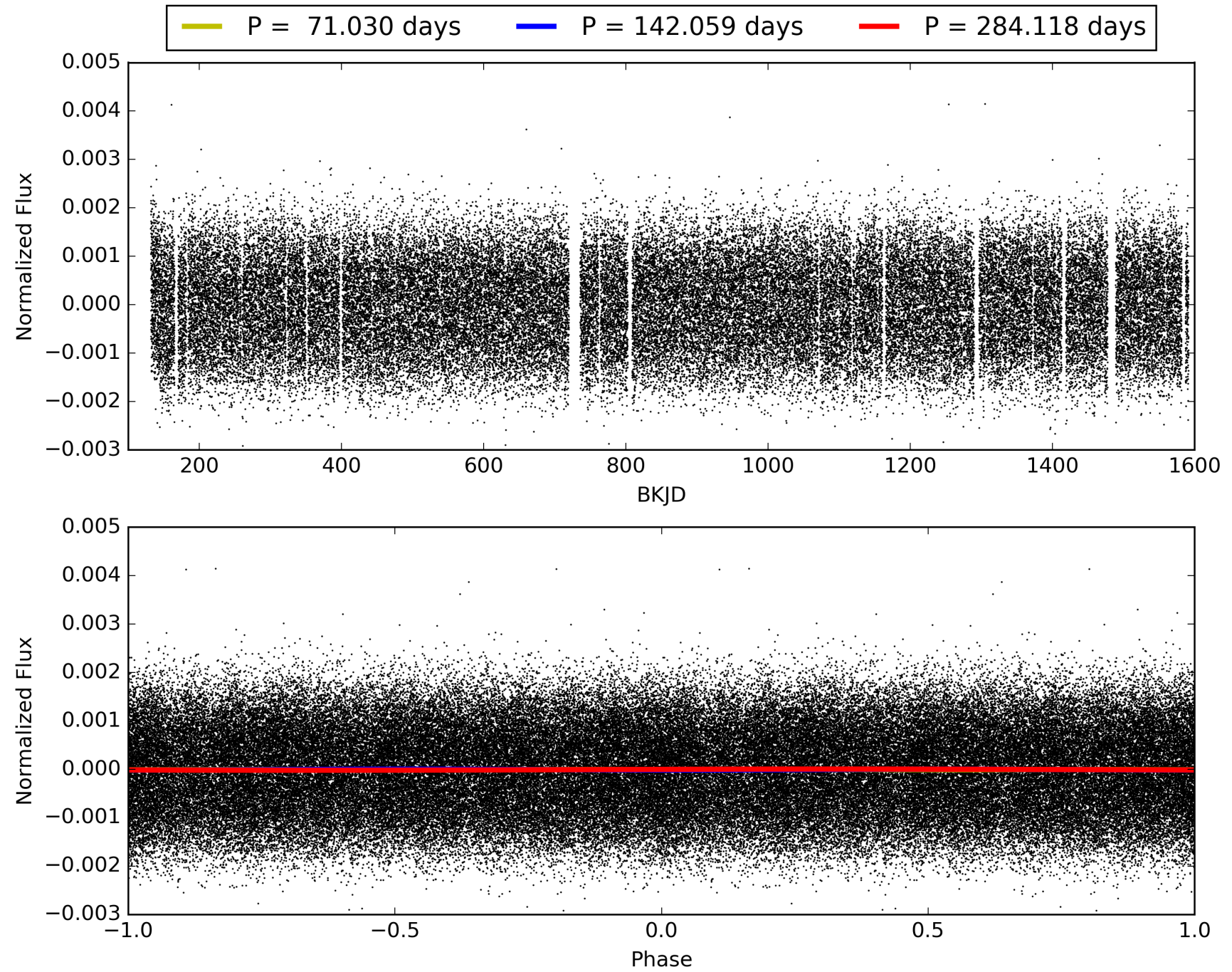
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 15:40:51 Z

