

KIC 008702874

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 008702874-01 | OBS | No | 1.036541 | 131.970379 | 10.8 | 2.522 | 9.2 | 4.2 | 2.05 | 6961 | 0.71 | 16013.76 |
| 008702874-02 | OBS | No | 526.574604 | 357.153421 | 413.8 | 5.234 | 9.4 | 7.8 | 2.05 | 6961 | 4.42 | 3.95 |
| 008702874-03 | OBS | No | 0.505643 | 132.039219 | 4.6 | 3.143 | 8.1 | 2.4 | 2.05 | 6961 | 0.45 | 41701.38 |
| 008702874-04 | OBS | No | 23.792033 | 145.367715 | 295.4 | 1.468 | 7.5 | 6.8 | 2.05 | 6961 | 4.07 | 245.49 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 008702874-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT |
| 008702874-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS |
| 008702874-03 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_UNCERTAIN |
| 008702874-04 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT |

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

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

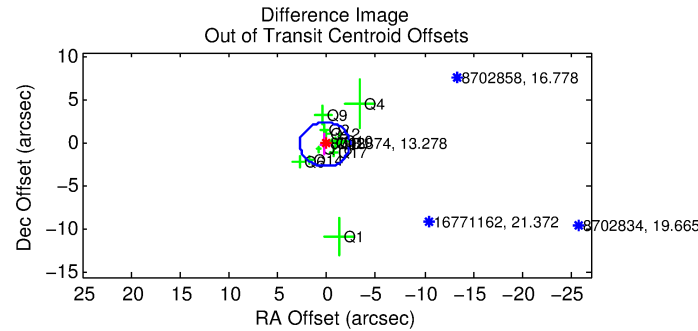
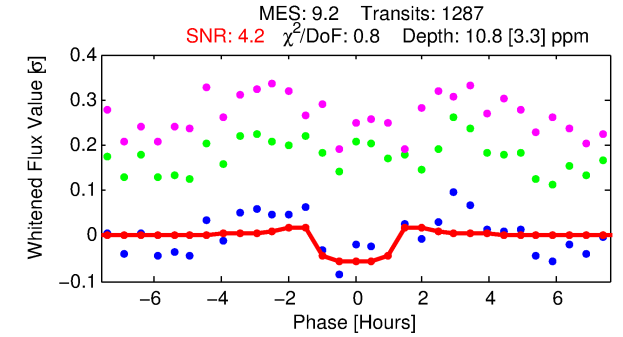
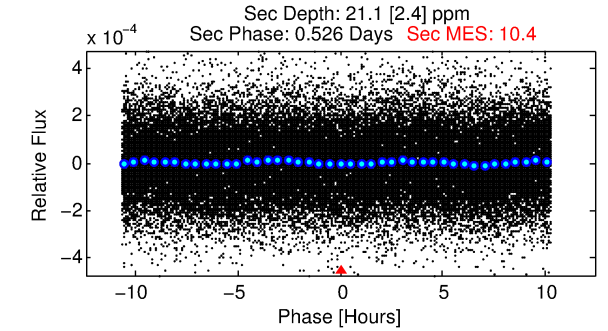
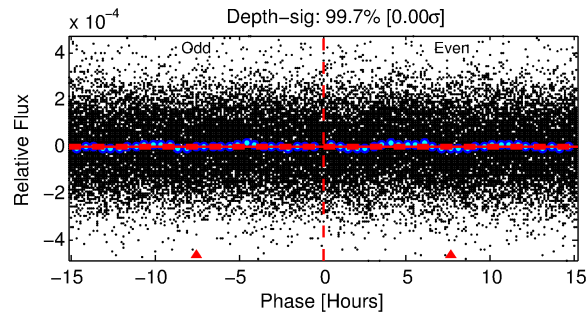
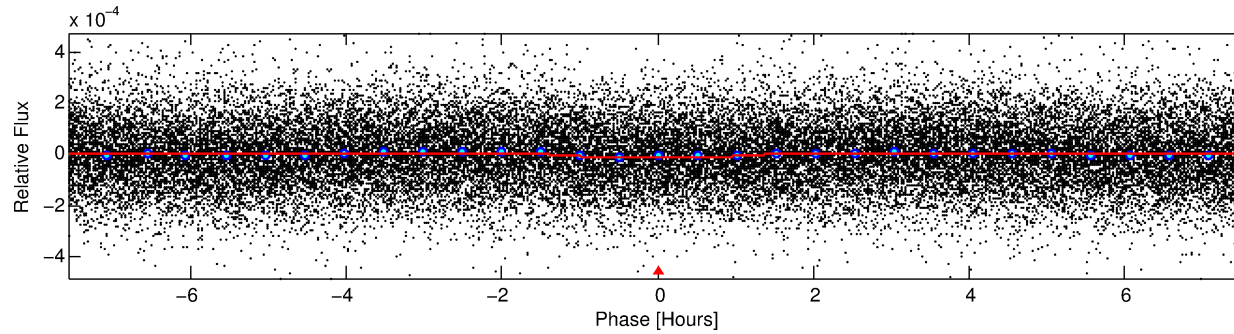
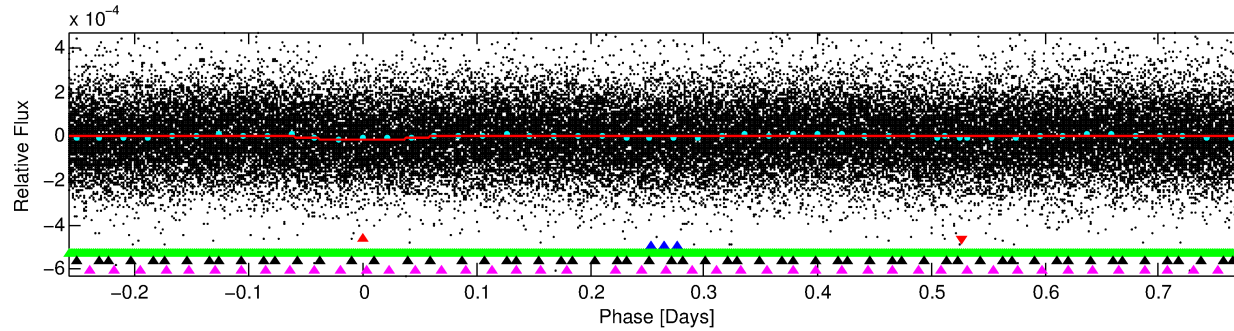
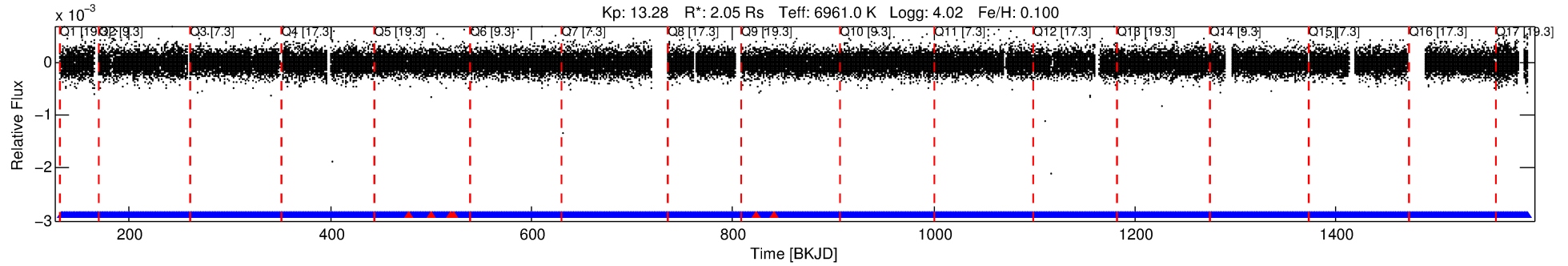
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008702874-01

No Significant Match Found

DV One-Page Summary

KIC: 8702874 Candidate: 1 of 5 Period: 1.037 d



DV Fit Results:

Period = 1.03654 [0.00002] d
Epoch = 131.9704 [0.0054] BKJD
Rp/R* = 0.0032 [0.0008]
a/R* = 2.58 [2.73]
b = 0.62 [1.22]
Seff = 16013.76 [6602.62]
Teq = 2868 [296] K
Rp = 0.71 [0.28] Re
a = 0.0235 [0.0059] AU
Ag = 12.66 [8.32] [1.40 σ]
Teffp = 8366 [1190] K [4.48 σ]

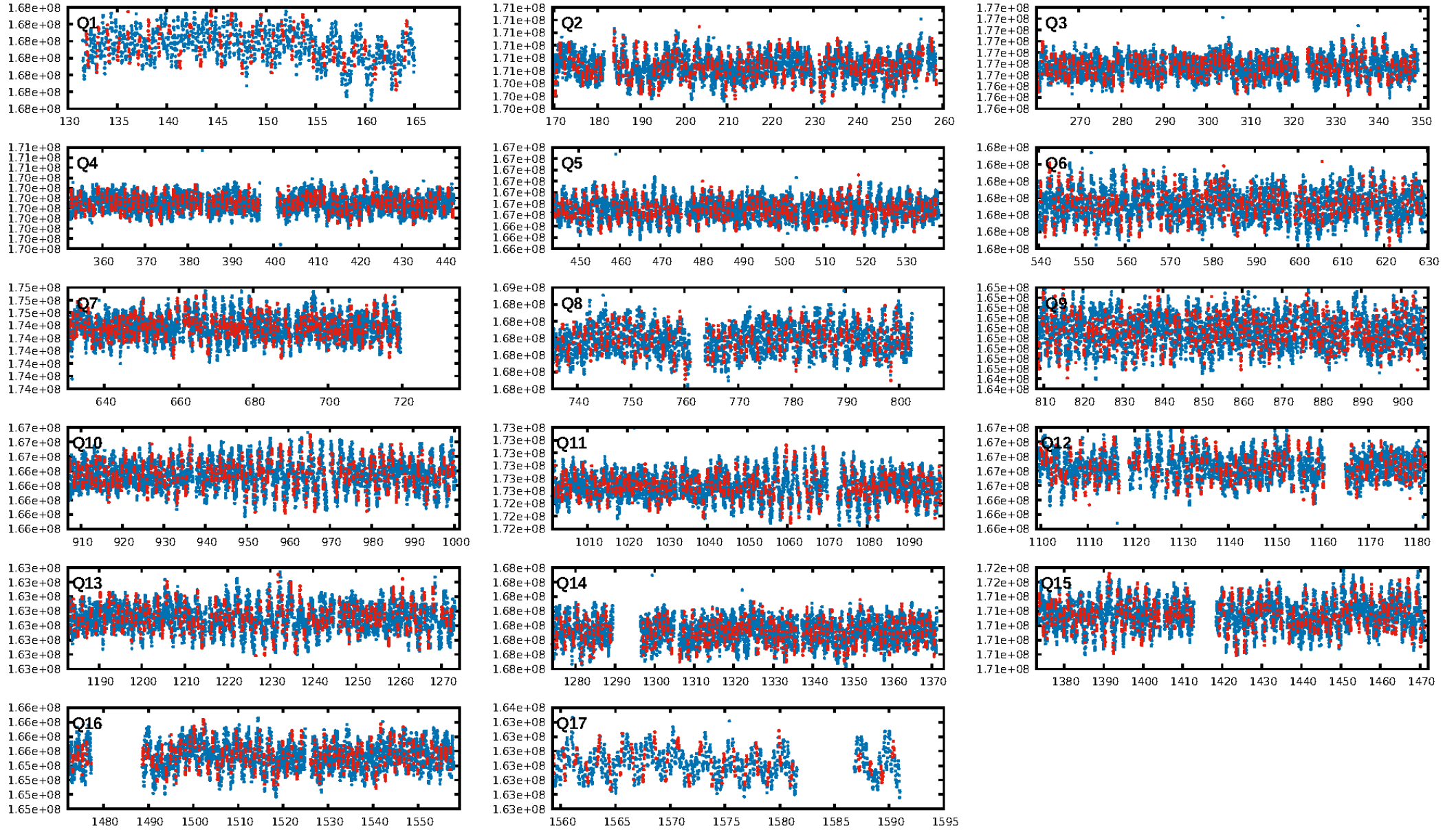
DV Diagnostic Results:

ShortPeriod-sig: 99.8% [3.16 σ]
LongPeriod-sig: 100.0% [187.11 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 2.25e-16
RollingBand-fgt: 1.00 [1223/1229]
GhostDiagnostic-chr: 0.7598
Centroid-sig: 0.1%
Centroid-so: 3.767 arcsec [2.47 σ]
OotOffset-rm: 0.251 arcsec [0.29 σ]
KicOffset-rm: 0.177 arcsec [0.19 σ]
OotOffset-st: 4/0/4/4 [12]
KicOffset-st: 4/0/4/4 [12]
DiffImageQuality-fgm: 0.25 [3/12]
DiffImageOverlap-fno: 0.00 [0/17]

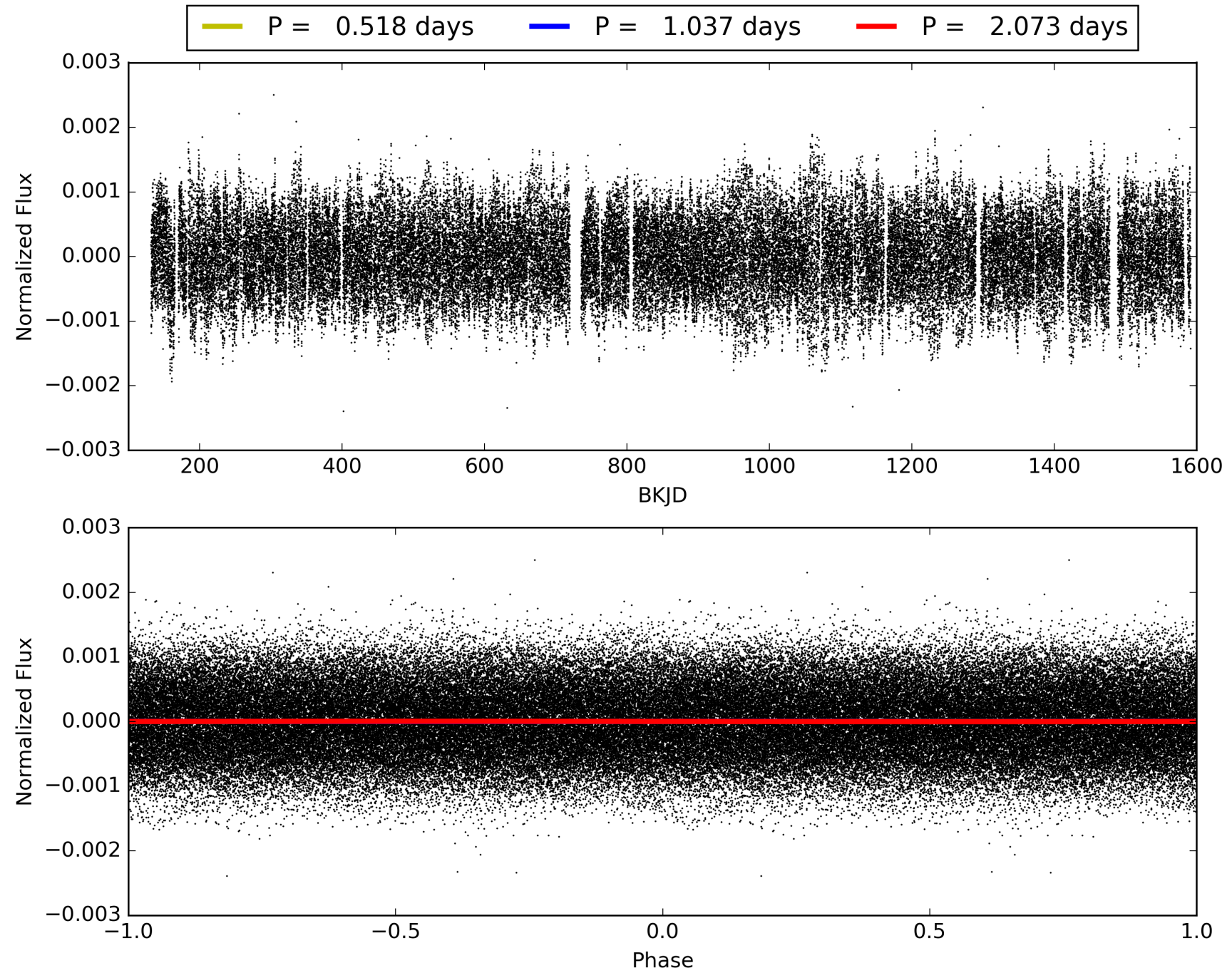
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 14:45:21 Z

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

TCE 008702874-01, PDC Light Curves

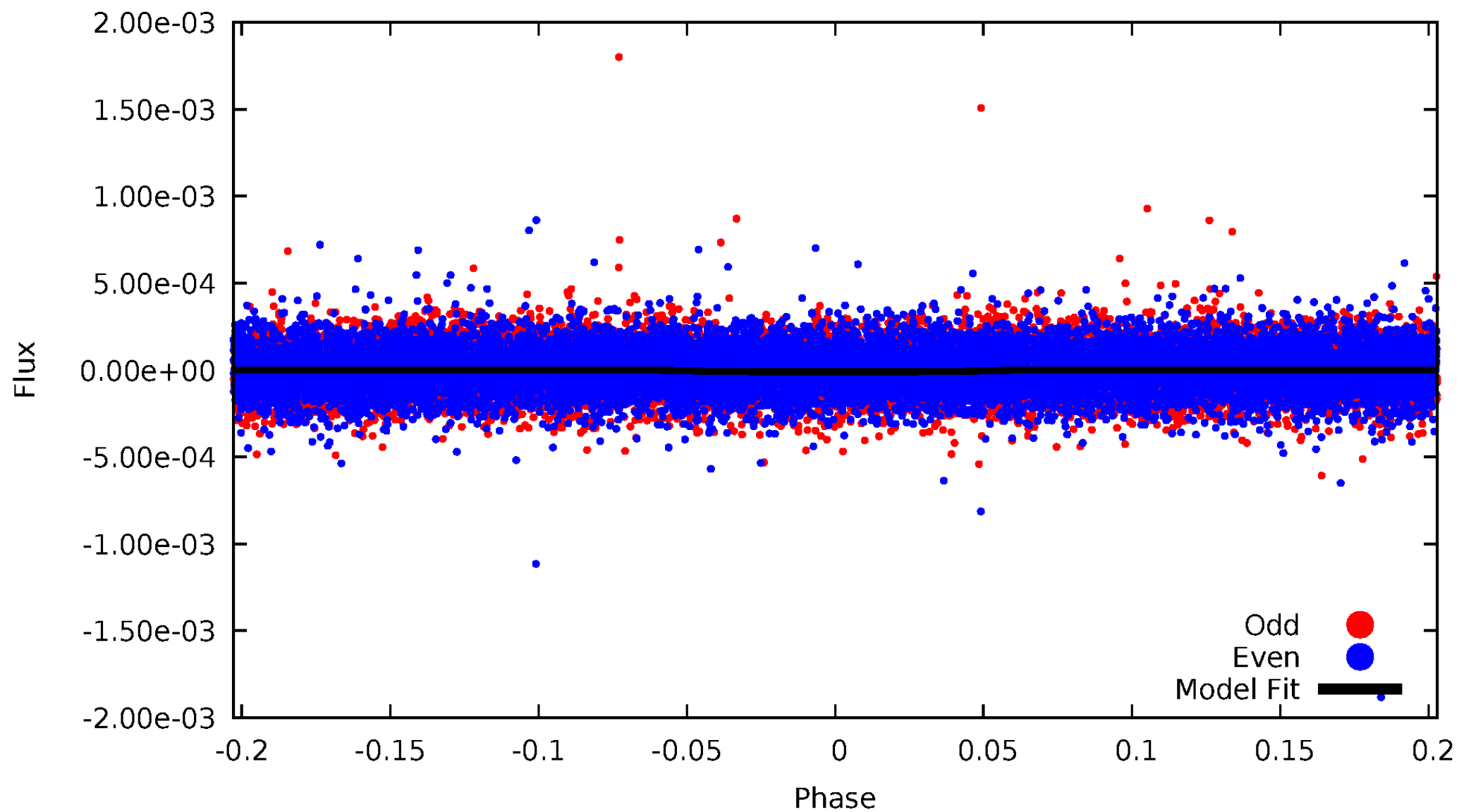


TCE 008702874-01



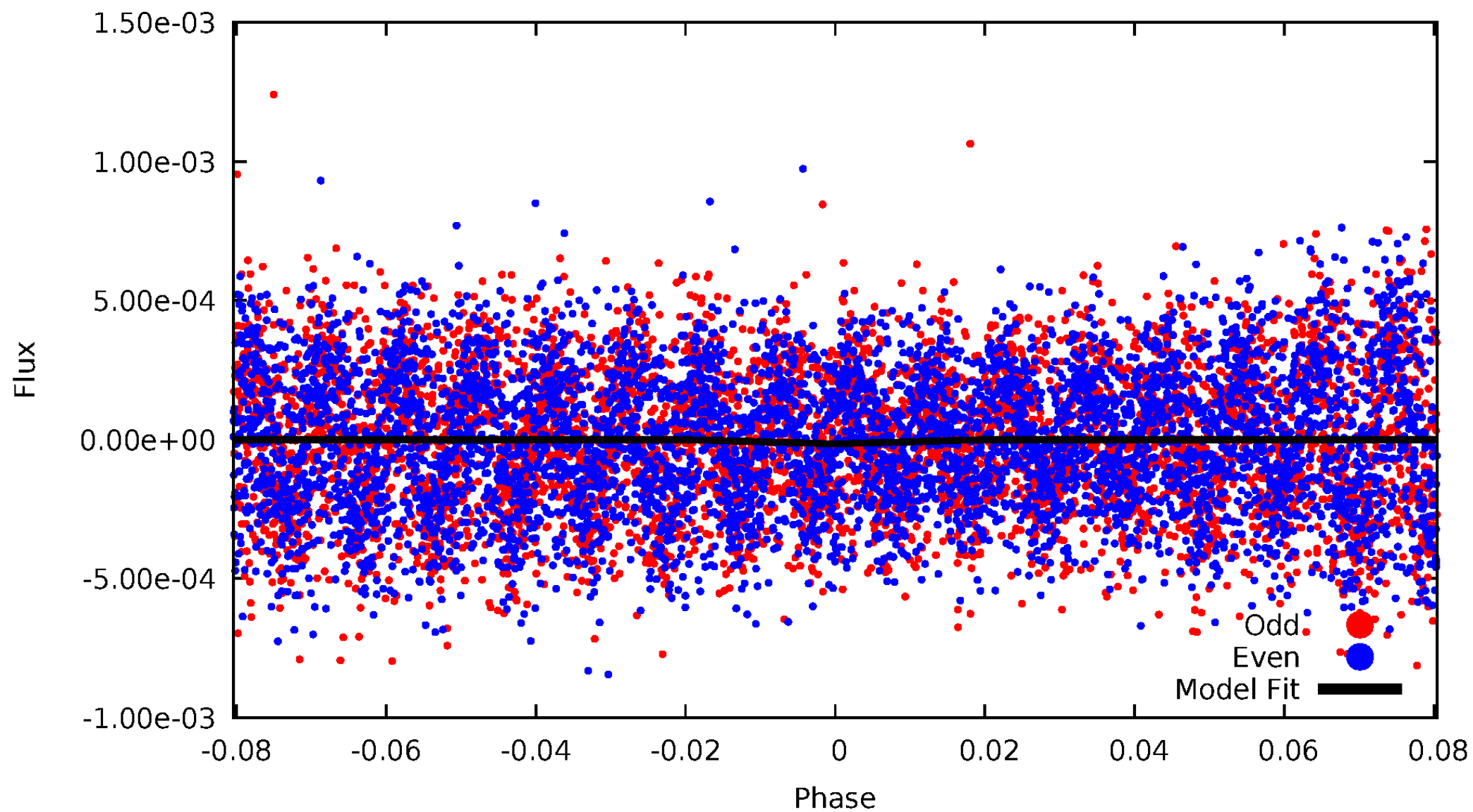
DV Odd/Even

TCE 008702874-01



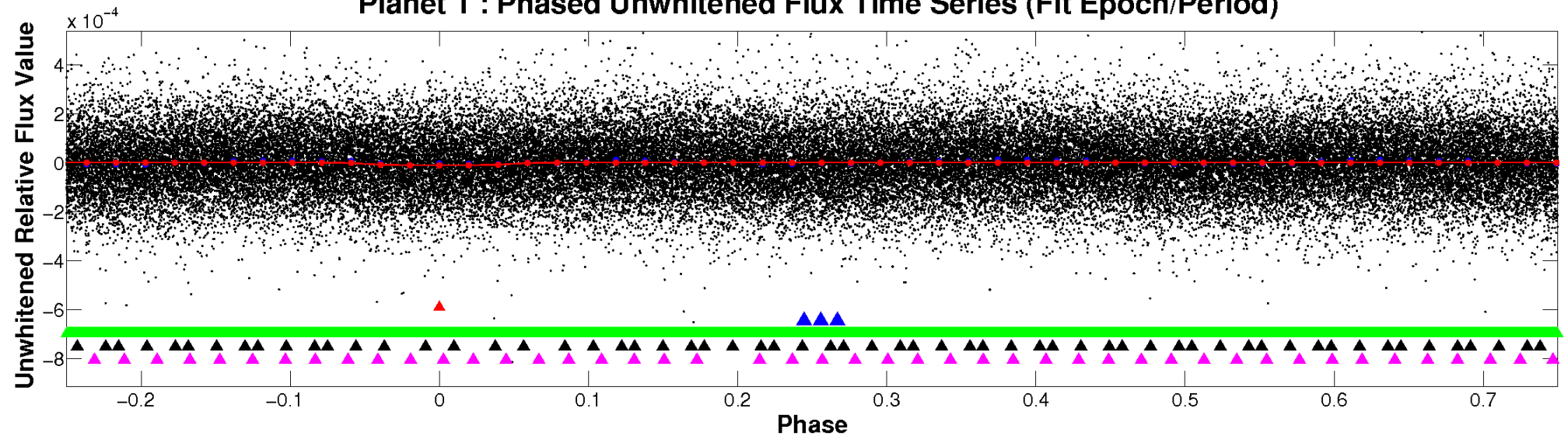
ALT Odd/Even

TCE 008702874-01

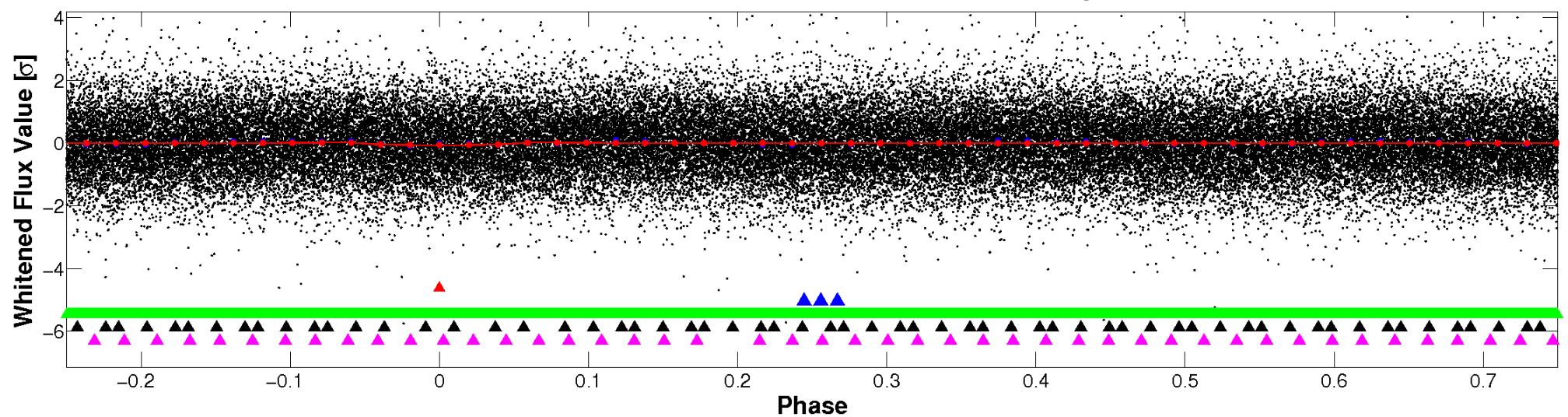


Non-Whitened Vs. Whitened Light Curve

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

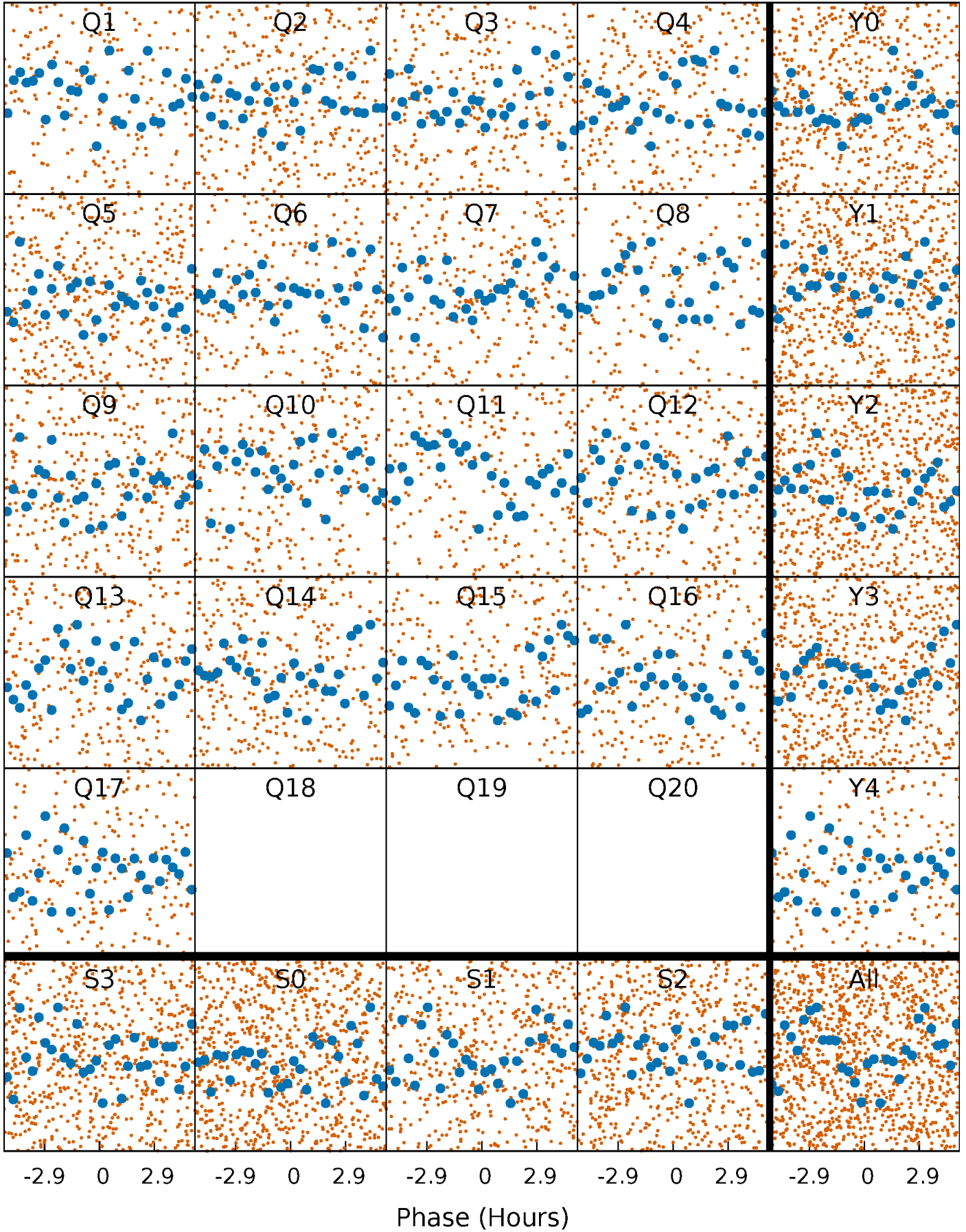


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



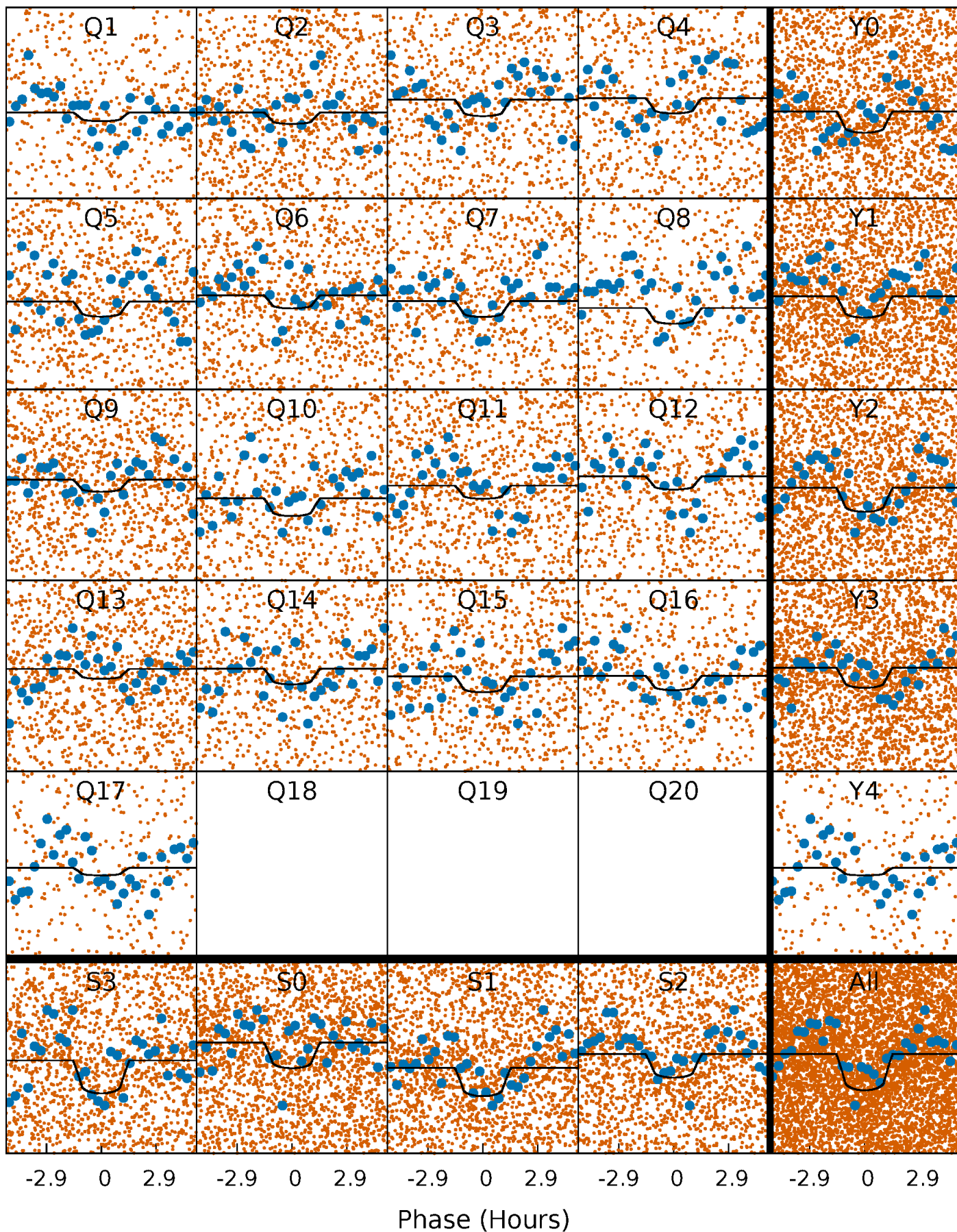
PDC Quarter-Phased Transit Curves

TCE 008702874-01 P= 1.036541 Days $T_0=131.970379$ (BKJD)



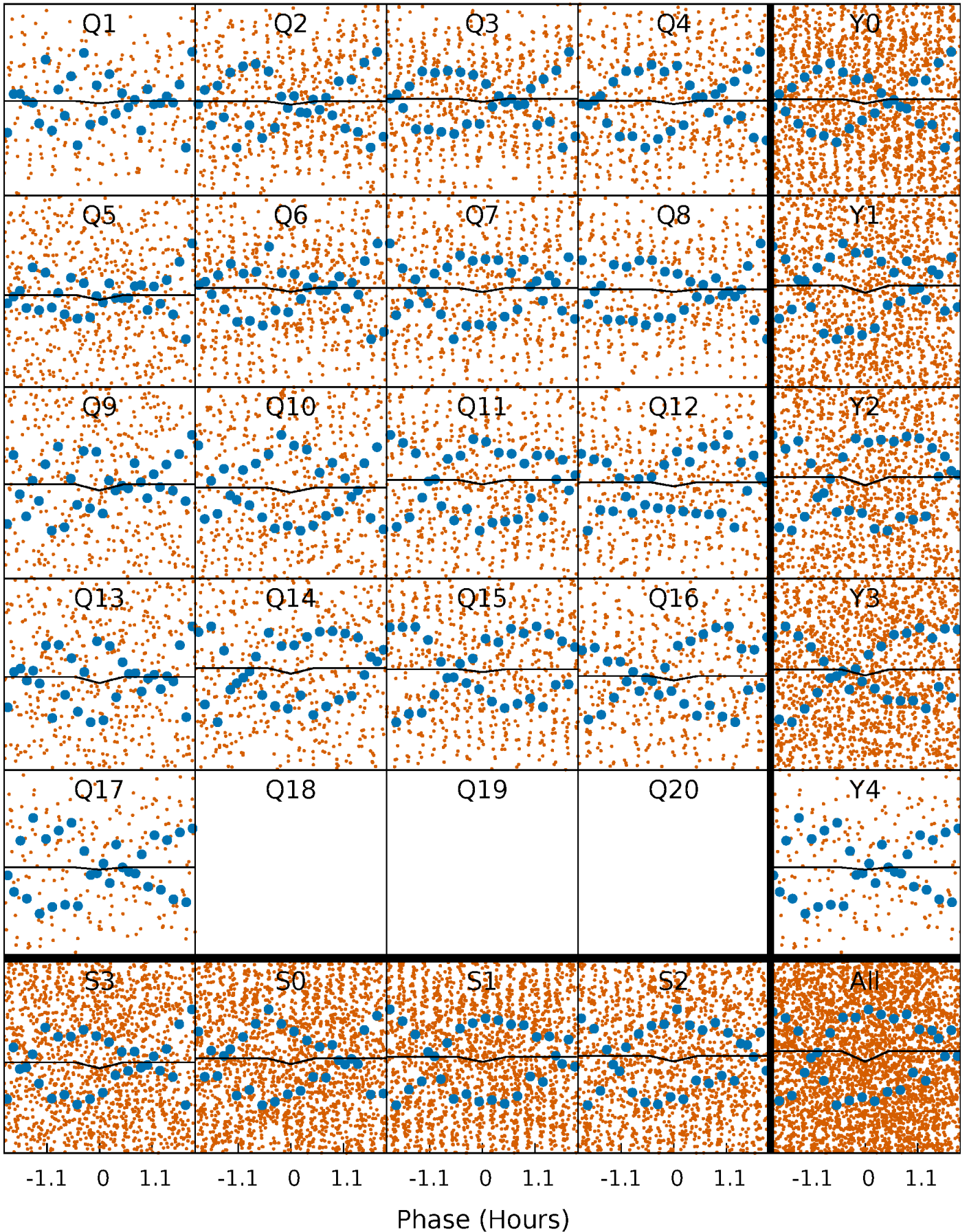
DV Quarter-Phased Transit Curves

TCE 008702874-01 P= 1.036541 Days $T_0=131.970379$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

