

KIC 005953966

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 005953966-01 | OBS | No | 22.263845 | 131.531427 | 140.6 | 15.000 | 11.8 | -1.0 | 1.01 | 5960 | 1.20 | 55.74 |
| 005953966-02 | OBS | No | 22.267024 | 153.492936 | 301.1 | 89.654 | 10.9 | 16.8 | 1.01 | 5960 | 2.28 | 55.73 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 005953966-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—CENT_NOFITS |
| 005953966-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—MOD_NONUNIQ_DV—SAME_NTL_PERIOD |

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

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

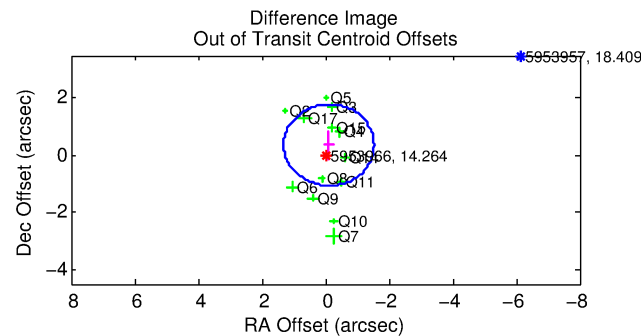
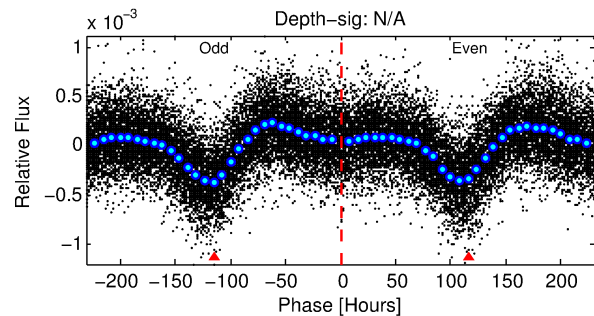
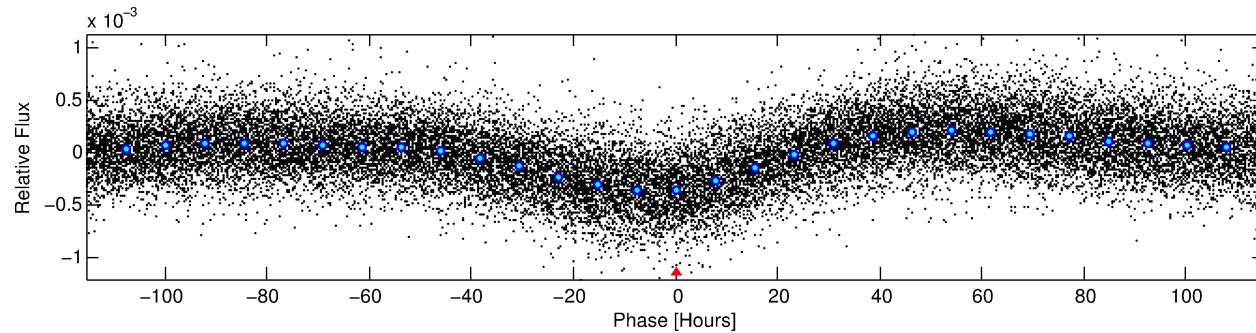
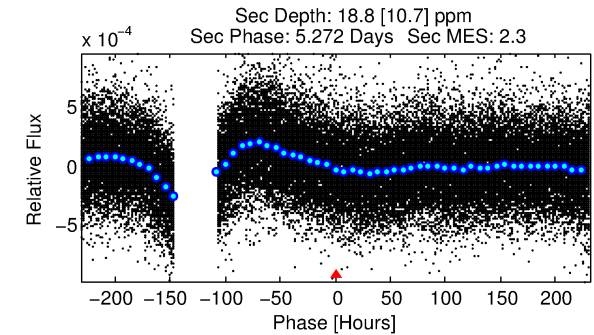
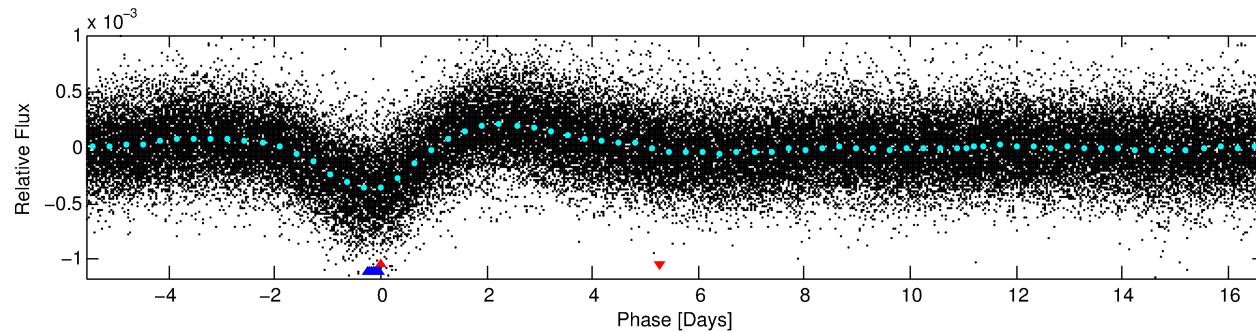
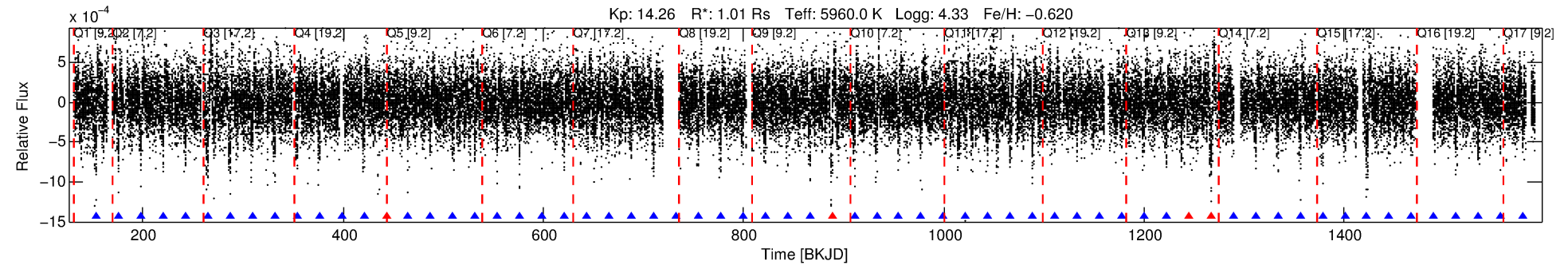
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005953966-01

No Significant Match Found

DV One-Page Summary

KIC: 5953966 Candidate: 1 of 2 Period: 22.264 d



TPS TCE Results:

Period = 22.26385 d
Epoch = 131.5314 BKJD

DV fit results are unavailable

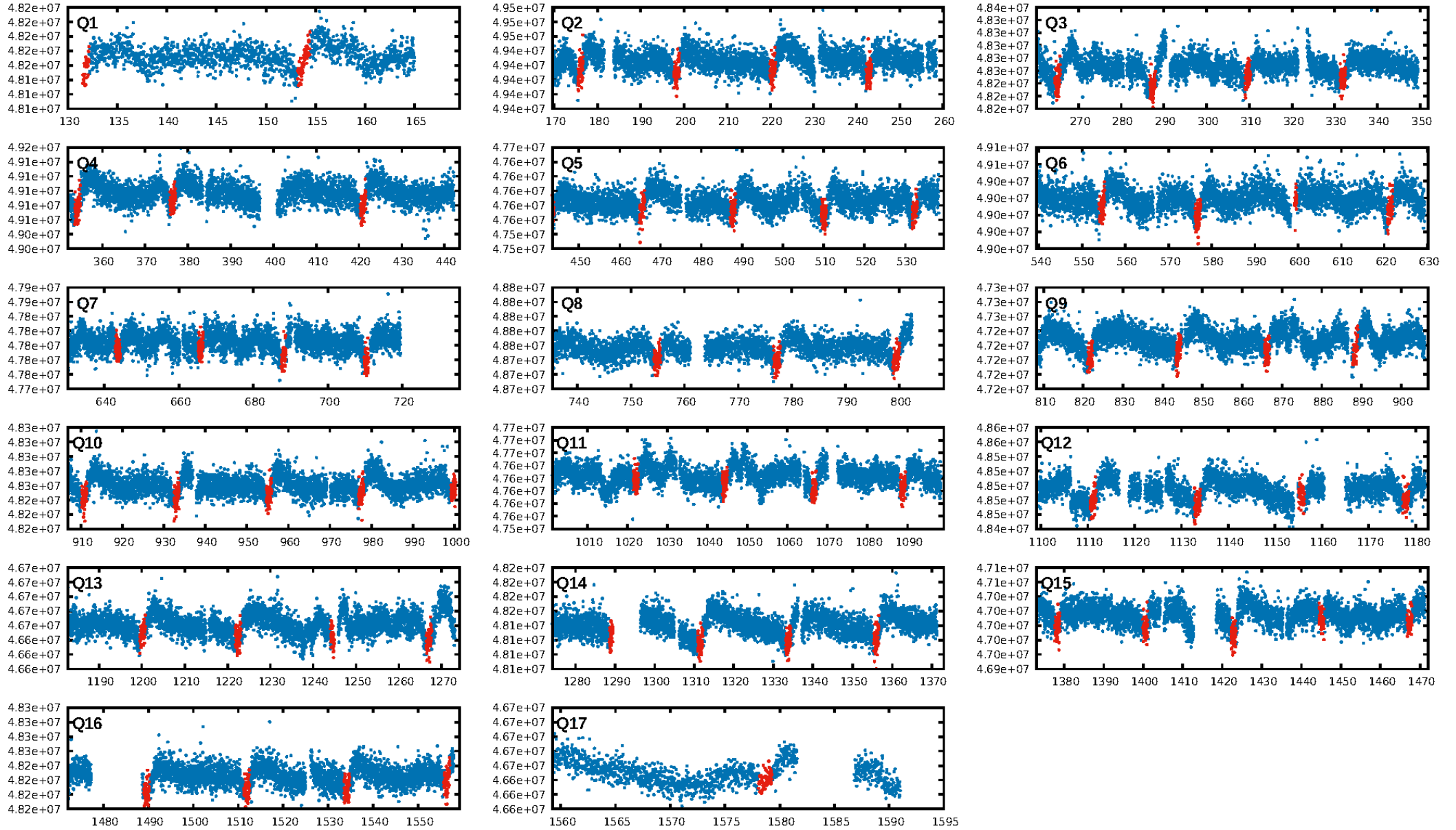
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.1% [0.006]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.63e-28
RollingBand-fgt: 0.93 [57/61]
GhostDiagnostic-chr: 1.673
Centroid-sig: 0.0%
Centroid-so: 3.700 arcsec [1.85σ]
OotOffset-rm: 0.384 arcsec [0.81σ]
KicOffset-rm: 0.293 arcsec [0.62σ]
OotOffset-st: 4/4/2/3 [13]
KicOffset-st: 4/4/2/3 [13]
DiffImageQuality-fgm: 0.92 [12/13]
DiffImageOverlap-fno: 0.00 [0/14]

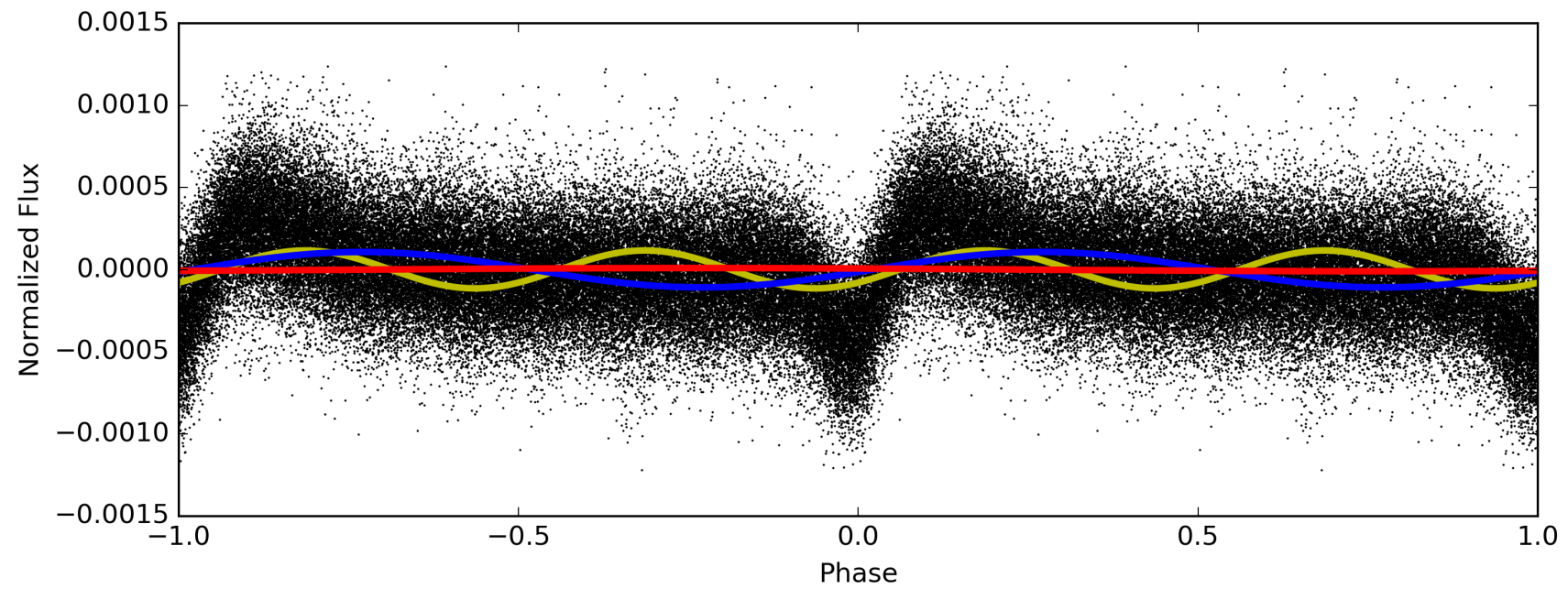
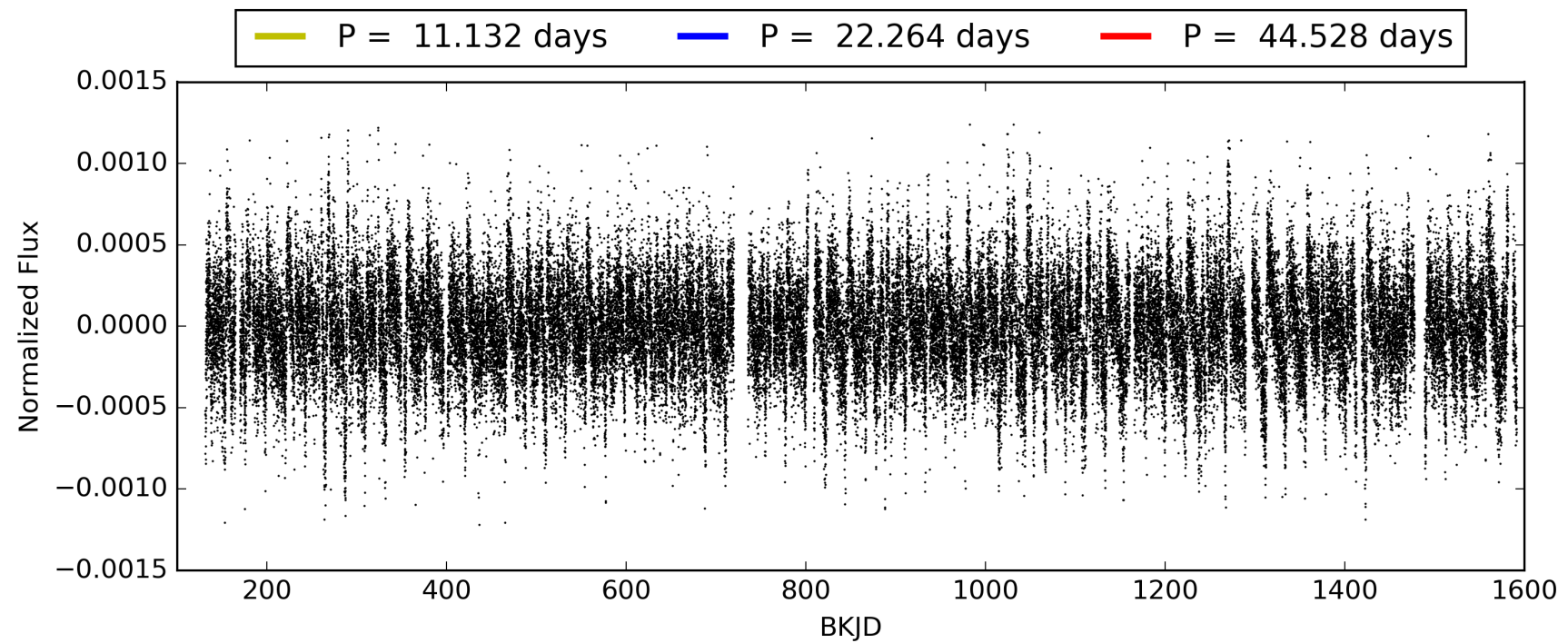
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 01:09:59 Z

