

KIC 006690082

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 006690082-01 | OBS | 1240.01 | 2.139558 | 131.514554 | 261.8 | 2.198 | 40.3 | 47.0 | 1.08 | 5534 | 2.10 | 976.27 |
| 006690082-02 | OBS | 1240.02 | 4.807108 | 134.640442 | 428.4 | 0.913 | 23.3 | 31.0 | 1.08 | 5534 | 2.71 | 331.76 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|------------|
| 006690082-01 | OBS | PC | 1.00 | 0 | 0 | 0 | 0 | NO_COMMENT |
| 006690082-02 | 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.

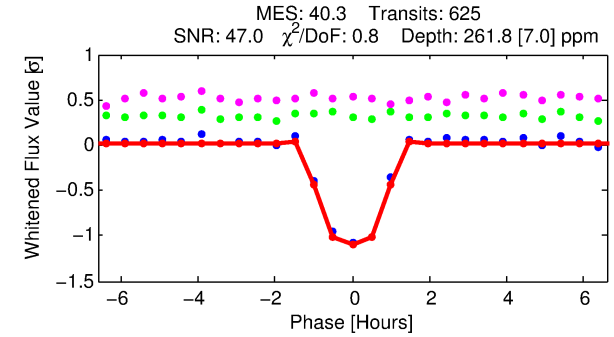
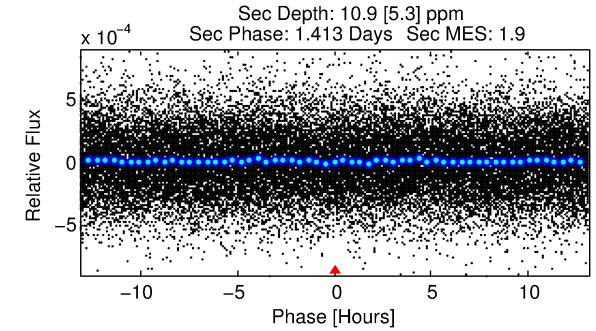
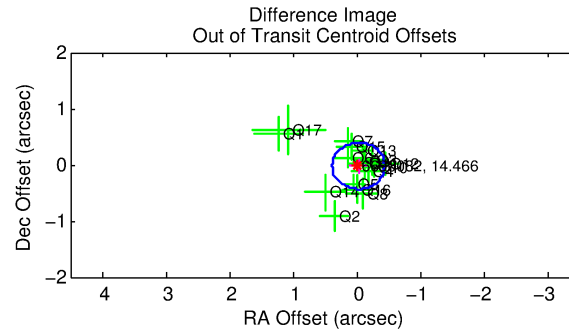
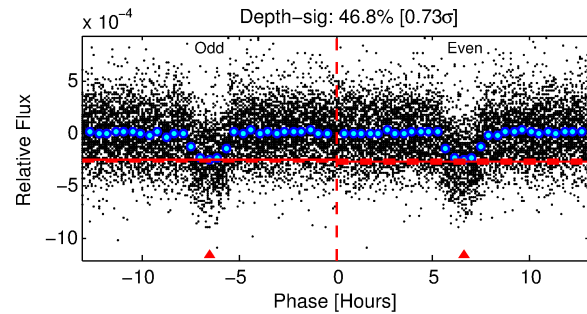
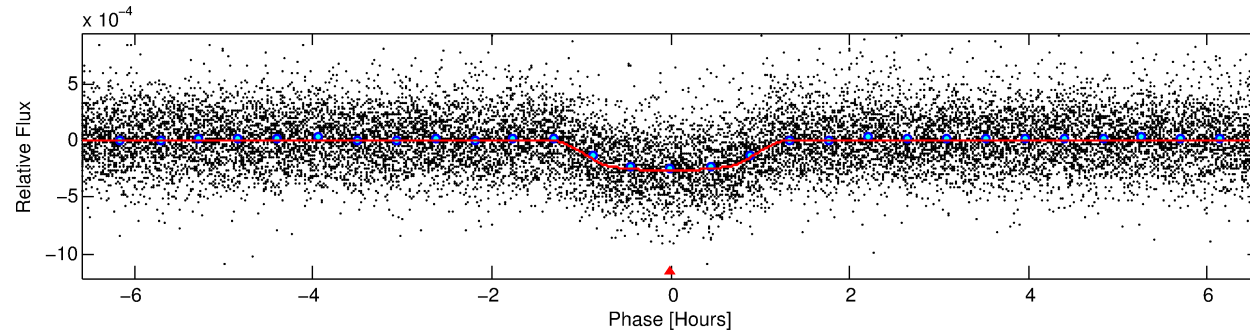
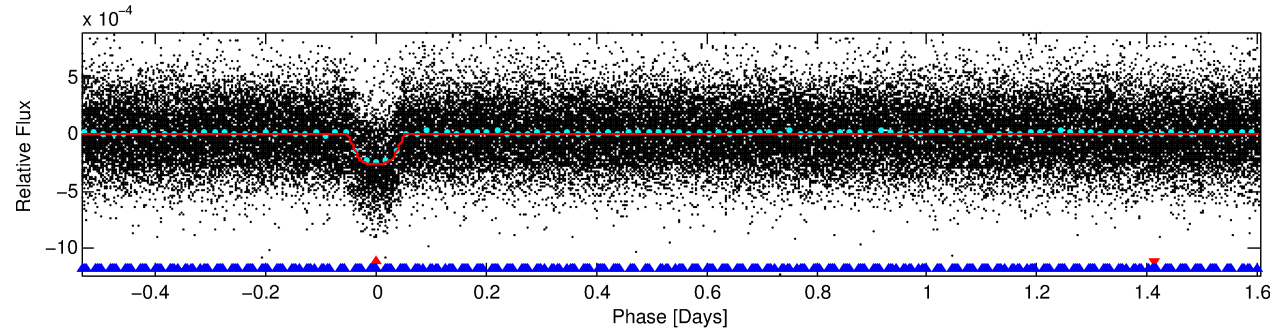
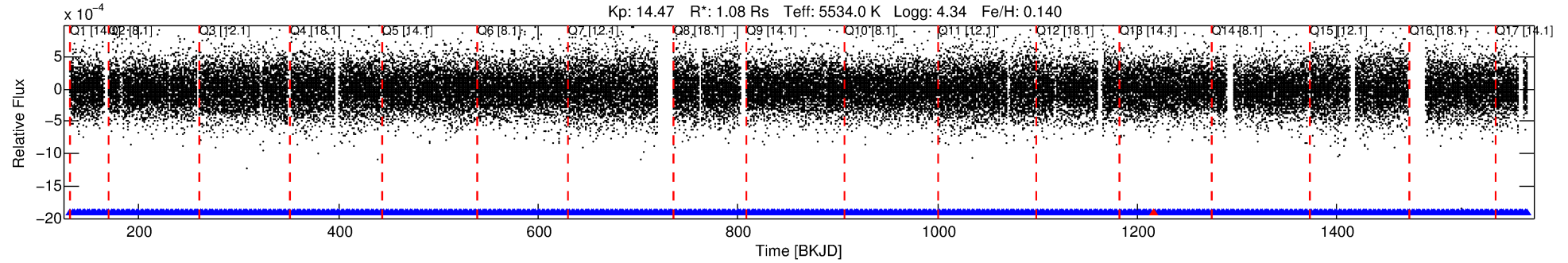
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 006690082-01

No Significant Match Found

DV One-Page Summary

KIC: 6690082 Candidate: 1 of 2 Period: 2.140 d
KOI: K01240.01 Name: Kepler-280b Corr: 0.967



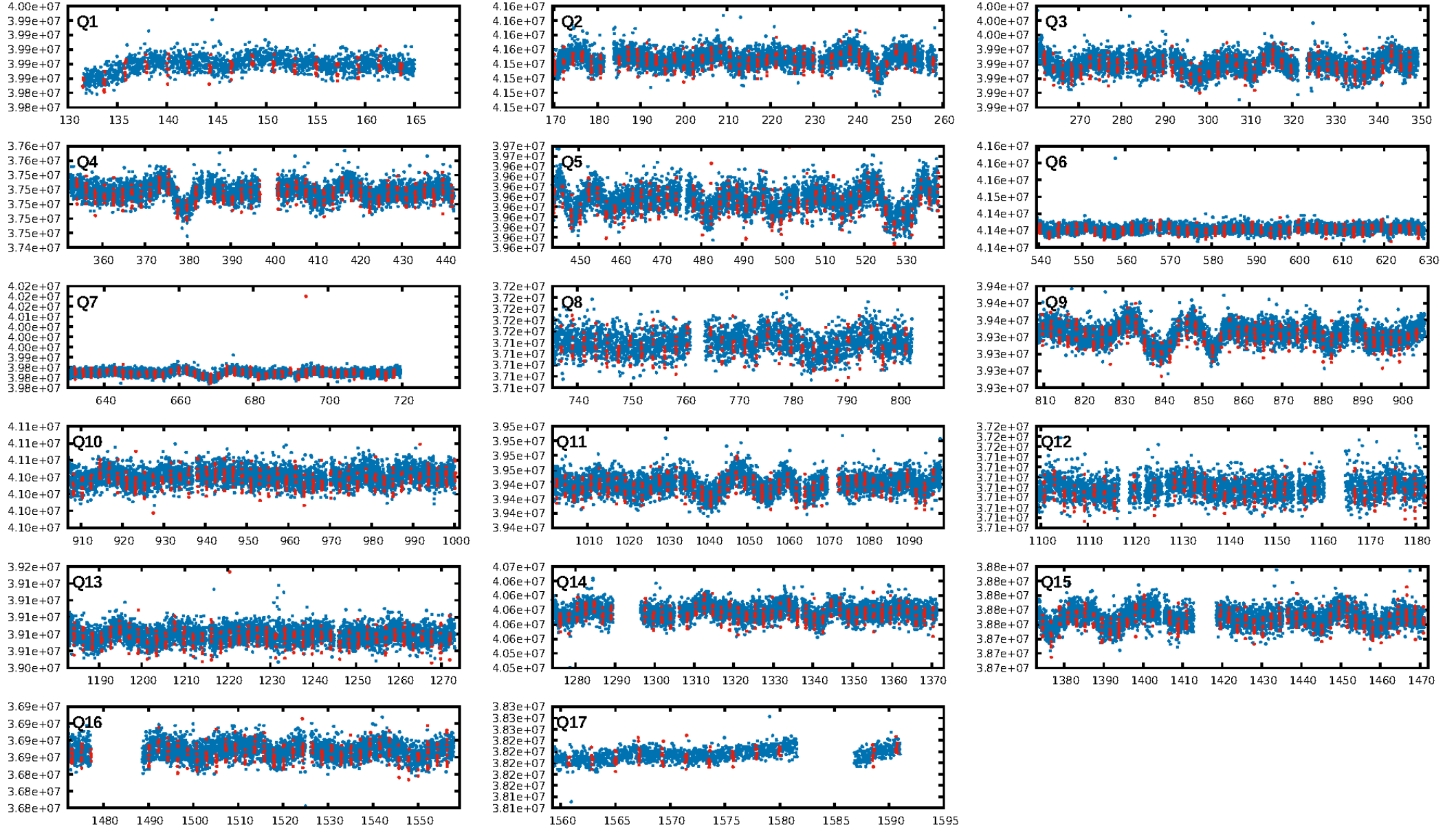
DV Fit Results:

Period = 2.13956 [0.00000] d
Epoch = 131.5146 [0.0007] BKJD
Rp/R* = 0.0178 [0.0027]
a/R* = 3.64 [2.29]
b = 0.90 [0.15]
Seff = 976.27 [236.66]
Teq = 1425 [86] K
Rp = 2.10 [0.46] Re
a = 0.0317 [0.0047] AU
Ag = 1.36 [0.85] [0.43 σ]
Teffp = 2380 [344] K [2.69 σ]

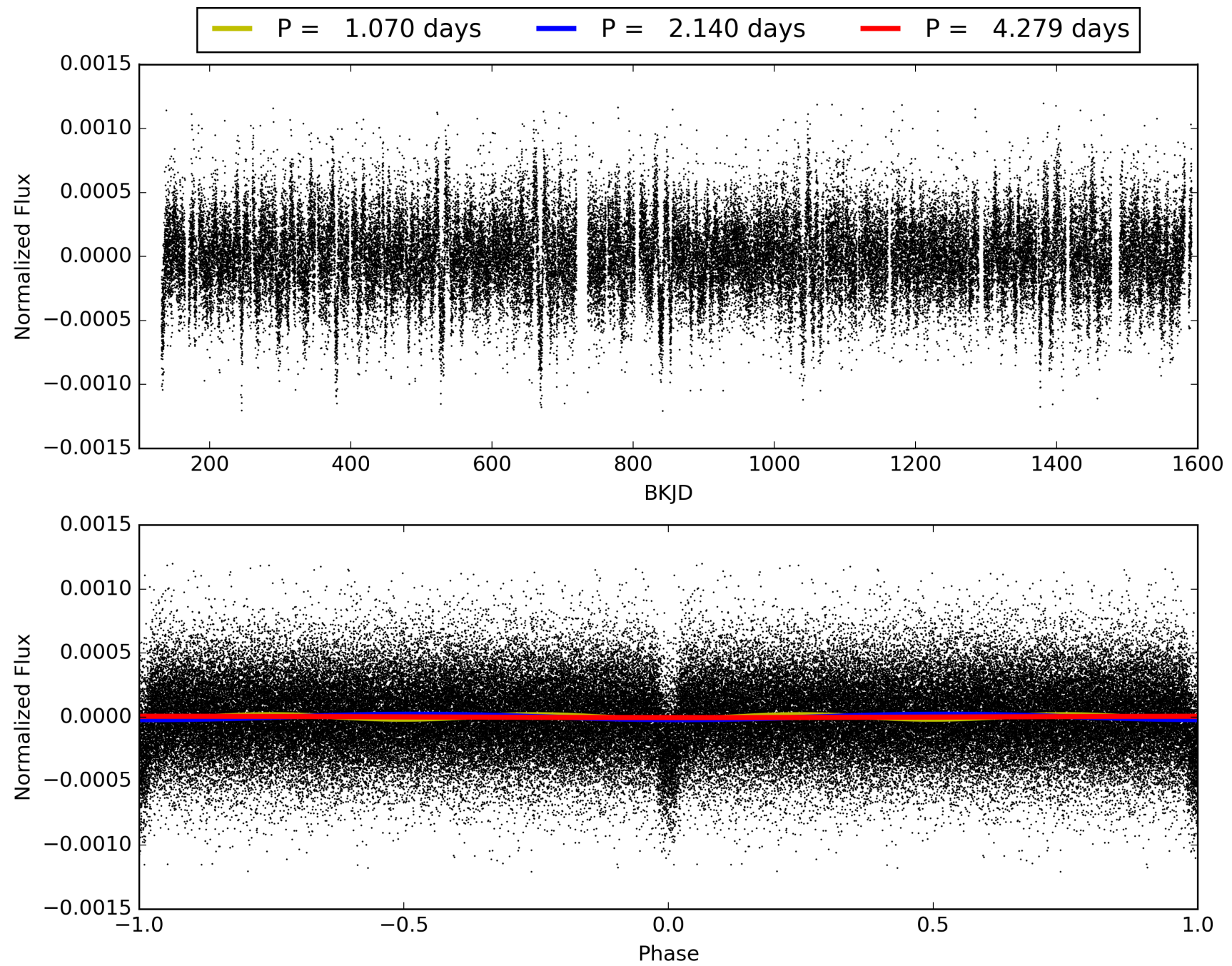
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [26.90 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [596/597]
GhostDiagnostic-chr: 4.136
Centroid-sig: 3.7%
Centroid-so: 0.759 arcsec [2.66 σ]
OotOffset-rm: 0.038 arcsec [0.27 σ]
KicOffset-rm: 0.282 arcsec [2.55 σ]
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 006690082-01, PDC Light Curves

