

KIC 010966623

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 010966623-01 | OBS | No | 0.720271 | 131.665827 | 3.1 | 0.921 | 9.1 | 0.3 | 2.40 | 15896 | 0.50 | 643686.71 |
| 010966623-02 | OBS | No | 0.722748 | 131.729699 | 72.3 | 1.118 | 7.8 | 7.4 | 2.40 | 15896 | 2.26 | 640746.64 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|----------------------------------------------------------------------------|
| 010966623-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—CENT_FEW_DIFFS |
| 010966623-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | SWEET_NTL—LPP_DV—MOD_NONUNIQ_DV |

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

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

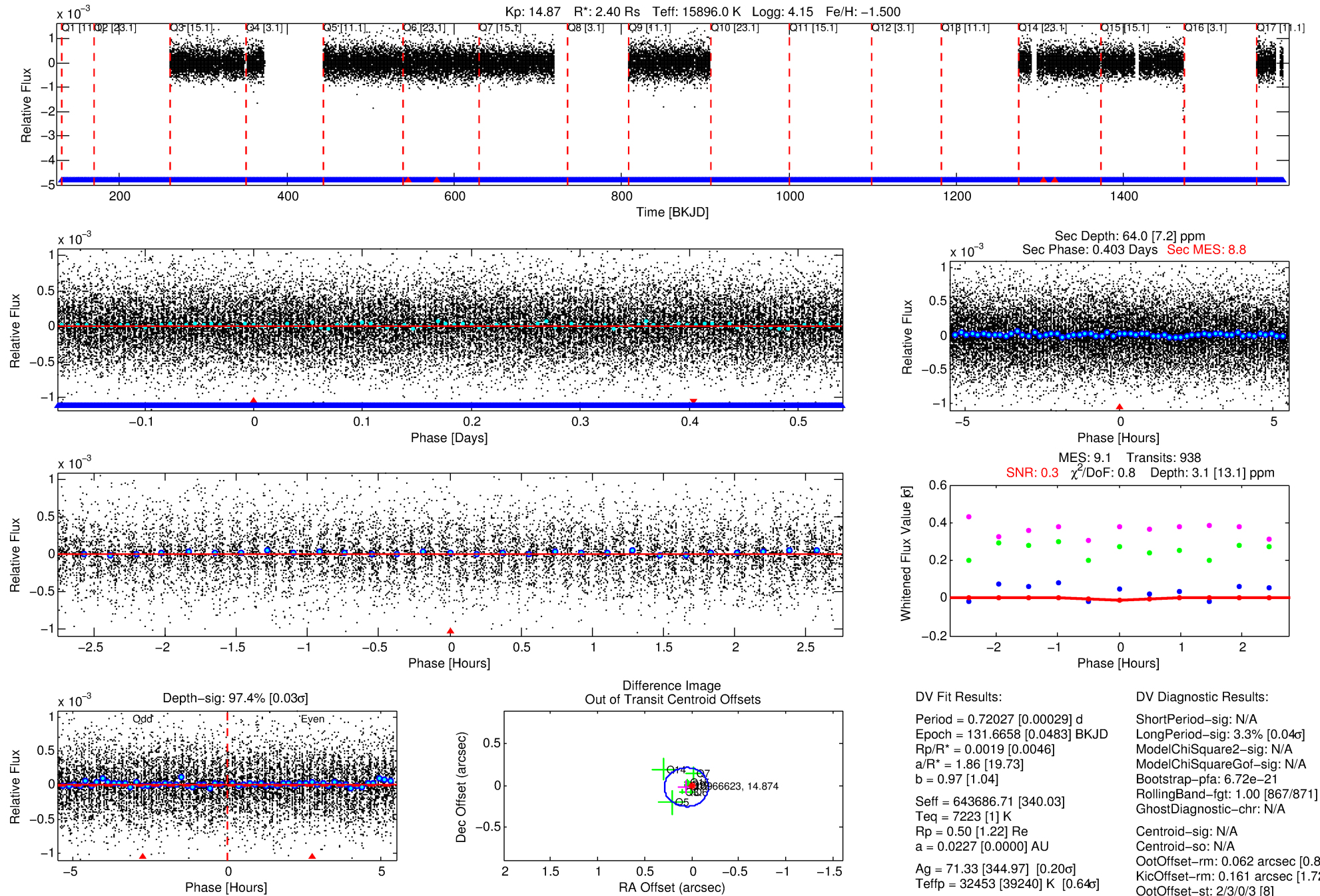
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010966623-01

No Significant Match Found

DV One-Page Summary

KIC: 10966623 Candidate: 1 of 2 Period: 0.720 d



DV Fit Results:

Period = 0.72027 [0.00029] d
Epoch = 131.6658 [0.0483] BKJD
Rp/R* = 0.0019 [0.0046]
a/R* = 1.86 [19.73]
b = 0.97 [1.04]
Seff = 643686.71 [340.03]
Teq = 7223 [1] K
Rp = 0.50 [1.22] Re
a = 0.0227 [0.0000] AU
Ag = 71.33 [344.97] [0.20 σ]
Teffp = 32453 [39240] K [0.64 σ]

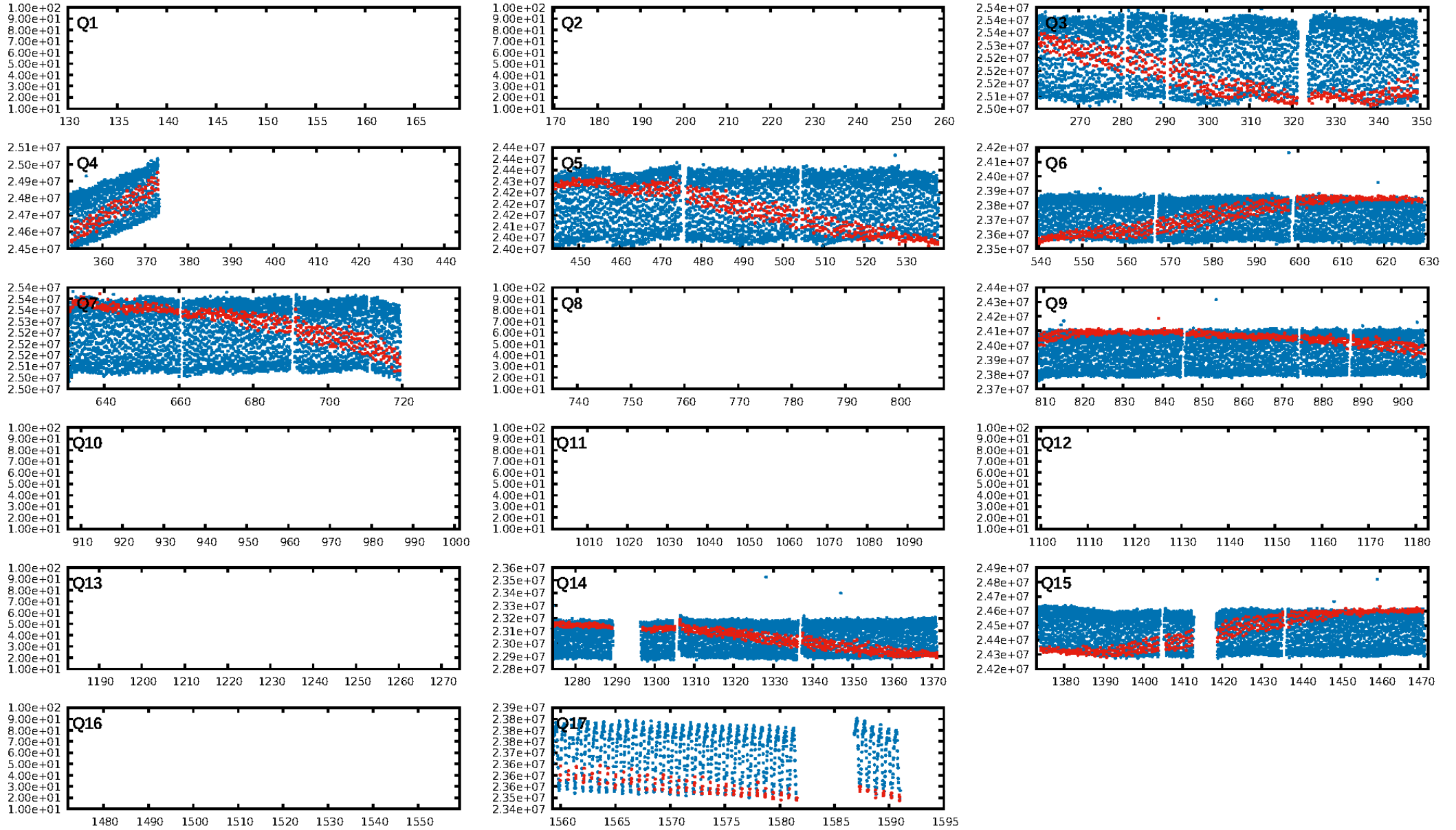
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 3.3% [0.04 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 6.72e-21
RollingBand-fgt: 1.00 [867/871]
GhostDiagnostic-chr: N/A
Centroid-sig: N/A
Centroid-so: N/A
OotOffset-rm: 0.062 arcsec [0.80 σ]
KicOffset-rm: 0.161 arcsec [1.72 σ]
OotOffset-st: 2/3/0/3 [8]
KicOffset-st: 2/3/0/3 [8]
DiffImageQuality-fgm: 0.25 [2/8]
DiffImageOverlap-fno: 0.75 [6/8]

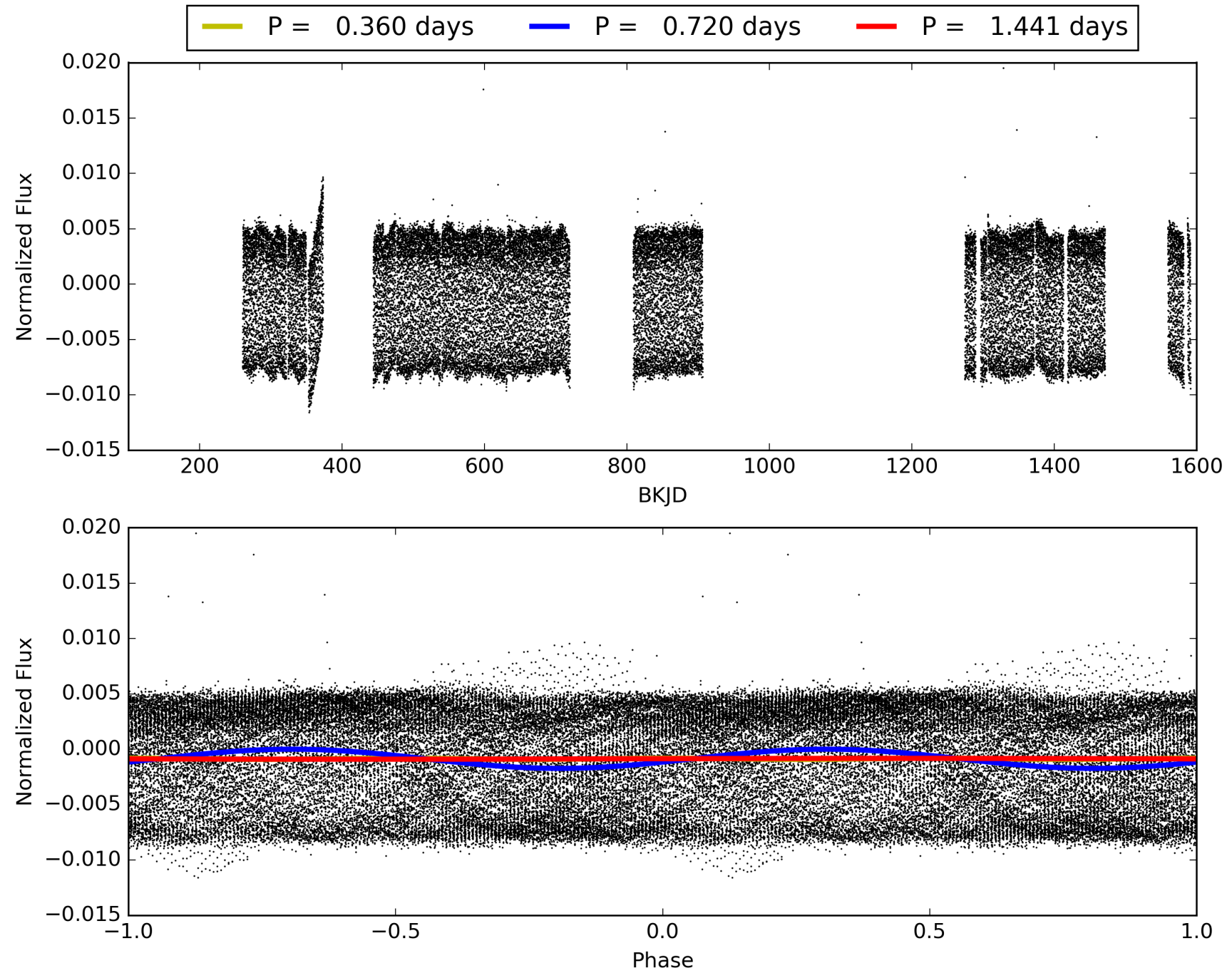
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 13:50:23 Z

