

KIC 004936438

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 004936438-01 | OBS | No | 184.688201 | 161.445627 | 15.9 | 5.493 | 8.6 | 6.8 | 7.90 | 4953 | 3.78 | 50.22 |
| 004936438-02 | OBS | No | 116.629261 | 152.629813 | 23.5 | 5.541 | 9.1 | 8.4 | 7.90 | 4953 | 4.74 | 92.69 |
| 004936438-03 | OBS | No | 68.442608 | 162.668970 | 15.6 | 4.067 | 7.3 | 7.4 | 7.90 | 4953 | 3.81 | 188.66 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 004936438-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_MARSHALL_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED |
| 004936438-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED |
| 004936438-03 | OBS | FP | 0.00 | 1 | 0 | 1 | 0 | MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED—HALO_GHOST |

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

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

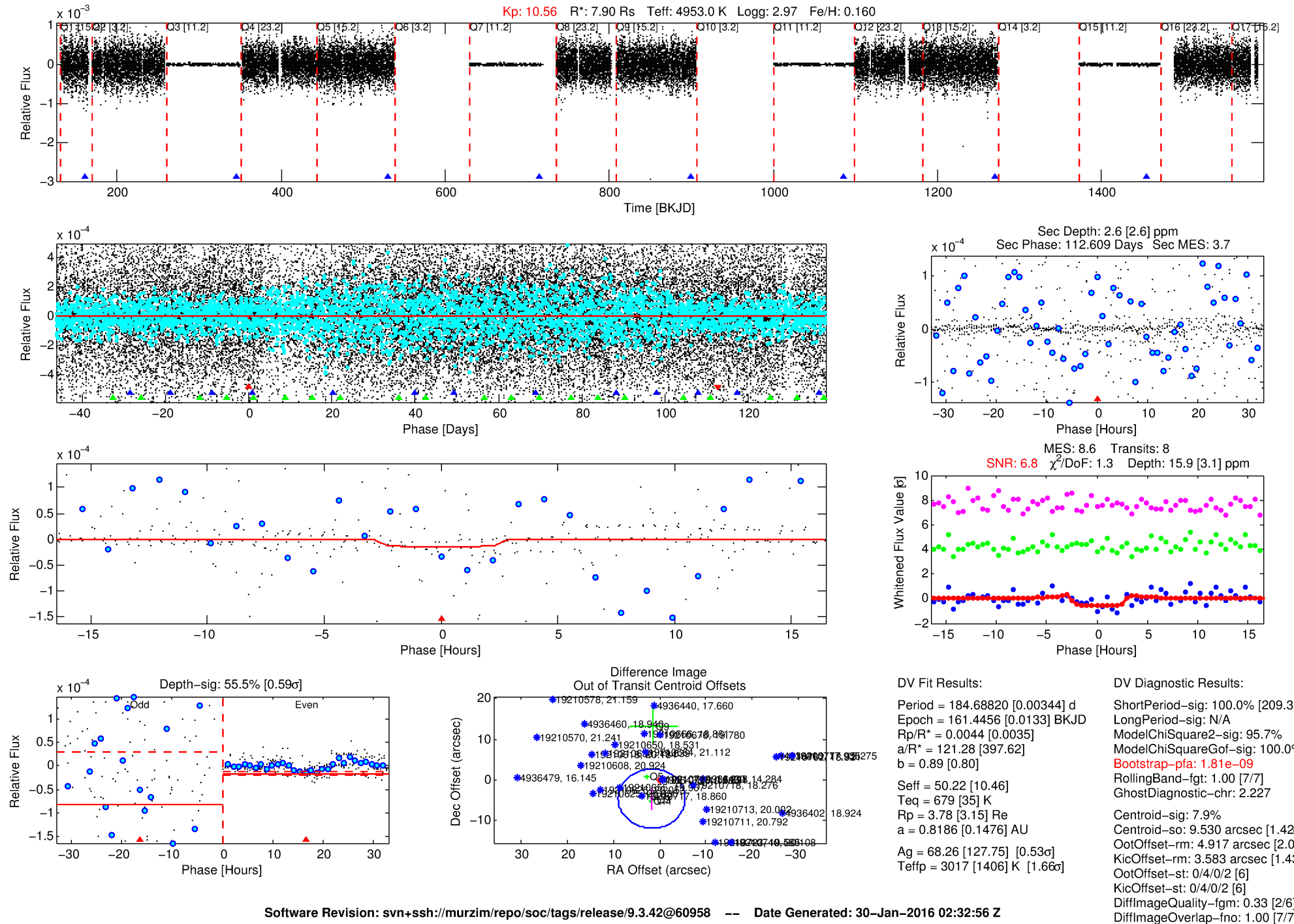
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004936438-01

No Significant Match Found

DV One-Page Summary

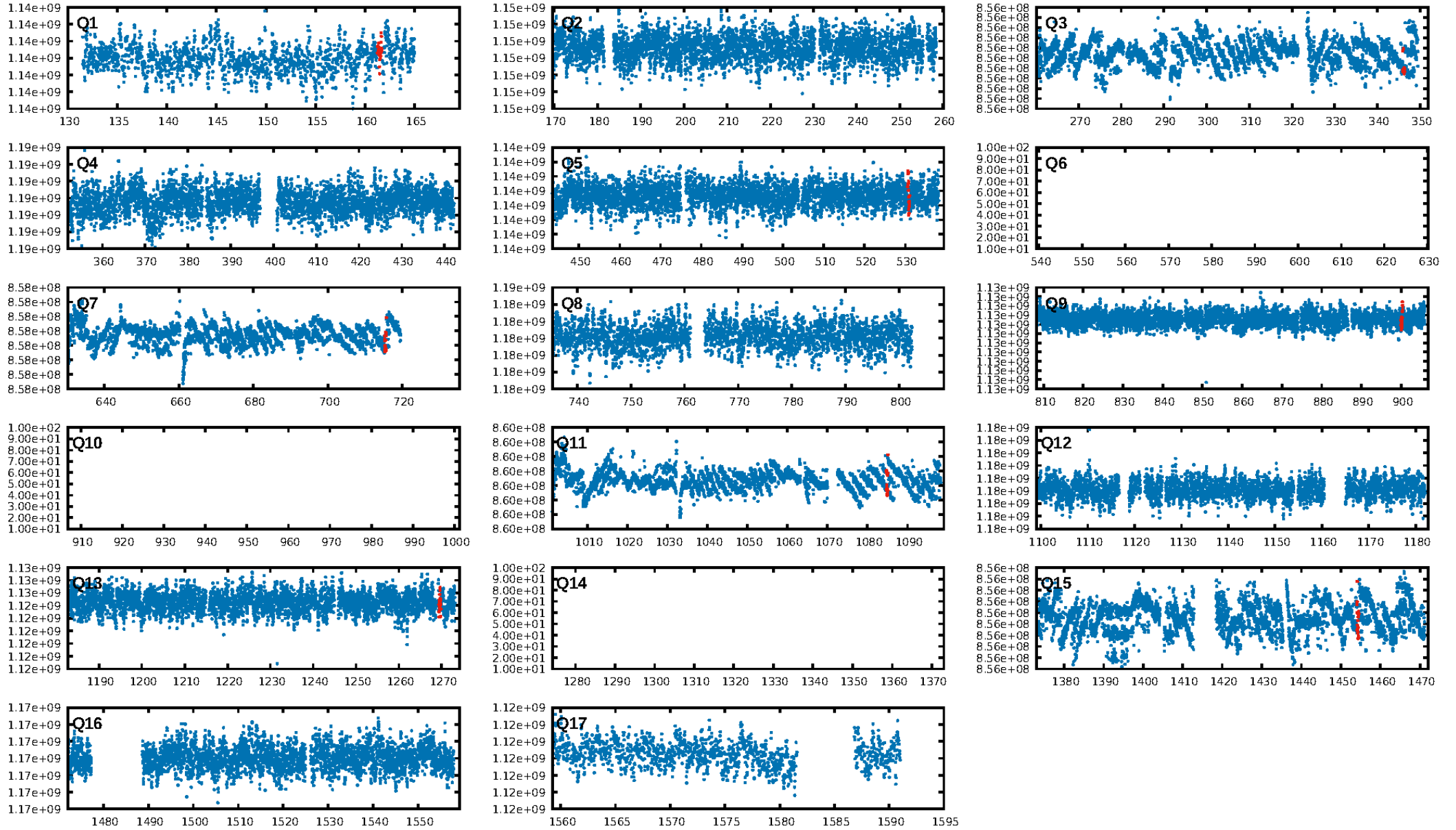
KIC: 4936438 Candidate: 1 of 3 Period: 184.688 d



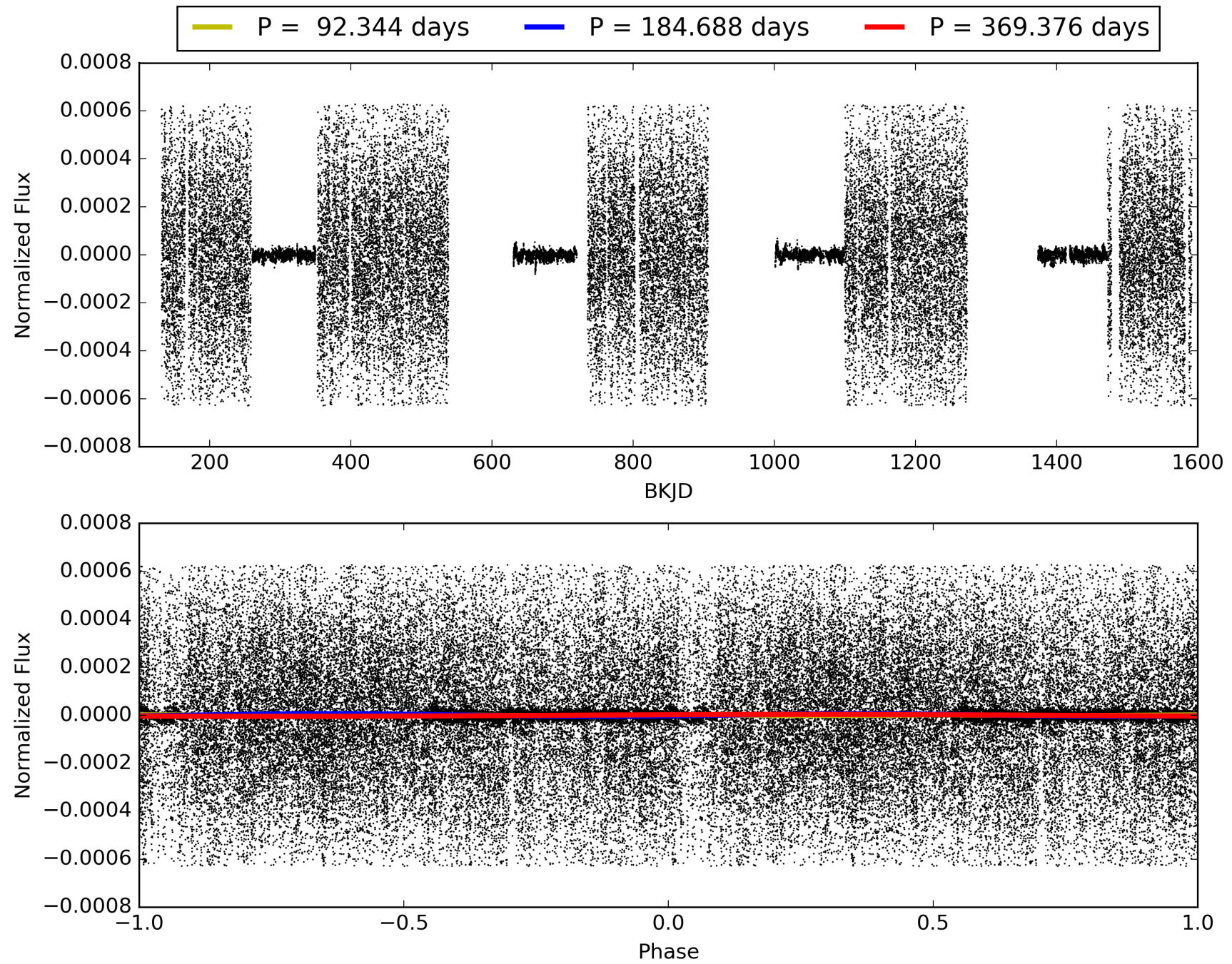
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 02:32:56 Z

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

TCE 004936438-01, PDC Light Curves

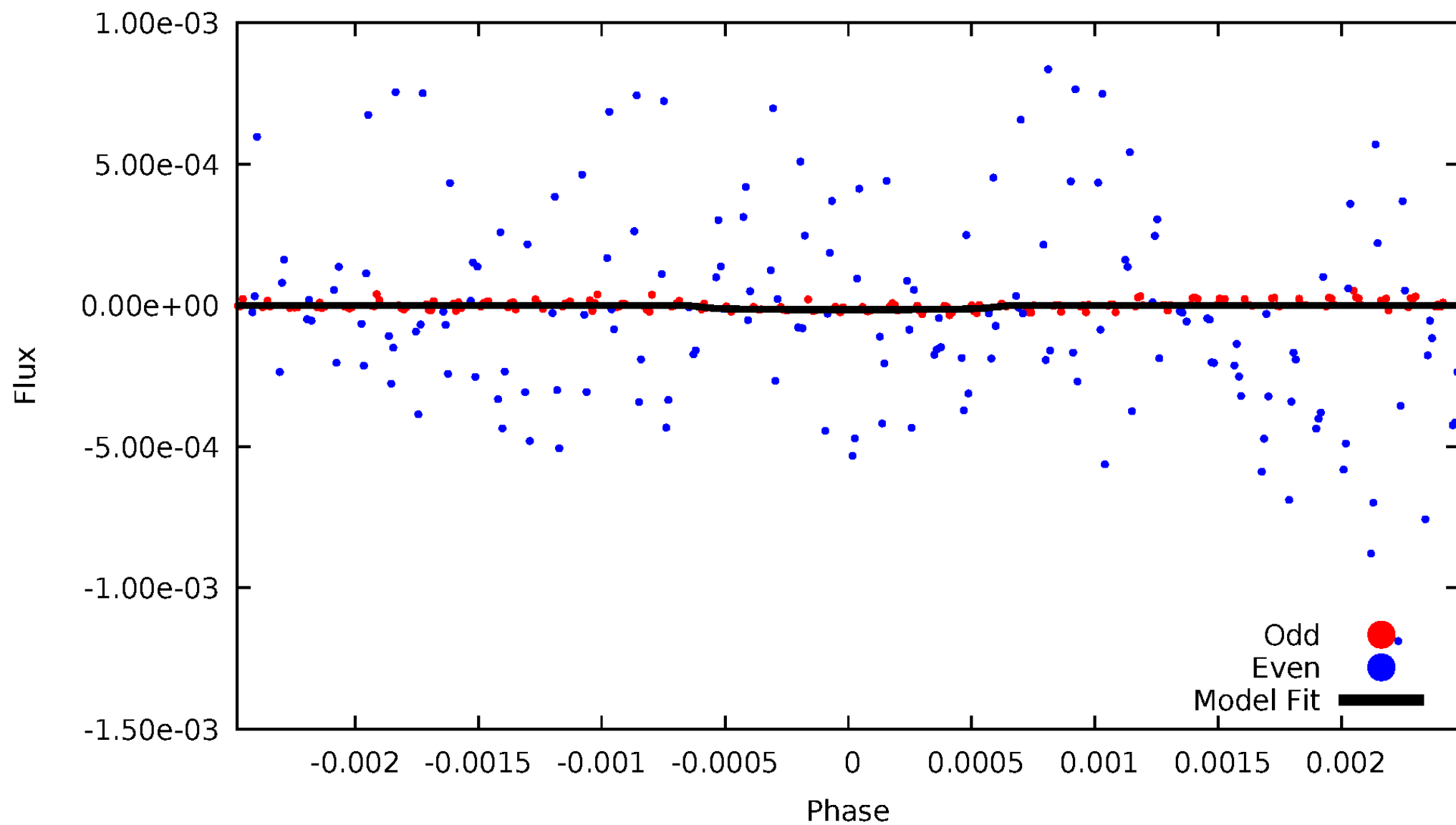


TCE 004936438-01



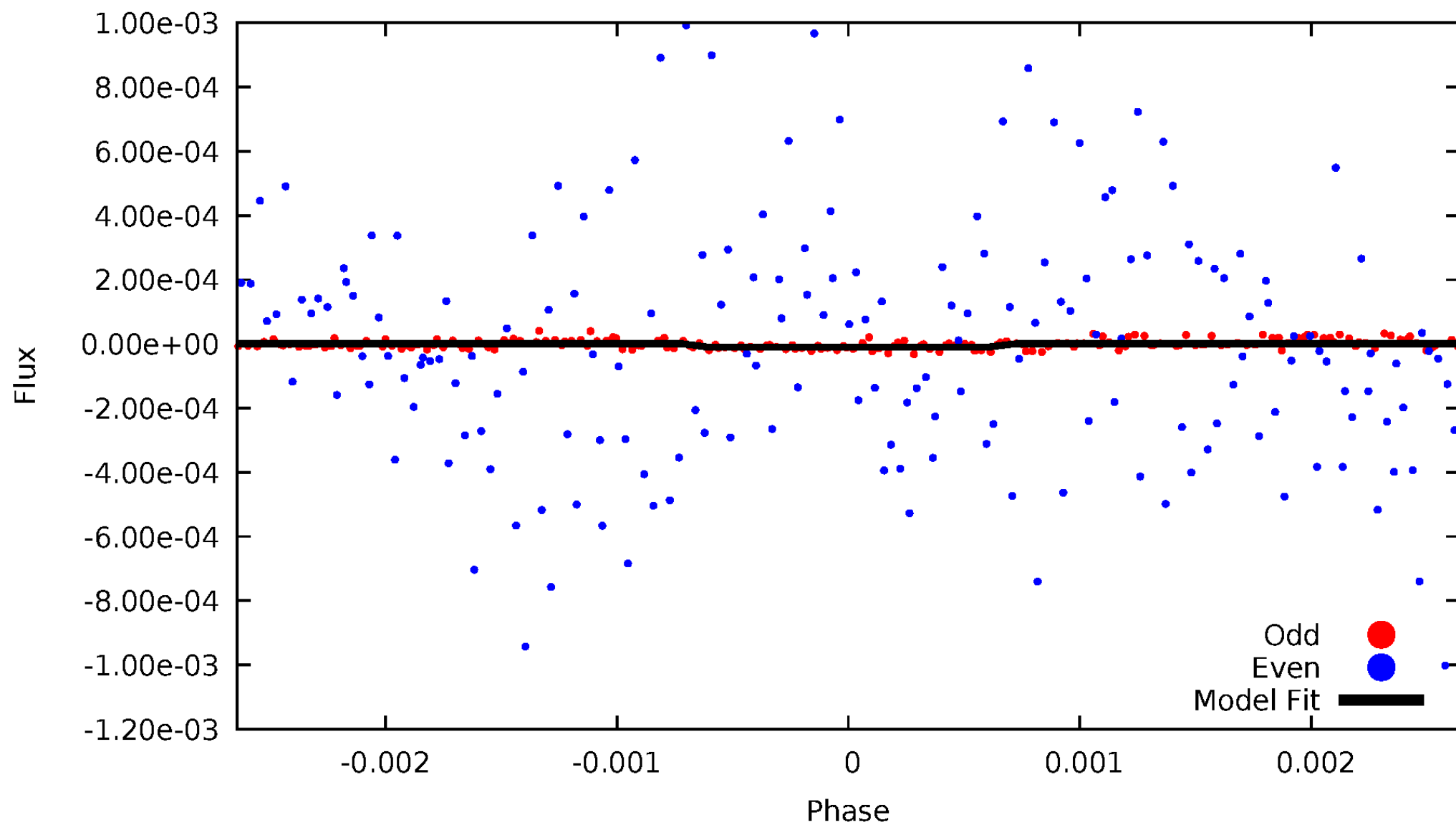
DV Odd/Even

TCE 004936438-01

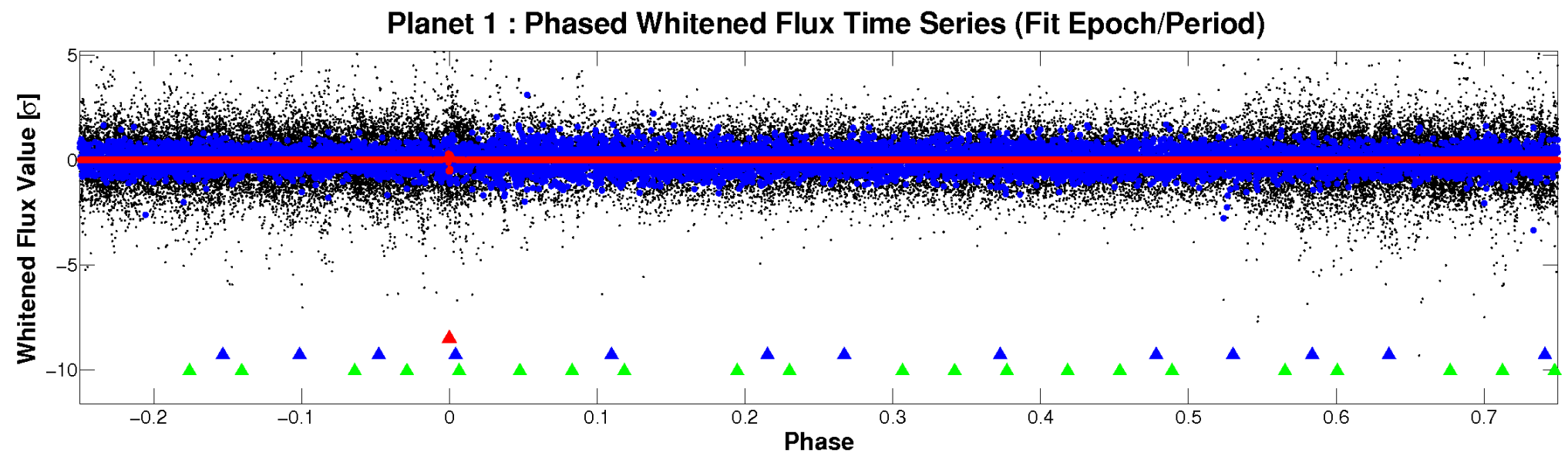
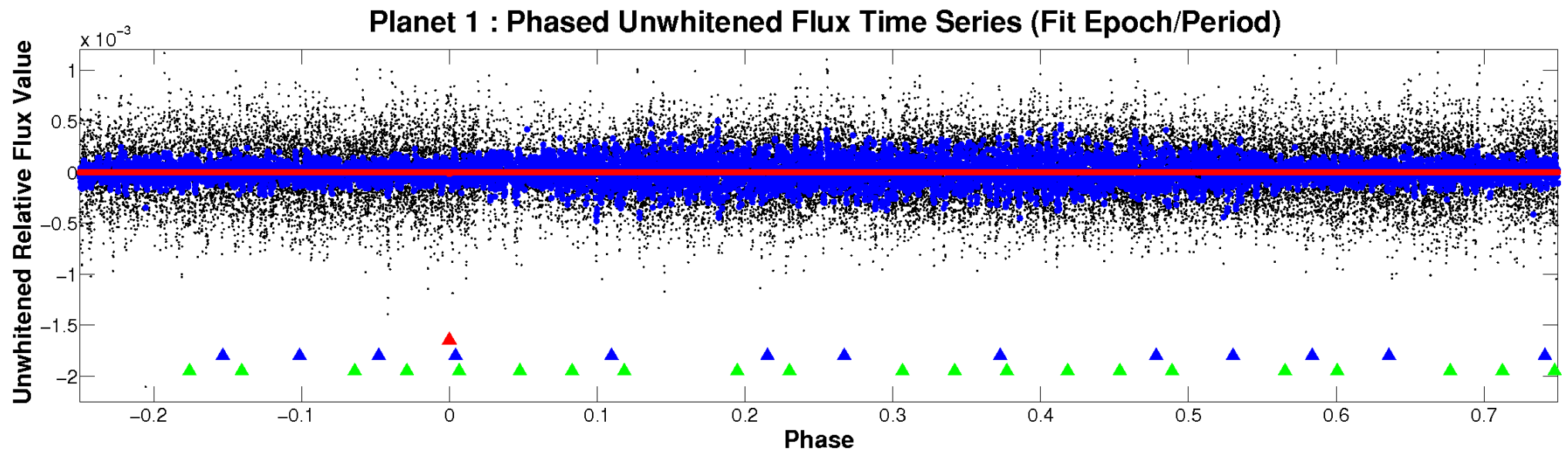


ALT Odd/Even

TCE 004936438-01



Non-Whitened Vs. Whitened Light Curve



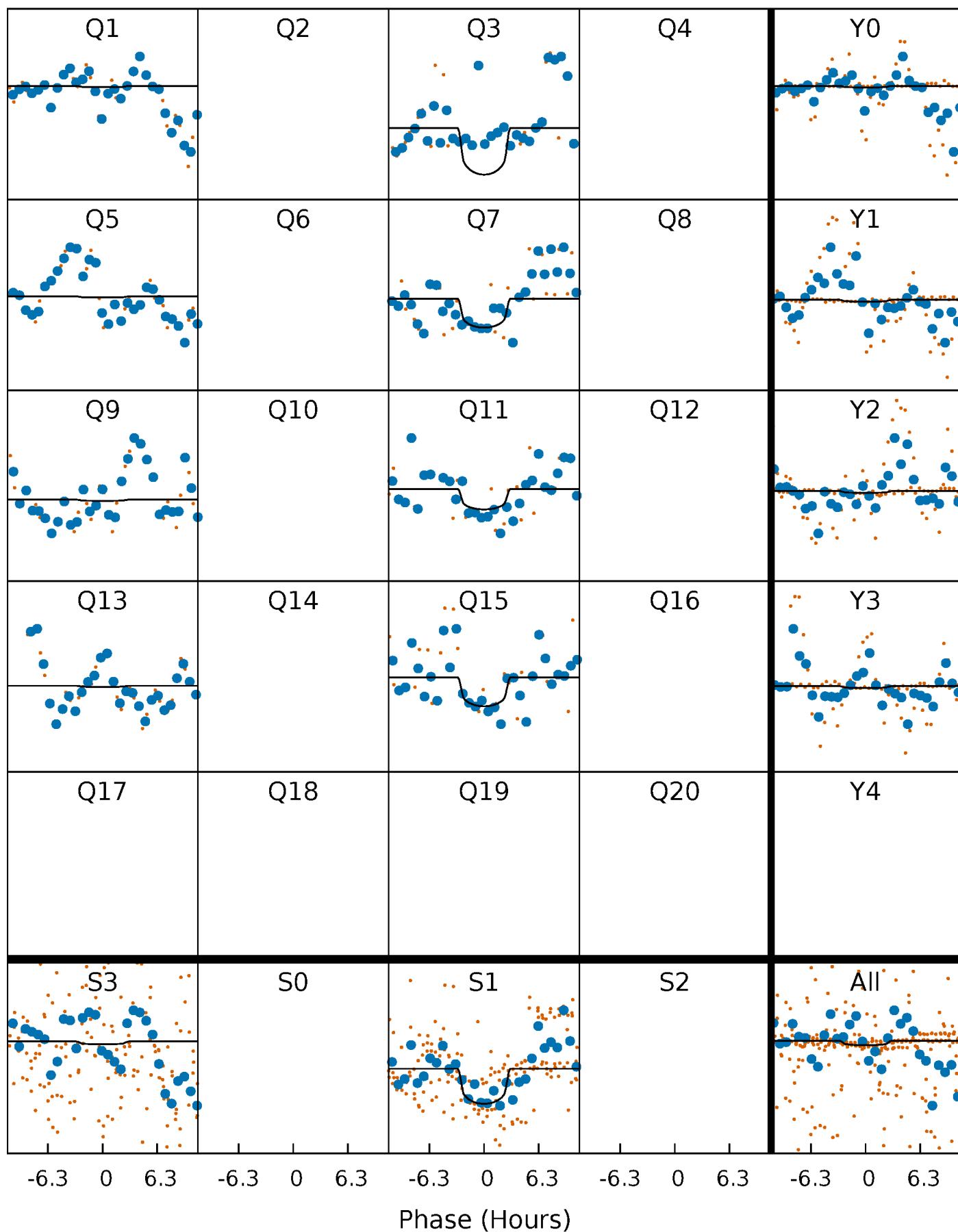
PDC Quarter-Phased Transit Curves

TCE 004936438-01 P=184.688201 Days $T_0=161.445627$ (BKJD)



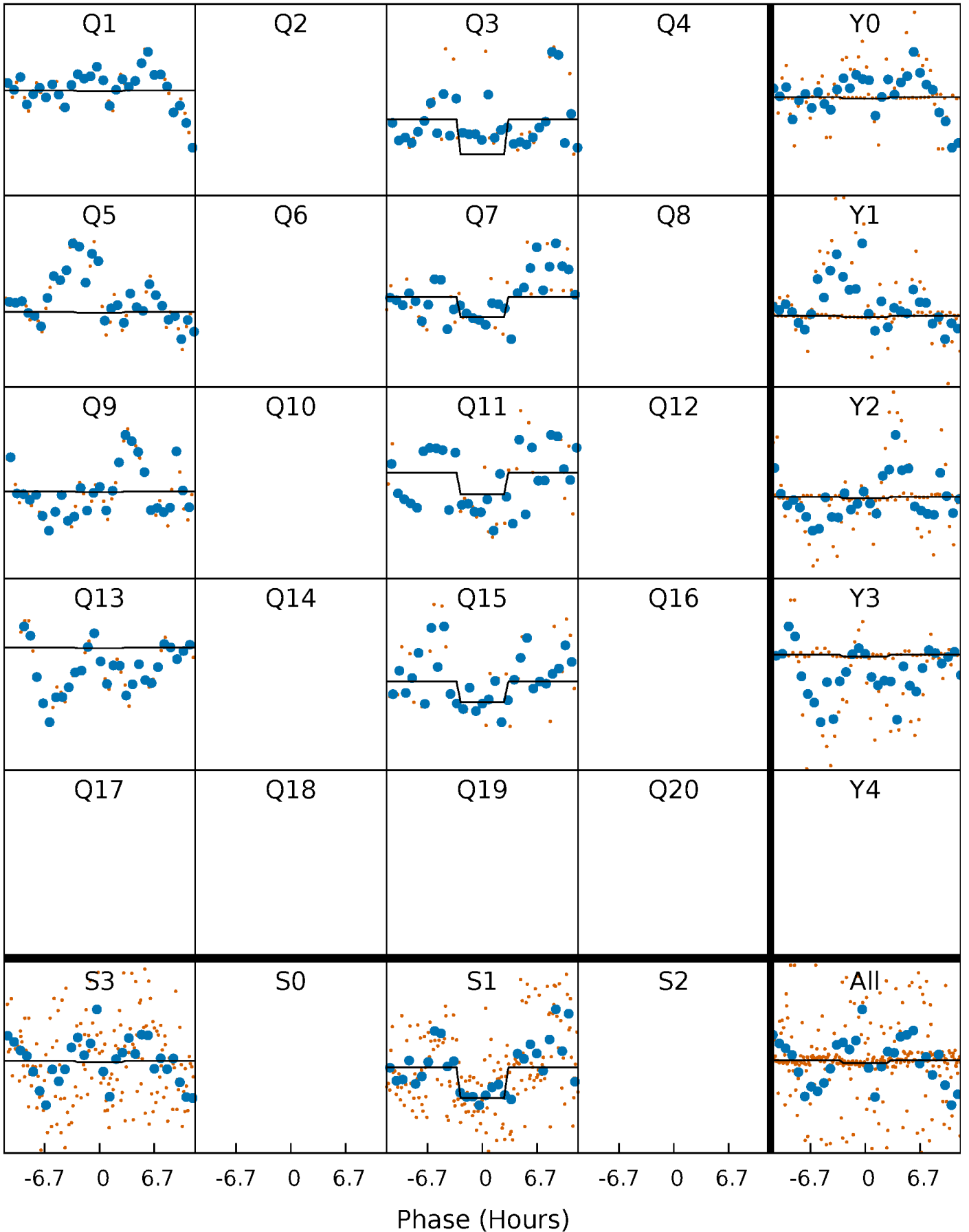
DV Quarter-Phased Transit Curves

TCE 004936438-01 P=184.688201 Days $T_0=161.445627$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

