

KIC 007134976

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 007134976-01 | OBS | 0874.01 | 4.601815 | 133.165769 | 765.8 | 2.391 | 52.1 | 61.4 | 0.83 | 4986 | 2.70 | 152.91 |
| 007134976-02 | OBS | 0874.02 | 11.187162 | 137.182258 | 332.2 | 3.366 | 17.3 | 19.2 | 0.83 | 4986 | 1.77 | 46.78 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|------------|
| 007134976-01 | OBS | PC | 1.00 | 0 | 0 | 0 | 0 | NO_COMMENT |
| 007134976-02 | OBS | PC | 1.00 | 0 | 0 | 0 | 0 | NO_COMMENT |

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.

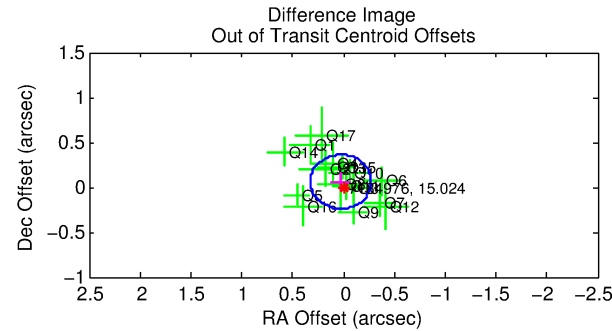
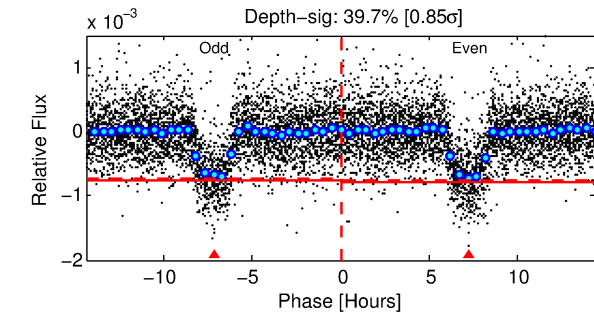
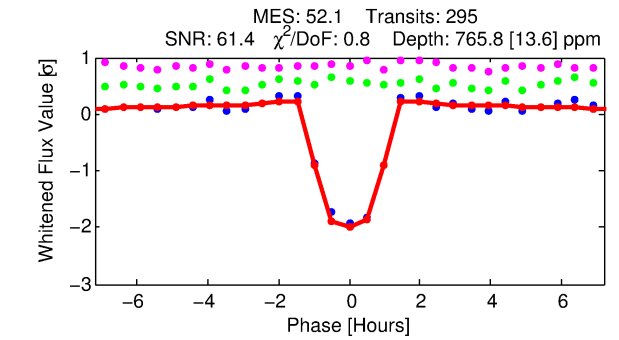
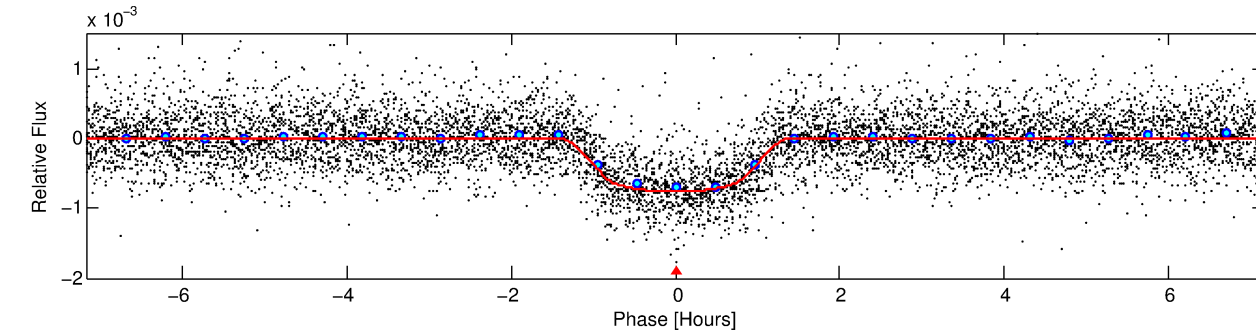
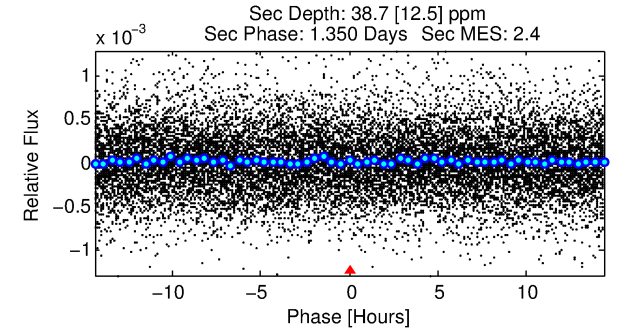
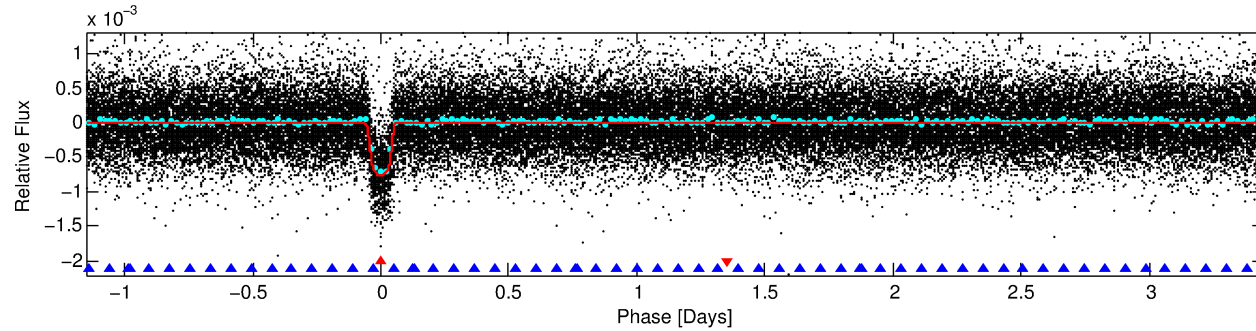
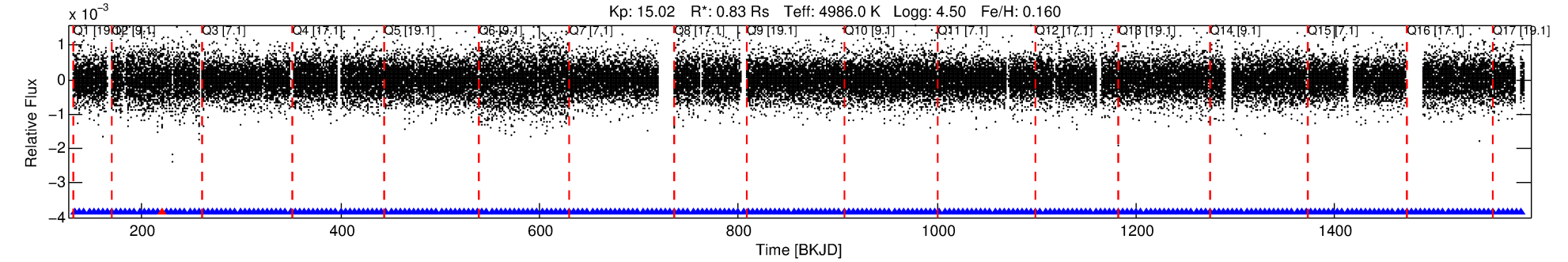
Ephemeris Match Information For 007134976-01

No Significant Match Found

DV One-Page Summary

KIC: 7134976 Candidate: 1 of 2 Period: 4.602 d
KOI: K00874.01 Name: Kepler-246b Corr: 0.971

Kp: 15.02 R*: 0.83 Rs Teff: 4986.0 K Logg: 4.50 Fe/H: 0.160



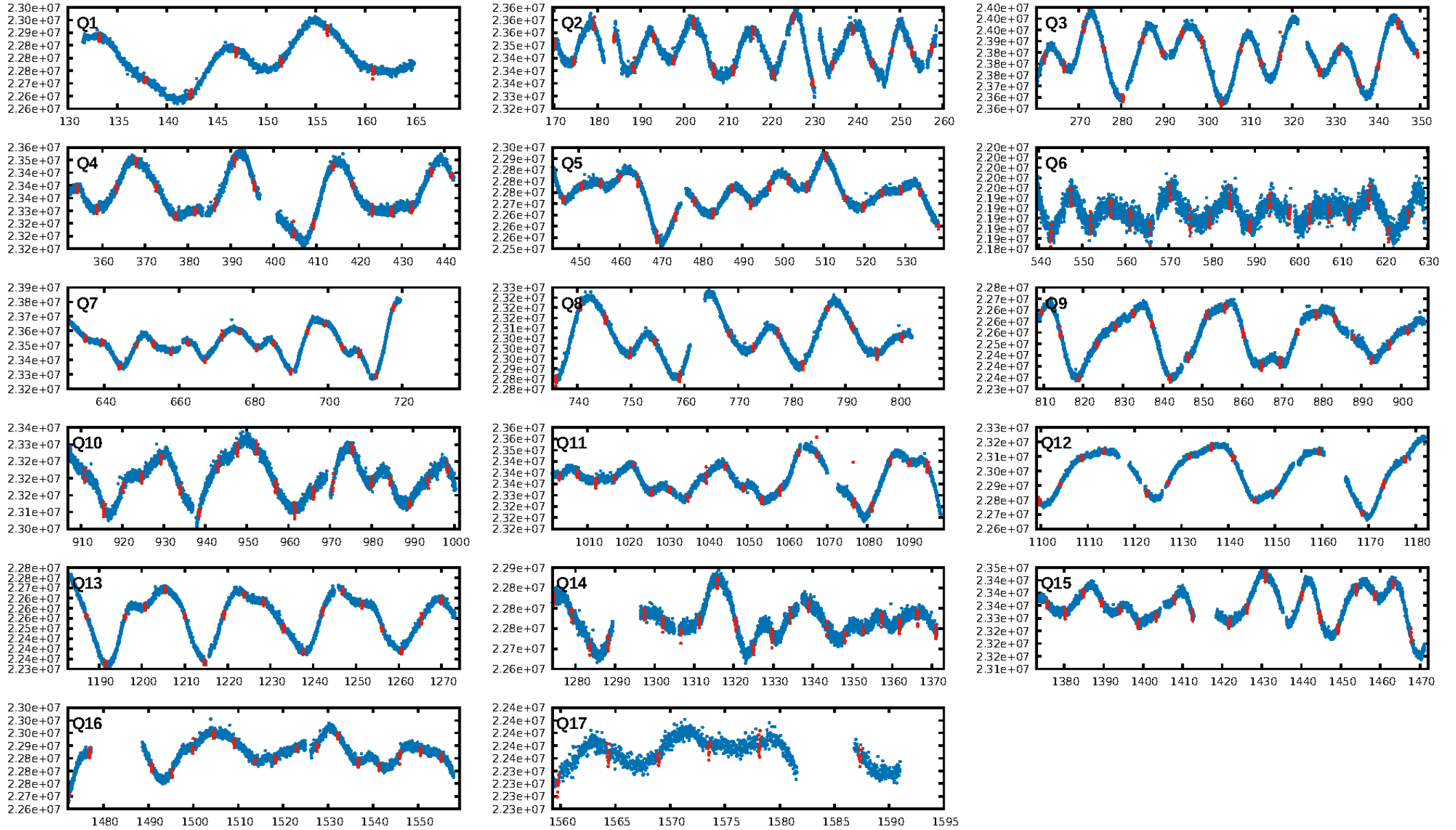
DV Fit Results:

Period = 4.60181 [0.00000] d
Epoch = 133.1658 [0.0007] BKJD
Rp/R* = 0.0297 [0.0033]
a/R* = 8.43 [3.33]
b = 0.86 [0.13]
Seff = 152.91 [22.70]
Teff = 897 [33] K
Rp = 2.70 [0.36] Re
a = 0.0501 [0.0040] AU
Ag = 7.34 [3.04] [2.09σ]
Teffp = 2282 [227] K [6.05σ]

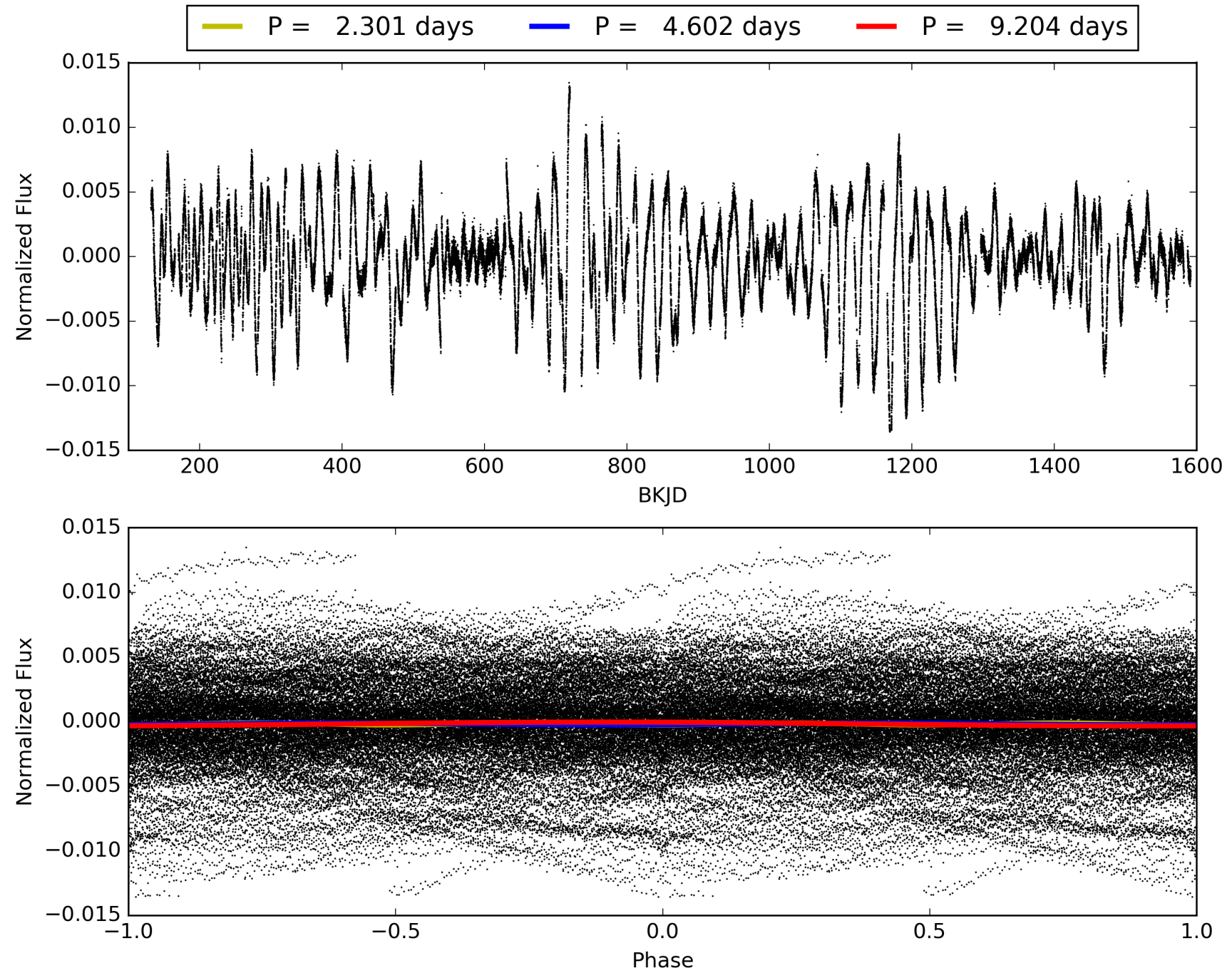
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [38.28σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [281/282]
GhostDiagnostic-chr: 4.493
Centroid-sig: N/A
Centroid-so: 0.392 arcsec [1.98σ]
OotOffset-rm: 0.066 arcsec [0.66σ]
KicOffset-rm: 0.034 arcsec [0.37σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 007134976-01, PDC Light Curves

