

KIC 003528198

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 003528198-01 | OBS | No | 455.810964 | 238.546322 | 1516.5 | 5.520 | 15.1 | 8.9 | 0.50 | 4654 | 2.23 | 0.12 |
| 003528198-02 | OBS | No | 384.940399 | 253.457226 | 1045.7 | 2.582 | 16.4 | 7.5 | 0.50 | 4654 | 1.61 | 0.15 |
| 003528198-03 | OBS | No | 347.686750 | 206.062570 | 593.5 | 4.817 | 15.9 | 4.4 | 0.50 | 4654 | 1.23 | 0.18 |
| 003528198-05 | OBS | No | 413.895380 | 500.629633 | 319.1 | 12.500 | 13.9 | -1.0 | 0.50 | 4654 | 0.89 | 0.14 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 003528198-01 | OBS | FP | 0.00 | 1 | 0 | 1 | 0 | INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST |
| 003528198-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES_MARSHALL_ZUMA_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS |
| 003528198-03 | OBS | FP | 0.00 | 1 | 0 | 1 | 0 | INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS—HALO_GHOST |
| 003528198-05 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS |

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

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

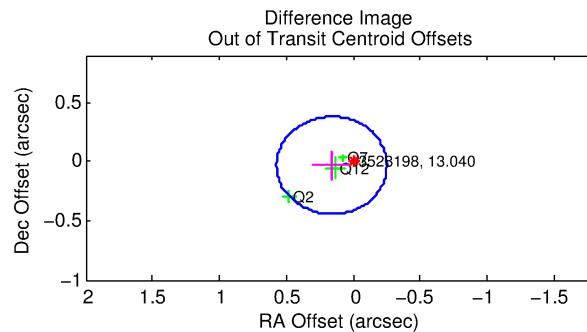
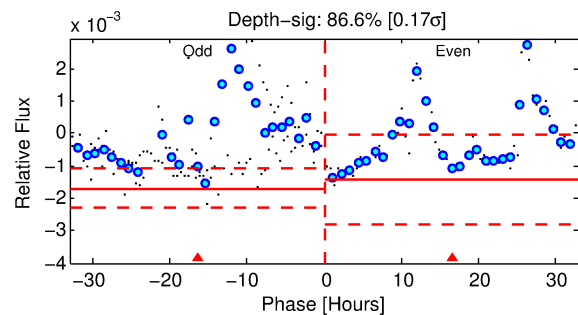
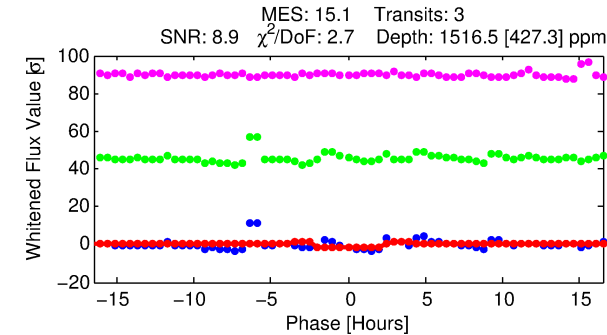
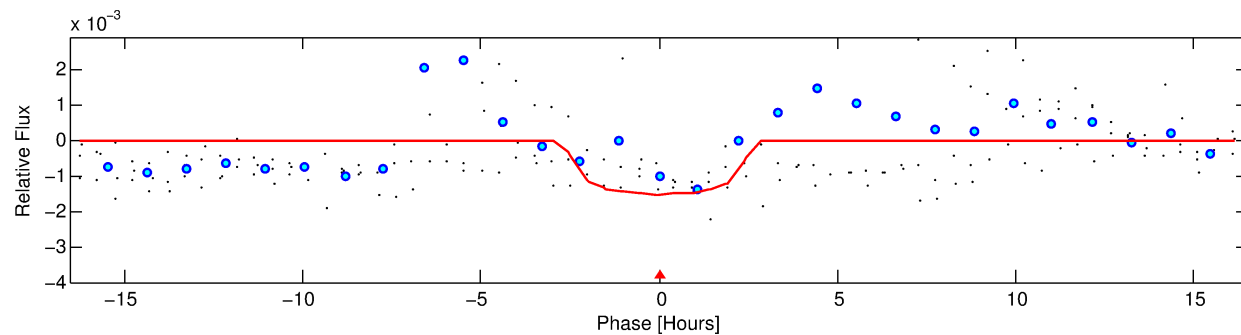
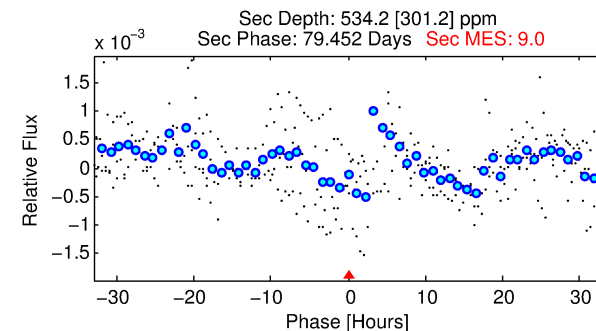
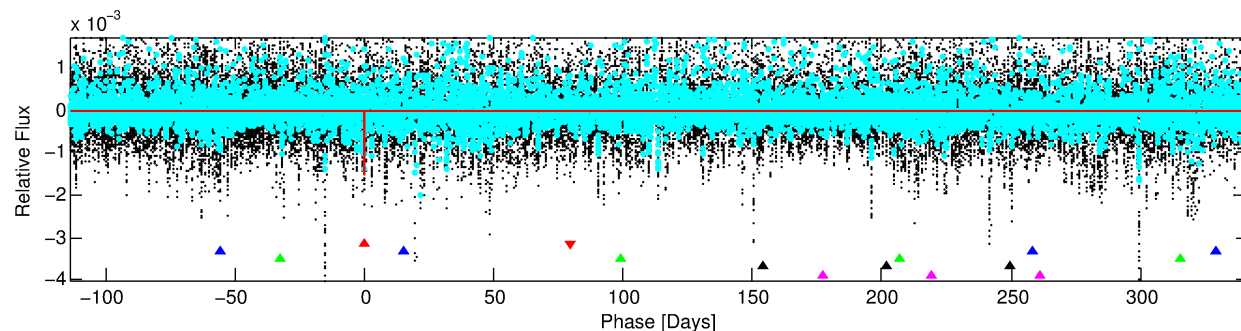
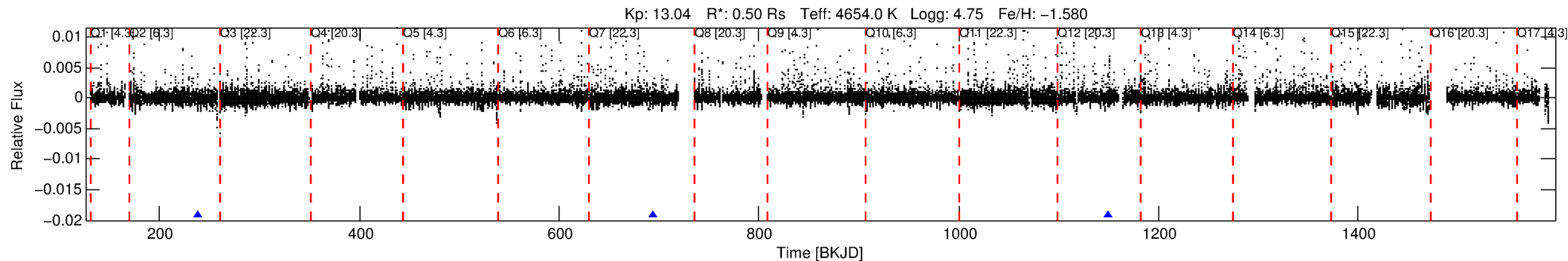
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 003528198-01

No Significant Match Found

DV One-Page Summary

KIC: 3528198 Candidate: 1 of 5 Period: 455.811 d



DV Fit Results:

Period = 455.81096 [0.00964] d
Epoch = 238.5463 [0.0139] BKJD
Rp/R* = 0.0406 [0.0115]
a/R* = 380.45 [352.23]
b = 0.85 [0.32]
Seff = 0.12 [0.02]
Teq = 151 [6] K
Rp = 2.23 [0.65] Re
a = 0.9310 [0.0556] AU
Ag = 51177.00 [41201.31] [1.24 σ]
Teff = 3510 [713] K [4.71 σ]

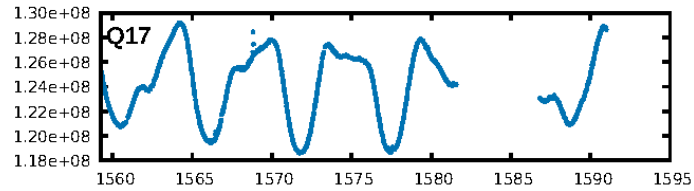
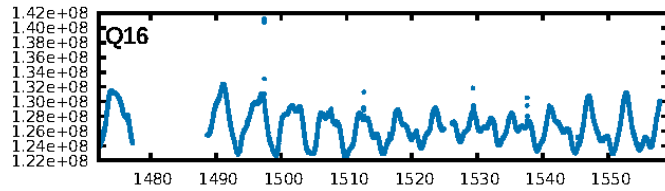
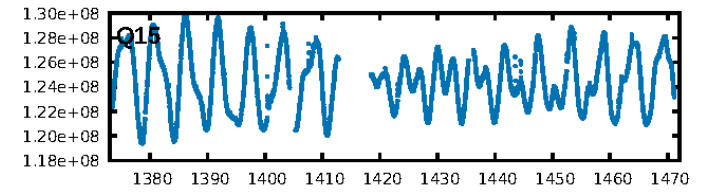
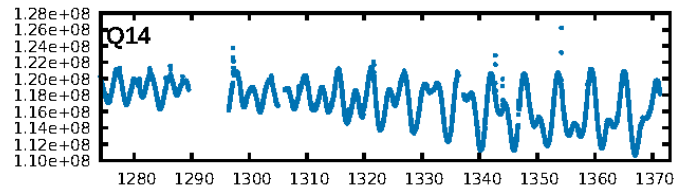
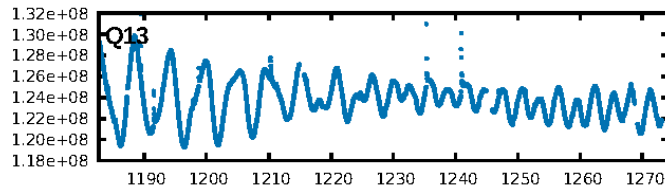
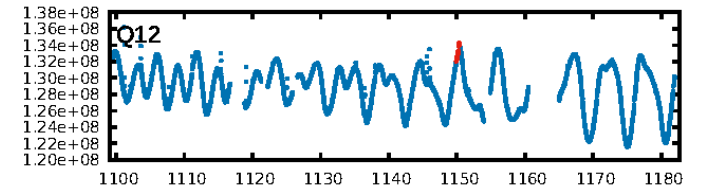
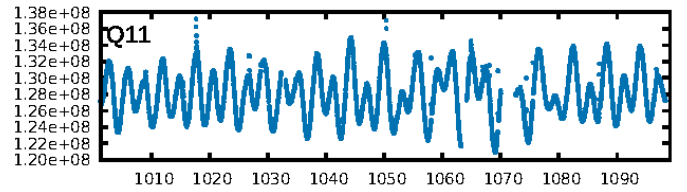
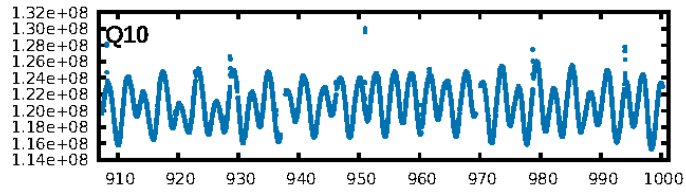
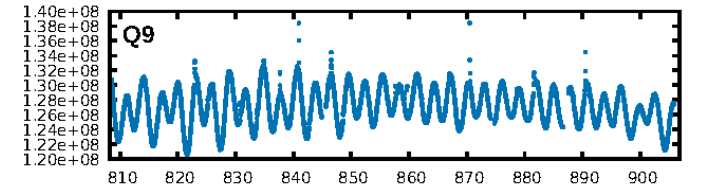
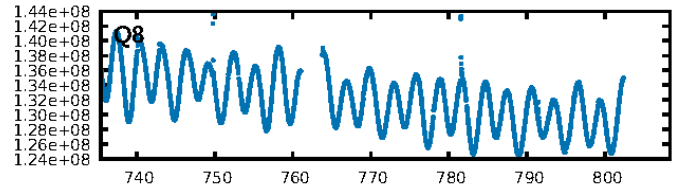
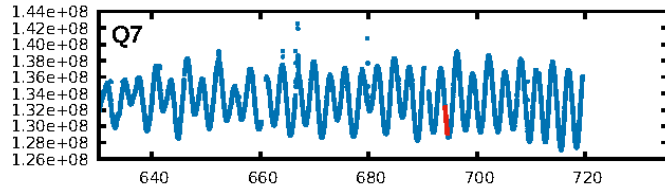
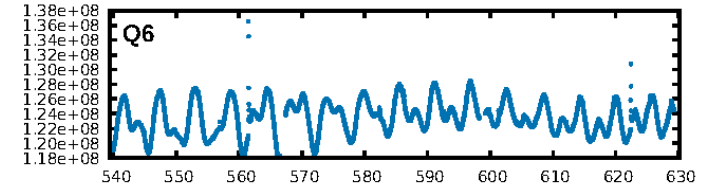
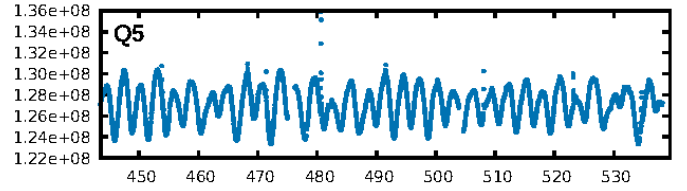
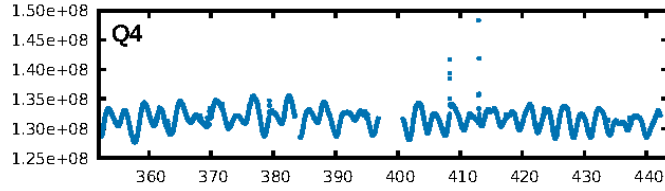
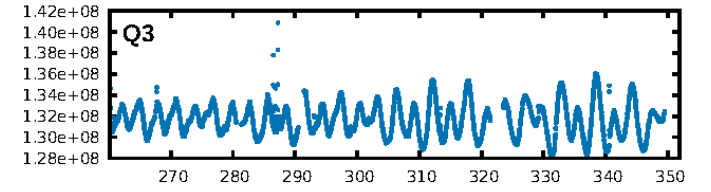
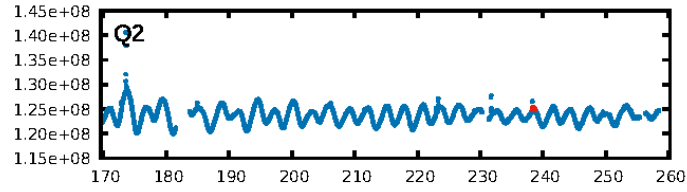
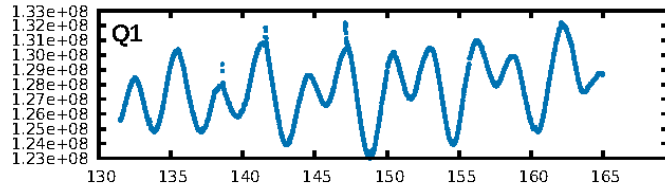
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [73.62 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 8.2%
ModelChiSquareGof-sig: 24.3%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 0.2292
Centroid-sig: 23.6%
Centroid-so: 0.206 arcsec [0.53 σ]
OotOffset-rm: 0.166 arcsec [1.20 σ]
KicOffset-rm: 0.245 arcsec [2.14 σ]
OotOffset-st: 1/1/1/0 [3]
KicOffset-st: 1/1/1/0 [3]
DiffImageQuality-fgm: 0.33 [1/3]
DiffImageOverlap-fno: 1.00 [3/3]

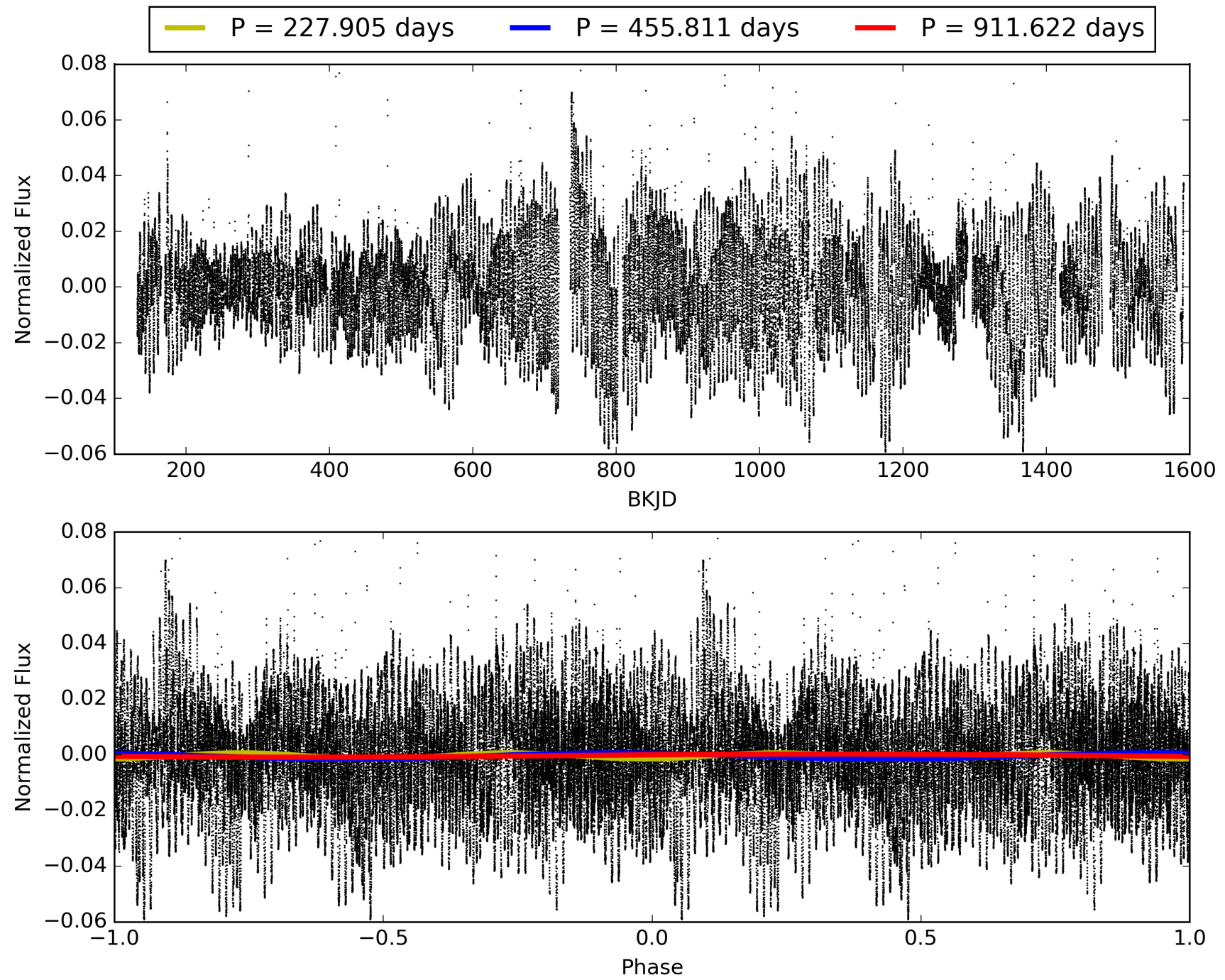
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 01:17:09 Z

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

TCE 003528198-01, PDC Light Curves

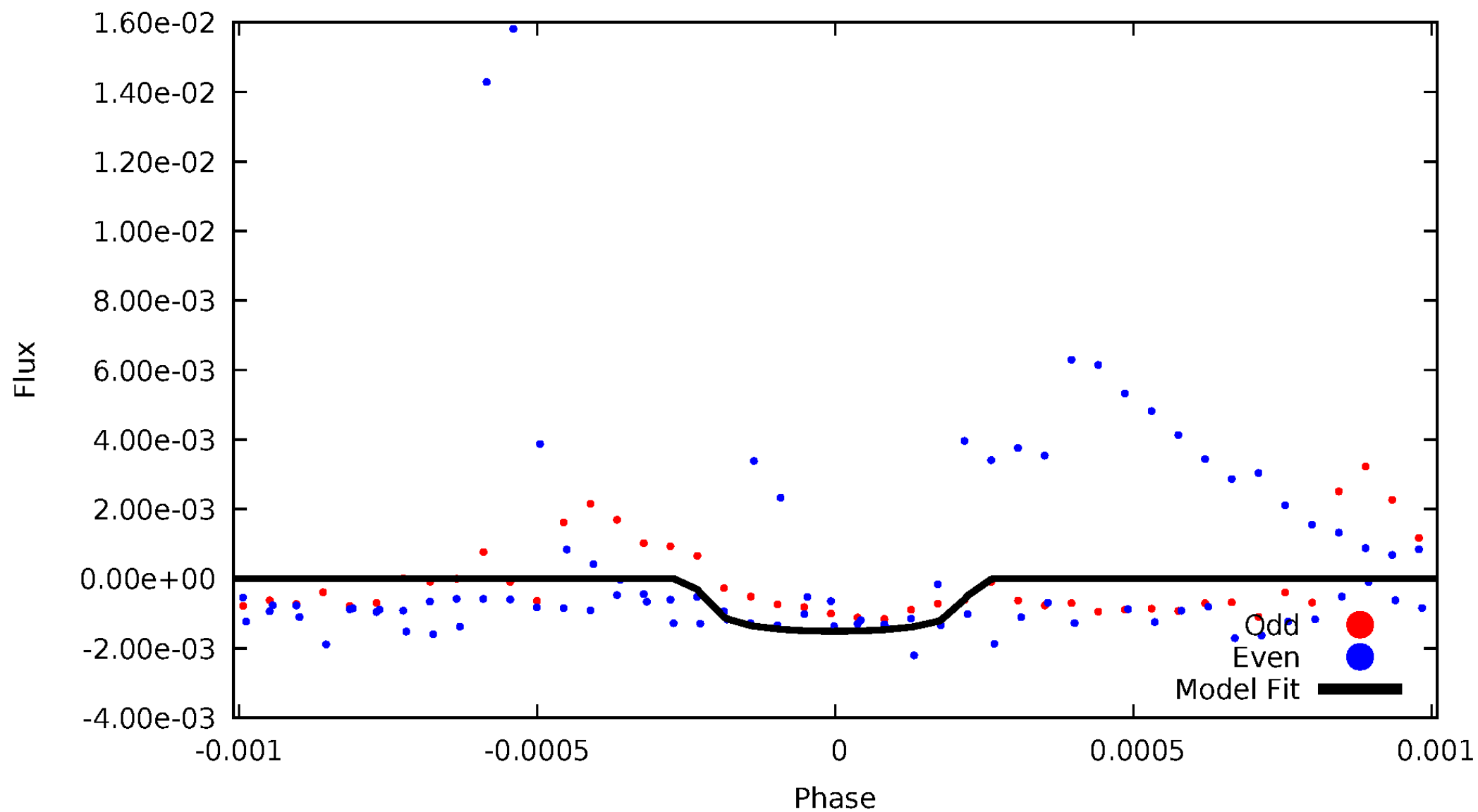


TCE 003528198-01



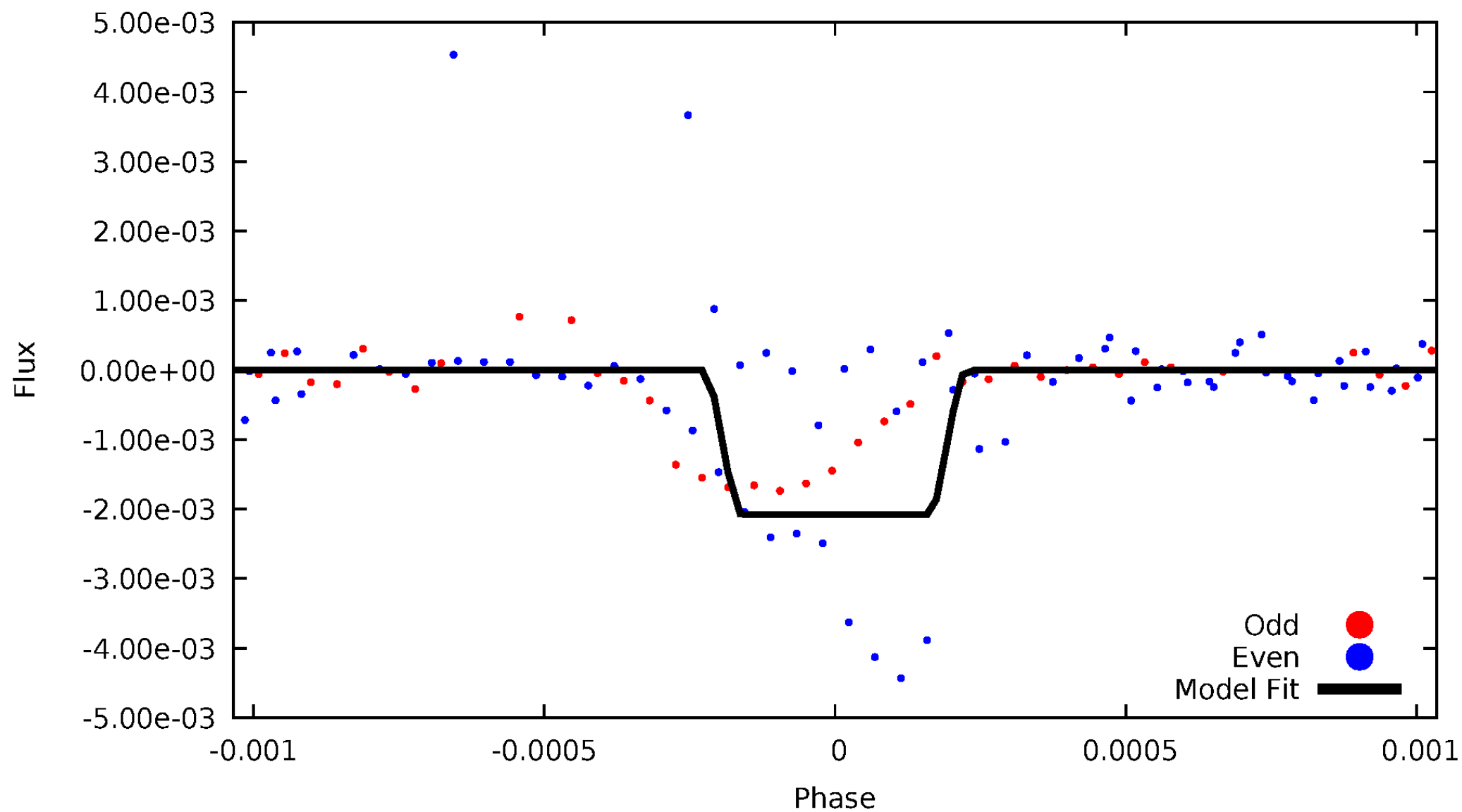
DV Odd/Even

TCE 003528198-01



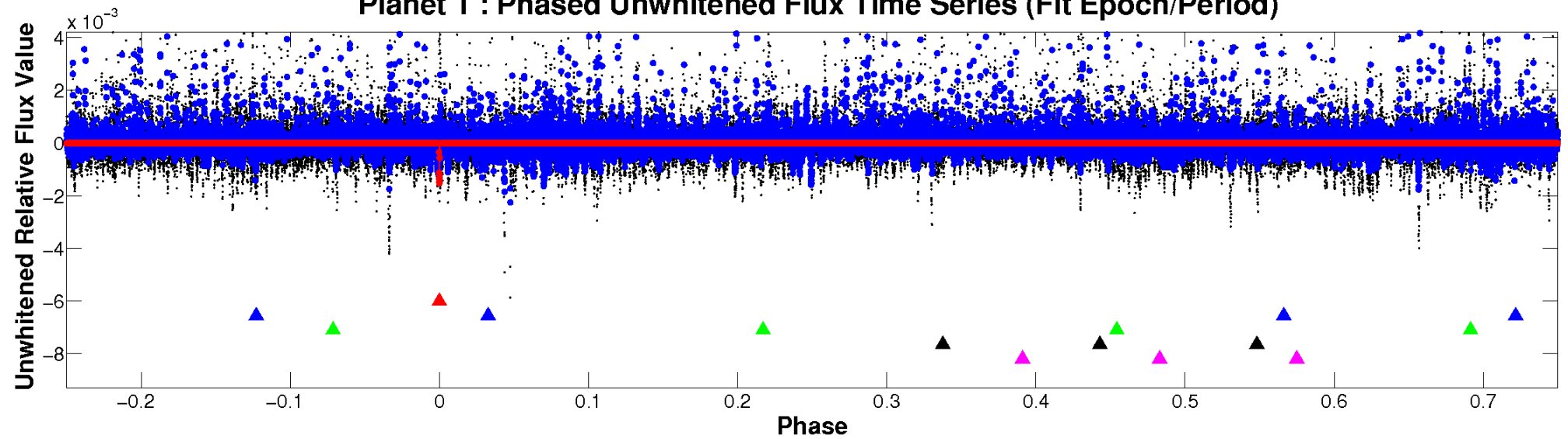
ALT Odd/Even

TCE 003528198-01

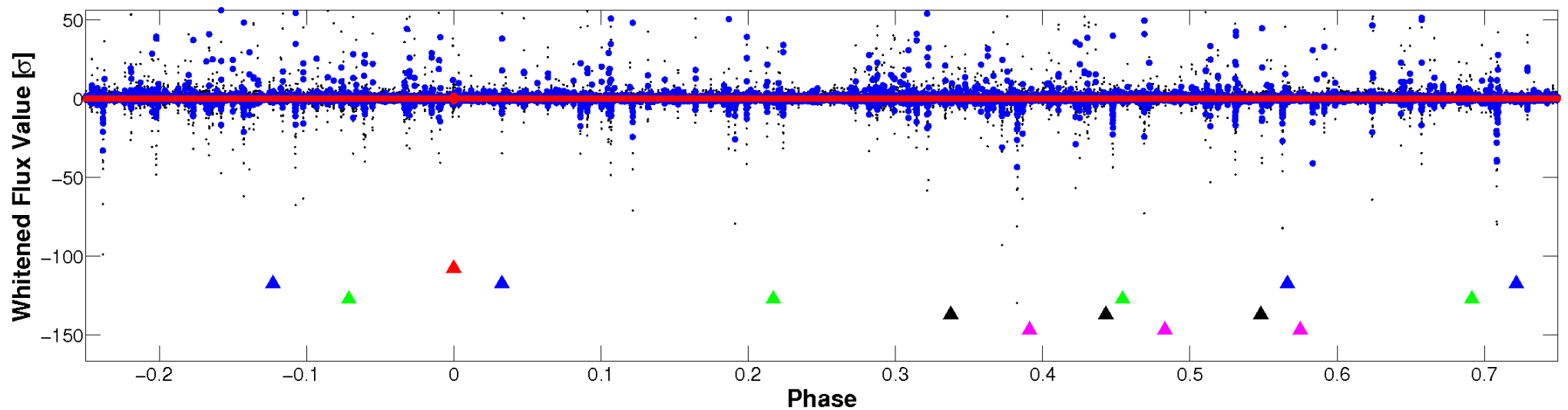


Non-Whitened Vs. Whitened Light Curve

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

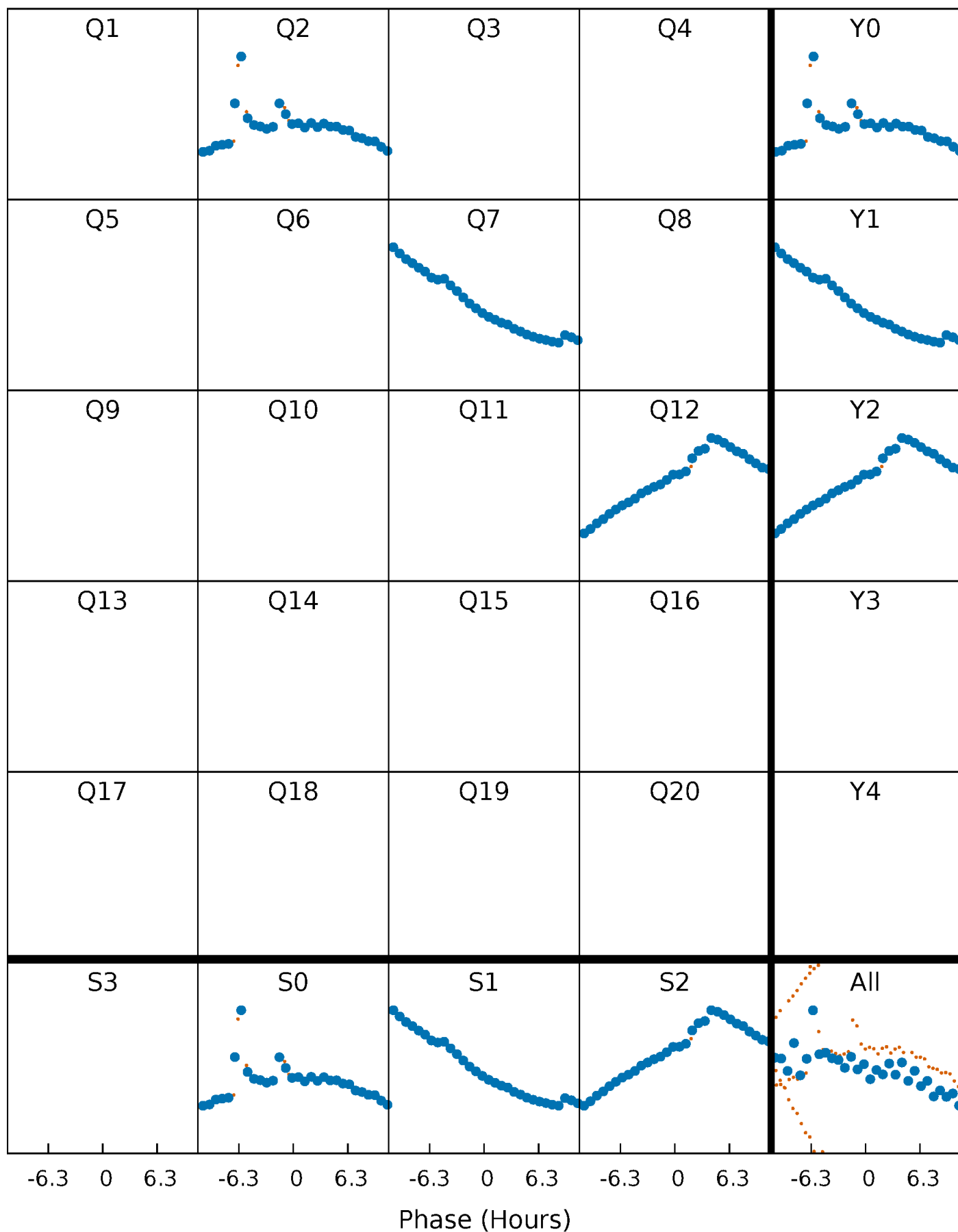


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



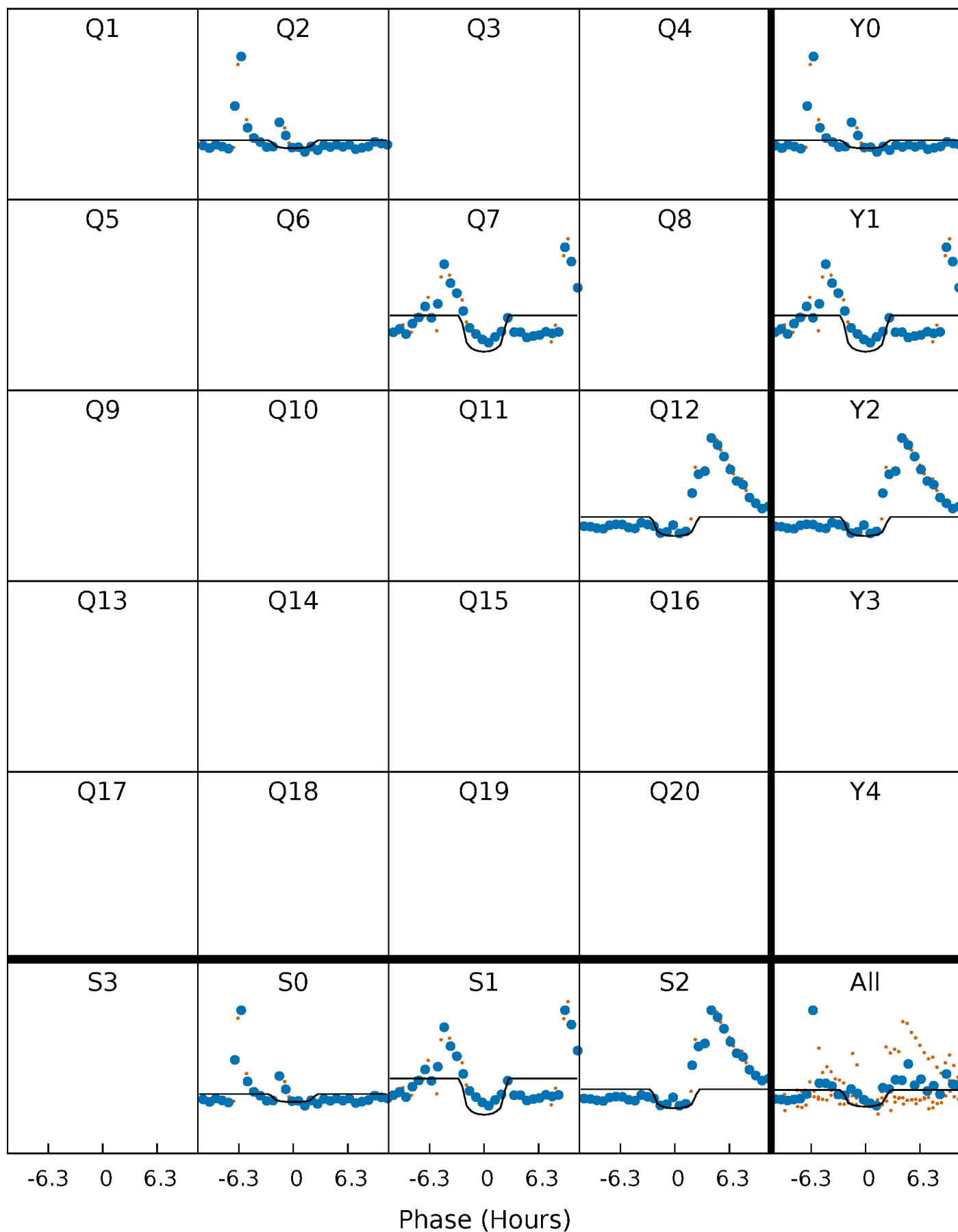
PDC Quarter-Phased Transit Curves

TCE 003528198-01 P=455.810964 Days $T_0=238.546322$ (BKJD)



