

KIC 008690471

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|-----|-----------------------------|-----------------|------------------------|------------------------|
| 008690471-01 | OBS | No | 1.059029 | 131.803182 | 17.2 | 7.205 | 7.2 | 5.0 | 1.76 | 6593 | 0.74 | 10439.67 |
| 008690471-03 | OBS | No | 13.197211 | 133.373569 | 96.5 | 10.827 | 11.6 | 5.1 | 1.76 | 6593 | 1.93 | 361.34 |
| 008690471-04 | OBS | No | 24.217075 | 151.536611 | 329.6 | 1.077 | 9.6 | 9.9 | 1.76 | 6593 | 3.30 | 160.84 |
| 008690471-05 | OBS | No | 49.938268 | 158.785913 | 330.7 | 5.229 | 8.4 | 8.9 | 1.76 | 6593 | 3.73 | 61.28 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 008690471-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—MOD_NONUNIQ_ALT |
| 008690471-03 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS |
| 008690471-04 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—CENT_FEW_DIFFS |
| 008690471-05 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—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.

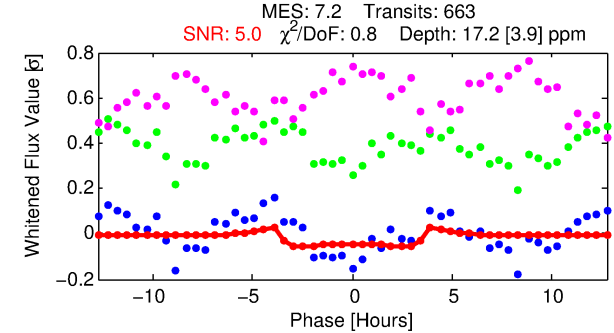
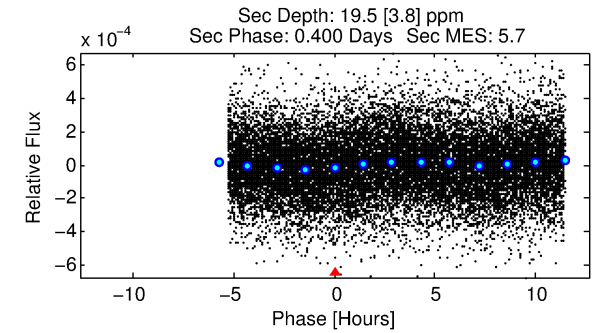
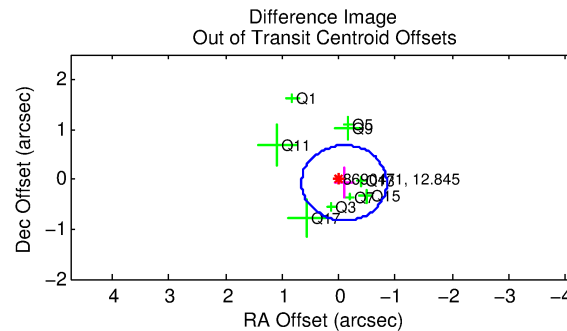
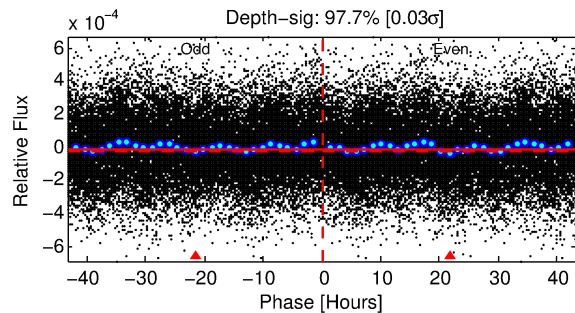
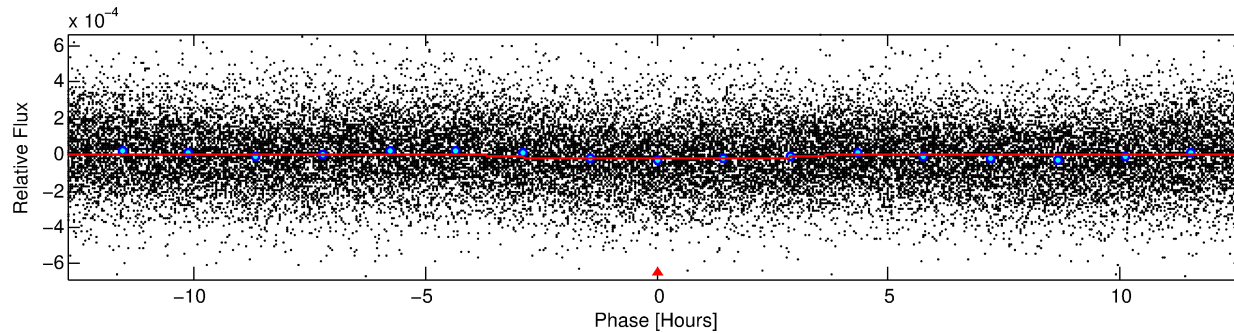
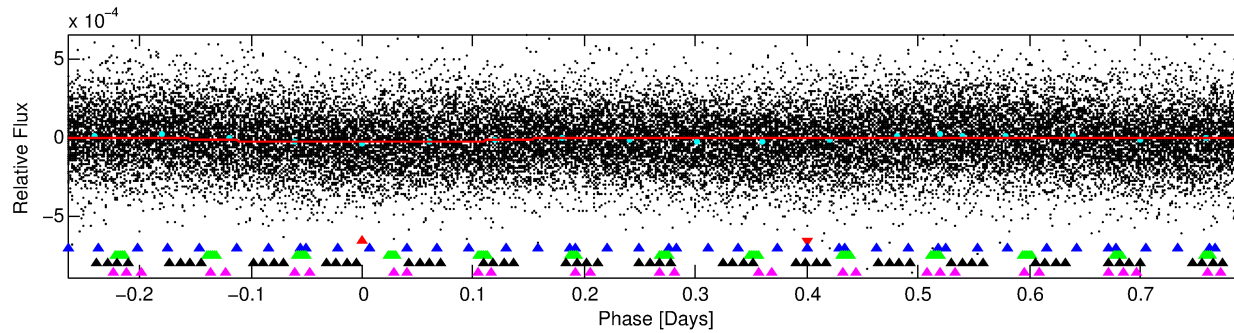
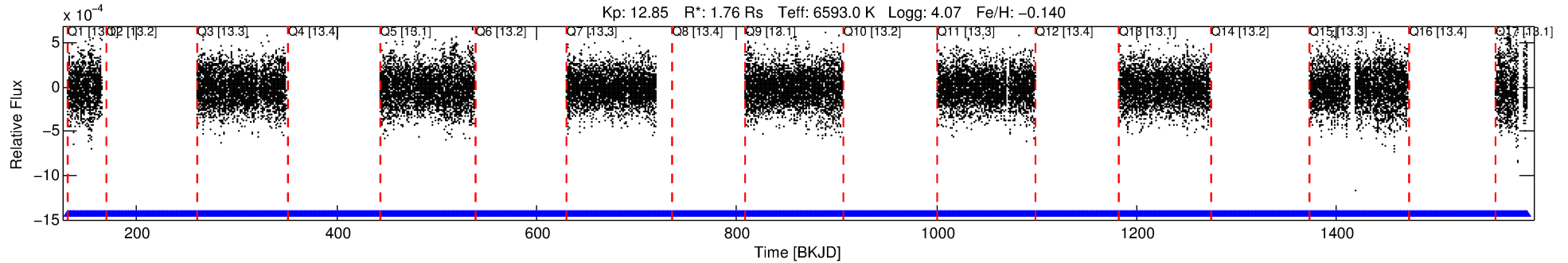
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008690471-01

No Significant Match Found

DV One-Page Summary

KIC: 8690471 Candidate: 1 of 5 Period: 1.059 d



DV Fit Results:

Period = 1.05903 [0.00003] d
Epoch = 131.8032 [0.0070] BKJD
Rp/R* = 0.0039 [0.0042]
a/R* = 1.27 [2.88]
b = 0.27 [20.10]
Seff = 10439.67 [4911.12]
Teq = 2577 [303] K
Rp = 0.74 [0.85] Re
a = 0.0224 [0.0066] AU
Ag = 9.86 [22.12] [0.40σ]
Teffp = 7061 [3892] K [1.15σ]

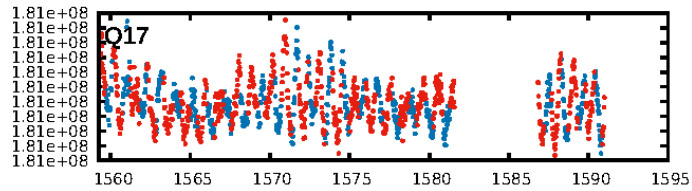
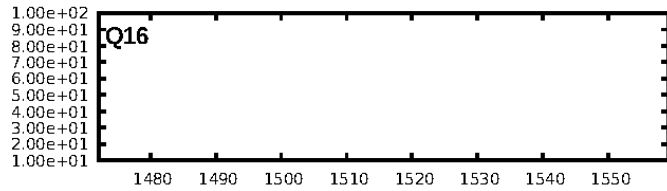
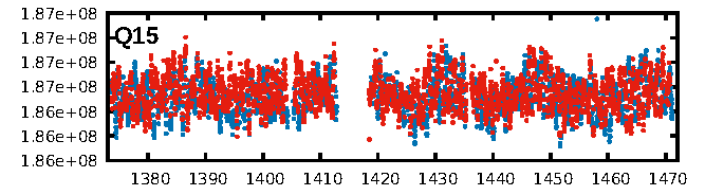
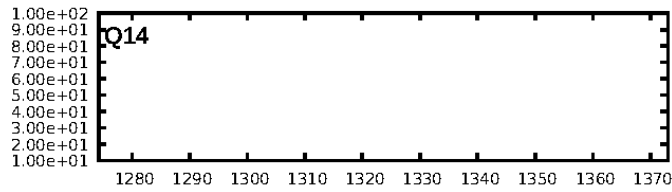
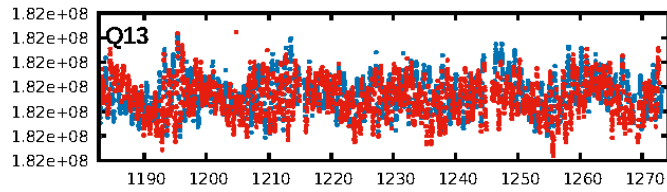
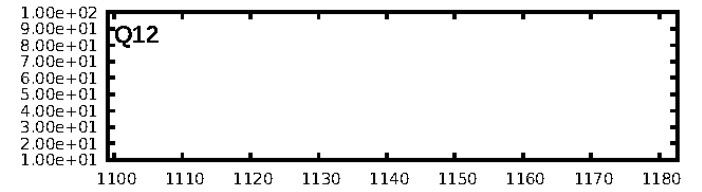
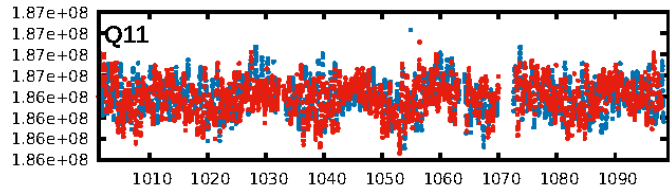
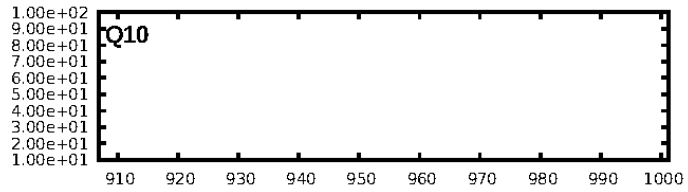
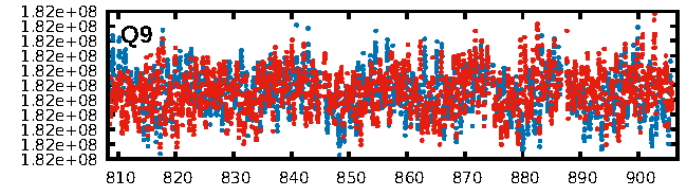
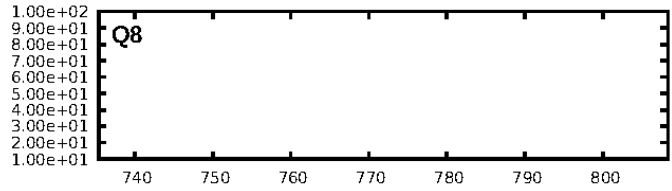
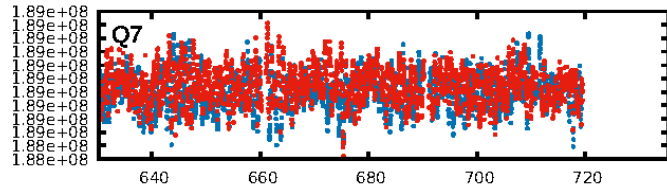
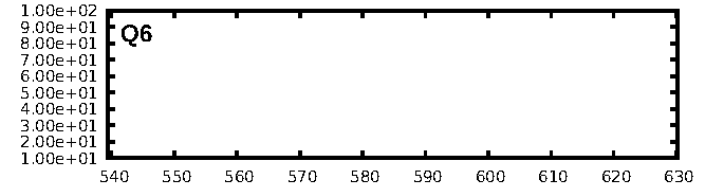
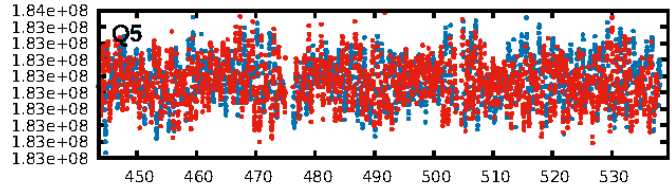
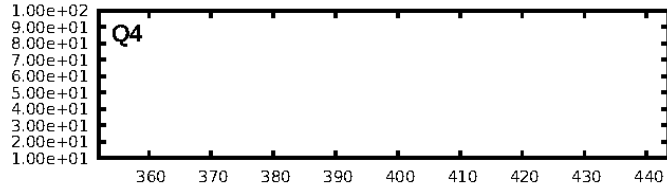
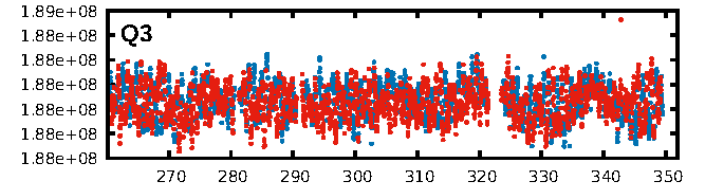
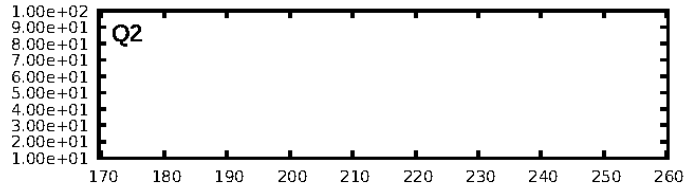
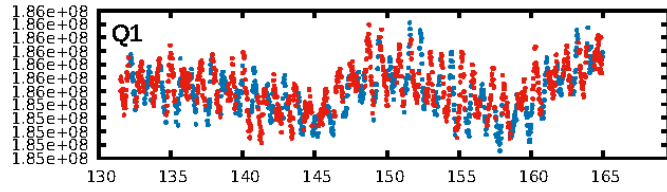
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [22.40σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 3.33e-07
RollingBand-fgt: 1.00 [604/604]
GhostDiagnostic-chr: 1.668
Centroid-sig: 0.0%
Centroid-so: 2.582 arcsec [2.77σ]
OotOffset-rm: 0.122 arcsec [0.49σ]
KicOffset-rm: 0.187 arcsec [0.70σ]
OotOffset-st: 0/4/0/5 [9]
KicOffset-st: 0/4/0/5 [9]
DiffImageQuality-fgm: 0.44 [4/9]
DiffImageOverlap-fno: 1.00 [9/9]

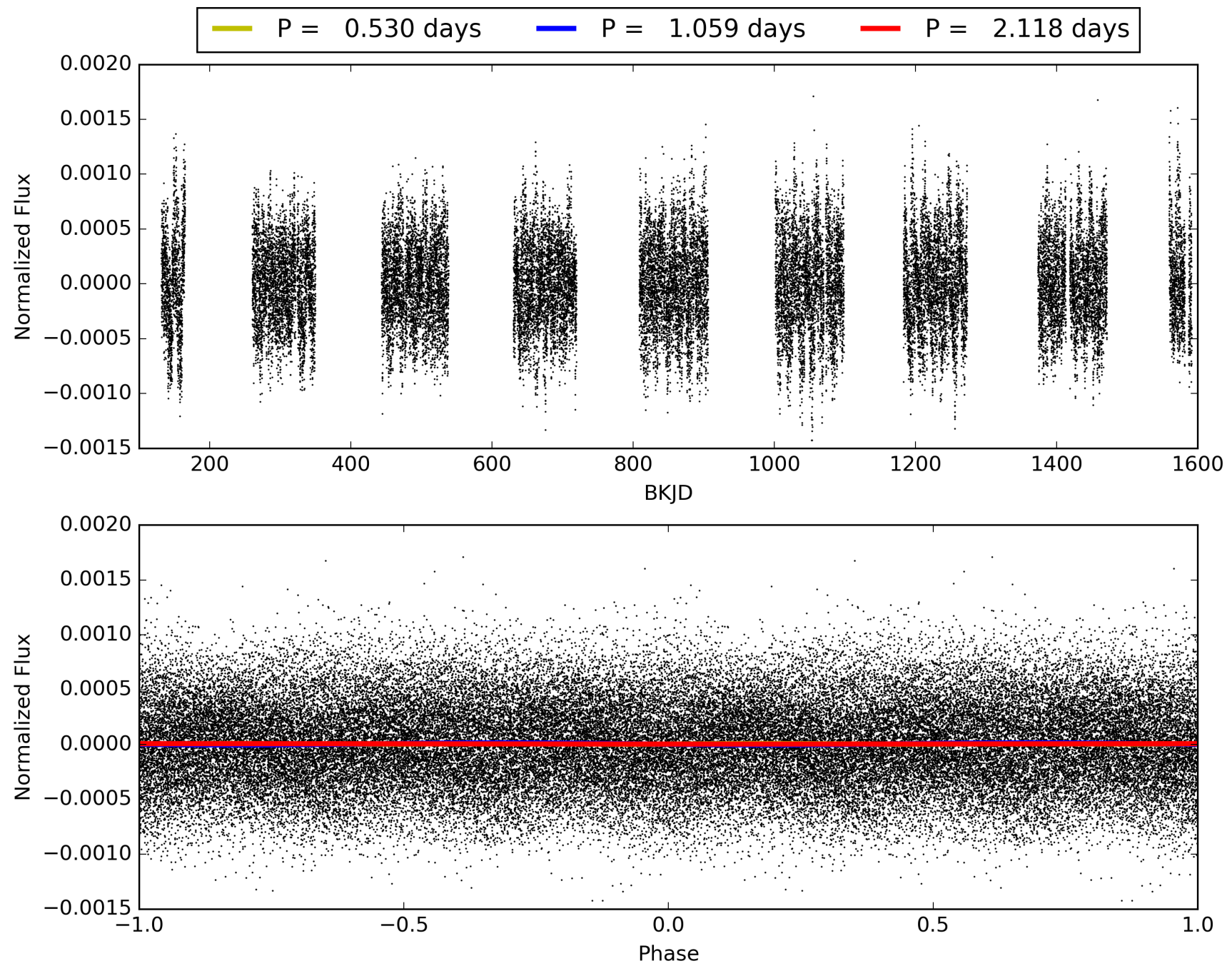
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 008690471-01, PDC Light Curves

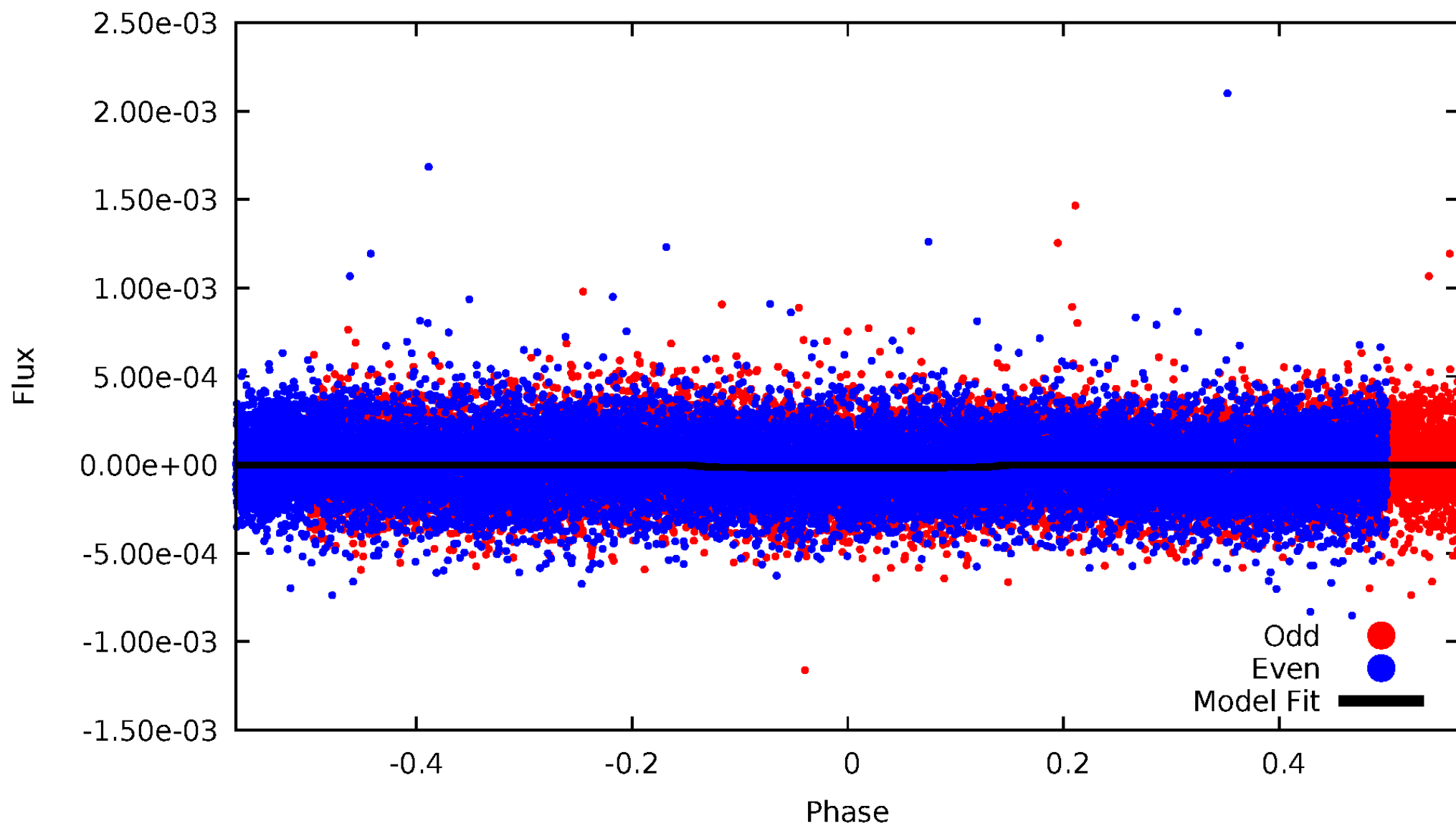


TCE 008690471-01



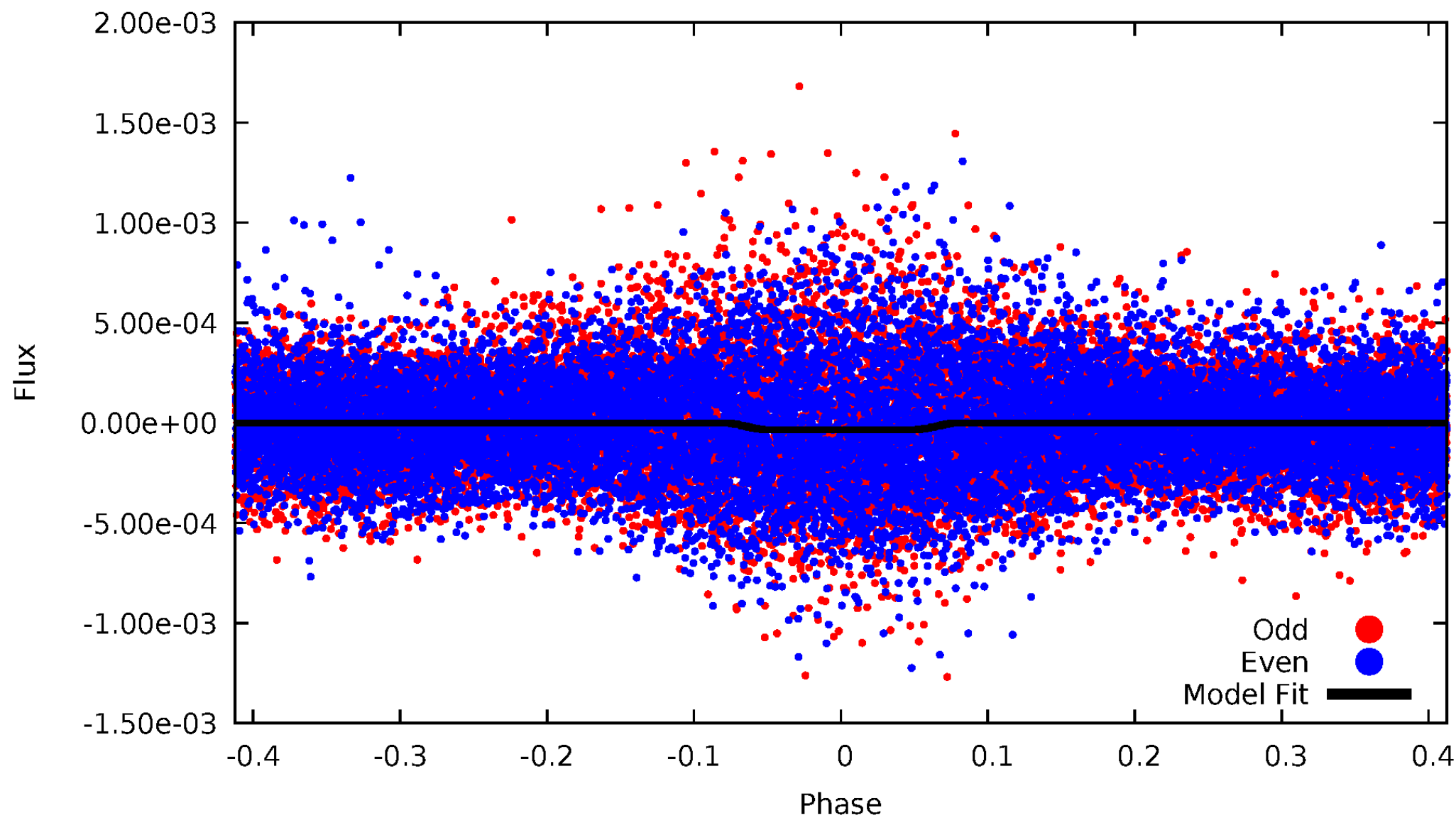
DV Odd/Even

TCE 008690471-01

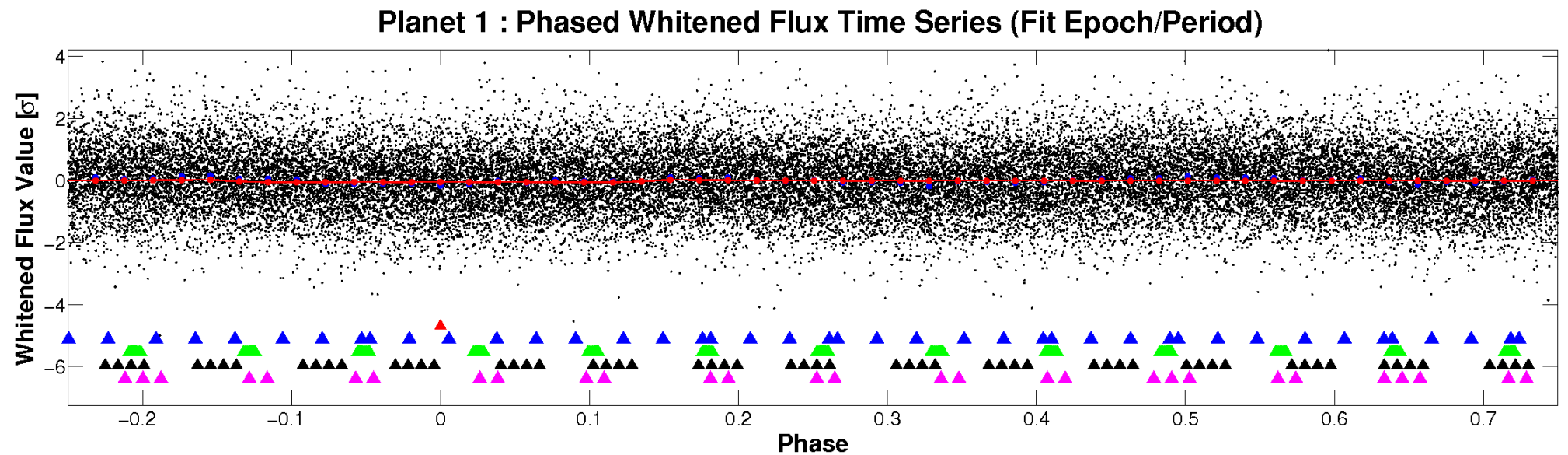
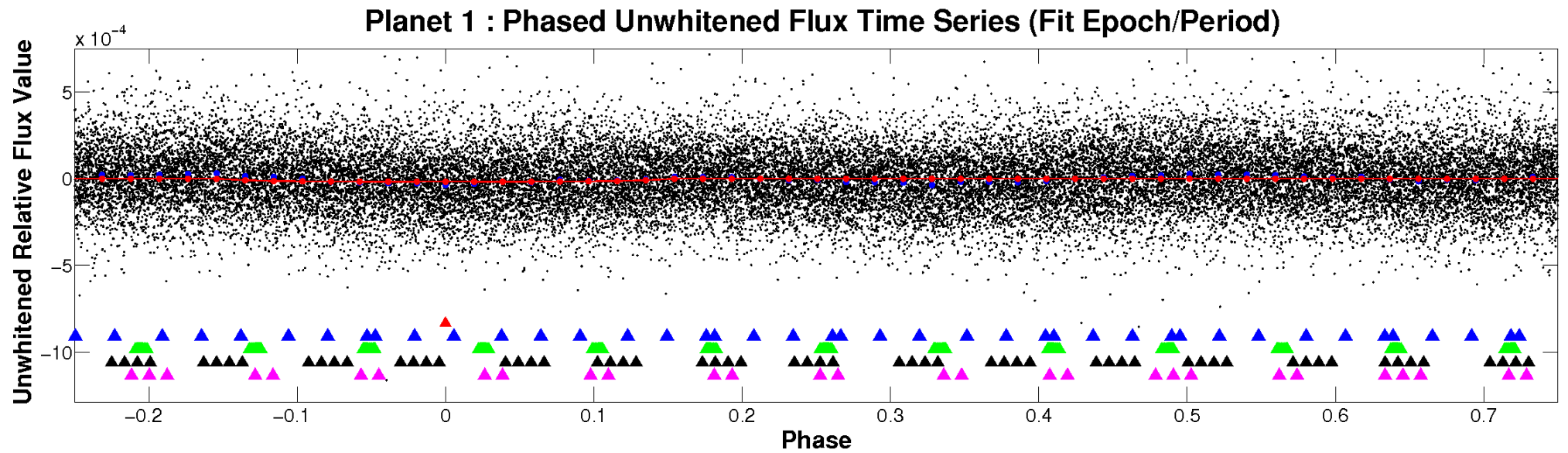


ALT Odd/Even

TCE 008690471-01

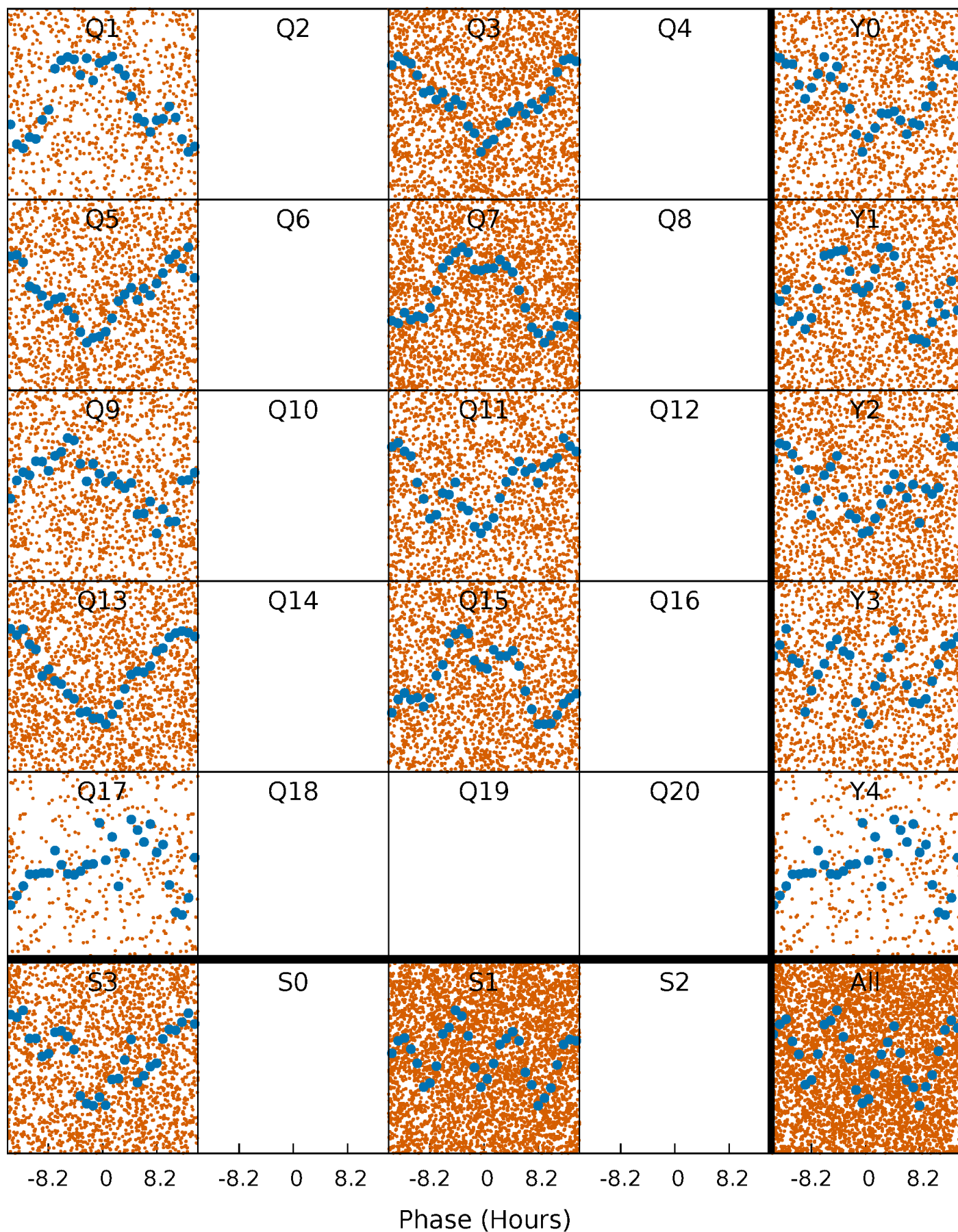


Non-Whitened Vs. Whitened Light Curve



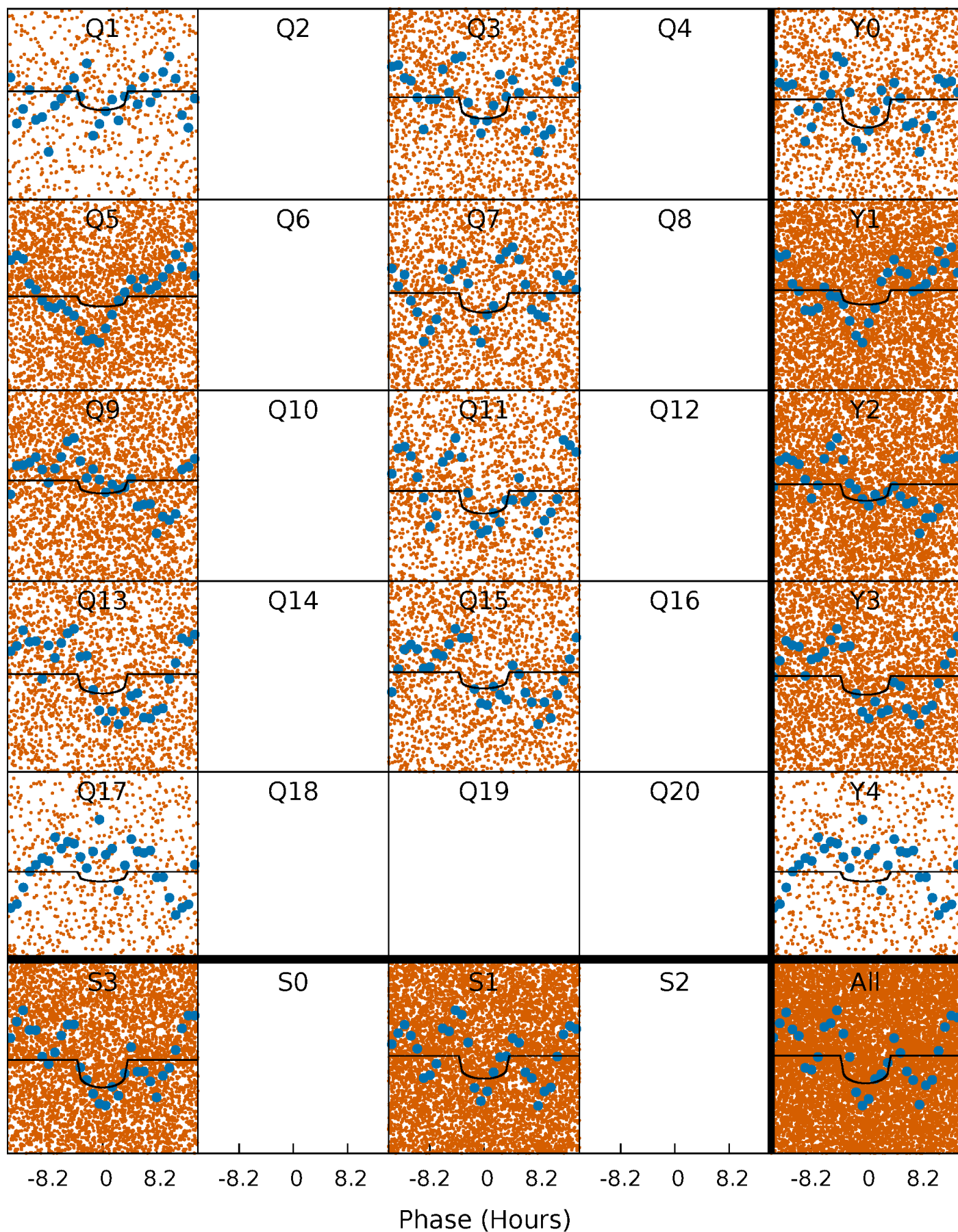
PDC Quarter-Phased Transit Curves

TCE 008690471-01 P= 1.059029 Days $T_0=131.803182$ (BKJD)



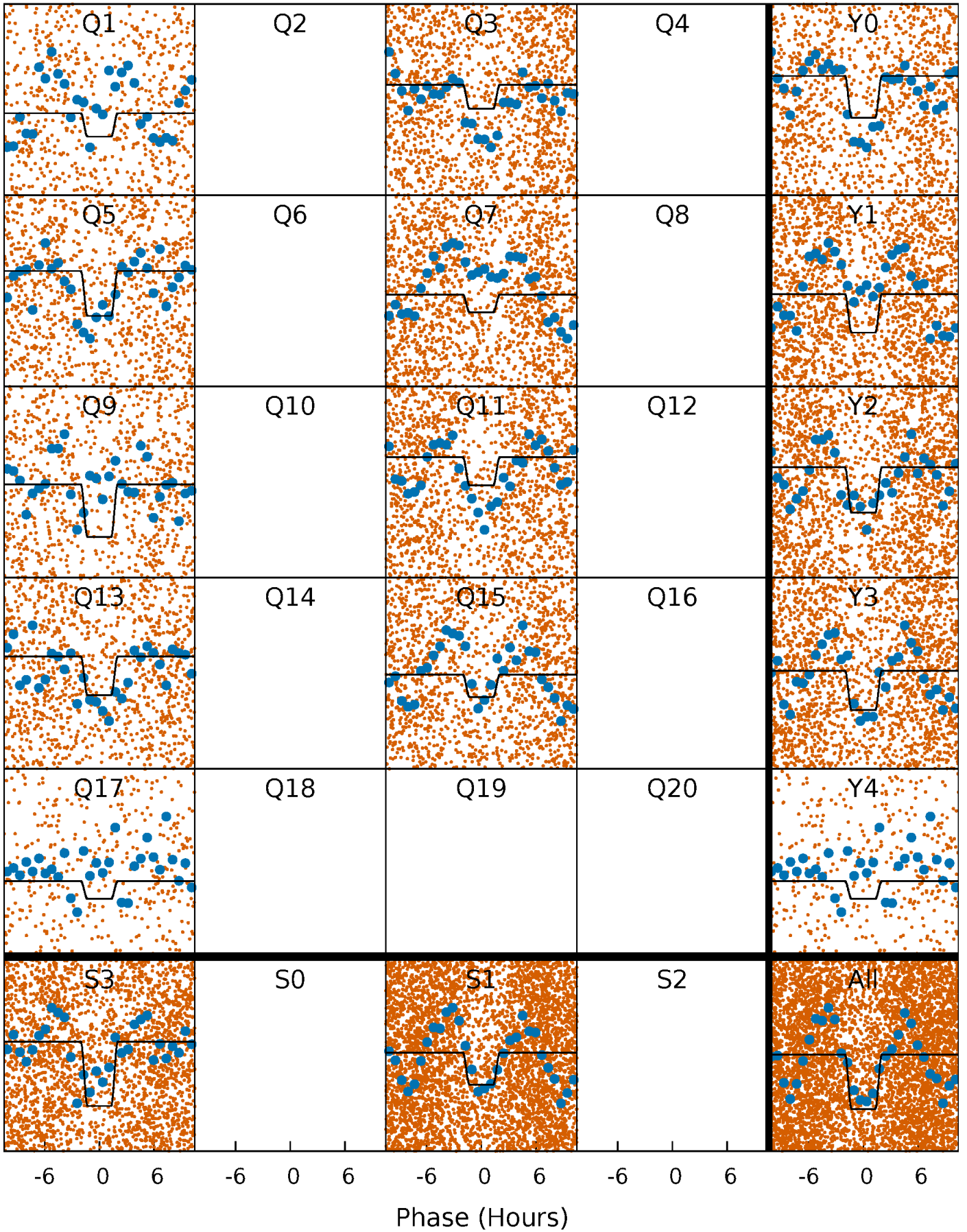
DV Quarter-Phased Transit Curves

TCE 008690471-01 P= 1.059029 Days $T_0=131.803182$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