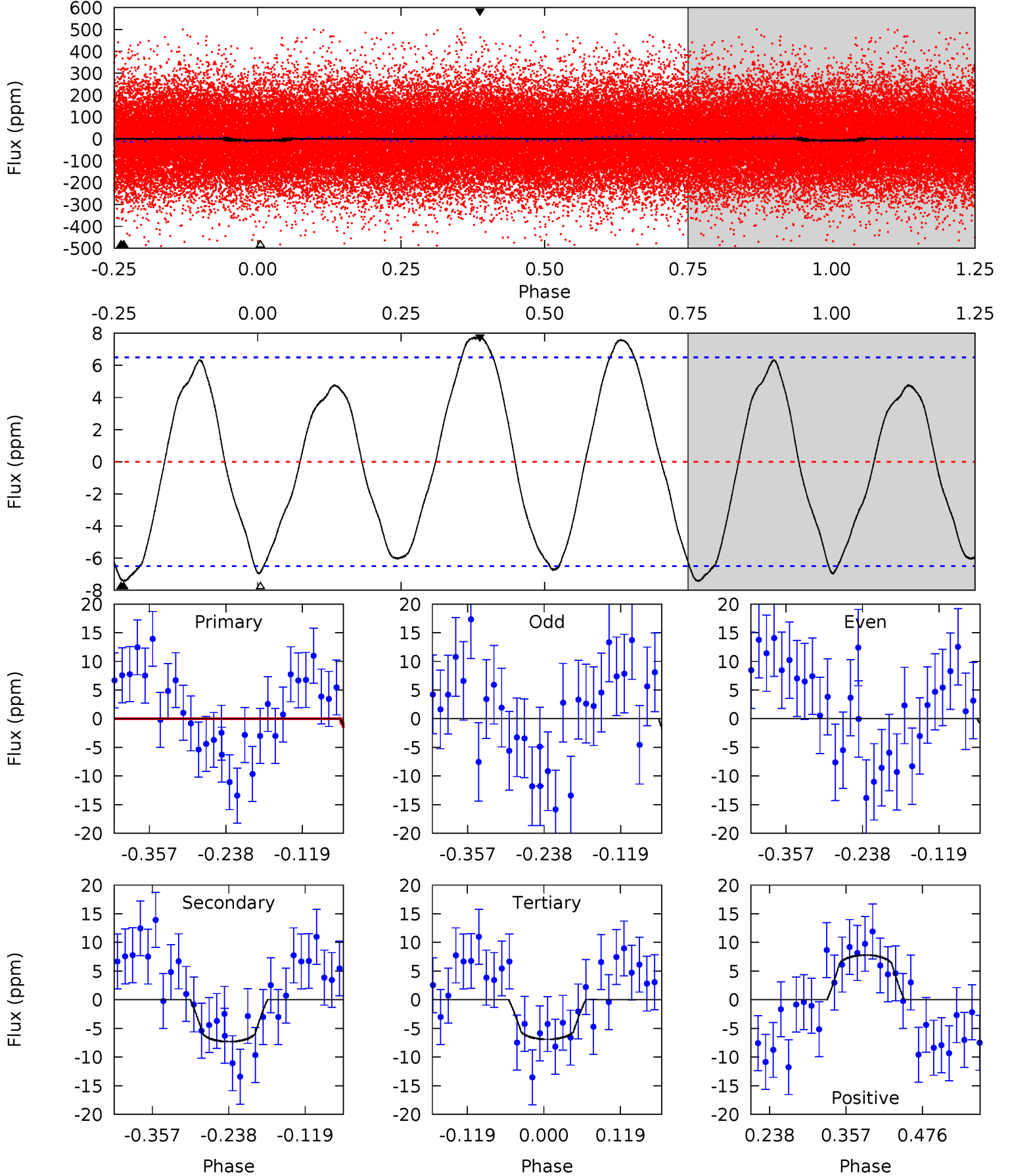
TCE 008702874-01 P= 1.036659 Days $T_0=131.926643$ (BKJD)



DV Model-Shift Uniqueness Test

008702874-01, P = 1.036541 Days, E = 130.933838 Days

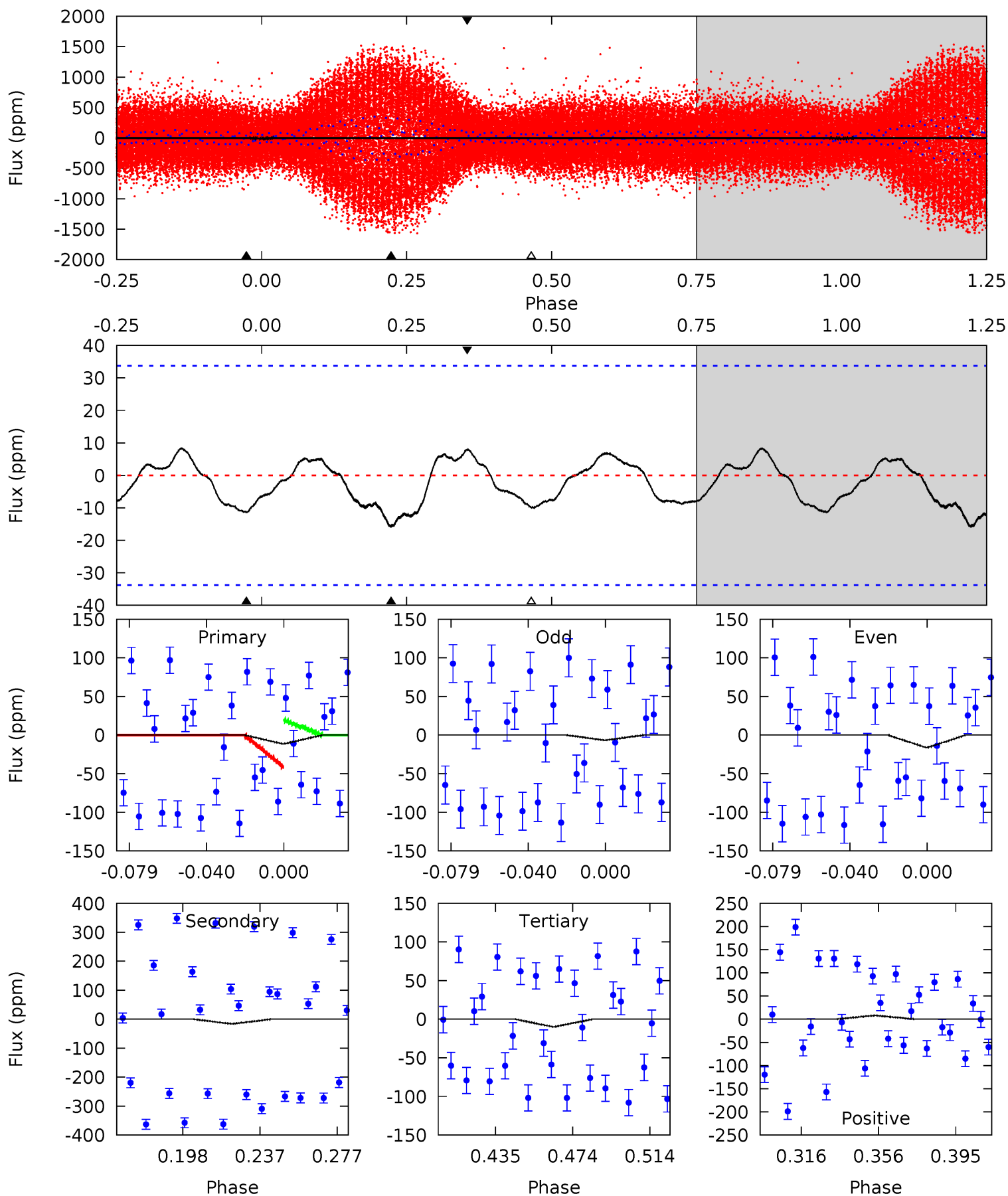
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 5.19 | 5.10 | 4.81 | 5.43 | 4.53 | 1.56 | 3.27 | 0.38 | -0.25 | 0.29 | -0.33 | 1.72 | 0.88 | 0.51 | 0.76 |



Alt Model-Shift Uniqueness Test

008702874-01, P = 1.036659 Days, E = 130.889984 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 1.62 | 2.27 | 1.41 | 1.15 | 4.76 | 2.06 | 0.77 | 0.21 | 0.47 | 0.86 | 1.12 | 0.61 | 0.76 | 0.34 | 1.38 |



Stellar Parameters For KIC 008702874

| | $T_{\text{eff}} (K)$ | $\log(g)$ | $[\text{Fe}/\text{H}]$ | $R (R_{\odot})$ | $M (M_{\odot})$ | $\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|--|
| | 6961^{+194}_{-305} | $4.021^{+0.209}_{-0.171}$ | $0.100^{+0.200}_{-0.350}$ | $2.049^{+0.586}_{-0.586}$ | $1.605^{+0.207}_{-0.311}$ | $0.263^{+0.364}_{-0.124}$ |
| | +3%/-4% | +5%/-4% | +200%/-350% | +29%/-29% | +13%/-19% | +138%/-47% |
| Source | PHO54 | PHO54 | PHO54 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 008702874-01 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|-------------|------------------------|----------------------|------------------------|---------------------------|
| DV | -7 ± 1 | $0.70^{+0.22}_{-0.20}$ | 3955^{+299}_{-319} | 6131^{+1168}_{-759} | $4.302^{+4.558}_{-1.802}$ |
| Alt. | -16 ± 7 | $0.85^{+0.24}_{-0.21}$ | 3983^{+301}_{-338} | 6875^{+1475}_{-1273} | $6.380^{+6.525}_{-3.599}$ |

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

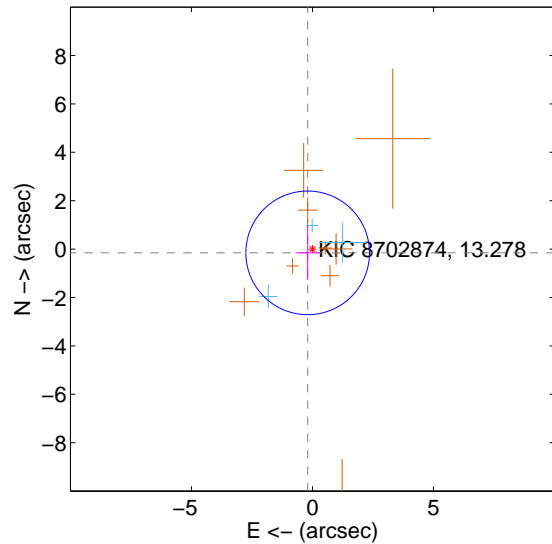
Supplemental centroid analysis for 008702874-01. Kepler magnitude: 13.28. Transit SNR 4.20

There are 3 quarters with good PRF difference image offsets

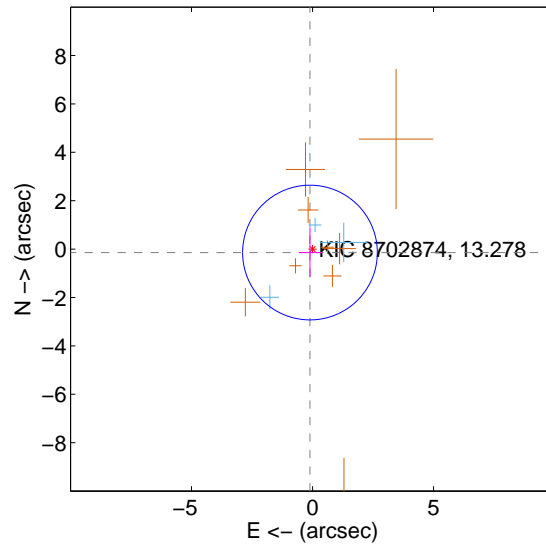
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT | 0.251 ± 0.851 | 0.29 | 0.197 ± 0.496 | -0.156 ± 1.126 |
| PRF-fit source offset from KIC position | 0.177 ± 0.928 | 0.19 | 0.106 ± 0.453 | -0.143 ± 1.024 |
| photometric centroid source offset | 3.77 ± 1.52 | 2.47 | -2.80 ± 1.52 | 2.52 ± 1.52 |

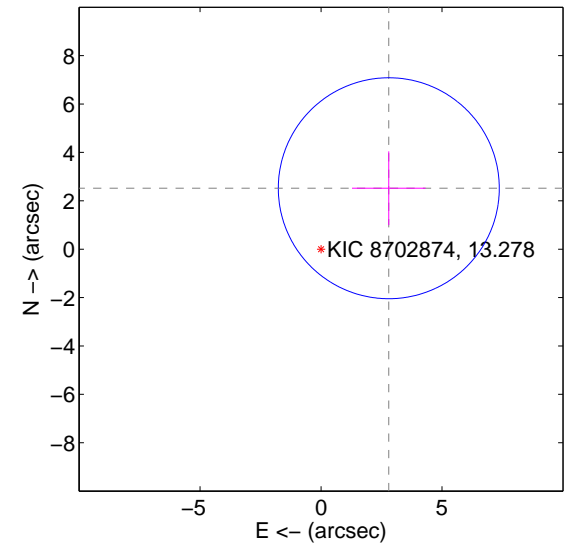
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

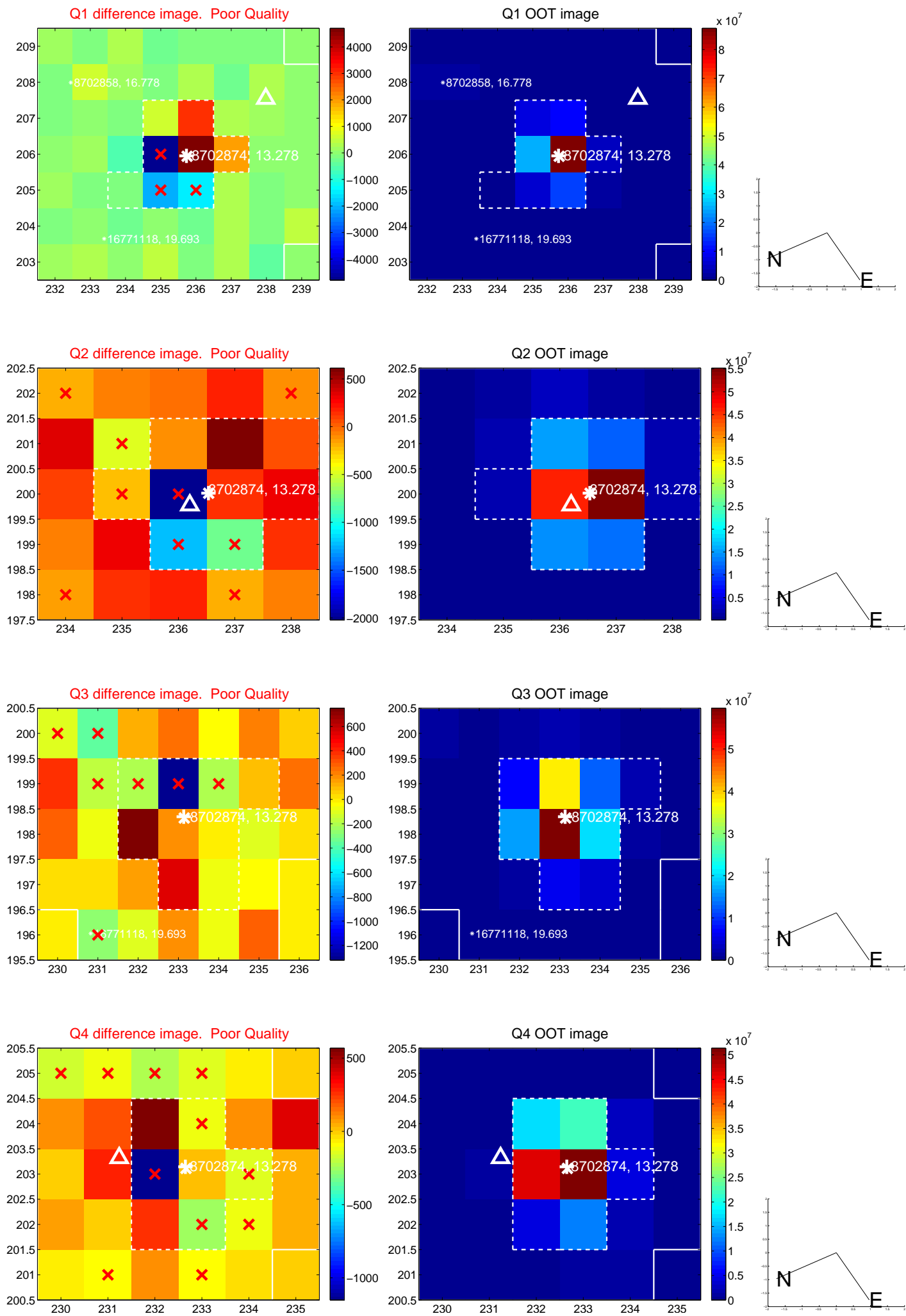


offset from photometric centroids

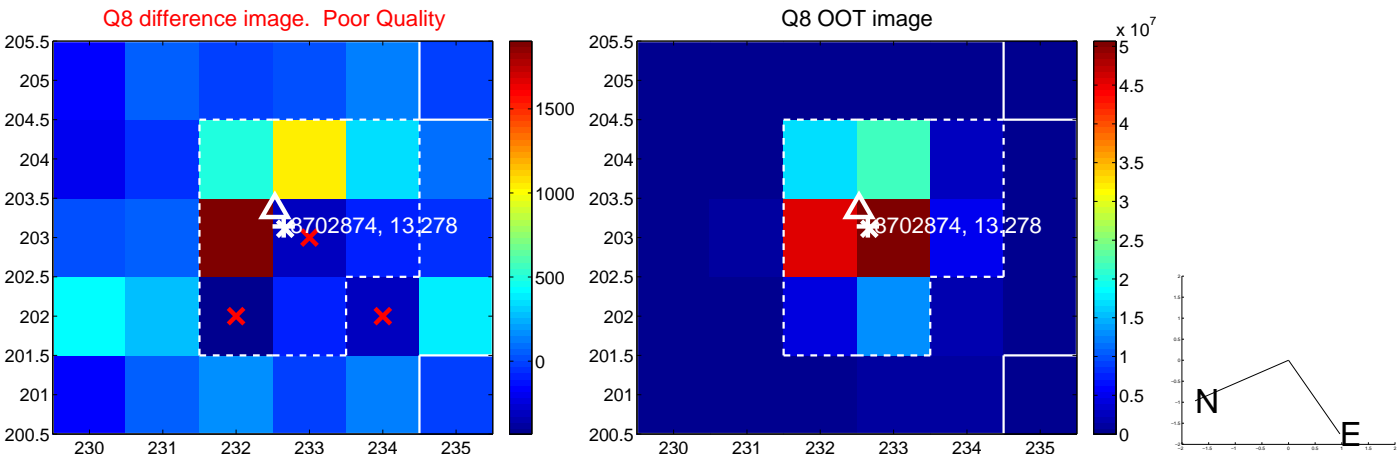
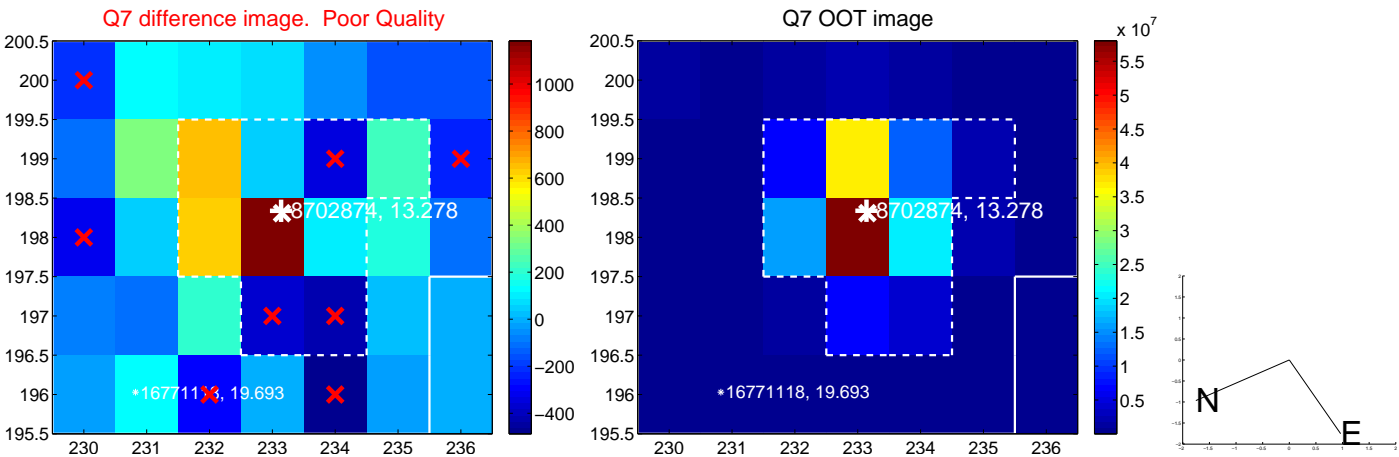
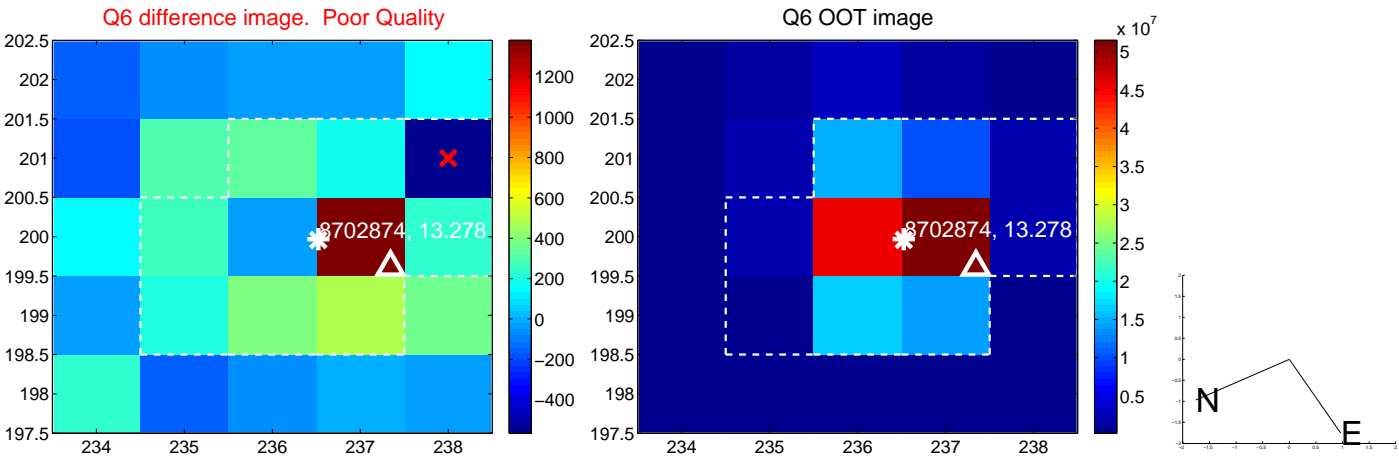
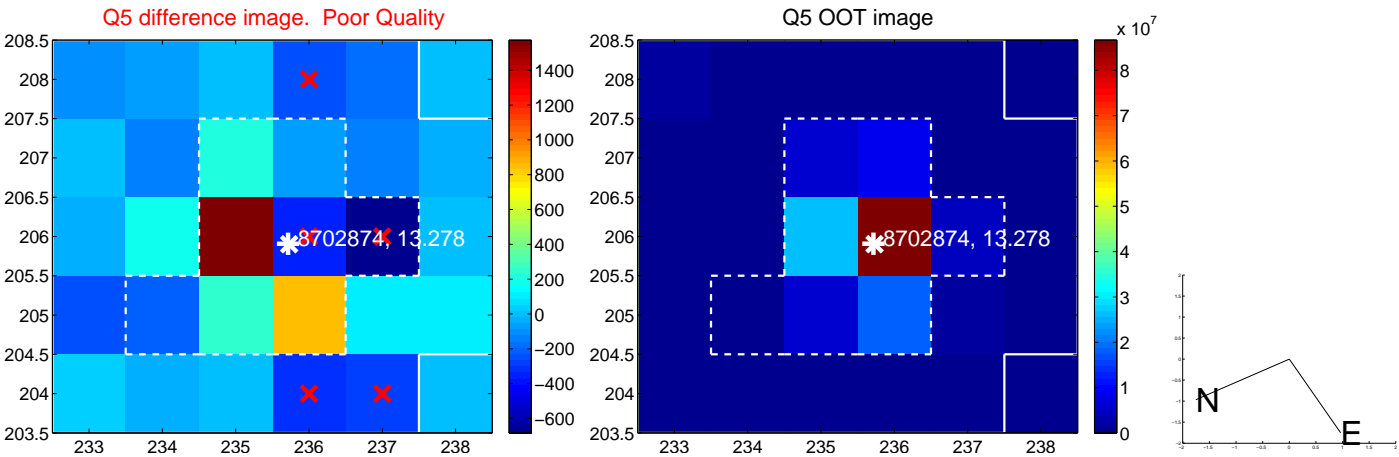


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

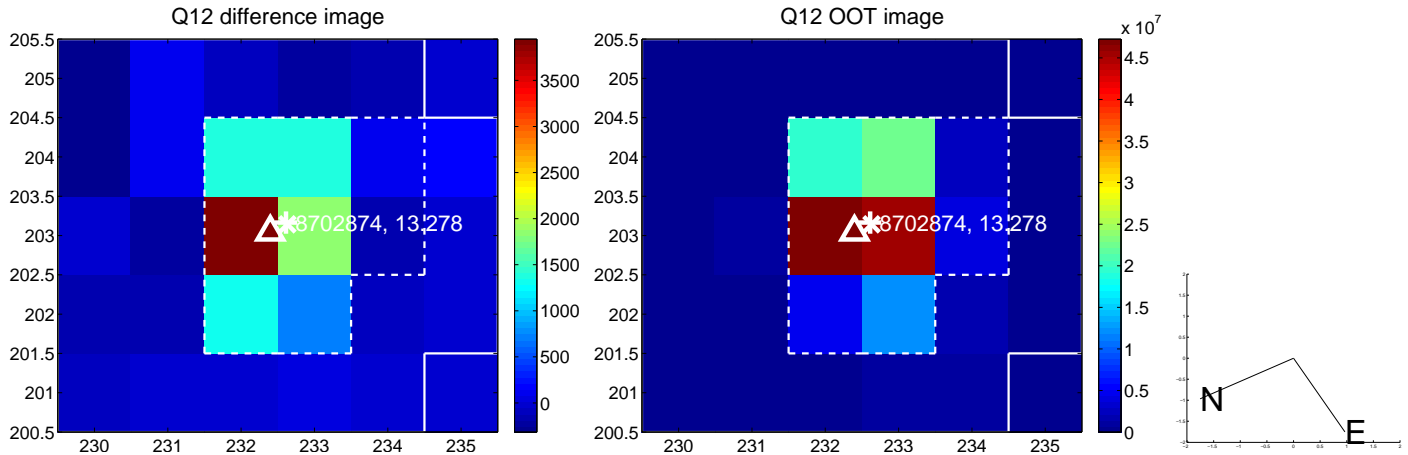
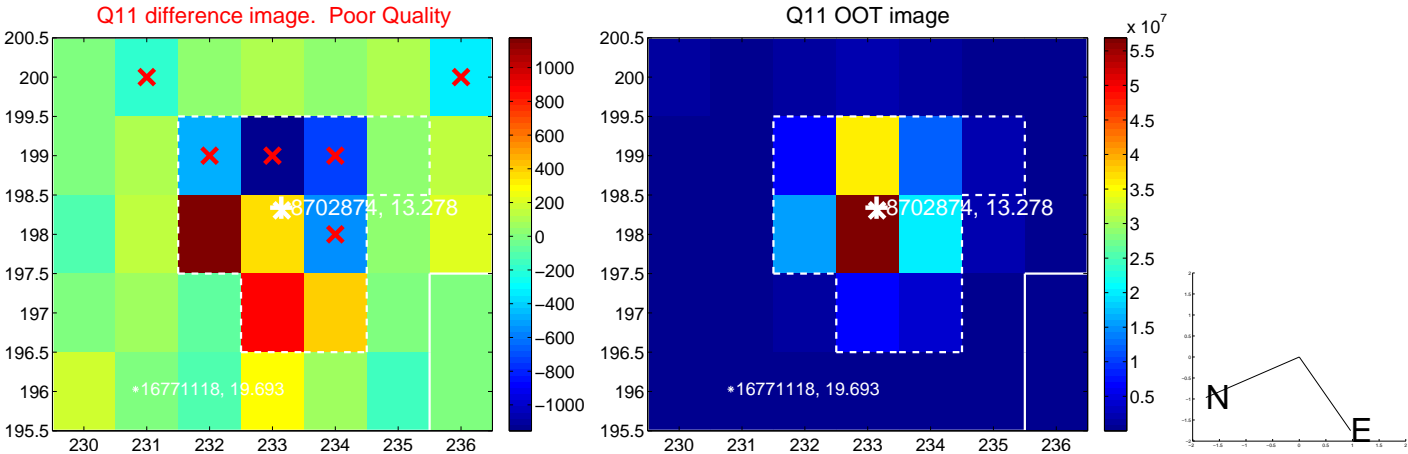
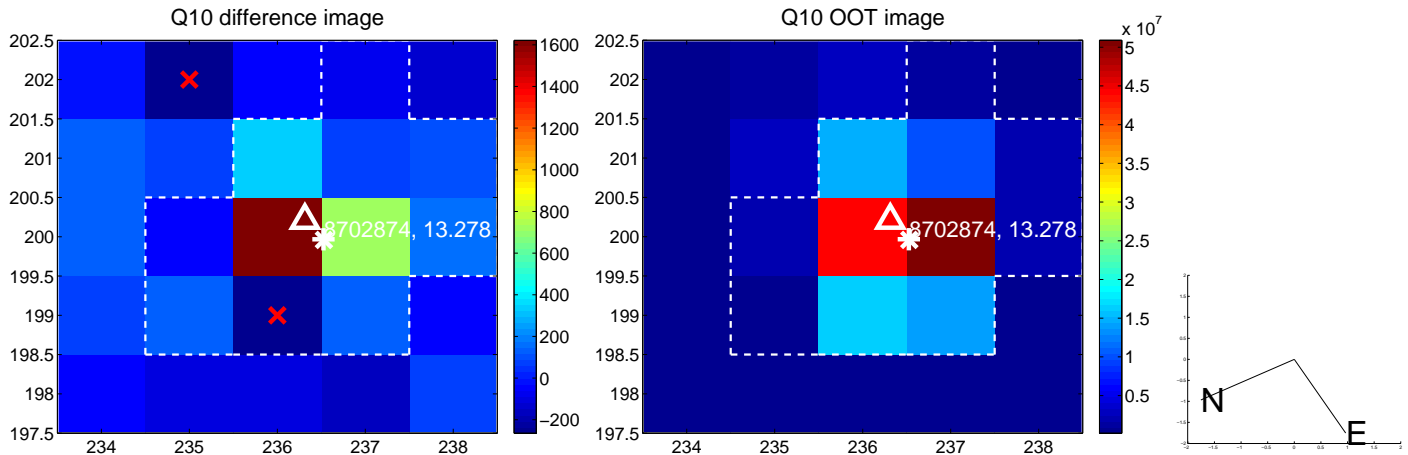
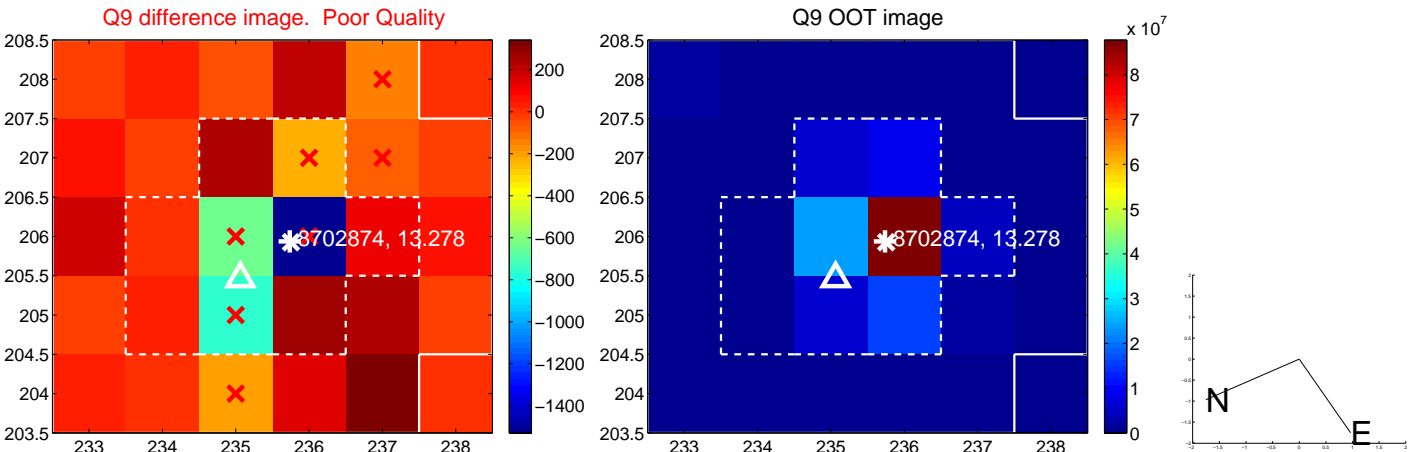
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



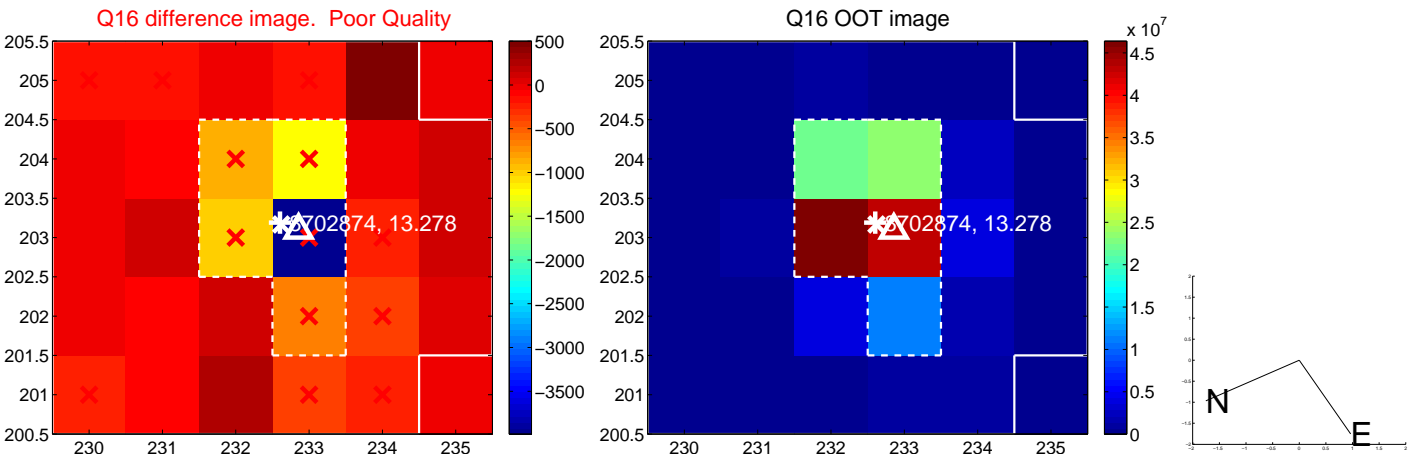
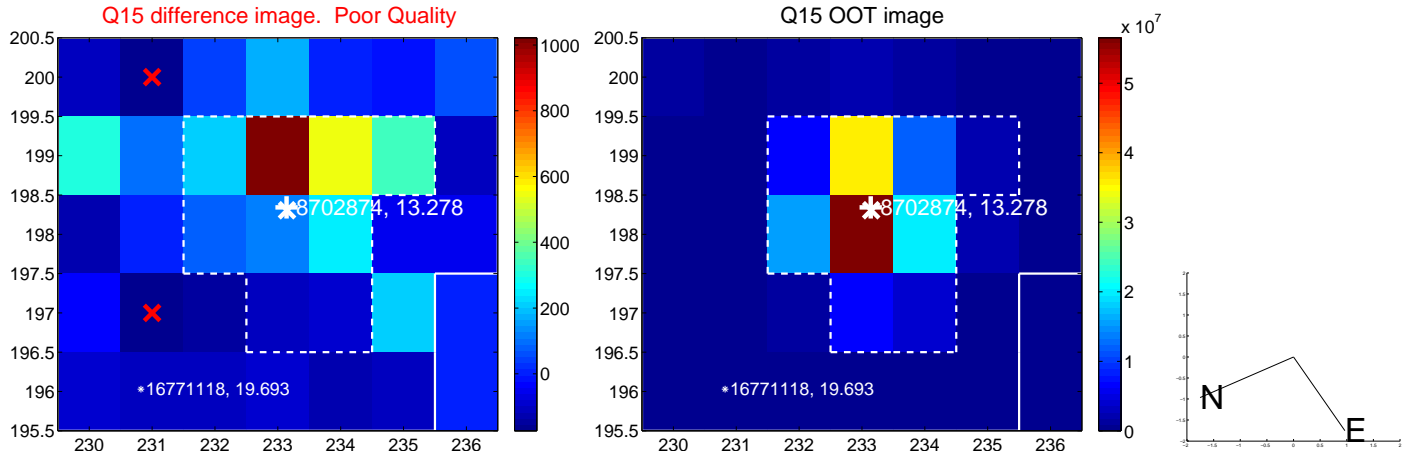
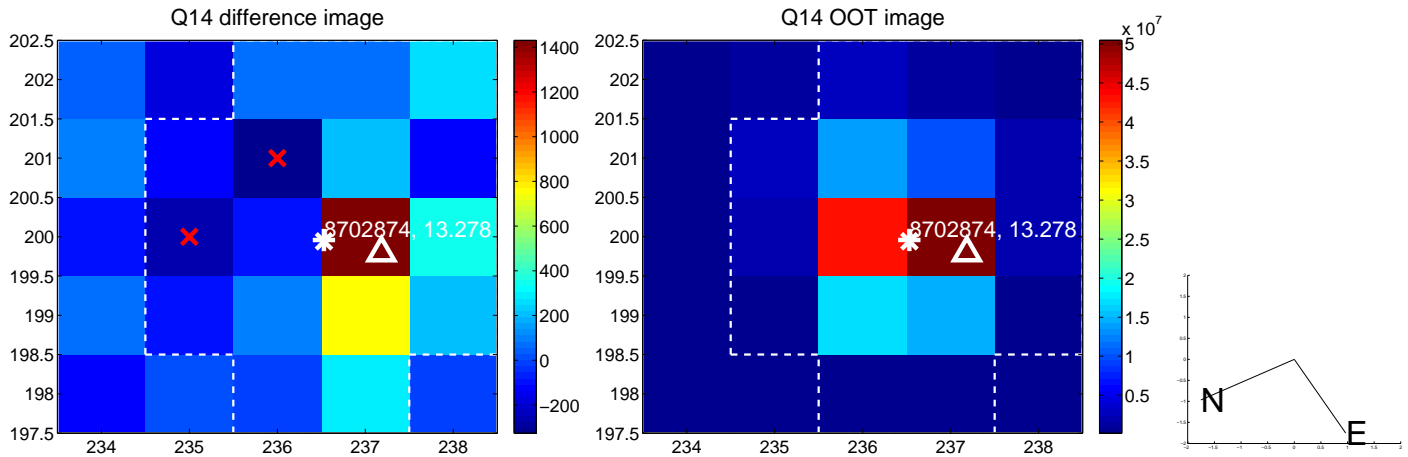
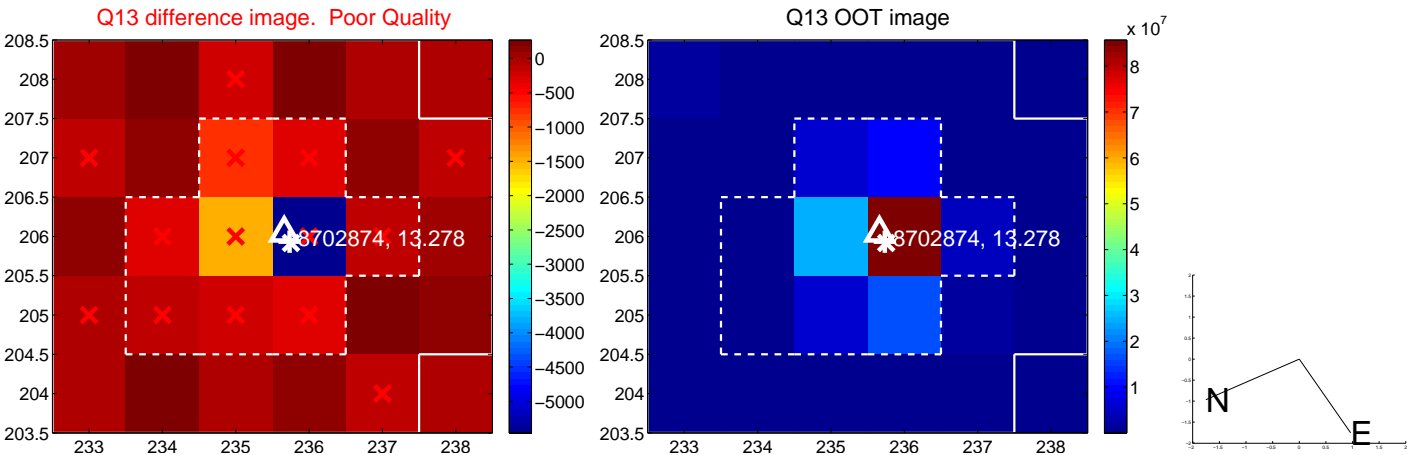
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



