

KIC 005438757

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 005438757-01 | OBS | 1601.01 | 10.350735 | 133.715263 | 269.1 | 6.479 | 30.4 | 33.6 | 1.08 | 5534 | 2.10 | 119.32 |
| 005438757-02 | OBS | 1601.02 | 62.922871 | 151.678598 | 400.4 | 11.578 | 23.1 | 23.0 | 1.08 | 5534 | 2.71 | 10.75 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|------------|
| 005438757-01 | OBS | PC | 1.00 | 0 | 0 | 0 | 0 | NO_COMMENT |
| 005438757-02 | OBS | PC | 0.84 | 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 005438757-01

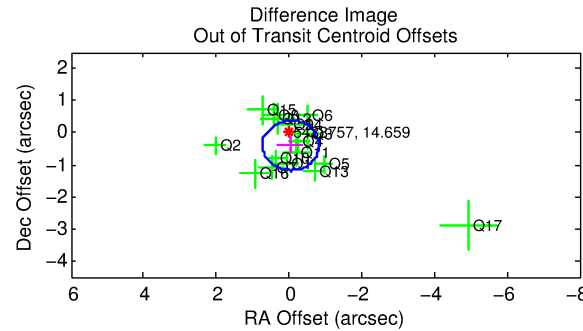
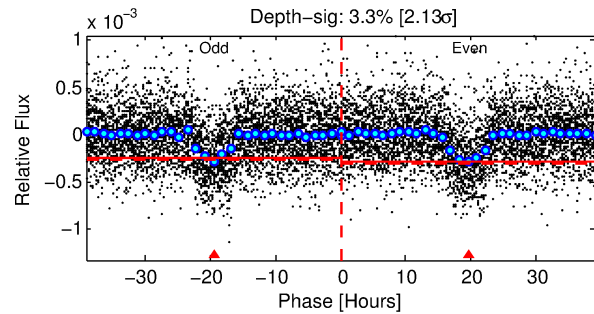
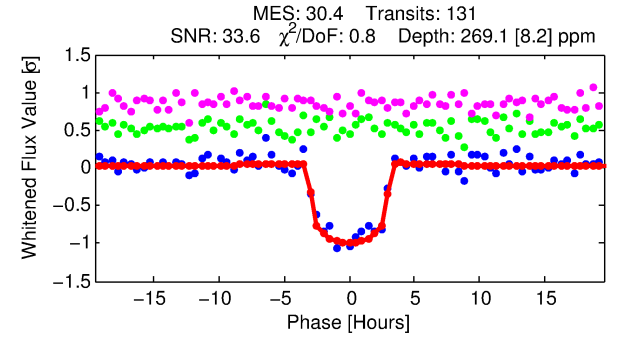
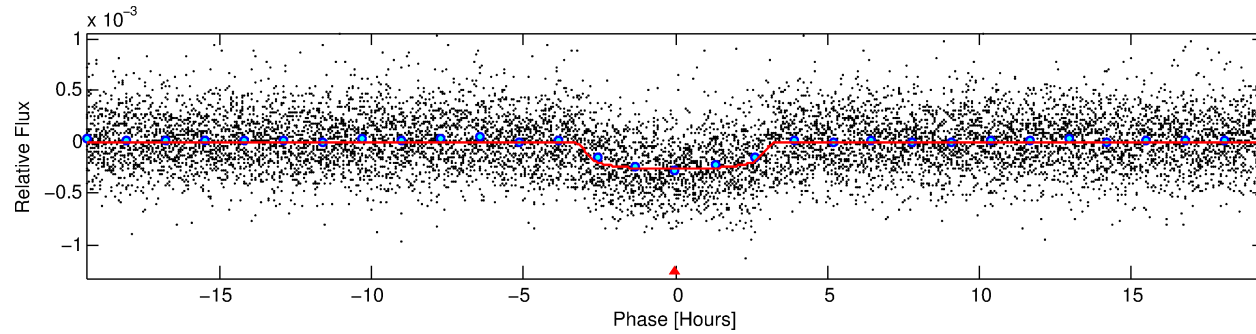
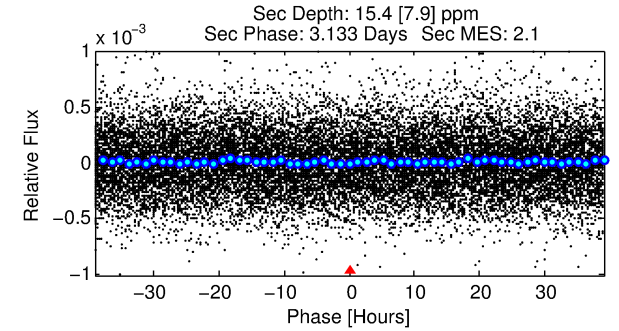
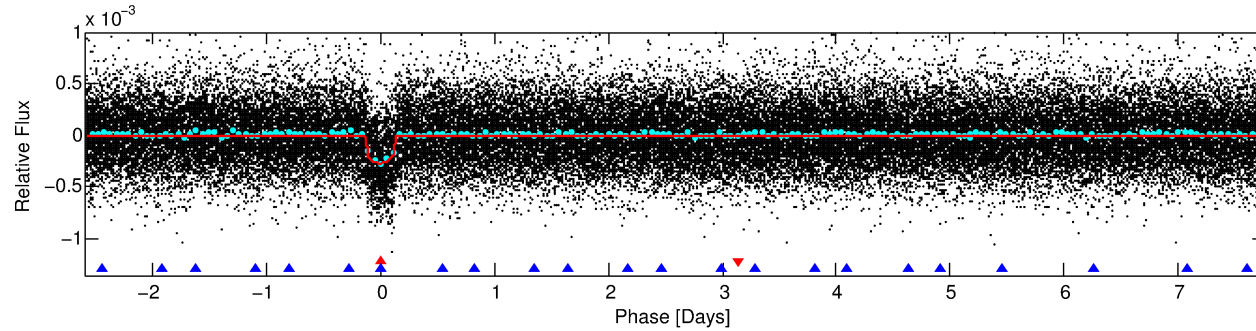
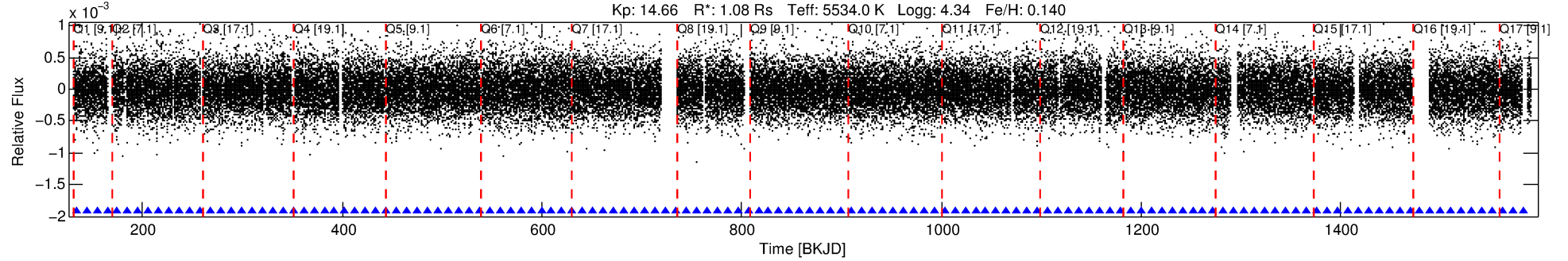
No Significant Match Found

DV One-Page Summary

KIC: 5438757 Candidate: 1 of 2 Period: 10.351 d

KOI: K01601.01 Corr: 0.992

Kp: 14.66 R*: 1.08 Rs Teff: 5534.0 K Logg: 4.34 Fe/H: 0.140



DV Fit Results:

Period = 10.35074 [0.00005] d
Epoch = 133.7153 [0.0037] BKJD
Rp/R* = 0.0179 [0.0016]
a/R* = 6.08 [2.23]
b = 0.89 [0.09]
Seff = 119.32 [28.92]
Teff = 843 [51] K
Rp = 2.10 [0.37] Re
a = 0.0906 [0.0133] AU
Ag = 15.74 [9.26] [1.59σ]
Teffp = 2595 [352] K [4.93σ]

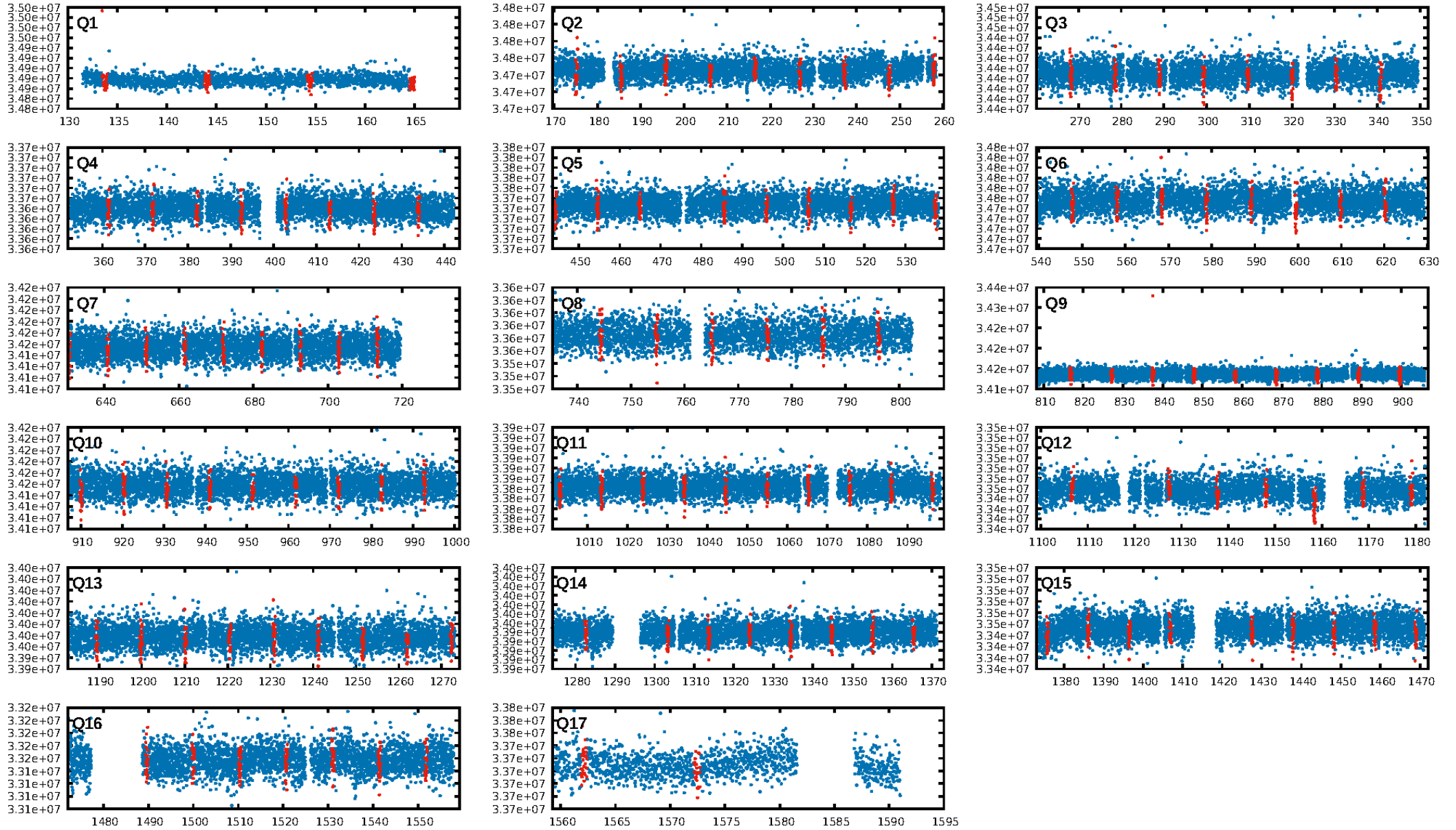
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [95.10σ]
ModelChiSquare2-sig: 63.3%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.48e-195
RollingBand-fgt: 1.00 [125/125]
GhostDiagnostic-chr: 3.796
Centroid-sig: 58.0%
Centroid-so: 0.329 arcsec [0.83σ]
OotOffset-rm: 0.405 arcsec [1.57σ]
KicOffset-rm: 0.332 arcsec [1.59σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.94 [16/17]
DiffImageOverlap-fno: 1.00 [17/17]

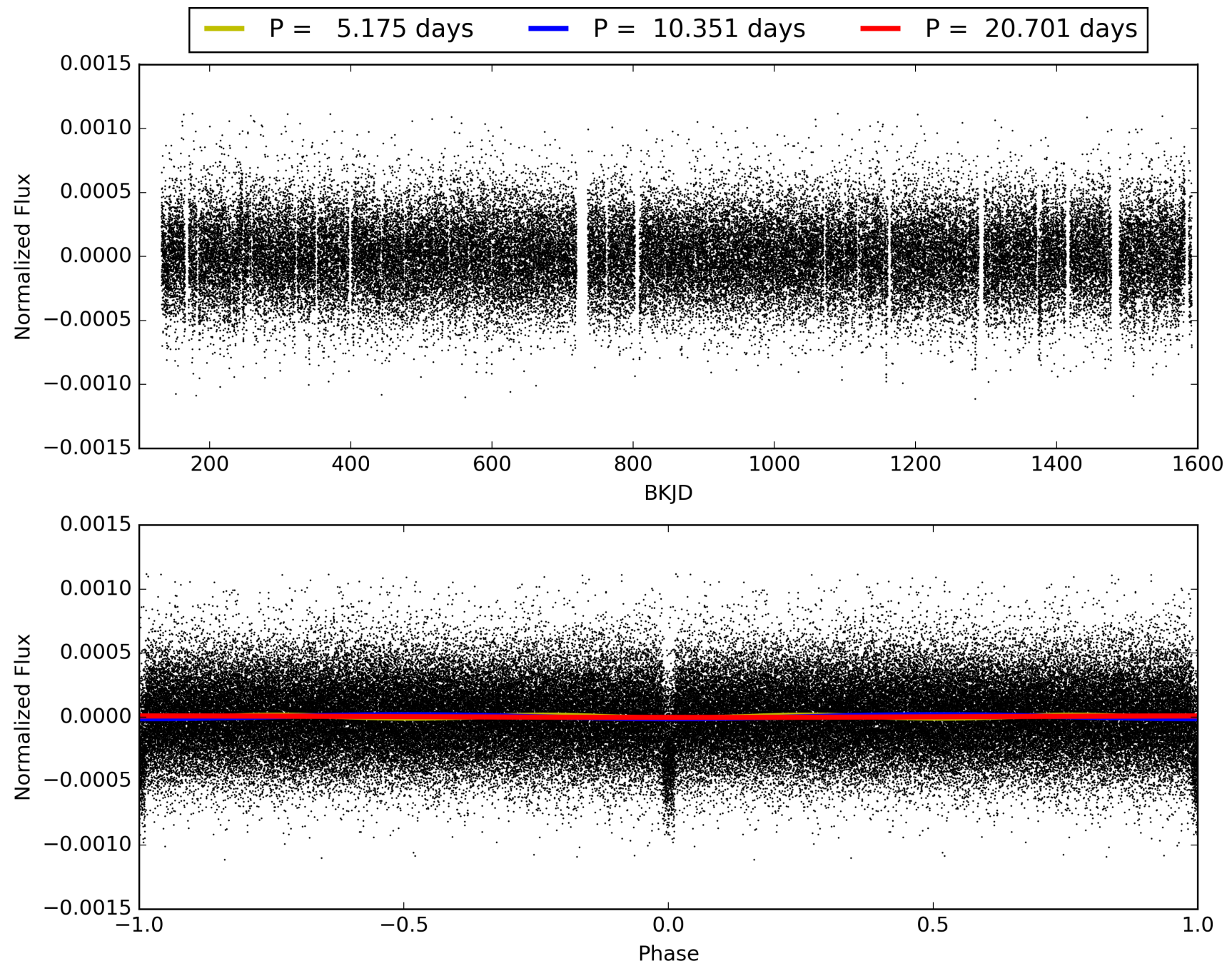
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 19:47:39 Z