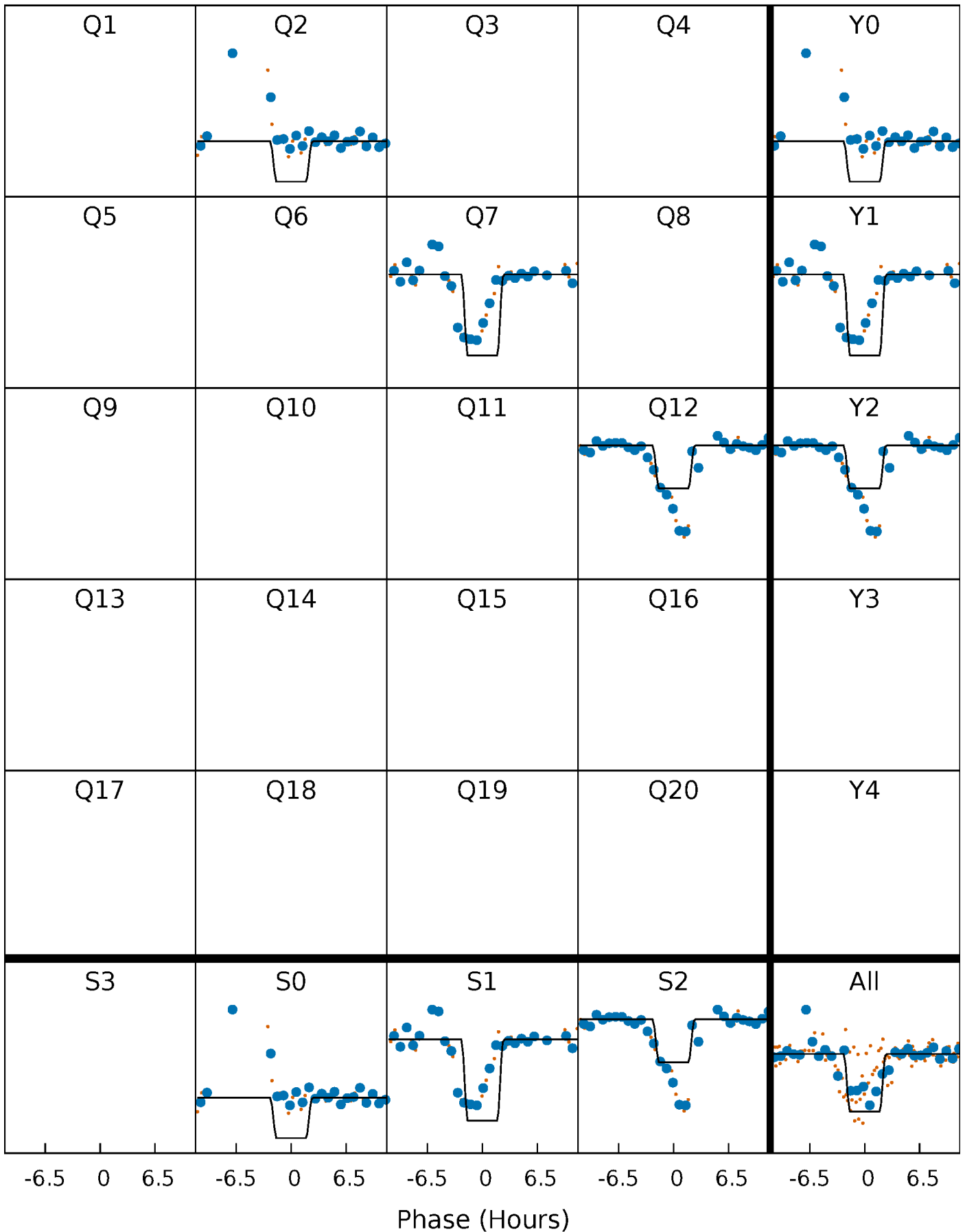
DV Quarter-Phased Transit Curves

TCE 003528198-01 P=455.810964 Days $T_0=238.546322$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

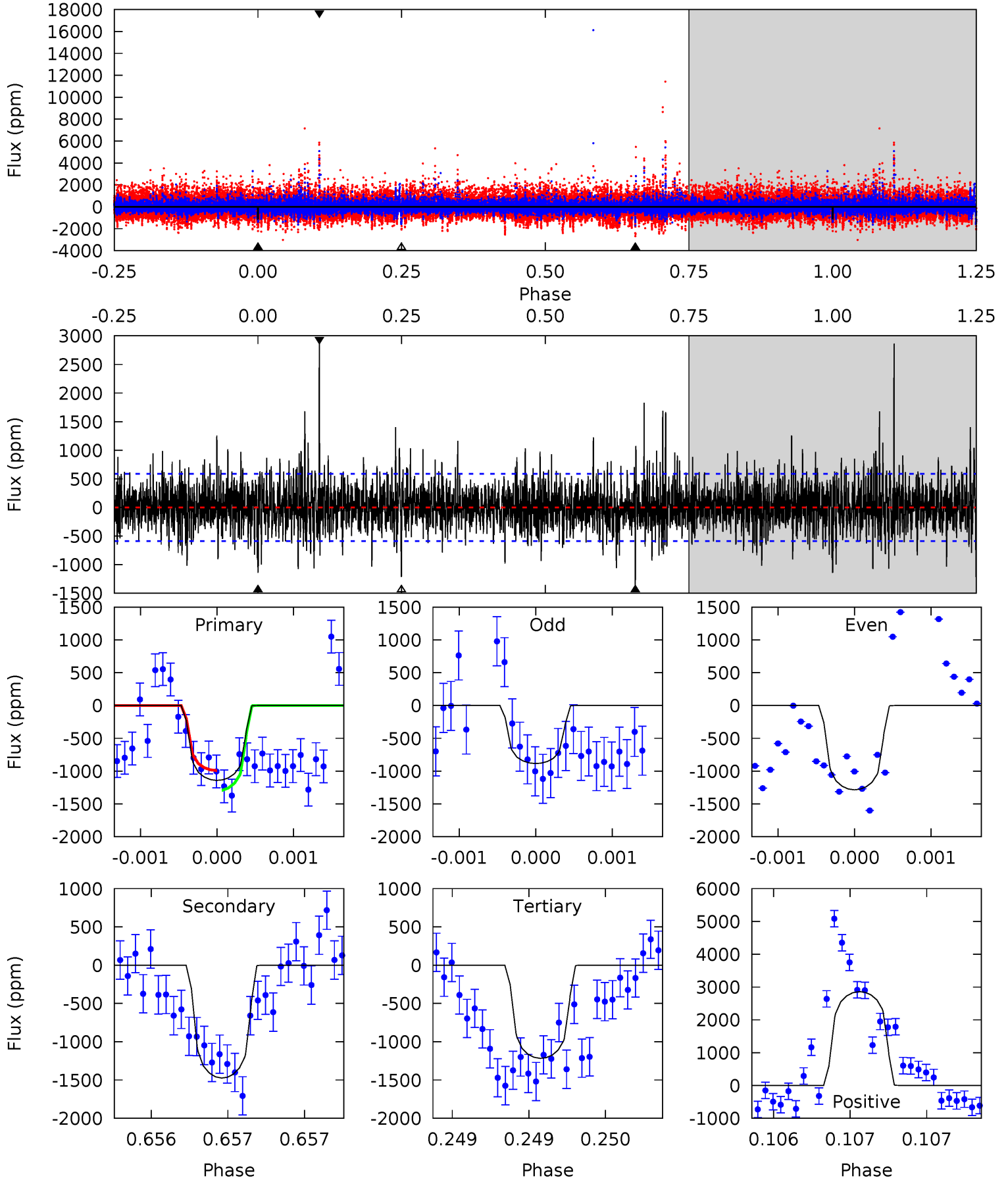
TCE 003528198-01 P=455.777367 Days $T_0=238.619677$ (BKJD)



DV Model-Shift Uniqueness Test

003528198-01, P = 455.810964 Days, E = 238.546322 Days

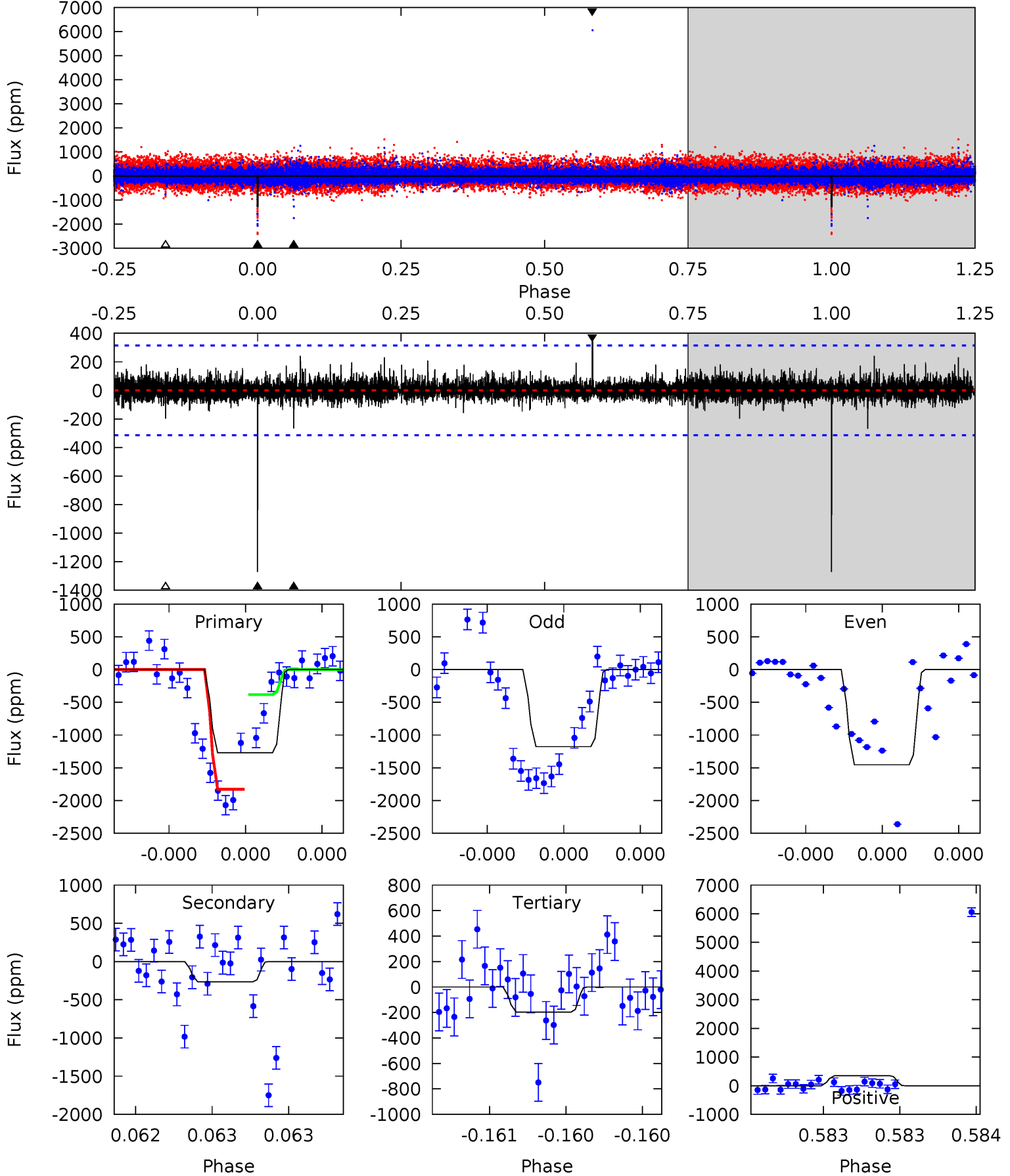
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 10.8 | 13.9 | 11.5 | 27.0 | 5.55 | 3.44 | 2.87 | -0.71 | -16.2 | 2.42 | -13.1 | 0.93 | 0.86 | 0.66 | 1.43 |



Alt Model-Shift Uniqueness Test

003528198-01, P = 455.777367 Days, E = 238.619677 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 22.7 | 4.77 | 3.52 | 6.29 | 5.60 | 3.52 | 0.67 | 19.1 | 16.4 | 1.25 | -1.53 | 2.78 | 1.24 | 0.22 | 13.3 |



Stellar Parameters For KIC 003528198

| | $T_{\text{eff}}(K)$ | $\log(g)$ | $[\text{Fe}/\text{H}]$ | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 4654^{+129}_{-162} | $4.749^{+0.049}_{-0.025}$ | $-1.580^{+0.300}_{-0.250}$ | $0.503^{+0.024}_{-0.035}$ | $0.517^{+0.032}_{-0.025}$ | $5.723^{+1.128}_{-0.528}$ |
| | +3%/-3% | +1%/-1% | +19%/-16% | +5%/-7% | +6%/-5% | +20%/-9% |
| Source | PHO1 | KIC0 | KIC0 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 003528198-01 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|-----------------|------------------------|----------------------|----------------------|-----------------------------|
| DV | -1474 ± 106 | $2.25^{+0.59}_{-0.60}$ | 210^{+7}_{-8} | 4516^{+619}_{-419} | $137875^{+116780}_{-50213}$ |
| Alt. | -267 ± 56 | $2.49^{+0.65}_{-0.60}$ | 210^{+6}_{-8} | 3260^{+329}_{-233} | 20531^{+17229}_{-8098} |

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

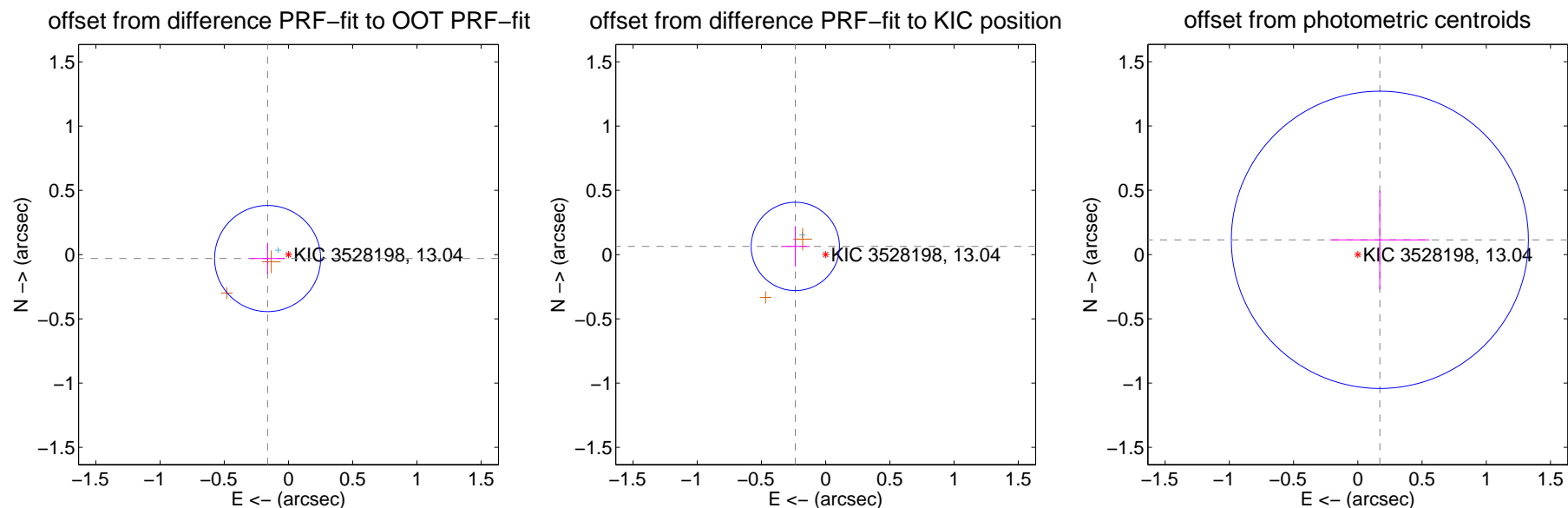
DV Centroid Data

Supplemental centroid analysis for 003528198-01. Kepler magnitude: 13.04. Transit SNR 8.85

There are 1 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.18 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT | 0.166 ± 0.138 | 1.20 | 0.163 ± 0.138 | -0.031 ± 0.119 |
| PRF-fit source offset from KIC position | 0.245 ± 0.115 | 2.14 | 0.236 ± 0.111 | 0.064 ± 0.158 |
| photometric centroid source offset | 0.21 ± 0.39 | 0.53 | -0.17 ± 0.39 | 0.11 ± 0.38 |



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.

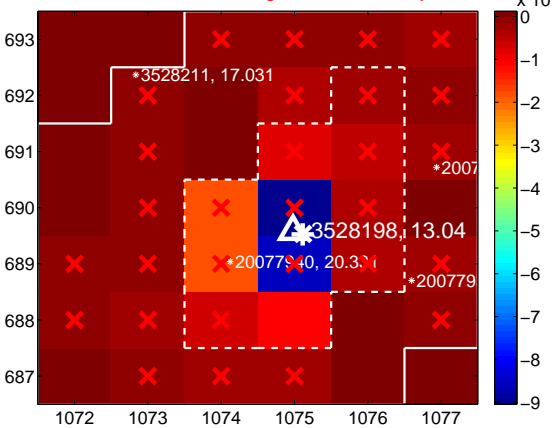
Q1 no difference image



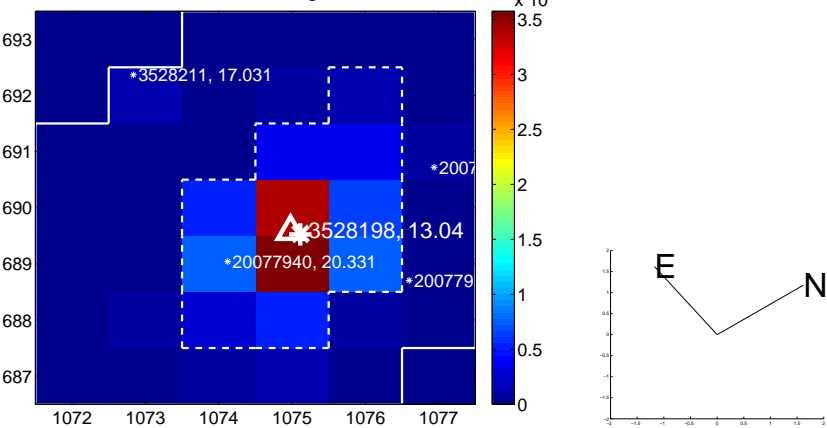
Q1 no OOT image



Q2 difference image. Poor Quality



Q2 OOT image



Q3 no difference image



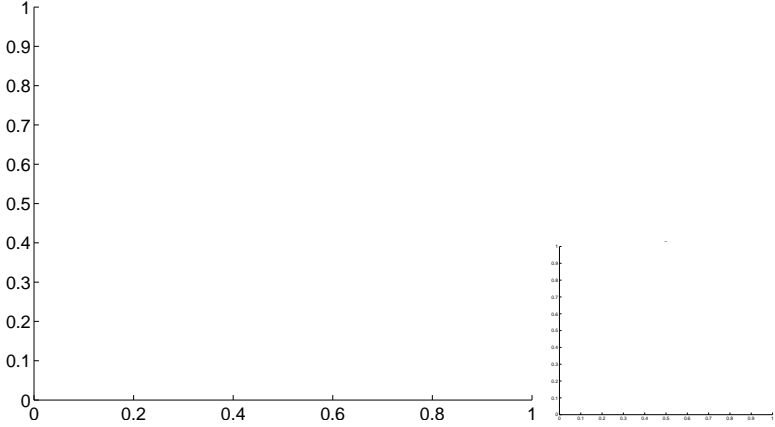
Q3 no OOT image



Q4 no difference image



Q4 no OOT image



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

Q5 no difference image



Q5 no OOT image



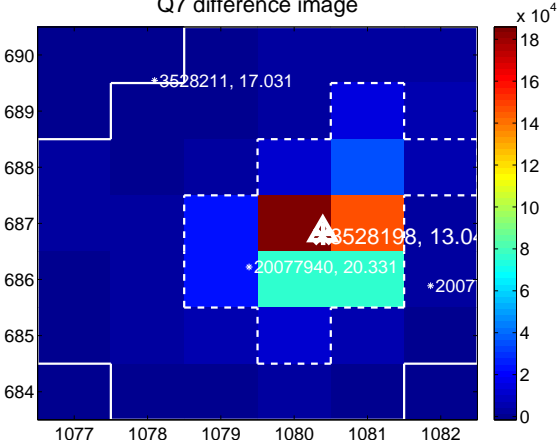
Q6 no difference image



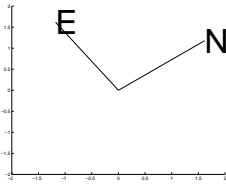
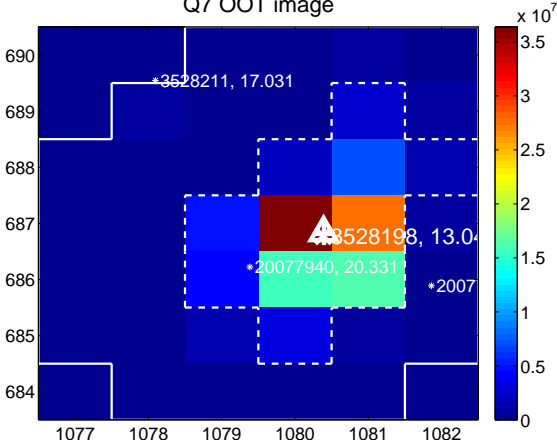
Q6 no OOT image



Q7 difference image



Q7 OOT image



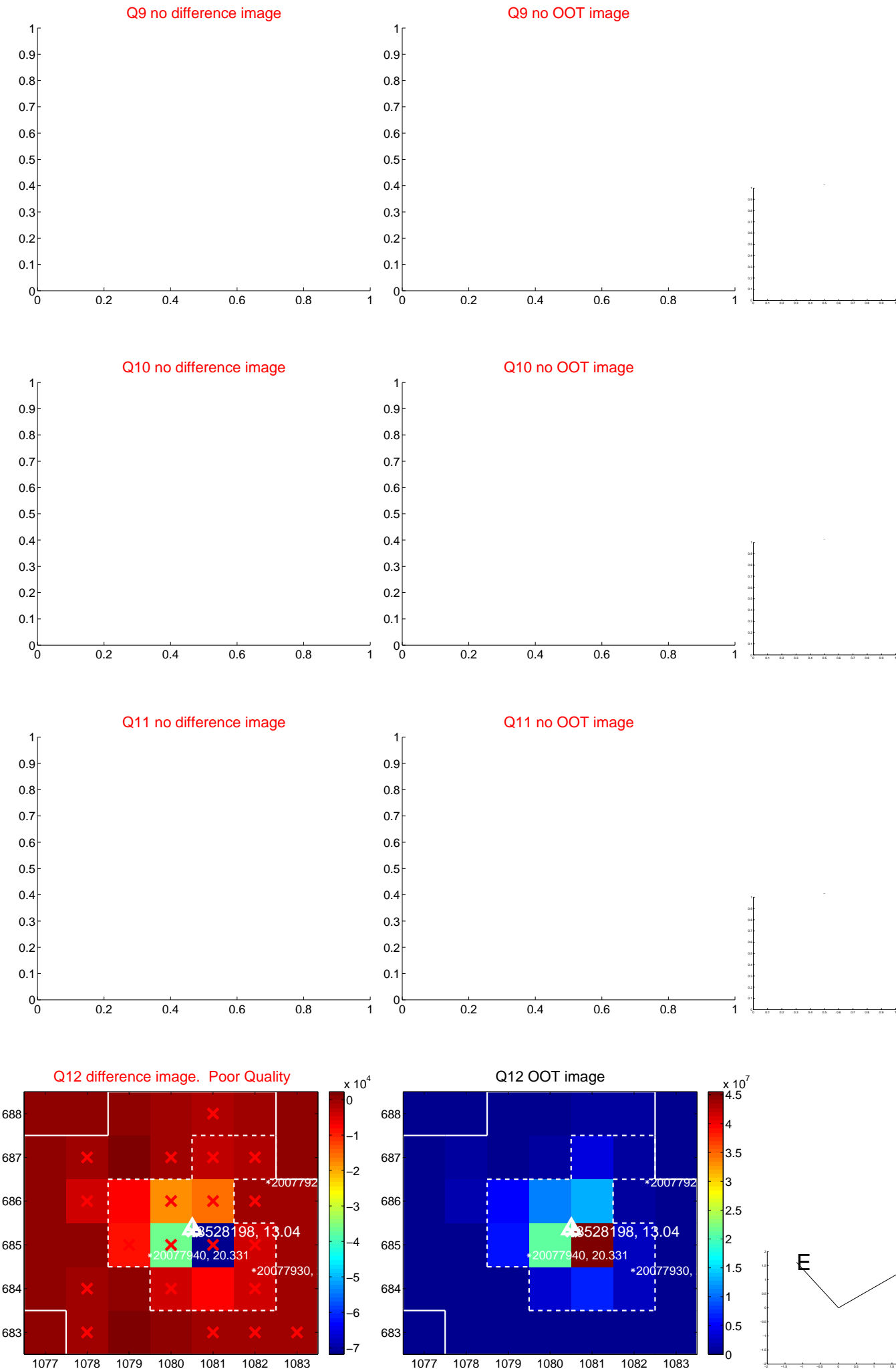
Q8 no difference image



Q8 no OOT image



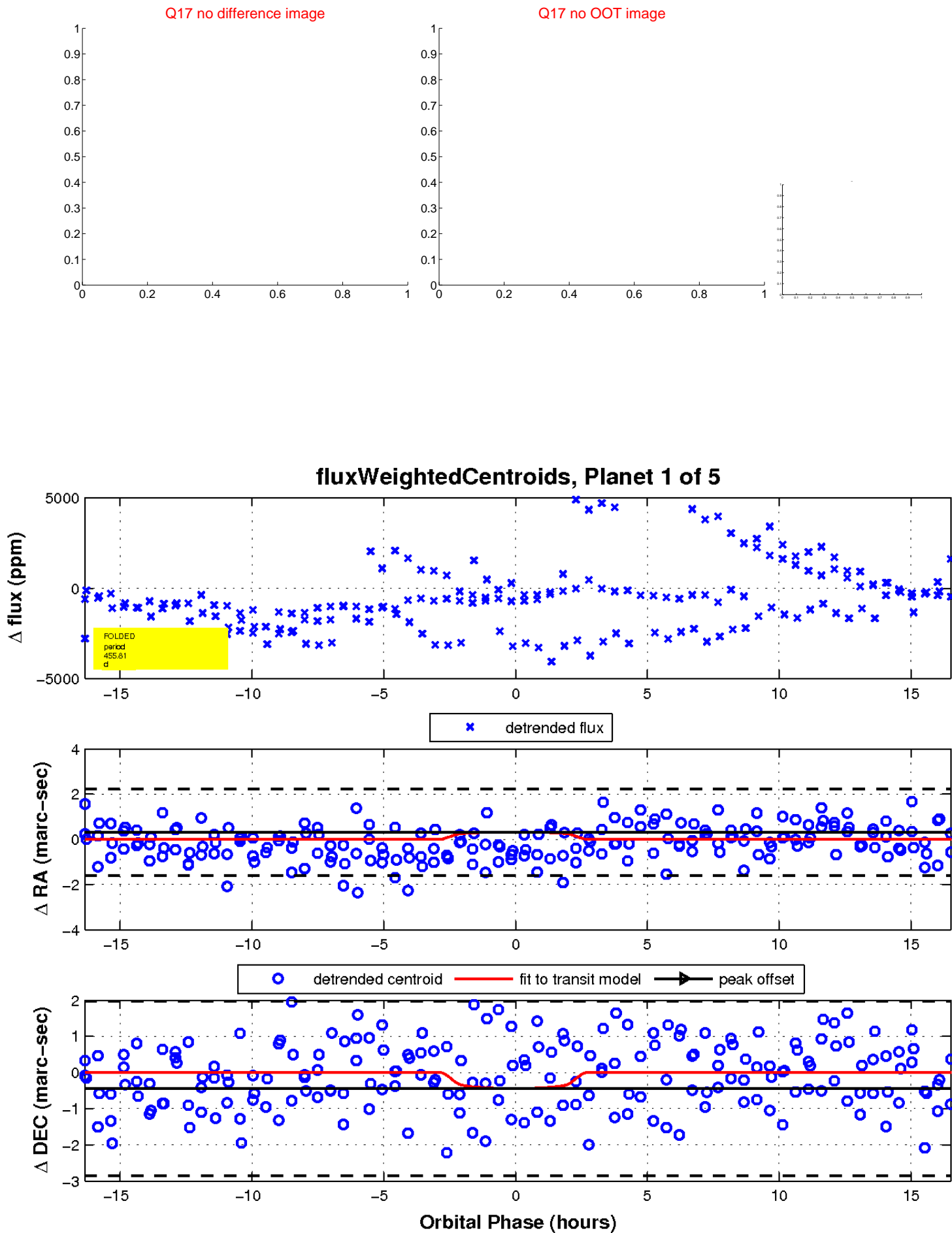
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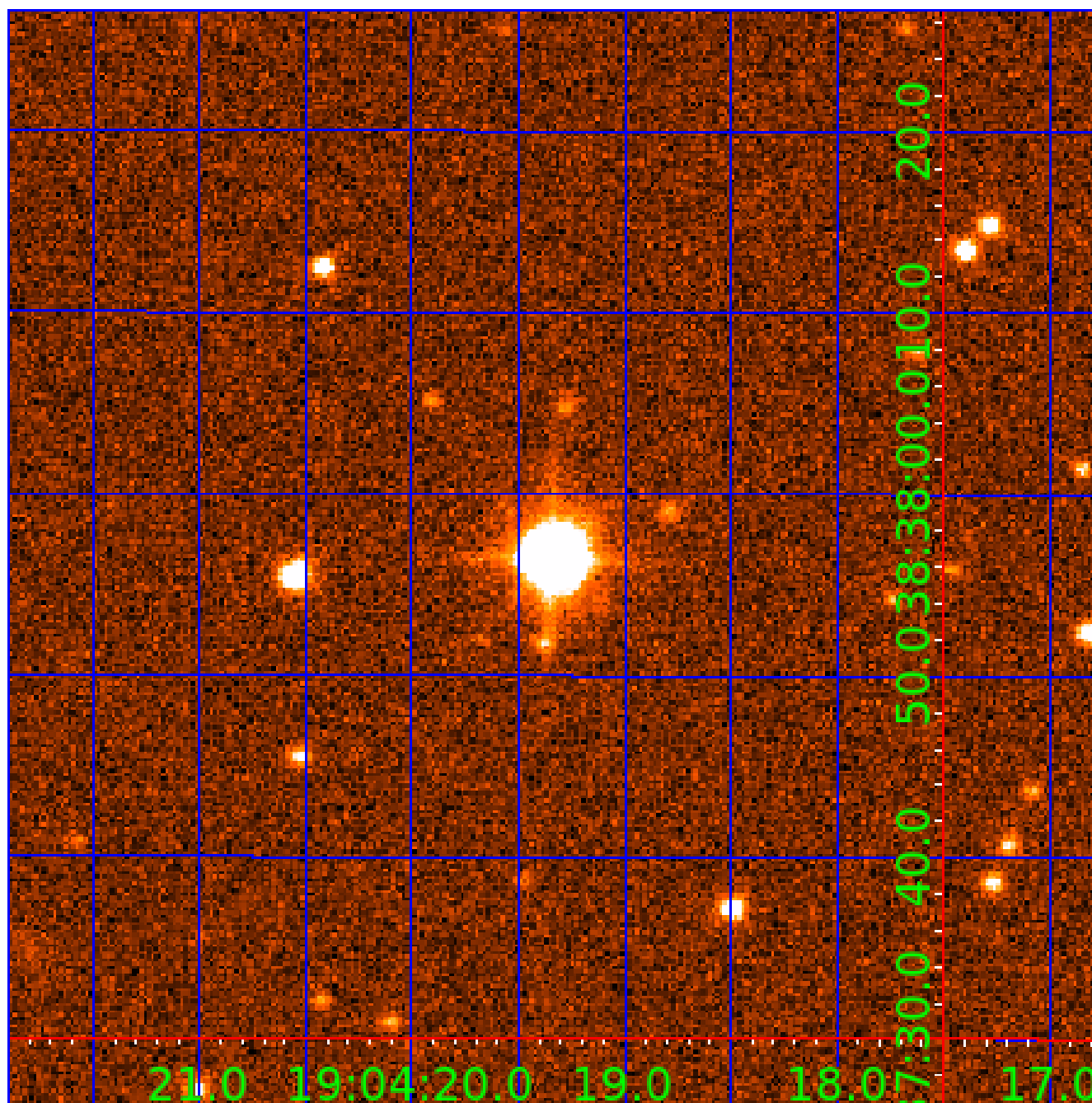


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 003528198

Q1-17 DR25 TCE Parameters

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| 003528198-05 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS |

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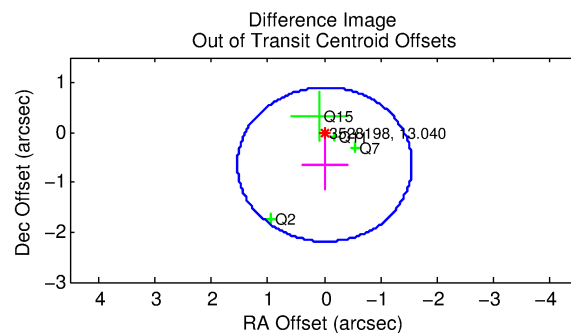
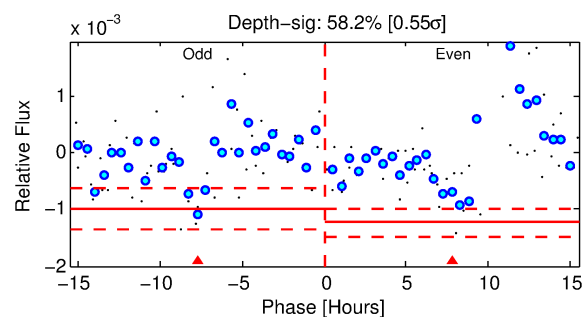
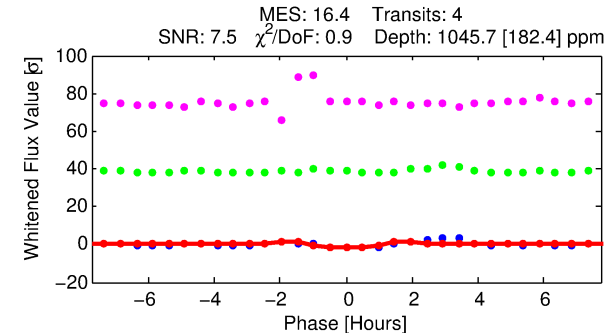
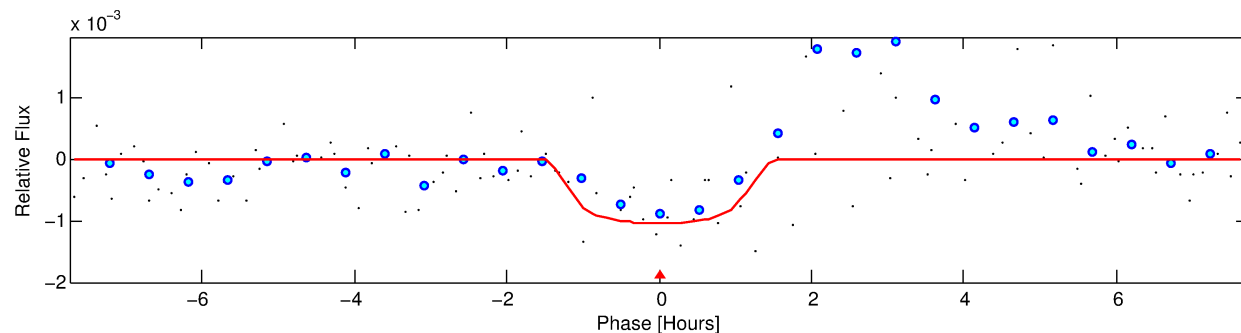
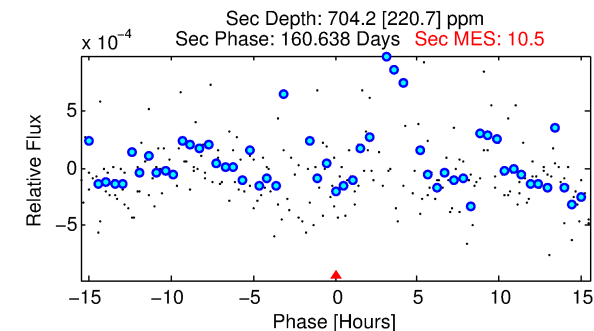
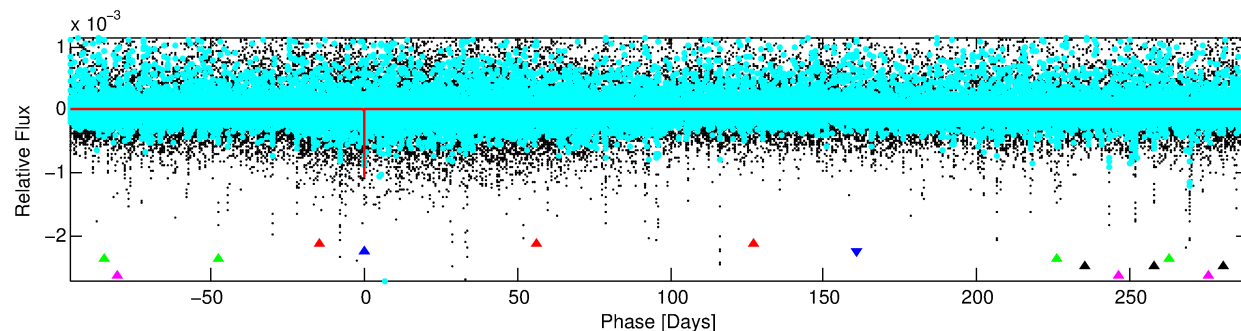
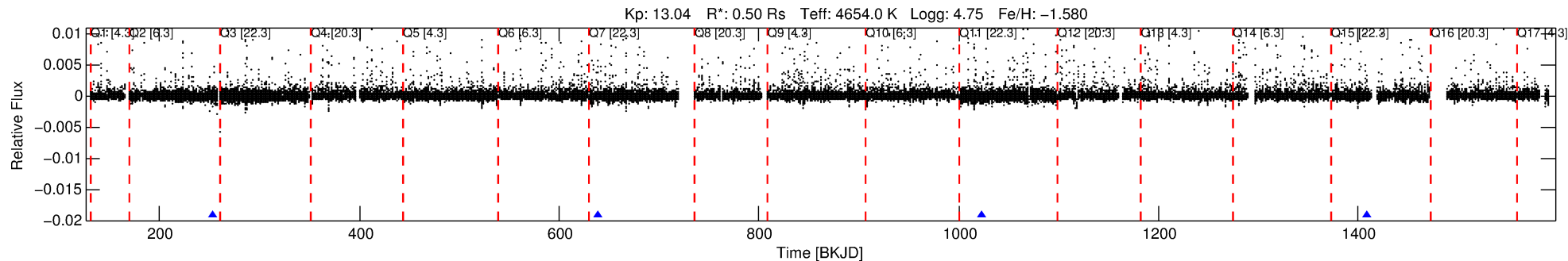
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 003528198-02