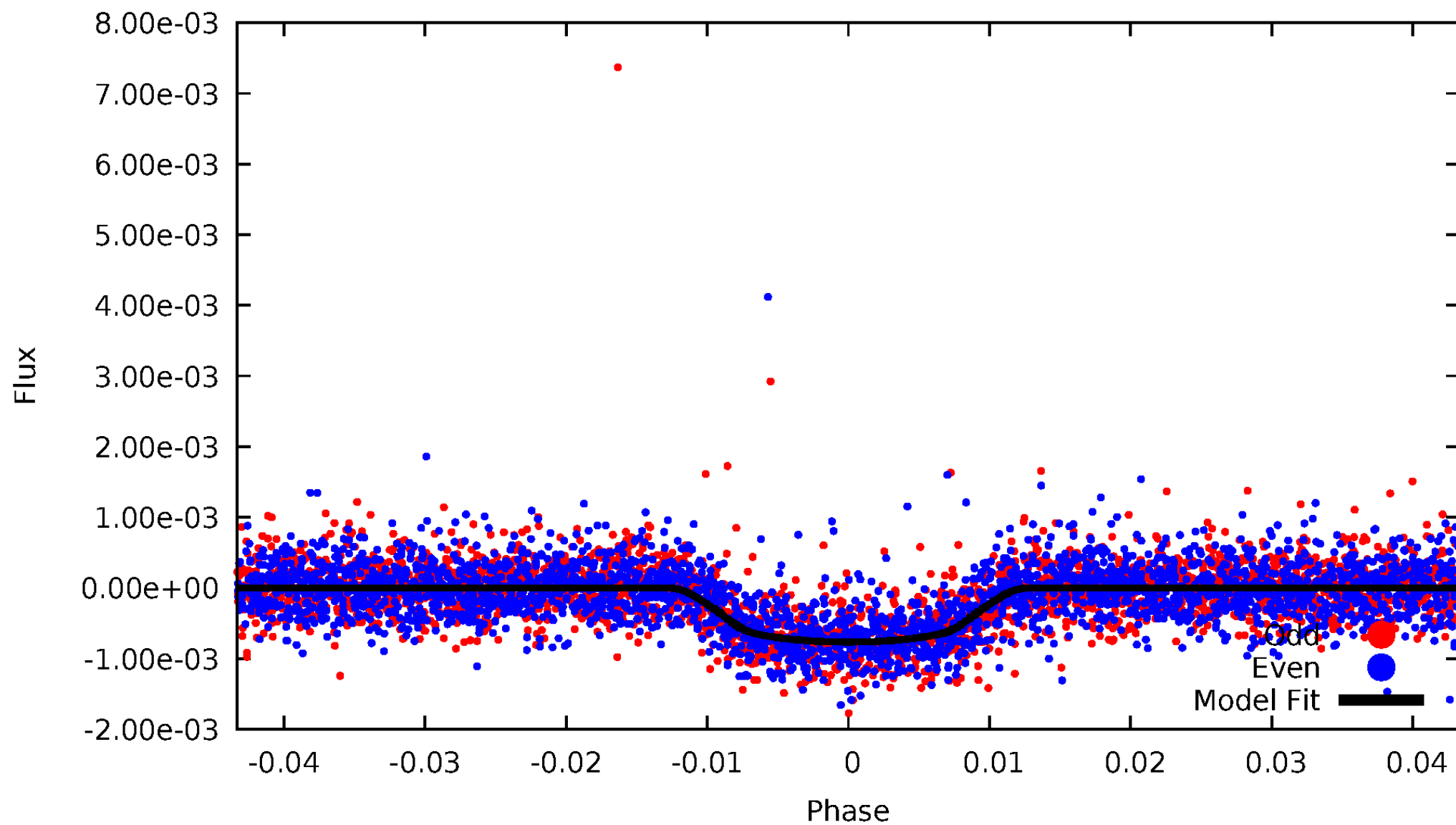


TCE 007134976-01



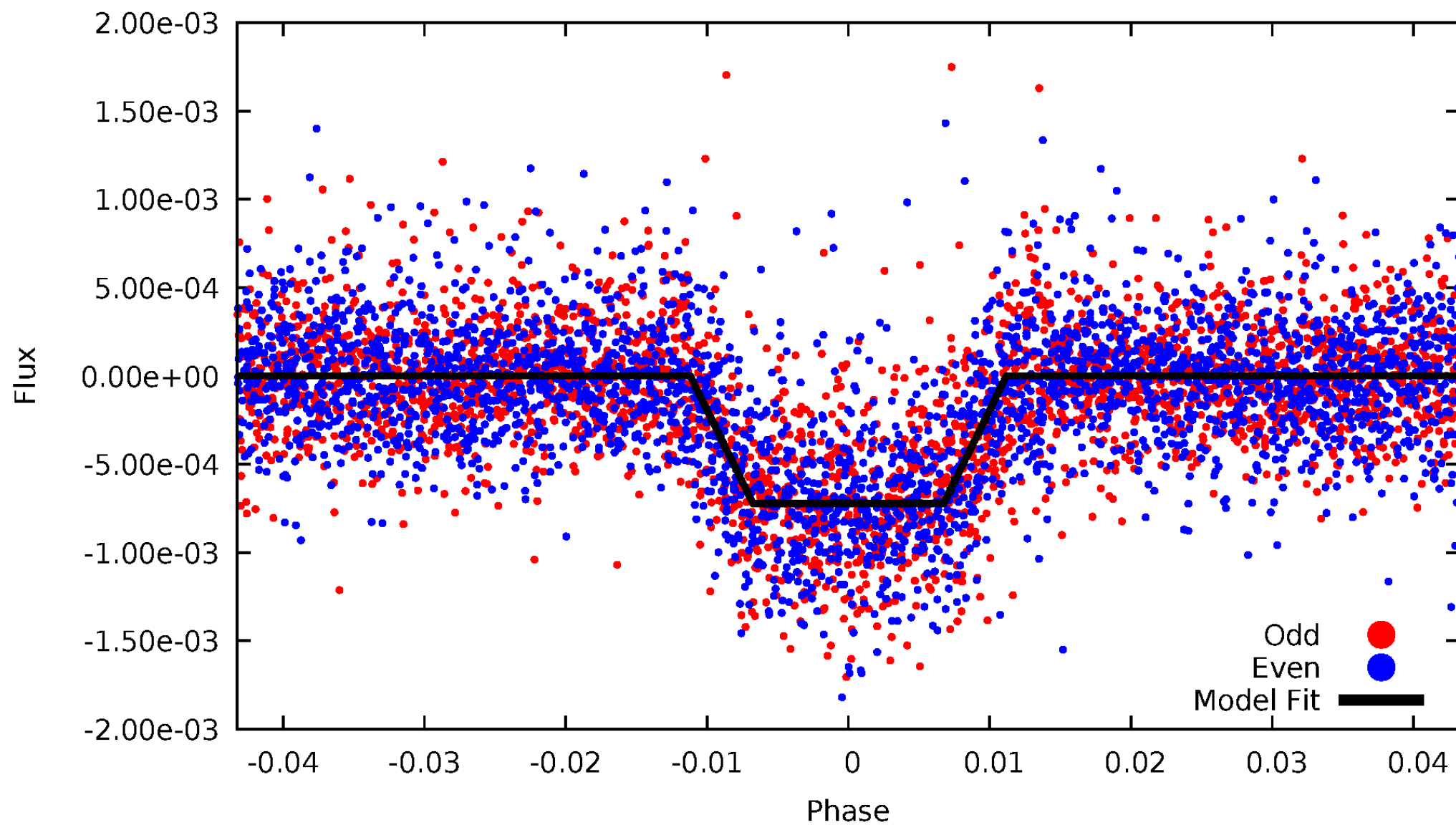
DV Odd/Even

TCE 007134976-01



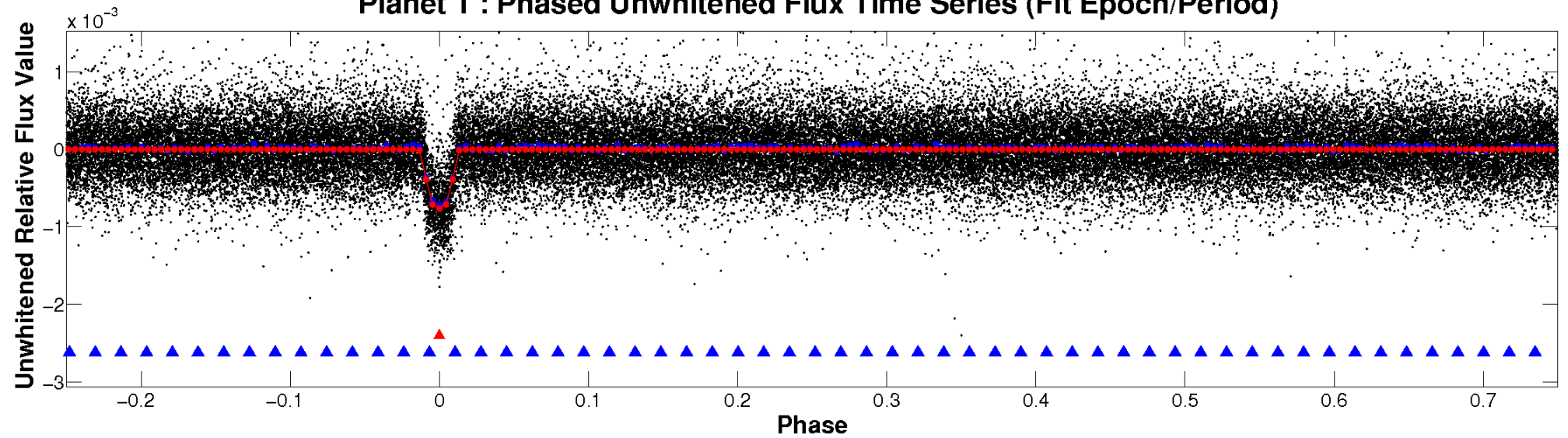
ALT Odd/Even

TCE 007134976-01

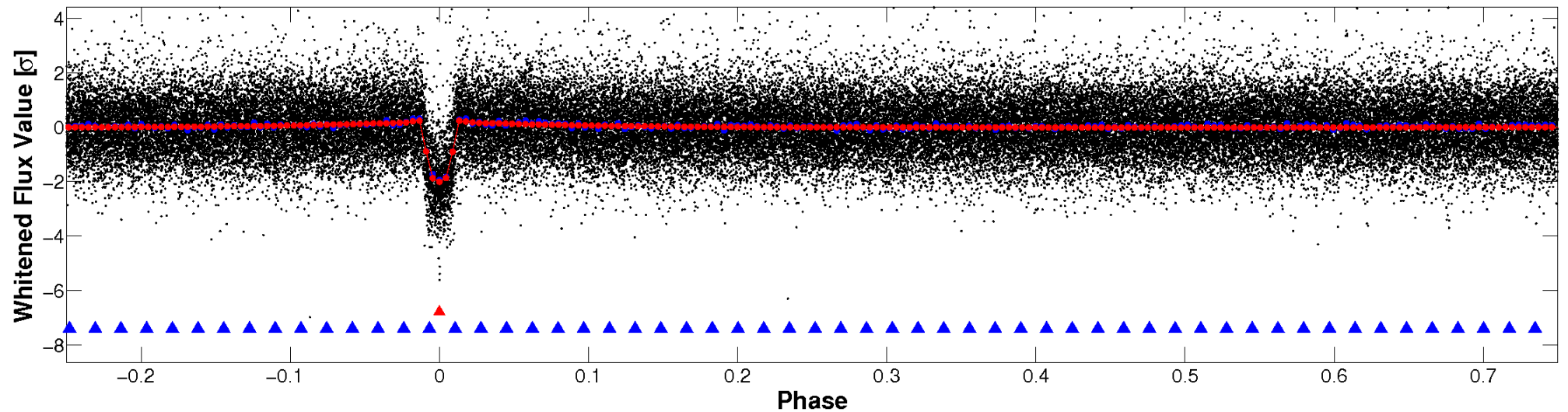


Non-Whitened Vs. Whitened Light Curve

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

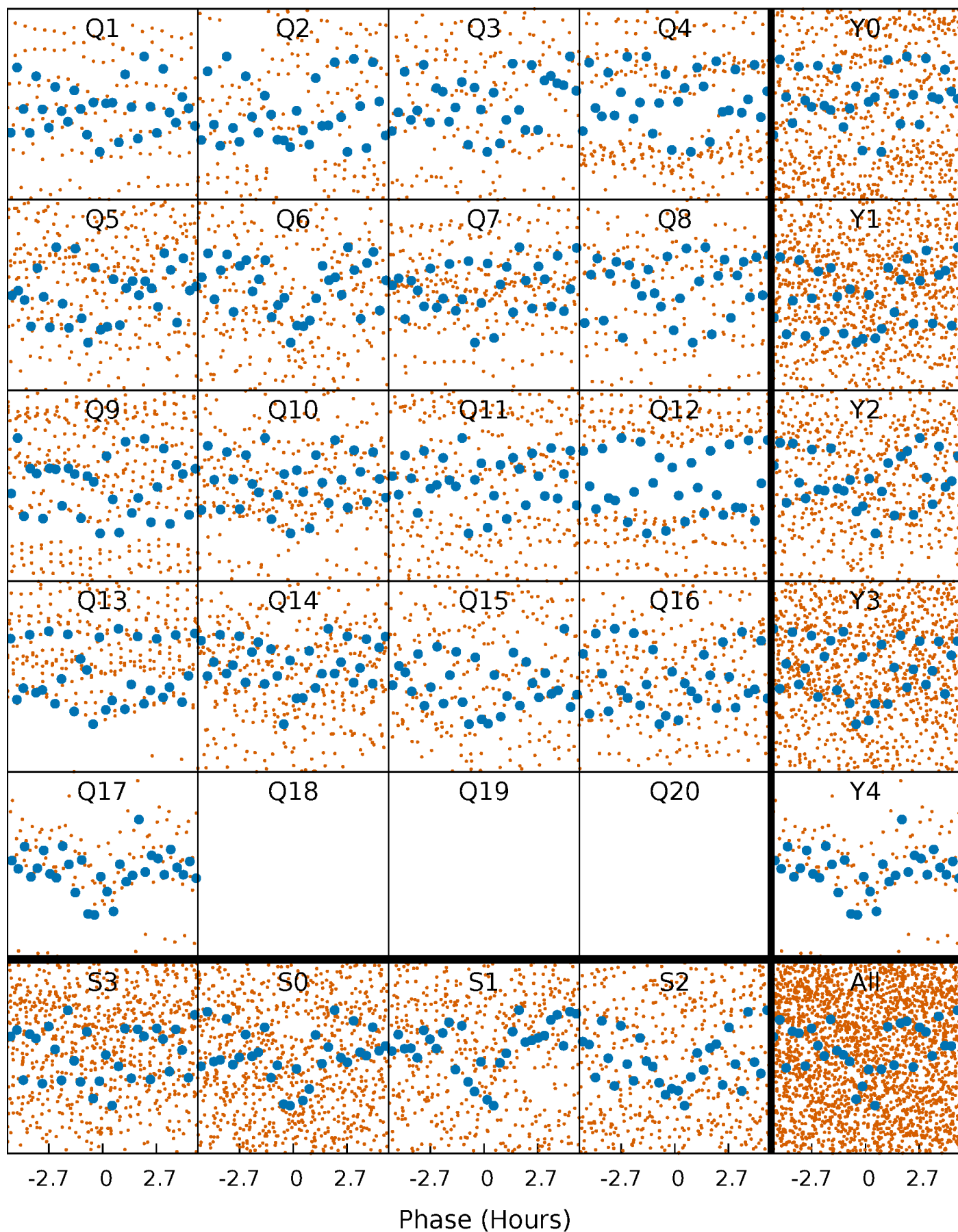


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



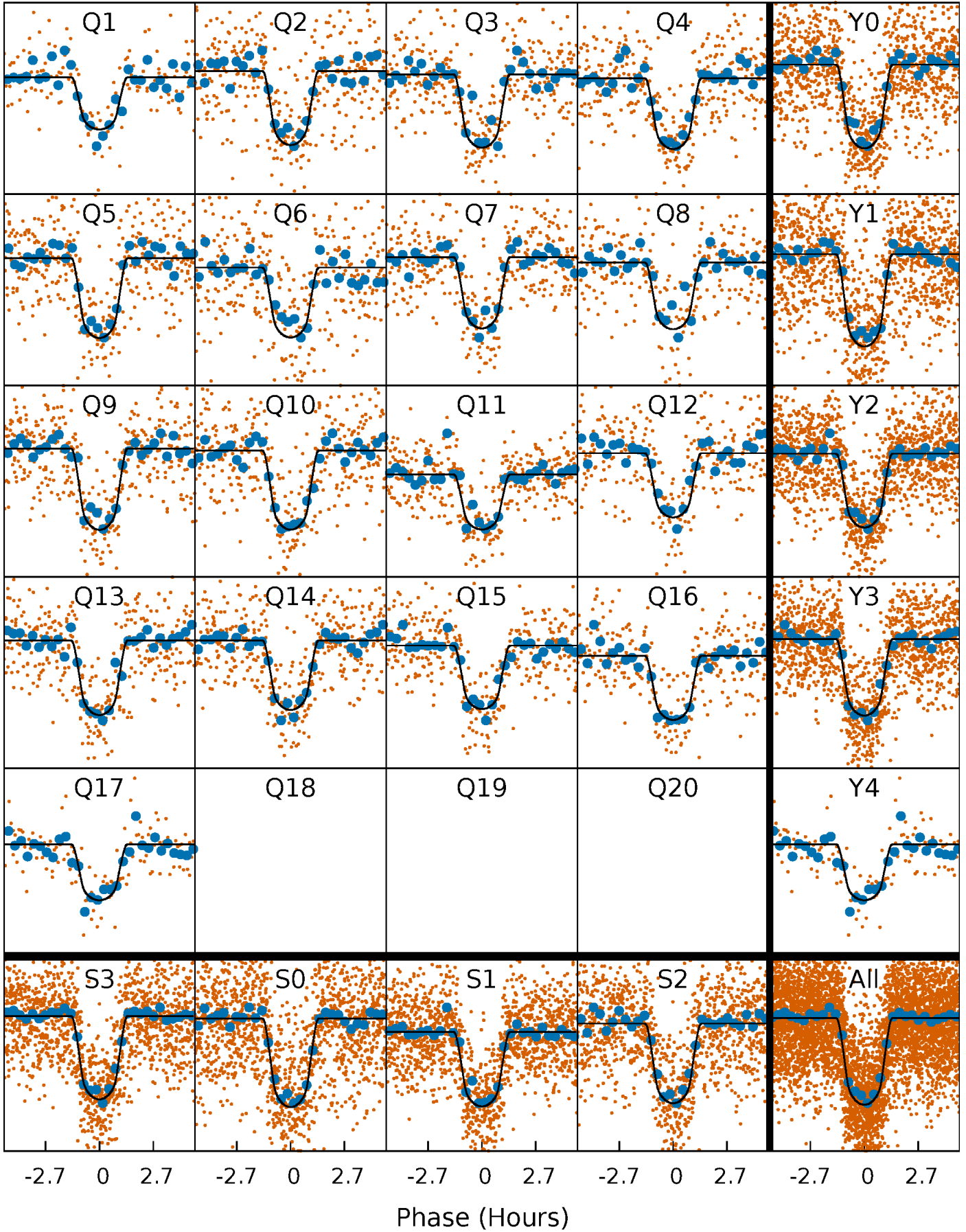
PDC Quarter-Phased Transit Curves

TCE 007134976-01 P= 4.601815 Days $T_0=133.165769$ (BKJD)



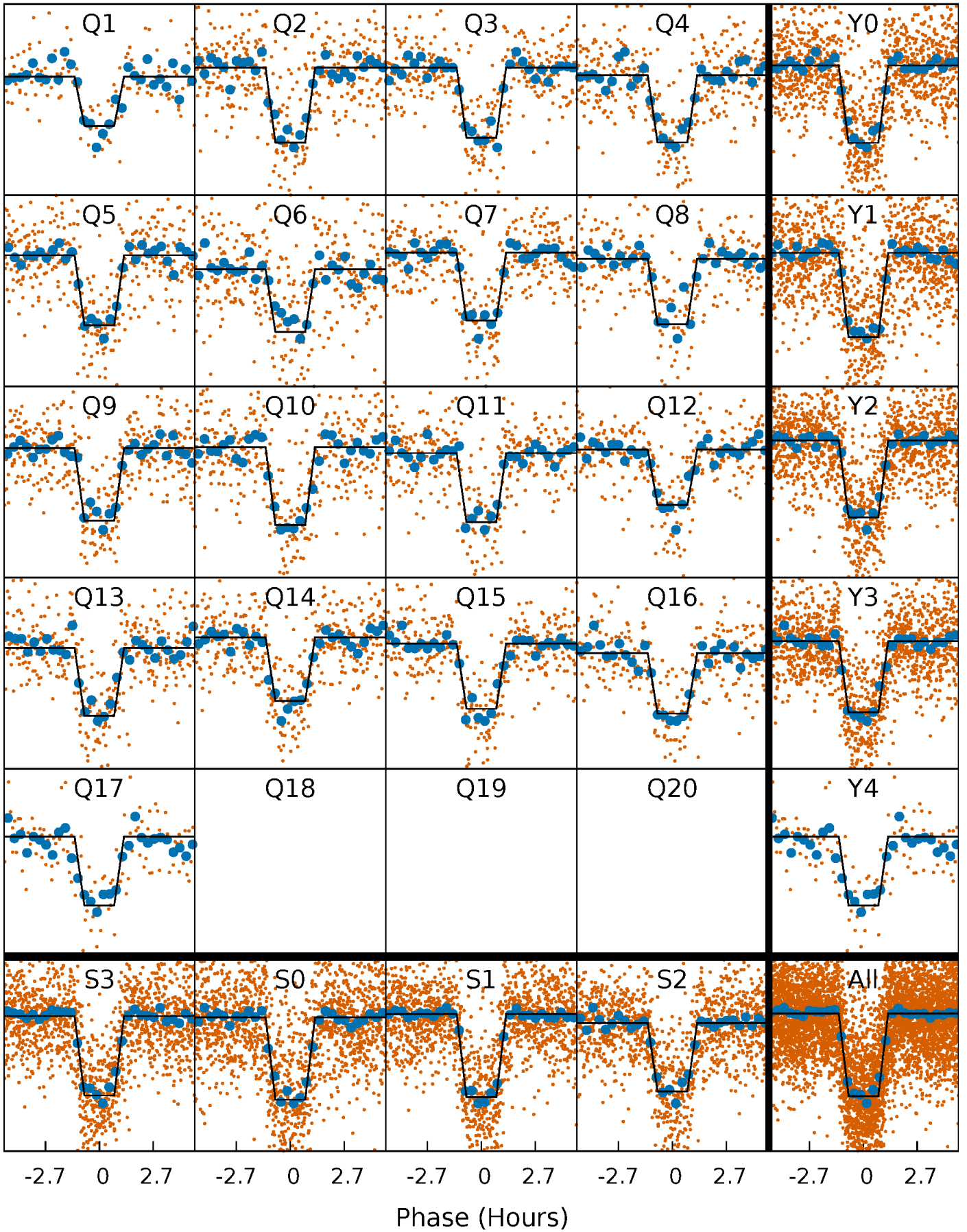
DV Quarter-Phased Transit Curves

TCE 007134976-01 P= 4.601815 Days $T_0=133.165769$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

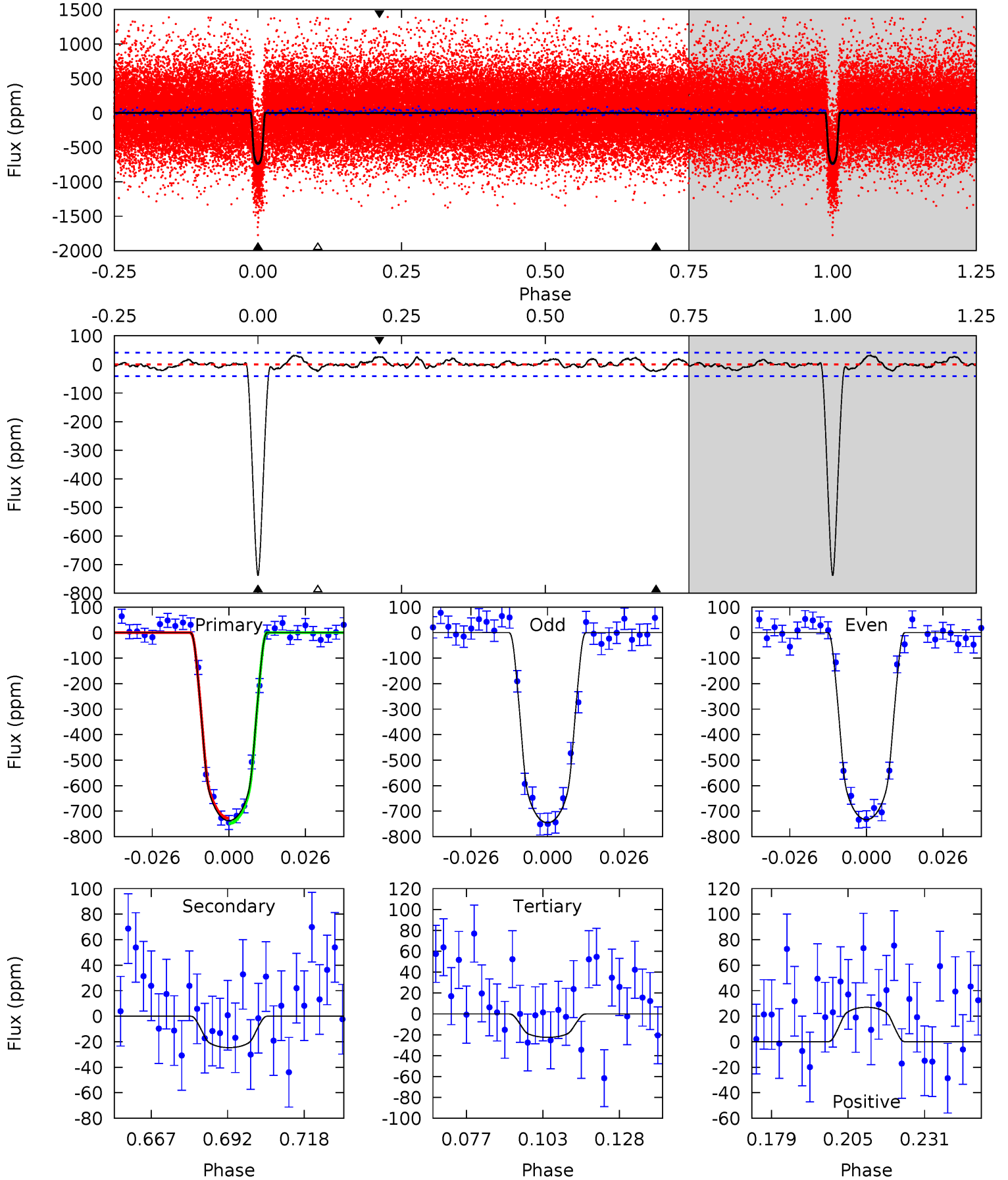
TCE 007134976-01 P= 4.601819 Days $T_0=133.165291$ (BKJD)