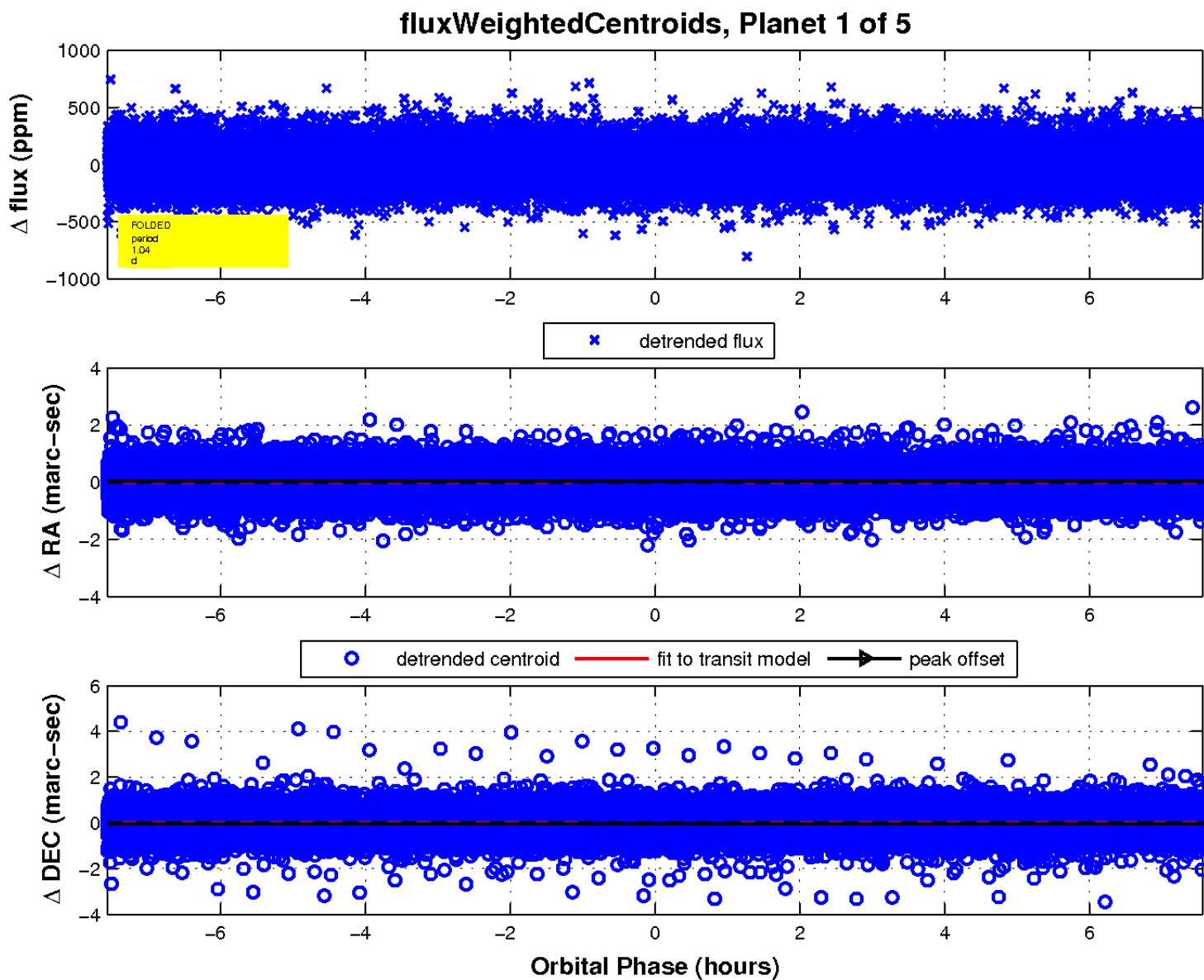
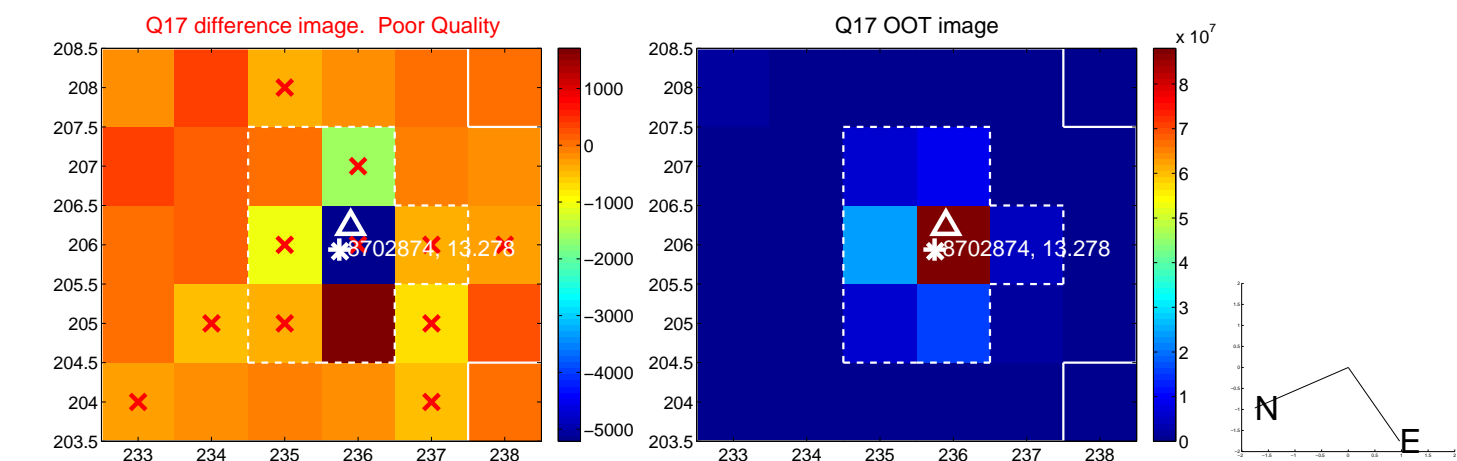
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

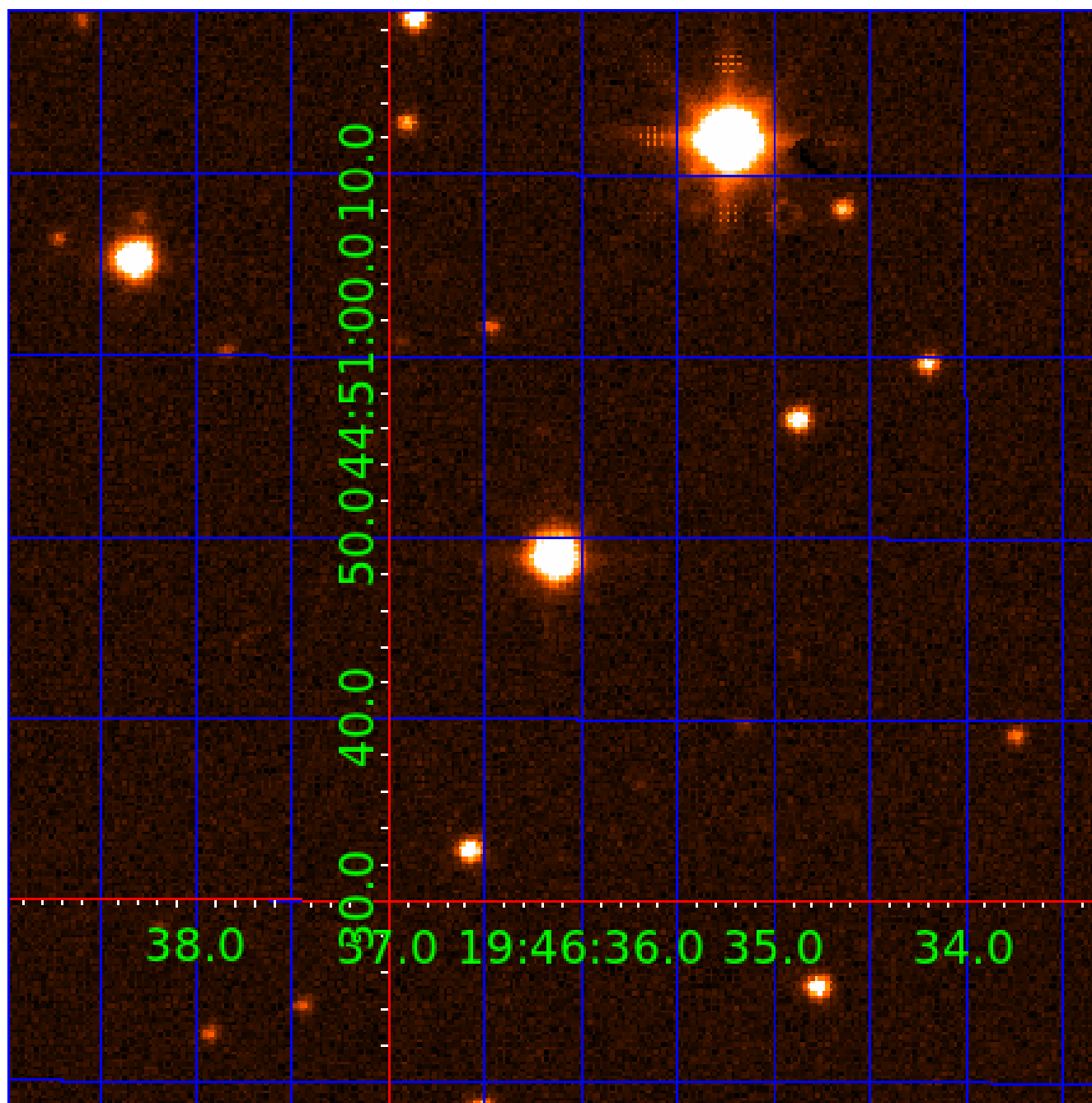


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 008702874

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 008702874-01 | OBS | No | 1.036541 | 131.970379 | 10.8 | 2.522 | 9.2 | 4.2 | 2.05 | 6961 | 0.71 | 16013.76 |
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| 008702874-04 | OBS | No | 23.792033 | 145.367715 | 295.4 | 1.468 | 7.5 | 6.8 | 2.05 | 6961 | 4.07 | 245.49 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 008702874-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT |
| 008702874-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS |
| 008702874-03 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_UNCERTAIN |
| 008702874-04 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT |

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

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

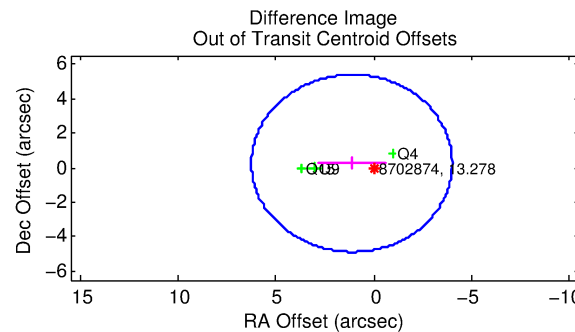
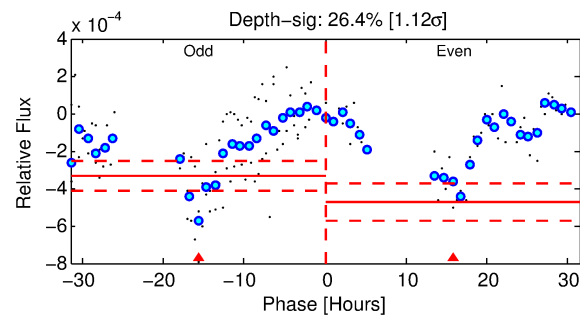
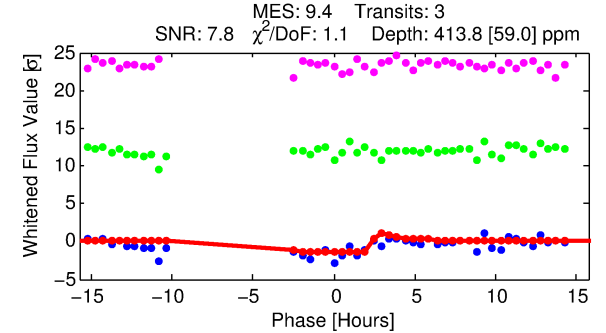
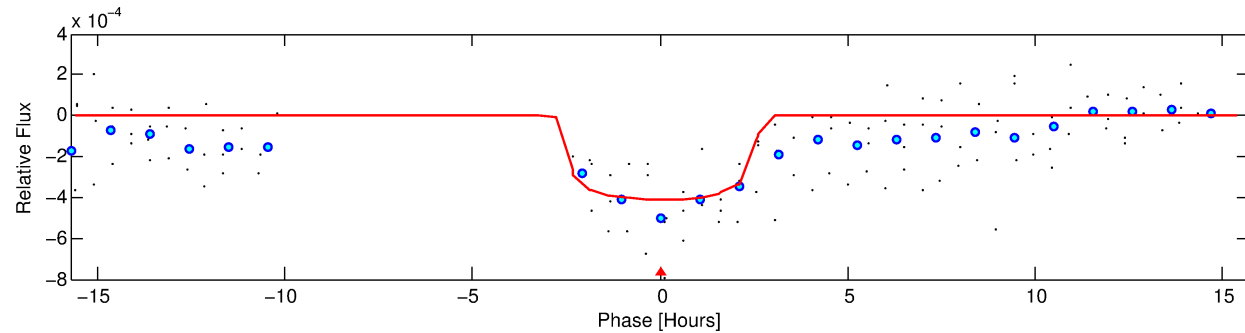
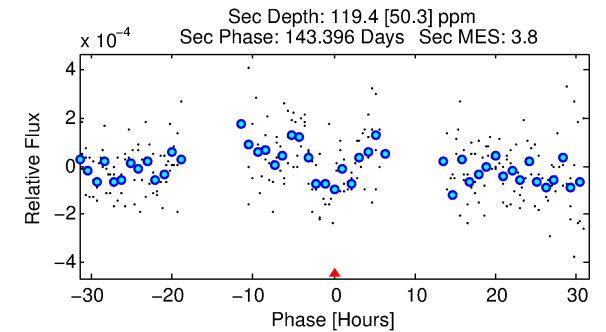
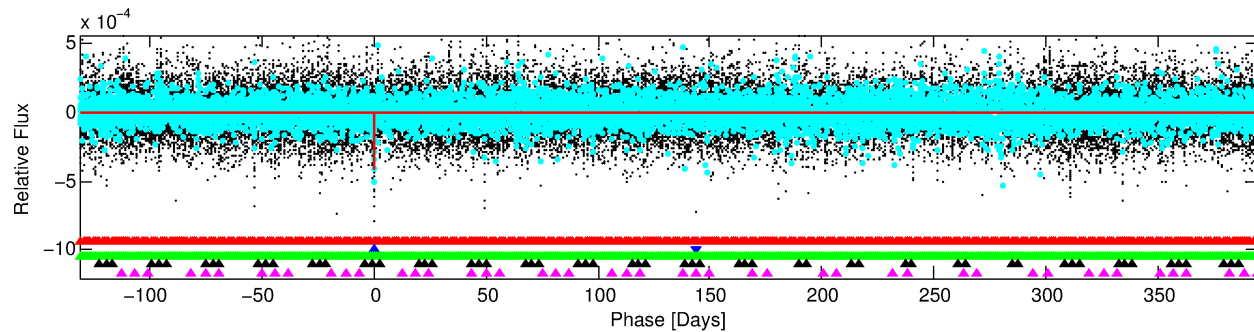
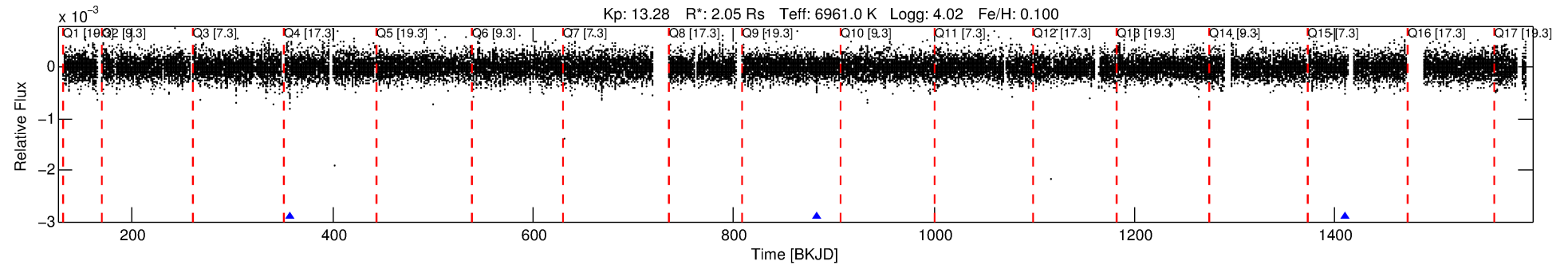
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008702874-02

No Significant Match Found

DV One-Page Summary

KIC: 8702874 Candidate: 2 of 5 Period: 526.575 d



DV Fit Results:

Period = 526.57460 [0.00593] d
Epoch = 357.1534 [0.0142] BKJD
Rp/R* = 0.0198 [0.0339]
a/R* = 598.50 [5962.31]
b = 0.66 [8.57]
Seff = 3.95 [1.63]
Teq = 359 [37] K
Rp = 4.42 [7.69] Re
a = 1.4952 [0.3726] AU
Ag = 7501.99 [26077.99] [0.29σ]
Teffp = 5173 [4475] K [1.08σ]

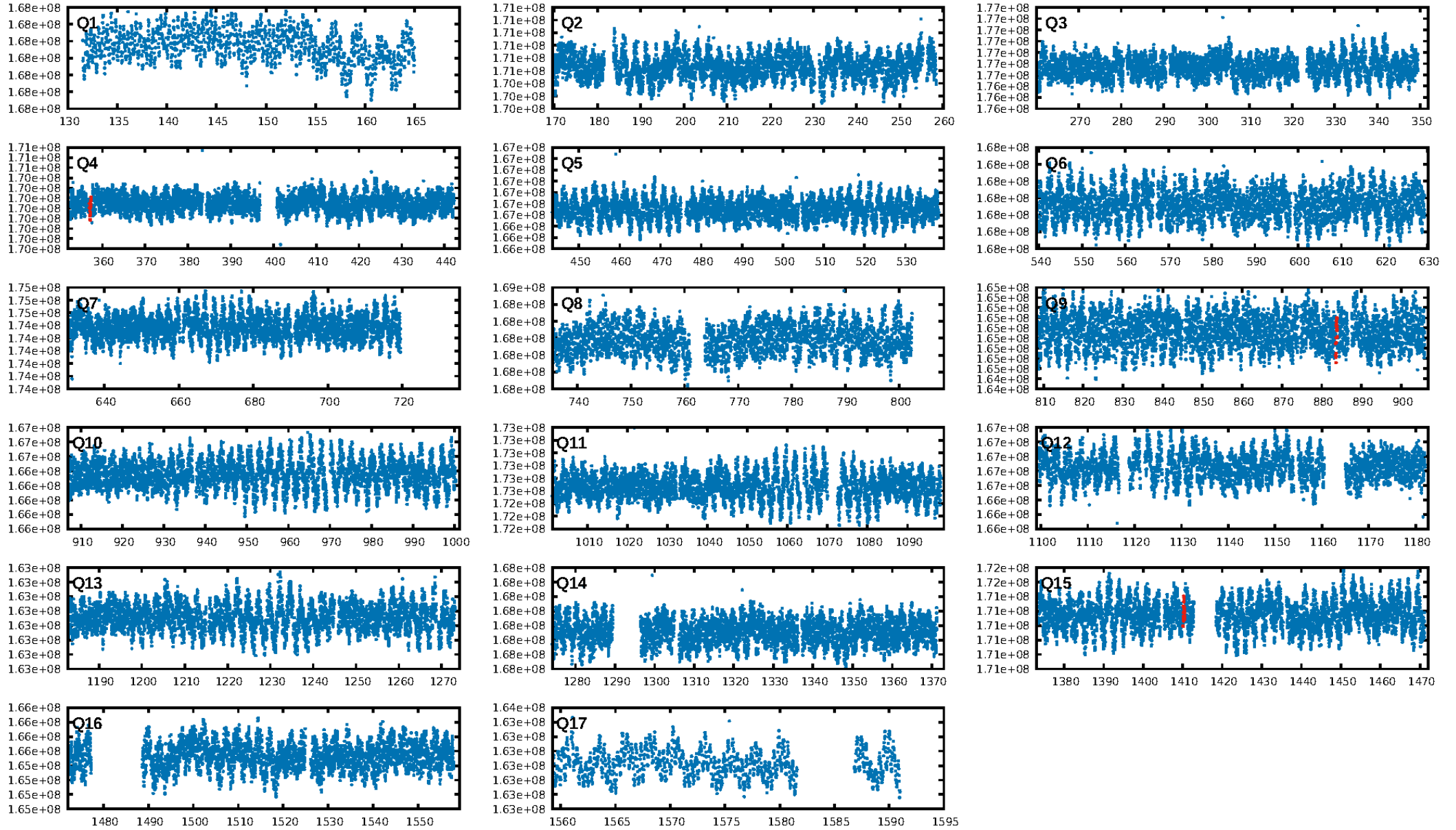
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [2043.17σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 1.8%
ModelChiSquareGof-sig: 86.4%
Bootstrap-pfa: 8.12e-11
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -3.04
Centroid-sig: 0.2%
Centroid-so: 1.379 arcsec [2.14σ]
OotOffset-rm: 1.149 arcsec [0.67σ]
KicOffset-st: 0/1/1/1 [3]
KicOffset-st: 0/1/1/1 [3]
DiffImageQuality-fgm: 0.33 [1/3]
DiffImageOverlap-fno: 0.00 [0/3]

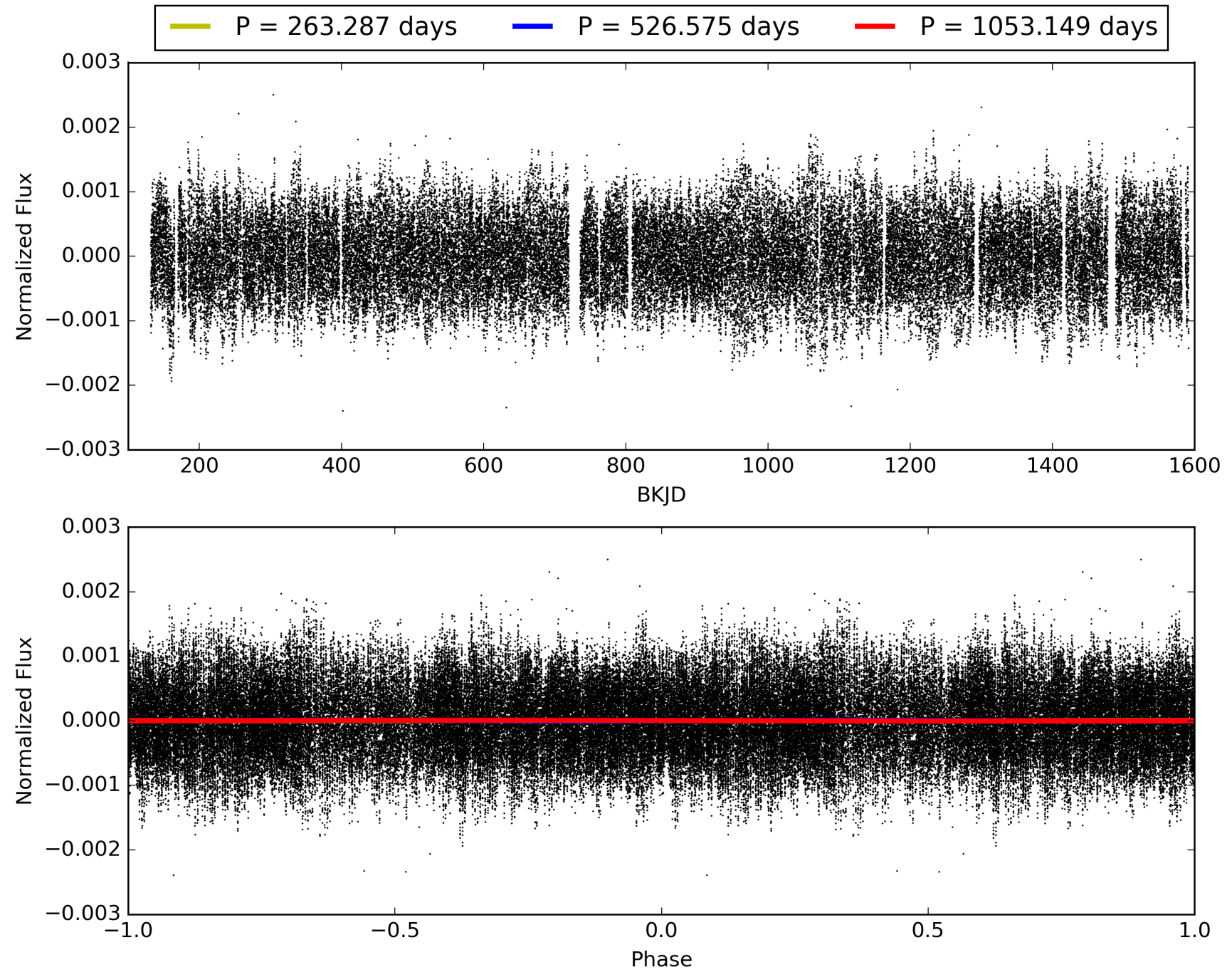
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 008702874-02, PDC Light Curves

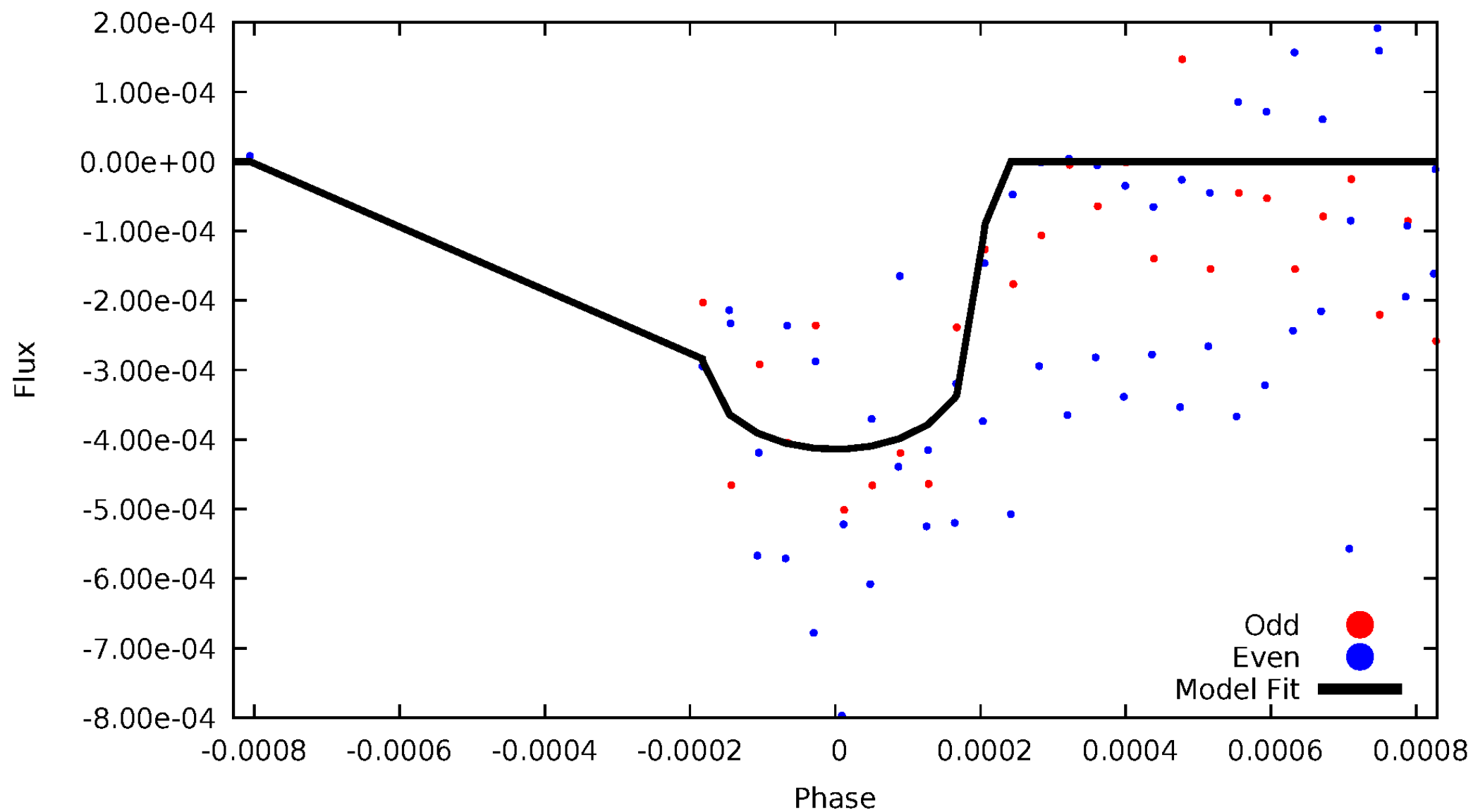


TCE 008702874-02



DV Odd/Even

TCE 008702874-02

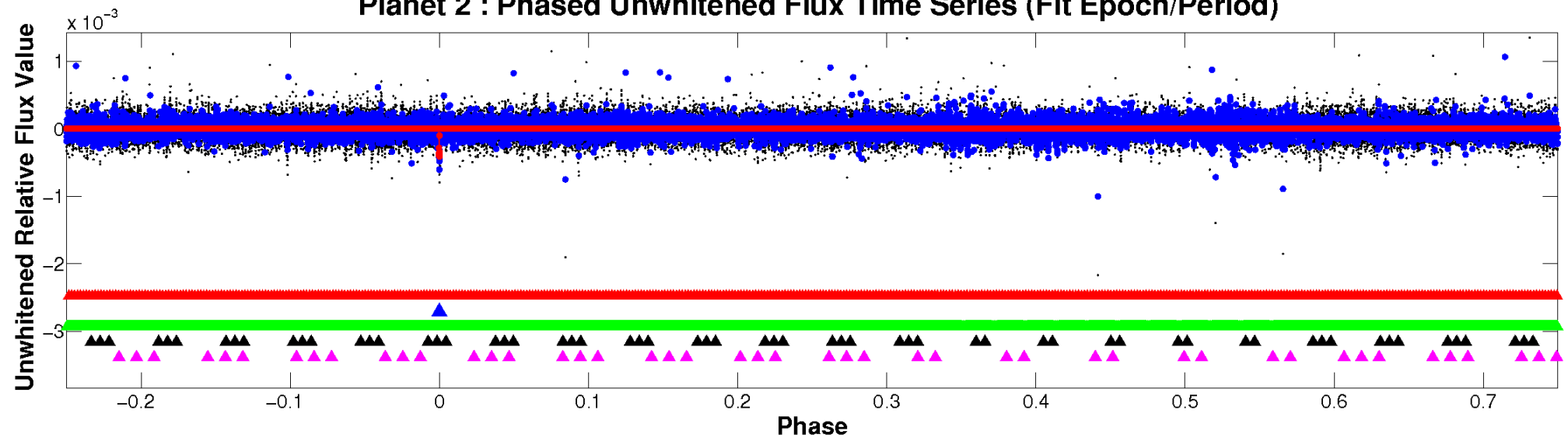


ALT Odd/Even

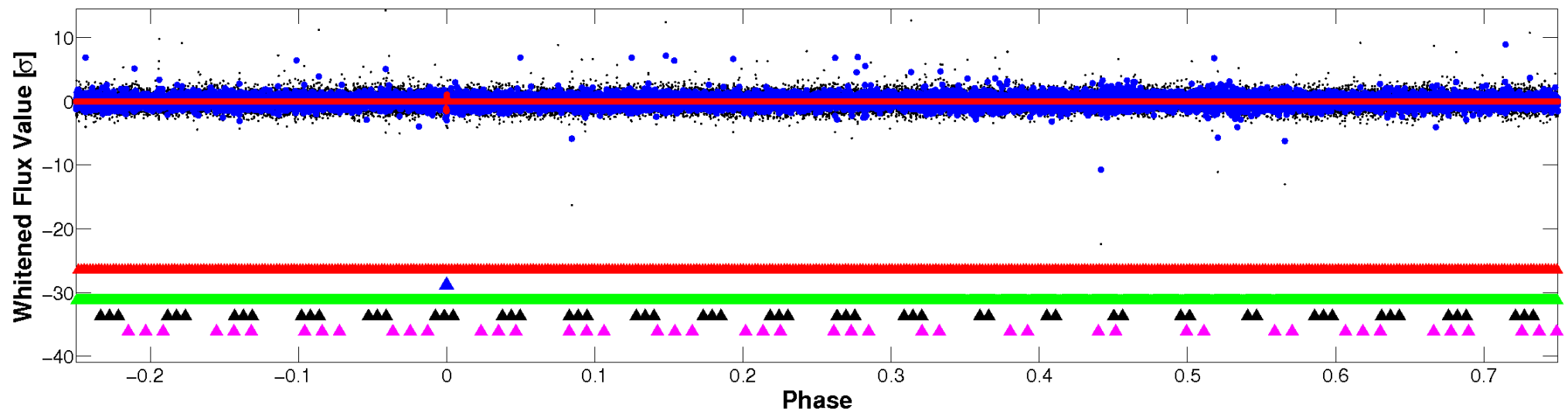
This plot does not exist for this TCE.

Non-Whitened Vs. Whitened Light Curve

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

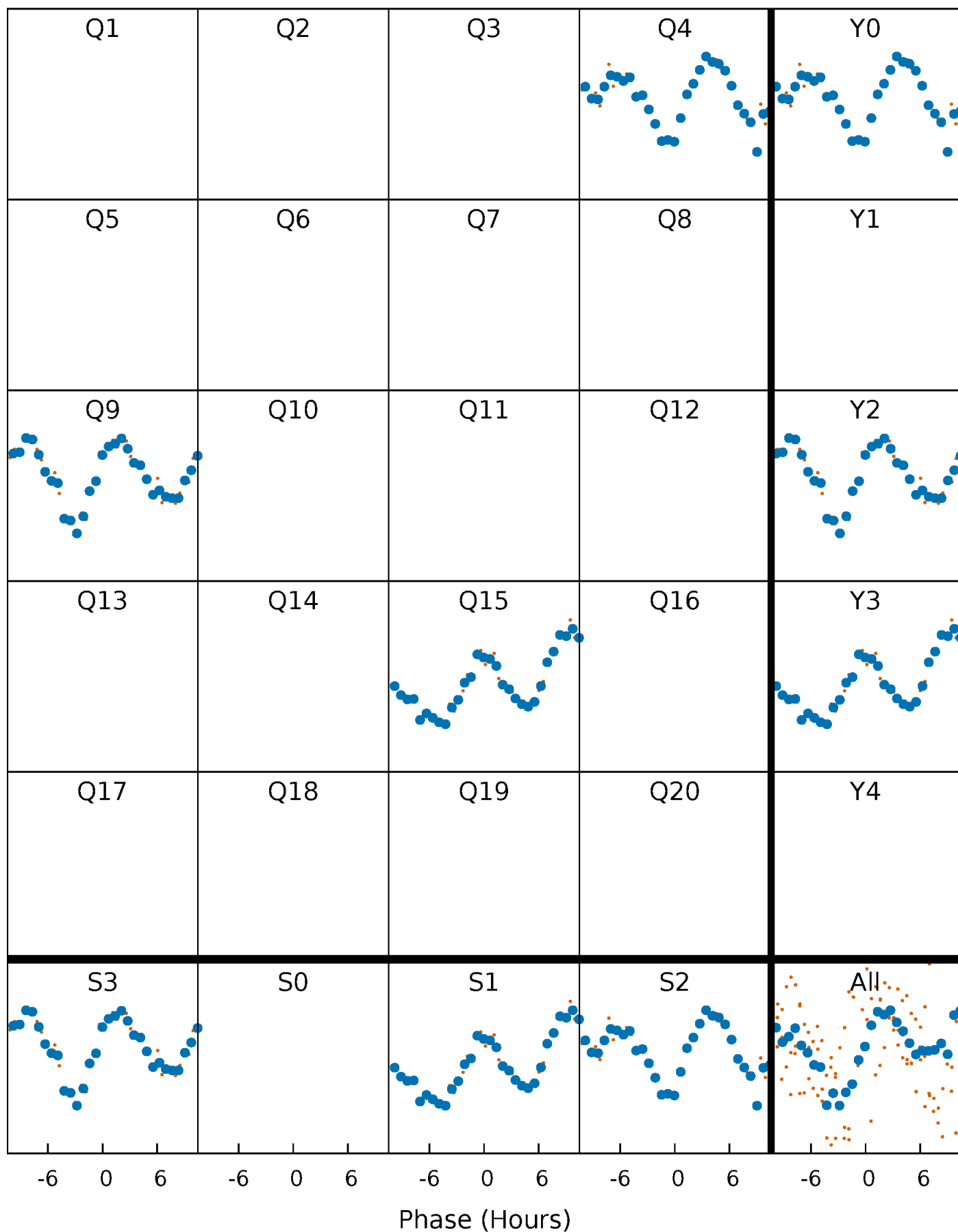


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



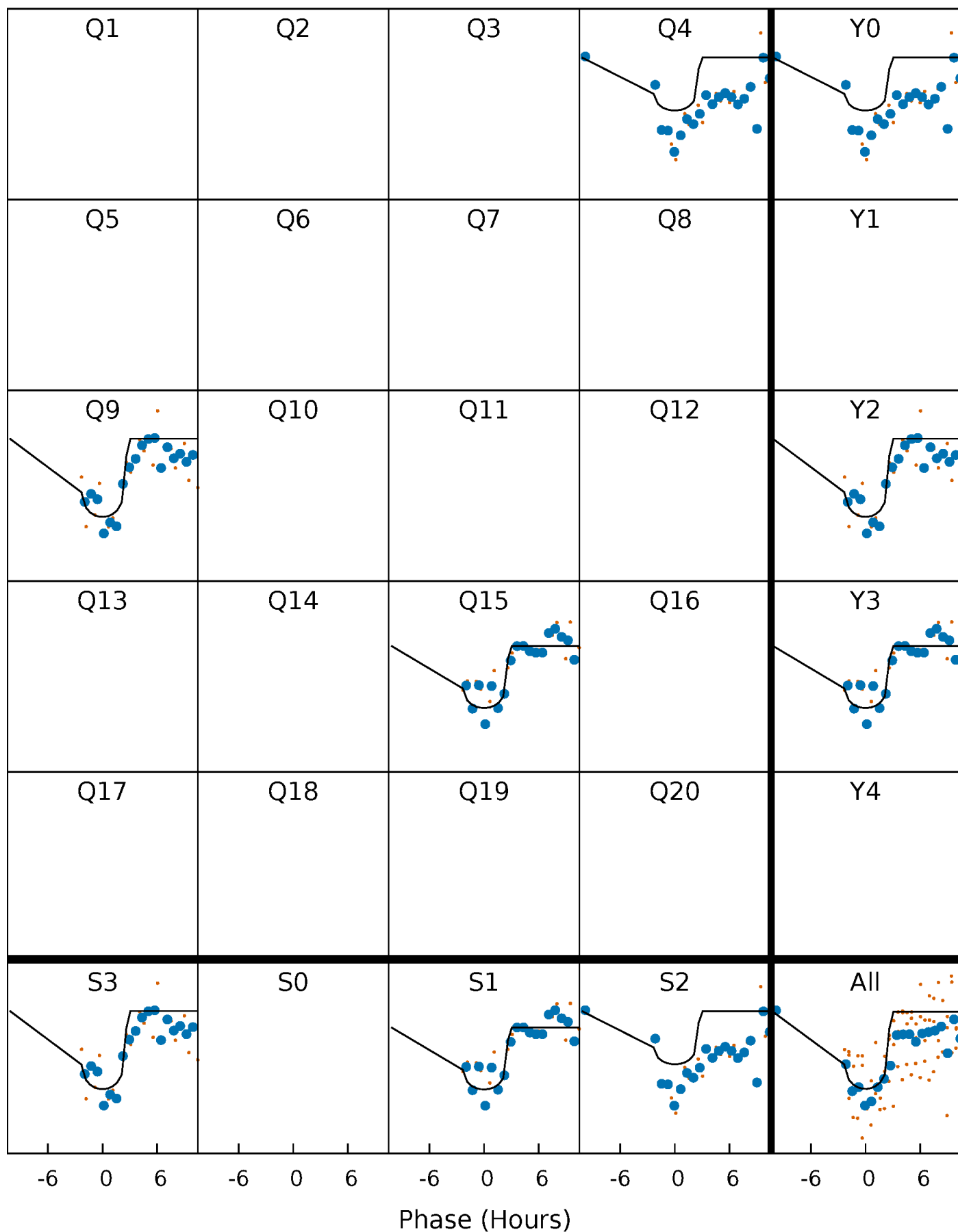
PDC Quarter-Phased Transit Curves

TCE 008702874-02 P=526.574604 Days $T_0=357.153421$ (BKJD)



DV Quarter-Phased Transit Curves

TCE 008702874-02 $P=526.574604$ Days $T_0=357.153421$ (BKJD)

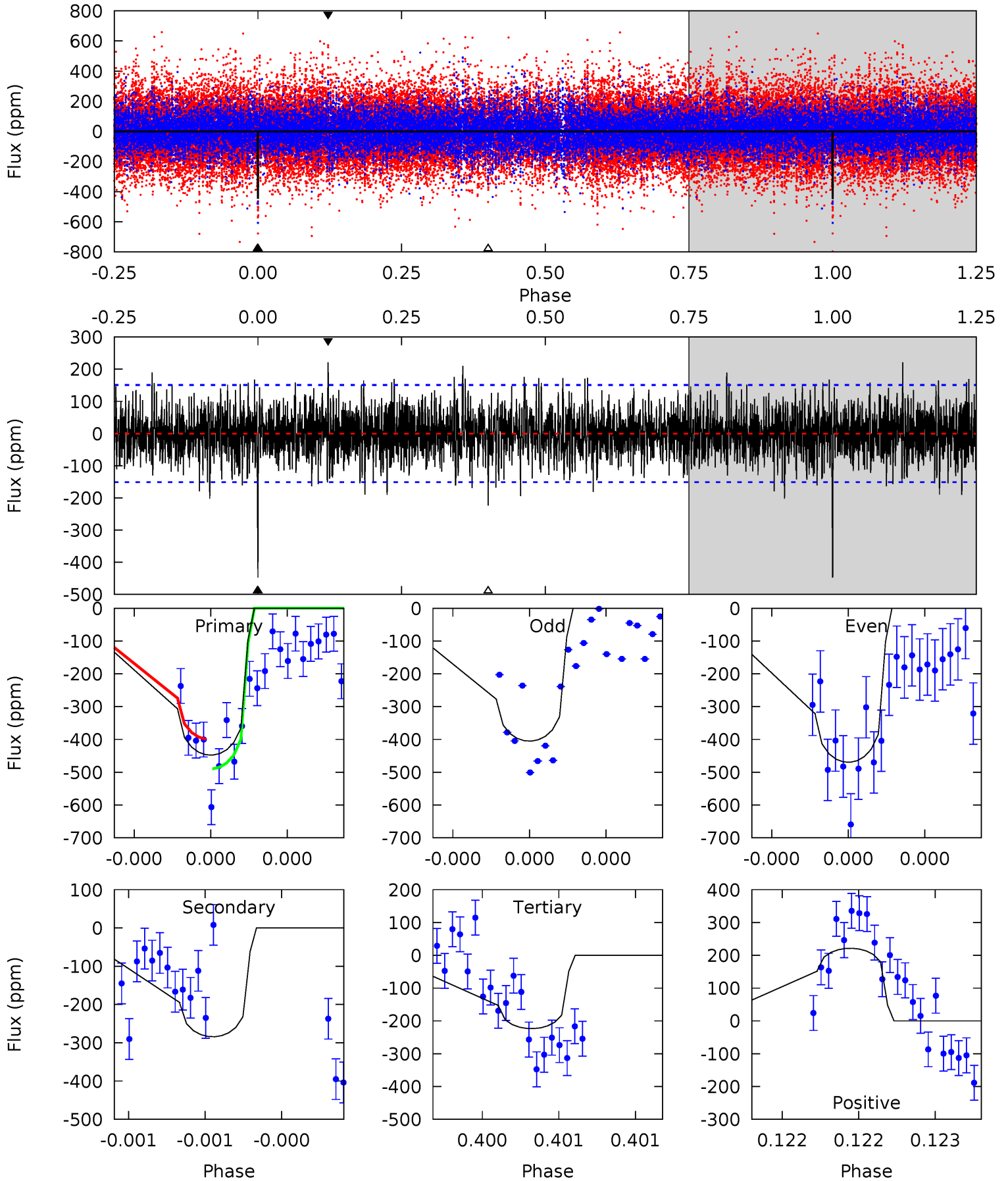


This plot does not exist for this TCE.

