

# KIC 004455231

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 004455231-01 | OBS      | 1332.01 | 19.305819     | 141.519652   | 703.3       | 4.394            | 30.3 | 31.9 | 1.52                        | 5661            | 4.43                   | 104.67                 |
| 004455231-02 | OBS      | 1332.03 | 56.637532     | 135.522869   | 578.4       | 6.157            | 17.1 | 17.4 | 1.52                        | 5661            | 3.86                   | 24.92                  |
| 004455231-03 | OBS      | 1332.02 | 6.097435      | 134.553448   | 199.7       | 3.533            | 13.9 | 14.4 | 1.52                        | 5661            | 2.56                   | 486.65                 |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|------------|
| 004455231-01 | OBS      | PC   | 1.00  | 0 | 0 | 0 | 0 | NO_COMMENT |
| 004455231-02 | OBS      | PC   | 0.99  | 0 | 0 | 0 | 0 | NO_COMMENT |
| 004455231-03 | 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.

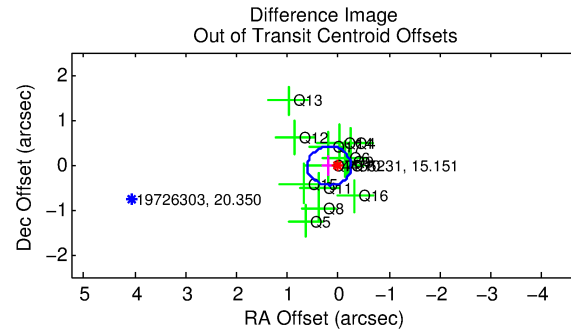
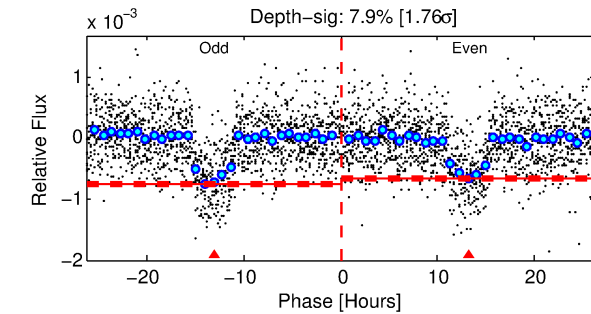
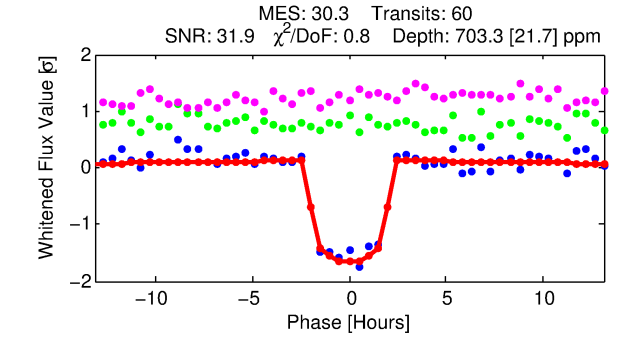
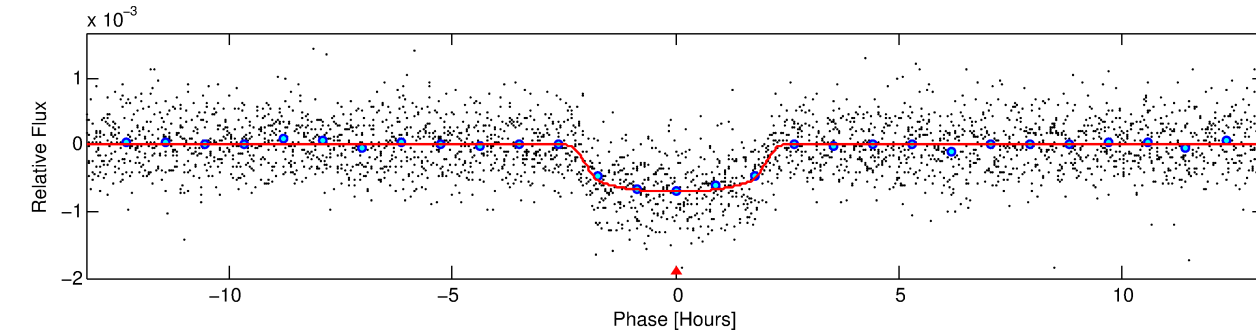
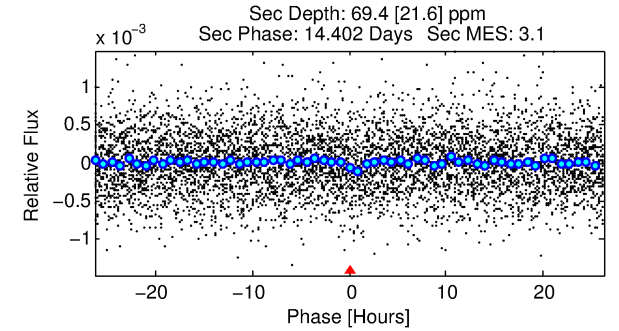
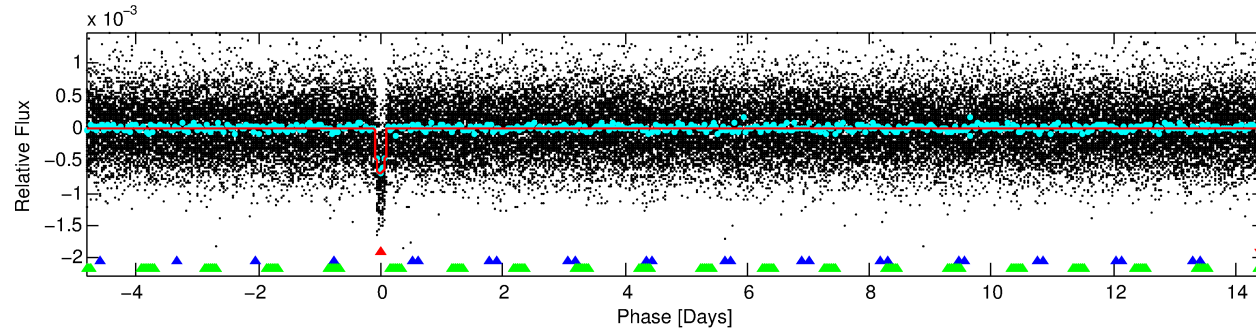
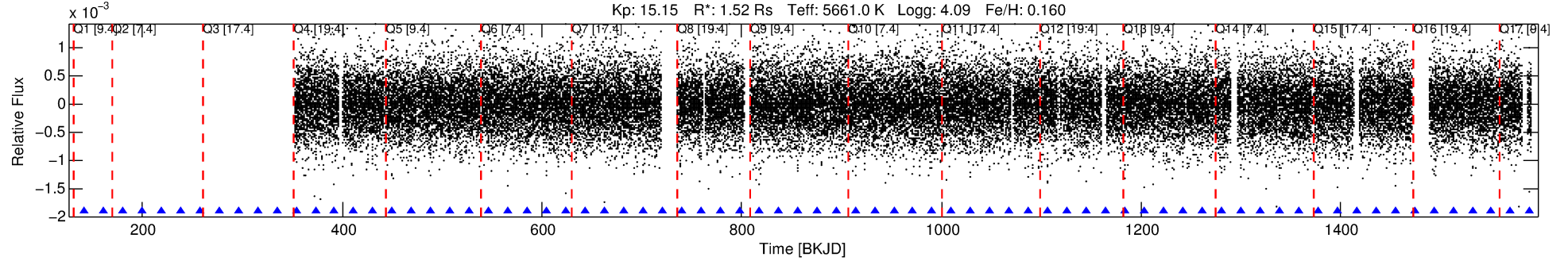
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 004455231-01

No Significant Match Found

# DV One-Page Summary

KIC: 4455231 Candidate: 1 of 3 Period: 19.306 d  
KOI: K01332.01 Name: Kepler-288c Corr: 0.987



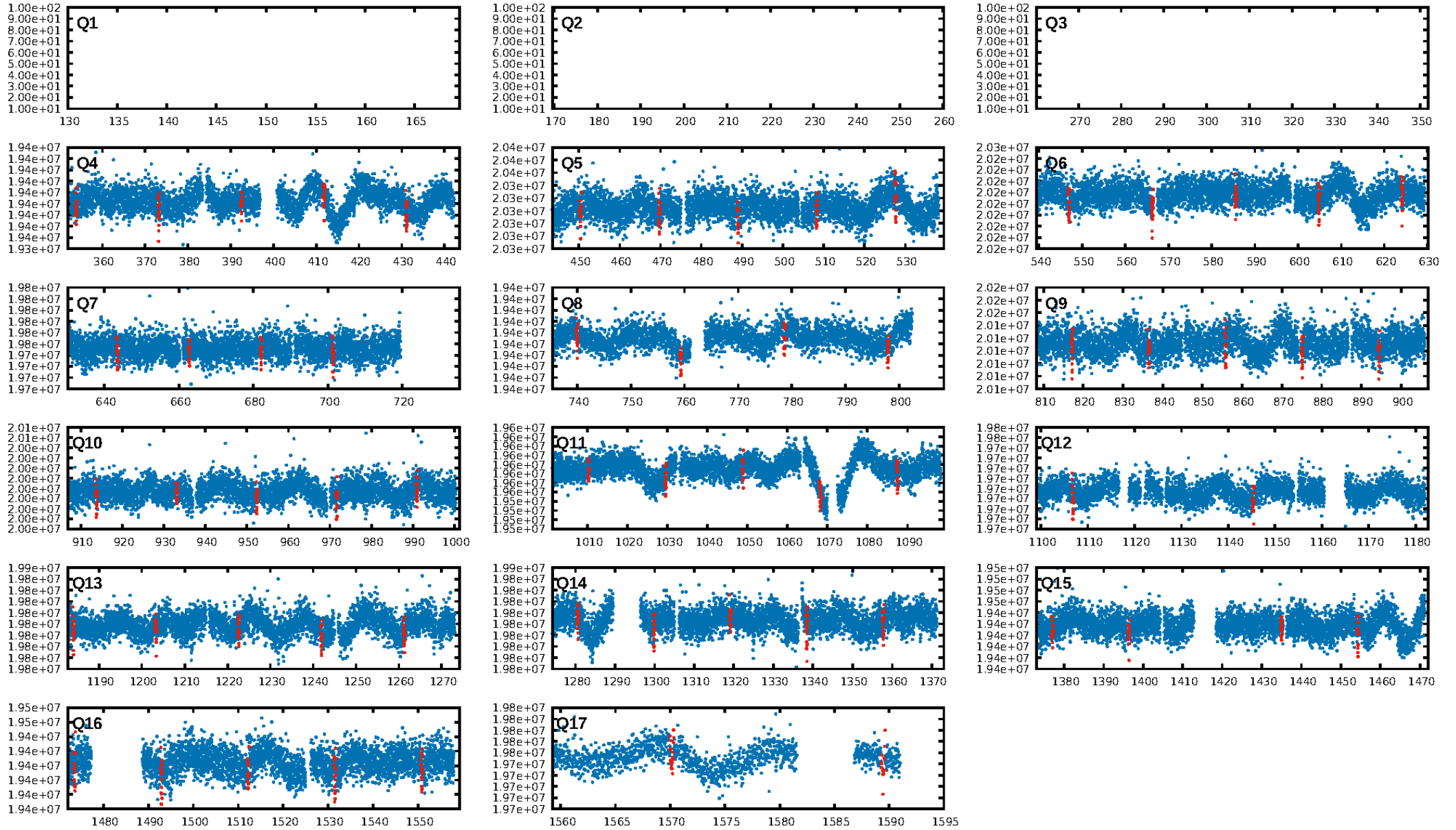
## DV Fit Results:

Period = 19.30582 [0.00008] d  
Epoch = 141.5197 [0.0035] BKJD  
Rp/R\* = 0.0267 [0.0055]  
a/R\* = 22.77 [19.64]  
b = 0.77 [0.46]  
Seff = 104.67 [36.95]  
Teff = 816 [72] K  
Rp = 4.43 [1.37] Re  
a = 0.1427 [0.0313] AU  
Ag = 39.64 [24.66] [1.57σ]  
Teffp = 3164 [411] K [5.63σ]

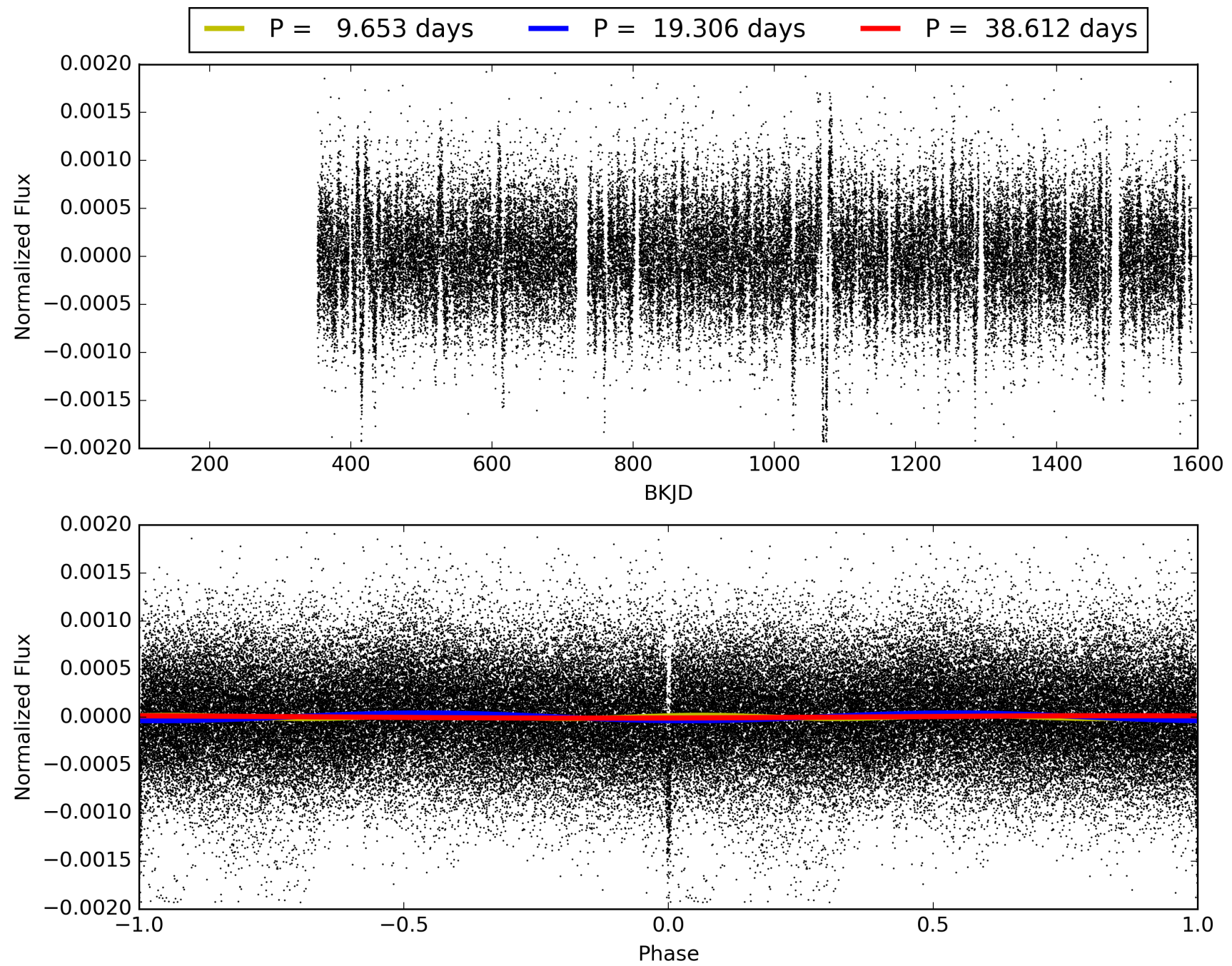
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [56.22σ]  
LongPeriod-sig: 100.0% [118.45σ]  
ModelChiSquare2-sig: 92.6%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 2.64e-200  
RollingBand-fgt: 1.00 [58/58]  
GhostDiagnostic-chr: 25.66  
Centroid-sig: 0.0%  
Centroid-so: 0.600 arcsec [1.48σ]  
OotOffset-rm: 0.179 arcsec [1.24σ]  
KicOffset-rm: 0.182 arcsec [0.91σ]  
OotOffset-st: 3/3/4/4 [14]  
KicOffset-st: 3/3/4/4 [14]  
DiffImageQuality-fgm: 1.00 [14/14]  
DiffImageOverlap-fno: 1.00 [14/14]

