

KIC 007902481

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 007902481-01 | OBS | No | 368.628542 | 233.959450 | 899.6 | 19.311 | 9.1 | 9.6 | 0.95 | 5900 | 3.46 | 0.93 |
| 007902481-02 | OBS | No | 358.504060 | 192.889985 | 528.8 | 16.556 | 7.7 | 7.7 | 0.95 | 5900 | 2.31 | 0.96 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|---|
| 007902481-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_SKYE—LPP_DV—ALL_TRANS_CHASES—CENT_FEW_DIFFS |
| 007902481-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS |

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

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

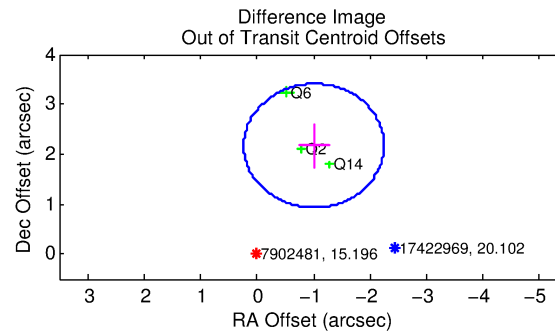
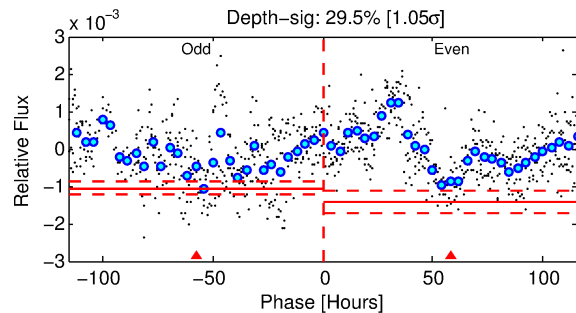
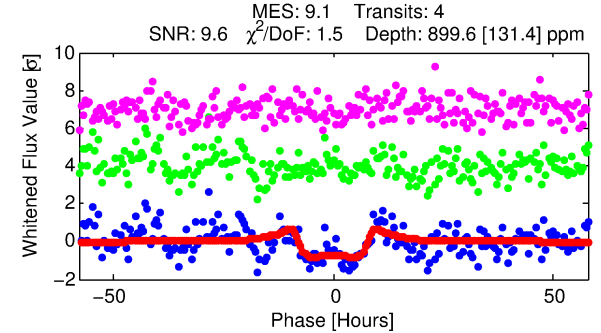
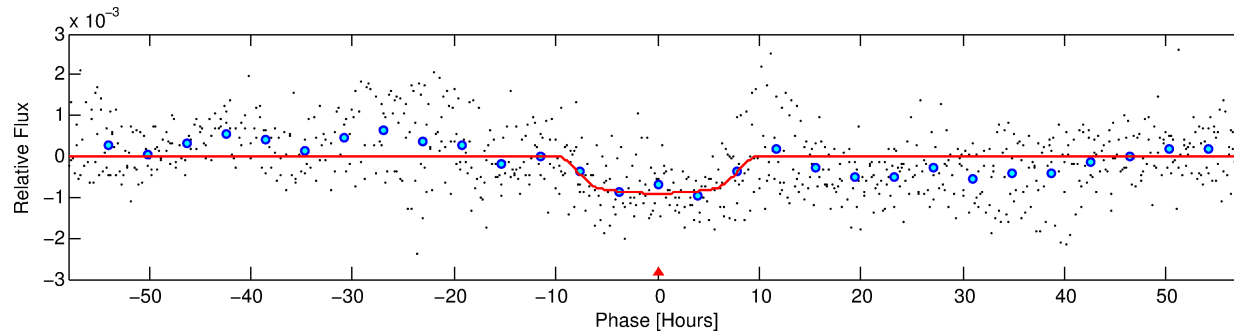
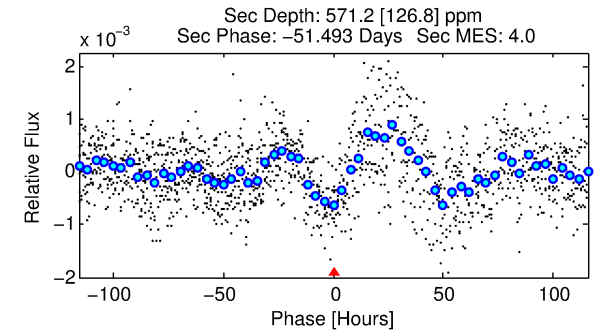
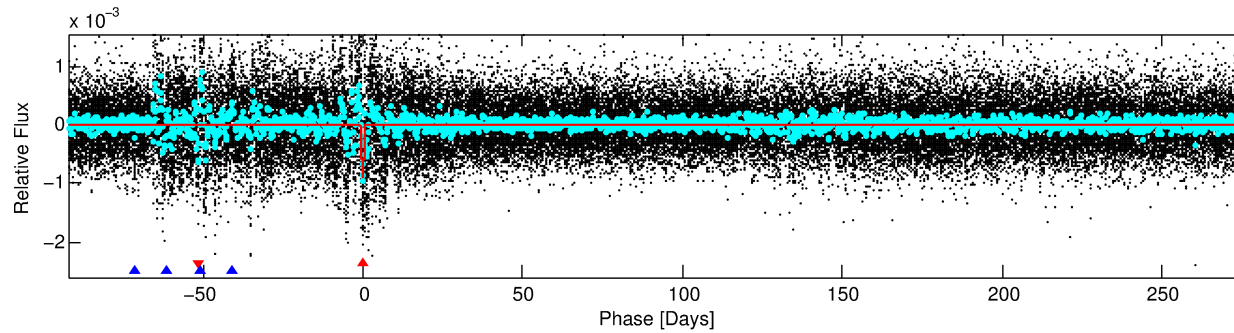
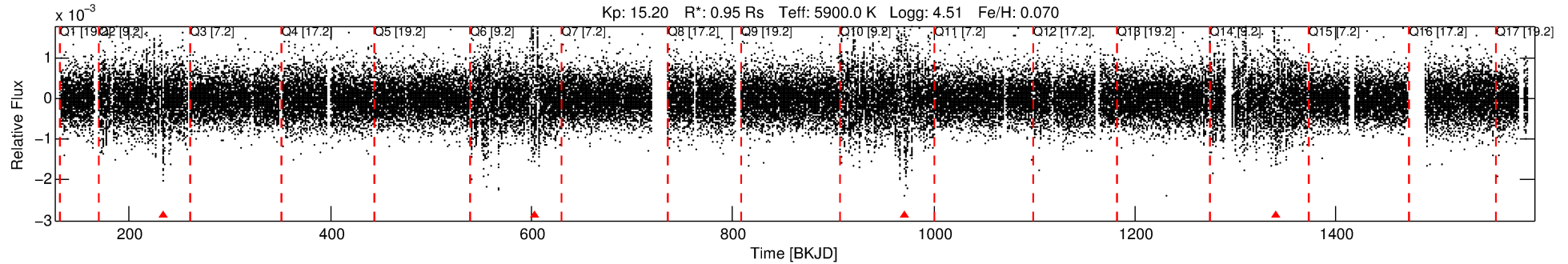
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 007902481-01

No Significant Match Found

DV One-Page Summary

KIC: 7902481 Candidate: 1 of 2 Period: 368.629 d



DV Fit Results:

Period = 368.62854 [0.01510] d
Epoch = 233.9595 [0.0277] BKJD
Rp/R* = 0.0334 [0.0033]
a/R* = 68.38 [16.75]
b = 0.92 [0.04]
Seff = 0.93 [0.41]
Teq = 250 [28] K
Rp = 3.46 [1.20] Re
a = 1.0277 [0.2912] AU
Ag = 27686.70 [14122.63] [1.96σ]
Teffp = 4994 [410] K [11.55σ]

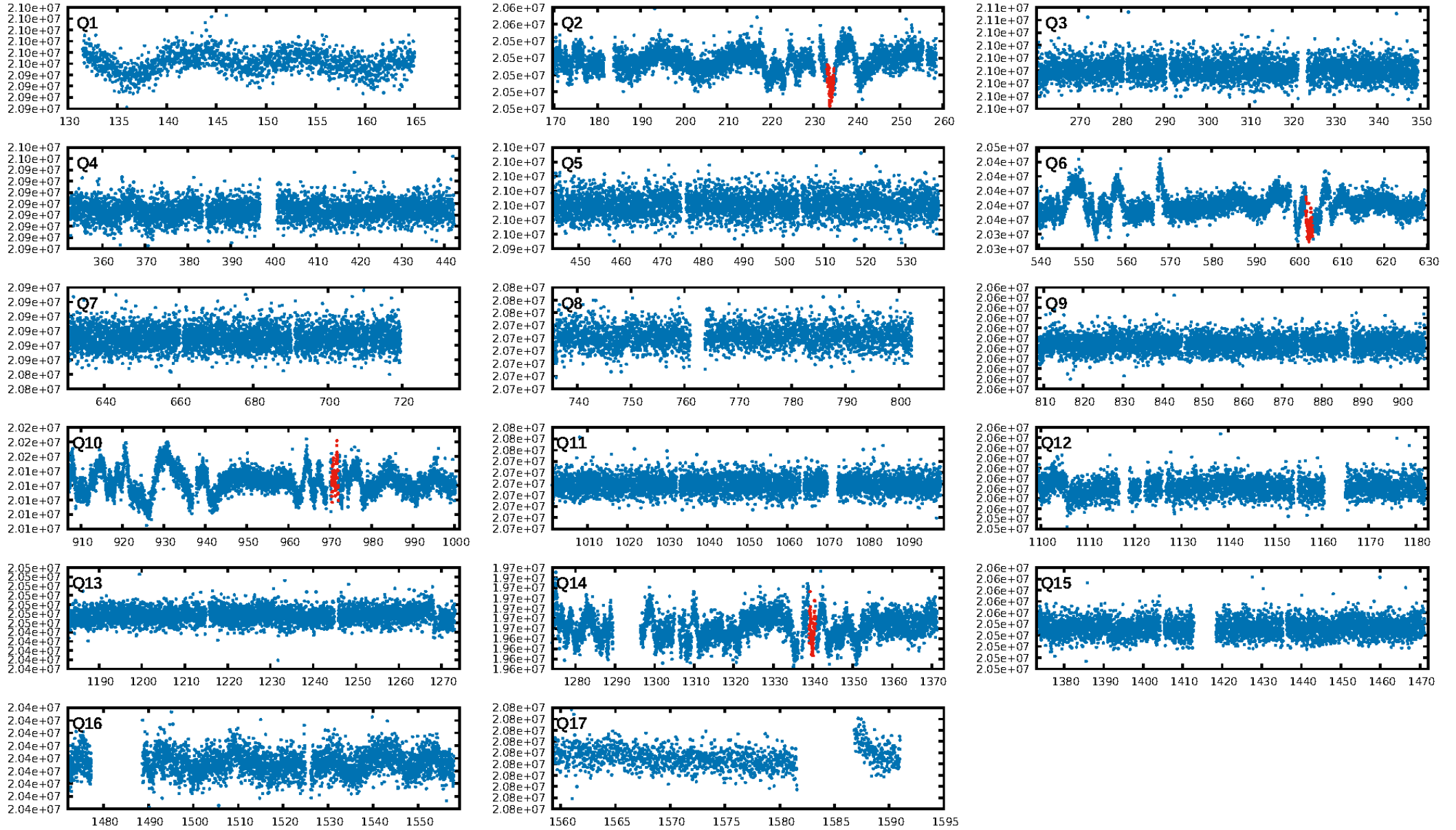
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [9.55σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 39.4%
ModelChiSquareGof-sig: 89.2%
Bootstrap-pfa: 1.94e-12
RollingBand-fgt: 0.00 [0/4]
GhostDiagnostic-chr: 3.763
Centroid-sig: 1.0%
Centroid-so: 4.727 arcsec [2.50σ]
OotOffset-rm: 2.391 arcsec [5.79σ]
KicOffset-rm: 2.431 arcsec [5.83σ]
OotOffset-st: 3/0/0/0 [3]
KicOffset-st: 3/0/0/0 [3]
DiffImageQuality-fgm: 0.33 [1/3]
DiffImageOverlap-fno: 1.00 [3/3]

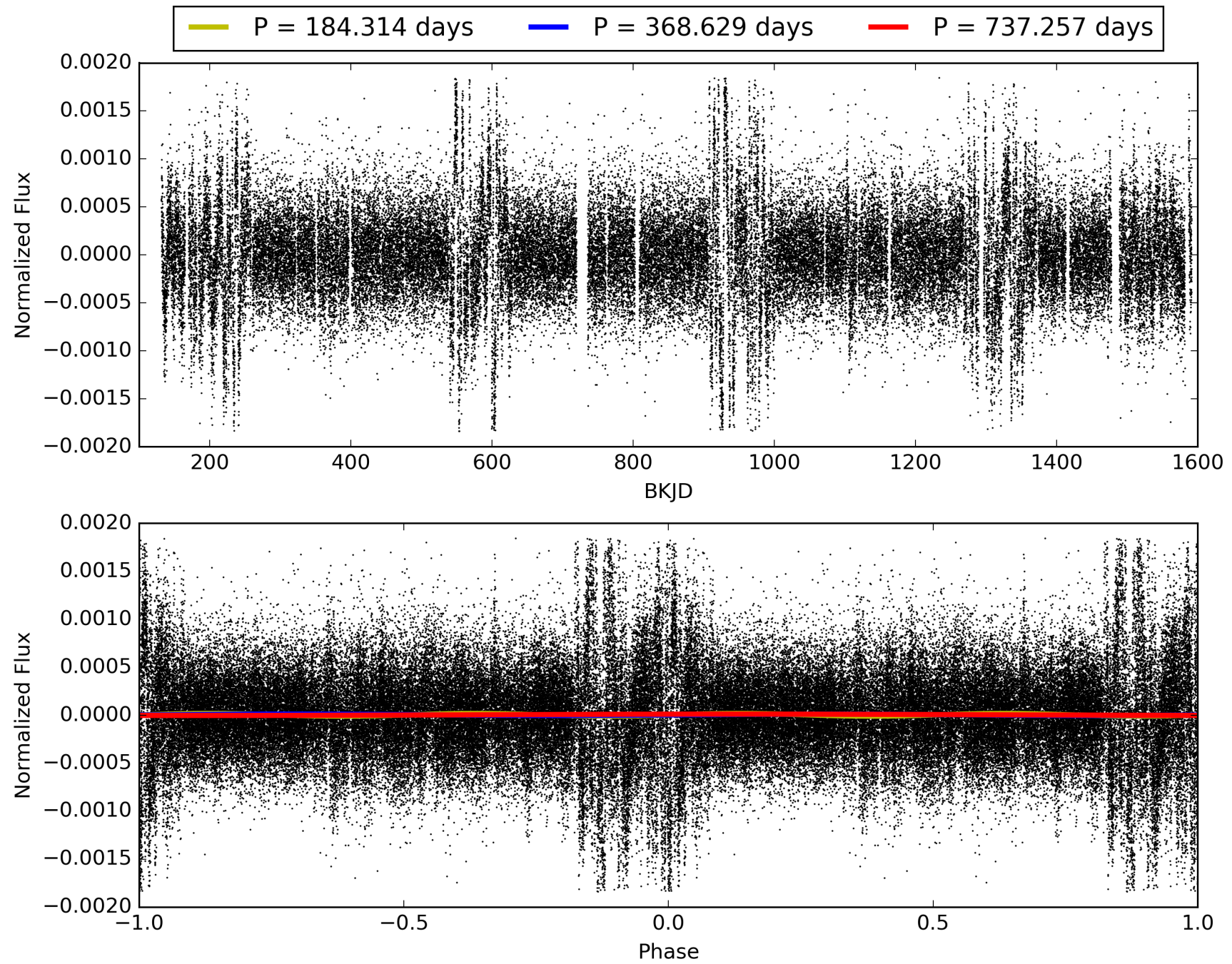
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 05:31:33 Z