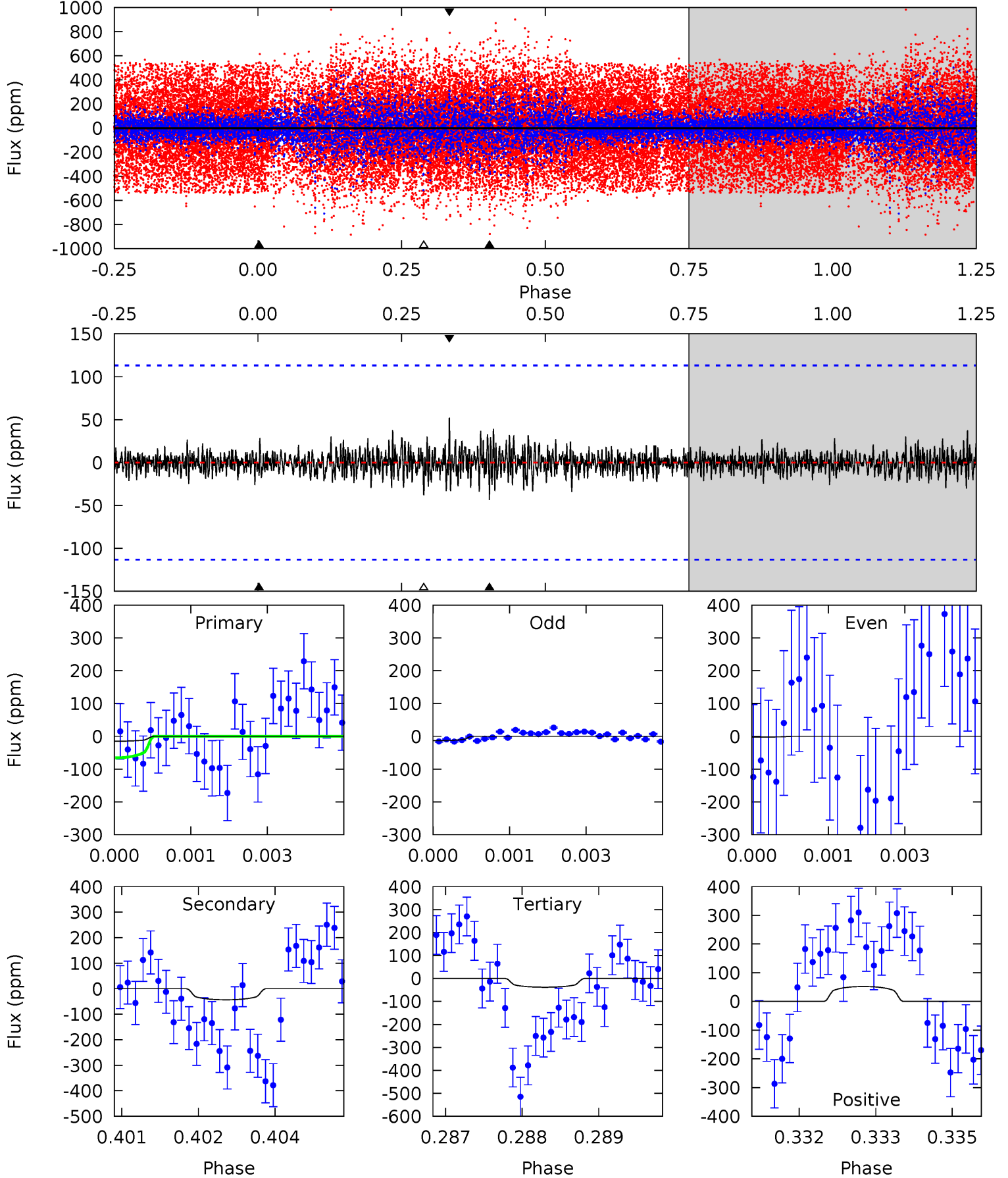
TCE 004936438-01 P=184.705760 Days $T_0=161.381331$ (BKJD)



DV Model-Shift Uniqueness Test

004936438-01, P = 184.688201 Days, E = 161.445627 Days

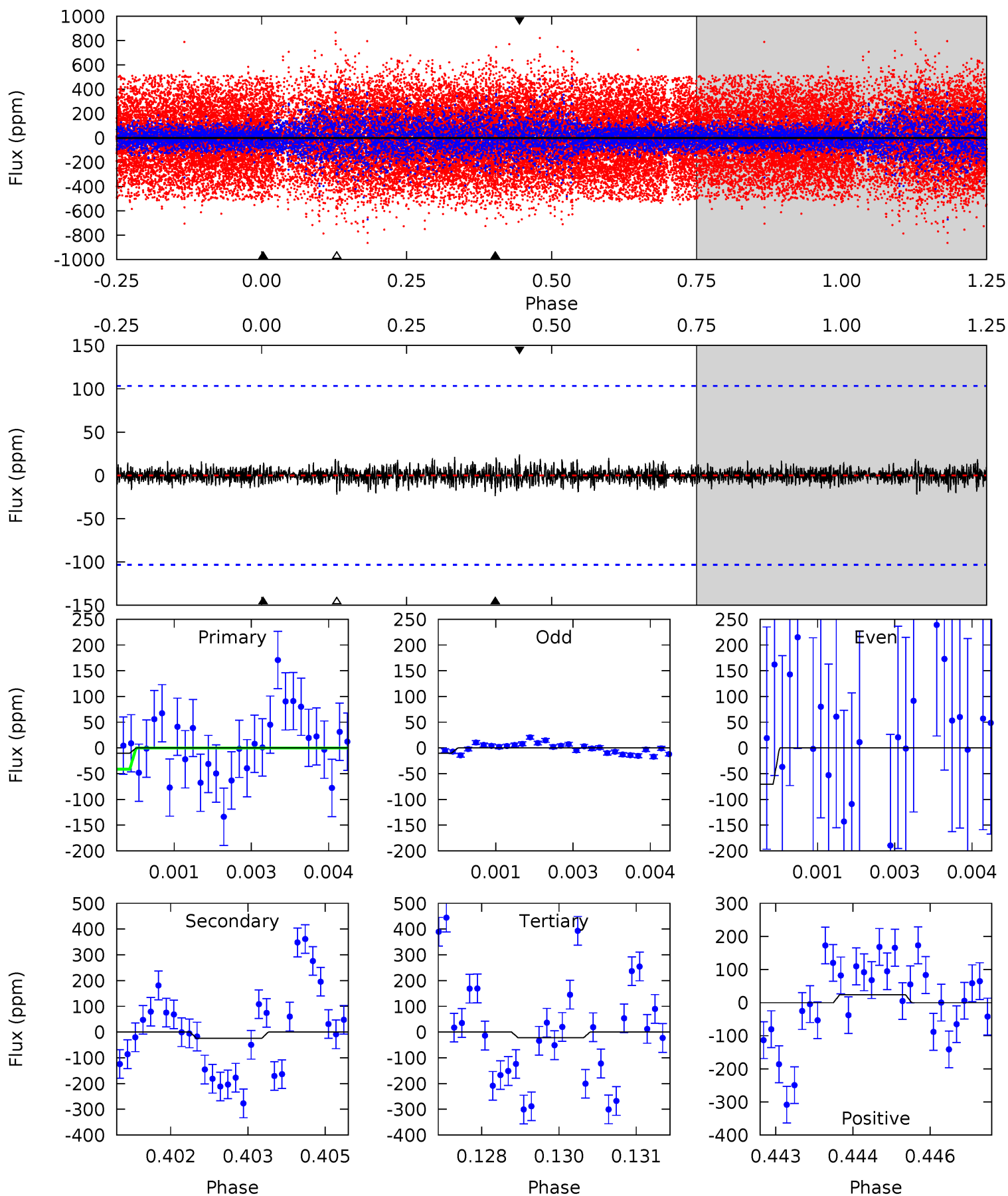
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 0.72 | 2.08 | 1.81 | 2.49 | 5.40 | 3.21 | 0.48 | -1.09 | -1.77 | 0.26 | -0.42 | 0.25 | 0.36 | 0.55 | 1.57 |



Alt Model-Shift Uniqueness Test

004936438-01, P = 184.705760 Days, E = 161.381331 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|-------|-------|------|
| 0.53 | 1.24 | 1.15 | 1.25 | 5.39 | 3.19 | 0.31 | -0.62 | -0.72 | 0.09 | -0.01 | 1.55 | -3.75 | 0.50 | 0.99 |



Stellar Parameters For KIC 004936438

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | $M(M_{\odot})$ | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|---------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 4953^{+58}_{-117} | $2.974^{+0.033}_{-0.027}$ | $0.160^{+0.100}_{-0.400}$ | $7.900^{+0.373}_{-2.116}$ | $2.143^{+0.052}_{-0.993}$ | $0.006^{+0.003}_{-0.000}$ |
| | +1%/-2% | +1%/-1% | +62%/-250% | +5%/-27% | +2%/-46% | +42%/-8% |
| Source | PHO56 | AST56 | PHO56 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 004936438-01 / KOI

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|--------------|------------------------|-------------------|------------------------|----------------------|
| DV | -43 ± 21 | $4.20^{+2.97}_{-2.51}$ | 949^{+16}_{-26} | 5499^{+3916}_{-1232} | 792^{+4615}_{-556} |
| Alt. | -24 ± 19 | $3.55^{+2.67}_{-2.22}$ | 947^{+18}_{-26} | 5014^{+4089}_{-1454} | 530^{+4597}_{-448} |

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 $A_{obs} \gg 1.0$

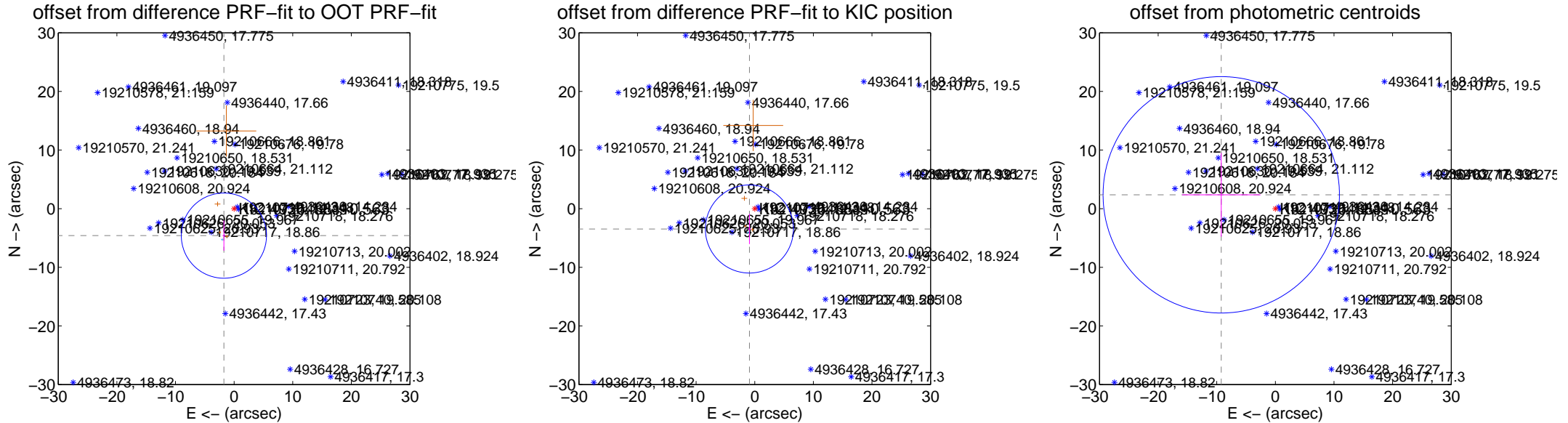
DV Centroid Data

Supplemental centroid analysis for 004936438-01. **Kepler magnitude: 10.56.** Transit SNR 6.83

There are 2 quarters with good PRF difference image offsets

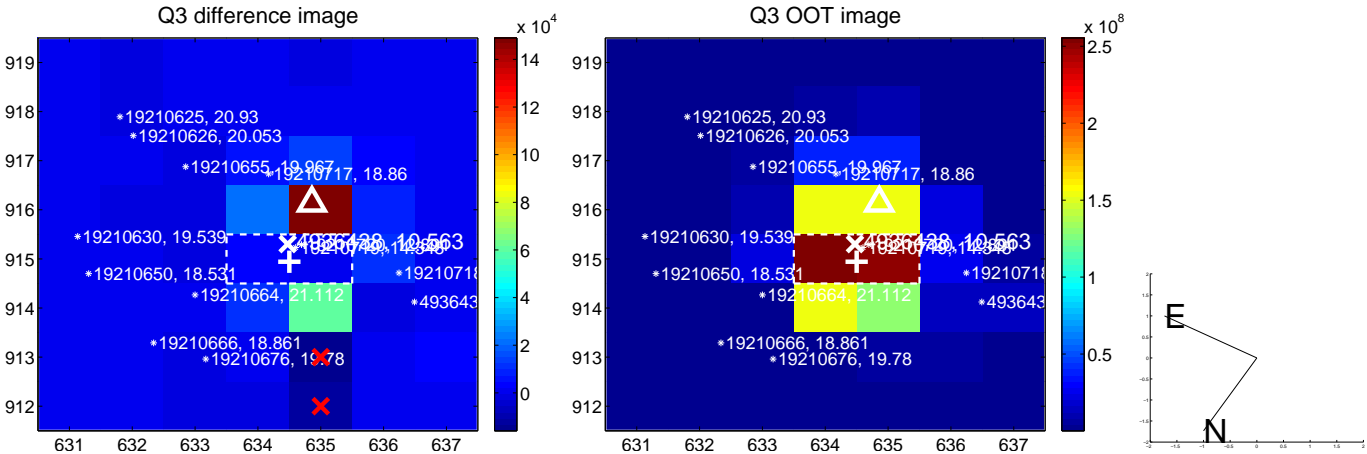
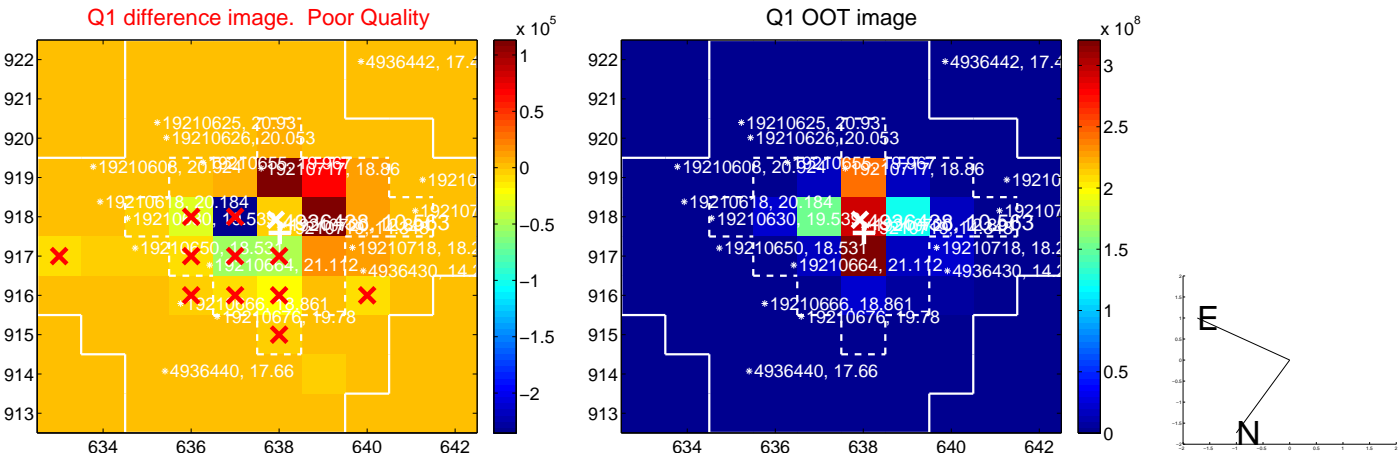
The direct PRF centroid is offset from the target star catalog position by about 1.35 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT | 4.917 ± 2.422 | 2.03 | 1.741 ± 0.247 | -4.598 ± 2.583 |
| PRF-fit source offset from KIC position | 3.583 ± 2.504 | 1.43 | 0.908 ± 0.255 | -3.466 ± 2.572 |
| photometric centroid source offset | 9.53 ± 6.72 | 1.42 | 9.23 ± 6.69 | 2.36 ± 7.12 |

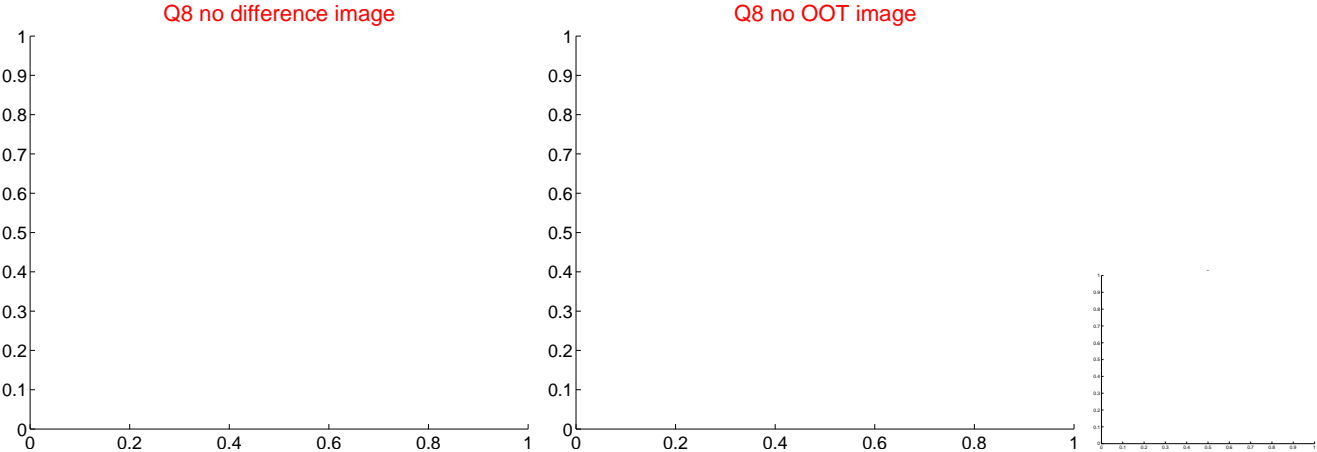
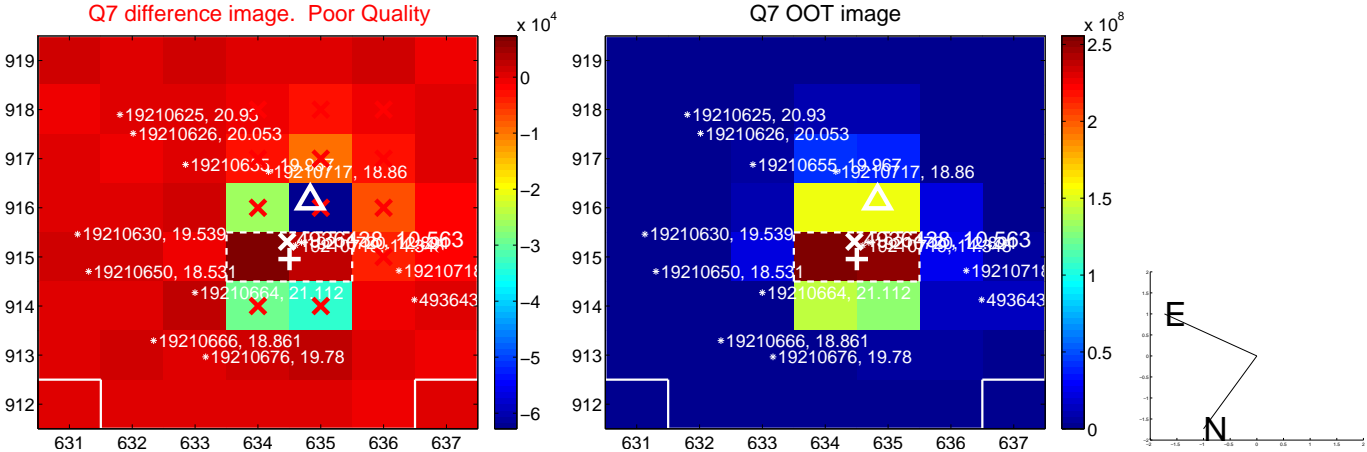
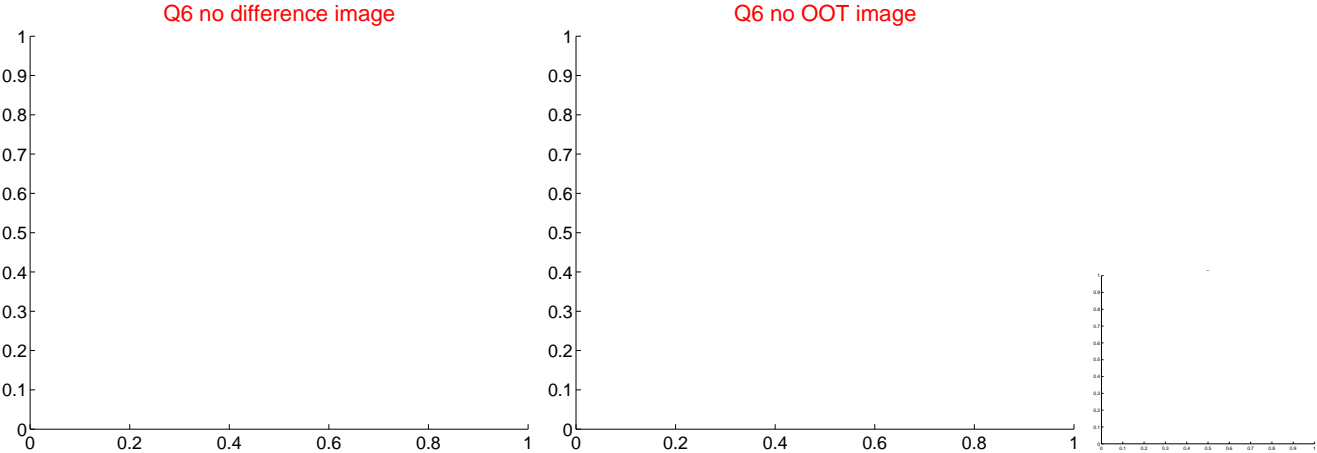
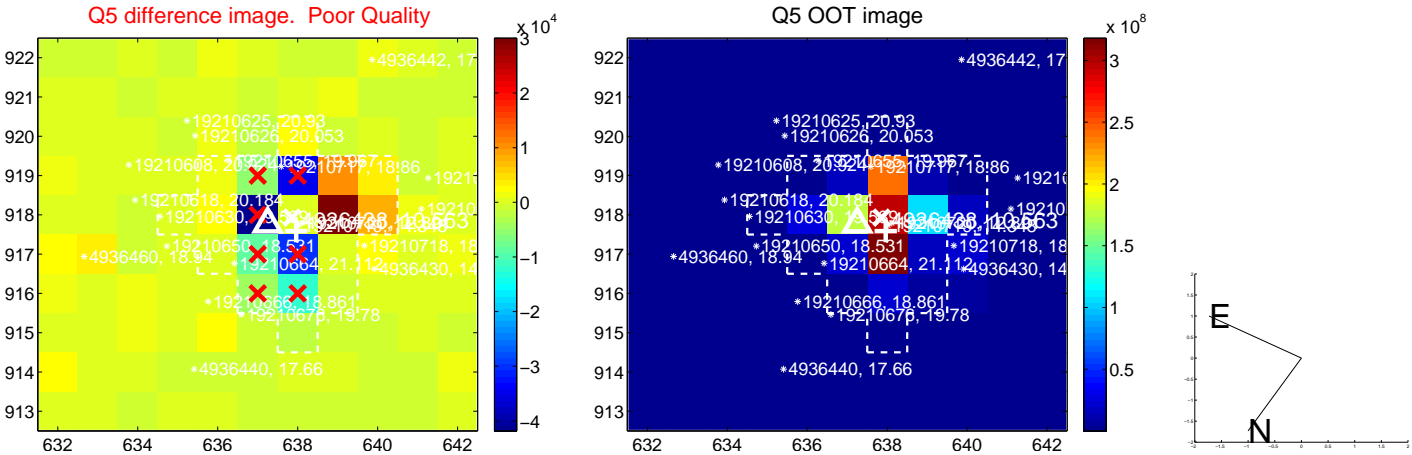


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

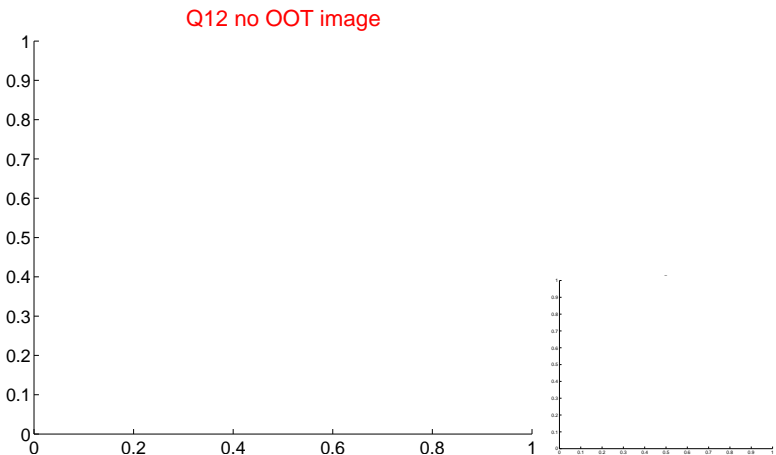
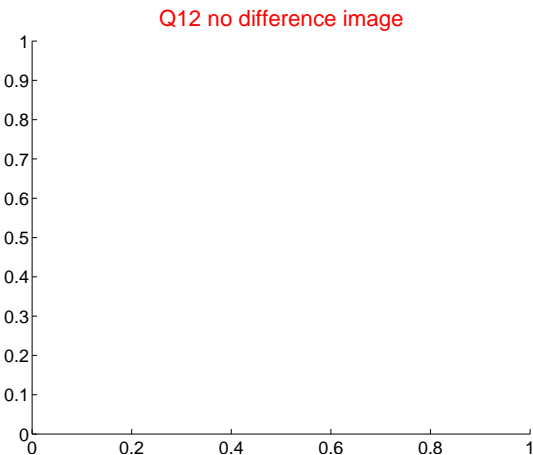
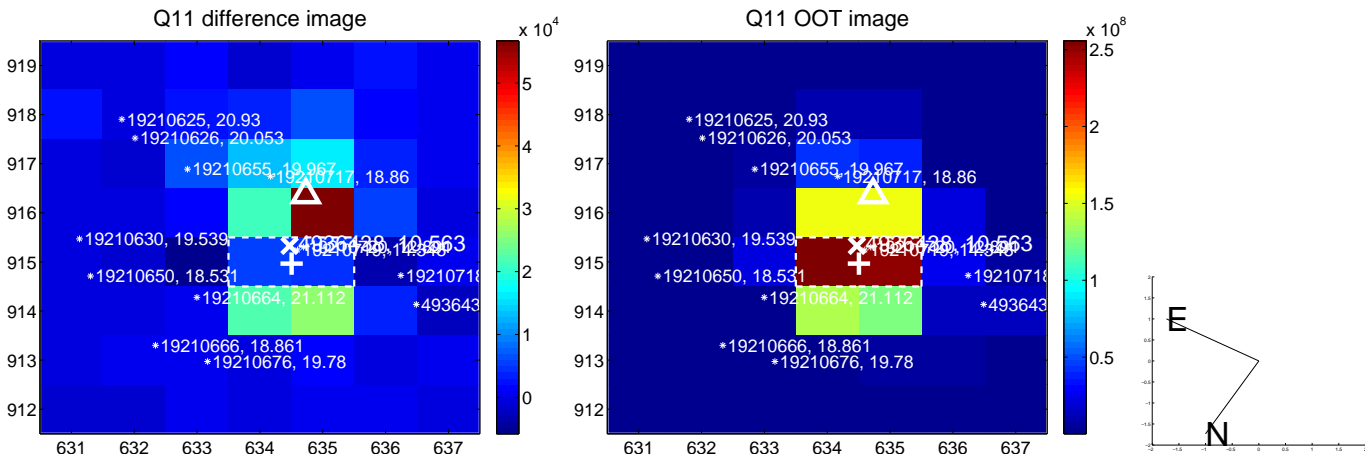
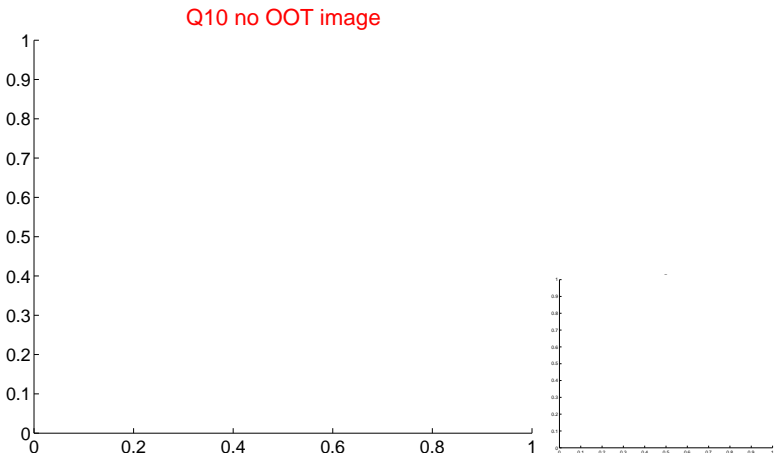
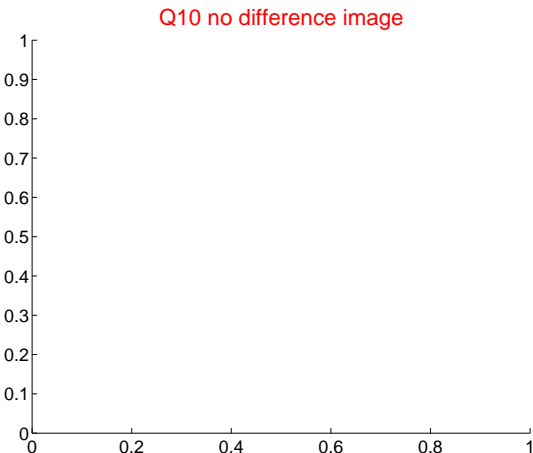
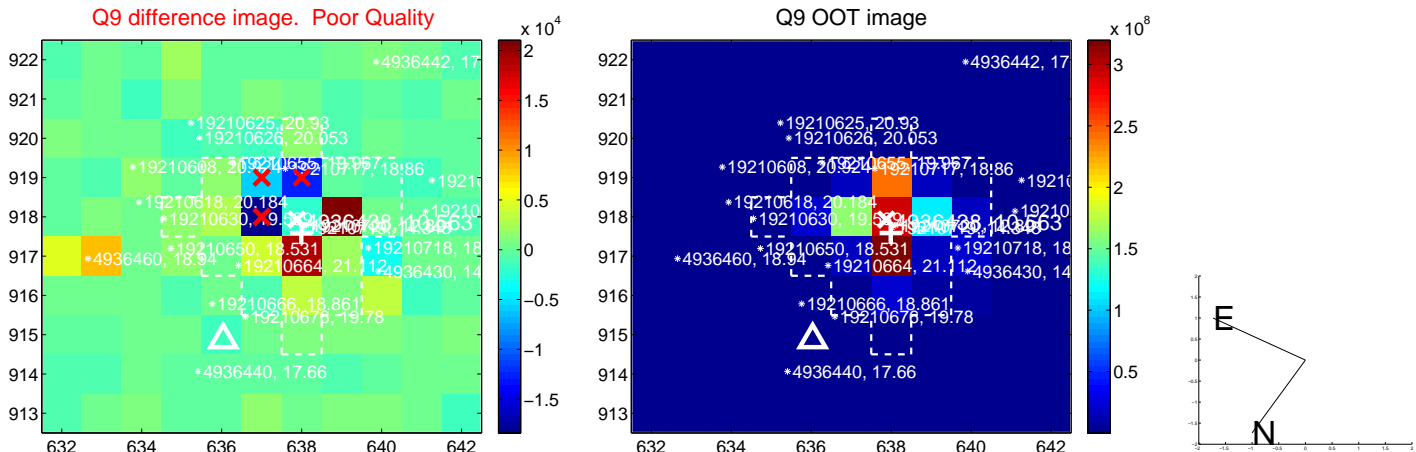
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