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

TCE 005953966-01, PDC Light Curves

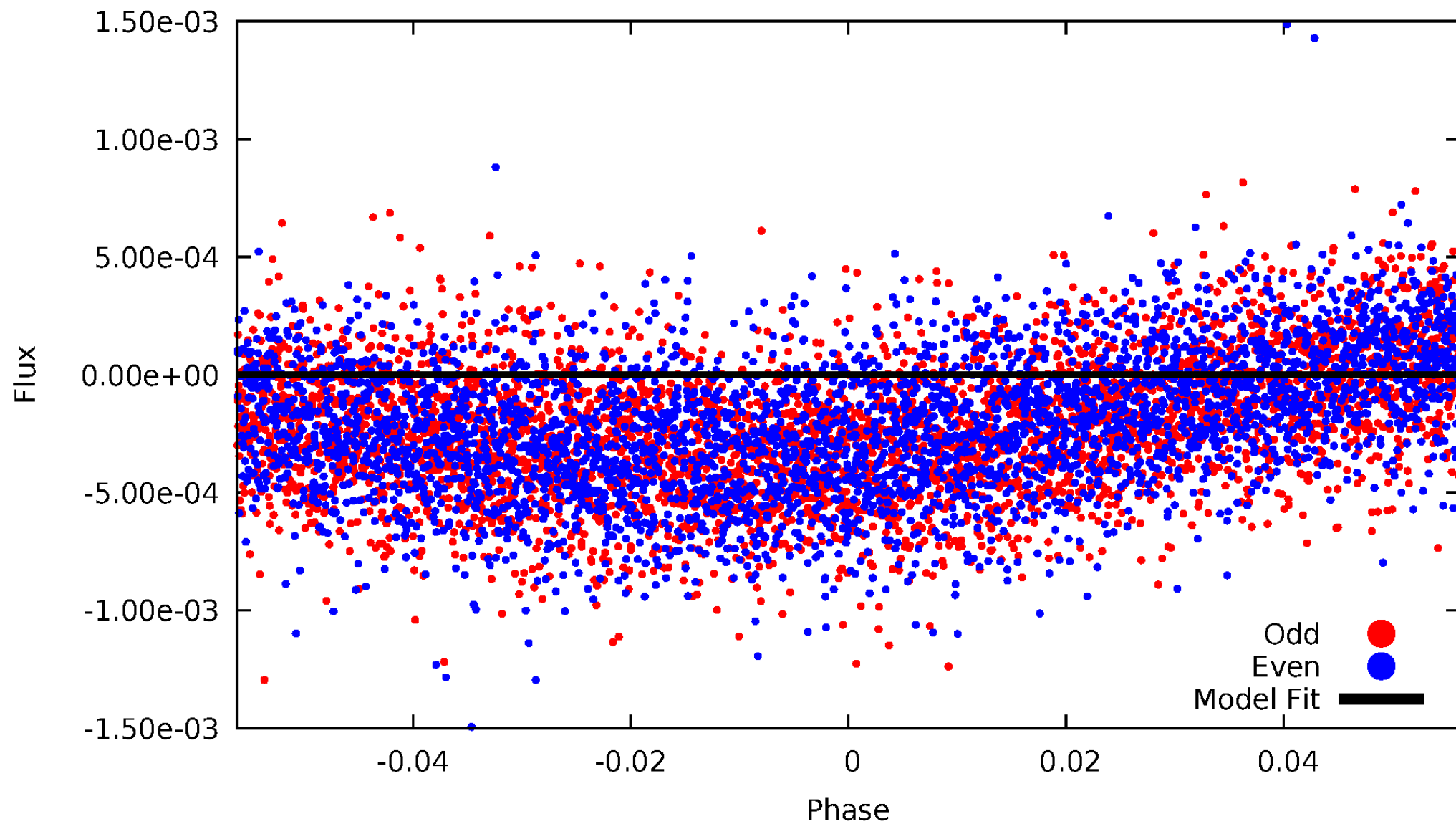


TCE 005953966-01



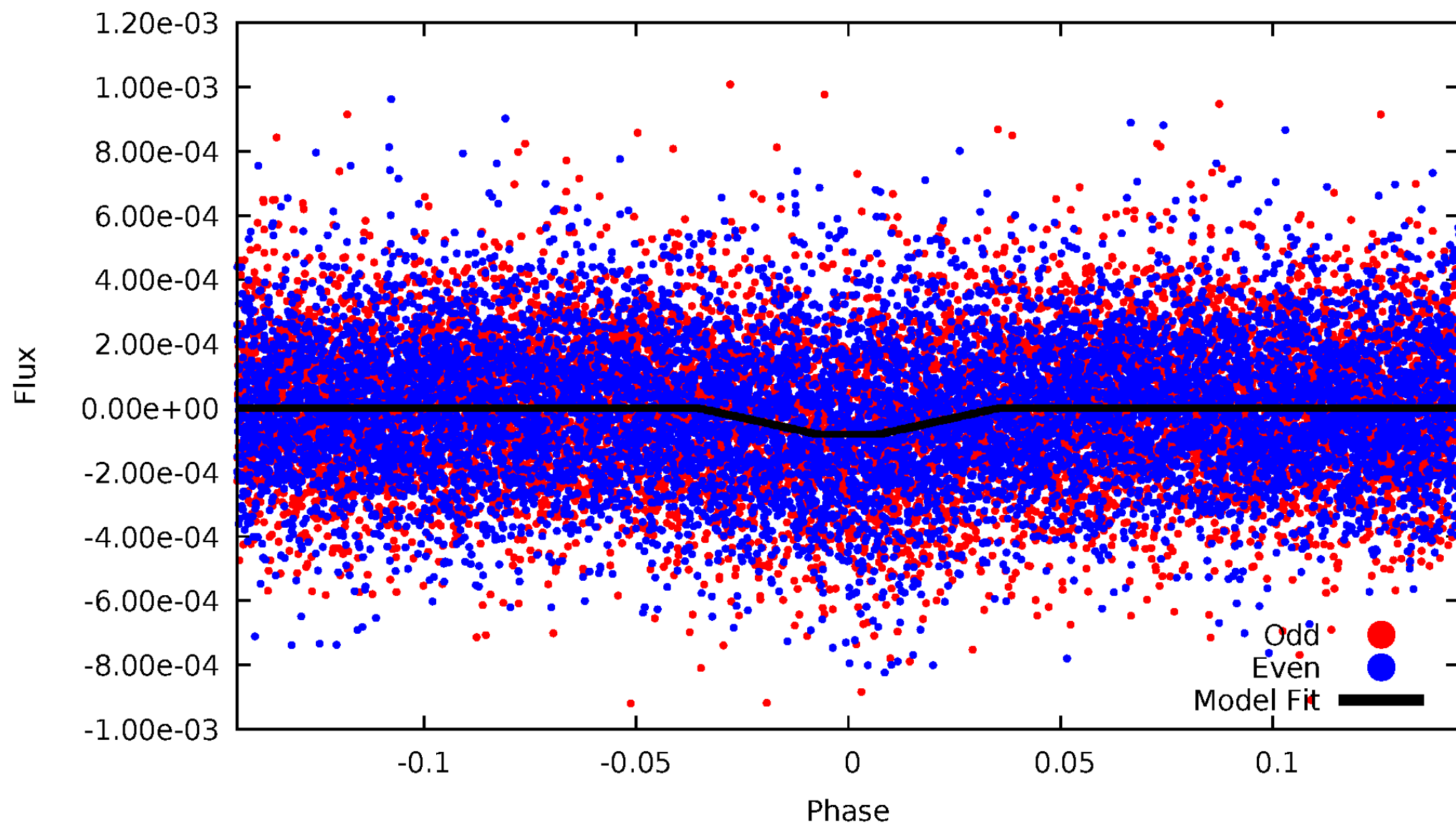
DV Odd/Even

TCE 005953966-01

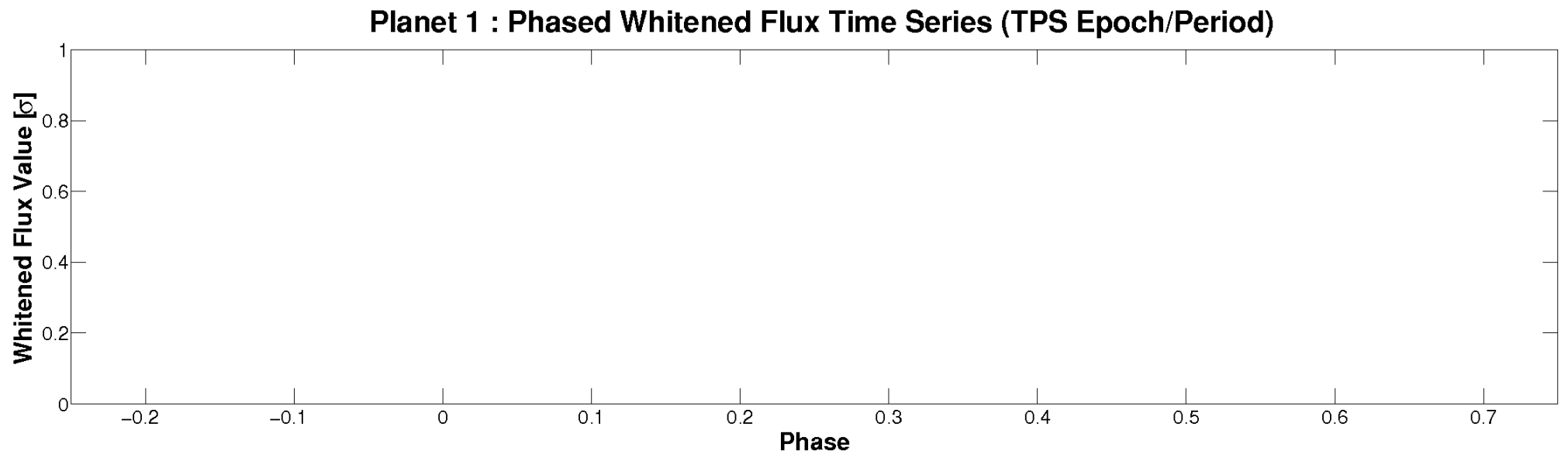
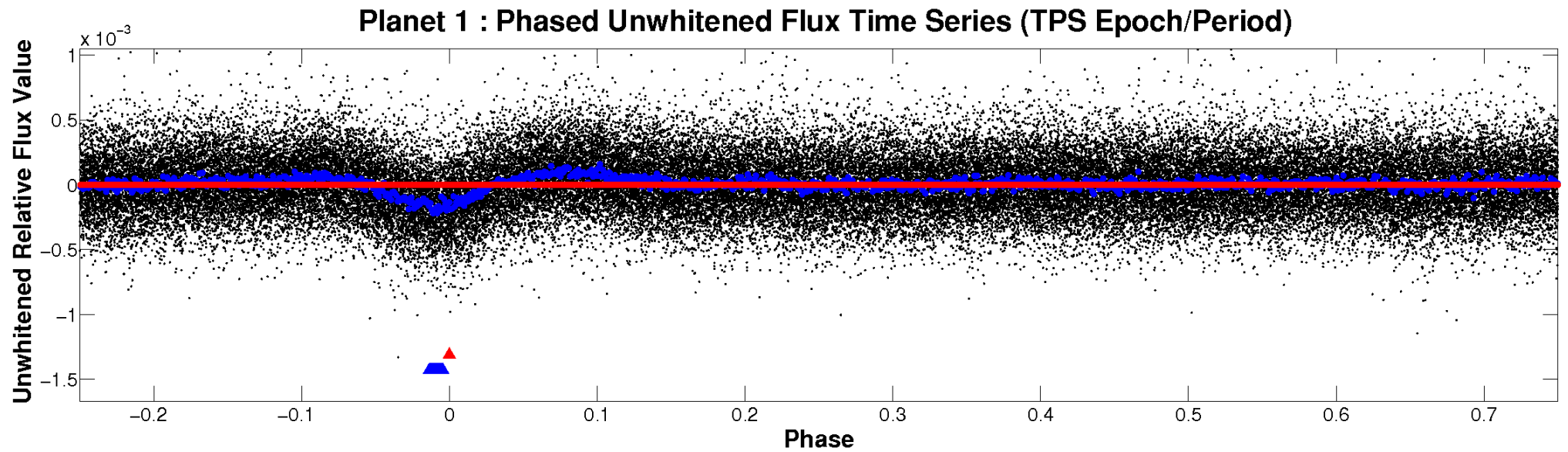


ALT Odd/Even

TCE 005953966-01

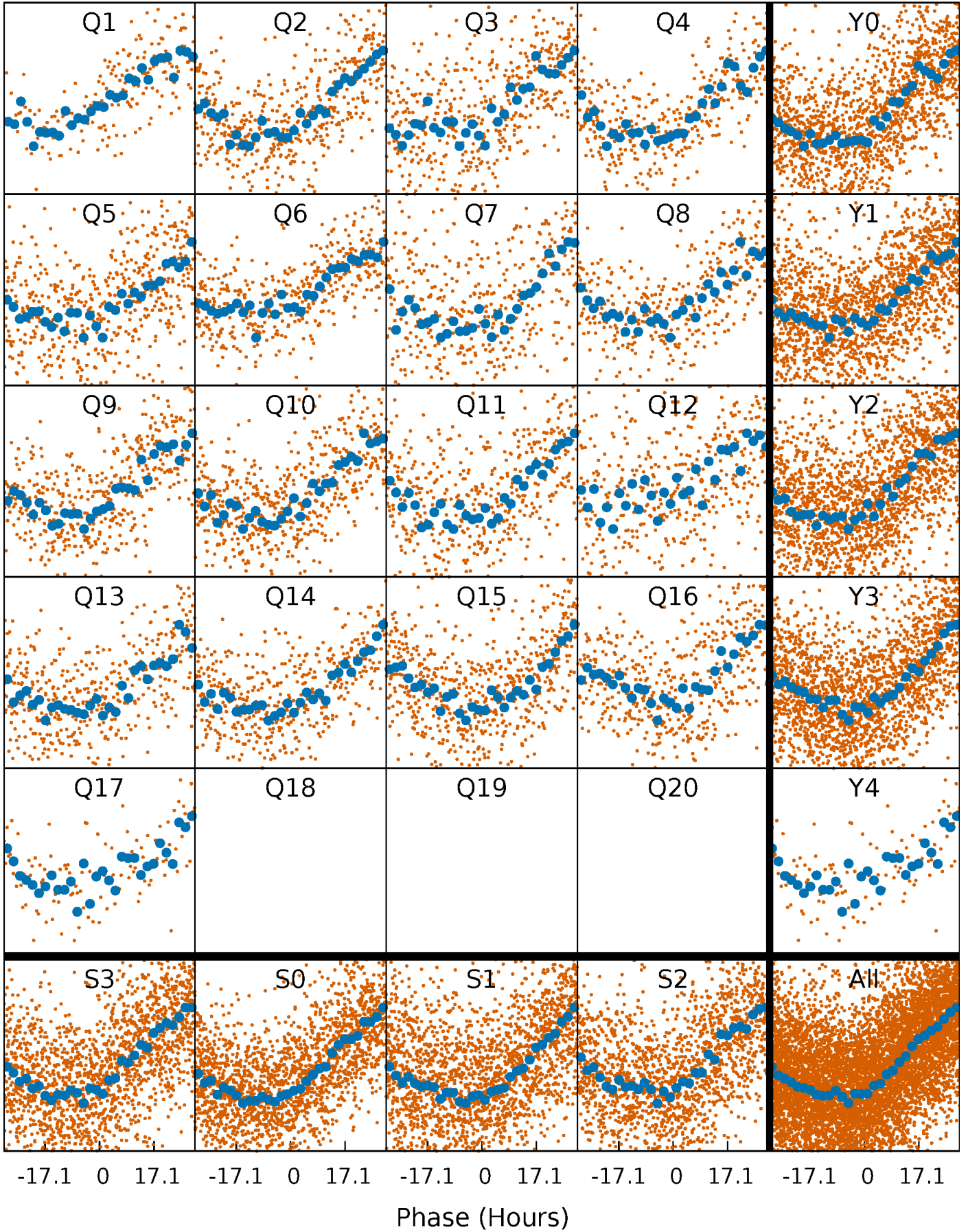


Non-Whitened Vs. Whitened Light Curve



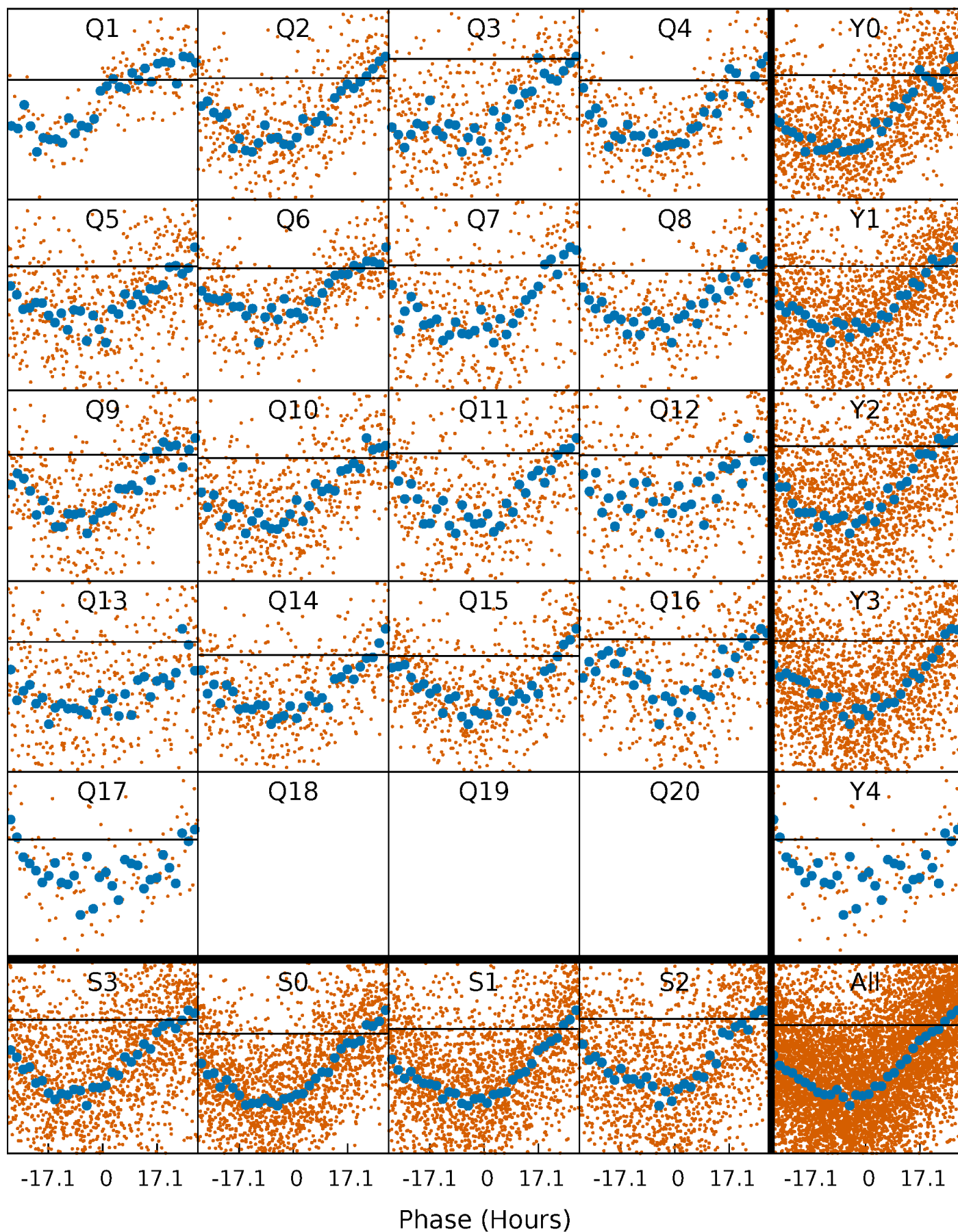
PDC Quarter-Phased Transit Curves

TCE 005953966-01 P= 22.263845 Days $T_0=131.531427$ (BKJD)



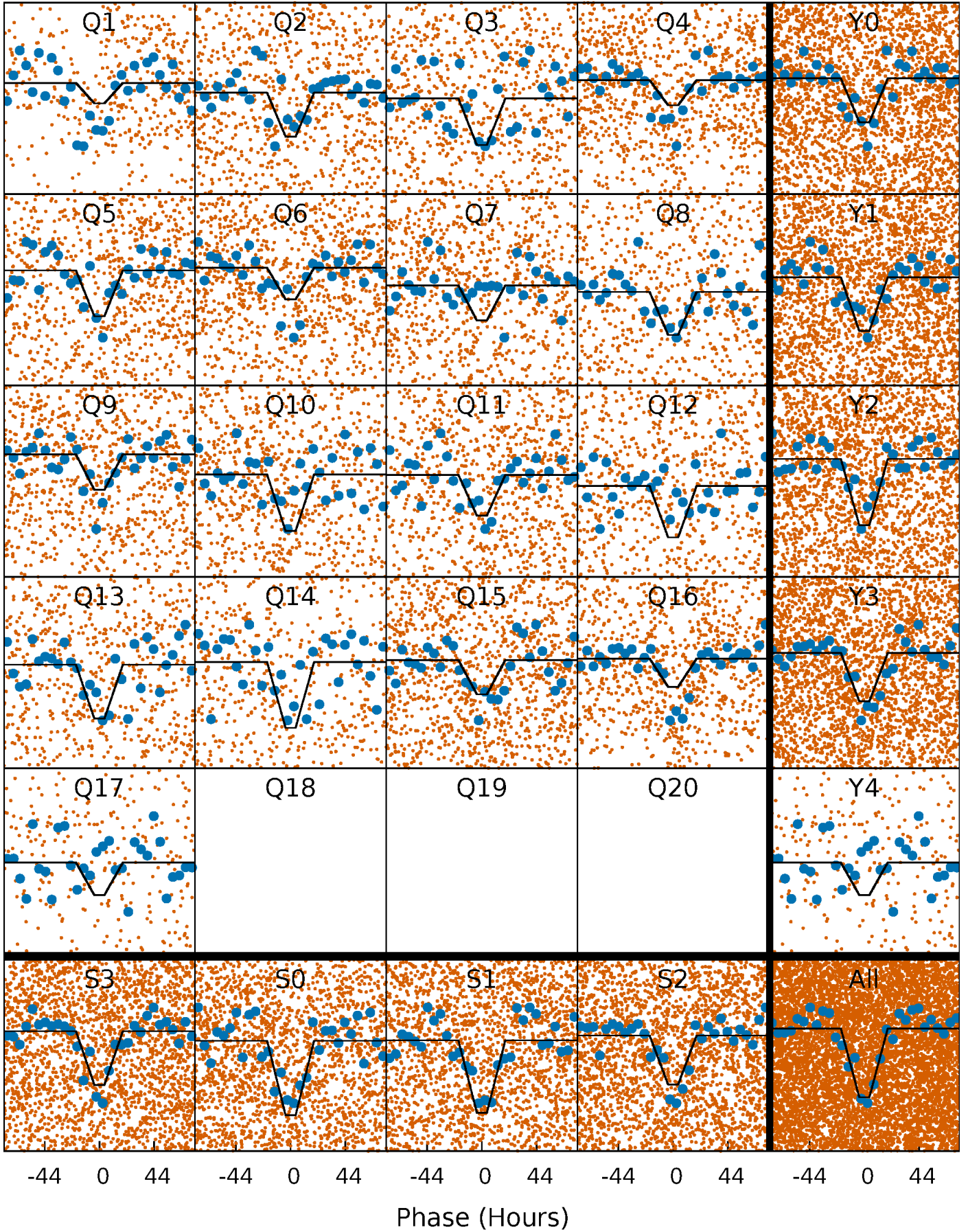
DV Quarter-Phased Transit Curves

TCE 005953966-01 P= 22.263845 Days $T_0=131.531427$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