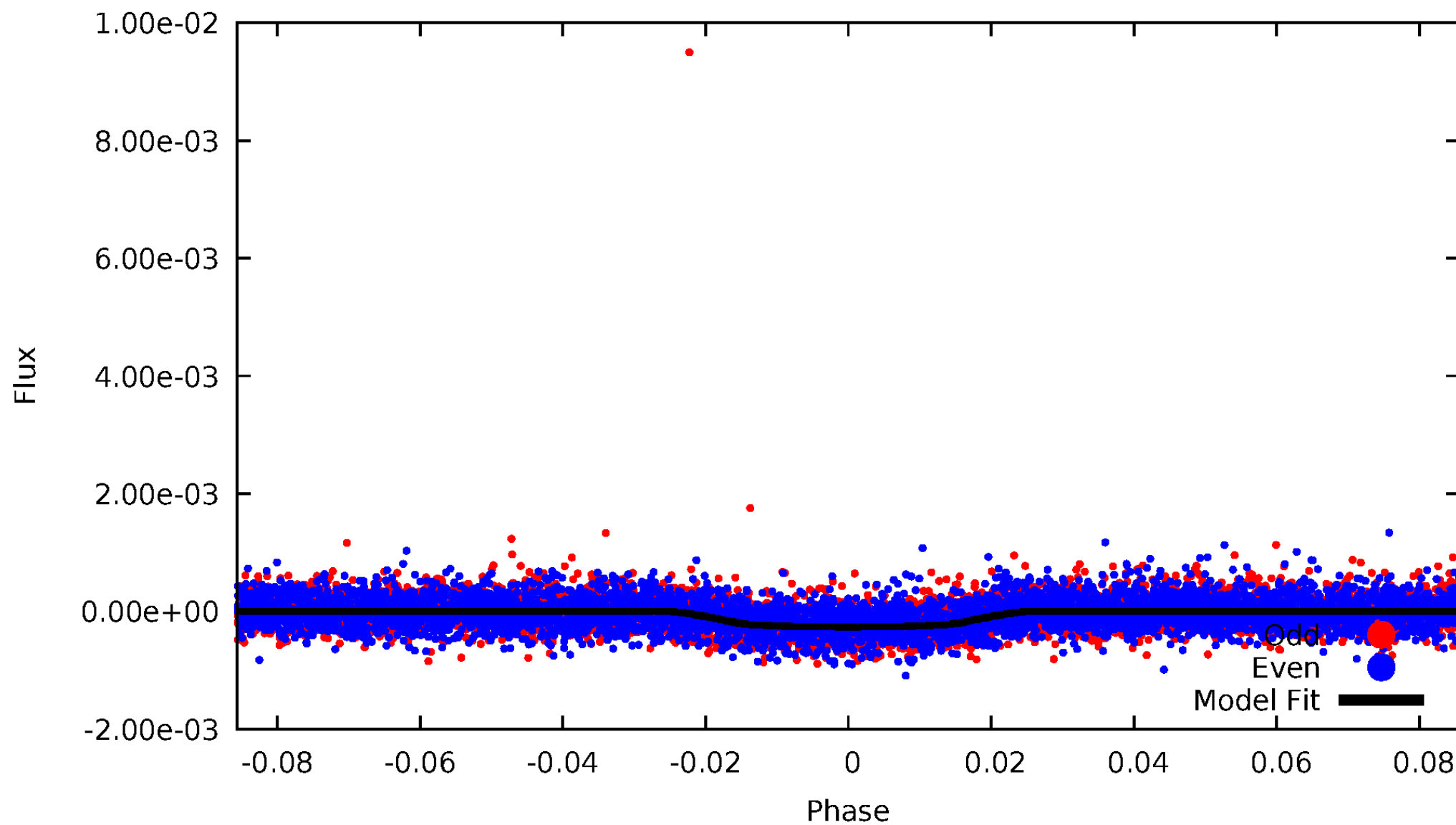


TCE 006690082-01



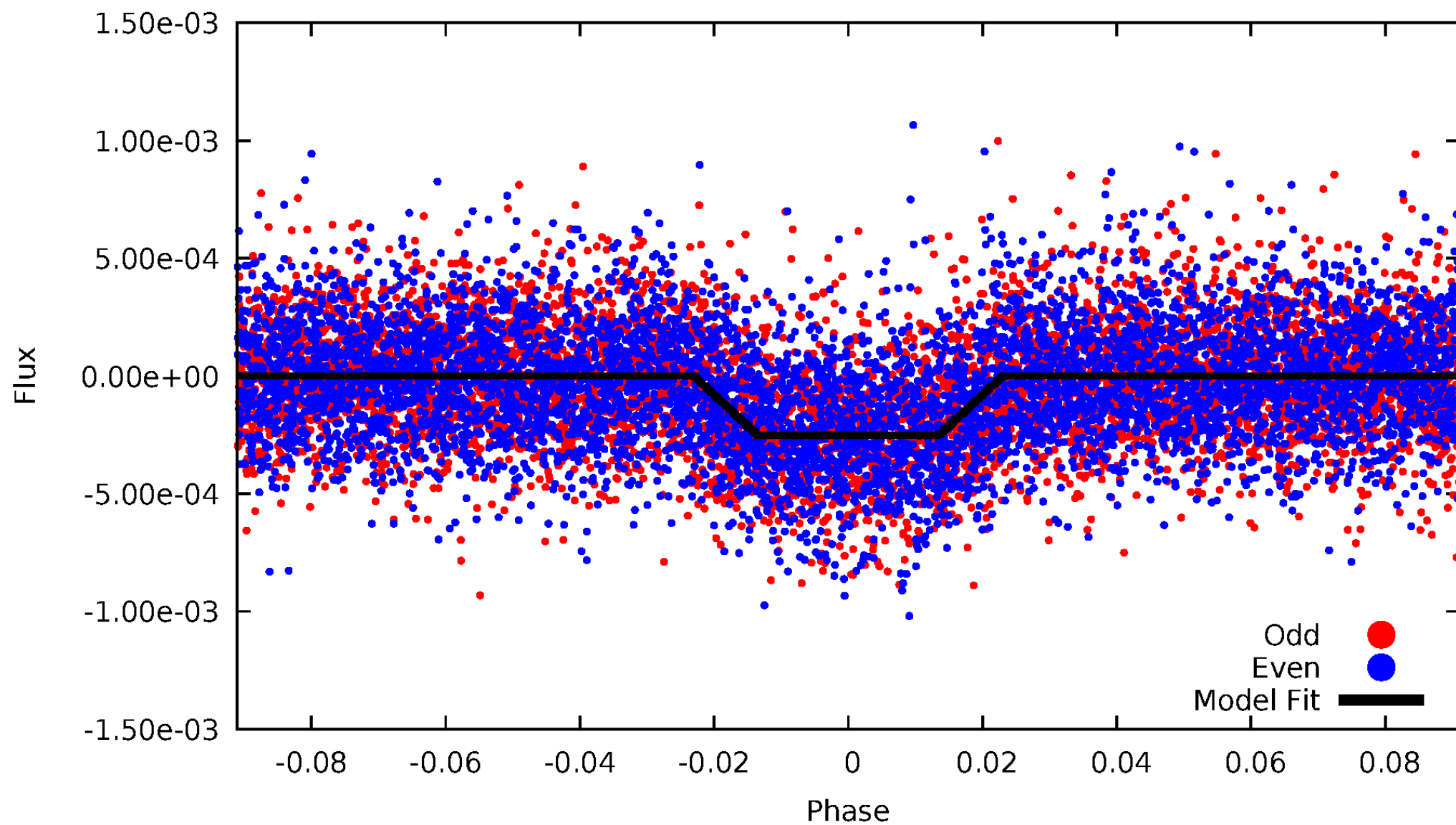
DV Odd/Even

TCE 006690082-01



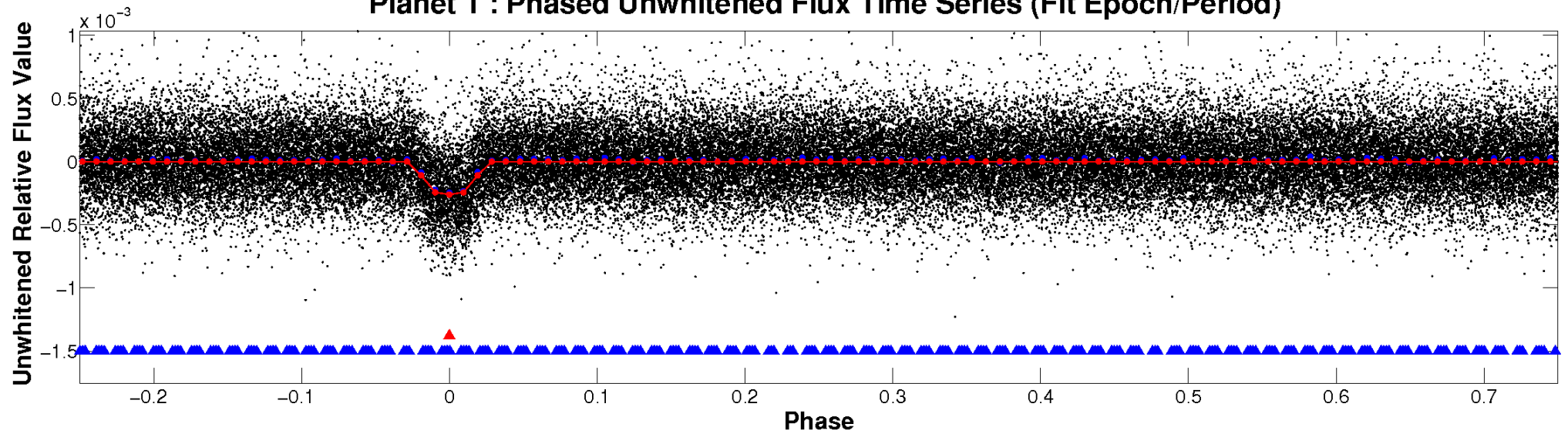
ALT Odd/Even

TCE 006690082-01

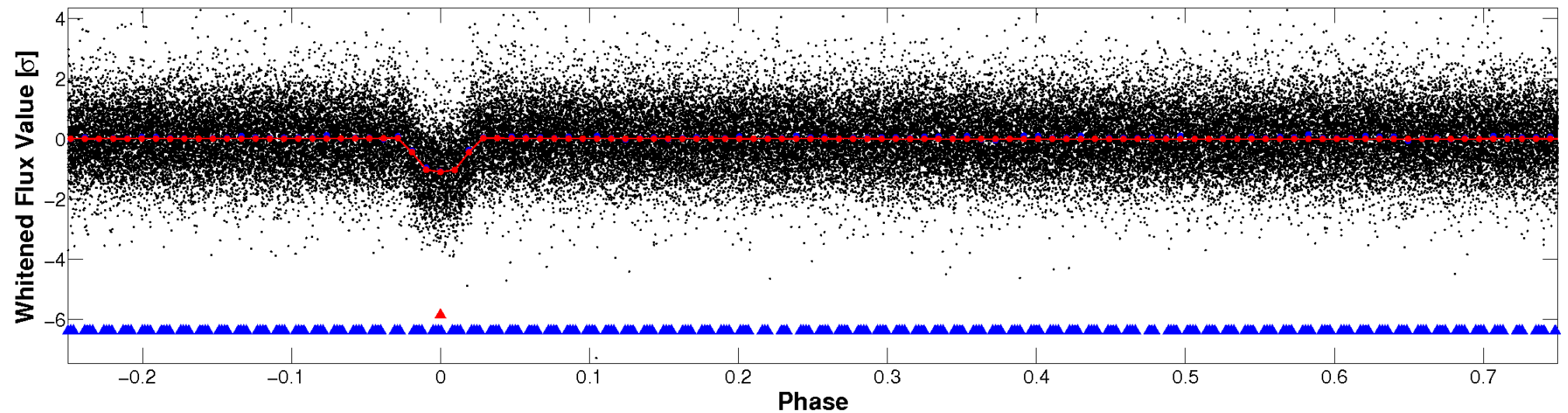


Non-Whitened Vs. Whitened Light Curve

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

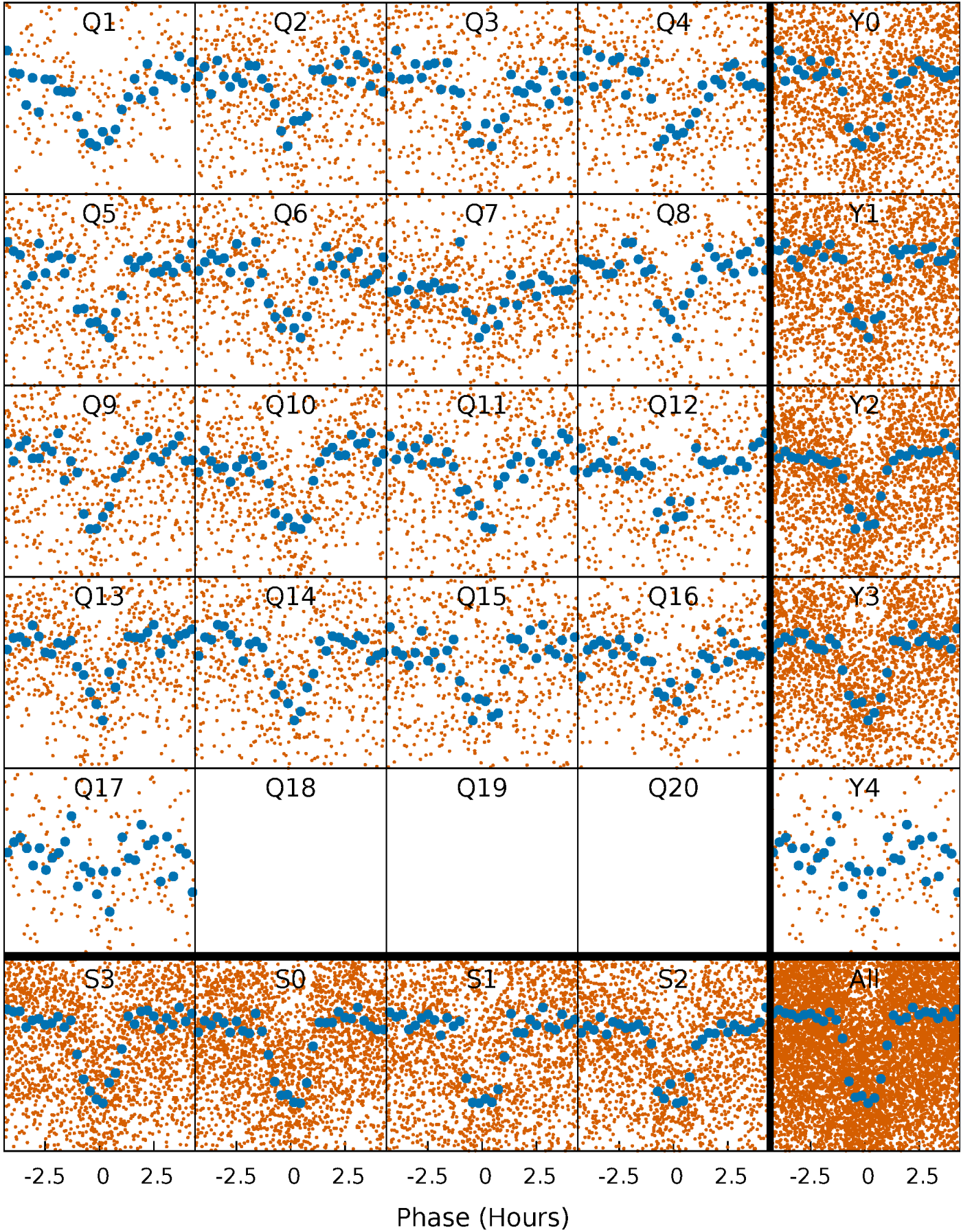


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



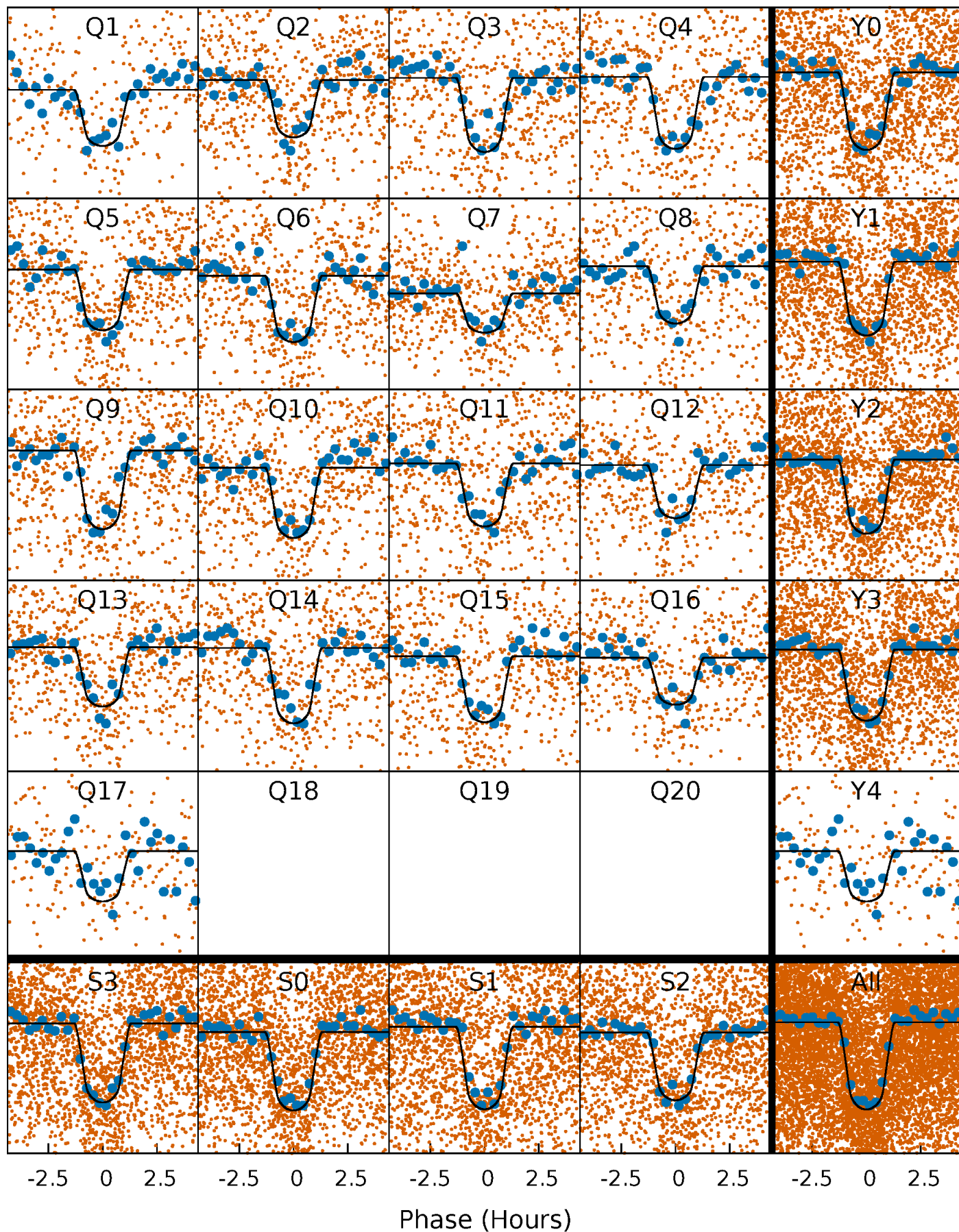
PDC Quarter-Phased Transit Curves

TCE 006690082-01 P= 2.139558 Days $T_0=131.514554$ (BKJD)