No Significant Match Found

DV One-Page Summary

KIC: 3528198 Candidate: 2 of 5 Period: 384.940 d



DV Fit Results:

Period = 384.94040 [0.00318] d
Epoch = 253.4572 [0.0079] BKJD
Rp/R* = 0.0294 [0.1087]
a/R* = 1171.05 [19585.35]
b = 0.05 [320.96]
Seff = 0.15 [0.03]
Teq = 160 [7] K
Rp = 1.61 [5.97] Re
a = 0.8318 [0.0497] AU
Ag = 102867.84 [761504.19] [0.14σ]
Teff = 4421 [8183] K [0.52σ]

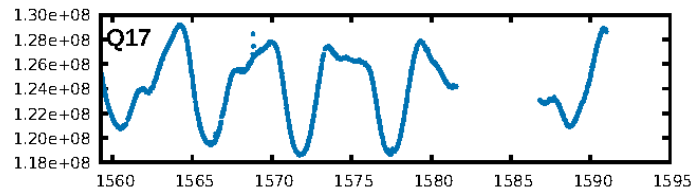
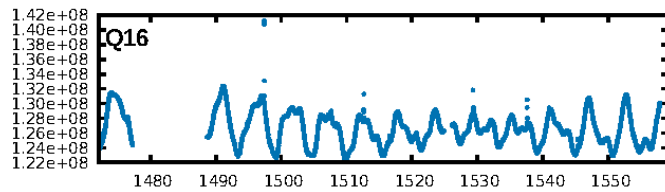
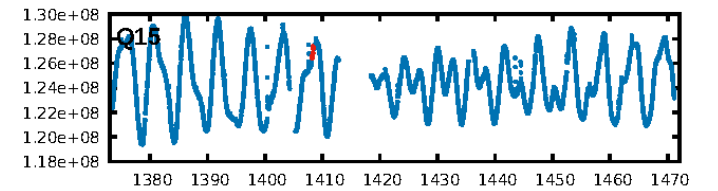
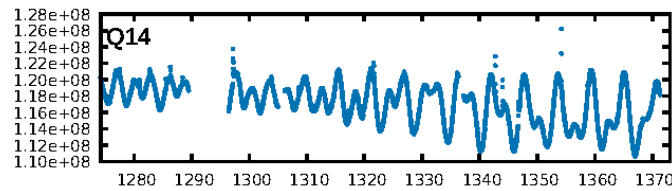
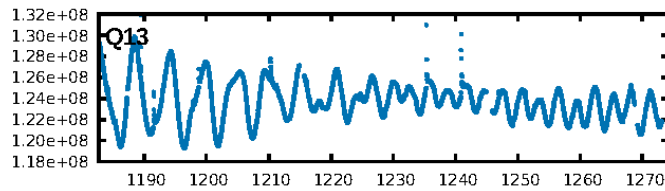
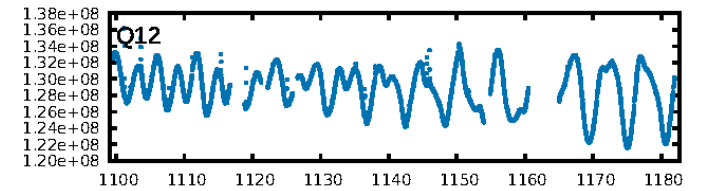
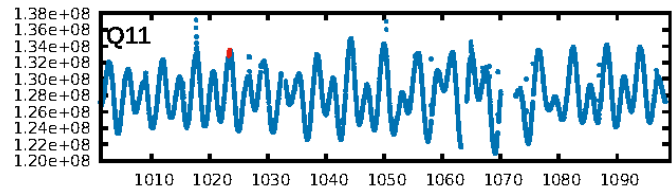
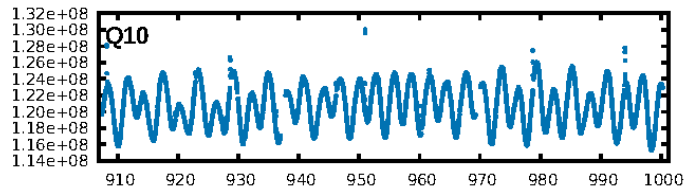
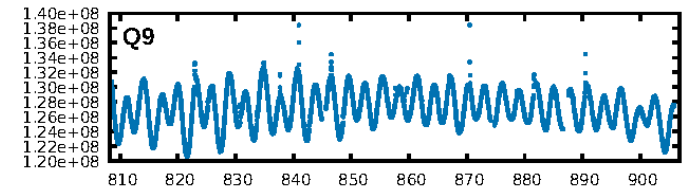
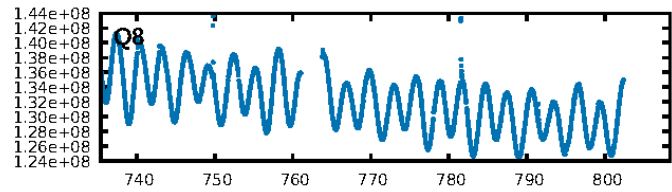
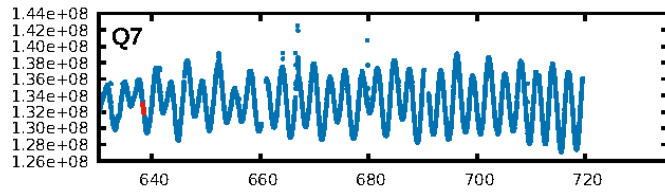
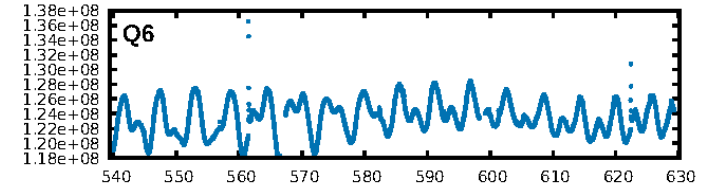
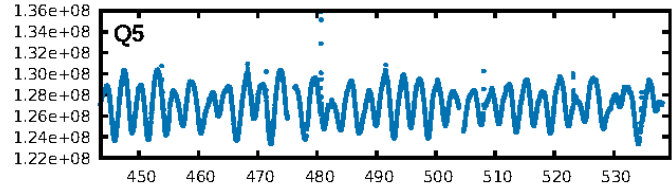
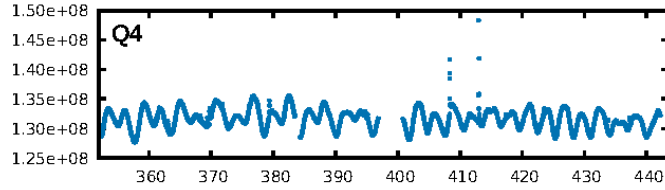
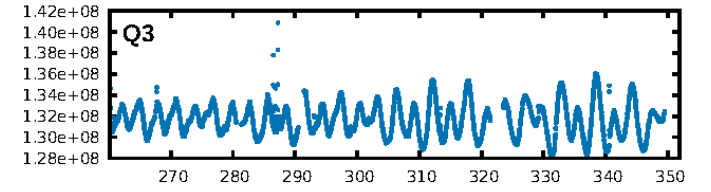
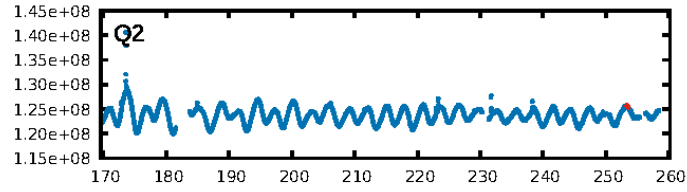
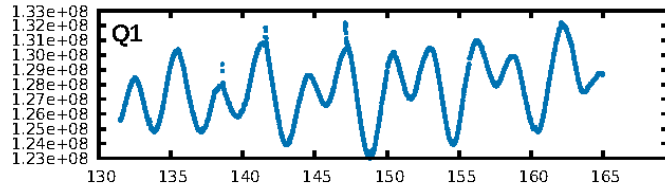
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [163.60σ]
LongPeriod-sig: 100.0% [53.72σ]
ModelChiSquare2-sig: 15.6%
ModelChiSquareGof-sig: 97.7%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: -0.5721
Centroid-sig: 60.2%
Centroid-so: 0.269 arcsec [0.49σ]
OotOffset-rm: 0.646 arcsec [1.26σ]
OotOffset-st: 1/3/0/0 [4]
KicOffset-rm: 0.546 arcsec [0.94σ]
KicOffset-st: 1/3/0/0 [4]
DiffImageQuality-fgm: 0.50 [2/4]
DiffImageOverlap-fno: 1.00 [4/4]

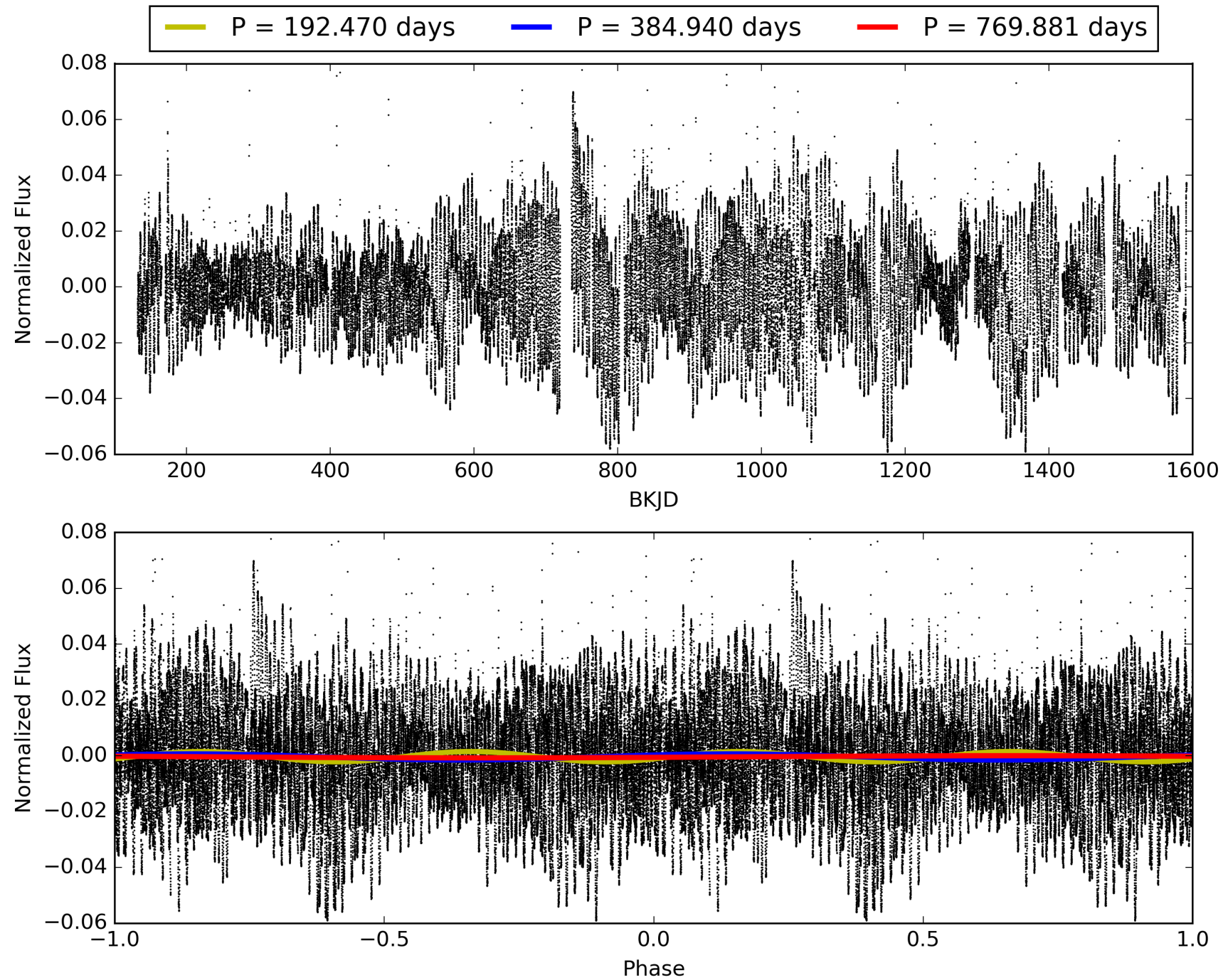
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 01:17:30 Z

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

TCE 003528198-02, PDC Light Curves

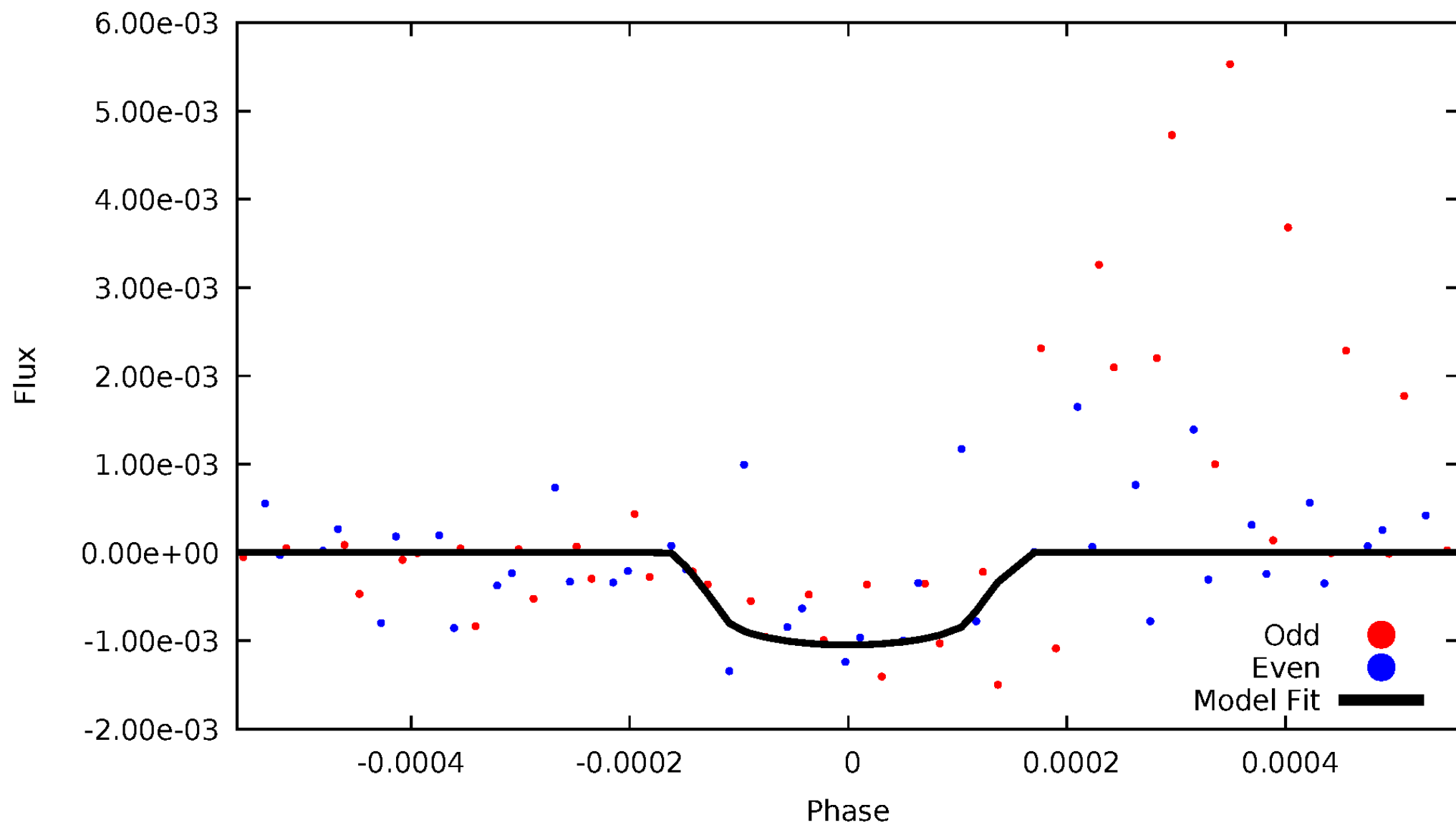


TCE 003528198-02



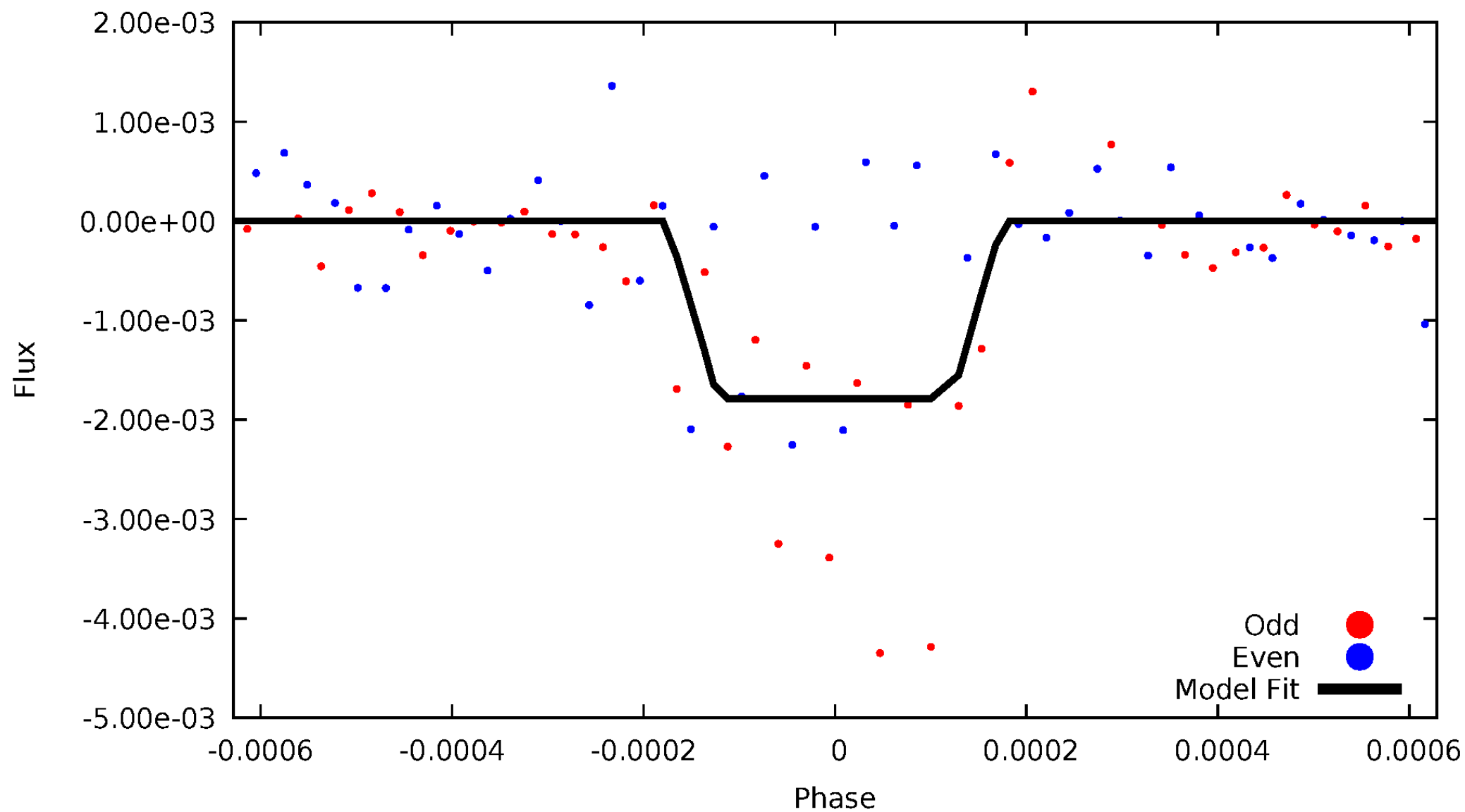
DV Odd/Even

TCE 003528198-02



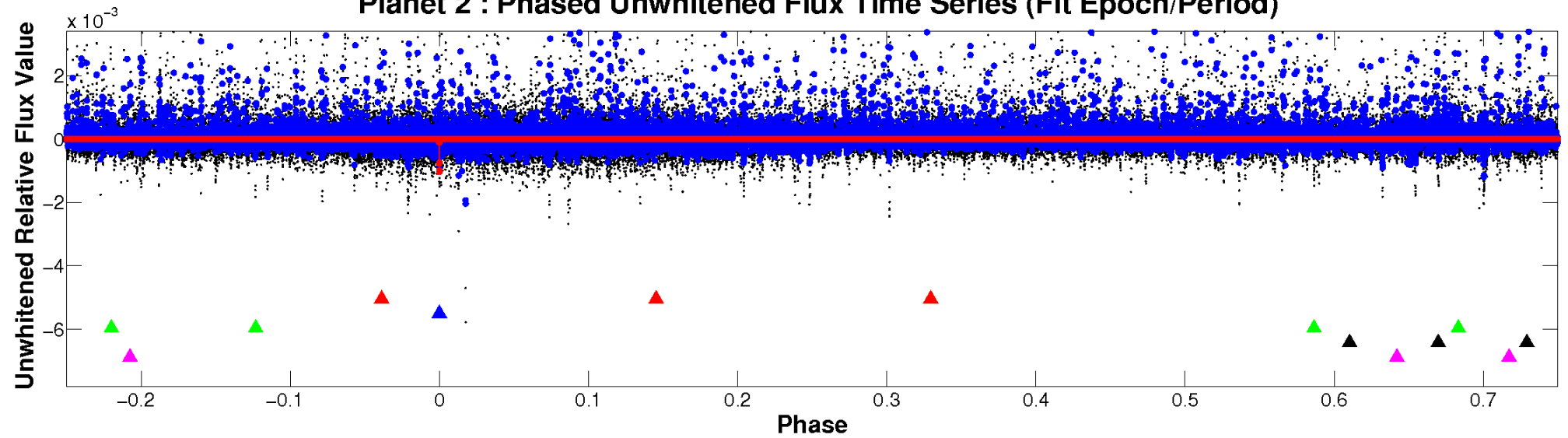
ALT Odd/Even

TCE 003528198-02

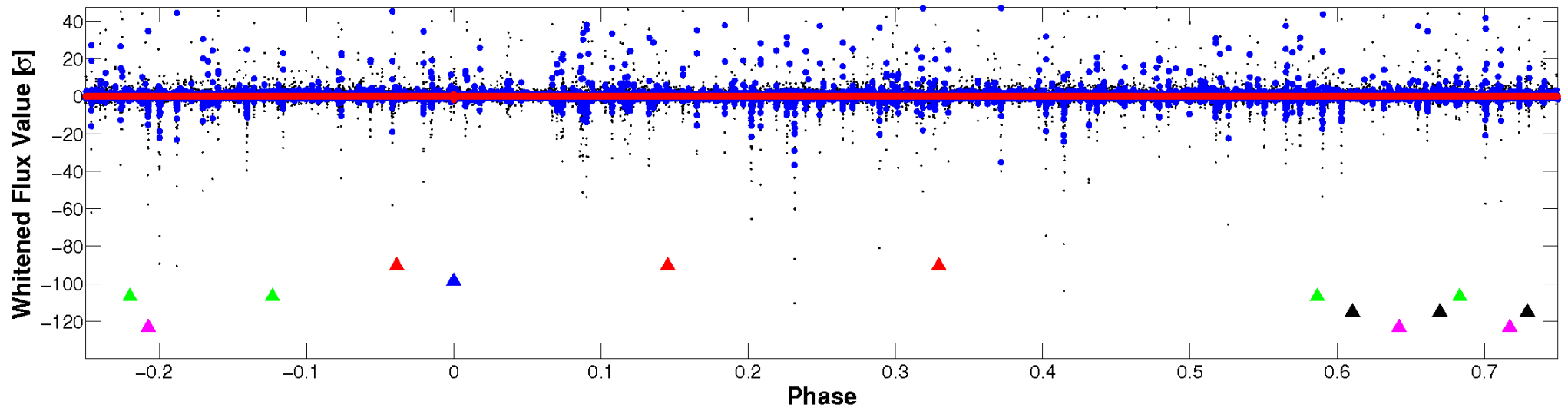


Non-Whitened Vs. Whitened Light Curve

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

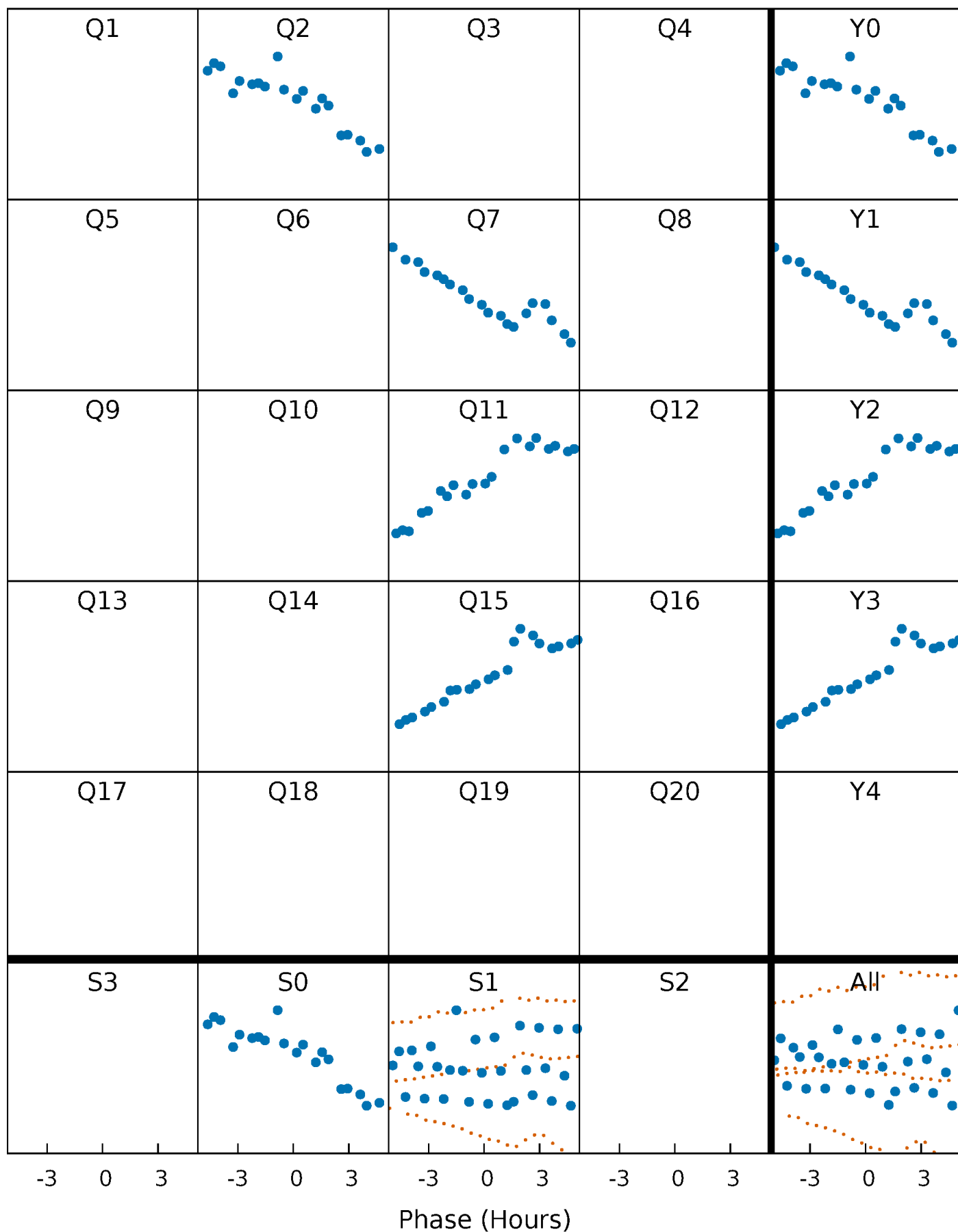


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



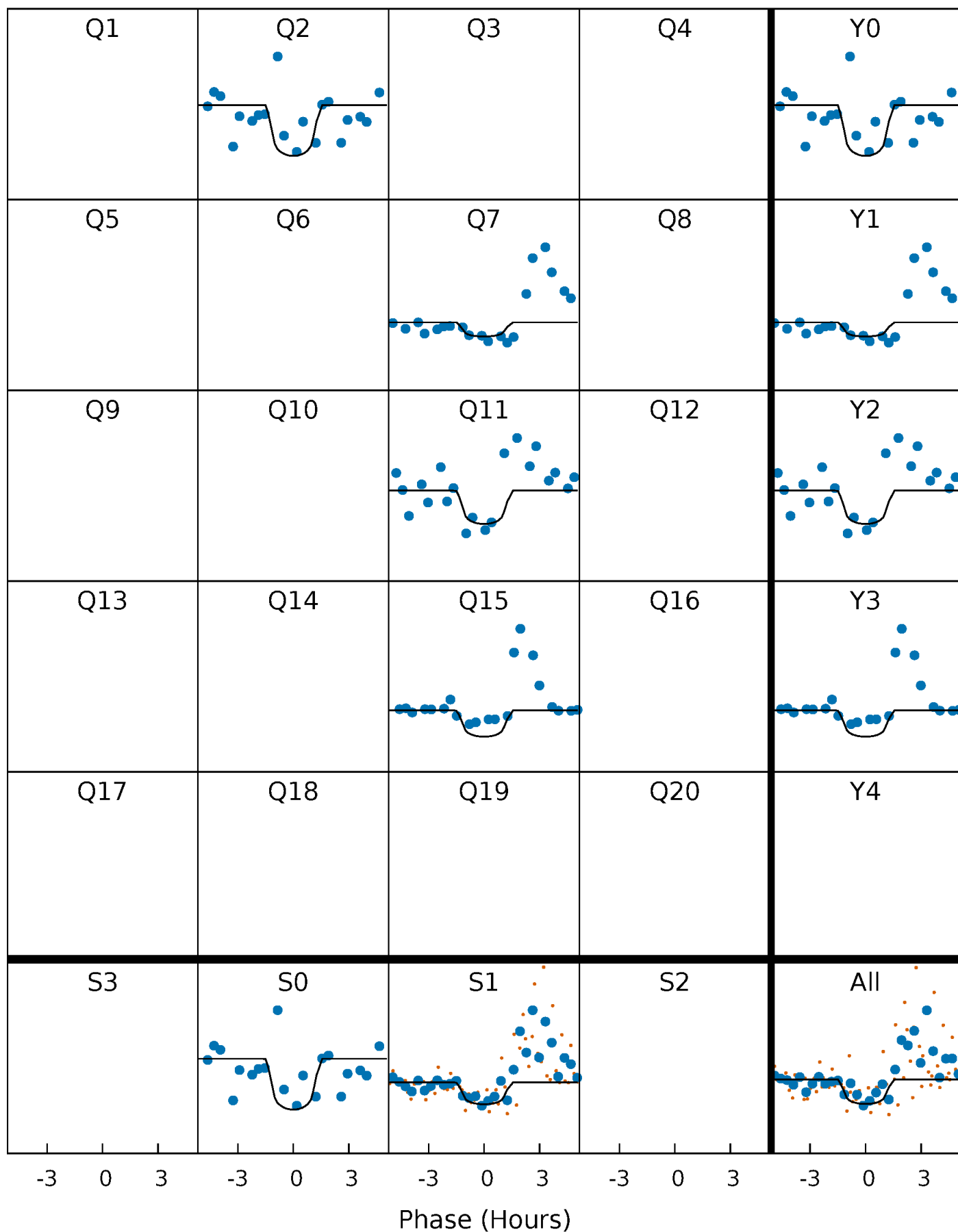
PDC Quarter-Phased Transit Curves

TCE 003528198-02 $P=384.940399$ Days $T_0=253.457226$ (BKJD)



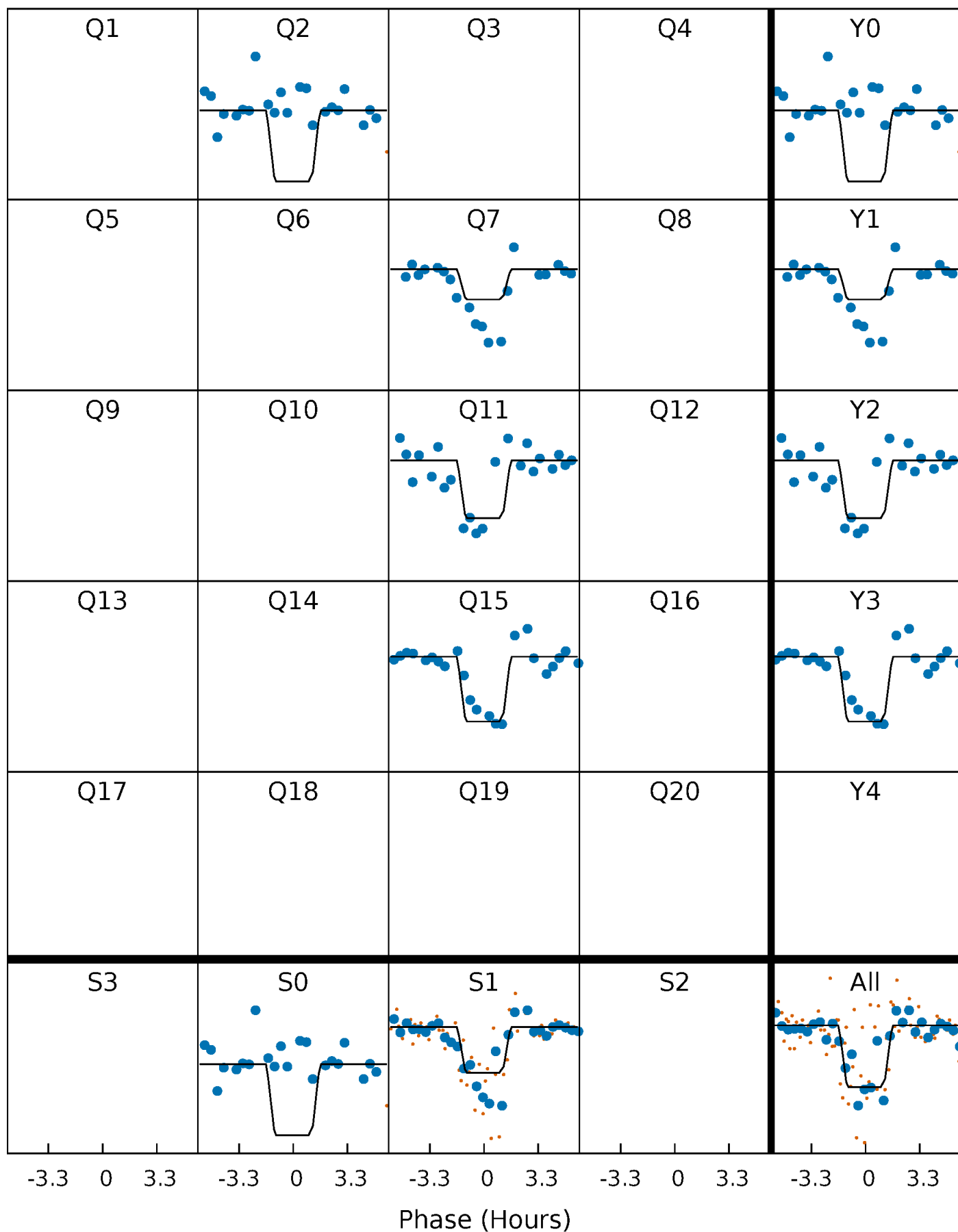
DV Quarter-Phased Transit Curves

TCE 003528198-02 $P=384.940399$ Days $T_0=253.457226$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

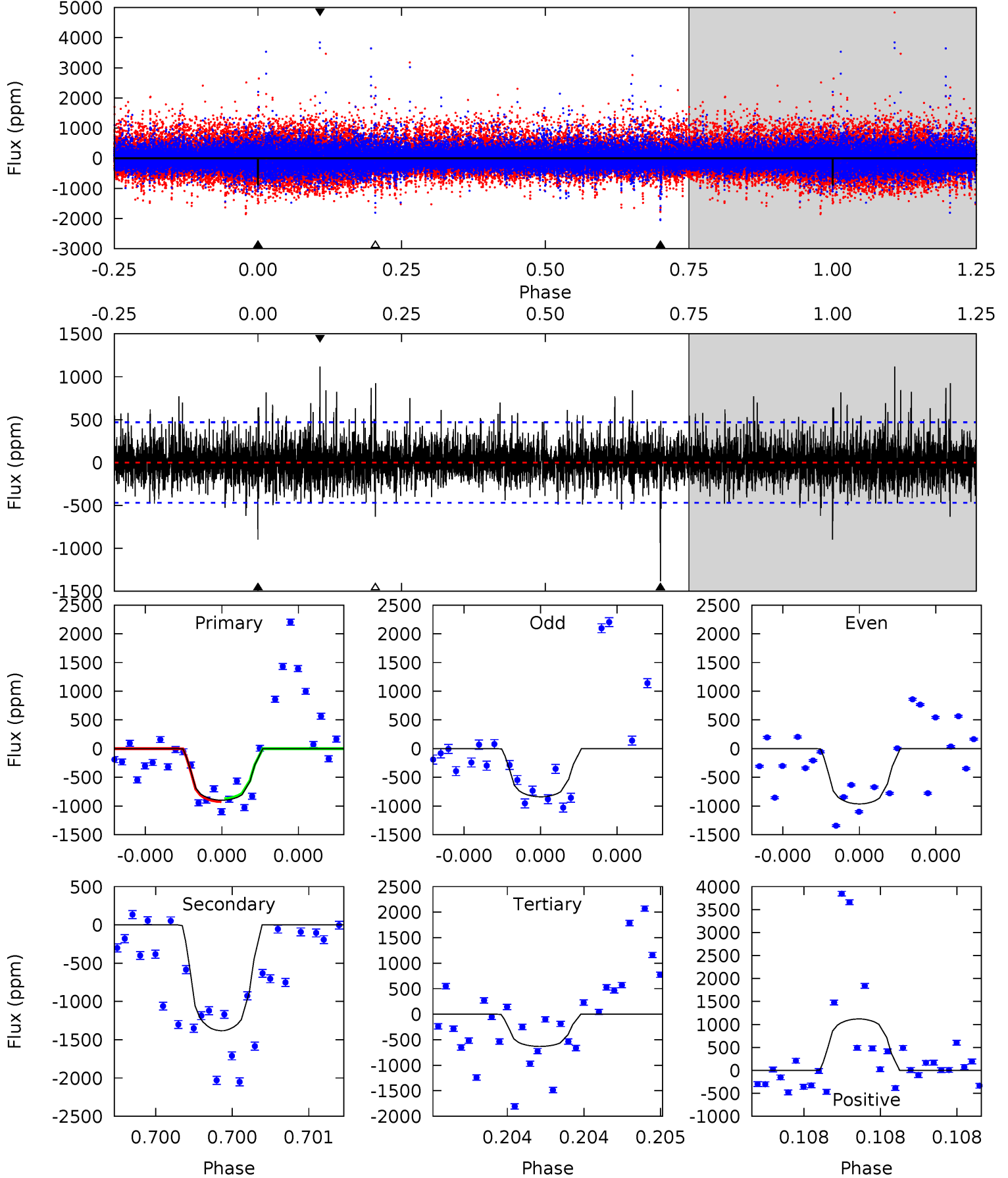
TCE 003528198-02 P=384.921942 Days $T_0=253.510266$ (BKJD)