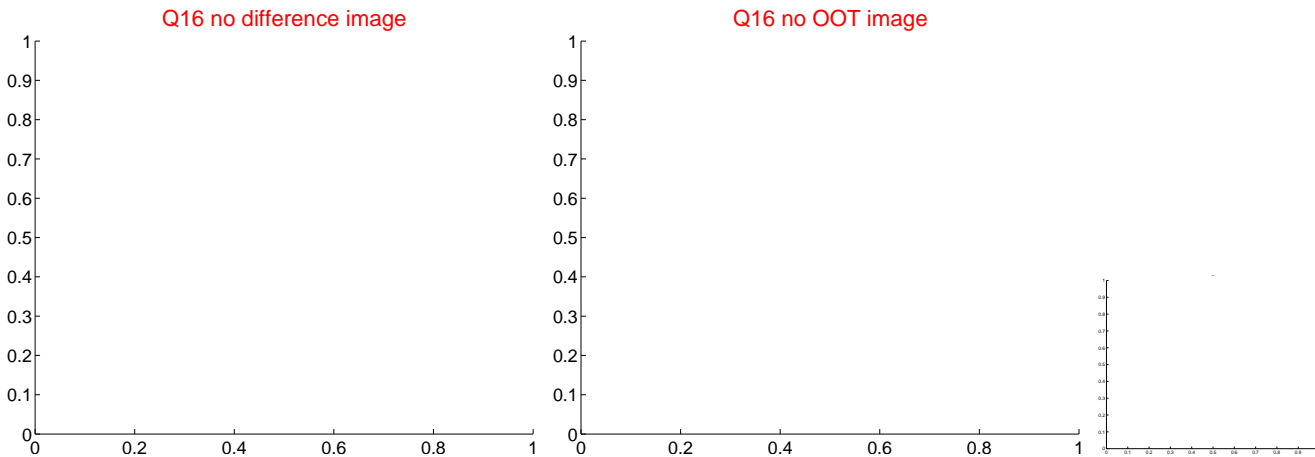
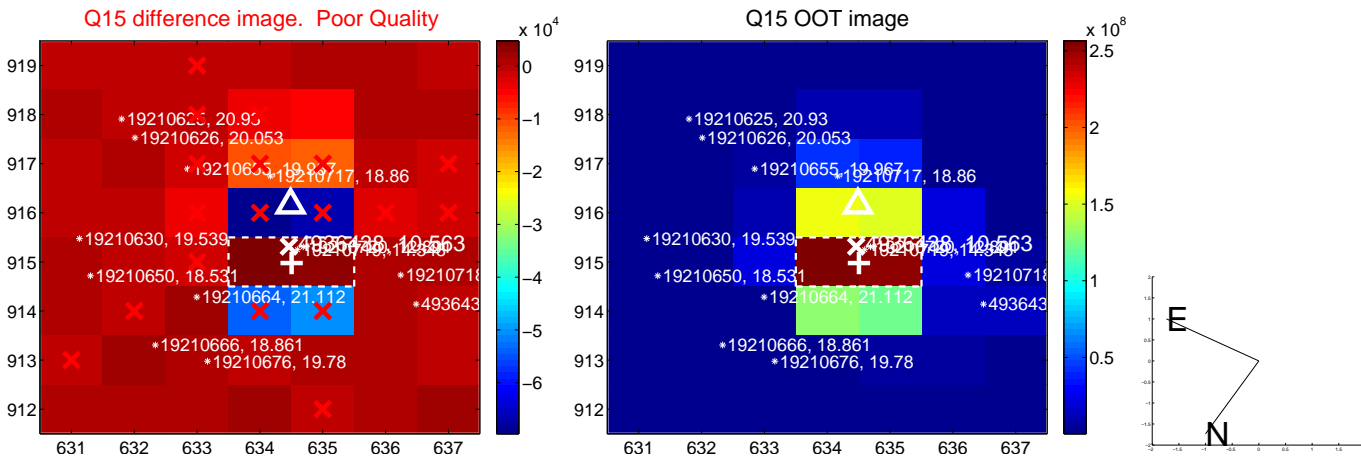
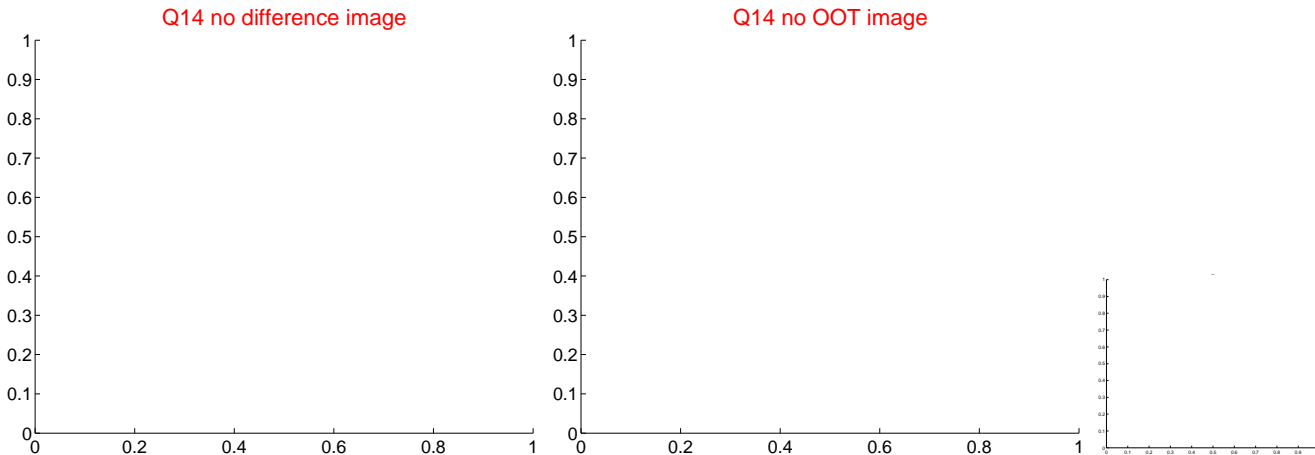
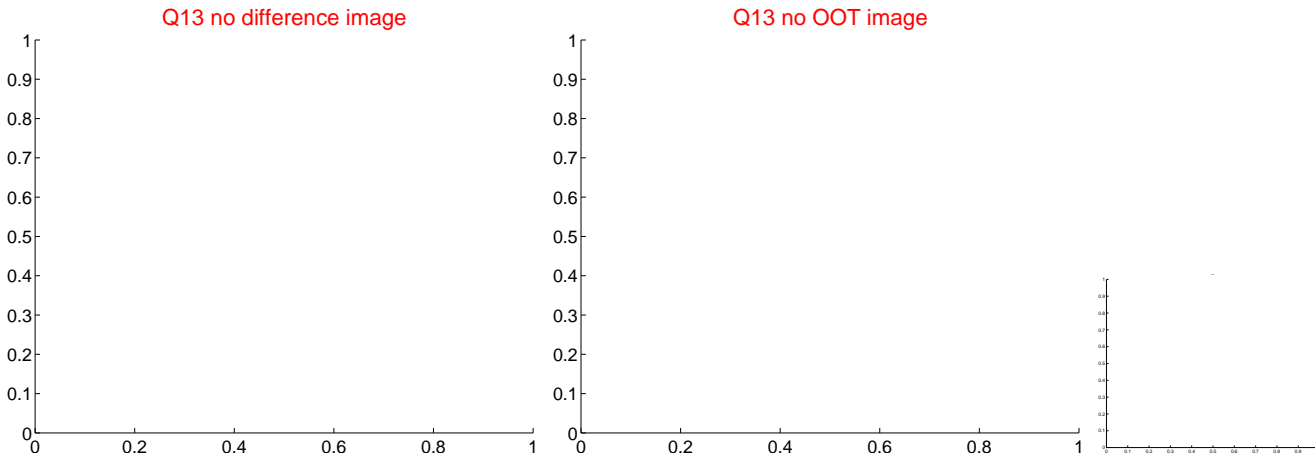
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



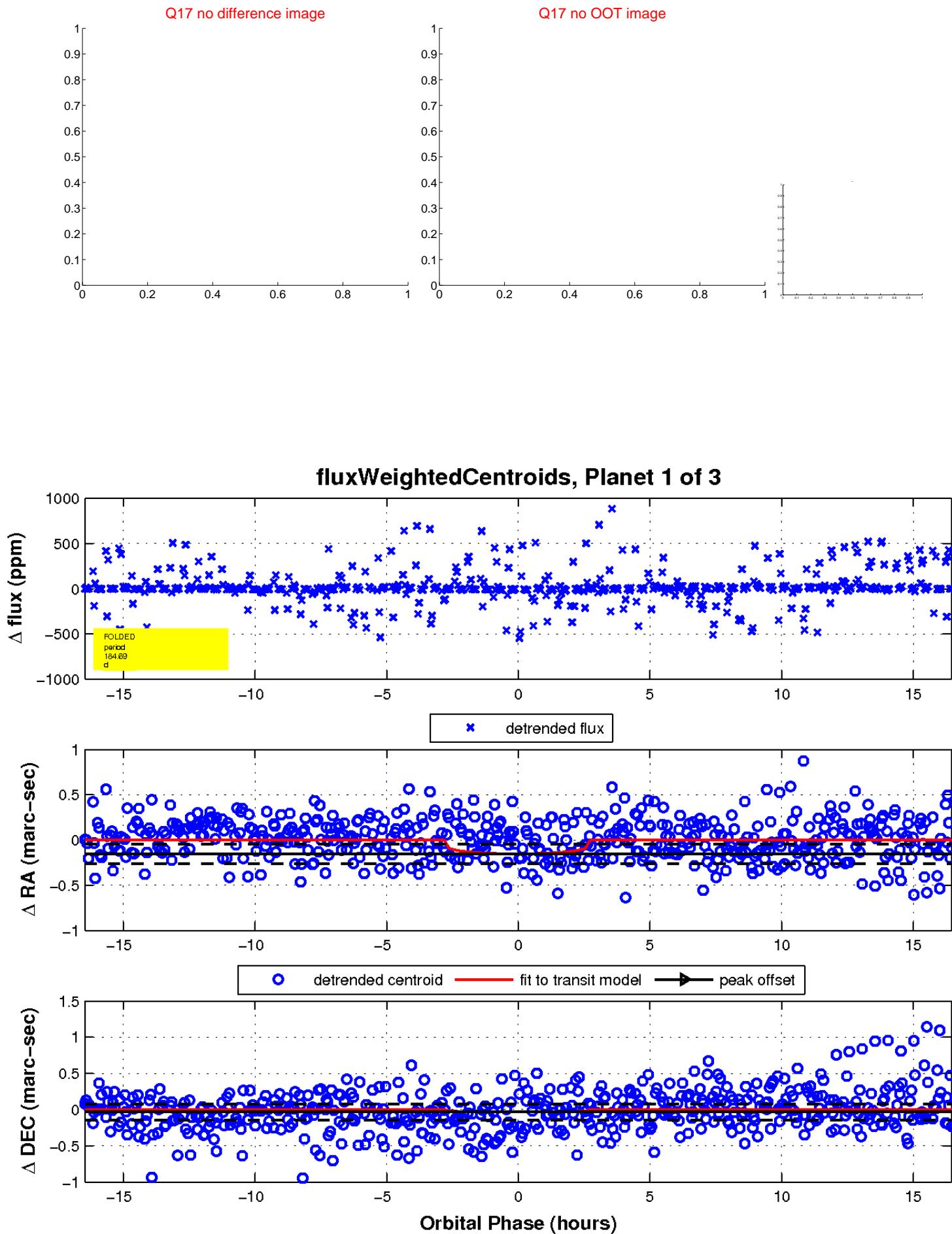
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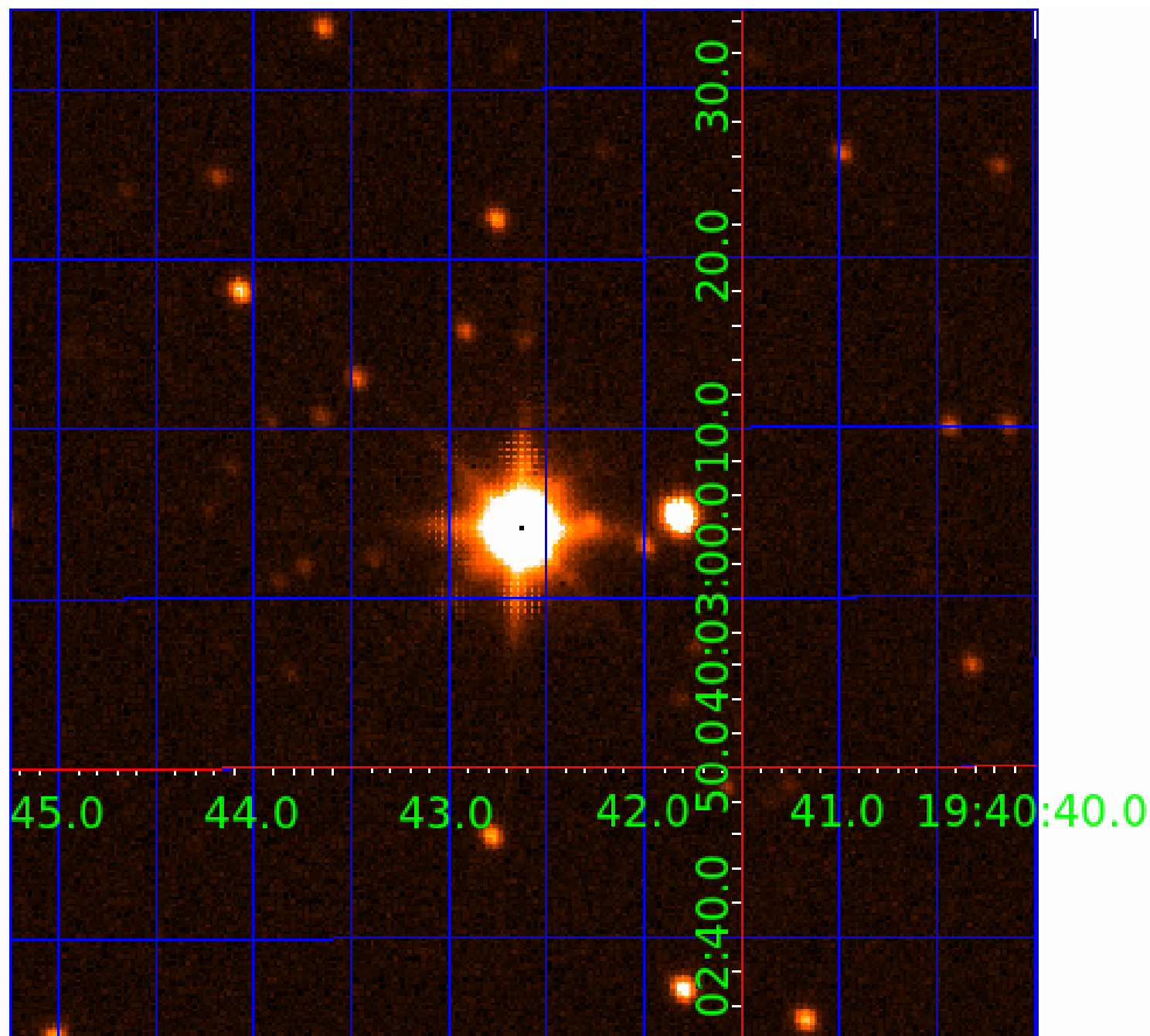


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 004936438

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 004936438-01 | OBS | No | 184.688201 | 161.445627 | 15.9 | 5.493 | 8.6 | 6.8 | 7.90 | 4953 | 3.78 | 50.22 |
| 004936438-02 | OBS | No | 116.629261 | 152.629813 | 23.5 | 5.541 | 9.1 | 8.4 | 7.90 | 4953 | 4.74 | 92.69 |
| 004936438-03 | OBS | No | 68.442608 | 162.668970 | 15.6 | 4.067 | 7.3 | 7.4 | 7.90 | 4953 | 3.81 | 188.66 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 004936438-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_MARSHALL_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED |
| 004936438-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED |
| 004936438-03 | OBS | FP | 0.00 | 1 | 0 | 1 | 0 | MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED—HALO_GHOST |

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

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

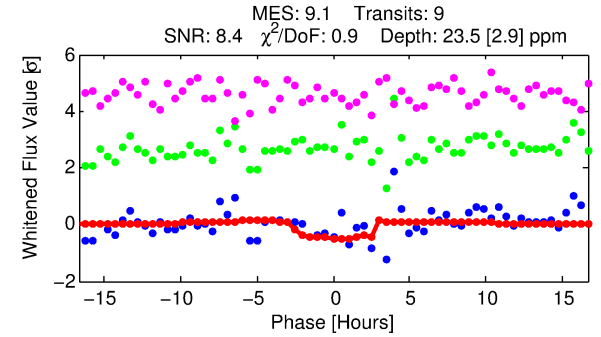
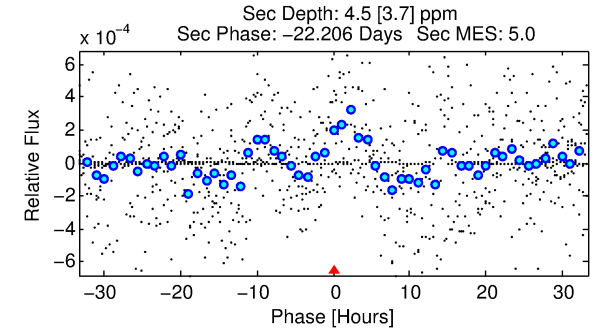
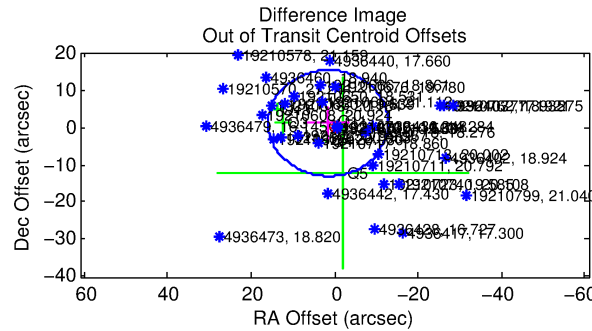
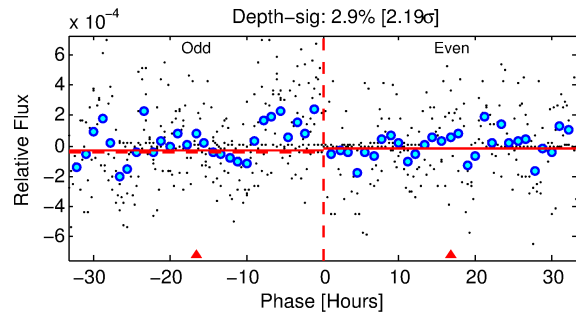
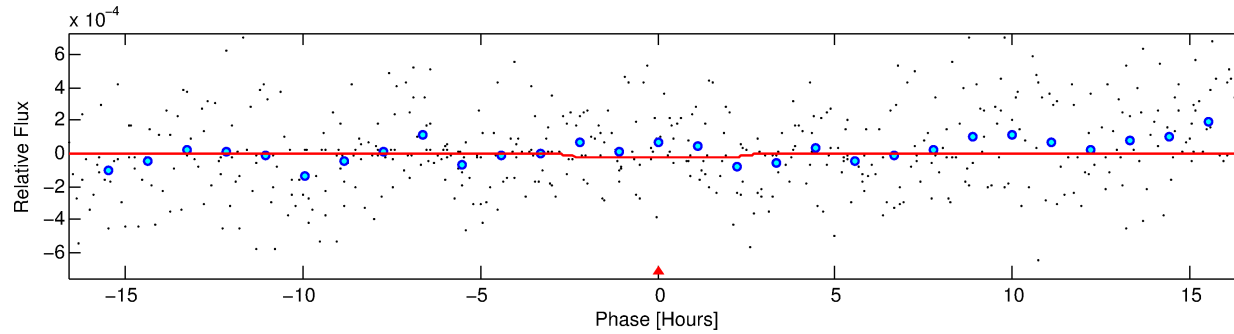
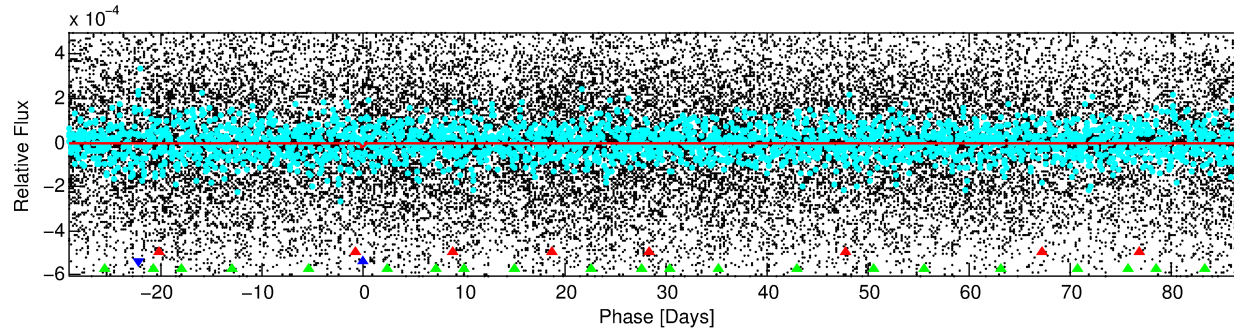
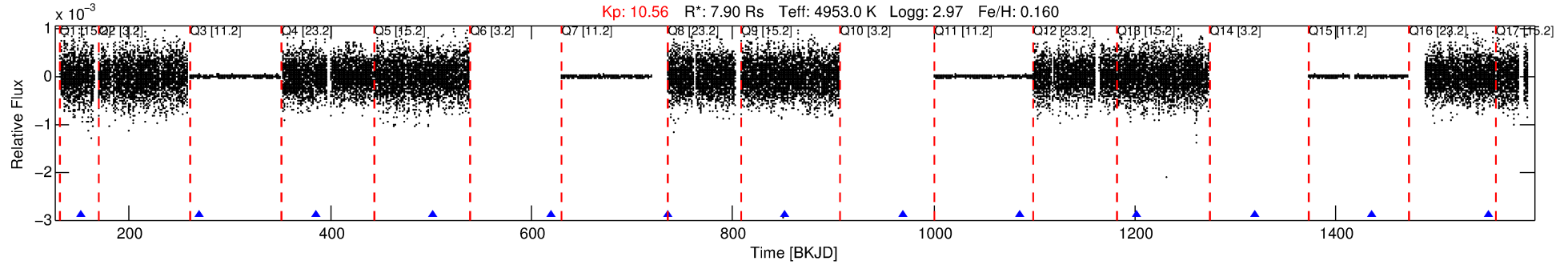
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004936438-02

No Significant Match Found

DV One-Page Summary

KIC: 4936438 Candidate: 2 of 3 Period: 116.629 d



DV Fit Results:

Period = 116.62926 [0.00209] d
Epoch = 152.6298 [0.0095] BKJD
Rp/R* = 0.0055 [0.0025]
a/R* = 68.35 [127.14]
b = 0.91 [0.35]
Seff = 92.69 [19.31]
Teq = 791 [41] K
Rp = 4.74 [2.49] Re
a = 0.6025 [0.1087] AU
Ag = 39.76 [49.61] [0.78 σ]
Teffp = 3072 [950] K [2.40 σ]

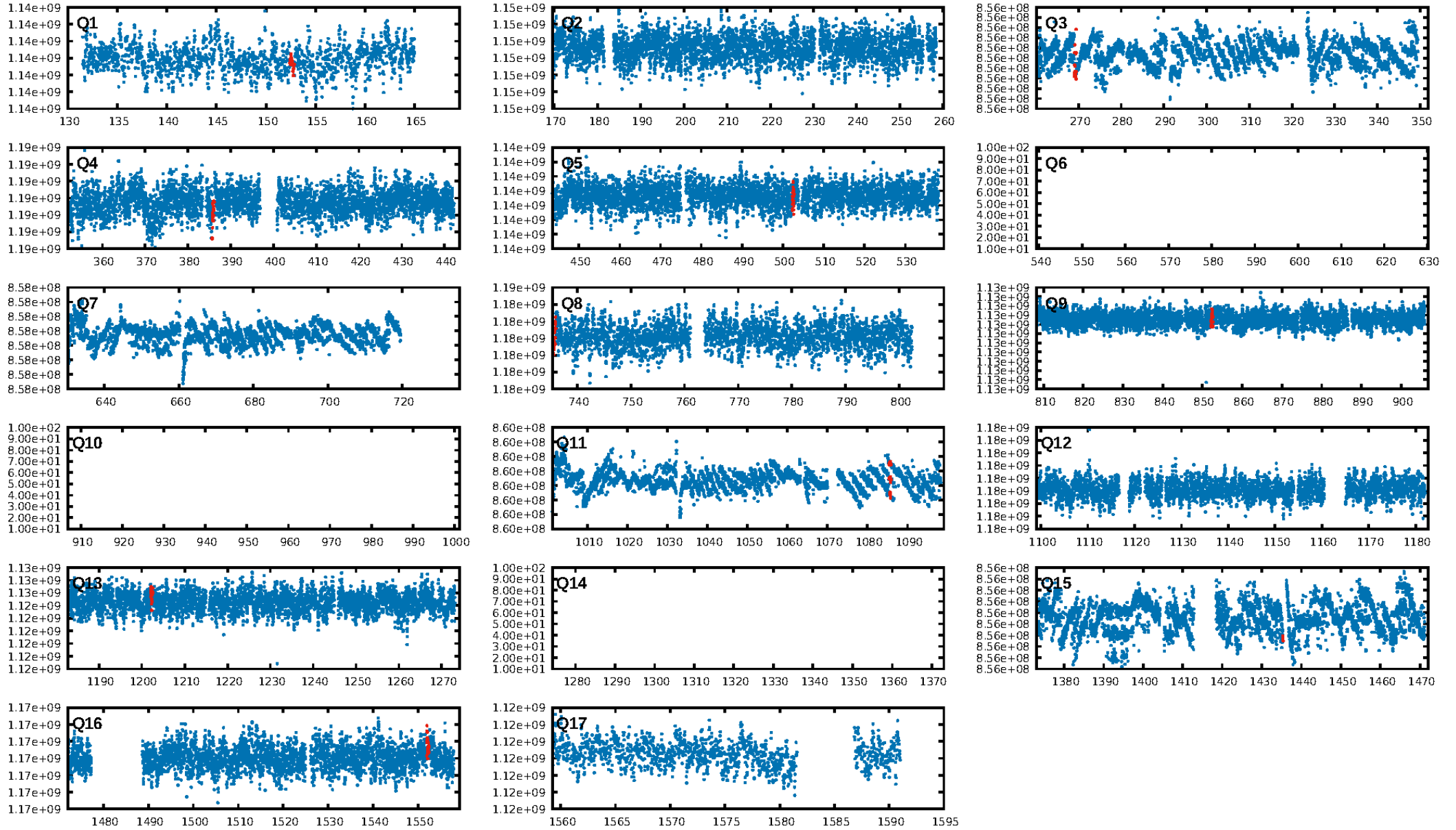
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [168.26 σ]
LongPeriod-sig: 100.0% [209.36 σ]
ModelChiSquare2-sig: 74.5%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 5.54e-11
RollingBand-fgt: 1.00 [8/8]
GhostDiagnostic-chr: 0.977
Centroid-sig: 95.0%
Centroid-so: 0.526 arcsec [0.09 σ]
OotOffset-rm: 1.994 arcsec [0.42 σ]
KicOffset-rm: 1.824 arcsec [0.39 σ]
OotOffset-st: 0/2/1/3 [6]
KicOffset-st: 0/2/1/3 [6]
DiffImageQuality-fgm: 0.17 [1/6]
DiffImageOverlap-fno: 1.00 [8/8]