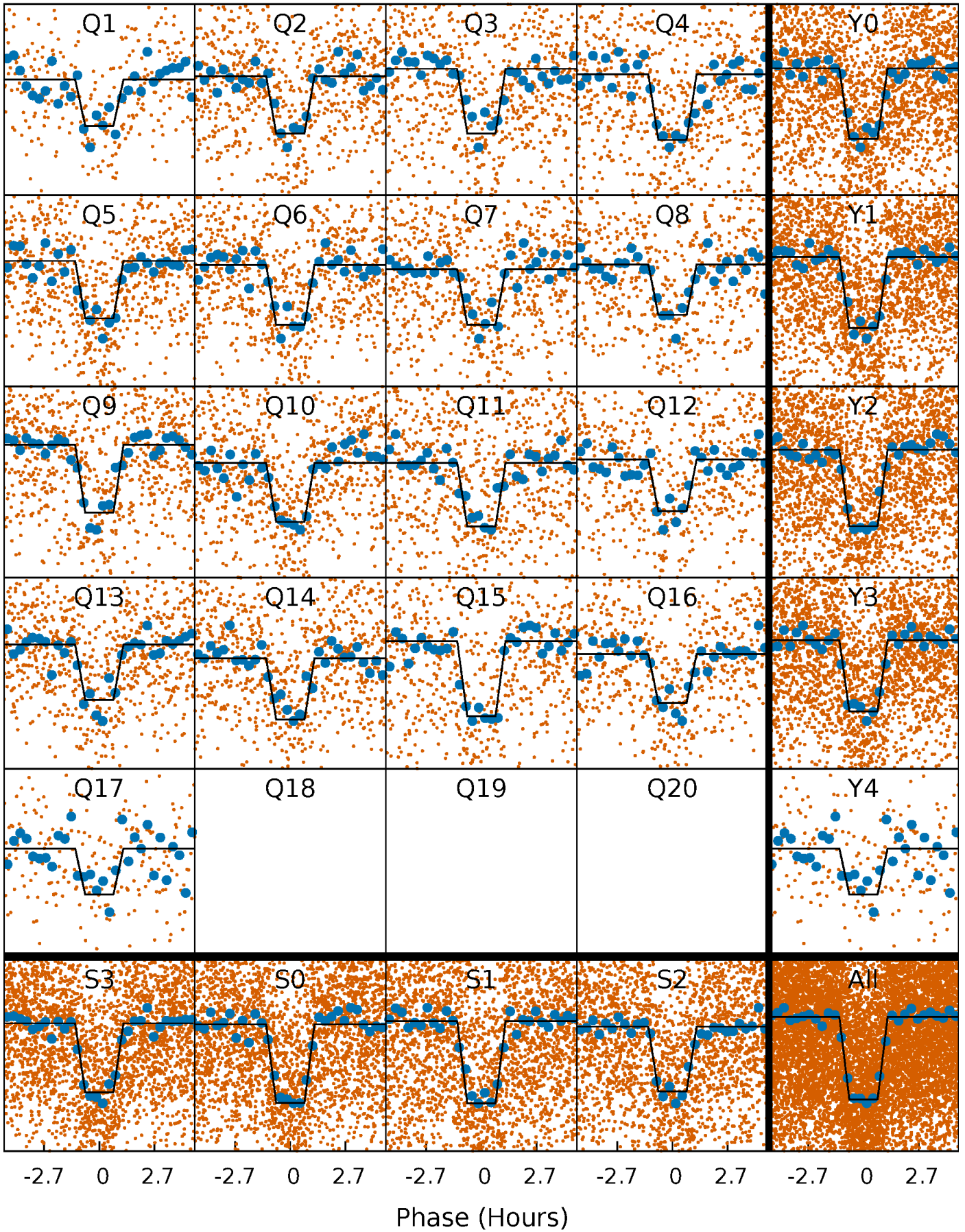
DV Quarter-Phased Transit Curves

TCE 006690082-01 P= 2.139558 Days $T_0=131.514554$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

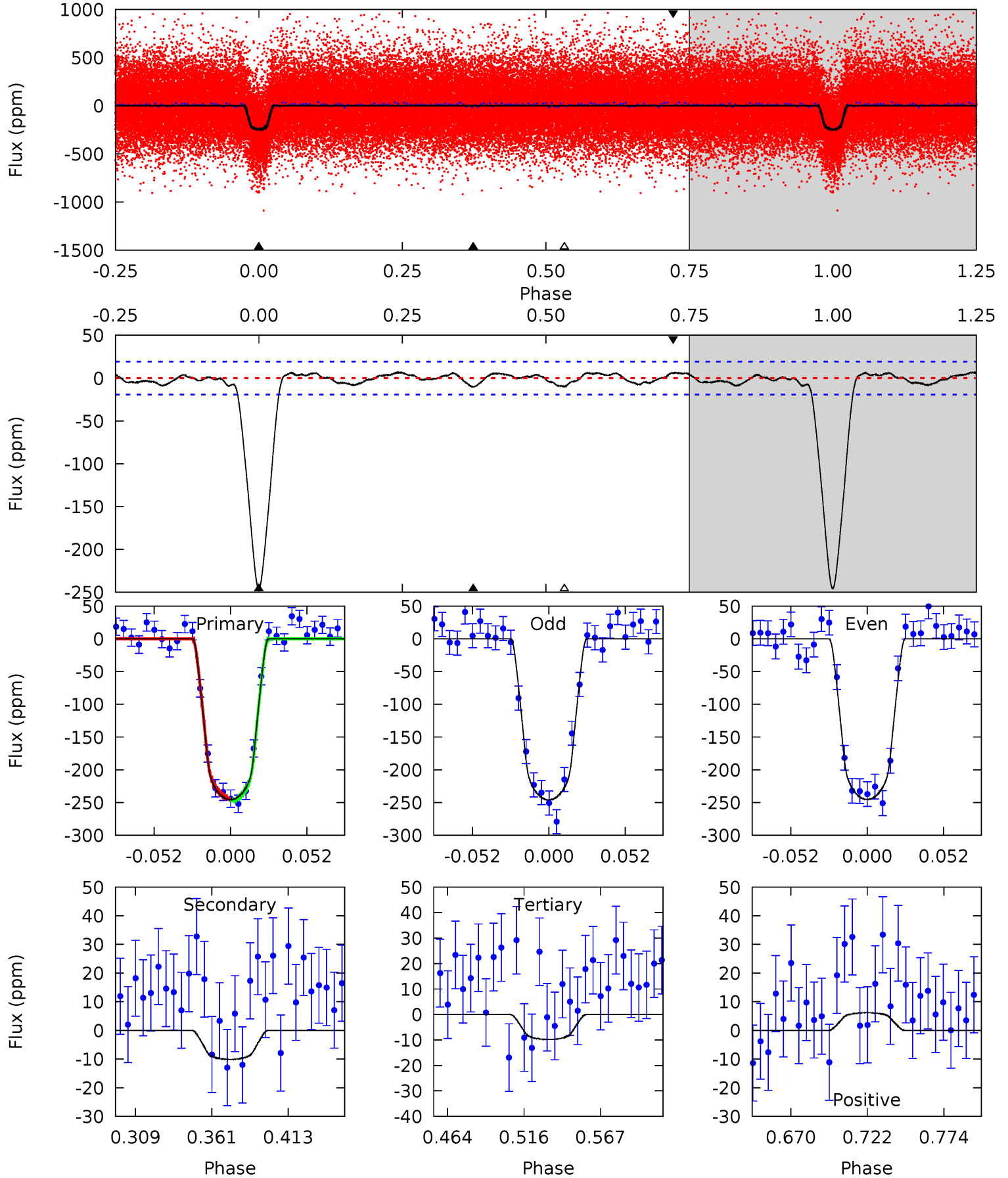
TCE 006690082-01 P= 2.139565 Days $T_0=131.511214$ (BKJD)



DV Model-Shift Uniqueness Test

006690082-01, P = 2.139558 Days, E = 129.374996 Days

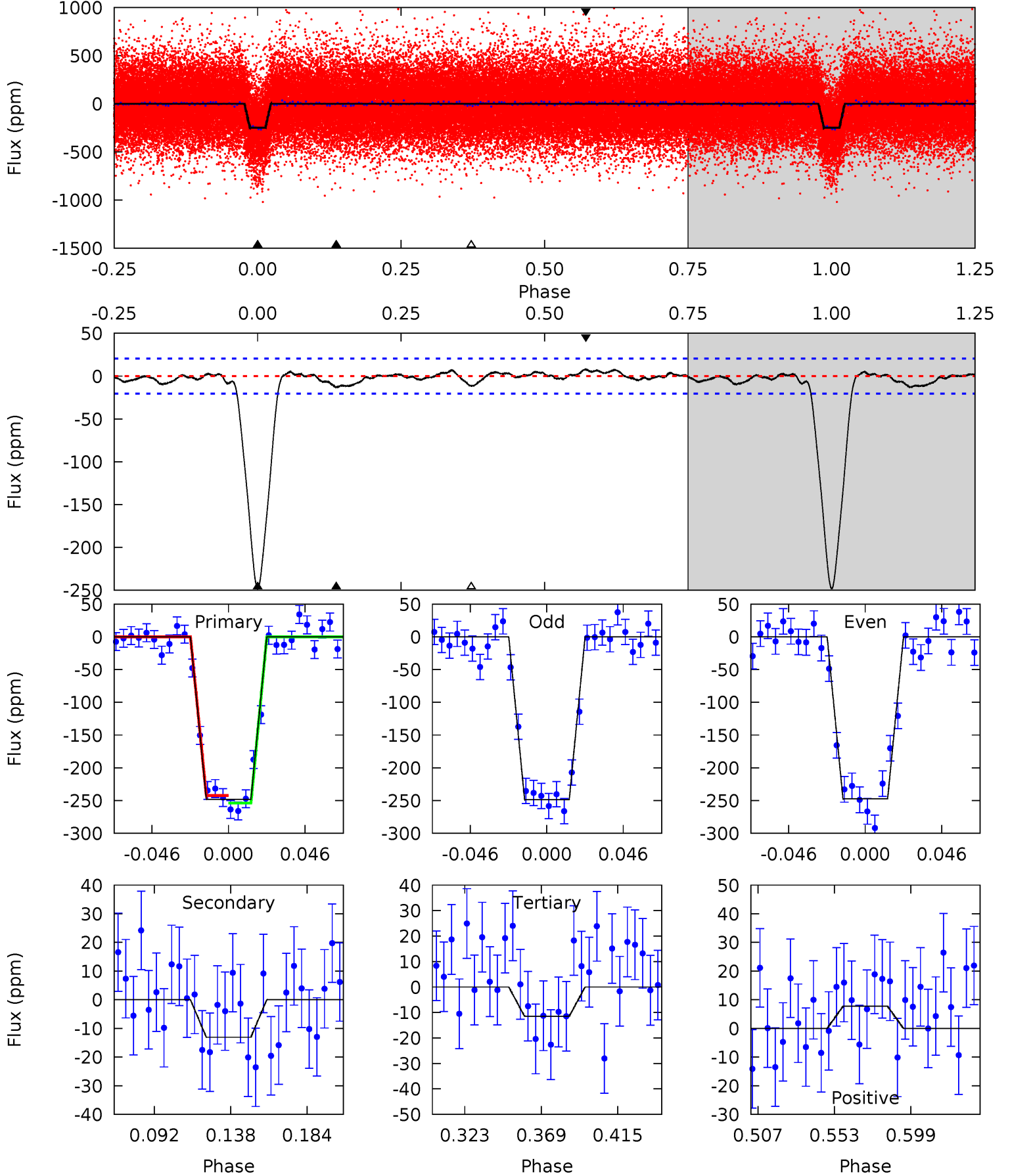
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 60.1 | 2.48 | 2.40 | 1.51 | 4.70 | 1.95 | 1.07 | 57.7 | 58.6 | 0.08 | 0.97 | 0.08 | 0.98 | 0.03 | 0.51 |



Alt Model-Shift Uniqueness Test

006690082-01, P = 2.139565 Days, E = 131.511214 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 57.5 | 3.03 | 2.67 | 1.79 | 4.72 | 1.99 | 0.89 | 54.8 | 55.7 | 0.36 | 1.24 | 0.16 | 0.99 | 0.03 | 1.36 |



Stellar Parameters For KIC 006690082

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|---------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 5534^{+82}_{-74} | $4.338^{+0.138}_{-0.103}$ | $0.140^{+0.150}_{-0.150}$ | $1.080^{+0.165}_{-0.150}$ | $0.926^{+0.067}_{-0.043}$ | $1.036^{+0.586}_{-0.316}$ |
| | +1%/-1% | +3%/-2% | +107%/-107% | +15%/-14% | +7%/-5% | +57%/-31% |
| 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 006690082-01 / KOI 1240.01

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{max} (K)$ | $T_{obs} (K)$ | A_{obs} |
|---------|-------------|------------------------|--------------------|----------------------|---------------------------|
| DV | -10 ± 4 | $2.12^{+0.36}_{-0.38}$ | 1988^{+85}_{-77} | 2886^{+259}_{-310} | $1.242^{+0.915}_{-0.555}$ |
| Alt. | -13 ± 4 | $1.85^{+0.37}_{-0.34}$ | 1986^{+85}_{-84} | 3140^{+253}_{-255} | $2.066^{+1.360}_{-0.860}$ |

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 $A_{obs} \gg 1.0$

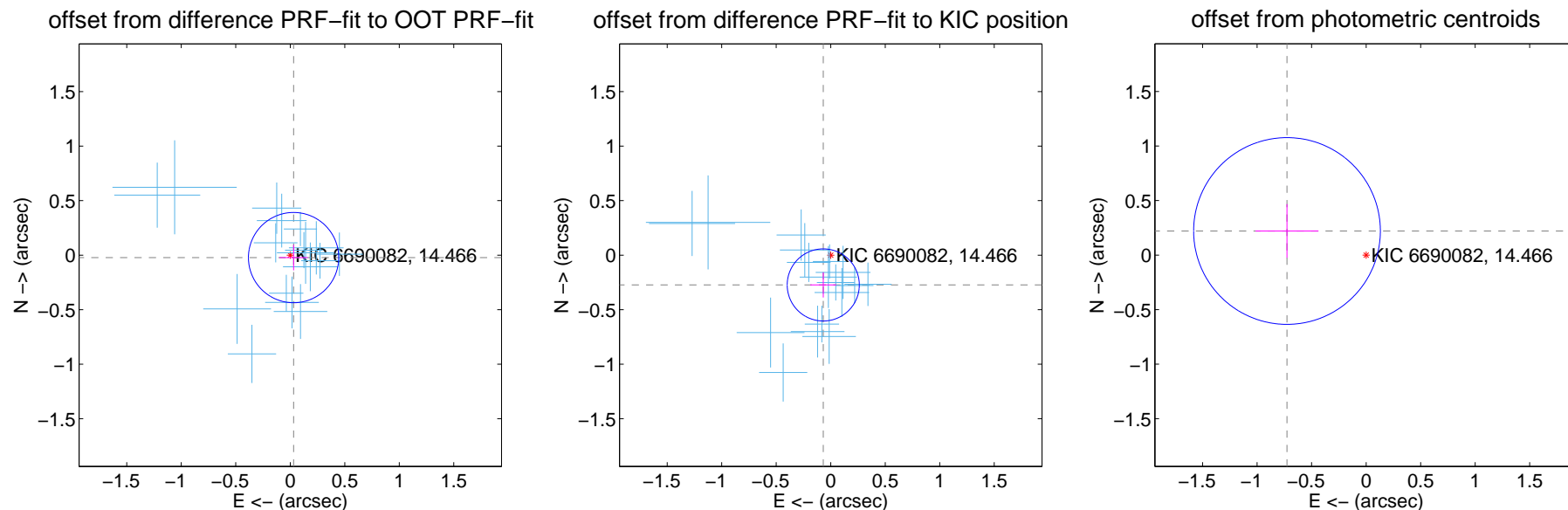
DV Centroid Data

Supplemental centroid analysis for 006690082-01. Kepler magnitude: 14.47. Transit SNR 46.95

