

# KIC 01192998

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 011192998-01 | OBS      | 0481.01 | 7.650247      | 133.720954   | 958.7       | 2.861            | 68.7 | 75.4 | 0.75                        | 5409            | 2.56                   | 84.00                  |
| 011192998-02 | OBS      | 0481.02 | 1.554001      | 132.535609   | 403.1       | 1.911            | 55.1 | 62.7 | 0.75                        | 5409            | 1.79                   | 703.48                 |
| 011192998-03 | OBS      | 0481.03 | 34.259550     | 148.975688   | 1036.7      | 5.213            | 43.8 | 45.5 | 0.75                        | 5409            | 2.83                   | 11.38                  |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|------------|
| 011192998-01 | OBS      | PC   | 1.00  | 0 | 0 | 0 | 0 | NO_COMMENT |
| 011192998-02 | OBS      | PC   | 1.00  | 0 | 0 | 0 | 0 | NO_COMMENT |
| 011192998-03 | OBS      | PC   | 1.00  | 0 | 0 | 0 | 0 | NO_COMMENT |

**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.

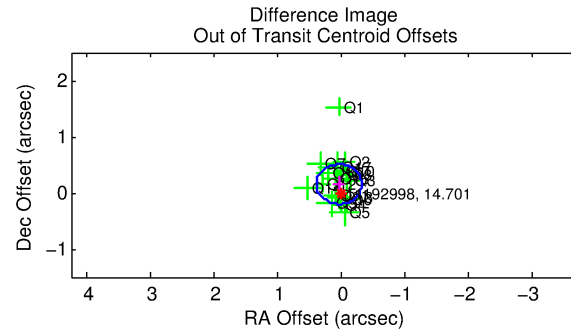
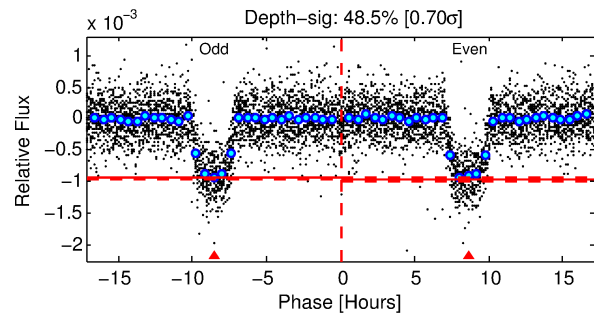
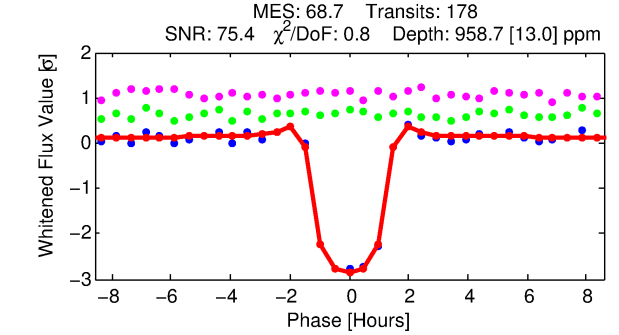
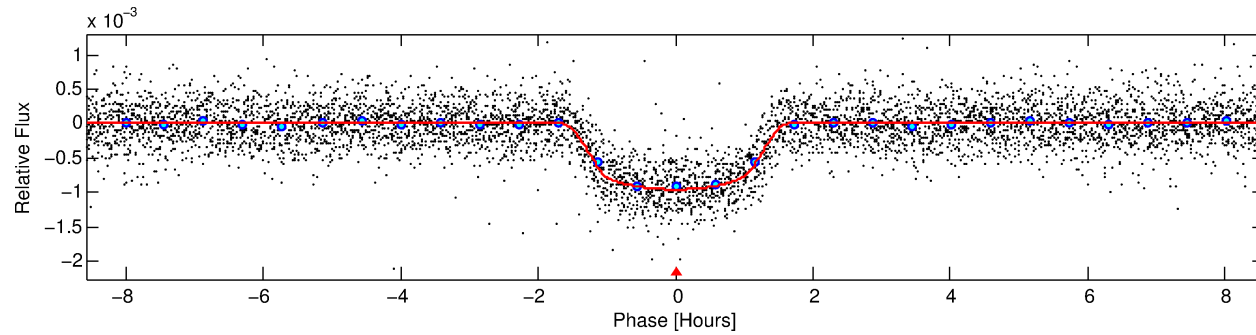
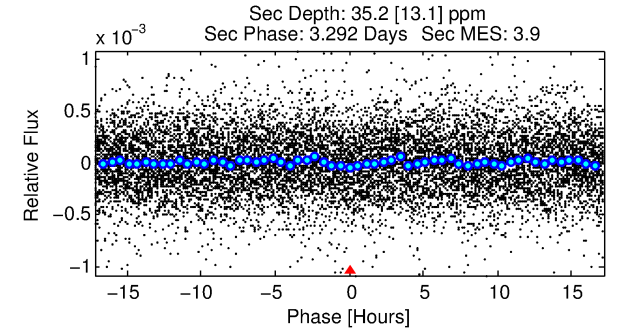
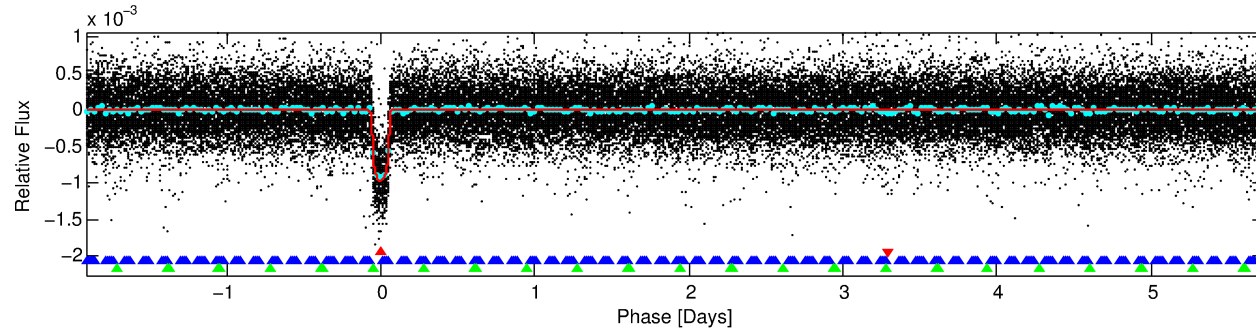
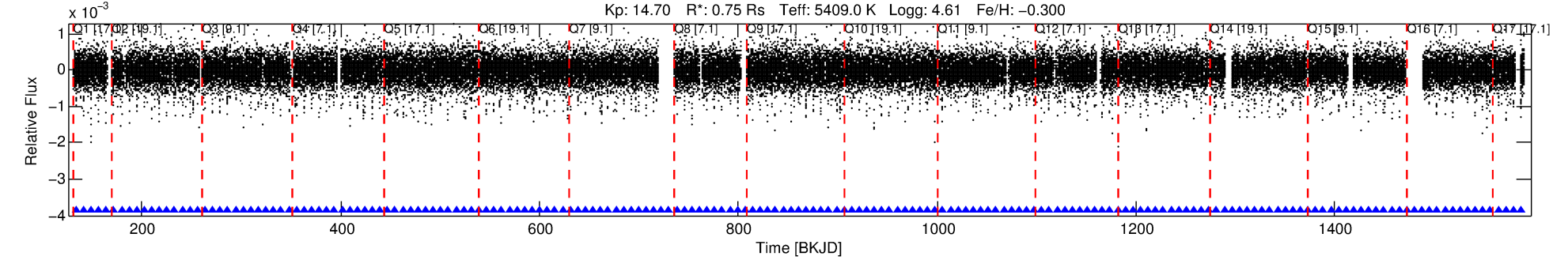
Ephemeris Match Information For 011192998-01

No Significant Match Found

# DV One-Page Summary

KIC: 11192998 Candidate: 1 of 3 Period: 7.650 d  
KOI: K00481.01 Name: Kepler-166b Corr: 0.980

Kp: 14.70 R\*: 0.75 Rs Teff: 5409.0 K Logg: 4.61 Fe/H: -0.300



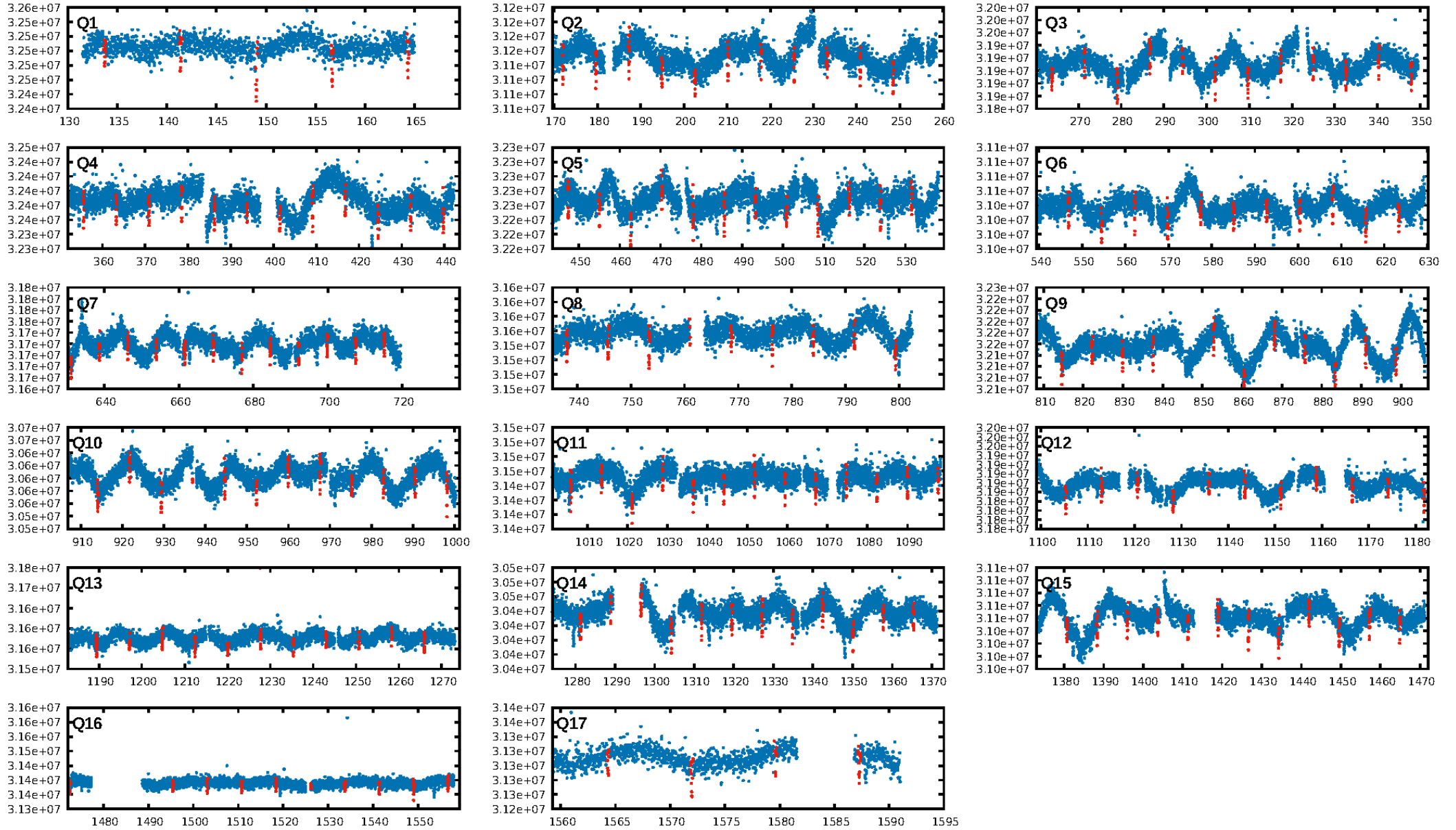
## DV Fit Results:

Period = 7.65025 [0.00001] d  
Epoch = 133.7210 [0.0007] BKJD  
Rp/R\* = 0.0314 [0.0027]  
a/R\* = 13.56 [4.83]  
b = 0.79 [0.17]  
Seff = 84.00 [21.43]  
Teff = 772 [49] K  
Rp = 2.56 [0.55] Re  
a = 0.0713 [0.0113] AU  
Ag = 15.00 [7.04] [1.99σ]  
Teffp = 2349 [252] K [6.15σ]

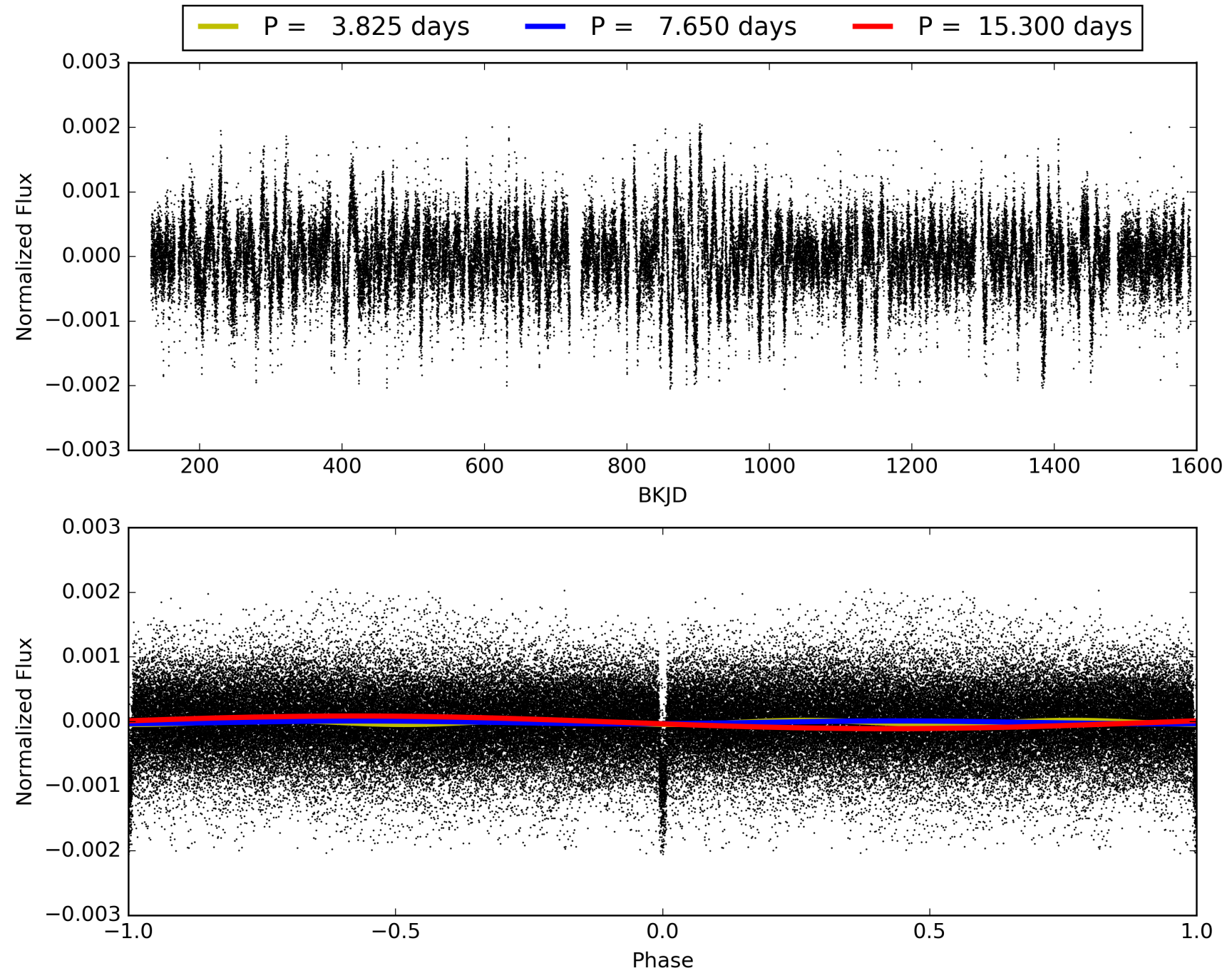
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [42.53σ]  
LongPeriod-sig: 100.0% [107.40σ]  
ModelChiSquare2-sig: 100.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [169/169]  
GhostDiagnostic-chr: 4.256  
Centroid-sig: 0.0%  
Centroid-so: 0.191 arcsec [1.57σ]  
OotOffset-rm: 0.156 arcsec [1.32σ]  
KicOffset-rm: 0.262 arcsec [2.56σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 011192998-01, PDC Light Curves



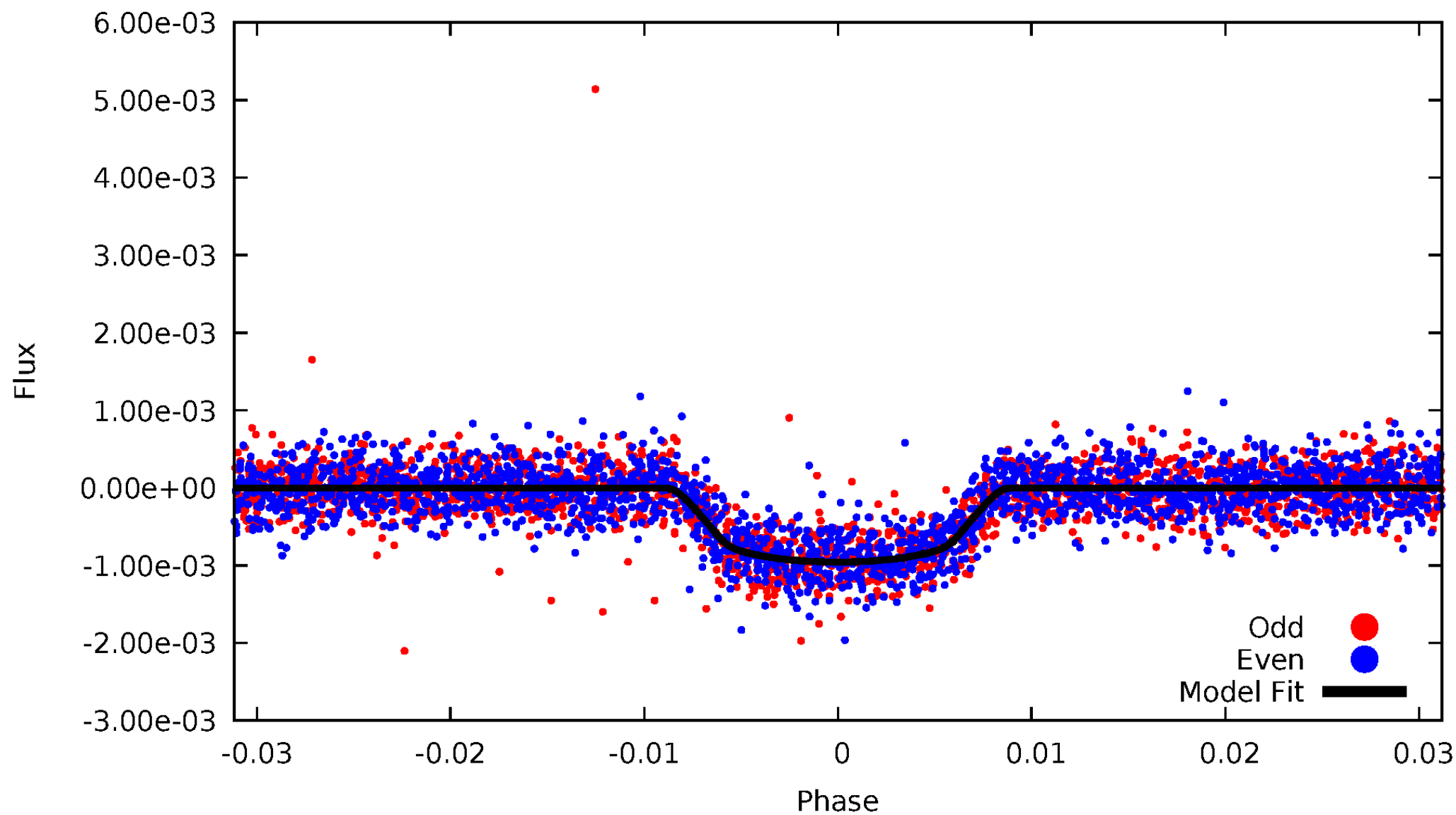
# TCE 011192998-01





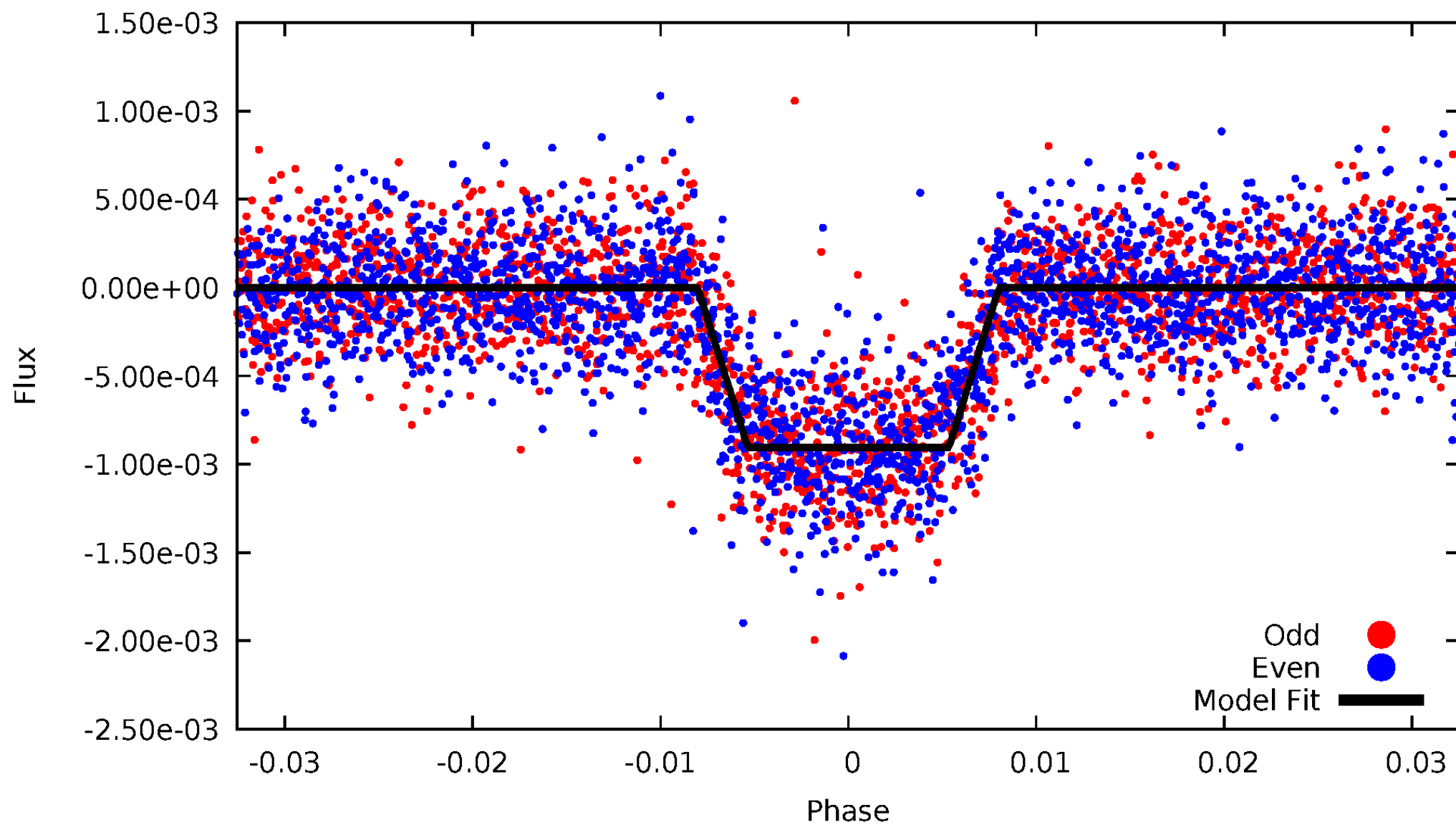
# DV Odd/Even

TCE 011192998-01



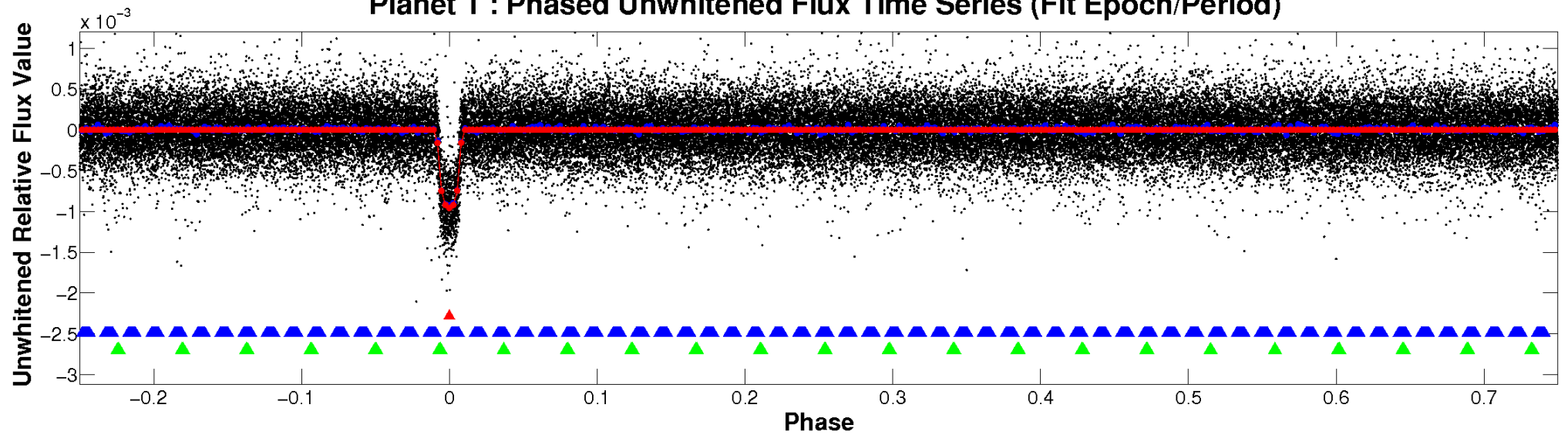
# ALT Odd/Even

TCE 011192998-01

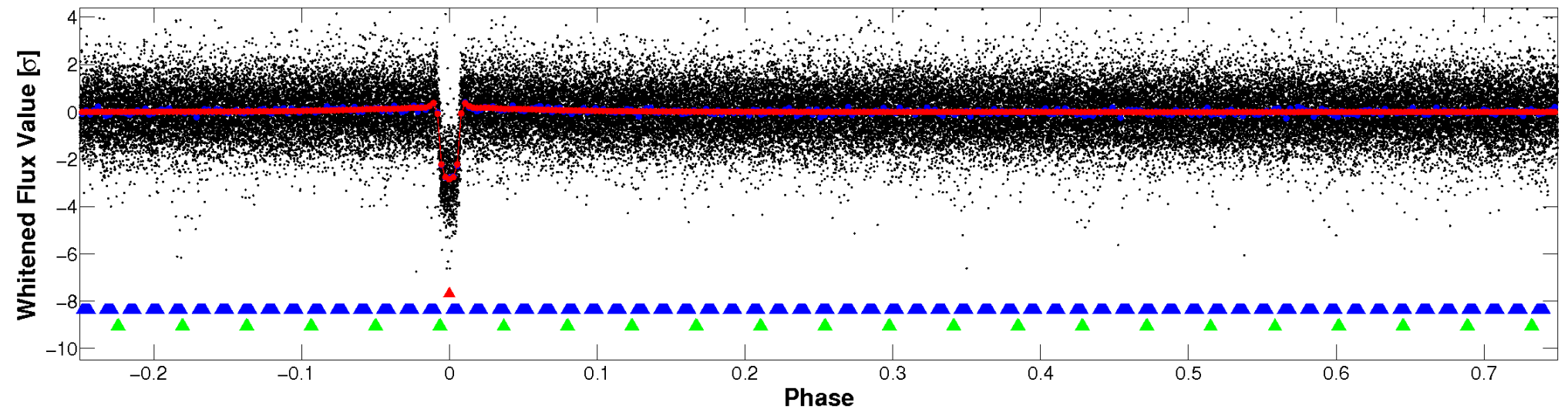


# Non-Whitened Vs. Whitened Light Curve

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

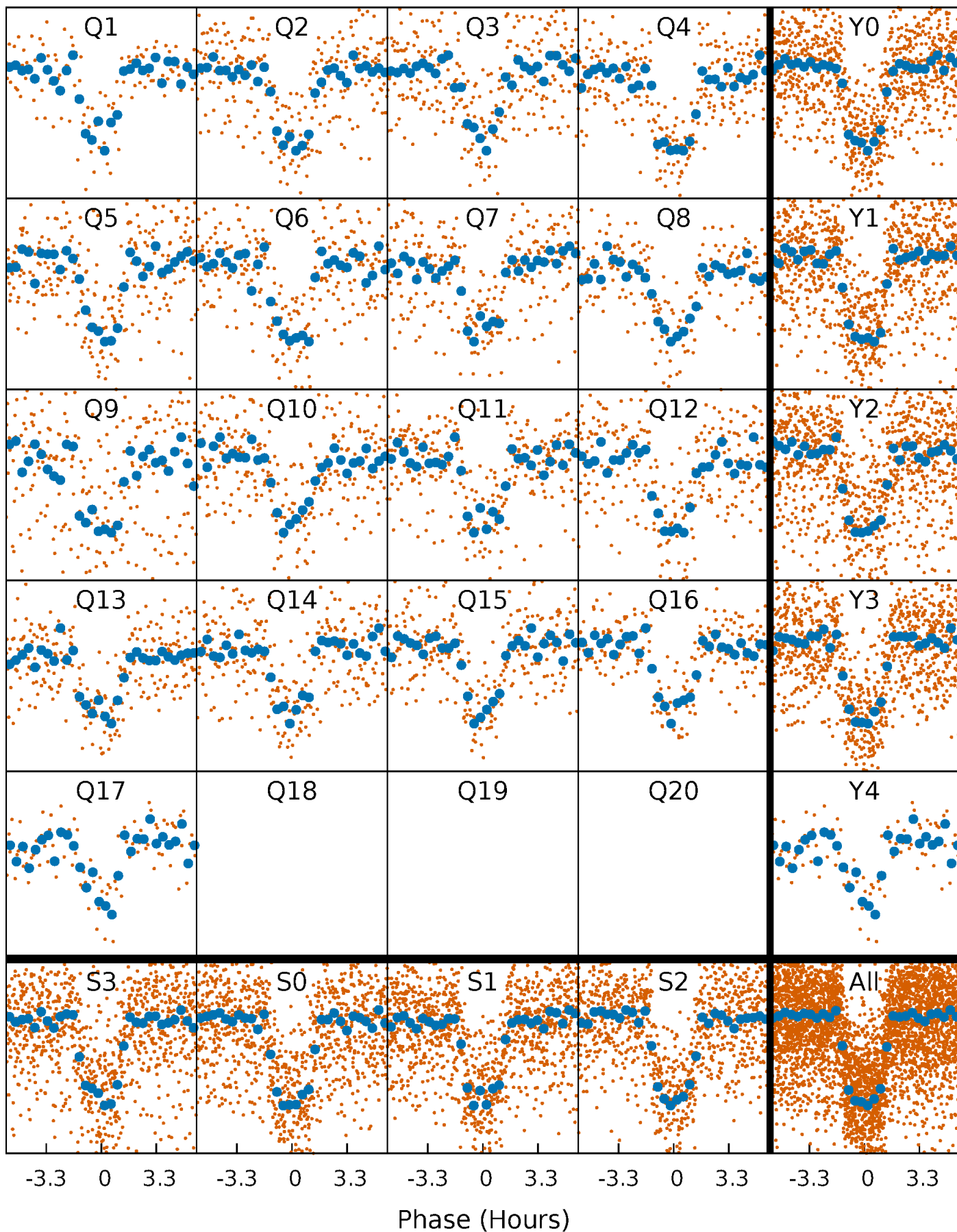


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



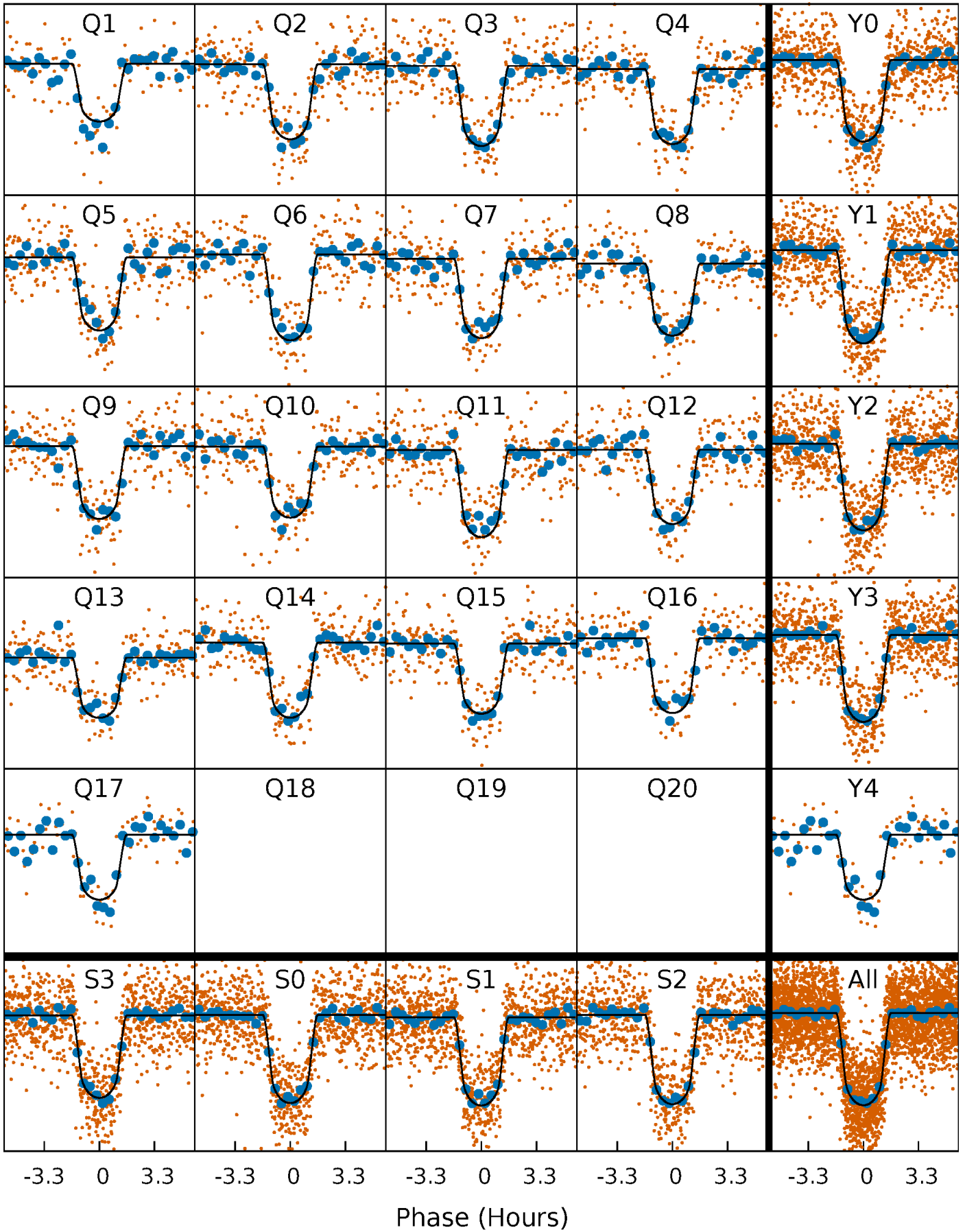
# PDC Quarter-Phased Transit Curves

TCE 011192998-01 P= 7.650247 Days  $T_0=133.720954$  (BKJD)