DV Model-Shift Uniqueness Test

008702874-02, P = 526.574604 Days, E = 357.153421 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 16.6 | 10.6 | 8.30 | 8.22 | 5.60 | 3.52 | 2.10 | 8.33 | 8.41 | 2.26 | 2.34 | 1.15 | 1.11 | 0.33 | 1.64 |



Alt Model-Shift Uniqueness Test

This plot does not exist for this TCE.

Stellar Parameters For KIC 008702874

| | $T_{\text{eff}} (K)$ | $\log(g)$ | $[\text{Fe}/\text{H}]$ | $R (R_{\odot})$ | $M (M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 6961^{+194}_{-305} | $4.021^{+0.209}_{-0.171}$ | $0.100^{+0.200}_{-0.350}$ | $2.049^{+0.586}_{-0.586}$ | $1.605^{+0.207}_{-0.311}$ | $0.263^{+0.364}_{-0.124}$ |
| | +3%/-4% | +5%/-4% | +200%/-350% | +29%/-29% | +13%/-19% | +138%/-47% |
| Source | PHO54 | PHO54 | PHO54 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 008702874-02 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|---------------|------------------------|----------------------|------------------------|-------------------------|
| DV | -284 ± 27 | $6.22^{+7.22}_{-4.22}$ | 497^{+40}_{-37} | 5295^{+5080}_{-1327} | 8765^{+75662}_{-6878} |
| Alt. | N/A | N/A | N/A | N/A | N/A |

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

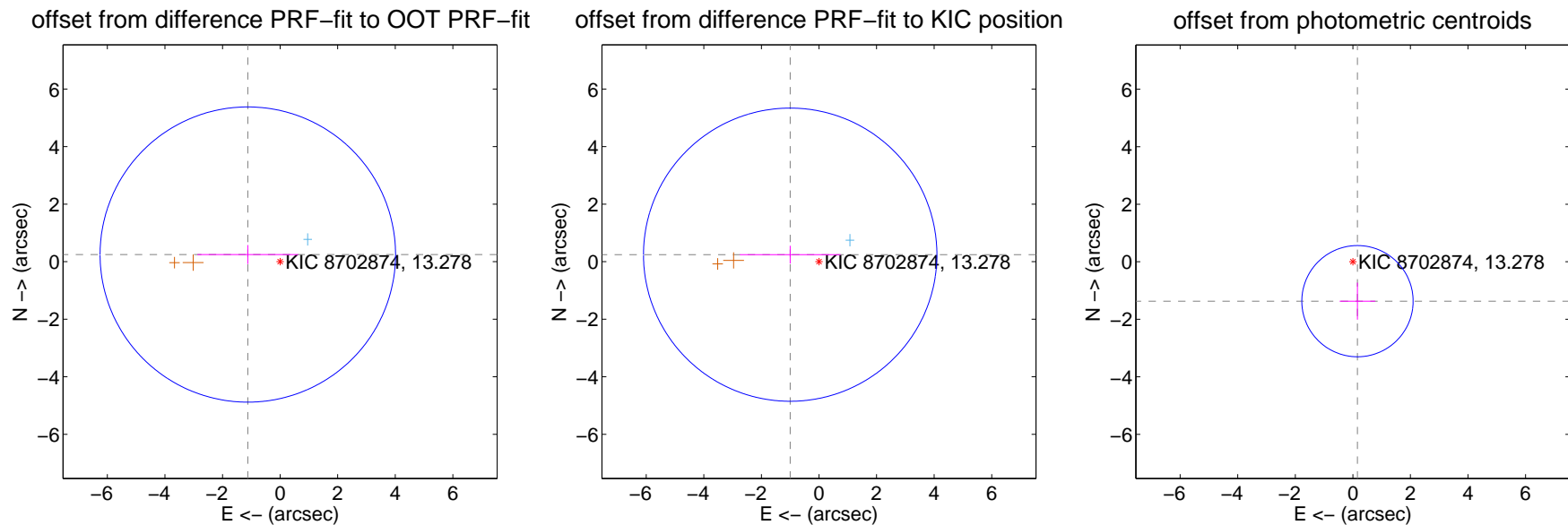
DV Centroid Data

Supplemental centroid analysis for 008702874-02. Kepler magnitude: 13.28. Transit SNR 7.83

There are 1 quarters with good PRF difference image offsets

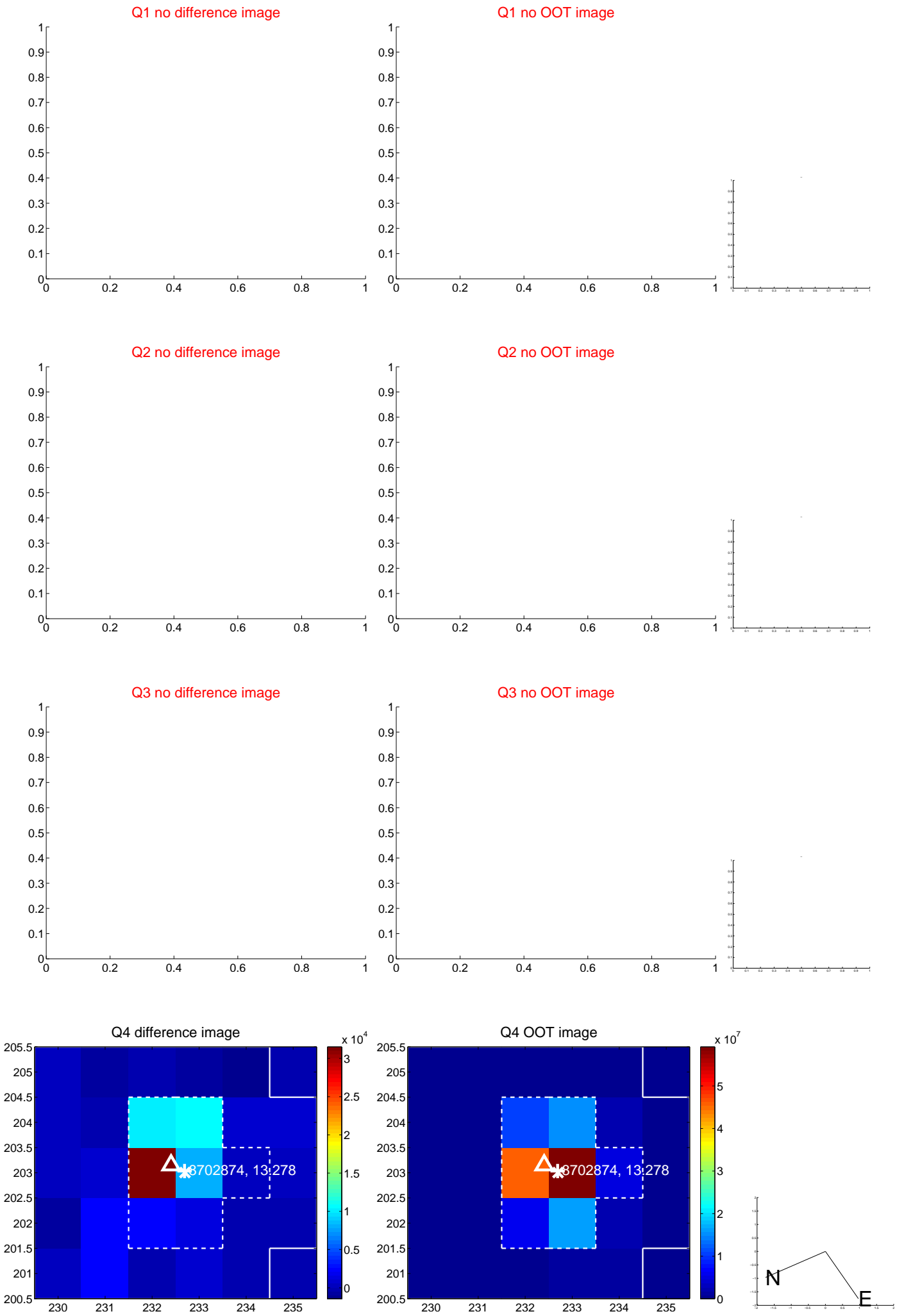
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|-------------------|
| PRF-fit source offset from OOT | 1.149 ± 1.710 | 0.67 | 1.121 ± 1.750 | 0.249 ± 0.329 |
| PRF-fit source offset from KIC position | 1.029 ± 1.698 | 0.61 | 0.999 ± 1.746 | 0.244 ± 0.310 |
| photometric centroid source offset | 1.38 ± 0.64 | 2.14 | -0.16 ± 0.62 | -1.37 ± 0.64 |



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.

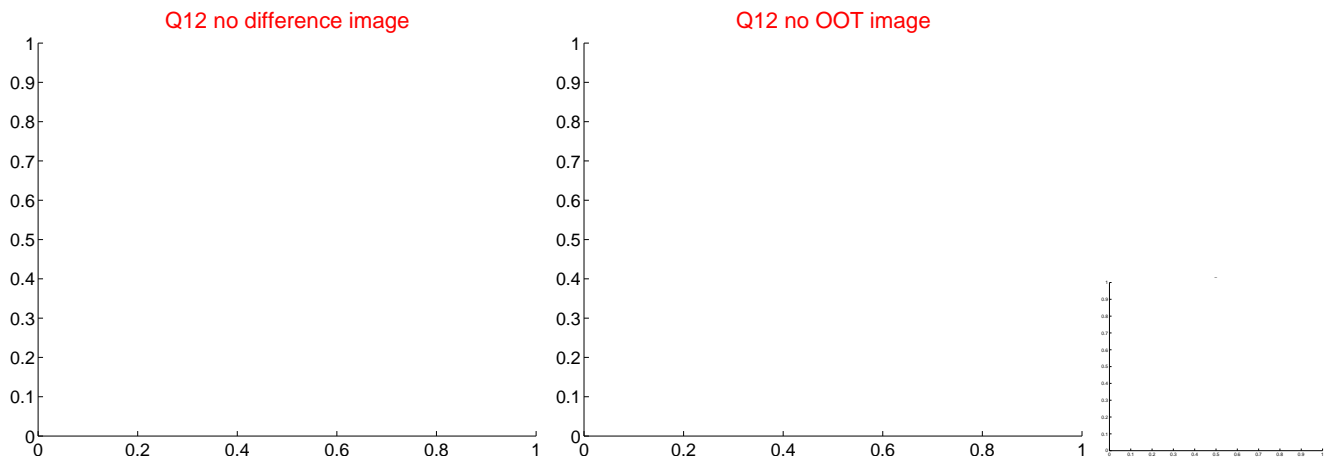
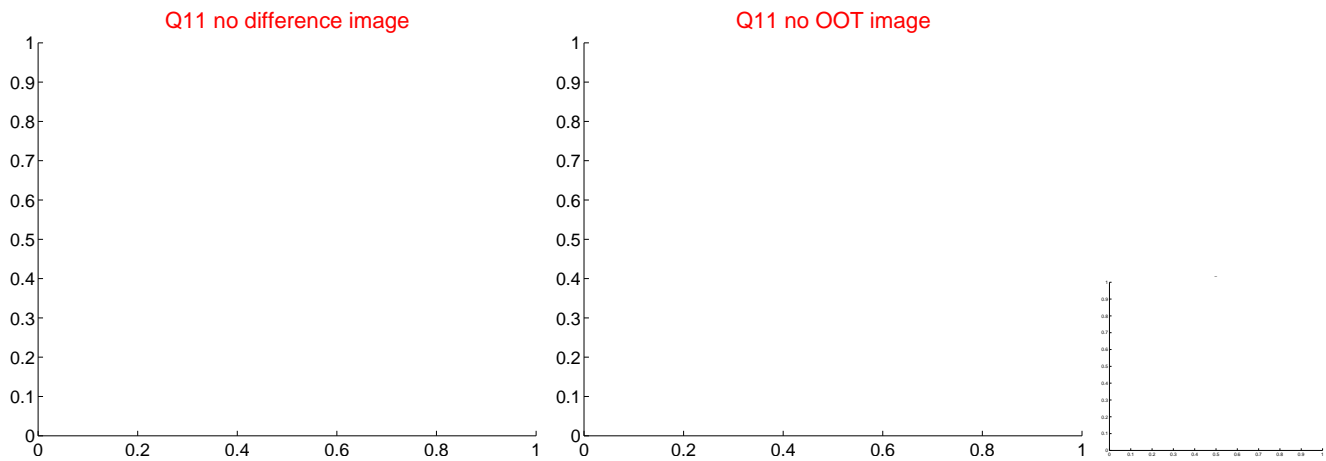
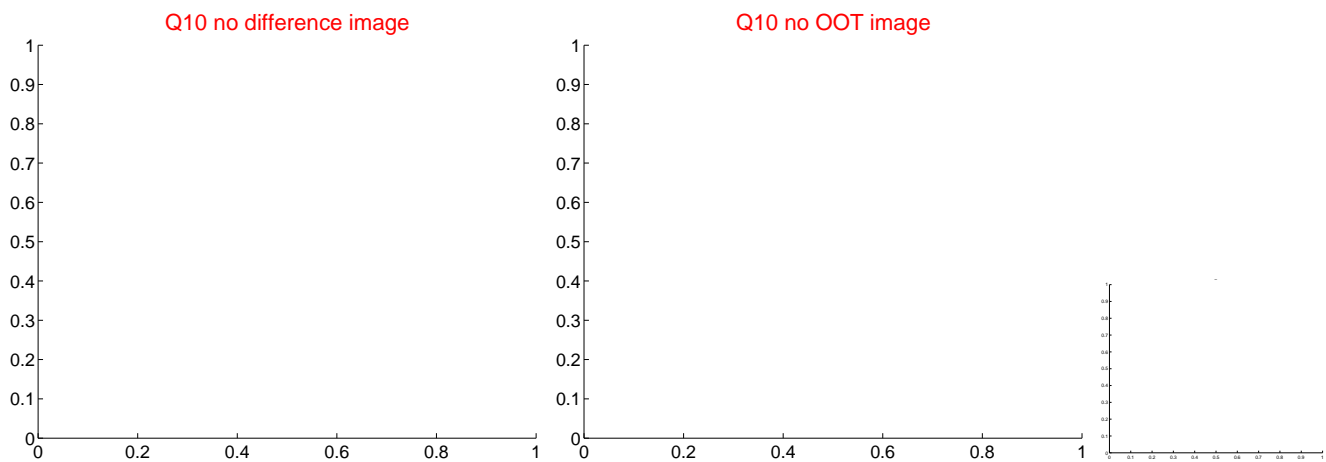
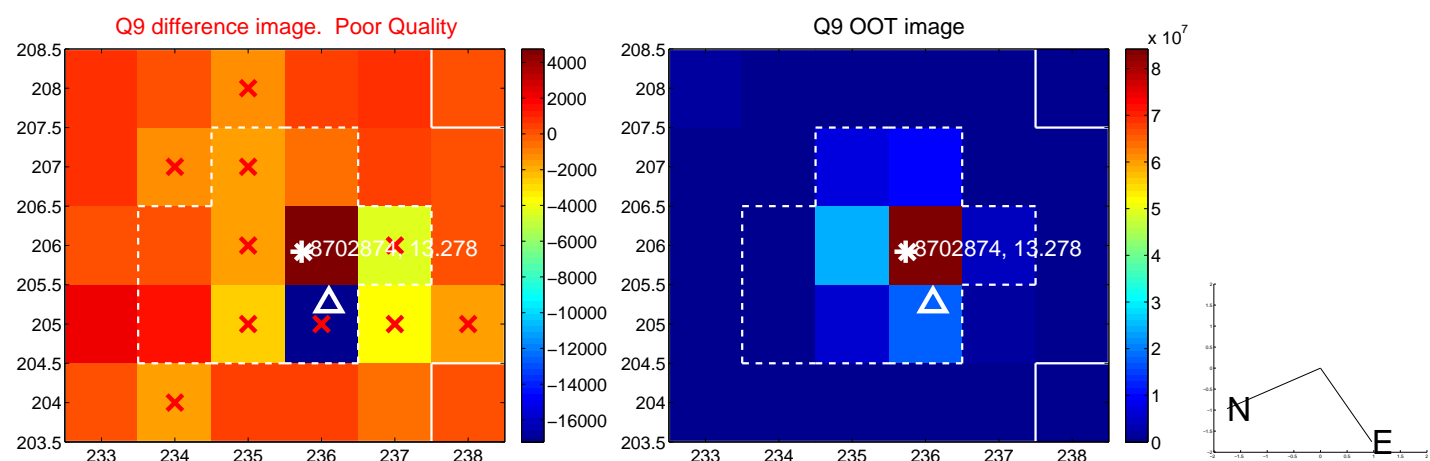
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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



white ×: 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.

Q13 no difference image



Q13 no OOT image



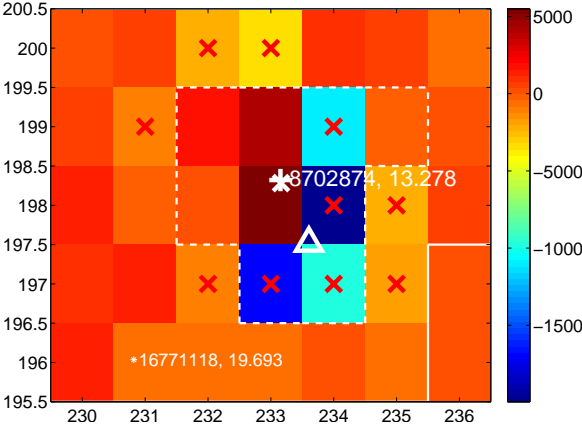
Q14 no difference image



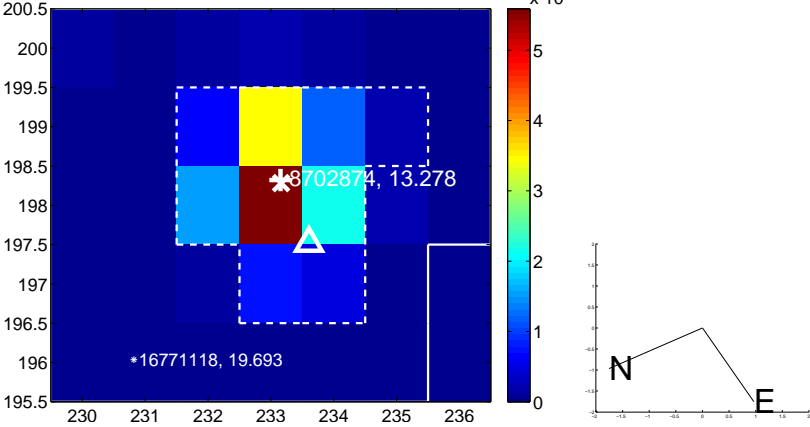
Q14 no OOT image



Q15 difference image. Poor Quality



Q15 OOT image



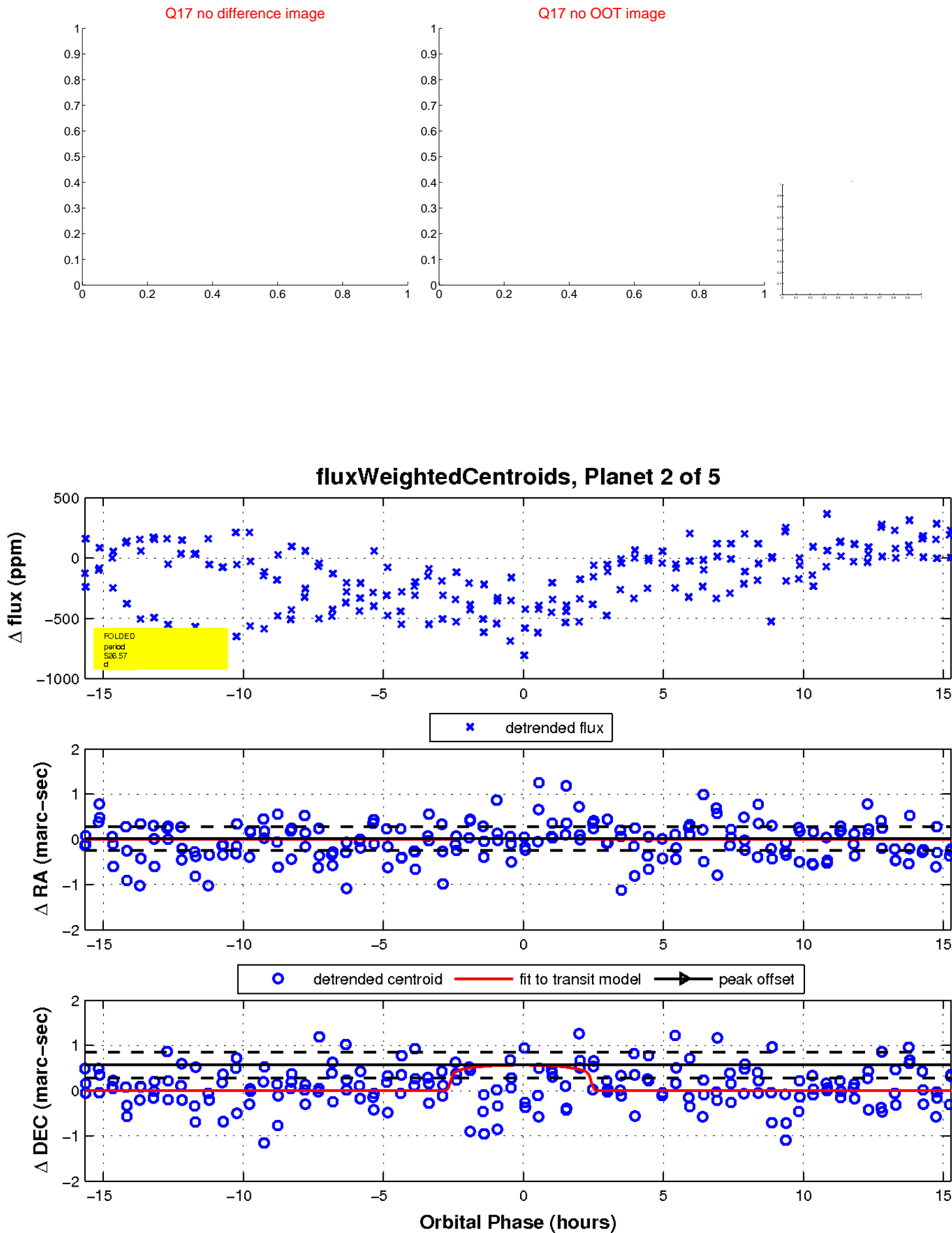
Q16 no difference image



Q16 no OOT image

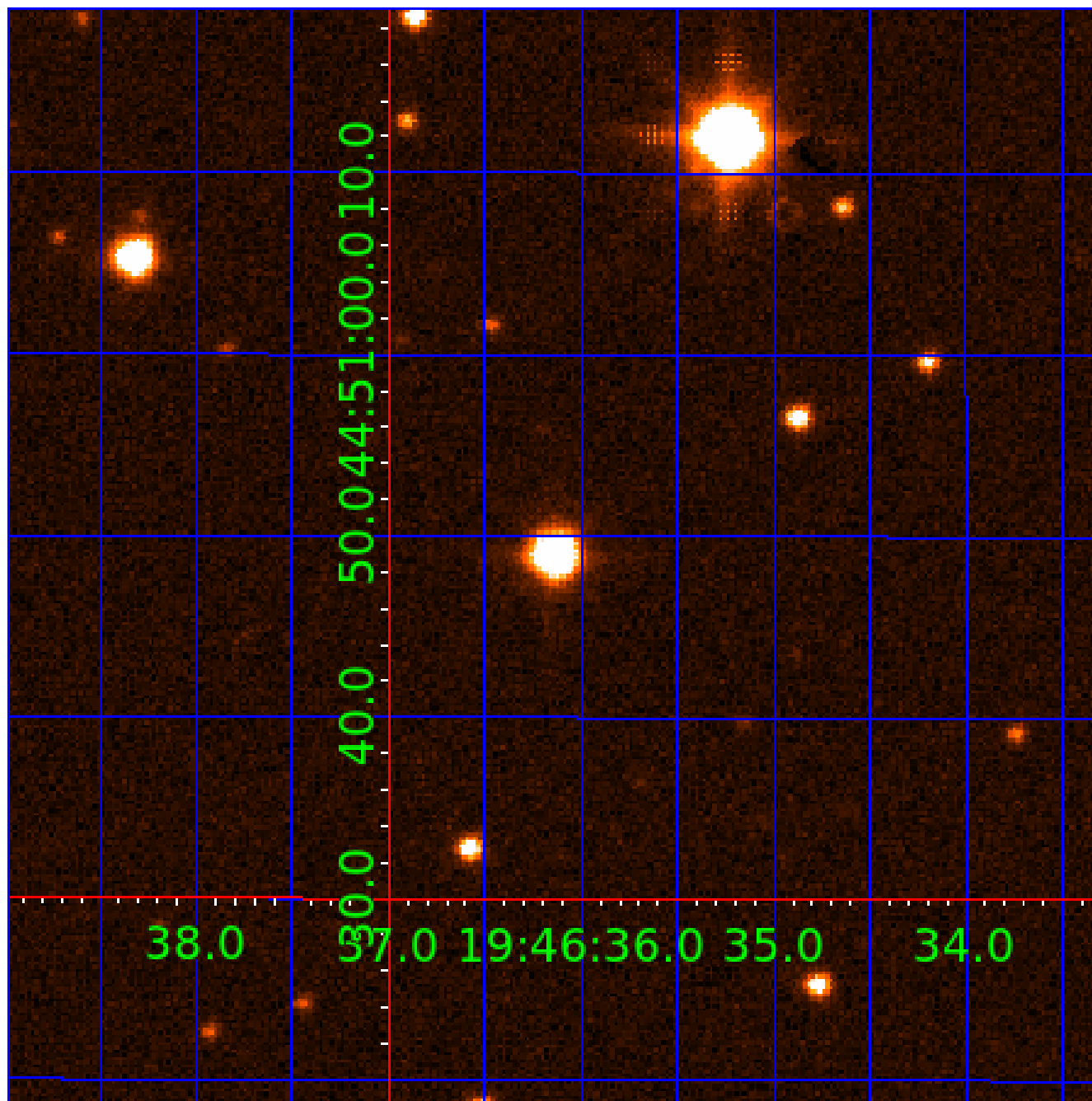


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 008702874

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 008702874-01 | OBS | No | 1.036541 | 131.970379 | 10.8 | 2.522 | 9.2 | 4.2 | 2.05 | 6961 | 0.71 | 16013.76 |
| 008702874-02 | OBS | No | 526.574604 | 357.153421 | 413.8 | 5.234 | 9.4 | 7.8 | 2.05 | 6961 | 4.42 | 3.95 |
| 008702874-03 | OBS | No | 0.505643 | 132.039219 | 4.6 | 3.143 | 8.1 | 2.4 | 2.05 | 6961 | 0.45 | 41701.38 |
| 008702874-04 | OBS | No | 23.792033 | 145.367715 | 295.4 | 1.468 | 7.5 | 6.8 | 2.05 | 6961 | 4.07 | 245.49 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 008702874-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT |
| 008702874-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS |
| 008702874-03 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_UNCERTAIN |
| 008702874-04 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT |

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

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

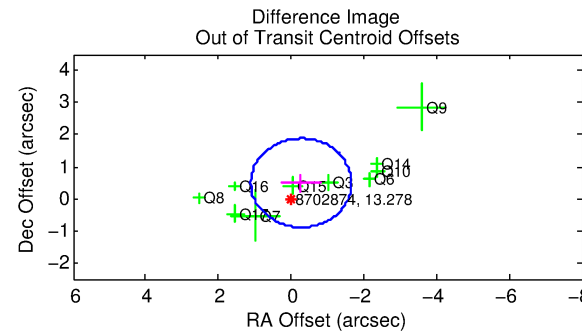
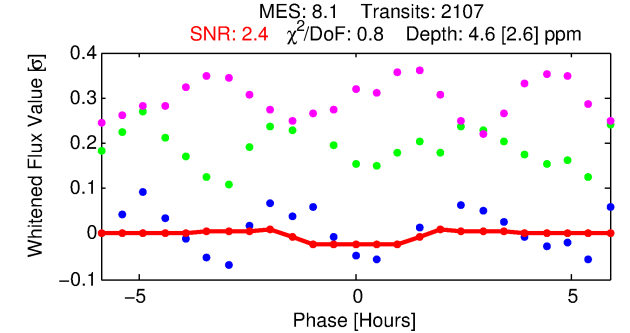
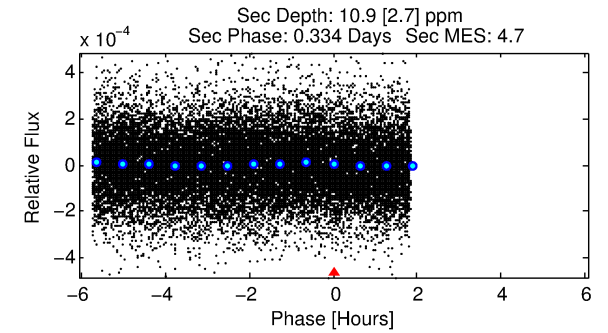
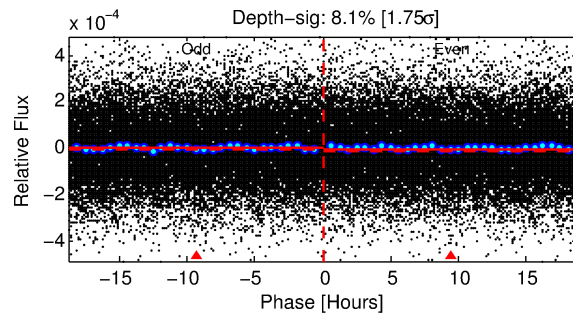
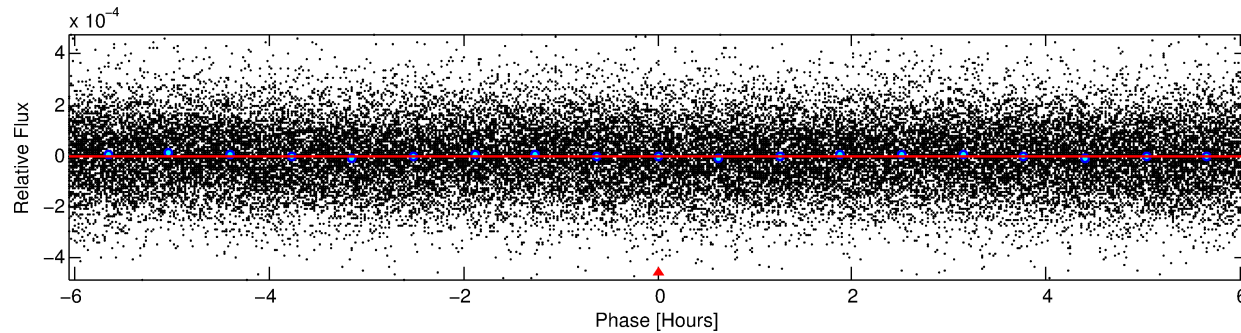
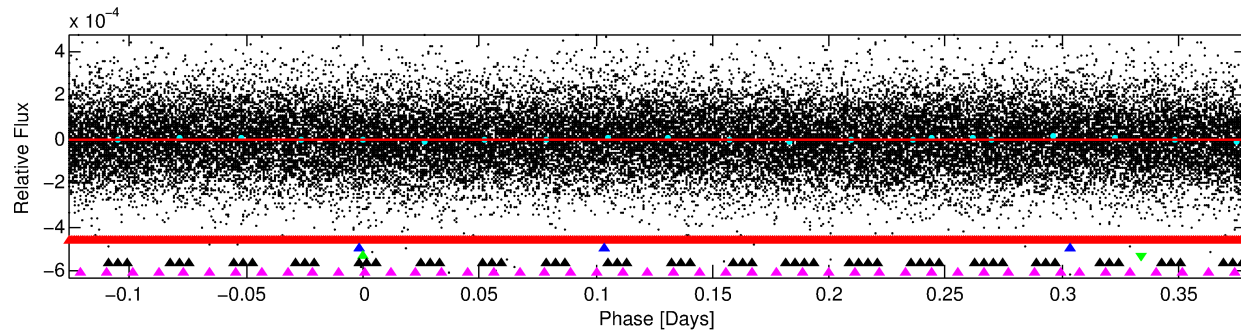
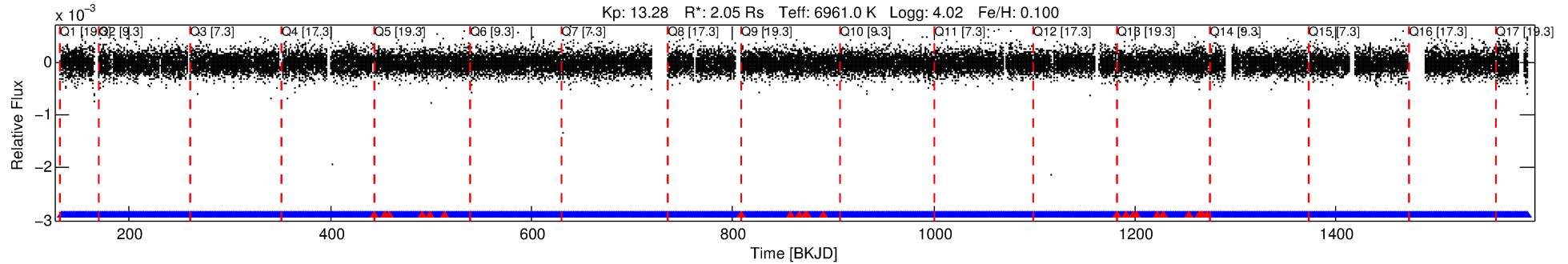
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008702874-03

No Significant Match Found

DV One-Page Summary

KIC: 8702874 Candidate: 3 of 5 Period: 0.506 d



DV Fit Results:

Period = 0.50564 [0.00004] d
Epoch = 132.0392 [0.0111] BKJD
Rp/R* = 0.0020 [0.0024]
a/R* = 1.33 [3.79]
b = 0.39 [14.44]
Seff = 41701.38 [17193.86]
Teq = 3644 [376] K
Rp = 0.45 [0.54] Re
a = 0.0146 [0.0036] AU
Ag = 6.34 [15.25] [0.35 σ]
Teffp = 8941 [5321] K [0.99 σ]

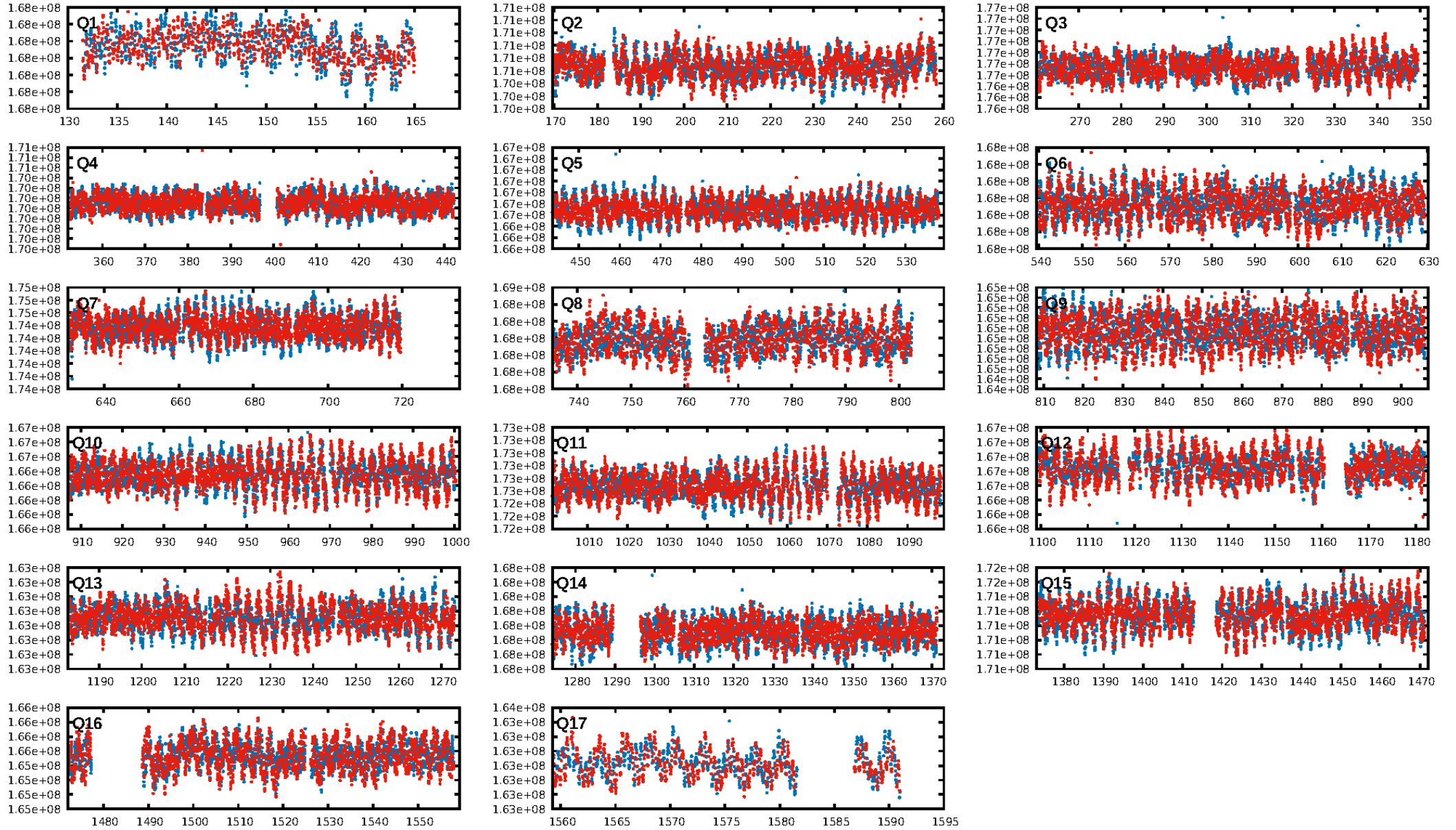
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 99.8% [3.16 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 2.92e-15
RollingBand-fgt: 0.99 [1992/2015]
GhostDiagnostic-chr: N/A
Centroid-sig: N/A
Centroid-so: N/A
OotOffset-rm: 0.563 arcsec [1.22 σ]
KicOffset-rm: 0.609 arcsec [0.99 σ]
OotOffset-st: 3/3/2/2 [10]
KicOffset-st: 3/3/2/2 [10]
DiffImageQuality-fgm: 0.60 [6/10]
DiffImageOverlap-fno: 1.00 [17/17]