DV Model-Shift Uniqueness Test

003528198-02, P = 384.940399 Days, E = 253.457226 Days

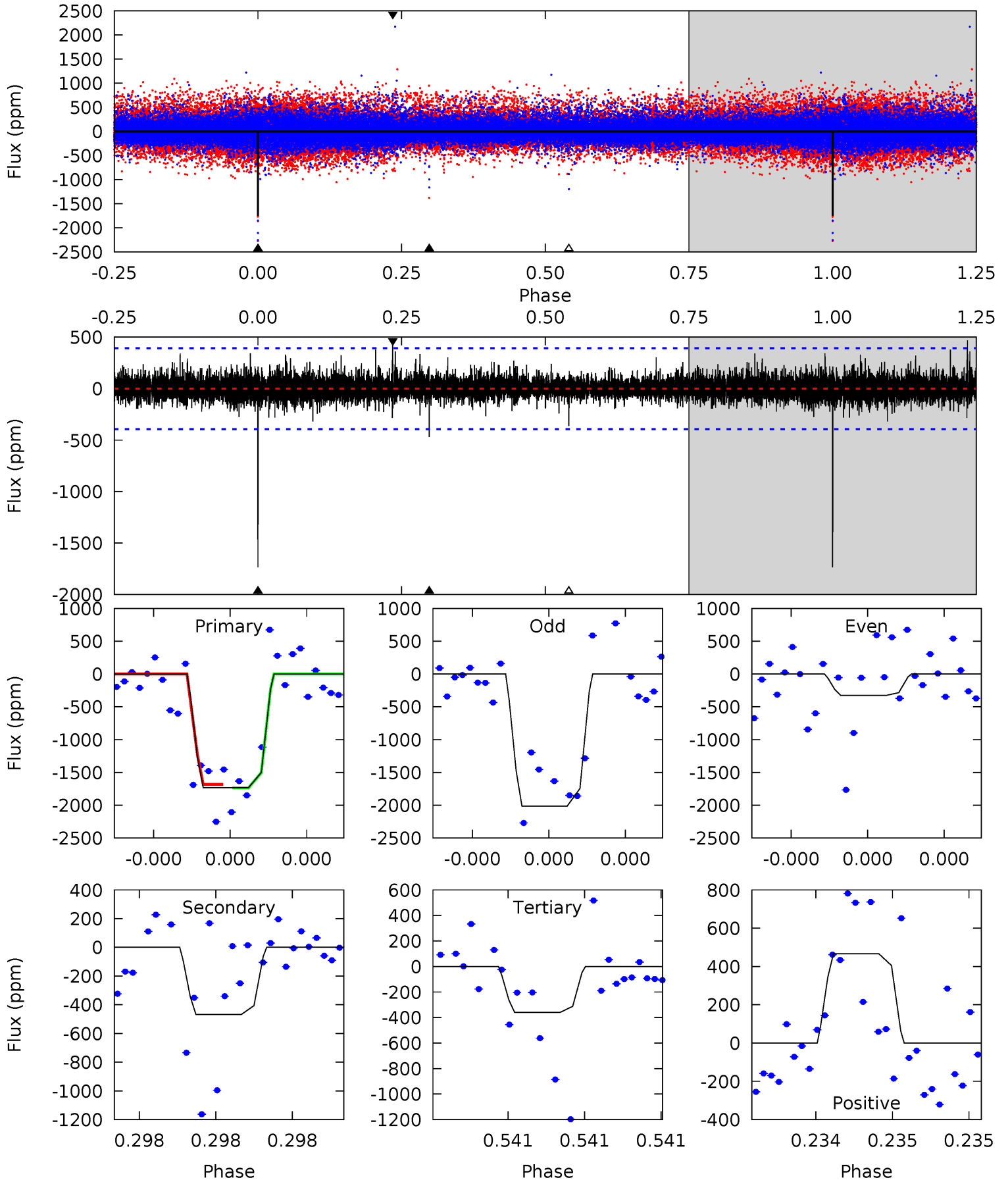
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 10.8 | 16.6 | 7.59 | 13.5 | 5.65 | 3.60 | 1.89 | 3.22 | -2.66 | 9.04 | 3.17 | 0.39 | 1.17 | 0.45 | 0.31 |



Alt Model-Shift Uniqueness Test

003528198-02, P = 384.921942 Days, E = 253.510266 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|-----|
| 24.9 | 6.73 | 5.18 | 6.71 | 5.65 | 3.60 | 0.94 | 19.7 | 18.2 | 1.54 | 0.01 | 14.7 | 1.02 | 0.21 | 0 |



Stellar Parameters For KIC 003528198

| | $T_{\text{eff}}(K)$ | $\log(g)$ | $[\text{Fe}/\text{H}]$ | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 4654^{+129}_{-162} | $4.749^{+0.049}_{-0.025}$ | $-1.580^{+0.300}_{-0.250}$ | $0.503^{+0.024}_{-0.035}$ | $0.517^{+0.032}_{-0.025}$ | $5.723^{+1.128}_{-0.528}$ |
| | +3%/-3% | +1%/-1% | +19%/-16% | +5%/-7% | +6%/-5% | +20%/-9% |
| Source | PHO1 | KIC0 | KIC0 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 003528198-02 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|----------------|------------------------|----------------------|-----------------------|----------------------------|
| DV | -1383 ± 83 | $4.96^{+4.27}_{-3.40}$ | 223^{+7}_{-9} | 3396^{+1891}_{-570} | $21386^{+198577}_{-15242}$ |
| Alt. | -468 ± 70 | $4.78^{+4.80}_{-2.94}$ | 222^{+8}_{-8} | 2931^{+1006}_{-490} | 7864^{+44412}_{-5955} |

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

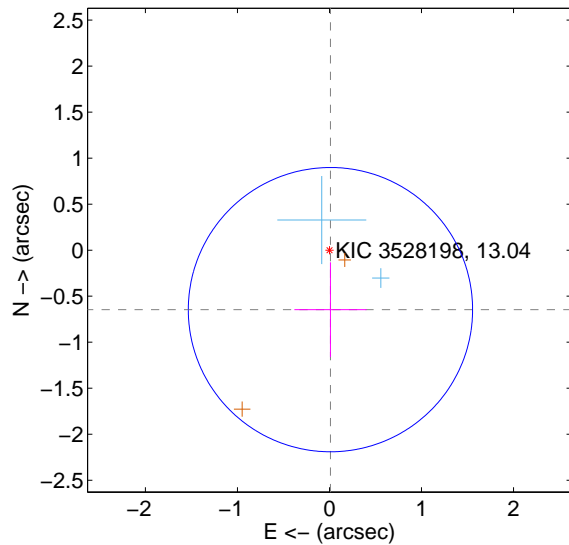
Supplemental centroid analysis for 003528198-02. Kepler magnitude: 13.04. Transit SNR 7.51

There are 2 quarters with good PRF difference image offsets

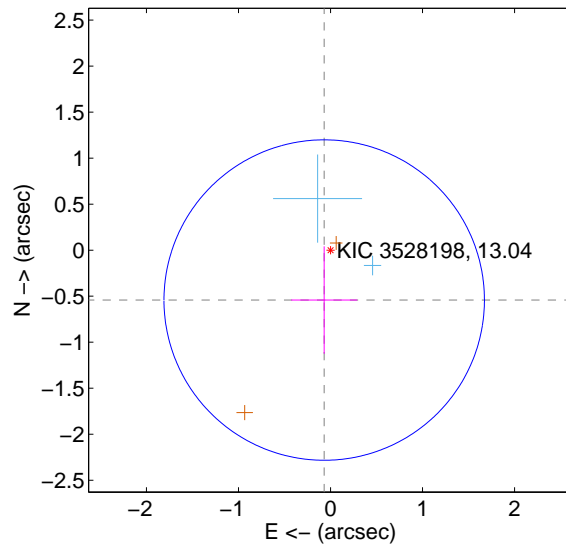
The direct PRF centroid is offset from the target star catalog position by about 0.24 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 0.646 ± 0.515 | 1.26 | -0.011 ± 0.392 | -0.646 ± 0.515 |
| PRF-fit source offset from KIC position | 0.546 ± 0.580 | 0.94 | 0.069 ± 0.359 | -0.542 ± 0.583 |
| photometric centroid source offset | 0.27 ± 0.55 | 0.49 | -0.27 ± 0.55 | 0.01 ± 0.64 |

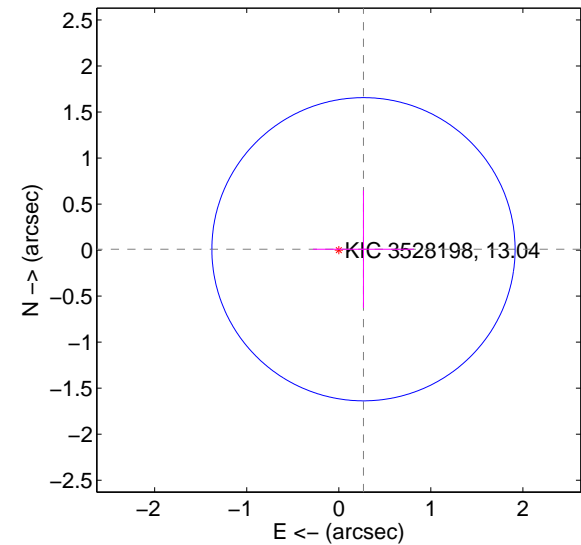
offset from difference PRF-fit to OOT PRF-fit



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.

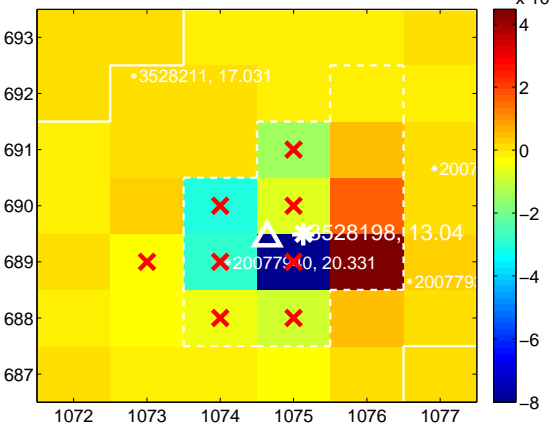
Q1 no difference image



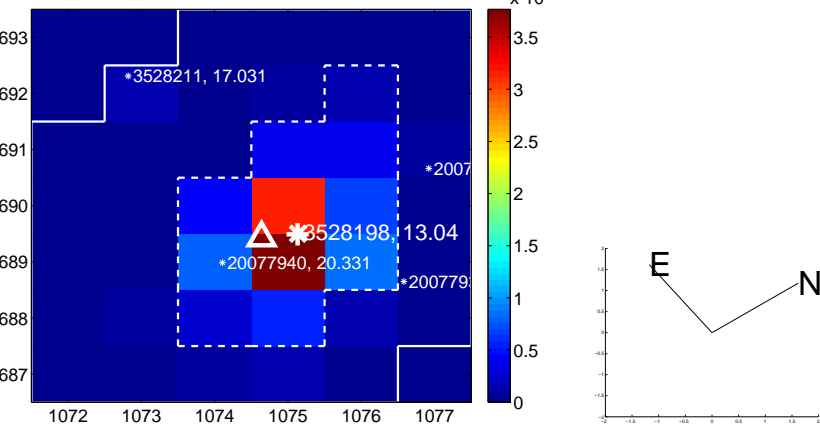
Q1 no OOT image



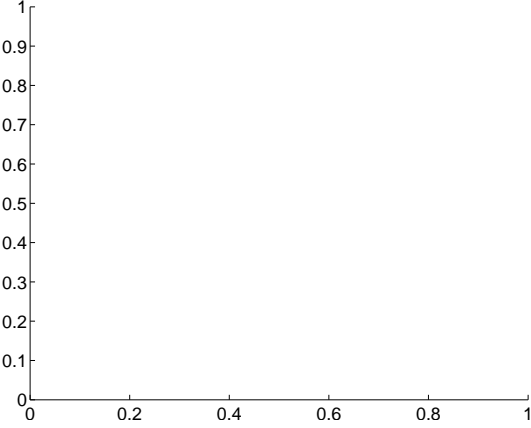
Q2 difference image. Poor Quality



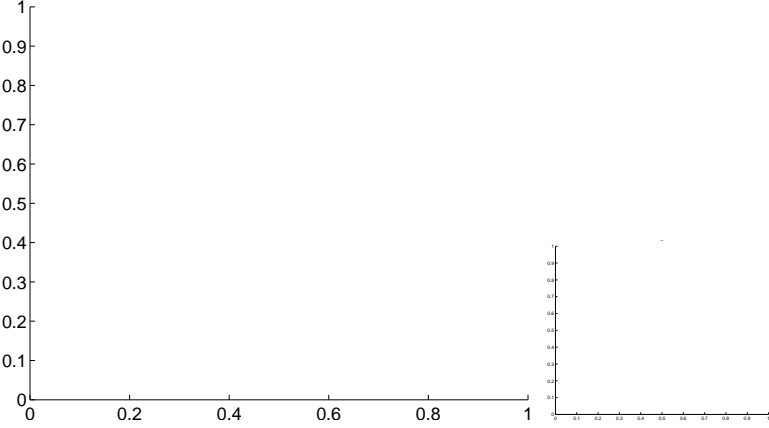
Q2 OOT image



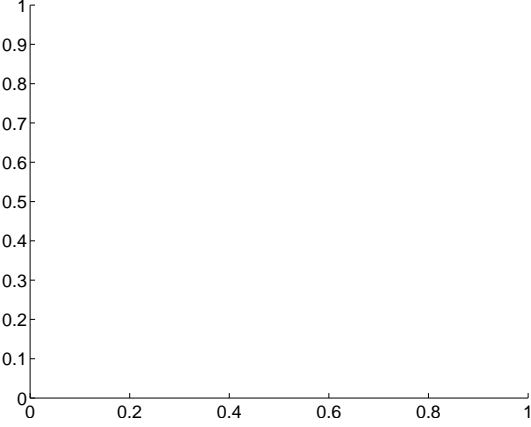
Q3 no difference image



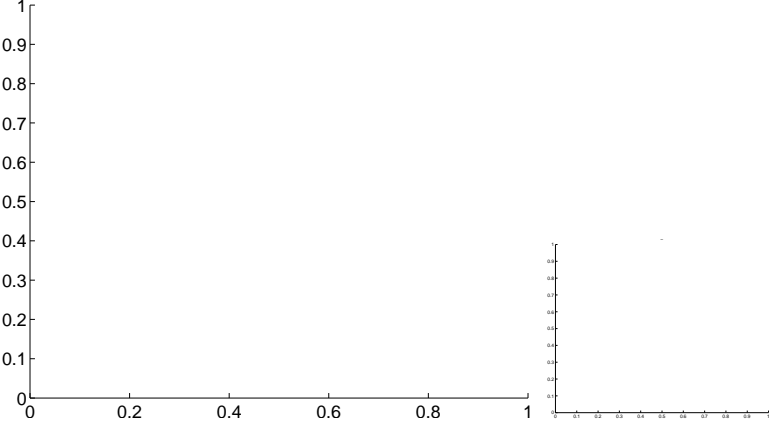
Q3 no OOT image



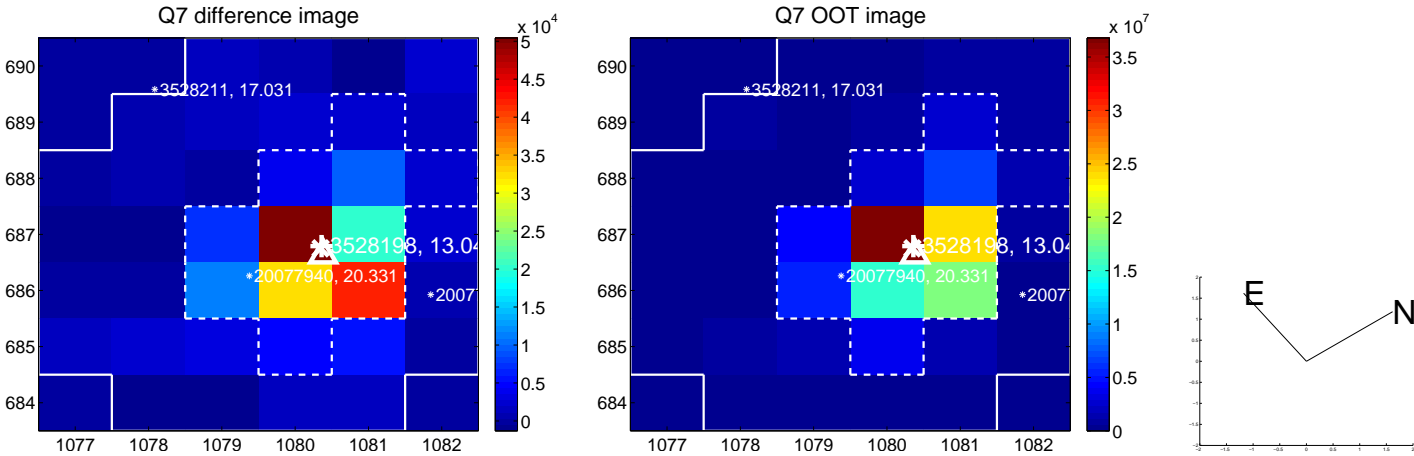
Q4 no difference image



Q4 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.

Q9 no difference image



Q9 no OOT image



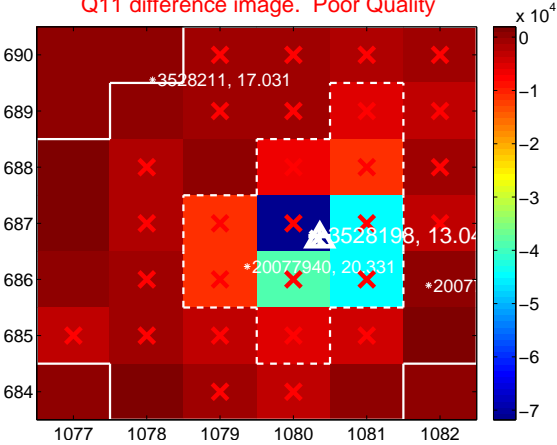
Q10 no difference image



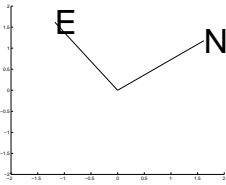
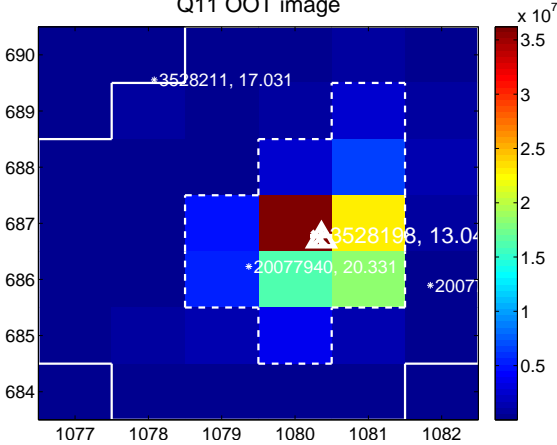
Q10 no OOT image



Q11 difference image. Poor Quality



Q11 OOT image



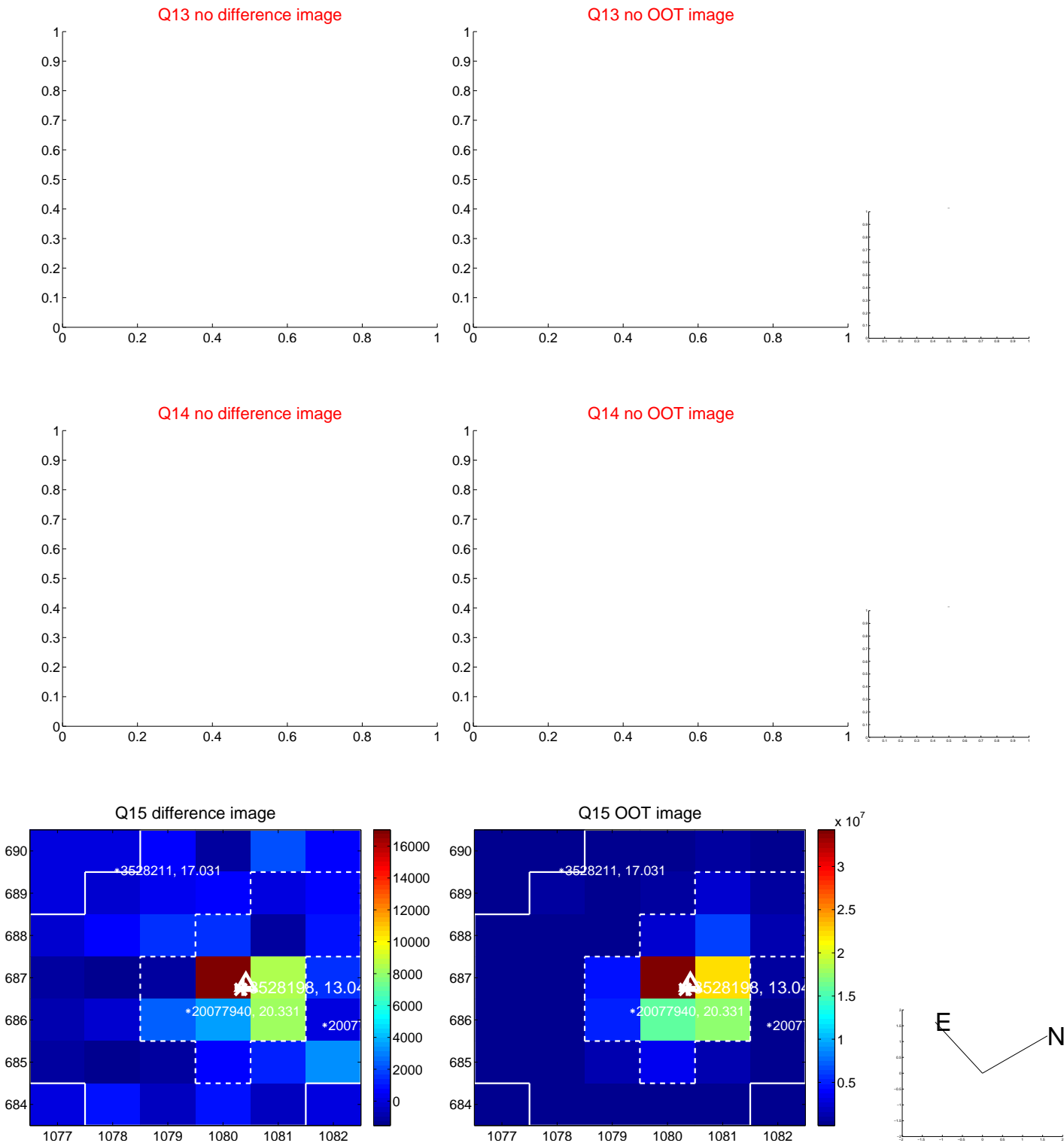
Q12 no difference image



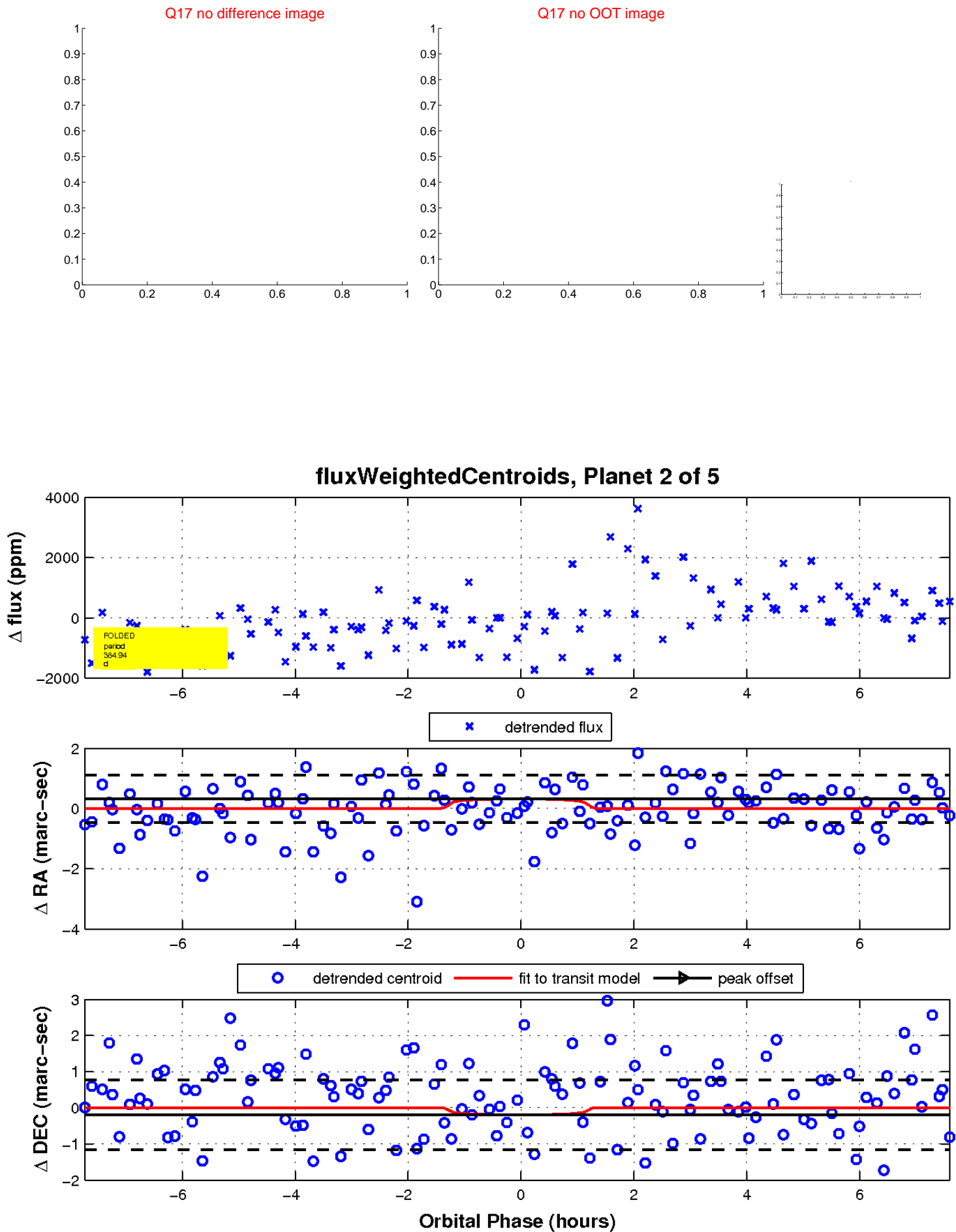
Q12 no OOT image



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

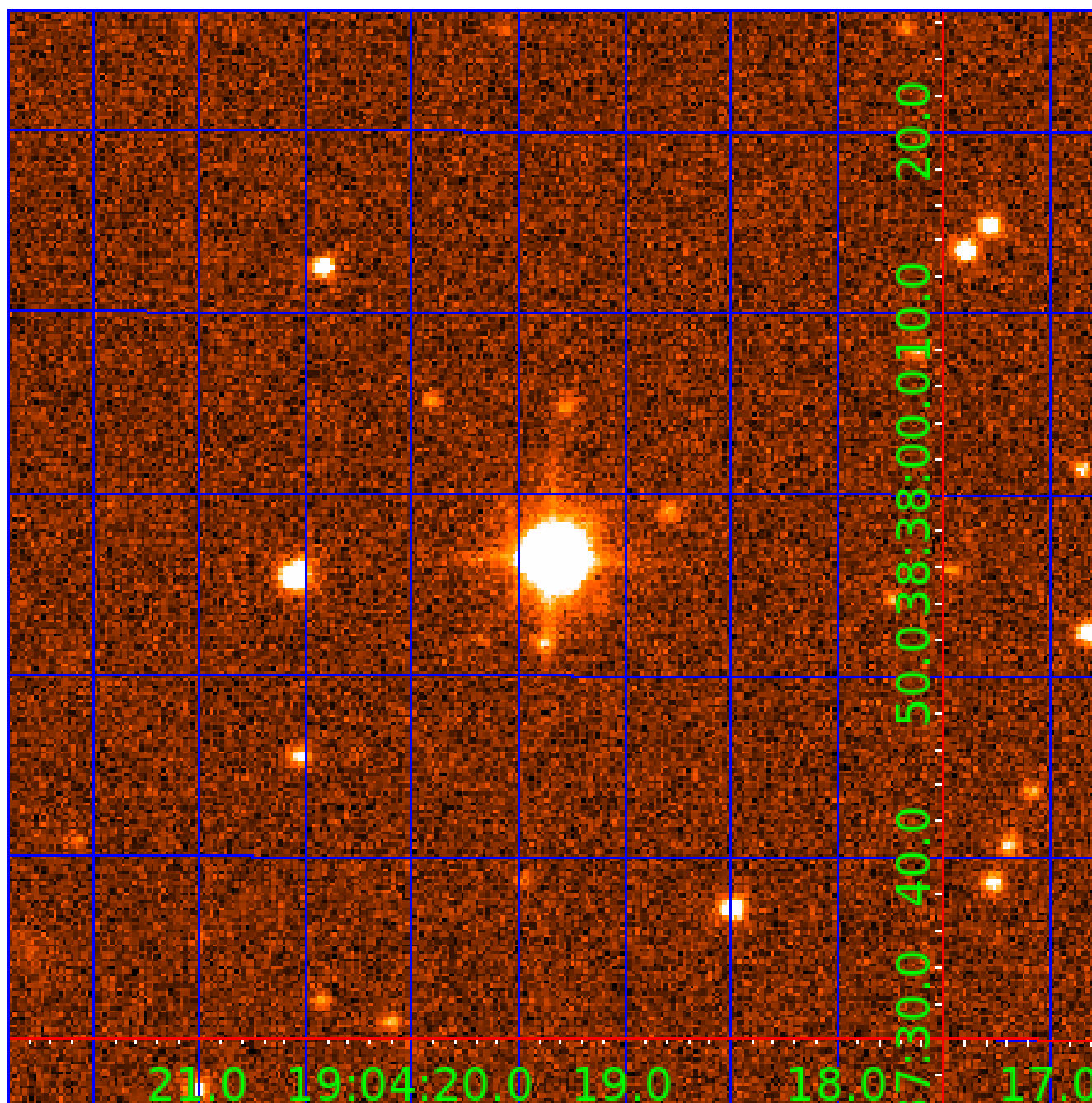


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 003528198

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 003528198-01 | OBS | No | 455.810964 | 238.546322 | 1516.5 | 5.520 | 15.1 | 8.9 | 0.50 | 4654 | 2.23 | 0.12 |
| 003528198-02 | OBS | No | 384.940399 | 253.457226 | 1045.7 | 2.582 | 16.4 | 7.5 | 0.50 | 4654 | 1.61 | 0.15 |
| 003528198-03 | OBS | No | 347.686750 | 206.062570 | 593.5 | 4.817 | 15.9 | 4.4 | 0.50 | 4654 | 1.23 | 0.18 |
| 003528198-05 | OBS | No | 413.895380 | 500.629633 | 319.1 | 12.500 | 13.9 | -1.0 | 0.50 | 4654 | 0.89 | 0.14 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 003528198-01 | OBS | FP | 0.00 | 1 | 0 | 1 | 0 | INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST |
| 003528198-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES_MARSHALL_ZUMA_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS |
| 003528198-03 | OBS | FP | 0.00 | 1 | 0 | 1 | 0 | INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS—HALO_GHOST |
| 003528198-05 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS |

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

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

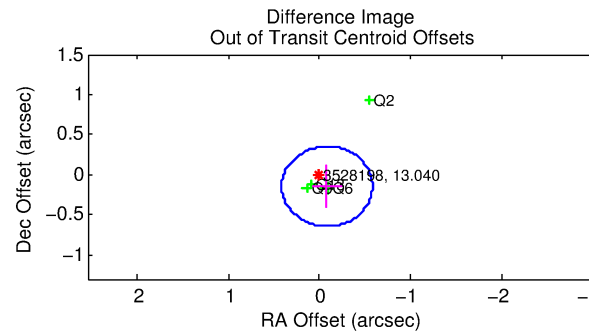
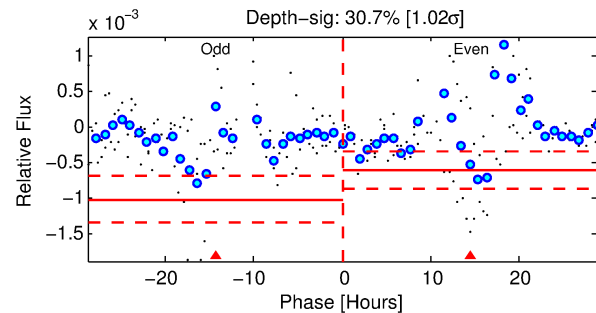
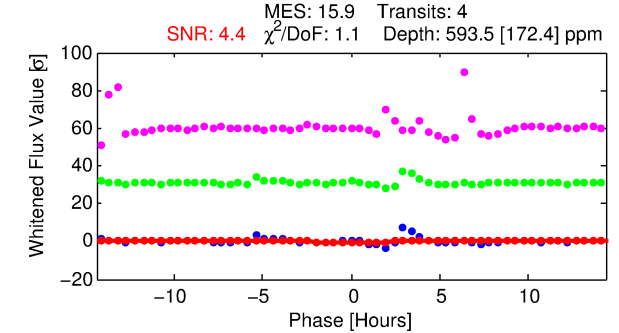
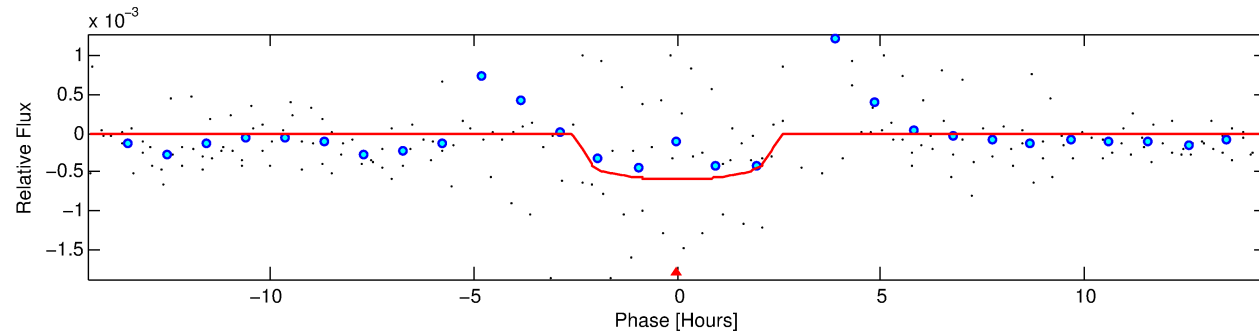
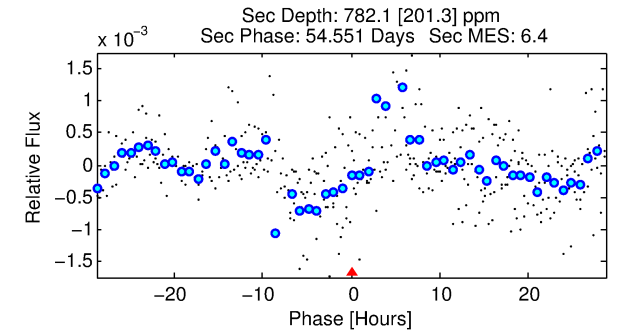
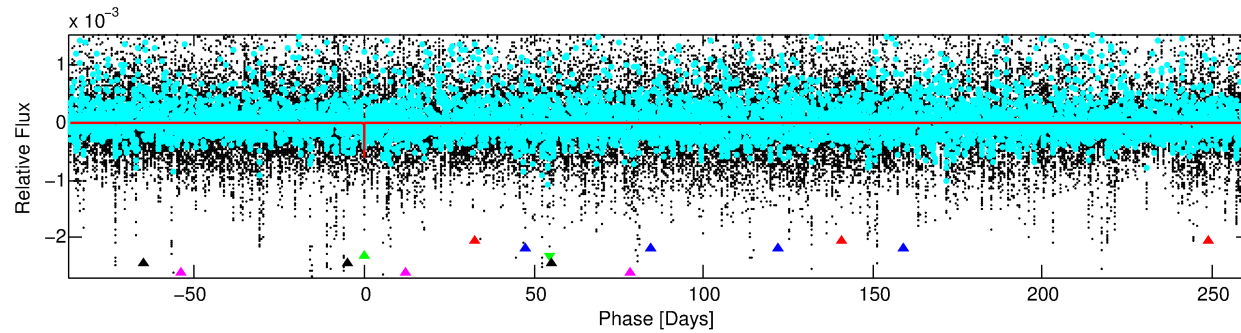
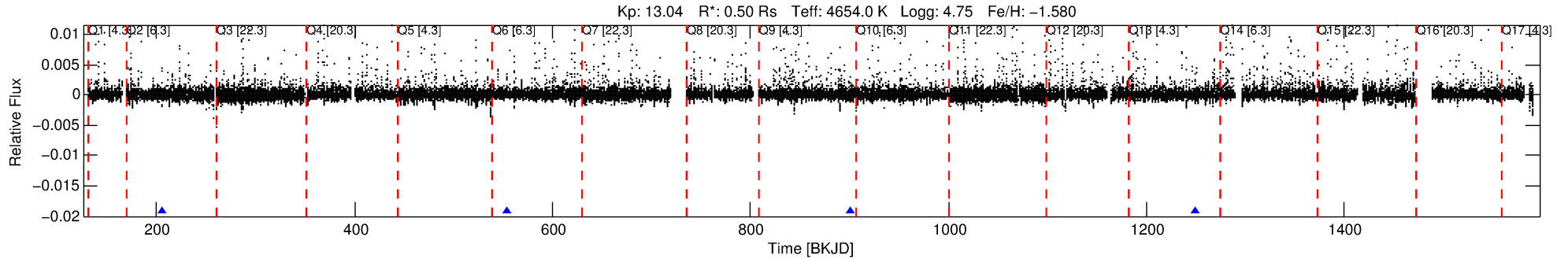
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 003528198-03