# DV Quarter-Phased Transit Curves

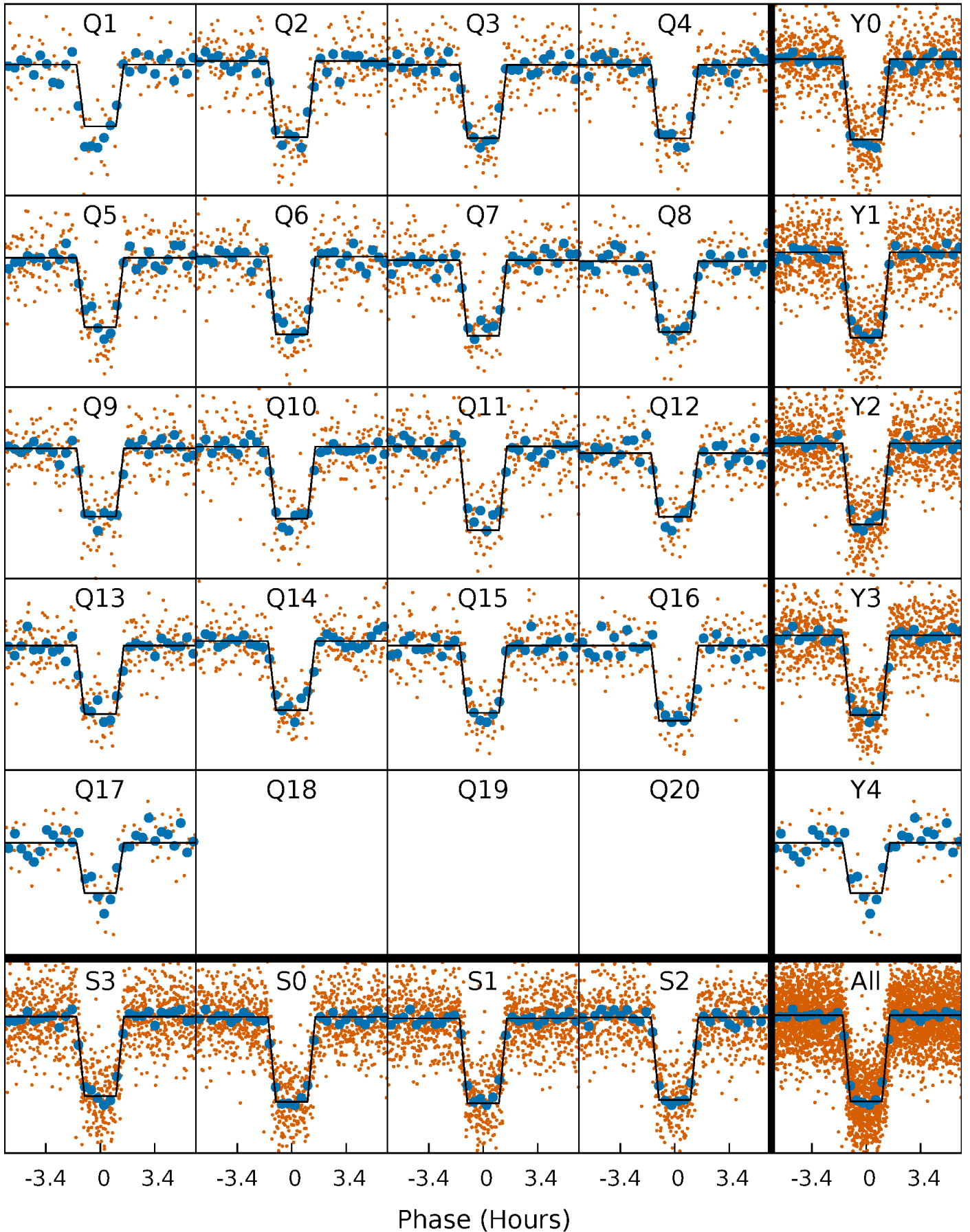
TCE 011192998-01   P= 7.650247 Days    $T_0=133.720954$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

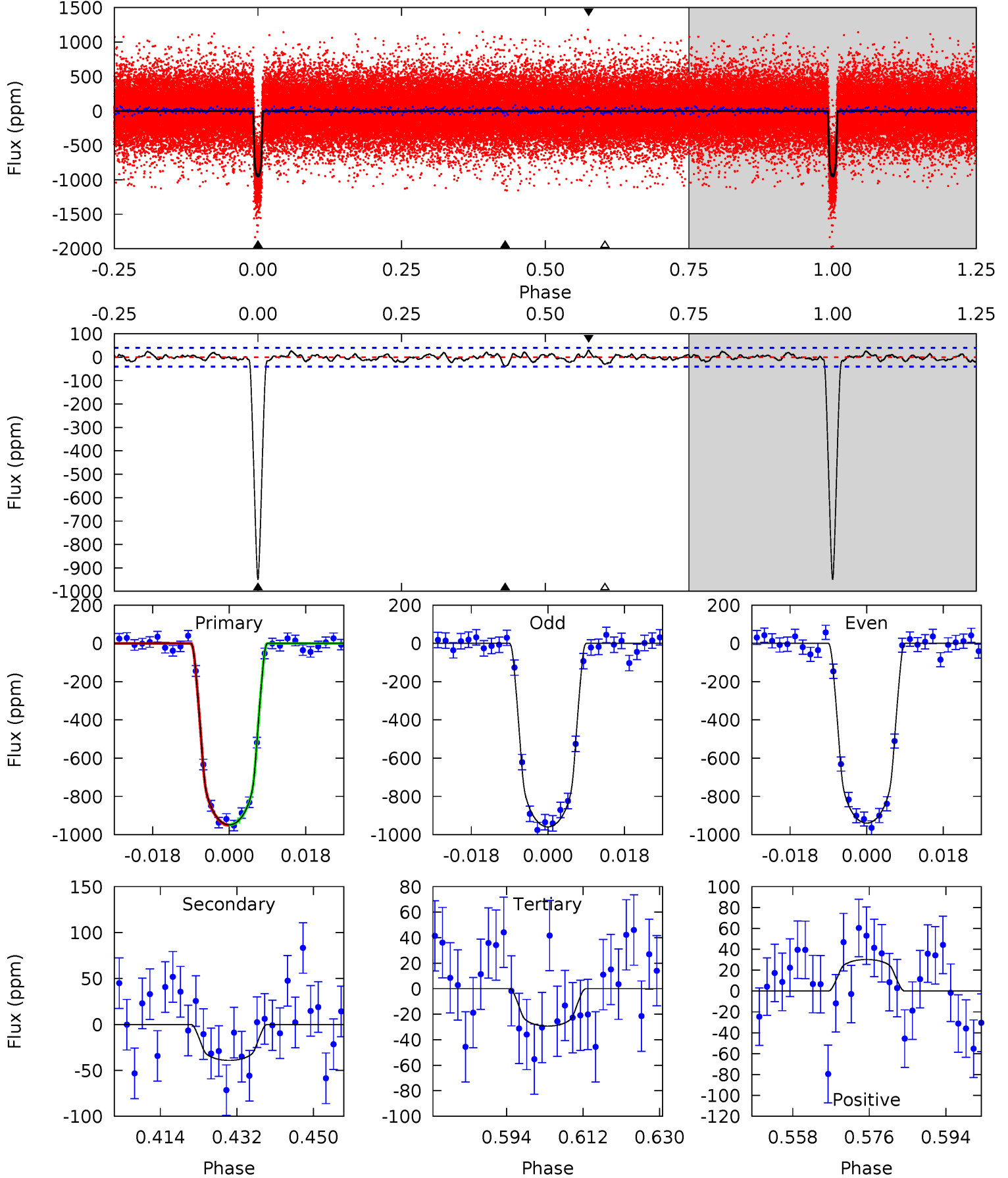
TCE 011192998-01 P= 7.650198 Days  $T_0=133.725674$  (BKJD)



# DV Model-Shift Uniqueness Test

011192998-01, P = 7.650247 Days, E = 126.070707 Days

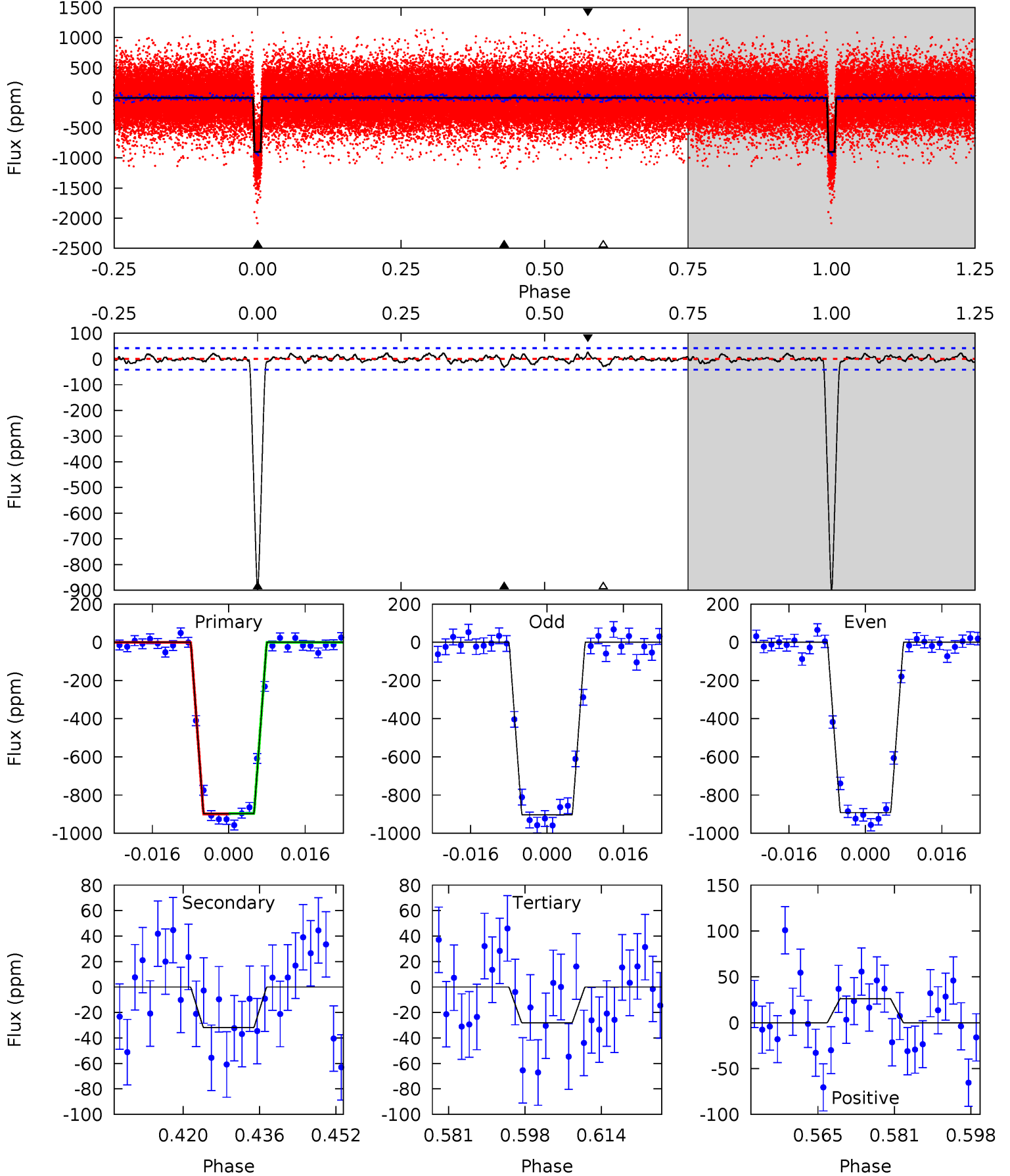
| Pri   | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|-------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 116.1 | 4.79 | 3.59 | 3.69 | 4.91            | 2.37            | 1.24             | 112.5   | 112.4   | 1.20    | 1.10    | 1.20    | 1.01 | 0.03  | 0.11 |



# Alt Model-Shift Uniqueness Test

011192998-01, P = 7.650198 Days, E = 126.075476 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  |
|-------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 105.3 | 3.74 | 3.29 | 3.07 | 4.93            | 2.41            | 1.06             | 102.0   | 102.3   | 0.45    | 0.68    | 0.70    | 1.03 | 0.03  | 0.18 |



### Stellar Parameters For KIC 011192998

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                     | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
|        | $5409^{+162}_{-146}$ | $4.609^{+0.030}_{-0.120}$ | $-0.300^{+0.300}_{-0.300}$ | $0.746^{+0.145}_{-0.058}$ | $0.835^{+0.080}_{-0.098}$ | $2.836^{+0.453}_{-1.016}$                 |
|        | +3%/-3%              | +1%/-3%                   | +100%/-100%                | +19%/-8%                  | +10%/-12%                 | +16%/-36%                                 |
| 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 011192998-01 / KOI 0481.01

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$     | $T_{max} (K)$      | $T_{obs} (K)$        | $A_{obs}$      |
|---------|-------------|------------------------|--------------------|----------------------|----------------|
| DV      | $-39 \pm 8$ | $2.64^{+0.31}_{-0.29}$ | $1099^{+51}_{-45}$ | $3037^{+136}_{-129}$ | $15^{+5}_{-4}$ |
| Alt.    | $-32 \pm 9$ | $2.54^{+0.32}_{-0.28}$ | $1101^{+53}_{-39}$ | $2988^{+145}_{-150}$ | $14^{+5}_{-4}$ |

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

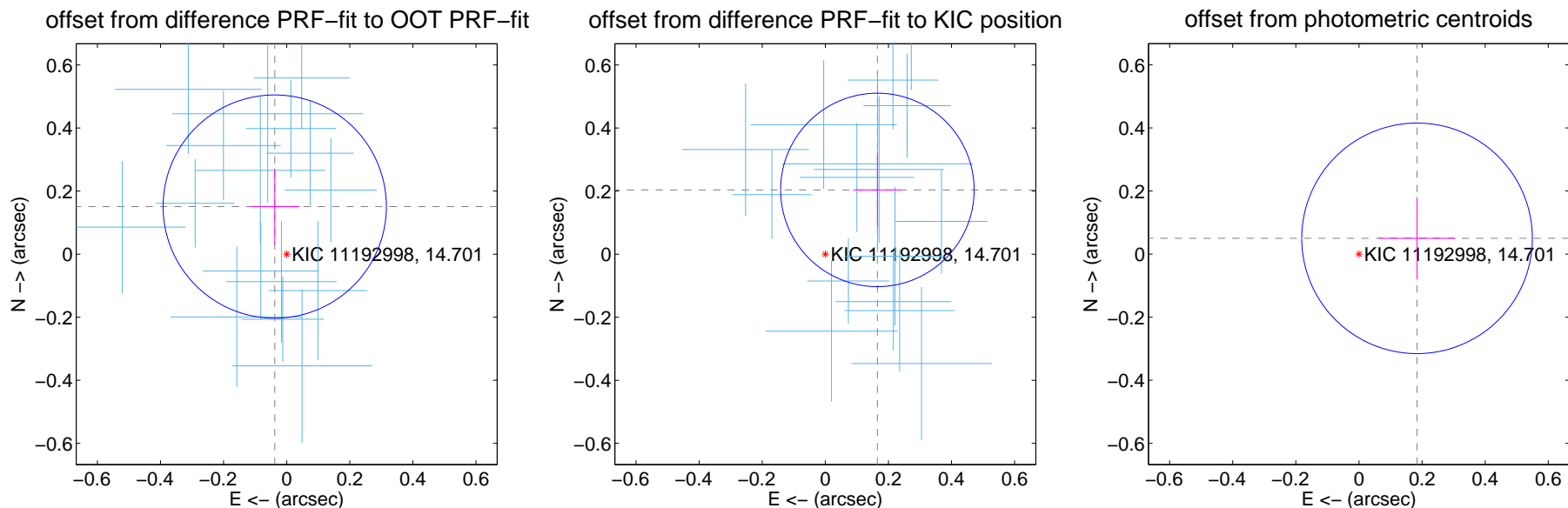
## DV Centroid Data

Supplemental centroid analysis for 011192998-01. Kepler magnitude: 14.70. Transit SNR 75.35

There are 17 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.28 arcsec

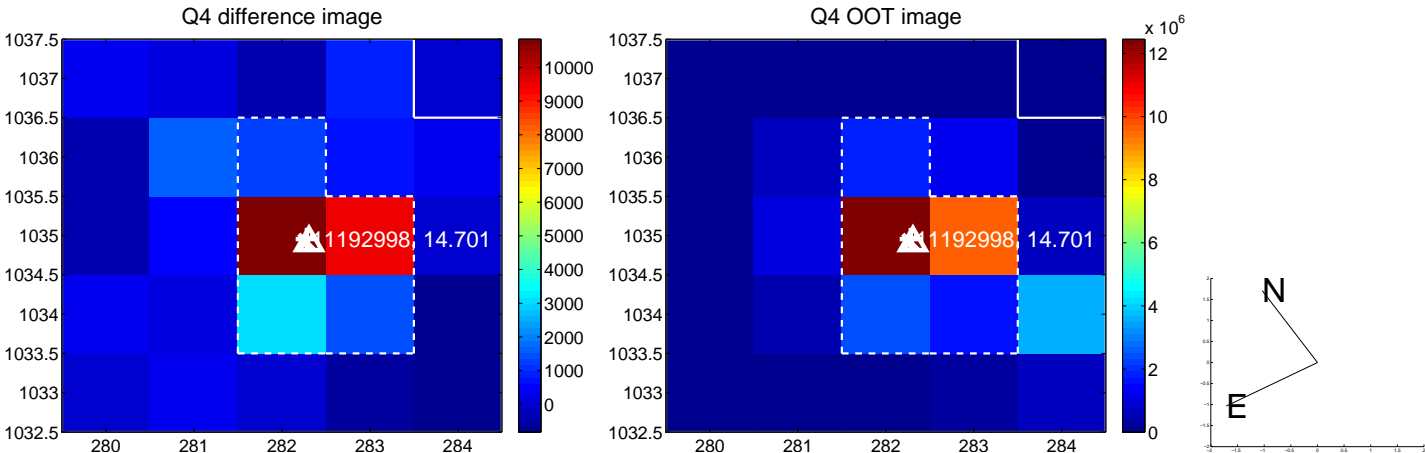
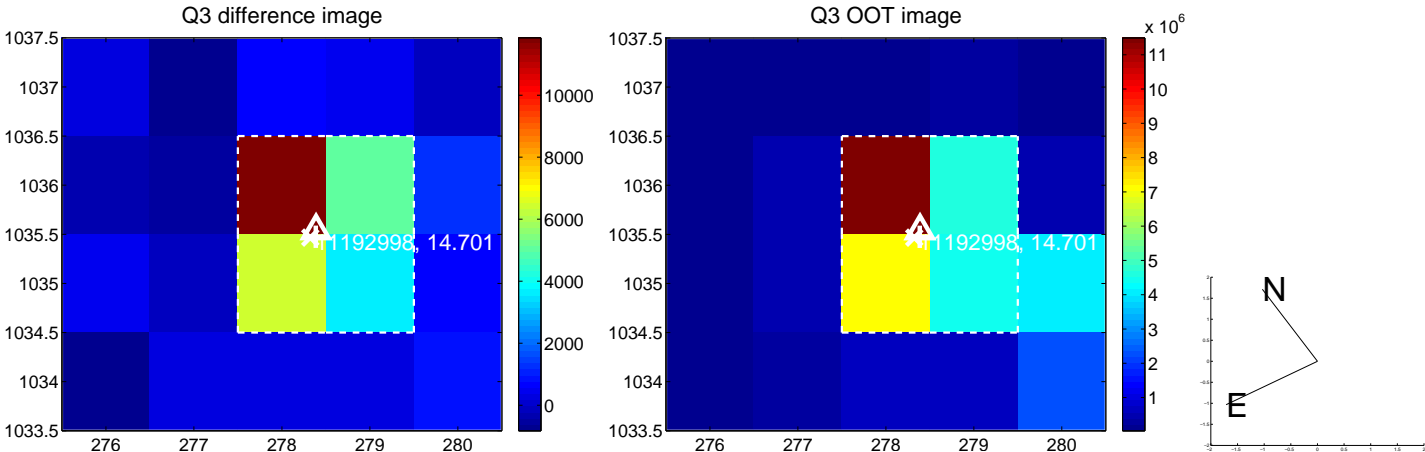
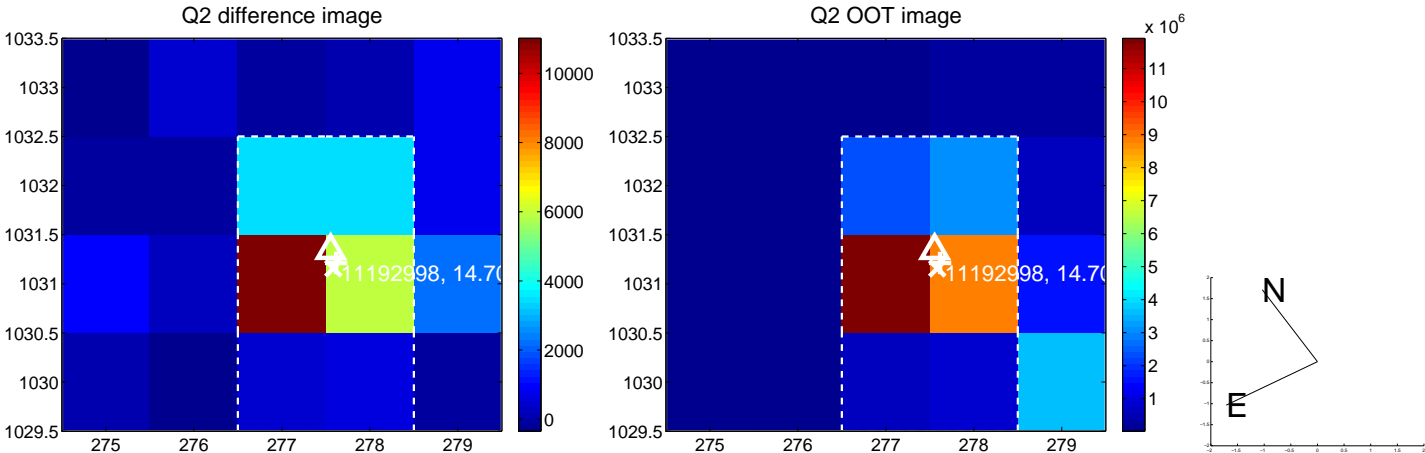
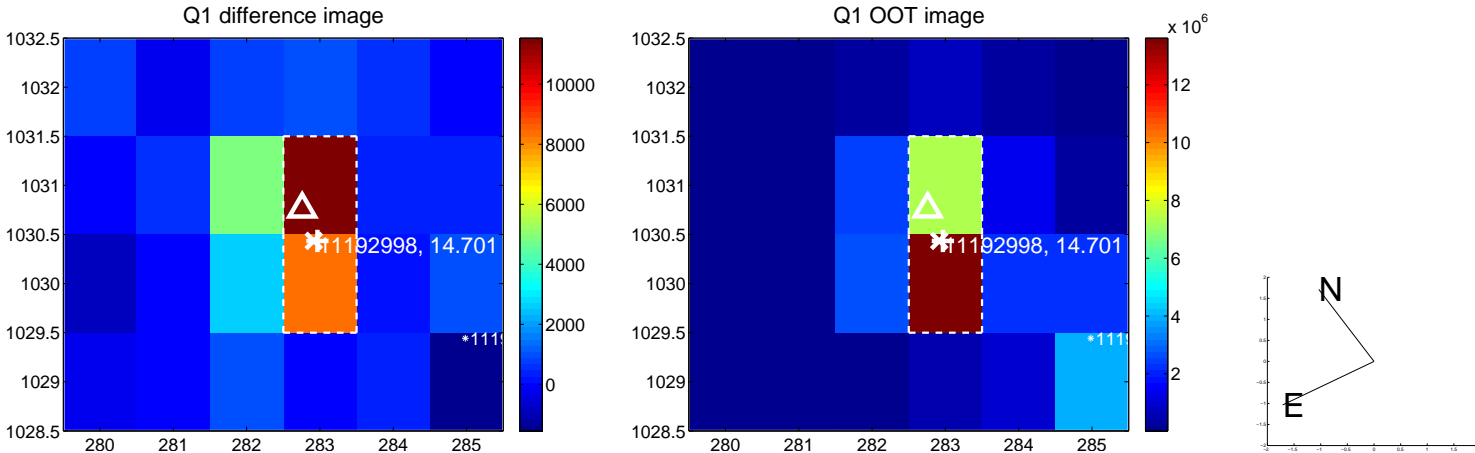
|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec      |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT          | $0.156 \pm 0.118$  | 1.32                | $0.038 \pm 0.077$  | $0.151 \pm 0.120$ |
| PRF-fit source offset from KIC position | $0.262 \pm 0.102$  | 2.56                | $-0.165 \pm 0.076$ | $0.204 \pm 0.118$ |
| photometric centroid source offset      | $0.19 \pm 0.12$    | 1.57                | $-0.18 \pm 0.12$   | $0.05 \pm 0.13$   |



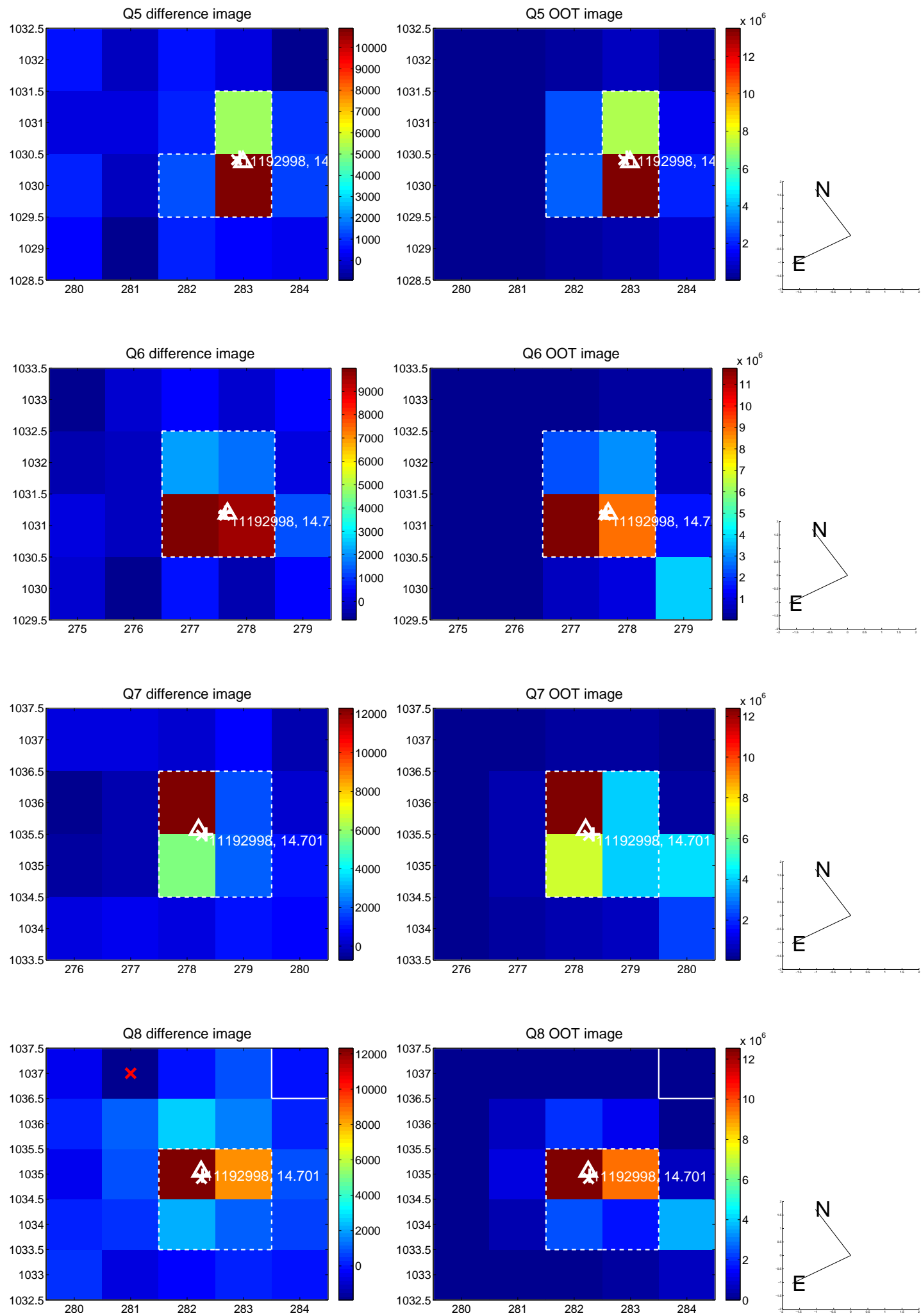
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