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

TCE 005438757-01, PDC Light Curves

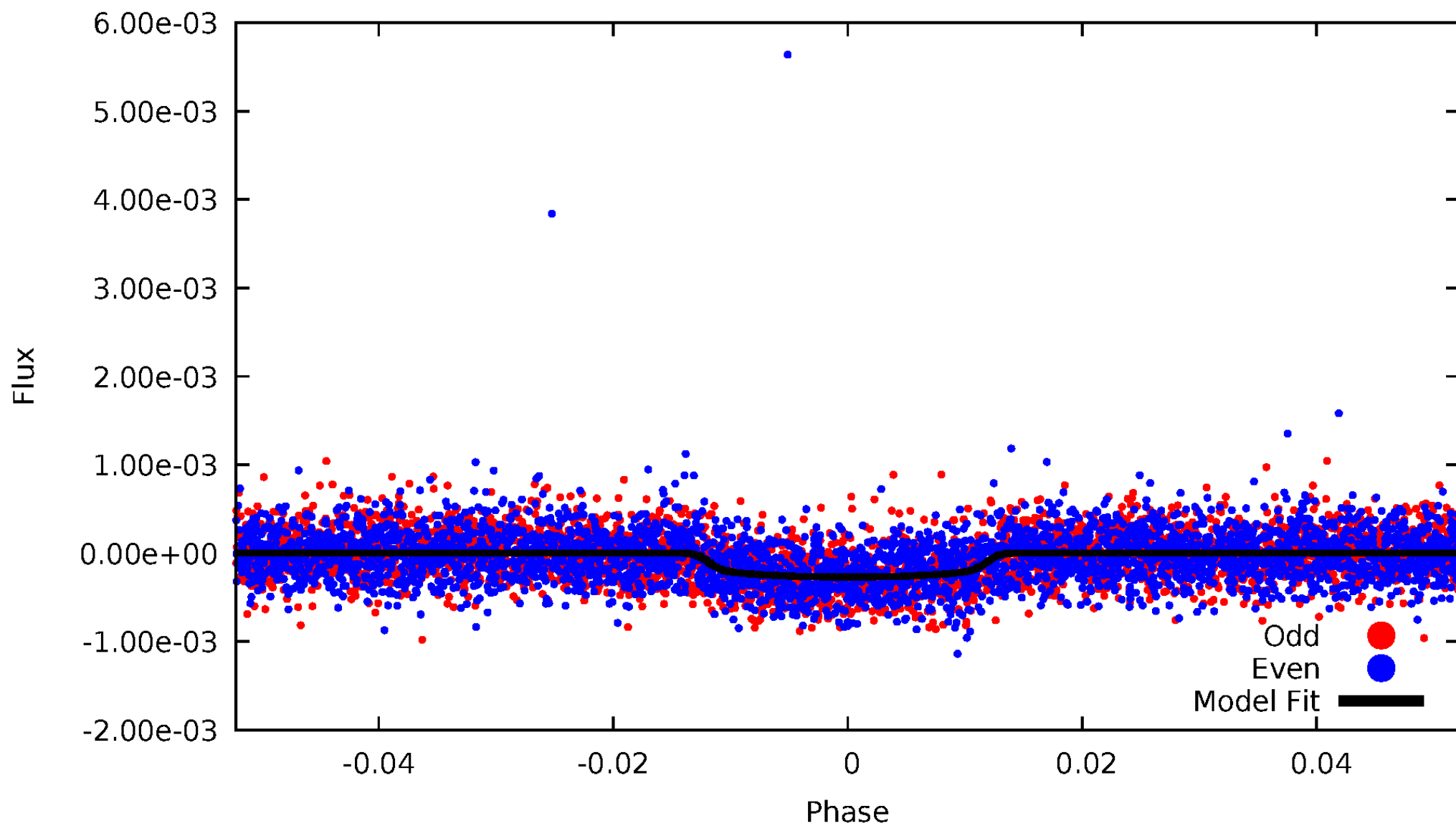


TCE 005438757-01



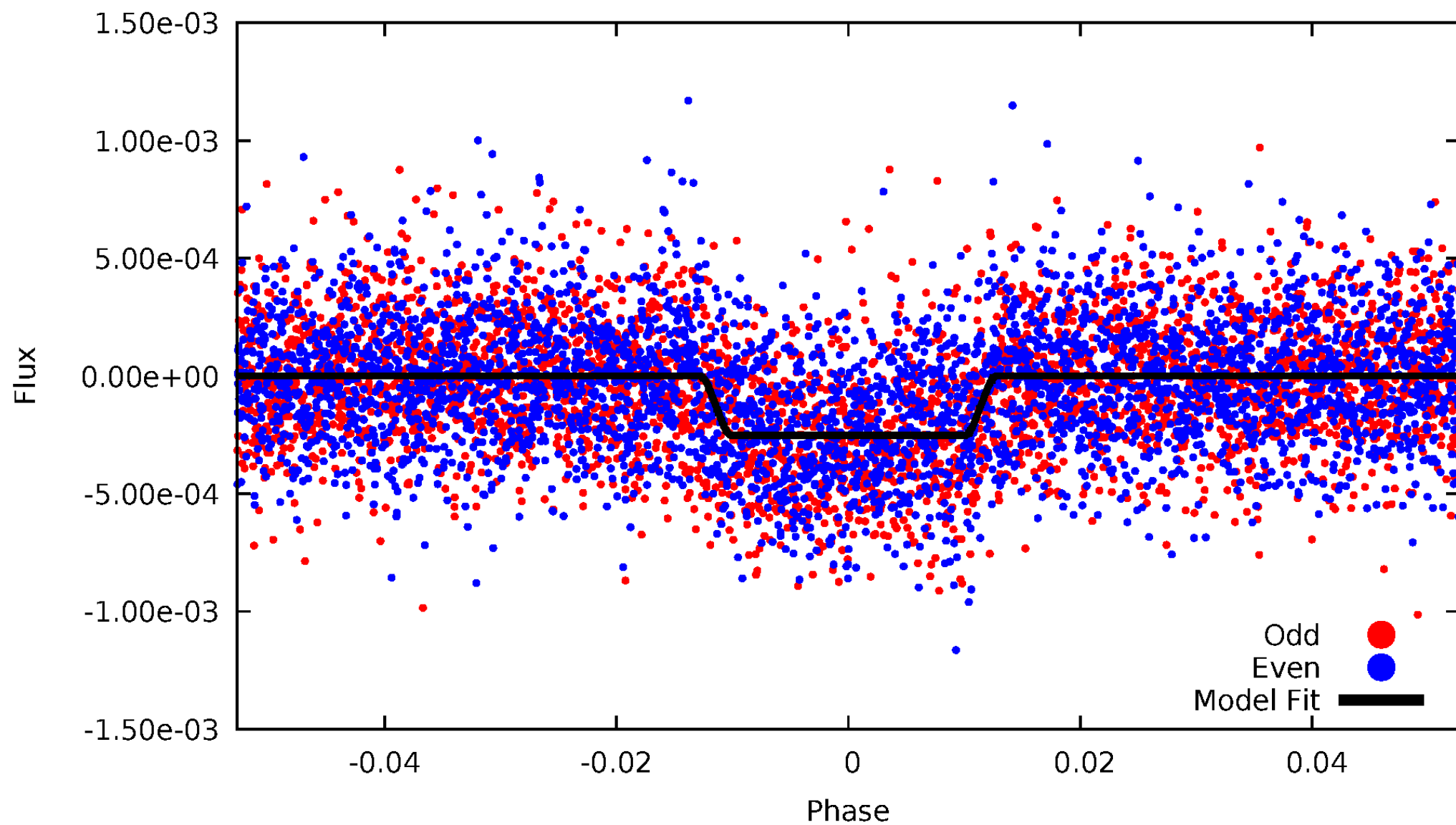
DV Odd/Even

TCE 005438757-01



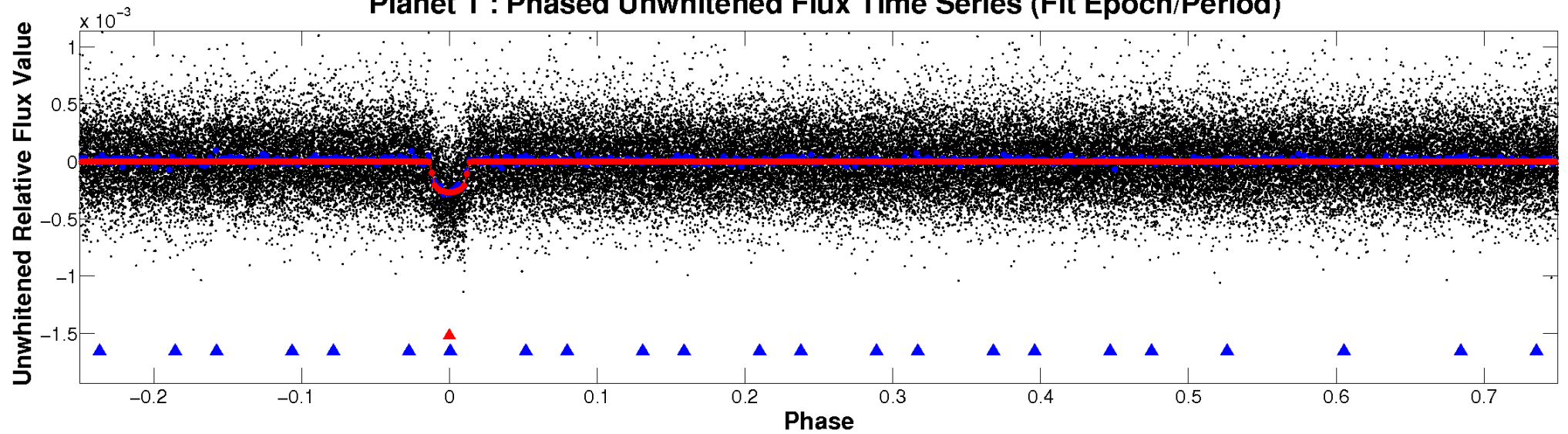
ALT Odd/Even

TCE 005438757-01

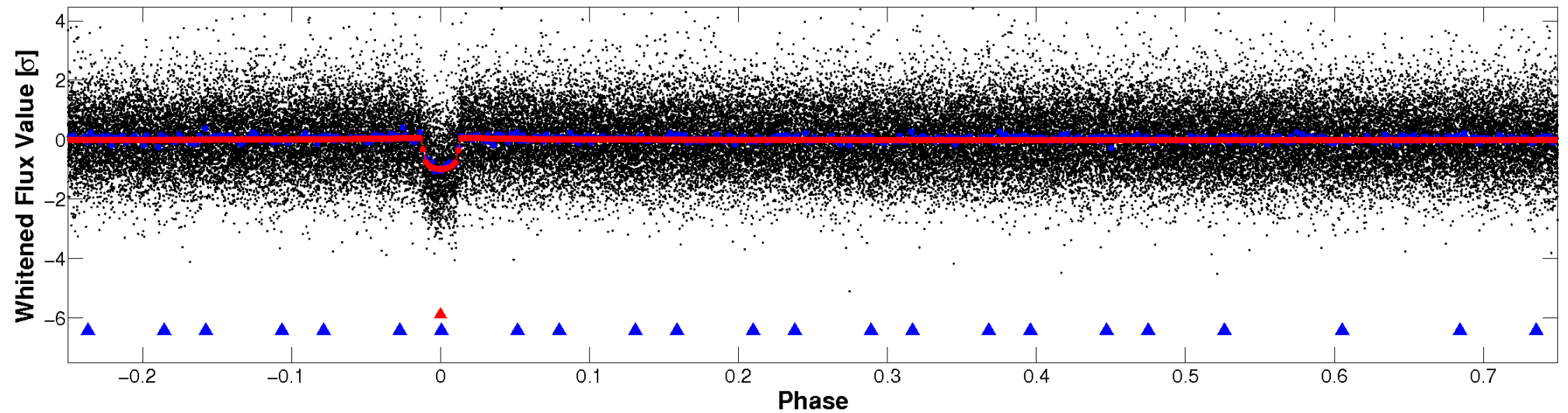


Non-Whitened Vs. Whitened Light Curve

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

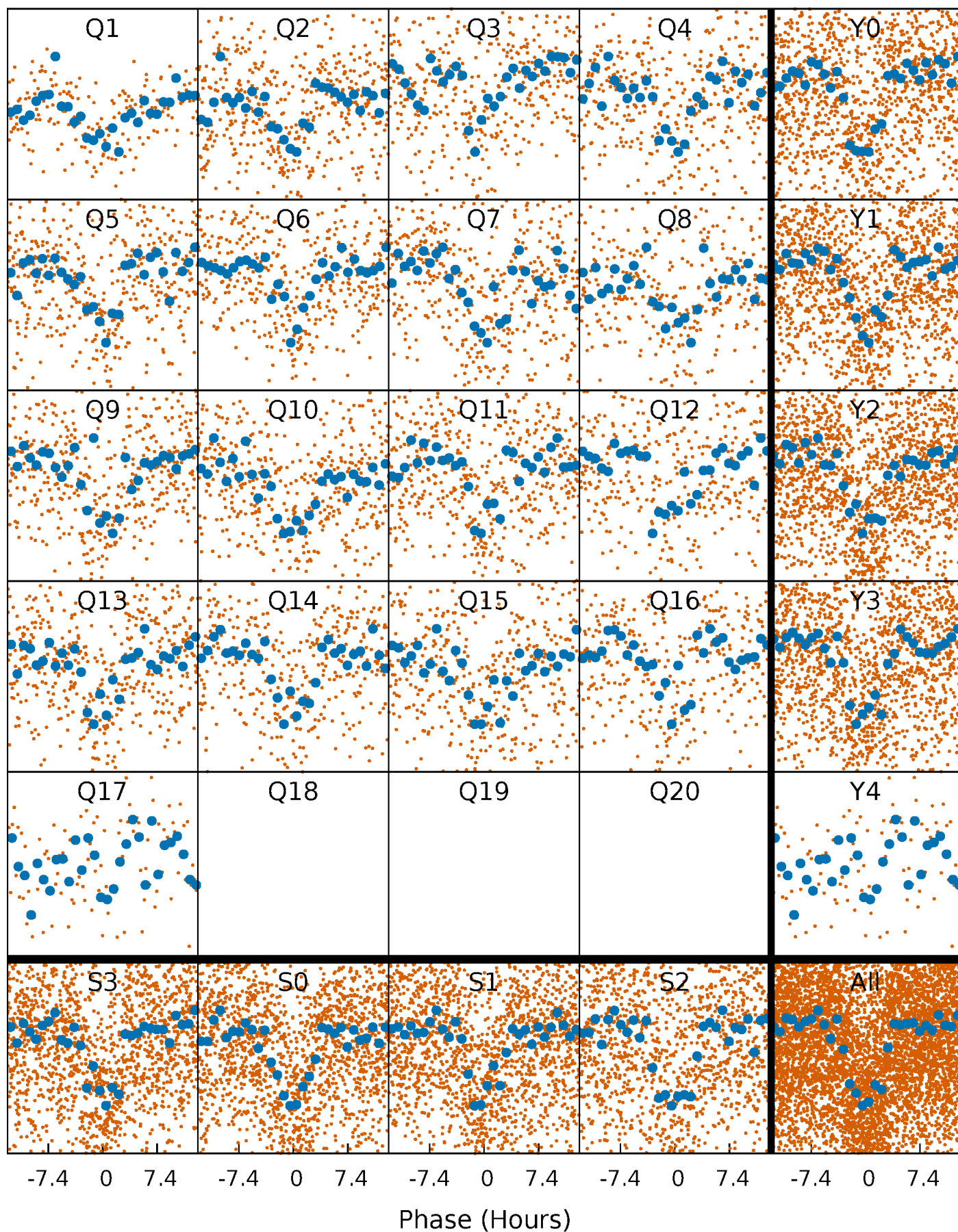


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



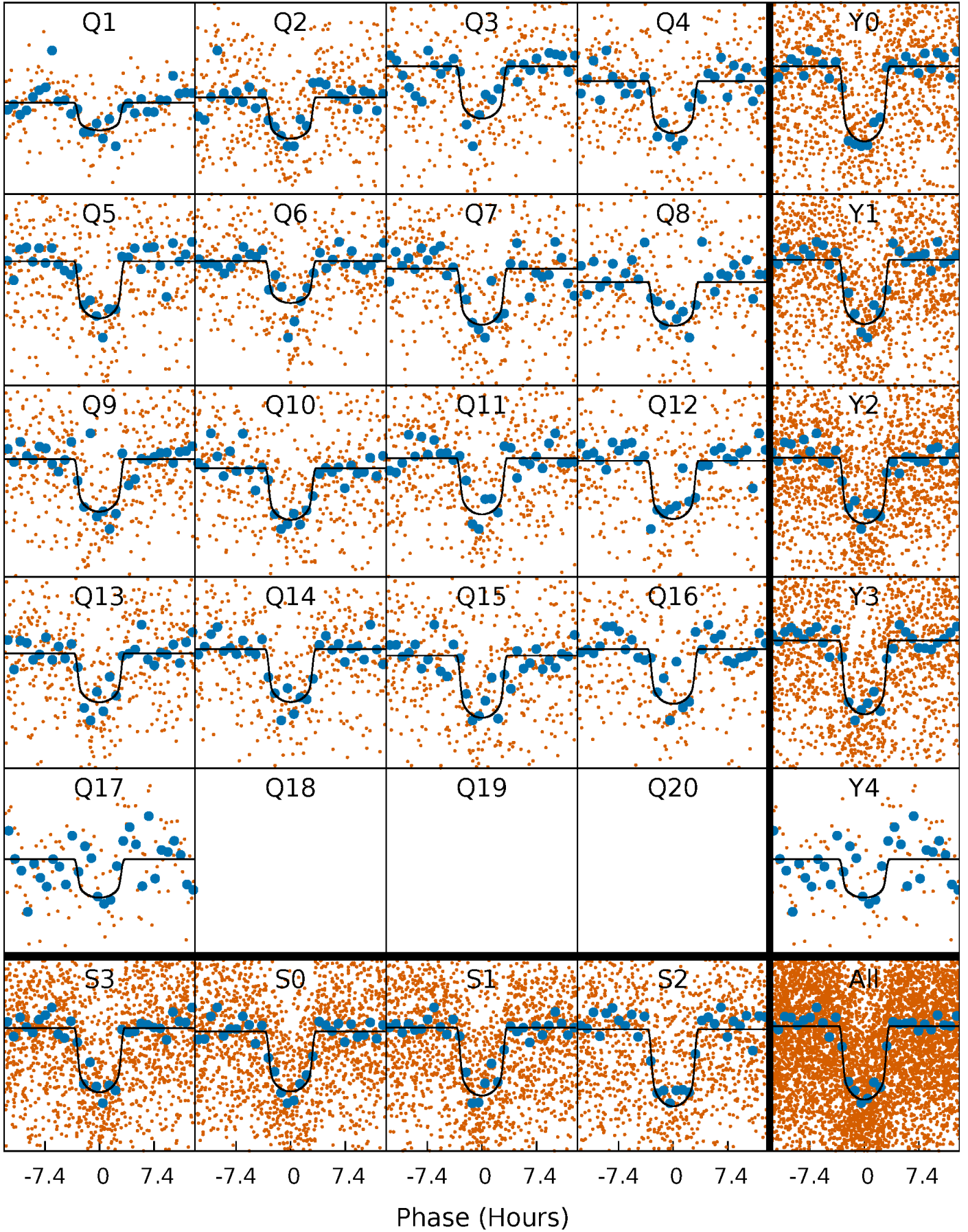
PDC Quarter-Phased Transit Curves

TCE 005438757-01 P= 10.350735 Days $T_0=133.715263$ (BKJD)



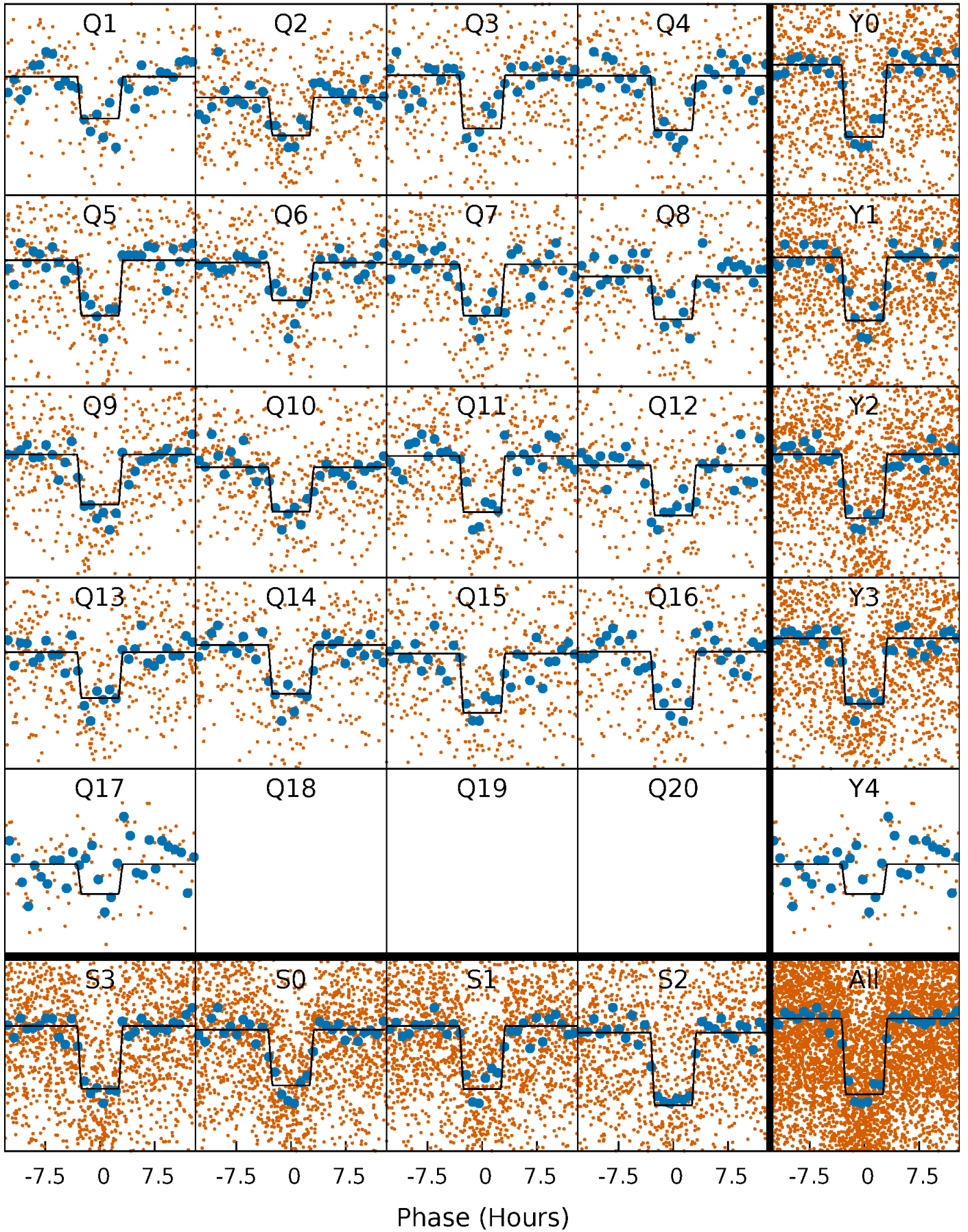
DV Quarter-Phased Transit Curves

TCE 005438757-01 P= 10.350735 Days $T_0=133.715263$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

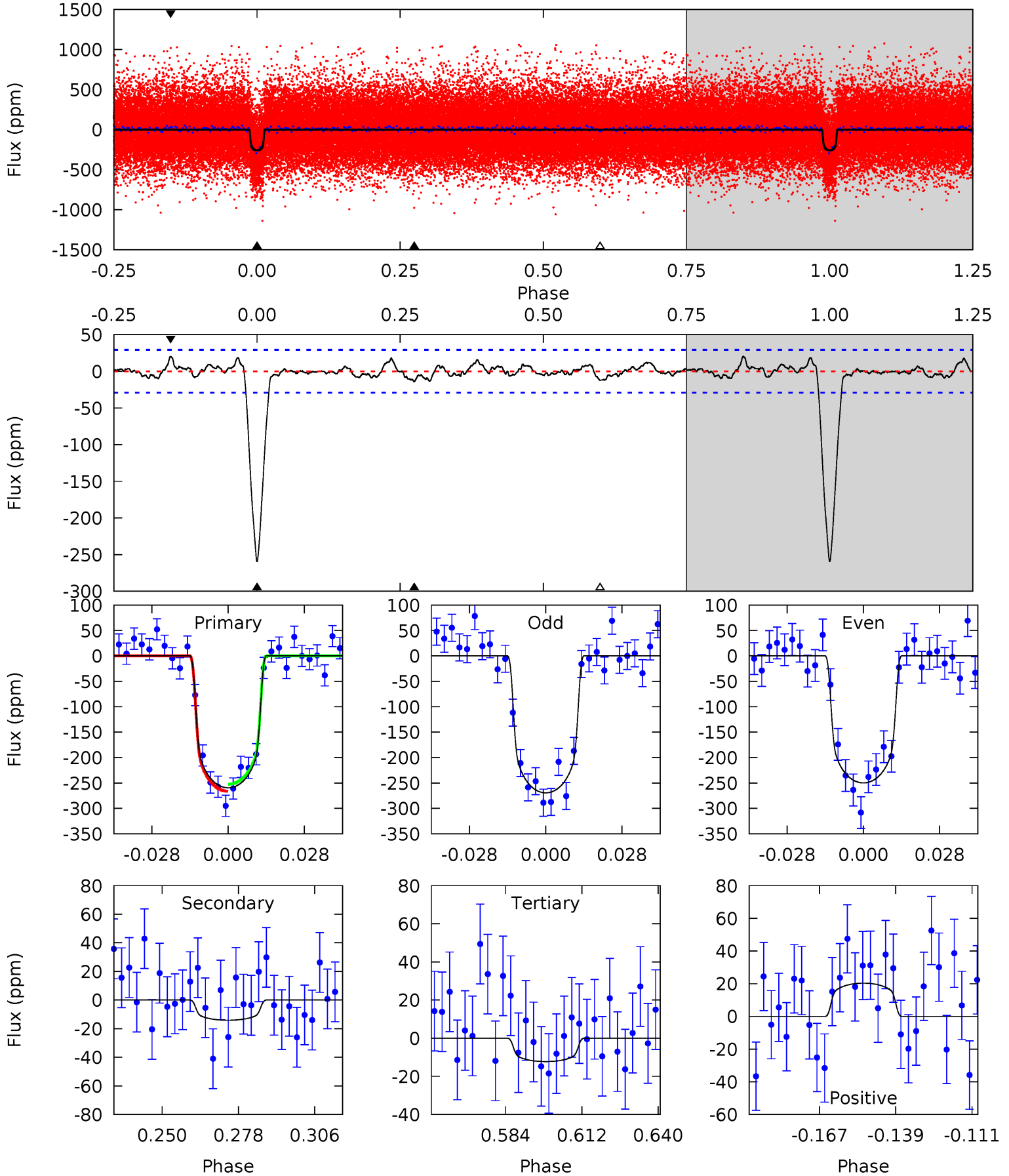
TCE 005438757-01 P= 10.350793 Days $T_0=133.712728$ (BKJD)



