

KIC 005021374

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 005021374-01 | OBS | No | 487.094165 | 266.667169 | 348.2 | 2.779 | 19.1 | 1.7 | 1.80 | 7109 | 3.56 | 3.89 |
| 005021374-02 | OBS | No | 420.278477 | 199.802000 | 516.7 | 2.226 | 20.7 | 4.4 | 1.80 | 7109 | 4.82 | 4.73 |
| 005021374-03 | OBS | No | 293.691097 | 167.071123 | 255.7 | 1.237 | 22.6 | 2.7 | 1.80 | 7109 | 3.24 | 7.63 |
| 005021374-04 | OBS | No | 360.267274 | 394.667002 | 5129.8 | 16.284 | 17.9 | 4.7 | 1.80 | 7109 | 15.01 | 5.81 |
| 005021374-05 | OBS | No | 477.293906 | 312.586391 | 291.3 | 4.500 | 17.8 | -1.0 | 1.80 | 7109 | 3.10 | 3.99 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 005021374-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS |
| 005021374-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS |
| 005021374-03 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_ALT—INCONSISTENT_TRANS |
| 005021374-04 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS |
| 005021374-05 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS |

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

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

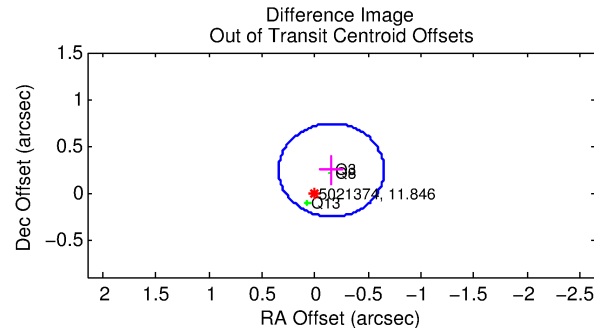
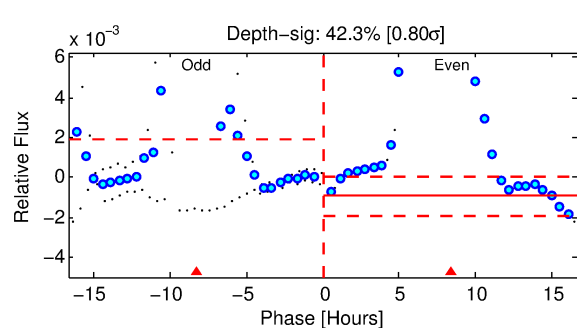
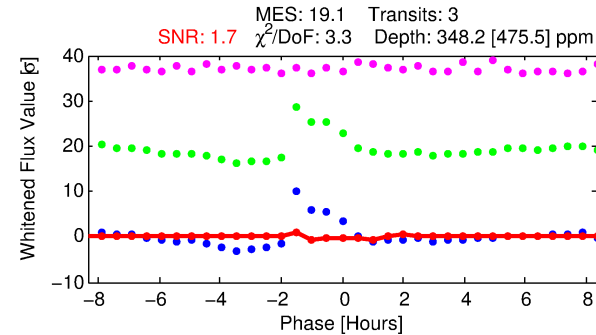
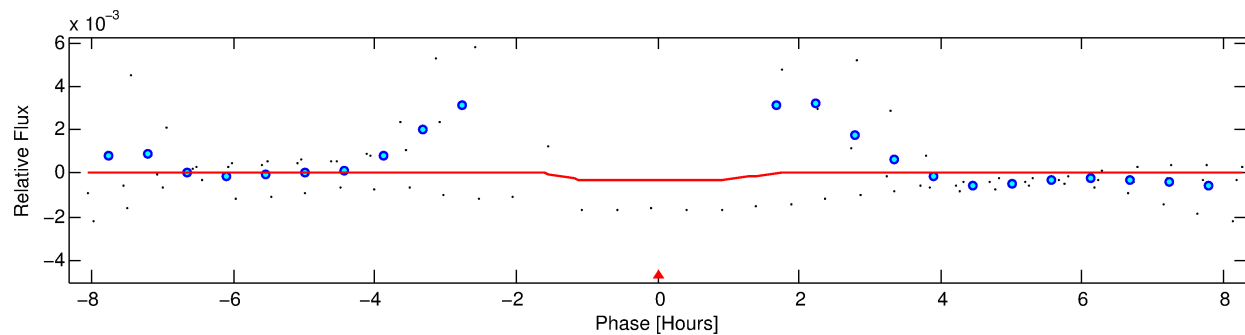
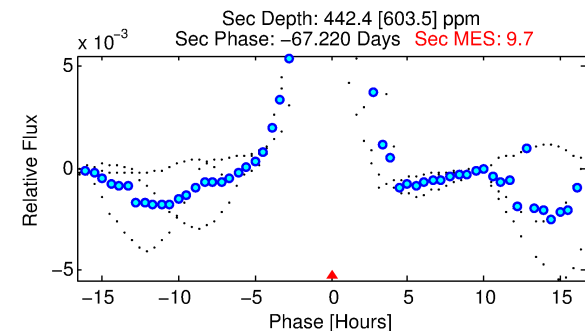
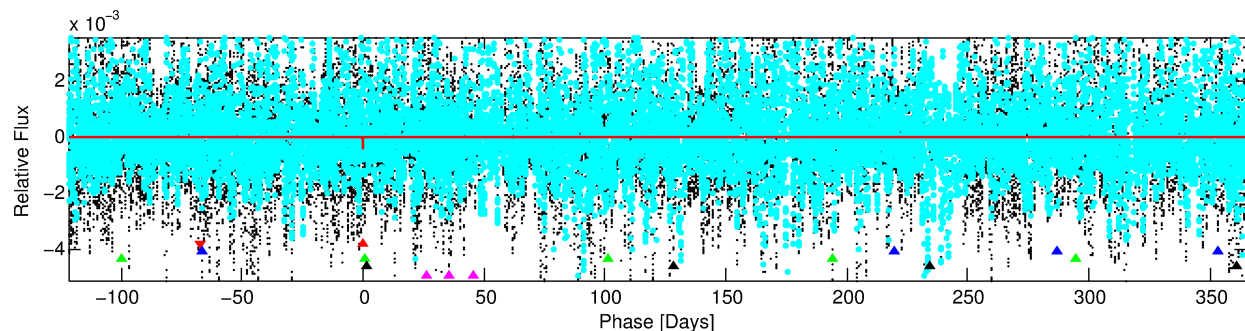
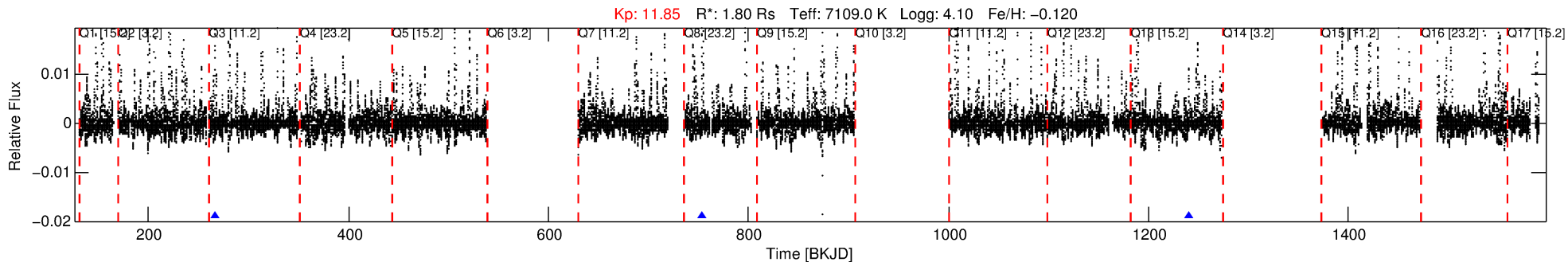
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005021374-01

No Significant Match Found

DV One-Page Summary

KIC: 5021374 Candidate: 1 of 5 Period: 487.094 d



DV Fit Results:

Period = 487.09417 [0.02039] d
Epoch = 266.6672 [0.0247] BKJD
Rp/R* = 0.0182 [0.0878]
a/R* = 1043.94 [29546.33]
b = 0.66 [24.72]
Seff = 3.89 [1.43]
Teff = 358 [33] K
Rp = 3.56 [17.25] Re
a = 1.3782 [0.3321] AU
Ag = 36464.82 [356260.60] [0.10σ]
Teffp = 7649 [18674] K [0.39σ]

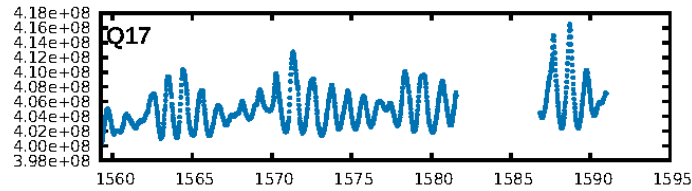
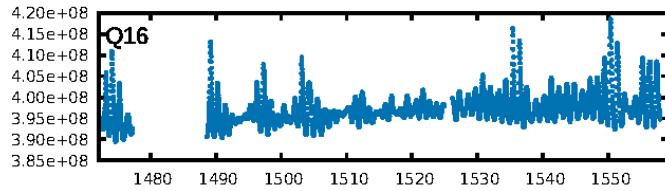
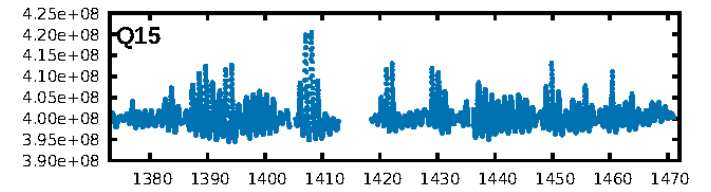
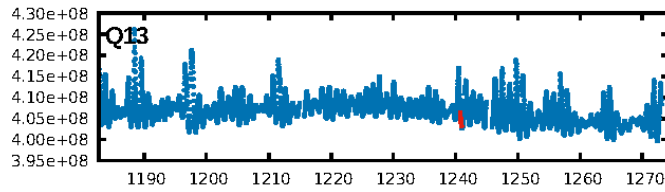
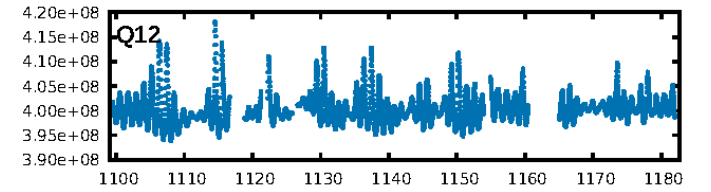
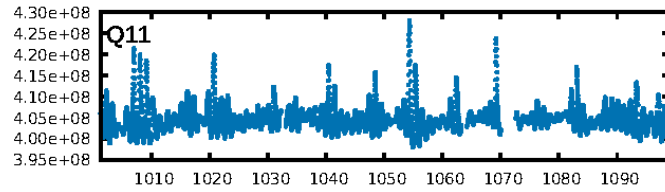
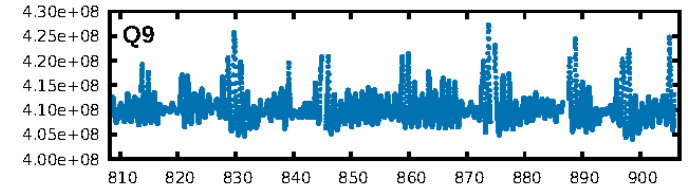
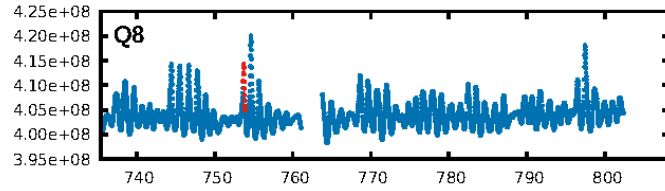
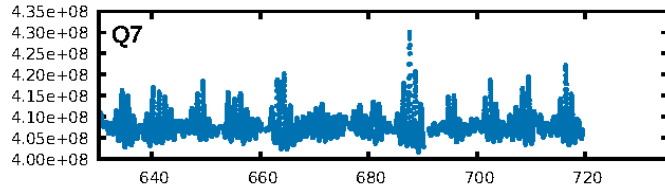
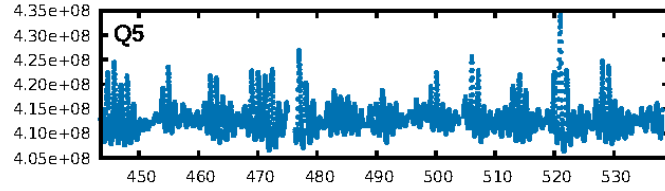
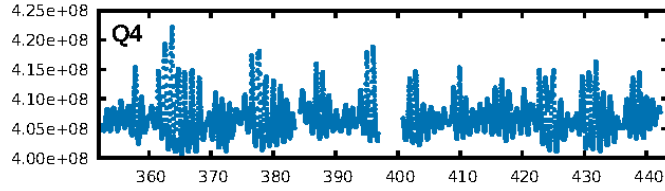
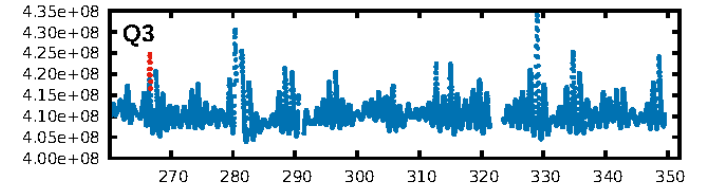
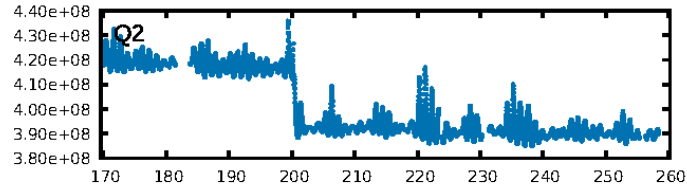
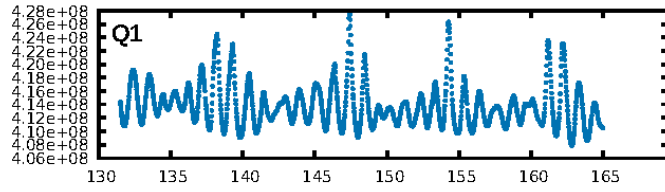
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [44.47σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 79.3%
ModelChiSquareGof-sig: 22.8%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 0.8976
Centroid-sig: 48.6%
Centroid-so: 0.937 arcsec [0.90σ]
OotOffset-rm: 0.285 arcsec [1.72σ]
KicOffset-rm: 0.274 arcsec [2.34σ]
OotOffset-st: 0/1/1/1 [3]
KicOffset-st: 0/1/1/1 [3]
DiffImageQuality-fgm: 0.33 [1/3]
DiffImageOverlap-fno: 1.00 [3/3]

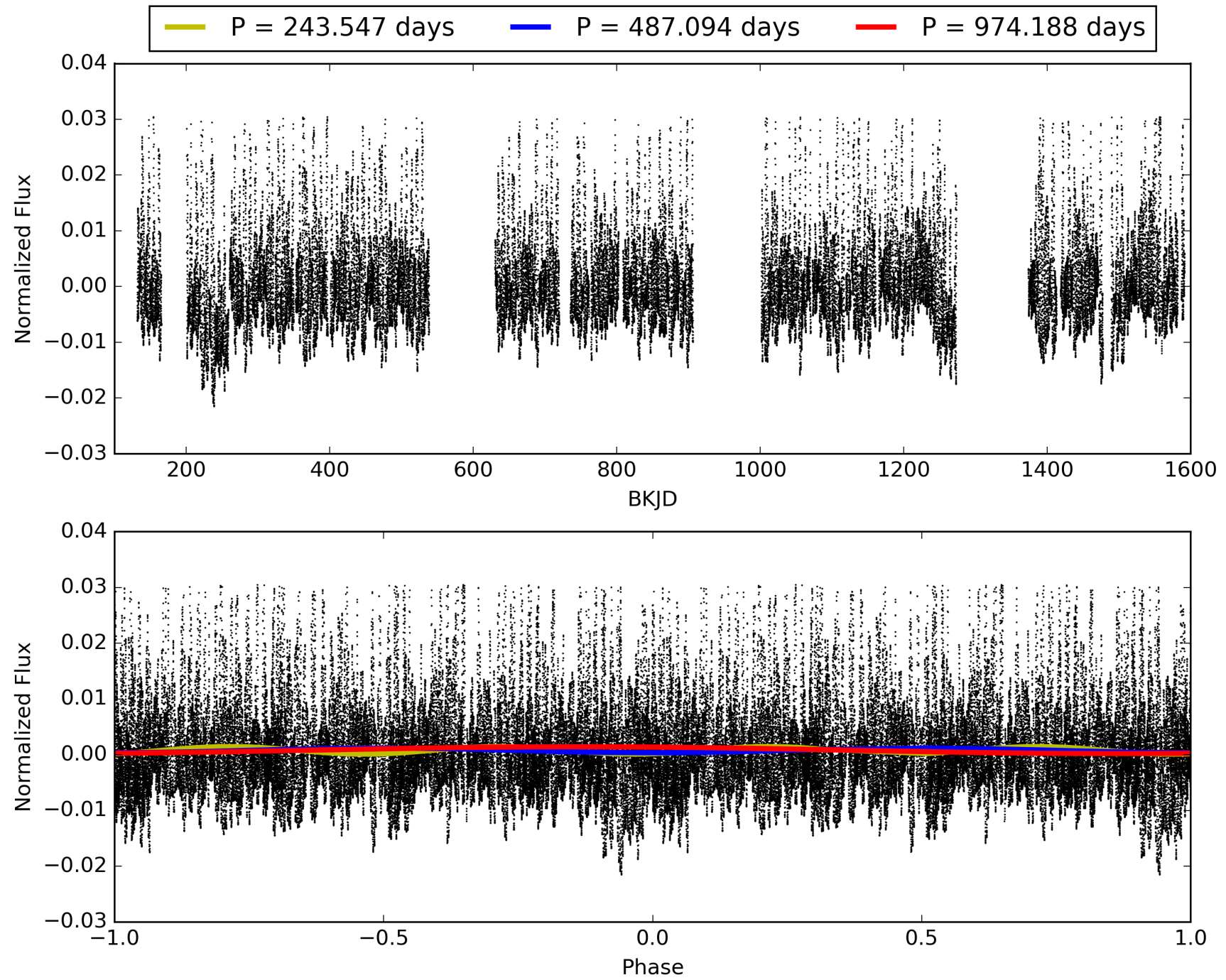
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 05:28:29 Z

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

TCE 005021374-01, PDC Light Curves

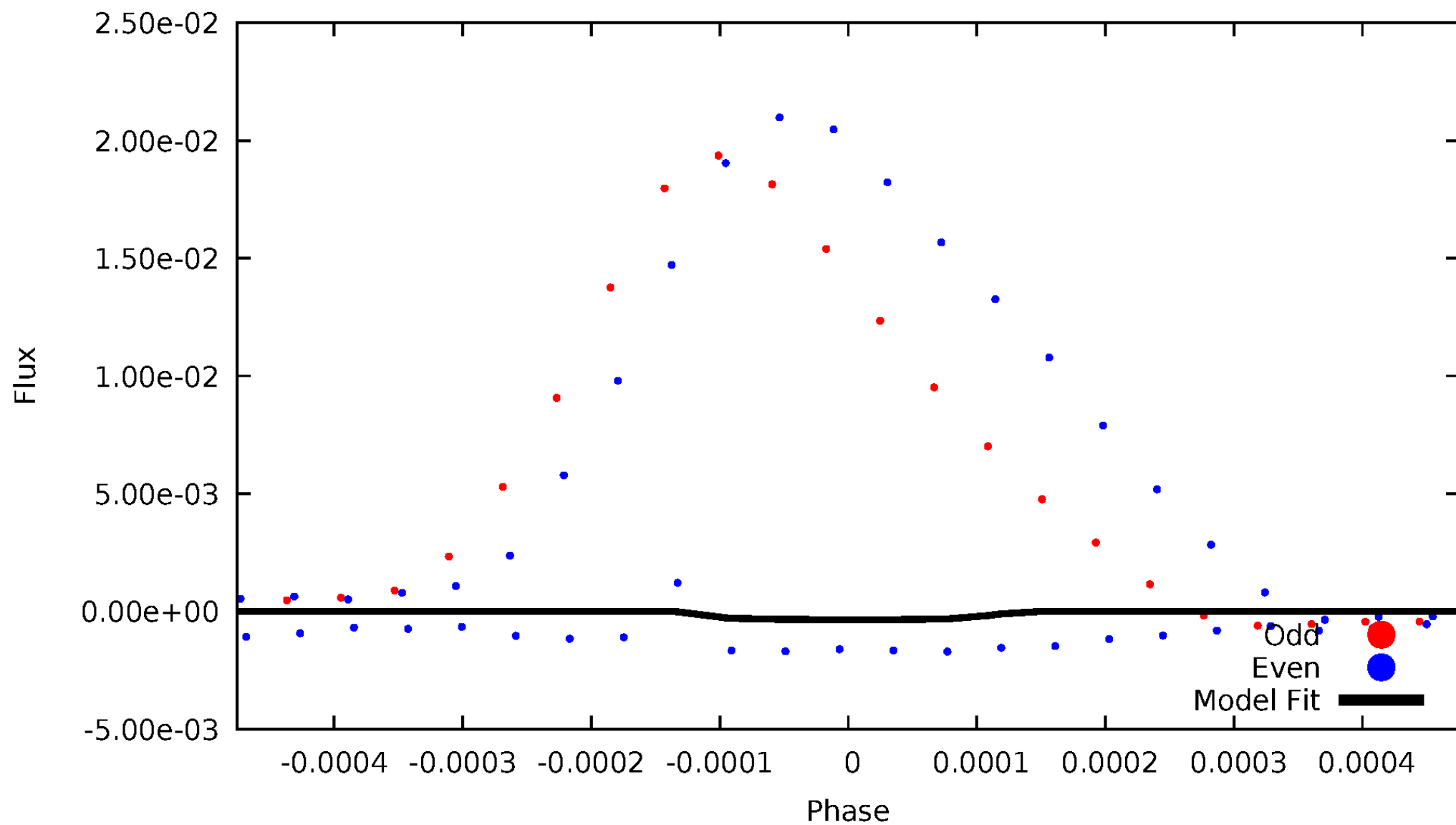


TCE 005021374-01



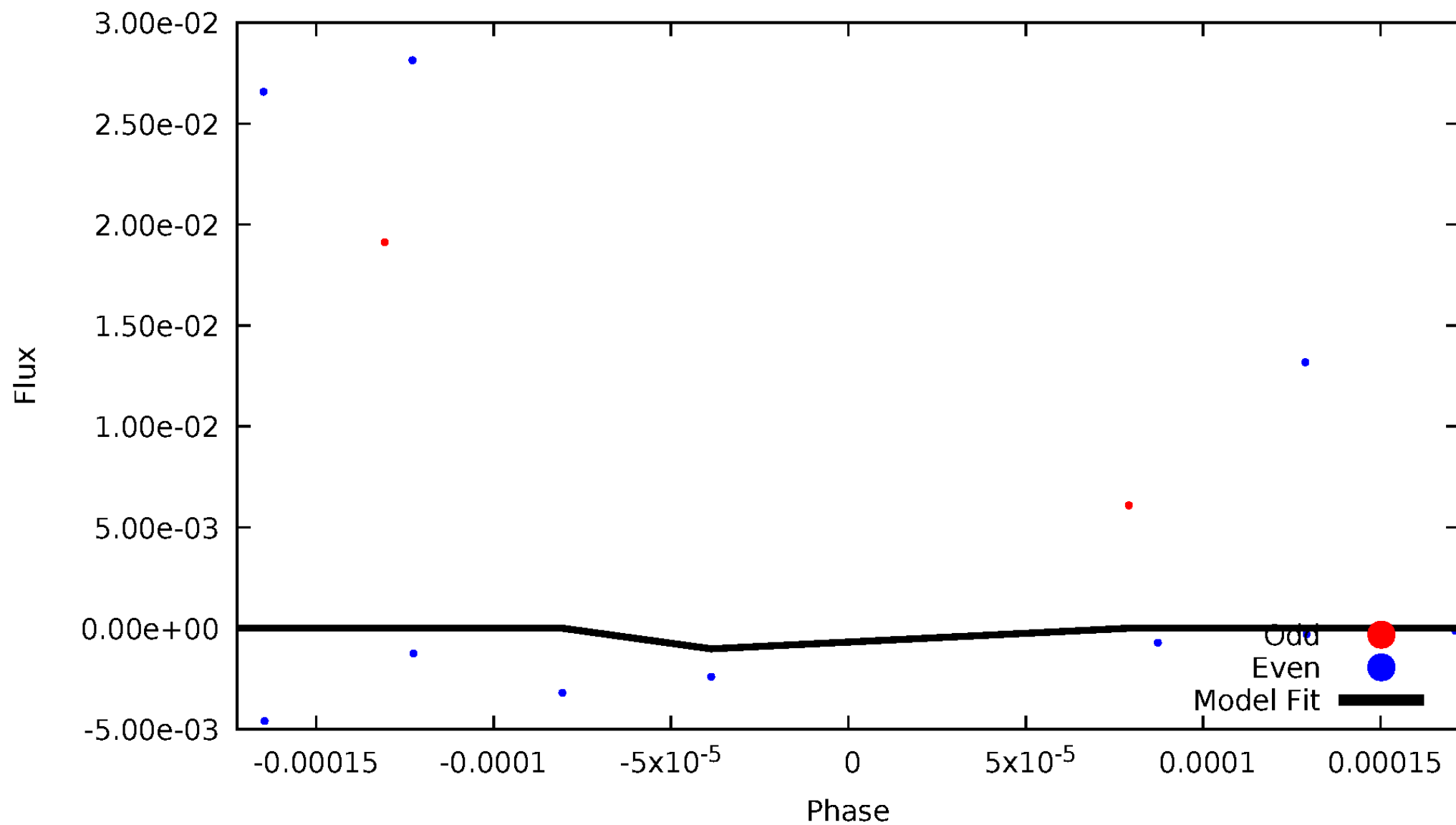
DV Odd/Even

TCE 005021374-01



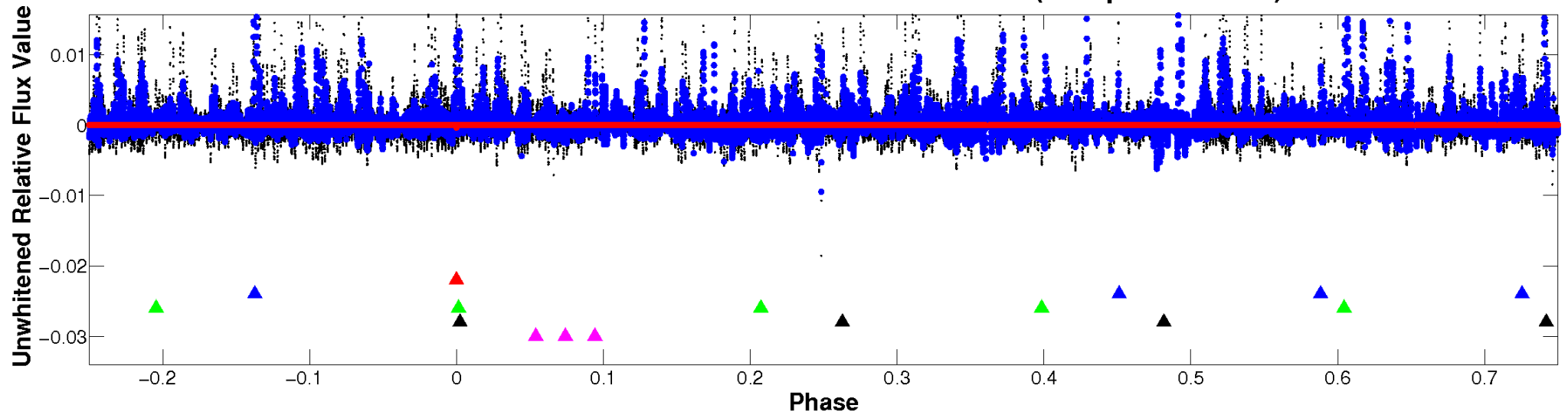
ALT Odd/Even

TCE 005021374-01

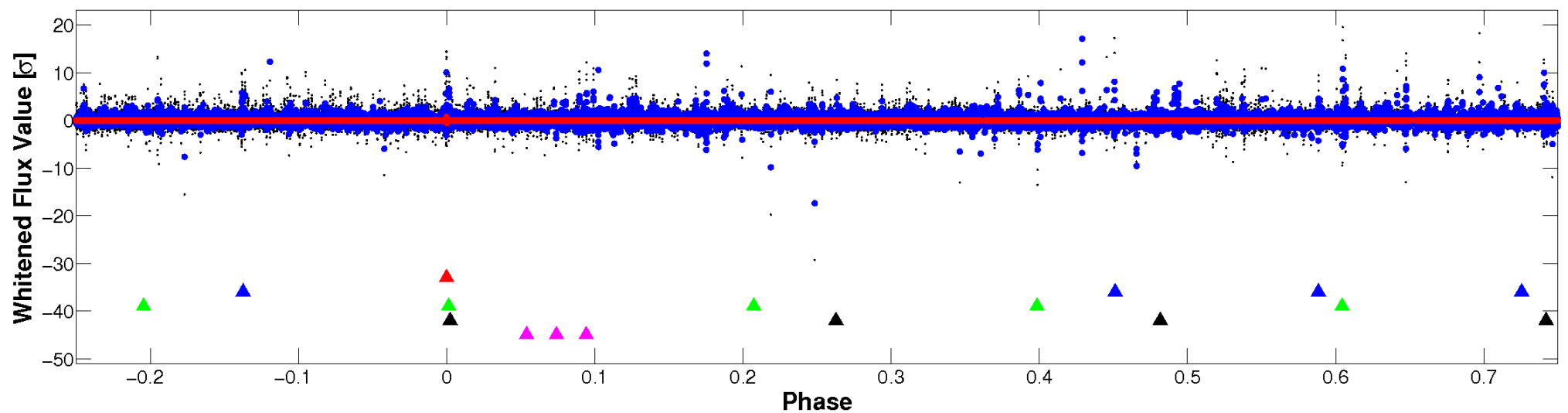


Non-Whitened Vs. Whitened Light Curve

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

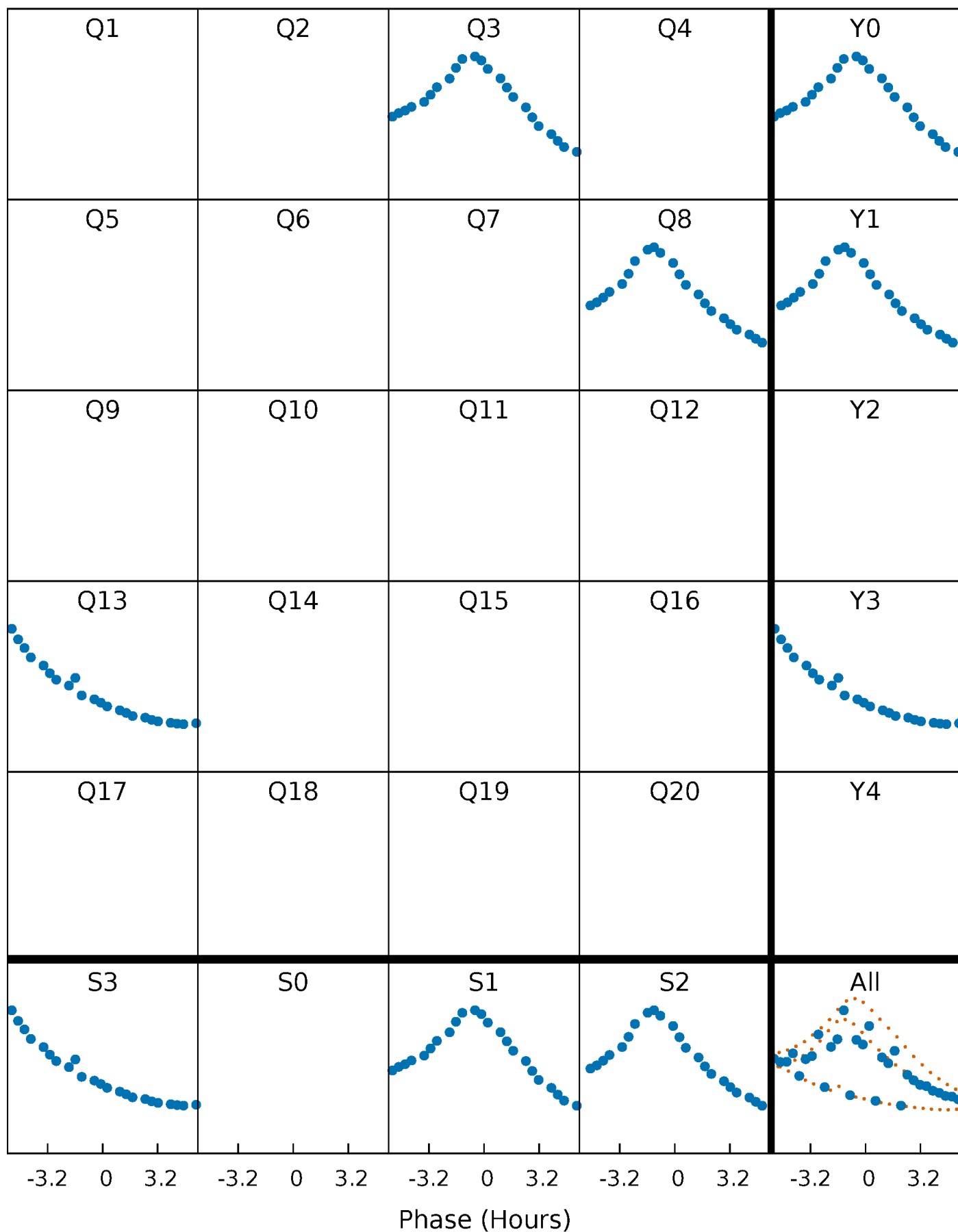


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



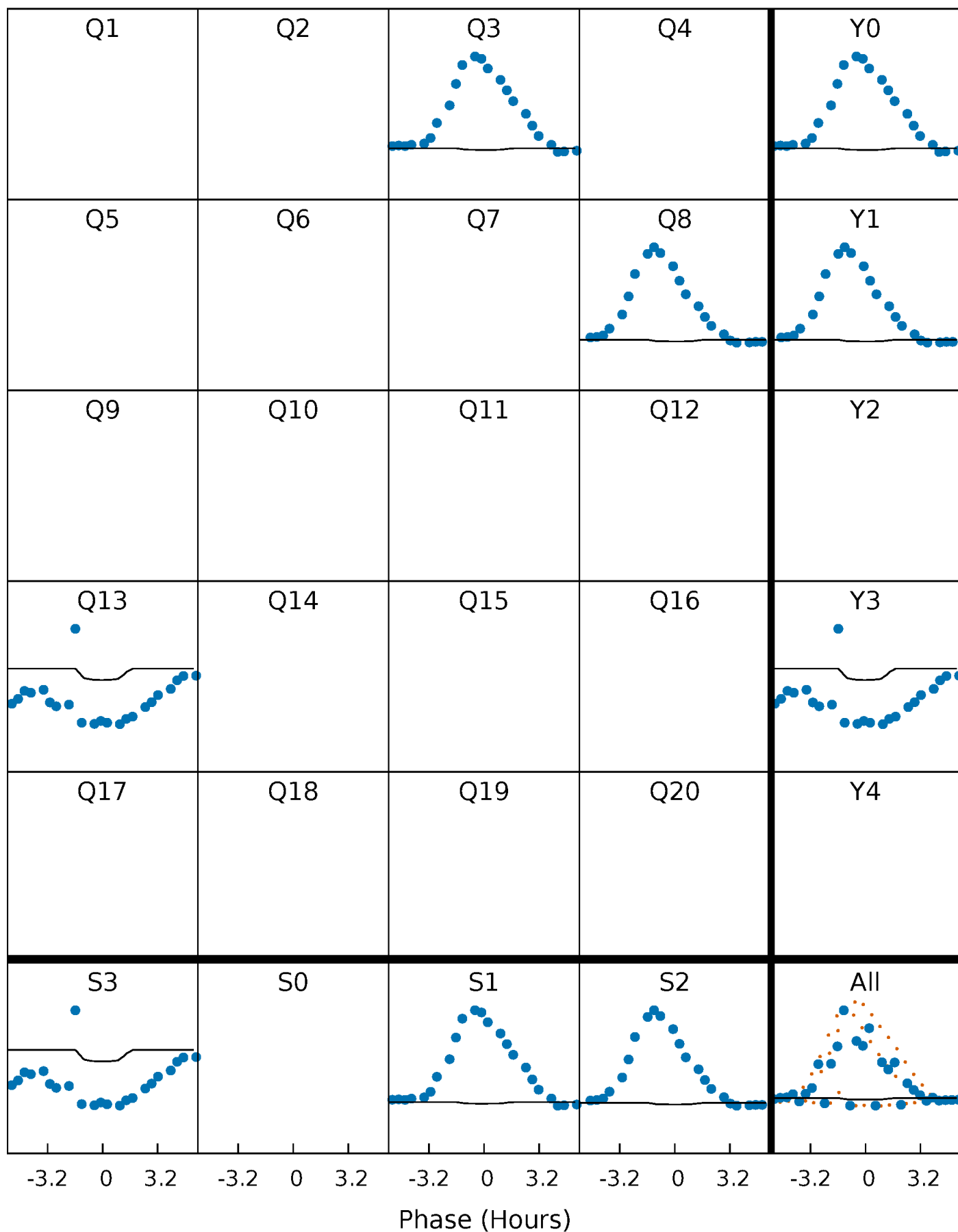
PDC Quarter-Phased Transit Curves

TCE 005021374-01 P=487.094165 Days $T_0=266.667169$ (BKJD)



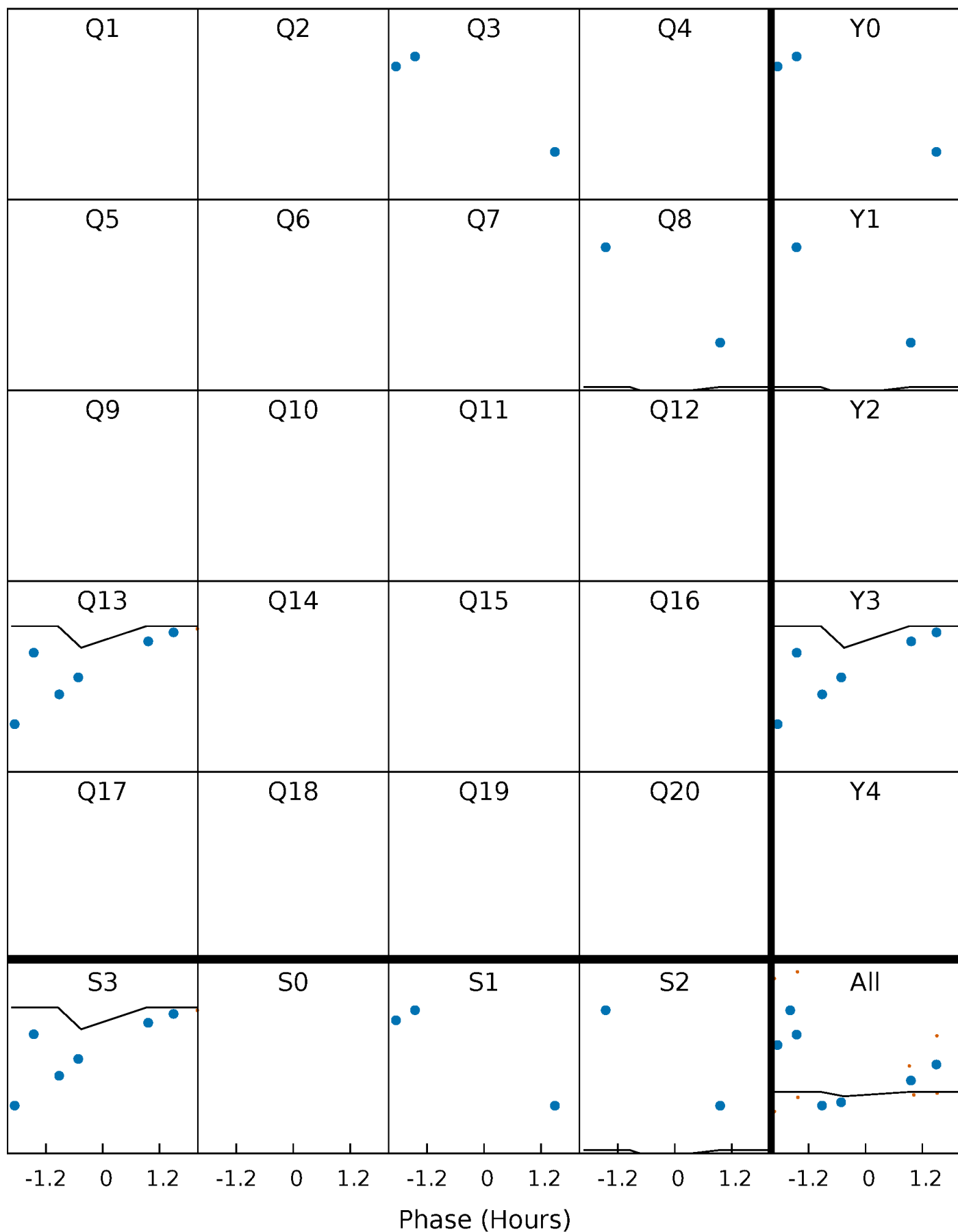
DV Quarter-Phased Transit Curves

TCE 005021374-01 P=487.094165 Days $T_0=266.667169$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