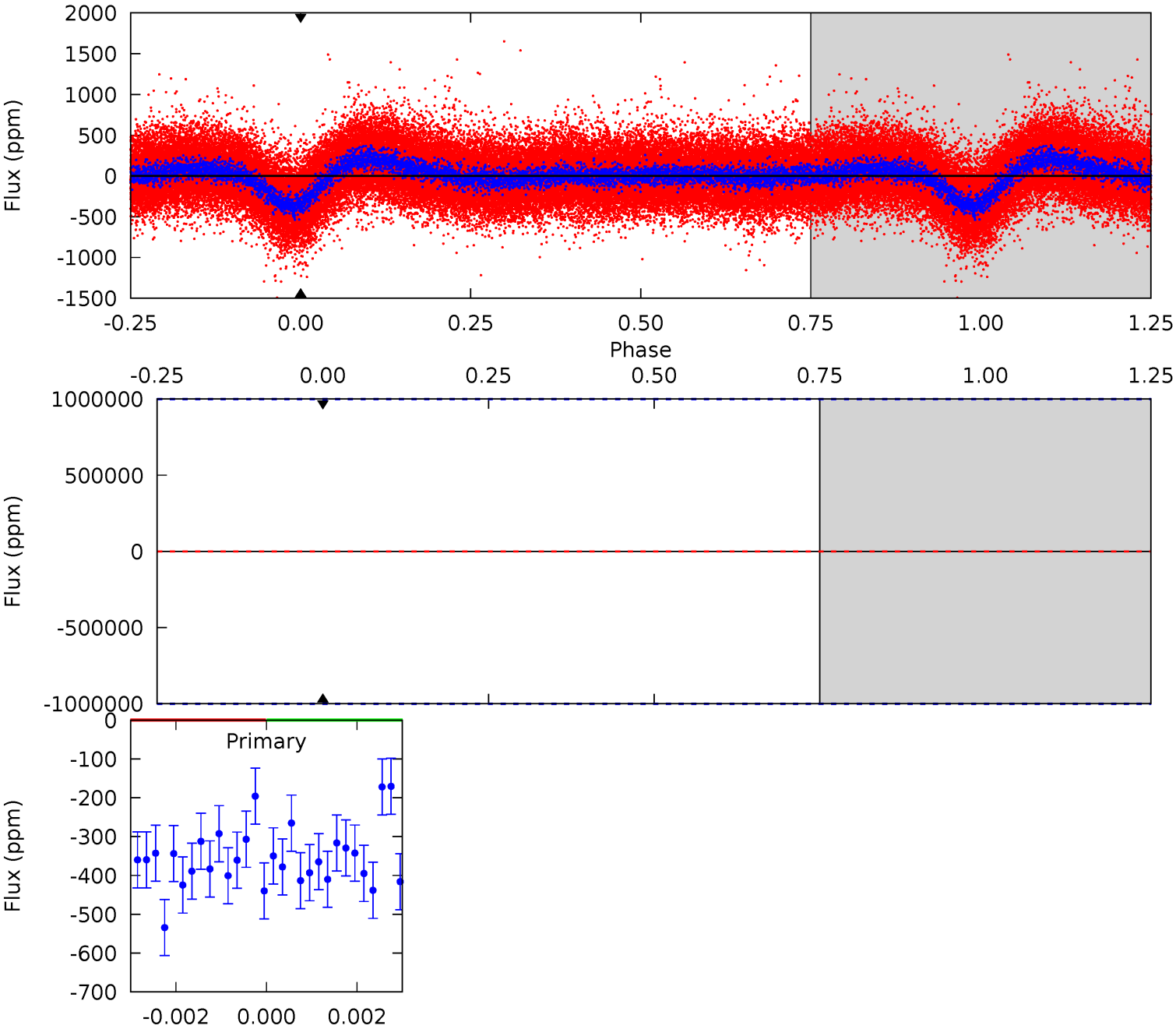
TCE 005953966-01 P= 22.263845 Days $T_0=153.742414$ (BKJD)



DV Model-Shift Uniqueness Test

005953966-01, P = 22.263845 Days, E = 109.267582 Days

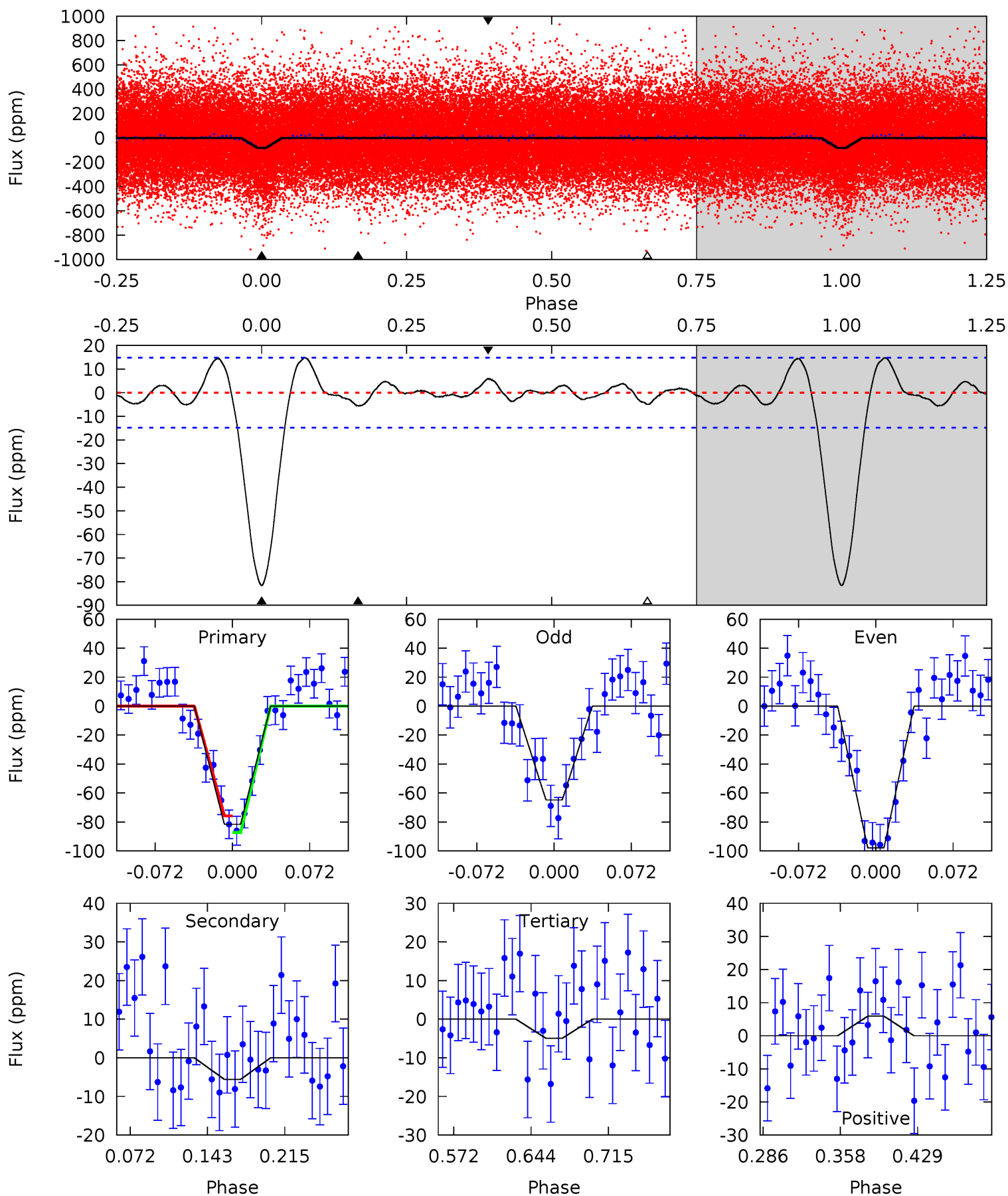
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|-----|-----|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|-----|-------|-----|
| 0 | 0 | 0 | 0 | 1.00 | 1.00 | 1.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |



Alt Model-Shift Uniqueness Test

005953966-01, P = 22.263845 Days, E = 131.478569 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 25.5 | 1.74 | 1.55 | 1.84 | 4.63 | 1.80 | 1.24 | 23.9 | 23.7 | 0.20 | -0.10 | 5.17 | 0.87 | 0.15 | 1.80 |



Stellar Parameters For KIC 005953966

| | $T_{\text{eff}} (K)$ | $\log(g)$ | $[\text{Fe}/\text{H}]$ | $R (R_{\odot})$ | $M (M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 5960^{+179}_{-161} | $4.334^{+0.195}_{-0.195}$ | $-0.620^{+0.300}_{-0.300}$ | $1.013^{+0.271}_{-0.222}$ | $0.808^{+0.105}_{-0.056}$ | $1.094^{+1.092}_{-0.554}$ |
| | +3%/-3% | +4%/-4% | +48%/-48% | +27%/-22% | +13%/-7% | +100%/-51% |
| 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 005953966-01 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{max} (K)$ | $T_{obs} (K)$ | A_{obs} |
|---------|-----------------|------------------------|-------------------|--------------------------|----------------------------|
| DV | 0 ± 1000000 | $8.33^{+8.08}_{-5.86}$ | 975^{+79}_{-65} | 4044^{+20799}_{-24583} | 141^{+30510}_{-24274} |
| Alt. | -6 ± 3 | $7.83^{+8.18}_{-5.58}$ | 978^{+78}_{-66} | 1962^{+754}_{-3658} | $0.859^{+10.440}_{-0.686}$ |

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 $A_{obs} \gg 1.0$

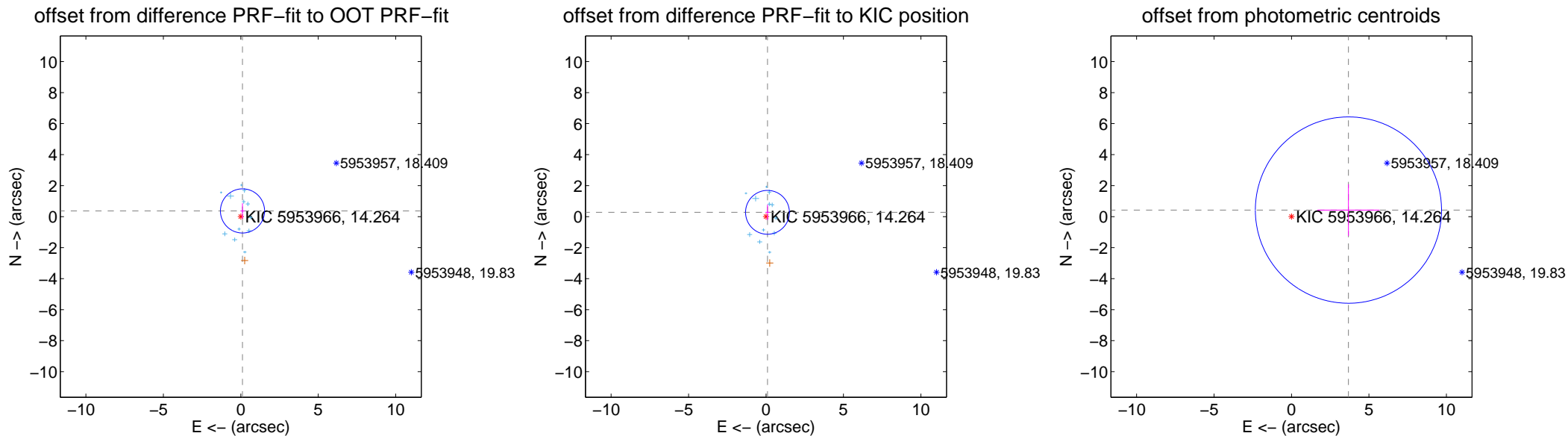
DV Centroid Data

Supplemental centroid analysis for 005953966-01. Kepler magnitude: 14.26. Transit SNR -1.00

There are 12 quarters with good PRF difference image offsets

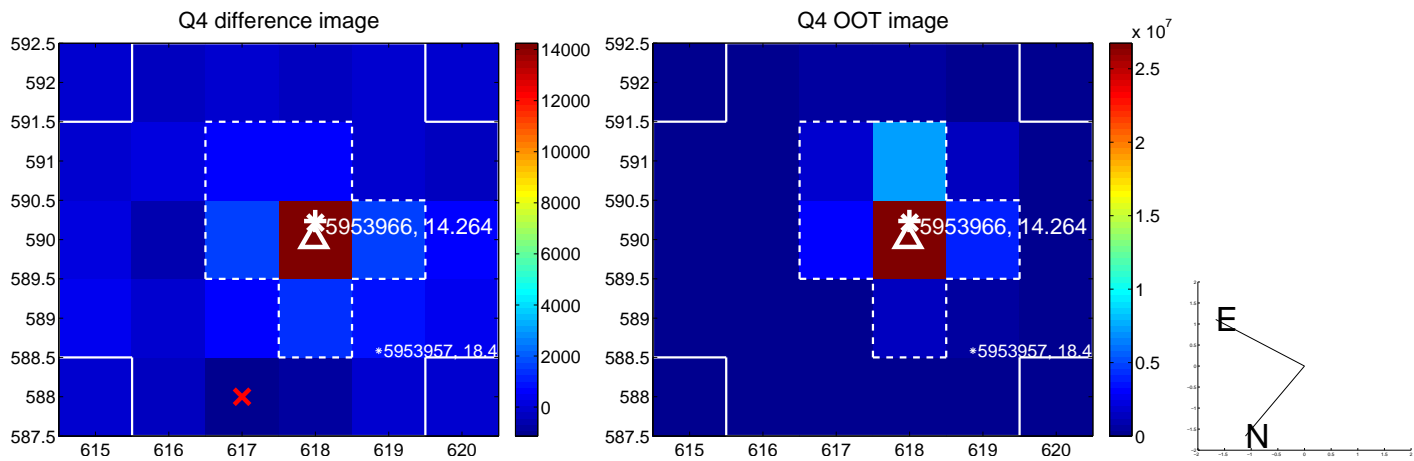
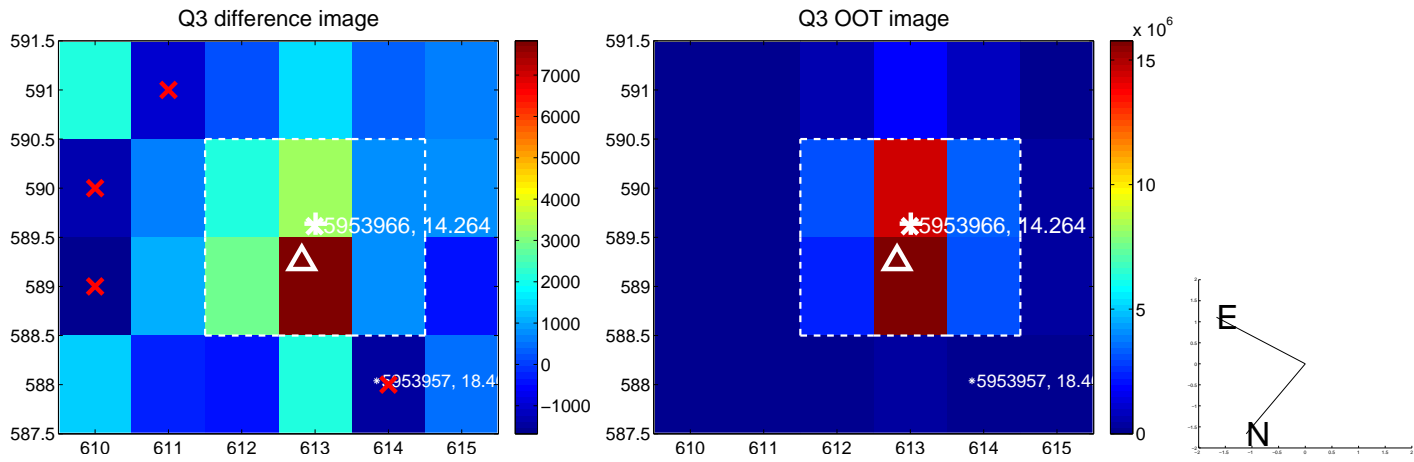
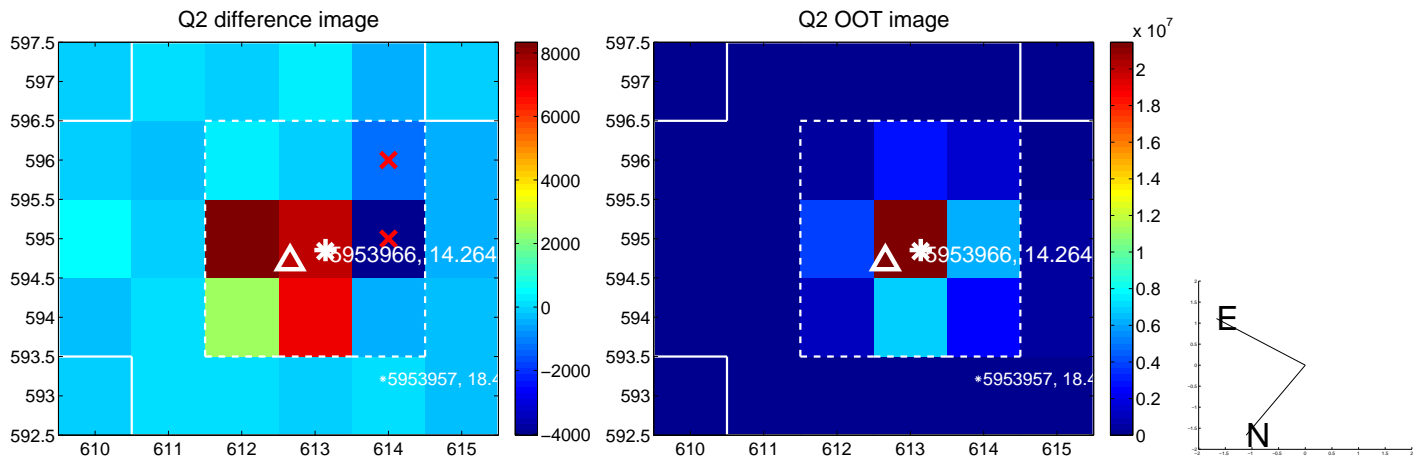
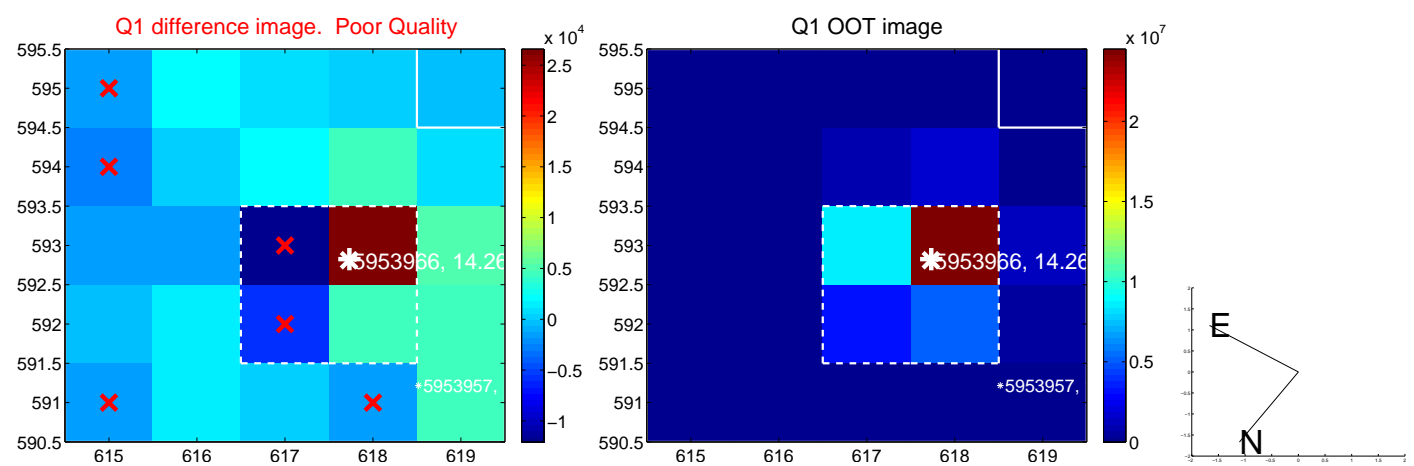
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT | 0.384 ± 0.475 | 0.81 | -0.109 ± 0.135 | 0.368 ± 0.493 |
| PRF-fit source offset from KIC position | 0.293 ± 0.471 | 0.62 | -0.094 ± 0.137 | 0.277 ± 0.496 |
| photometric centroid source offset | 3.70 ± 2.00 | 1.85 | -3.68 ± 2.01 | 0.42 ± 1.66 |