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

TCE 010966623-01, PDC Light Curves

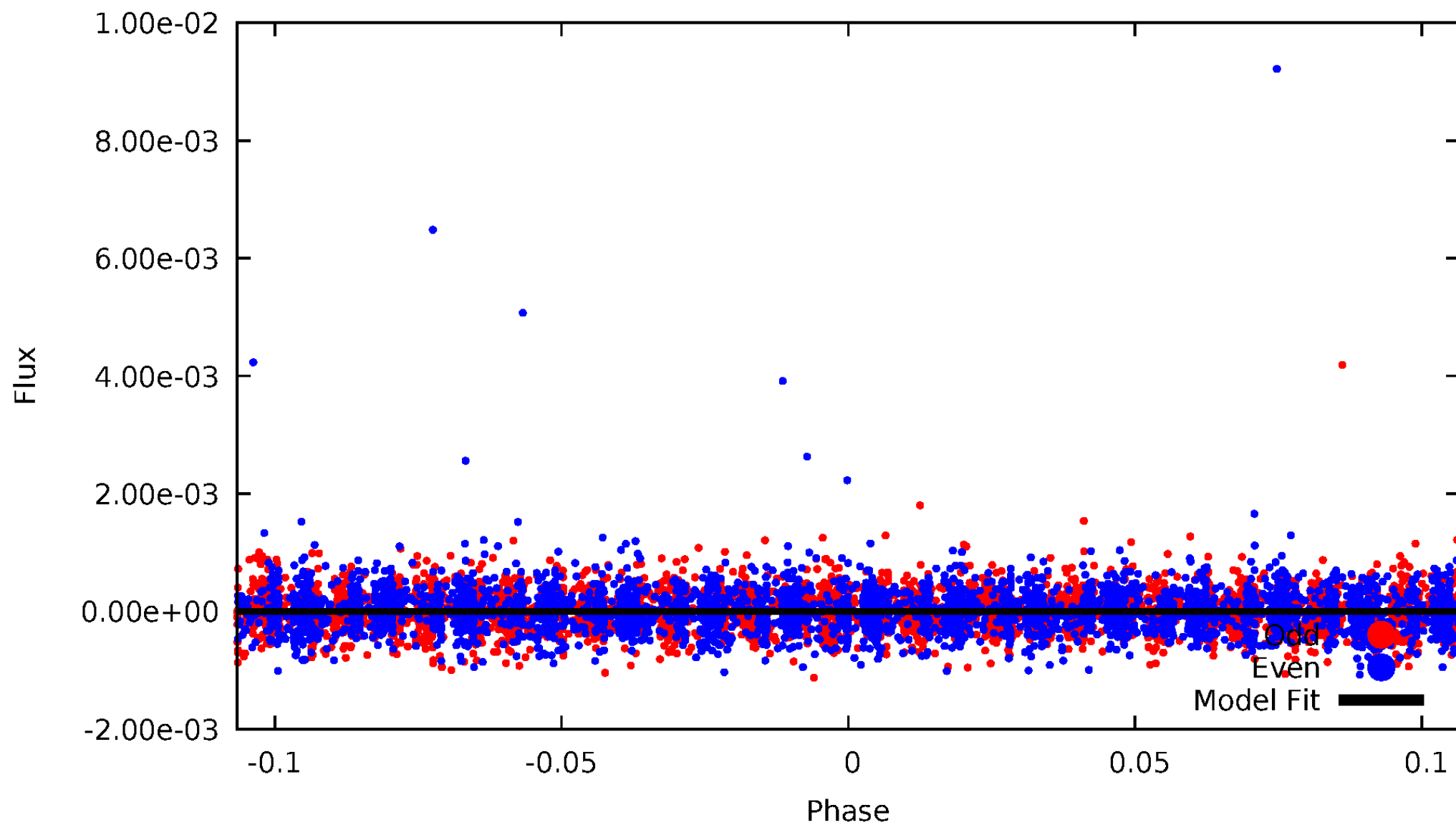


TCE 010966623-01



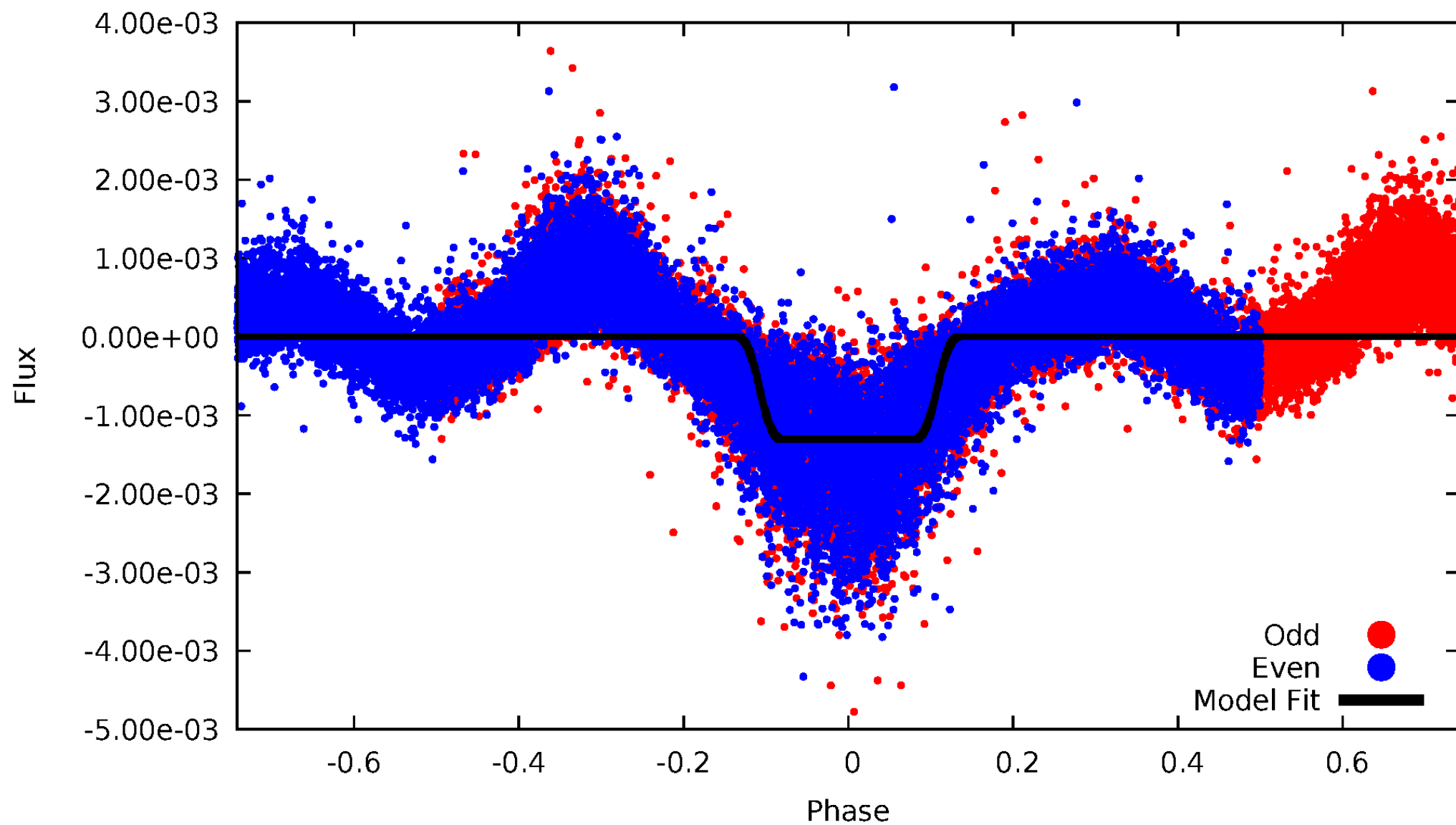
DV Odd/Even

TCE 010966623-01

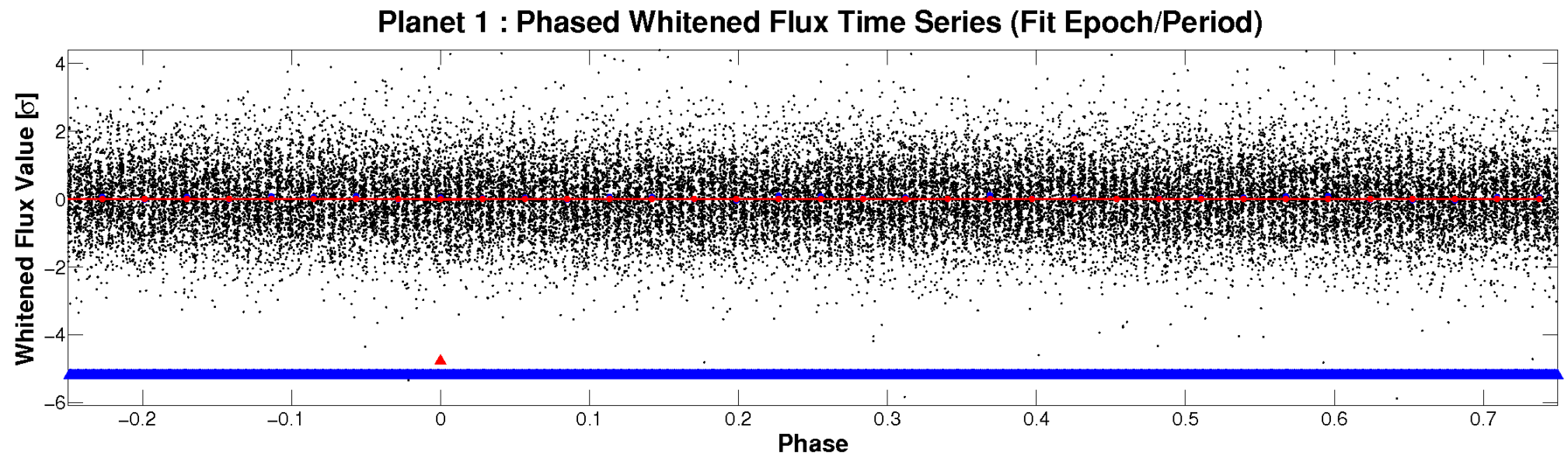
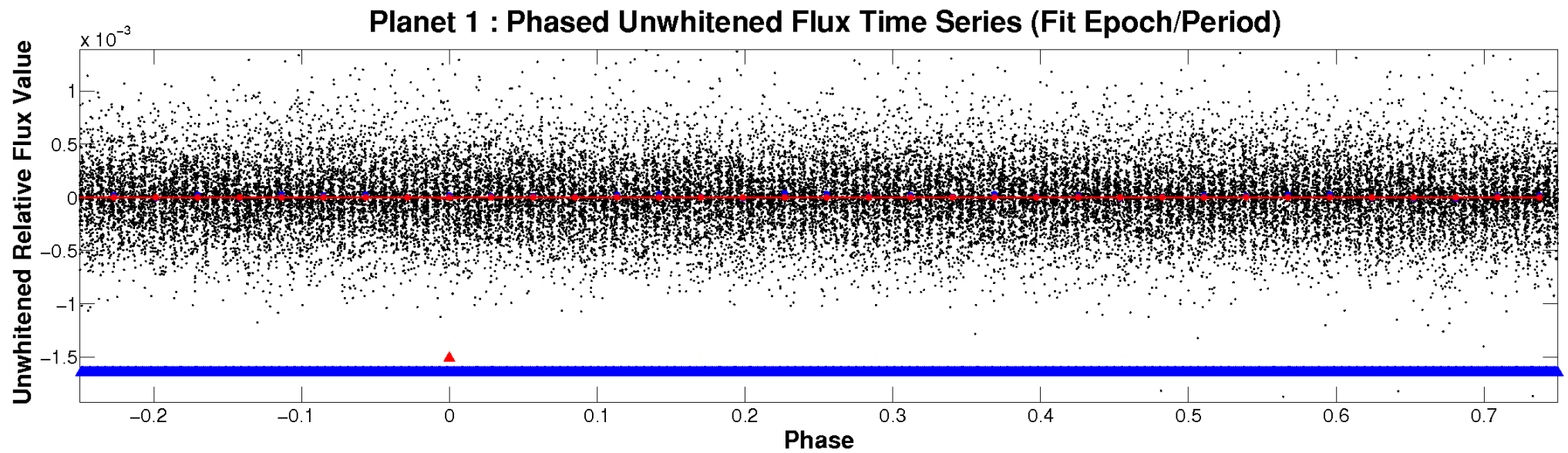


ALT Odd/Even

TCE 010966623-01

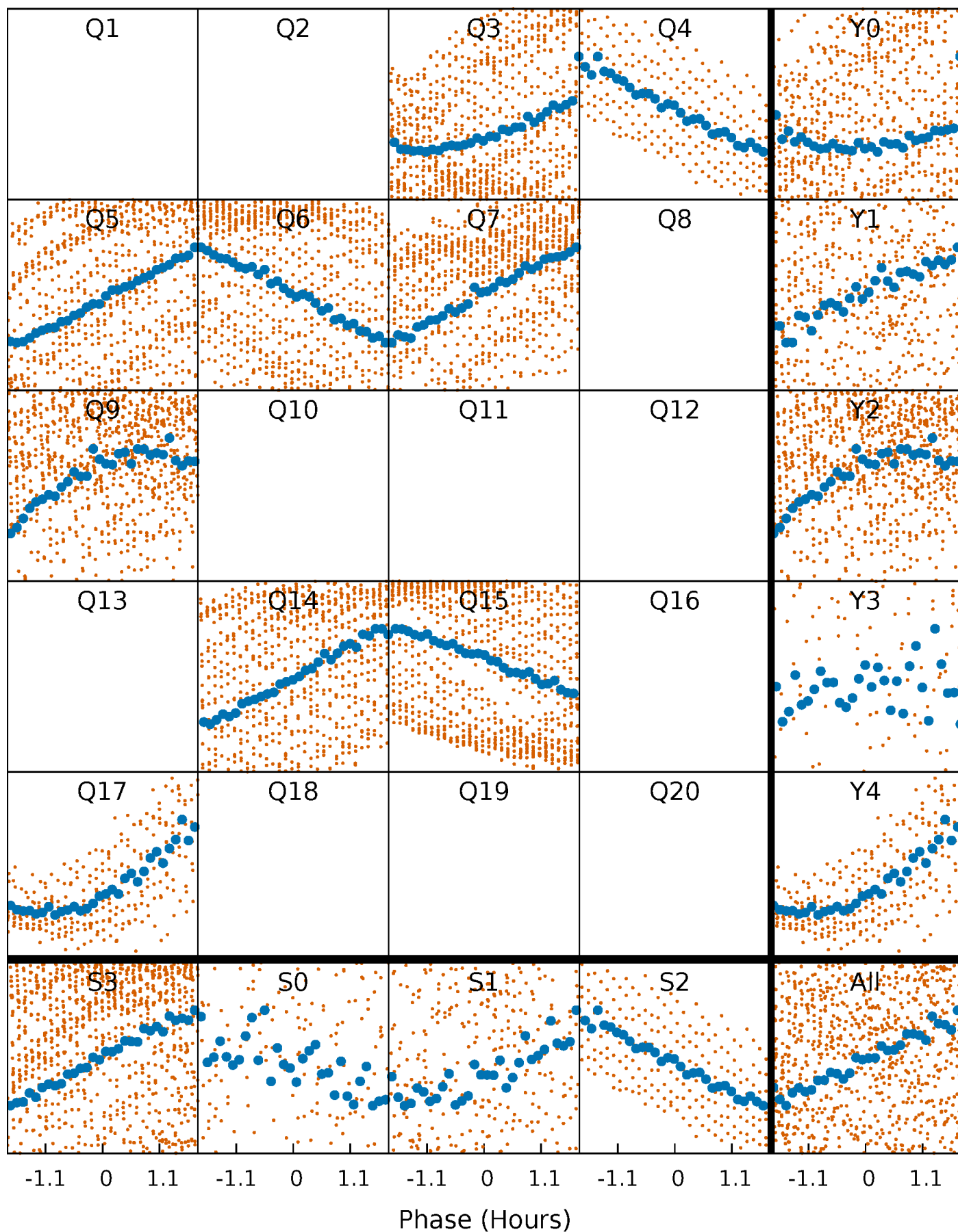


Non-Whitened Vs. Whitened Light Curve



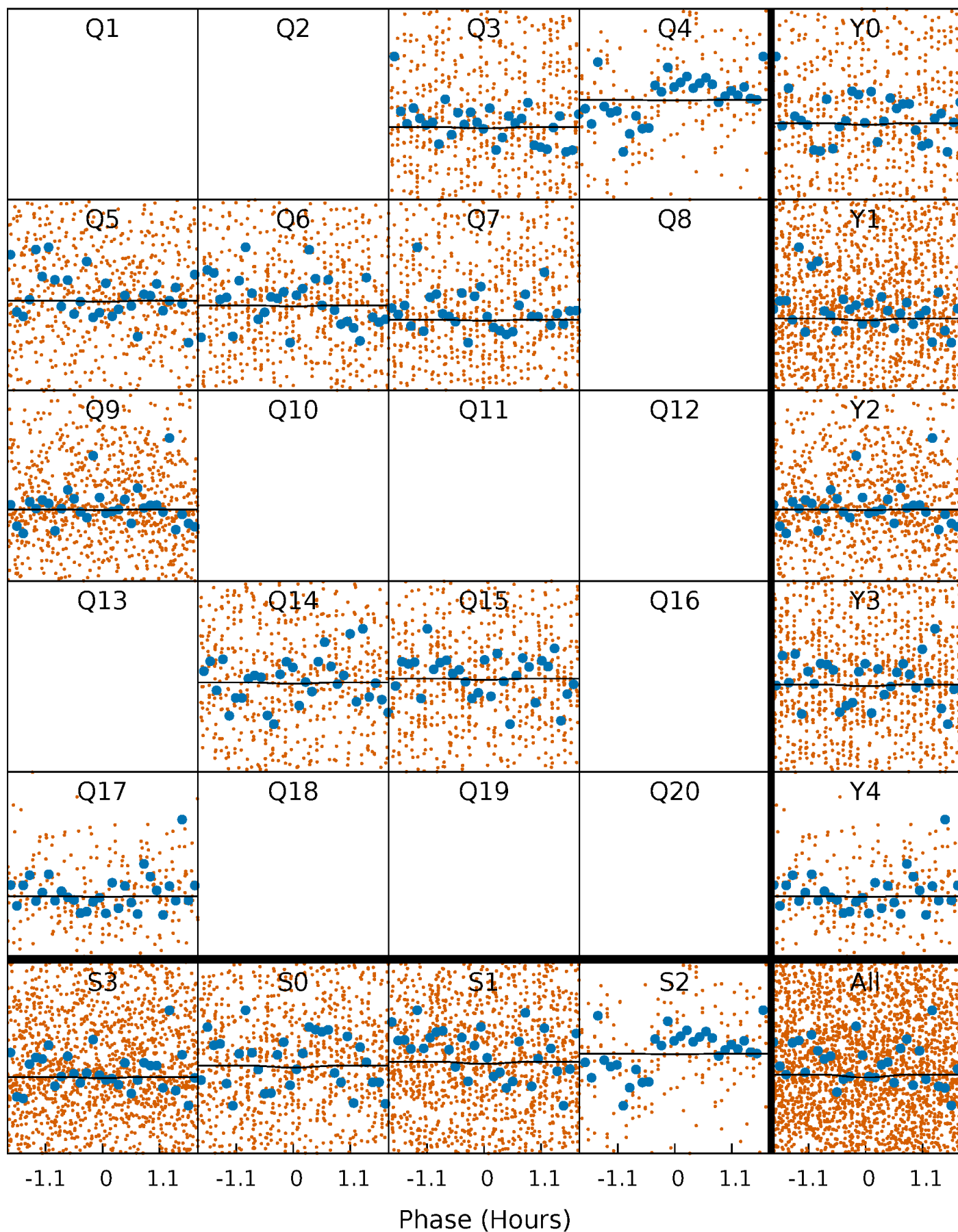
PDC Quarter-Phased Transit Curves

TCE 010966623-01 P= 0.720271 Days $T_0=131.665827$ (BKJD)



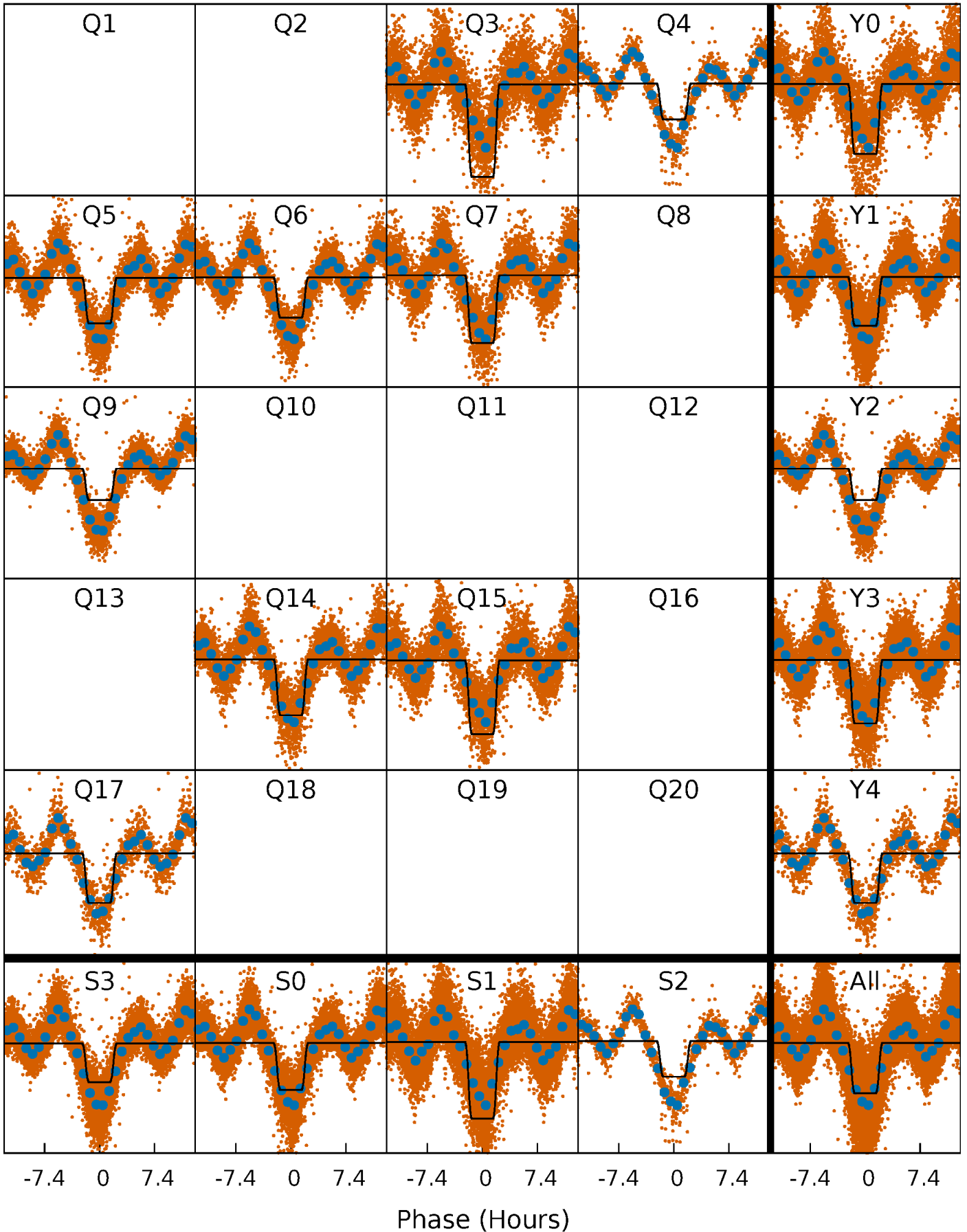
DV Quarter-Phased Transit Curves

TCE 010966623-01 P= 0.720271 Days $T_0=131.665827$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