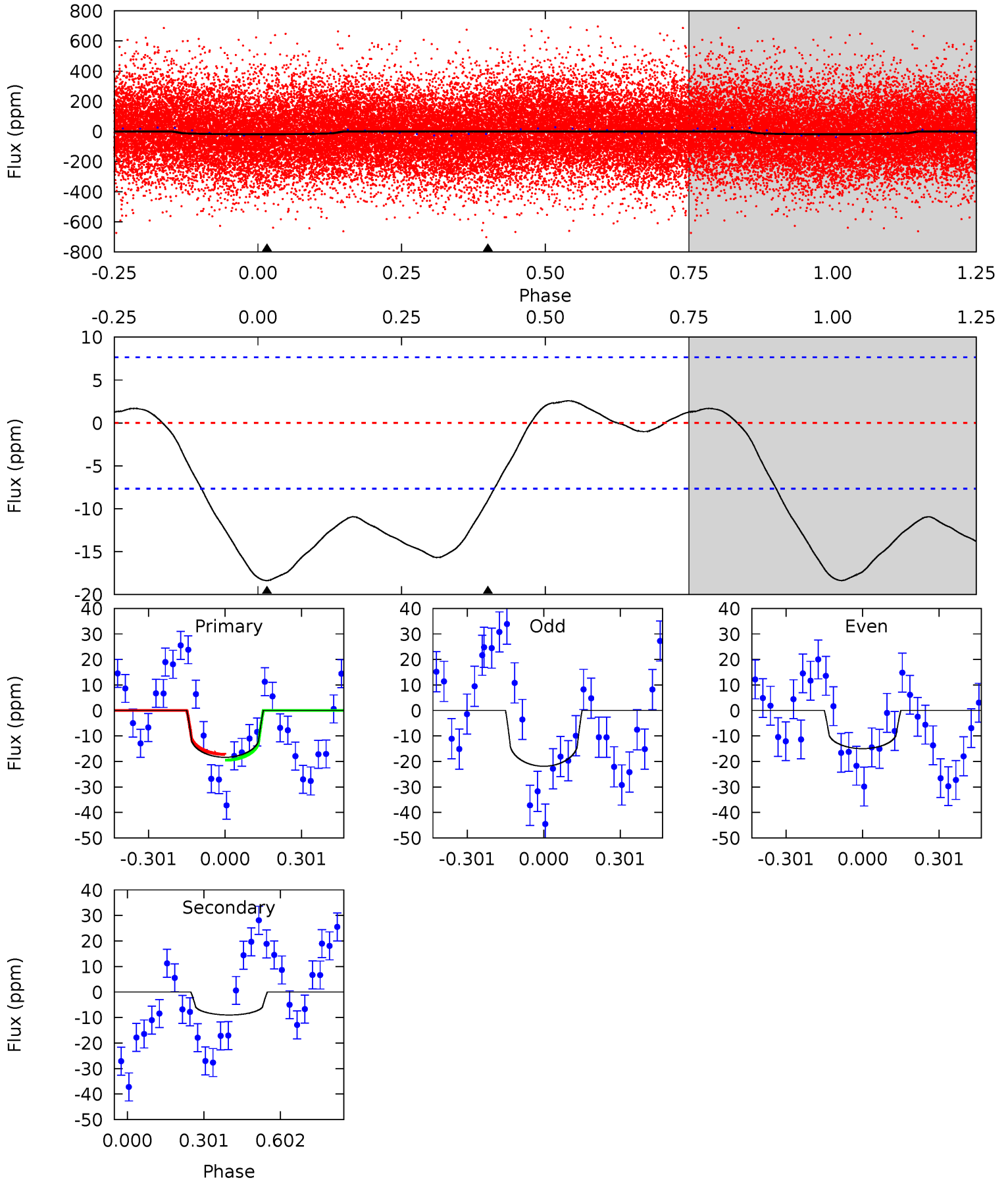
TCE 008690471-01 P= 1.059034 Days $T_0=131.778477$ (BKJD)



DV Model-Shift Uniqueness Test

008690471-01, P = 1.059029 Days, E = 130.744153 Days

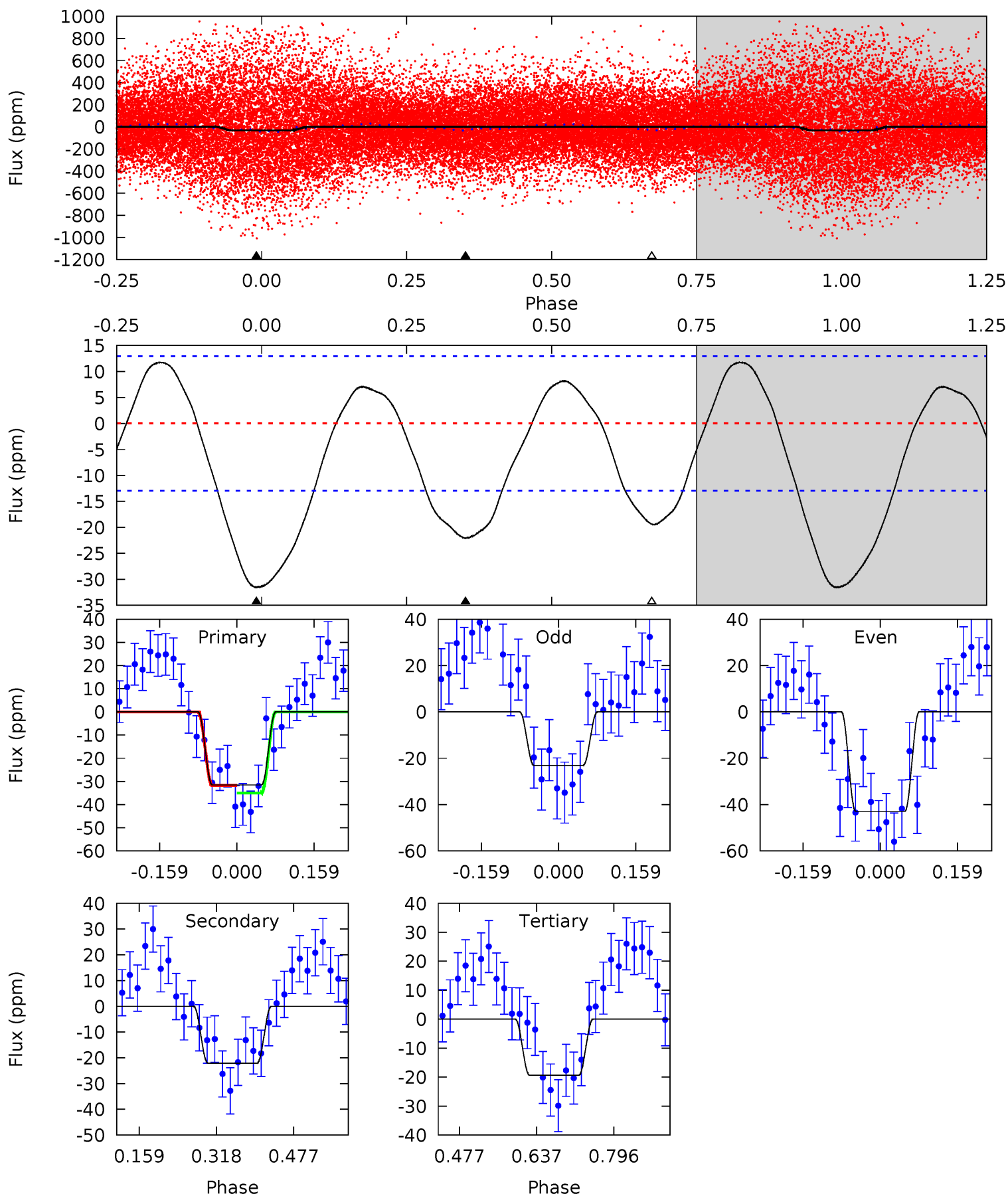
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 10.4 | 5.10 | 0 | 0 | 4.33 | 1.03 | 0.48 | 10.4 | 10.4 | 5.10 | 5.10 | 1.99 | 0.74 | 0.12 | 0.67 |



Alt Model-Shift Uniqueness Test

008690471-01, P = 1.059034 Days, E = 130.719443 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 10.9 | 7.61 | 6.67 | 0 | 4.47 | 1.41 | 3.64 | 4.20 | 10.9 | 0.94 | 7.61 | 3.00 | 0.48 | 0.27 | 0.57 |



Stellar Parameters For KIC 008690471

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 6593^{+181}_{-250} | $4.074^{+0.252}_{-0.168}$ | $-0.140^{+0.250}_{-0.300}$ | $1.762^{+0.530}_{-0.583}$ | $1.350^{+0.182}_{-0.296}$ | $0.347^{+0.557}_{-0.163}$ |
| | +3%/-4% | +6%/-4% | +179%/-214% | +30%/-33% | +13%/-22% | +160%/-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 008690471-01 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|-------------|------------------------|----------------------|------------------------|----------------------------|
| DV | -9 ± 2 | $0.87^{+0.77}_{-0.56}$ | 3565^{+304}_{-278} | 5165^{+3809}_{-1314} | $3.208^{+20.054}_{-2.291}$ |
| Alt. | -22 ± 3 | $1.12^{+0.87}_{-0.63}$ | 3557^{+309}_{-342} | 5627^{+3753}_{-1253} | $4.693^{+21.085}_{-3.189}$ |

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

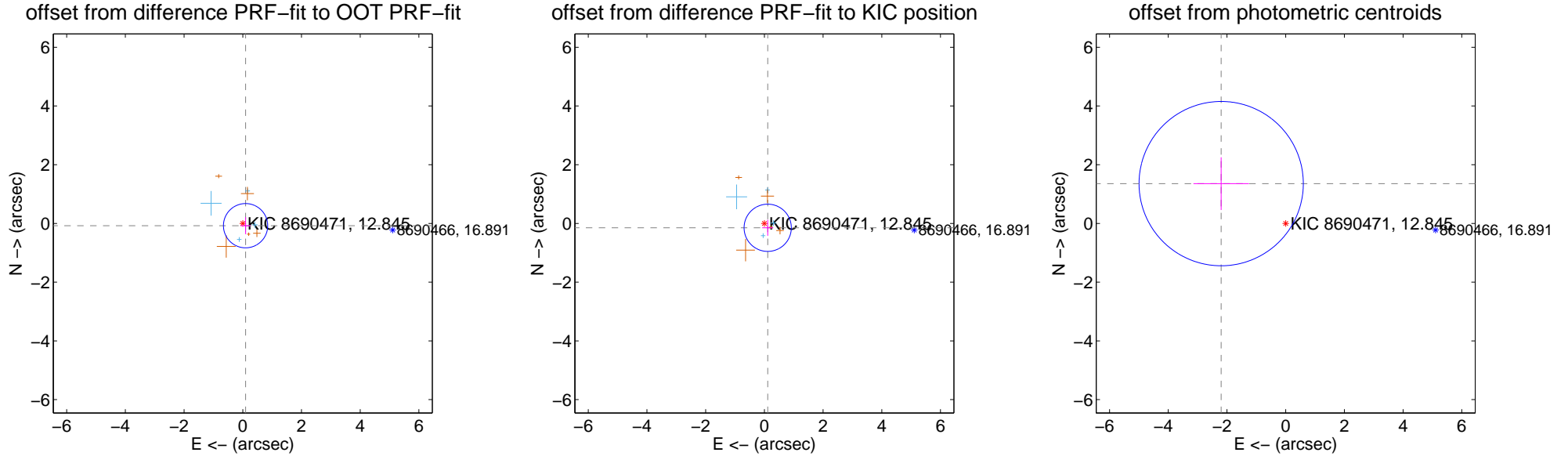
DV Centroid Data

Supplemental centroid analysis for 008690471-01. Kepler magnitude: 12.85. Transit SNR 5.00

There are 4 quarters with good PRF difference image offsets

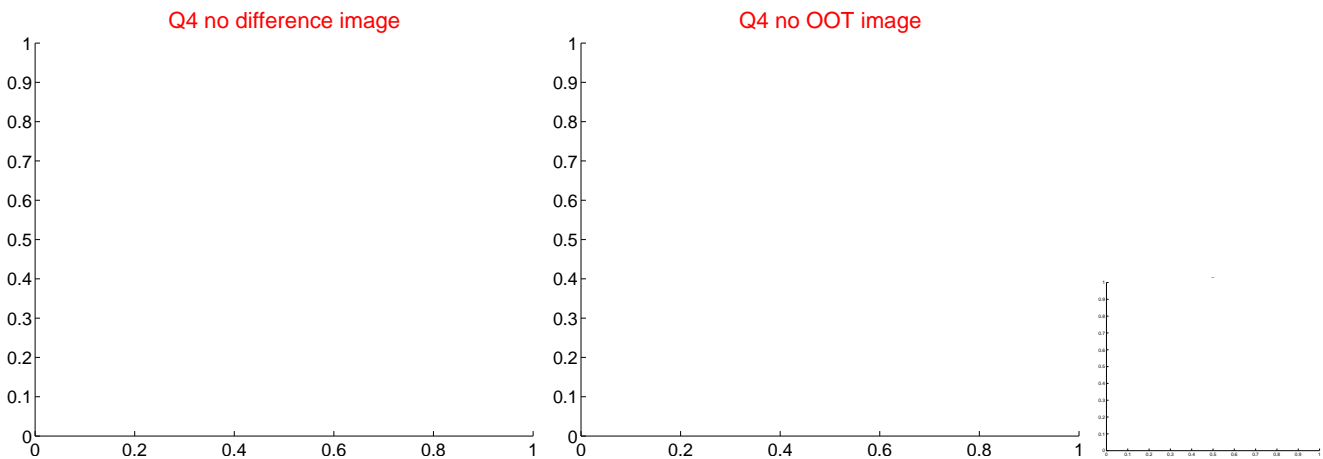
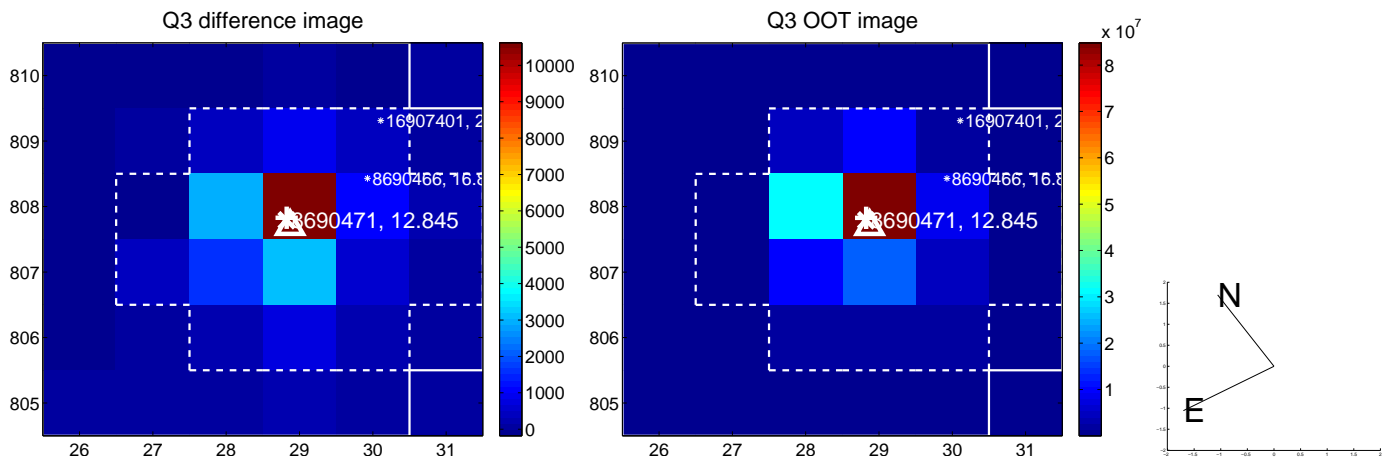
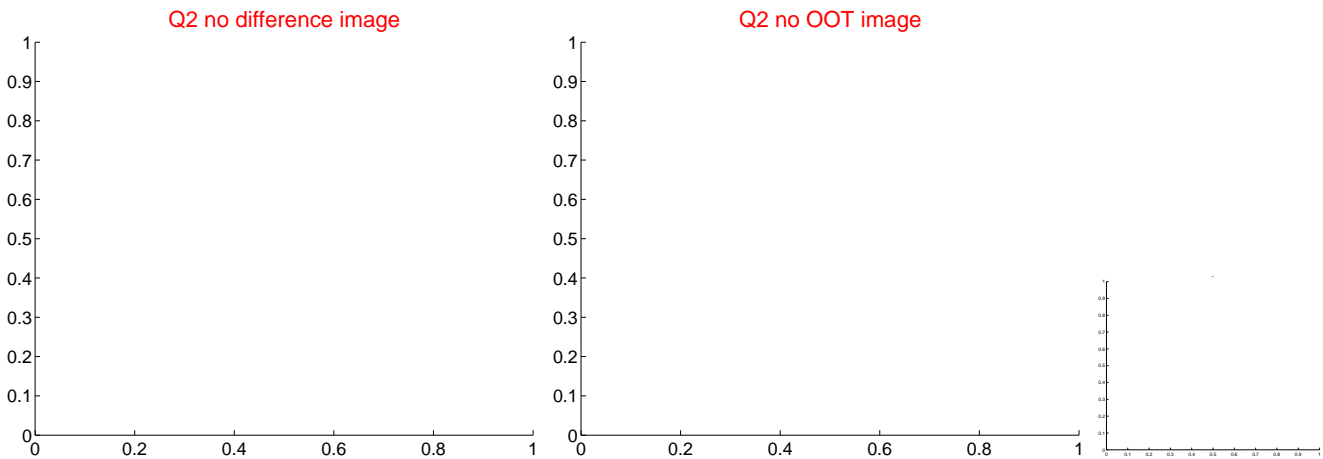
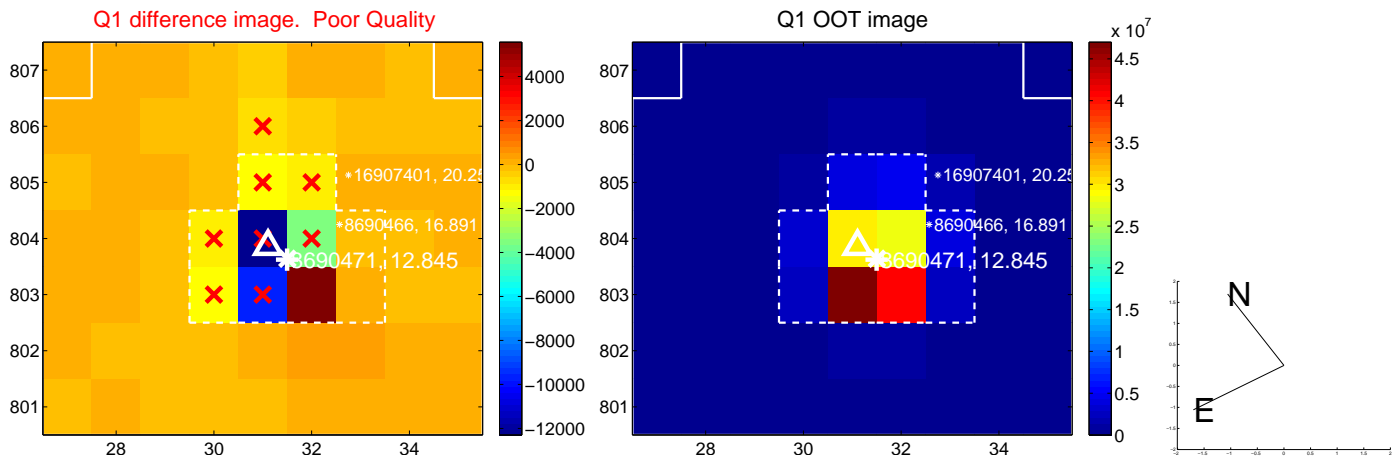
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 0.122 ± 0.251 | 0.49 | -0.095 ± 0.170 | -0.077 ± 0.290 |
| PRF-fit source offset from KIC position | 0.187 ± 0.268 | 0.70 | -0.113 ± 0.188 | -0.148 ± 0.271 |
| photometric centroid source offset | 2.58 ± 0.93 | 2.77 | 2.20 ± 0.95 | 1.36 ± 0.90 |

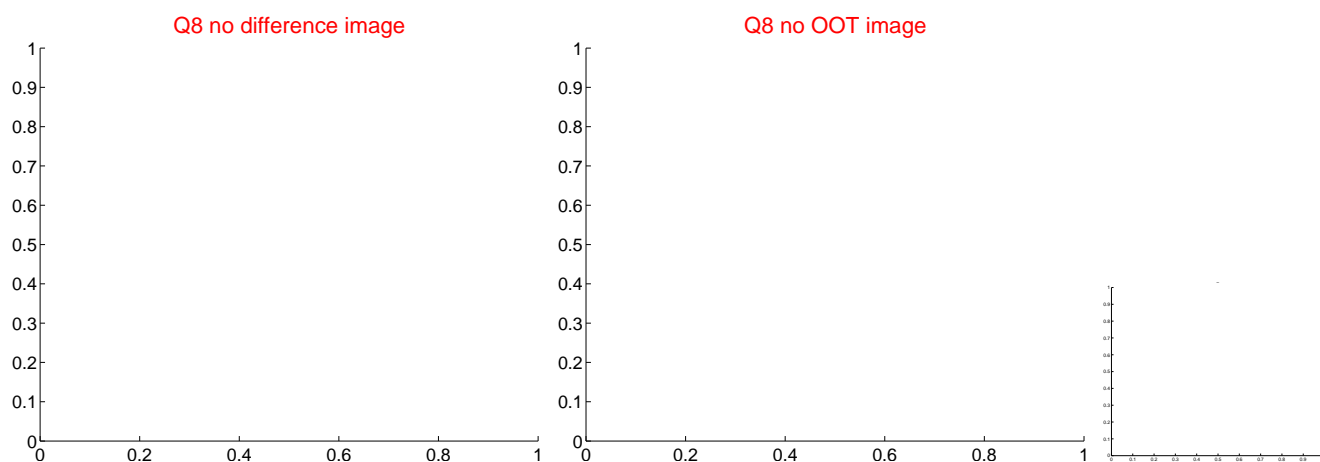
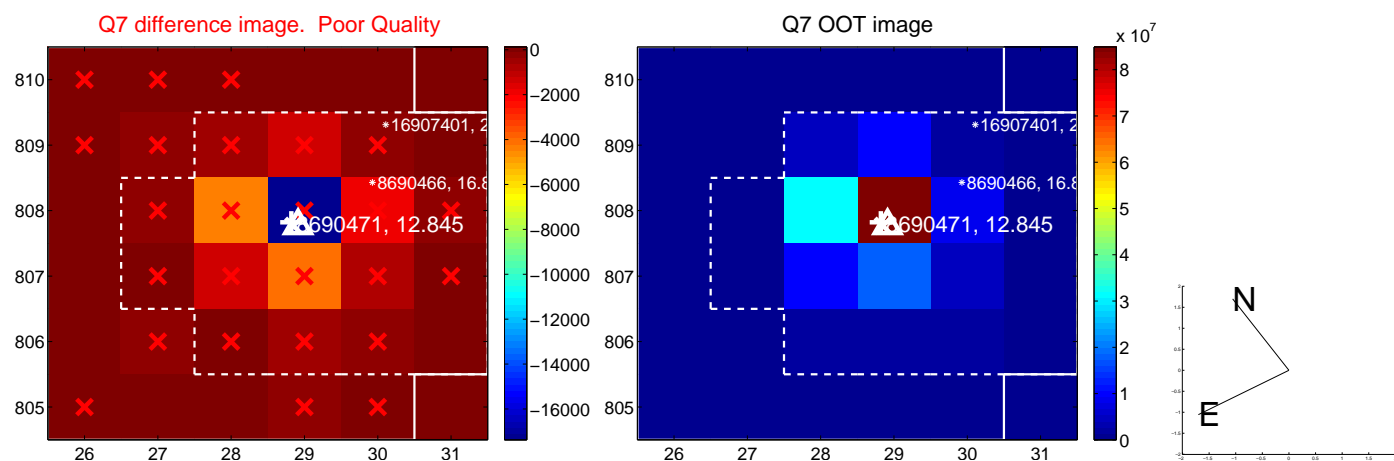
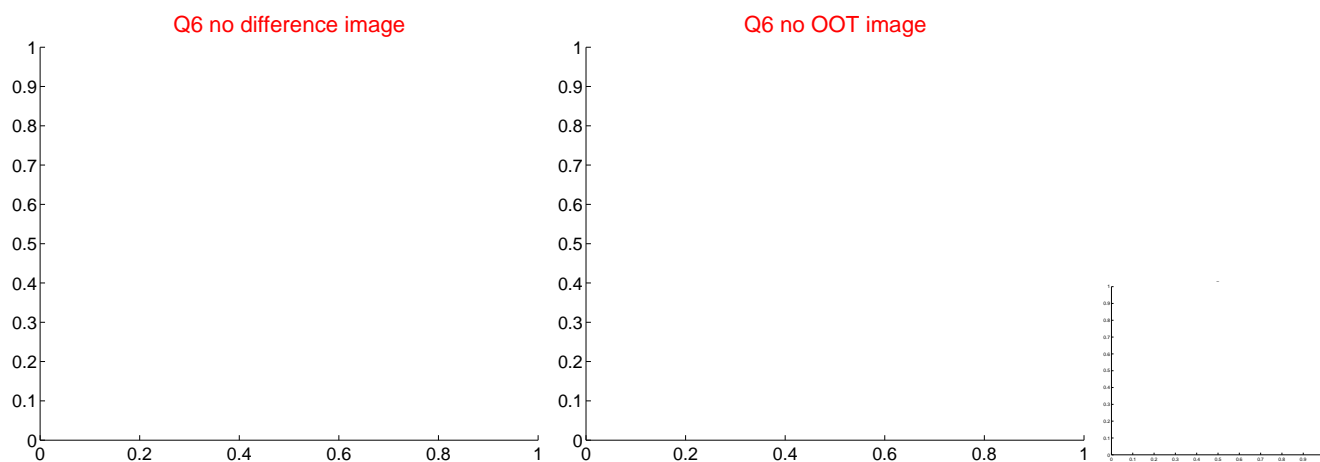
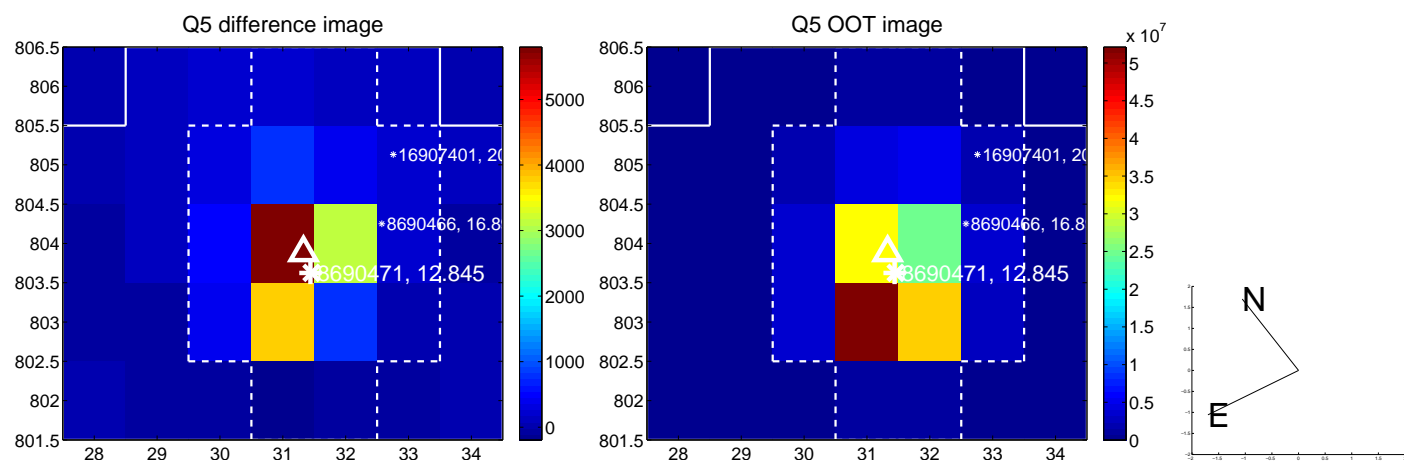


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

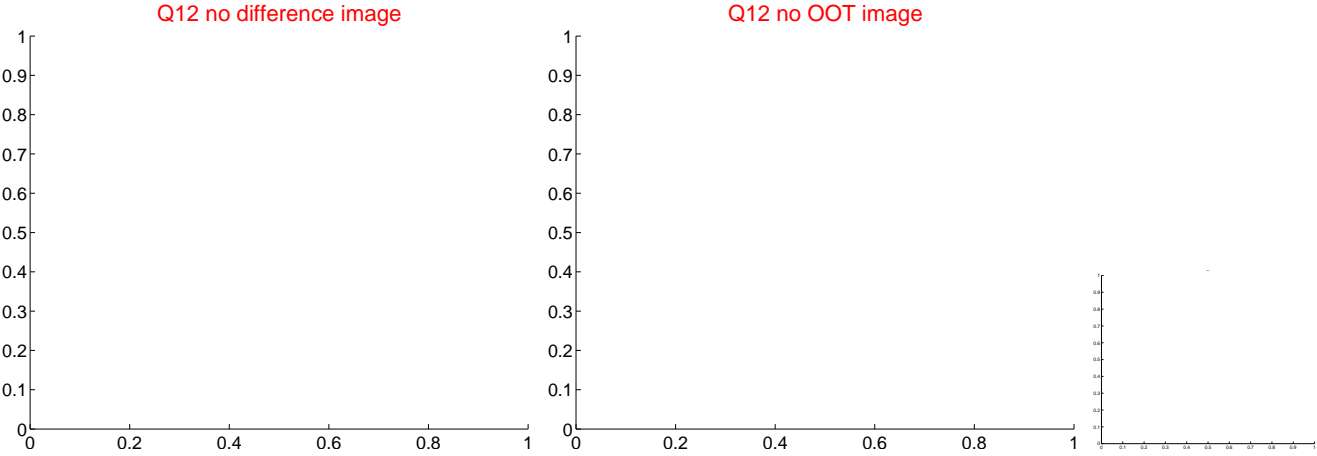
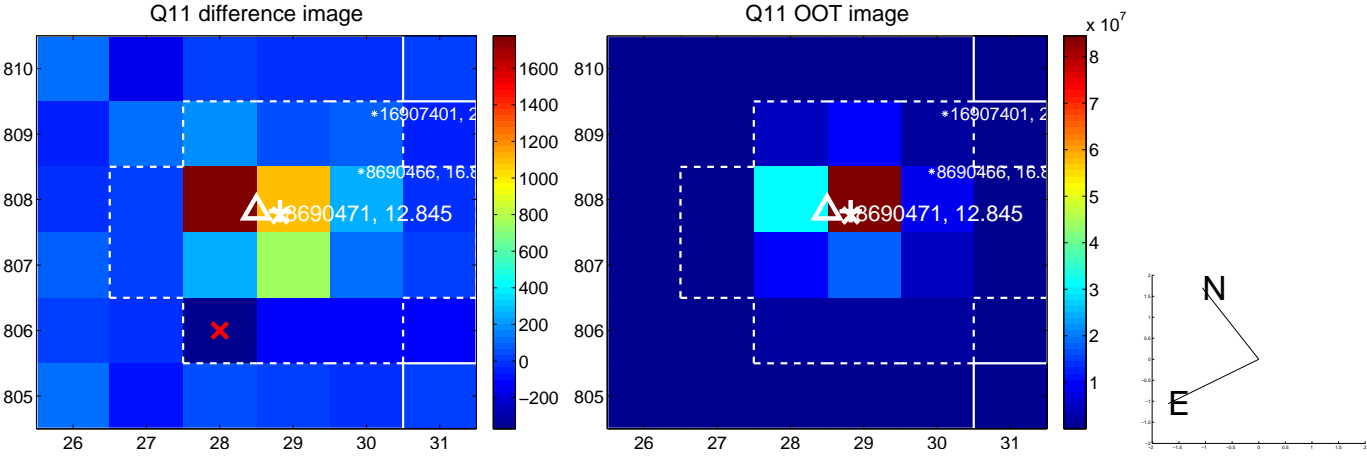
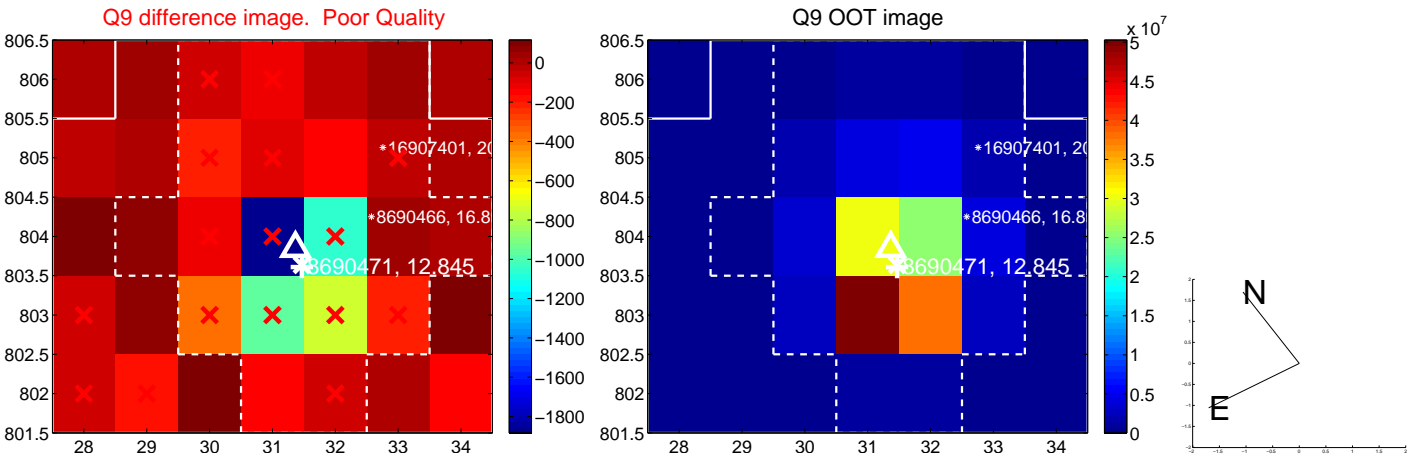
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



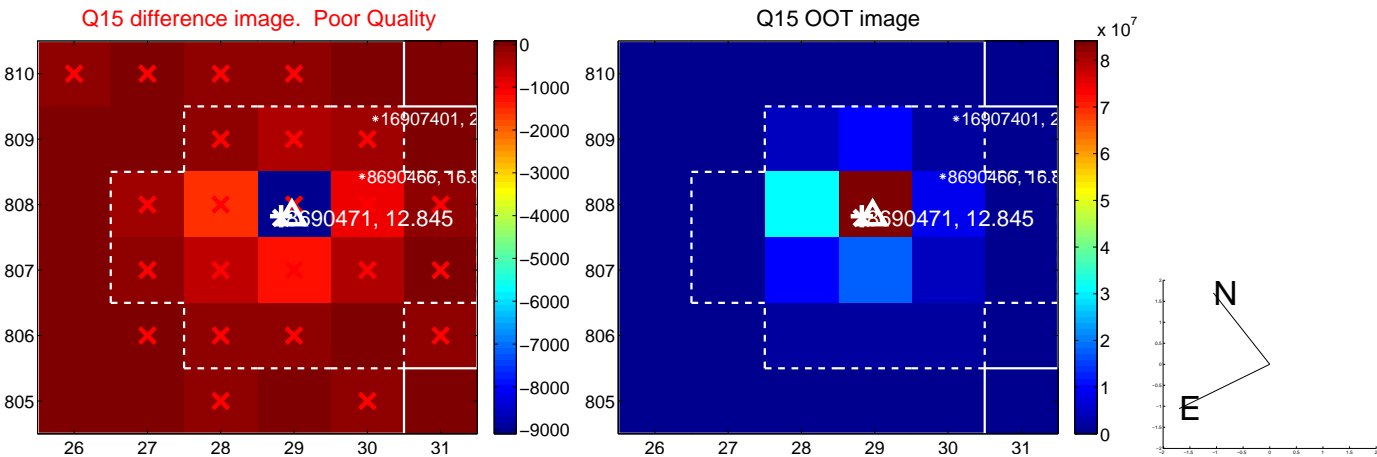
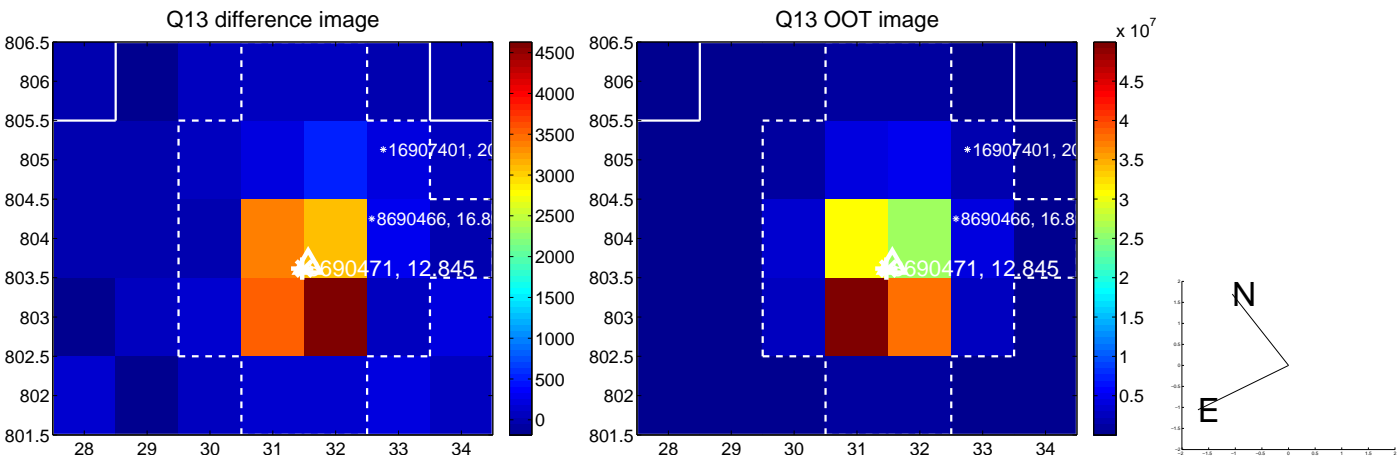
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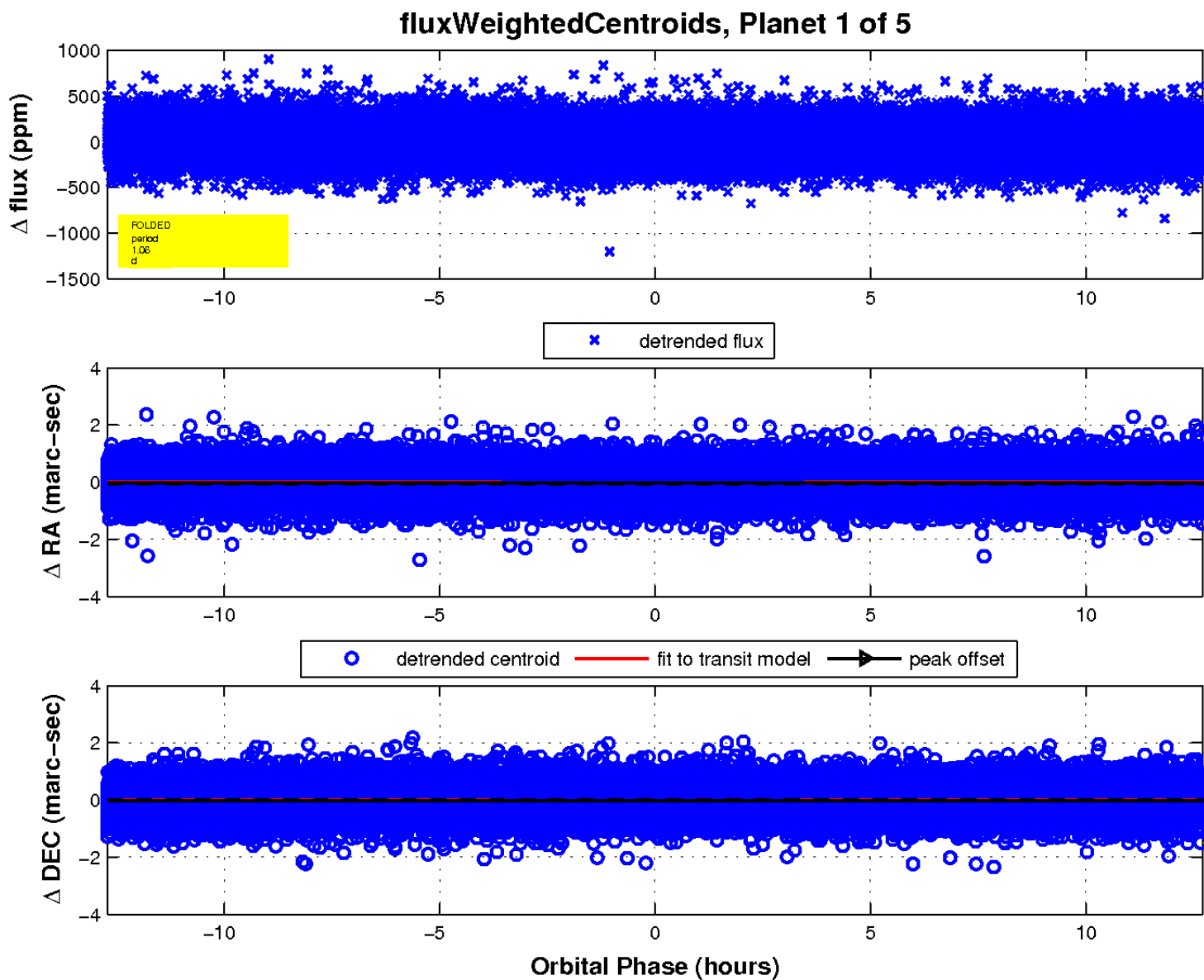
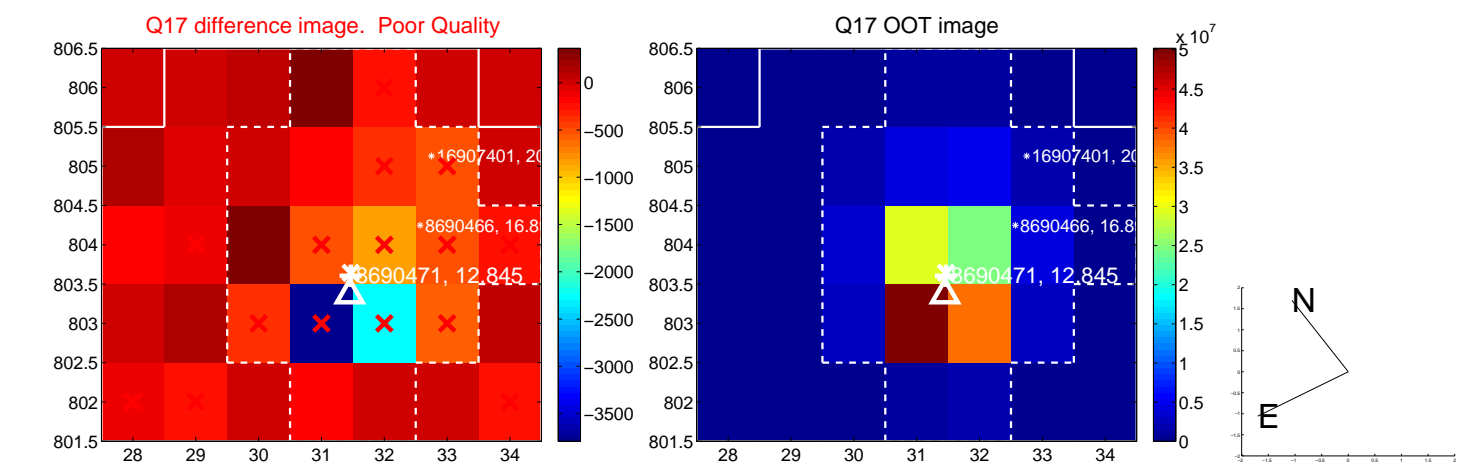
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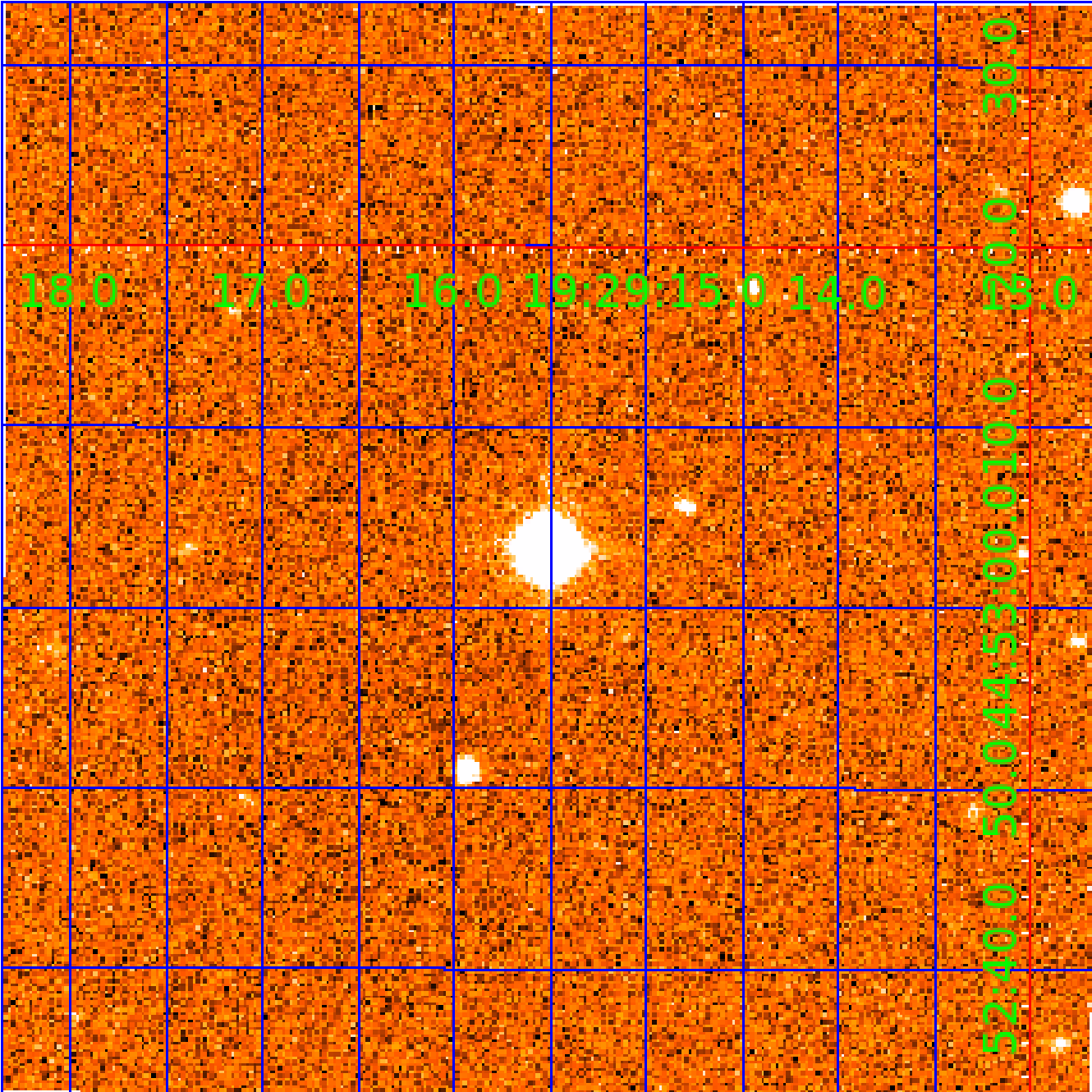