No Significant Match Found

DV One-Page Summary

KIC: 3528198 Candidate: 3 of 5 Period: 347.687 d



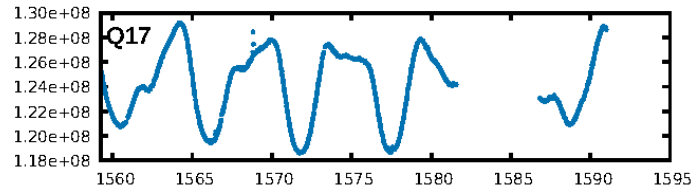
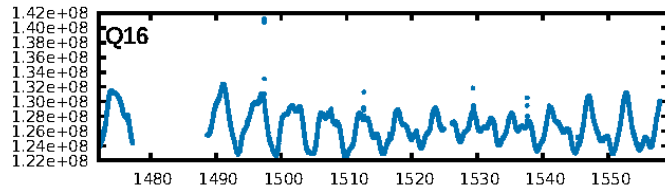
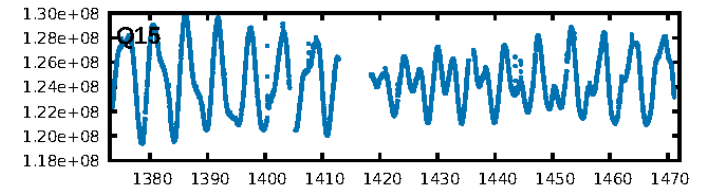
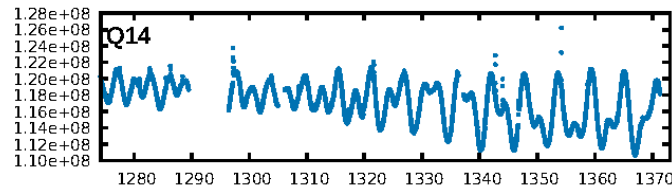
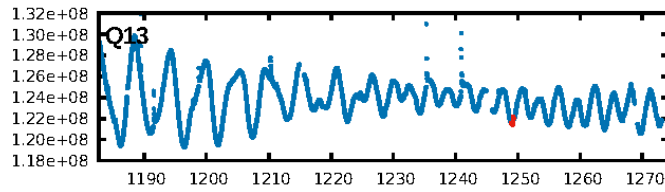
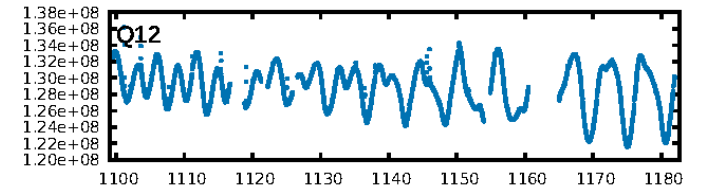
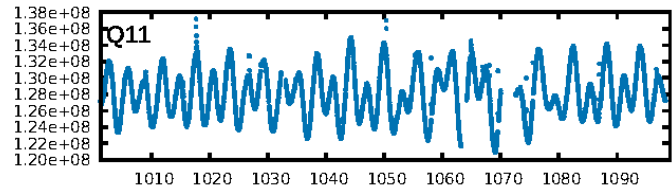
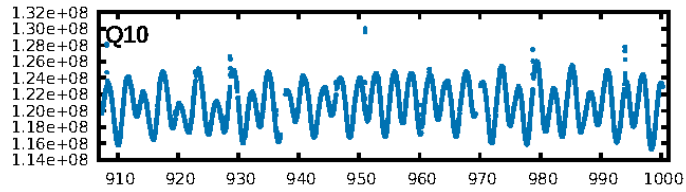
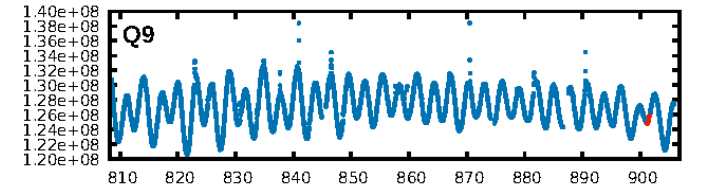
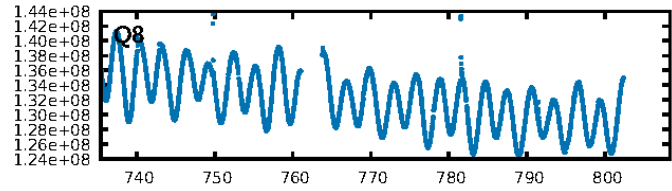
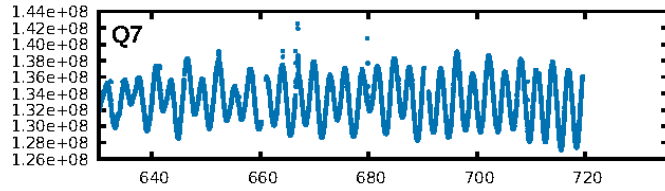
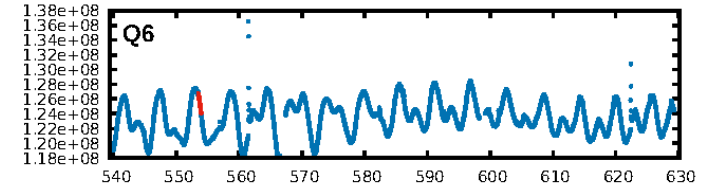
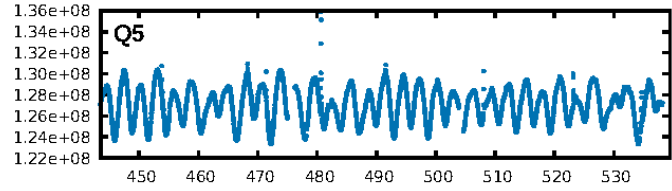
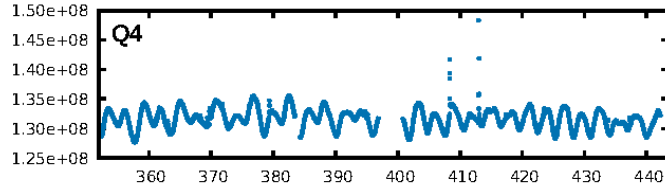
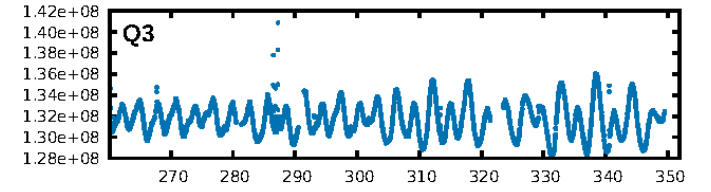
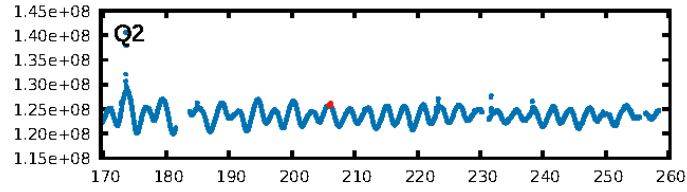
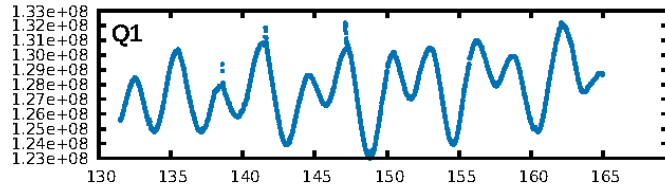
DV Fit Results:

Period = 347.68675 [0.00617] d
Epoch = 206.0626 [0.0124] BKJD
Rp/R* = 0.0225 [0.0405]
a/R* = 526.41 [4193.63]
b = 0.37 [18.93]
Seff = 0.18 [0.03]
Teq = 165 [7] K
Rp = 1.23 [2.22] Re
a = 0.7772 [0.0464] AU
Ag = 170674.75 [616304.31] [0.28σ]
Teffp = 5191 [4688] K [1.07σ]

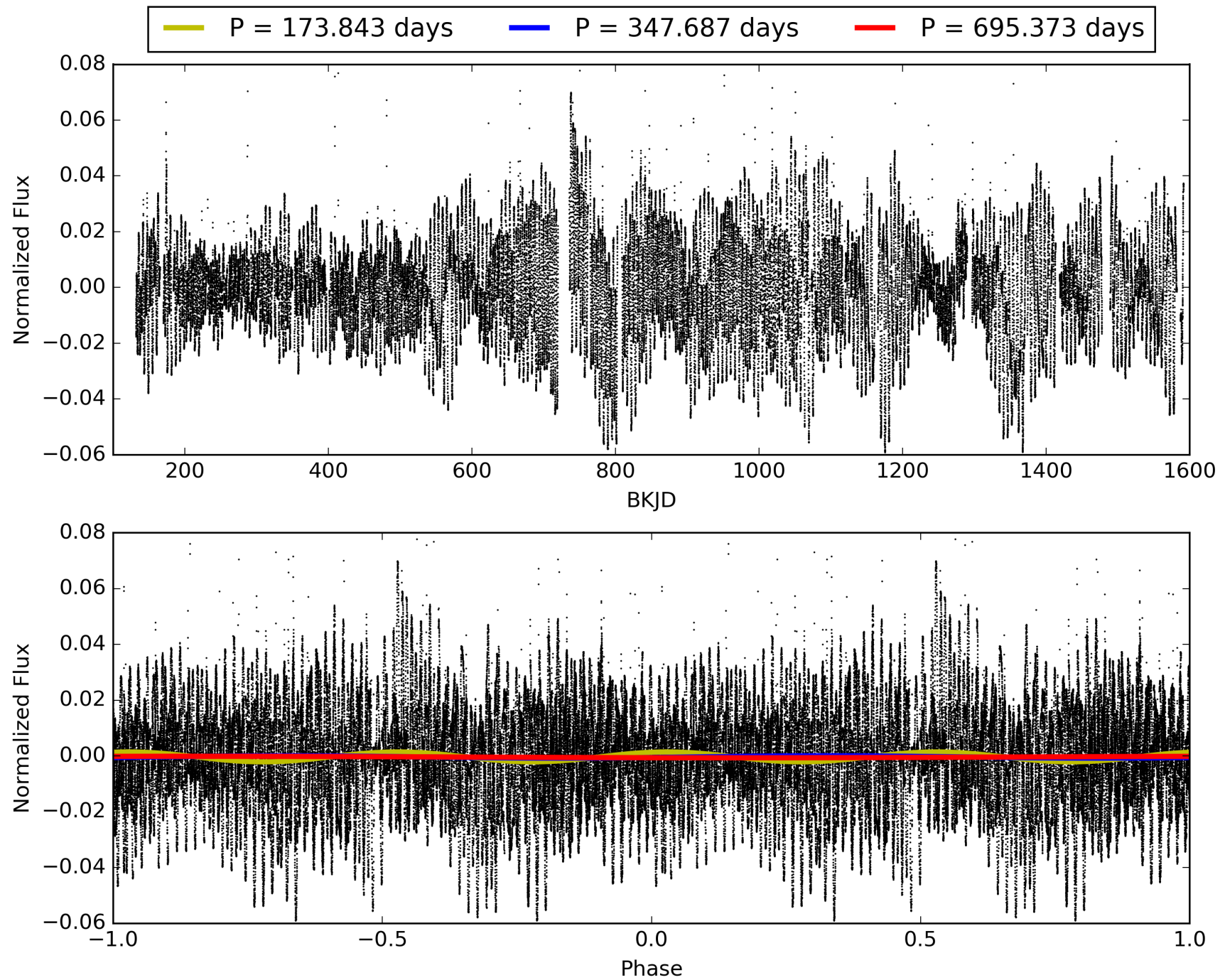
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [163.60σ]
ModelChiSquare2-sig: 31.5%
ModelChiSquareGof-sig: 80.1%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: 0.208
Centroid-sig: 42.1%
Centroid-so: 0.771 arcsec [0.88σ]
OotOffset-rm: 0.168 arcsec [1.01σ]
KicOffset-rm: 0.178 arcsec [0.72σ]
OotOffset-st: 2/0/0/2 [4]
KicOffset-st: 2/0/0/2 [4]
DiffImageQuality-fgm: 0.50 [2/4]
DiffImageOverlap-fno: 1.00 [4/4]

TCE 003528198-03, PDC Light Curves

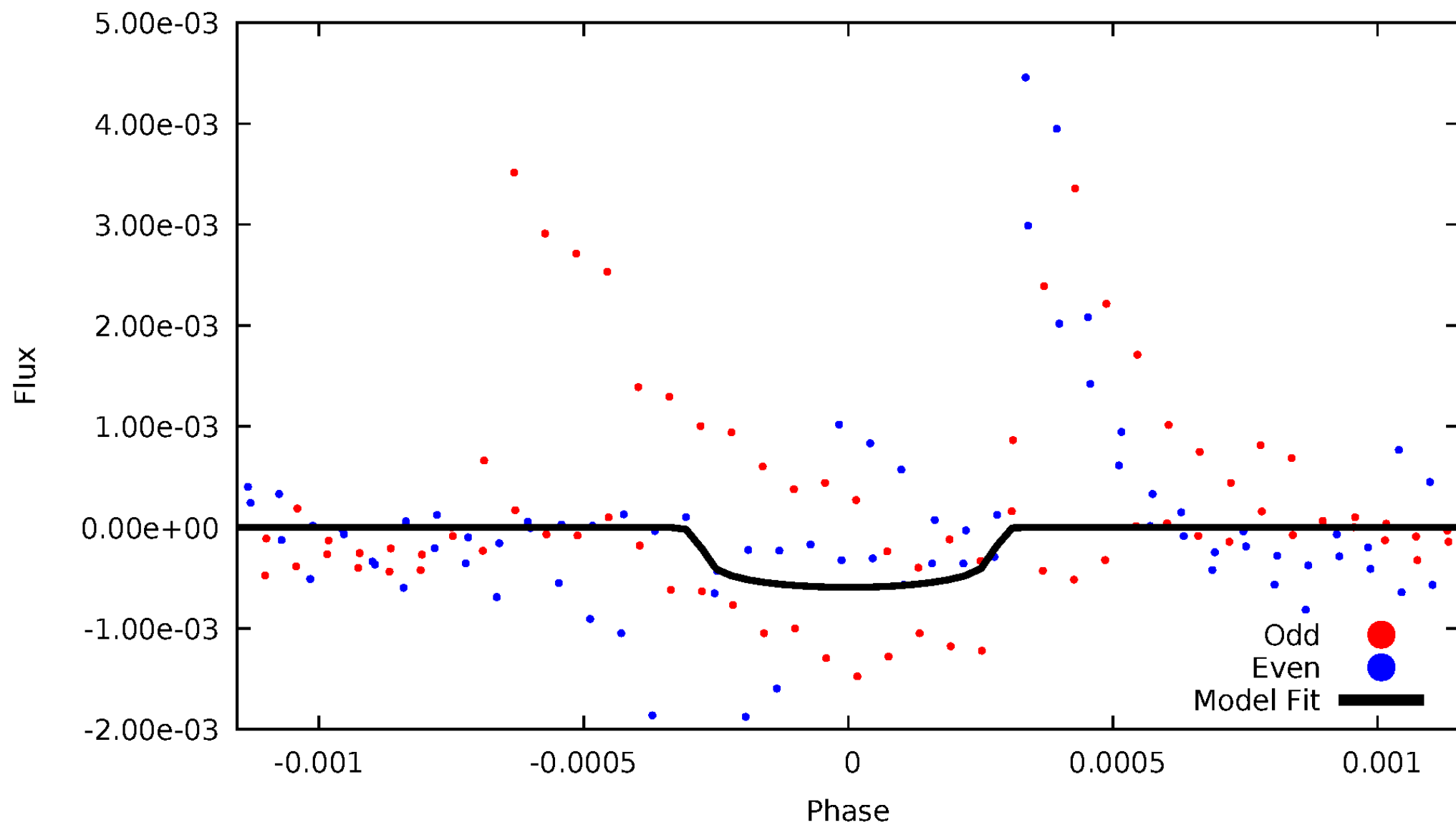


TCE 003528198-03



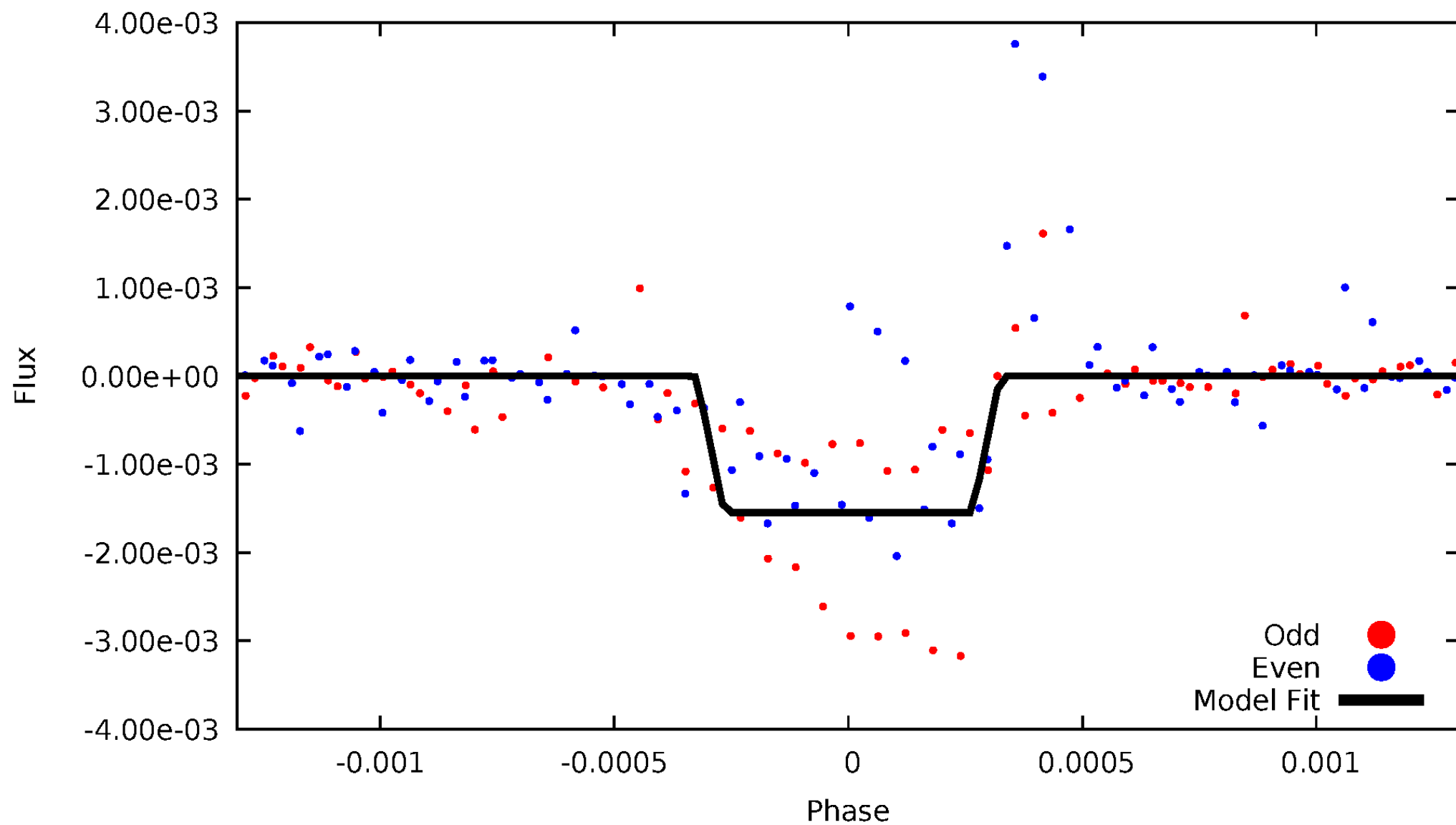
DV Odd/Even

TCE 003528198-03



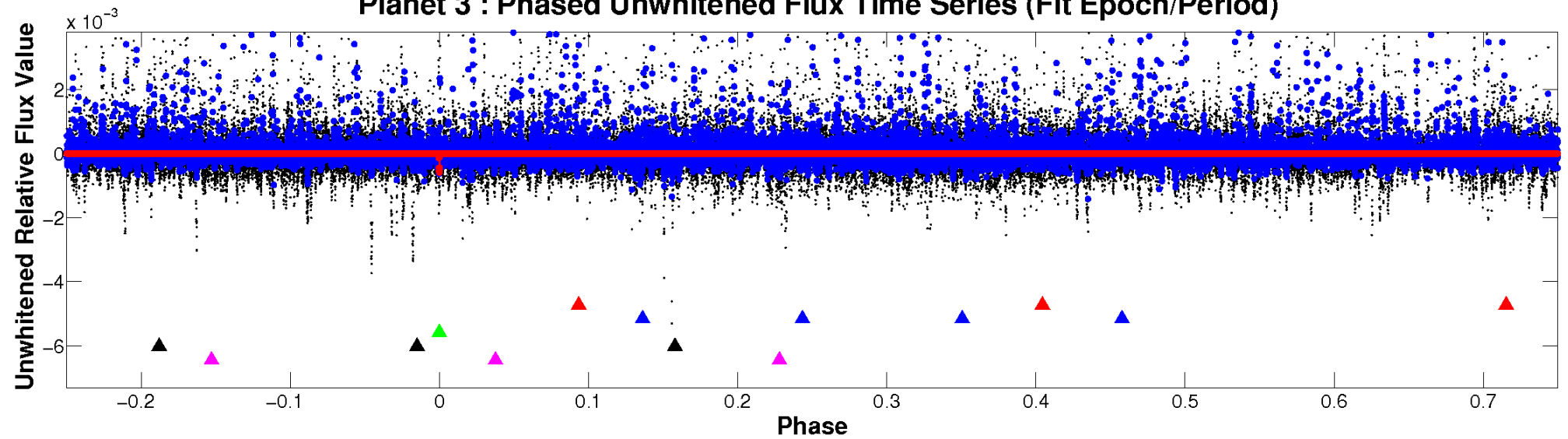
ALT Odd/Even

TCE 003528198-03

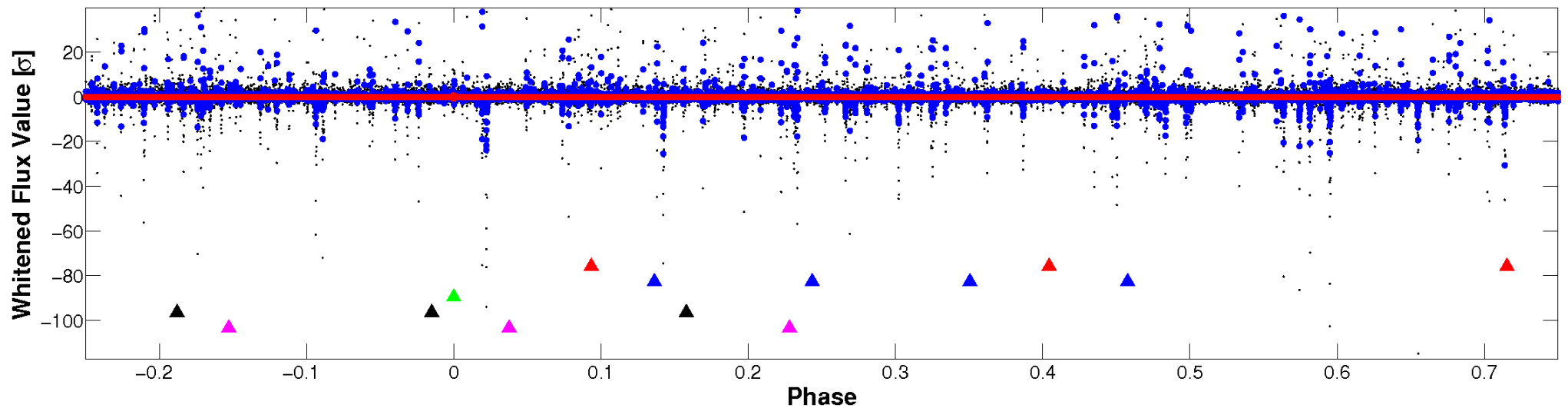


Non-Whitened Vs. Whitened Light Curve

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

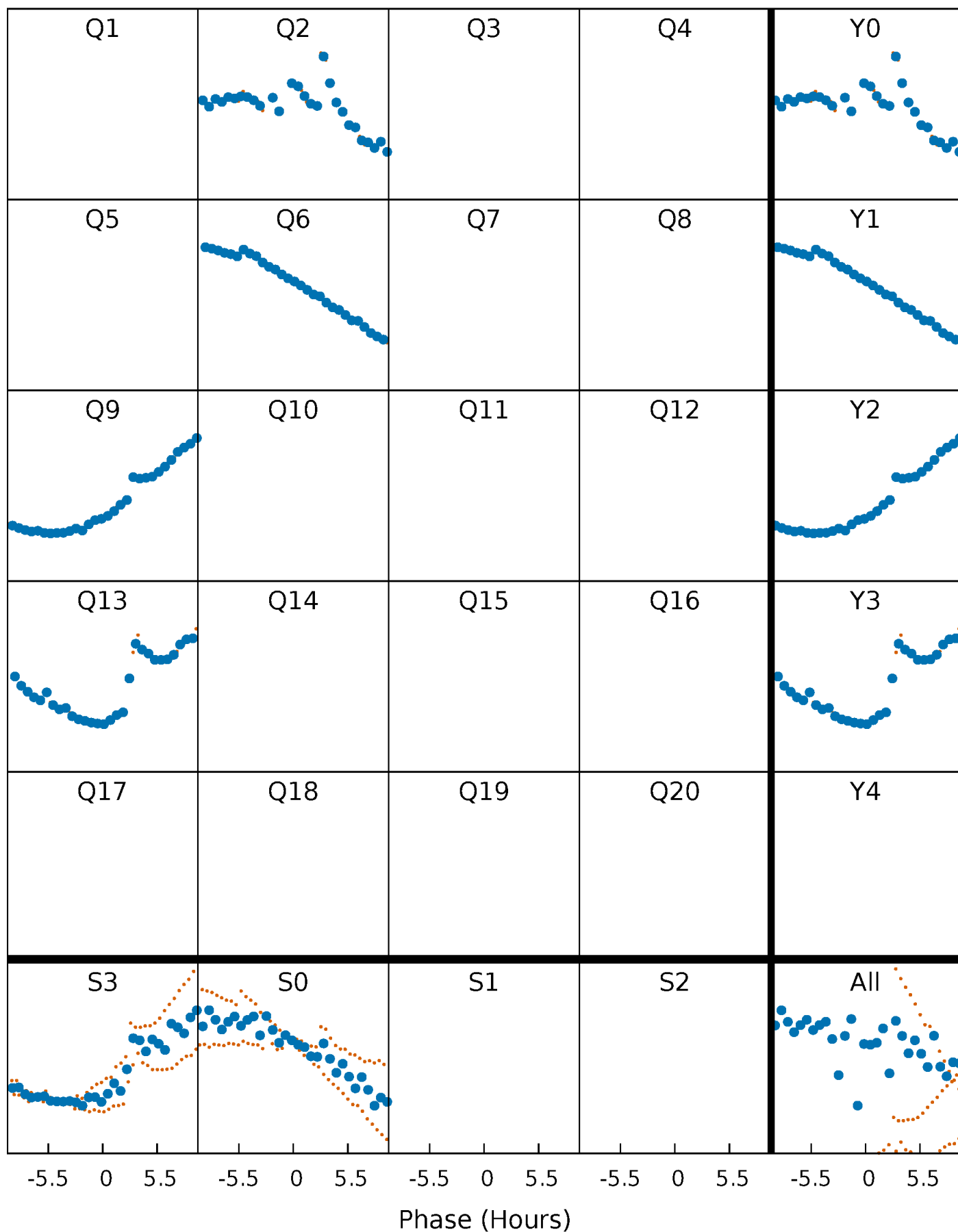


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



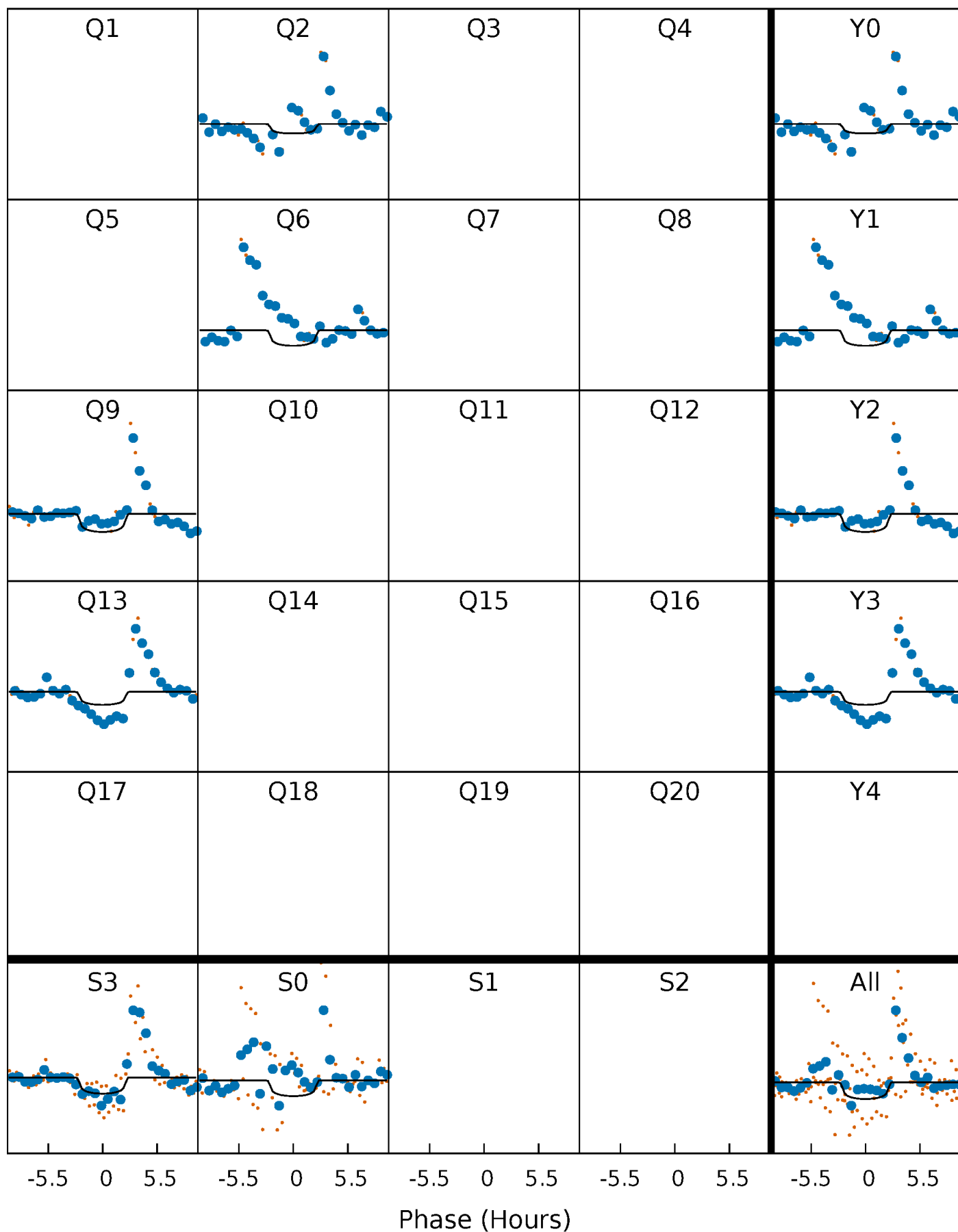
PDC Quarter-Phased Transit Curves

TCE 003528198-03 $P=347.686750$ Days $T_0=206.062570$ (BKJD)



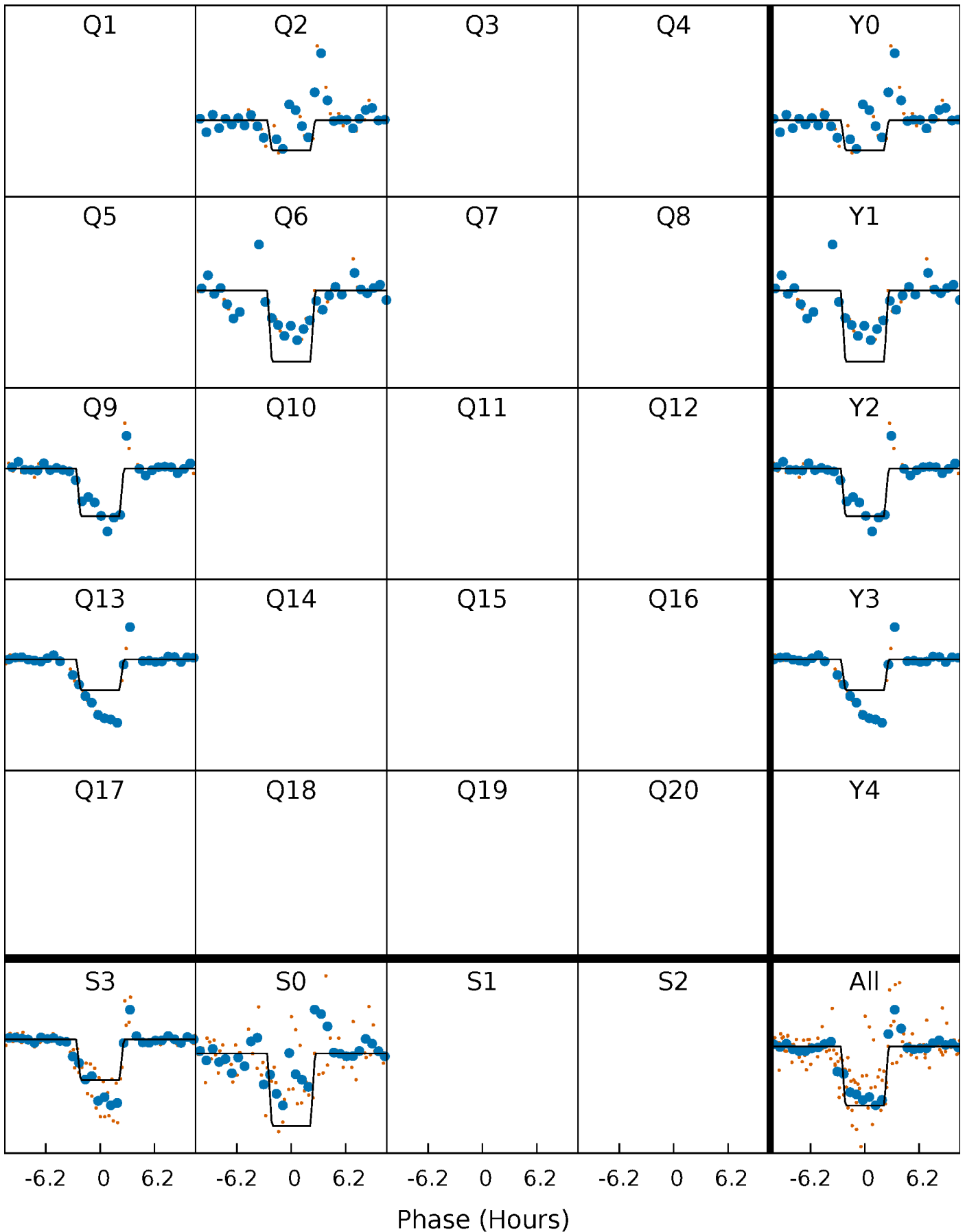
DV Quarter-Phased Transit Curves

TCE 003528198-03 $P=347.686750$ Days $T_0=206.062570$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

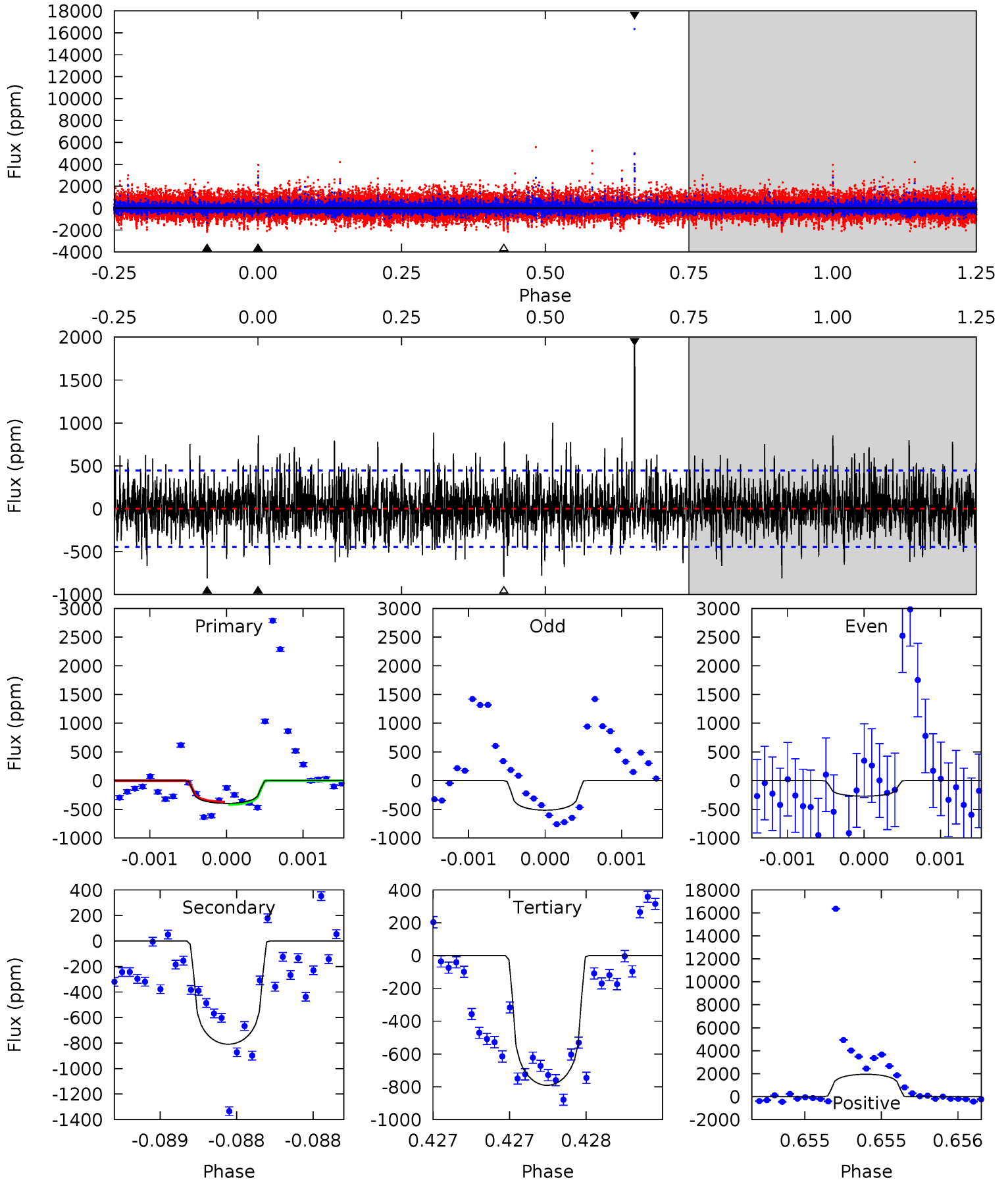
TCE 003528198-03 P=347.690646 Days $T_0=206.055167$ (BKJD)



