

KIC 004770365

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 004770365-01 | OBS | 1475.01 | 1.609320 | 132.273220 | 716.2 | 1.653 | 29.2 | 33.8 | 0.60 | 4224 | 1.73 | 199.75 |
| 004770365-02 | OBS | 1475.02 | 9.512160 | 137.923372 | 1188.3 | 3.087 | 24.0 | 26.8 | 0.60 | 4224 | 2.38 | 18.69 |
| 004770365-03 | OBS | 1475.03 | 4.729467 | 132.929496 | 433.3 | 2.391 | 10.9 | 12.5 | 0.60 | 4224 | 1.60 | 47.45 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--------------|
| 004770365-01 | OBS | PC | 1.00 | 0 | 0 | 0 | 0 | NO_COMMENT |
| 004770365-02 | OBS | PC | 0.97 | 0 | 0 | 0 | 0 | NO_COMMENT |
| 004770365-03 | OBS | PC | 0.99 | 0 | 0 | 0 | 0 | CENT_KIC_POS |

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 004770365-01

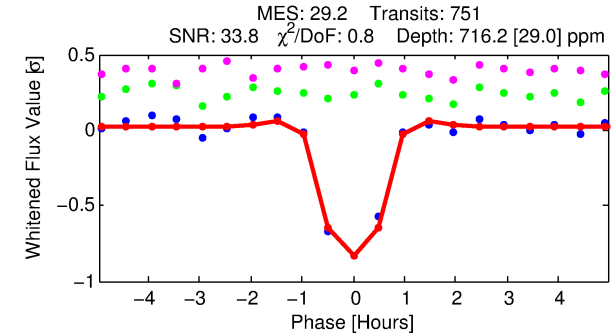
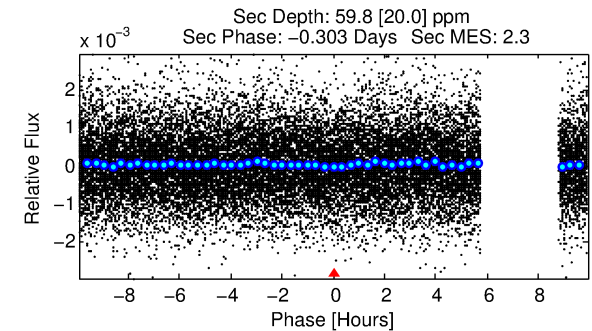
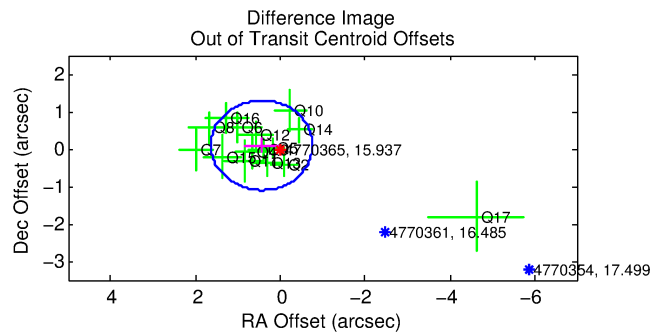
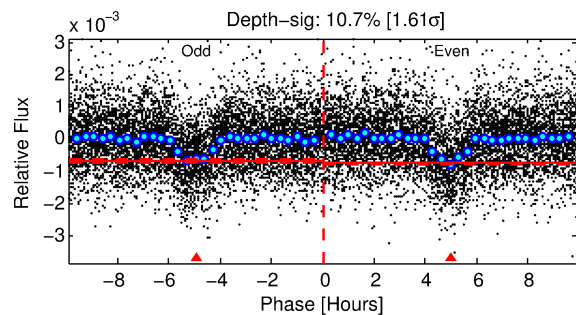
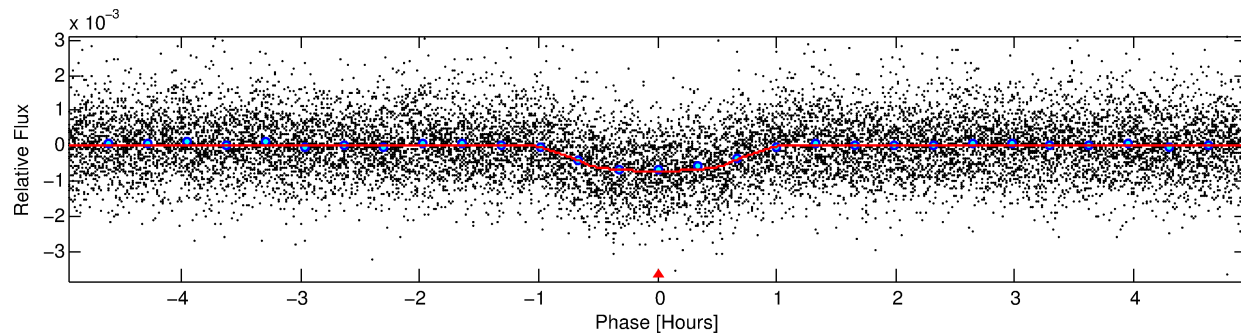
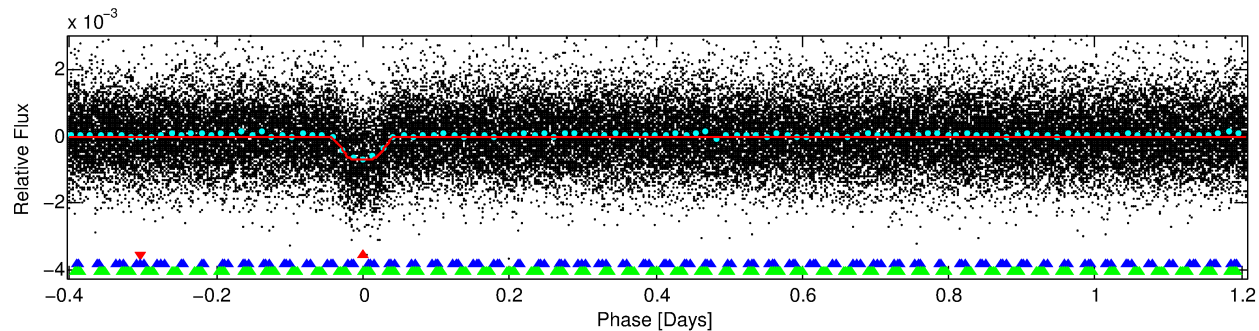
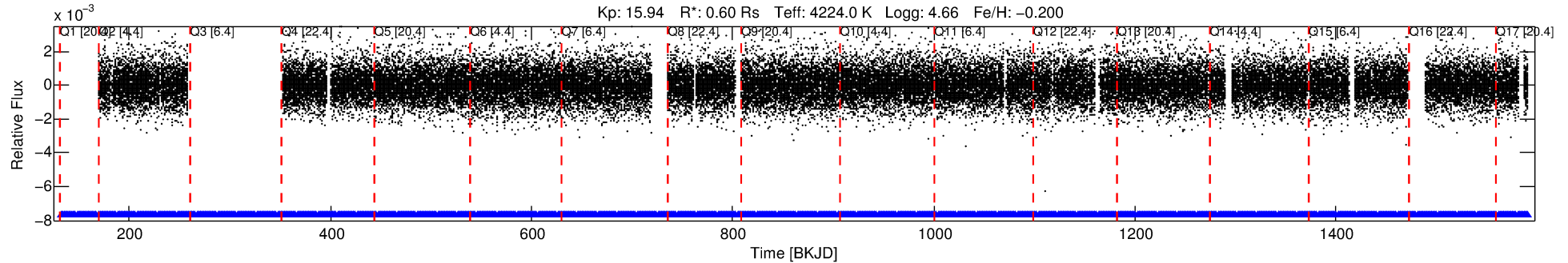
No Significant Match Found

DV One-Page Summary

KIC: 4770365 Candidate: 1 of 3 Period: 1.609 d

KOI: K01475.01 Corr: 0.974

Kp: 15.94 R*: 0.60 Rs Teff: 4224.0 K Logg: 4.66 Fe/H: -0.200



DV Fit Results:

Period = 1.60932 [0.00000] d
Epoch = 132.2732 [0.0007] BKJD
Rp/R* = 0.0263 [0.0116]
a/R* = 5.66 [8.35]
b = 0.70 [1.16]
Seff = 199.75 [18.84]
Teq = 959 [23] K
Rp = 1.73 [0.77] Re
a = 0.0228 [0.0009] AU
Ag = 5.71 [5.40] [0.87σ]
Teffp = 2292 [543] K [2.45σ]

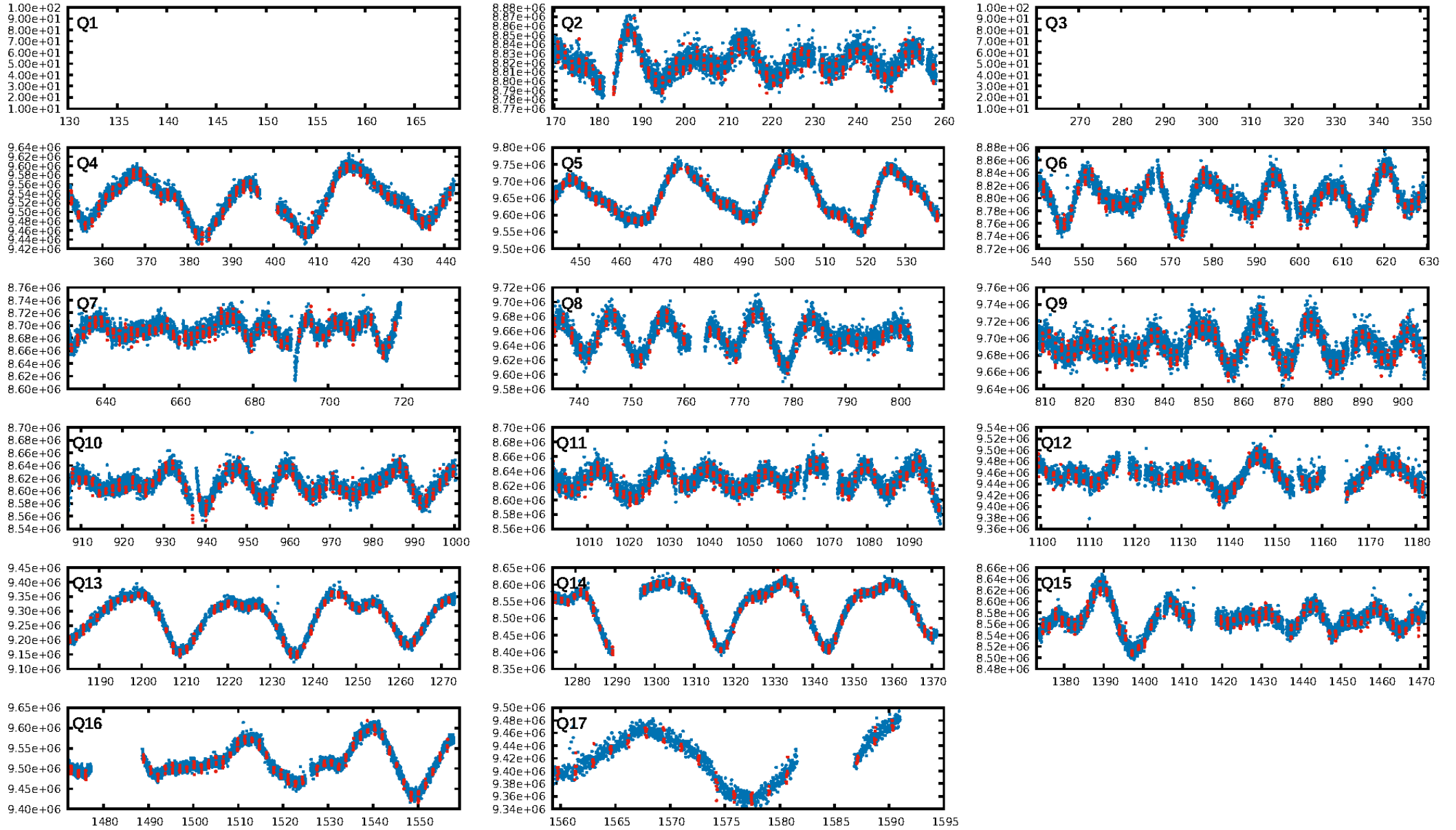
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [25.76σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 5.26e-178
RollingBand-fgt: 1.00 [734/734]
GhostDiagnostic-chr: 2.951
Centroid-sig: N/A
Centroid-so: 0.858 arcsec [2.96σ]
OotOffset-rm: 0.448 arcsec [1.12σ]
KicOffset-rm: 0.127 arcsec [0.46σ]
OotOffset-st: 4/3/4/4 [15]
KicOffset-st: 4/3/4/4 [15]
DiffImageQuality-fgm: 0.93 [14/15]
DiffImageOverlap-fno: 1.00 [15/15]

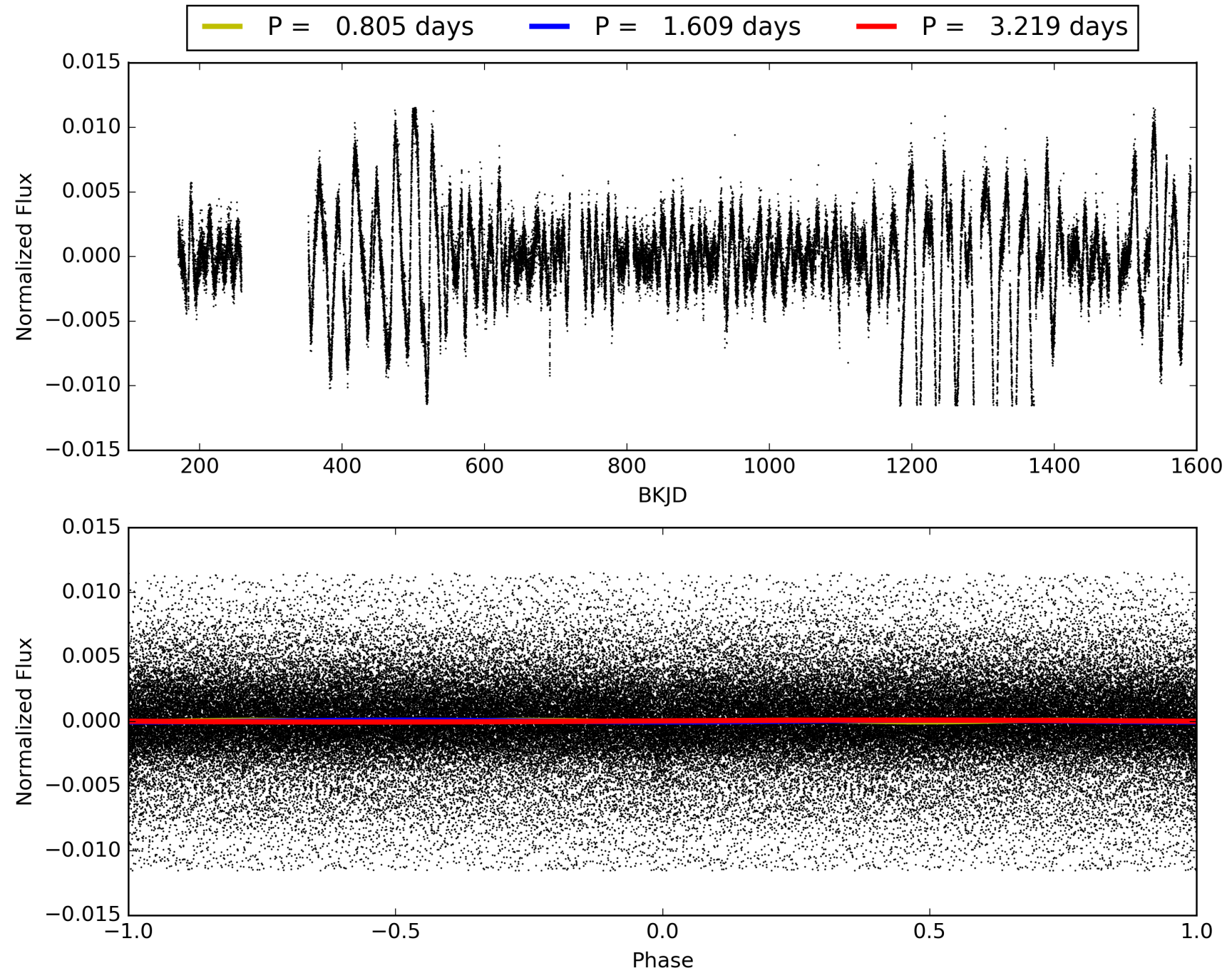
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 23:06:18 Z

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

TCE 004770365-01, PDC Light Curves

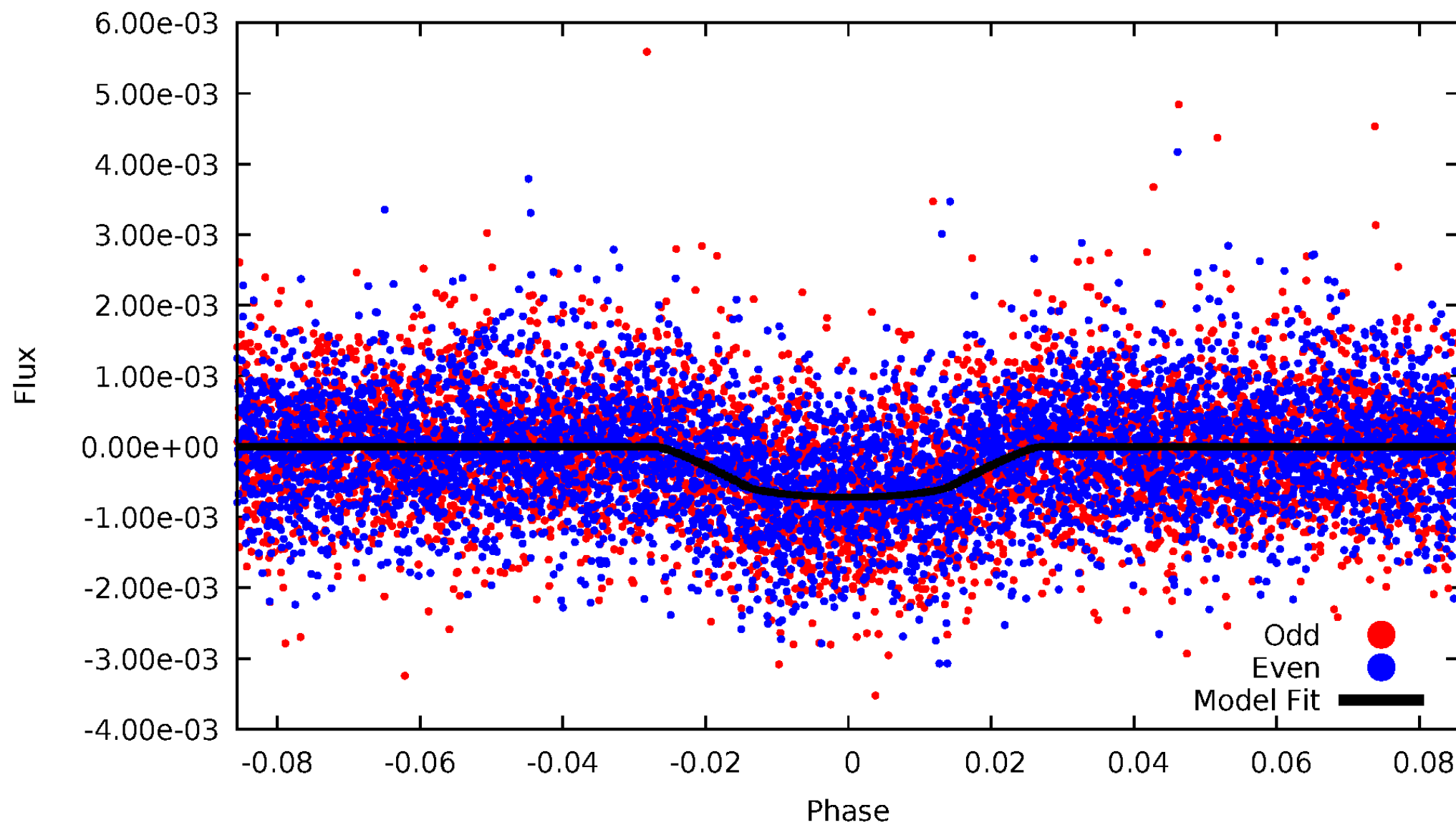


TCE 004770365-01



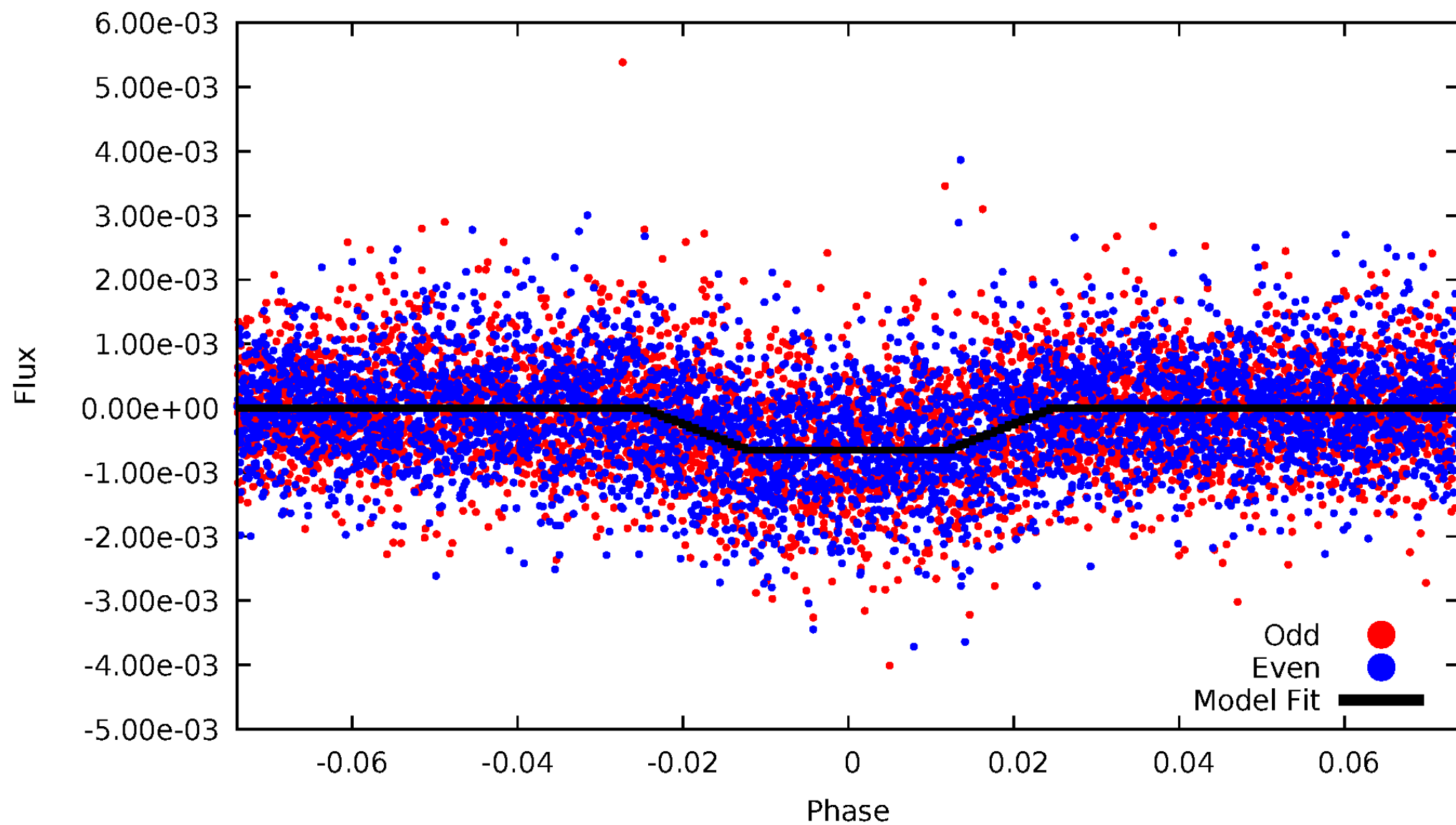
DV Odd/Even

TCE 004770365-01

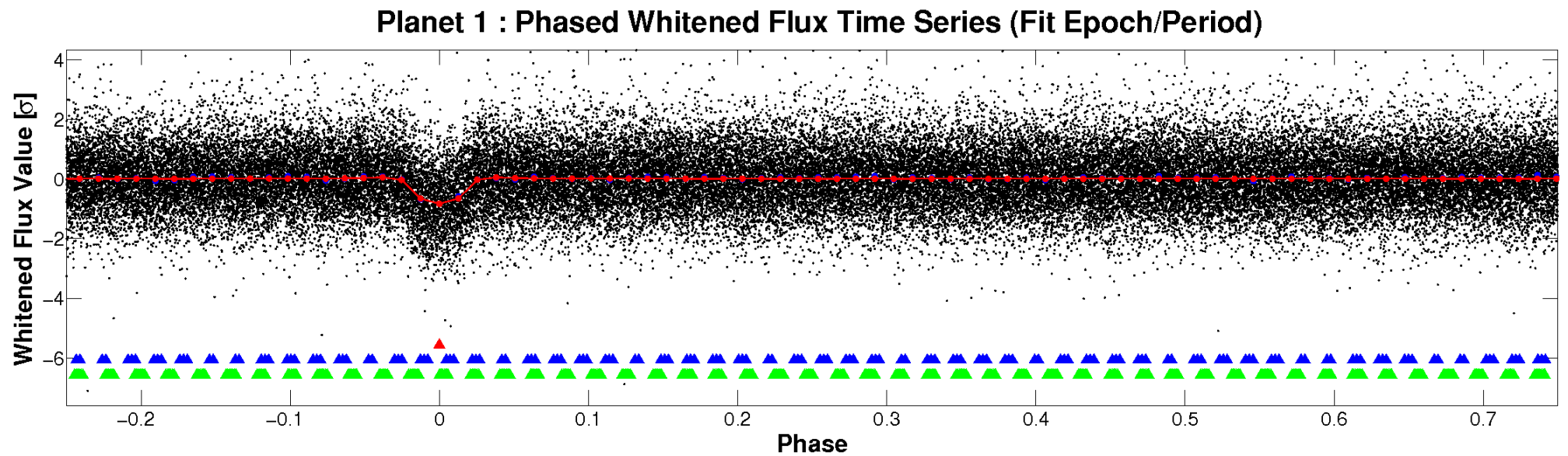
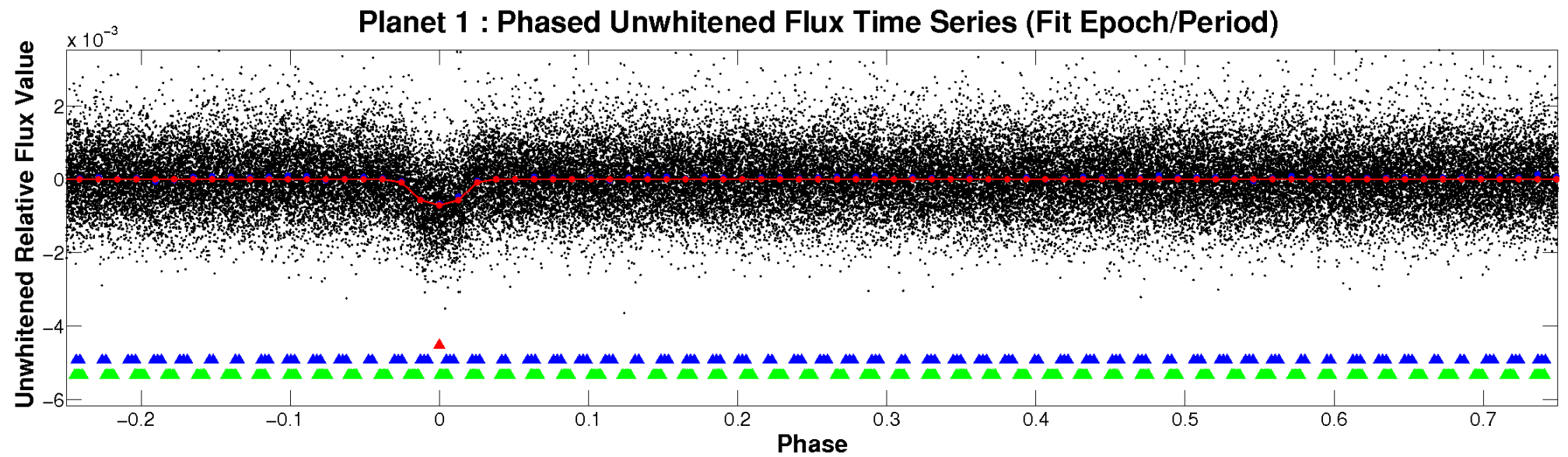