# TCE 004455231-01, PDC Light Curves



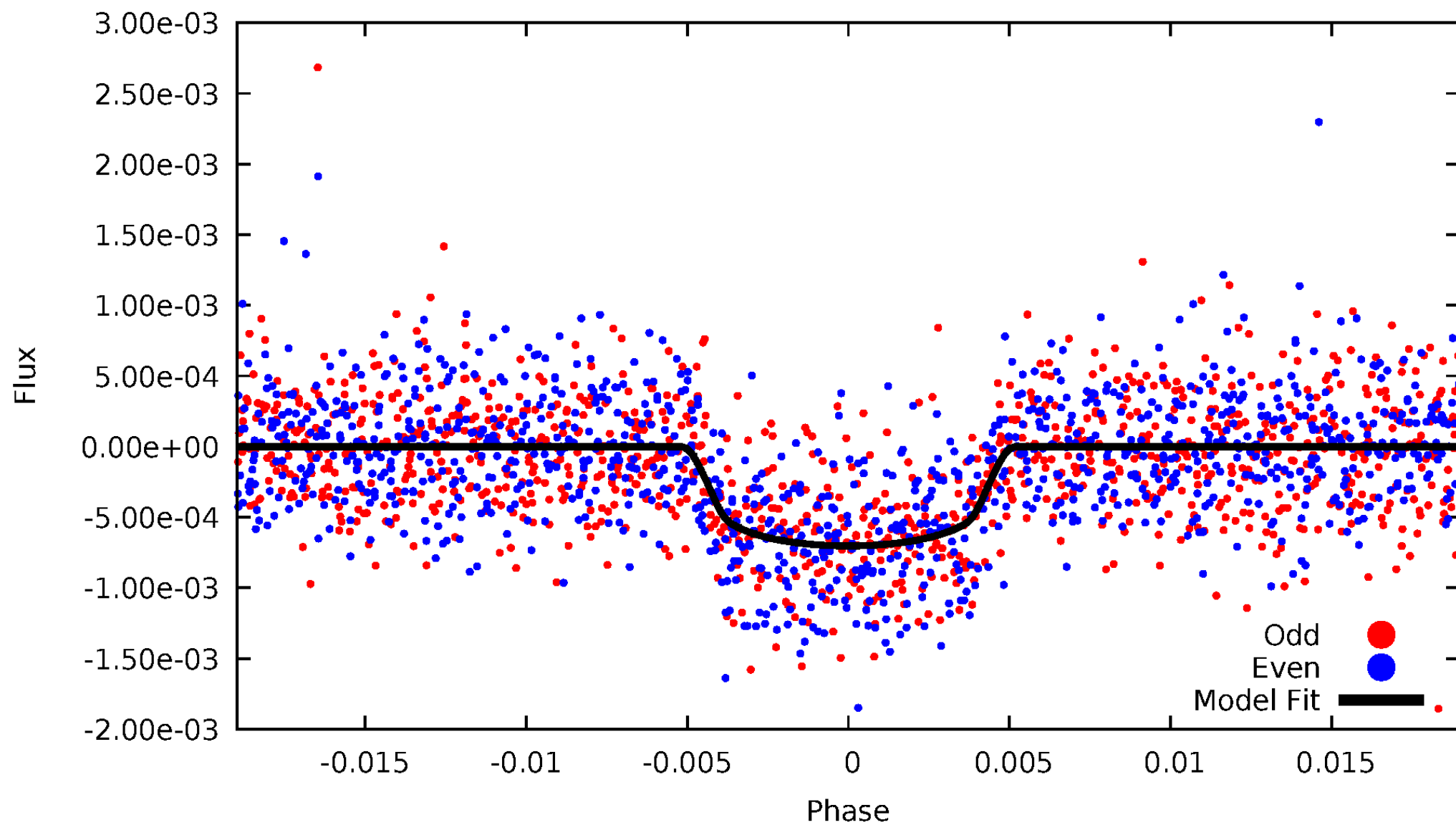
TCE 004455231-01





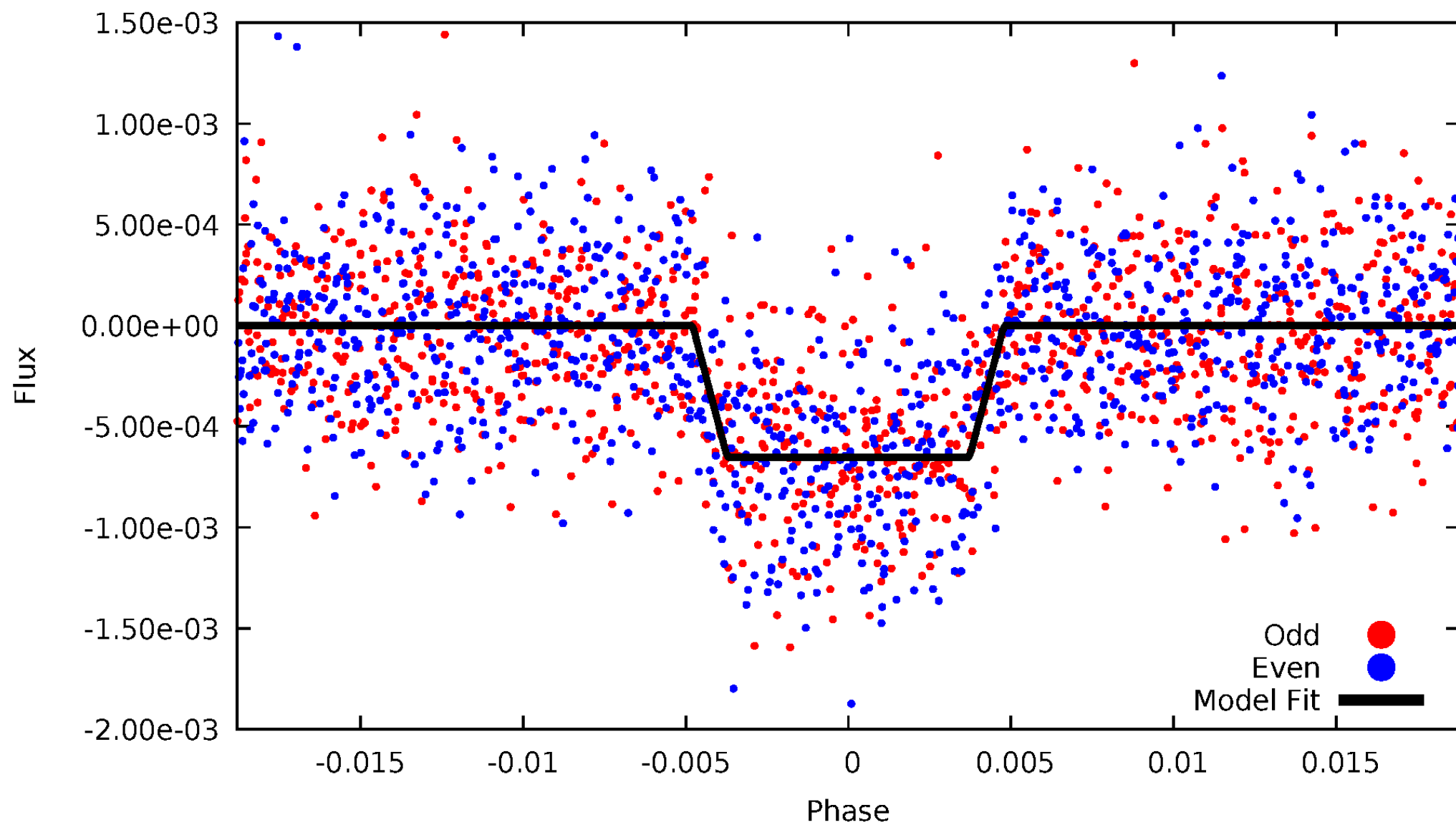
# DV Odd/Even

TCE 004455231-01



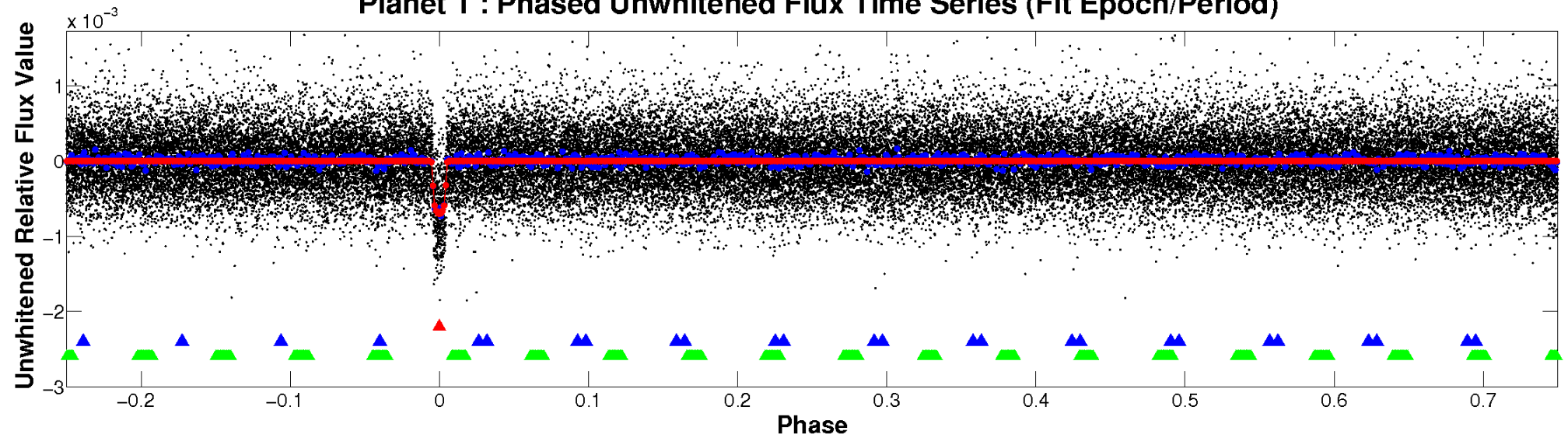
# ALT Odd/Even

TCE 004455231-01

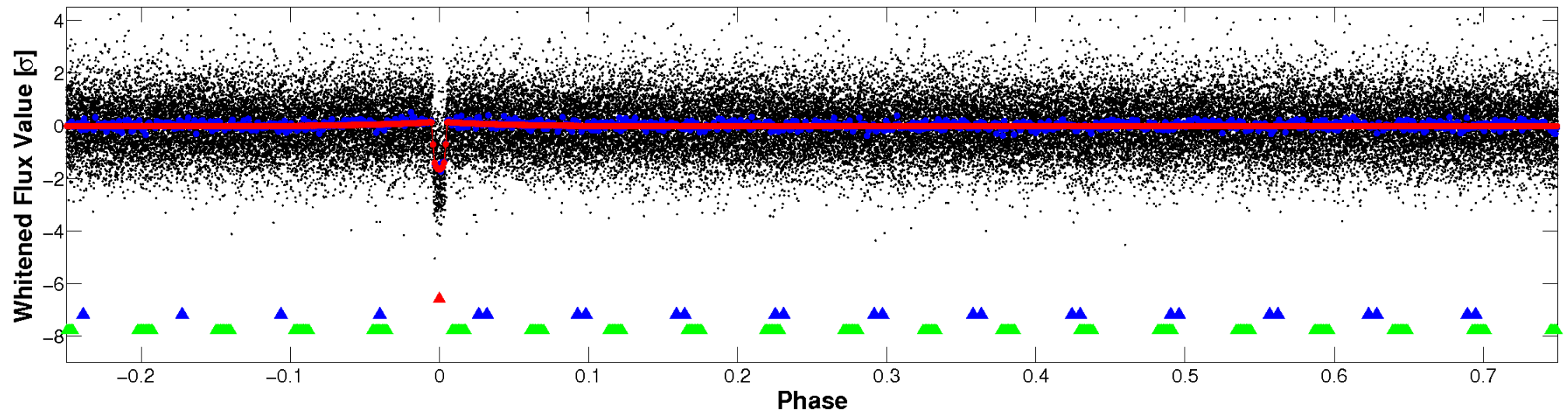


# Non-Whitened Vs. Whitened Light Curve

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

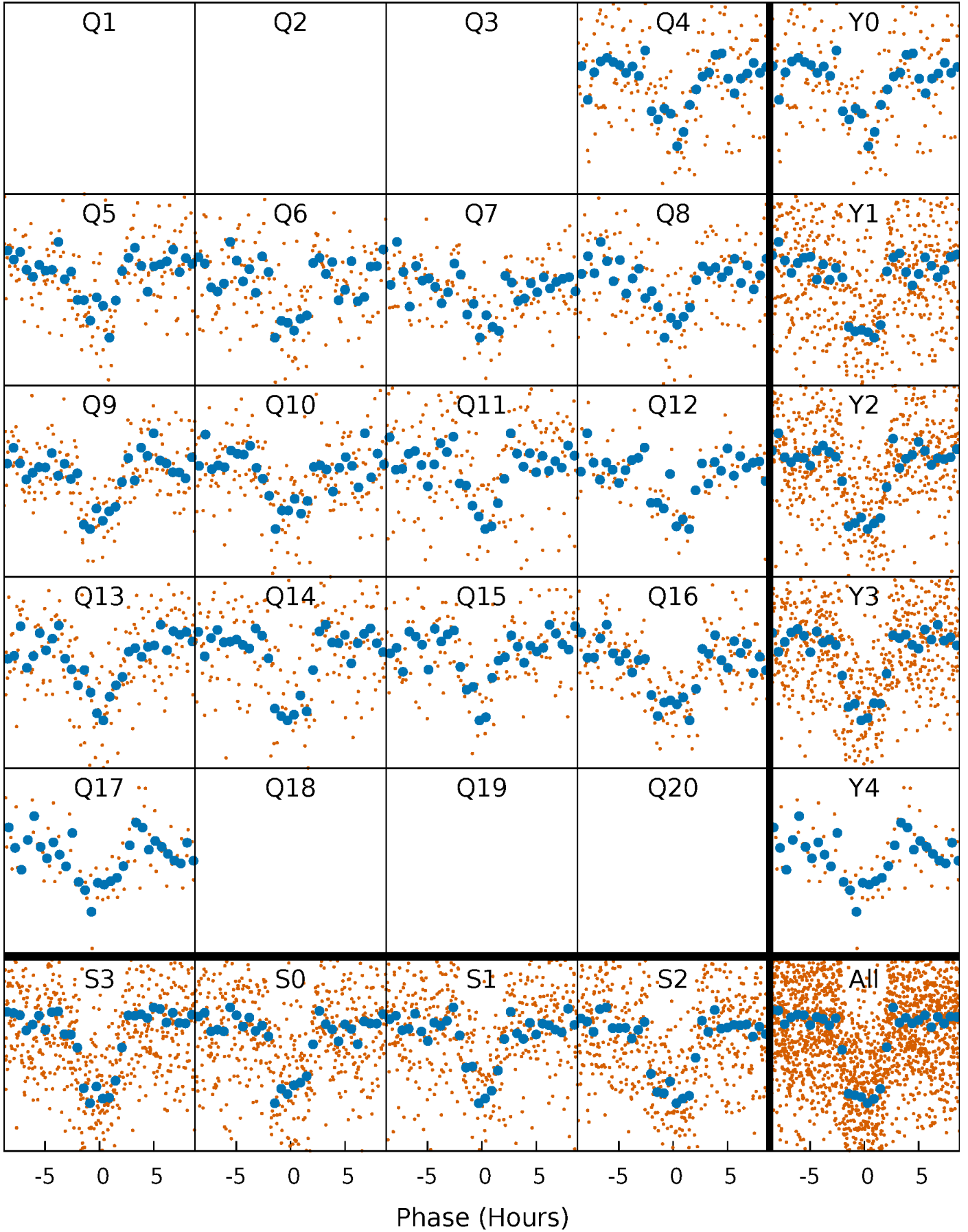


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

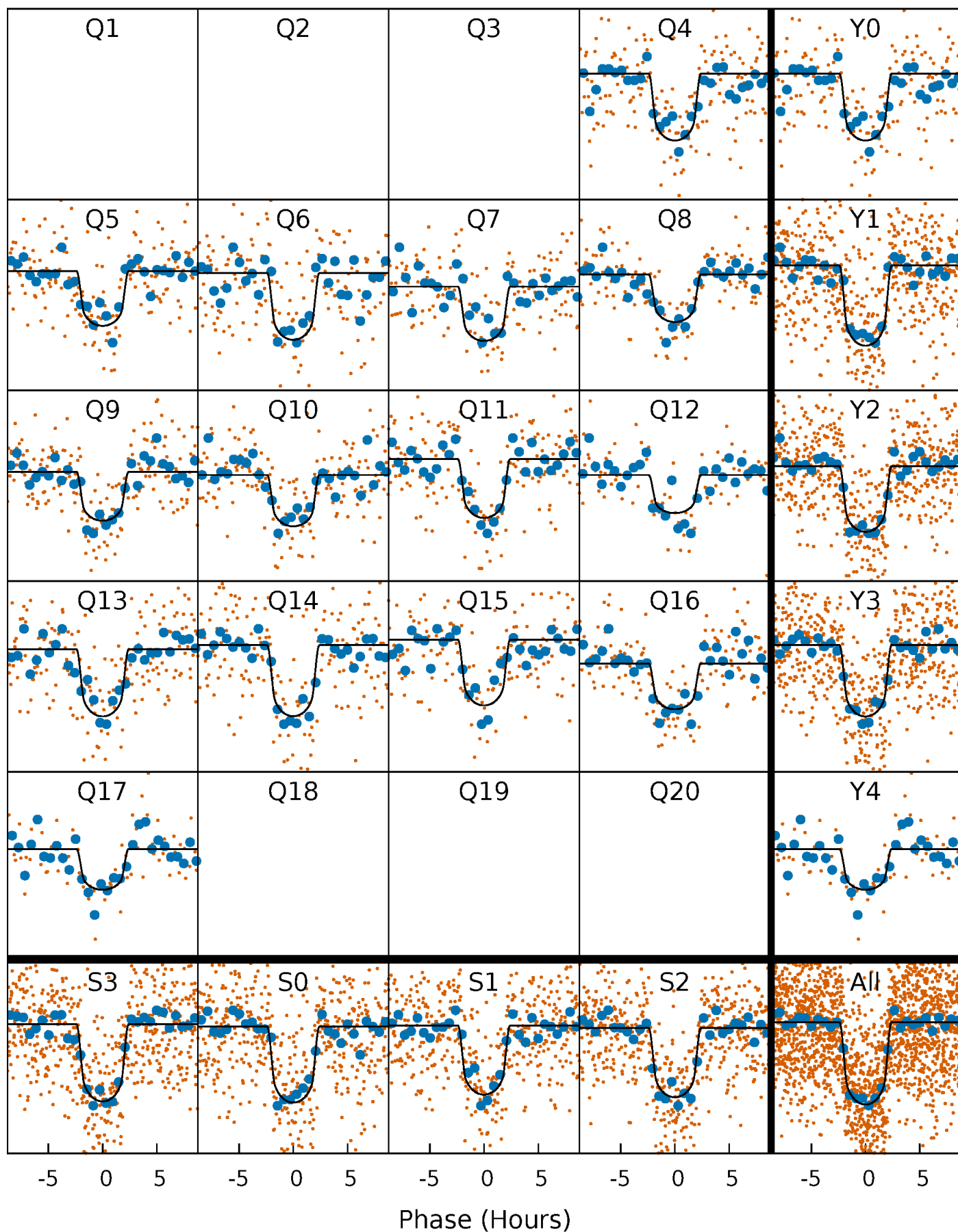
TCE 004455231-01 P= 19.305819 Days  $T_0=141.519652$  (BKJD)





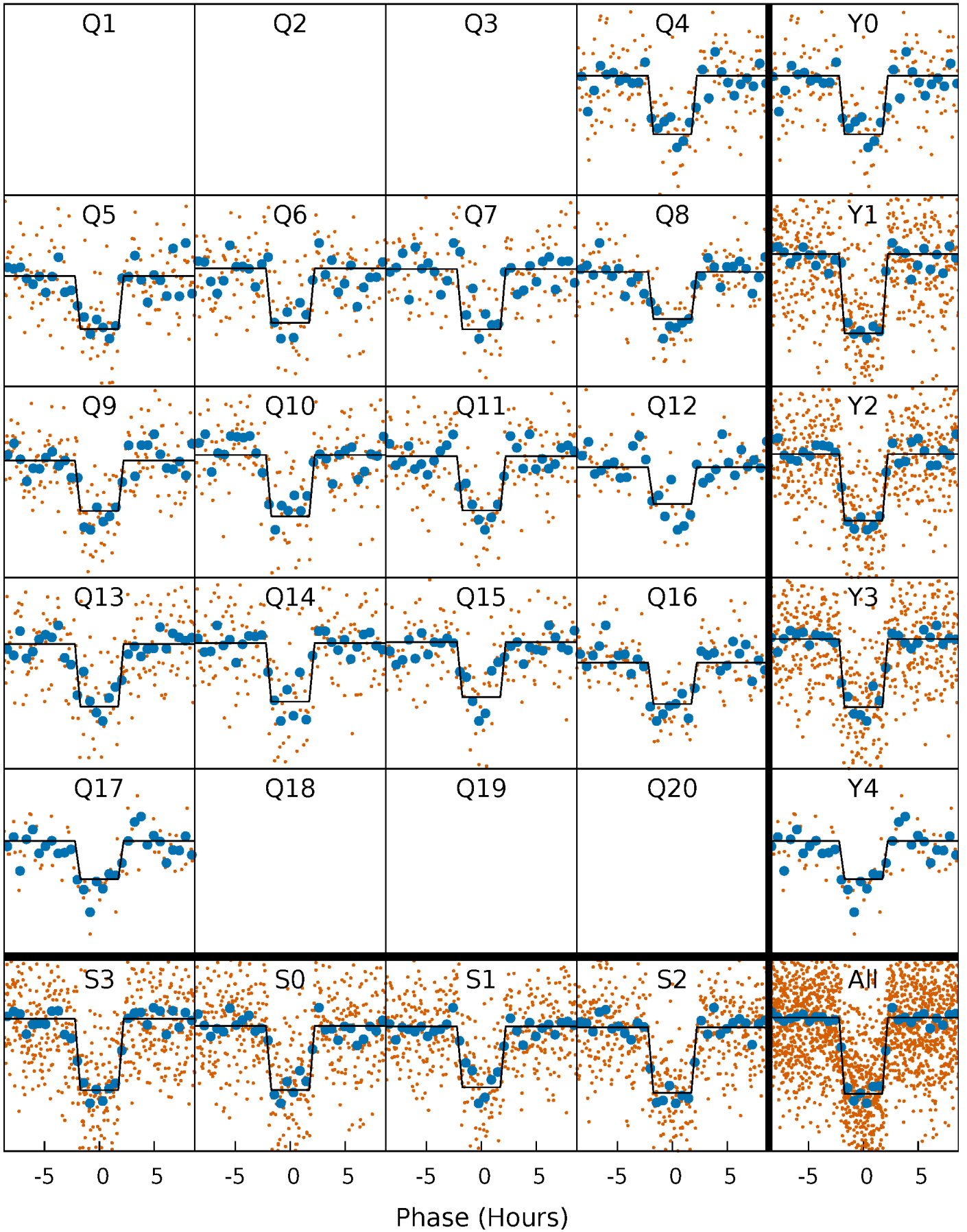
# DV Quarter-Phased Transit Curves

TCE 004455231-01 P= 19.305819 Days  $T_0=141.519652$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

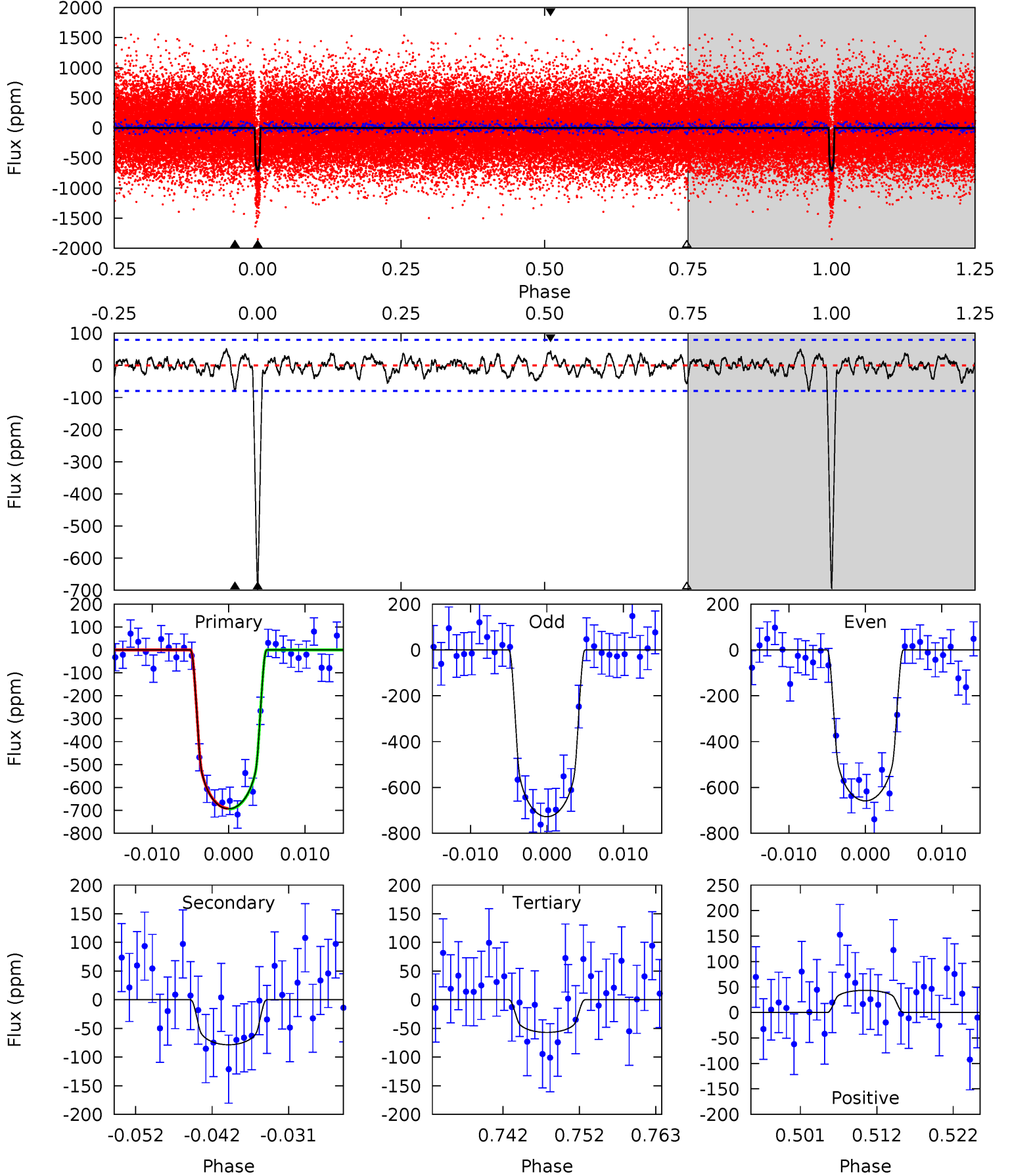
TCE 004455231-01 P= 19.306010 Days  $T_0=141.512005$  (BKJD)



# DV Model-Shift Uniqueness Test

004455231-01, P = 19.305819 Days, E = 141.519652 Days

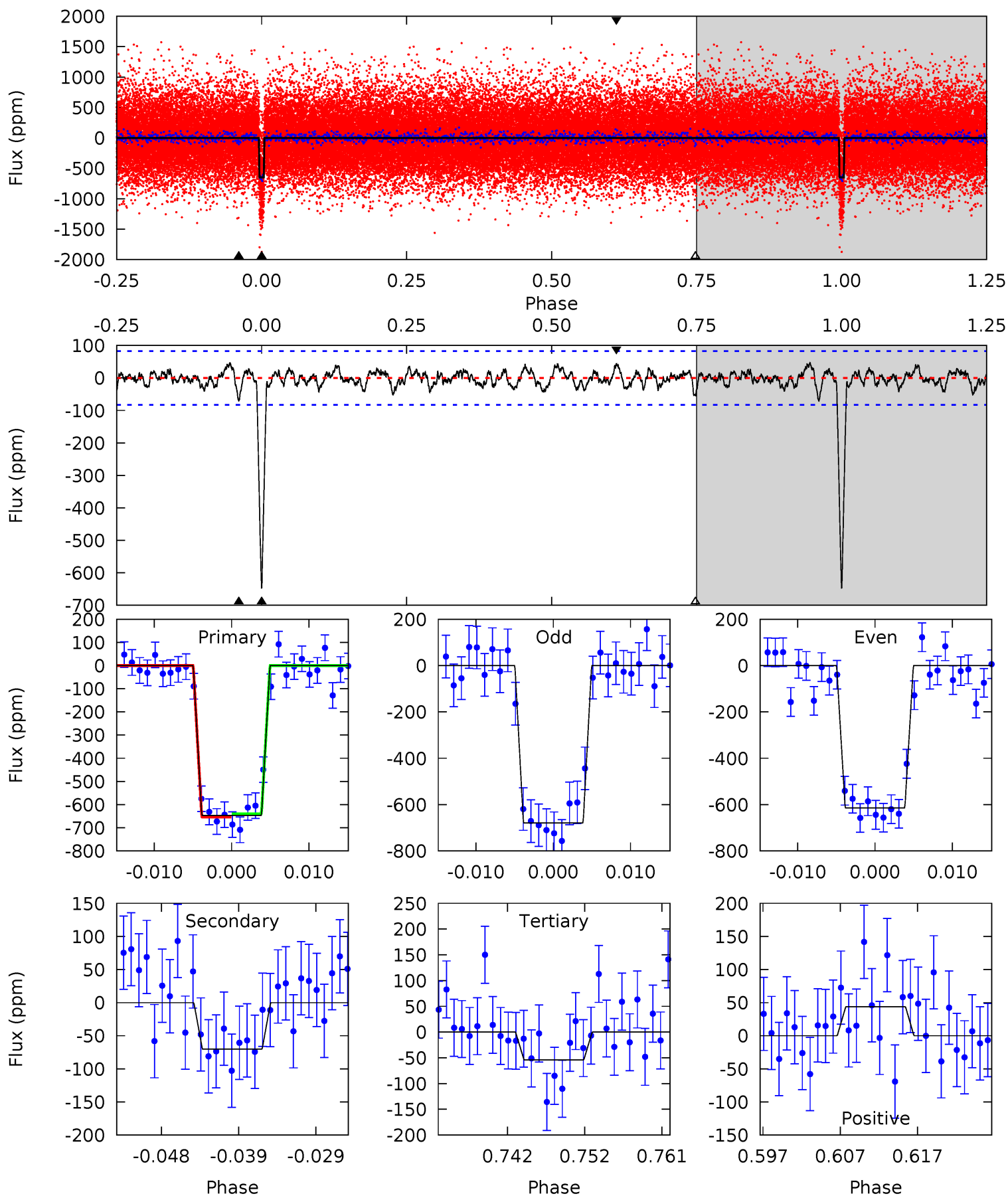
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 43.7 | 4.95 | 3.59 | 2.74 | 5.02            | 2.56            | 1.22             | 40.1    | 40.9    | 1.35    | 2.20    | 2.19    | 1.00 | 0.07  | 0.09 |



# Alt Model-Shift Uniqueness Test

004455231-01, P = 19.306010 Days, E = 141.512005 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  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 39.4 | 4.29 | 3.29 | 2.67 | 5.03            | 2.59            | 1.12             | 36.1    | 36.7    | 0.99    | 1.62    | 1.99    | 0.99 | 0.07  | 0.43 |





### Stellar Parameters For KIC 004455231

|        | $T_{\text{eff}}(K)$ | $\log(g)$                 | [Fe/H]                    | $R$ ( $R_{\odot}$ )       | $M(M_{\odot})$            | $p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ ) |
|--------|---------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
|        | $5661^{+85}_{-77}$  | $4.090^{+0.203}_{-0.087}$ | $0.160^{+0.150}_{-0.150}$ | $1.522^{+0.236}_{-0.353}$ | $1.040^{+0.093}_{-0.084}$ | $0.415^{+0.420}_{-0.131}$                     |
|        | +2%/-1%             | +5%/-2%                   | +94%/-94%                 | +16%/-23%                 | +9%/-8%                   | +101%/-32%                                    |
| Source | SPE90               | SPE90                     | SPE90                     | DSEP                      |                           |   |

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

### Secondary Eclipse Parameters for KIC 004455231-01 / KOI 1332.01

| Detrend | Depth (ppm)  | $R_p$ ( $R_{\oplus}$ ) | $T_{\text{max}}$ (K) | $T_{\text{obs}}$ (K) | $A_{\text{obs}}$ |
|---------|--------------|------------------------|----------------------|----------------------|------------------|
| DV      | $-79 \pm 16$ | $4.36^{+1.03}_{-1.01}$ | $1130^{+48}_{-73}$   | $3658^{+328}_{-246}$ | $47^{+34}_{-17}$ |
| Alt.    | $-70 \pm 16$ | $4.09^{+1.09}_{-0.97}$ | $1133^{+48}_{-70}$   | $3673^{+347}_{-271}$ | $47^{+36}_{-18}$ |

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

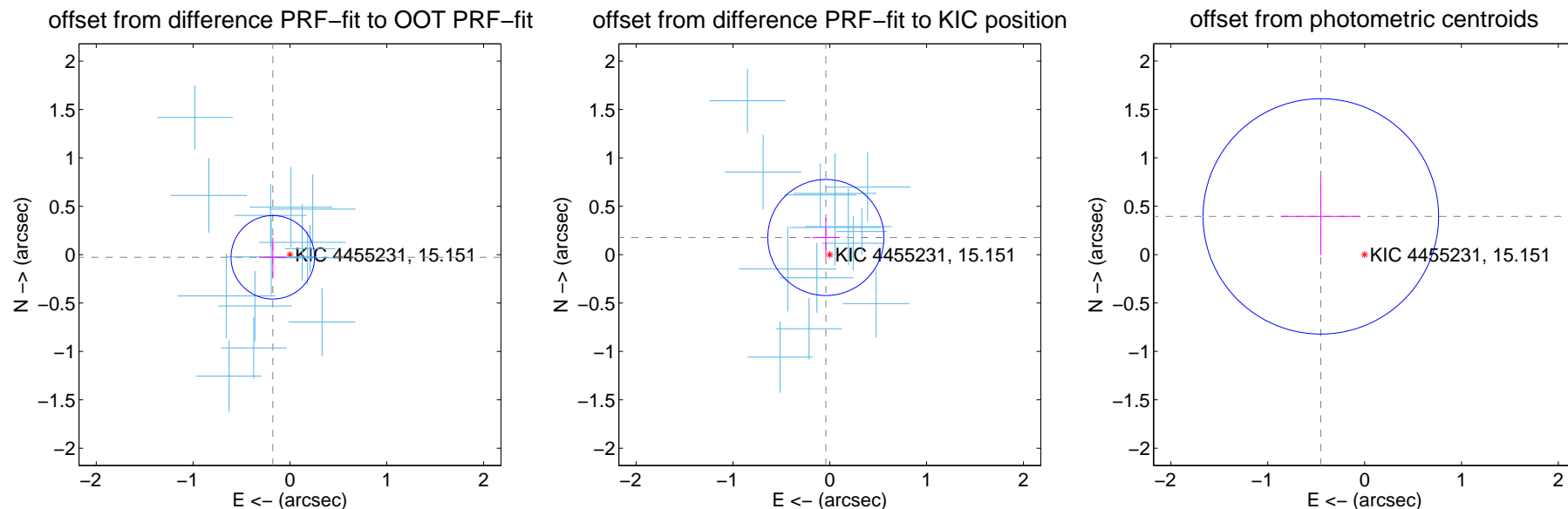
## DV Centroid Data

Supplemental centroid analysis for 004455231-01. Kepler magnitude: 15.15. Transit SNR 31.85

There are 14 quarters with good PRF difference image offsets

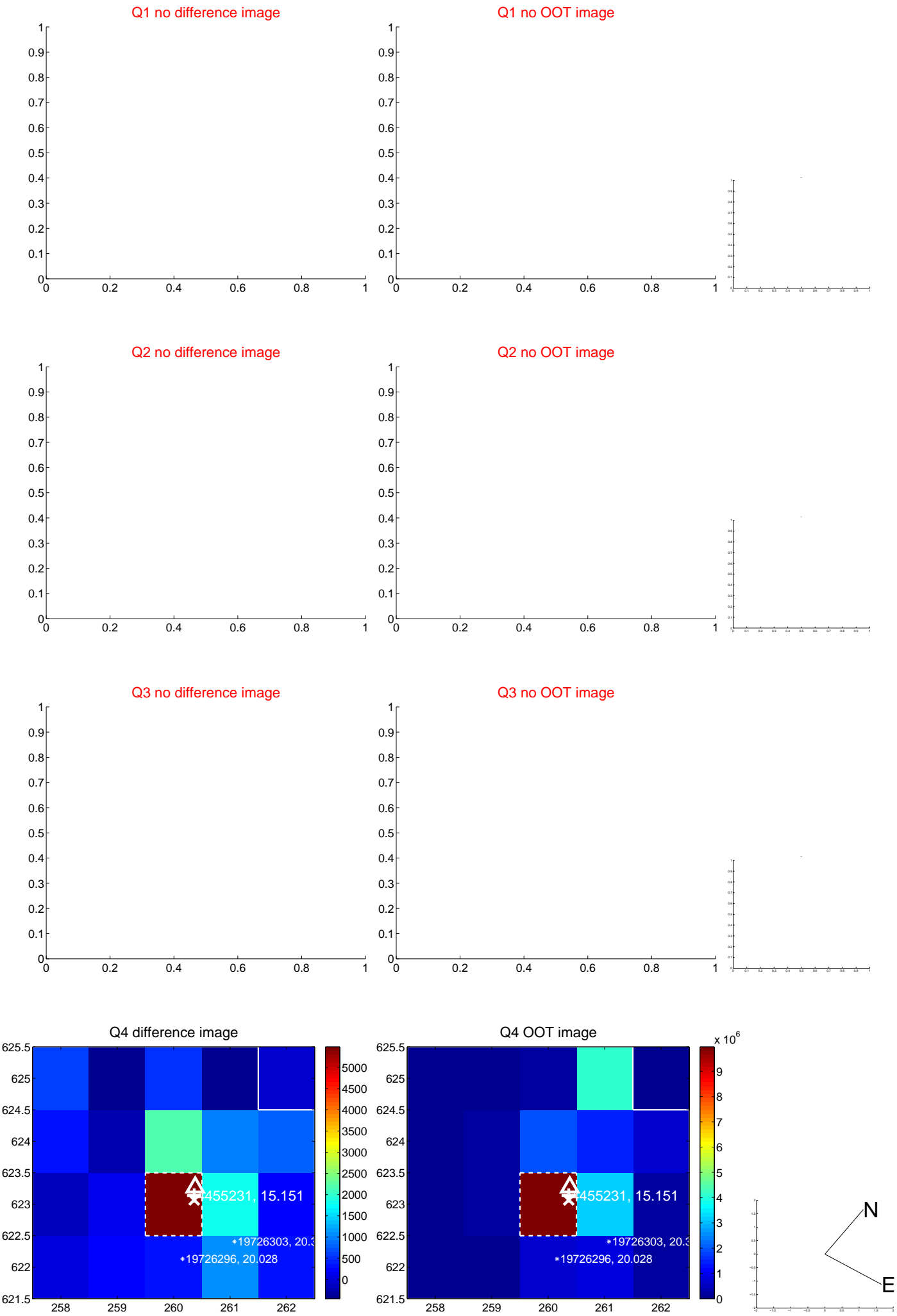
The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA       | $\Delta$ Dec       |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT          | $0.179 \pm 0.144$  | 1.24                | $0.177 \pm 0.142$ | $-0.027 \pm 0.203$ |
| PRF-fit source offset from KIC position | $0.182 \pm 0.200$  | 0.91                | $0.041 \pm 0.138$ | $0.177 \pm 0.203$  |
| photometric centroid source offset      | $0.60 \pm 0.41$    | 1.48                | $0.45 \pm 0.41$   | $0.39 \pm 0.40$    |

