

KIC 005881813

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 005881813-01 | OBS | 2744.01 | 109.646804 | 190.673389 | 901.9 | 6.599 | 22.1 | 22.9 | 1.45 | 5332 | 4.93 | 7.97 |
| 005881813-02 | OBS | 2744.02 | 11.615624 | 131.965242 | 186.3 | 2.014 | 8.1 | 8.9 | 1.45 | 5332 | 2.39 | 158.94 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|------------|
| 005881813-01 | OBS | PC | 0.99 | 0 | 0 | 0 | 0 | NO_COMMENT |
| 005881813-02 | OBS | PC | 0.58 | 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.

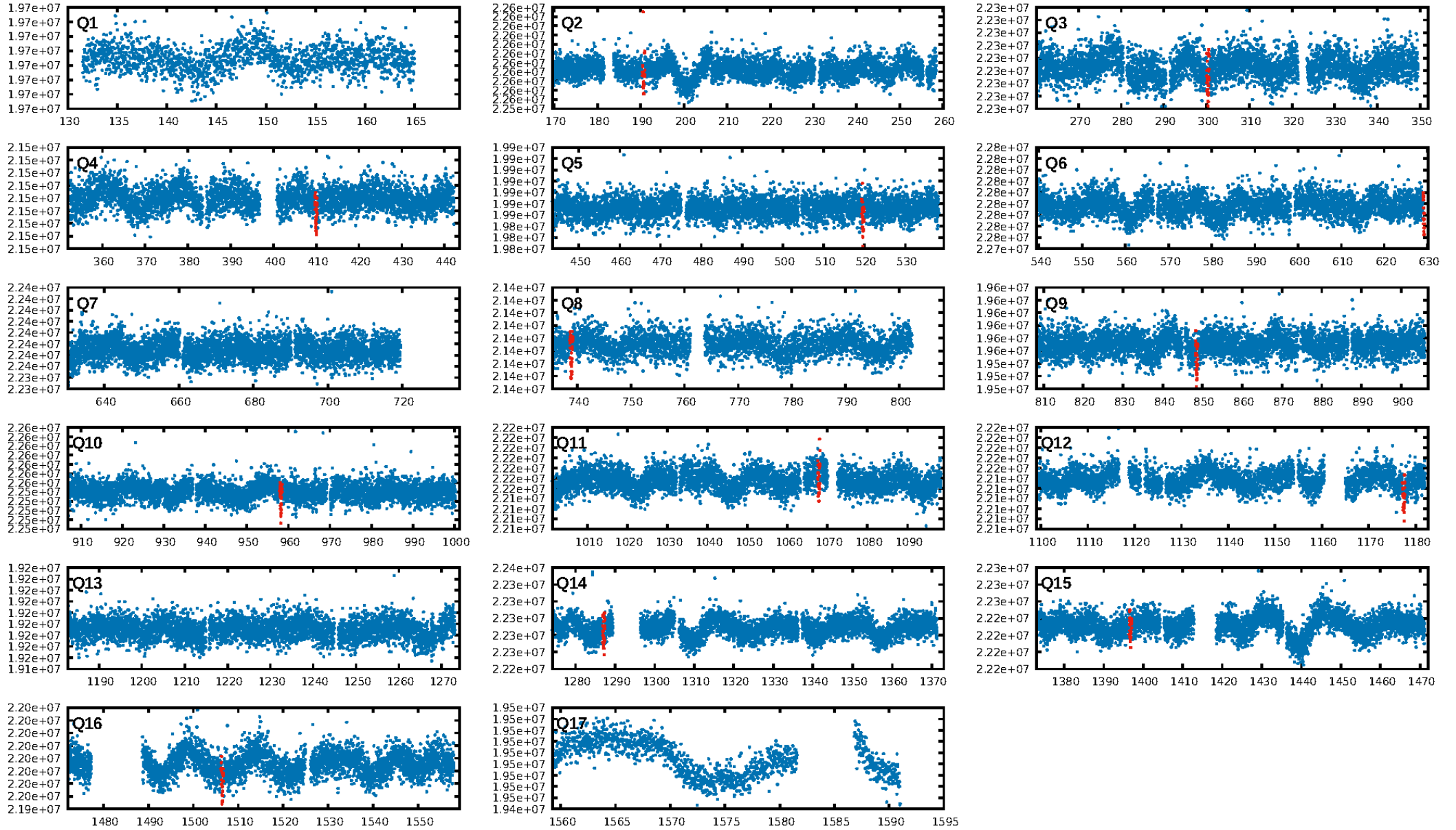
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005881813-01