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

TCE 007902481-01, PDC Light Curves

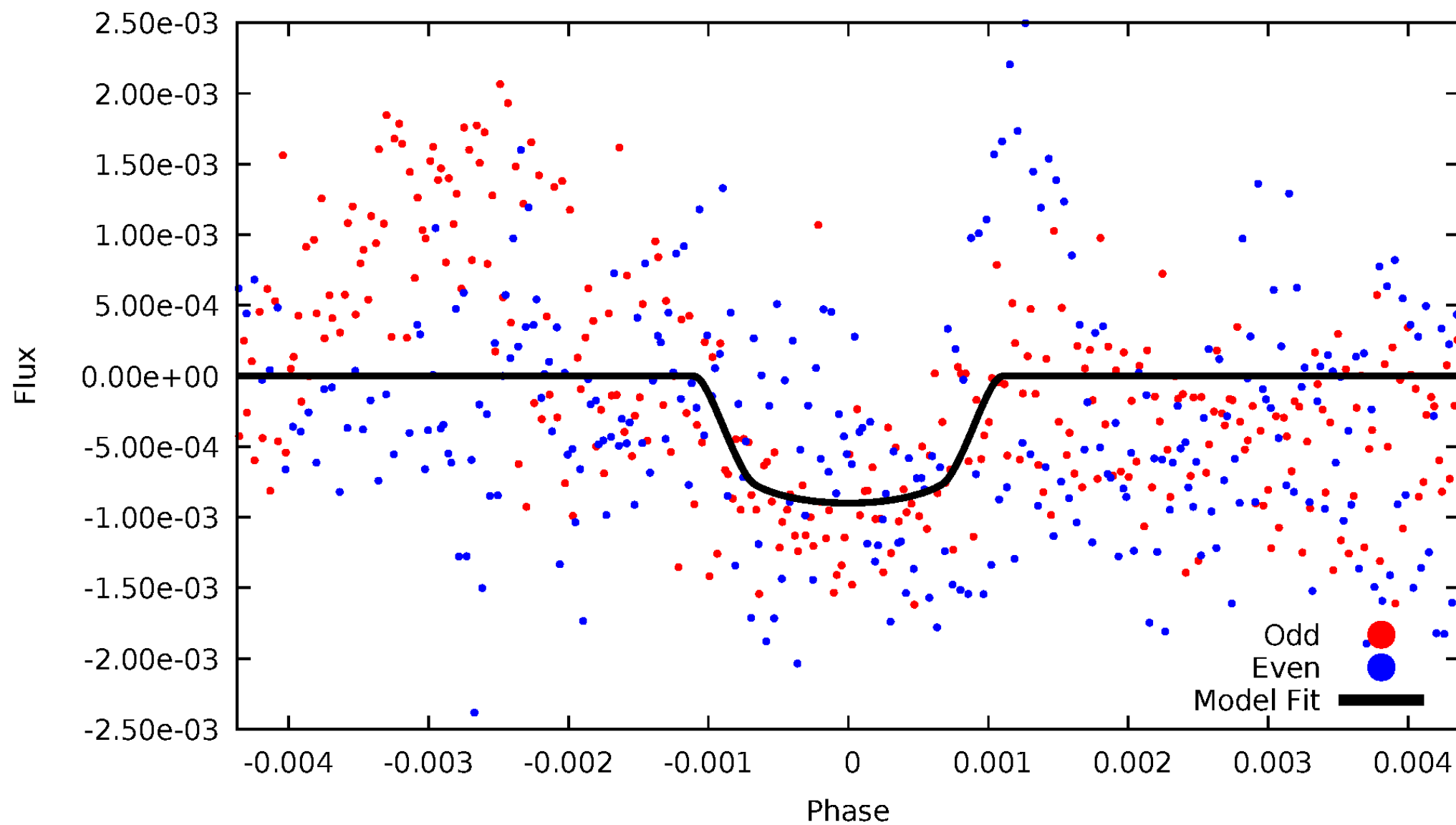


TCE 007902481-01



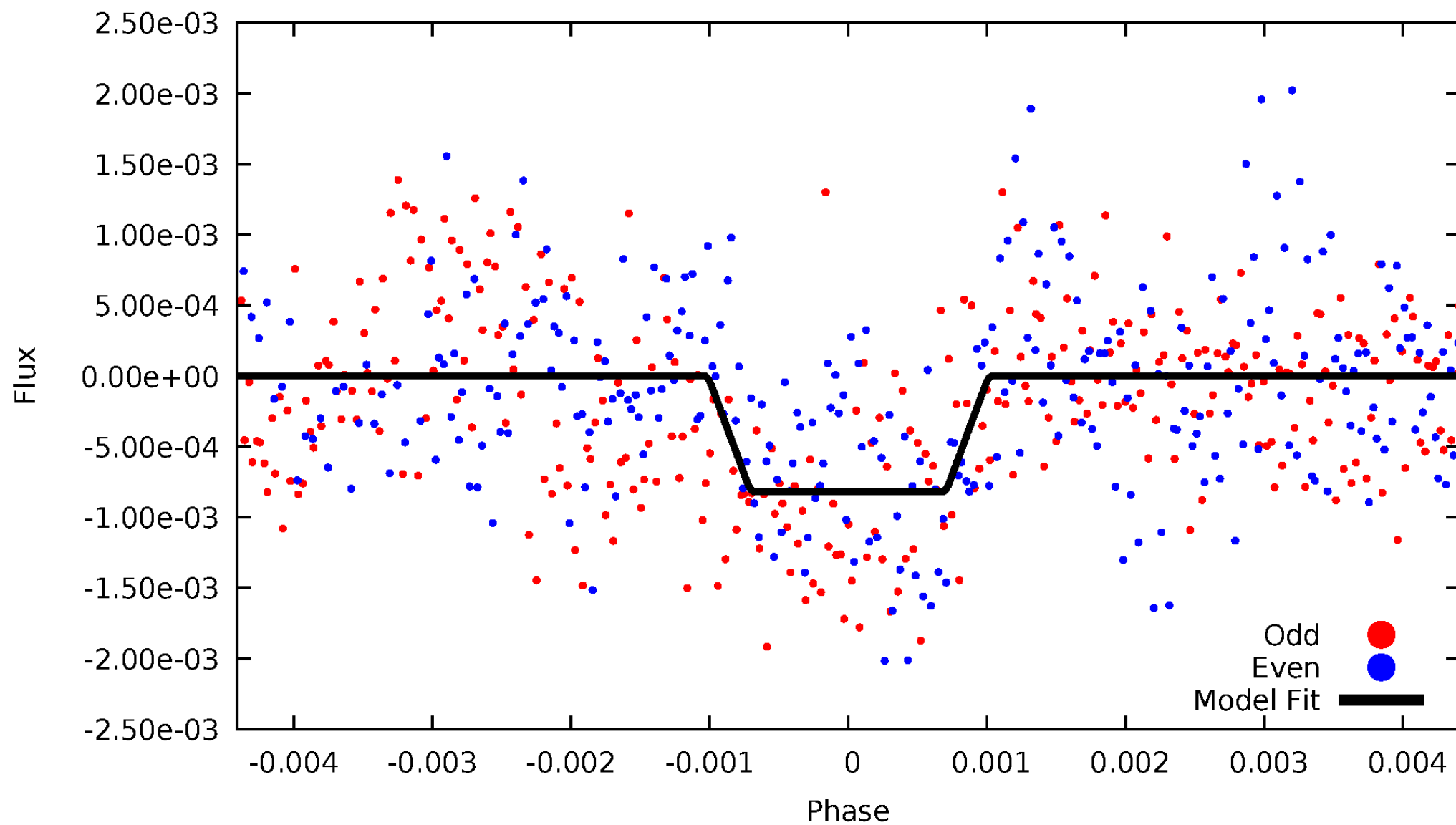
DV Odd/Even

TCE 007902481-01



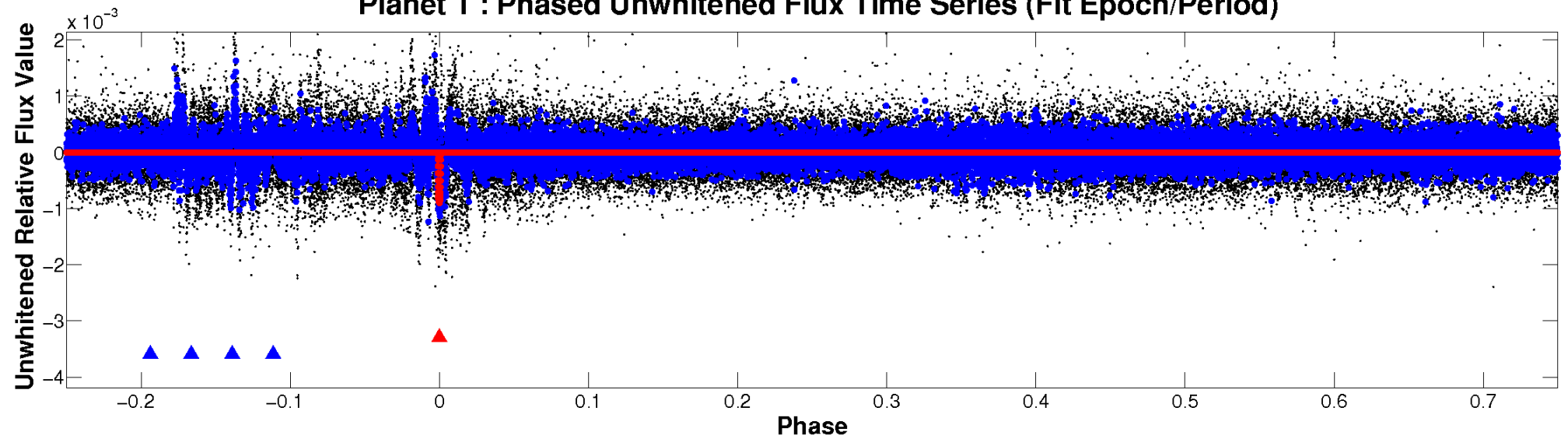
ALT Odd/Even

TCE 007902481-01

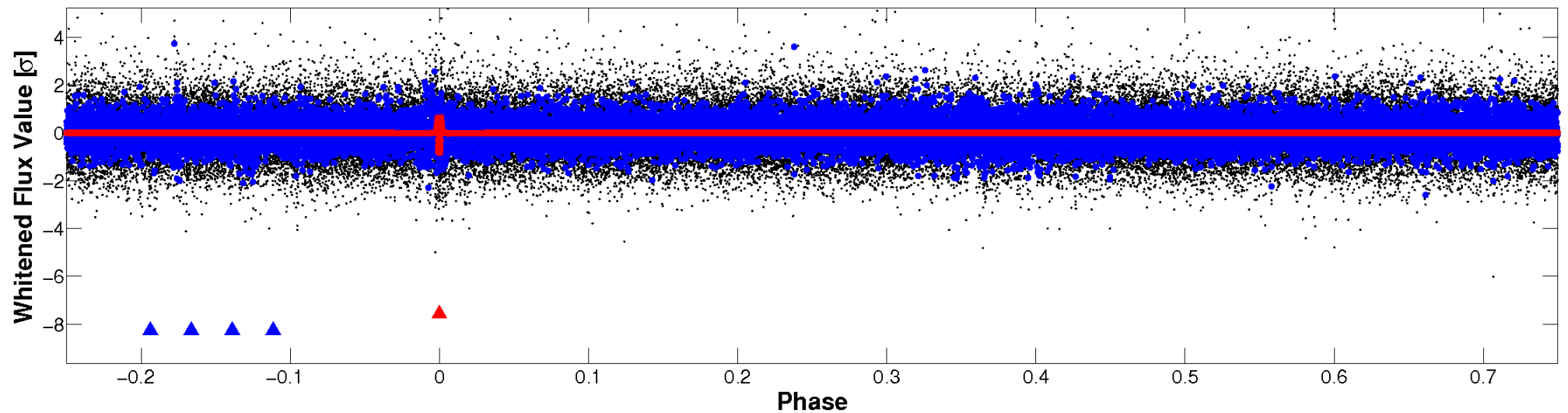


Non-Whitened Vs. Whitened Light Curve

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

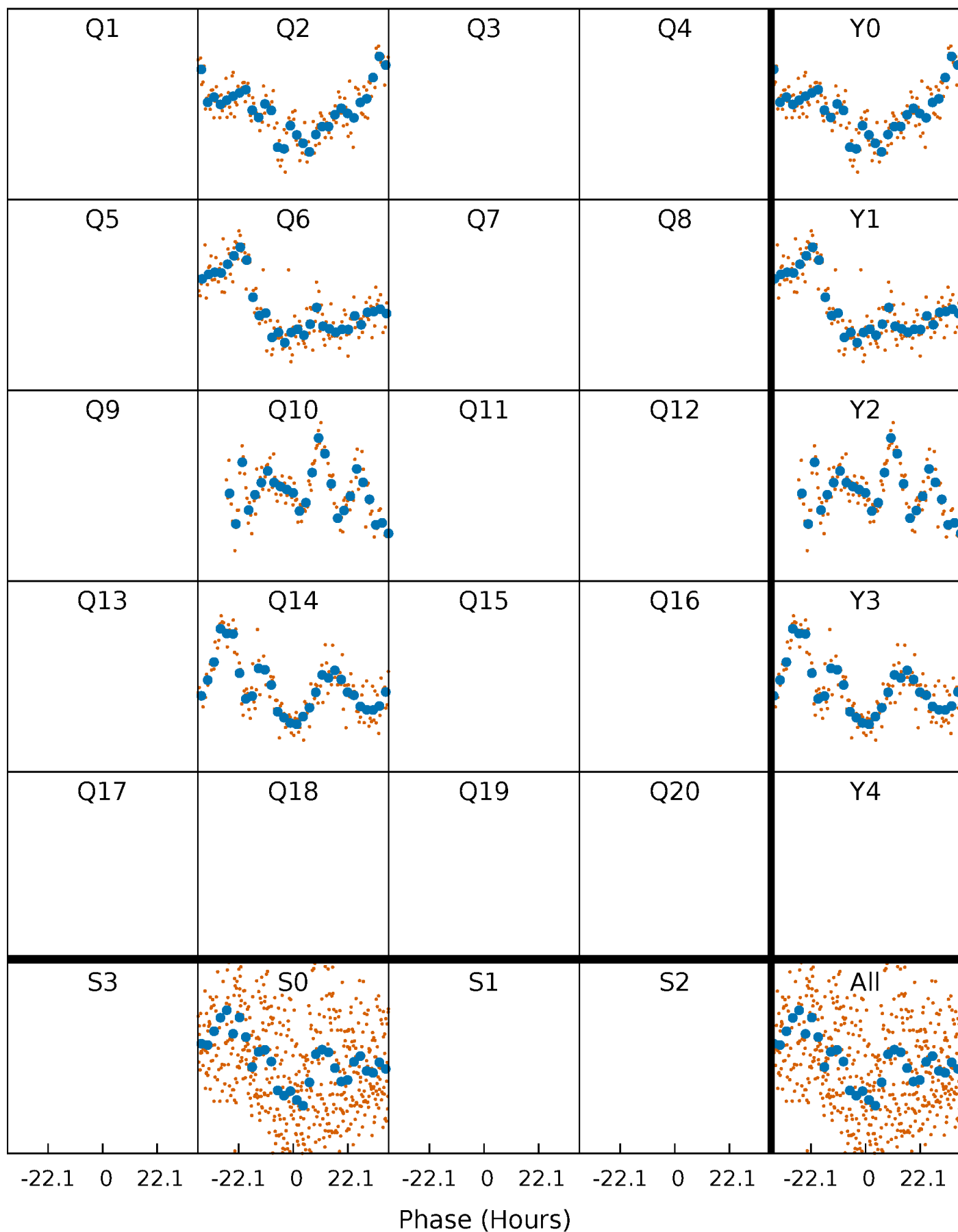


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



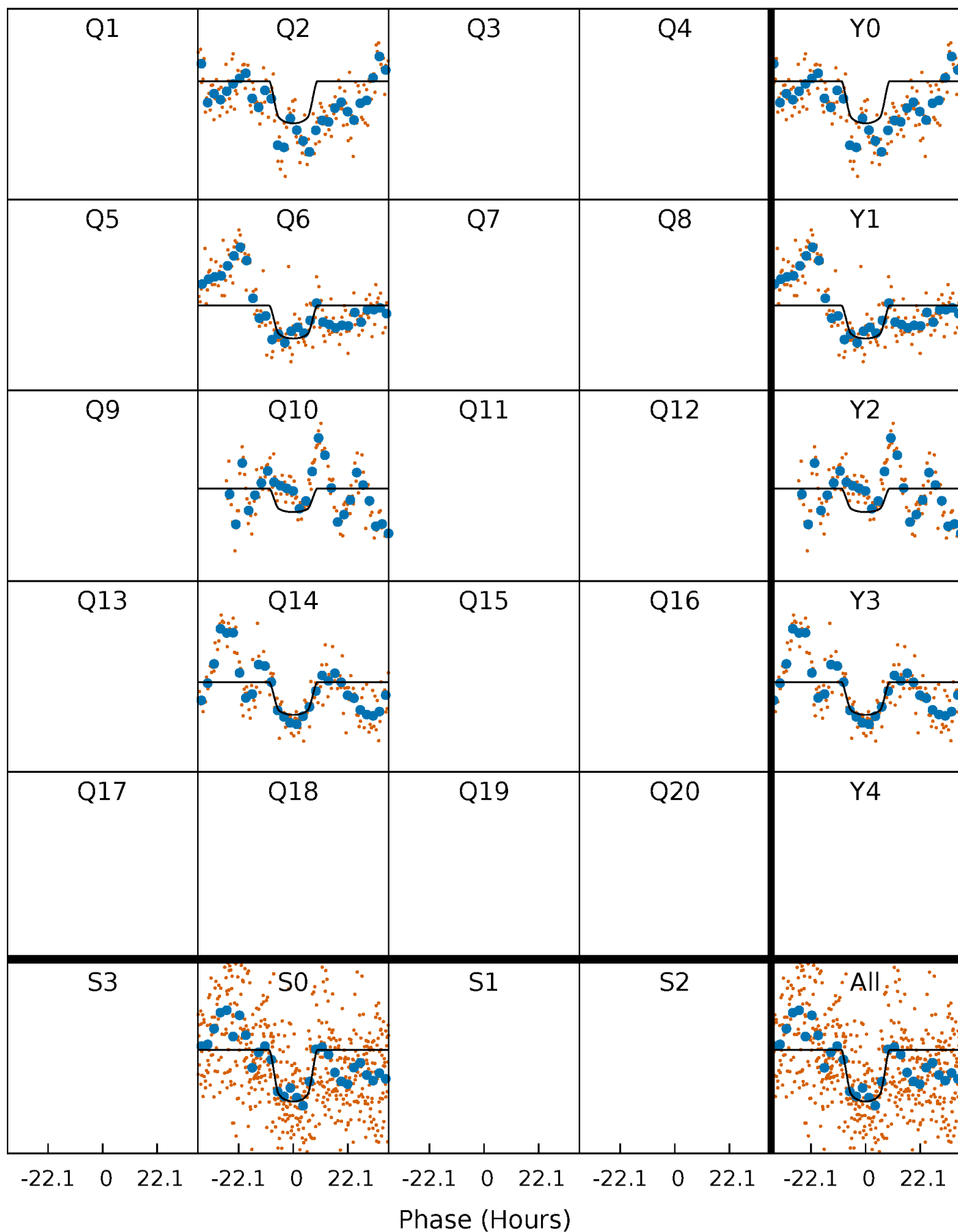
PDC Quarter-Phased Transit Curves

TCE 007902481-01 P=368.628542 Days $T_0=233.959450$ (BKJD)



DV Quarter-Phased Transit Curves

TCE 007902481-01 P=368.628542 Days $T_0=233.959450$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