DV Model-Shift Uniqueness Test

005438757-01, P = 10.350735 Days, E = 123.364528 Days

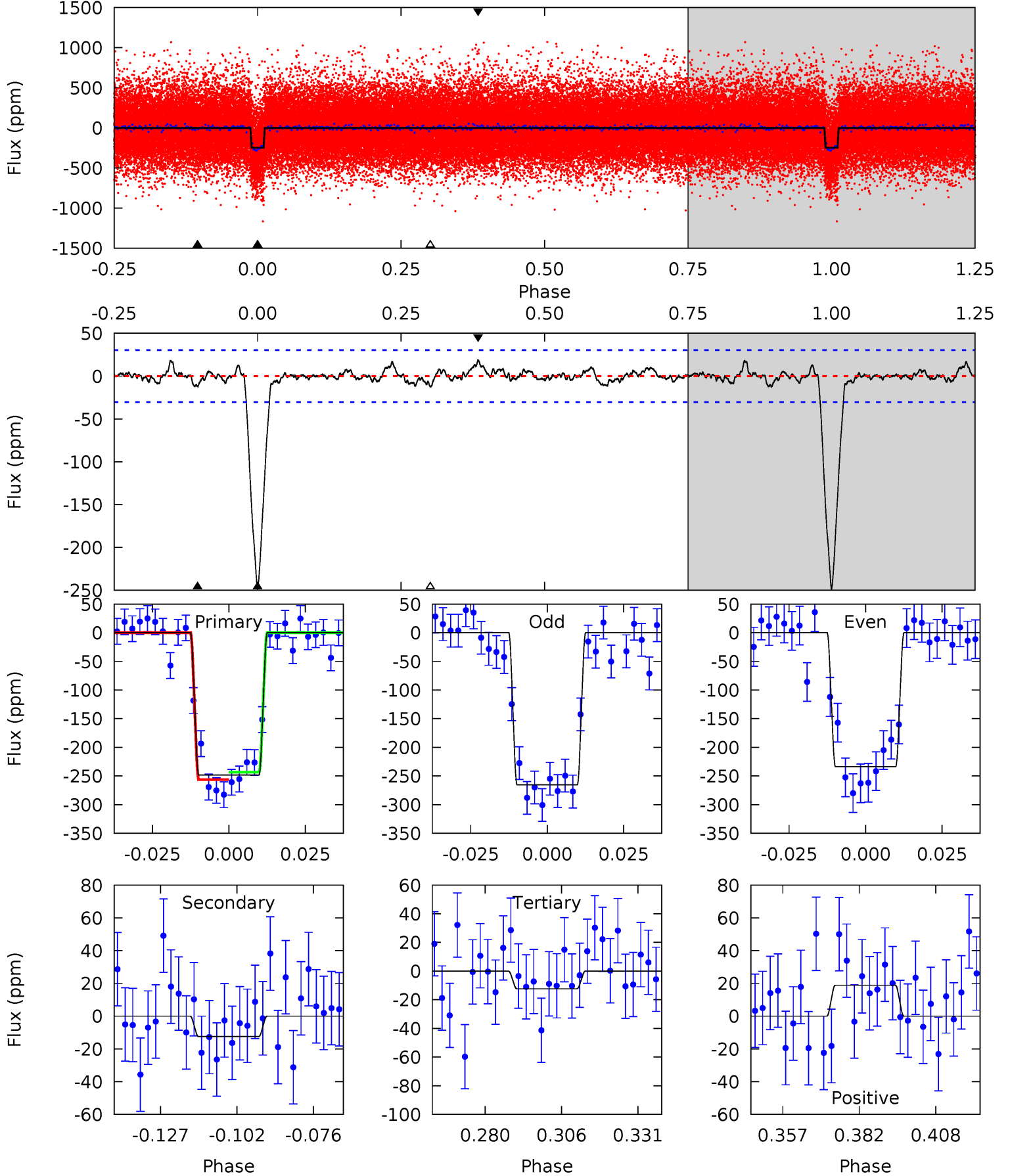
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 42.8 | 2.33 | 2.02 | 3.36 | 4.83 | 2.20 | 0.97 | 40.8 | 39.5 | 0.30 | -1.03 | 1.61 | 1.00 | 0.07 | 1.15 |



Alt Model-Shift Uniqueness Test

005438757-01, $P = 10.350793$ Days, $E = 123.361935$ Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 39.6 | 1.99 | 1.97 | 3.00 | 4.84 | 2.23 | 0.85 | 37.6 | 36.6 | 0.02 | -1.01 | 2.53 | 0.99 | 0.07 | 1.01 |



Stellar Parameters For KIC 005438757

| | $T_{\text{eff}} (K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M (M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 5534^{+82}_{-74} | $4.338^{+0.138}_{-0.103}$ | $0.140^{+0.150}_{-0.150}$ | $1.080^{+0.165}_{-0.150}$ | $0.926^{+0.067}_{-0.043}$ | $1.036^{+0.586}_{-0.316}$ |
| | +1%/-1% | +3%/-2% | +107%/-107% | +15%/-14% | +7%/-5% | +57%/-31% |
| 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 005438757-01 / KOI 1601.01

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|-------------|------------------------|----------------------|----------------------|------------------|
| DV | -14 ± 6 | $2.10^{+0.27}_{-0.25}$ | 1175^{+46}_{-54} | 3134^{+205}_{-251} | 15^{+8}_{-6} |
| Alt. | -12 ± 6 | $1.85^{+0.25}_{-0.23}$ | 1175^{+47}_{-52} | 3192^{+228}_{-310} | 16^{+10}_{-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 $T_{\text{obs}} \gg T_{\text{max}}$ AND $A_{\text{obs}} \gg 1.0$

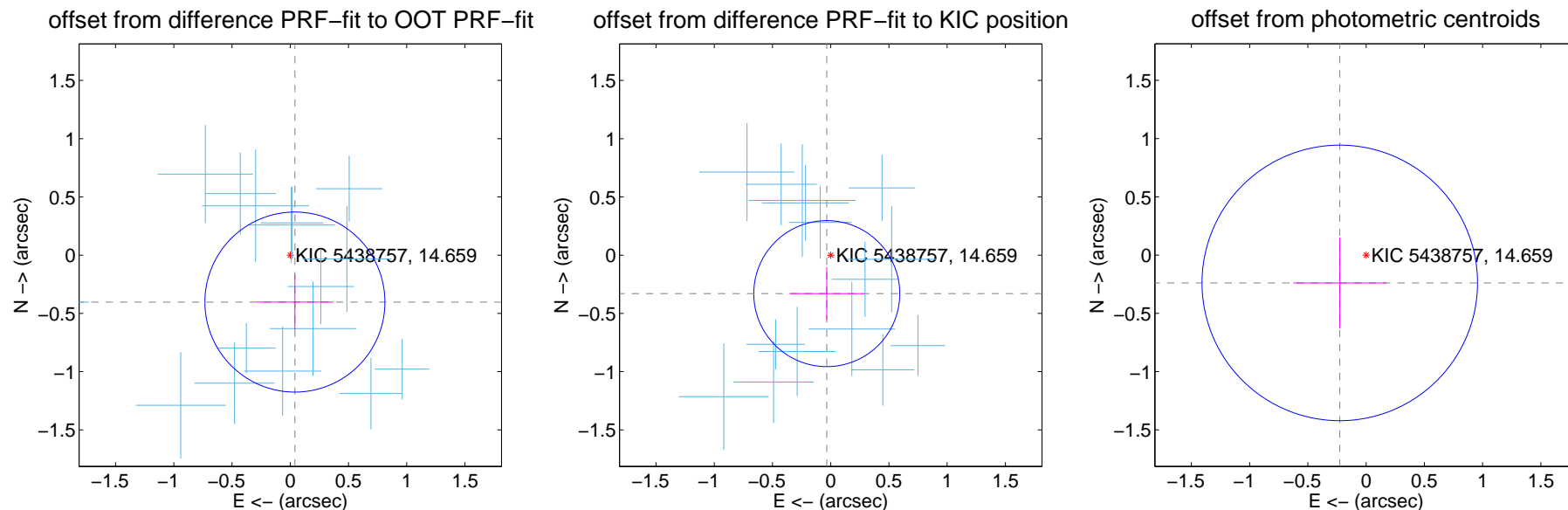
DV Centroid Data

Supplemental centroid analysis for 005438757-01. Kepler magnitude: 14.66. Transit SNR 33.61

There are 16 quarters with good PRF difference image offsets

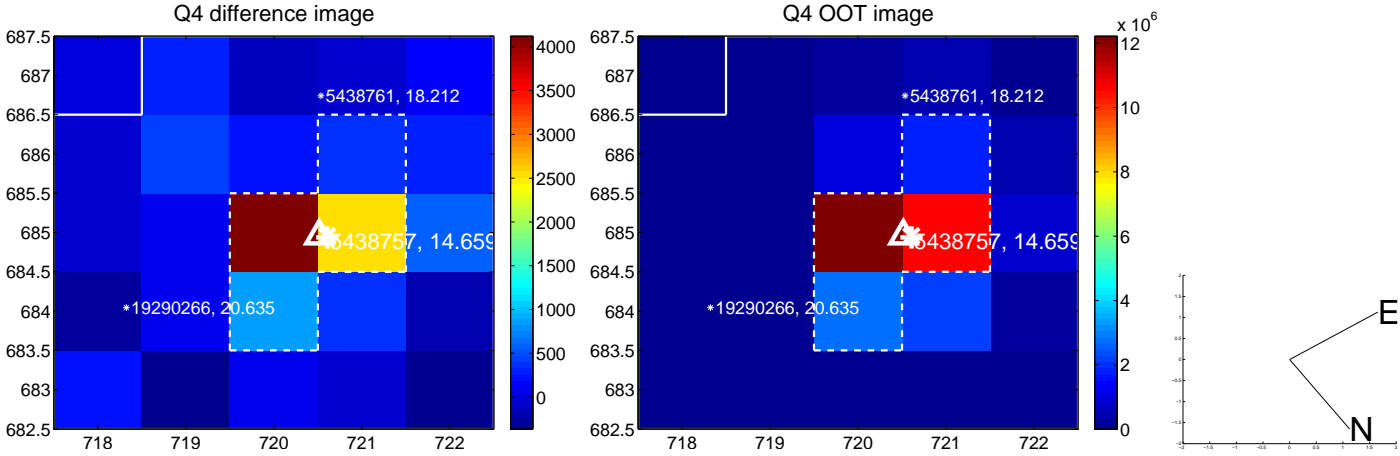
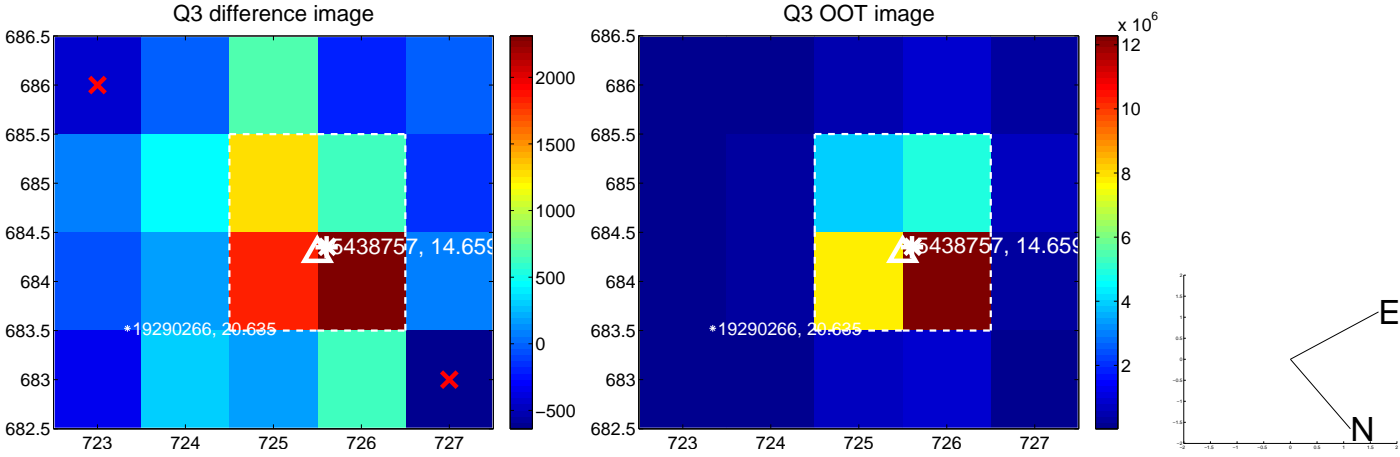
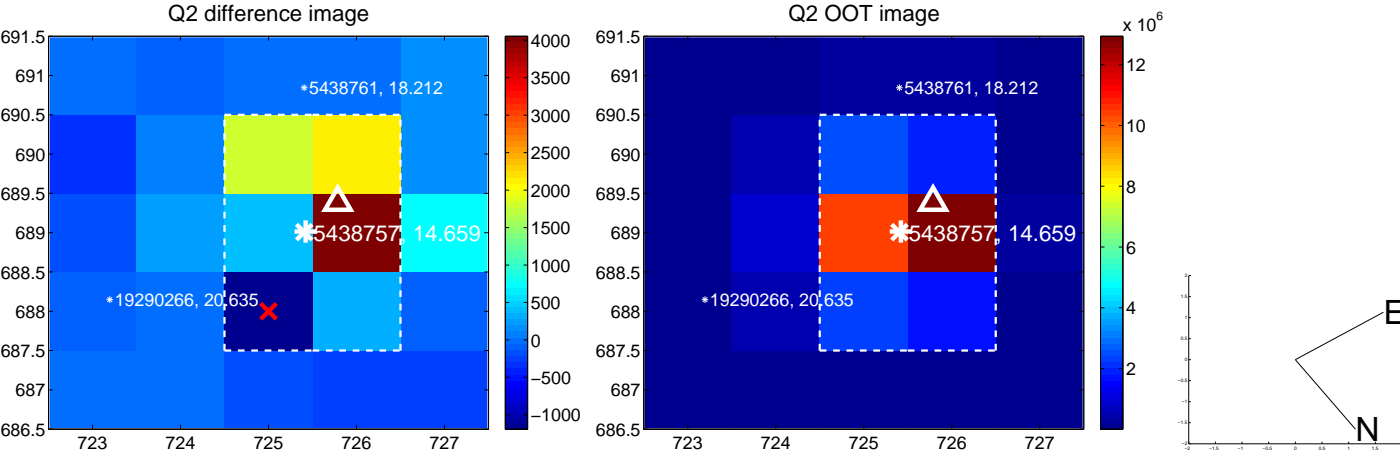
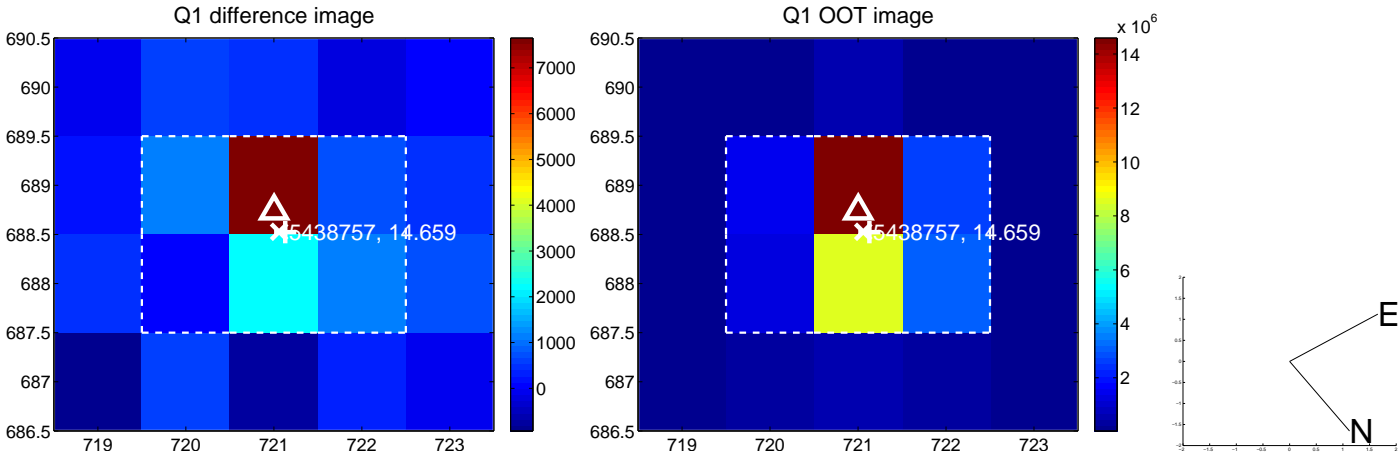
The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 0.405 ± 0.258 | 1.57 | -0.040 ± 0.329 | -0.403 ± 0.238 |
| PRF-fit source offset from KIC position | 0.332 ± 0.209 | 1.59 | 0.034 ± 0.318 | -0.330 ± 0.226 |
| photometric centroid source offset | 0.33 ± 0.39 | 0.83 | 0.23 ± 0.40 | -0.24 ± 0.39 |

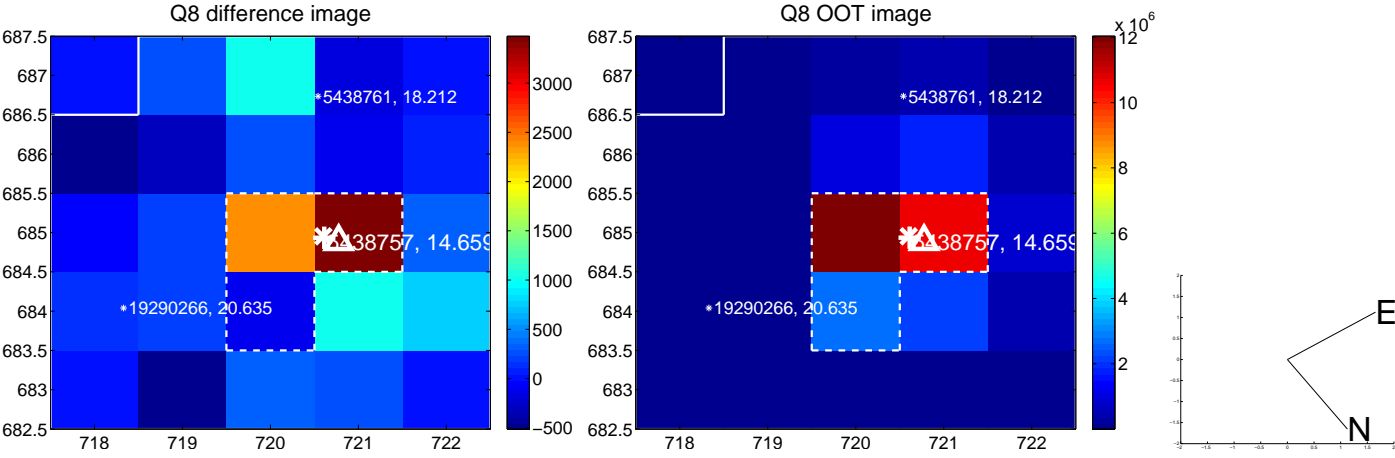
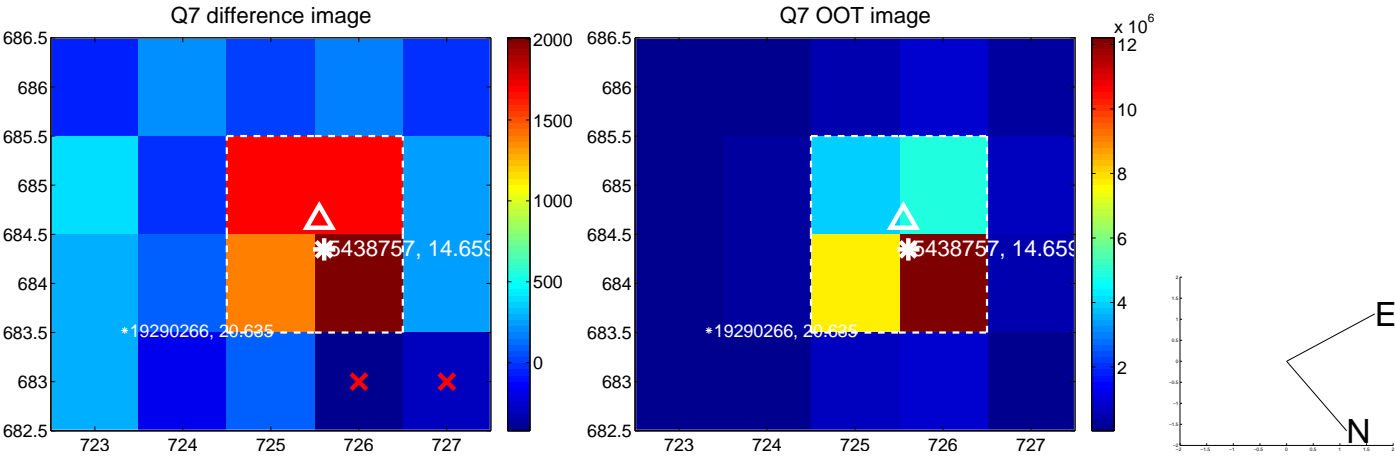
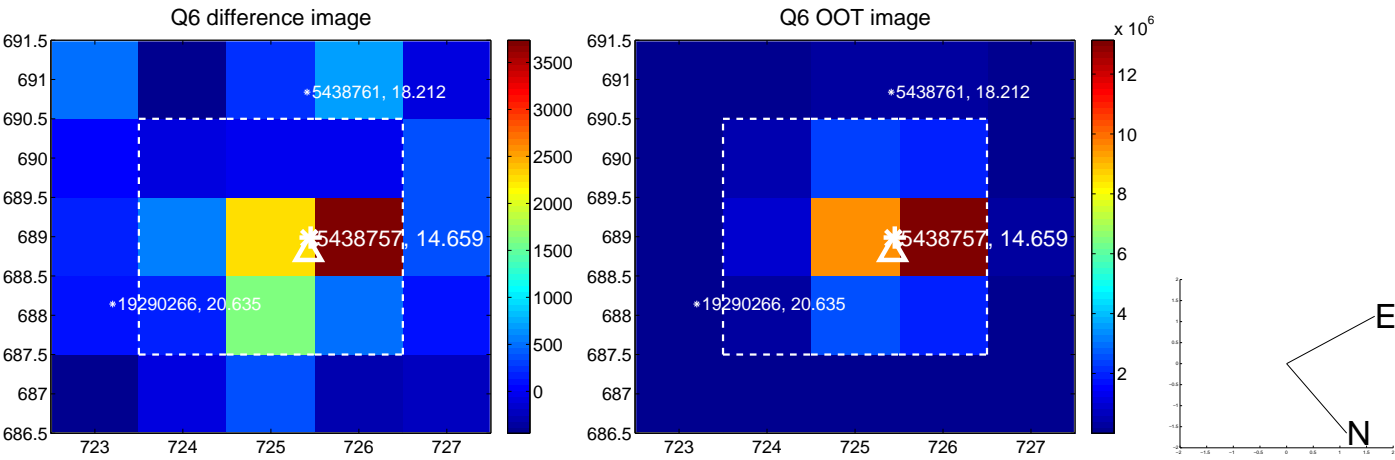
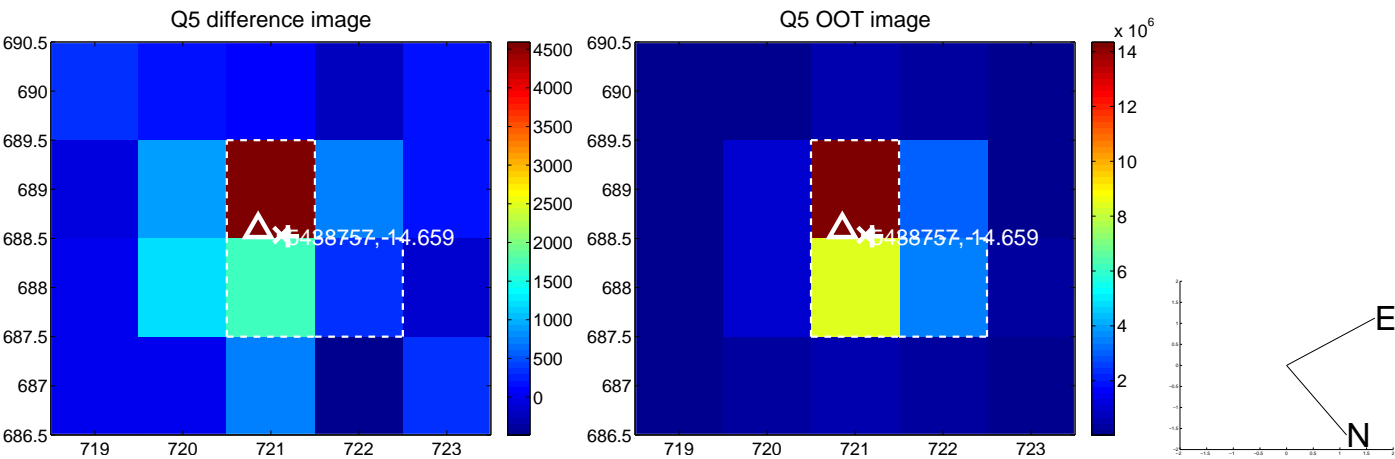