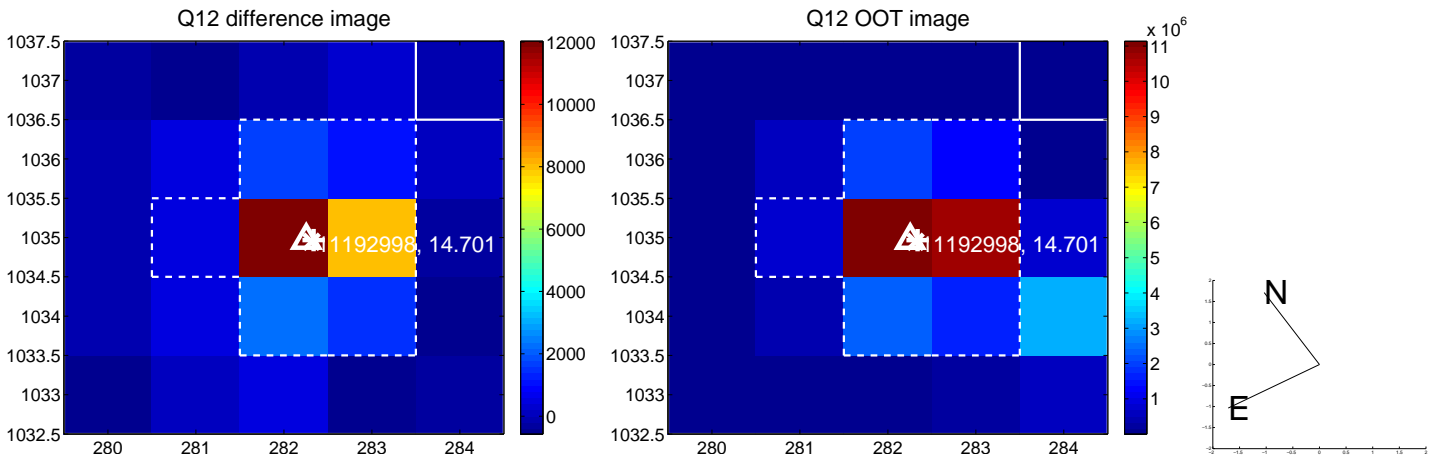
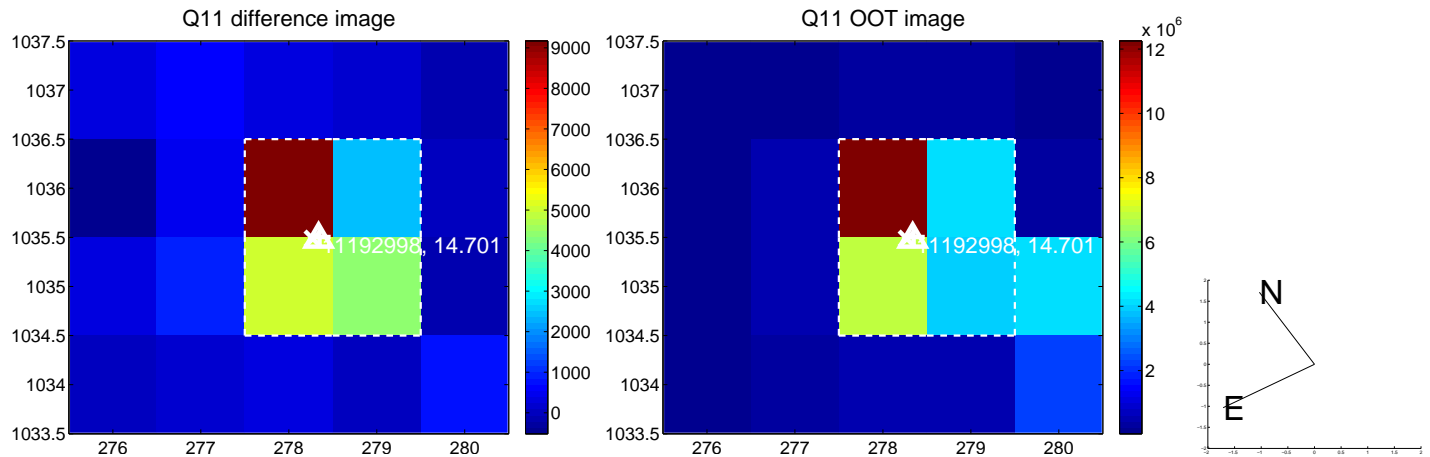
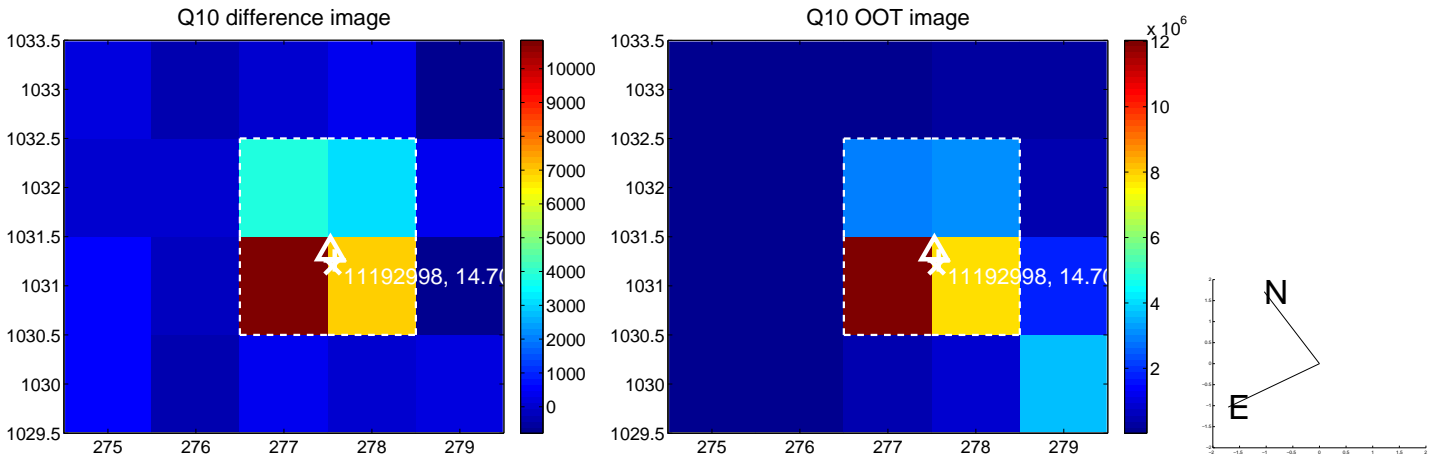
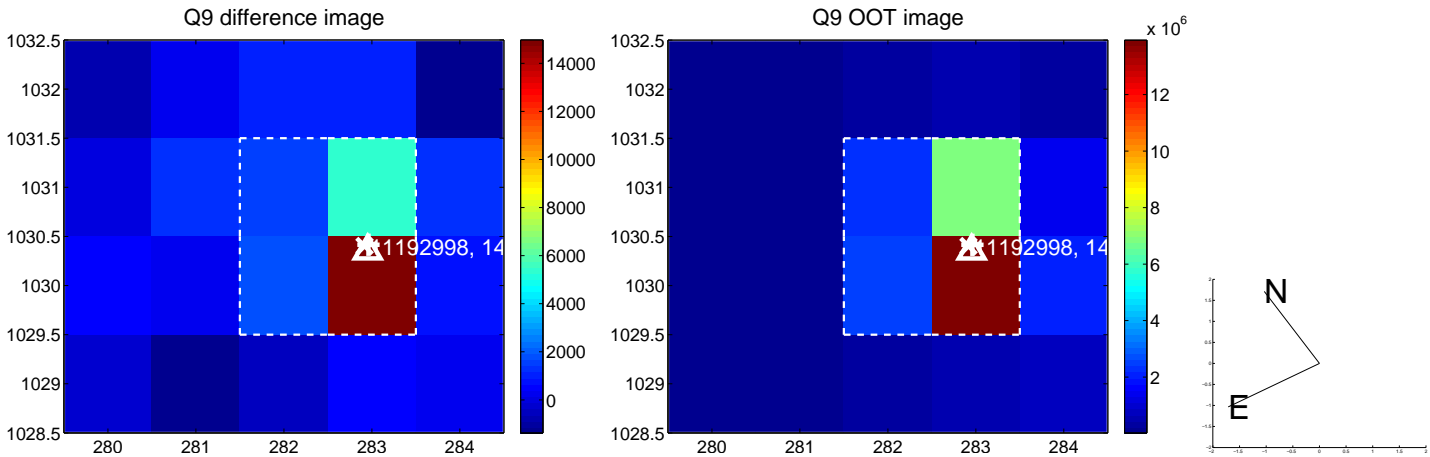
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



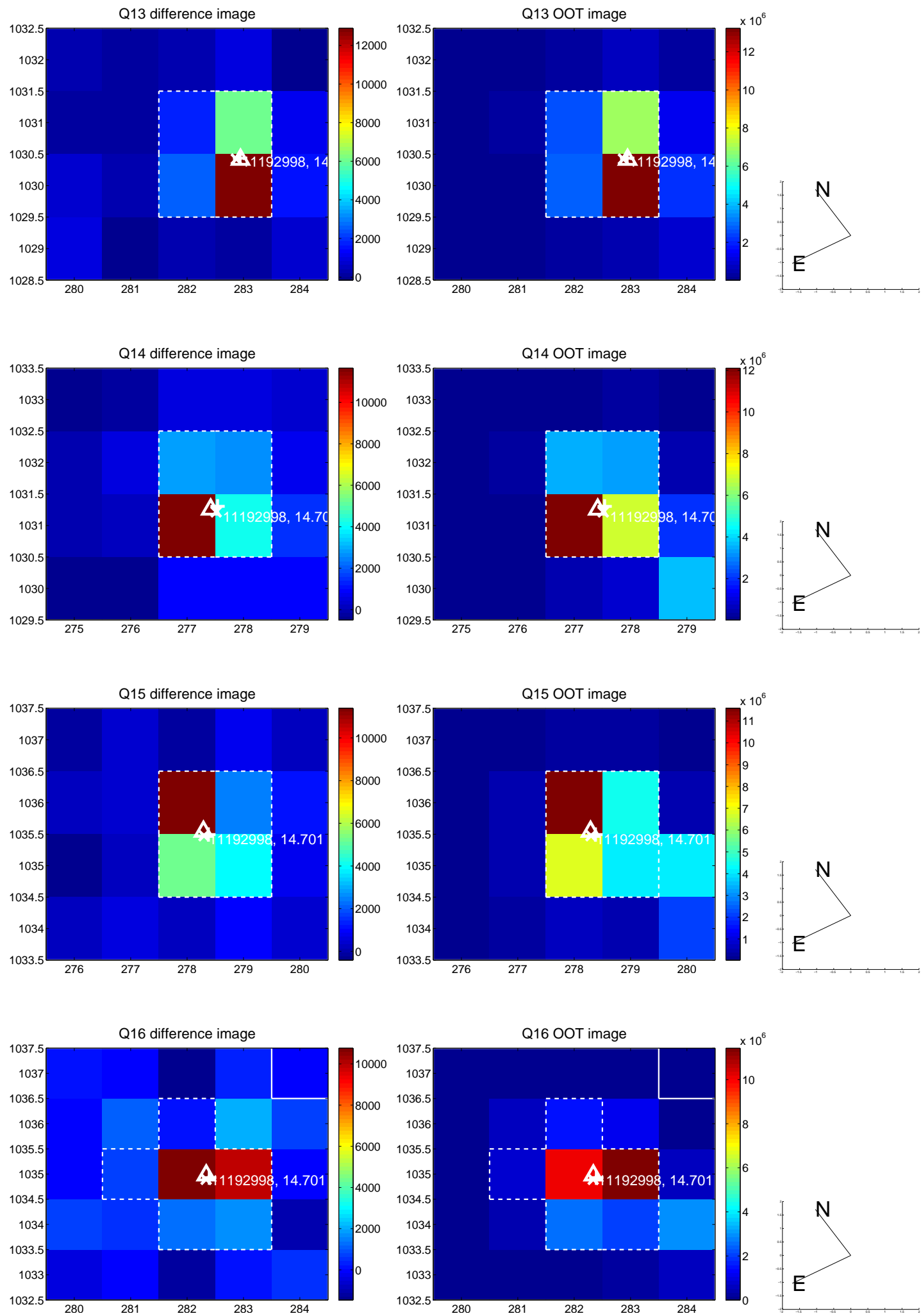
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



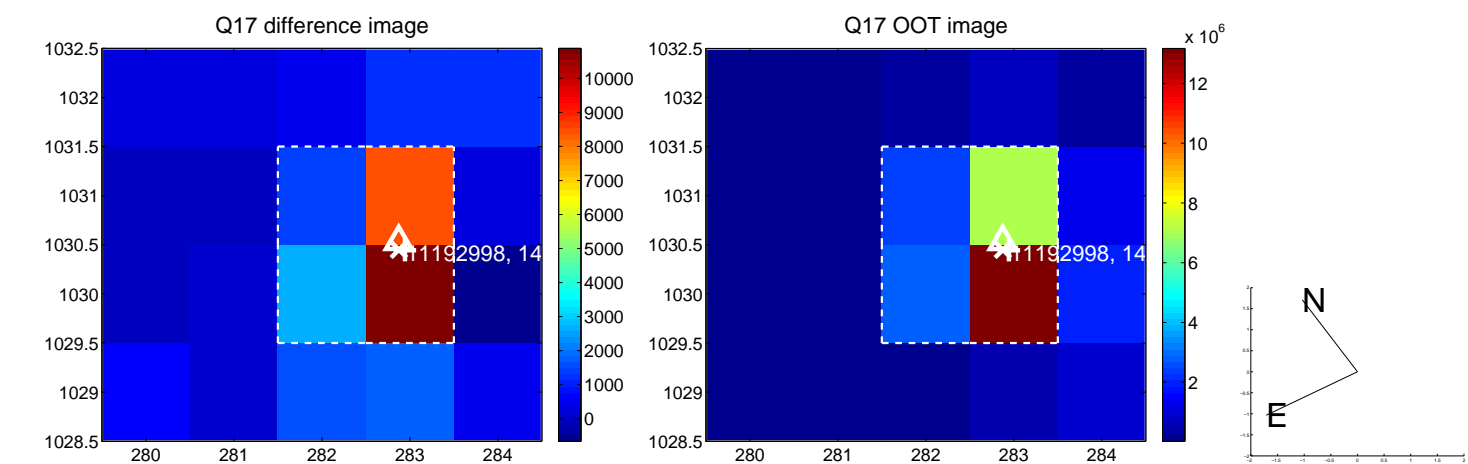
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



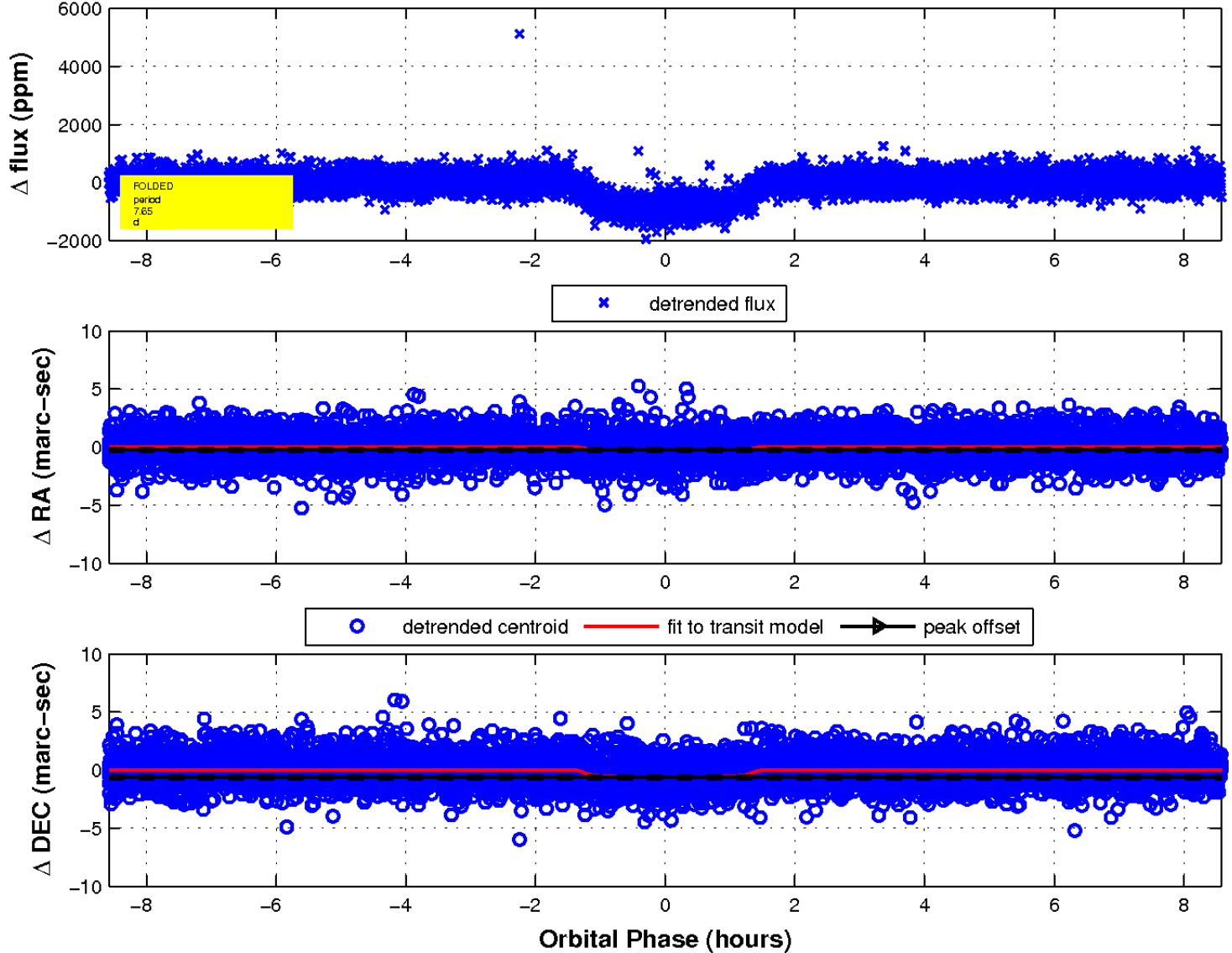
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



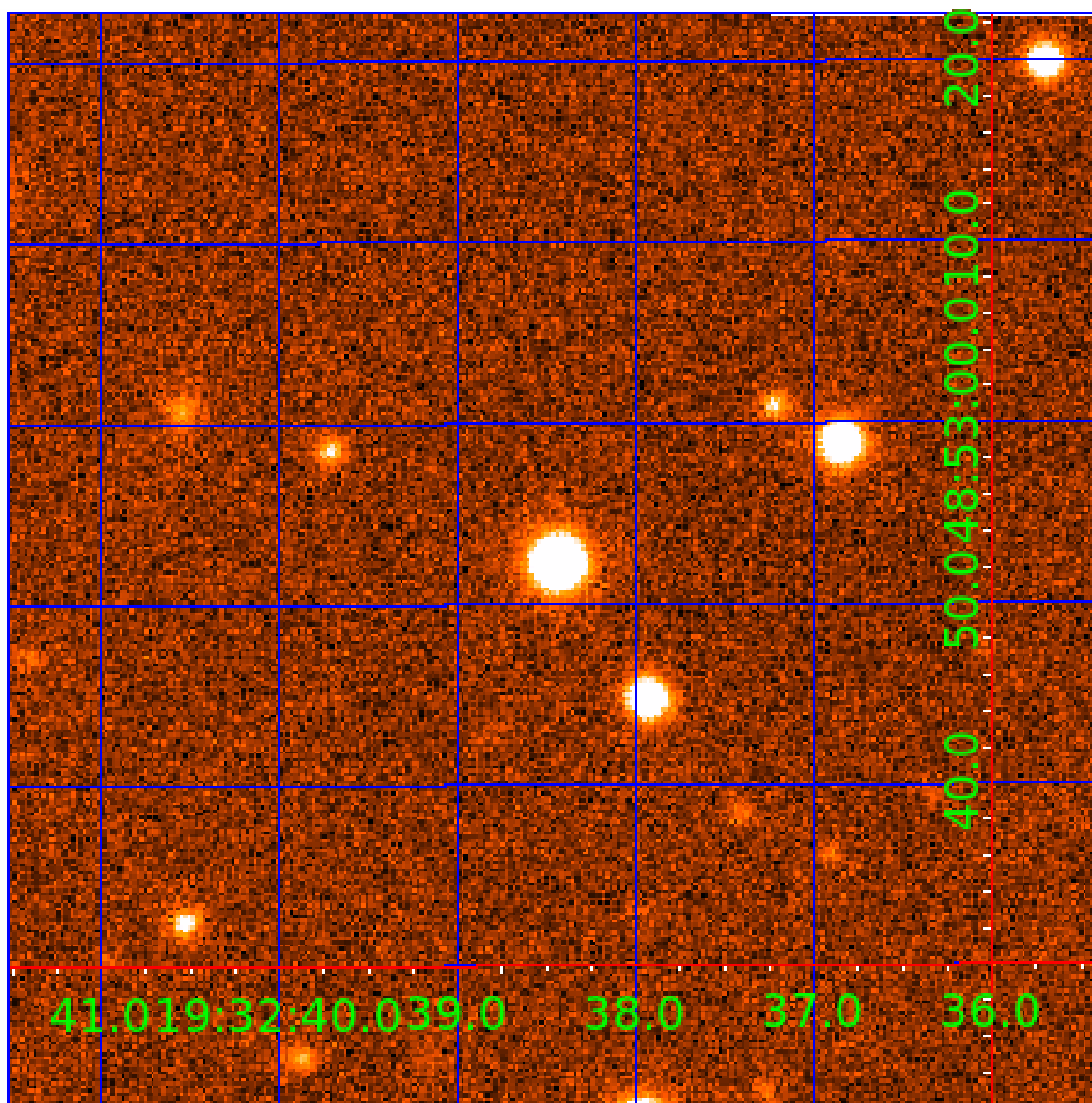
fluxWeightedCentroids, Planet 1 of 3





UKIRT Image

Declination



# KIC 011192998

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 011192998-01 | OBS      | 0481.01 | 7.650247      | 133.720954   | 958.7       | 2.861            | 68.7 | 75.4 | 0.75                        | 5409            | 2.56                   | 84.00                  |
| 011192998-02 | OBS      | 0481.02 | 1.554001      | 132.535609   | 403.1       | 1.911            | 55.1 | 62.7 | 0.75                        | 5409            | 1.79                   | 703.48                 |
| 011192998-03 | OBS      | 0481.03 | 34.259550     | 148.975688   | 1036.7      | 5.213            | 43.8 | 45.5 | 0.75                        | 5409            | 2.83                   | 11.38                  |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|------------|
| 011192998-01 | OBS      | PC   | 1.00  | 0 | 0 | 0 | 0 | NO_COMMENT |
| 011192998-02 | OBS      | PC   | 1.00  | 0 | 0 | 0 | 0 | NO_COMMENT |
| 011192998-03 | OBS      | PC   | 1.00  | 0 | 0 | 0 | 0 | NO_COMMENT |

**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 011192998-02

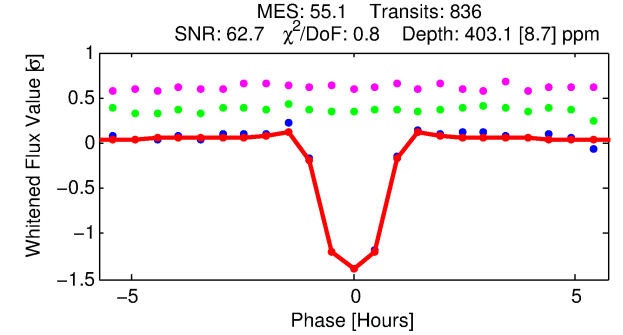
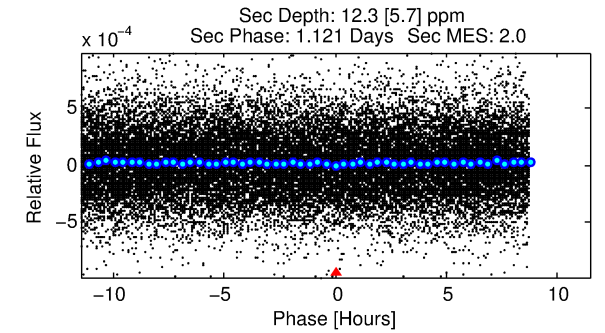
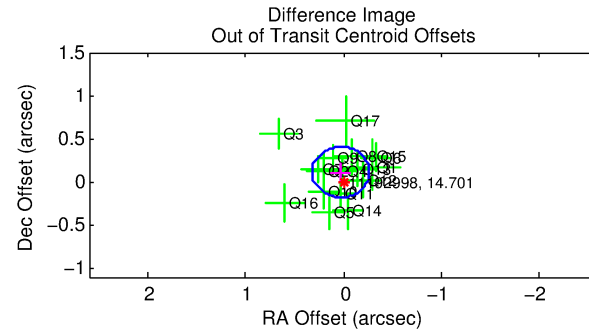
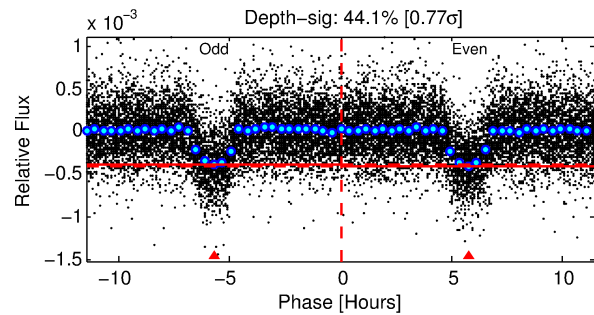
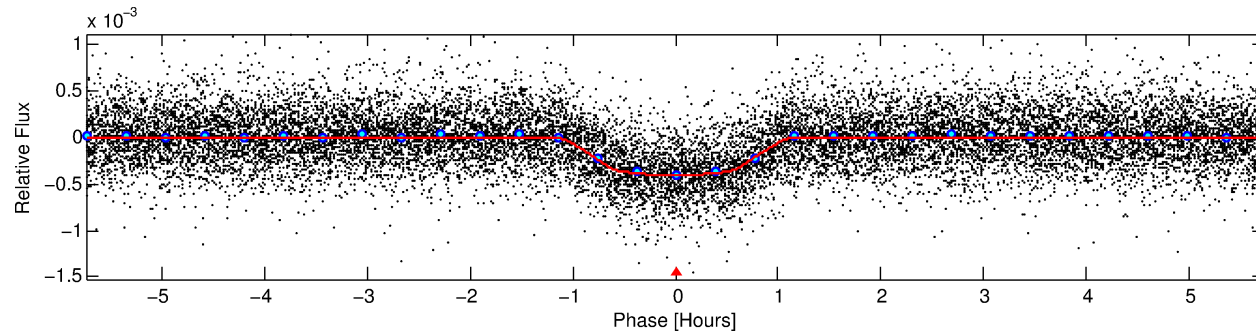
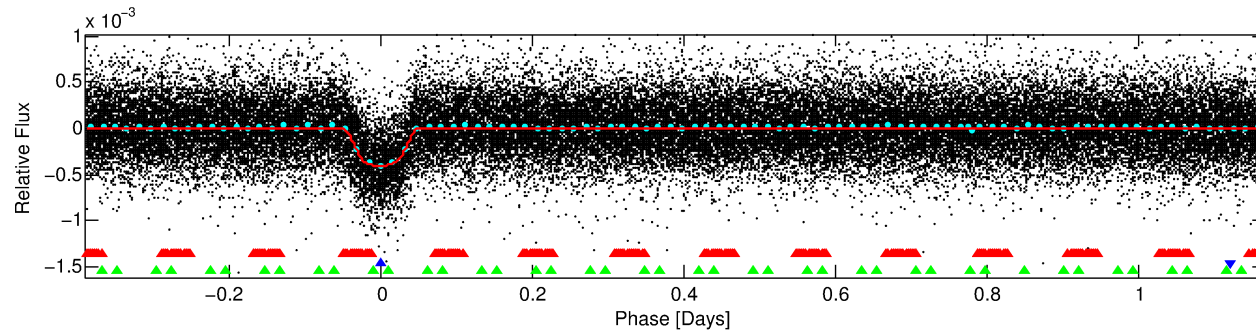
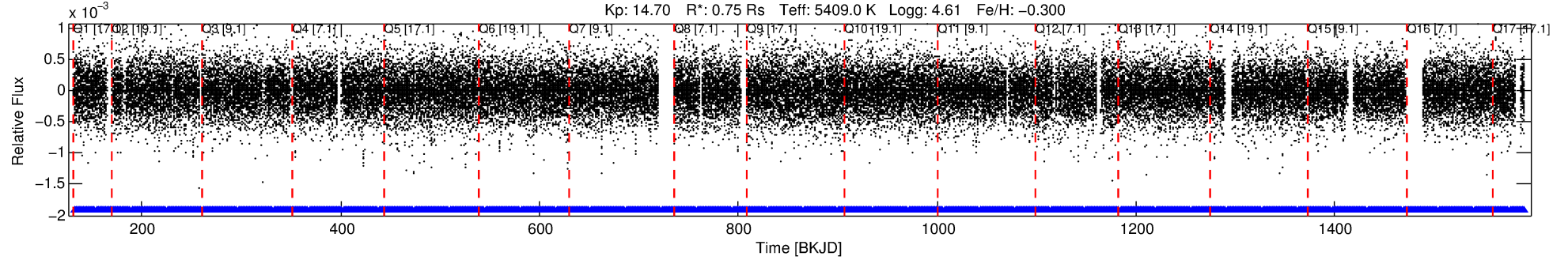
No Significant Match Found

# DV One-Page Summary

KIC: 11192998 Candidate: 2 of 3 Period: 1.554 d

KOI: K00481.02 Corr: 0.962

Kp: 14.70 R\*: 0.75 Rs Teff: 5409.0 K Logg: 4.61 Fe/H: -0.300



## DV Fit Results:

Period = 1.55400 [0.00000] d  
Epoch = 132.5356 [0.0004] BKJD  
Rp/R\* = 0.0220 [0.0021]  
a/R\* = 3.19 [1.22]  
b = 0.90 [0.10]  
Seff = 703.48 [179.46]  
Teff = 1313 [84] K  
Rp = 1.79 [0.39] Re  
a = 0.0246 [0.0039] AU  
Ag = 1.28 [0.70] [0.40σ]  
Teffp = 2159 [279] K [2.91σ]