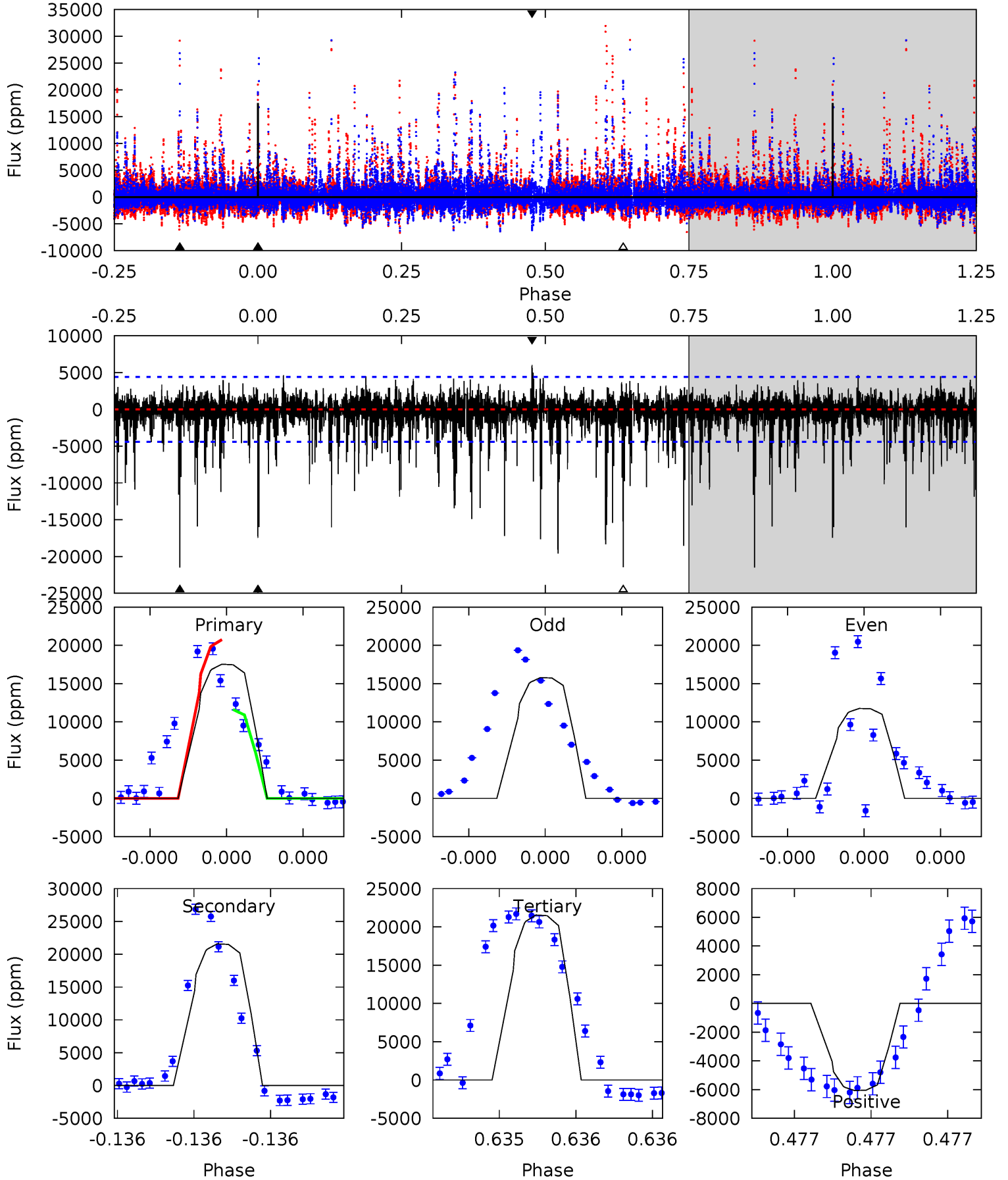
TCE 005021374-01 P=487.074770 Days $T_0=266.700972$ (BKJD)



DV Model-Shift Uniqueness Test

005021374-01, P = 487.094165 Days, E = 266.667169 Days

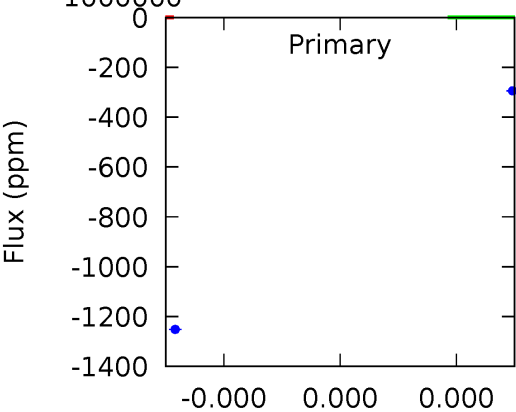
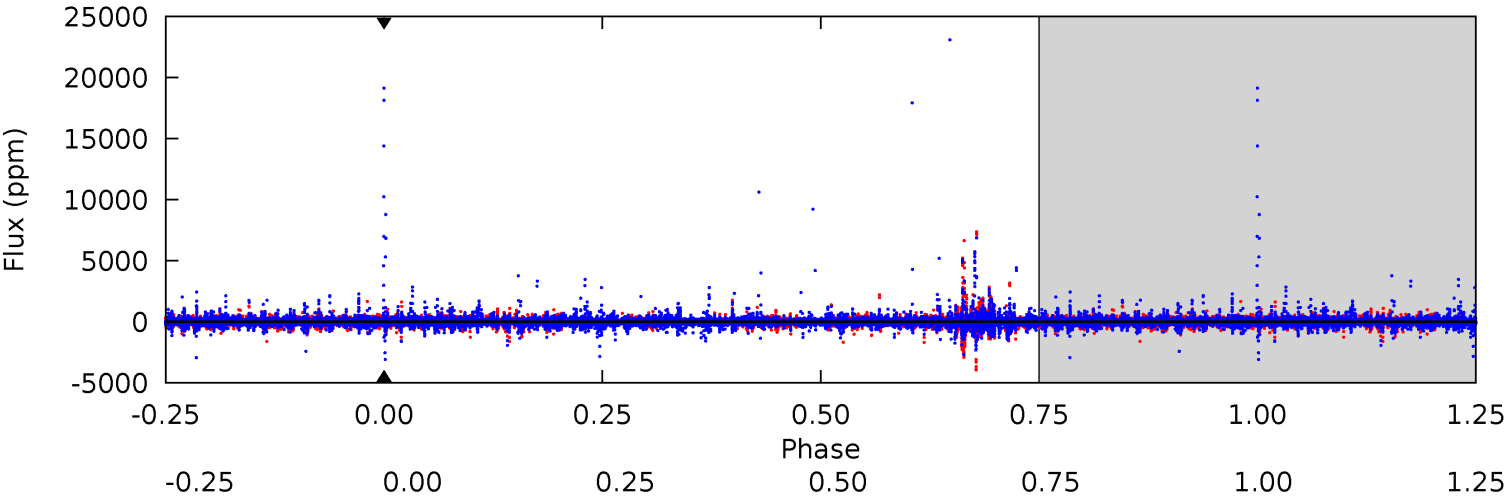
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|-----|
| 22.5 | 27.6 | 27.6 | 7.77 | 5.67 | 3.63 | 2.27 | -5.14 | 14.7 | 0.04 | 19.9 | 3.07 | 0.73 | 0.22 | 0 |



Alt Model-Shift Uniqueness Test

005021374-01, P = 487.074770 Days, E = 266.700972 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 |



Stellar Parameters For KIC 005021374

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 7109^{+175}_{-275} | $4.097^{+0.158}_{-0.175}$ | $-0.120^{+0.250}_{-0.350}$ | $1.796^{+0.539}_{-0.392}$ | $1.470^{+0.218}_{-0.239}$ | $0.358^{+0.333}_{-0.171}$ |
| | +2%/-4% | +4%/-4% | +208%/-292% | +30%/-22% | +15%/-16% | +93%/-48% |
| 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 005021374-01 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|------------------|---------------------------|----------------------|--------------------------|-------------------------------|
| DV | -21497 ± 778 | $12.60^{+13.52}_{-8.81}$ | 498^{+38}_{-30} | 12564^{+41941}_{-5056} | $137309^{+1412523}_{-104939}$ |
| Alt. | -0 ± 1000000 | $25.47^{+16.45}_{-13.94}$ | 499^{+37}_{-34} | 5363^{+12794}_{-18996} | $8625^{+307247}_{-188882}$ |

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

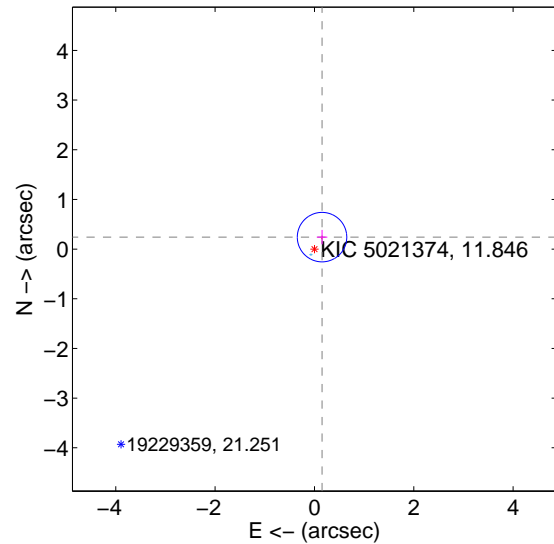
Supplemental centroid analysis for 005021374-01. **Kepler magnitude: 11.85.** Transit SNR 1.69

There are 1 quarters with good PRF difference image offsets

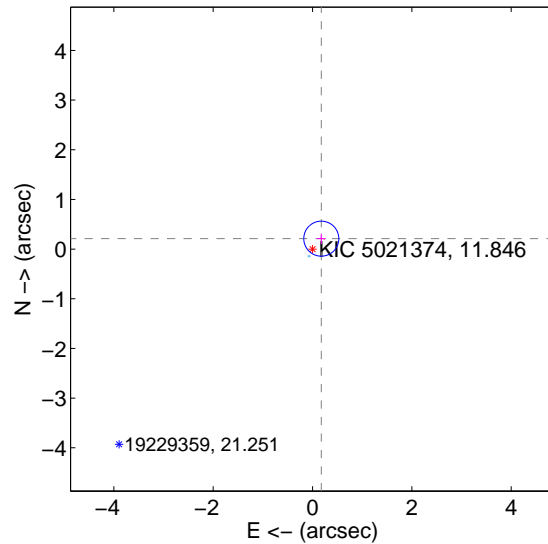
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT | 0.285 ± 0.166 | 1.72 | -0.153 ± 0.105 | 0.241 ± 0.145 |
| PRF-fit source offset from KIC position | 0.274 ± 0.117 | 2.34 | -0.176 ± 0.090 | 0.210 ± 0.102 |
| photometric centroid source offset | 0.94 ± 1.04 | 0.90 | 0.79 ± 1.01 | -0.51 ± 1.11 |

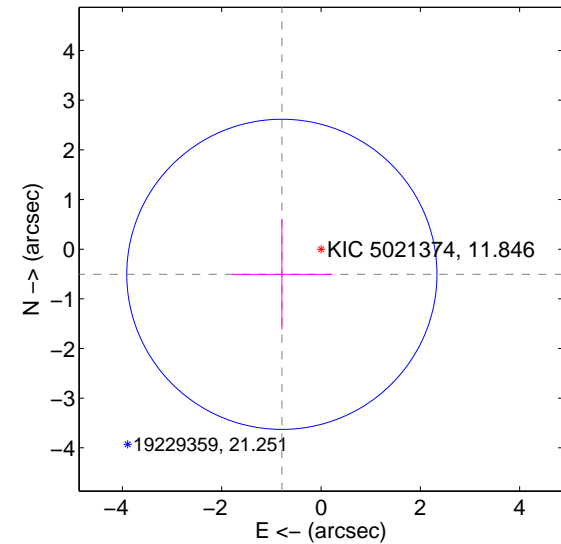
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

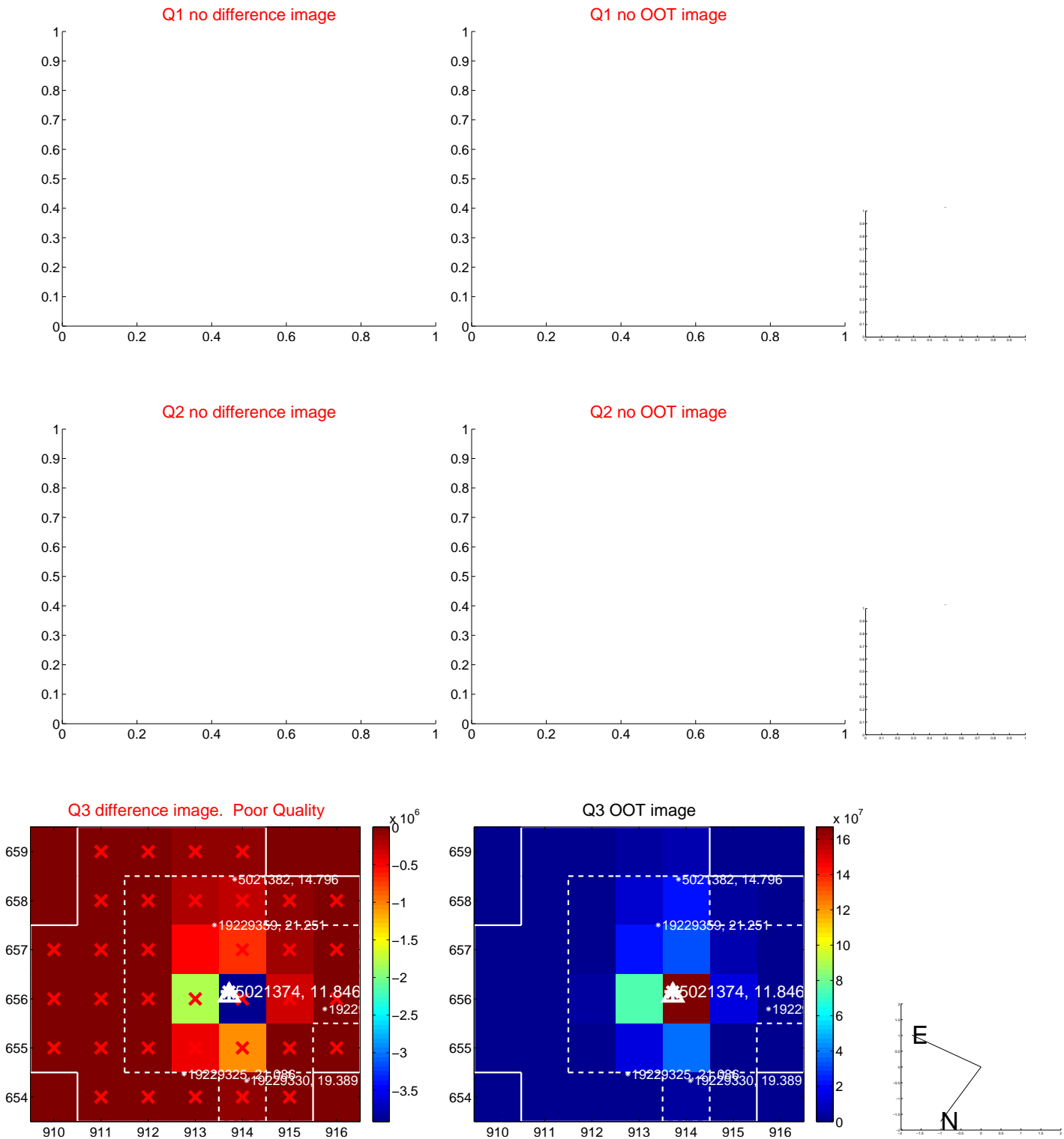


offset from photometric centroids



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

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



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

Q5 no difference image



Q5 no OOT image



Q6 no difference image



Q6 no OOT image



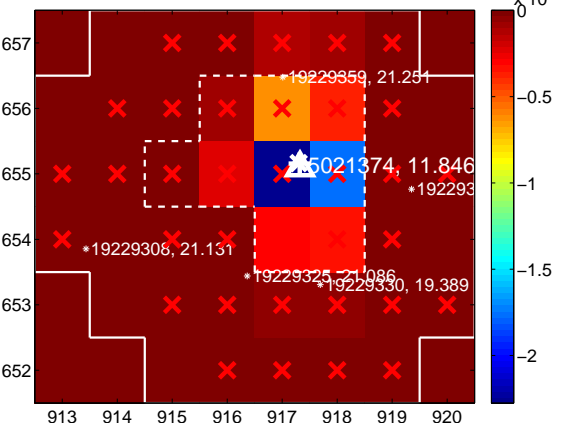
Q7 no difference image



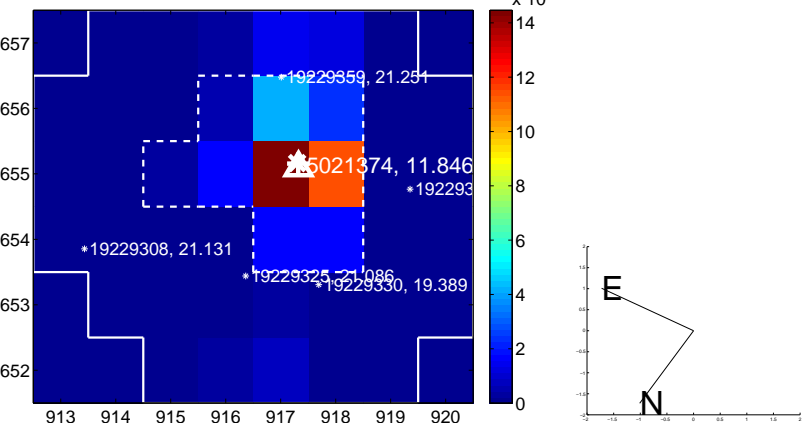
Q7 no OOT image



Q8 difference image. Poor Quality



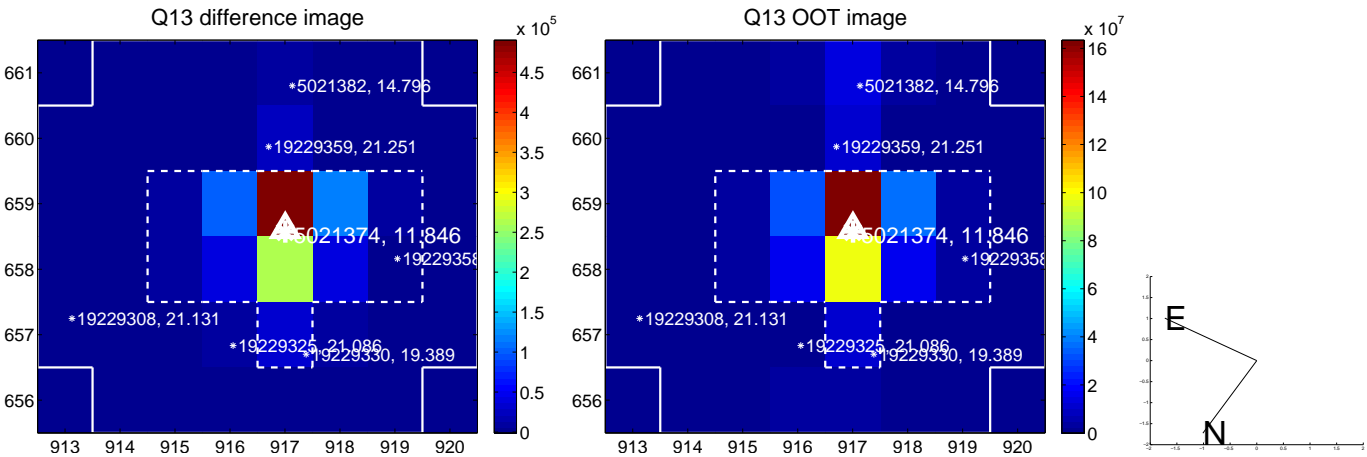
Q8 OOT image



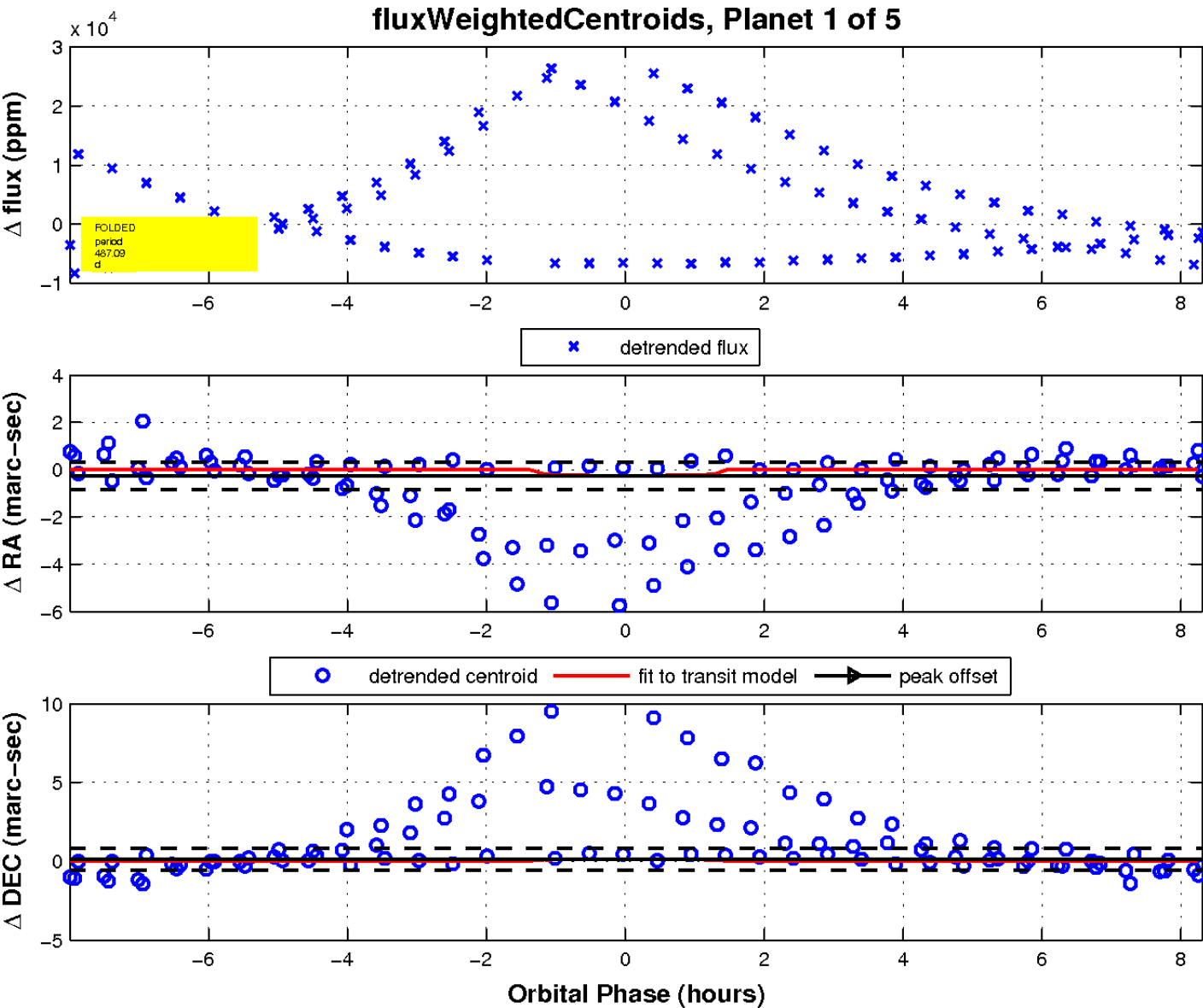
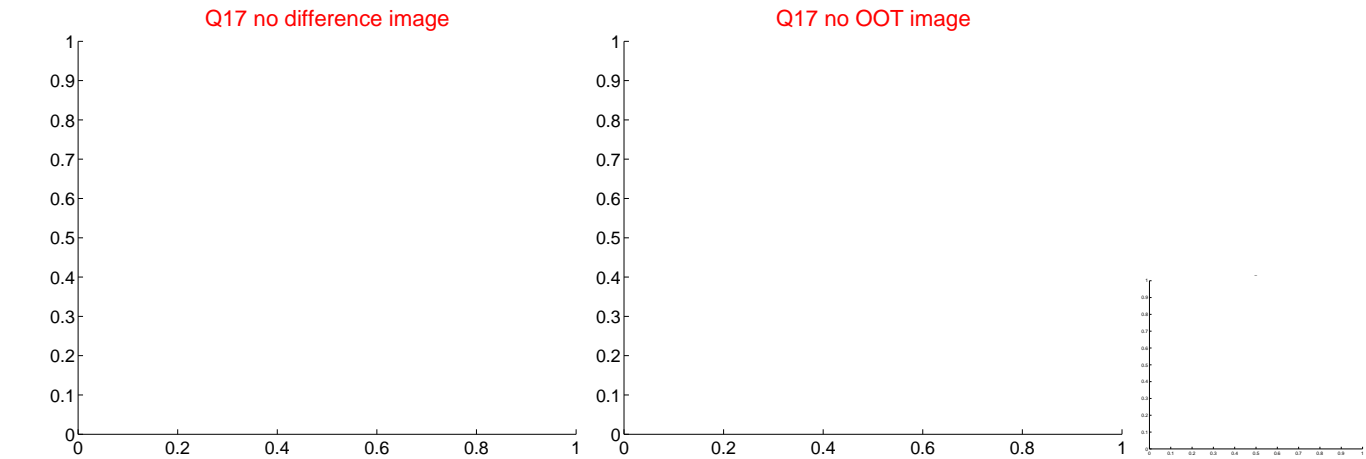
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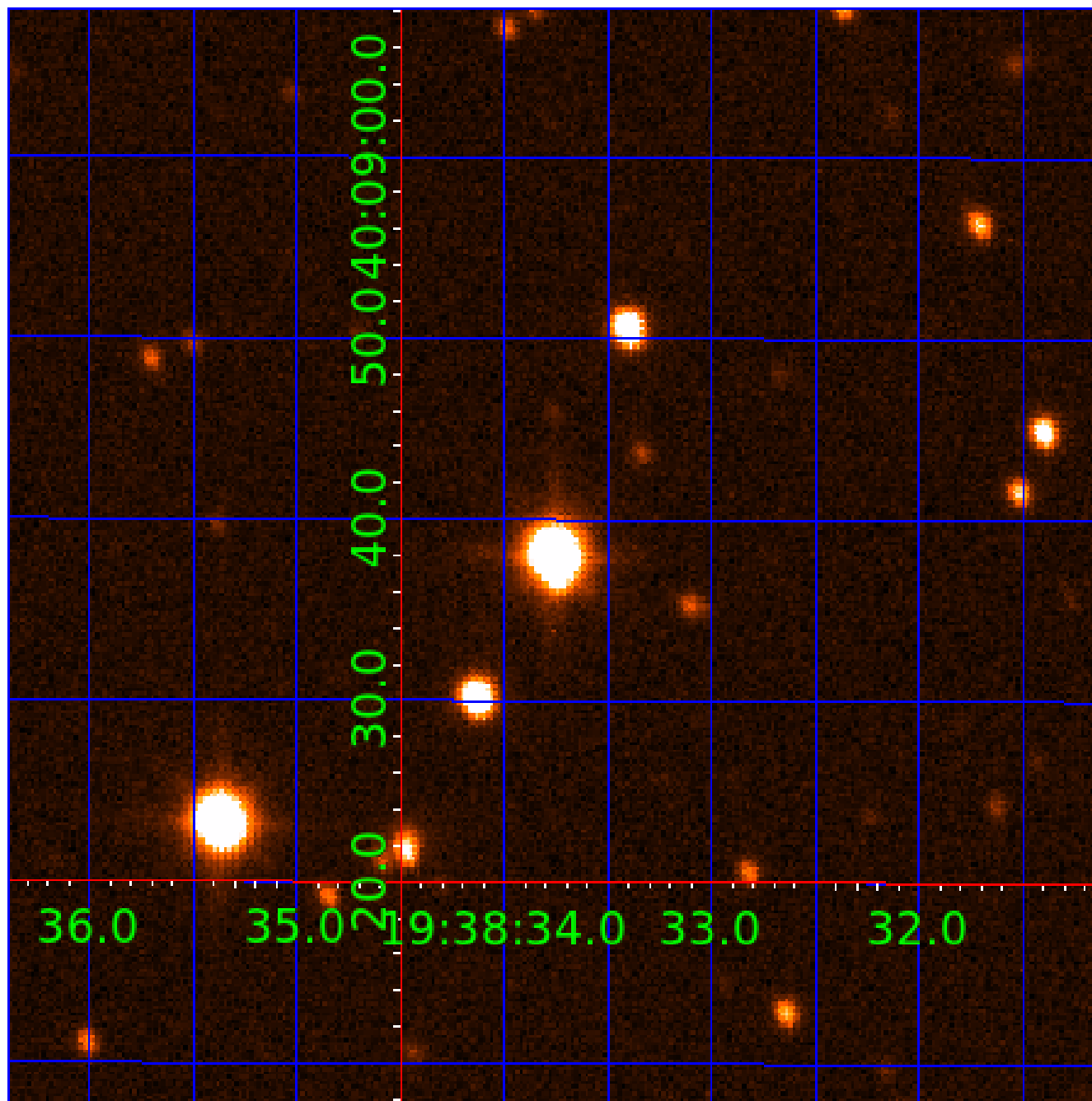


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UKIRT Image

Declination



KIC 005021374

Q1-17 DR25 TCE Parameters

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| 005021374-05 | OBS | No | 477.293906 | 312.586391 | 291.3 | 4.500 | 17.8 | -1.0 | 1.80 | 7109 | 3.10 | 3.99 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
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| 005021374-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS |
| 005021374-03 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_ALT—INCONSISTENT_TRANS |
| 005021374-04 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS |
| 005021374-05 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS |

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

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

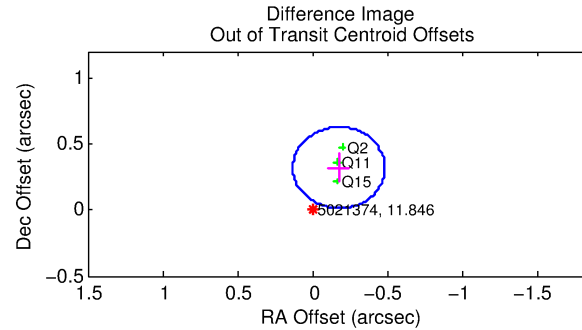
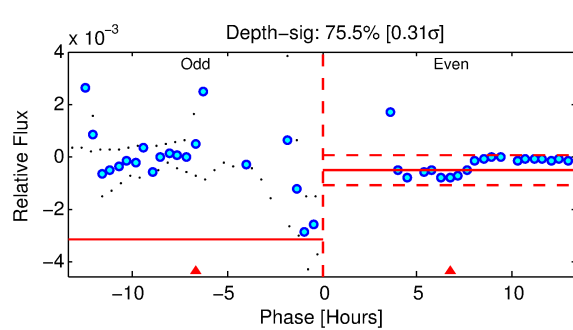
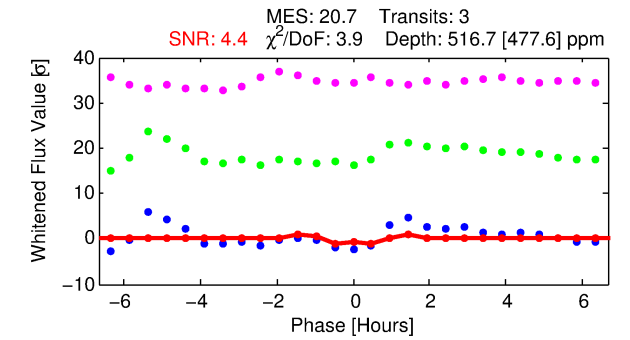
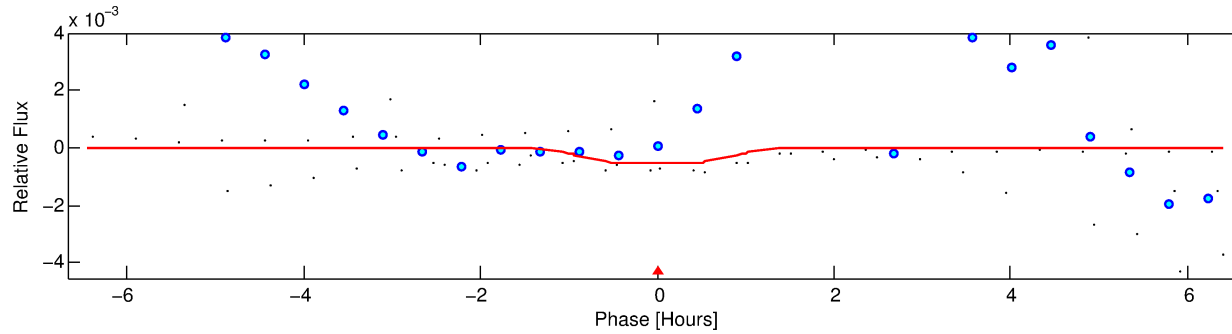
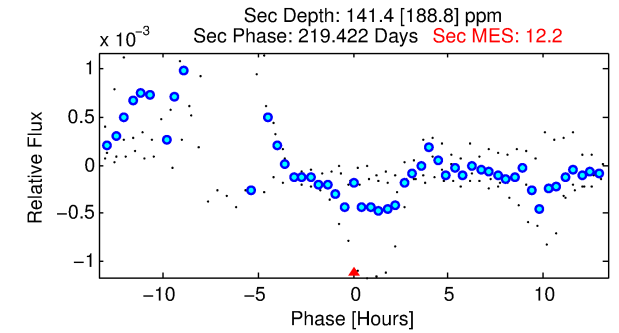
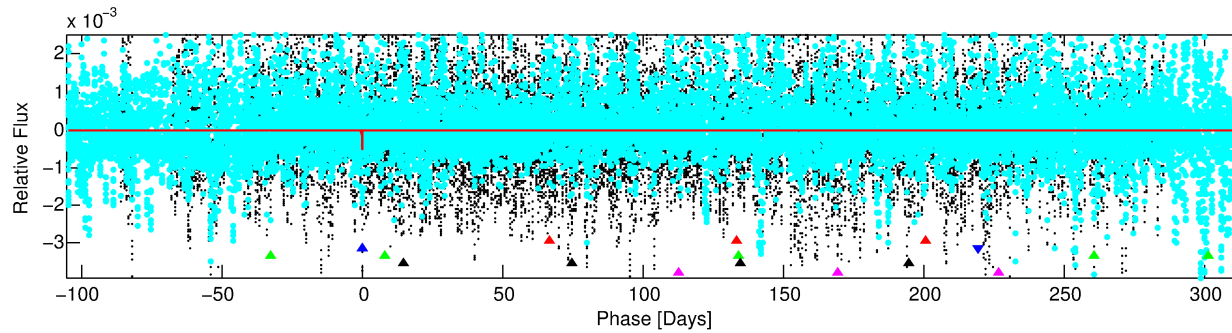
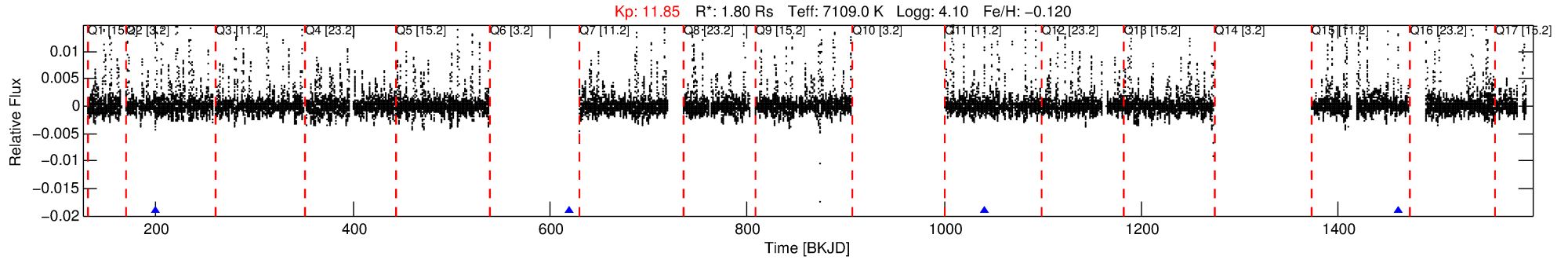
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005021374-02

No Significant Match Found

DV One-Page Summary

KIC: 5021374 Candidate: 2 of 5 Period: 420.278 d



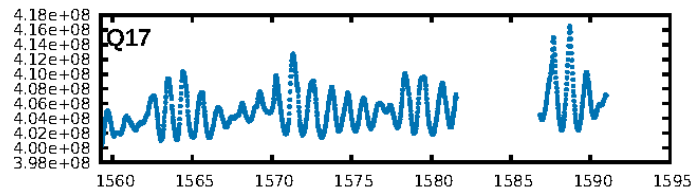
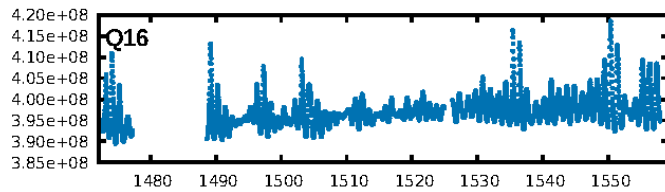
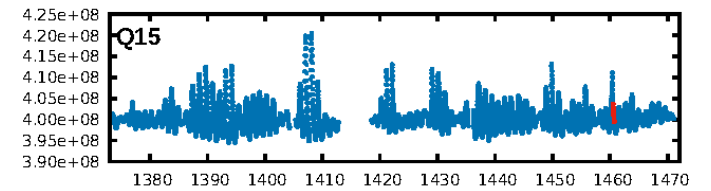
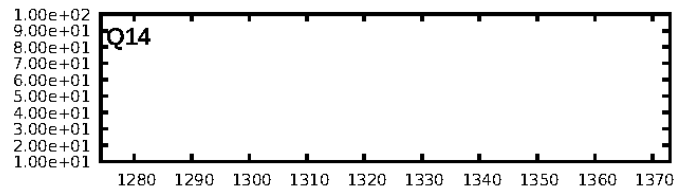
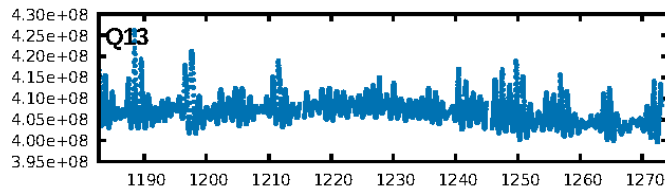
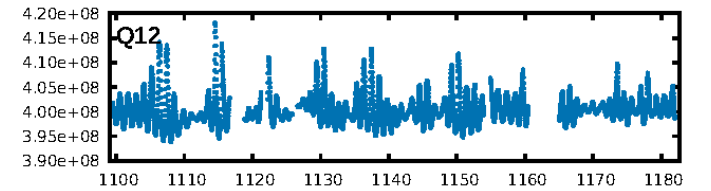
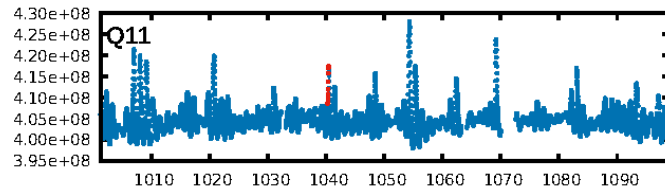
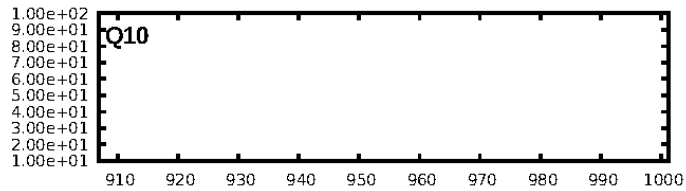
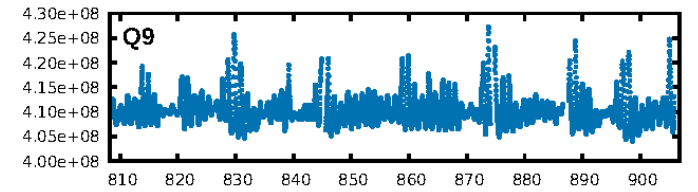
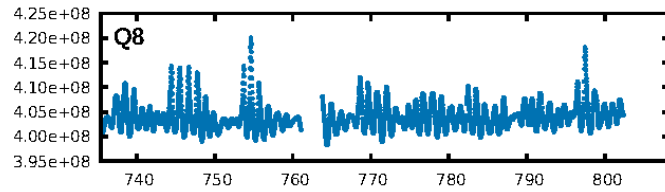
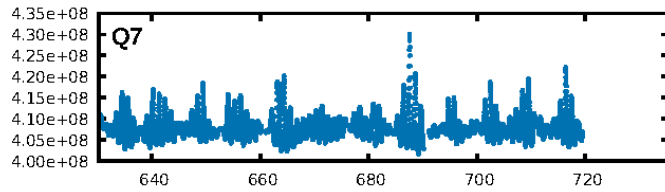
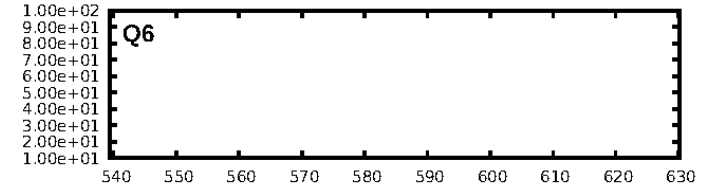
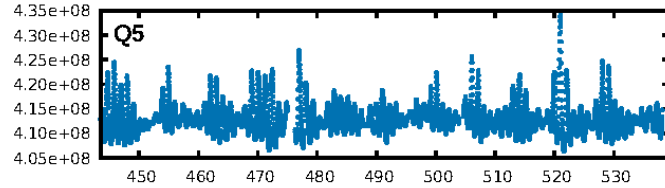
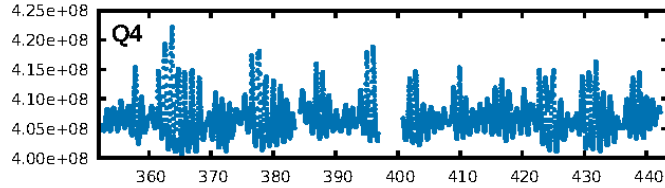
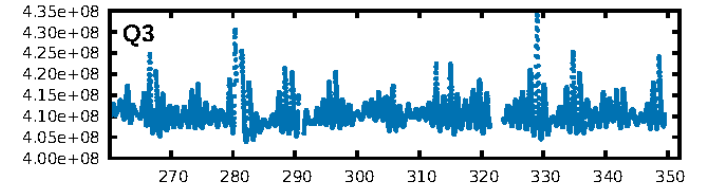
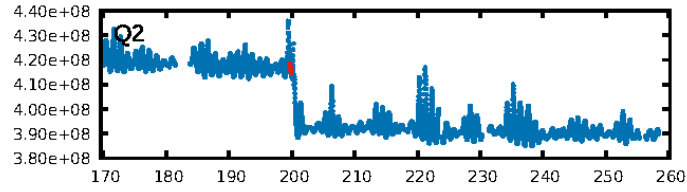
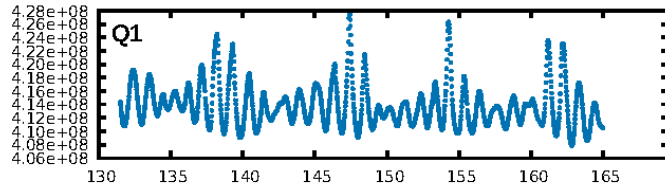
DV Fit Results:

Period = 420.27848 [0.01648] d
Epoch = 199.8020 [0.0348] BKJD
Rp/R* = 0.0246 [0.1387]
a/R* = 652.98 [22599.56]
b = 0.92 [5.92]
Seff = 4.73 [1.75]
Teq = 376 [35] K
Rp = 4.82 [27.21] Re
a = 1.2491 [0.3010] AU
Ag = 5216.10 [59205.21] [0.09σ]
Teff = 4941 [14017] K [0.33σ]