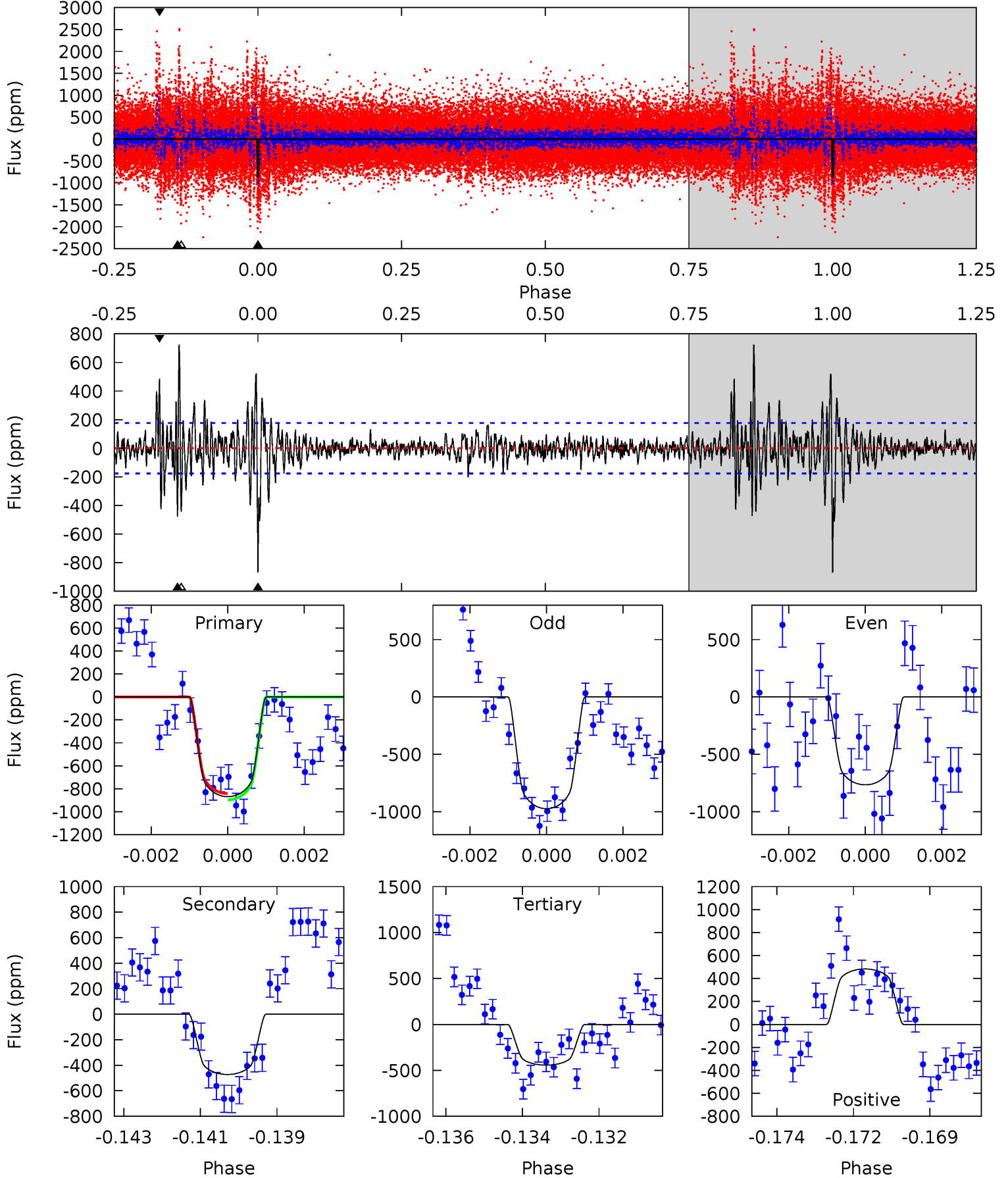
TCE 007902481-01 P=368.628234 Days $T_0=233.941147$ (BKJD)



DV Model-Shift Uniqueness Test

007902481-01, P = 368.628542 Days, E = 233.959450 Days

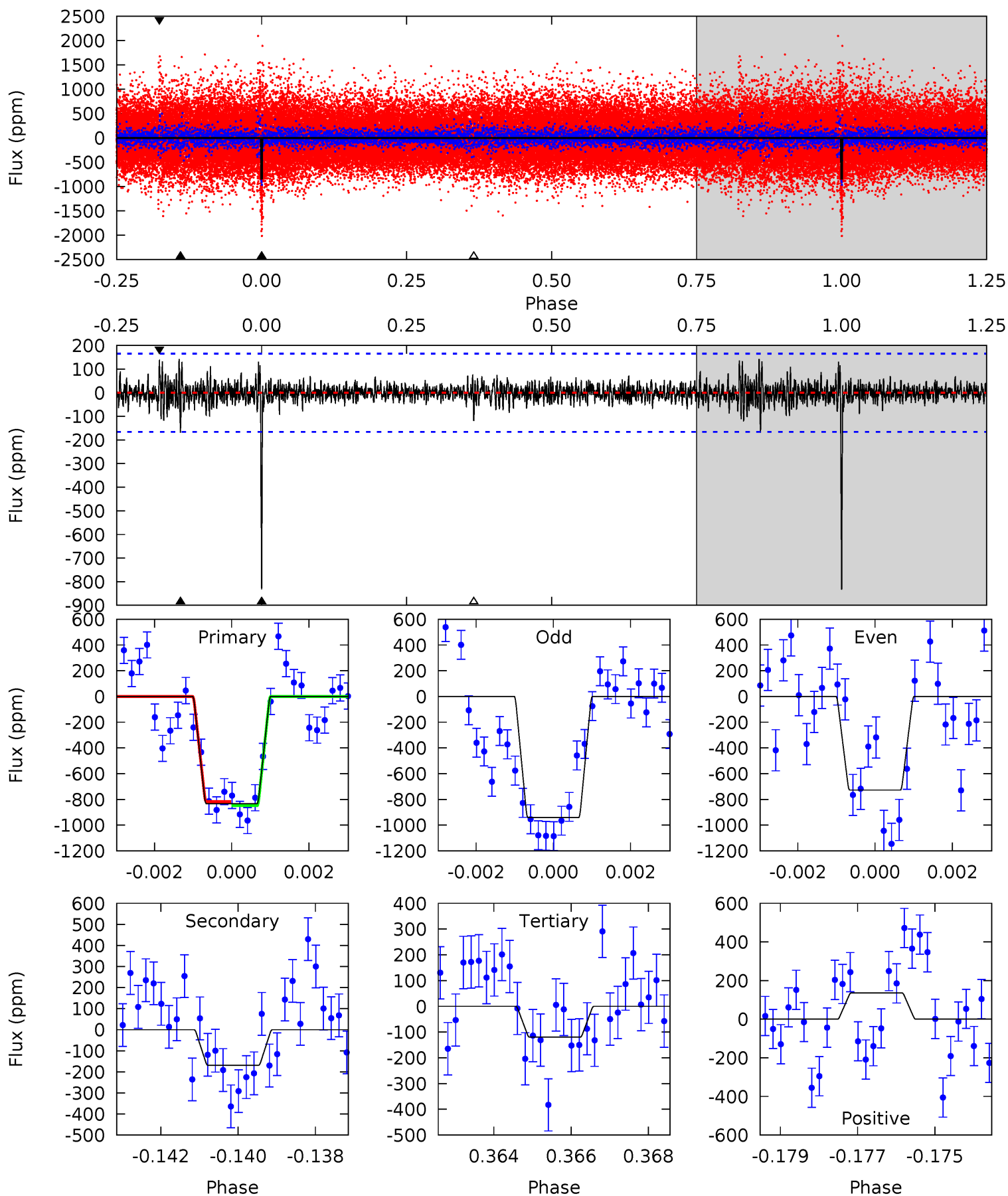
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 26.1 | 14.2 | 13.3 | 14.5 | 5.31 | 3.06 | 2.76 | 12.8 | 11.6 | 0.87 | -0.32 | 3.13 | 0.91 | 0.45 | 0.82 |



Alt Model-Shift Uniqueness Test

007902481-01, P = 368.628234 Days, E = 233.941147 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 26.8 | 5.41 | 3.85 | 4.38 | 5.32 | 3.08 | 0.92 | 22.9 | 22.4 | 1.57 | 1.04 | 3.44 | 1.12 | 0.15 | 0.51 |



Stellar Parameters For KIC 007902481

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | M (M_{\odot}) | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 5900^{+176}_{-211} | $4.509^{+0.040}_{-0.229}$ | $0.070^{+0.250}_{-0.300}$ | $0.951^{+0.317}_{-0.079}$ | $1.065^{+0.124}_{-0.138}$ | $1.745^{+0.377}_{-0.941}$ |
| | +3%/-4% | +1%/-5% | +357%/-429% | +33%/-8% | +12%/-13% | +22%/-54% |
| 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 007902481-01 / KOI

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|---------------|------------------------|-------------------|----------------------|-------------------------|
| DV | -472 ± 33 | $3.64^{+0.67}_{-0.49}$ | 360^{+26}_{-20} | 4857^{+287}_{-245} | 20351^{+6493}_{-5684} |
| Alt. | -169 ± 31 | $3.12^{+0.62}_{-0.43}$ | 360^{+29}_{-19} | 4232^{+255}_{-267} | 9845^{+3771}_{-3167} |

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 $A_{obs} \gg 1.0$

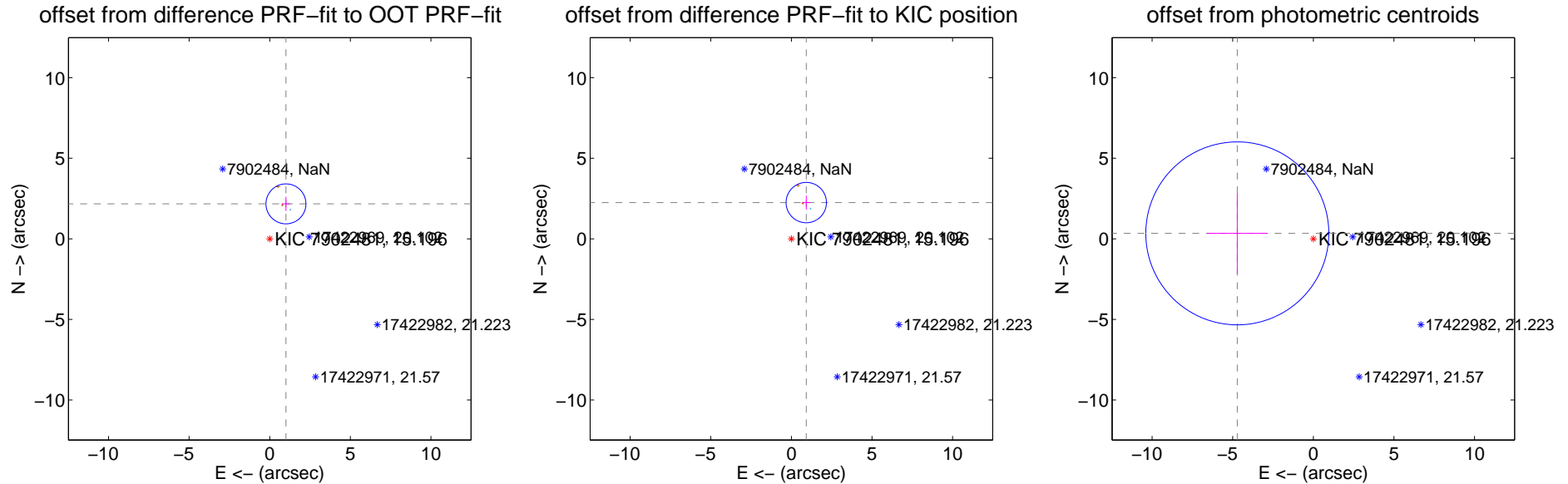
DV Centroid Data

Supplemental centroid analysis for 007902481-01. Kepler magnitude: 15.20. Transit SNR 9.60

There are 1 quarters with good PRF difference image offsets

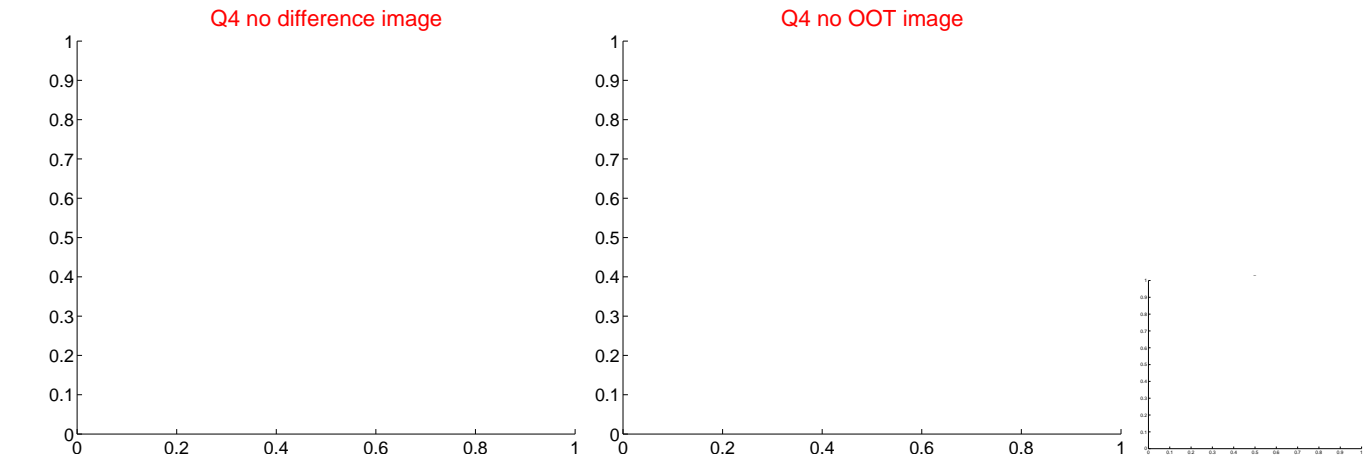
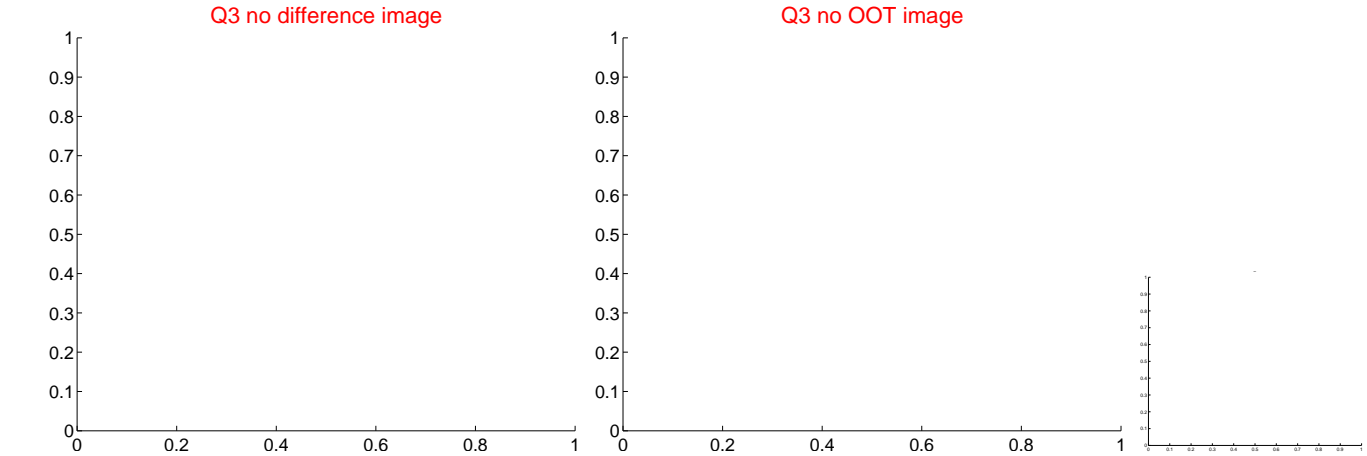
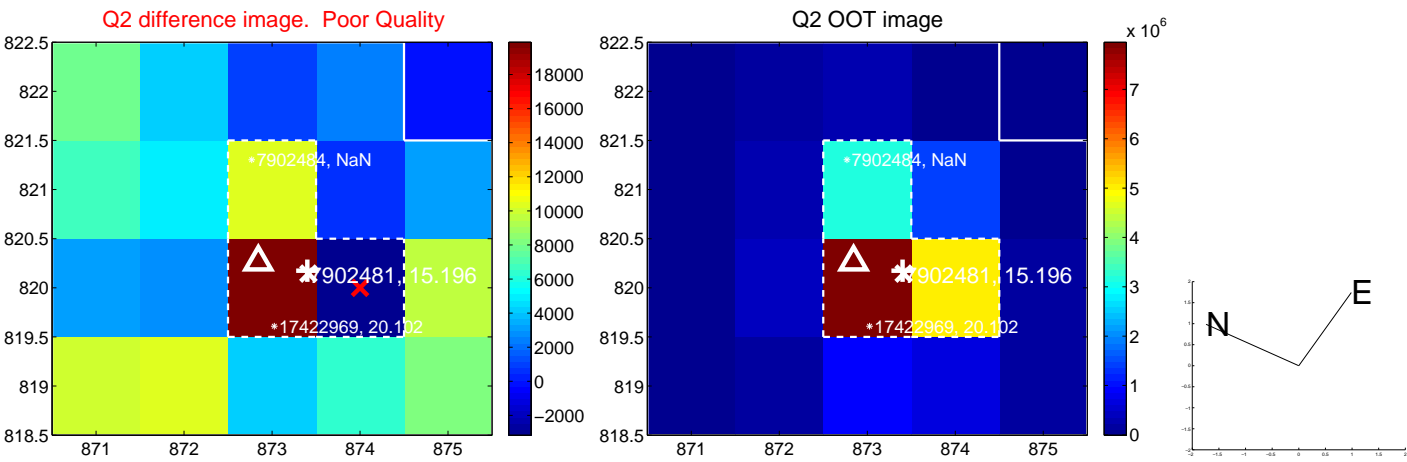
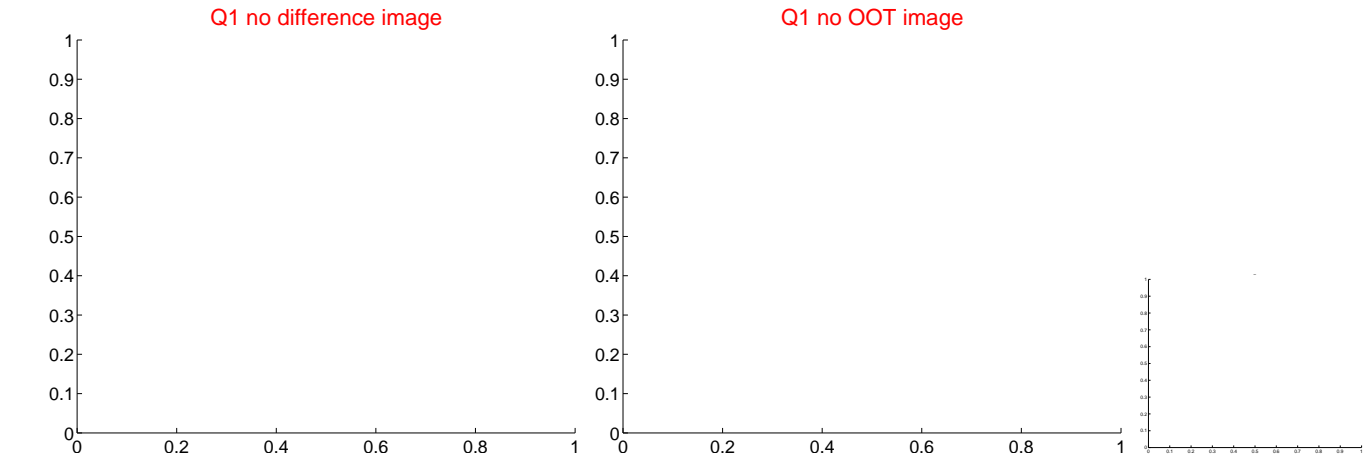
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT | 2.391 \pm 0.413 | 5.79 | -1.006 \pm 0.260 | 2.170 \pm 0.439 |
| PRF-fit source offset from KIC position | 2.431 \pm 0.417 | 5.83 | -0.923 \pm 0.256 | 2.248 \pm 0.438 |
| photometric centroid source offset | 4.73 \pm 1.89 | 2.50 | 4.71 \pm 1.89 | 0.34 \pm 2.49 |