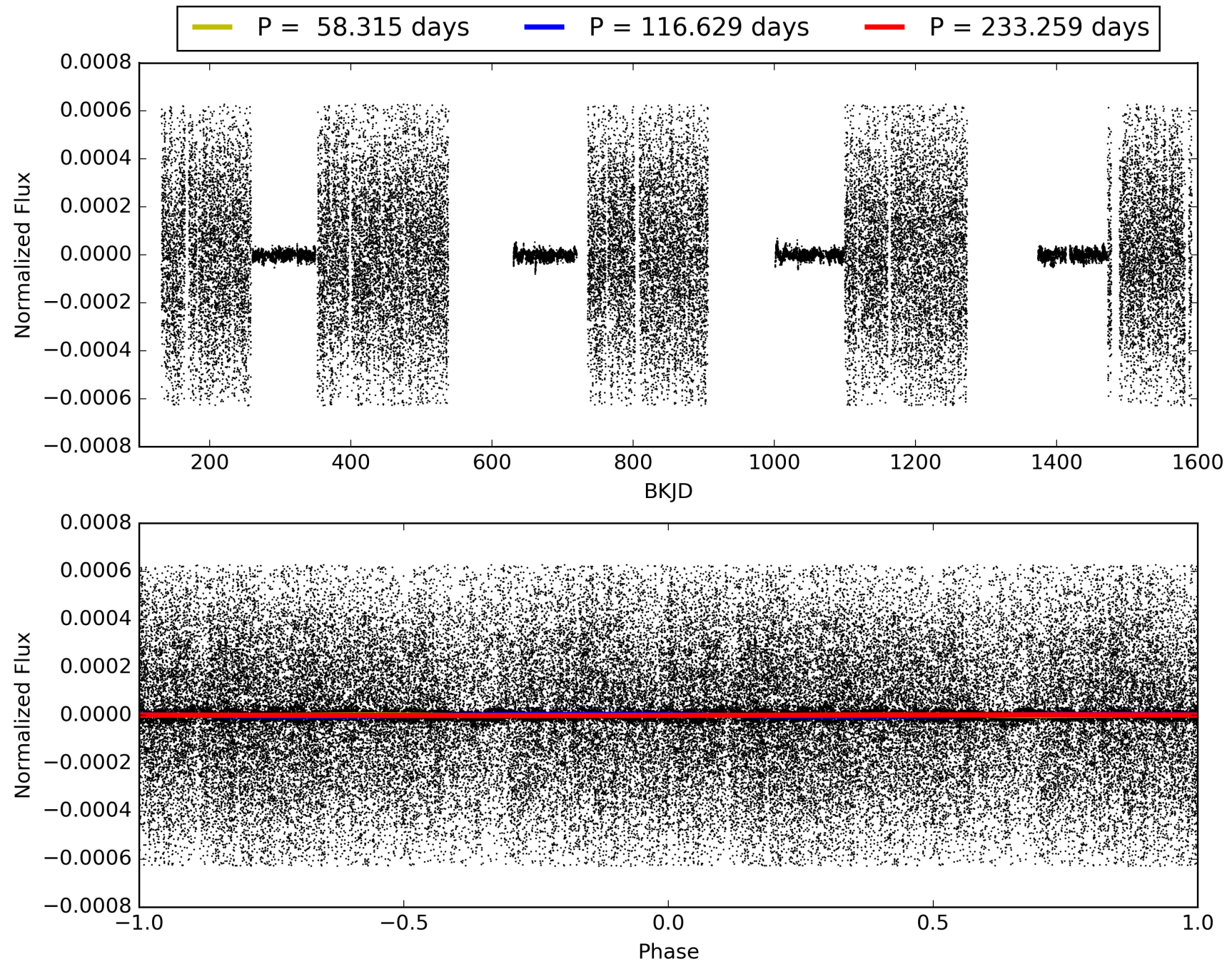
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 02:33:10 Z

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

TCE 004936438-02, PDC Light Curves

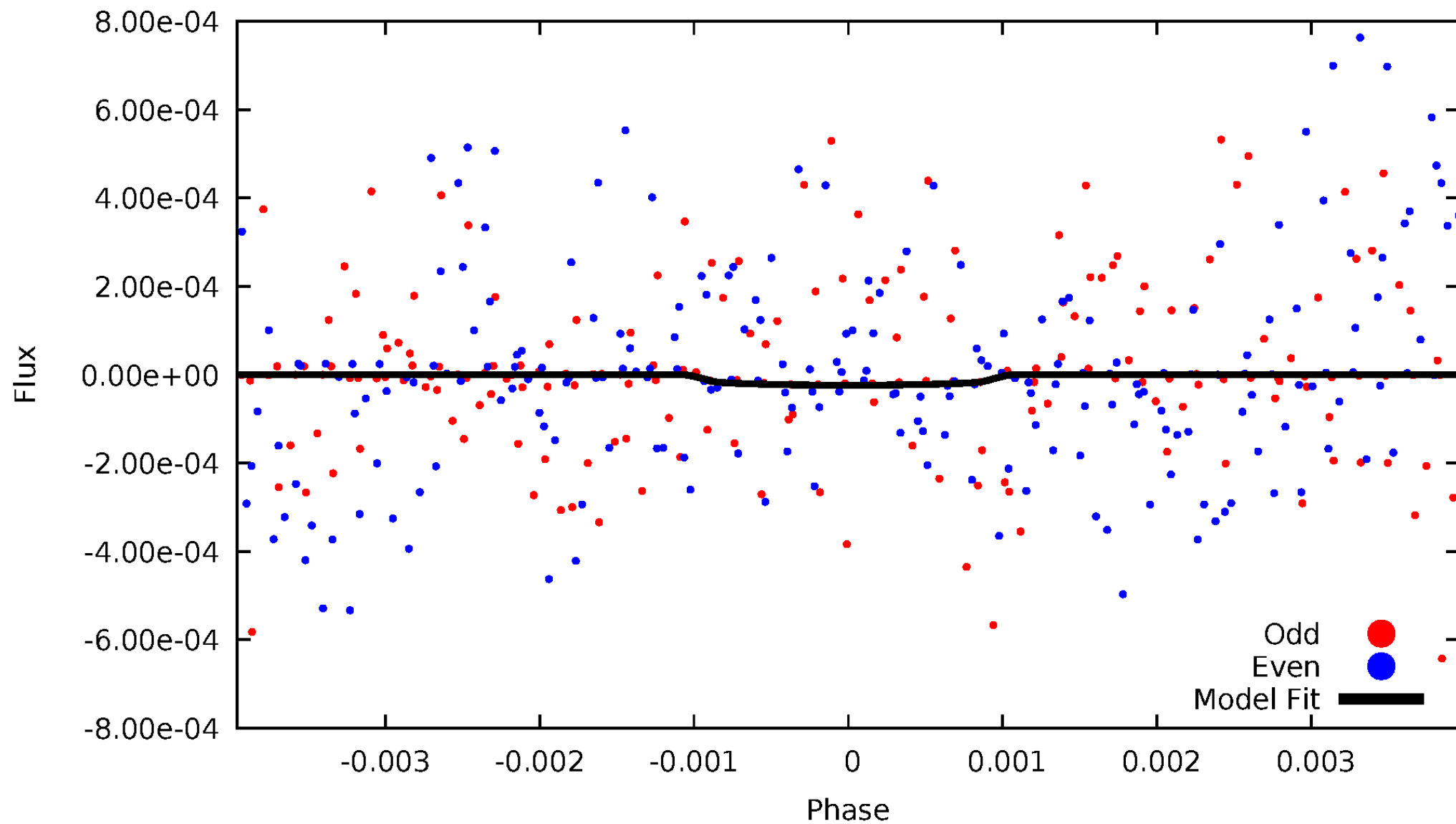


TCE 004936438-02



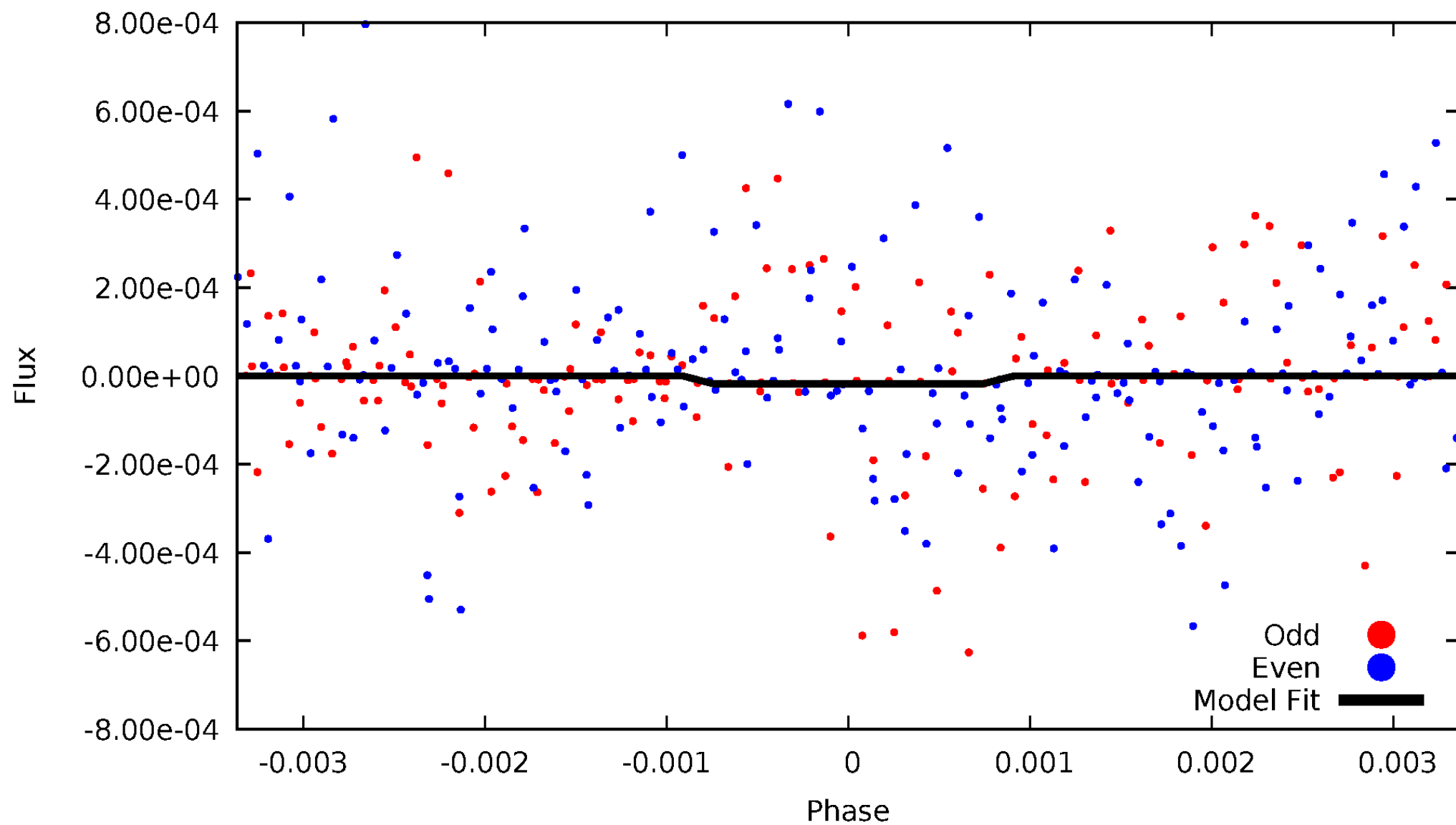
DV Odd/Even

TCE 004936438-02



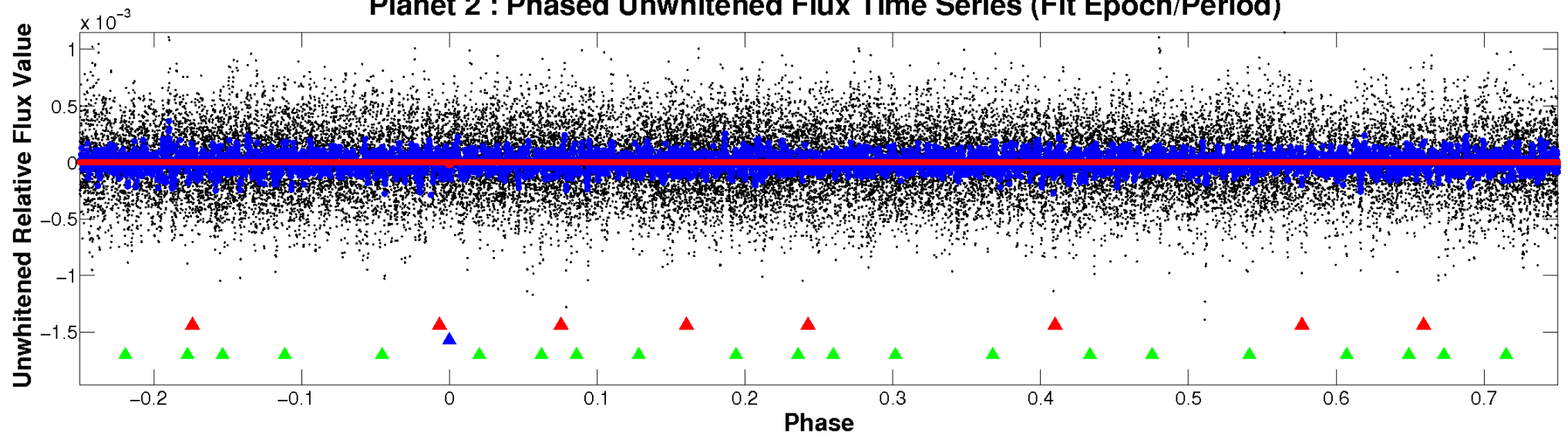
ALT Odd/Even

TCE 004936438-02

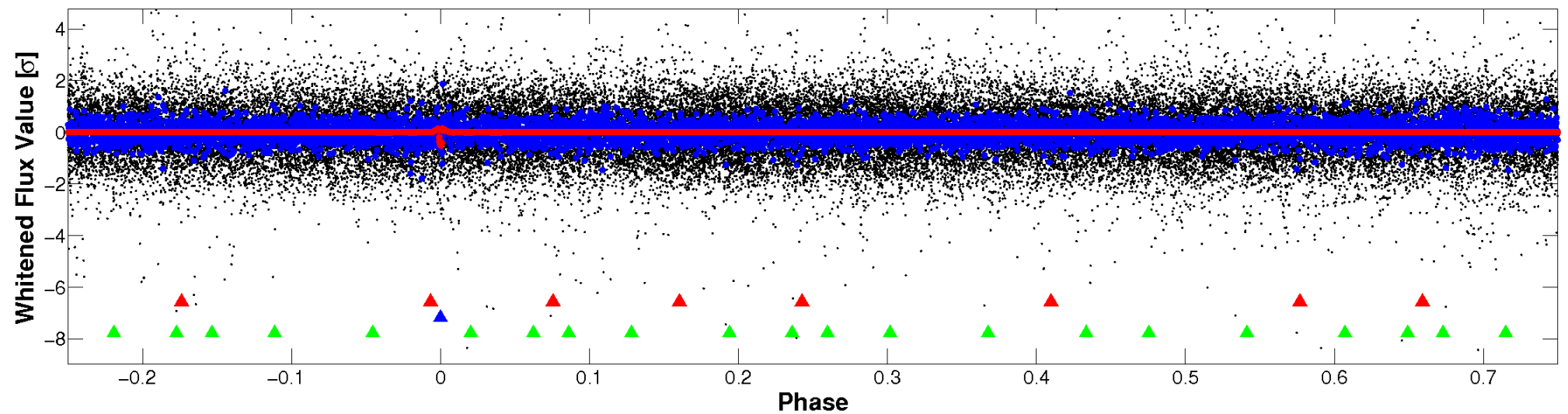


Non-Whitened Vs. Whitened Light Curve

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

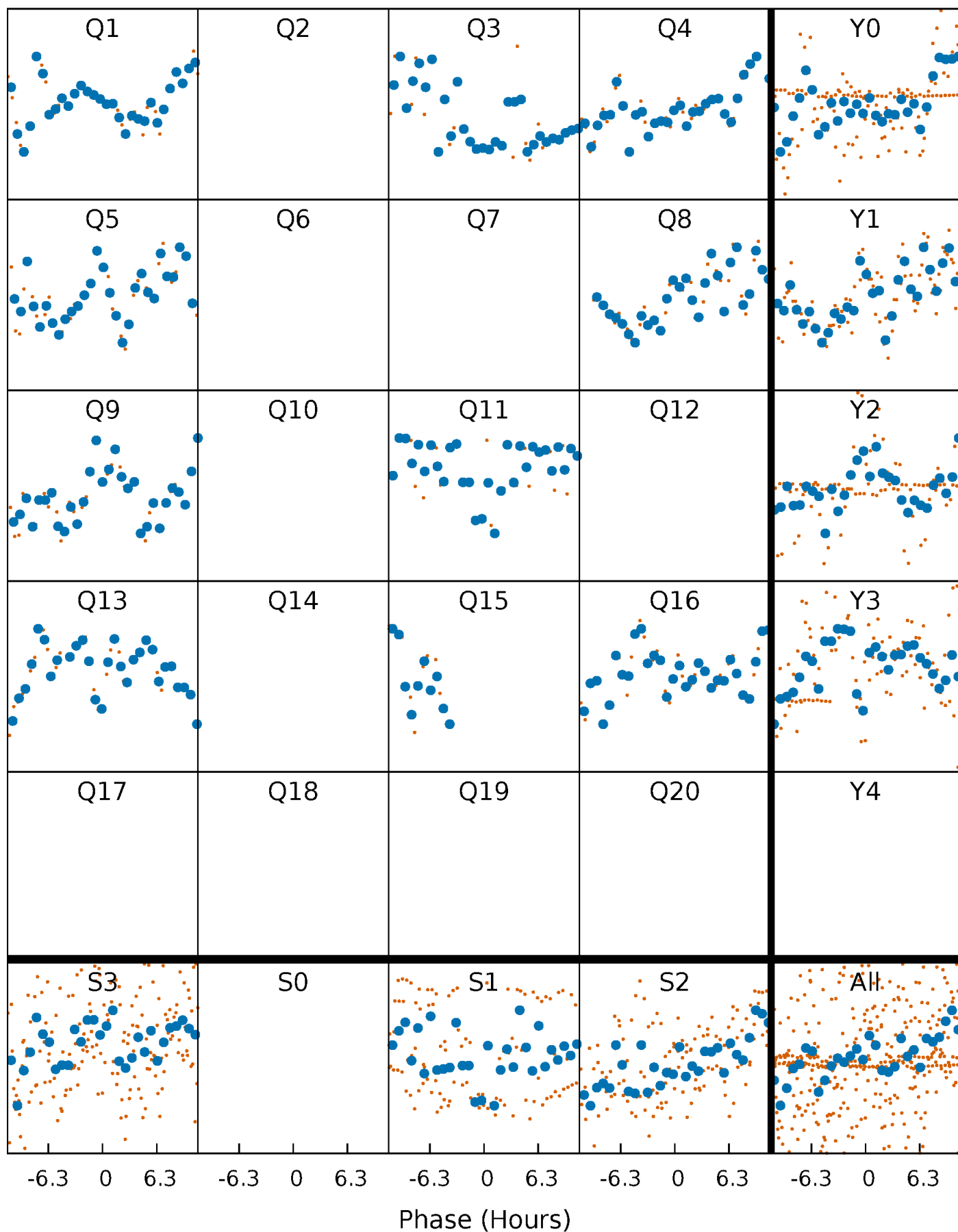


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



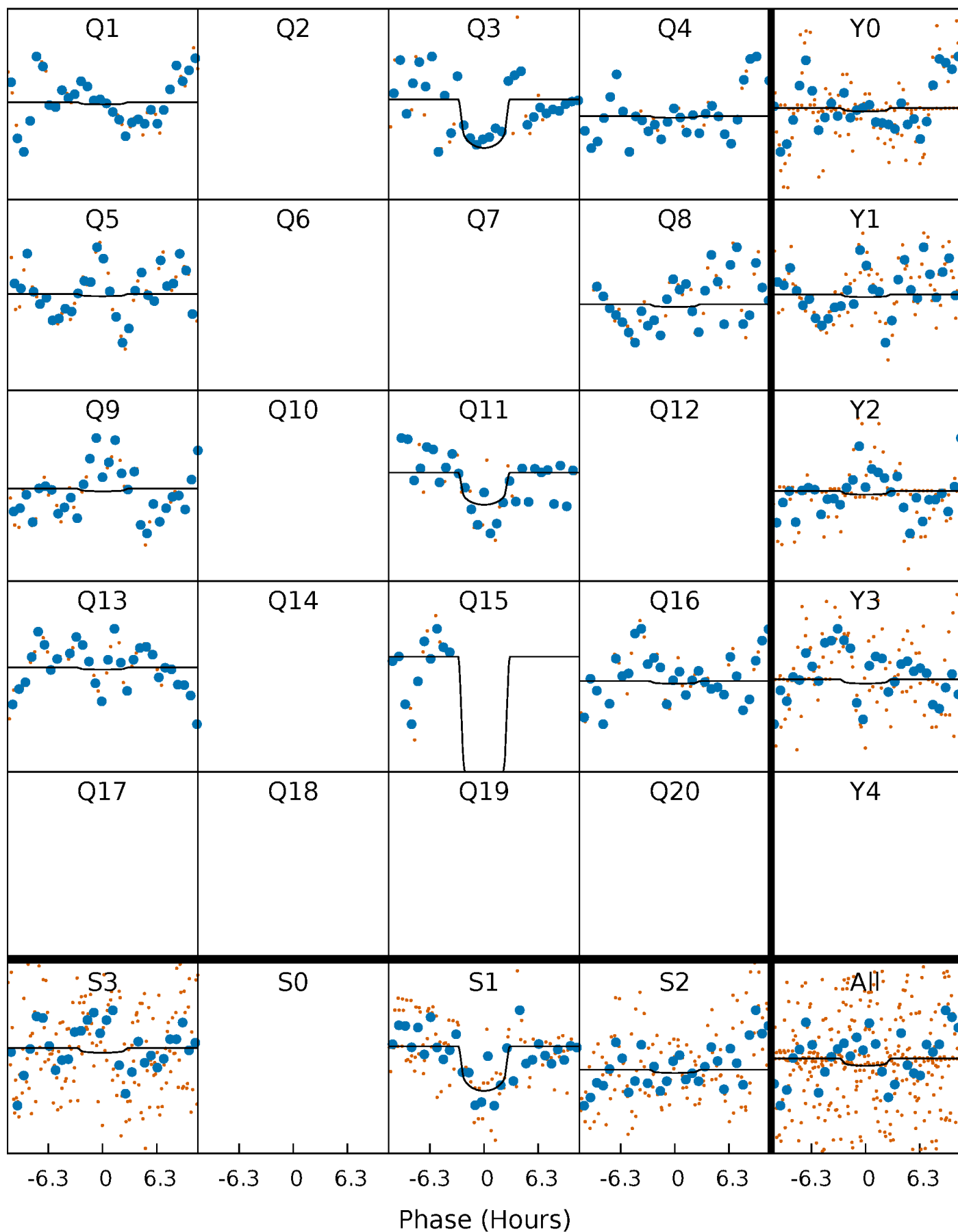
PDC Quarter-Phased Transit Curves

TCE 004936438-02 P=116.629261 Days $T_0=152.629813$ (BKJD)



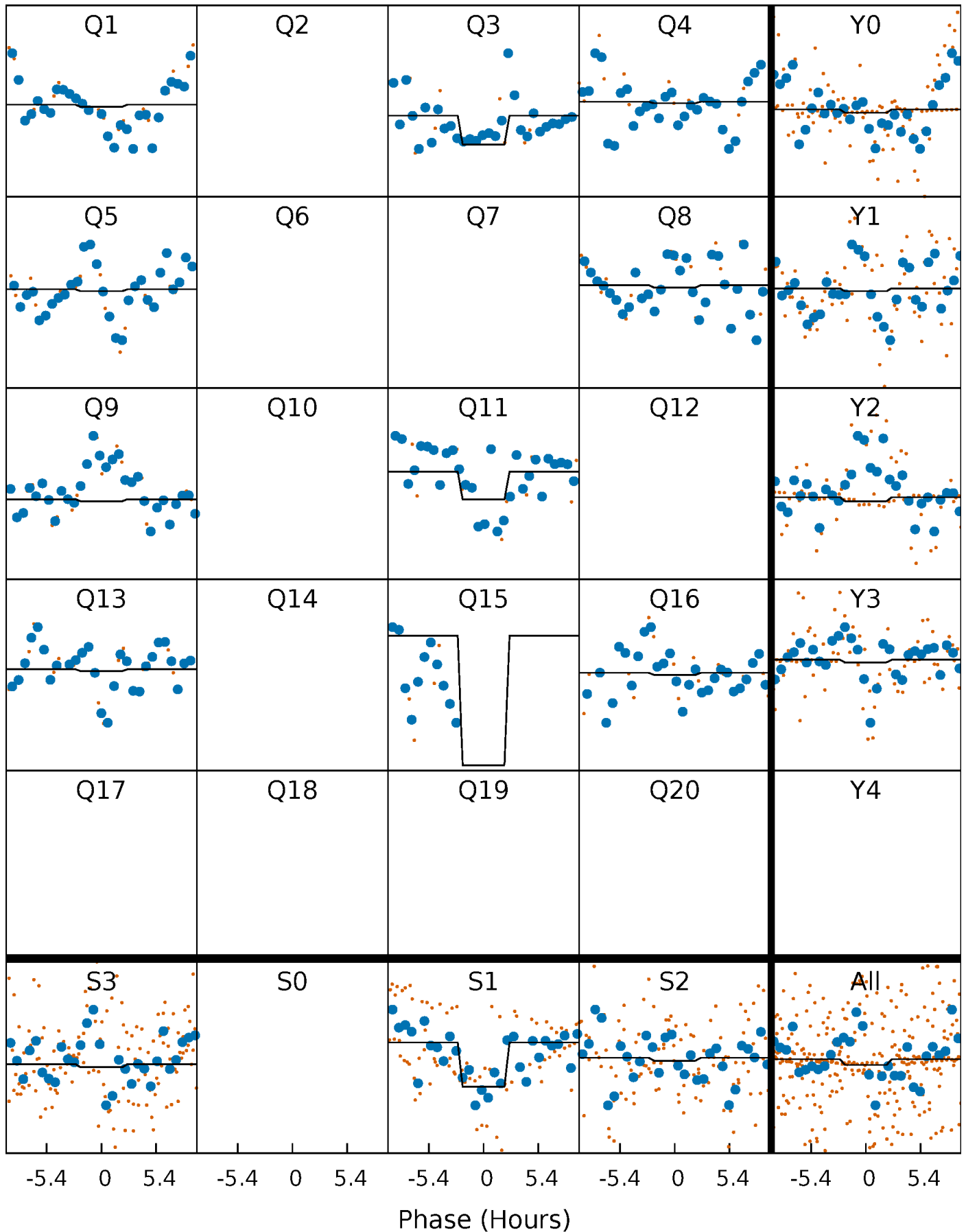
DV Quarter-Phased Transit Curves

TCE 004936438-02 P=116.629261 Days $T_0=152.629813$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

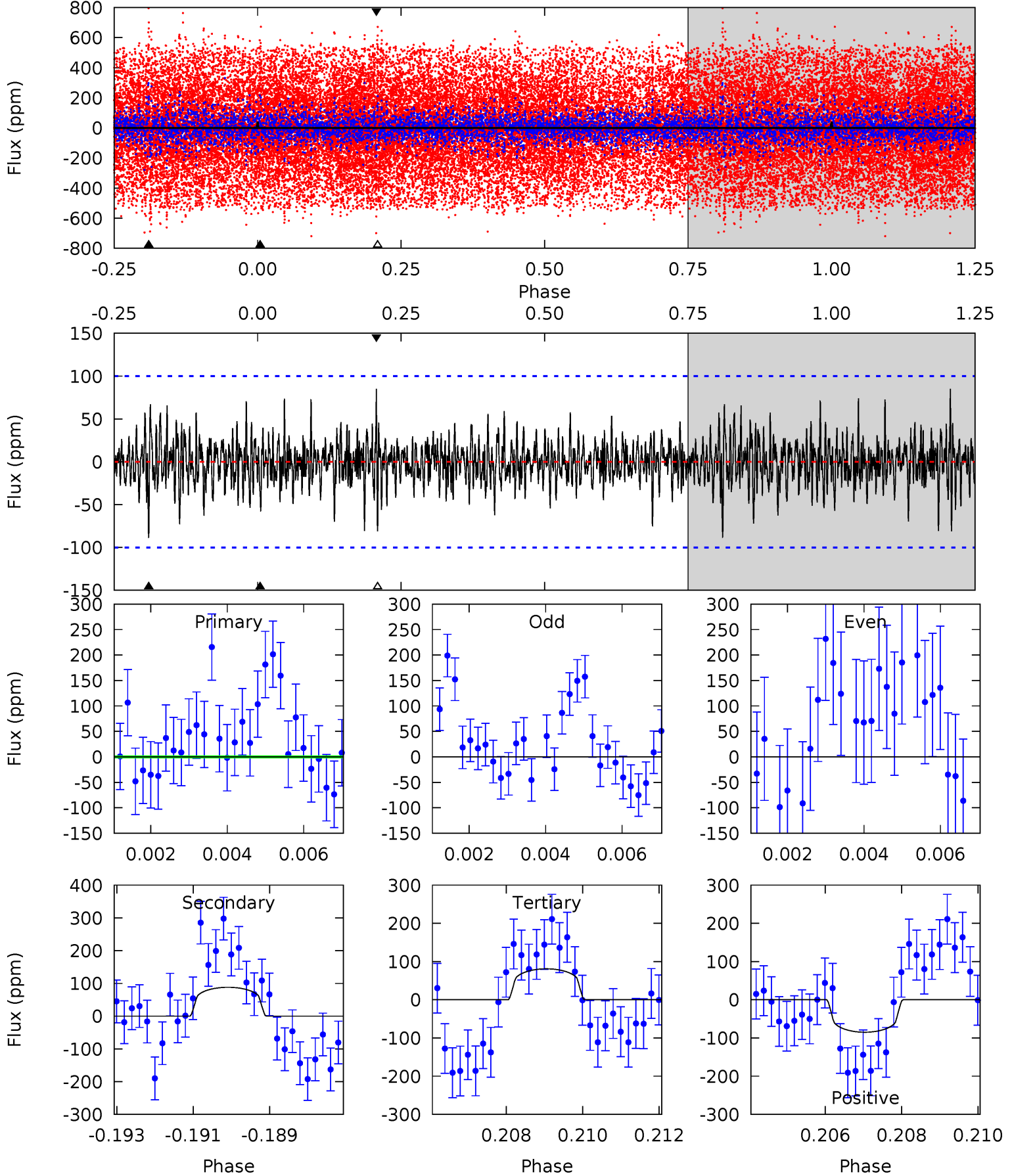
TCE 004936438-02 P=116.618781 Days $T_0=152.693656$ (BKJD)