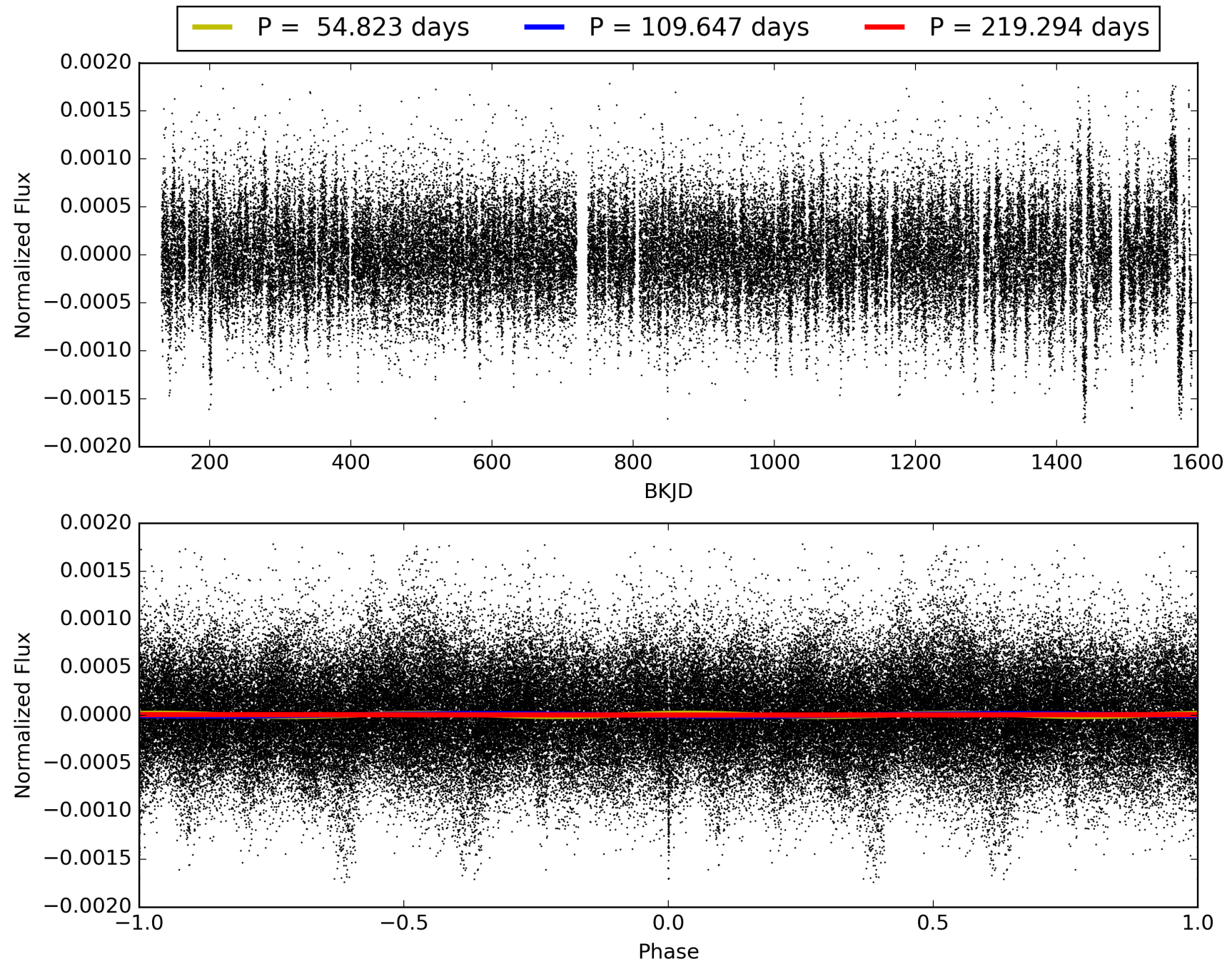
No Significant Match Found

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

TCE 005881813-01, PDC Light Curves

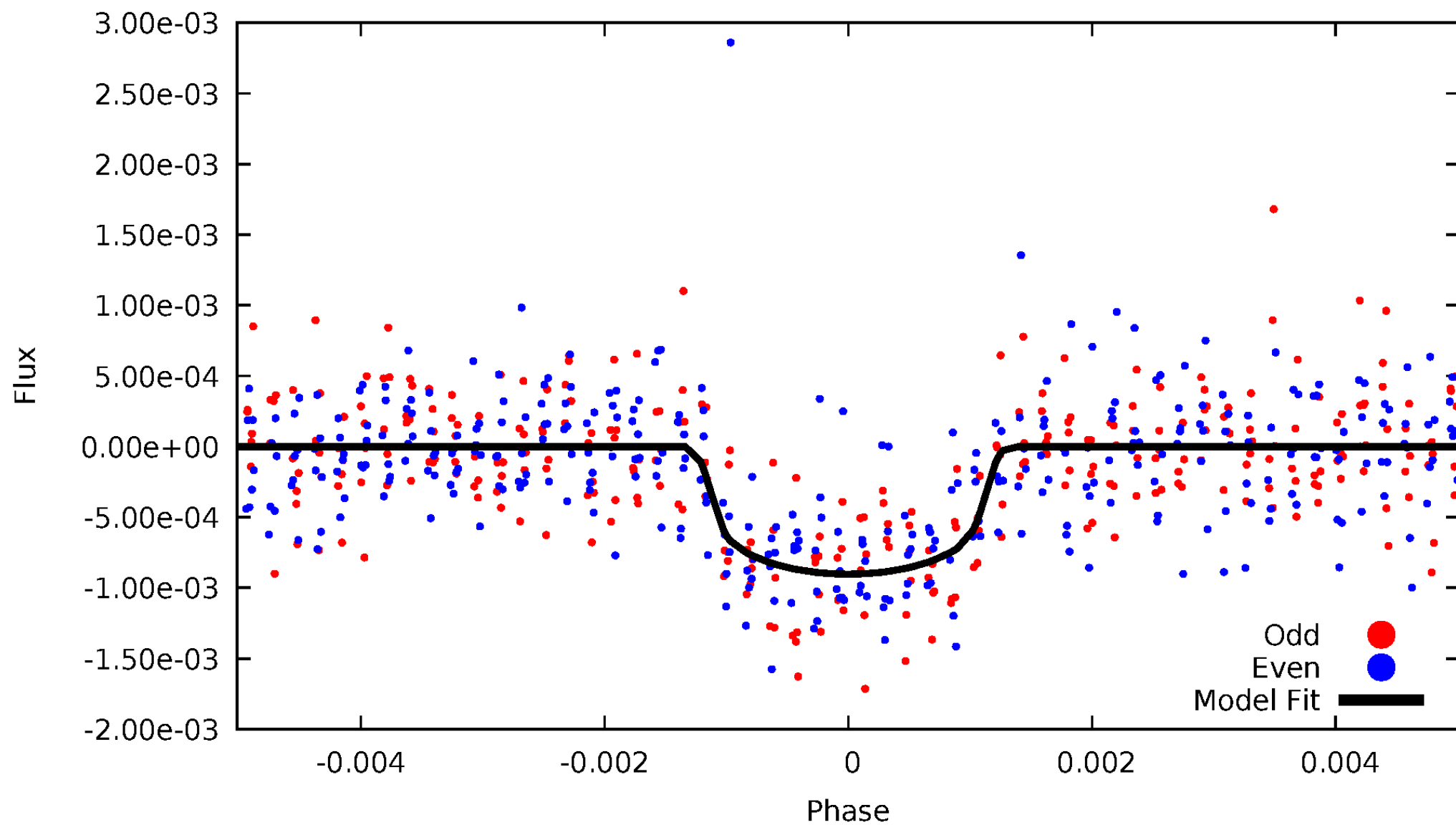


TCE 005881813-01



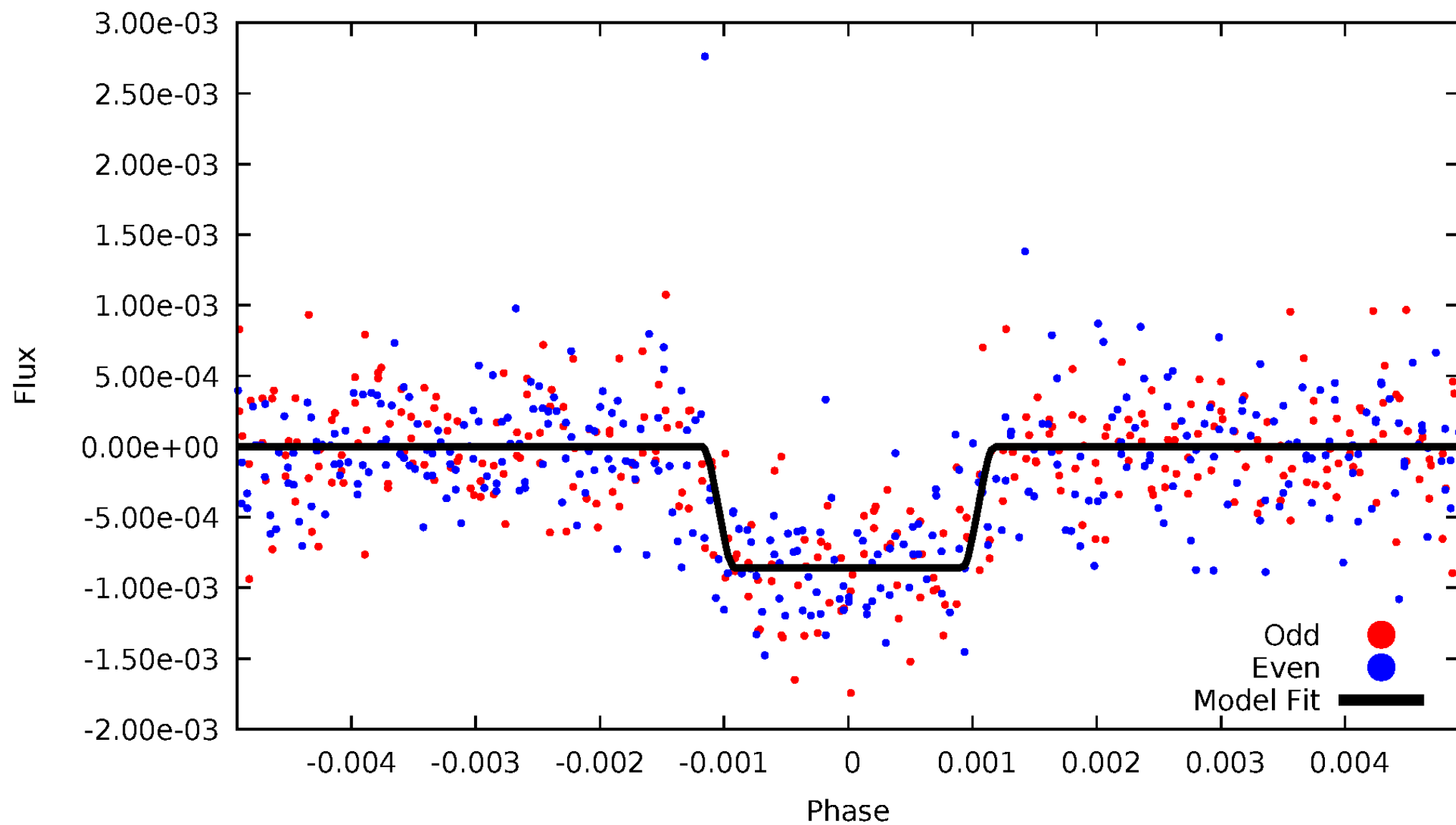
DV Odd/Even

TCE 005881813-01



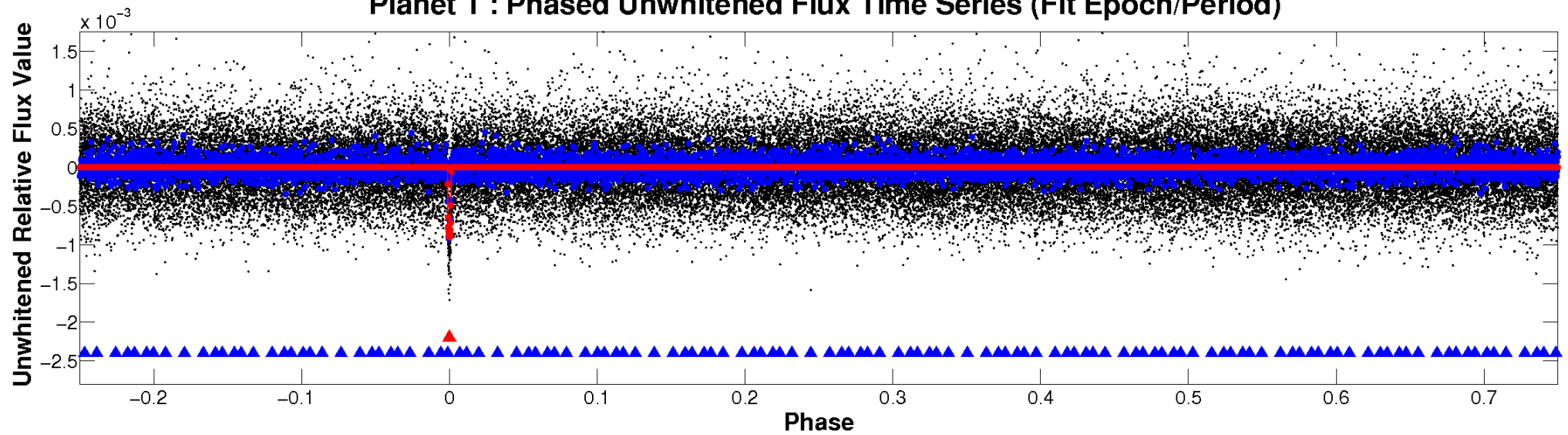
ALT Odd/Even

TCE 005881813-01

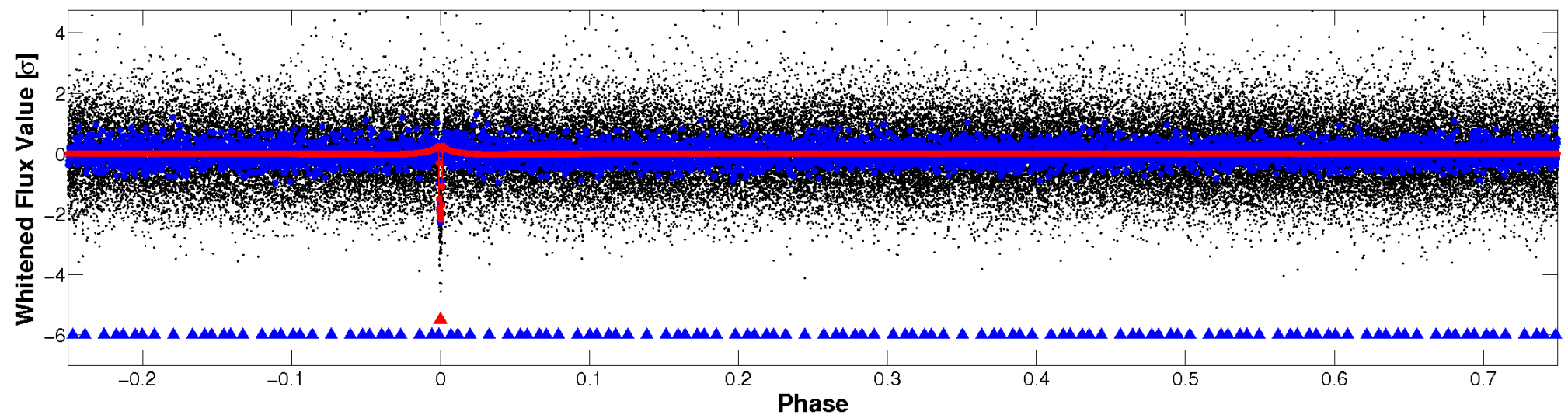


Non-Whitened Vs. Whitened Light Curve

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

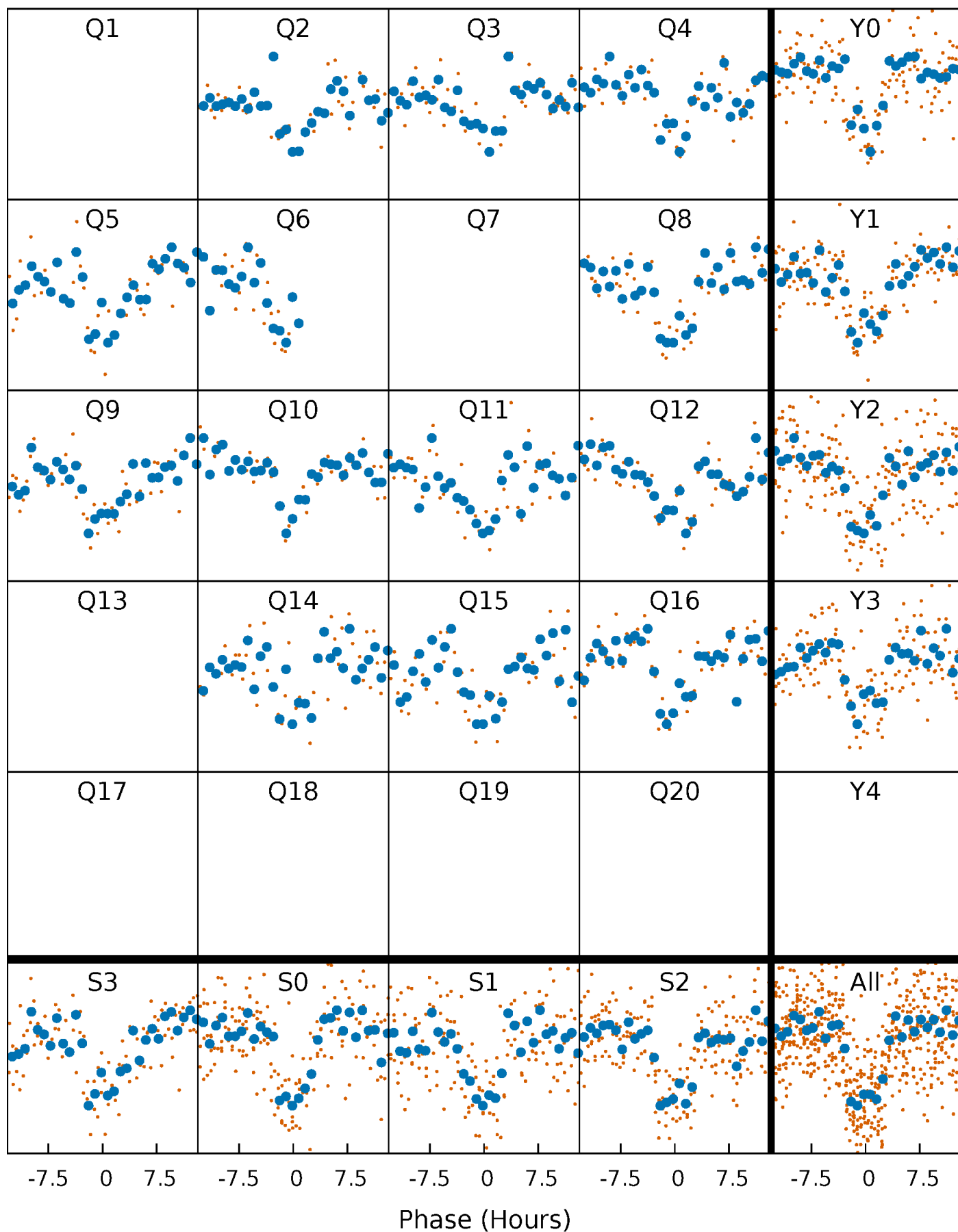


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



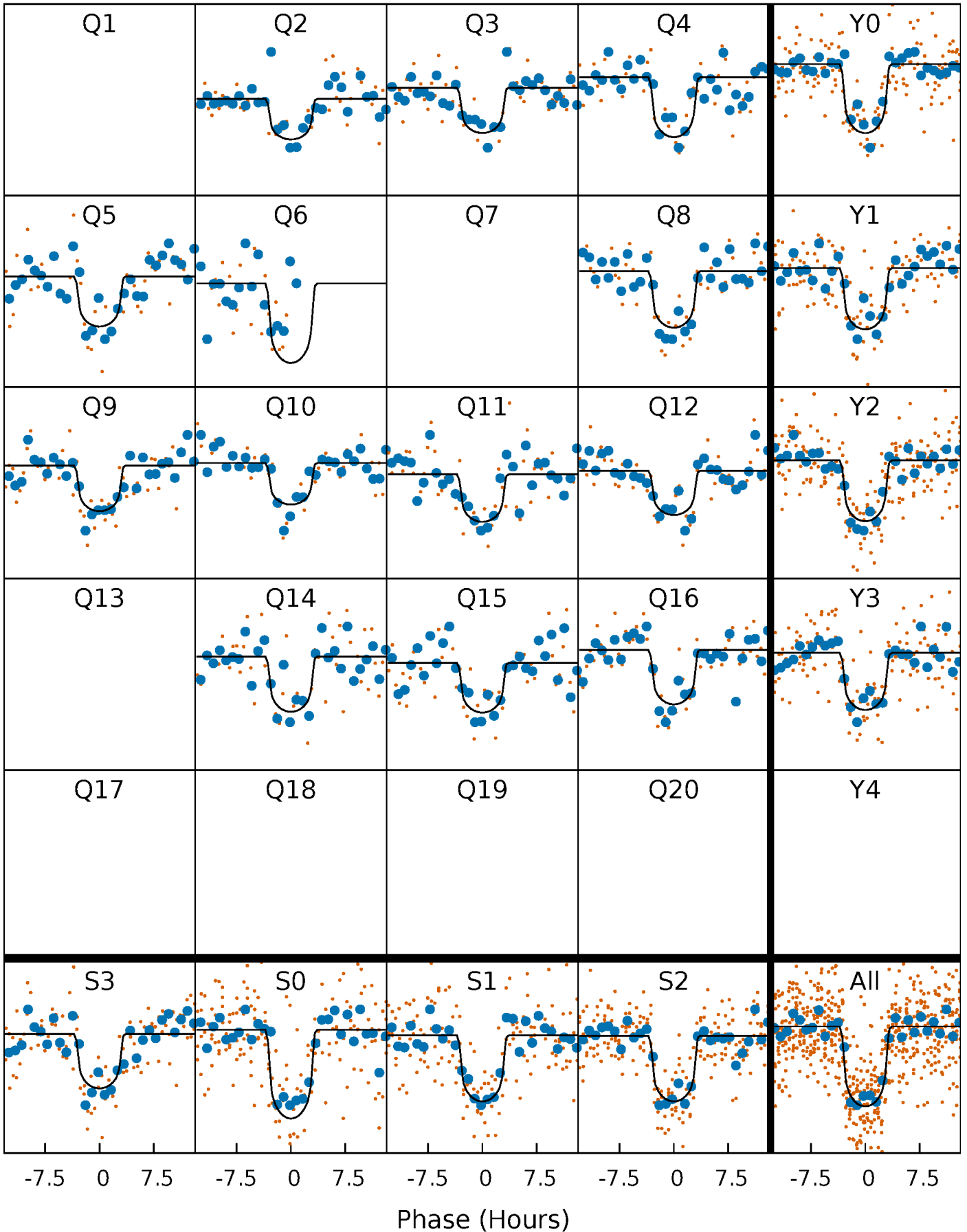
PDC Quarter-Phased Transit Curves

TCE 005881813-01 P=109.646804 Days $T_0=190.673390$ (BKJD)



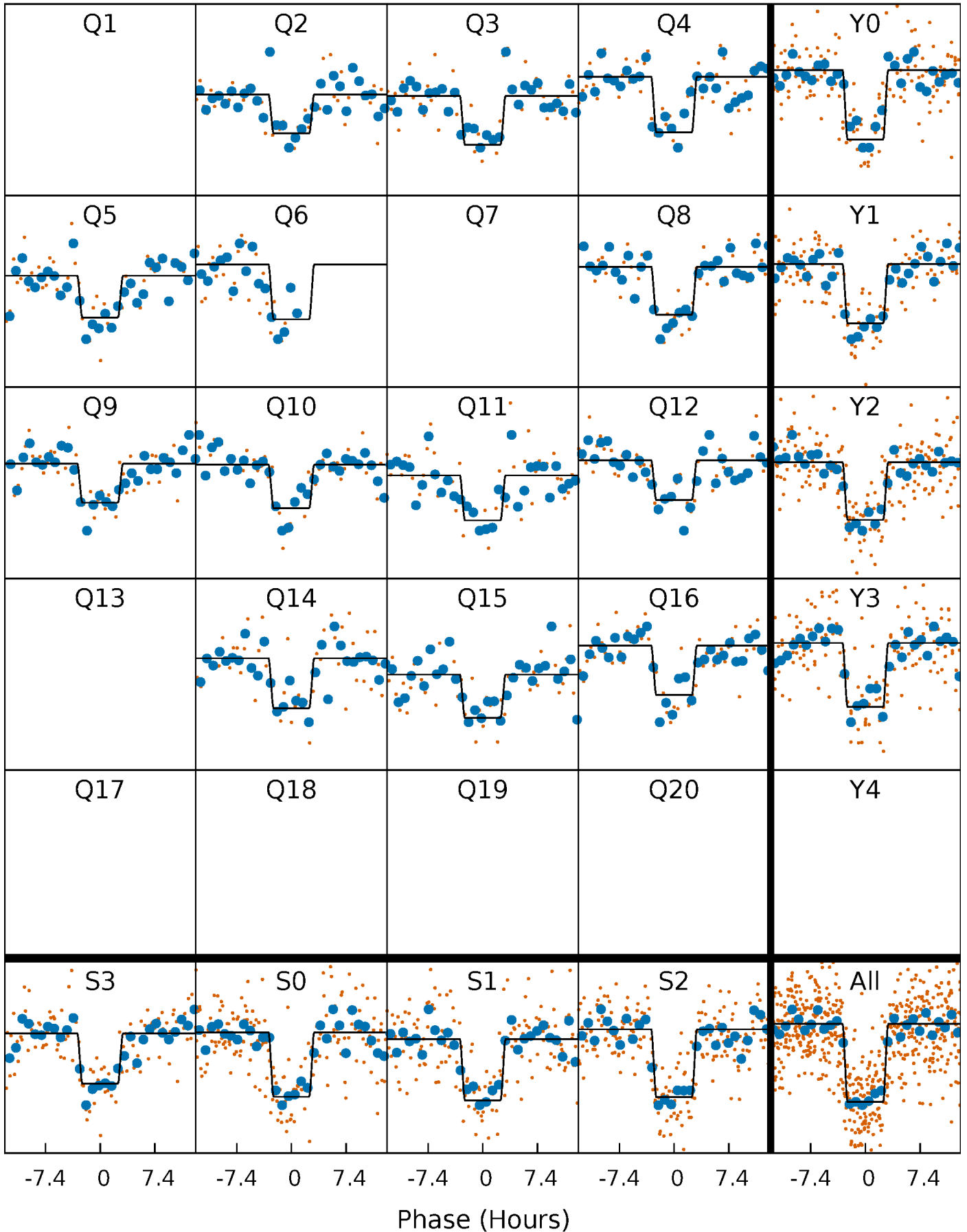
DV Quarter-Phased Transit Curves

TCE 005881813-01 P=109.646804 Days $T_0=190.673390$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

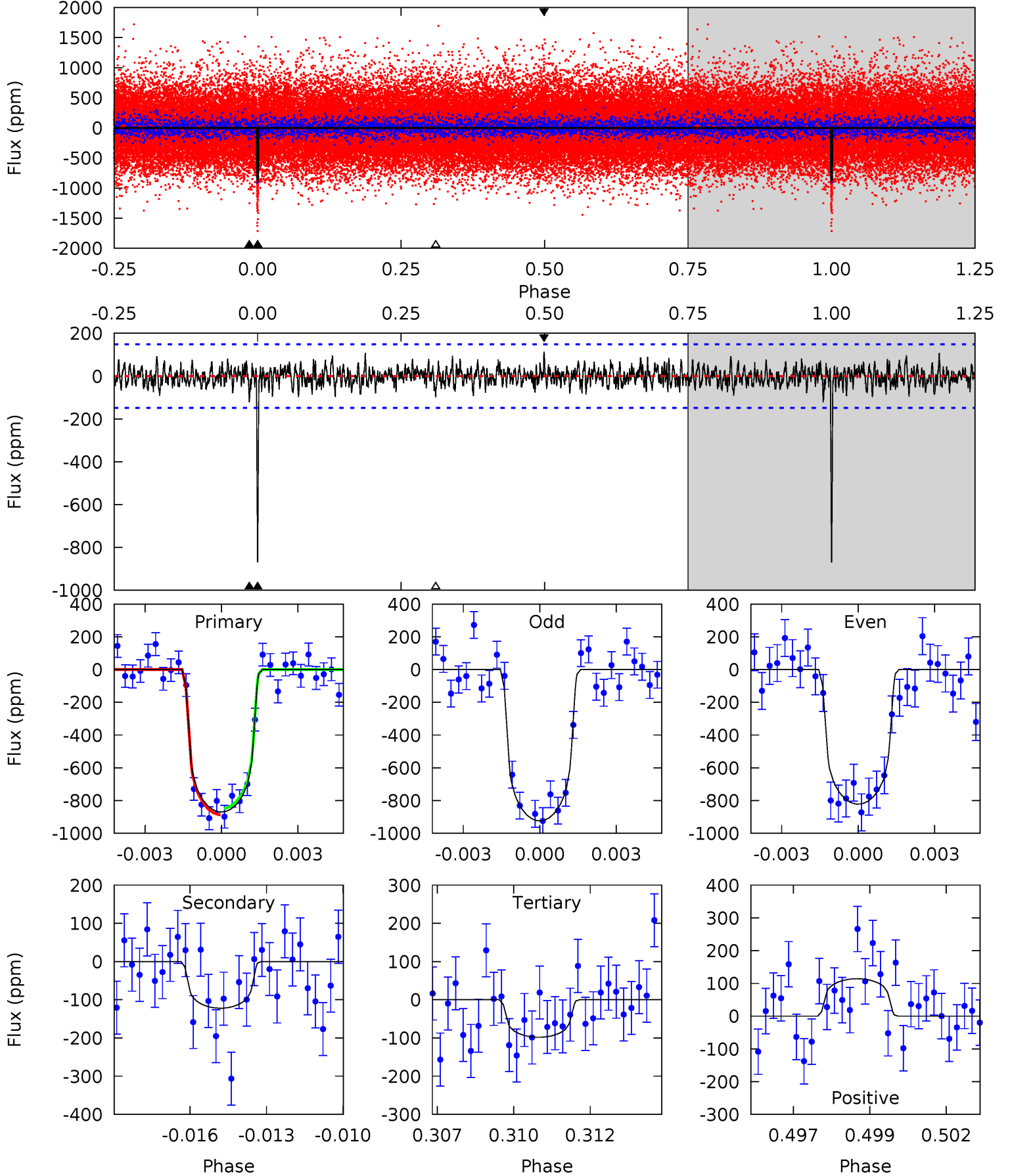
TCE 005881813-01 P=109.644145 Days $T_0=190.694173$ (BKJD)



DV Model-Shift Uniqueness Test

005881813-01, $P = 109.646804$ Days, $E = 81.026586$ Days

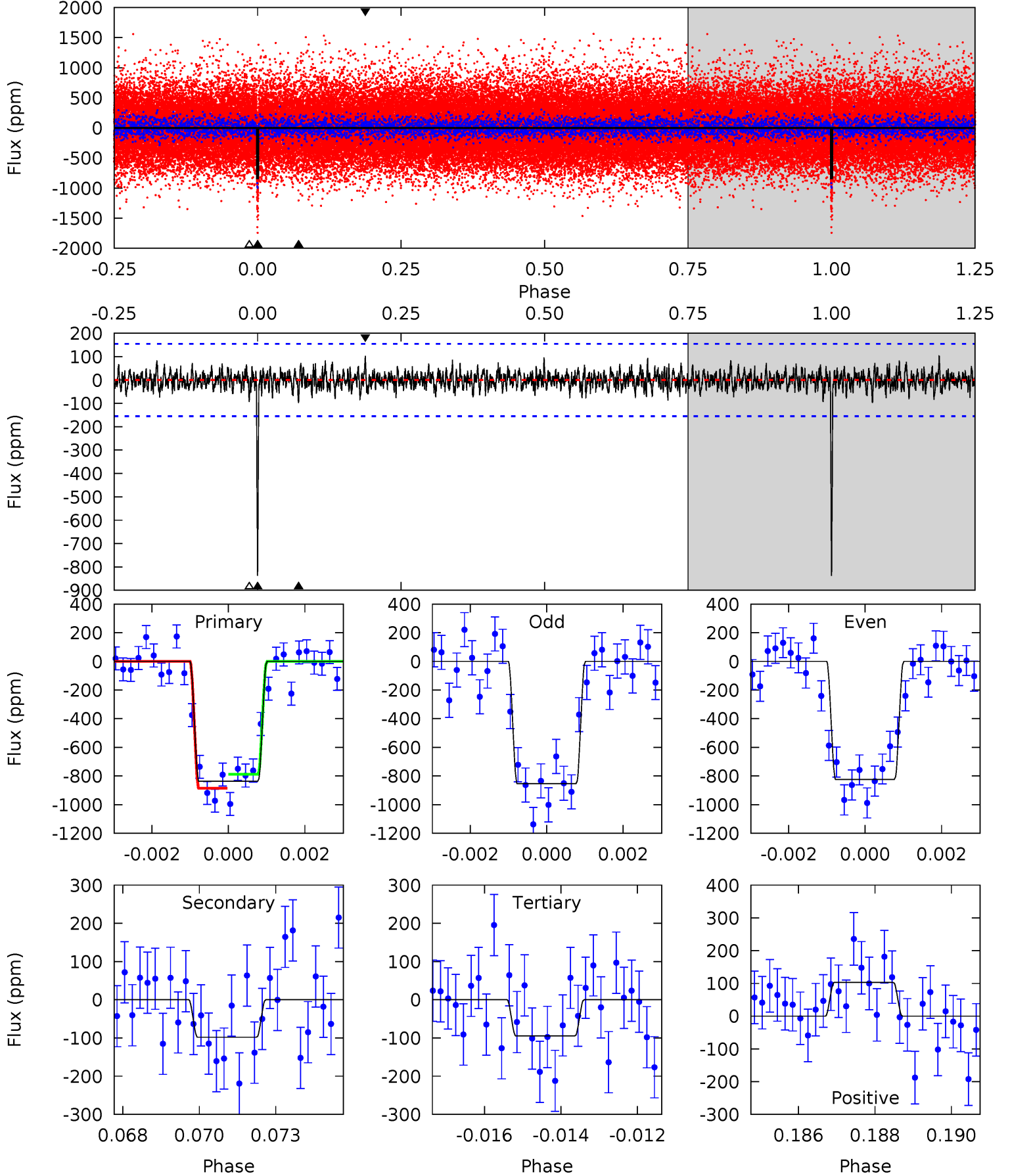
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 30.9 | 4.35 | 3.49 | 4.06 | 5.28 | 3.01 | 1.16 | 27.5 | 26.9 | 0.85 | 0.28 | 1.81 | 0.95 | 0.12 | 0.68 |



Alt Model-Shift Uniqueness Test

005881813-01, P = 109.644145 Days, E = 81.050028 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 28.6 | 3.35 | 3.23 | 3.51 | 5.30 | 3.04 | 0.95 | 25.4 | 25.1 | 0.11 | -0.16 | 0.52 | 0.99 | 0.11 | 1.67 |



Stellar Parameters For KIC 005881813

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | $M(M_{\odot})$ | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|---------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 5332^{+88}_{-72} | $4.083^{+0.368}_{-0.092}$ | $0.180^{+0.200}_{-0.100}$ | $1.453^{+0.218}_{-0.510}$ | $0.932^{+0.047}_{-0.058}$ | $0.428^{+1.141}_{-0.142}$ |
| | +2%/-1% | +9%/-2% | +111%/-56% | +15%/-35% | +5%/-6% | +267%/-33% |
| 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 005881813-01 / KOI 2744.01

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|---------------|------------------------|-------------------|----------------------|---------------------|
| DV | -122 ± 28 | $4.75^{+0.88}_{-0.95}$ | 593^{+30}_{-56} | 3596^{+205}_{-198} | 571^{+375}_{-205} |
| Alt. | -98 ± 29 | $4.38^{+0.85}_{-0.93}$ | 590^{+31}_{-63} | 3535^{+230}_{-223} | 541^{+394}_{-223} |

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

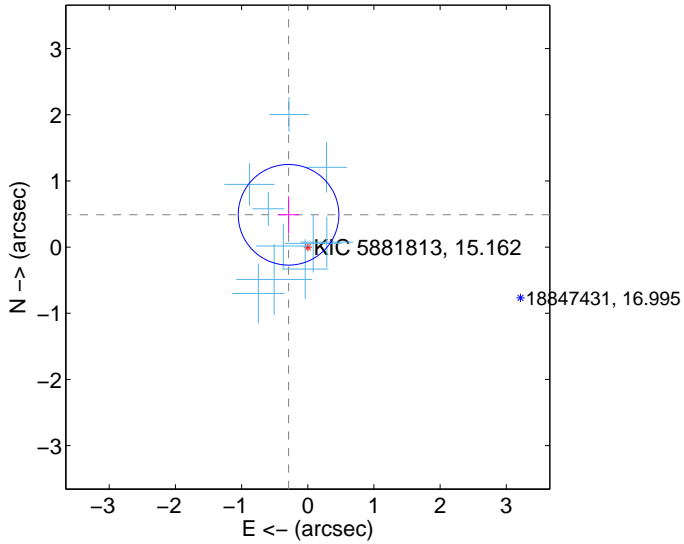
Supplemental centroid analysis for 005881813-01. Kepler magnitude: 15.16. Transit SNR 22.92