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

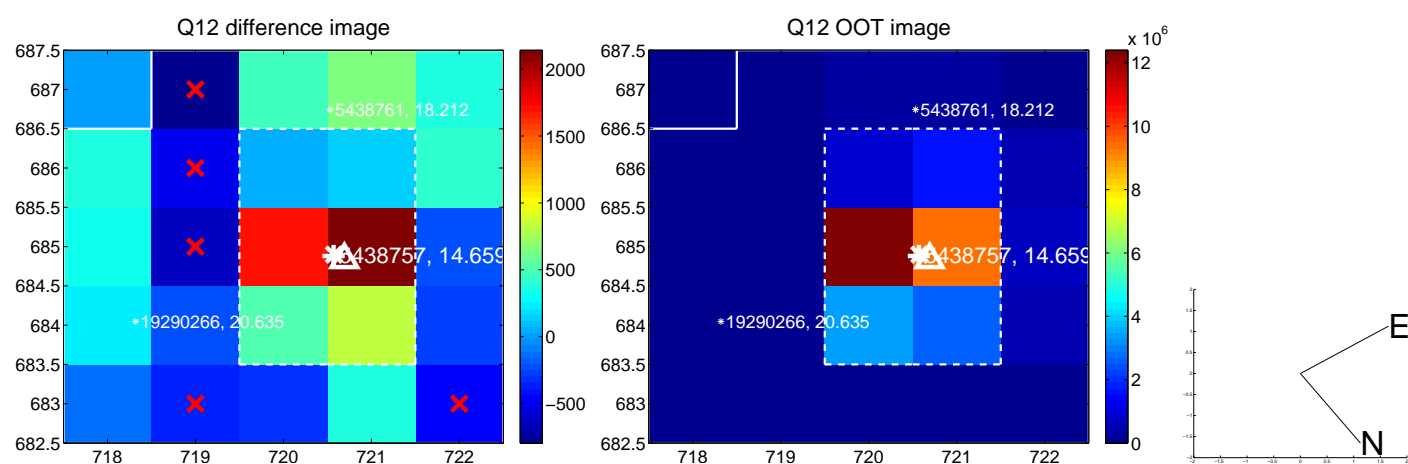
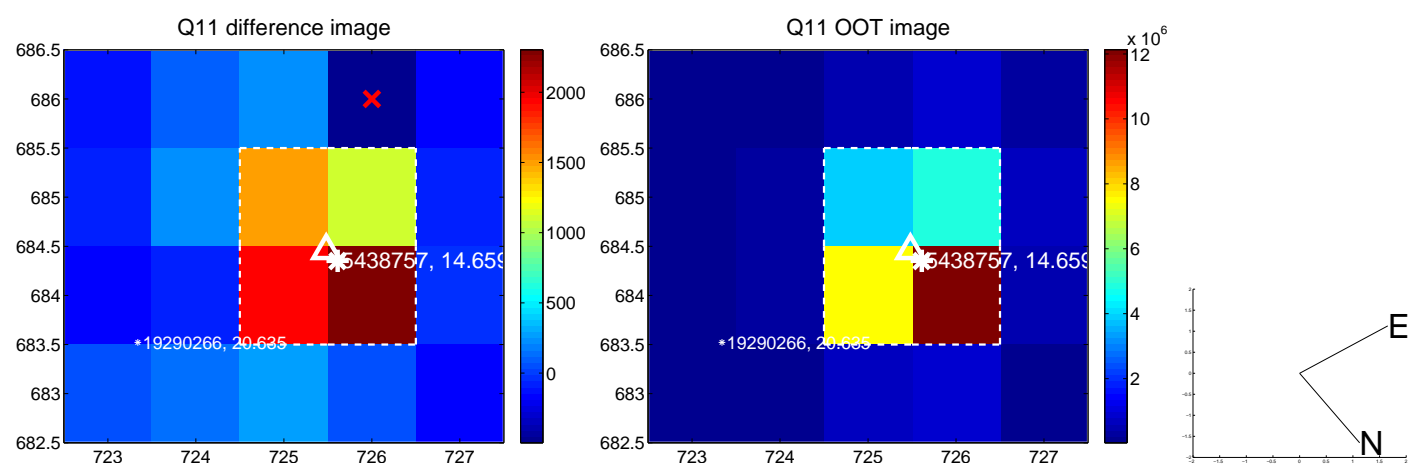
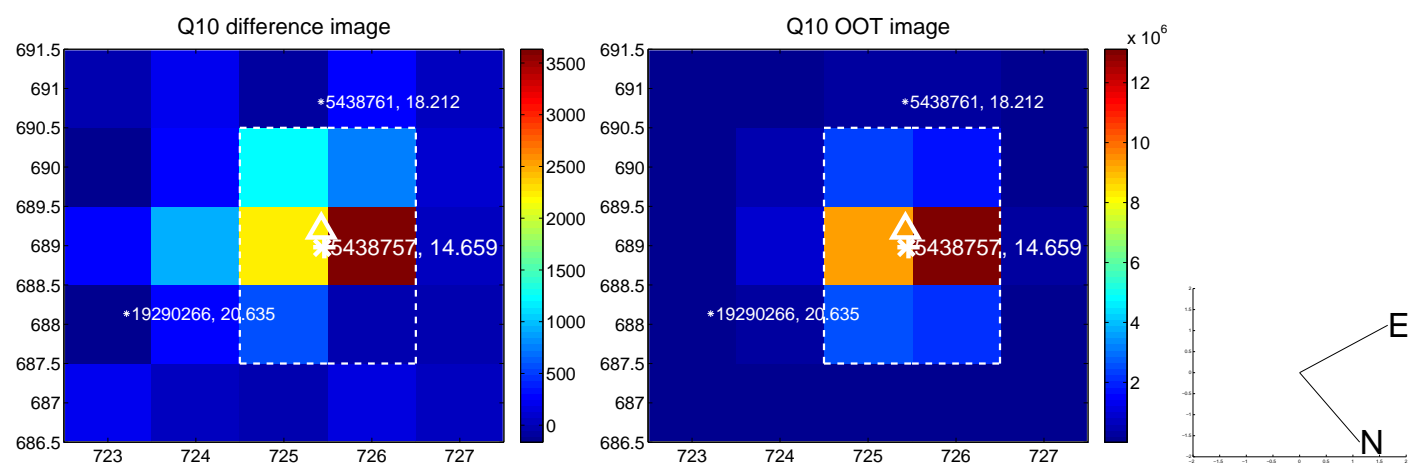
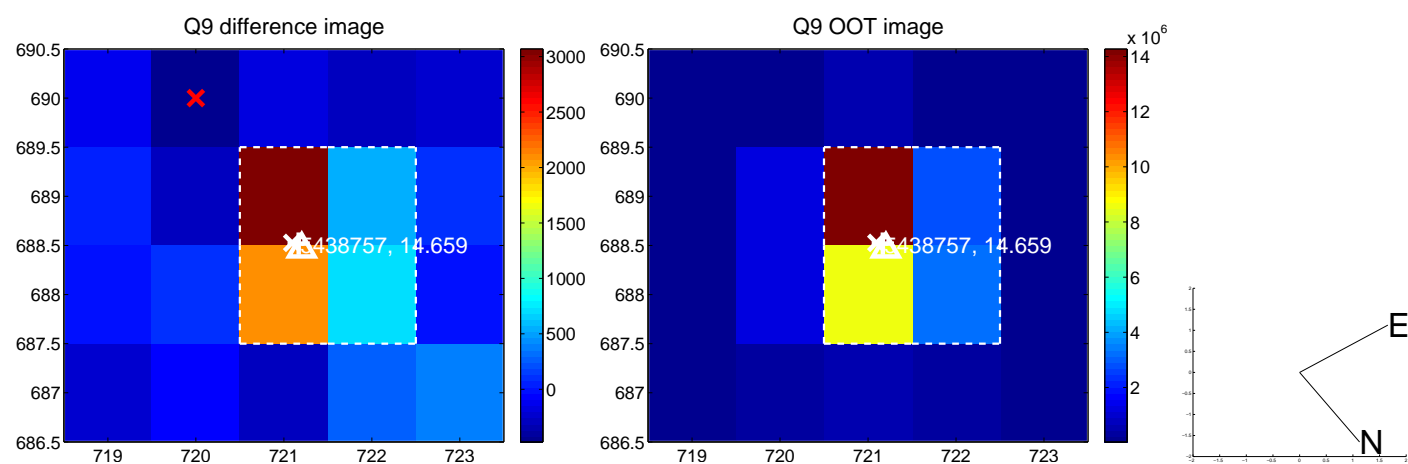
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



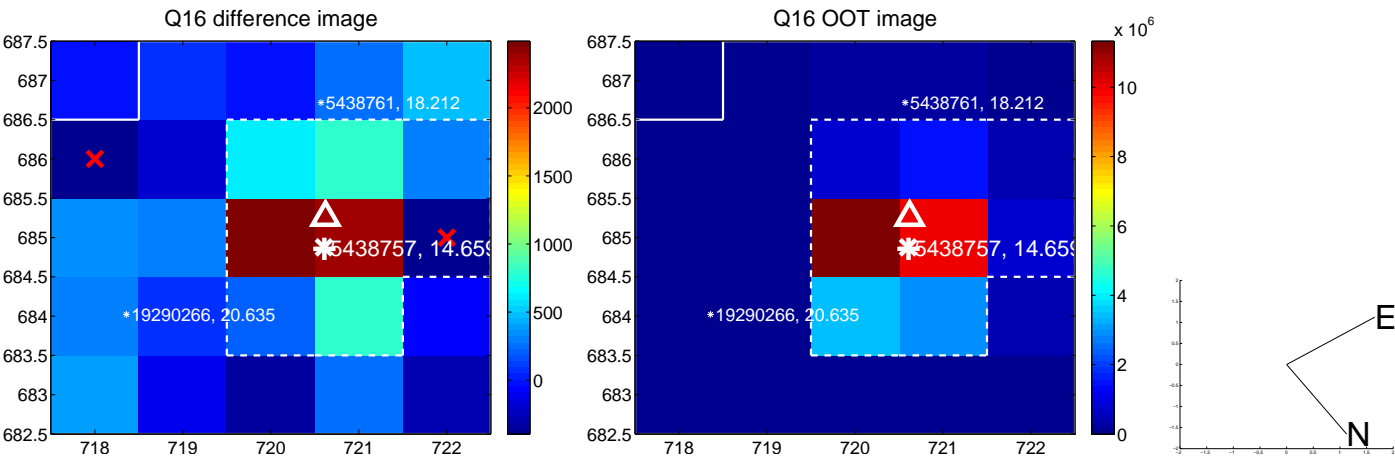
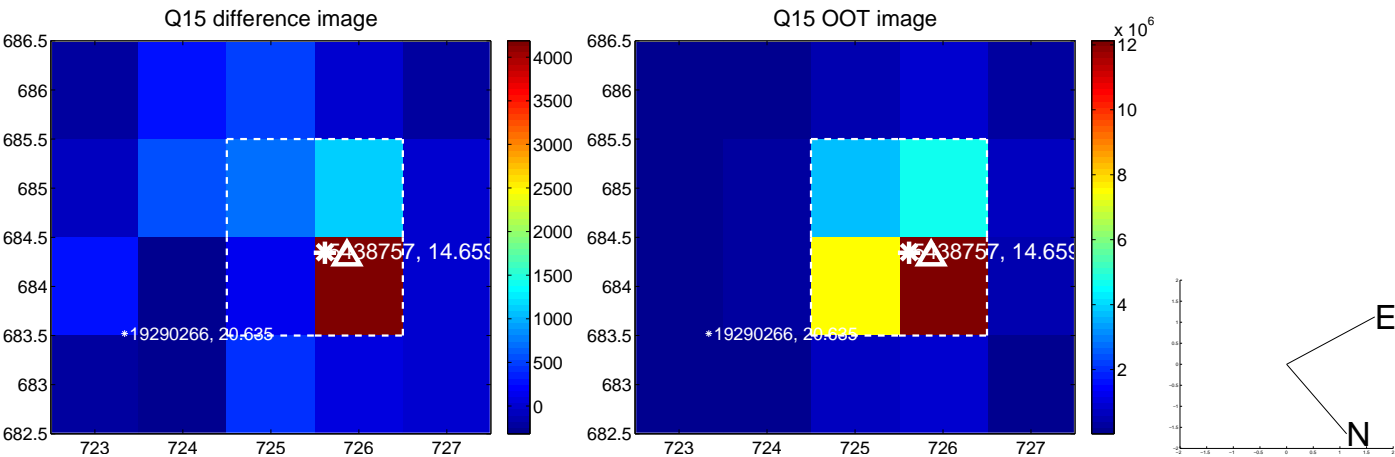
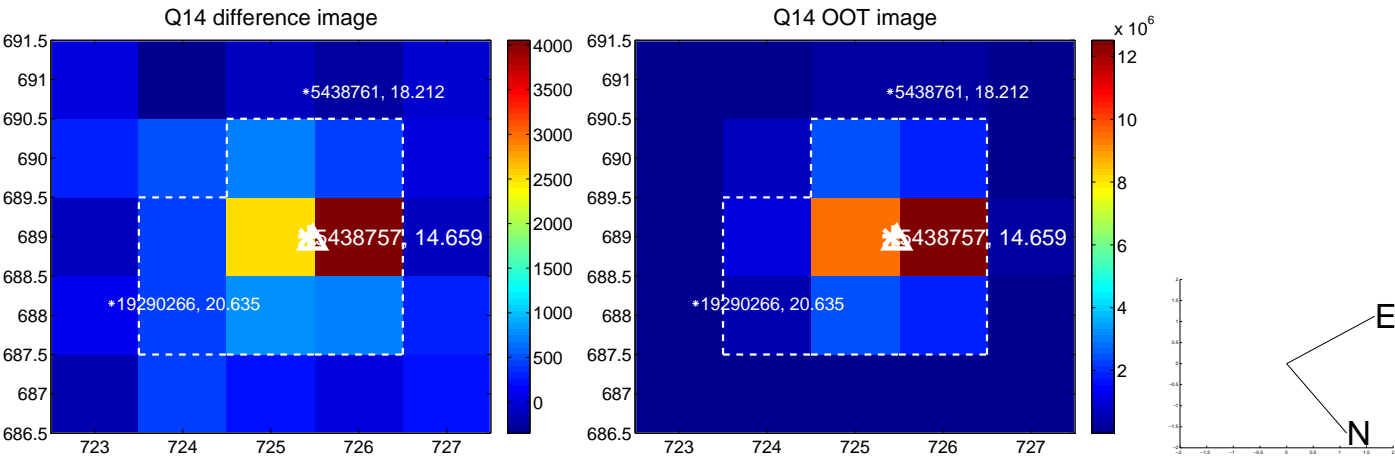
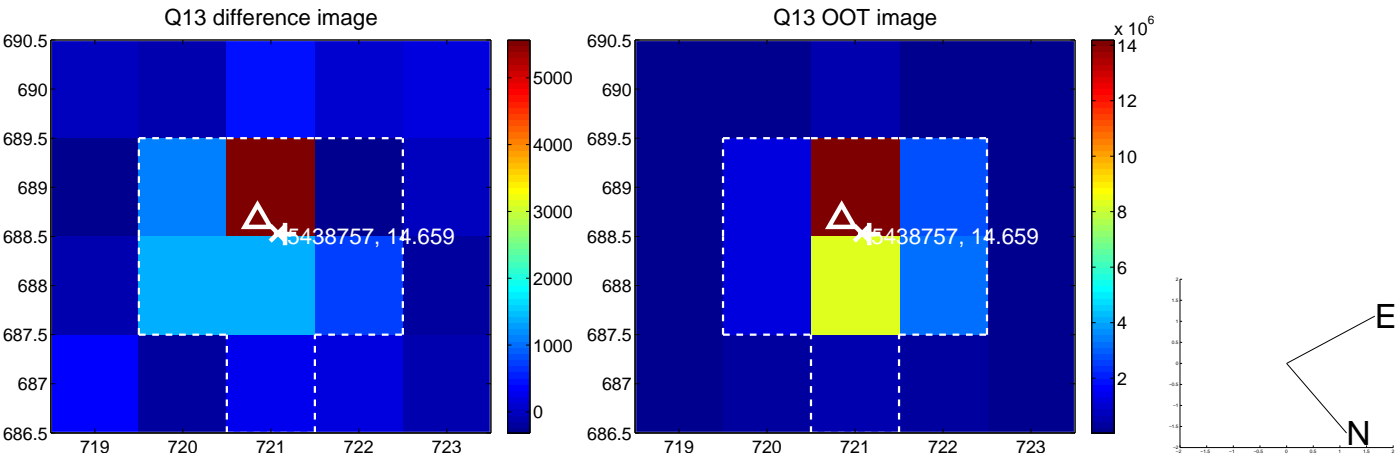
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



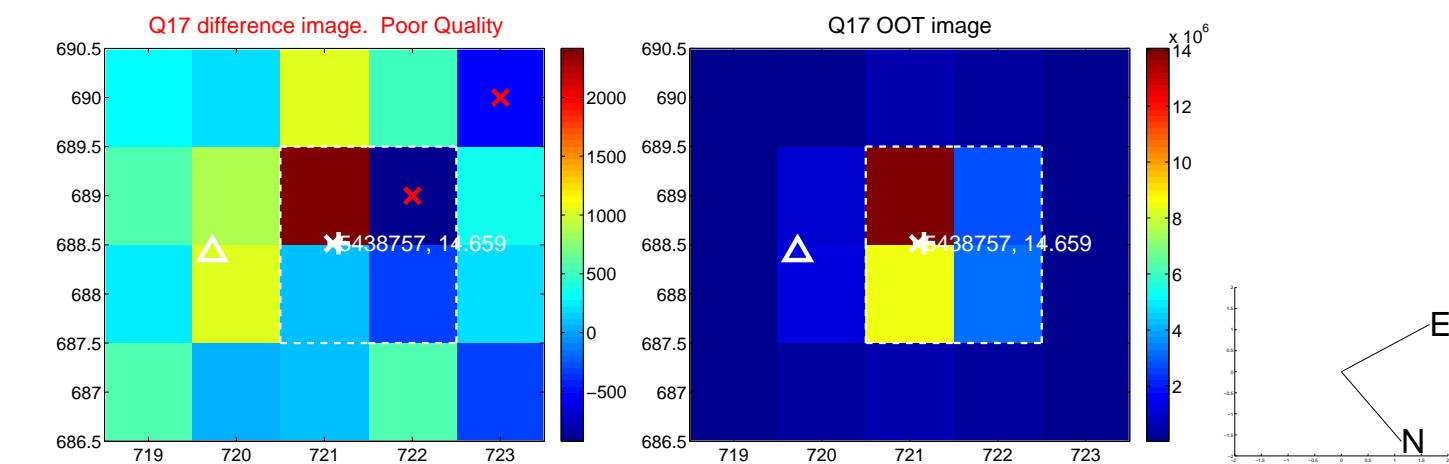
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