There are 17 quarters with good PRF difference image offsets

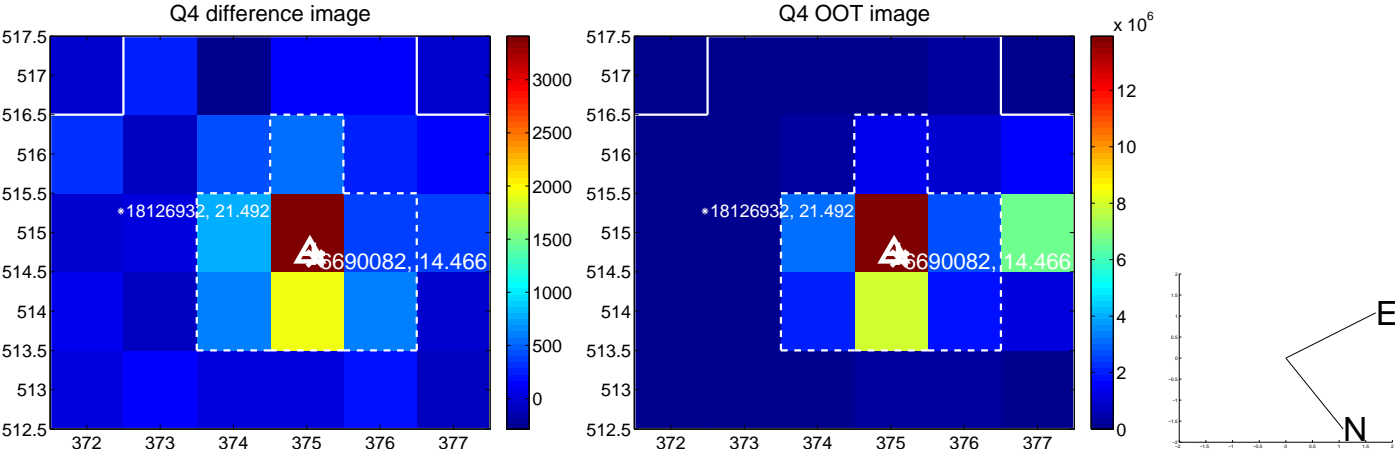
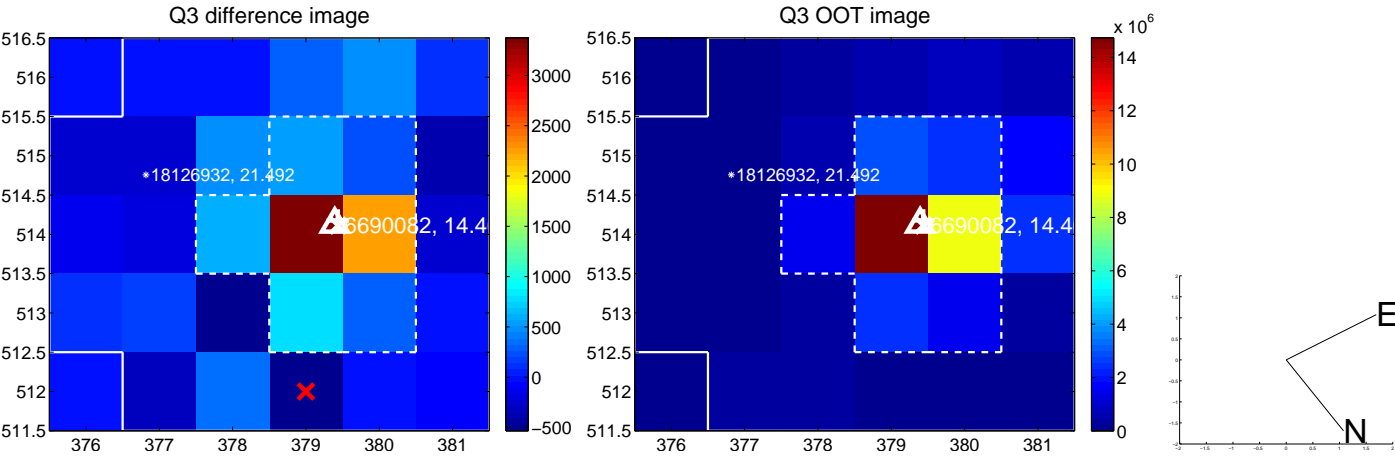
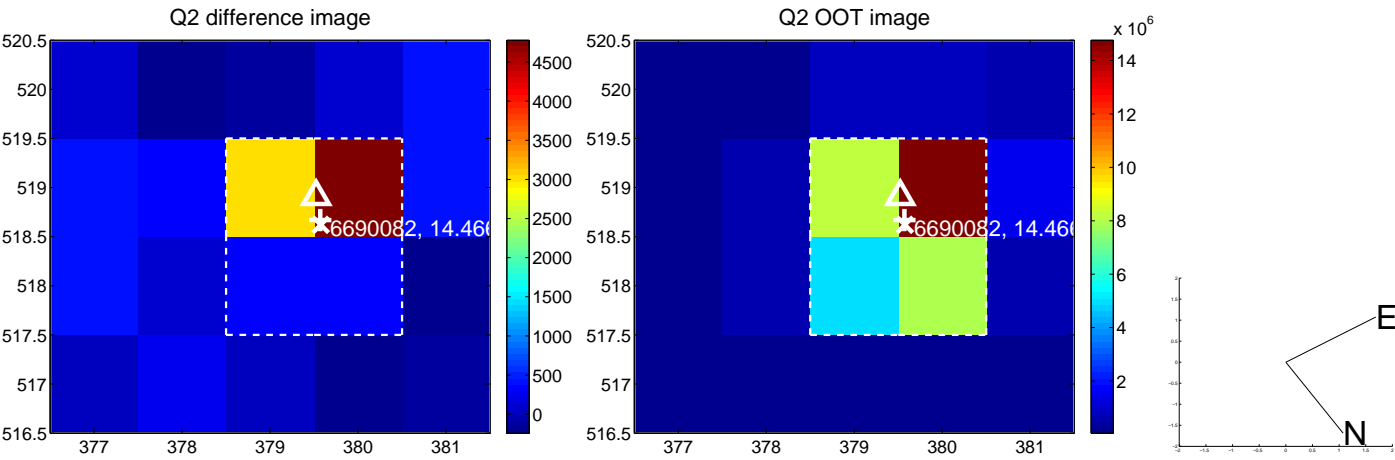
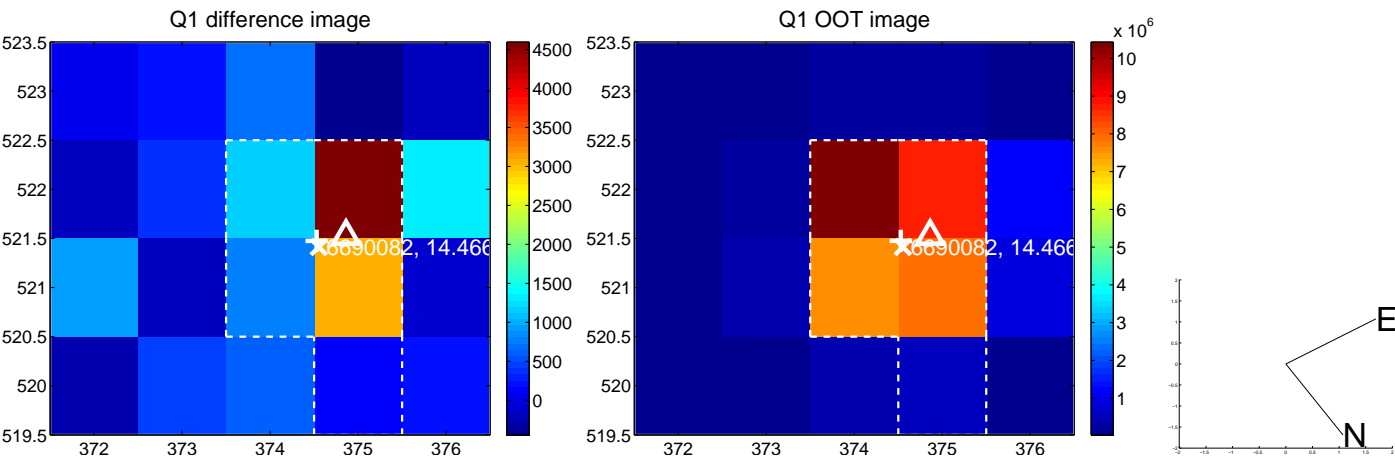
The direct PRF centroid is offset from the target star catalog position by about 0.33 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 0.038 ± 0.138 | 0.27 | -0.030 ± 0.130 | -0.022 ± 0.116 |
| PRF-fit source offset from KIC position | 0.282 ± 0.110 | 2.55 | 0.068 ± 0.119 | -0.273 ± 0.115 |
| photometric centroid source offset | 0.76 ± 0.29 | 2.66 | 0.73 ± 0.29 | 0.22 ± 0.25 |

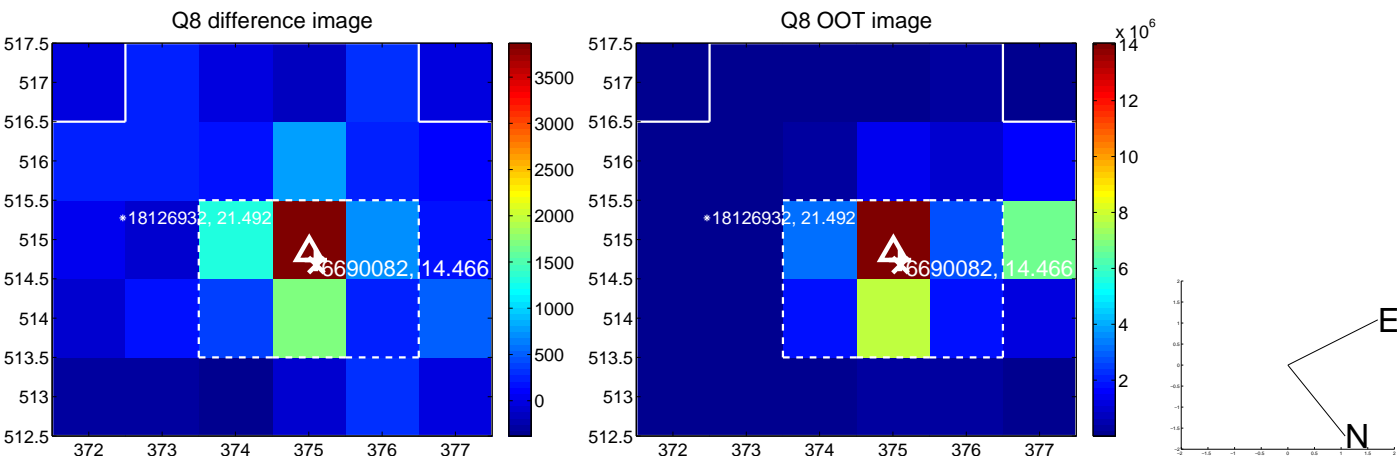
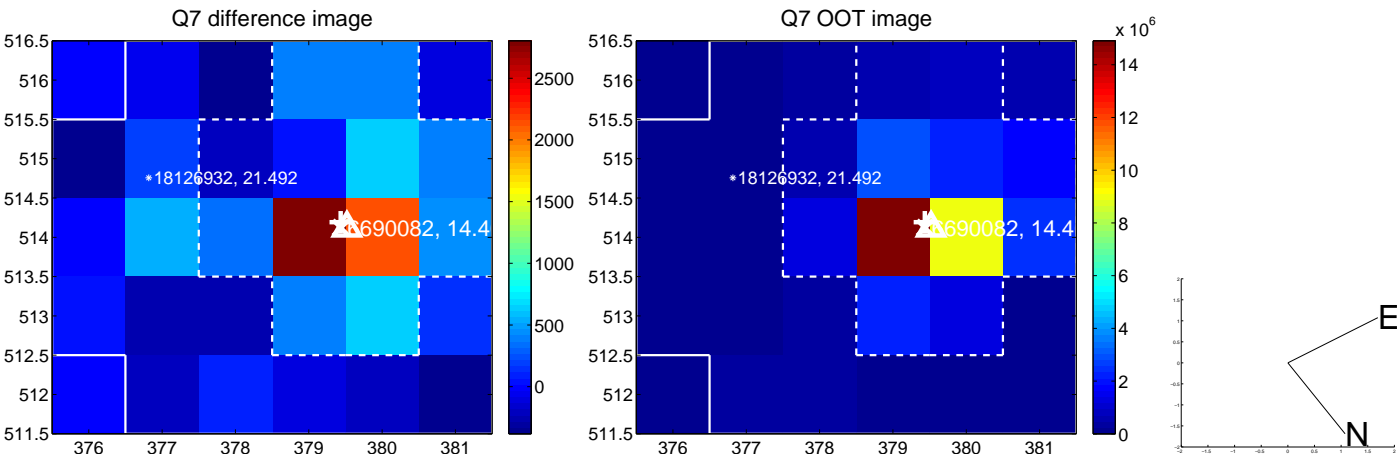
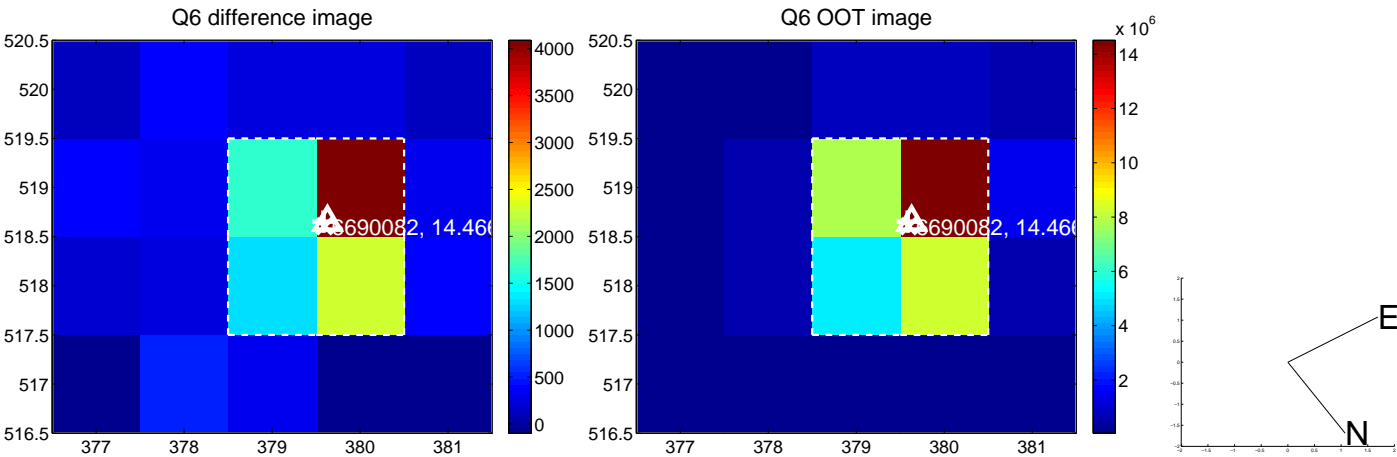
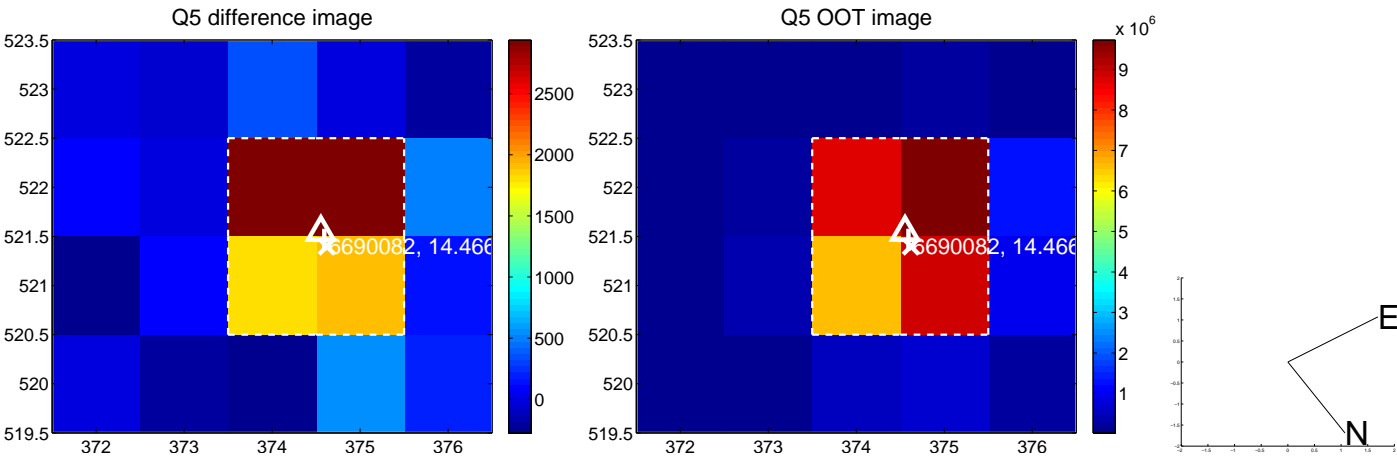