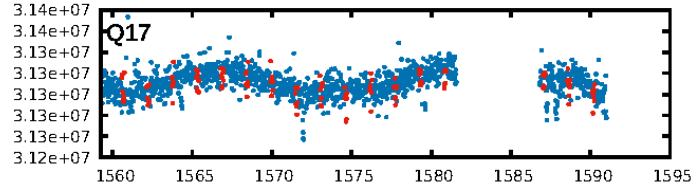
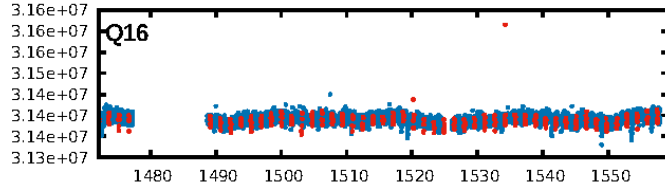
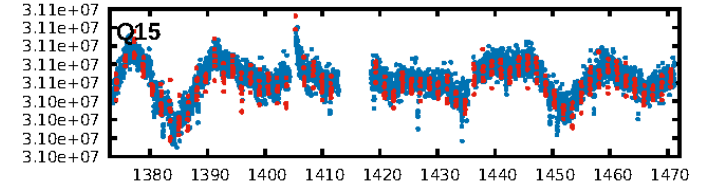
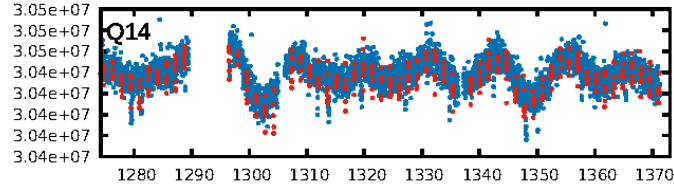
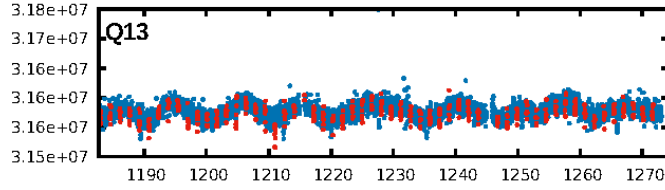
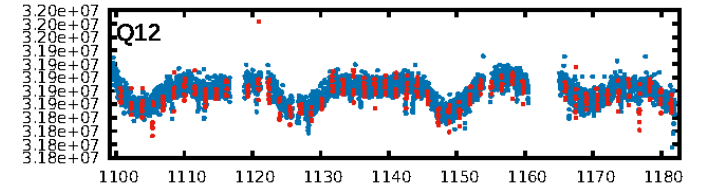
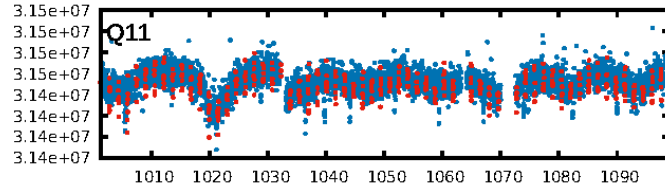
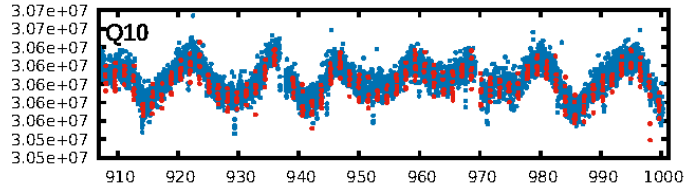
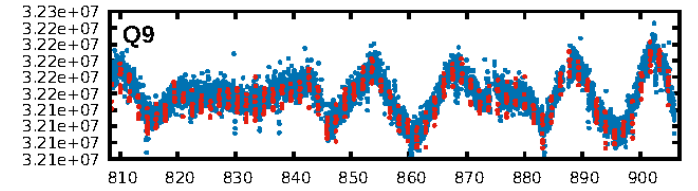
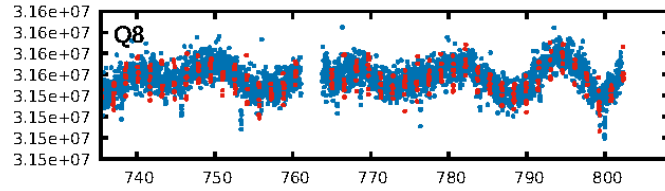
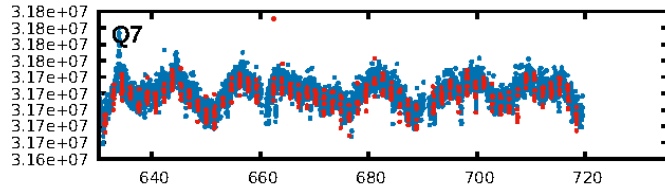
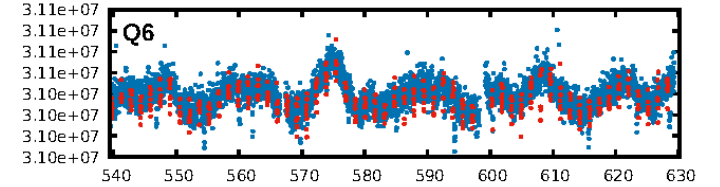
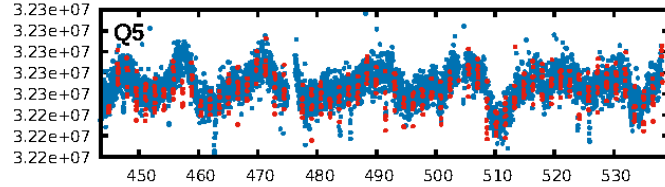
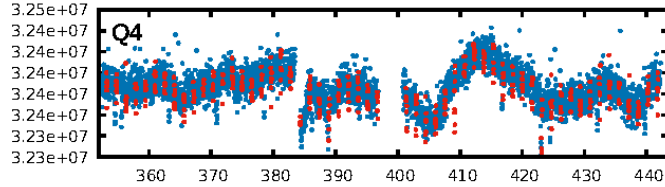
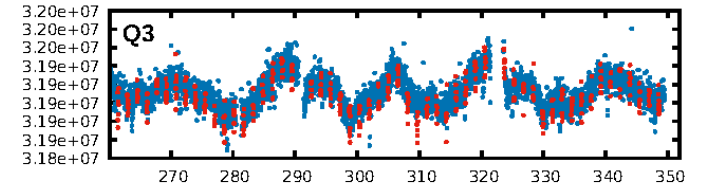
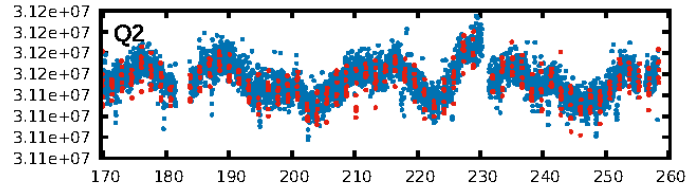
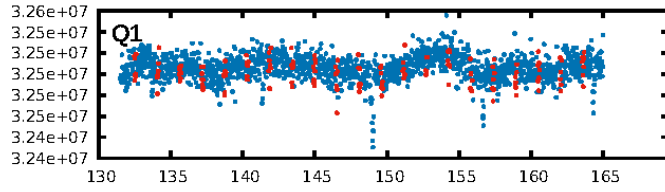
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [42.53σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [798/798]  
GhostDiagnostic-chr: 6.117  
Centroid-sig: 0.0%  
Centroid-so: 0.128 arcsec [0.75σ]  
OotOffset-rm: 0.117 arcsec [1.20σ]  
KicOffset-rm: 0.222 arcsec [2.32σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

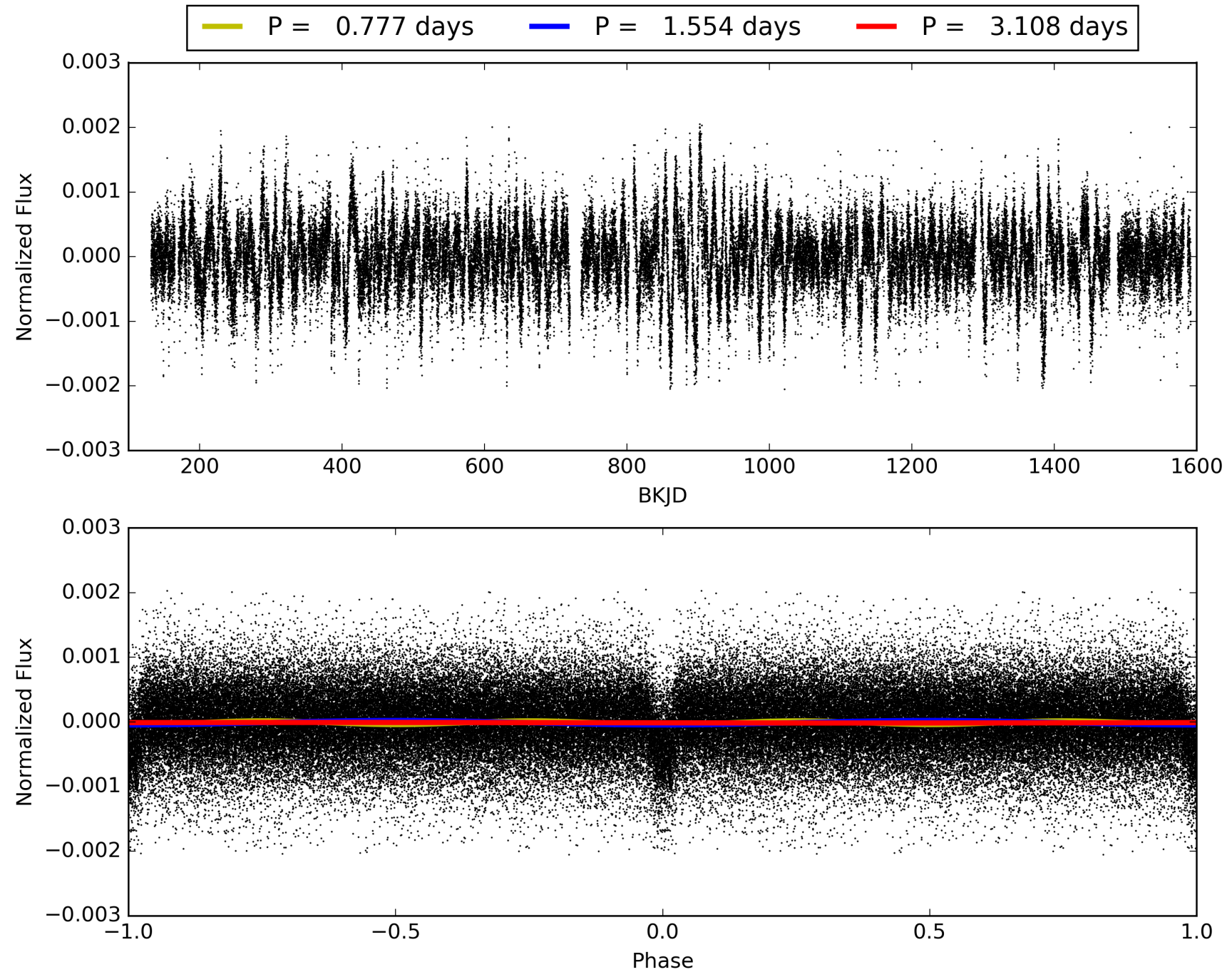
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 10:33:17 Z

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

# TCE 011192998-02, PDC Light Curves



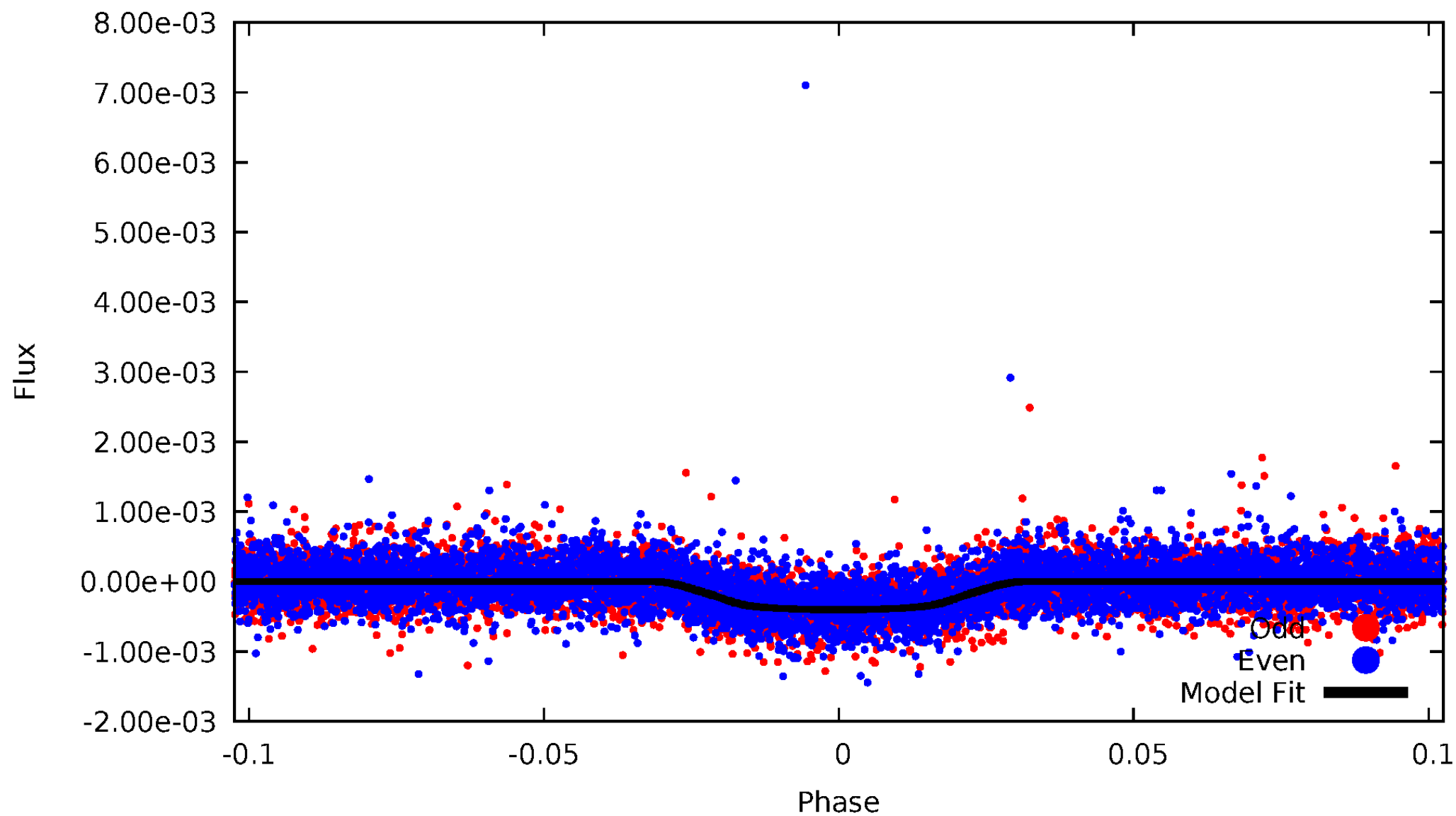
# TCE 011192998-02





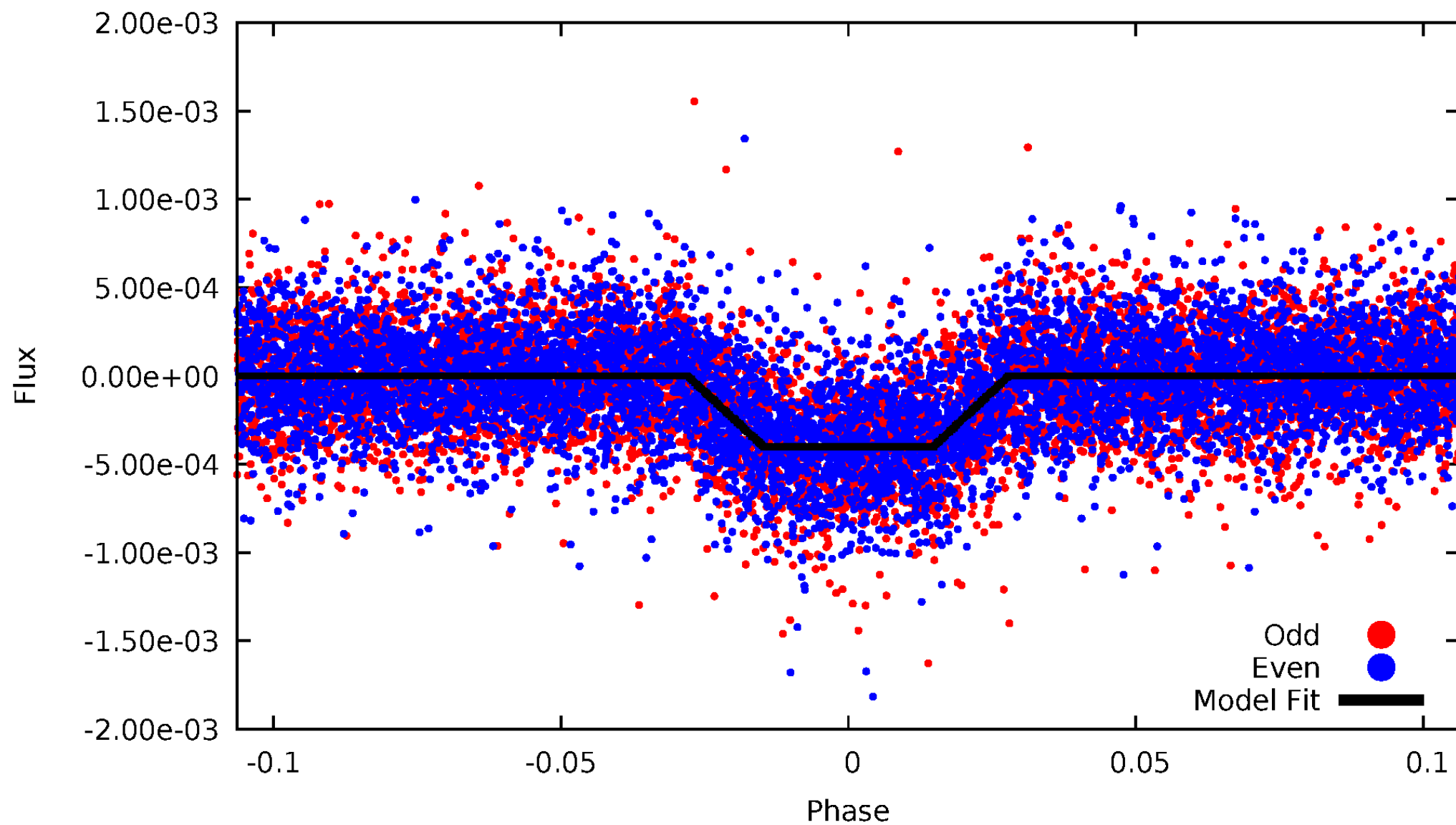
# DV Odd/Even

TCE 011192998-02



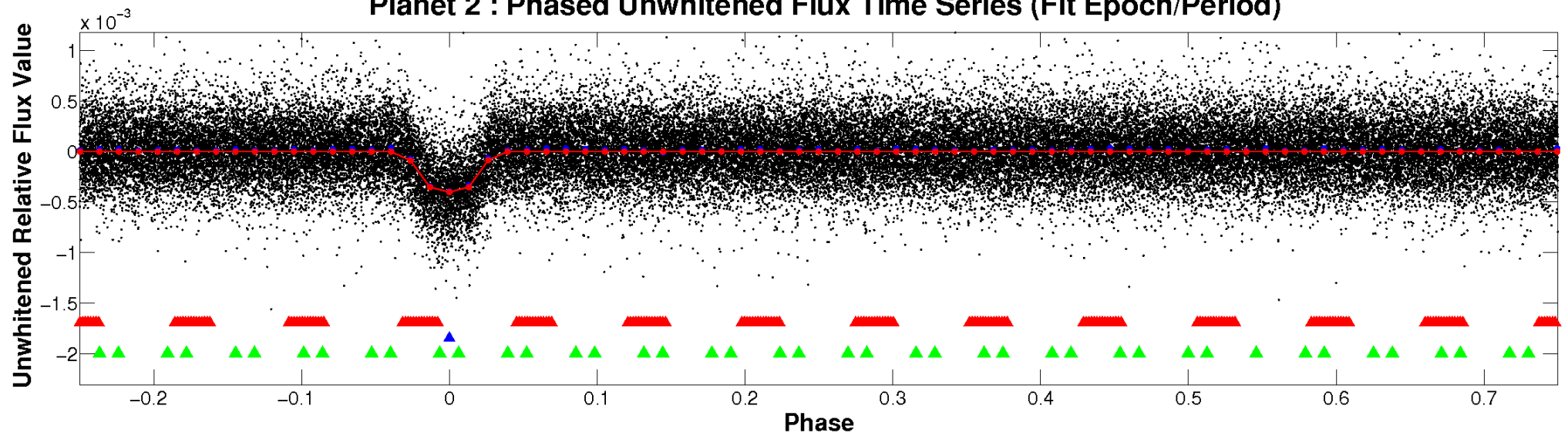
# ALT Odd/Even

TCE 011192998-02

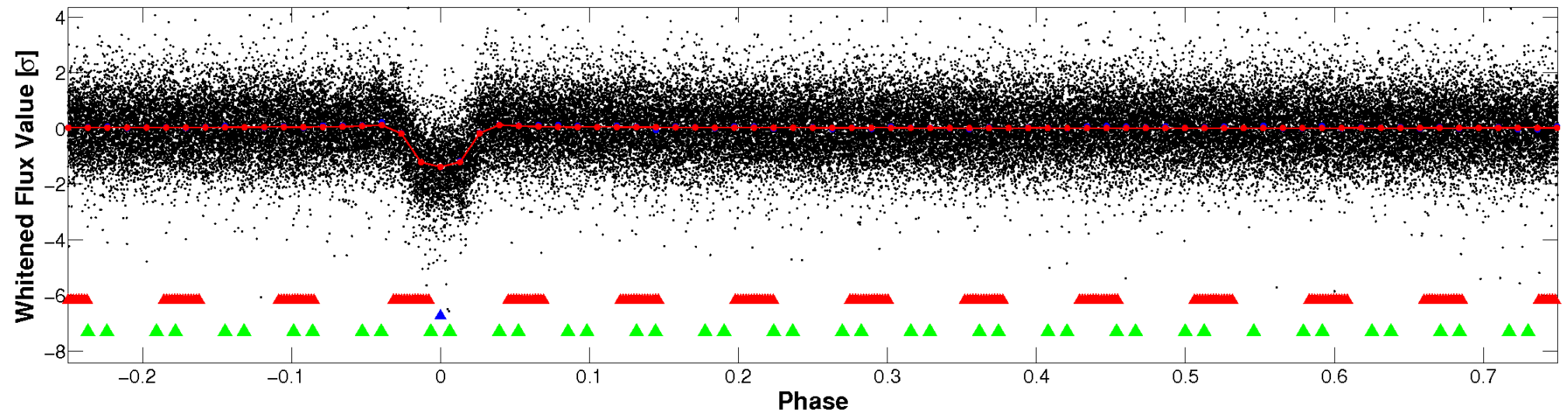


# Non-Whitened Vs. Whitened Light Curve

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

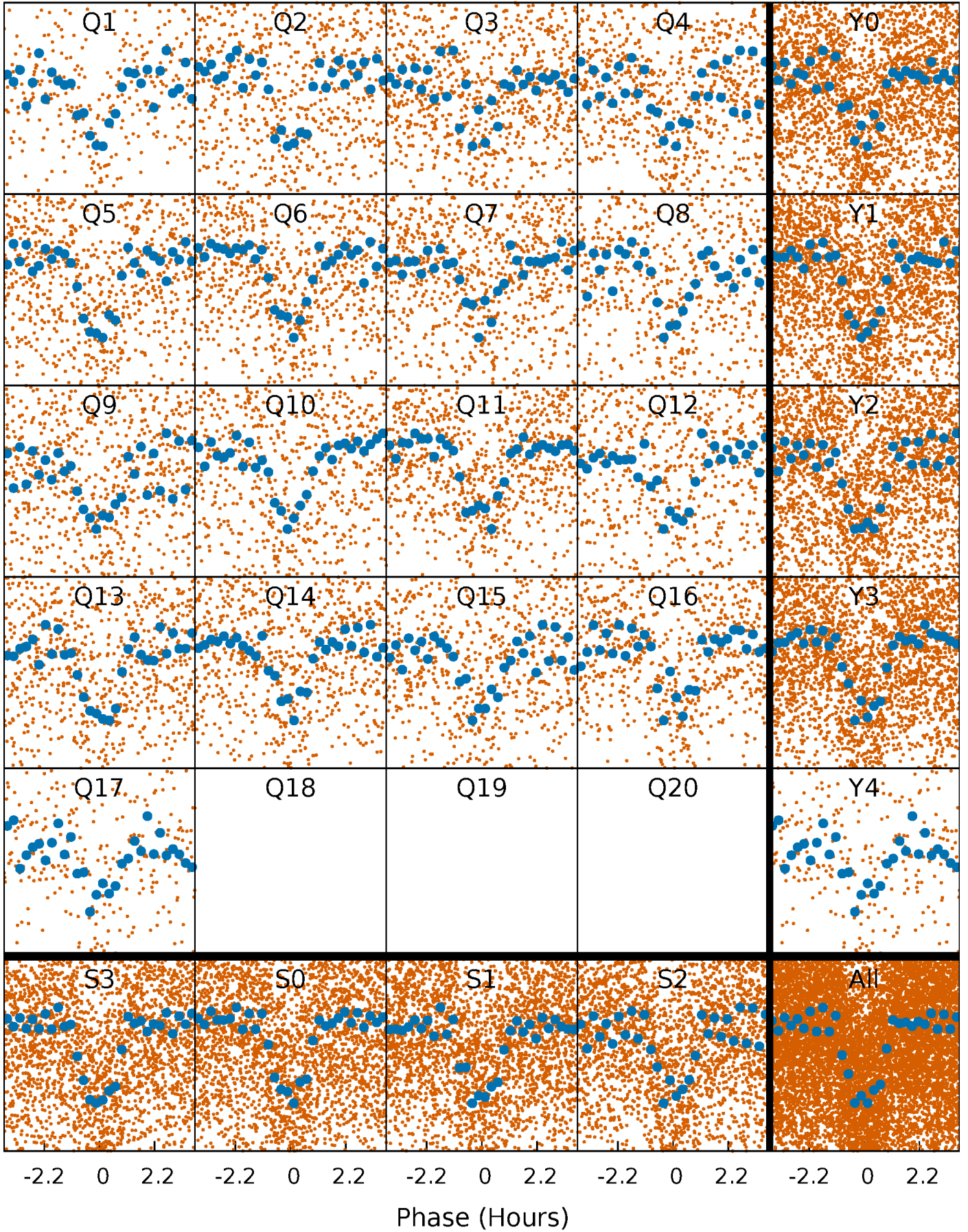


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

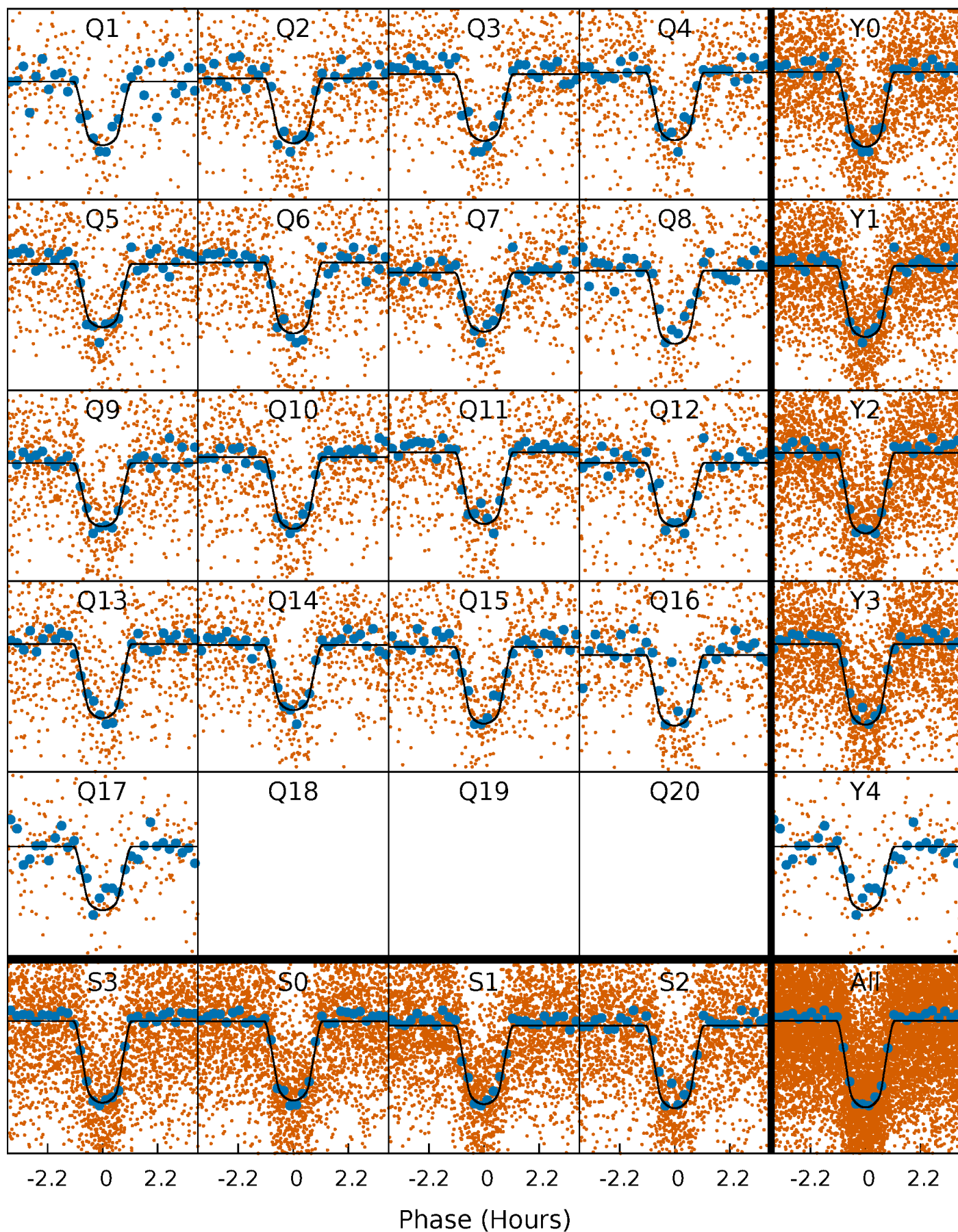
TCE 011192998-02 P= 1.554001 Days  $T_0=132.535609$  (BKJD)





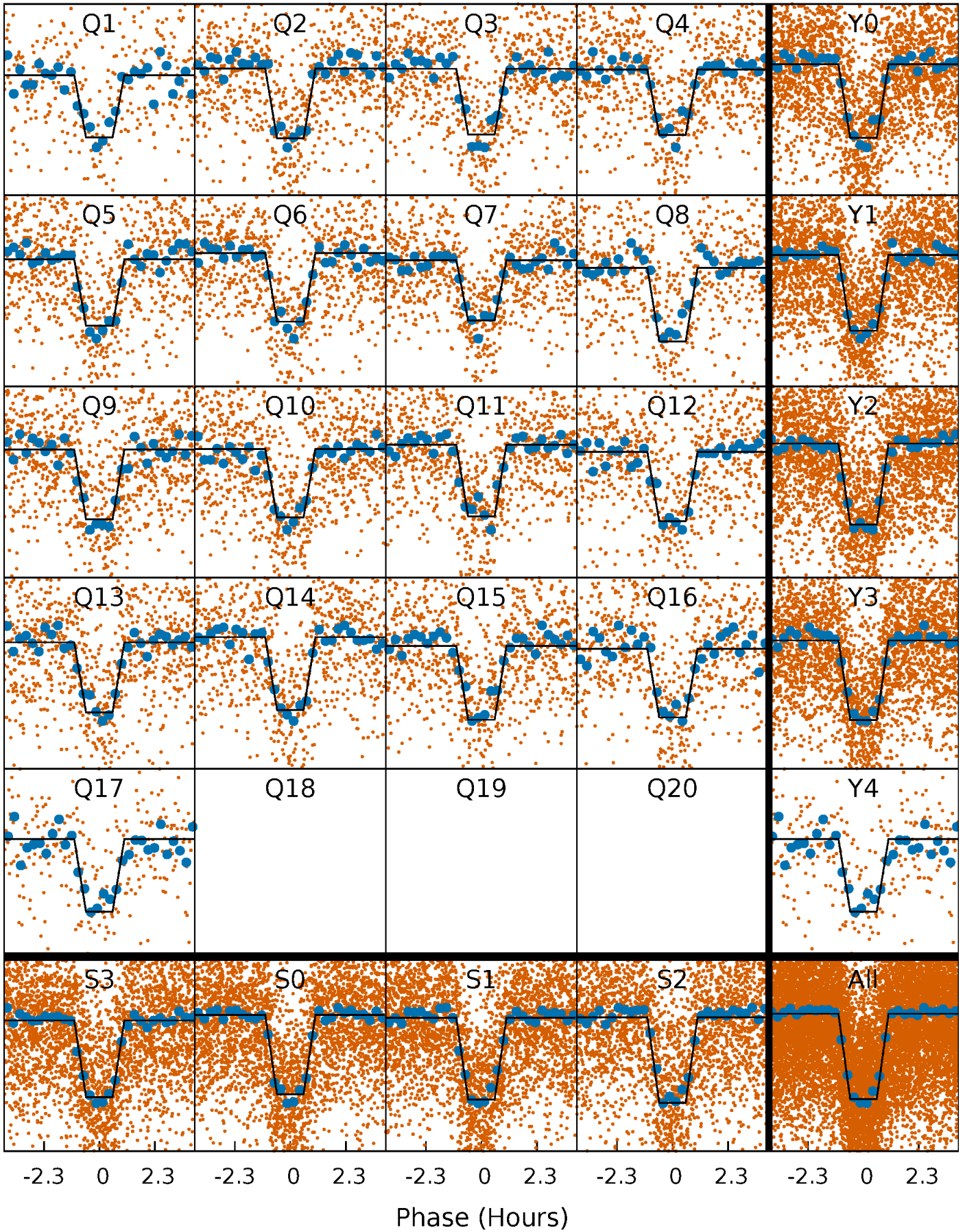
# DV Quarter-Phased Transit Curves

TCE 011192998-02   P= 1.554001 Days    $T_0=132.535609$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