There are 10 quarters with good PRF difference image offsets

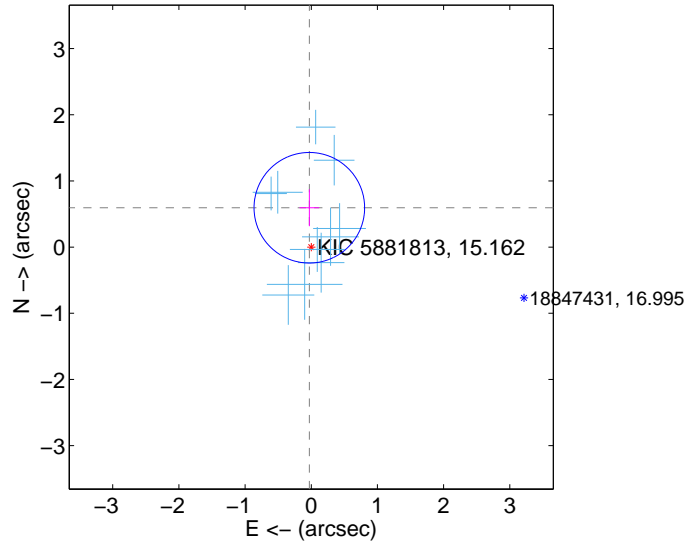
The direct PRF centroid is offset from the target star catalog position by about 0.46 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|-------------------|
| PRF-fit source offset from OOT | 0.568 ± 0.253 | 2.24 | 0.290 ± 0.157 | 0.488 ± 0.280 |
| PRF-fit source offset from KIC position | 0.595 ± 0.278 | 2.14 | 0.029 ± 0.149 | 0.594 ± 0.279 |
| photometric centroid source offset | 1.29 ± 0.59 | 2.20 | -1.09 ± 0.60 | -0.68 ± 0.54 |

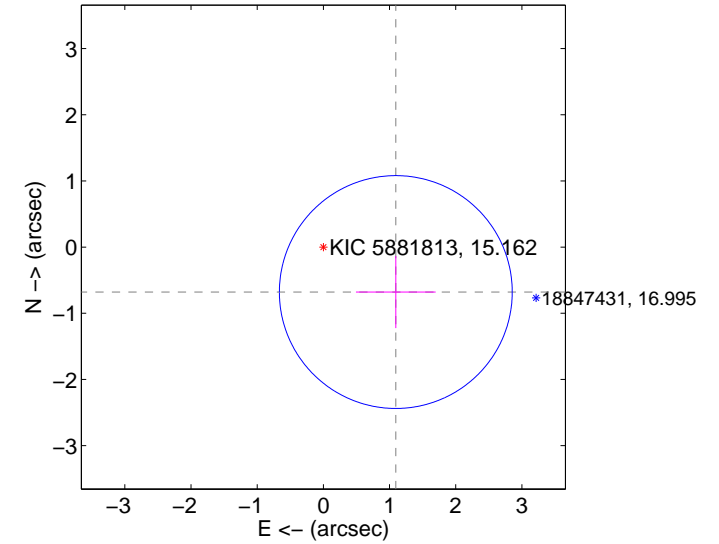
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

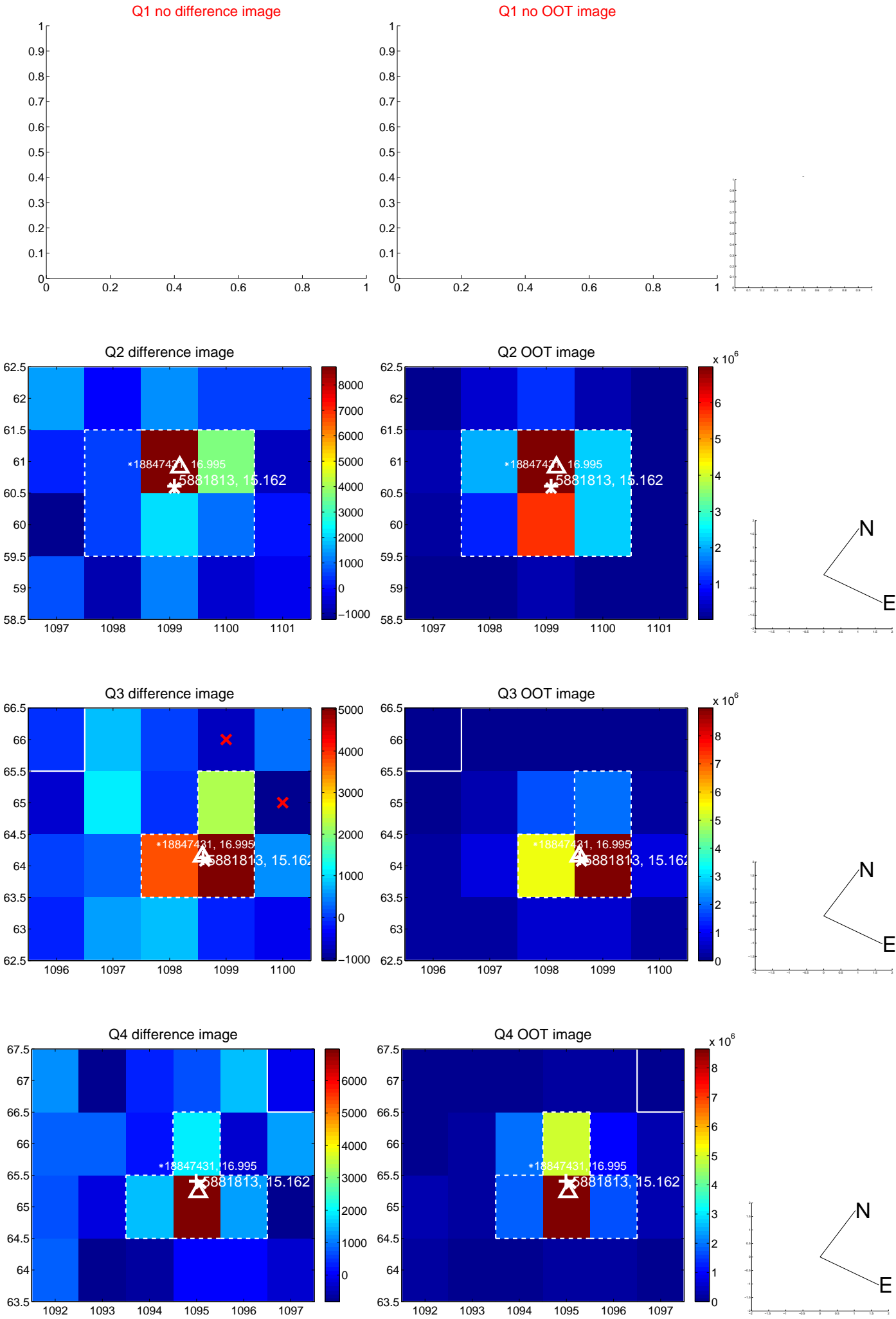


offset from photometric centroids

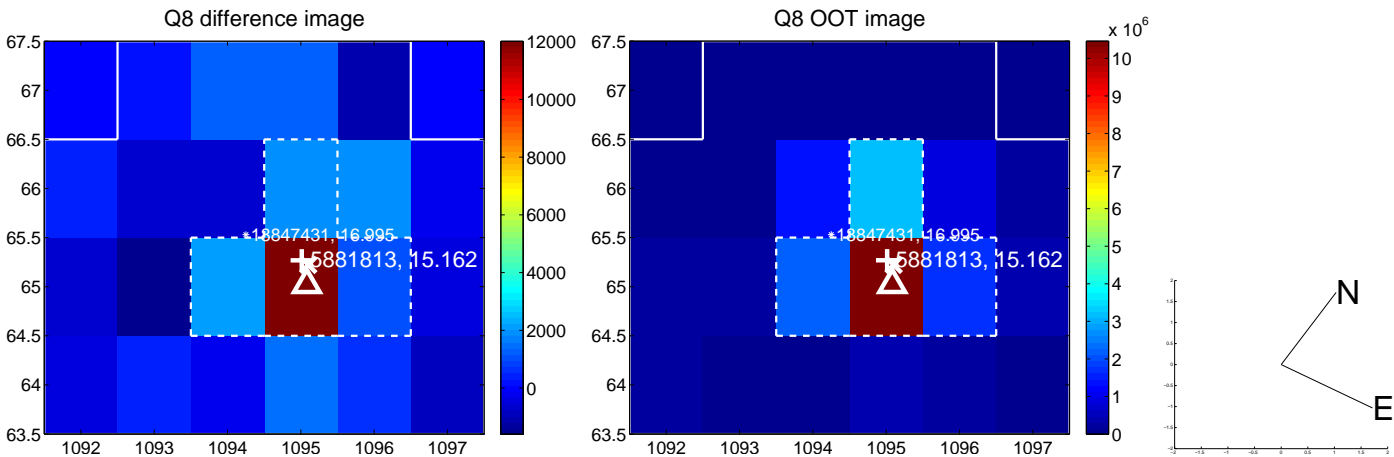
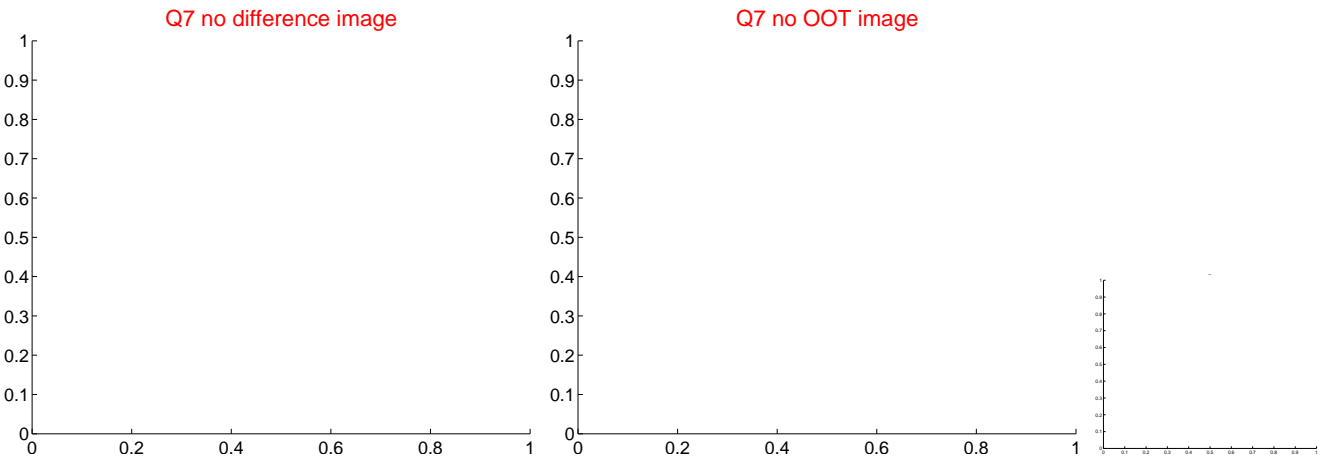
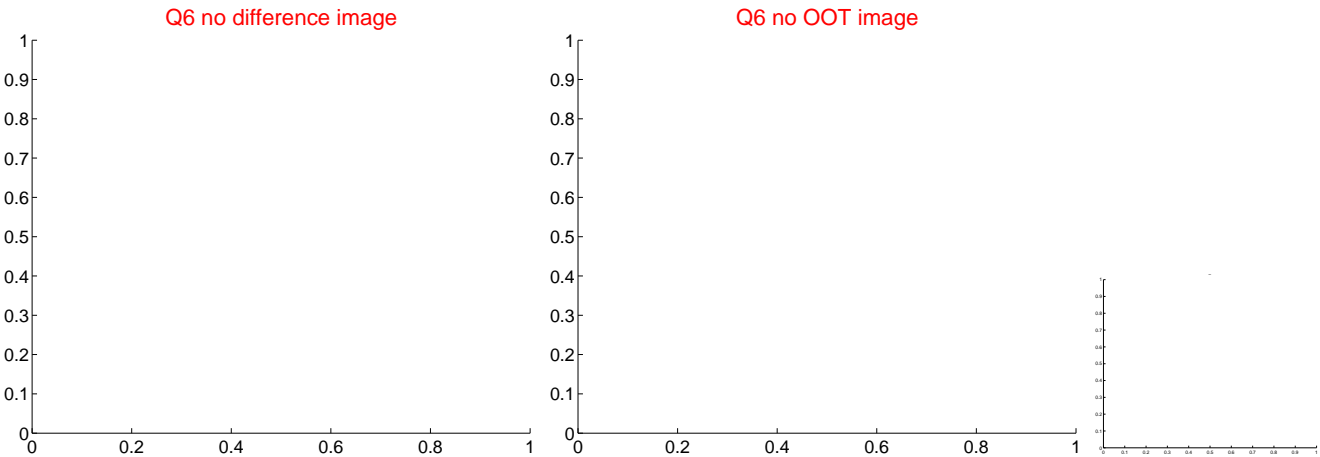
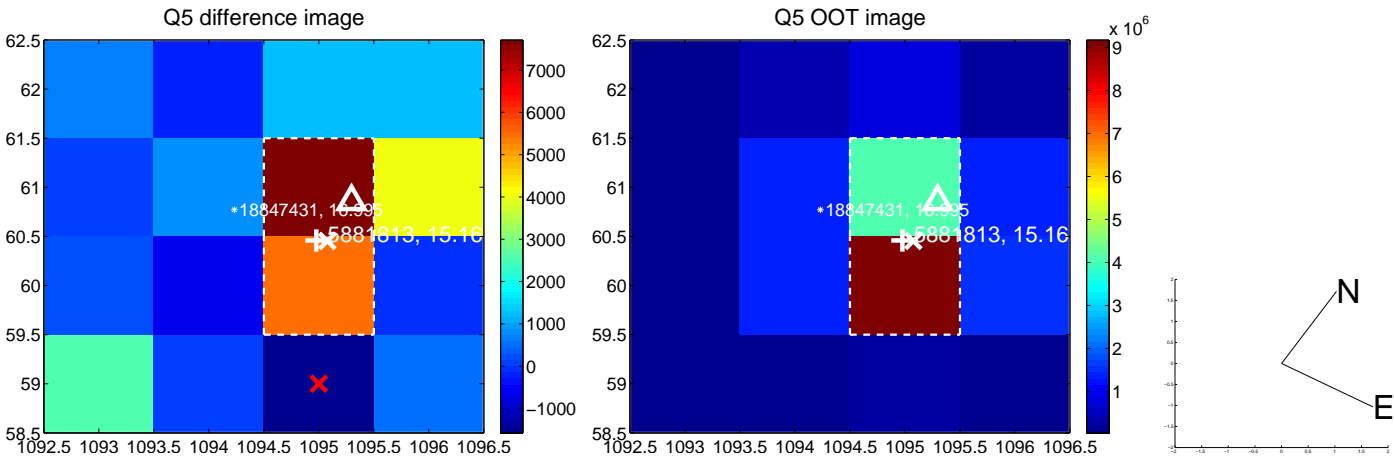


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

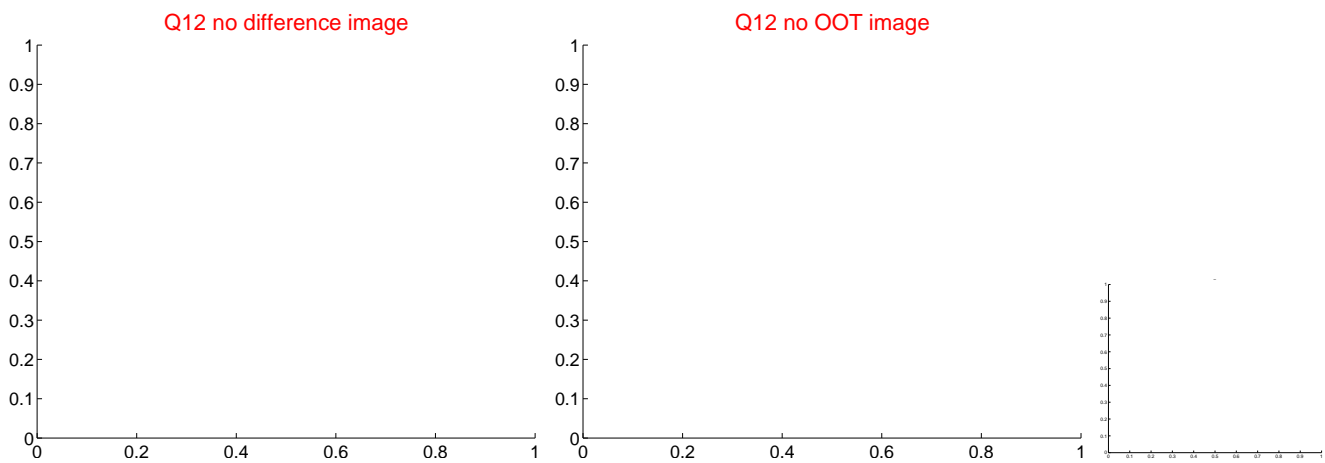
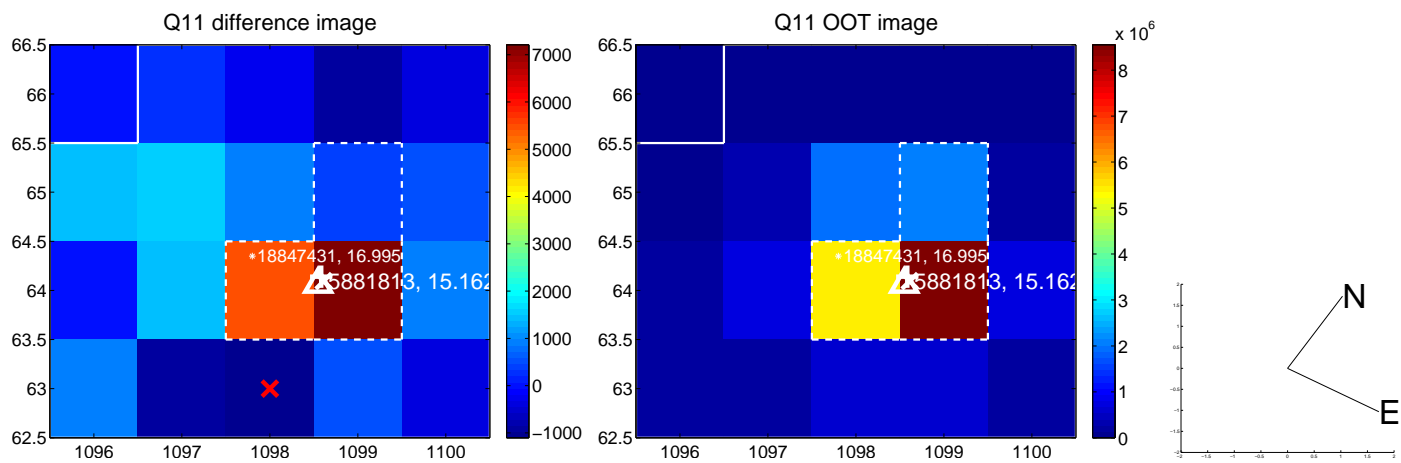
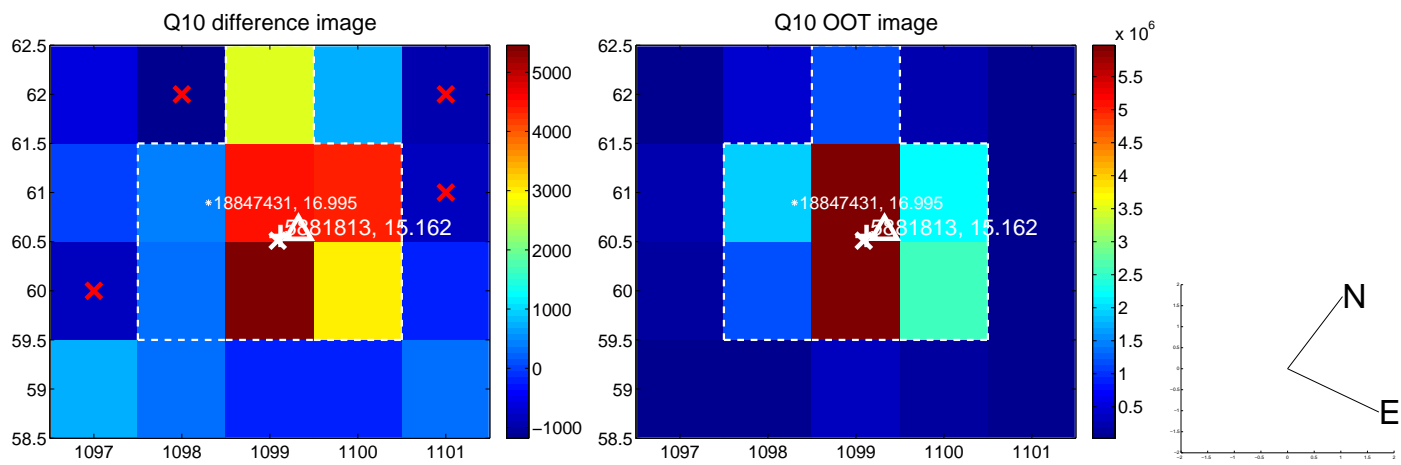
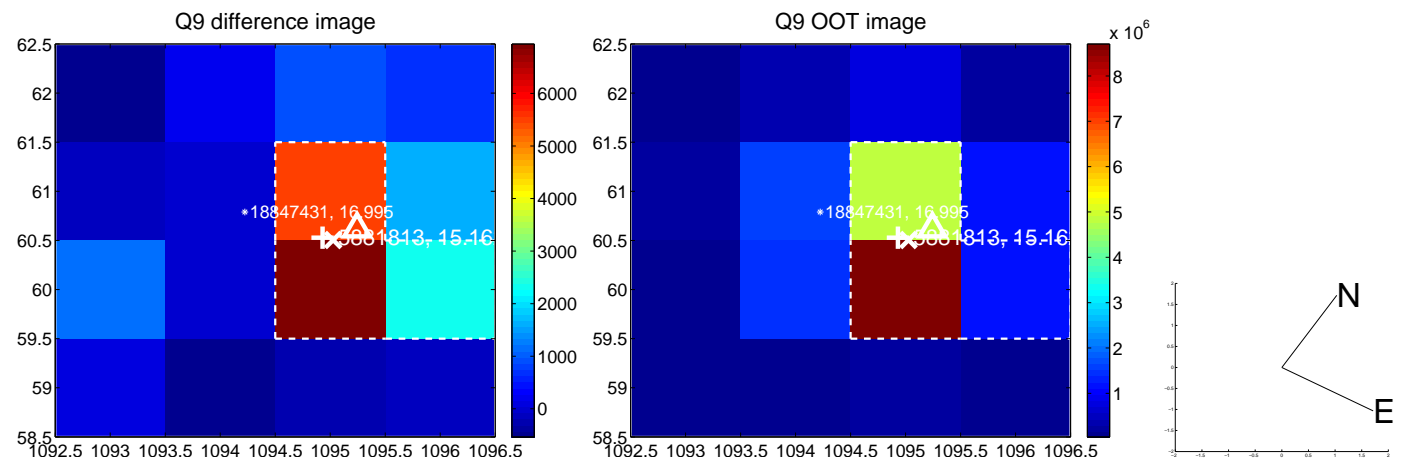
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