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

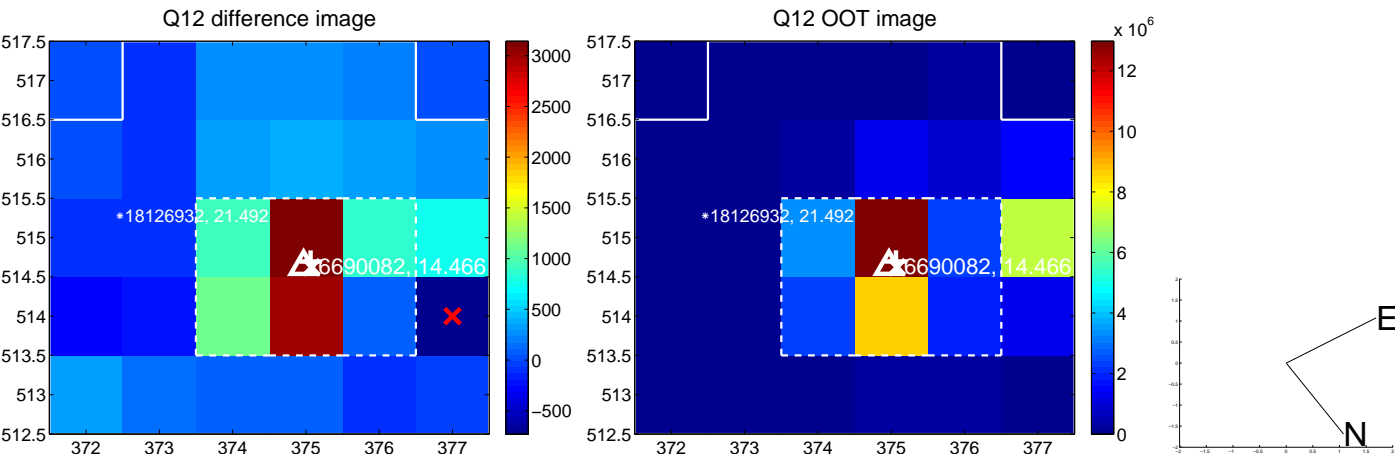
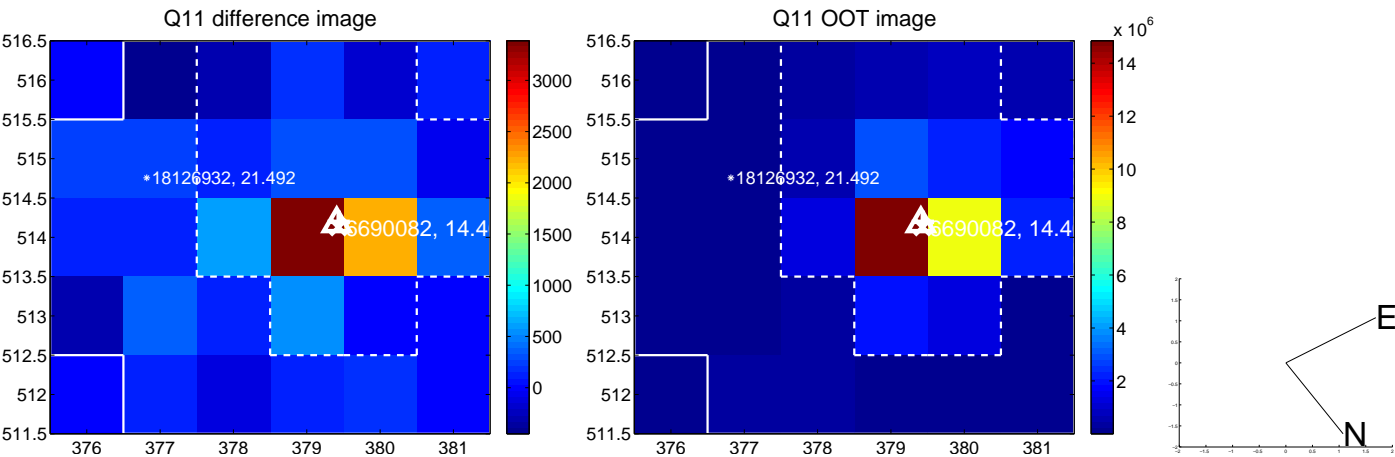
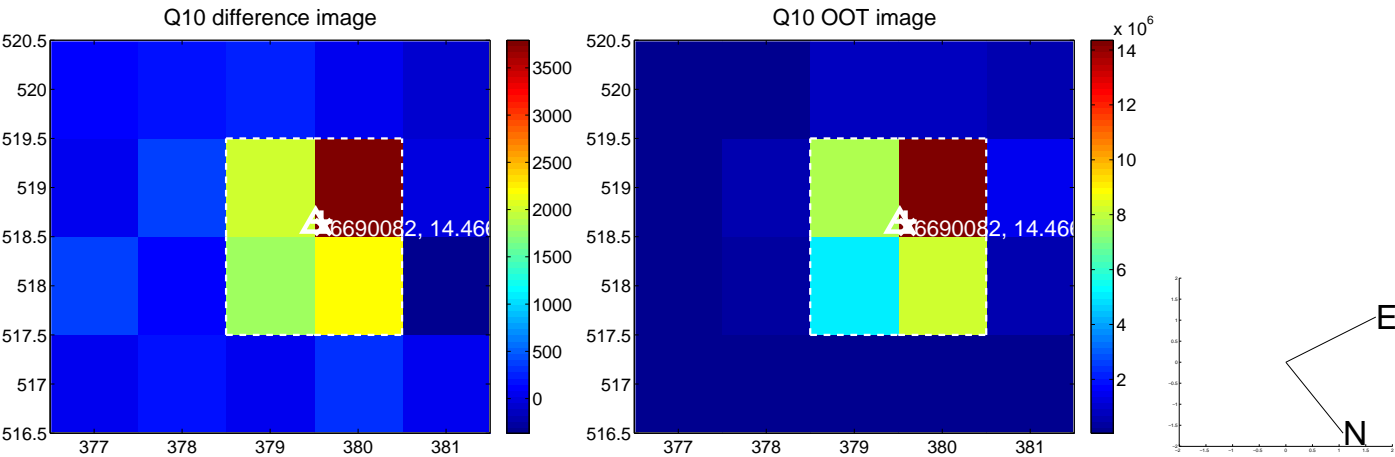
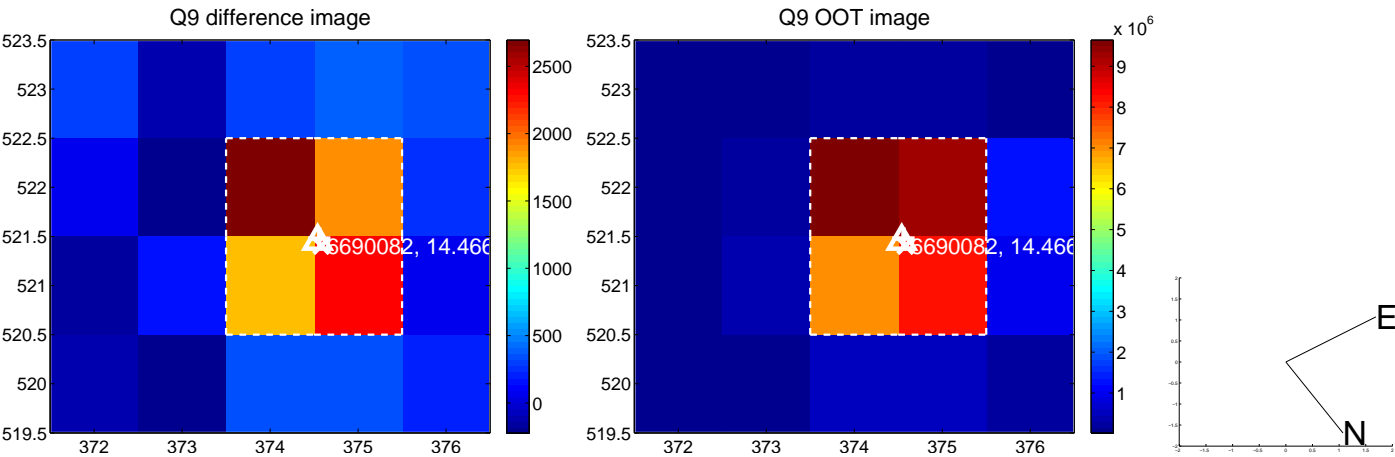
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

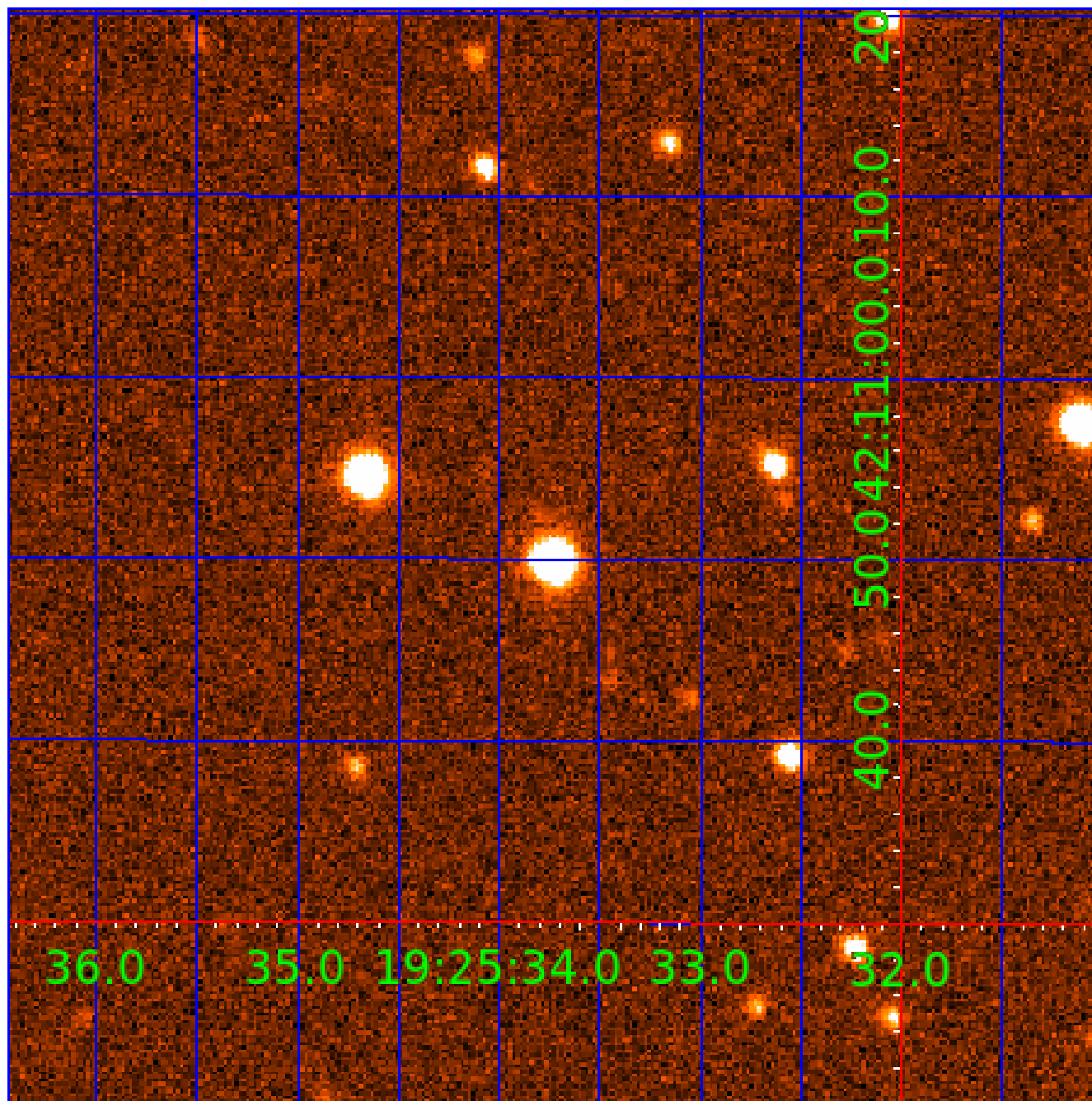


white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 006690082

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 006690082-01 | OBS | 1240.01 | 2.139558 | 131.514554 | 261.8 | 2.198 | 40.3 | 47.0 | 1.08 | 5534 | 2.10 | 976.27 |
| 006690082-02 | OBS | 1240.02 | 4.807108 | 134.640442 | 428.4 | 0.913 | 23.3 | 31.0 | 1.08 | 5534 | 2.71 | 331.76 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|------------|
| 006690082-01 | OBS | PC | 1.00 | 0 | 0 | 0 | 0 | NO_COMMENT |
| 006690082-02 | 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.

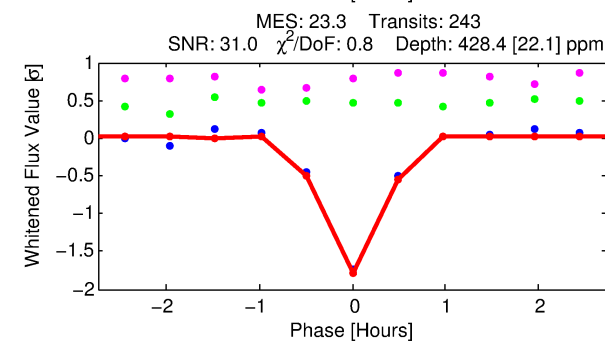
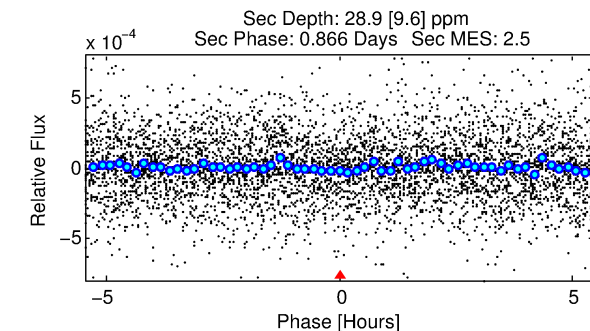
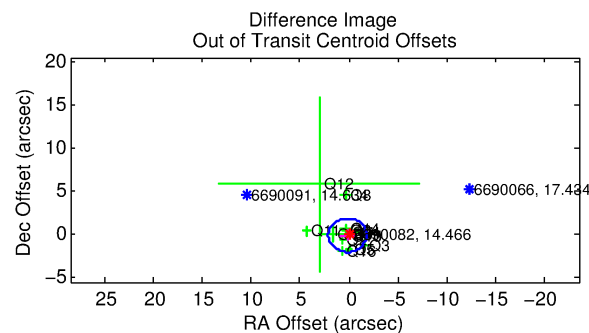
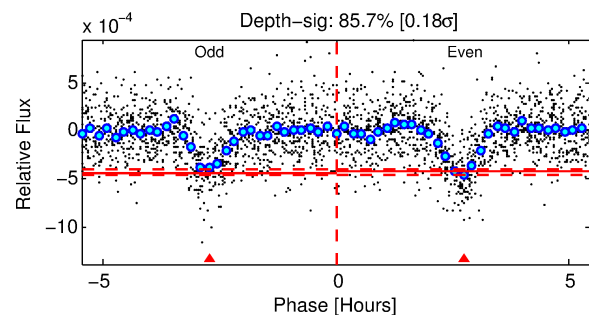
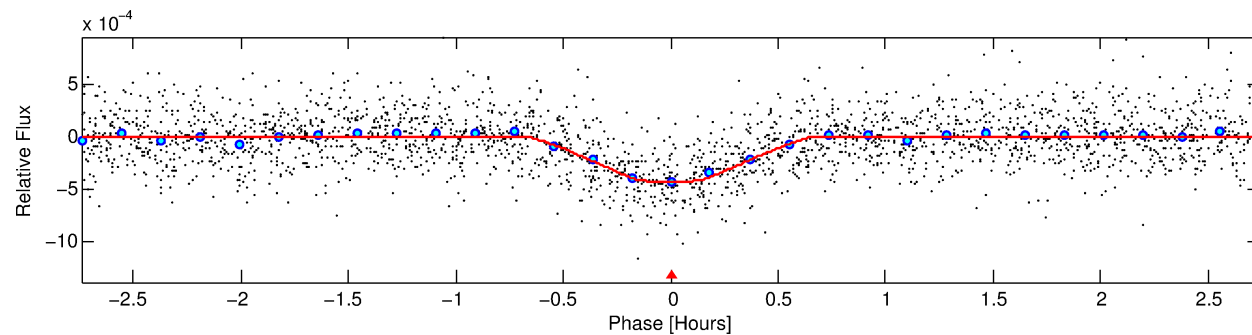
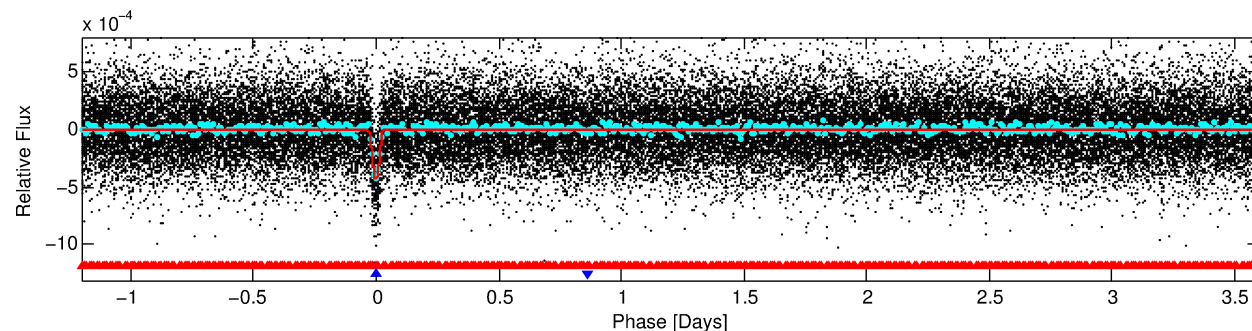
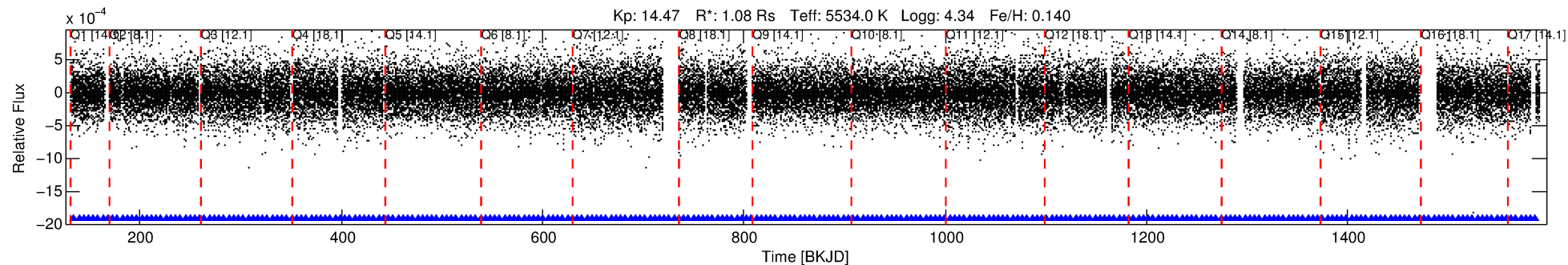
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 006690082-02