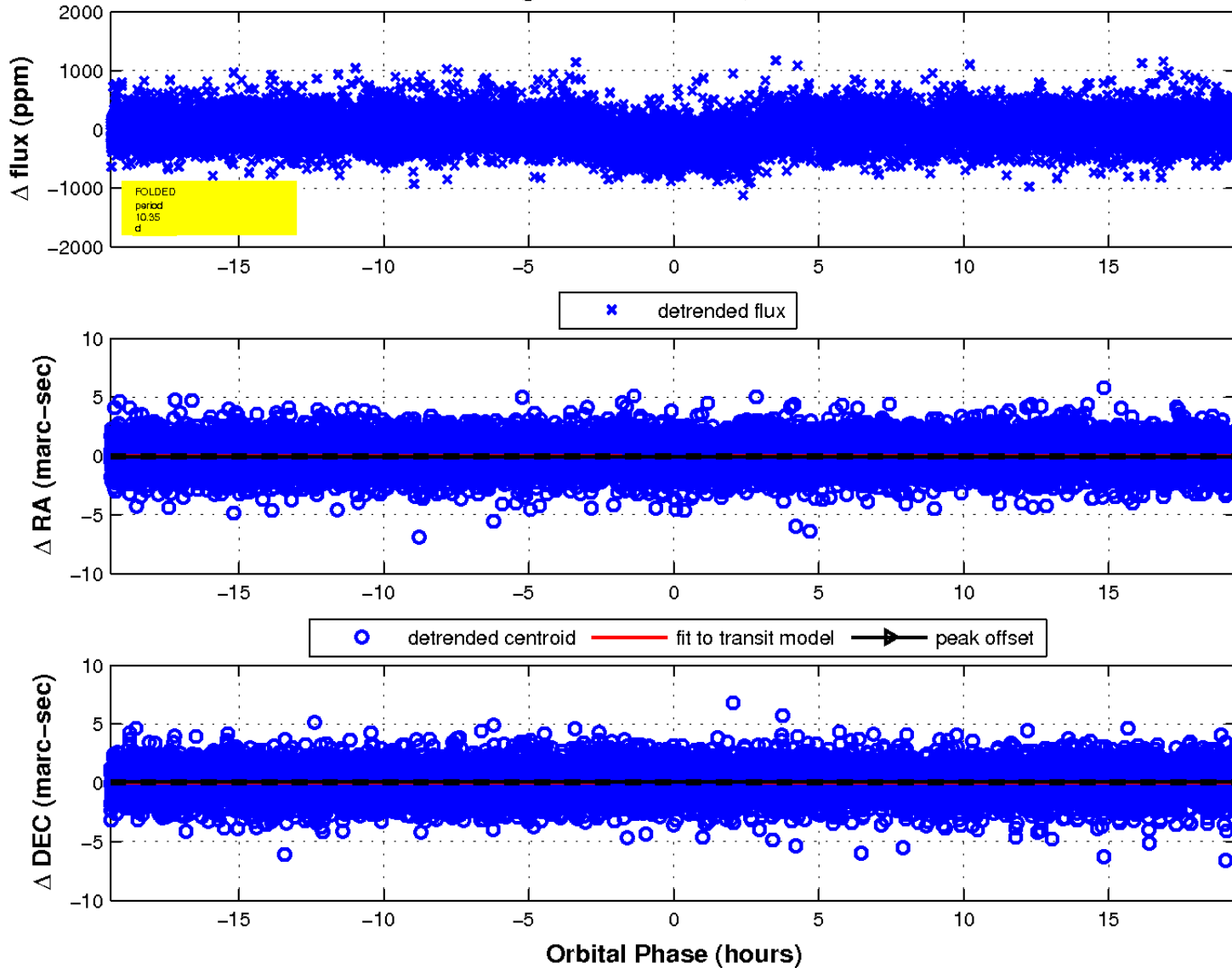
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

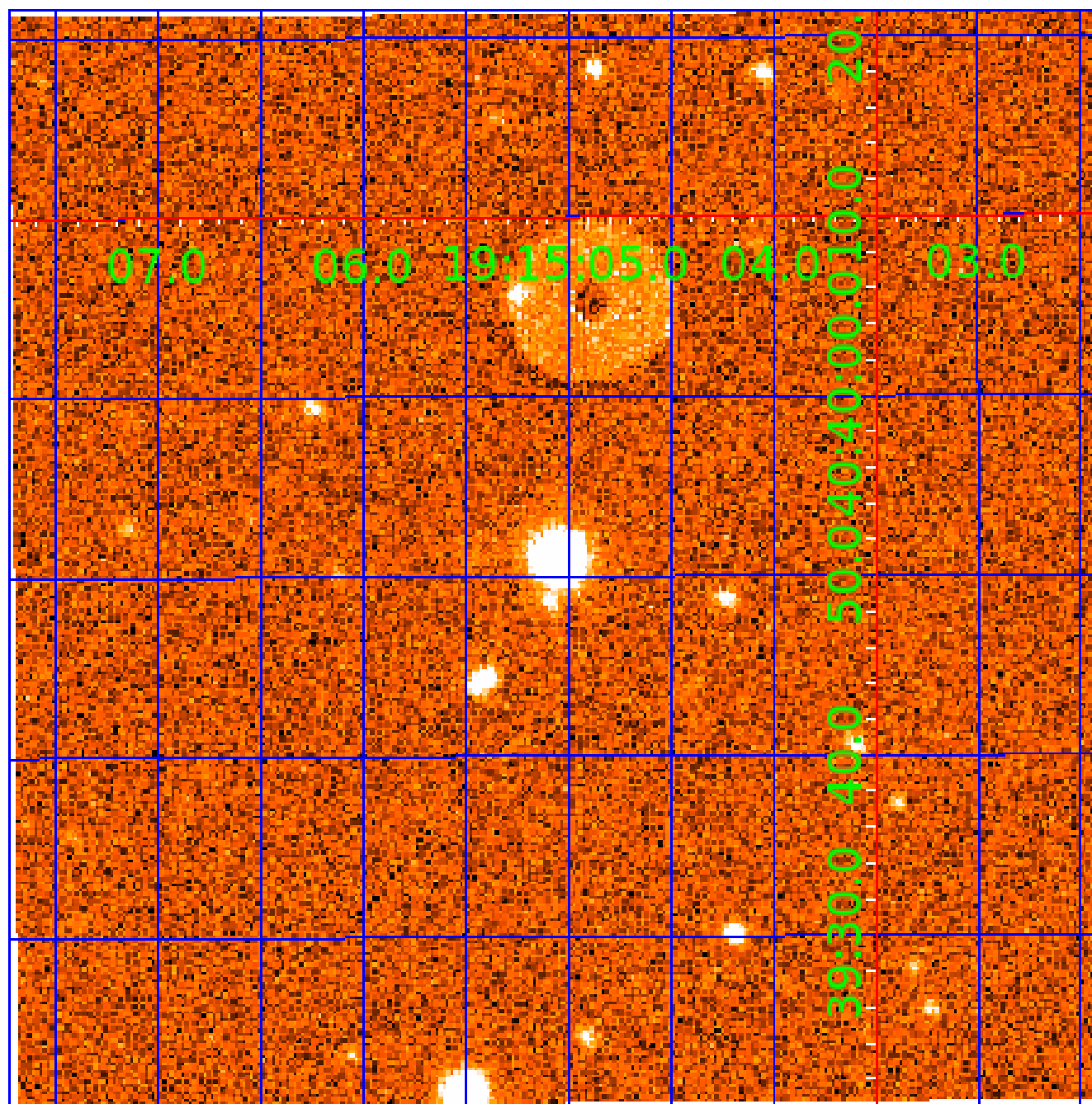


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 005438757

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 005438757-01 | OBS | 1601.01 | 10.350735 | 133.715263 | 269.1 | 6.479 | 30.4 | 33.6 | 1.08 | 5534 | 2.10 | 119.32 |
| 005438757-02 | OBS | 1601.02 | 62.922871 | 151.678598 | 400.4 | 11.578 | 23.1 | 23.0 | 1.08 | 5534 | 2.71 | 10.75 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|------------|
| 005438757-01 | OBS | PC | 1.00 | 0 | 0 | 0 | 0 | NO_COMMENT |
| 005438757-02 | OBS | PC | 0.84 | 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.

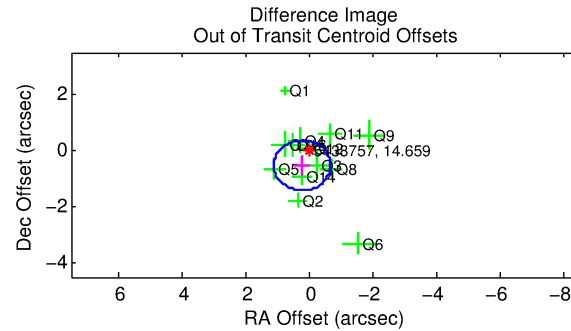
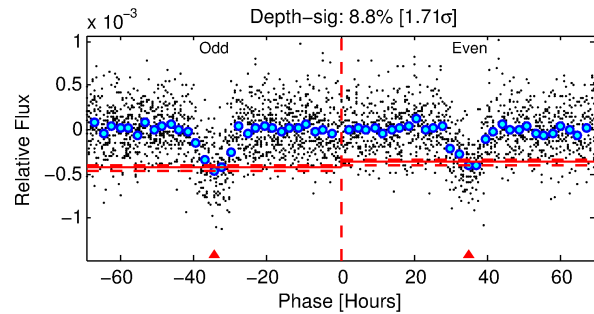
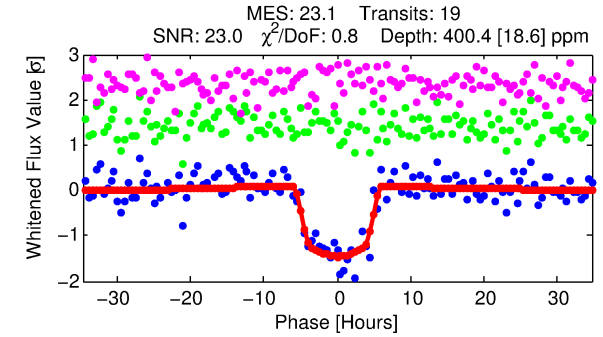
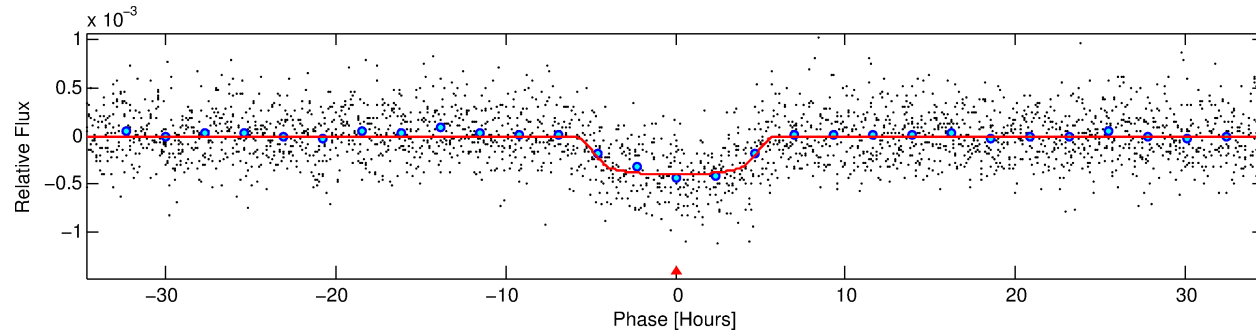
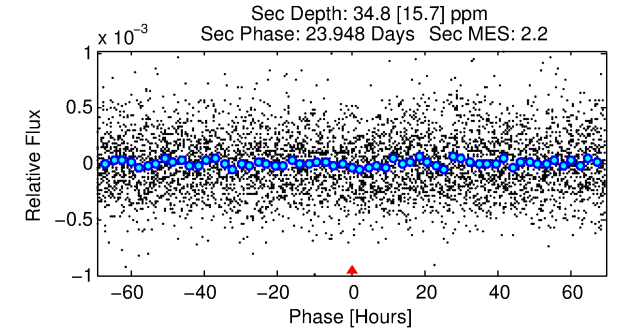
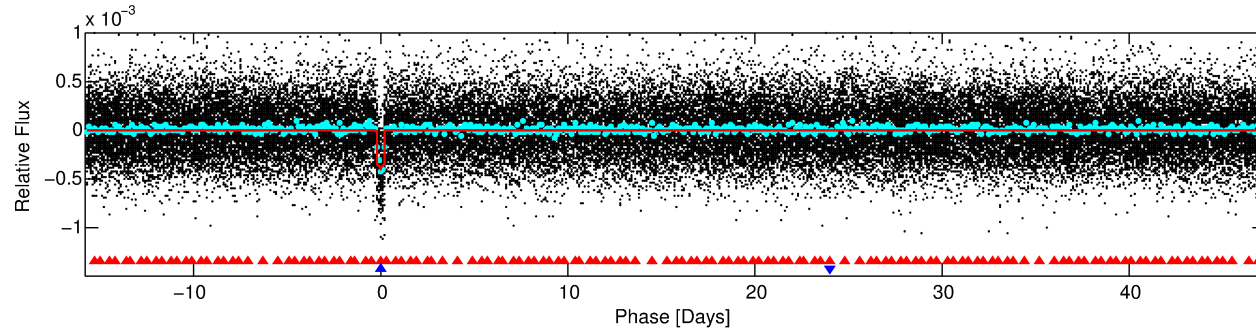
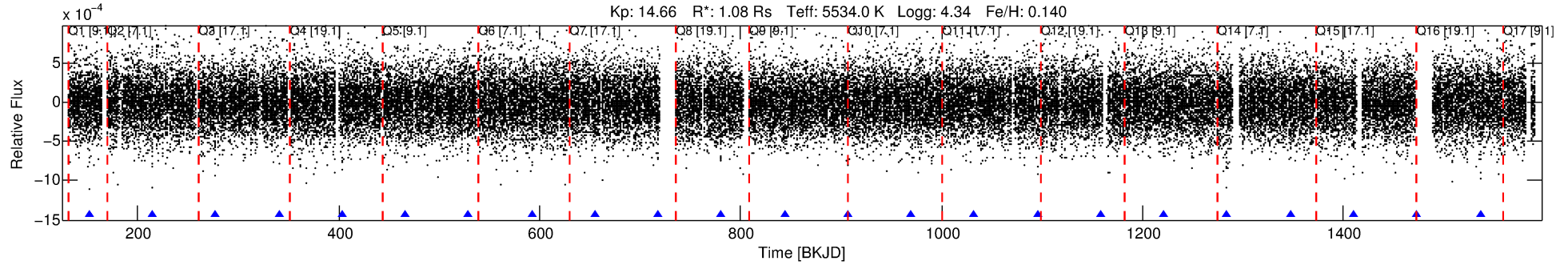
Ephemeris Match Information For 005438757-02

No Significant Match Found

DV One-Page Summary

KIC: 5438757 Candidate: 2 of 2 Period: 62.923 d

KOI: K01601.02 Corr: 0.988



DV Fit Results:

Period = 62.92287 [0.00078] d
Epoch = 151.6786 [0.0095] BKJD
Rp/R* = 0.0230 [0.0011]
a/R* = 17.35 [3.18]
b = 0.93 [0.03]
Seff = 10.75 [2.61]
Teff = 462 [28] K
Rp = 2.70 [0.43] Re
a = 0.3019 [0.0444] AU
Ag = 238.36 [123.28] [1.93σ]
Teffp = 2805 [326] K [7.17σ]

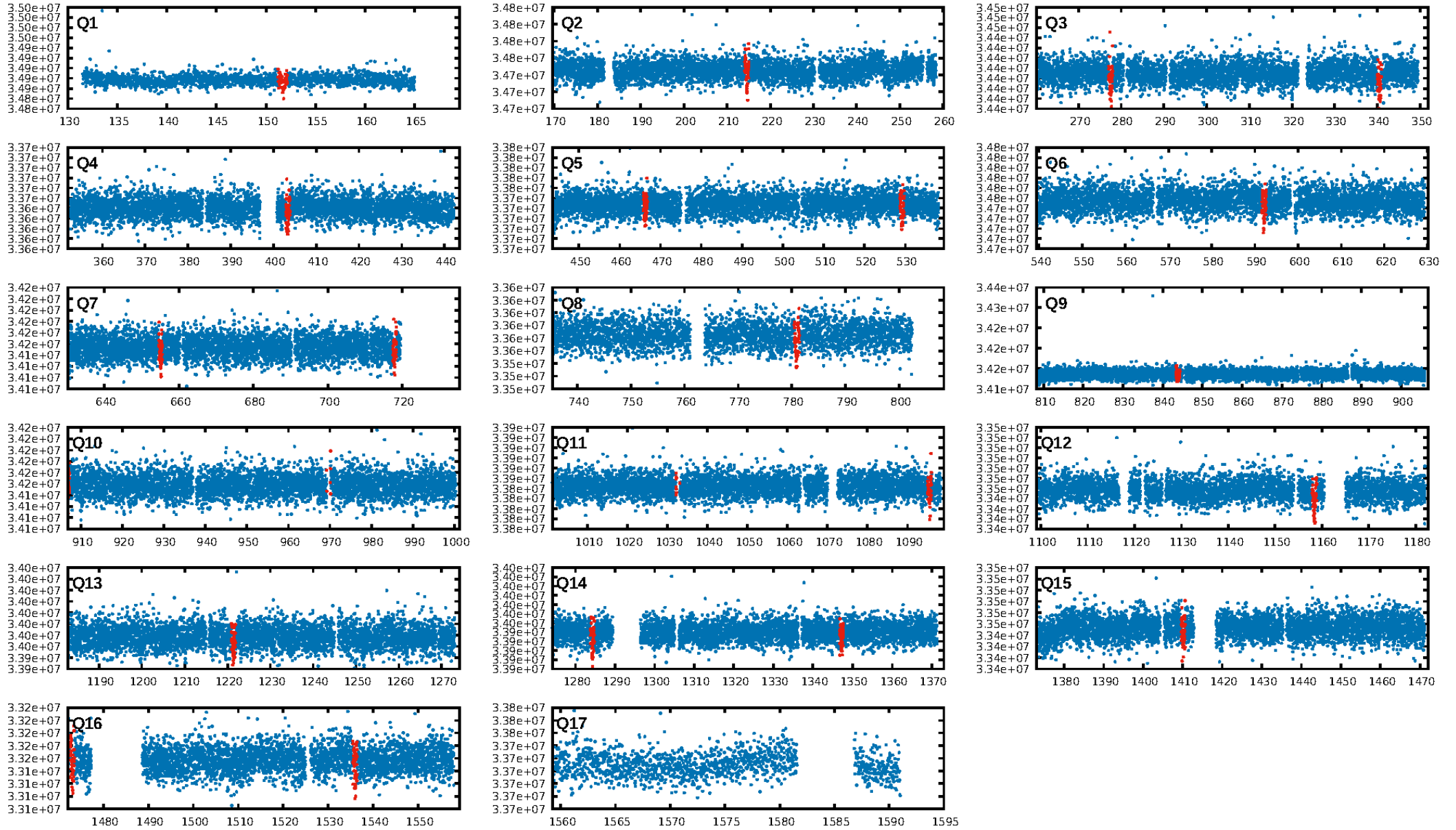
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [95.10σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 51.6%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 2.48e-115
RollingBand-fgt: 1.00 [18/18]
GhostDiagnostic-chr: 5.784
Centroid-sig: 0.6%
Centroid-so: 0.861 arcsec [1.59σ]
OotOffset-rm: 0.581 arcsec [1.96σ]
KicOffset-rm: 0.233 arcsec [0.93σ]
OotOffset-st: 3/3/4/3 [13]
KicOffset-st: 3/3/4/3 [13]
DiffImageQuality-fgm: 1.00 [13/13]
DiffImageOverlap-fno: 0.77 [10/13]

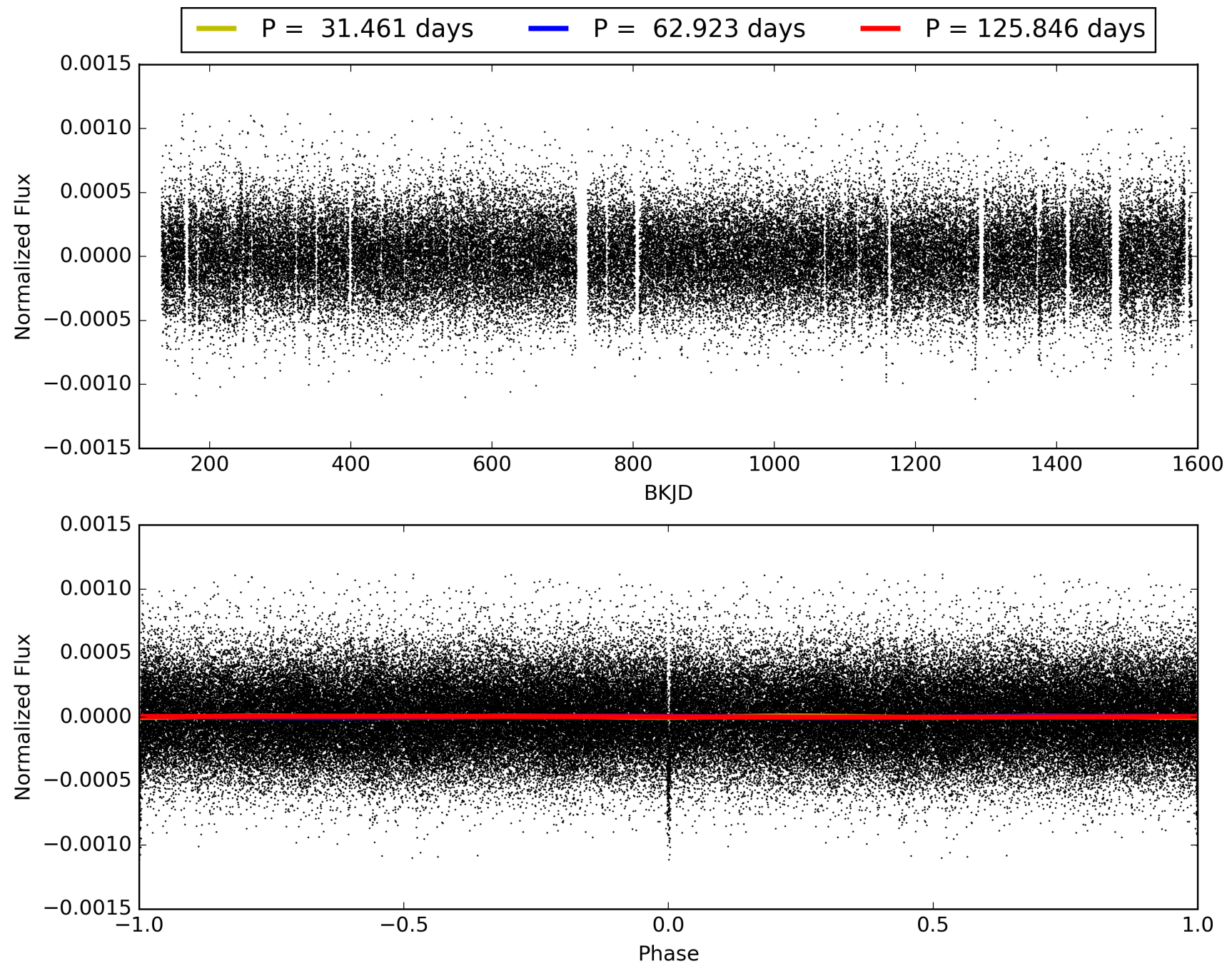
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 19:47:46 Z