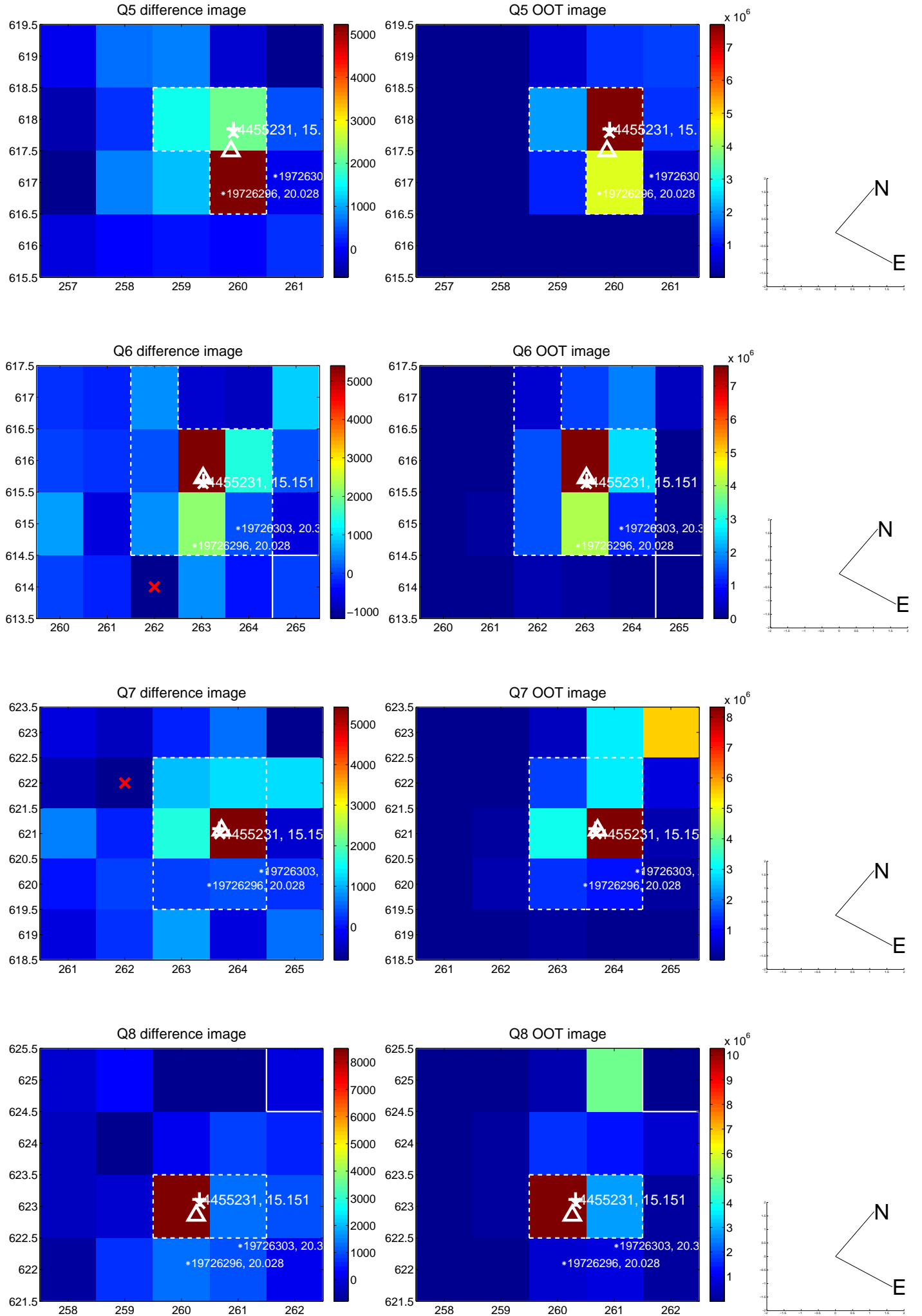


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

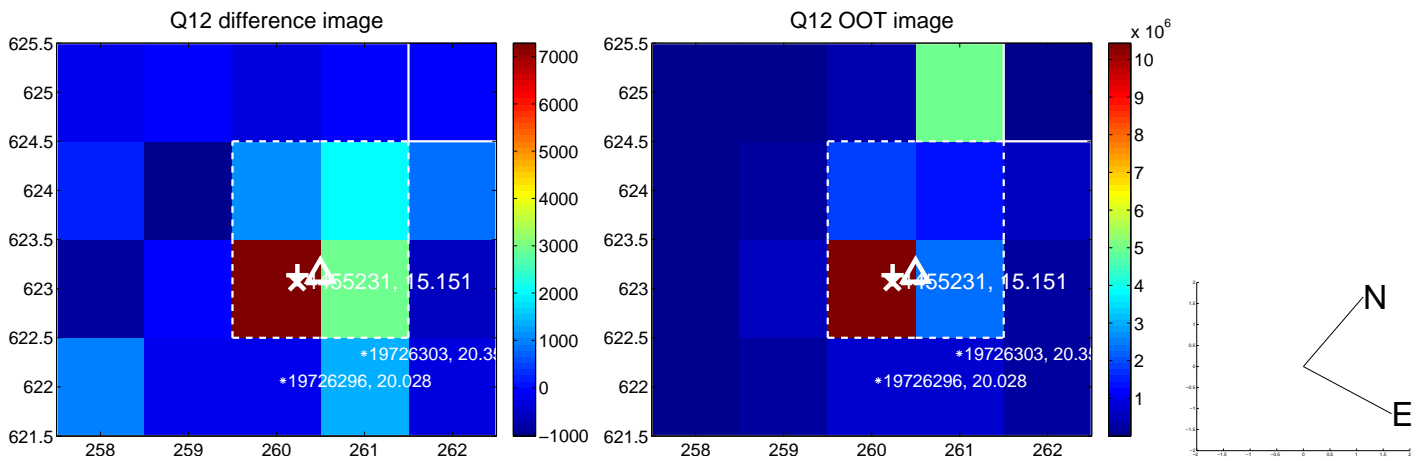
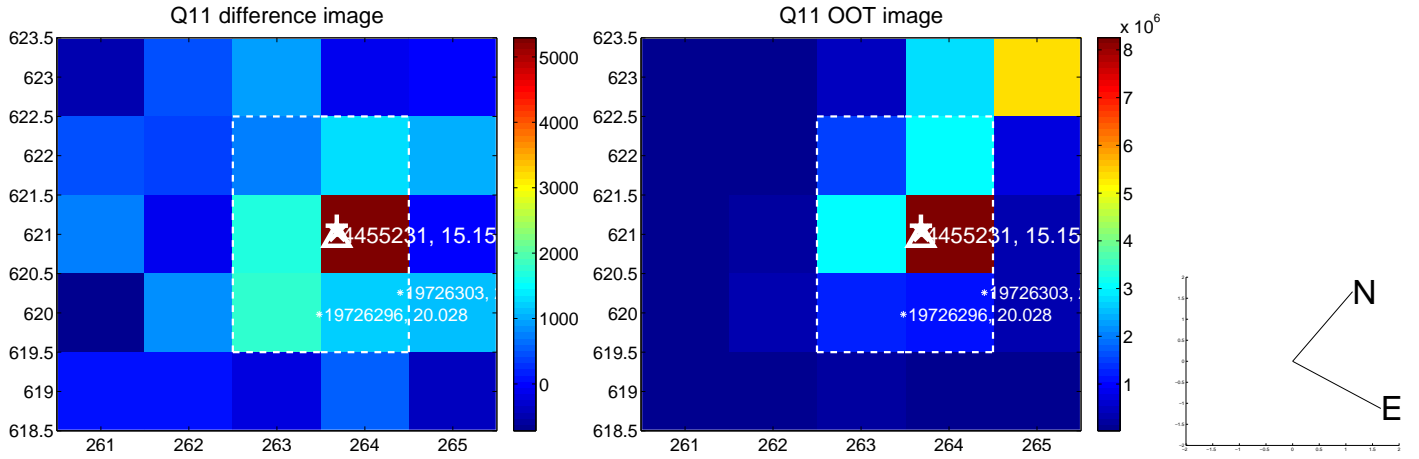
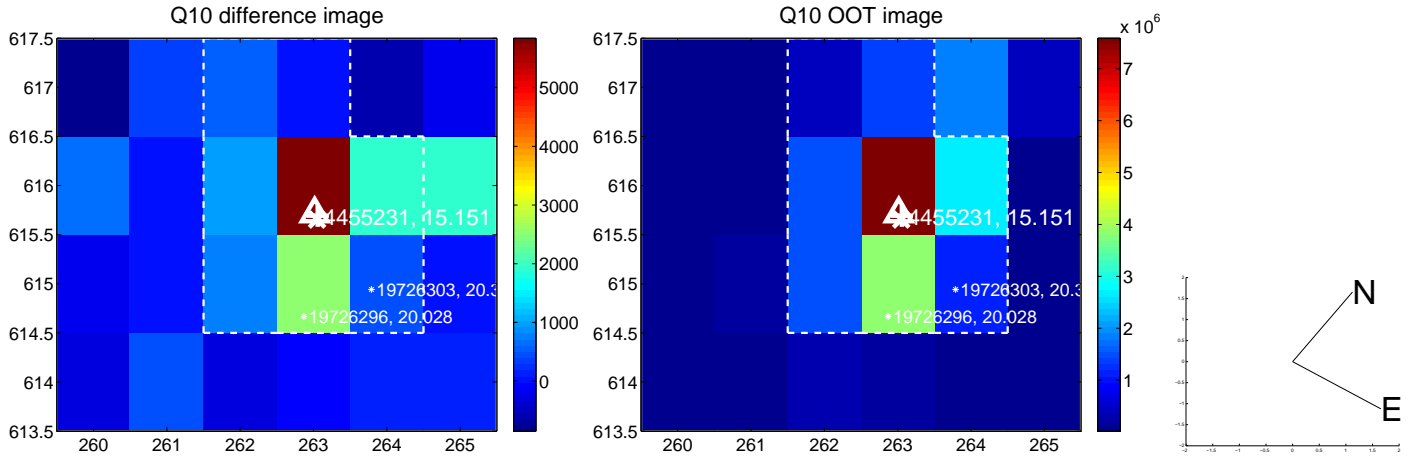
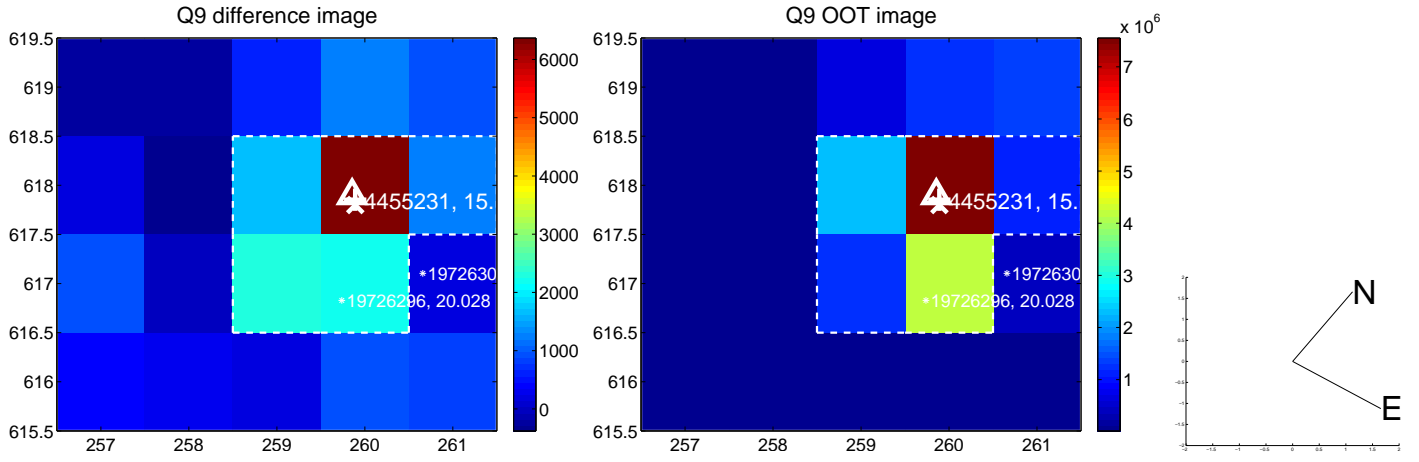


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

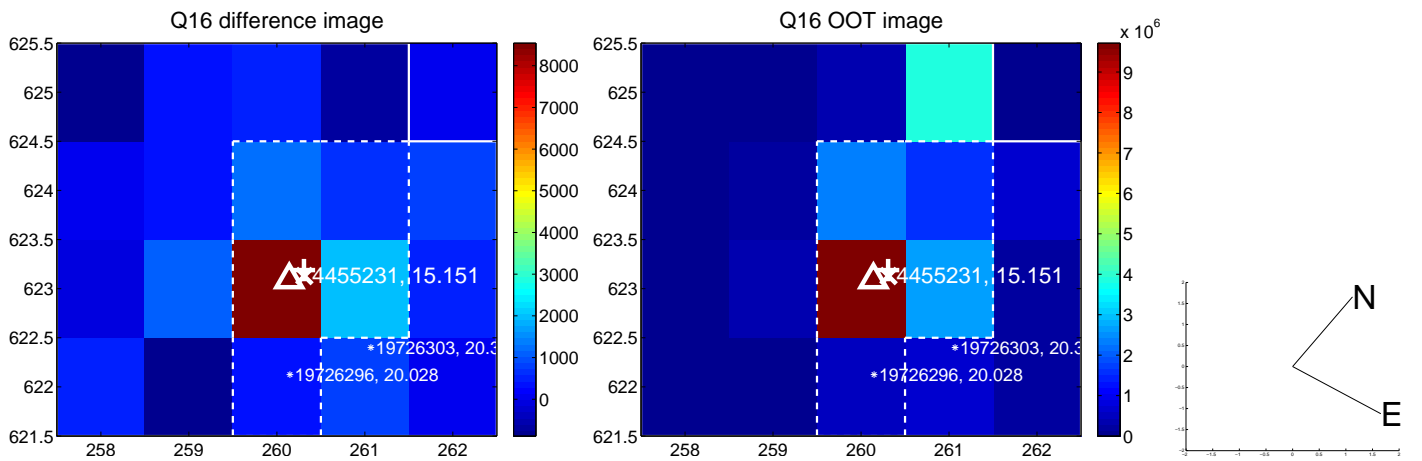
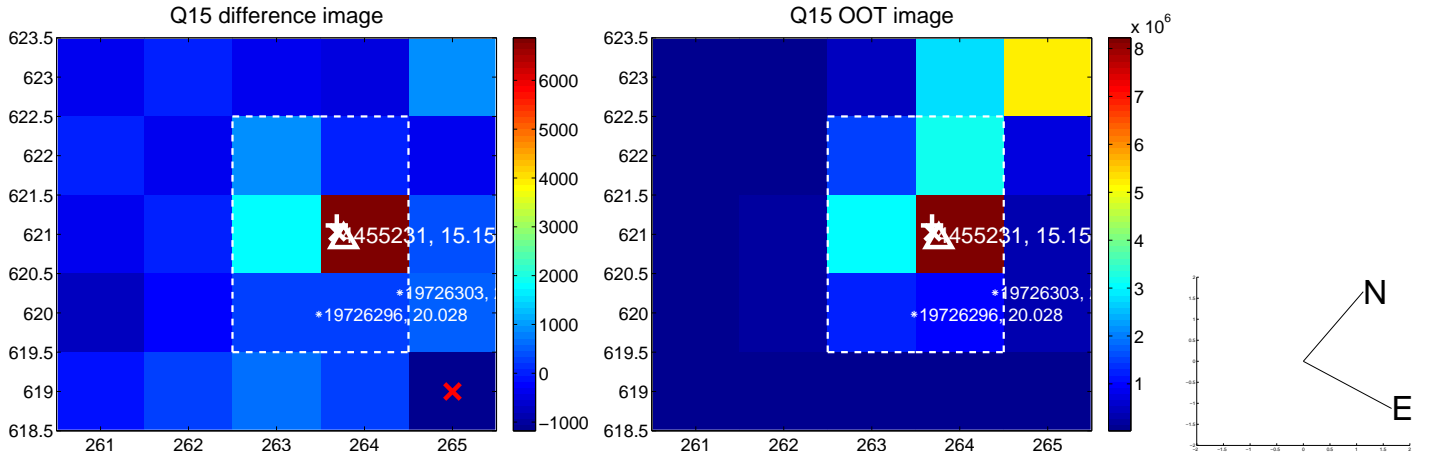
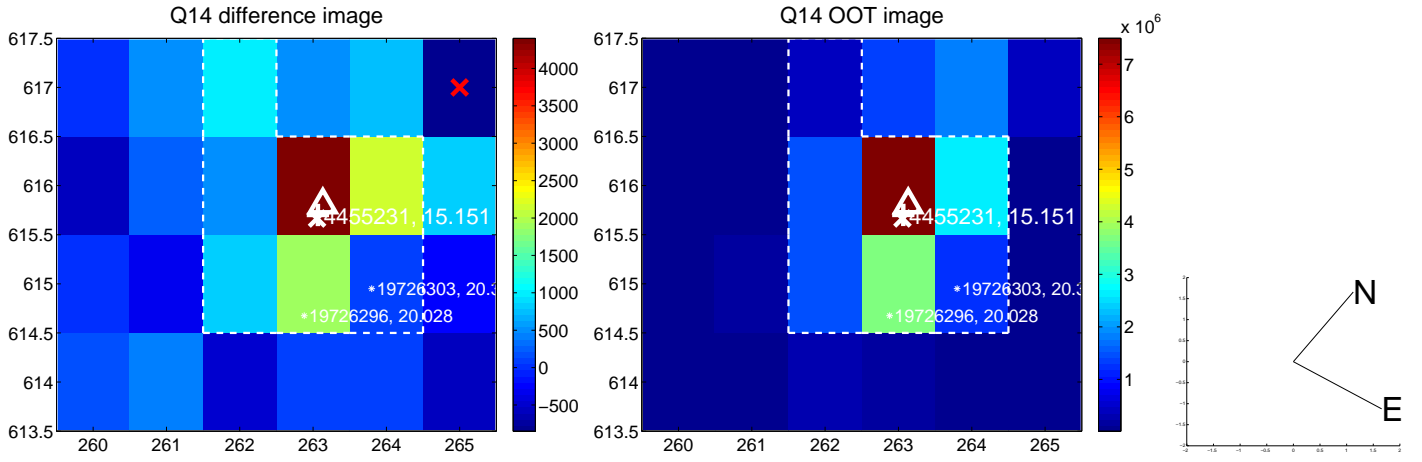
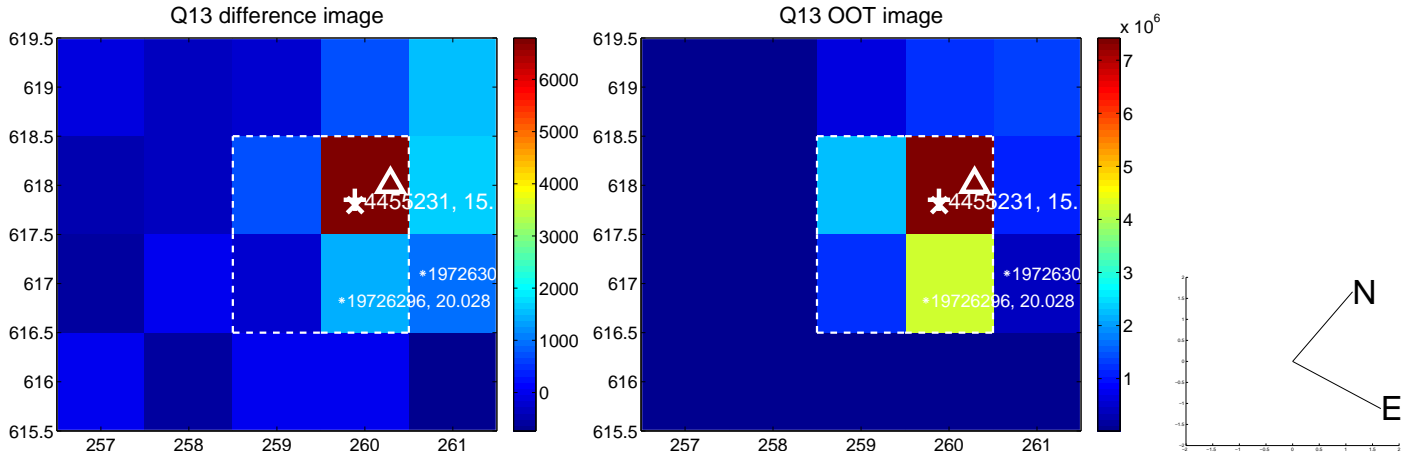




white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



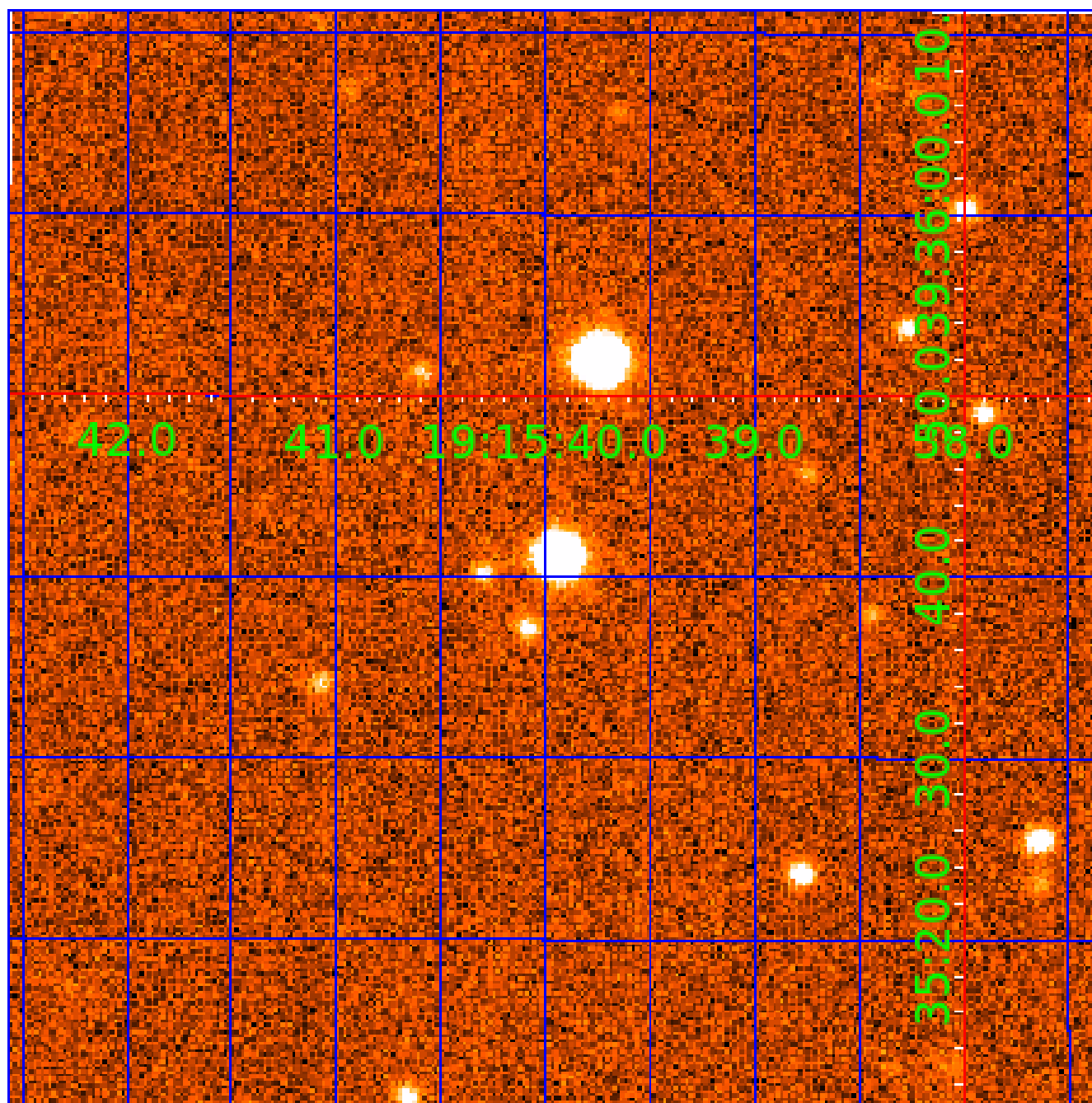
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 004455231

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 004455231-01 | OBS      | 1332.01 | 19.305819     | 141.519652   | 703.3       | 4.394            | 30.3 | 31.9 | 1.52                        | 5661            | 4.43                   | 104.67                 |
| 004455231-02 | OBS      | 1332.03 | 56.637532     | 135.522869   | 578.4       | 6.157            | 17.1 | 17.4 | 1.52                        | 5661            | 3.86                   | 24.92                  |
| 004455231-03 | OBS      | 1332.02 | 6.097435      | 134.553448   | 199.7       | 3.533            | 13.9 | 14.4 | 1.52                        | 5661            | 2.56                   | 486.65                 |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|------------|
| 004455231-01 | OBS      | PC   | 1.00  | 0 | 0 | 0 | 0 | NO_COMMENT |
| 004455231-02 | OBS      | PC   | 0.99  | 0 | 0 | 0 | 0 | NO_COMMENT |
| 004455231-03 | 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.

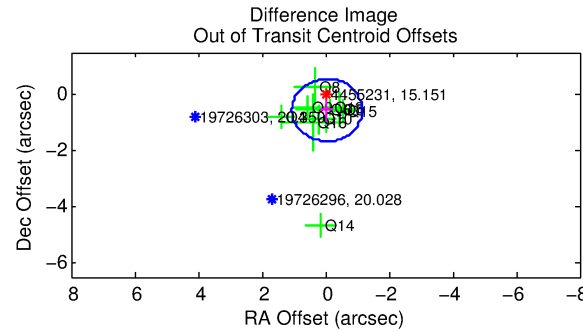
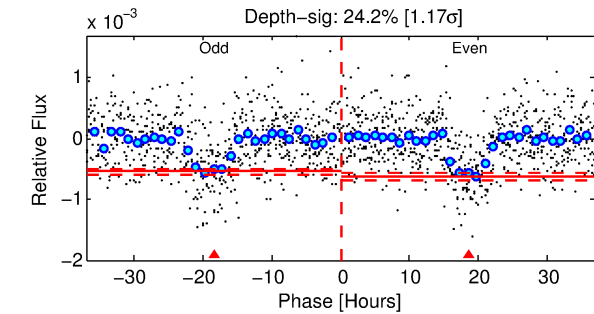
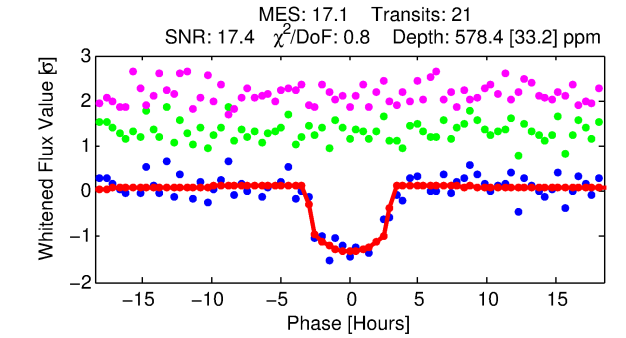
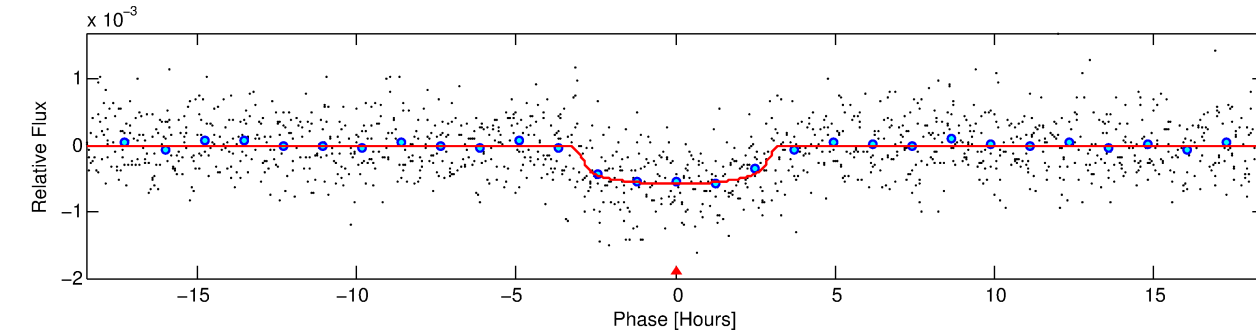
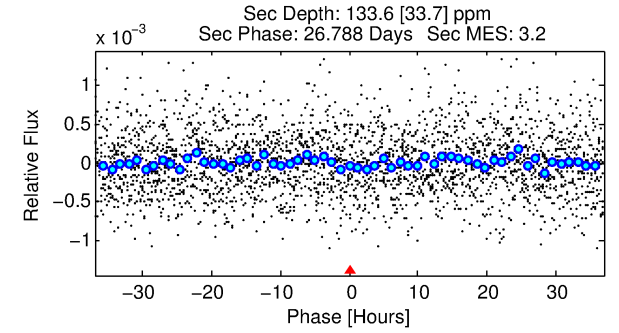
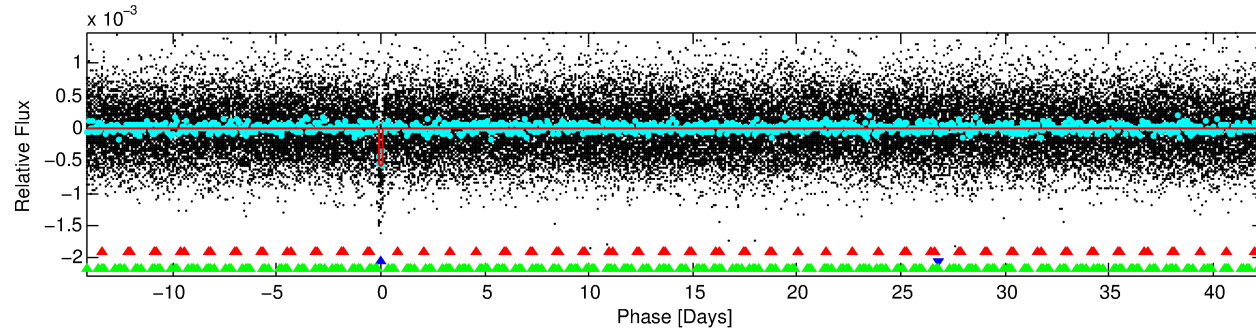
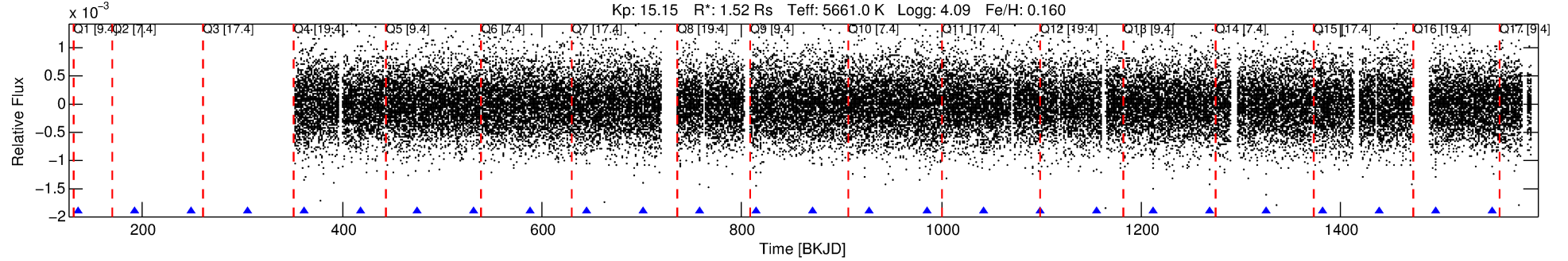
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004455231-02

No Significant Match Found

# DV One-Page Summary

KIC: 4455231 Candidate: 2 of 3 Period: 56.638 d  
KOI: K01332.03 Name: Kepler-288d Corr: 0.875



## DV Fit Results:

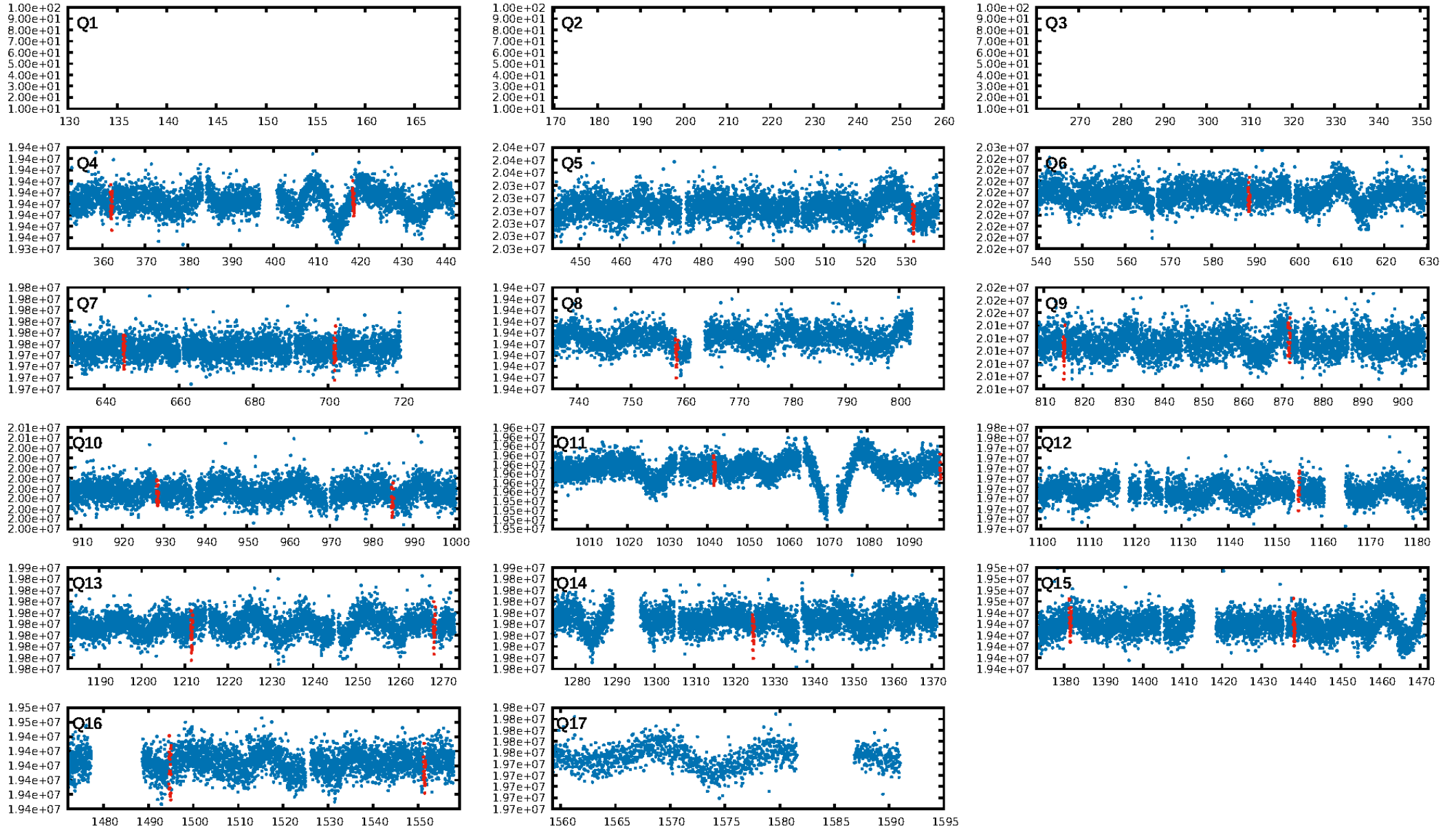
Period = 56.63753 [0.00055] d  
Epoch = 135.5229 [0.0089] BKJD  
Rp/R\* = 0.0233 [0.0125]  
a/R\* = 54.82 [122.43]  
b = 0.66 [1.92]  
Seff = 24.92 [8.80]  
Teff = 570 [50] K  
Rp = 3.86 [2.26] Re  
a = 0.2924 [0.0642] AU  
Ag = 421.61 [487.17] [0.86 $\sigma$ ]  
Teffp = 3992 [1101] K [3.10 $\sigma$ ]