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



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

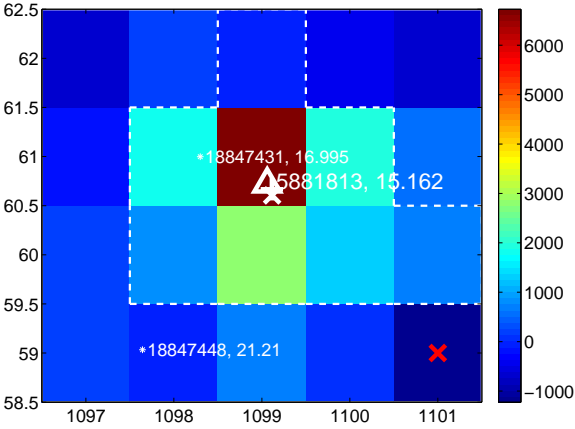
Q13 no difference image



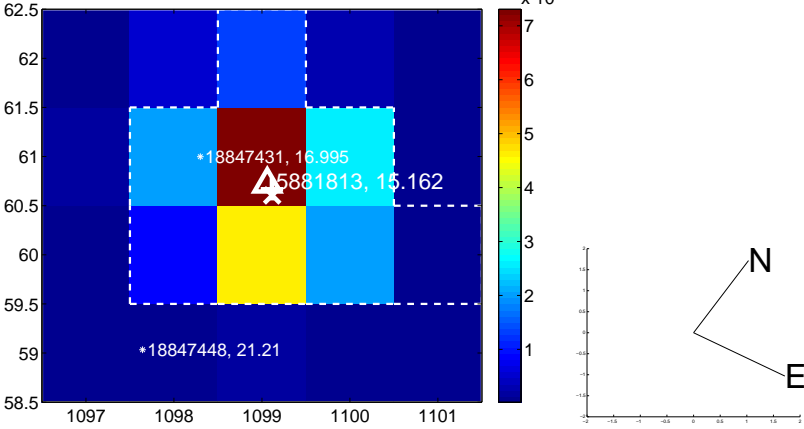
Q13 no OOT image



Q14 difference image



Q14 OOT image



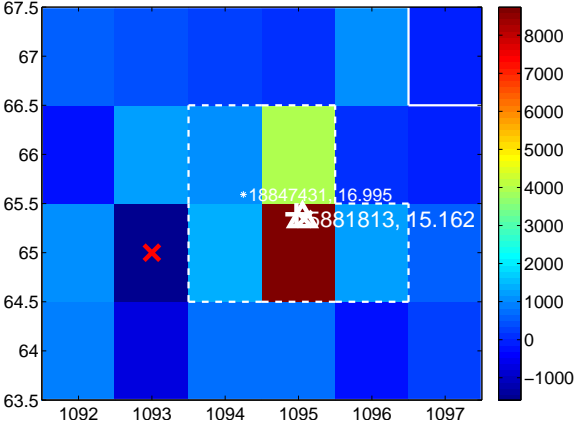
Q15 no difference image



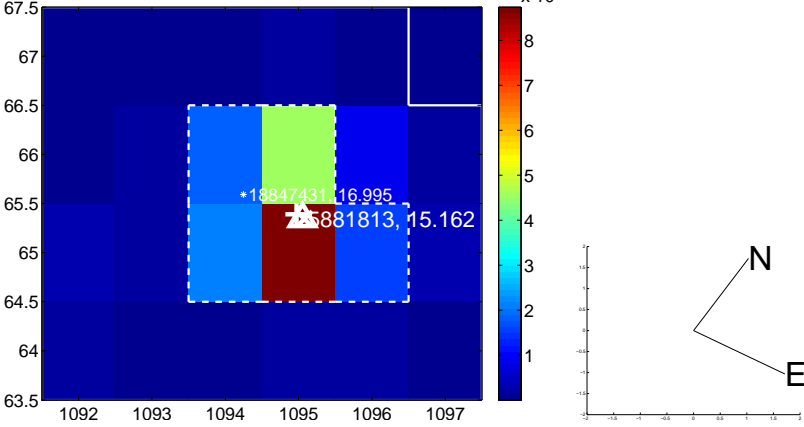
Q15 no OOT image



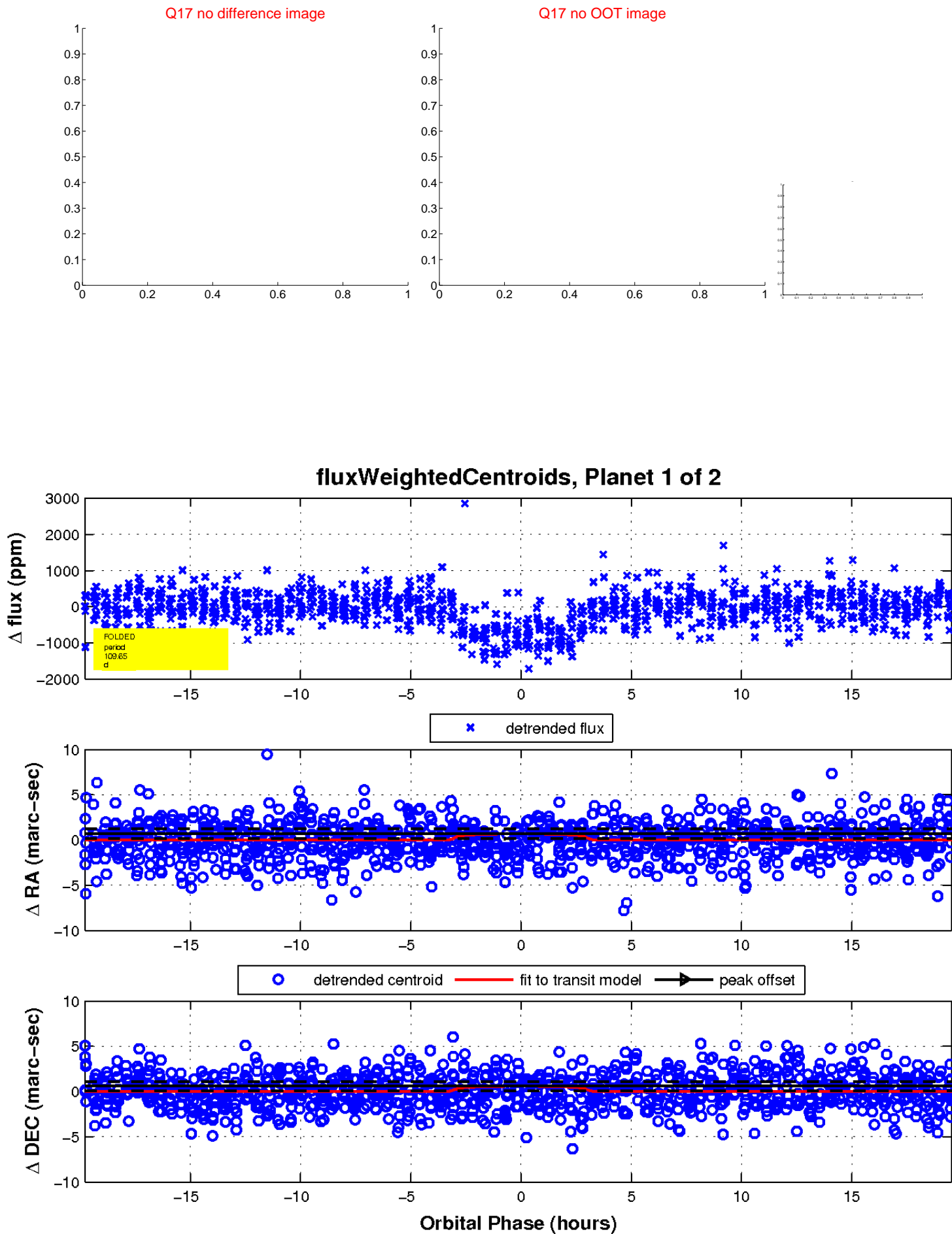
Q16 difference image



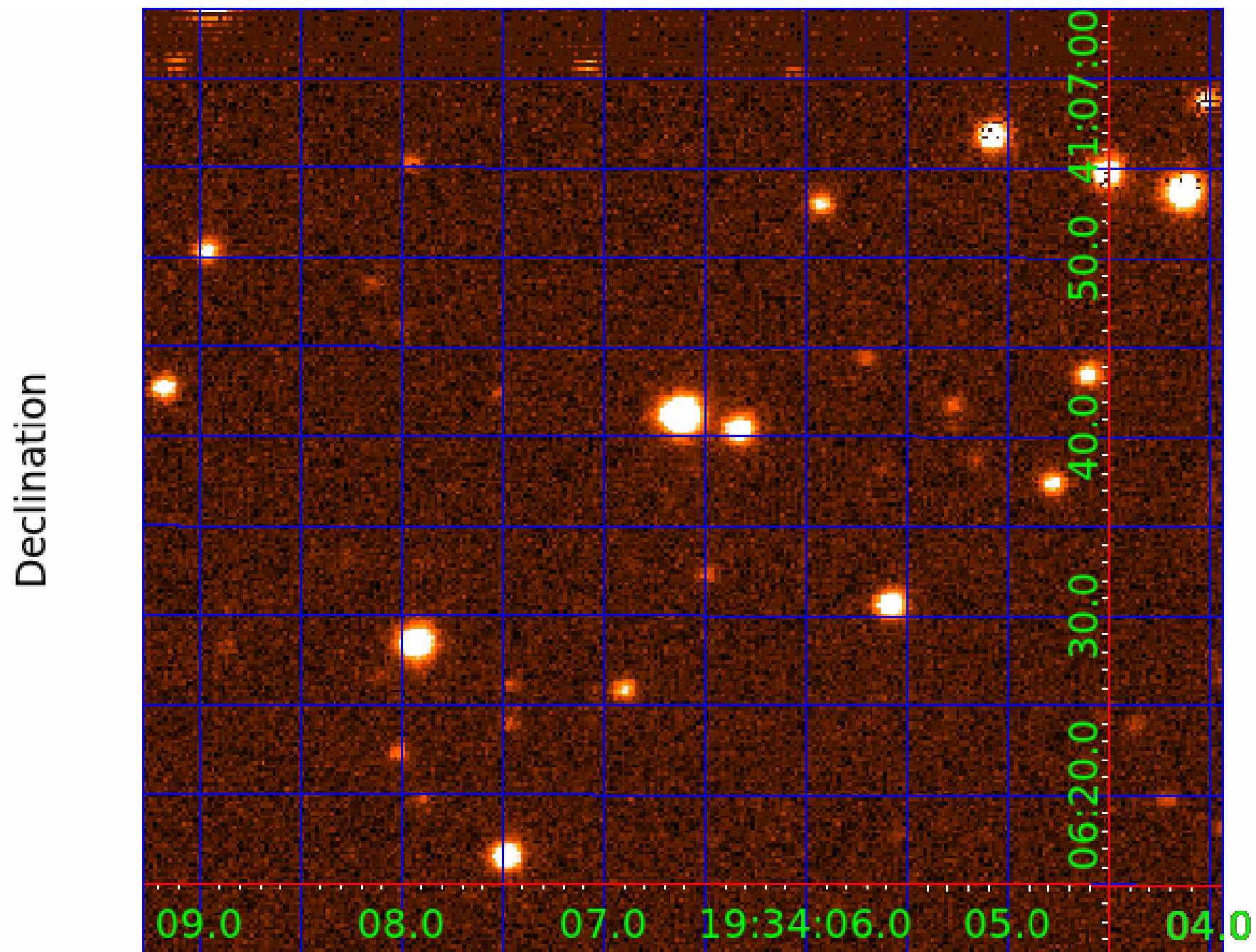
Q16 OOT image



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



UKIRT Image



KIC 005881813

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 005881813-01 | OBS | 2744.01 | 109.646804 | 190.673389 | 901.9 | 6.599 | 22.1 | 22.9 | 1.45 | 5332 | 4.93 | 7.97 |
| 005881813-02 | OBS | 2744.02 | 11.615624 | 131.965242 | 186.3 | 2.014 | 8.1 | 8.9 | 1.45 | 5332 | 2.39 | 158.94 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|------------|
| 005881813-01 | OBS | PC | 0.99 | 0 | 0 | 0 | 0 | NO_COMMENT |
| 005881813-02 | OBS | PC | 0.58 | 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 for comment definitions.

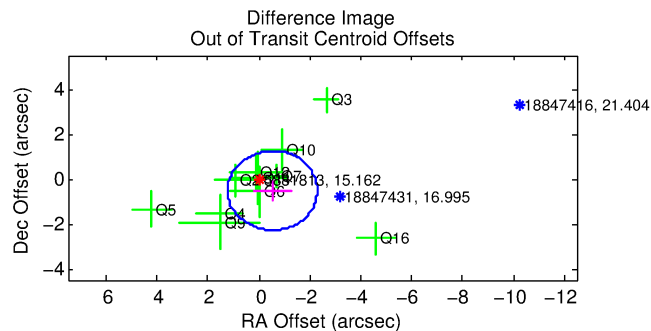
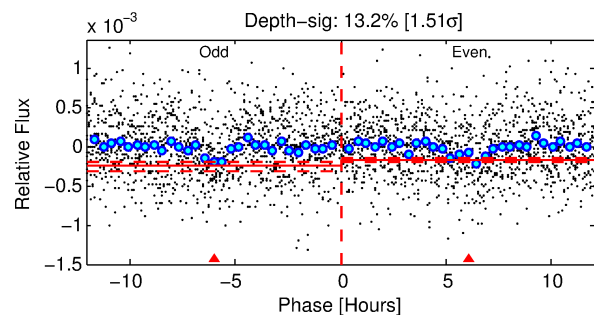
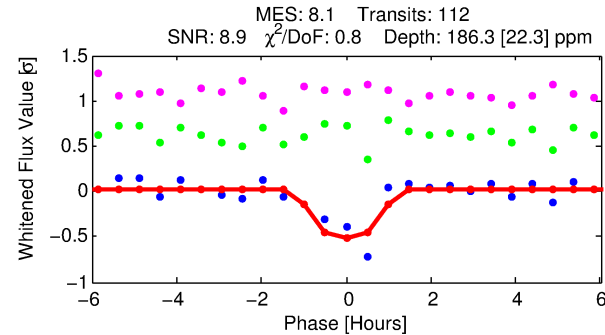
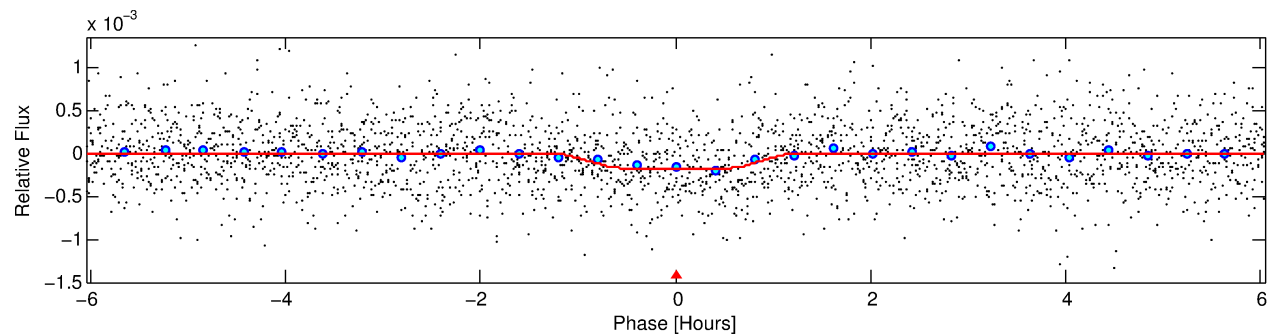
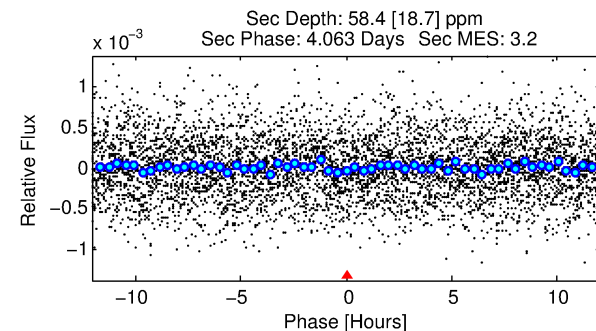
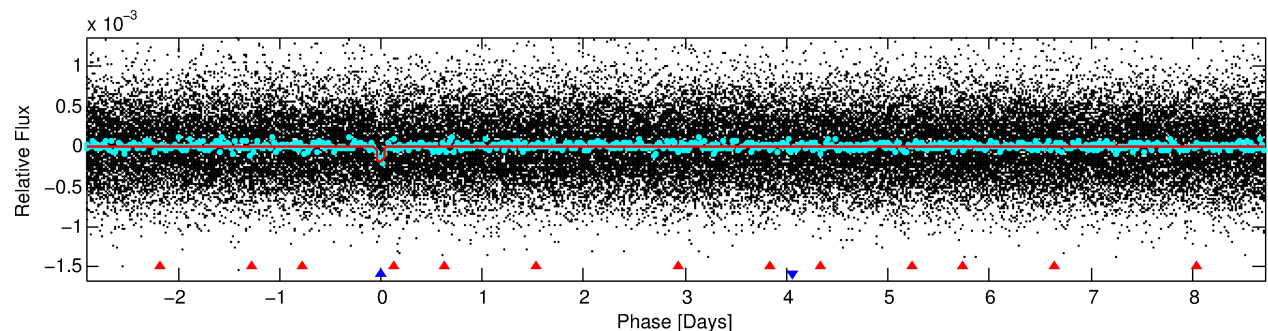
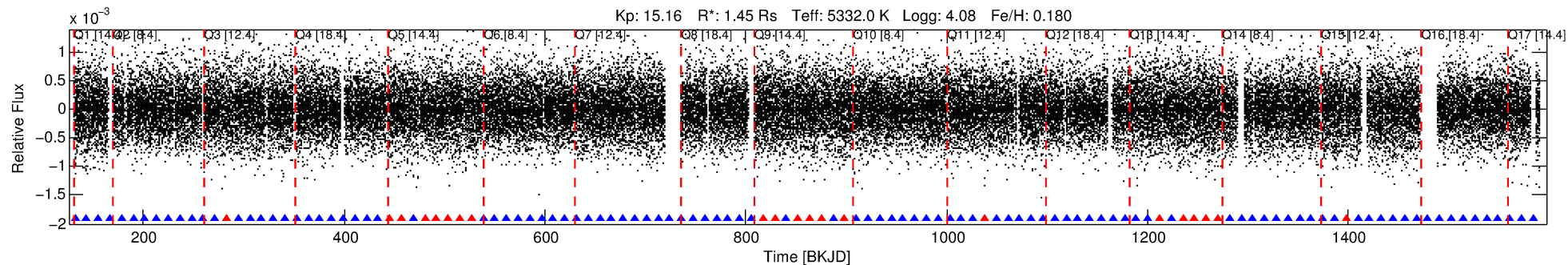
Ephemeris Match Information For 005881813-02