ALT Odd/Even

TCE 004770365-01

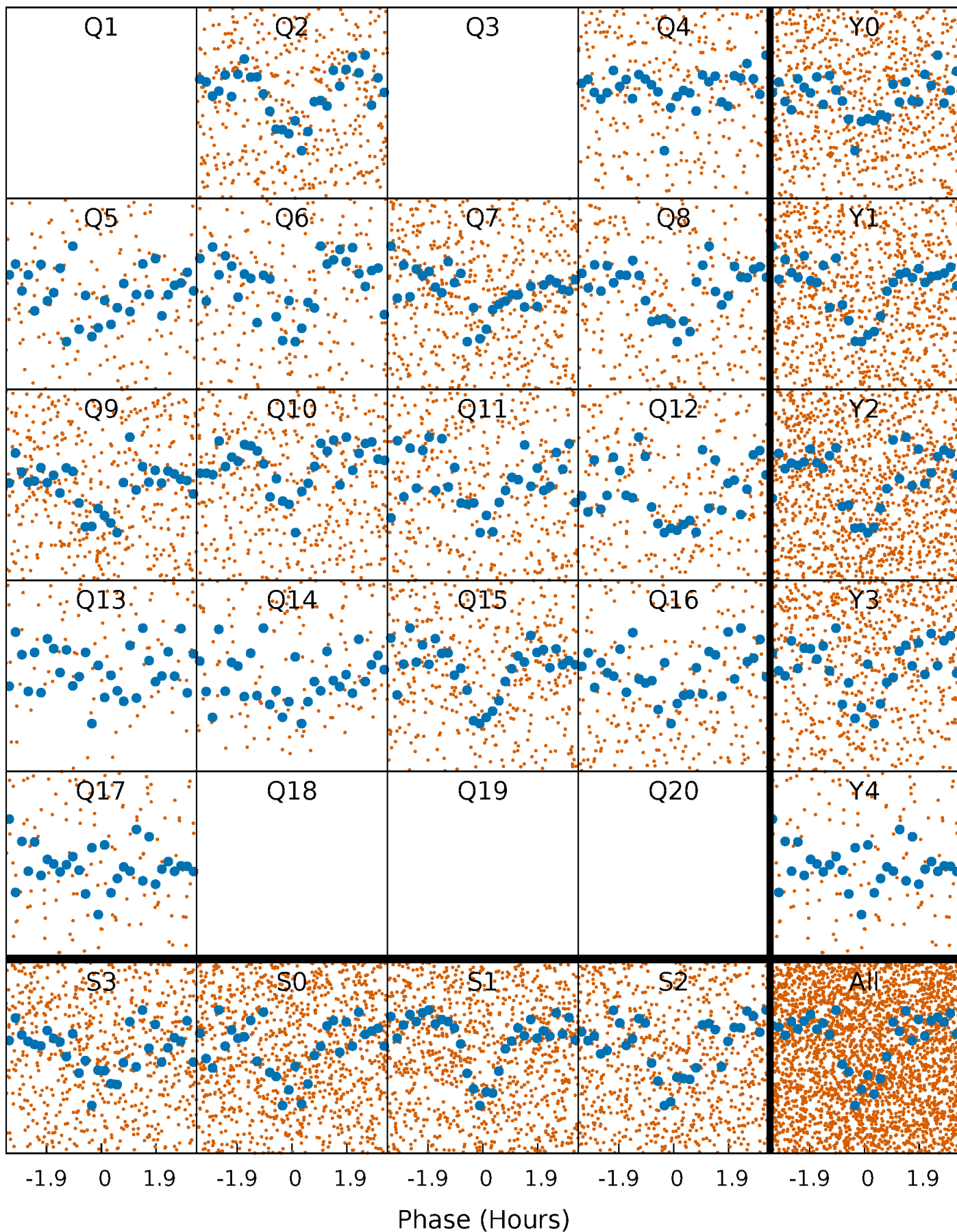


Non-Whitened Vs. Whitened Light Curve



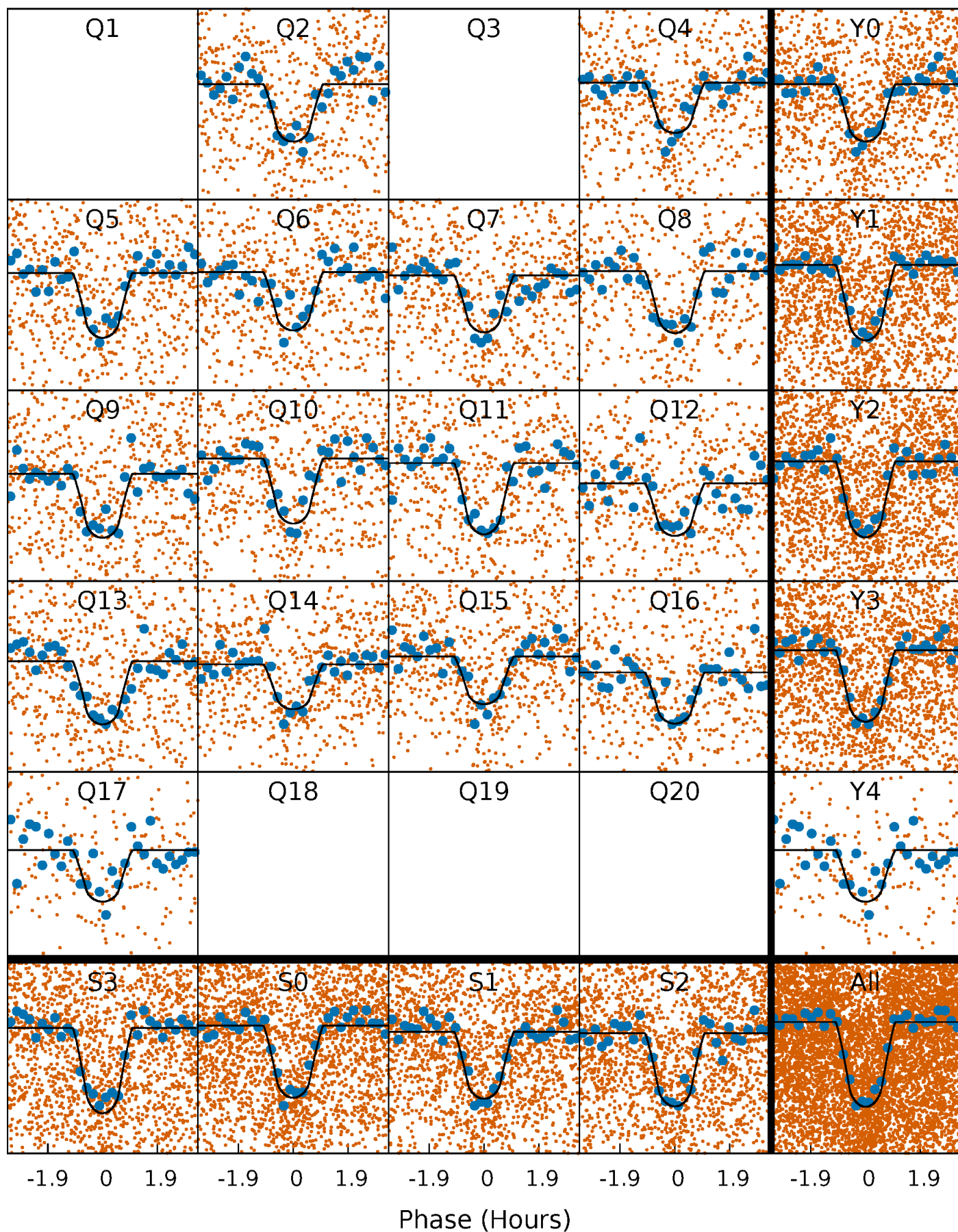
PDC Quarter-Phased Transit Curves

TCE 004770365-01 P= 1.609320 Days $T_0=132.273220$ (BKJD)



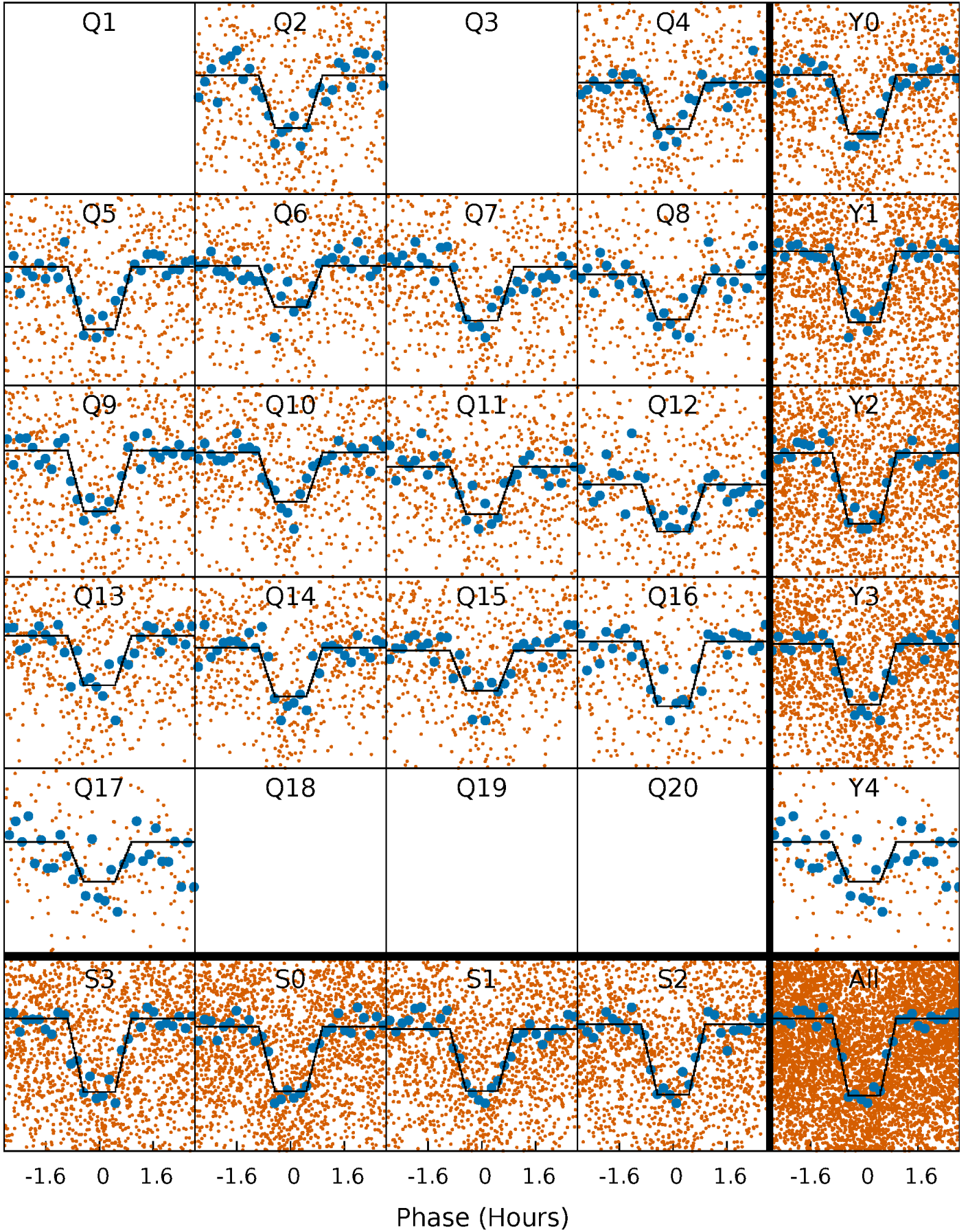
DV Quarter-Phased Transit Curves

TCE 004770365-01 P= 1.609320 Days $T_0=132.273220$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

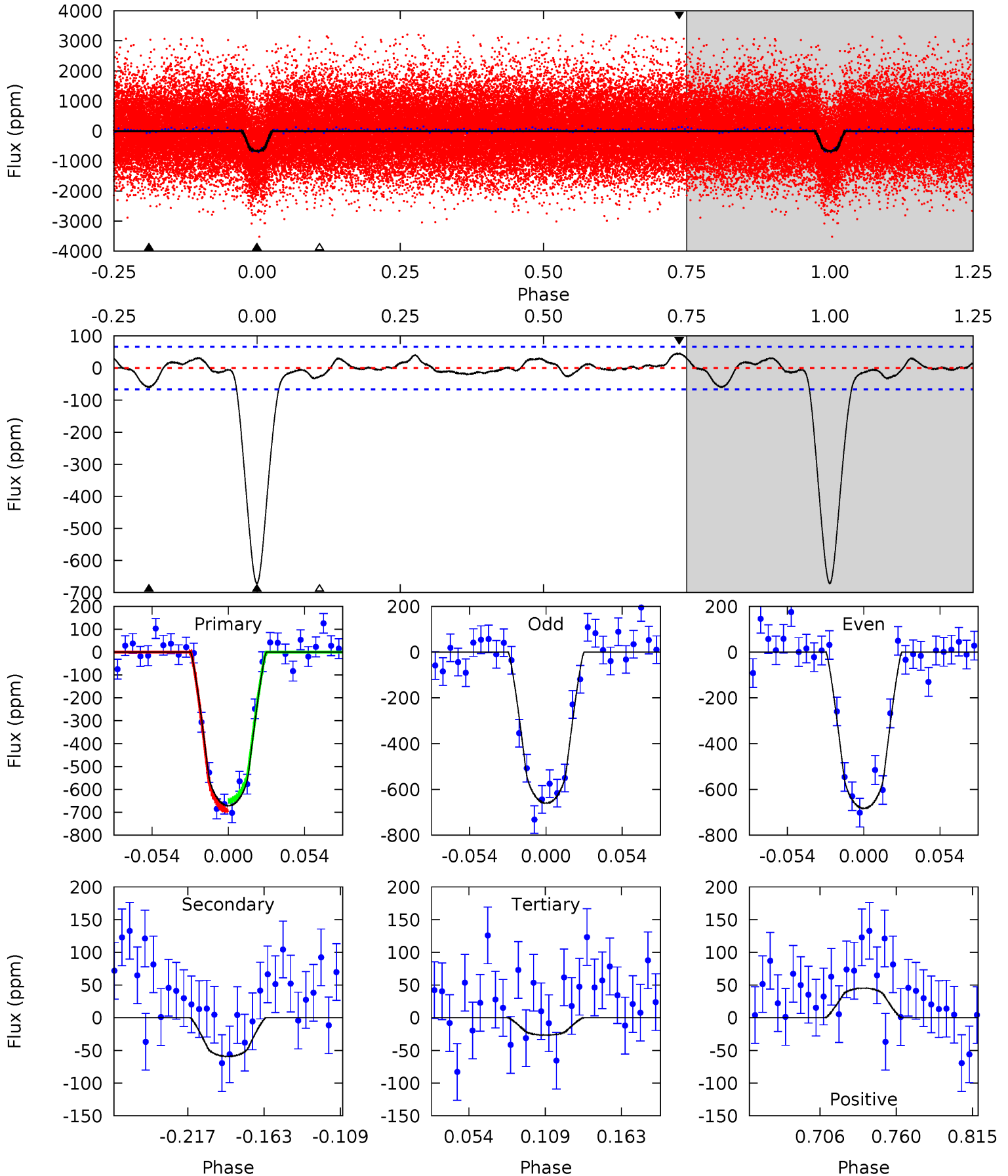
TCE 004770365-01 P= 1.609316 Days $T_0=132.275084$ (BKJD)



DV Model-Shift Uniqueness Test

004770365-01, P = 1.609320 Days, E = 132.273220 Days

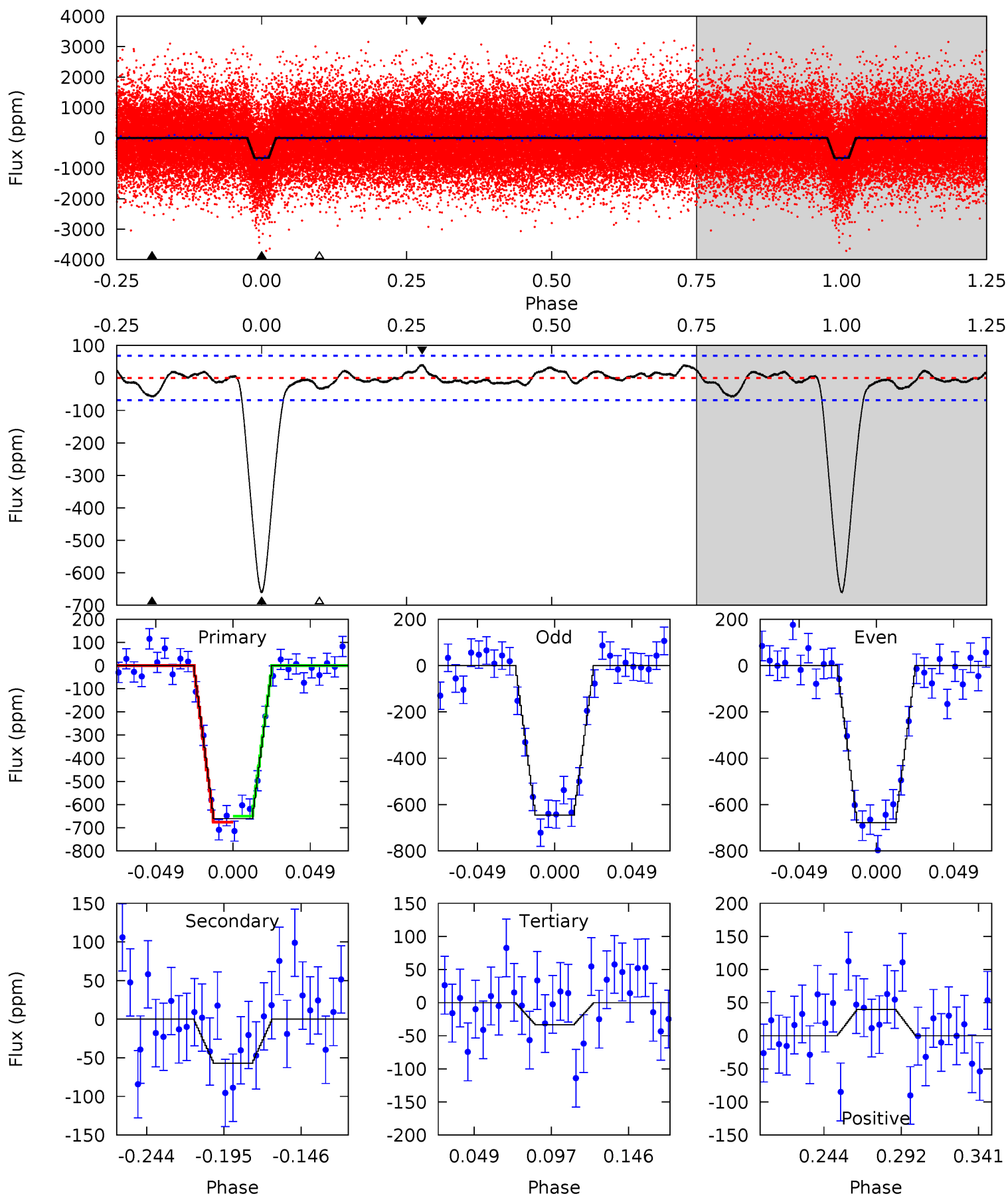
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 47.3 | 4.17 | 1.88 | 3.19 | 4.69 | 1.92 | 1.17 | 45.4 | 44.1 | 2.30 | 0.99 | 0.80 | 1.03 | 0.06 | 1.47 |



Alt Model-Shift Uniqueness Test

004770365-01, P = 1.609316 Days, E = 132.275084 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 45.6 | 3.93 | 2.31 | 2.74 | 4.71 | 1.97 | 1.07 | 43.3 | 42.9 | 1.62 | 1.19 | 1.11 | 1.01 | 0.06 | 0.92 |



Stellar Parameters For KIC 004770365

| | $T_{\text{eff}}(K)$ | $\log(g)$ | $[\text{Fe}/\text{H}]$ | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|---------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 4224^{+84}_{-84} | $4.662^{+0.025}_{-0.020}$ | $-0.200^{+0.150}_{-0.150}$ | $0.603^{+0.027}_{-0.030}$ | $0.609^{+0.033}_{-0.033}$ | $3.921^{+0.420}_{-0.346}$ |
| | +2%/-2% | +1%/-0% | +75%/-75% | +4%/-5% | +5%/-5% | +11%/-9% |
| Source | SPE60 | SPE60 | SPE60 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 004770365-01 / KOI 1475.01

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|--------------|------------------------|----------------------|----------------------|----------------------------|
| DV | -59 ± 14 | $1.79^{+0.78}_{-0.76}$ | 1340^{+29}_{-28} | 2812^{+497}_{-283} | $5.360^{+10.272}_{-2.924}$ |
| Alt. | -57 ± 14 | $1.69^{+0.78}_{-0.77}$ | 1338^{+31}_{-27} | 2848^{+565}_{-307} | $5.565^{+13.515}_{-2.980}$ |

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

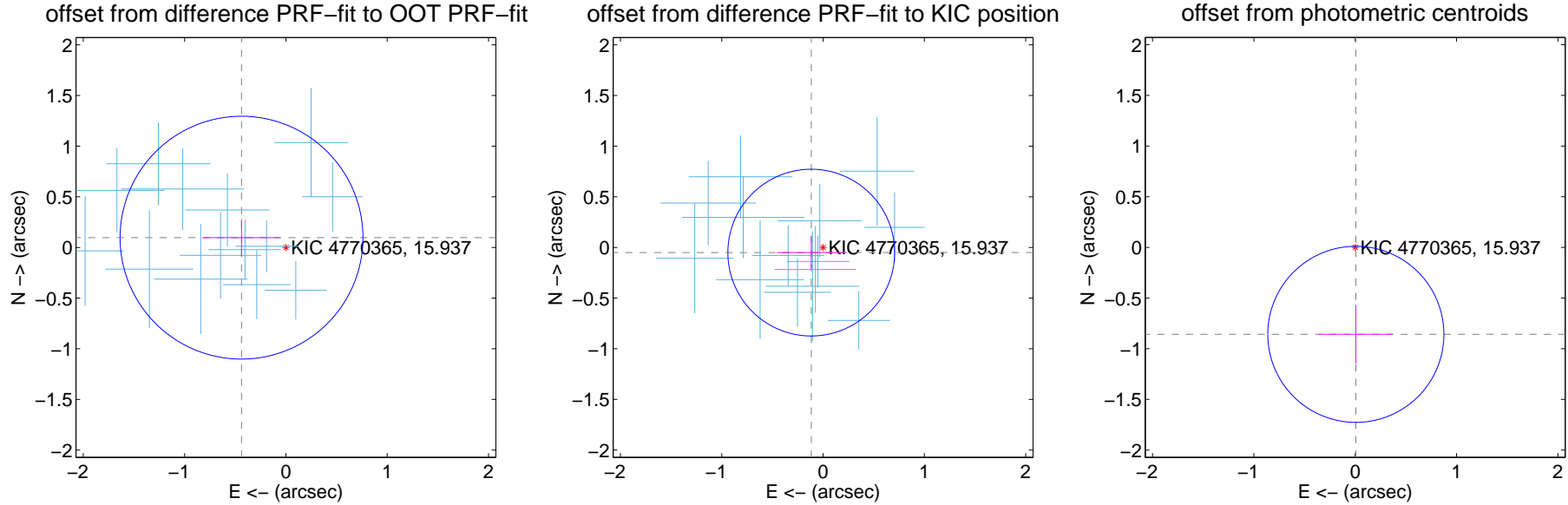
DV Centroid Data

Supplemental centroid analysis for 004770365-01. Kepler magnitude: 15.94. Transit SNR 33.80

There are 14 quarters with good PRF difference image offsets

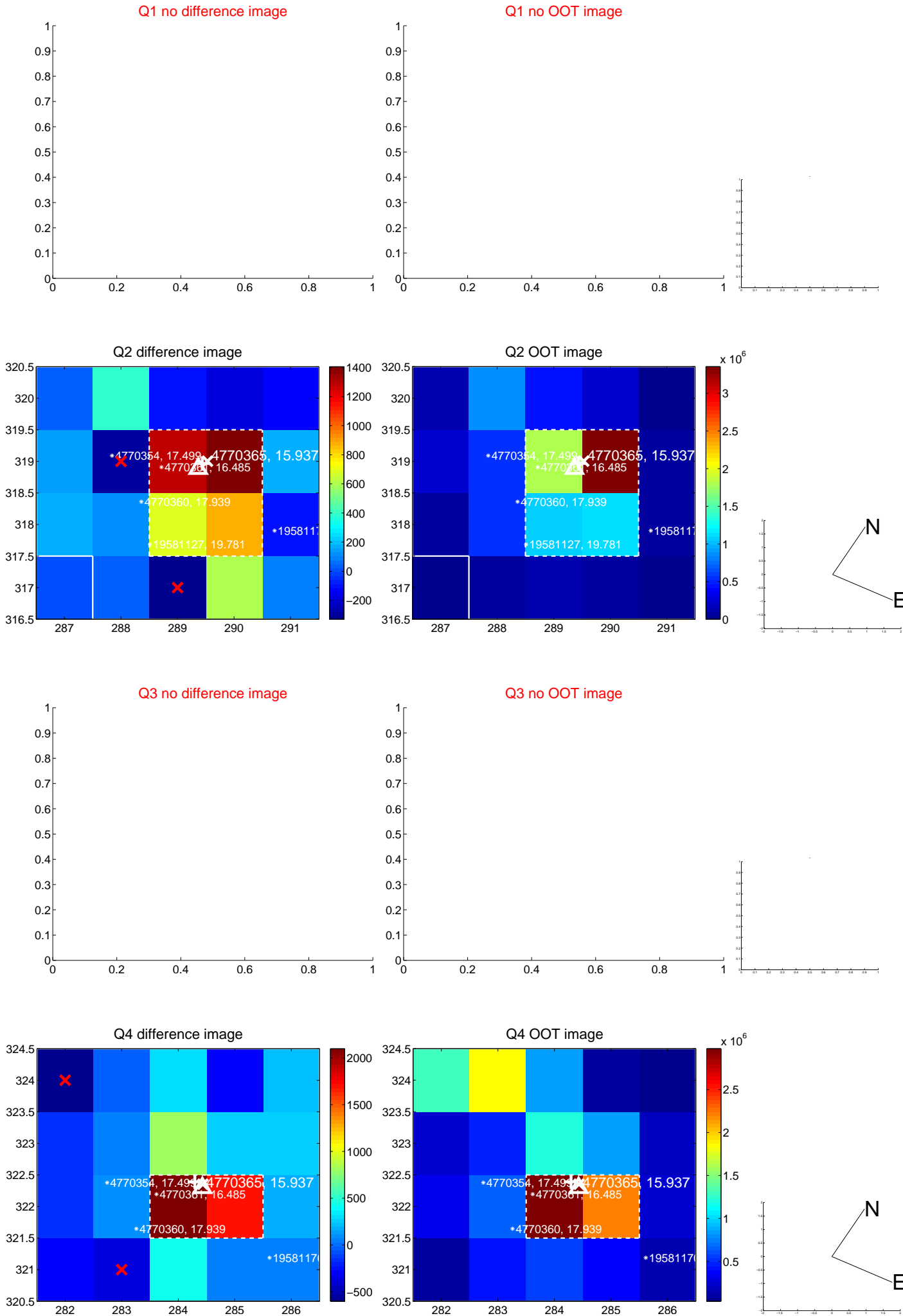
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT | 0.448 ± 0.399 | 1.12 | 0.438 ± 0.382 | 0.097 ± 0.184 |
| PRF-fit source offset from KIC position | 0.127 ± 0.274 | 0.46 | 0.117 ± 0.338 | -0.051 ± 0.163 |
| photometric centroid source offset | 0.86 ± 0.29 | 2.96 | -0.01 ± 0.36 | -0.86 ± 0.29 |