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

TCE 005438757-02, PDC Light Curves

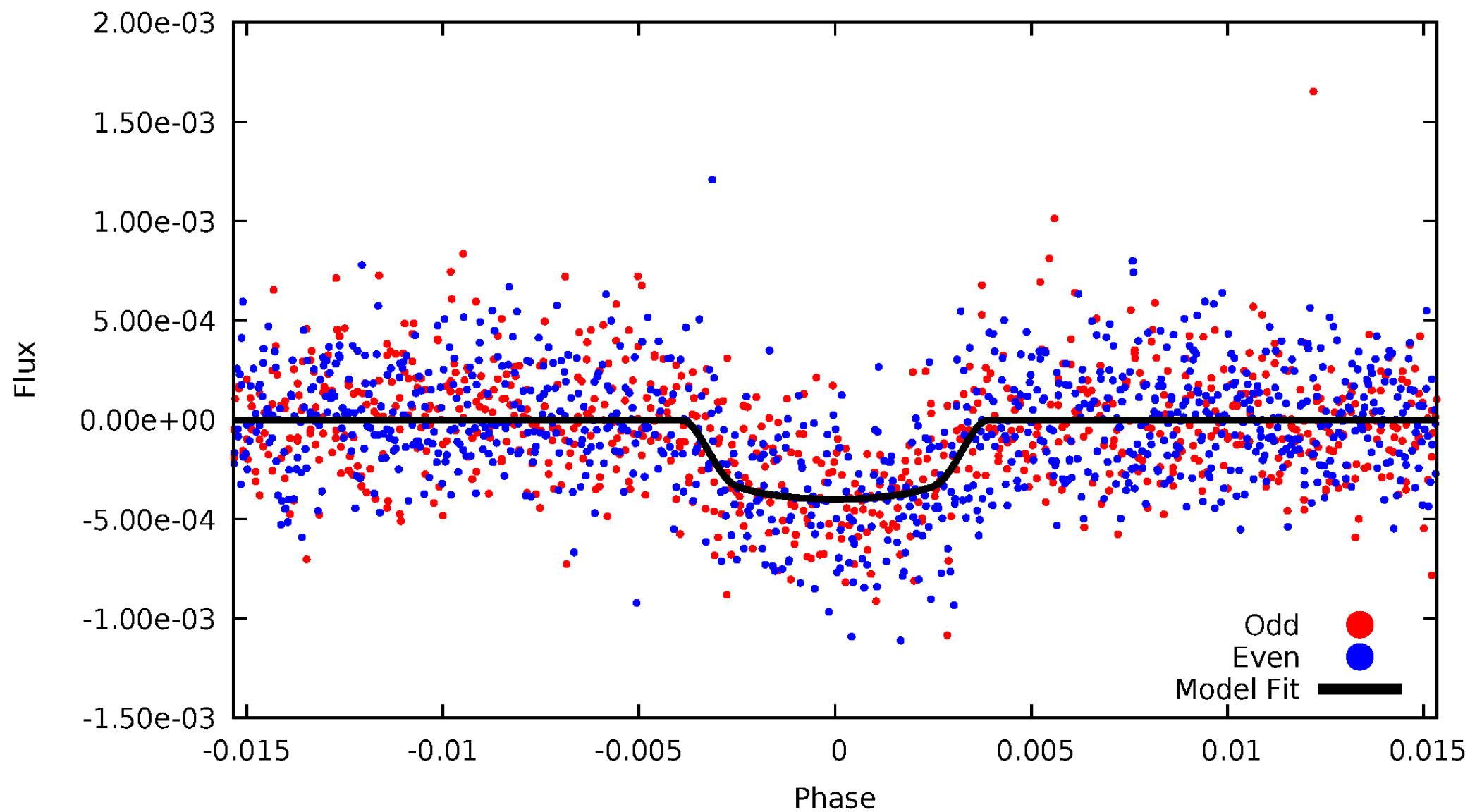


TCE 005438757-02



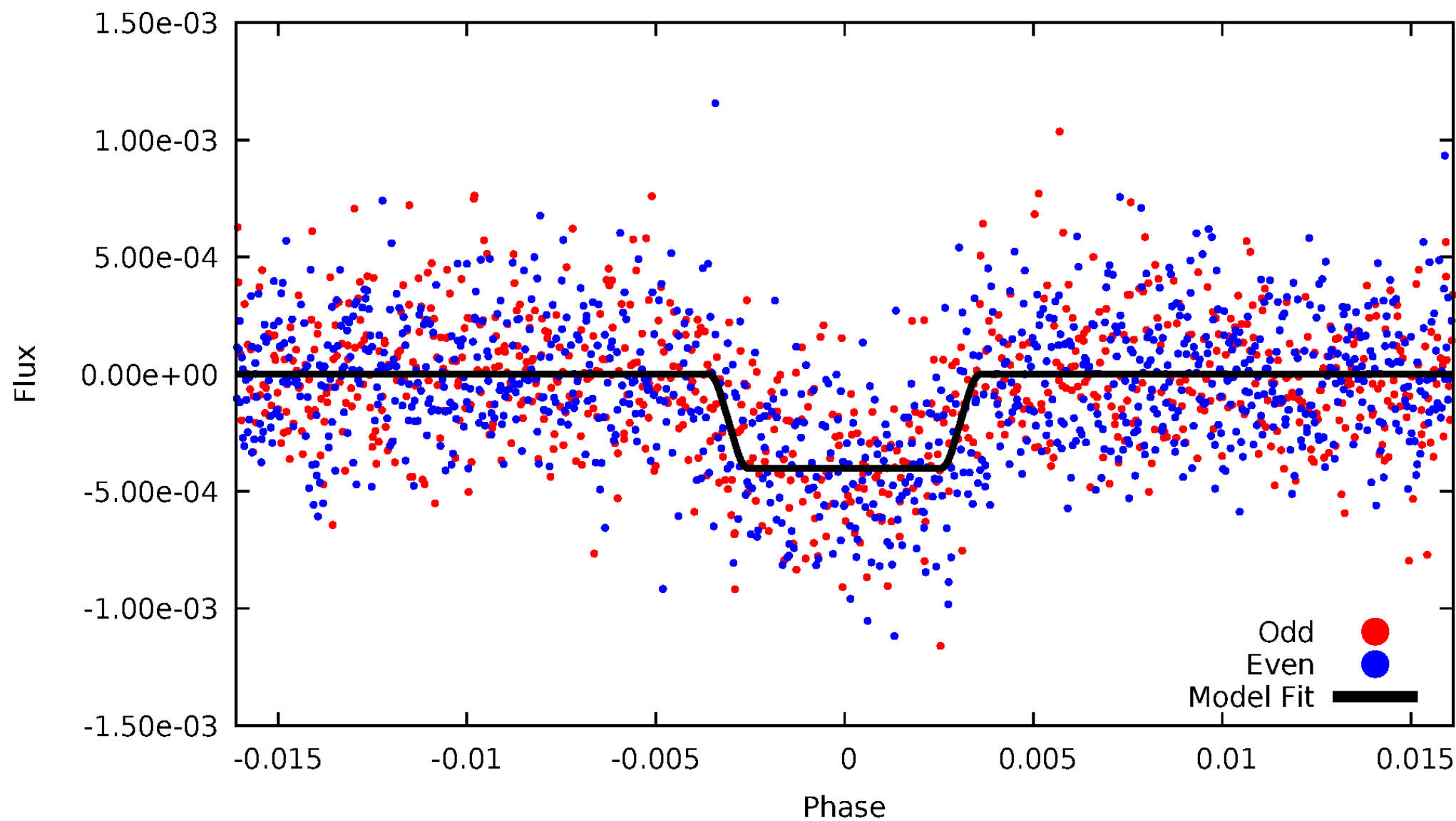
DV Odd/Even

TCE 005438757-02



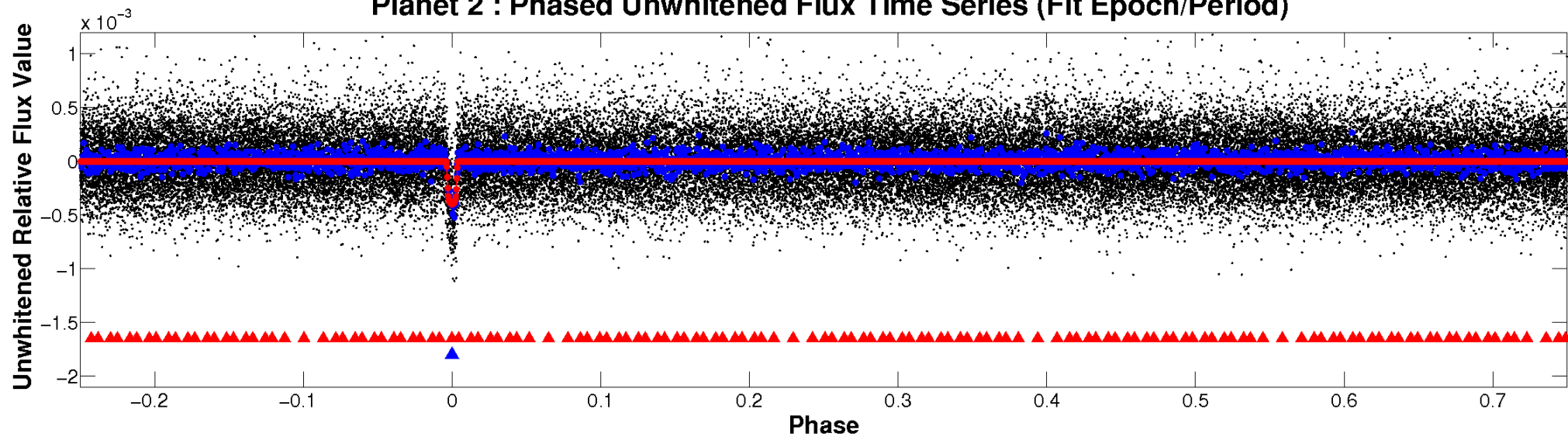
ALT Odd/Even

TCE 005438757-02

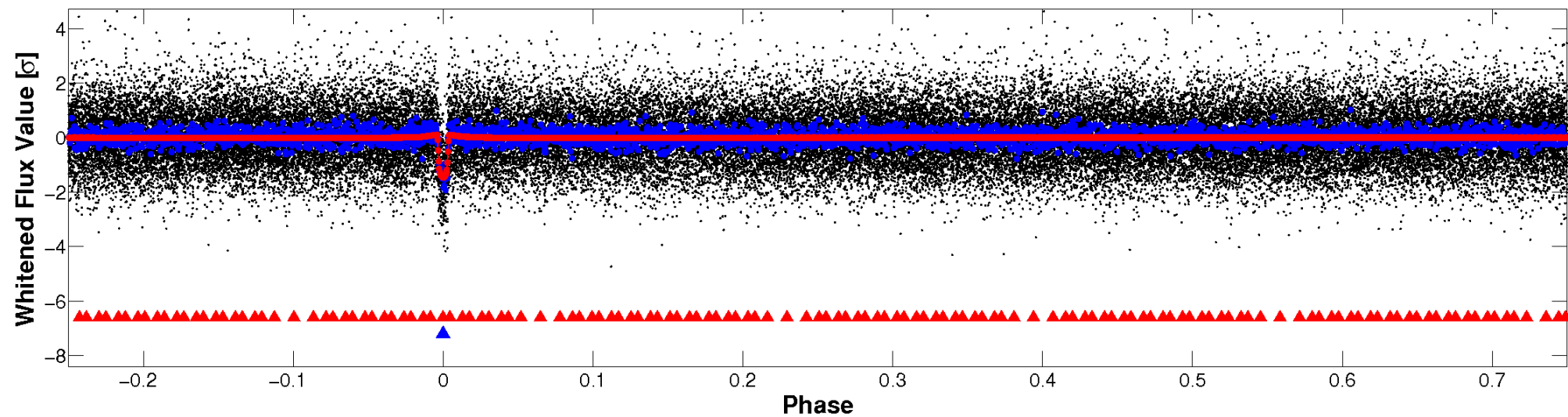


Non-Whitened Vs. Whitened Light Curve

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

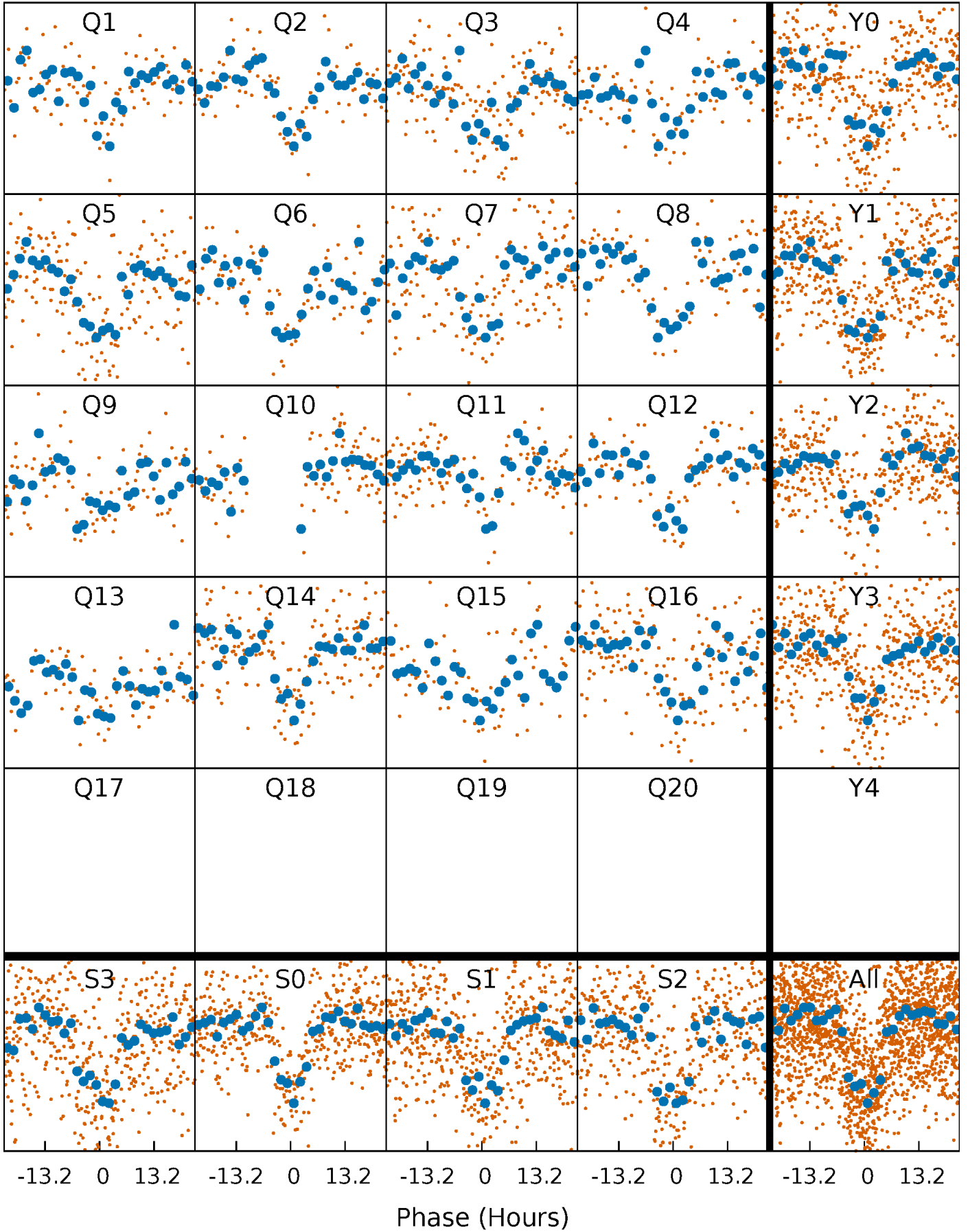


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



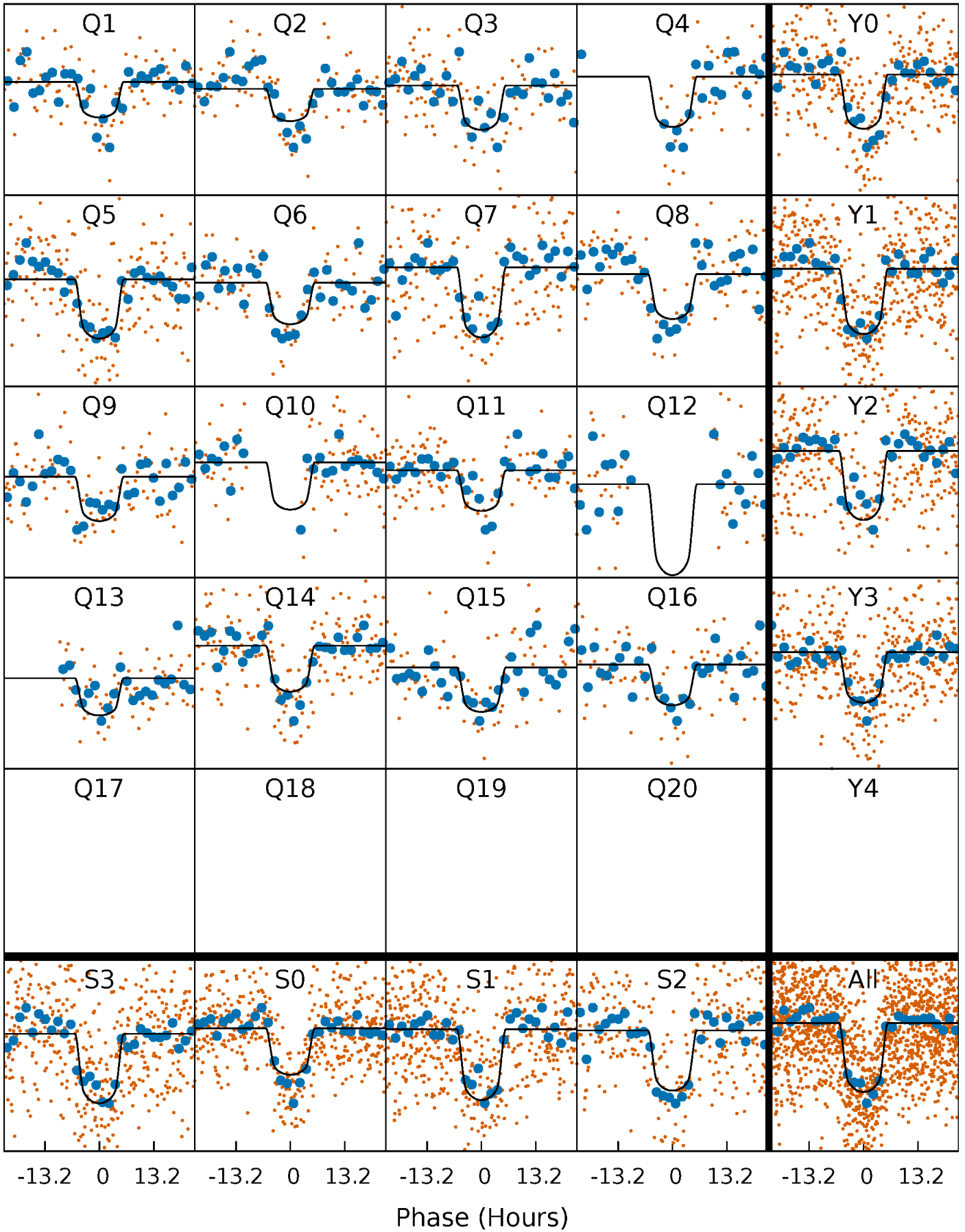
PDC Quarter-Phased Transit Curves

TCE 005438757-02 P= 62.922871 Days $T_0=151.678598$ (BKJD)



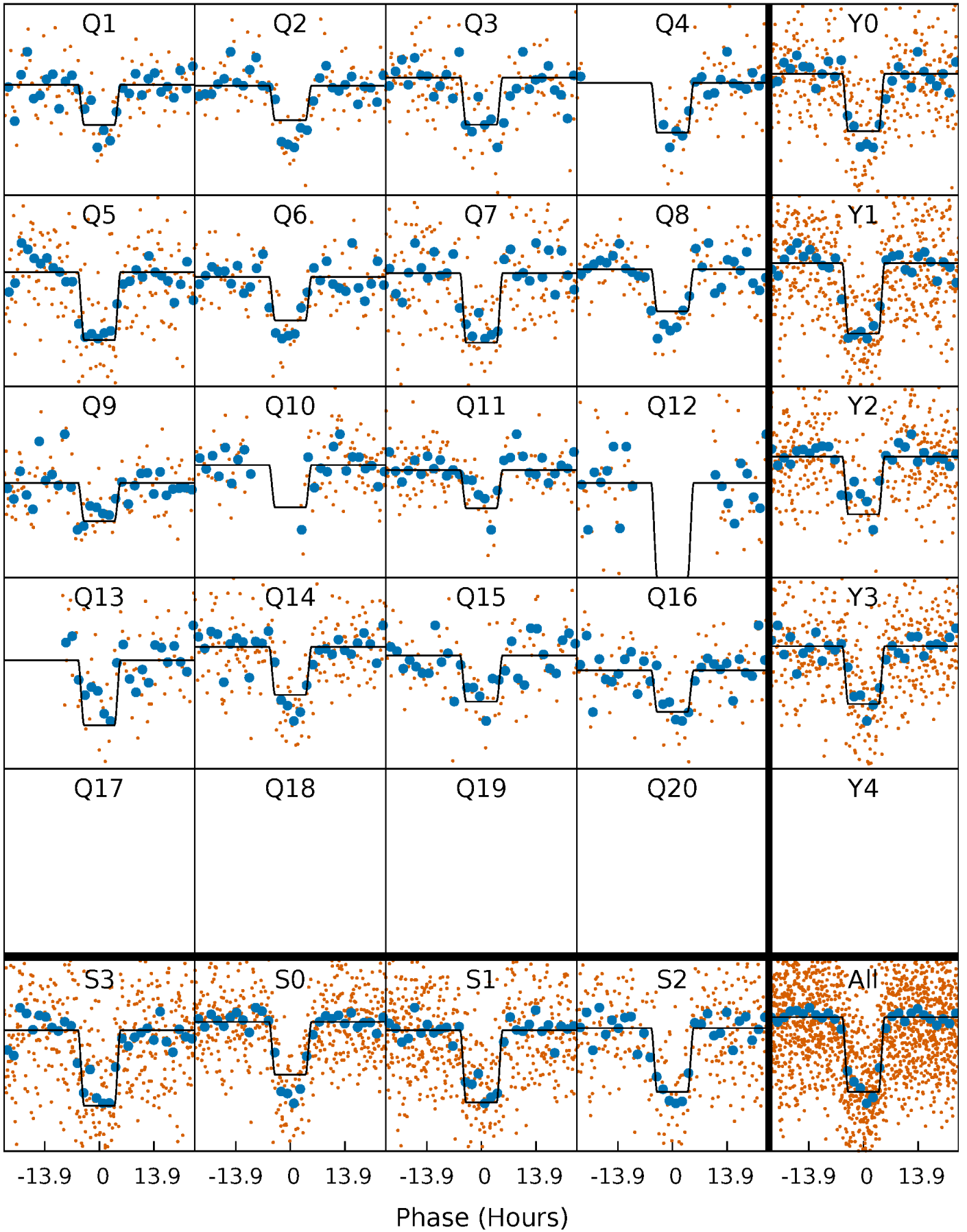
DV Quarter-Phased Transit Curves

TCE 005438757-02 P= 62.922871 Days $T_0=151.678598$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