No Significant Match Found

DV One-Page Summary

KIC: 6690082 Candidate: 2 of 2 Period: 4.807 d
KOI: K01240.02 Name: Kepler-280c Corr: 0.956



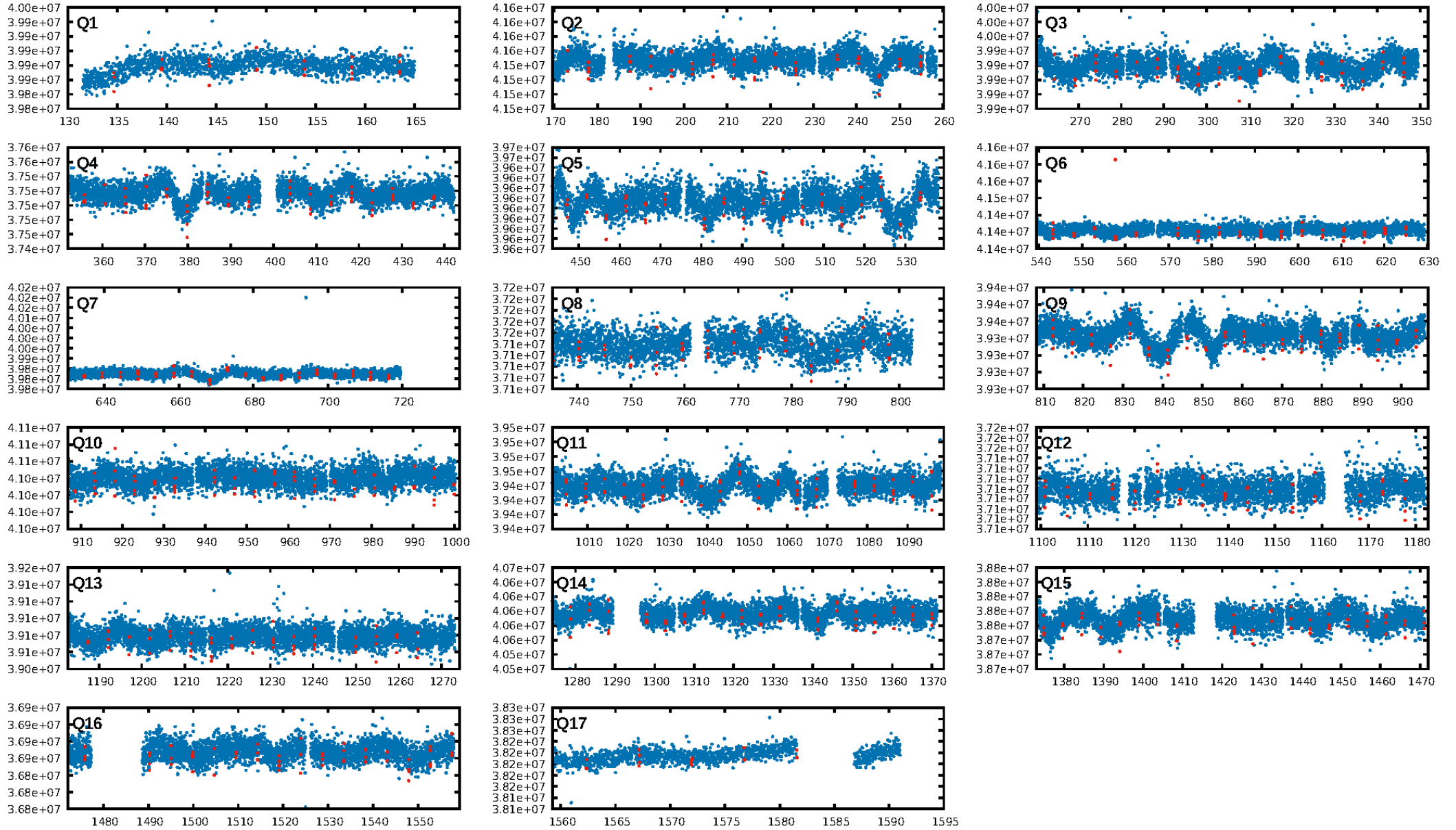
DV Fit Results:

Period = 4.80711 [0.00001] d
Epoch = 134.6404 [0.0007] BKJD
Rp/R* = 0.0230 [0.0056]
a/R* = 19.92 [20.91]
b = 0.90 [0.24]
Seff = 331.76 [80.42]
Teq = 1088 [66] K
Rp = 2.71 [0.78] Re
a = 0.0544 [0.0080] AU
Ag = 6.42 [4.09] [1.33 σ]
Teffp = 2678 [398] K [3.94 σ]

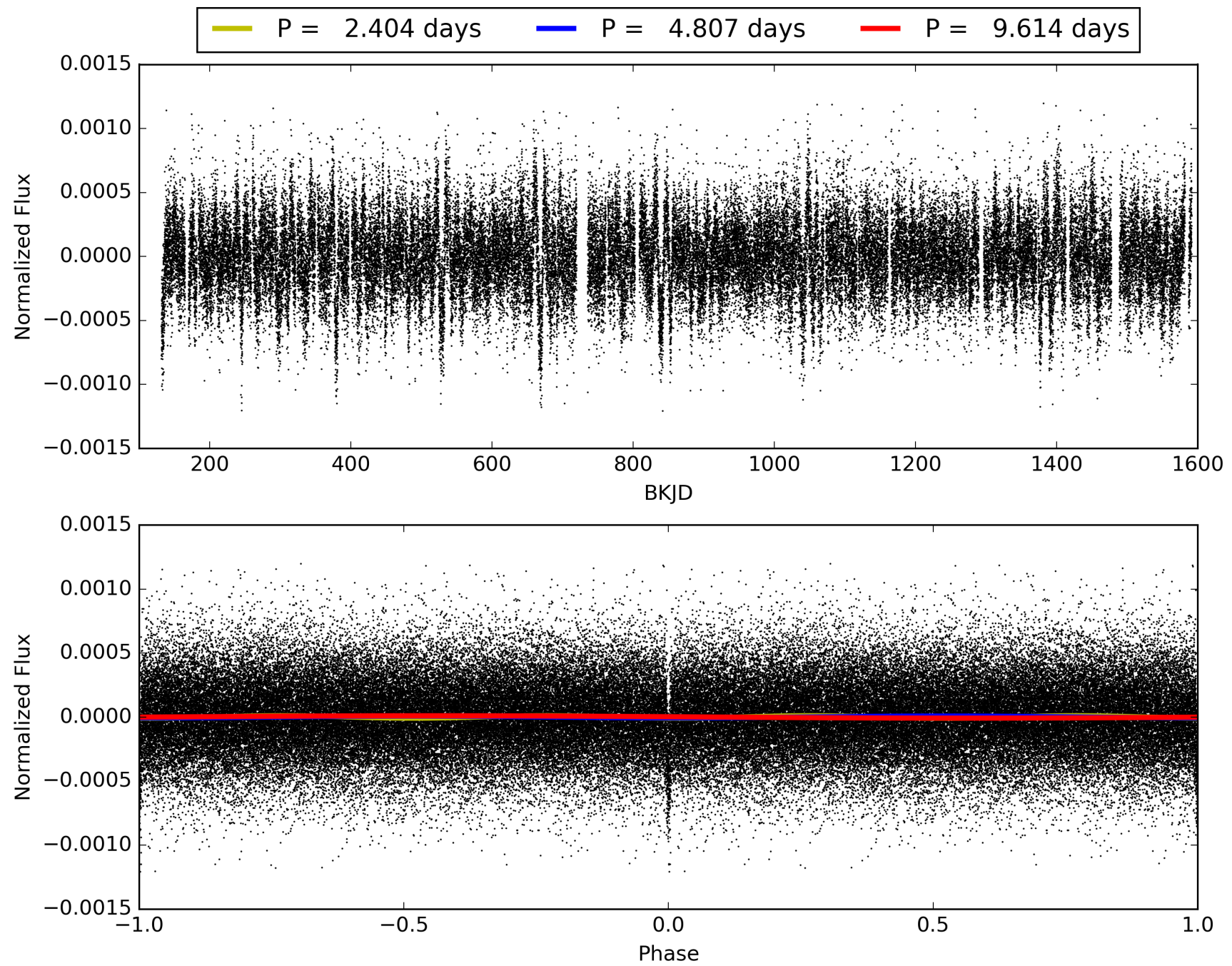
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [26.90 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.04e-113
RollingBand-fgt: 1.00 [233/233]
GhostDiagnostic-chr: 8.974
Centroid-sig: 80.7%
Centroid-so: 0.556 arcsec [1.29 σ]
OotOffset-rm: 0.214 arcsec [0.33 σ]
KicOffset-rm: 0.452 arcsec [0.70 σ]
OotOffset-st: 4/4/4/4 [16]
KicOffset-st: 4/4/4/4 [16]
DiffImageQuality-fgm: 0.81 [13/16]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 006690082-02, PDC Light Curves