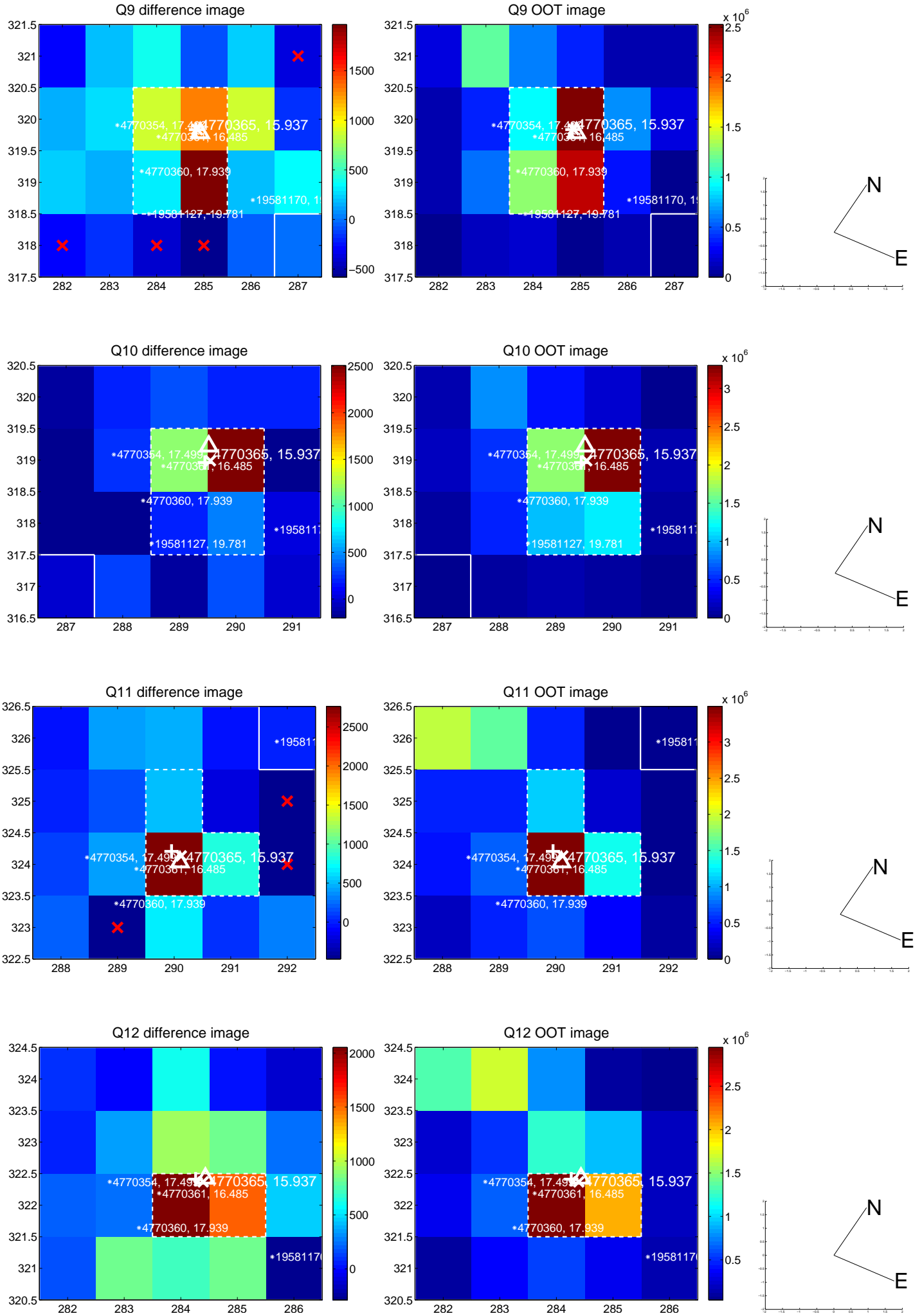


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

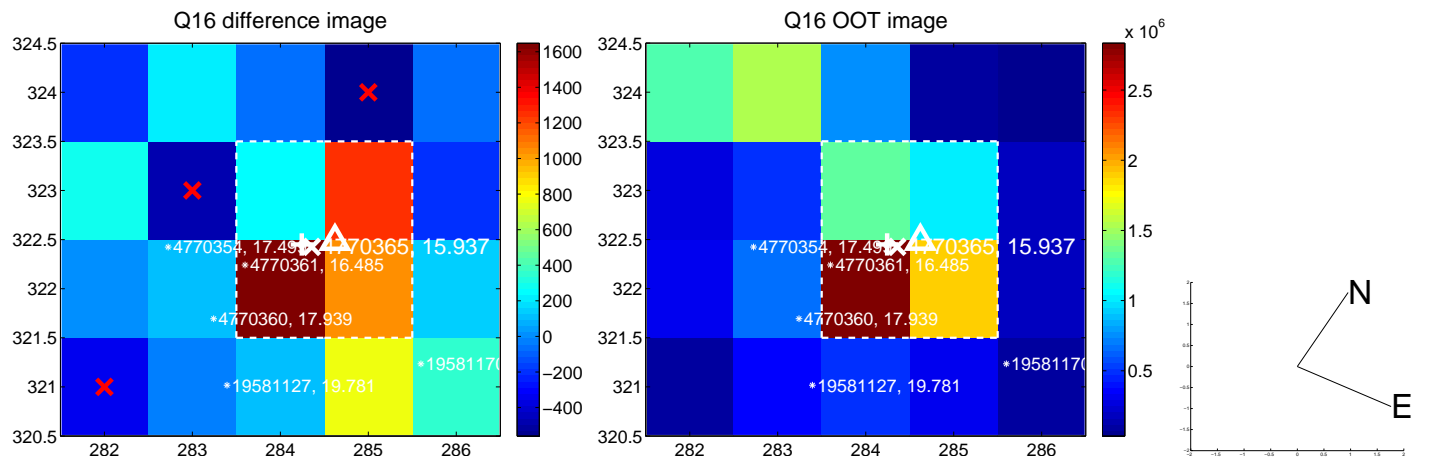
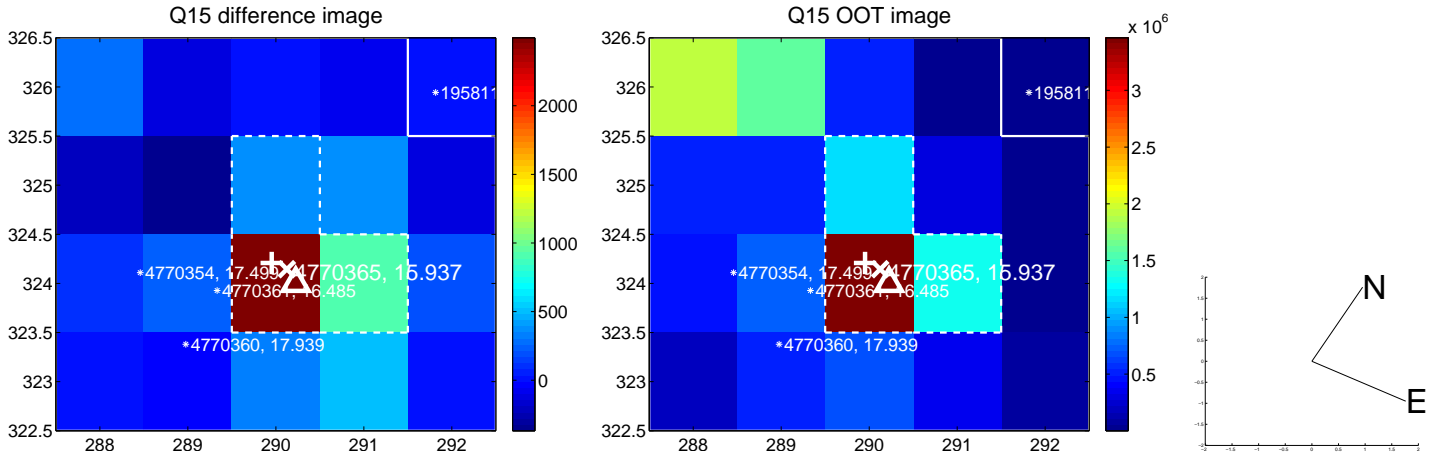
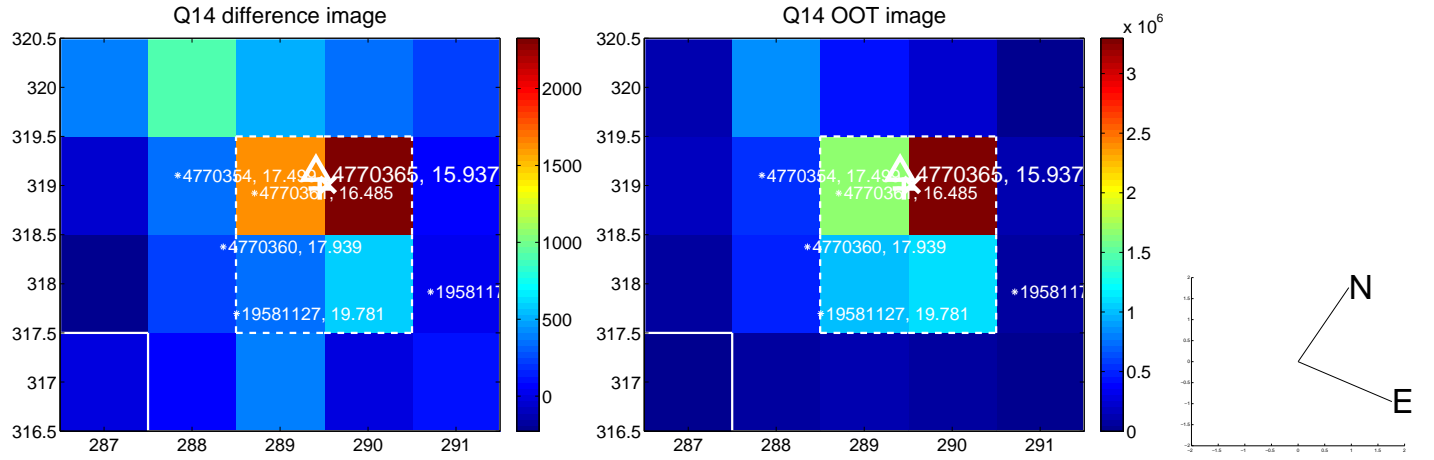
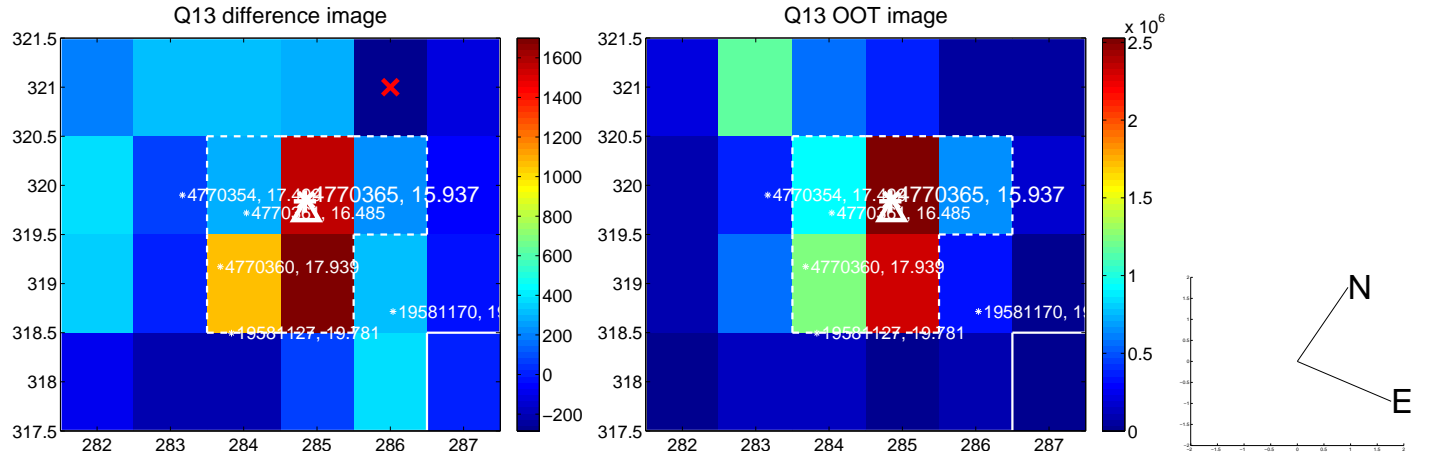
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



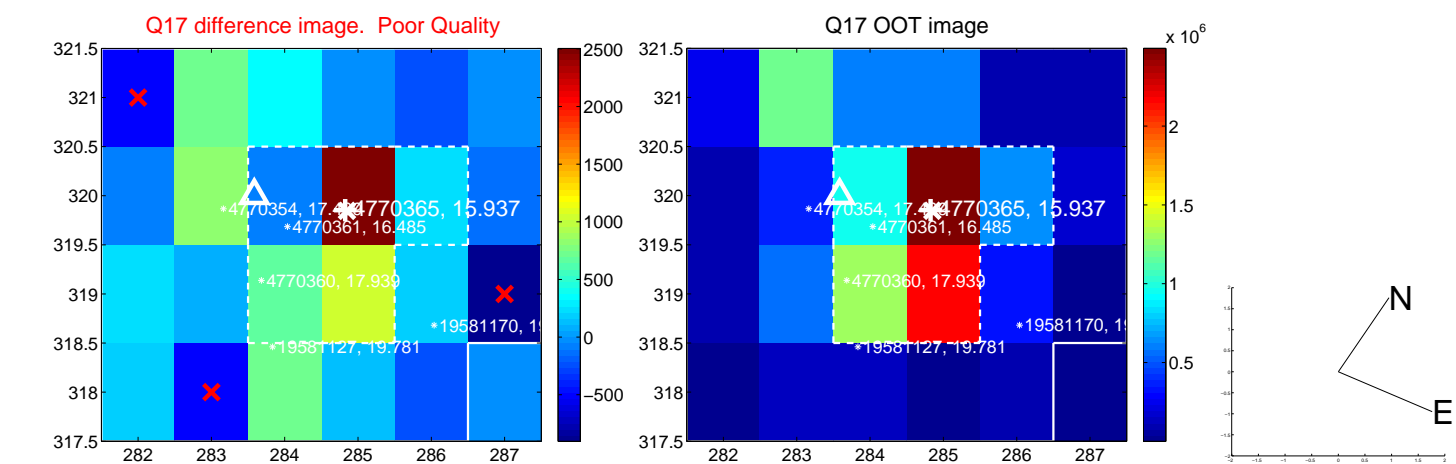
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



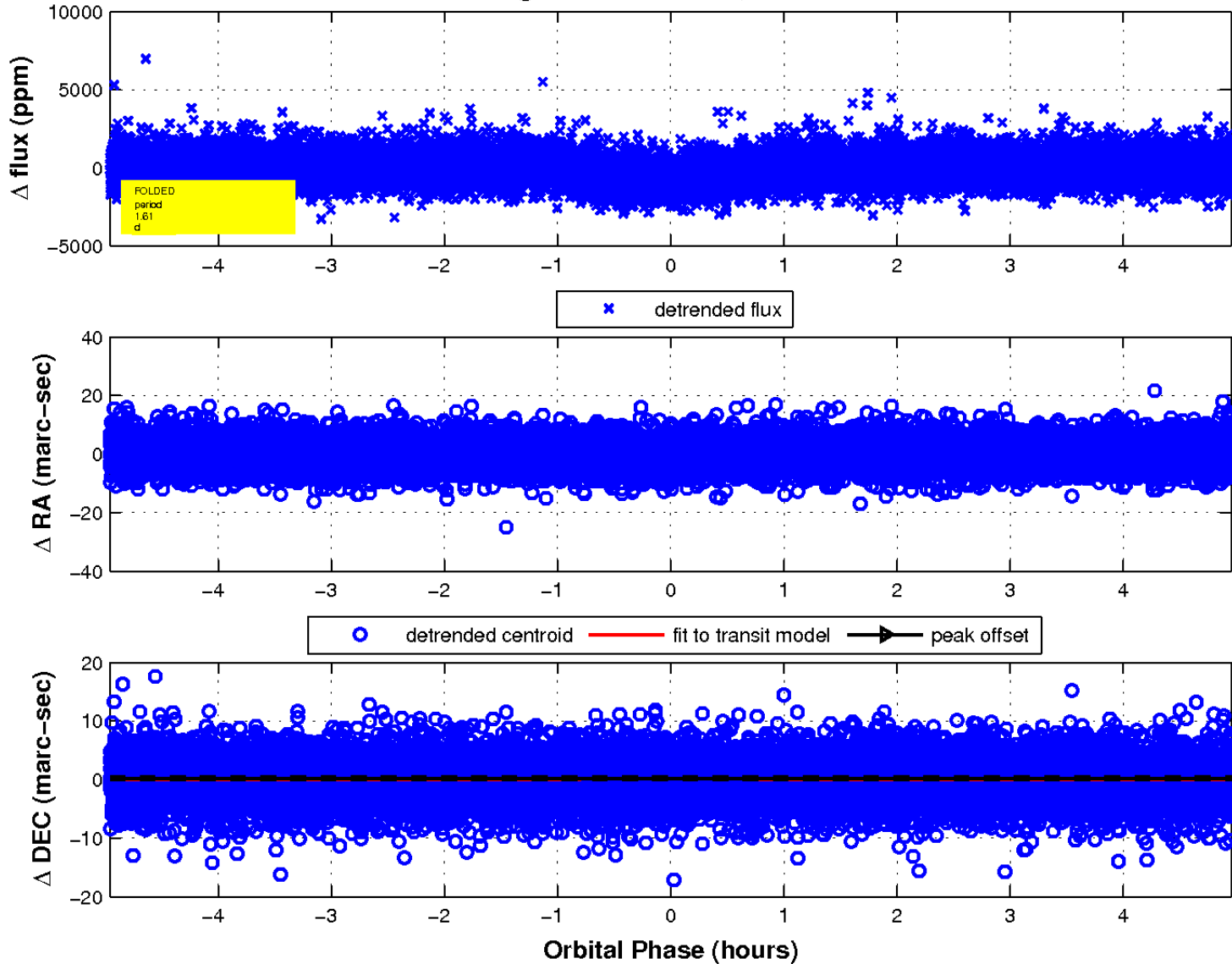
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

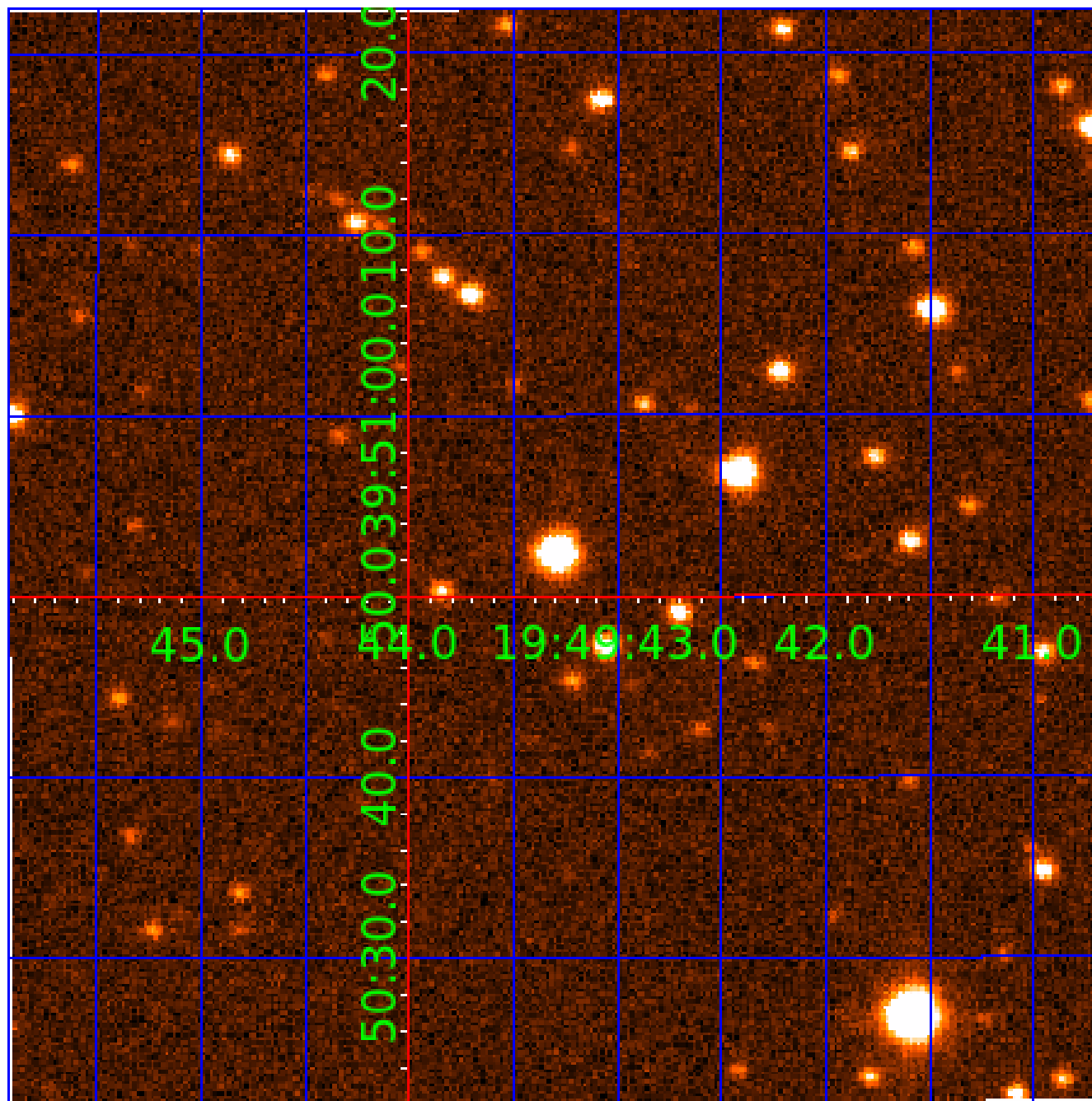


fluxWeightedCentroids, Planet 1 of 3



UKIRT Image

Declination



KIC 004770365

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 004770365-01 | OBS | 1475.01 | 1.609320 | 132.273220 | 716.2 | 1.653 | 29.2 | 33.8 | 0.60 | 4224 | 1.73 | 199.75 |
| 004770365-02 | OBS | 1475.02 | 9.512160 | 137.923372 | 1188.3 | 3.087 | 24.0 | 26.8 | 0.60 | 4224 | 2.38 | 18.69 |
| 004770365-03 | OBS | 1475.03 | 4.729467 | 132.929496 | 433.3 | 2.391 | 10.9 | 12.5 | 0.60 | 4224 | 1.60 | 47.45 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--------------|
| 004770365-01 | OBS | PC | 1.00 | 0 | 0 | 0 | 0 | NO_COMMENT |
| 004770365-02 | OBS | PC | 0.97 | 0 | 0 | 0 | 0 | NO_COMMENT |
| 004770365-03 | OBS | PC | 0.99 | 0 | 0 | 0 | 0 | CENT_KIC_POS |

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.

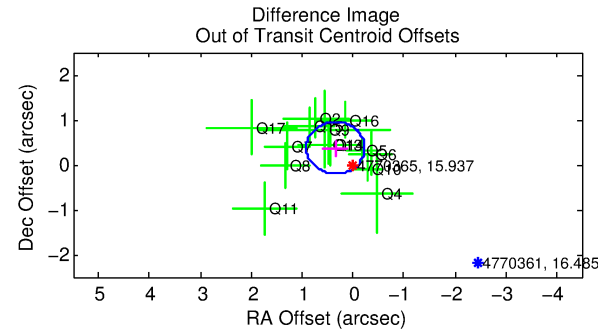
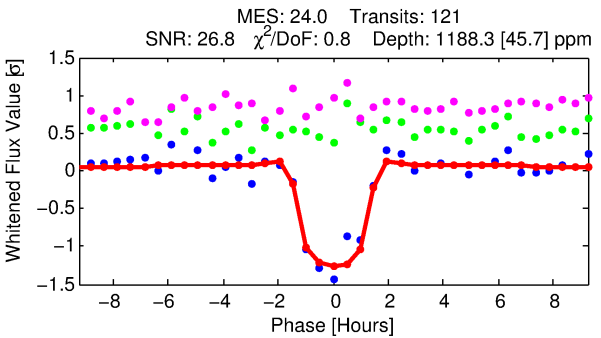
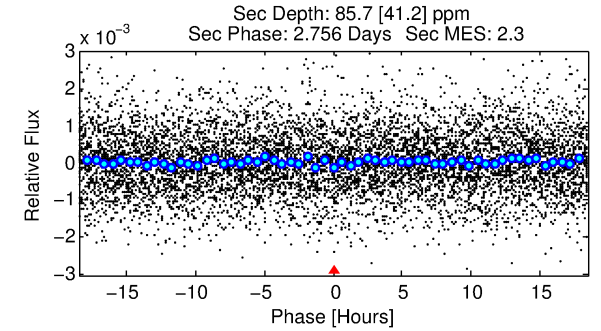
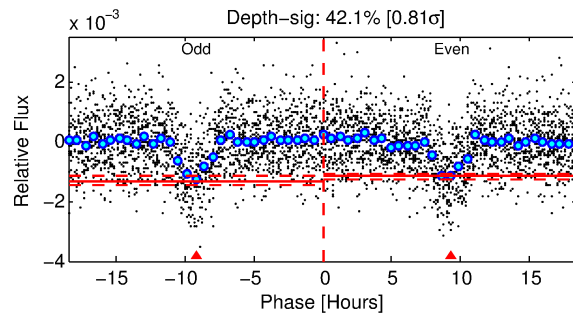
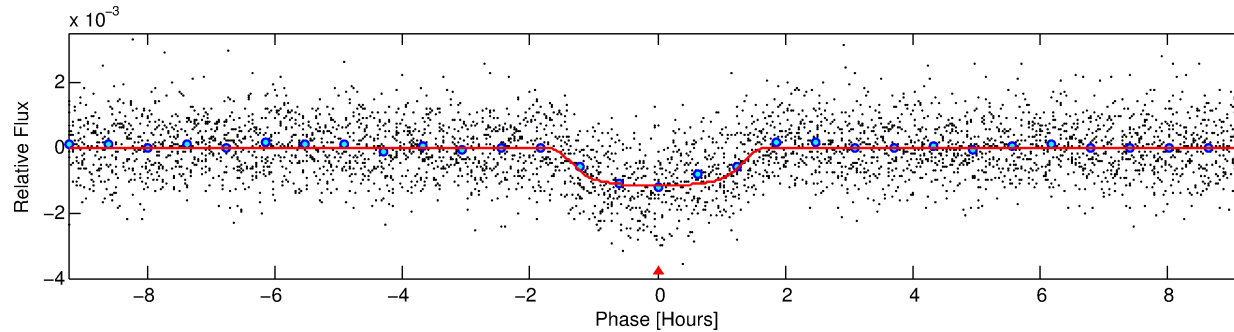
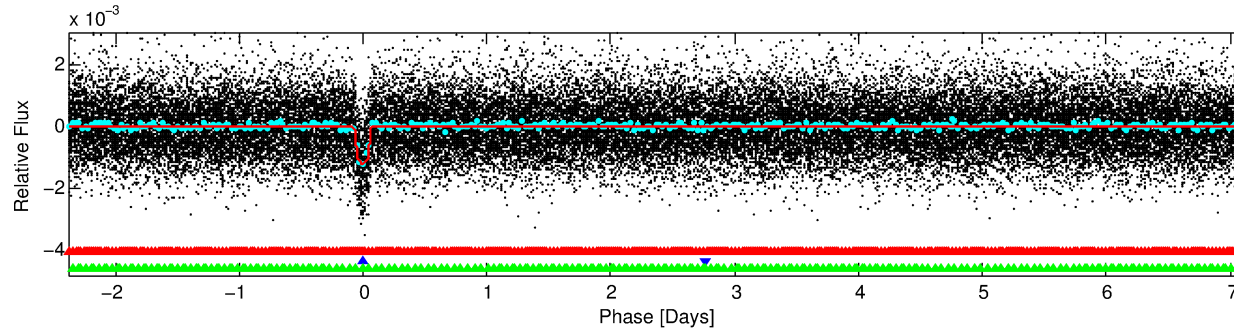
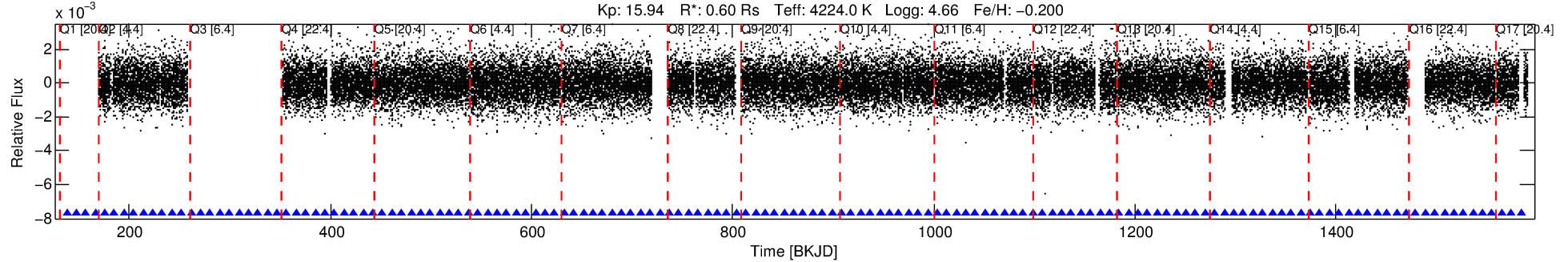
Ephemeris Match Information For 004770365-02

No Significant Match Found

DV One-Page Summary

KIC: 4770365 Candidate: 2 of 3 Period: 9.512 d
KOI: K01475.02 Corr: 0.968

Kp: 15.94 R*: 0.60 Rs Teff: 4224.0 K Logg: 4.66 Fe/H: -0.200



DV Fit Results:

Period = 9.51216 [0.00003] d
Epoch = 137.9234 [0.0026] BKJD
Rp/R* = 0.0361 [0.0069]
a/R* = 14.64 [10.20]
b = 0.83 [0.27]
Seff = 18.69 [1.76]
Teq = 530 [13] K
Rp = 2.38 [0.47] Re
a = 0.0745 [0.0029] AU
Ag = 46.27 [28.55] [1.59σ]
Teffp = 2138 [331] K [4.85σ]

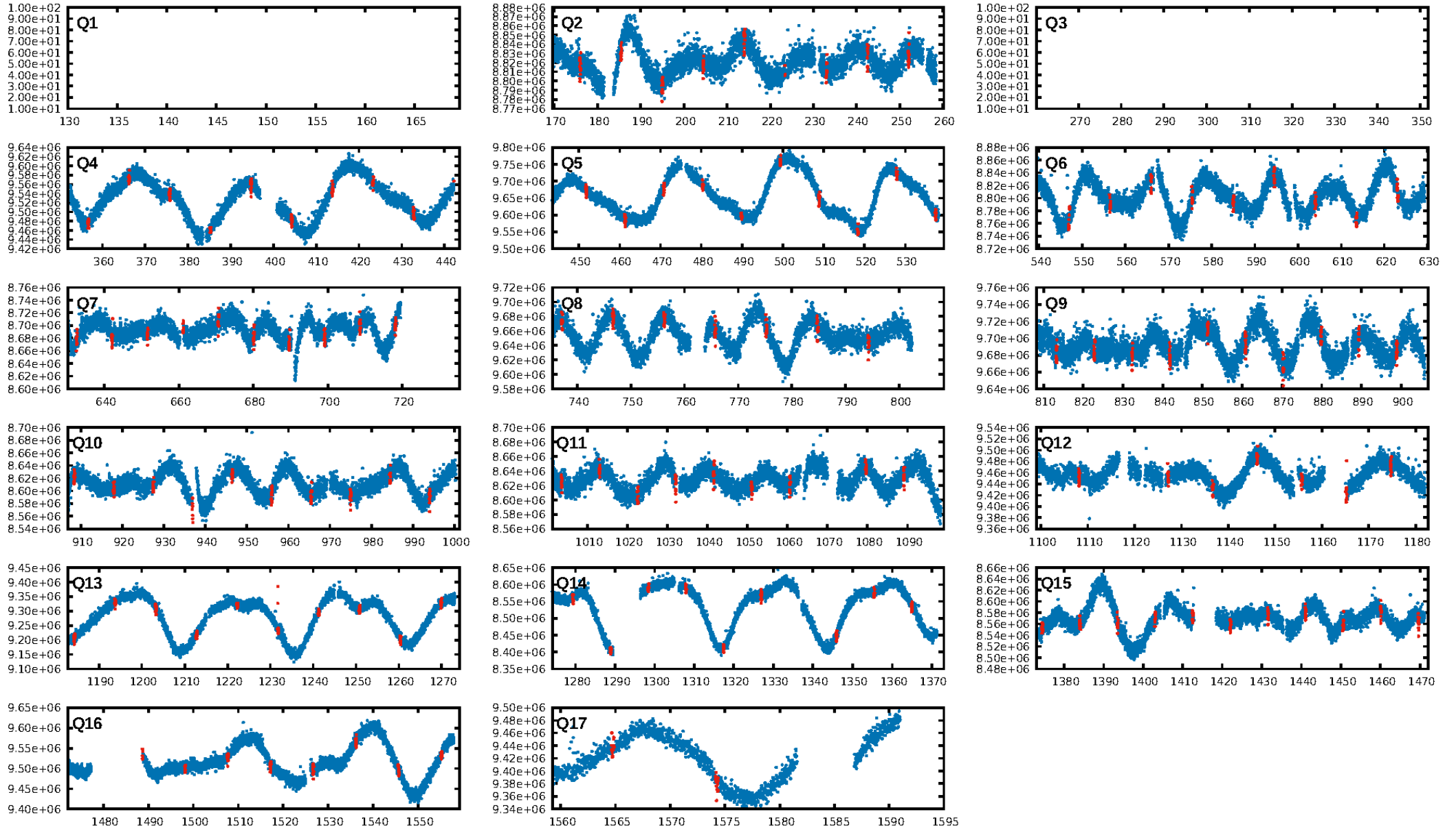
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [29.39σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 87.7%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 2.67e-122
RollingBand-fgt: 1.00 [120/120]
GhostDiagnostic-chr: 2.424
Centroid-sig: N/A
Centroid-so: 1.209 arcsec [3.38σ]
OotOffset-rm: 0.508 arcsec [2.64σ]
KicOffset-rm: 0.206 arcsec [1.25σ]
OotOffset-st: 4/3/3/4 [14]
KicOffset-st: 4/3/3/4 [14]
DiffImageQuality-fgm: 0.93 [13/14]
DiffImageOverlap-fno: 0.87 [13/15]