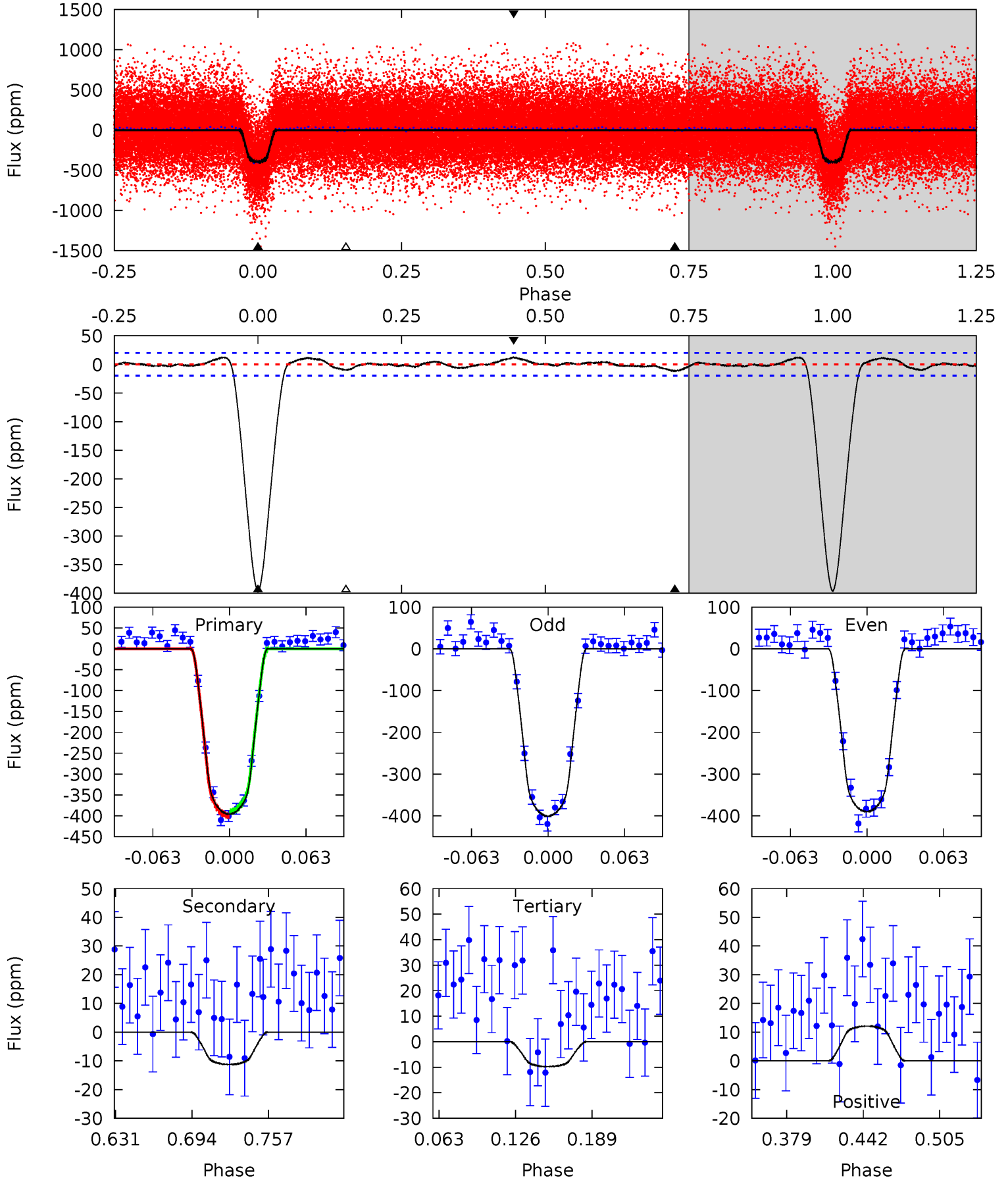
TCE 011192998-02   P= 1.554003 Days    $T_0=132.534834$  (BKJD)



# DV Model-Shift Uniqueness Test

011192998-02, P = 1.554001 Days, E = 130.981608 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  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 92.8 | 2.64 | 2.28 | 2.84 | 4.66            | 1.86            | 1.07             | 90.5    | 89.9    | 0.35    | -0.20   | 1.21    | 1.01 | 0.03  | 1.10 |

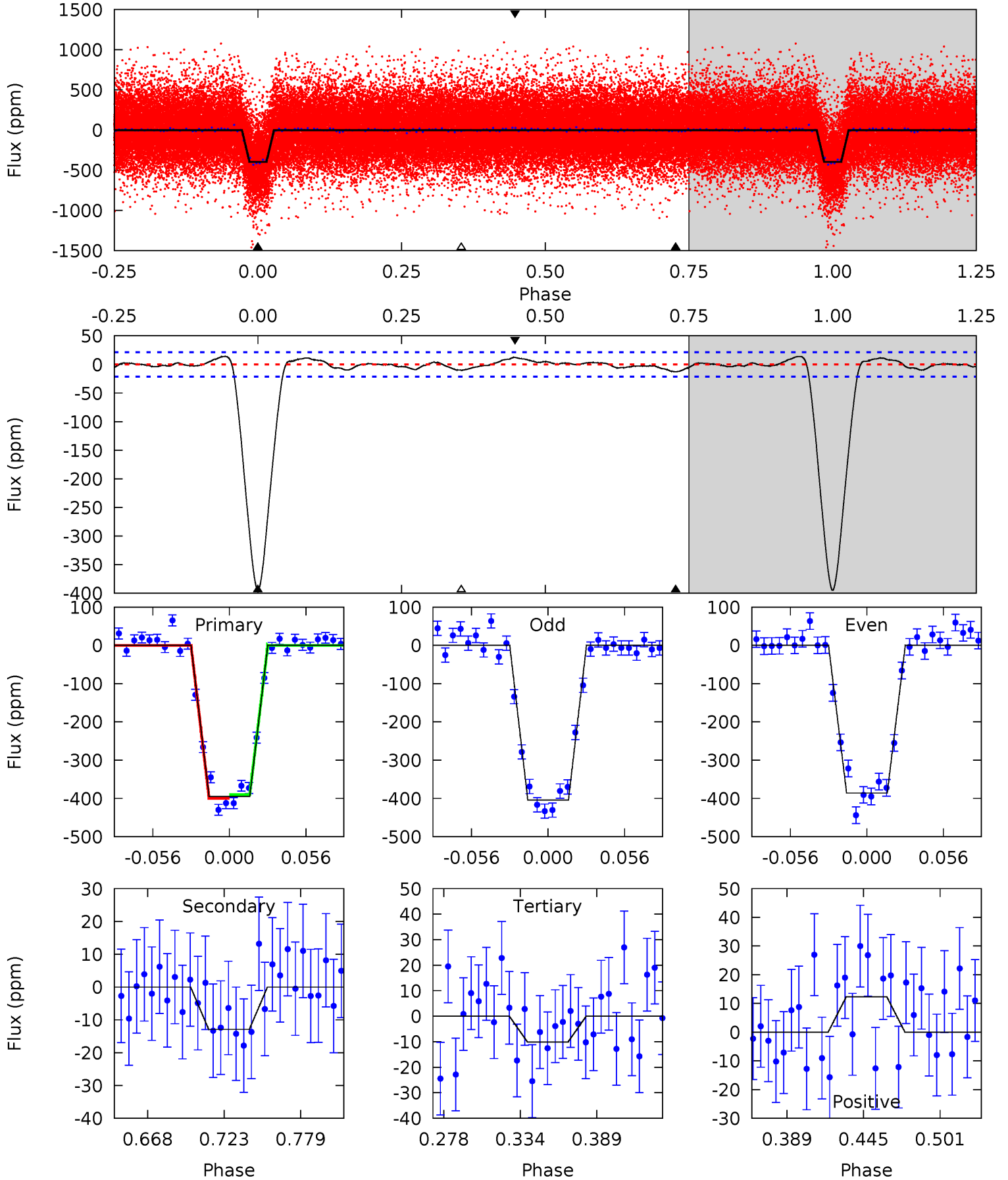




# Alt Model-Shift Uniqueness Test

011192998-02, P = 1.554003 Days, E = 130.980831 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  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 87.1 | 2.85 | 2.23 | 2.71 | 4.69            | 1.91            | 1.20             | 84.9    | 84.4    | 0.62    | 0.14    | 2.03    | 0.99 | 0.03  | 1.13 |



### Stellar Parameters For KIC 011192998

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                     | $R$ ( $R_{\odot}$ )       | $M$ ( $M_{\odot}$ )       | $p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ ) |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
|        | $5409^{+162}_{-146}$ | $4.609^{+0.030}_{-0.120}$ | $-0.300^{+0.300}_{-0.300}$ | $0.746^{+0.145}_{-0.058}$ | $0.835^{+0.080}_{-0.098}$ | $2.836^{+0.453}_{-1.016}$                     |
|        | +3%/-3%              | +1%/-3%                   | +100%/-100%                | +19%/-8%                  | +10%/-12%                 | +16%/-36%                                     |
| 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 011192998-02 / KOI 0481.02

| Detrend | Depth (ppm) | $R_p$ ( $R_{\oplus}$ ) | $T_{max}$ (K)      | $T_{obs}$ (K)        | $A_{obs}$                 |
|---------|-------------|------------------------|--------------------|----------------------|---------------------------|
| DV      | $-11 \pm 4$ | $1.84^{+0.23}_{-0.21}$ | $1867^{+90}_{-70}$ | $2713^{+192}_{-255}$ | $1.087^{+0.492}_{-0.429}$ |
| Alt.    | $-13 \pm 5$ | $1.69^{+0.22}_{-0.21}$ | $1869^{+87}_{-73}$ | $2856^{+204}_{-233}$ | $1.439^{+0.743}_{-0.567}$ |

$T_{max}$  = 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

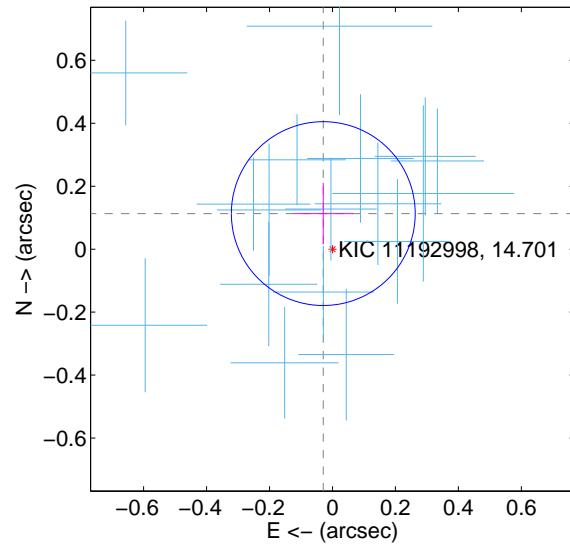
Supplemental centroid analysis for 011192998-02. Kepler magnitude: 14.70. Transit SNR 62.67

There are 17 quarters with good PRF difference image offsets

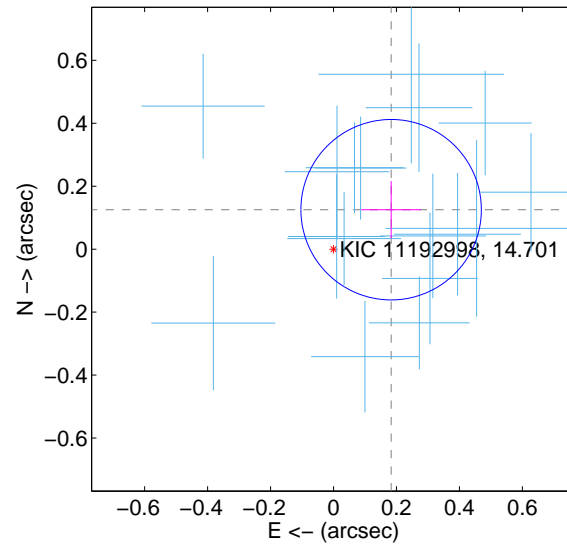
The direct PRF centroid is offset from the target star catalog position by about 0.27 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec      |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT          | $0.117 \pm 0.097$  | 1.20                | $0.029 \pm 0.095$  | $0.113 \pm 0.097$ |
| PRF-fit source offset from KIC position | $0.222 \pm 0.096$  | 2.32                | $-0.183 \pm 0.095$ | $0.125 \pm 0.091$ |
| photometric centroid source offset      | $0.13 \pm 0.17$    | 0.75                | $-0.04 \pm 0.16$   | $-0.12 \pm 0.17$  |

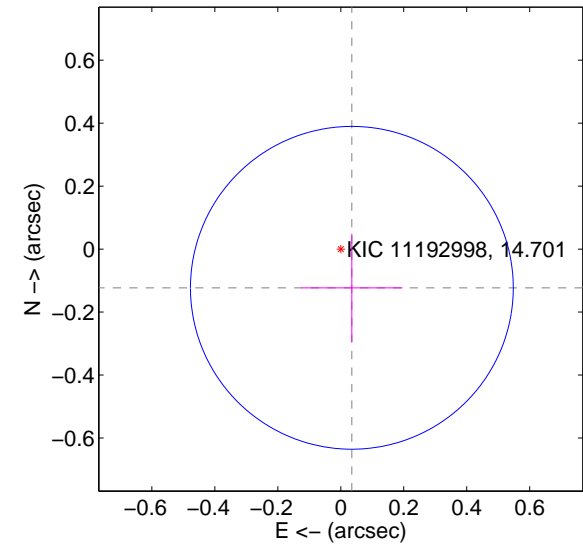
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

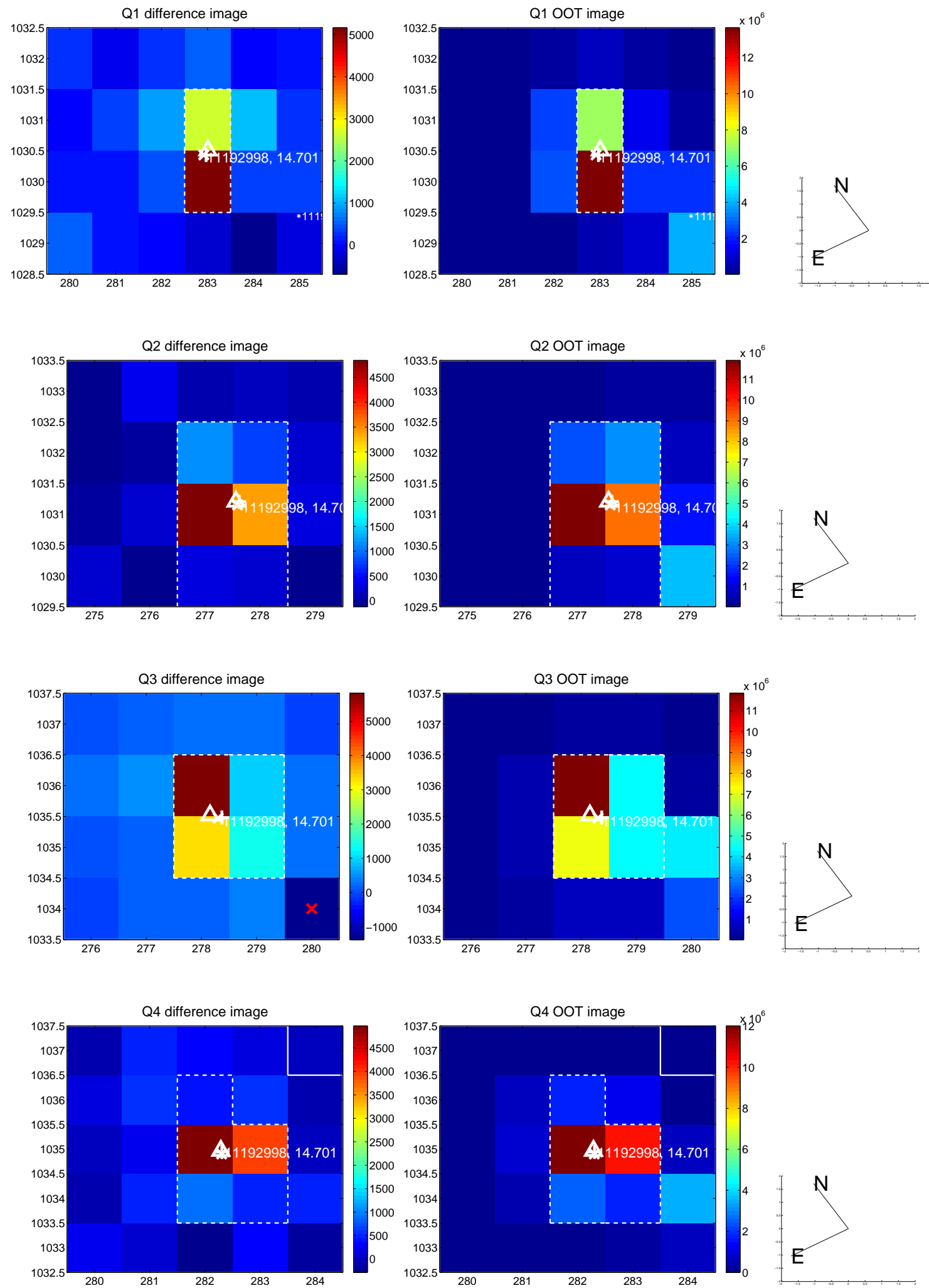


offset from photometric centroids

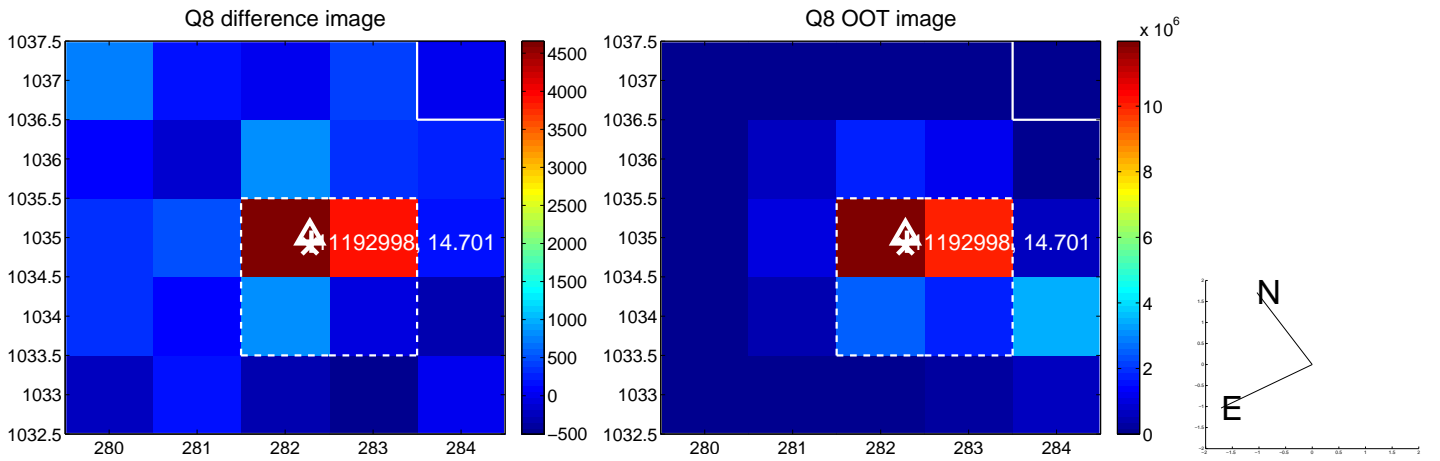
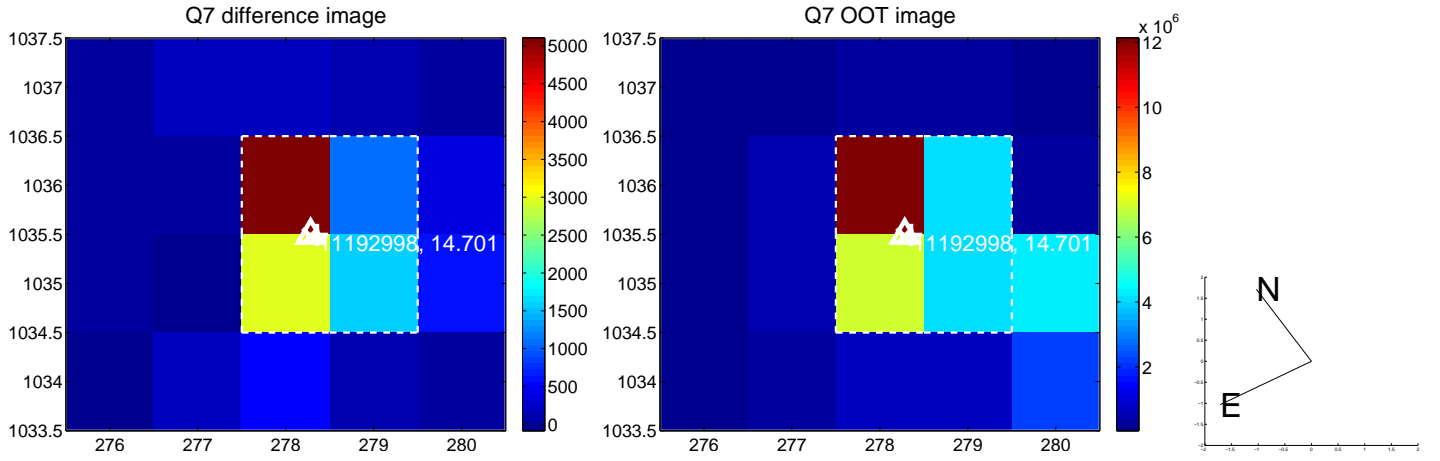
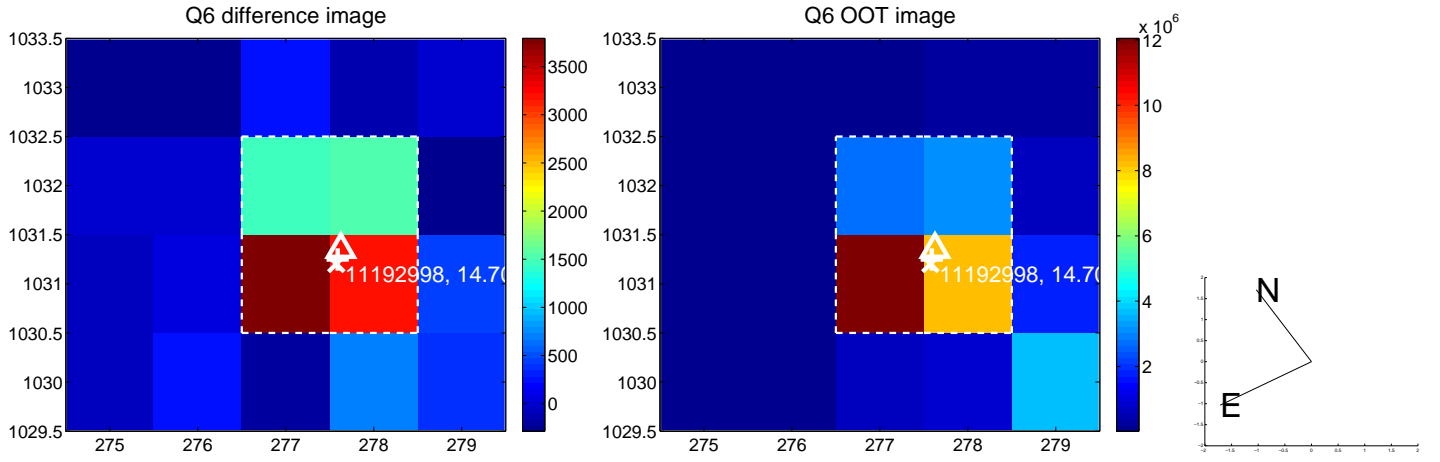
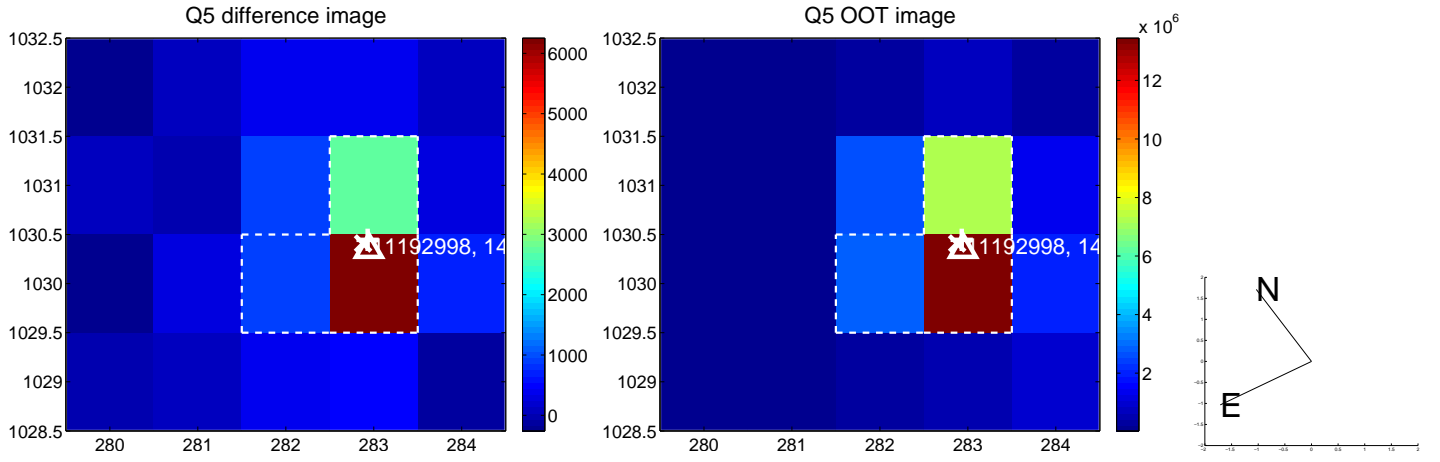


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

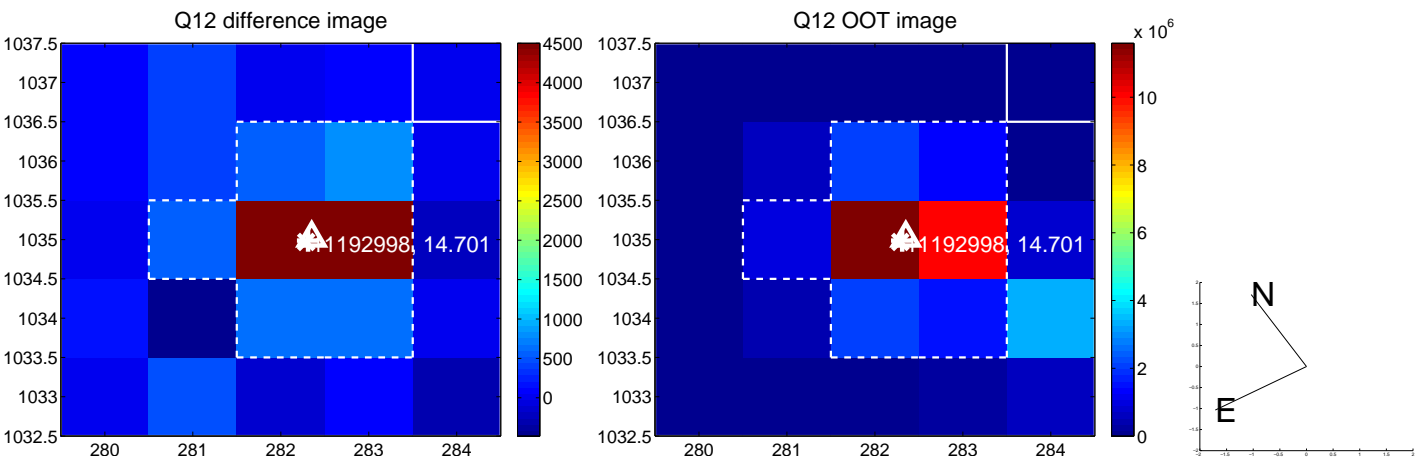
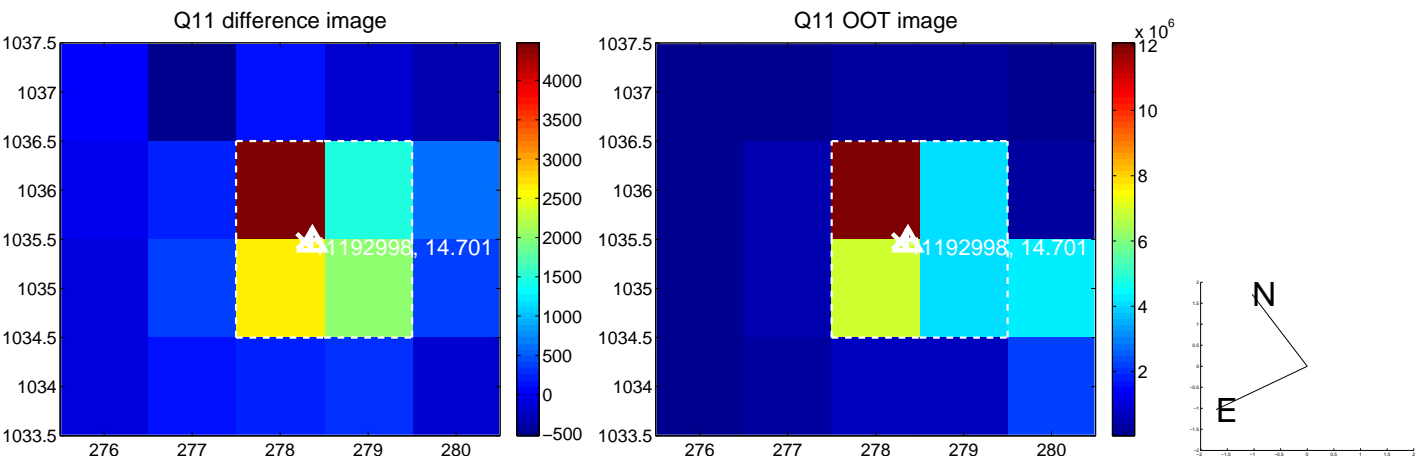
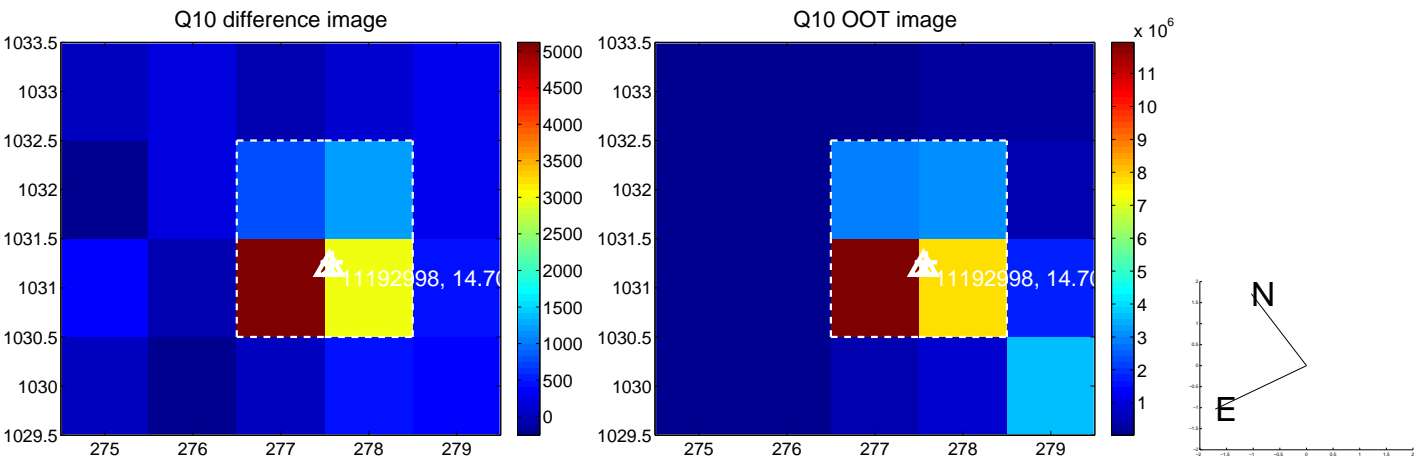
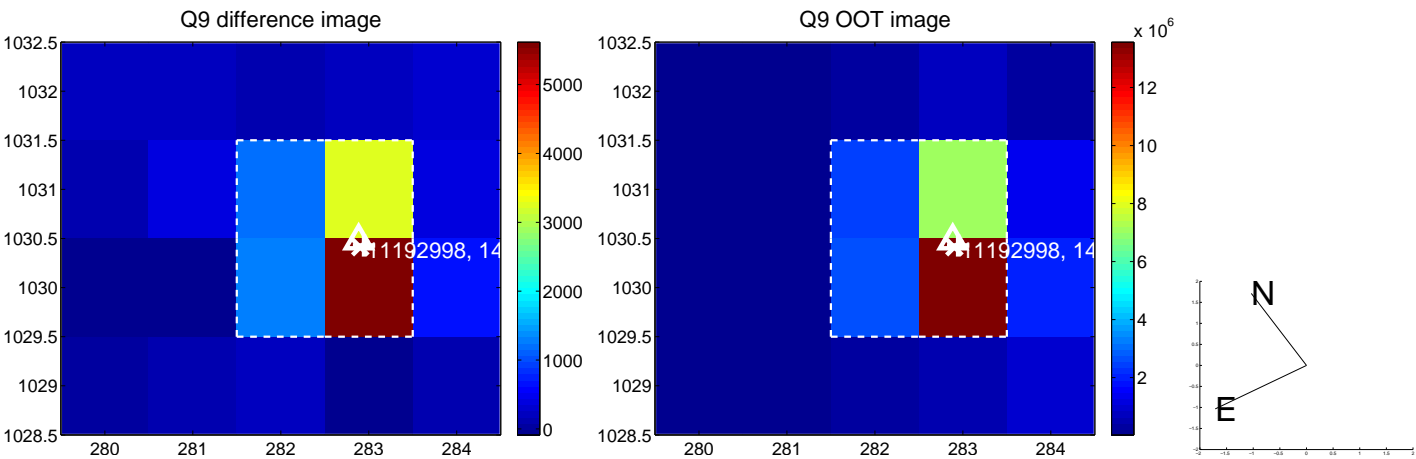
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