## DV Diagnostic Results:

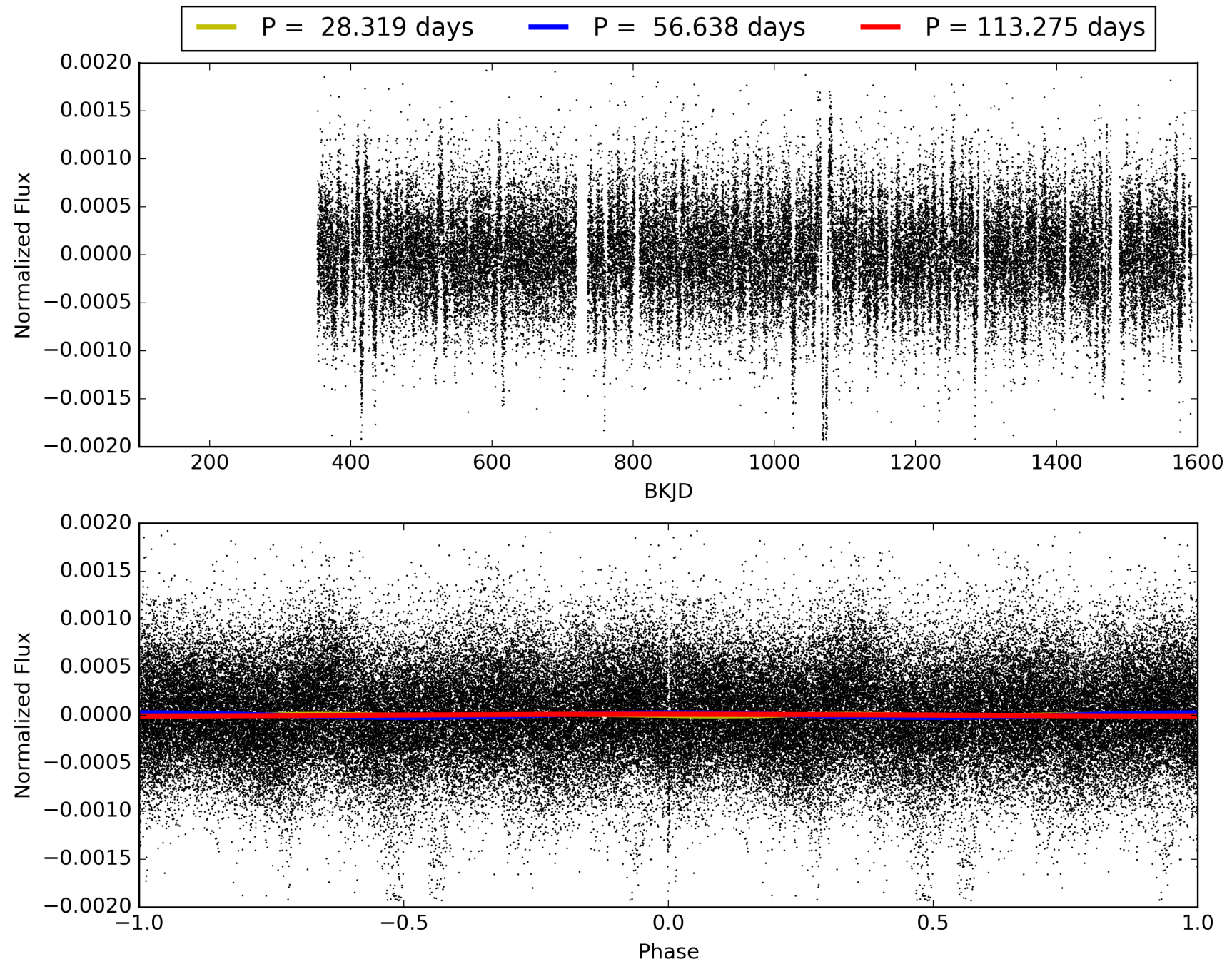
ShortPeriod-sig: 100.0% [118.45 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 66.1%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 2.40e-65  
RollingBand-fgt: 1.00 [21/21]  
GhostDiagnostic-chr: -8.062  
Centroid-sig: 4.9%  
Centroid-so: 0.439 arcsec [0.62 $\sigma$ ]  
OotOffset-rm: 0.563 arcsec [1.53 $\sigma$ ]  
KicOffset-rm: 0.375 arcsec [0.85 $\sigma$ ]  
OotOffset-st: 3/1/3/3 [10]  
KicOffset-st: 3/1/3/3 [10]  
DiffImageQuality-fgm: 0.80 [8/10]  
DiffImageOverlap-fno: 1.00 [11/11]



# TCE 004455231-02, PDC Light Curves

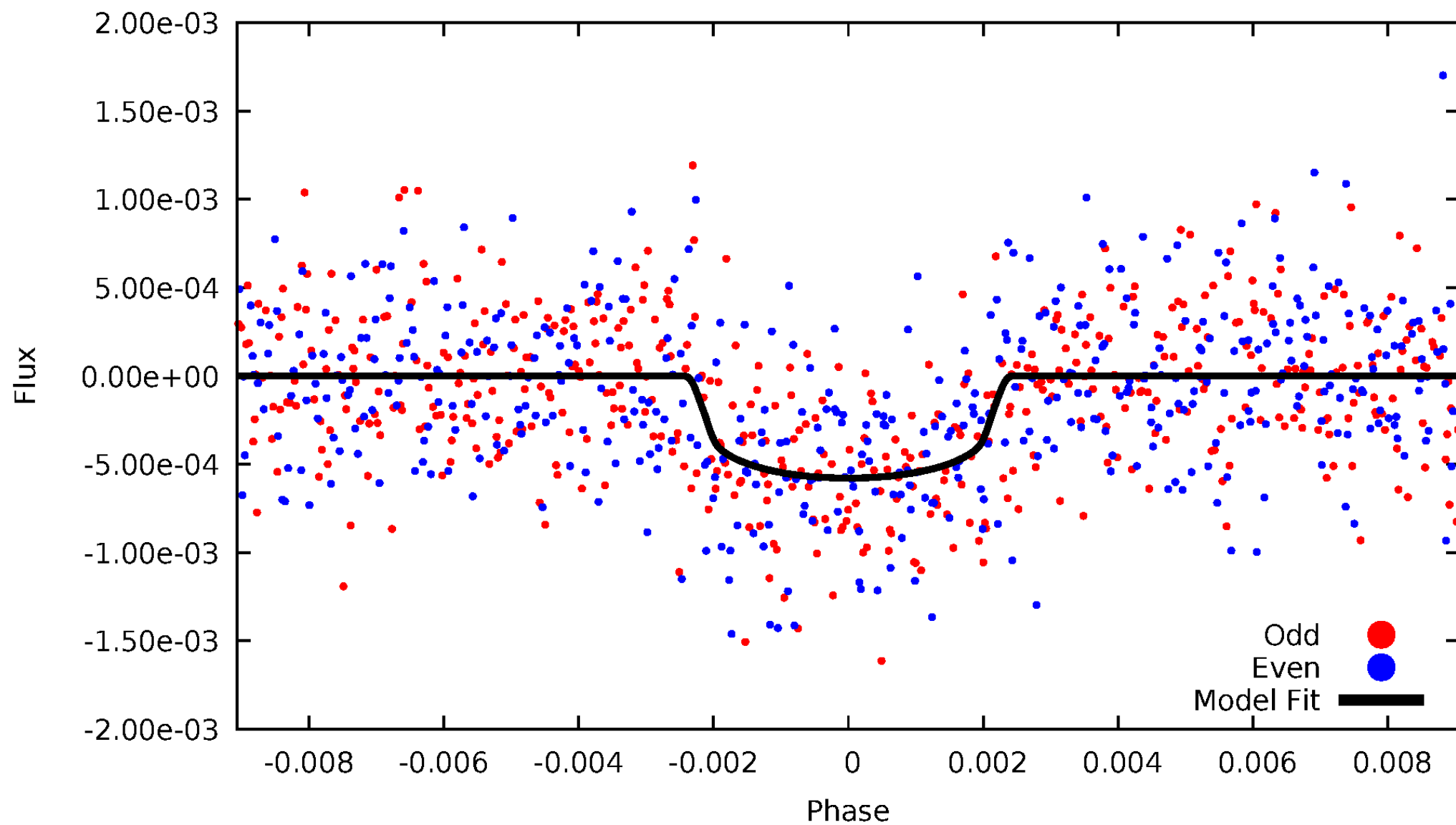


TCE 004455231-02



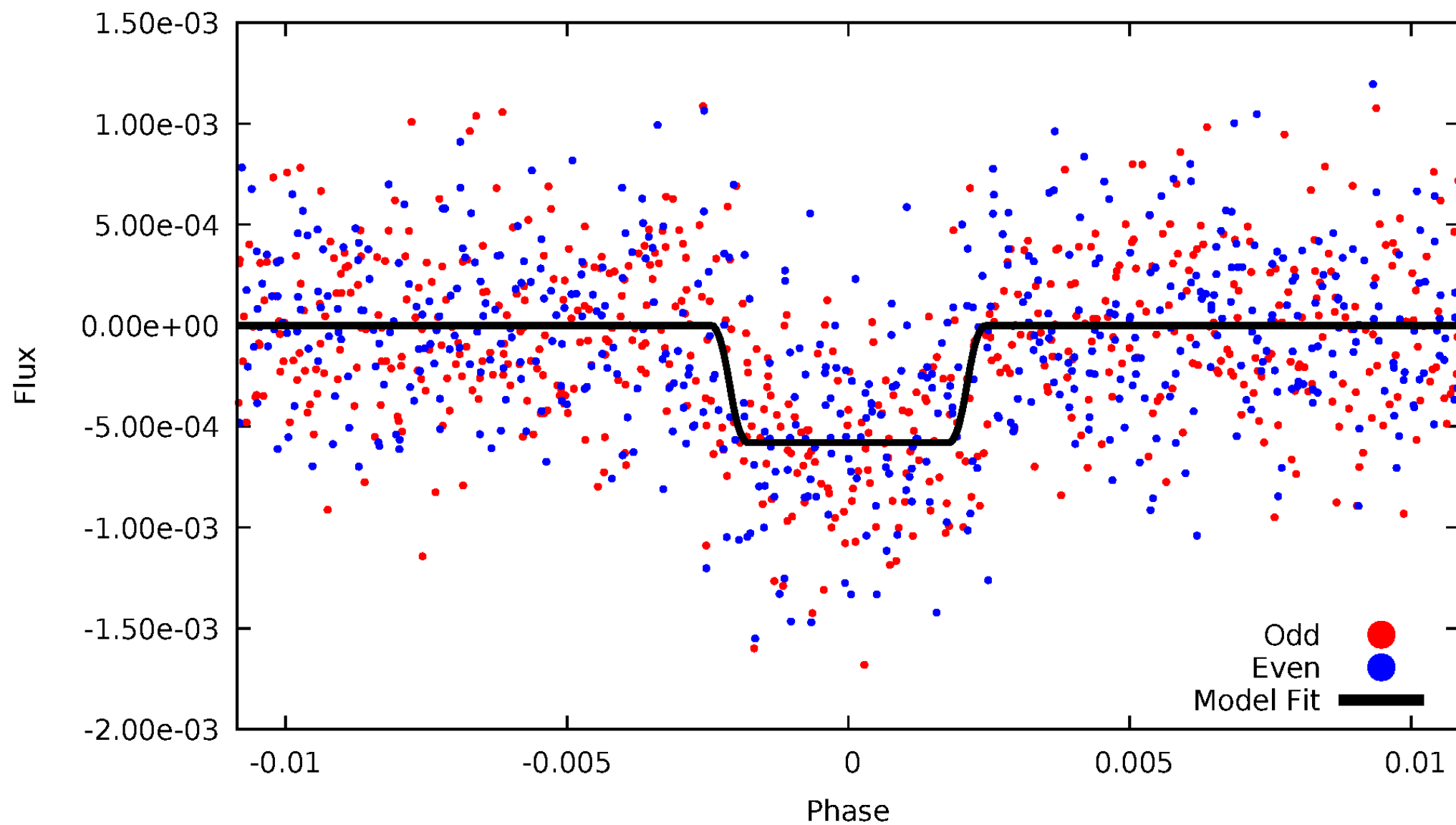
# DV Odd/Even

TCE 004455231-02



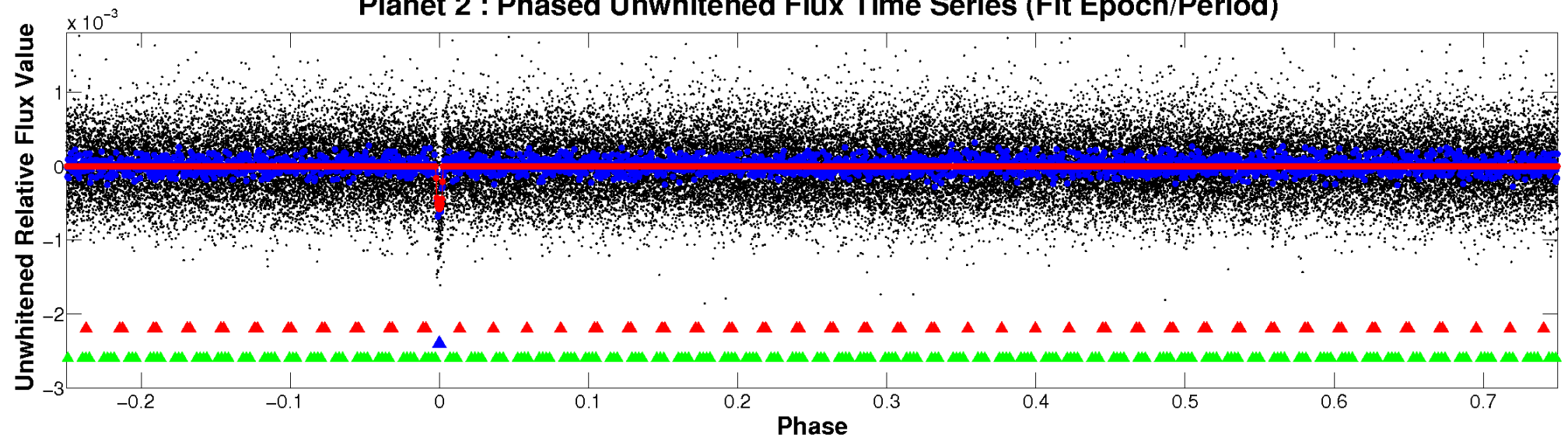
# ALT Odd/Even

TCE 004455231-02

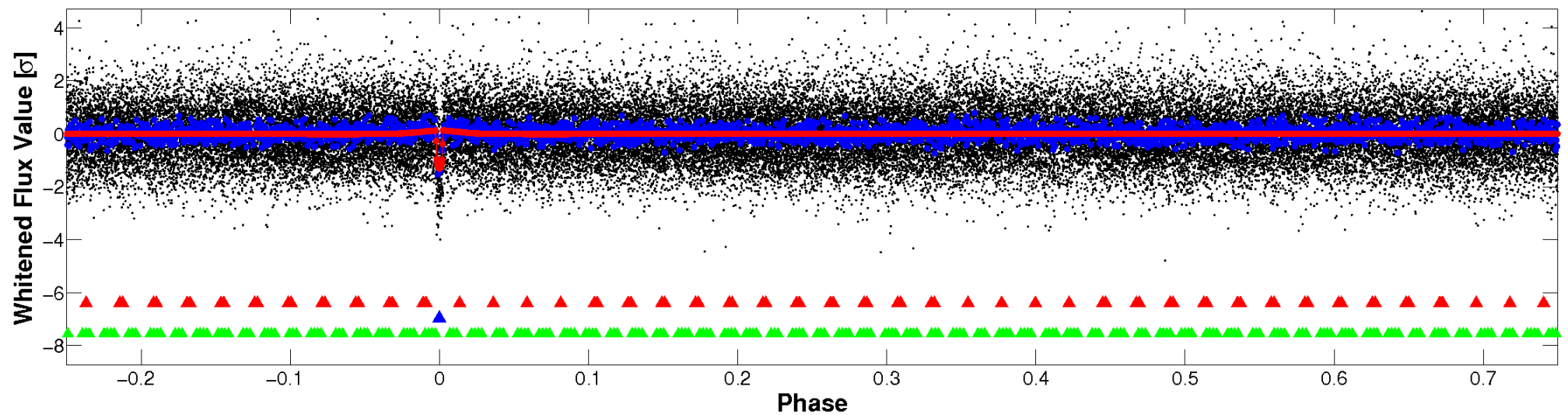


# Non-Whitened Vs. Whitened Light Curve

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



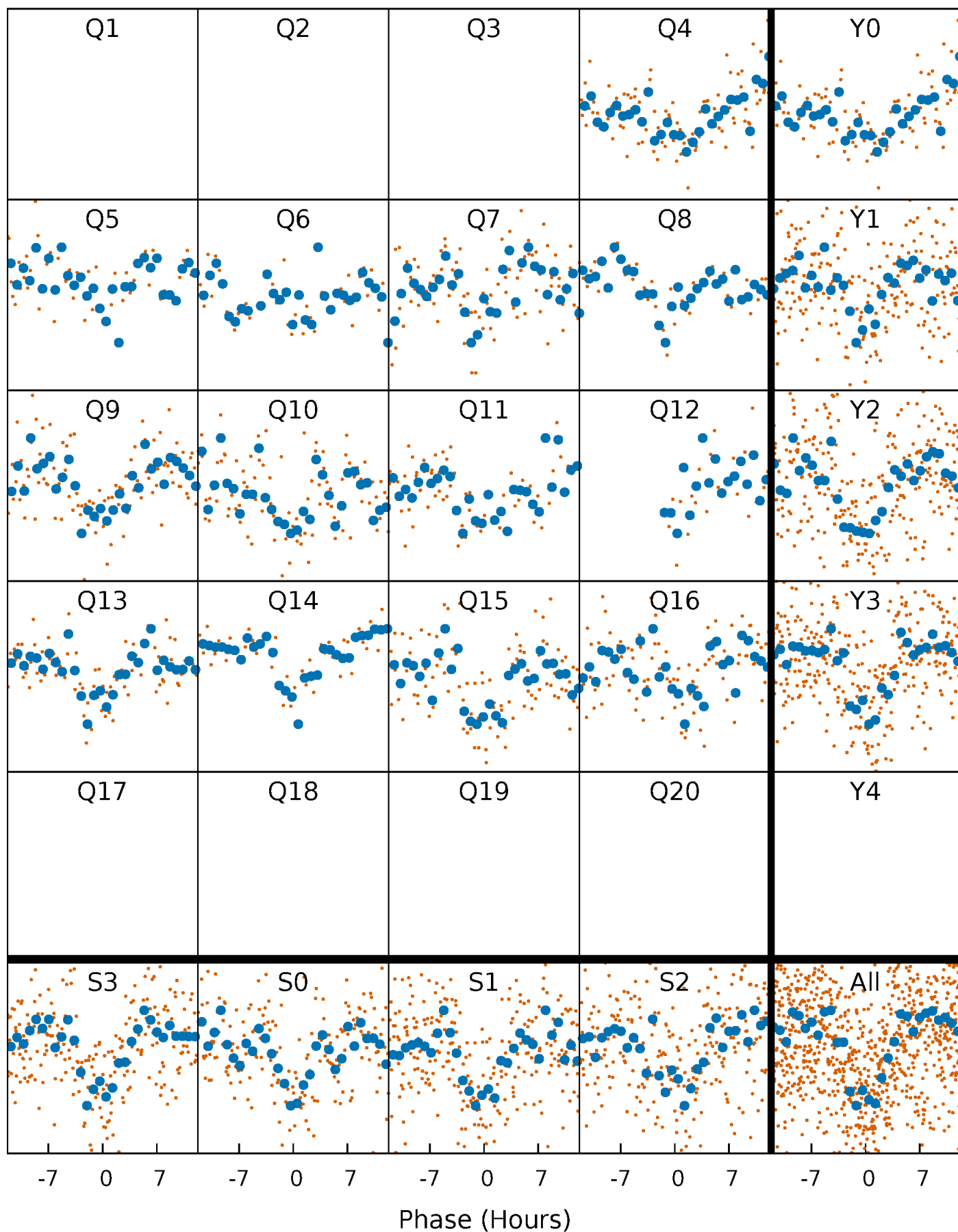
Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

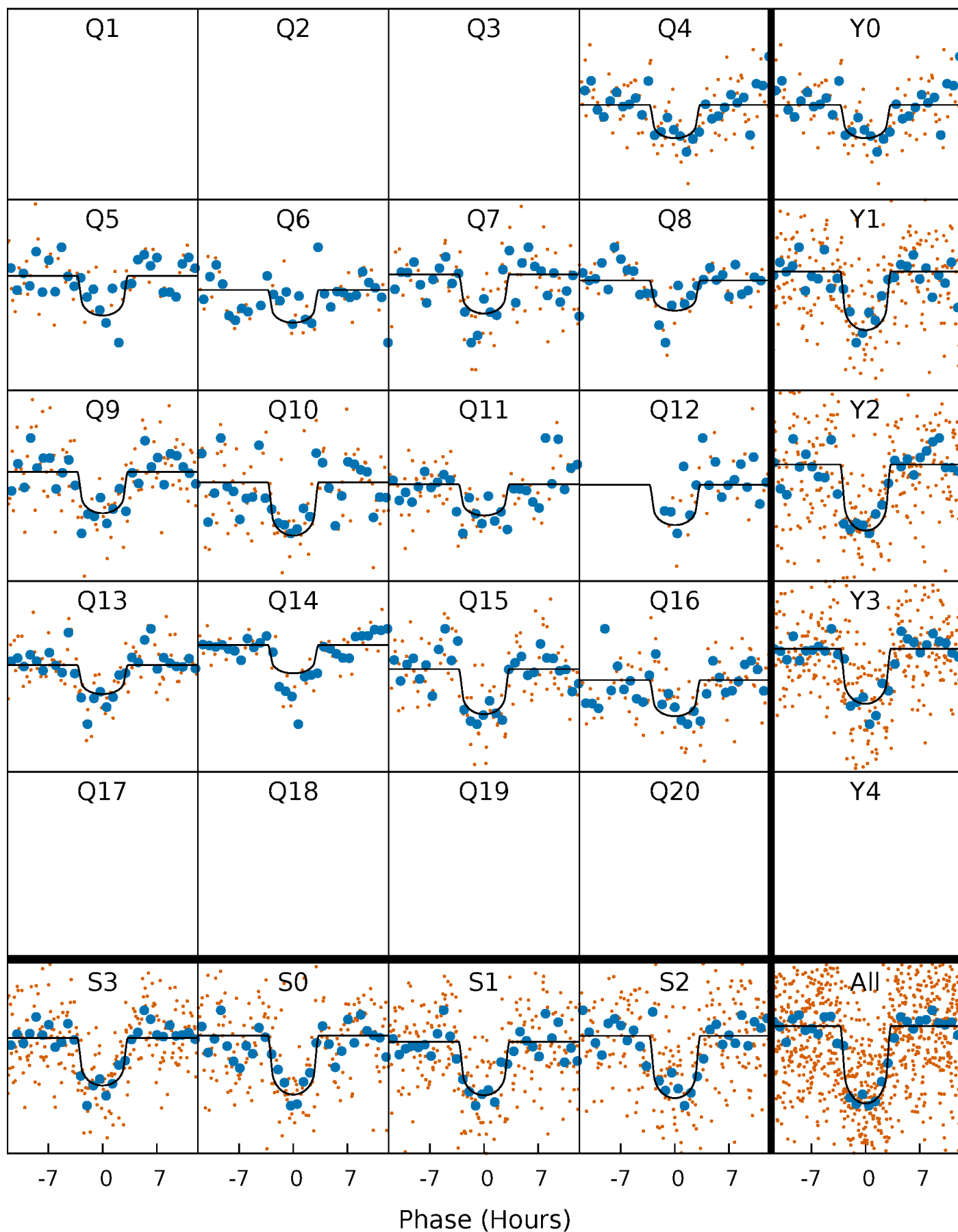
TCE 004455231-02   P= 56.637532 Days    $T_0=135.522869$  (BKJD)





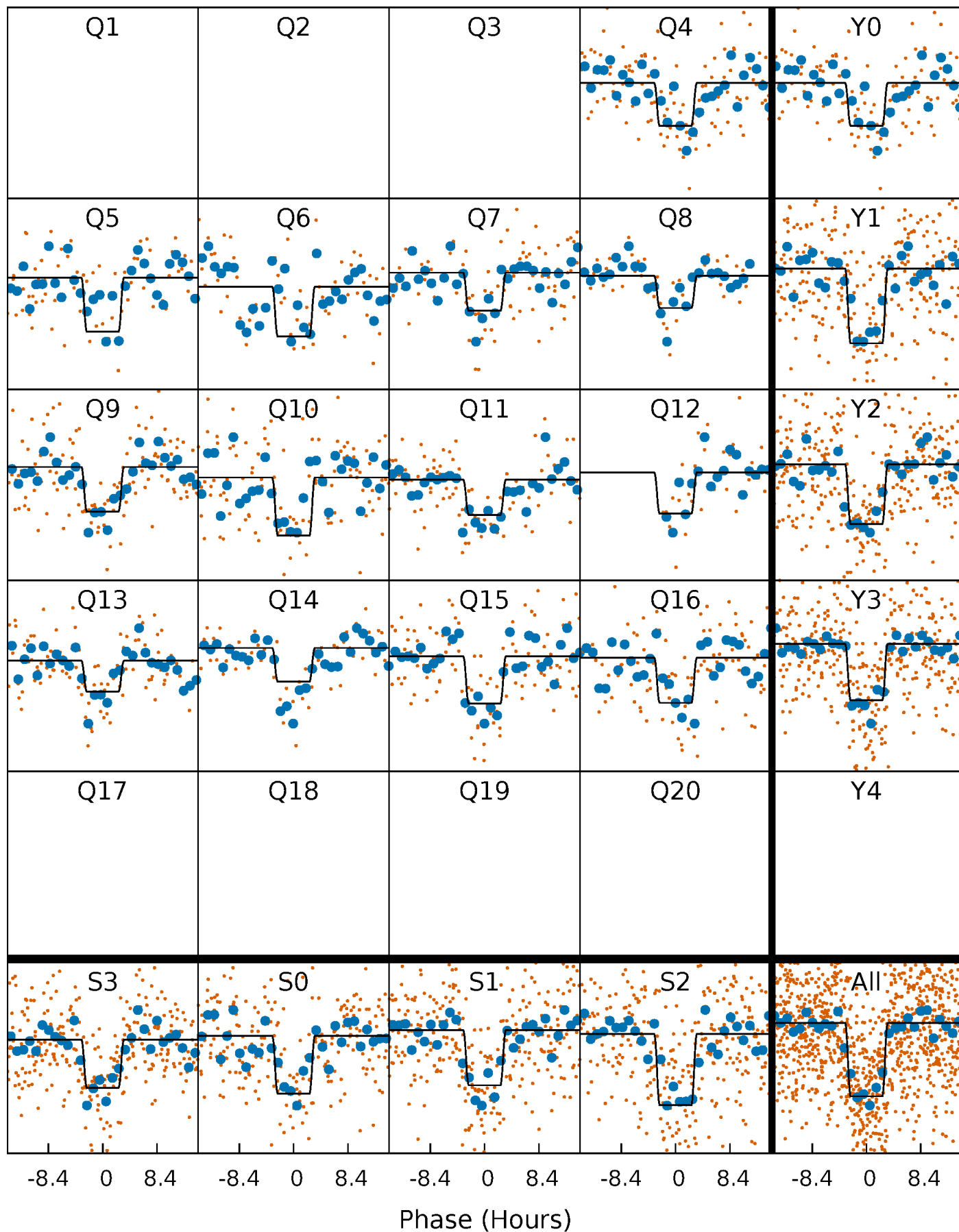
# DV Quarter-Phased Transit Curves

TCE 004455231-02 P= 56.637532 Days  $T_0=135.522869$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

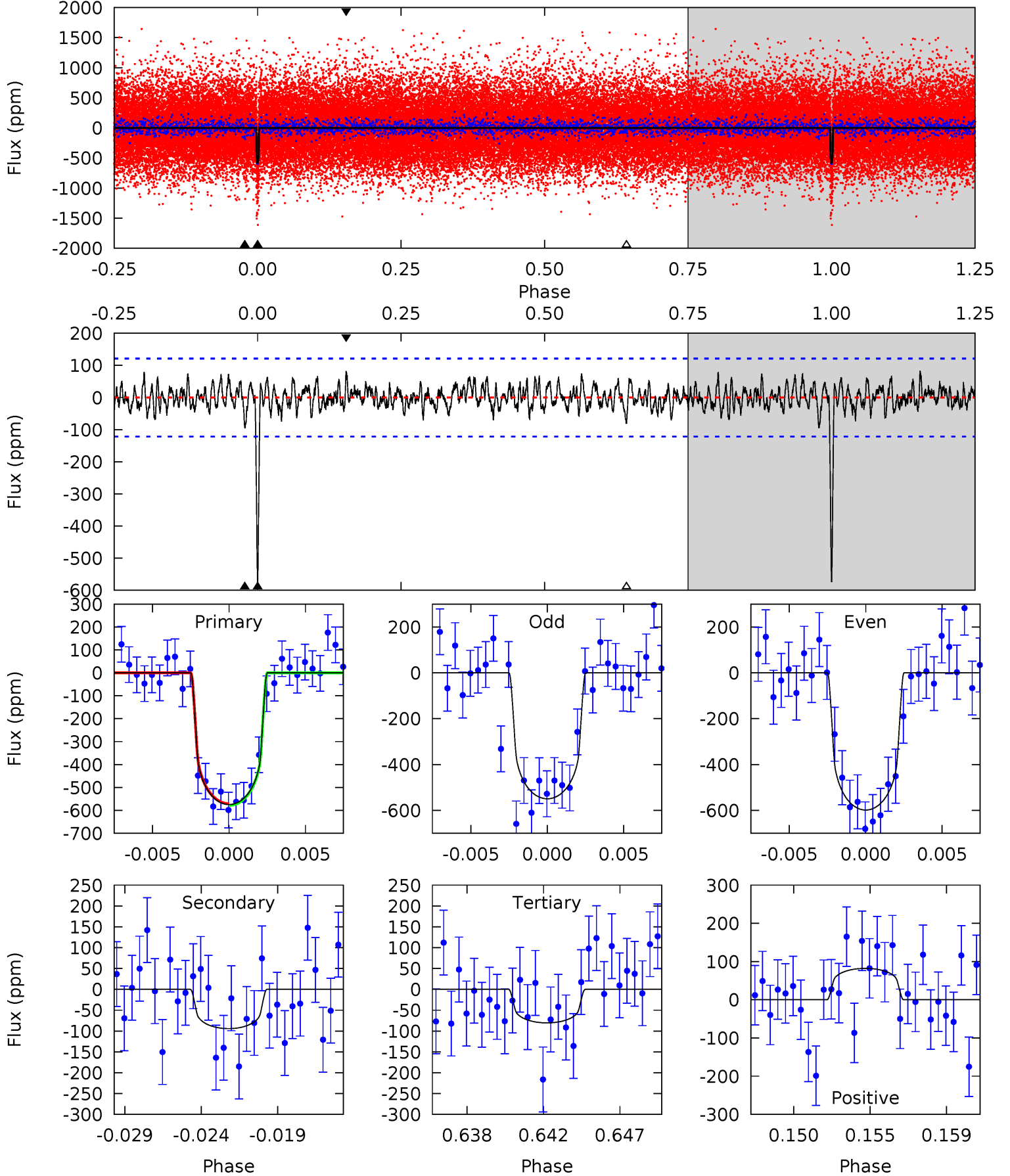
TCE 004455231-02 P= 56.639332 Days  $T_0=135.496987$  (BKJD)