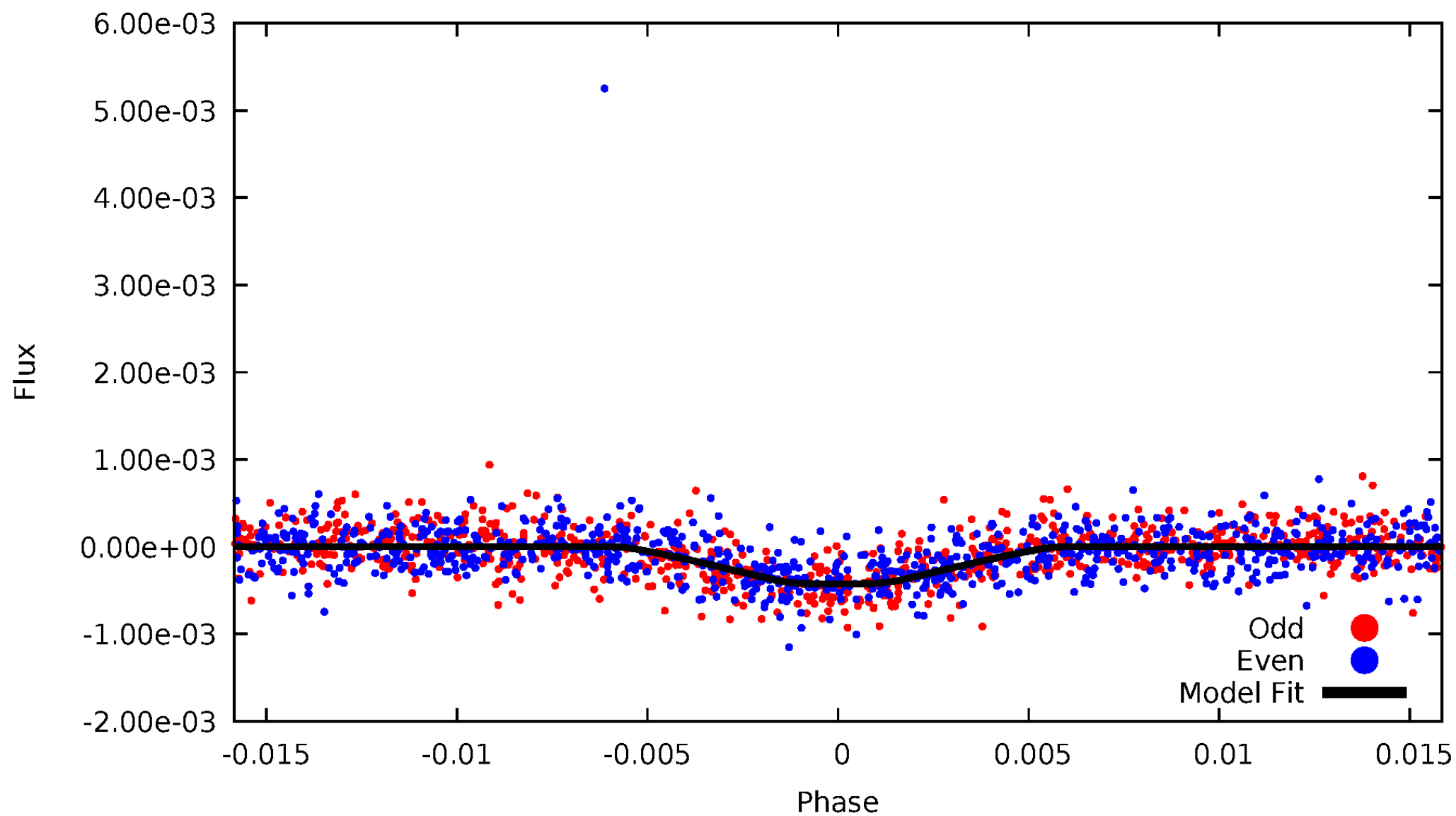


TCE 006690082-02



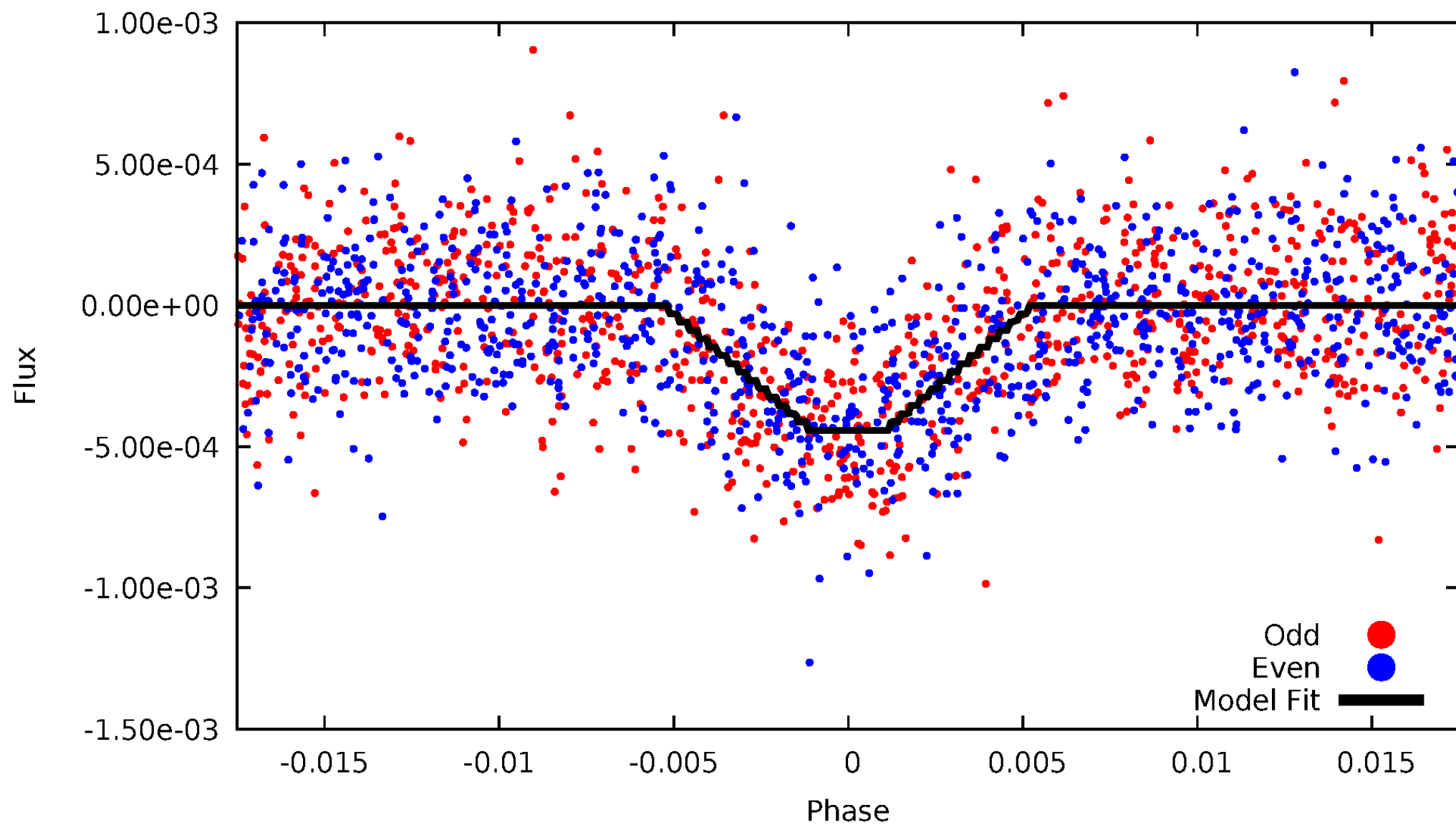
DV Odd/Even

TCE 006690082-02



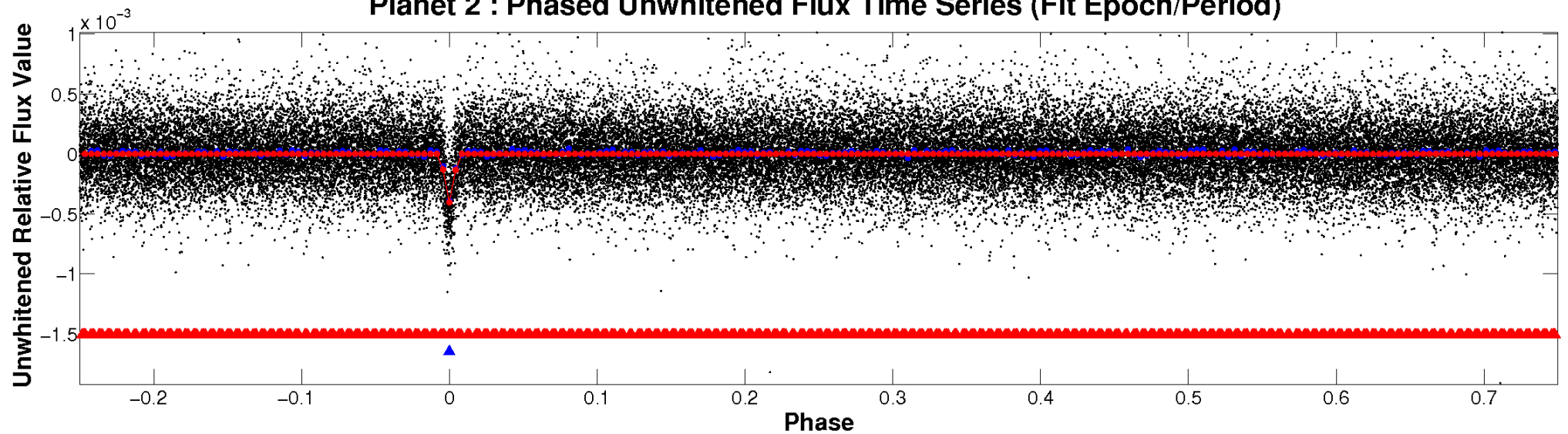
ALT Odd/Even

TCE 006690082-02

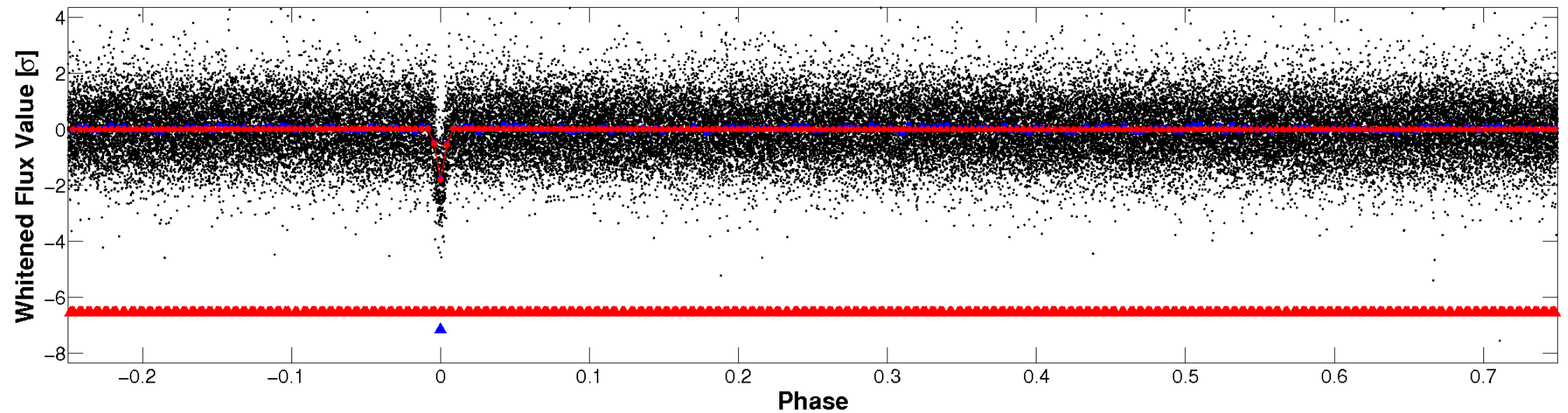


Non-Whitened Vs. Whitened Light Curve

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

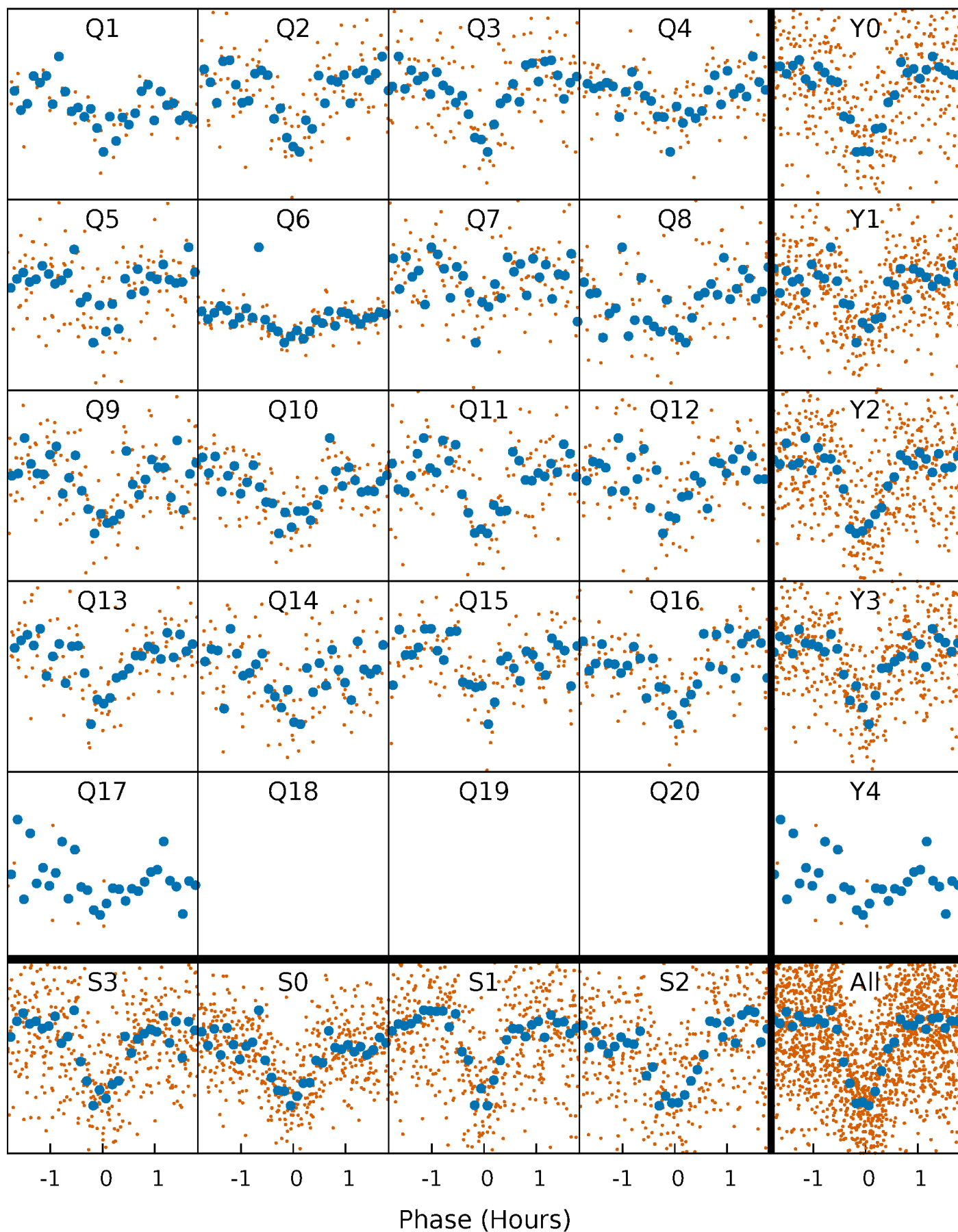


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



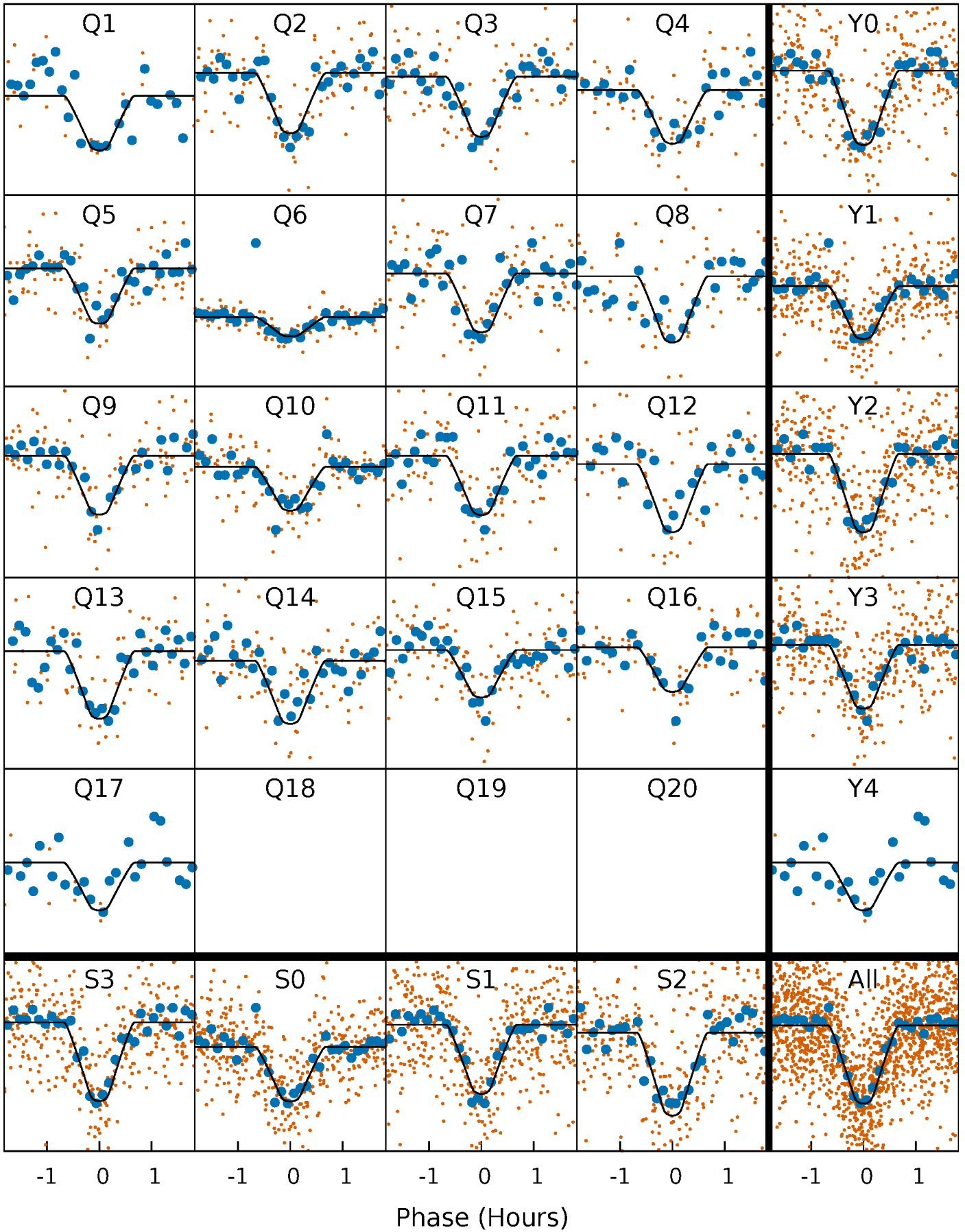
PDC Quarter-Phased Transit Curves

TCE 006690082-02 P= 4.807108 Days $T_0=134.640442$ (BKJD)



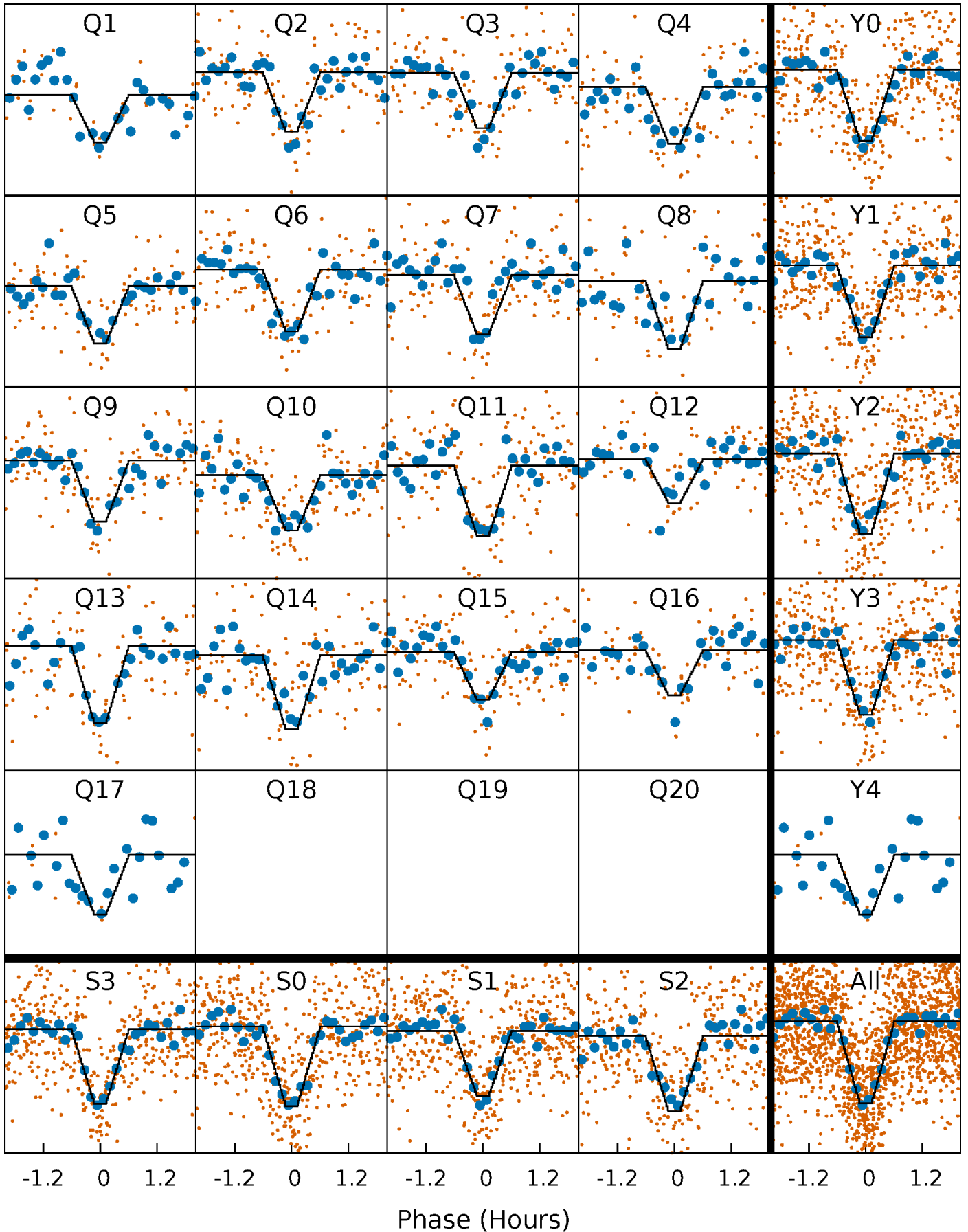
DV Quarter-Phased Transit Curves

TCE 006690082-02 $P = 4.807108$ Days $T_0 = 134.640442$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