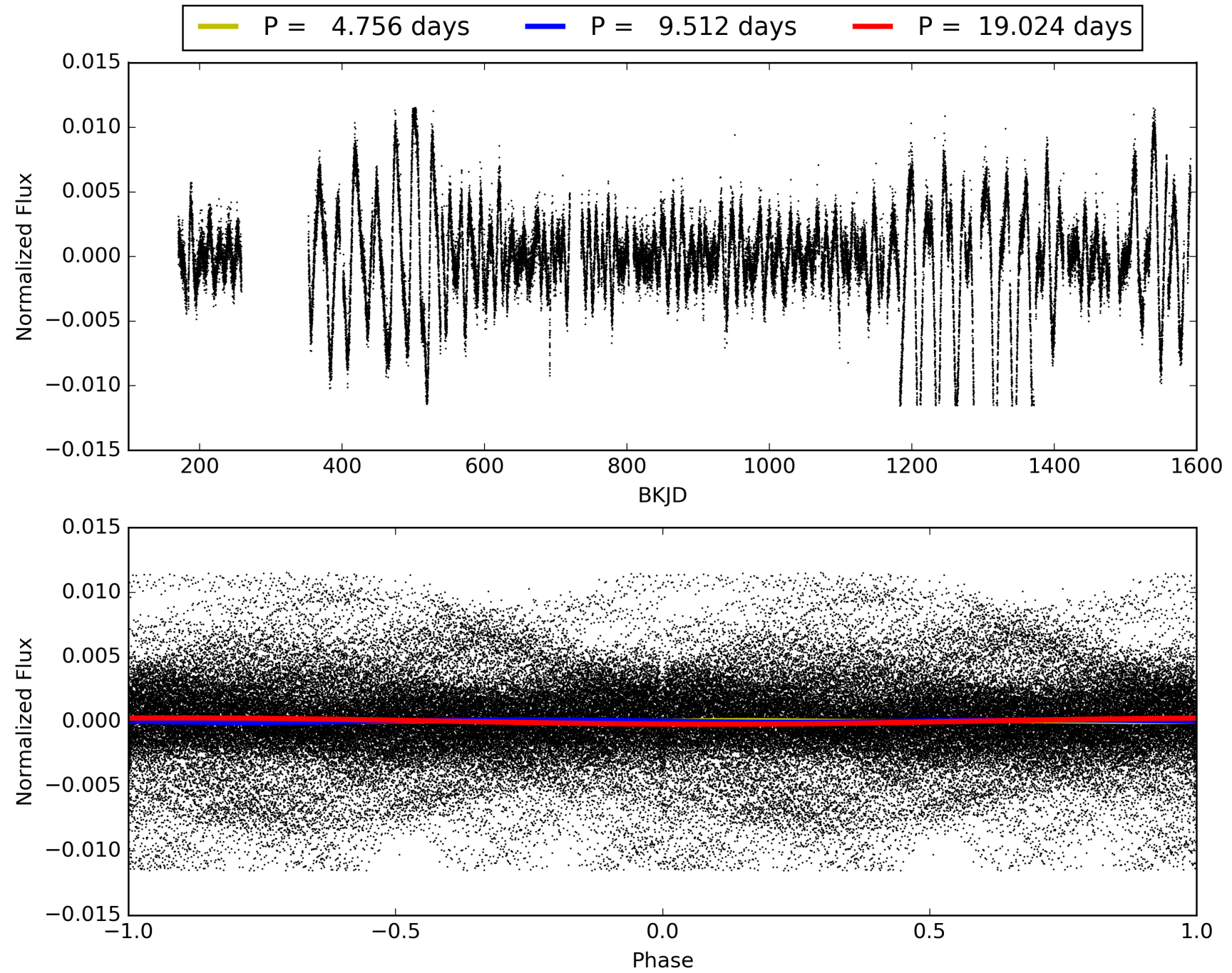
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 23:06:26 Z

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

TCE 004770365-02, PDC Light Curves

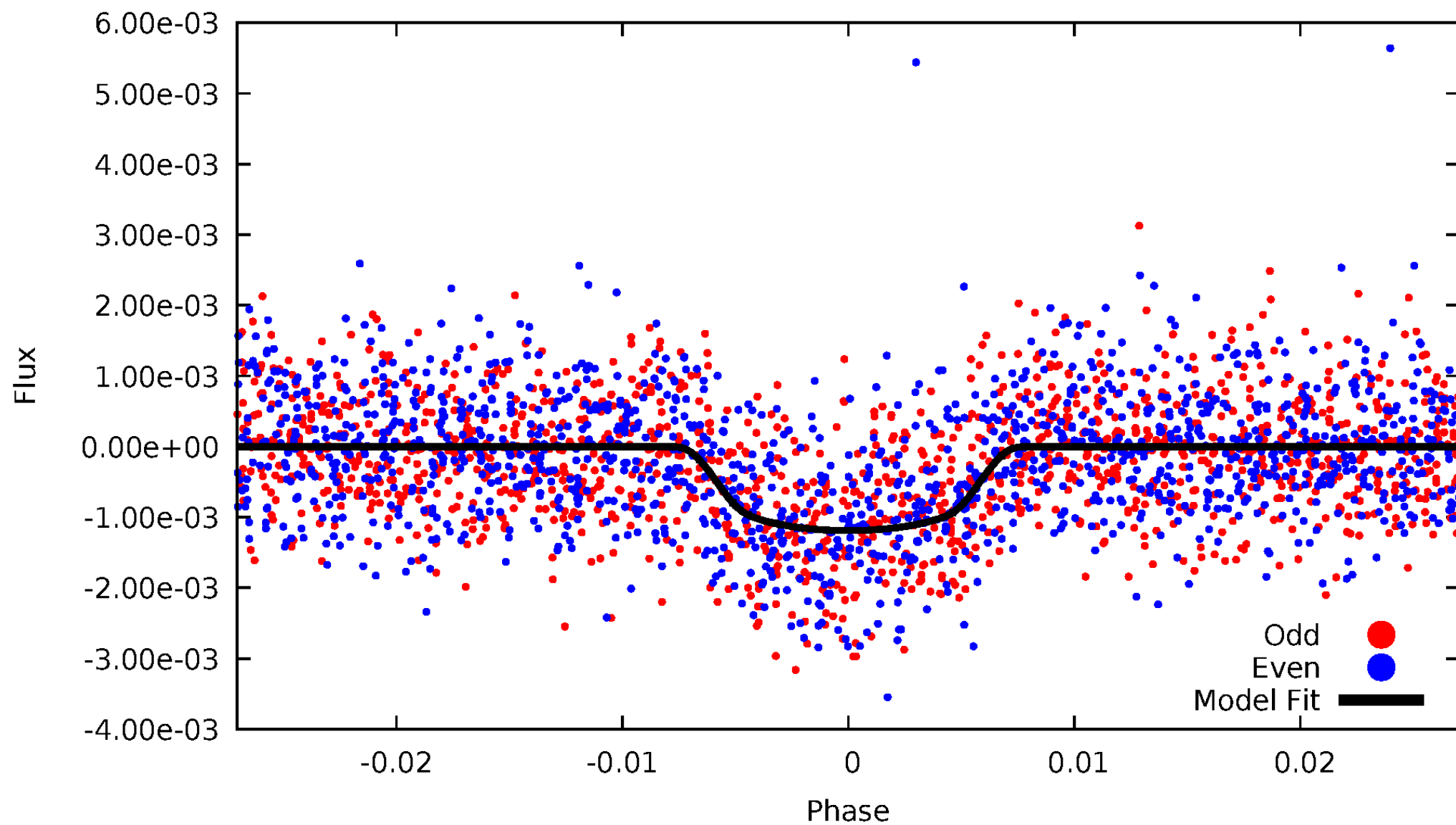


TCE 004770365-02



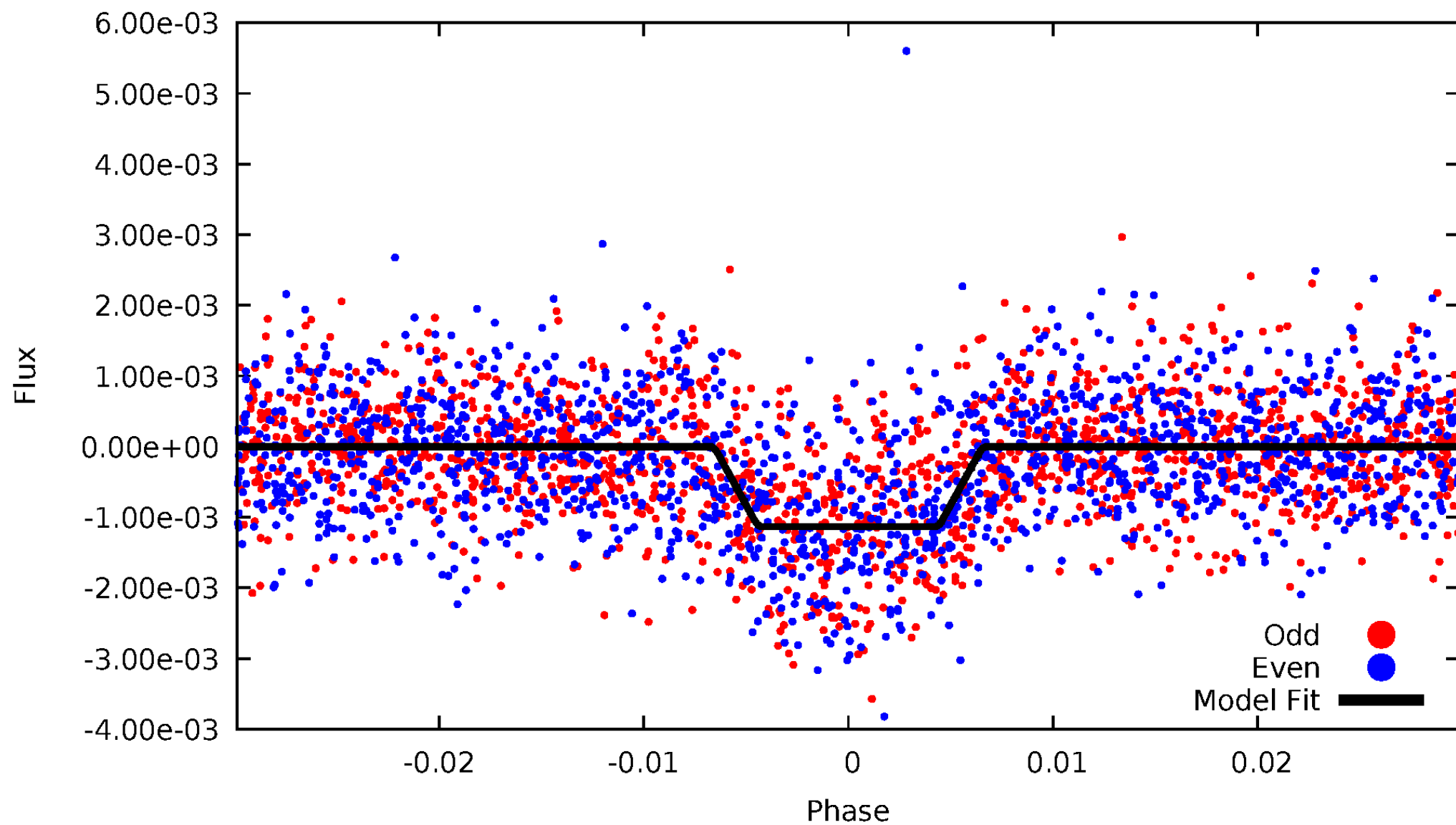
DV Odd/Even

TCE 004770365-02



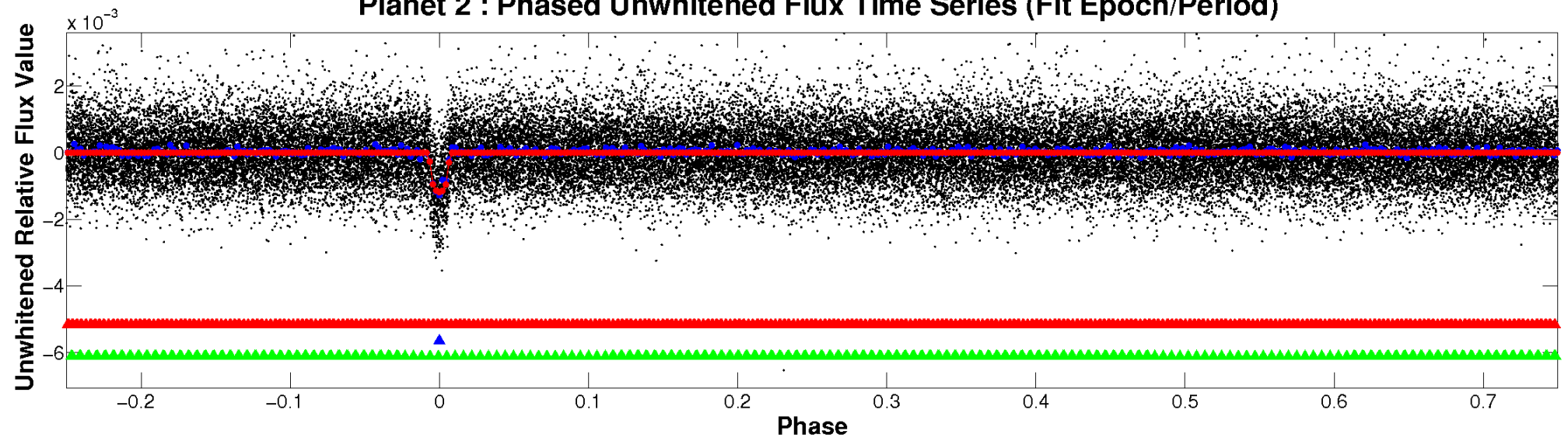
ALT Odd/Even

TCE 004770365-02

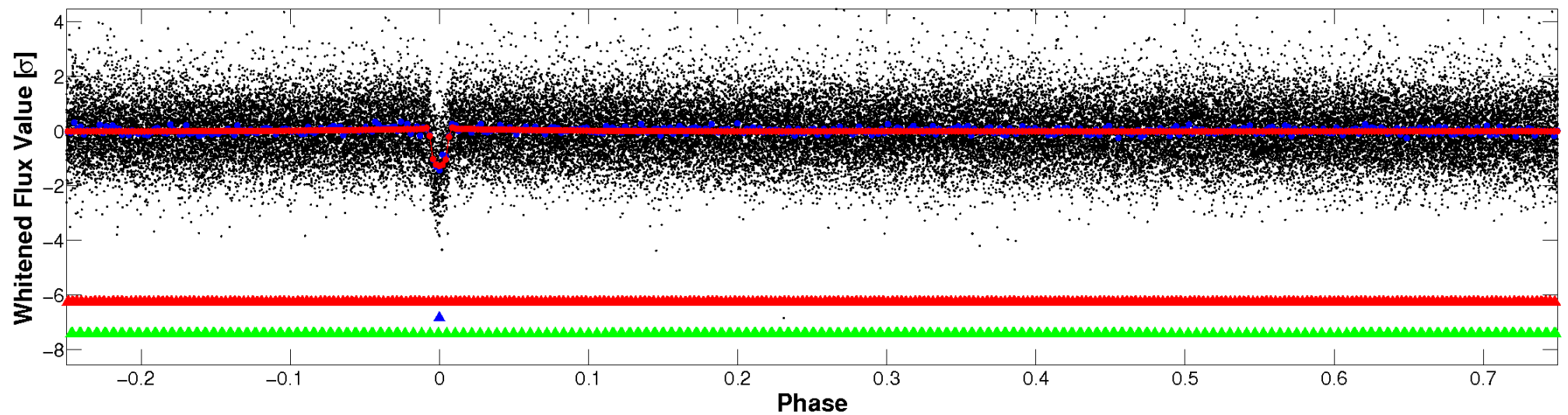


Non-Whitened Vs. Whitened Light Curve

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

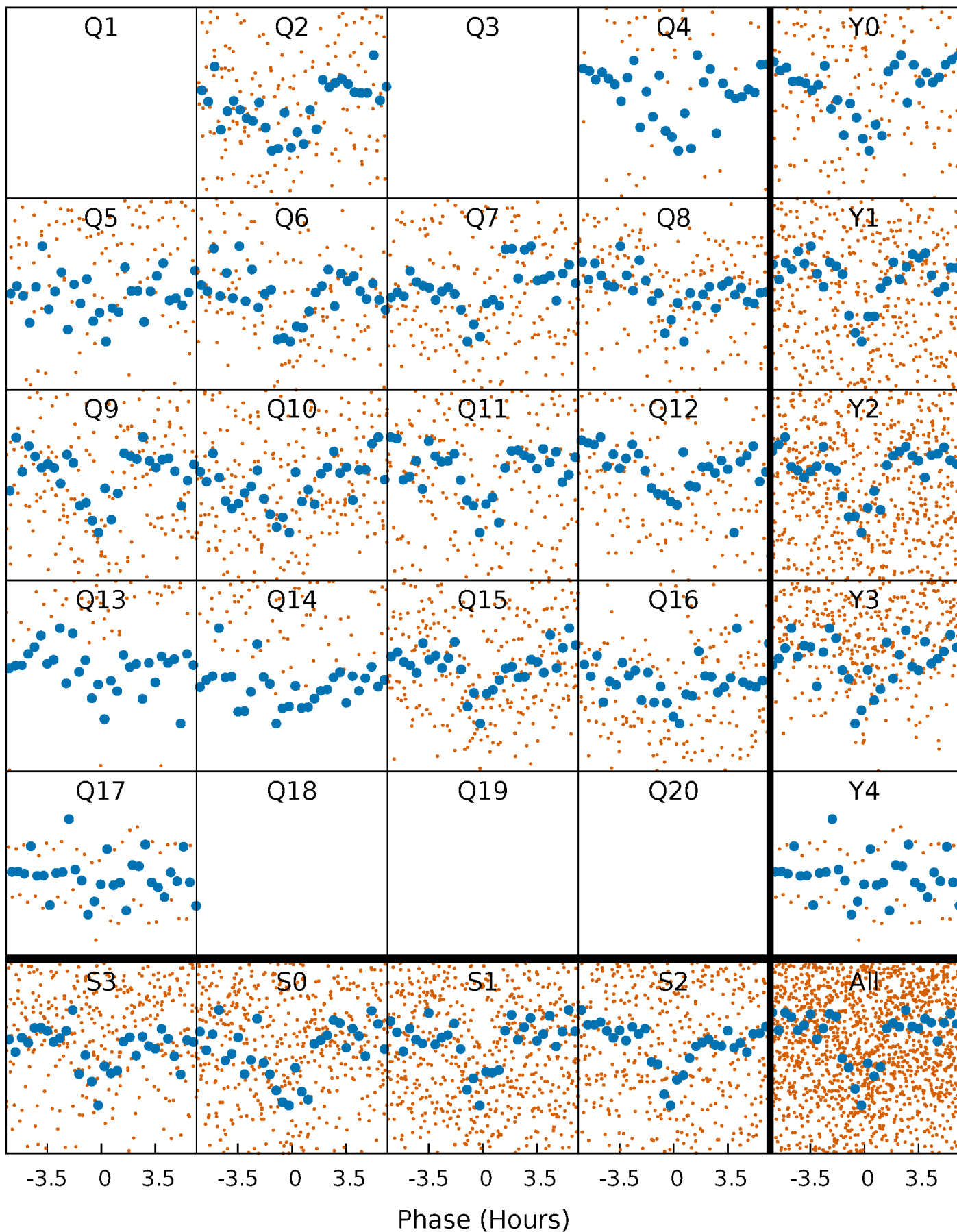


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



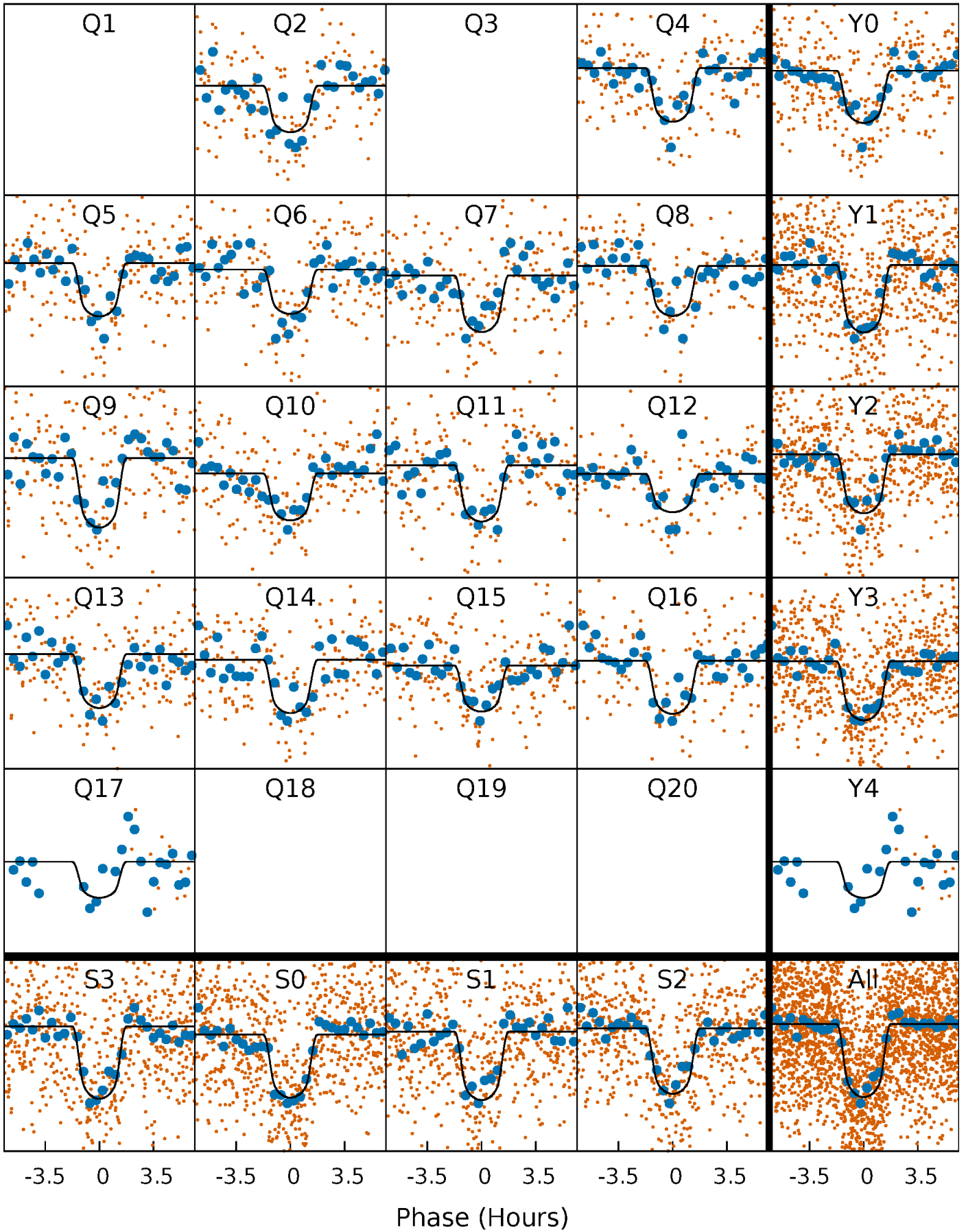
PDC Quarter-Phased Transit Curves

TCE 004770365-02 P= 9.512160 Days $T_0=137.923372$ (BKJD)



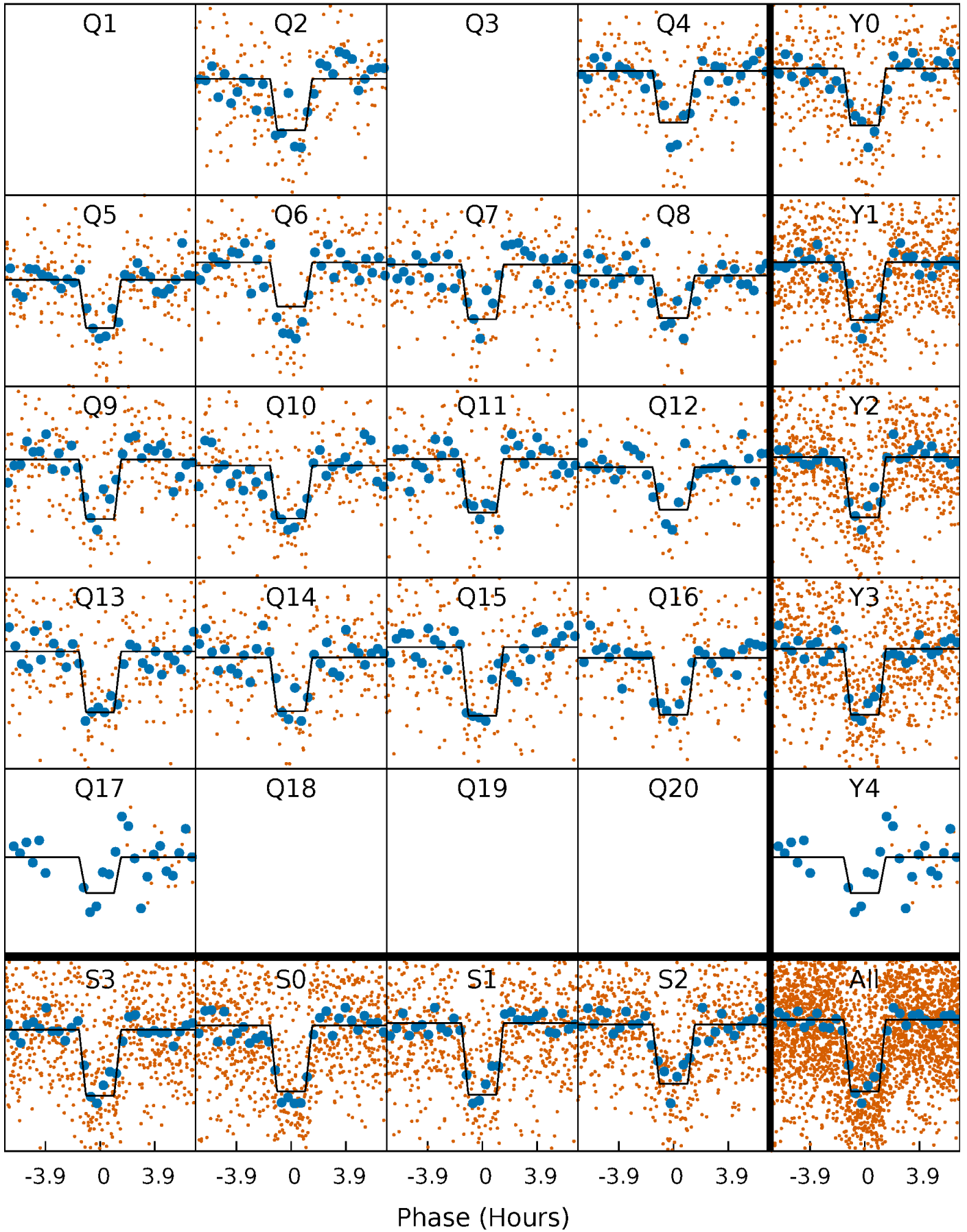
DV Quarter-Phased Transit Curves

TCE 004770365-02 $P = 9.512160$ Days $T_0 = 137.923372$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

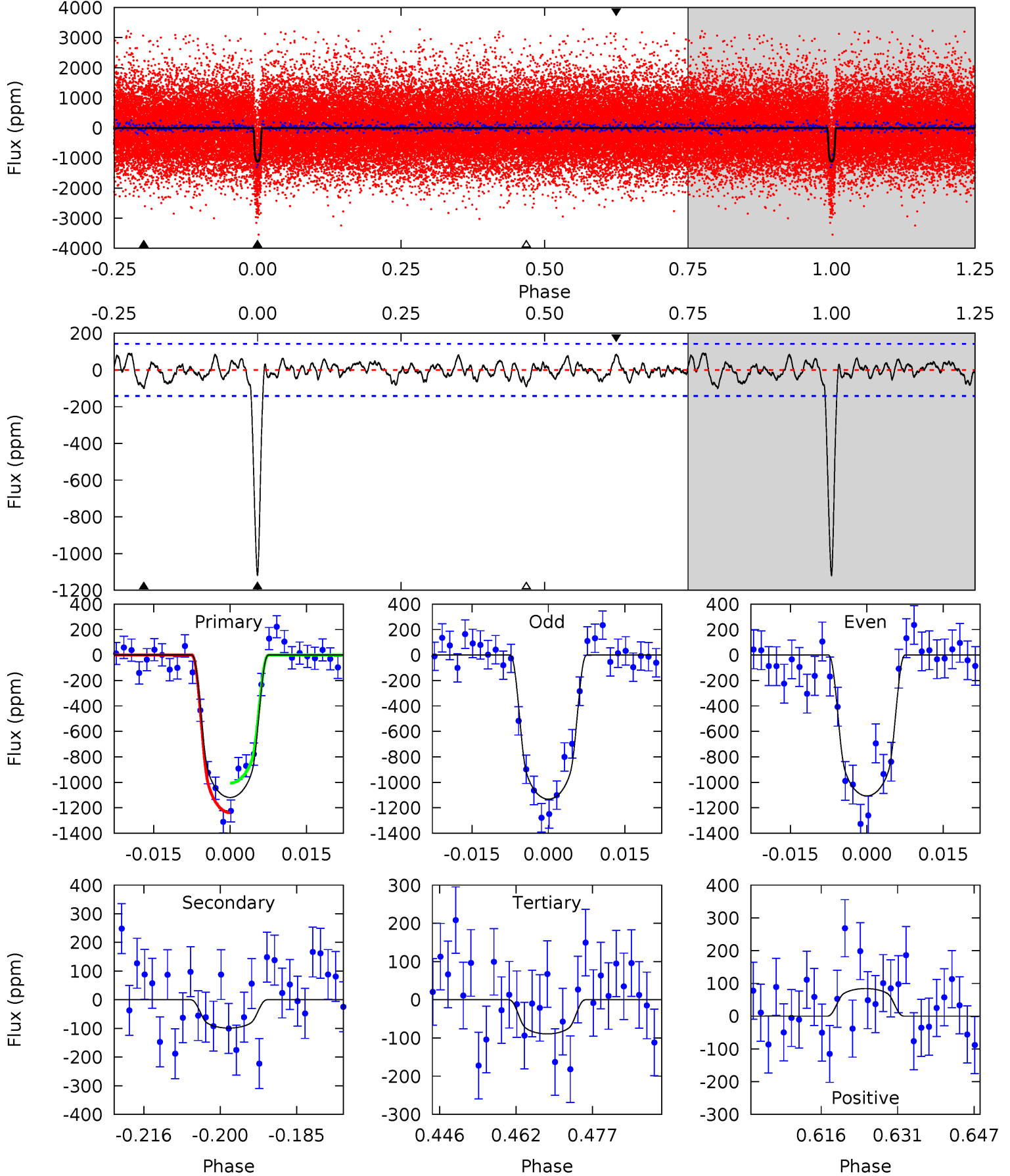
TCE 004770365-02 P= 9.512275 Days $T_0=137.912475$ (BKJD)