DV Model-Shift Uniqueness Test

003528198-03, P = 347.686750 Days, E = 206.062570 Days

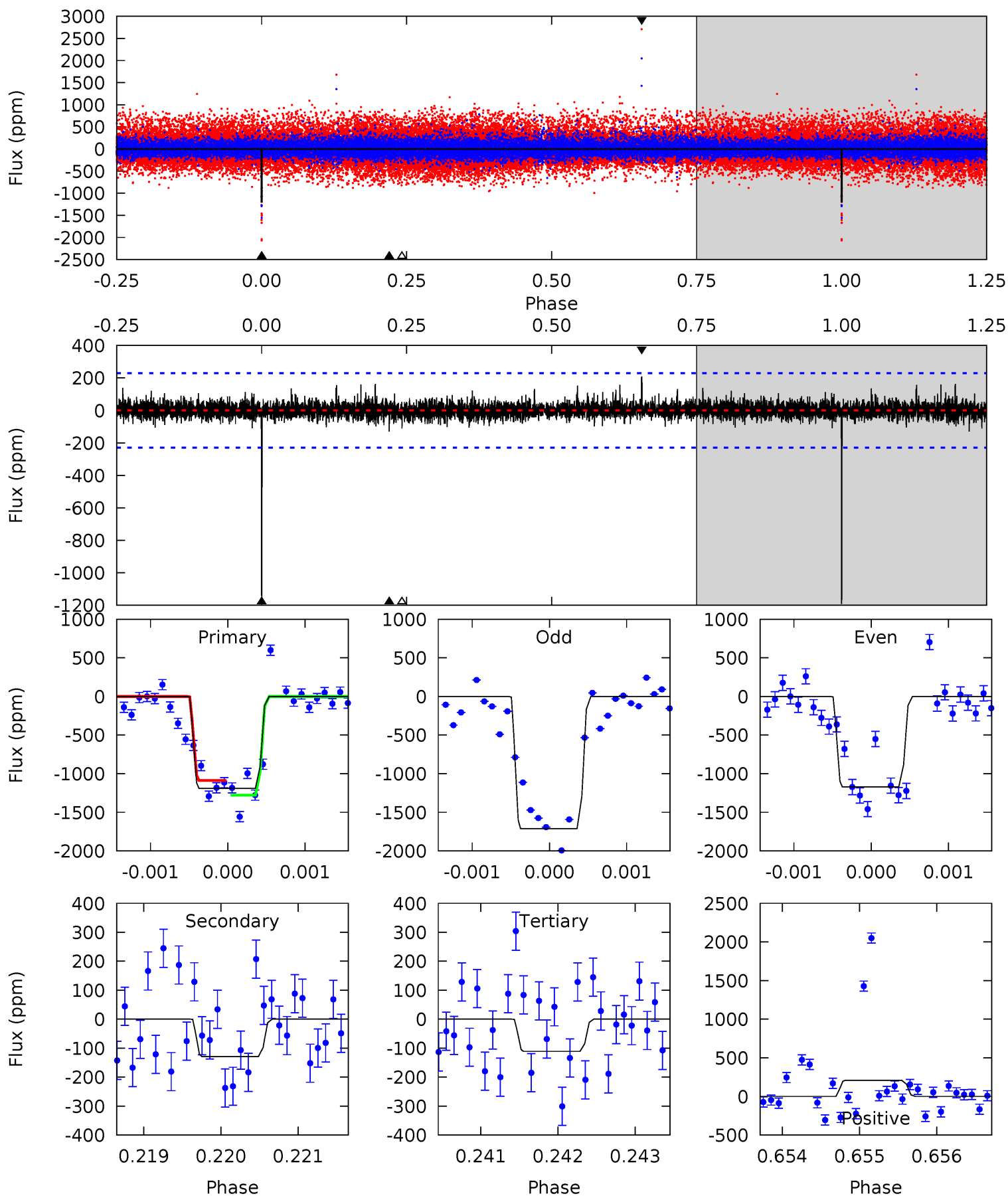
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 4.94 | 10.1 | 9.83 | 24.2 | 5.54 | 3.42 | 2.63 | -4.89 | -19.3 | 0.23 | -14.1 | 1.00 | 1.45 | 0.71 | 0.25 |



Alt Model-Shift Uniqueness Test

003528198-03, P = 347.690646 Days, E = 206.055167 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 28.7 | 3.11 | 2.68 | 5.03 | 5.52 | 3.40 | 0.71 | 26.0 | 23.6 | 0.43 | -1.92 | 6.81 | 1.20 | 0.15 | 2.23 |



Stellar Parameters For KIC 003528198

| | $T_{\text{eff}}(K)$ | $\log(g)$ | $[\text{Fe}/\text{H}]$ | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 4654^{+129}_{-162} | $4.749^{+0.049}_{-0.025}$ | $-1.580^{+0.300}_{-0.250}$ | $0.503^{+0.024}_{-0.035}$ | $0.517^{+0.032}_{-0.025}$ | $5.723^{+1.128}_{-0.528}$ |
| | +3%/-3% | +1%/-1% | +19%/-16% | +5%/-7% | +6%/-5% | +20%/-9% |
| Source | PHO1 | KIC0 | KIC0 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 003528198-03 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|---------------|------------------------|----------------------|-----------------------|----------------------------|
| DV | -809 ± 80 | $2.07^{+1.70}_{-1.41}$ | 230^{+7}_{-8} | 4147^{+2657}_{-770} | $62205^{+529786}_{-43717}$ |
| Alt. | -129 ± 42 | $2.75^{+1.91}_{-1.81}$ | 230^{+7}_{-8} | 2839^{+1115}_{-397} | 5486^{+40684}_{-3822} |

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

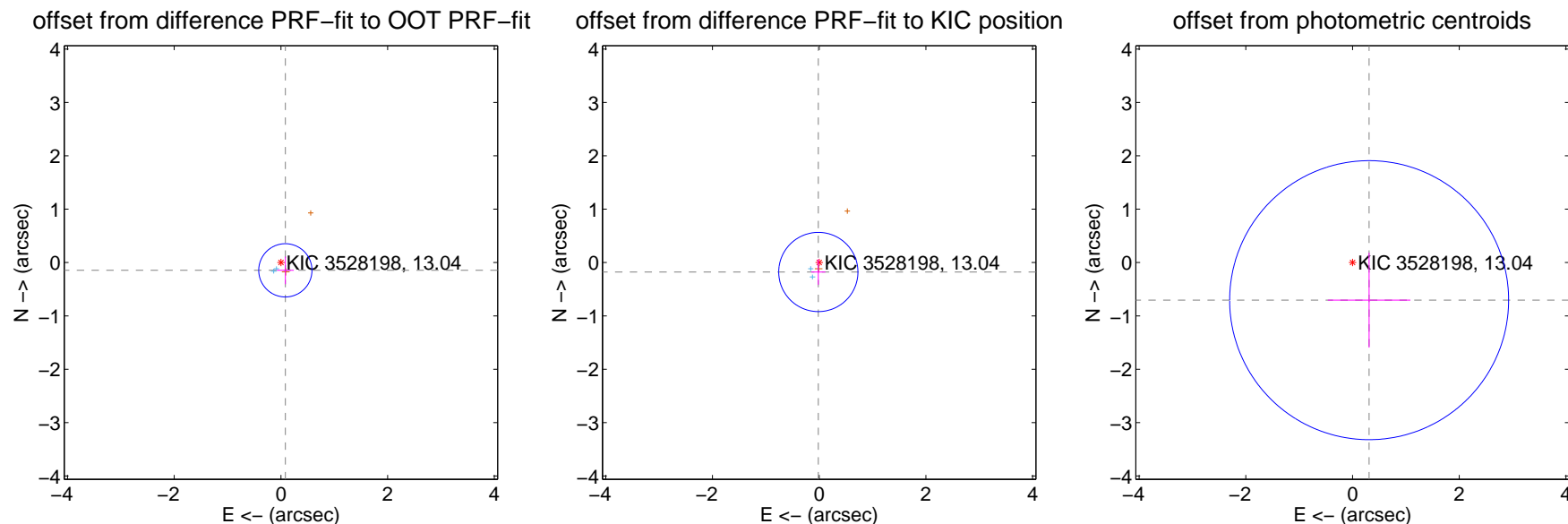
DV Centroid Data

Supplemental centroid analysis for 003528198-03. Kepler magnitude: 13.04. Transit SNR 4.36

There are 2 quarters with good PRF difference image offsets

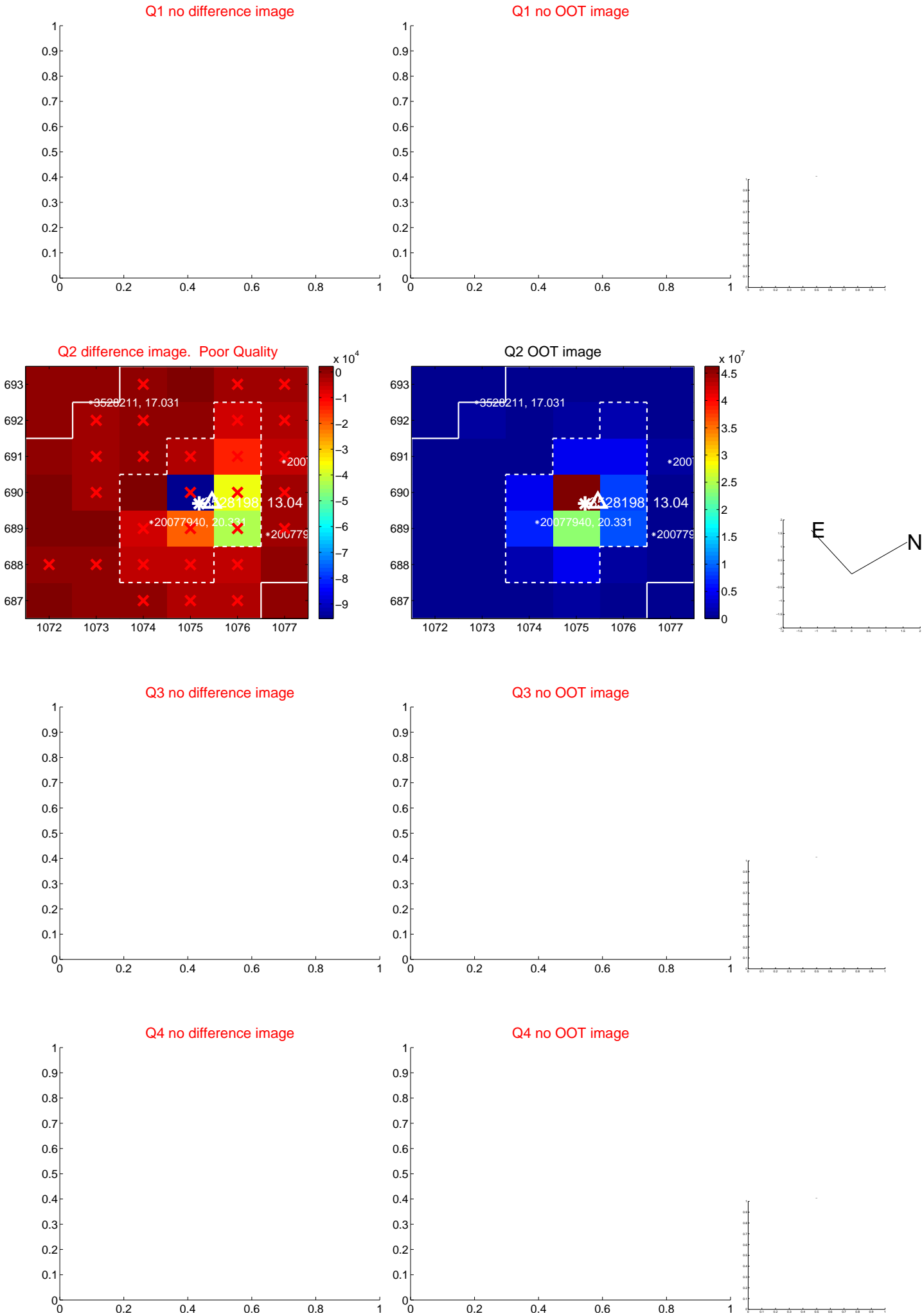
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 0.168 ± 0.166 | 1.01 | -0.083 ± 0.157 | -0.146 ± 0.258 |
| PRF-fit source offset from KIC position | 0.178 ± 0.247 | 0.72 | 0.016 ± 0.133 | -0.177 ± 0.239 |
| photometric centroid source offset | 0.77 ± 0.87 | 0.88 | -0.31 ± 0.77 | -0.71 ± 0.89 |

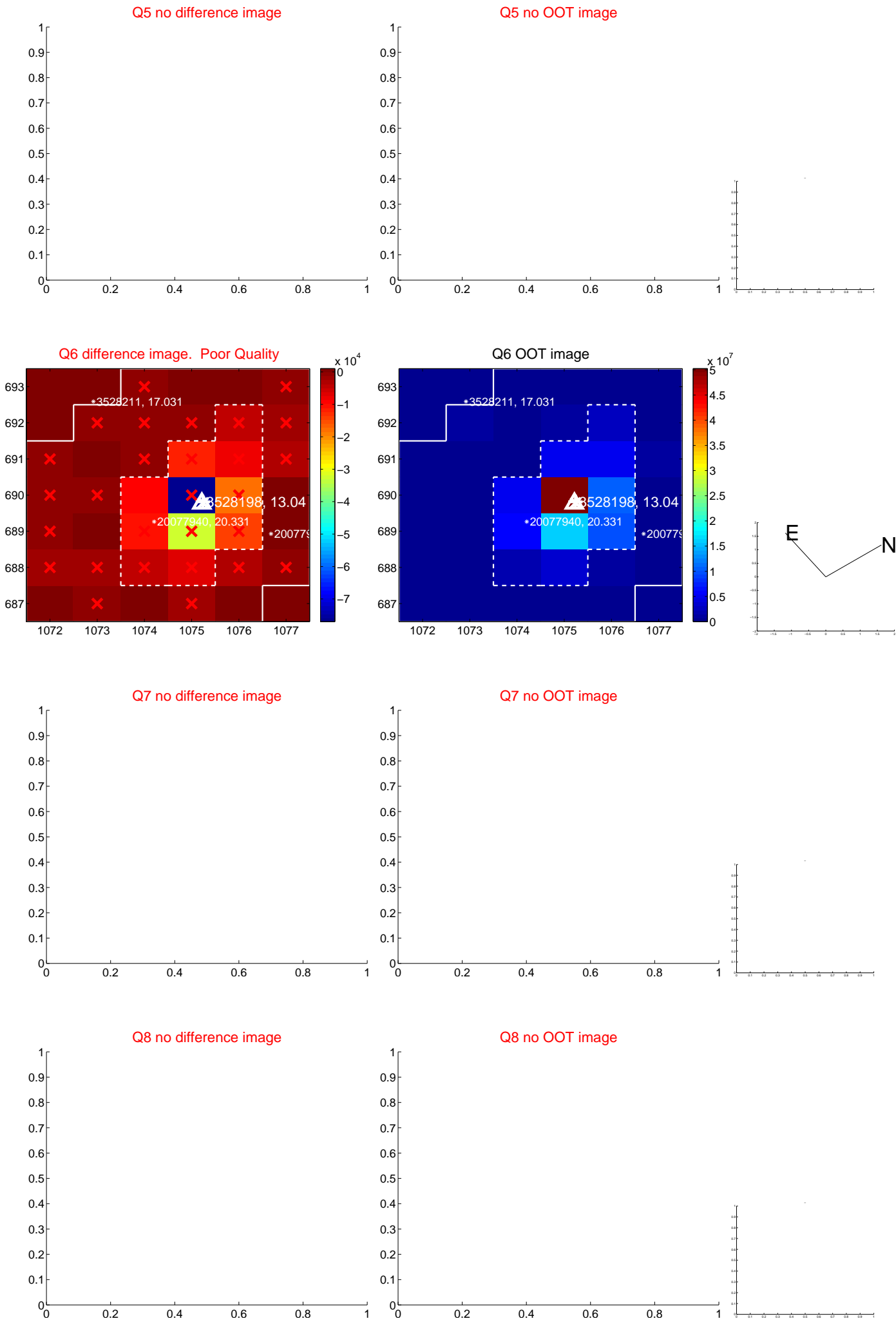


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

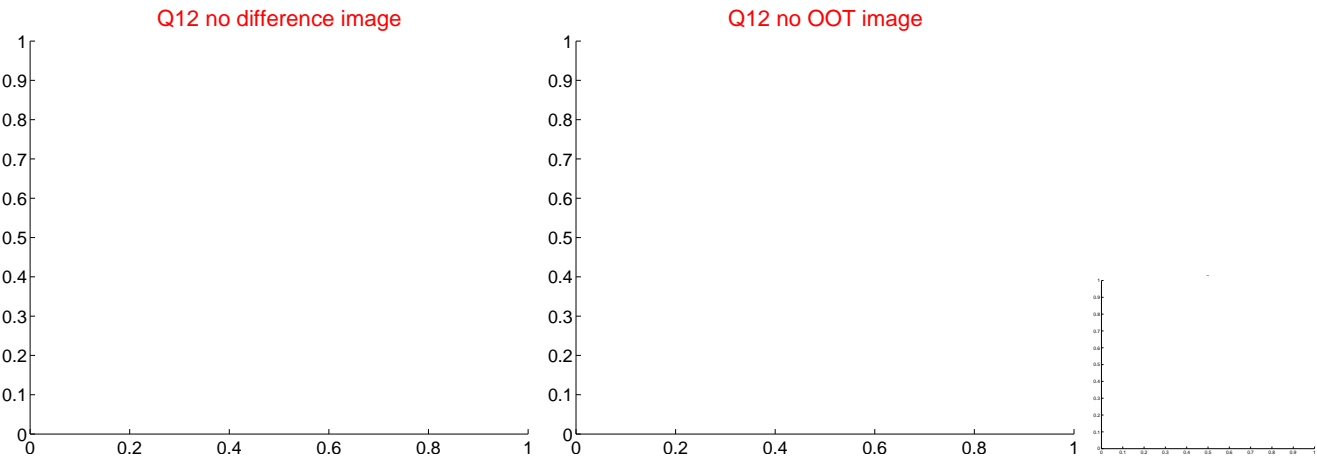
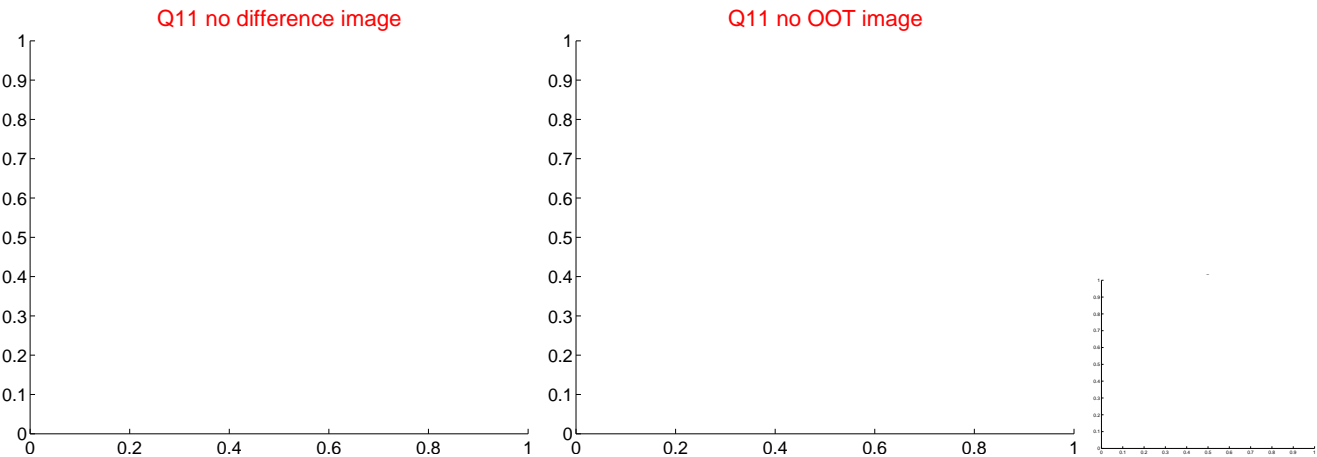
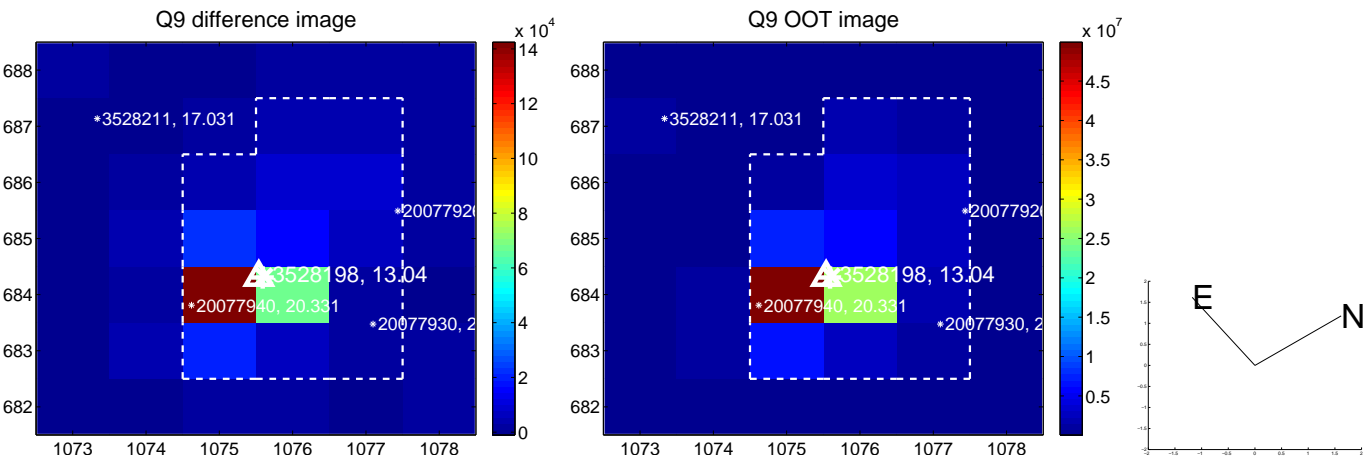
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



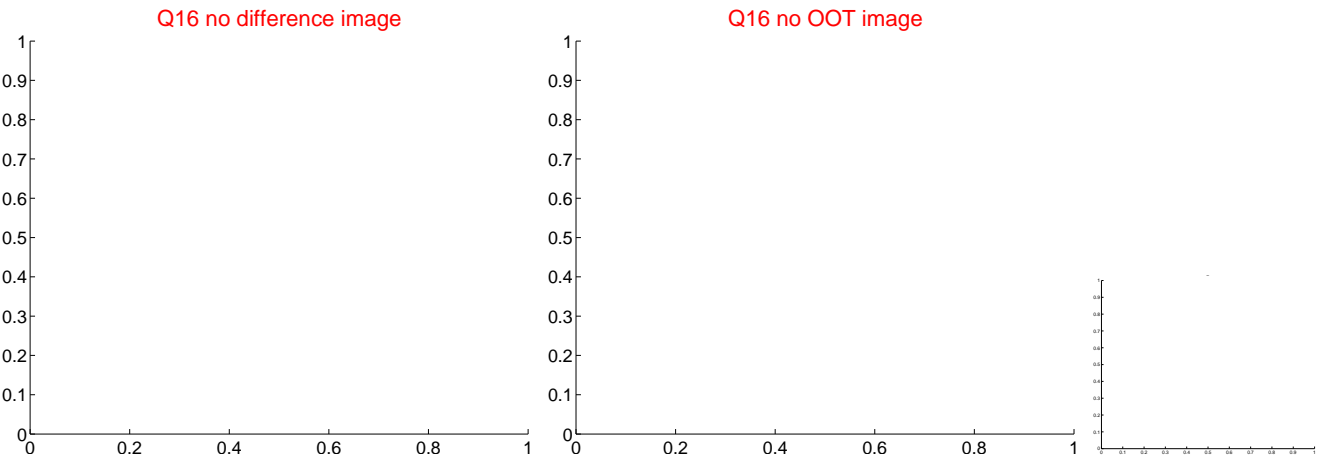
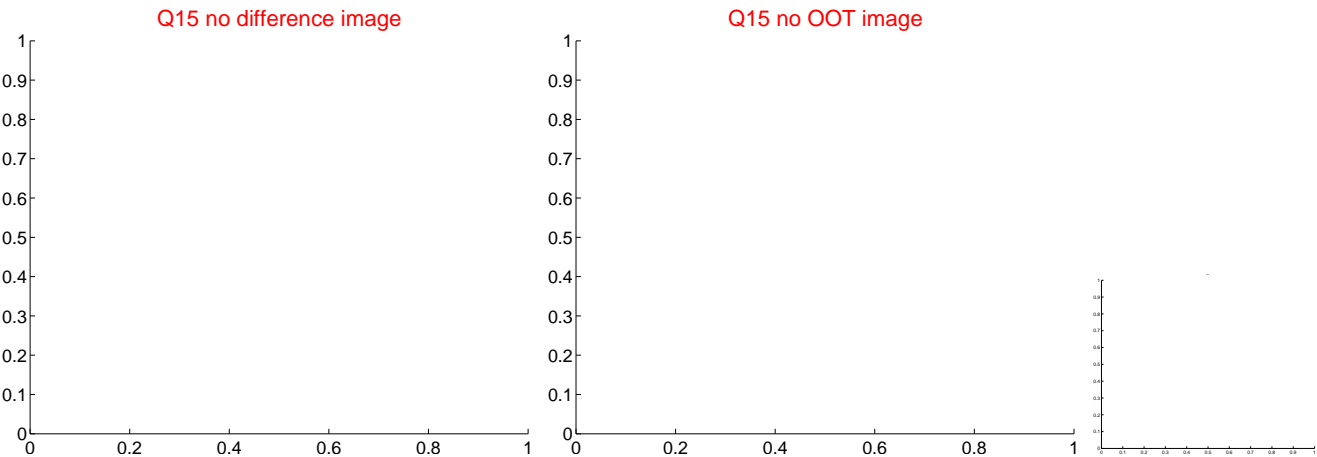
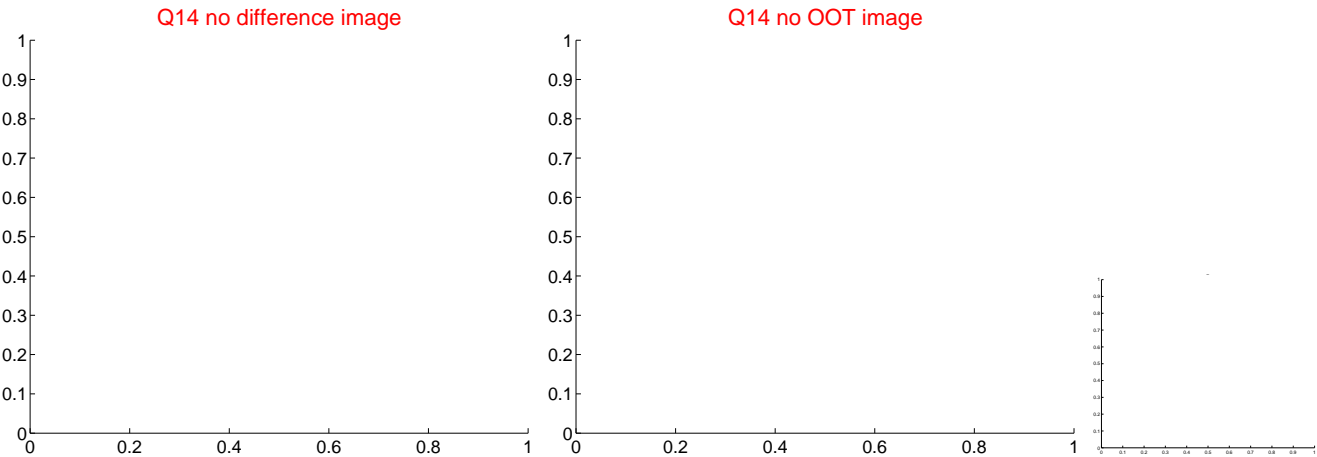
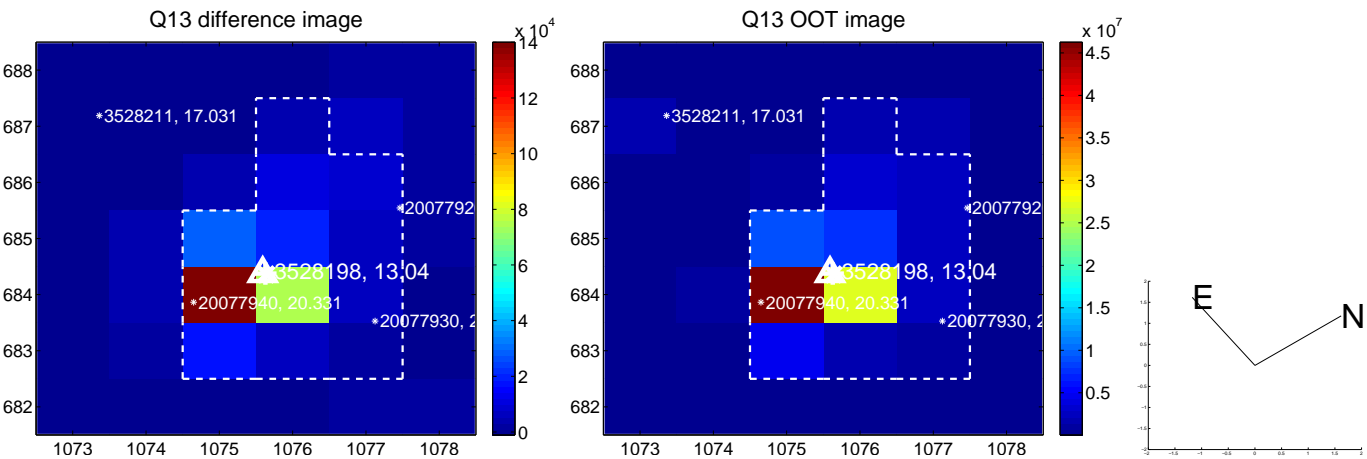
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



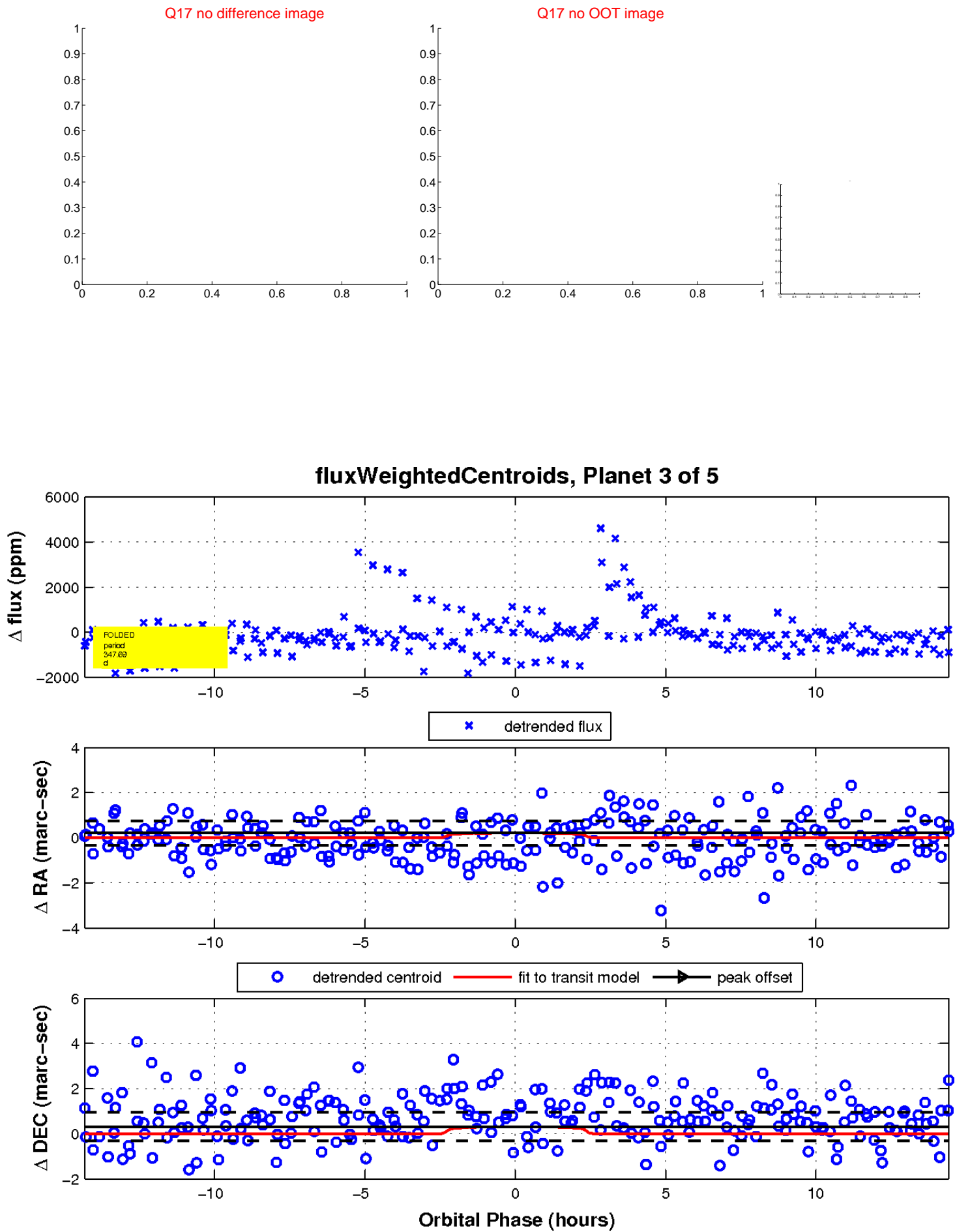
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

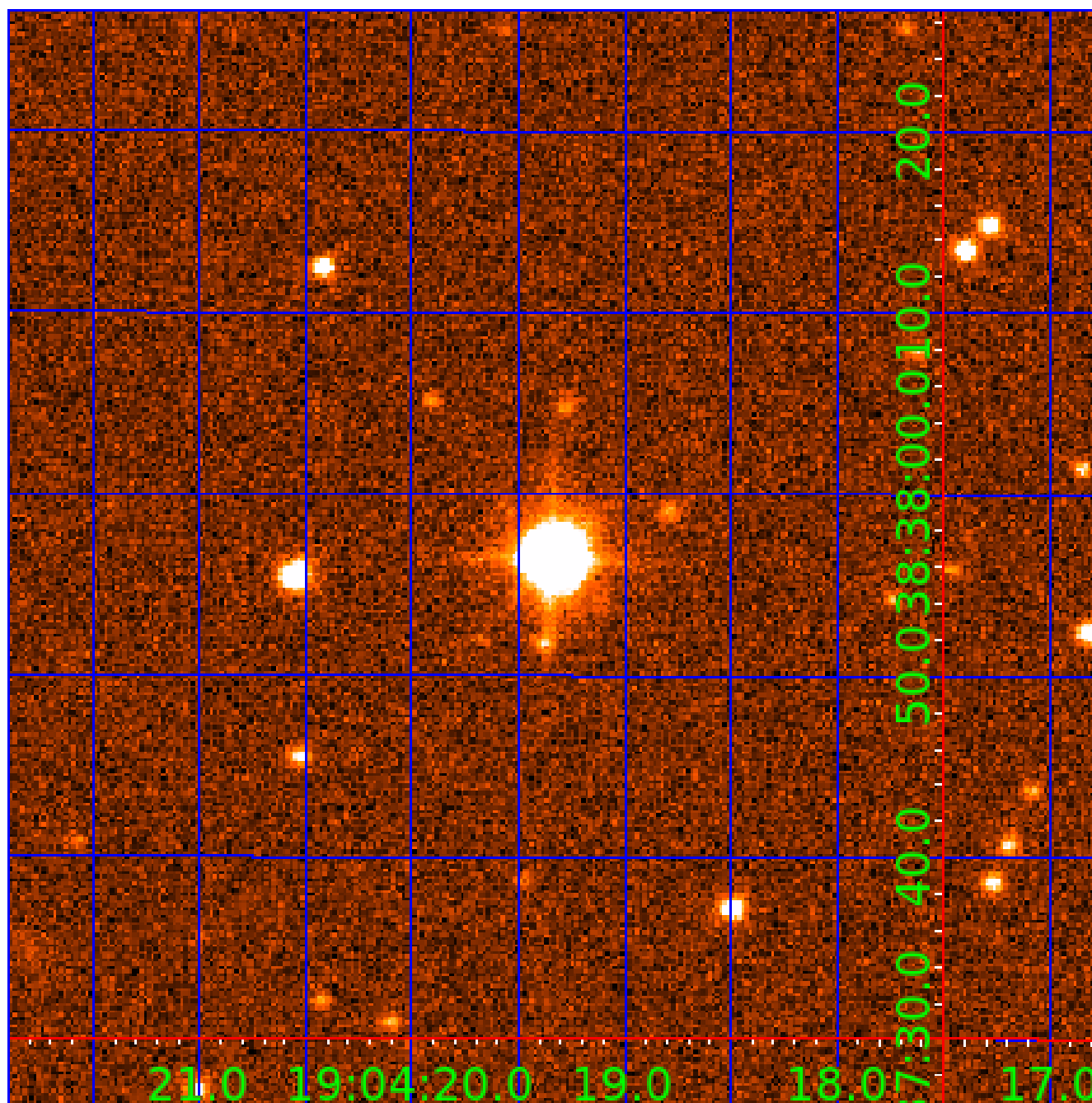


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 003528198

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 003528198-01 | OBS | No | 455.810964 | 238.546322 | 1516.5 | 5.520 | 15.1 | 8.9 | 0.50 | 4654 | 2.23 | 0.12 |
| 003528198-02 | OBS | No | 384.940399 | 253.457226 | 1045.7 | 2.582 | 16.4 | 7.5 | 0.50 | 4654 | 1.61 | 0.15 |
| 003528198-03 | OBS | No | 347.686750 | 206.062570 | 593.5 | 4.817 | 15.9 | 4.4 | 0.50 | 4654 | 1.23 | 0.18 |
| 003528198-05 | OBS | No | 413.895380 | 500.629633 | 319.1 | 12.500 | 13.9 | -1.0 | 0.50 | 4654 | 0.89 | 0.14 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 003528198-01 | OBS | FP | 0.00 | 1 | 0 | 1 | 0 | INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST |
| 003528198-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES_MARSHALL_ZUMA_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS |
| 003528198-03 | OBS | FP | 0.00 | 1 | 0 | 1 | 0 | INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS—HALO_GHOST |
| 003528198-05 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS |