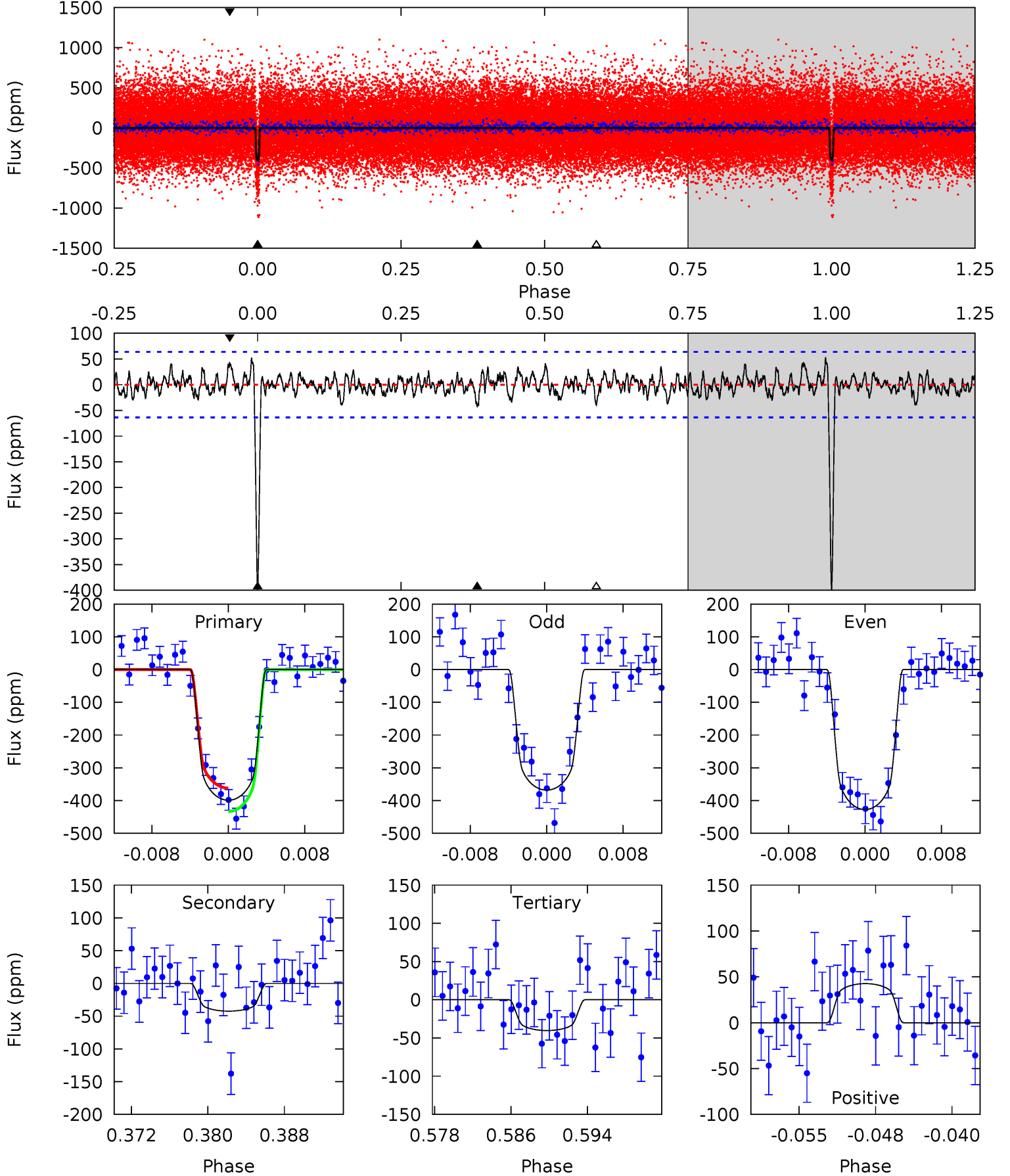
TCE 005438757-02 P= 62.920981 Days $T_0=151.700590$ (BKJD)



DV Model-Shift Uniqueness Test

005438757-02, P = 62.922871 Days, E = 88.755727 Days

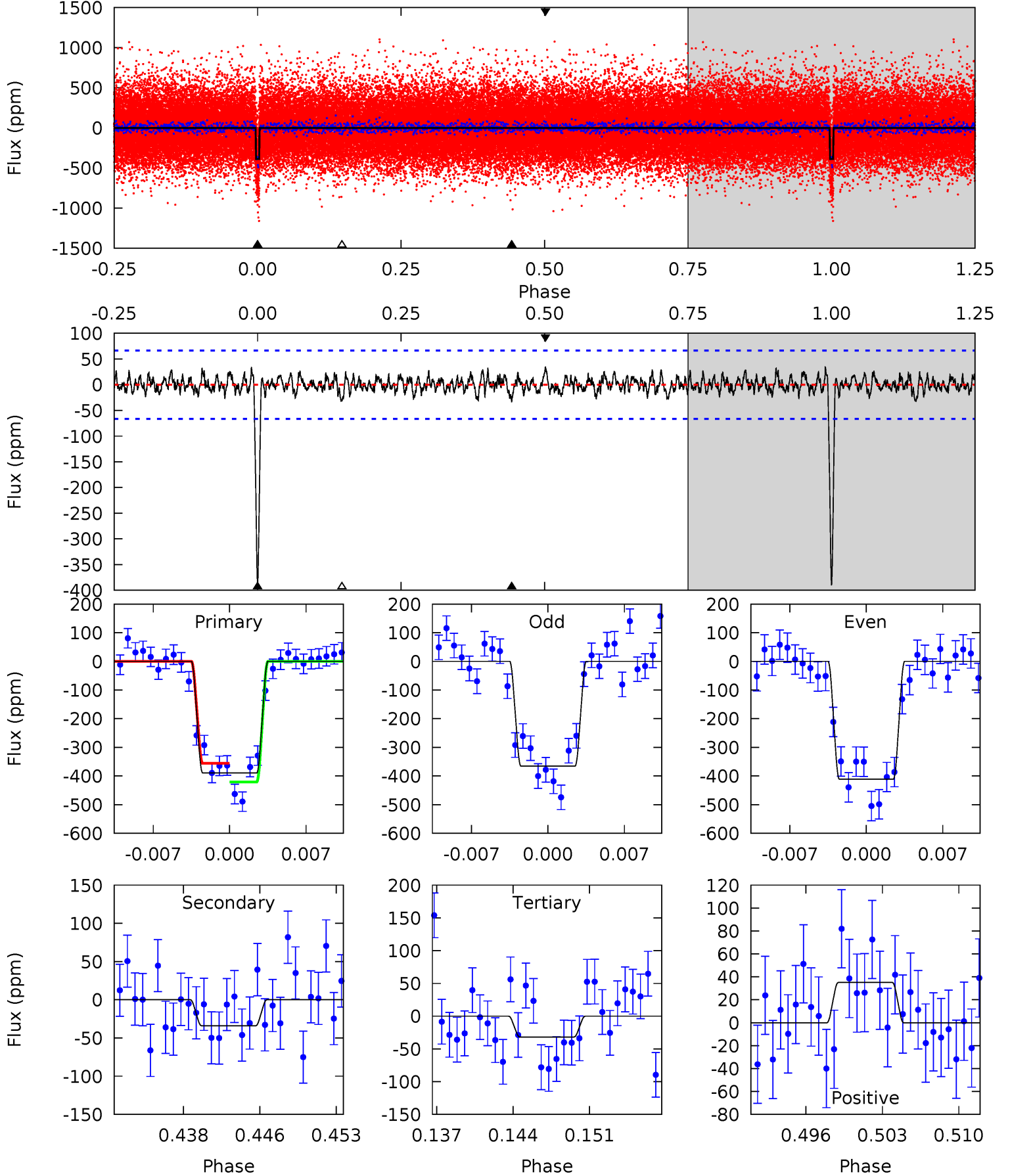
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 31.8 | 3.38 | 3.20 | 3.39 | 5.07 | 2.66 | 1.14 | 28.6 | 28.4 | 0.17 | -0.01 | 2.37 | 0.99 | 0.12 | 2.86 |



Alt Model-Shift Uniqueness Test

005438757-02, P = 62.920981 Days, E = 88.779609 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 29.8 | 2.60 | 2.44 | 2.68 | 5.09 | 2.69 | 0.88 | 27.4 | 27.1 | 0.17 | -0.08 | 1.73 | 1.00 | 0.08 | 2.48 |



Stellar Parameters For KIC 005438757

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|---------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 5534^{+82}_{-74} | $4.338^{+0.138}_{-0.103}$ | $0.140^{+0.150}_{-0.150}$ | $1.080^{+0.165}_{-0.150}$ | $0.926^{+0.067}_{-0.043}$ | $1.036^{+0.586}_{-0.316}$ |
| | +1%/-1% | +3%/-2% | +107%/-107% | +15%/-14% | +7%/-5% | +57%/-31% |
| 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 005438757-02 / KOI 1601.02

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|--------------|------------------------|----------------------|----------------------|---------------------|
| DV | -42 ± 13 | $2.69^{+0.27}_{-0.27}$ | 642^{+25}_{-27} | 3434^{+158}_{-186} | 294^{+106}_{-99} |
| Alt. | -34 ± 13 | $2.36^{+0.25}_{-0.23}$ | 643^{+29}_{-27} | 3461^{+194}_{-243} | 298^{+147}_{-114} |

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

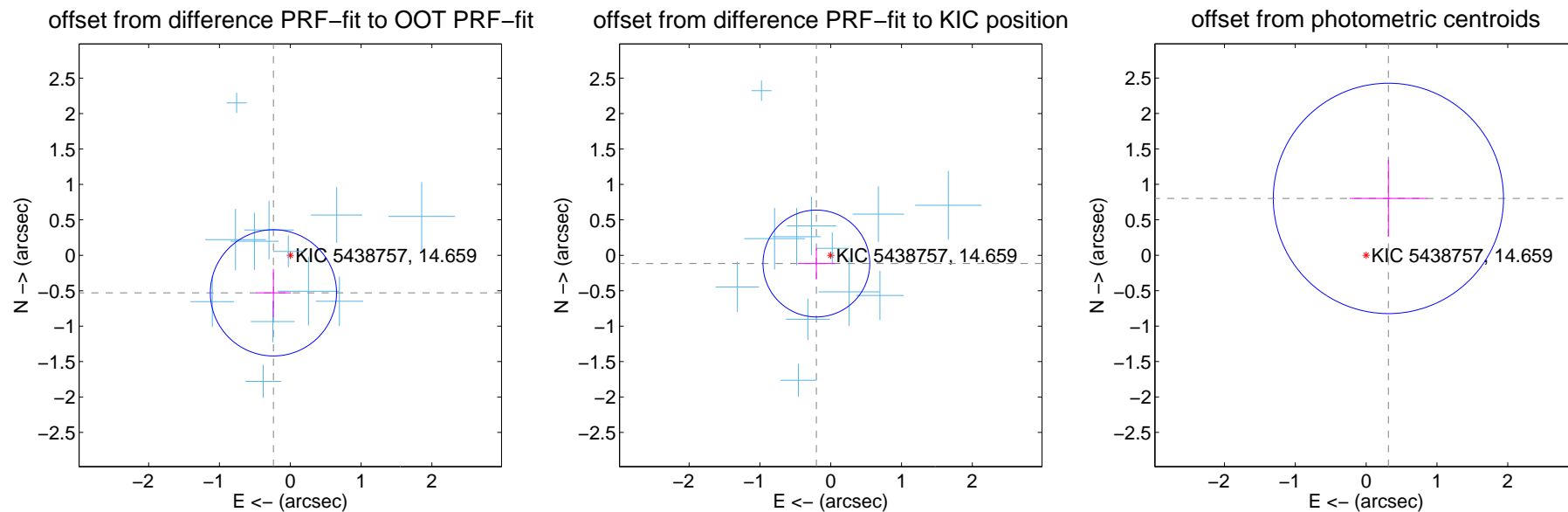
DV Centroid Data

Supplemental centroid analysis for 005438757-02. Kepler magnitude: 14.66. Transit SNR 23.05

There are 13 quarters with good PRF difference image offsets

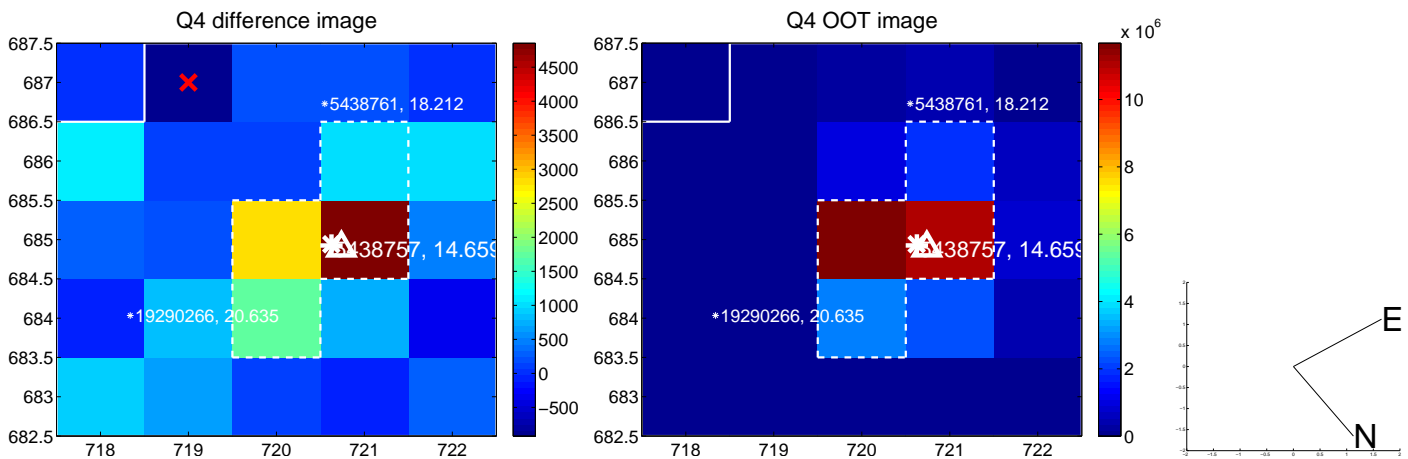
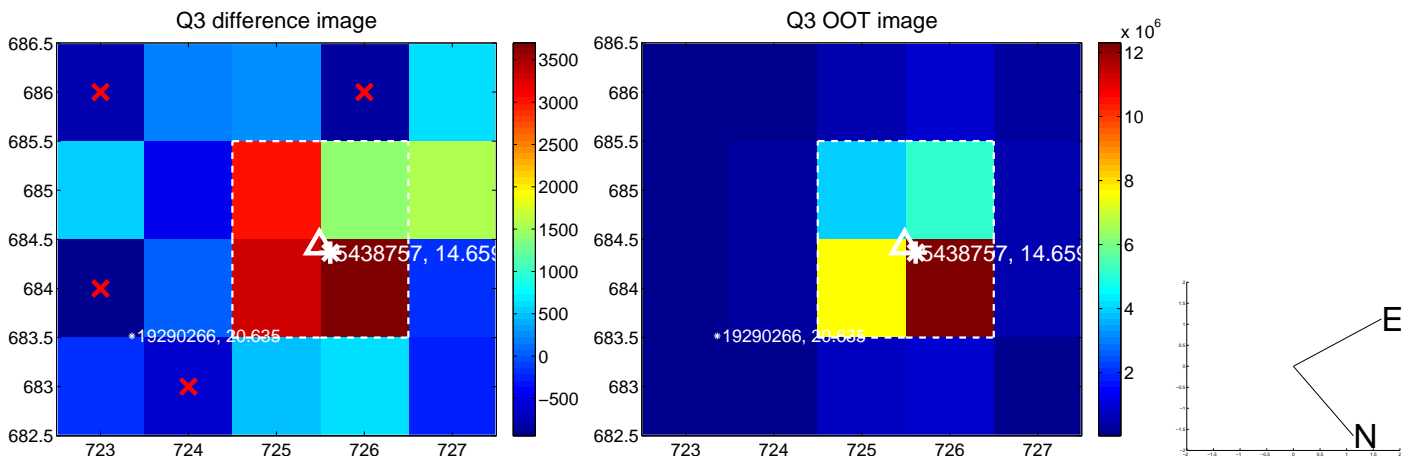
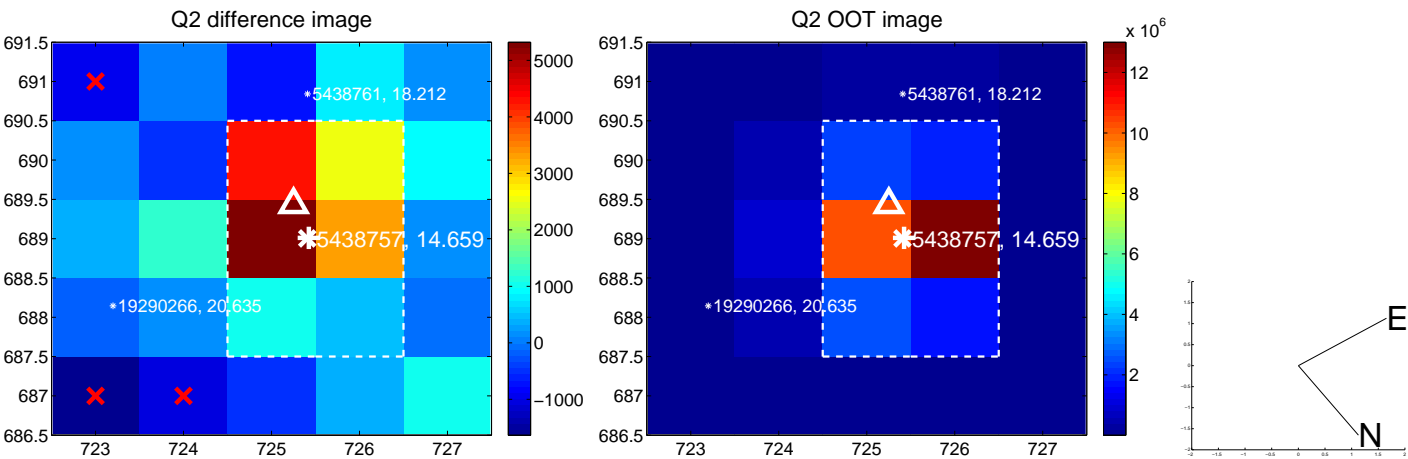
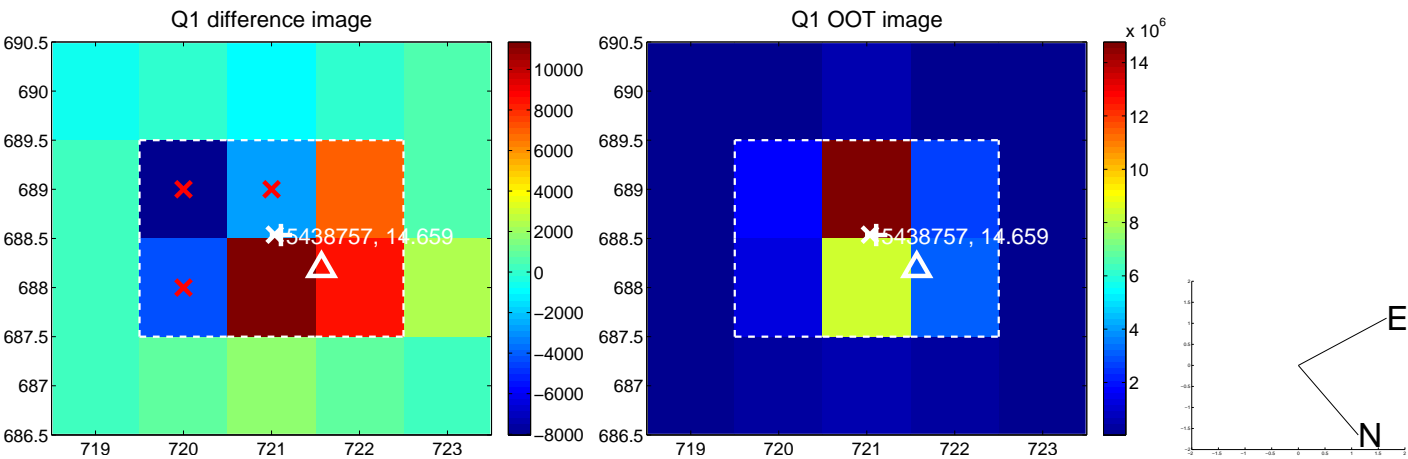
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT | 0.581 ± 0.297 | 1.96 | 0.237 ± 0.244 | -0.530 ± 0.337 |
| PRF-fit source offset from KIC position | 0.233 ± 0.251 | 0.93 | 0.202 ± 0.261 | -0.116 ± 0.218 |
| photometric centroid source offset | 0.86 ± 0.54 | 1.59 | -0.31 ± 0.55 | 0.80 ± 0.54 |