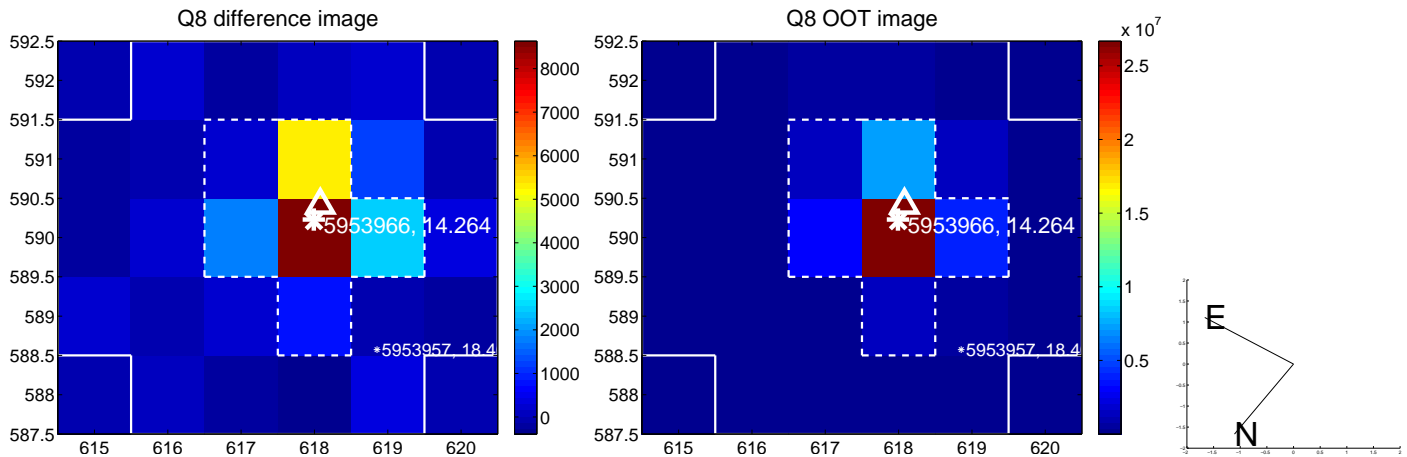
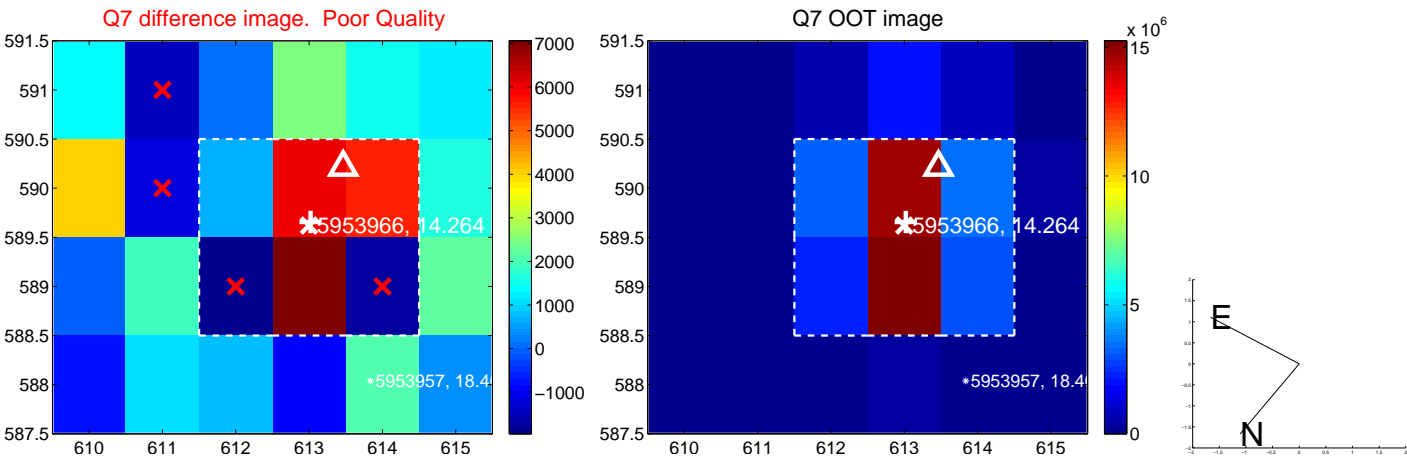
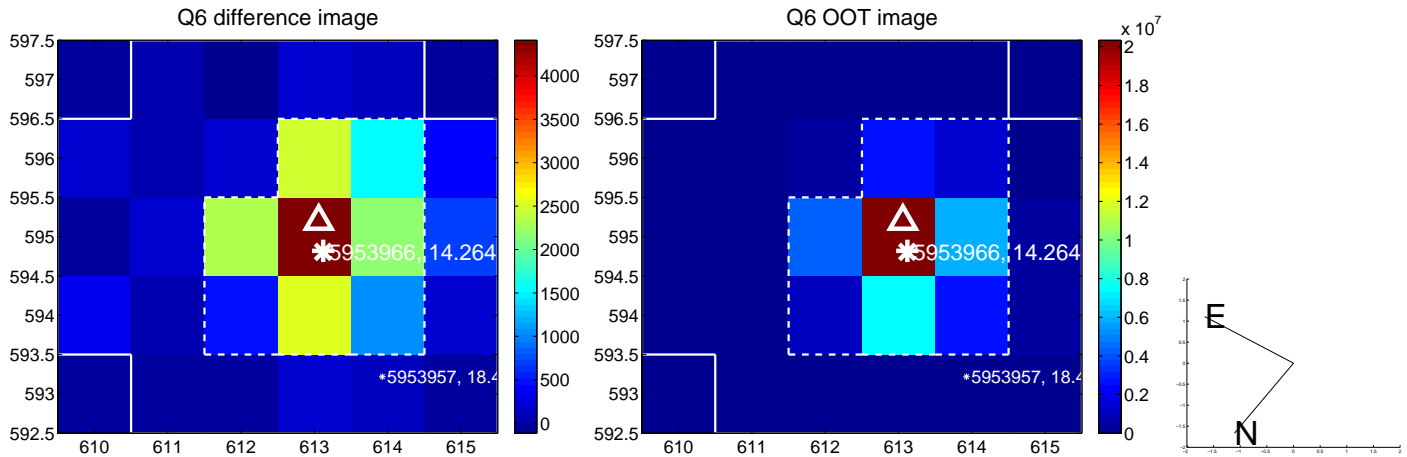
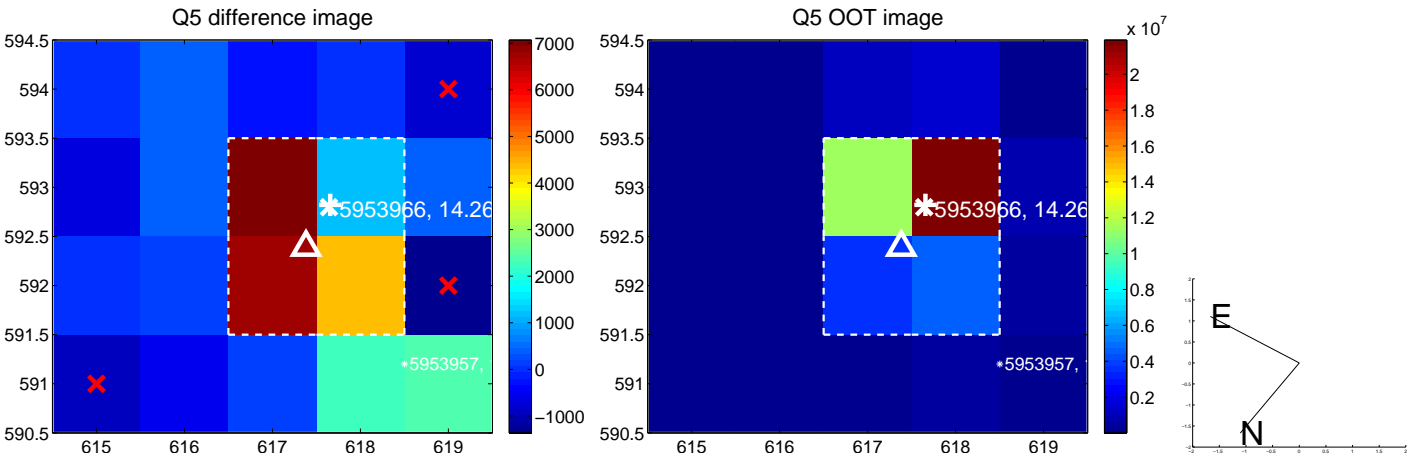


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

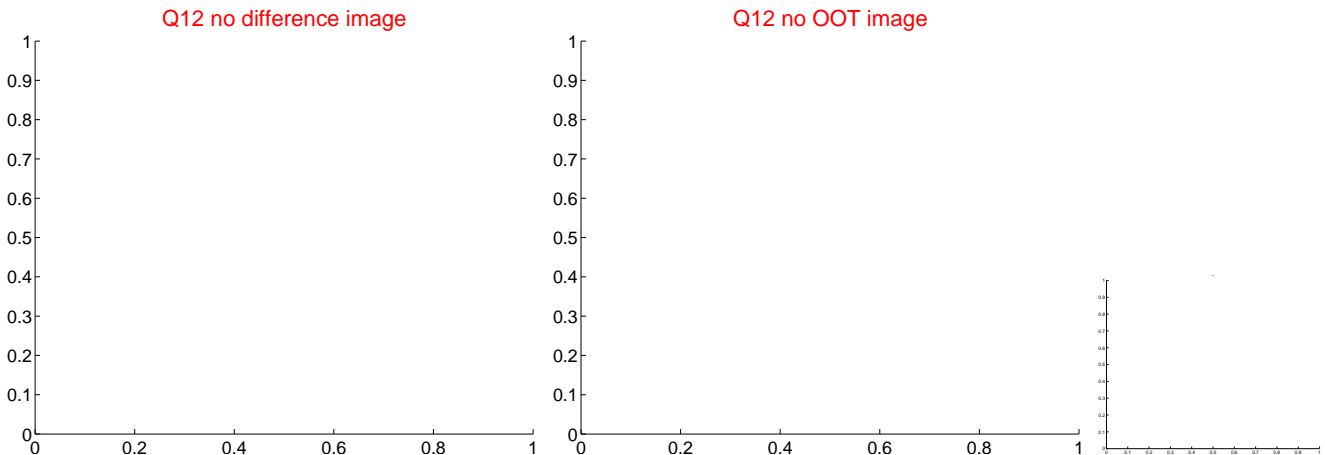
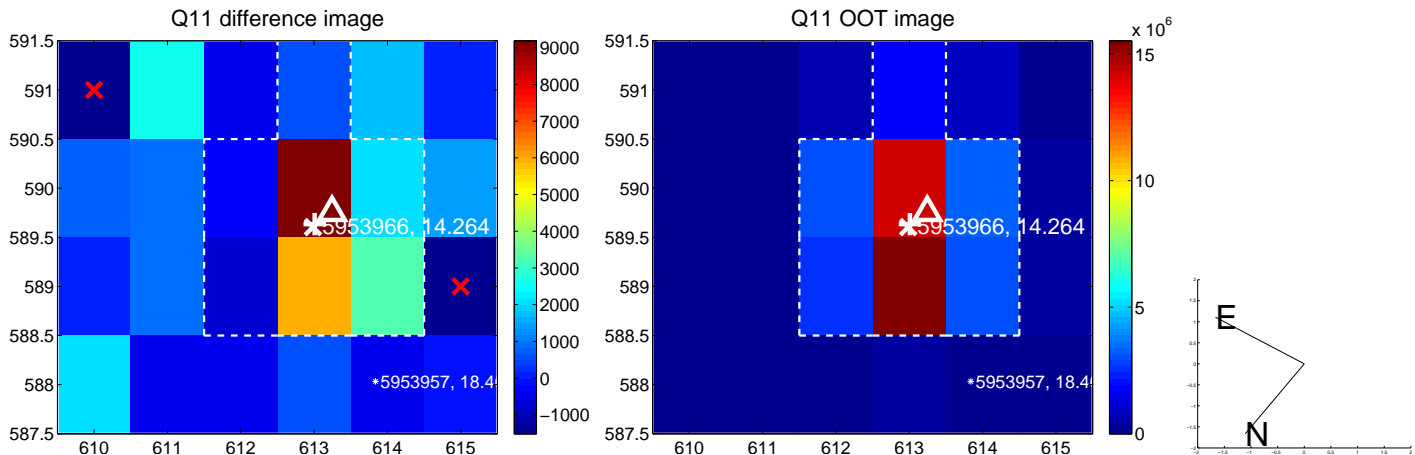
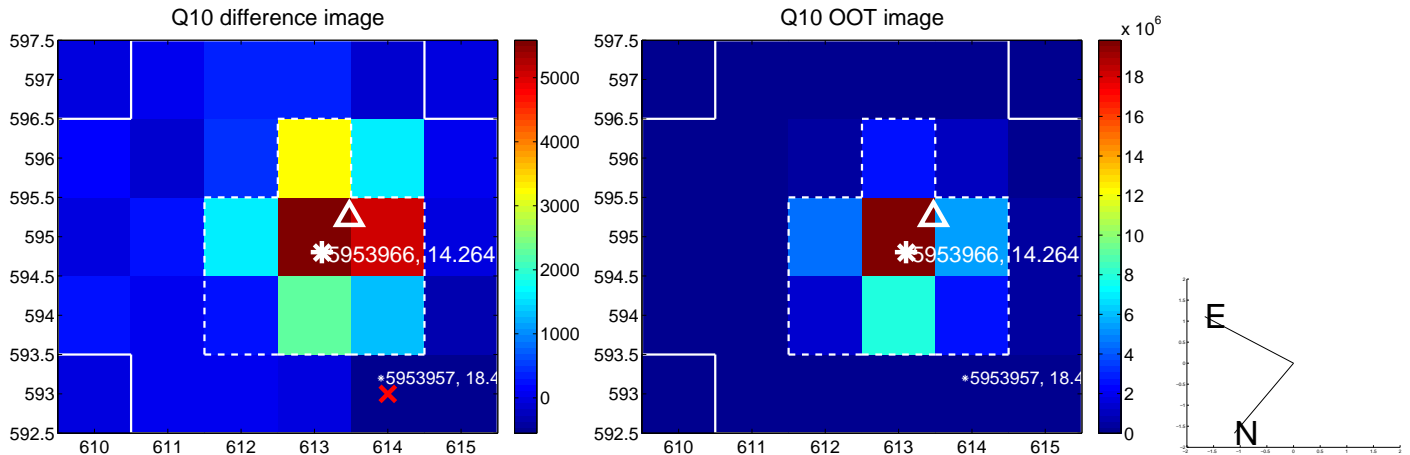
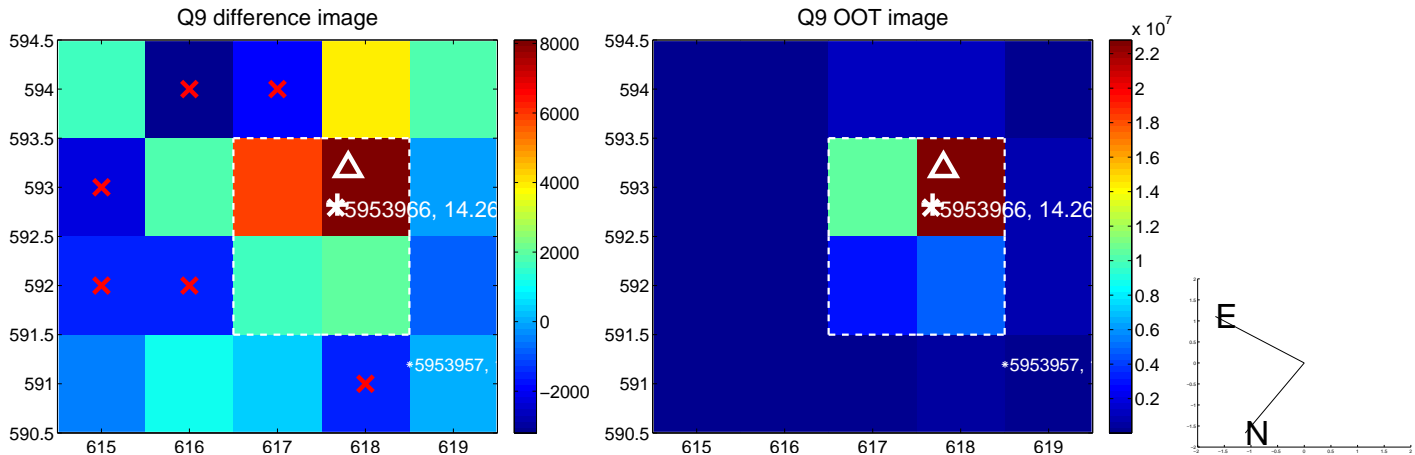
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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.