No Significant Match Found

DV One-Page Summary

KIC: 5881813 Candidate: 2 of 2 Period: 11.616 d

KOI: K02744.02 Corr: 0.832



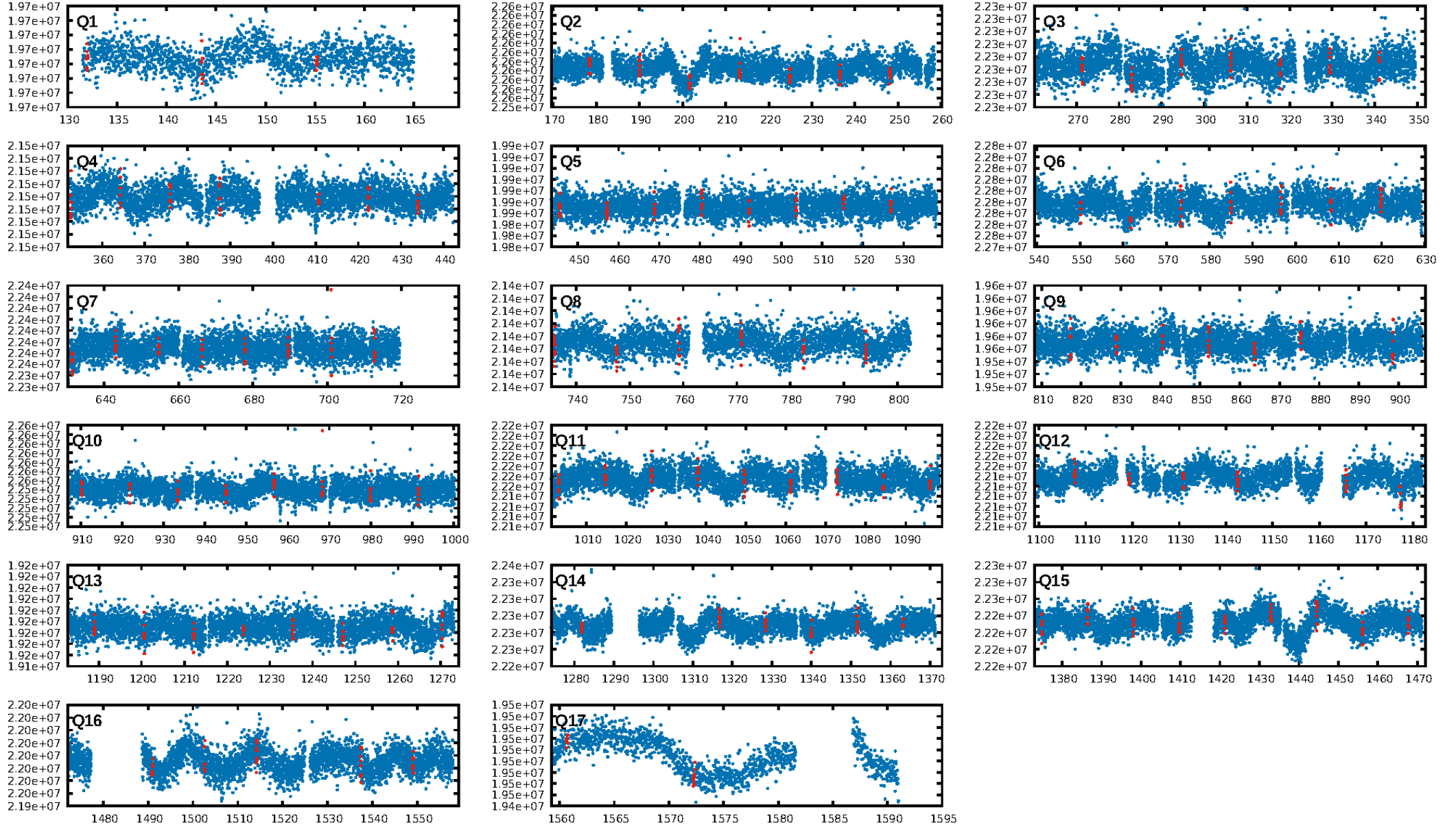
DV Fit Results:

Period = 11.61562 [0.00009] d
Epoch = 131.9652 [0.0058] BKJD
Rp/R* = 0.0151 [0.0162]
a/R* = 20.97 [94.68]
b = 0.90 [1.02]
Seff = 158.94 [97.75]
T_{eq} = 905 [139] K
Rp = 2.39 [2.70] Re
a = 0.0981 [0.0360] AU
Ag = 54.07 [121.78] [0.44σ]
T_{eff} = 3796 [2058] K [1.40σ]

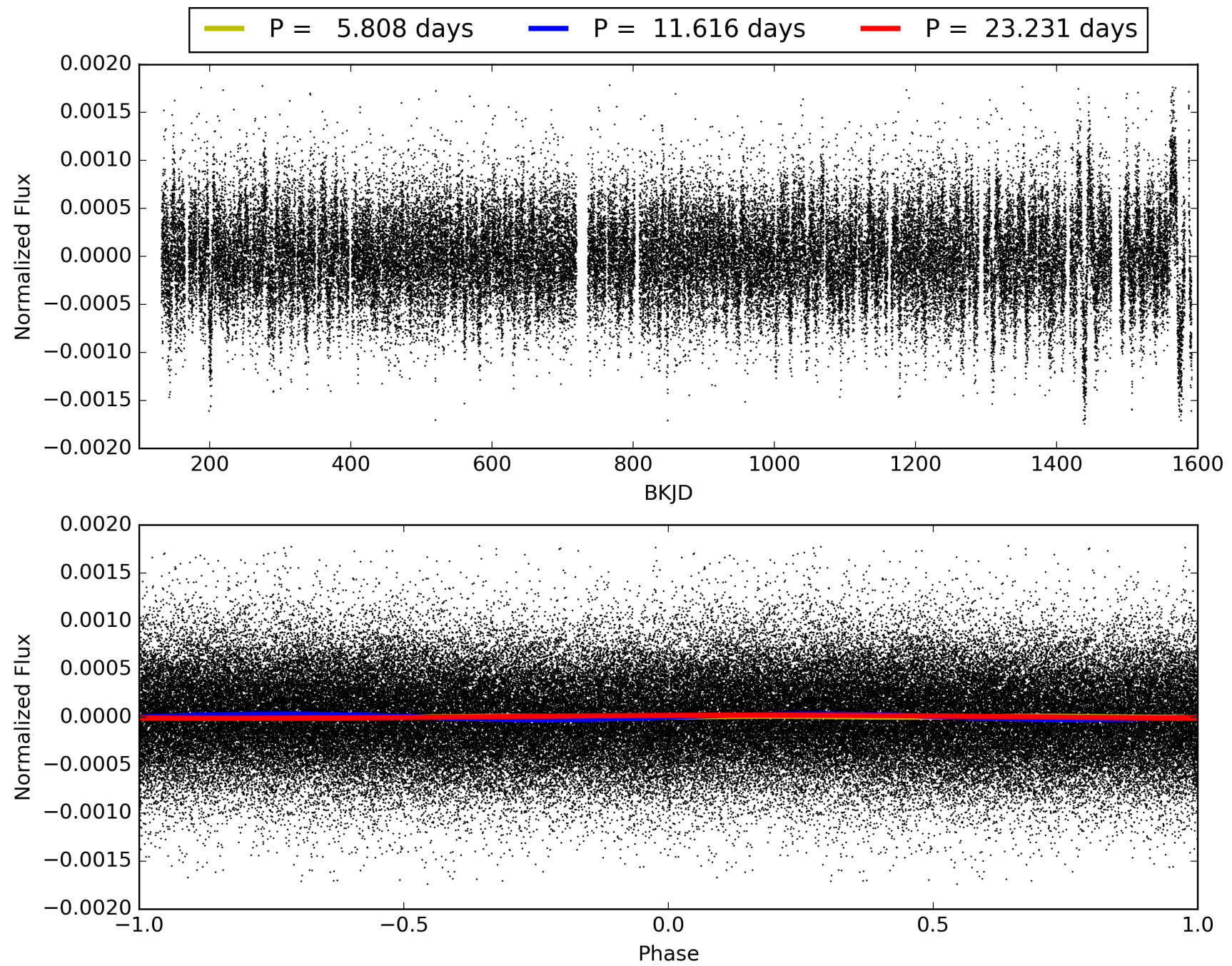
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [340.99σ]
ModelChiSquare2-sig: 100.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 3.10e-16
RollingBand-fgt: 0.80 [86/107]
GhostDiagnostic-chr: 2.815
Centroid-sig: 14.7%
Centroid-so: 1.942 arcsec [1.20σ]
OotOffset-rm: 0.745 arcsec [1.27σ]
KicOffset-rm: 0.579 arcsec [1.17σ]
OotOffset-st: 3/3/3/2 [11]
KicOffset-st: 3/3/3/2 [11]
DiffImageQuality-fgm: 0.36 [4/11]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 005881813-02, PDC Light Curves