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UKIRT Image

Declination



KIC 008690471

Q1-17 DR25 TCE Parameters

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Robovetter Results

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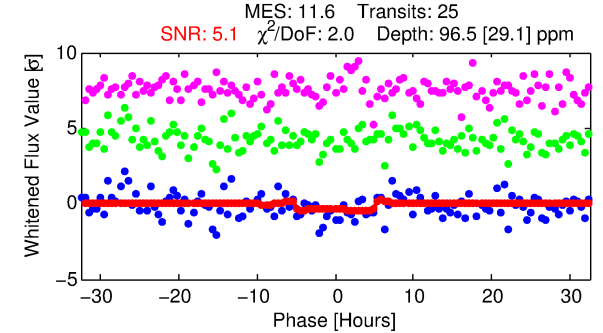
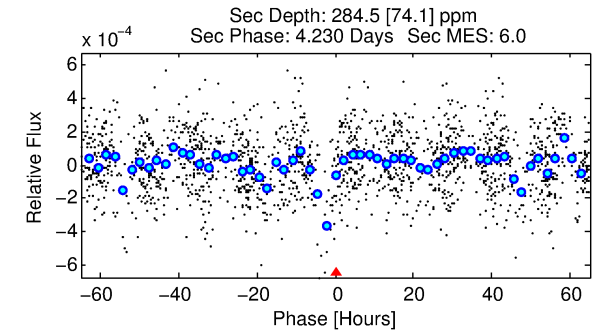
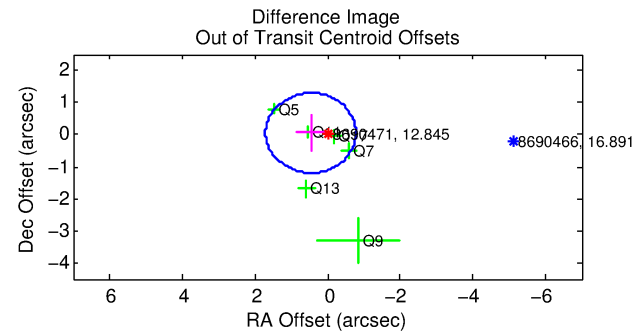
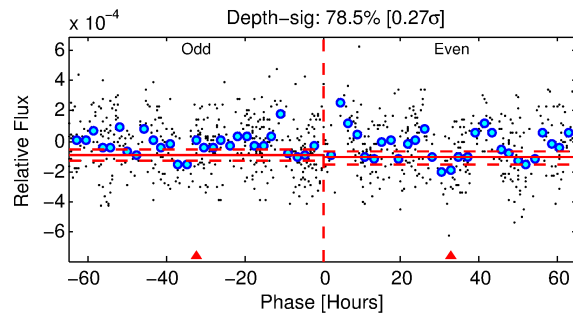
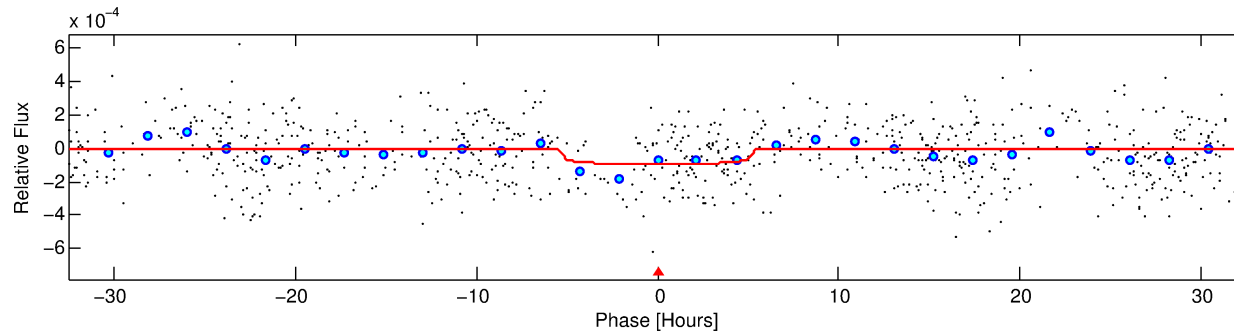
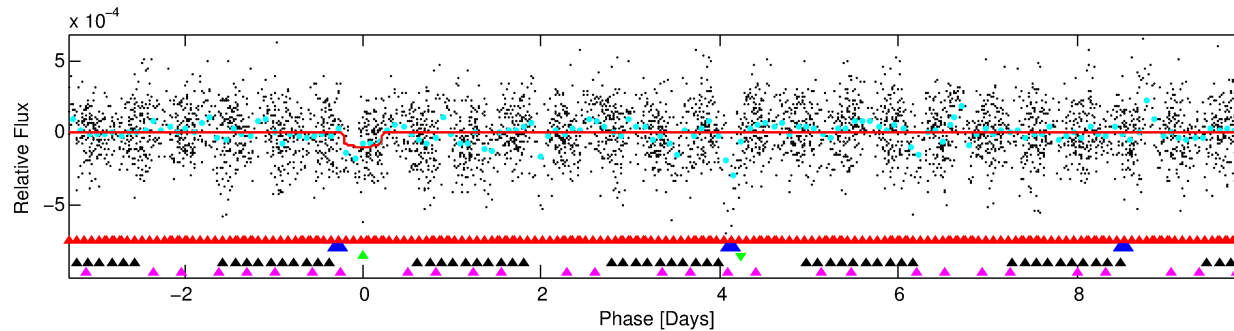
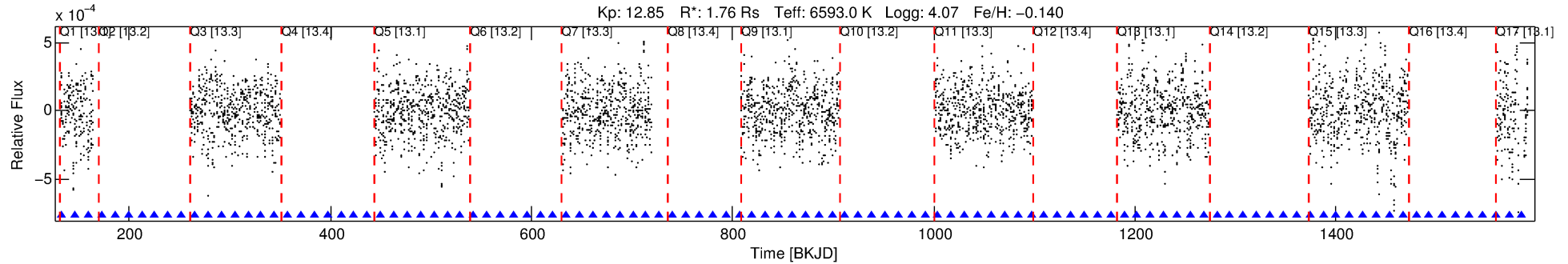
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008690471-03

No Significant Match Found

DV One-Page Summary

KIC: 8690471 Candidate: 3 of 5 Period: 13.197 d



DV Fit Results:

Period = 13.19721 [0.00063] d
Epoch = 133.3736 [0.0536] BKJD
Rp/R* = 0.0100 [0.0051]
a/R* = 5.53 [14.40]
b = 0.82 [1.06]
Seff = 361.34 [169.99]
Teq = 1112 [131] K
Rp = 1.93 [1.17] Re
a = 0.1206 [0.0354] AU
Ag = 611.94 [696.38] [0.88 σ]
Teff = 8549 [2262] K [3.28 σ]

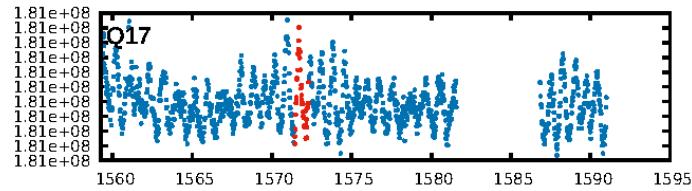
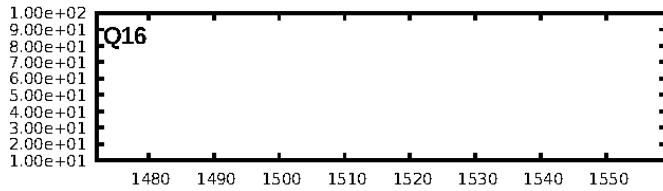
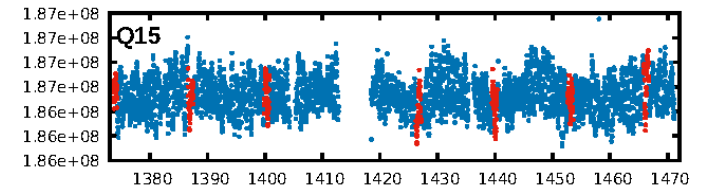
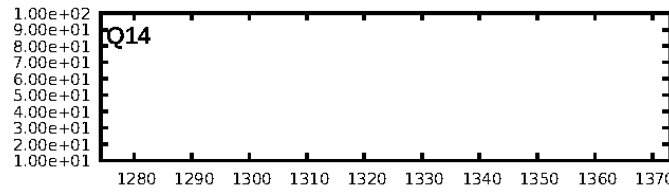
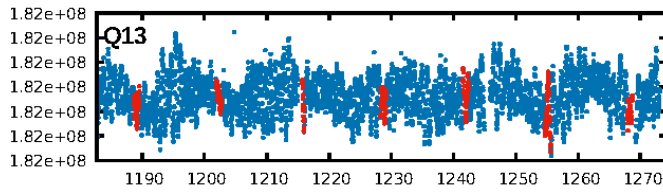
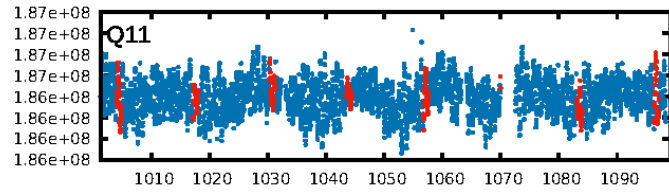
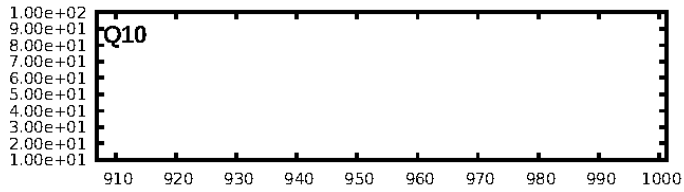
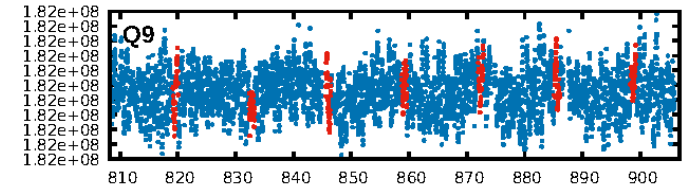
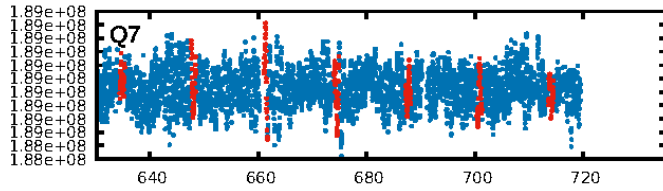
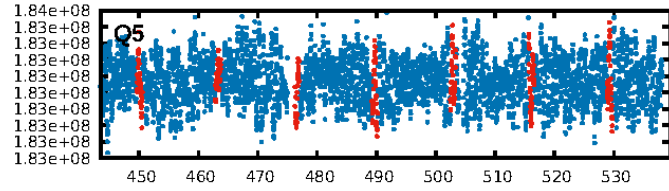
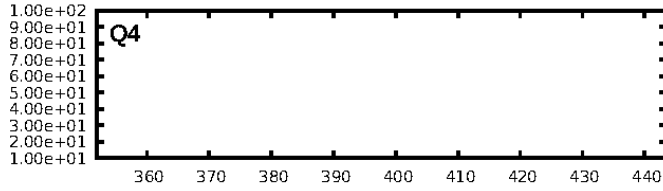
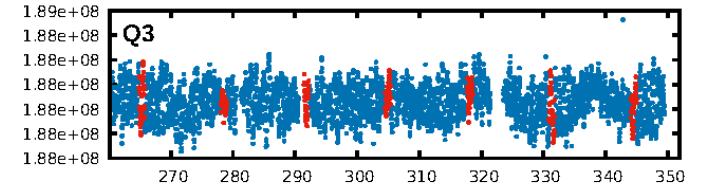
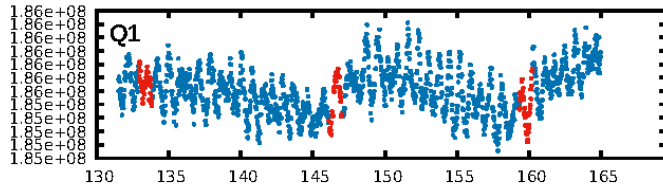
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [22.40 σ]
LongPeriod-sig: 100.0% [24.31 σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 5.77e-25
RollingBand-fgt: 1.00 [23/23]
GhostDiagnostic-chr: -9.841
Centroid-sig: 0.0%
Centroid-so: 1.258 arcsec [2.44 σ]
OotOffset-rm: 0.463 arcsec [1.12 σ]
KicOffset-rm: 0.352 arcsec [0.78 σ]
OotOffset-st: 0/2/0/4 [6]
KicOffset-st: 0/2/0/4 [6]
DiffImageQuality-fgm: 0.17 [1/6]
DiffImageOverlap-fno: 0.00 [0/9]

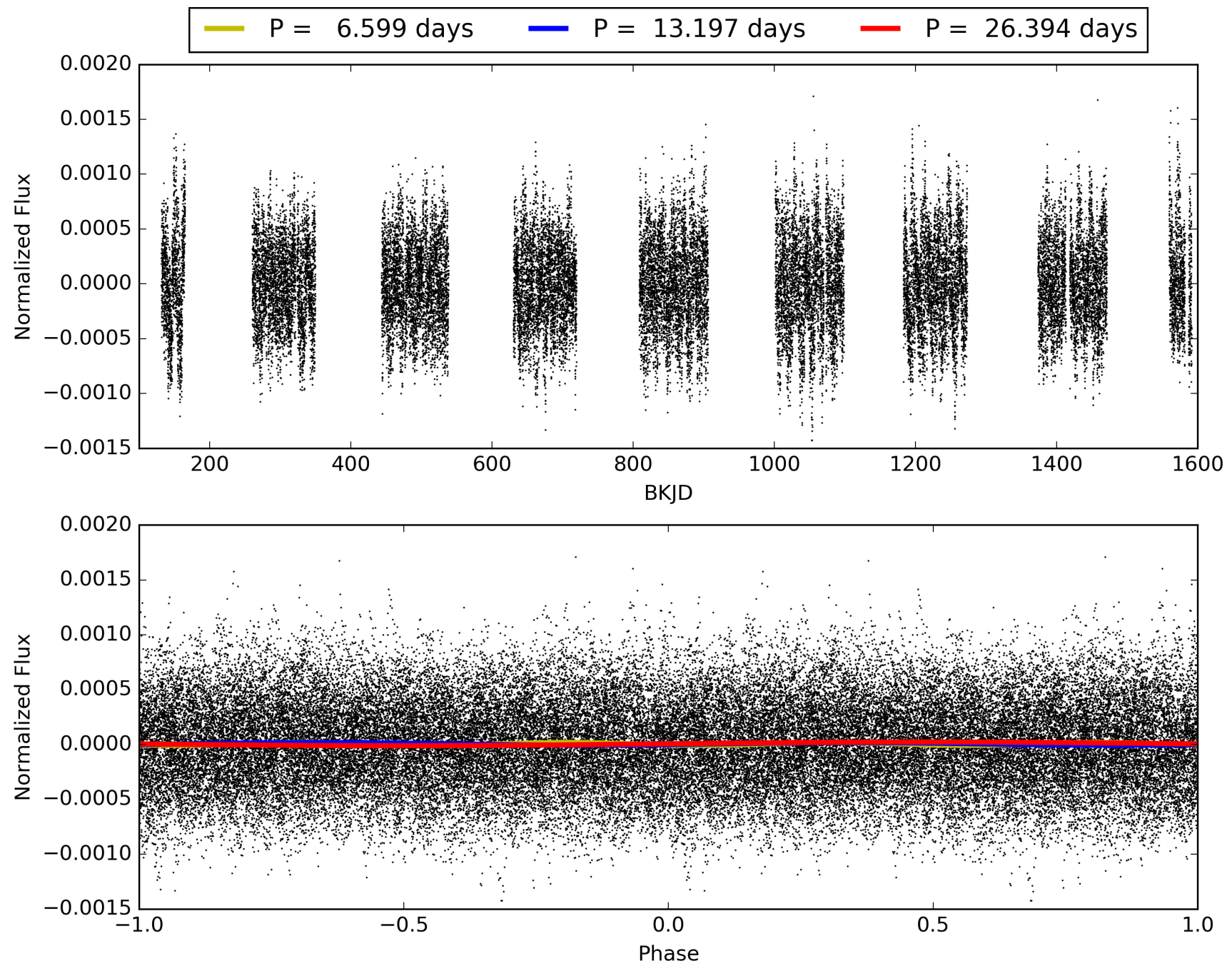
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 19:30:22 Z

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

TCE 008690471-03, PDC Light Curves

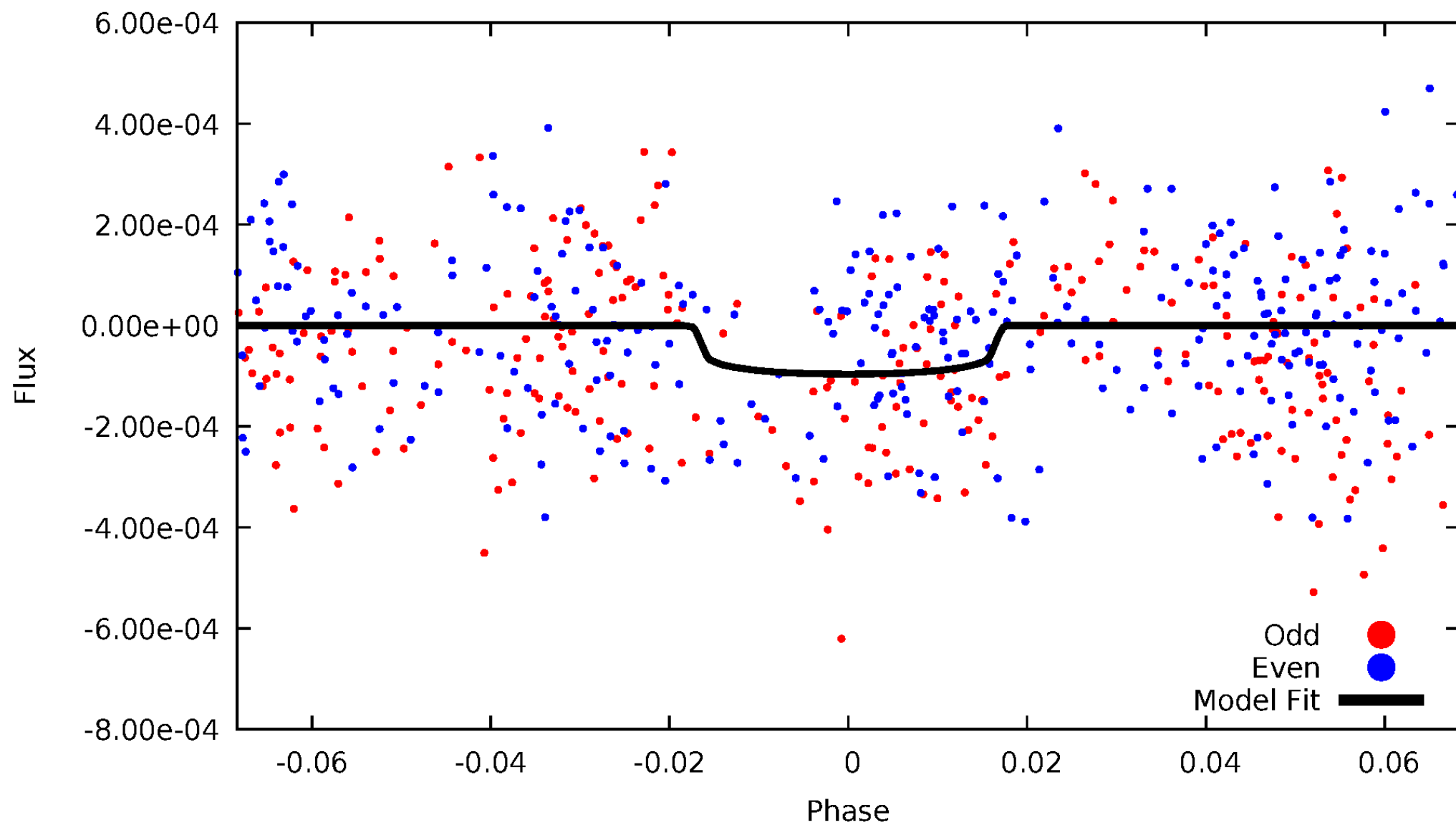


TCE 008690471-03



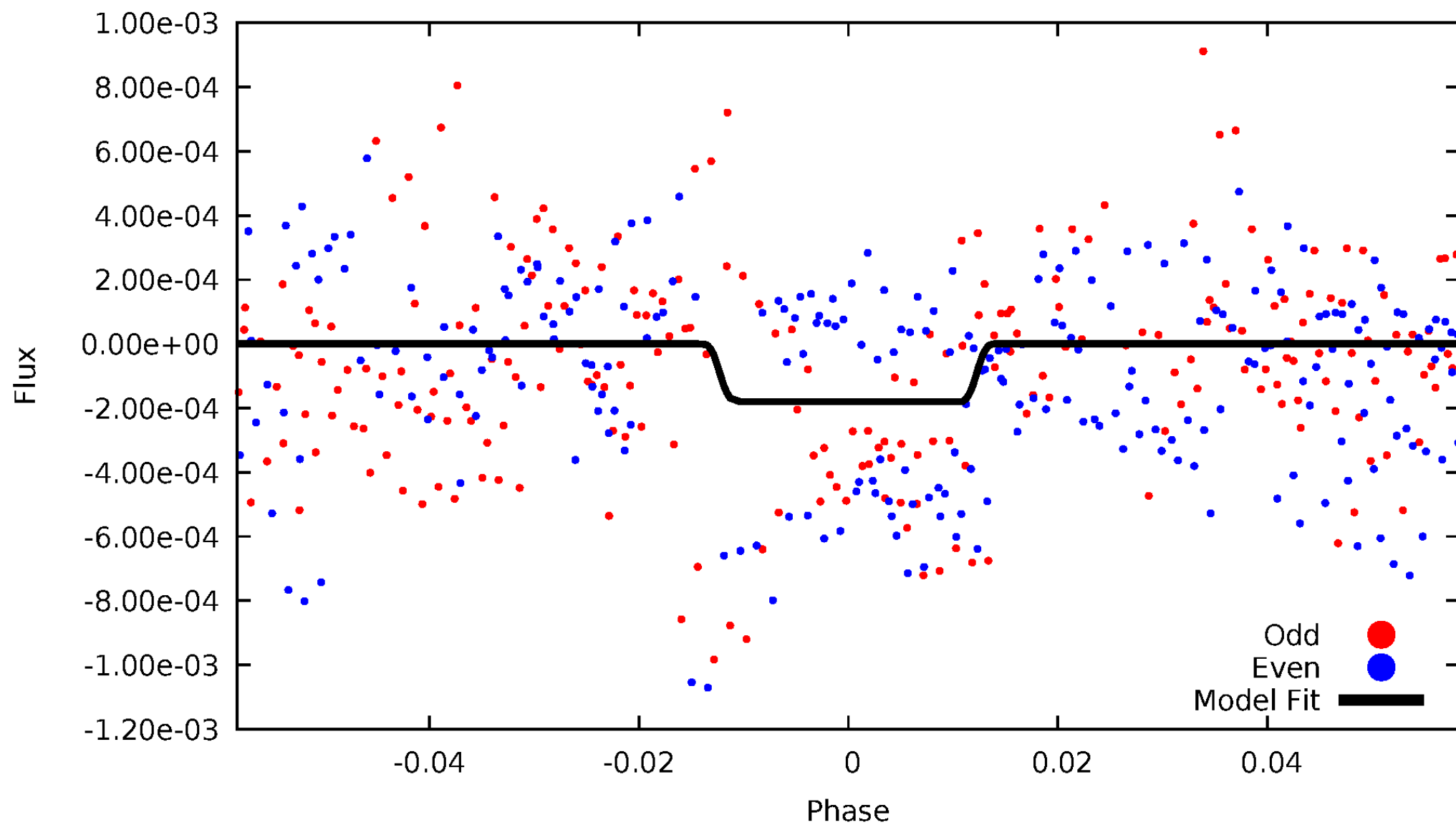
DV Odd/Even

TCE 008690471-03



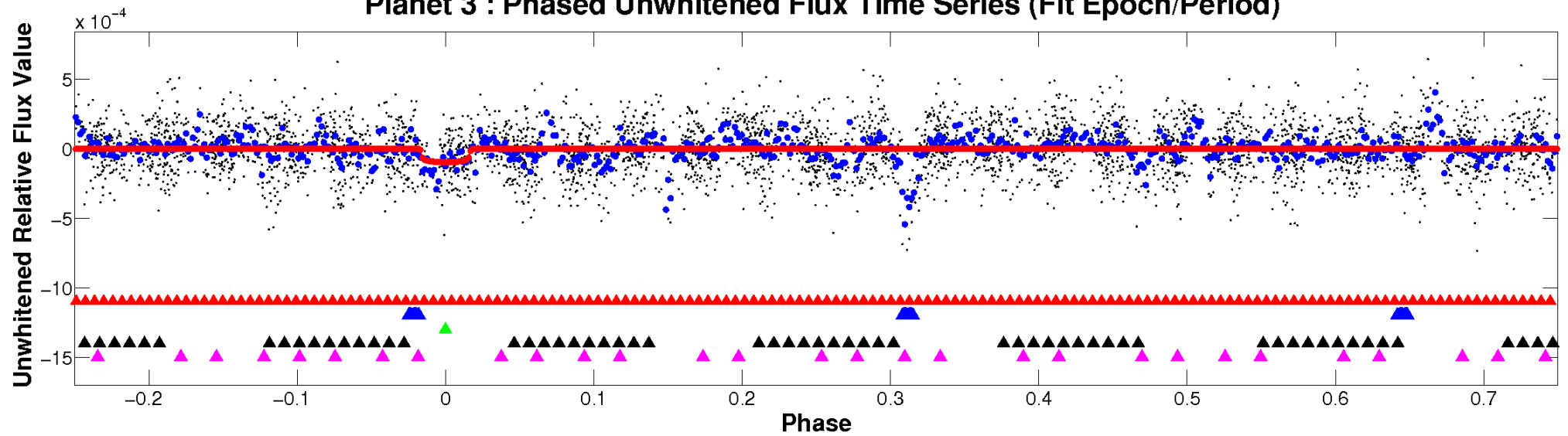
ALT Odd/Even

TCE 008690471-03

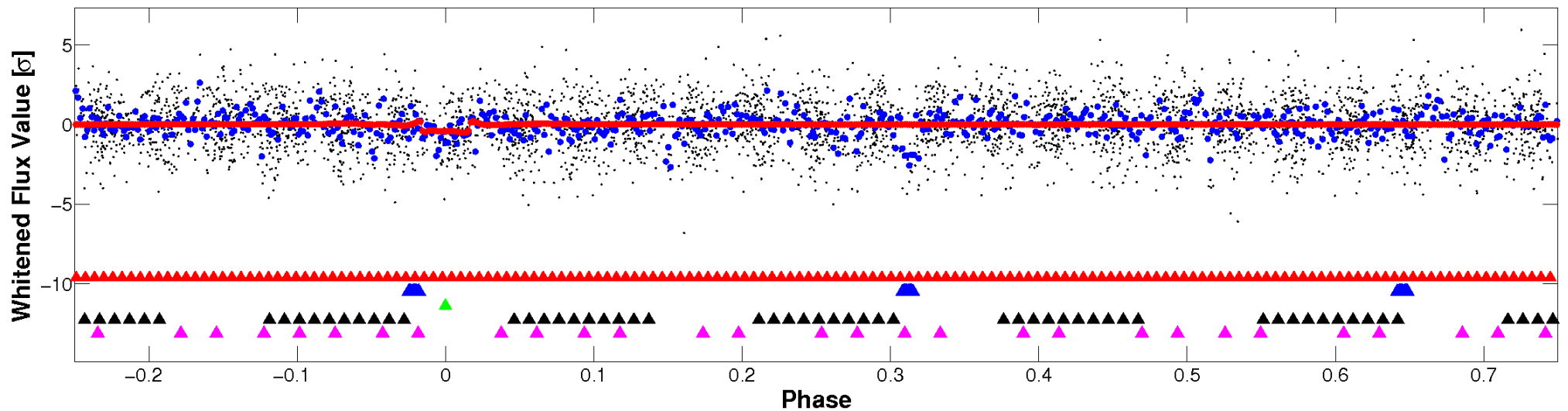


Non-Whitened Vs. Whitened Light Curve

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

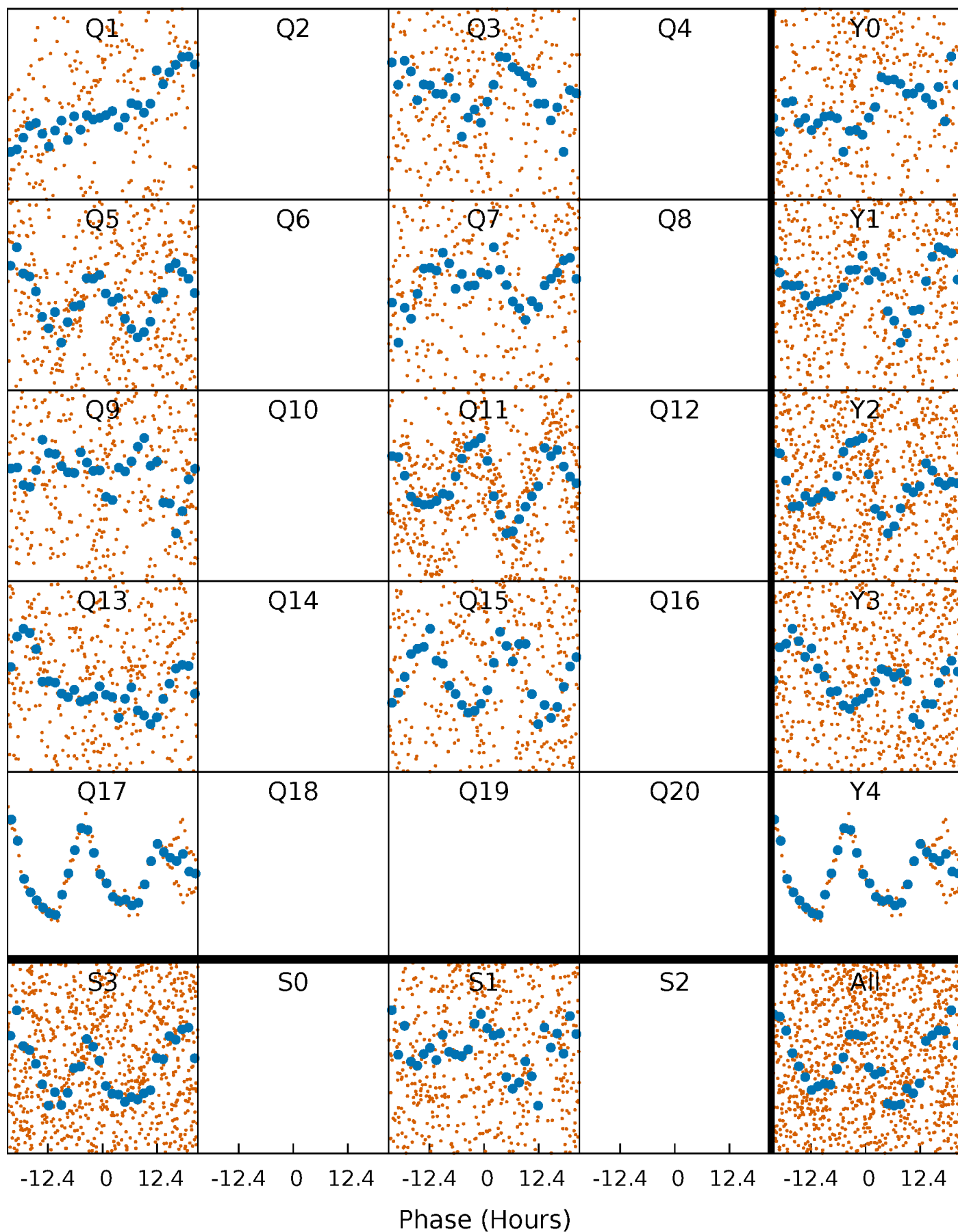


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



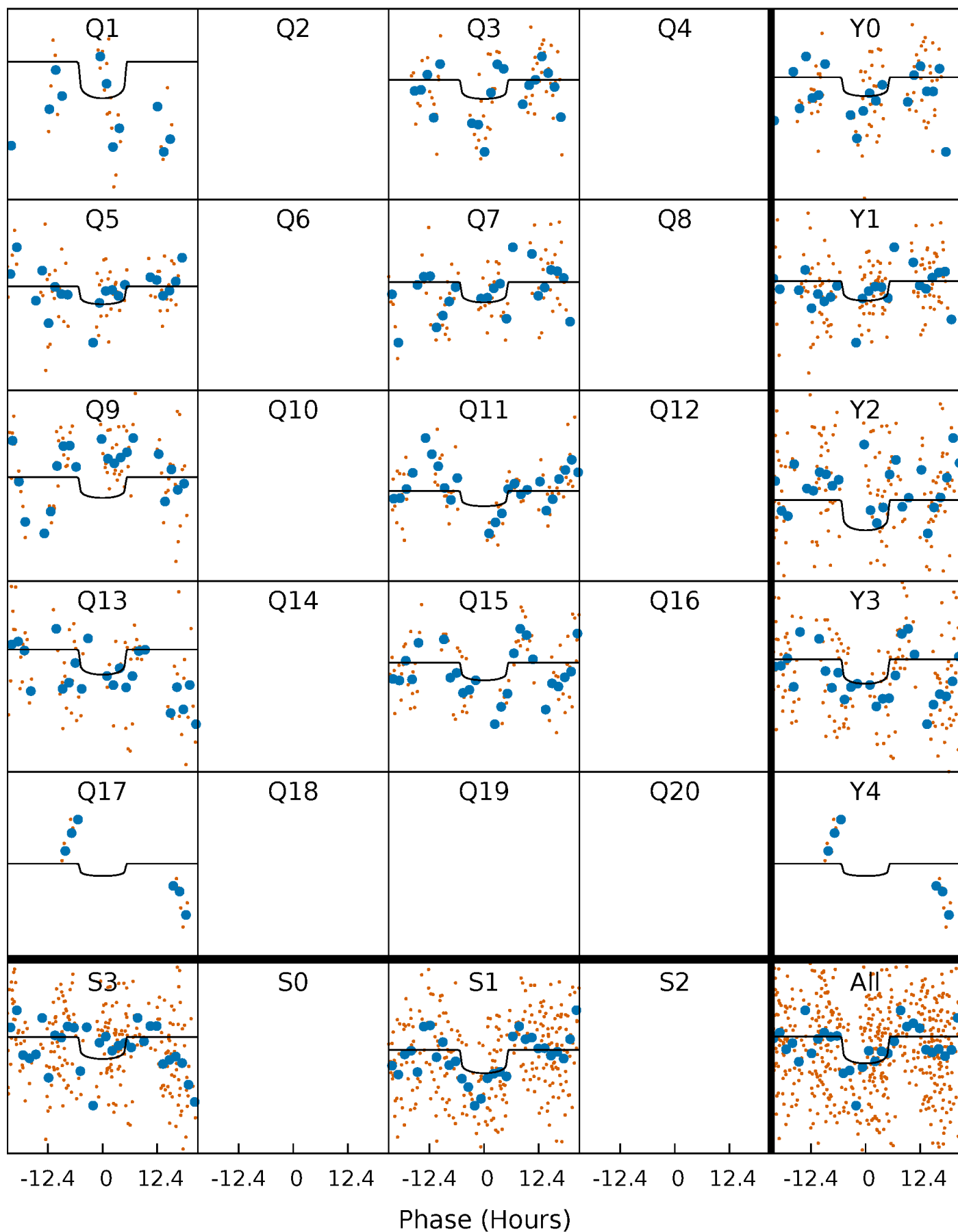
PDC Quarter-Phased Transit Curves

TCE 008690471-03 P= 13.197211 Days $T_0=133.373569$ (BKJD)