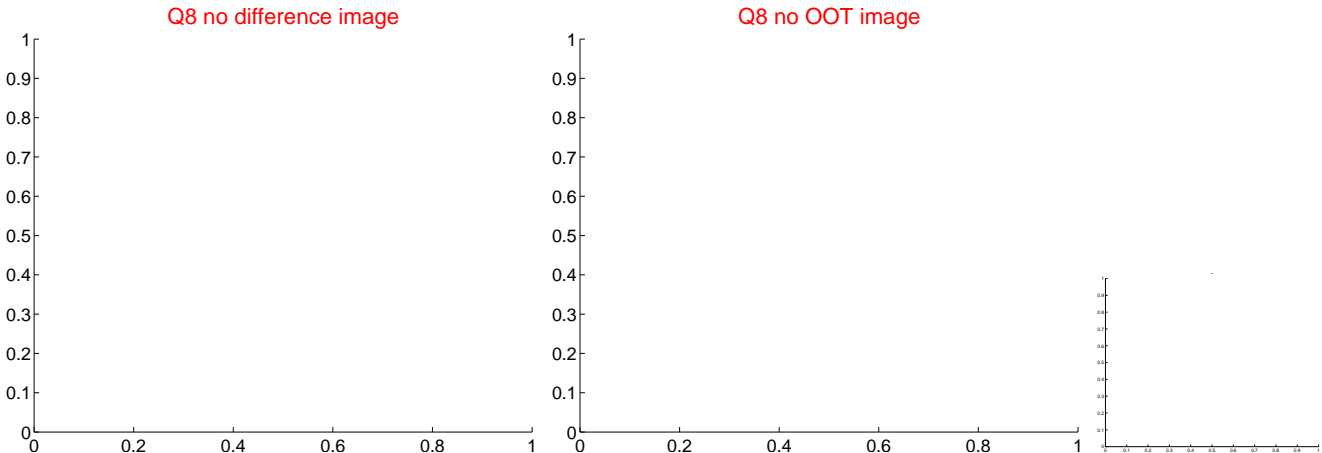
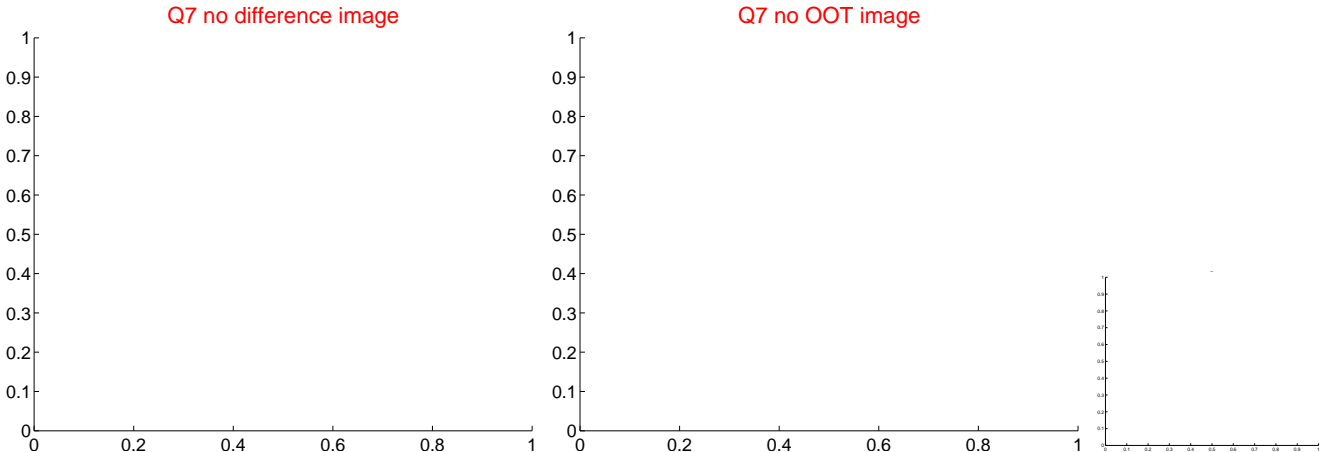
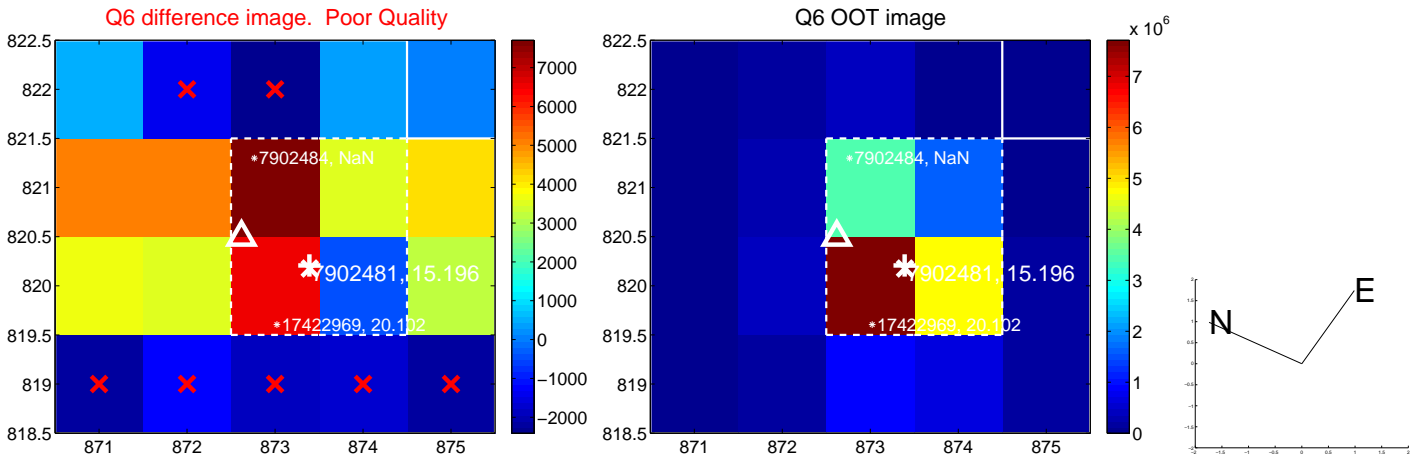
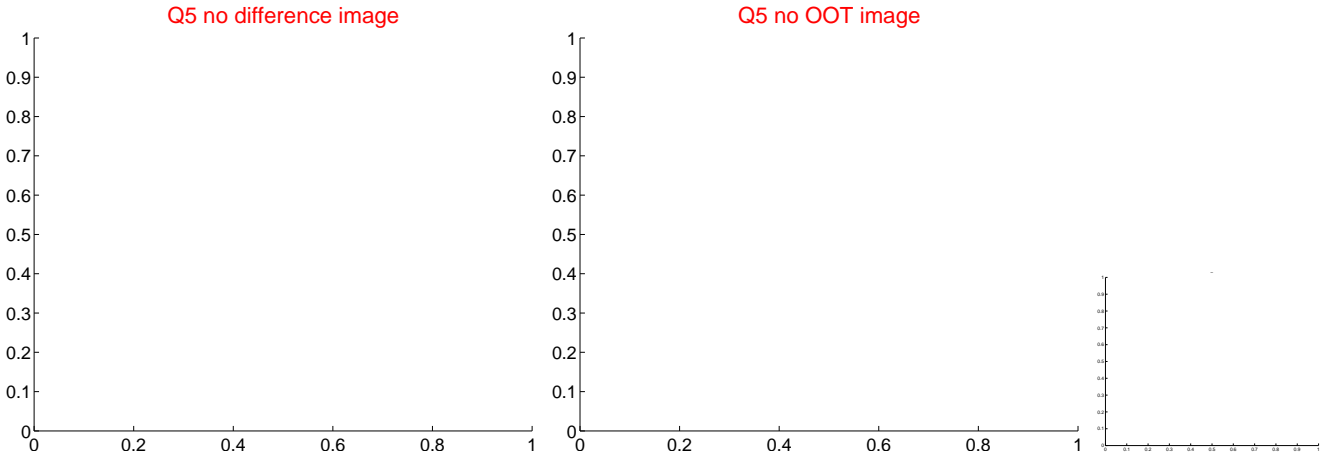


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

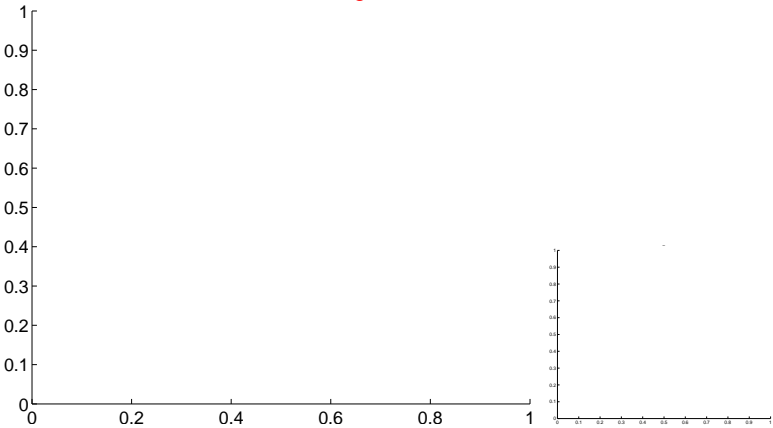


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

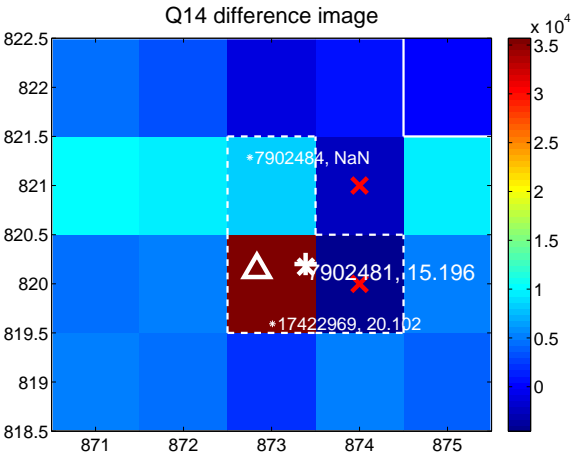
Q13 no difference image



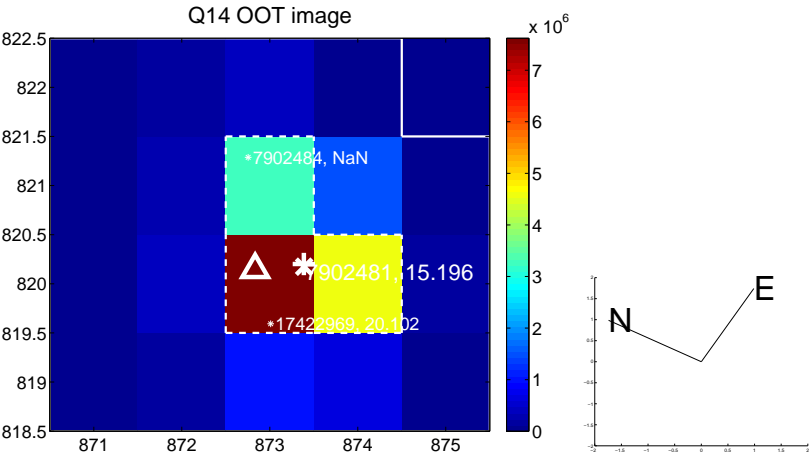
Q13 no OOT image



Q14 difference image



Q14 OOT image



Q15 no difference image



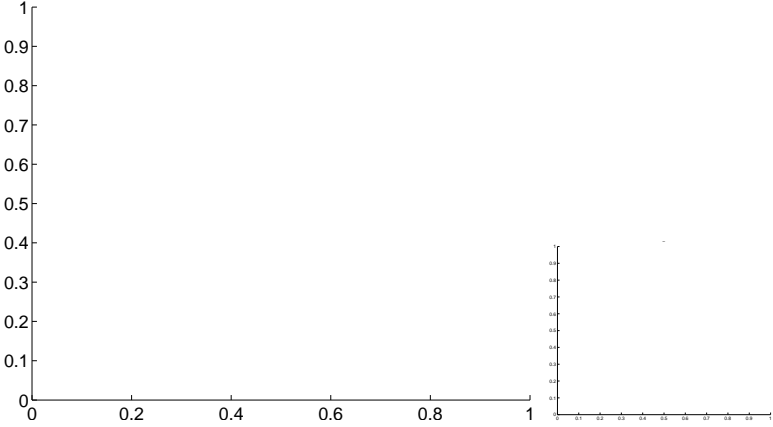
Q15 no OOT image



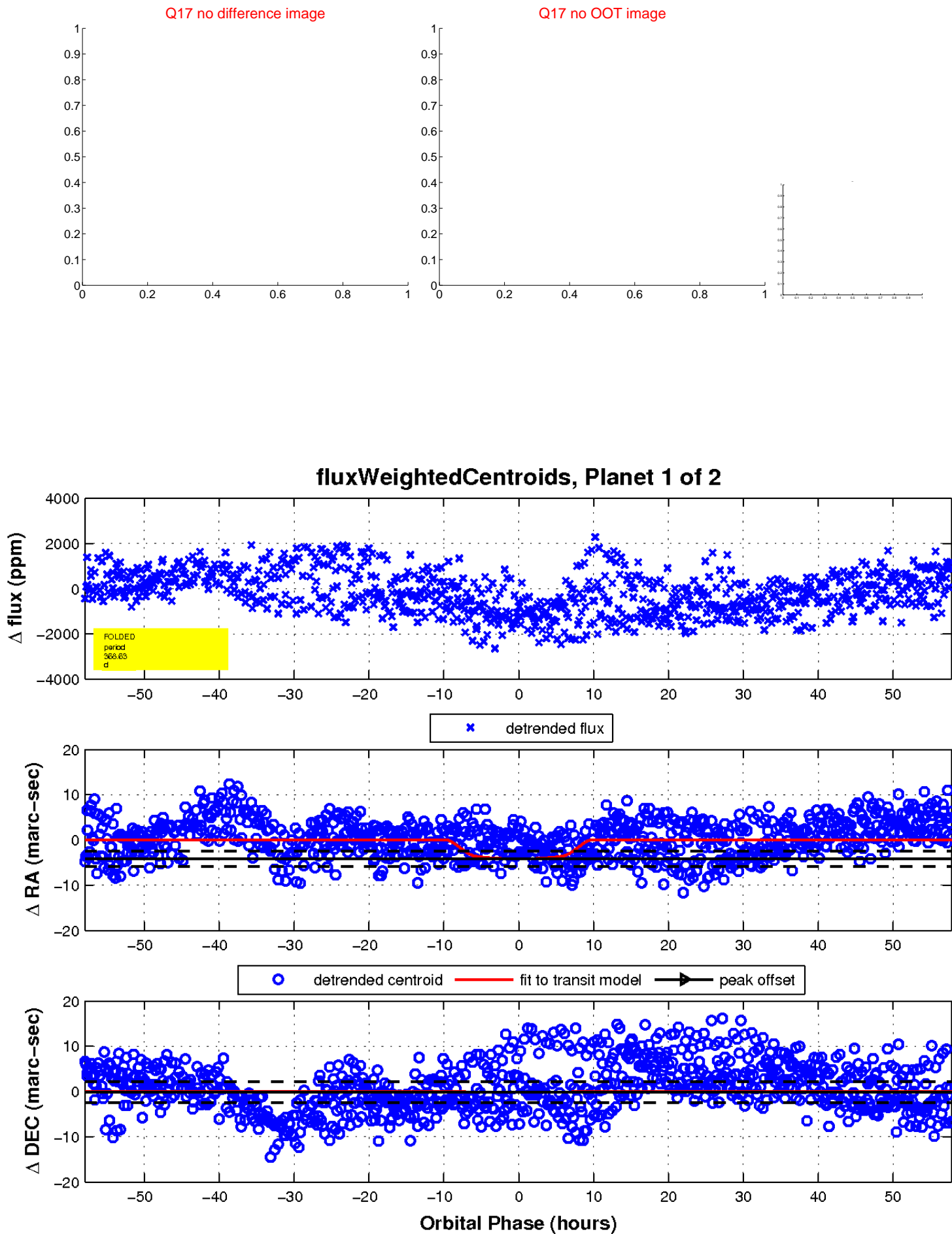
Q16 no difference image



Q16 no OOT image

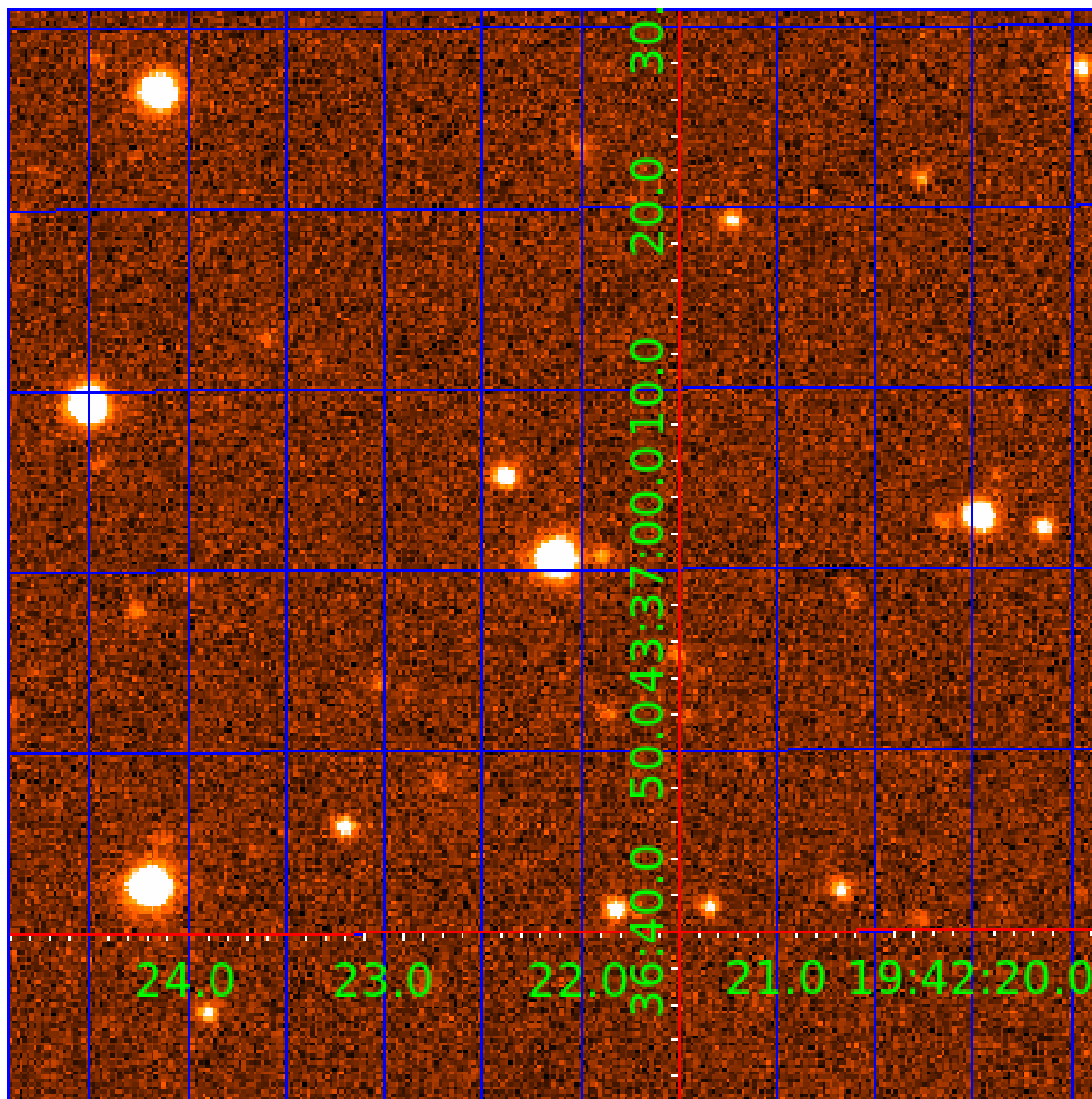


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 007902481

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 007902481-01 | OBS | No | 368.628542 | 233.959450 | 899.6 | 19.311 | 9.1 | 9.6 | 0.95 | 5900 | 3.46 | 0.93 |
| 007902481-02 | OBS | No | 358.504060 | 192.889985 | 528.8 | 16.556 | 7.7 | 7.7 | 0.95 | 5900 | 2.31 | 0.96 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|---|
| 007902481-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_SKYE—LPP_DV—ALL_TRANS_CHASES—CENT_FEW_DIFFS |
| 007902481-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS |