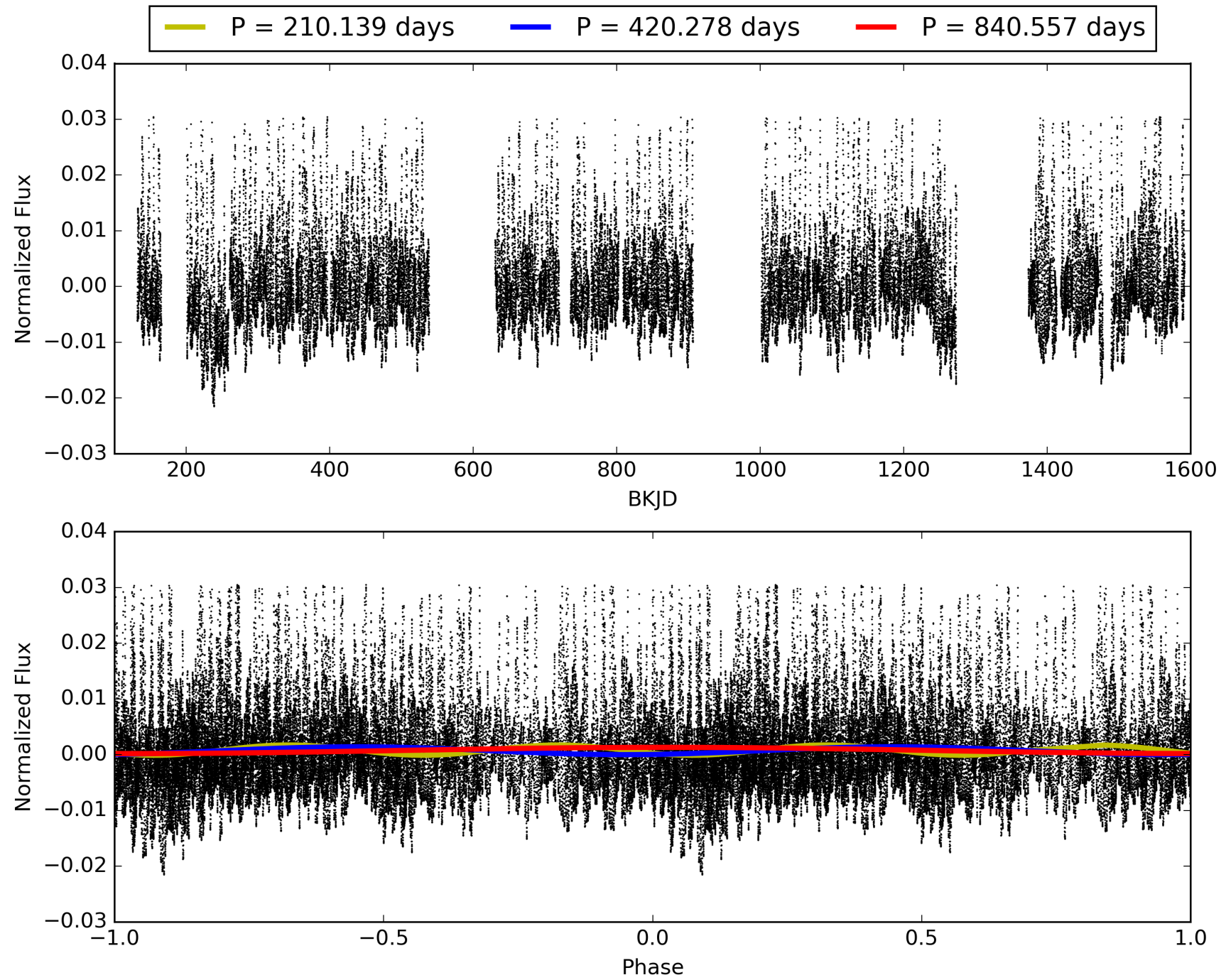
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [87.63σ]
LongPeriod-sig: 100.0% [272.56σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 2.7%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 0.412
Centroid-sig: 5.9%
Centroid-so: 1.458 arcsec [1.49σ]
OotOffset-rm: 0.365 arcsec [3.57σ]
KicOffset-rm: 0.376 arcsec [2.88σ]
OotOffset-st: 1/2/0/0 [3]
KicOffset-st: 1/2/0/0 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

TCE 005021374-02, PDC Light Curves

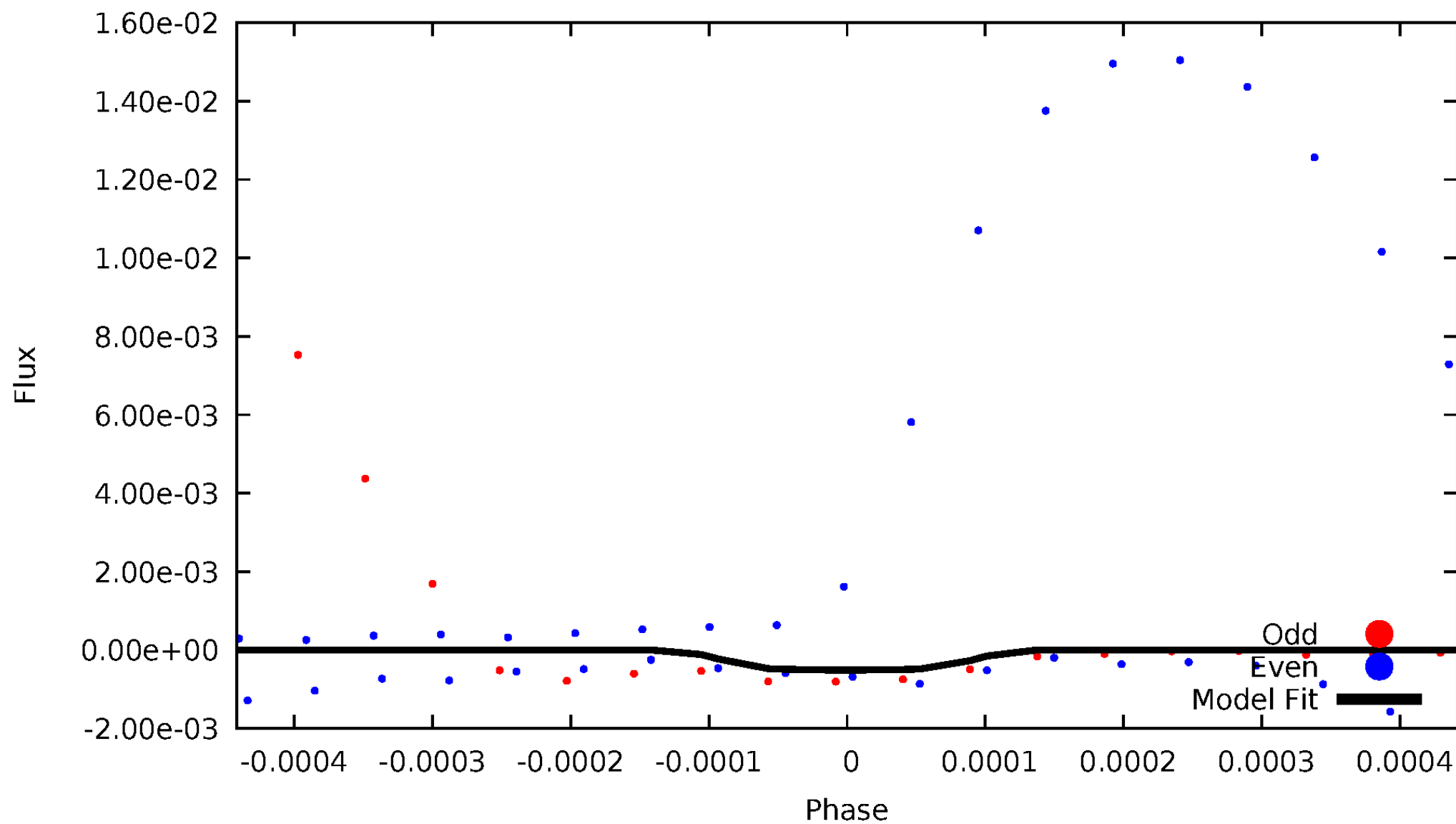


TCE 005021374-02



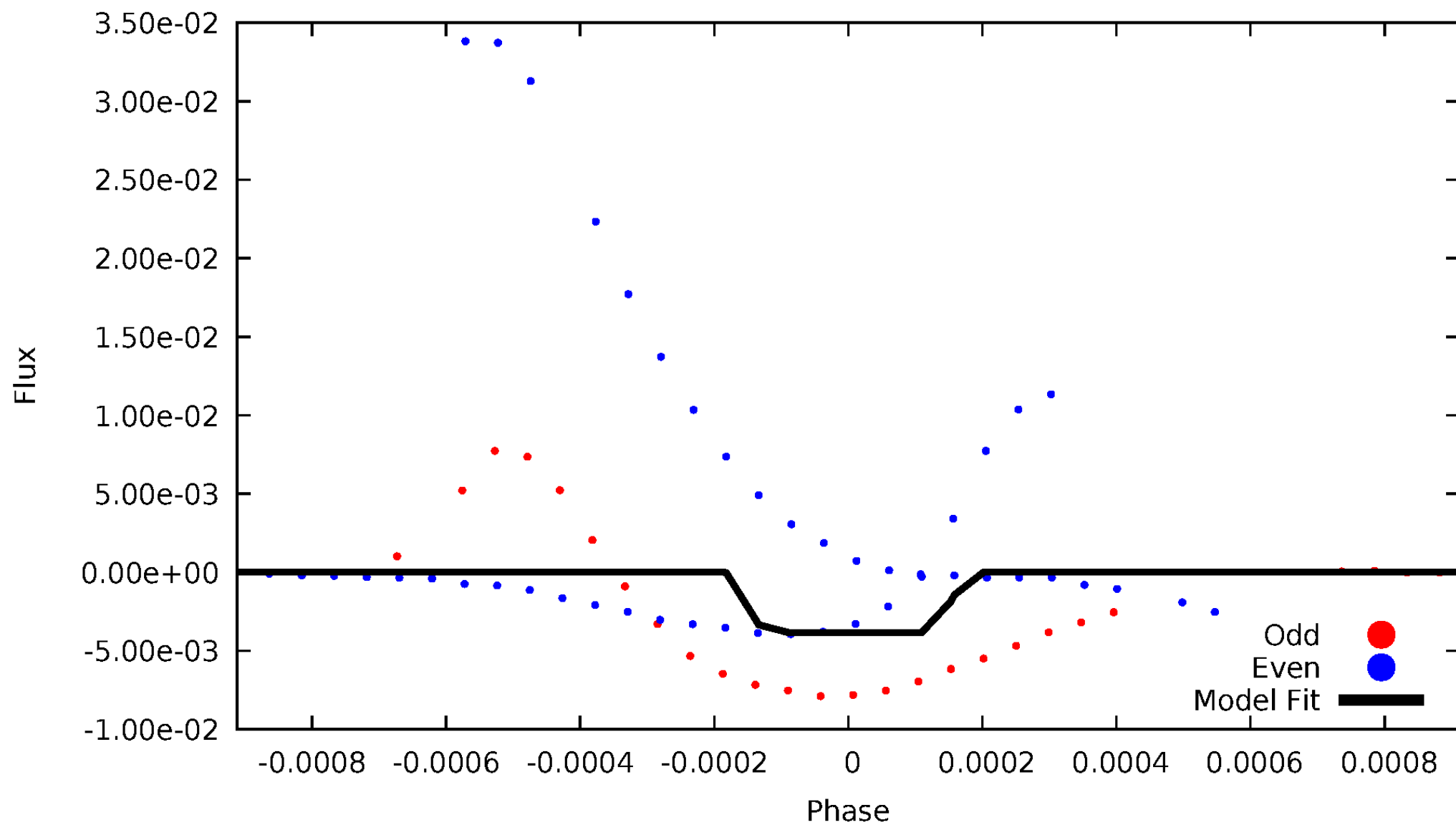
DV Odd/Even

TCE 005021374-02



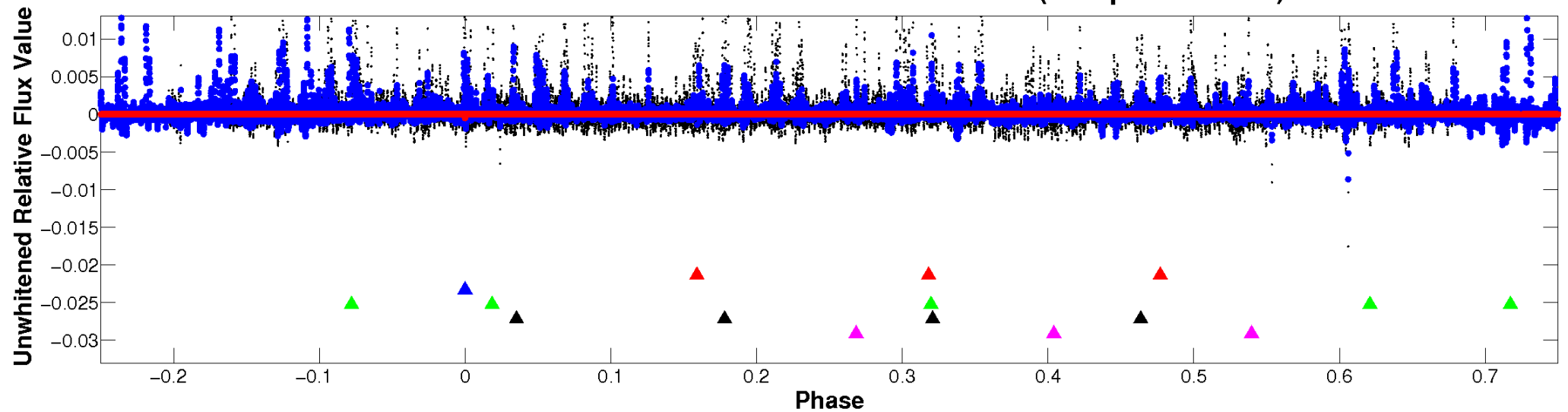
ALT Odd/Even

TCE 005021374-02

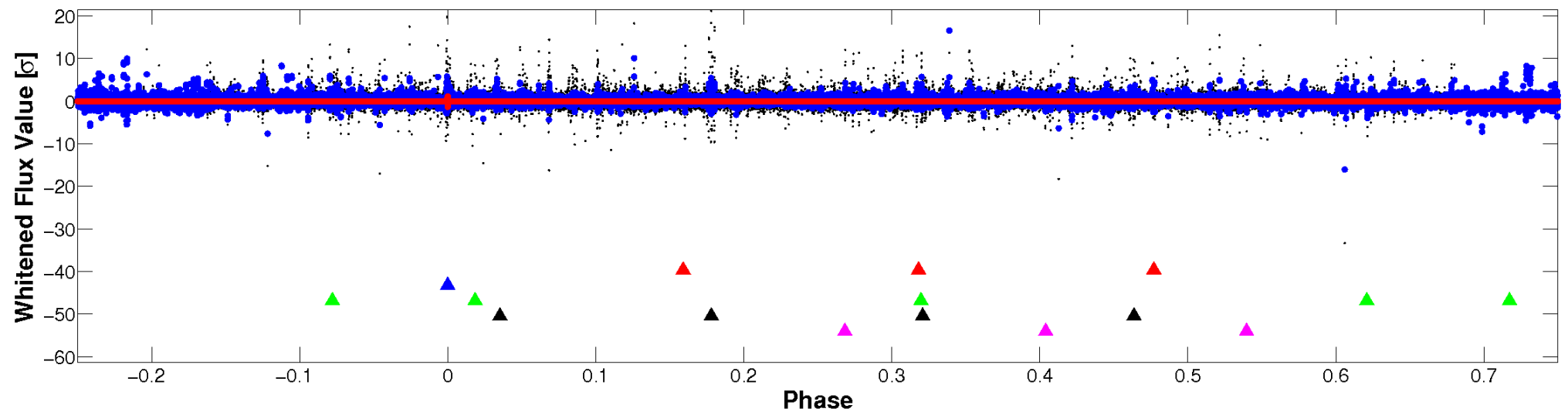


Non-Whitened Vs. Whitened Light Curve

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

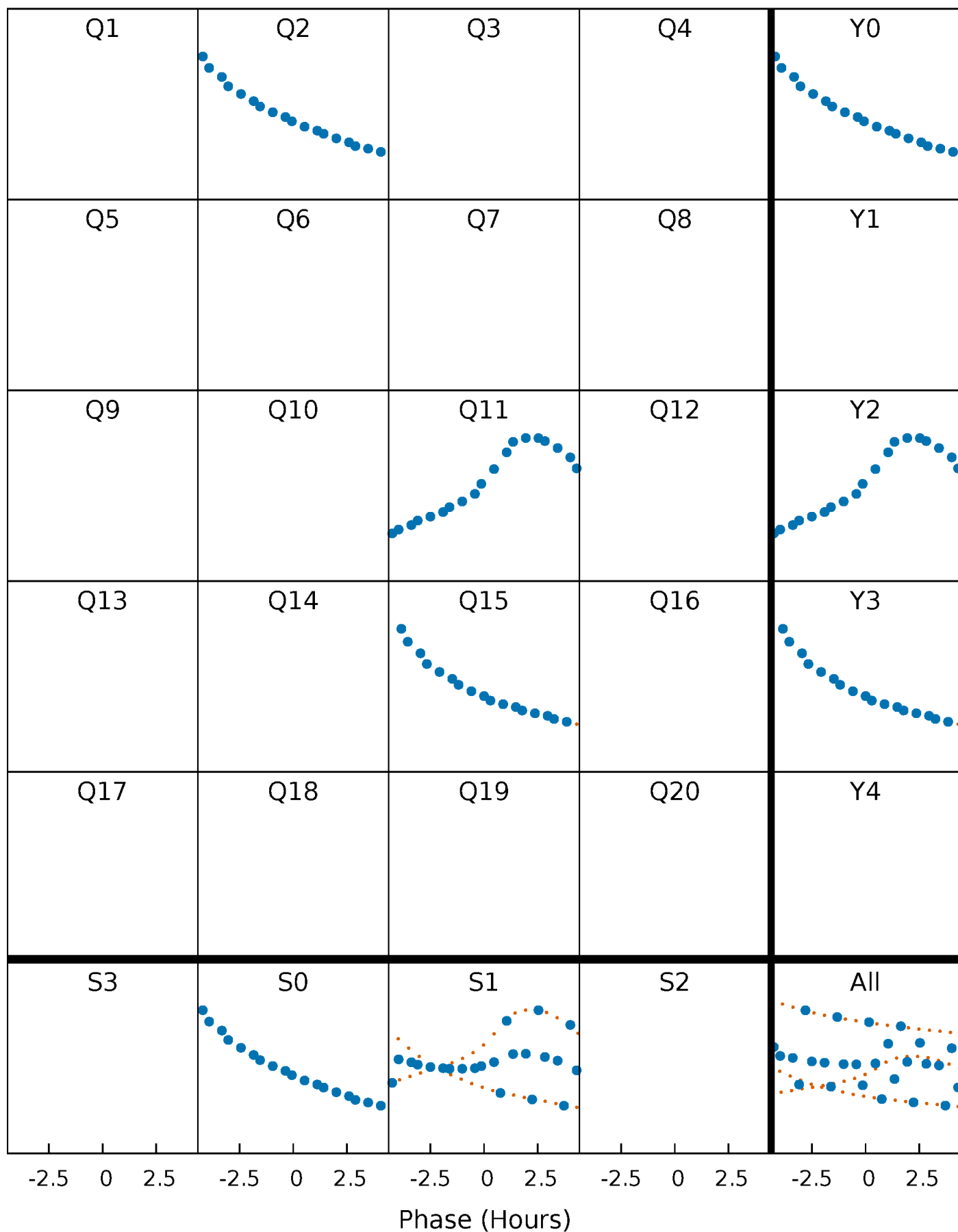


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



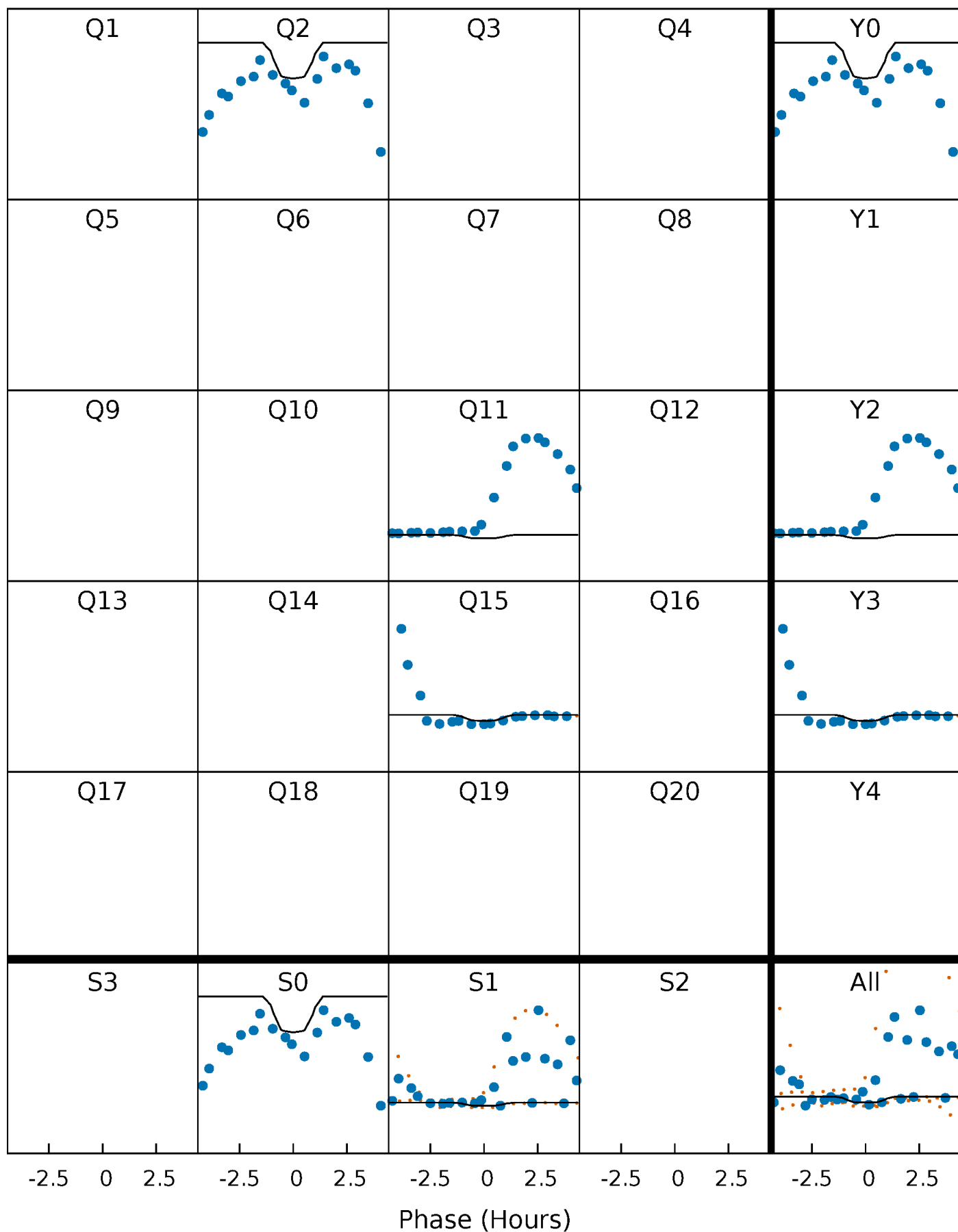
PDC Quarter-Phased Transit Curves

TCE 005021374-02 P=420.278477 Days $T_0=199.802000$ (BKJD)



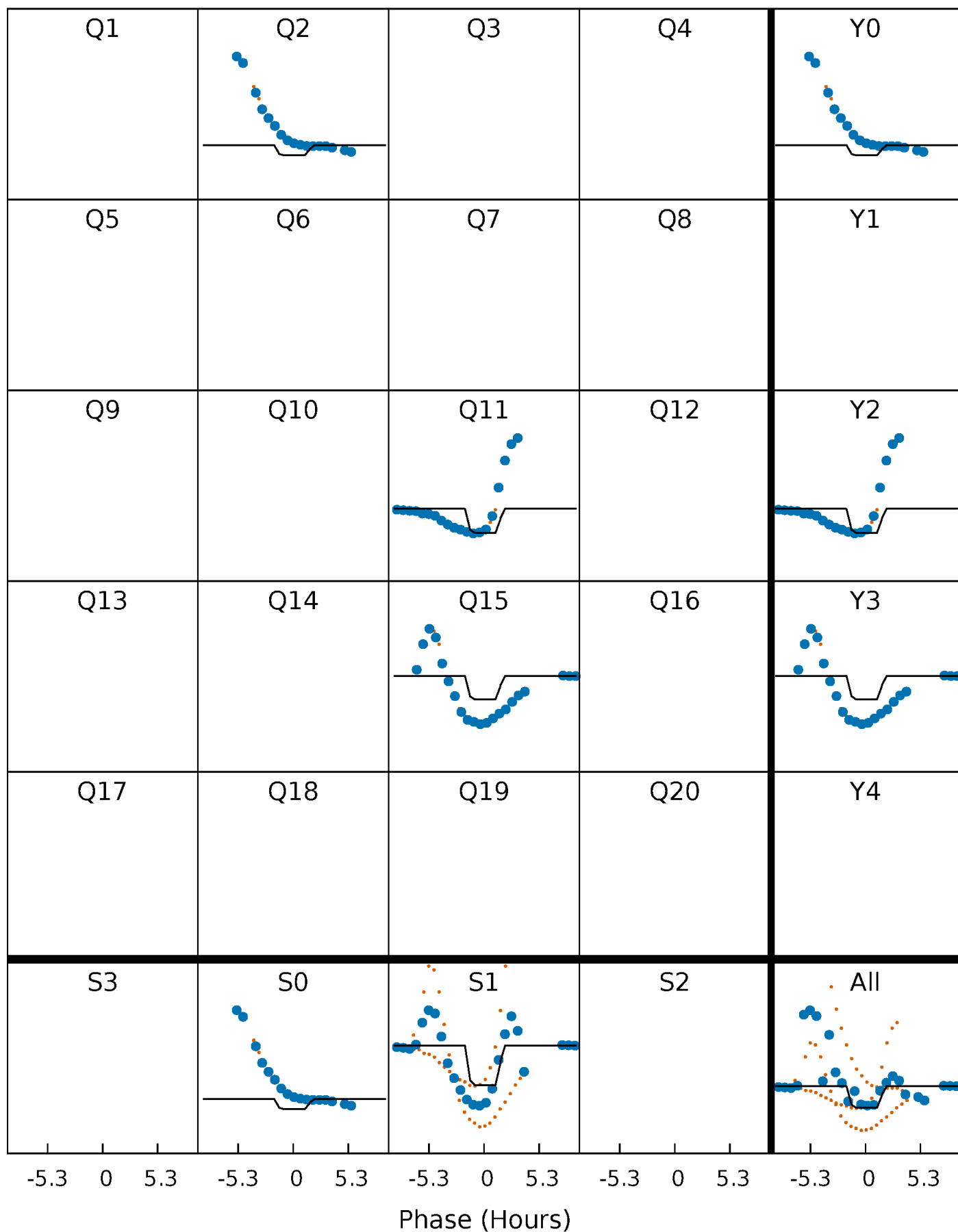
DV Quarter-Phased Transit Curves

TCE 005021374-02 P=420.278477 Days $T_0=199.802000$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

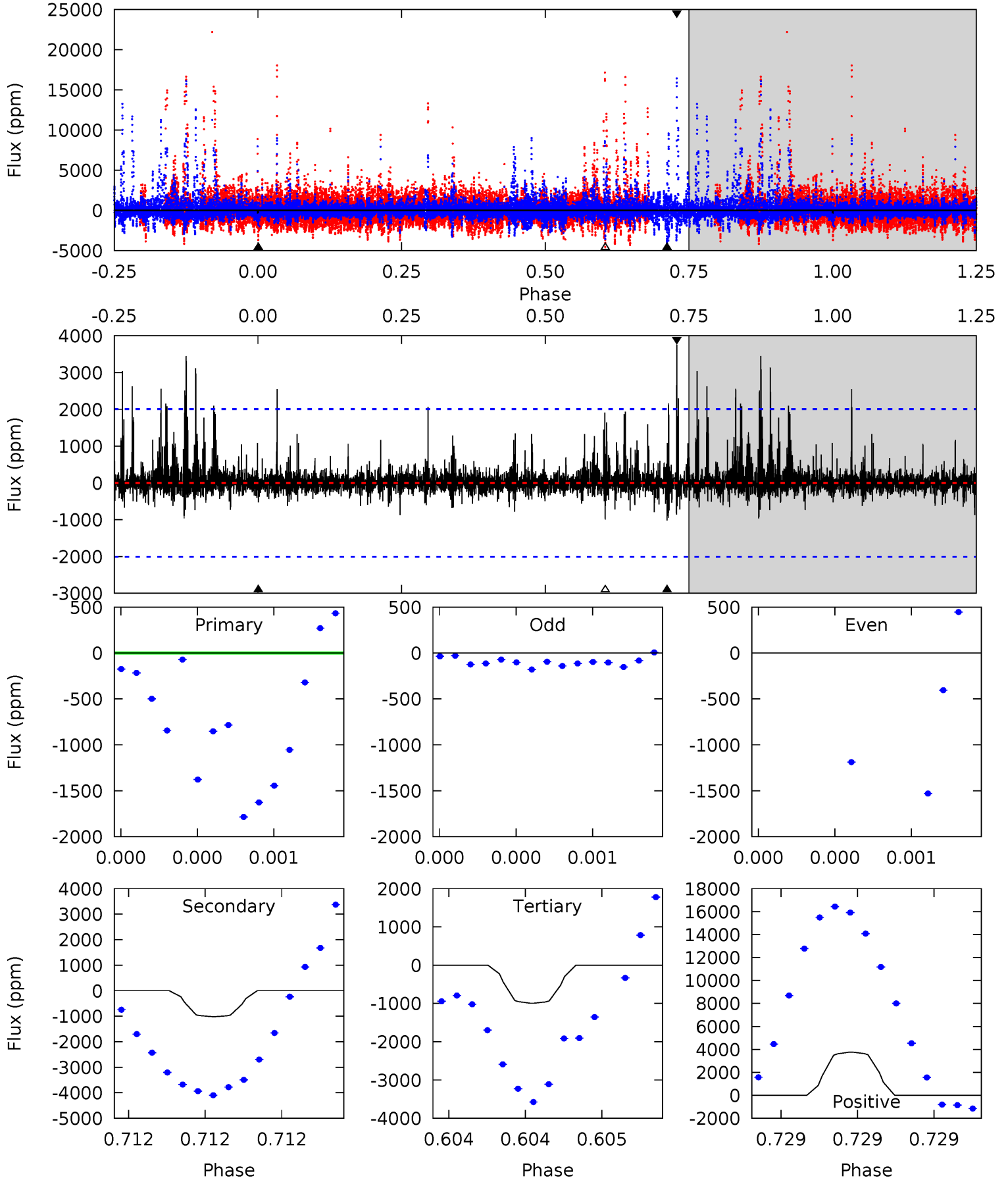
TCE 005021374-02 P=420.318329 Days $T_0=199.675946$ (BKJD)



DV Model-Shift Uniqueness Test

005021374-02, P = 420.278477 Days, E = 199.802000 Days

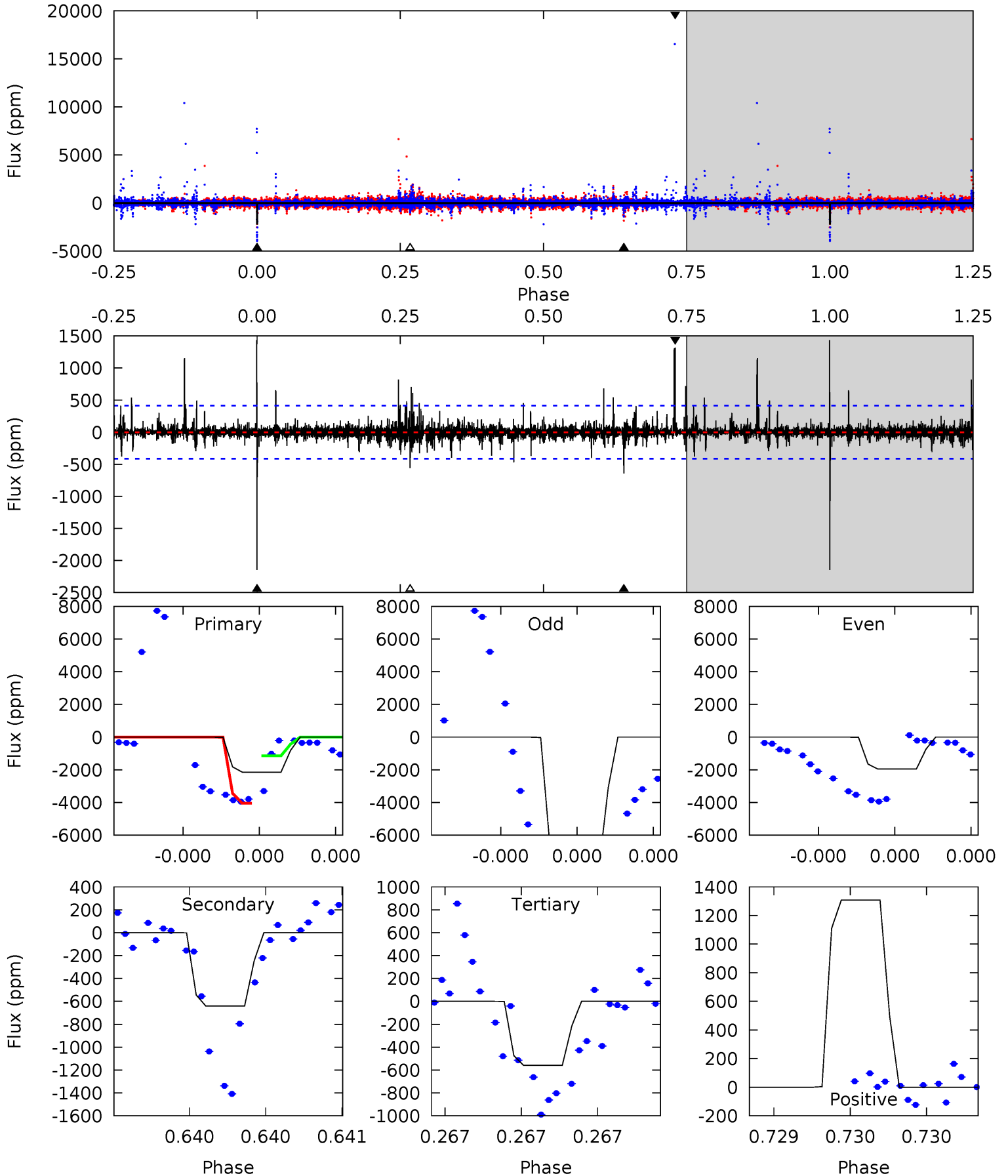
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|-------|-------|------|
| 0.93 | 2.89 | 2.82 | 10.7 | 5.70 | 3.67 | 0.73 | -1.89 | -9.73 | 0.07 | -7.77 | 0.82 | -1.01 | 0.79 | 1.14 |



Alt Model-Shift Uniqueness Test

005021374-02, P = 420.318329 Days, E = 199.675946 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|-----|
| 29.1 | 8.69 | 7.58 | 17.7 | 5.62 | 3.55 | 0.95 | 21.5 | 11.4 | 1.11 | -9.04 | 29.0 | 1.14 | 0.40 | 0 |



Stellar Parameters For KIC 005021374

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 7109^{+175}_{-275} | $4.097^{+0.158}_{-0.175}$ | $-0.120^{+0.250}_{-0.350}$ | $1.796^{+0.539}_{-0.392}$ | $1.470^{+0.218}_{-0.239}$ | $0.358^{+0.333}_{-0.171}$ |
| | +2%/-4% | +4%/-4% | +208%/-292% | +30%/-22% | +15%/-16% | +93%/-48% |
| 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 005021374-02 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{max} (K)$ | $T_{obs} (K)$ | A_{obs} |
|---------|-----------------|---------------------------|-------------------|-----------------------|-------------------------|
| DV | -1018 ± 352 | $20.89^{+21.36}_{-14.71}$ | 523^{+37}_{-35} | 4083^{+2774}_{-881} | 1891^{+20183}_{-1467} |
| Alt. | -641 ± 74 | $23.76^{+22.27}_{-16.63}$ | 525^{+36}_{-36} | 3660^{+2161}_{-693} | 993^{+8827}_{-746} |

T_{max} = Theoretical Maximum Planetary Temperature
 T_{obs} = Observed Planetary Temperature (Assuming A=0.3)
 A_{obs} = Observed Albedo (Assuming T=0)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

DV Centroid Data

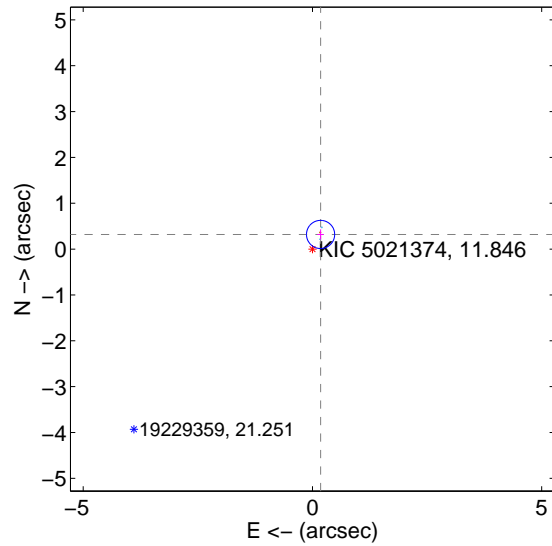
Supplemental centroid analysis for 005021374-02. **Kepler magnitude: 11.85.** Transit SNR 4.39

There are 2 quarters with good PRF difference image offsets

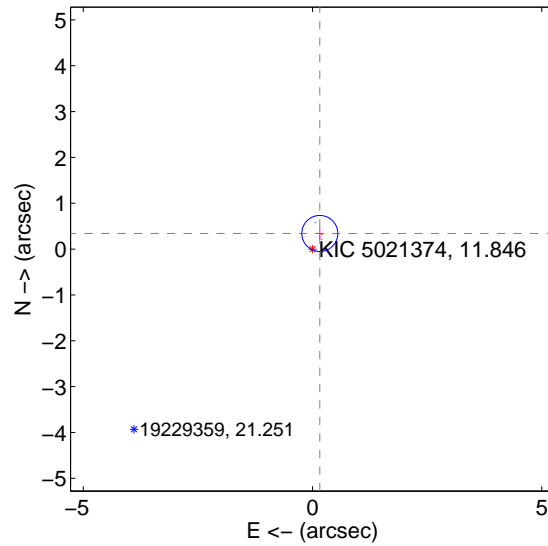
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|-------------------------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT | 0.365 ± 0.102 | 3.57 | -0.177 ± 0.068 | 0.319 ± 0.111 |
| PRF-fit source offset from KIC position | 0.376 ± 0.131 | 2.88 | -0.159 ± 0.085 | 0.341 ± 0.139 |
| photometric centroid source offset | 1.46 ± 0.98 | 1.49 | -0.96 ± 0.82 | 1.09 ± 1.09 |

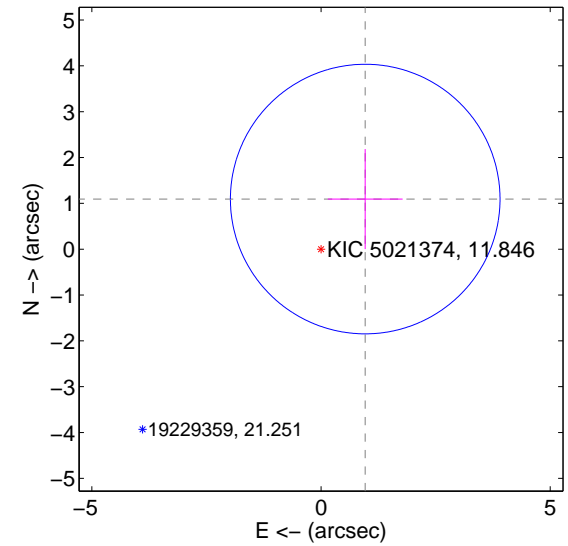
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

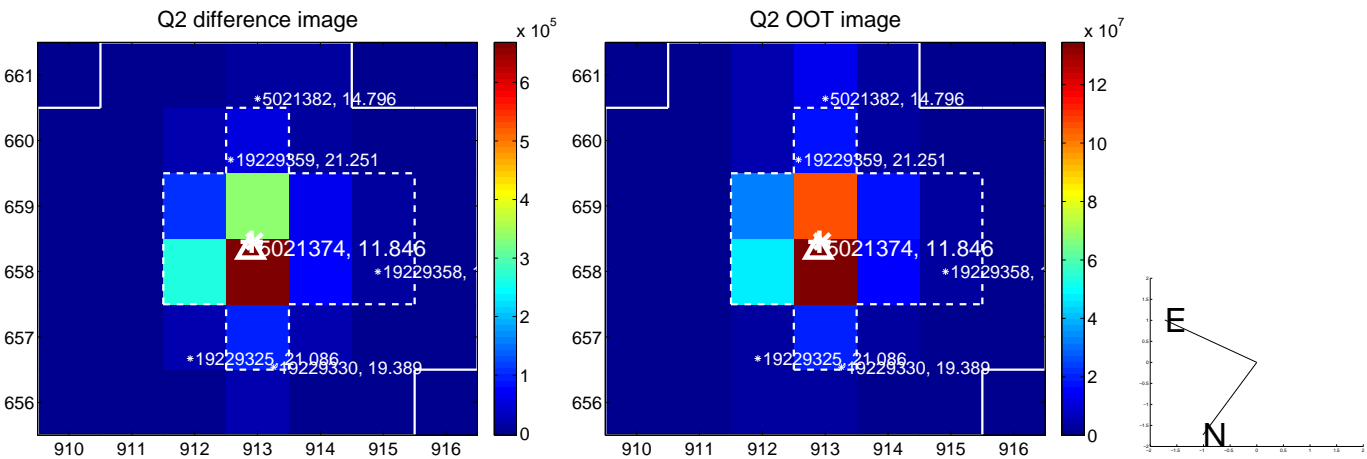


offset from photometric centroids



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

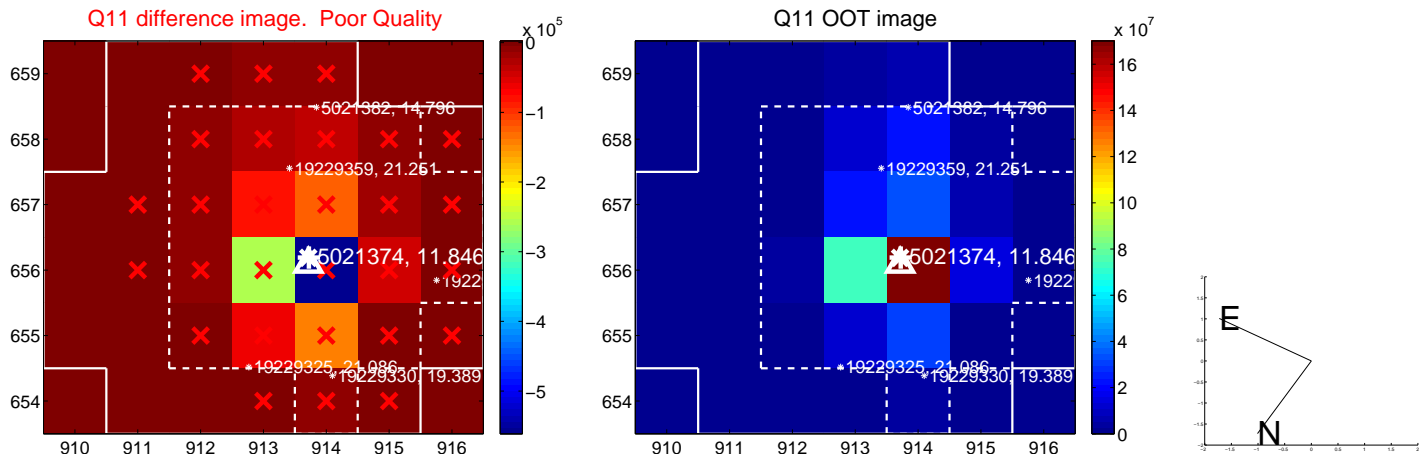
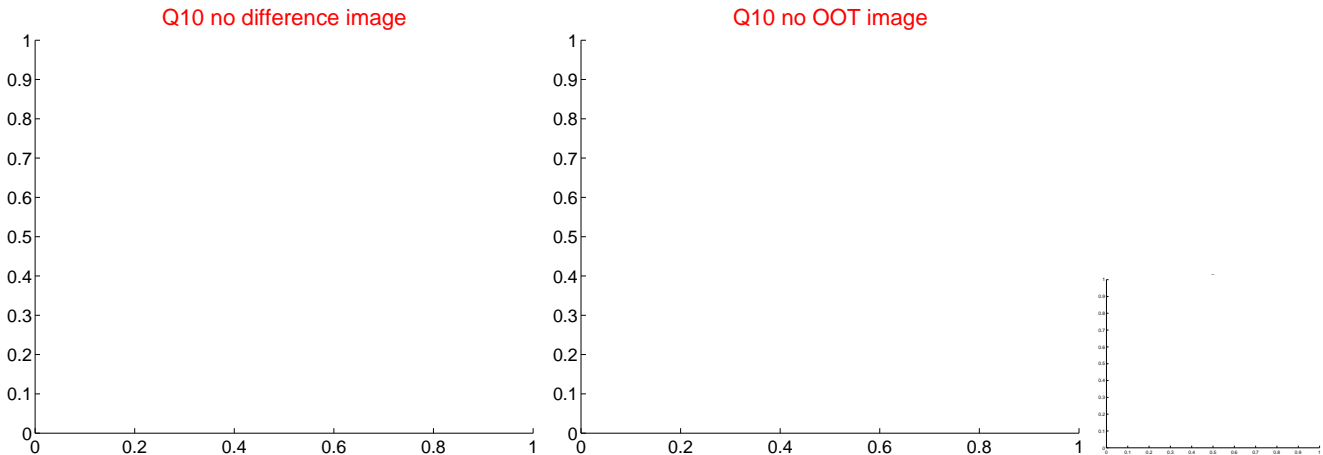
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