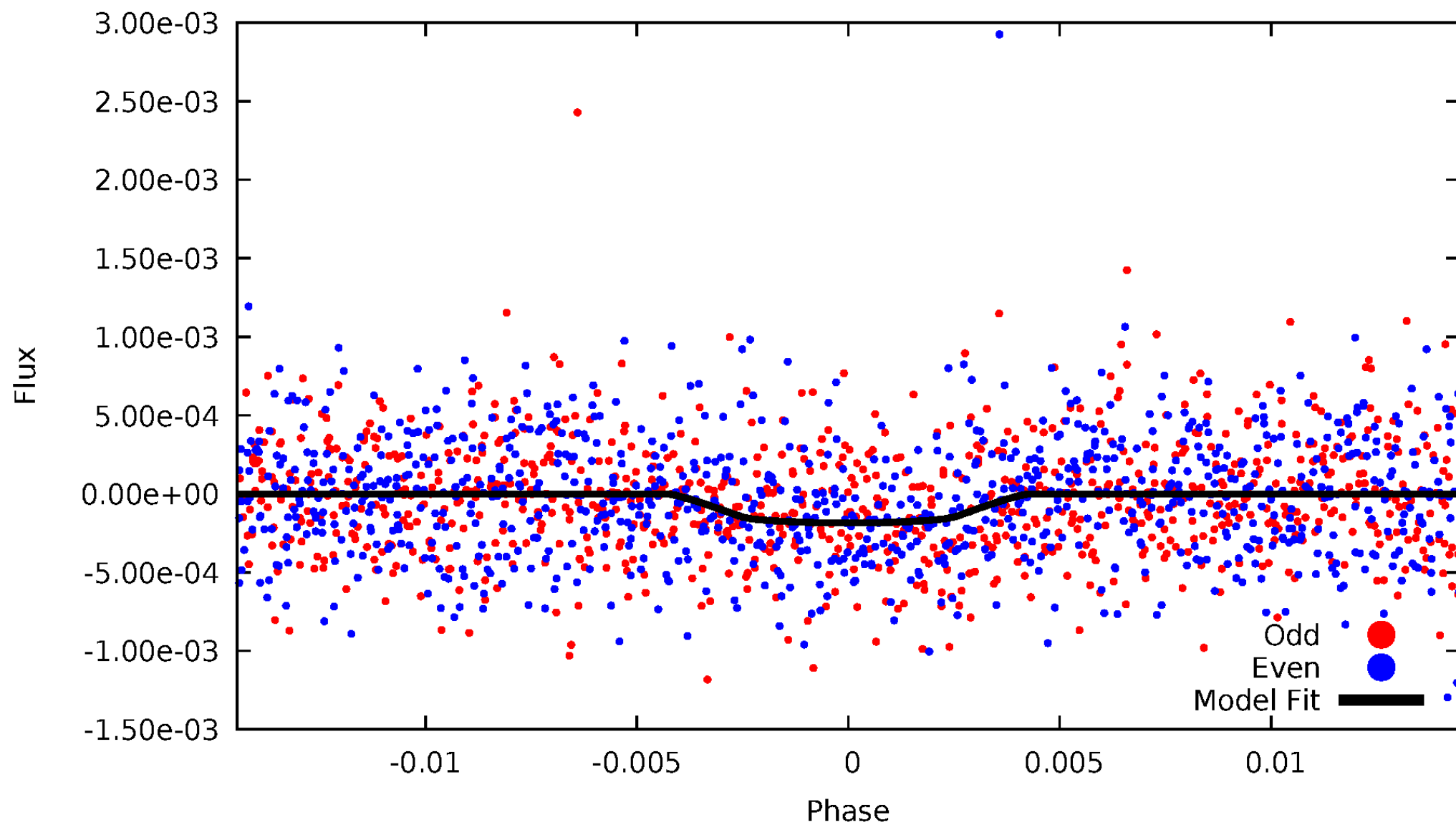


TCE 005881813-02



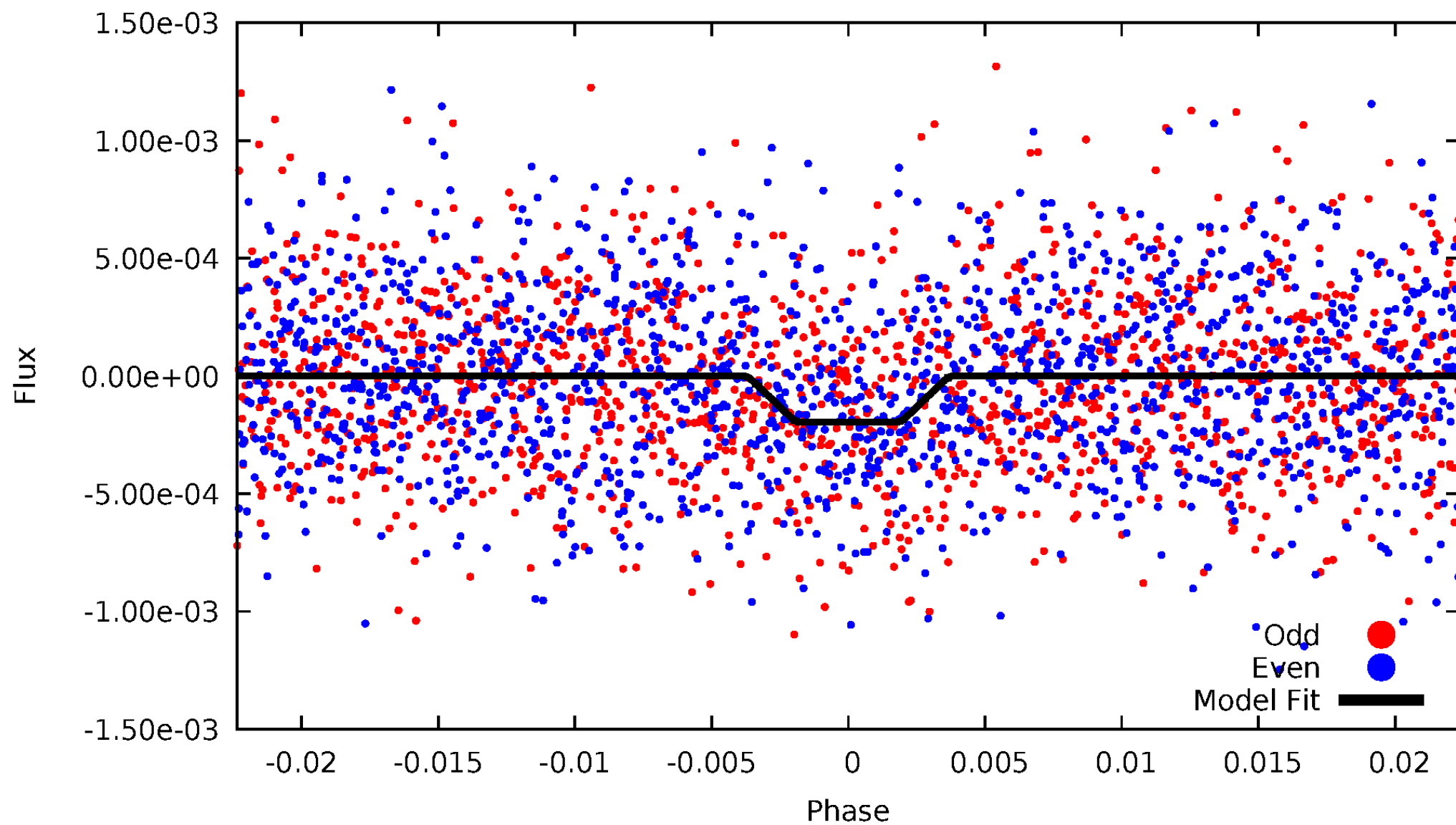
DV Odd/Even

TCE 005881813-02



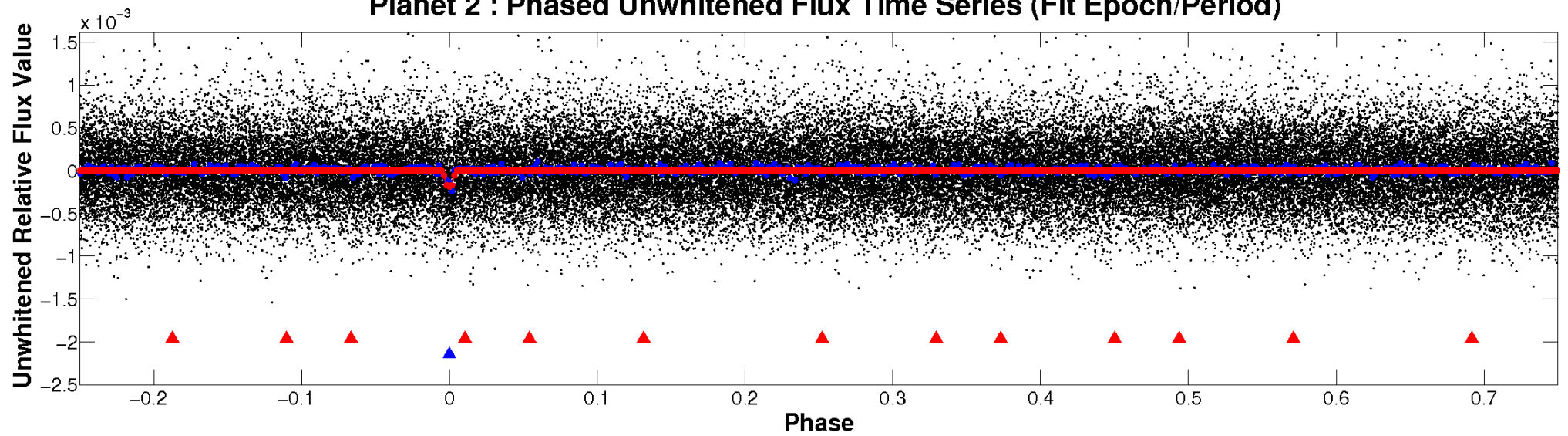
ALT Odd/Even

TCE 005881813-02

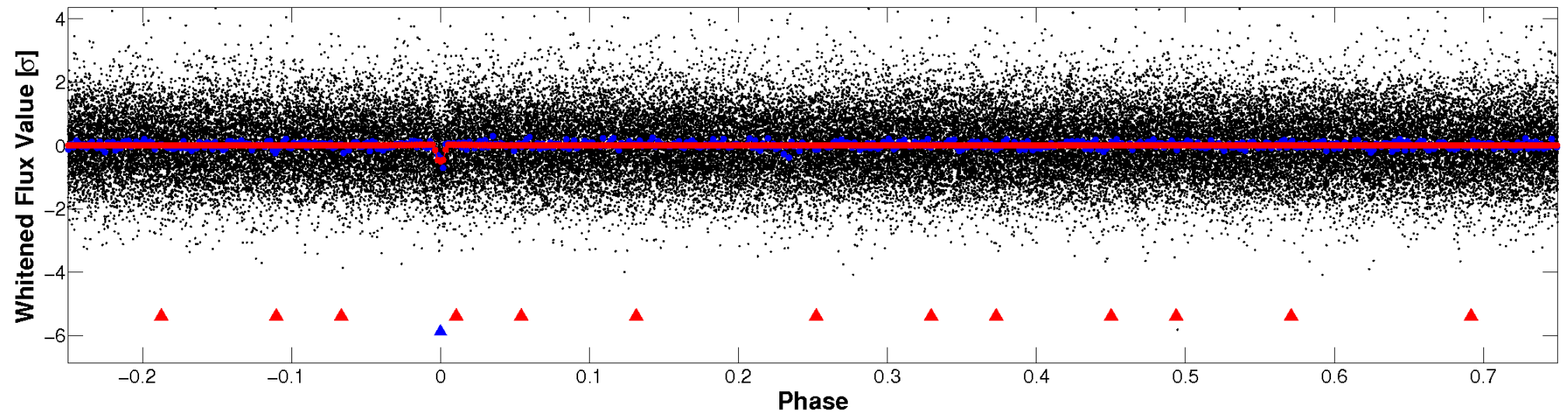


Non-Whitened Vs. Whitened Light Curve

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

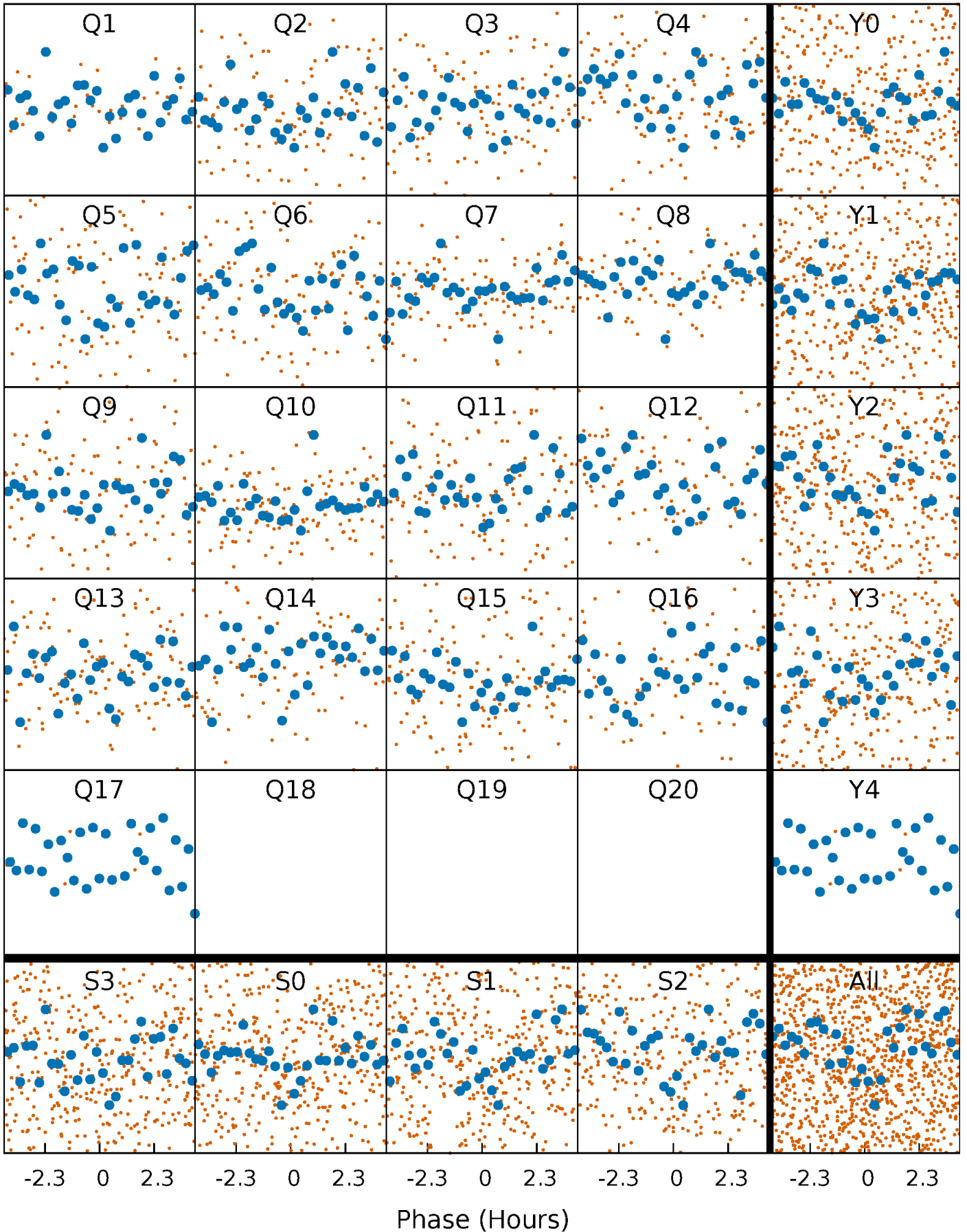


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



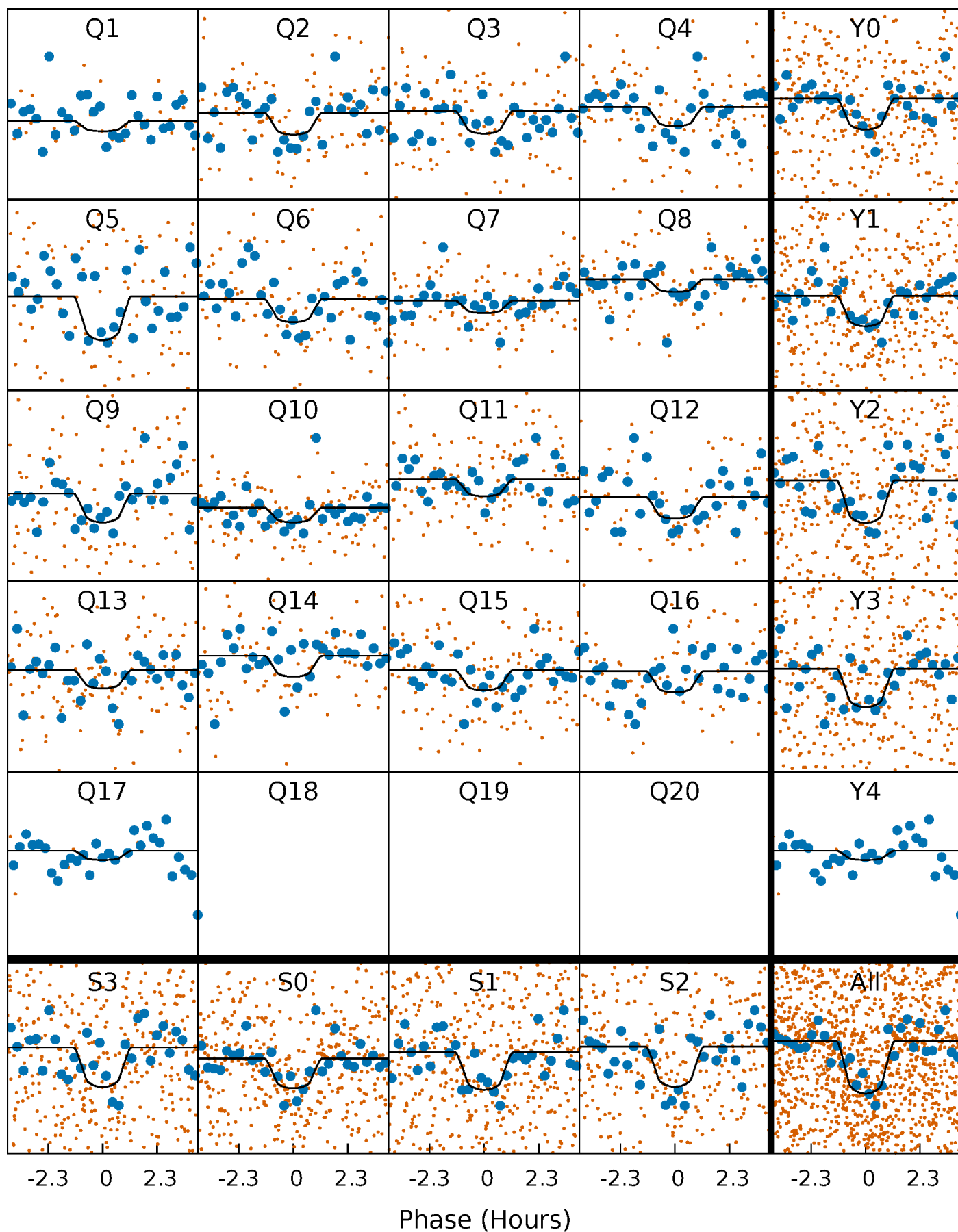
PDC Quarter-Phased Transit Curves

TCE 005881813-02 P= 11.615624 Days $T_0=131.965242$ (BKJD)



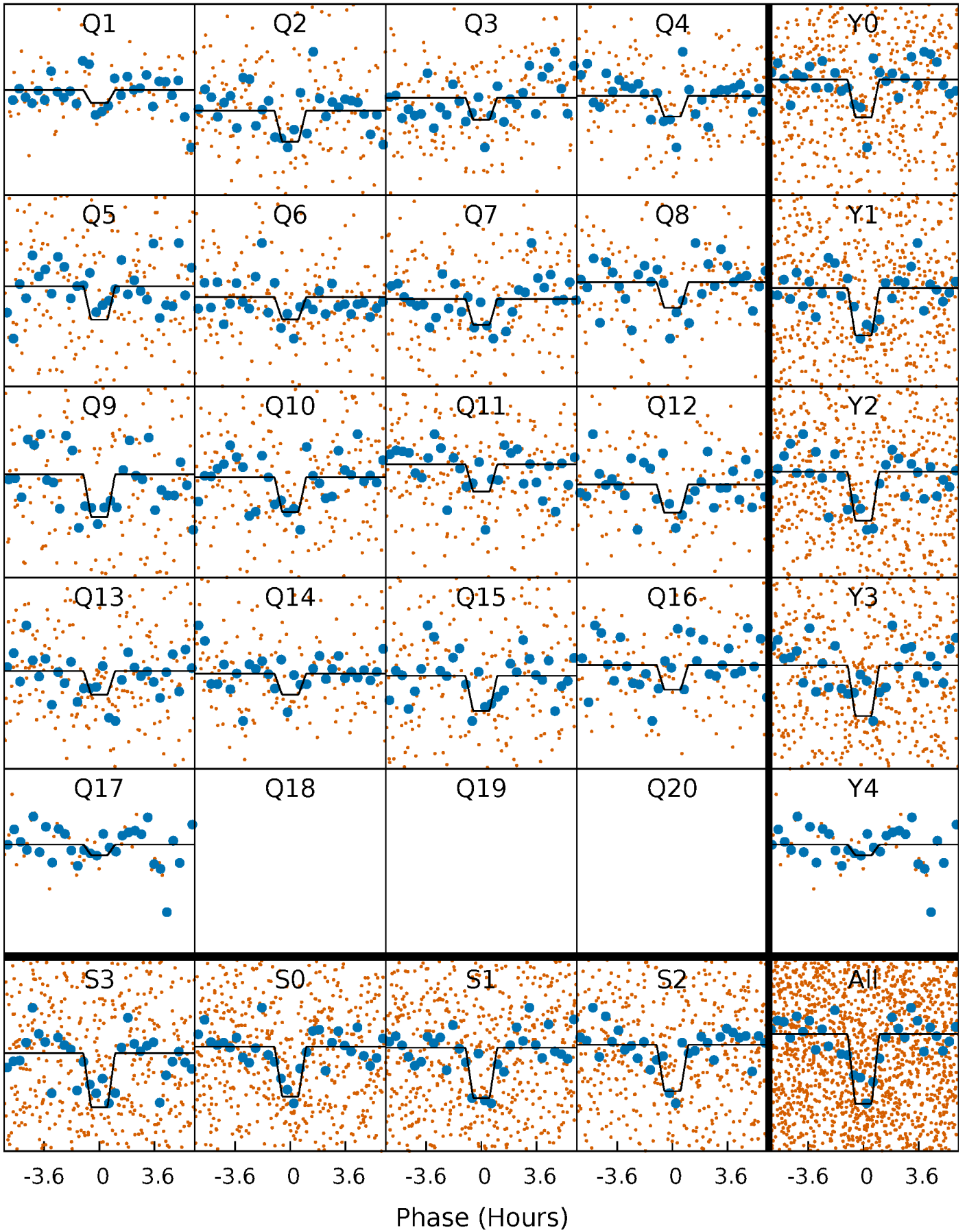
DV Quarter-Phased Transit Curves

TCE 005881813-02 P= 11.615624 Days $T_0=131.965242$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

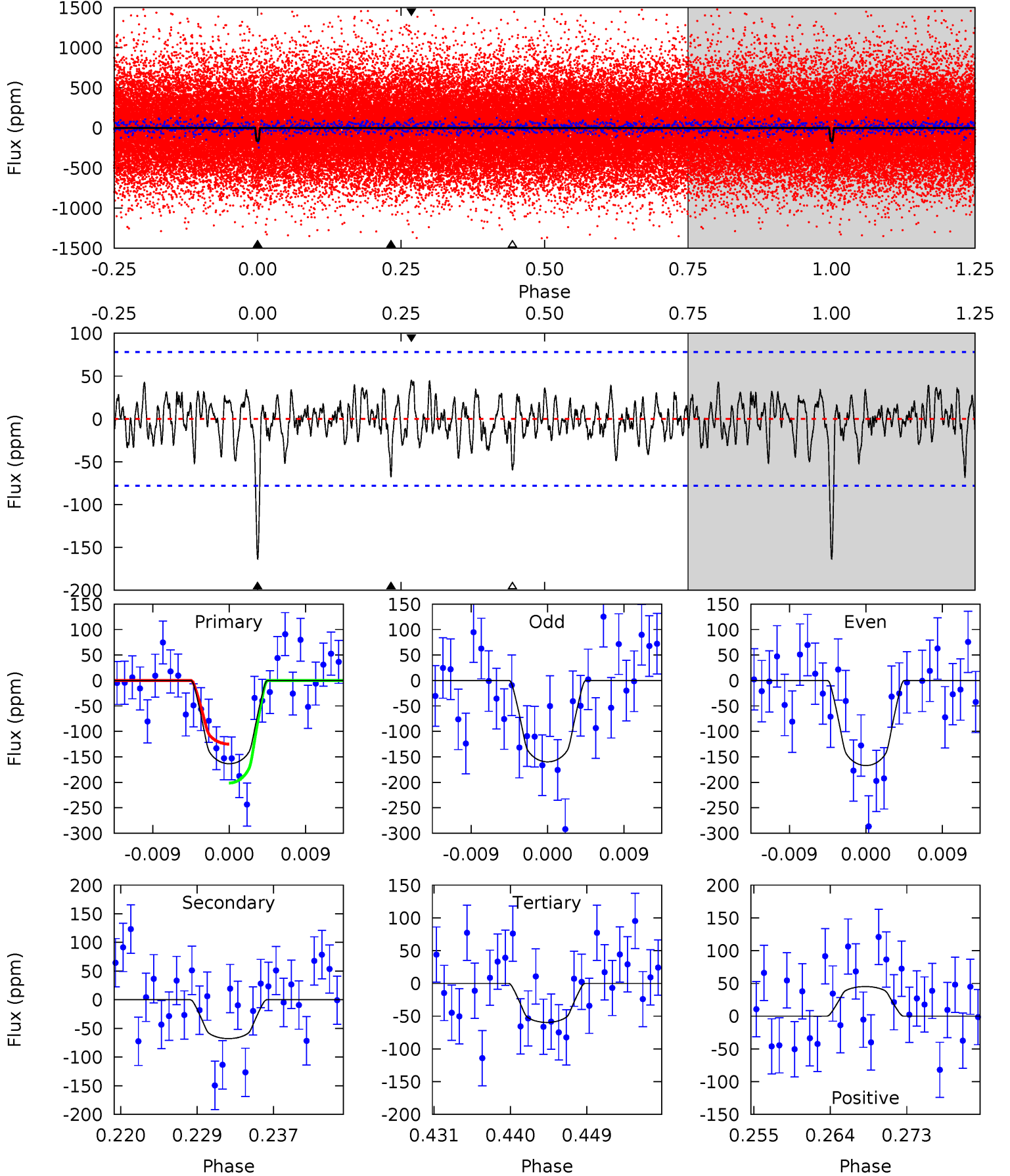
TCE 005881813-02 P= 11.615346 Days $T_0=131.980942$ (BKJD)



DV Model-Shift Uniqueness Test

005881813-02, P = 11.615624 Days, E = 120.349618 Days

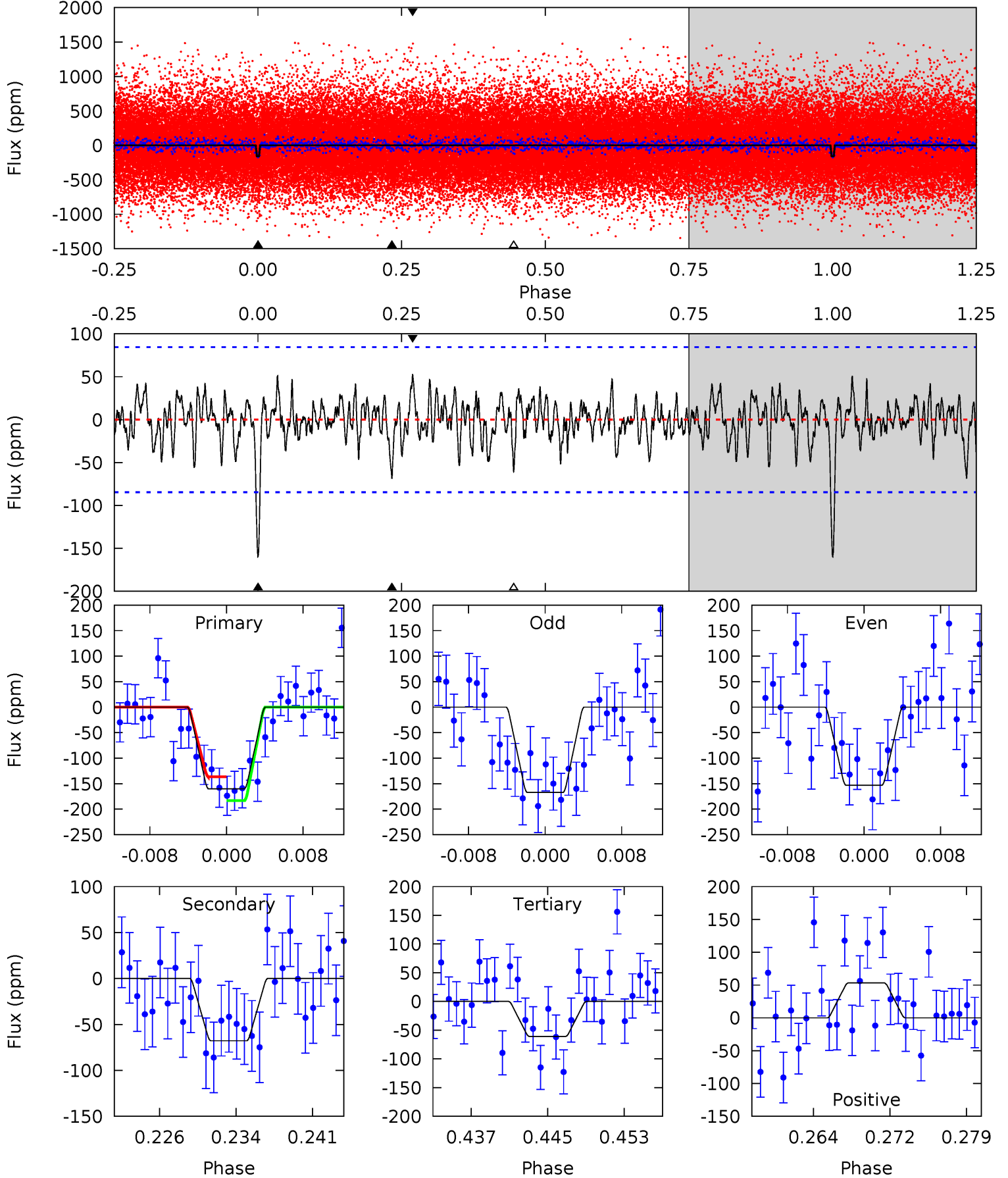
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 10.6 | 4.38 | 3.86 | 2.92 | 5.05 | 2.62 | 1.19 | 6.72 | 7.66 | 0.53 | 1.46 | 0.23 | 1.08 | 0.22 | 2.48 |



Alt Model-Shift Uniqueness Test

005881813-02, P = 11.615346 Days, E = 120.365596 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 9.61 | 4.08 | 3.67 | 3.20 | 5.08 | 2.67 | 1.16 | 5.94 | 6.41 | 0.41 | 0.88 | 0.42 | 0.89 | 0.25 | 1.40 |



Stellar Parameters For KIC 005881813

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | $M(M_{\odot})$ | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|---------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 5332^{+88}_{-72} | $4.083^{+0.368}_{-0.092}$ | $0.180^{+0.200}_{-0.100}$ | $1.453^{+0.218}_{-0.510}$ | $0.932^{+0.047}_{-0.058}$ | $0.428^{+1.141}_{-0.142}$ |
| | +2%/-1% | +9%/-2% | +111%/-56% | +15%/-35% | +5%/-6% | +267%/-33% |
| 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 005881813-02 / KOI 2744.02

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|--------------|------------------------|----------------------|-----------------------|-------------------|
| DV | -68 ± 15 | $2.77^{+2.38}_{-1.85}$ | 1248^{+59}_{-121} | 3863^{+2056}_{-691} | 46^{+387}_{-33} |
| Alt. | -68 ± 17 | $2.59^{+2.37}_{-1.63}$ | 1248^{+64}_{-134} | 3906^{+1792}_{-698} | 51^{+324}_{-37} |