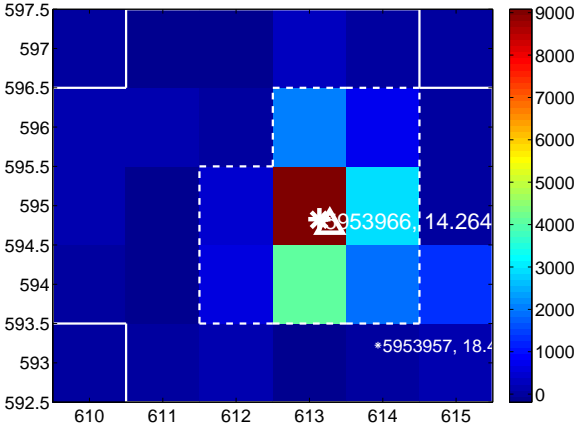
Q13 no difference image



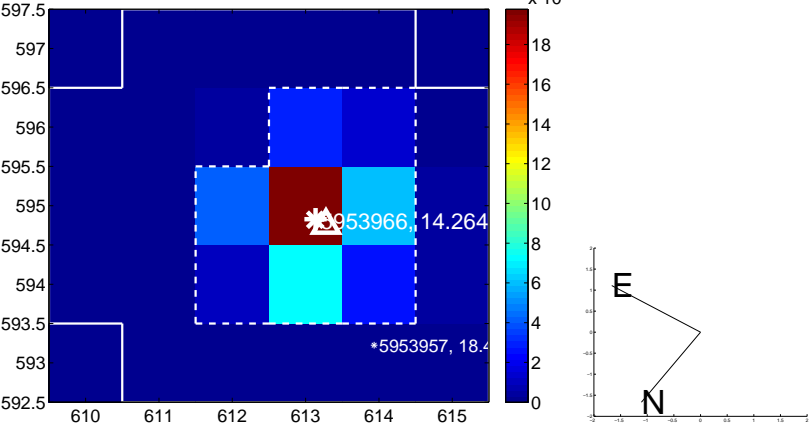
Q13 no OOT image



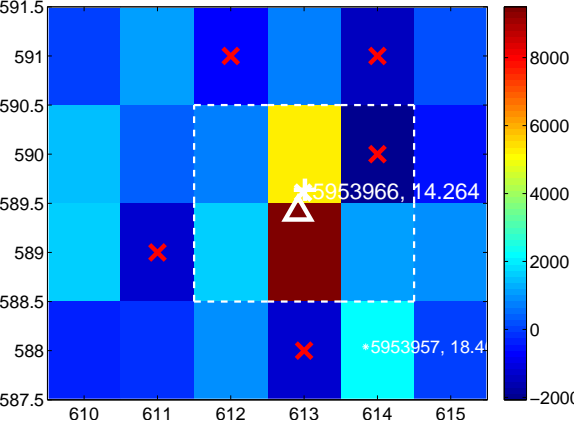
Q14 difference image



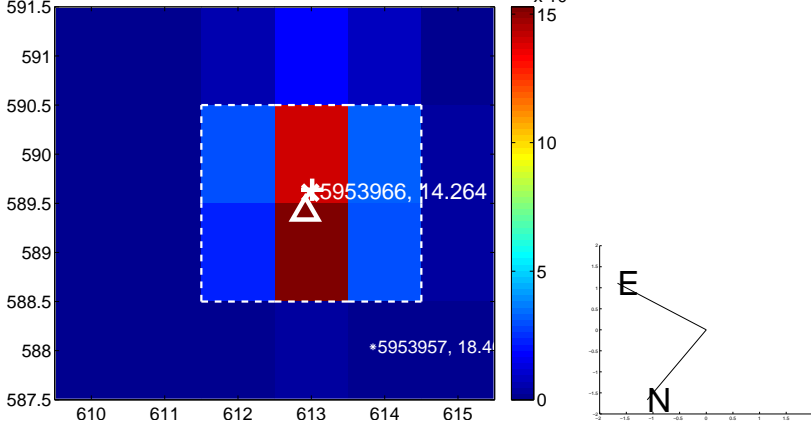
Q14 OOT image



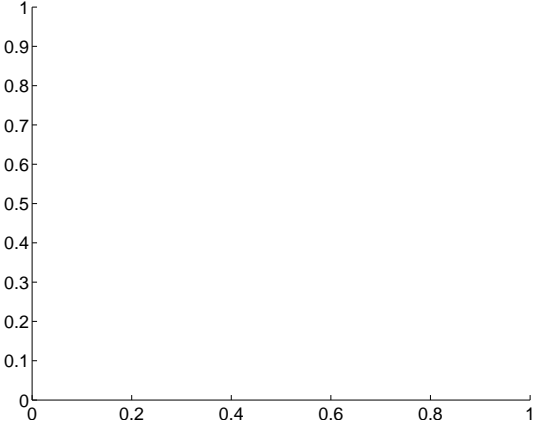
Q15 difference image



Q15 OOT image



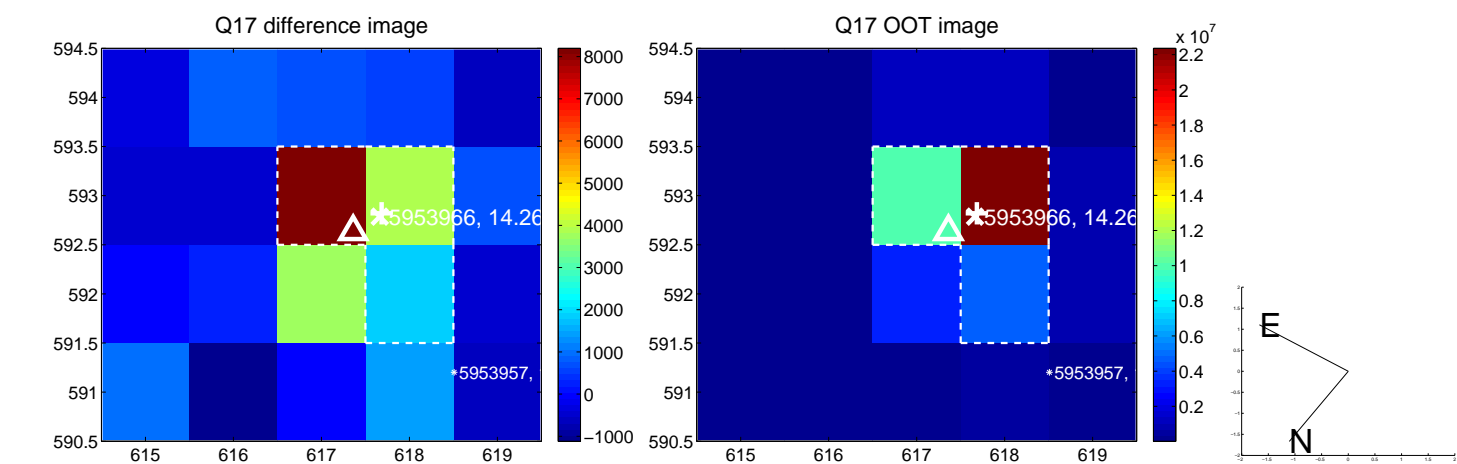
Q16 no difference image



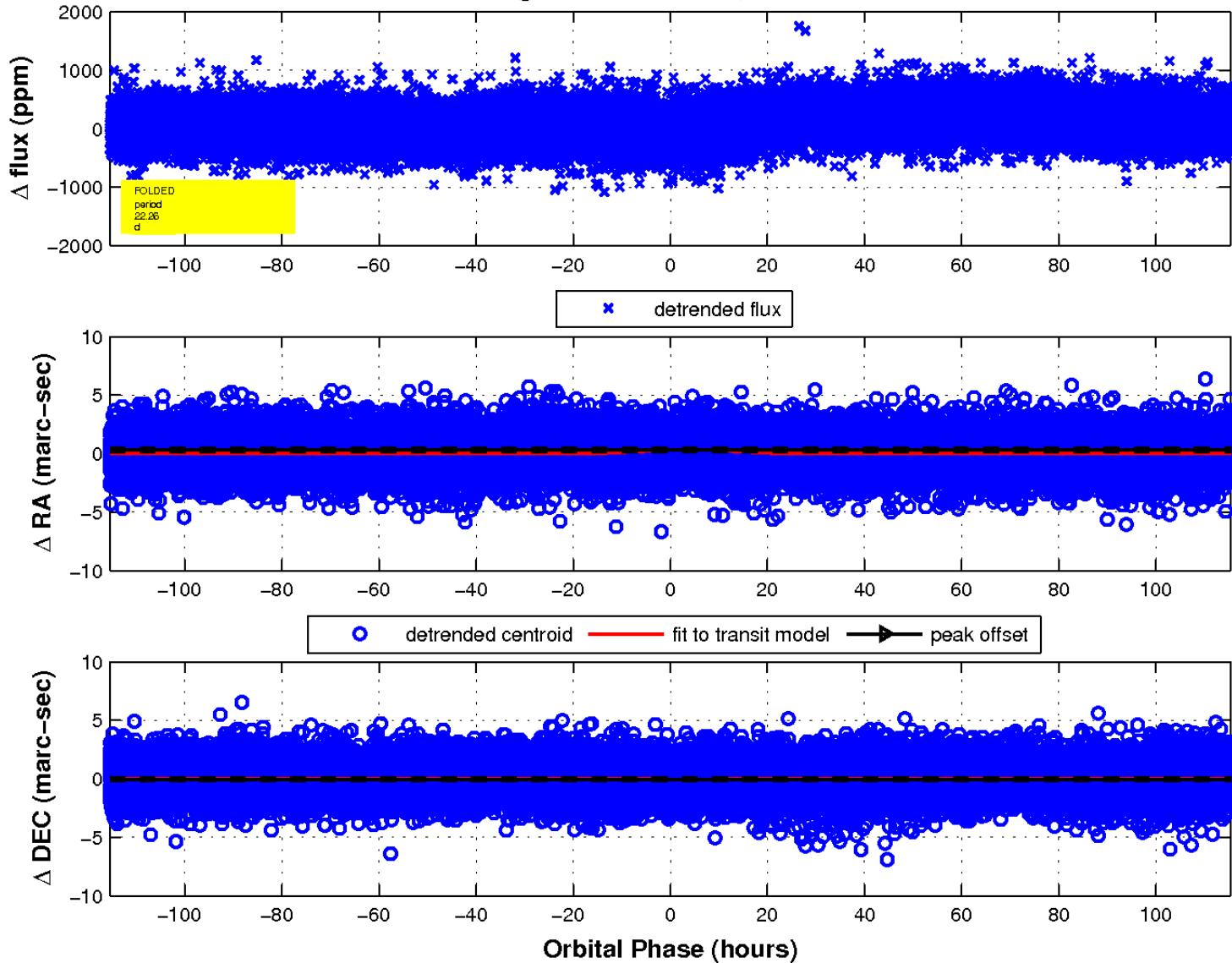
Q16 no OOT image



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

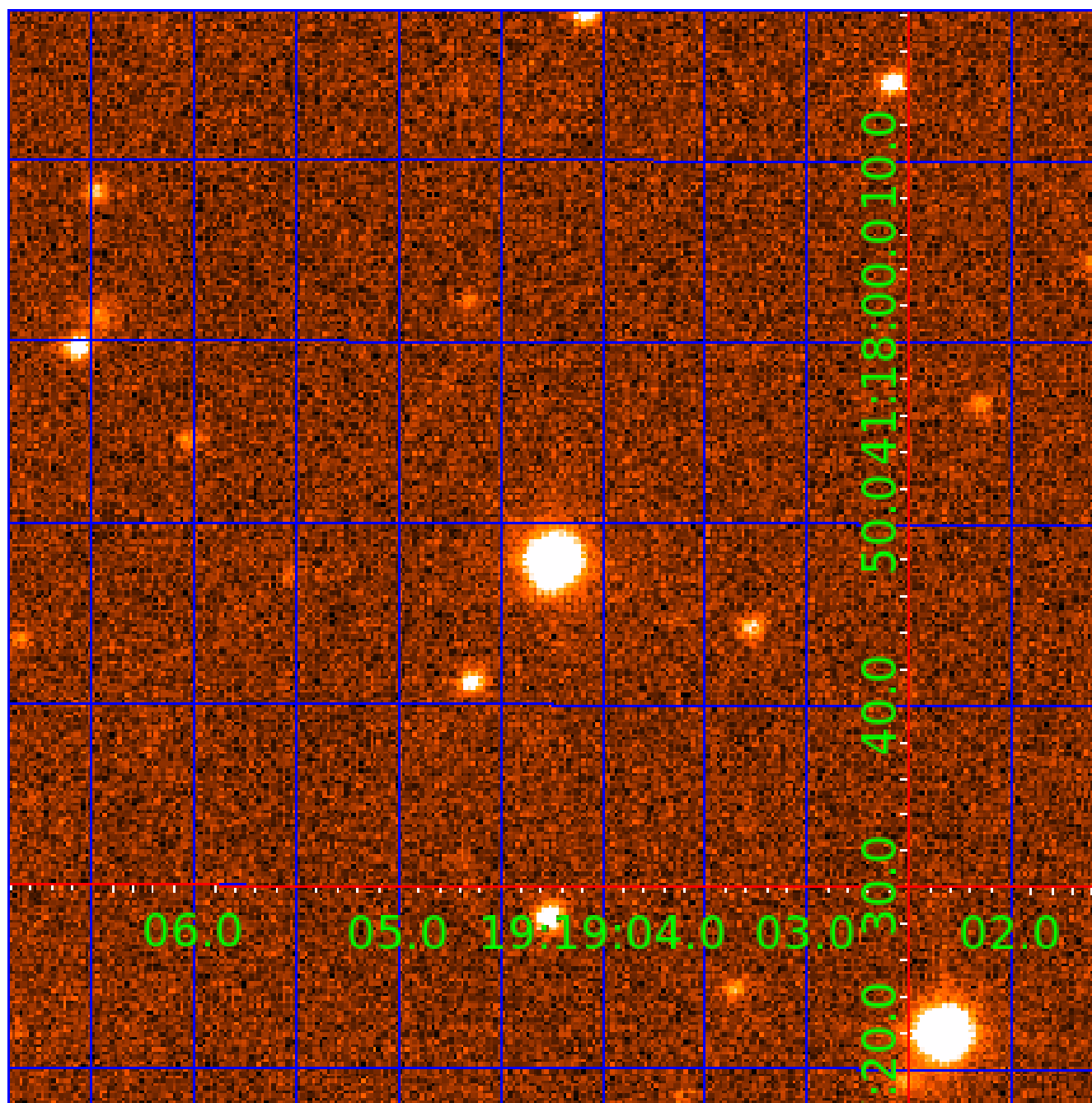


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 005953966

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 005953966-01 | OBS | No | 22.263845 | 131.531427 | 140.6 | 15.000 | 11.8 | -1.0 | 1.01 | 5960 | 1.20 | 55.74 |
| 005953966-02 | OBS | No | 22.267024 | 153.492936 | 301.1 | 89.654 | 10.9 | 16.8 | 1.01 | 5960 | 2.28 | 55.73 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 005953966-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—CENT_NOFITS |
| 005953966-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—MOD_NONUNIQ_DV—SAME_NTL_PERIOD |

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

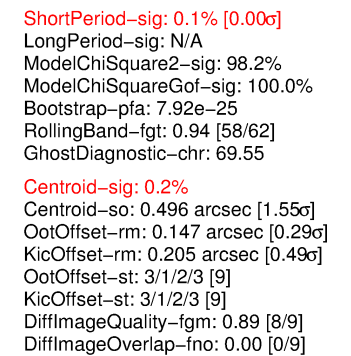
N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

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

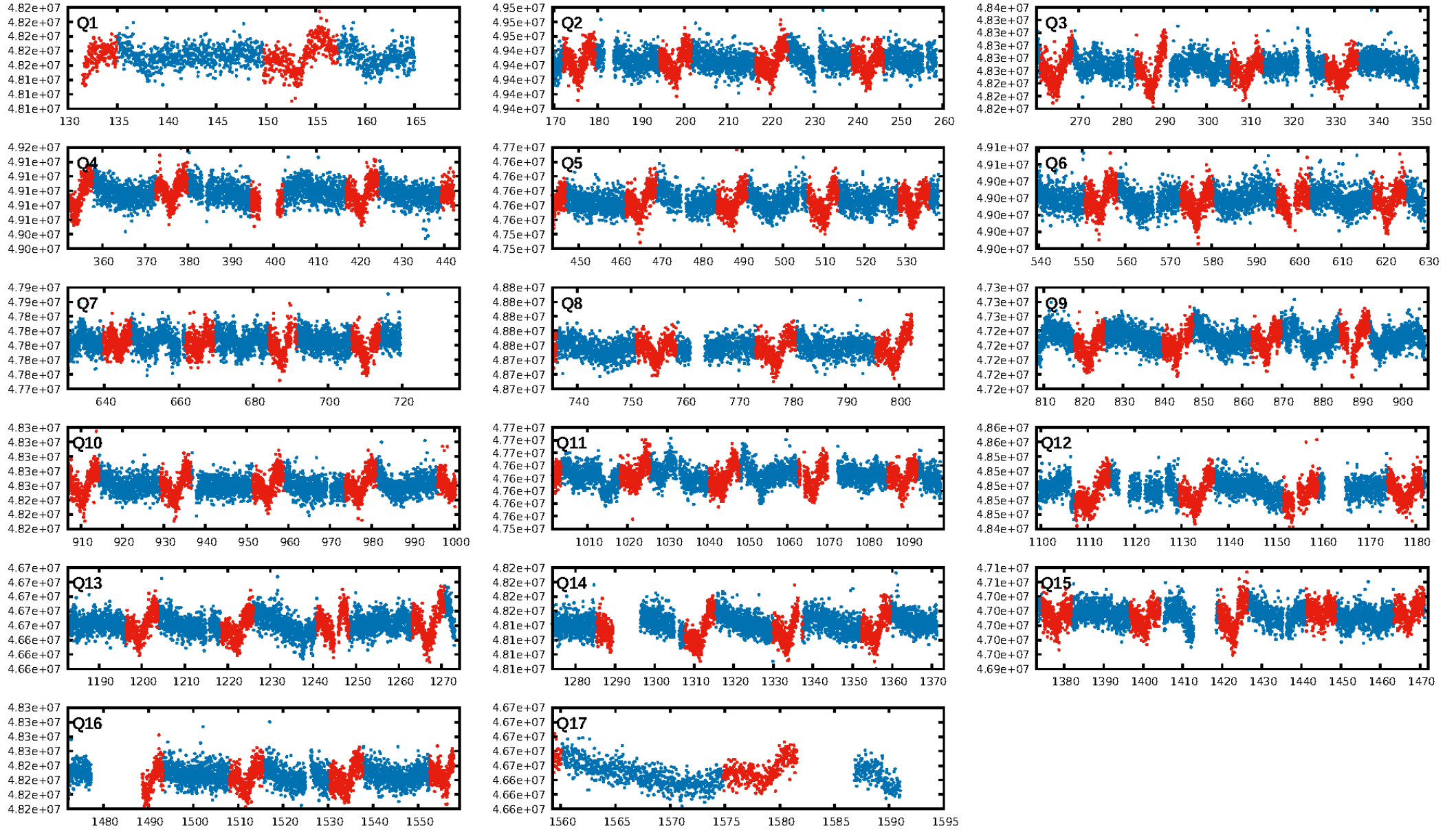
Ephemeris Match Information For 005953966-02

No Significant Match Found

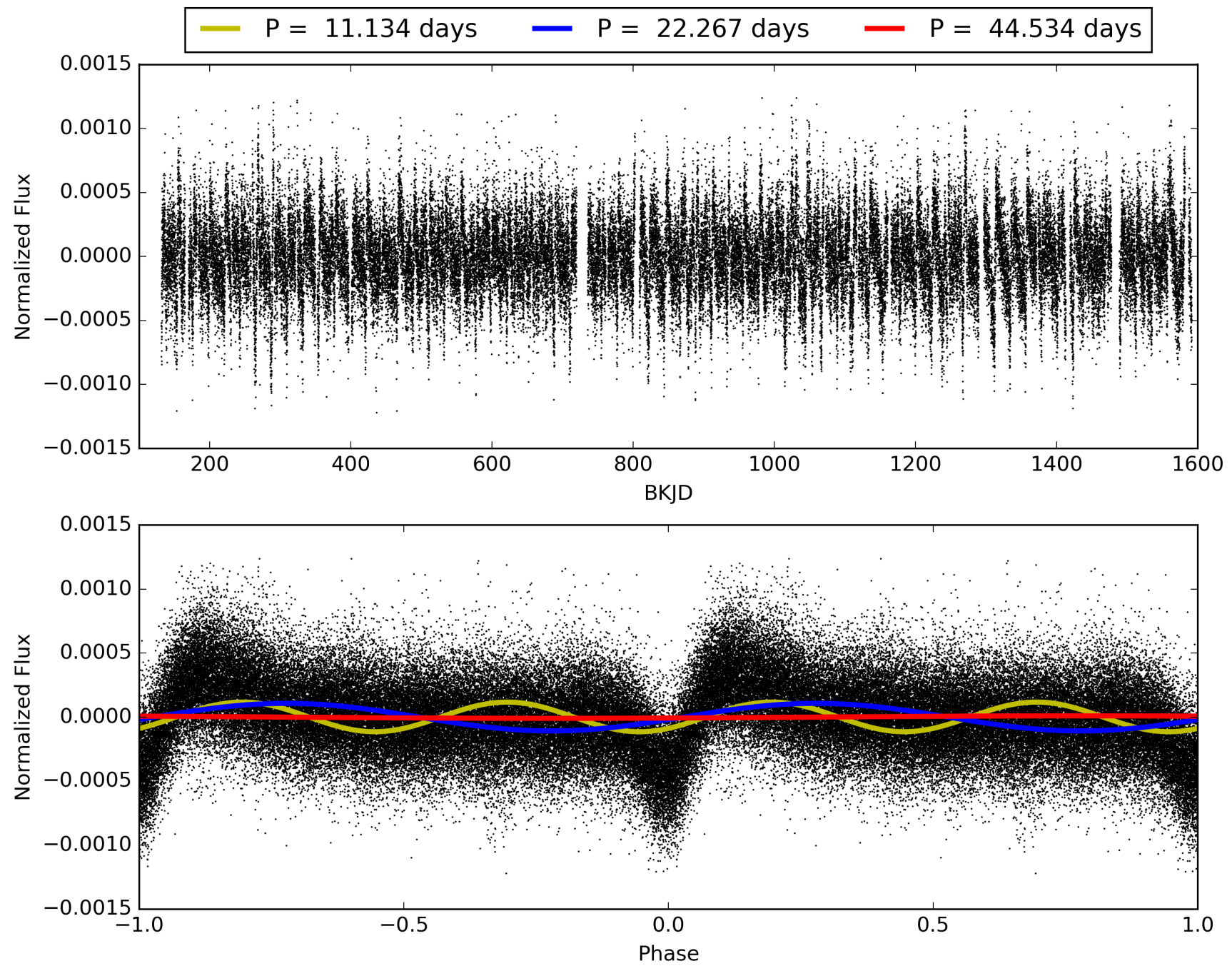
KIC: 5953966 Candidate: 2 of 2 Period: 22.267 d