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



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

Q13 no difference image



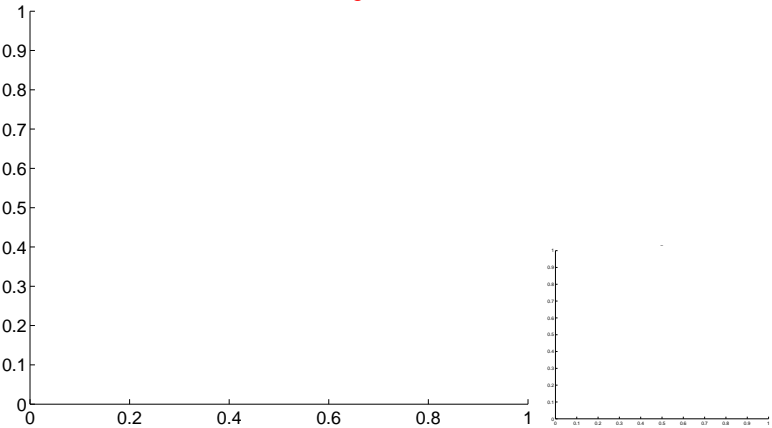
Q13 no OOT image



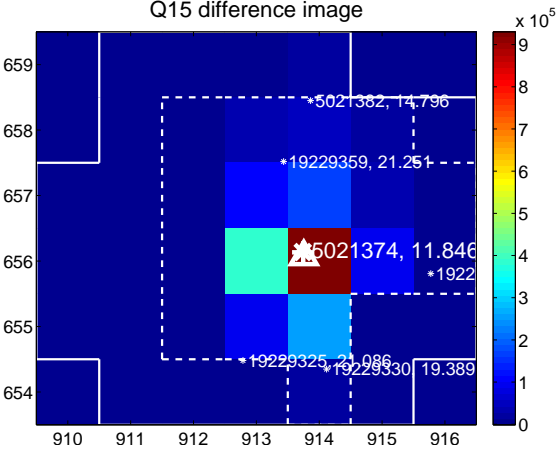
Q14 no difference image



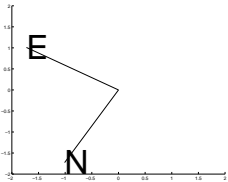
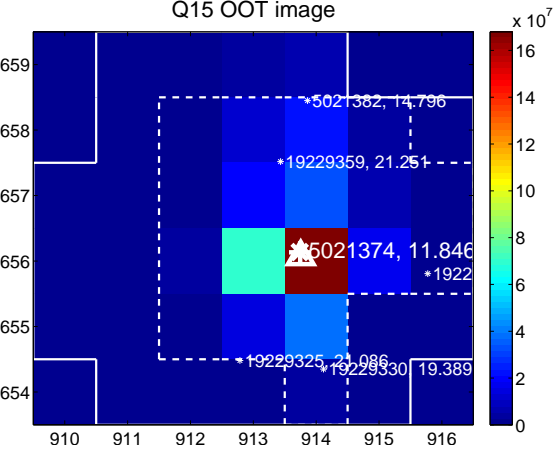
Q14 no OOT image



Q15 difference image



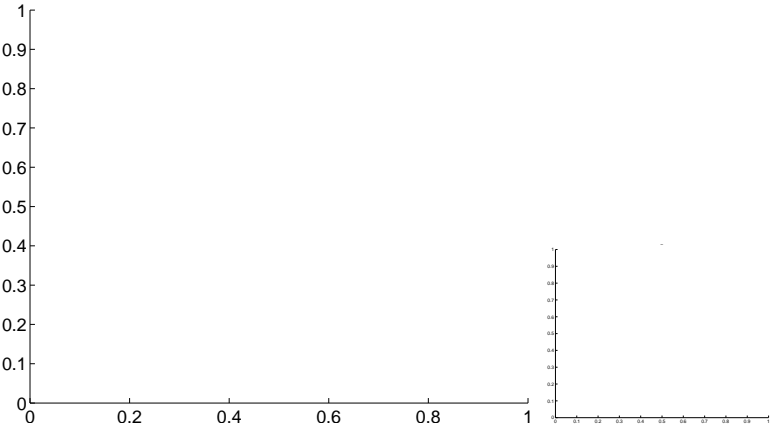
Q15 OOT image



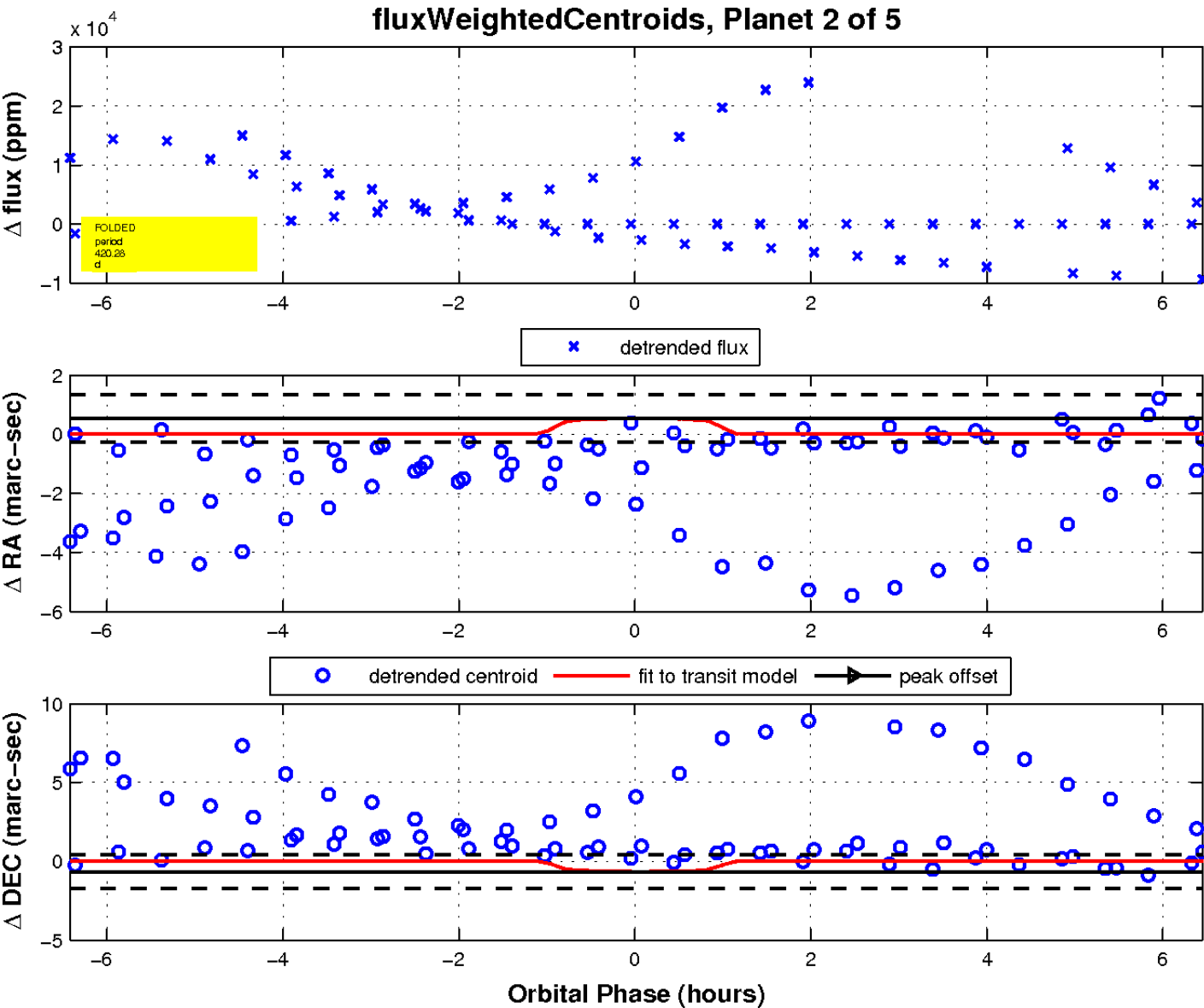
Q16 no difference image



Q16 no OOT image

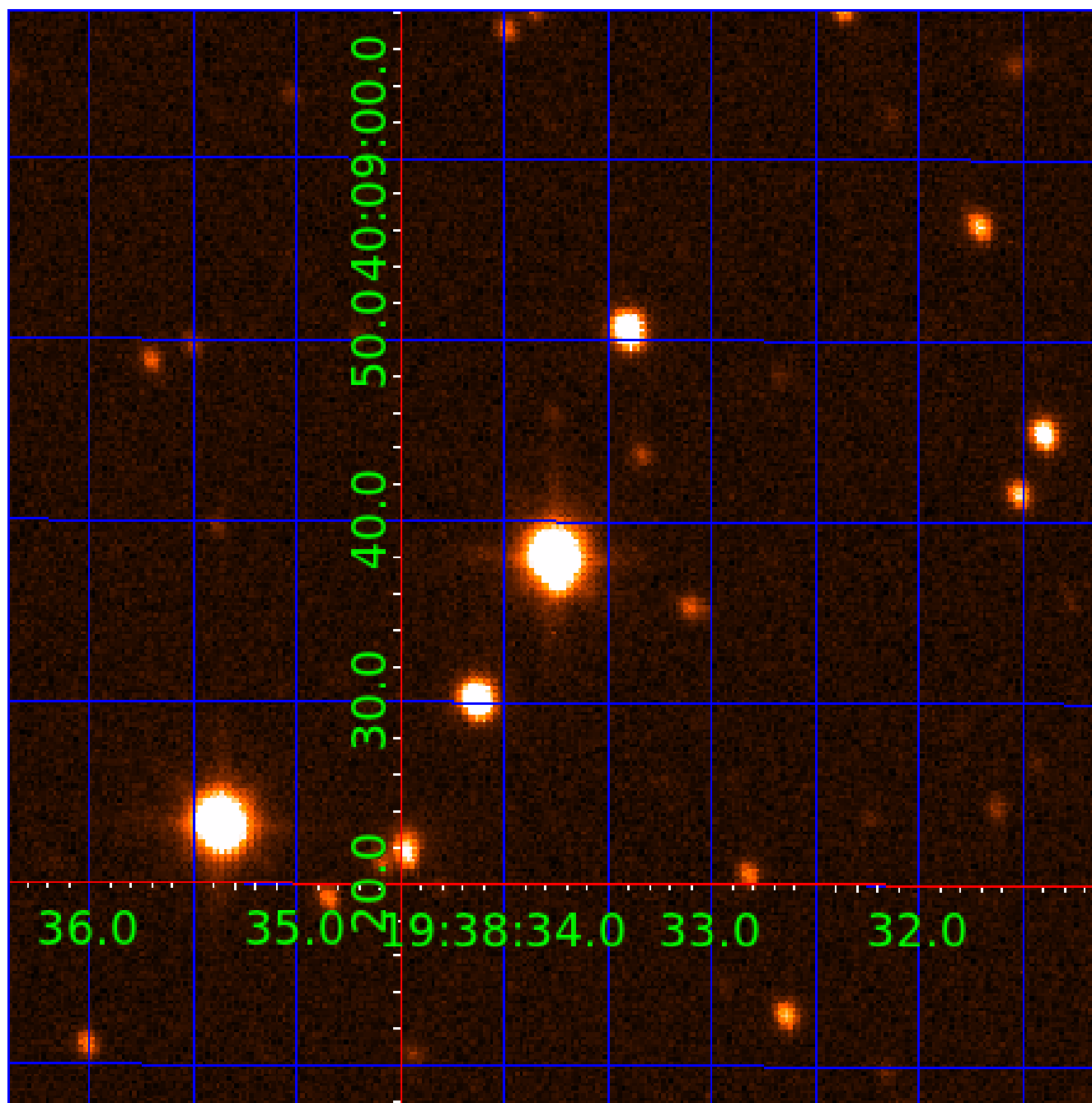


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 005021374

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 005021374-01 | OBS | No | 487.094165 | 266.667169 | 348.2 | 2.779 | 19.1 | 1.7 | 1.80 | 7109 | 3.56 | 3.89 |
| 005021374-02 | OBS | No | 420.278477 | 199.802000 | 516.7 | 2.226 | 20.7 | 4.4 | 1.80 | 7109 | 4.82 | 4.73 |
| 005021374-03 | OBS | No | 293.691097 | 167.071123 | 255.7 | 1.237 | 22.6 | 2.7 | 1.80 | 7109 | 3.24 | 7.63 |
| 005021374-04 | OBS | No | 360.267274 | 394.667002 | 5129.8 | 16.284 | 17.9 | 4.7 | 1.80 | 7109 | 15.01 | 5.81 |
| 005021374-05 | OBS | No | 477.293906 | 312.586391 | 291.3 | 4.500 | 17.8 | -1.0 | 1.80 | 7109 | 3.10 | 3.99 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 005021374-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS |
| 005021374-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS |
| 005021374-03 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_ALT—INCONSISTENT_TRANS |
| 005021374-04 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS |
| 005021374-05 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS |

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

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

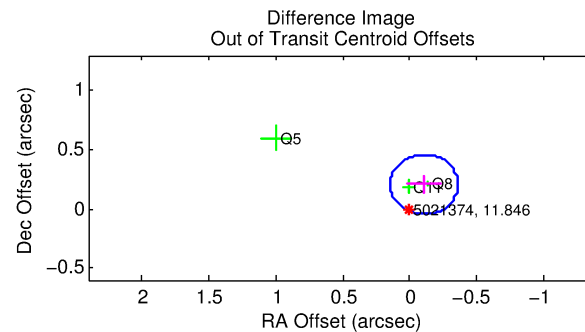
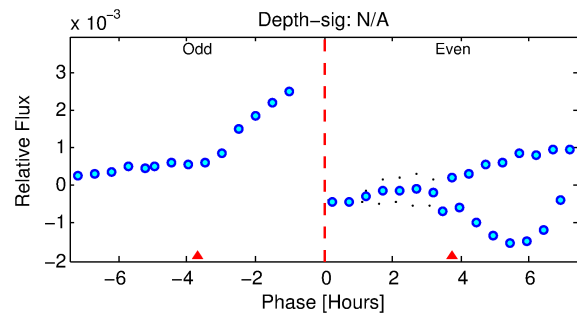
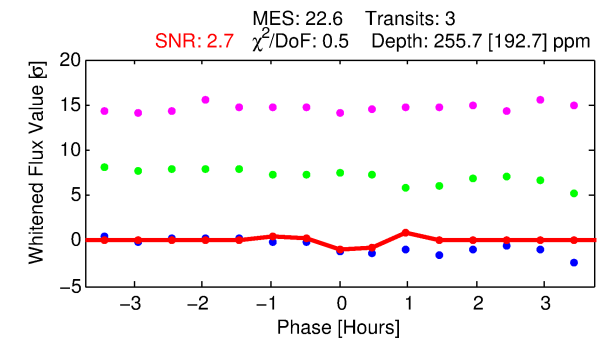
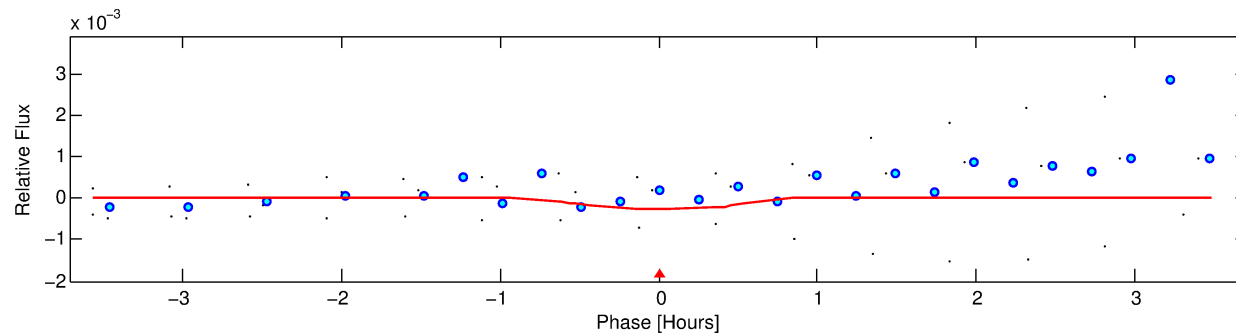
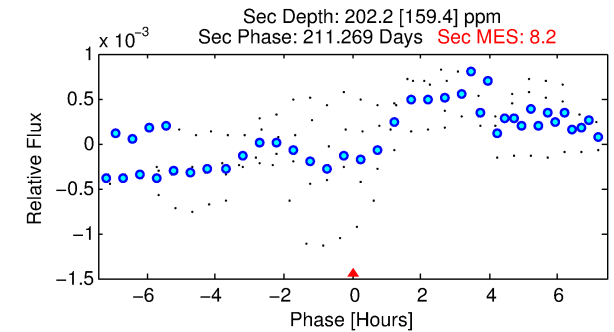
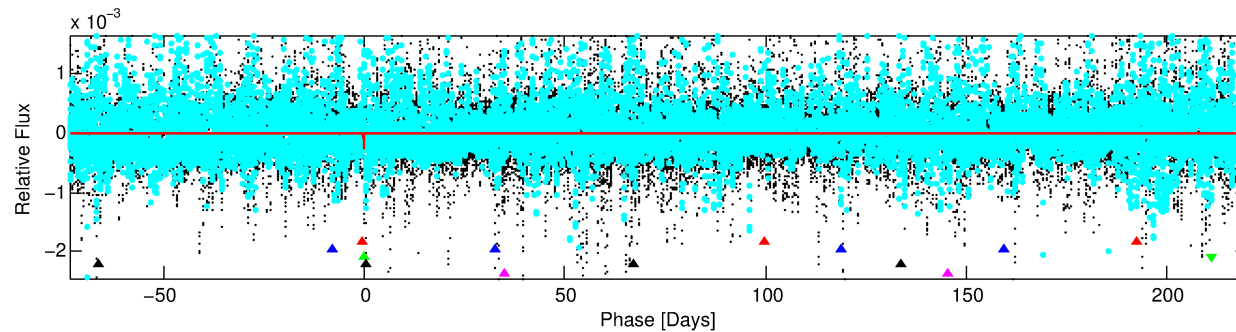
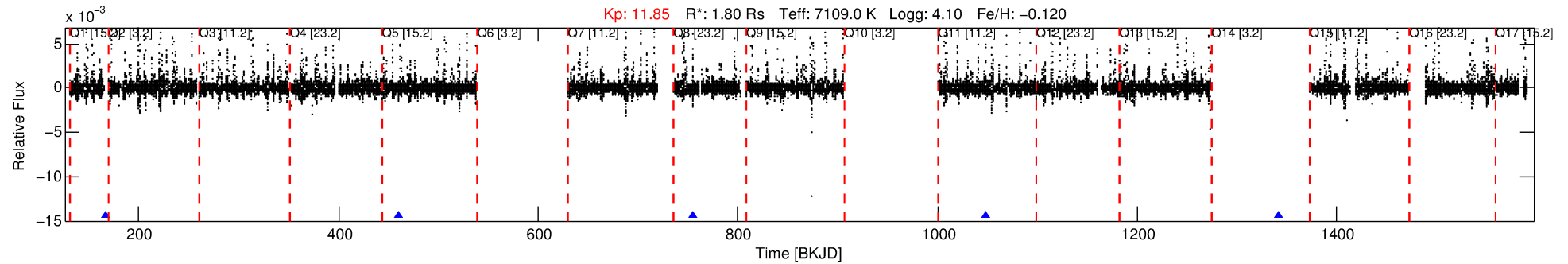
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005021374-03

No Significant Match Found

DV One-Page Summary

KIC: 5021374 Candidate: 3 of 5 Period: 293.691 d



DV Fit Results:

Period = 293.69110 [0.00918] d
Epoch = 167.0711 [0.0175] BKJD
Rp/R* = 0.0165 [0.0887]
a/R* = 1027.29 [33324.55]
b = 0.84 [11.28]
Seff = 7.63 [2.81]
Teq = 424 [39] K
Rp = 3.24 [17.42] Re
a = 0.9836 [0.2370] AU
Ag = 10245.52 [110318.69] [0.09σ]
Teffp = 6592 [17738] K [0.35σ]

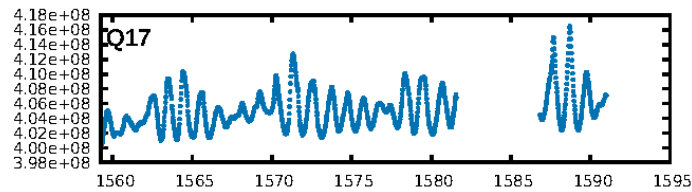
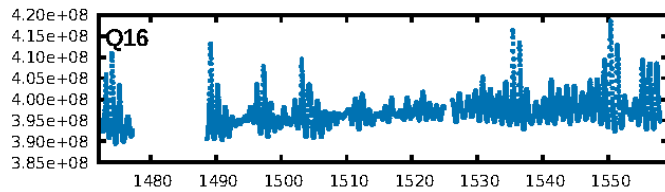
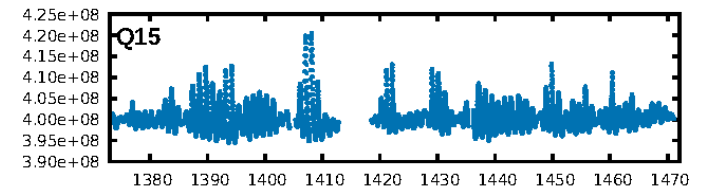
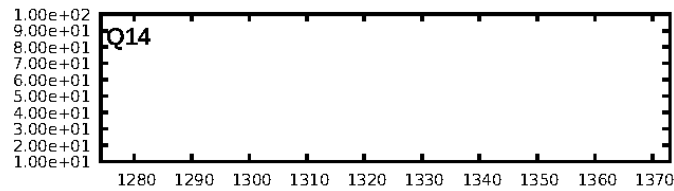
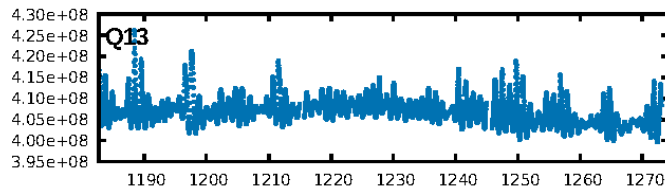
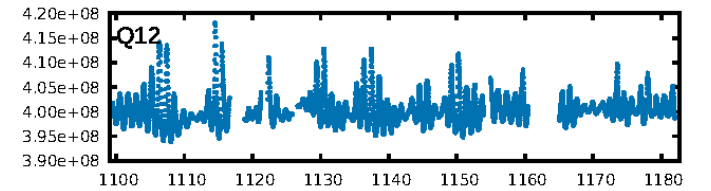
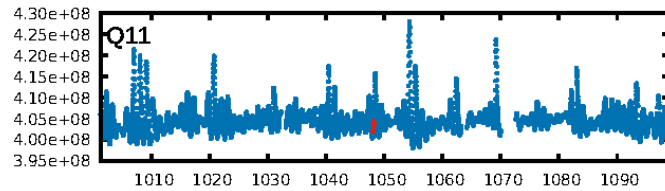
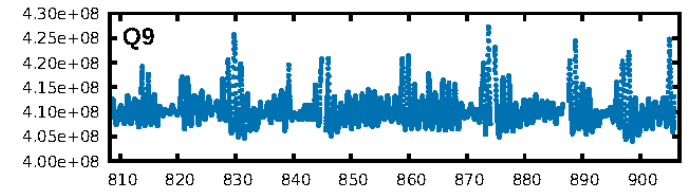
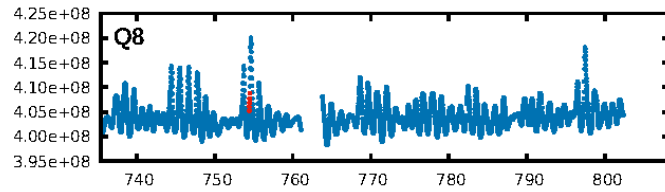
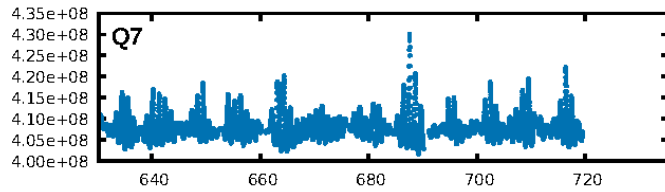
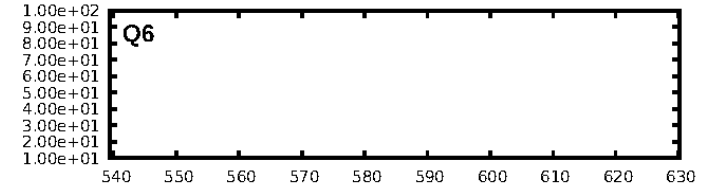
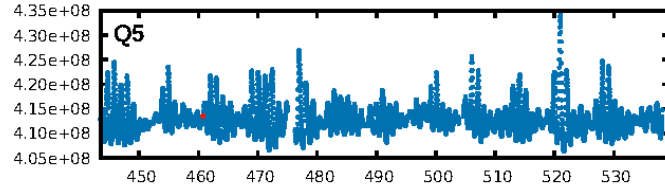
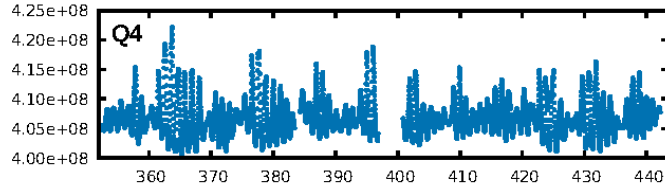
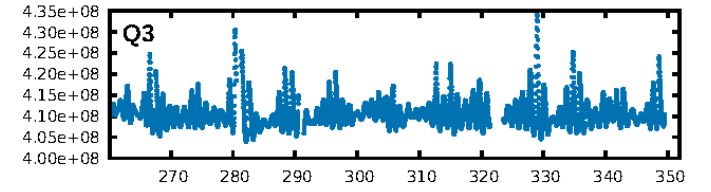
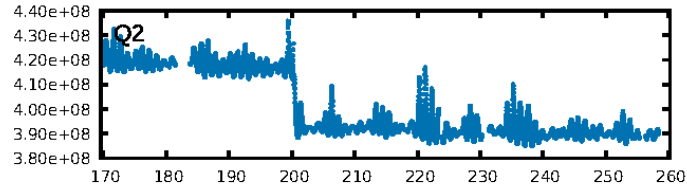
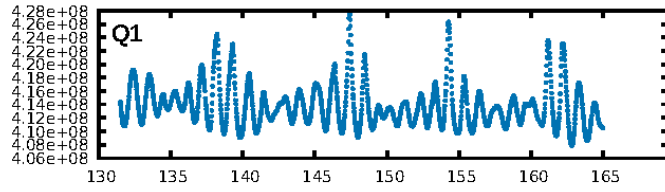
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [97.84σ]
ModelChiSquare2-sig: 74.2%
ModelChiSquareGof-sig: 99.1%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 0.7993
Centroid-sig: 69.8%
Centroid-so: 0.507 arcsec [0.31σ]
OotOffset-rm: 0.234 arcsec [2.77σ]
OotOffset-st: 0/1/1/1 [3]
KicOffset-rm: 0.271 arcsec [2.10σ]
KicOffset-st: 0/1/1/1 [3]
DiffImageQuality-fgm: 1.00 [3/3]
DiffImageOverlap-fno: 0.67 [2/3]

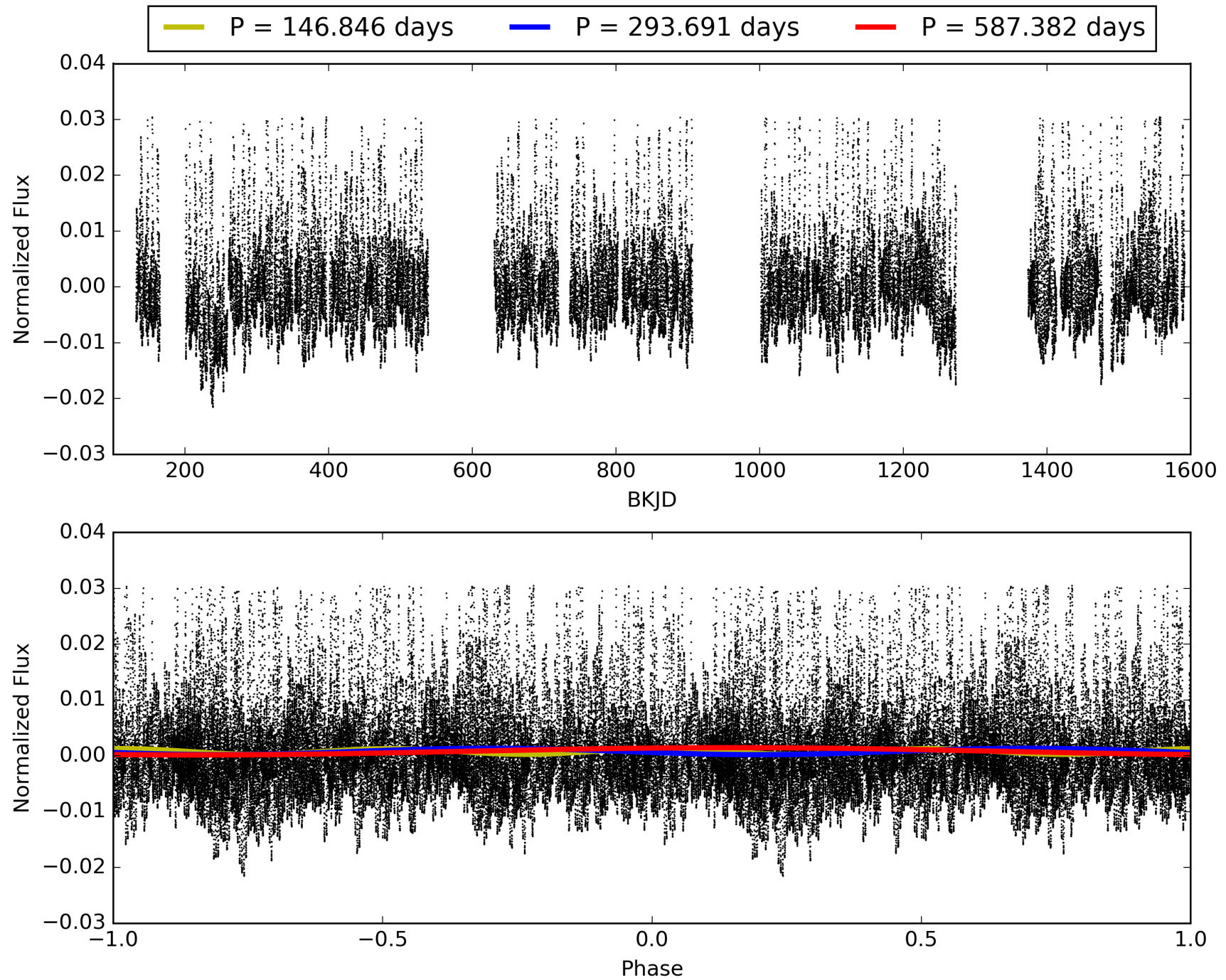
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 05:29:13 Z