DV Model-Shift Uniqueness Test

004770365-02, P = 9.512160 Days, E = 137.923372 Days

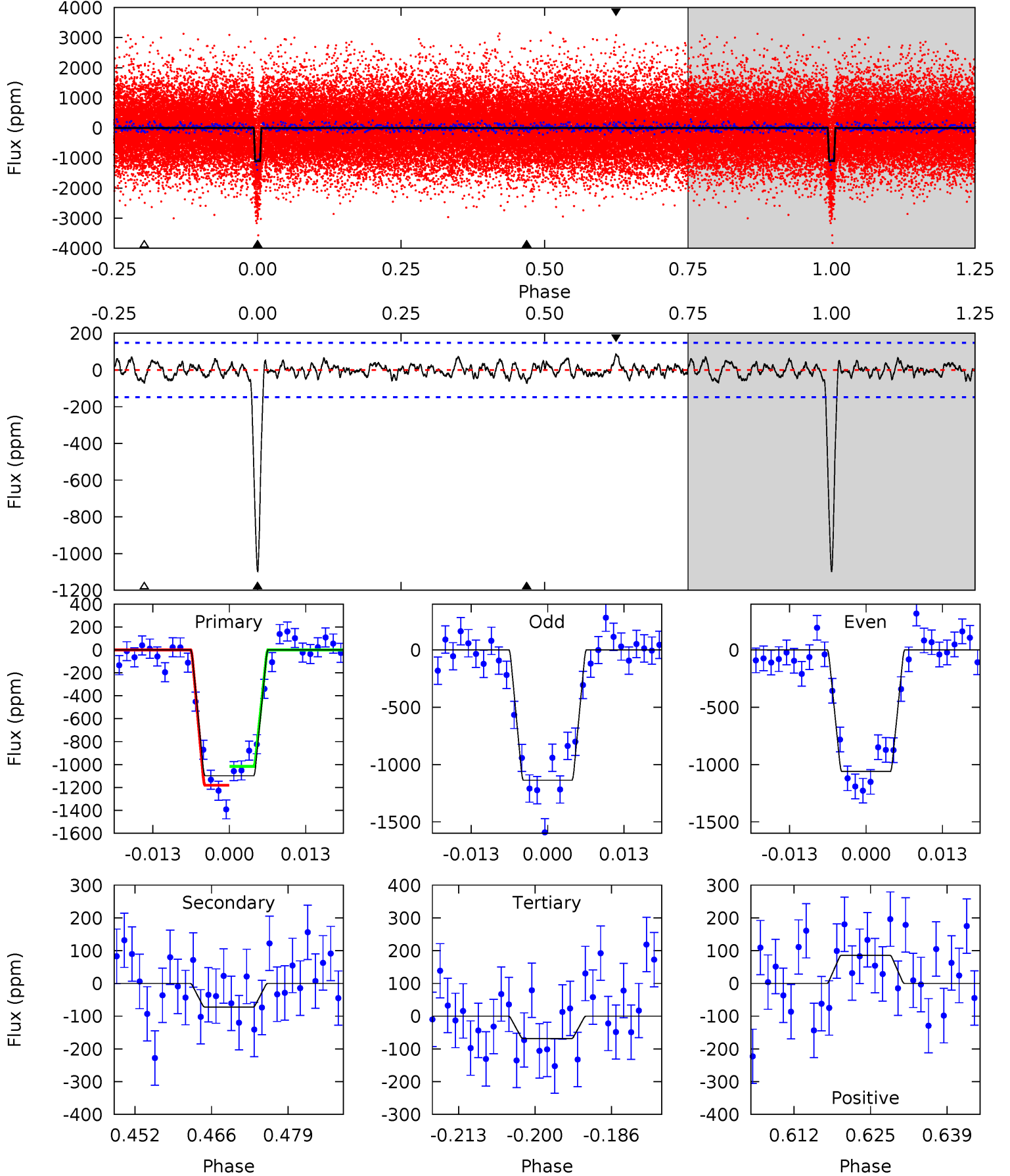
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 38.9 | 3.43 | 3.11 | 2.92 | 4.94 | 2.42 | 1.17 | 35.8 | 35.9 | 0.32 | 0.51 | 0.44 | 0.98 | 0.08 | 4.05 |



Alt Model-Shift Uniqueness Test

004770365-02, P = 9.512275 Days, E = 137.912475 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 36.9 | 2.42 | 2.31 | 2.88 | 4.97 | 2.48 | 0.94 | 34.6 | 34.1 | 0.12 | -0.46 | 1.29 | 0.97 | 0.07 | 2.78 |



Stellar Parameters For KIC 004770365

| | $T_{\text{eff}}(K)$ | $\log(g)$ | $[\text{Fe}/\text{H}]$ | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|---------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 4224^{+84}_{-84} | $4.662^{+0.025}_{-0.020}$ | $-0.200^{+0.150}_{-0.150}$ | $0.603^{+0.027}_{-0.030}$ | $0.609^{+0.033}_{-0.033}$ | $3.921^{+0.420}_{-0.346}$ |
| | +2%/-2% | +1%/-0% | +75%/-75% | +4%/-5% | +5%/-5% | +11%/-9% |
| Source | SPE60 | SPE60 | SPE60 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 004770365-02 / KOI 1475.02

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|--------------|------------------------|----------------------|----------------------|------------------|
| DV | -99 ± 29 | $2.38^{+0.47}_{-0.43}$ | 740^{+17}_{-15} | 2817^{+198}_{-180} | 53^{+34}_{-20} |
| Alt. | -72 ± 30 | $2.19^{+0.49}_{-0.45}$ | 740^{+16}_{-14} | 2739^{+249}_{-216} | 43^{+35}_{-20} |

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

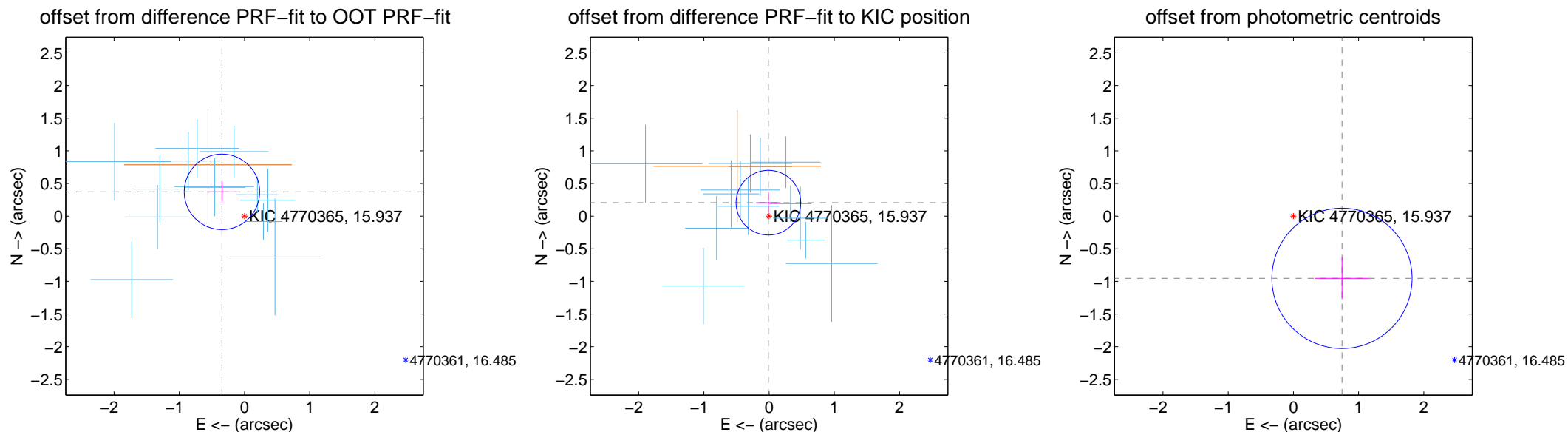
DV Centroid Data

Supplemental centroid analysis for 004770365-02. Kepler magnitude: 15.94. Transit SNR 26.83

There are 13 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|-------------------|
| PRF-fit source offset from OOT | 0.508 ± 0.193 | 2.64 | 0.346 ± 0.228 | 0.372 ± 0.166 |
| PRF-fit source offset from KIC position | 0.206 ± 0.165 | 1.25 | 0.010 ± 0.187 | 0.206 ± 0.163 |
| photometric centroid source offset | 1.21 ± 0.36 | 3.38 | -0.74 ± 0.41 | -0.95 ± 0.32 |



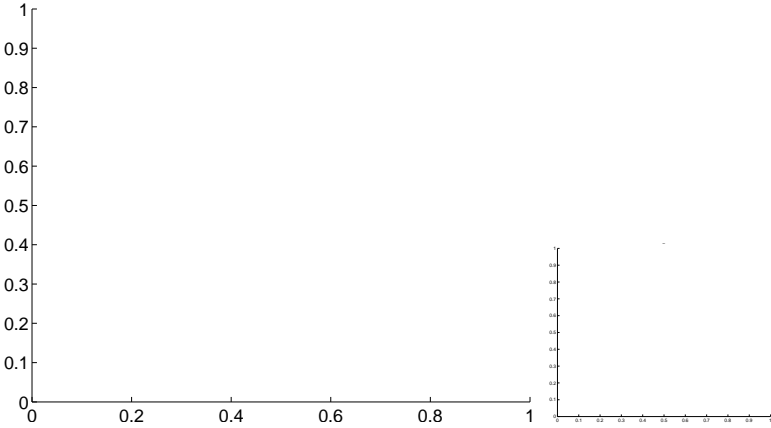
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

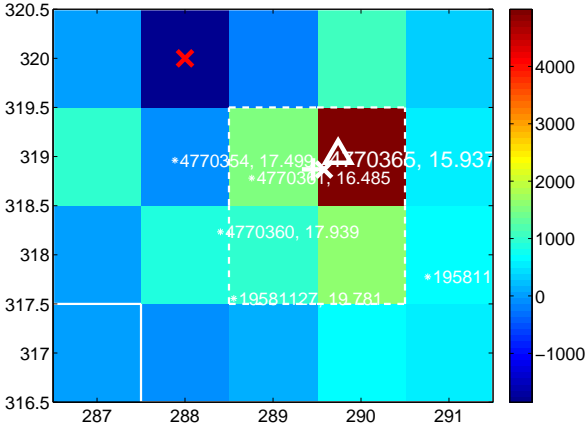
Q1 no difference image



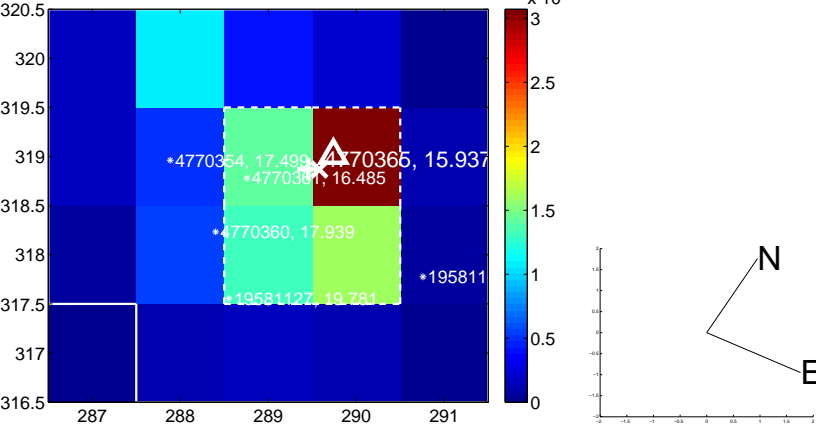
Q1 no OOT image



Q2 difference image



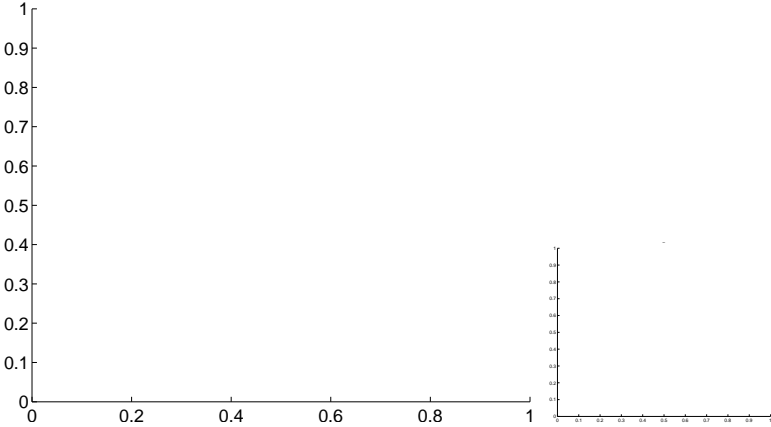
Q2 OOT image



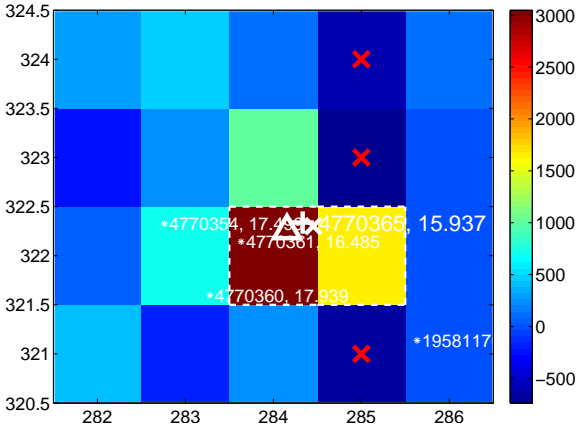
Q3 no difference image



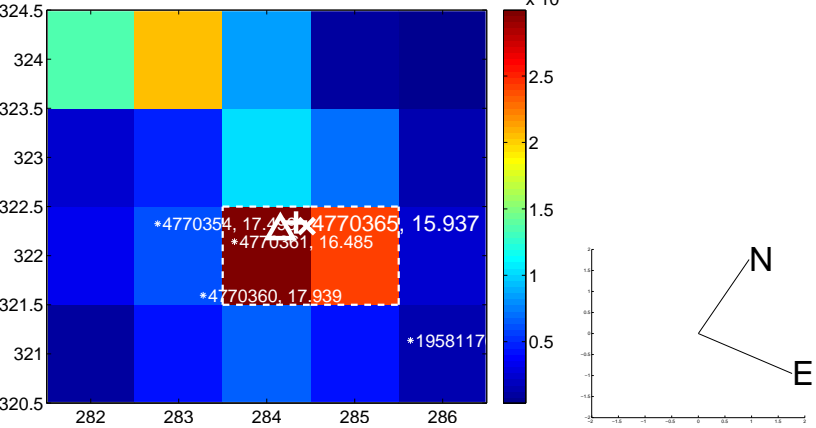
Q3 no OOT image



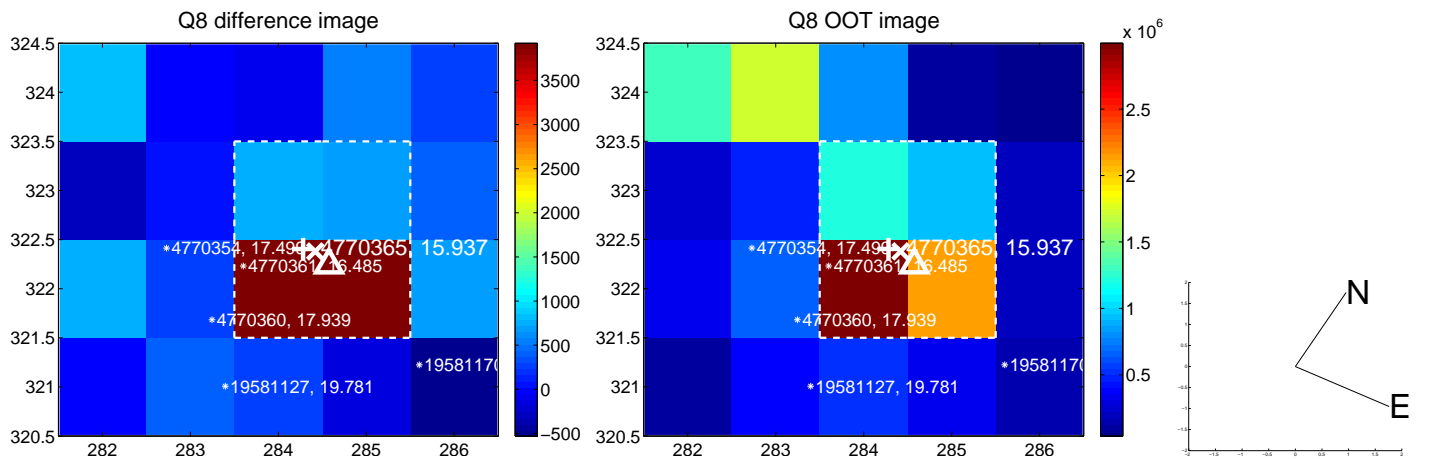
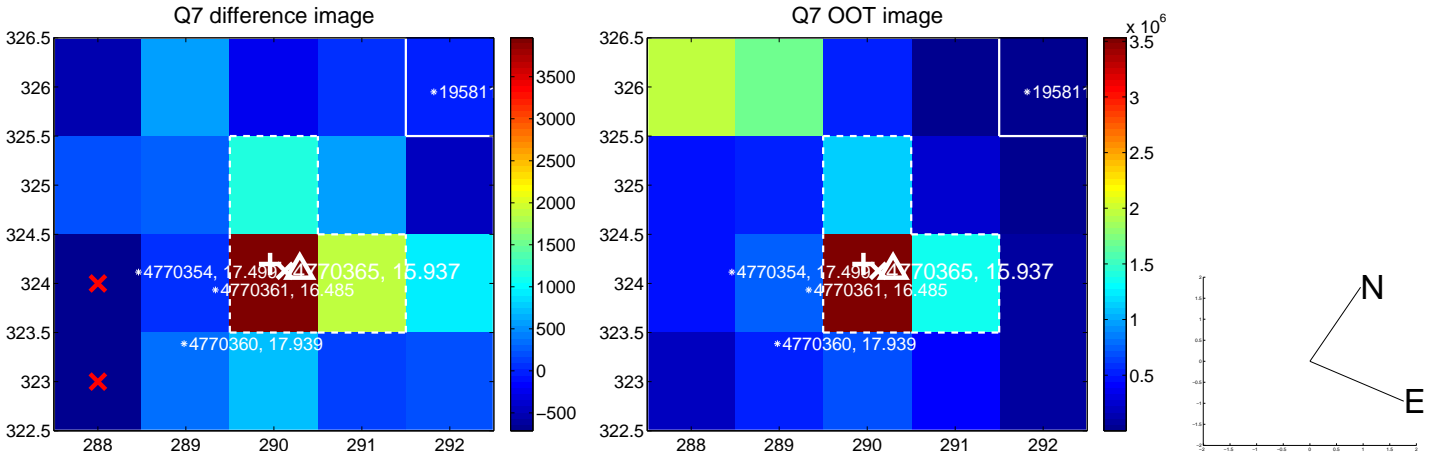
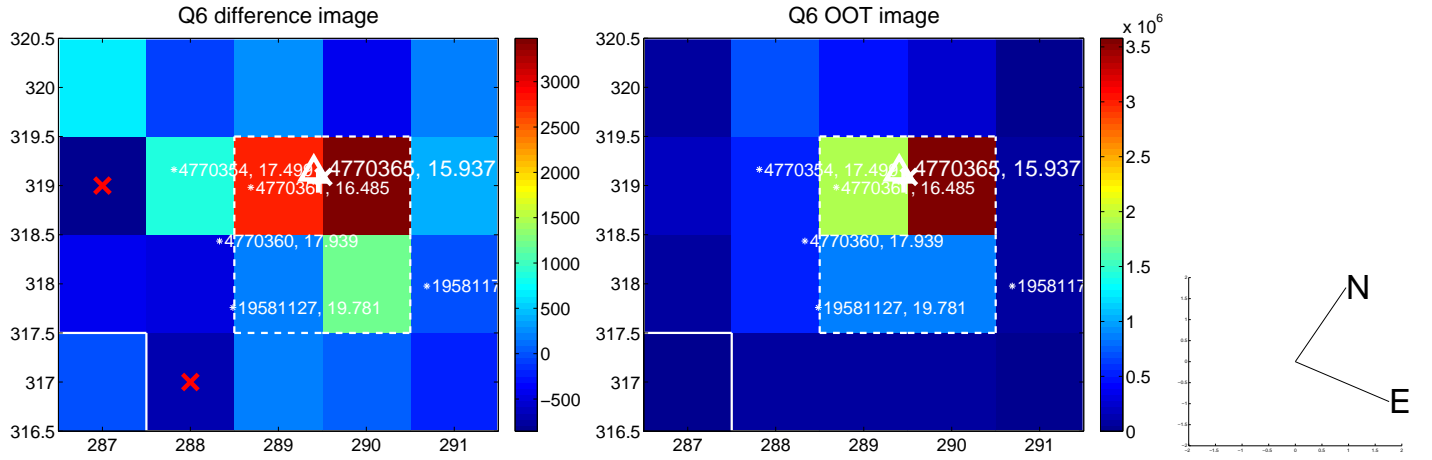
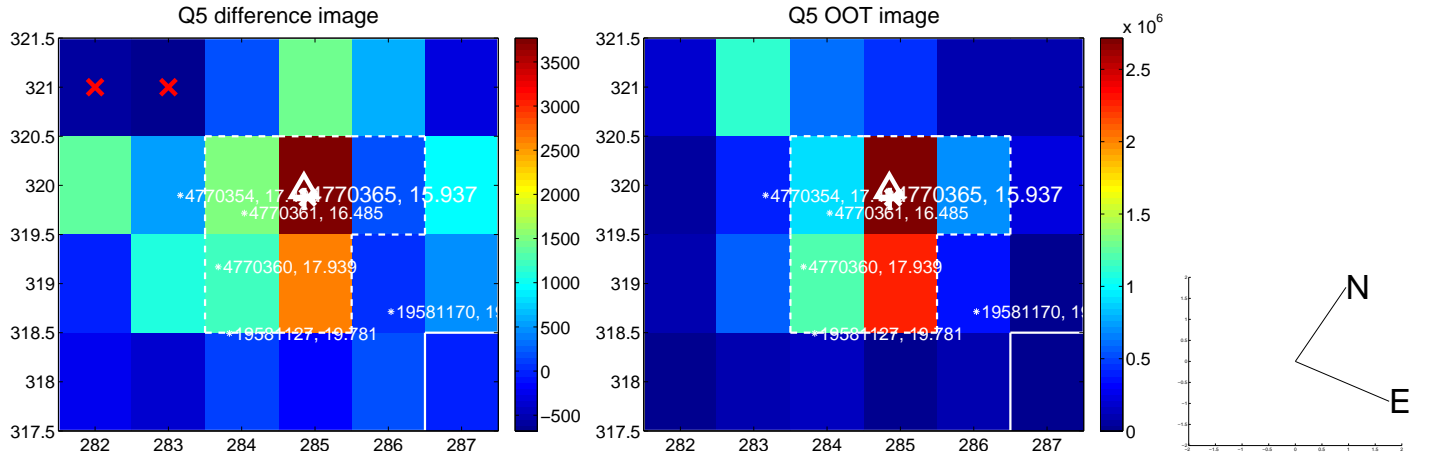
Q4 difference image



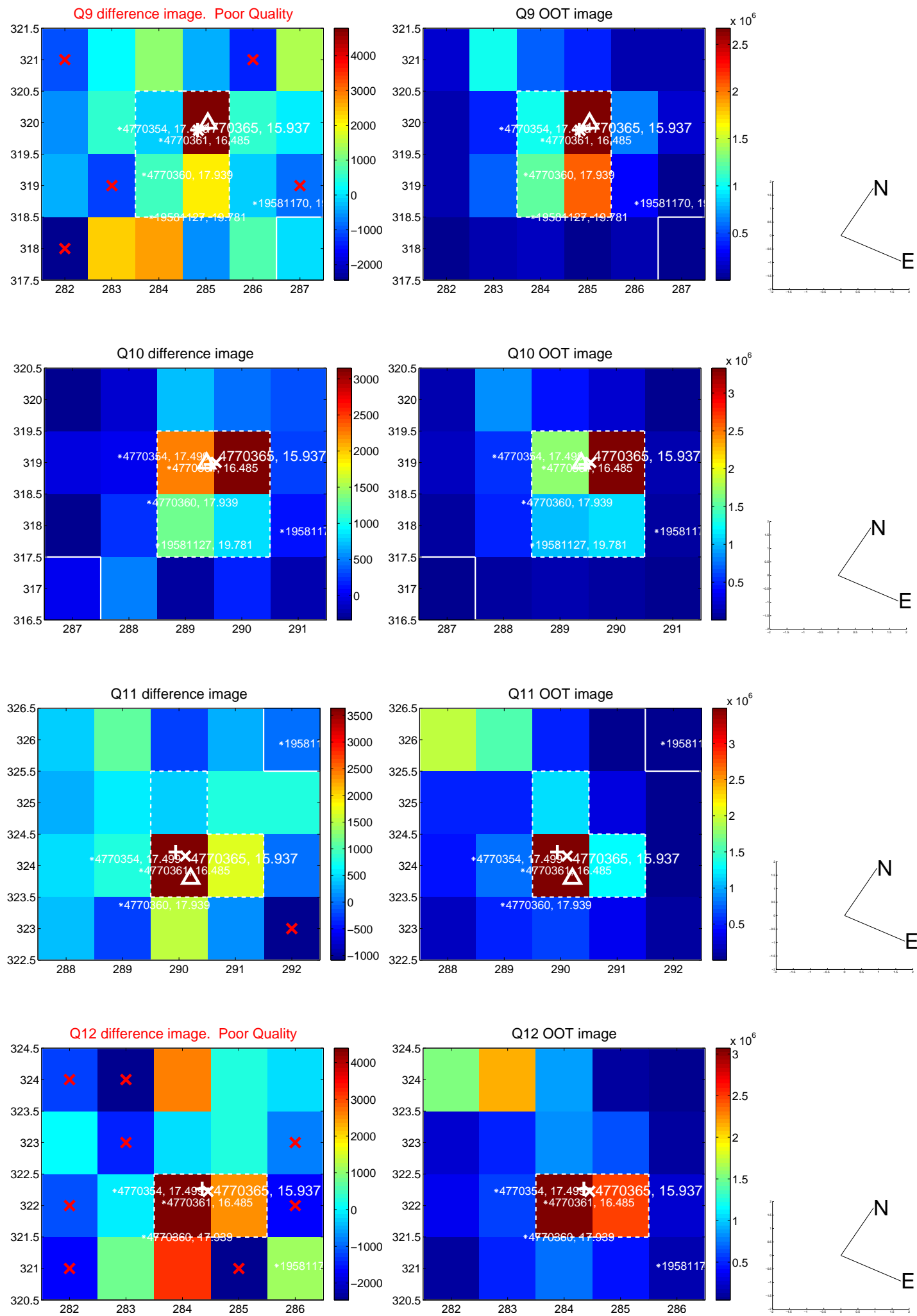
Q4 OOT image



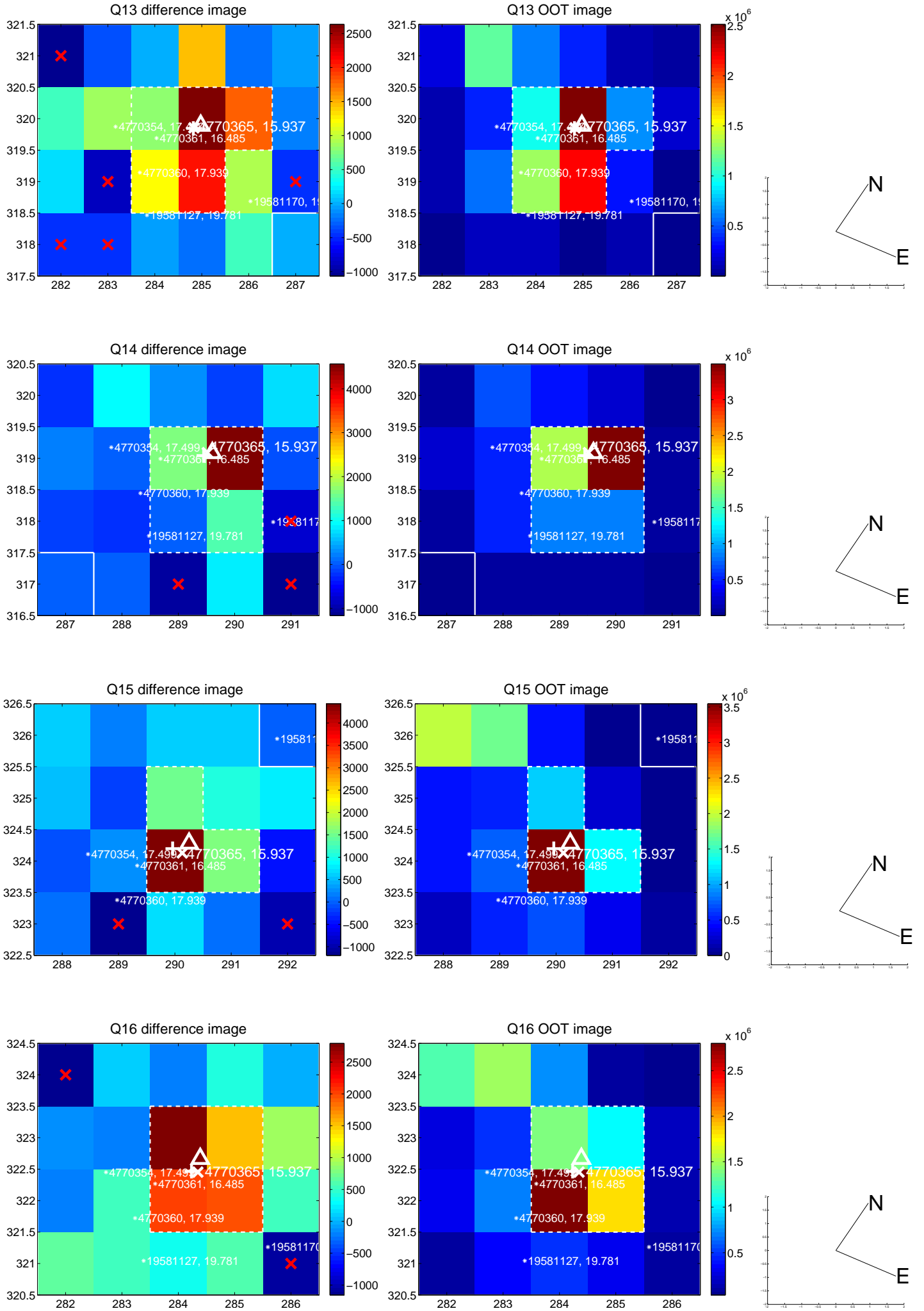
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