DV Model-Shift Uniqueness Test

004936438-02, P = 116.629261 Days, E = 36.000552 Days

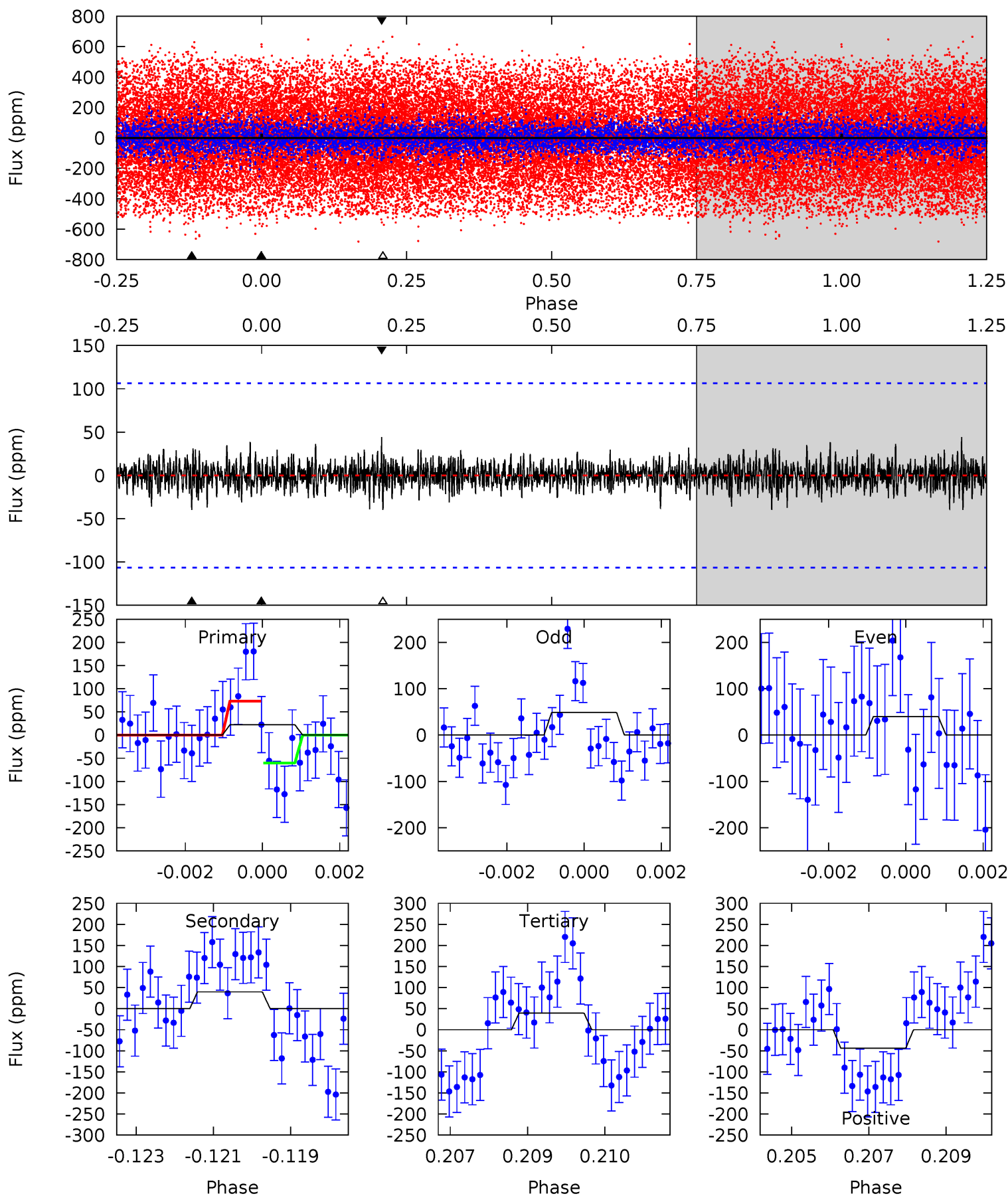
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 1.87 | 4.68 | 4.30 | 4.52 | 5.31 | 3.07 | 1.11 | -2.43 | -2.65 | 0.38 | 0.16 | 0.39 | 5.73 | 0.49 | 0.17 |



Alt Model-Shift Uniqueness Test

004936438-02, P = 116.618781 Days, E = 36.074875 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|-------|-------|------|
| 1.12 | 1.99 | 1.99 | 2.21 | 5.35 | 3.13 | 0.55 | -0.87 | -1.09 | 0.00 | -0.22 | 0.24 | -0.45 | 0.53 | 0.33 |



Stellar Parameters For KIC 004936438

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | $M(M_{\odot})$ | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|---------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 4953^{+58}_{-117} | $2.974^{+0.033}_{-0.027}$ | $0.160^{+0.100}_{-0.400}$ | $7.900^{+0.373}_{-2.116}$ | $2.143^{+0.052}_{-0.993}$ | $0.006^{+0.003}_{-0.000}$ |
| | +1%/-2% | +1%/-1% | +62%/-250% | +5%/-27% | +2%/-46% | +42%/-8% |
| Source | PHO56 | AST56 | PHO56 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 004936438-02 / KOI

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|--------------|------------------------|--------------------|------------------------|----------------------|
| DV | -88 ± 19 | $4.61^{+2.17}_{-1.99}$ | 1104^{+21}_{-30} | 6361^{+2585}_{-1123} | 823^{+1759}_{-459} |
| Alt. | -40 ± 20 | $3.61^{+2.24}_{-1.83}$ | 1106^{+20}_{-29} | 5777^{+3190}_{-1283} | 528^{+2110}_{-358} |

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

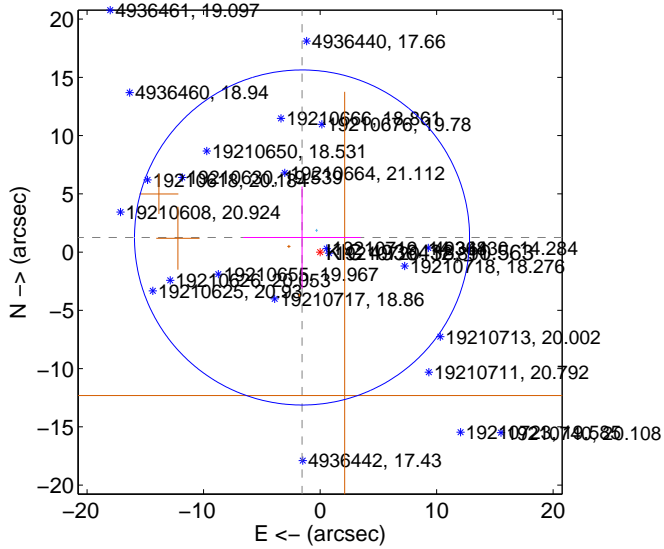
Supplemental centroid analysis for 004936438-02. **Kepler magnitude: 10.56.** Transit SNR 8.44

There are 1 quarters with good PRF difference image offsets

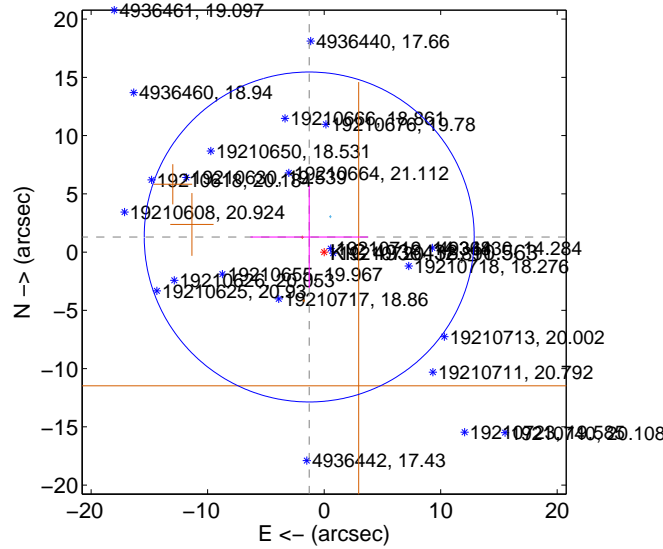
The direct PRF centroid is offset from the target star catalog position by about 1.18 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|-------------------|
| PRF-fit source offset from OOT | 1.994 ± 4.793 | 0.42 | 1.550 ± 5.046 | 1.254 ± 4.378 |
| PRF-fit source offset from KIC position | 1.824 ± 4.720 | 0.39 | 1.282 ± 5.046 | 1.297 ± 4.378 |
| photometric centroid source offset | 0.53 ± 5.59 | 0.09 | 0.10 ± 5.19 | -0.52 ± 5.61 |

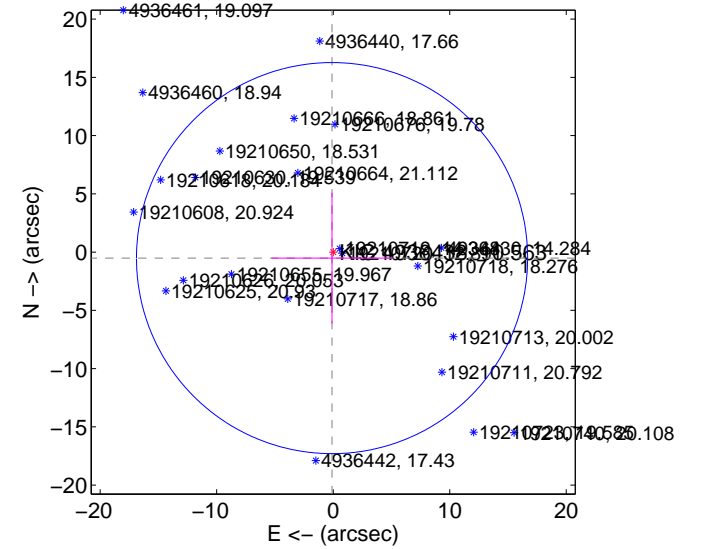
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

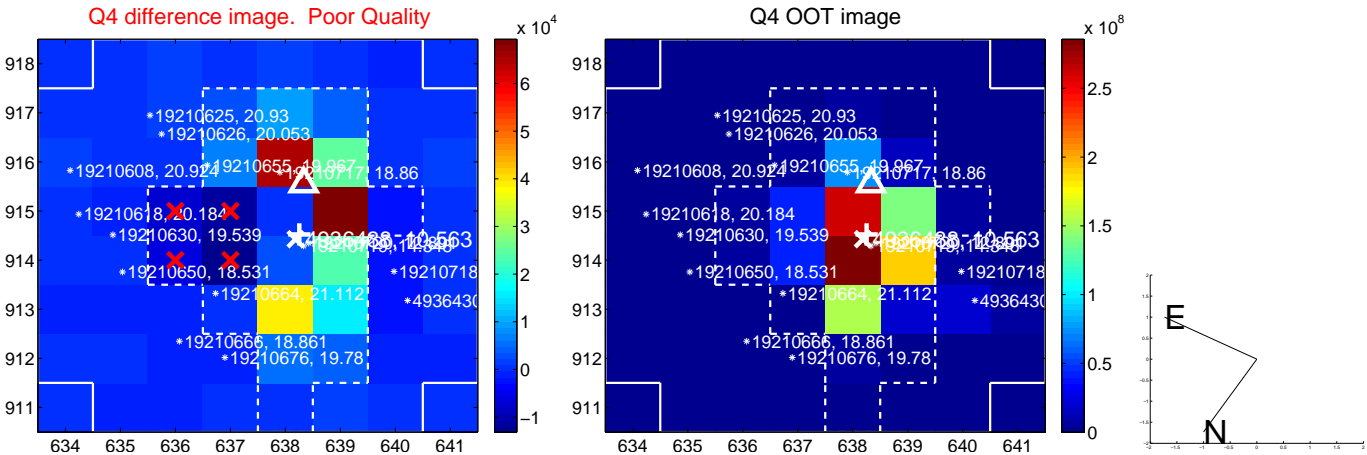
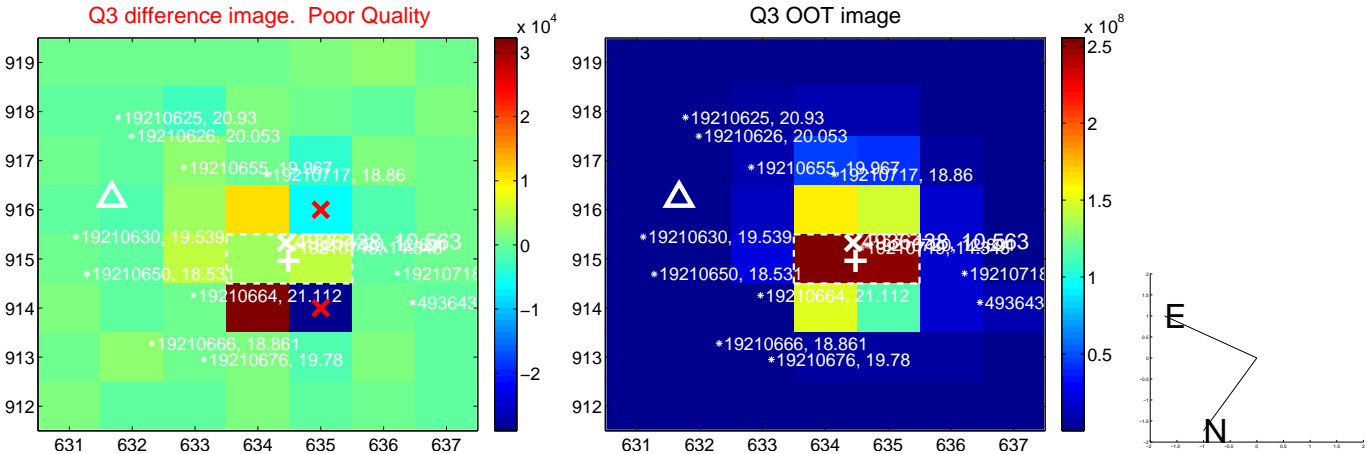
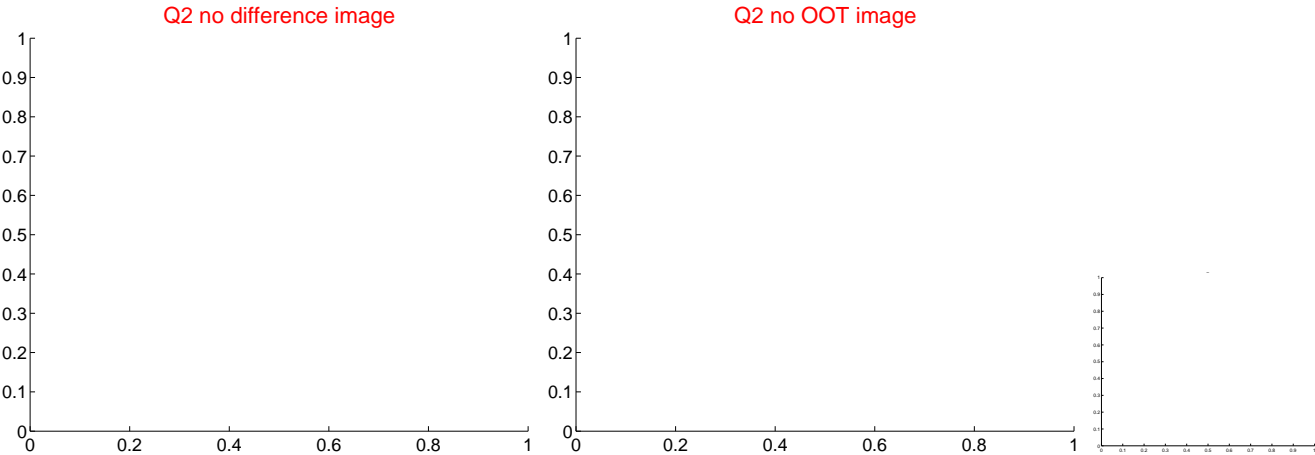
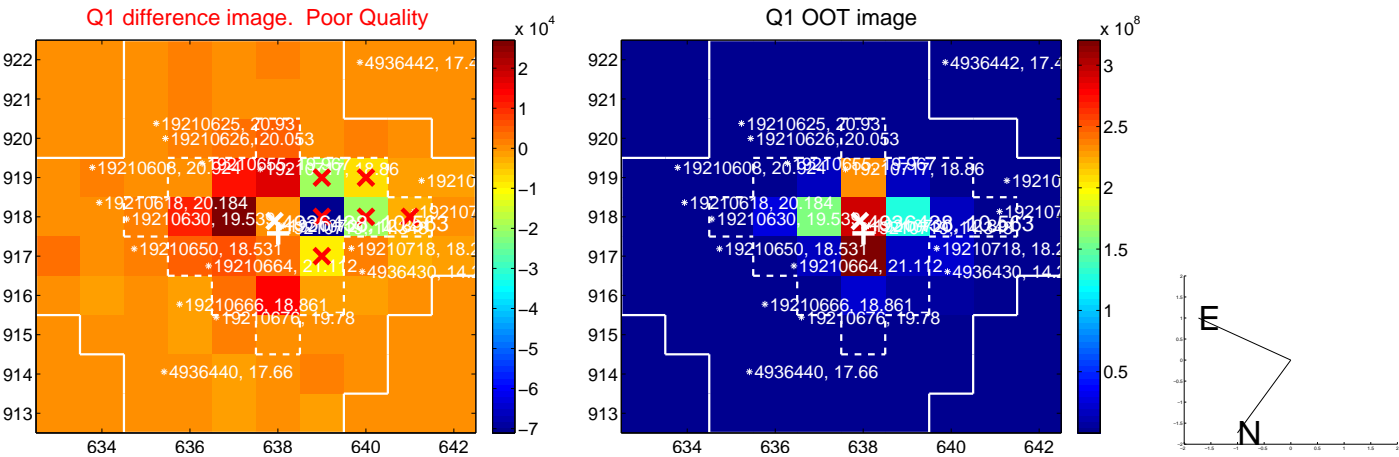


offset from photometric centroids

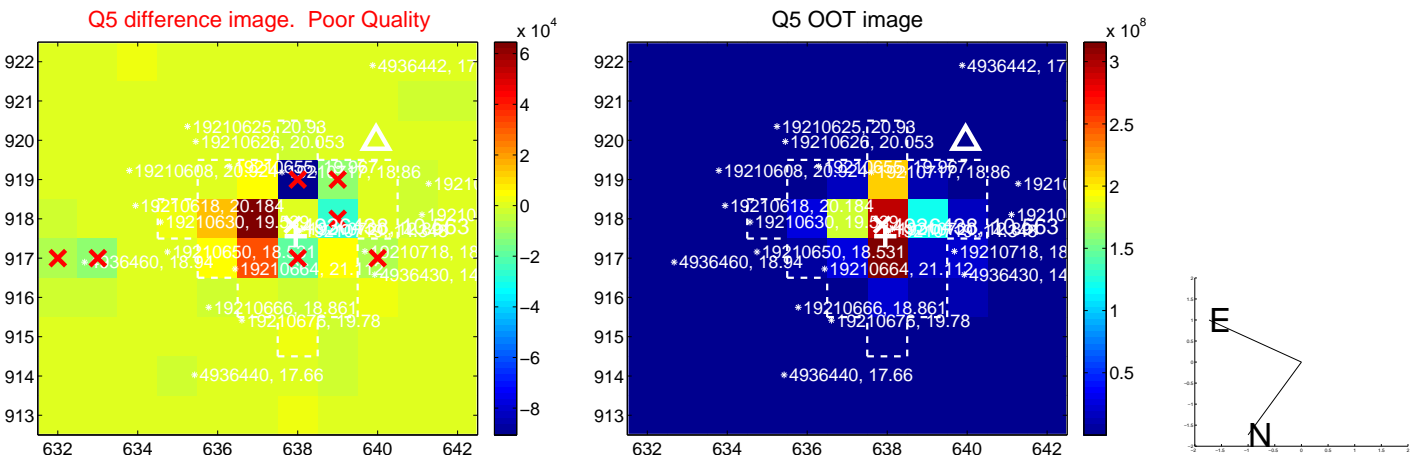


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

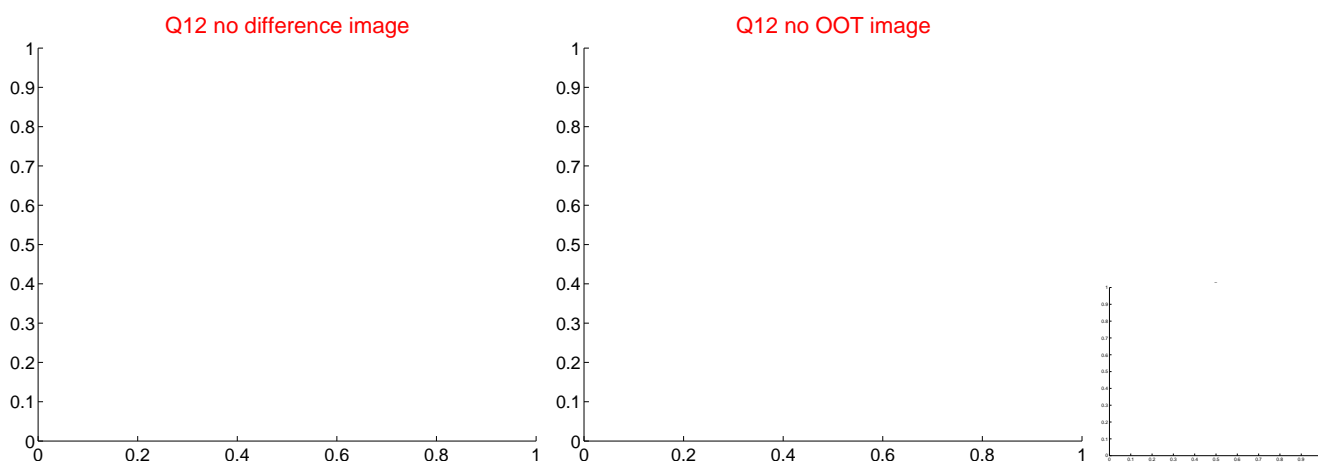
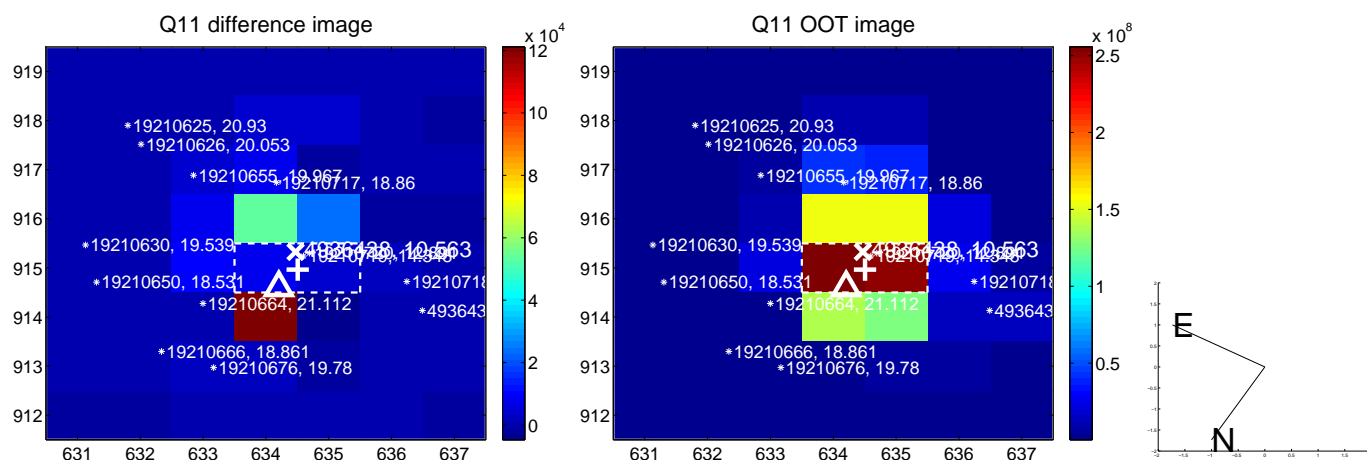
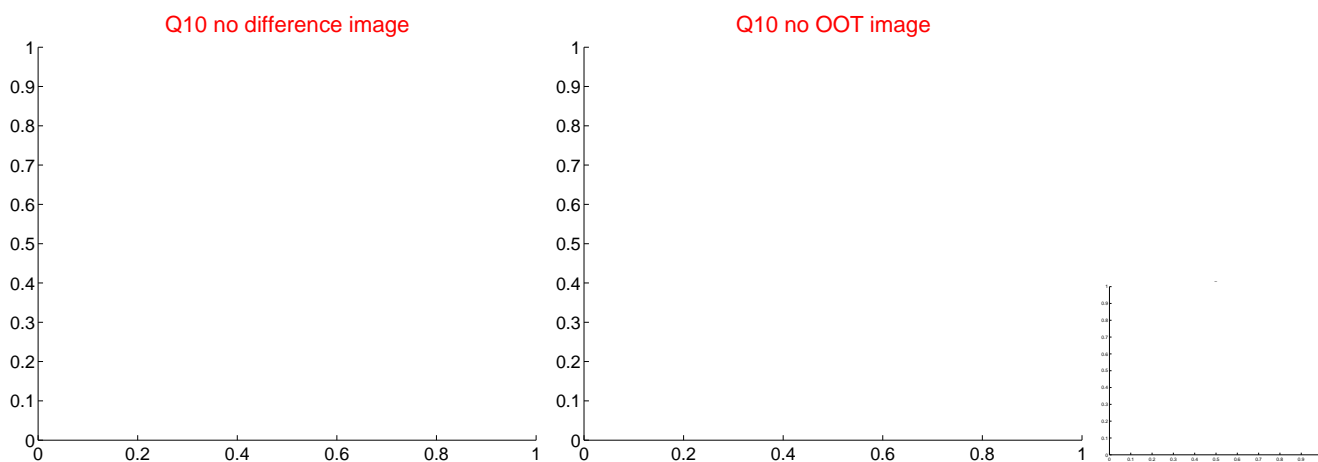
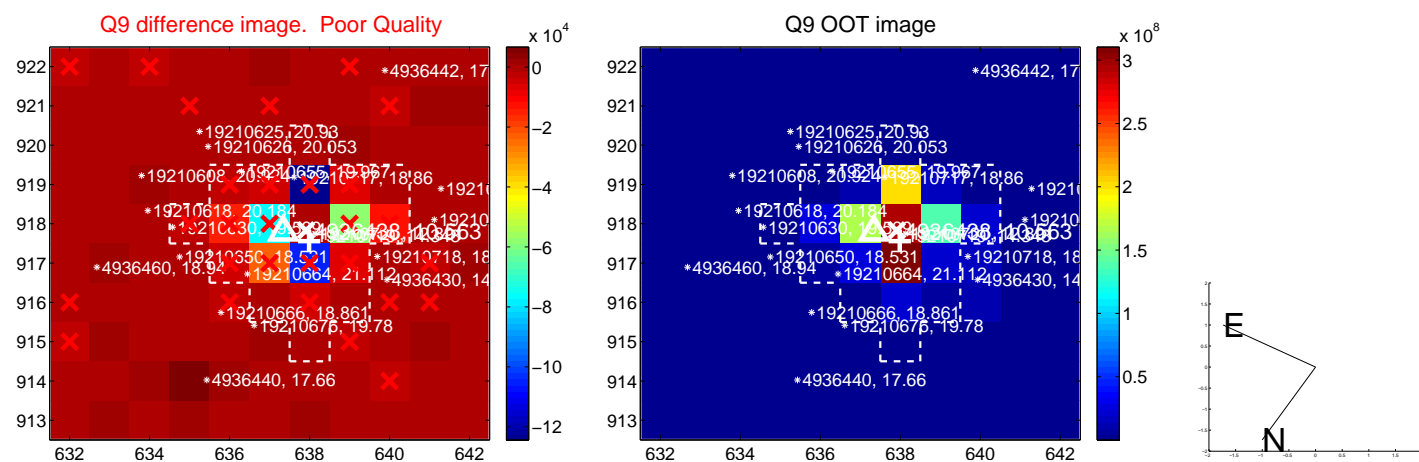
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



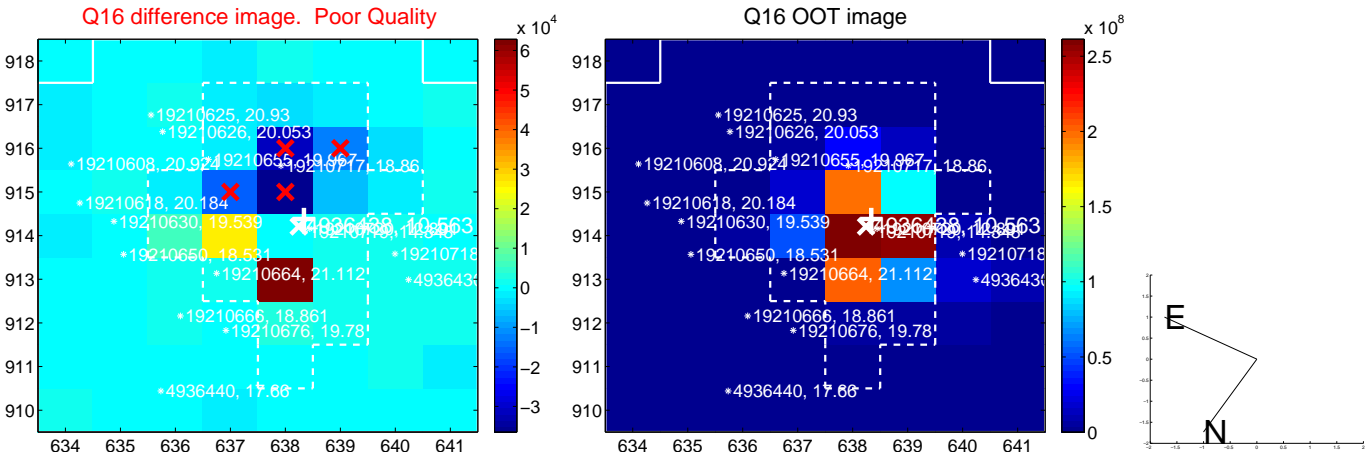
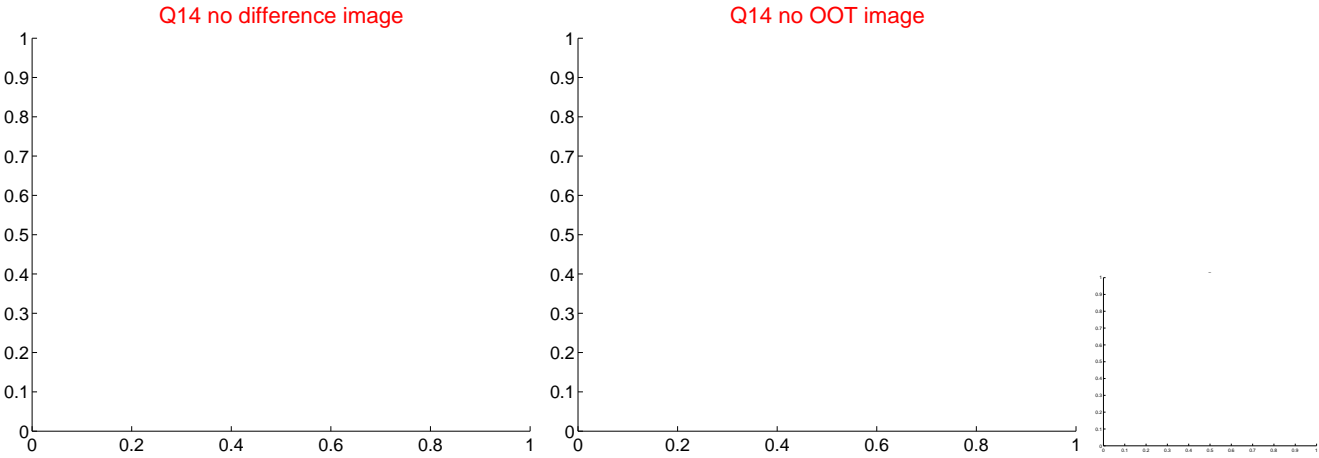
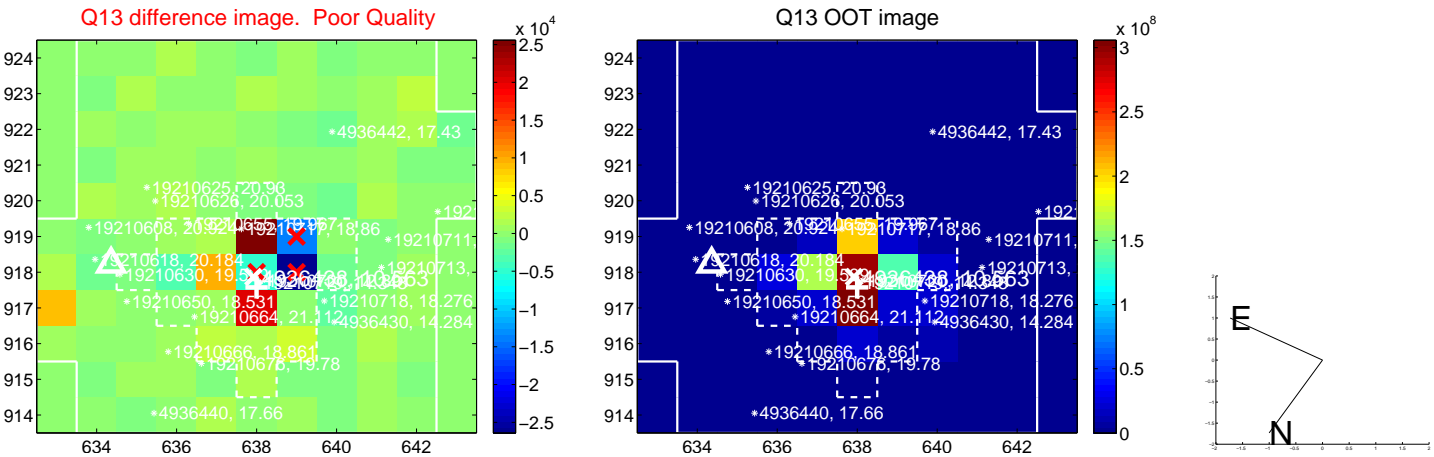
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