DV Model-Shift Uniqueness Test

007134976-01, P = 4.601815 Days, E = 128.563954 Days

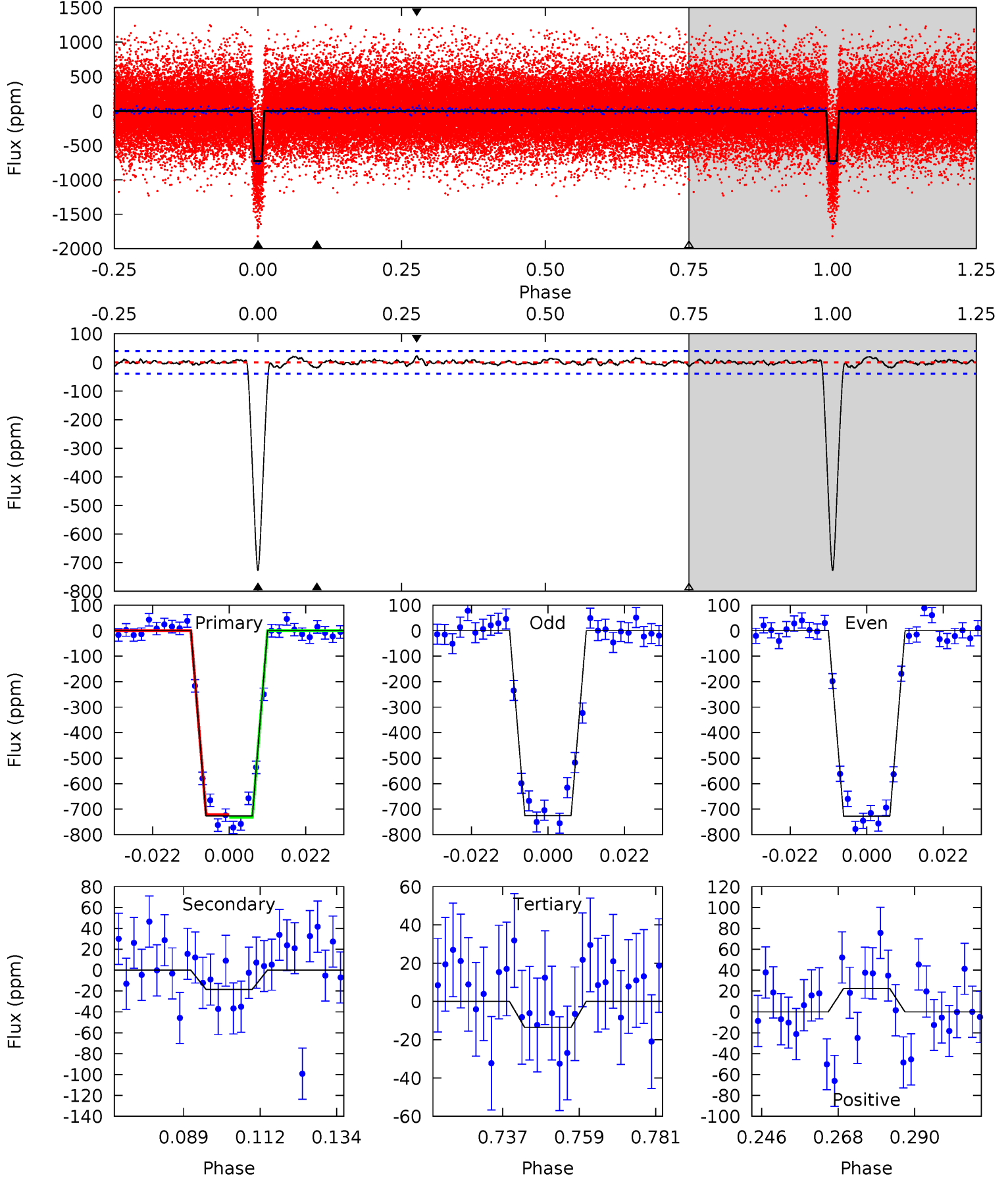
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 87.2 | 2.91 | 2.66 | 3.19 | 4.84 | 2.23 | 1.29 | 84.5 | 84.0 | 0.26 | -0.28 | 0.74 | 0.96 | 0.04 | 1.23 |



Alt Model-Shift Uniqueness Test

007134976-01, P = 4.601819 Days, E = 128.563472 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 89.1 | 2.26 | 1.67 | 2.75 | 4.87 | 2.28 | 0.83 | 87.5 | 86.4 | 0.59 | -0.49 | 0.13 | 0.99 | 0.03 | 0.69 |



Stellar Parameters For KIC 007134976

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (g \cdot \text{cm}^{-3})$ |
|--------|---------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------------------------------|
| | 4986^{+82}_{-82} | $4.496^{+0.080}_{-0.025}$ | $0.160^{+0.150}_{-0.150}$ | $0.833^{+0.032}_{-0.064}$ | $0.793^{+0.050}_{-0.029}$ | $1.931^{+0.567}_{-0.159}$ |
| | +2%/-2% | +2%/-1% | +94%/-94% | +4%/-8% | +6%/-4% | +29%/-8% |
| Source | SPE90 | SPE90 | SPE90 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 007134976-01 / KOI 0874.01

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|-------------|------------------------|----------------------|----------------------|---------------------------|
| DV | -25 ± 8 | $2.66^{+0.32}_{-0.31}$ | 1244^{+28}_{-32} | 2744^{+150}_{-185} | $4.834^{+2.267}_{-1.854}$ |
| Alt. | -18 ± 8 | $2.40^{+0.29}_{-0.31}$ | 1244^{+25}_{-31} | 2708^{+188}_{-238} | $4.491^{+2.693}_{-2.169}$ |

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

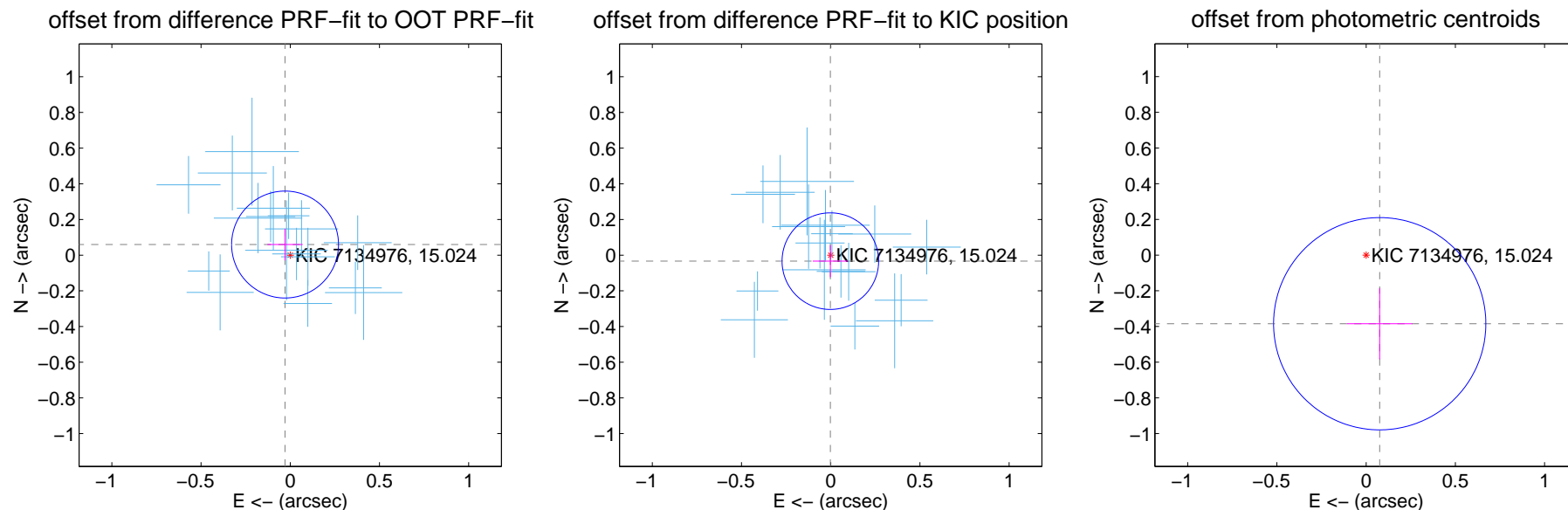
DV Centroid Data

Supplemental centroid analysis for 007134976-01. Kepler magnitude: 15.02. Transit SNR 61.41

There are 17 quarters with good PRF difference image offsets

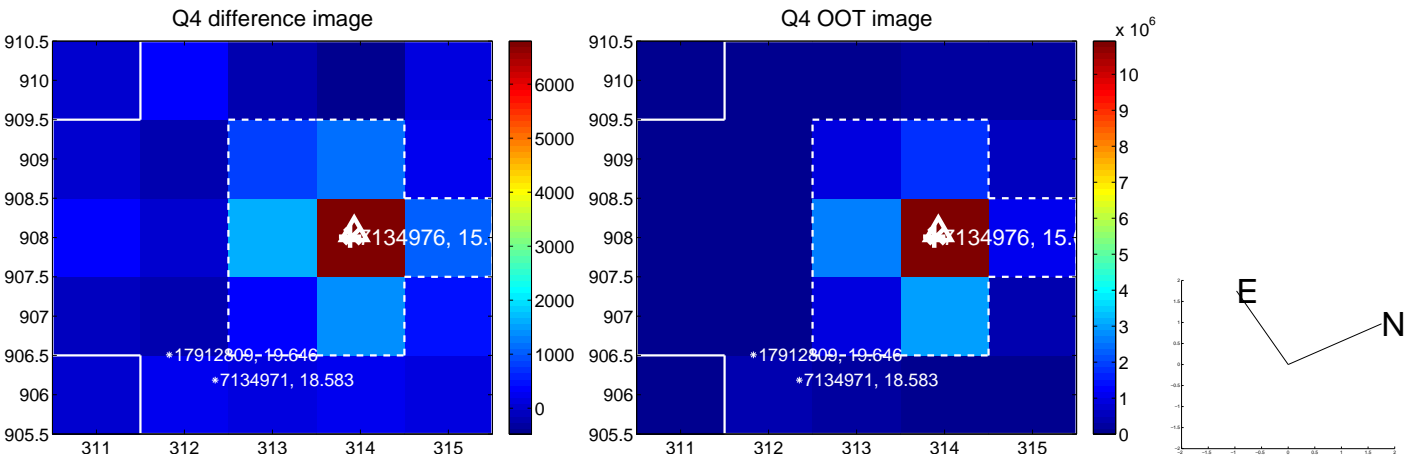
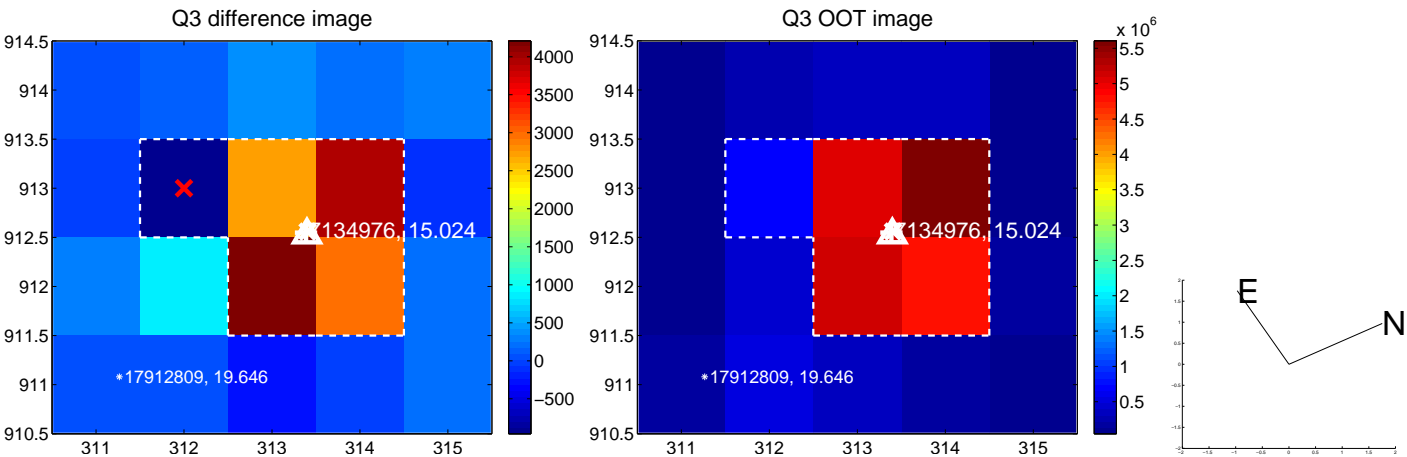
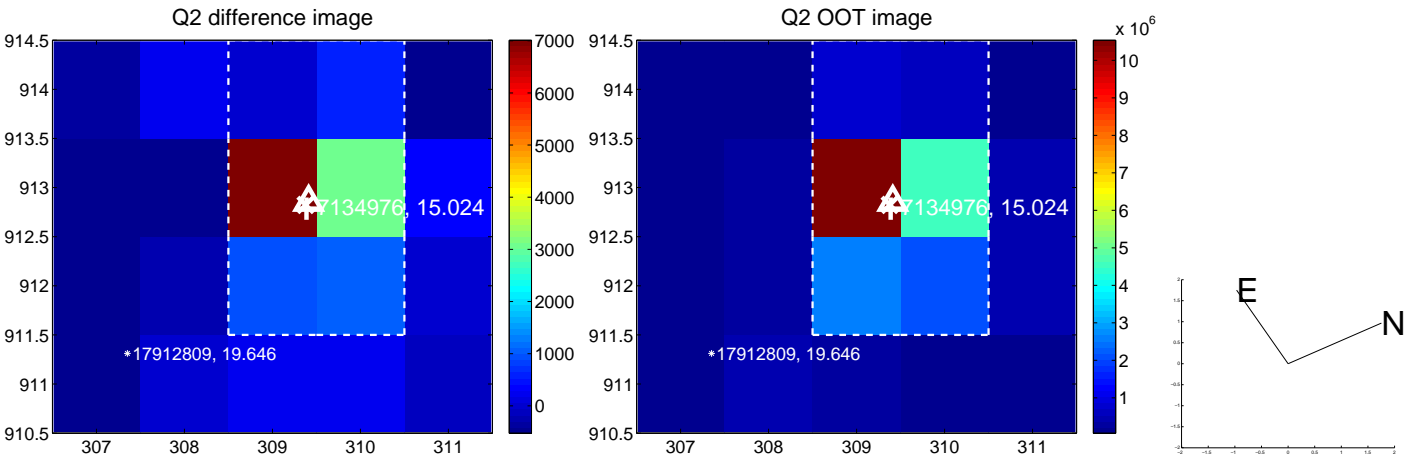
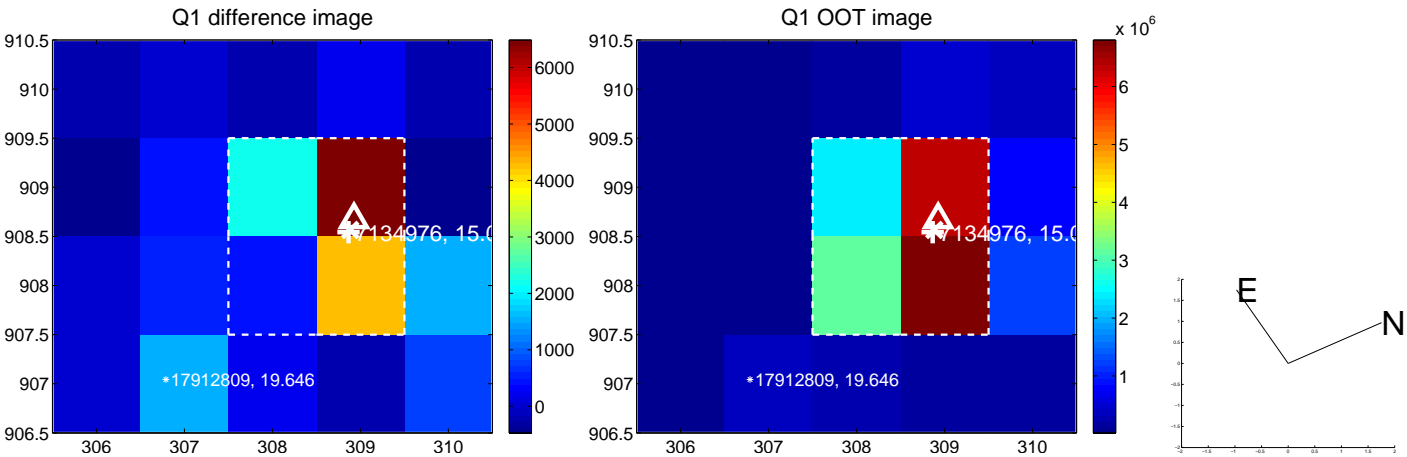
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT | 0.066 ± 0.100 | 0.66 | 0.029 ± 0.099 | 0.059 ± 0.089 |
| PRF-fit source offset from KIC position | 0.034 ± 0.090 | 0.37 | 0.002 ± 0.098 | -0.034 ± 0.090 |
| photometric centroid source offset | 0.39 ± 0.20 | 1.98 | -0.08 ± 0.18 | -0.38 ± 0.20 |