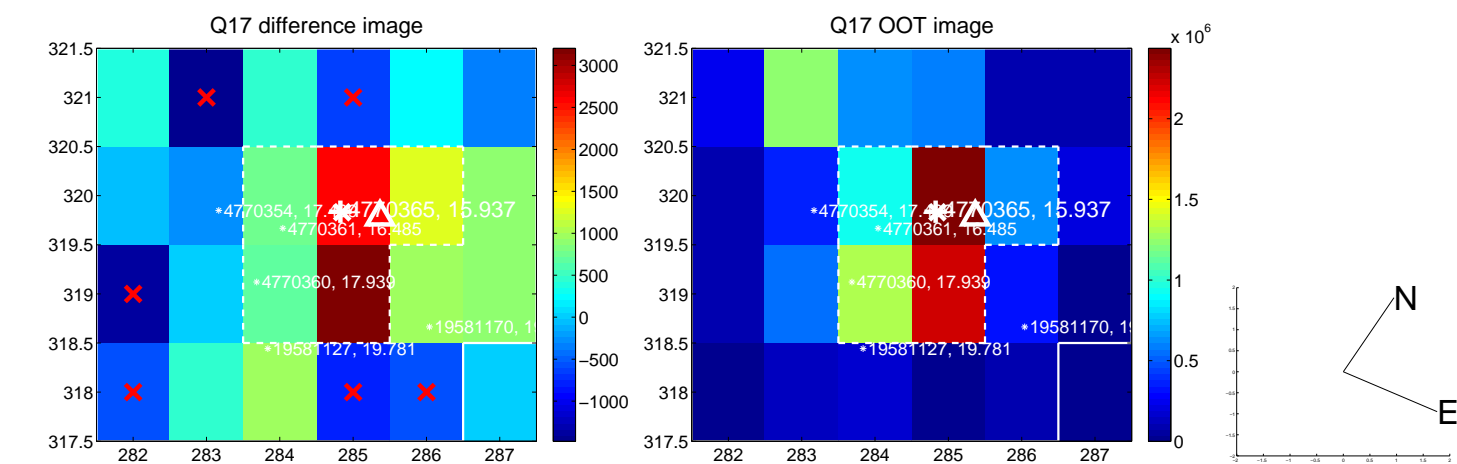
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



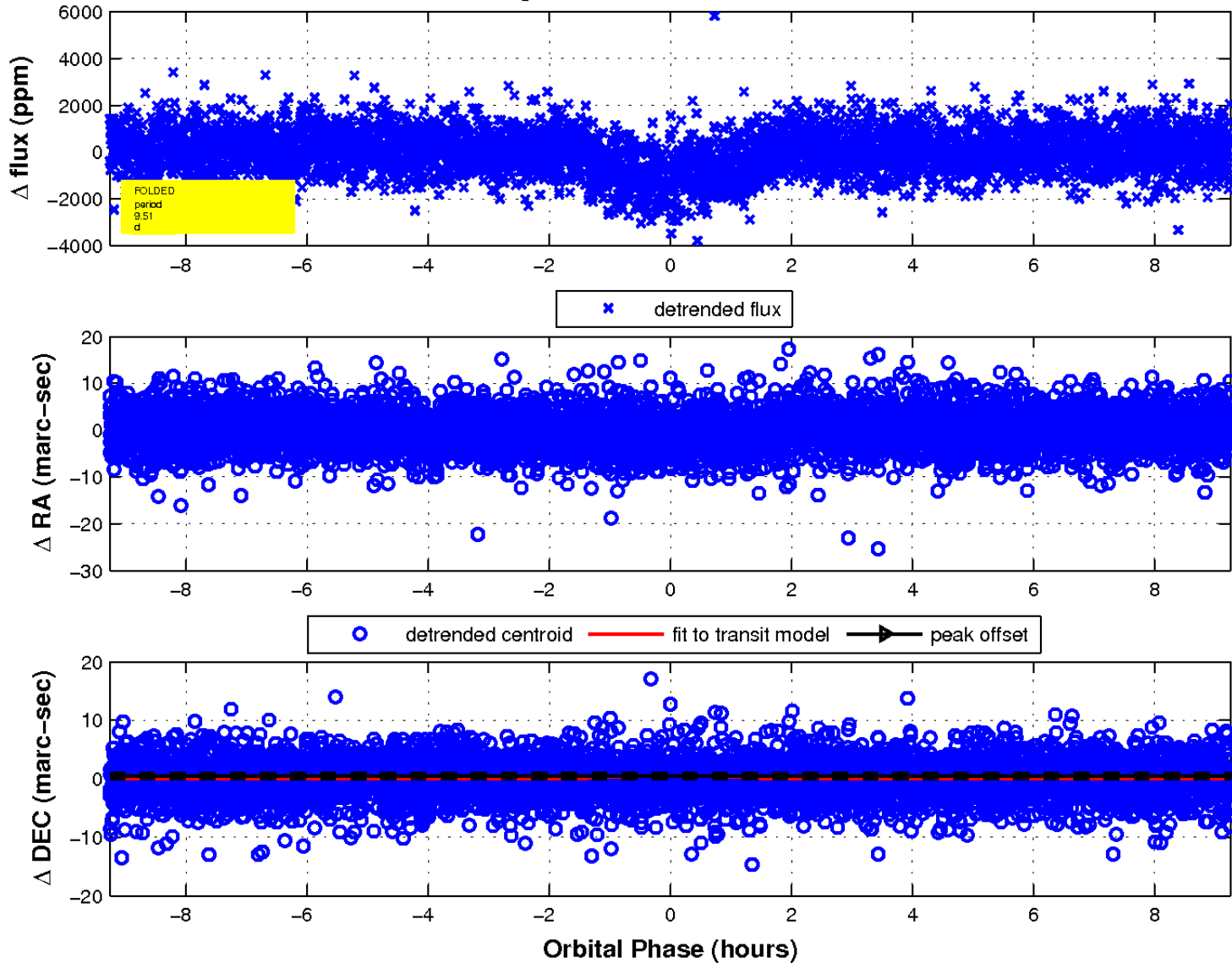
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

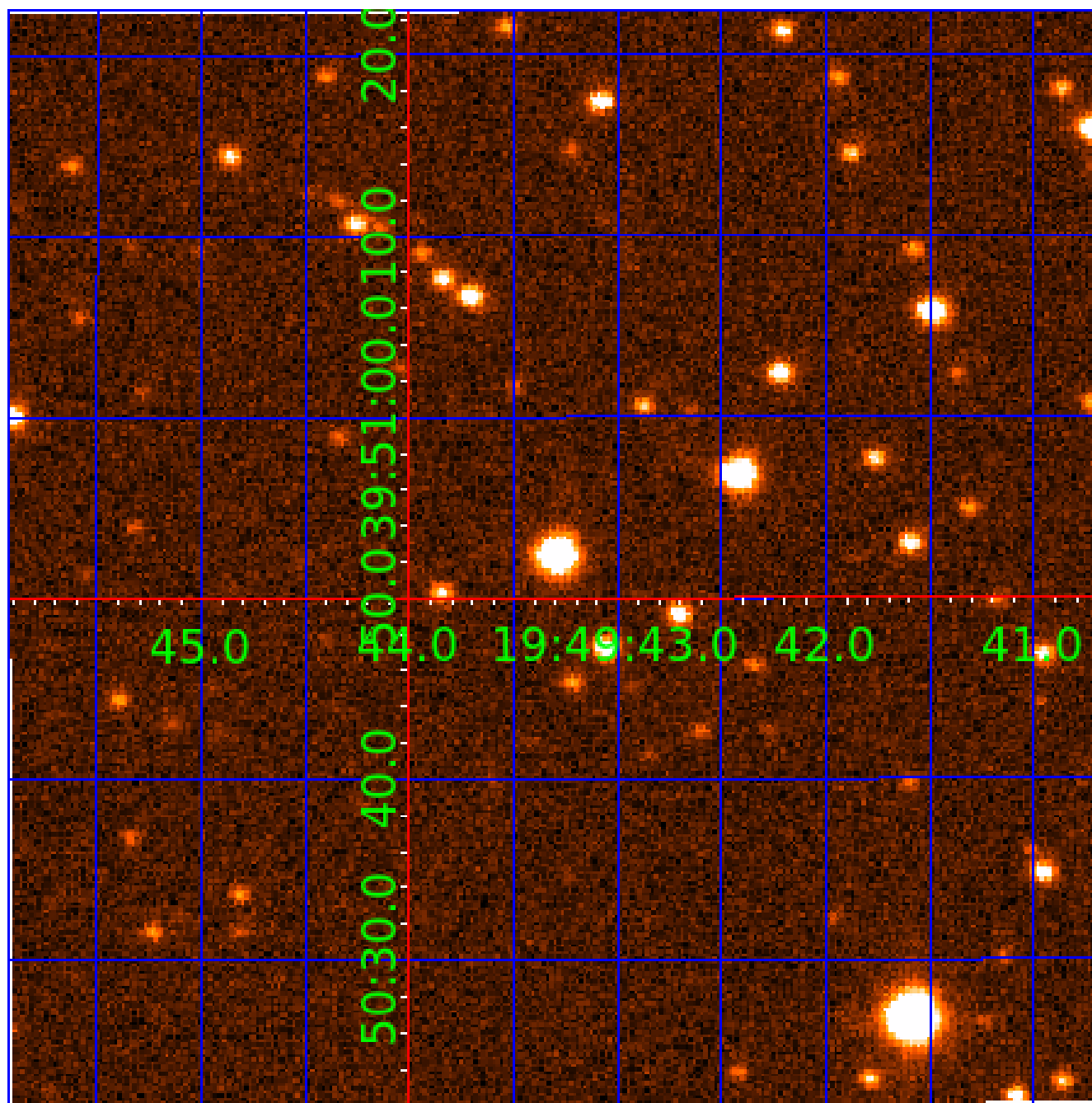


fluxWeightedCentroids, Planet 2 of 3



UKIRT Image

Declination



KIC 004770365

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 004770365-01 | OBS | 1475.01 | 1.609320 | 132.273220 | 716.2 | 1.653 | 29.2 | 33.8 | 0.60 | 4224 | 1.73 | 199.75 |
| 004770365-02 | OBS | 1475.02 | 9.512160 | 137.923372 | 1188.3 | 3.087 | 24.0 | 26.8 | 0.60 | 4224 | 2.38 | 18.69 |
| 004770365-03 | OBS | 1475.03 | 4.729467 | 132.929496 | 433.3 | 2.391 | 10.9 | 12.5 | 0.60 | 4224 | 1.60 | 47.45 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--------------|
| 004770365-01 | OBS | PC | 1.00 | 0 | 0 | 0 | 0 | NO_COMMENT |
| 004770365-02 | OBS | PC | 0.97 | 0 | 0 | 0 | 0 | NO_COMMENT |
| 004770365-03 | OBS | PC | 0.99 | 0 | 0 | 0 | 0 | CENT_KIC_POS |

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.

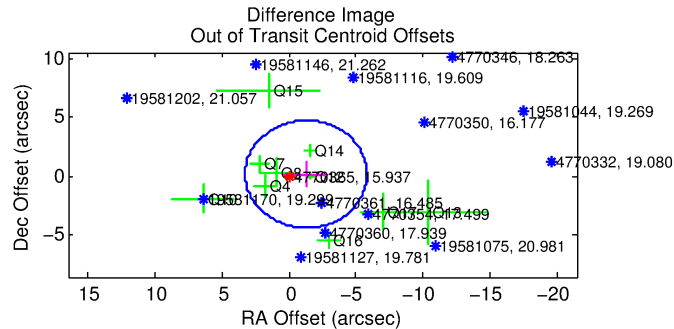
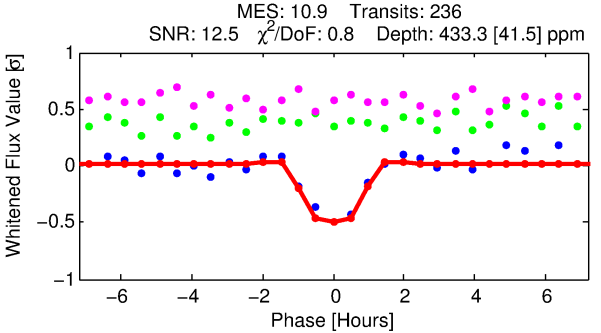
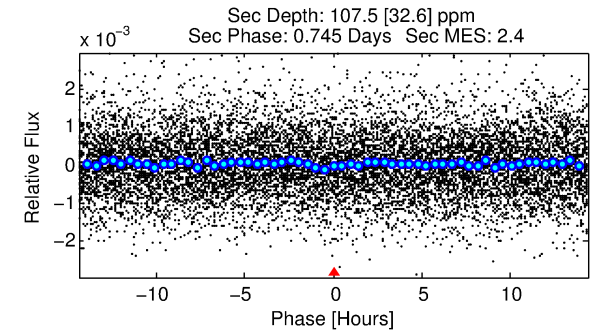
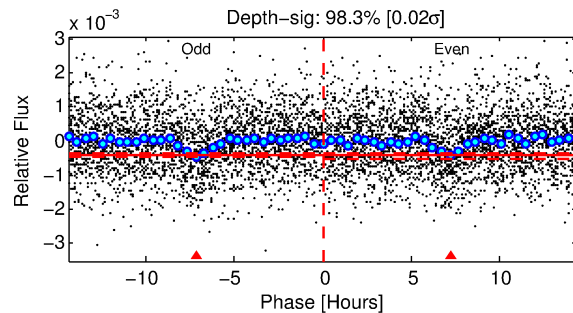
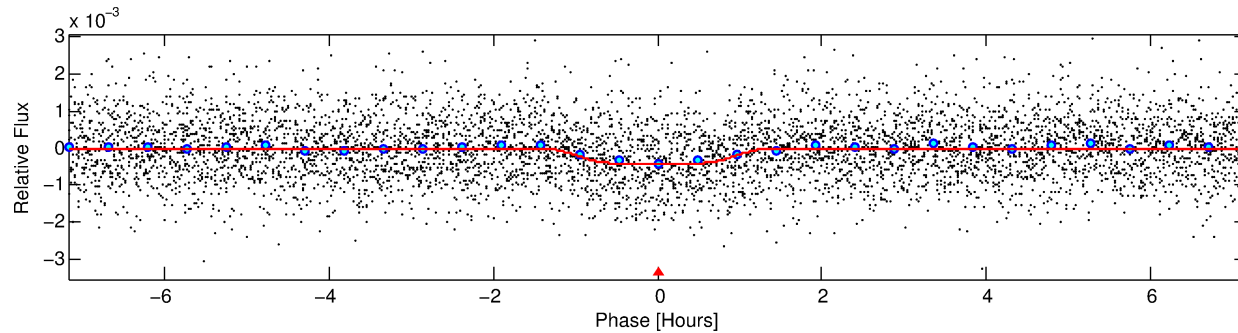
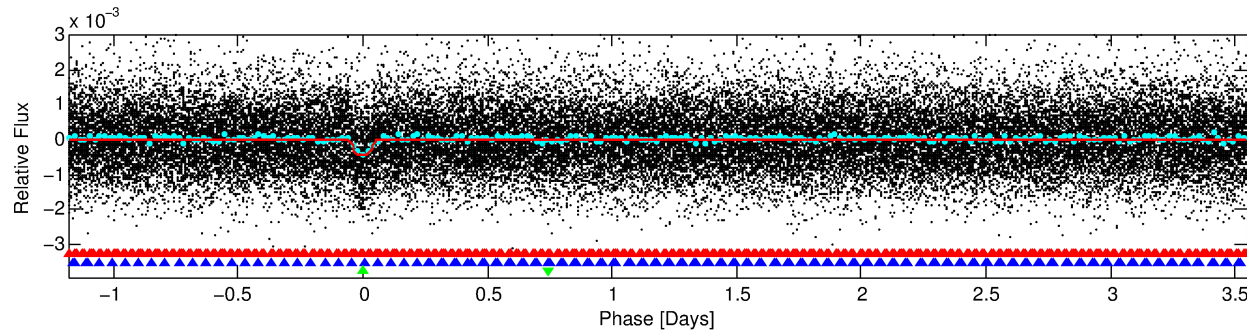
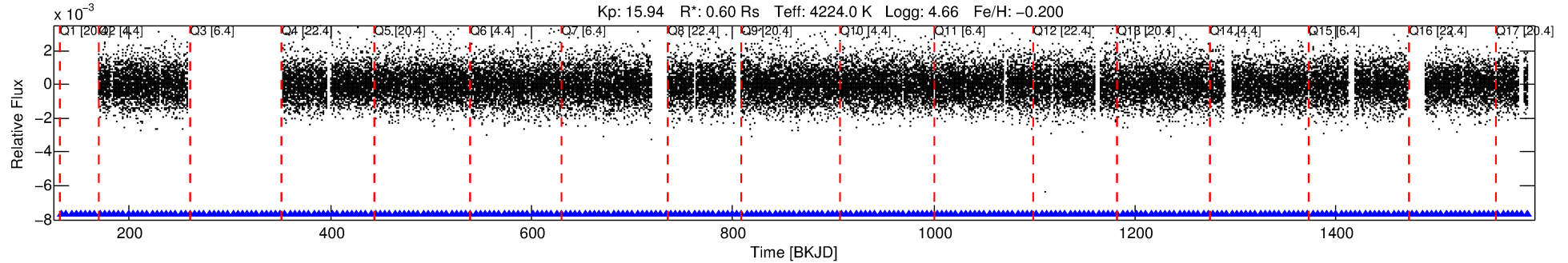
Ephemeris Match Information For 004770365-03

No Significant Match Found

DV One-Page Summary

KIC: 4770365 Candidate: 3 of 3 Period: 4.729 d
KOI: K01475.03 Corr: 0.962

Kp: 15.94 R*: 0.60 Rs Teff: 4224.0 K Logg: 4.66 Fe/H: -0.200



DV Fit Results:

Period = 4.72947 [0.00002] d
Epoch = 132.9295 [0.0036] BKJD
Rp/R* = 0.0243 [0.0055]
a/R* = 6.48 [5.69]
b = 0.93 [0.13]
Seff = 47.45 [4.48]
Teff = 669 [16] K
Rp = 1.60 [0.37] Re
a = 0.0468 [0.0018] AU
Ag = 50.48 [27.68] [1.79σ]
Teffp = 2758 [380] K [5.49σ]

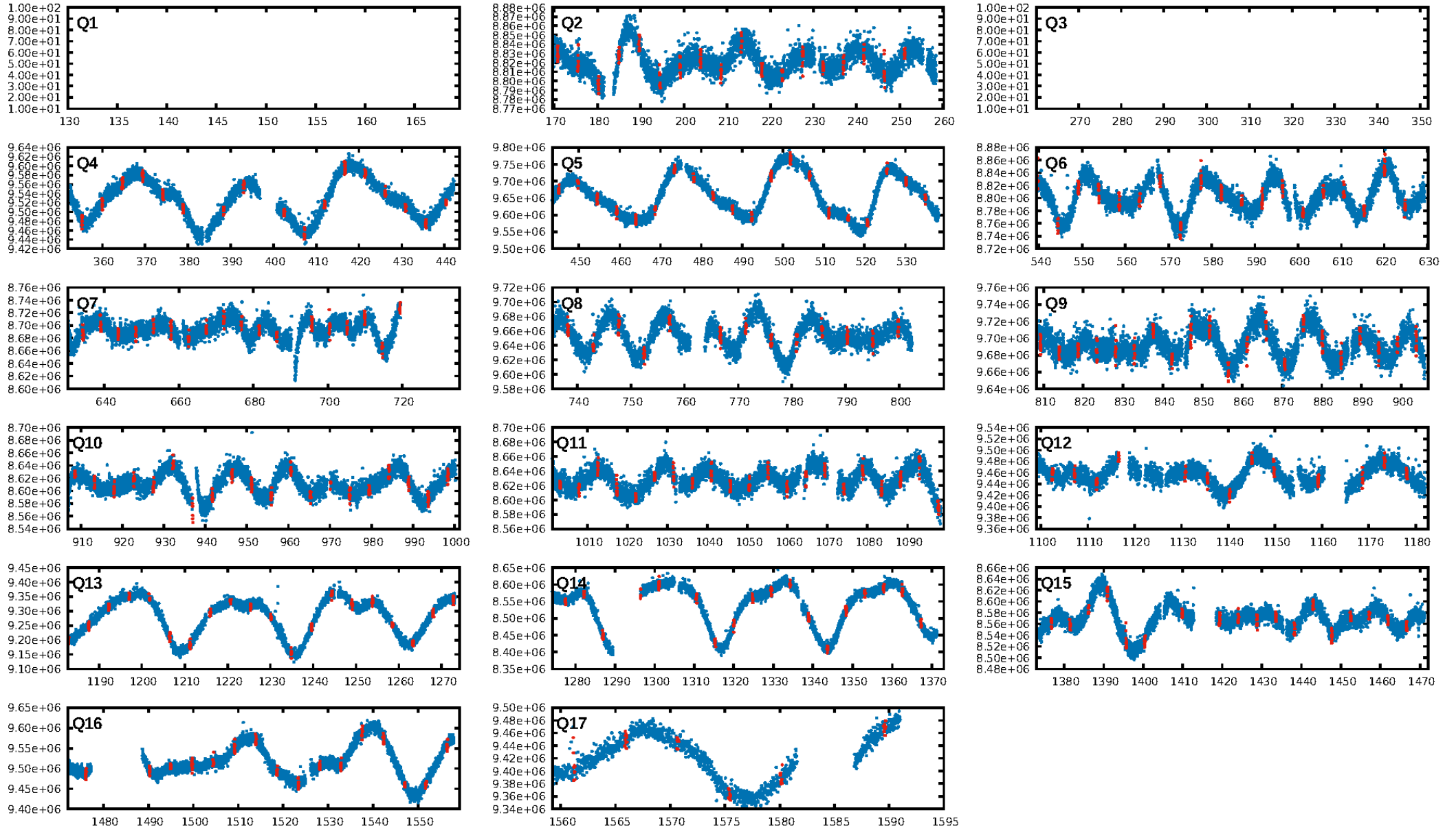
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [25.76σ]
LongPeriod-sig: 100.0% [29.39σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 2.13e-27
RollingBand-fgt: 1.00 [230/230]
GhostDiagnostic-chr: 1.539
Centroid-sig: N/A
Centroid-so: 1.439 arcsec [1.96σ]
OotOffset-rm: 1.272 arcsec [0.84σ]
KicOffset-rm: 1.716 arcsec [1.60σ]
OotOffset-st: 2/2/4/2 [10]
KicOffset-st: 2/2/4/2 [10]
DiffImageQuality-fgm: 0.30 [3/10]
DiffImageOverlap-fno: 1.00 [15/15]

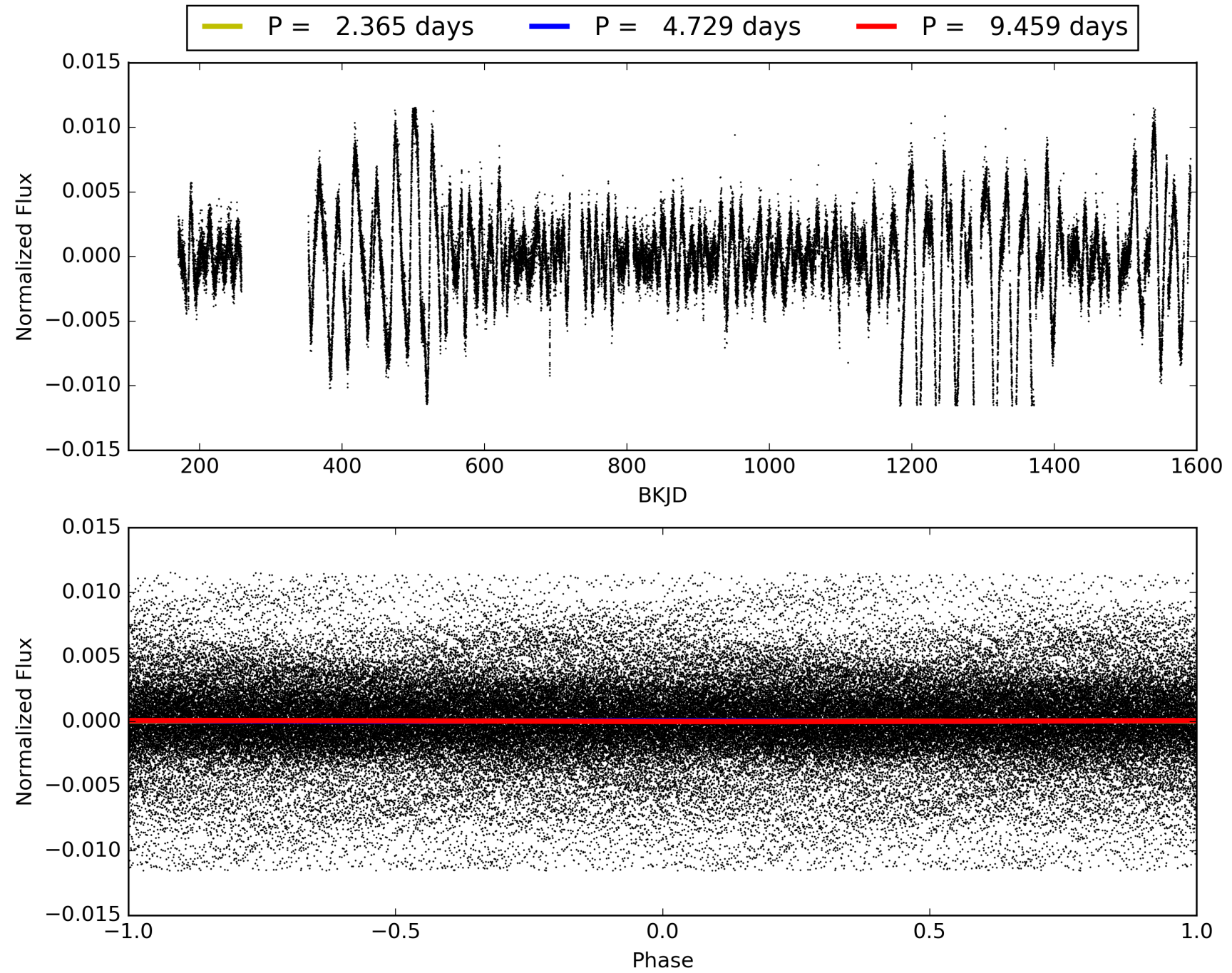
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 23:06:32 Z