TCE 005953966-02, PDC Light Curves

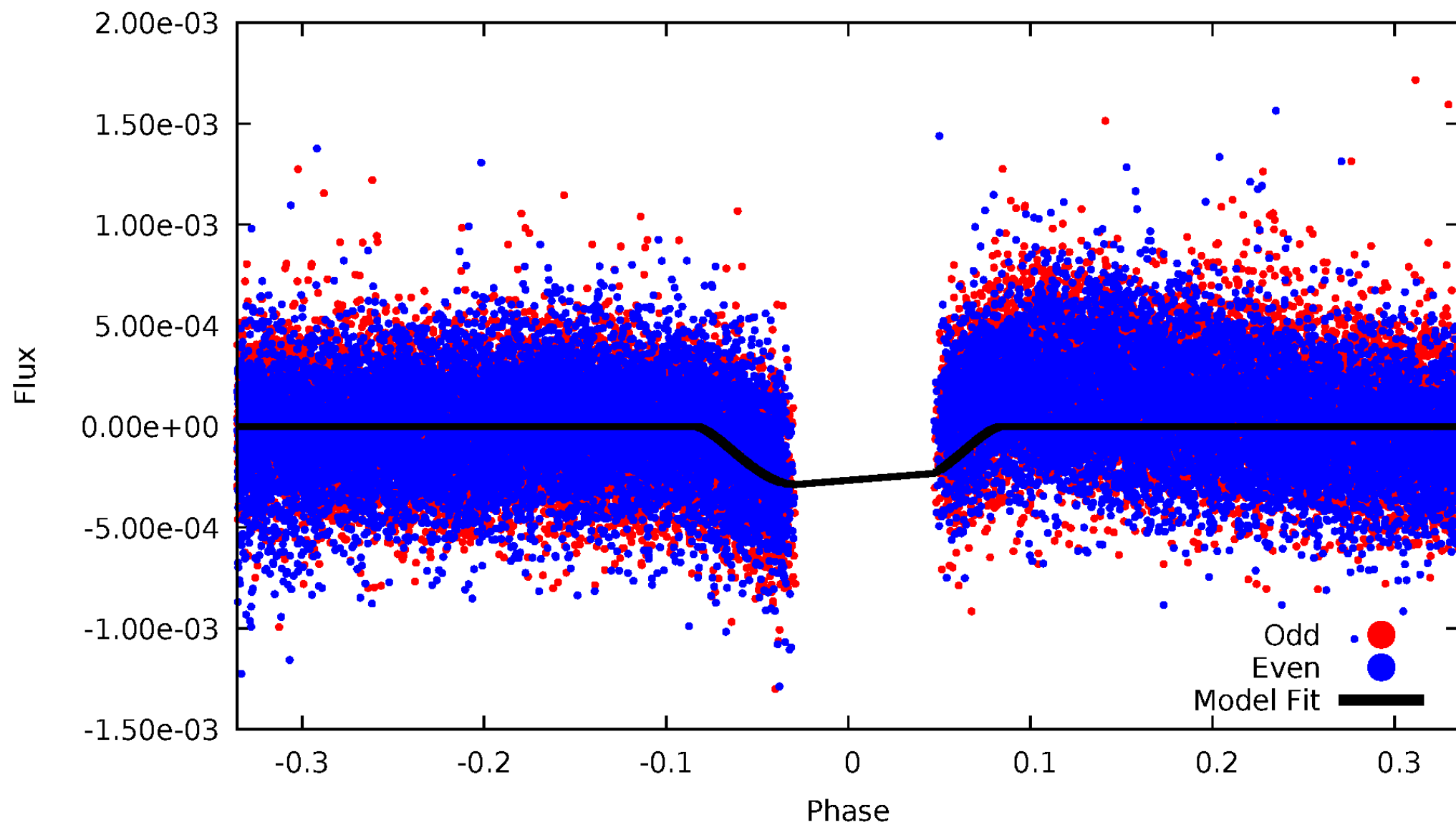


TCE 005953966-02



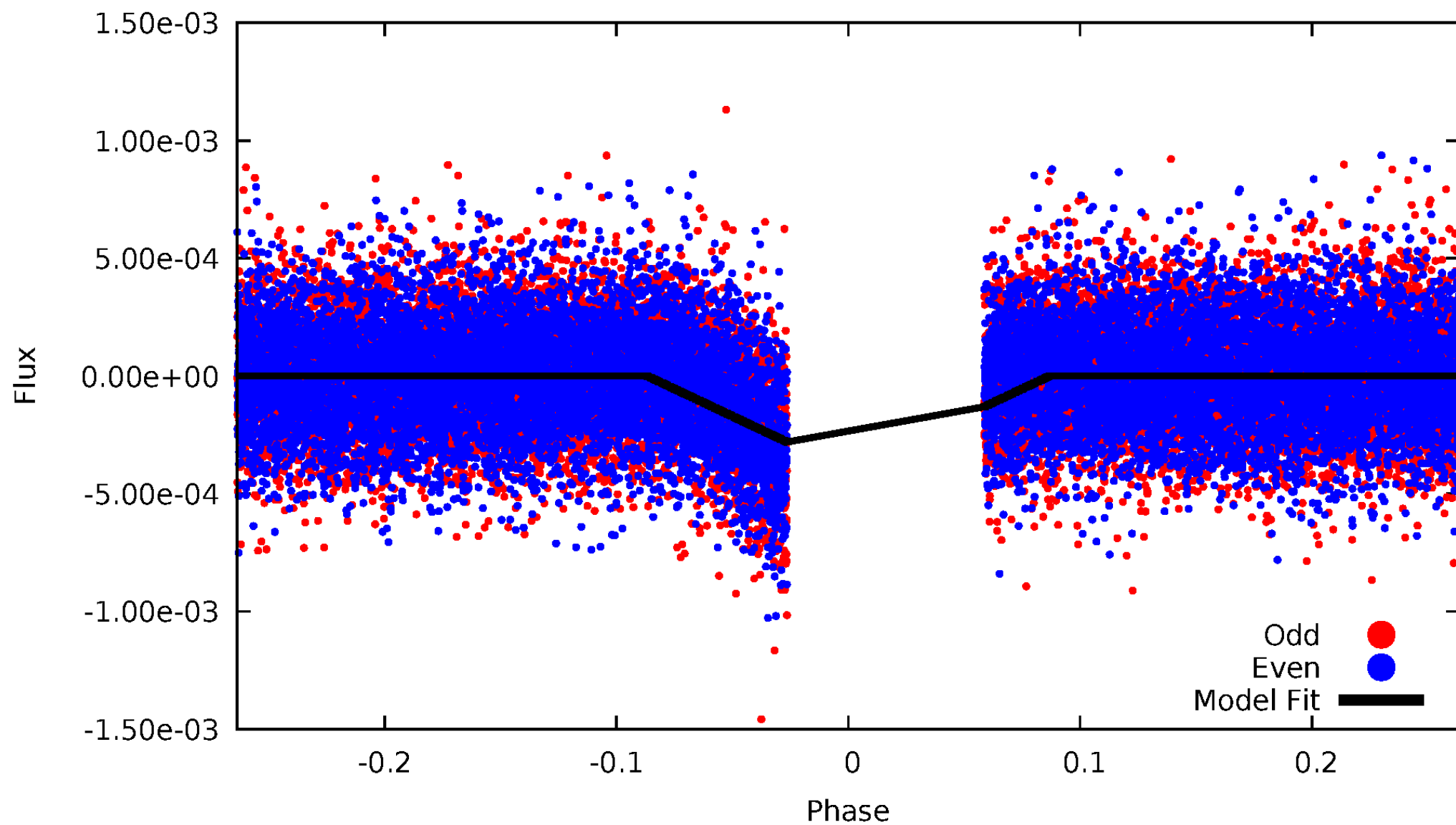
DV Odd/Even

TCE 005953966-02



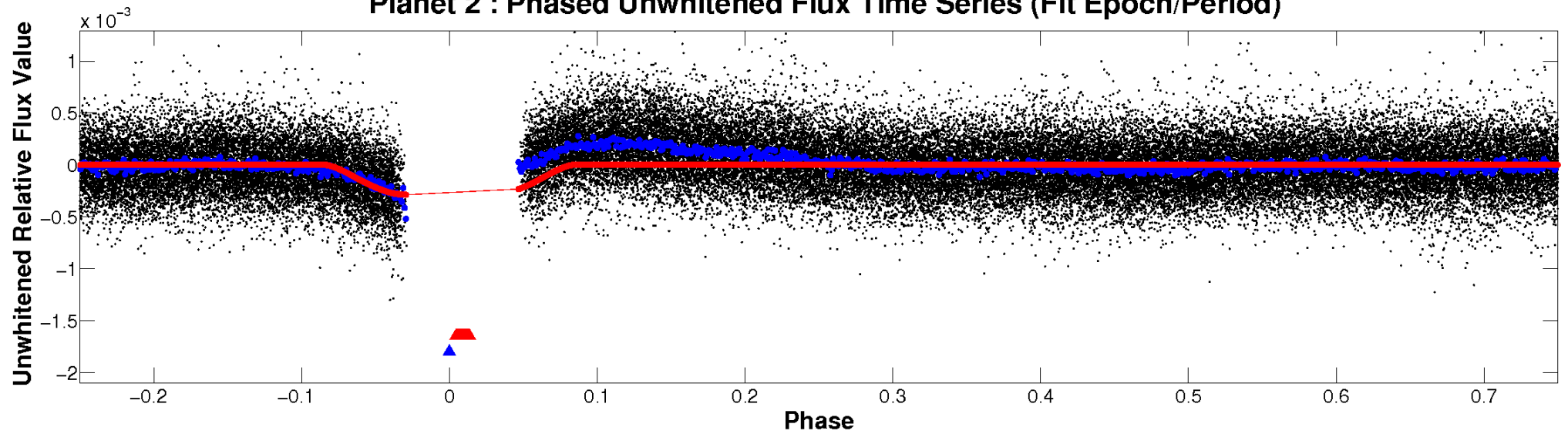
ALT Odd/Even

TCE 005953966-02

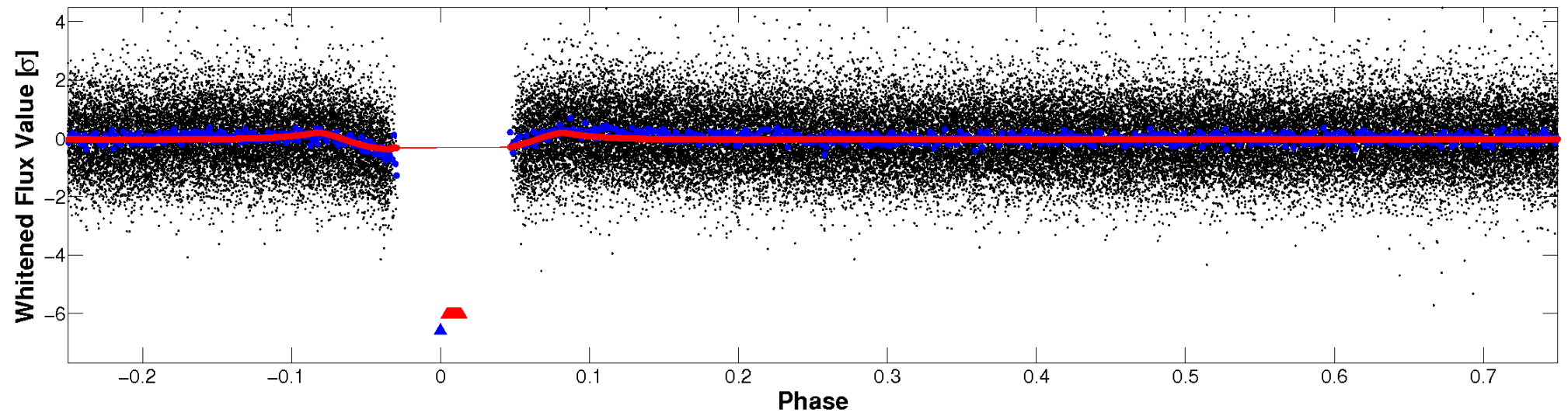


Non-Whitened Vs. Whitened Light Curve

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

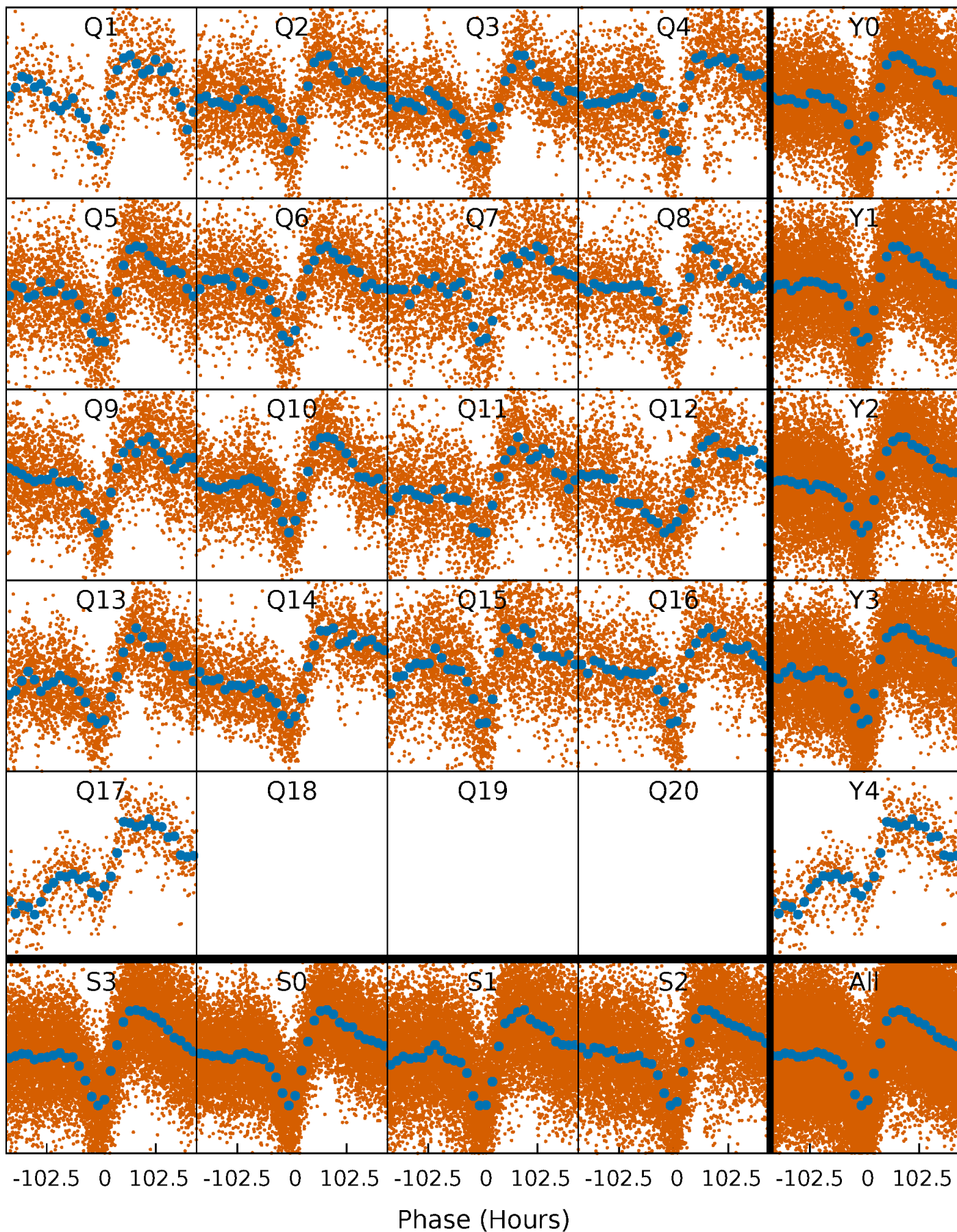


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



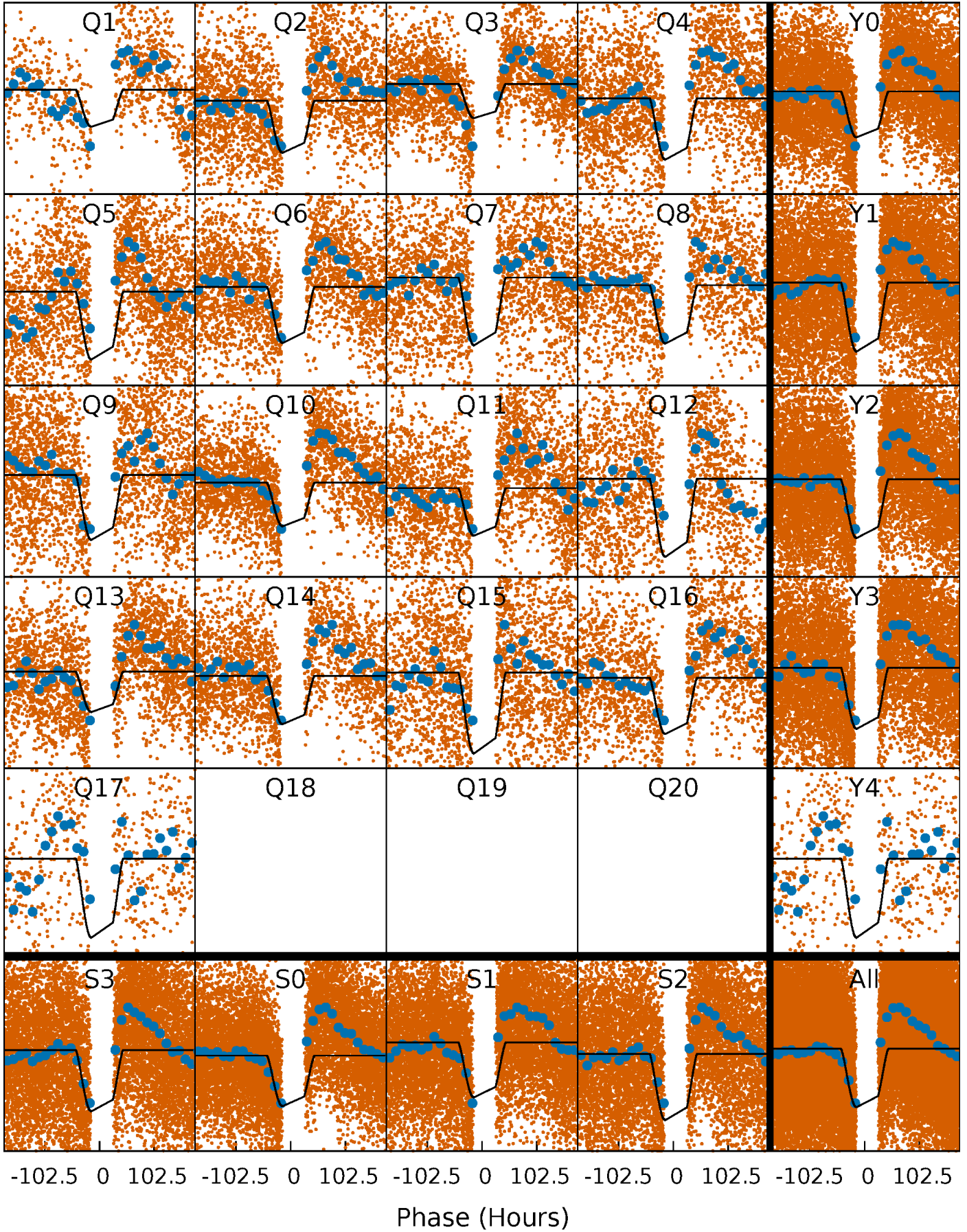
PDC Quarter-Phased Transit Curves

TCE 005953966-02 P= 22.267024 Days $T_0=153.492936$ (BKJD)



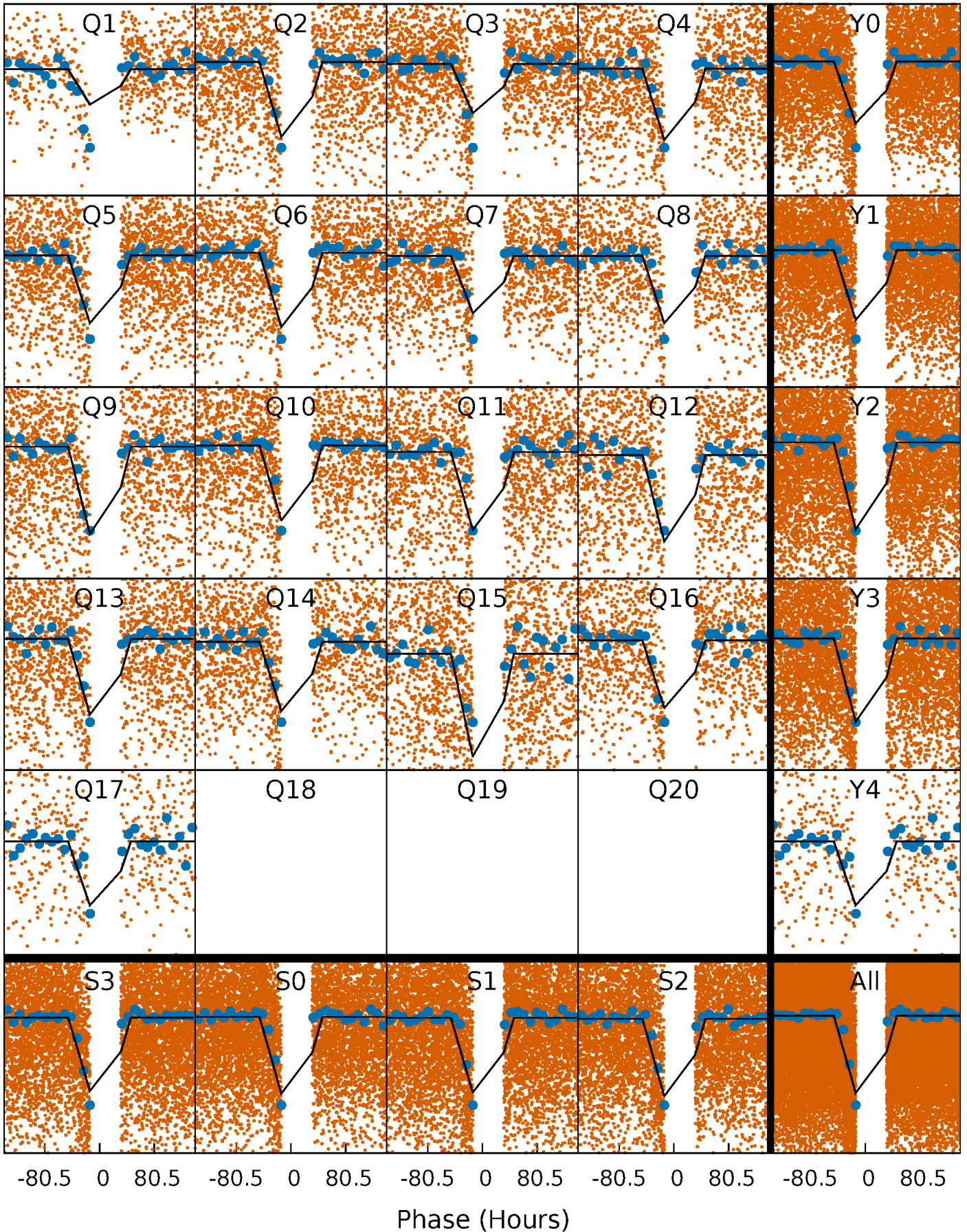
DV Quarter-Phased Transit Curves

TCE 005953966-02 $P = 22.267024$ Days $T_0 = 153.492936$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