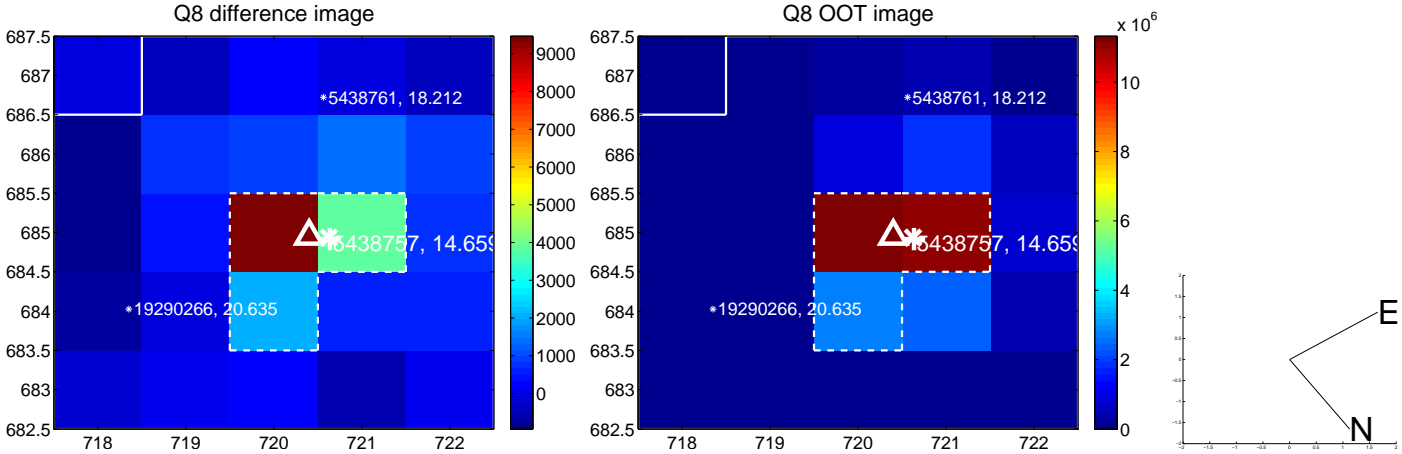
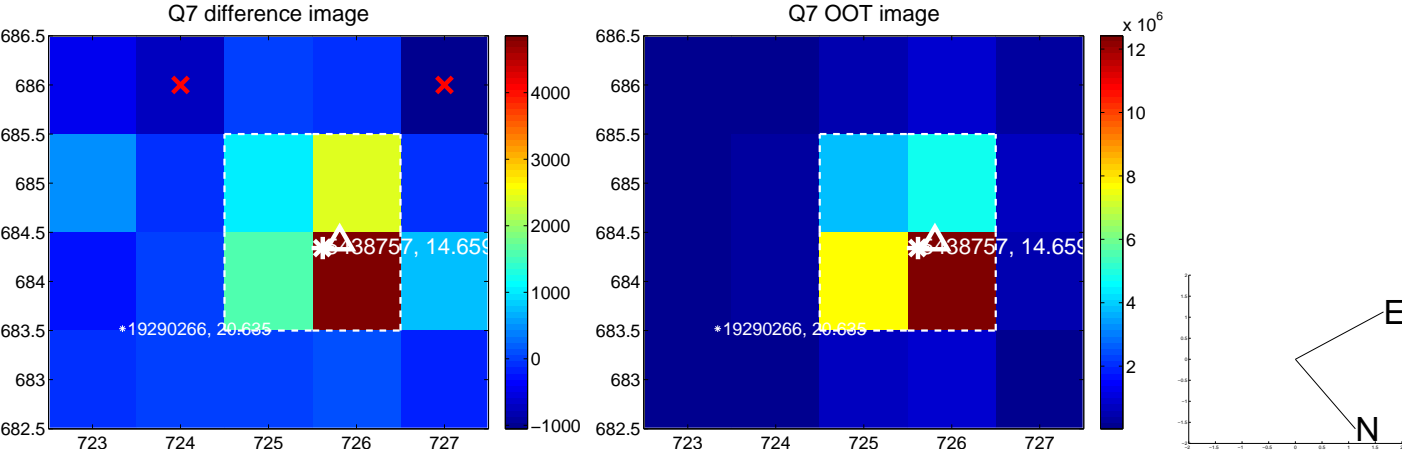
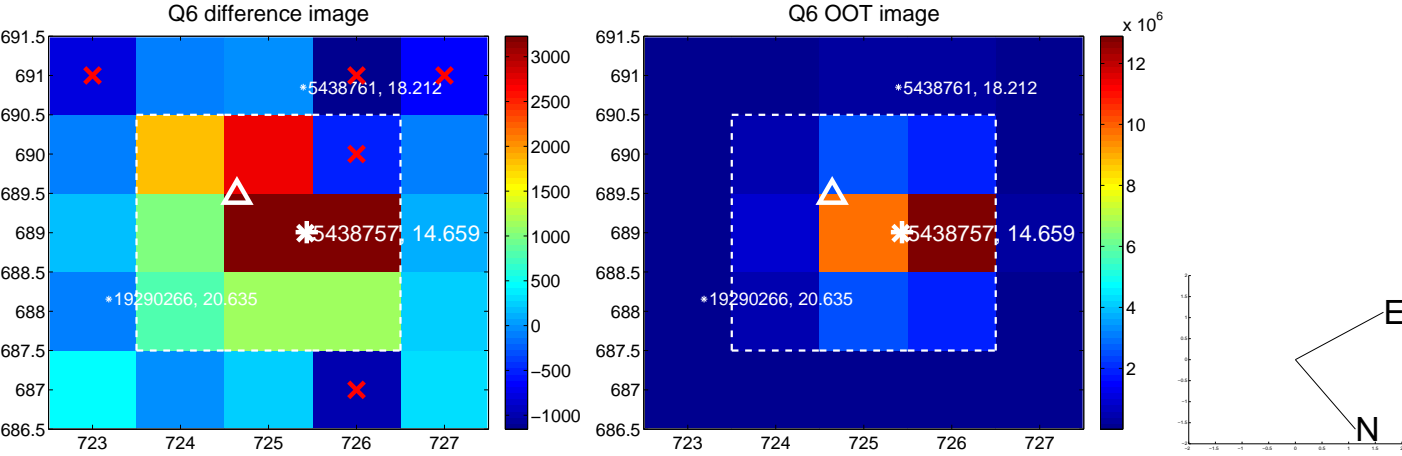
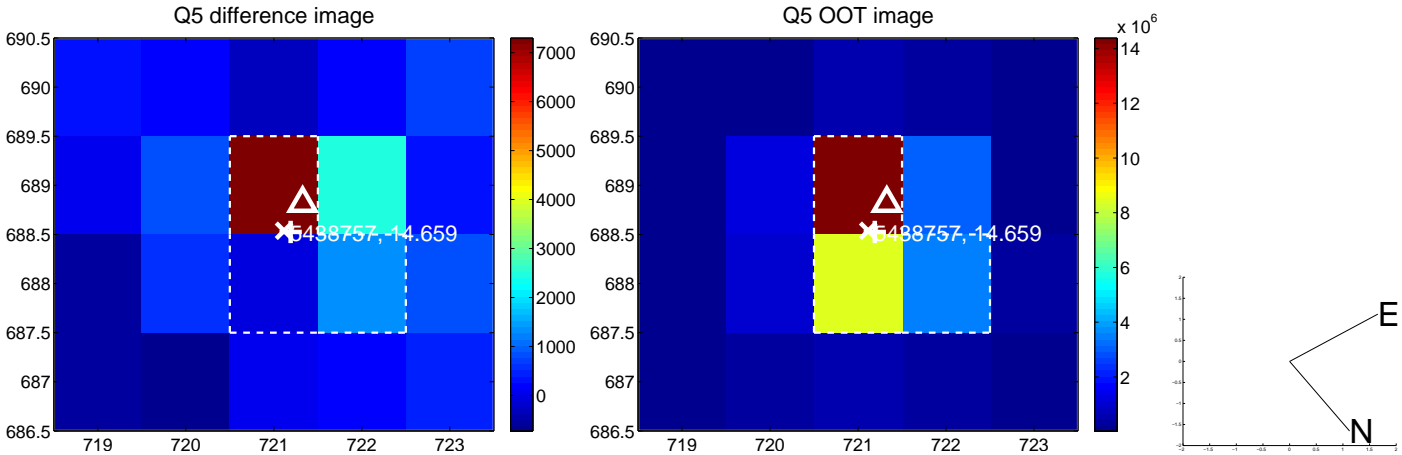


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

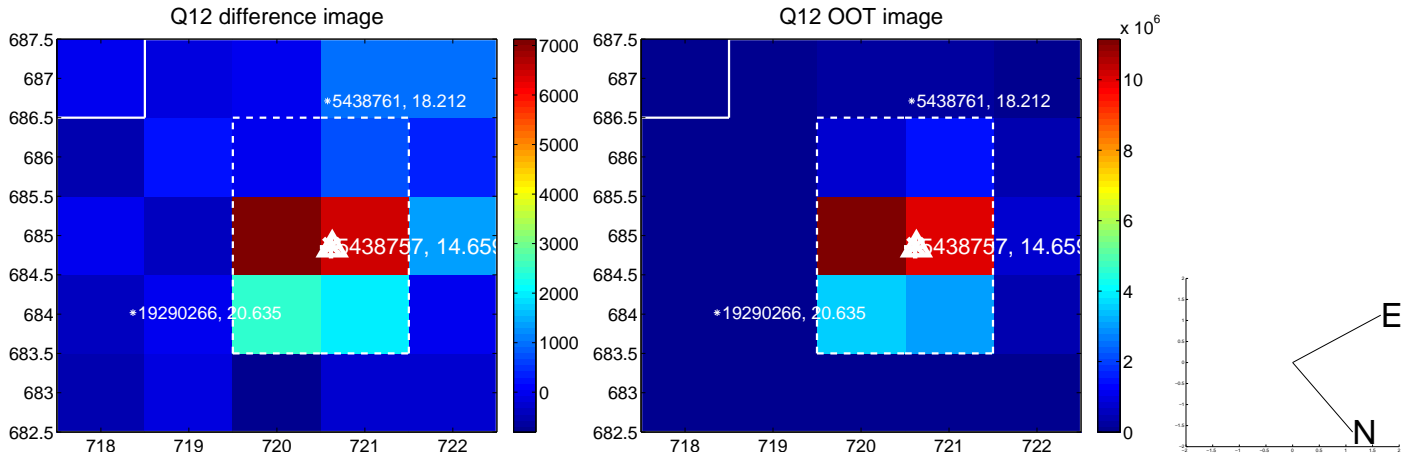
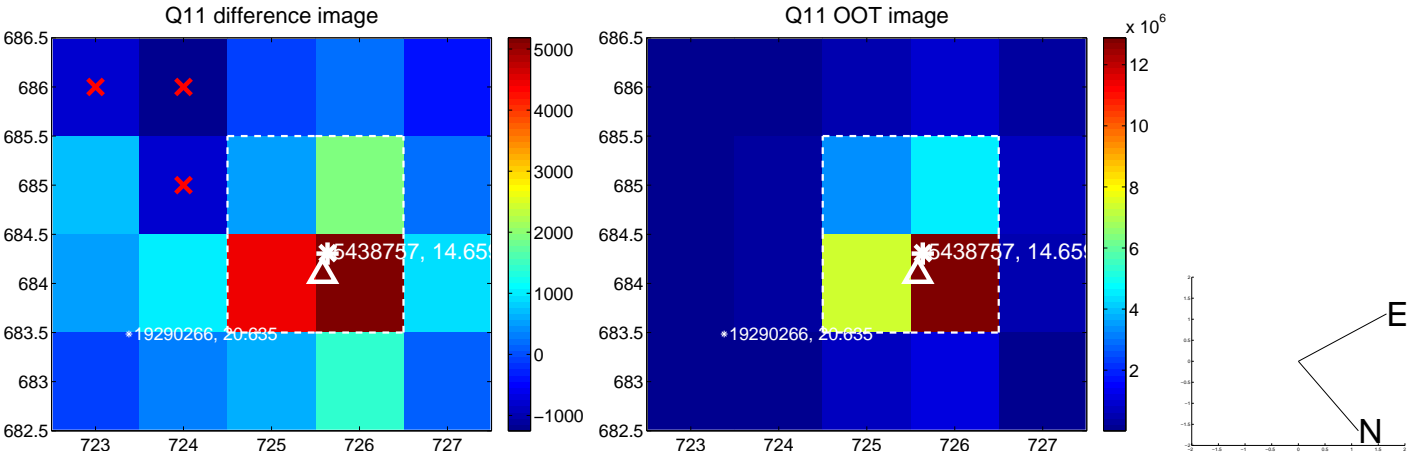
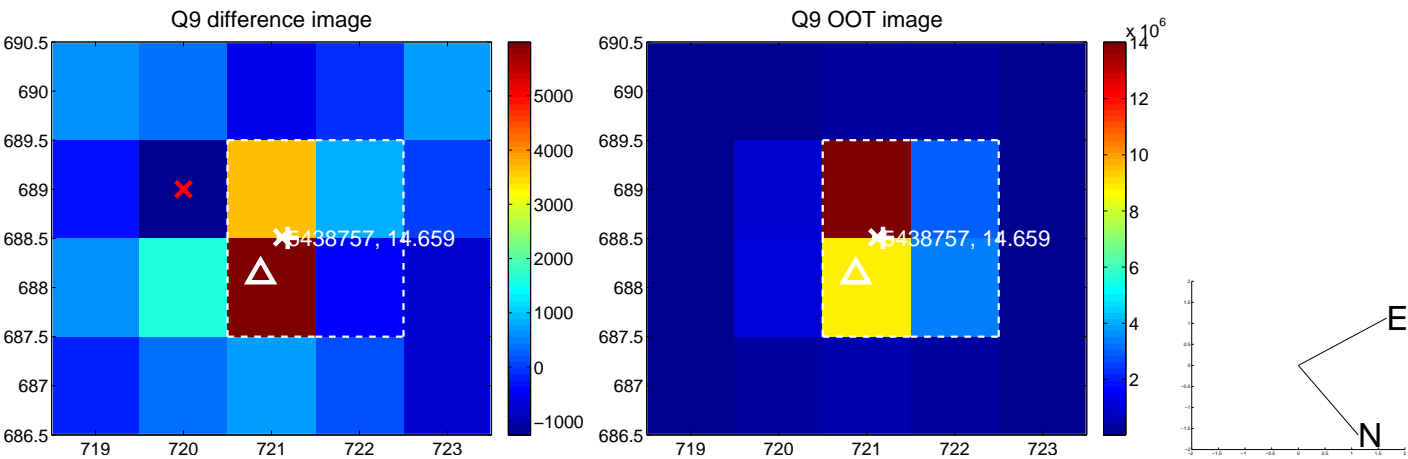
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



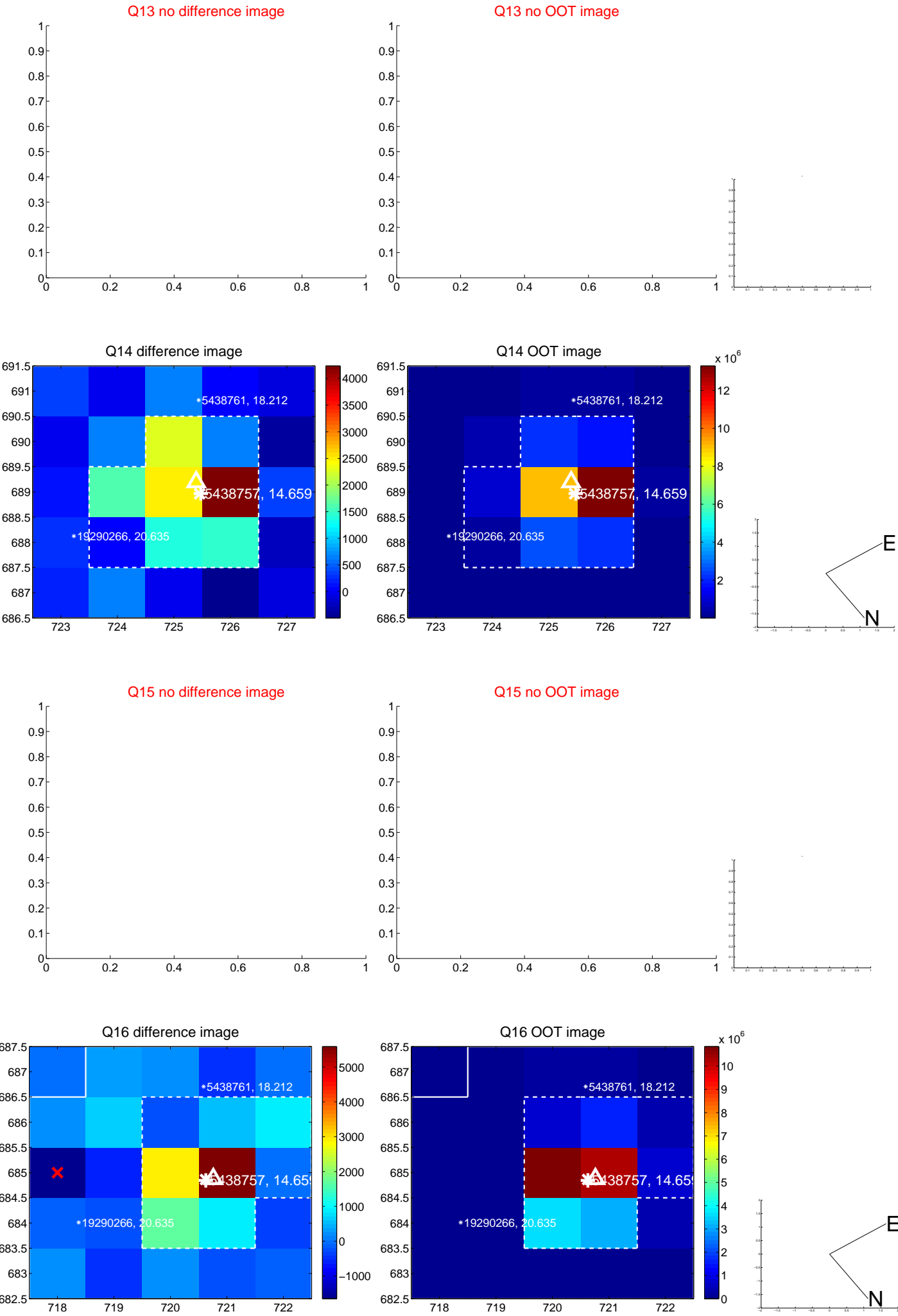
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



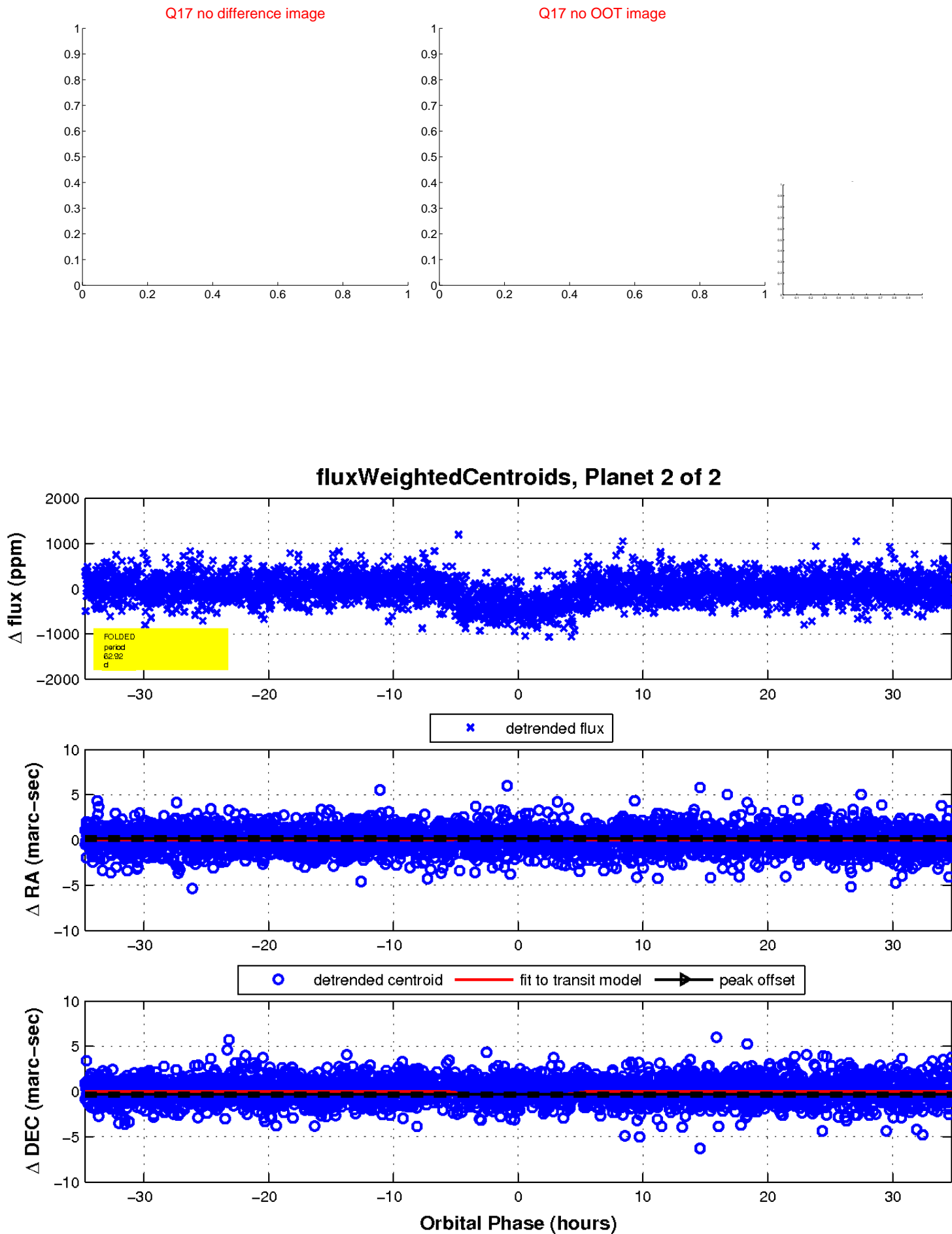
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