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

TCE 005021374-03, PDC Light Curves

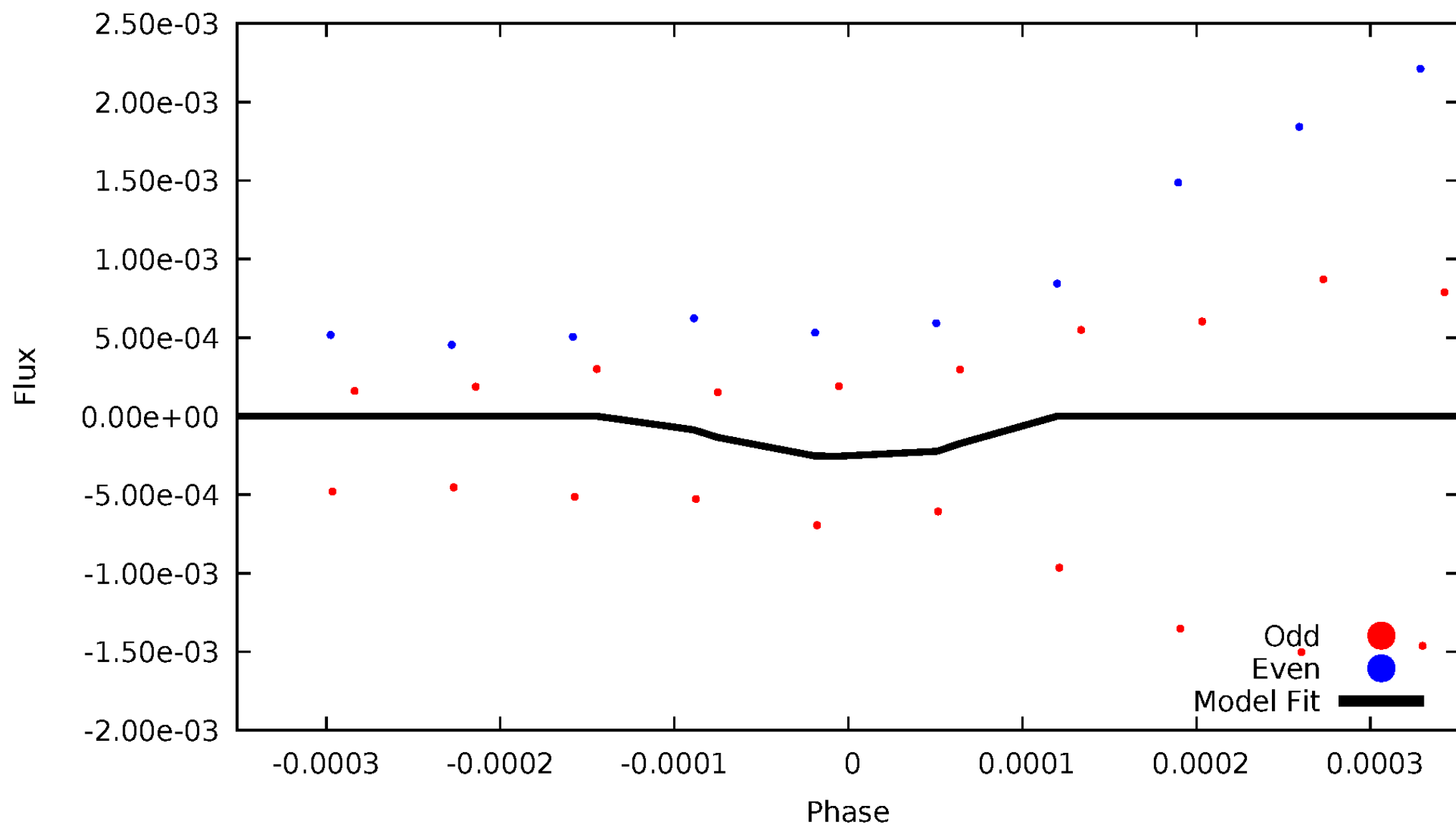


TCE 005021374-03



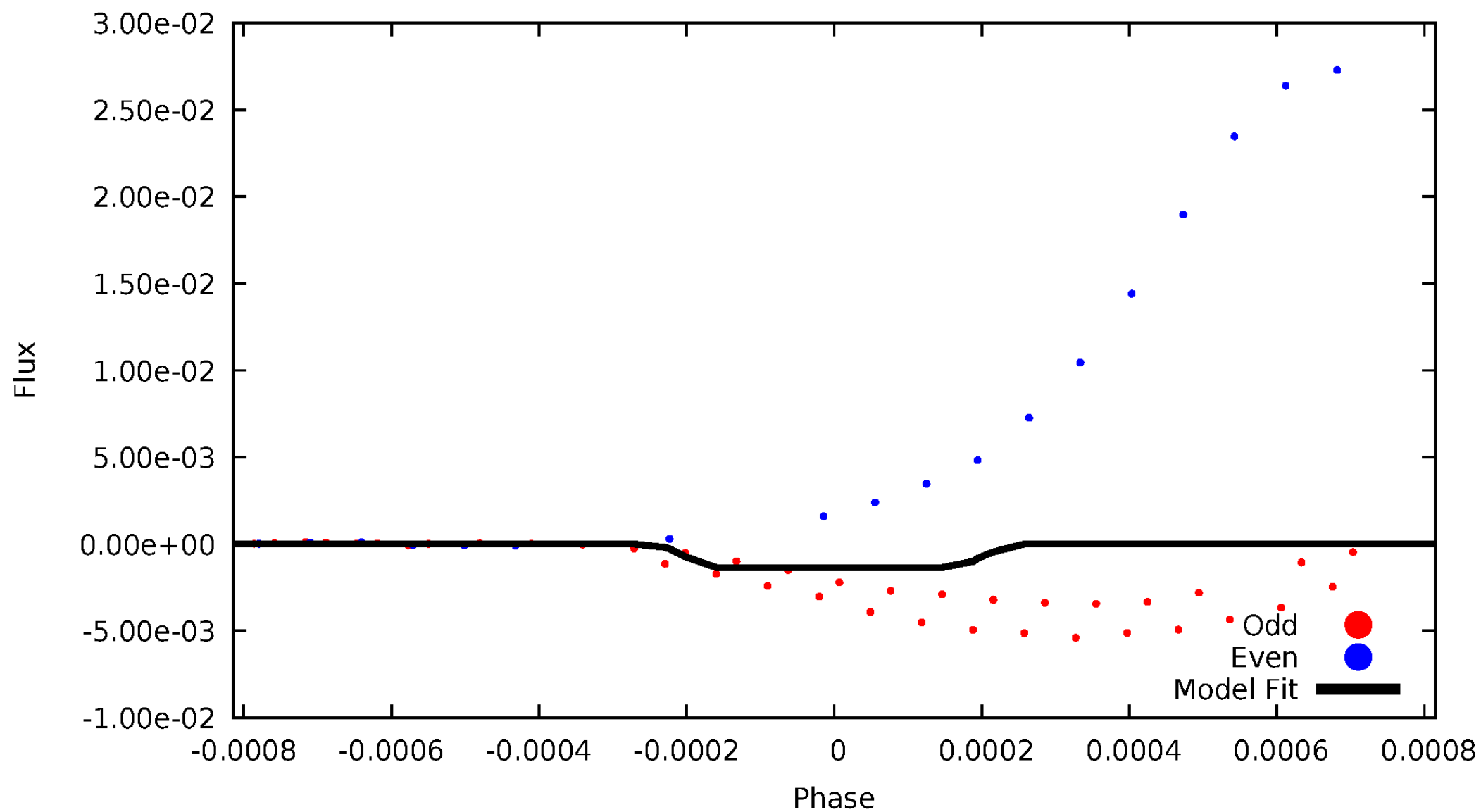
DV Odd/Even

TCE 005021374-03



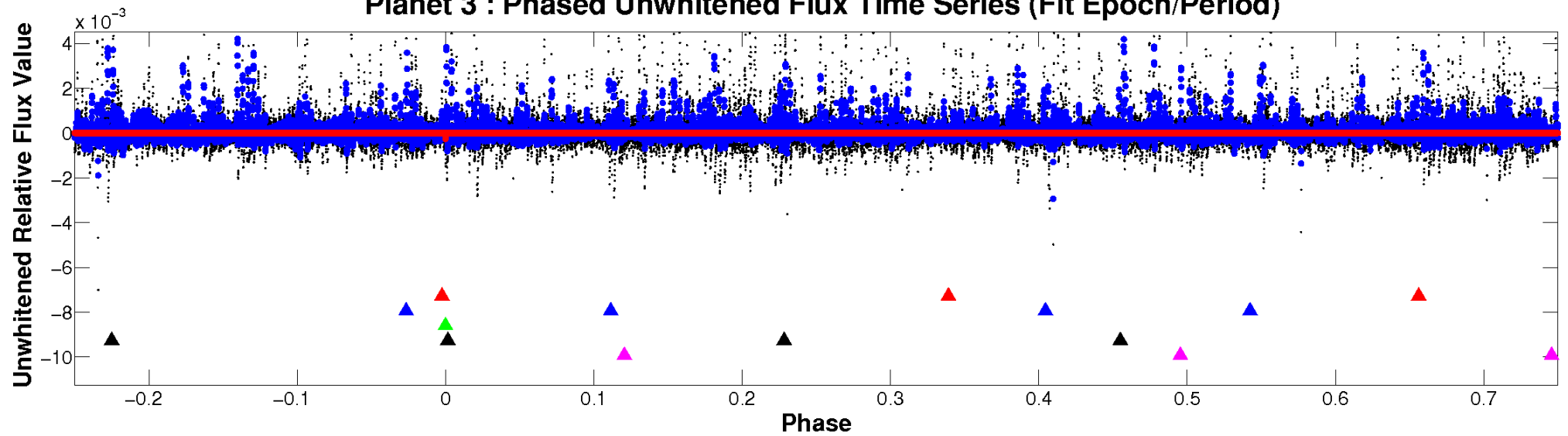
ALT Odd/Even

TCE 005021374-03

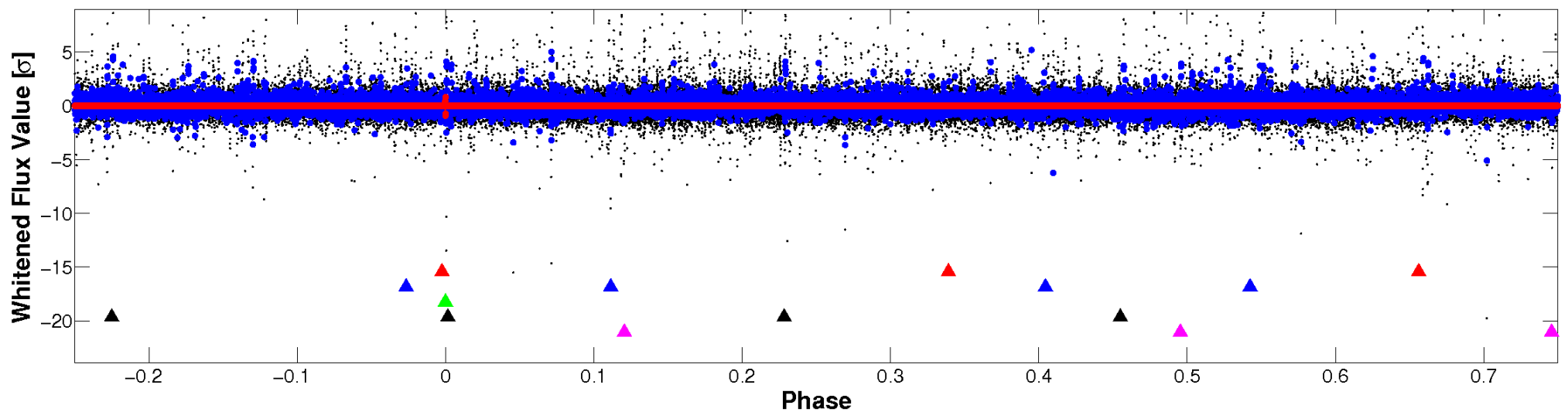


Non-Whitened Vs. Whitened Light Curve

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

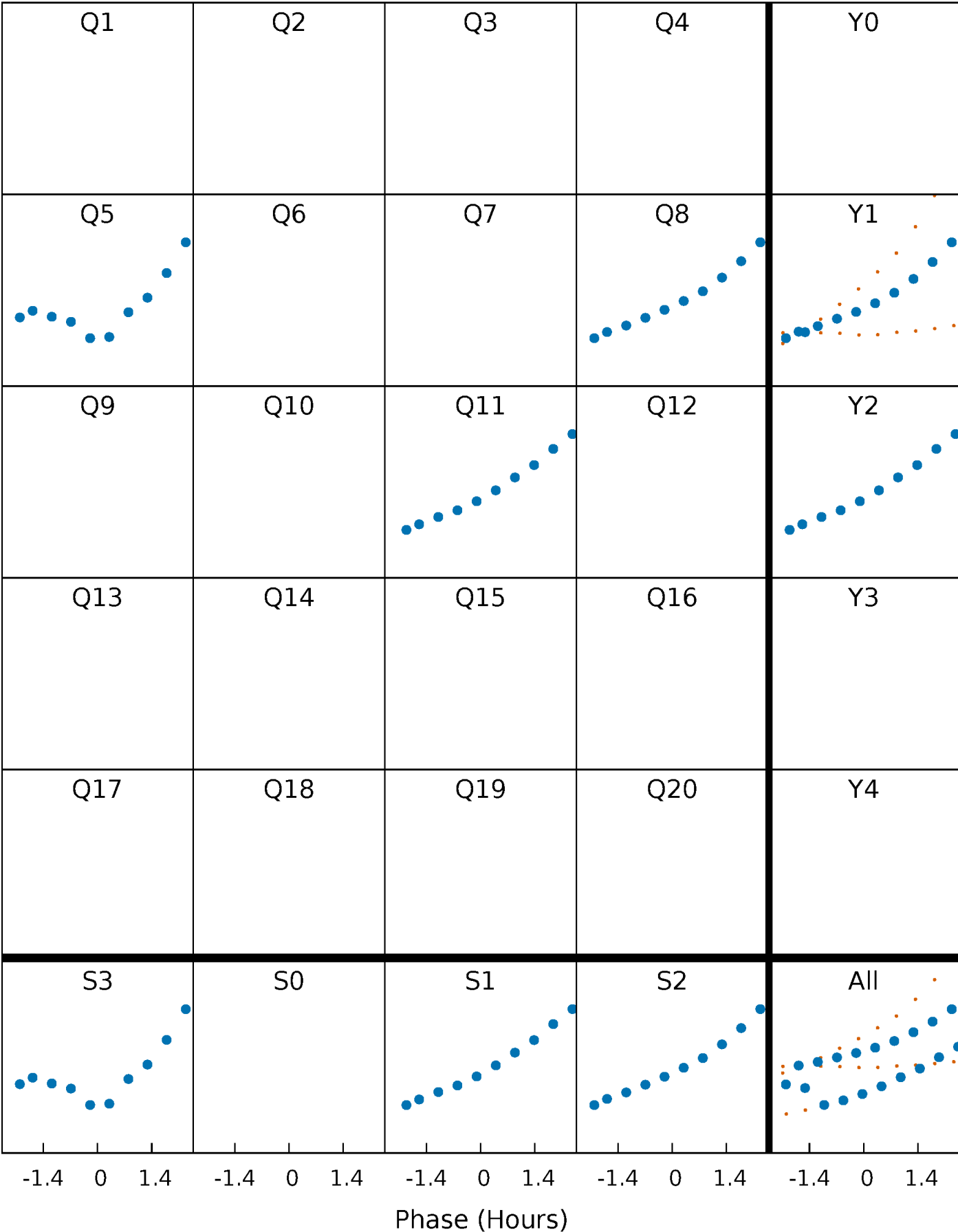


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



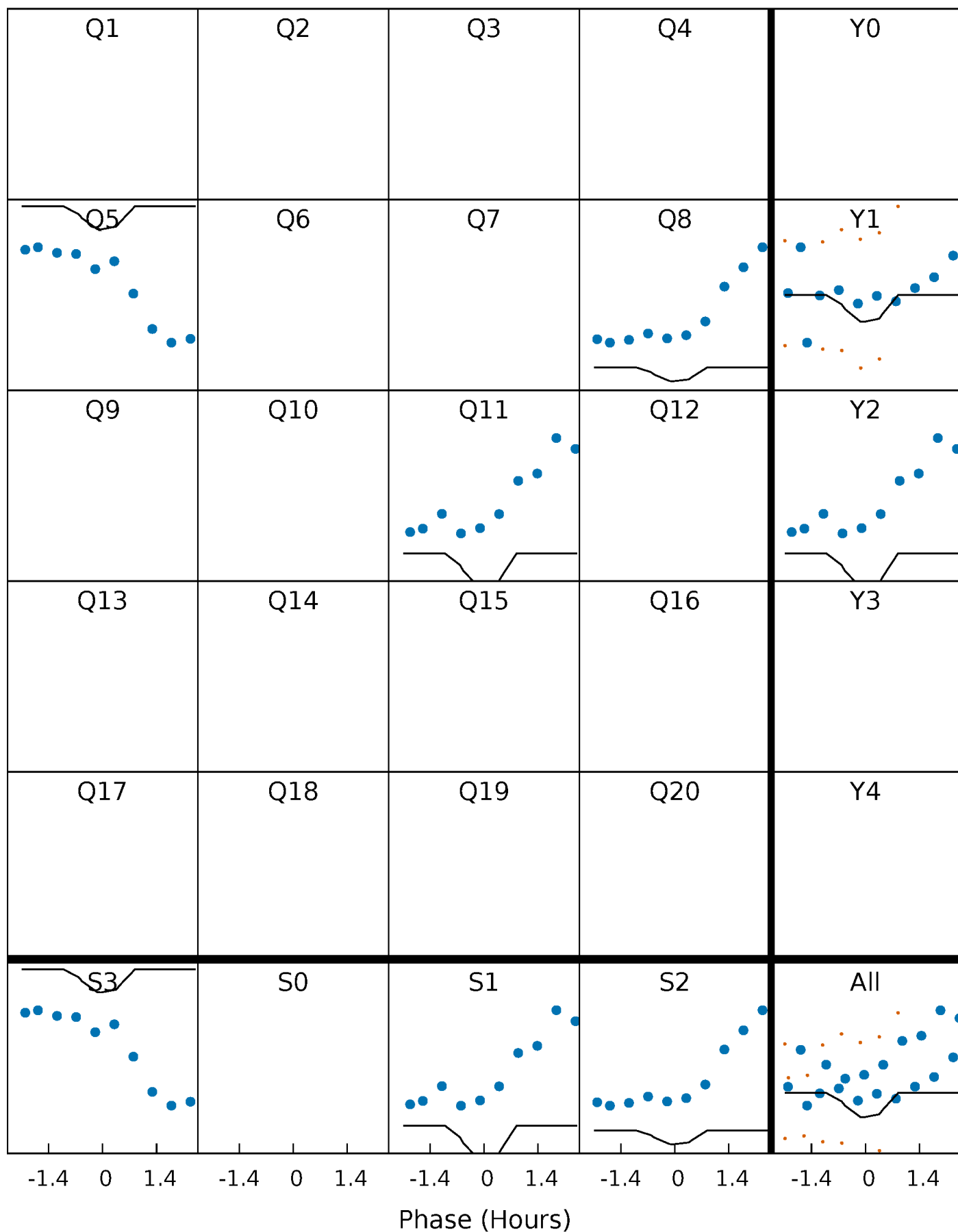
PDC Quarter-Phased Transit Curves

TCE 005021374-03 P=293.691097 Days T₀=167.071123 (BKJD)



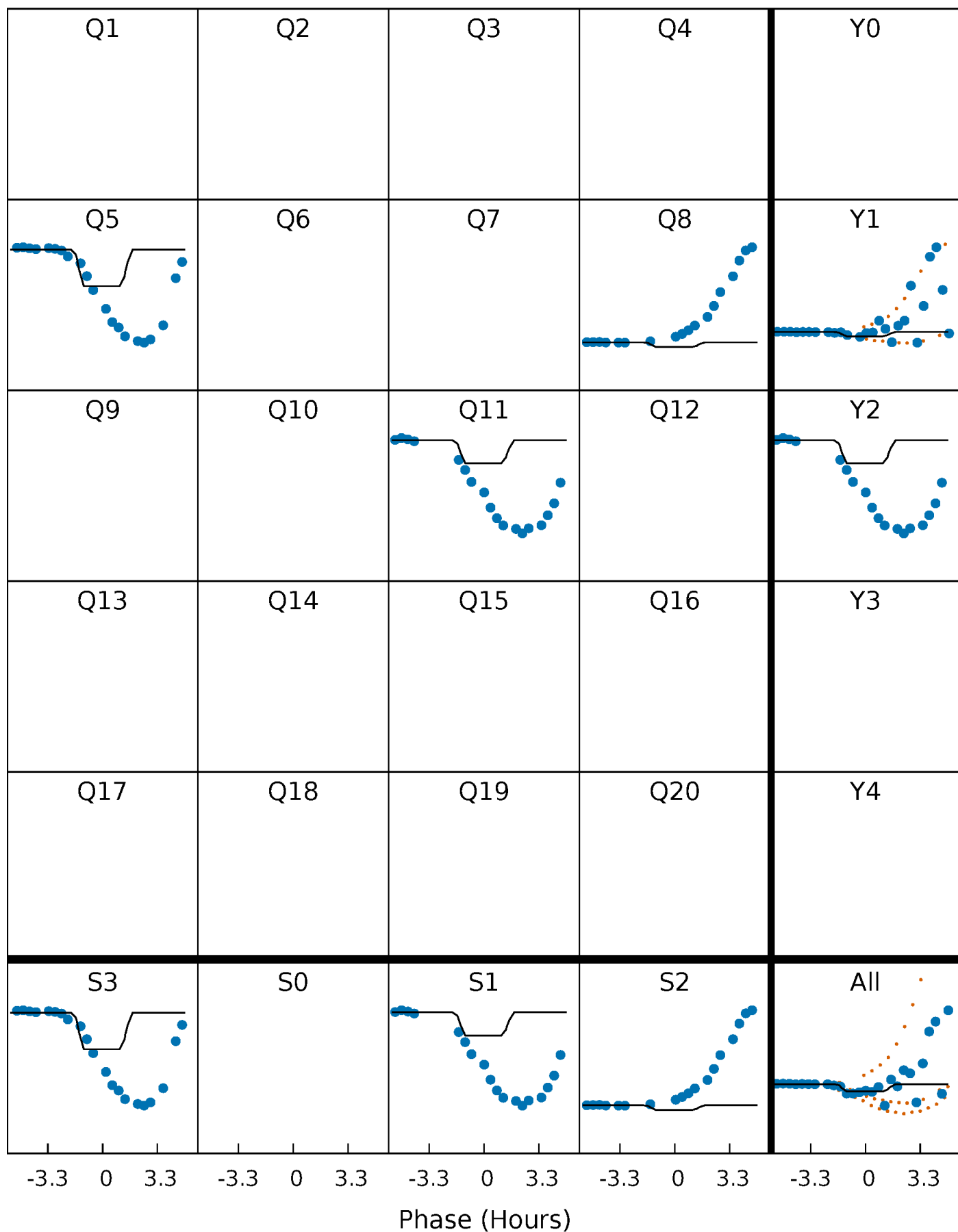
DV Quarter-Phased Transit Curves

TCE 005021374-03 P=293.691097 Days $T_0=167.071123$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

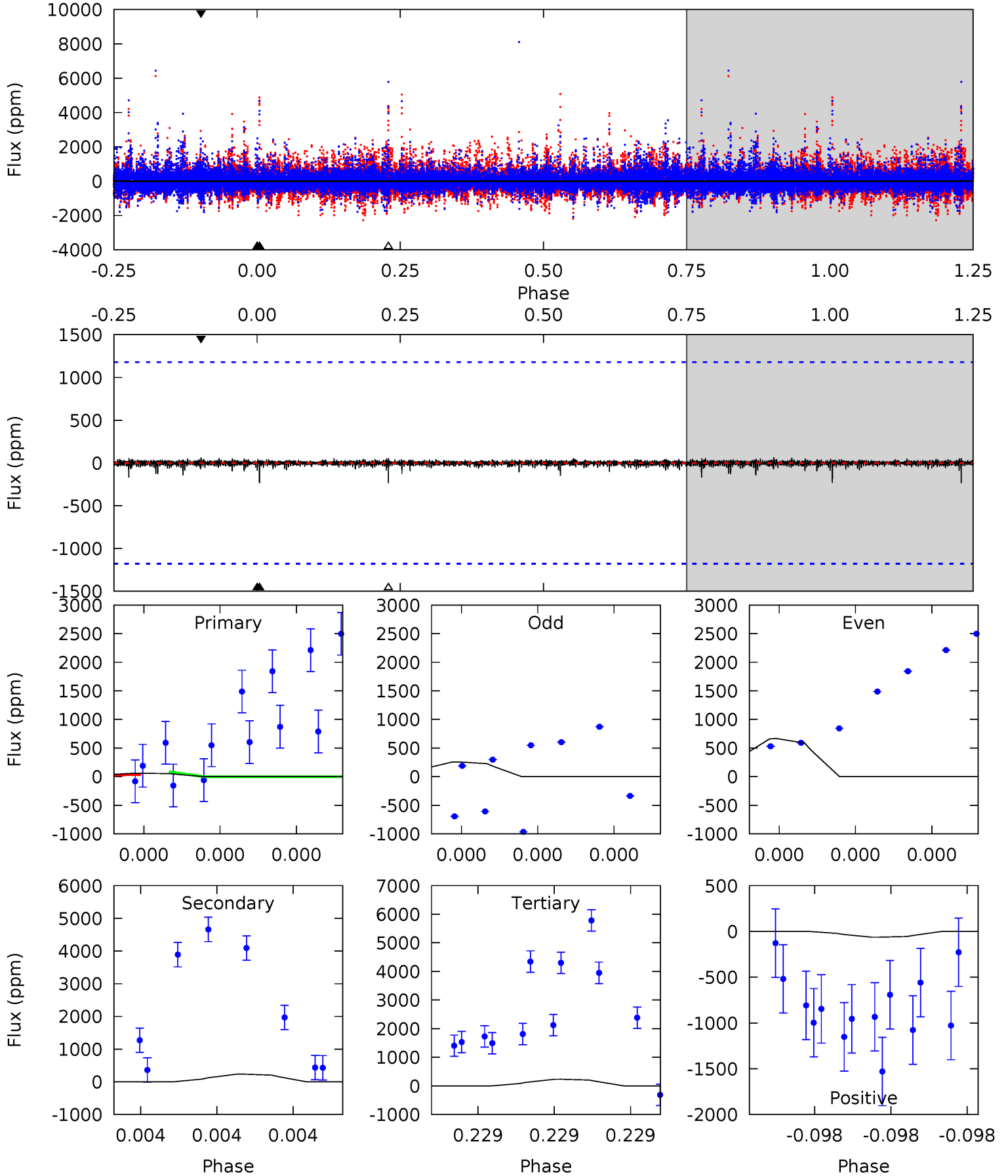
TCE 005021374-03 P=293.676563 Days $T_0=167.078300$ (BKJD)



DV Model-Shift Uniqueness Test

005021374-03, P = 293.691097 Days, E = 167.071123 Days

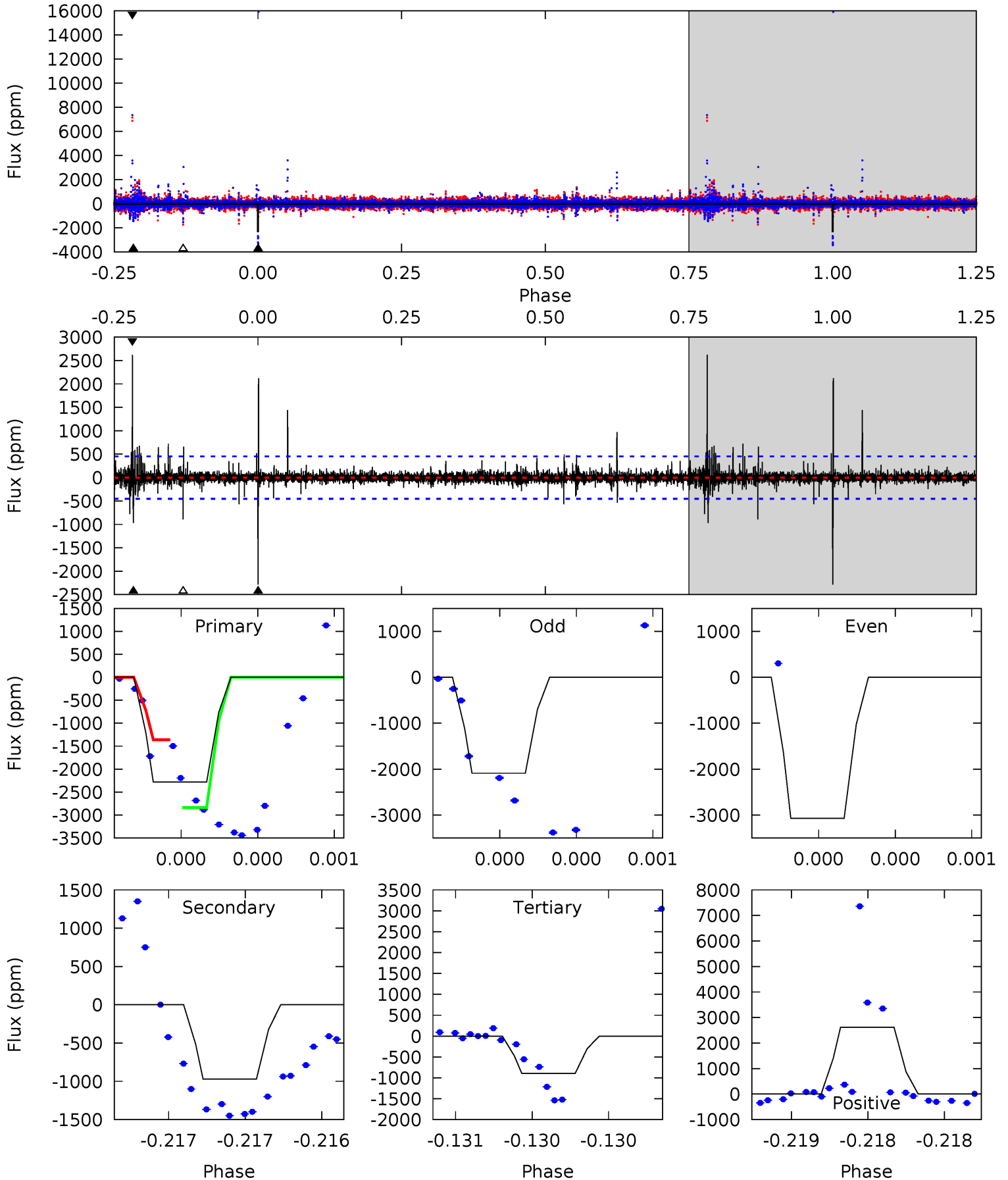
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 0.30 | 1.15 | 1.14 | 0.31 | 5.78 | 3.79 | 0.08 | -0.84 | -0.02 | 0.00 | 0.83 | 0.76 | 0.23 | 0.21 | 0.12 |



Alt Model-Shift Uniqueness Test

005021374-03, P = 293.676563 Days, E = 167.078300 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|-----|
| 28.2 | 12.0 | 11.0 | 32.4 | 5.60 | 3.52 | 0.95 | 17.2 | -4.19 | 0.94 | -20.4 | 4.46 | 0.40 | 0.53 | 0 |



Stellar Parameters For KIC 005021374

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 7109^{+175}_{-275} | $4.097^{+0.158}_{-0.175}$ | $-0.120^{+0.250}_{-0.350}$ | $1.796^{+0.539}_{-0.392}$ | $1.470^{+0.218}_{-0.239}$ | $0.358^{+0.333}_{-0.171}$ |
| | +2%/-4% | +4%/-4% | +208%/-292% | +30%/-22% | +15%/-16% | +93%/-48% |
| 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 005021374-03 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{max} (K)$ | $T_{obs} (K)$ | A_{obs} |
|---------|-------------|---------------------------|-------------------|------------------------|-------------------------|
| DV | -234±204 | $12.30^{+14.52}_{-8.68}$ | 591^{+43}_{-40} | 3613^{+2167}_{-1100} | 560^{+5701}_{-514} |
| Alt. | -970±81 | $15.19^{+14.57}_{-10.69}$ | 592^{+43}_{-41} | 4659^{+3627}_{-1017} | 2259^{+22019}_{-1678} |

T_{max} = Theoretical Maximum Planetary Temperature

T_{obs} = Observed Planetary Temperature (Assuming A=0.3)

A_{obs} = Observed Albedo (Assuming T=0)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

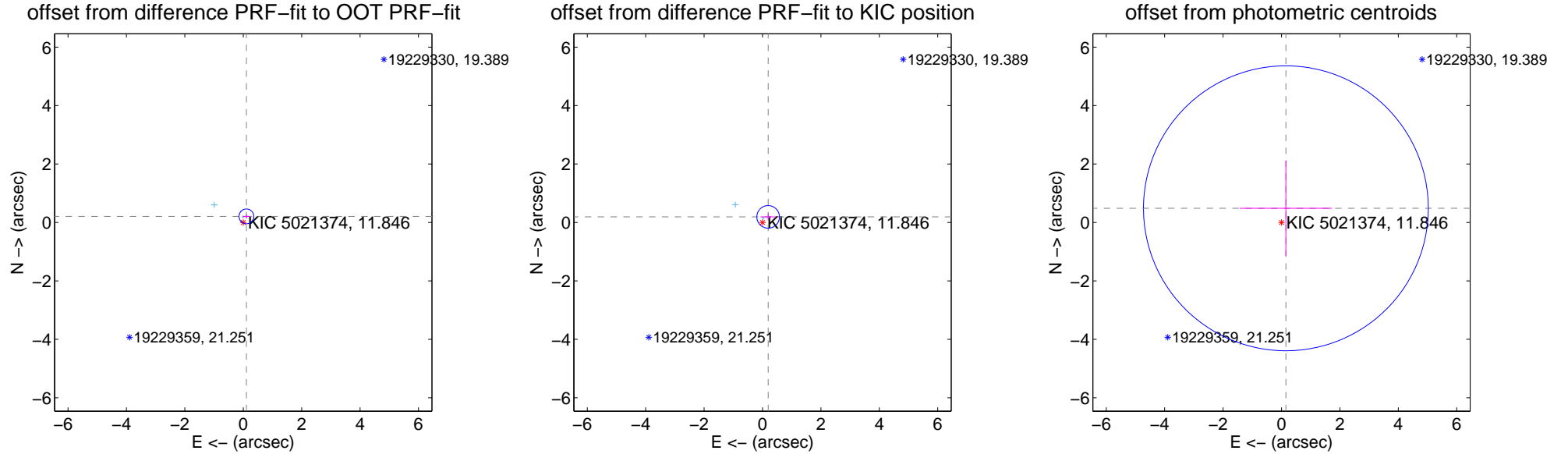
DV Centroid Data

Supplemental centroid analysis for 005021374-03. **Kepler magnitude: 11.85.** Transit SNR 2.68

There are 3 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT | 0.234 ± 0.084 | 2.77 | -0.108 ± 0.123 | 0.208 ± 0.071 |
| PRF-fit source offset from KIC position | 0.271 ± 0.129 | 2.10 | -0.193 ± 0.261 | 0.190 ± 0.122 |
| photometric centroid source offset | 0.51 ± 1.63 | 0.31 | -0.15 ± 1.58 | 0.48 ± 1.63 |

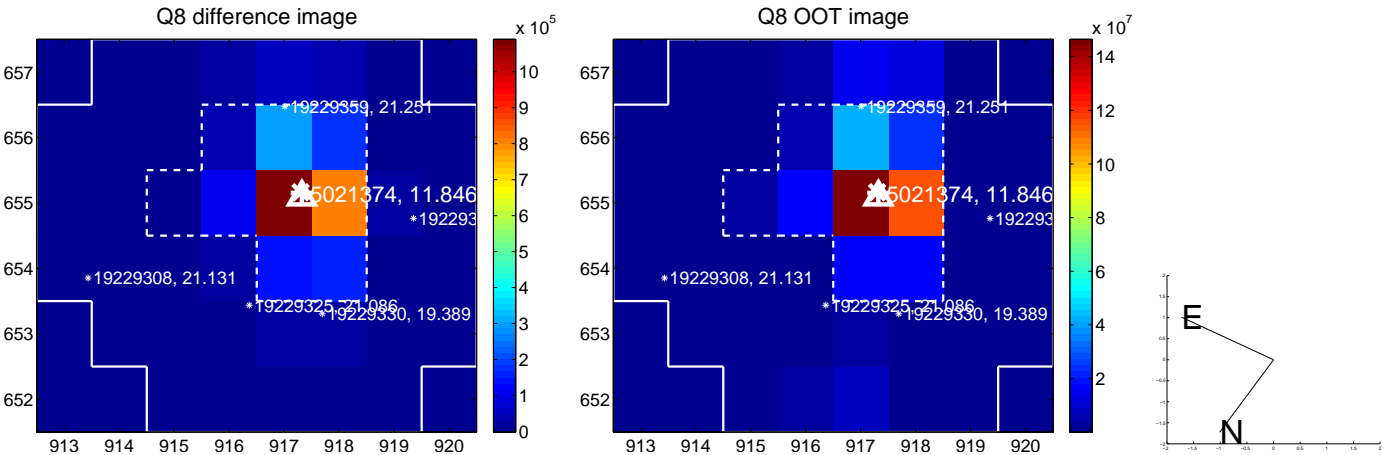
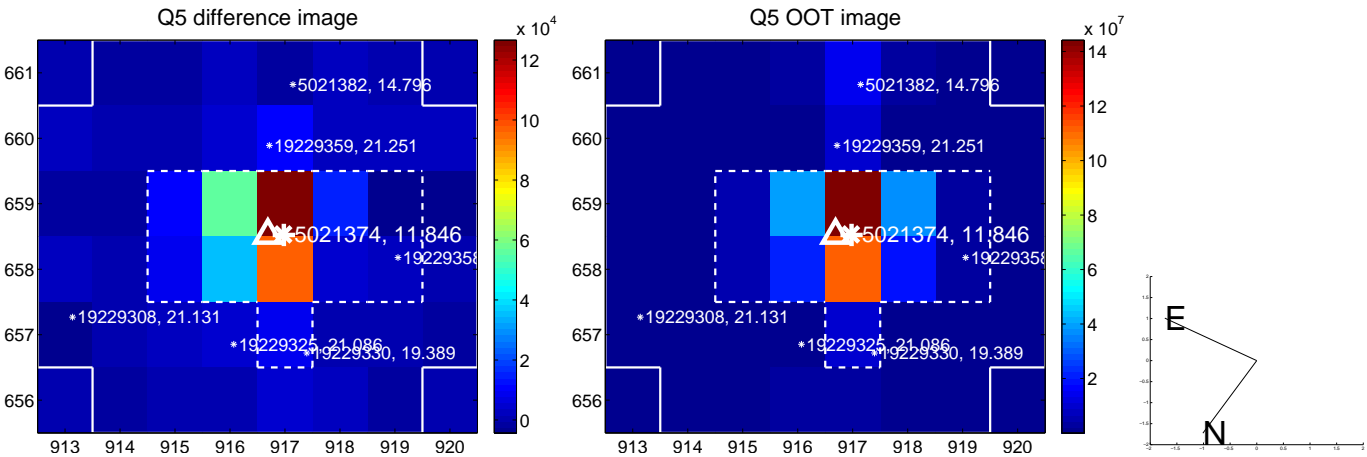


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

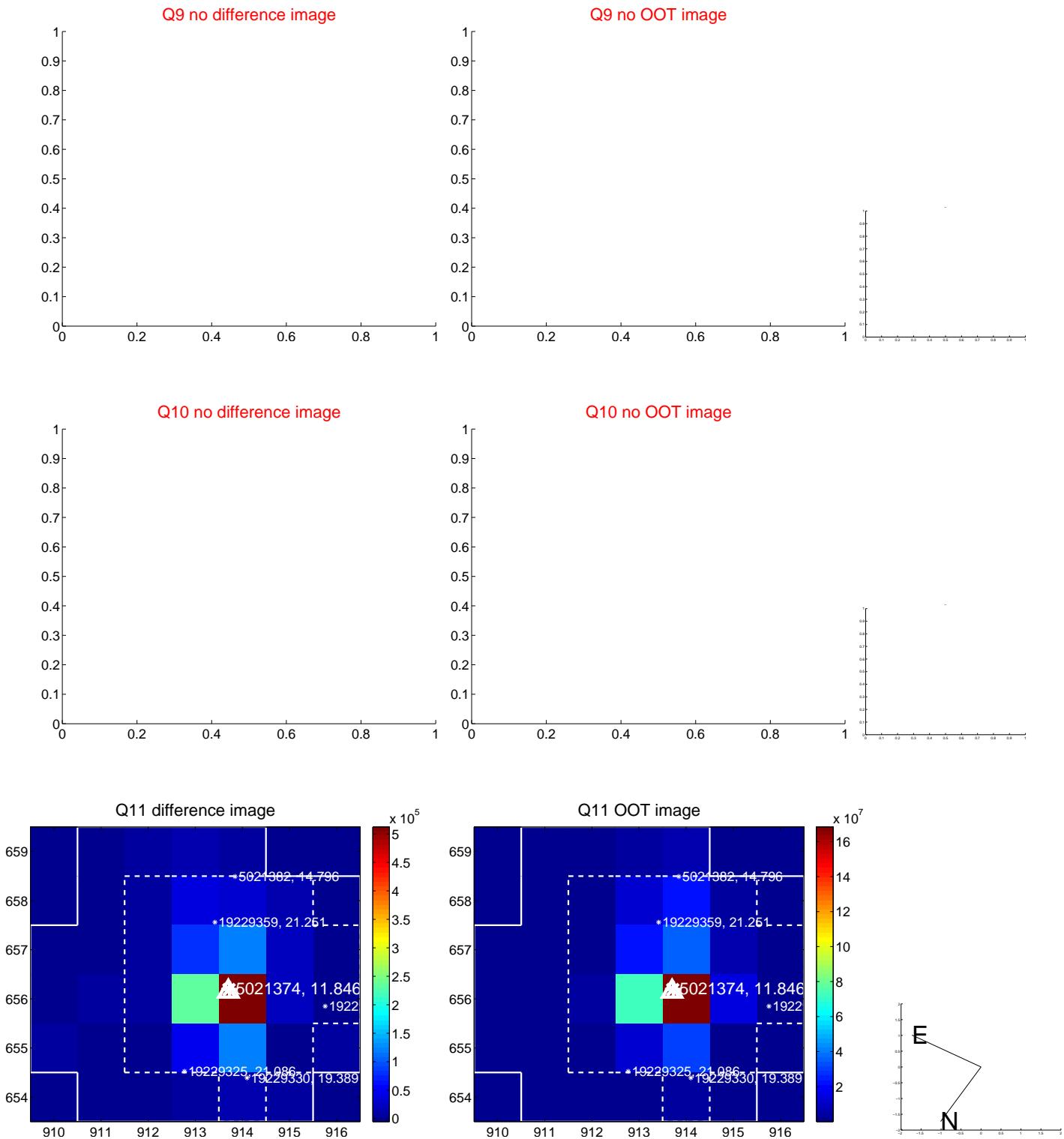
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



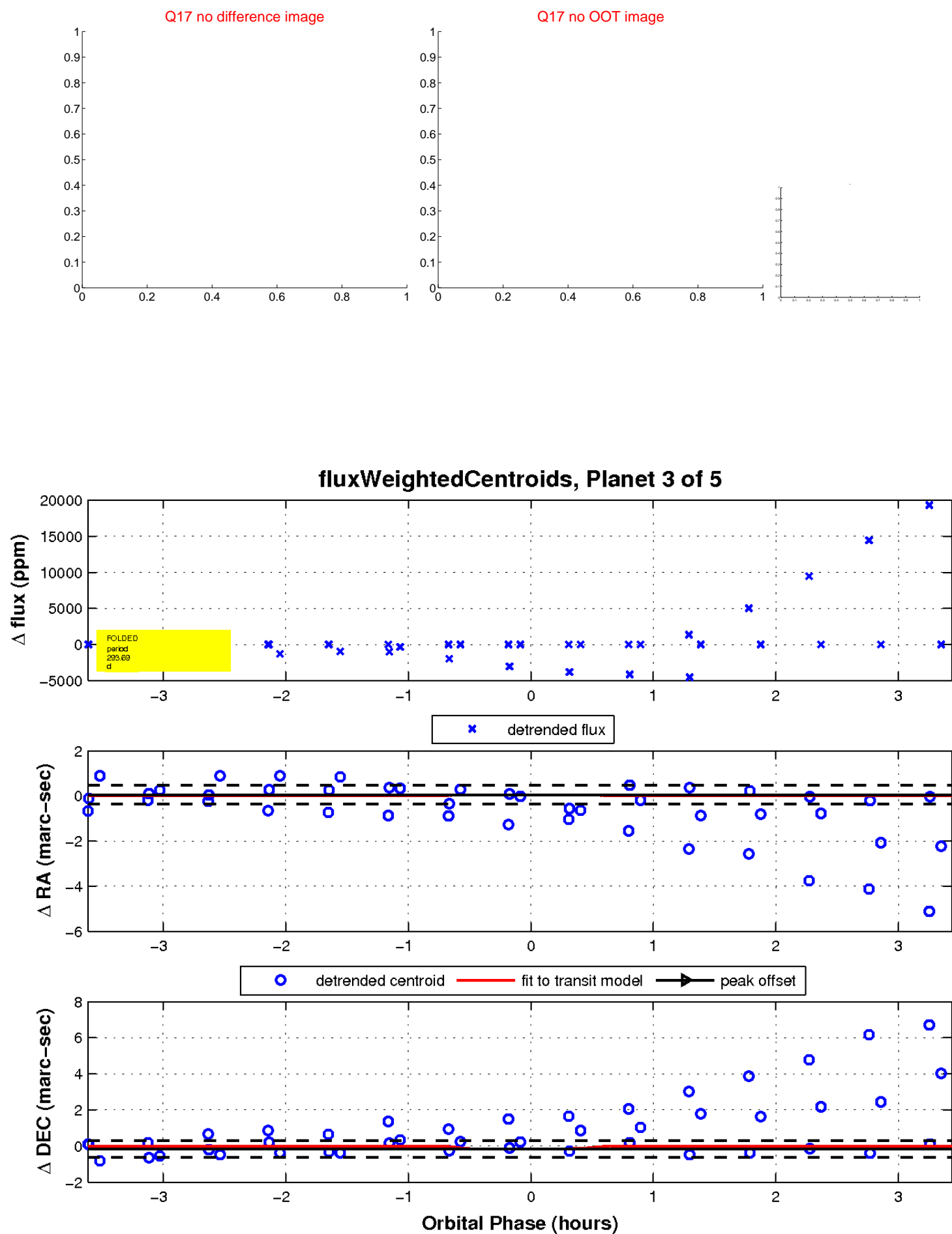
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

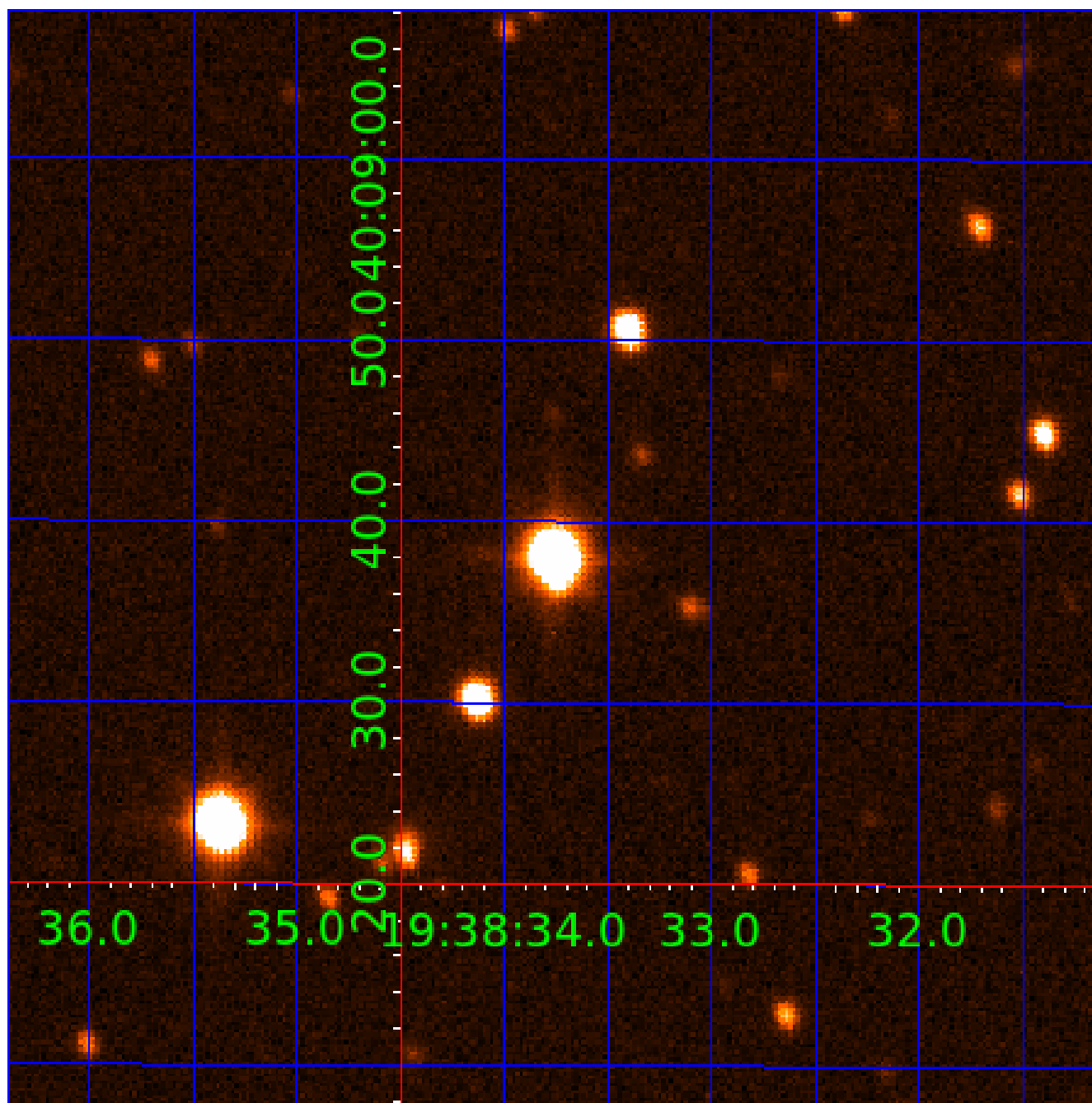


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 005021374

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 005021374-01 | OBS | No | 487.094165 | 266.667169 | 348.2 | 2.779 | 19.1 | 1.7 | 1.80 | 7109 | 3.56 | 3.89 |
| 005021374-02 | OBS | No | 420.278477 | 199.802000 | 516.7 | 2.226 | 20.7 | 4.4 | 1.80 | 7109 | 4.82 | 4.73 |
| 005021374-03 | OBS | No | 293.691097 | 167.071123 | 255.7 | 1.237 | 22.6 | 2.7 | 1.80 | 7109 | 3.24 | 7.63 |
| 005021374-04 | OBS | No | 360.267274 | 394.667002 | 5129.8 | 16.284 | 17.9 | 4.7 | 1.80 | 7109 | 15.01 | 5.81 |
| 005021374-05 | OBS | No | 477.293906 | 312.586391 | 291.3 | 4.500 | 17.8 | -1.0 | 1.80 | 7109 | 3.10 | 3.99 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 005021374-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS |
| 005021374-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS |
| 005021374-03 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_ALT—INCONSISTENT_TRANS |
| 005021374-04 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS |
| 005021374-05 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS |

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

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

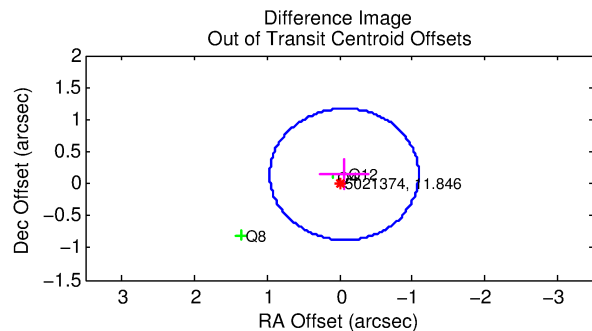
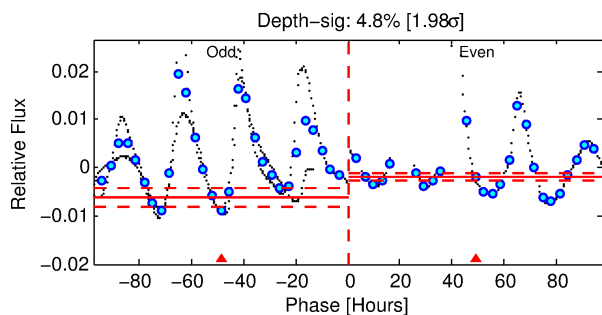
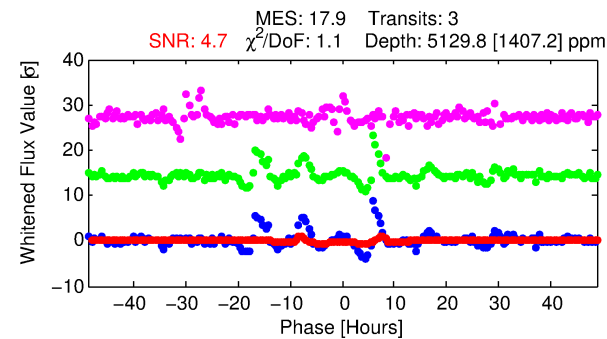
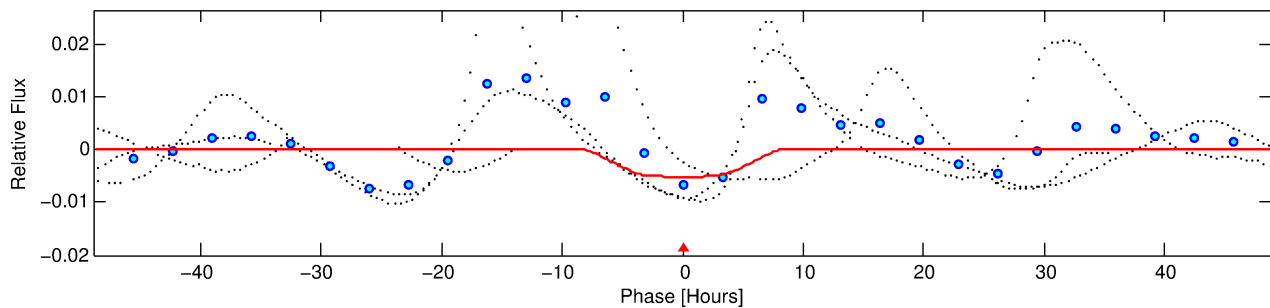
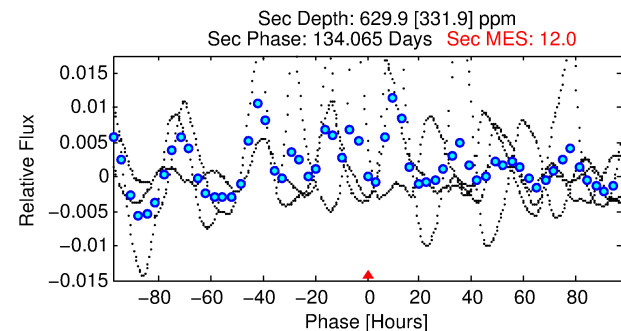
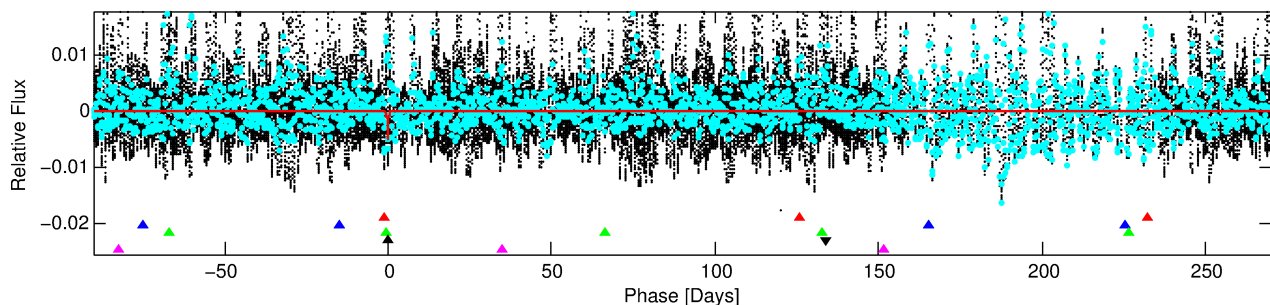
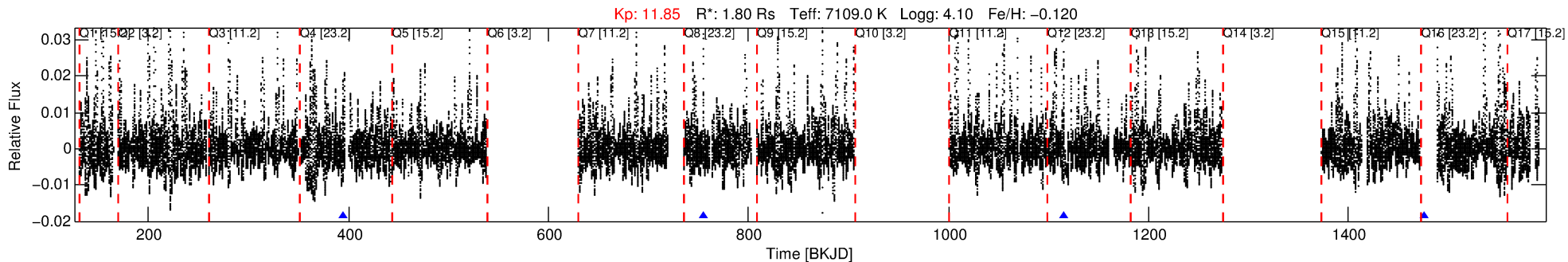
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005021374-04

No Significant Match Found

DV One-Page Summary

KIC: 5021374 Candidate: 4 of 5 Period: 360.267 d



DV Fit Results:

Period = 360.26727 [0.01040] d
Epoch = 394.6670 [0.0122] BKJD
Rp/R* = 0.0766 [0.0103]
a/R* = 100.01 [5.81]
b = 0.90 [0.01]
Seff = 5.81 [2.14]
Teq = 396 [37] K
Rp = 15.00 [4.94] Re
a = 1.1272 [0.2716] AU
Ag = 1955.47 [1330.28] [1.47σ]
Teffp = 4070 [623] K [5.89σ]

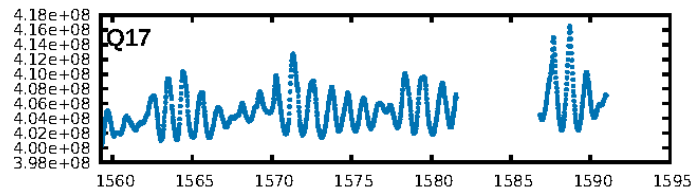
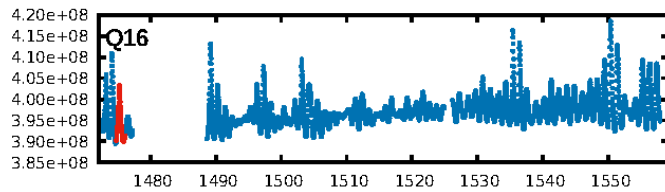
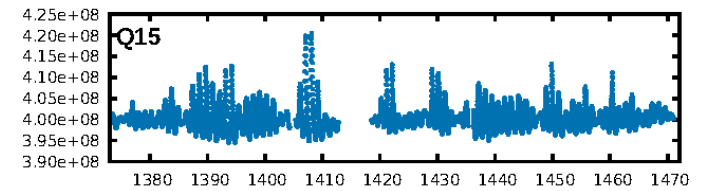
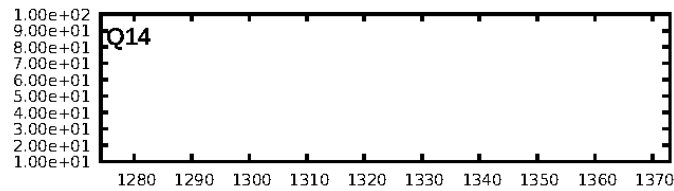
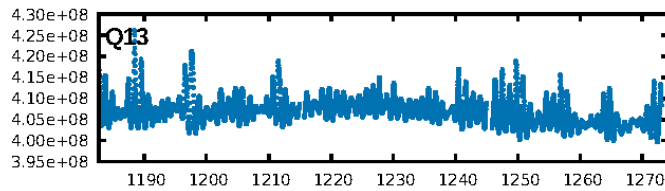
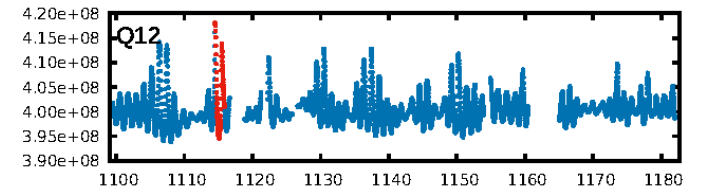
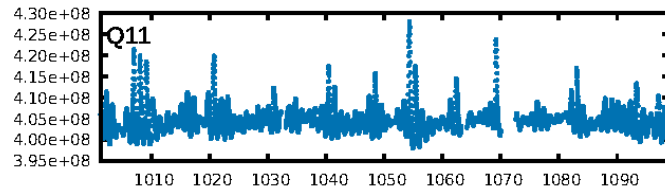
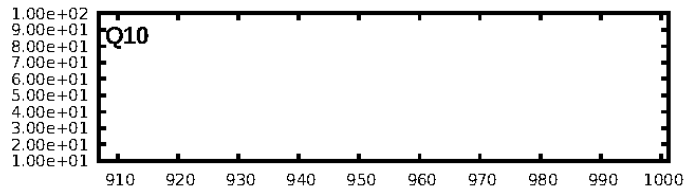
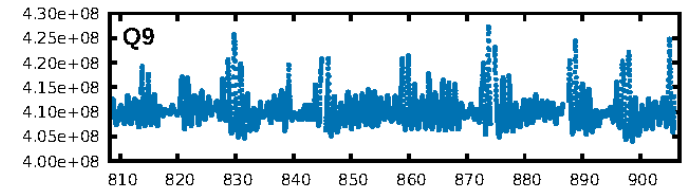
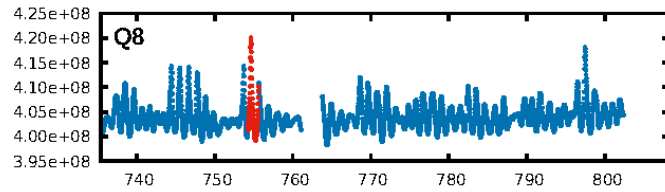
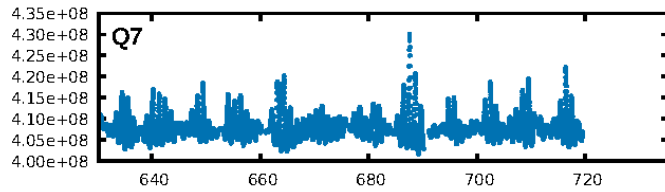
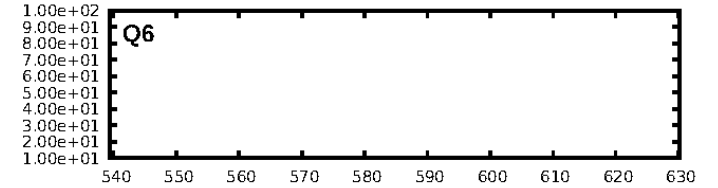
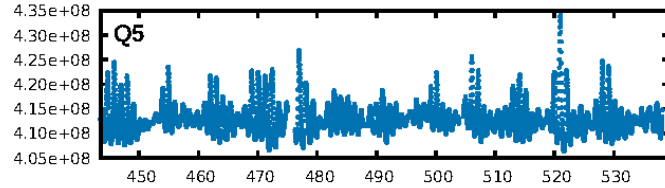
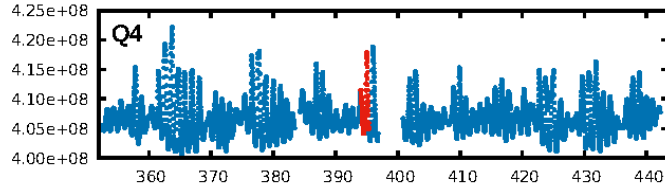
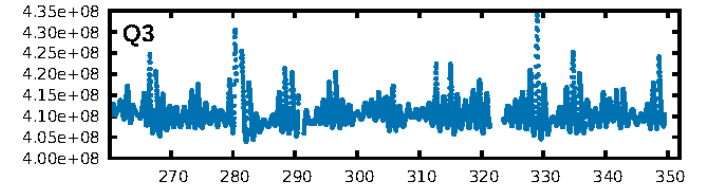
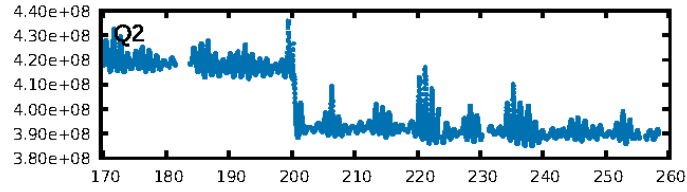
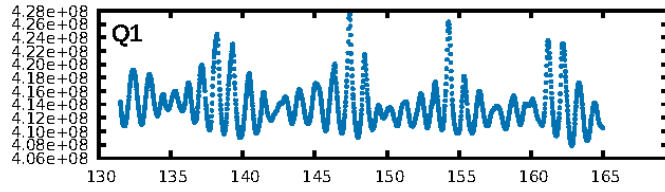
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [97.84σ]
LongPeriod-sig: 100.0% [87.63σ]
ModelChiSquare2-sig: 72.8%
ModelChiSquareGof-sig: 99.9%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 0.4785
Centroid-sig: 2.9%
Centroid-so: 0.358 arcsec [2.34σ]
OotOffset-rm: 0.159 arcsec [0.47σ]
OotOffset-st: 0/0/3/0 [3]
KicOffset-rm: 0.172 arcsec [0.35σ]
KicOffset-st: 0/0/3/0 [3]
DiffImageQuality-fgm: 1.00 [3/3]
DiffImageOverlap-fno: 0.67 [2/3]

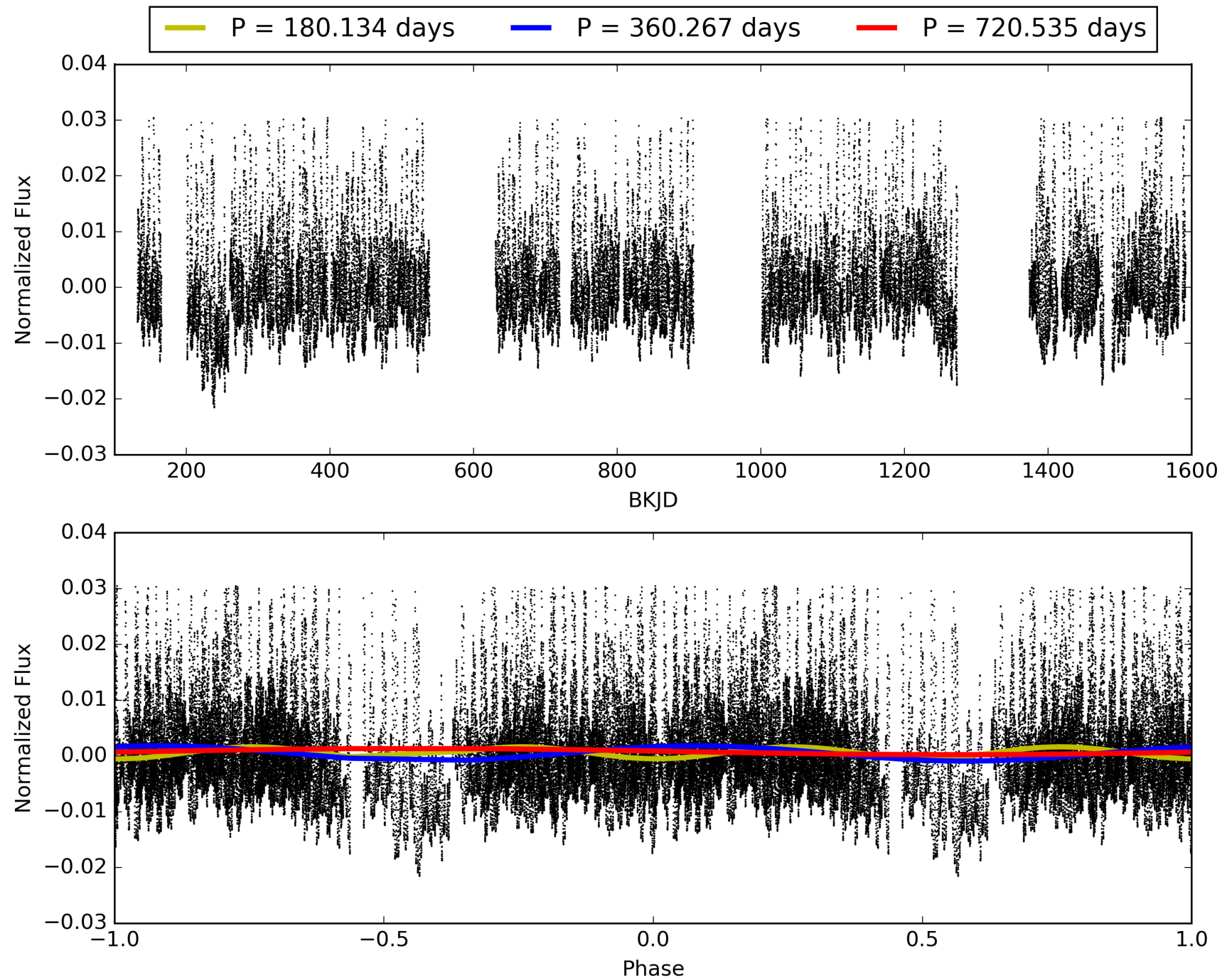
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 05:29:21 Z

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

TCE 005021374-04, PDC Light Curves

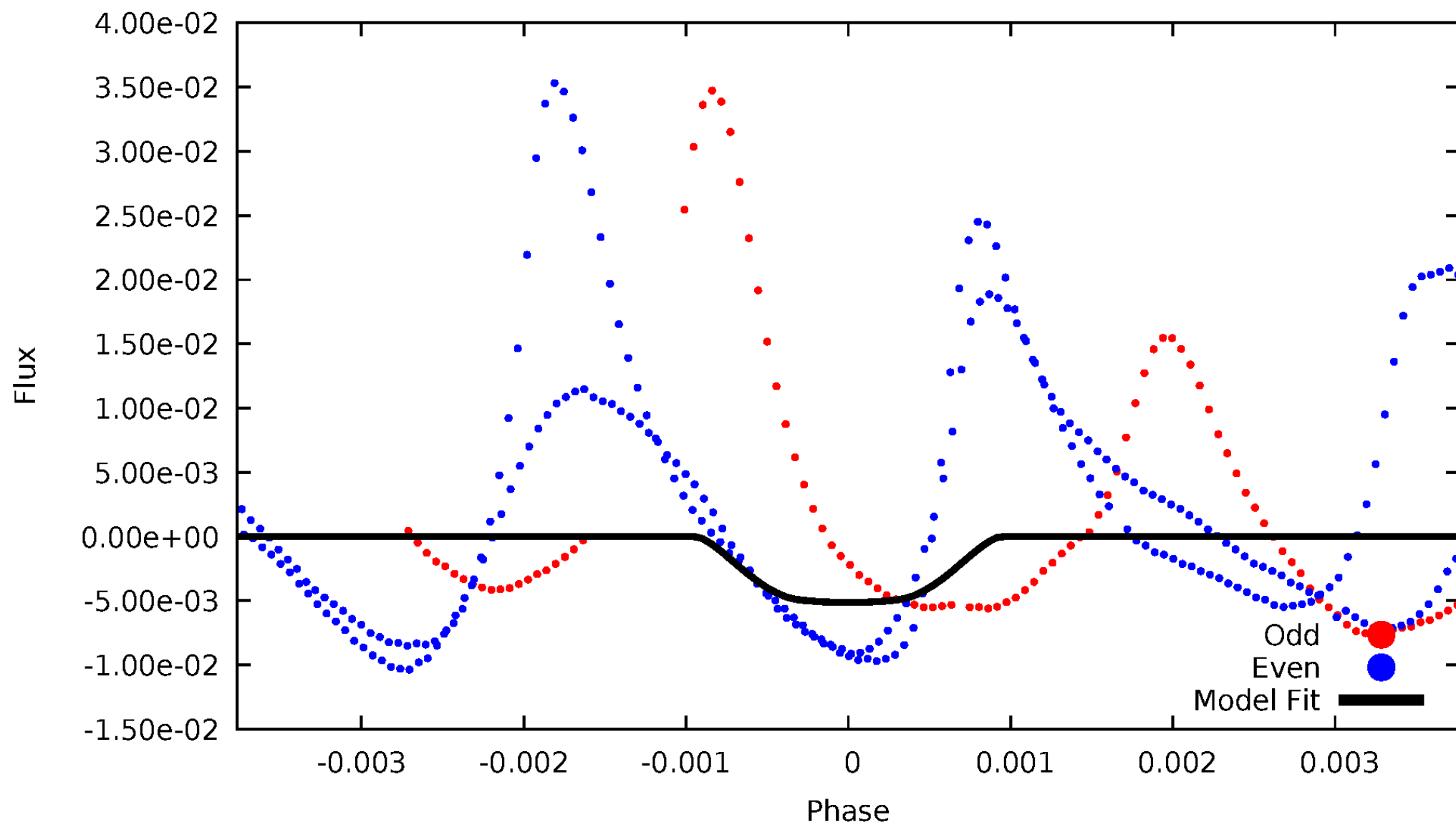


TCE 005021374-04



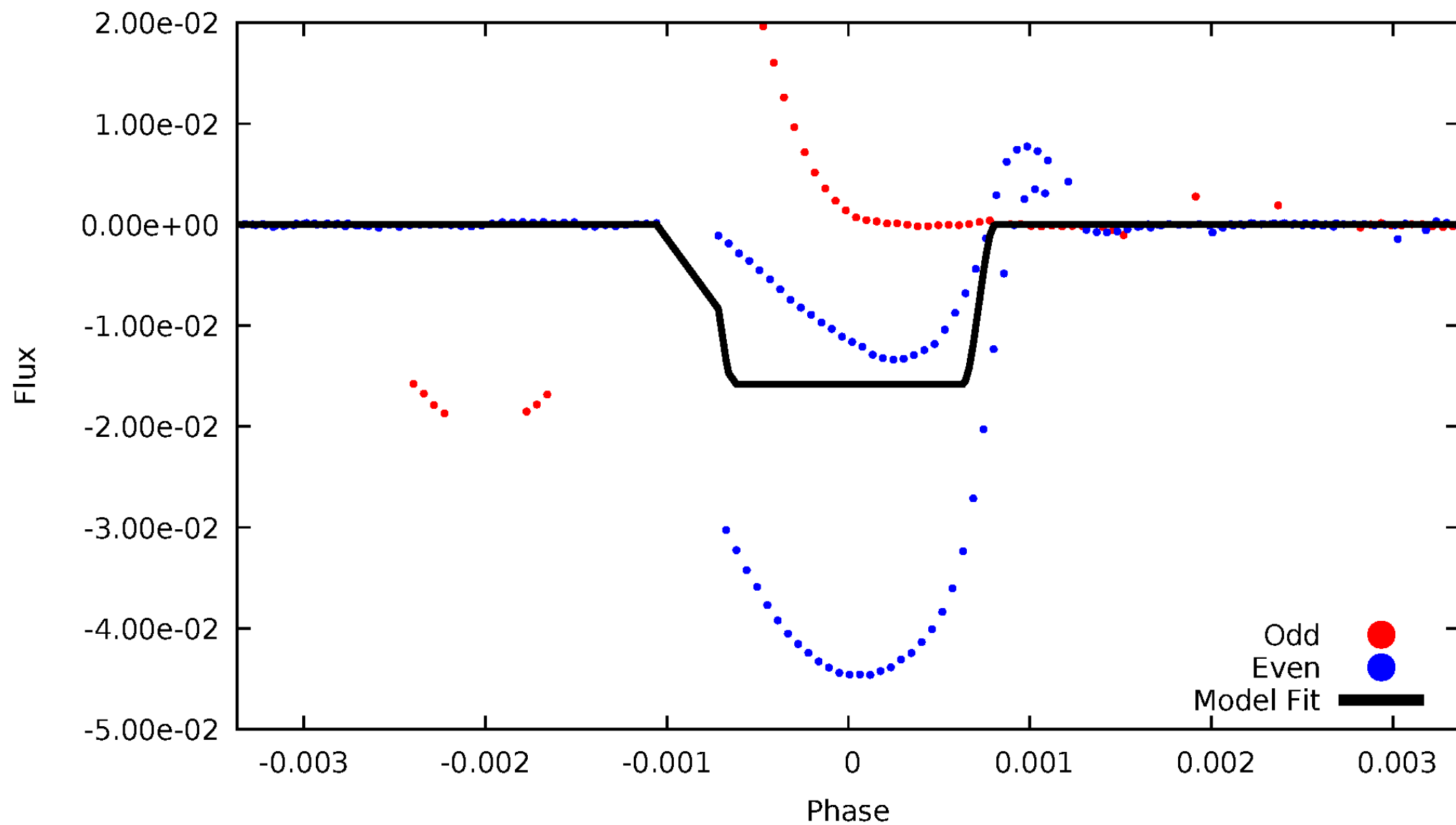
DV Odd/Even

TCE 005021374-04



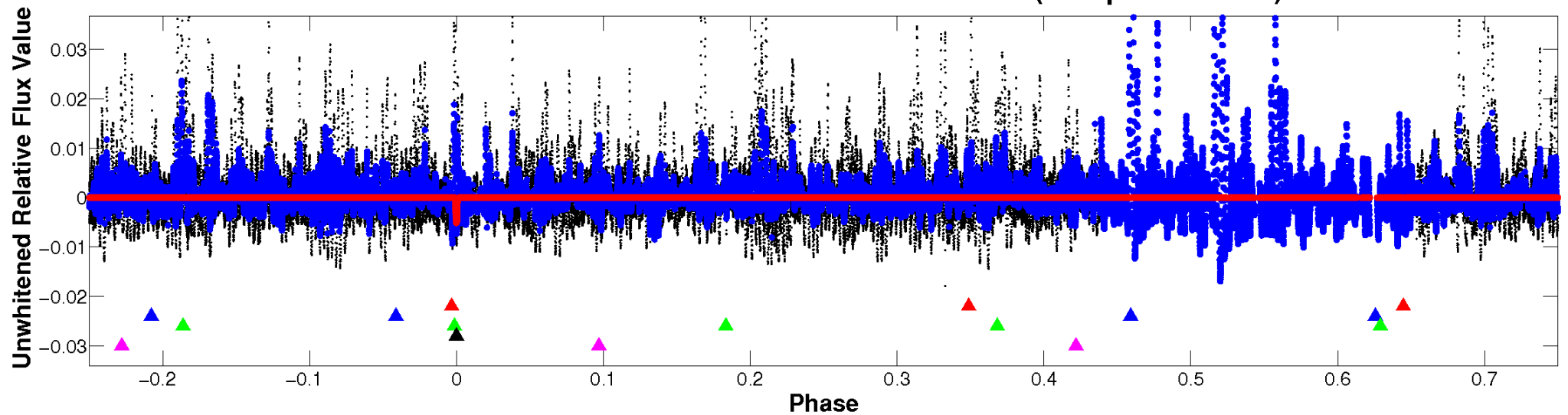
ALT Odd/Even

TCE 005021374-04

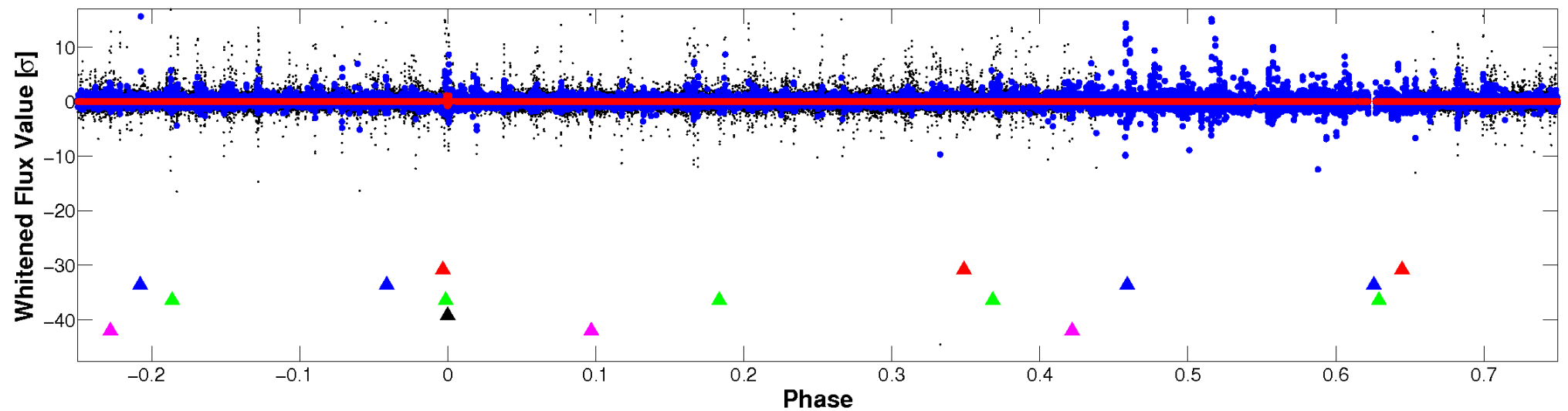


Non-Whitened Vs. Whitened Light Curve

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

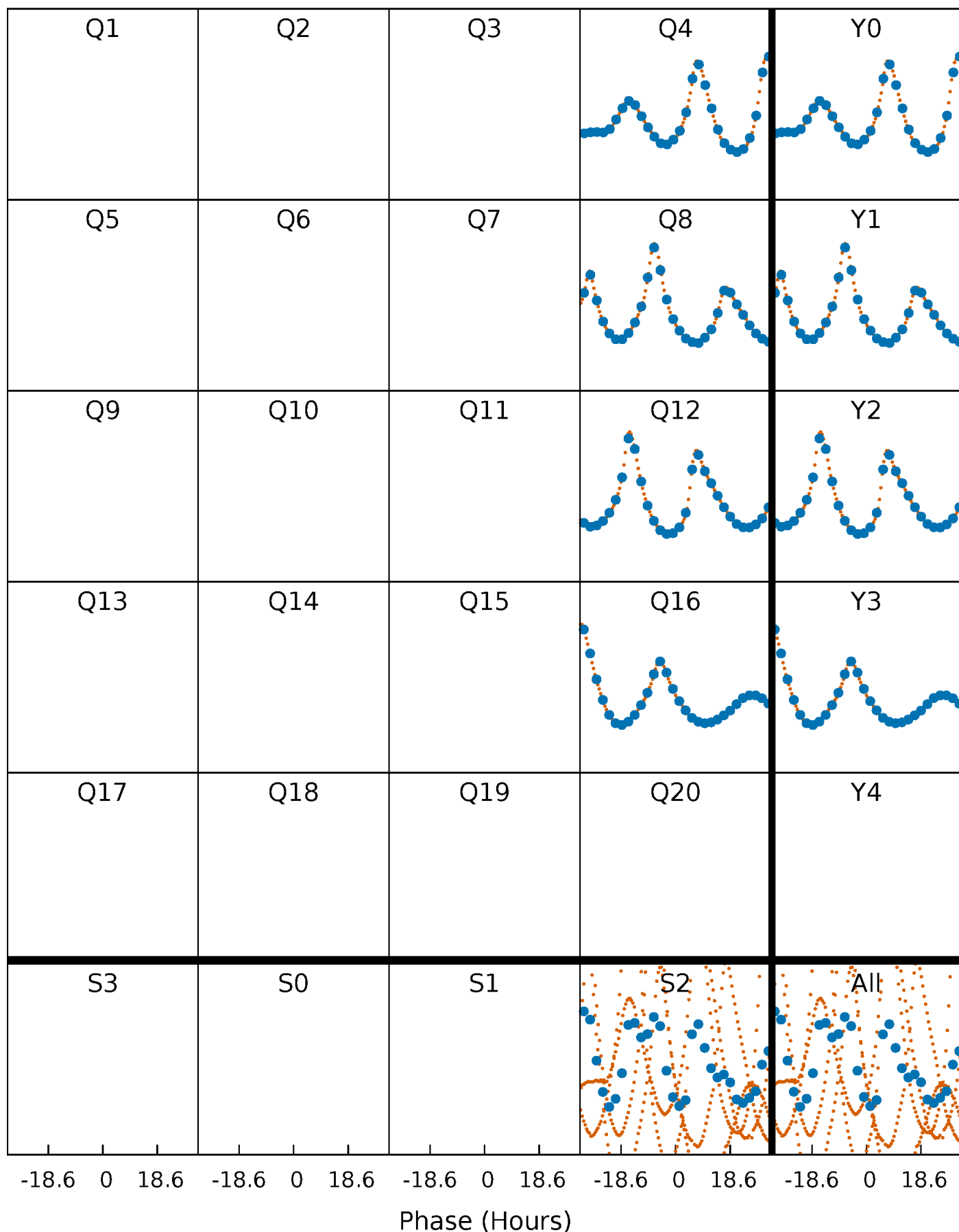


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



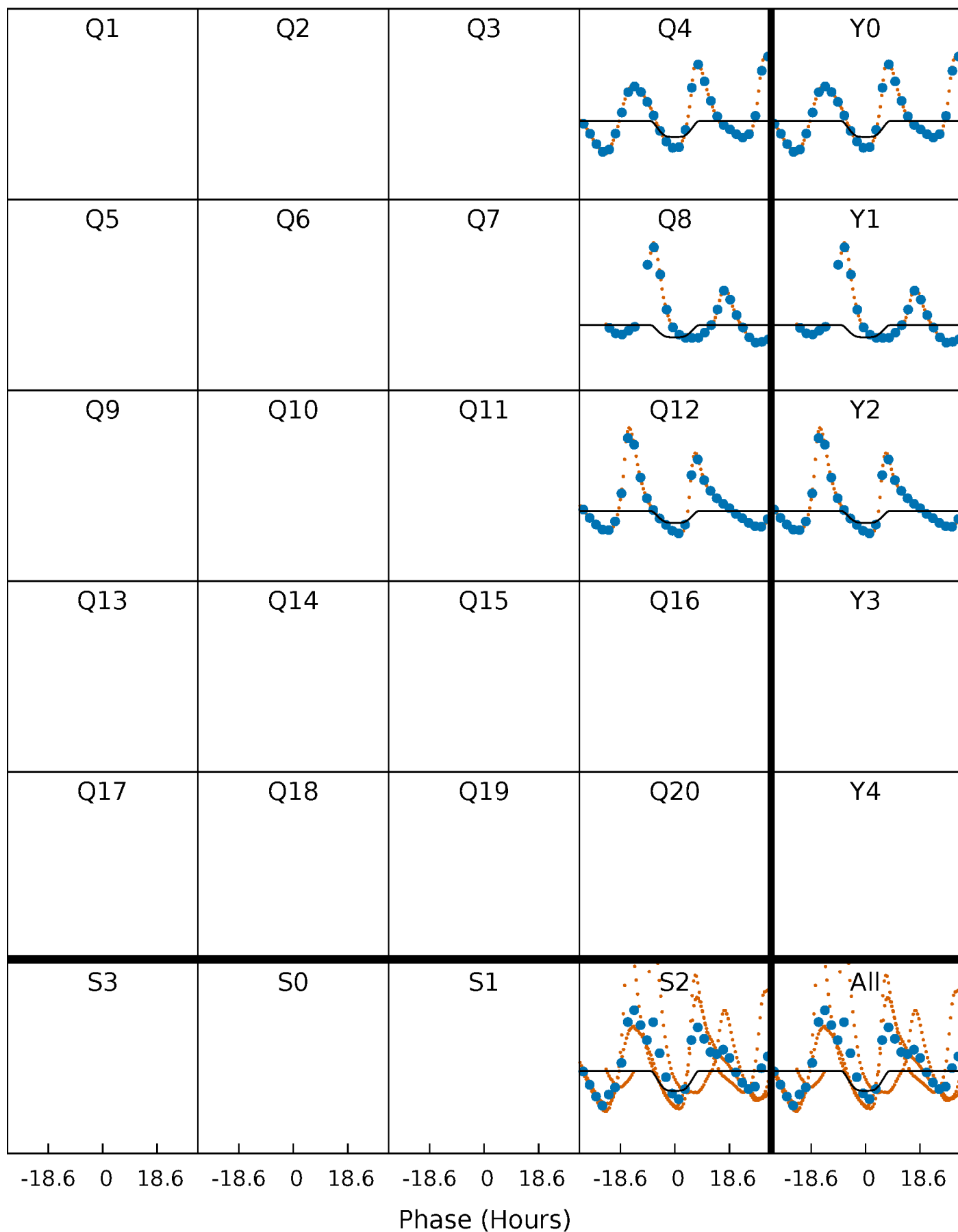
PDC Quarter-Phased Transit Curves

TCE 005021374-04 P=360.267274 Days $T_0=394.667002$ (BKJD)



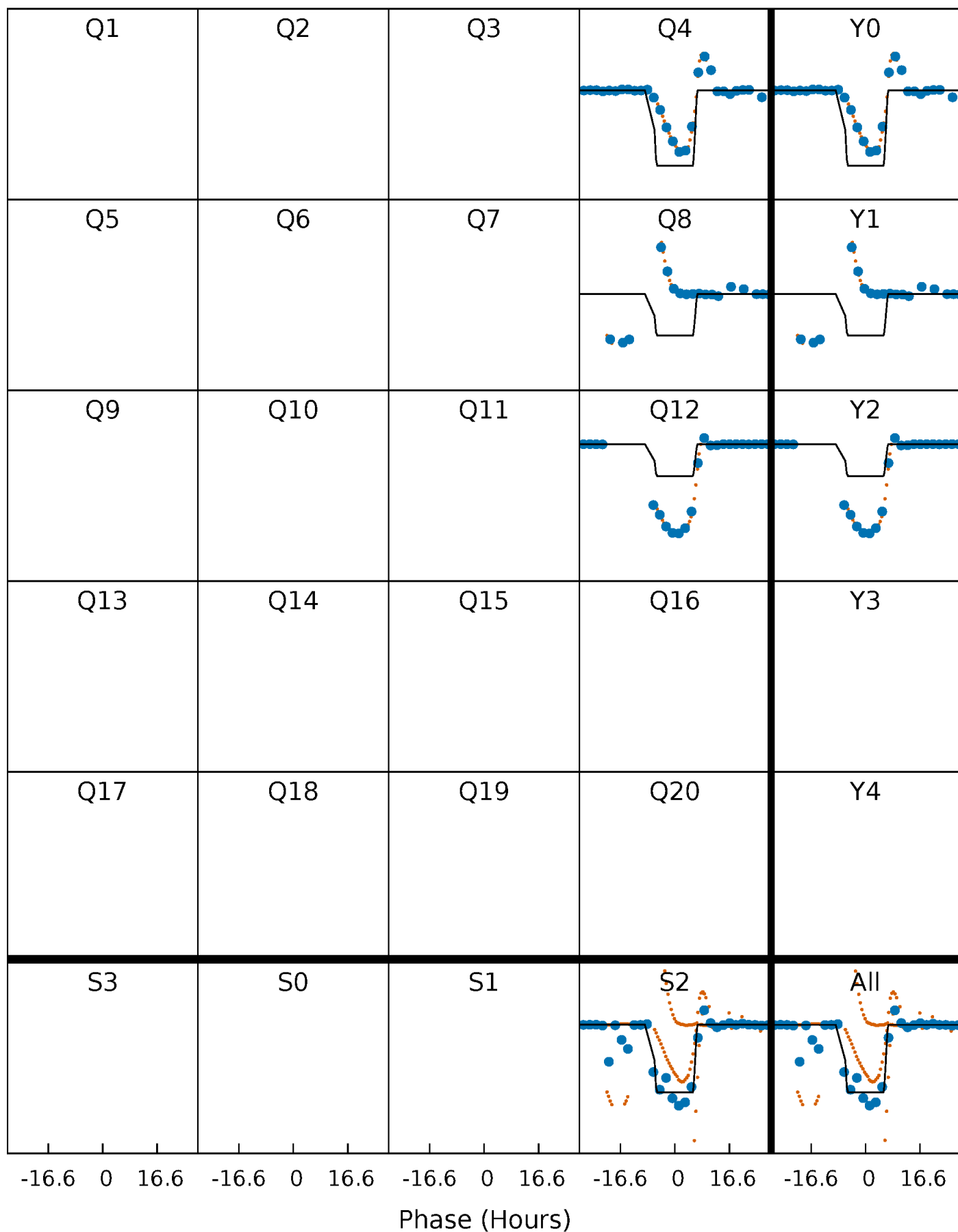
DV Quarter-Phased Transit Curves

TCE 005021374-04 $P=360.267274$ Days $T_0=394.667002$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

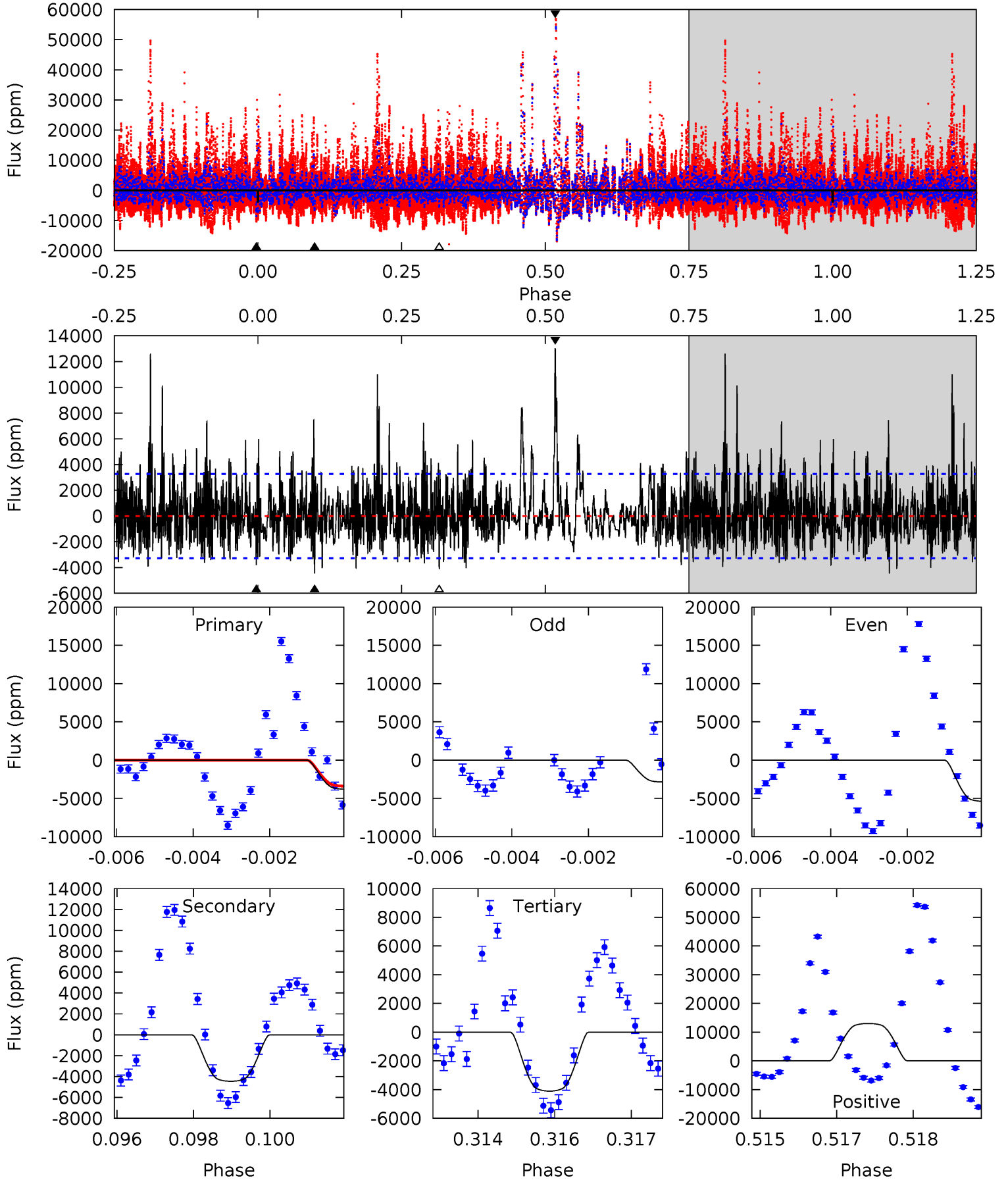
TCE 005021374-04 $P=360.257285$ Days $T_0=394.624629$ (BKJD)