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

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

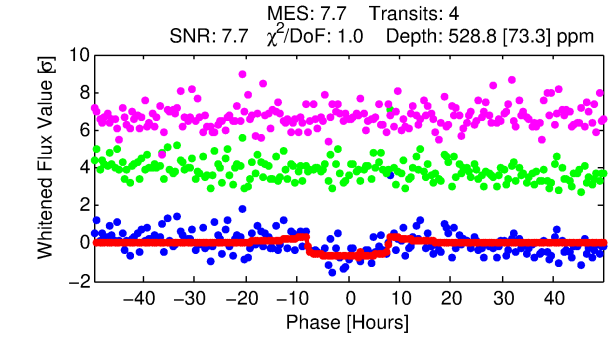
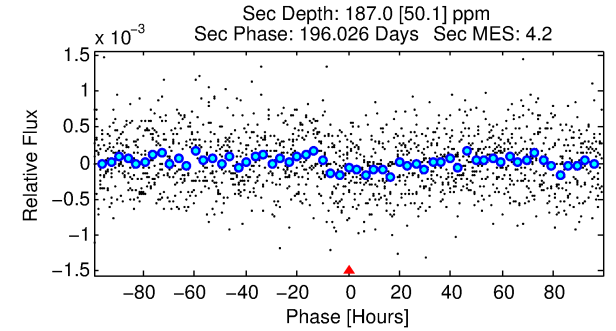
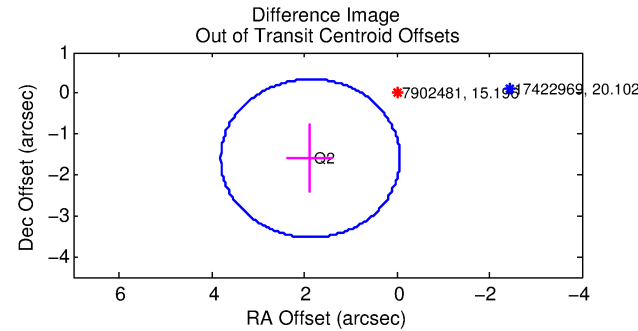
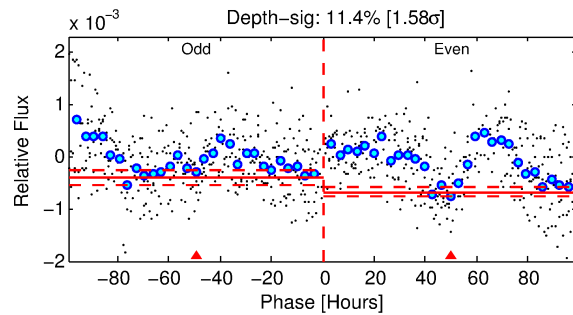
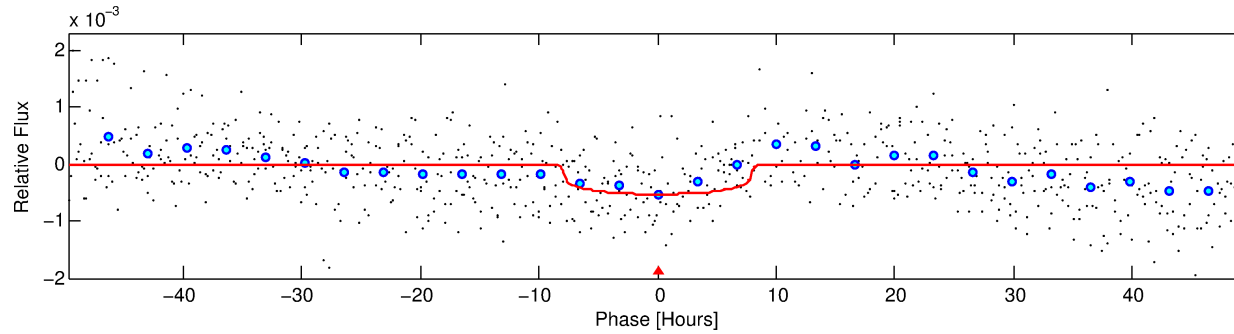
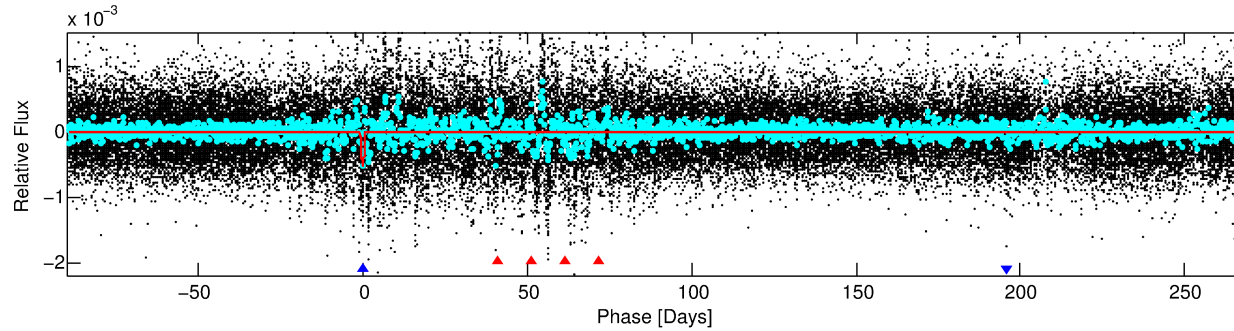
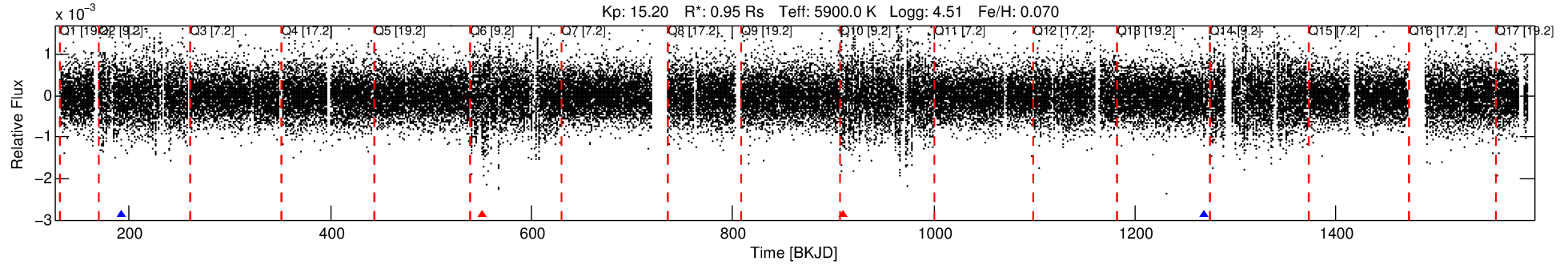
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 007902481-02

No Significant Match Found

DV One-Page Summary

KIC: 7902481 Candidate: 2 of 2 Period: 358.504 d



DV Fit Results:

Period = 358.50406 [0.01132] d
Epoch = 192.8900 [0.0218] BKJD
Rp/R* = 0.0222 [0.0082]
a/R* = 129.45 [209.65]
b = 0.66 [1.41]
Seff = 0.96 [0.42]
Teq = 253 [28] K
Rp = 2.31 [1.15] Re
a = 1.0088 [0.2858] AU
Ag = 19664.49 [17517.63] [1.12 σ]
Teffp = 4627 [926] K [4.72 σ]

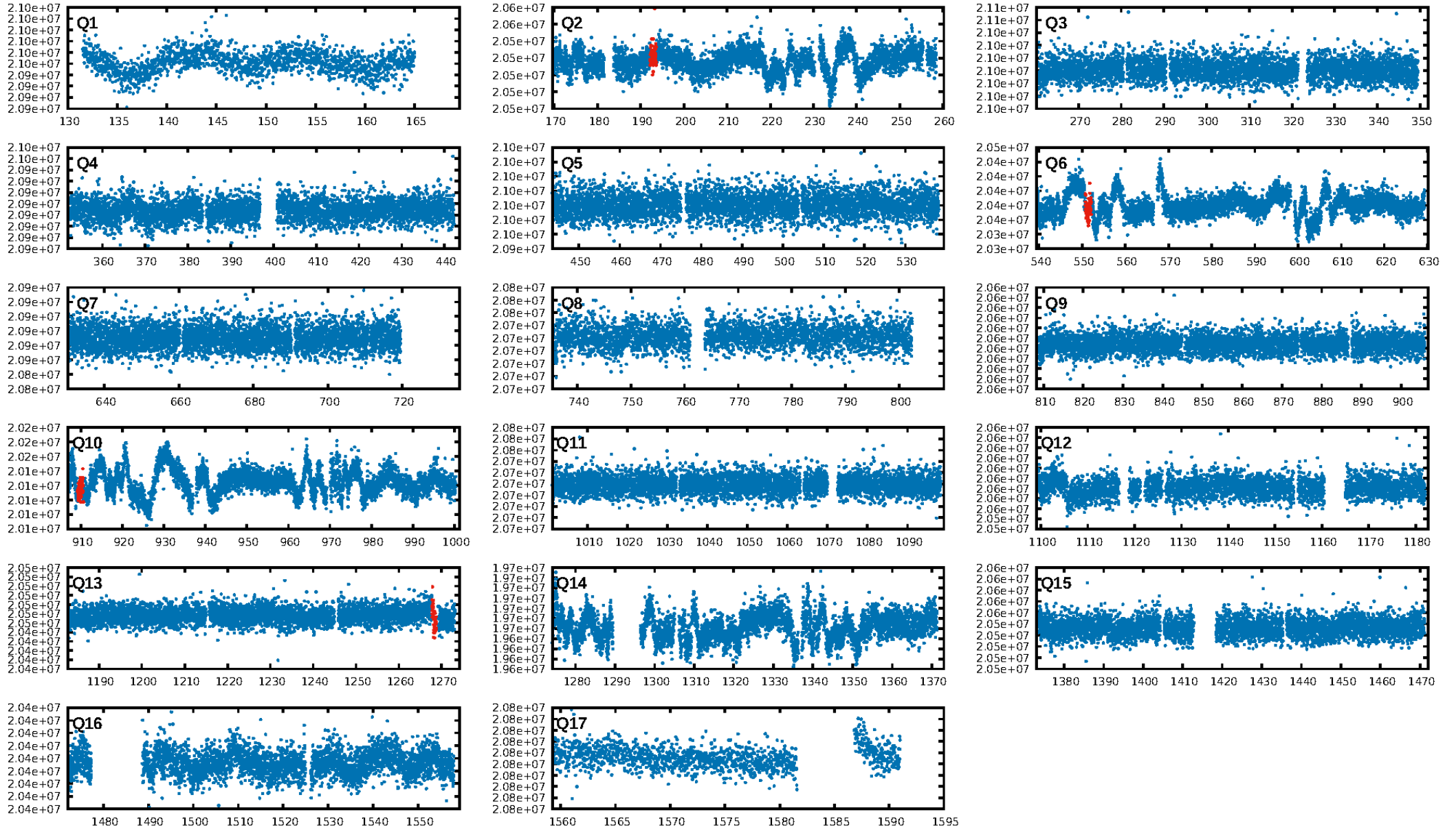
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [9.55 σ]
ModelChiSquare2-sig: 10.5%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 7.04e-10
RollingBand-fgt: 0.50 [2/4]
GhostDiagnostic-chr: -1.311
Centroid-sig: 47.0%
Centroid-so: 1.183 arcsec [0.48 σ]
OotOffset-rm: 2.460 arcsec [3.81 σ]
KicOffset-rm: 2.458 arcsec [3.93 σ]
OotOffset-st: 1/0/0/0 [1]
KicOffset-st: 1/0/0/0 [1]
DiffImageQuality-fgm: 0.00 [0/1]
DiffImageOverlap-fno: 1.00 [3/3]

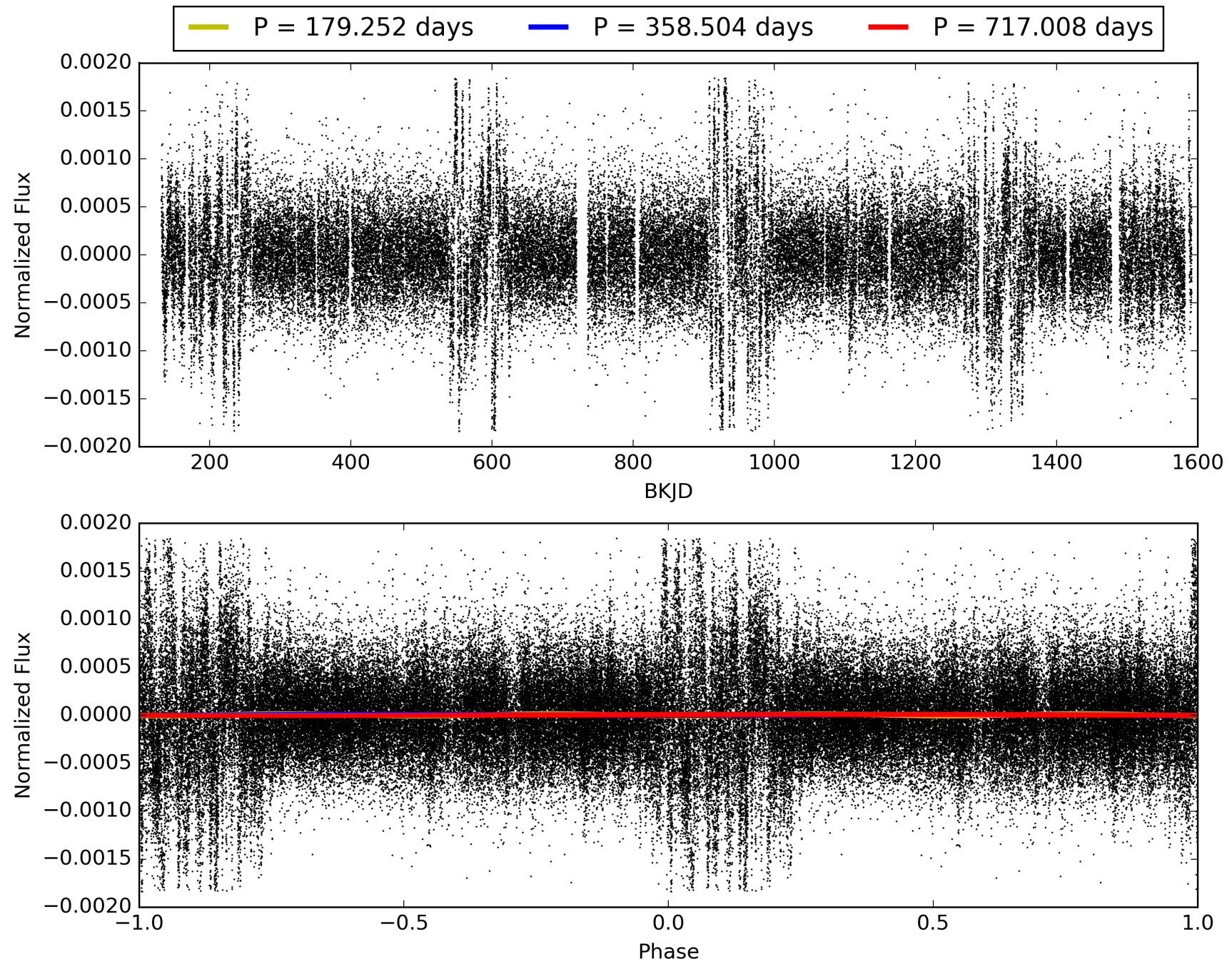
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 05:31:41 Z