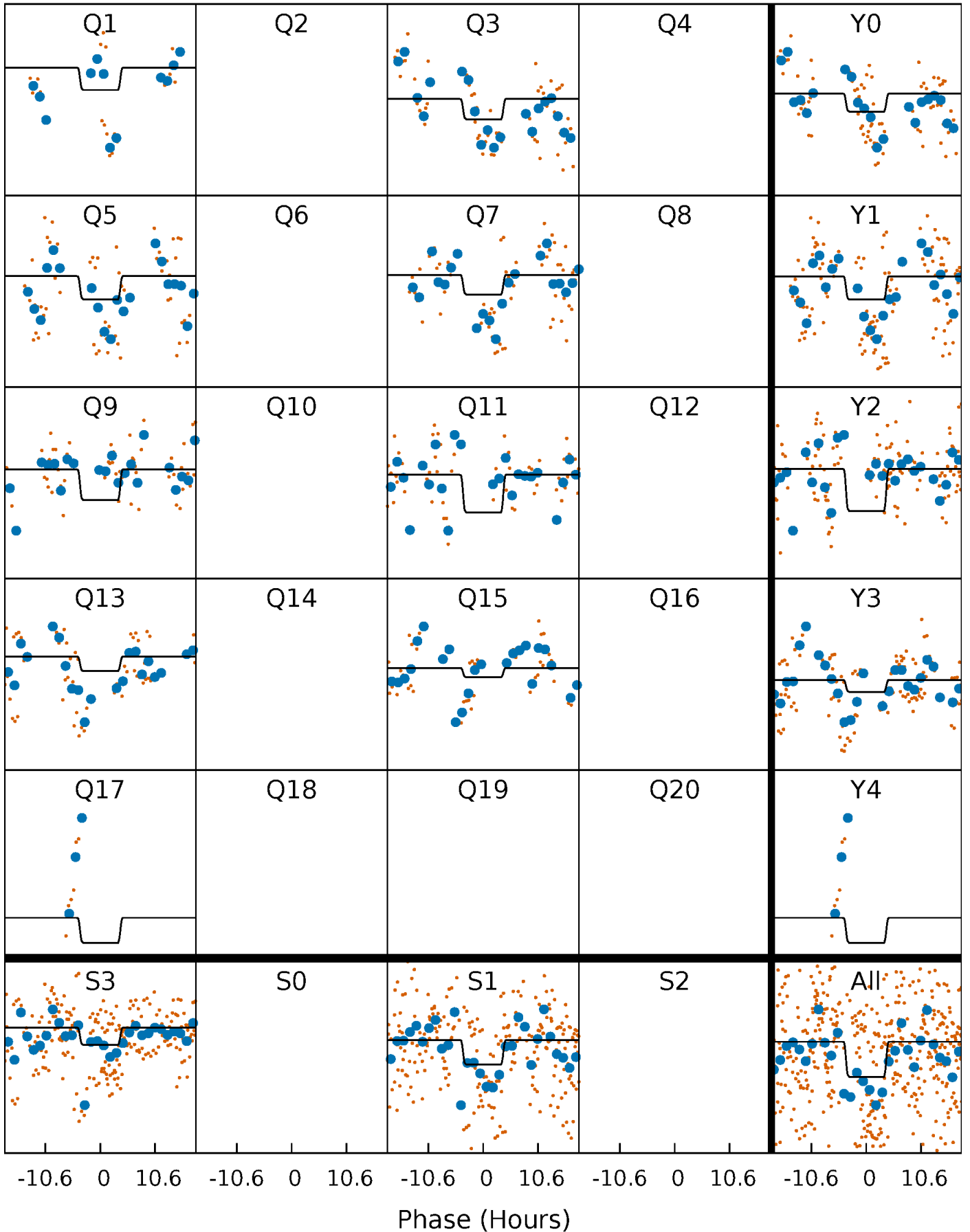
DV Quarter-Phased Transit Curves

TCE 008690471-03 $P = 13.197211$ Days $T_0 = 133.373569$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

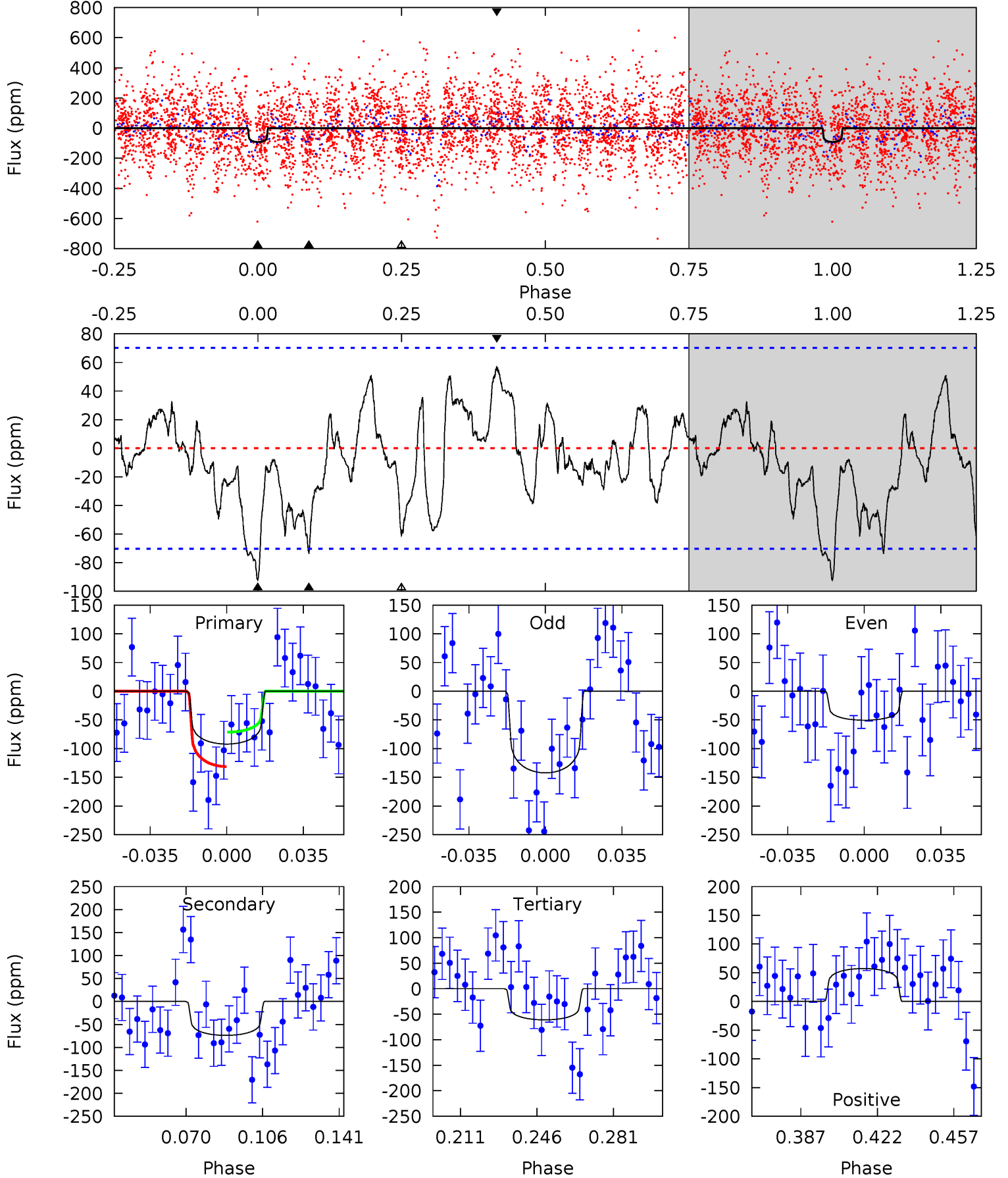
TCE 008690471-03 P= 13.195900 Days $T_0=133.408351$ (BKJD)



DV Model-Shift Uniqueness Test

008690471-03, P = 13.197211 Days, E = 120.176358 Days

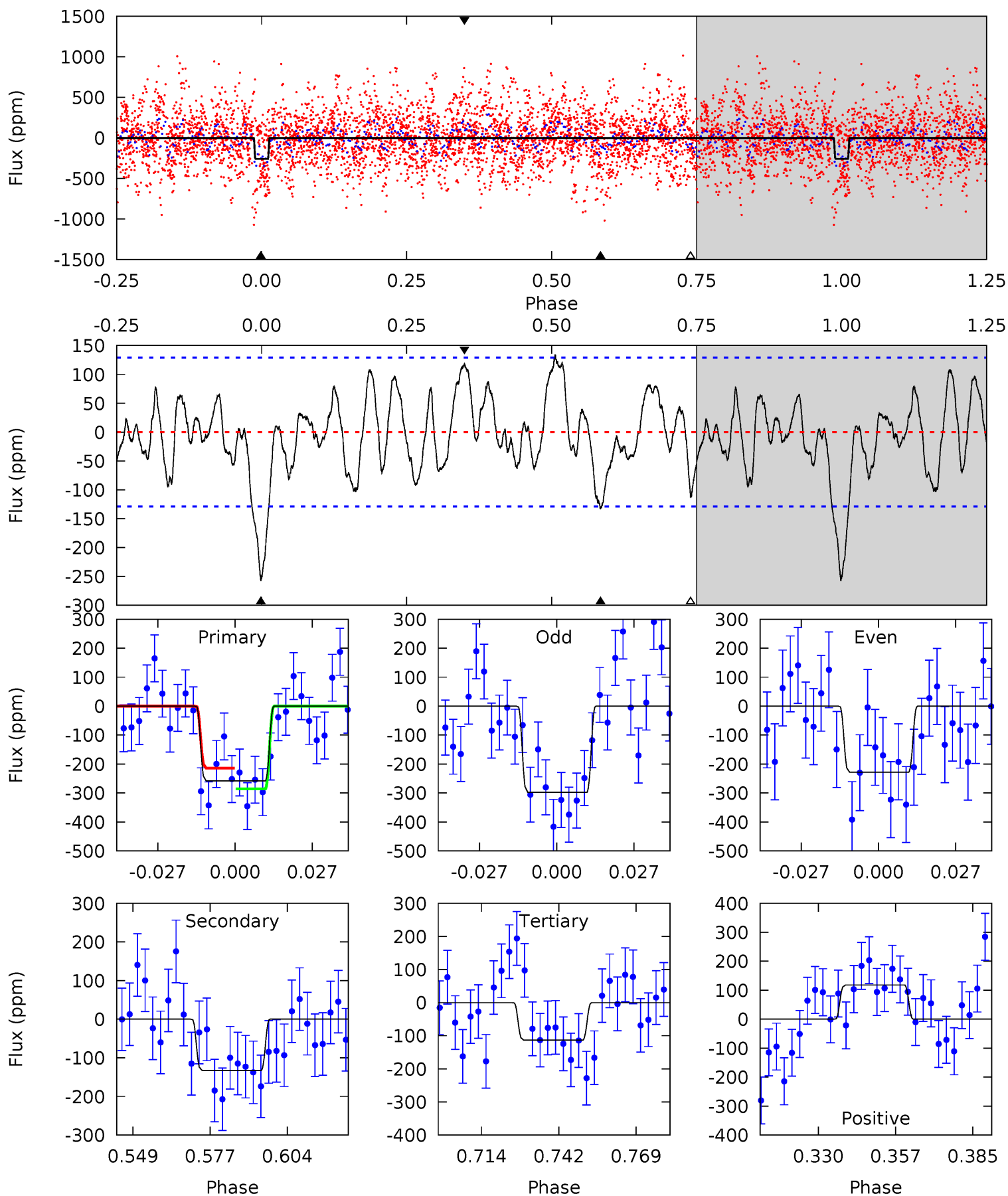
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 6.27 | 5.03 | 4.16 | 3.90 | 4.78 | 2.11 | 1.72 | 2.11 | 2.37 | 0.87 | 1.13 | 3.12 | 0.92 | 0.38 | 1.79 |



Alt Model-Shift Uniqueness Test

008690471-03, P = 13.195900 Days, E = 120.212451 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 9.65 | 4.97 | 4.23 | 4.42 | 4.83 | 2.20 | 1.92 | 5.42 | 5.23 | 0.73 | 0.54 | 1.29 | 7.56 | 0.34 | 1.33 |



Stellar Parameters For KIC 008690471

| | $T_{\text{eff}} (K)$ | $\log(g)$ | $[\text{Fe}/\text{H}]$ | $R (R_{\odot})$ | $M (M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 6593^{+181}_{-250} | $4.074^{+0.252}_{-0.168}$ | $-0.140^{+0.250}_{-0.300}$ | $1.762^{+0.530}_{-0.583}$ | $1.350^{+0.182}_{-0.296}$ | $0.347^{+0.557}_{-0.163}$ |
| | +3%/-4% | +6%/-4% | +179%/-214% | +30%/-33% | +13%/-22% | +160%/-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 008690471-03 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|---------------|------------------------|----------------------|-----------------------|--------------------|
| DV | -74 ± 15 | $1.96^{+1.00}_{-0.98}$ | 1542^{+139}_{-145} | 5960^{+2595}_{-992} | 150^{+454}_{-86} |
| Alt. | -133 ± 27 | $2.50^{+1.25}_{-0.95}$ | 1545^{+121}_{-130} | 6042^{+1910}_{-891} | 163^{+297}_{-88} |

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

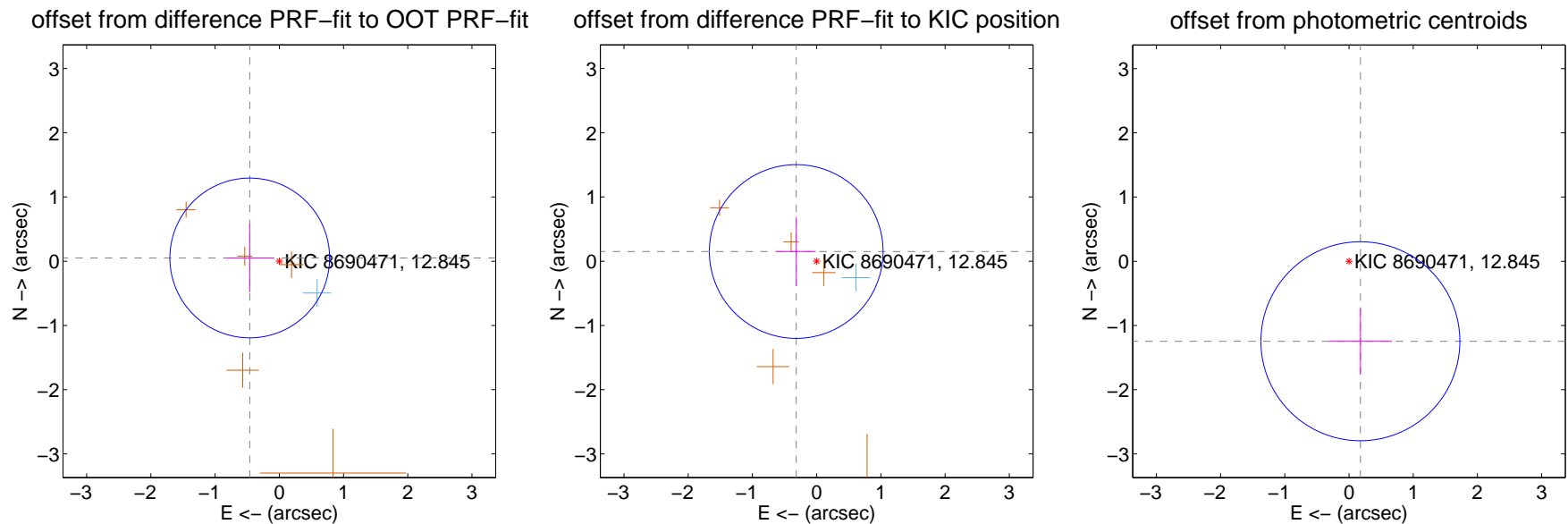
DV Centroid Data

Supplemental centroid analysis for 008690471-03. Kepler magnitude: 12.85. Transit SNR 5.07

There are 1 quarters with good PRF difference image offsets

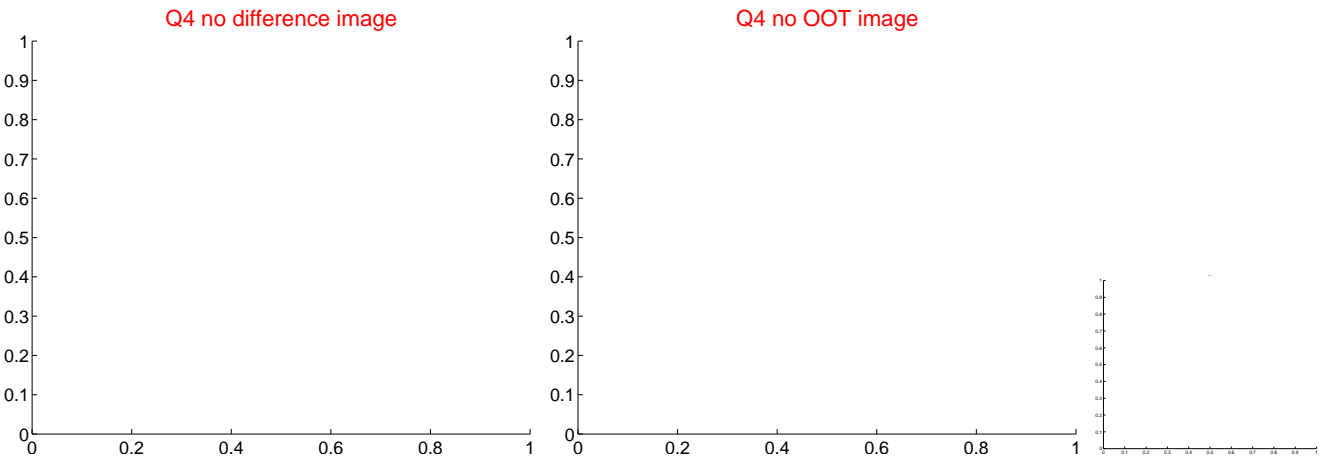
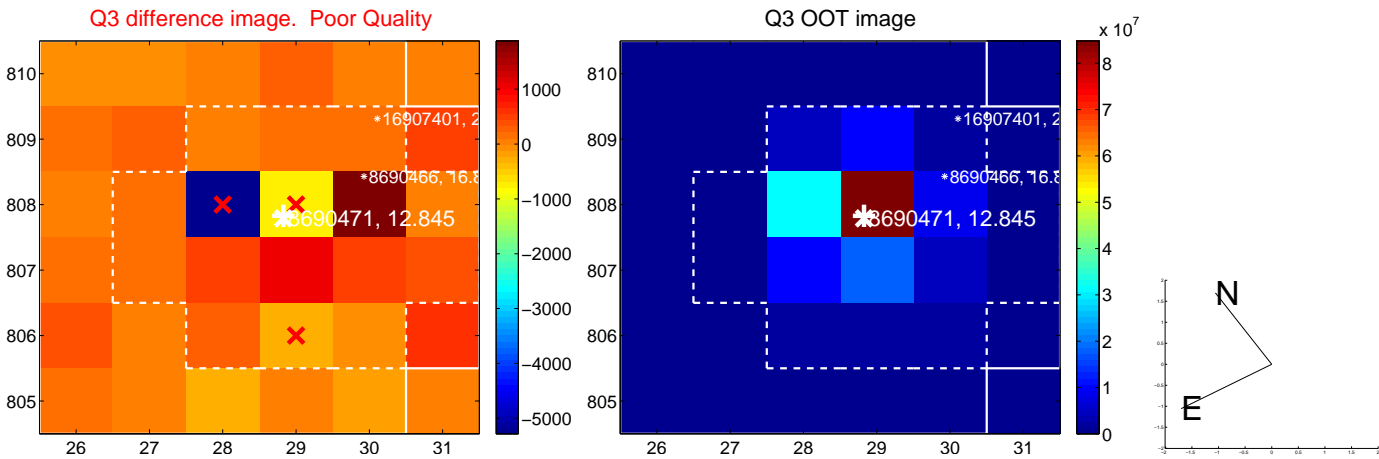
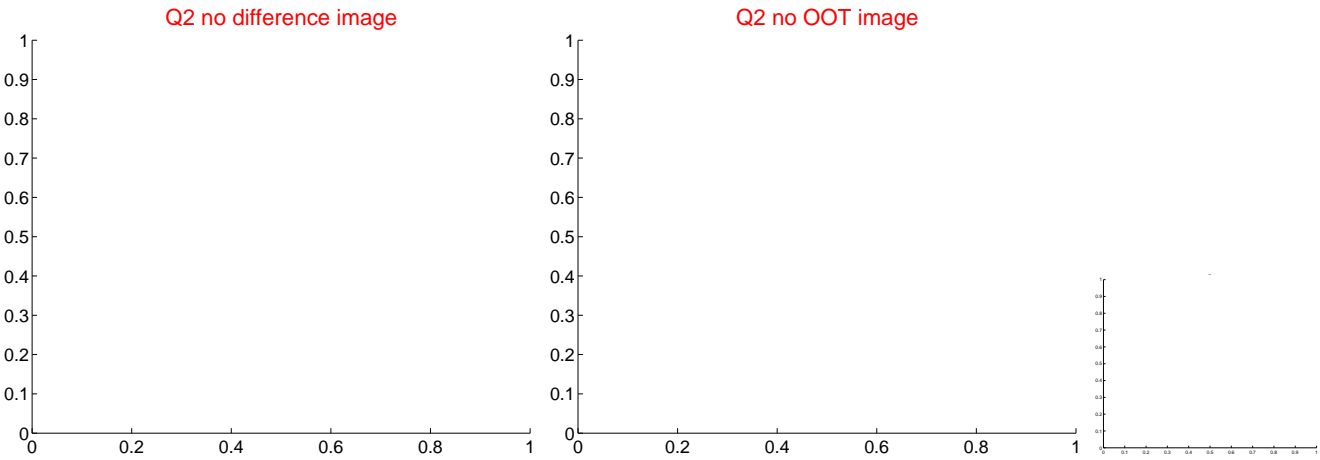
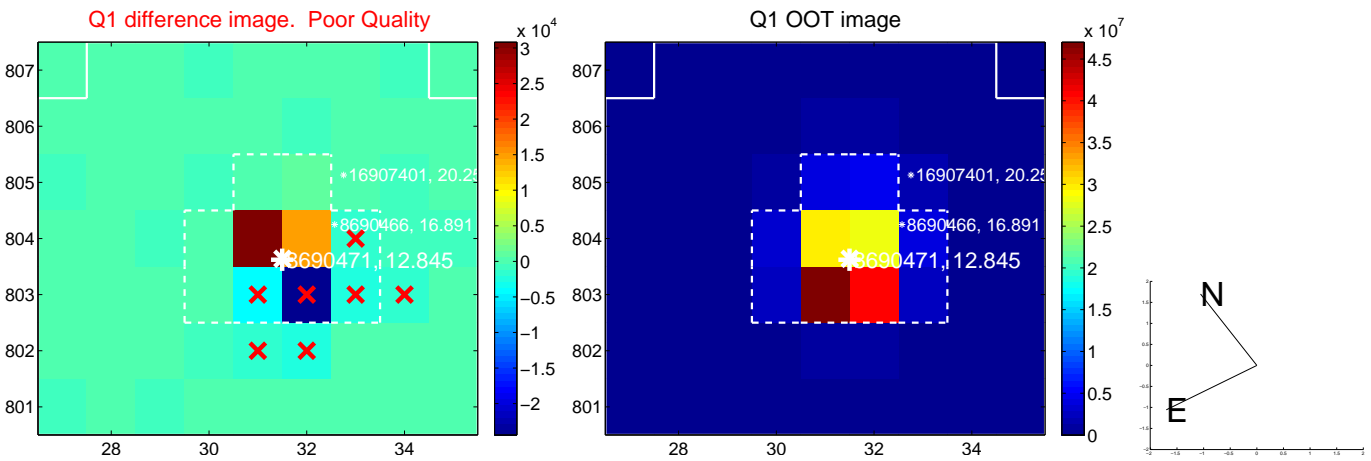
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|-------------------|
| PRF-fit source offset from OOT | 0.463 ± 0.414 | 1.12 | 0.460 ± 0.373 | 0.050 ± 0.533 |
| PRF-fit source offset from KIC position | 0.352 ± 0.451 | 0.78 | 0.318 ± 0.305 | 0.151 ± 0.539 |
| photometric centroid source offset | 1.26 ± 0.52 | 2.44 | -0.18 ± 0.49 | -1.25 ± 0.52 |

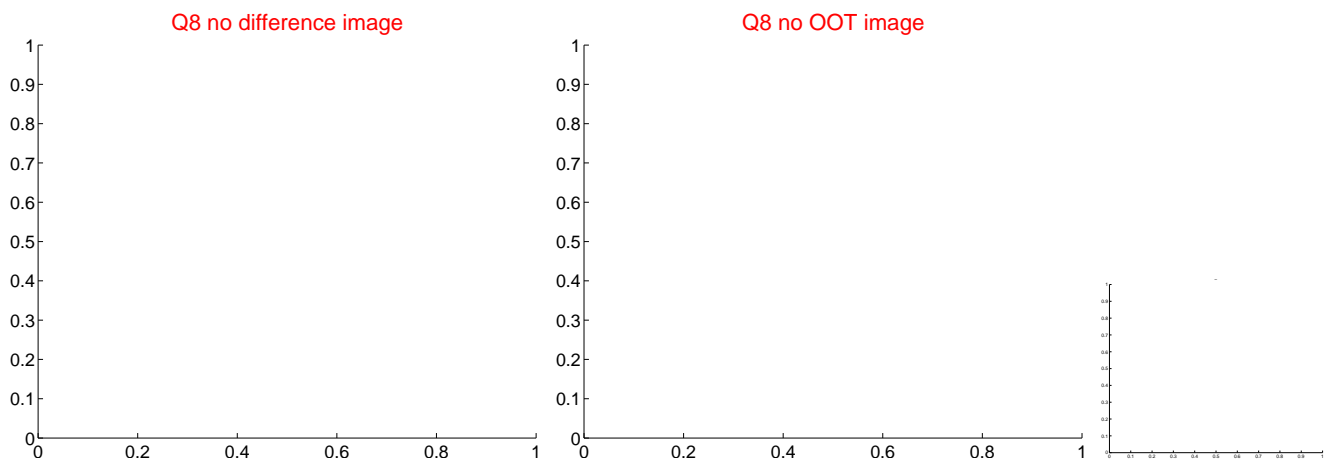
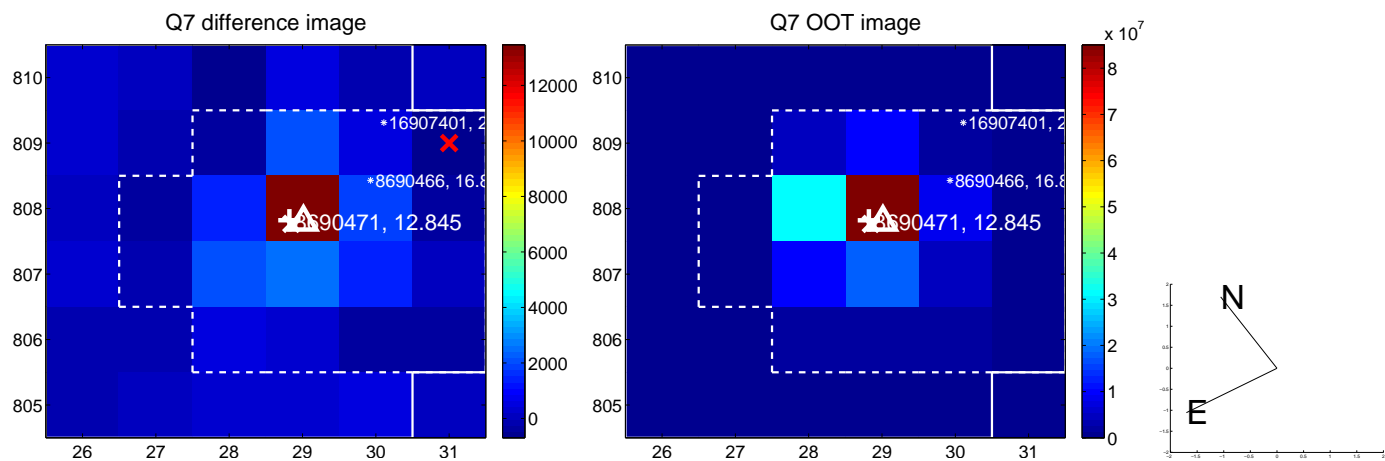
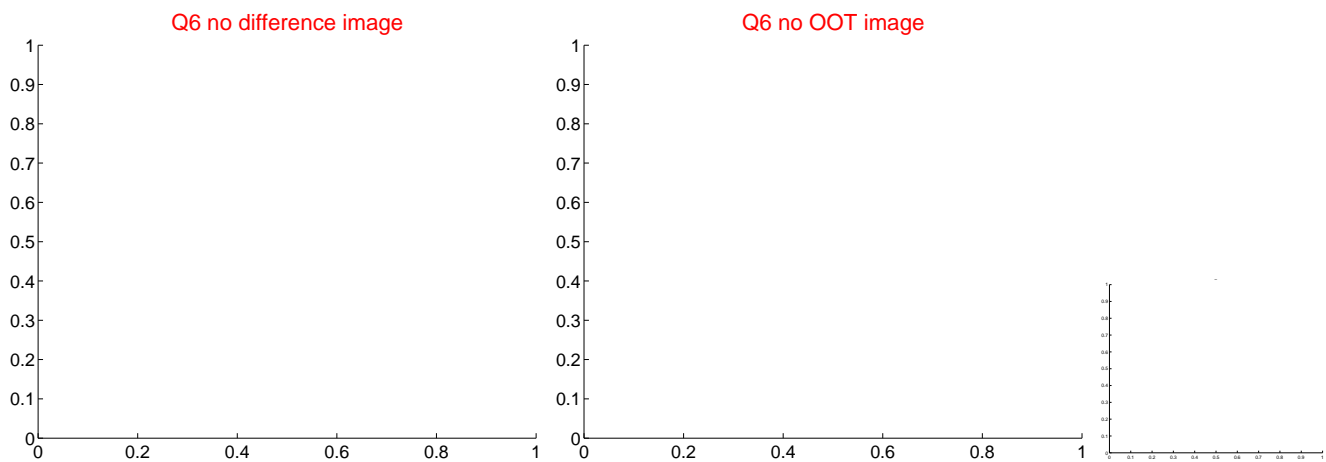
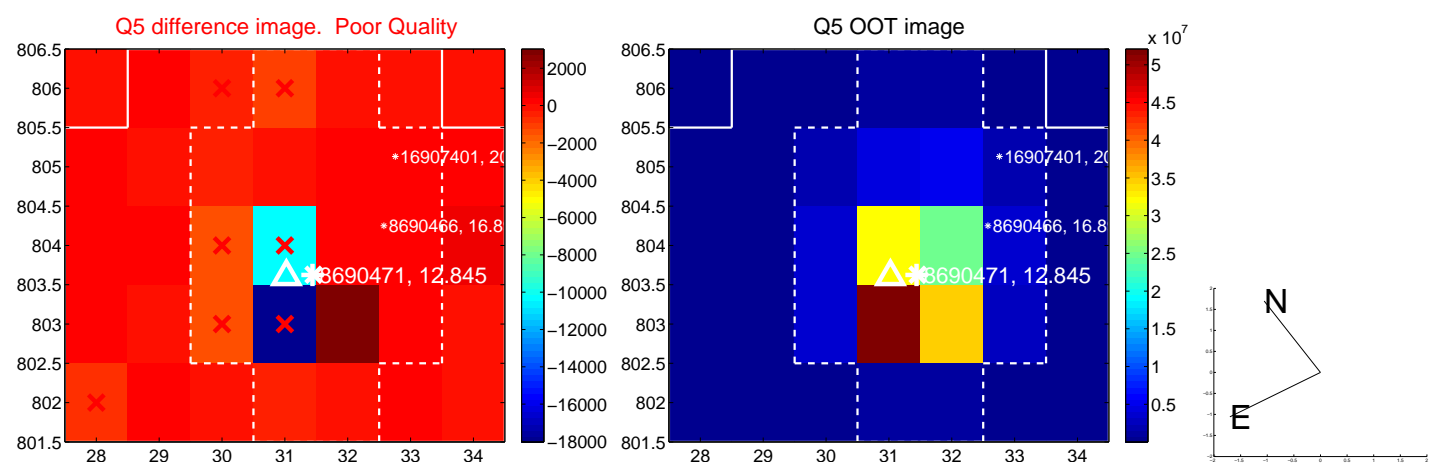


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

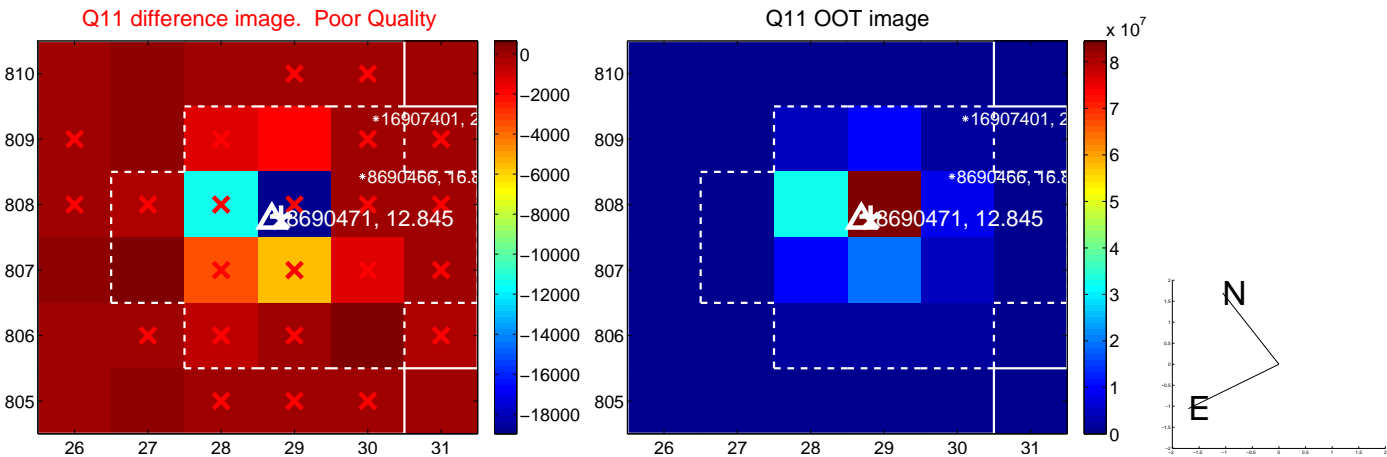
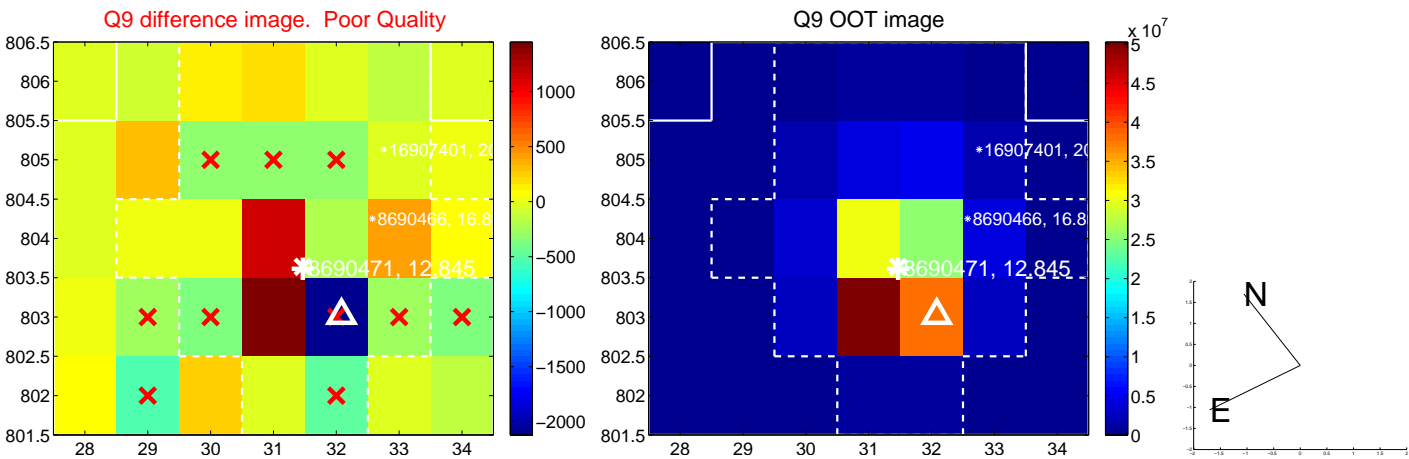
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



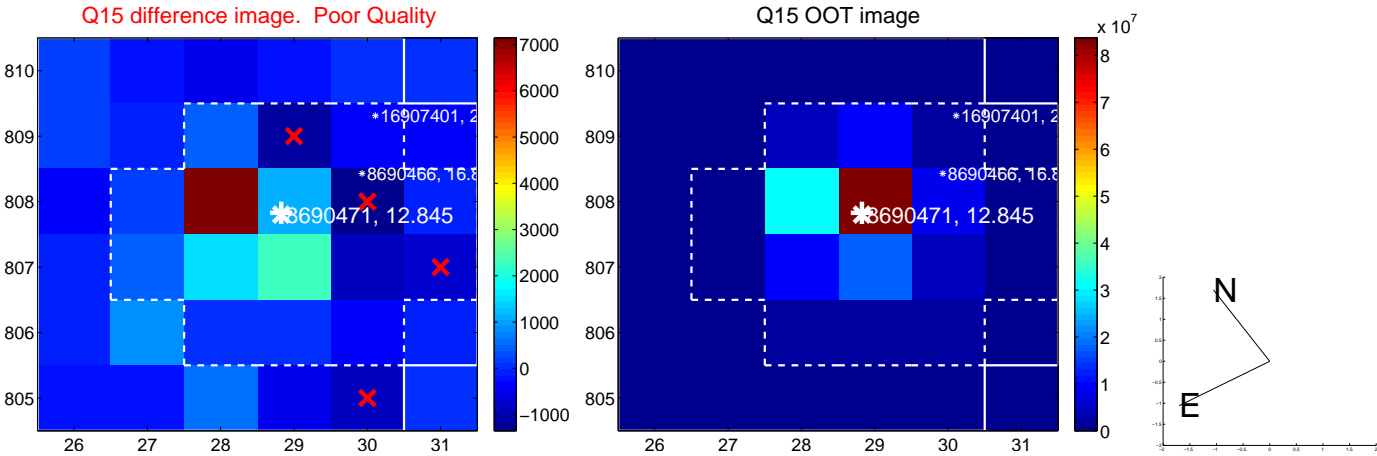
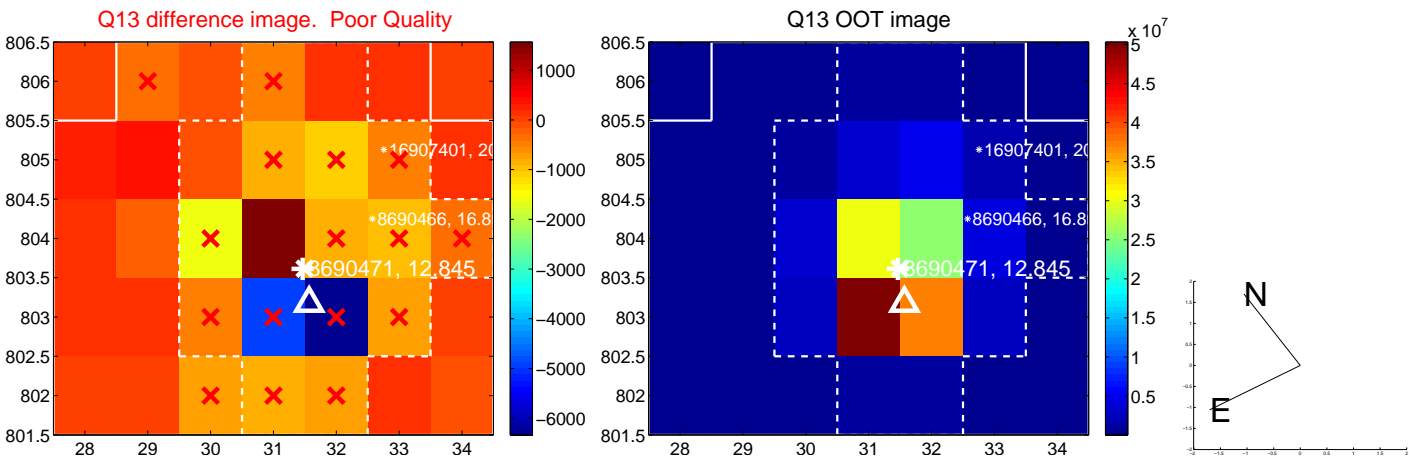
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