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

# TCE 008196903-03, PDC Light Curves

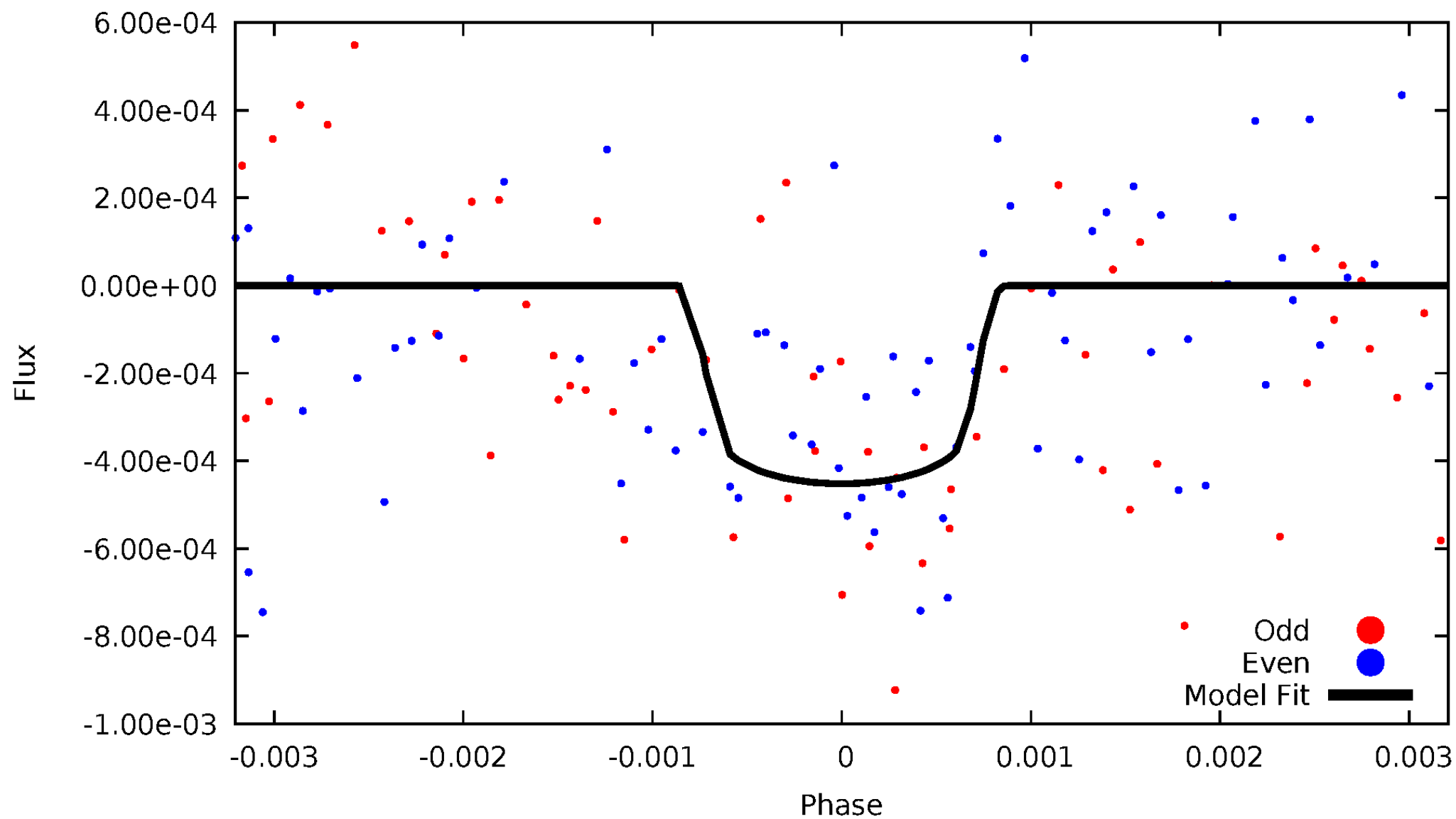


# TCE 008196903-03



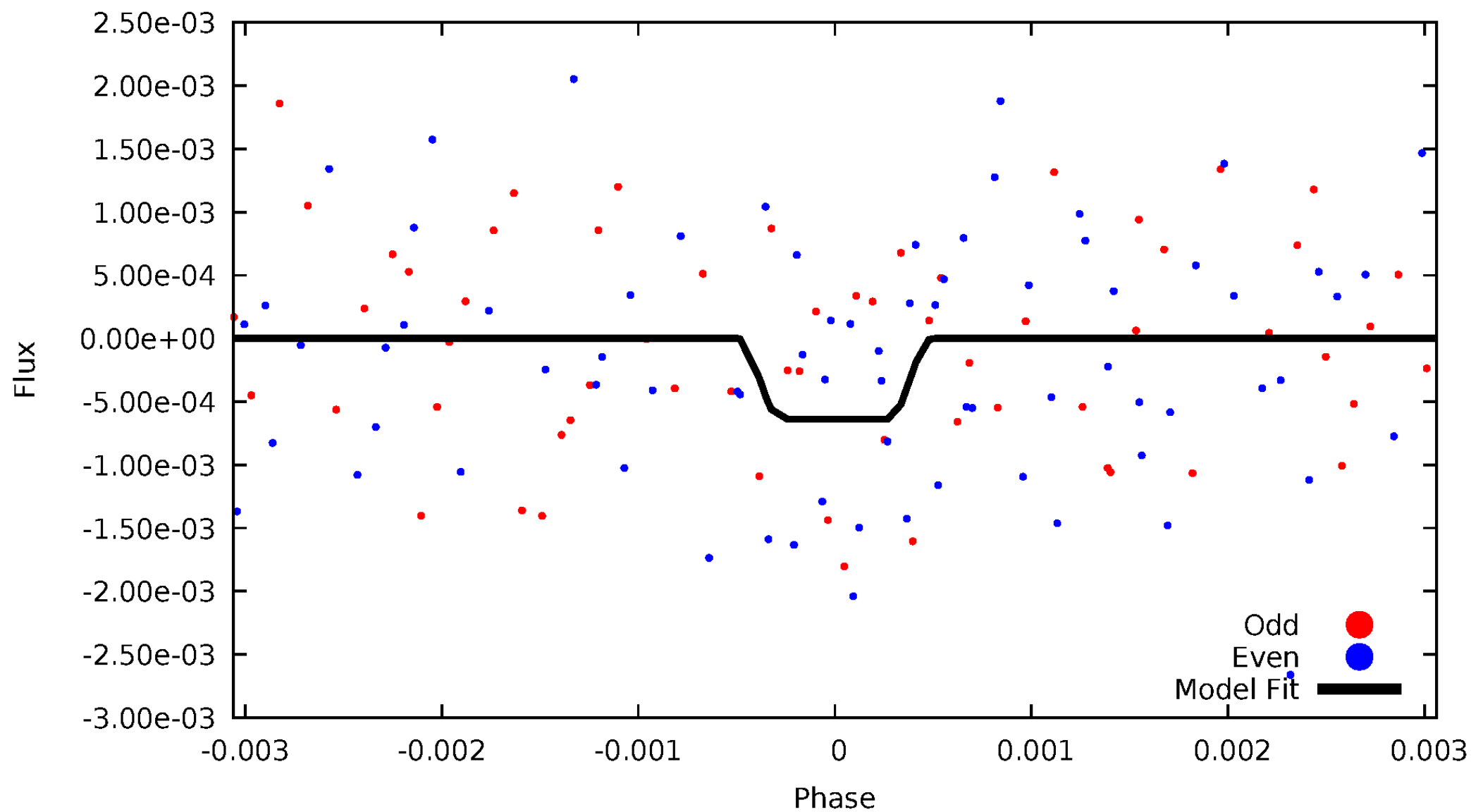
# DV Odd/Even

TCE 008196903-03



# ALT Odd/Even

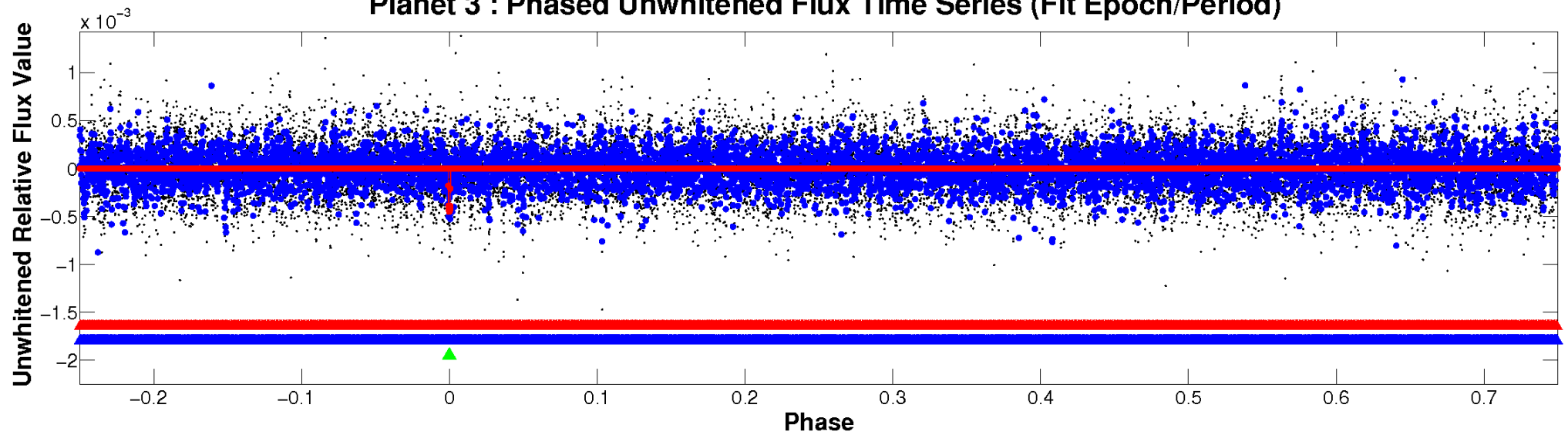