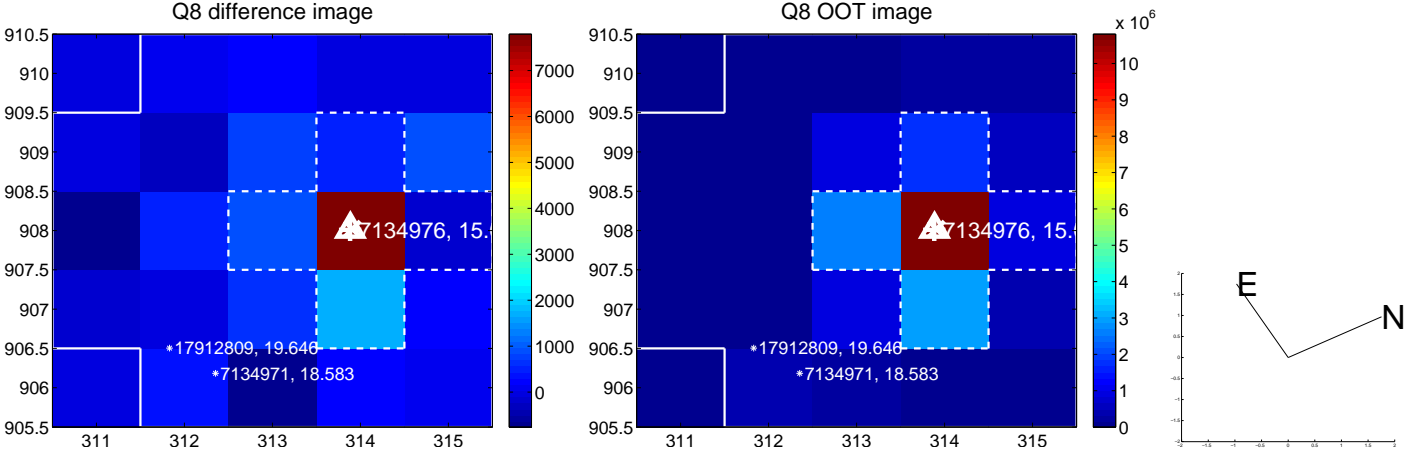
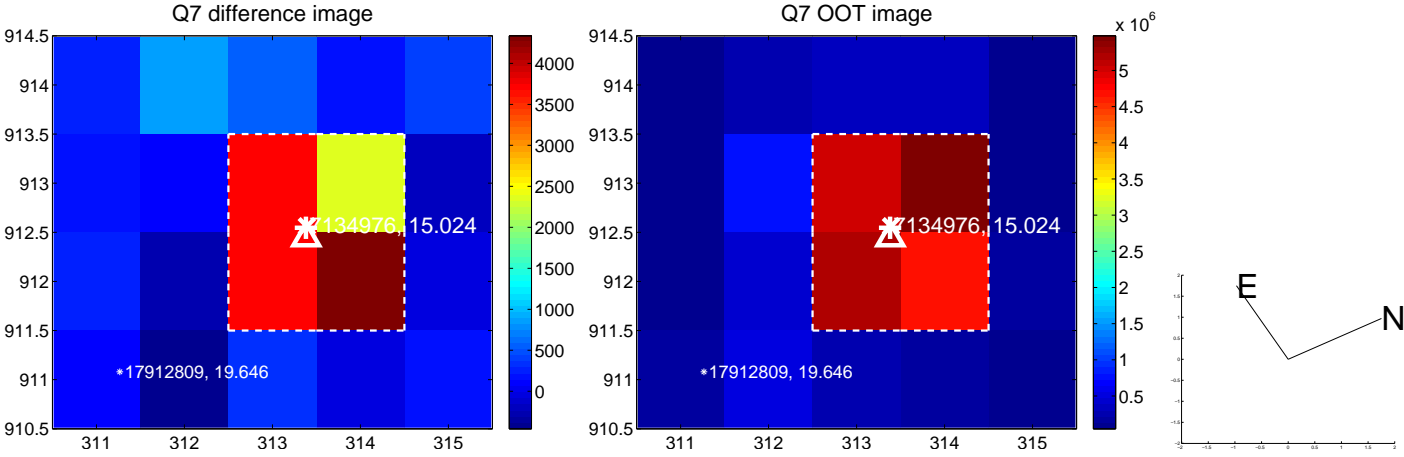
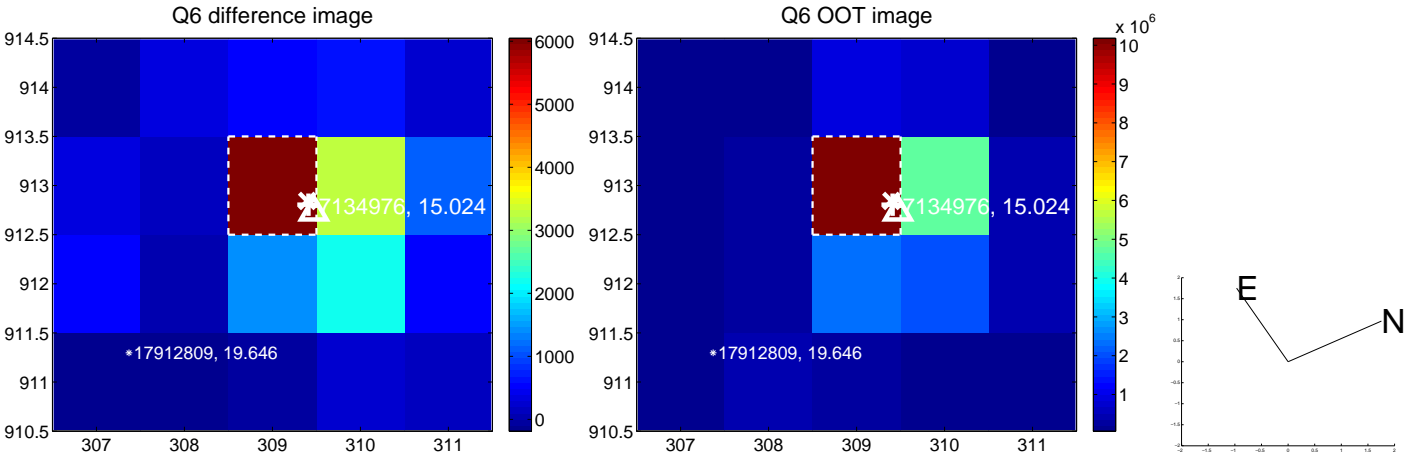
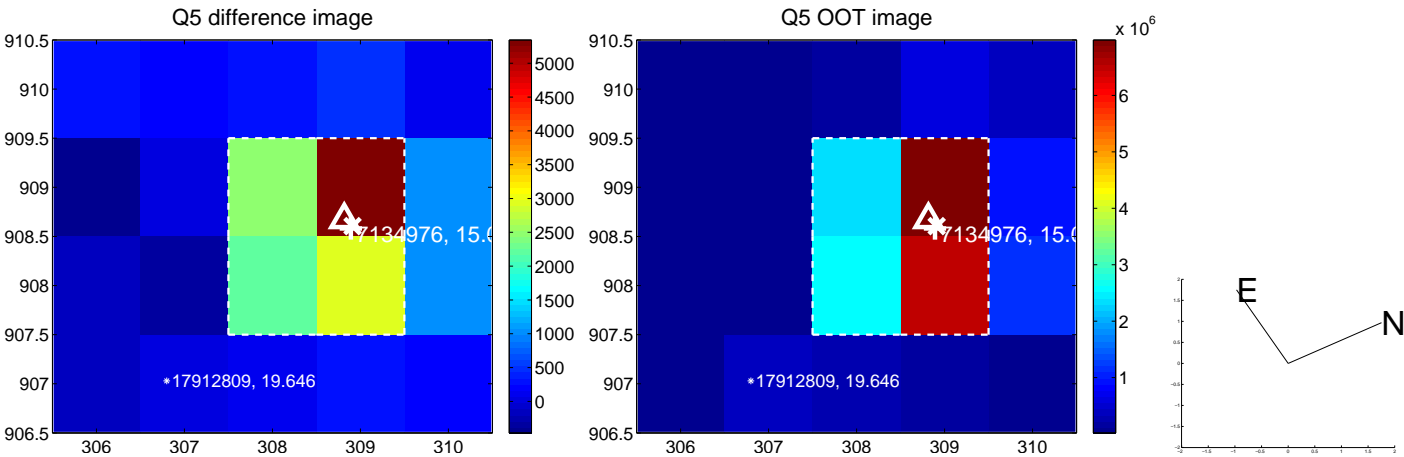


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

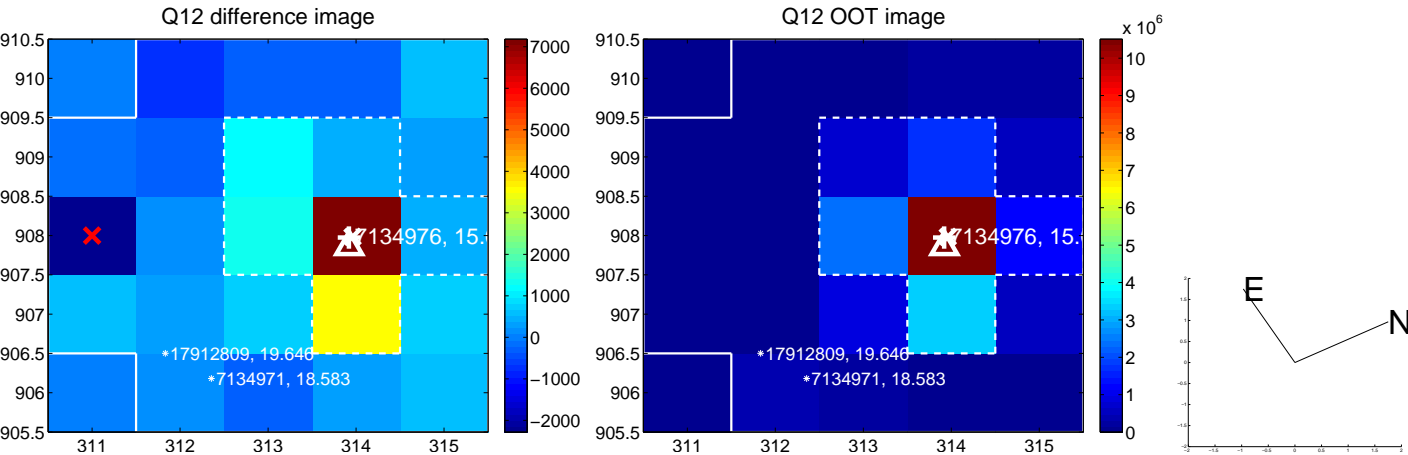
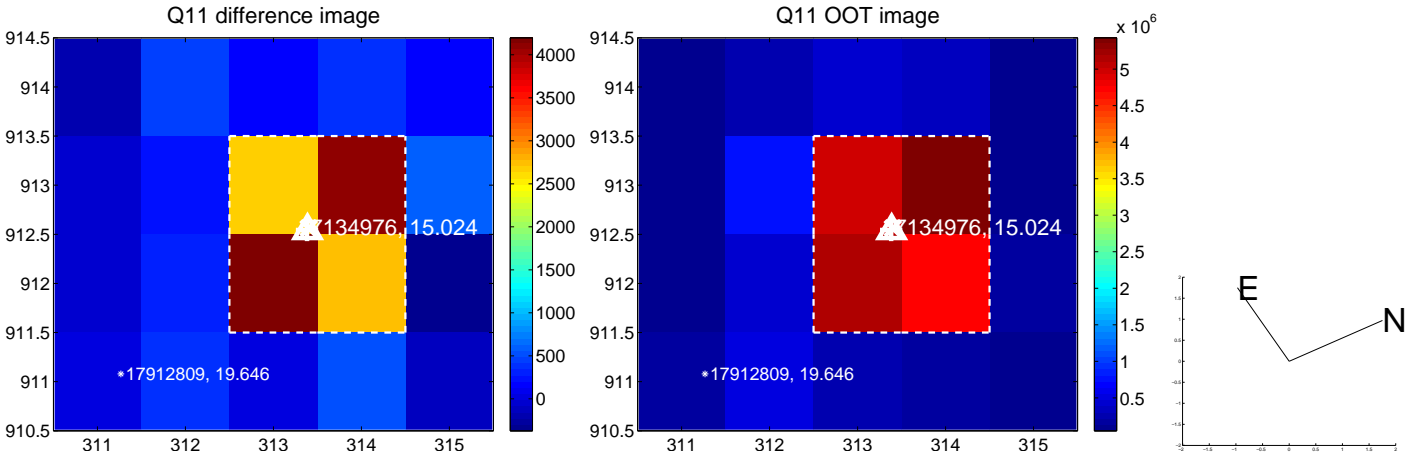
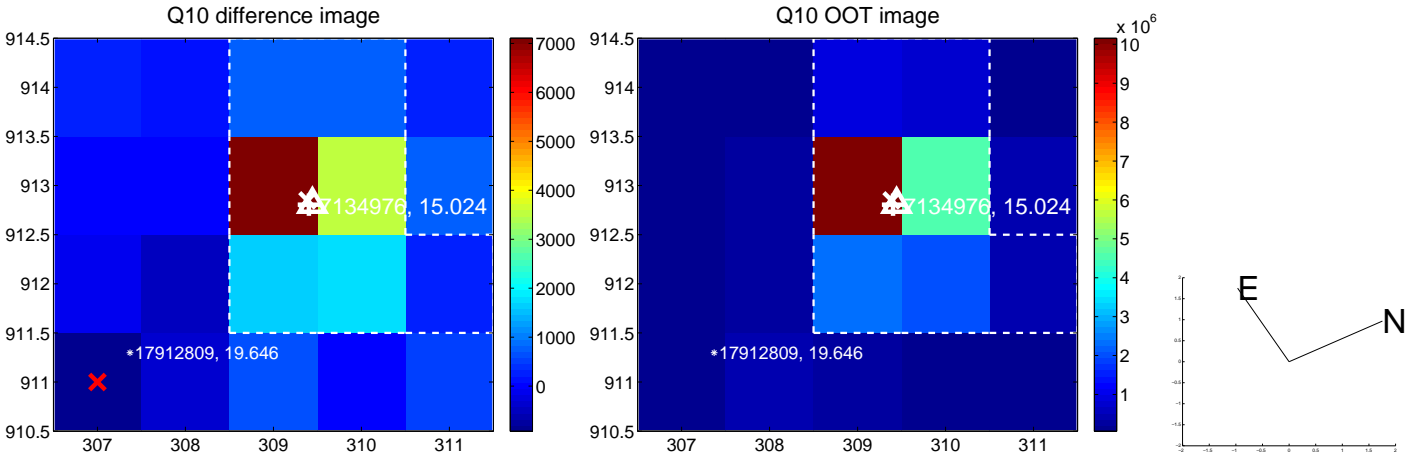
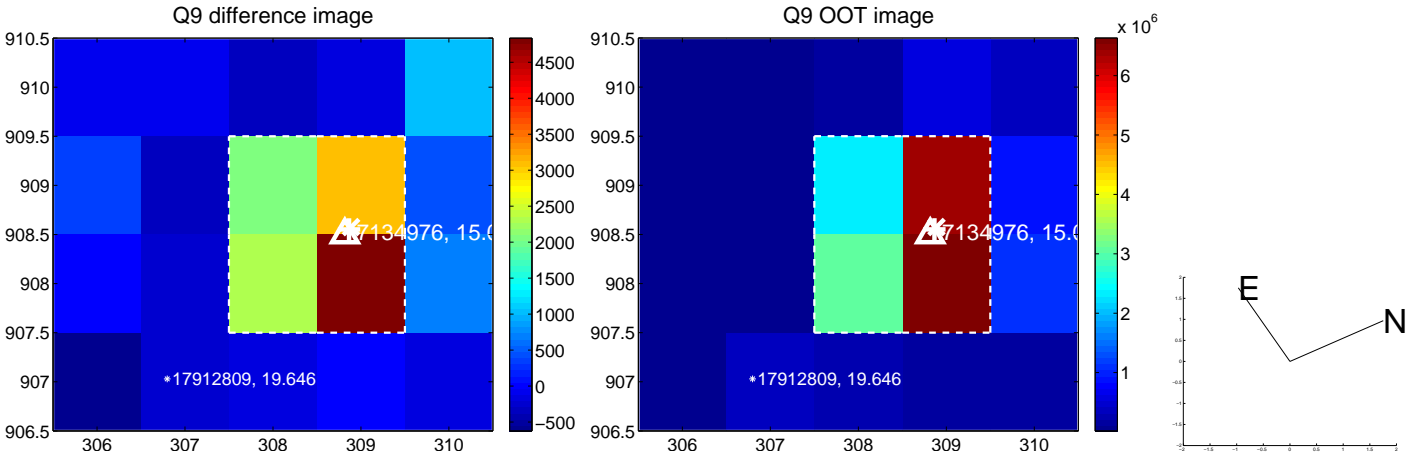
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



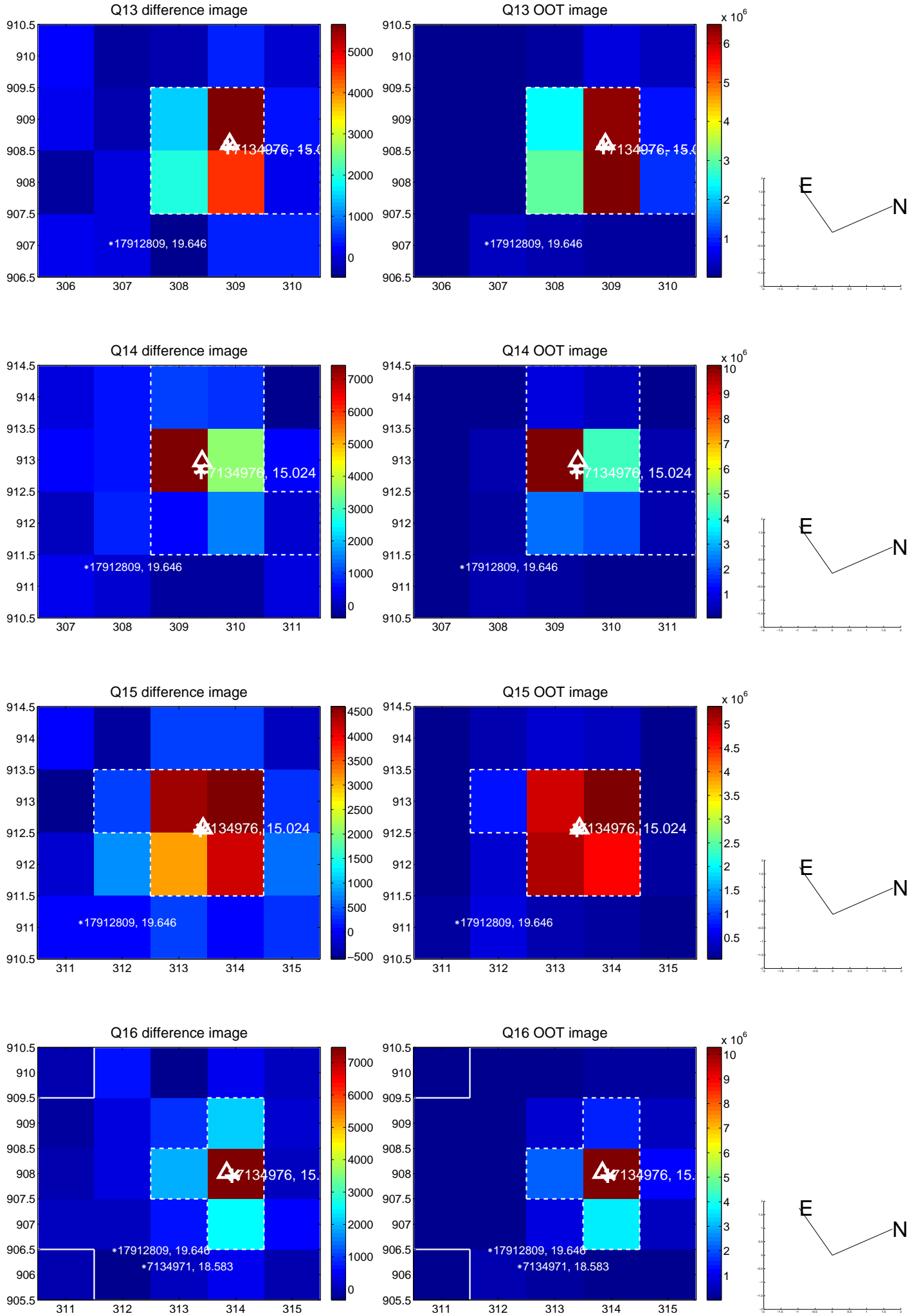
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