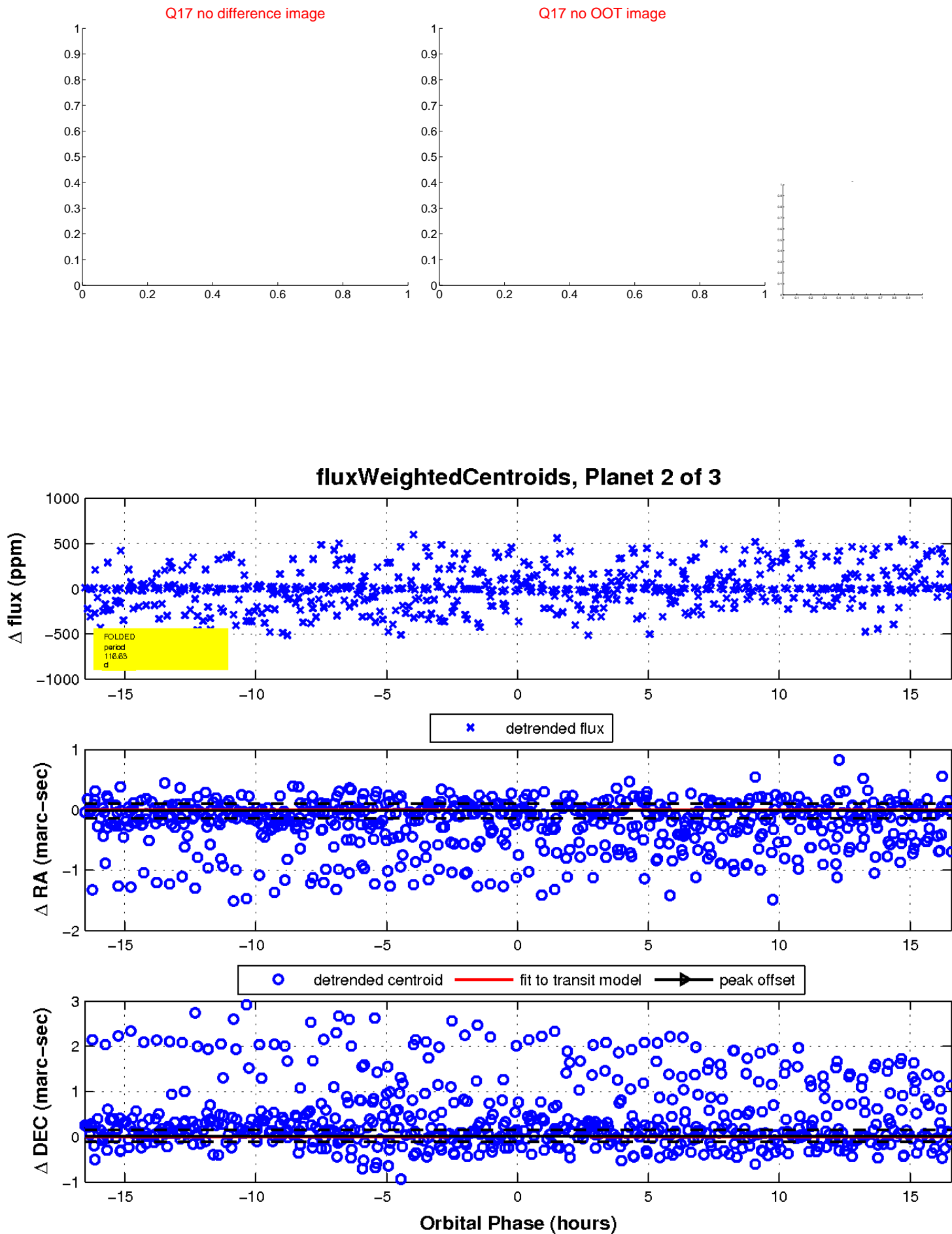
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

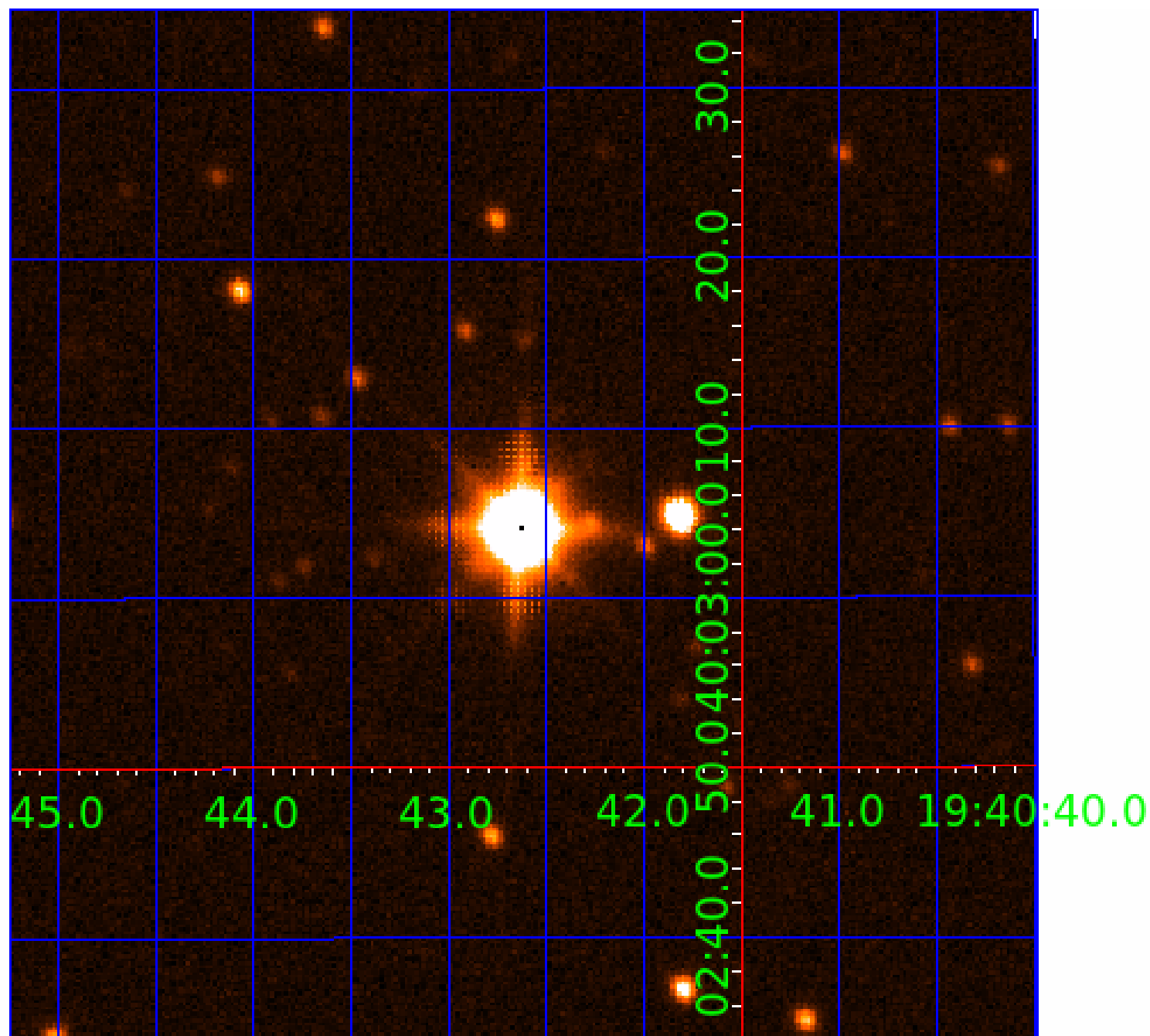


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 004936438

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 004936438-01 | OBS | No | 184.688201 | 161.445627 | 15.9 | 5.493 | 8.6 | 6.8 | 7.90 | 4953 | 3.78 | 50.22 |
| 004936438-02 | OBS | No | 116.629261 | 152.629813 | 23.5 | 5.541 | 9.1 | 8.4 | 7.90 | 4953 | 4.74 | 92.69 |
| 004936438-03 | OBS | No | 68.442608 | 162.668970 | 15.6 | 4.067 | 7.3 | 7.4 | 7.90 | 4953 | 3.81 | 188.66 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 004936438-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_MARSHALL_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED |
| 004936438-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED |
| 004936438-03 | OBS | FP | 0.00 | 1 | 0 | 1 | 0 | MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED—HALO_GHOST |

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

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

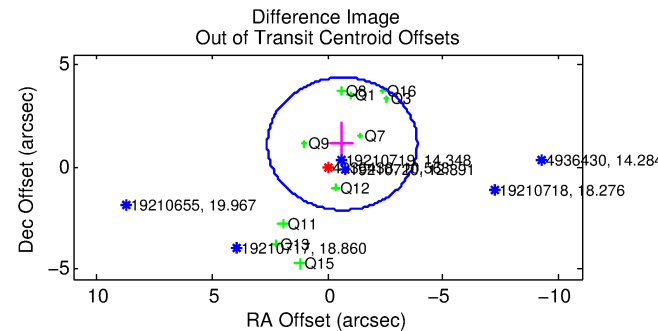
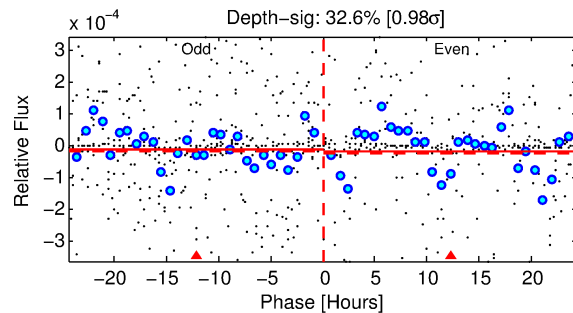
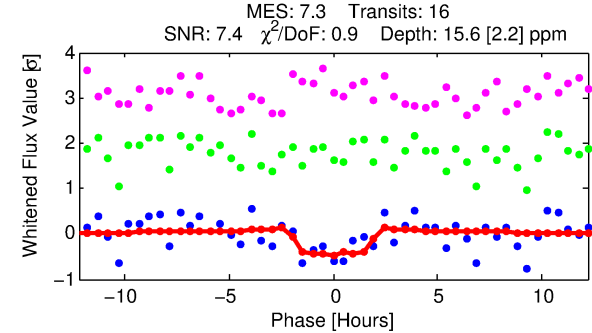
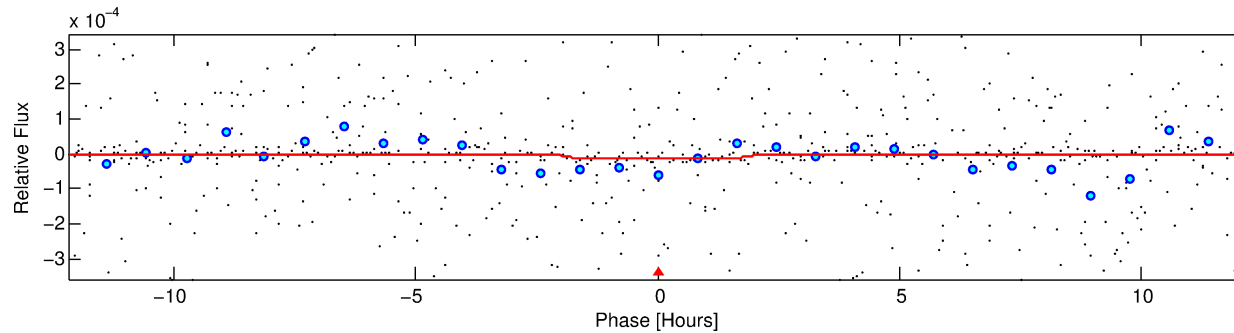
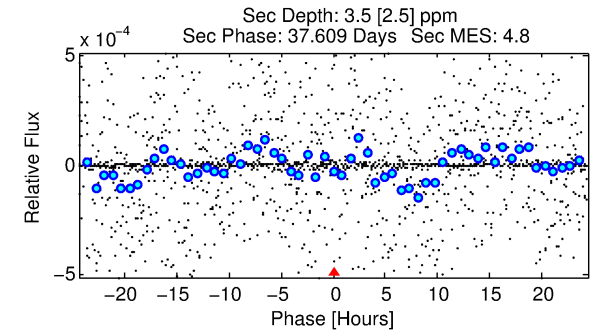
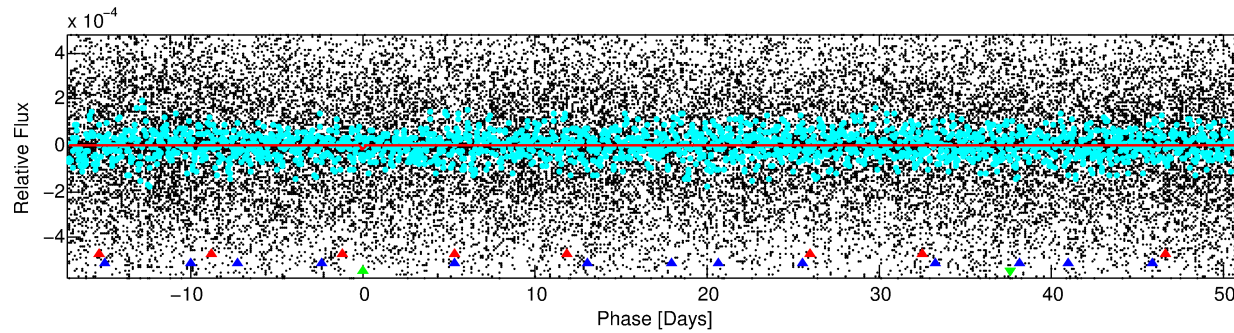
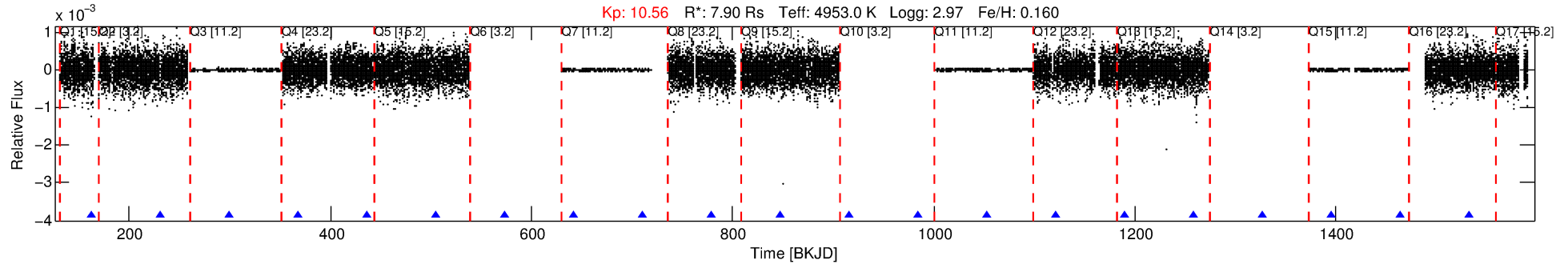
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004936438-03

No Significant Match Found

DV One-Page Summary

KIC: 4936438 Candidate: 3 of 3 Period: 68.443 d



DV Fit Results:

Period = 68.44261 [0.00075] d
Epoch = 162.6690 [0.0103] BKJD
Rp/R* = 0.0044 [0.0026]
a/R* = 57.27 [138.61]
b = 0.90 [0.52]
Seff = 188.66 [39.29]
Teq = 945 [49] K
Rp = 3.81 [2.48] Re
a = 0.4223 [0.0762] AU
Ag = 23.95 [33.41] [0.69σ]
Teffp = 3232 [1120] K [2.04σ]

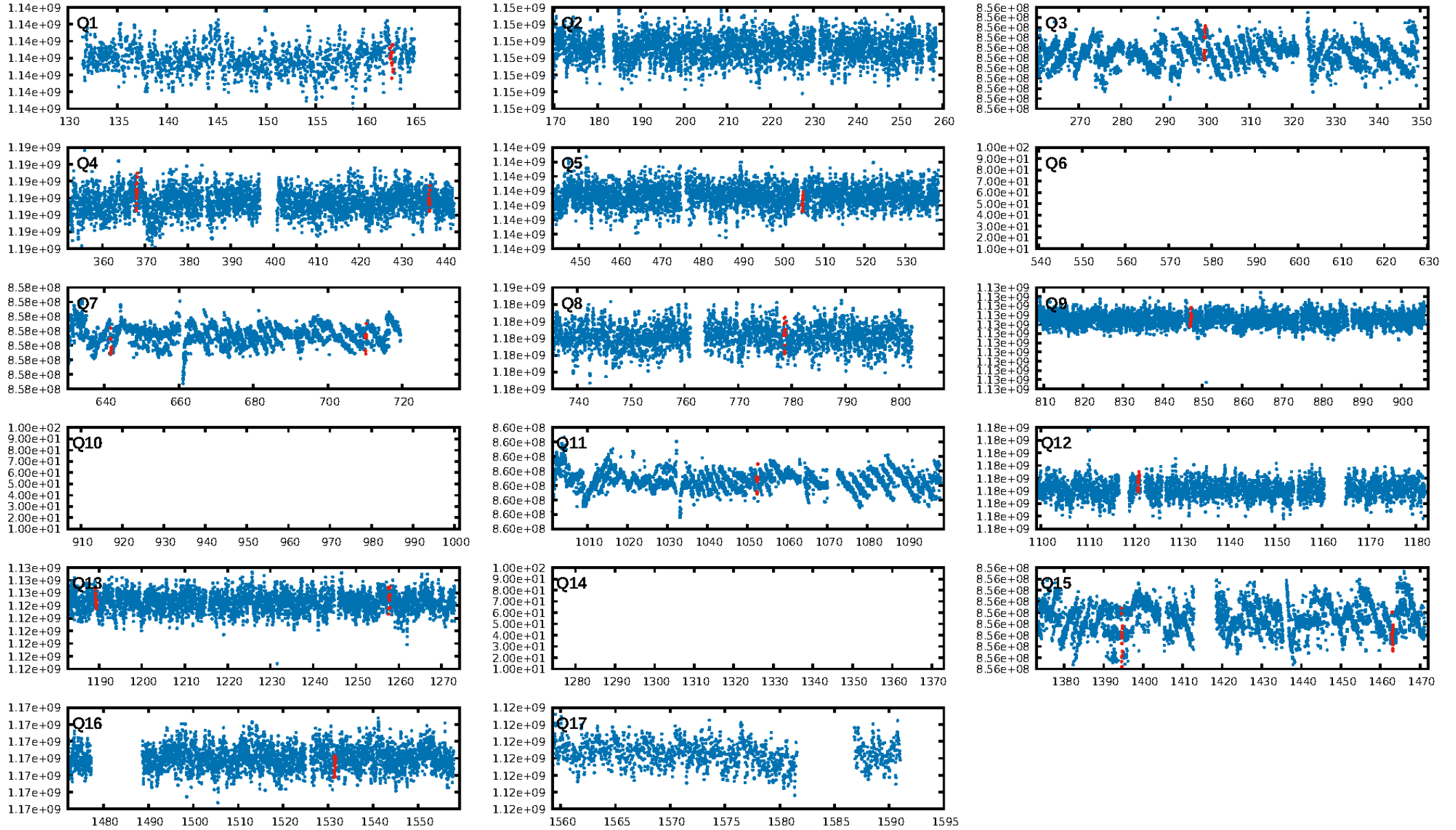
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [168.26σ]
ModelChiSquare2-sig: 63.8%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.22e-08
RollingBand-fgt: 1.00 [15/15]
GhostDiagnostic-chr: 0.0004329
Centroid-sig: 19.6%
Centroid-so: 6.885 arcsec [0.94σ]
OotOffset-rm: 1.290 arcsec [1.19σ]
OotOffset-st: 0/4/3/3 [10]
KicOffset-rm: 1.781 arcsec [1.89σ]
KicOffset-st: 0/4/3/3 [10]
DiffImageQuality-fgm: 0.40 [4/10]
DiffImageOverlap-fno: 1.00 [11/11]

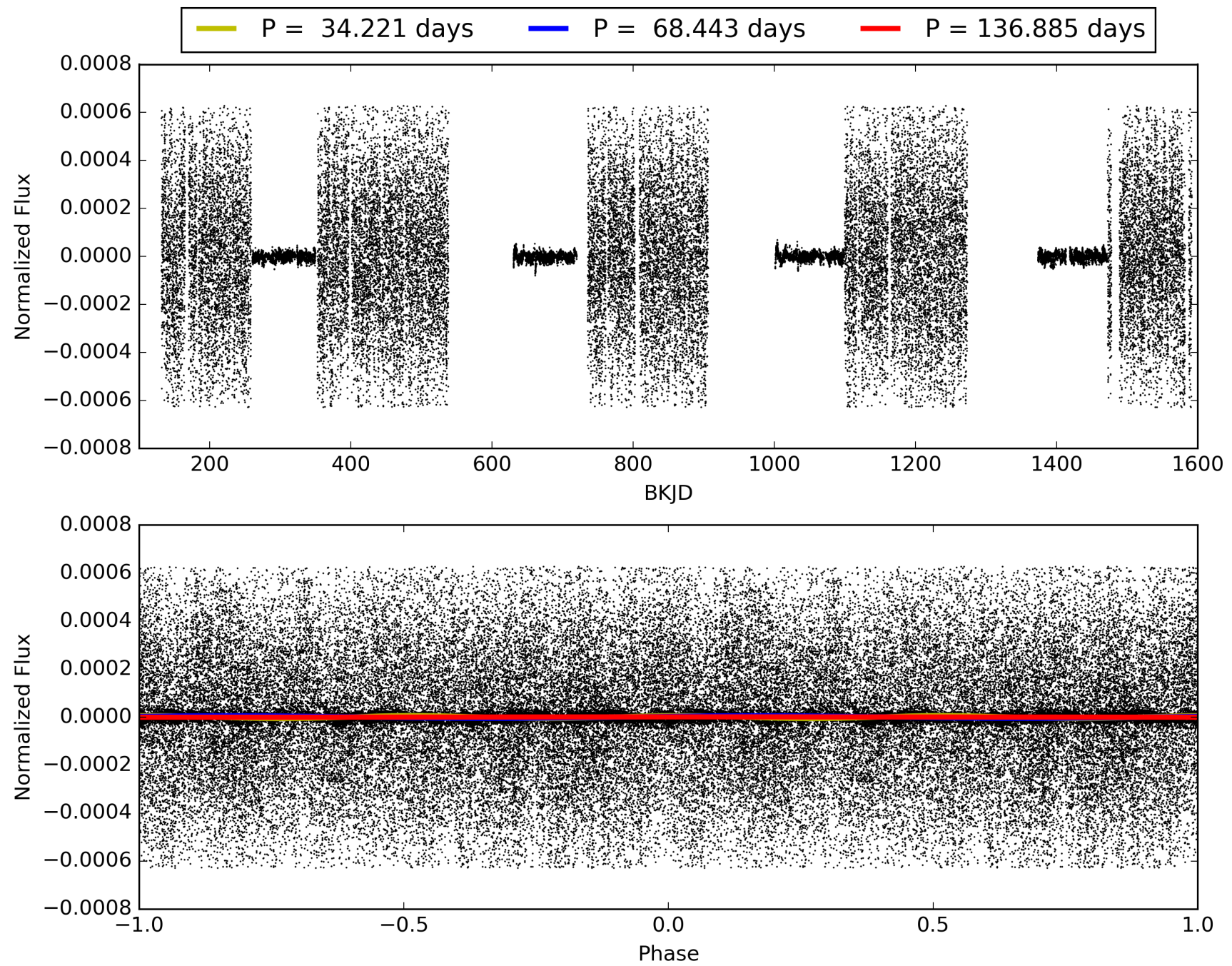
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 02:33:24 Z