TCE 008196903-03



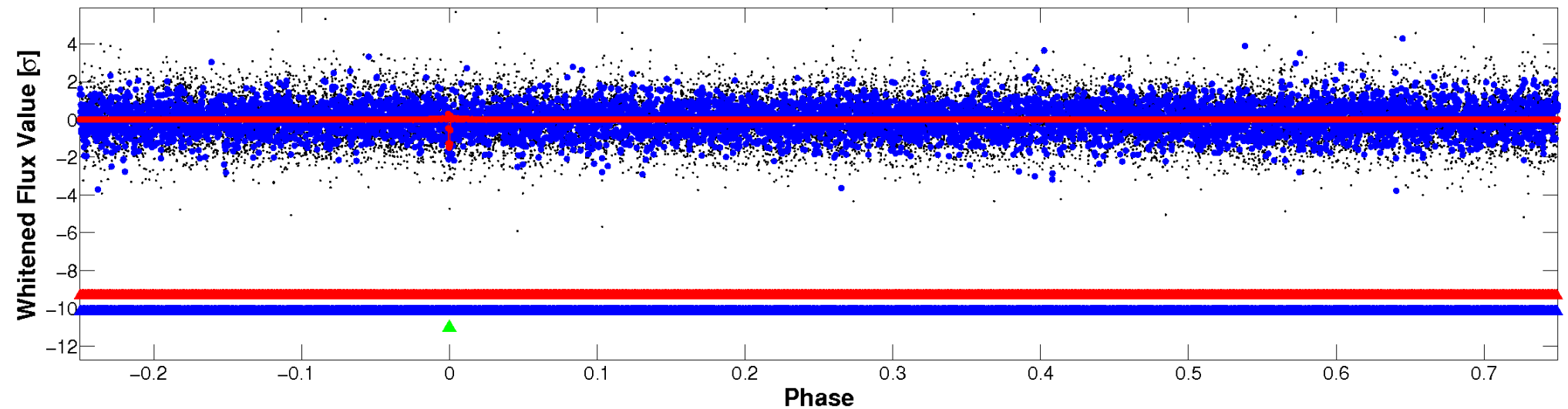


# Non-Whitened Vs. Whitened Light Curve

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

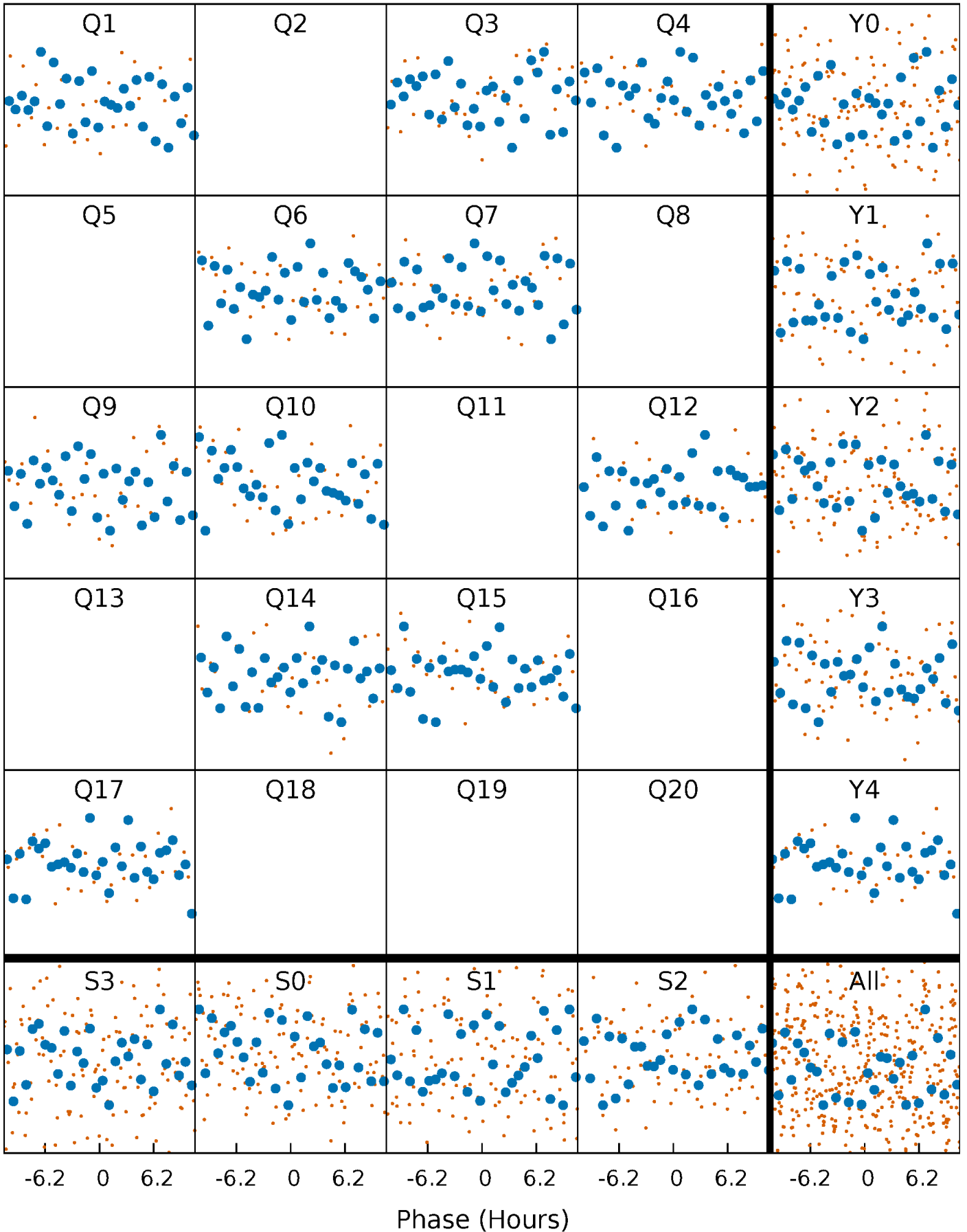


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



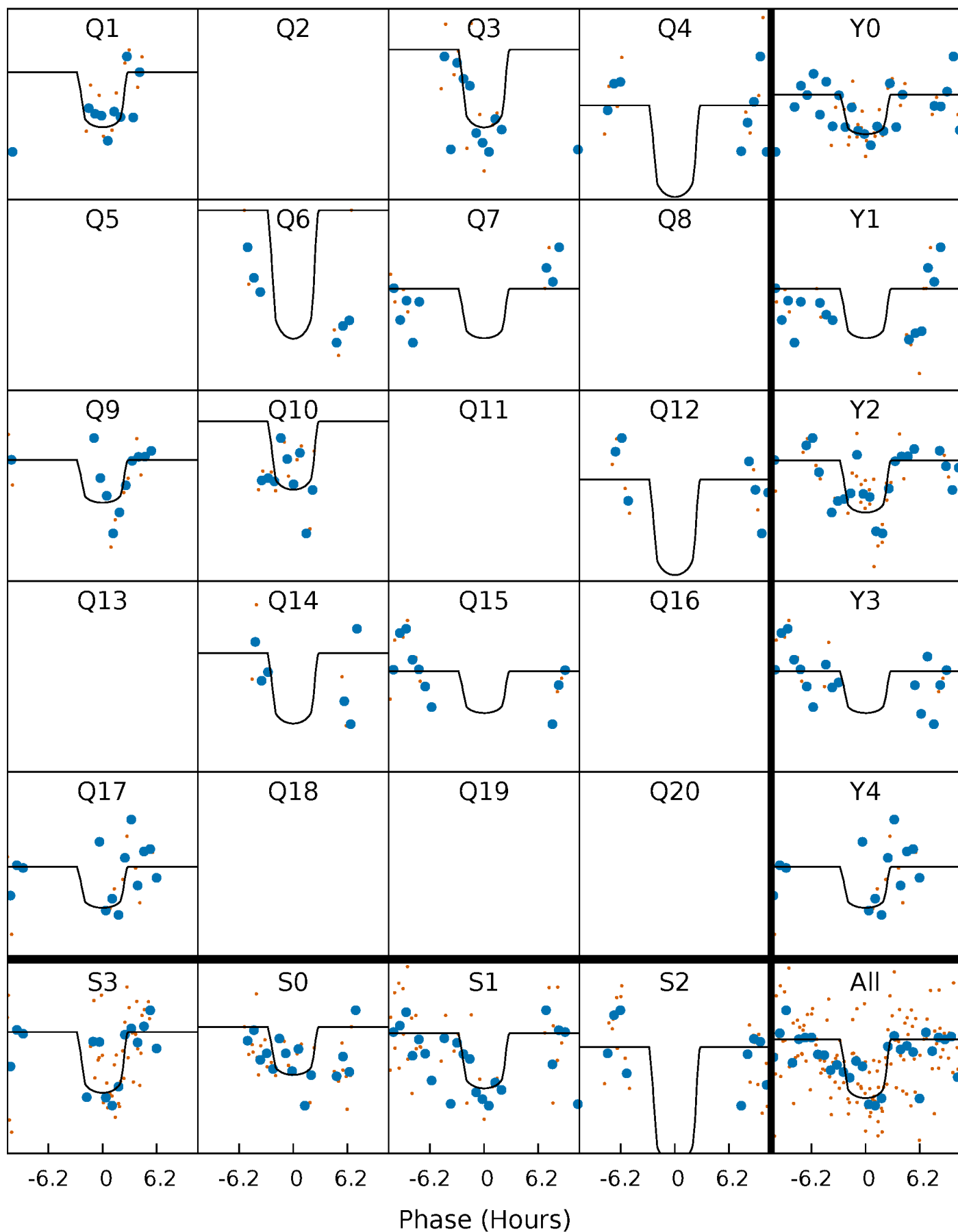