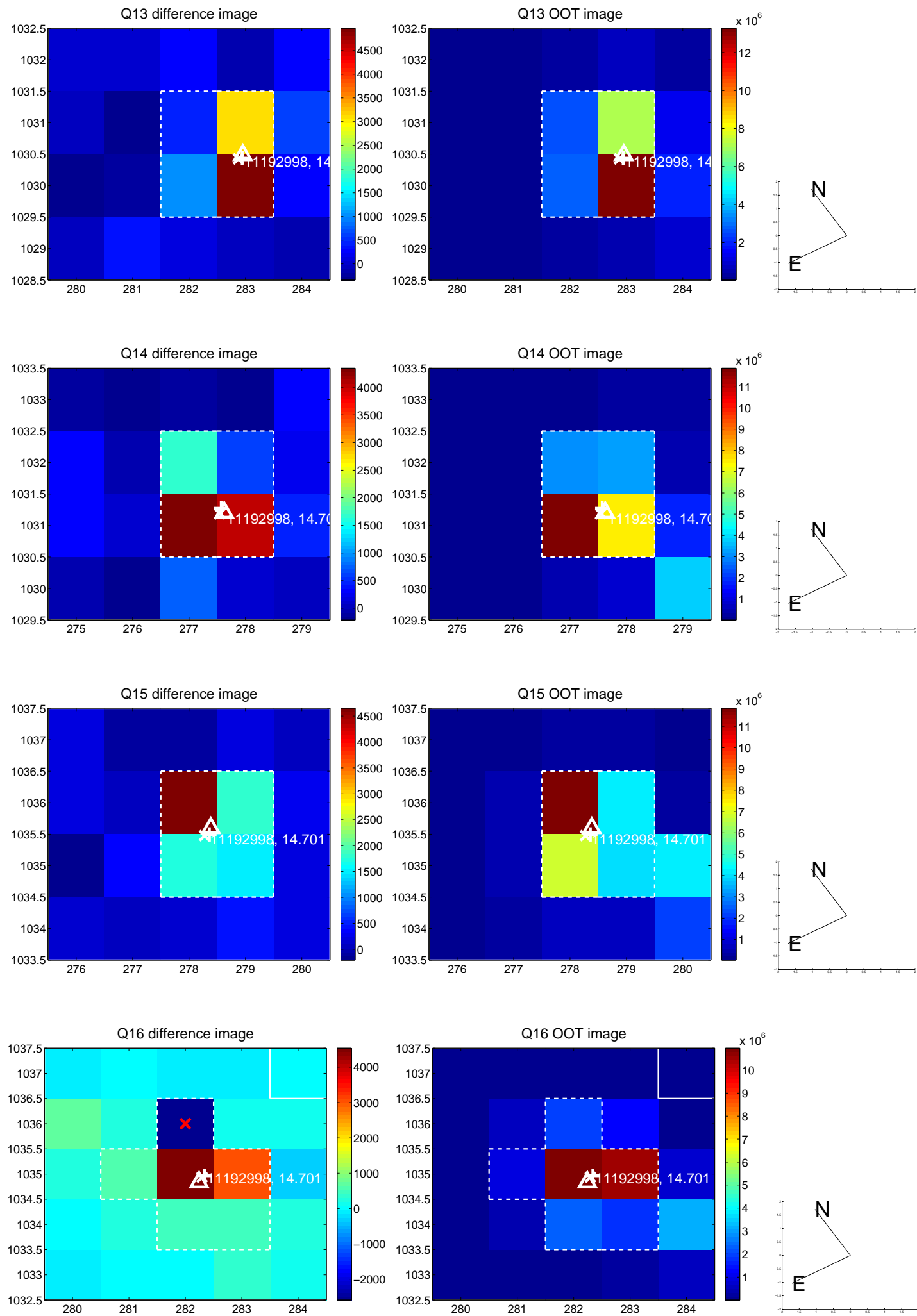
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

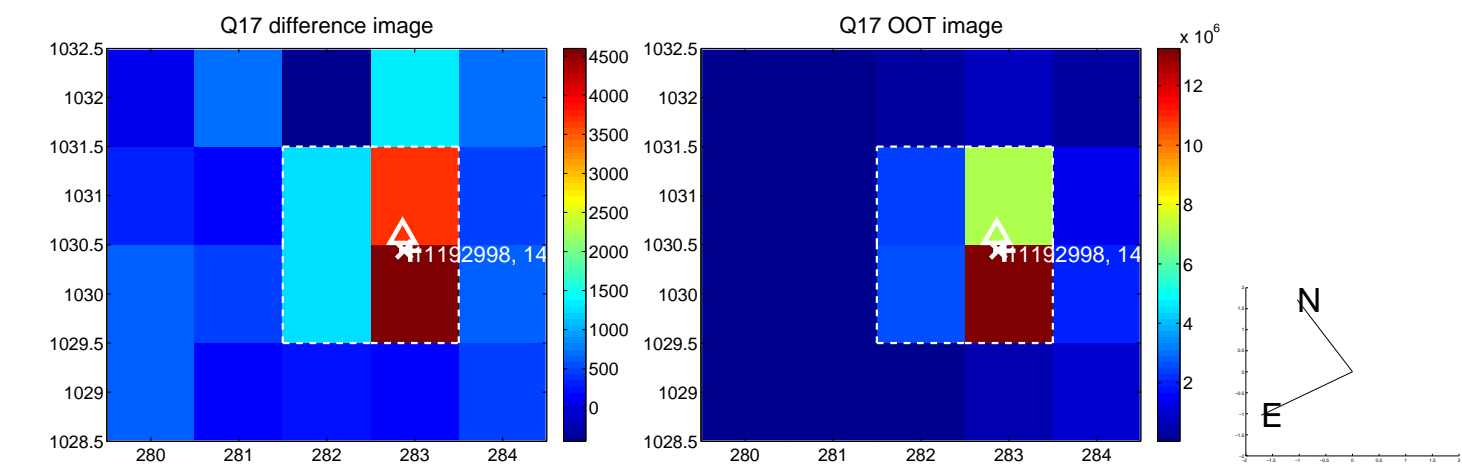


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

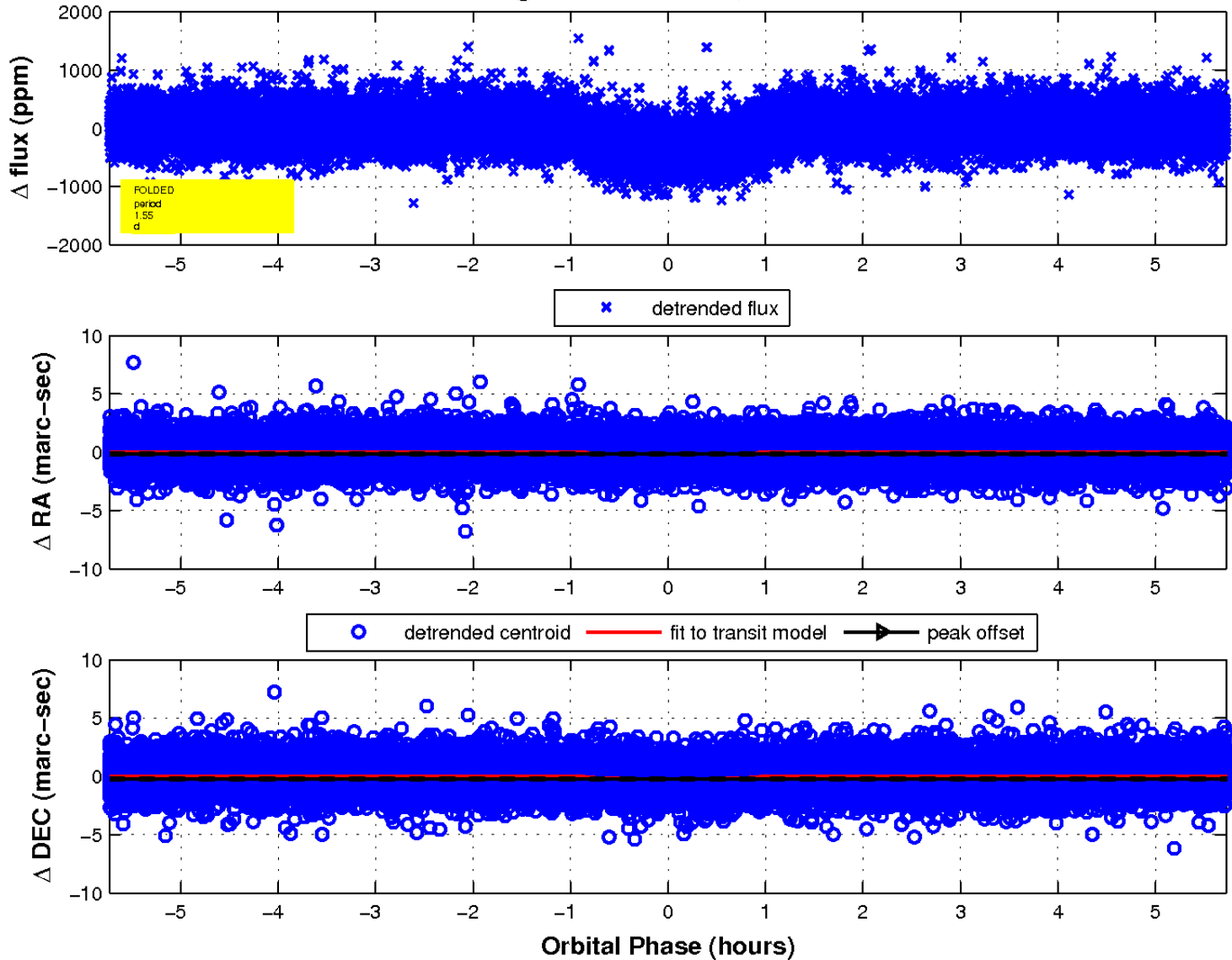




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

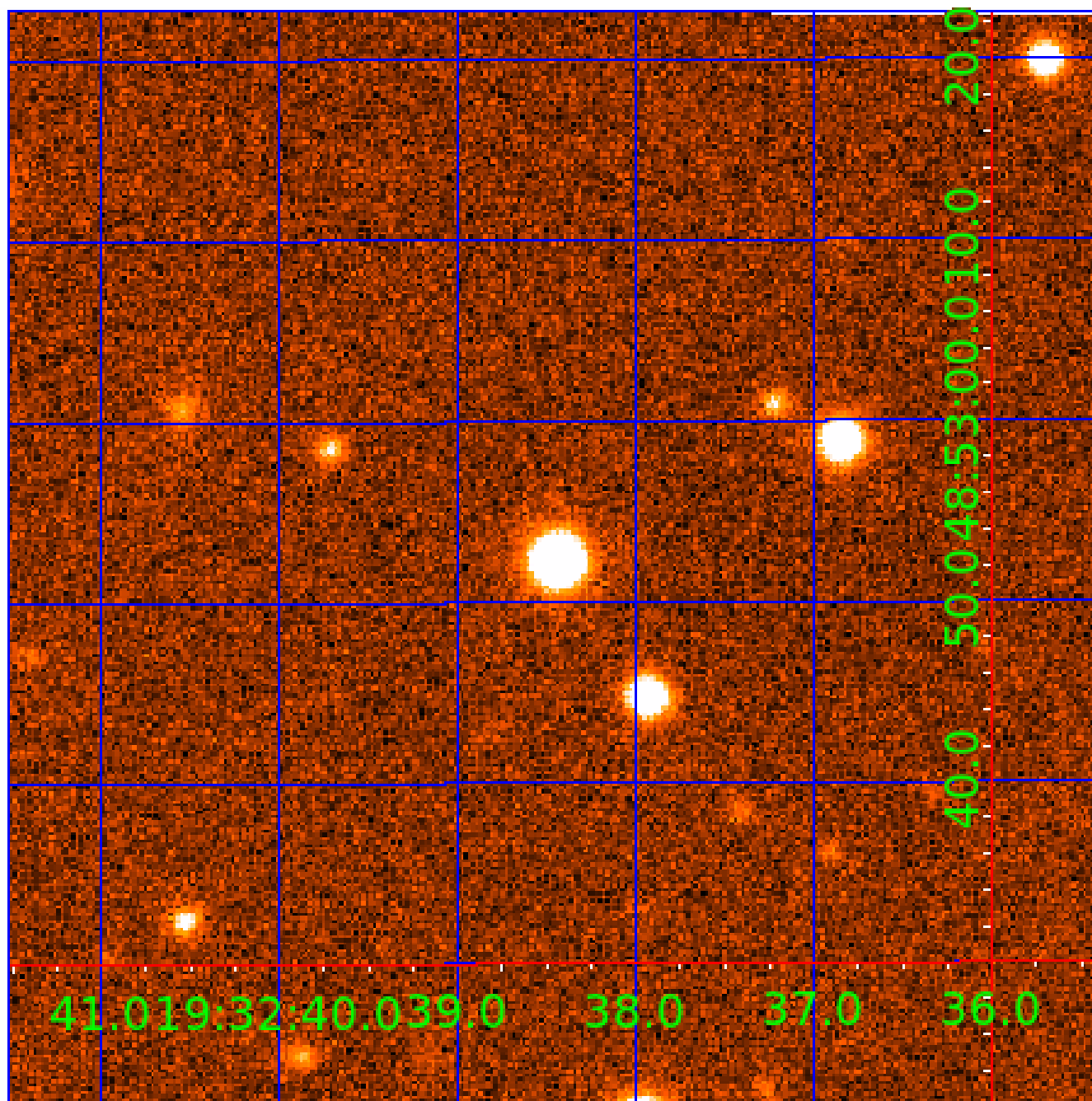


fluxWeightedCentroids, Planet 2 of 3



UKIRT Image

Declination



# KIC 01192998

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 011192998-01 | OBS      | 0481.01 | 7.650247      | 133.720954   | 958.7       | 2.861            | 68.7 | 75.4 | 0.75                        | 5409            | 2.56                   | 84.00                  |
| 011192998-02 | OBS      | 0481.02 | 1.554001      | 132.535609   | 403.1       | 1.911            | 55.1 | 62.7 | 0.75                        | 5409            | 1.79                   | 703.48                 |
| 011192998-03 | OBS      | 0481.03 | 34.259550     | 148.975688   | 1036.7      | 5.213            | 43.8 | 45.5 | 0.75                        | 5409            | 2.83                   | 11.38                  |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|------------|
| 011192998-01 | OBS      | PC   | 1.00  | 0 | 0 | 0 | 0 | NO_COMMENT |
| 011192998-02 | OBS      | PC   | 1.00  | 0 | 0 | 0 | 0 | NO_COMMENT |
| 011192998-03 | OBS      | PC   | 1.00  | 0 | 0 | 0 | 0 | NO_COMMENT |

**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.

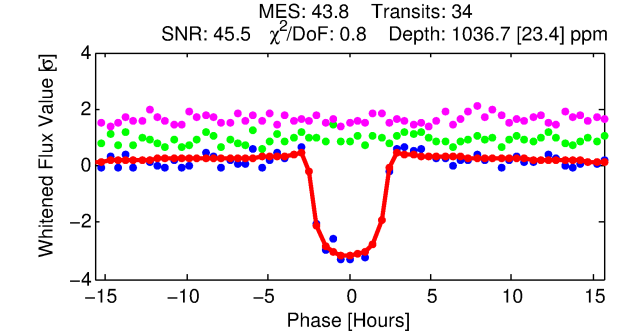
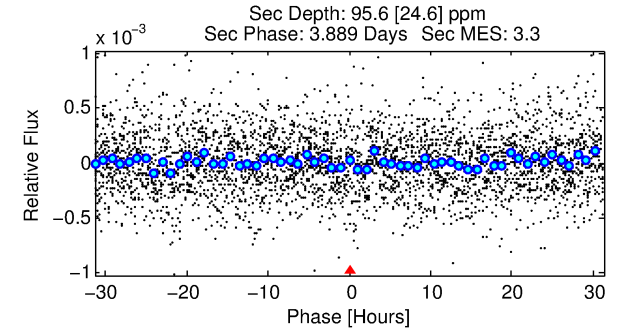
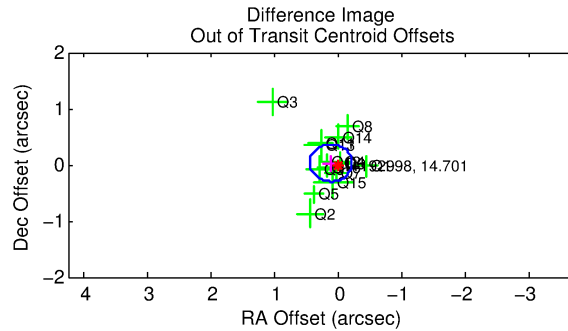
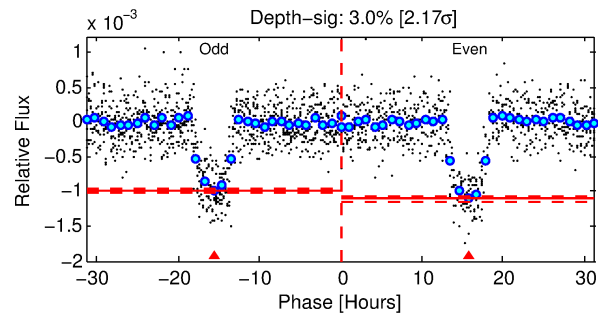
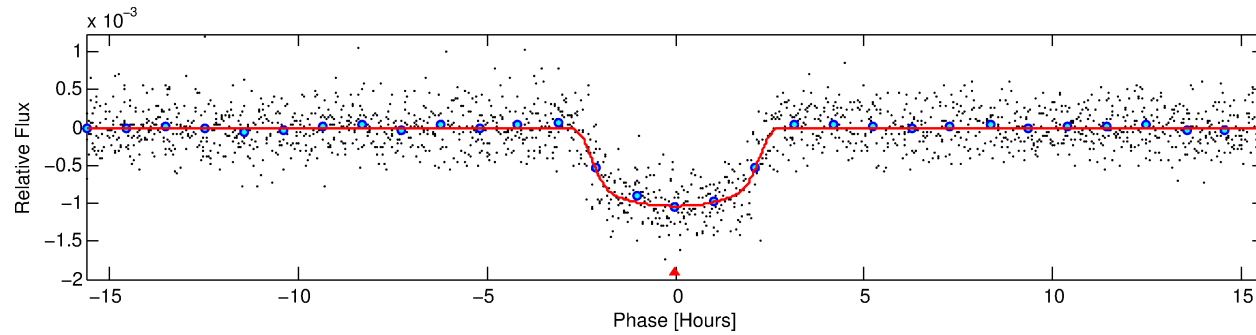
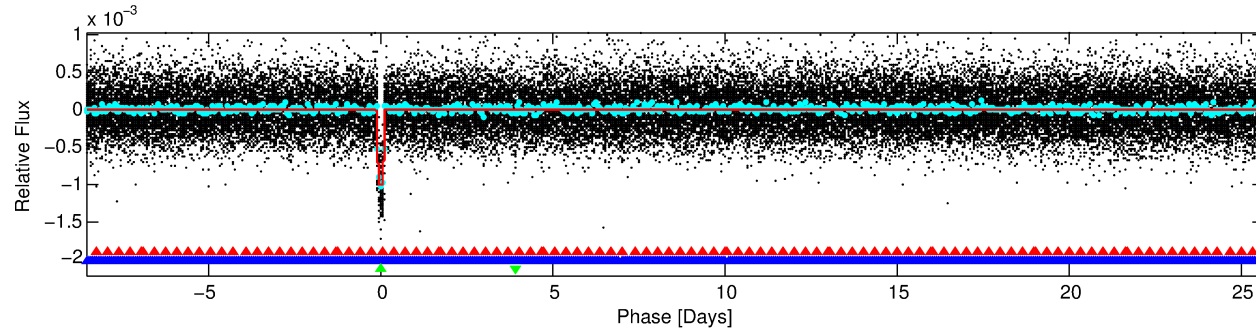
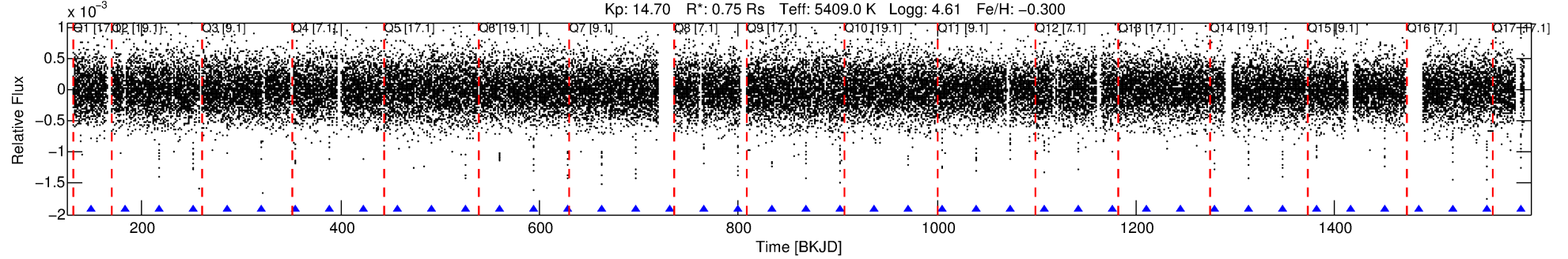
## Ephemeris Match Information For 011192998-03

No Significant Match Found

# DV One-Page Summary

KIC: 11192998 Candidate: 3 of 3 Period: 34.260 d  
KOI: K00481.03 Name: Kepler-166c Corr: 0.959

Kp: 14.70 R\*: 0.75 Rs Teff: 5409.0 K Logg: 4.61 Fe/H: -0.300



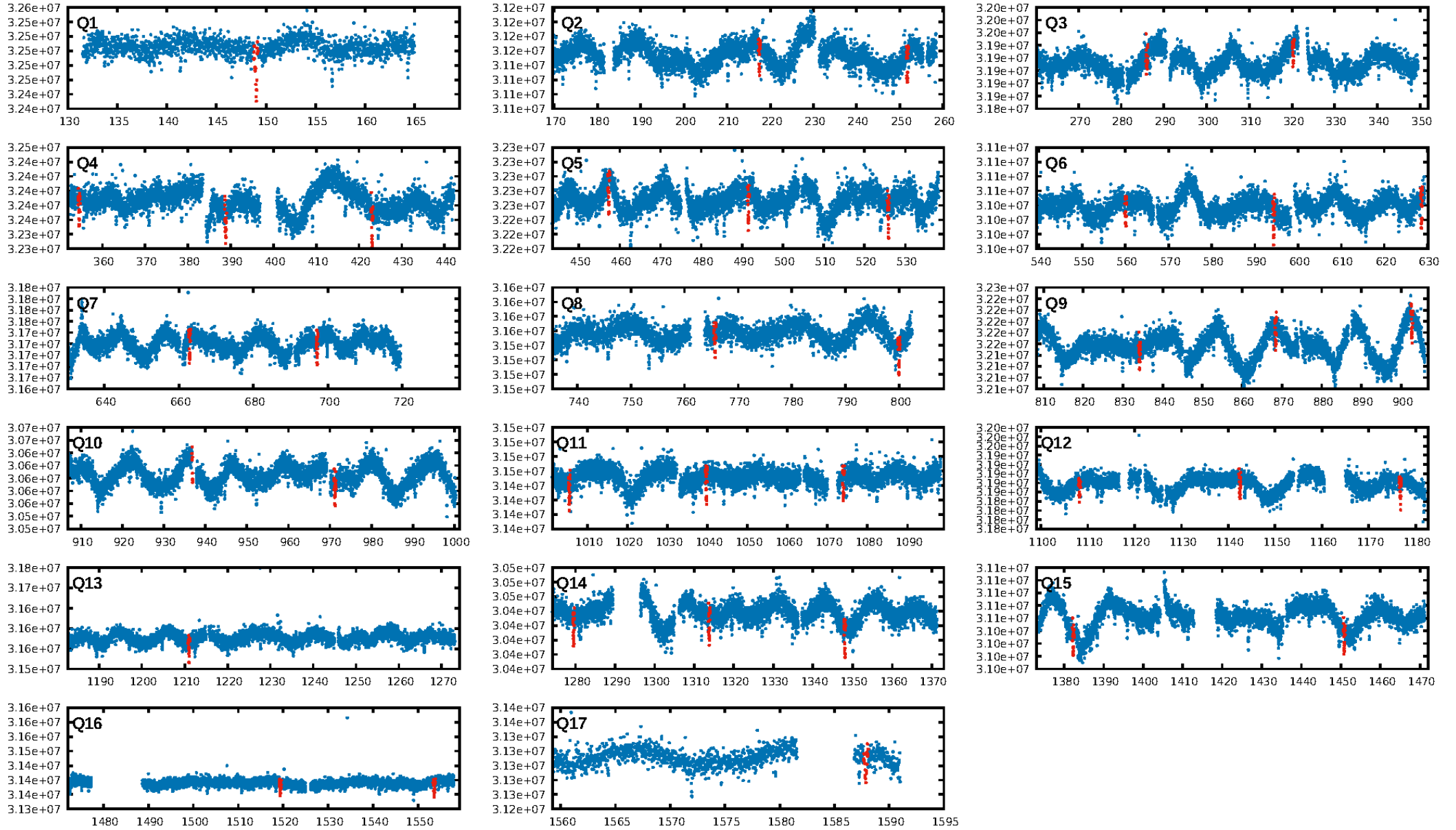
## DV Fit Results:

Period = 34.25955 [0.00009] d  
Epoch = 148.9757 [0.0023] BKJD  
Rp/R\* = 0.0347 [0.0012]  
a/R\* = 27.14 [3.77]  
b = 0.88 [0.04]  
Seff = 11.38 [2.90]  
Teq = 468 [30] K  
Rp = 2.83 [0.56] Re  
a = 0.1937 [0.0308] AU  
Ag = 246.46 [86.04] [2.85σ]  
Teffp = 2869 [210] K [11.33σ]

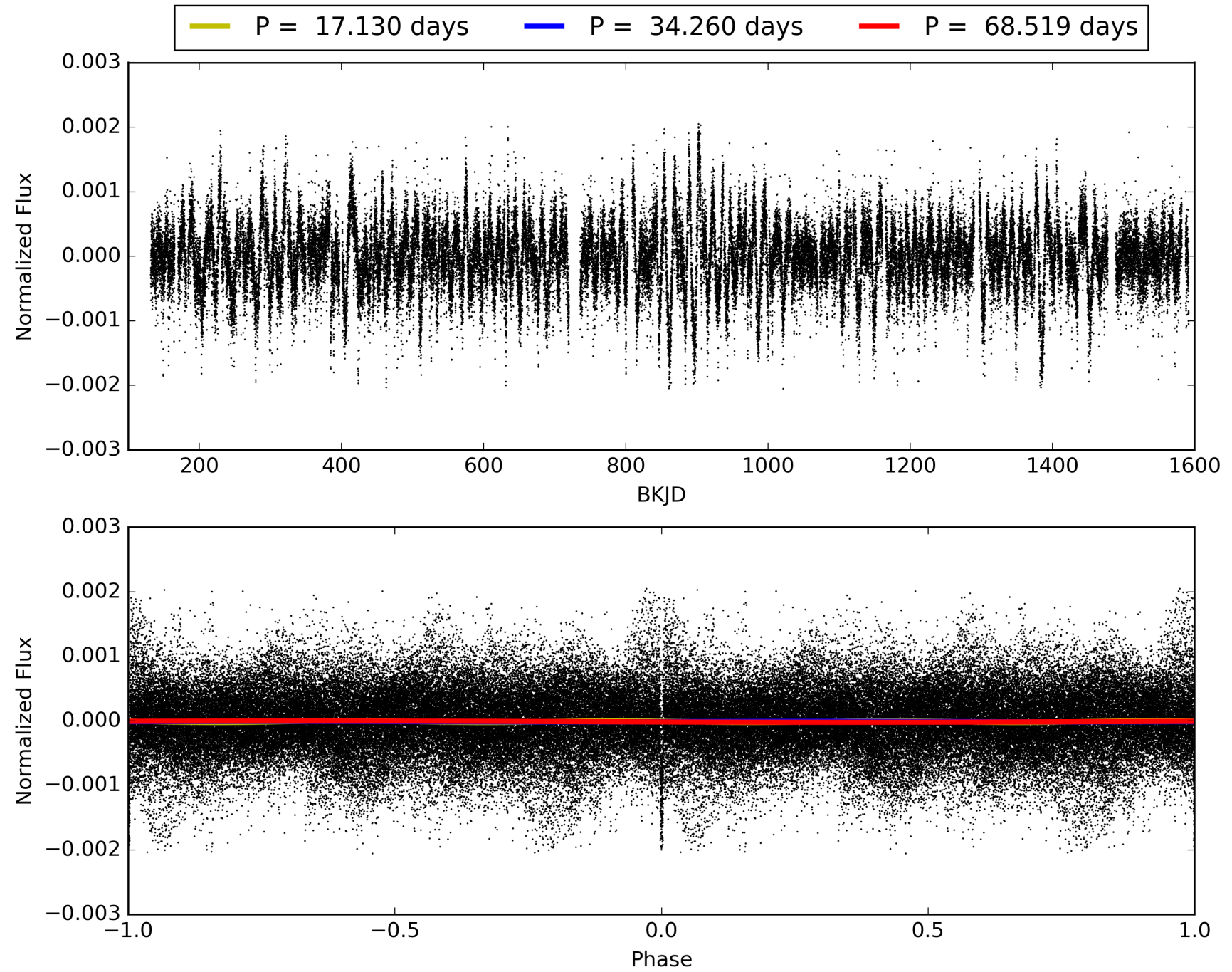
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [107.40σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 54.2%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [33/33]  
GhostDiagnostic-chr: 3.089  
Centroid-sig: 0.0%  
Centroid-so: 0.496 arcsec [2.64σ]  
OotOffset-rm: 0.122 arcsec [1.11σ]  
KicOffset-rm: 0.087 arcsec [0.81σ]  
OotOffset-st: 3/4/4/4 [15]  
KicOffset-st: 3/4/4/4 [15]  
DiffImageQuality-fgm: 1.00 [15/15]  
DiffImageOverlap-fno: 0.20 [3/15]