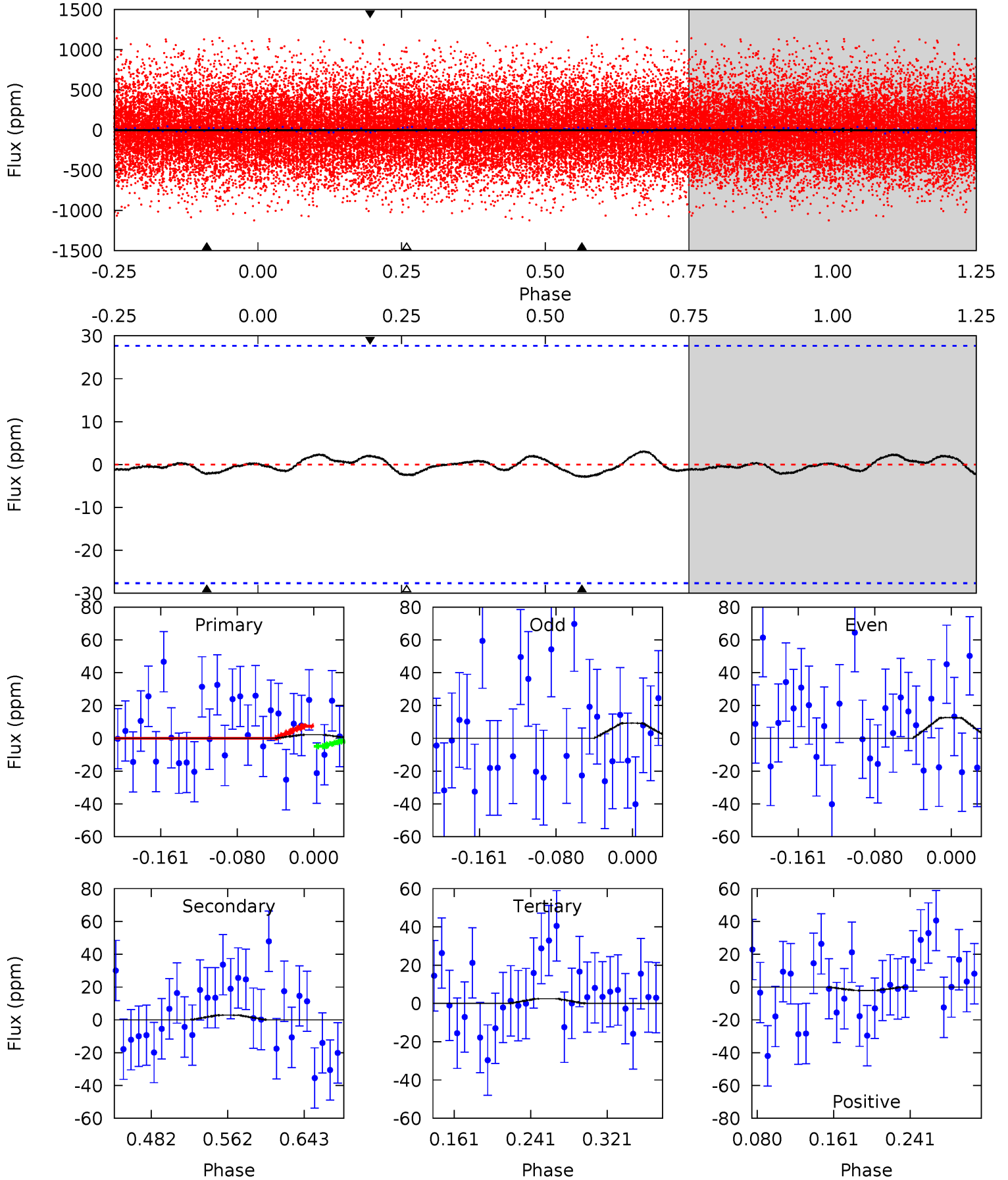
TCE 010966623-01 P= 0.722743 Days $T_0=131.715829$ (BKJD)



DV Model-Shift Uniqueness Test

010966623-01, P = 0.720271 Days, E = 131.665827 Days

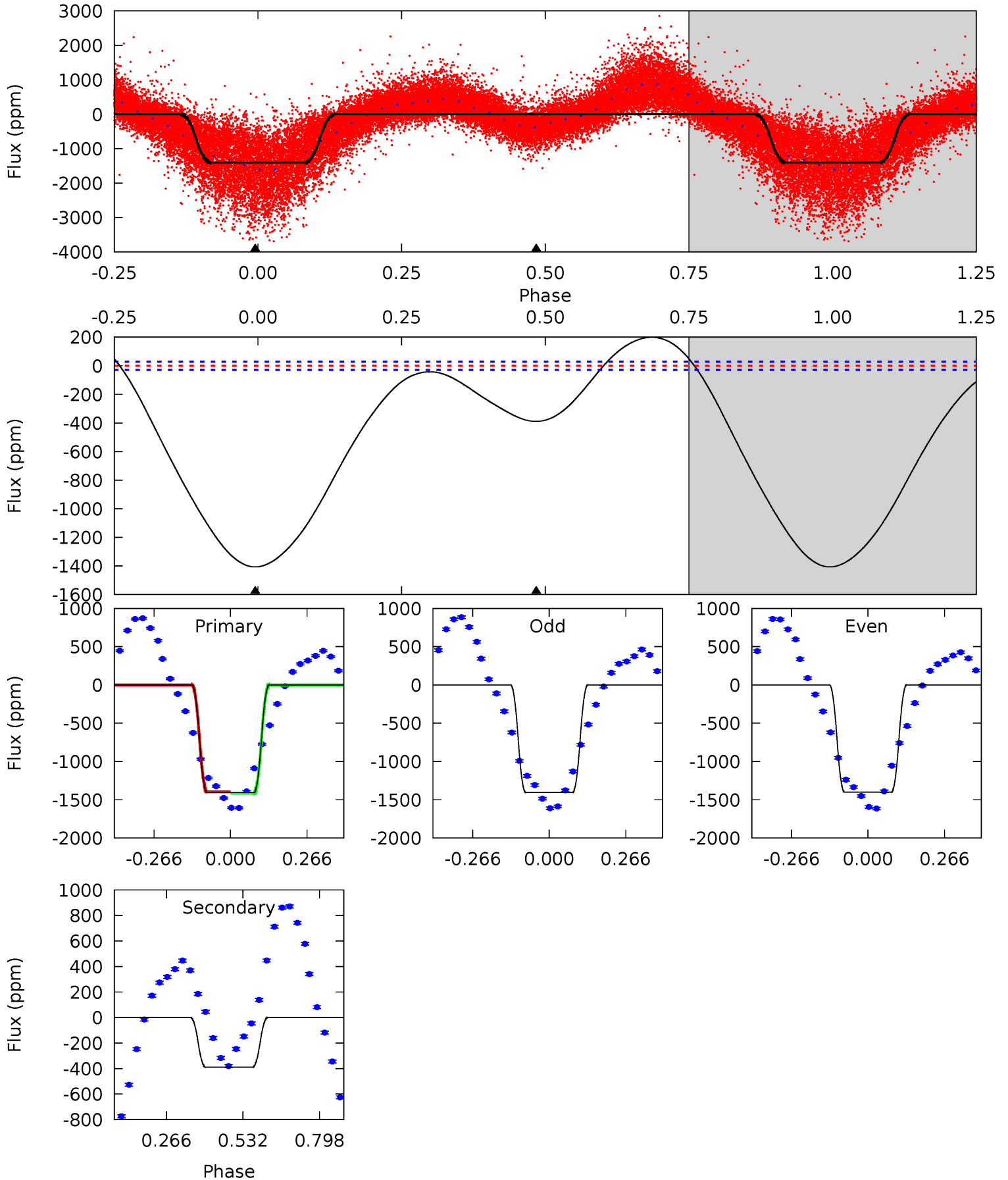
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|-------|-------|------|
| 0.36 | 0.48 | 0.41 | 0.35 | 4.61 | 1.75 | 0.22 | -0.05 | 0.02 | 0.07 | 0.13 | 0.28 | -2.42 | 0.52 | 0.21 |



Alt Model-Shift Uniqueness Test

010966623-01, P = 0.722743 Days, E = 131.715829 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|-------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 213.0 | 58.9 | 0 | 0 | 4.35 | 1.11 | 19.6 | 213.0 | 213.0 | 58.9 | 58.9 | 0.31 | 1.06 | 0.12 | 1.47 |



Stellar Parameters For KIC 010966623

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|---------------------|---------------------------|----------------------------|---------------------------|---------------------------|-------------------------------------------|
| | 15896^{+1}_{-1} | $4.152^{+1.000}_{-1.000}$ | $-1.500^{+1.000}_{-1.000}$ | $2.404^{+1.000}_{-1.000}$ | $2.995^{+1.000}_{-1.000}$ | $0.304^{+1.000}_{-1.000}$ |
| | +0%/-0% | +24%/-24% | +67%/-67% | +42%/-42% | +33%/-33% | +329%/-329% |
| Source | KIC0 | KIC0 | KIC0 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 010966623-01 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{max} (K)$ | $T_{obs} (K)$ | A_{obs} |
|---------|--------------|------------------------|-----------------------|--------------------------|---------------------------|
| DV | -3 ± 6 | $1.05^{+0.97}_{-0.69}$ | 10095^{+230}_{-255} | 5829^{+13691}_{-14522} | $0.516^{+6.135}_{-1.160}$ |
| Alt. | -389 ± 7 | $9.48^{+1.28}_{-1.10}$ | 10074^{+232}_{-223} | 8670^{+966}_{-856} | $1.232^{+0.347}_{-0.275}$ |

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 $A_{obs} \gg 1.0$

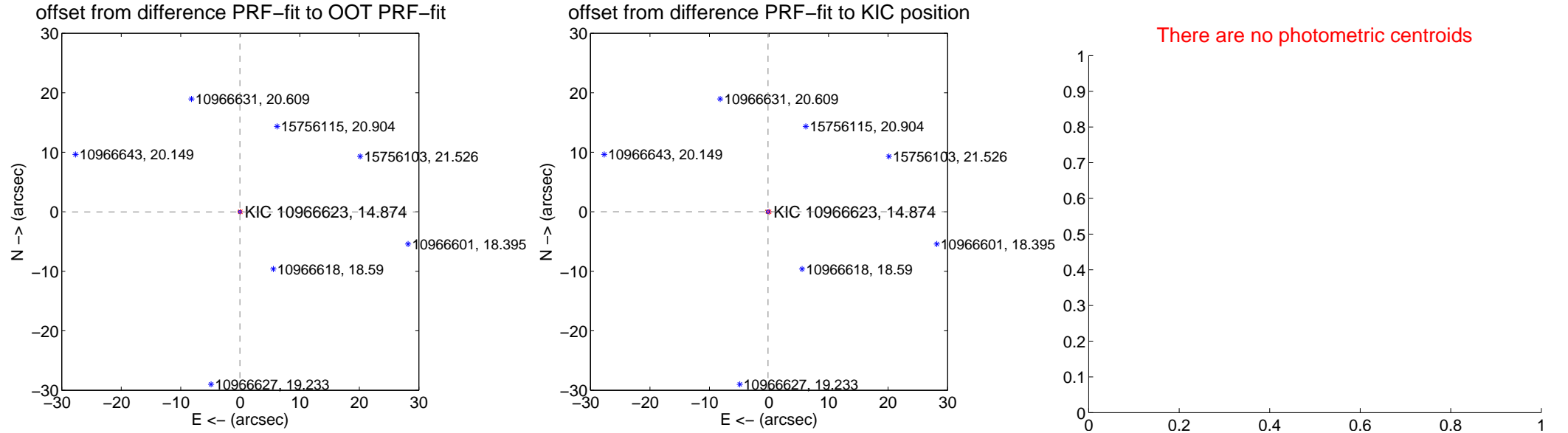
DV Centroid Data

Supplemental centroid analysis for 010966623-01. Kepler magnitude: 14.87. Transit SNR 0.34

There are 2 quarters with good PRF difference image offsets

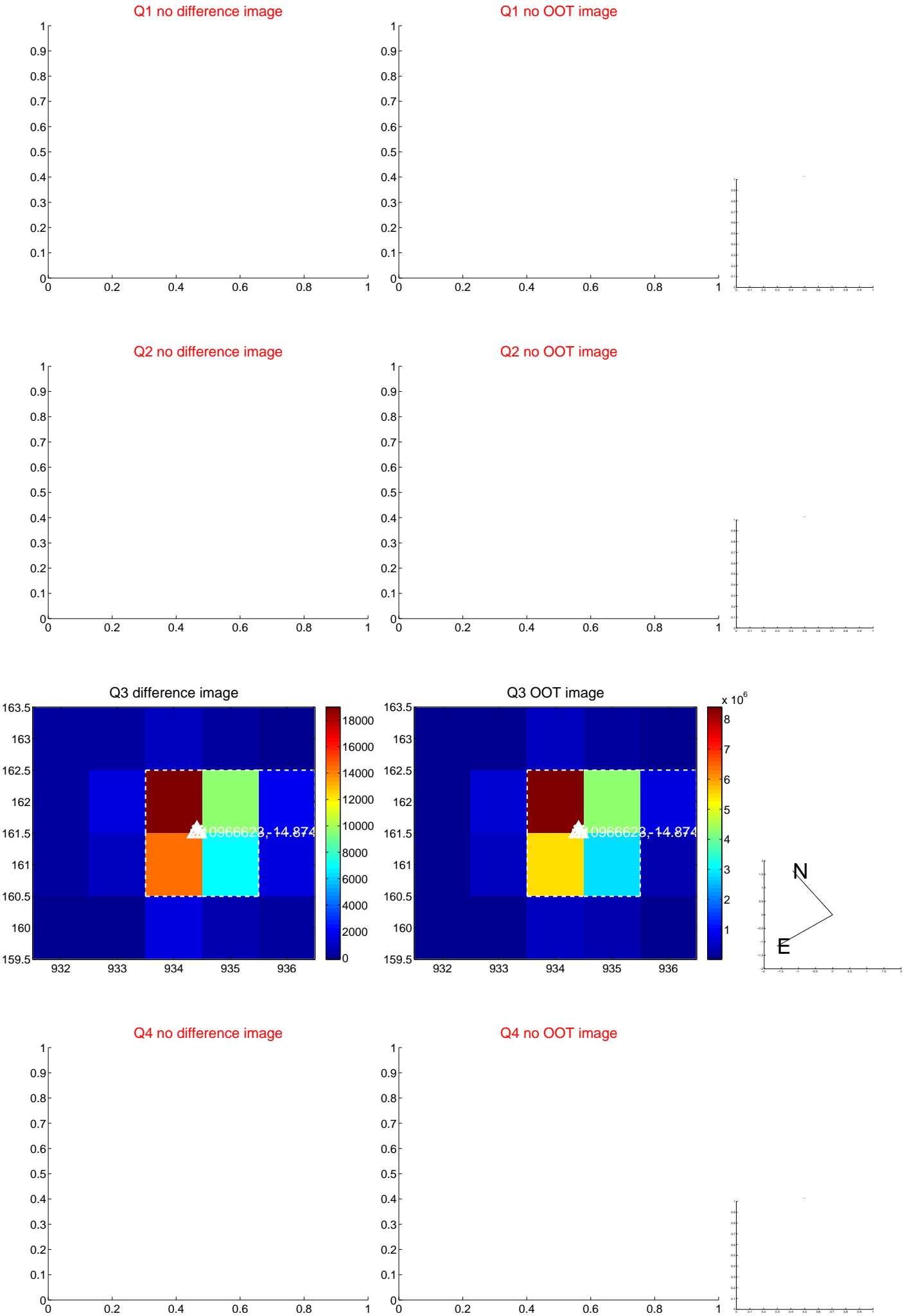
The direct PRF centroid is offset from the target star catalog position by about 0.24 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|-----------------------------------------|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT | 0.062 ± 0.078 | 0.80 | 0.058 ± 0.076 | -0.023 ± 0.081 |
| PRF-fit source offset from KIC position | 0.161 ± 0.094 | 1.72 | 0.161 ± 0.094 | 0.009 ± 0.084 |
| photometric centroid source offset | — | — | — | — |

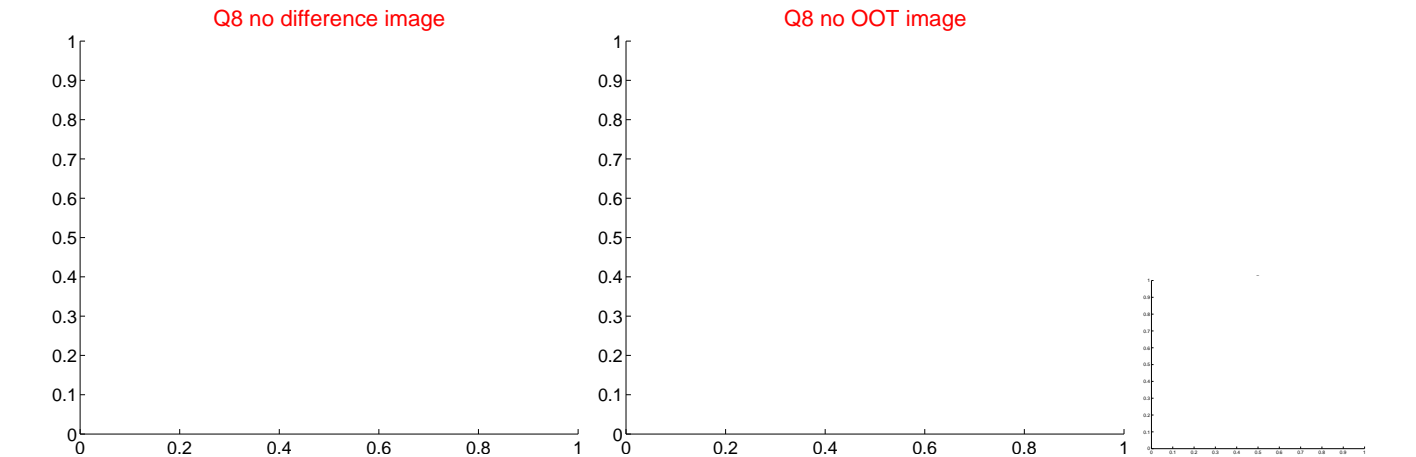
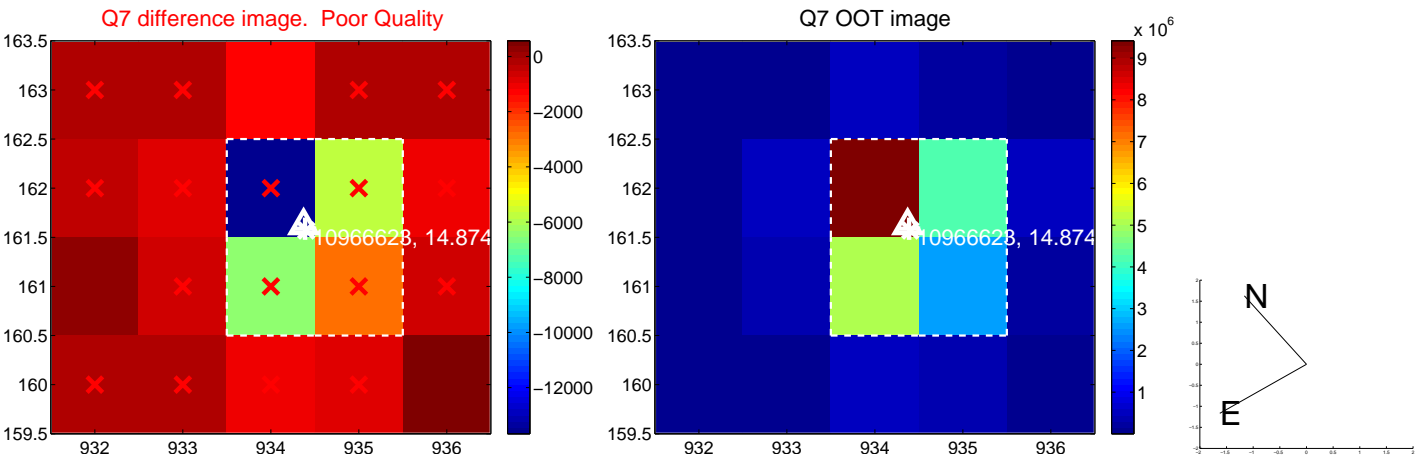
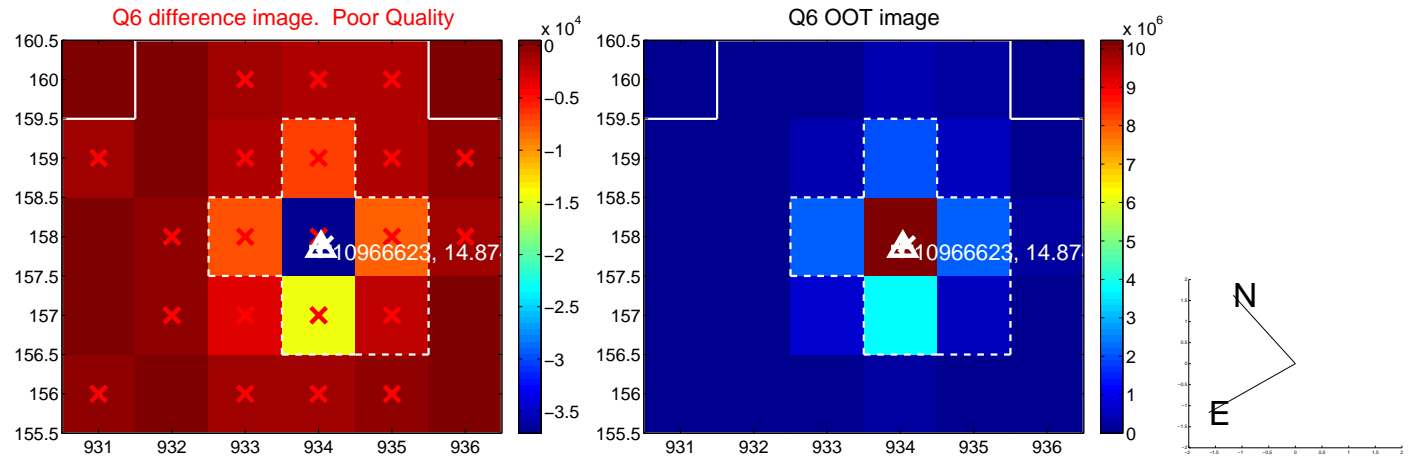
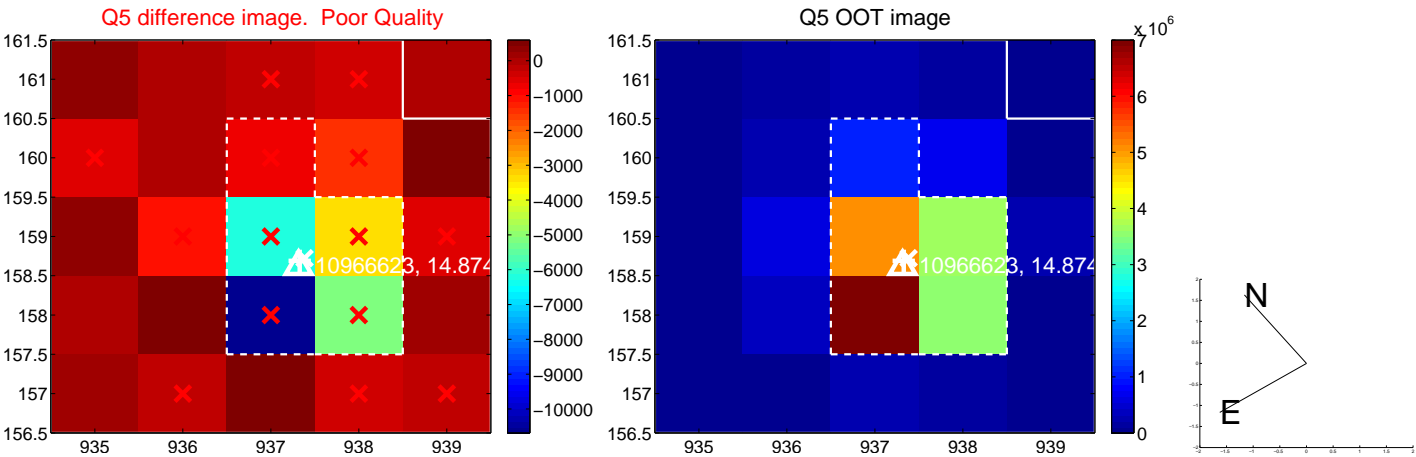