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

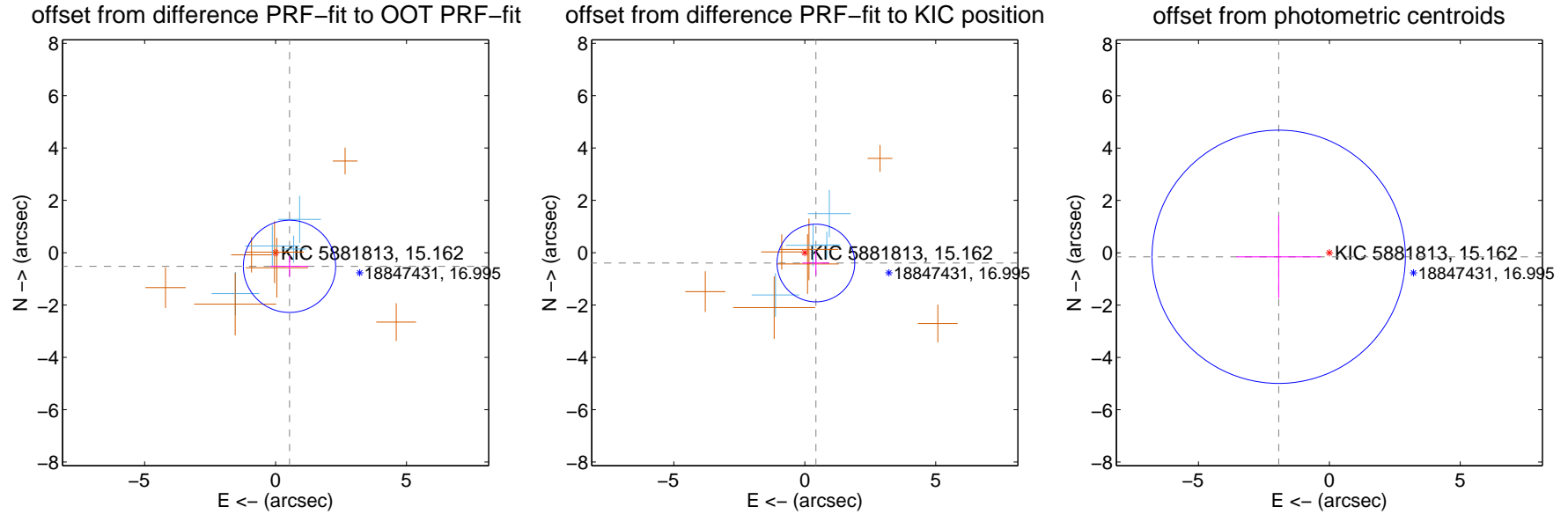
DV Centroid Data

Supplemental centroid analysis for 005881813-02. Kepler magnitude: 15.16. Transit SNR 8.88

There are 4 quarters with good PRF difference image offsets

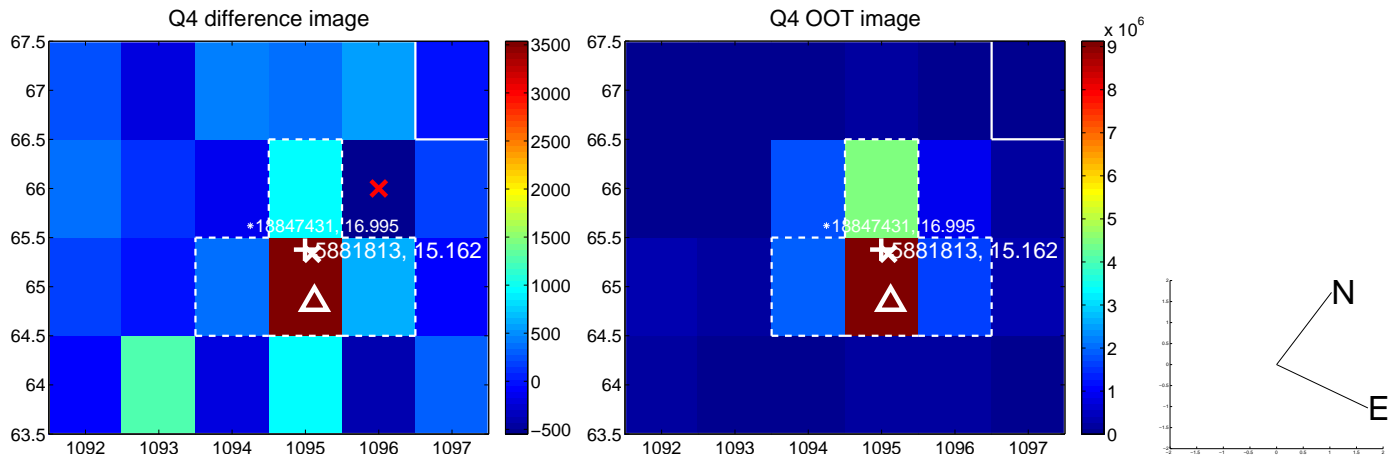
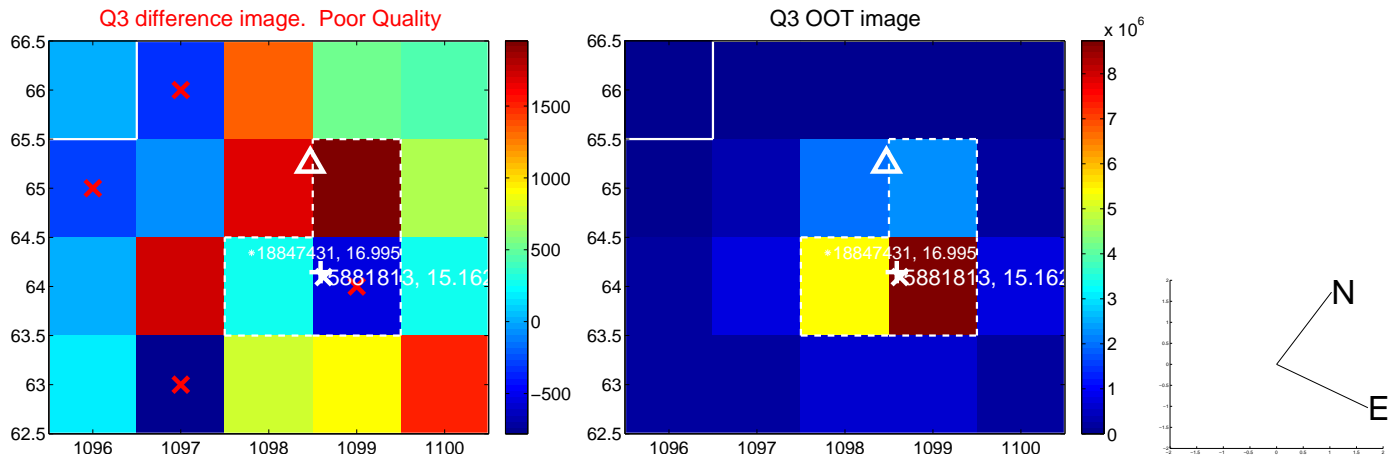
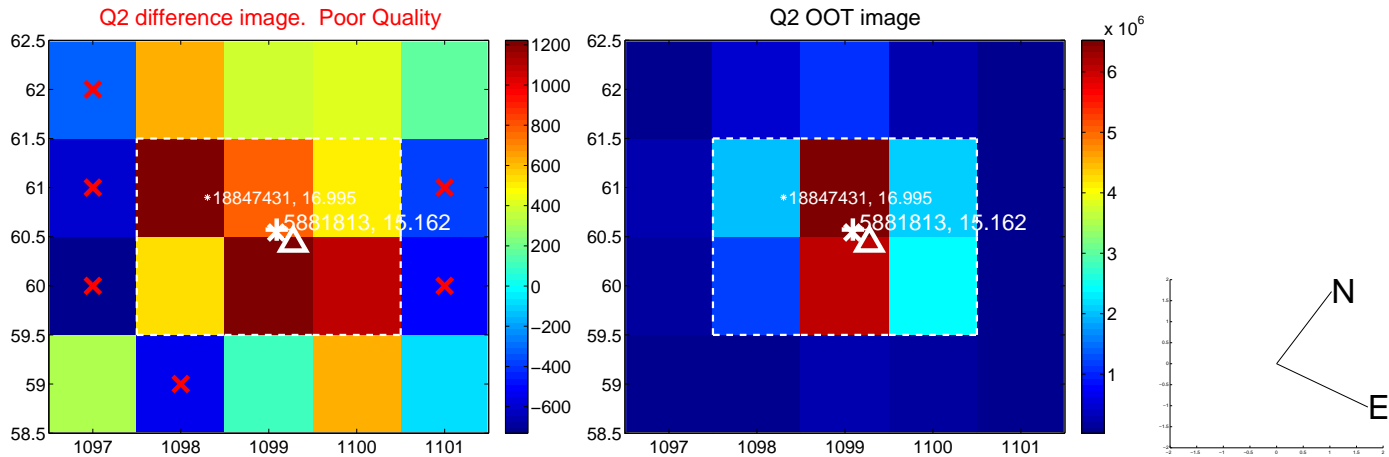
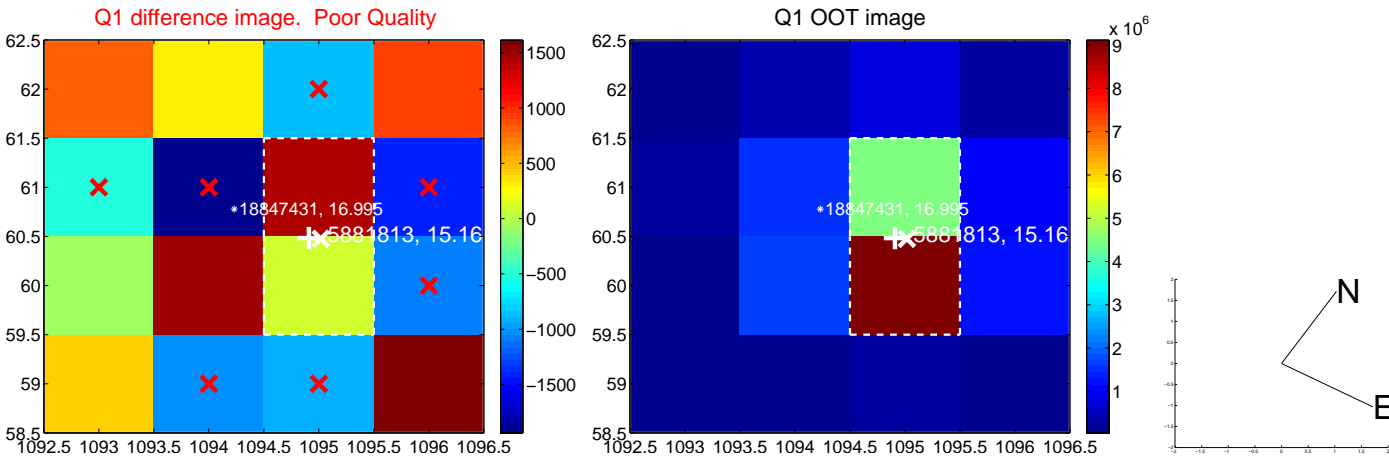
The direct PRF centroid is offset from the target star catalog position by about 0.48 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 0.745 ± 0.588 | 1.27 | -0.532 ± 0.722 | -0.521 ± 0.403 |
| PRF-fit source offset from KIC position | 0.579 ± 0.495 | 1.17 | -0.424 ± 0.514 | -0.394 ± 0.472 |
| photometric centroid source offset | 1.94 ± 1.61 | 1.20 | 1.94 ± 1.61 | -0.15 ± 1.58 |

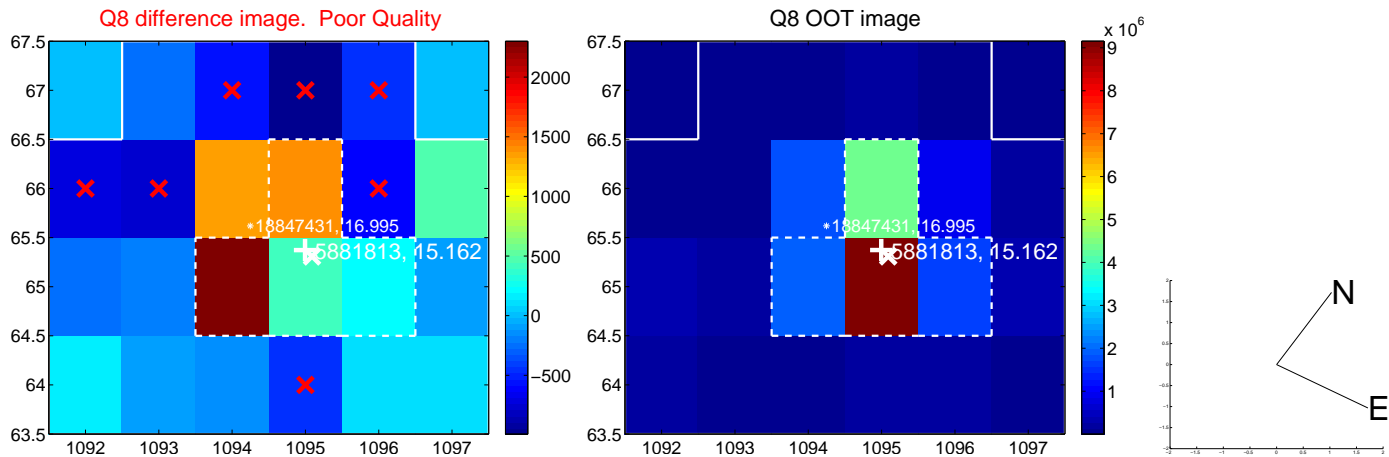
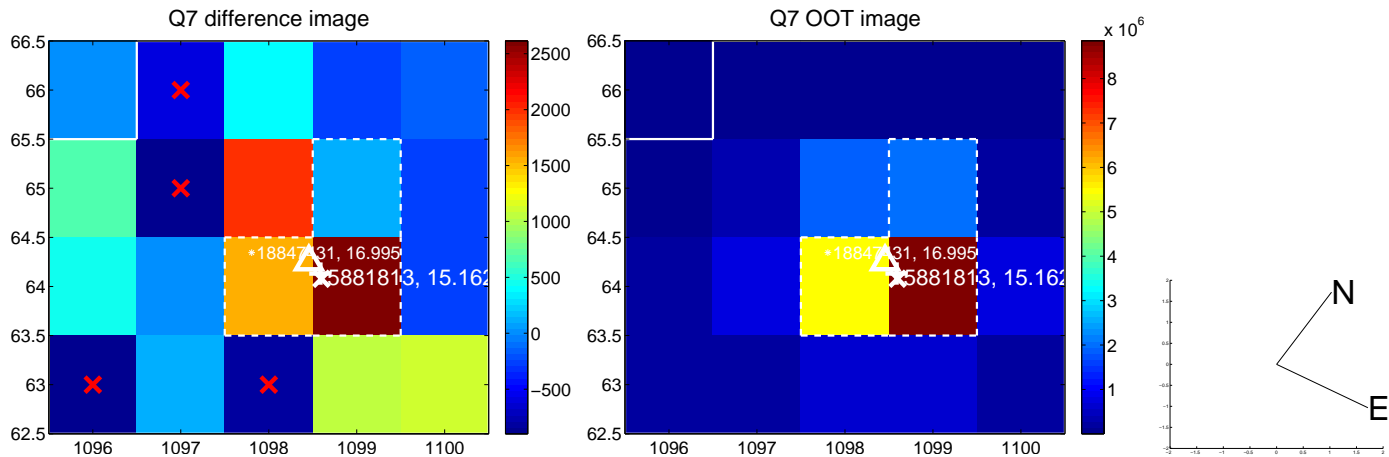
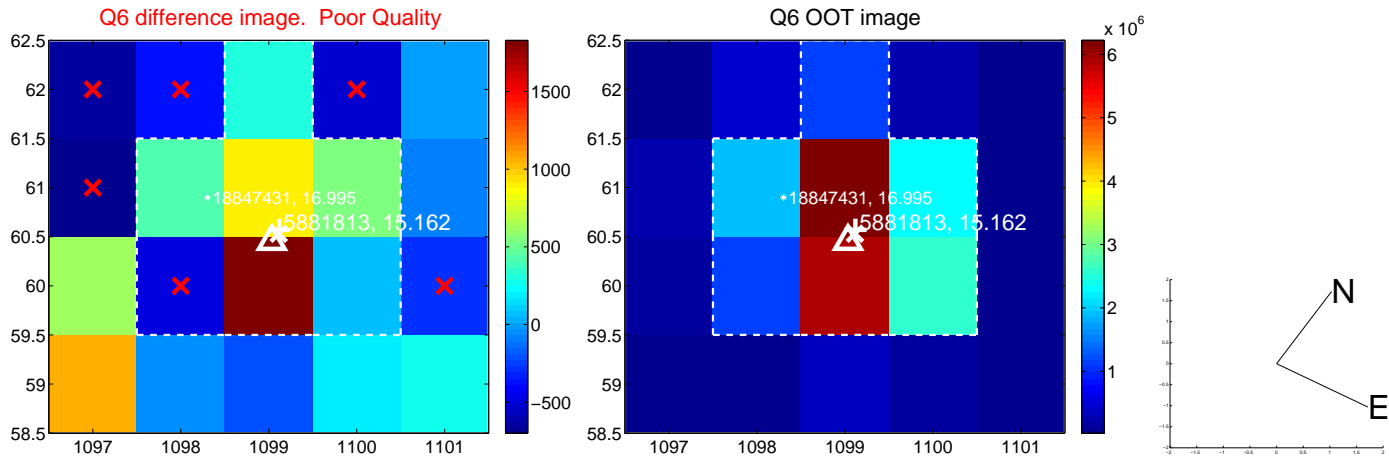
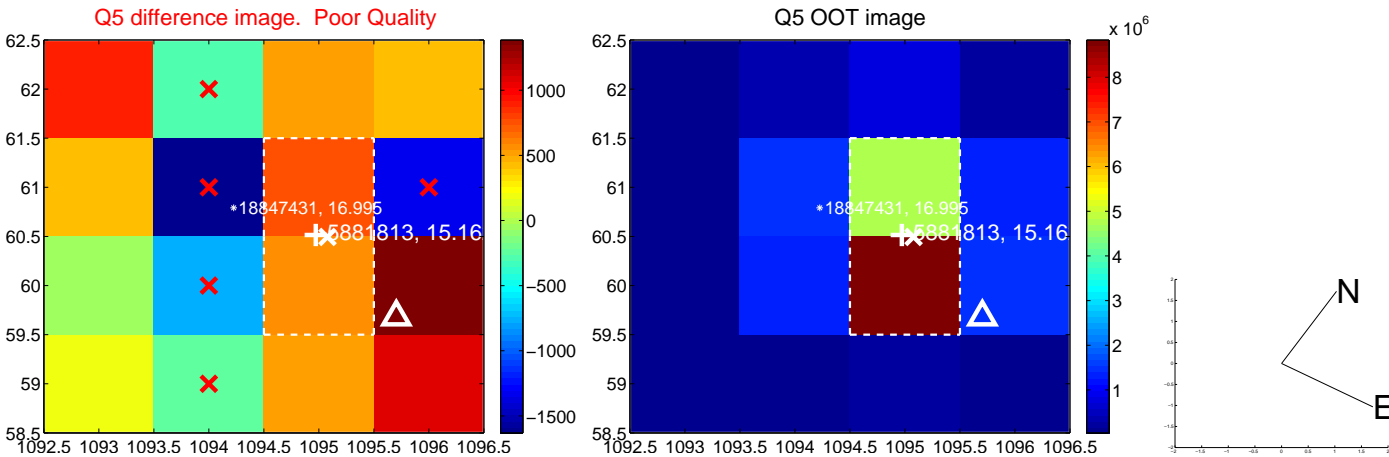