# PDC Quarter-Phased Transit Curves

TCE 008196903-03   P=142.059170 Days    $T_0=145.259913$  (BKJD)



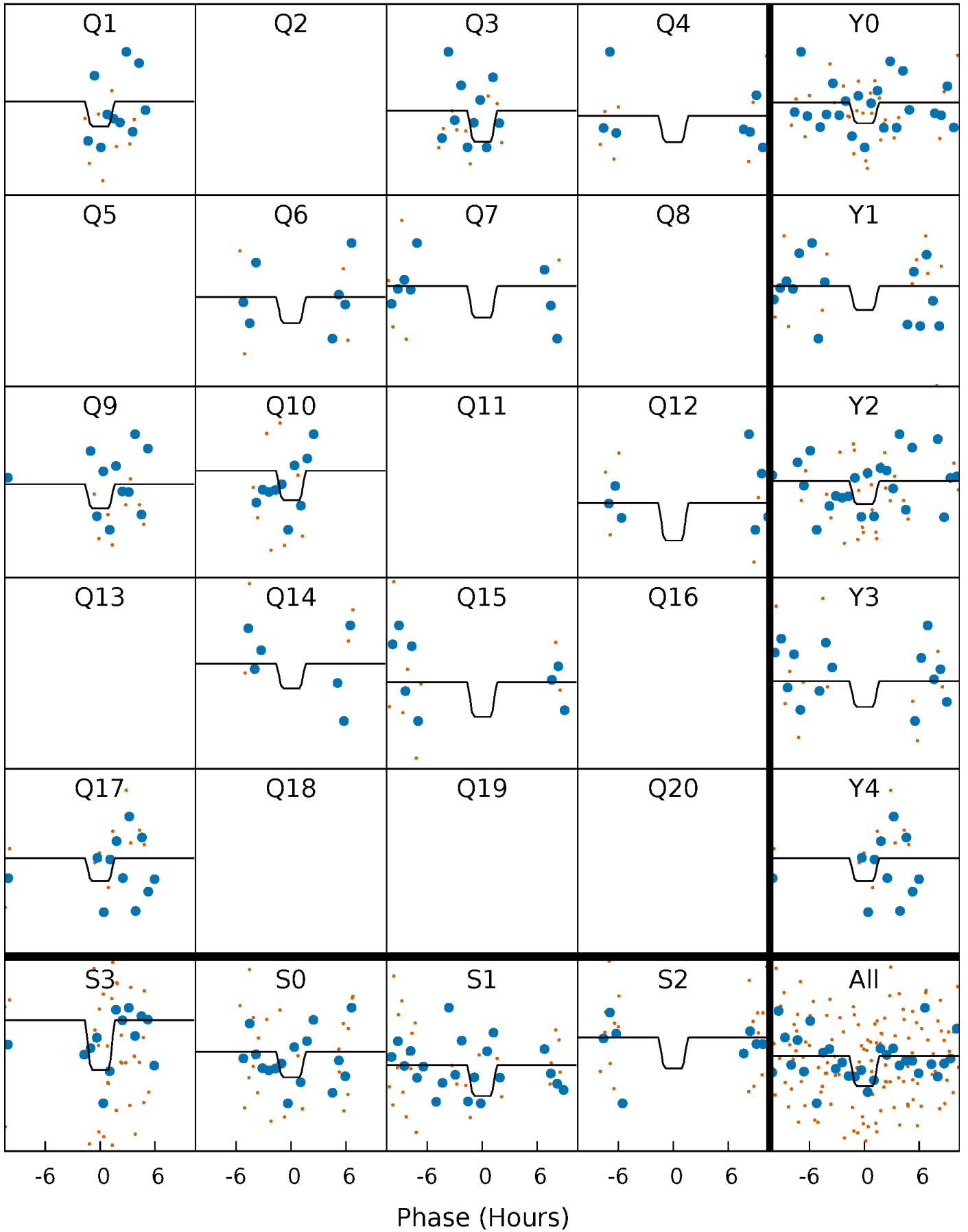
# DV Quarter-Phased Transit Curves

TCE 008196903-03 P=142.059170 Days  $T_0=145.259913$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