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

TCE 004936438-03, PDC Light Curves

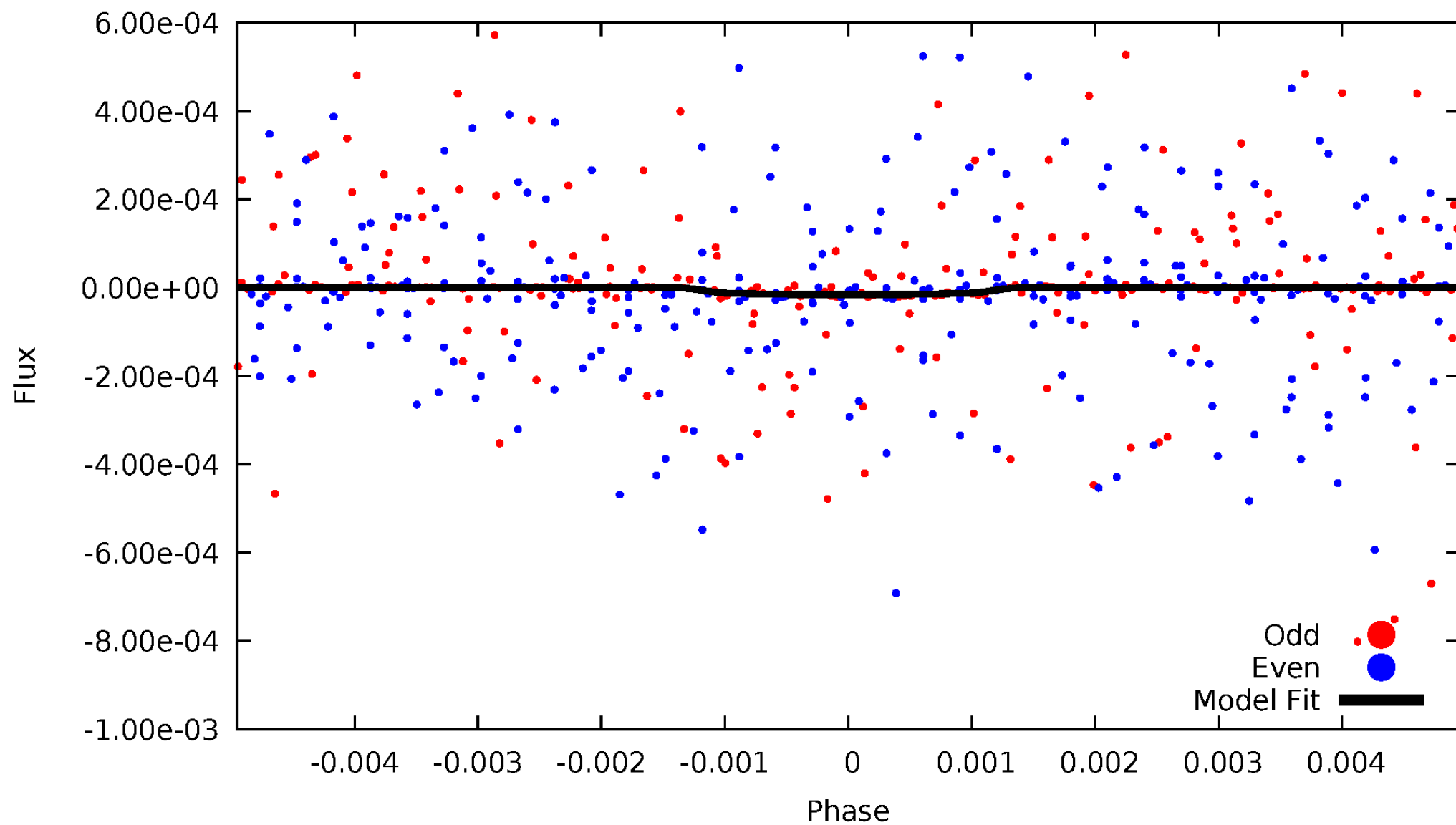


TCE 004936438-03



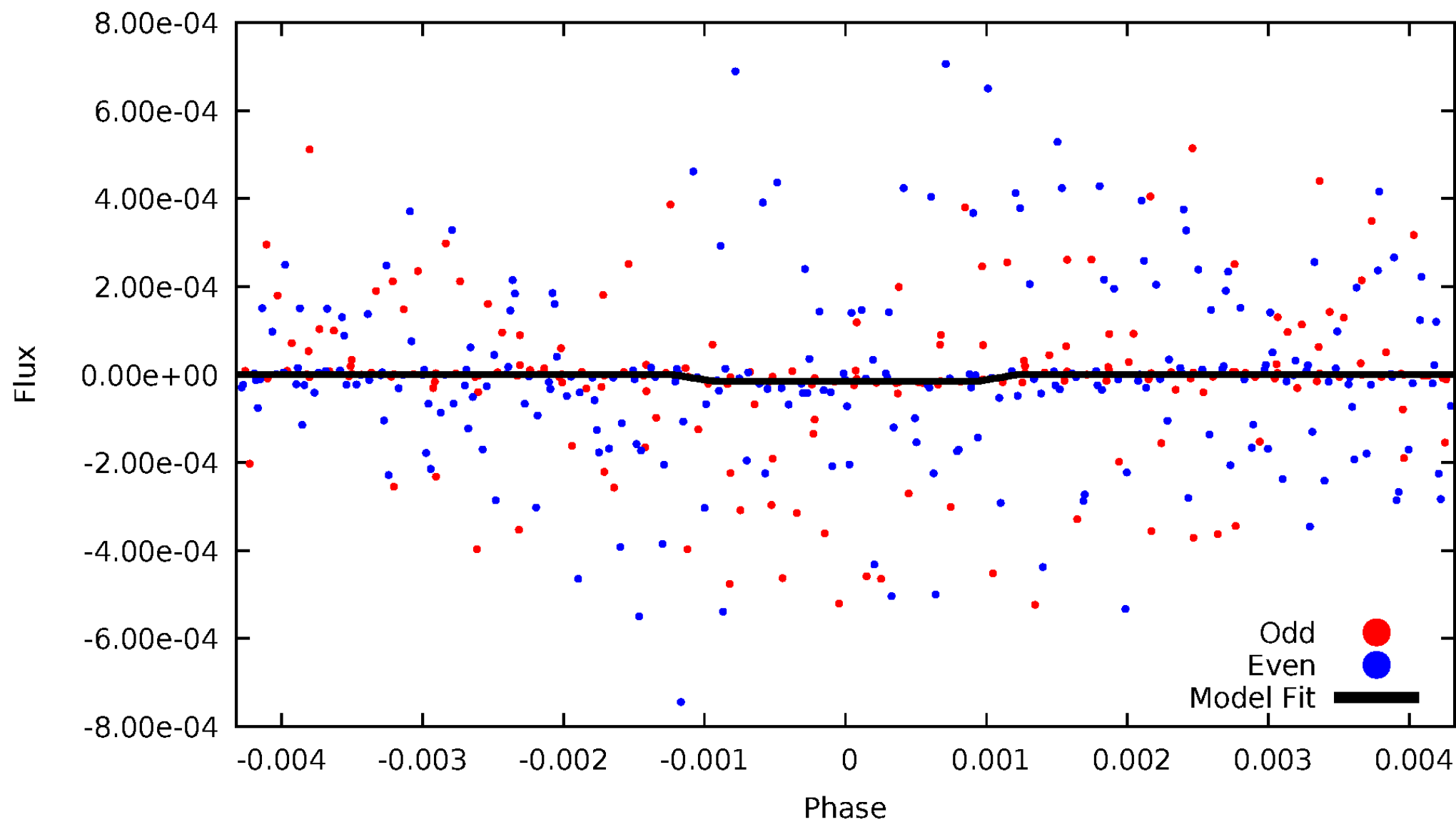
DV Odd/Even

TCE 004936438-03



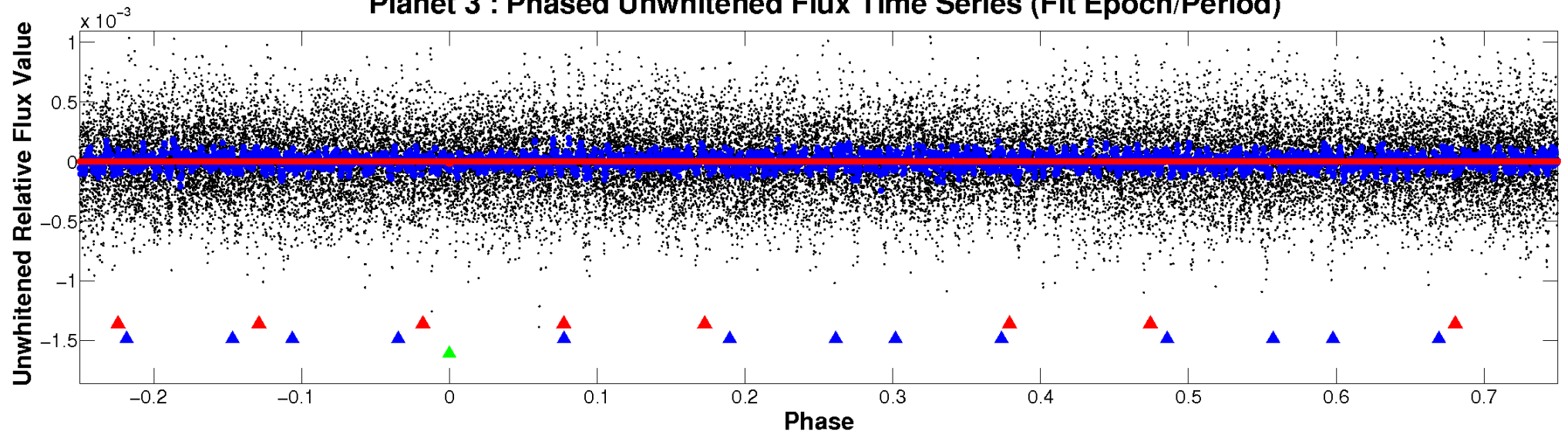
ALT Odd/Even

TCE 004936438-03

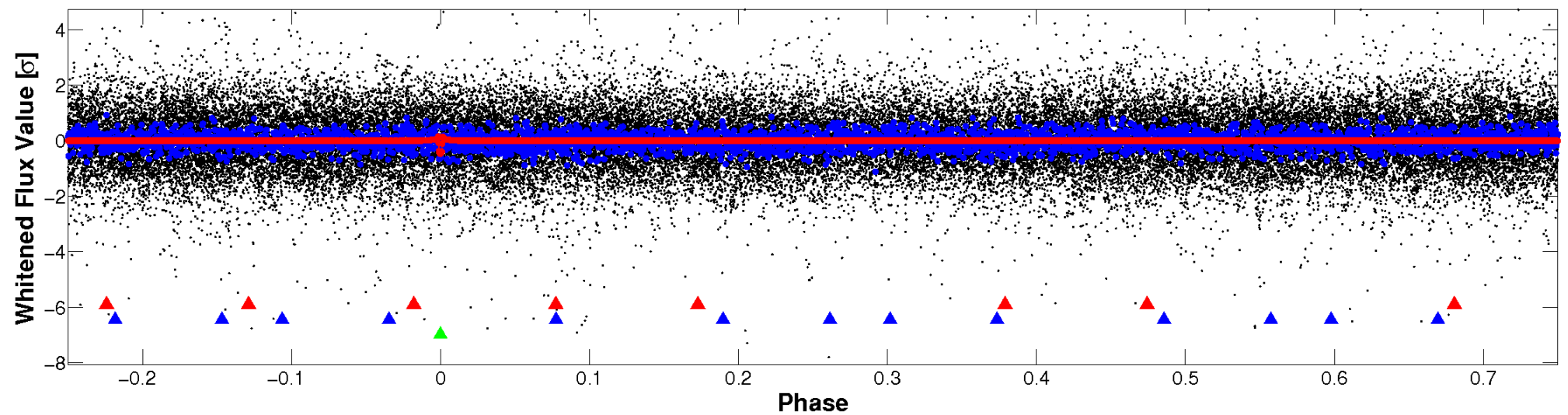


Non-Whitened Vs. Whitened Light Curve

Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

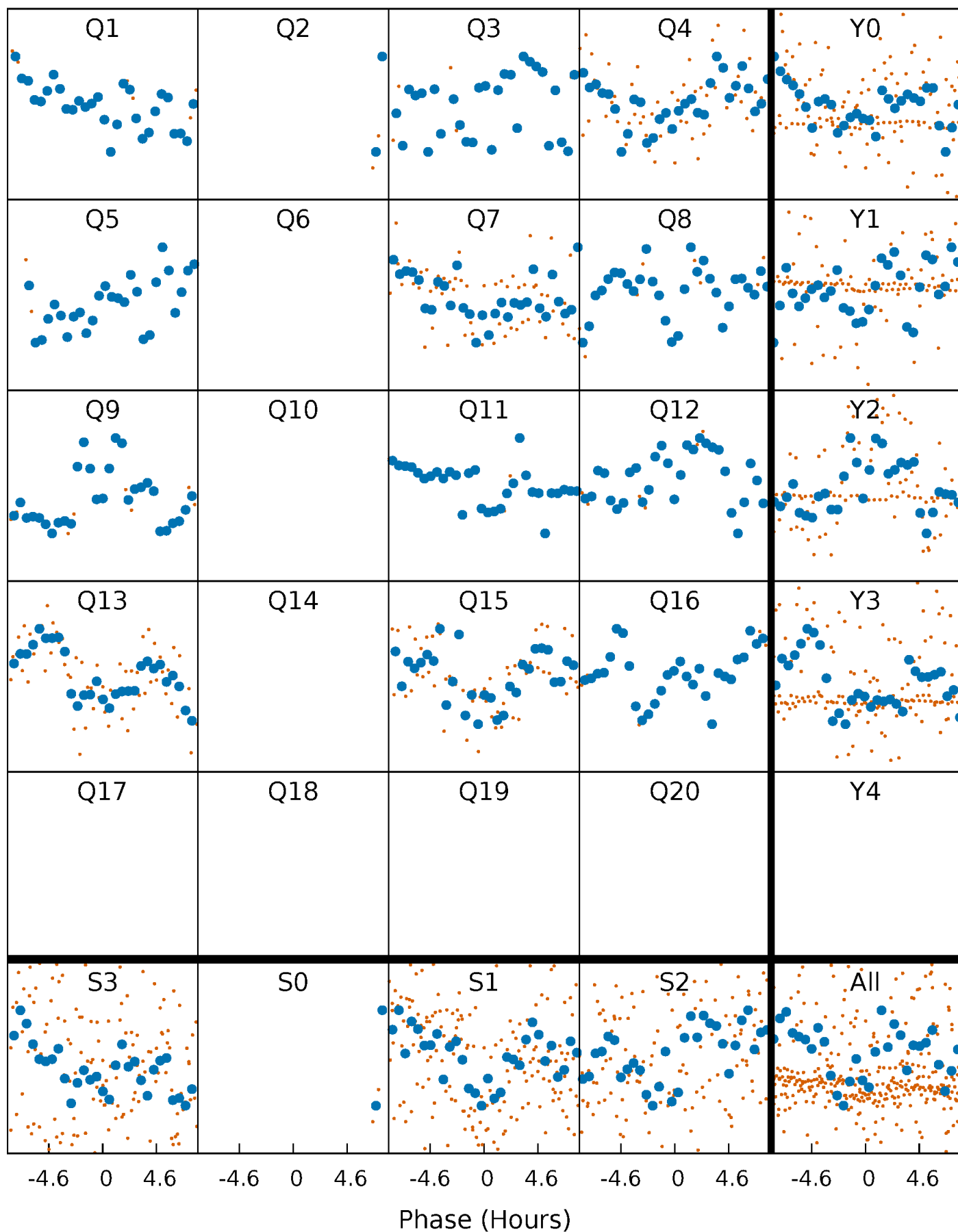


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



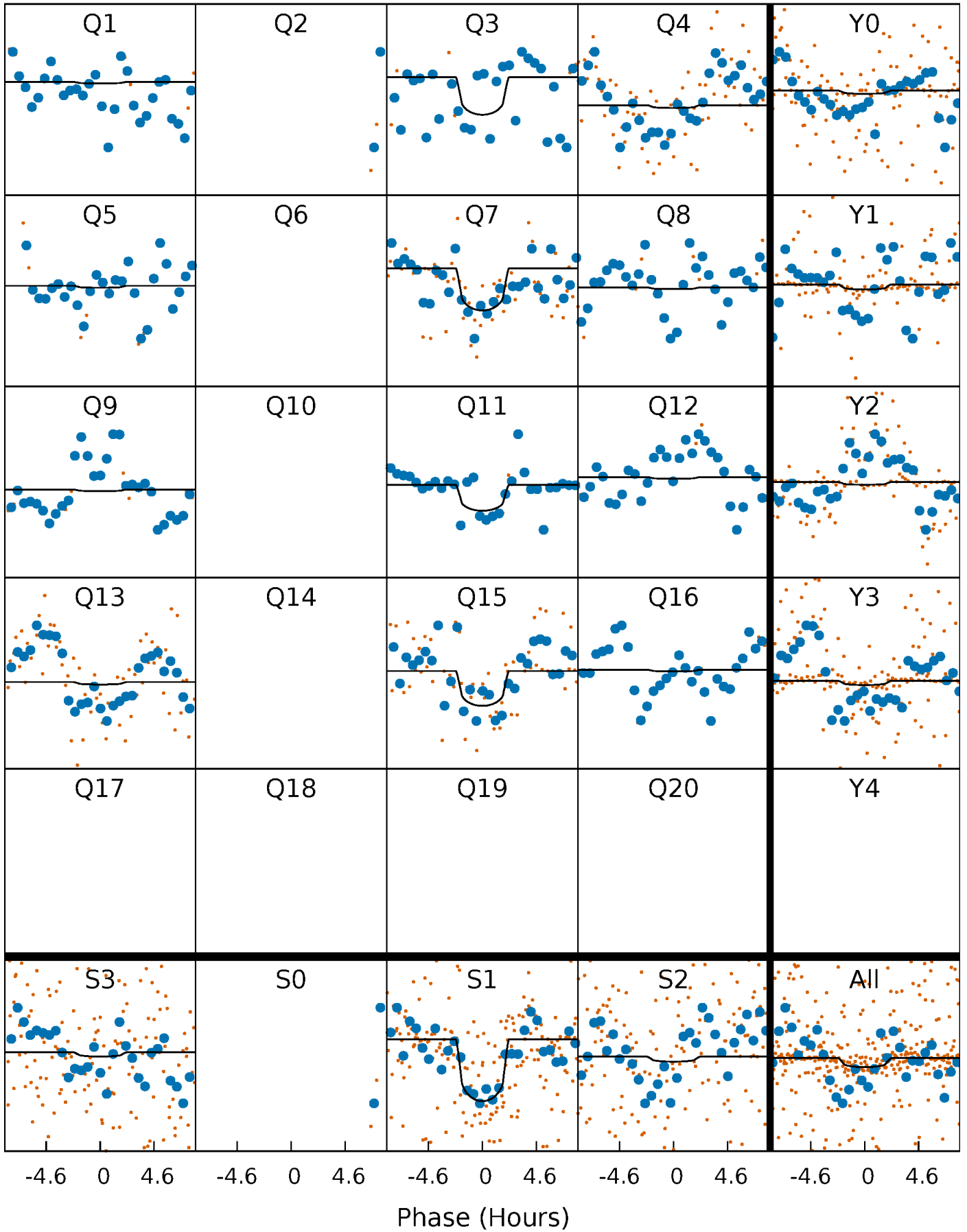
PDC Quarter-Phased Transit Curves

TCE 004936438-03 P= 68.442608 Days $T_0=162.668970$ (BKJD)



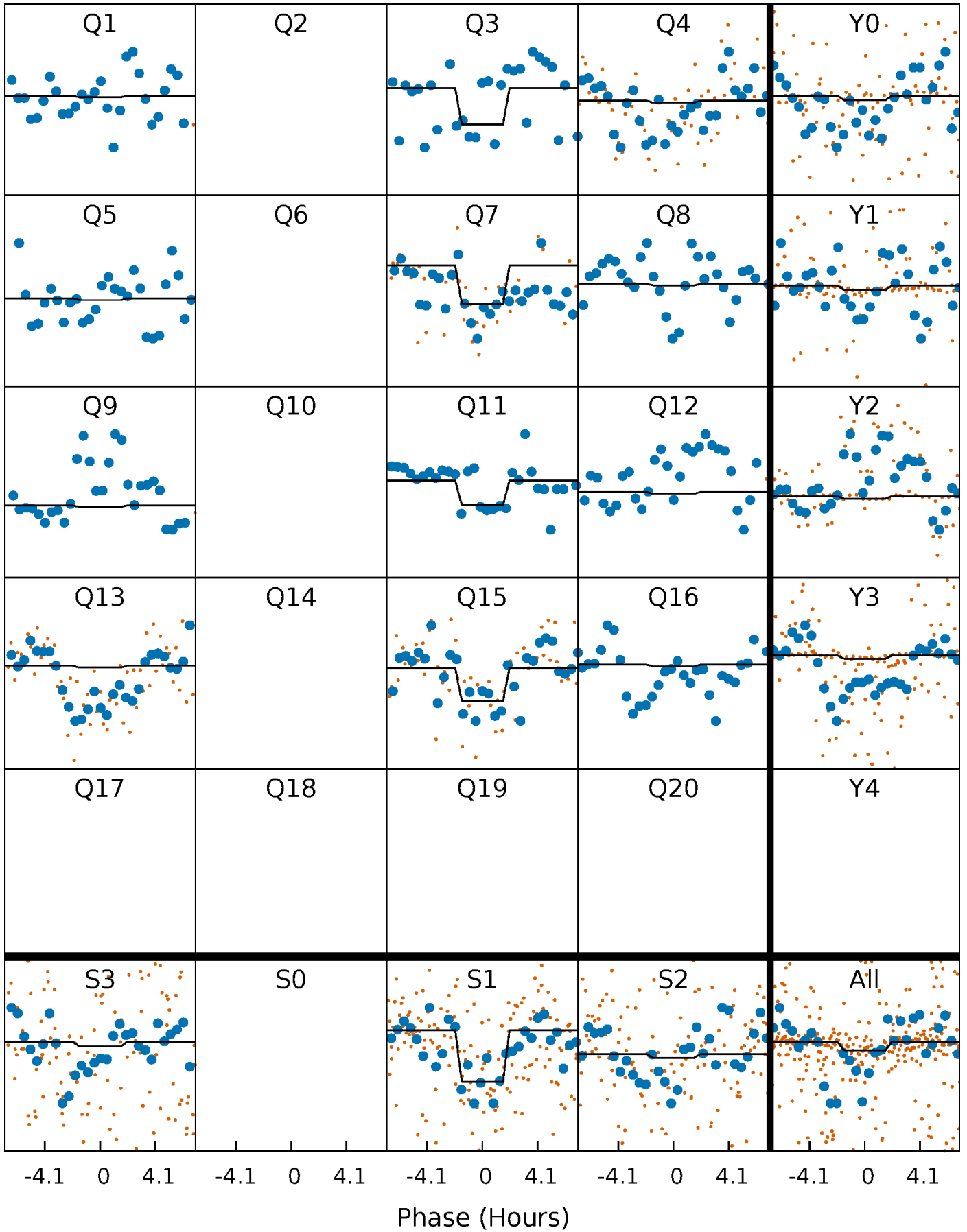
DV Quarter-Phased Transit Curves

TCE 004936438-03 P= 68.442608 Days $T_0=162.668970$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

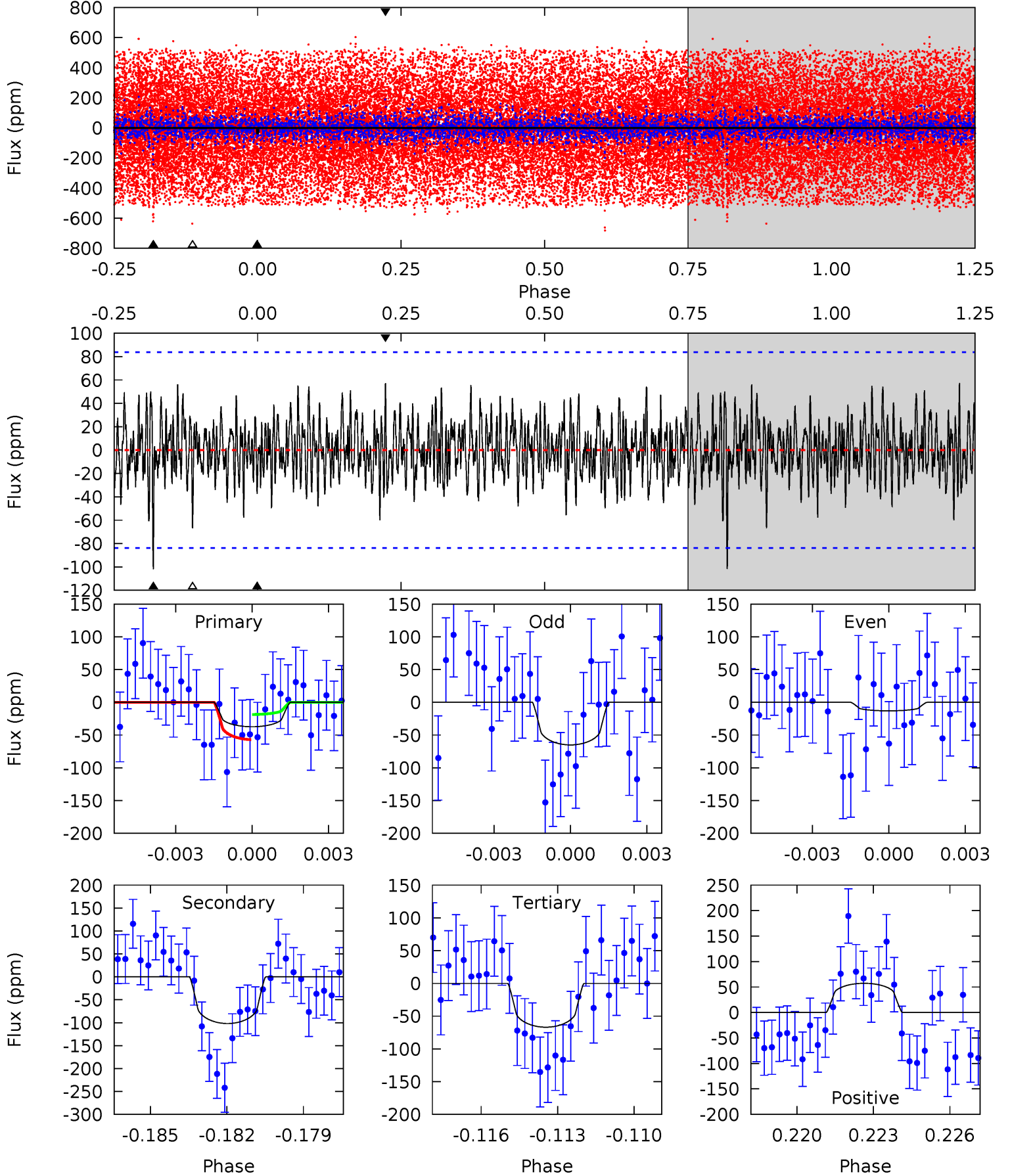
TCE 004936438-03 P= 68.443632 Days $T_0=162.651446$ (BKJD)



DV Model-Shift Uniqueness Test

004936438-03, P = 68.442608 Days, E = 94.226362 Days

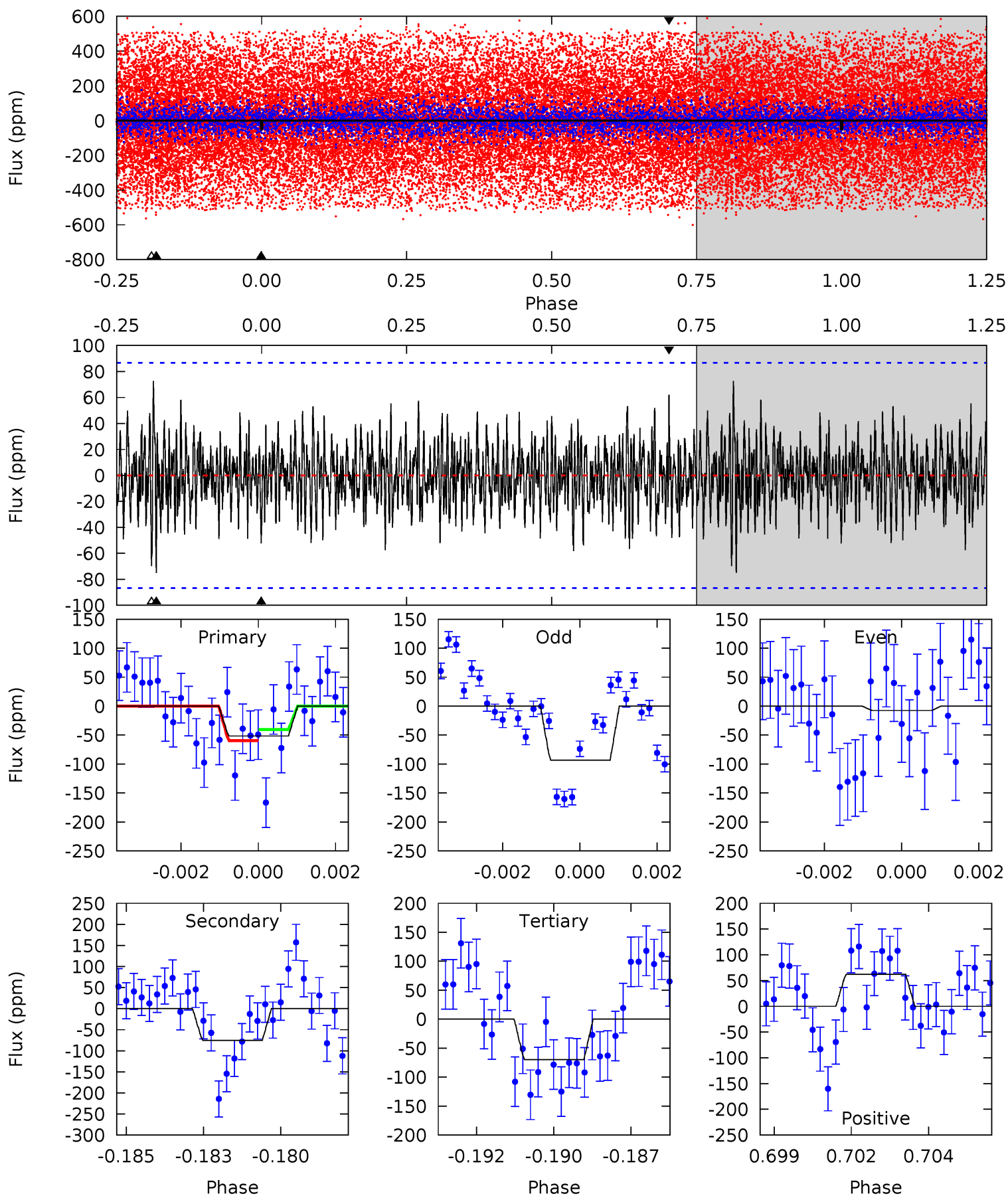
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 2.35 | 6.41 | 4.21 | 3.60 | 5.27 | 2.99 | 1.30 | -1.86 | -1.26 | 2.20 | 2.80 | 1.63 | 0.78 | 0.36 | 1.23 |



Alt Model-Shift Uniqueness Test

004936438-03, P = 68.443632 Days, E = 94.207814 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 3.16 | 4.58 | 4.26 | 3.78 | 5.29 | 3.04 | 1.25 | -1.10 | -0.63 | 0.33 | 0.80 | 2.62 | 1.89 | 0.49 | 0.59 |



Stellar Parameters For KIC 004936438

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | $M(M_{\odot})$ | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|---------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 4953^{+58}_{-117} | $2.974^{+0.033}_{-0.027}$ | $0.160^{+0.100}_{-0.400}$ | $7.900^{+0.373}_{-2.116}$ | $2.143^{+0.052}_{-0.993}$ | $0.006^{+0.003}_{-0.000}$ |
| | +1%/-2% | +1%/-1% | +62%/-250% | +5%/-27% | +2%/-46% | +42%/-8% |
| Source | PHO56 | AST56 | PHO56 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 004936438-03 / KOI

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|---------------|------------------------|--------------------|------------------------|----------------------|
| DV | -102 ± 16 | $4.04^{+2.16}_{-2.11}$ | 1318^{+27}_{-39} | 7051^{+4653}_{-1420} | 600^{+2082}_{-353} |
| Alt. | -75 ± 16 | $3.58^{+2.03}_{-2.05}$ | 1320^{+24}_{-33} | 7017^{+5600}_{-1497} | 568^{+2615}_{-345} |

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 $A_{obs} \gg 1.0$

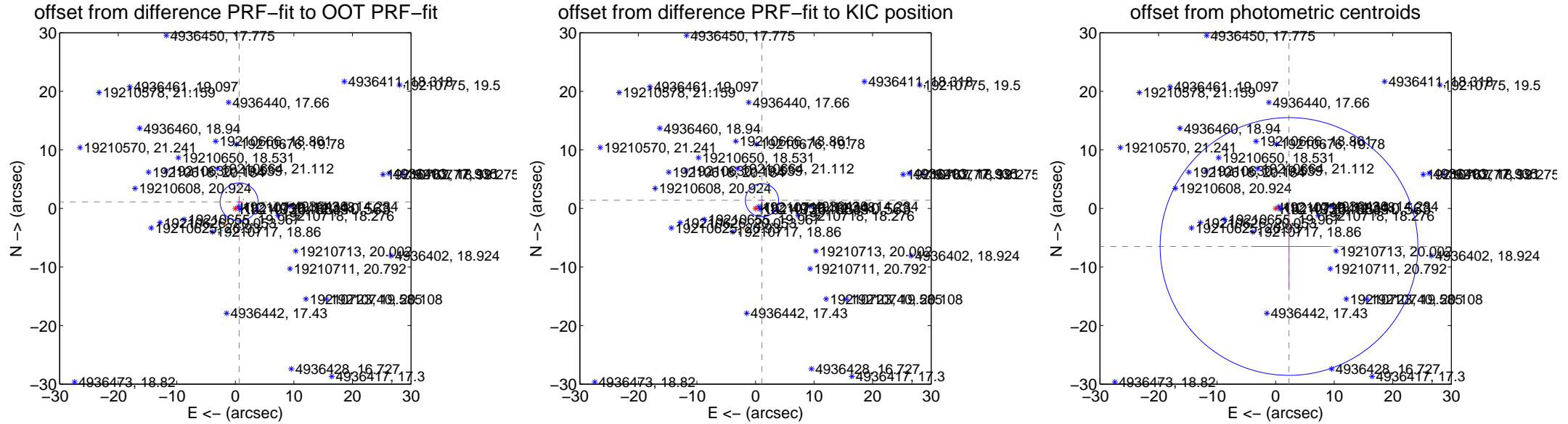
DV Centroid Data

Supplemental centroid analysis for 004936438-03. **Kepler magnitude: 10.56.** Transit SNR 7.36