# TCE 011192998-03, PDC Light Curves



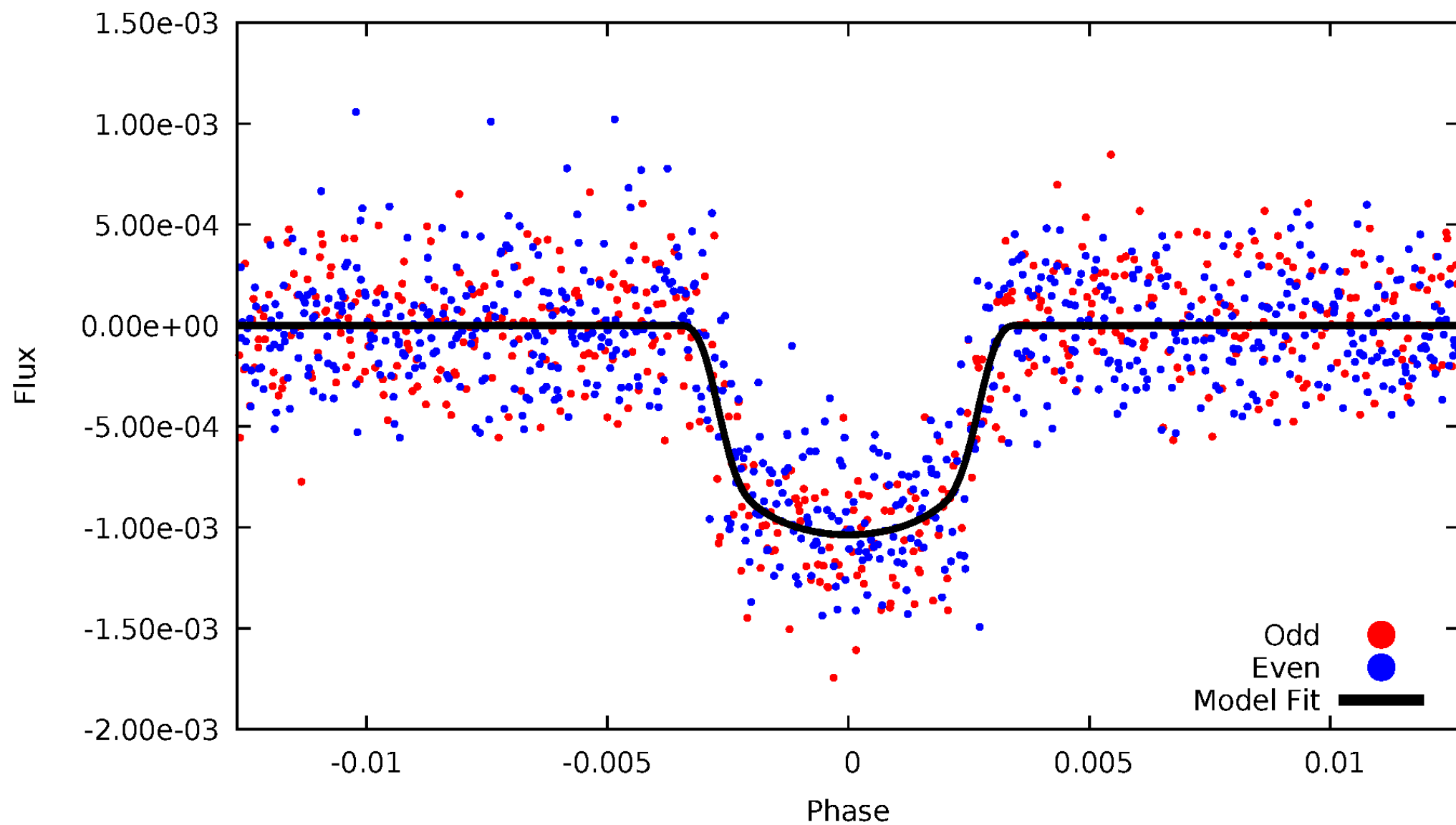
# TCE 011192998-03





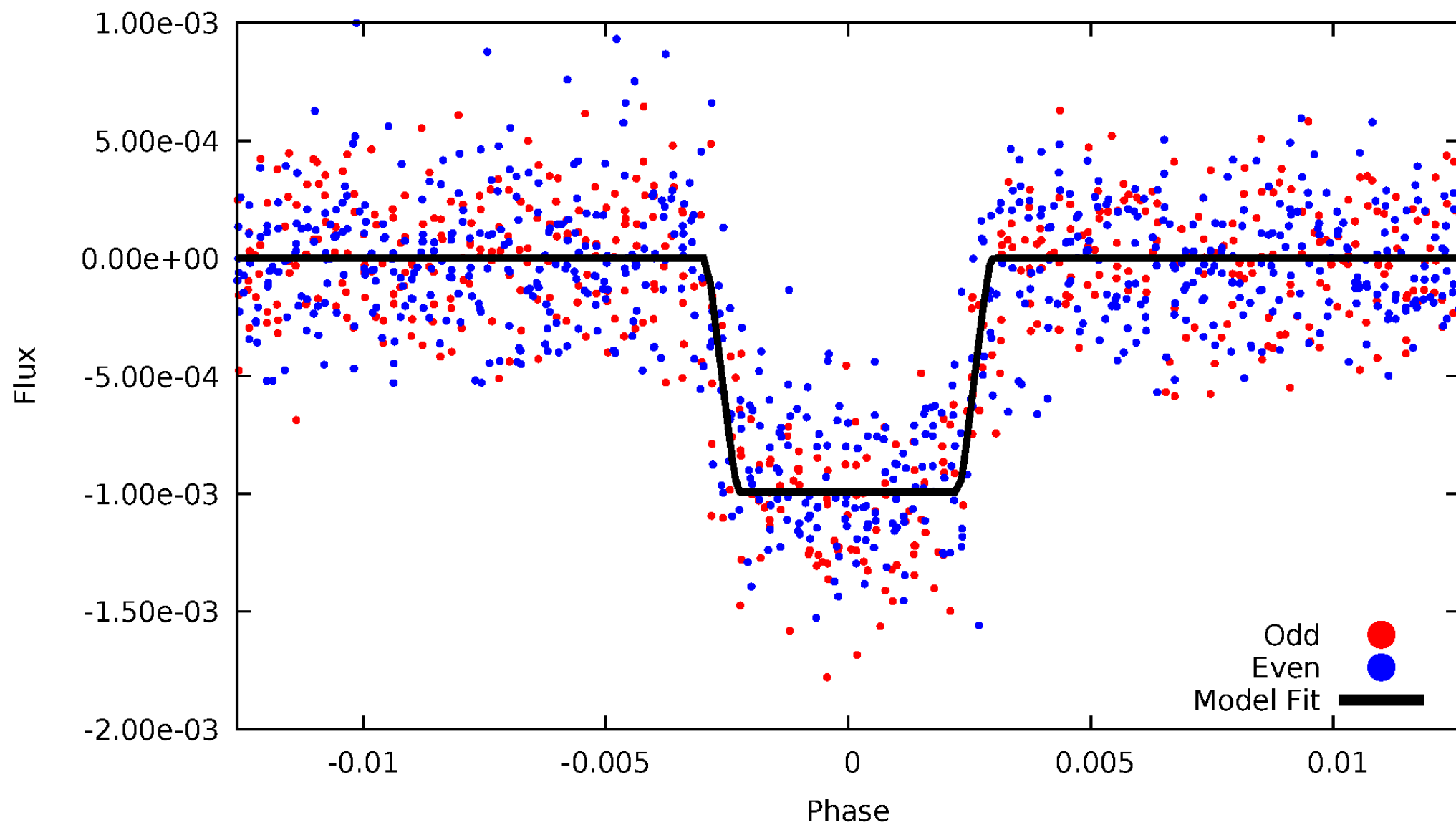
DV Odd/Even

TCE 011192998-03



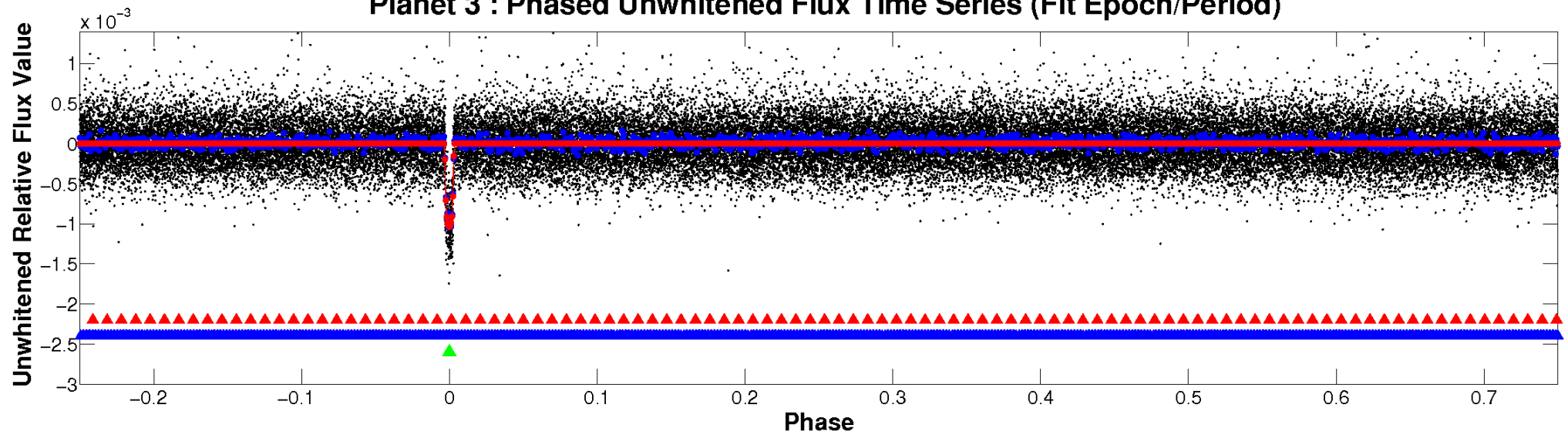
# ALT Odd/Even

TCE 011192998-03

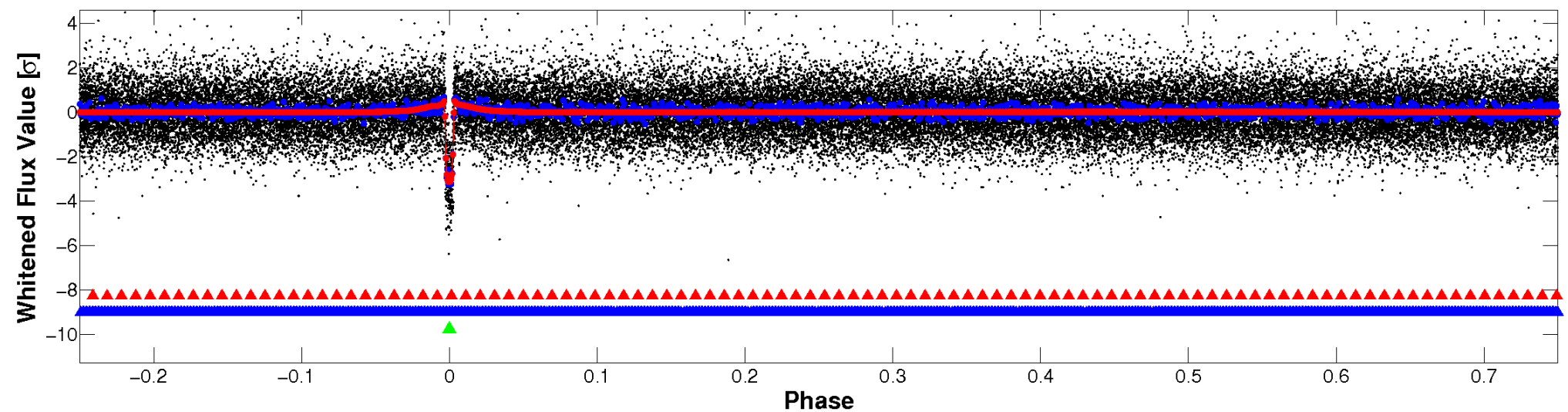


# Non-Whitened Vs. Whitened Light Curve

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

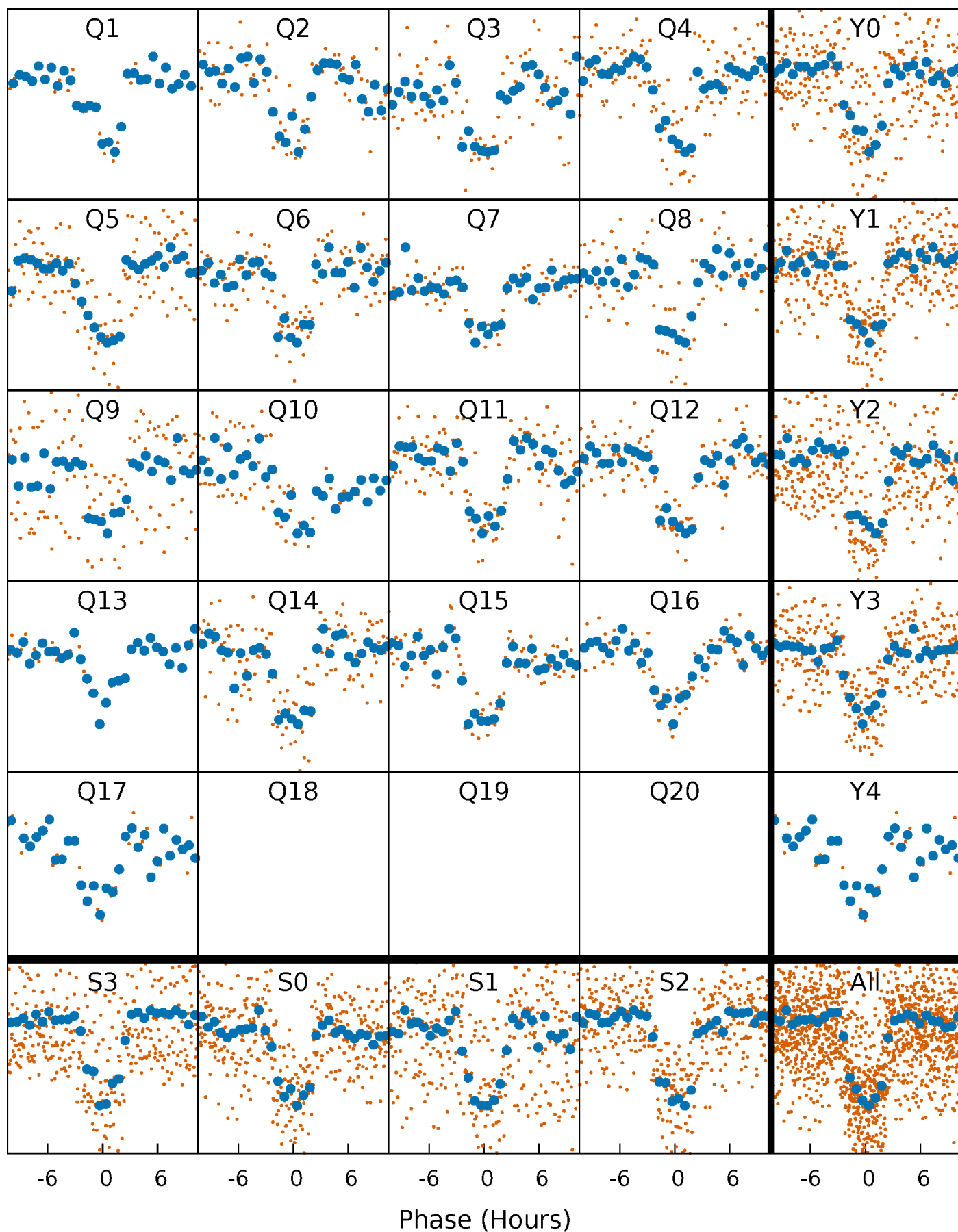


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



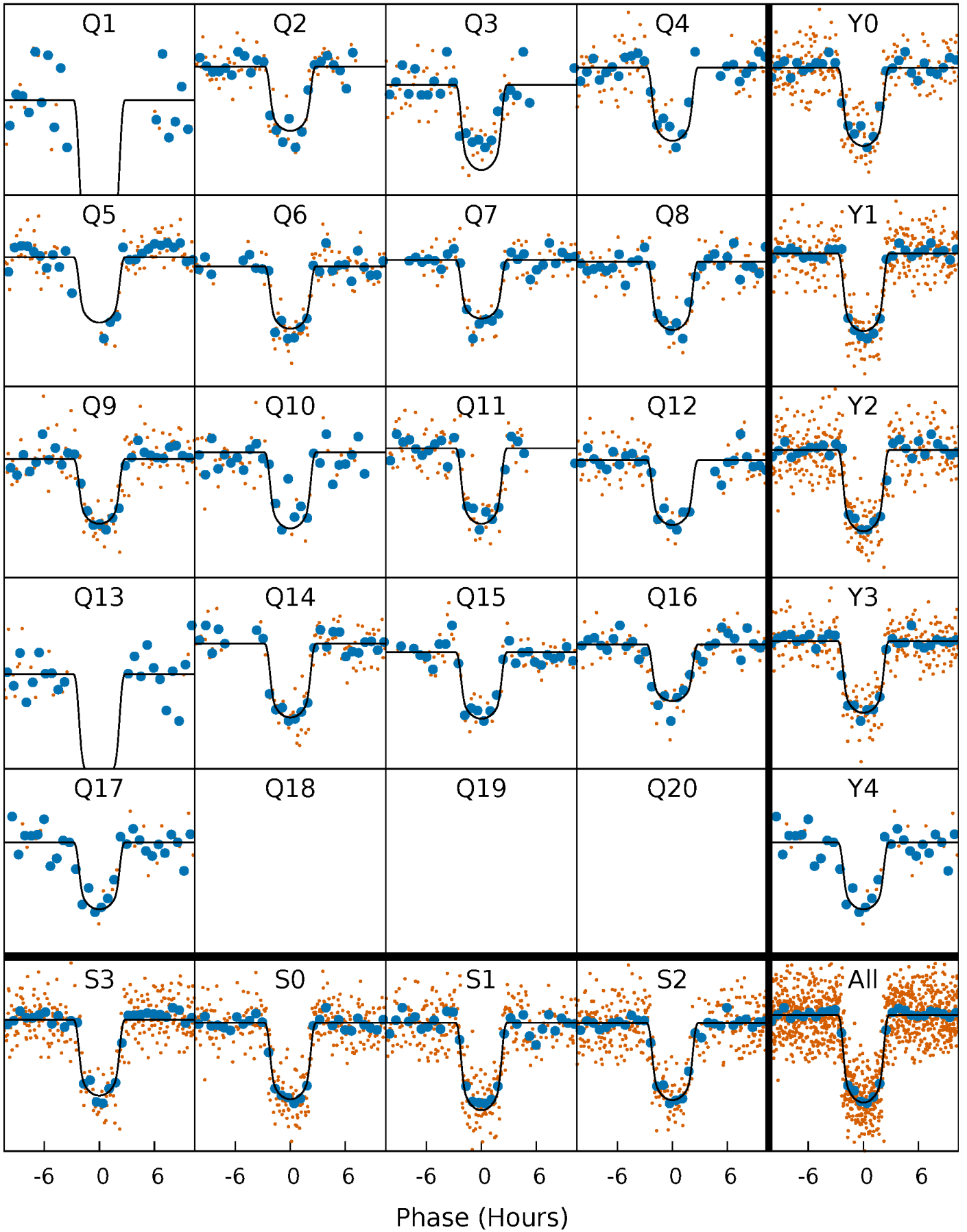
# PDC Quarter-Phased Transit Curves

TCE 011192998-03 P= 34.259550 Days  $T_0=148.975688$  (BKJD)



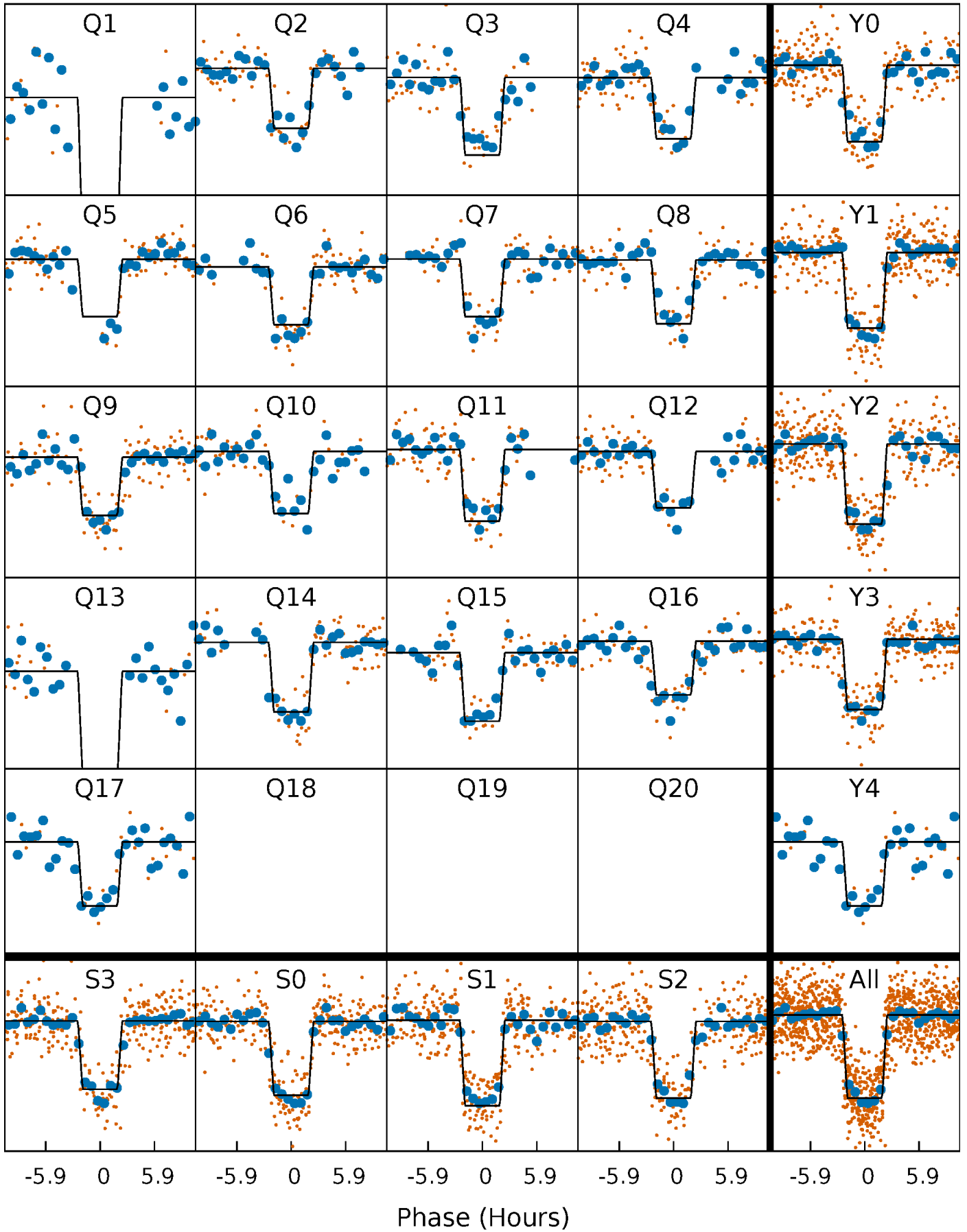
# DV Quarter-Phased Transit Curves

TCE 011192998-03 P= 34.259550 Days  $T_0=148.975688$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 011192998-03     $P = 34.259738$  Days     $T_0 = 148.972430$  (BKJD)

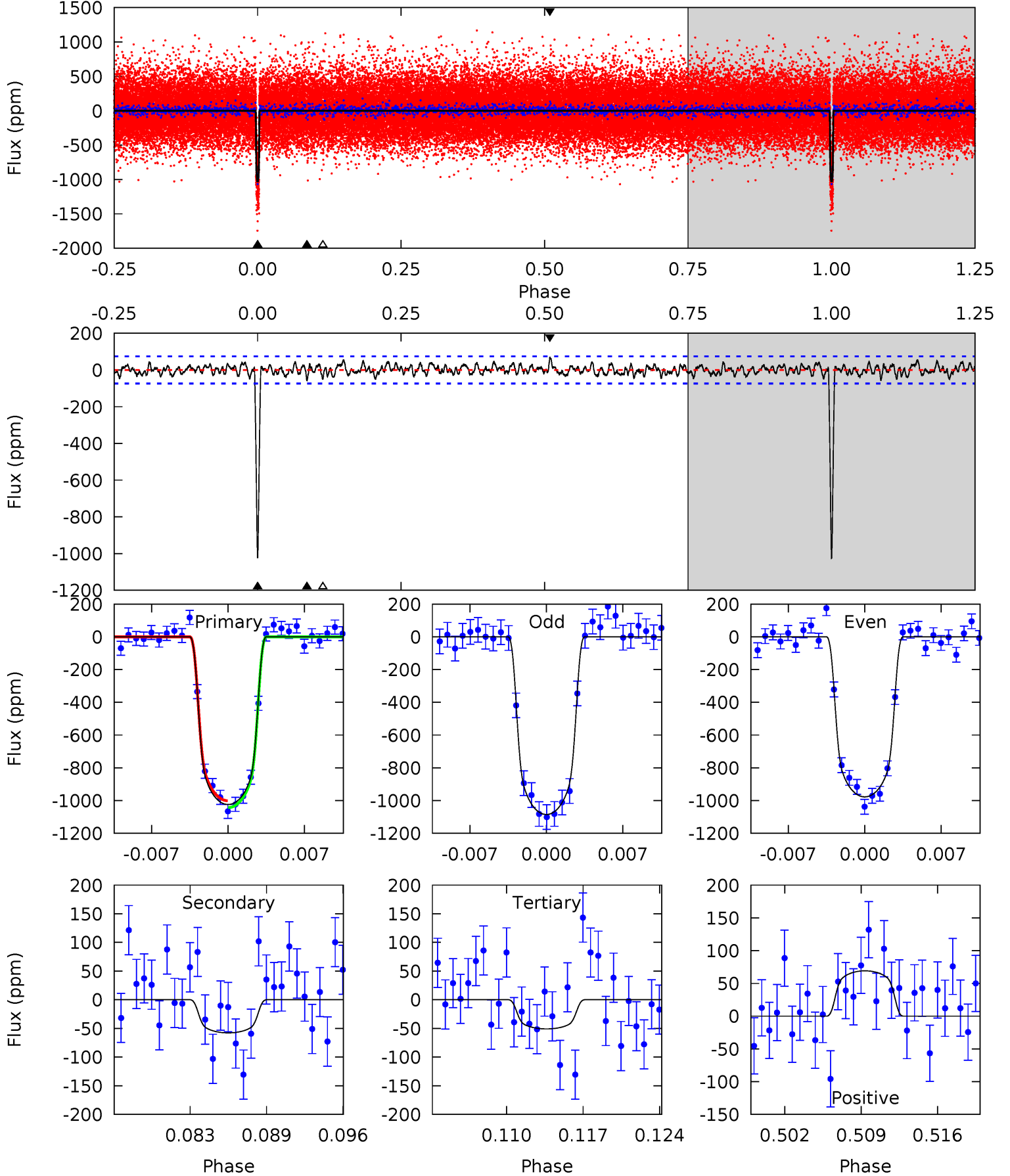




# DV Model-Shift Uniqueness Test

011192998-03, P = 34.259550 Days, E = 114.716138 Days

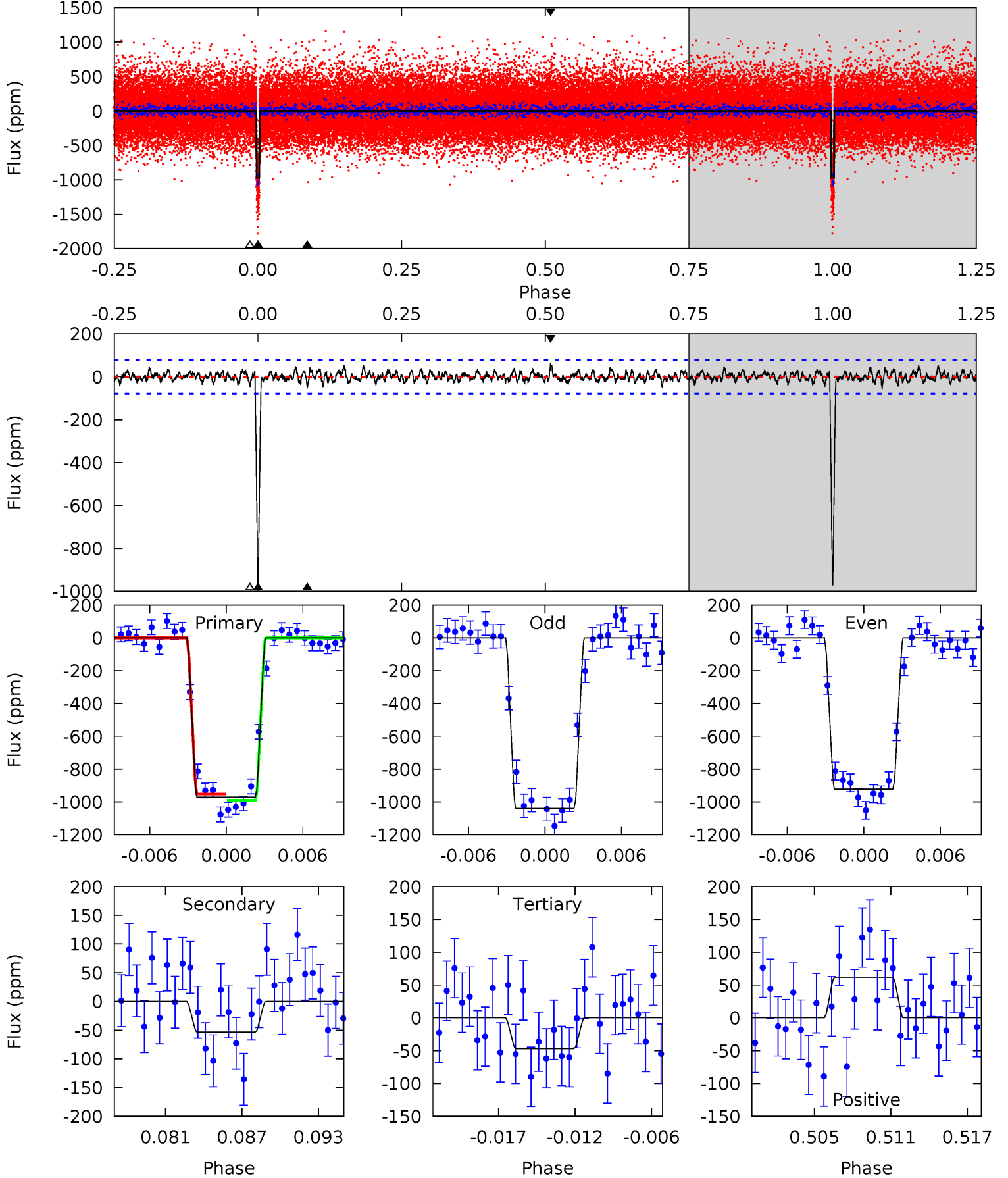
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 70.2 | 3.96 | 3.49 | 4.74 | 5.10            | 2.70            | 1.35             | 66.7    | 65.5    | 0.47    | -0.78   | 3.64    | 1.01 | 0.06  | 1.43 |