# DV Model-Shift Uniqueness Test

004455231-02, P = 56.637532 Days, E = 135.522869 Days

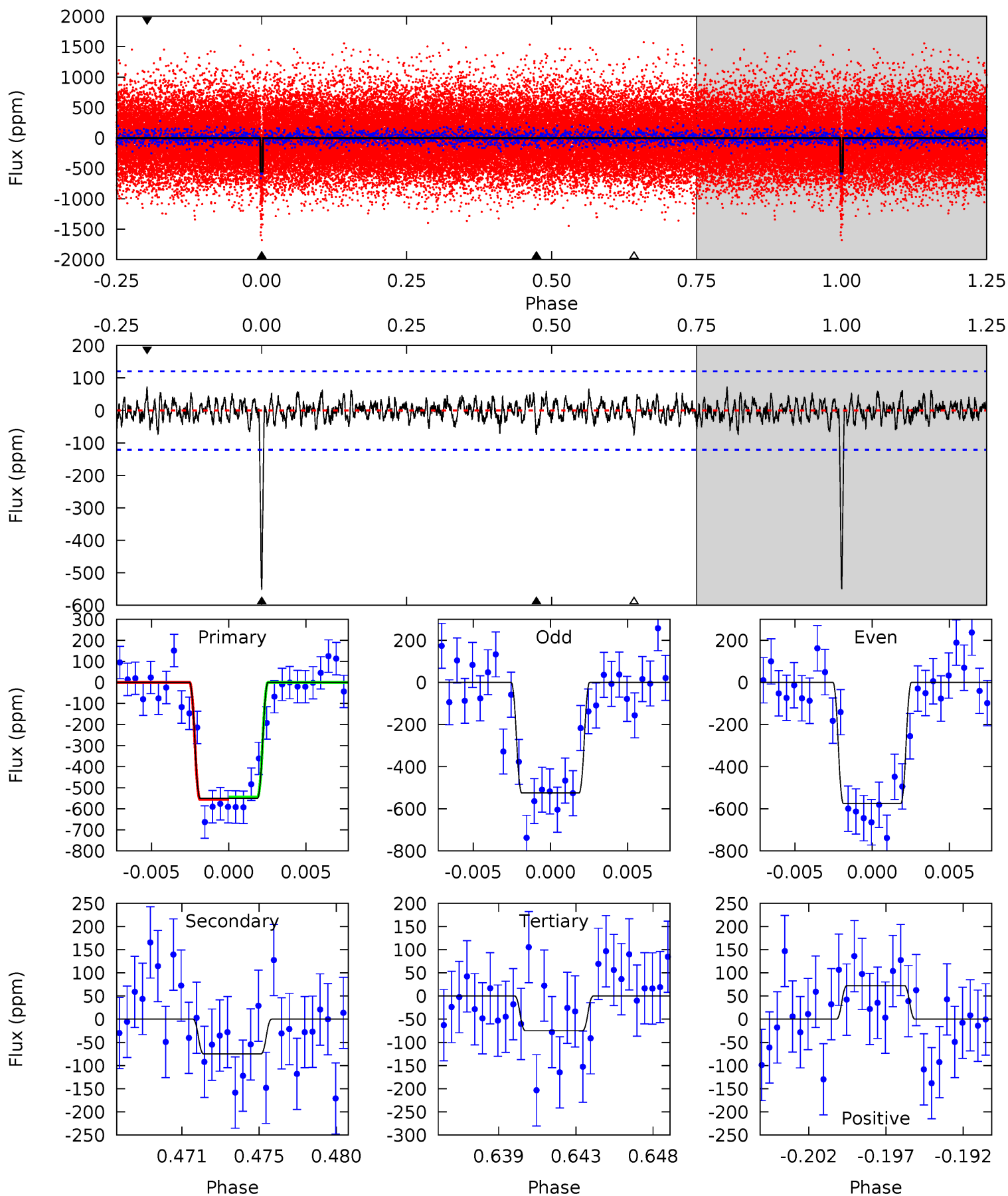
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 24.5 | 4.01 | 3.43 | 3.50 | 5.16            | 2.82            | 1.21             | 21.0    | 21.0    | 0.59    | 0.52    | 1.05    | 0.99 | 0.13  | 0.15 |



# Alt Model-Shift Uniqueness Test

004455231-02, P = 56.639332 Days, E = 135.496987 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  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 23.5 | 3.20 | 3.19 | 3.10 | 5.17            | 2.82            | 1.00             | 20.3    | 20.4    | 0.01    | 0.11    | 1.08    | 1.01 | 0.12  | 0.25 |



### Stellar Parameters For KIC 004455231

|        | $T_{\text{eff}}(K)$ | $\log(g)$                 | [Fe/H]                    | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|---------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
|        | $5661^{+85}_{-77}$  | $4.090^{+0.203}_{-0.087}$ | $0.160^{+0.150}_{-0.150}$ | $1.522^{+0.236}_{-0.353}$ | $1.040^{+0.093}_{-0.084}$ | $0.415^{+0.420}_{-0.131}$                 |
|        | +2%/-1%             | +5%/-2%                   | +94%/-94%                 | +16%/-23%                 | +9%/-8%                   | +101%/-32%                                |
| Source | SPE90               | SPE90                     | SPE90                     | DSEP                      |                           |   |

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

### Secondary Eclipse Parameters for KIC 004455231-02 / KOI 1332.03

| Detrend | Depth (ppm)  | $R_p (R_{\oplus})$     | $T_{max} (K)$     | $T_{obs} (K)$         | $A_{obs}$            |
|---------|--------------|------------------------|-------------------|-----------------------|----------------------|
| DV      | $-94 \pm 23$ | $3.70^{+2.00}_{-1.88}$ | $788^{+35}_{-49}$ | $3981^{+1295}_{-560}$ | $319^{+1104}_{-195}$ |
| Alt.    | $-75 \pm 23$ | $3.99^{+2.23}_{-2.03}$ | $791^{+34}_{-49}$ | $3701^{+1163}_{-474}$ | $211^{+666}_{-130}$  |

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

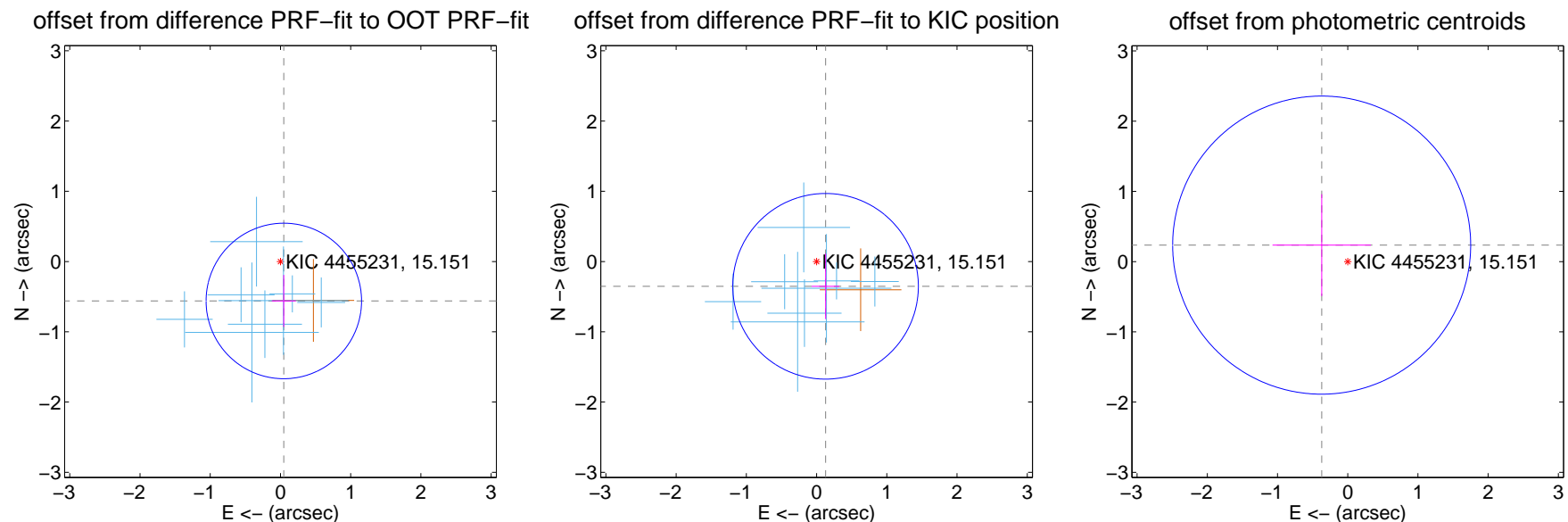
## DV Centroid Data

Supplemental centroid analysis for 004455231-02. Kepler magnitude: 15.15. Transit SNR 17.41

There are 8 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

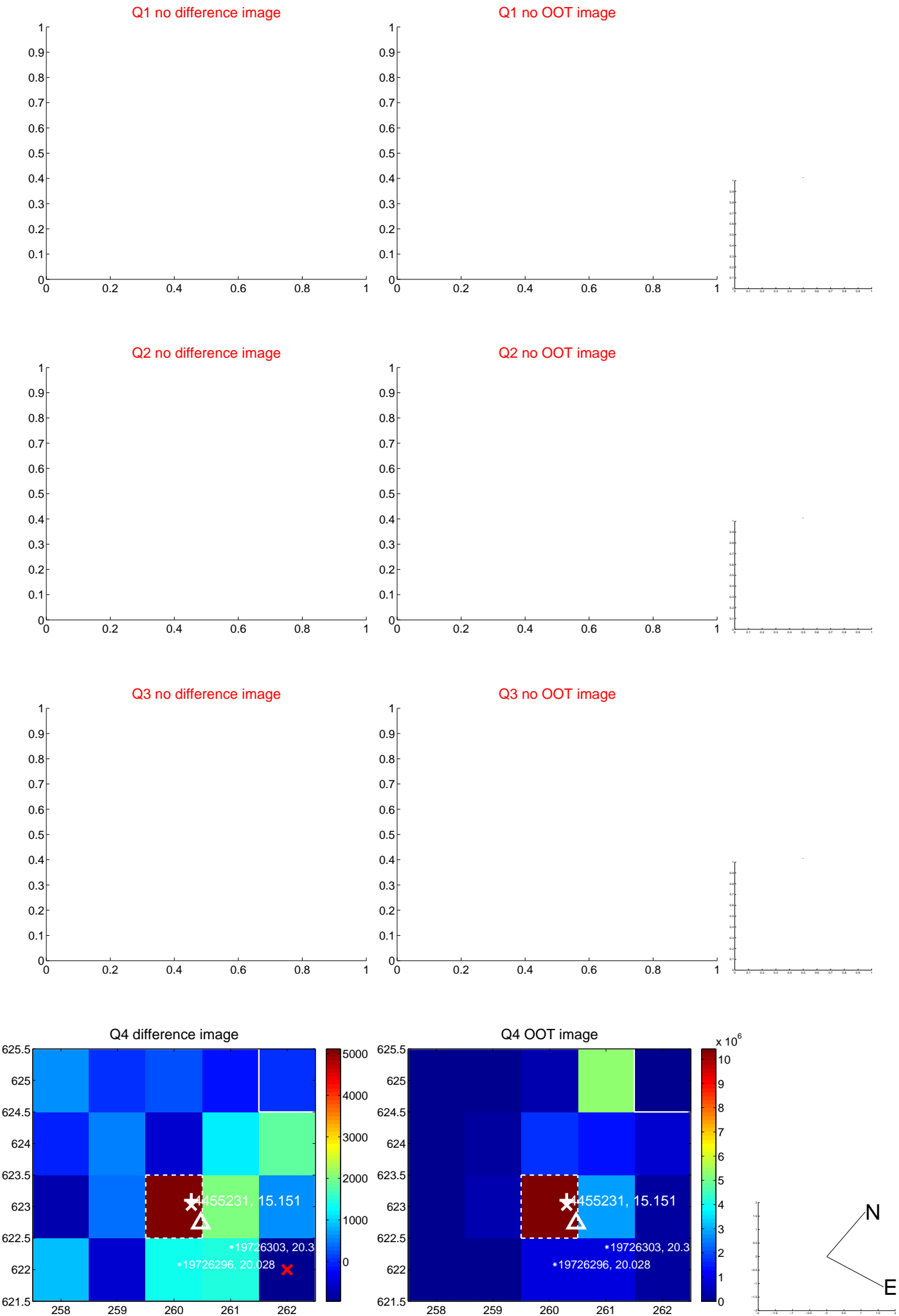
|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec       |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT          | $0.563 \pm 0.369$  | 1.53                | $-0.048 \pm 0.171$ | $-0.561 \pm 0.370$ |
| PRF-fit source offset from KIC position | $0.375 \pm 0.440$  | 0.85                | $-0.128 \pm 0.197$ | $-0.353 \pm 0.467$ |
| photometric centroid source offset      | $0.44 \pm 0.71$    | 0.62                | $0.37 \pm 0.70$    | $0.23 \pm 0.72$    |



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

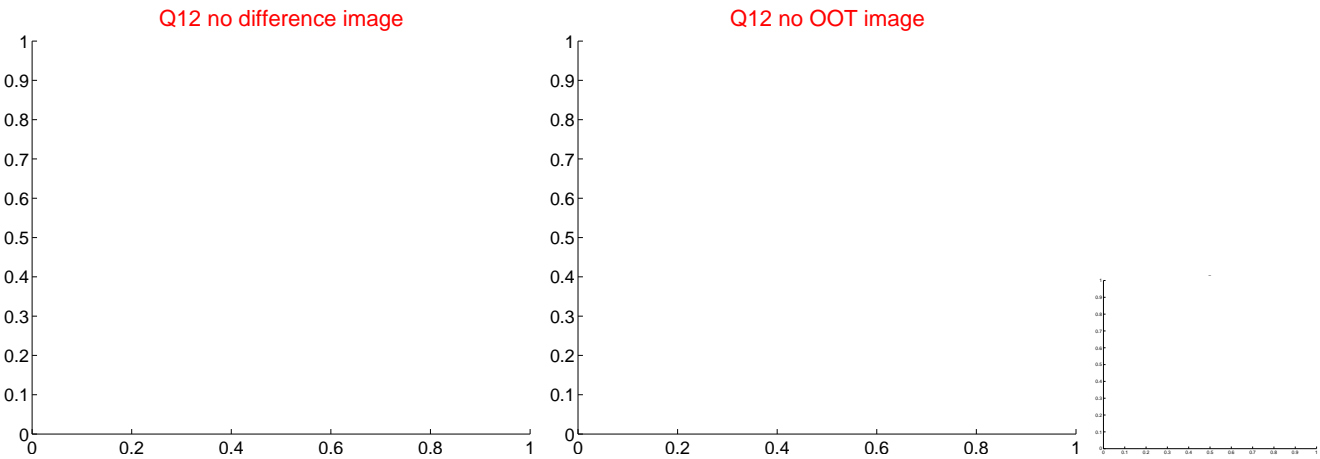
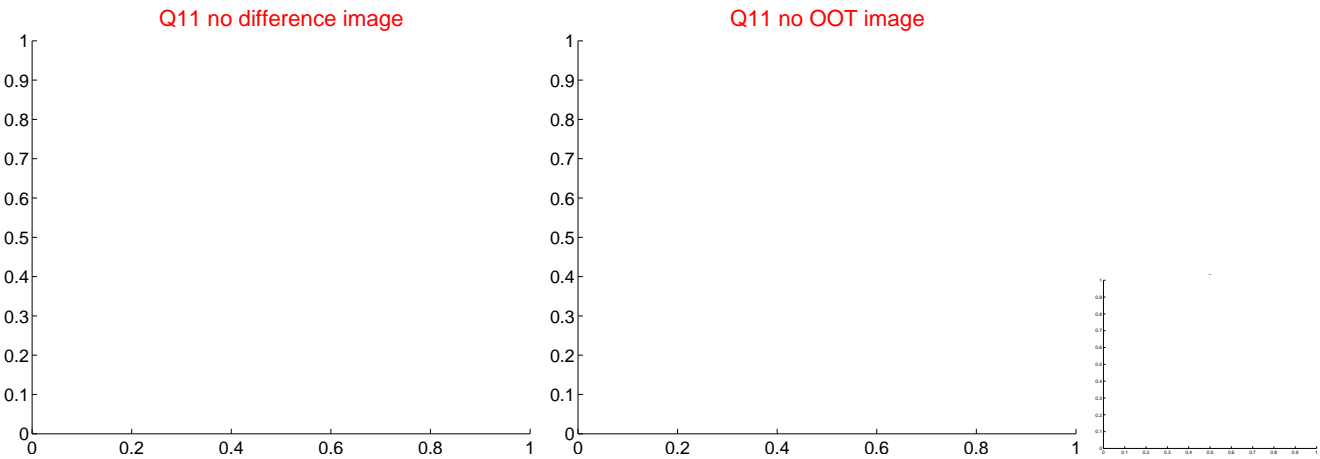
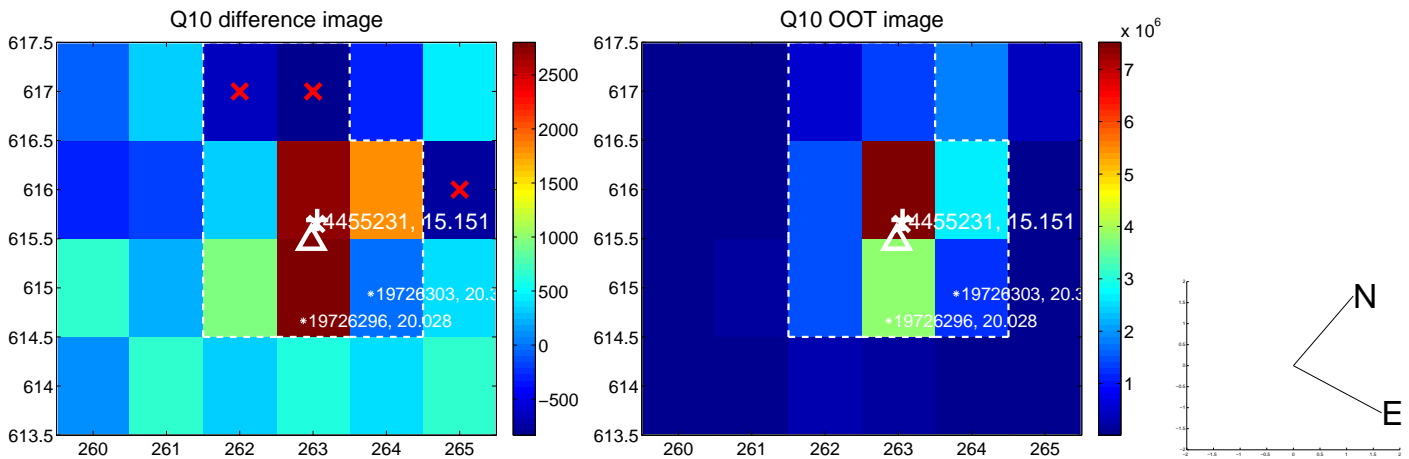
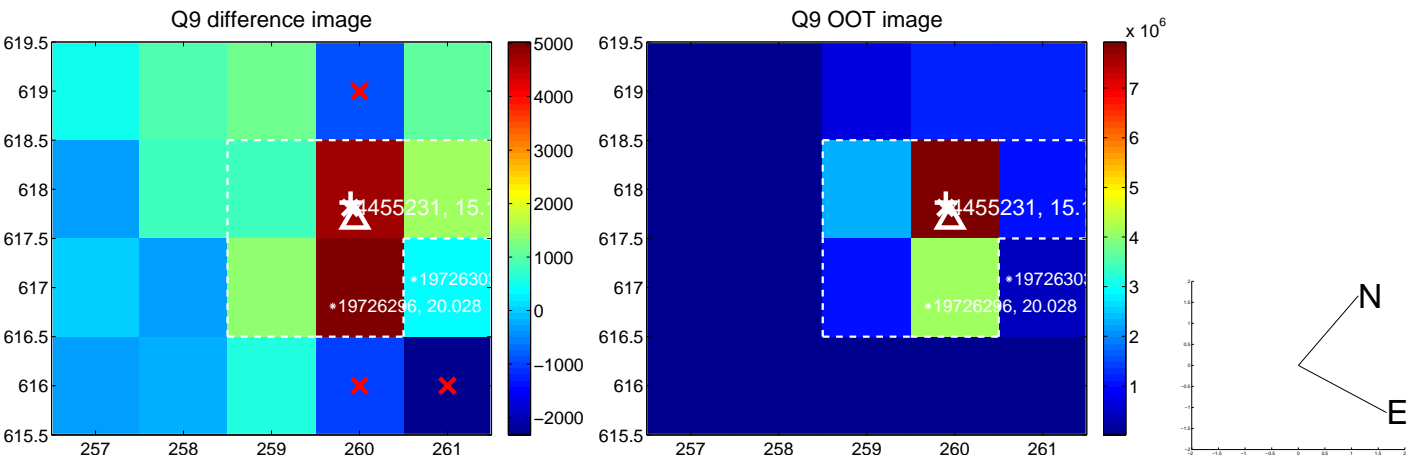


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

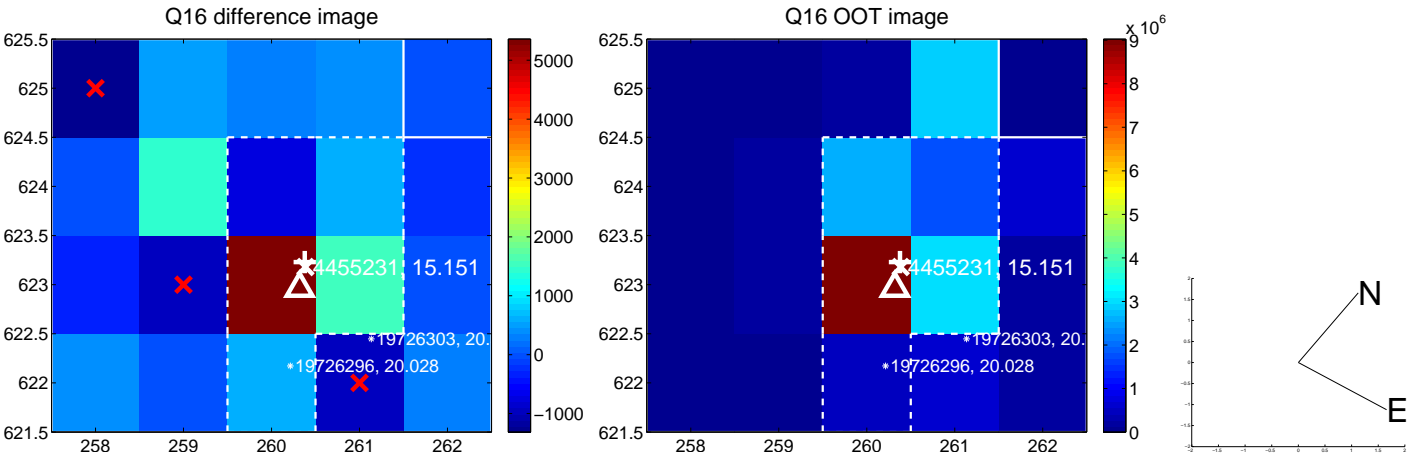
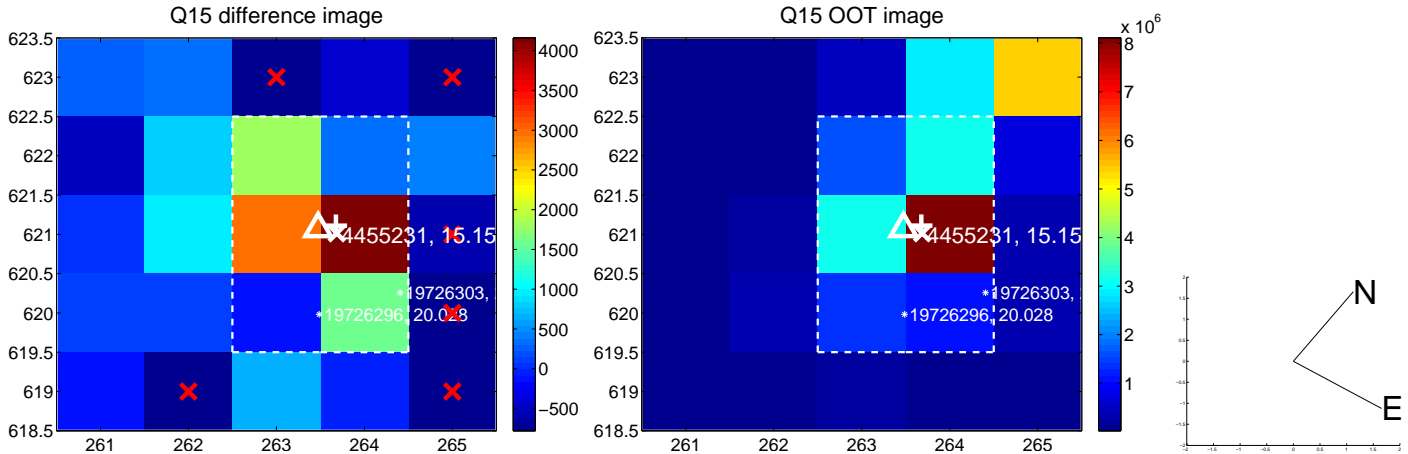
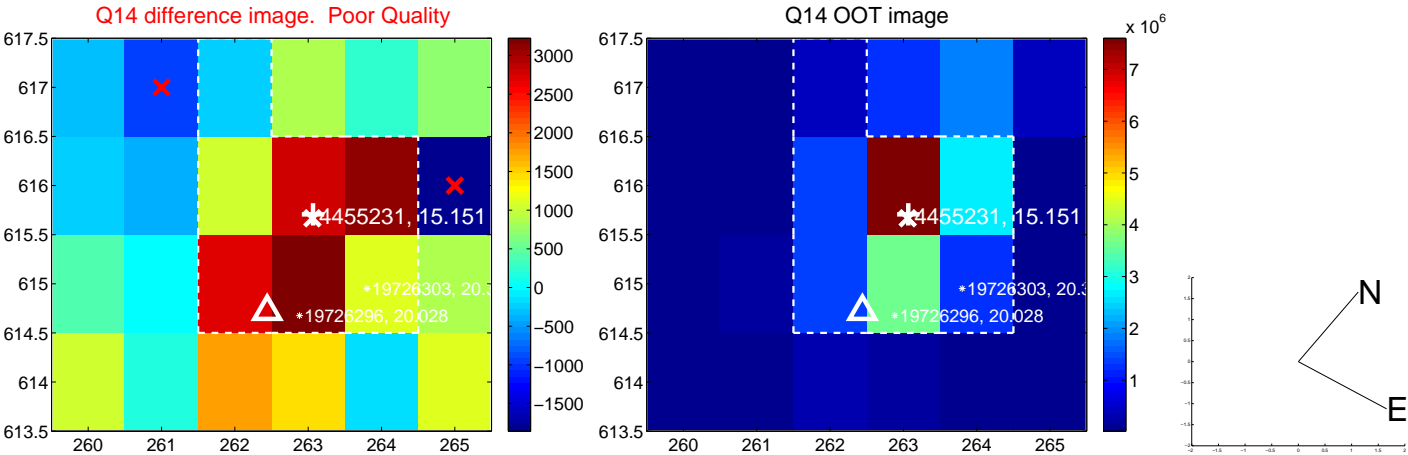
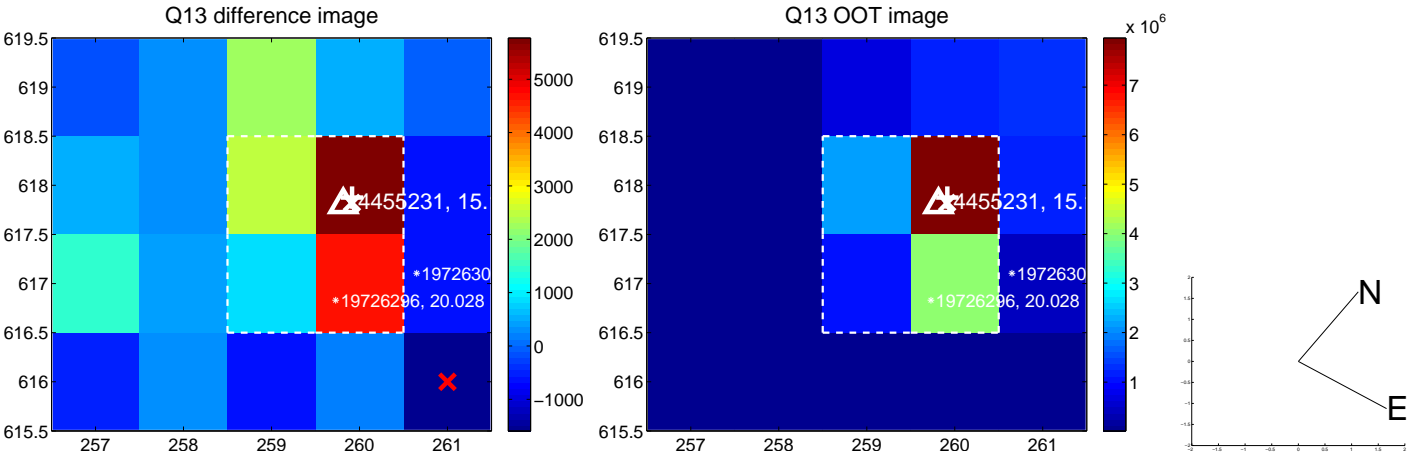