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

TCE 007902481-02, PDC Light Curves

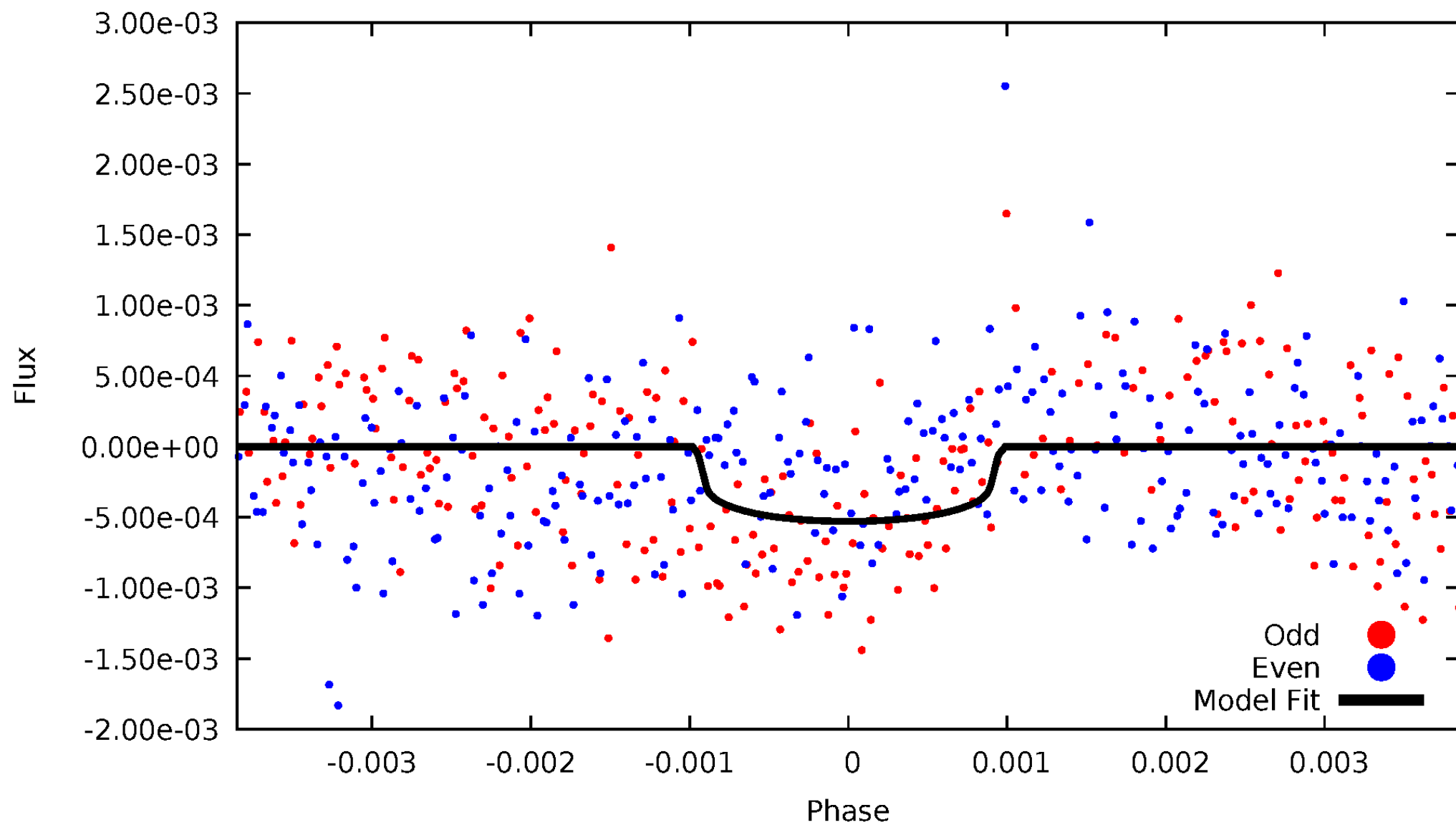


TCE 007902481-02



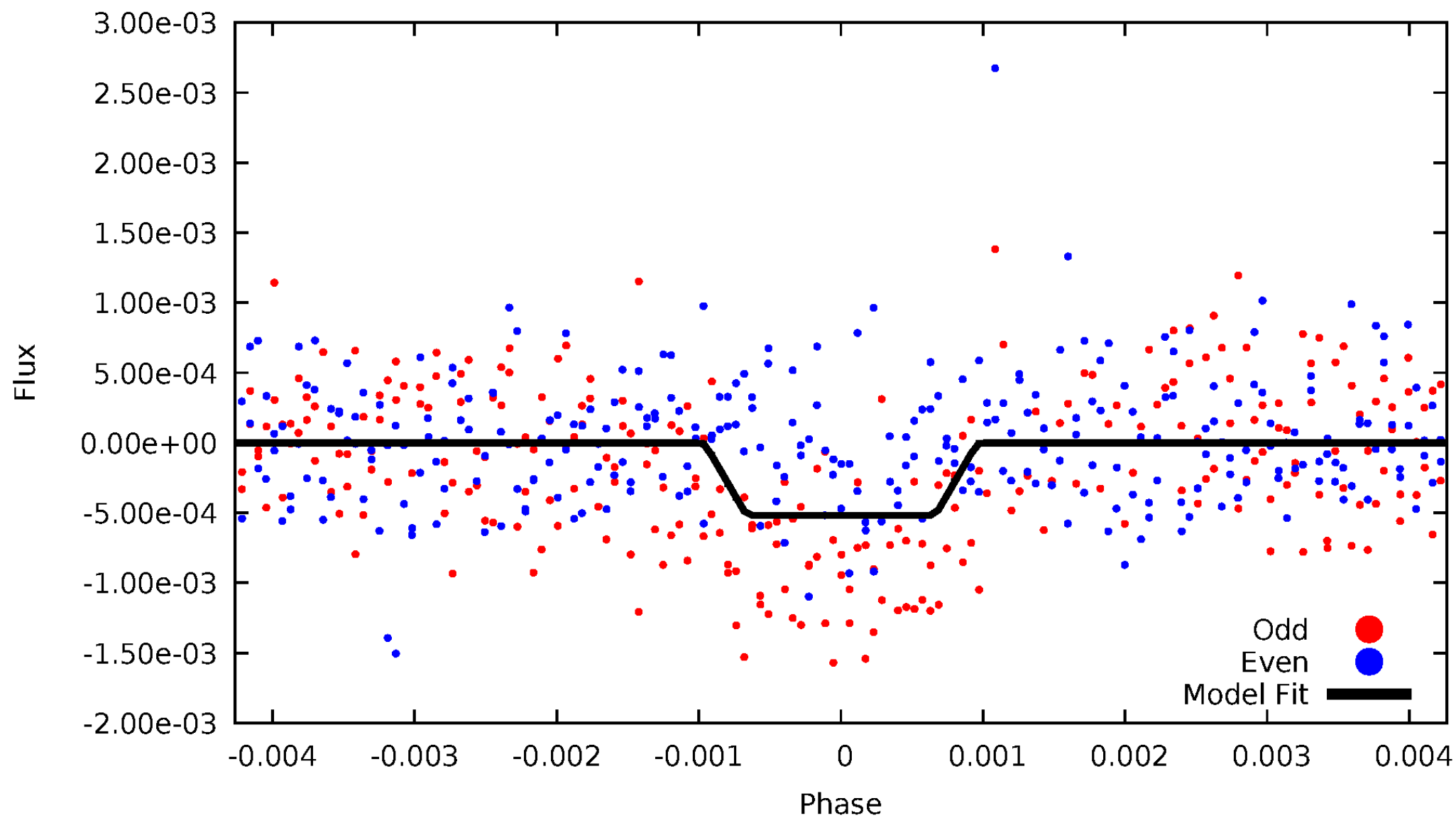
DV Odd/Even

TCE 007902481-02



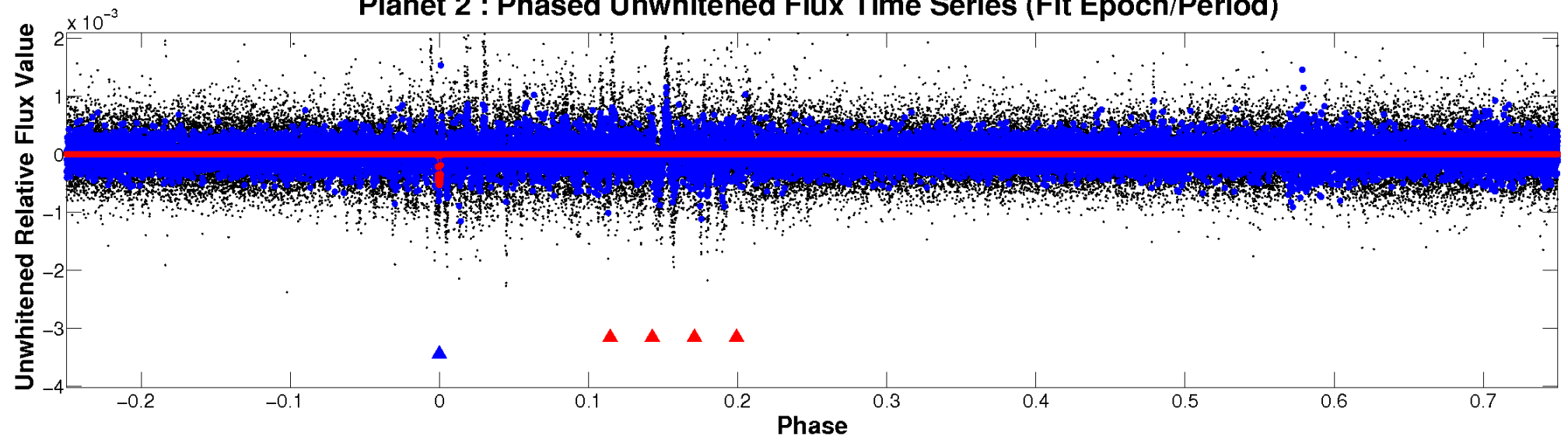
ALT Odd/Even

TCE 007902481-02

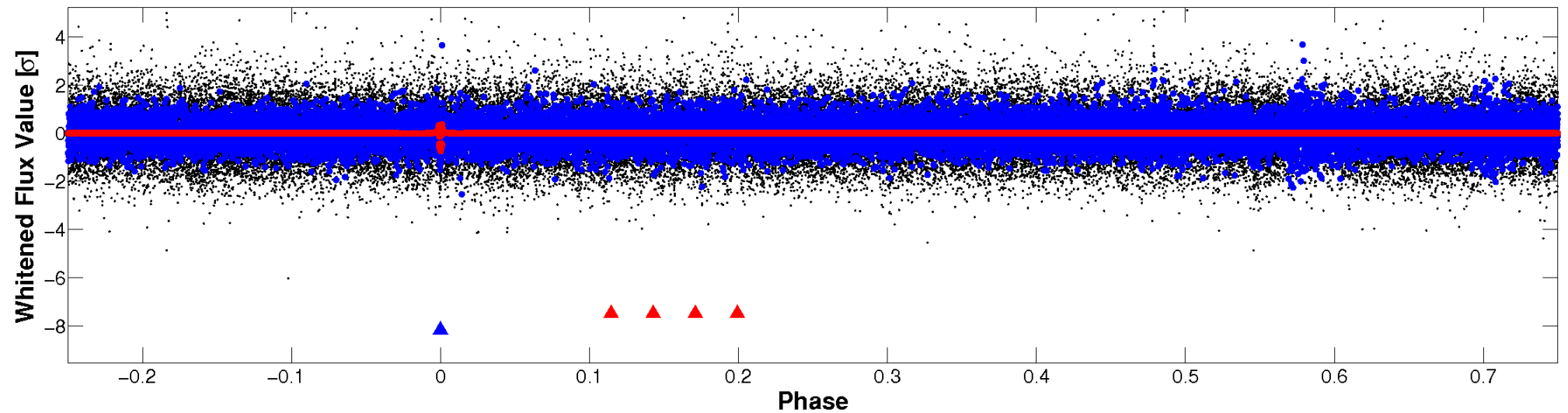


Non-Whitened Vs. Whitened Light Curve

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



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



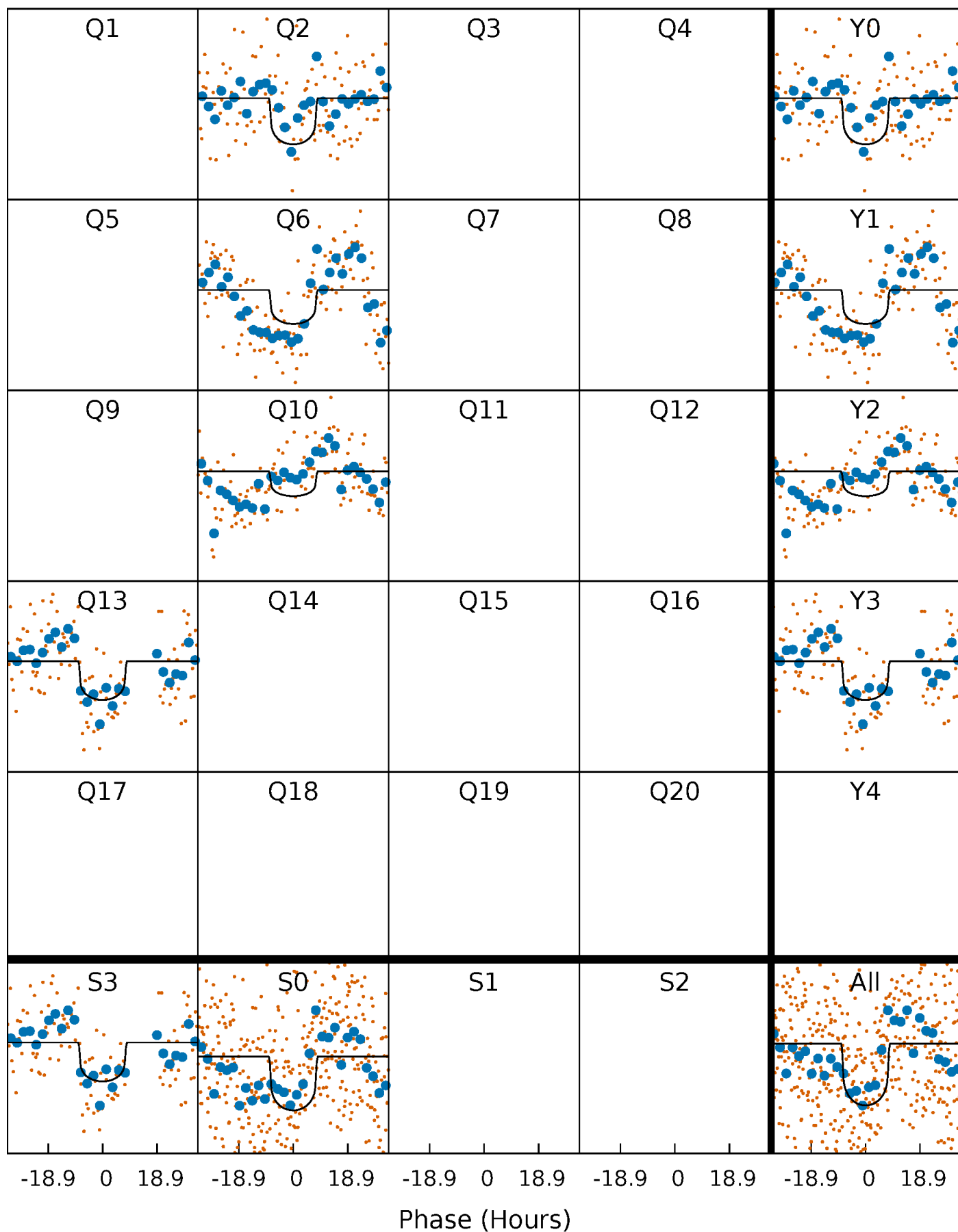
PDC Quarter-Phased Transit Curves

TCE 007902481-02 P=358.504060 Days $T_0=192.889985$ (BKJD)



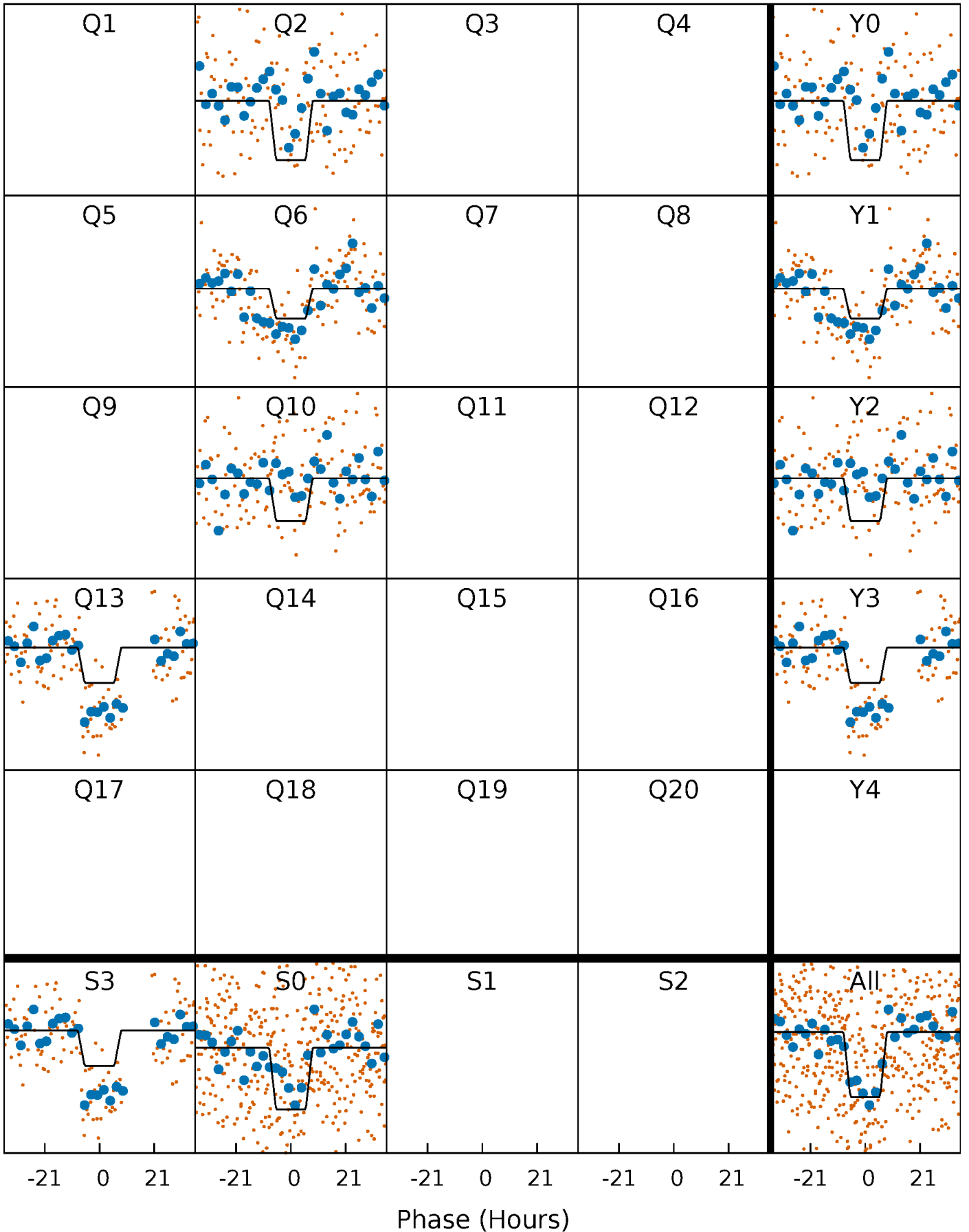
DV Quarter-Phased Transit Curves

TCE 007902481-02 $P=358.504060$ Days $T_0=192.889985$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