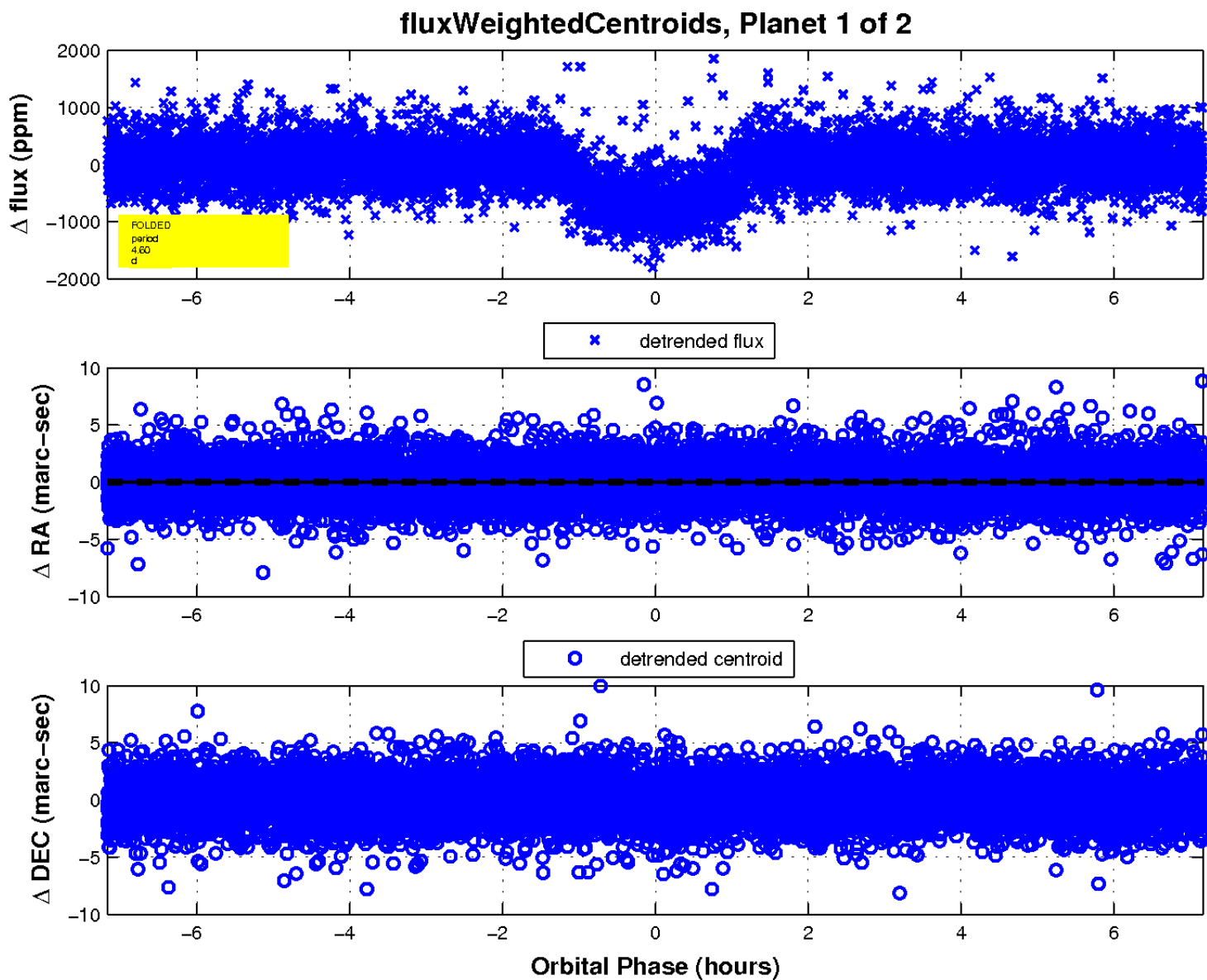
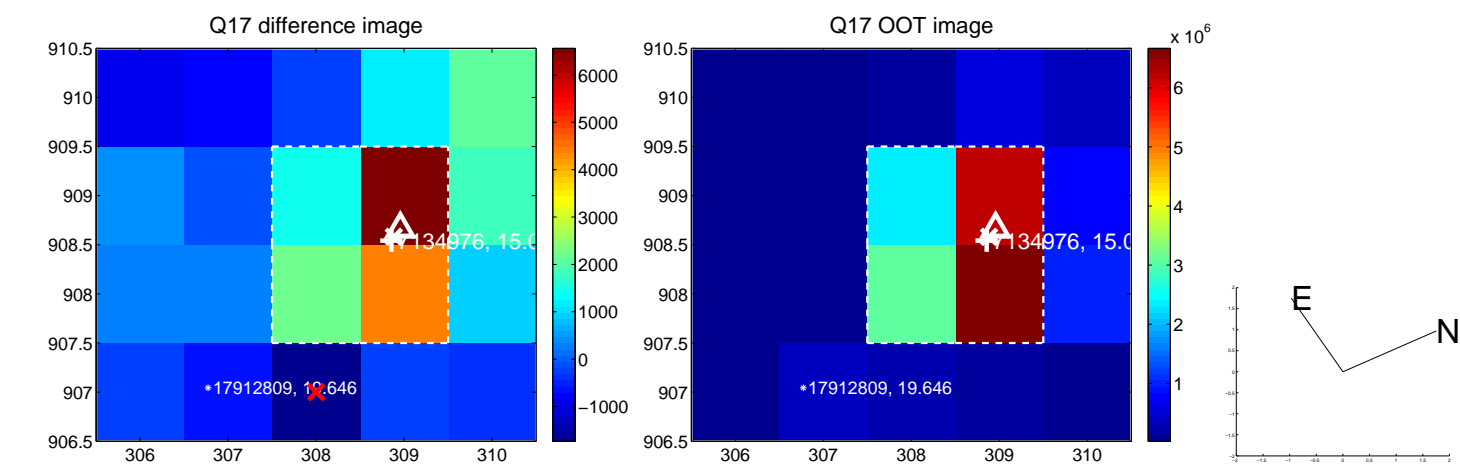
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

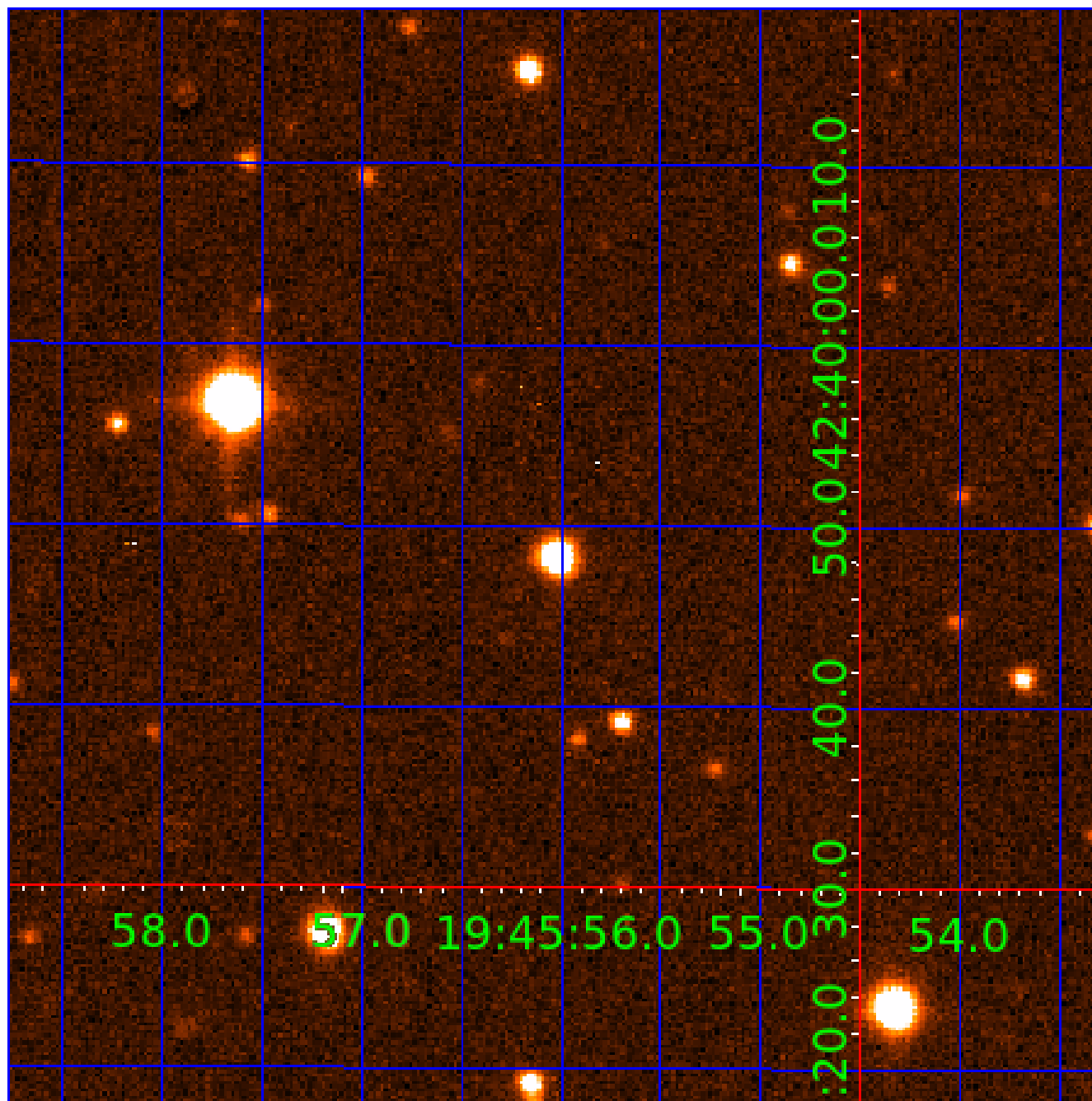


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 007134976

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 007134976-01 | OBS | 0874.01 | 4.601815 | 133.165769 | 765.8 | 2.391 | 52.1 | 61.4 | 0.83 | 4986 | 2.70 | 152.91 |
| 007134976-02 | OBS | 0874.02 | 11.187162 | 137.182258 | 332.2 | 3.366 | 17.3 | 19.2 | 0.83 | 4986 | 1.77 | 46.78 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|------------|
| 007134976-01 | OBS | PC | 1.00 | 0 | 0 | 0 | 0 | NO_COMMENT |
| 007134976-02 | OBS | PC | 1.00 | 0 | 0 | 0 | 0 | NO_COMMENT |

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.

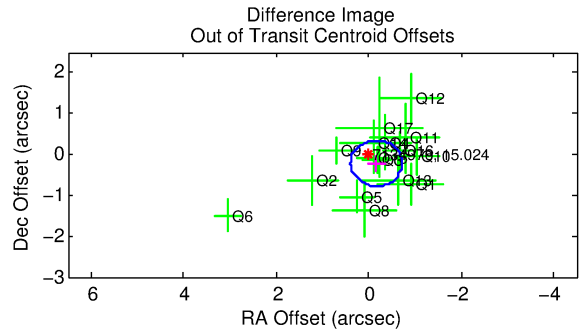
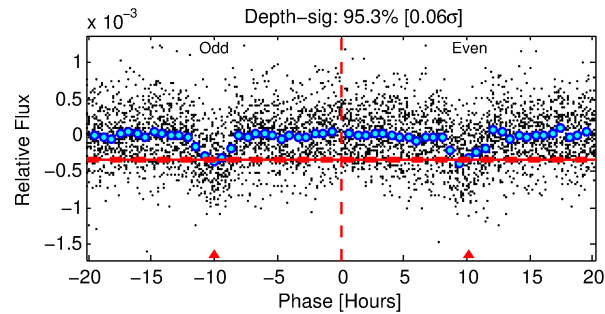
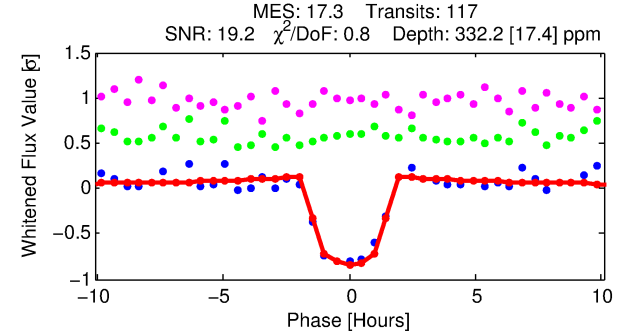
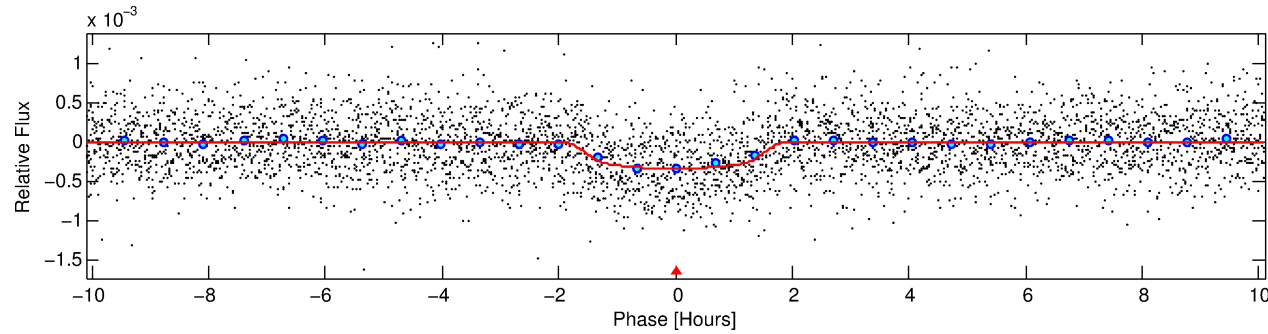
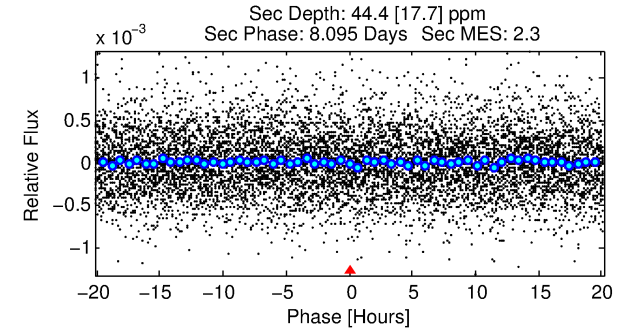
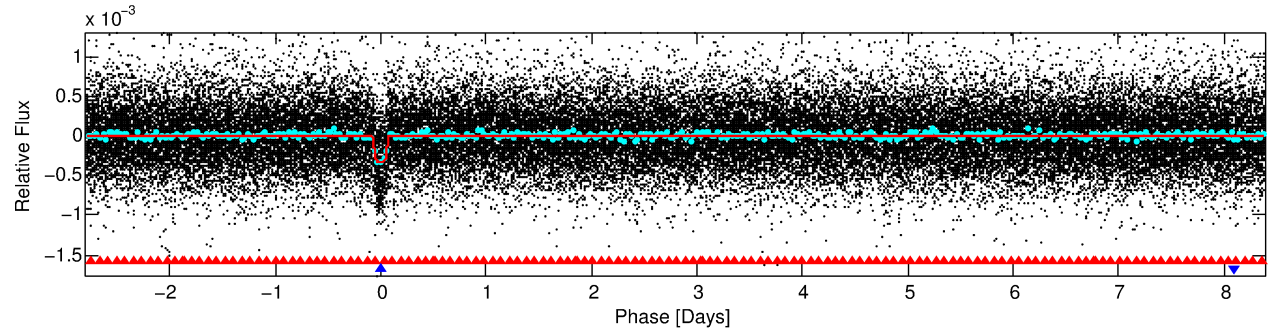
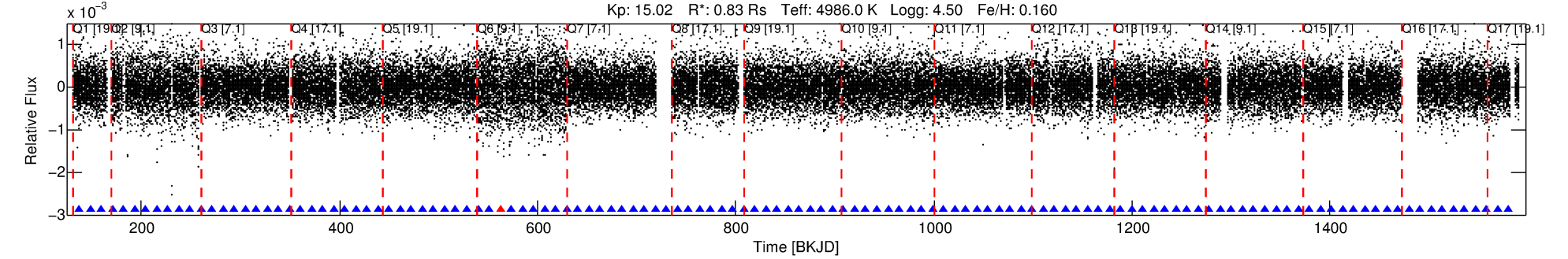
Ephemeris Match Information For 007134976-02

No Significant Match Found

DV One-Page Summary

KIC: 7134976 Candidate: 2 of 2 Period: 11.187 d
KOI: K00874.02 Name: Kepler-246c Corr: 0.976

Kp: 15.02 R*: 0.83 Rs Teff: 4986.0 K Logg: 4.50 Fe/H: 0.160



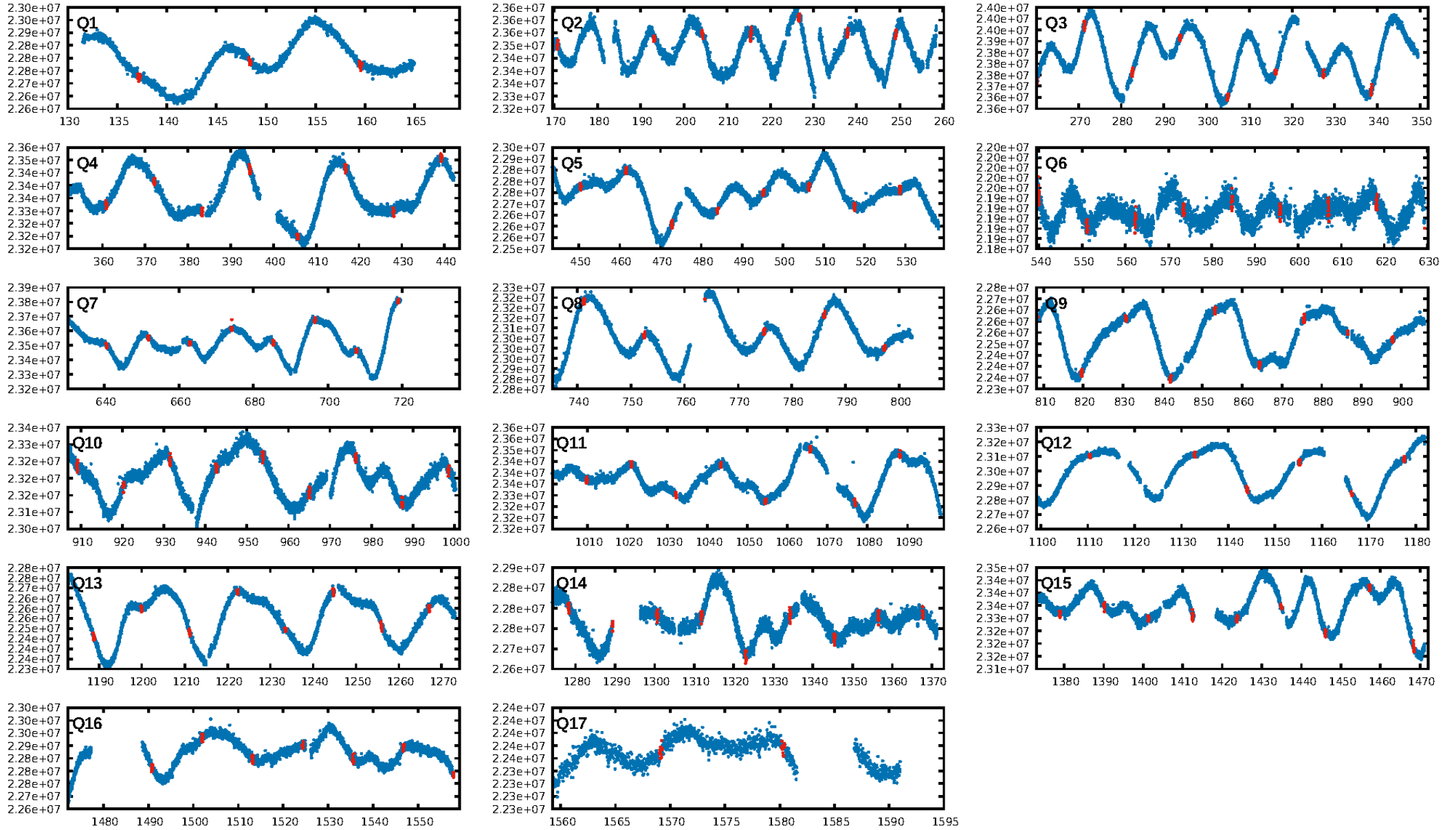
DV Fit Results:

Period = 11.18716 [0.00005] d
Epoch = 137.1823 [0.0037] BKJD
Rp/R* = 0.0195 [0.0078]
a/R* = 14.14 [20.79]
b = 0.85 [0.48]
Seff = 46.78 [6.94]
Teff = 667 [25] K
Rp = 1.77 [0.72] Re
a = 0.0906 [0.0072] AU
Ag = 63.86 [57.45] [1.09σ]
Teffp = 2915 [650] K [3.46σ]

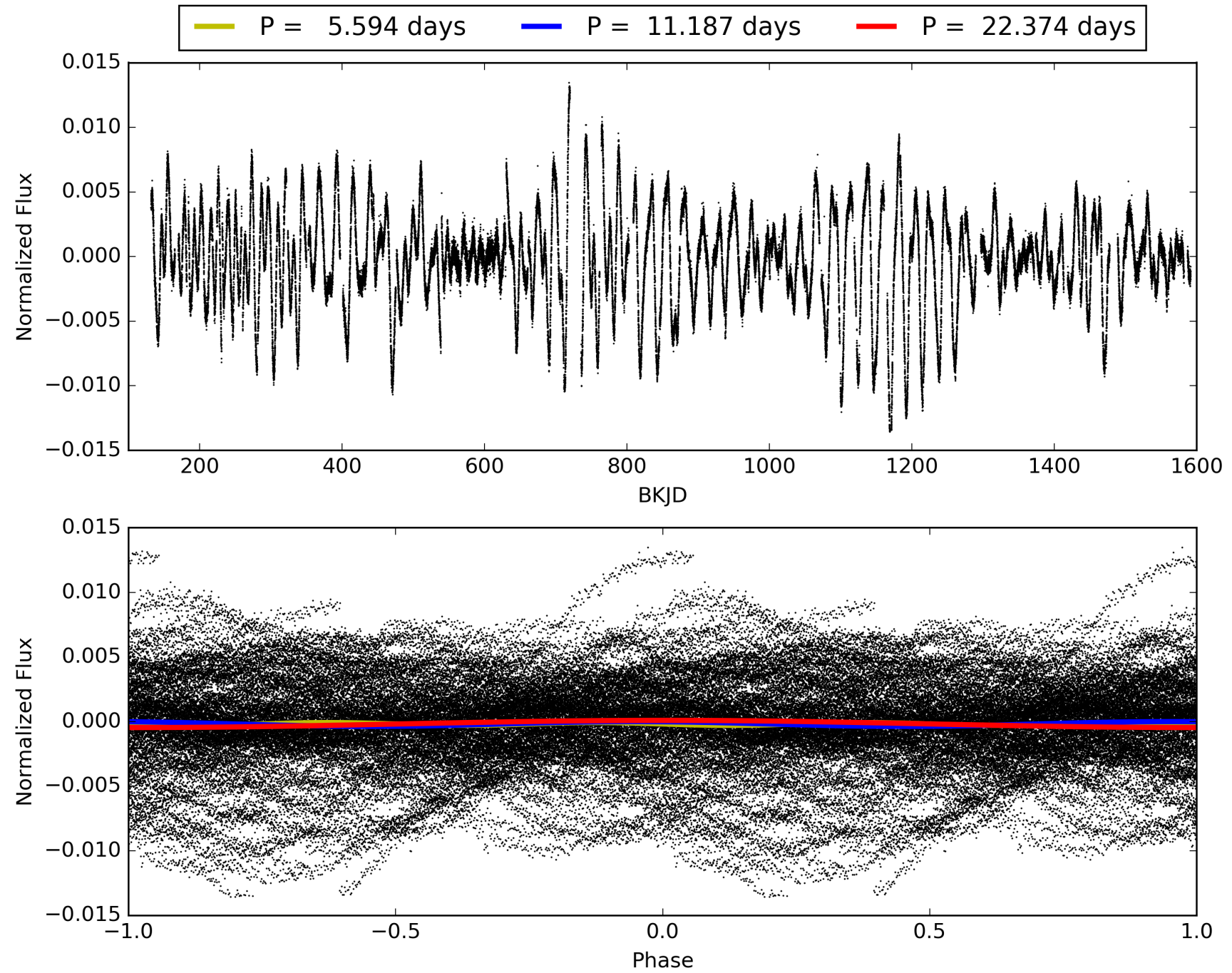
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [38.28σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 99.7%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 4.07e-66
RollingBand-fgt: 0.99 [111/112]
GhostDiagnostic-chr: 2.732
Centroid-sig: N/A
Centroid-so: 0.336 arcsec [0.56σ]
OotOffset-rm: 0.271 arcsec [1.46σ]
KicOffset-rm: 0.381 arcsec [2.05σ]
OotOffset-st: 4/3/4/5 [16]
KicOffset-st: 4/3/4/5 [16]
DiffImageQuality-fgm: 0.81 [13/16]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 007134976-02, PDC Light Curves