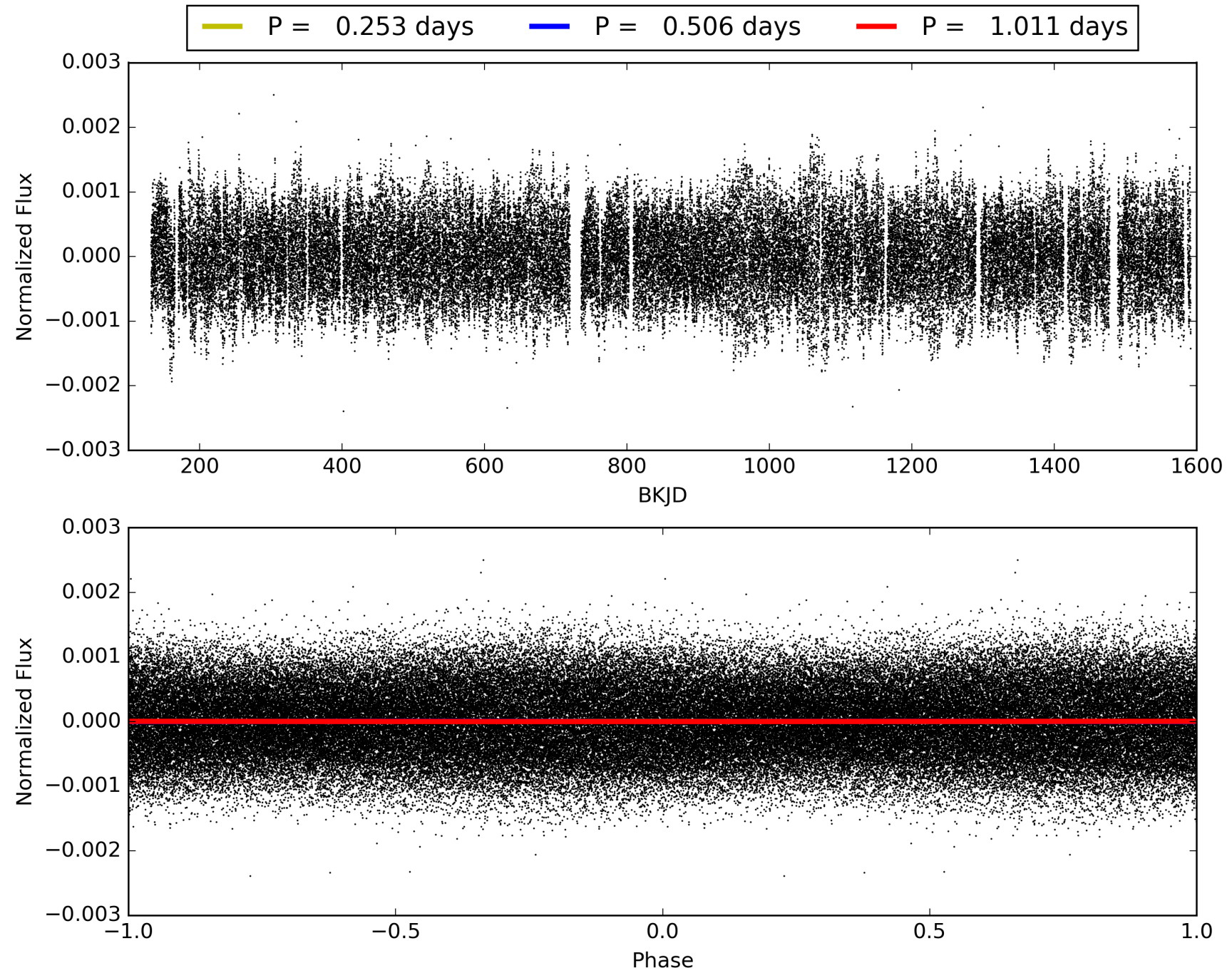
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 14:45:46 Z

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

TCE 008702874-03, PDC Light Curves

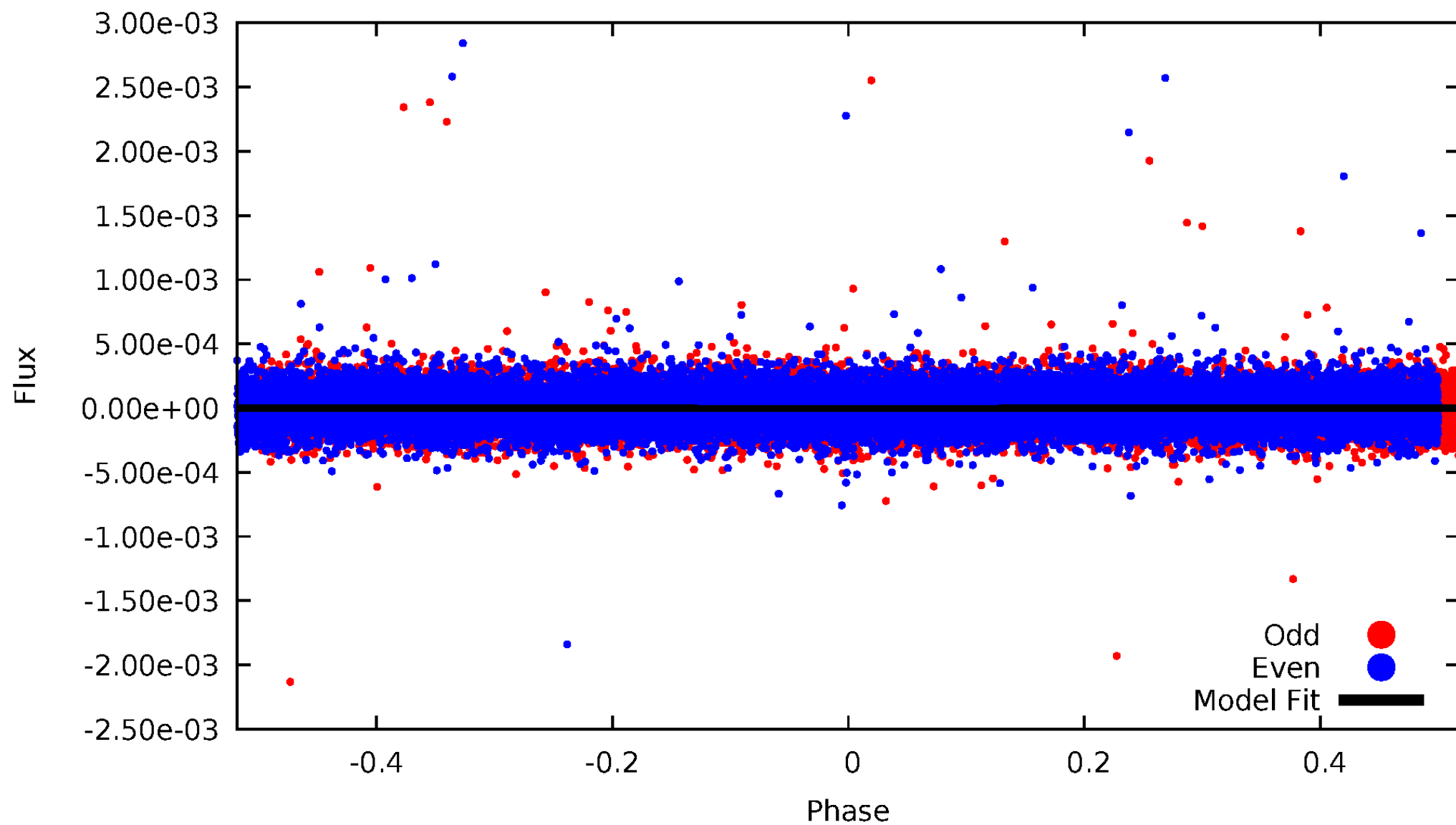


TCE 008702874-03



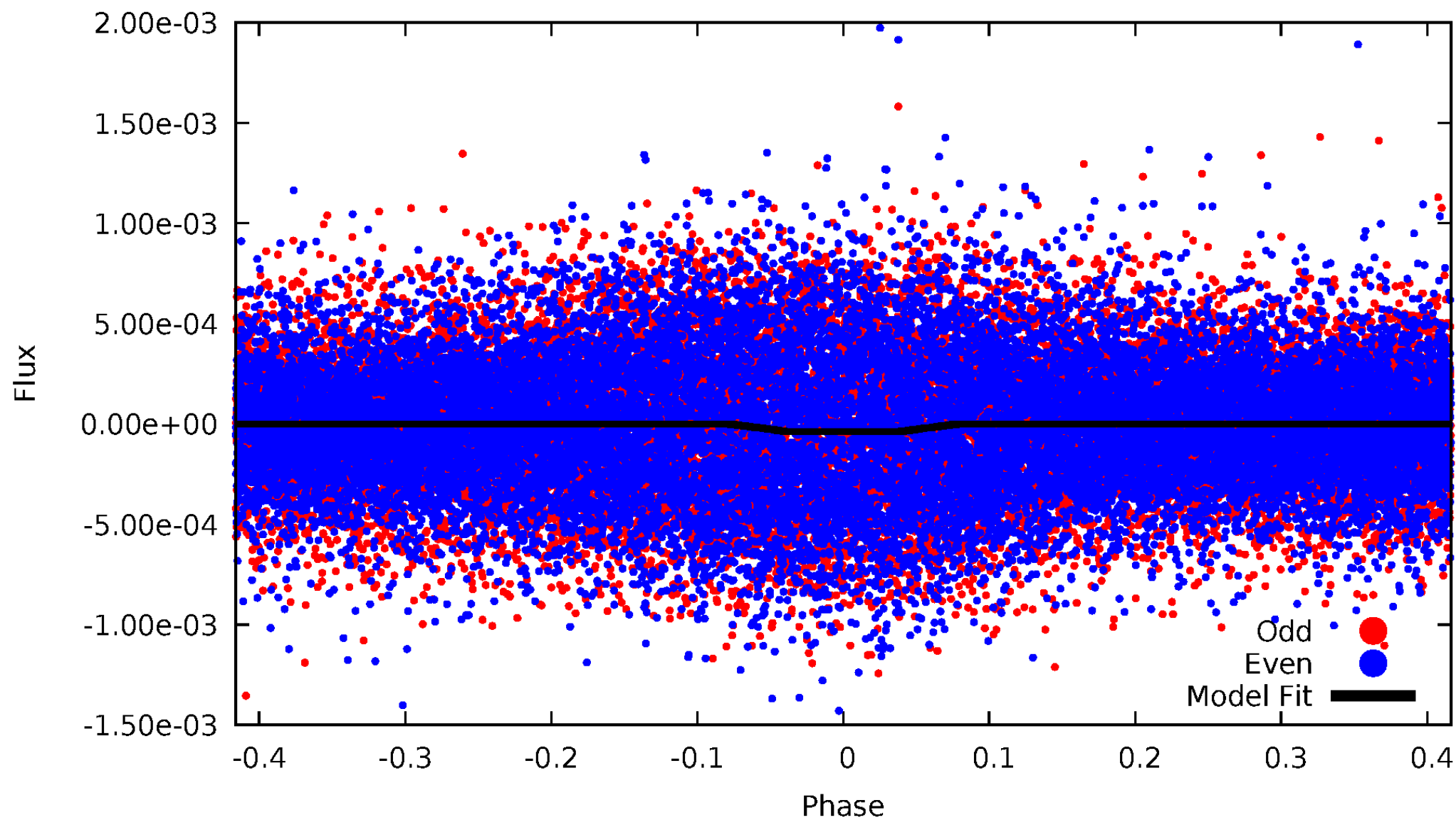
DV Odd/Even

TCE 008702874-03



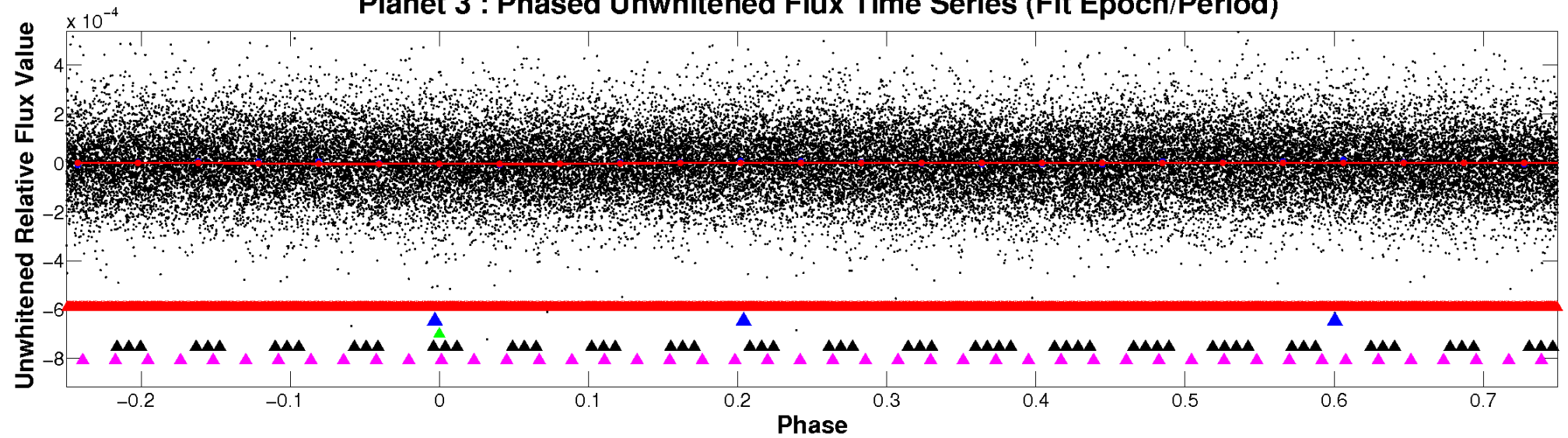
ALT Odd/Even

TCE 008702874-03

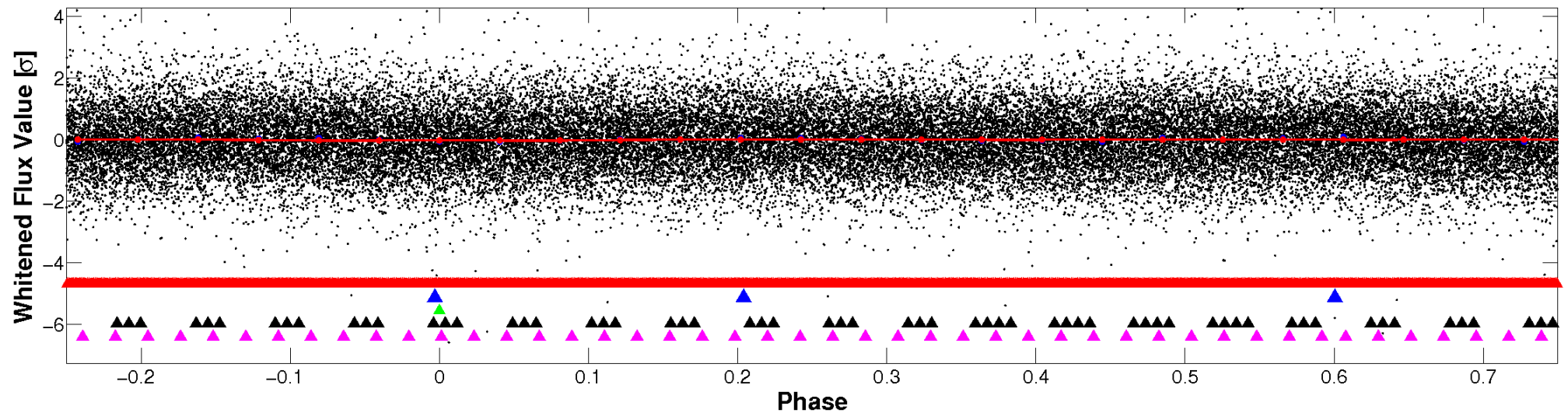


Non-Whitened Vs. Whitened Light Curve

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

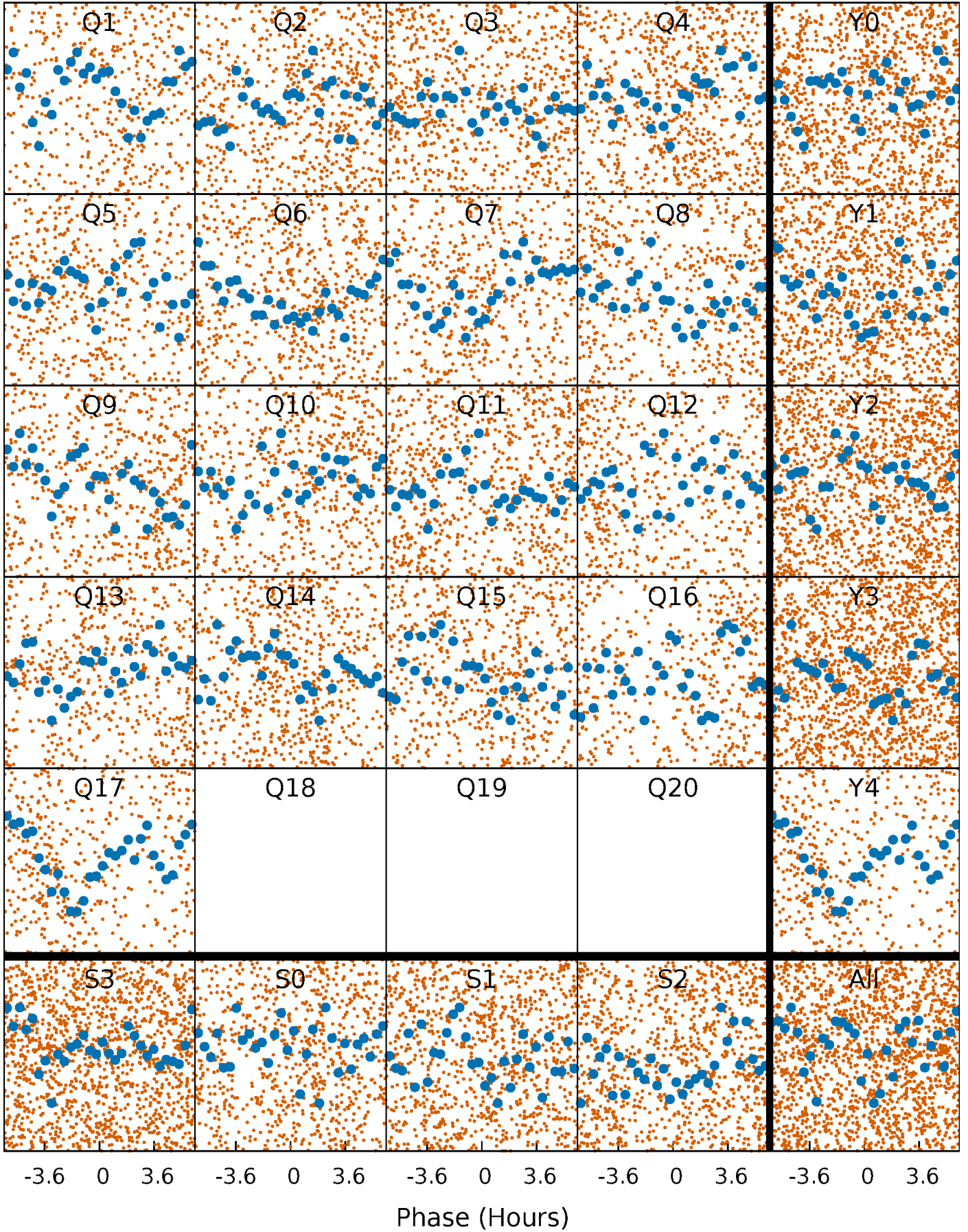


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



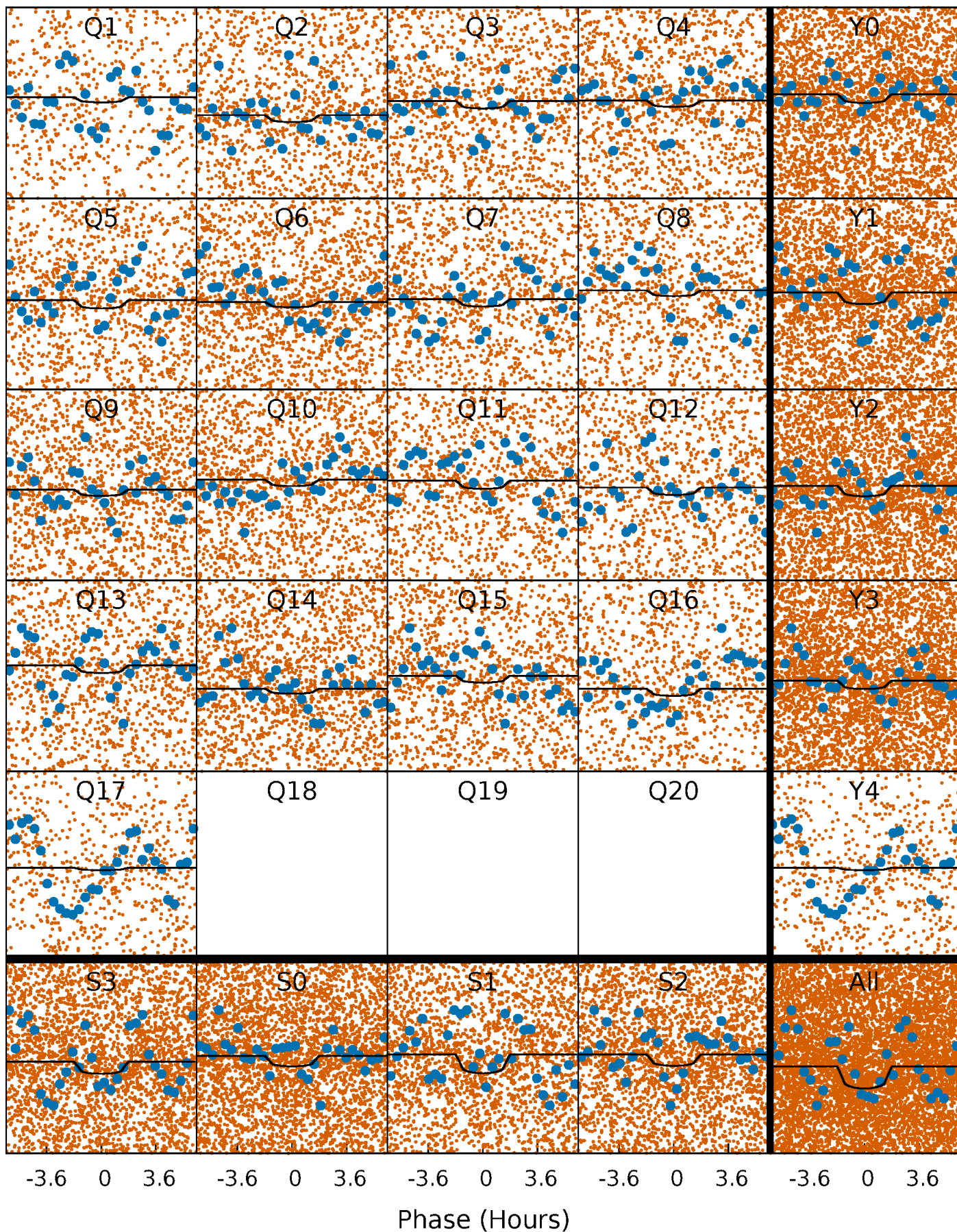
PDC Quarter-Phased Transit Curves

TCE 008702874-03 P= 0.505643 Days $T_0=132.039219$ (BKJD)



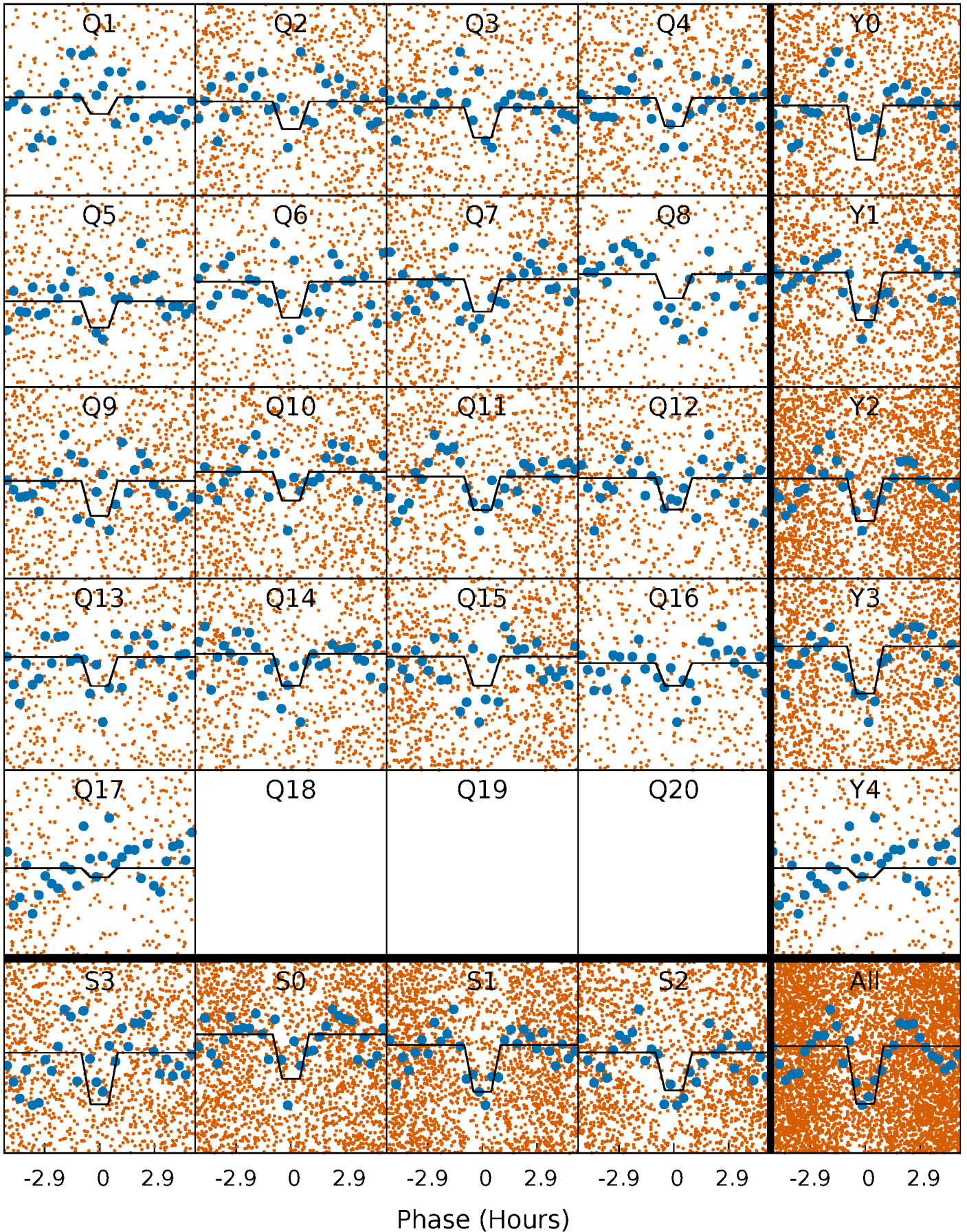
DV Quarter-Phased Transit Curves

TCE 008702874-03 P= 0.505643 Days $T_0=132.039219$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

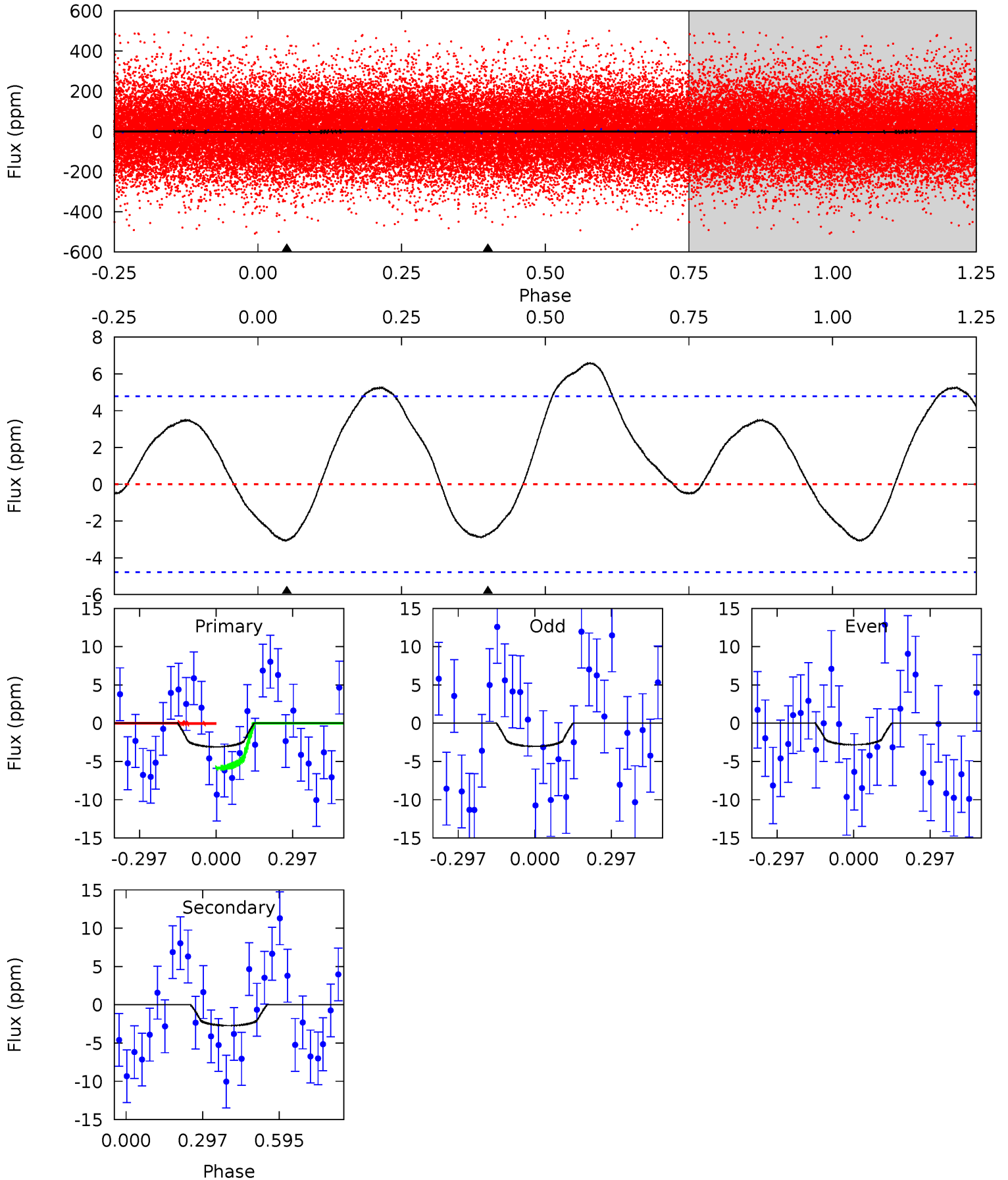
TCE 008702874-03 $P = 0.505675$ Days $T_0 = 132.014444$ (BKJD)



DV Model-Shift Uniqueness Test

008702874-03, P = 0.505643 Days, E = 131.027933 Days

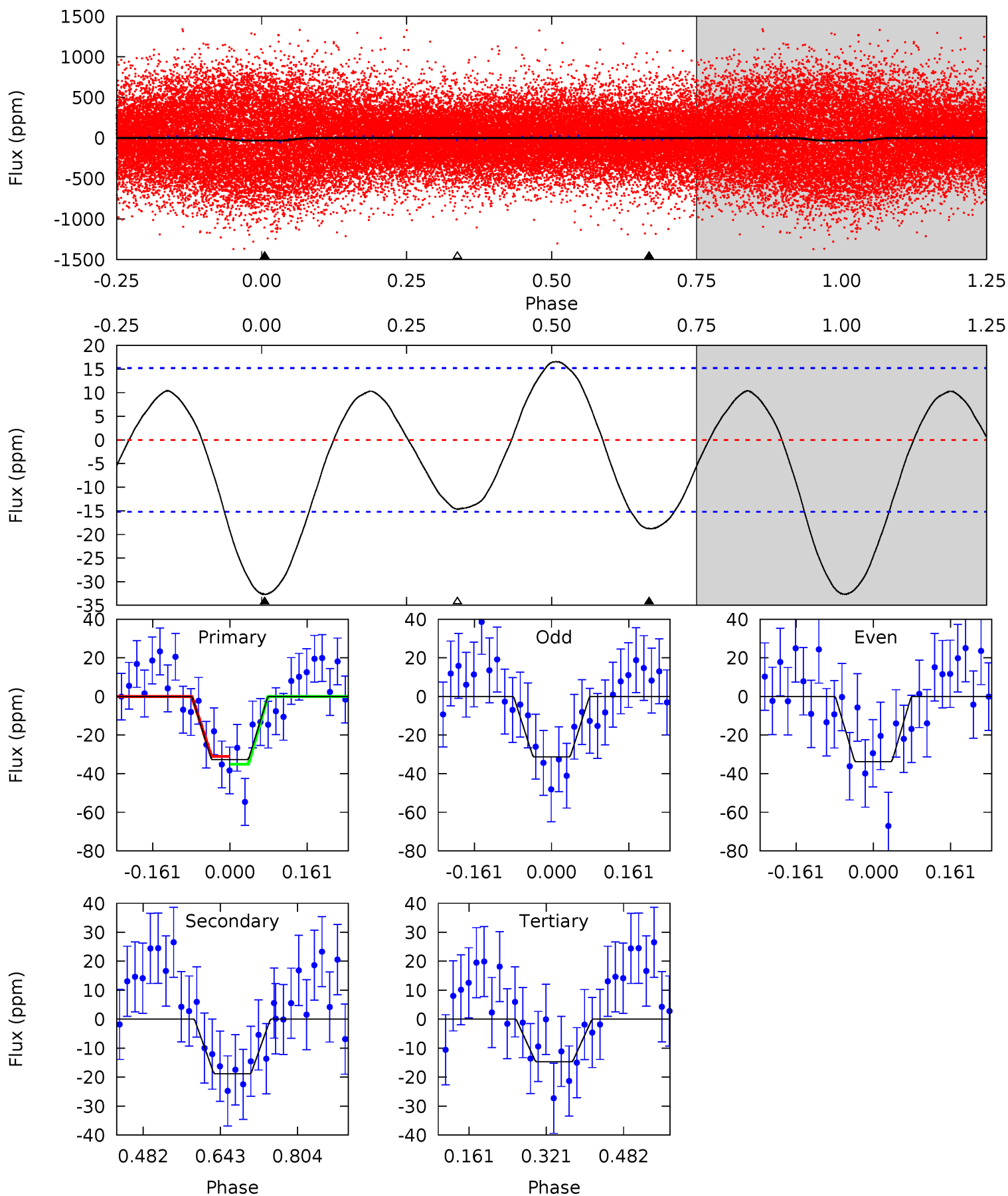
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 2.80 | 2.47 | 0 | 0 | 4.33 | 1.04 | 0.55 | 2.80 | 2.80 | 2.47 | 2.47 | 0.10 | 2.19 | 0.68 | 2.56 |



Alt Model-Shift Uniqueness Test

008702874-03, P = 0.505675 Days, E = 131.508769 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 9.58 | 5.51 | 4.30 | 0 | 4.46 | 1.40 | 2.97 | 5.29 | 9.58 | 1.22 | 5.51 | 0.37 | 0.76 | 0.34 | 0.57 |



Stellar Parameters For KIC 008702874

| | $T_{\text{eff}} (K)$ | $\log(g)$ | $[\text{Fe}/\text{H}]$ | $R (R_{\odot})$ | $M (M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 6961^{+194}_{-305} | $4.021^{+0.209}_{-0.171}$ | $0.100^{+0.200}_{-0.350}$ | $2.049^{+0.586}_{-0.586}$ | $1.605^{+0.207}_{-0.311}$ | $0.263^{+0.364}_{-0.124}$ |
| | +3%/-4% | +5%/-4% | +200%/-350% | +29%/-29% | +13%/-19% | +138%/-47% |
| Source | PHO54 | PHO54 | PHO54 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 008702874-03 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|-------------|------------------------|----------------------|------------------------|---------------------------|
| DV | -3 ± 1 | $0.56^{+0.50}_{-0.36}$ | 5071^{+389}_{-442} | 5078^{+4708}_{-8491} | $0.996^{+7.120}_{-0.763}$ |
| Alt. | -19 ± 3 | $1.35^{+0.56}_{-0.52}$ | 5047^{+373}_{-427} | 5382^{+1765}_{-1129} | $1.186^{+1.960}_{-0.619}$ |

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

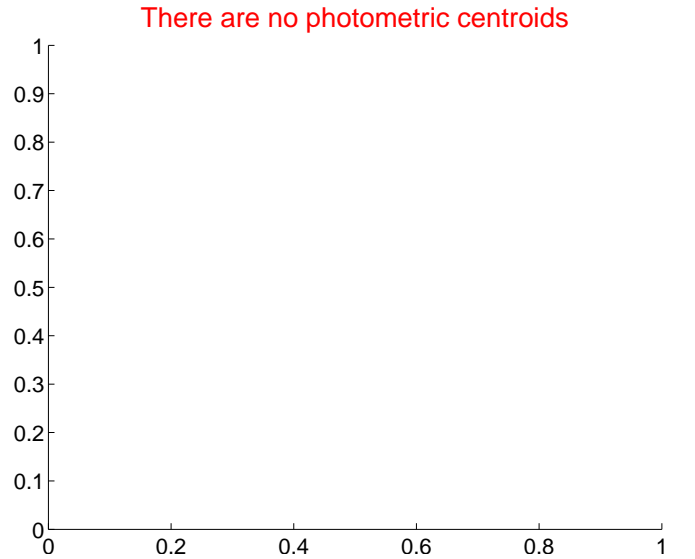
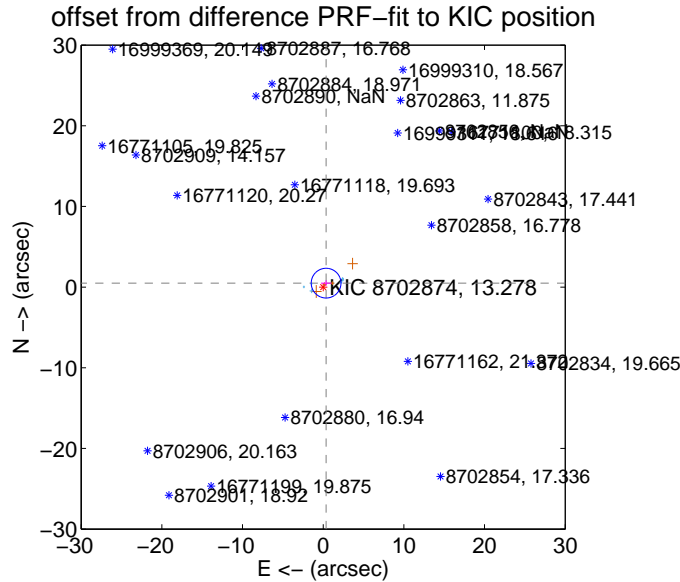
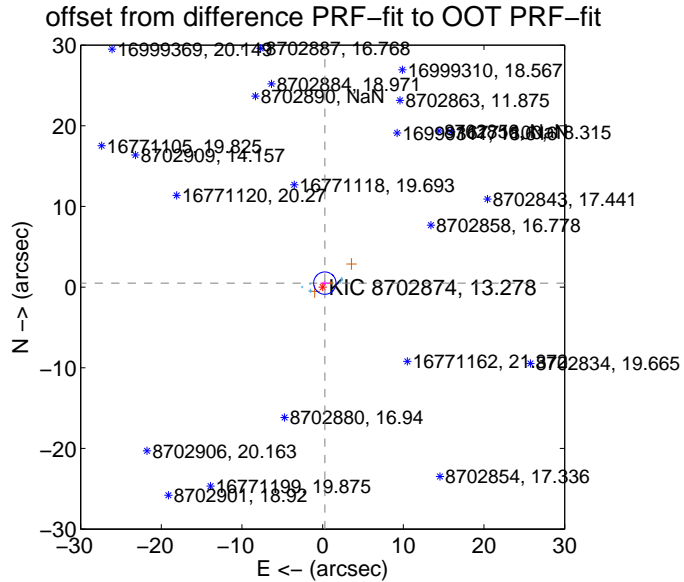
DV Centroid Data