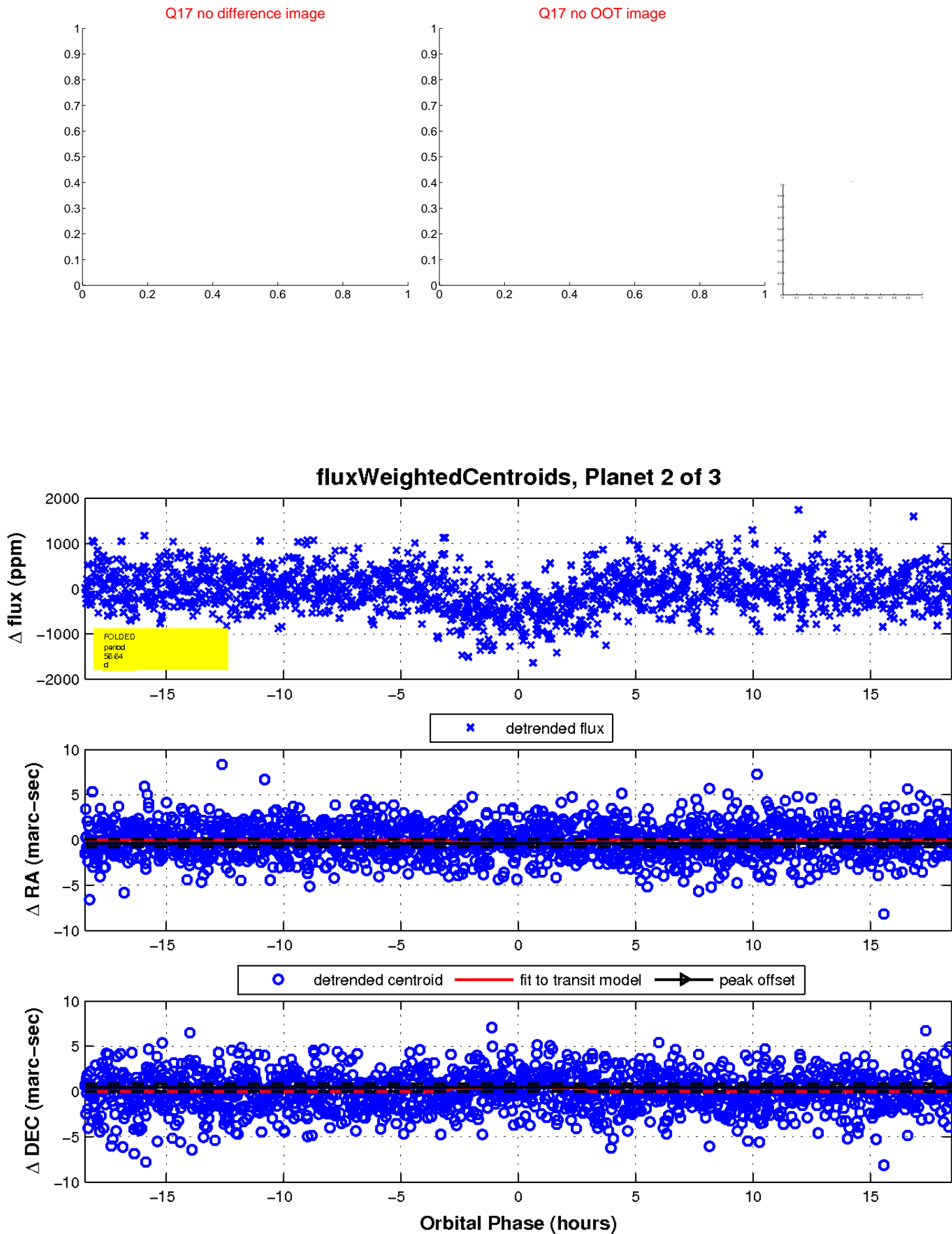
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

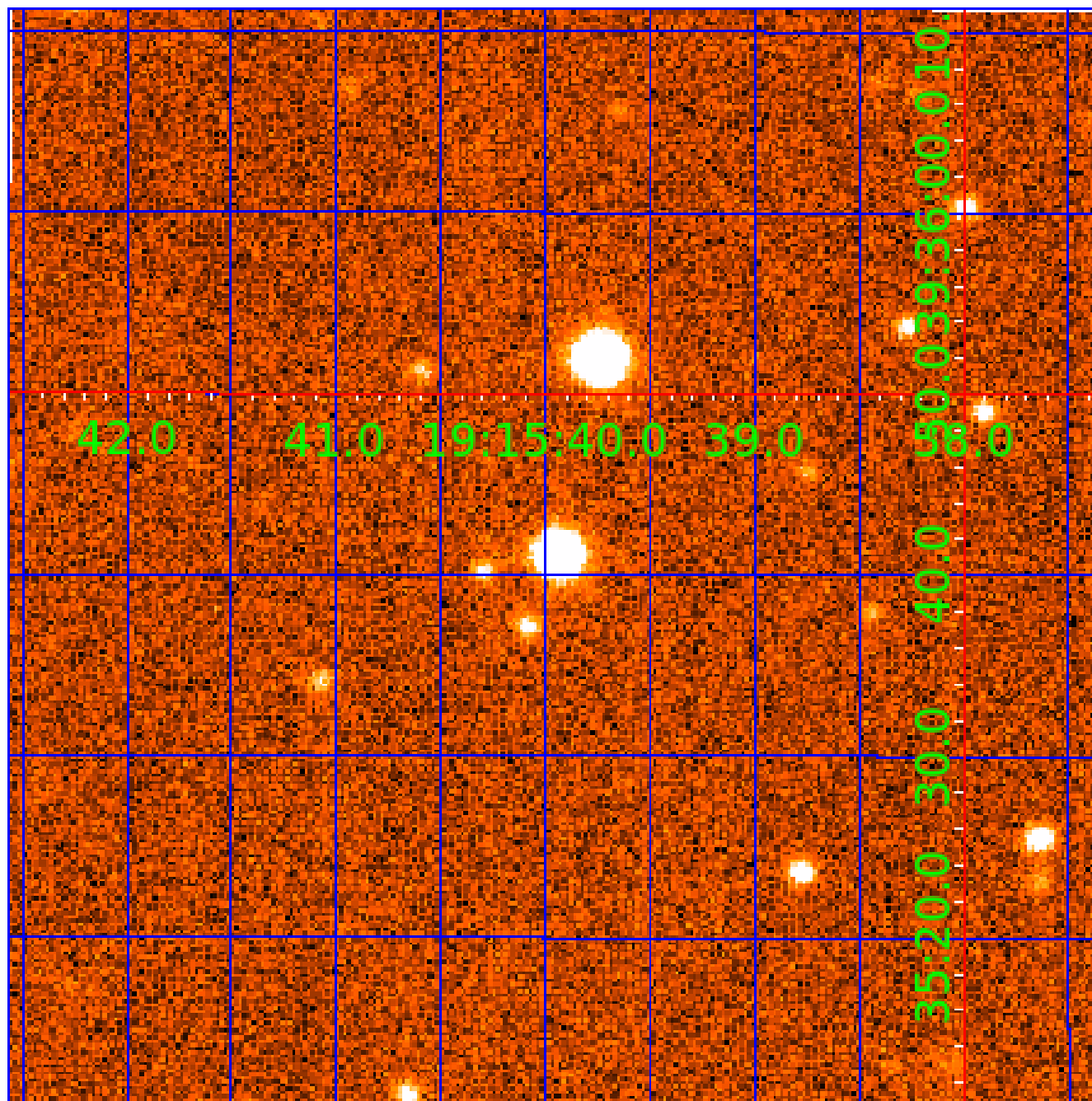


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 004455231

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 004455231-01 | OBS      | 1332.01 | 19.305819     | 141.519652   | 703.3       | 4.394            | 30.3 | 31.9 | 1.52                        | 5661            | 4.43                   | 104.67                 |
| 004455231-02 | OBS      | 1332.03 | 56.637532     | 135.522869   | 578.4       | 6.157            | 17.1 | 17.4 | 1.52                        | 5661            | 3.86                   | 24.92                  |
| 004455231-03 | OBS      | 1332.02 | 6.097435      | 134.553448   | 199.7       | 3.533            | 13.9 | 14.4 | 1.52                        | 5661            | 2.56                   | 486.65                 |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|------------|
| 004455231-01 | OBS      | PC   | 1.00  | 0 | 0 | 0 | 0 | NO_COMMENT |
| 004455231-02 | OBS      | PC   | 0.99  | 0 | 0 | 0 | 0 | NO_COMMENT |
| 004455231-03 | 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.

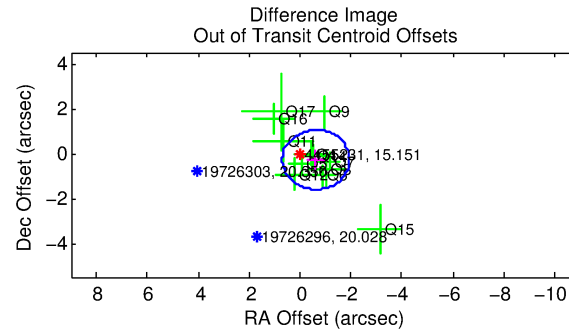
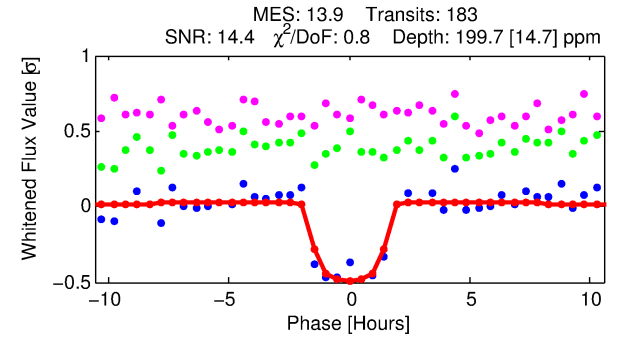
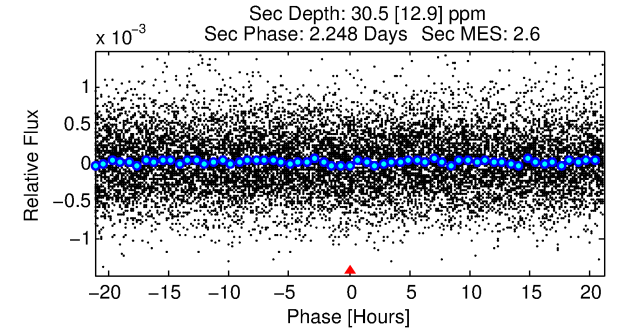
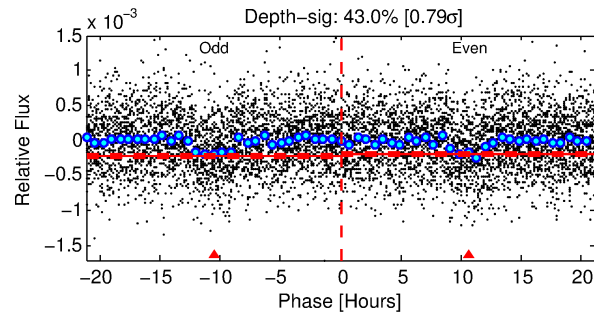
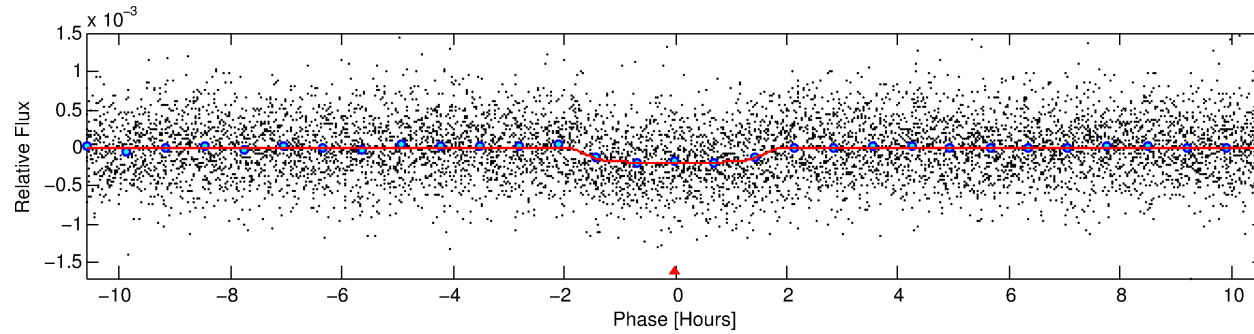
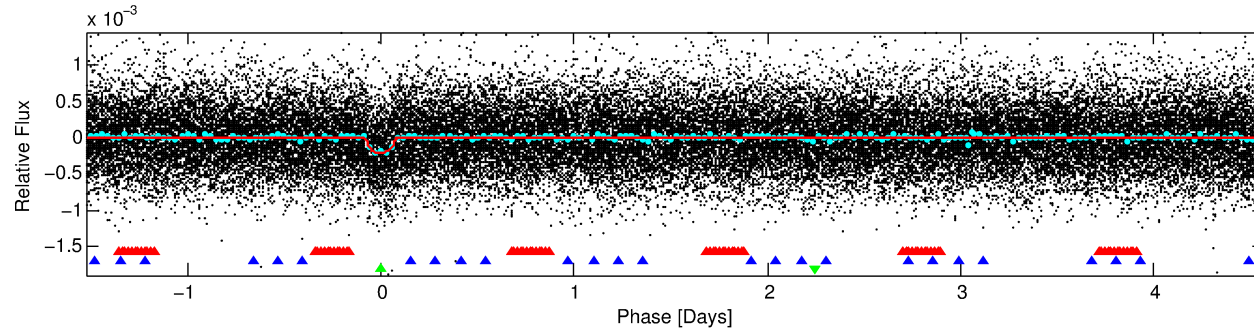
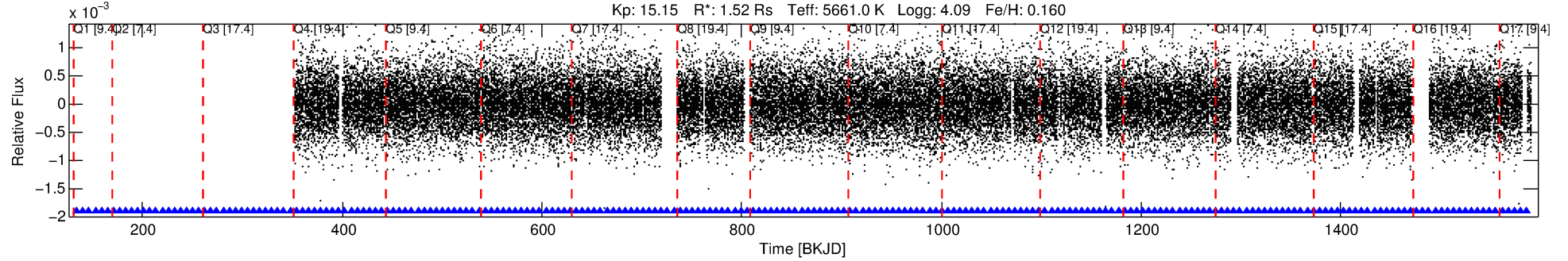
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004455231-03

No Significant Match Found

# DV One-Page Summary

KIC: 4455231 Candidate: 3 of 3 Period: 6.097 d  
KOI: K01332.02 Name: Kepler-288b Corr: 0.952



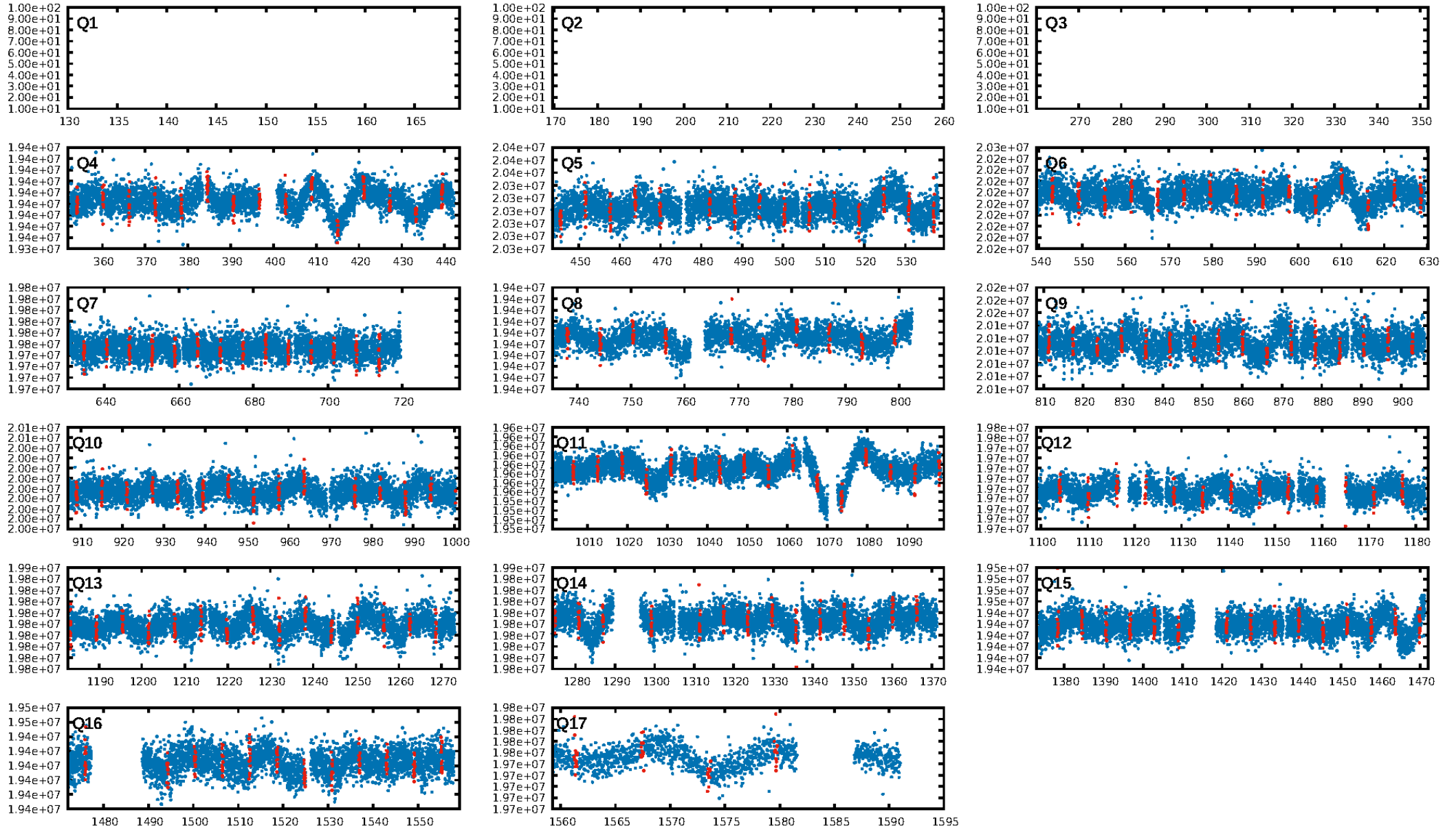
## DV Fit Results:

Period = 6.09743 [0.00004] d  
Epoch = 134.5534 [0.0051] BKJD  
Rp/R\* = 0.0154 [0.0059]  
a/R\* = 6.39 [10.89]  
b = 0.90 [0.40]  
Seff = 486.65 [171.79]  
Teff = 1198 [106] K  
Rp = 2.56 [1.14] Re  
a = 0.0662 [0.0145] AU  
Ag = 11.24 [10.57] [0.97 $\sigma$ ]  
Teffp = 3390 [742] K [2.92 $\sigma$ ]

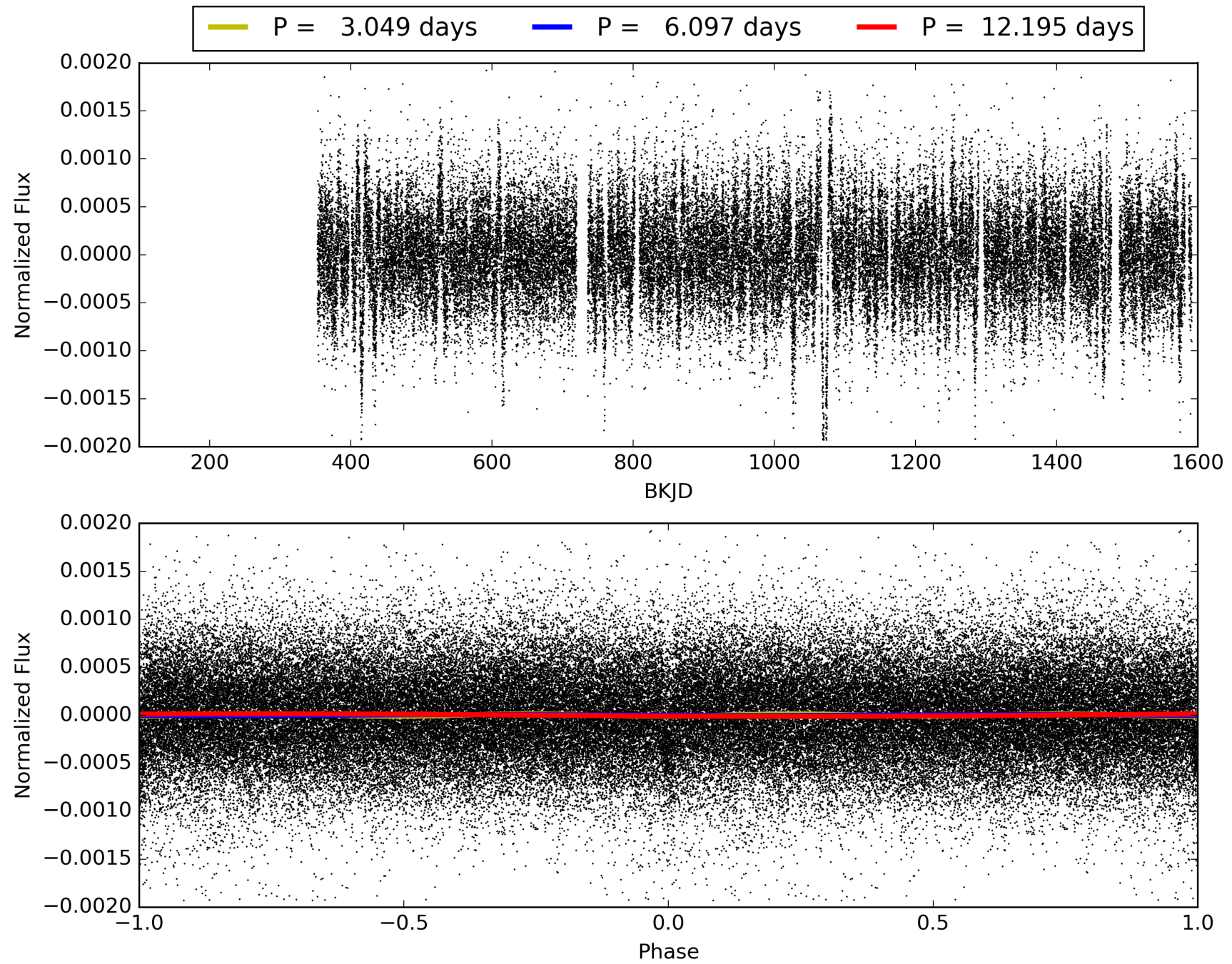
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [56.22 $\sigma$ ]  
ModelChiSquare2-sig: 99.9%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 8.35e-44  
RollingBand-fgt: 1.00 [179/179]  
GhostDiagnostic-chr: 2.024  
Centroid-sig: 0.1%  
Centroid-so: 0.842 arcsec [0.93 $\sigma$ ]  
OotOffset-rm: 0.683 arcsec [1.55 $\sigma$ ]  
KicOffset-rm: 0.760 arcsec [2.26 $\sigma$ ]  
OotOffset-st: 2/3/4/3 [12]  
KicOffset-st: 2/3/4/3 [12]  
DiffImageQuality-fgm: 0.75 [9/12]  
DiffImageOverlap-fno: 1.00 [14/14]