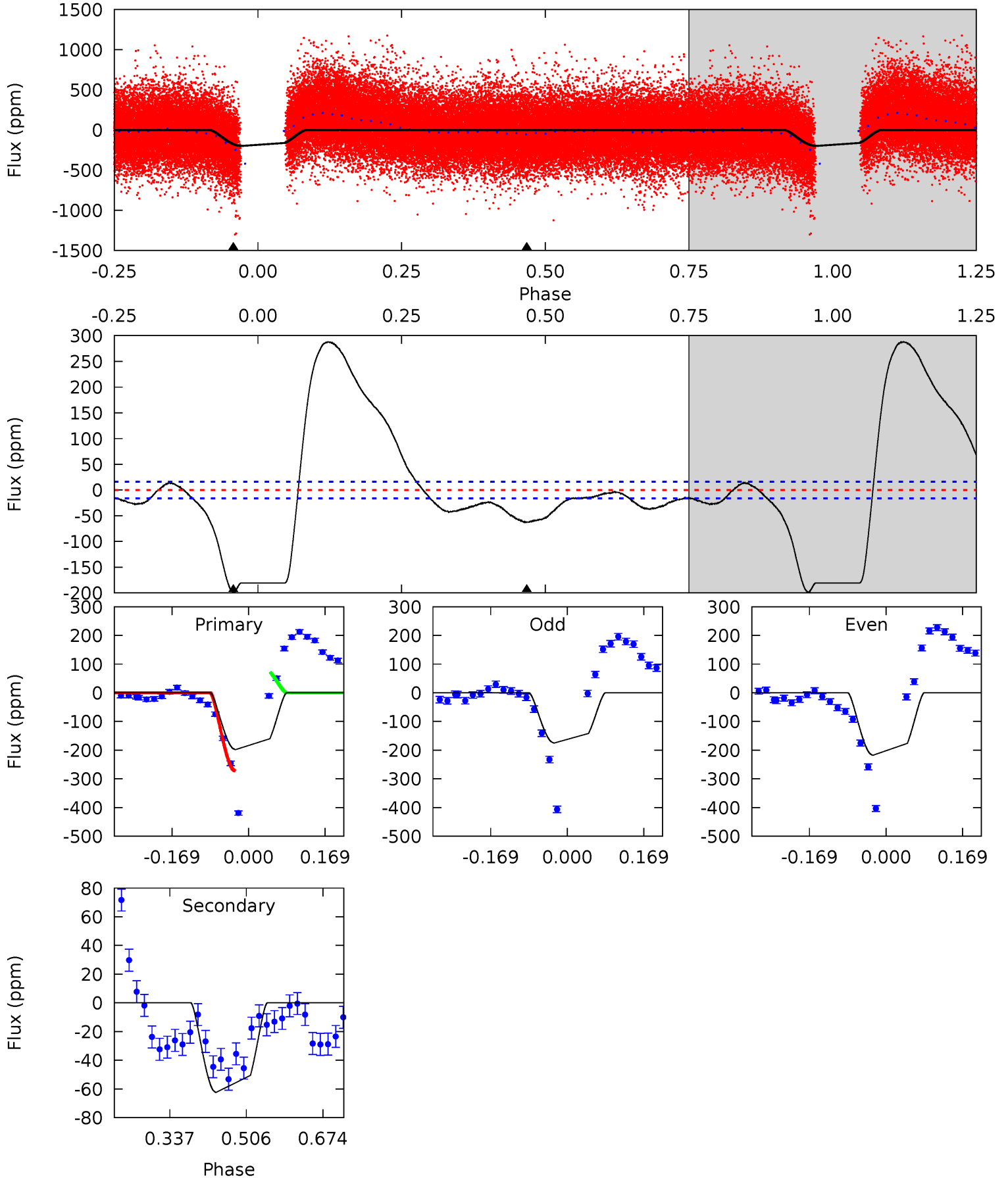
TCE 005953966-02 P= 22.263845 Days $T_0=153.436848$ (BKJD)



DV Model-Shift Uniqueness Test

005953966-02, P = 22.267024 Days, E = 131.225912 Days

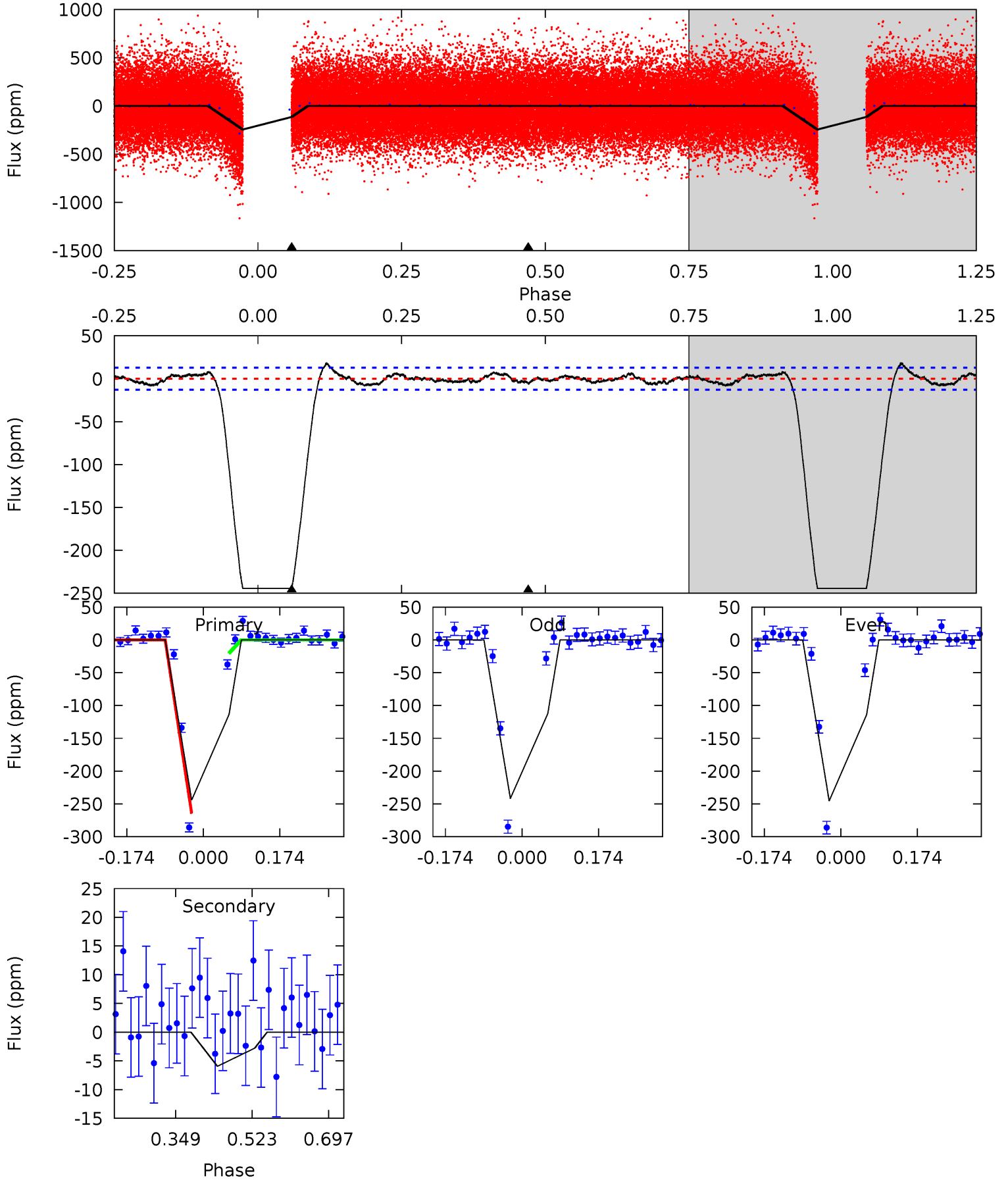
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 54.8 | 17.3 | 0 | 0 | 4.45 | 1.38 | 29.7 | 54.8 | 54.8 | 17.3 | 17.3 | 5.99 | 1.14 | 0.59 | 29.1 |



Alt Model-Shift Uniqueness Test

005953966-02, P = 22.263845 Days, E = 131.173003 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 84.4 | 2.05 | 0 | 0 | 4.45 | 1.36 | 1.28 | 84.4 | 84.4 | 2.05 | 2.05 | 0.66 | 0.98 | 0.07 | 39.2 |



Stellar Parameters For KIC 005953966

| | $T_{\text{eff}} (K)$ | $\log(g)$ | $[\text{Fe}/\text{H}]$ | $R (R_{\odot})$ | $M (M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 5960^{+179}_{-161} | $4.334^{+0.195}_{-0.195}$ | $-0.620^{+0.300}_{-0.300}$ | $1.013^{+0.271}_{-0.222}$ | $0.808^{+0.105}_{-0.056}$ | $1.094^{+1.092}_{-0.554}$ |
| | +3%/-3% | +4%/-4% | +48%/-48% | +27%/-22% | +13%/-7% | +100%/-51% |
| 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 005953966-02 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|-------------|------------------------|----------------------|----------------------|-------------------|
| DV | -63 ± 4 | $2.31^{+0.42}_{-0.30}$ | 975^{+79}_{-69} | 4000^{+130}_{-112} | 136^{+48}_{-37} |
| Alt. | -6 ± 3 | $2.29^{+0.37}_{-0.31}$ | 979^{+78}_{-70} | 2802^{+169}_{-237} | 13^{+9}_{-6} |

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 $A_{\text{obs}} \gg 1.0$

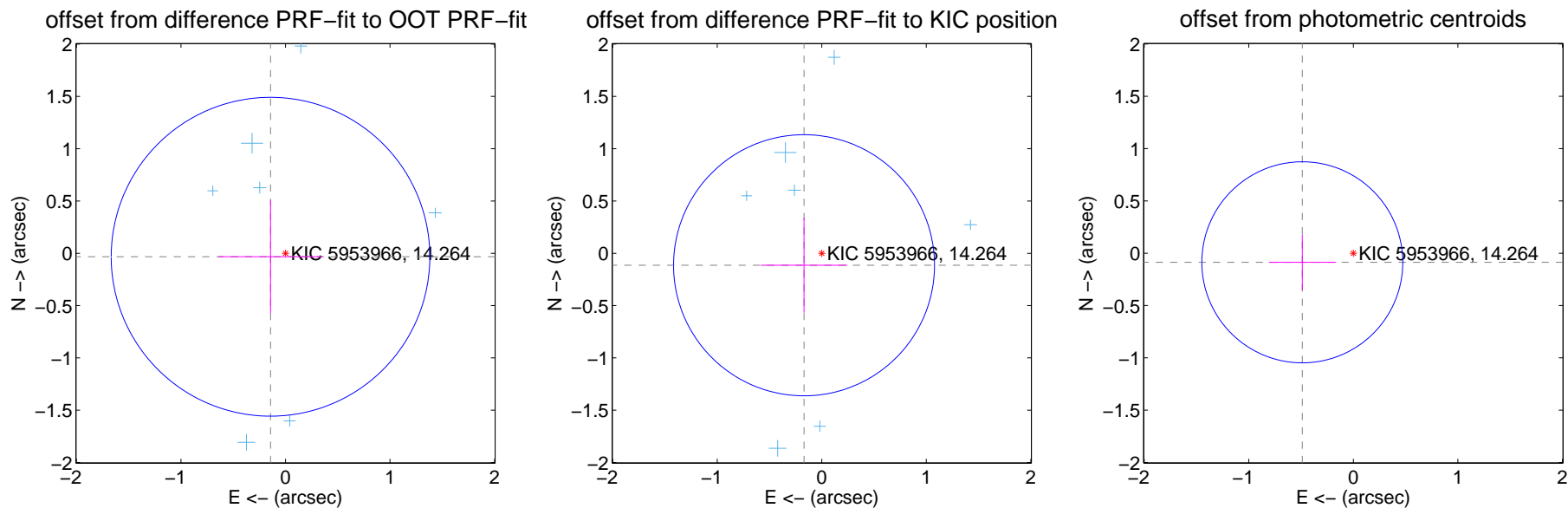
DV Centroid Data

Supplemental centroid analysis for 005953966-02. Kepler magnitude: 14.26. Transit SNR 16.83

There are 8 quarters with good PRF difference image offsets

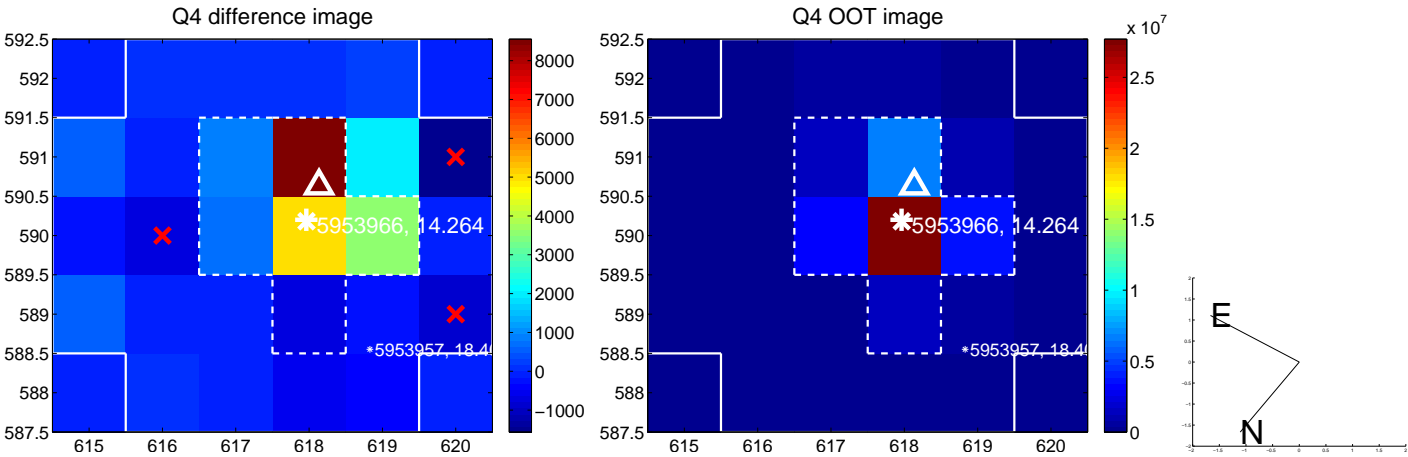
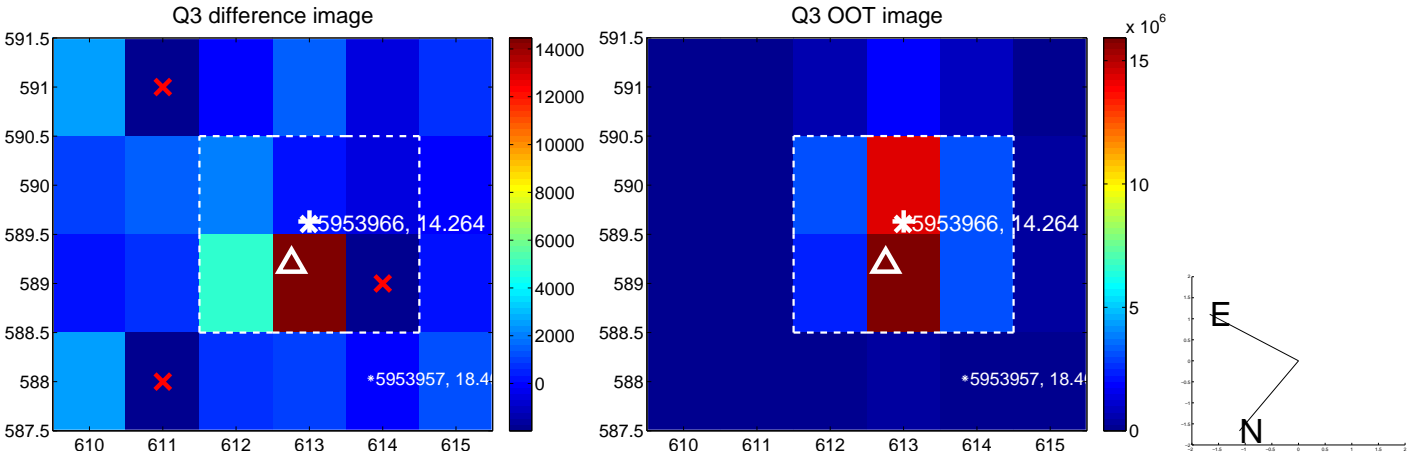
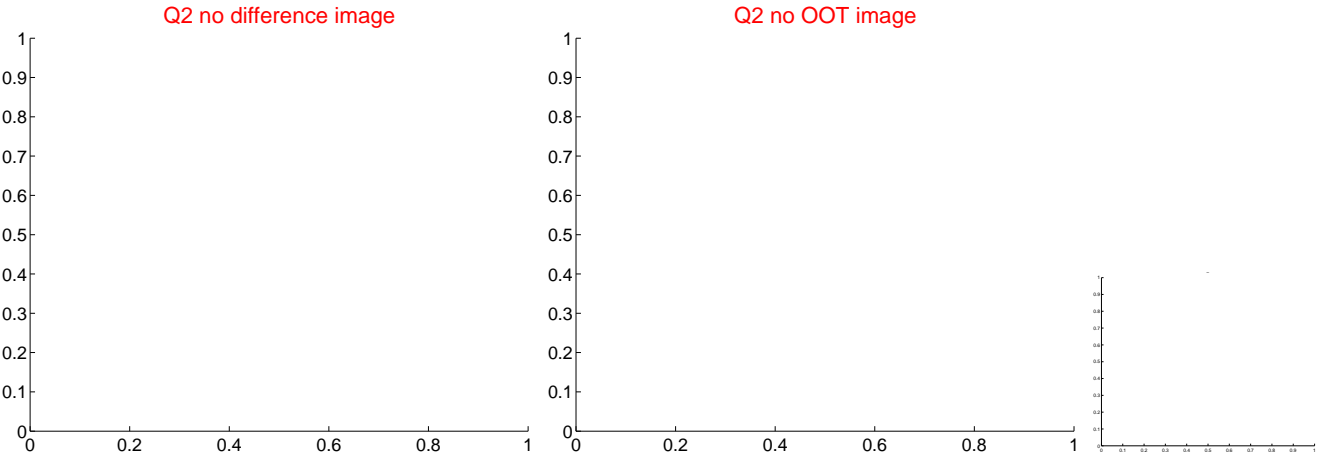
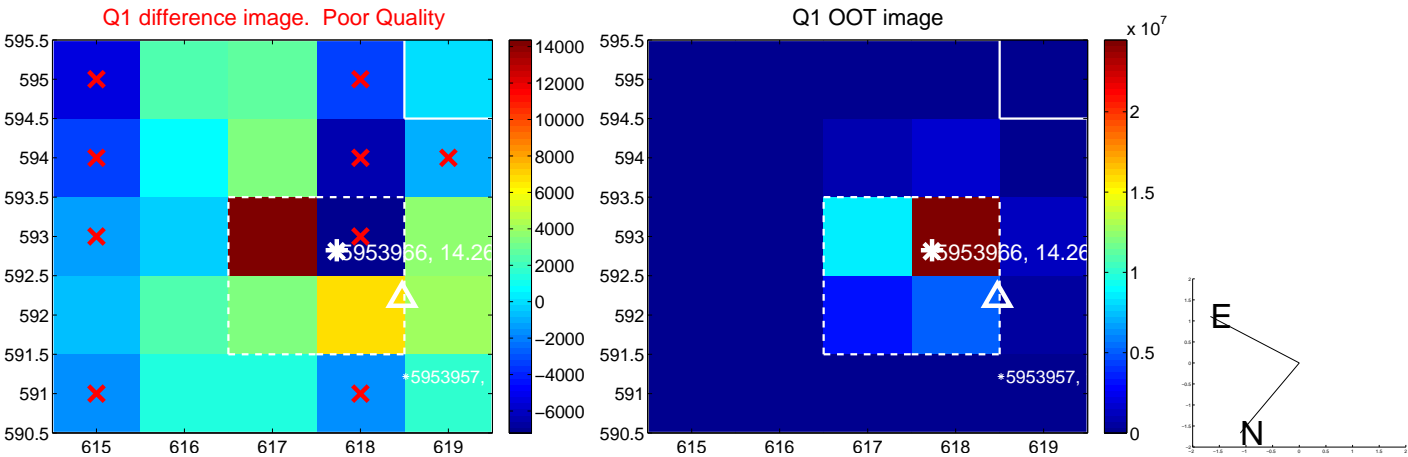
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT | 0.147 ± 0.508 | 0.29 | 0.143 ± 0.499 | -0.033 ± 0.538 |
| PRF-fit source offset from KIC position | 0.205 ± 0.416 | 0.49 | 0.170 ± 0.414 | -0.115 ± 0.454 |
| photometric centroid source offset | 0.50 ± 0.32 | 1.55 | 0.49 ± 0.32 | -0.09 ± 0.27 |