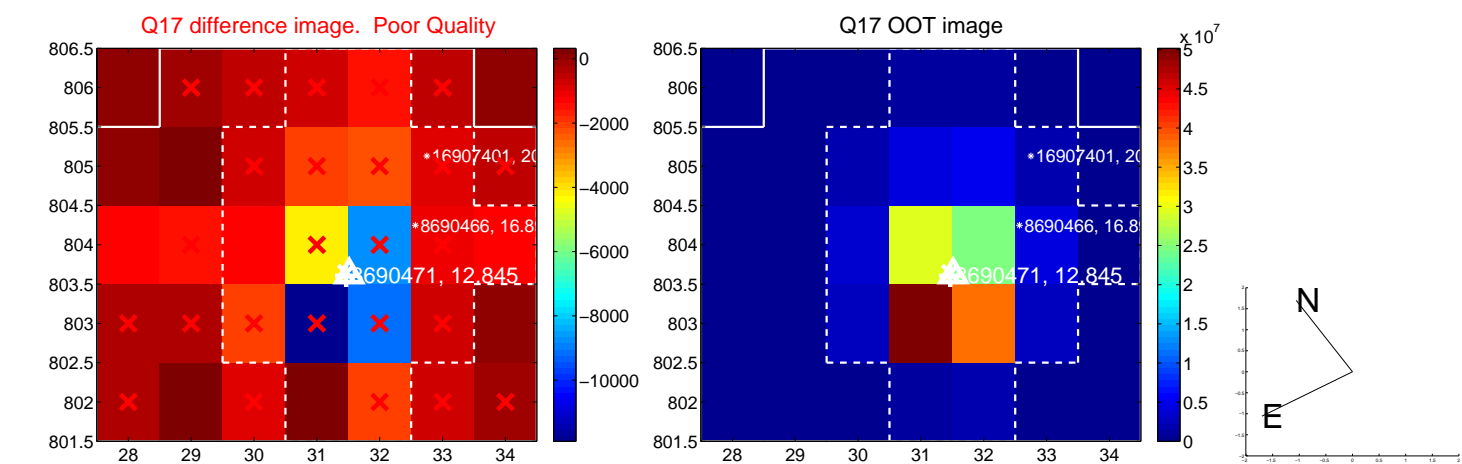
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



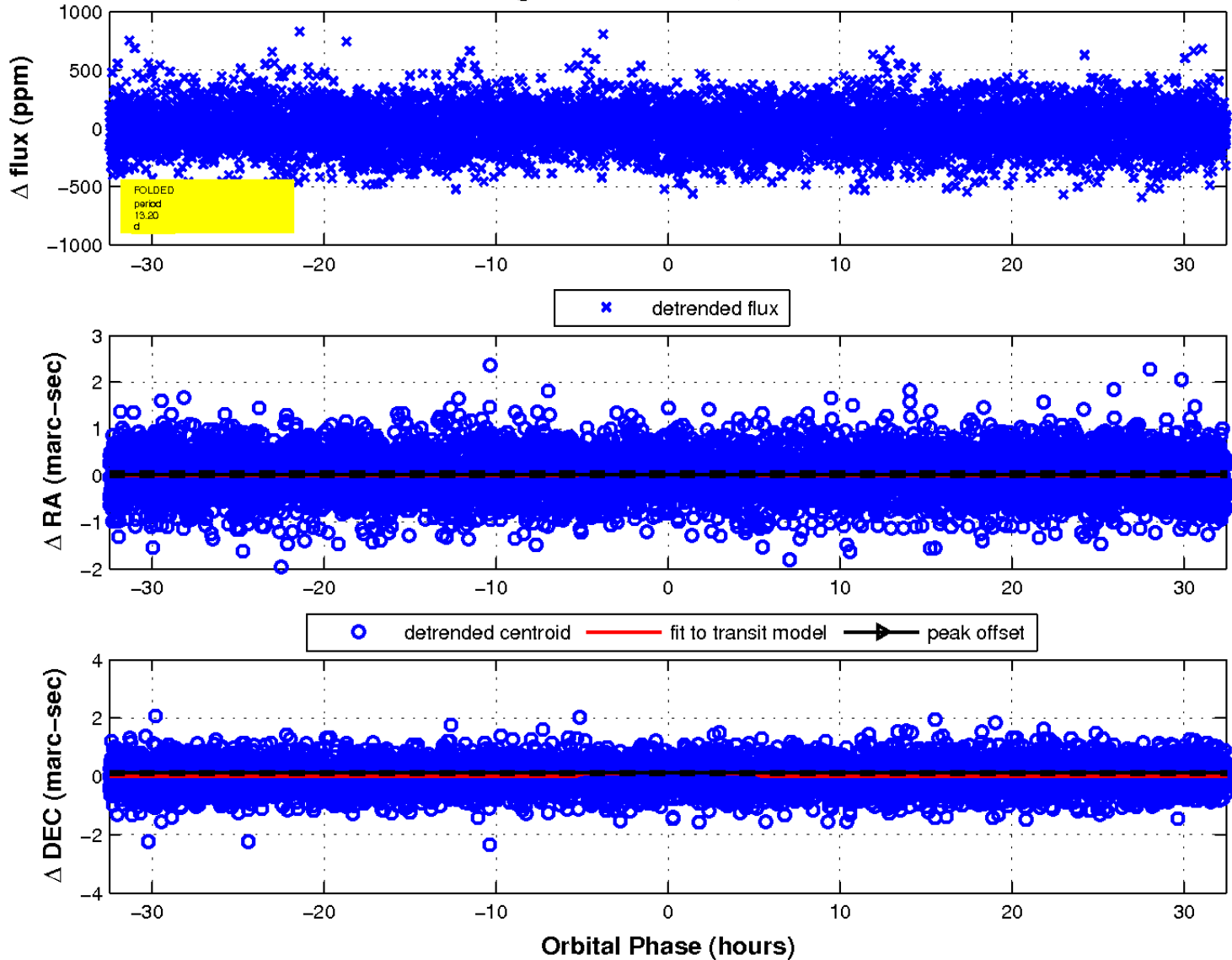
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

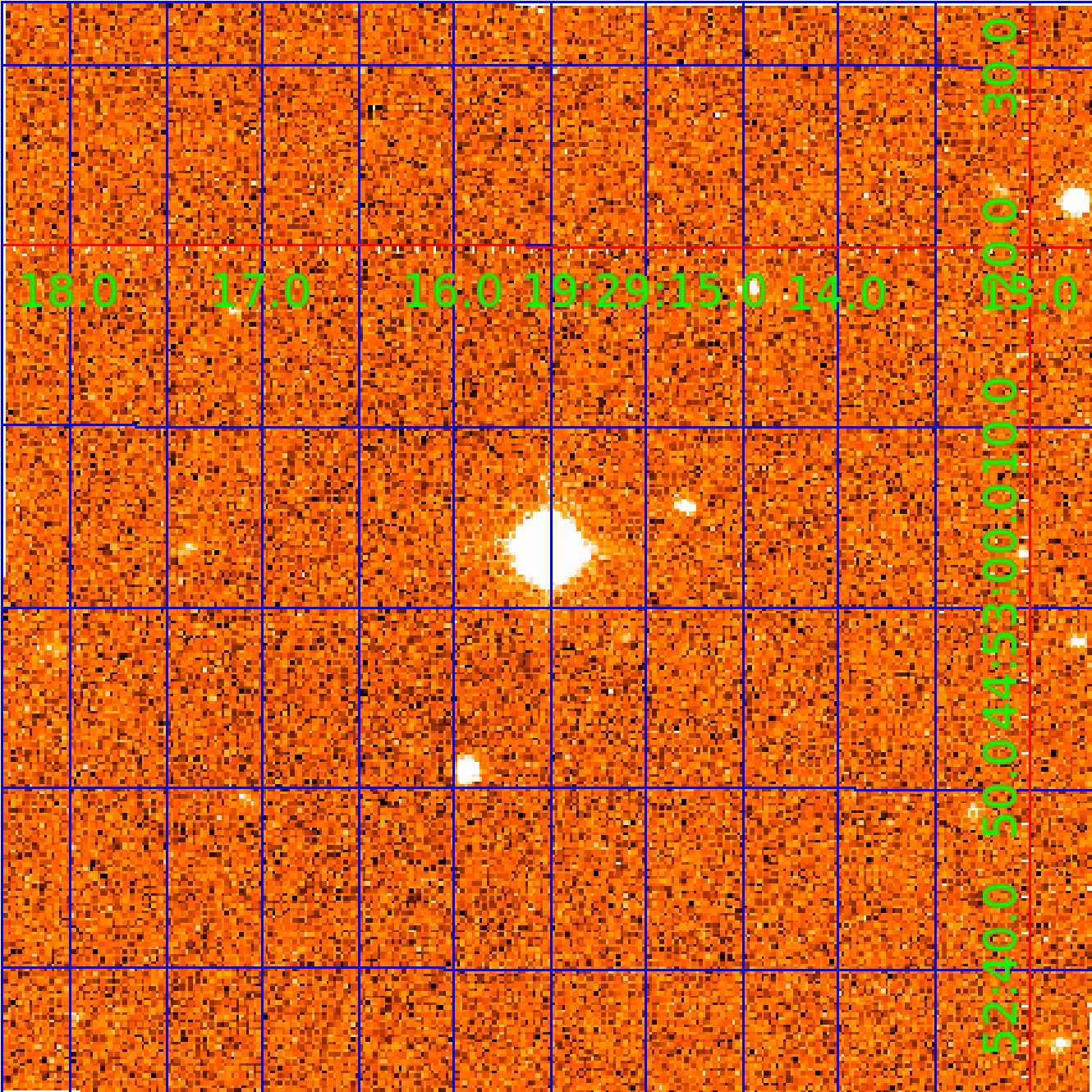


fluxWeightedCentroids, Planet 3 of 5



UKIRT Image

Declination



KIC 008690471

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|-----|-----------------------------|-----------------|------------------------|------------------------|
| 008690471-01 | OBS | No | 1.059029 | 131.803182 | 17.2 | 7.205 | 7.2 | 5.0 | 1.76 | 6593 | 0.74 | 10439.67 |
| 008690471-03 | OBS | No | 13.197211 | 133.373569 | 96.5 | 10.827 | 11.6 | 5.1 | 1.76 | 6593 | 1.93 | 361.34 |
| 008690471-04 | OBS | No | 24.217075 | 151.536611 | 329.6 | 1.077 | 9.6 | 9.9 | 1.76 | 6593 | 3.30 | 160.84 |
| 008690471-05 | OBS | No | 49.938268 | 158.785913 | 330.7 | 5.229 | 8.4 | 8.9 | 1.76 | 6593 | 3.73 | 61.28 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 008690471-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—MOD_NONUNIQ_ALT |
| 008690471-03 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS |
| 008690471-04 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—CENT_FEW_DIFFS |
| 008690471-05 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—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.

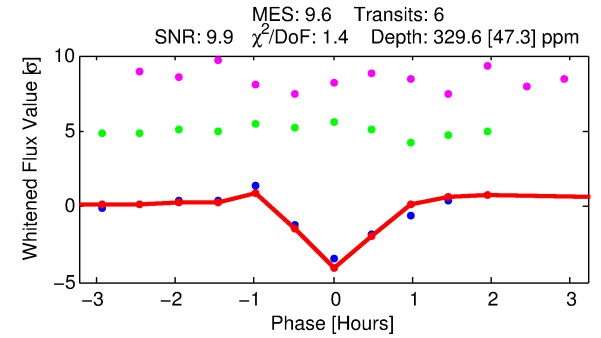
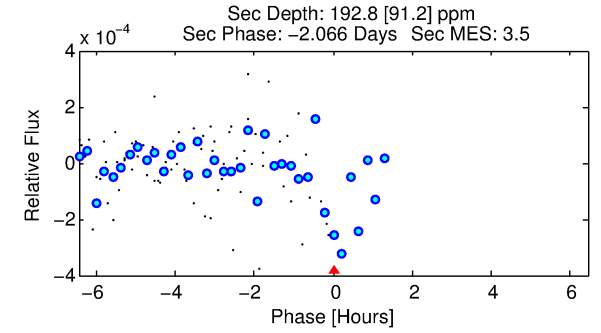
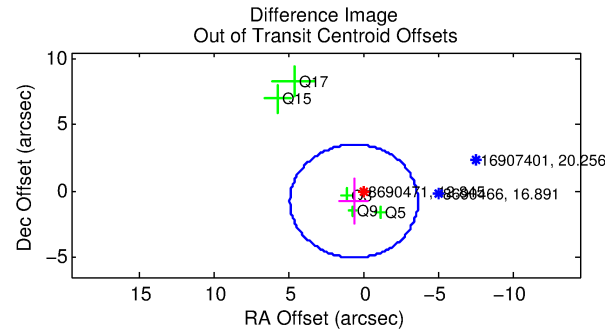
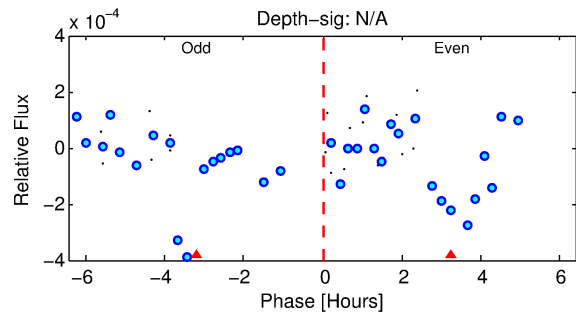
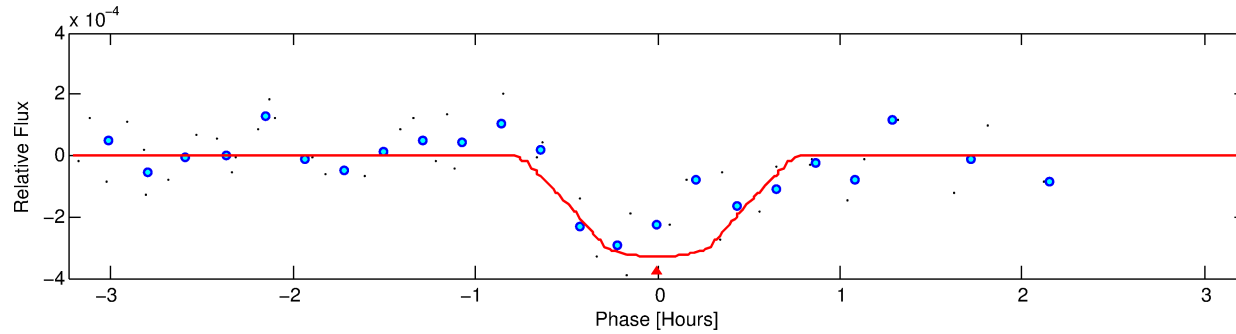
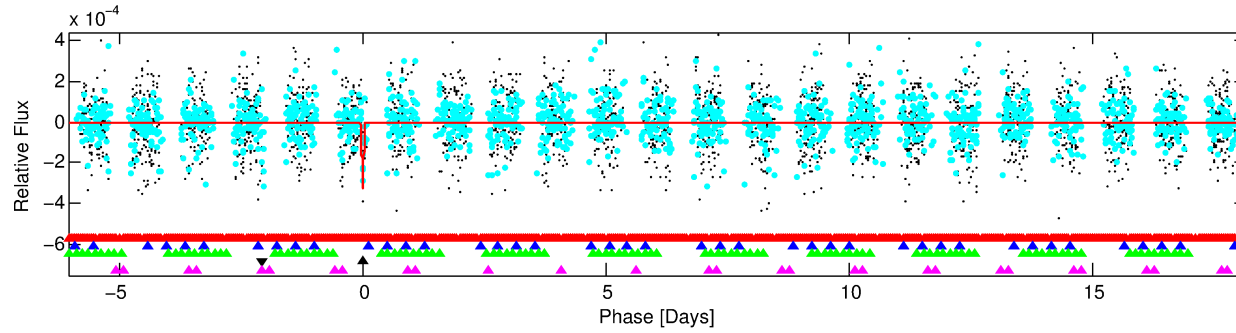
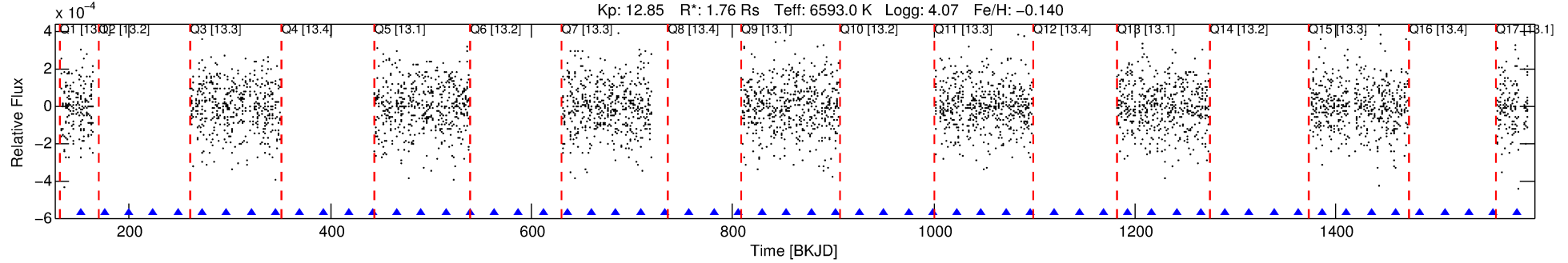
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008690471-04

No Significant Match Found

DV One-Page Summary

KIC: 8690471 Candidate: 4 of 5 Period: 24.217 d



DV Fit Results:

Period = 24.21708 [0.00020] d
Epoch = 151.5366 [0.0074] BKJD
Rp/R* = 0.0172 [0.0202]
a/R* = 158.93 [1005.36]
b = 0.42 [12.38]
Seff = 160.84 [75.67]
Teq = 908 [107] K
Rp = 3.30 [4.04] Re
a = 0.1808 [0.0530] AU
Ag = 318.24 [777.79] [0.41σ]
Teffp = 5930 [3570] K [1.41σ]

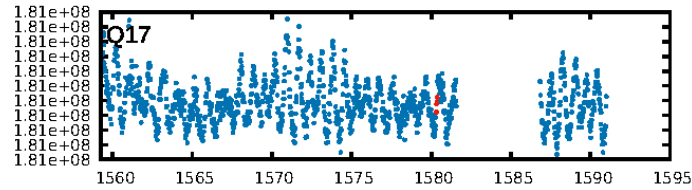
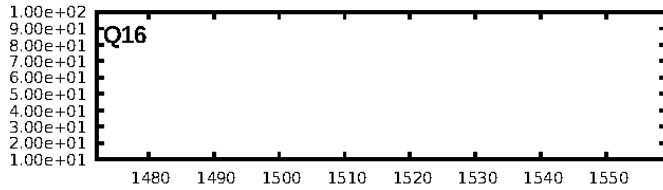
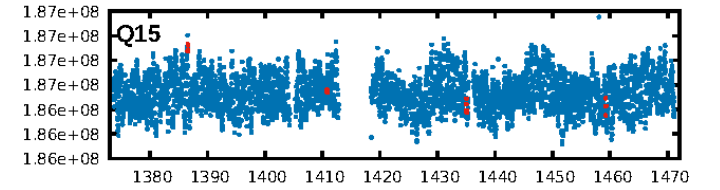
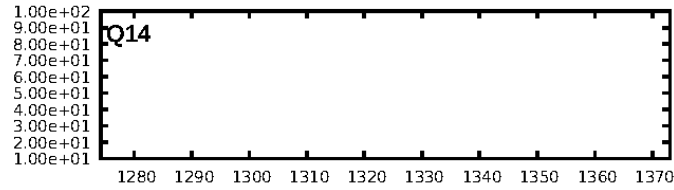
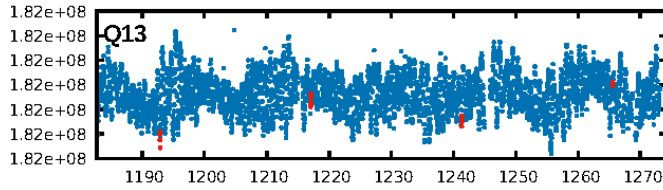
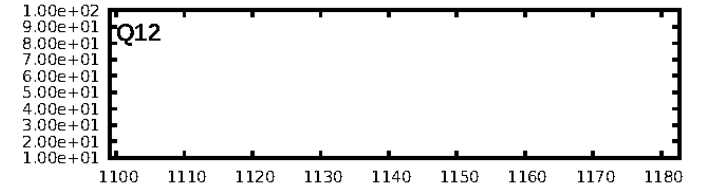
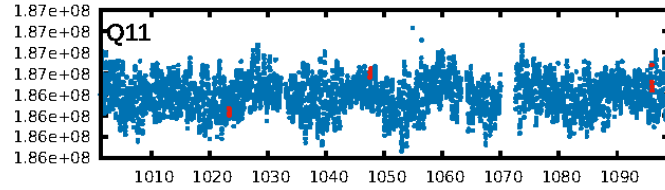
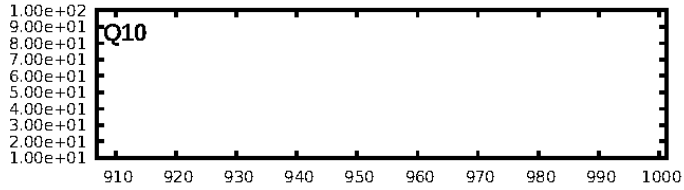
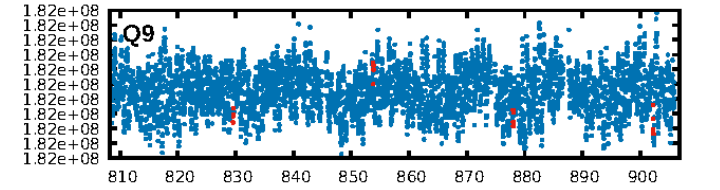
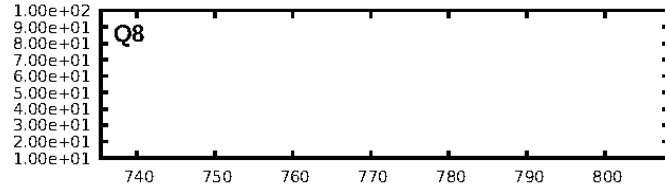
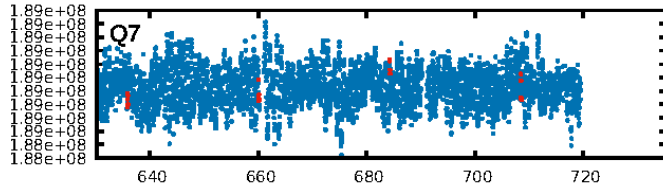
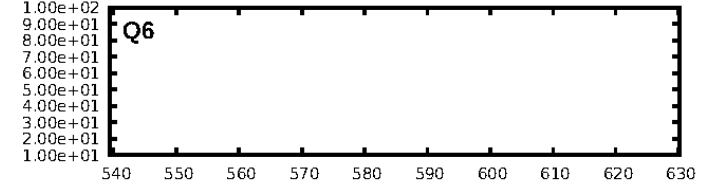
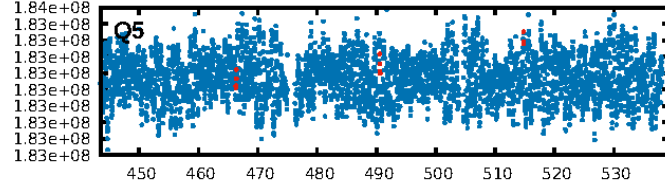
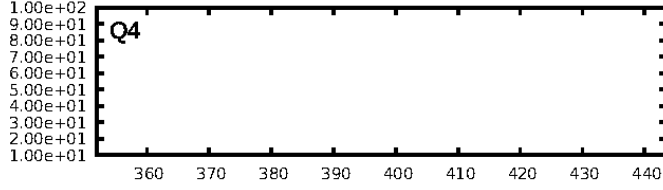
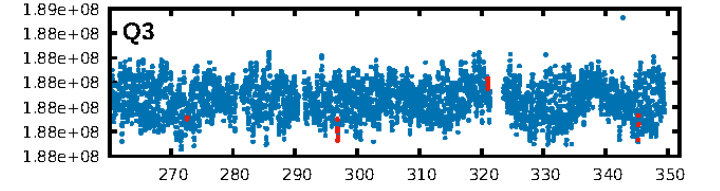
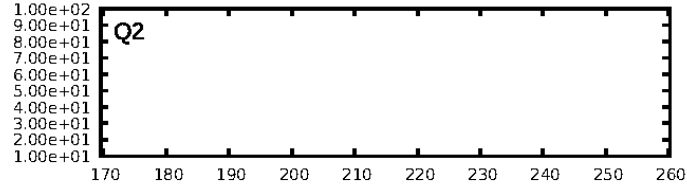
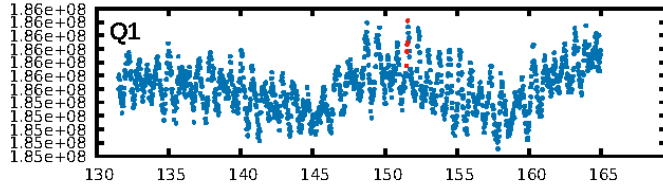
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [24.31σ]
LongPeriod-sig: 100.0% [96.98σ]
ModelChiSquare2-sig: 9.9%
ModelChiSquareGof-sig: 58.0%
Bootstrap-pfa: 9.68e-10
RollingBand-fgt: 1.00 [6/6]
GhostDiagnostic-chr: 2.136
Centroid-sig: 56.3%
Centroid-so: 0.443 arcsec [0.74σ]
OotOffset-rm: 0.973 arcsec [0.68σ]
OotOffset-st: 0/2/0/3 [5]
KicOffset-rm: 0.928 arcsec [0.71σ]
KicOffset-st: 0/2/0/3 [5]
DiffImageQuality-fgm: 0.40 [2/5]
DiffImageOverlap-fno: 0.89 [8/9]

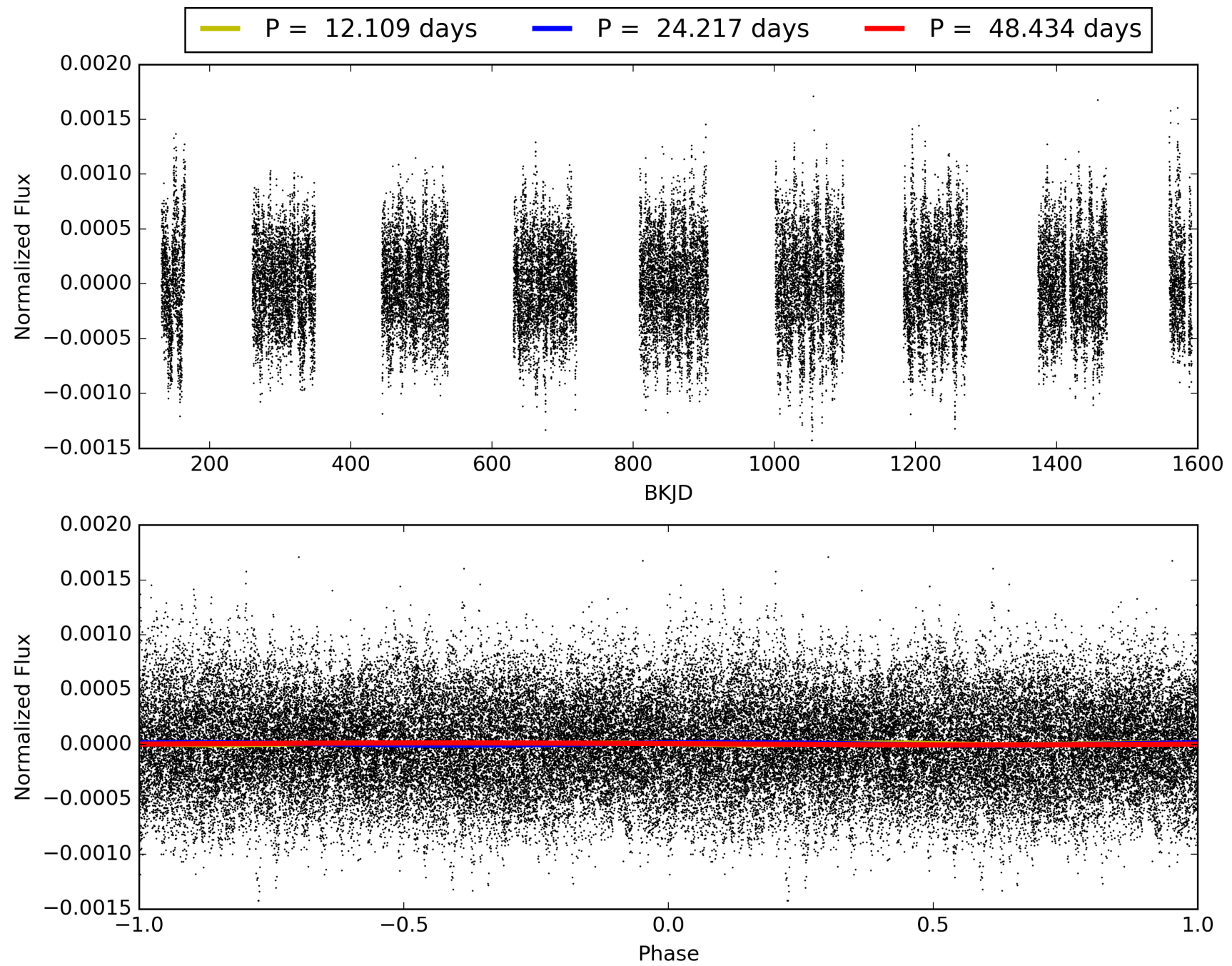
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 19:30:25 Z

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

TCE 008690471-04, PDC Light Curves

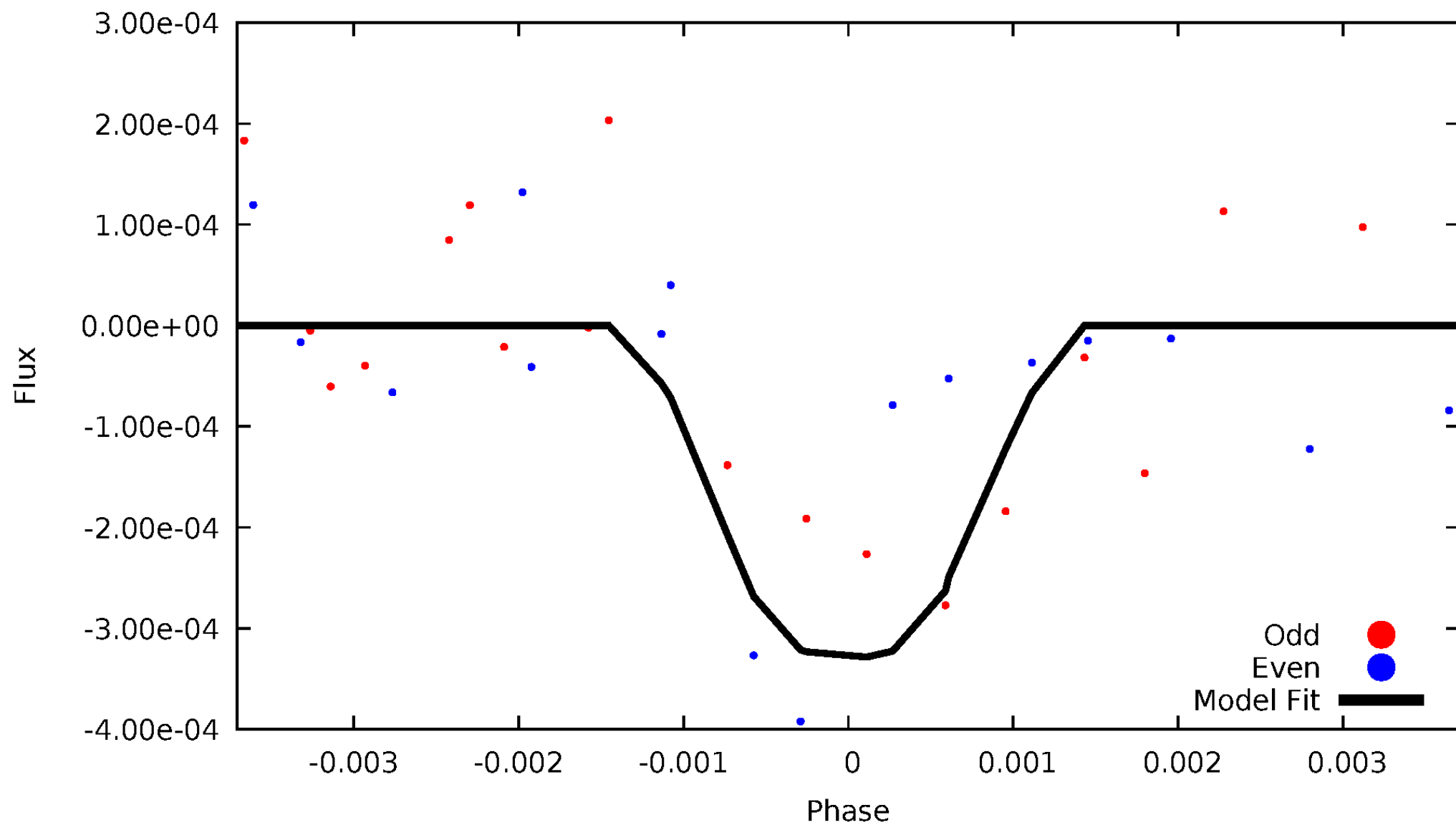


TCE 008690471-04



DV Odd/Even

TCE 008690471-04

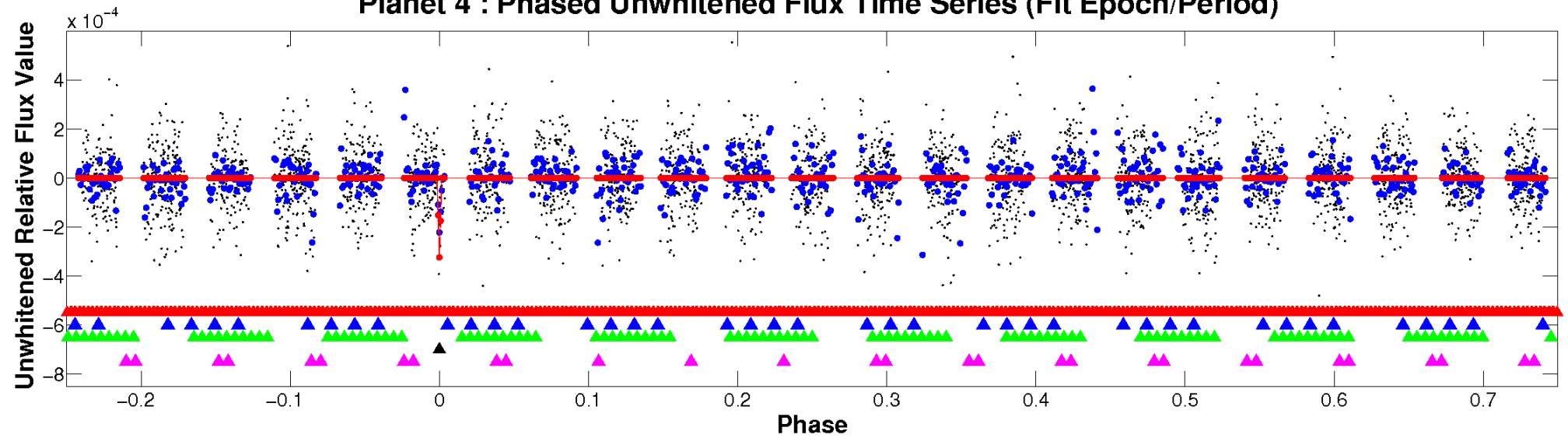


ALT Odd/Even

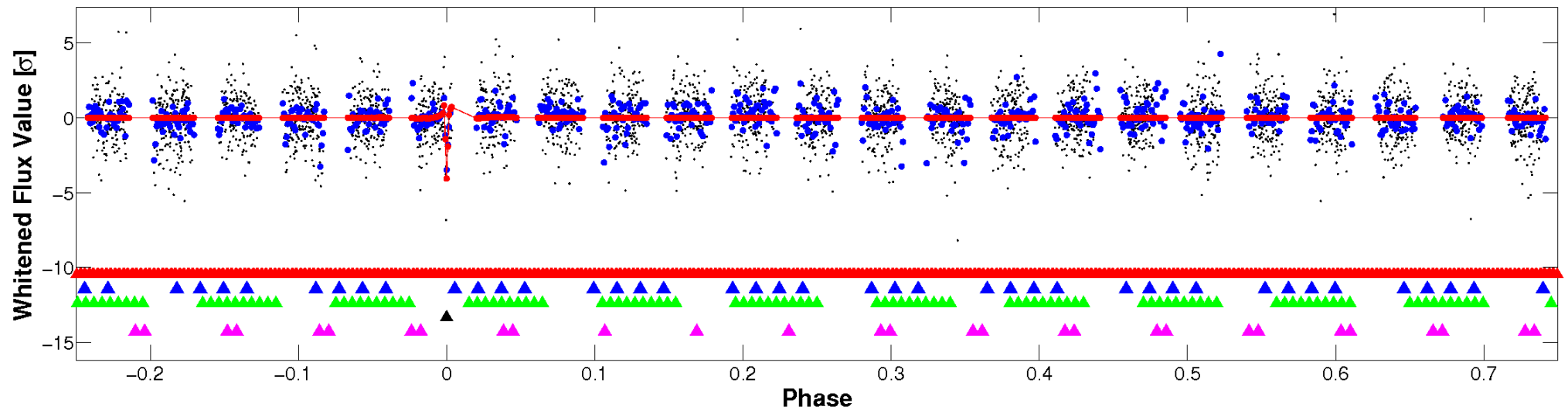
This plot does not exist for this TCE.

Non-Whitened Vs. Whitened Light Curve

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

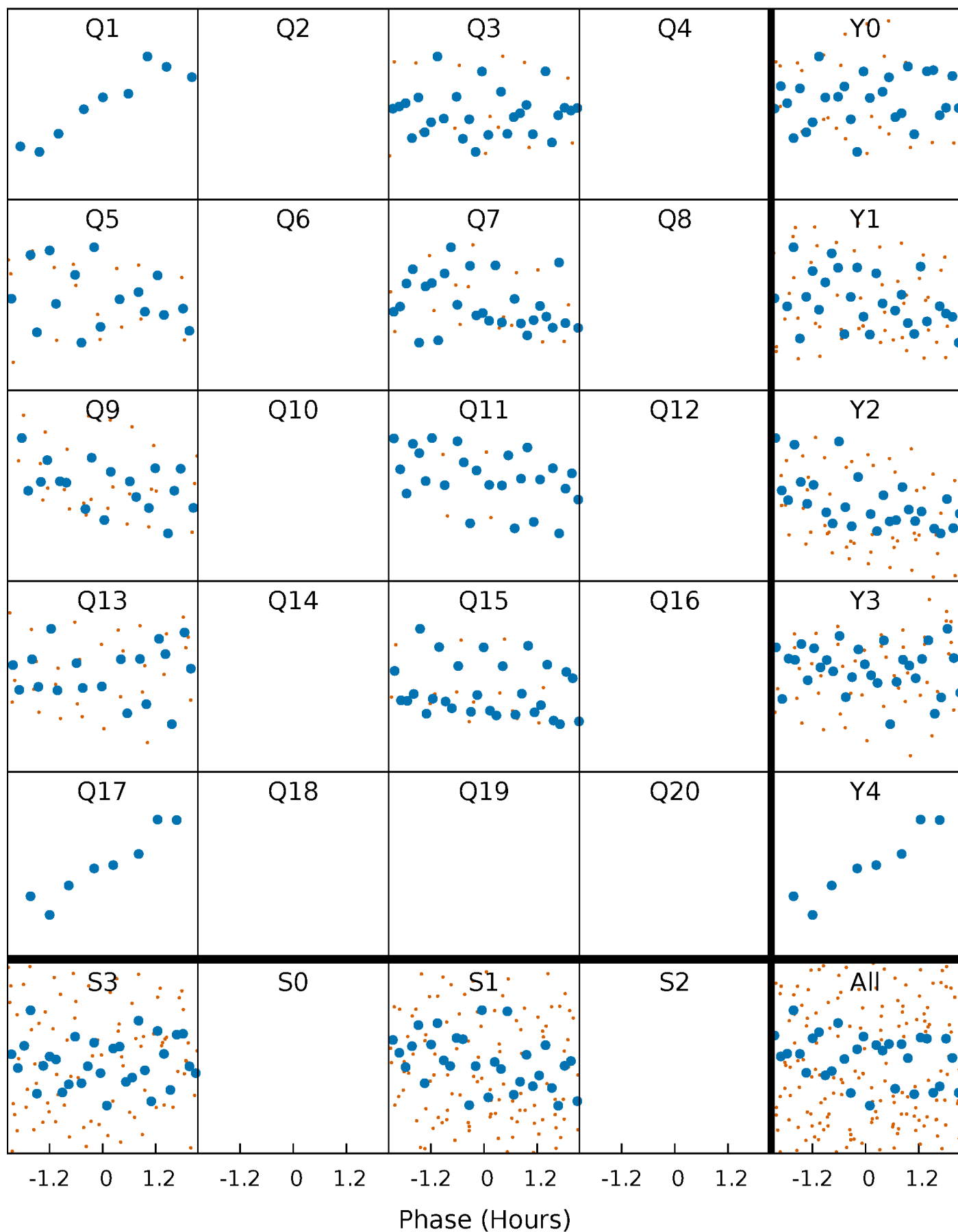


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



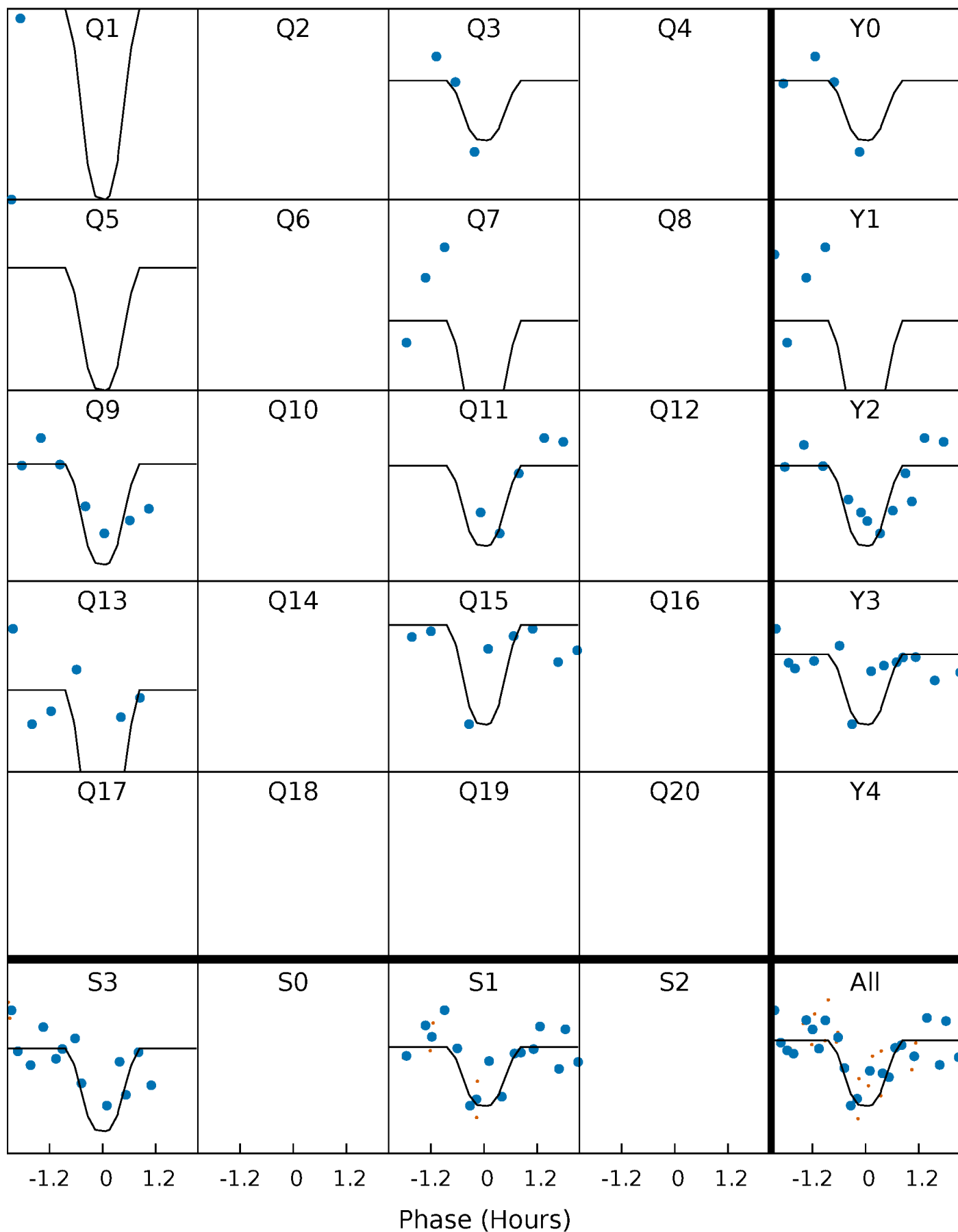
PDC Quarter-Phased Transit Curves

TCE 008690471-04 $P = 24.217075$ Days $T_0 = 151.536611$ (BKJD)



DV Quarter-Phased Transit Curves

TCE 008690471-04 P= 24.217075 Days $T_0=151.536611$ (BKJD)

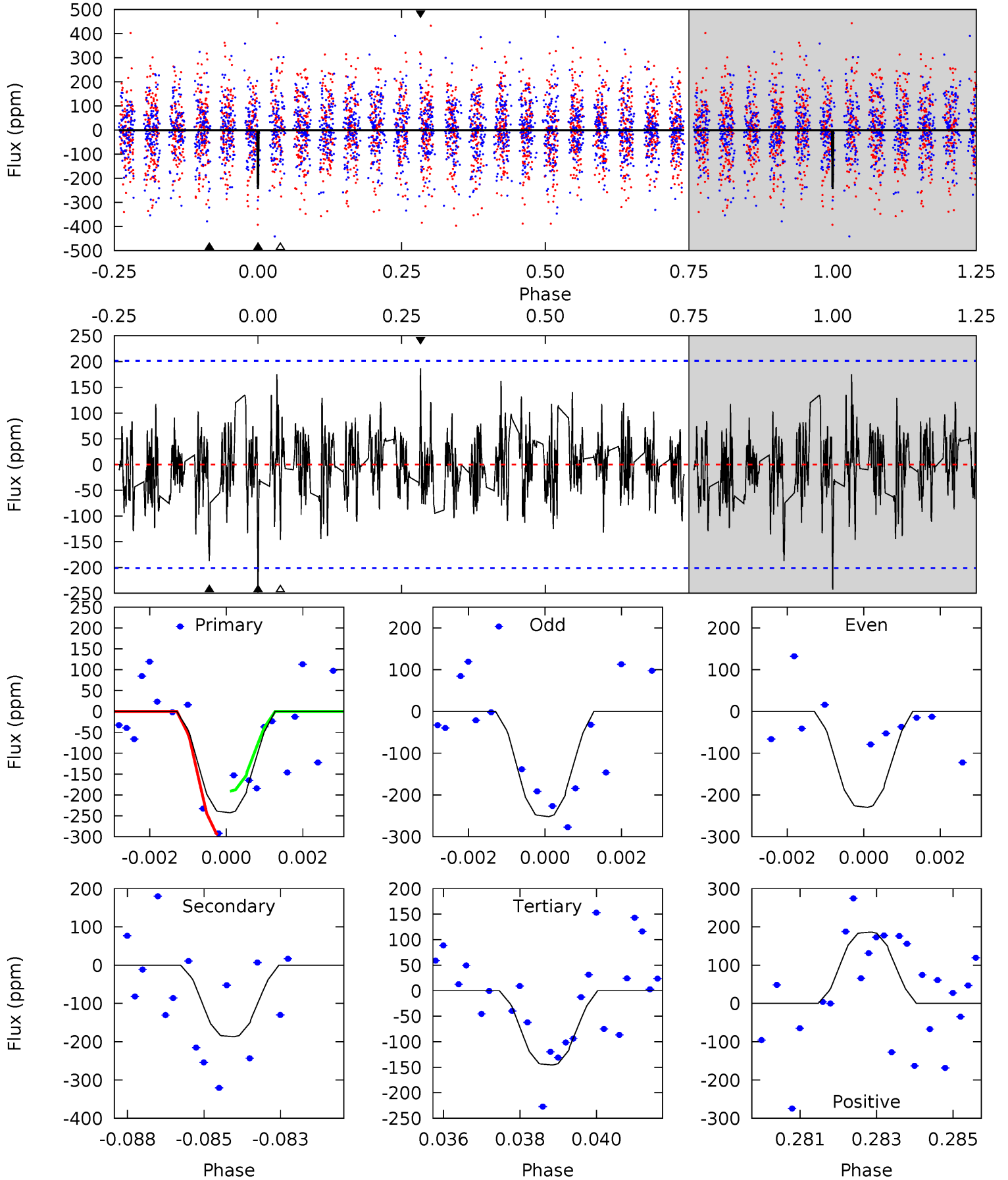


This plot does not exist for this TCE.