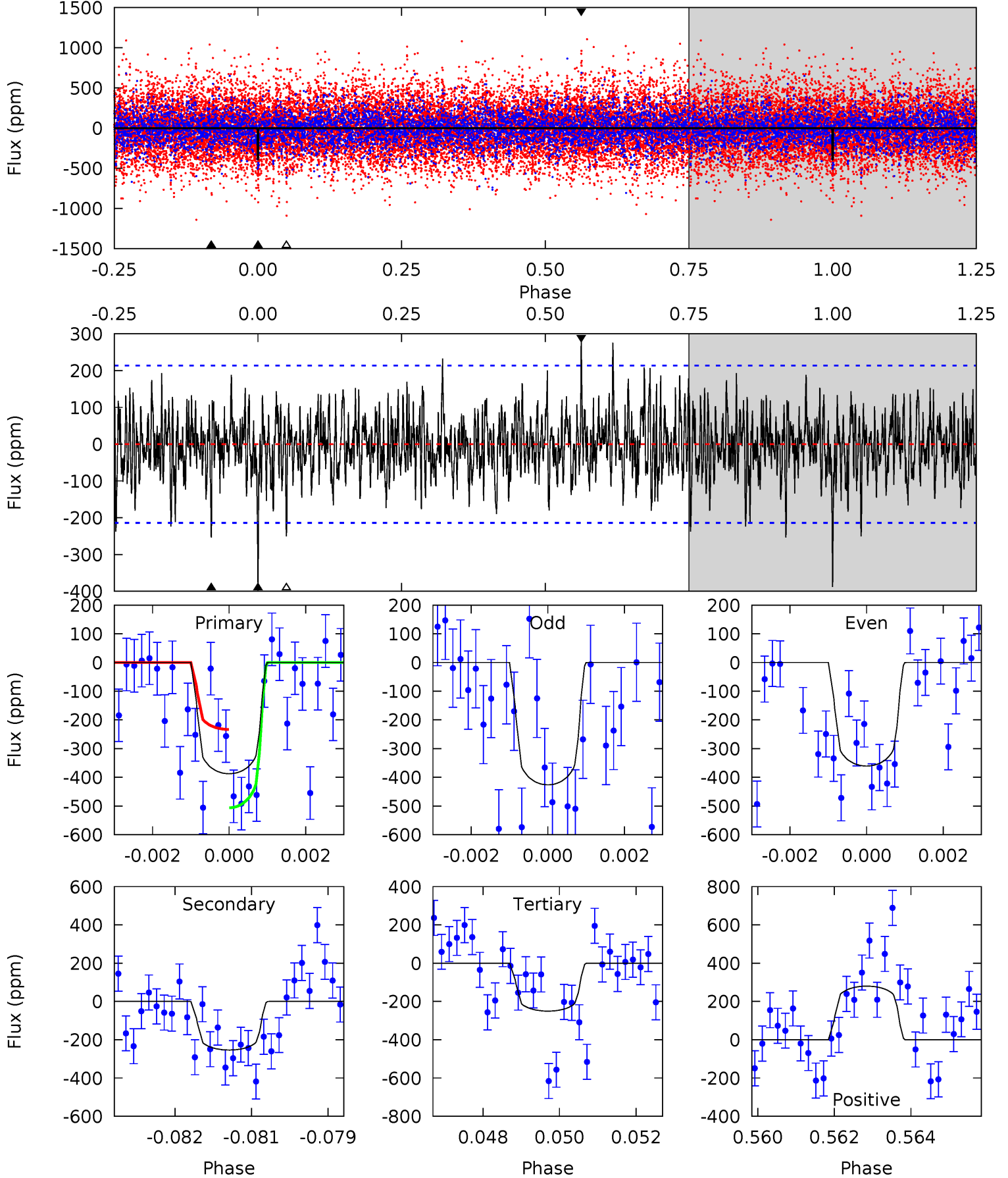
TCE 008196903-03 P=142.061858 Days  $T_0=145.250826$  (BKJD)



# DV Model-Shift Uniqueness Test

008196903-03, P = 142.059170 Days, E = 3.200743 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  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 9.71 | 6.36 | 6.27 | 7.02 | 5.35            | 3.14            | 1.79             | 3.44    | 2.69    | 0.08    | -0.66   | 0.80    | 0.96 | 0.42  | 3.36 |

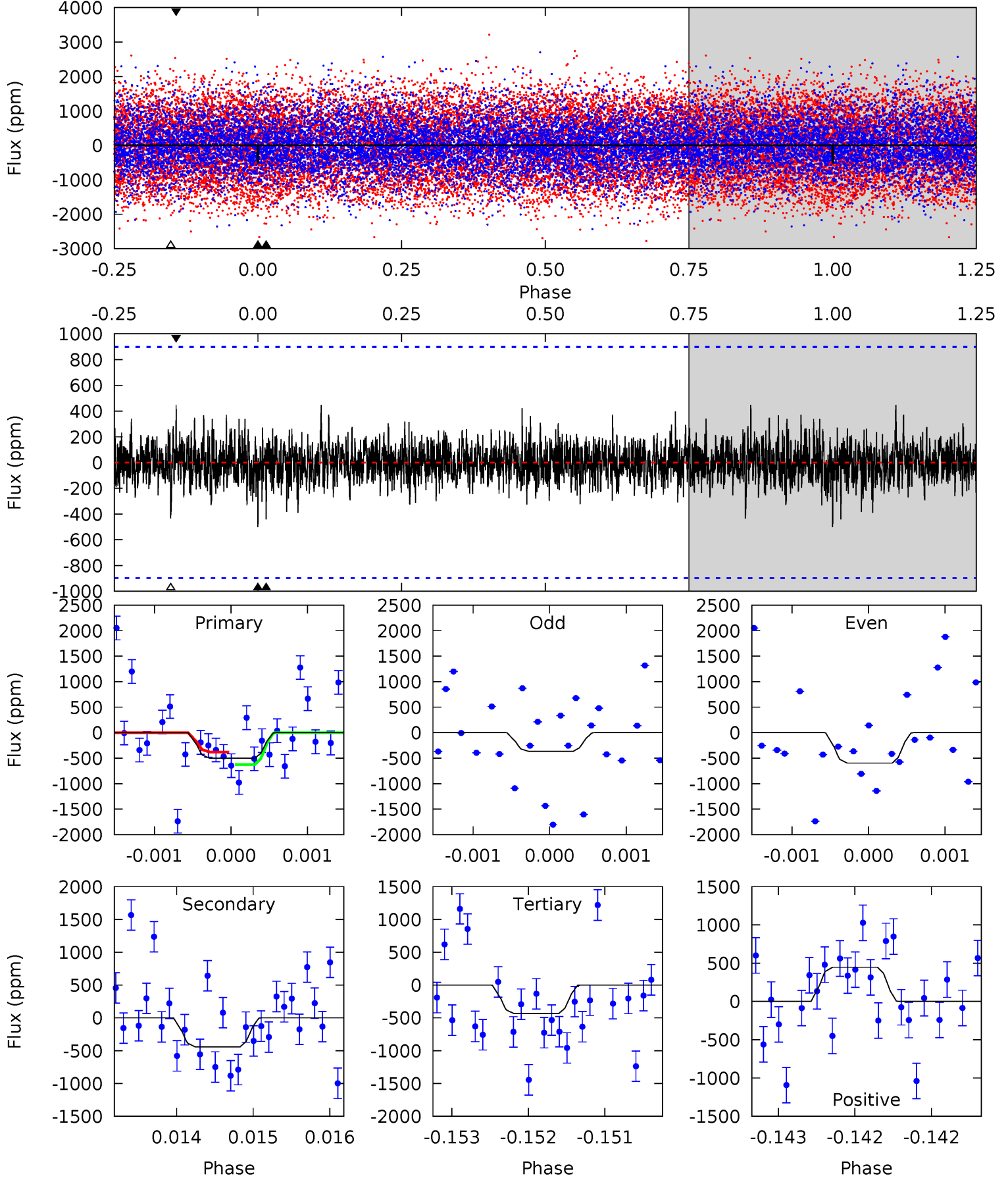




# Alt Model-Shift Uniqueness Test

008196903-03, P = 142.061858 Days, E = 3.188968 Days

| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 3.05 | 2.69 | 2.65 | 2.73 | 5.48            | 3.33            | 0.69             | 0.40    | 0.33    | 0.04    | -0.03   | 0.69    | 0.99 | 0.47  | 0.75 |



### Stellar Parameters For KIC 008196903

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                    | $R$ ( $R_{\odot}$ )       | $M$ ( $M_{\odot}$ )       | $p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ ) |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
|        | $8419^{+204}_{-379}$ | $3.950^{+0.241}_{-0.111}$ | $0.070^{+0.250}_{-0.550}$ | $2.555^{+0.487}_{-0.836}$ | $2.120^{+0.304}_{-0.564}$ | $0.179^{+0.318}_{-0.064}$                     |
|        | +2%/-5%              | +6%/-3%                   | +357%/-786%               | +19%/-33%                 | +14%/-27%                 | +177%/-36%                                    |
| Source | KIC0                 | KIC0                      | KIC0                      | DSEP                      |                           |   |

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

### Secondary Eclipse Parameters for KIC 008196903-03 / KOI

| Detrend | Depth (ppm)    | $R_p$ ( $R_{\oplus}$ ) | $T_{\text{max}}$ (K) | $T_{\text{obs}}$ (K)   | $A_{\text{obs}}$       |
|---------|----------------|------------------------|----------------------|------------------------|------------------------|
| DV      | $-254 \pm 40$  | $5.82^{+3.30}_{-2.92}$ | $983^{+65}_{-86}$    | $6862^{+3888}_{-1300}$ | $1920^{+5722}_{-1165}$ |
| Alt.    | $-442 \pm 164$ | $6.54^{+3.48}_{-2.73}$ | $982^{+65}_{-80}$    | $7483^{+3180}_{-1540}$ | $2527^{+4919}_{-1536}$ |