There are 4 quarters with good PRF difference image offsets

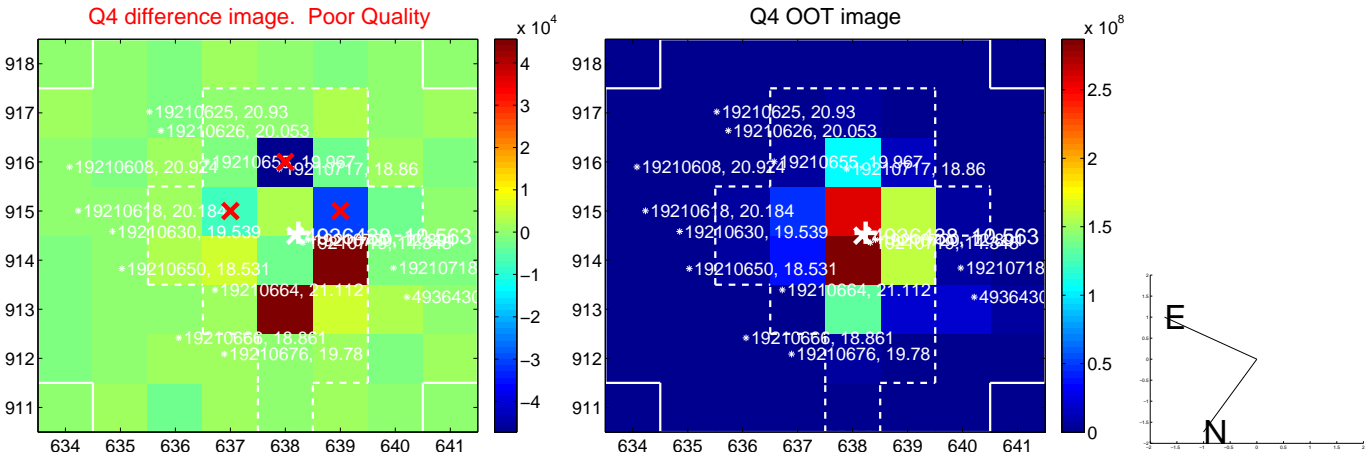
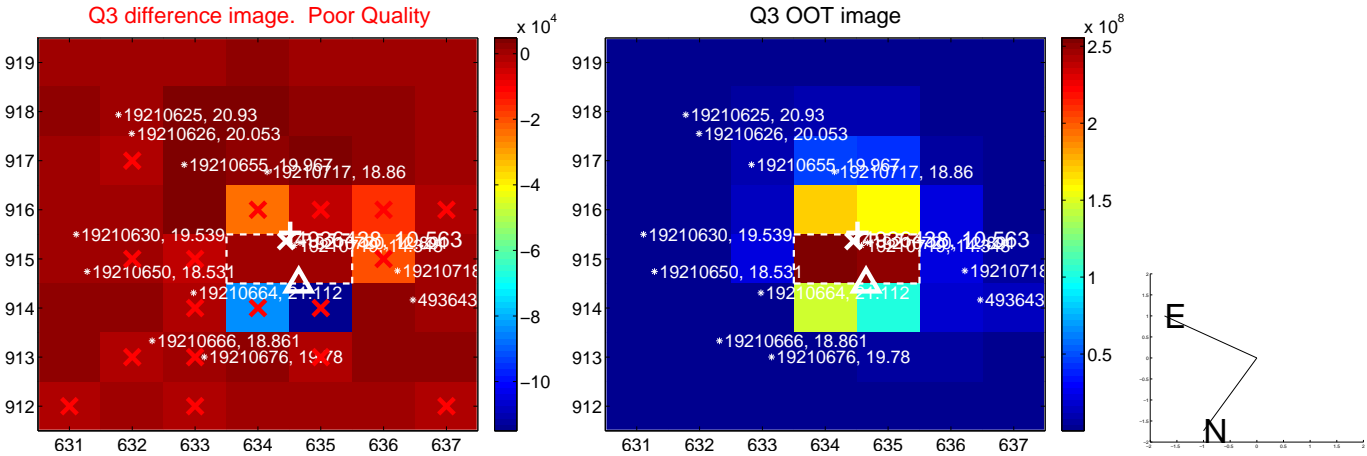
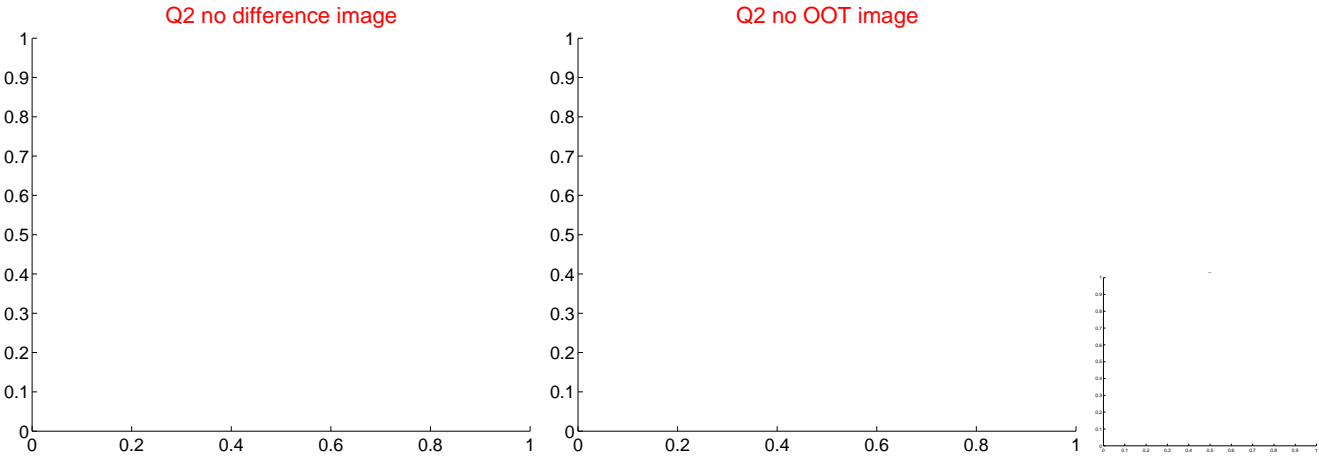
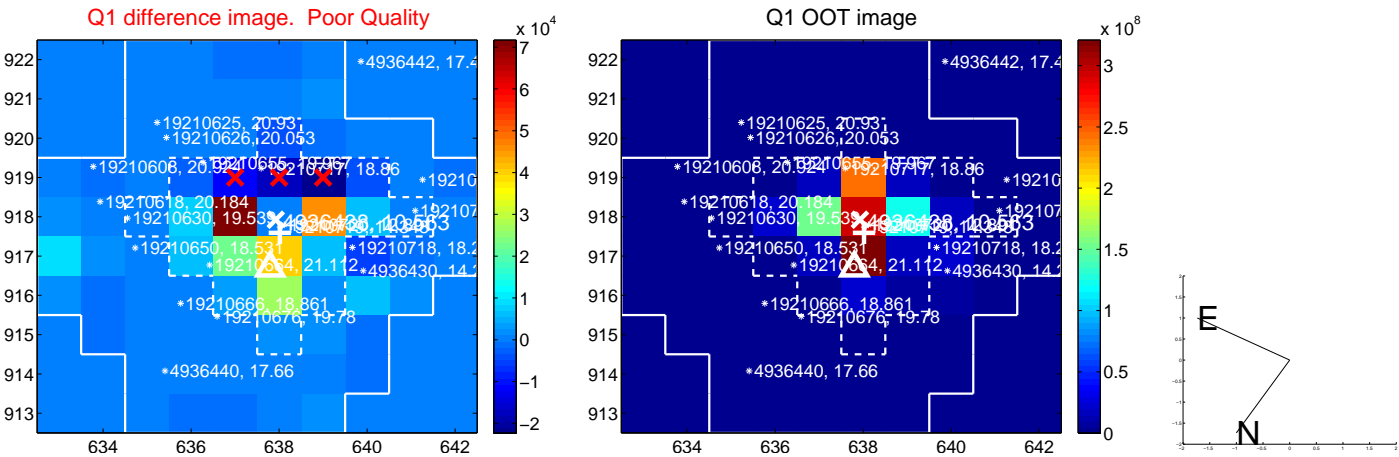
The direct PRF centroid is offset from the target star catalog position by about 0.66 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT | 1.290 ± 1.081 | 1.19 | -0.641 ± 0.488 | 1.119 ± 1.008 |
| PRF-fit source offset from KIC position | 1.781 ± 0.944 | 1.89 | -1.104 ± 0.487 | 1.397 ± 0.859 |
| photometric centroid source offset | 6.89 ± 7.34 | 0.94 | -2.28 ± 6.46 | -6.50 ± 7.44 |

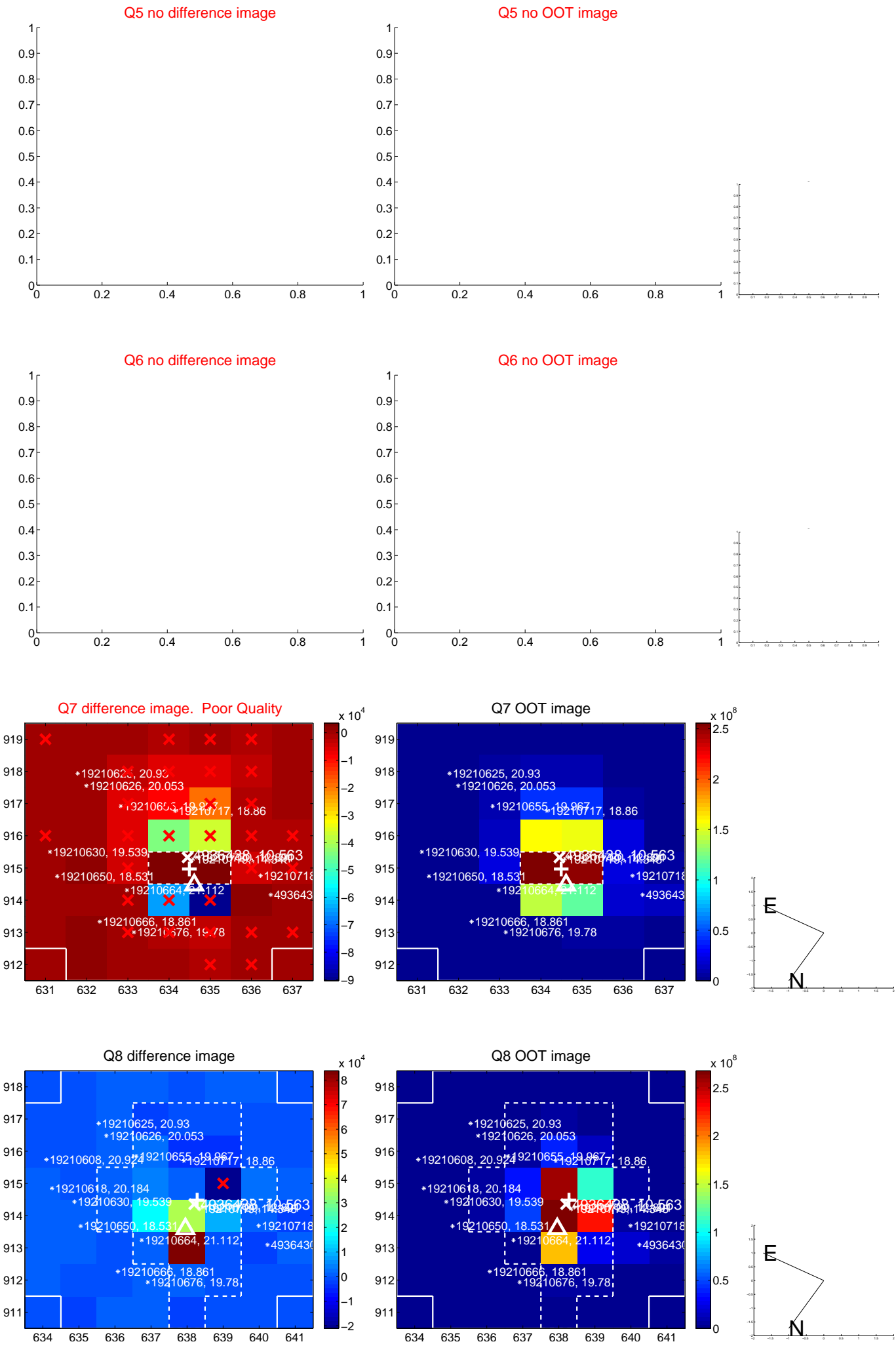


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

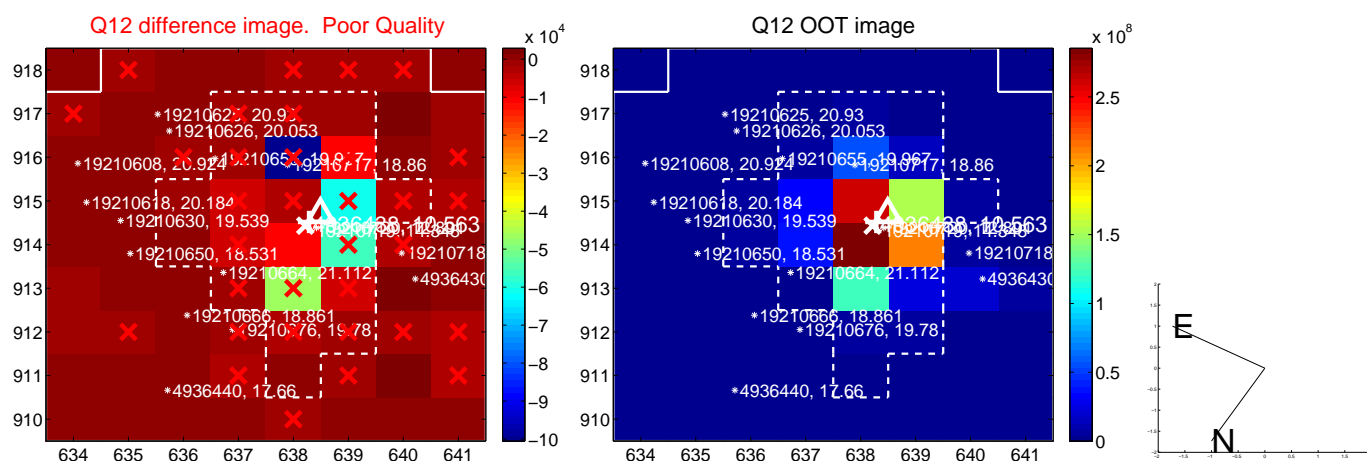
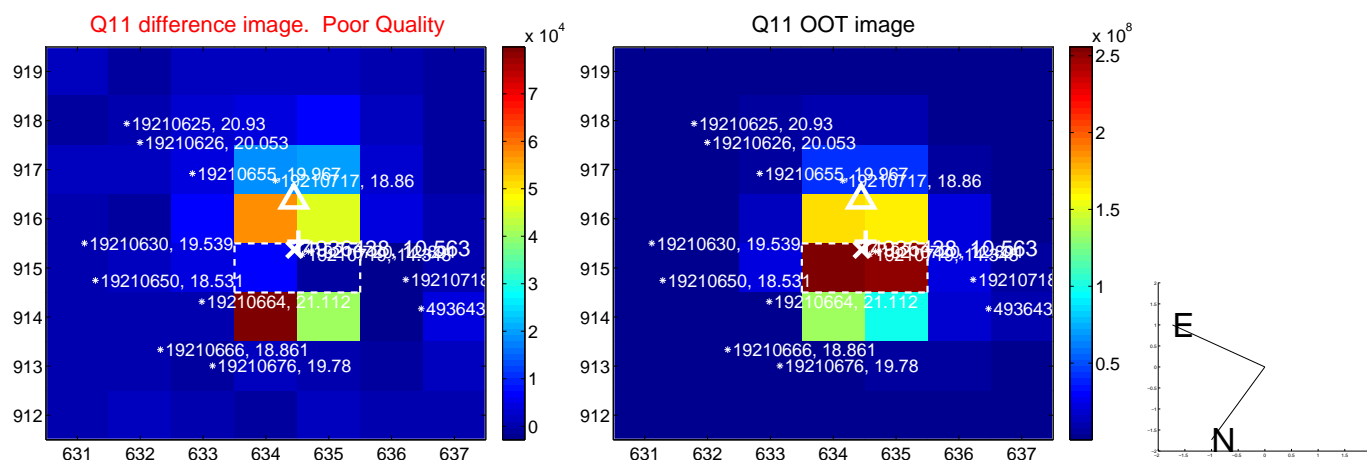
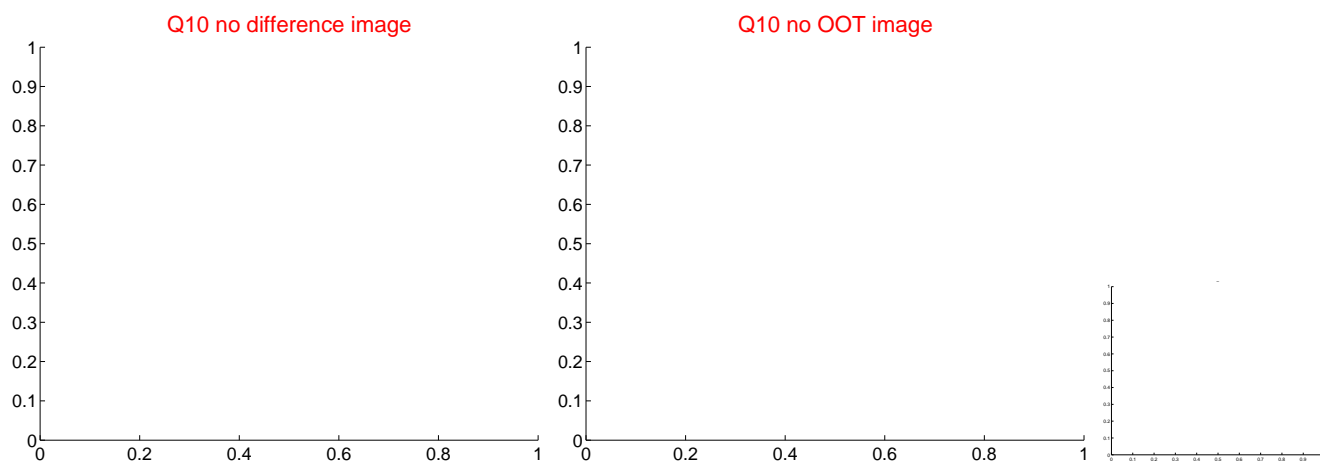
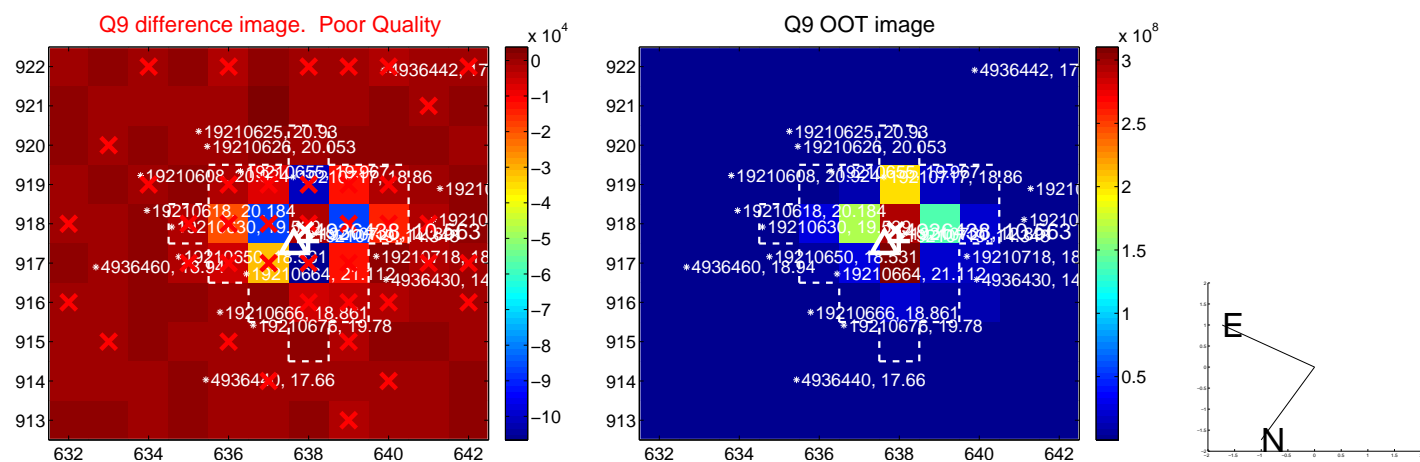
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



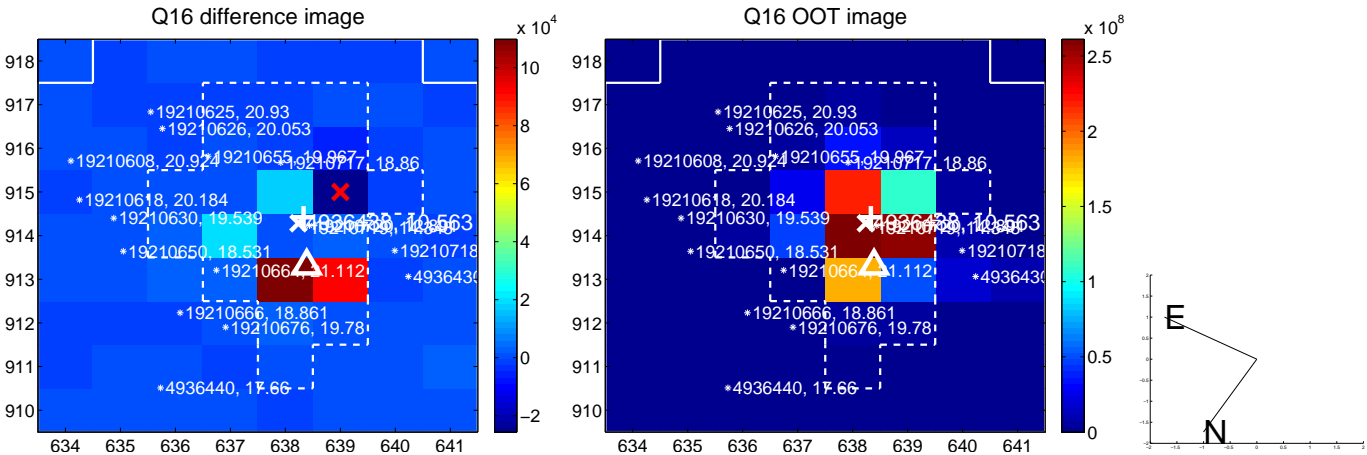
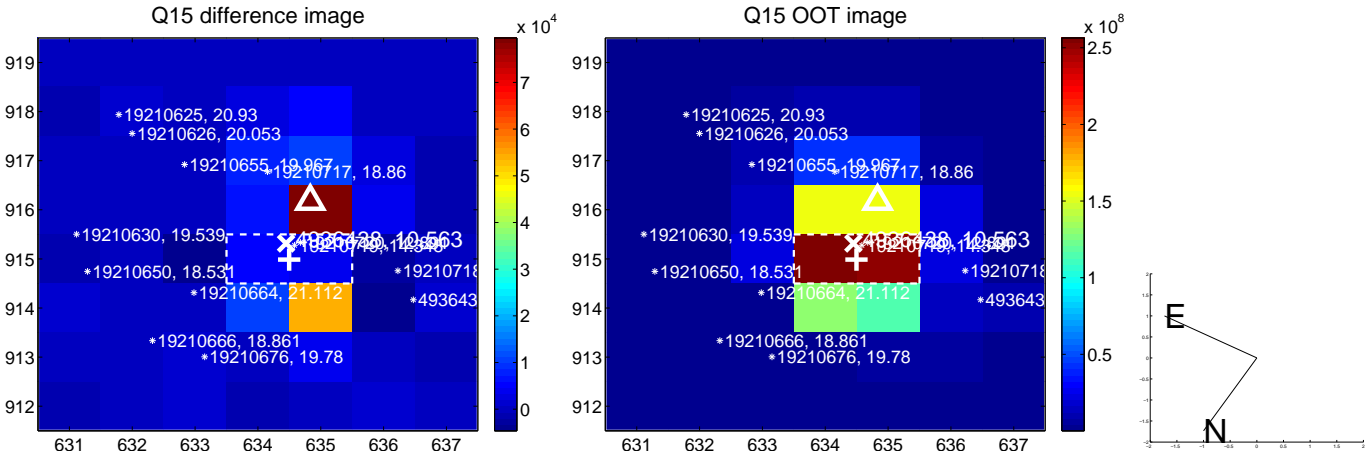
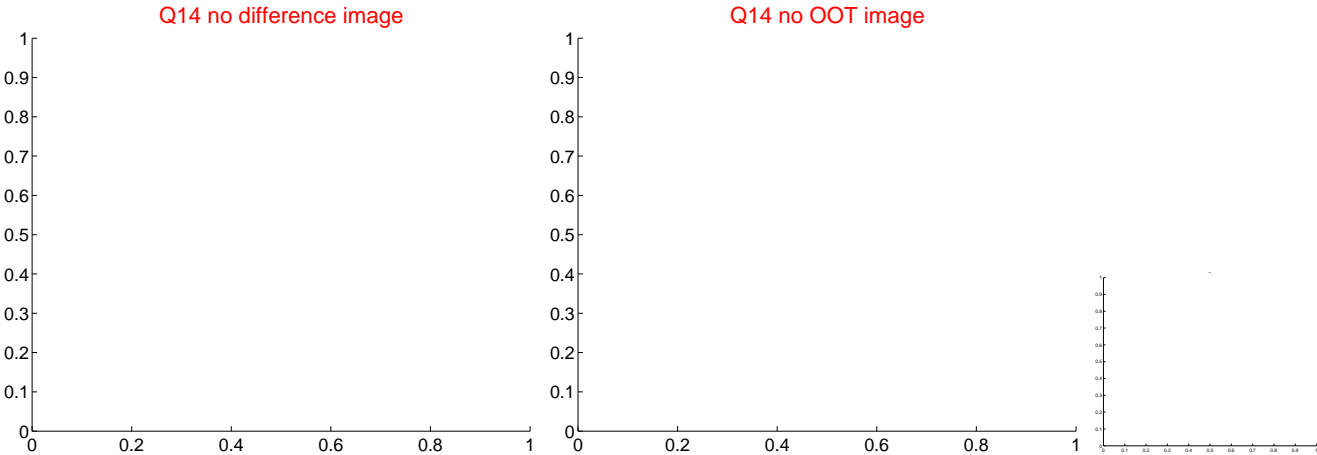
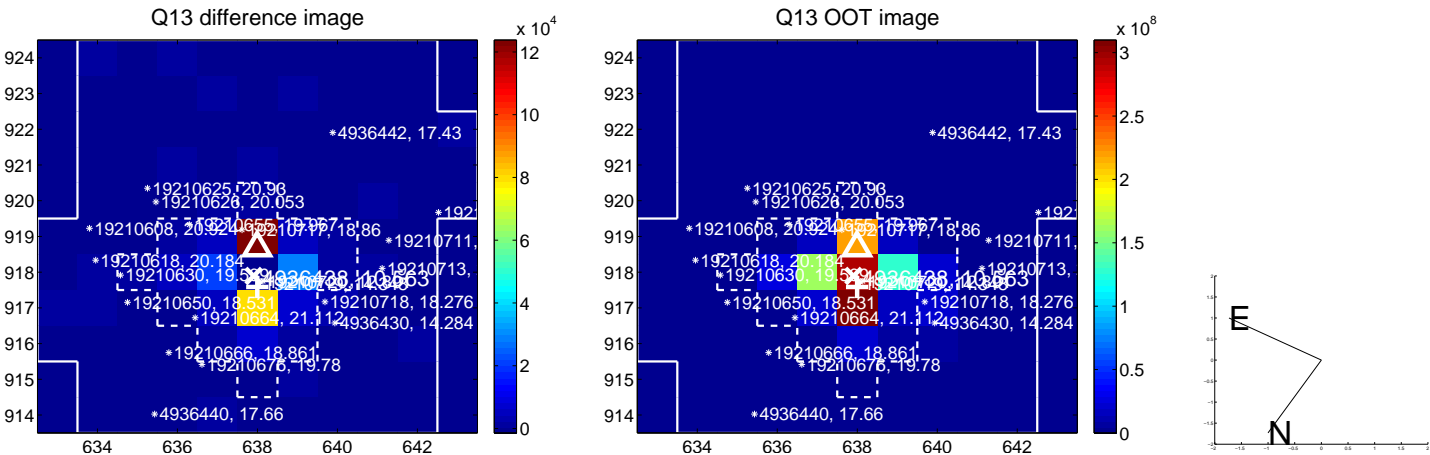
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



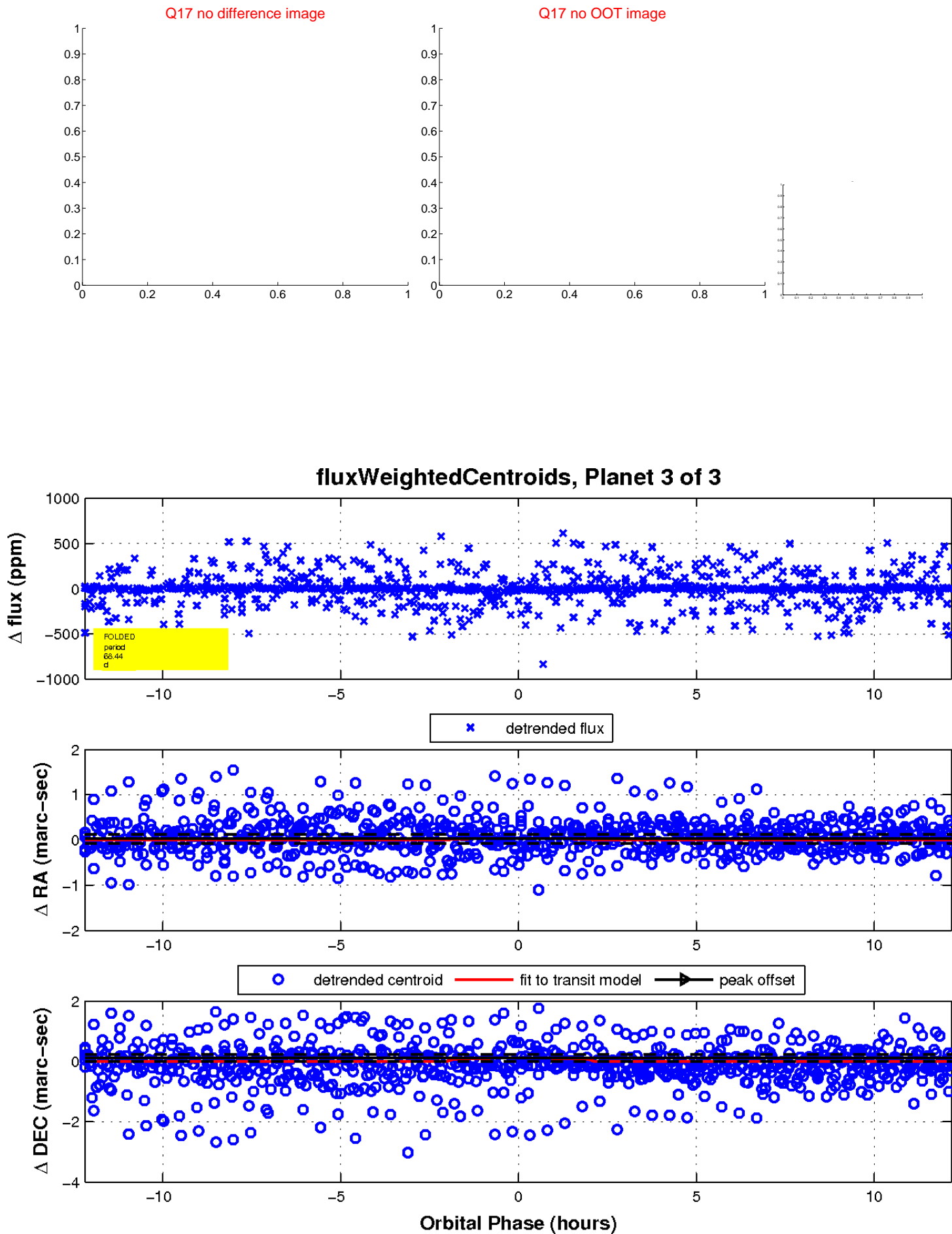
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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UKIRT Image

Declination