DV Model-Shift Uniqueness Test

008690471-04, P = 24.217075 Days, E = 127.319536 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 6.41 | 4.94 | 3.84 | 4.93 | 5.31 | 3.06 | 1.29 | 2.56 | 1.48 | 1.09 | 0.01 | 0.29 | 0.93 | 0.43 | 1.37 |



Alt Model-Shift Uniqueness Test

This plot does not exist for this TCE.

Stellar Parameters For KIC 008690471

| | $T_{\text{eff}} (K)$ | $\log(g)$ | $[\text{Fe}/\text{H}]$ | $R (R_{\odot})$ | $M (M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 6593^{+181}_{-250} | $4.074^{+0.252}_{-0.168}$ | $-0.140^{+0.250}_{-0.300}$ | $1.762^{+0.530}_{-0.583}$ | $1.350^{+0.182}_{-0.296}$ | $0.347^{+0.557}_{-0.163}$ |
| | +3%/-4% | +6%/-4% | +179%/-214% | +30%/-33% | +13%/-22% | +160%/-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 008690471-04 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{max} (K)$ | $T_{obs} (K)$ | A_{obs} |
|---------|---------------|------------------------|---------------------|------------------------|----------------------|
| DV | -187 ± 38 | $4.24^{+3.45}_{-2.71}$ | 1253^{+103}_{-99} | 5102^{+3402}_{-1019} | 175^{+1100}_{-120} |
| 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 $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

DV Centroid Data

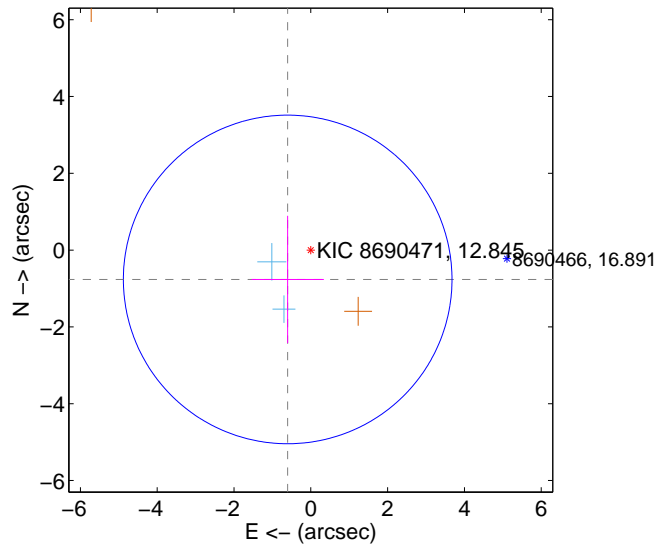
Supplemental centroid analysis for 008690471-04. Kepler magnitude: 12.85. Transit SNR 9.92

There are 2 quarters with good PRF difference image offsets

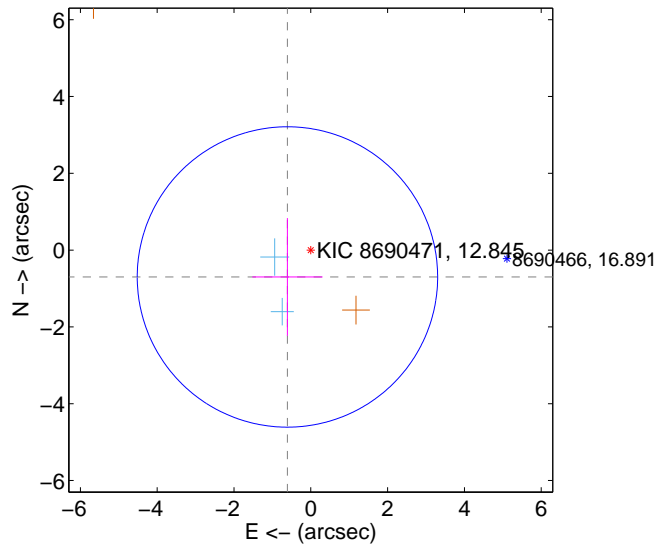
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT | 0.973 ± 1.426 | 0.68 | 0.603 ± 0.941 | -0.764 ± 1.658 |
| PRF-fit source offset from KIC position | 0.928 ± 1.304 | 0.71 | 0.609 ± 0.915 | -0.700 ± 1.534 |
| photometric centroid source offset | 0.44 ± 0.60 | 0.74 | -0.20 ± 0.61 | -0.39 ± 0.59 |

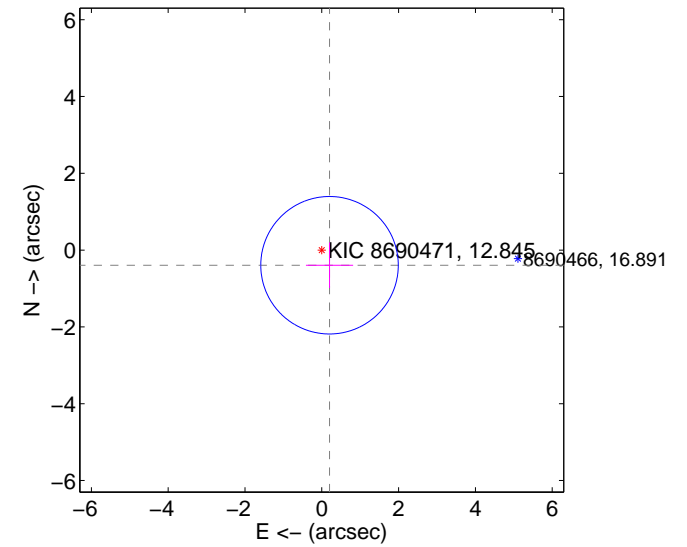
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

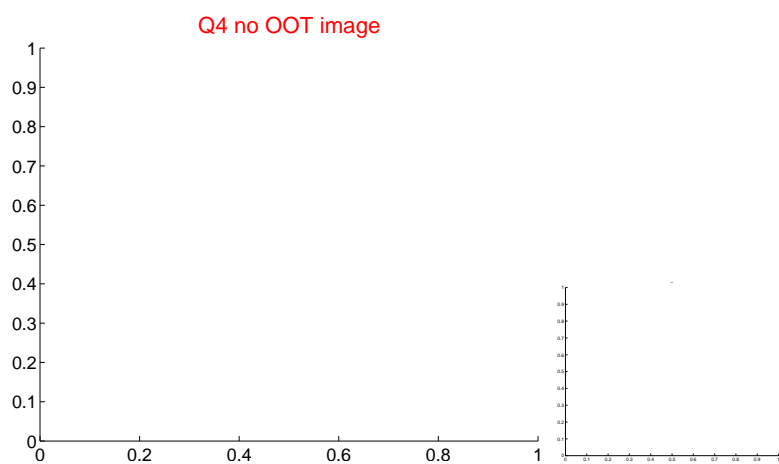
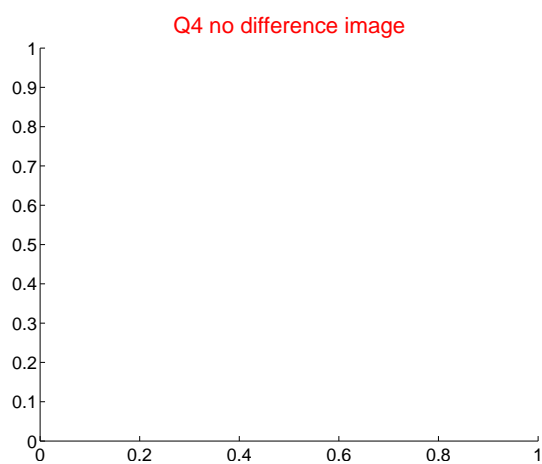
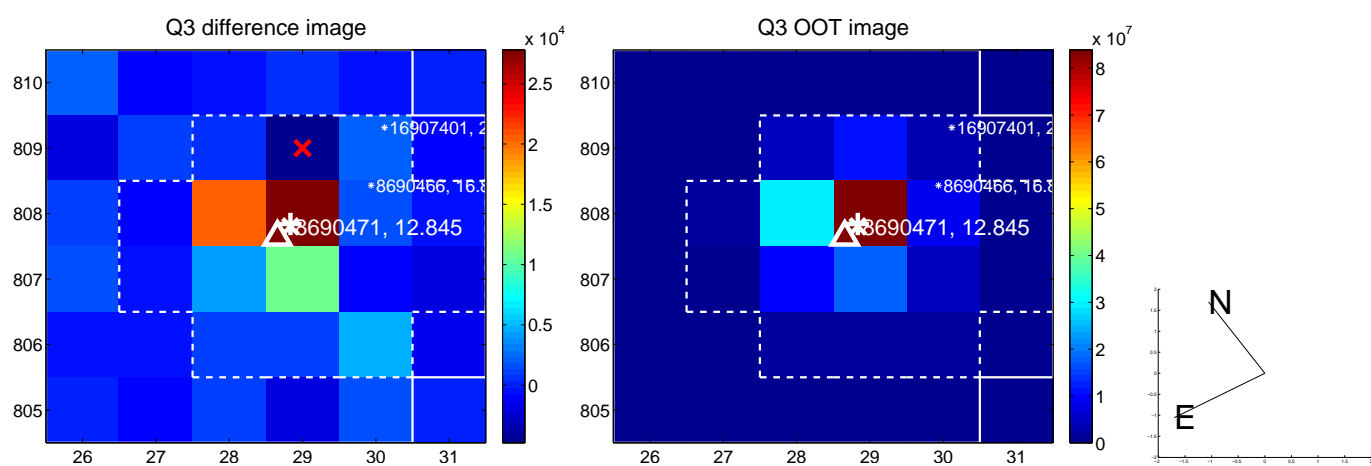
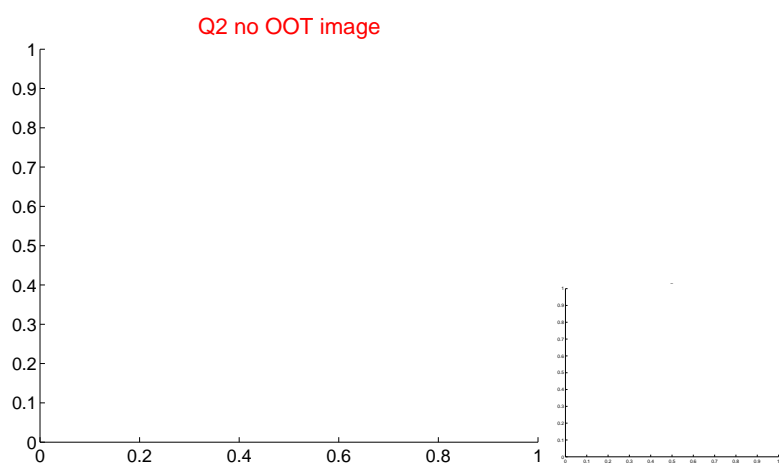
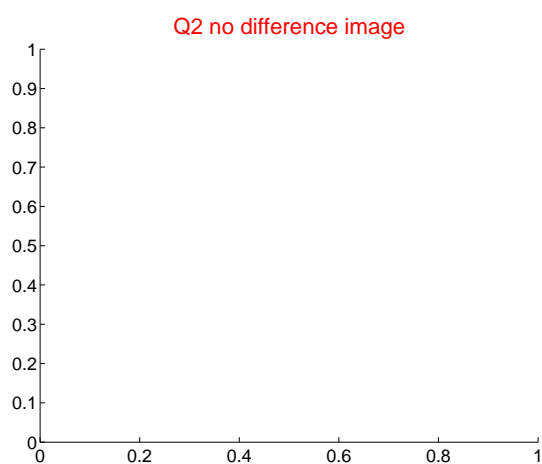
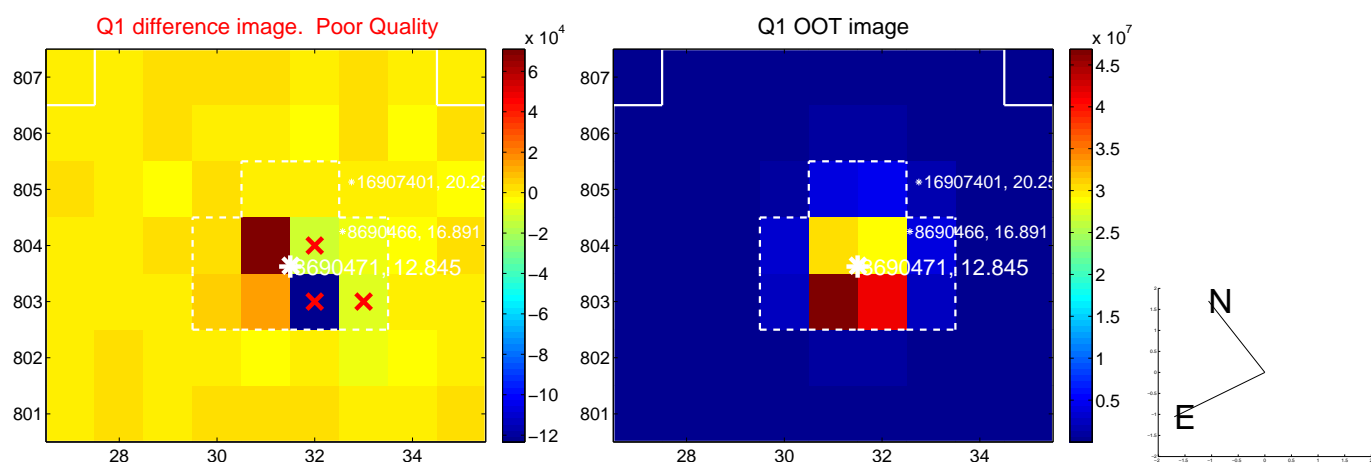


offset from photometric centroids

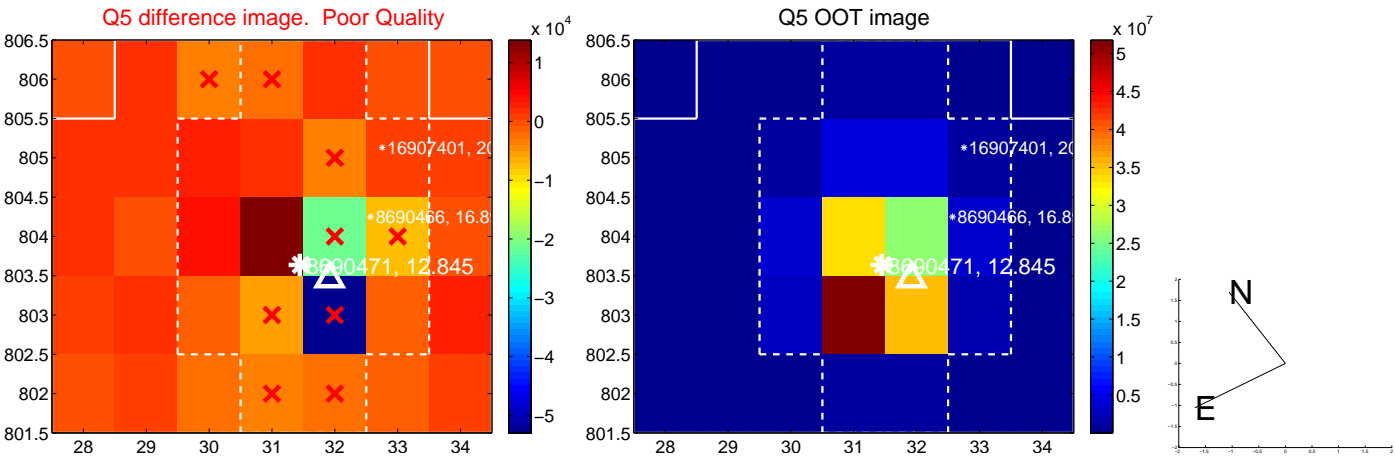


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

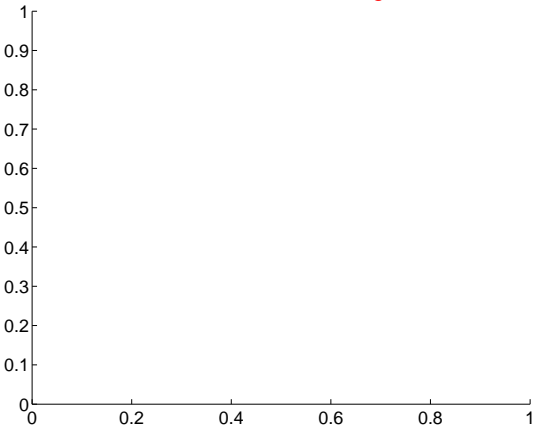
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



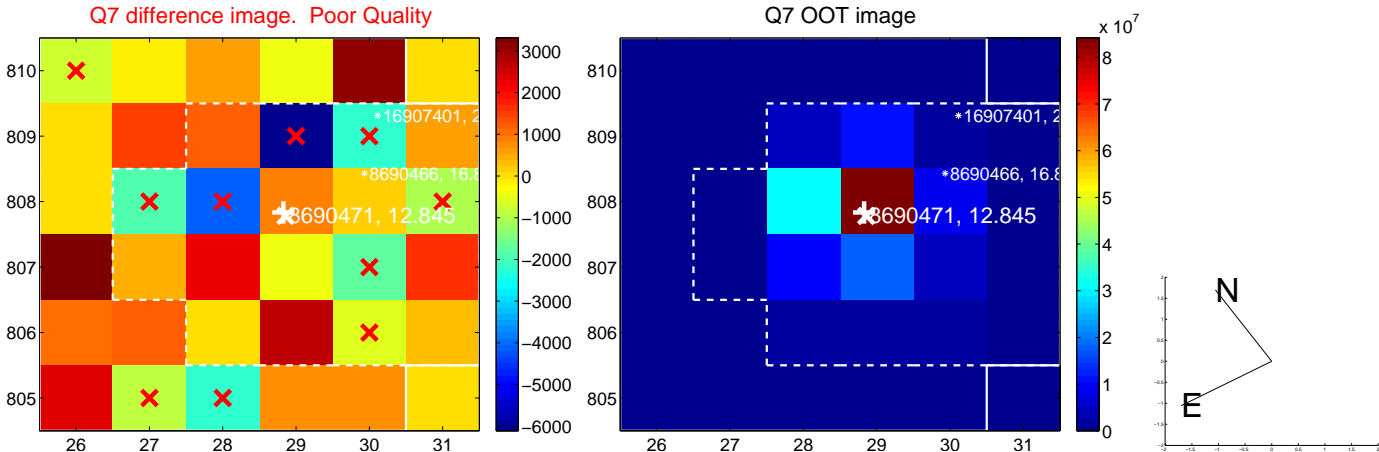
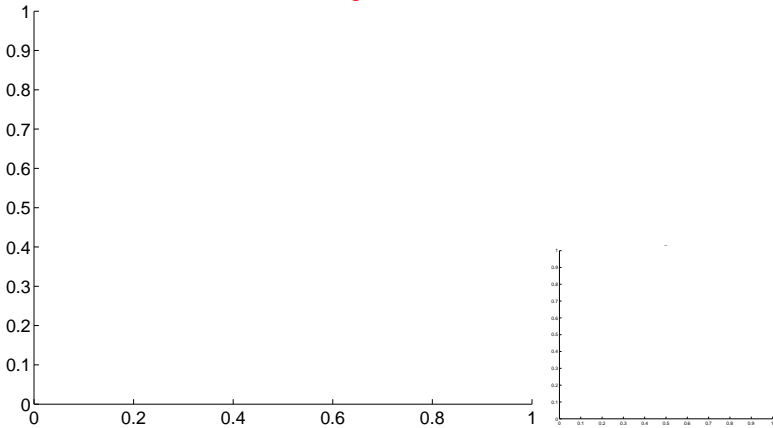
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



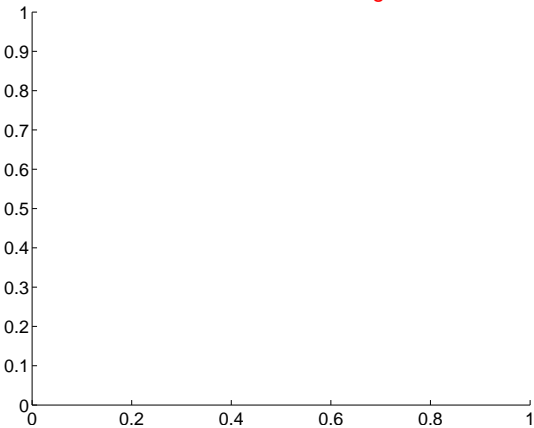
Q6 no difference image



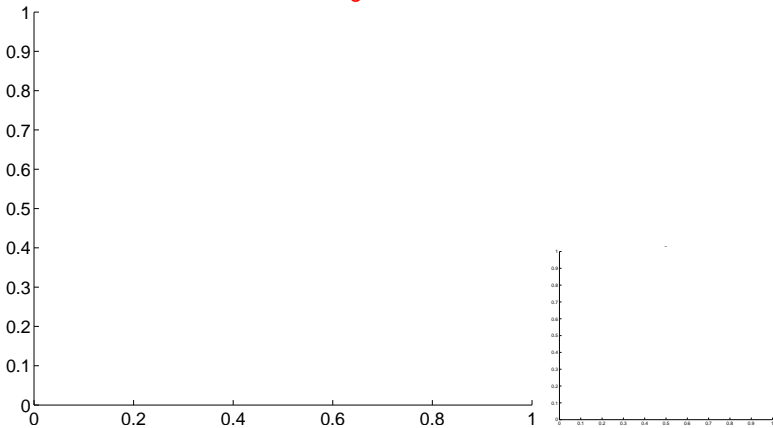
Q6 no OOT image



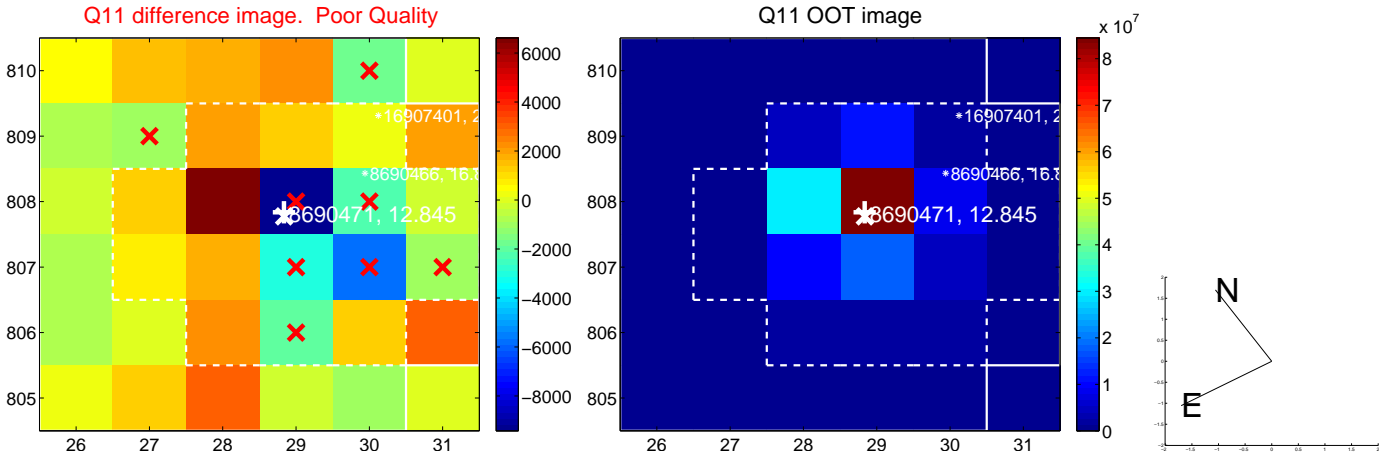
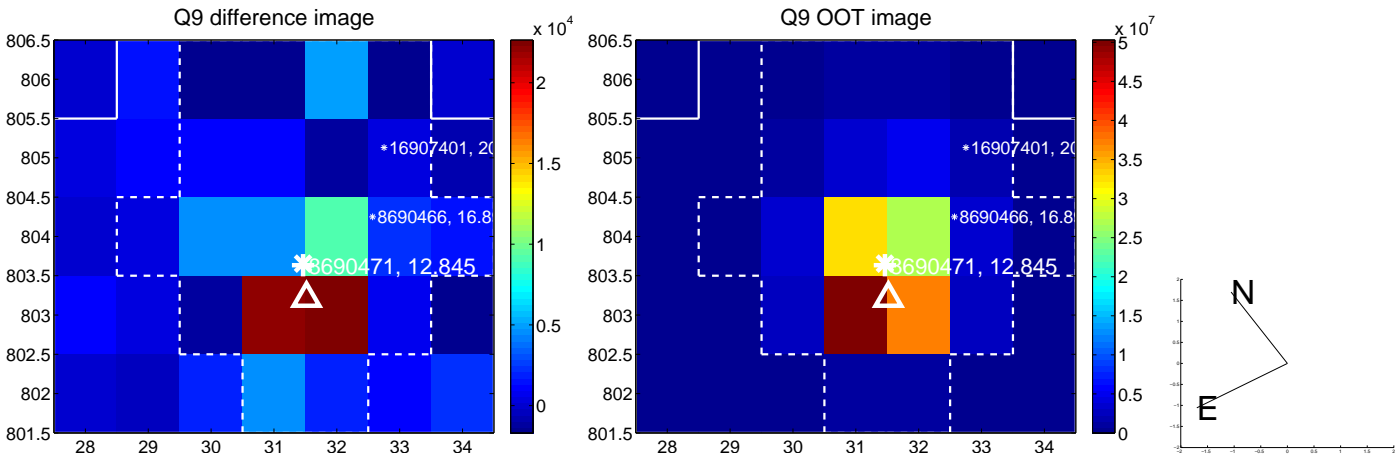
Q8 no difference image



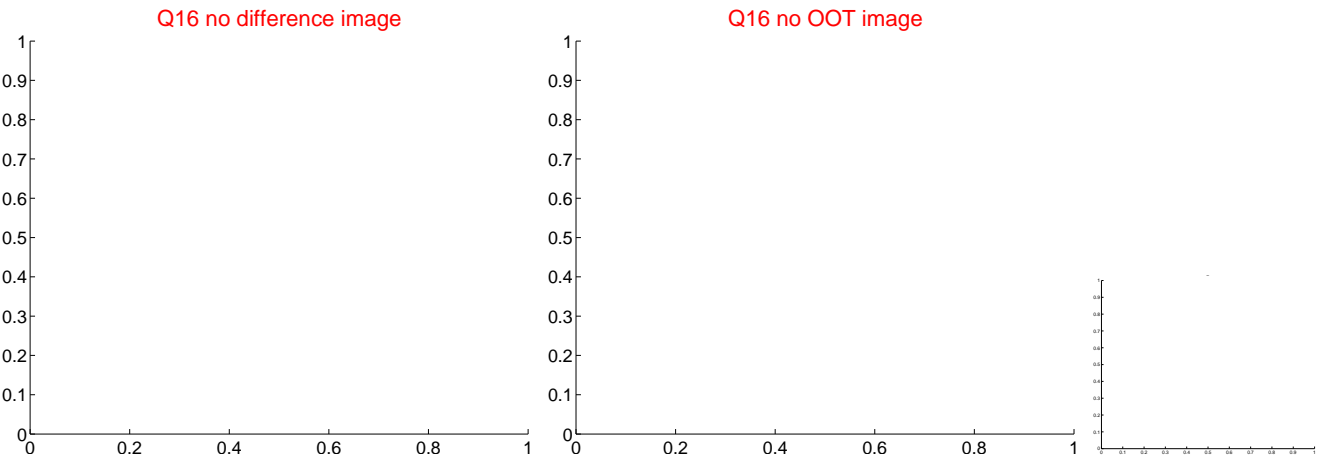
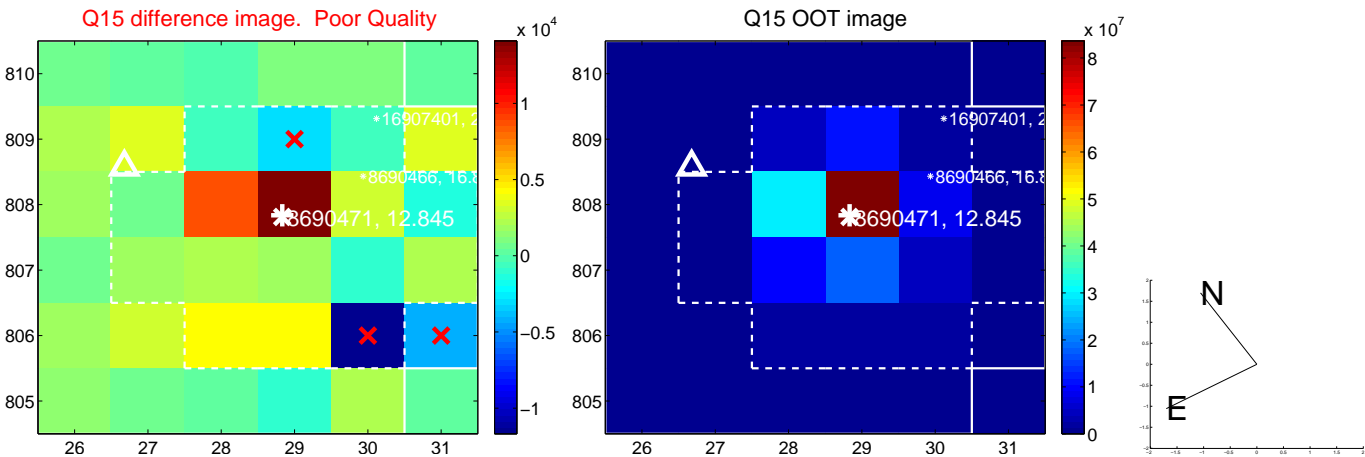
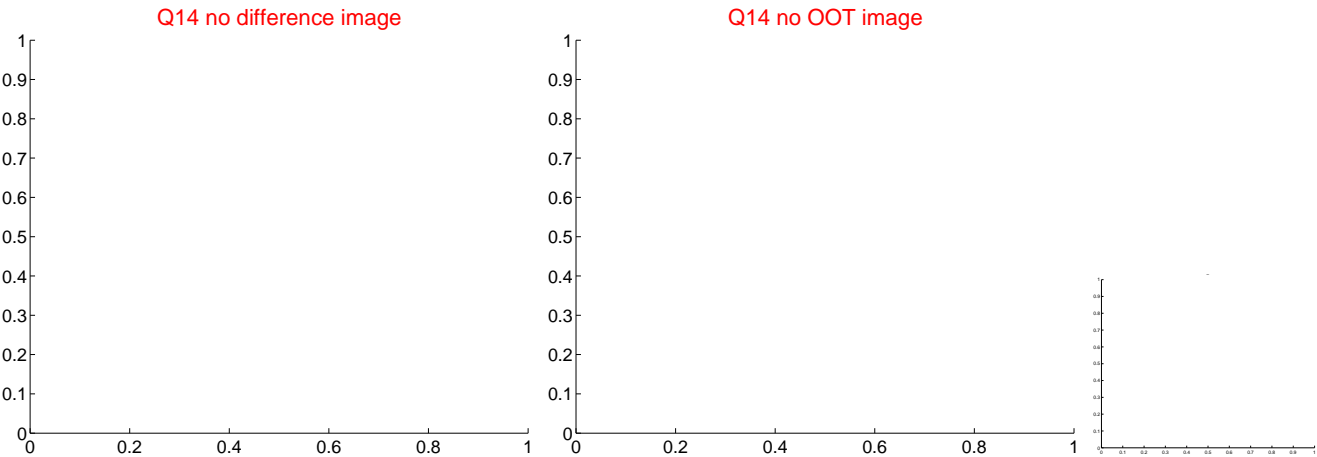
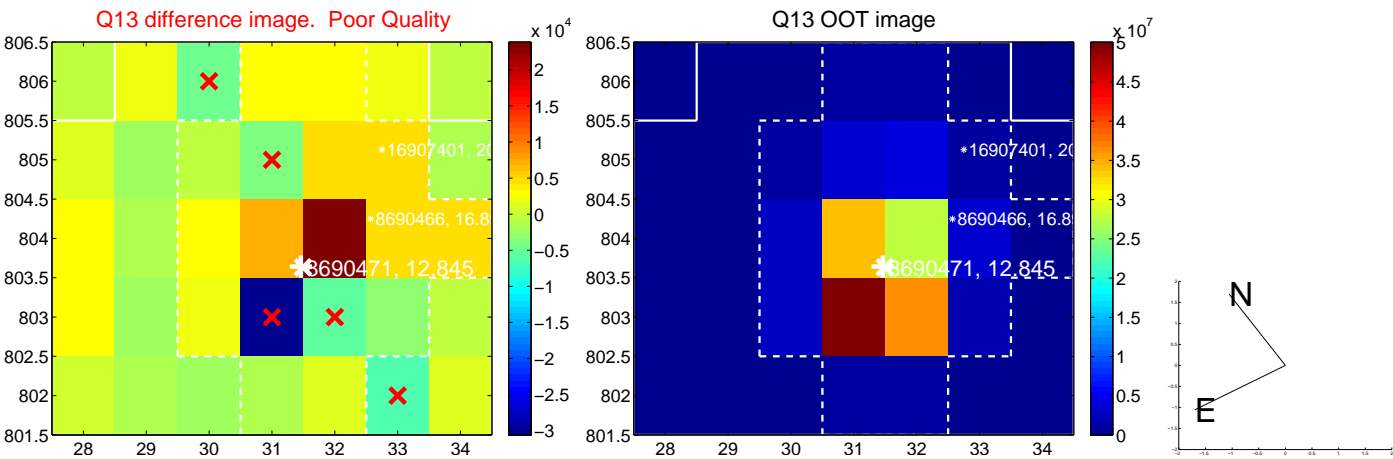
Q8 no OOT image



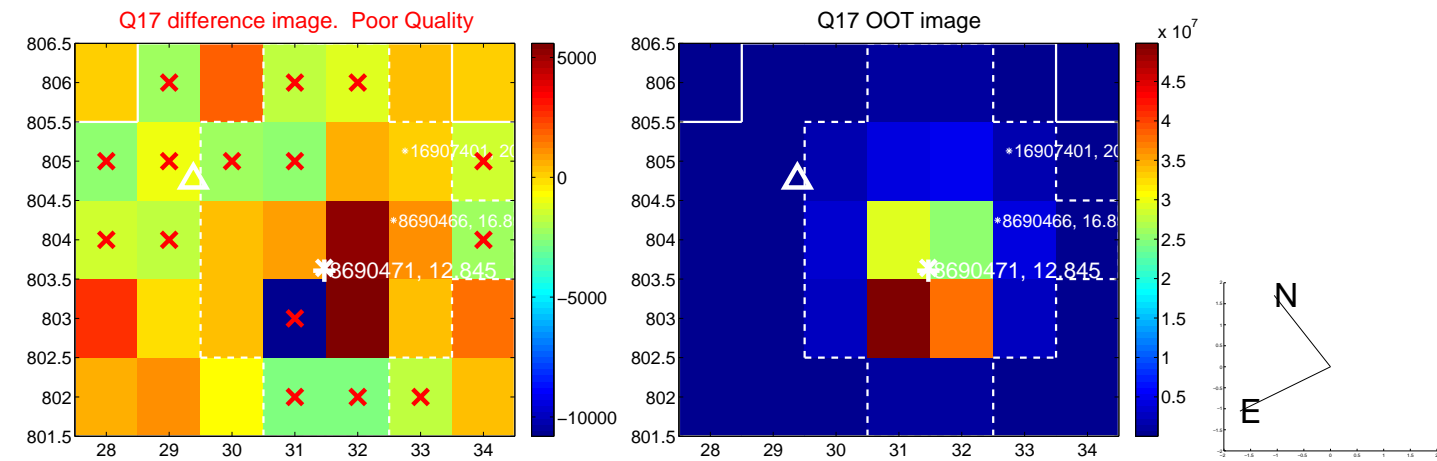
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