# TCE 004455231-03, PDC Light Curves



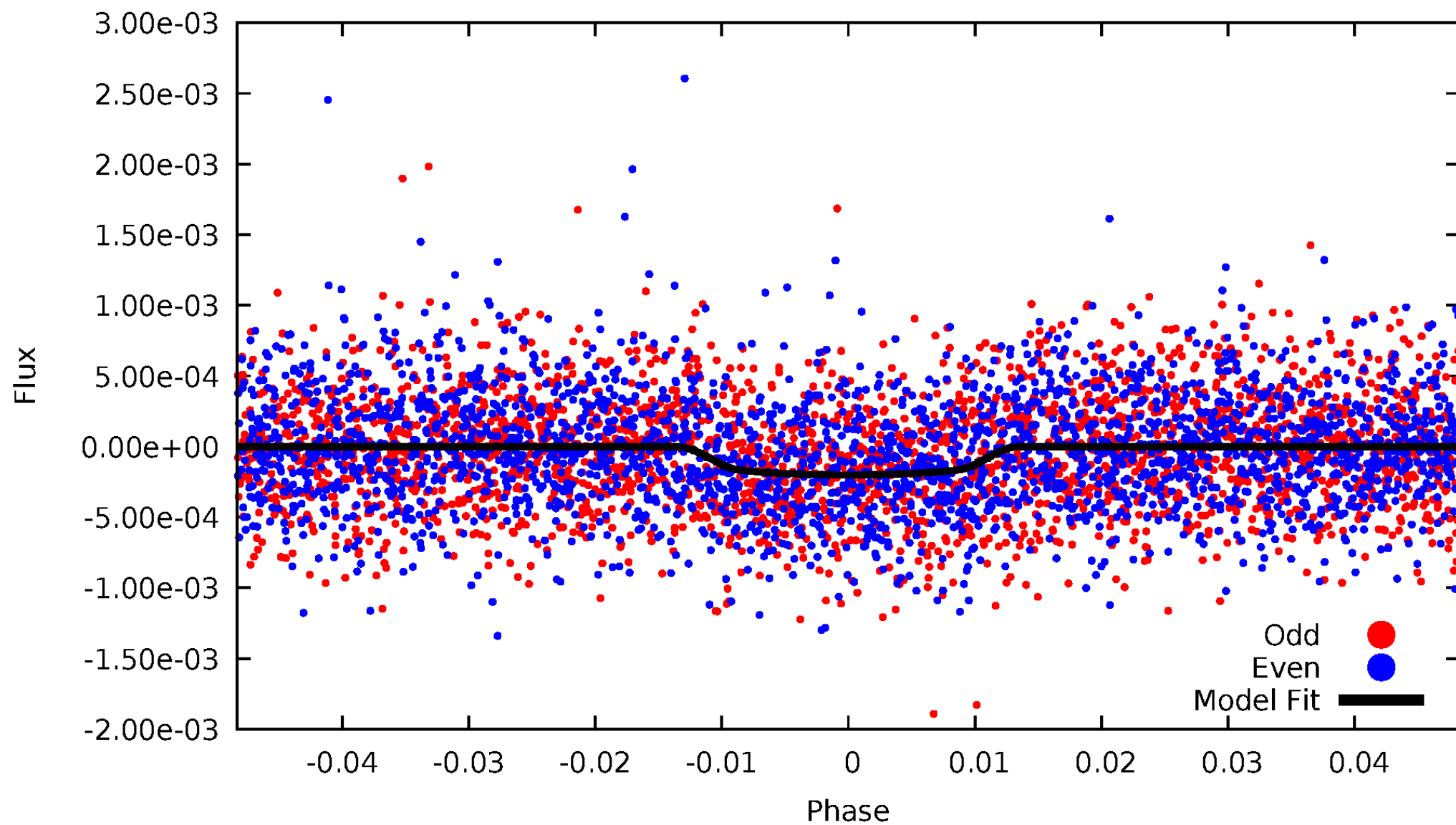
TCE 004455231-03





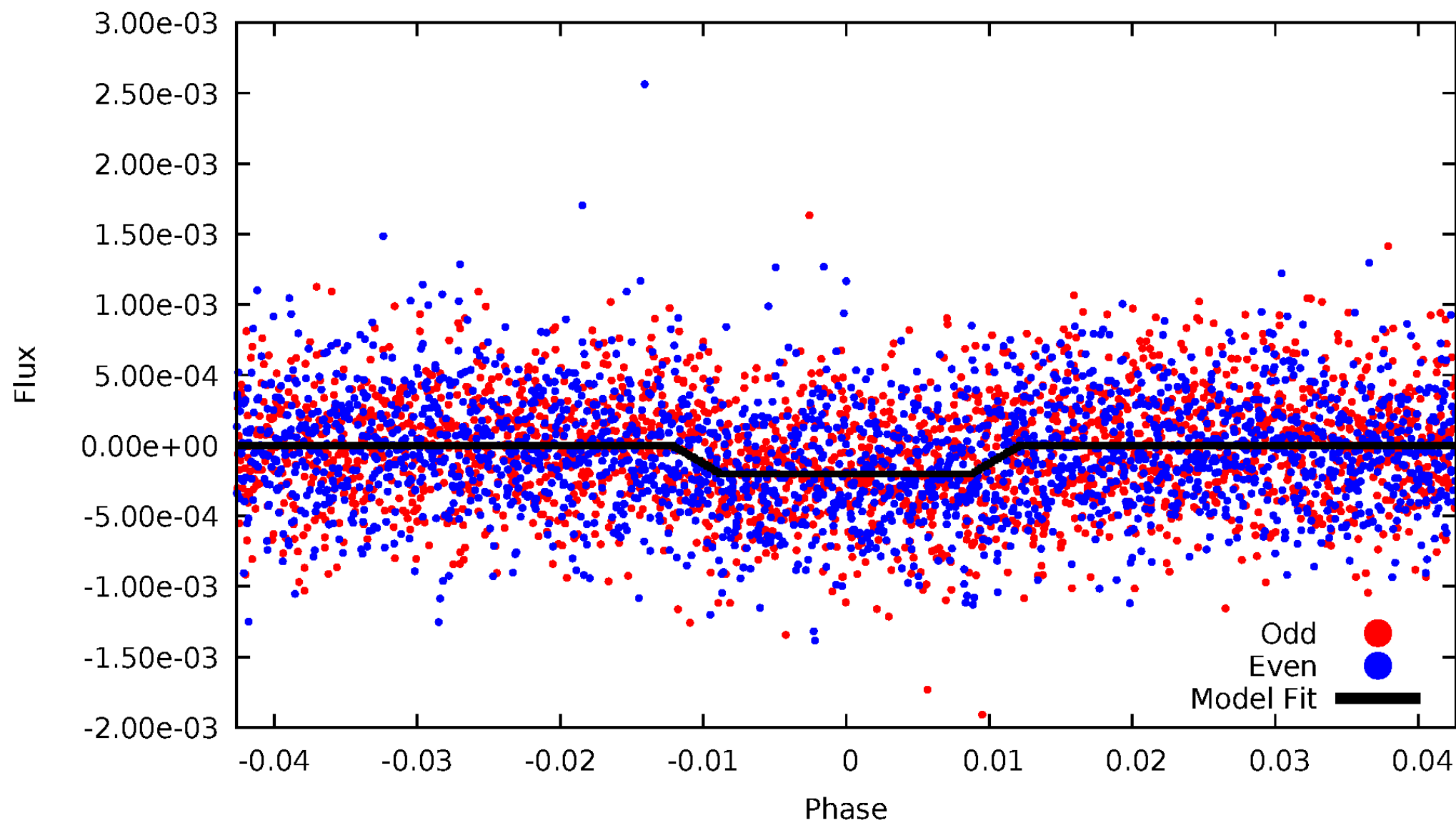
# DV Odd/Even

TCE 004455231-03



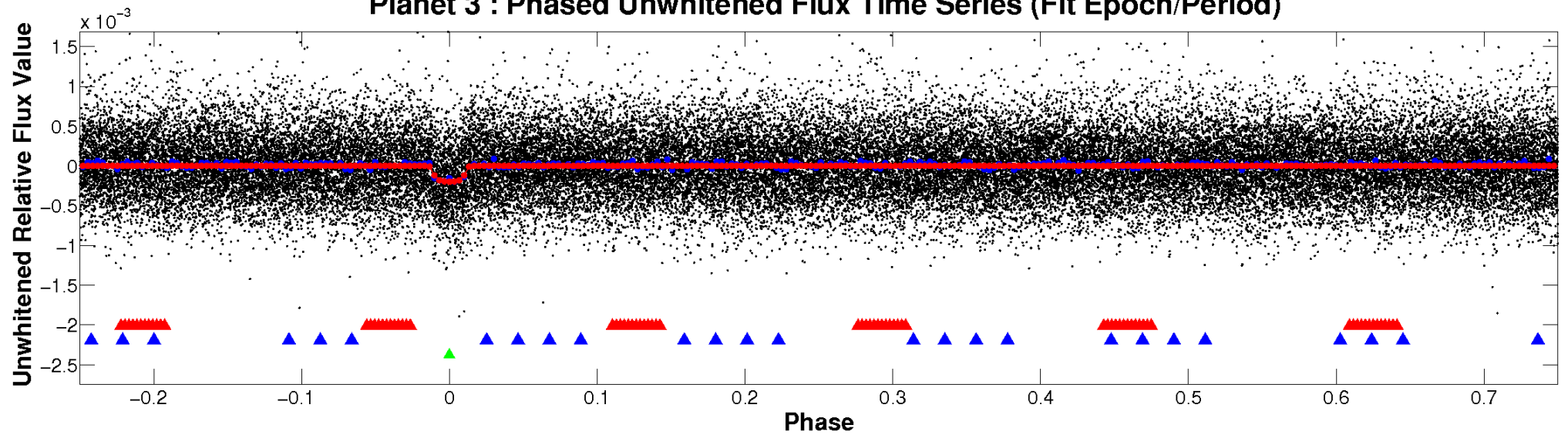
# ALT Odd/Even

TCE 004455231-03

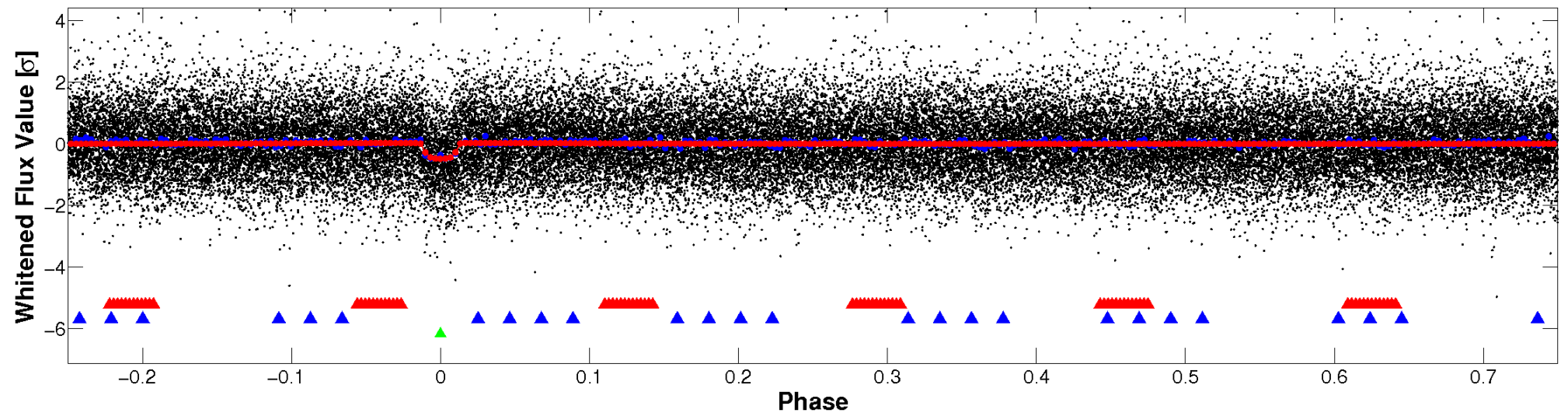


# Non-Whitened Vs. Whitened Light Curve

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



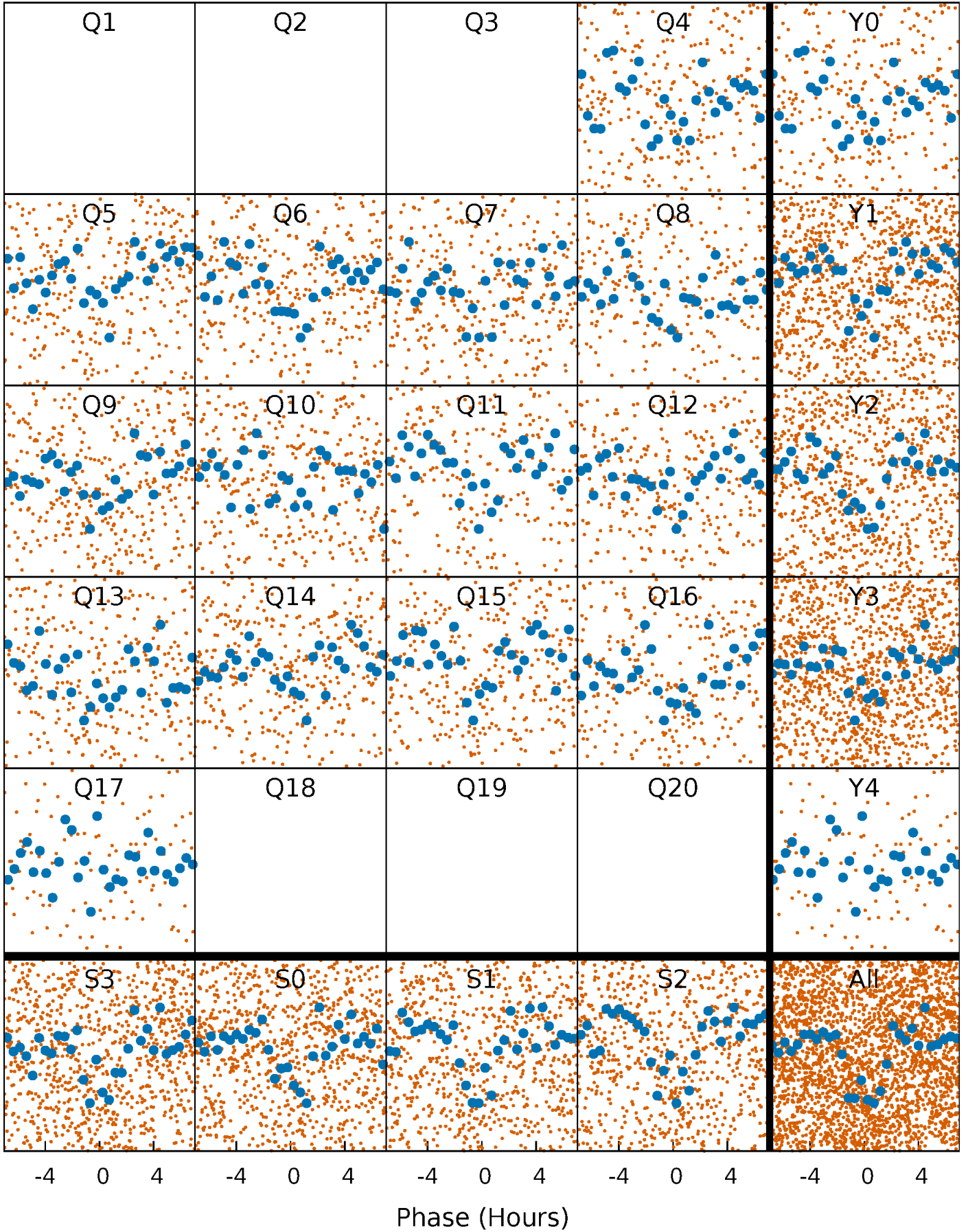
## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)





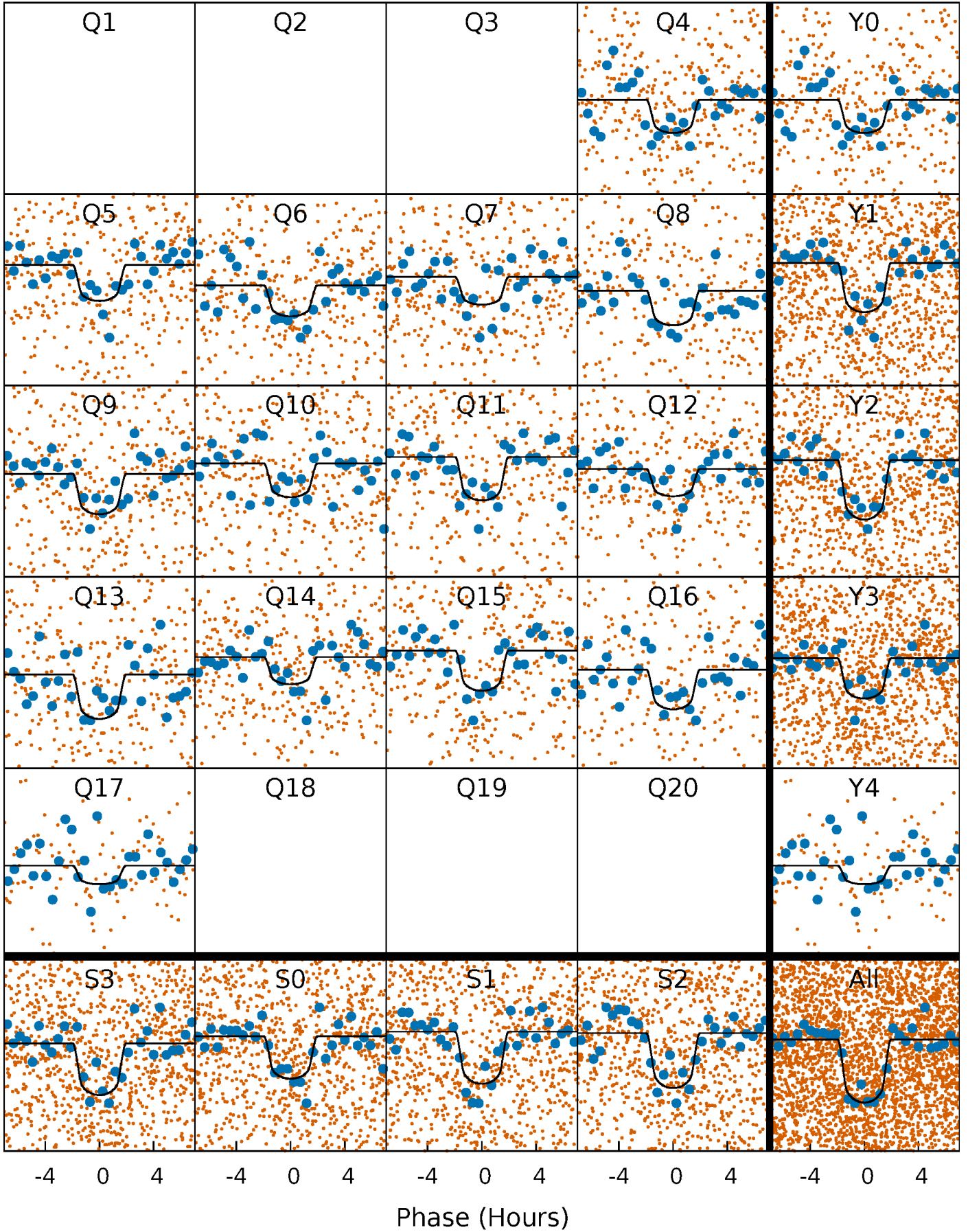
# PDC Quarter-Phased Transit Curves

TCE 004455231-03 P= 6.097435 Days  $T_0=134.553448$  (BKJD)



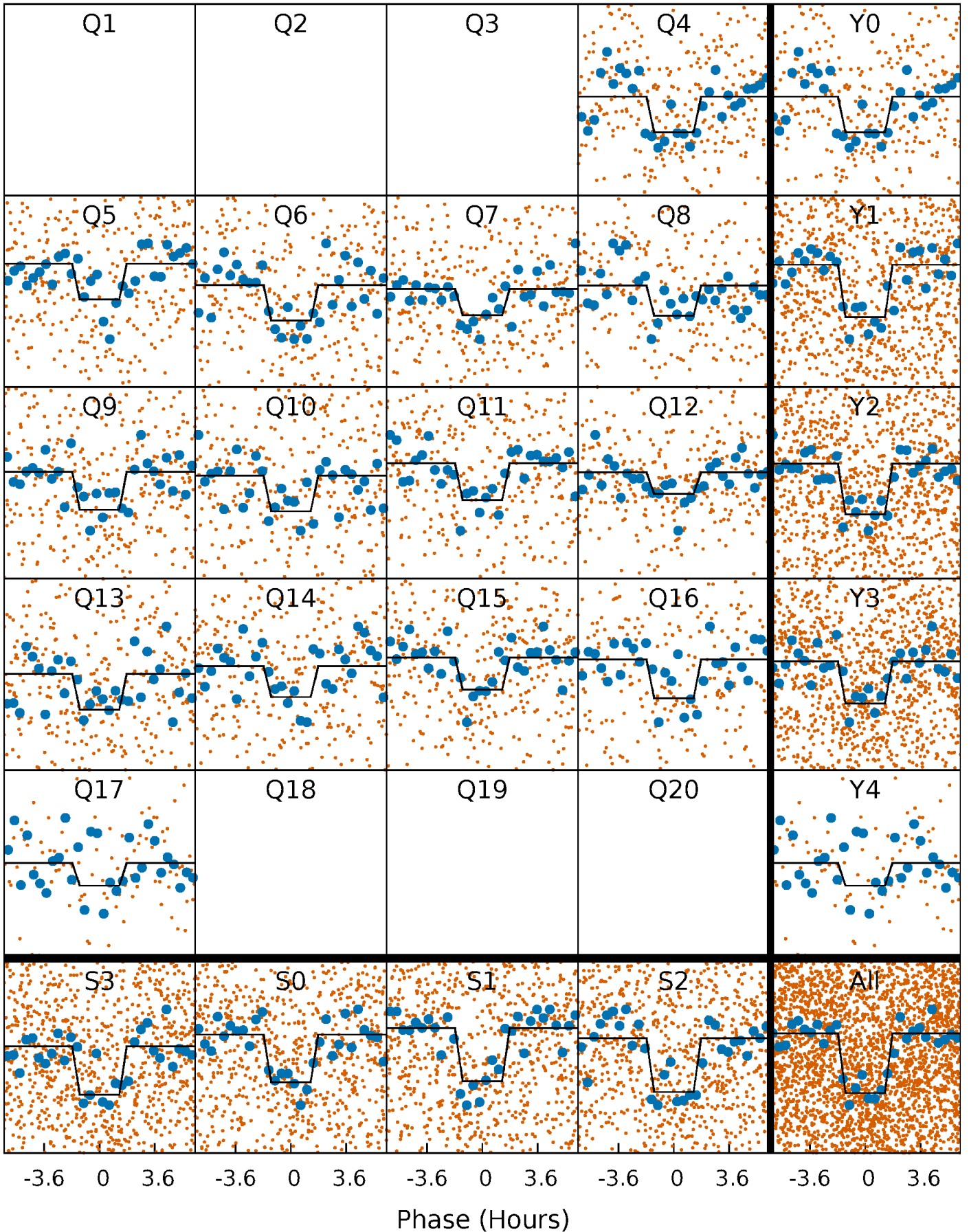
# DV Quarter-Phased Transit Curves

TCE 004455231-03 P= 6.097435 Days  $T_0=134.553448$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

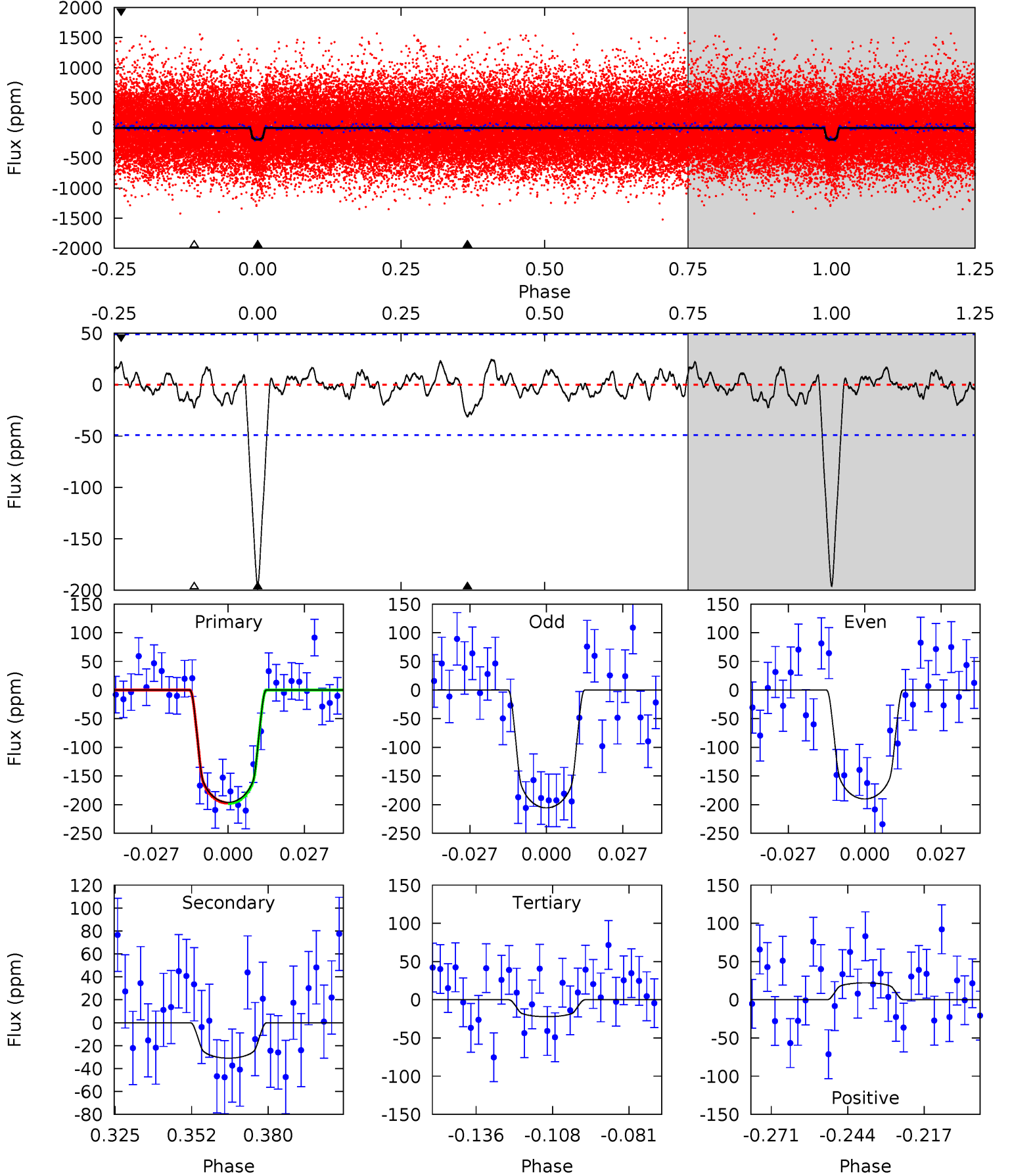
TCE 004455231-03 P= 6.097531 Days  $T_0=134.540872$  (BKJD)



# DV Model-Shift Uniqueness Test

004455231-03, P = 6.097435 Days, E = 134.553448 Days

| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 19.3 | 3.05 | 2.18 | 2.18 | 4.83            | 2.21            | 0.91             | 17.1    | 17.1    | 0.87    | 0.87    | 0.77    | 0.97 | 0.11  | 0.04 |

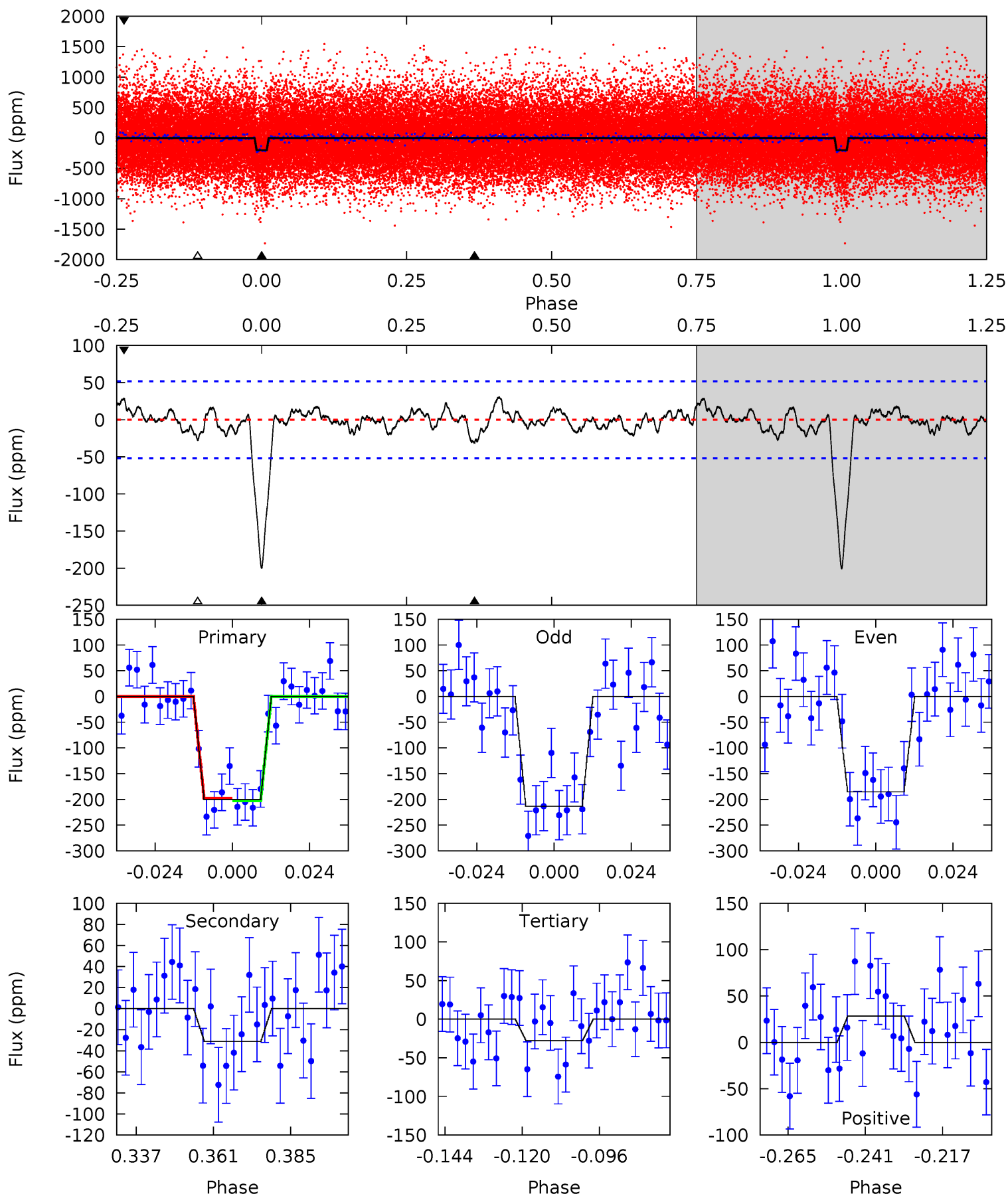




# Alt Model-Shift Uniqueness Test

004455231-03, P = 6.097531 Days, E = 134.540872 Days

| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 18.8 | 2.92 | 2.61 | 2.66 | 4.86            | 2.26            | 1.00             | 16.2    | 16.1    | 0.31    | 0.26    | 1.32    | 0.96 | 0.13  | 0.25 |



### Stellar Parameters For KIC 004455231

|        | $T_{\text{eff}}(K)$ | $\log(g)$                 | [Fe/H]                    | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|---------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
|        | $5661^{+85}_{-77}$  | $4.090^{+0.203}_{-0.087}$ | $0.160^{+0.150}_{-0.150}$ | $1.522^{+0.236}_{-0.353}$ | $1.040^{+0.093}_{-0.084}$ | $0.415^{+0.420}_{-0.131}$                 |
|        | +2%/-1%             | +5%/-2%                   | +94%/-94%                 | +16%/-23%                 | +9%/-8%                   | +101%/-32%                                |
| Source | SPE90               | SPE90                     | SPE90                     | DSEP                      |                           |   |

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

### Secondary Eclipse Parameters for KIC 004455231-03 / KOI 1332.02

| Detrend | Depth (ppm)  | $R_p (R_{\oplus})$     | $T_{max} (K)$       | $T_{obs} (K)$        | $A_{obs}$       |
|---------|--------------|------------------------|---------------------|----------------------|-----------------|
| DV      | $-31 \pm 10$ | $2.47^{+0.98}_{-0.93}$ | $1662^{+74}_{-107}$ | $3759^{+727}_{-443}$ | $12^{+20}_{-7}$ |
| Alt.    | $-31 \pm 11$ | $2.29^{+1.01}_{-0.97}$ | $1657^{+69}_{-101}$ | $3855^{+893}_{-512}$ | $14^{+31}_{-8}$ |

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

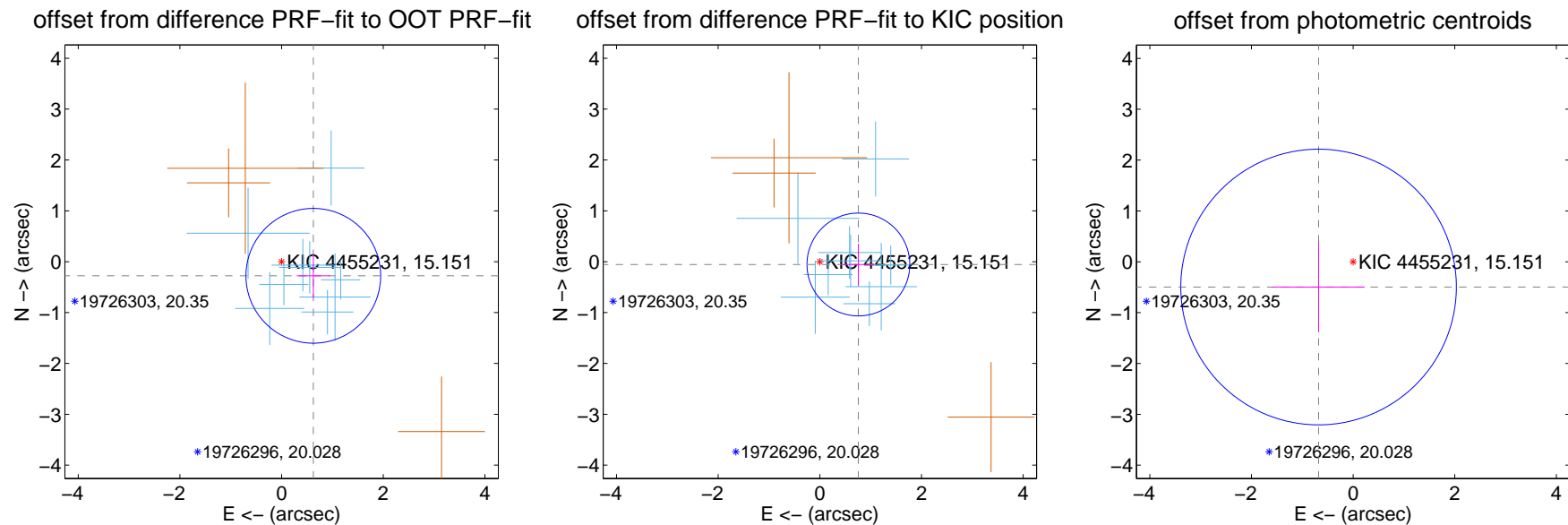
## DV Centroid Data

Supplemental centroid analysis for 004455231-03. Kepler magnitude: 15.15. Transit SNR 14.43

There are 9 quarters with good PRF difference image offsets

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

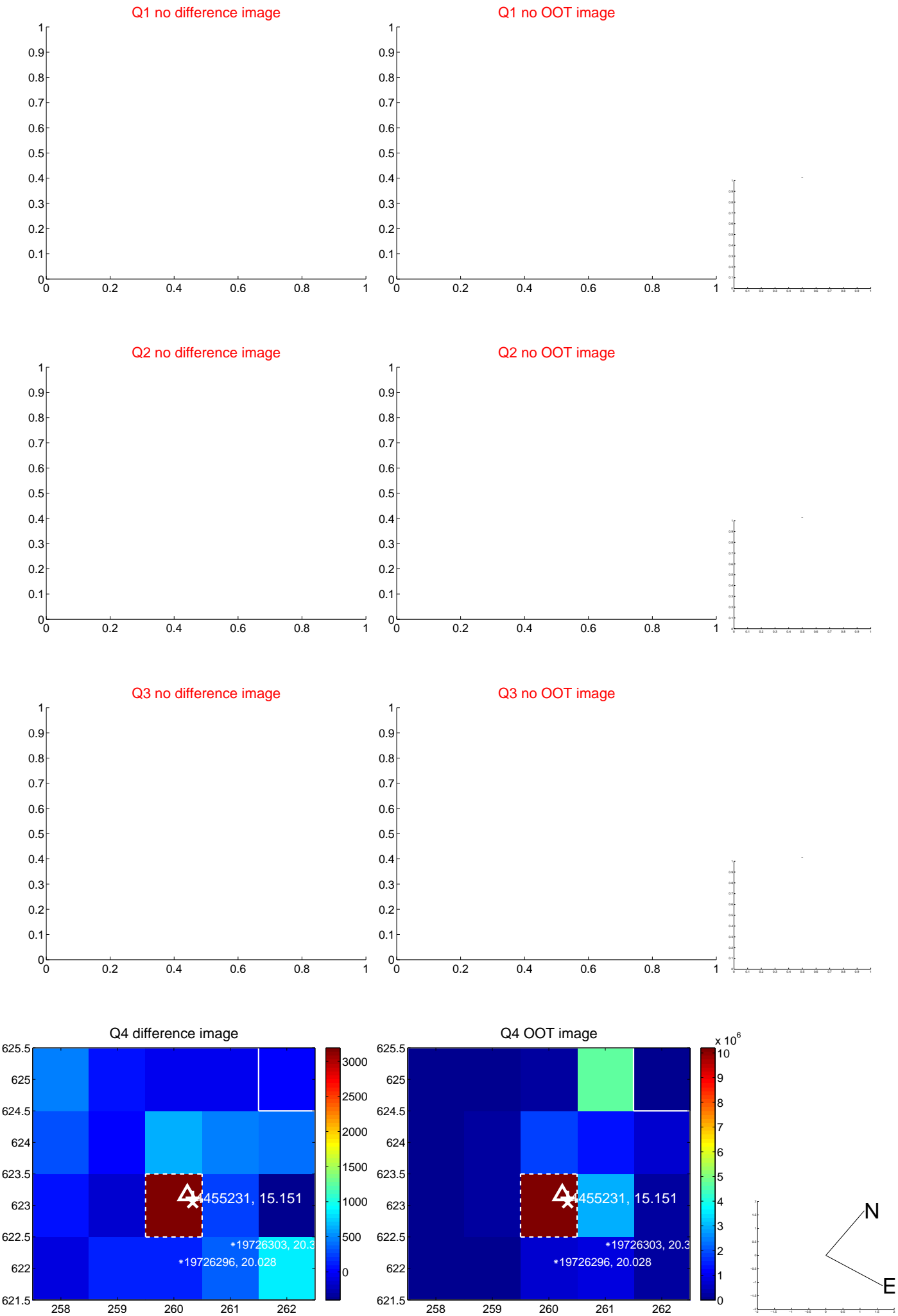
|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec       |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT          | $0.683 \pm 0.442$  | 1.55                | $-0.624 \pm 0.325$ | $-0.277 \pm 0.438$ |
| PRF-fit source offset from KIC position | $0.760 \pm 0.337$  | 2.26                | $-0.758 \pm 0.317$ | $-0.055 \pm 0.409$ |
| photometric centroid source offset      | $0.84 \pm 0.90$    | 0.93                | $0.68 \pm 0.91$    | $-0.50 \pm 0.89$   |