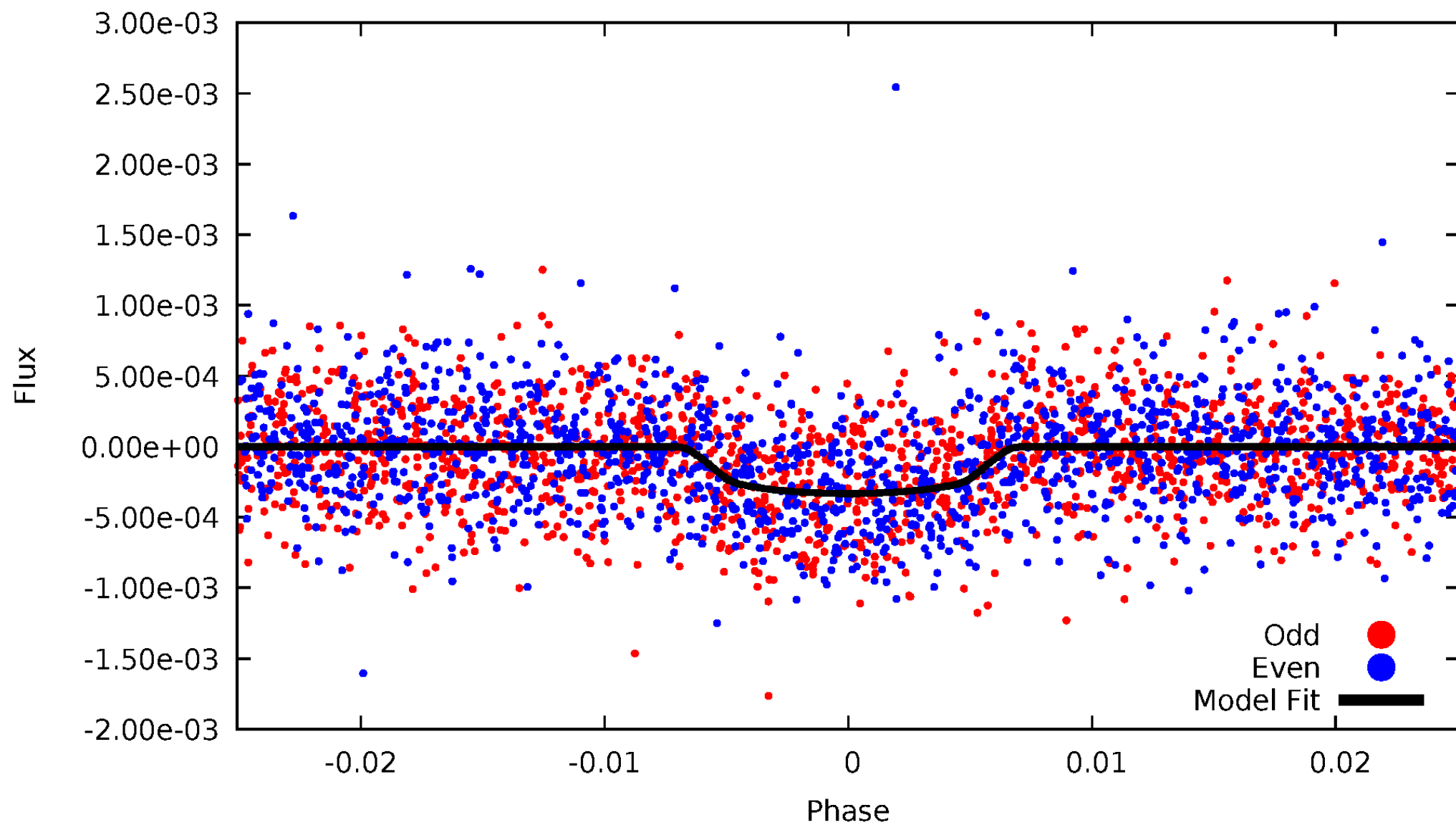


TCE 007134976-02



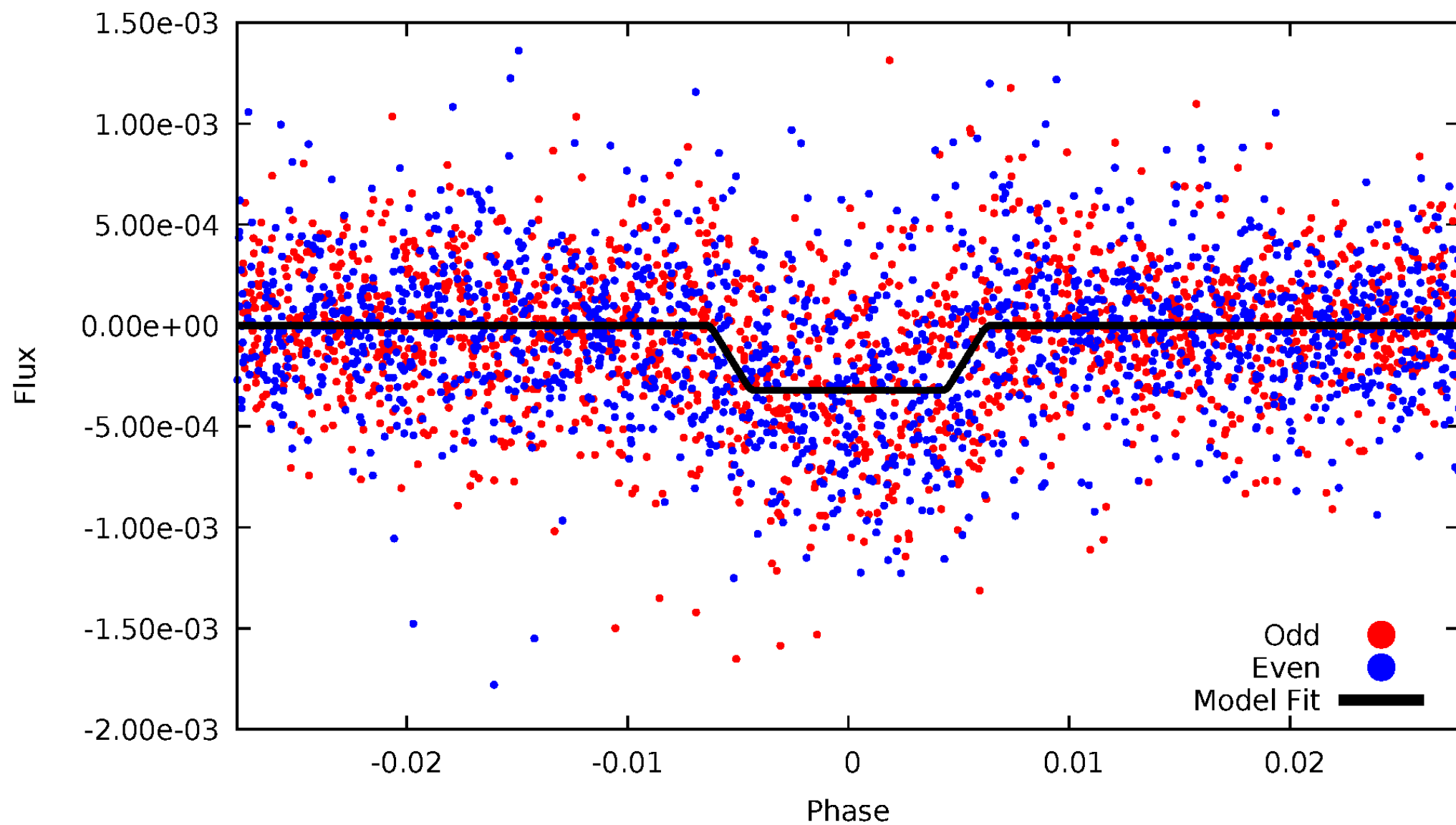
DV Odd/Even

TCE 007134976-02



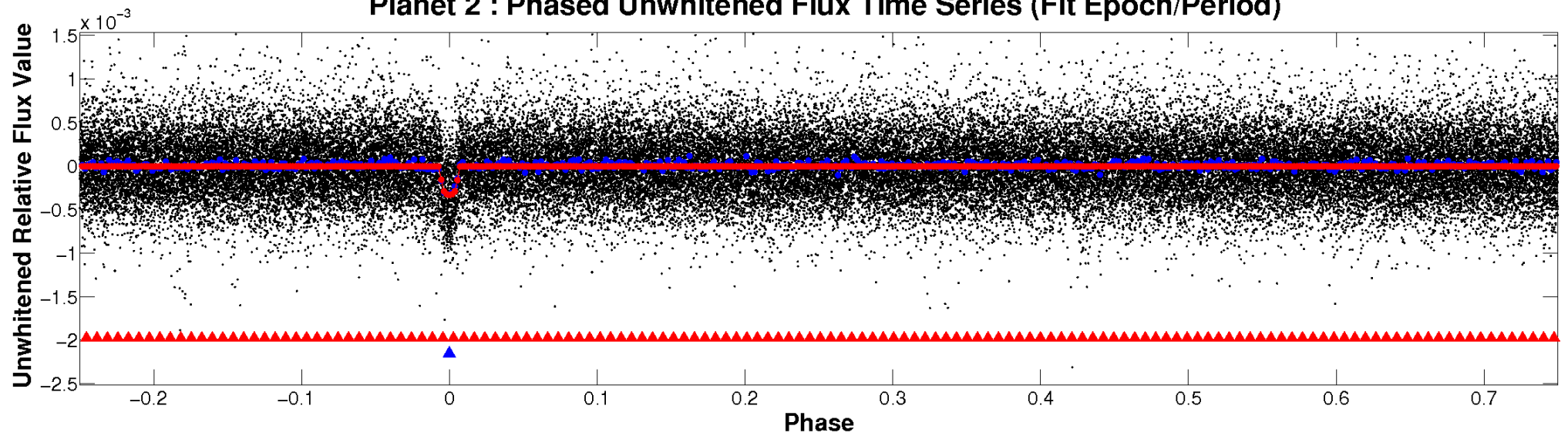
ALT Odd/Even

TCE 007134976-02

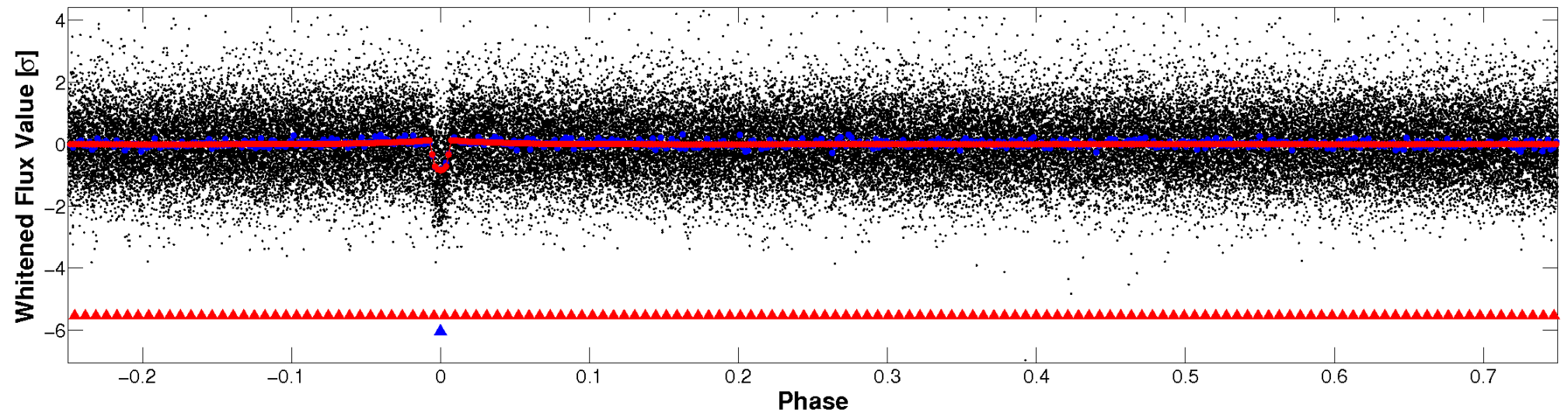


Non-Whitened Vs. Whitened Light Curve

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

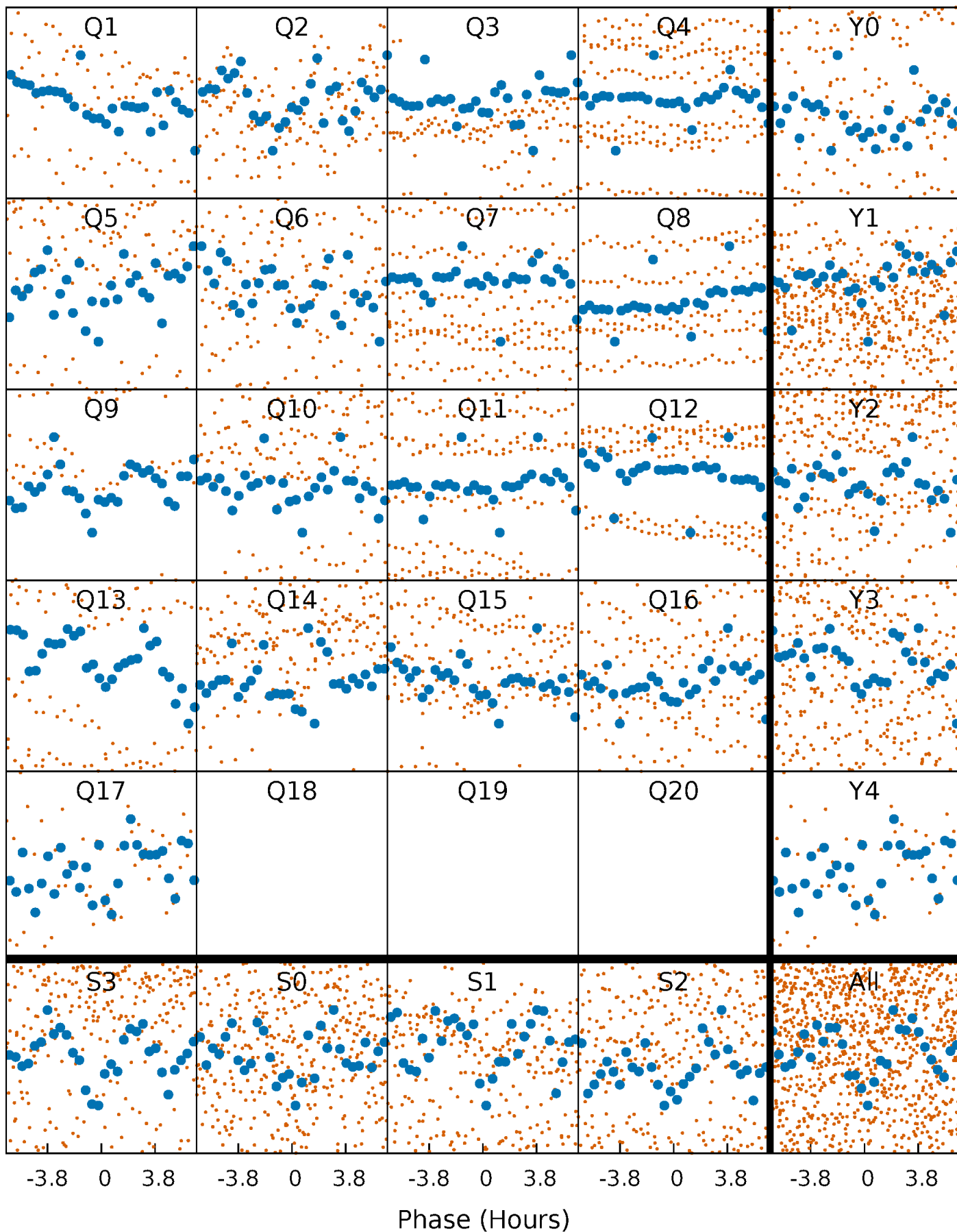


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



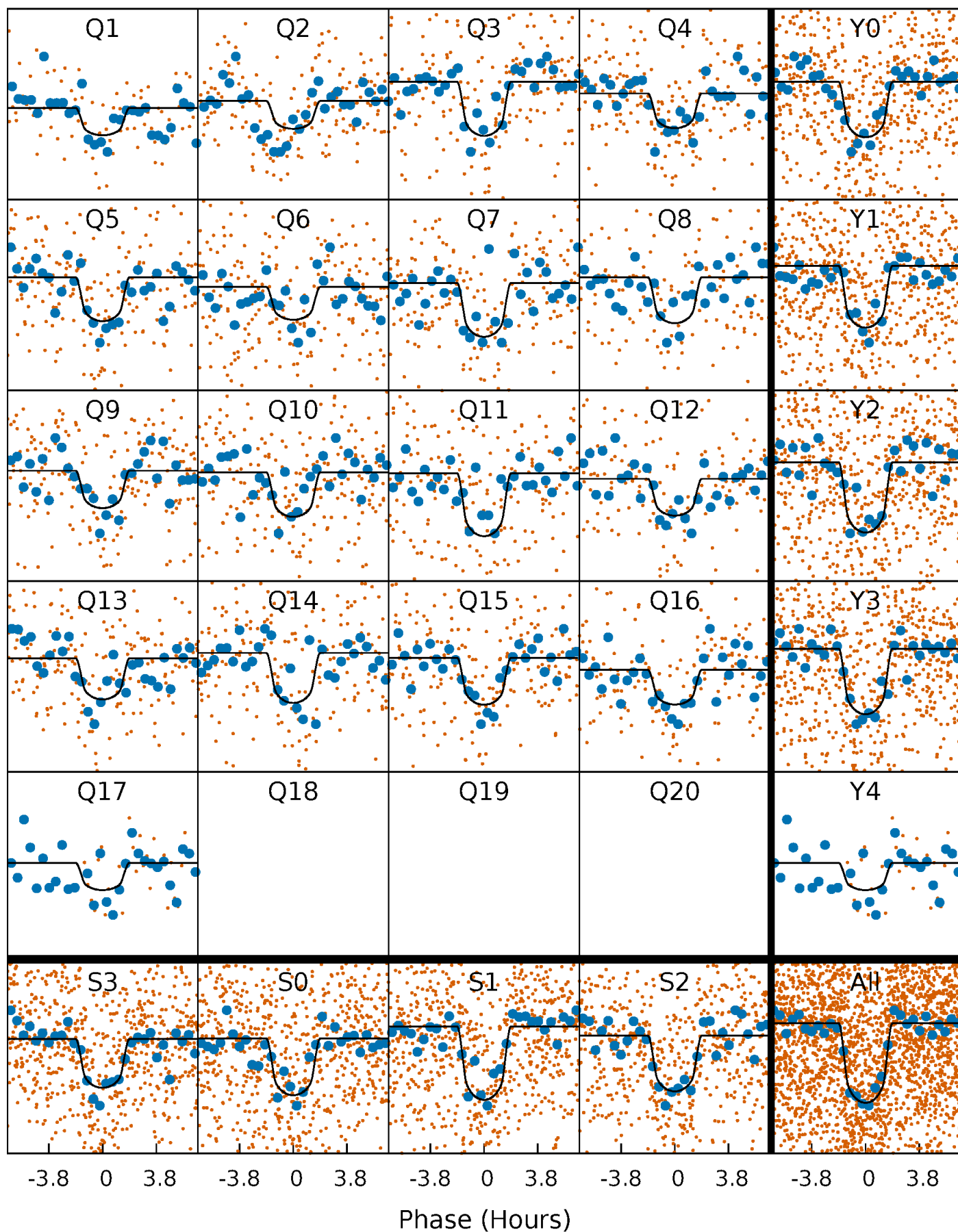
PDC Quarter-Phased Transit Curves

TCE 007134976-02 P= 11.187162 Days $T_0=137.182258$ (BKJD)