Supplemental centroid analysis for 008702874-03. Kepler magnitude: 13.28. Transit SNR 2.36

There are 6 quarters with good PRF difference image offsets

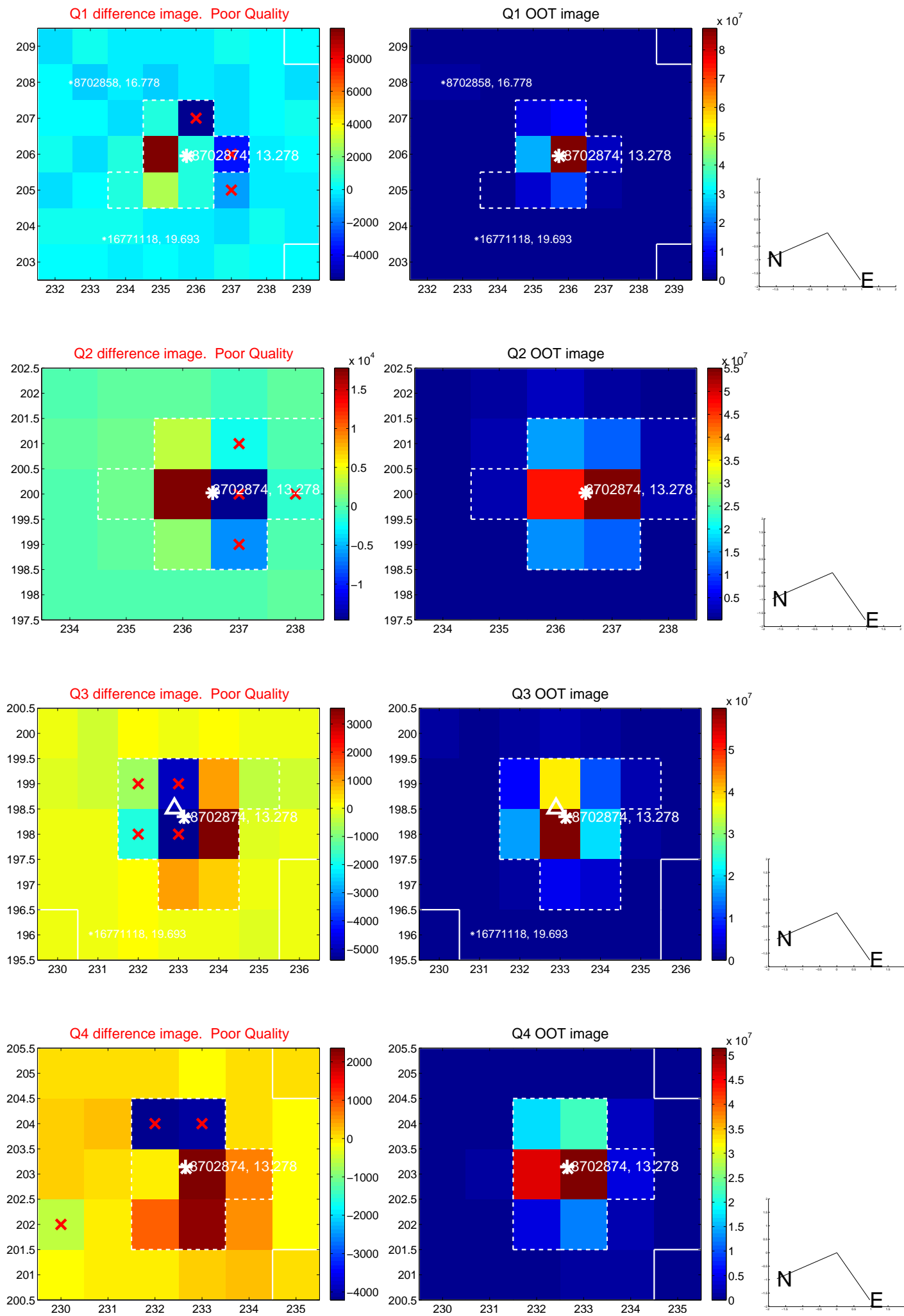
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT | 0.563 ± 0.462 | 1.22 | -0.272 ± 0.544 | 0.493 ± 0.263 |
| PRF-fit source offset from KIC position | 0.609 ± 0.615 | 0.99 | -0.362 ± 0.638 | 0.490 ± 0.334 |
| photometric centroid source offset | — | — | — | — |

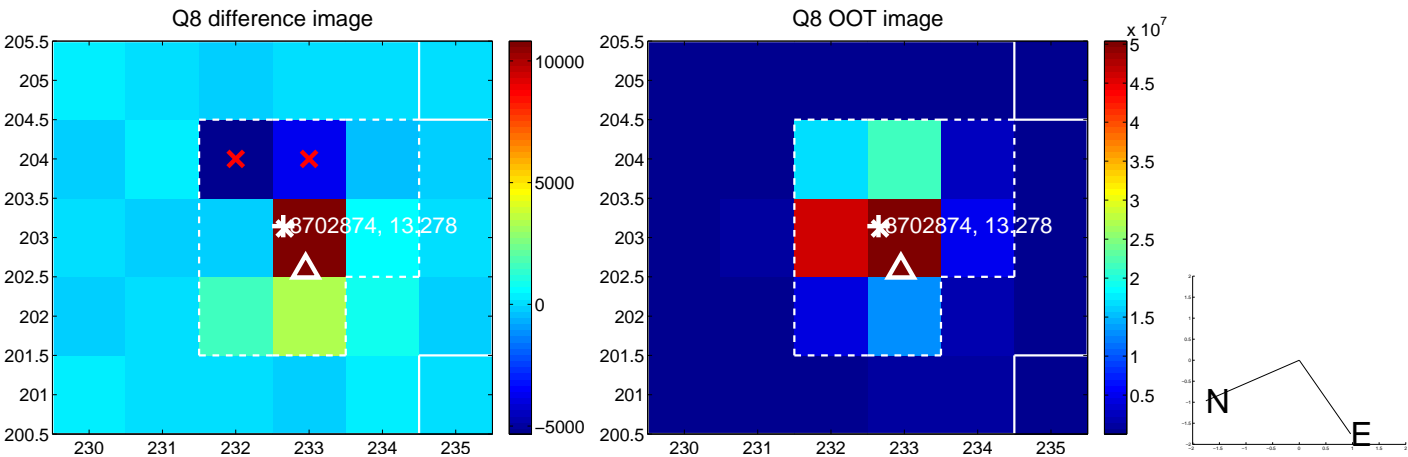
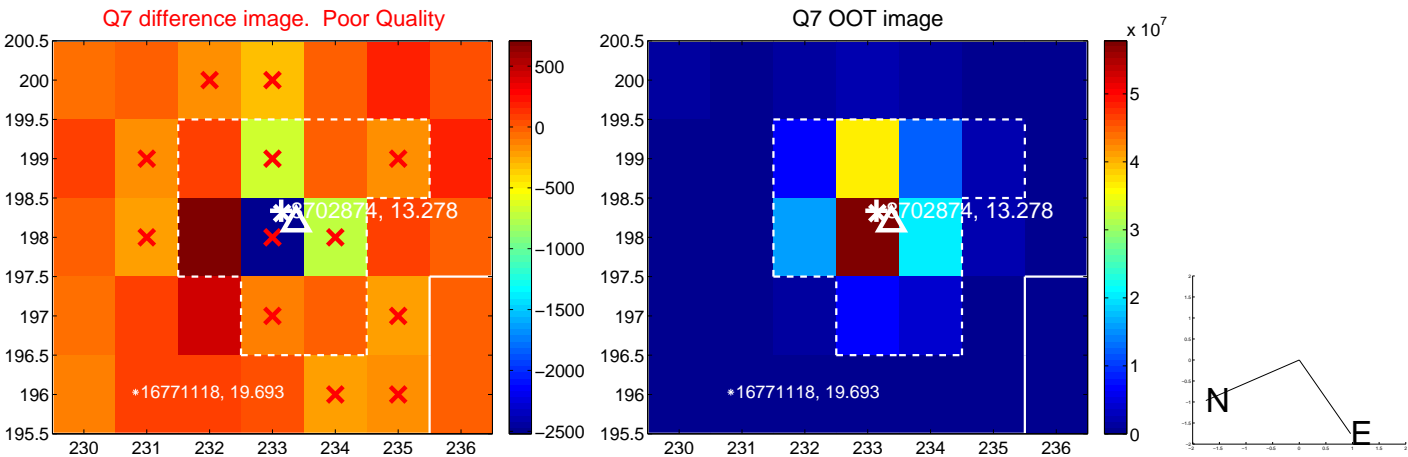
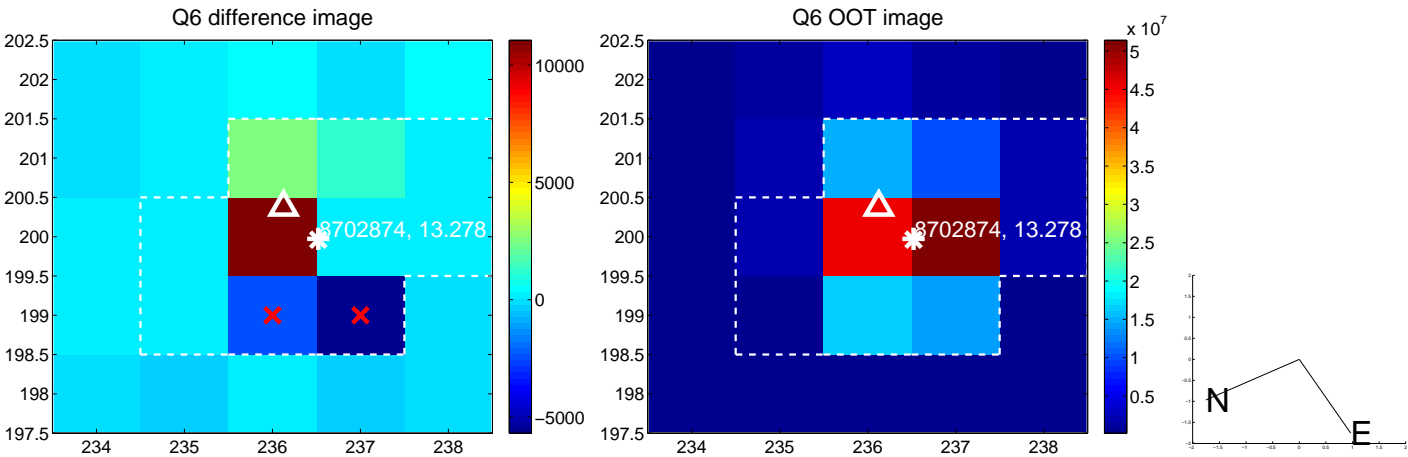
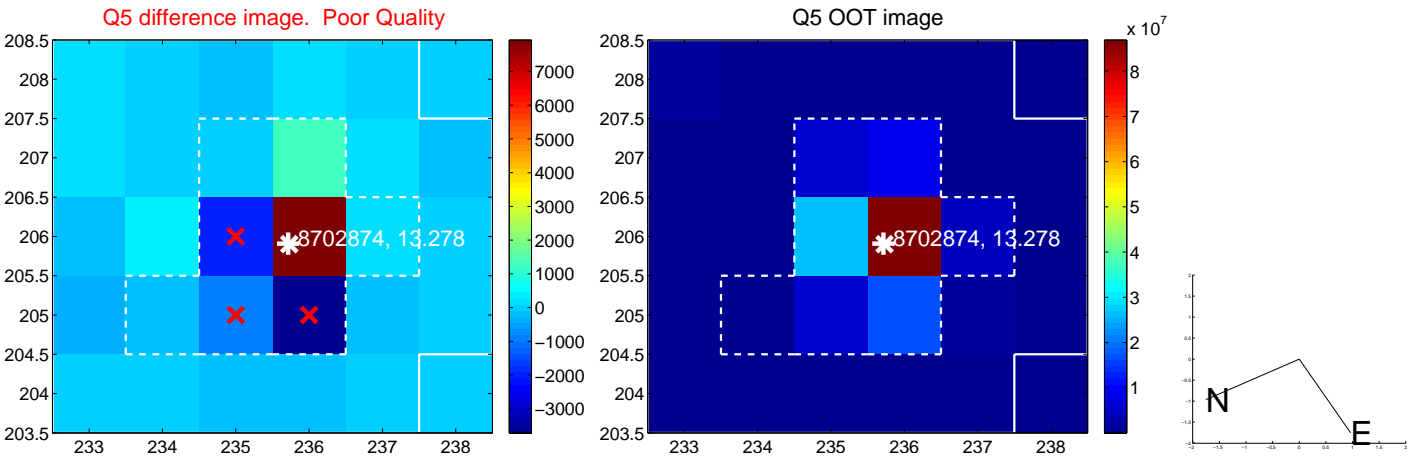


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

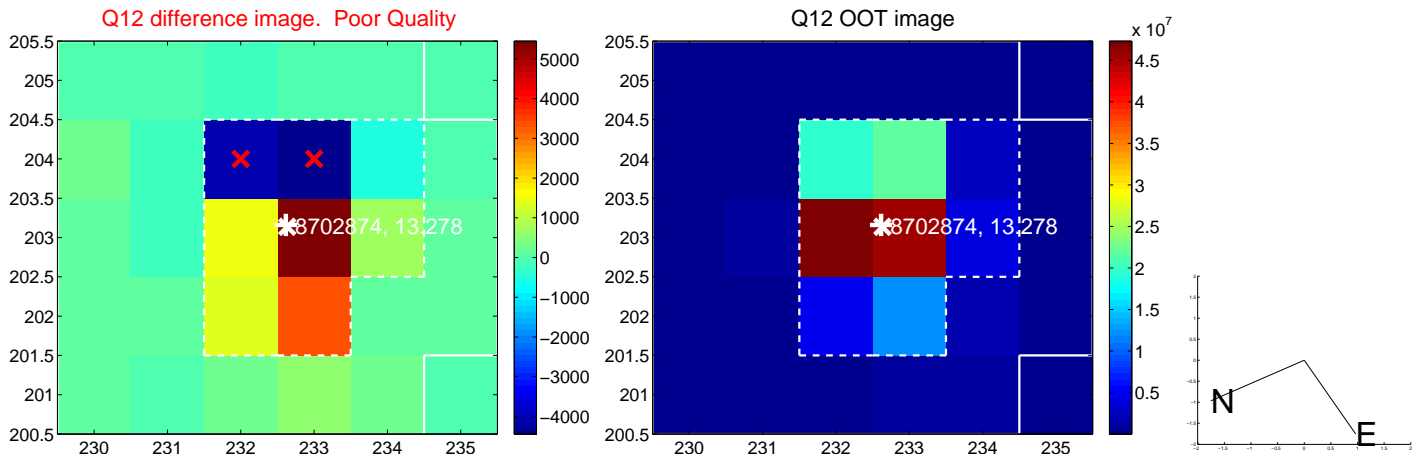
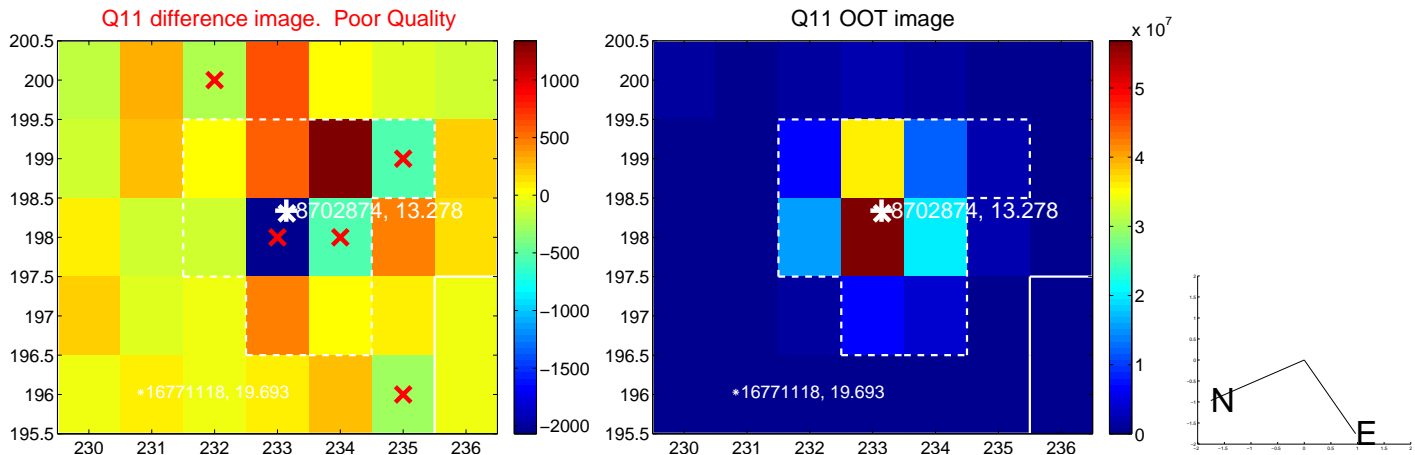
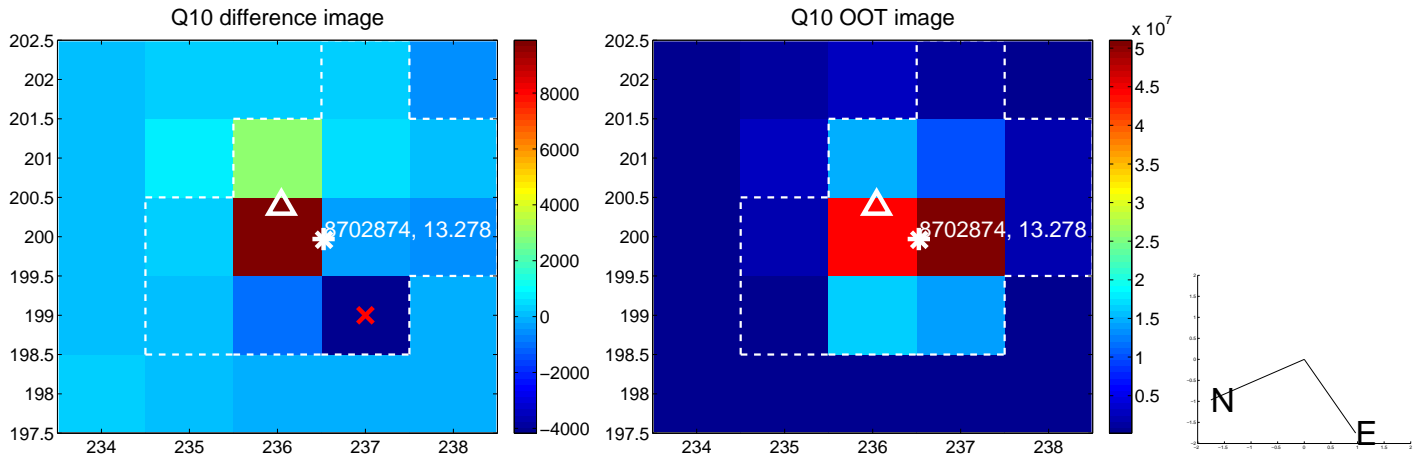
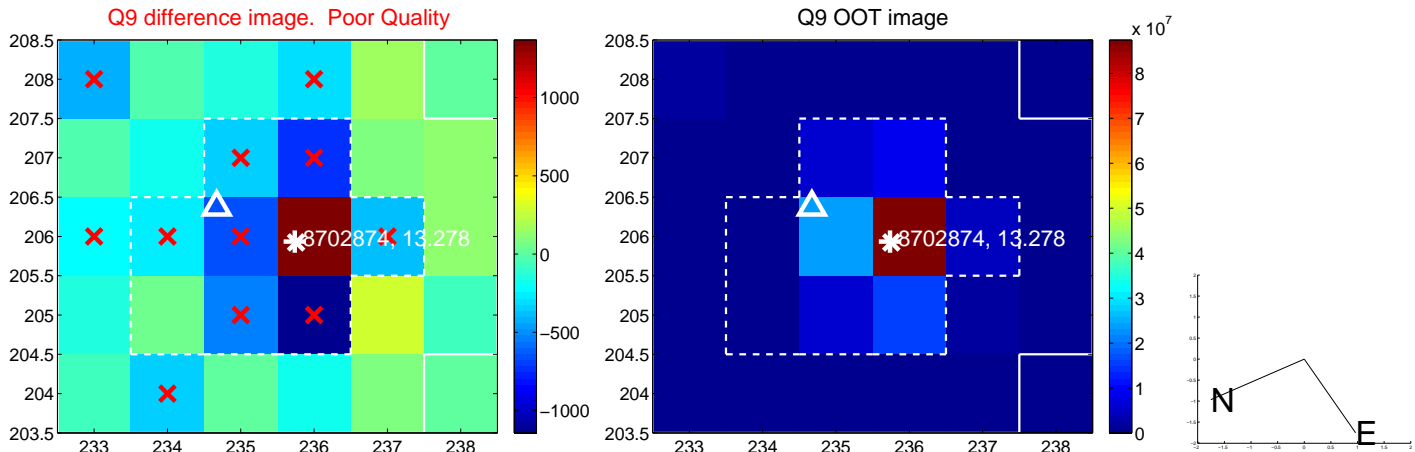
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



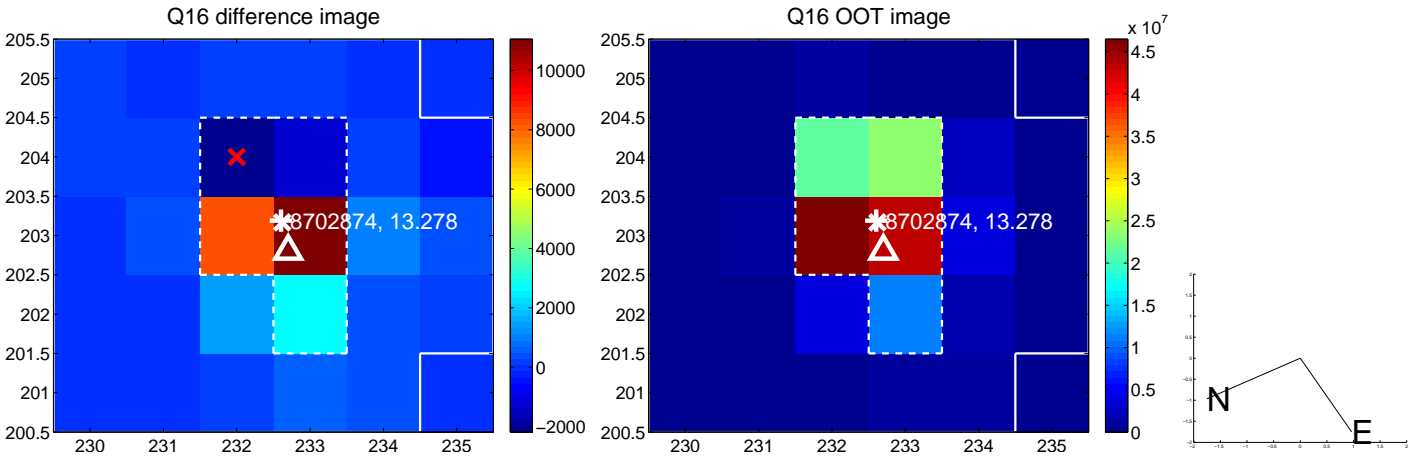
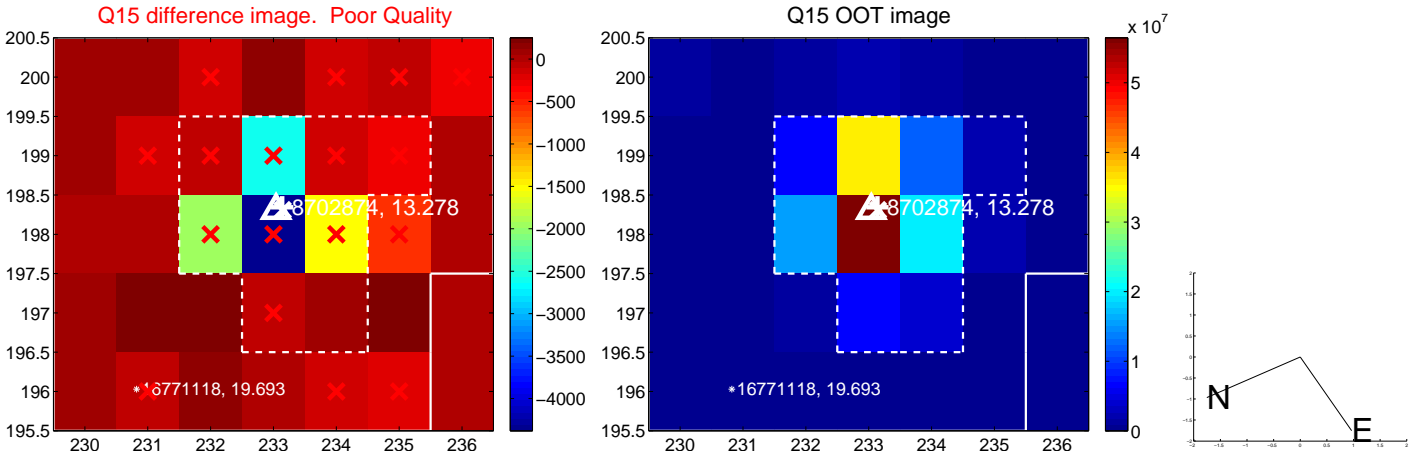
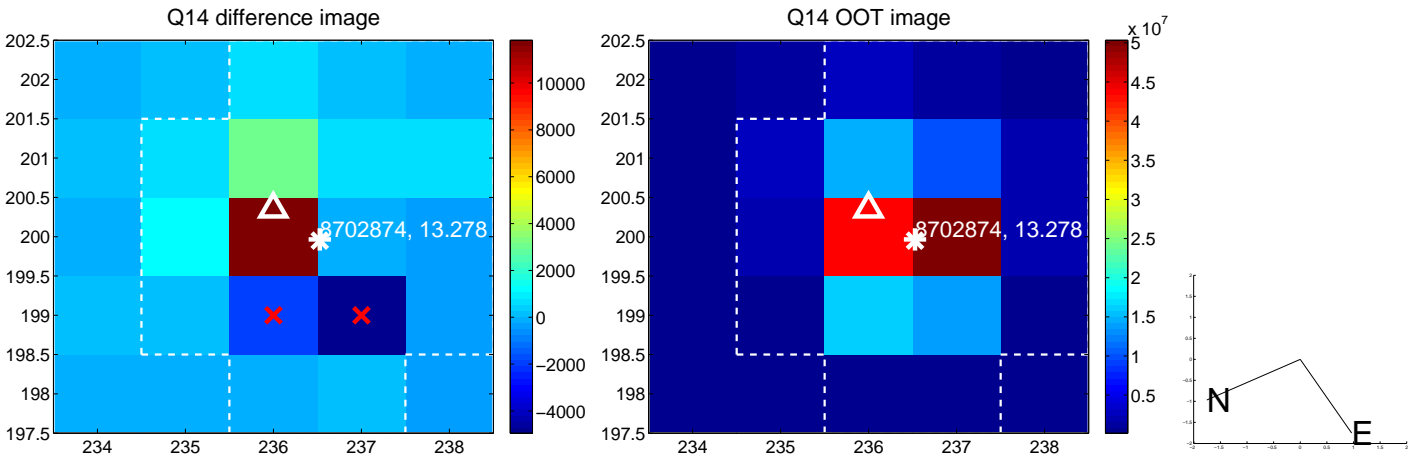
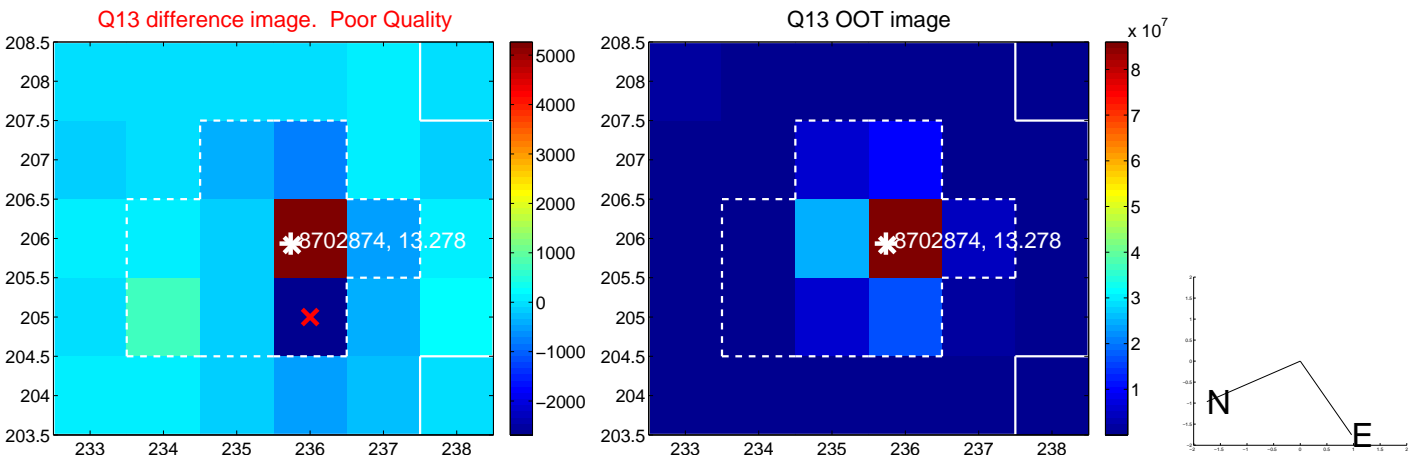
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



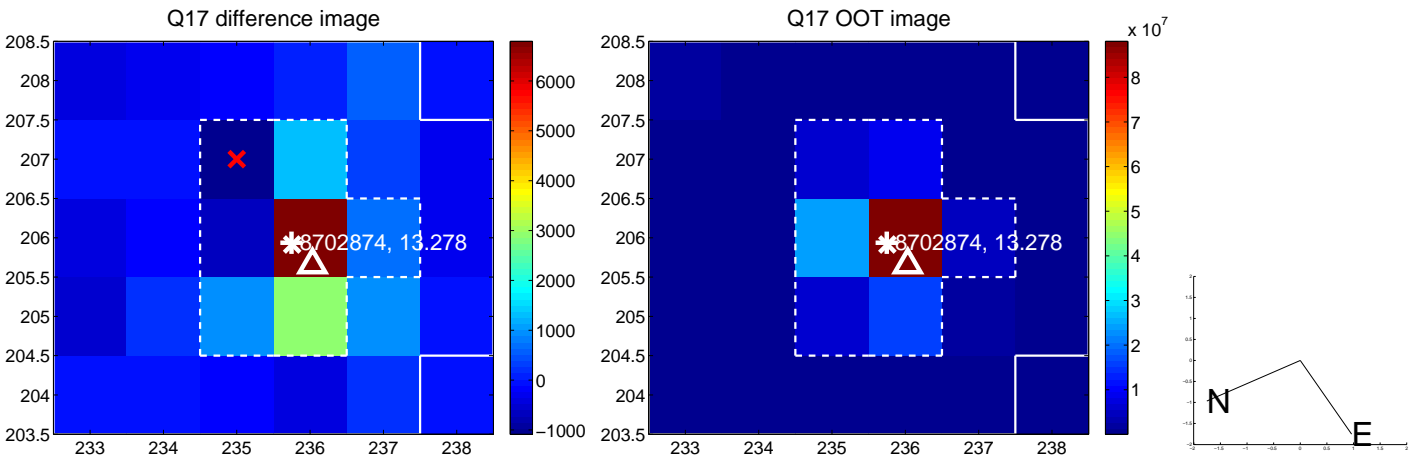
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



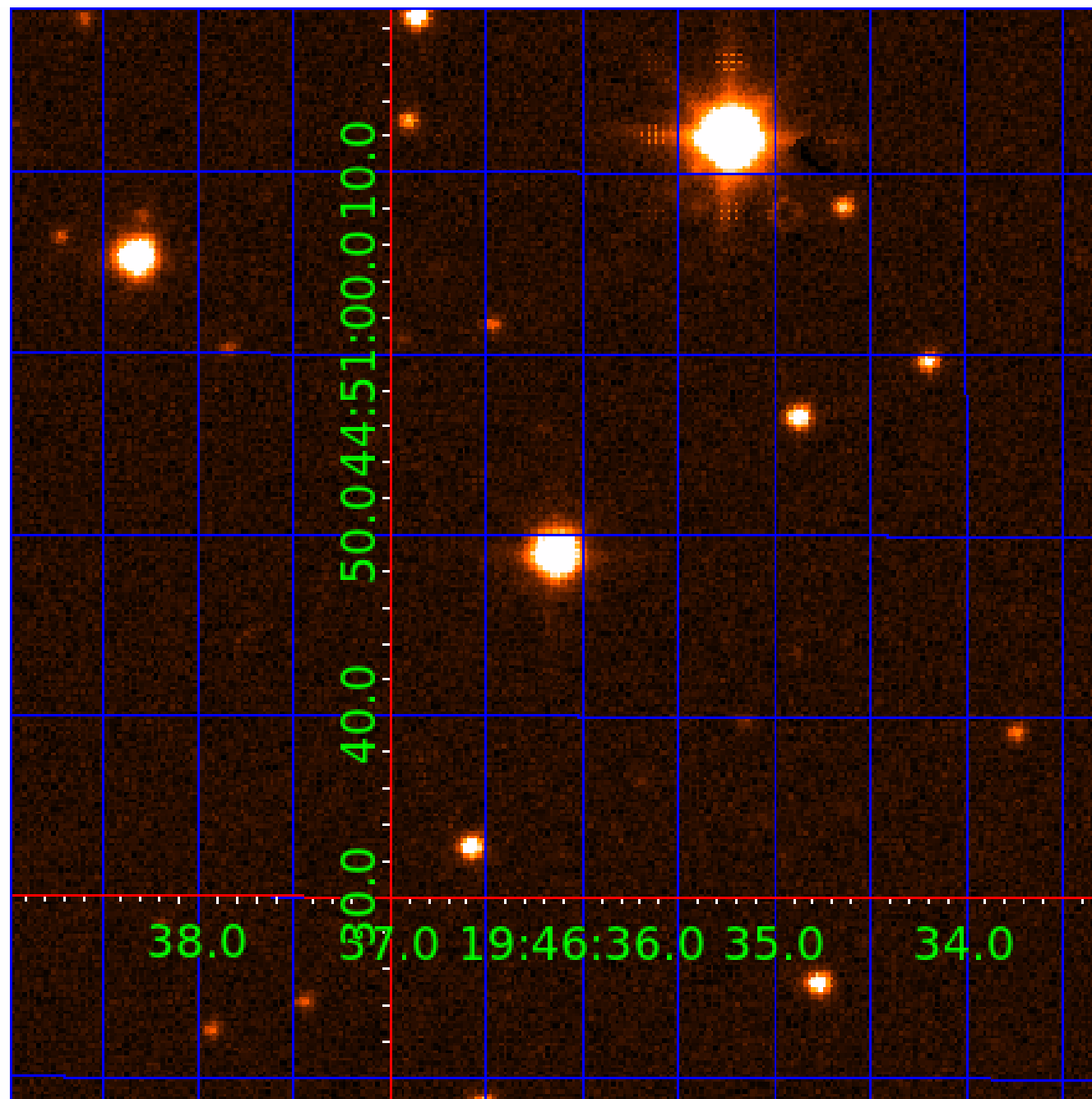
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



folded centroid time series figure for this object.