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

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

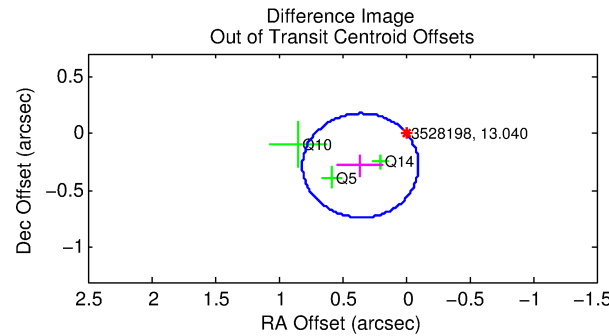
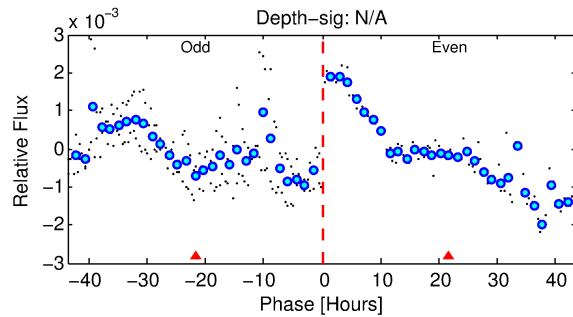
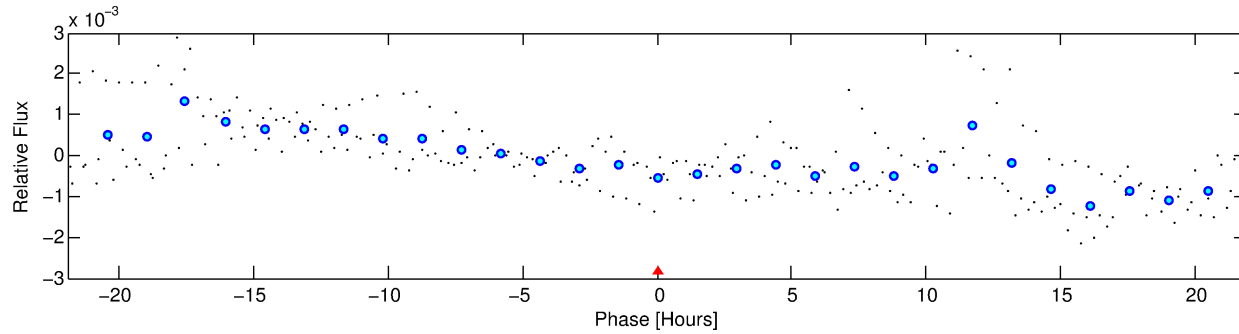
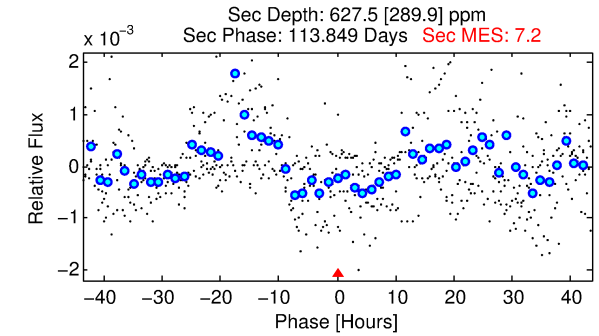
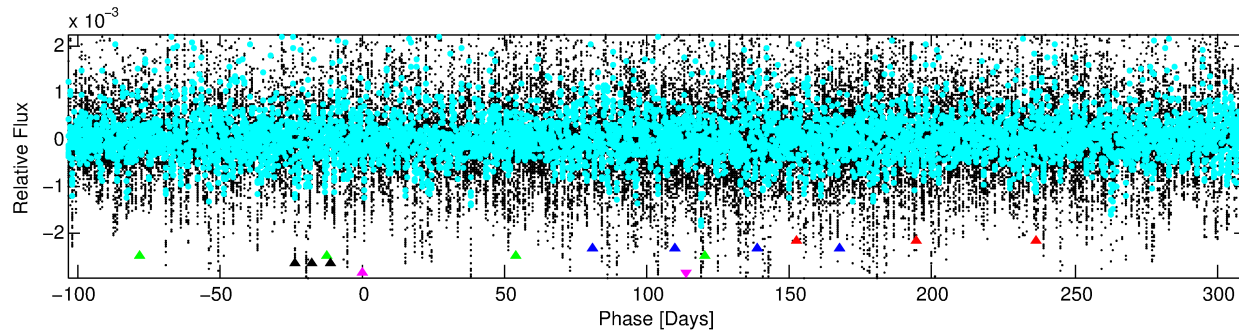
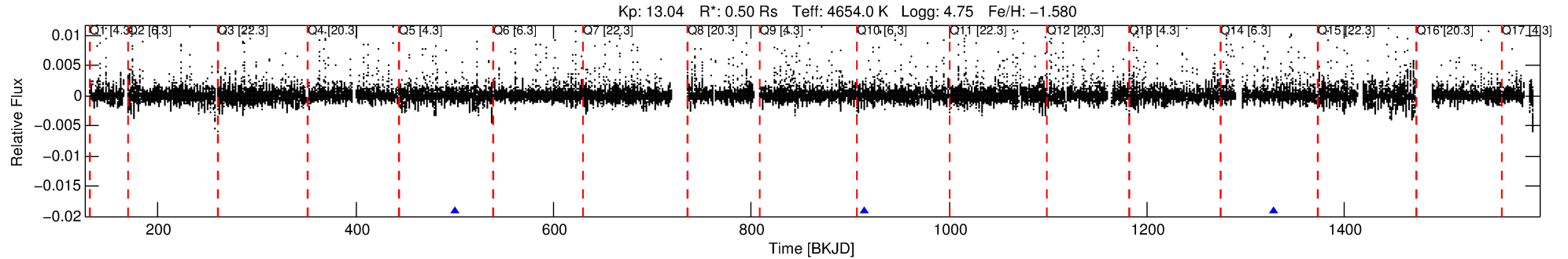
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 003528198-05

No Significant Match Found

DV One-Page Summary

KIC: 3528198 Candidate: 5 of 5 Period: 413.895 d



TPS TCE Results:

Period = 413.89538 d
Epoch = 500.6296 BKJD

DV fit results are unavailable

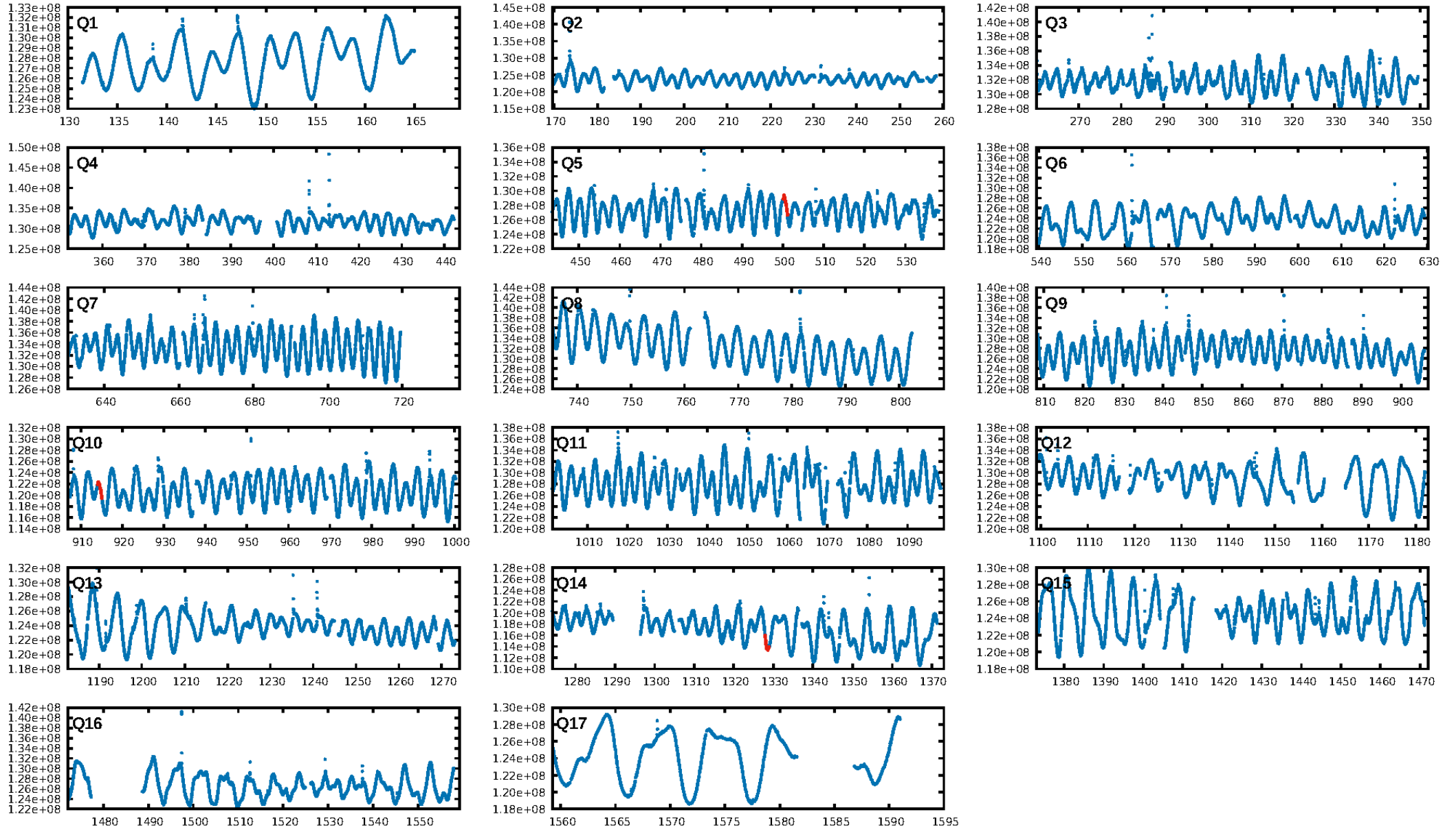
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [9.15 σ]
LongPeriod-sig: 100.0% [73.62 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -1.602
Centroid-sig: 11.5%
Centroid-so: 65.397 arcsec [1.03 σ]
OotOffset-rm: 0.453 arcsec [2.98 σ]
KicOffset-rm: 0.458 arcsec [2.63 σ]
OotOffset-st: 2/0/0/1 [3]
KicOffset-st: 2/0/0/1 [3]
DiffImageQuality-fgm: 0.00 [0/3]
DiffImageOverlap-fno: 1.00 [3/3]

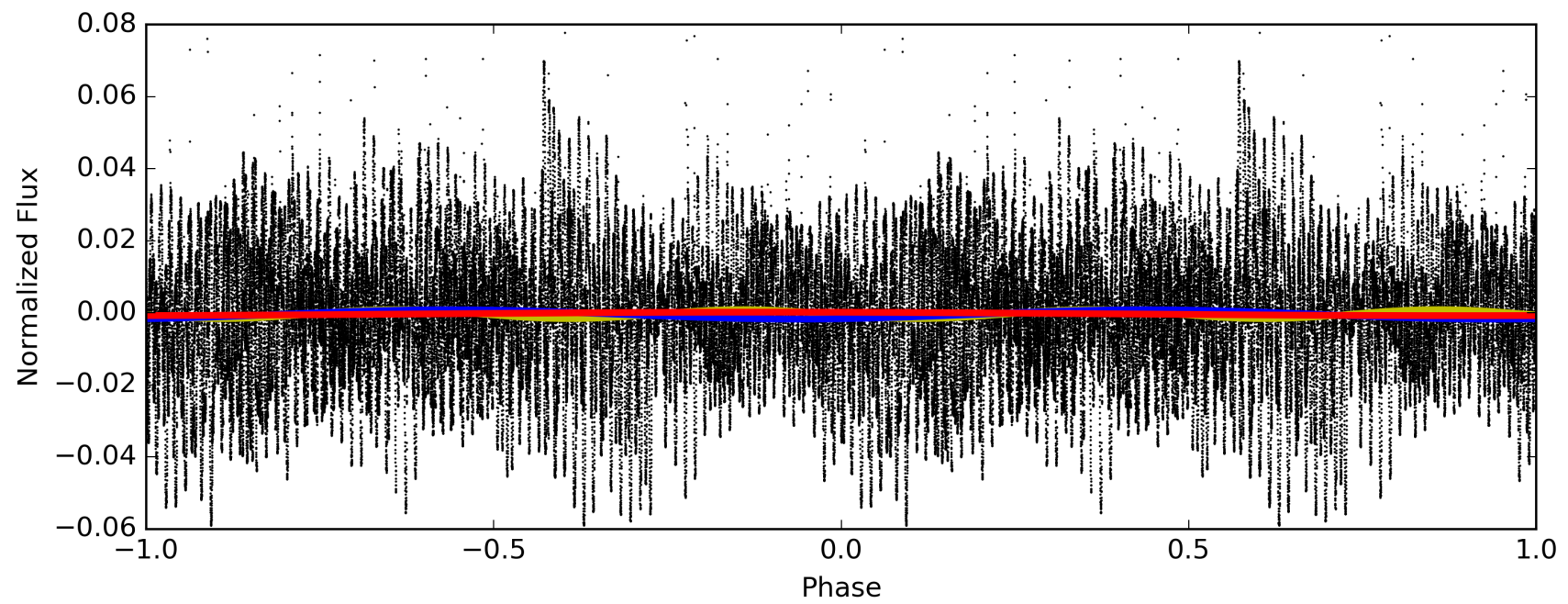
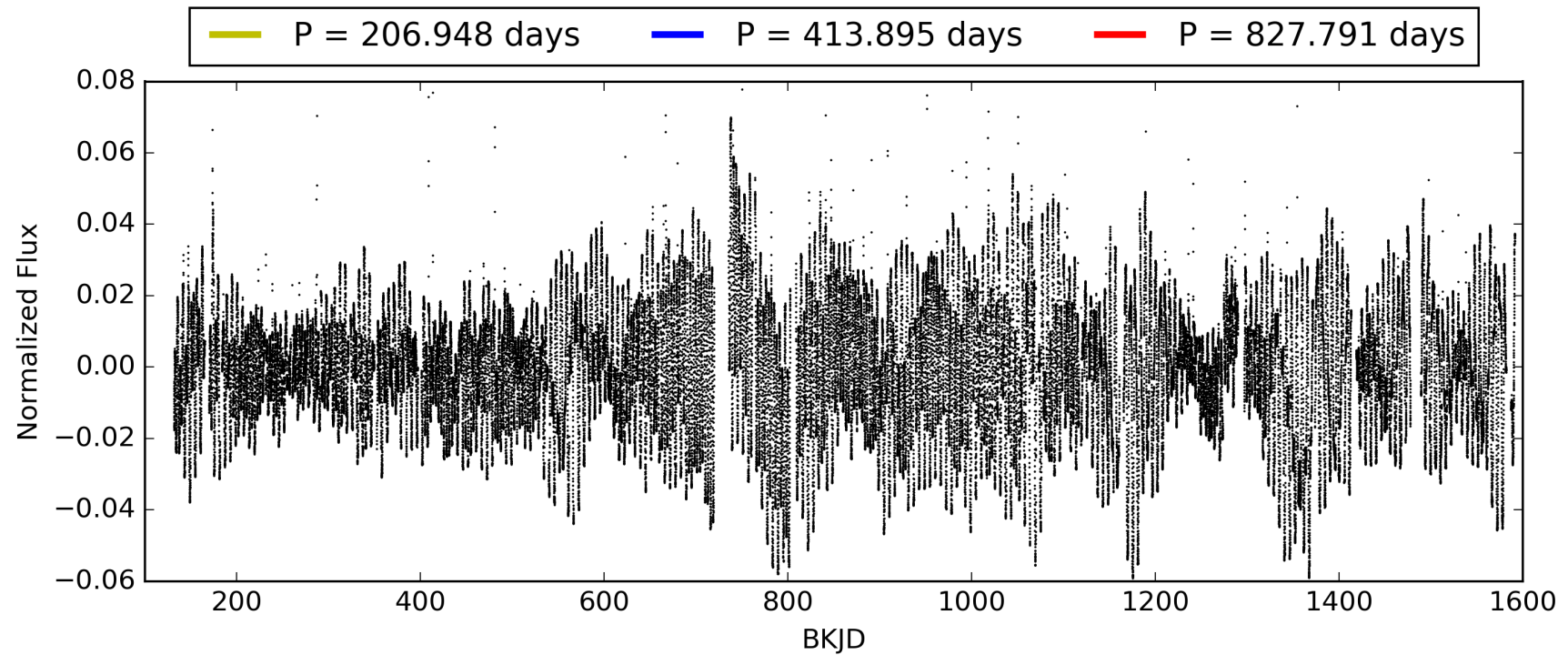
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 01:18:03 Z

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

TCE 003528198-05, PDC Light Curves

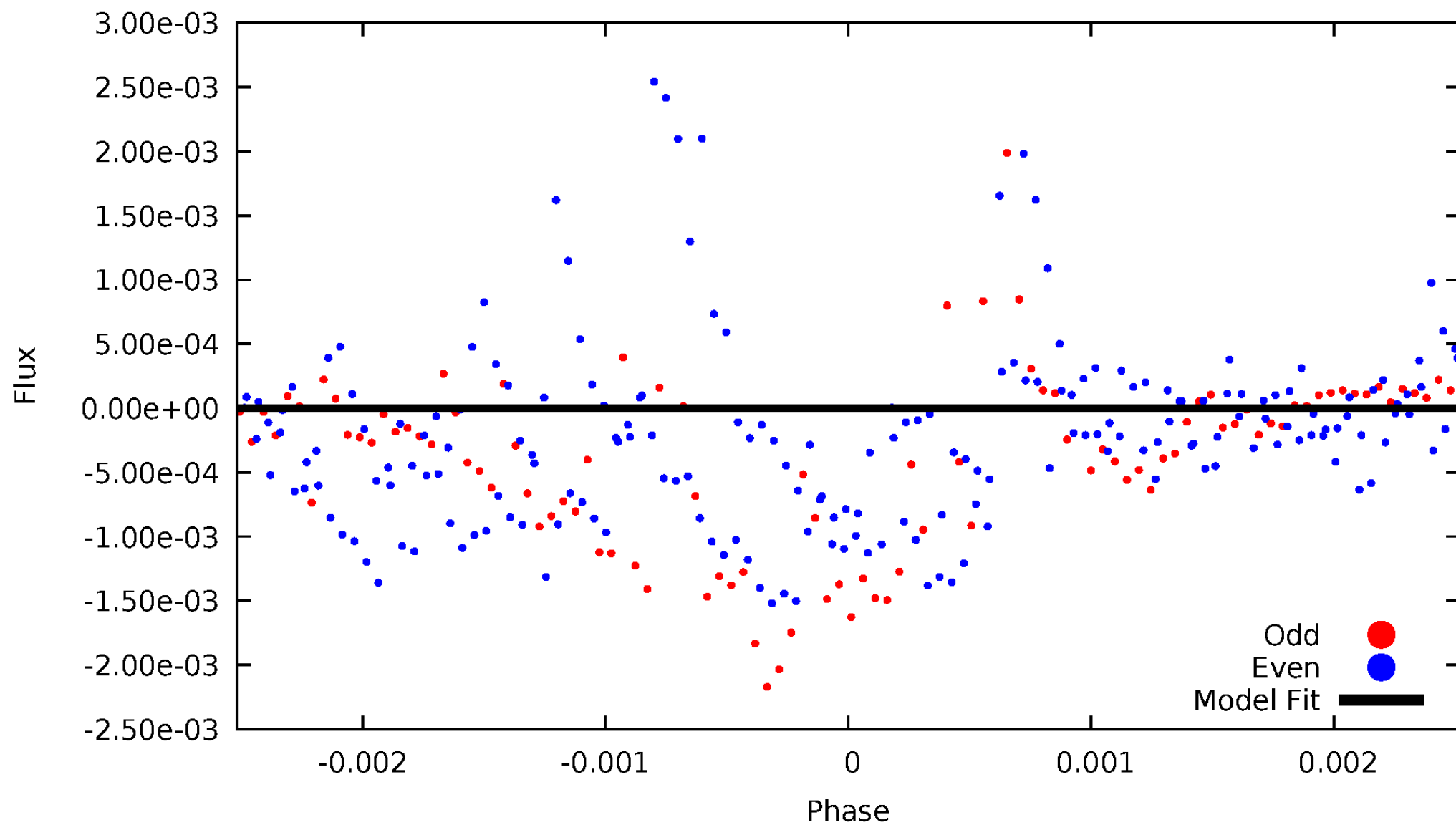


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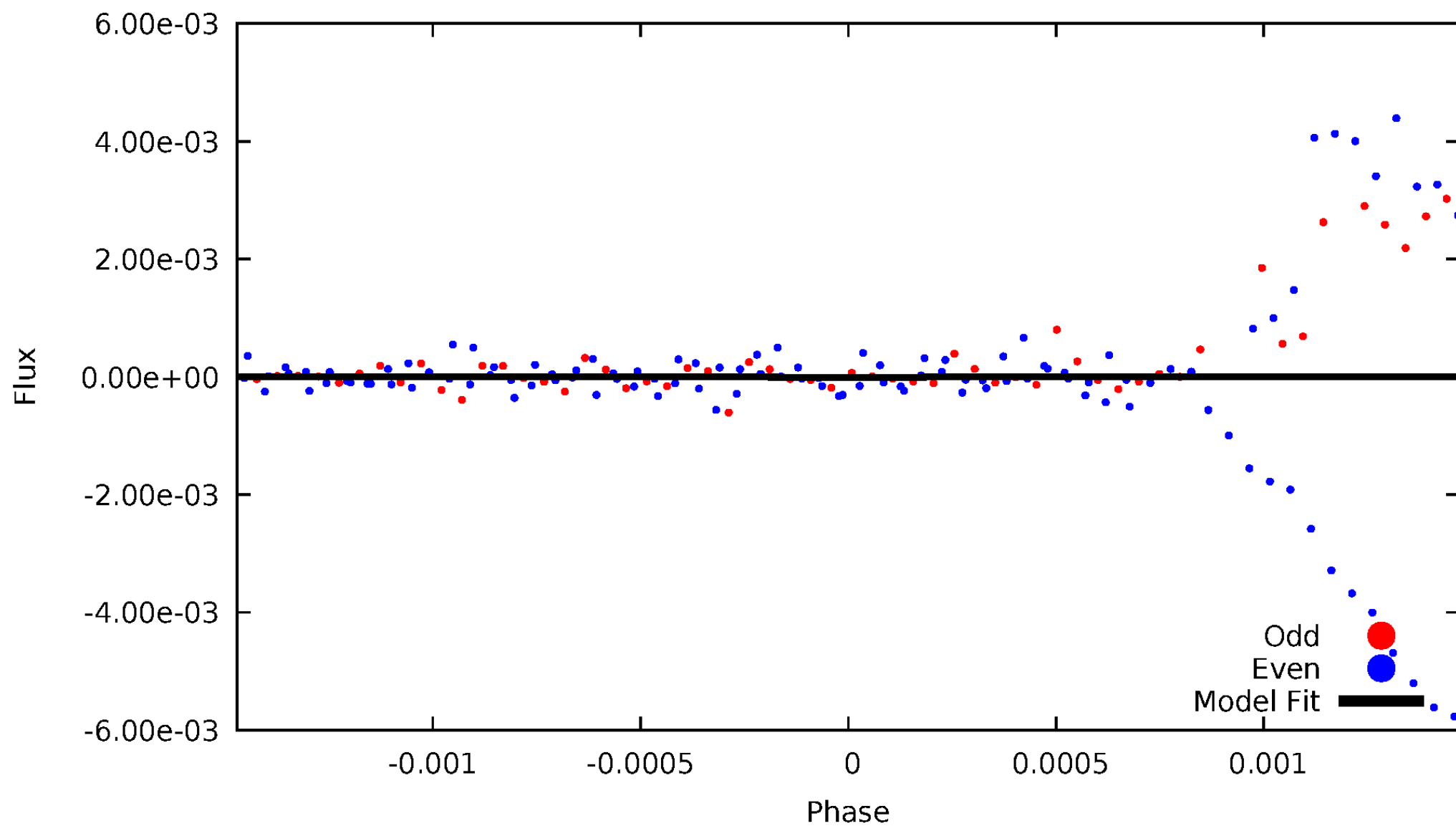
DV Odd/Even

TCE 003528198-05

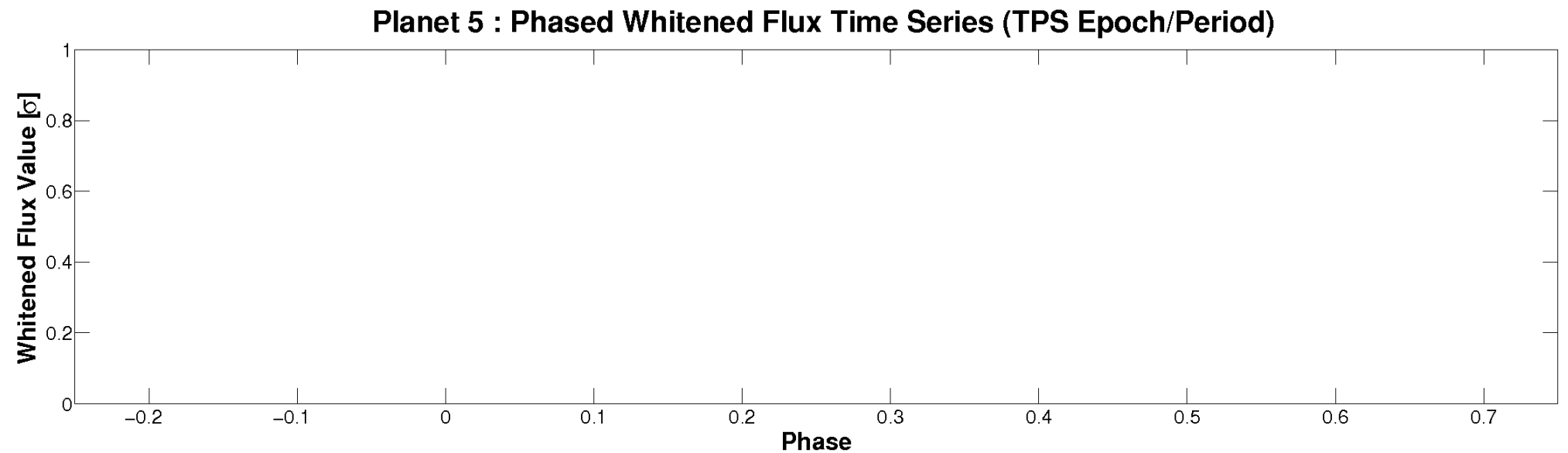
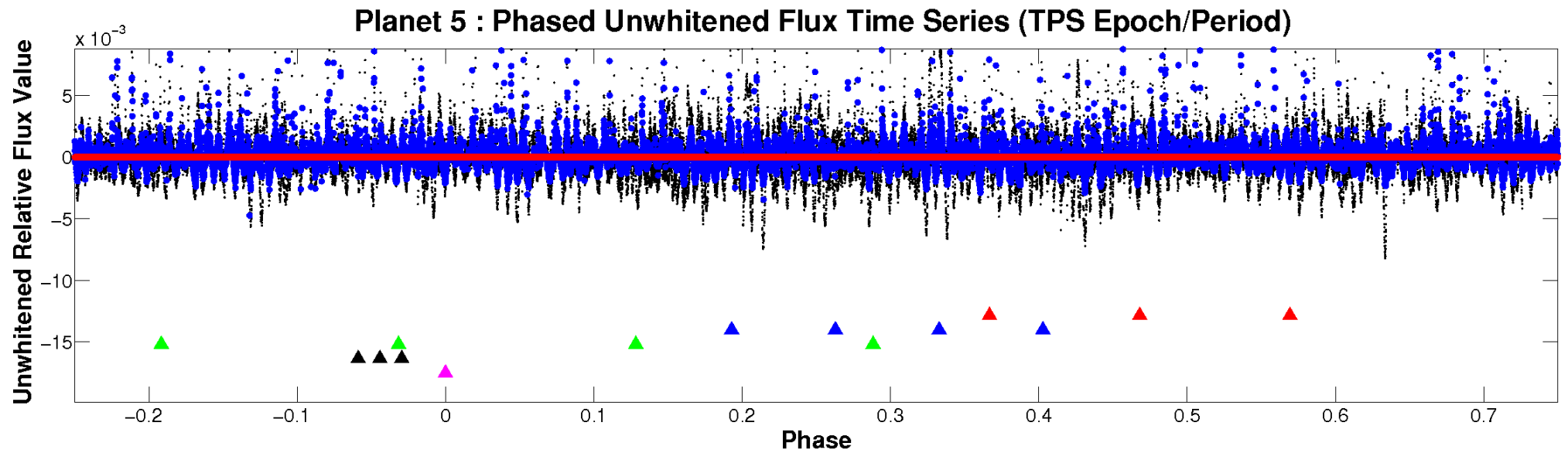


ALT Odd/Even

TCE 003528198-05

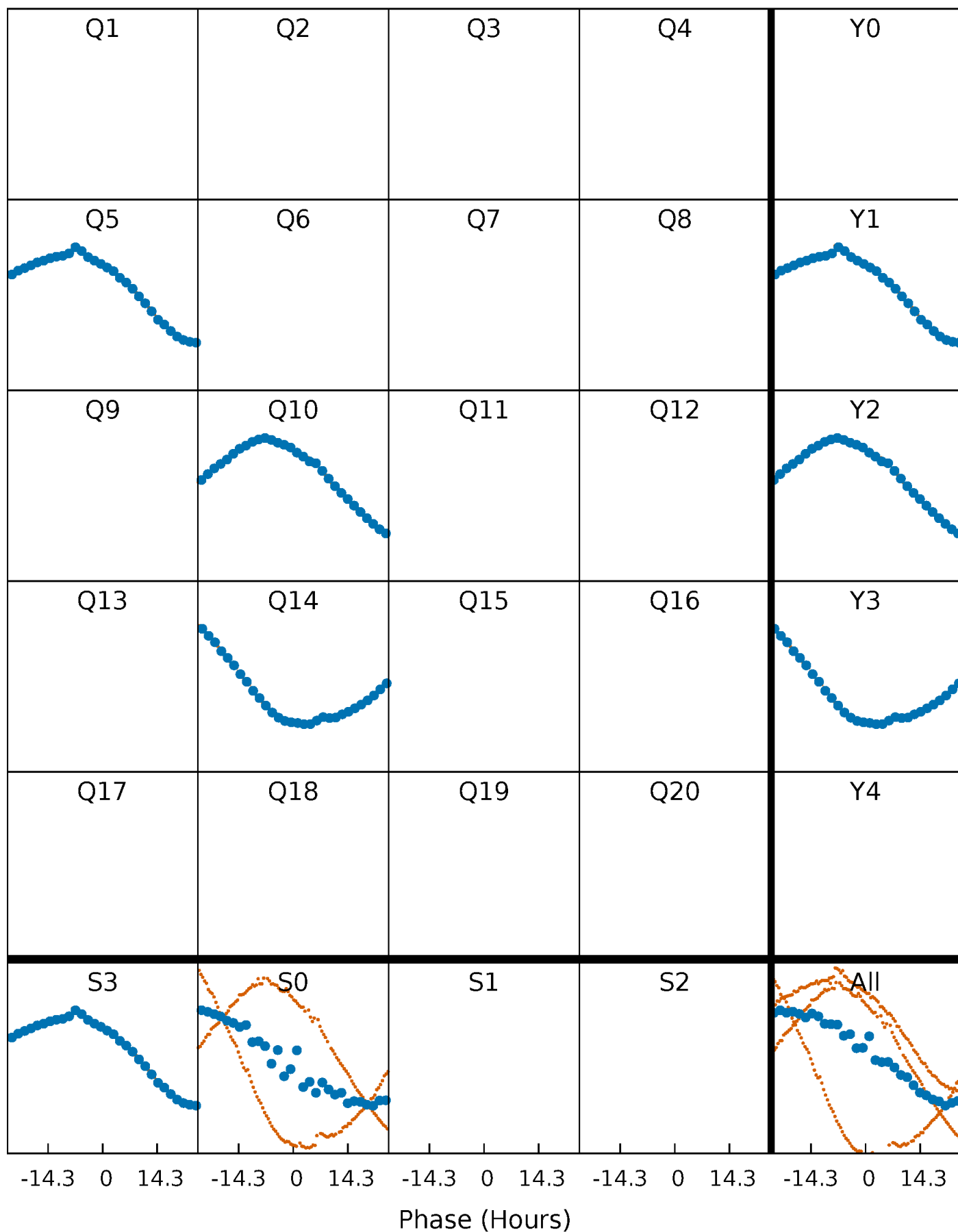


Non-Whitened Vs. Whitened Light Curve



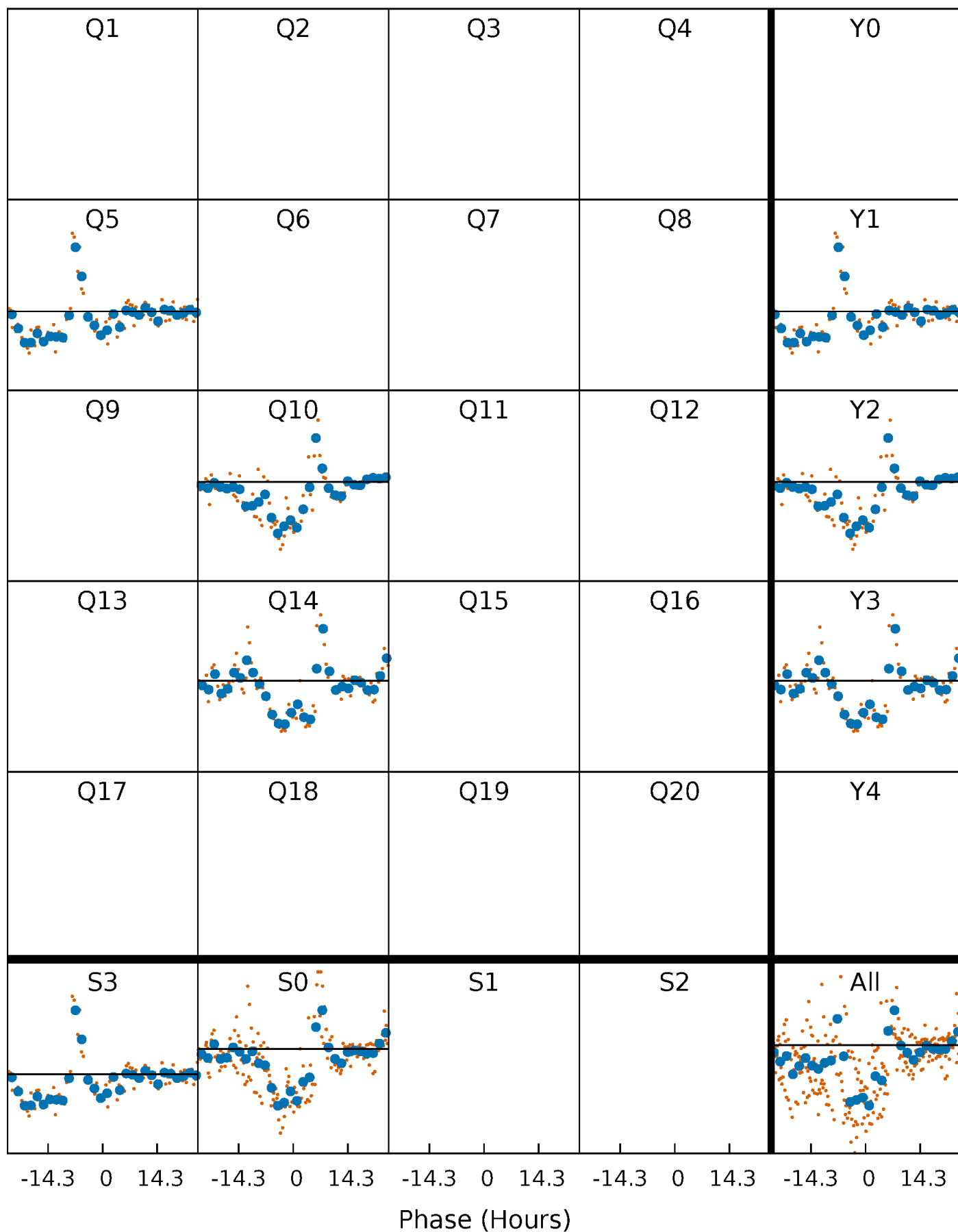
PDC Quarter-Phased Transit Curves

TCE 003528198-05 $P=413.895380$ Days $T_0=500.629633$ (BKJD)



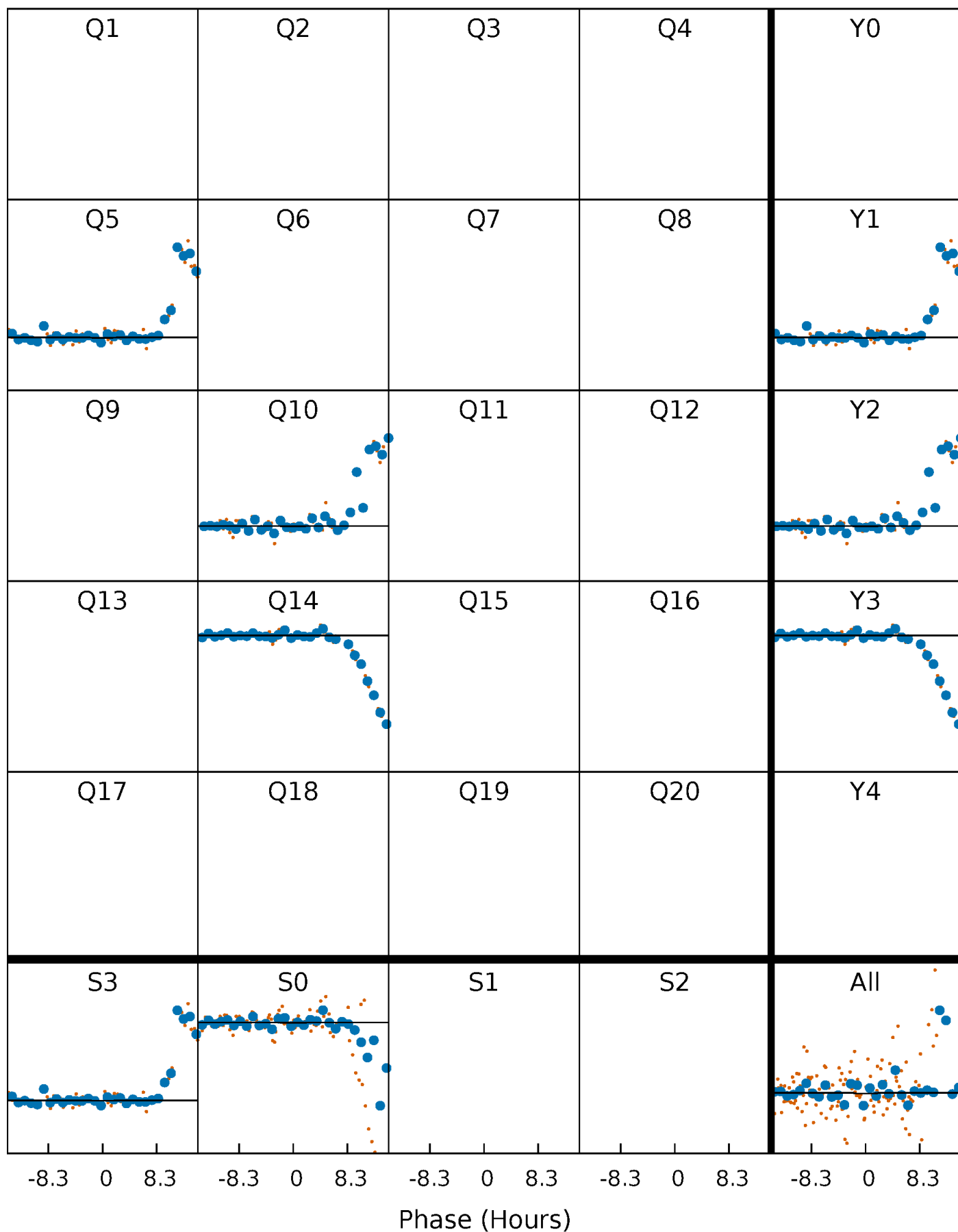
DV Quarter-Phased Transit Curves

TCE 003528198-05 $P=413.895380$ Days $T_0=500.629633$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