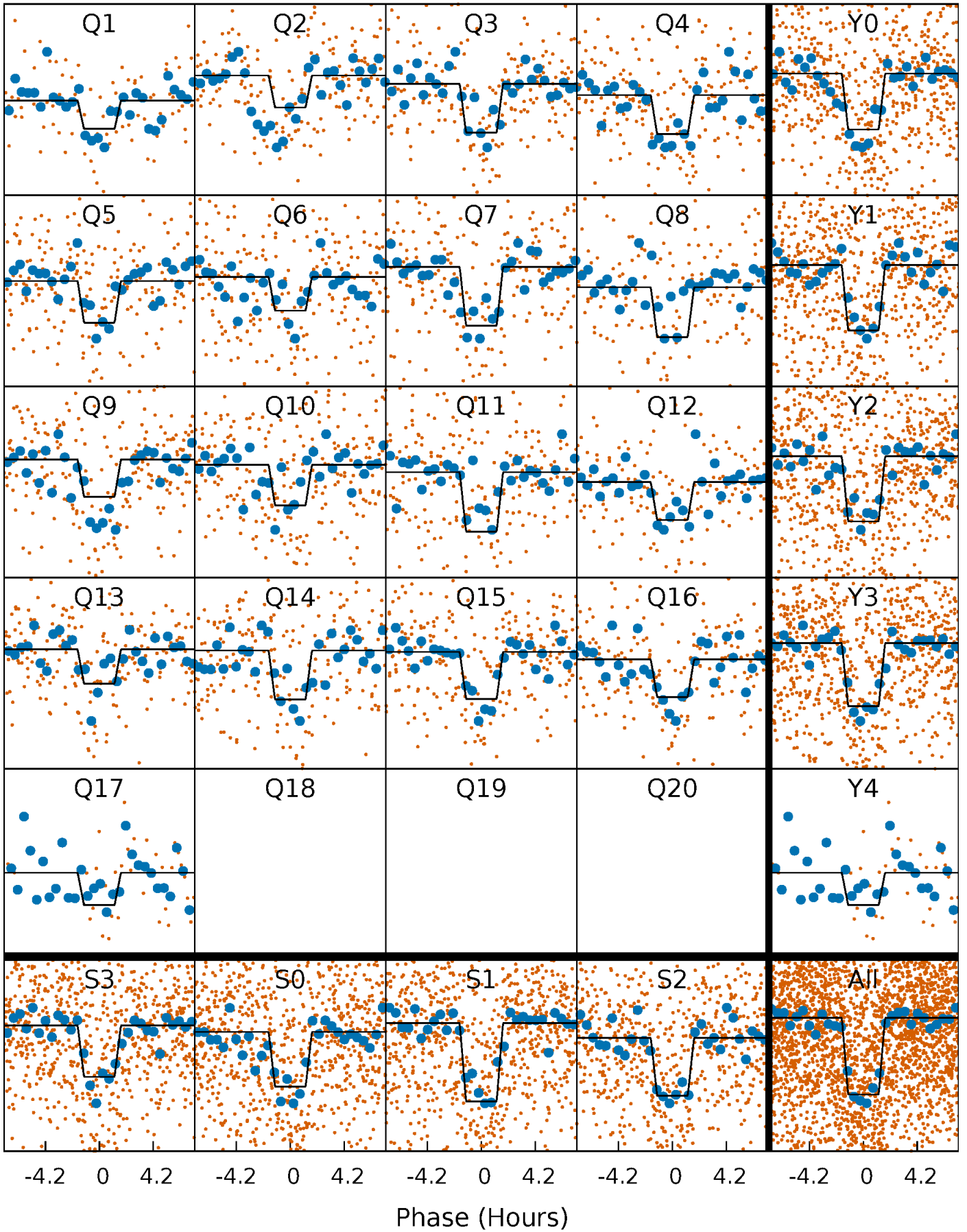
DV Quarter-Phased Transit Curves

TCE 007134976-02 P= 11.187162 Days $T_0=137.182258$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

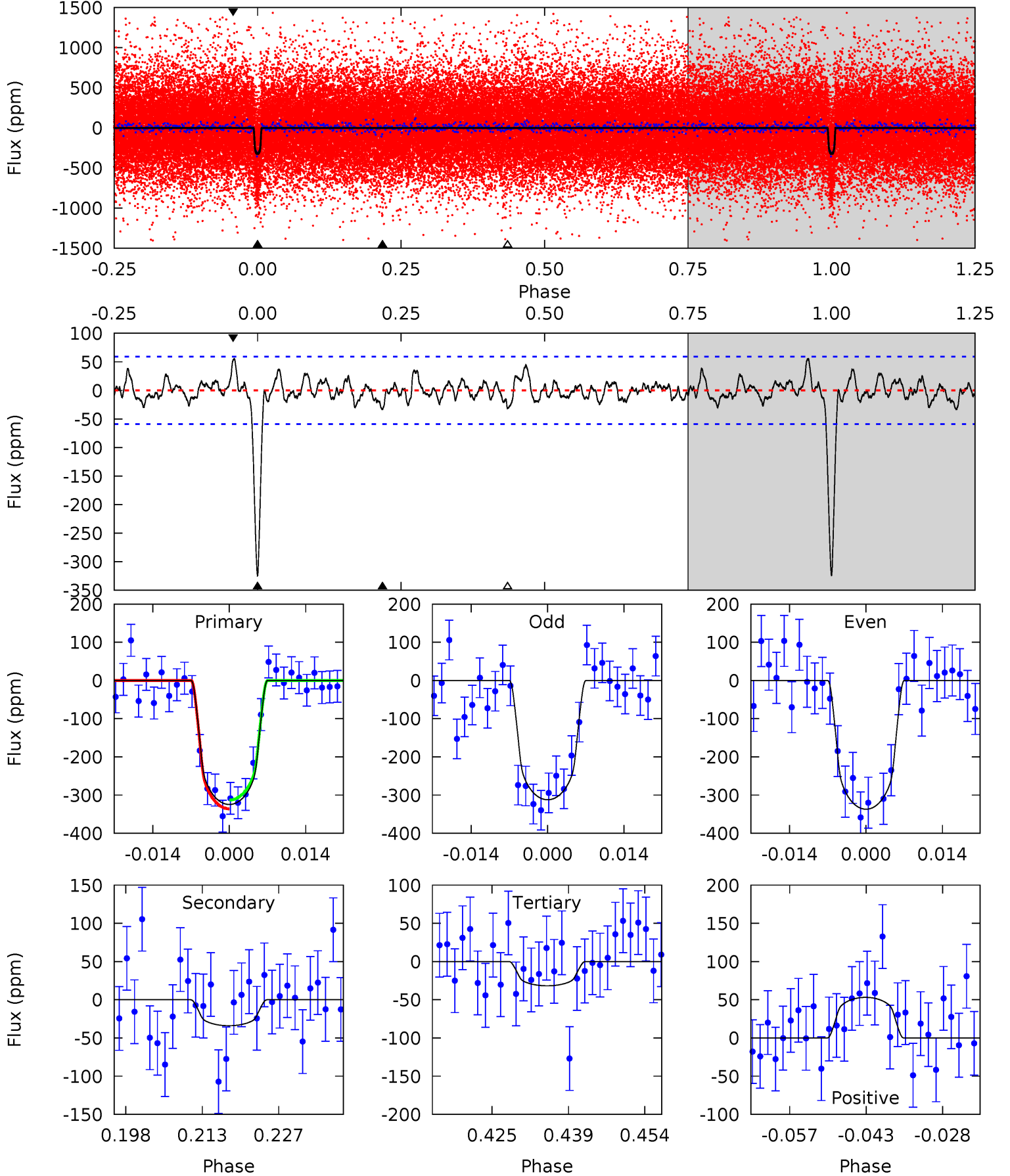
TCE 007134976-02 P= 11.187158 Days $T_0=137.180083$ (BKJD)



DV Model-Shift Uniqueness Test

007134976-02, P = 11.187162 Days, E = 125.995096 Days

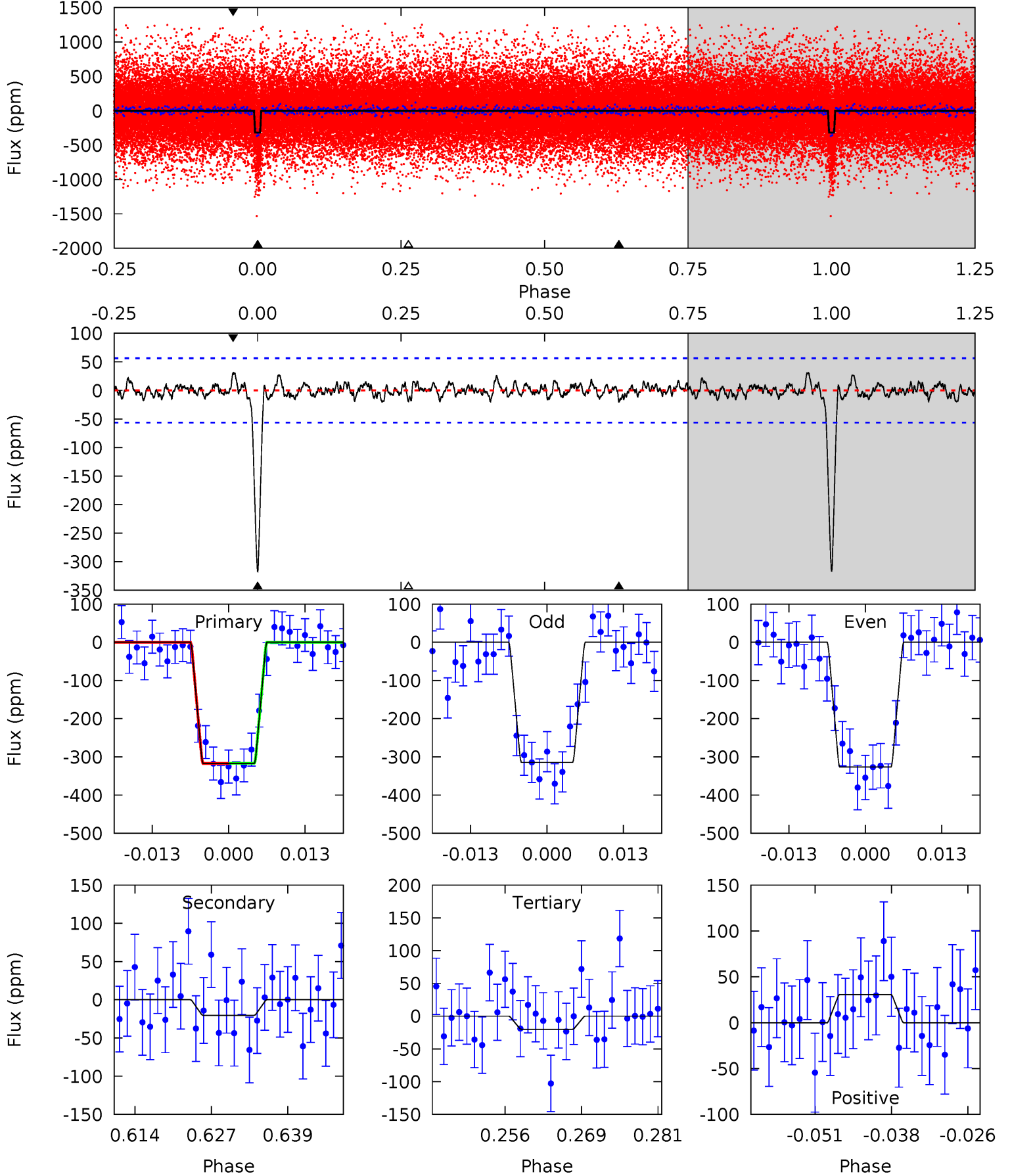
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 27.3 | 2.86 | 2.67 | 4.47 | 4.96 | 2.45 | 1.20 | 24.6 | 22.8 | 0.19 | -1.61 | 1.04 | 0.99 | 0.14 | 0.97 |



Alt Model-Shift Uniqueness Test

007134976-02, P = 11.187158 Days, E = 125.992925 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 28.0 | 1.80 | 1.78 | 2.71 | 4.98 | 2.49 | 0.76 | 26.2 | 25.3 | 0.02 | -0.92 | 0.55 | 1.07 | 0.09 | 0.02 |



Stellar Parameters For KIC 007134976

| | $T_{\text{eff}}(K)$ | $\log(g)$ | $[\text{Fe}/\text{H}]$ | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|---------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 4986^{+82}_{-82} | $4.496^{+0.080}_{-0.025}$ | $0.160^{+0.150}_{-0.150}$ | $0.833^{+0.032}_{-0.064}$ | $0.793^{+0.050}_{-0.029}$ | $1.931^{+0.567}_{-0.159}$ |
| | +2%/-2% | +2%/-1% | +94%/-94% | +4%/-8% | +6%/-4% | +29%/-8% |
| Source | SPE90 | SPE90 | SPE90 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 007134976-02 / KOI 0874.02

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|--------------|------------------------|----------------------|----------------------|------------------|
| DV | -34 ± 12 | $1.75^{+0.67}_{-0.69}$ | 924^{+20}_{-24} | 3234^{+599}_{-347} | 50^{+94}_{-28} |
| Alt. | -20 ± 11 | $1.58^{+0.73}_{-0.70}$ | 925^{+23}_{-23} | 3083^{+657}_{-416} | 36^{+92}_{-25} |

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

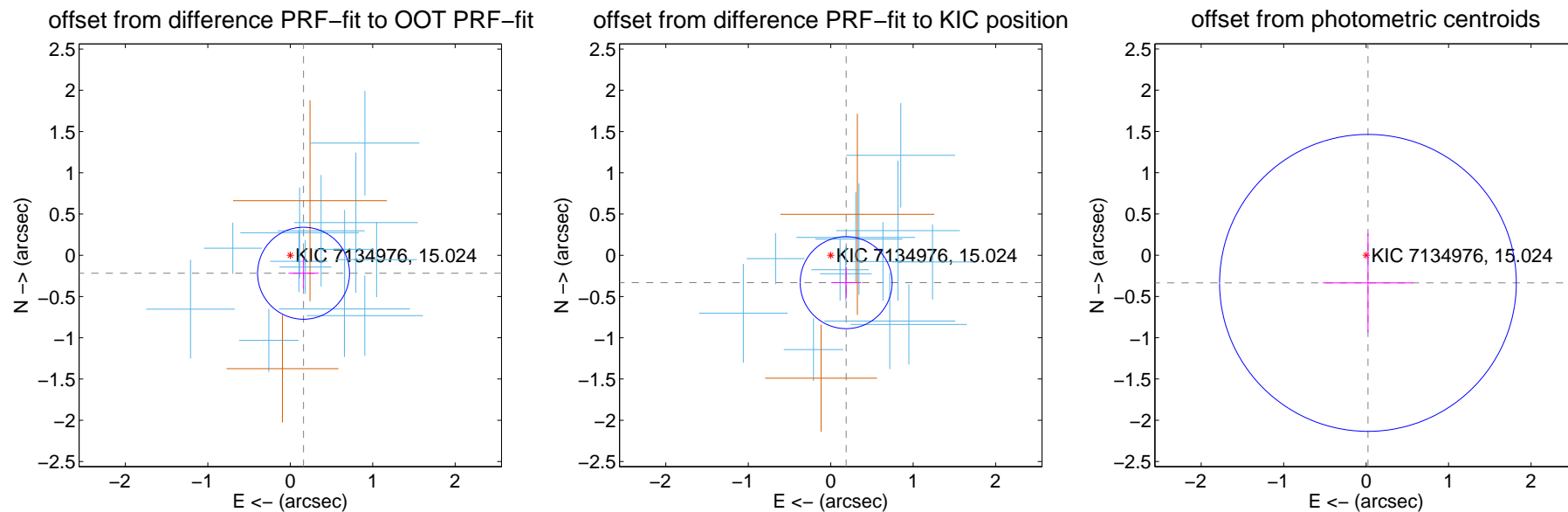
DV Centroid Data

Supplemental centroid analysis for 007134976-02. Kepler magnitude: 15.02. Transit SNR 19.16