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

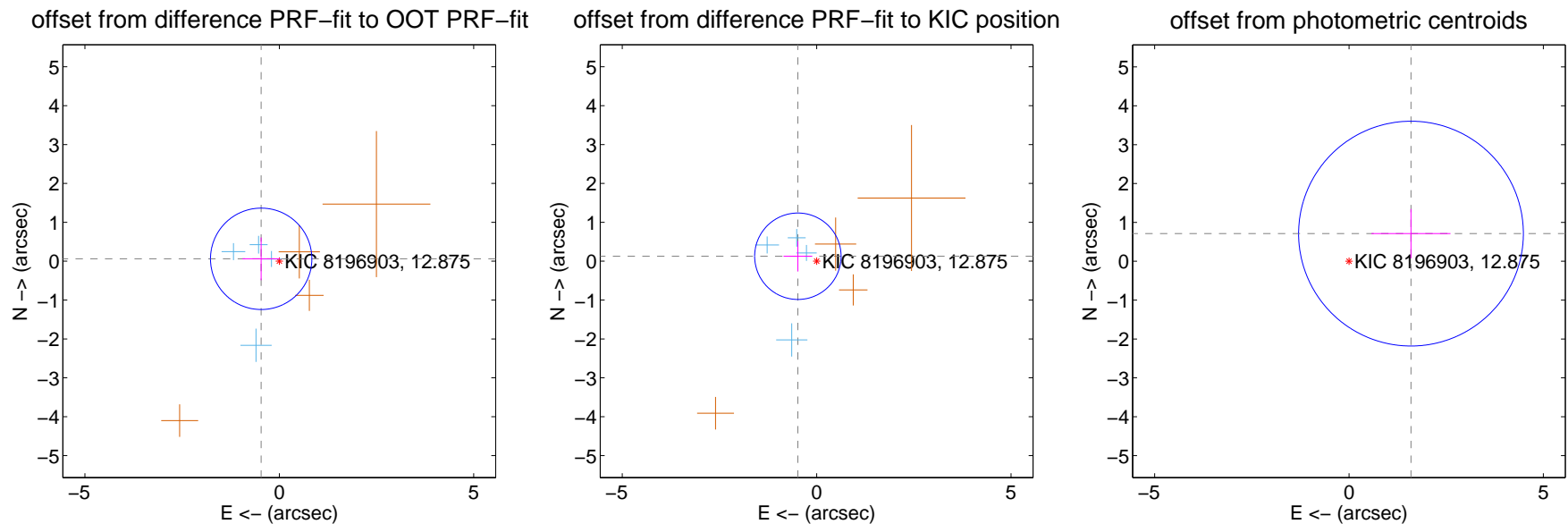
## DV Centroid Data

Supplemental centroid analysis for 008196903-03. Kepler magnitude: 12.88. Transit SNR 8.50

There are 4 quarters with good PRF difference image offsets

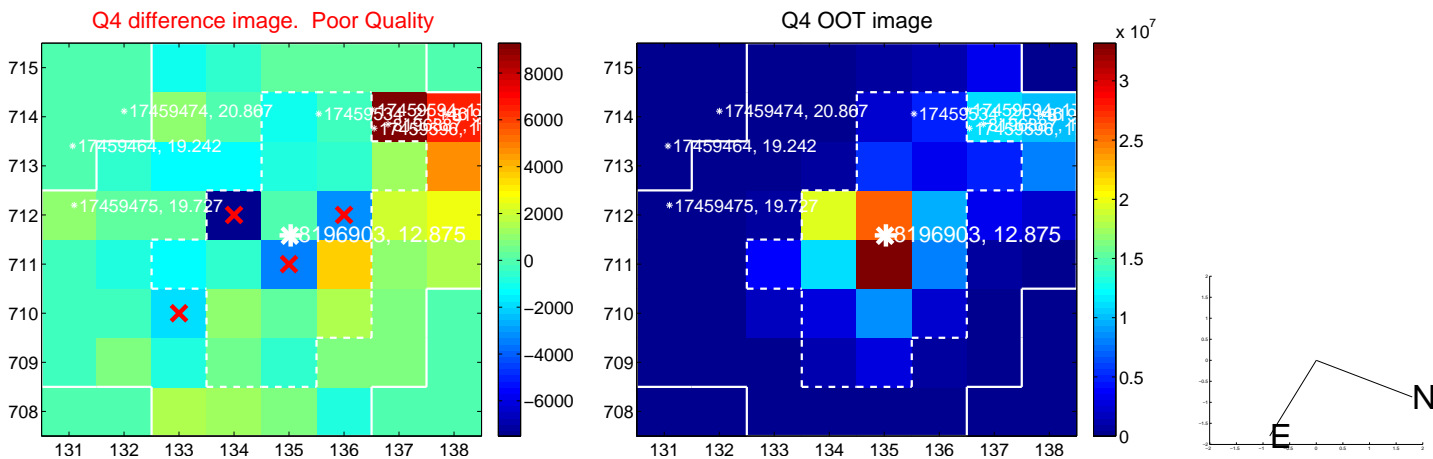
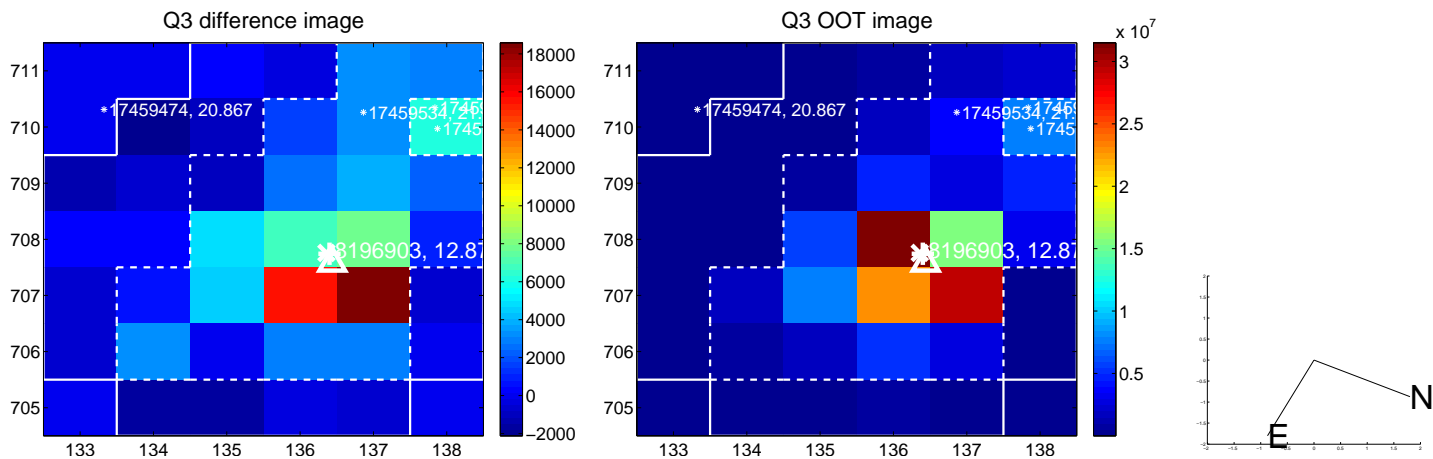
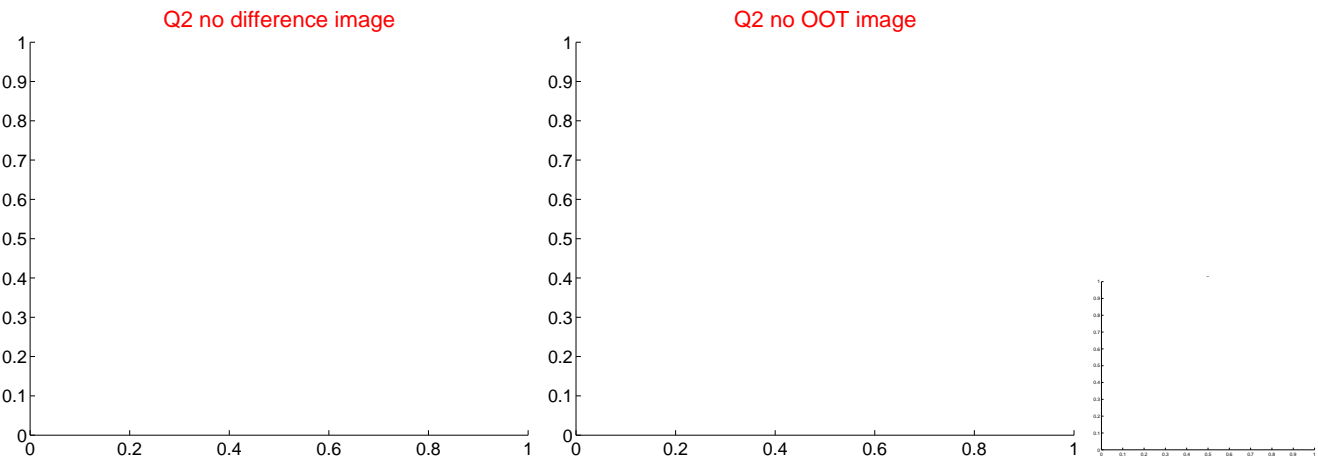
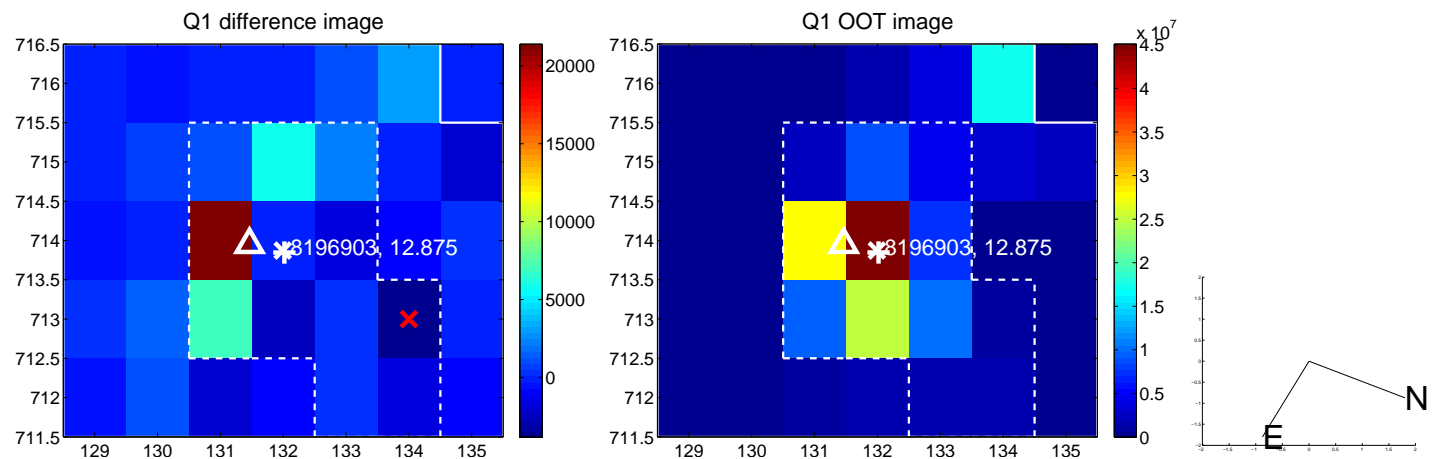
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA       | $\Delta$ Dec      |
|---|--------------------|---------------------|-------------------|-------------------|
| PRF-fit source offset from OOT          | $0.471 \pm 0.435$  | 1.08                | $0.467 \pm 0.482$ | $0.061 \pm 0.549$ |
| PRF-fit source offset from KIC position | $0.500 \pm 0.370$  | 1.35                | $0.483 \pm 0.369$ | $0.127 \pm 0.390$ |
| photometric centroid source offset      | $1.75 \pm 0.96$    | 1.81                | $-1.59 \pm 1.02$  | $0.71 \pm 0.63$   |