DV Model-Shift Uniqueness Test

005021374-04, P = 360.267274 Days, E = 34.399728 Days

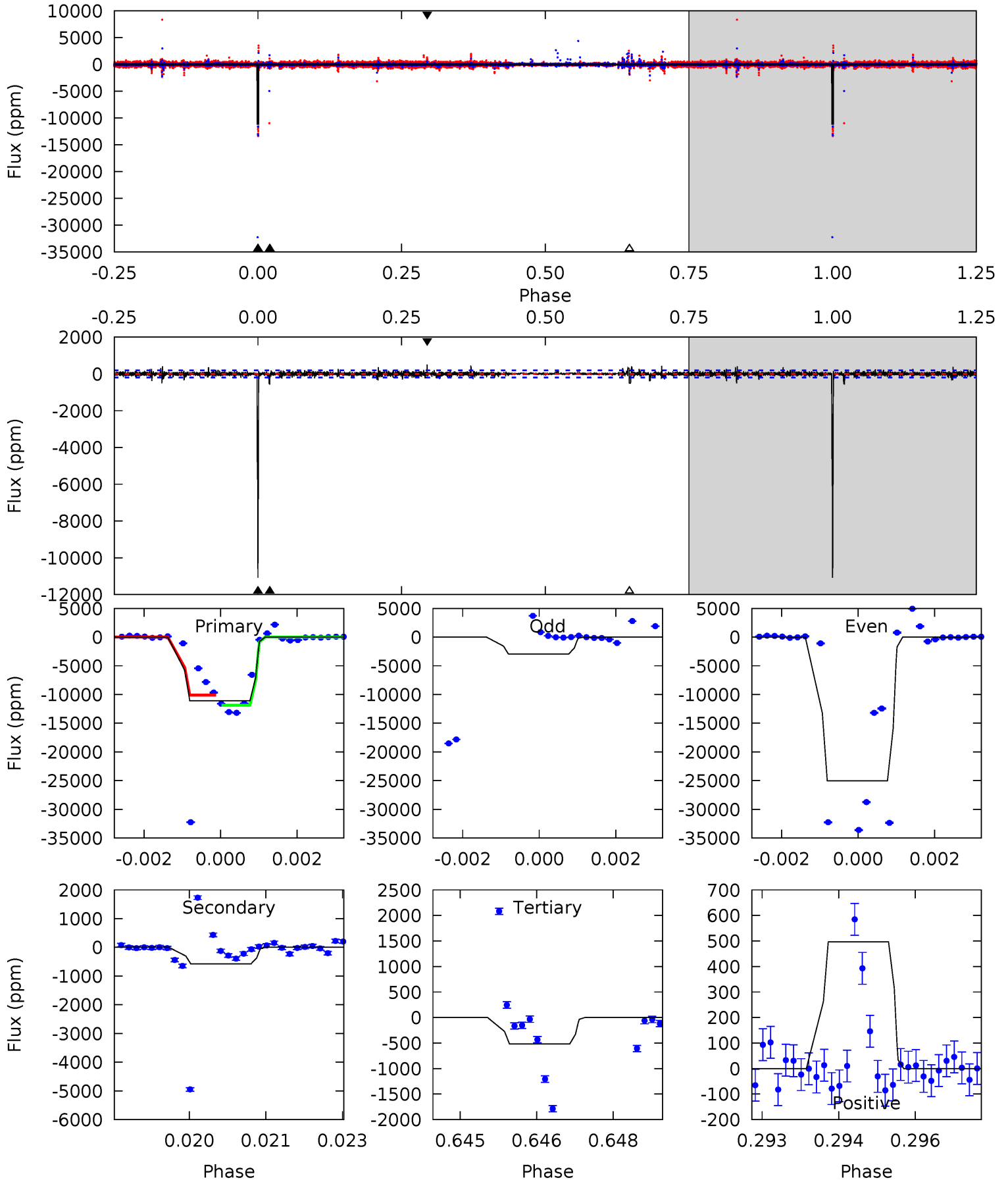
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 6.20 | 7.27 | 6.71 | 21.3 | 5.34 | 3.11 | 3.21 | -0.51 | -15.1 | 0.57 | -14.0 | 1.91 | 0.50 | 0.75 | 0.61 |



Alt Model-Shift Uniqueness Test

005021374-04, P = 360.257285 Days, E = 34.367344 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|-------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|-----|
| 310.0 | 16.1 | 14.5 | 13.9 | 5.38 | 3.17 | 1.73 | 295.5 | 296.1 | 1.60 | 2.19 | 192.3 | 1.67 | 0.04 | 0 |



Stellar Parameters For KIC 005021374

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 7109^{+175}_{-275} | $4.097^{+0.158}_{-0.175}$ | $-0.120^{+0.250}_{-0.350}$ | $1.796^{+0.539}_{-0.392}$ | $1.470^{+0.218}_{-0.239}$ | $0.358^{+0.333}_{-0.171}$ |
| | +2%/-4% | +4%/-4% | +208%/-292% | +30%/-22% | +15%/-16% | +93%/-48% |
| 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 005021374-04 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|-----------------|-------------------------|----------------------|----------------------|-------------------------|
| DV | -4456 ± 613 | $14.92^{+2.93}_{-2.66}$ | 553^{+40}_{-38} | 6609^{+612}_{-555} | 13824^{+6922}_{-4491} |
| Alt. | -575 ± 36 | $24.47^{+4.45}_{-3.41}$ | 551^{+41}_{-38} | 3543^{+124}_{-123} | 661^{+226}_{-178} |

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

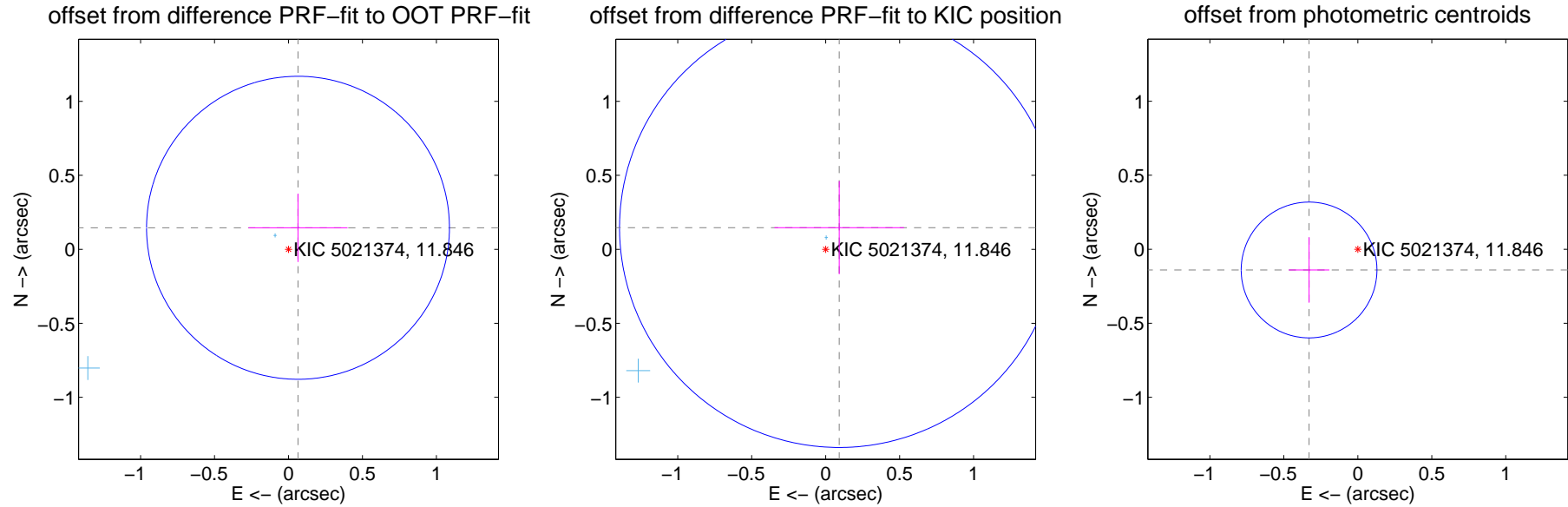
DV Centroid Data

Supplemental centroid analysis for 005021374-04. **Kepler magnitude: 11.85.** Transit SNR 4.69

There are 3 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT | 0.159 ± 0.341 | 0.47 | -0.064 ± 0.335 | 0.146 ± 0.231 |
| PRF-fit source offset from KIC position | 0.172 ± 0.495 | 0.35 | -0.092 ± 0.438 | 0.146 ± 0.315 |
| photometric centroid source offset | 0.36 ± 0.15 | 2.34 | 0.33 ± 0.14 | -0.14 ± 0.22 |



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 no difference image



Q2 no OOT image



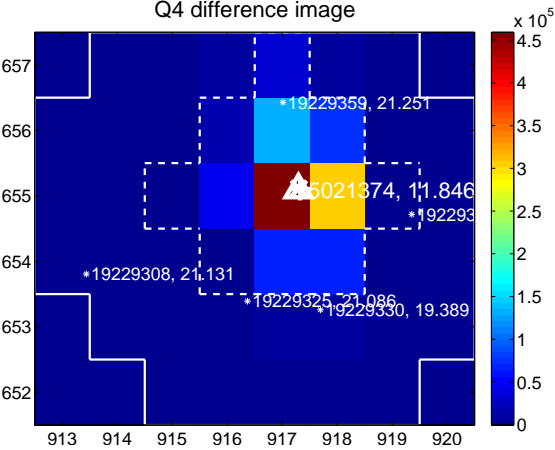
Q3 no difference image



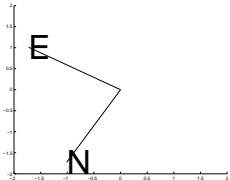
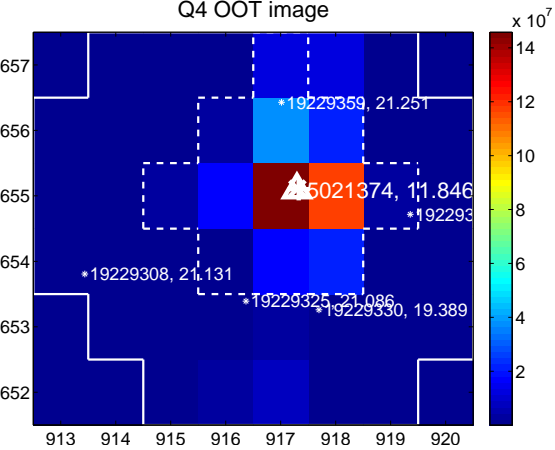
Q3 no OOT image



Q4 difference image



Q4 OOT image



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

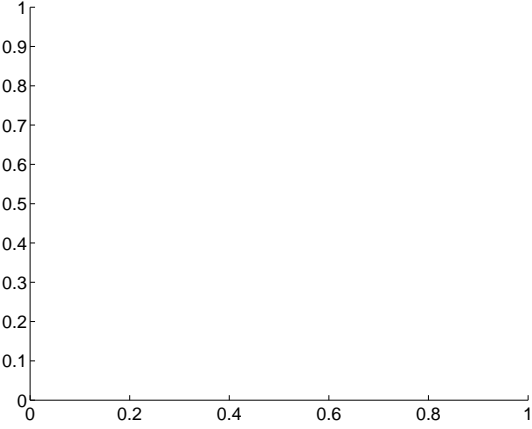
Q5 no difference image



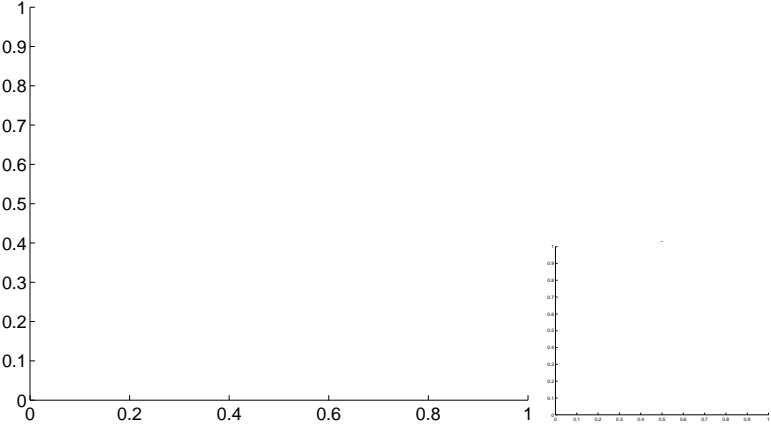
Q5 no OOT image



Q6 no difference image



Q6 no OOT image



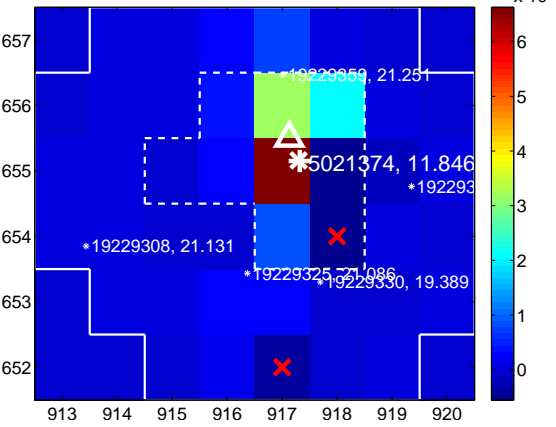
Q7 no difference image



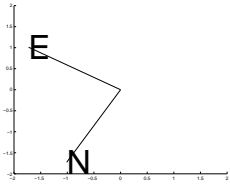
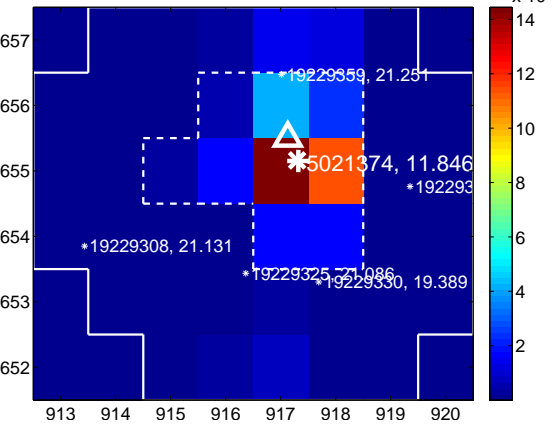
Q7 no OOT image



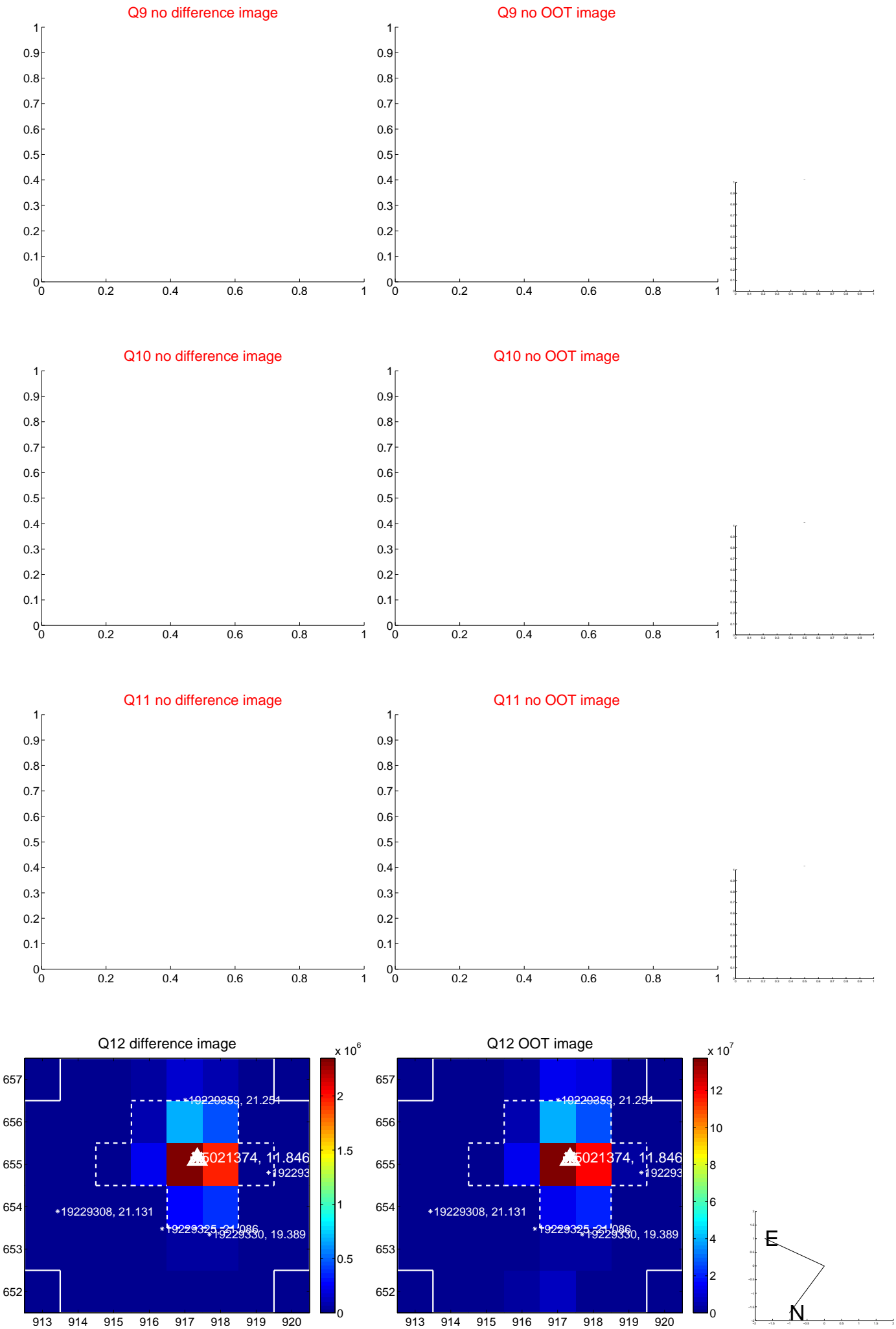
Q8 difference image



Q8 OOT image



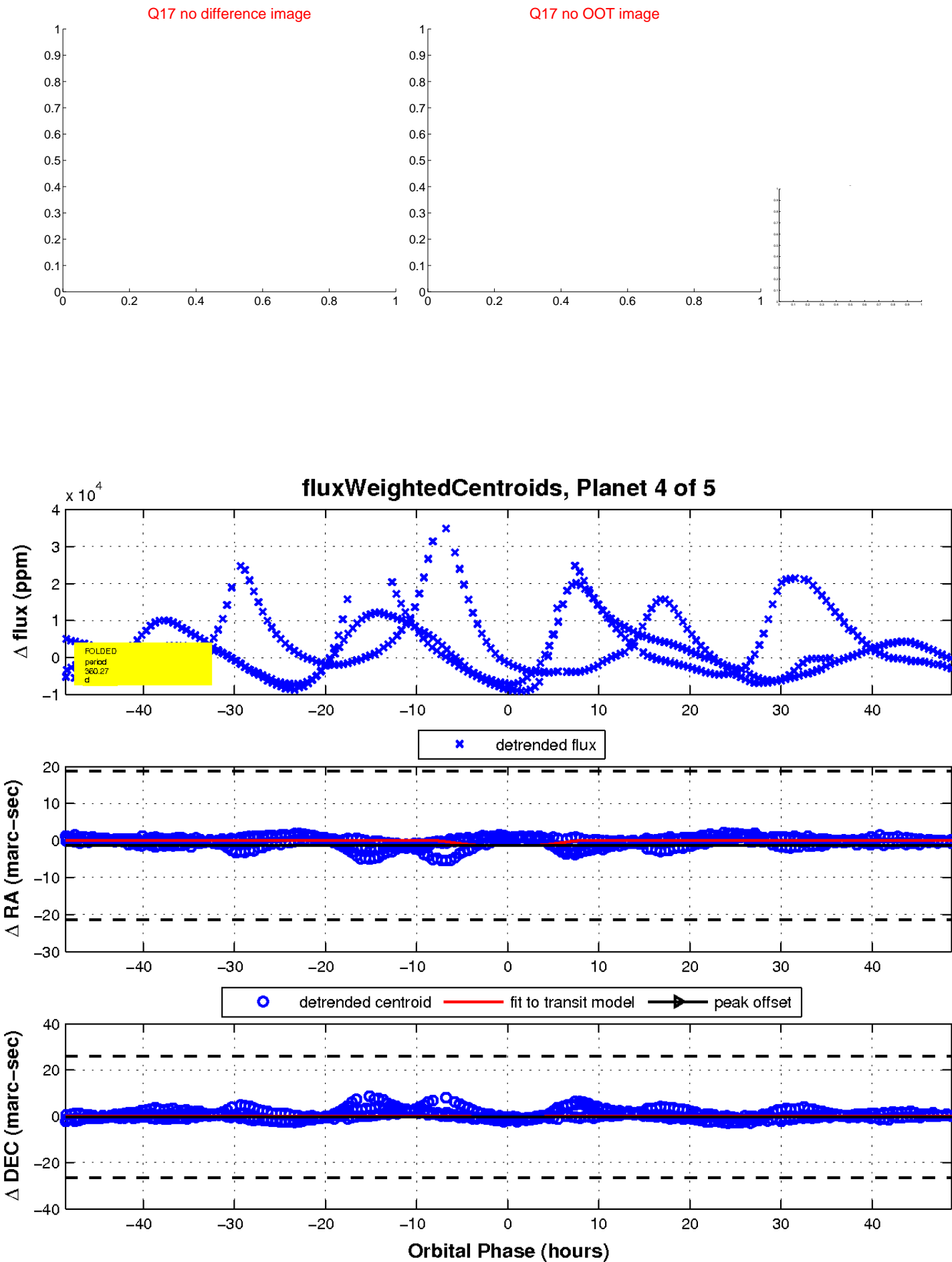
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



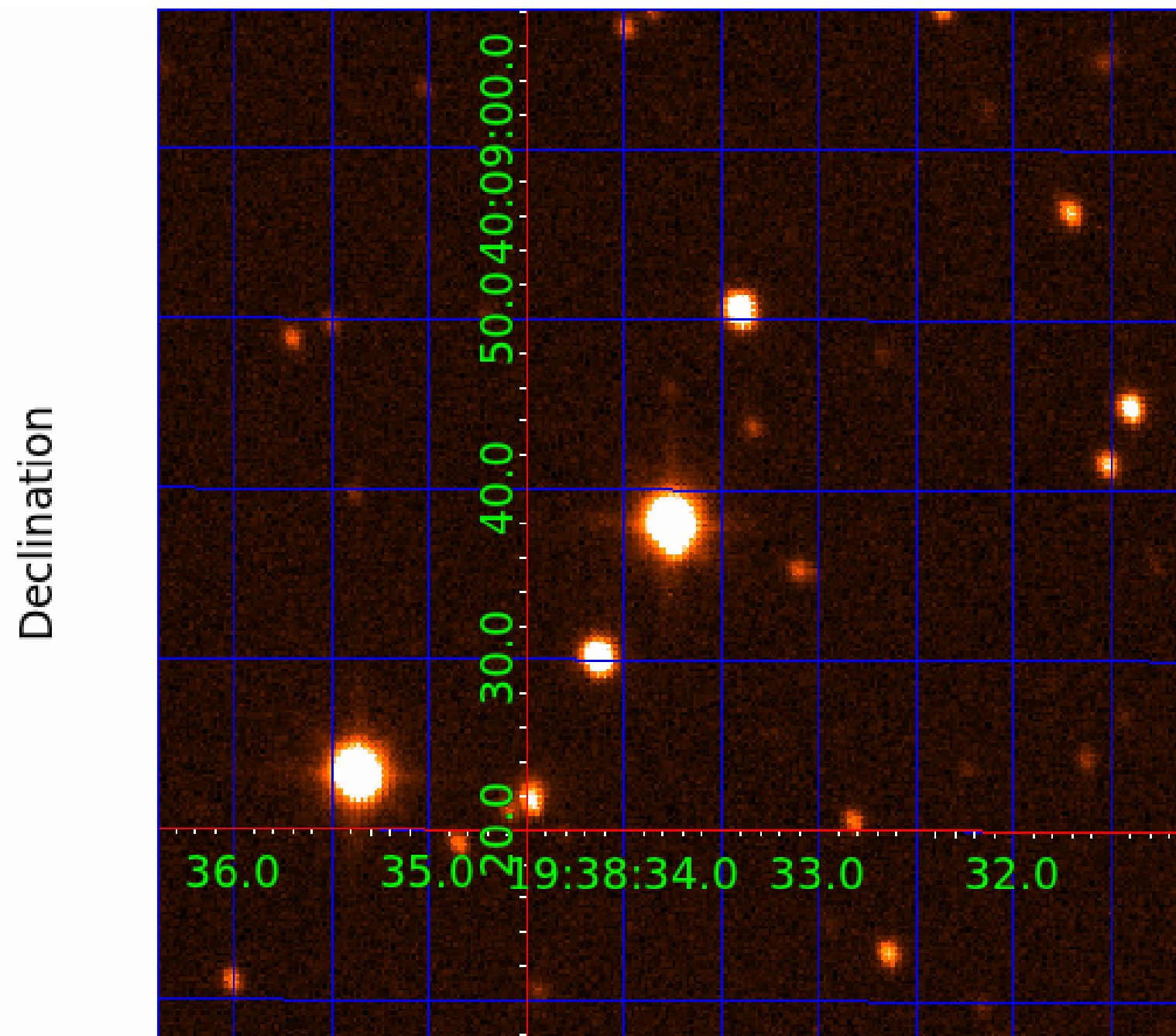
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 005021374

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 005021374-01 | OBS | No | 487.094165 | 266.667169 | 348.2 | 2.779 | 19.1 | 1.7 | 1.80 | 7109 | 3.56 | 3.89 |
| 005021374-02 | OBS | No | 420.278477 | 199.802000 | 516.7 | 2.226 | 20.7 | 4.4 | 1.80 | 7109 | 4.82 | 4.73 |
| 005021374-03 | OBS | No | 293.691097 | 167.071123 | 255.7 | 1.237 | 22.6 | 2.7 | 1.80 | 7109 | 3.24 | 7.63 |
| 005021374-04 | OBS | No | 360.267274 | 394.667002 | 5129.8 | 16.284 | 17.9 | 4.7 | 1.80 | 7109 | 15.01 | 5.81 |
| 005021374-05 | OBS | No | 477.293906 | 312.586391 | 291.3 | 4.500 | 17.8 | -1.0 | 1.80 | 7109 | 3.10 | 3.99 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 005021374-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS |
| 005021374-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS |
| 005021374-03 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_ALT—INCONSISTENT_TRANS |
| 005021374-04 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS |
| 005021374-05 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

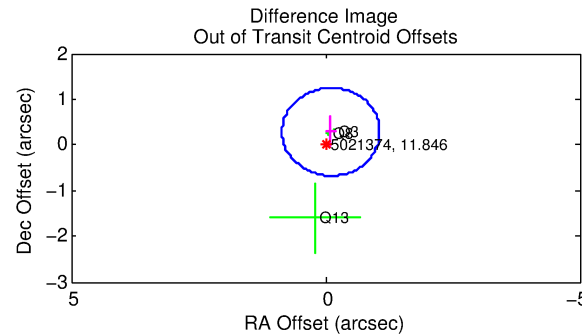
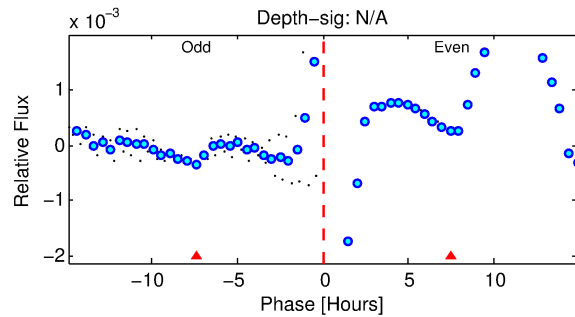
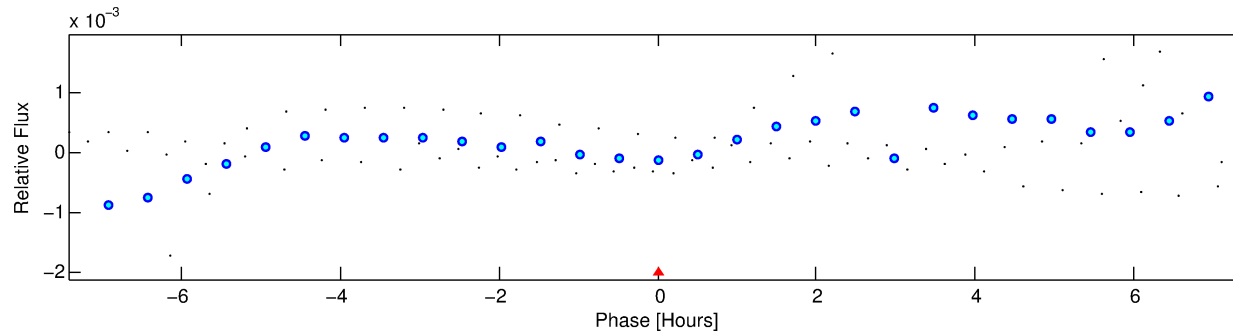
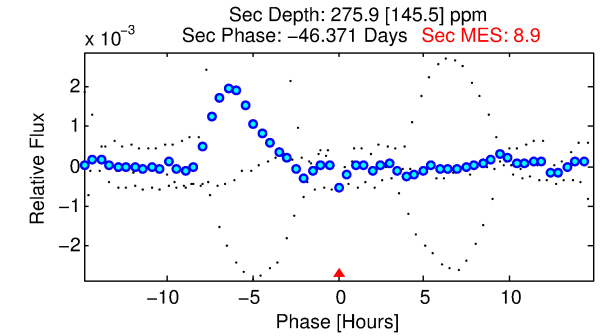
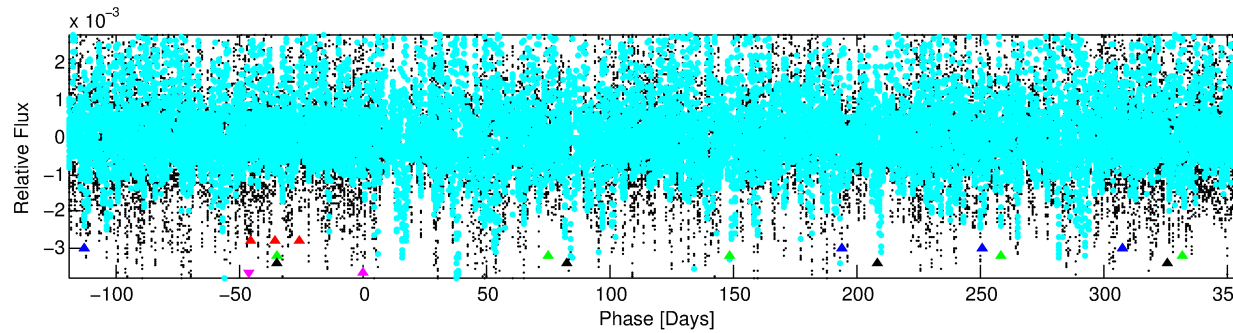
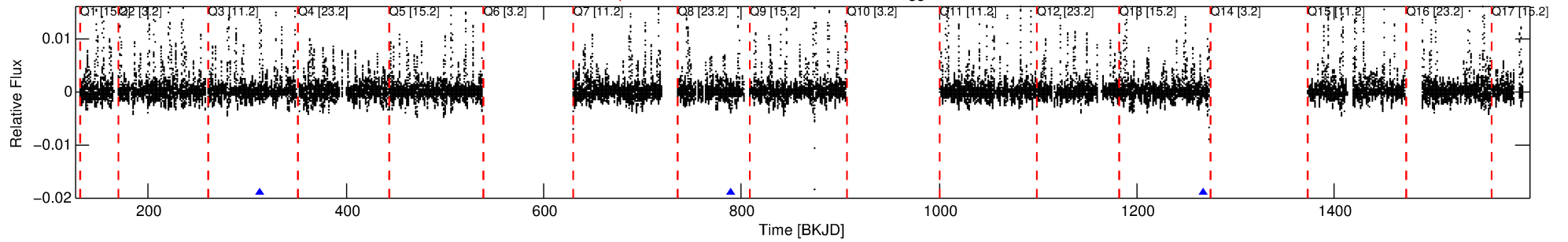
Ephemeris Match Information For 005021374-05

No Significant Match Found

DV One-Page Summary

KIC: 5021374 Candidate: 5 of 5 Period: 477.294 d

Kp: 11.85 R*: 1.80 Rs Teff: 7109.0 K Logg: 4.10 Fe/H: -0.120



TPS TCE Results:

Period = 477.29391 d
Epoch = 312.5864 BKJD

DV fit results are unavailable

DV Diagnostic Results:

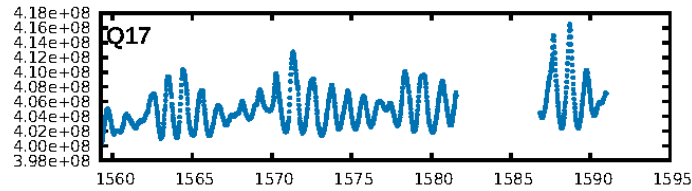
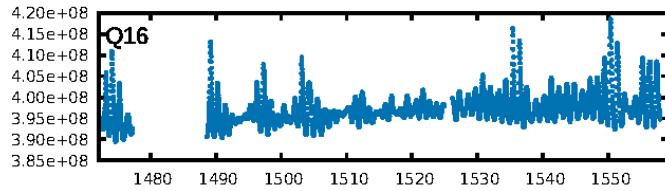
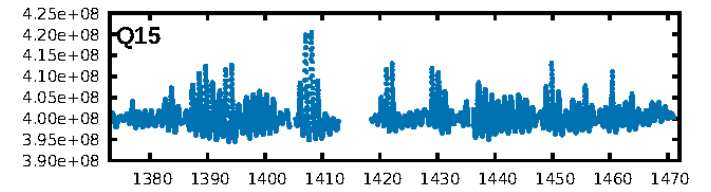
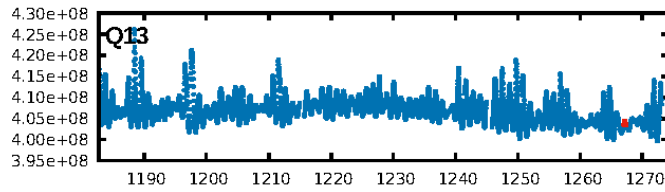
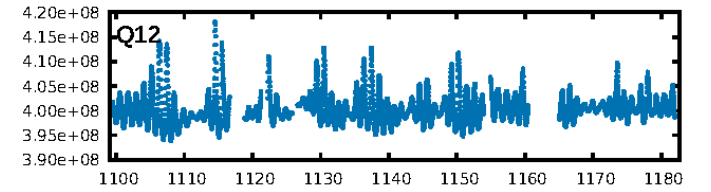
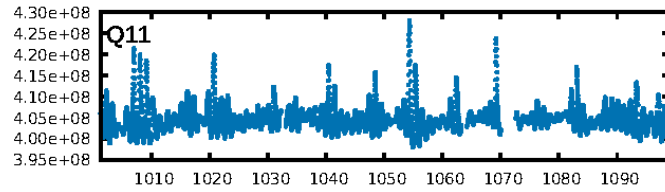
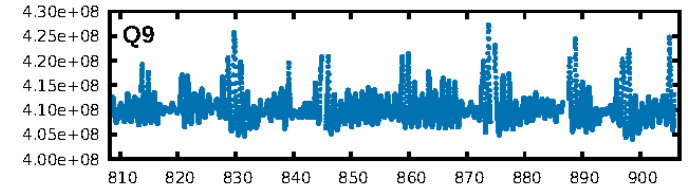
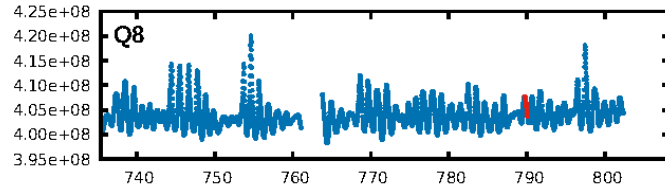
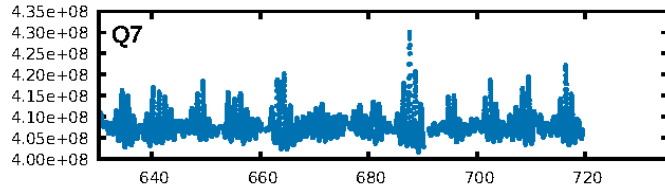
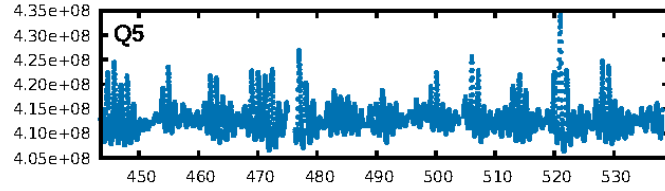
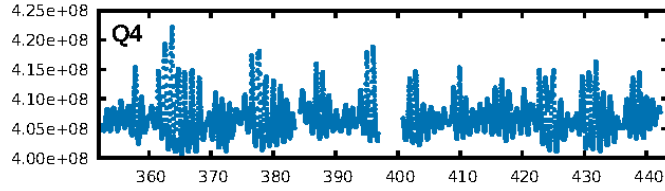
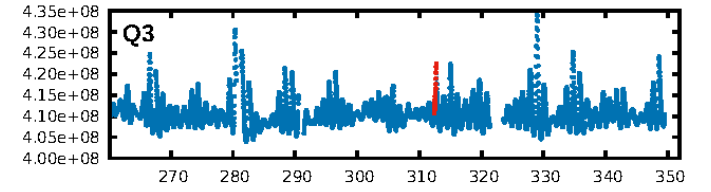
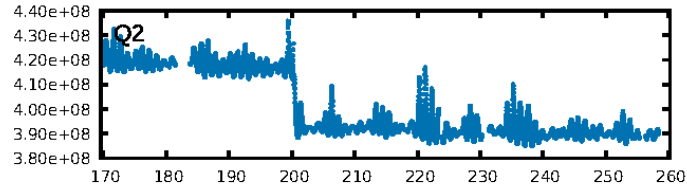
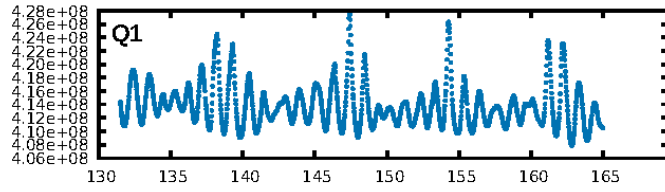
ShortPeriod-sig: 100.0% [272.56 σ]
LongPeriod-sig: 100.0% [44.47 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 0.7382

Centroid-sig: 7.0%
Centroid-so: 4.269 arcsec [1.42 σ]
OotOffset-rm: 0.305 arcsec [0.95 σ]
KicOffset-rm: 0.310 arcsec [0.39 σ]
OotOffset-st: 0/1/1/1 [3]
KicOffset-st: 0/1/1/1 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

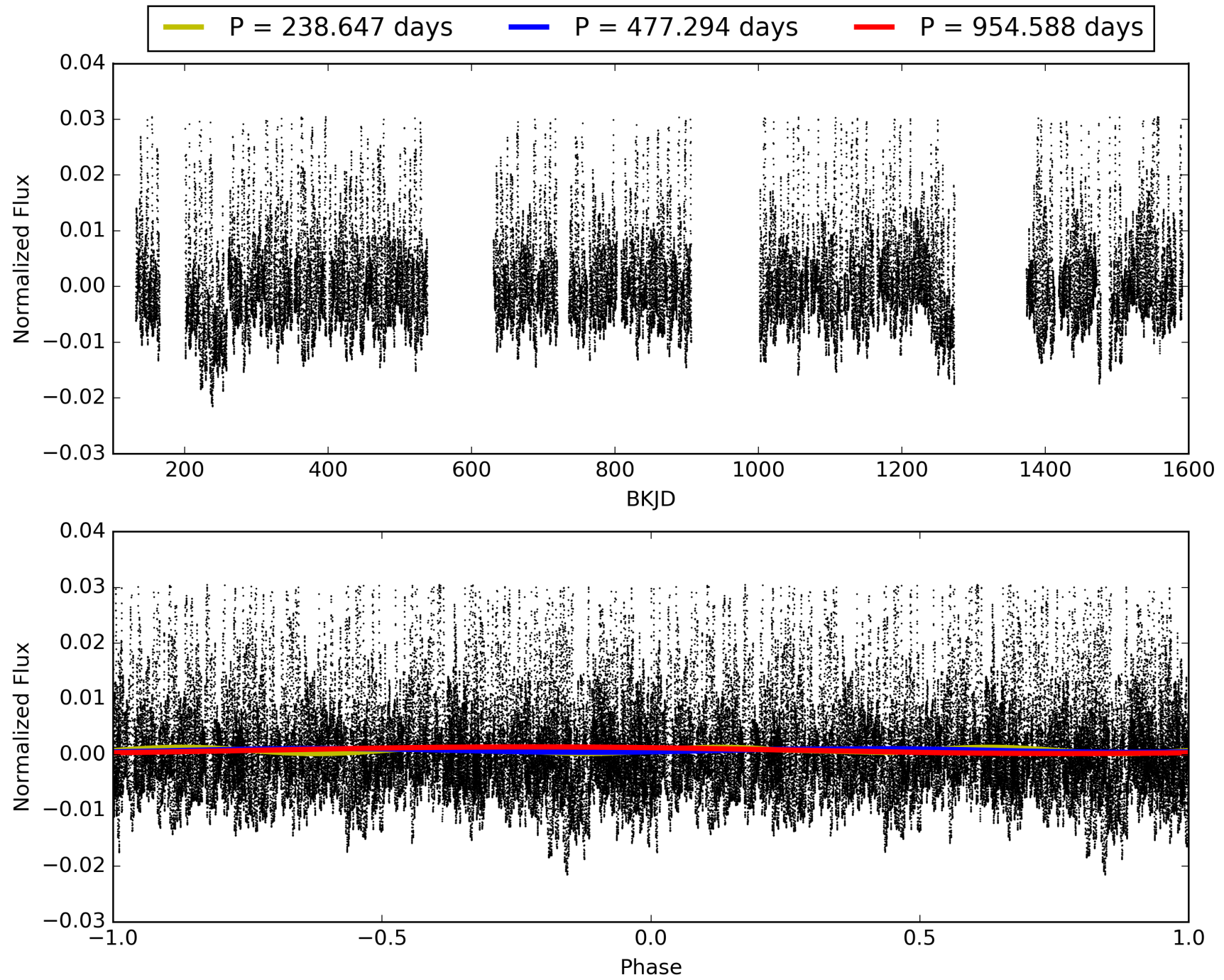
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 05:29:41 Z