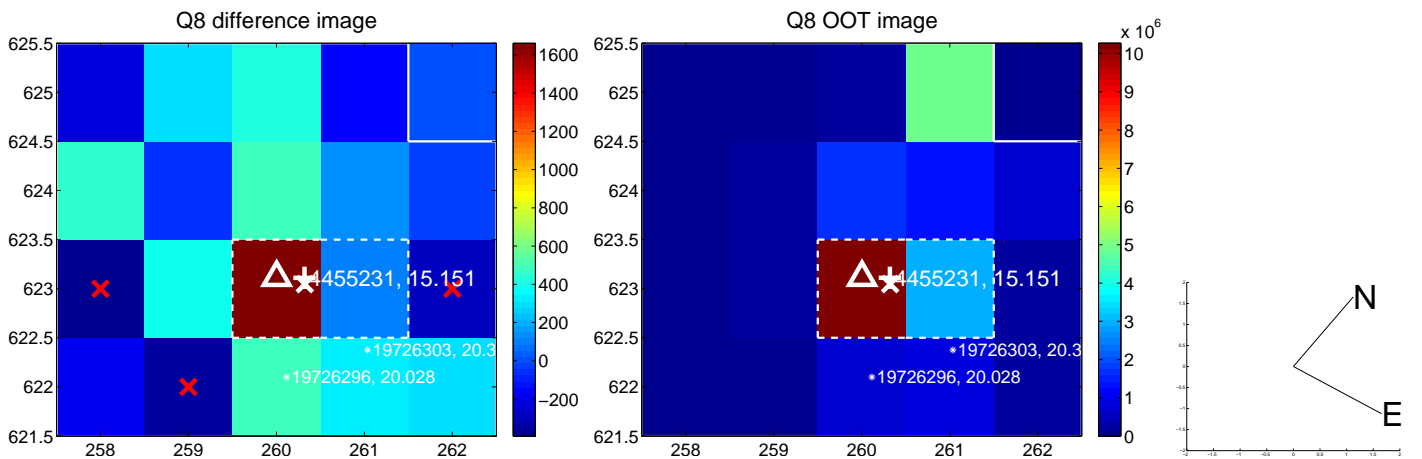
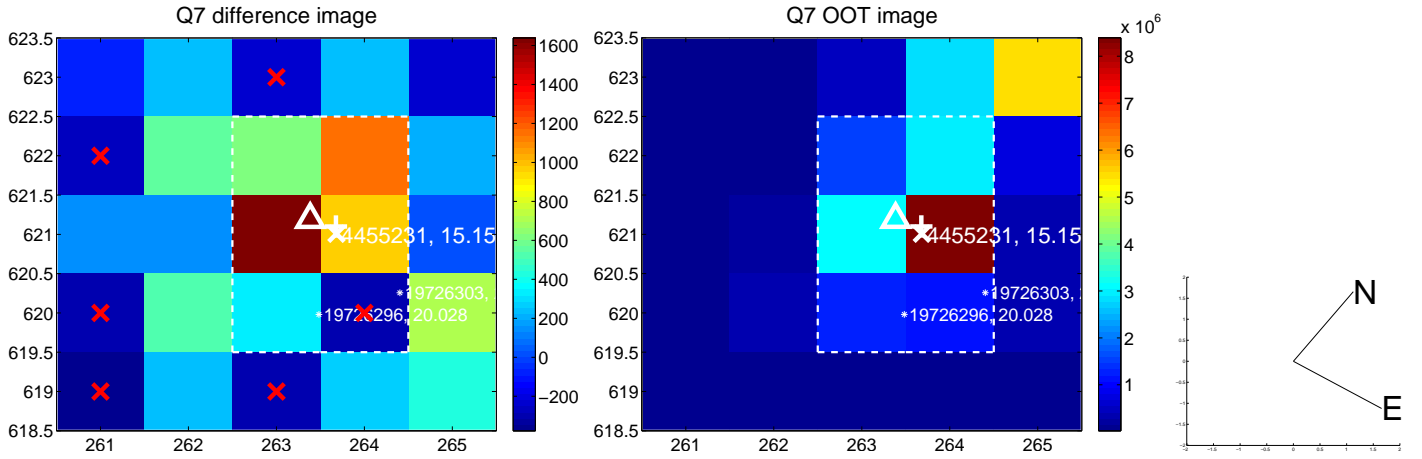
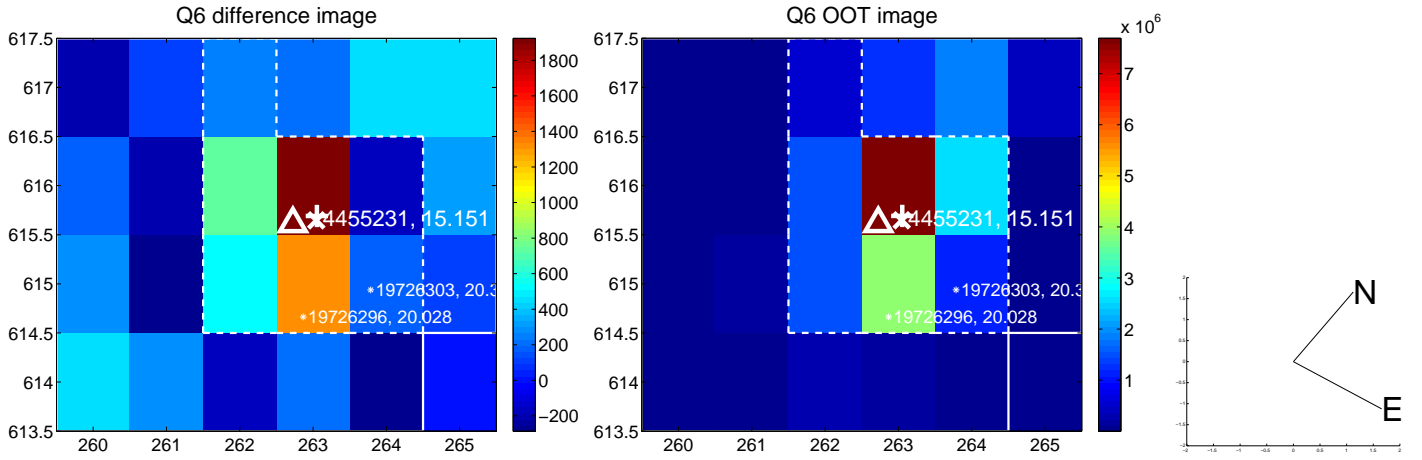
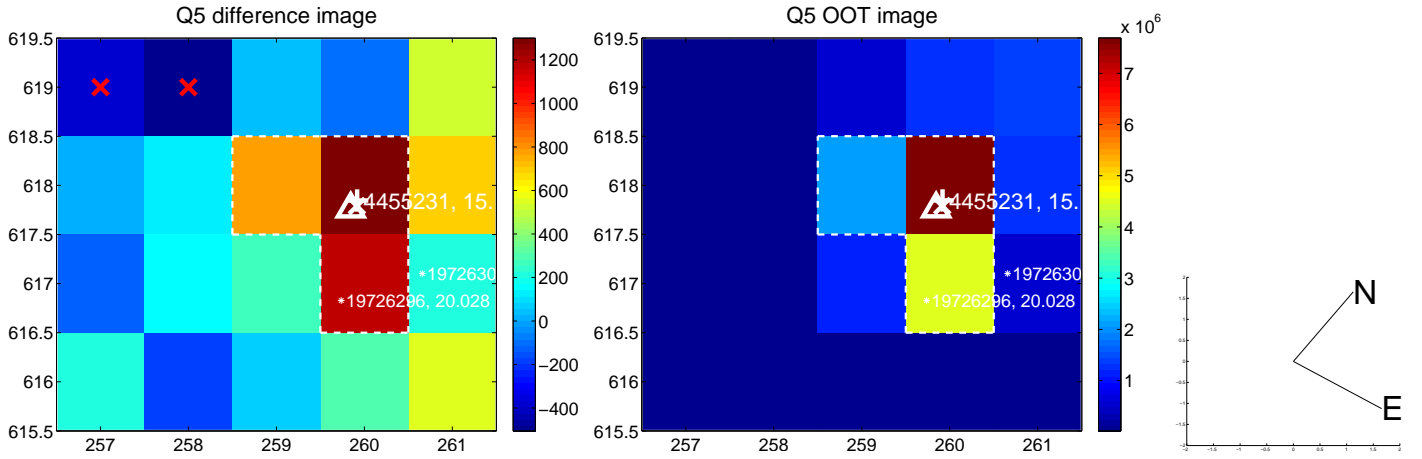
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



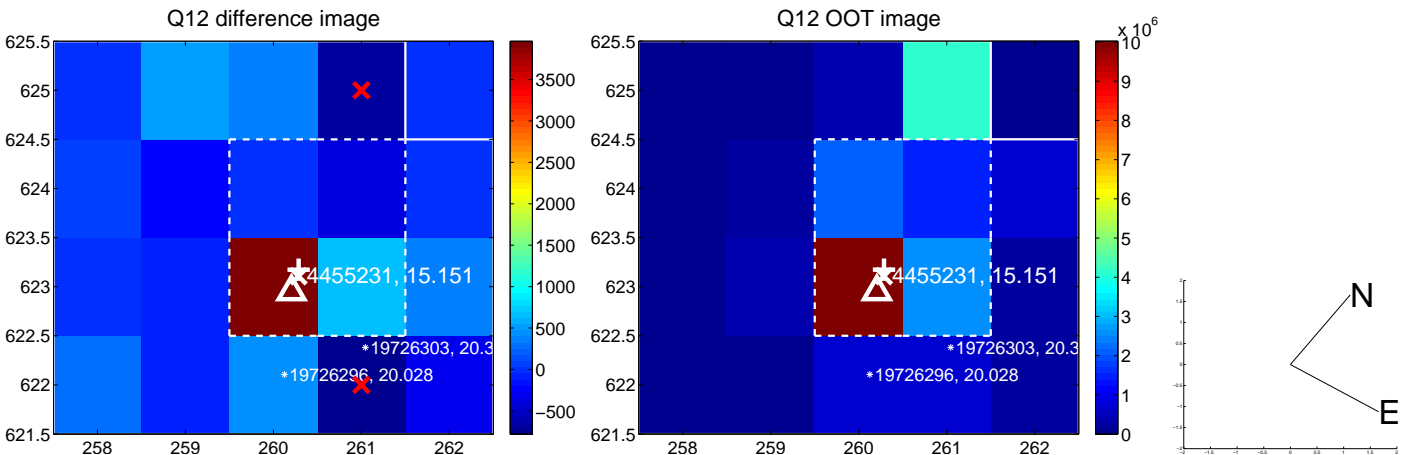
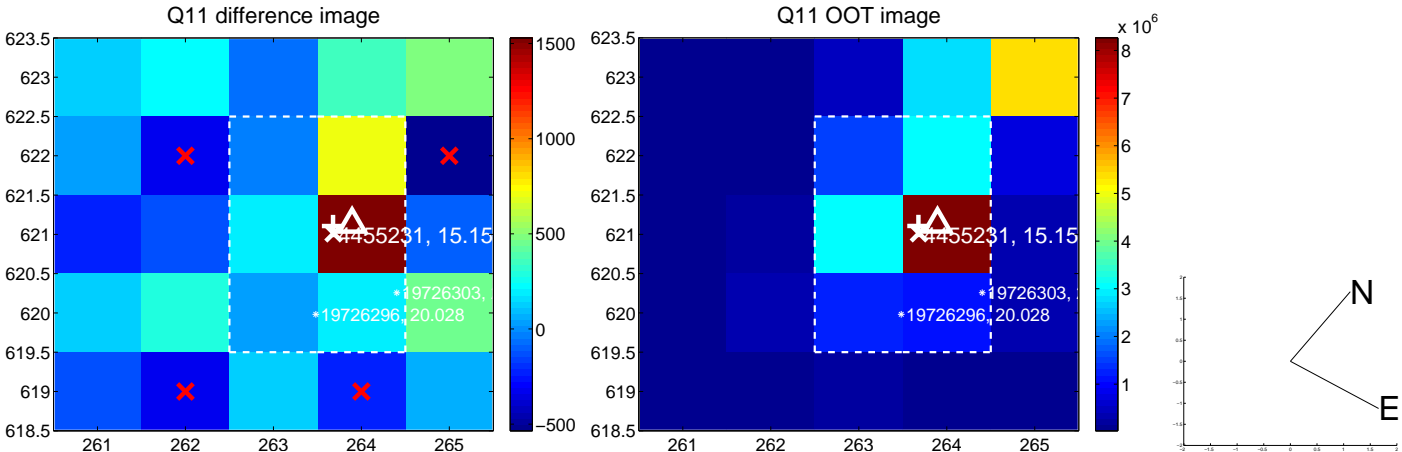
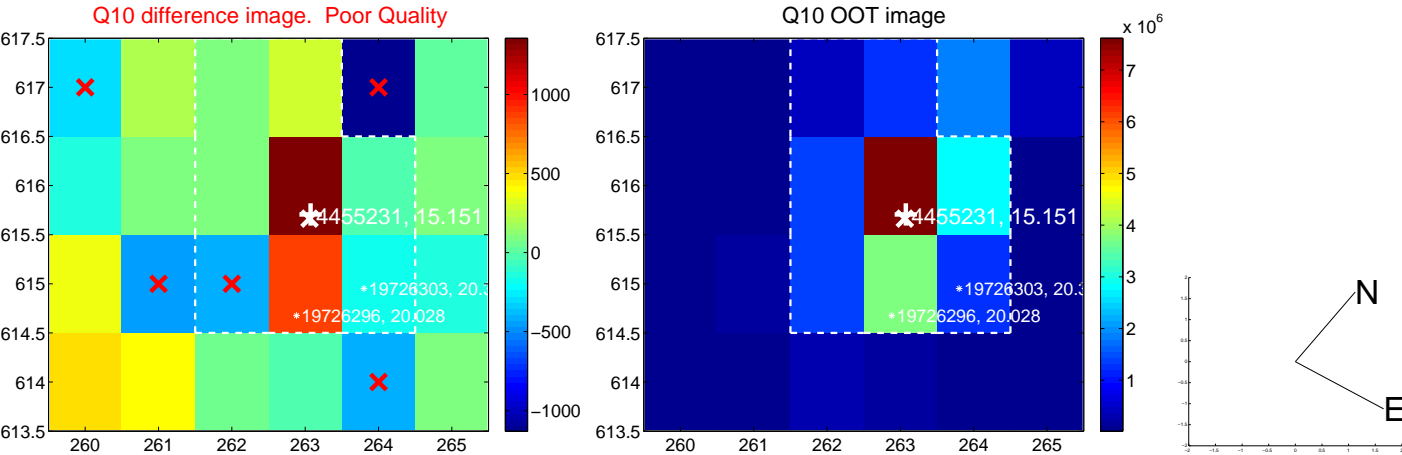
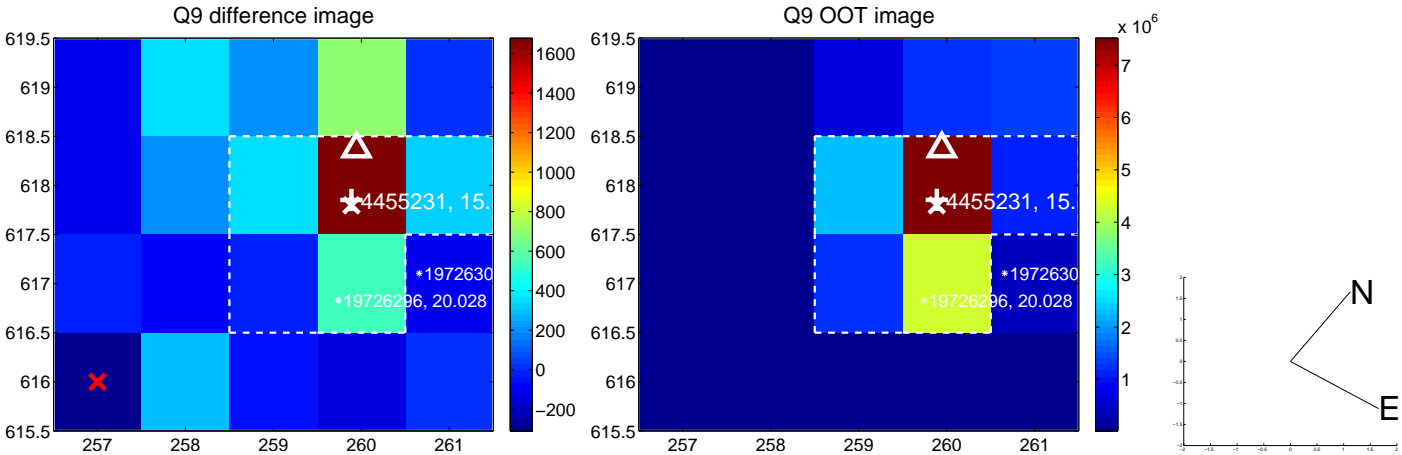
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



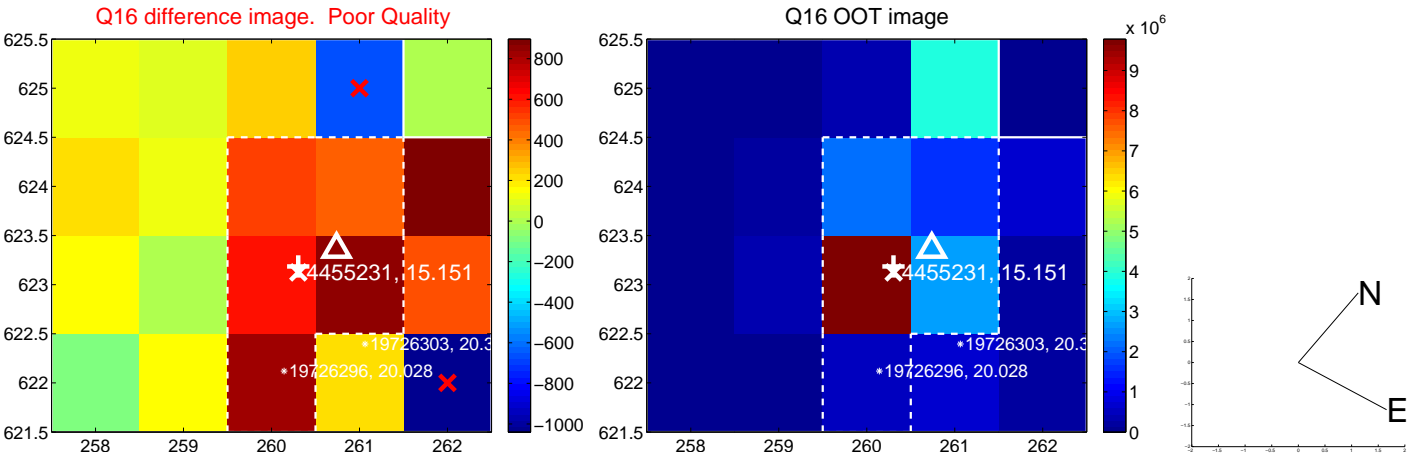
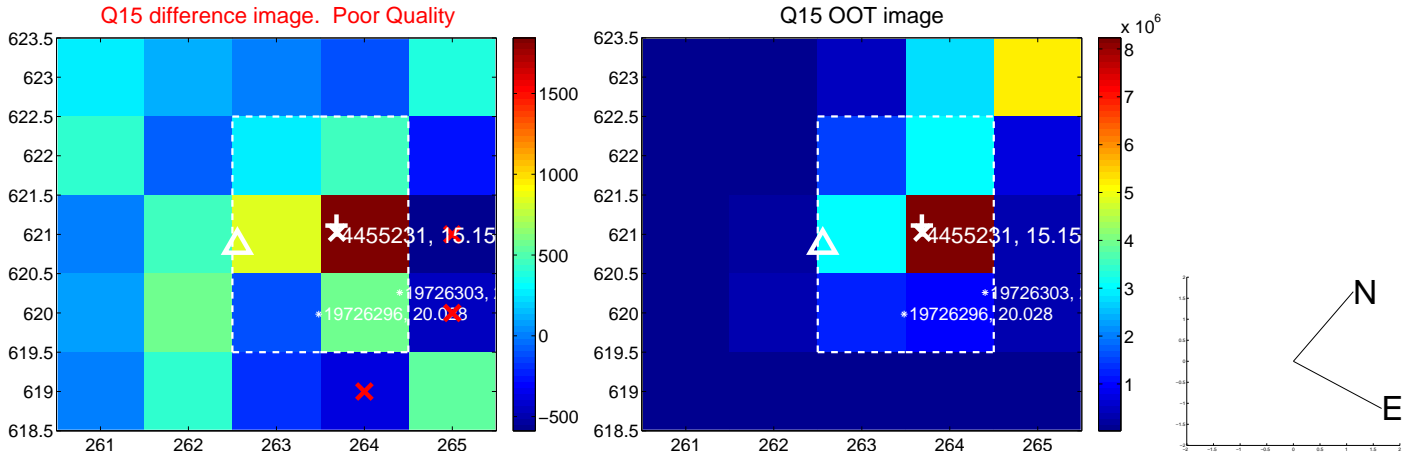
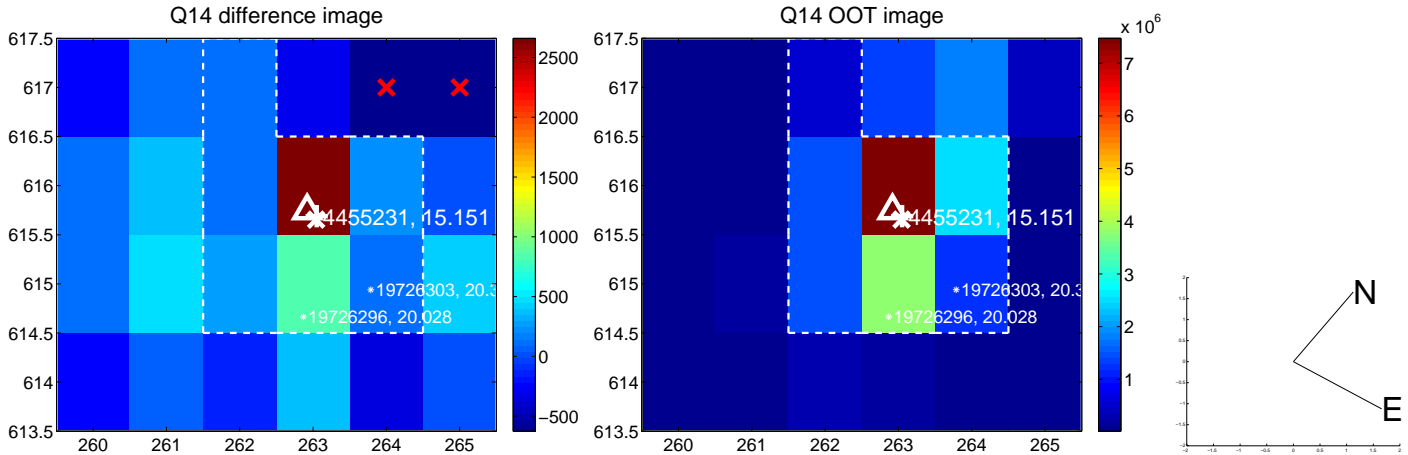
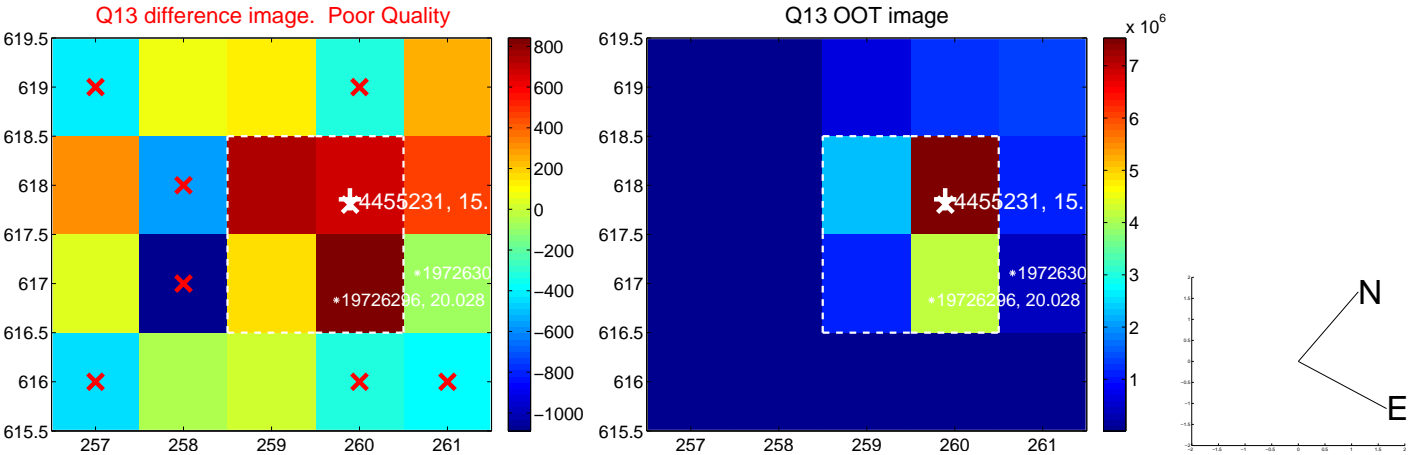
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



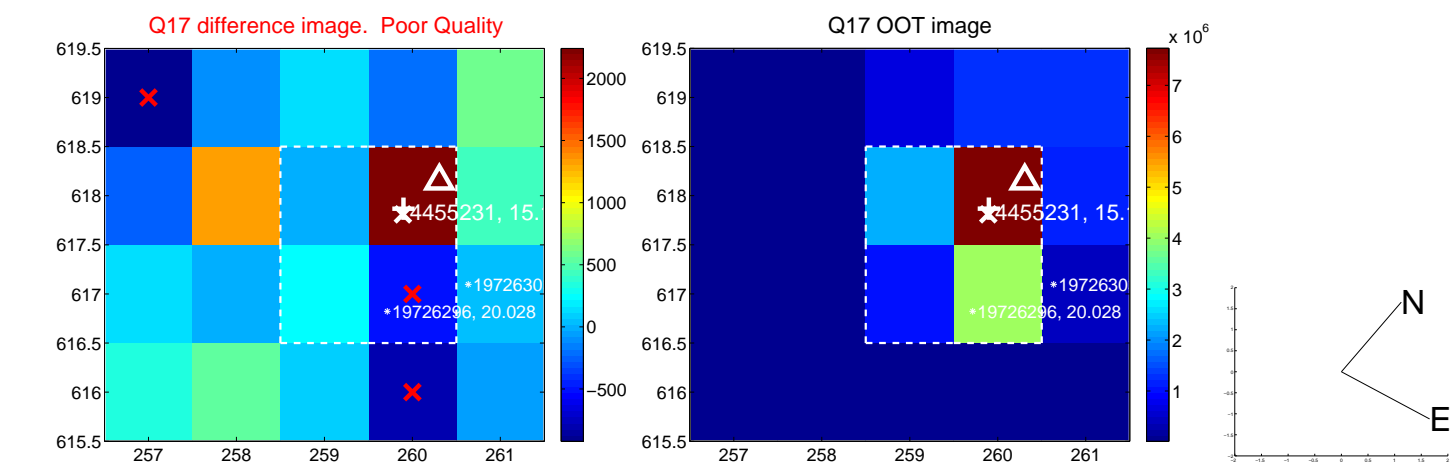
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



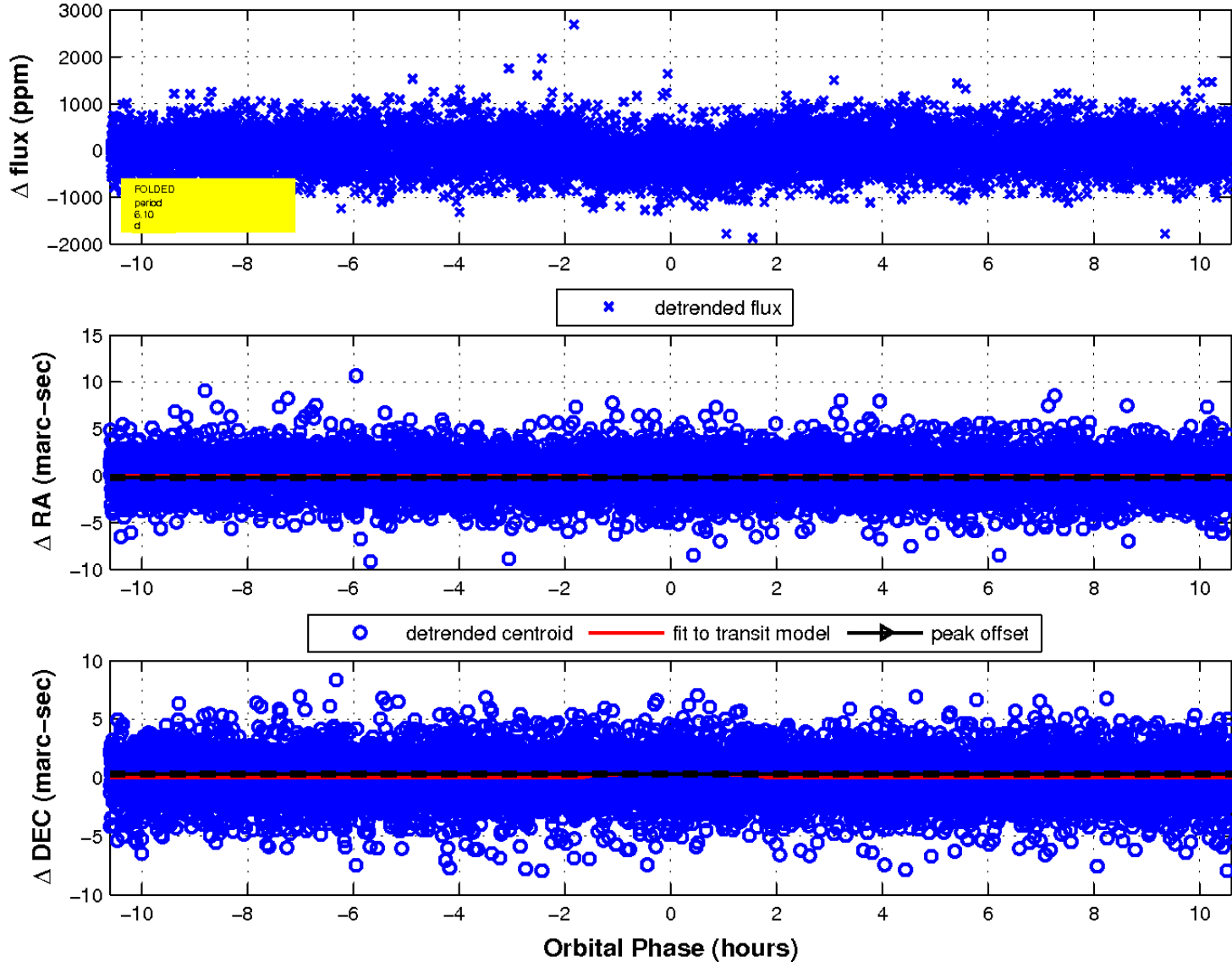
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 3 of 3



UKIRT Image

Declination