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.

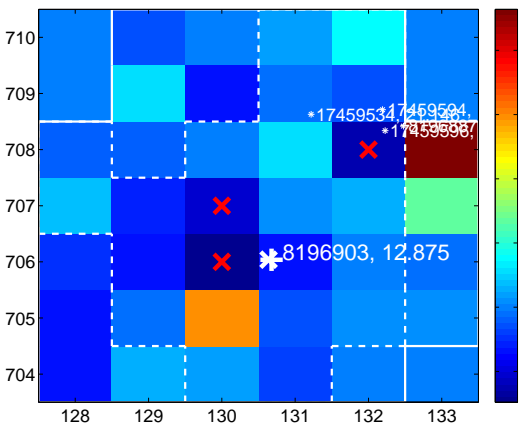
Q5 no difference image



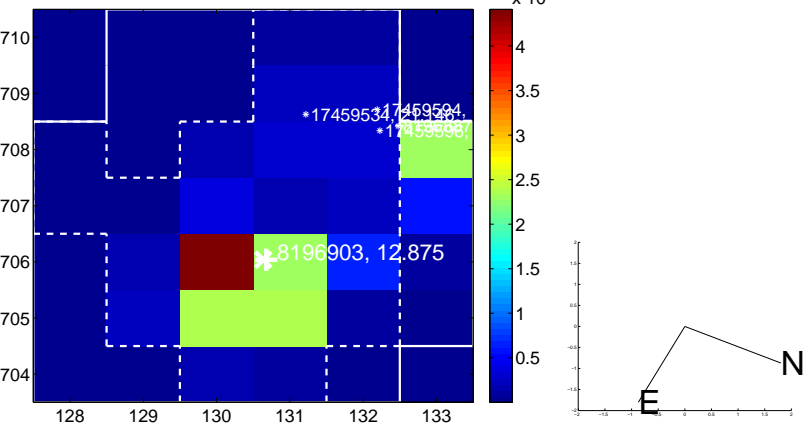
Q5 no OOT image



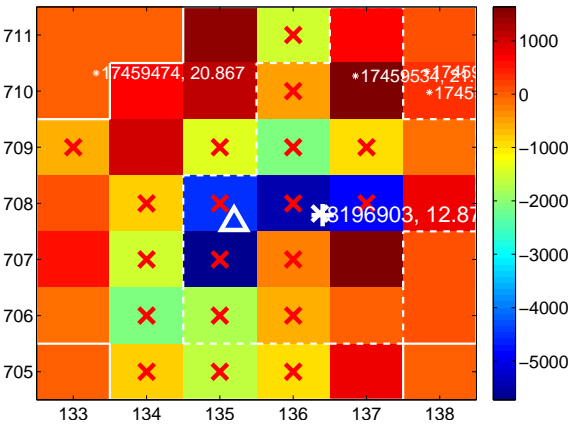
Q6 difference image. Poor Quality



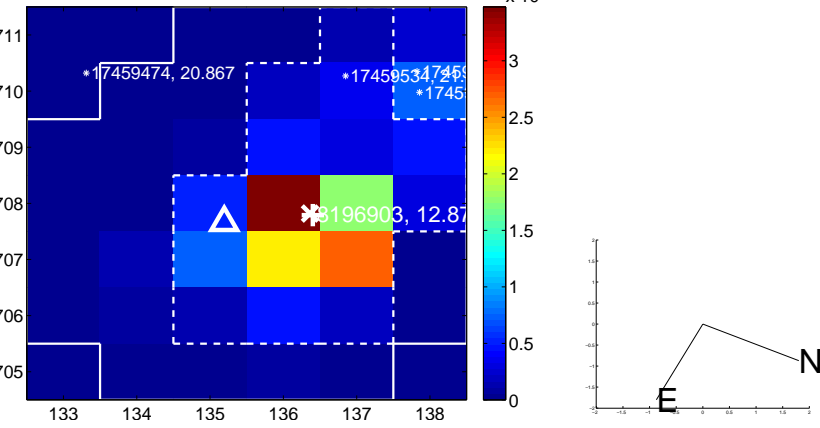
Q6 OOT image



Q7 difference image. Poor Quality



Q7 OOT image



Q8 no difference image

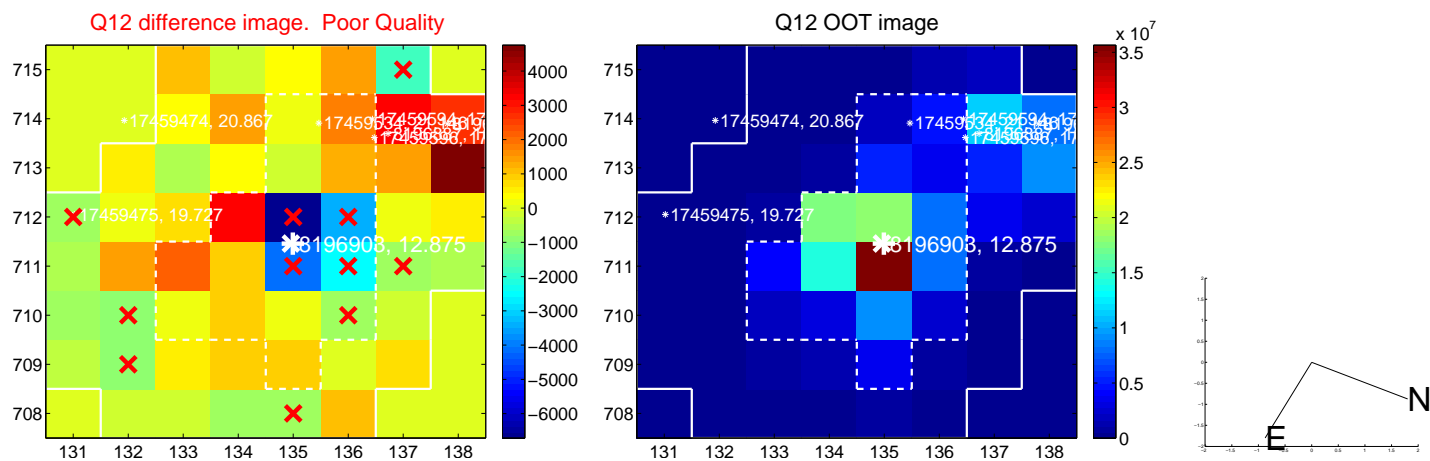
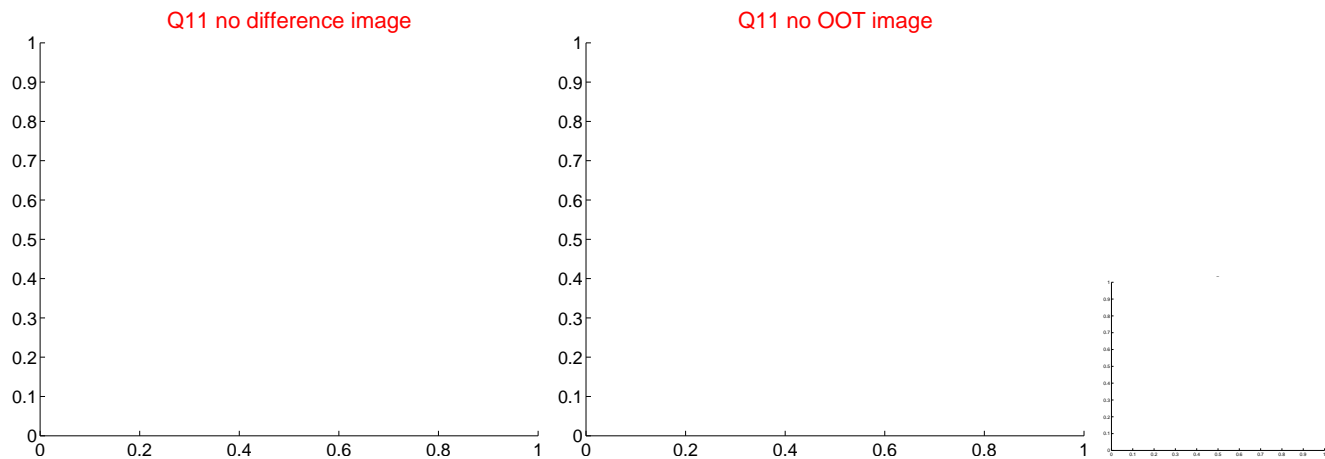
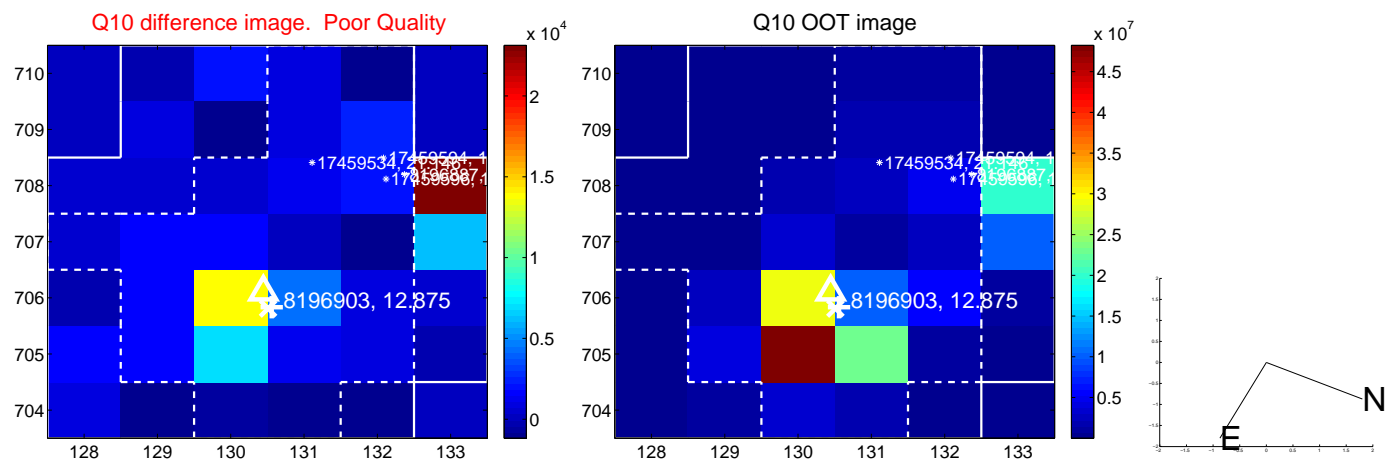
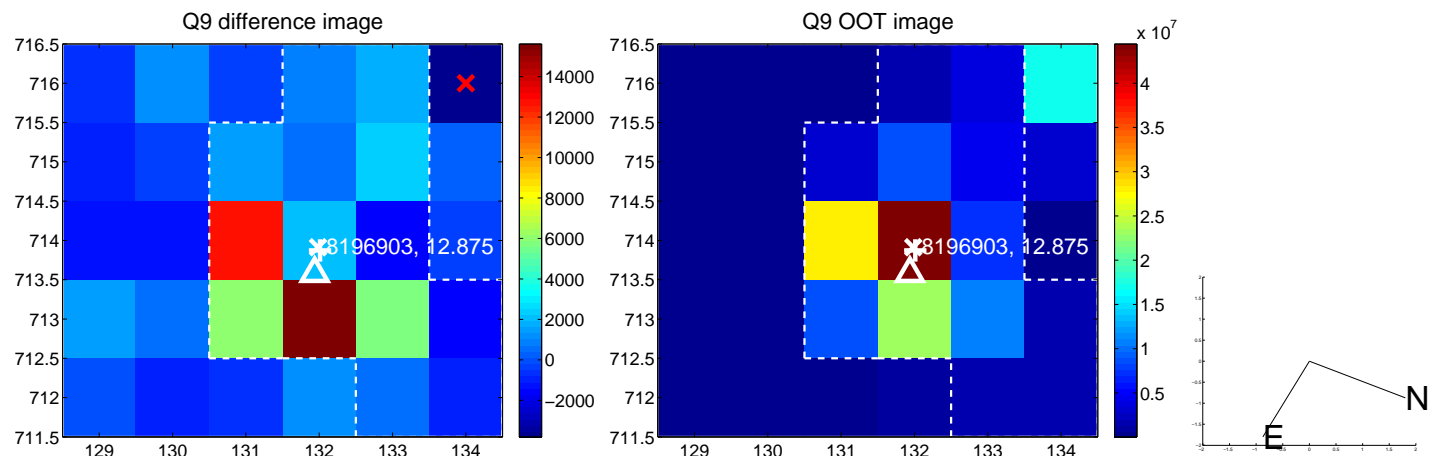


Q8 no OOT image





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.