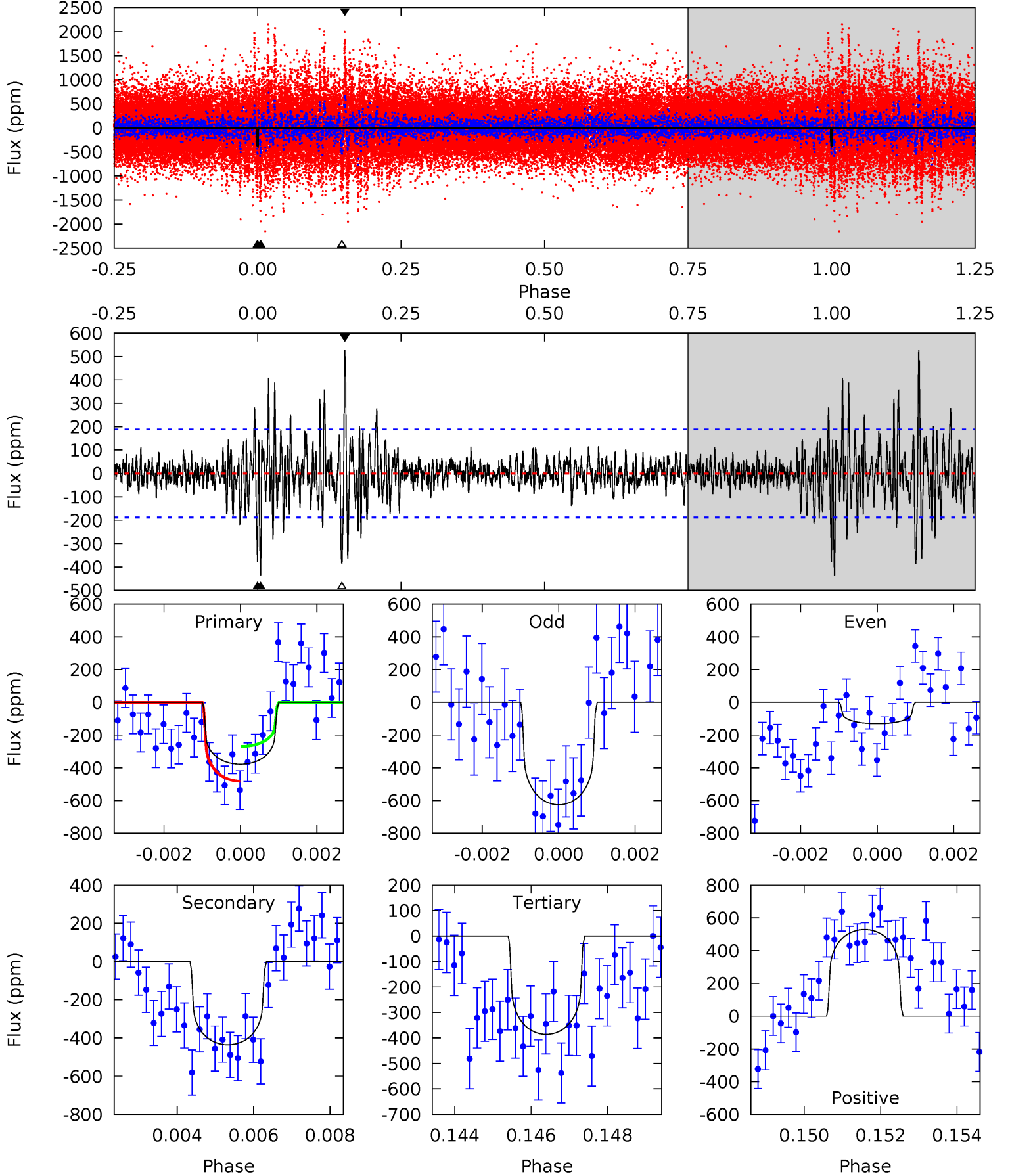
TCE 007902481-02 P=358.506810 Days $T_0=192.855211$ (BKJD)



DV Model-Shift Uniqueness Test

007902481-02, P = 358.504060 Days, E = 192.889985 Days

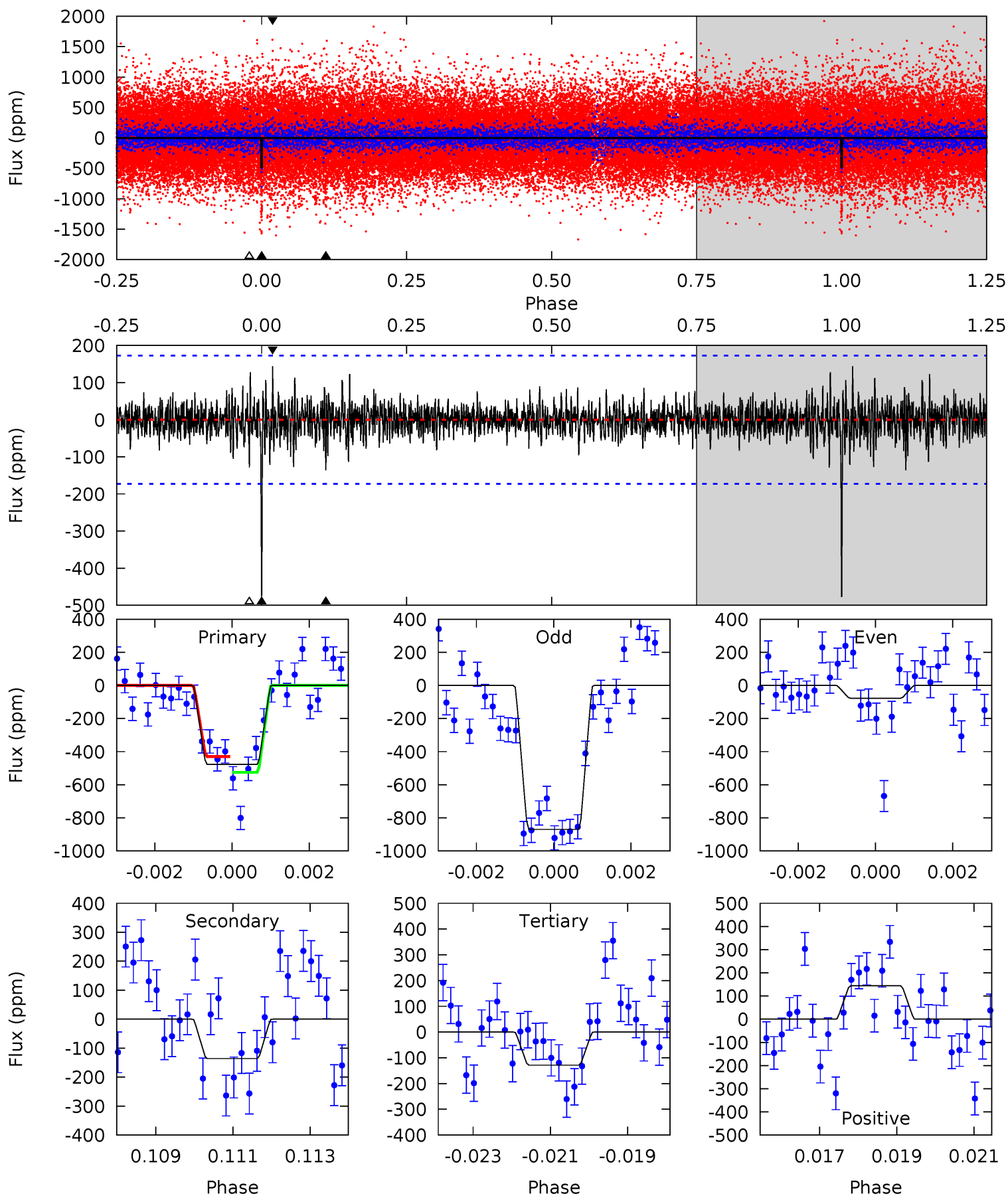
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 10.7 | 12.3 | 10.9 | 15.0 | 5.33 | 3.09 | 2.17 | -0.22 | -4.26 | 1.41 | -2.63 | 6.97 | 0.89 | 0.55 | 2.99 |



Alt Model-Shift Uniqueness Test

007902481-02, P = 358.506810 Days, E = 192.855211 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 14.7 | 4.20 | 3.97 | 4.44 | 5.33 | 3.10 | 0.95 | 10.8 | 10.3 | 0.23 | -0.25 | 12.2 | 1.10 | 0.23 | 1.47 |



Stellar Parameters For KIC 007902481

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | M (M_{\odot}) | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 5900^{+176}_{-211} | $4.509^{+0.040}_{-0.229}$ | $0.070^{+0.250}_{-0.300}$ | $0.951^{+0.317}_{-0.079}$ | $1.065^{+0.124}_{-0.138}$ | $1.745^{+0.377}_{-0.941}$ |
| | +3%/-4% | +1%/-5% | +357%/-429% | +33%/-8% | +12%/-13% | +22%/-54% |
| 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 007902481-02 / KOI

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|---------------|------------------------|-------------------|-----------------------|---------------------------|
| DV | -436 ± 35 | $2.38^{+1.01}_{-0.89}$ | 361^{+26}_{-17} | 5786^{+1517}_{-826} | 41506^{+65445}_{-20723} |
| Alt. | -136 ± 32 | $2.47^{+1.06}_{-0.90}$ | 364^{+28}_{-18} | 4411^{+936}_{-508} | 11827^{+18947}_{-6290} |

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 $A_{obs} \gg 1.0$

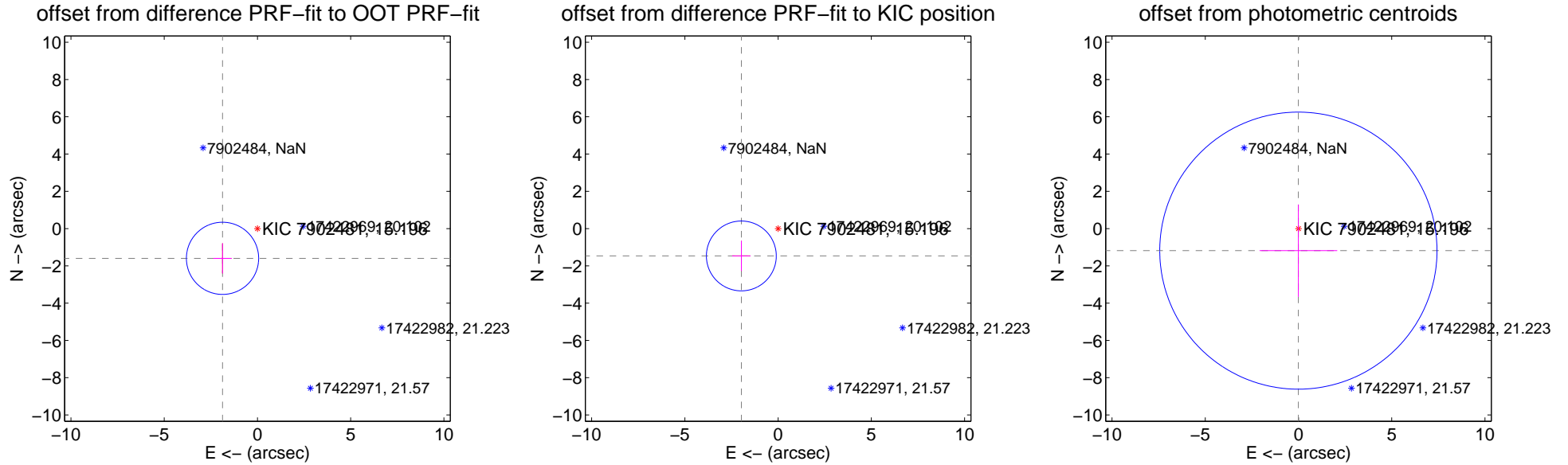
DV Centroid Data

Supplemental centroid analysis for 007902481-02. Kepler magnitude: 15.20. Transit SNR 7.72

There are 0 quarters with good PRF difference image offsets

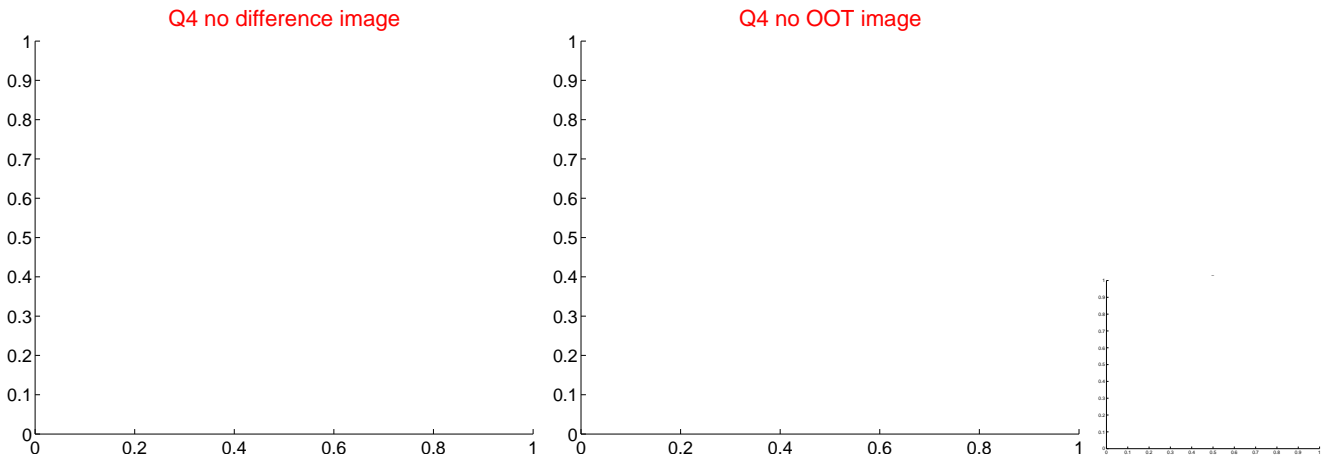
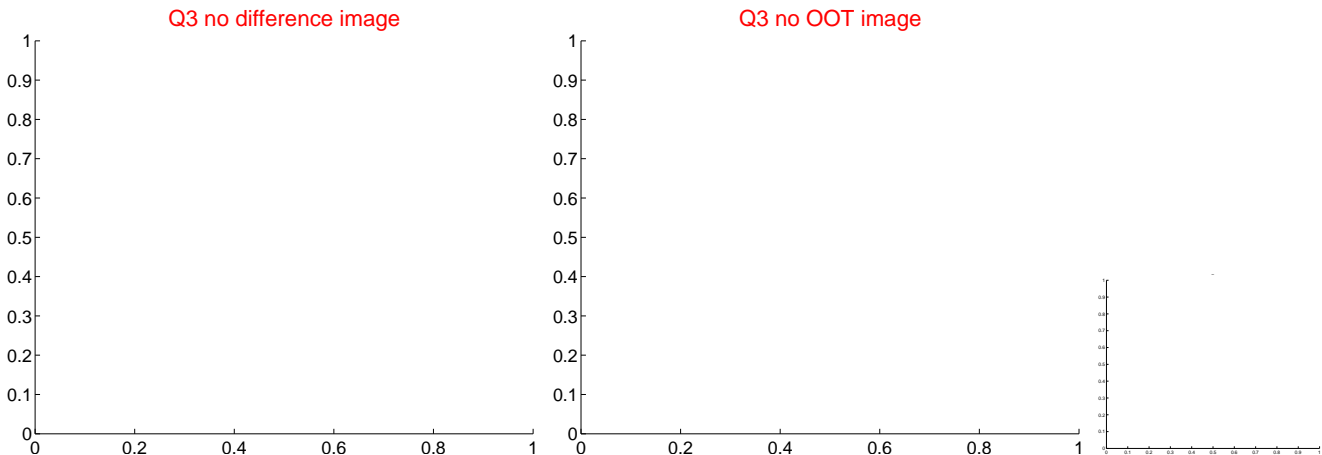
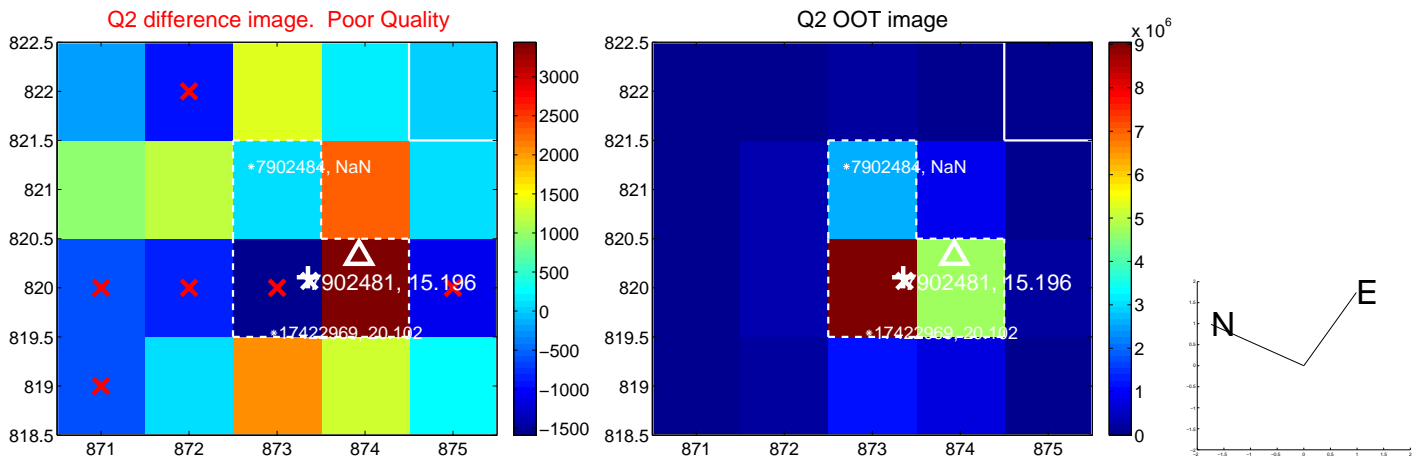
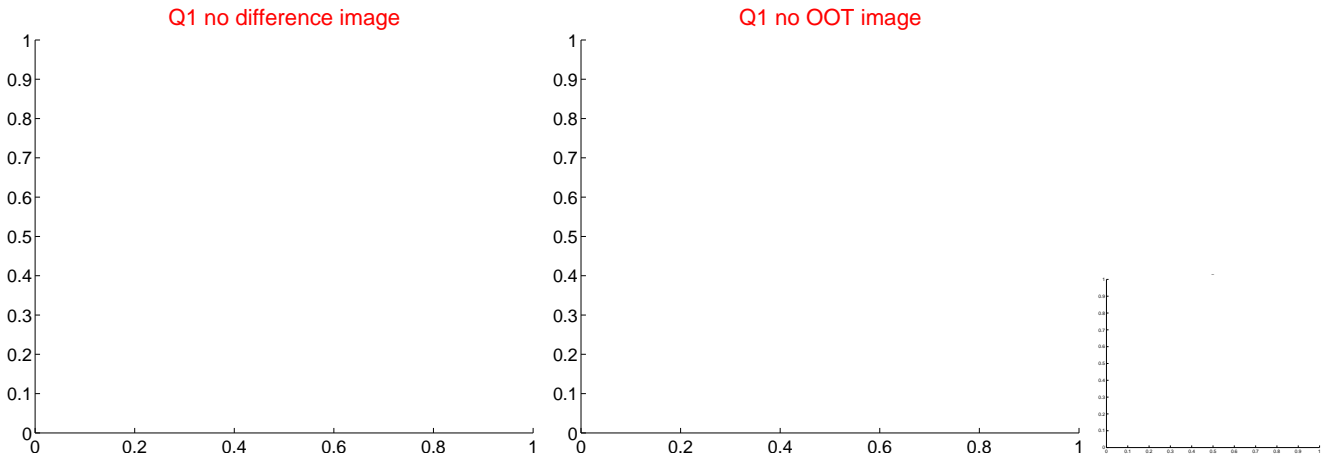
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT | 2.460 ± 0.646 | 3.81 | 1.872 ± 0.492 | -1.595 ± 0.811 |
| PRF-fit source offset from KIC position | 2.458 ± 0.625 | 3.93 | 1.972 ± 0.492 | -1.467 ± 0.811 |
| photometric centroid source offset | 1.18 ± 2.48 | 0.48 | 0.01 ± 2.08 | -1.18 ± 2.48 |