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

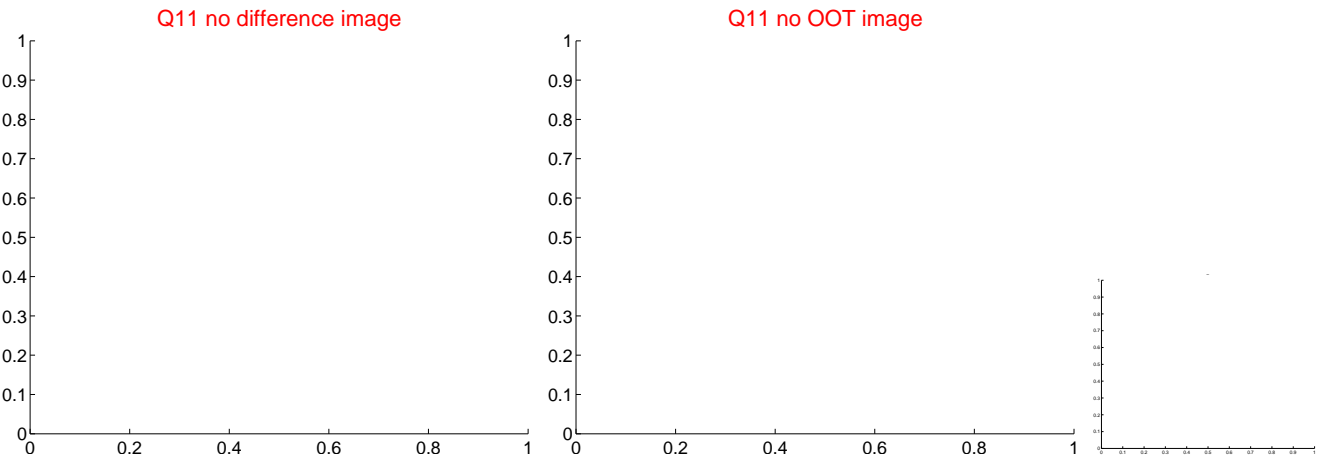
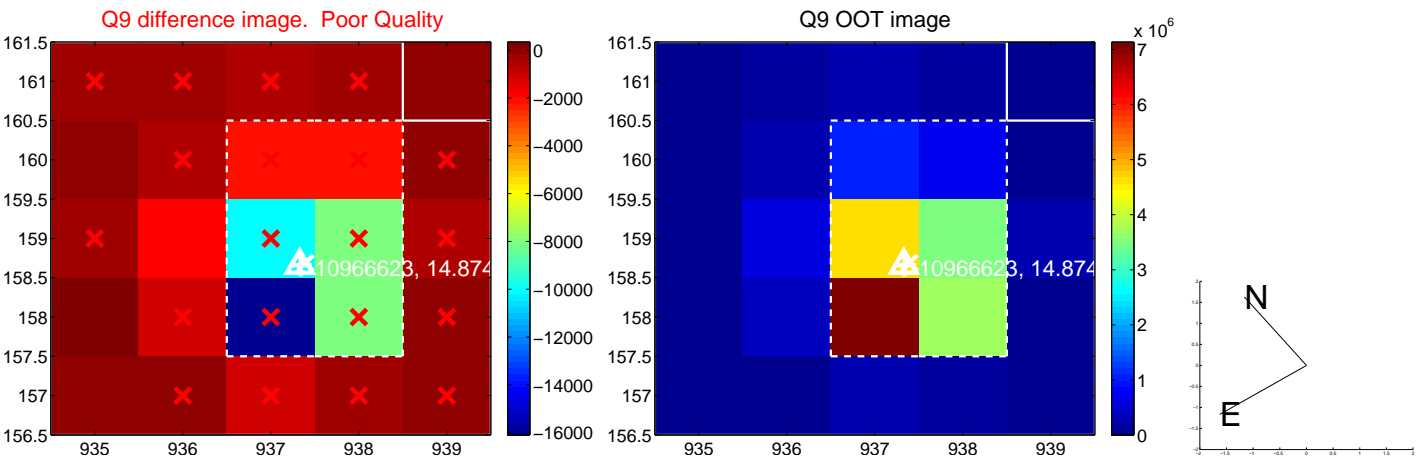
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



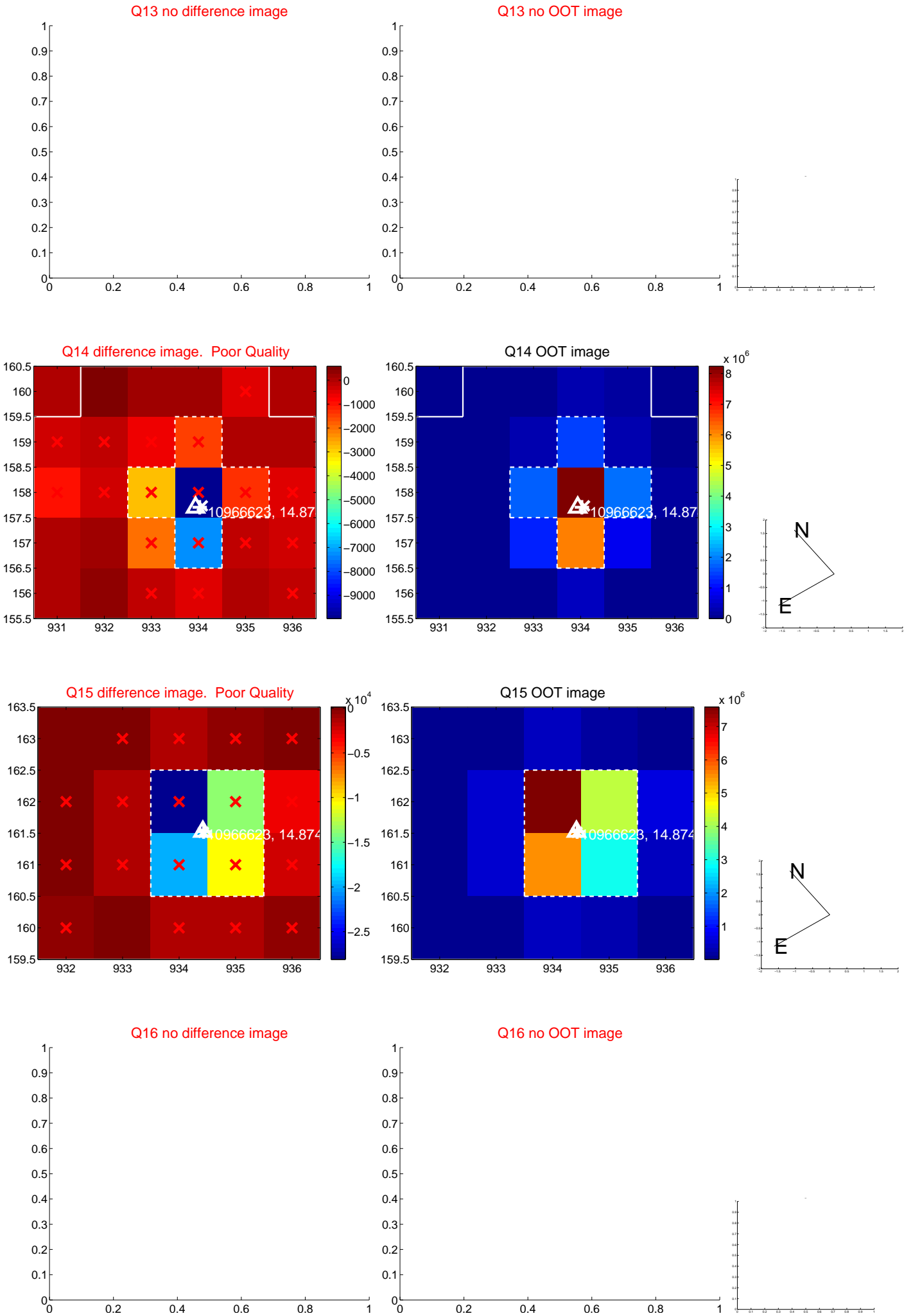
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



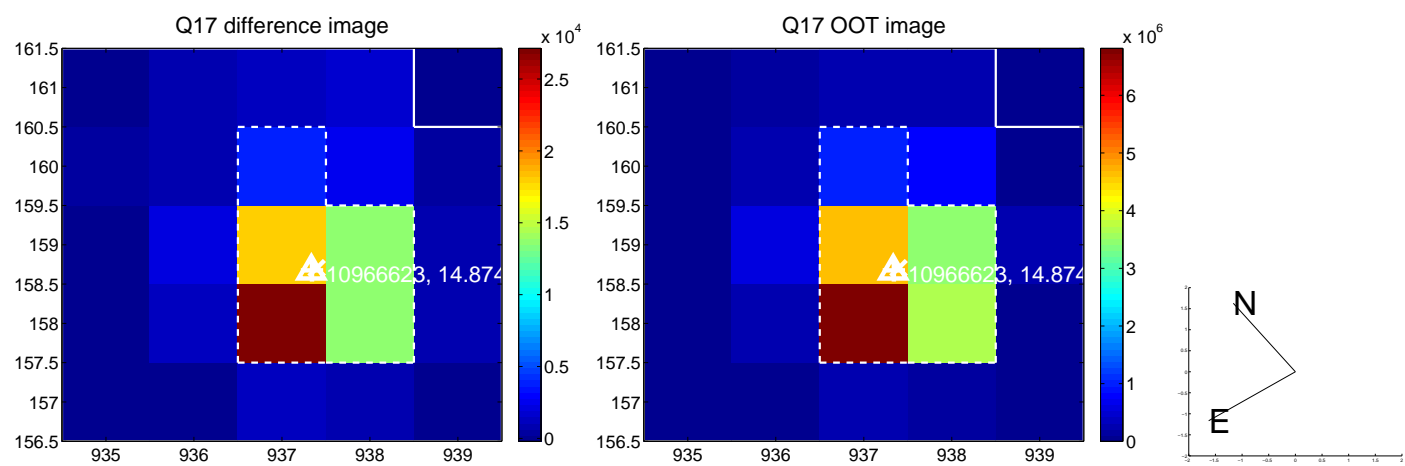
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



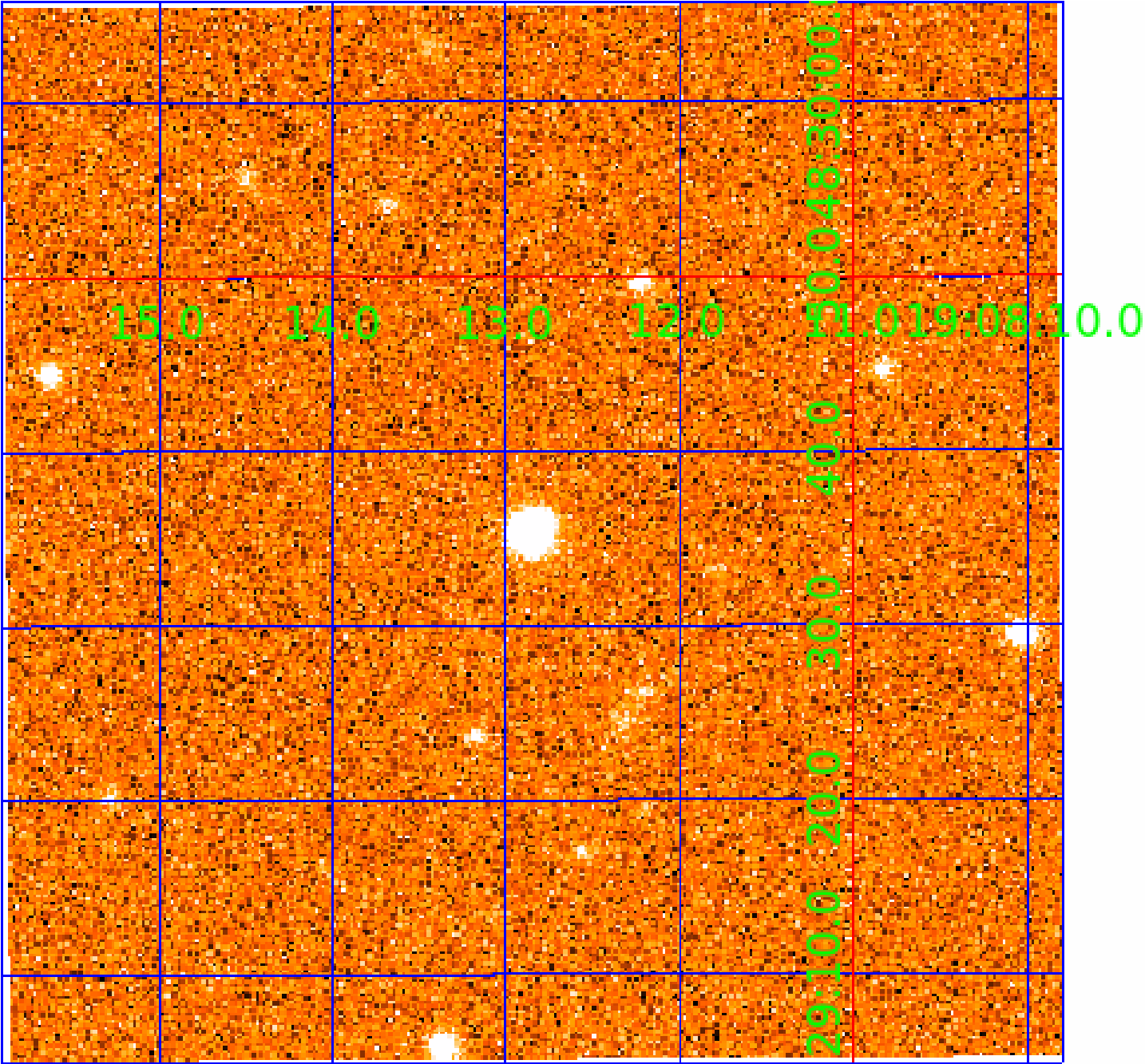
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



folded centroid time series figure for this object.