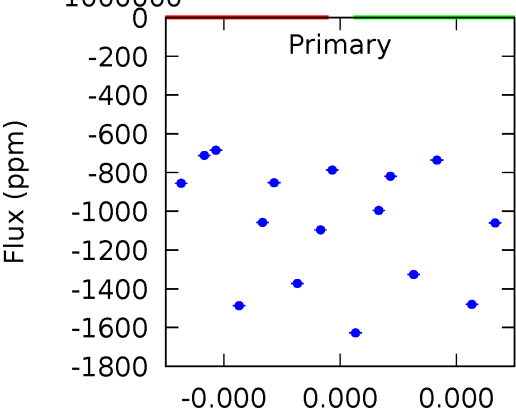
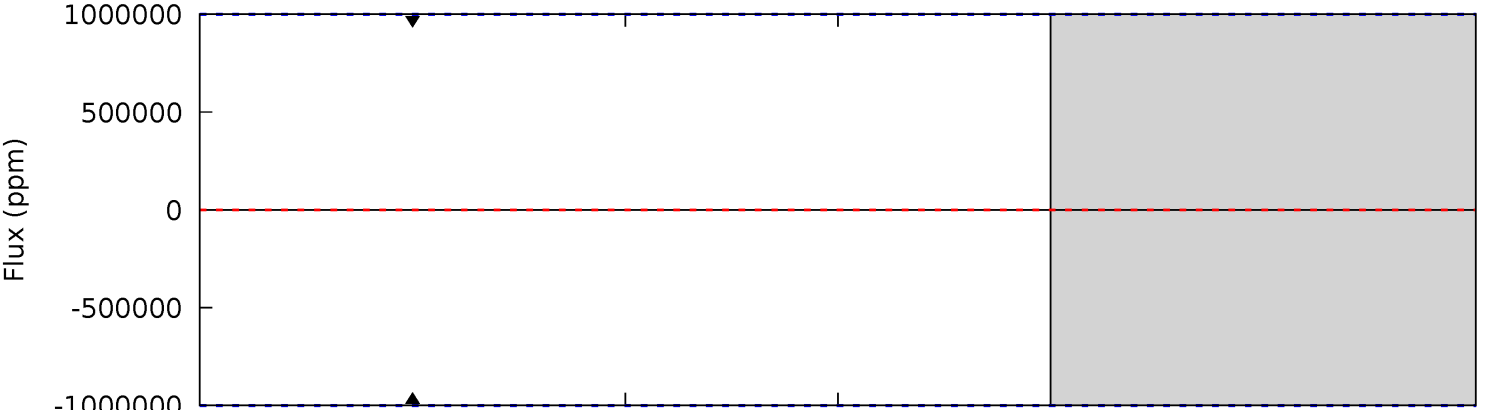
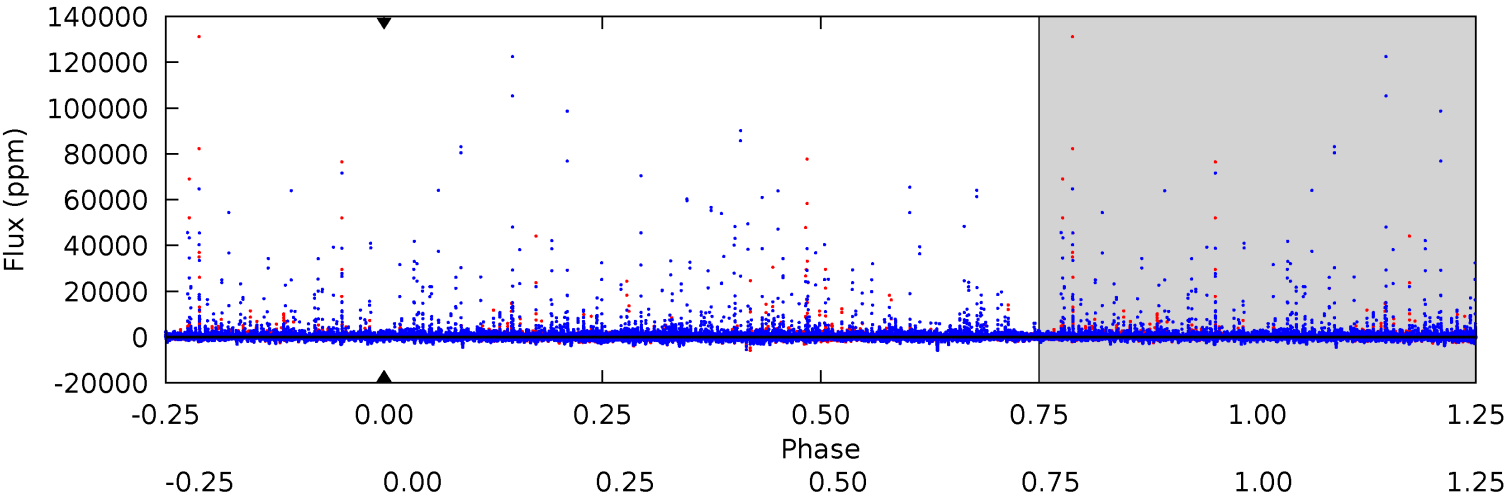
TCE 003528198-05 $P=413.895380$ Days $T_0=499.834183$ (BKJD)



DV Model-Shift Uniqueness Test

003528198-05, P = 413.895380 Days, E = 86.734253 Days

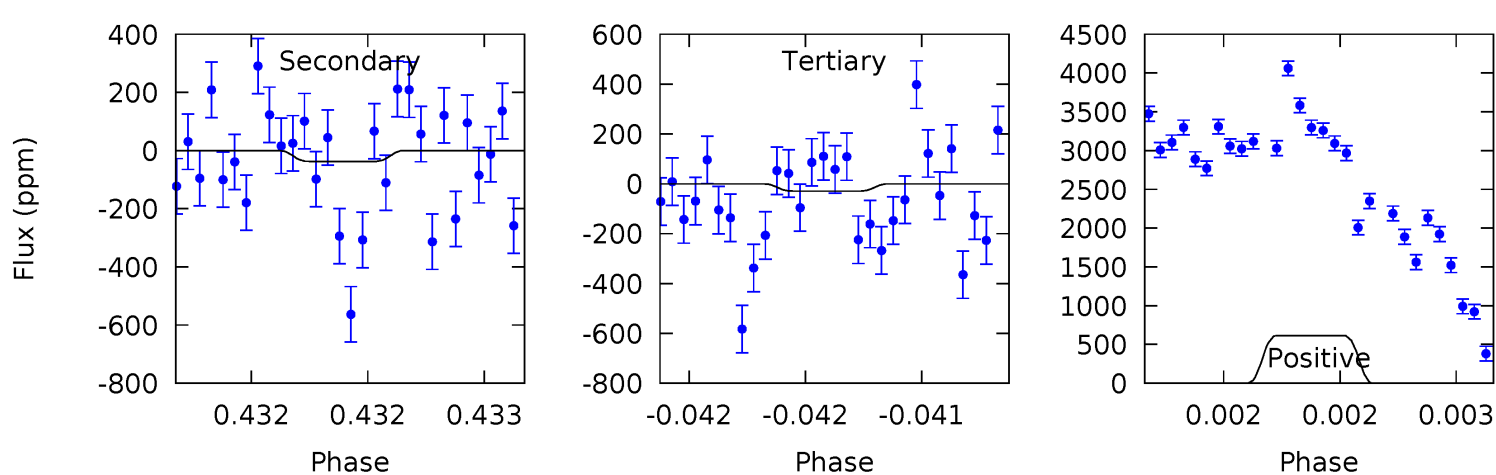
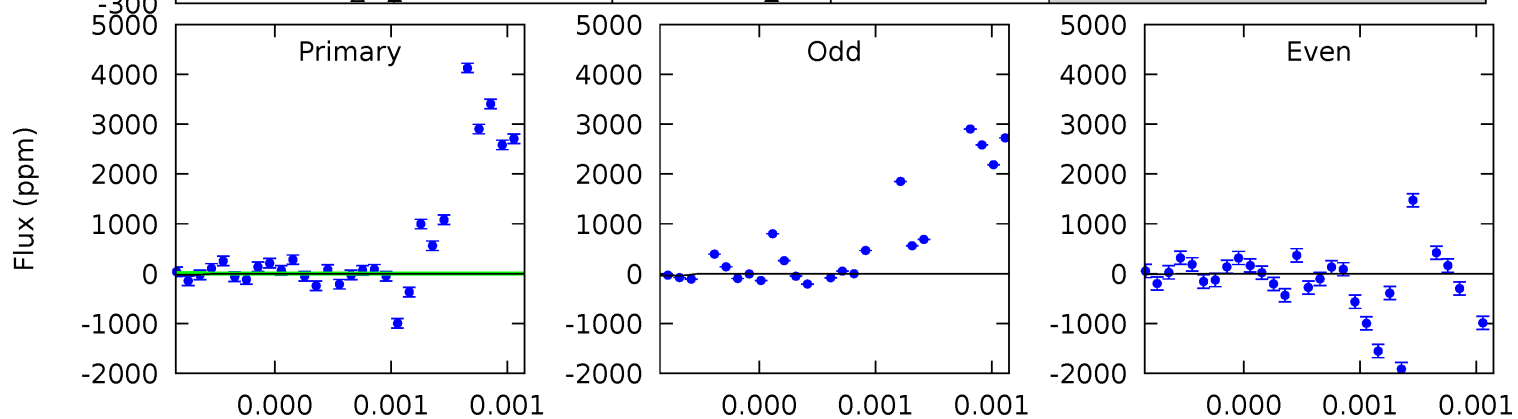
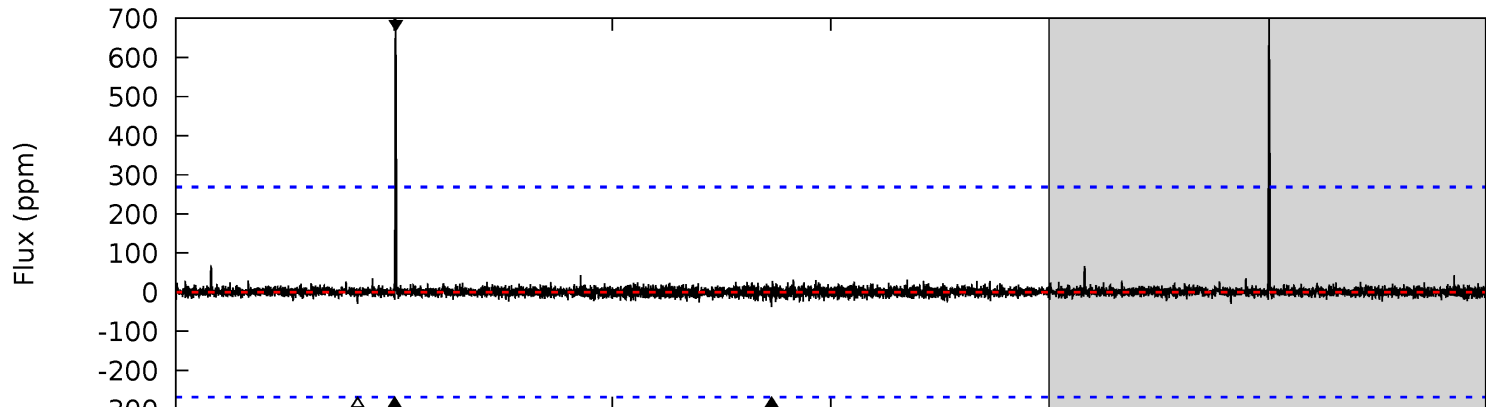
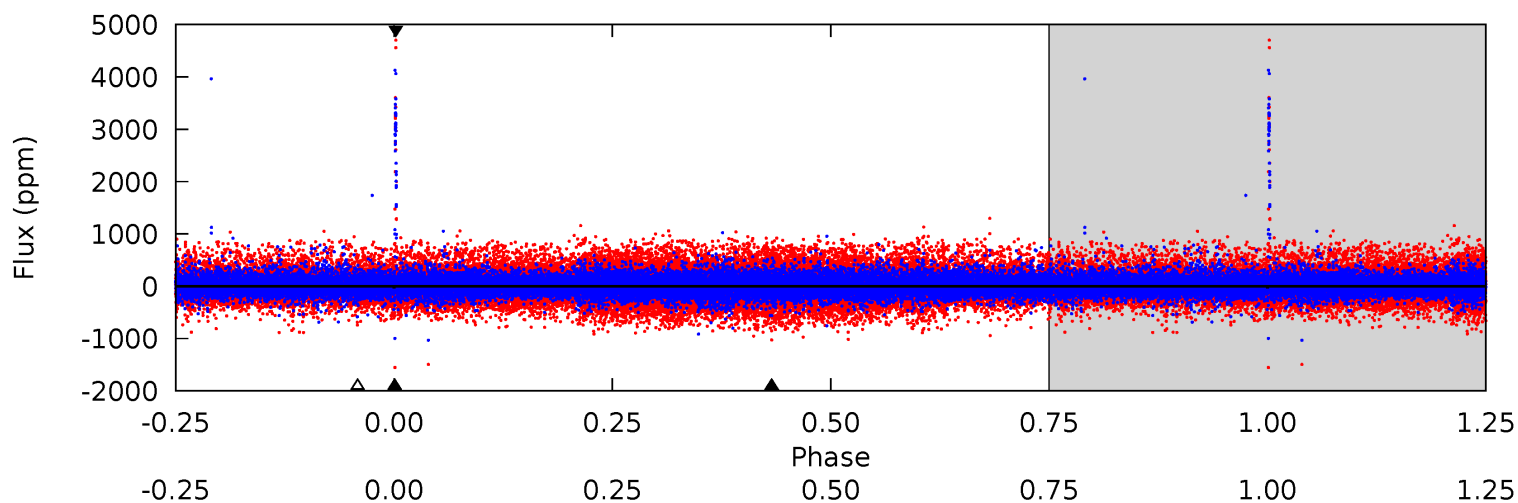
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|-----|-----|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|-----|-------|-----|
| 0 | 0 | 0 | 0 | 1.00 | 1.00 | 1.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |



Alt Model-Shift Uniqueness Test

003528198-05, P = 413.895380 Days, E = 85.938803 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 0.41 | 0.78 | 0.61 | 12.8 | 5.59 | 3.51 | 0.35 | -0.20 | -12.4 | 0.16 | -12.1 | 0.23 | 0.56 | 0.95 | 0.43 |



Stellar Parameters For KIC 003528198

| | $T_{\text{eff}}(K)$ | $\log(g)$ | $[\text{Fe}/\text{H}]$ | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 4654^{+129}_{-162} | $4.749^{+0.049}_{-0.025}$ | $-1.580^{+0.300}_{-0.250}$ | $0.503^{+0.024}_{-0.035}$ | $0.517^{+0.032}_{-0.025}$ | $5.723^{+1.128}_{-0.528}$ |
| | +3%/-3% | +1%/-1% | +19%/-16% | +5%/-7% | +6%/-5% | +20%/-9% |
| Source | PHO1 | KIC0 | KIC0 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 003528198-05 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|-----------------|------------------------|----------------------|--------------------------|---|
| DV | 0 ± 1000000 | $3.98^{+4.33}_{-2.84}$ | 216^{+7}_{-8} | -2717^{+15942}_{-9496} | $-6364.881^{+4883004.230}_{-4302425.618}$ |
| Alt. | -37 ± 48 | $3.49^{+3.64}_{-2.35}$ | 216^{+7}_{-8} | 2169^{+760}_{-4159} | 752^{+8048}_{-1077} |

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

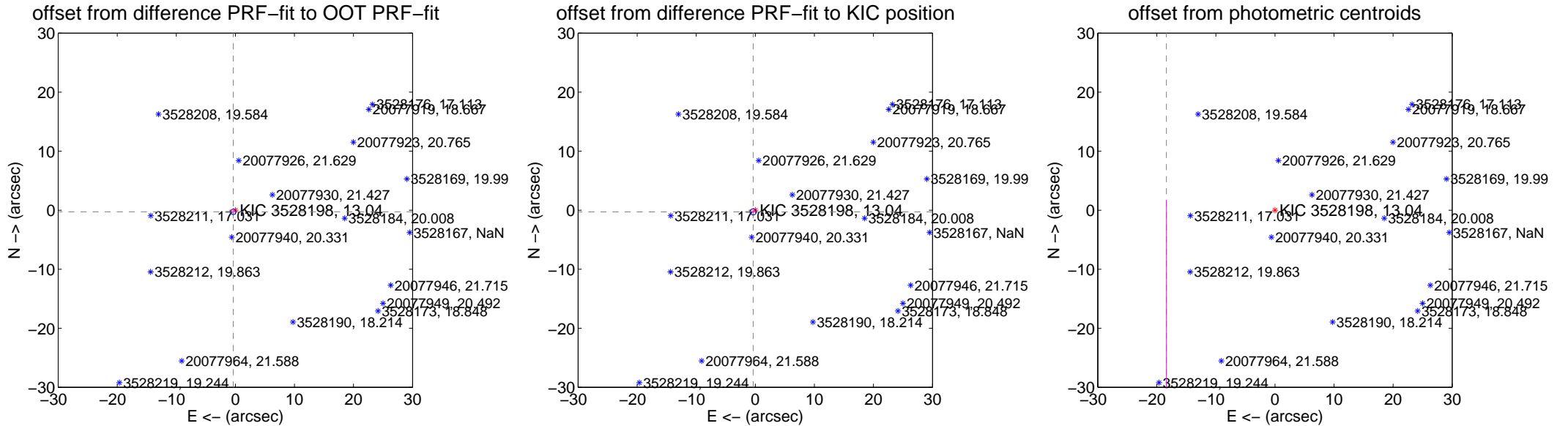
DV Centroid Data

Supplemental centroid analysis for 003528198-05. Kepler magnitude: 13.04. Transit SNR -1.00

There are 0 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT | 0.453 ± 0.152 | 2.98 | 0.356 ± 0.179 | -0.280 ± 0.094 |
| PRF-fit source offset from KIC position | 0.458 ± 0.174 | 2.63 | 0.358 ± 0.190 | -0.286 ± 0.146 |
| photometric centroid source offset | 65.40 ± 63.67 | 1.03 | 18.37 ± 53.17 | -62.76 ± 64.49 |

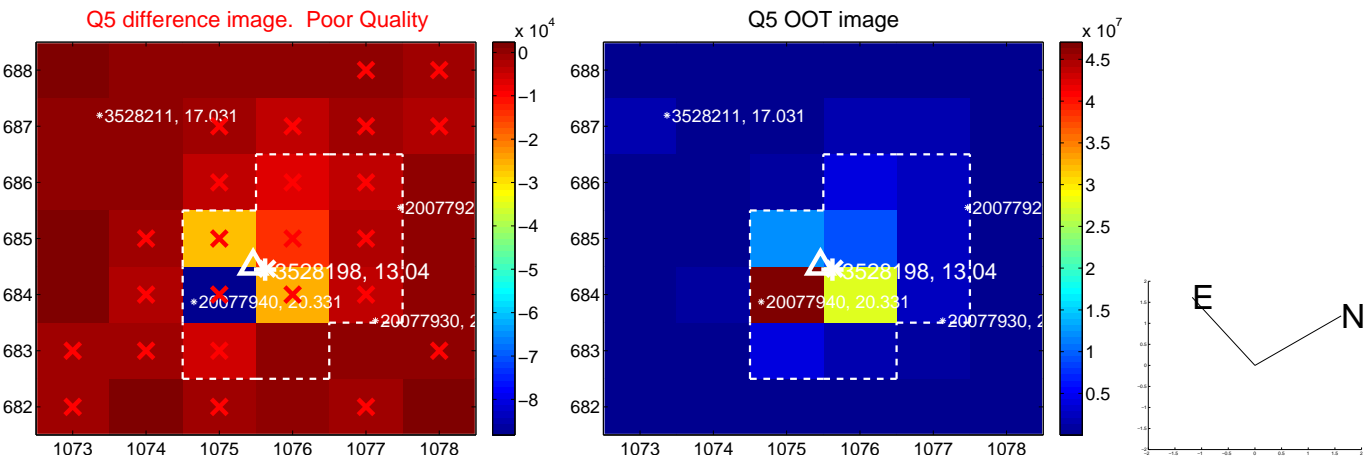


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

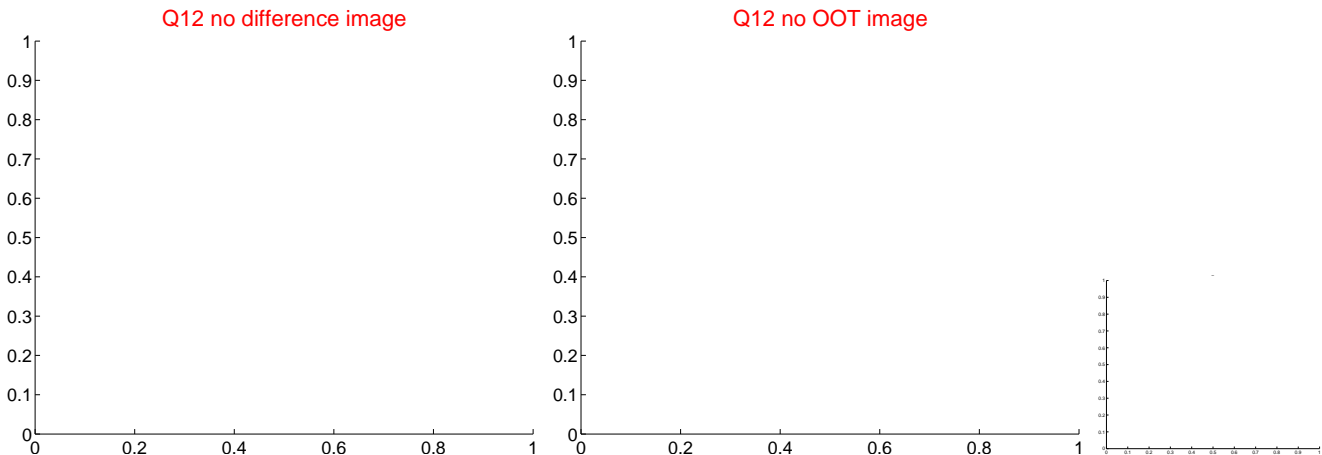
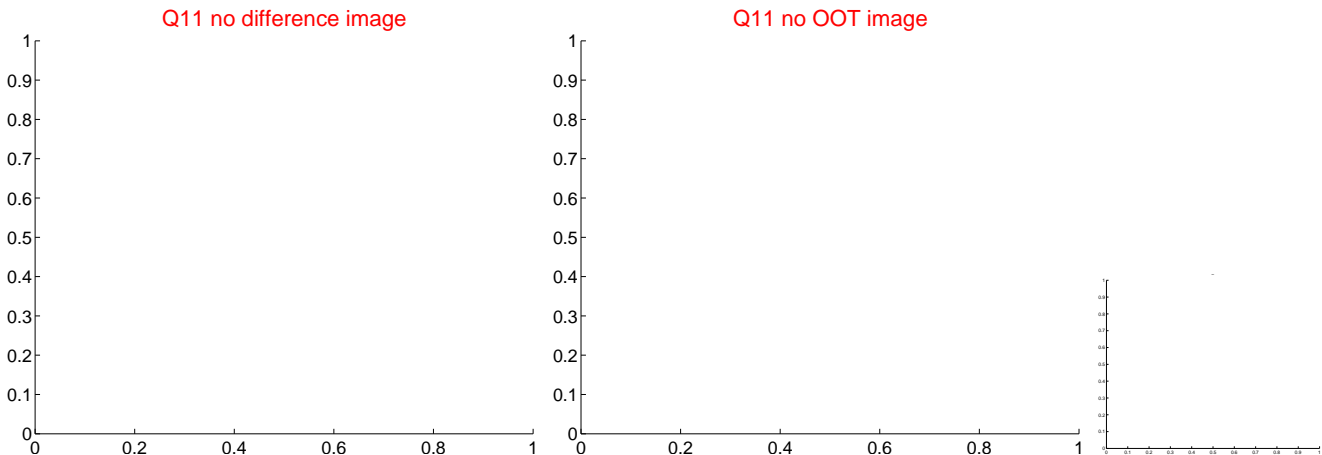
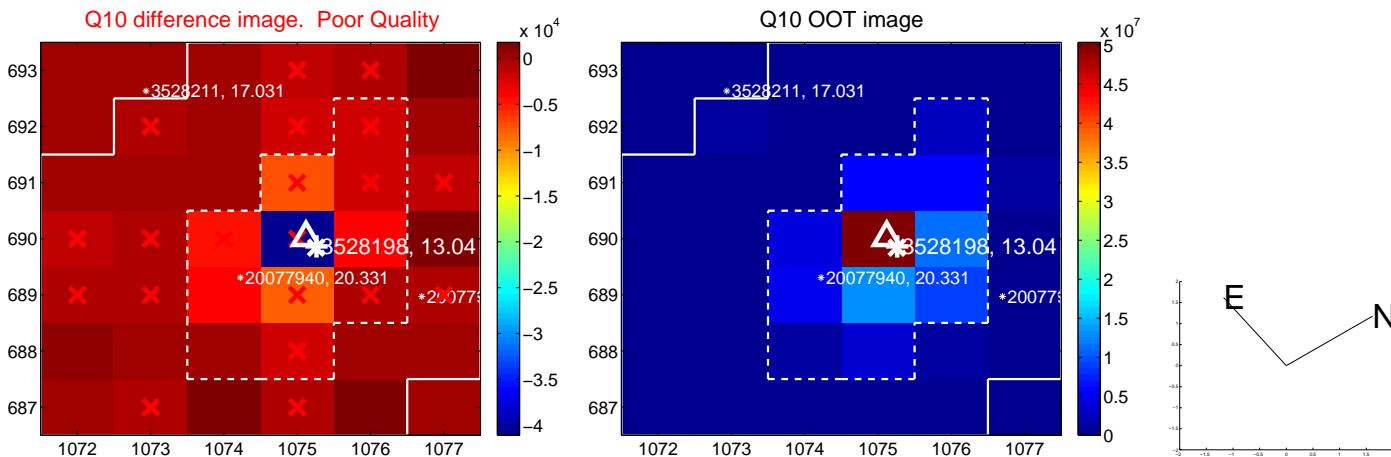
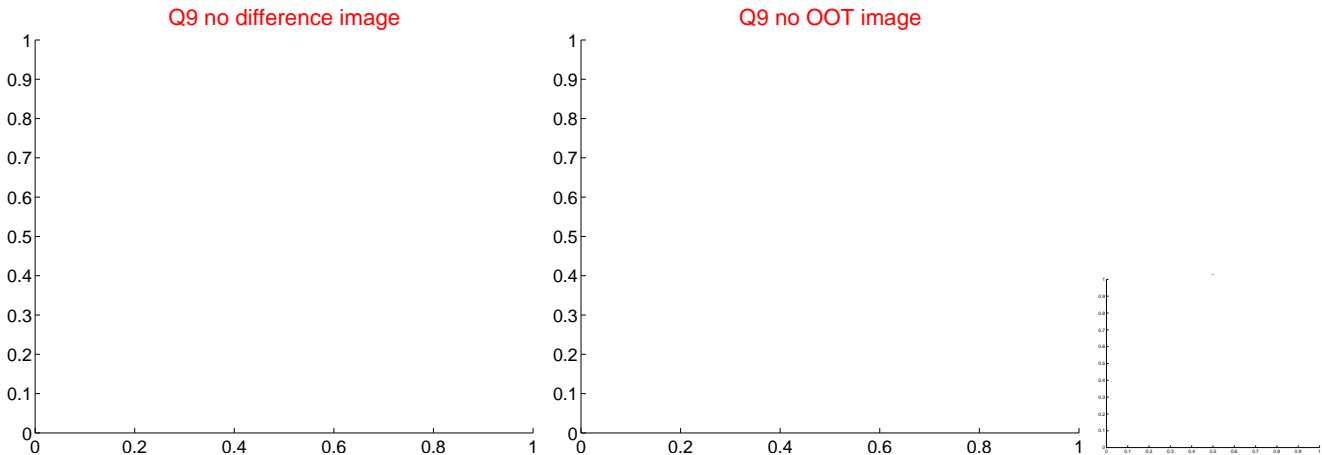
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



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

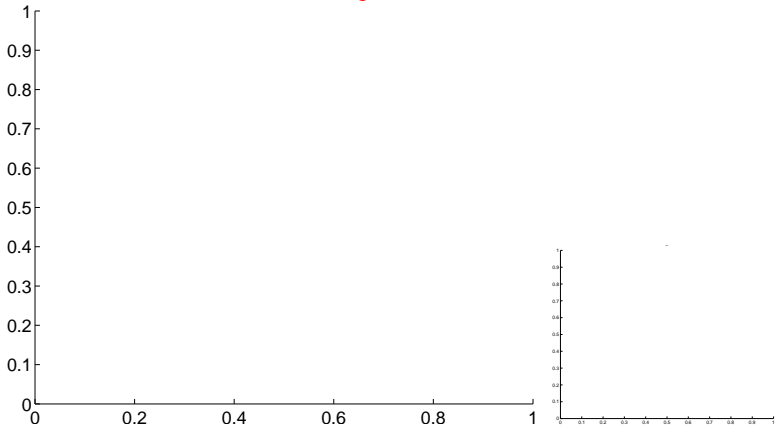


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

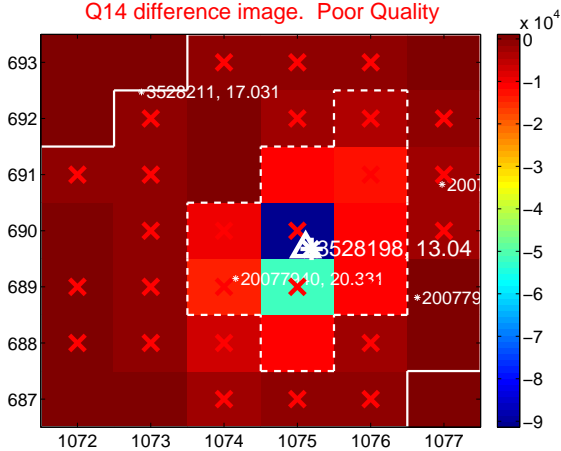
Q13 no difference image



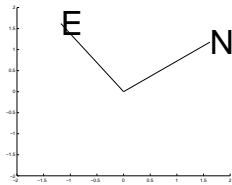
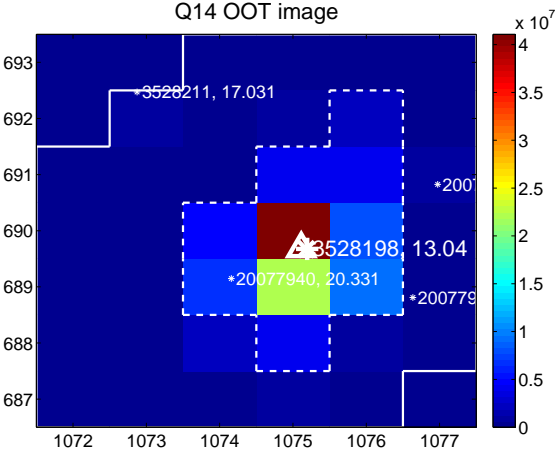
Q13 no OOT image



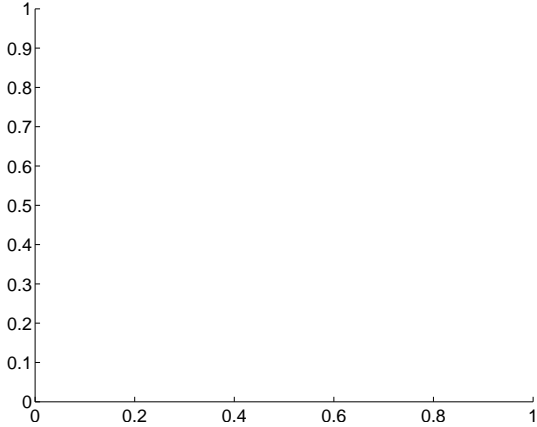
Q14 difference image. Poor Quality



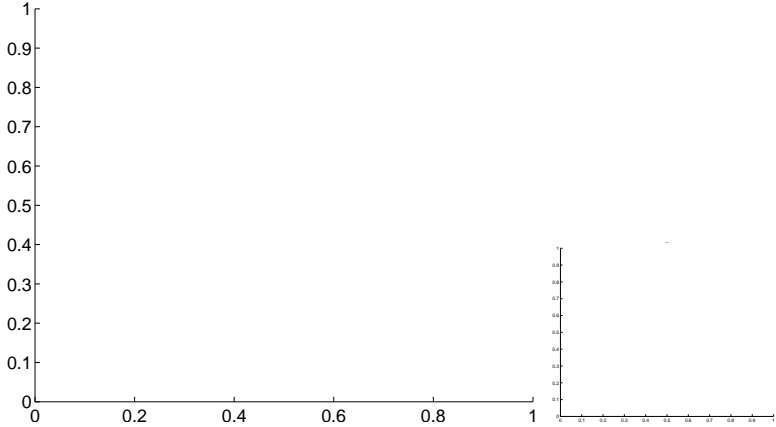
Q14 OOT image



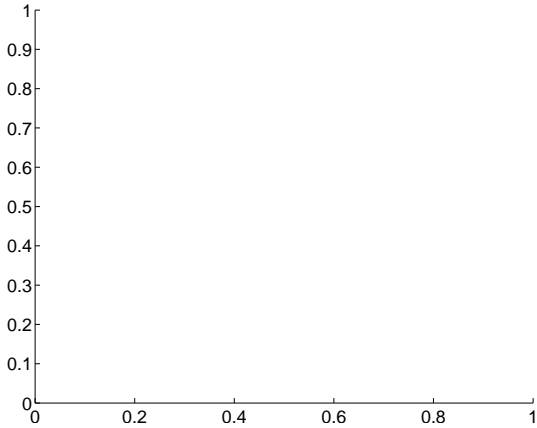
Q15 no difference image



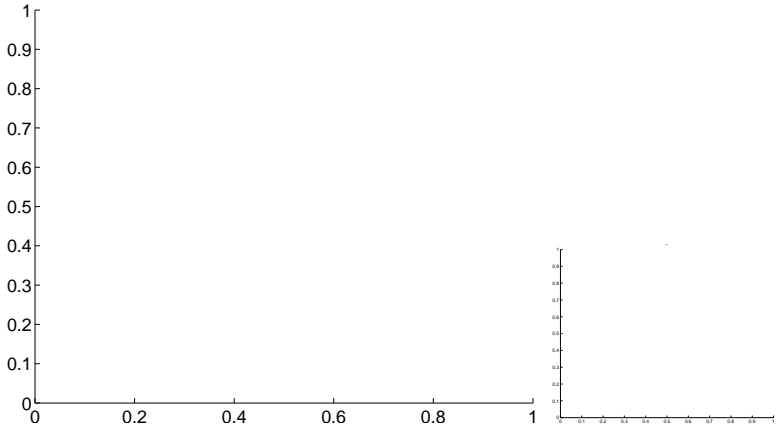
Q15 no OOT image



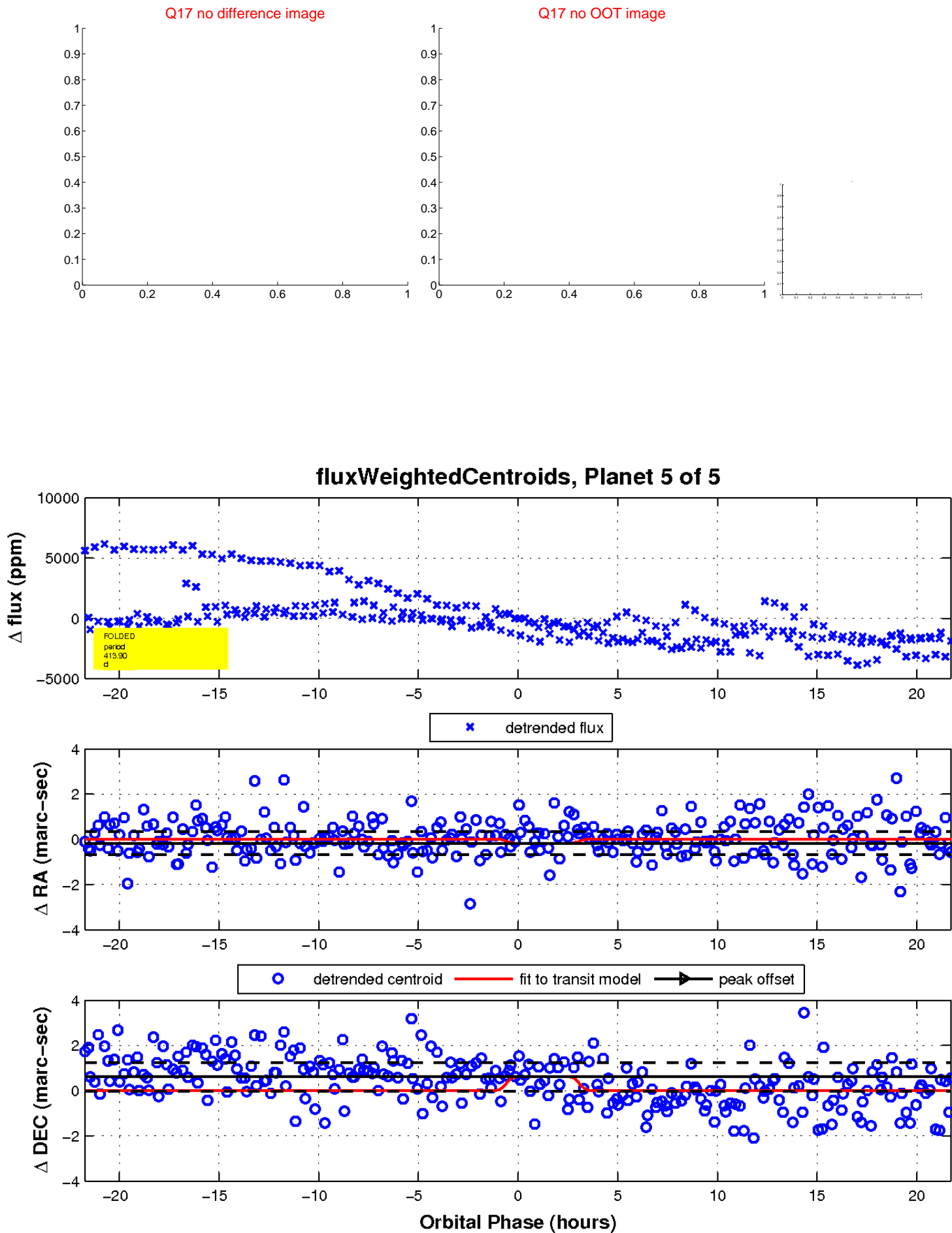
Q16 no difference image



Q16 no OOT image



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



UKIRT Image

Declination