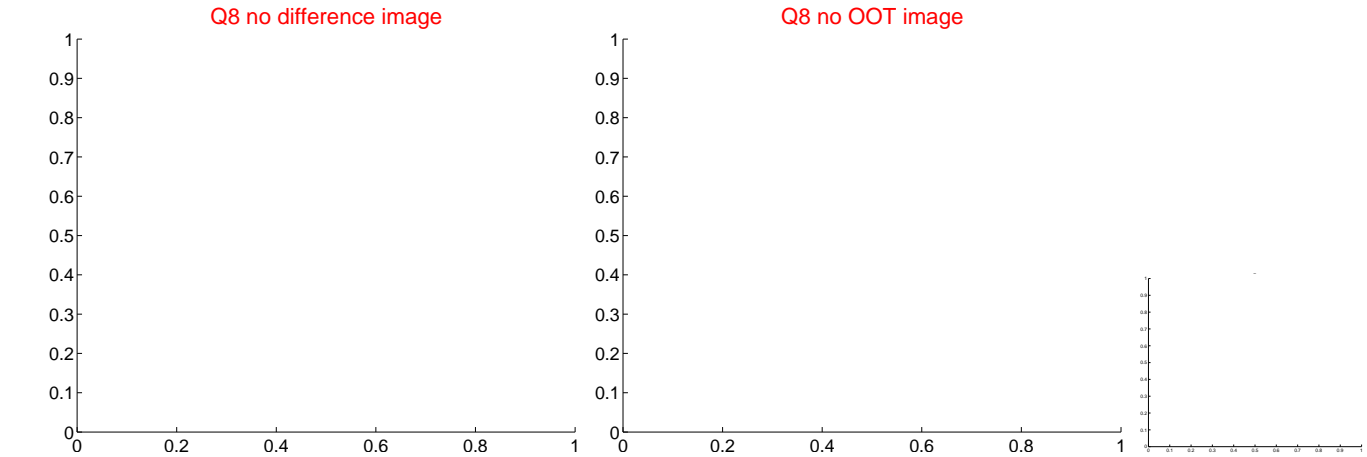
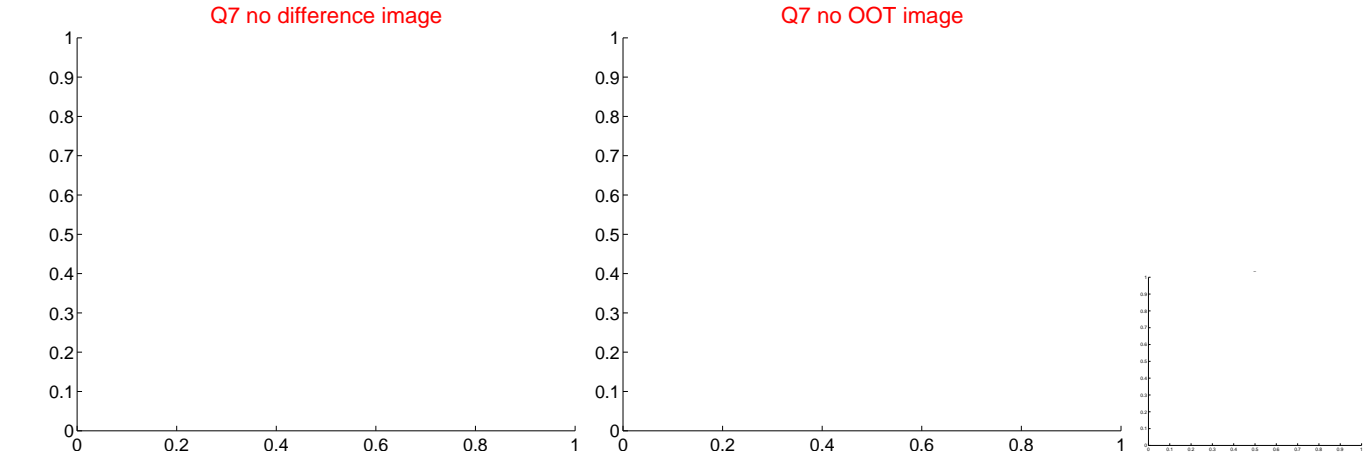
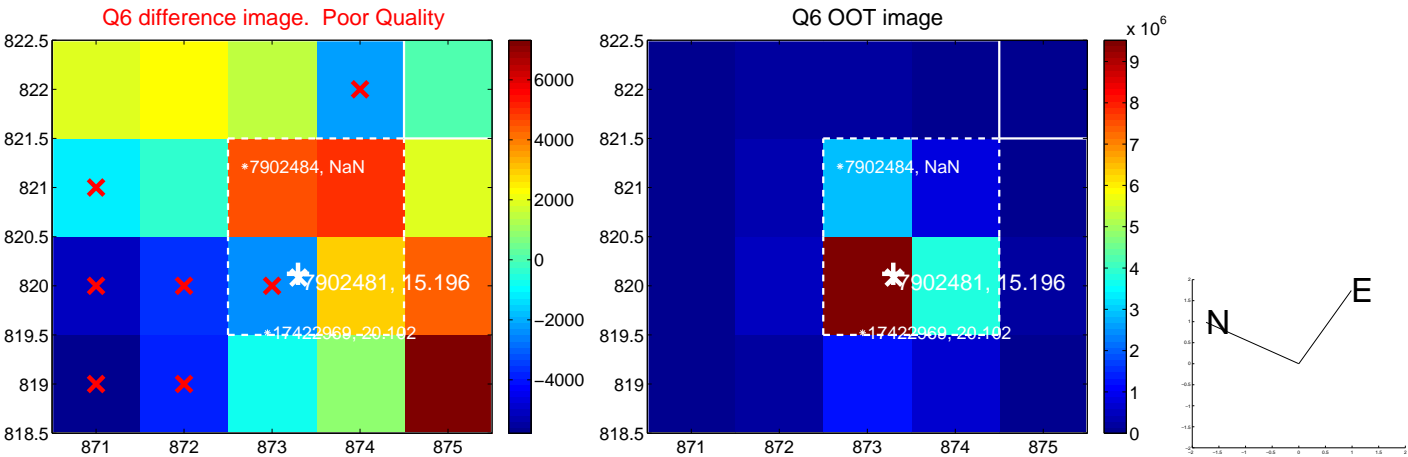
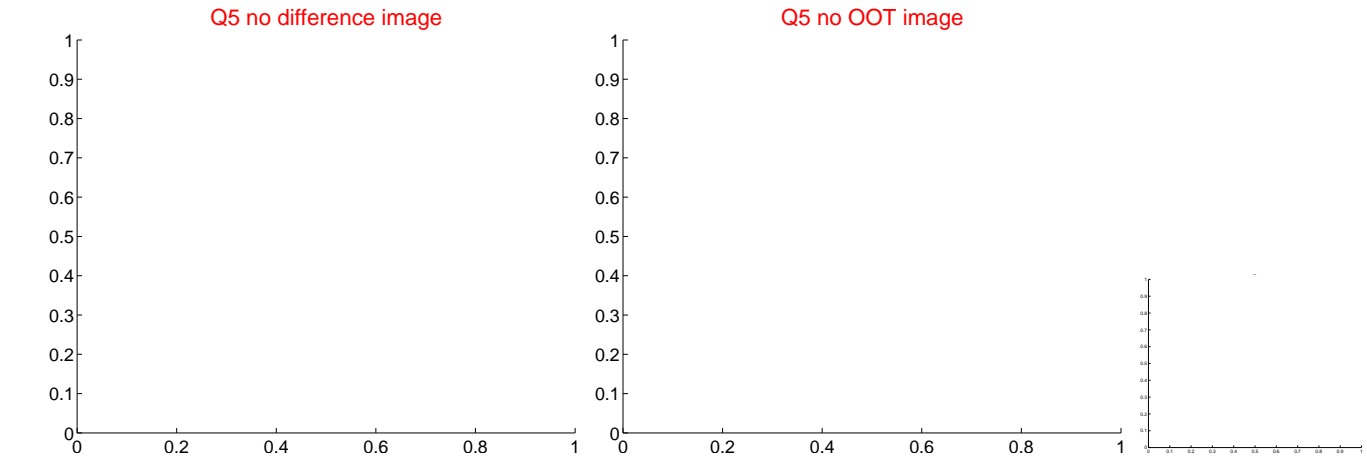


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

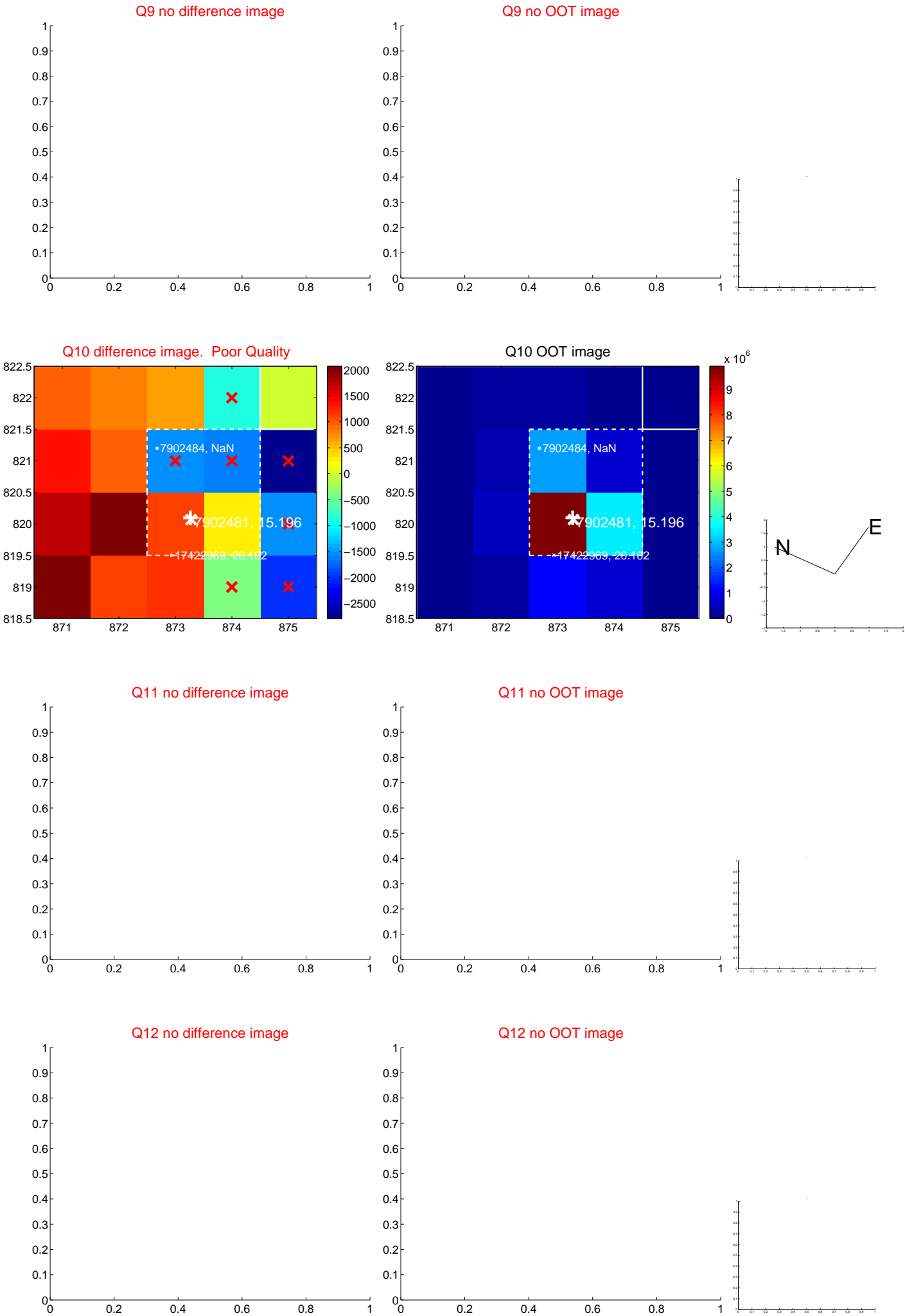
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



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



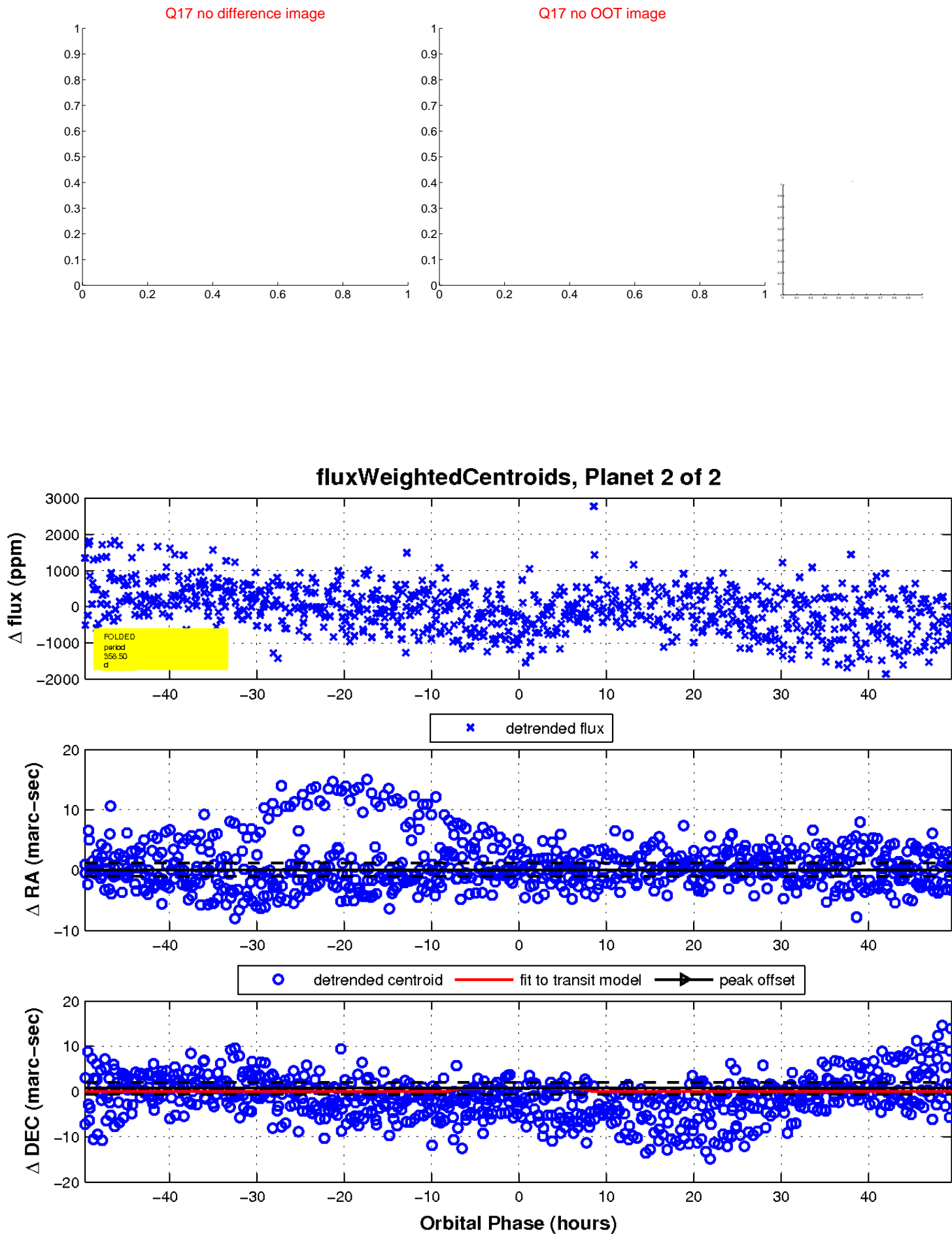
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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



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



UKIRT Image

Declination