UKIRT Image

Declination



KIC 010966623

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 010966623-01 | OBS | No | 0.720271 | 131.665827 | 3.1 | 0.921 | 9.1 | 0.3 | 2.40 | 15896 | 0.50 | 643686.71 |
| 010966623-02 | OBS | No | 0.722748 | 131.729699 | 72.3 | 1.118 | 7.8 | 7.4 | 2.40 | 15896 | 2.26 | 640746.64 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|----------------------------------------------------------------------------|
| 010966623-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—CENT_FEW_DIFFS |
| 010966623-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | SWEET_NTL—LPP_DV—MOD_NONUNIQ_DV |

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

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

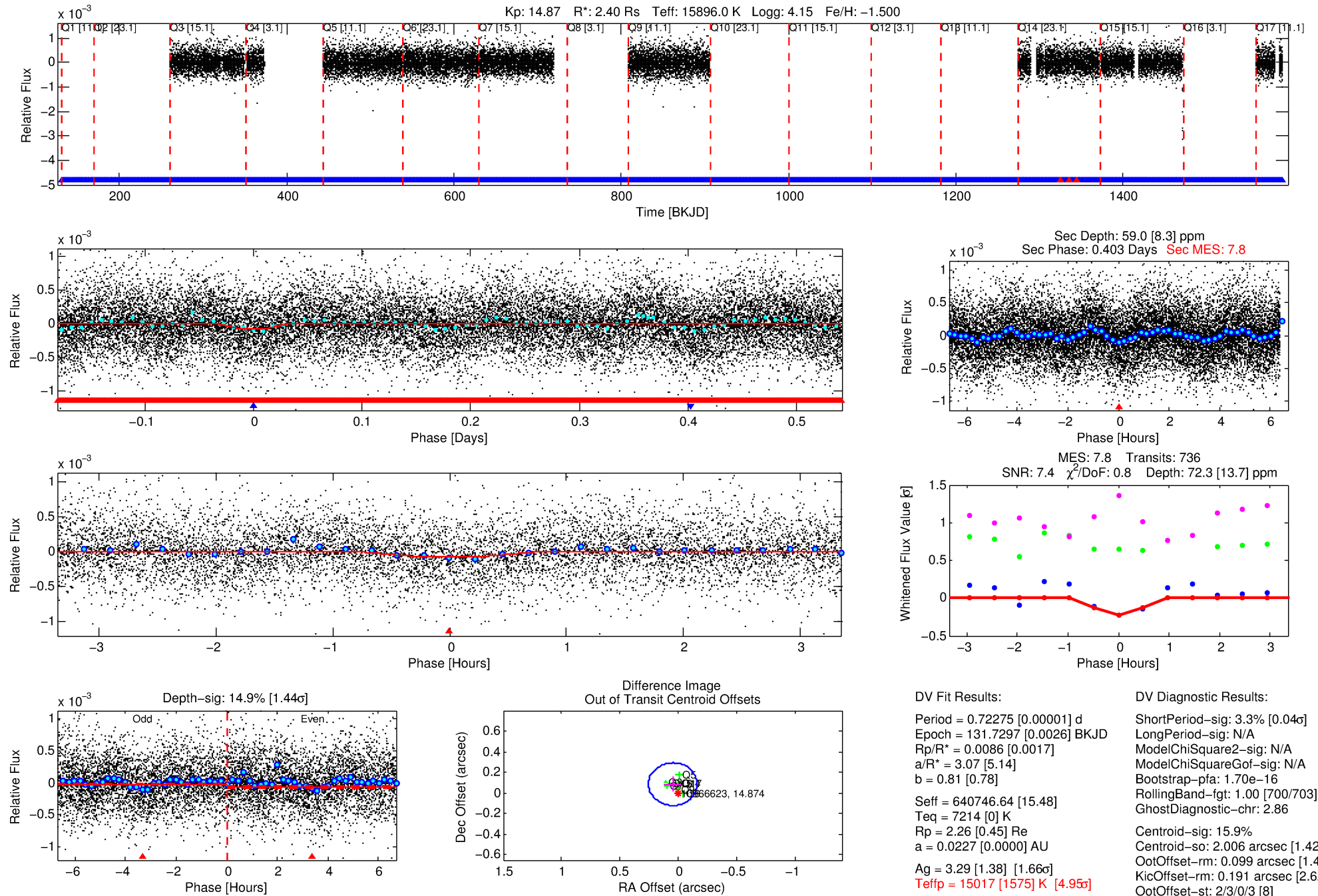
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010966623-02

No Significant Match Found

DV One-Page Summary

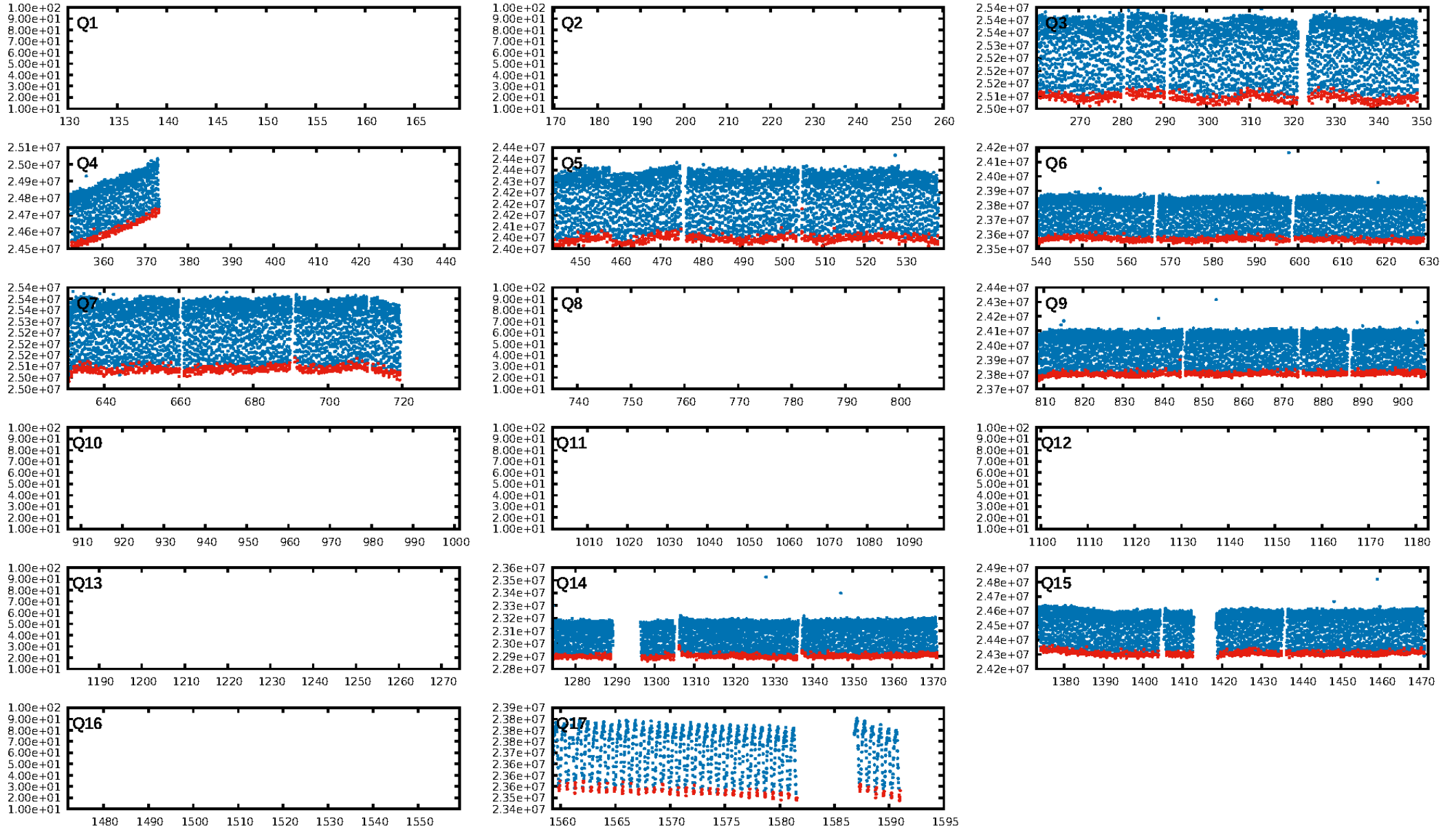
KIC: 10966623 Candidate: 2 of 2 Period: 0.723 d



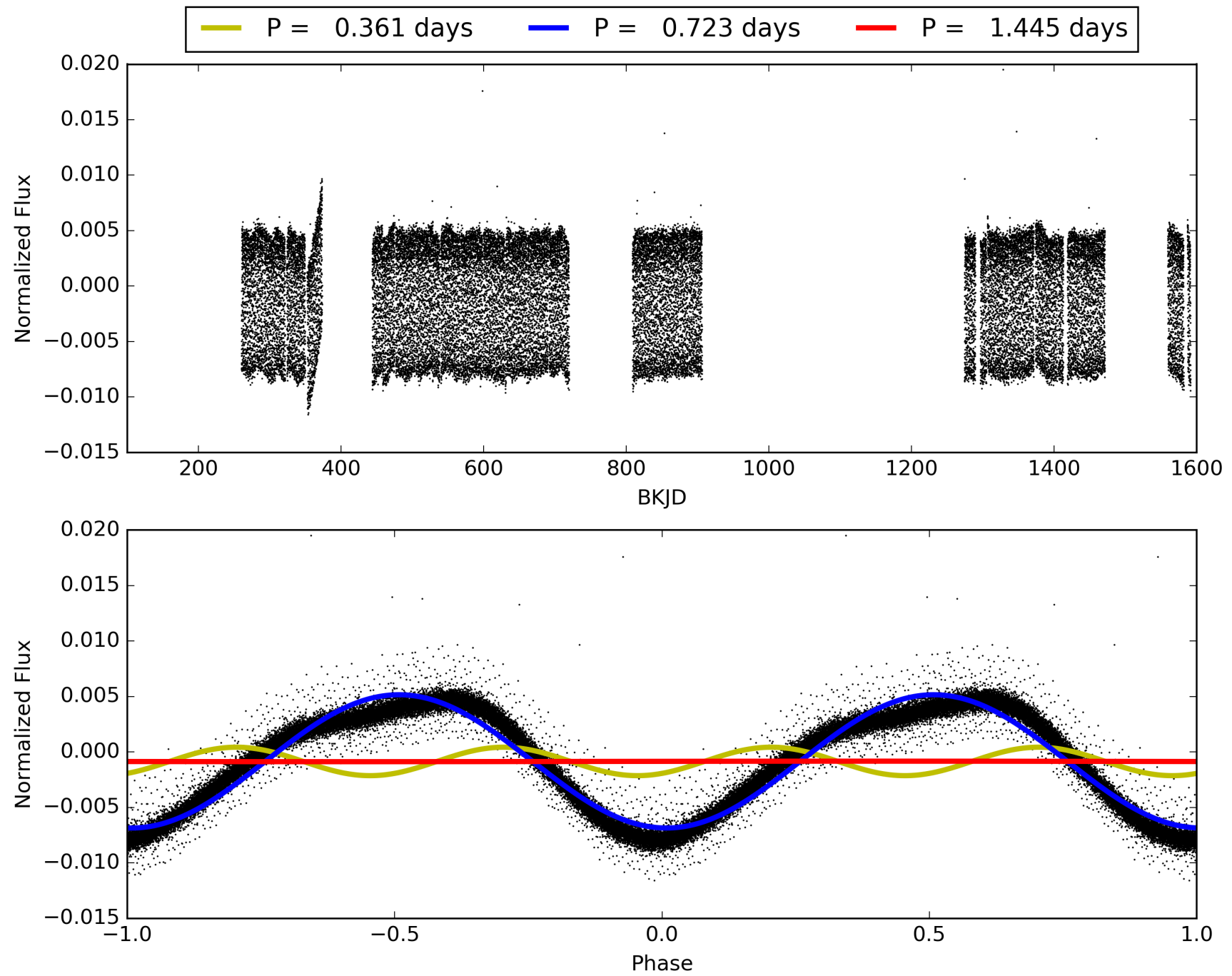
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 13:50:30 Z