UKIRT Image

Declination



KIC 008702874

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 008702874-01 | OBS | No | 1.036541 | 131.970379 | 10.8 | 2.522 | 9.2 | 4.2 | 2.05 | 6961 | 0.71 | 16013.76 |
| 008702874-02 | OBS | No | 526.574604 | 357.153421 | 413.8 | 5.234 | 9.4 | 7.8 | 2.05 | 6961 | 4.42 | 3.95 |
| 008702874-03 | OBS | No | 0.505643 | 132.039219 | 4.6 | 3.143 | 8.1 | 2.4 | 2.05 | 6961 | 0.45 | 41701.38 |
| 008702874-04 | OBS | No | 23.792033 | 145.367715 | 295.4 | 1.468 | 7.5 | 6.8 | 2.05 | 6961 | 4.07 | 245.49 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 008702874-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT |
| 008702874-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS |
| 008702874-03 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_UNCERTAIN |
| 008702874-04 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT |

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

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

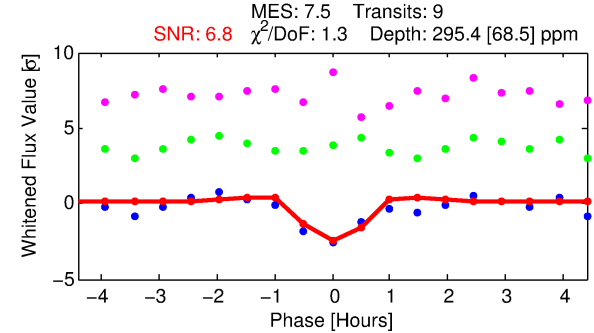
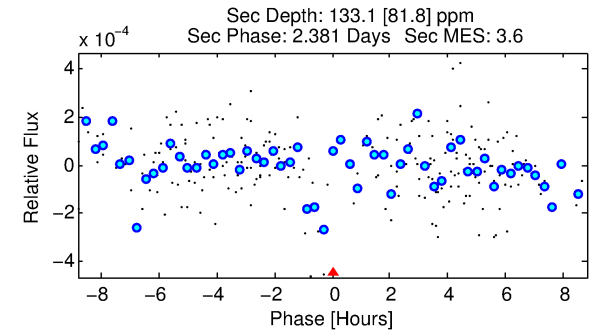
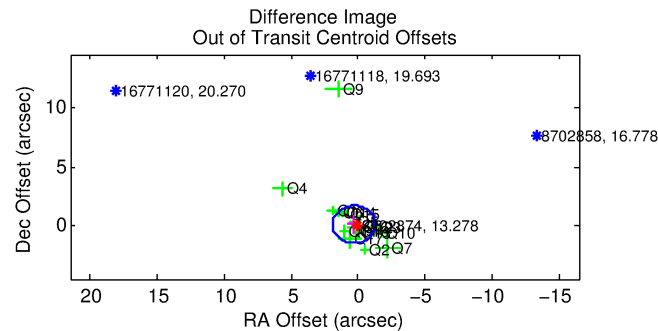
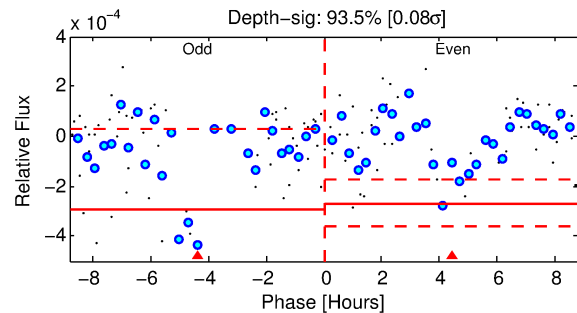
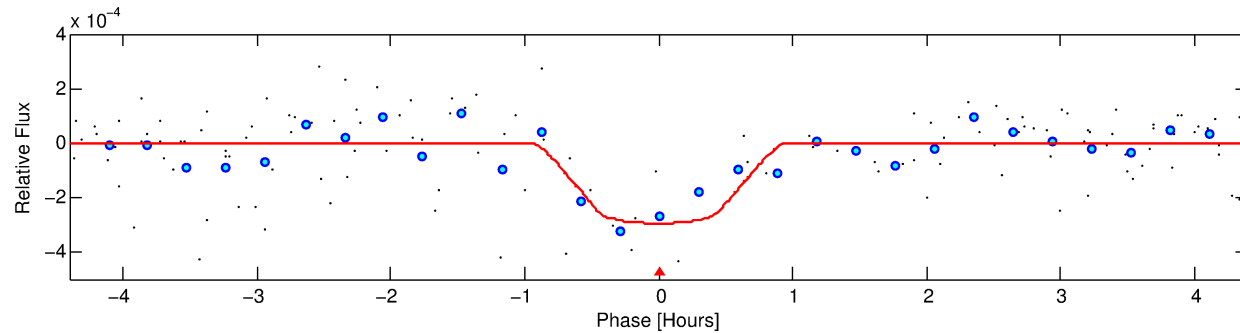
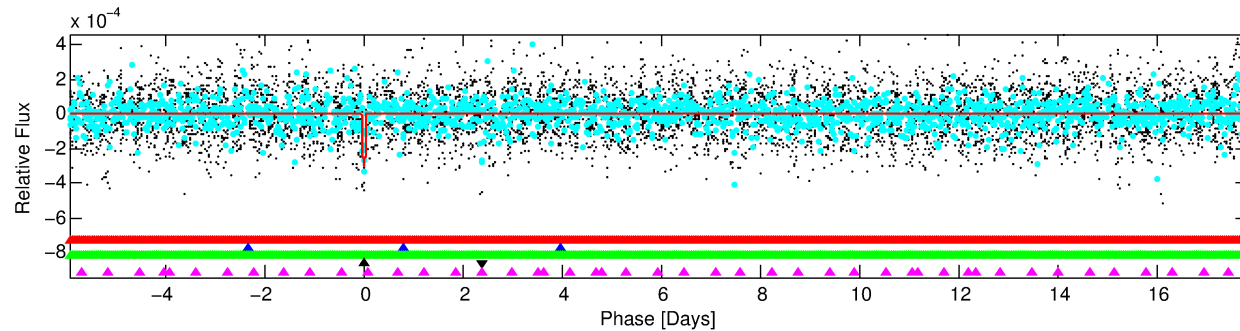
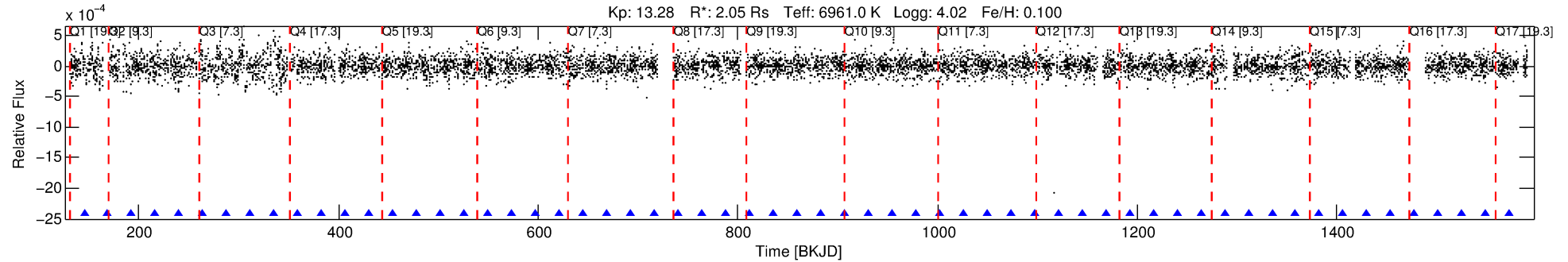
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008702874-04

No Significant Match Found

DV One-Page Summary

KIC: 8702874 Candidate: 4 of 5 Period: 23.792 d



DV Fit Results:

Period = 23.79203 [0.00019] d
Epoch = 145.3677 [0.0062] BKJD
Rp/R* = 0.0182 [0.0408]
a/R* = 61.77 [840.54]
b = 0.89 [3.28]
Seff = 245.49 [101.22]
Teq = 1009 [104] K
Rp = 4.07 [9.19] Re
a = 0.1897 [0.0473] AU
Ag = 158.86 [720.45] [0.22 σ]
Teffp = 5540 [6265] K [0.72 σ]

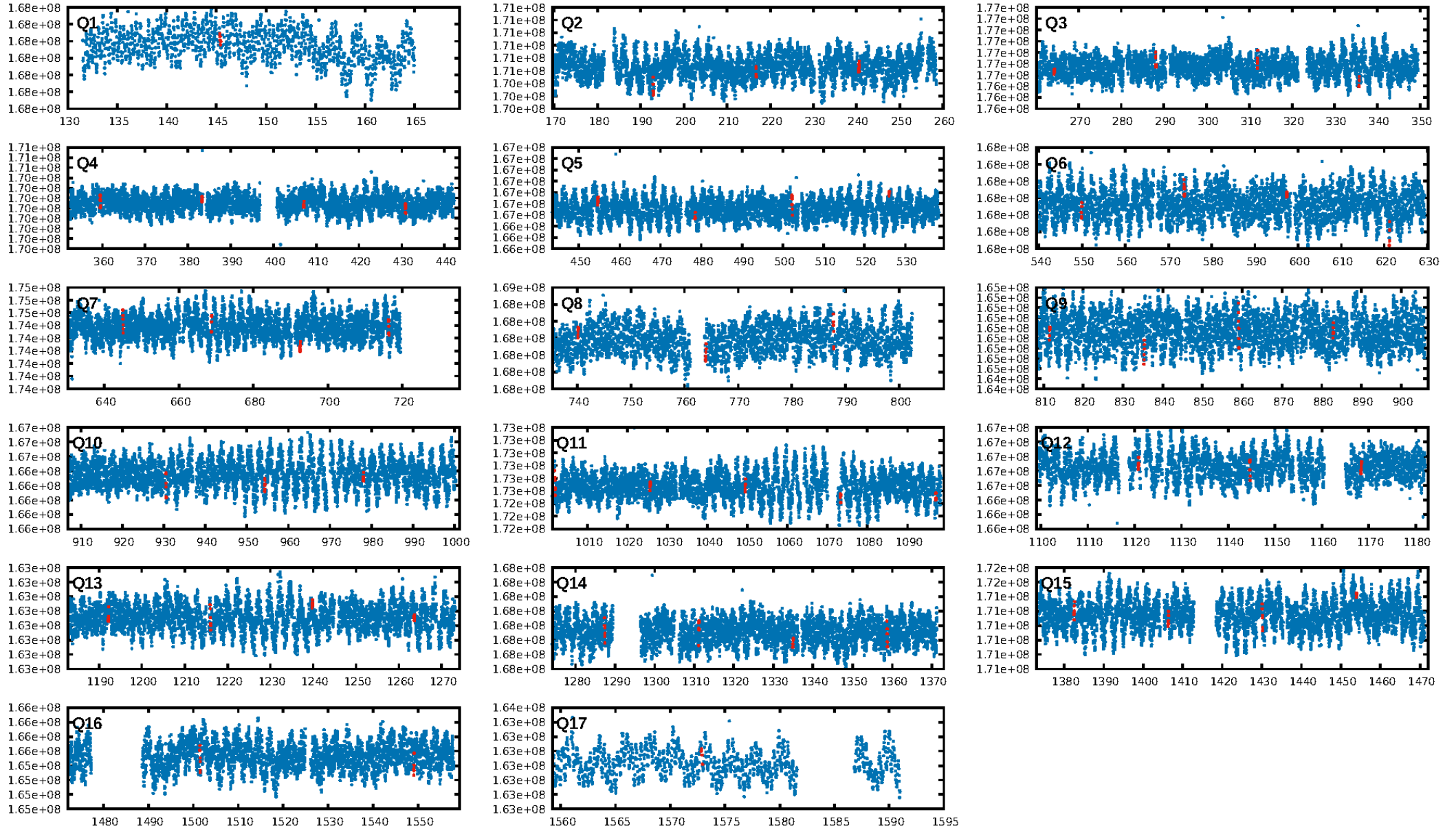
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [187.11 σ]
LongPeriod-sig: 100.0% [61.74 σ]
ModelChiSquare2-sig: 60.8%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 6.03e-10
RollingBand-fgt: 1.00 [9/9]
GhostDiagnostic-chr: 3.778
Centroid-sig: 14.3%
Centroid-so: 0.368 arcsec [1.00 σ]
OotOffset-rm: 0.346 arcsec [0.65 σ]
KicOffset-rm: 0.247 arcsec [0.40 σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.47 [8/17]
DiffImageOverlap-fno: 0.00 [0/17]

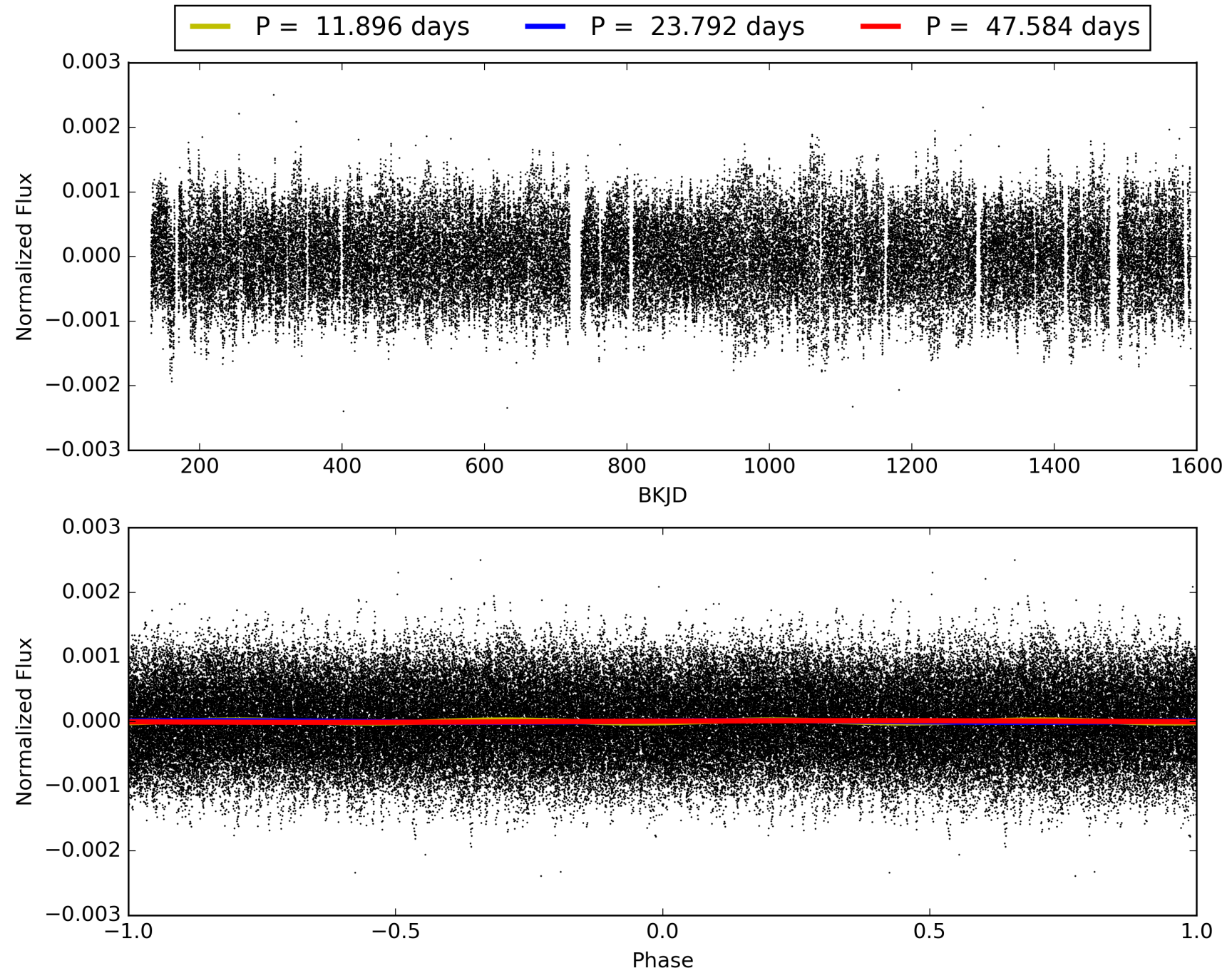
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 14:45:54 Z

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

TCE 008702874-04, PDC Light Curves

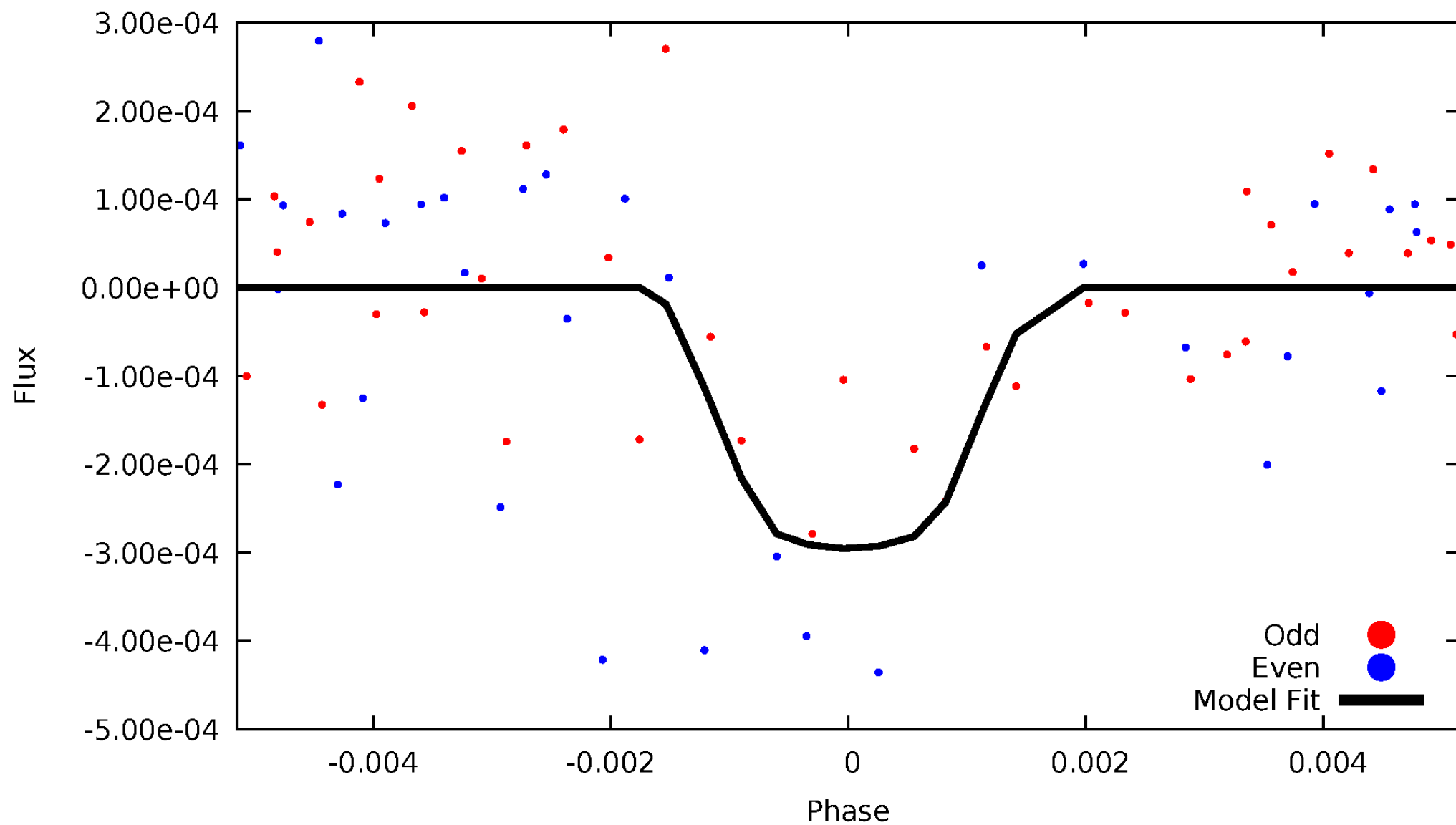


TCE 008702874-04



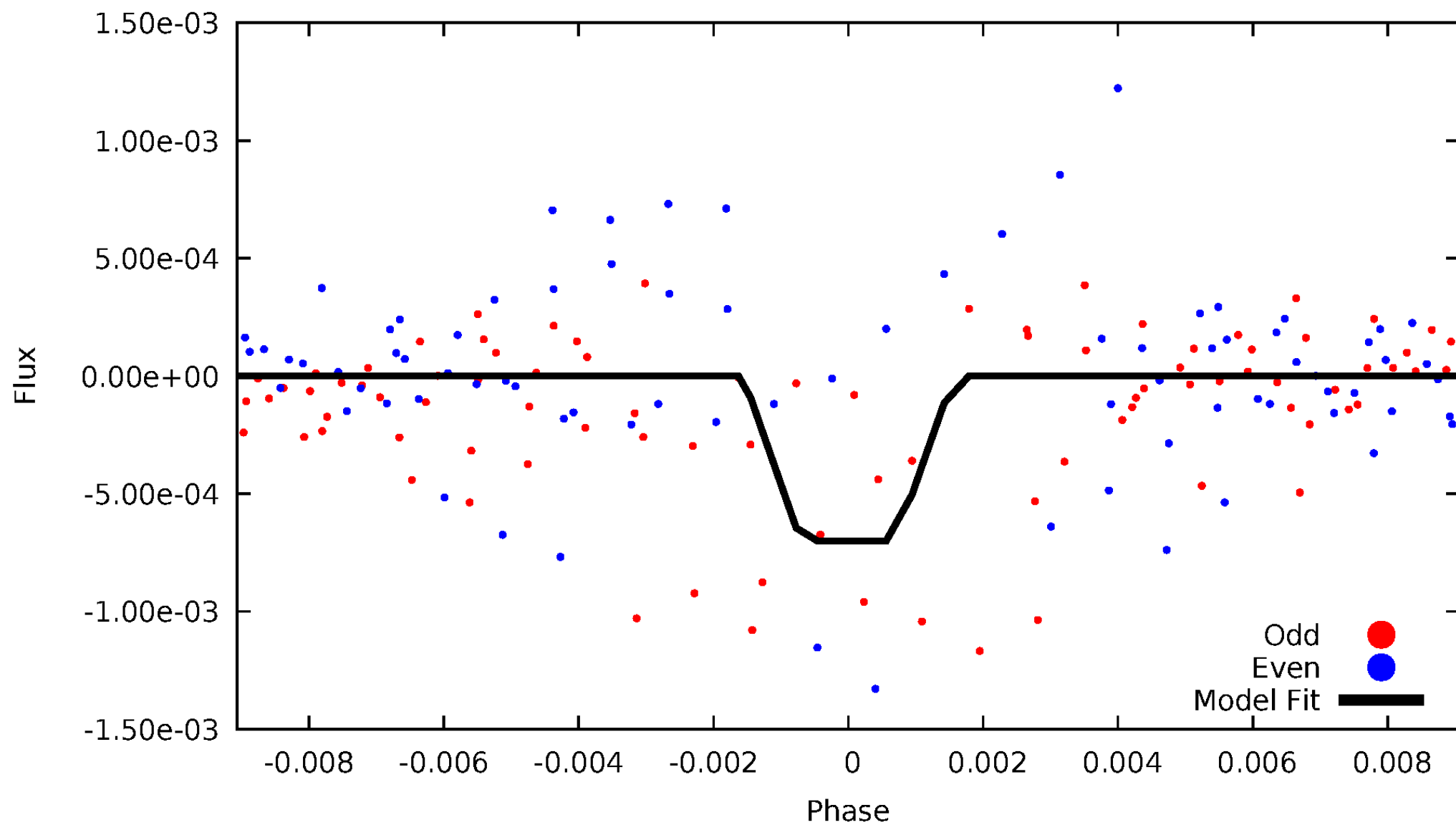
DV Odd/Even

TCE 008702874-04



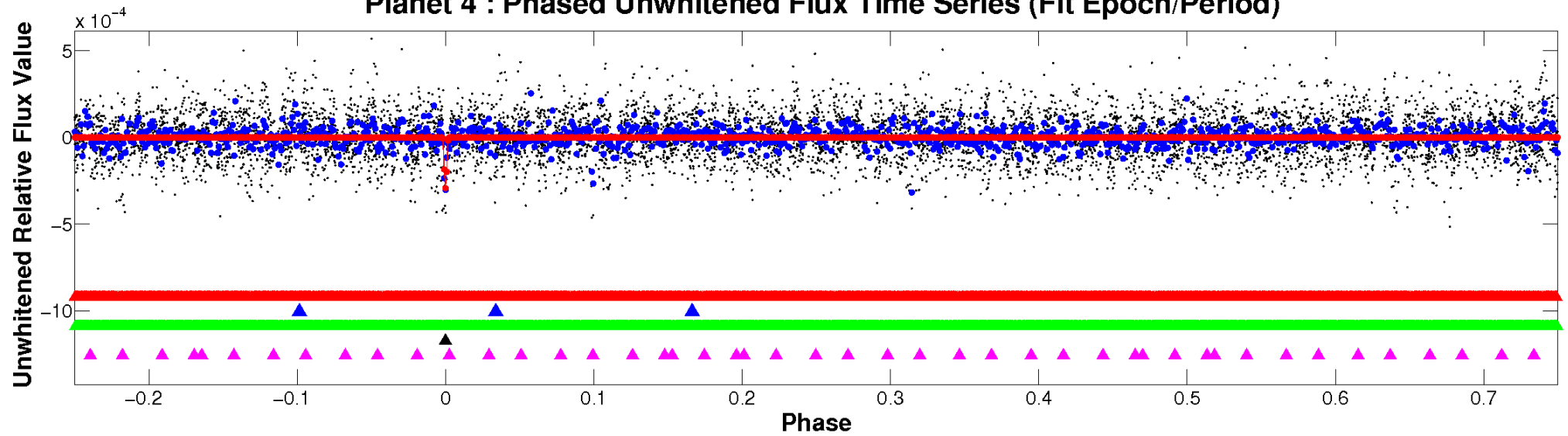
ALT Odd/Even

TCE 008702874-04

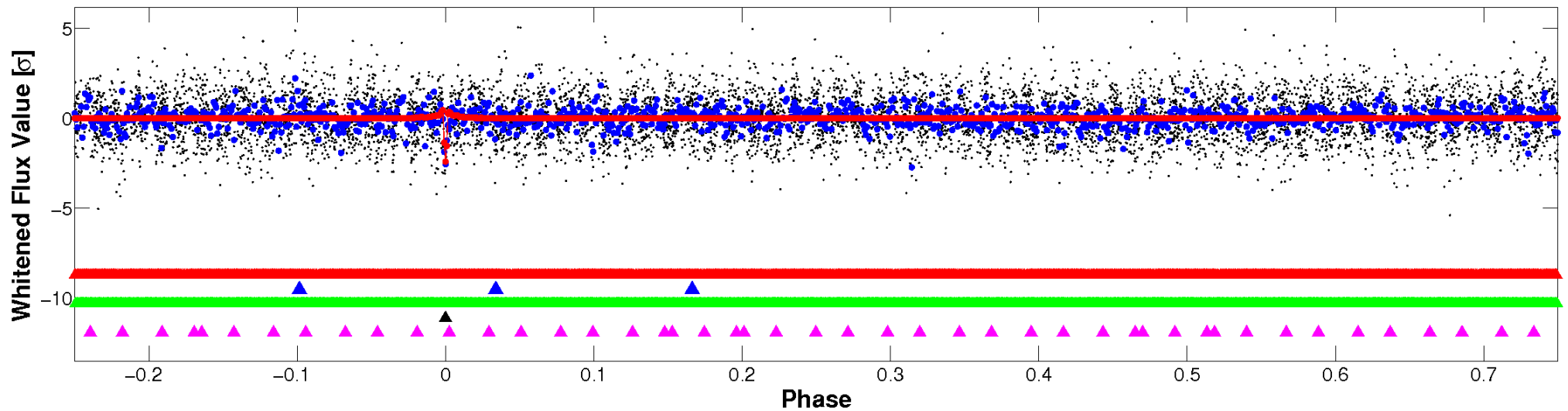


Non-Whitened Vs. Whitened Light Curve

Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

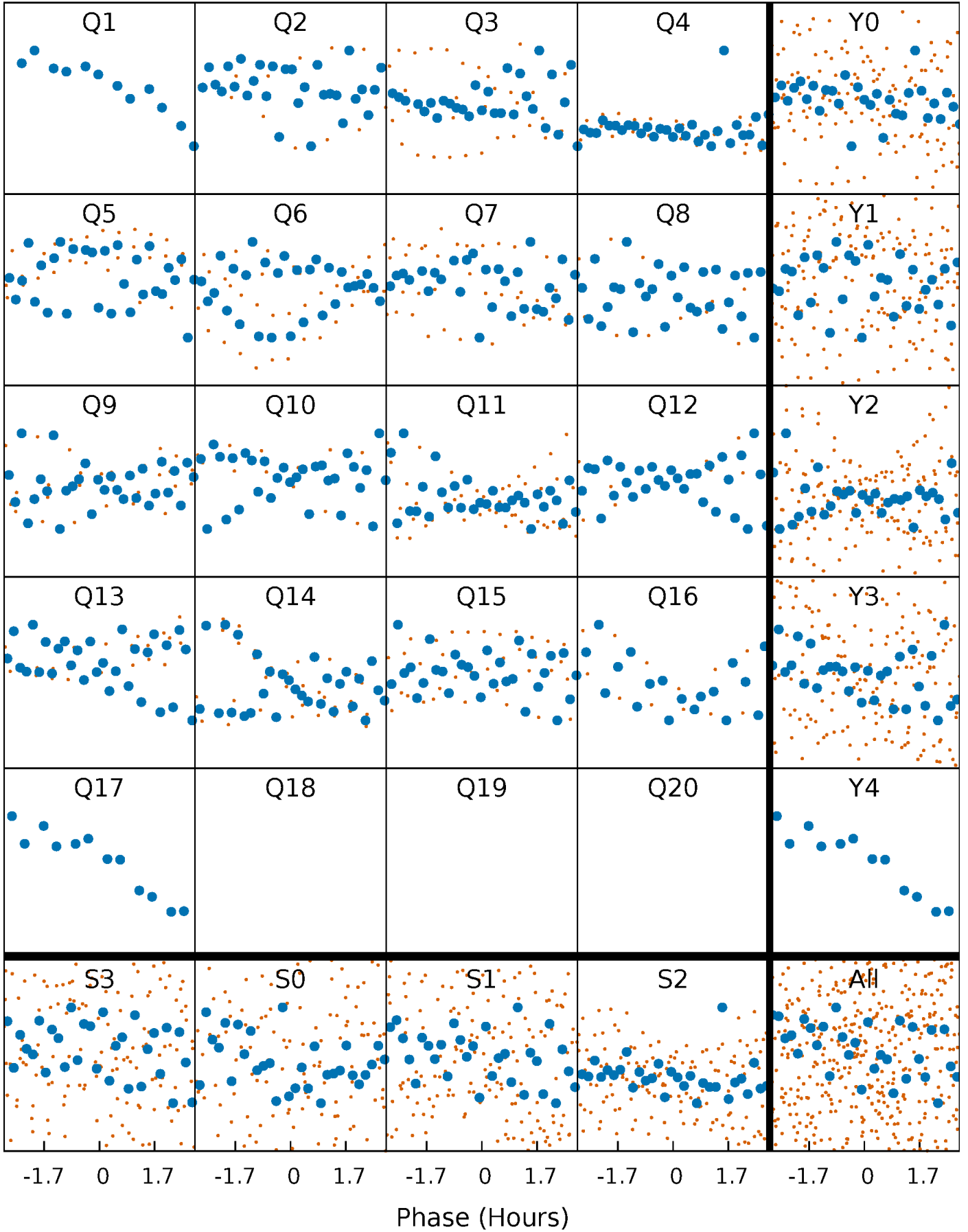


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



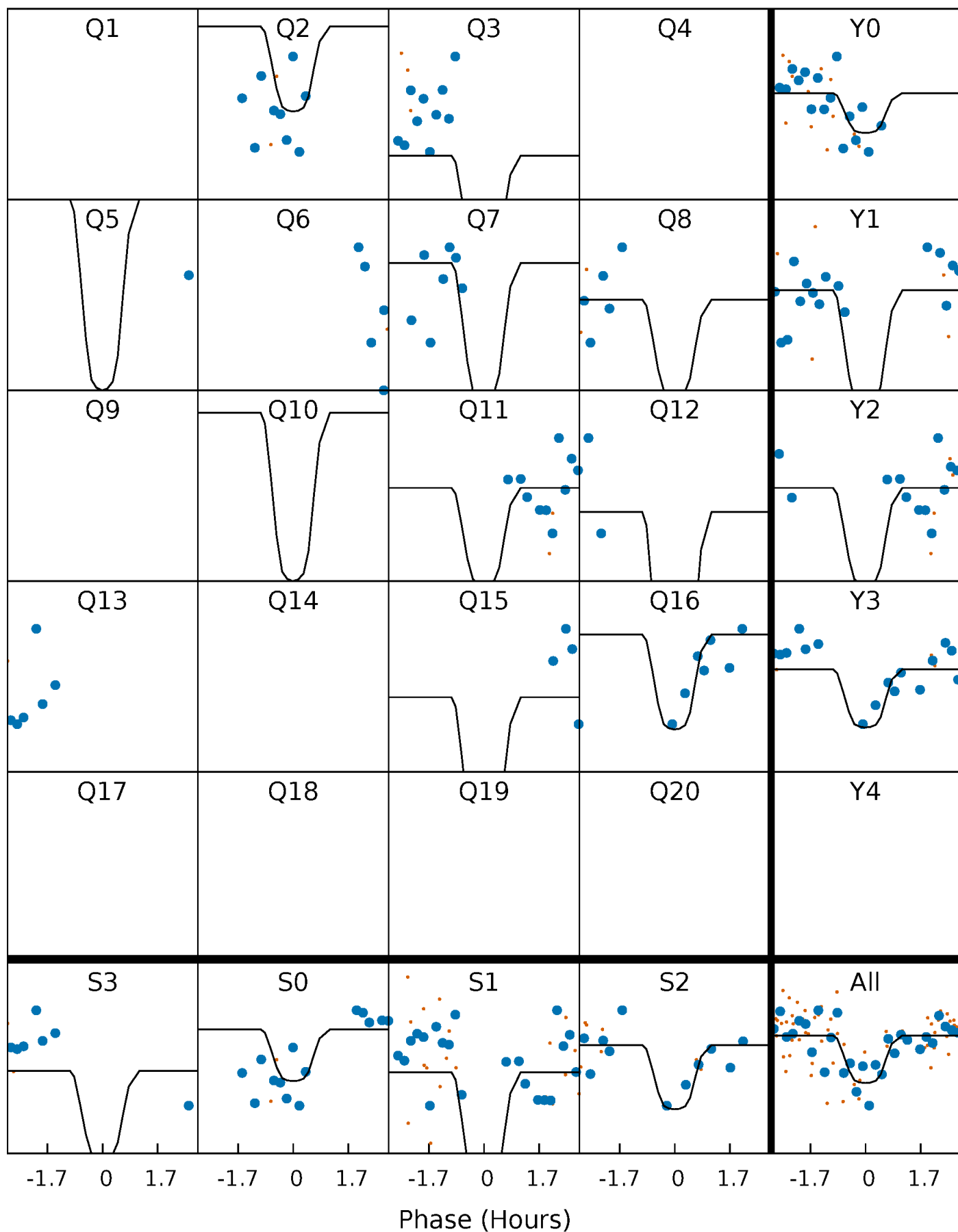
PDC Quarter-Phased Transit Curves

TCE 008702874-04 P= 23.792033 Days $T_0=145.367716$ (BKJD)



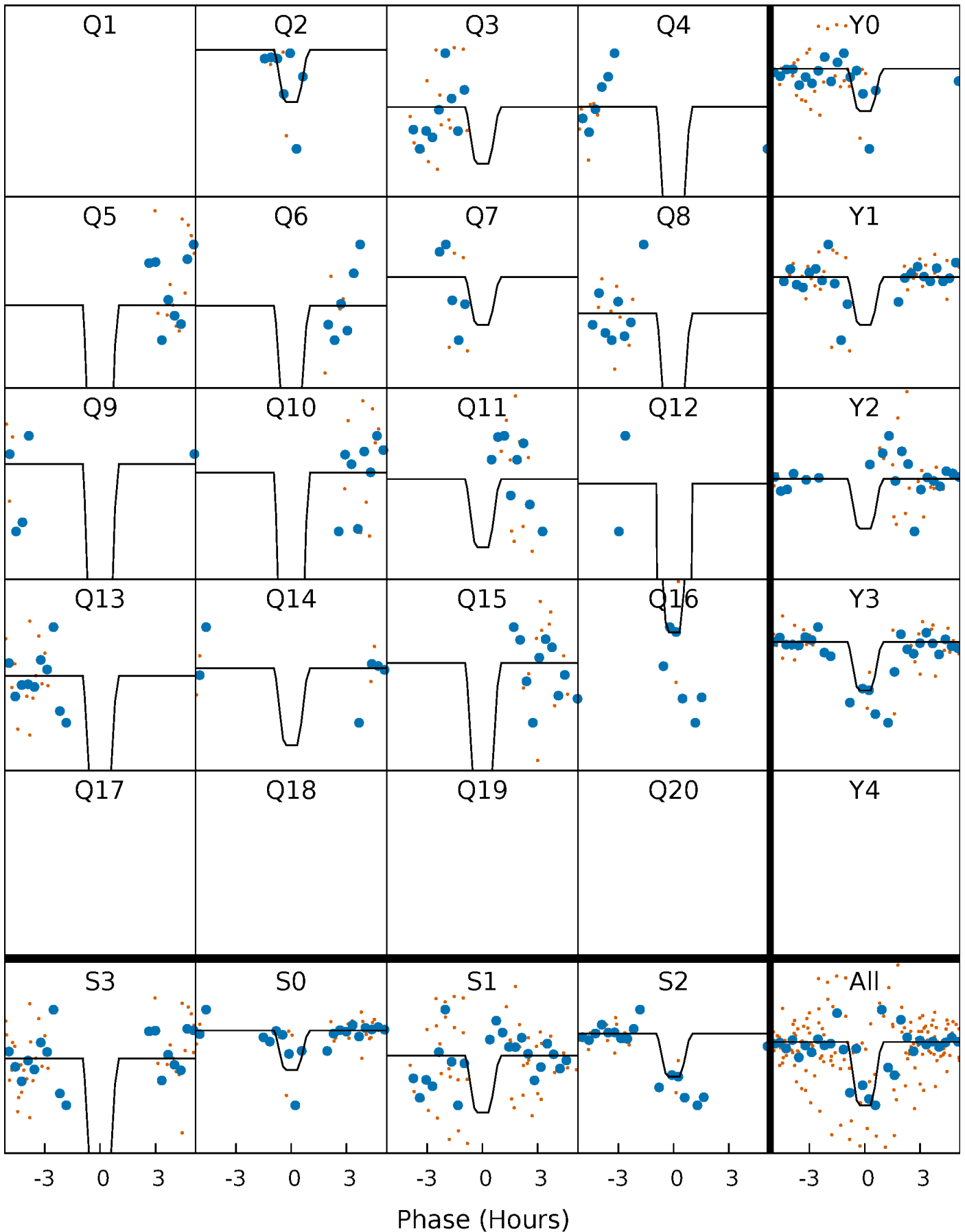
DV Quarter-Phased Transit Curves

TCE 008702874-04 P= 23.792033 Days $T_0=145.367716$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

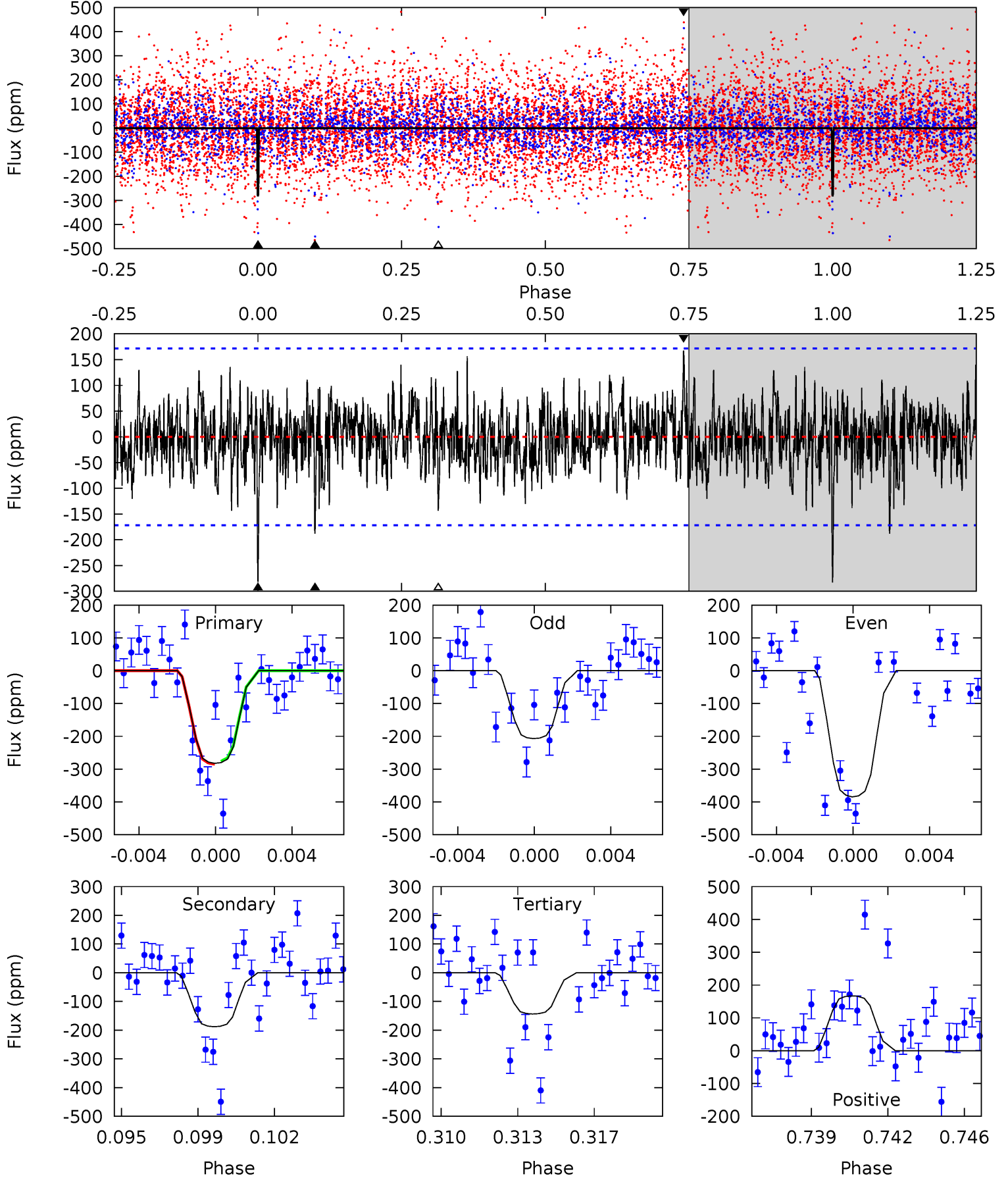
TCE 008702874-04 $P = 23.792498$ Days $T_0 = 145.363312$ (BKJD)



DV Model-Shift Uniqueness Test

008702874-04, $P = 23.792033$ Days, $E = 121.575683$ Days

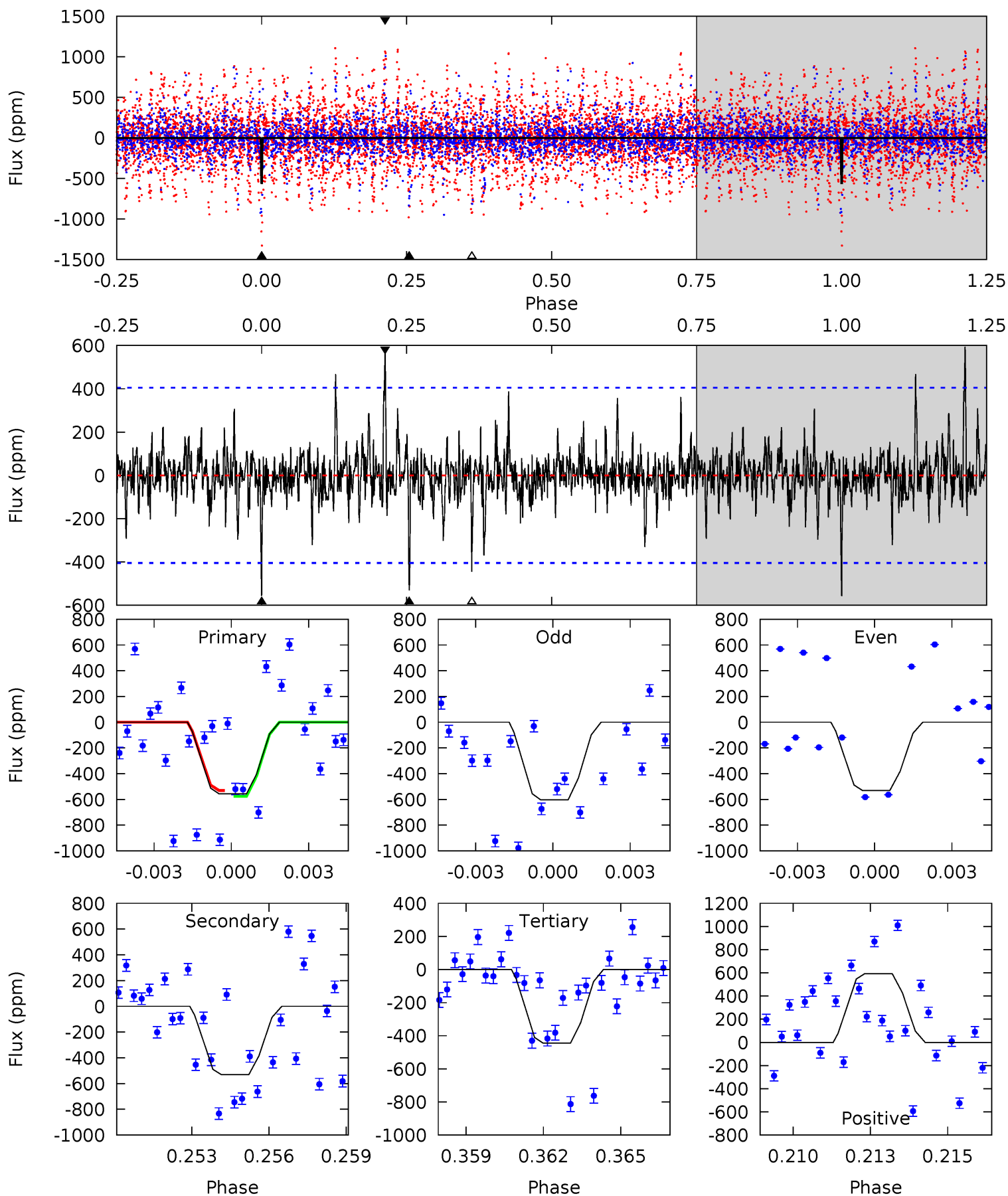
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 8.60 | 5.72 | 4.37 | 5.09 | 5.22 | 2.92 | 1.38 | 4.22 | 3.51 | 1.35 | 0.64 | 2.67 | 1.04 | 0.37 | 0.14 |