There are 13 quarters with good PRF difference image offsets

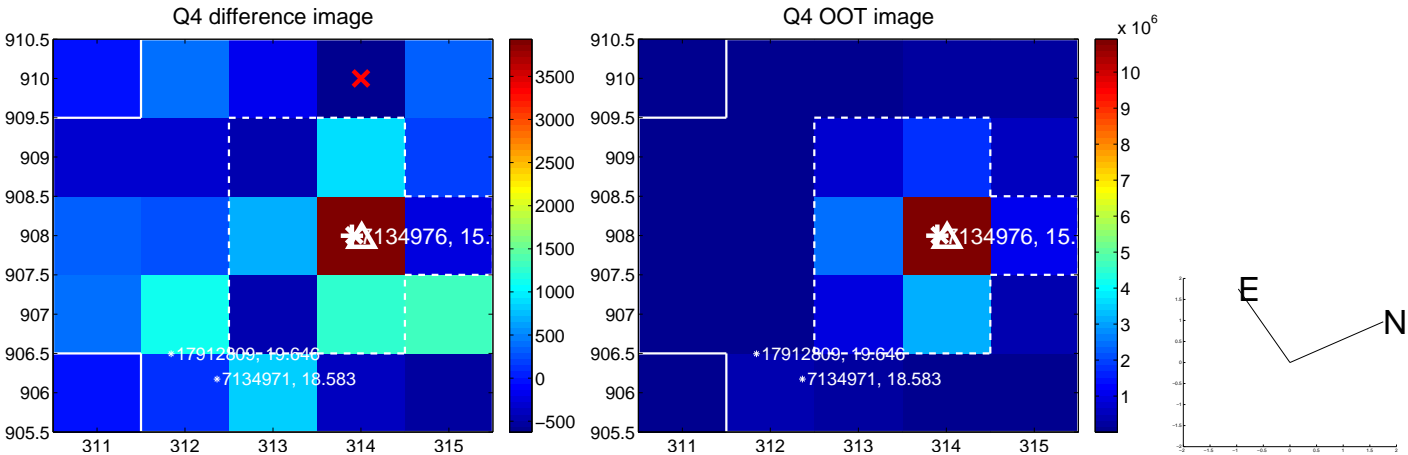
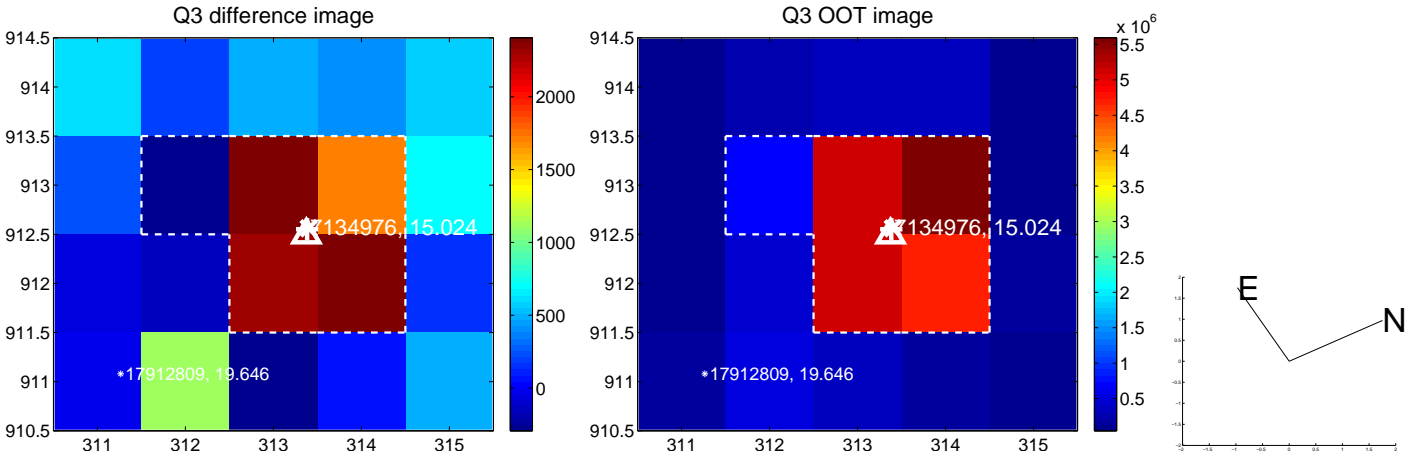
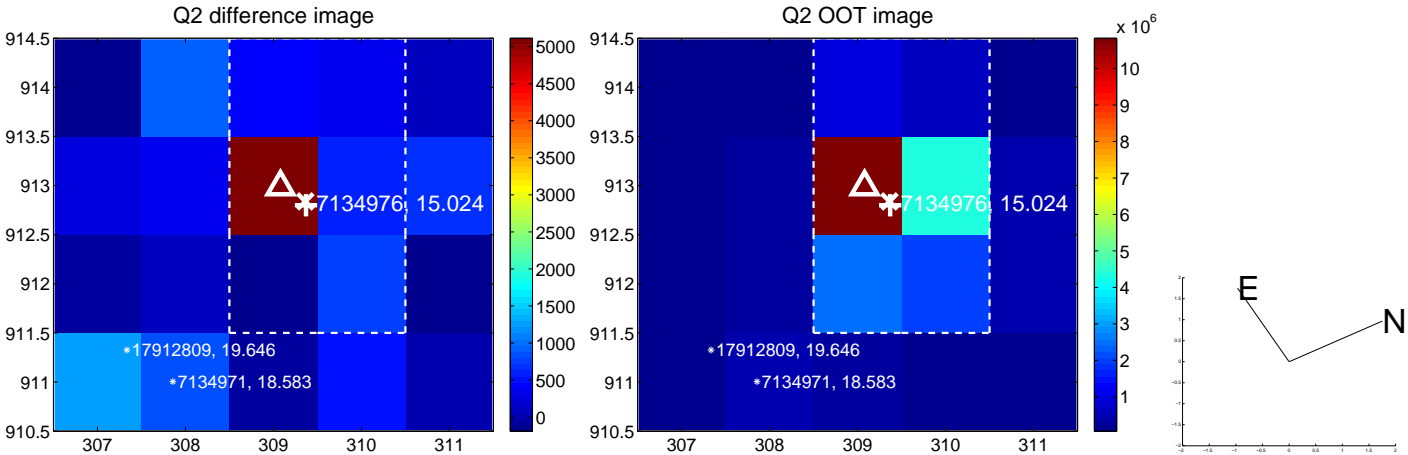
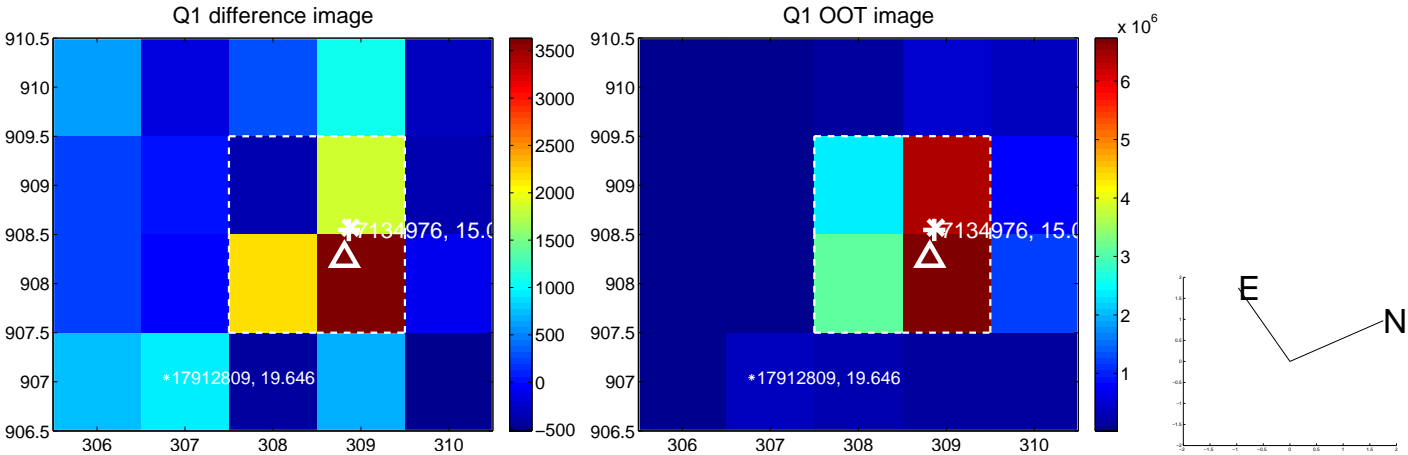
The direct PRF centroid is offset from the target star catalog position by about 0.18 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 0.271 ± 0.186 | 1.46 | -0.161 ± 0.182 | -0.218 ± 0.188 |
| PRF-fit source offset from KIC position | 0.381 ± 0.186 | 2.05 | -0.187 ± 0.180 | -0.332 ± 0.188 |
| photometric centroid source offset | 0.34 ± 0.60 | 0.56 | -0.02 ± 0.55 | -0.34 ± 0.60 |

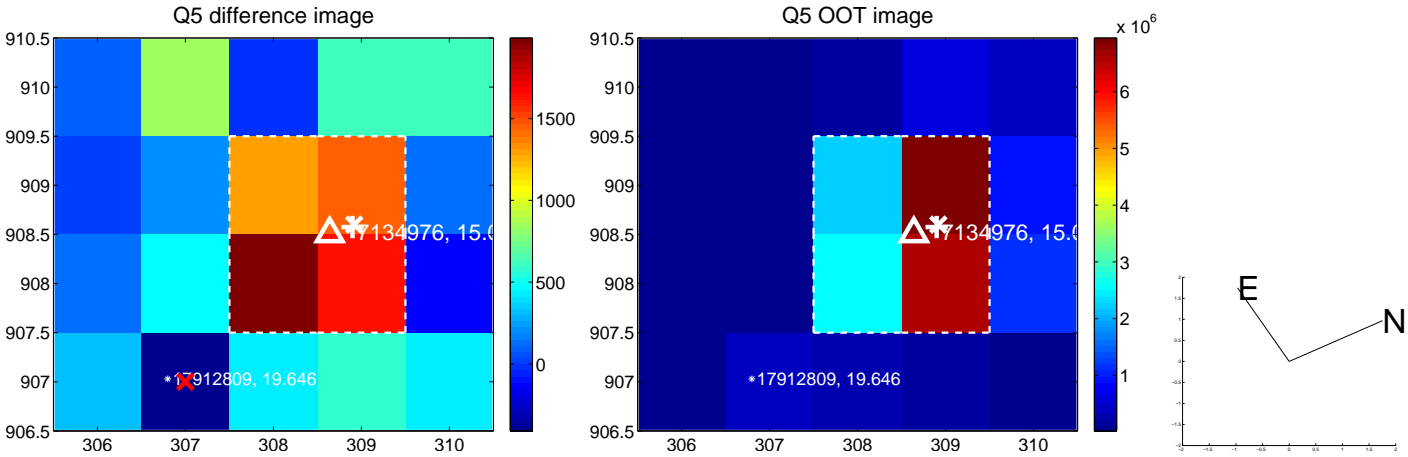


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

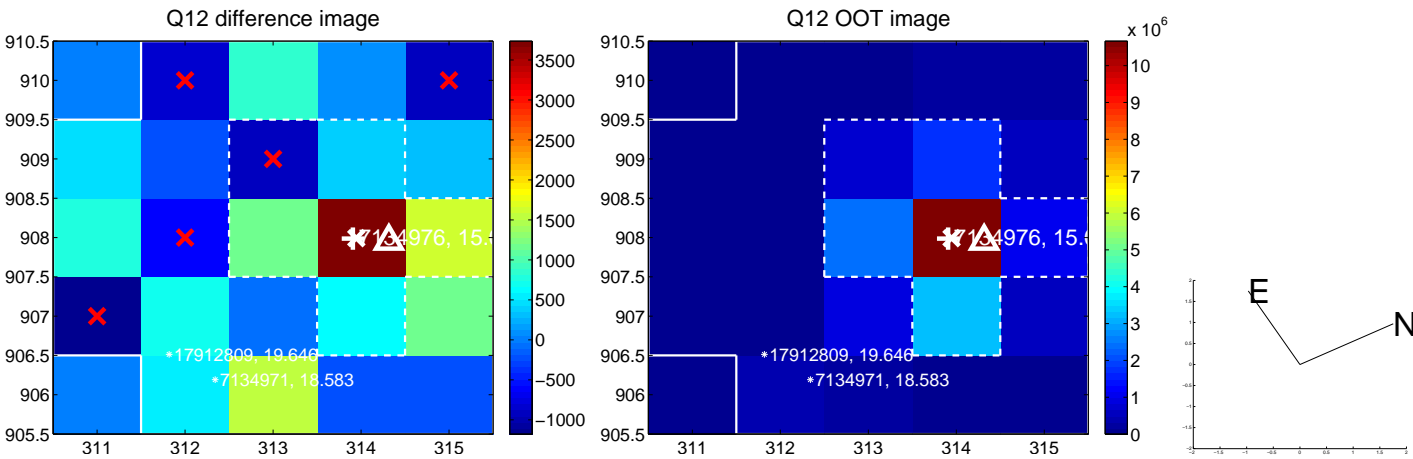
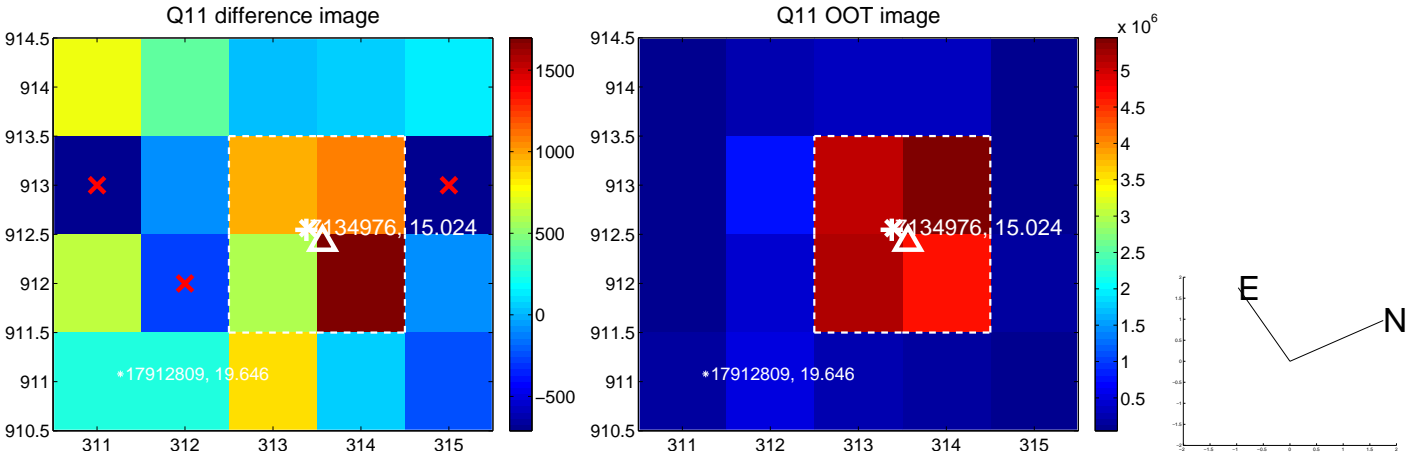
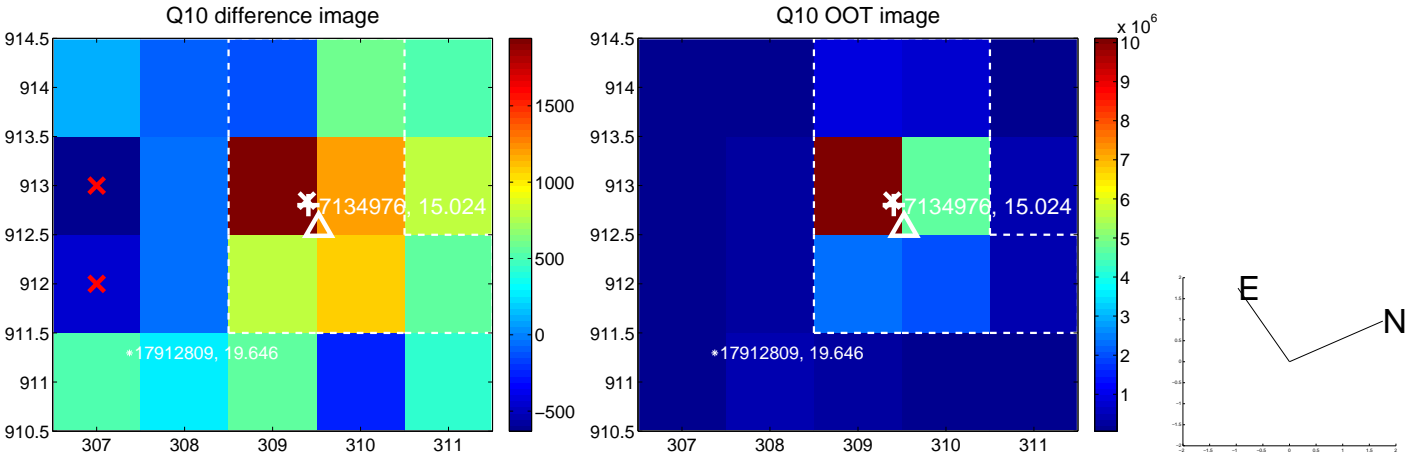
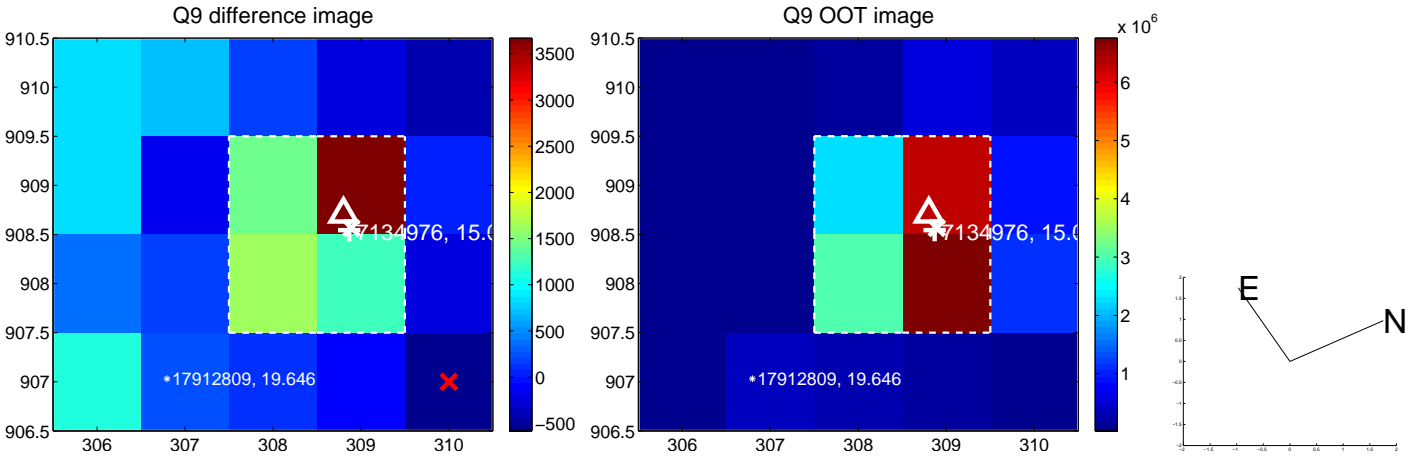
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



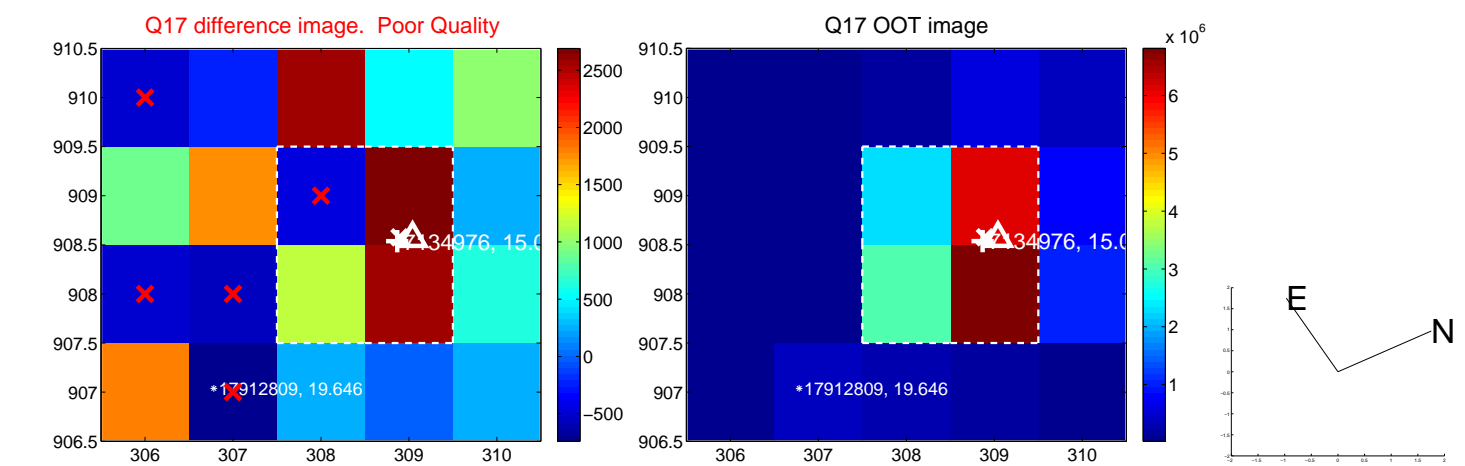
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



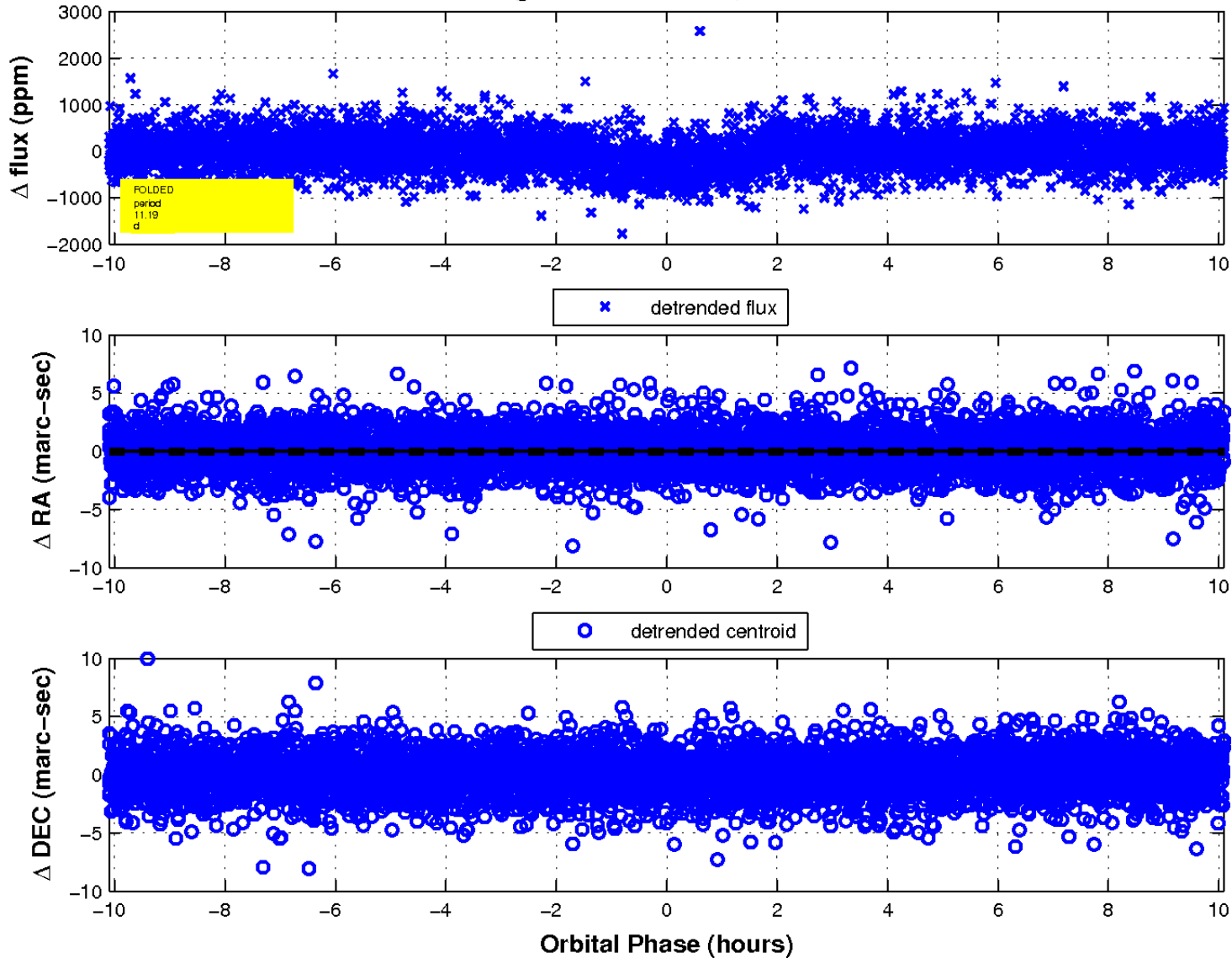
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