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

TCE 010966623-02, PDC Light Curves

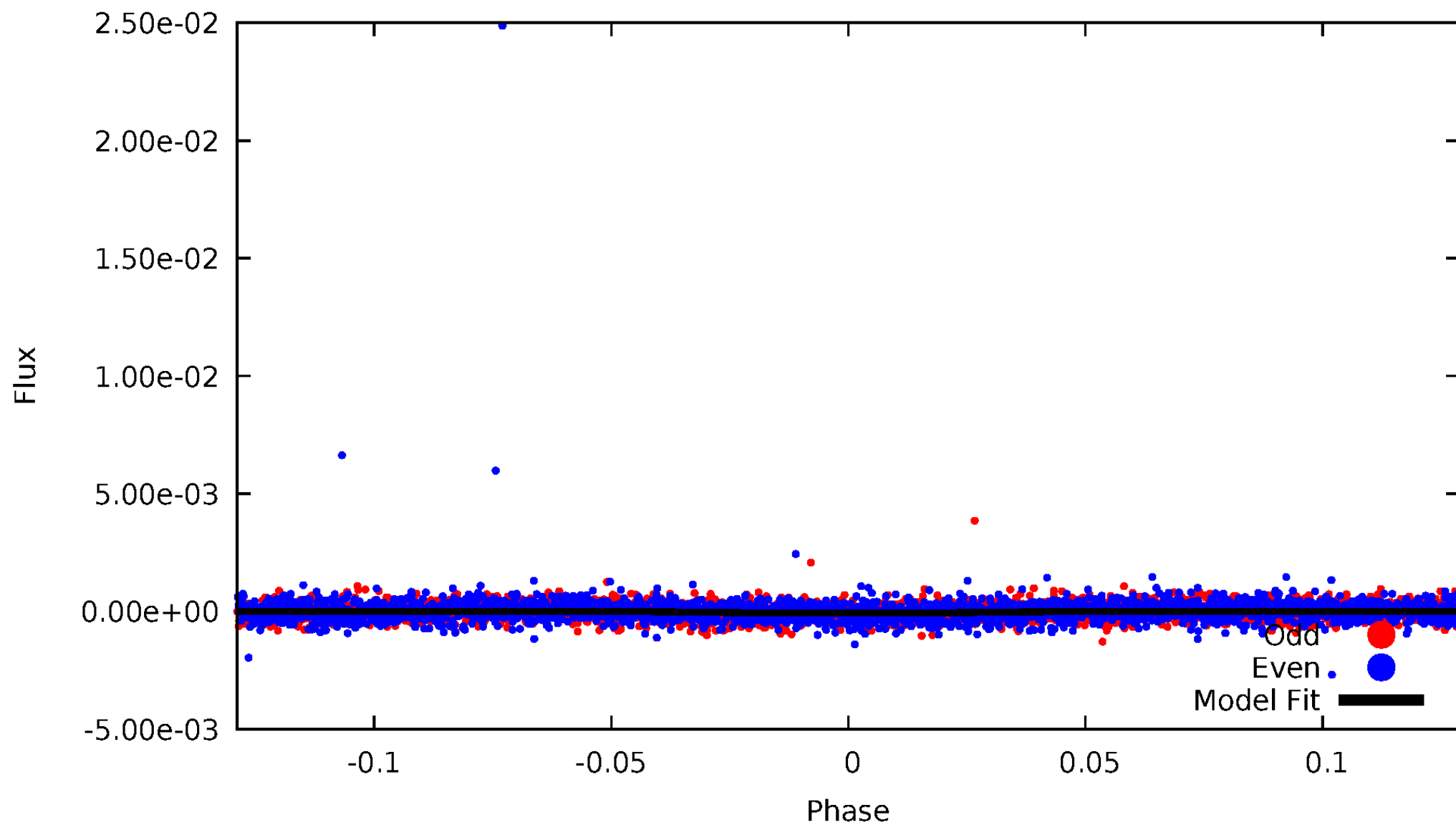


TCE 010966623-02



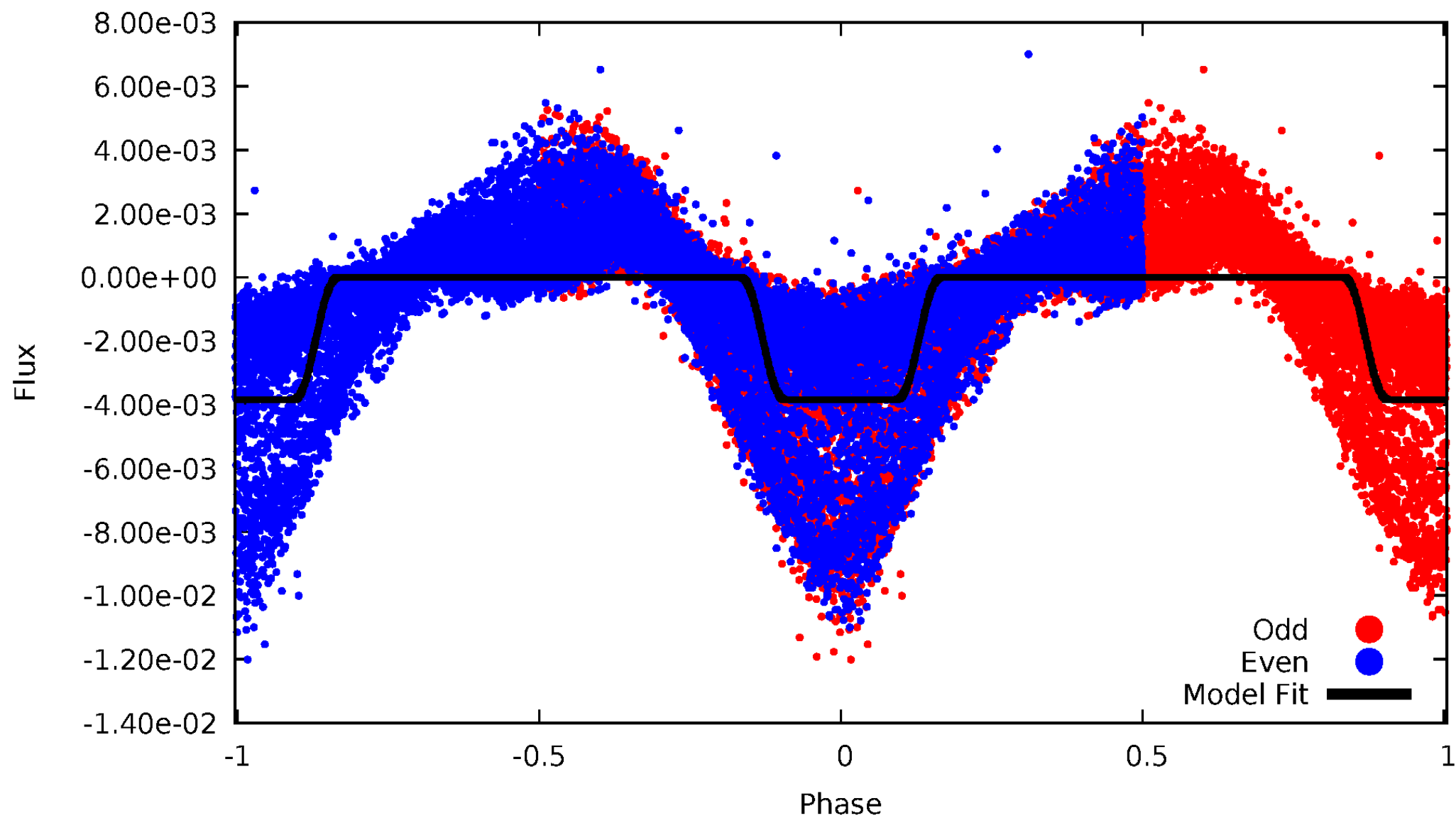
DV Odd/Even

TCE 010966623-02



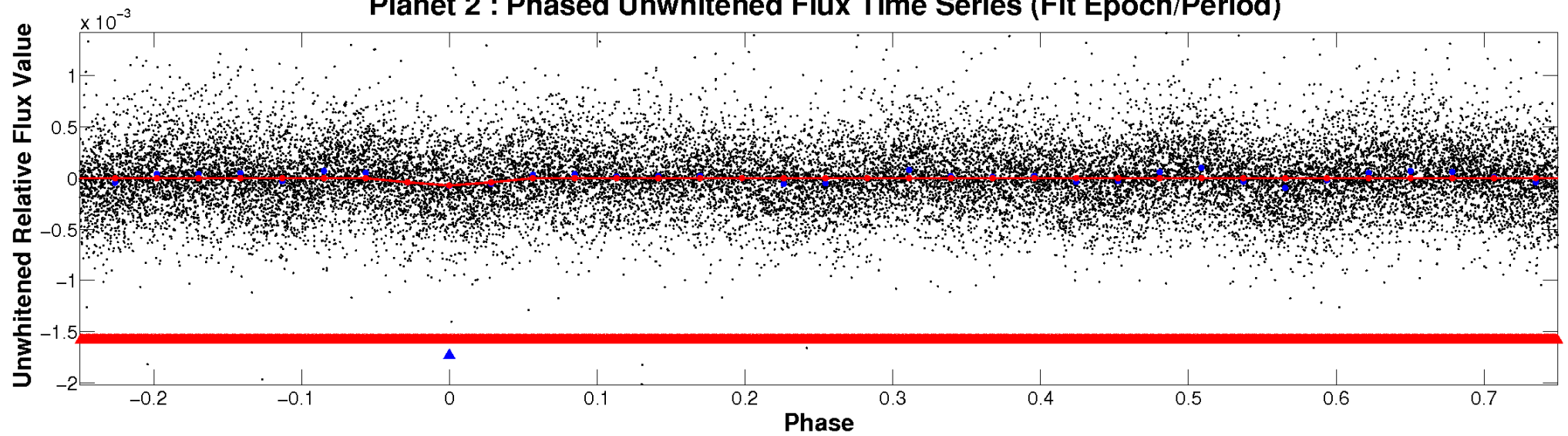
ALT Odd/Even

TCE 010966623-02

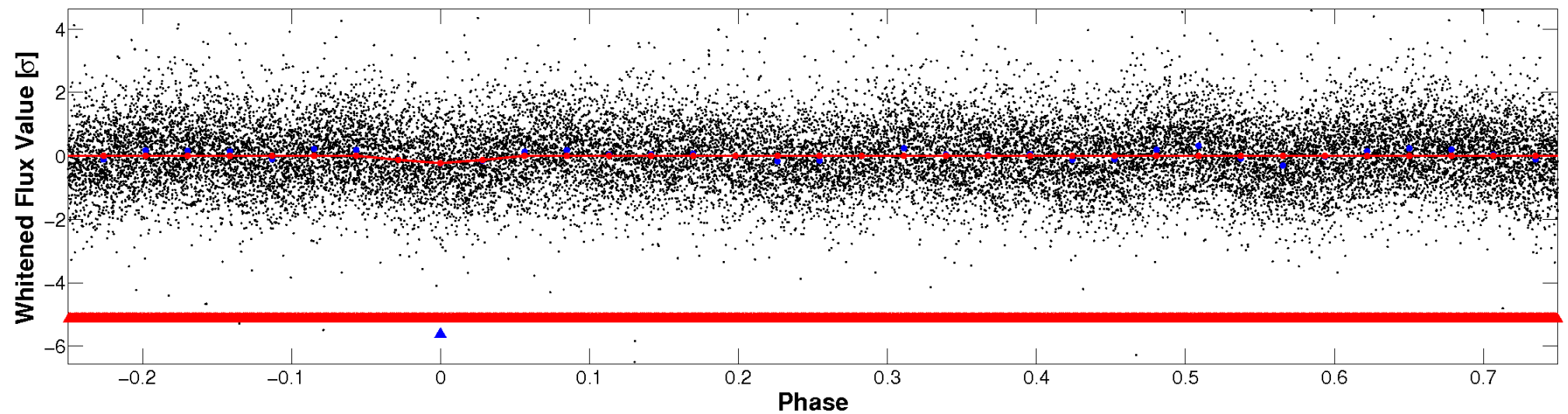


Non-Whitened Vs. Whitened Light Curve

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

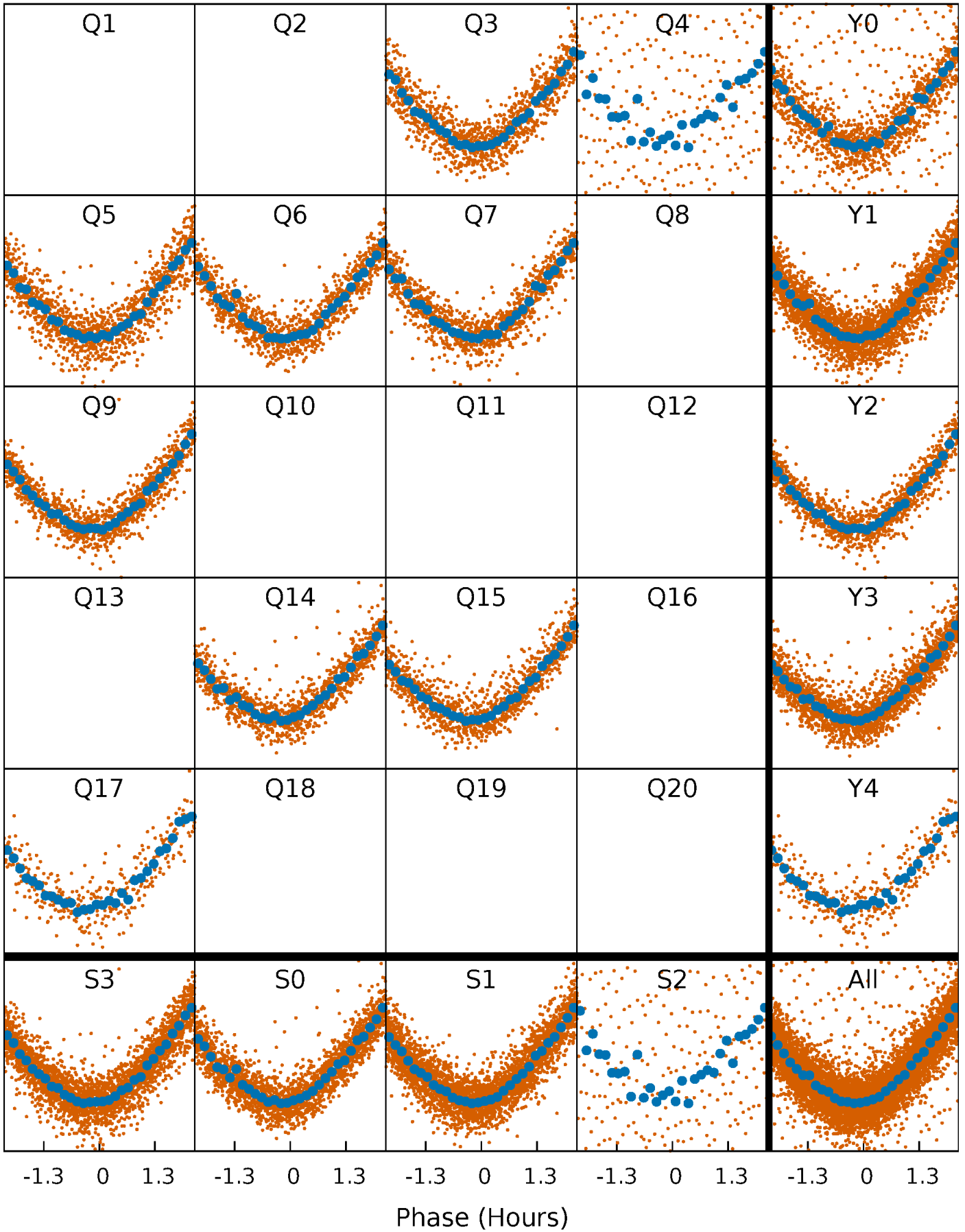


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



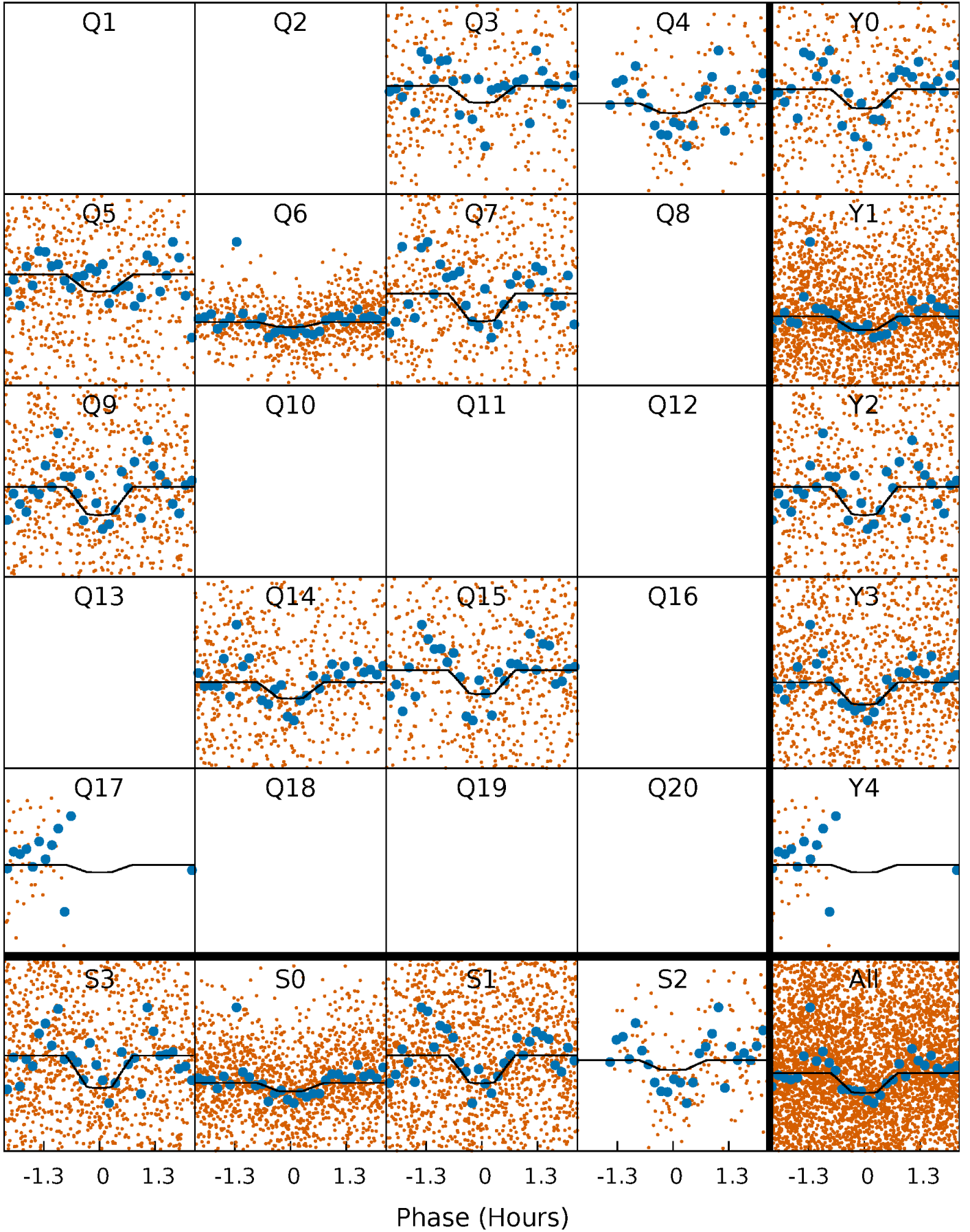
PDC Quarter-Phased Transit Curves

TCE 010966623-02 P= 0.722748 Days $T_0=131.729699$ (BKJD)



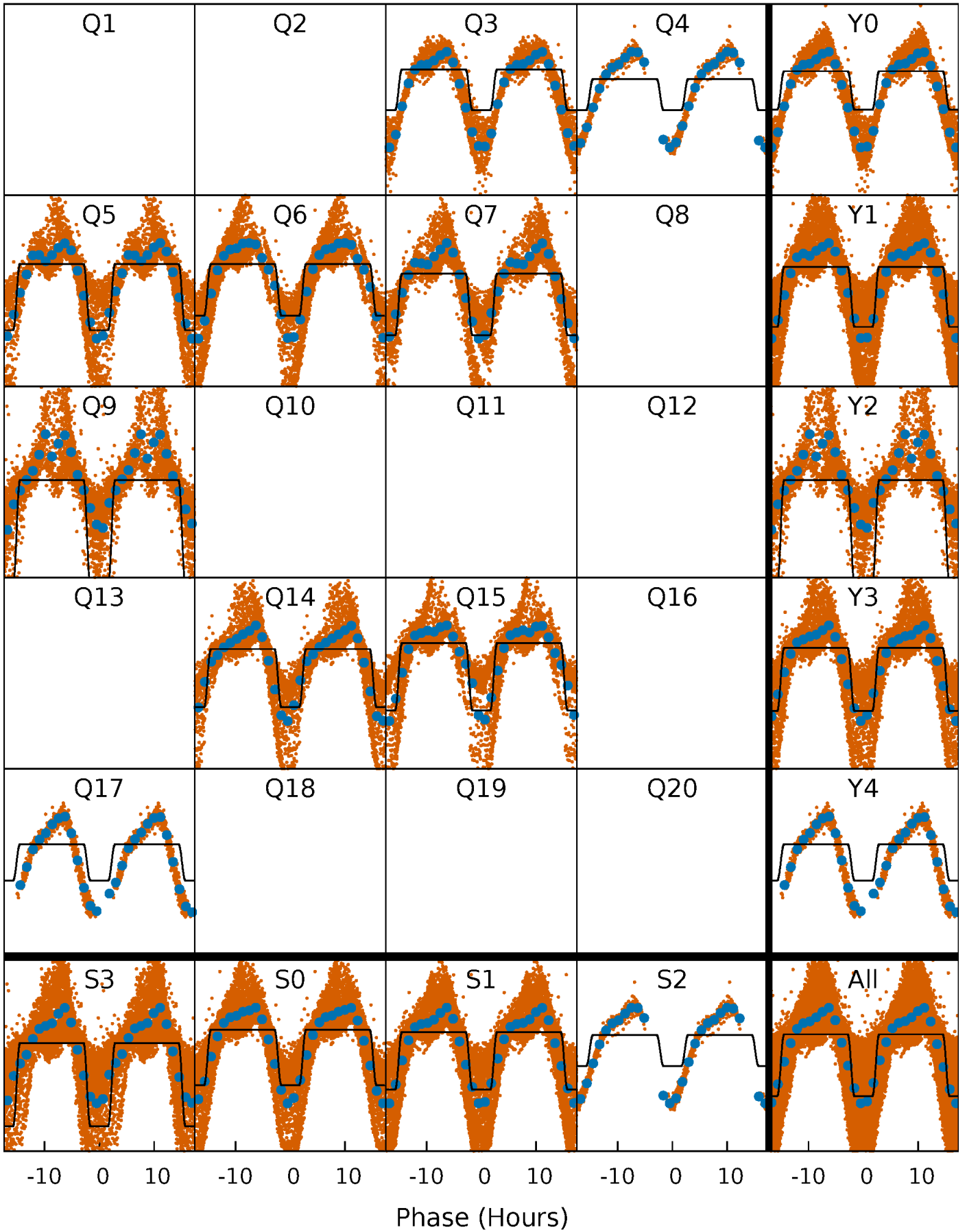
DV Quarter-Phased Transit Curves

TCE 010966623-02 P= 0.722748 Days $T_0=131.729699$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

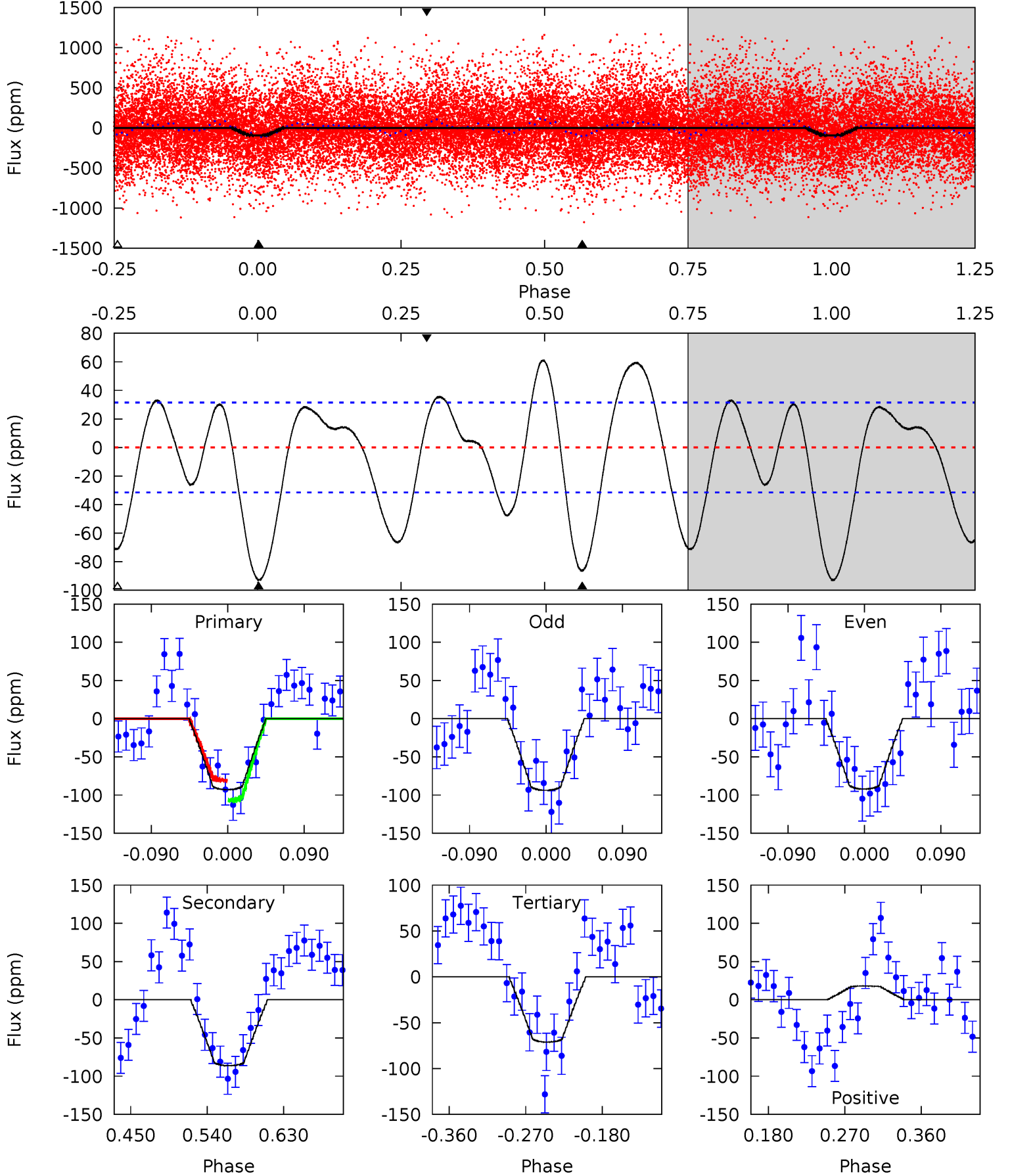
TCE 010966623-02 P= 0.722743 Days $T_0=131.733594$ (BKJD)