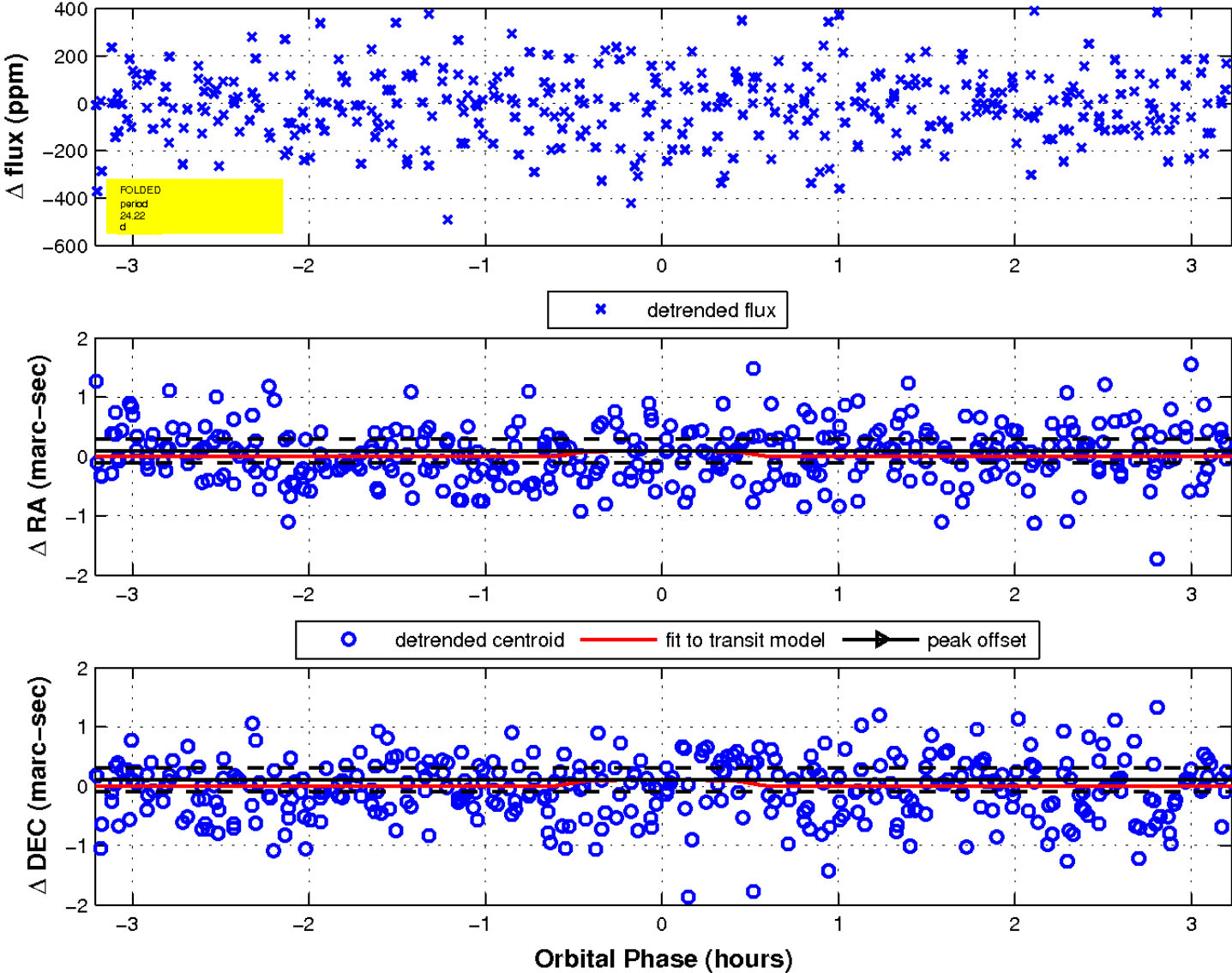
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

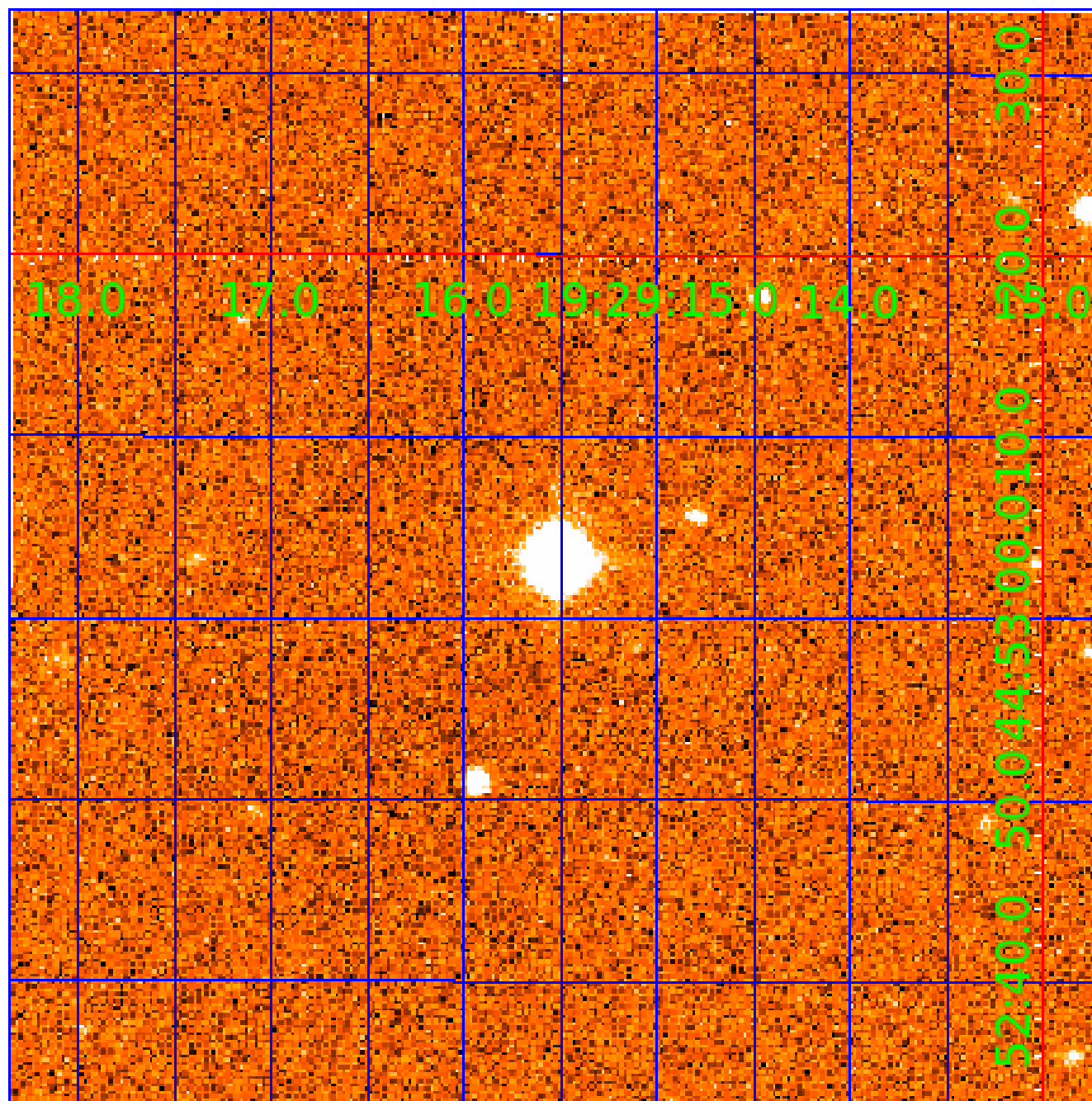


fluxWeightedCentroids, Planet 4 of 5



UKIRT Image

Declination



KIC 008690471

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|-----|-----------------------------|-----------------|------------------------|------------------------|
| 008690471-01 | OBS | No | 1.059029 | 131.803182 | 17.2 | 7.205 | 7.2 | 5.0 | 1.76 | 6593 | 0.74 | 10439.67 |
| 008690471-03 | OBS | No | 13.197211 | 133.373569 | 96.5 | 10.827 | 11.6 | 5.1 | 1.76 | 6593 | 1.93 | 361.34 |
| 008690471-04 | OBS | No | 24.217075 | 151.536611 | 329.6 | 1.077 | 9.6 | 9.9 | 1.76 | 6593 | 3.30 | 160.84 |
| 008690471-05 | OBS | No | 49.938268 | 158.785913 | 330.7 | 5.229 | 8.4 | 8.9 | 1.76 | 6593 | 3.73 | 61.28 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 008690471-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—MOD_NONUNIQ_ALT |
| 008690471-03 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS |
| 008690471-04 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—CENT_FEW_DIFFS |
| 008690471-05 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—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.

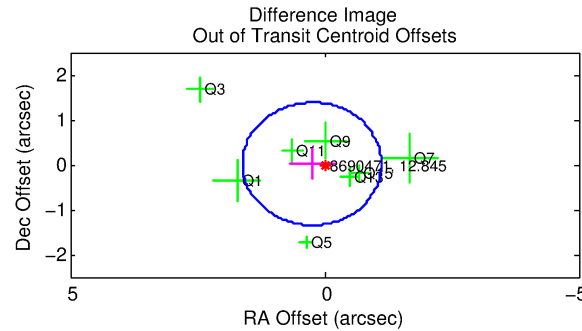
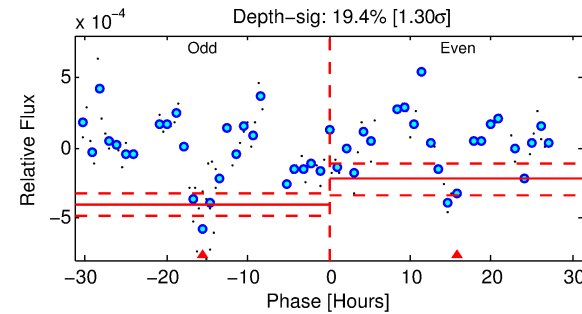
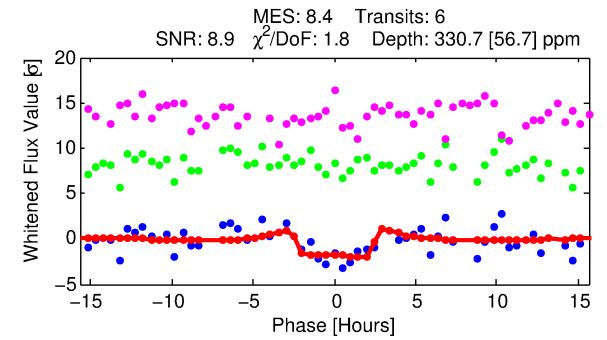
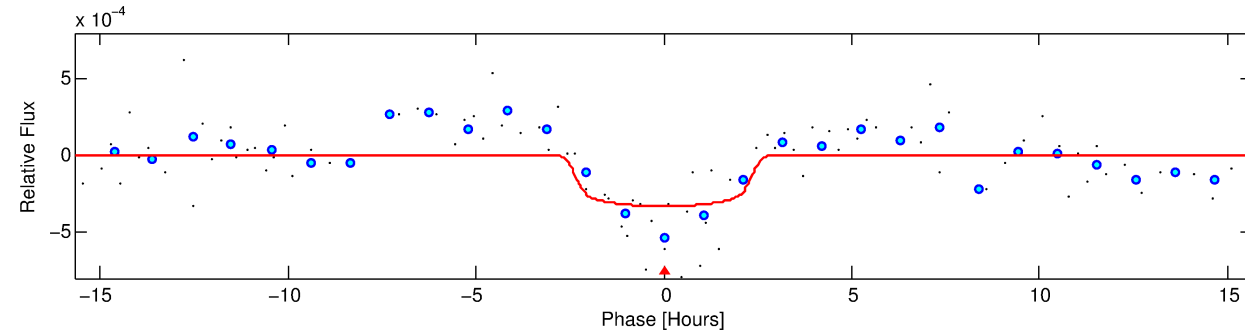
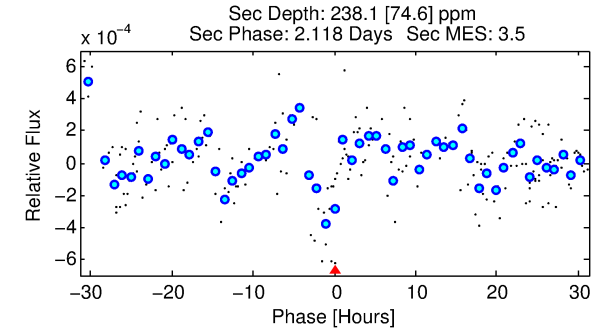
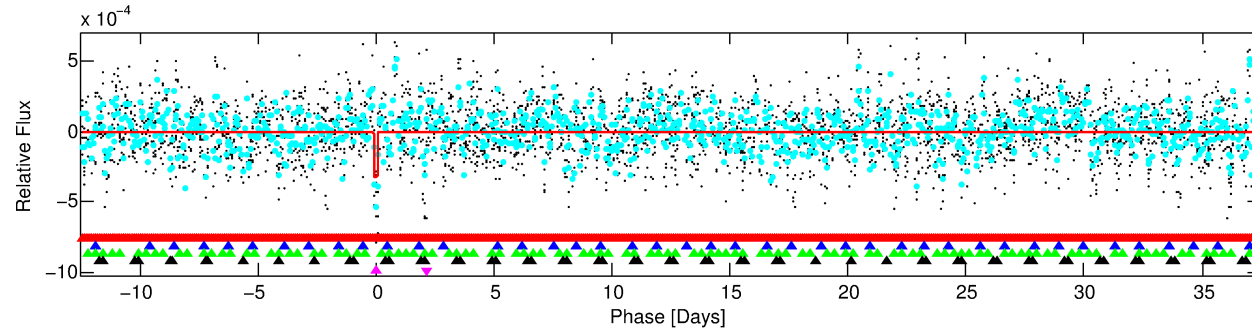
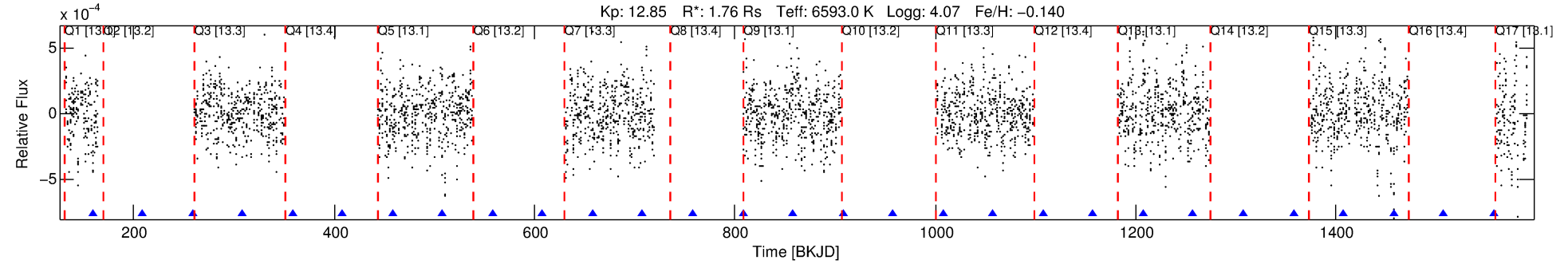
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008690471-05

No Significant Match Found

DV One-Page Summary

KIC: 8690471 Candidate: 5 of 5 Period: 49.938 d



DV Fit Results:

Period = 49.93827 [0.00085] d
Epoch = 158.7859 [0.0122] BKJD
Rp/R* = 0.0194 [0.0043]
a/R* = 35.25 [38.72]
b = 0.90 [0.24]
Seff = 61.28 [28.83]
Teq = 713 [84] K
Rp = 3.73 [1.49] Re
a = 0.2929 [0.0859] AU
Ag = 806.09 [566.59] [1.42σ]
Teffp = 5878 [830] K [6.19σ]

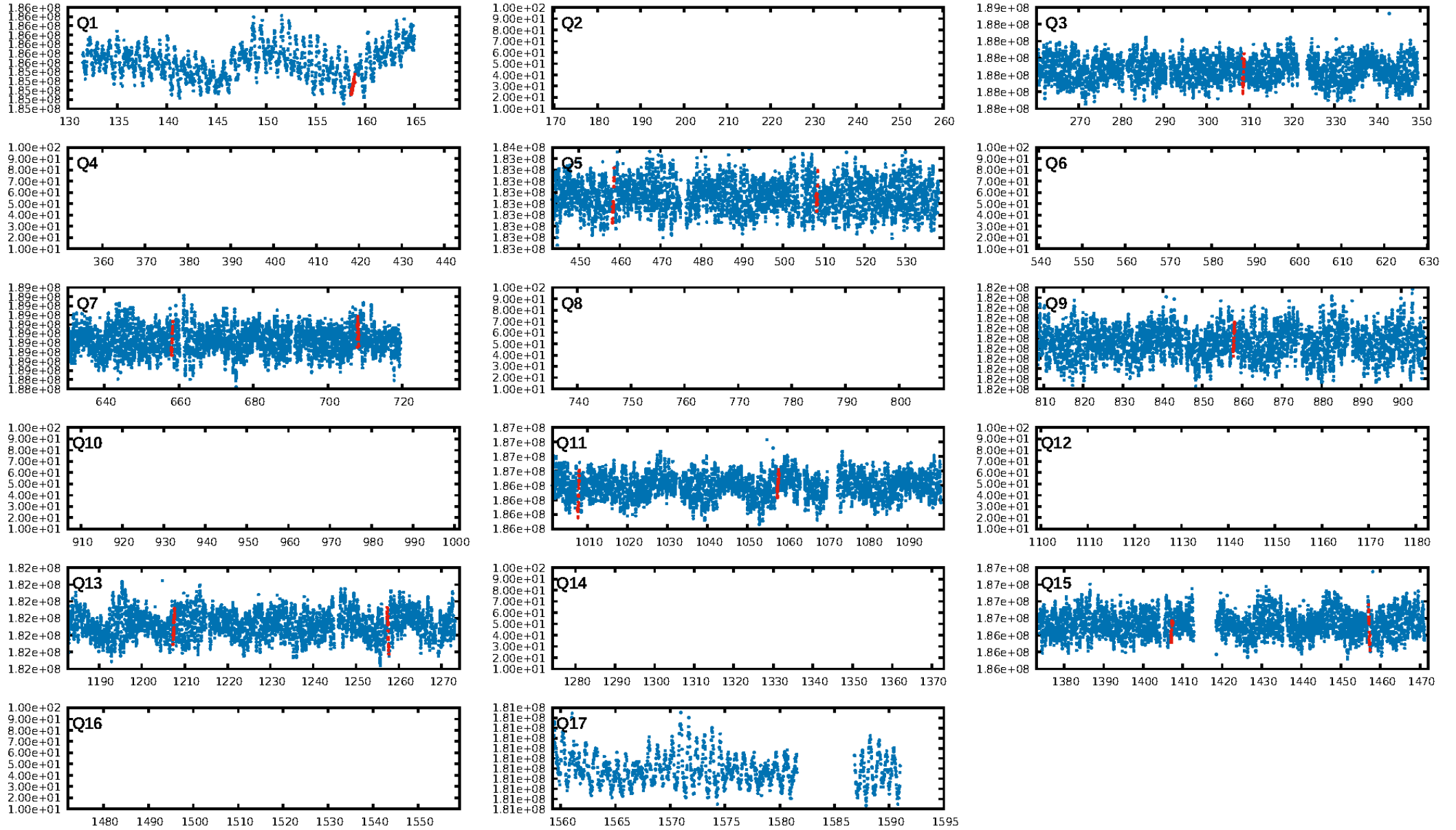
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [61.10σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 28.3%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 8.70e-09
RollingBand-fgt: 1.00 [5/5]
GhostDiagnostic-chr: -9.438
Centroid-sig: 5.8%
Centroid-so: 0.633 arcsec [1.56σ]
OotOffset-rm: 0.250 arcsec [0.55σ]
OotOffset-st: 0/4/0/4 [8]
KicOffset-rm: 0.268 arcsec [0.63σ]
KicOffset-st: 0/4/0/4 [8]
DiffImageQuality-fgm: 0.75 [6/8]
DiffImageOverlap-fno: 0.00 [0/8]

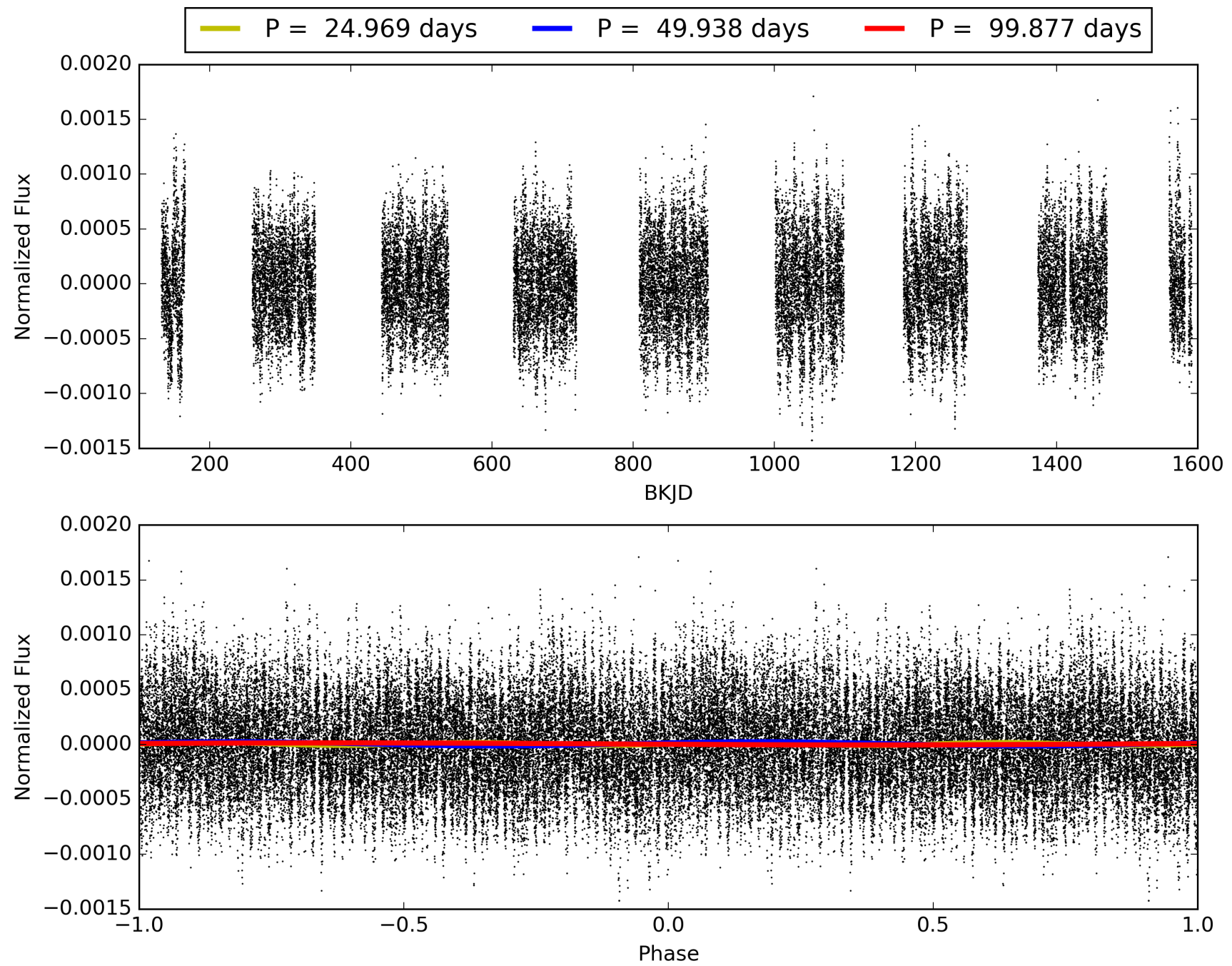
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 19:30:28 Z

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

TCE 008690471-05, PDC Light Curves

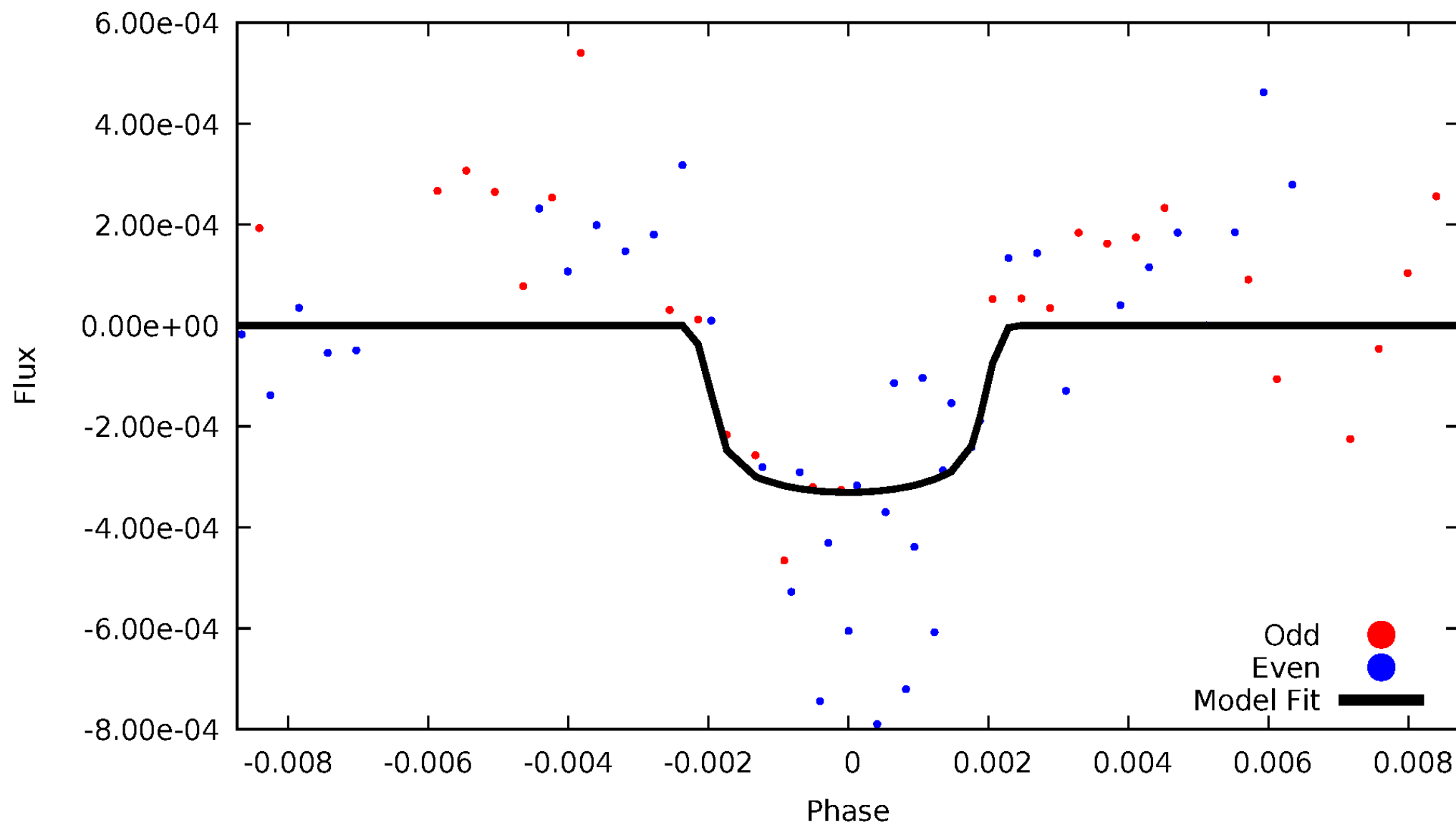


TCE 008690471-05



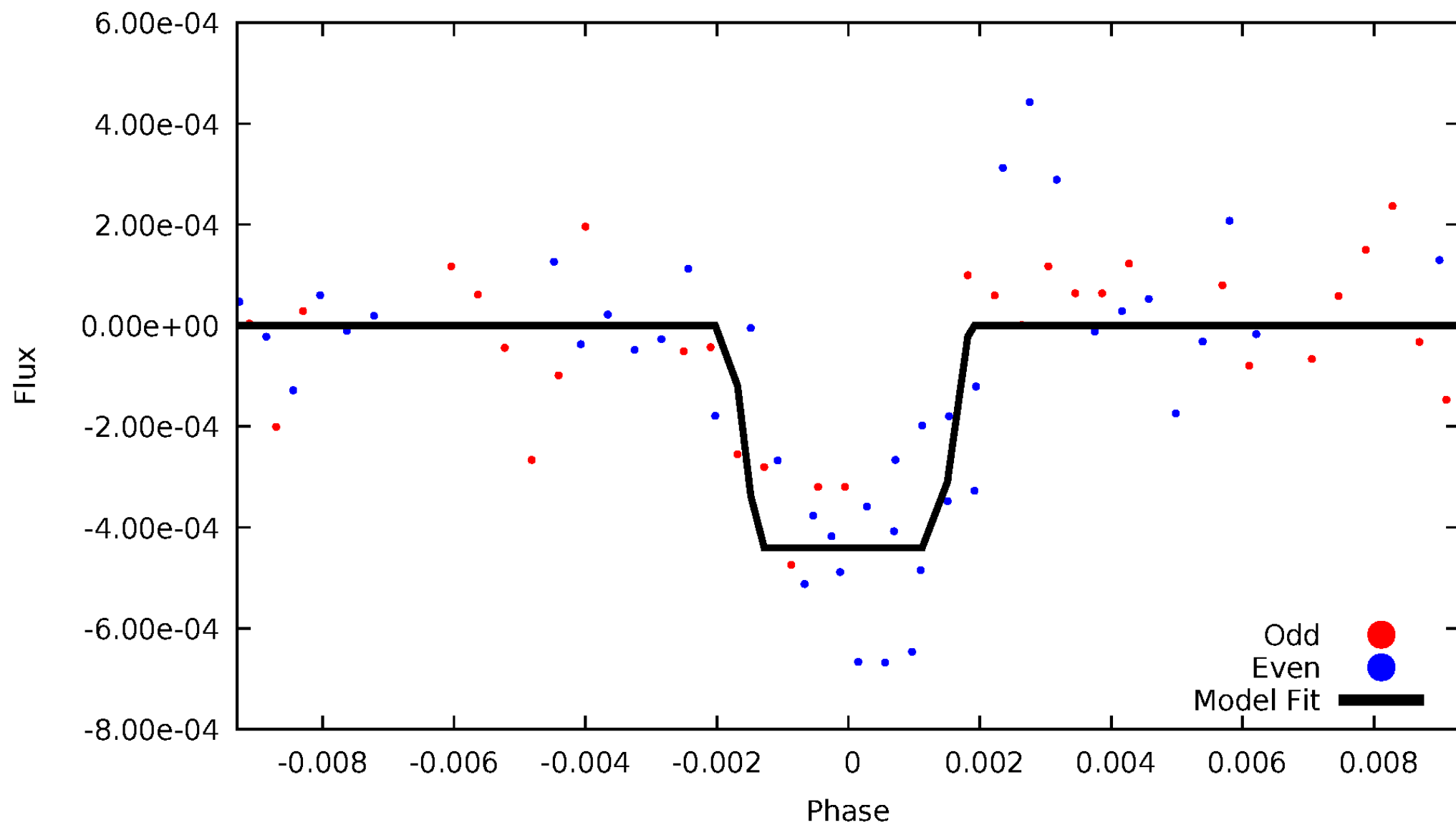
DV Odd/Even

TCE 008690471-05



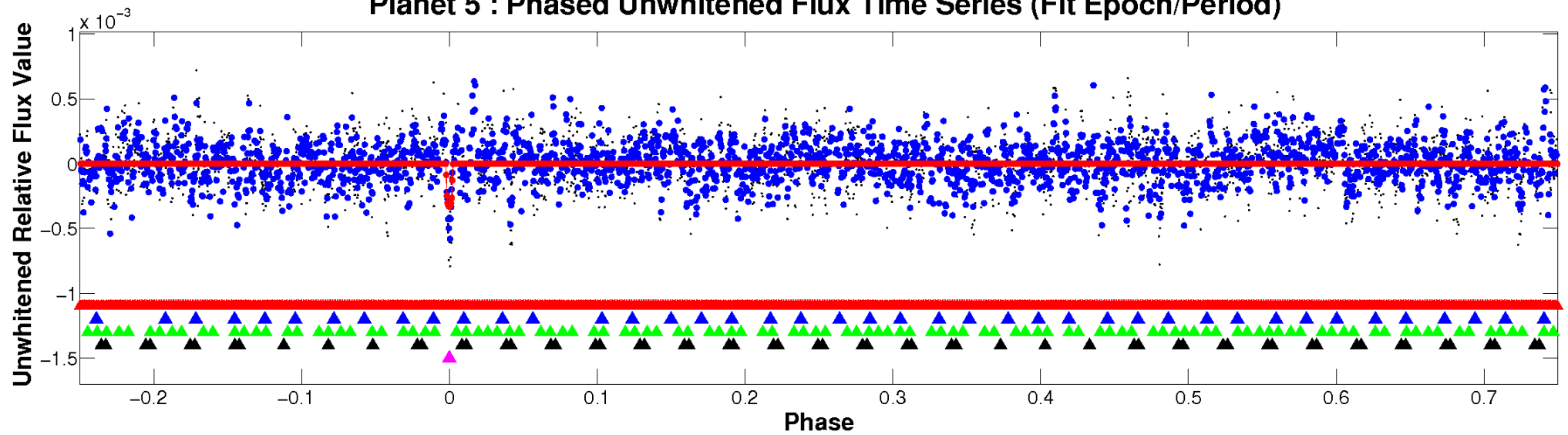
ALT Odd/Even

TCE 008690471-05

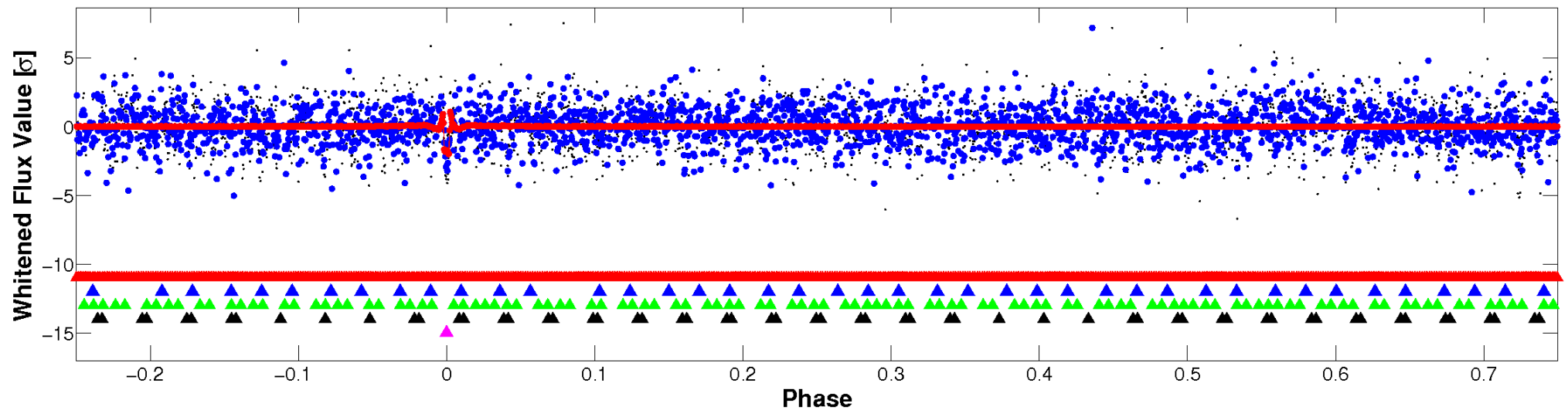


Non-Whitened Vs. Whitened Light Curve

Planet 5 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

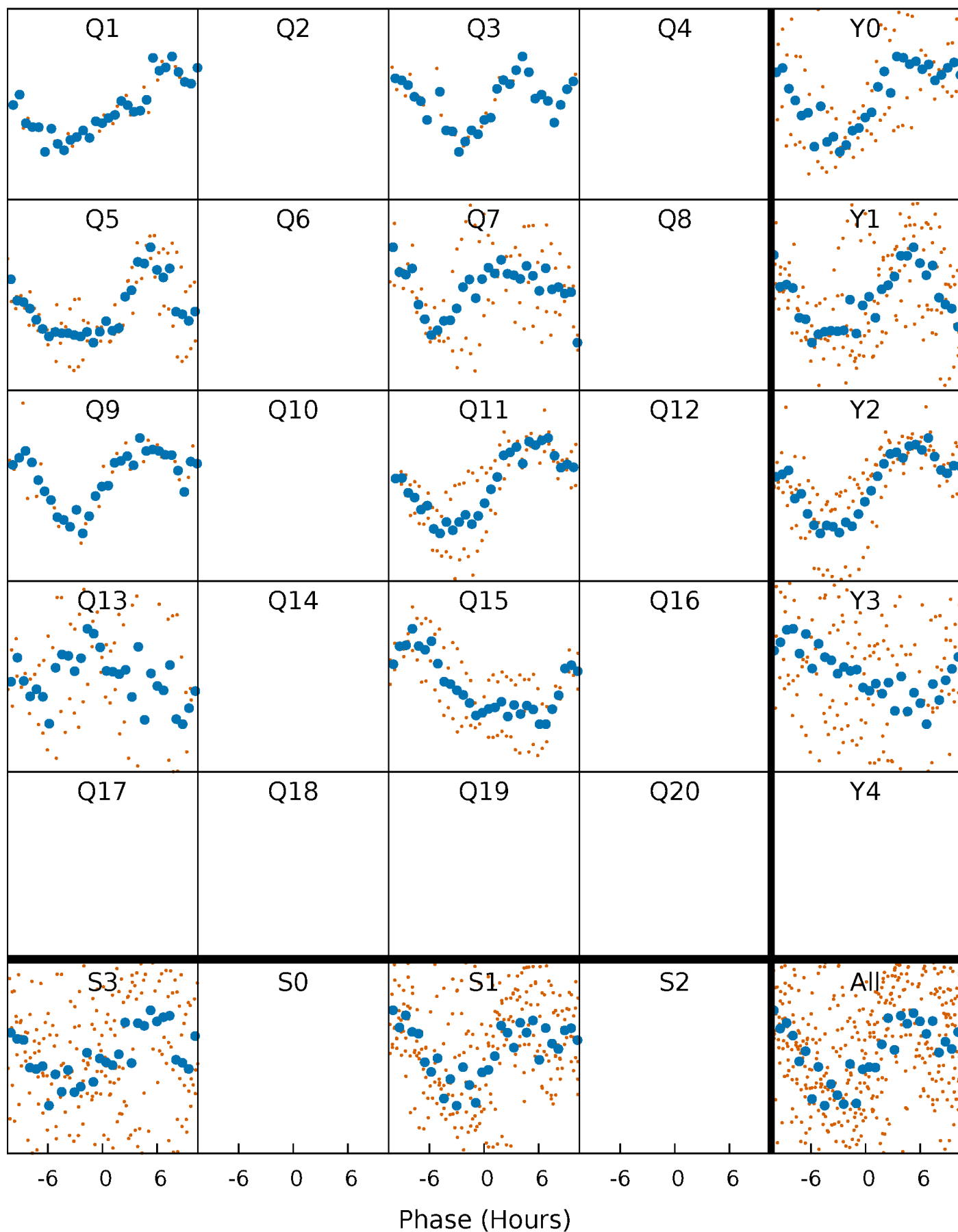


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



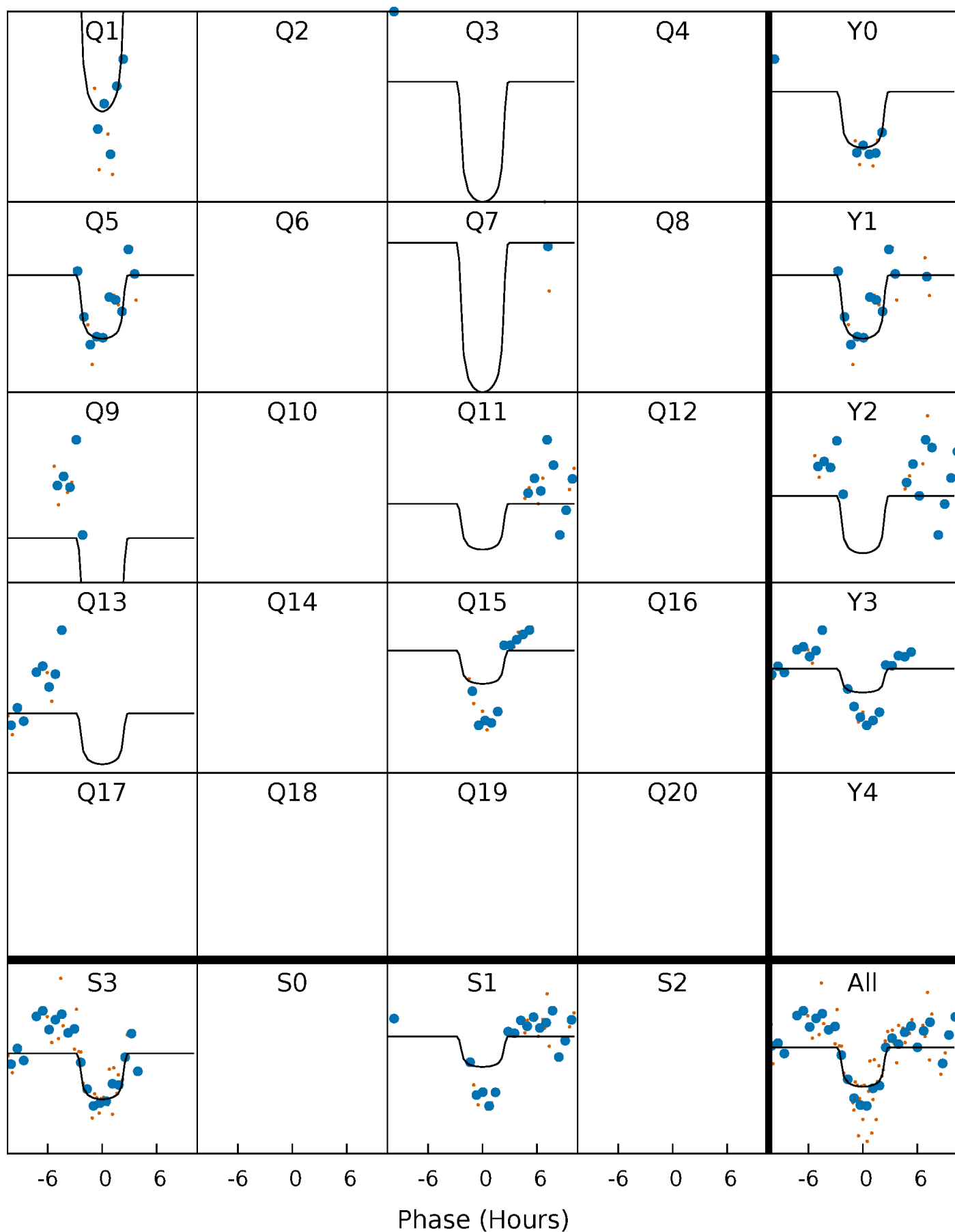
PDC Quarter-Phased Transit Curves

TCE 008690471-05 $P = 49.938268$ Days $T_0 = 158.785913$ (BKJD)