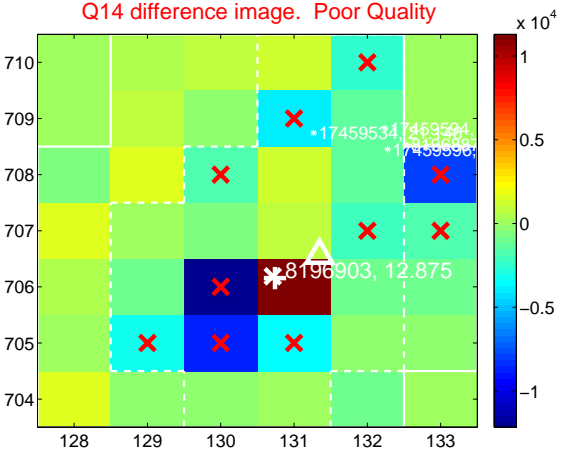
Q13 no difference image



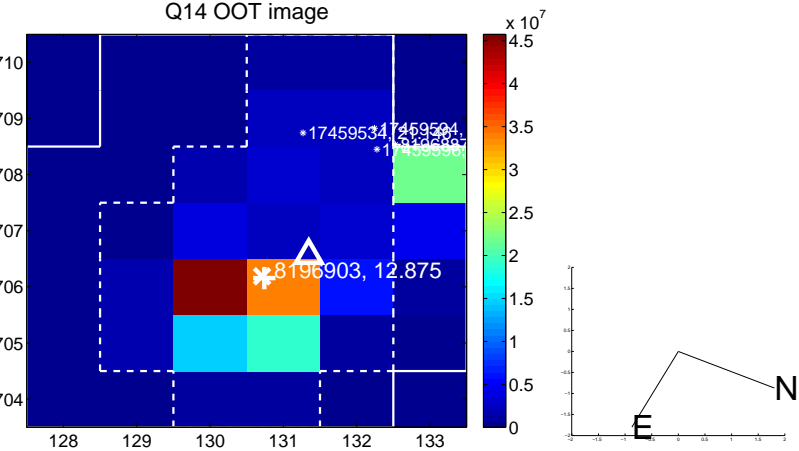
Q13 no OOT image



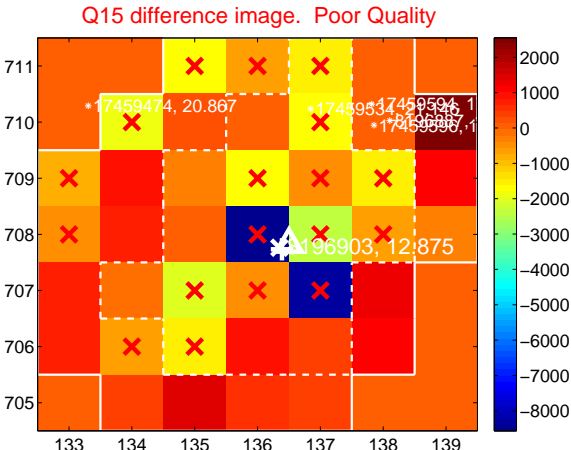
Q14 difference image. Poor Quality



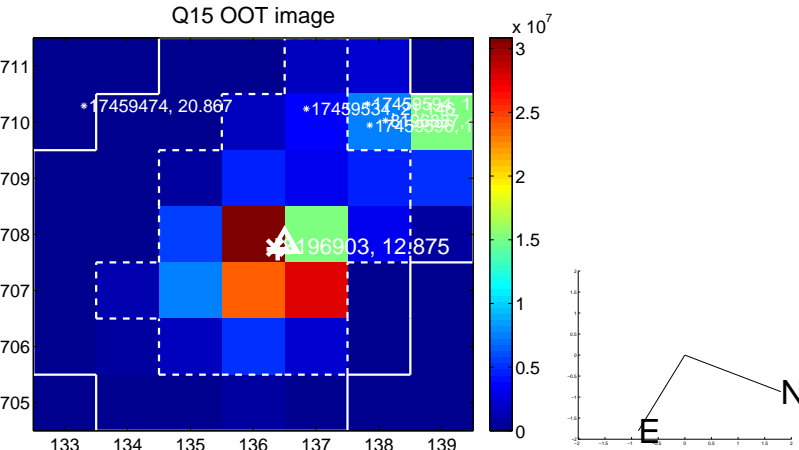
Q14 OOT image



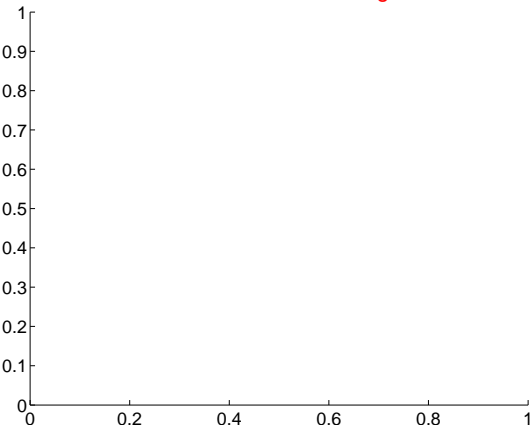
Q15 difference image. Poor Quality



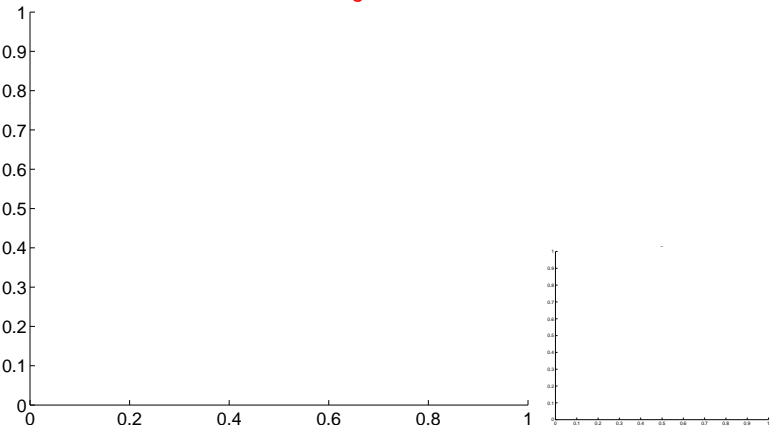
Q15 OOT image



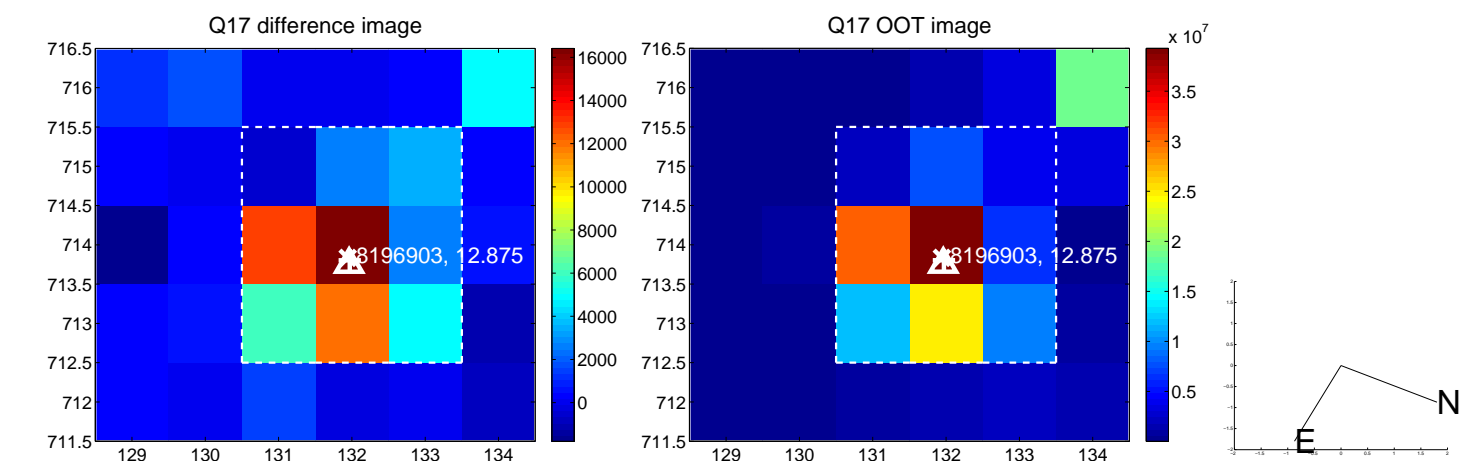
Q16 no difference image



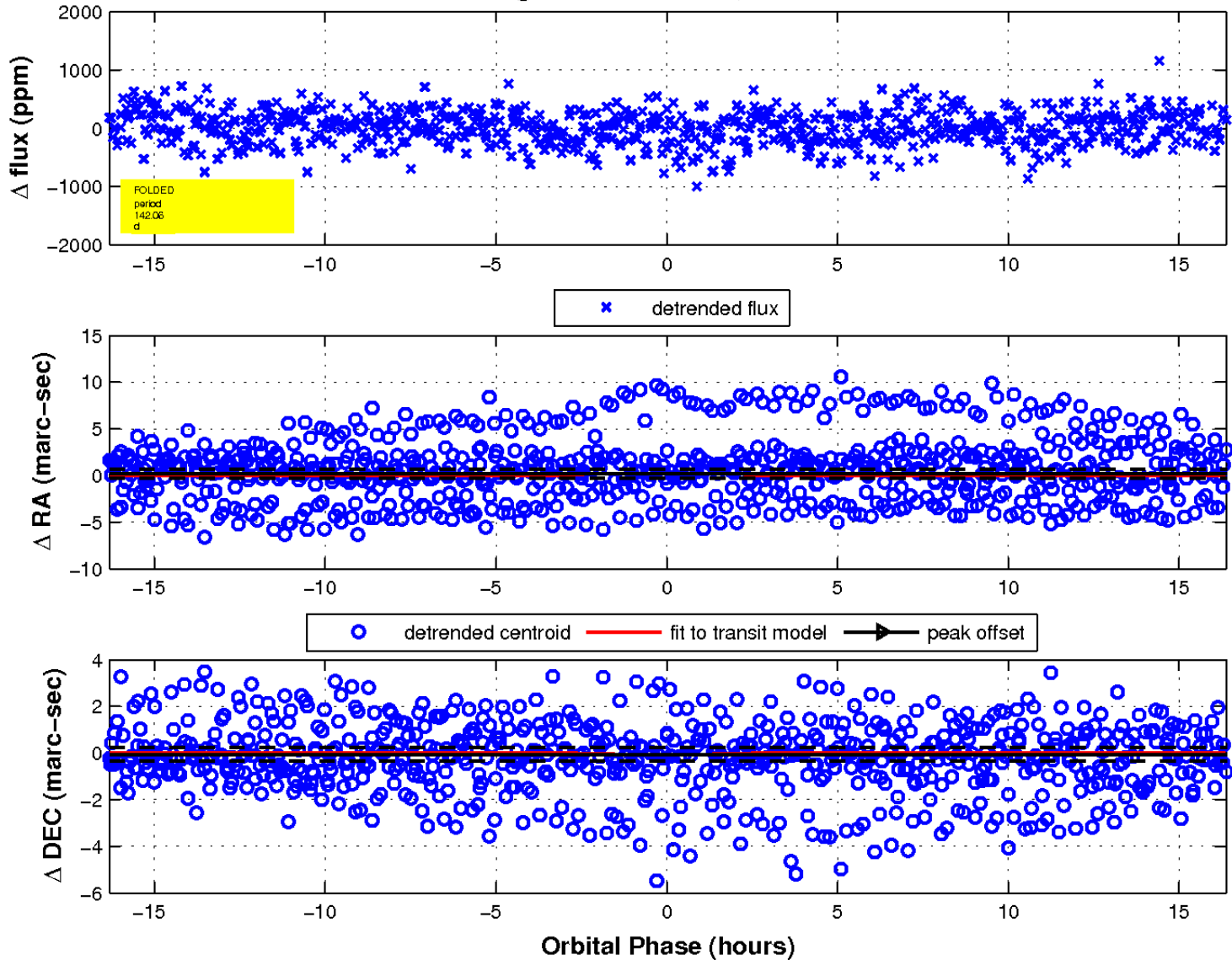
Q16 no OOT image



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



fluxWeightedCentroids, Planet 3 of 3



UKIRT Image

Declination