DV Model-Shift Uniqueness Test

010966623-02, P = 0.722748 Days, E = 131.729699 Days

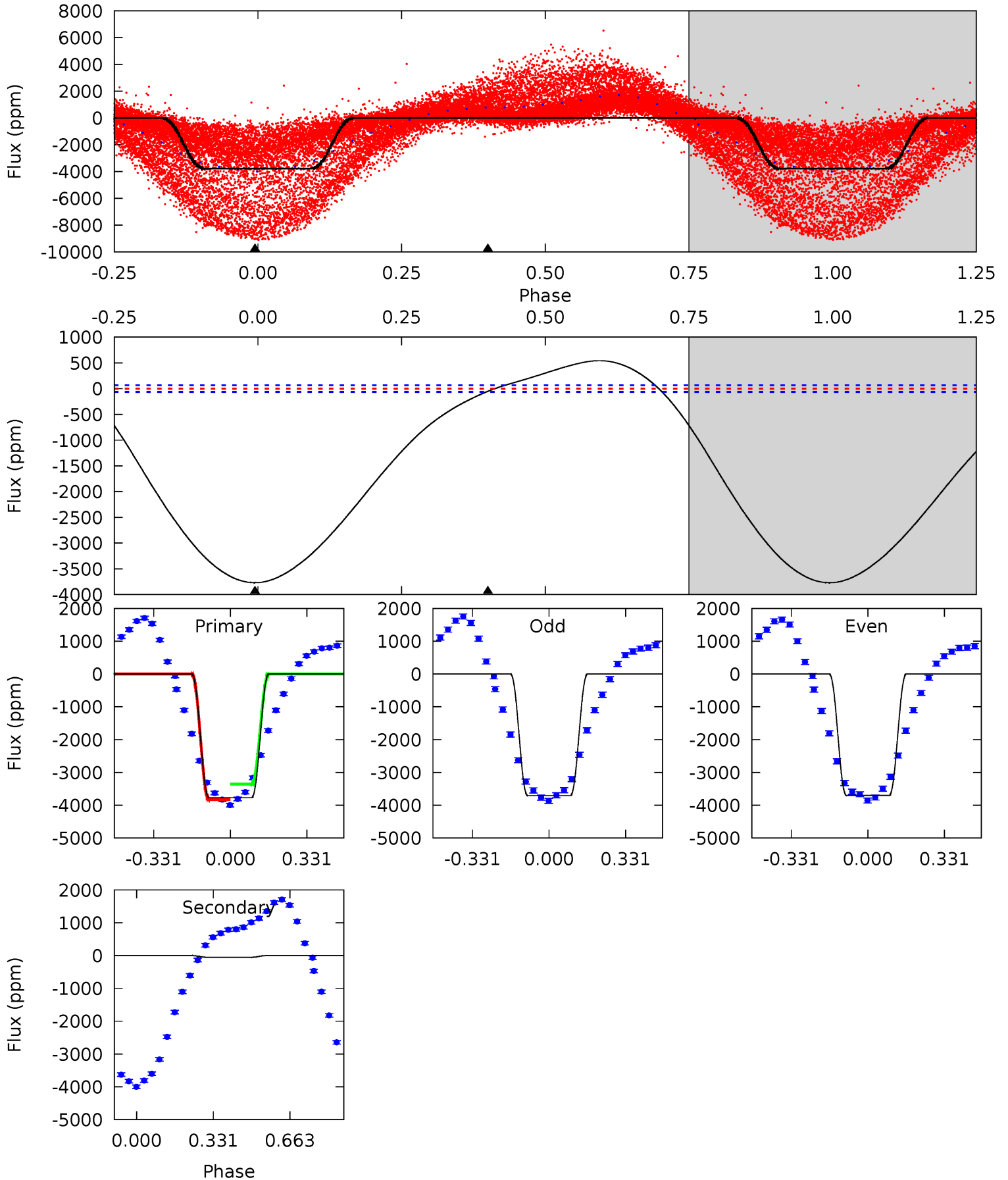
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 13.5 | 12.6 | 10.4 | 2.62 | 4.59 | 1.70 | 4.82 | 3.17 | 10.9 | 2.21 | 9.96 | 0.12 | 1.05 | 0.40 | 1.98 |



Alt Model-Shift Uniqueness Test

010966623-02, P = 0.722743 Days, E = 131.733594 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|-------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 248.4 | 3.49 | 0 | 0 | 4.31 | 0.97 | 19.4 | 248.4 | 248.4 | 3.49 | 3.49 | 0.07 | 1.01 | 0.13 | 22.8 |



Stellar Parameters For KIC 010966623

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|---------------------|---------------------------|----------------------------|---------------------------|---------------------------|-------------------------------------------|
| | 15896^{+1}_{-1} | $4.152^{+1.000}_{-1.000}$ | $-1.500^{+1.000}_{-1.000}$ | $2.404^{+1.000}_{-1.000}$ | $2.995^{+1.000}_{-1.000}$ | $0.304^{+1.000}_{-1.000}$ |
| | +0%/-0% | +24%/-24% | +67%/-67% | +42%/-42% | +33%/-33% | +329%/-329% |
| Source | KIC0 | KIC0 | KIC0 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 010966623-02 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|--------------|-------------------------|-----------------------|-------------------------|---------------------------|
| DV | -86 ± 7 | $2.26^{+0.46}_{-0.44}$ | 10089^{+202}_{-218} | 16612^{+4706}_{-2993} | $4.760^{+2.845}_{-1.470}$ |
| Alt. | -53 ± 15 | $16.27^{+0.76}_{-0.74}$ | 10086^{+208}_{-235} | -5957^{+166}_{-173} | $0.056^{+0.017}_{-0.017}$ |

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

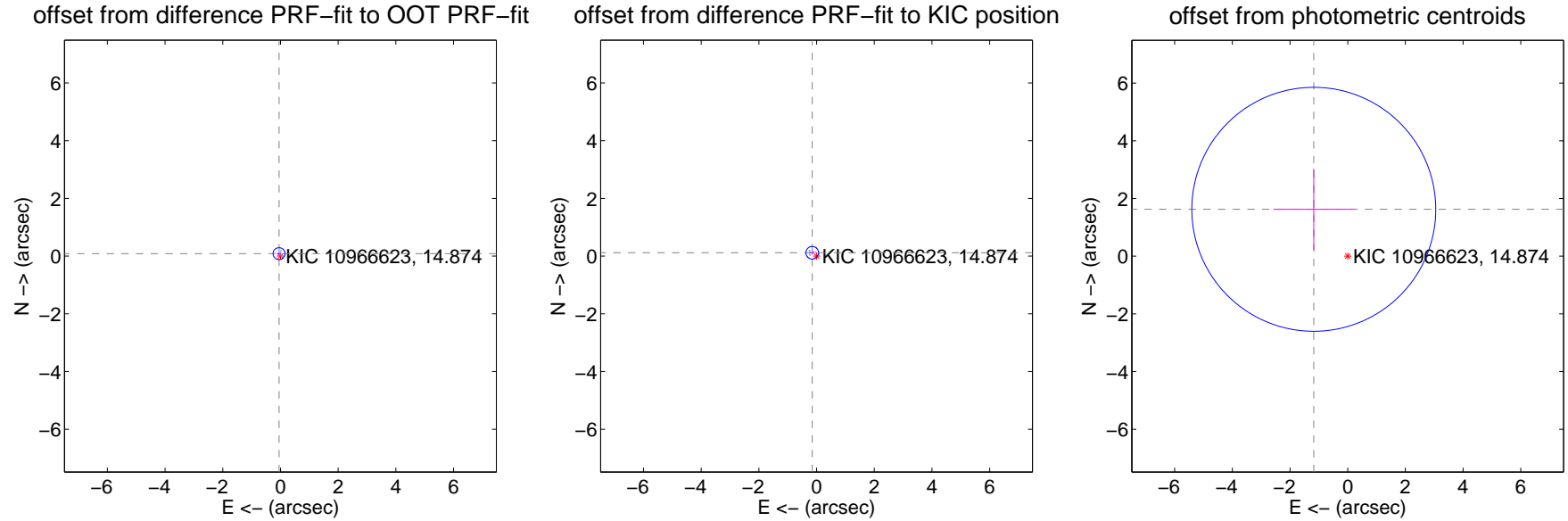
DV Centroid Data

Supplemental centroid analysis for 010966623-02. Kepler magnitude: 14.87. Transit SNR 7.40

There are 8 quarters with good PRF difference image offsets

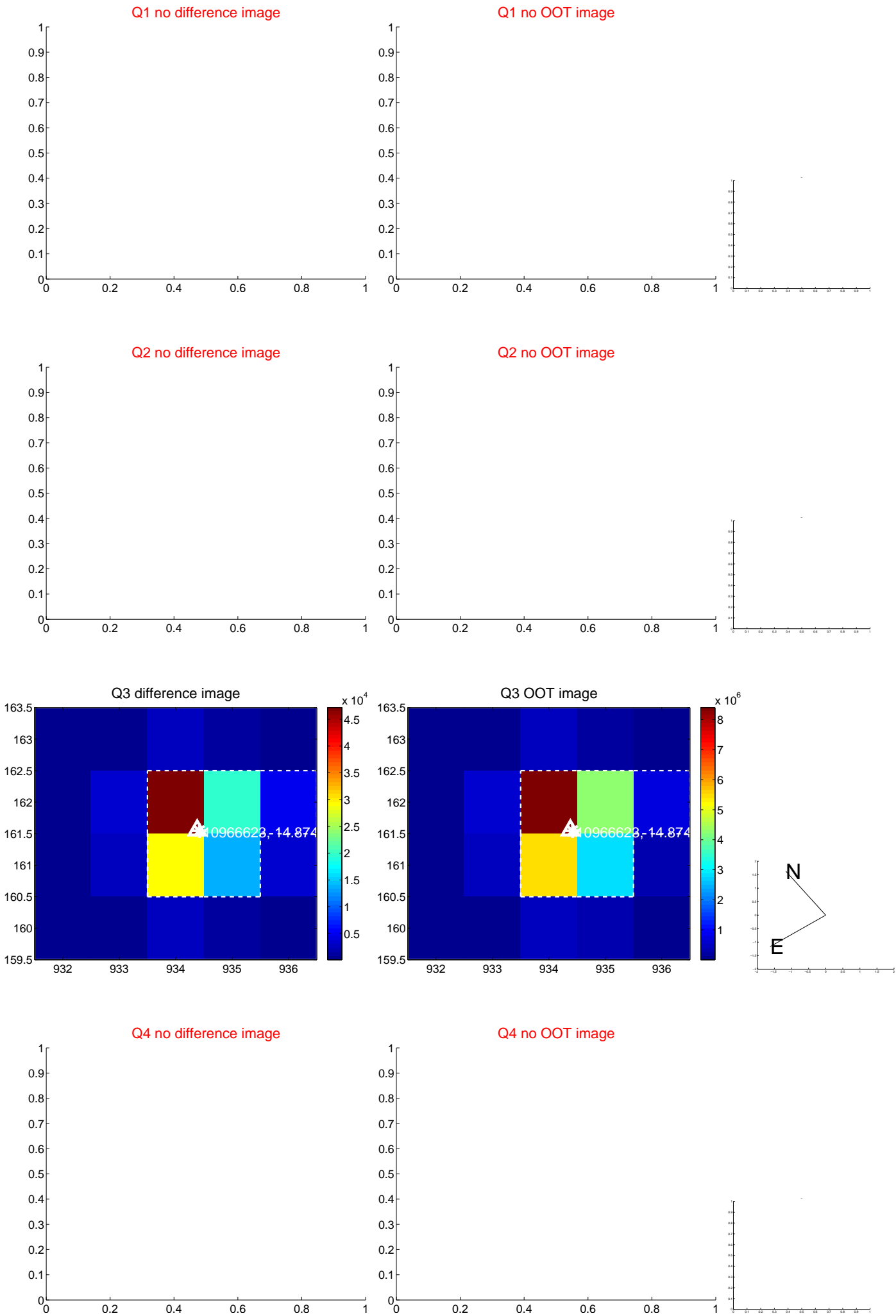
The direct PRF centroid is offset from the target star catalog position by about 0.24 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|-----------------------------------------|--------------------|---------------------|-------------------|-------------------|
| PRF-fit source offset from OOT | 0.099 ± 0.069 | 1.43 | 0.049 ± 0.071 | 0.085 ± 0.069 |
| PRF-fit source offset from KIC position | 0.191 ± 0.073 | 2.62 | 0.151 ± 0.076 | 0.117 ± 0.068 |
| photometric centroid source offset | 2.01 ± 1.41 | 1.42 | 1.18 ± 1.40 | 1.63 ± 1.41 |

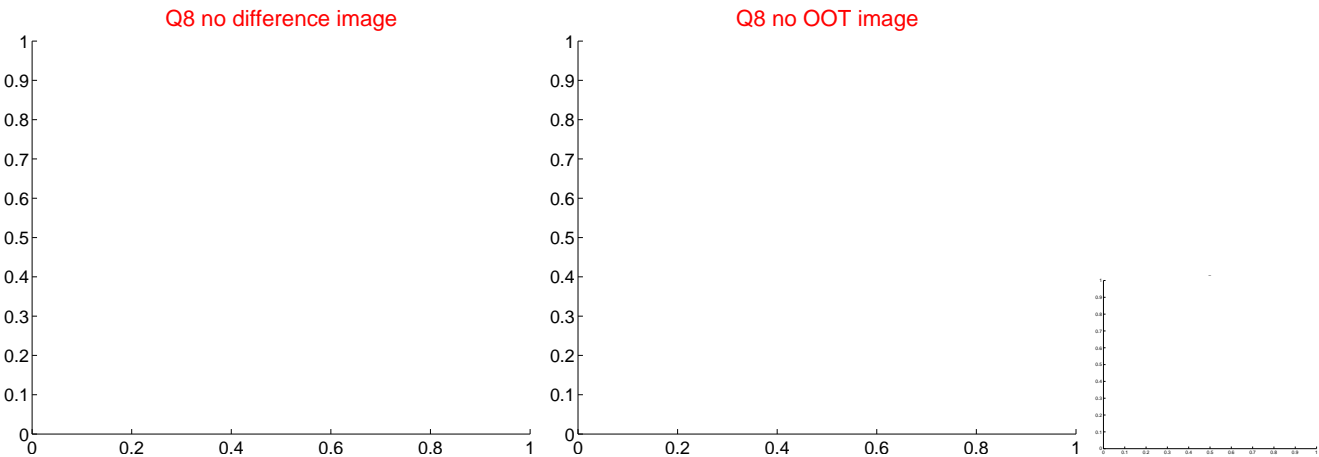
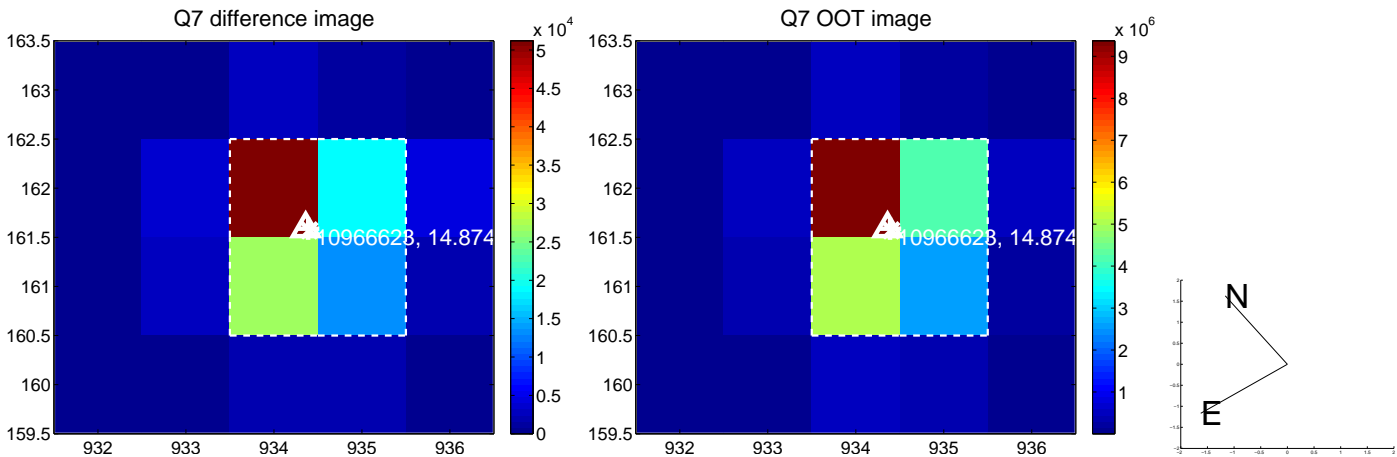
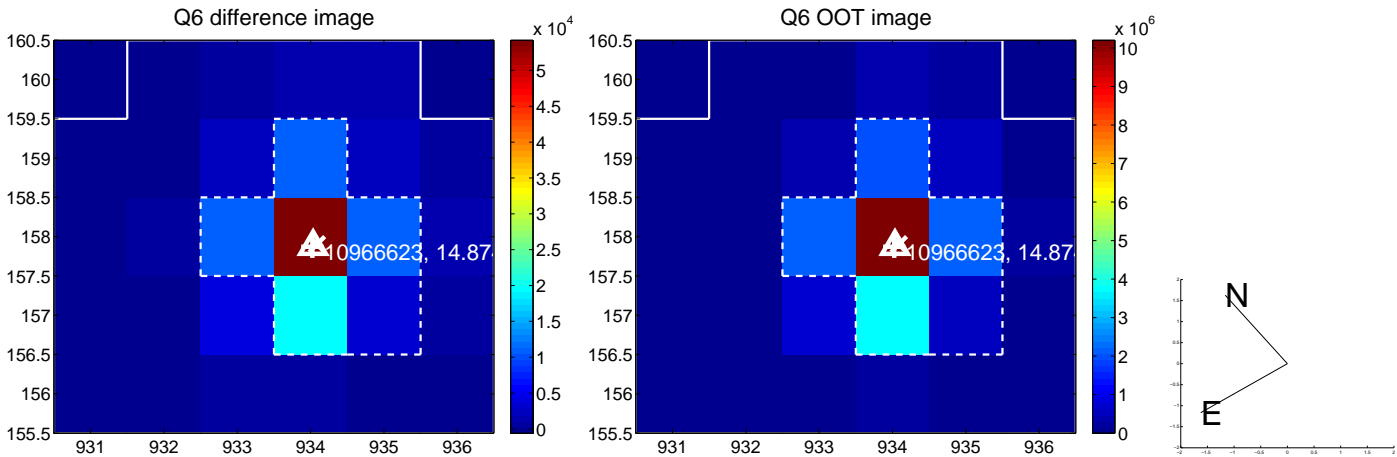
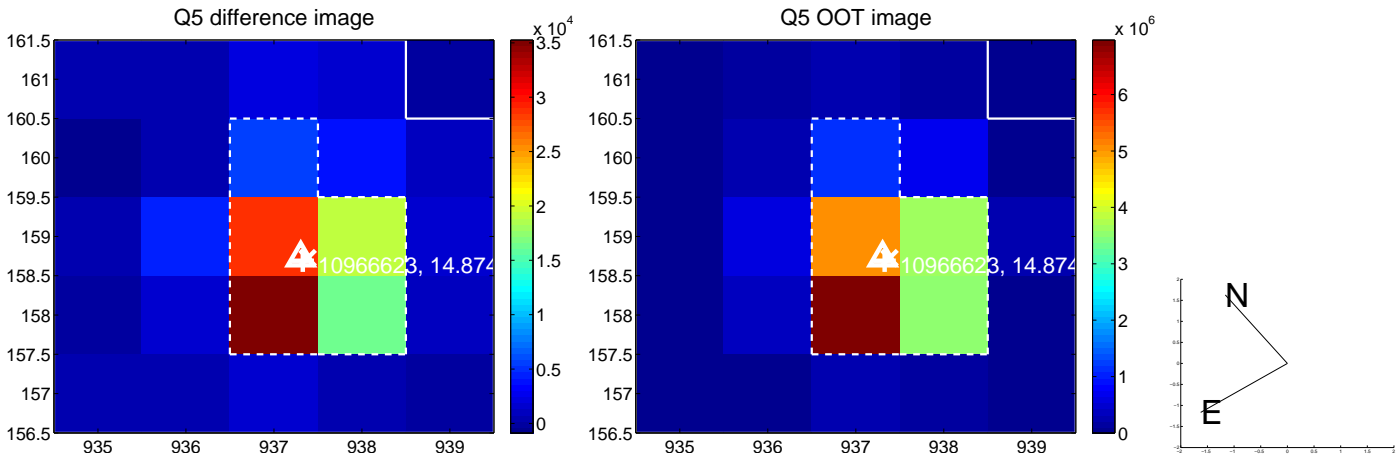