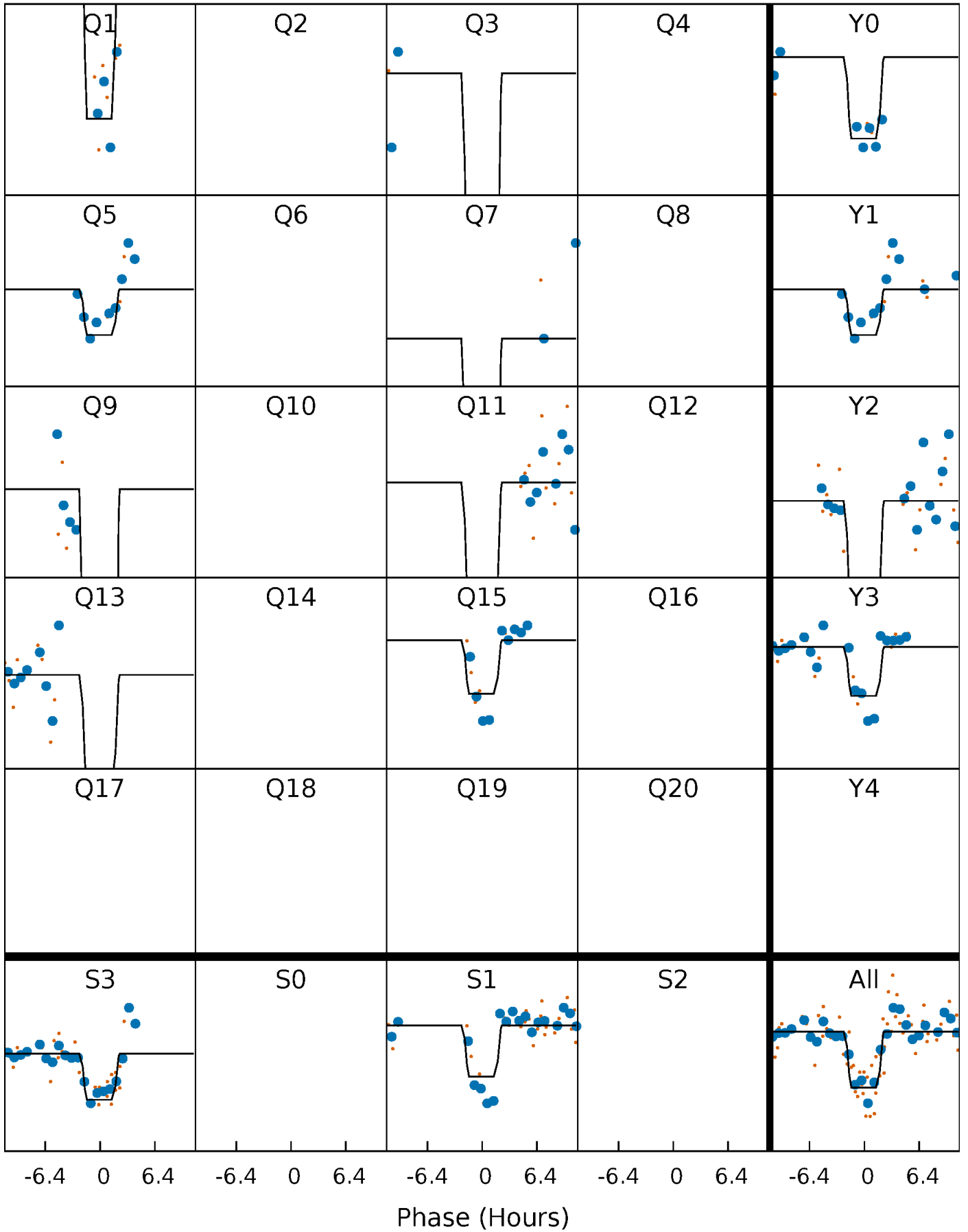
DV Quarter-Phased Transit Curves

TCE 008690471-05 $P = 49.938268$ Days $T_0 = 158.785913$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

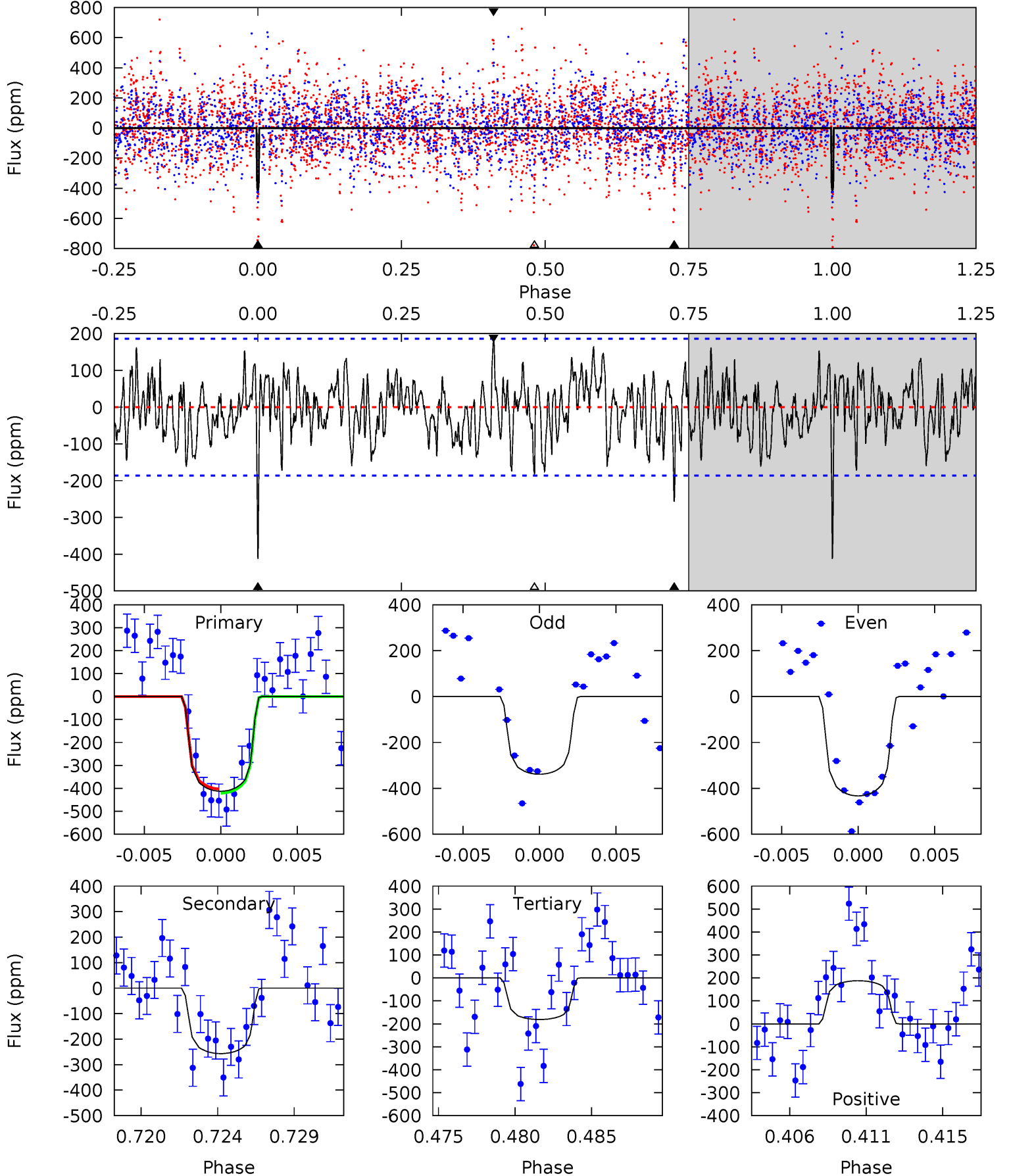
TCE 008690471-05 $P = 49.939077$ Days $T_0 = 158.777898$ (BKJD)



DV Model-Shift Uniqueness Test

008690471-05, P = 49.938268 Days, E = 108.847645 Days

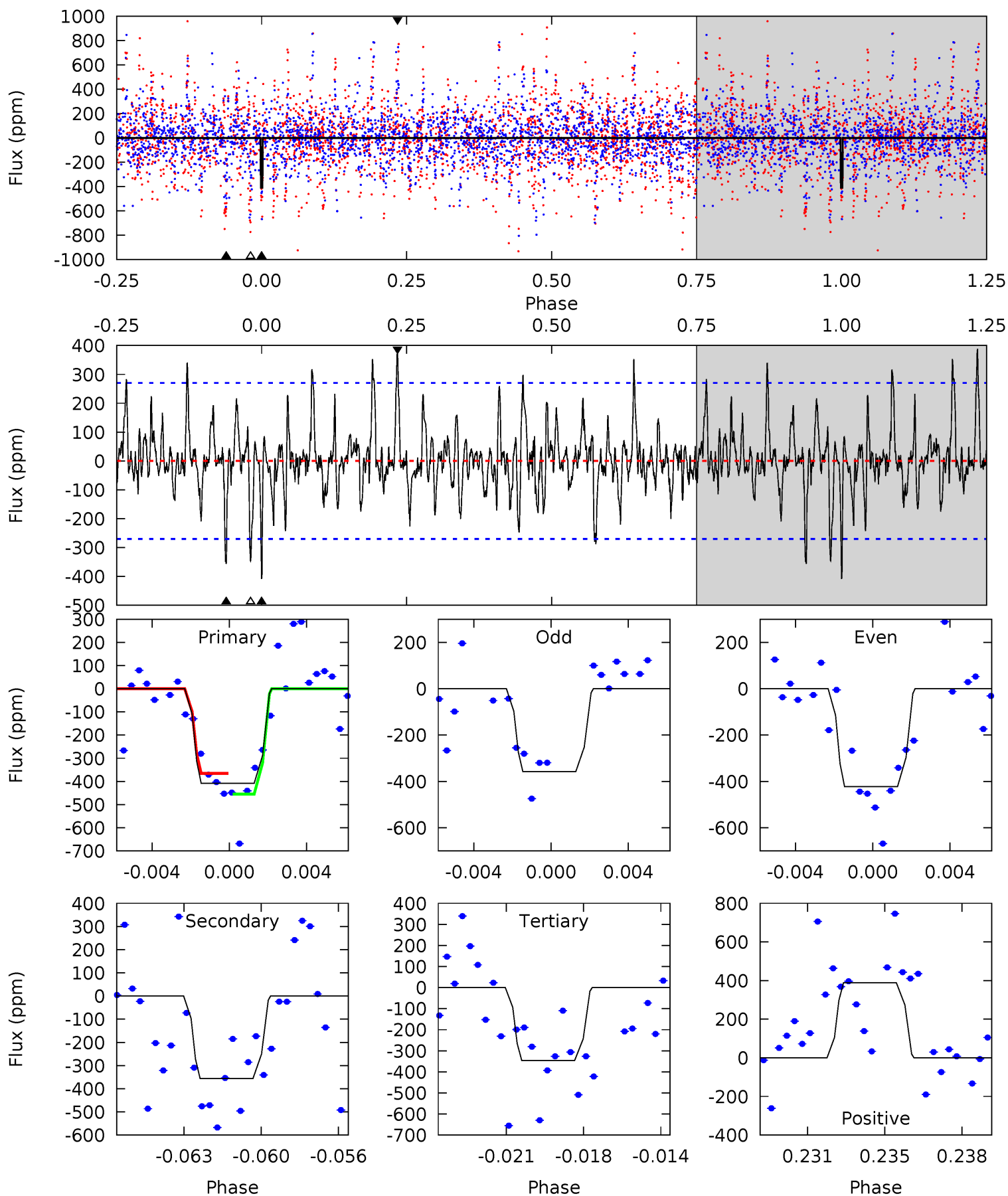
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 11.5 | 7.14 | 5.04 | 5.22 | 5.17 | 2.83 | 1.83 | 6.43 | 6.25 | 2.10 | 1.92 | 1.14 | 1.05 | 0.31 | 0.24 |



Alt Model-Shift Uniqueness Test

008690471-05, P = 49.939077 Days, E = 108.838821 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 7.89 | 6.88 | 6.69 | 7.50 | 5.22 | 2.92 | 1.88 | 1.20 | 0.39 | 0.19 | -0.62 | 0.50 | 0.96 | 0.49 | 0.86 |



Stellar Parameters For KIC 008690471

| | $T_{\text{eff}} (K)$ | $\log(g)$ | $[\text{Fe}/\text{H}]$ | $R (R_{\odot})$ | $M (M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 6593^{+181}_{-250} | $4.074^{+0.252}_{-0.168}$ | $-0.140^{+0.250}_{-0.300}$ | $1.762^{+0.530}_{-0.583}$ | $1.350^{+0.182}_{-0.296}$ | $0.347^{+0.557}_{-0.163}$ |
| | +3%/-4% | +6%/-4% | +179%/-214% | +30%/-33% | +13%/-22% | +160%/-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 008690471-05 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|---------------|------------------------|----------------------|----------------------|----------------------|
| DV | -257 ± 36 | $3.59^{+1.14}_{-0.91}$ | 993^{+74}_{-93} | 5978^{+838}_{-612} | 915^{+719}_{-372} |
| Alt. | -356 ± 52 | $3.95^{+1.12}_{-1.00}$ | 991^{+80}_{-89} | 6189^{+809}_{-575} | 1074^{+775}_{-451} |

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

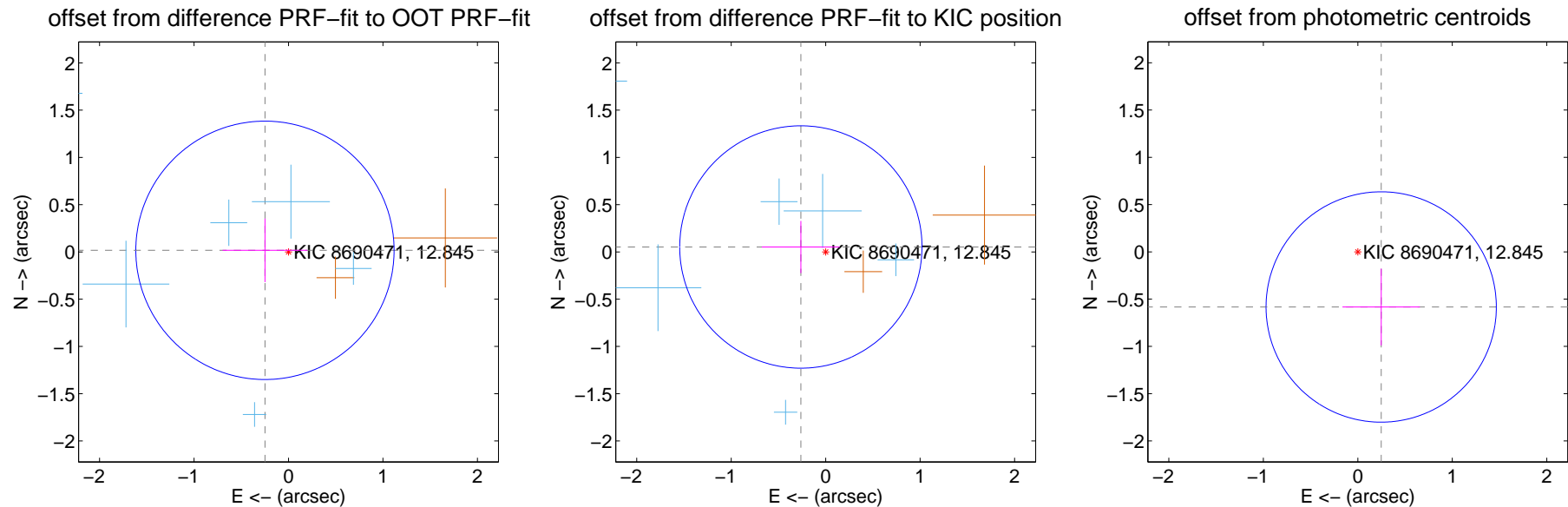
DV Centroid Data

Supplemental centroid analysis for 008690471-05. Kepler magnitude: 12.85. Transit SNR 8.91

There are 6 quarters with good PRF difference image offsets

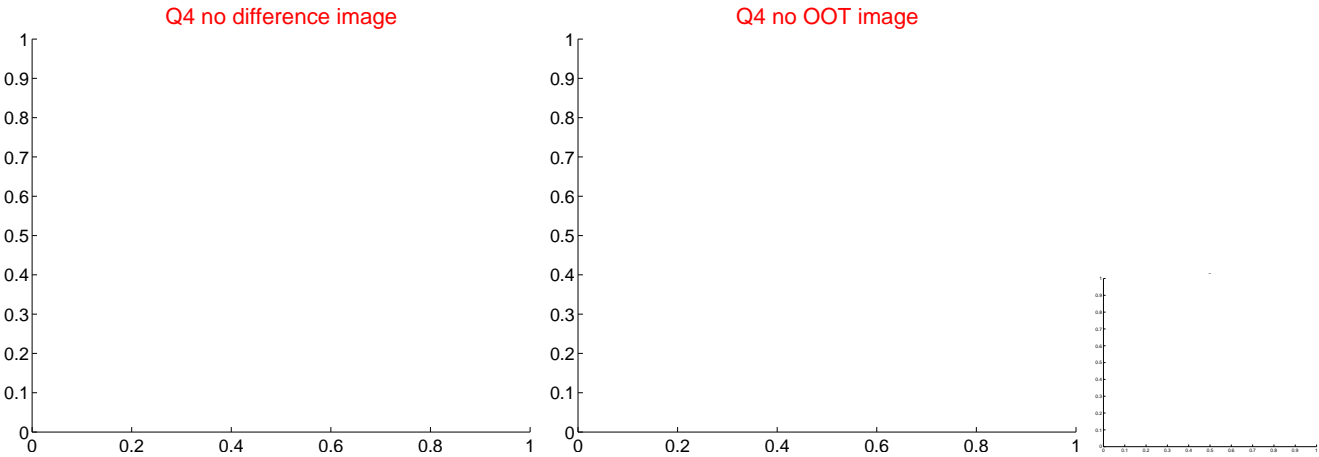
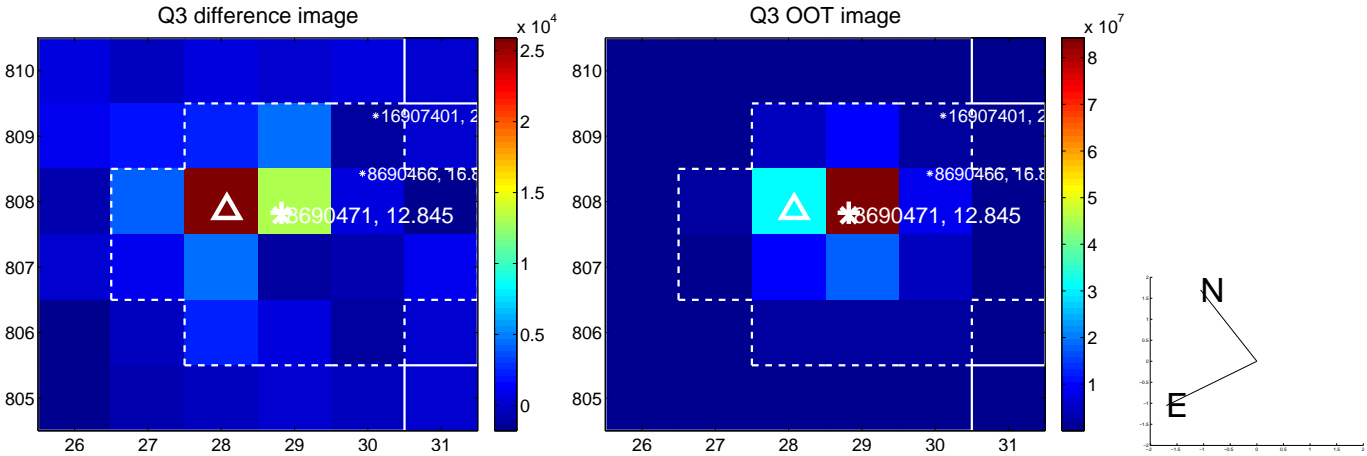
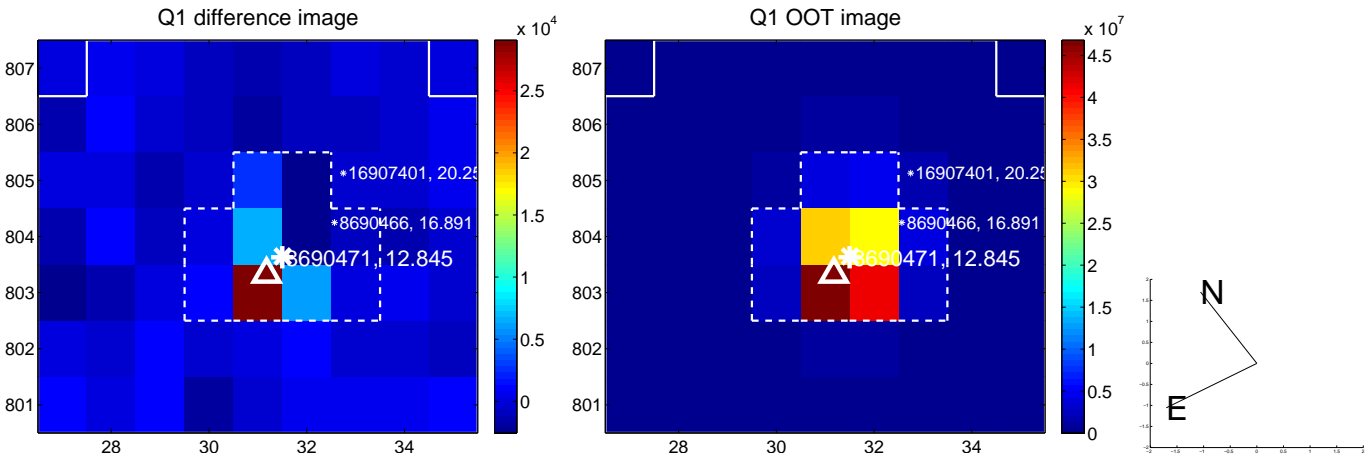
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|-------------------|
| PRF-fit source offset from OOT | 0.250 ± 0.456 | 0.55 | 0.249 ± 0.448 | 0.017 ± 0.336 |
| PRF-fit source offset from KIC position | 0.268 ± 0.427 | 0.63 | 0.263 ± 0.412 | 0.052 ± 0.276 |
| photometric centroid source offset | 0.63 ± 0.41 | 1.56 | -0.25 ± 0.41 | -0.58 ± 0.41 |

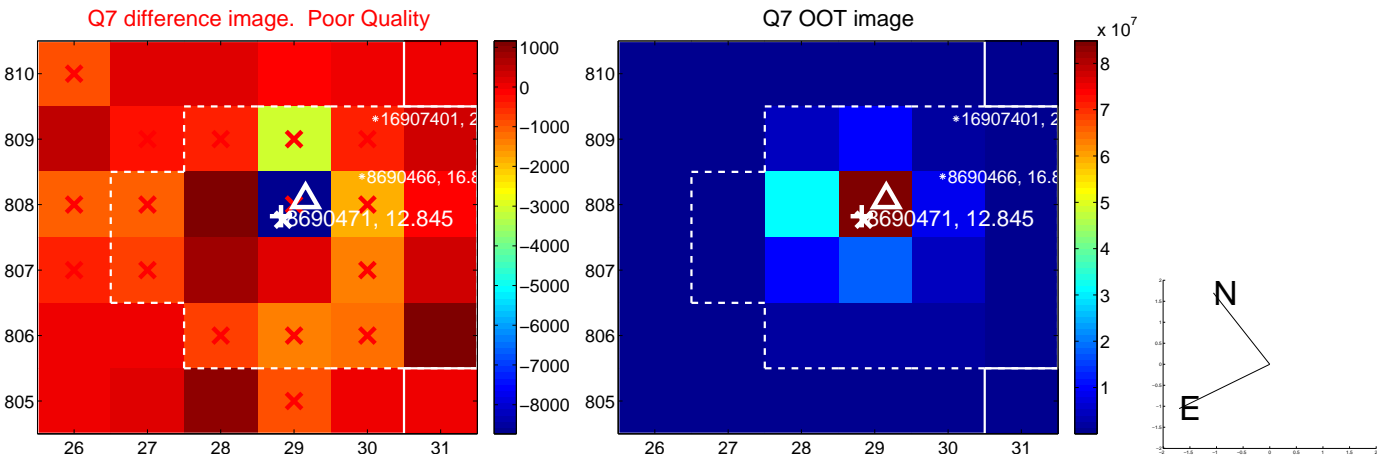
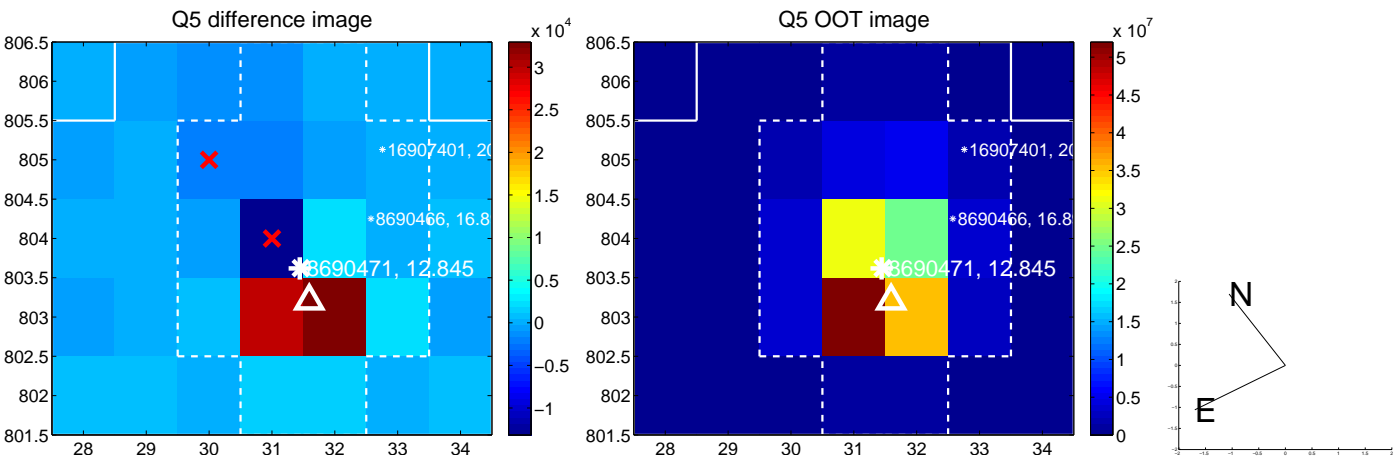


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

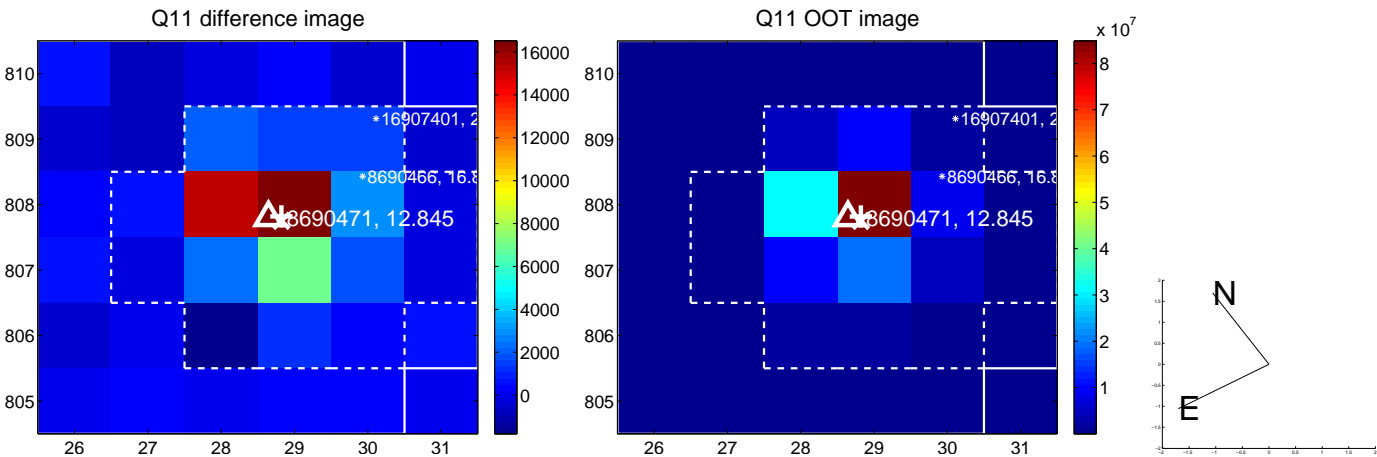
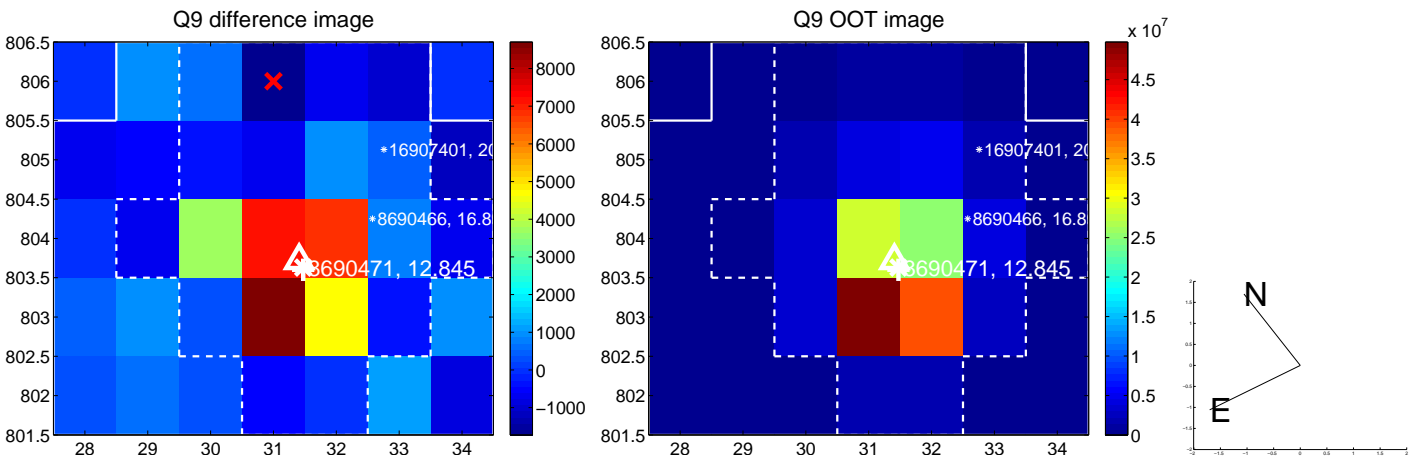
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



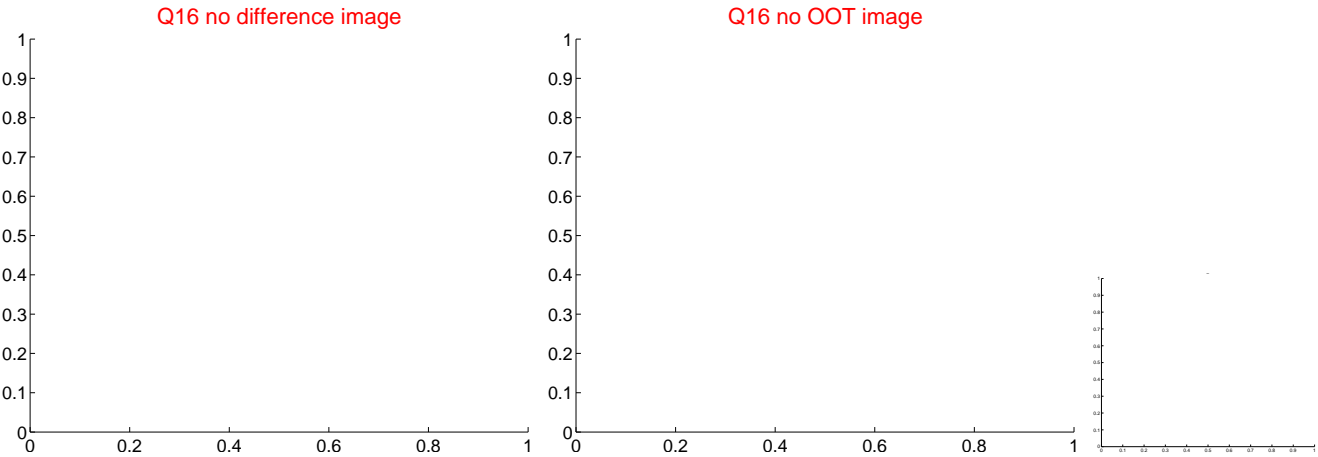
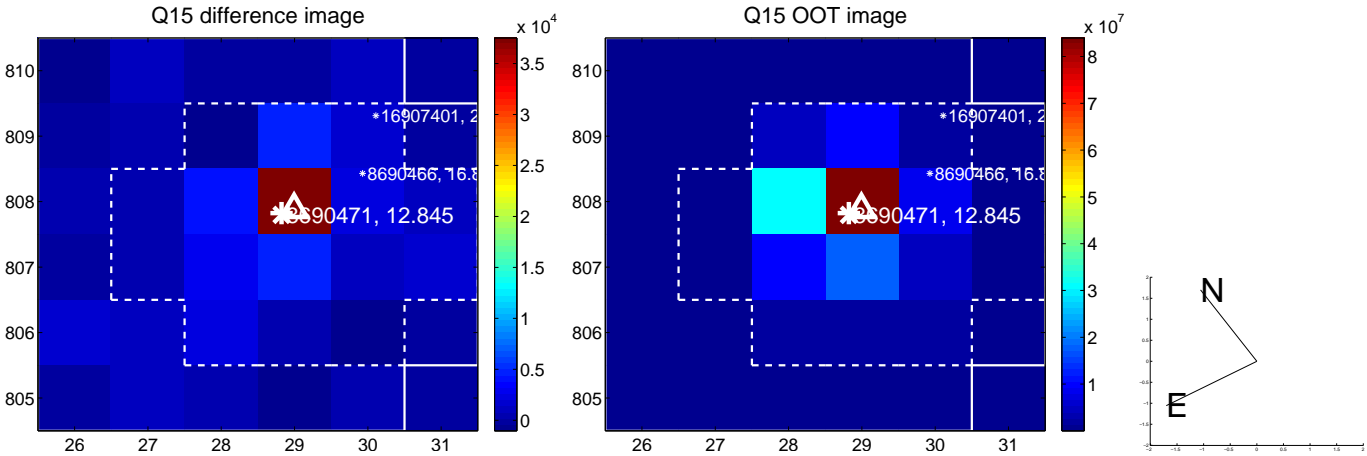
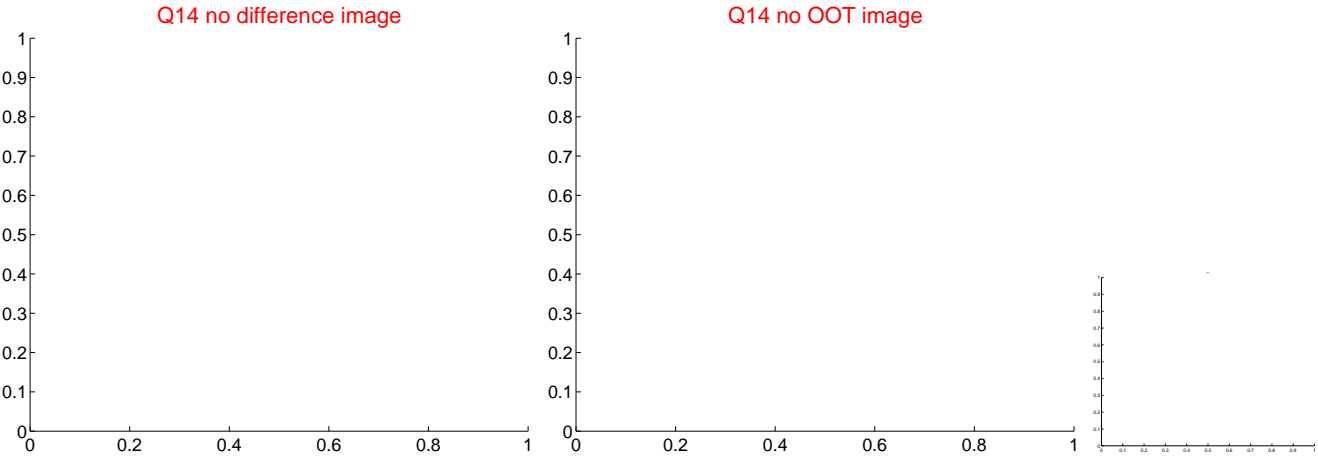
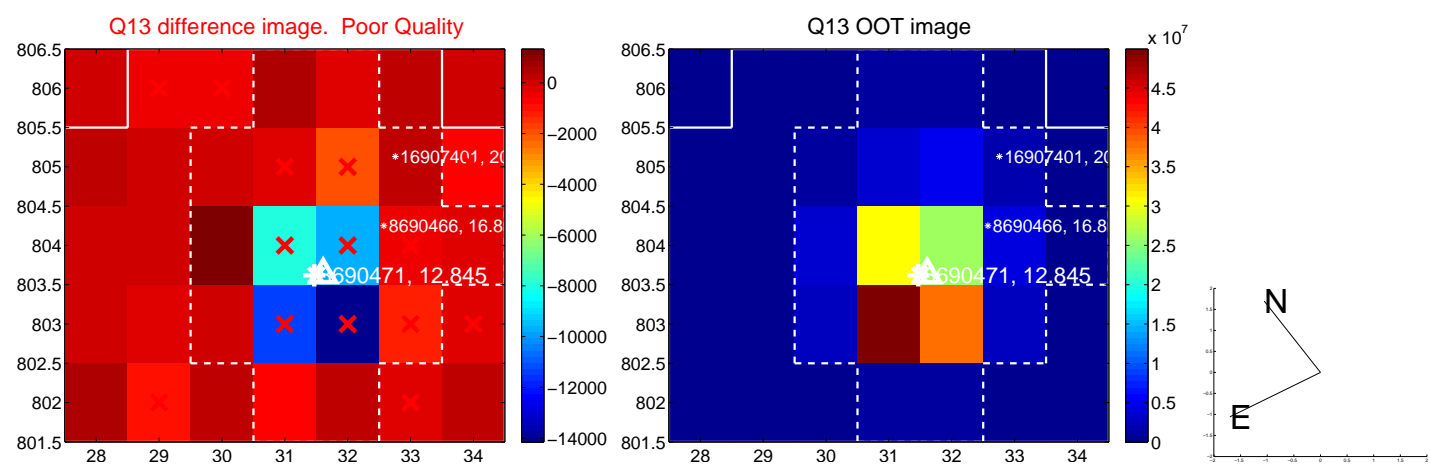
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



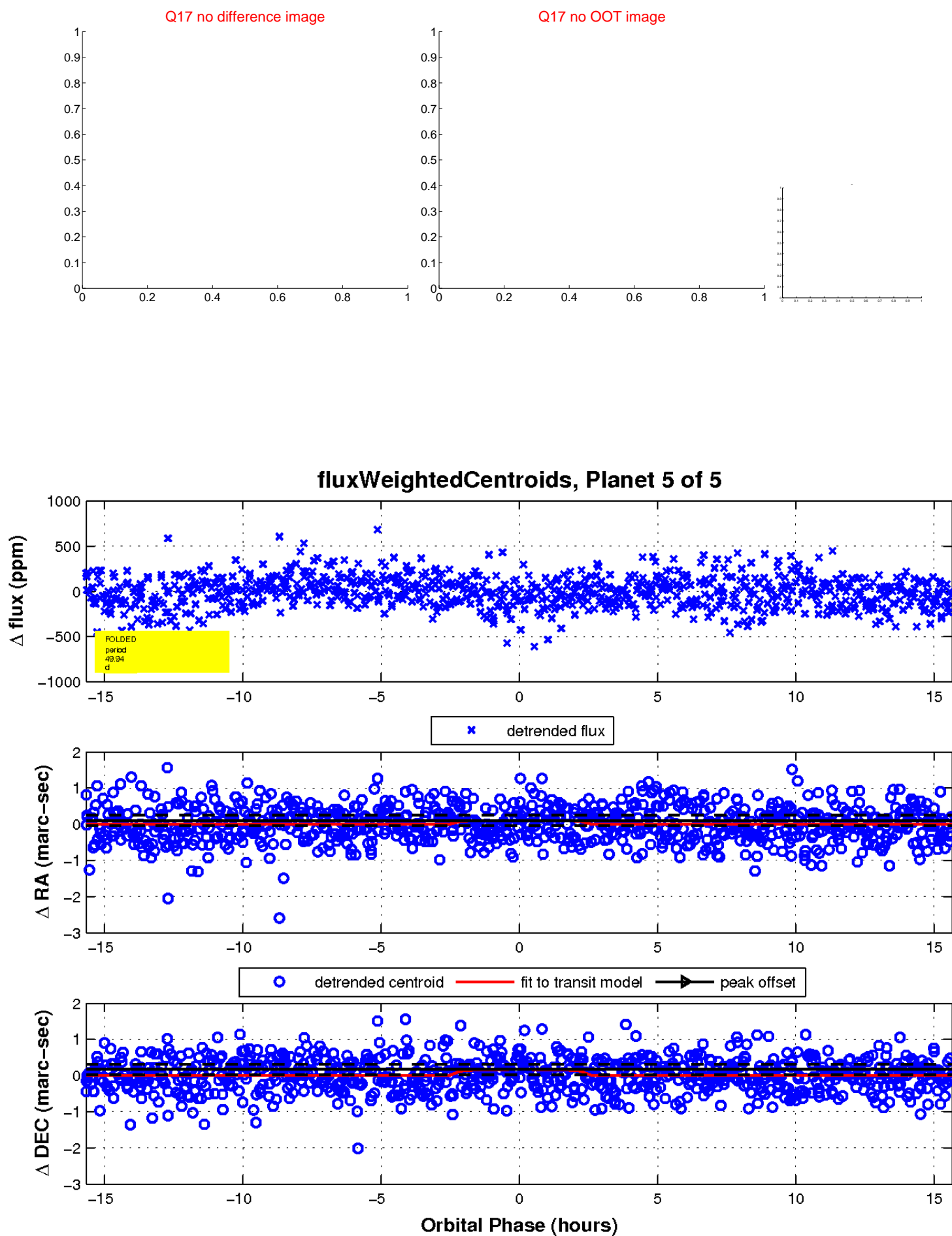
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



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



UKIRT Image

Declination