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

TCE 004770365-03, PDC Light Curves

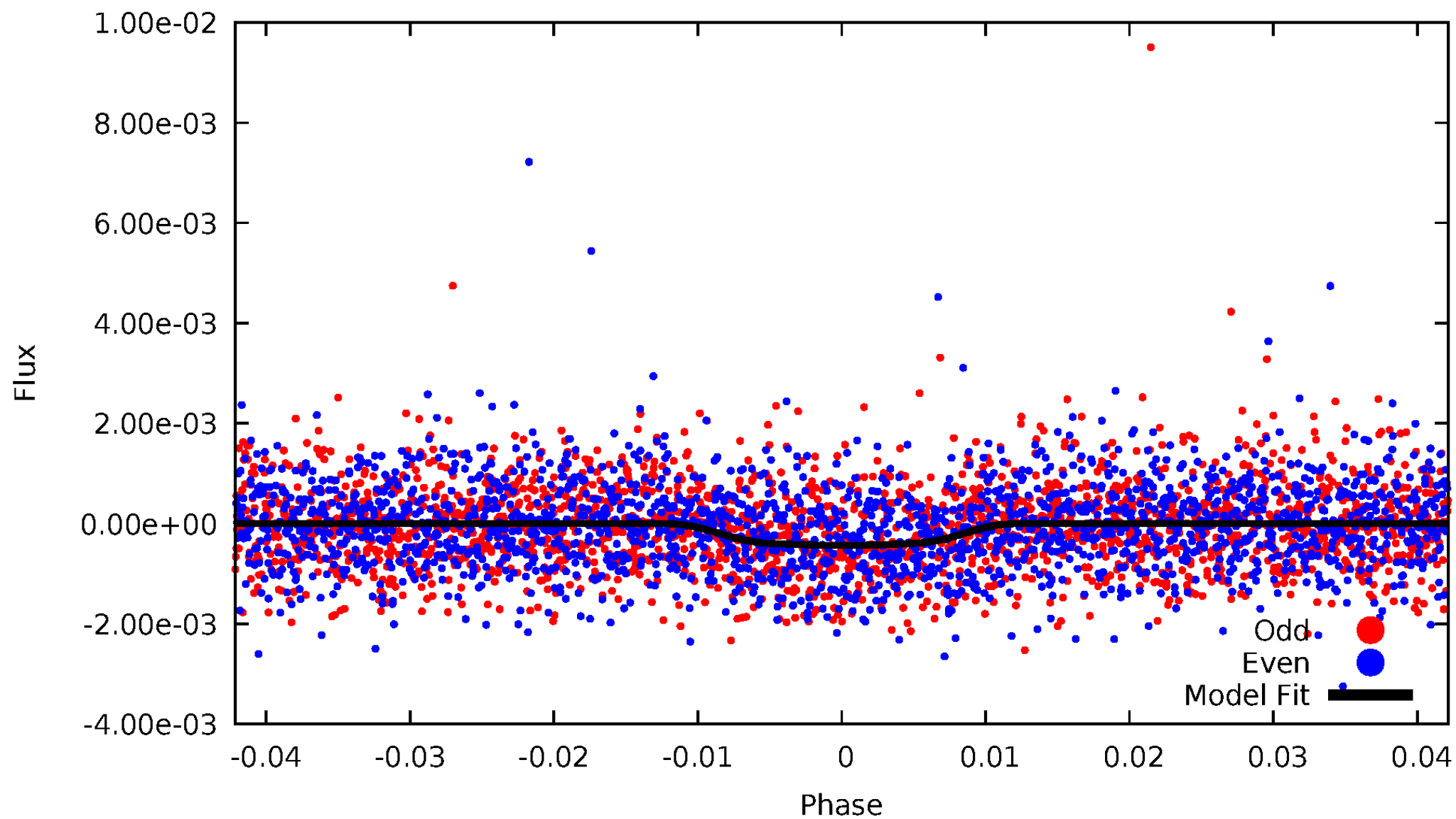


TCE 004770365-03



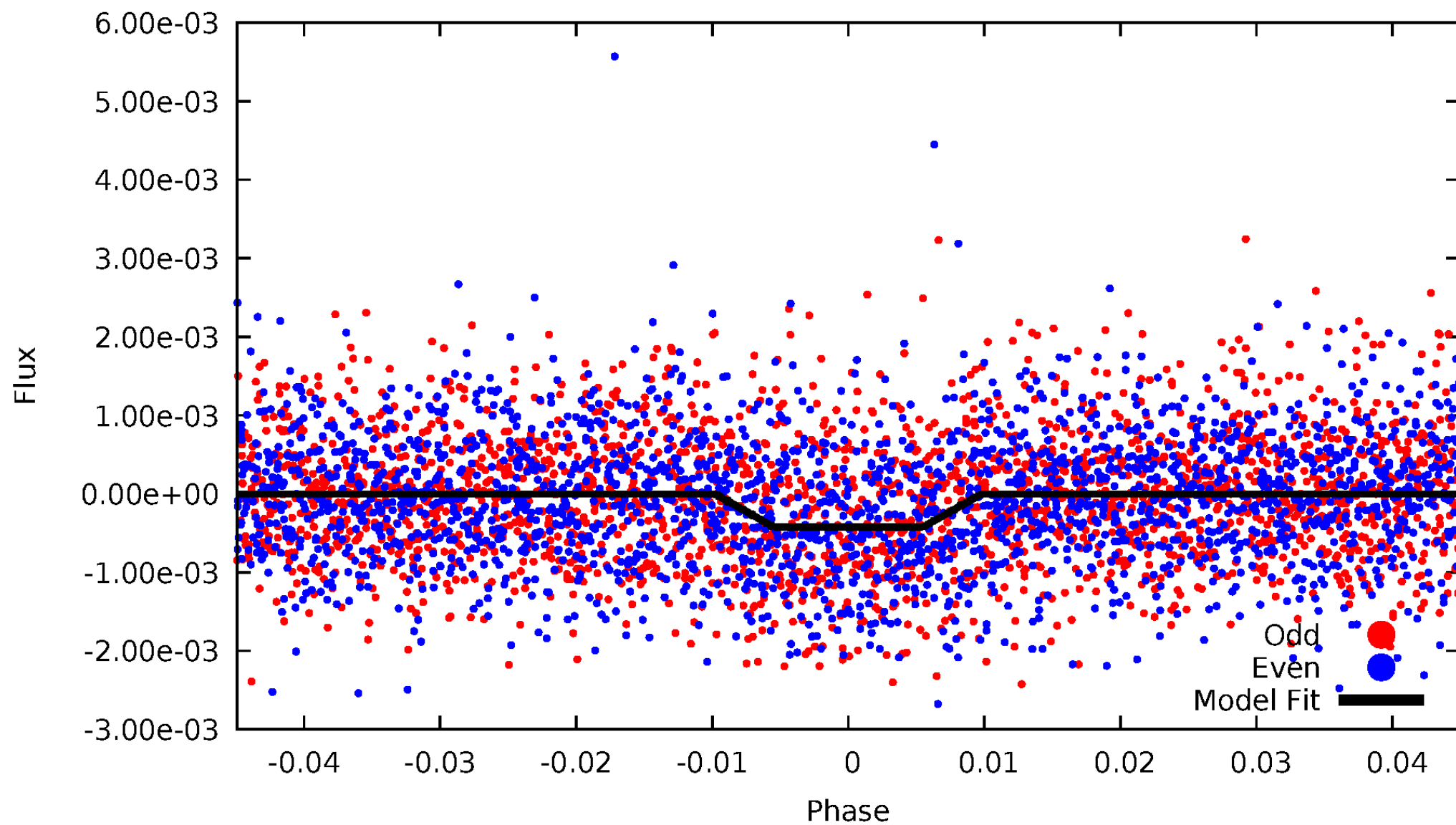
DV Odd/Even

TCE 004770365-03



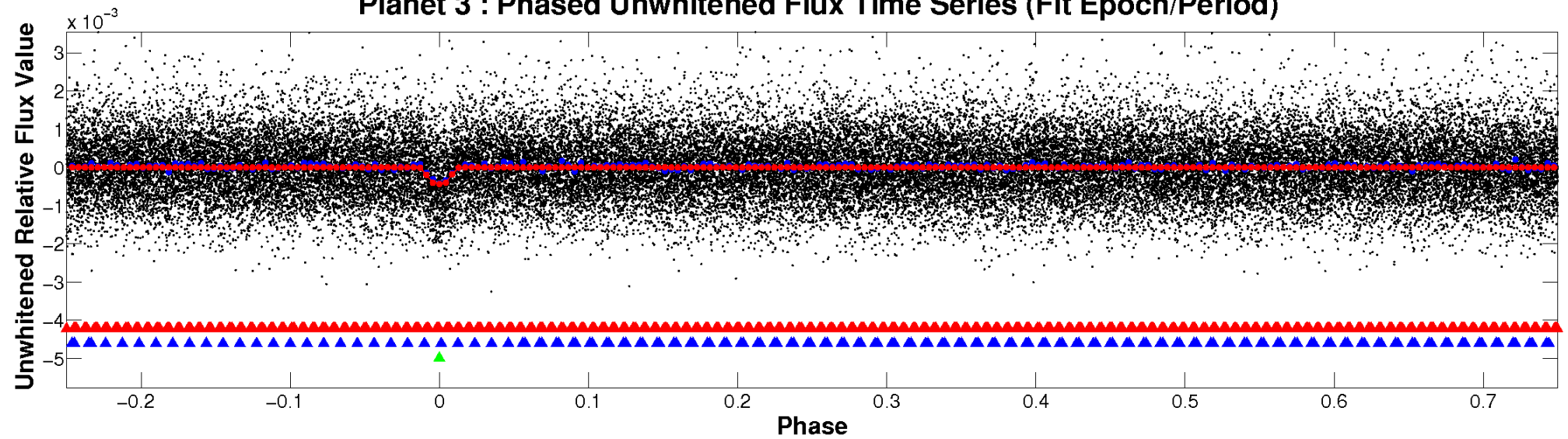
ALT Odd/Even

TCE 004770365-03

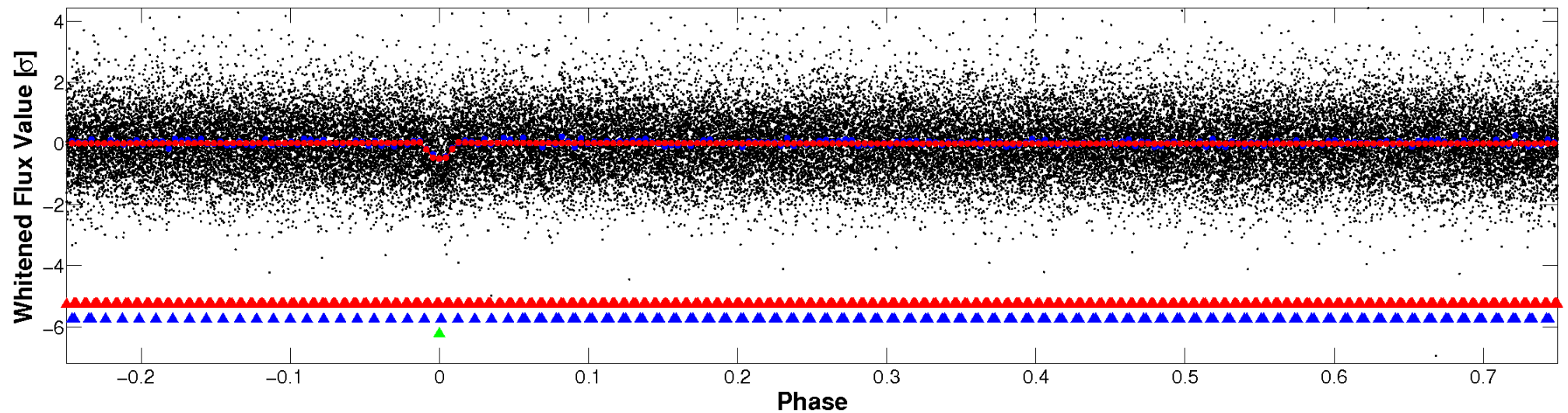


Non-Whitened Vs. Whitened Light Curve

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

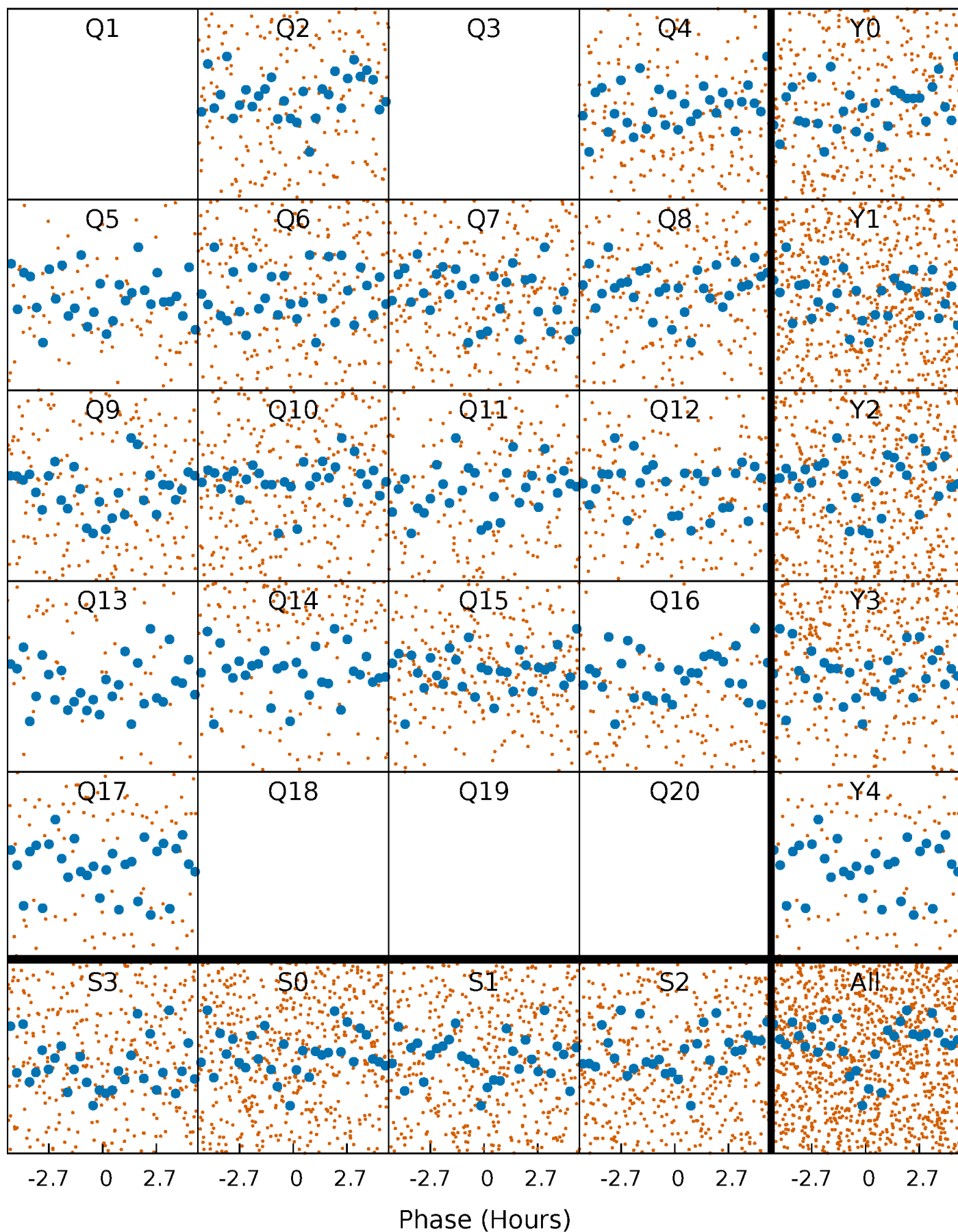


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



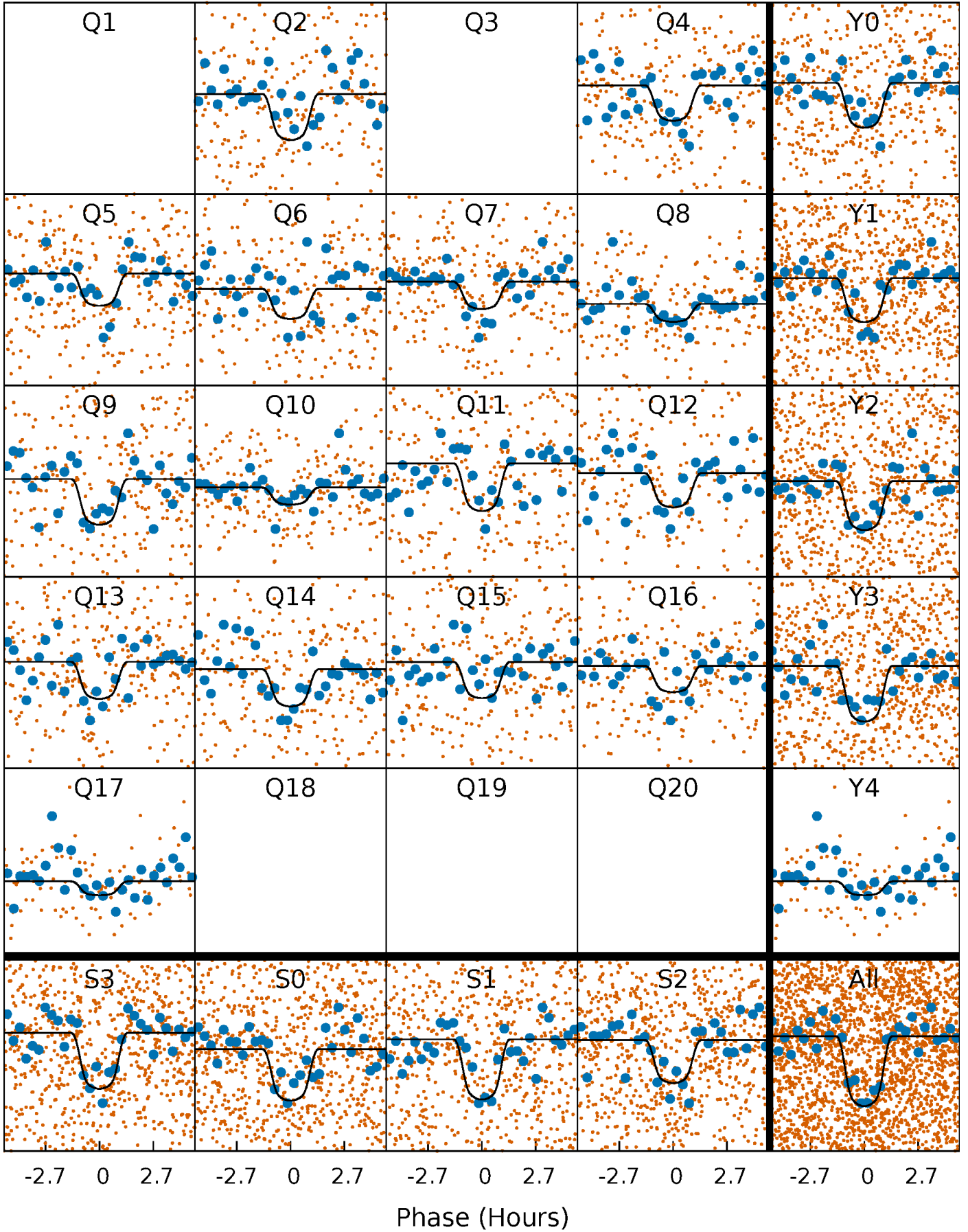
PDC Quarter-Phased Transit Curves

TCE 004770365-03 P= 4.729467 Days $T_0=132.929496$ (BKJD)



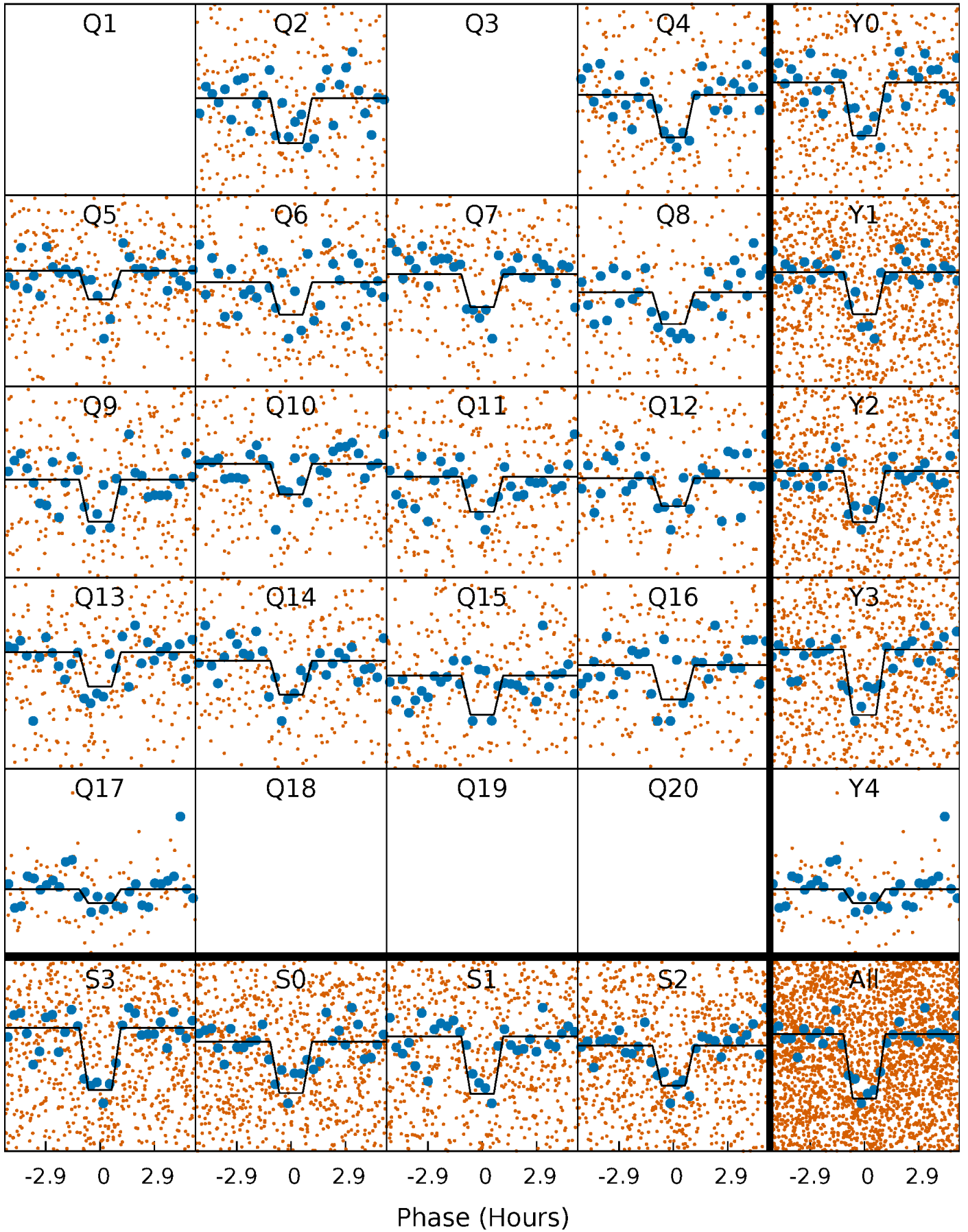
DV Quarter-Phased Transit Curves

TCE 004770365-03 P= 4.729467 Days $T_0=132.929496$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

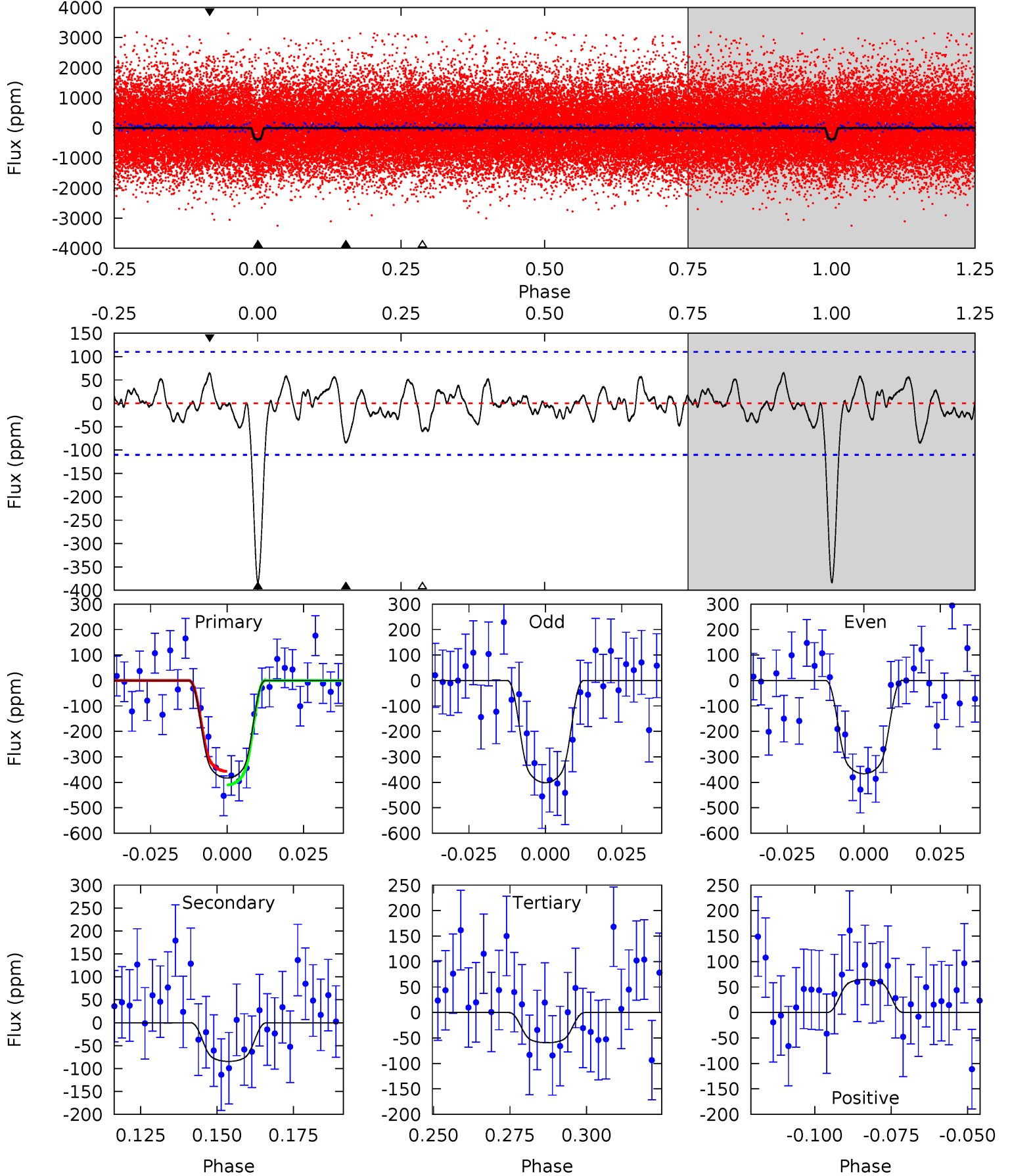
TCE 004770365-03 P= 4.729454 Days $T_0=132.932429$ (BKJD)



DV Model-Shift Uniqueness Test

004770365-03, P = 4.729467 Days, E = 132.929496 Days

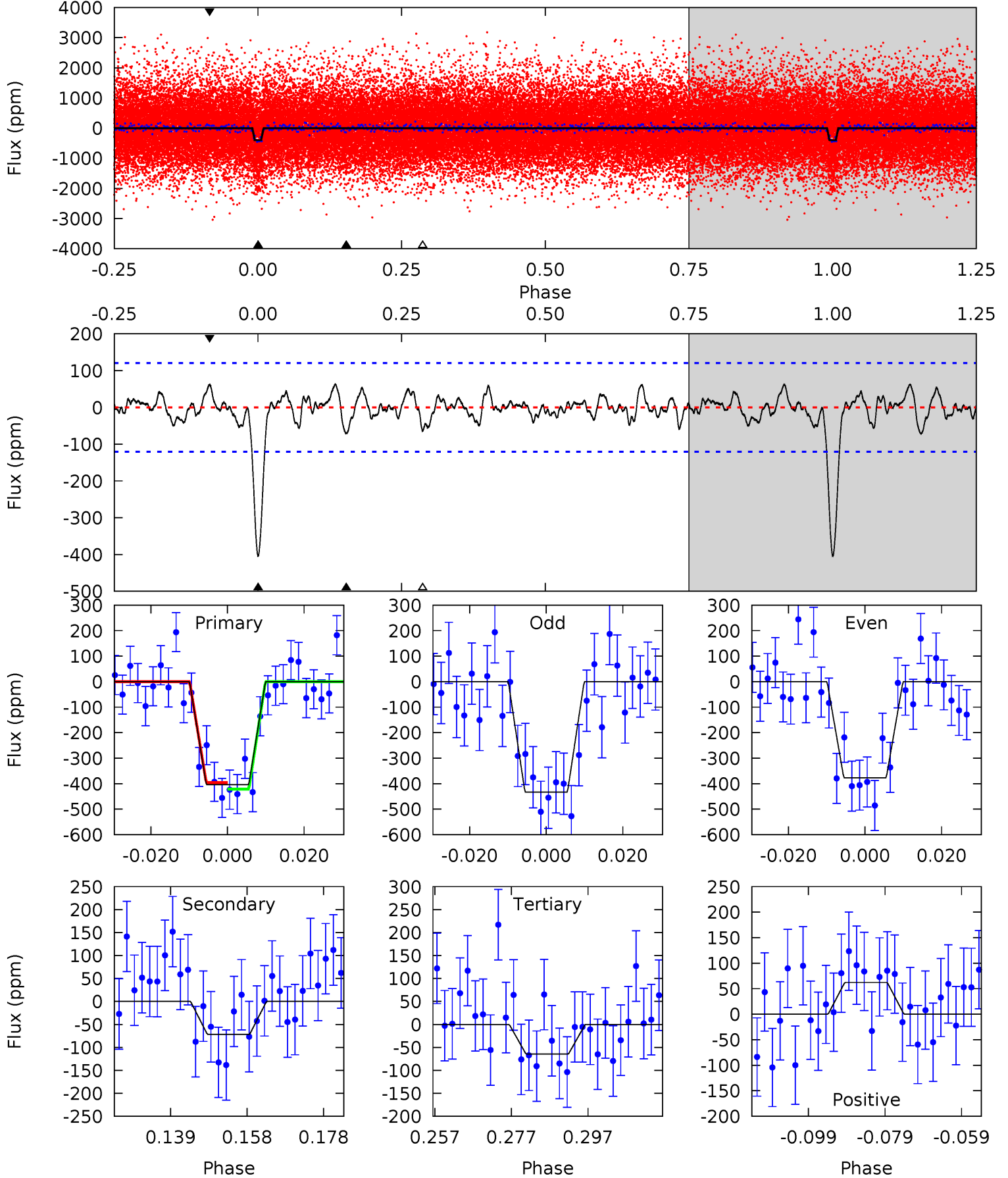
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 16.9 | 3.72 | 2.62 | 2.85 | 4.85 | 2.24 | 1.08 | 14.3 | 14.0 | 1.10 | 0.87 | 0.78 | 0.90 | 0.14 | 1.18 |



Alt Model-Shift Uniqueness Test

004770365-03, P = 4.729454 Days, E = 132.932429 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 16.4 | 2.90 | 2.62 | 2.53 | 4.89 | 2.33 | 0.98 | 13.8 | 13.9 | 0.28 | 0.37 | 1.15 | 0.87 | 0.13 | 0.52 |



Stellar Parameters For KIC 004770365

| | $T_{\text{eff}}(K)$ | $\log(g)$ | $[\text{Fe}/\text{H}]$ | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|---------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 4224^{+84}_{-84} | $4.662^{+0.025}_{-0.020}$ | $-0.200^{+0.150}_{-0.150}$ | $0.603^{+0.027}_{-0.030}$ | $0.609^{+0.033}_{-0.033}$ | $3.921^{+0.420}_{-0.346}$ |
| | +2%/-2% | +1%/-0% | +75%/-75% | +4%/-5% | +5%/-5% | +11%/-9% |
| Source | SPE60 | SPE60 | SPE60 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 004770365-03 / KOI 1475.03

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|--------------|------------------------|----------------------|----------------------|------------------|
| DV | -85 ± 23 | $1.58^{+0.36}_{-0.34}$ | 932^{+21}_{-20} | 3070^{+278}_{-234} | 41^{+28}_{-17} |
| Alt. | -71 ± 25 | $1.37^{+0.34}_{-0.37}$ | 935^{+20}_{-22} | 3129^{+355}_{-267} | 46^{+45}_{-22} |

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

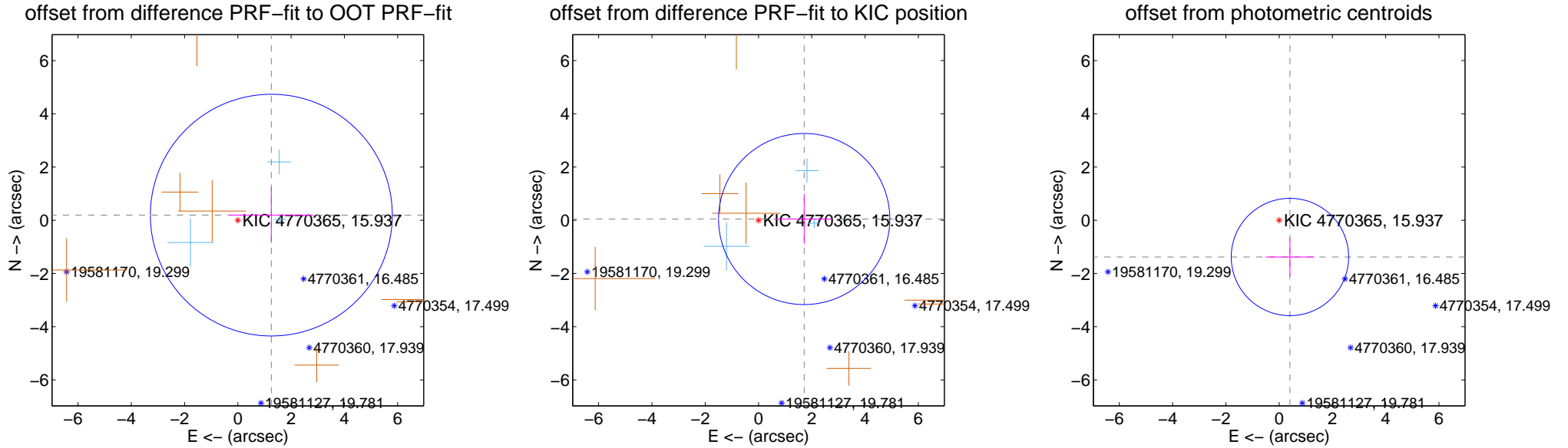
DV Centroid Data

Supplemental centroid analysis for 004770365-03. Kepler magnitude: 15.94. Transit SNR 12.51