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

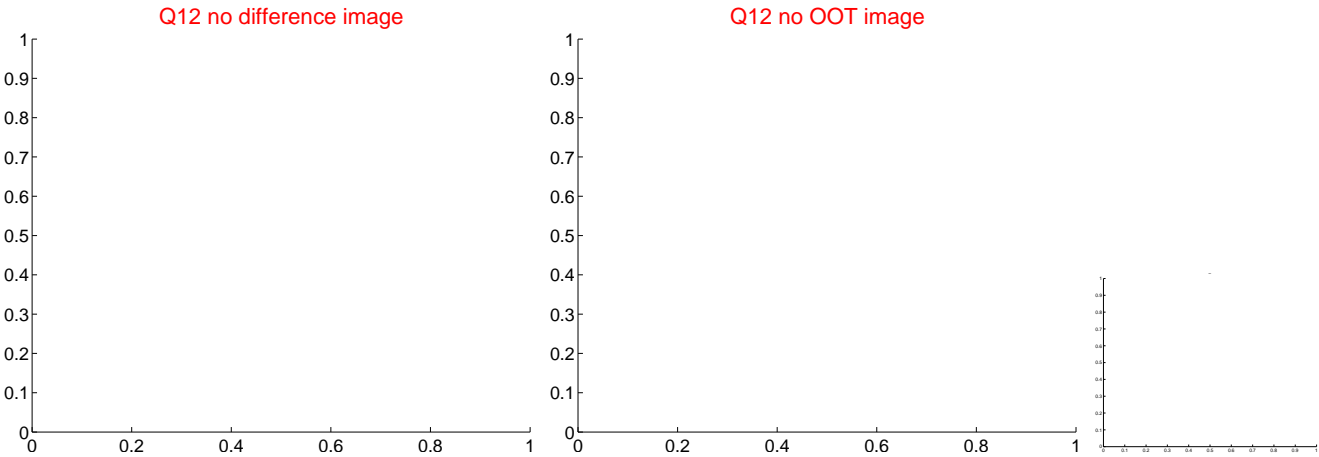
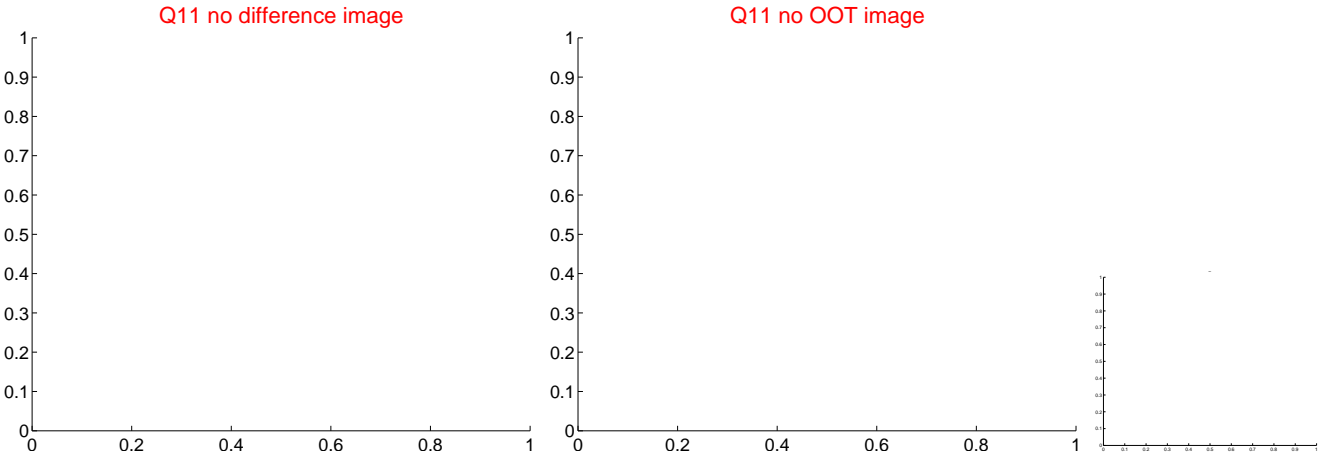
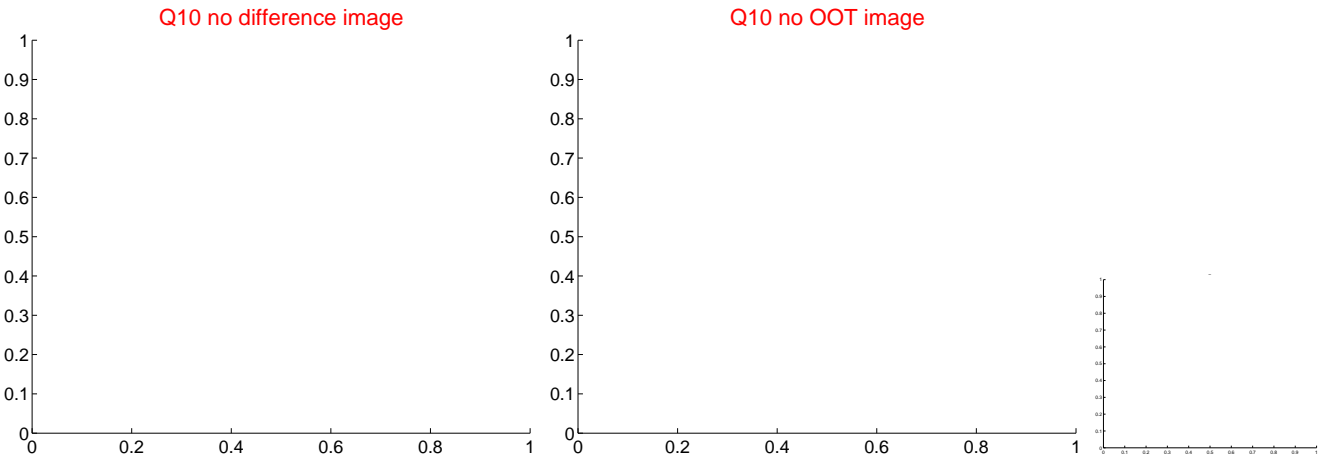
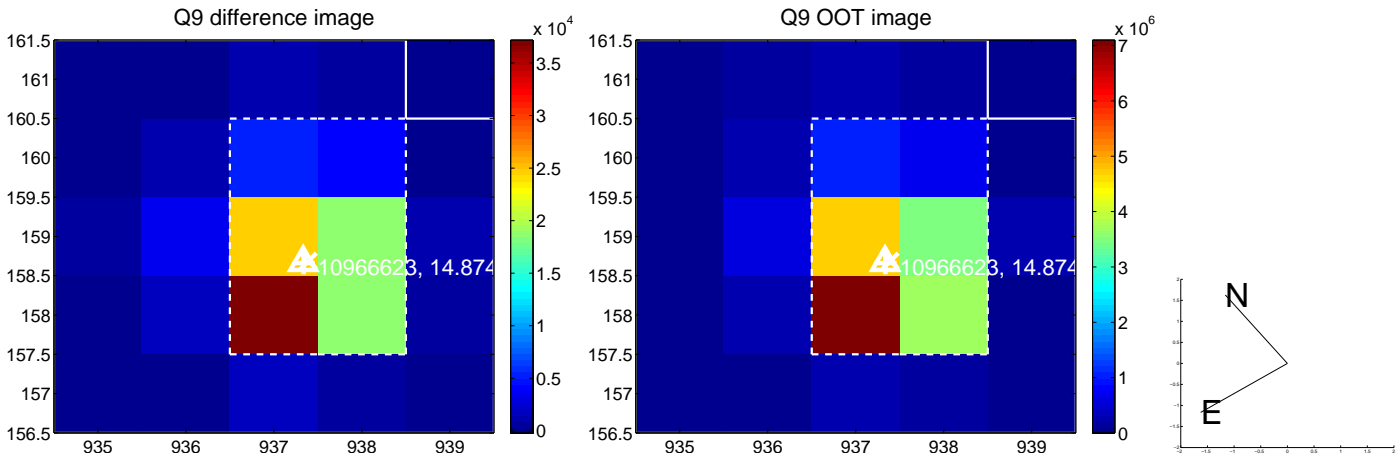
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

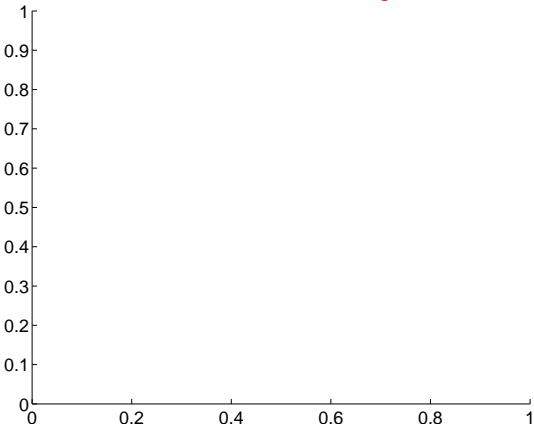


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

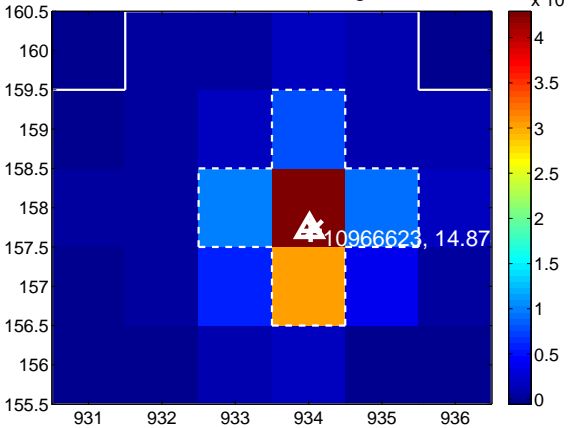
Q13 no difference image



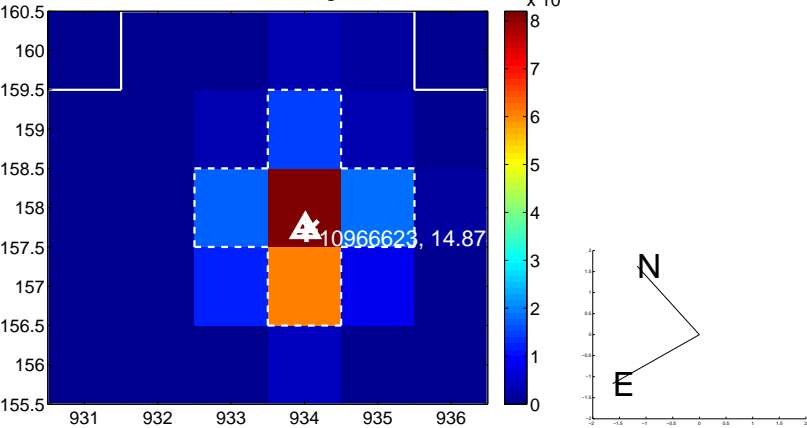
Q13 no OOT image



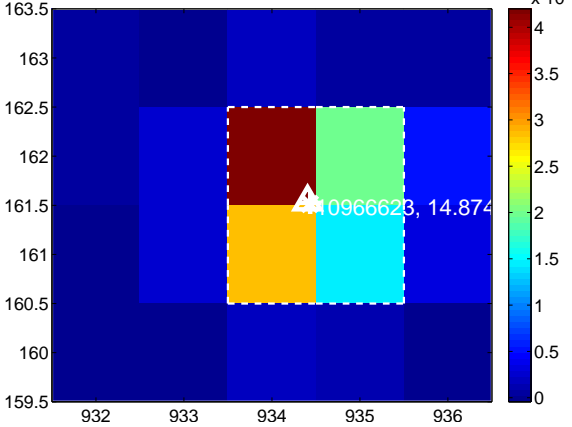
Q14 difference image



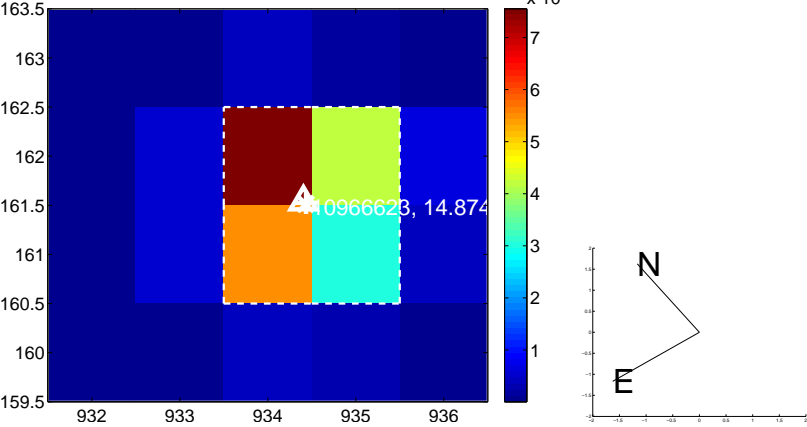
Q14 OOT image



Q15 difference image



Q15 OOT image



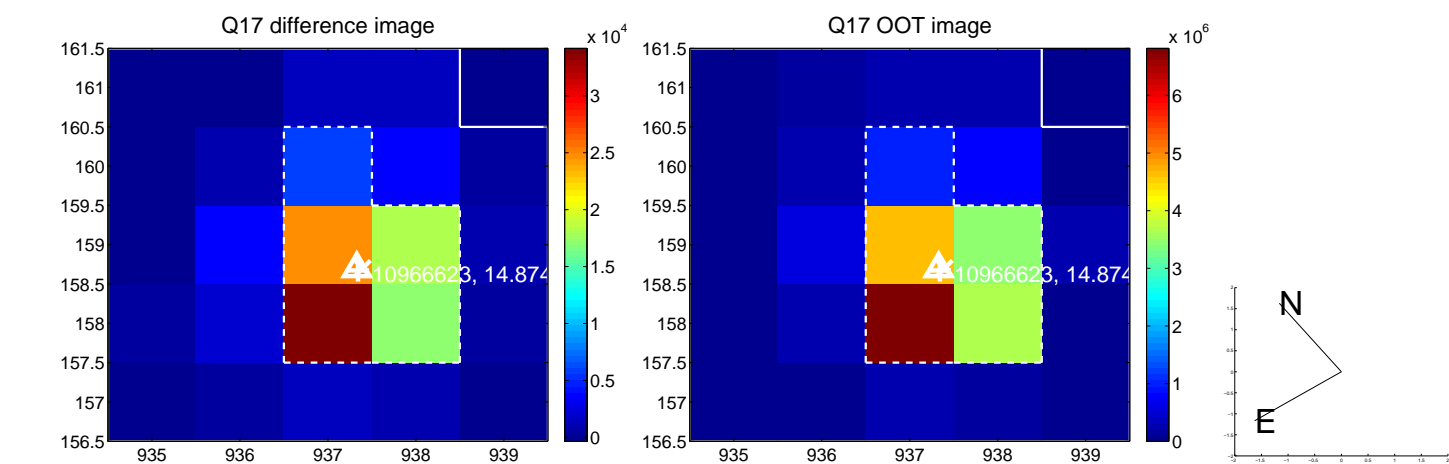
Q16 no difference image



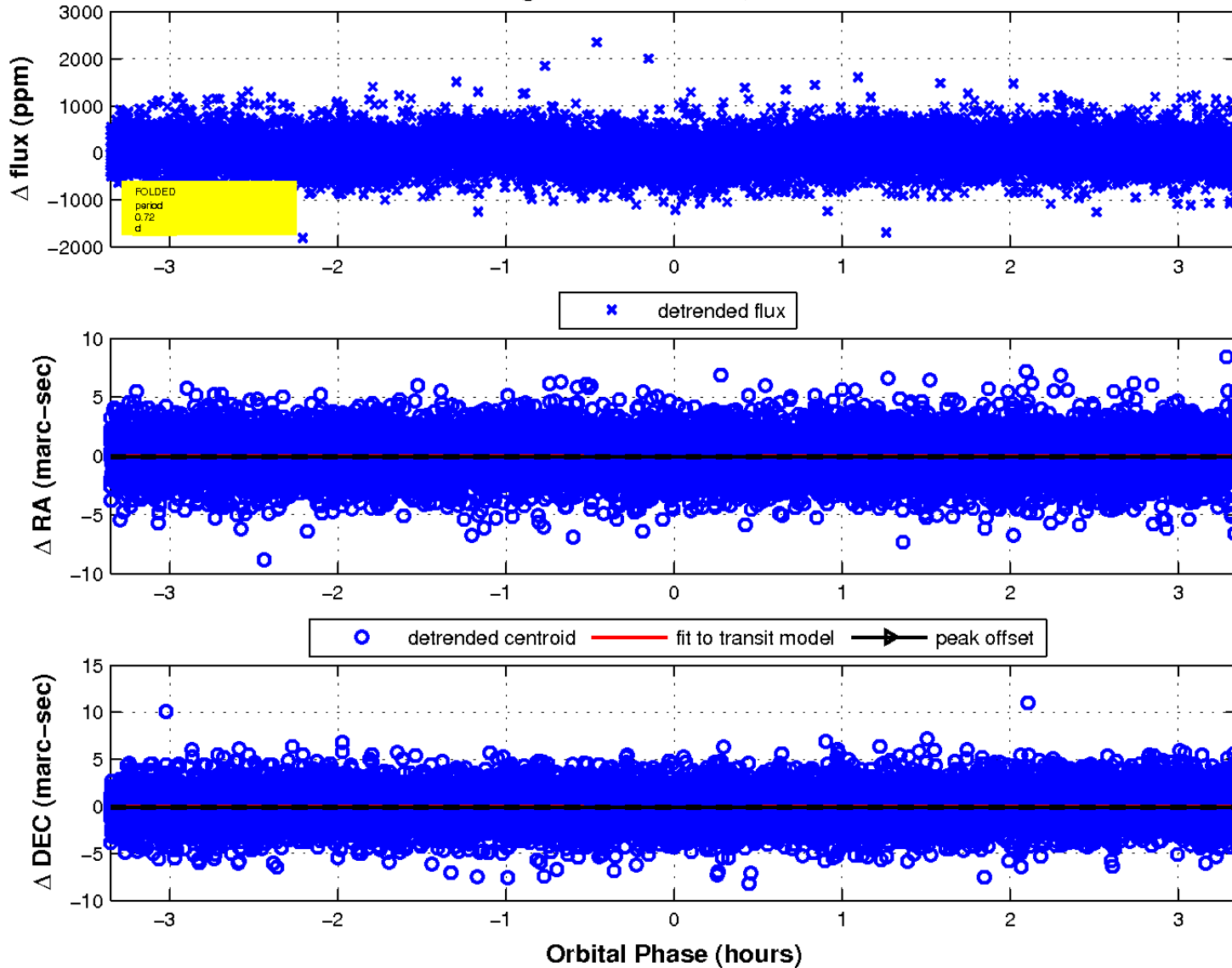
Q16 no OOT image



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