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

TCE 005021374-05, PDC Light Curves

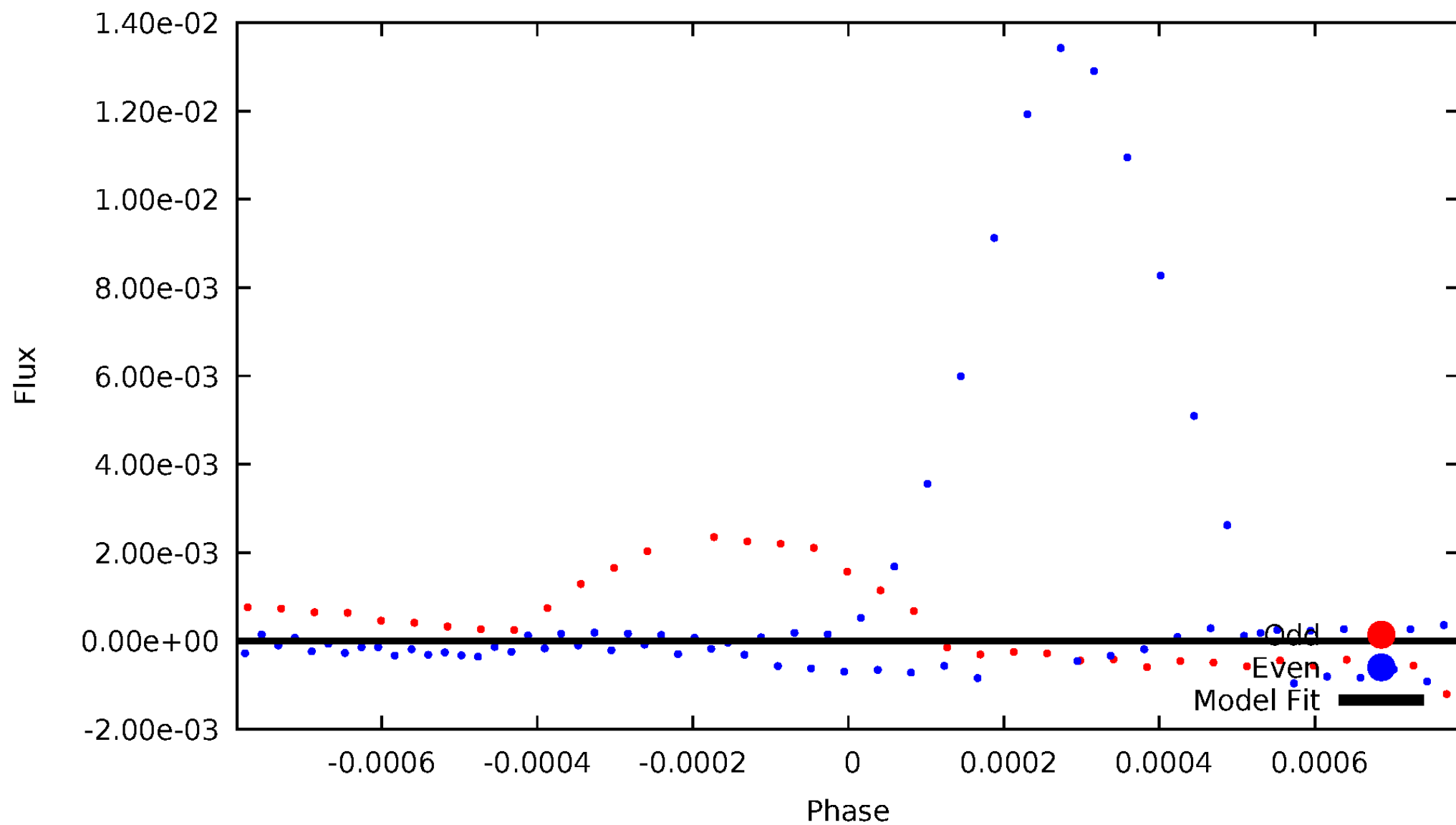


TCE 005021374-05



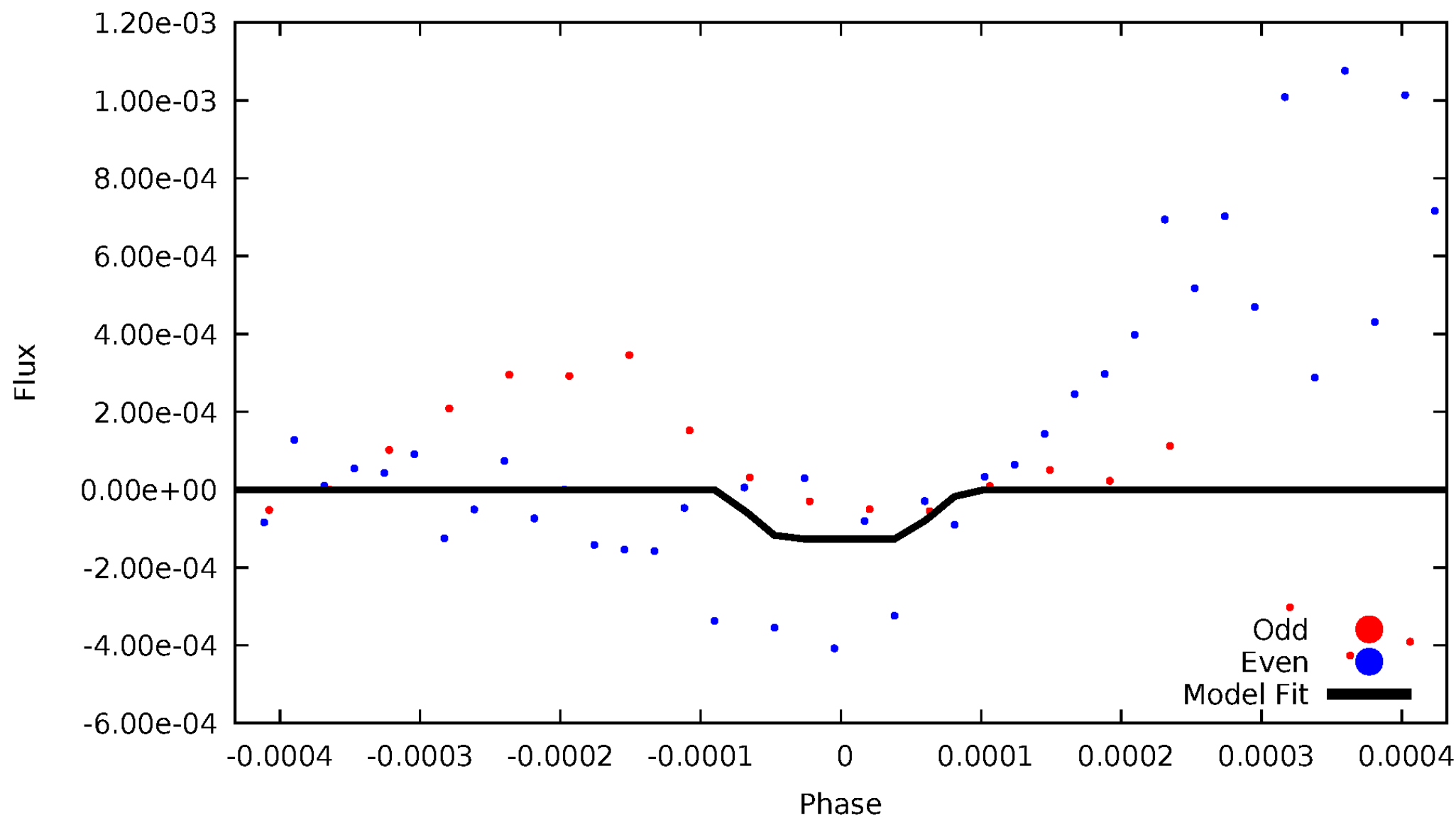
DV Odd/Even

TCE 005021374-05



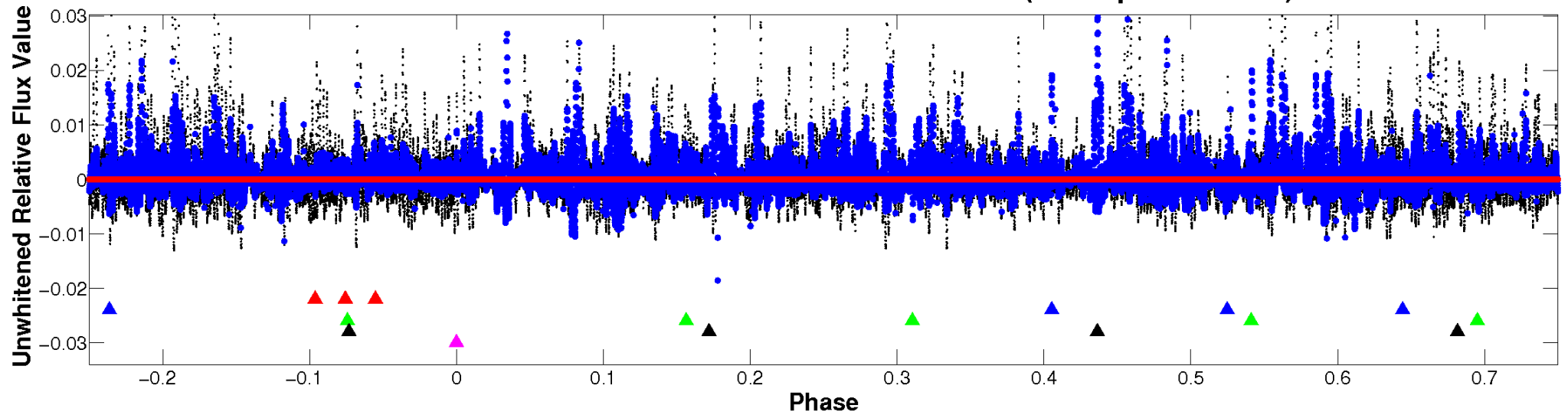
ALT Odd/Even

TCE 005021374-05



Non-Whitened Vs. Whitened Light Curve

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

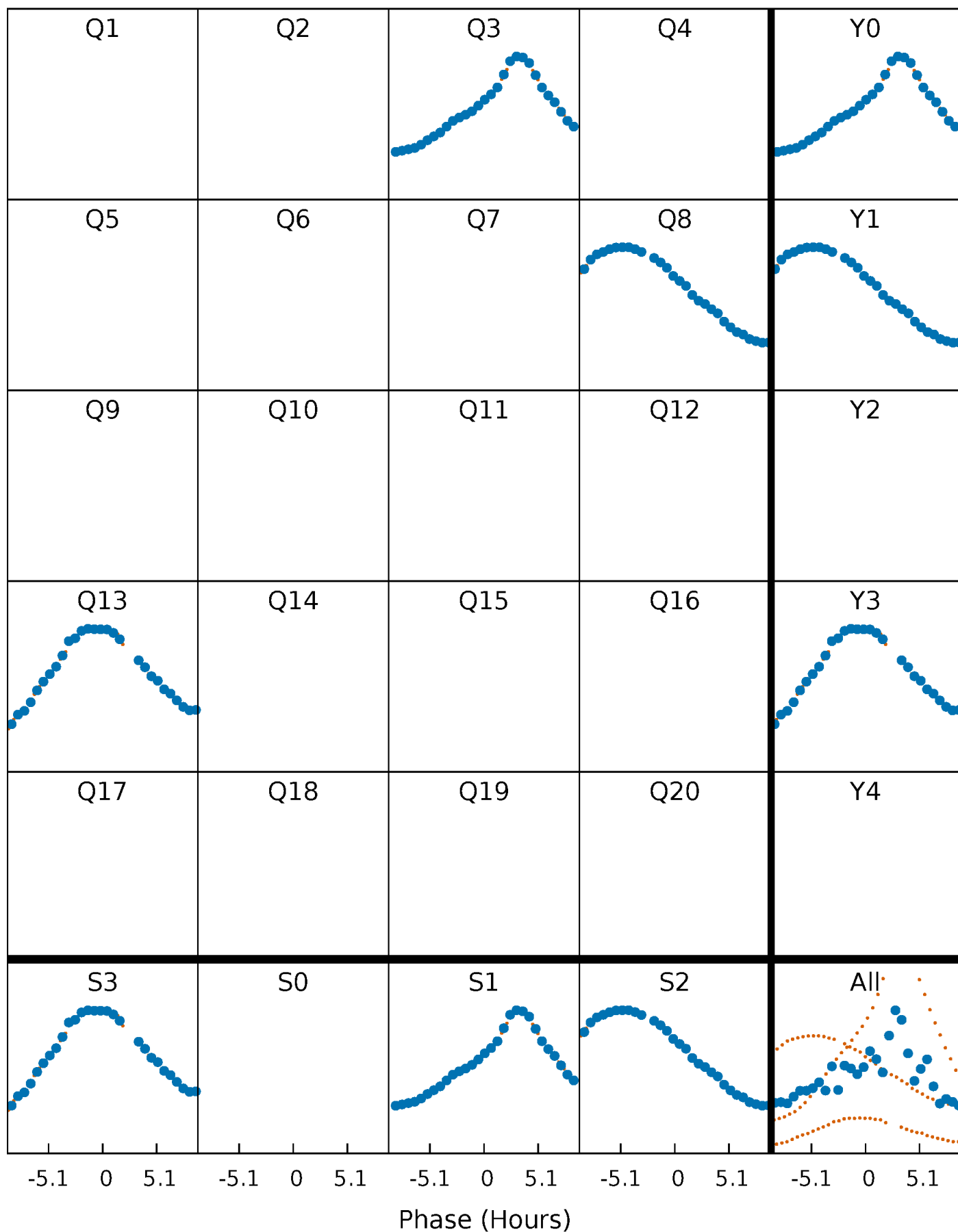


Planet 5 : Phased Whitened Flux Time Series (TPS Epoch/Period)



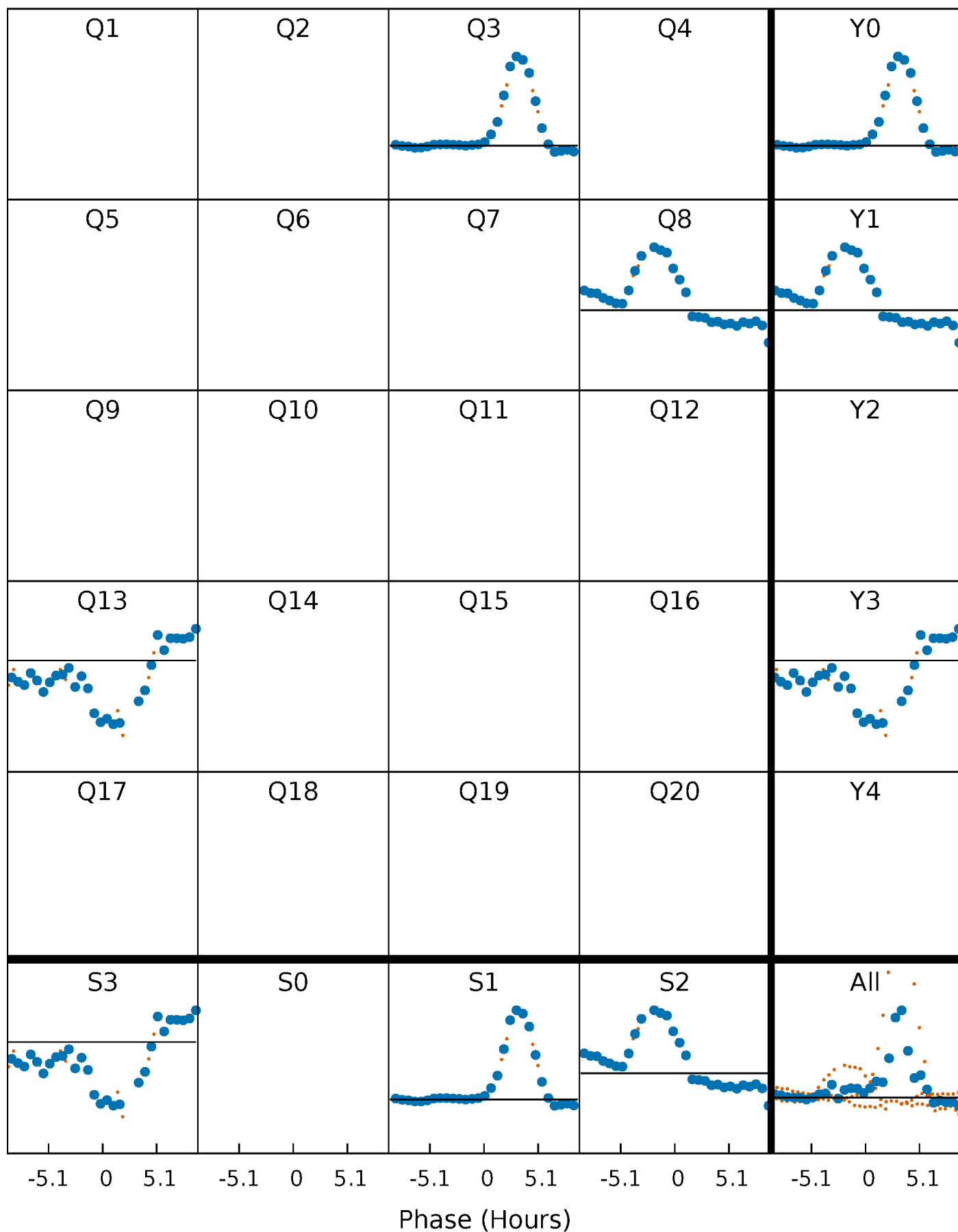
PDC Quarter-Phased Transit Curves

TCE 005021374-05 $P=477.293906$ Days $T_0=312.586391$ (BKJD)



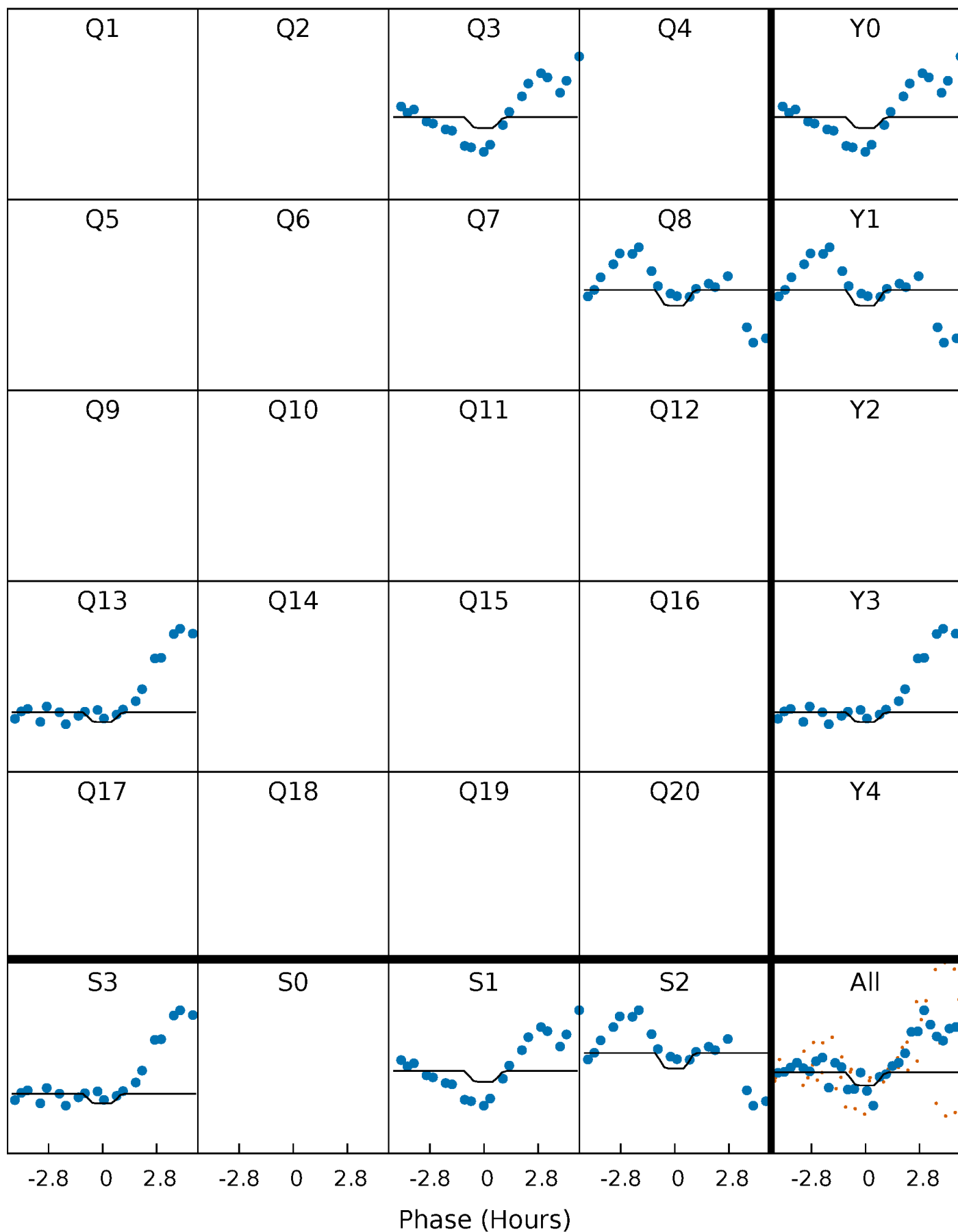
DV Quarter-Phased Transit Curves

TCE 005021374-05 $P=477.293906$ Days $T_0=312.586391$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

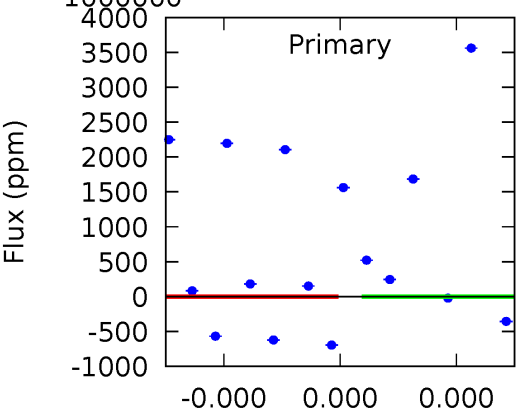
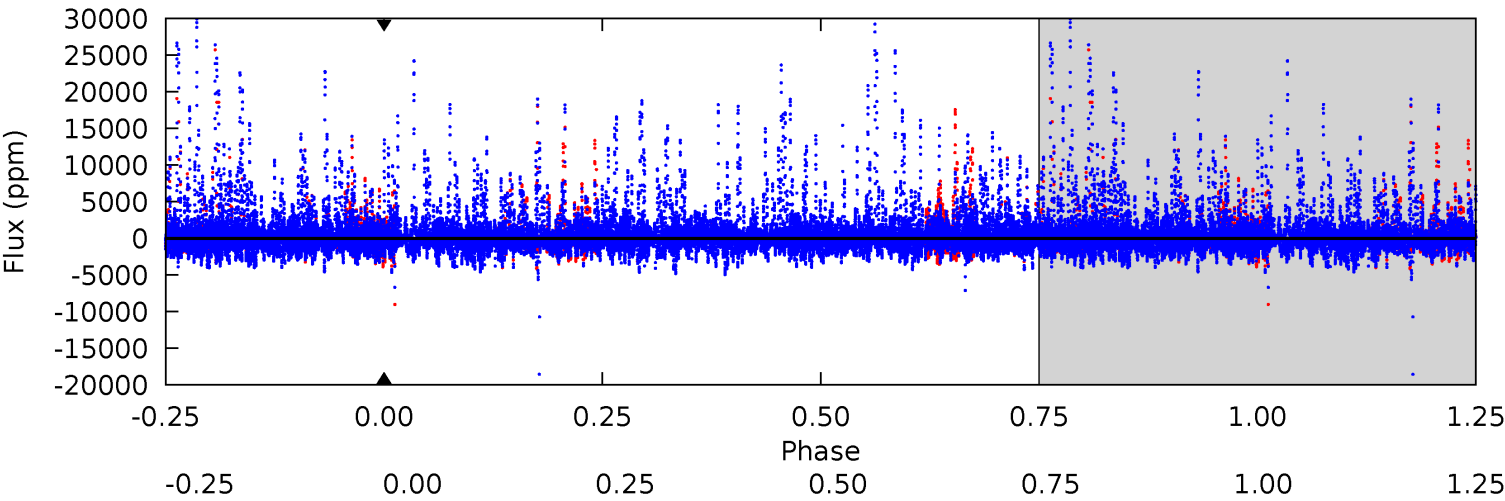
TCE 005021374-05 P=477.293906 Days $T_0=312.351151$ (BKJD)



DV Model-Shift Uniqueness Test

005021374-05, P = 477.293906 Days, E = 312.586391 Days

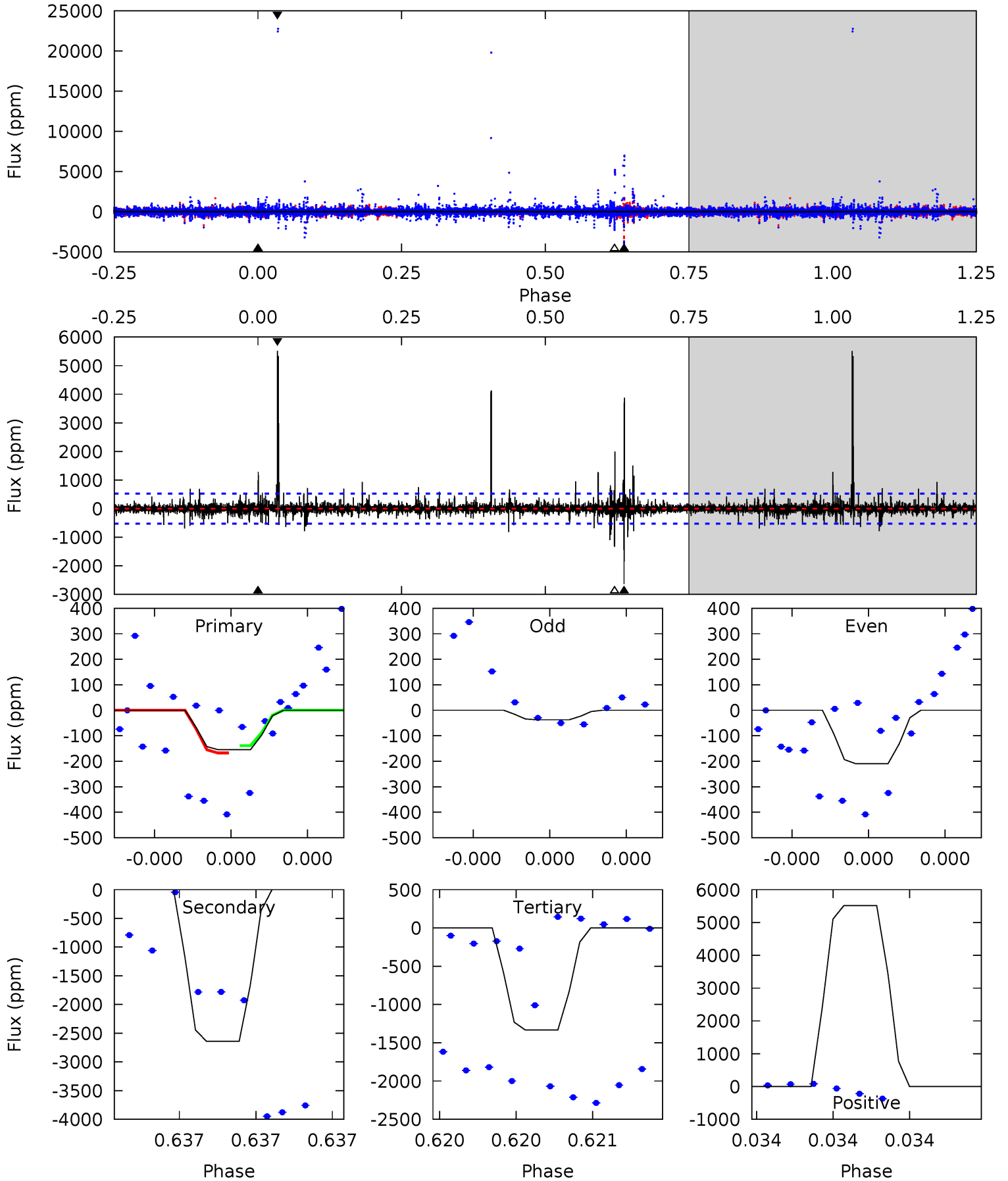
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|-----|-----|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|-----|-------|-----|
| 0 | 0 | 0 | 0 | 1.00 | 1.00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



Alt Model-Shift Uniqueness Test

005021374-05, P = 477.293906 Days, E = 312.351151 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 1.71 | 29.2 | 14.7 | 61.0 | 5.78 | 3.79 | 1.76 | -13.0 | -59.3 | 14.5 | -31.8 | 0.57 | 3.92 | 0.68 | 0.16 |



Stellar Parameters For KIC 005021374

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 7109^{+175}_{-275} | $4.097^{+0.158}_{-0.175}$ | $-0.120^{+0.250}_{-0.350}$ | $1.796^{+0.539}_{-0.392}$ | $1.470^{+0.218}_{-0.239}$ | $0.358^{+0.333}_{-0.171}$ |
| | +2%/-4% | +4%/-4% | +208%/-292% | +30%/-22% | +15%/-16% | +93%/-48% |
| 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 005021374-05 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{max} (K)$ | $T_{obs} (K)$ | A_{obs} |
|---------|-----------------|---------------------------|-------------------|---------------------------|---|
| DV | 0 ± 1000000 | $13.13^{+16.86}_{-9.34}$ | 504^{+36}_{-36} | -3170^{+43276}_{-35423} | $-423.706^{+1037214.702}_{-926082.152}$ |
| Alt. | -2639 ± 90 | $14.64^{+16.16}_{-10.14}$ | 503^{+35}_{-35} | 5894^{+6825}_{-1617} | $13030^{+124094}_{-10264}$ |

T_{max} = Theoretical Maximum Planetary Temperature

T_{obs} = Observed Planetary Temperature (Assuming A=0.3)

A_{obs} = Observed Albedo (Assuming T=0)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

DV Centroid Data

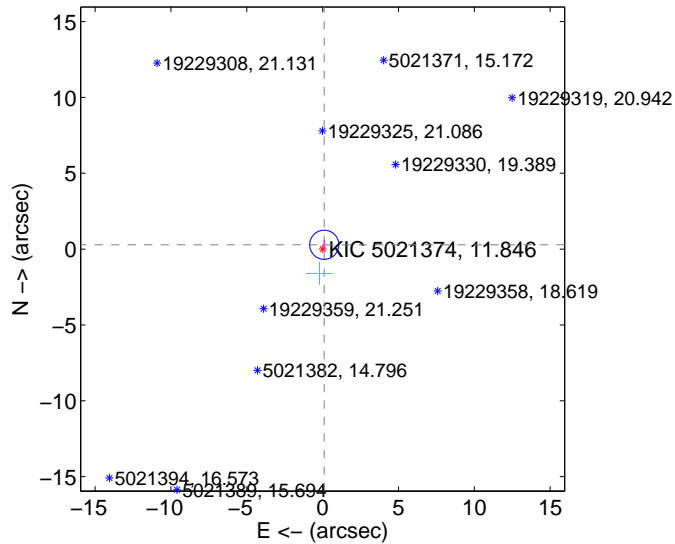
Supplemental centroid analysis for 005021374-05. **Kepler magnitude: 11.85.** Transit SNR -1.00

There are 2 quarters with good PRF difference image offsets

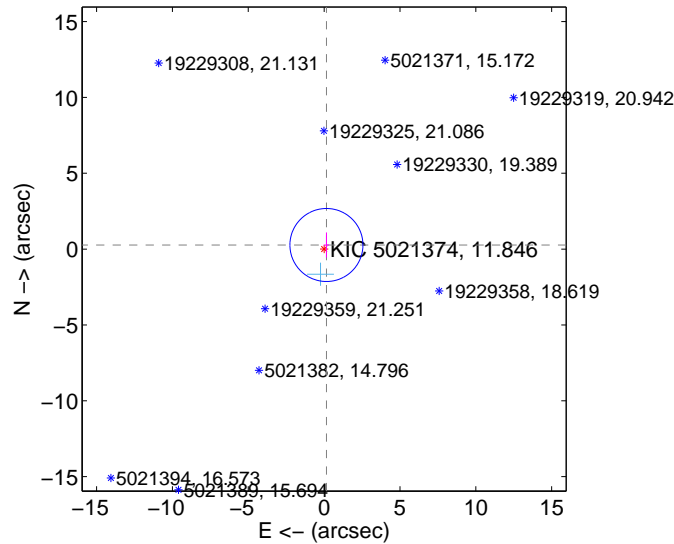
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT | 0.305 ± 0.320 | 0.95 | -0.105 ± 0.087 | 0.286 ± 0.321 |
| PRF-fit source offset from KIC position | 0.310 ± 0.802 | 0.39 | -0.152 ± 0.180 | 0.270 ± 0.826 |
| photometric centroid source offset | 4.27 ± 3.01 | 1.42 | -3.15 ± 2.84 | 2.89 ± 3.20 |

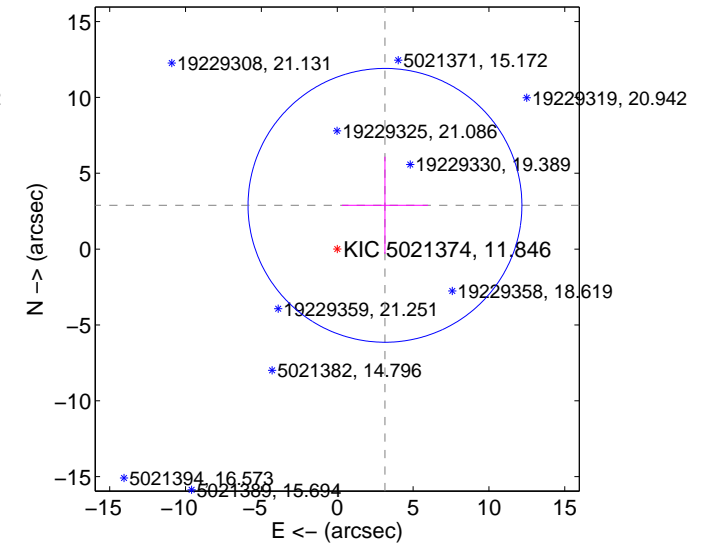
offset from difference PRF-fit to OOT PRF-fit



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



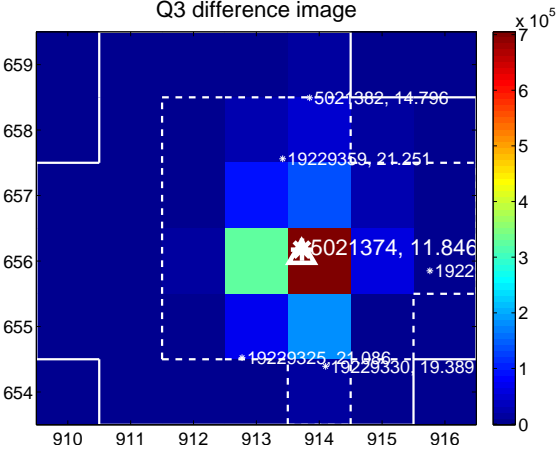
Q2 no difference image



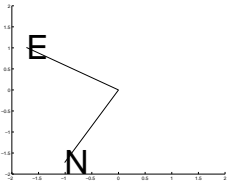
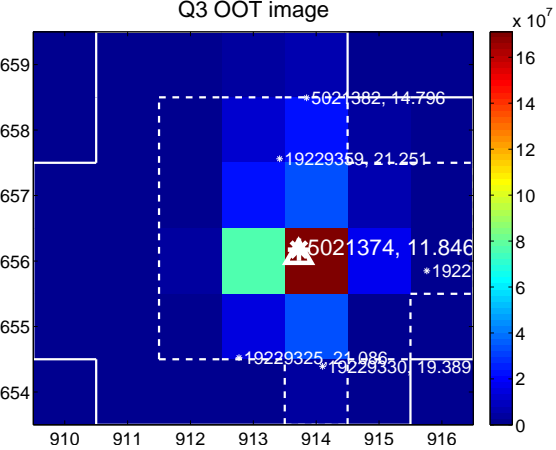
Q2 no OOT image



Q3 difference image



Q3 OOT image



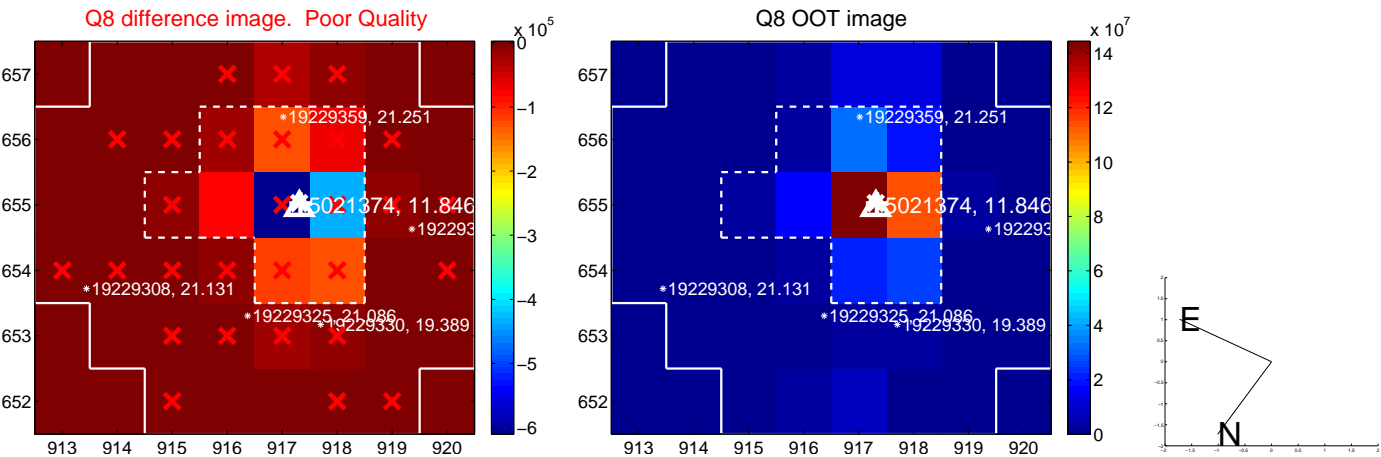
Q4 no difference image



Q4 no OOT image



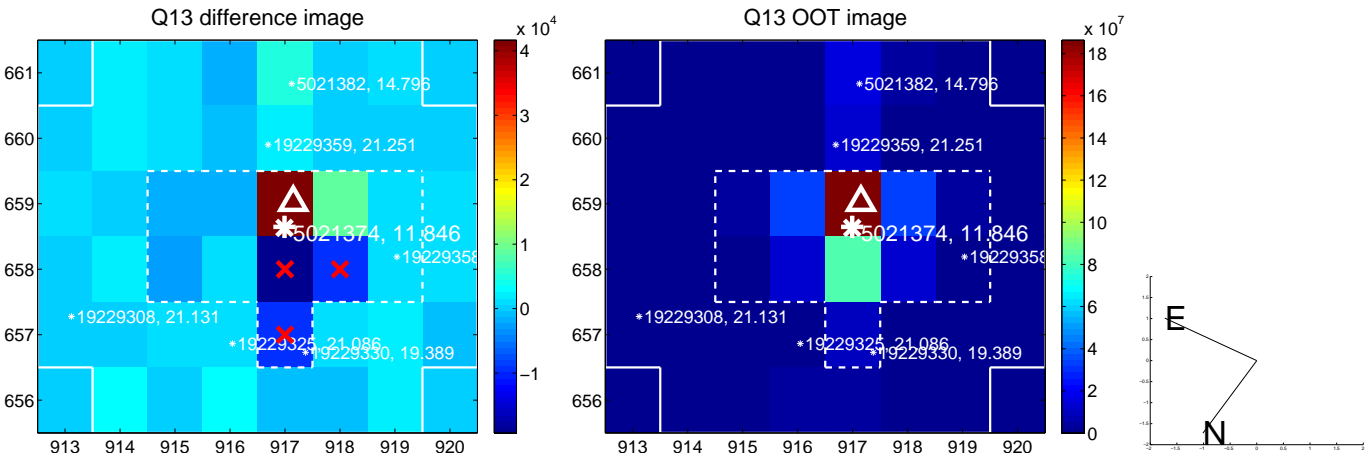
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



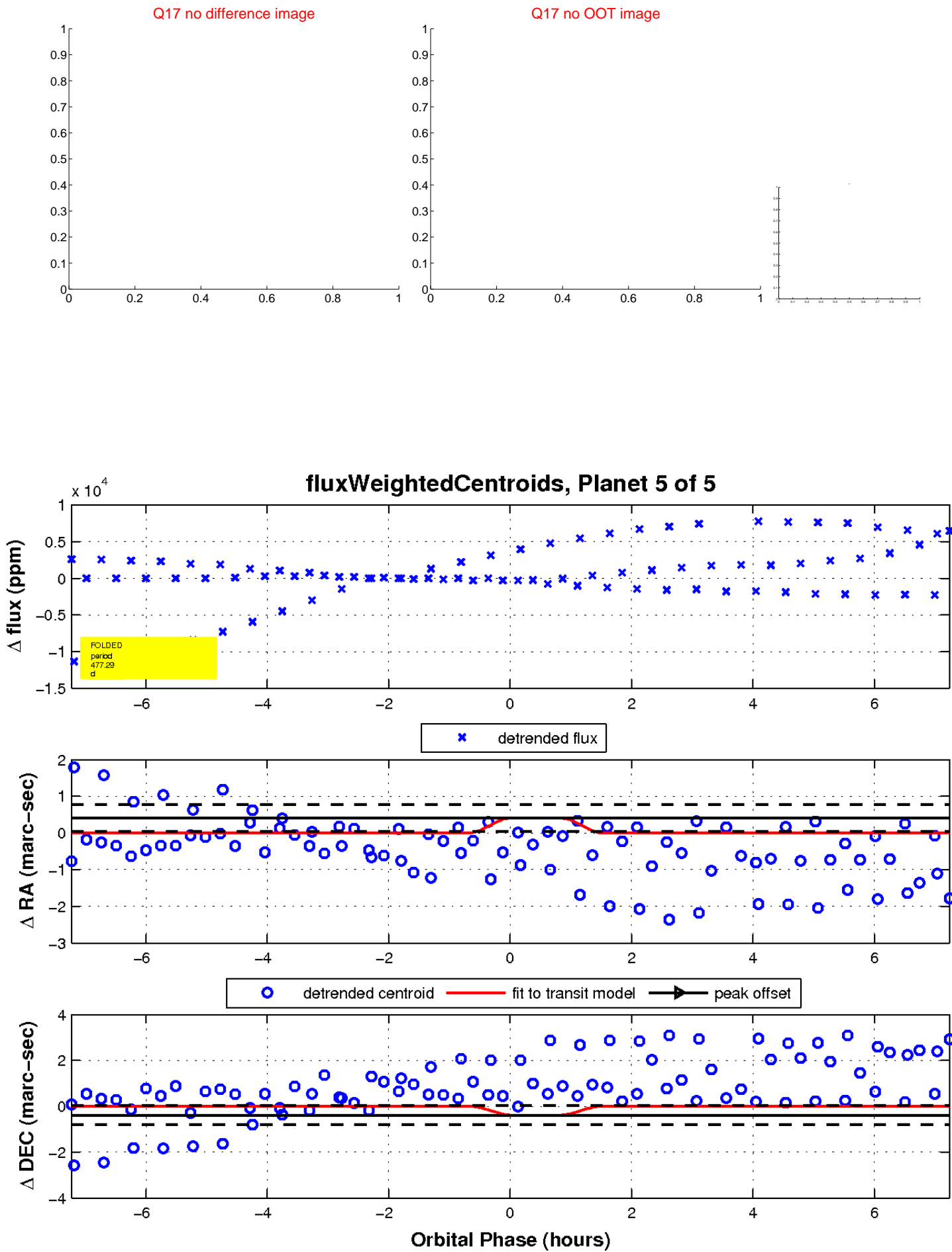
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