There are 3 quarters with good PRF difference image offsets

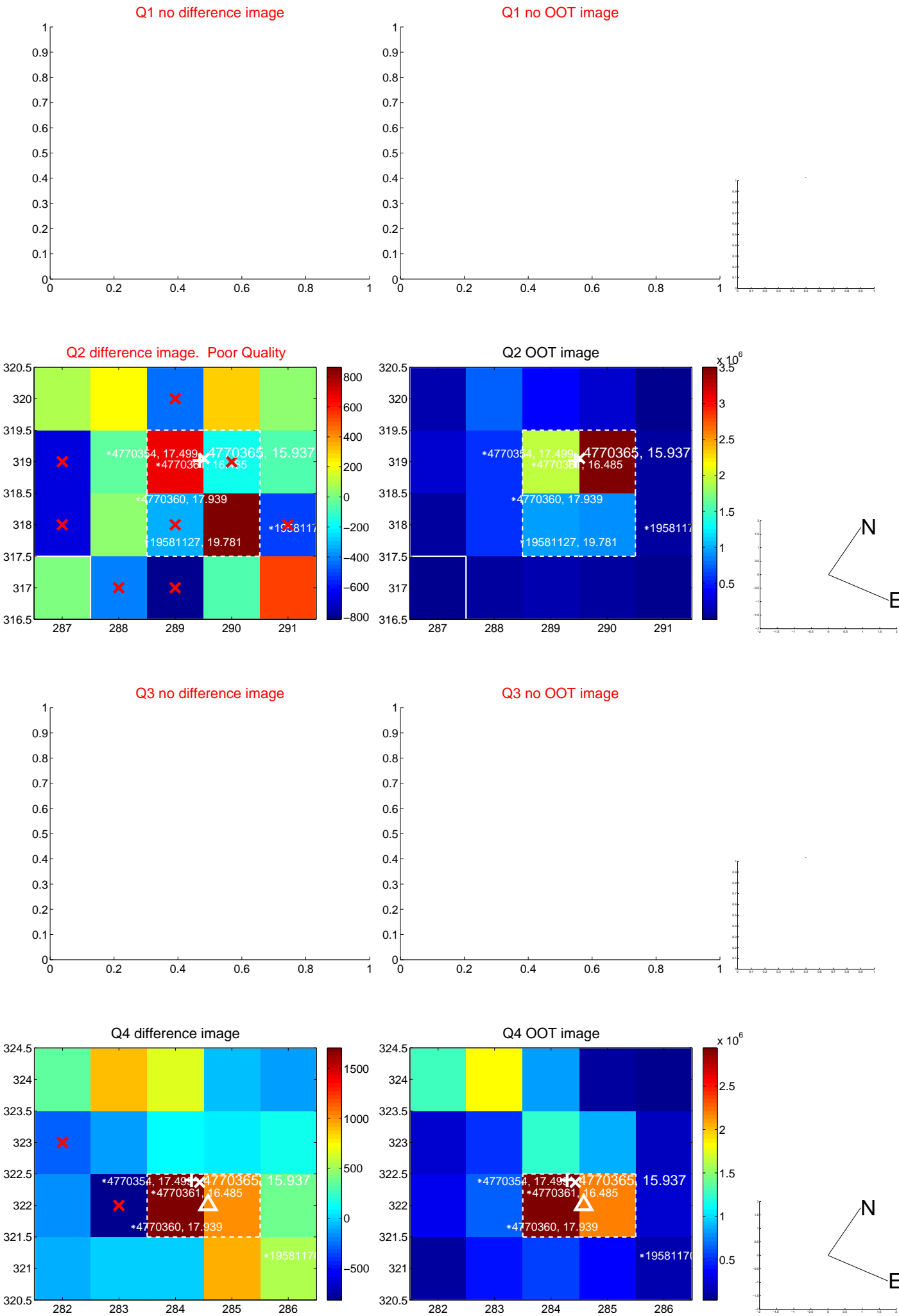
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT | 1.272 ± 1.514 | 0.84 | -1.258 ± 1.581 | 0.192 ± 1.041 |
| PRF-fit source offset from KIC position | 1.716 ± 1.072 | 1.60 | -1.715 ± 1.080 | 0.046 ± 0.943 |
| photometric centroid source offset | 1.44 ± 0.73 | 1.96 | -0.41 ± 0.91 | -1.38 ± 0.72 |

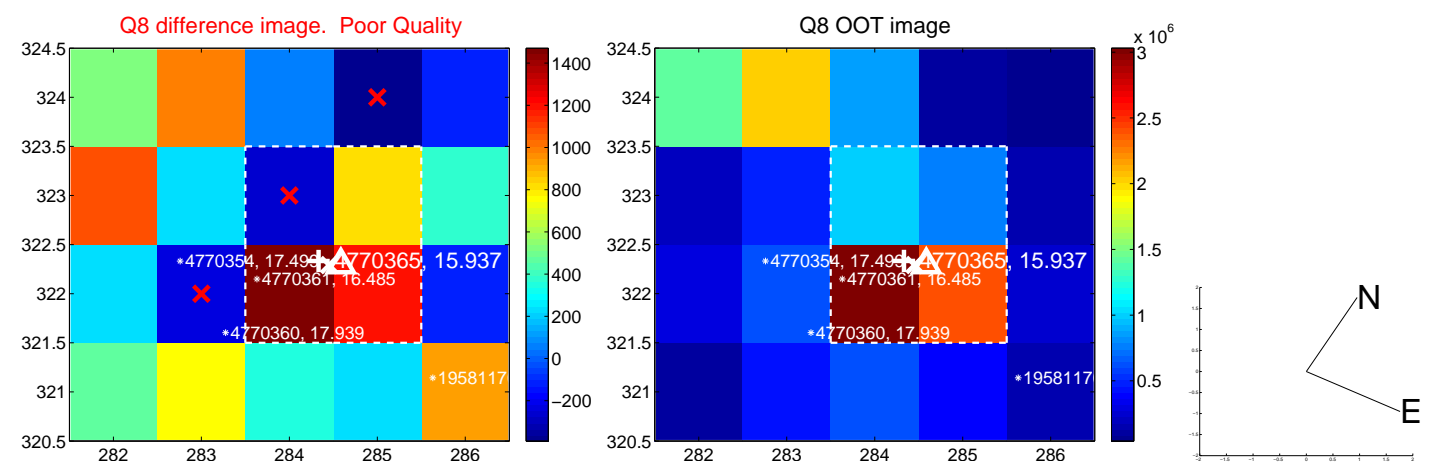
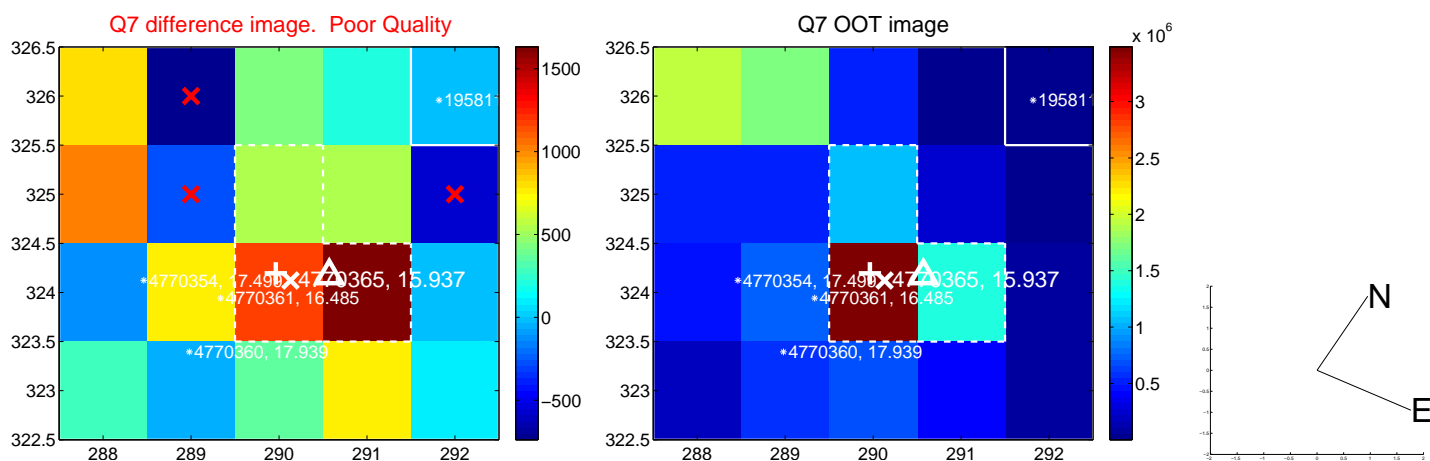
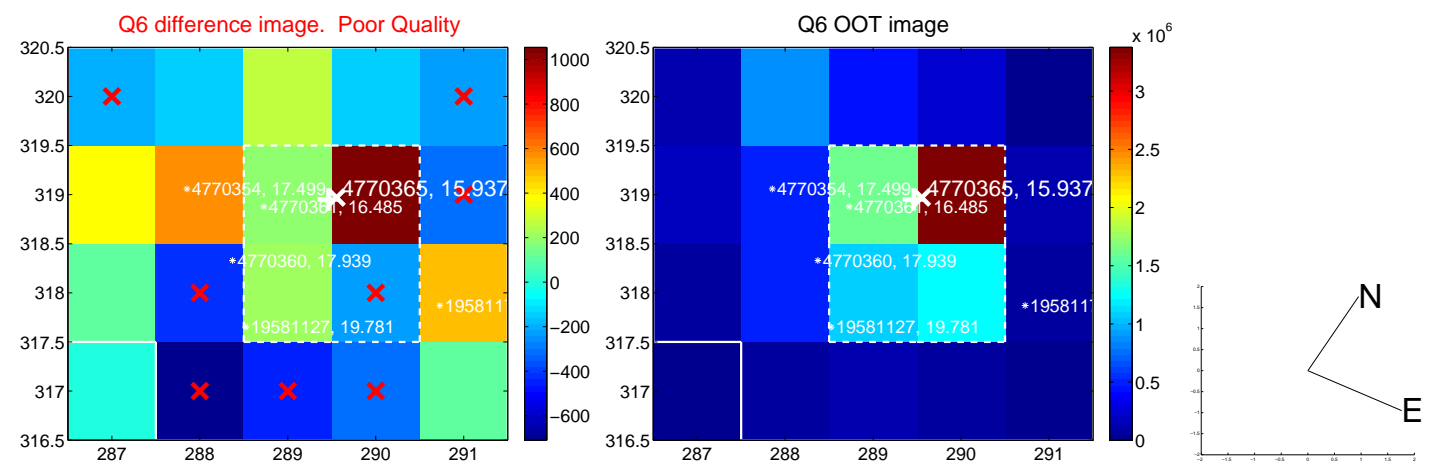
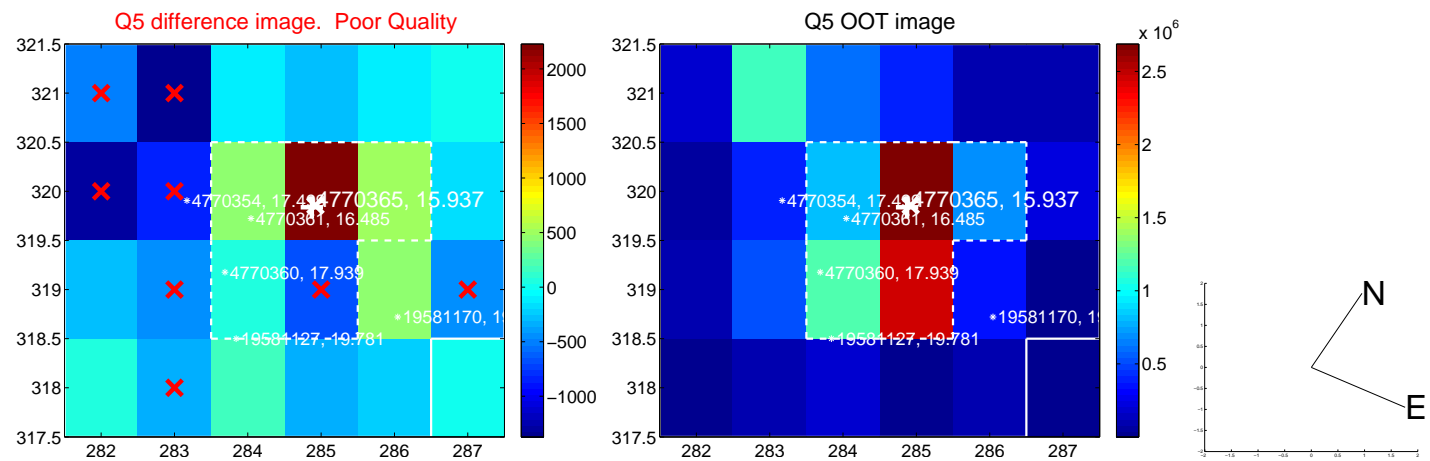


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

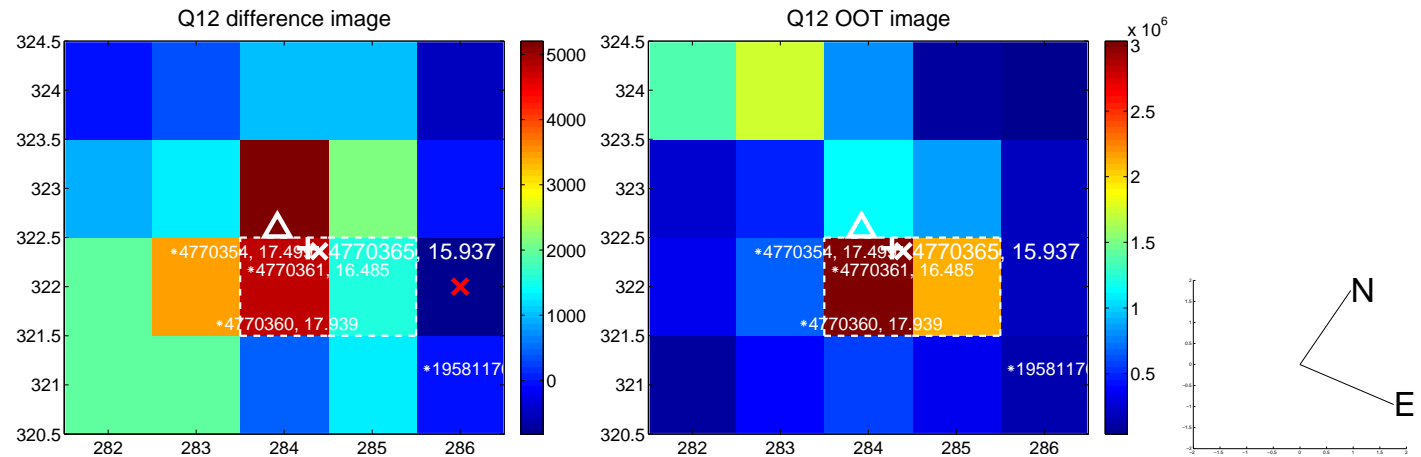
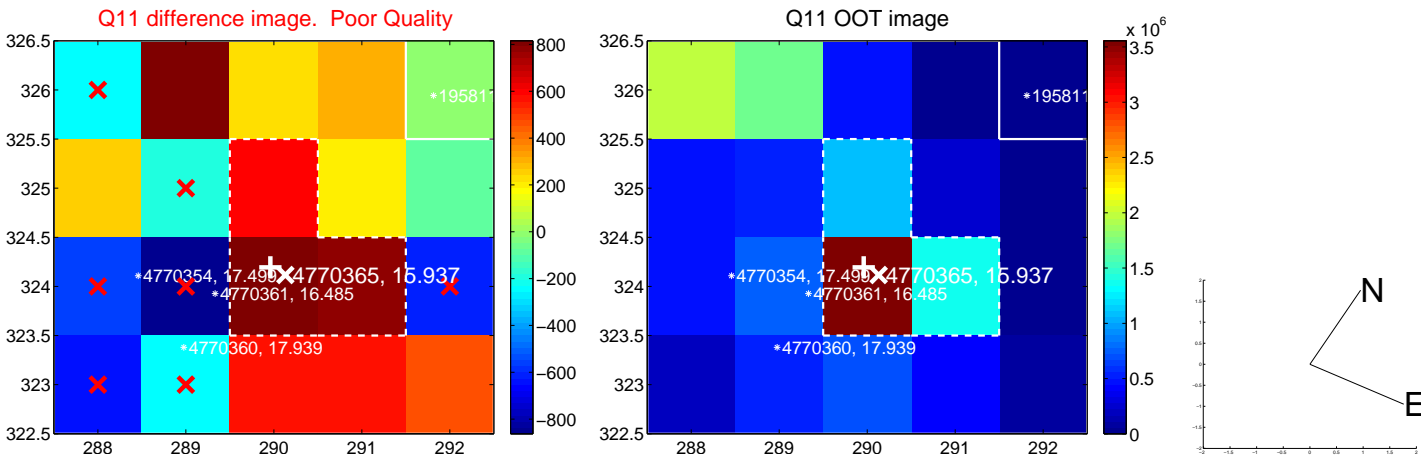
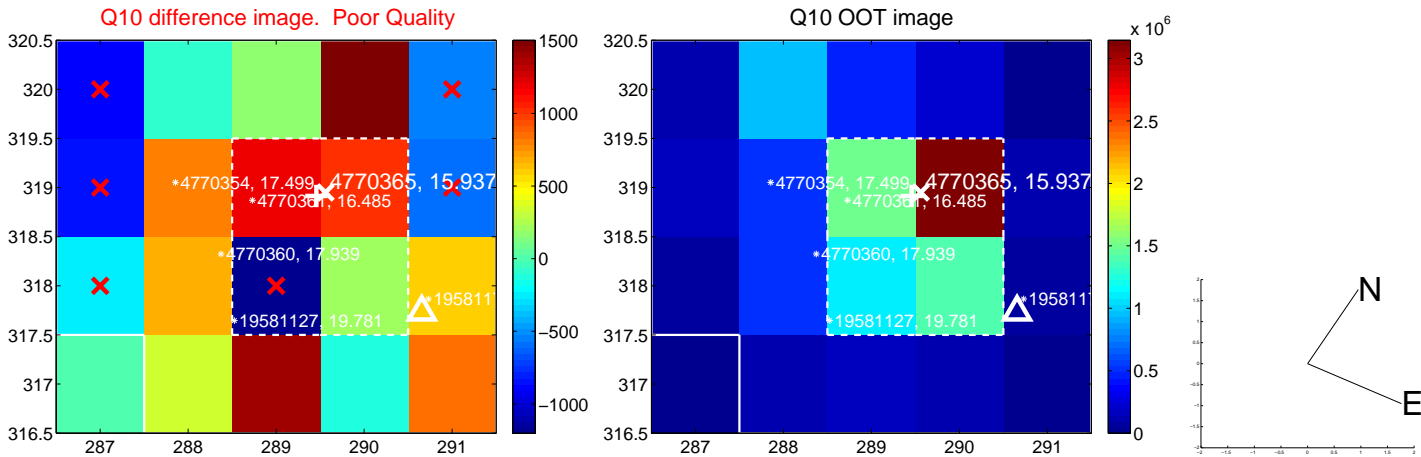
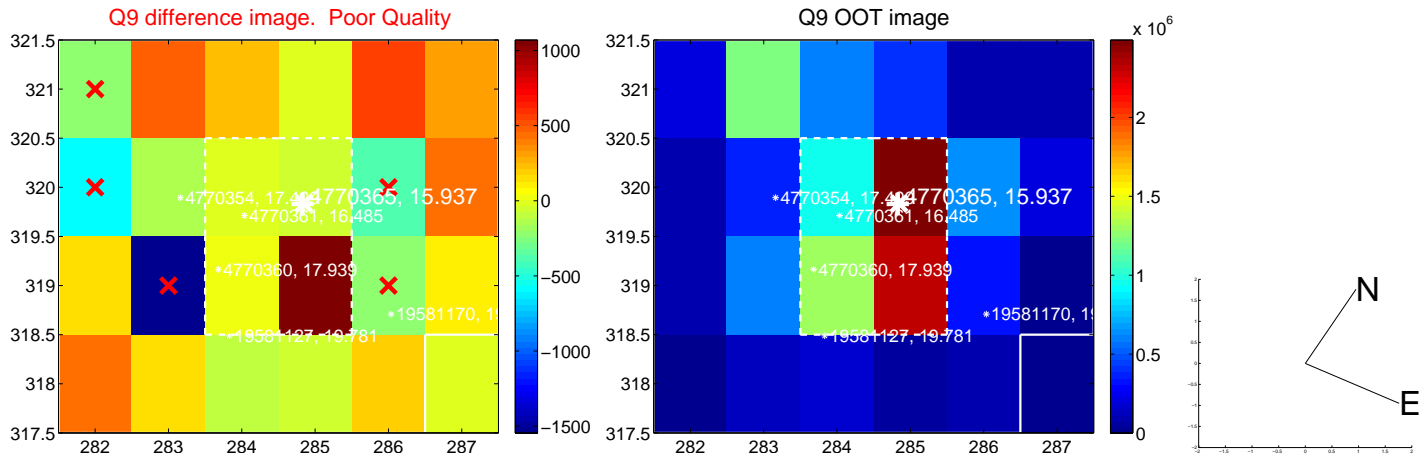
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



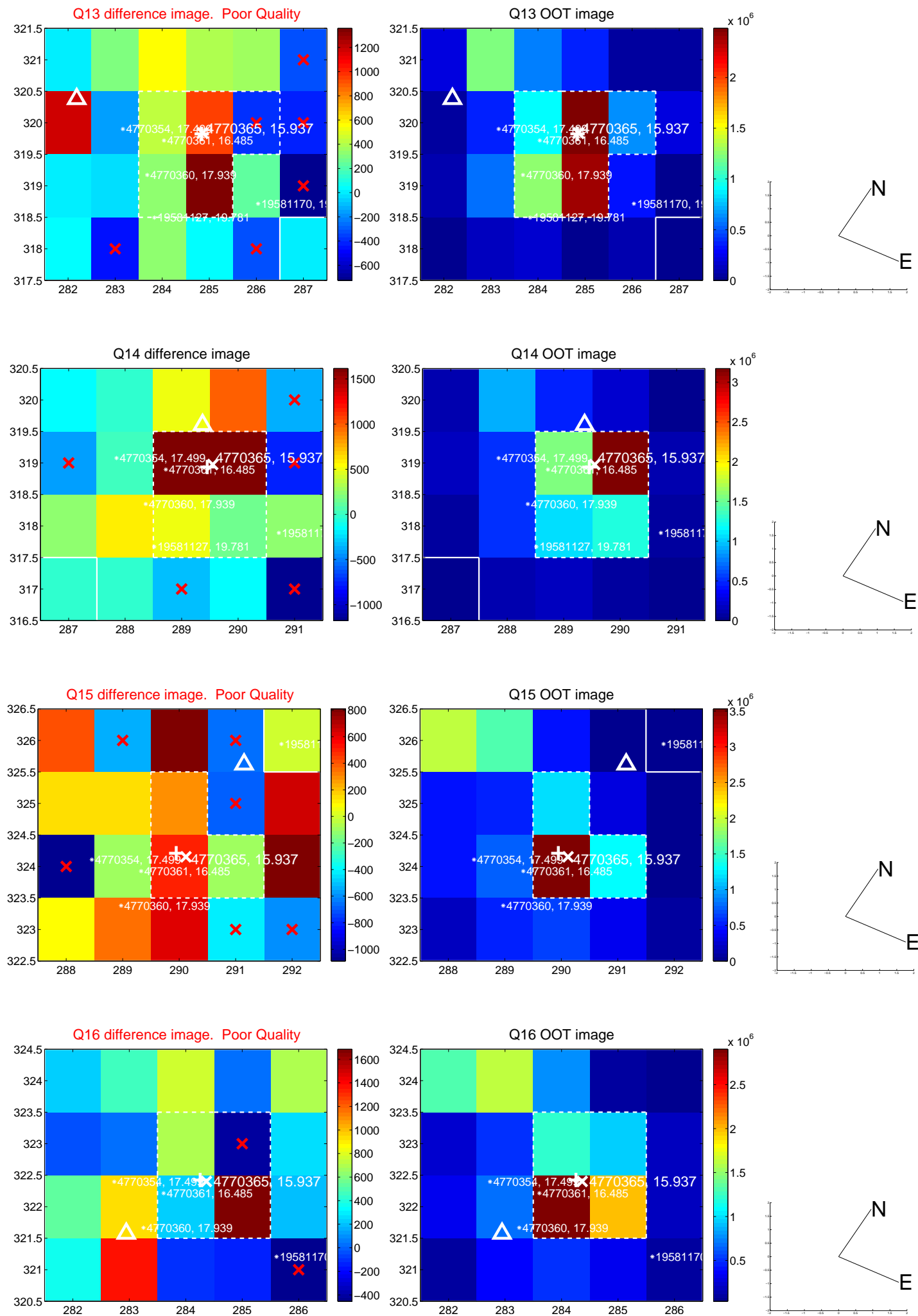
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



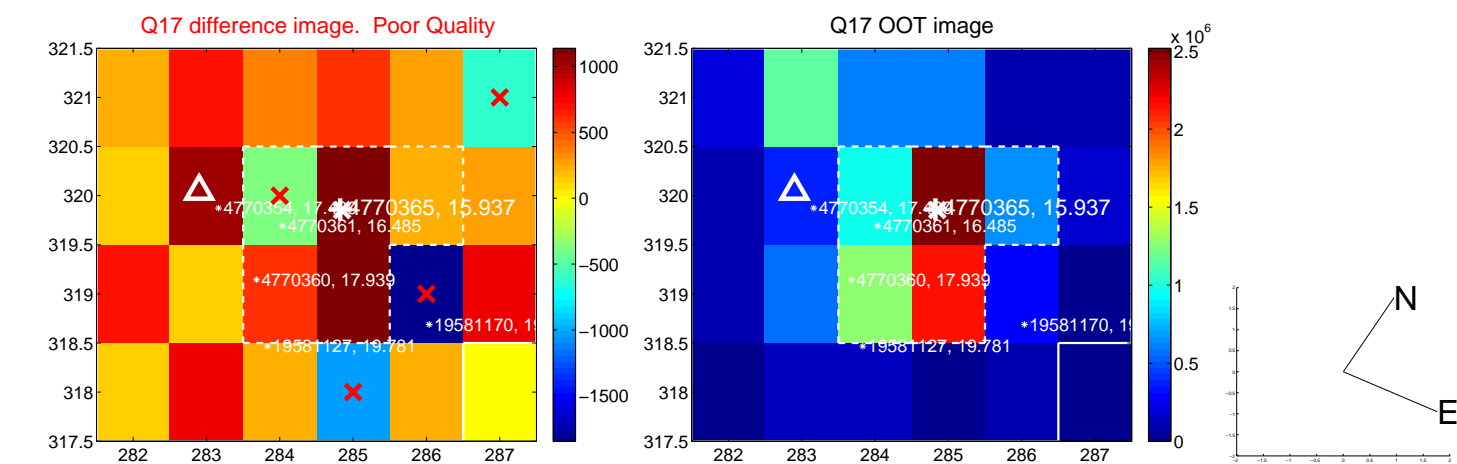
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



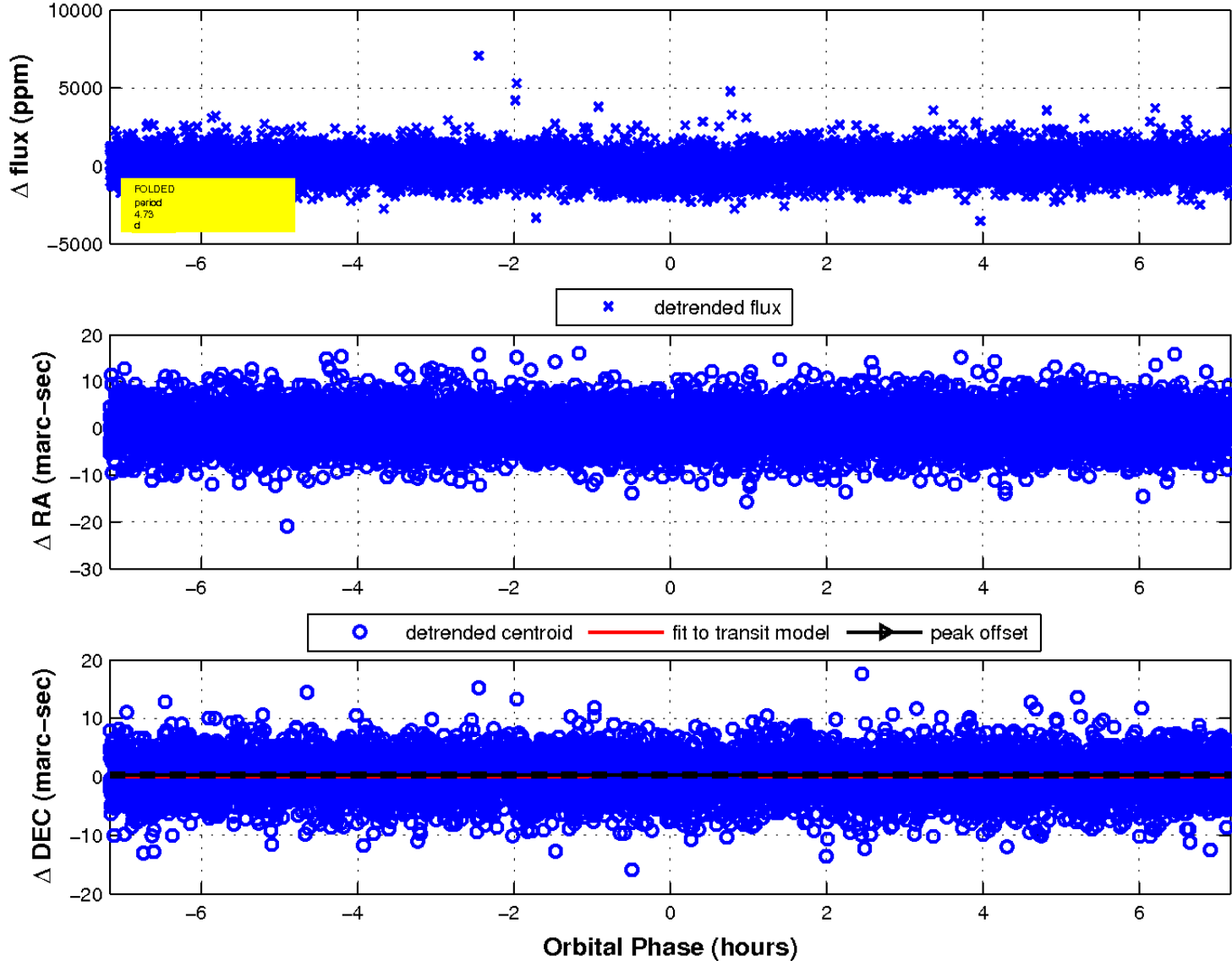
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 3 of 3



UKIRT Image

Declination