# Alt Model-Shift Uniqueness Test

011192998-03, P = 34.259738 Days, E = 114.712692 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  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 63.1 | 3.46 | 3.04 | 4.00 | 5.13            | 2.76            | 1.05             | 60.1    | 59.1    | 0.42    | -0.55   | 3.77    | 1.02 | 0.06  | 1.27 |



### Stellar Parameters For KIC 011192998

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                     | $R$ ( $R_{\odot}$ )       | $M$ ( $M_{\odot}$ )       | $p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ ) |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
|        | $5409^{+162}_{-146}$ | $4.609^{+0.030}_{-0.120}$ | $-0.300^{+0.300}_{-0.300}$ | $0.746^{+0.145}_{-0.058}$ | $0.835^{+0.080}_{-0.098}$ | $2.836^{+0.453}_{-1.016}$                     |
|        | +3%/-3%              | +1%/-3%                   | +100%/-100%                | +19%/-8%                  | +10%/-12%                 | +16%/-36%                                     |
| 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 011192998-03 / KOI 0481.03

| Detrend | Depth (ppm)  | $R_p$ ( $R_{\oplus}$ ) | $T_{\text{max}}$ (K) | $T_{\text{obs}}$ (K) | $A_{\text{obs}}$  |
|---------|--------------|------------------------|----------------------|----------------------|-------------------|
| DV      | $-58 \pm 15$ | $2.91^{+0.26}_{-0.22}$ | $668^{+29}_{-26}$    | $3131^{+132}_{-146}$ | $136^{+44}_{-37}$ |
| Alt.    | $-53 \pm 15$ | $2.63^{+0.26}_{-0.19}$ | $668^{+31}_{-26}$    | $3185^{+154}_{-163}$ | $156^{+50}_{-50}$ |

$T_{\text{max}}$  = 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

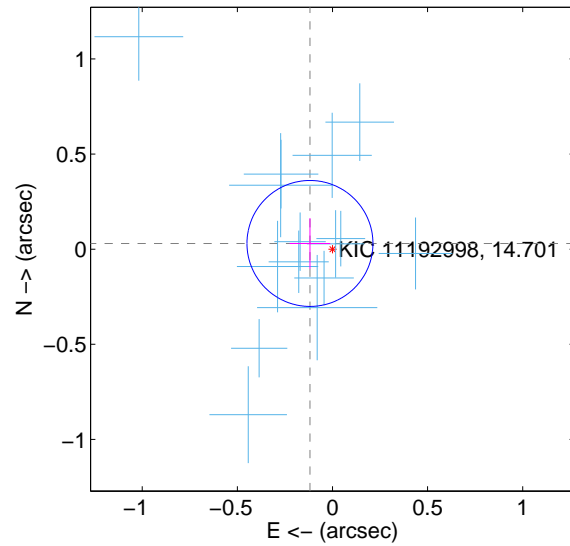
Supplemental centroid analysis for 011192998-03. Kepler magnitude: 14.70. Transit SNR 45.52

There are 15 quarters with good PRF difference image offsets

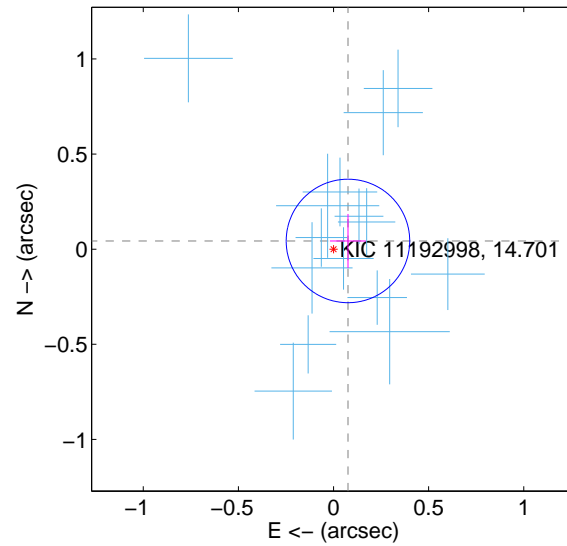
The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec      |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT          | $0.122 \pm 0.110$  | 1.11                | $0.118 \pm 0.106$  | $0.030 \pm 0.133$ |
| PRF-fit source offset from KIC position | $0.087 \pm 0.108$  | 0.81                | $-0.076 \pm 0.095$ | $0.043 \pm 0.142$ |
| photometric centroid source offset      | $0.50 \pm 0.19$    | 2.64                | $-0.49 \pm 0.19$   | $-0.07 \pm 0.20$  |

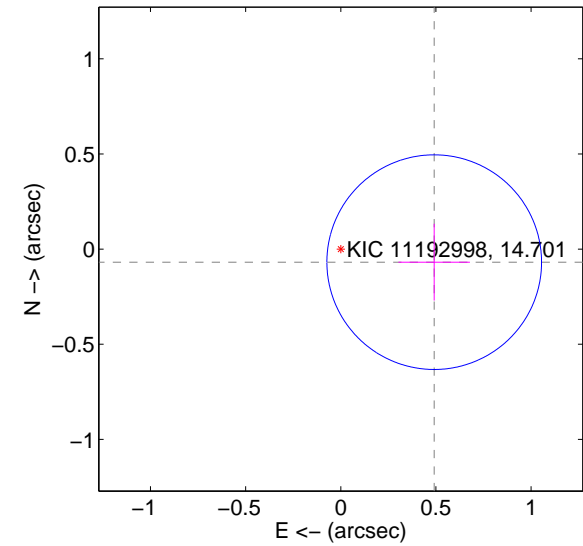
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

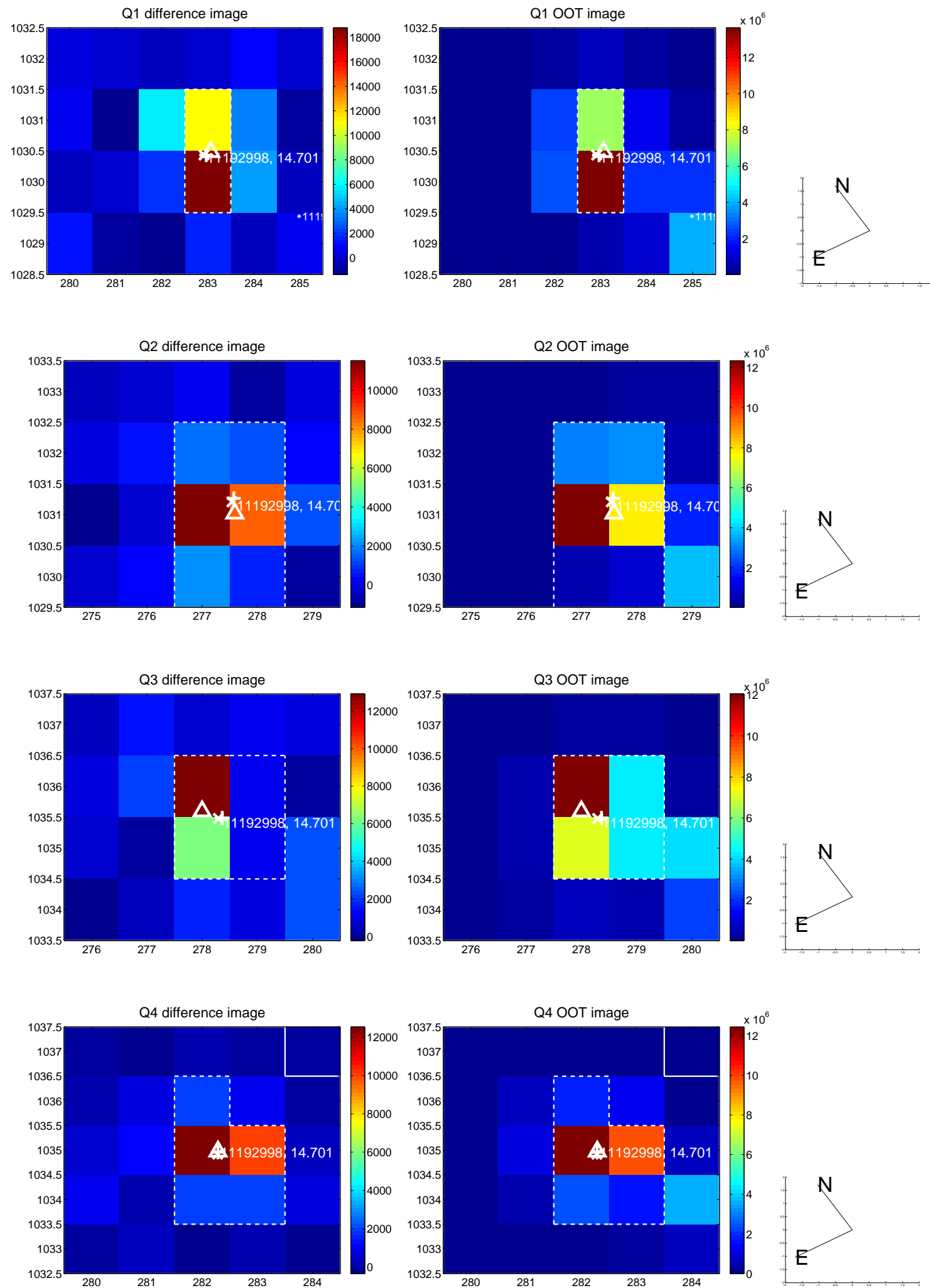


offset from photometric centroids

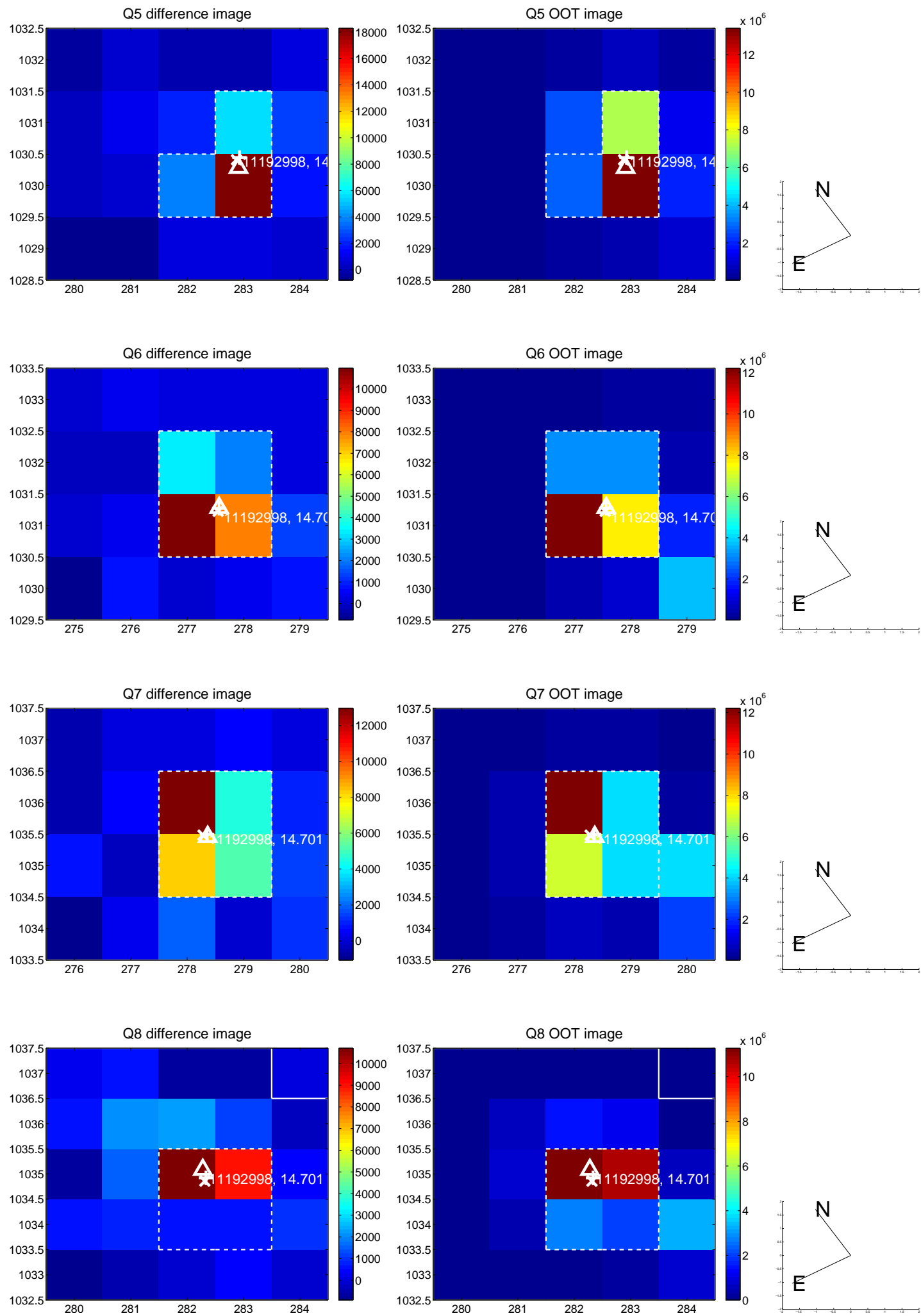


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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

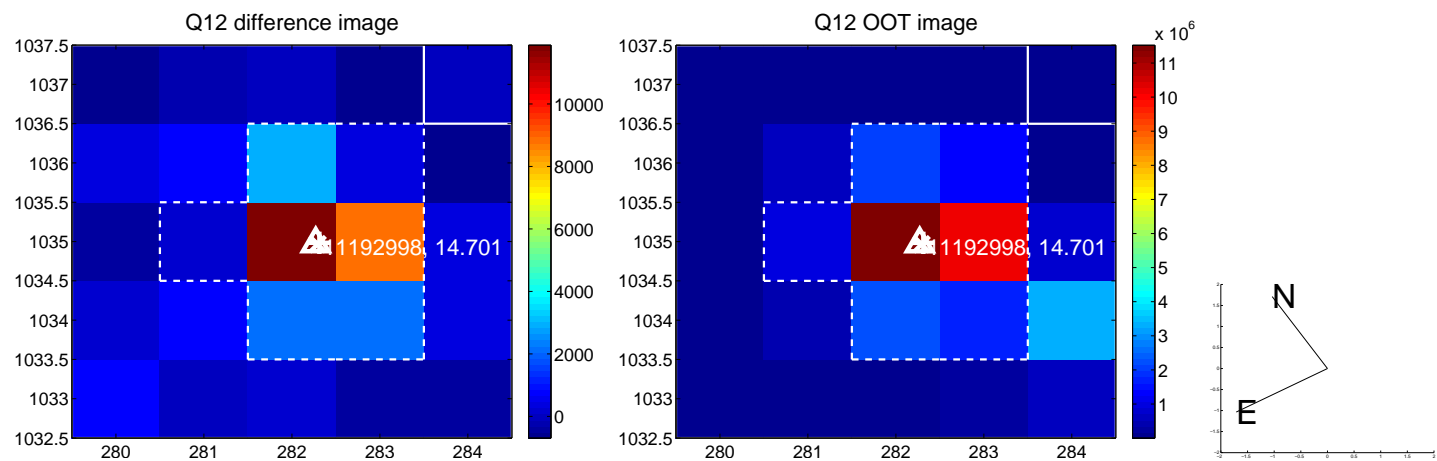
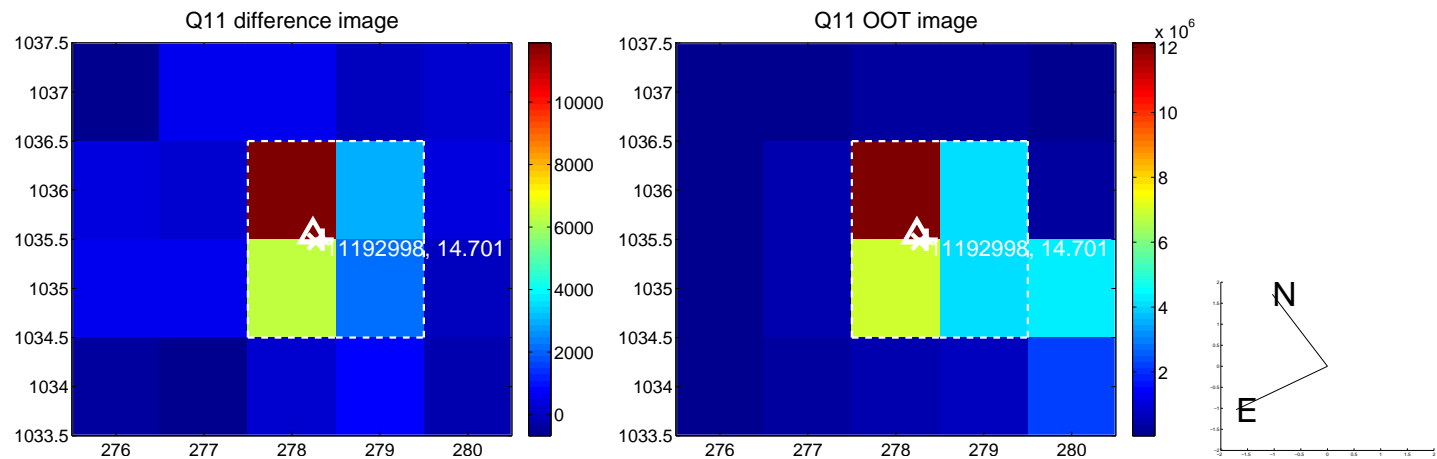
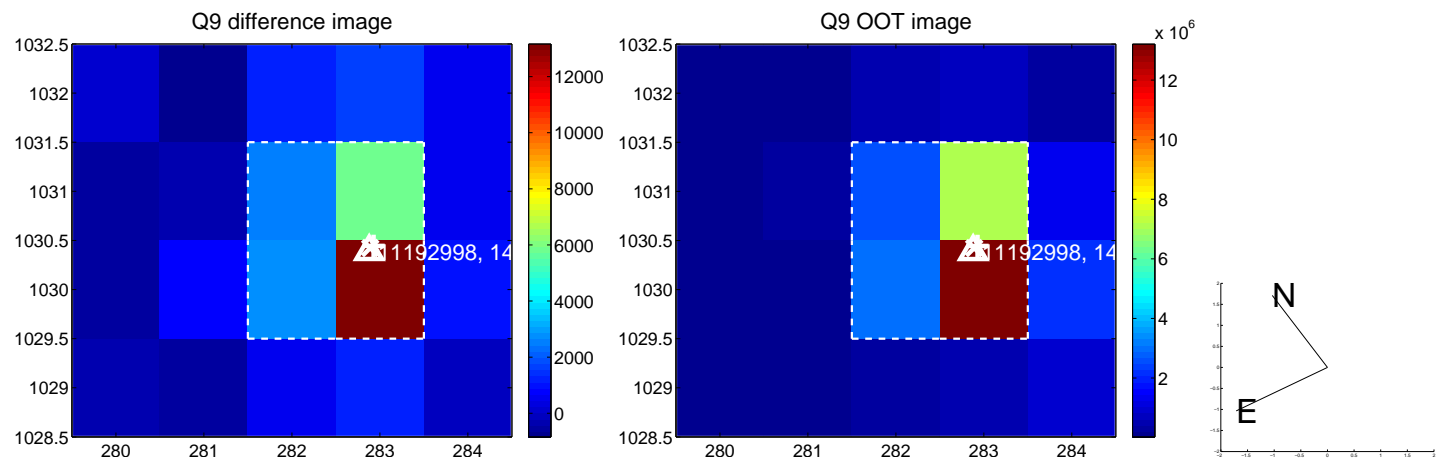


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

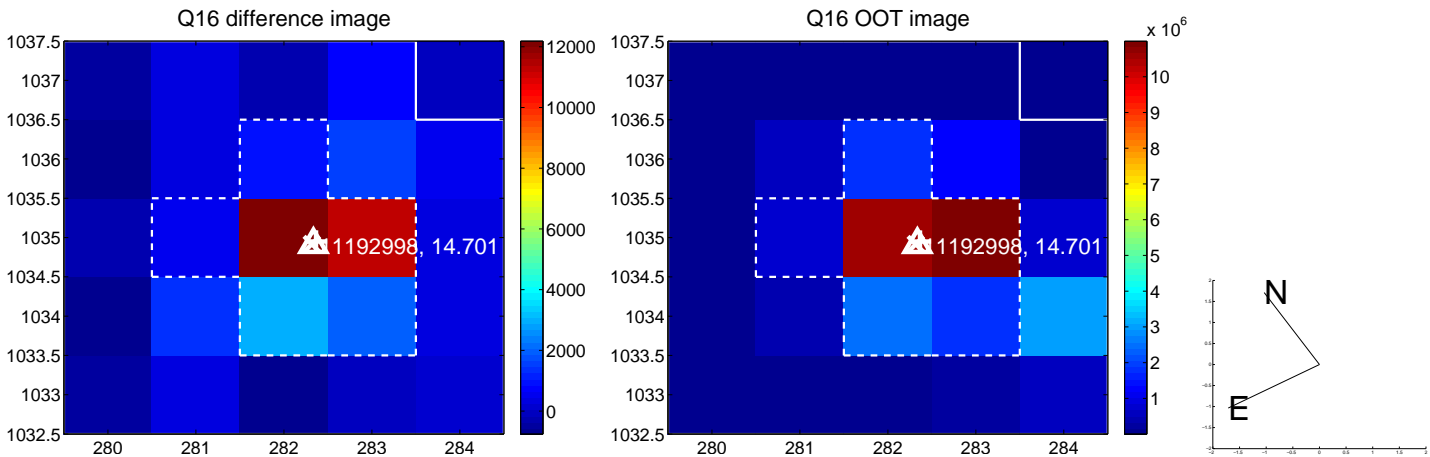
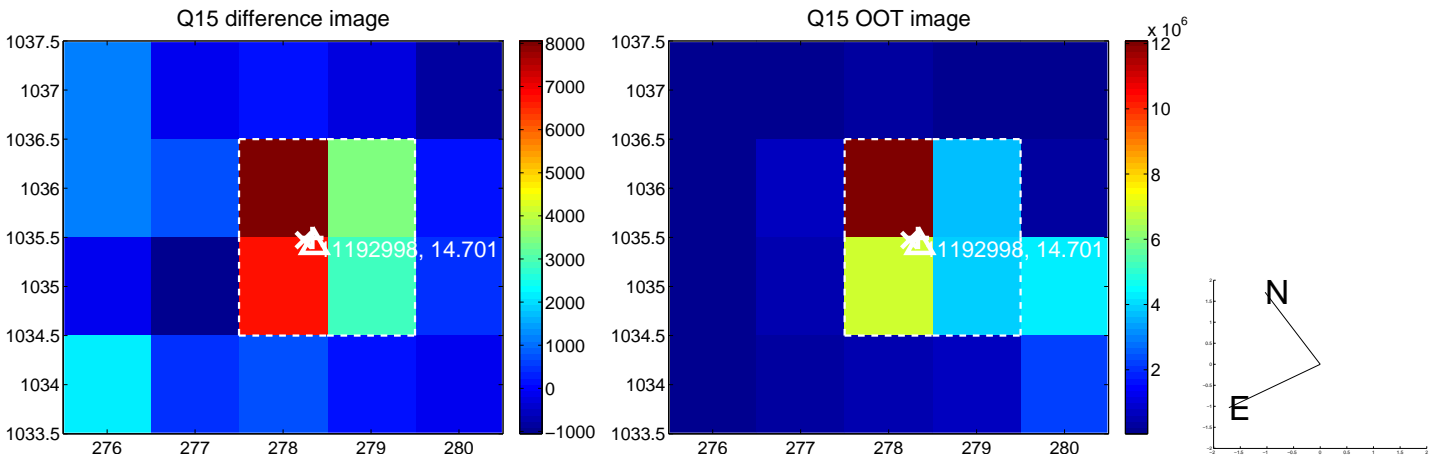
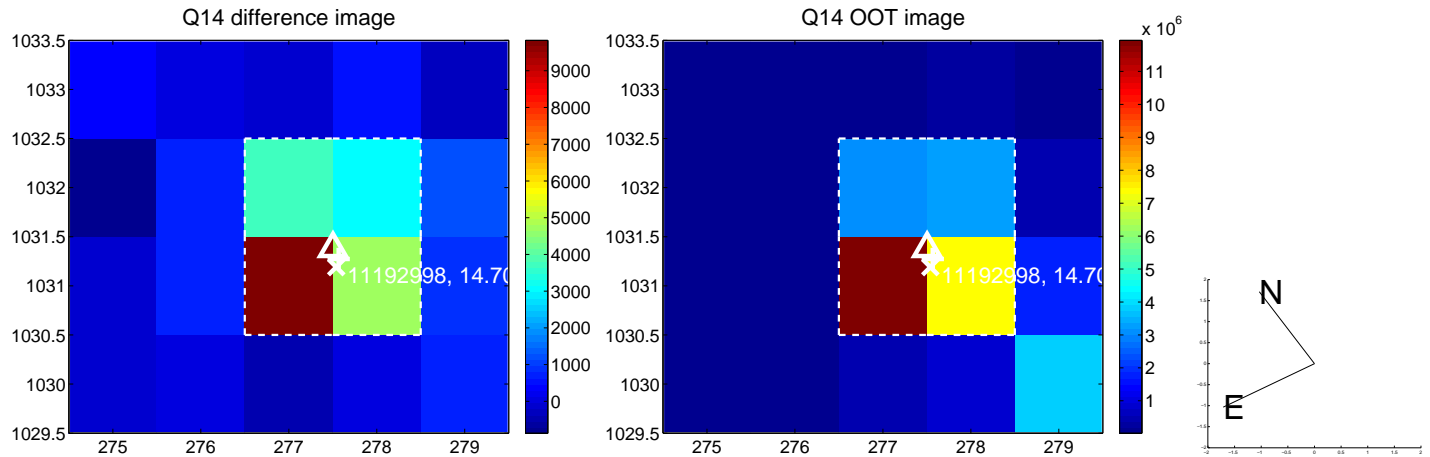
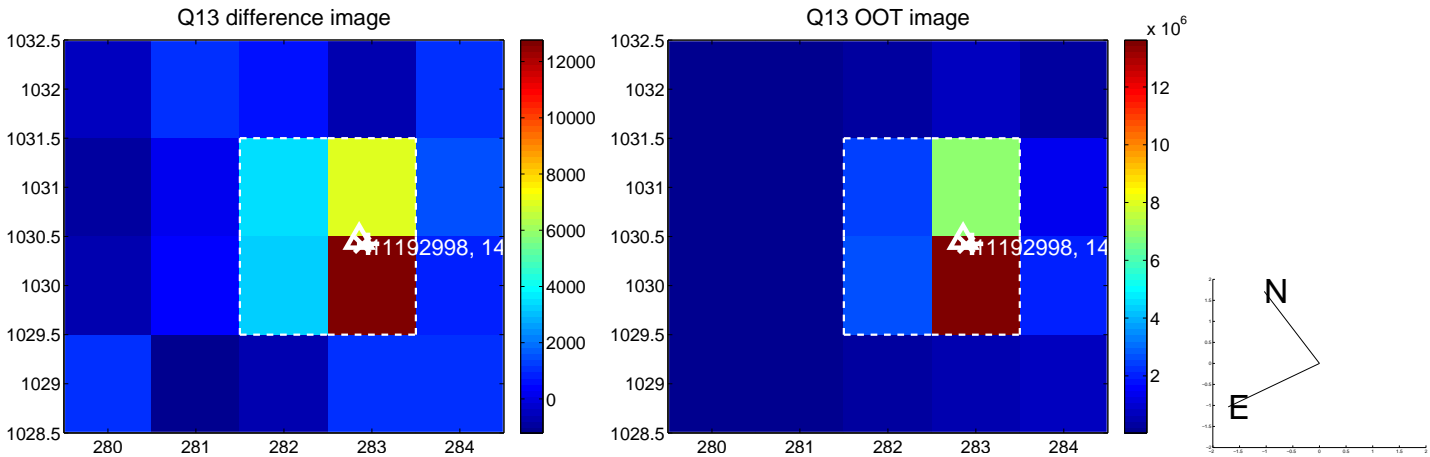




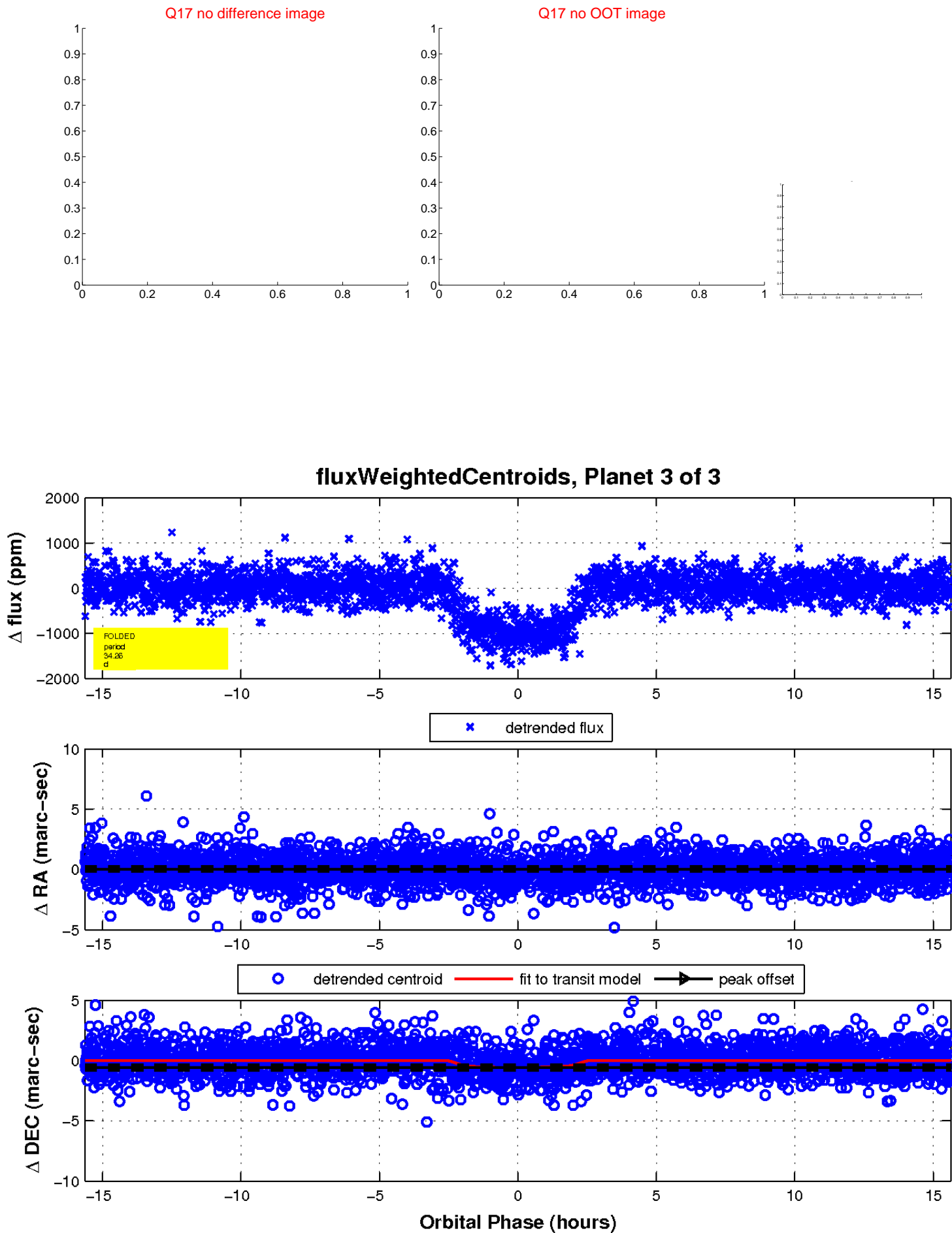
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white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination