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

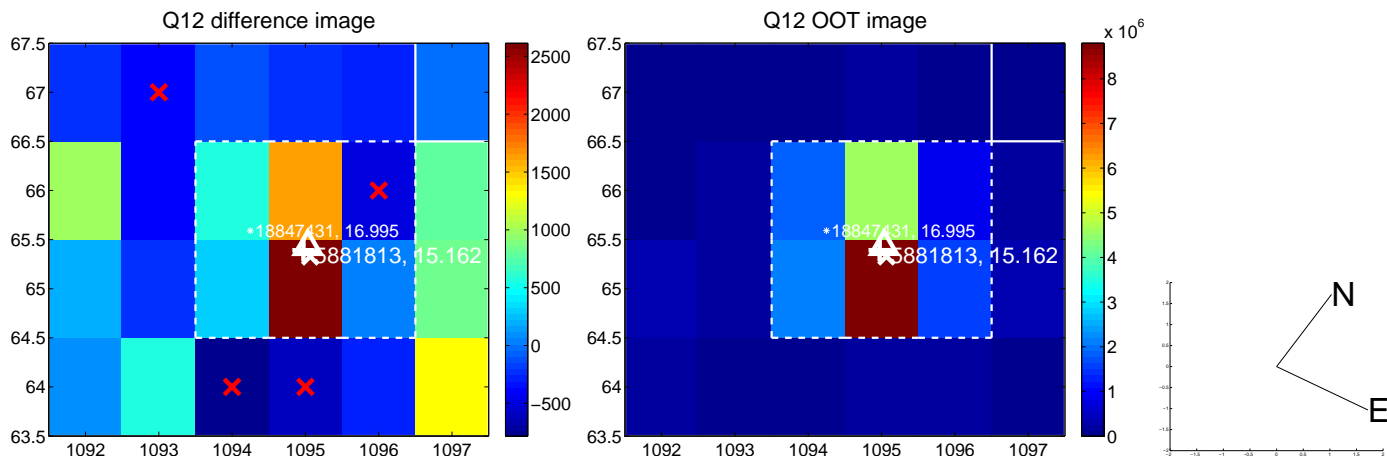
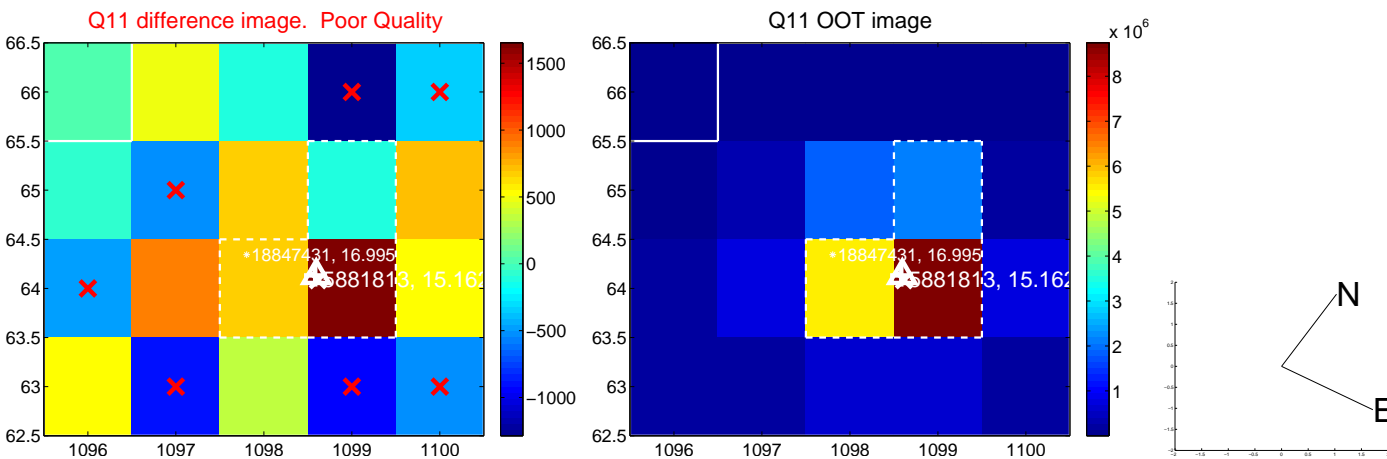
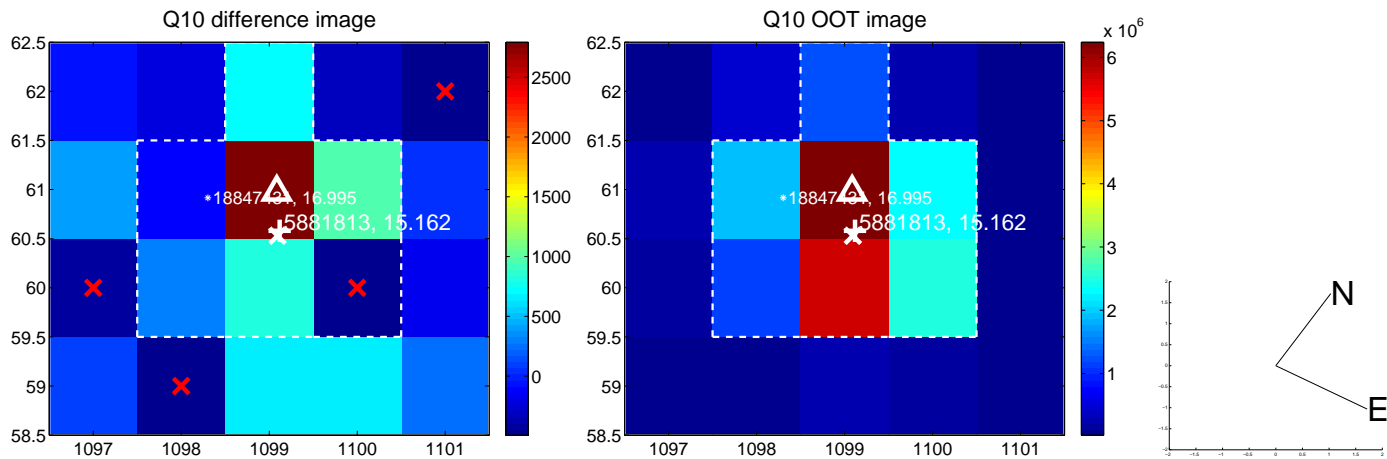
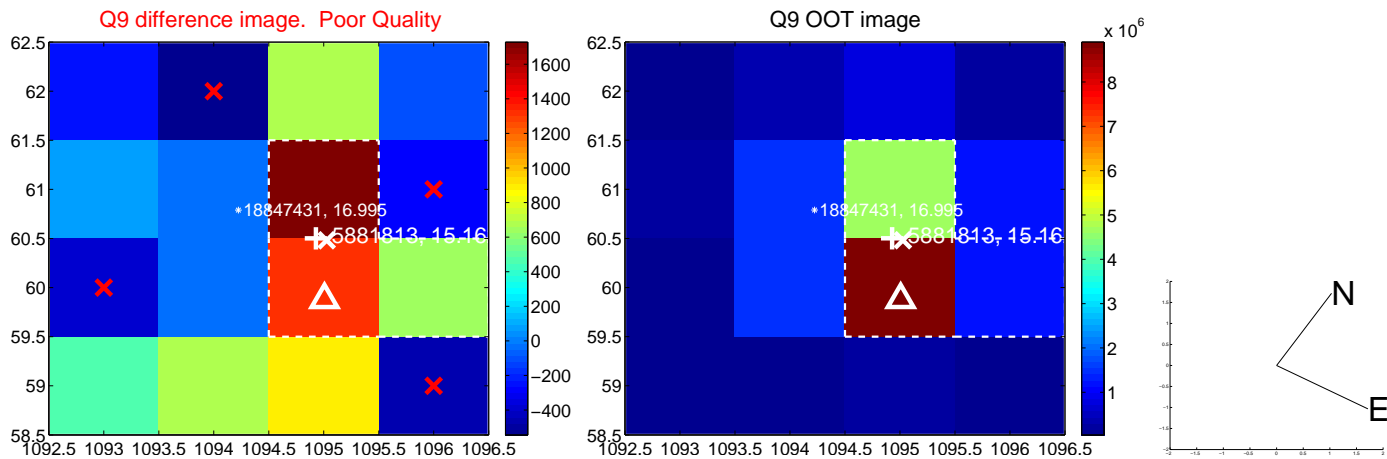
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



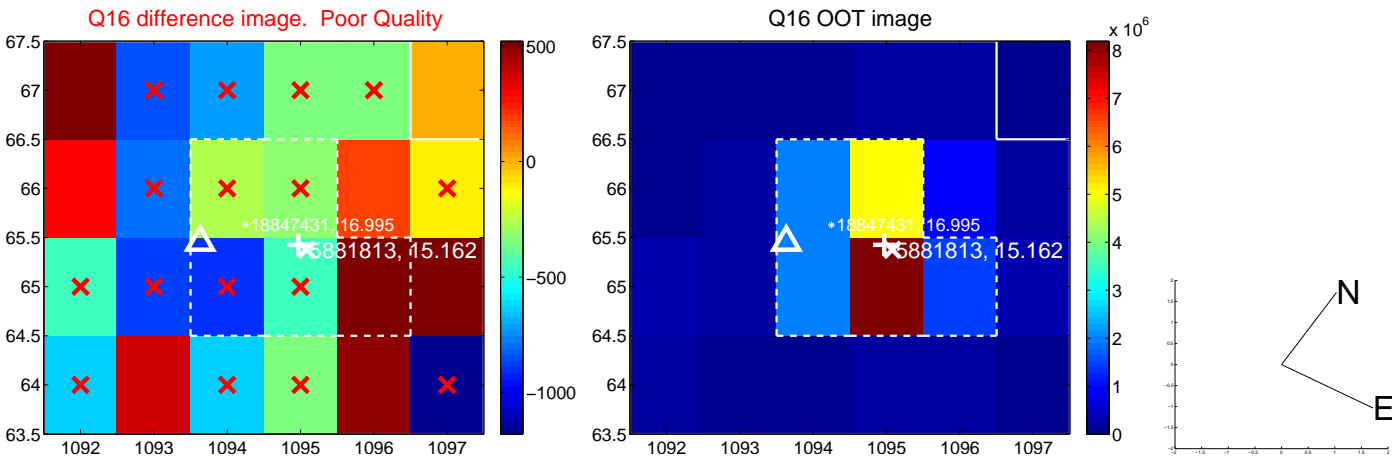
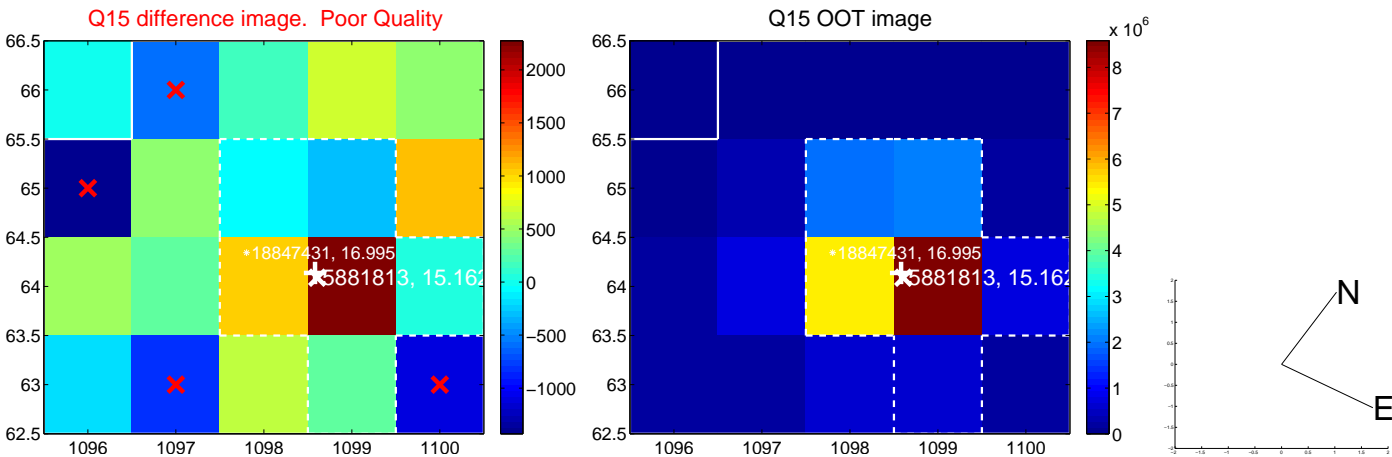
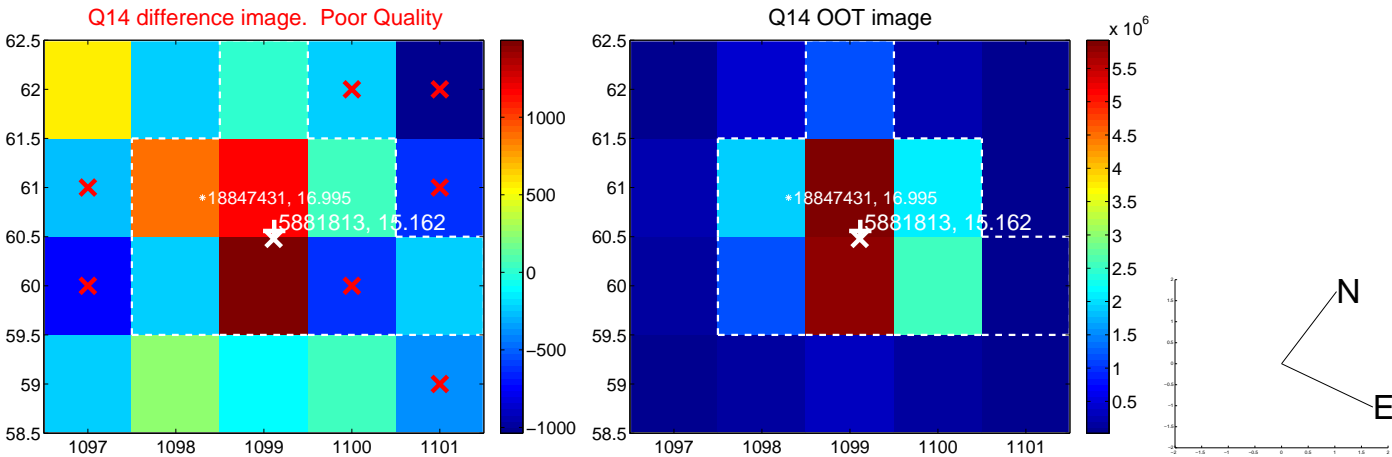
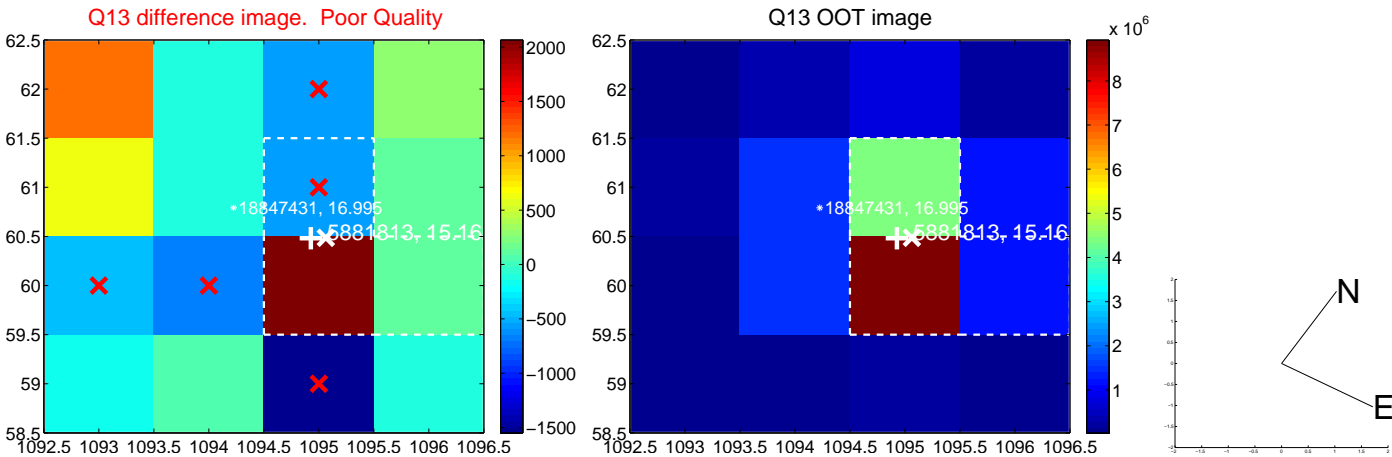
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



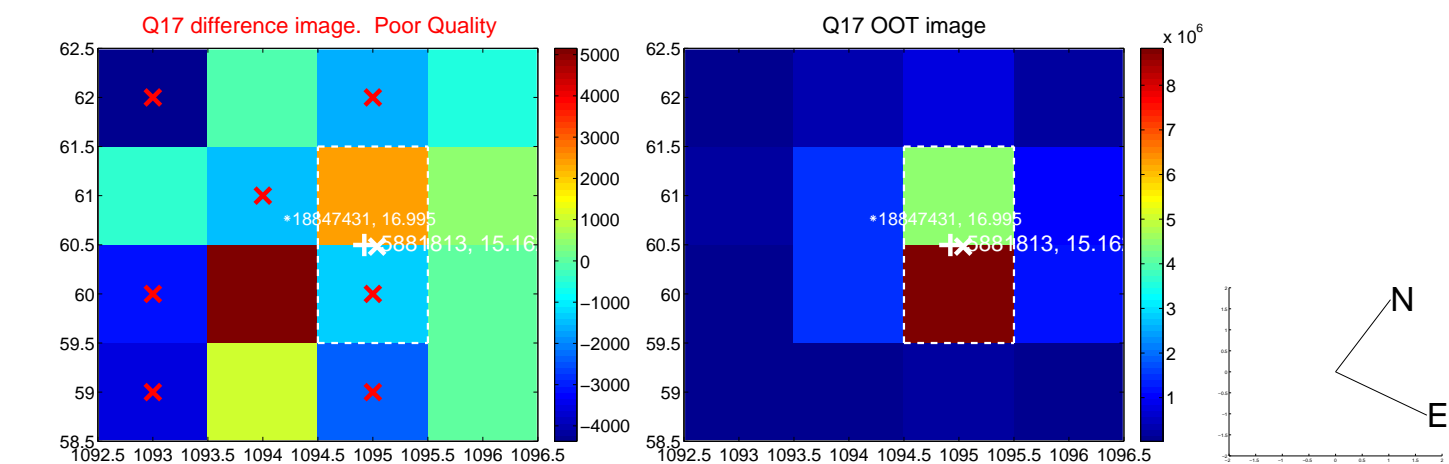
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



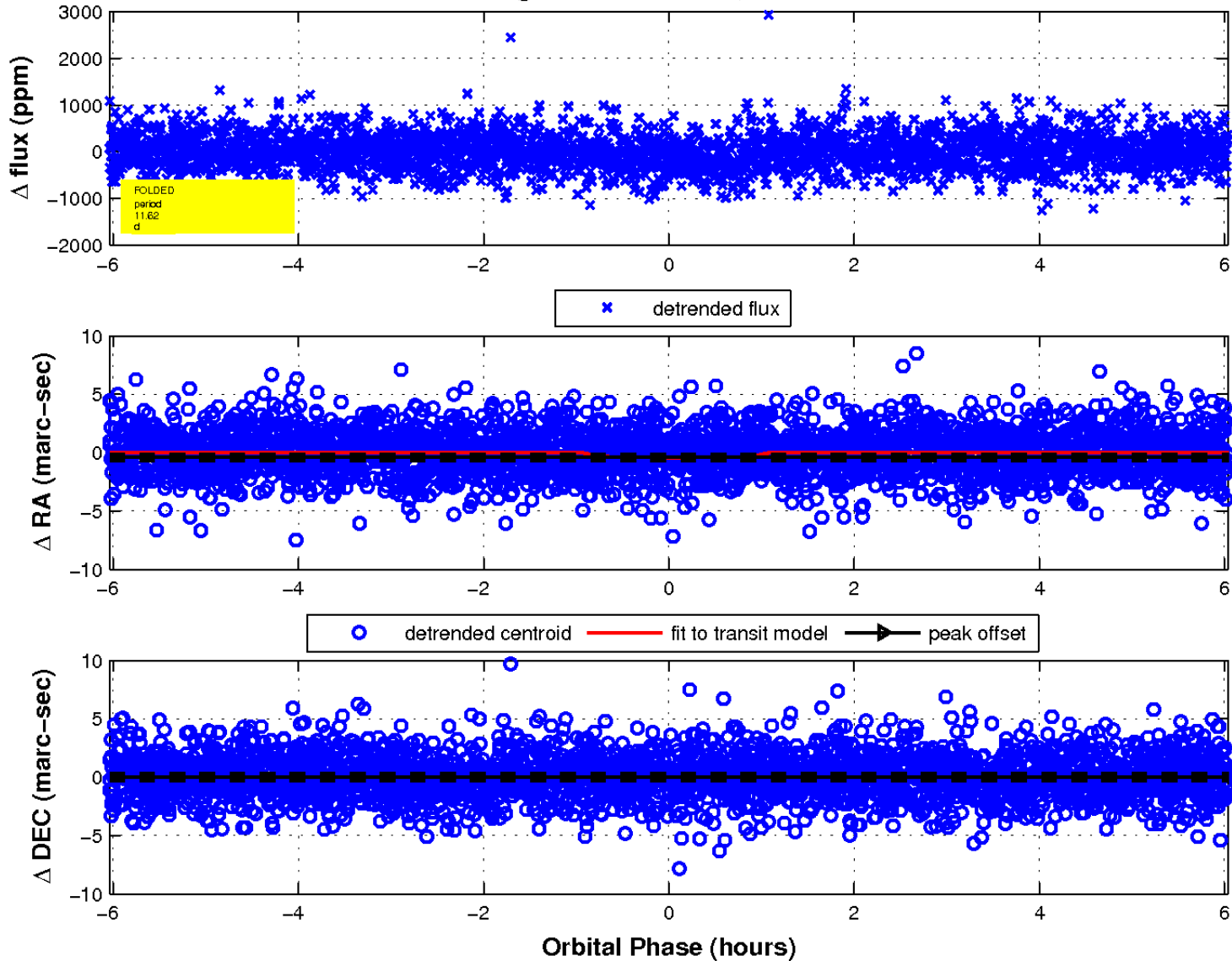
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