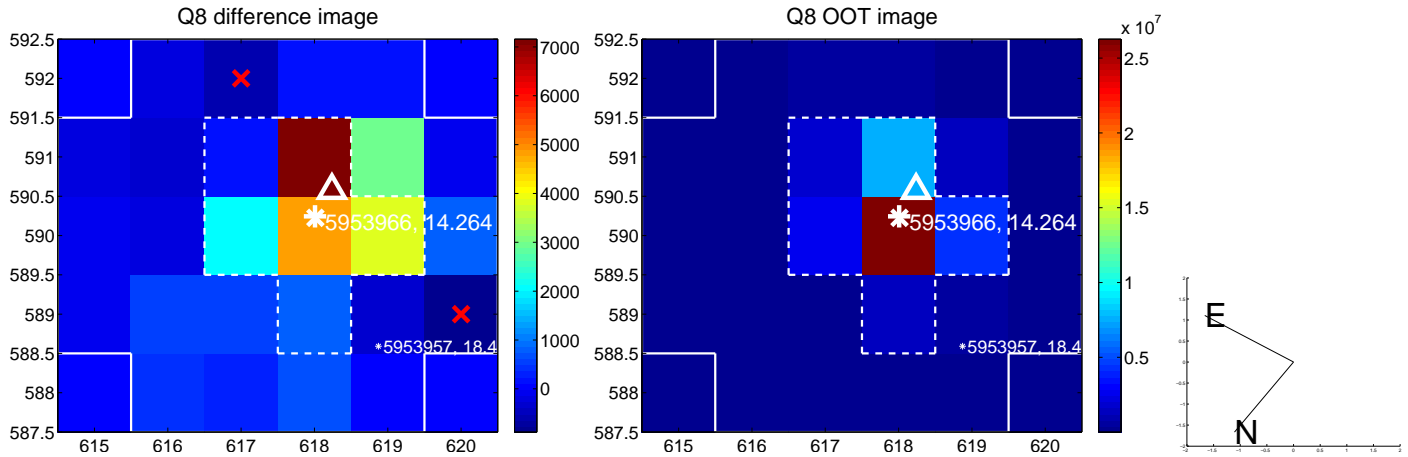
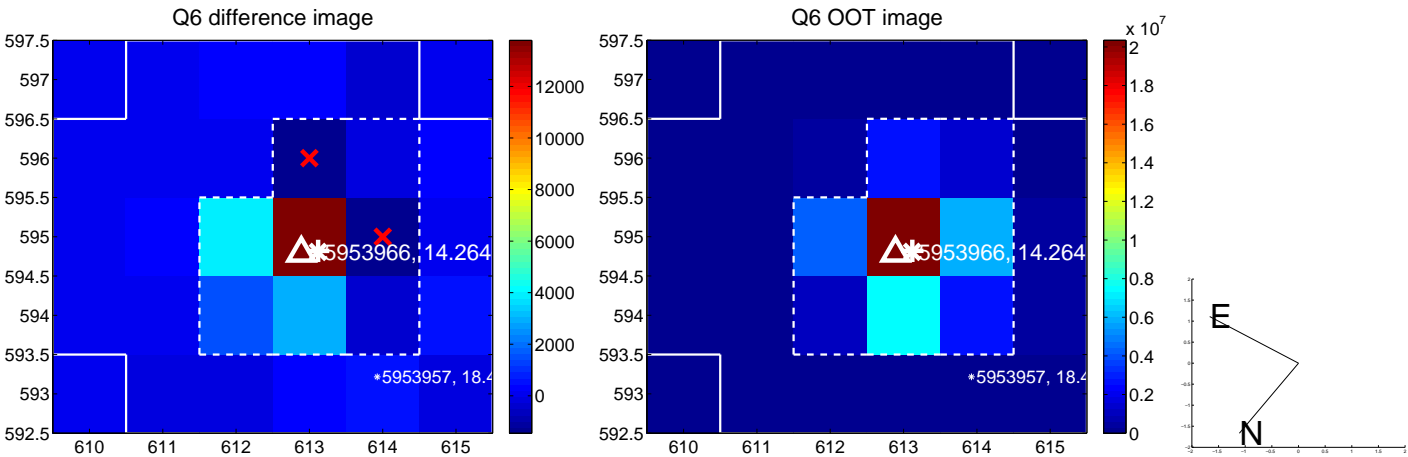
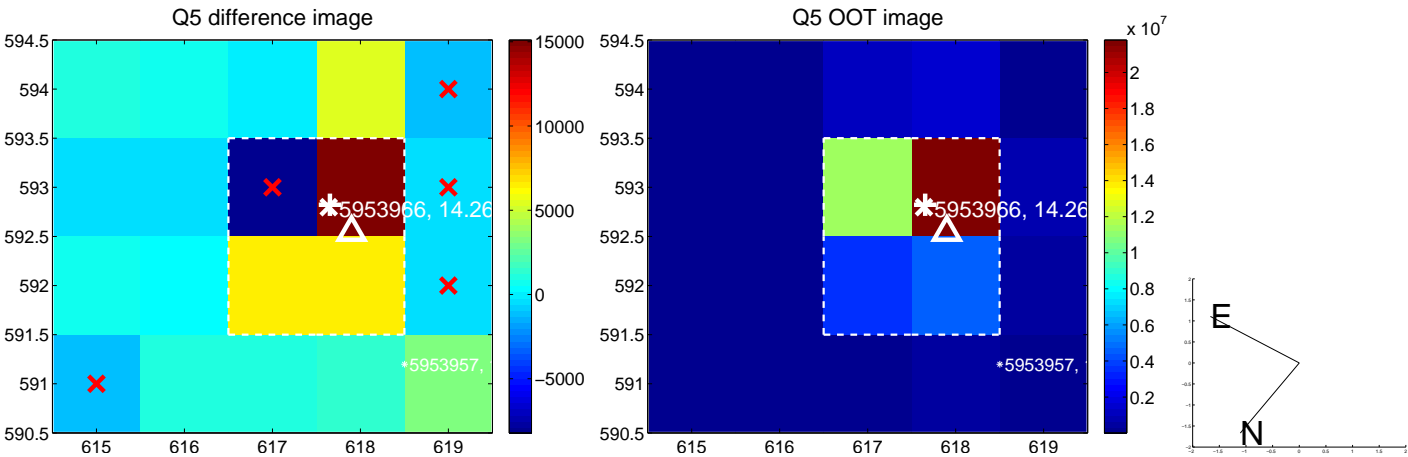


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

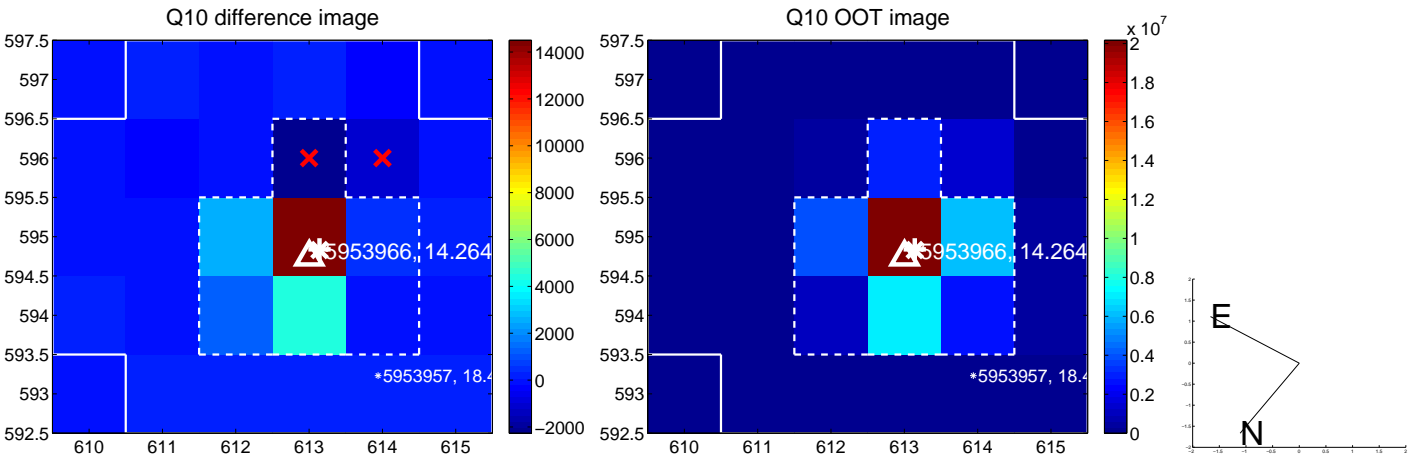
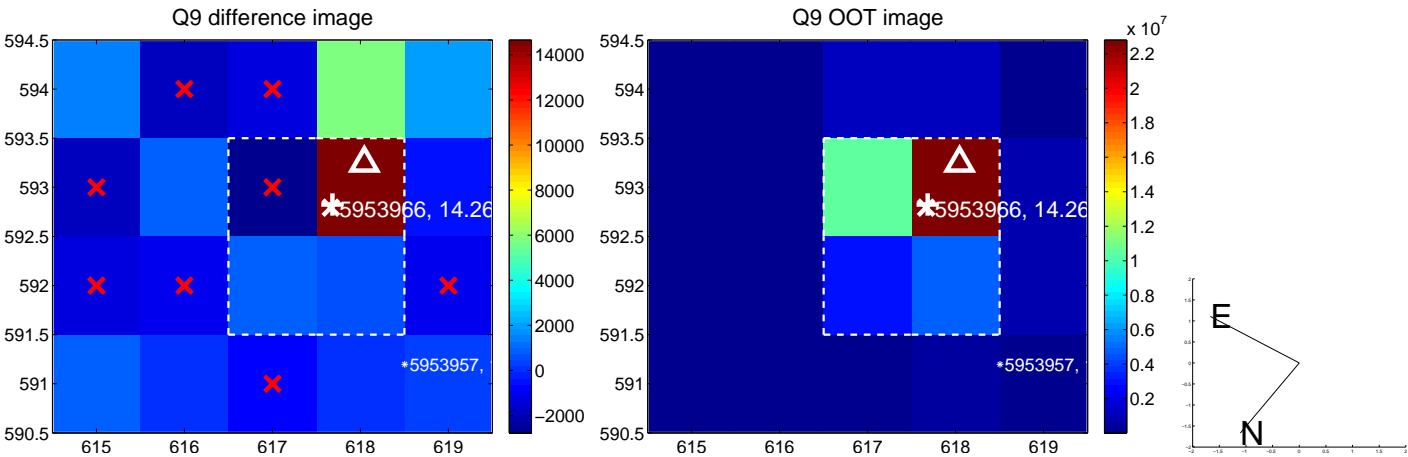
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



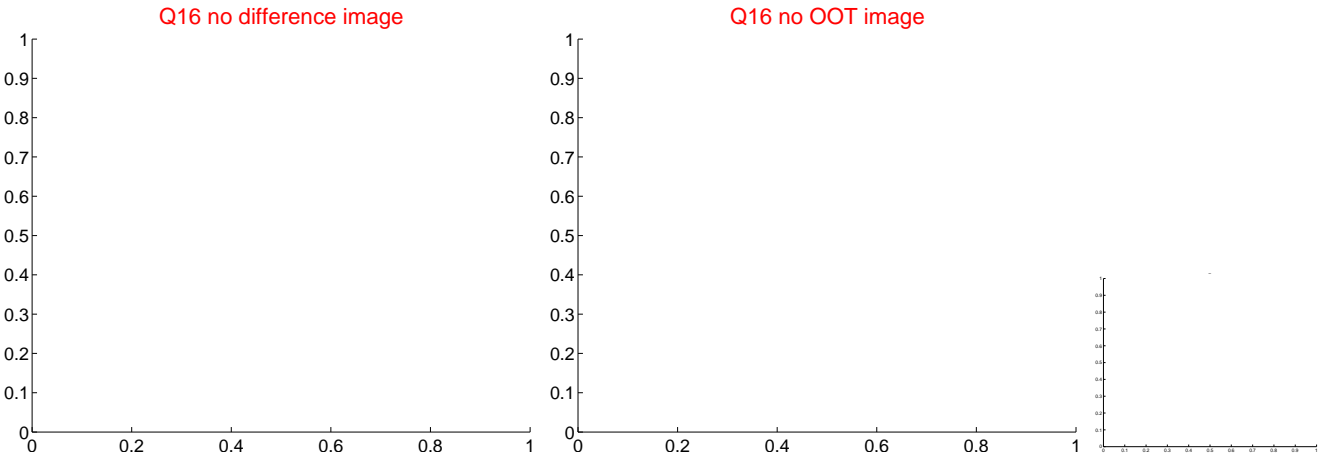
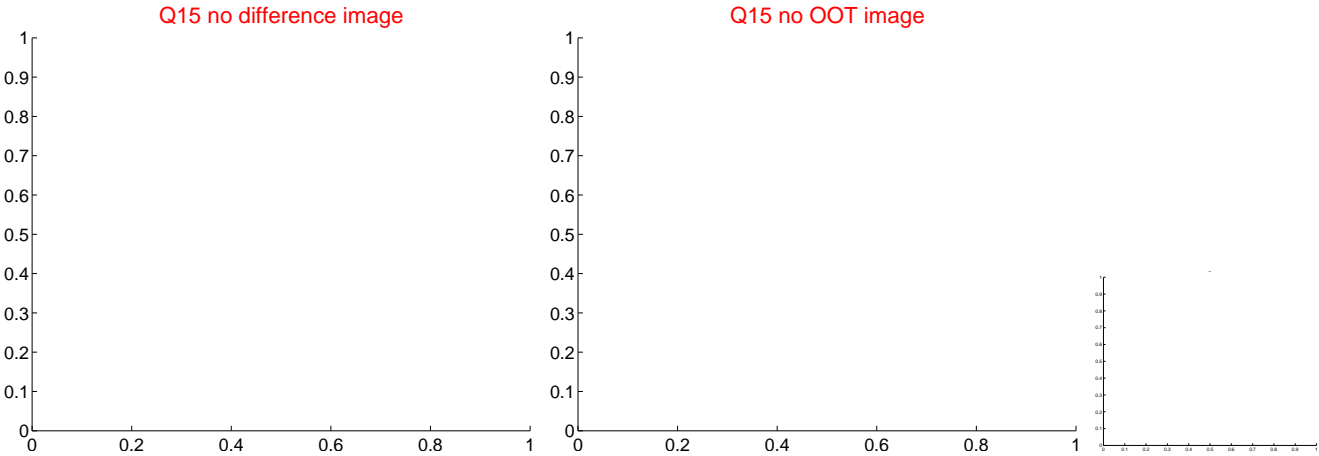
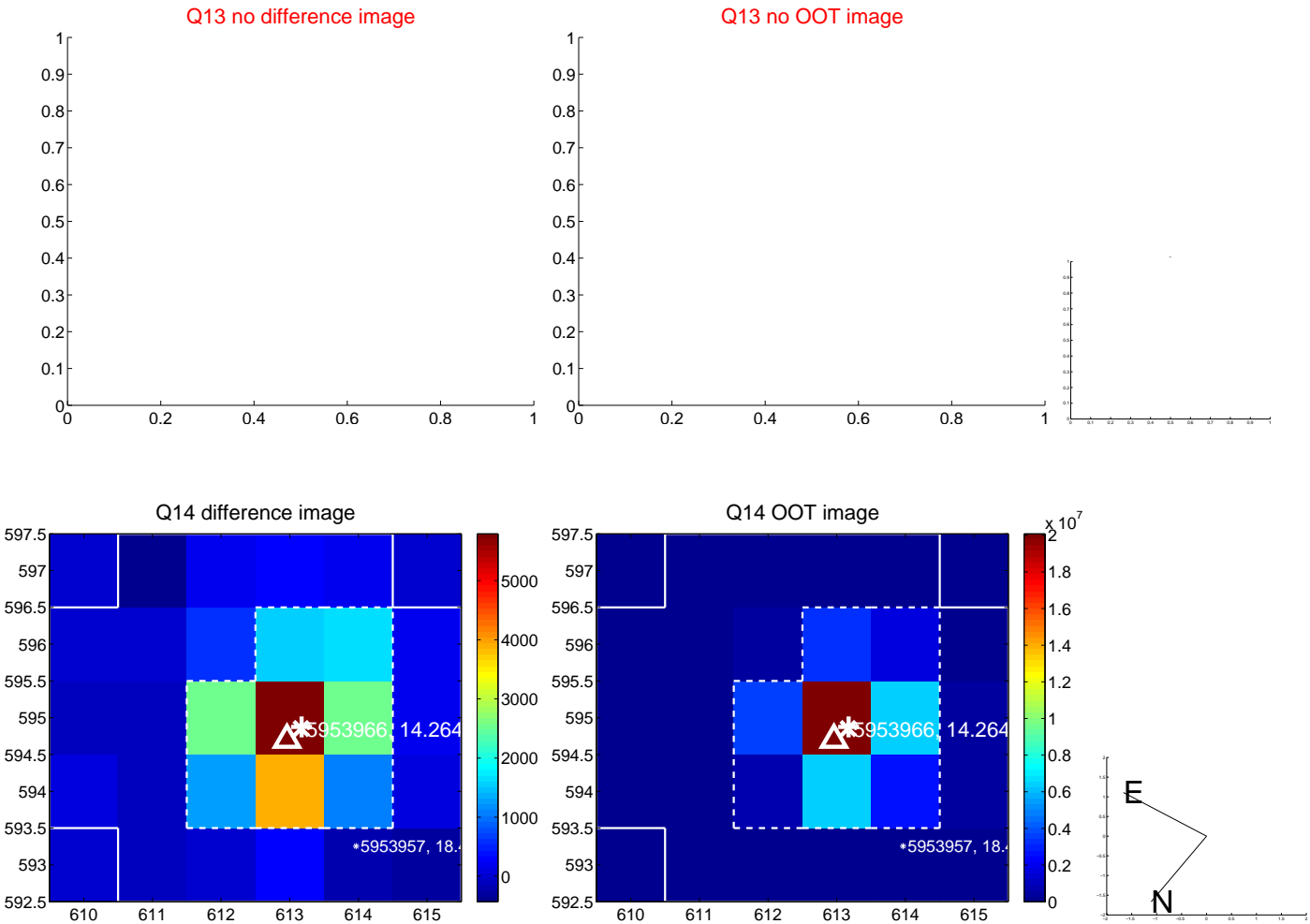
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



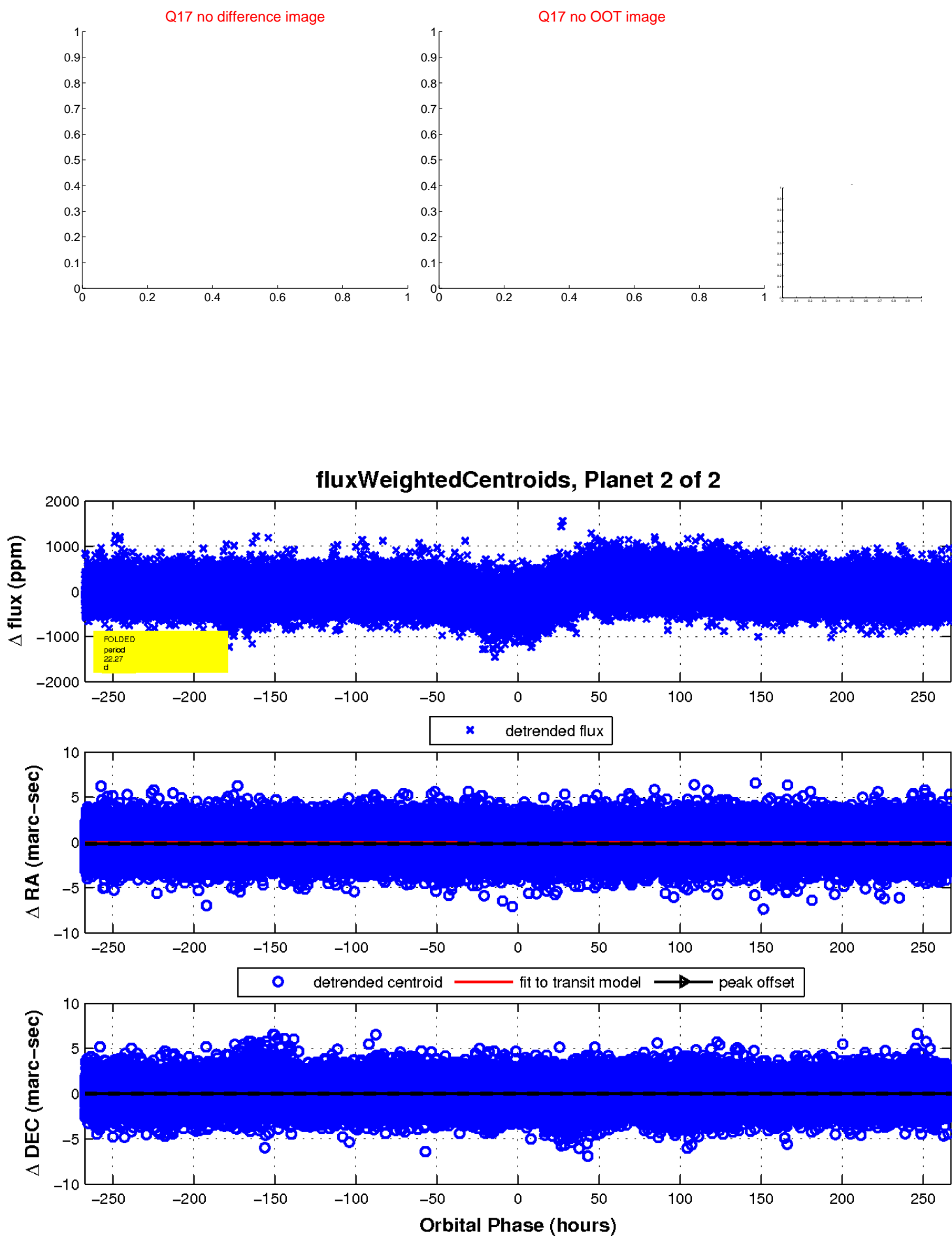
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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.



UKIRT Image

Declination