Alt Model-Shift Uniqueness Test

008702874-04, P = 23.792498 Days, E = 121.570814 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 7.24 | 6.90 | 5.78 | 7.71 | 5.26 | 2.98 | 1.20 | 1.45 | -0.48 | 1.12 | -0.81 | 0.47 | 1.23 | 0.52 | 0.30 |



Stellar Parameters For KIC 008702874

| | $T_{\text{eff}} (K)$ | $\log(g)$ | $[\text{Fe}/\text{H}]$ | $R (R_{\odot})$ | $M (M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 6961^{+194}_{-305} | $4.021^{+0.209}_{-0.171}$ | $0.100^{+0.200}_{-0.350}$ | $2.049^{+0.586}_{-0.586}$ | $1.605^{+0.207}_{-0.311}$ | $0.263^{+0.364}_{-0.124}$ |
| | +3%/-4% | +5%/-4% | +200%/-350% | +29%/-29% | +13%/-19% | +138%/-47% |
| Source | PHO54 | PHO54 | PHO54 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 008702874-04 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|---------------|------------------------|----------------------|------------------------|----------------------|
| DV | -188 ± 33 | $7.72^{+7.83}_{-5.20}$ | 1397^{+109}_{-111} | 4461^{+3095}_{-952} | 62^{+481}_{-47} |
| Alt. | -531 ± 77 | $8.31^{+7.86}_{-5.54}$ | 1399^{+104}_{-108} | 5443^{+4649}_{-1320} | 156^{+1147}_{-120} |

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

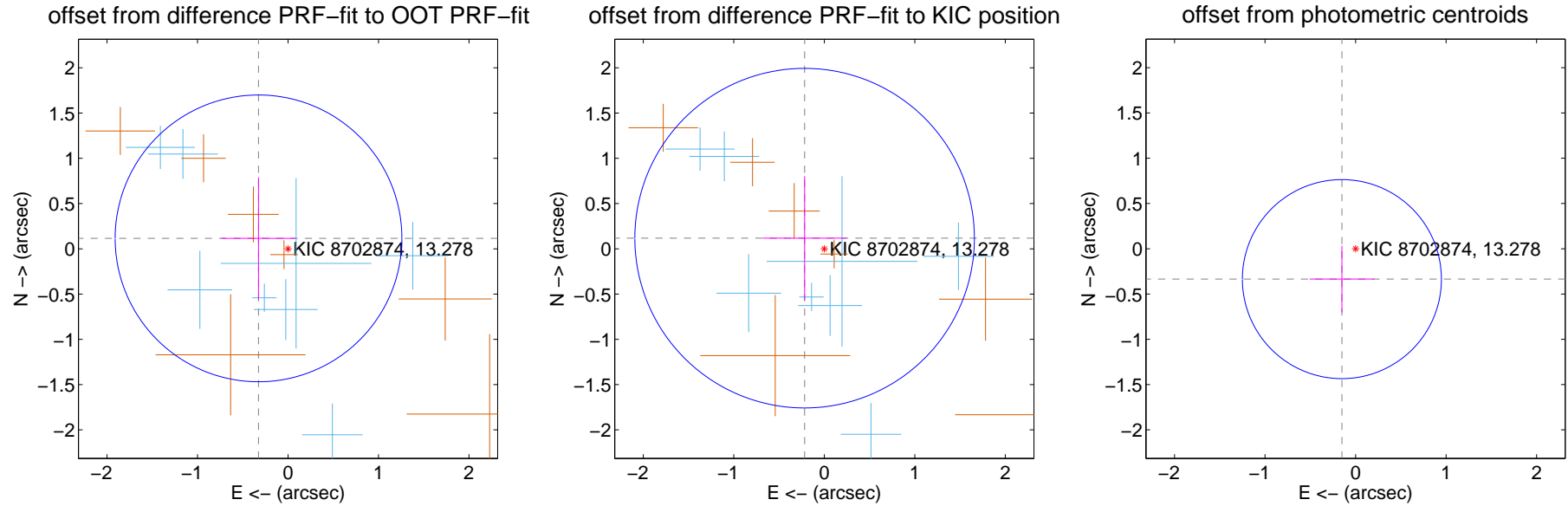
DV Centroid Data

Supplemental centroid analysis for 008702874-04. Kepler magnitude: 13.28. Transit SNR 6.80

There are 8 quarters with good PRF difference image offsets

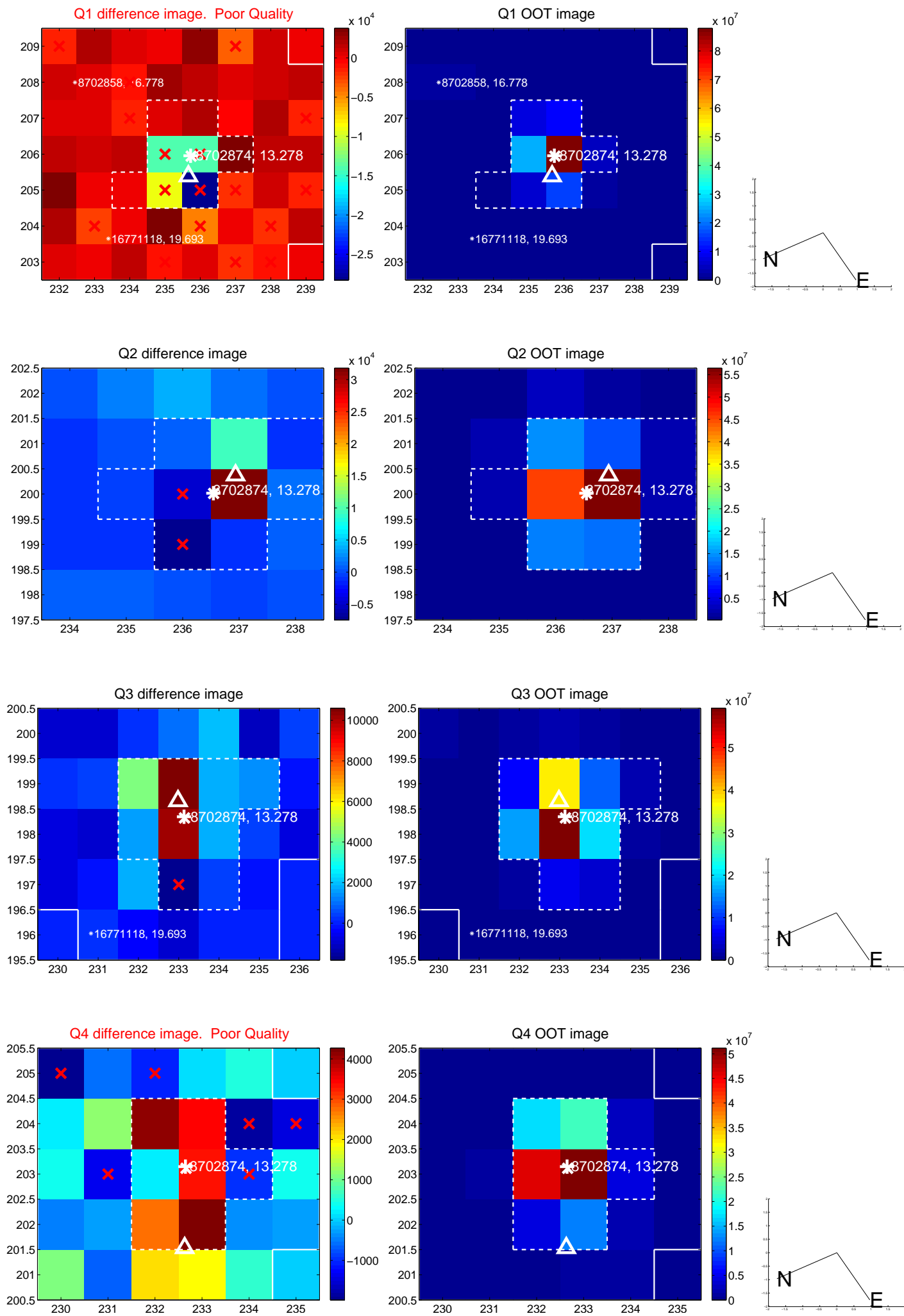
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|-------------------|
| PRF-fit source offset from OOT | 0.346 ± 0.528 | 0.65 | 0.326 ± 0.409 | 0.115 ± 0.675 |
| PRF-fit source offset from KIC position | 0.247 ± 0.625 | 0.40 | 0.217 ± 0.462 | 0.118 ± 0.685 |
| photometric centroid source offset | 0.37 ± 0.37 | 1.00 | 0.15 ± 0.36 | -0.34 ± 0.37 |

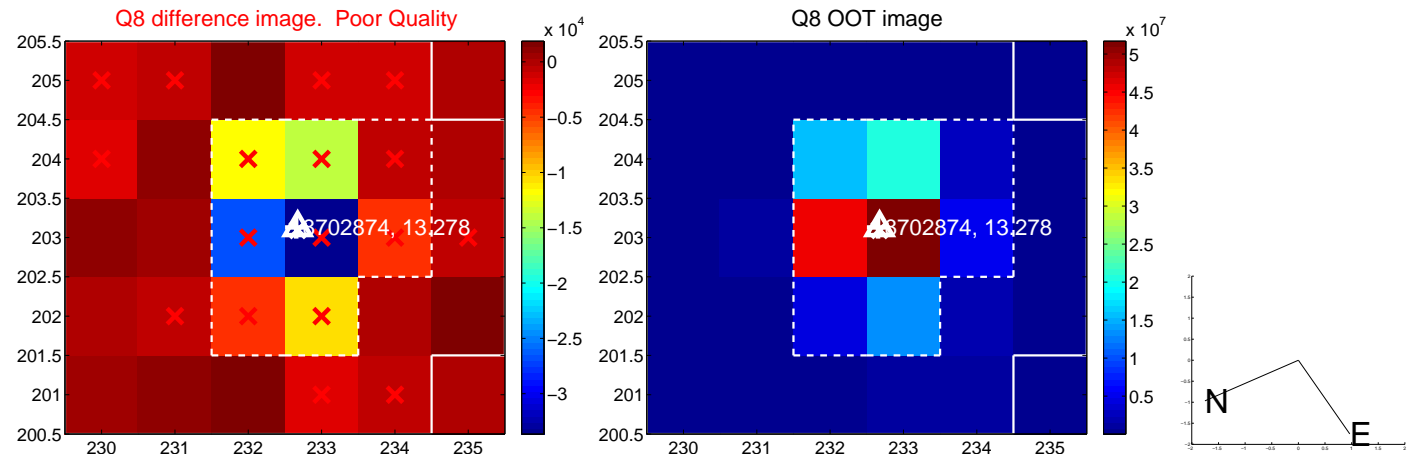
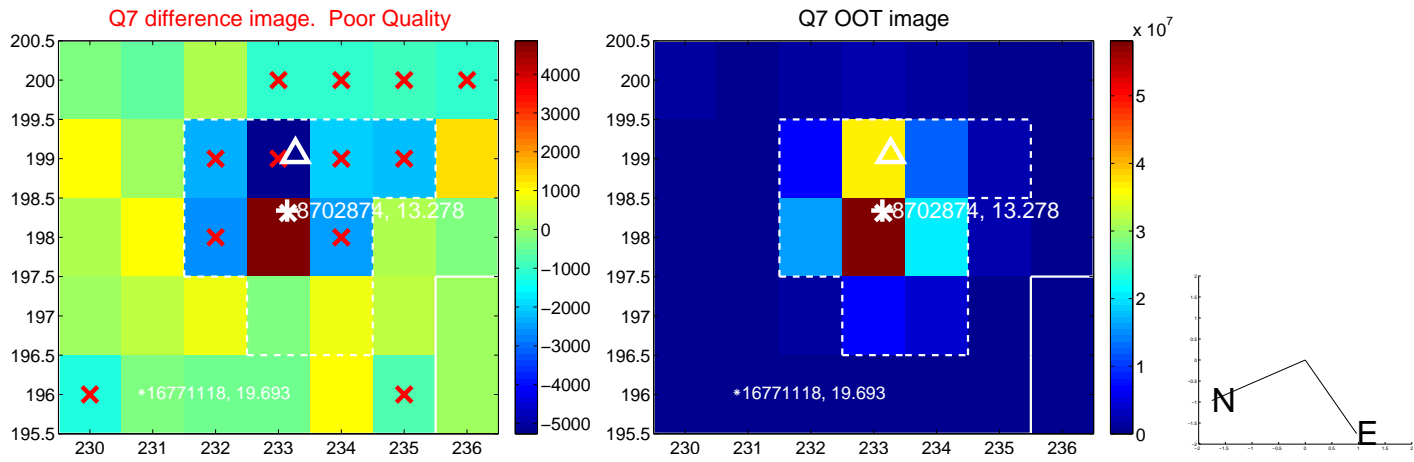
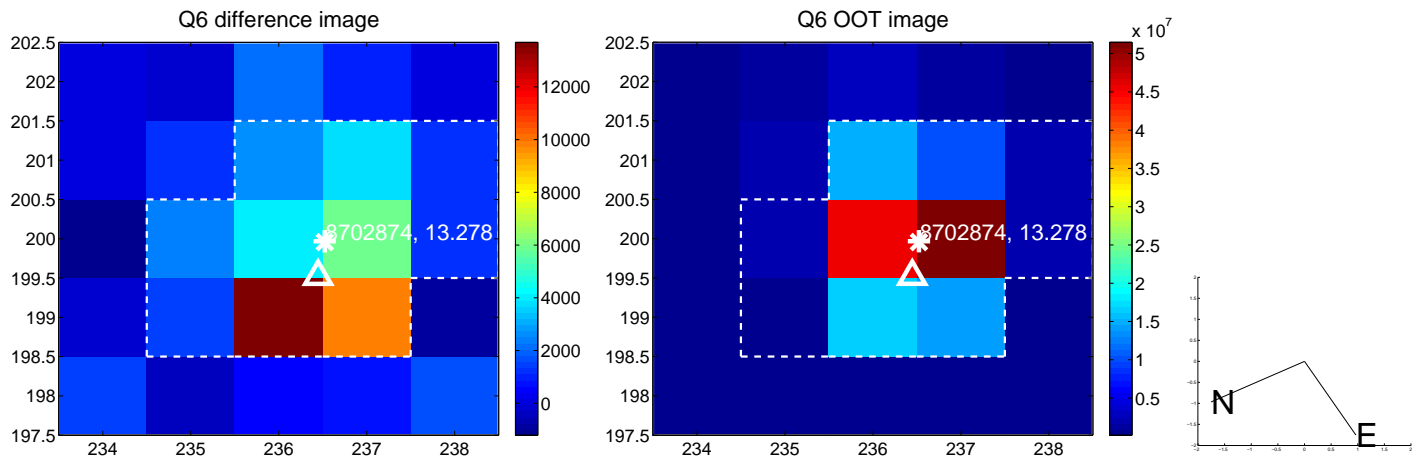
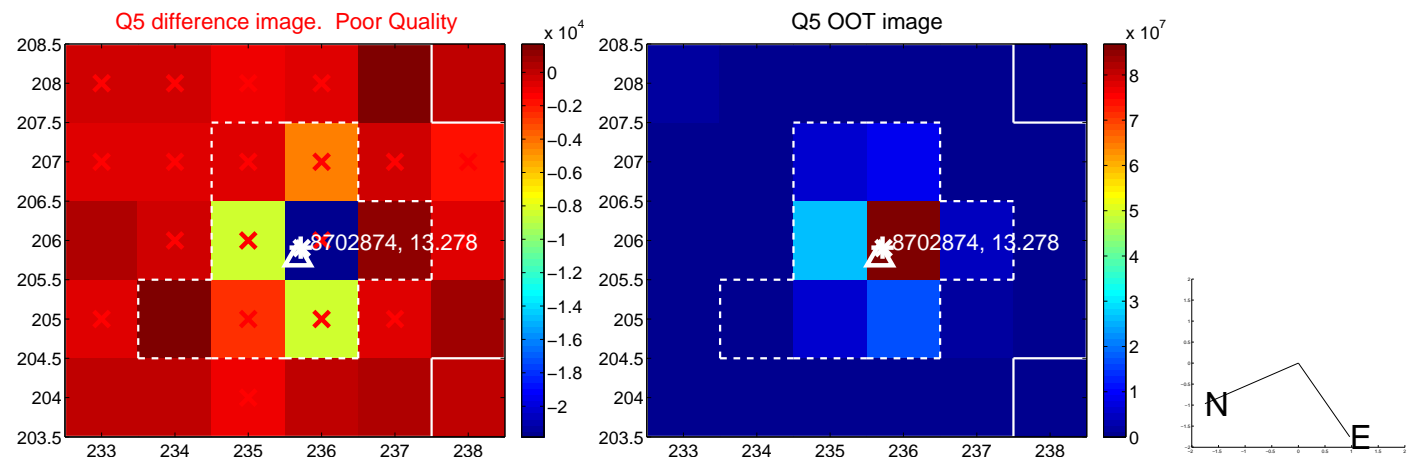


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

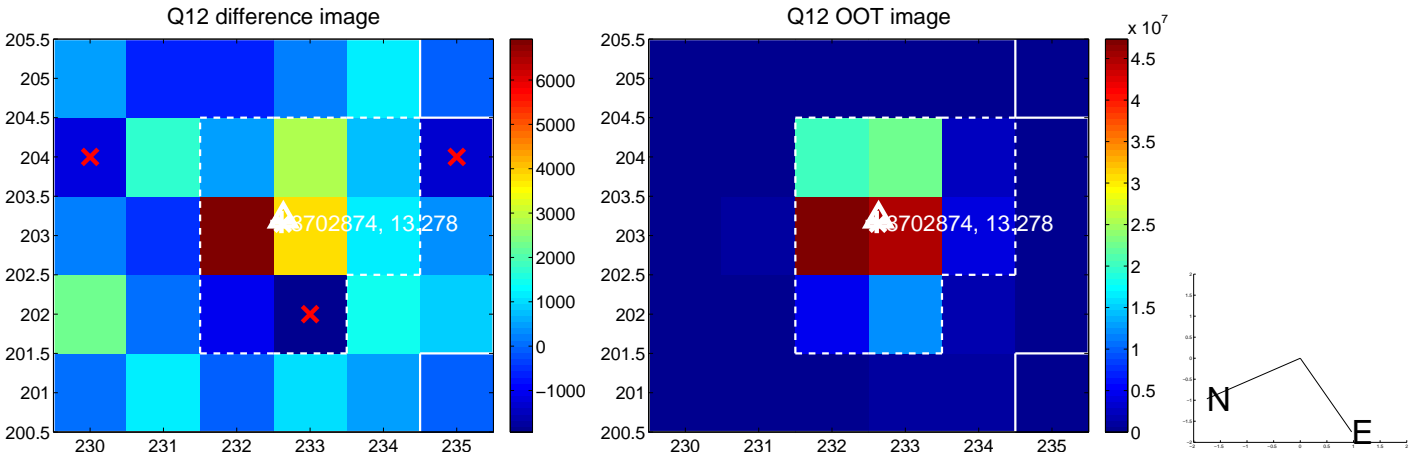
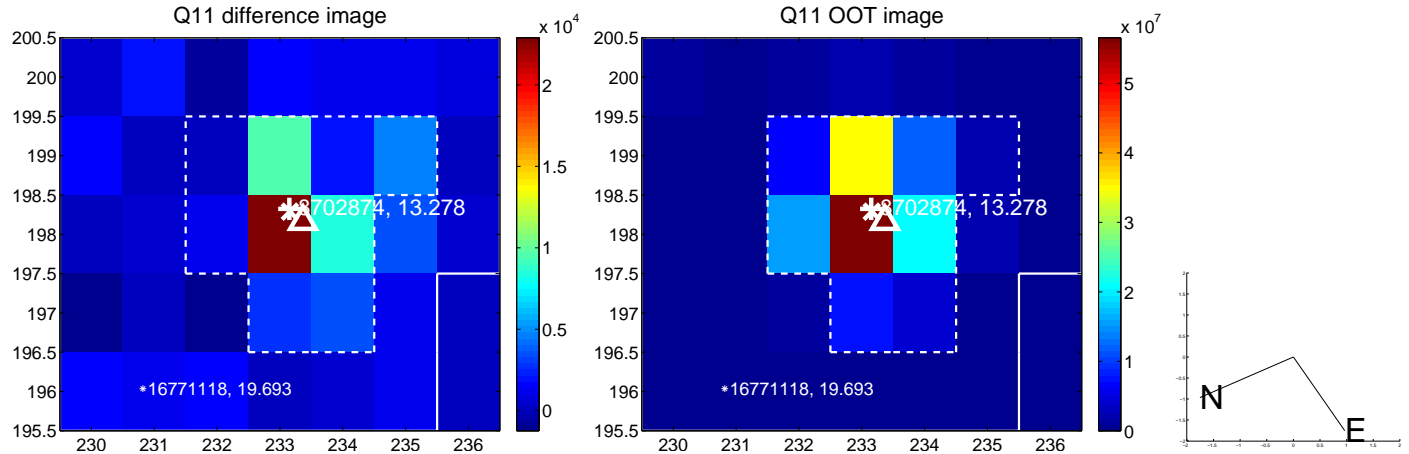
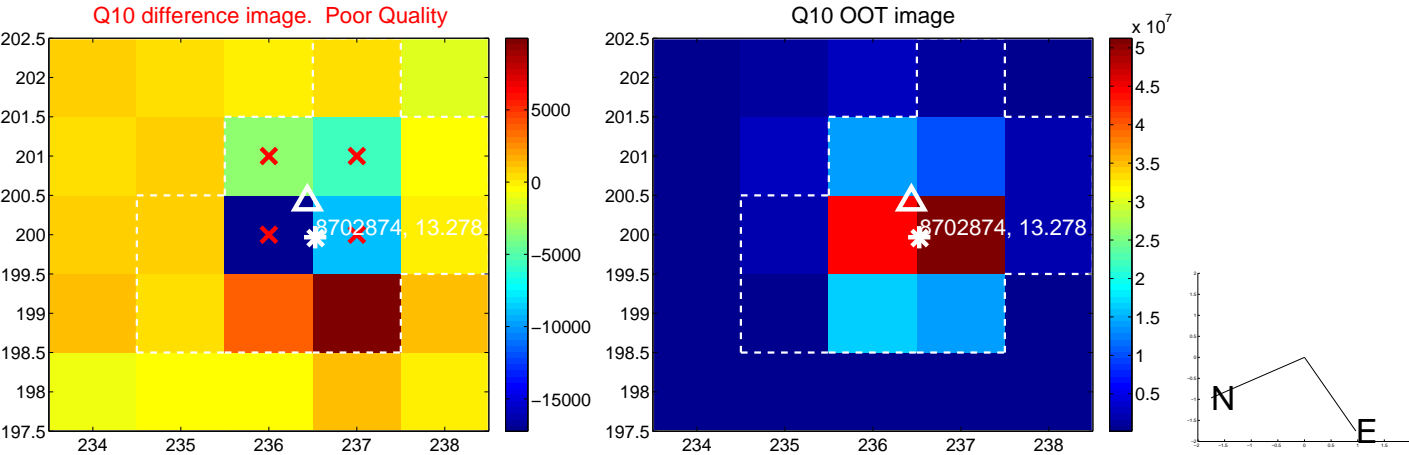
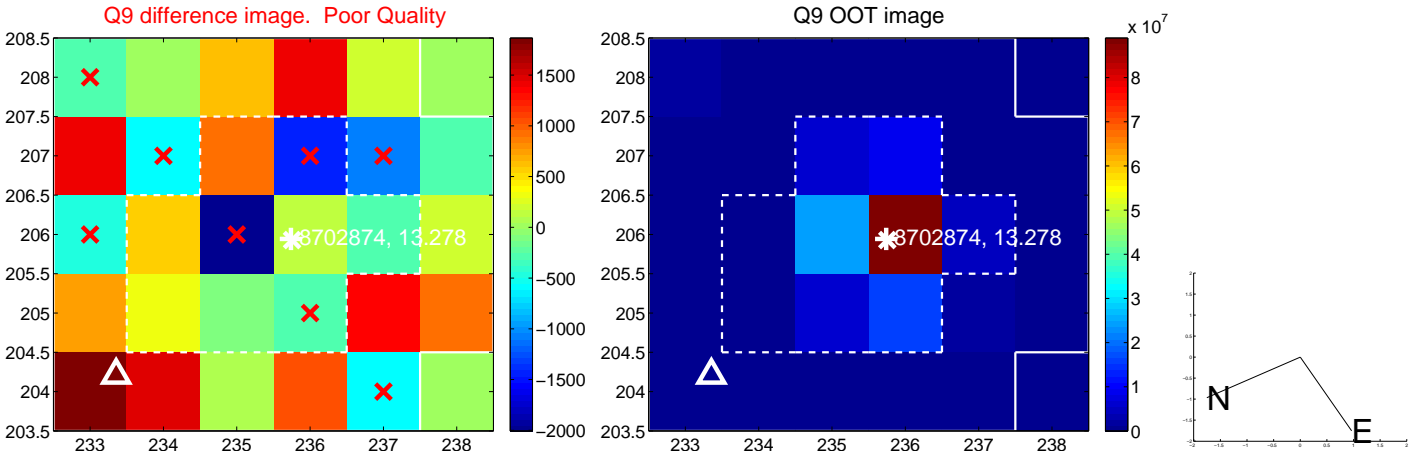
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



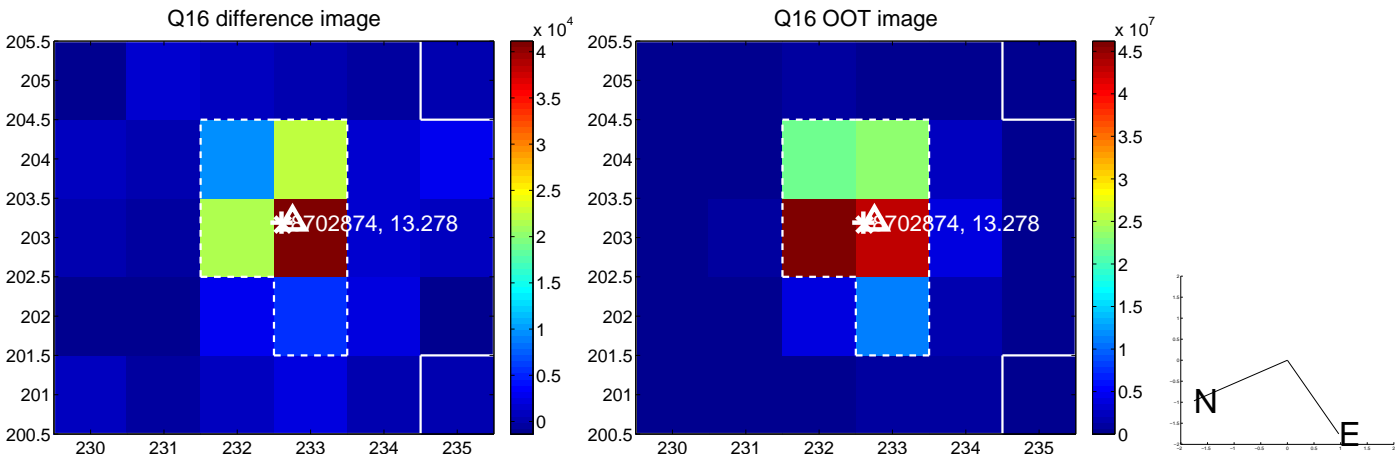
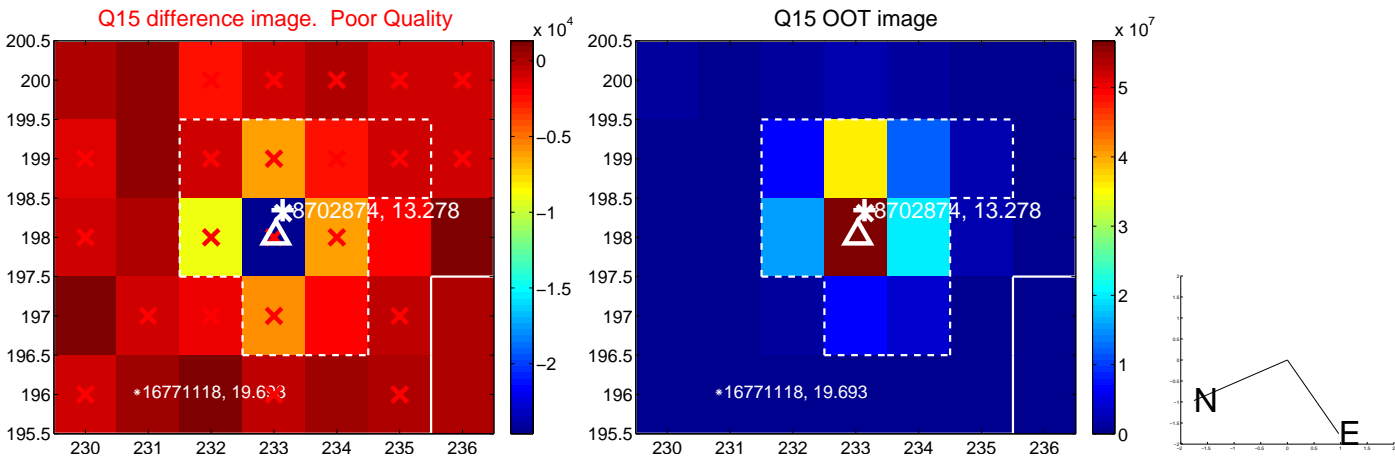
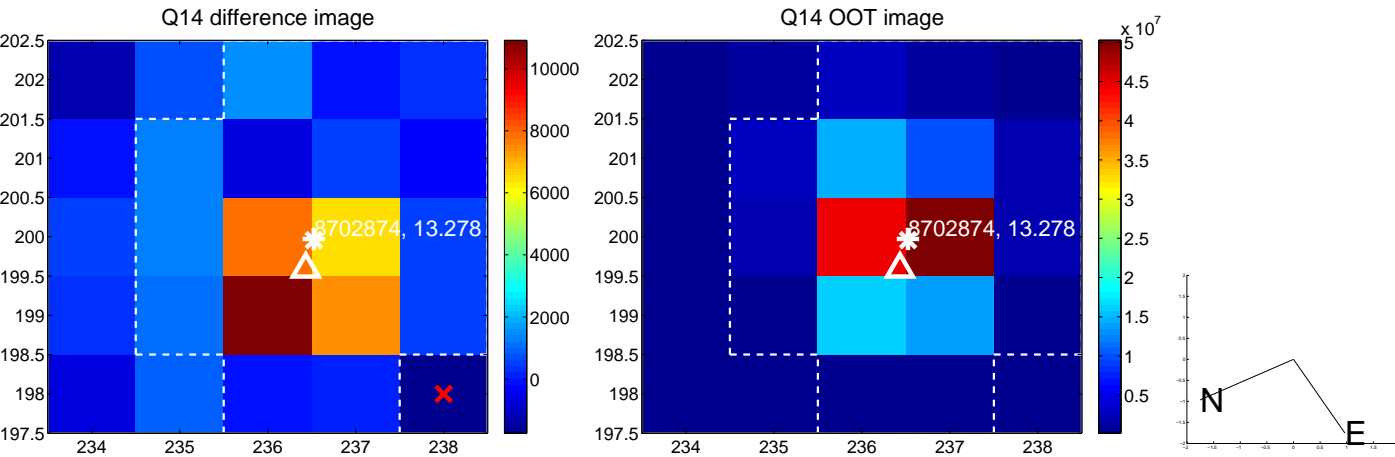
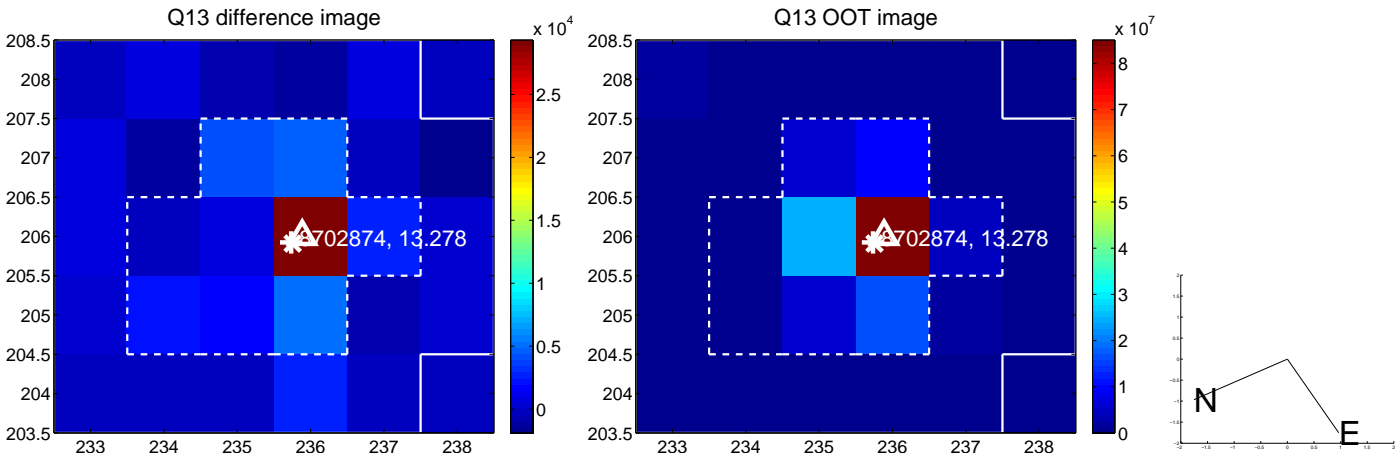
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



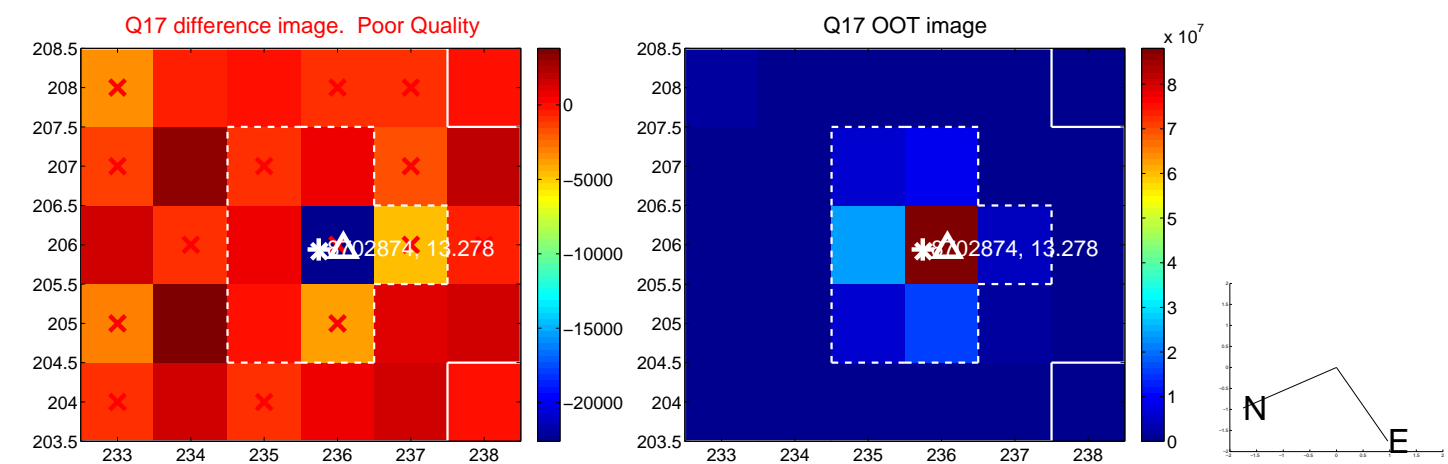
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



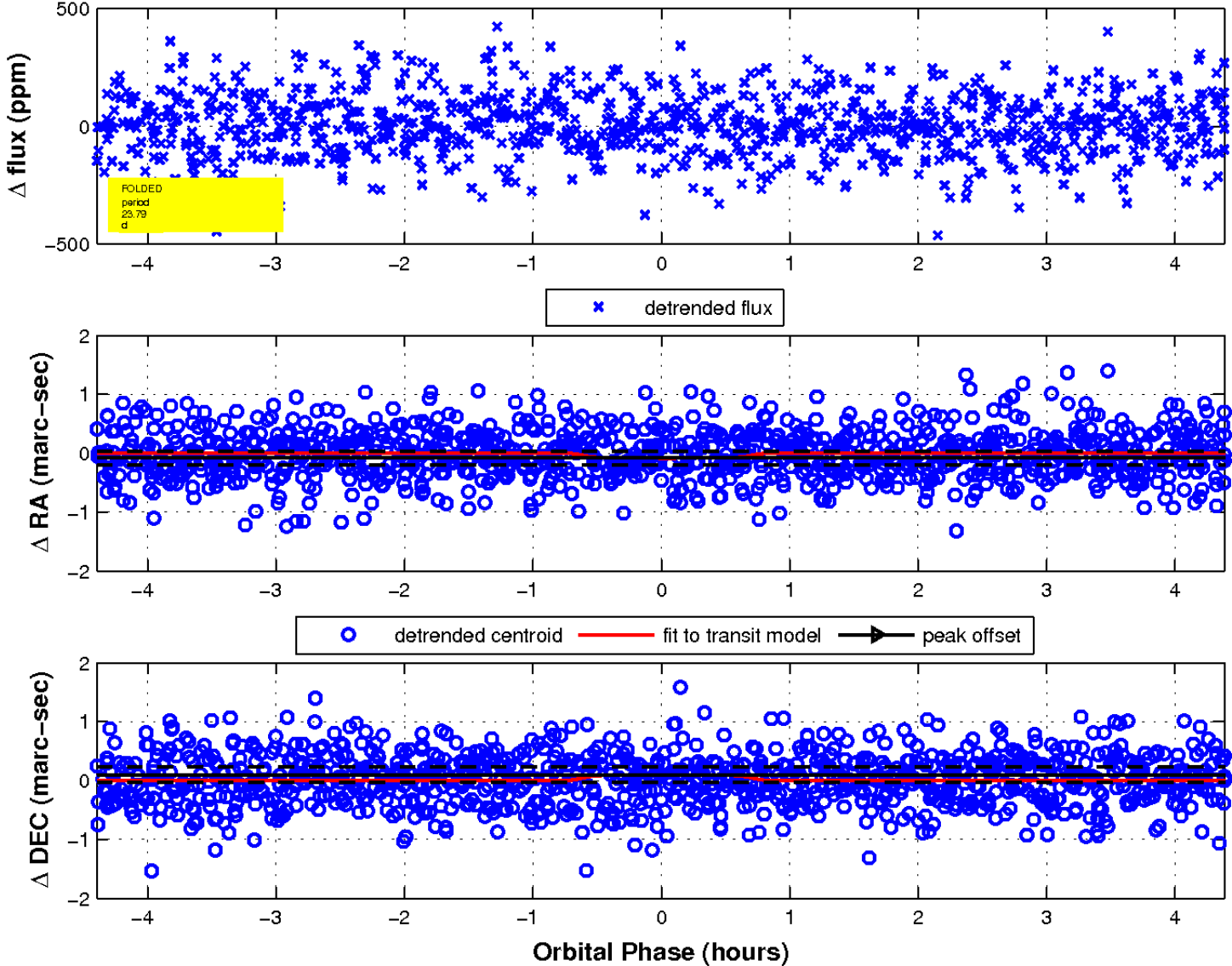
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 4 of 5



UKIRT Image

Declination