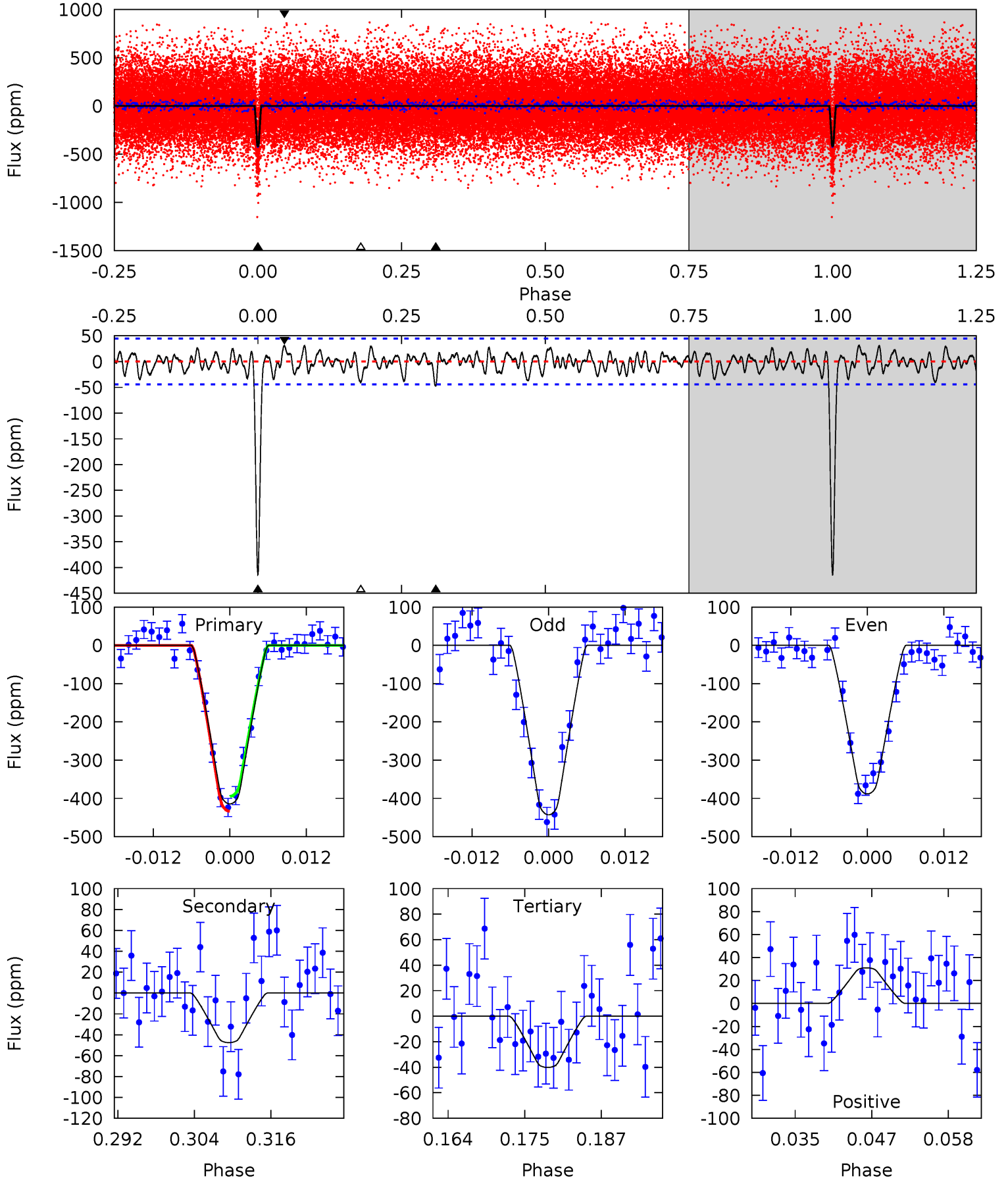
TCE 006690082-02 P= 4.807109 Days $T_0=134.639536$ (BKJD)



DV Model-Shift Uniqueness Test

006690082-02, P = 4.807108 Days, E = 129.833334 Days

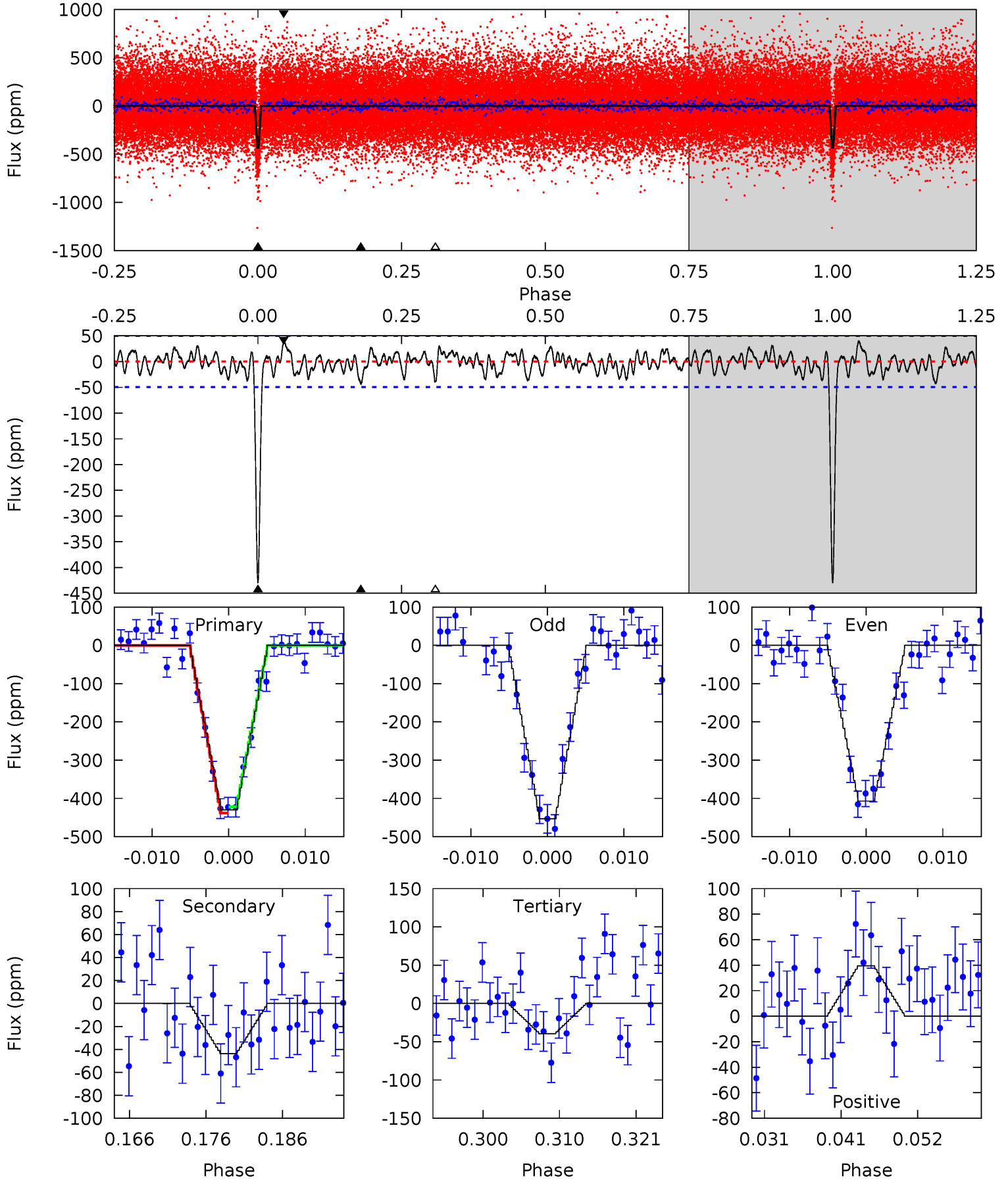
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 46.5 | 5.34 | 4.51 | 3.48 | 5.00 | 2.52 | 1.53 | 42.0 | 43.0 | 0.82 | 1.85 | 3.07 | 0.99 | 0.07 | 2.20 |



Alt Model-Shift Uniqueness Test

006690082-02, P = 4.807109 Days, E = 129.832427 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 43.5 | 4.43 | 3.99 | 3.99 | 5.02 | 2.56 | 1.50 | 39.6 | 39.6 | 0.44 | 0.44 | 2.35 | 0.99 | 0.08 | 0.82 |



Stellar Parameters For KIC 006690082

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|---------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 5534^{+82}_{-74} | $4.338^{+0.138}_{-0.103}$ | $0.140^{+0.150}_{-0.150}$ | $1.080^{+0.165}_{-0.150}$ | $0.926^{+0.067}_{-0.043}$ | $1.036^{+0.586}_{-0.316}$ |
| | +1%/-1% | +3%/-2% | +107%/-107% | +15%/-14% | +7%/-5% | +57%/-31% |
| 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 006690082-02 / KOI 1240.02

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{max} (K)$ | $T_{obs} (K)$ | A_{obs} |
|---------|--------------|------------------------|--------------------|----------------------|-----------------|
| DV | -48 ± 9 | $2.73^{+0.69}_{-0.70}$ | 1515^{+69}_{-66} | 3476^{+347}_{-263} | 10^{+9}_{-4} |
| Alt. | -44 ± 10 | $2.47^{+0.66}_{-0.65}$ | 1514^{+65}_{-69} | 3513^{+408}_{-257} | 11^{+11}_{-5} |

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 $A_{obs} \gg 1.0$

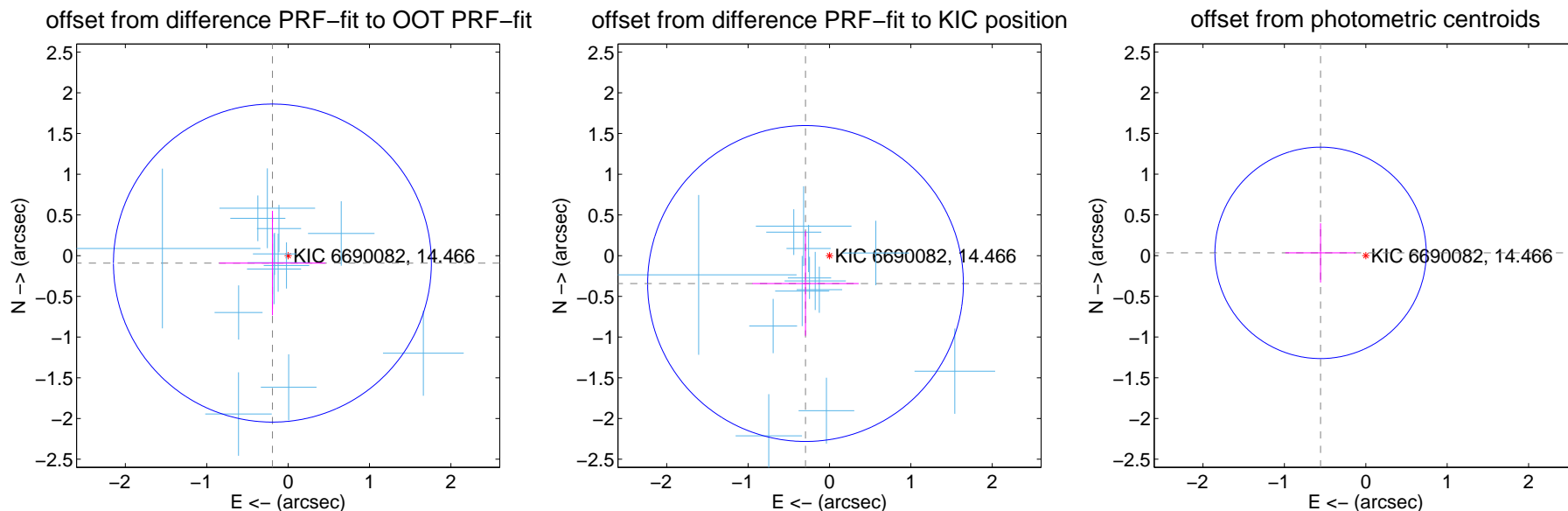
DV Centroid Data

Supplemental centroid analysis for 006690082-02. Kepler magnitude: 14.47. Transit SNR 30.97

There are 13 quarters with good PRF difference image offsets

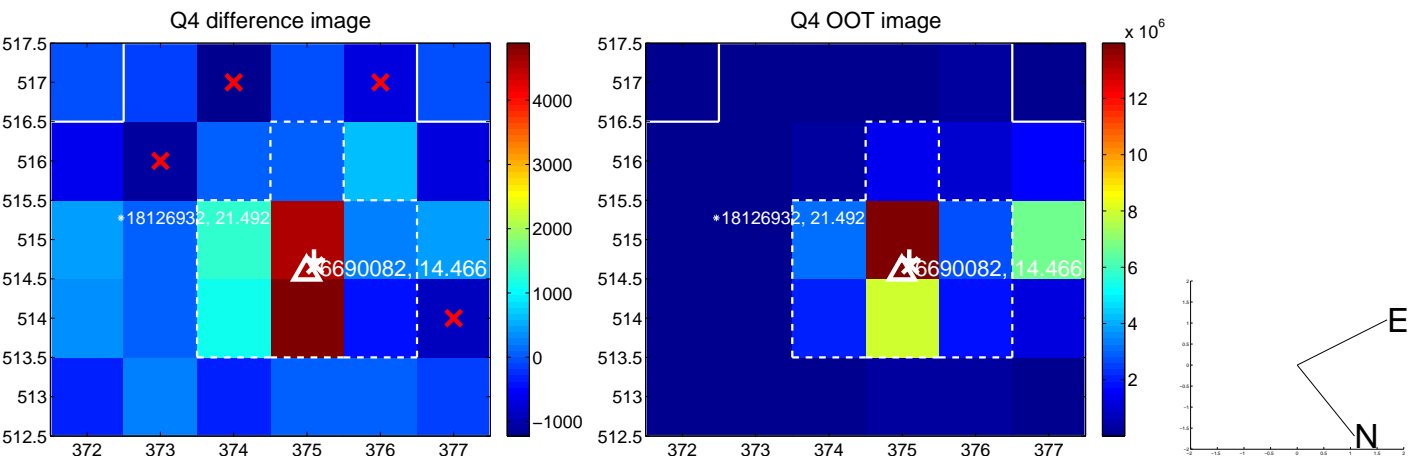
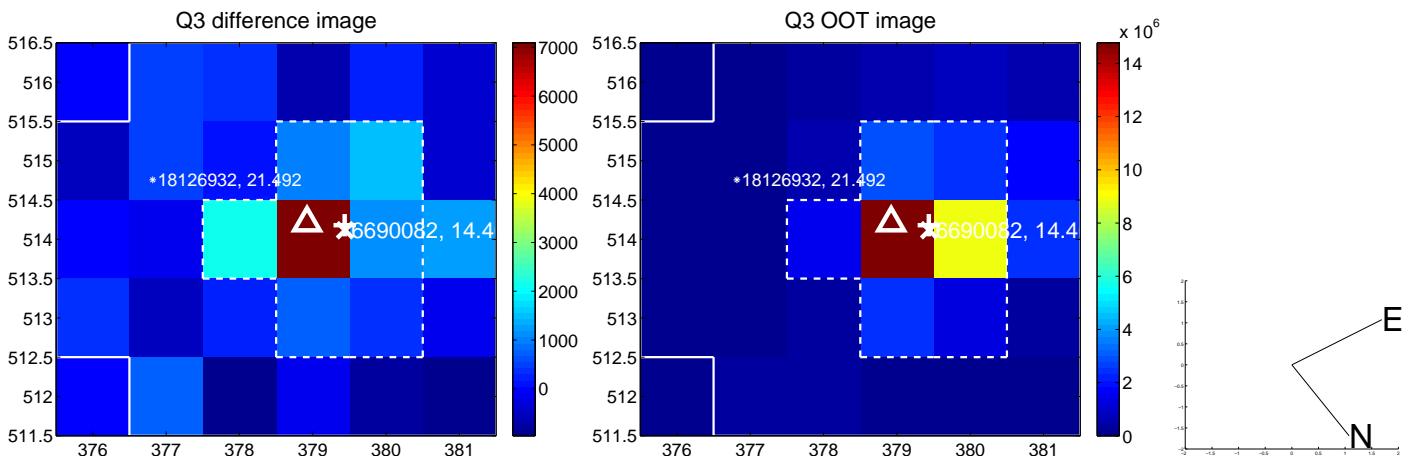
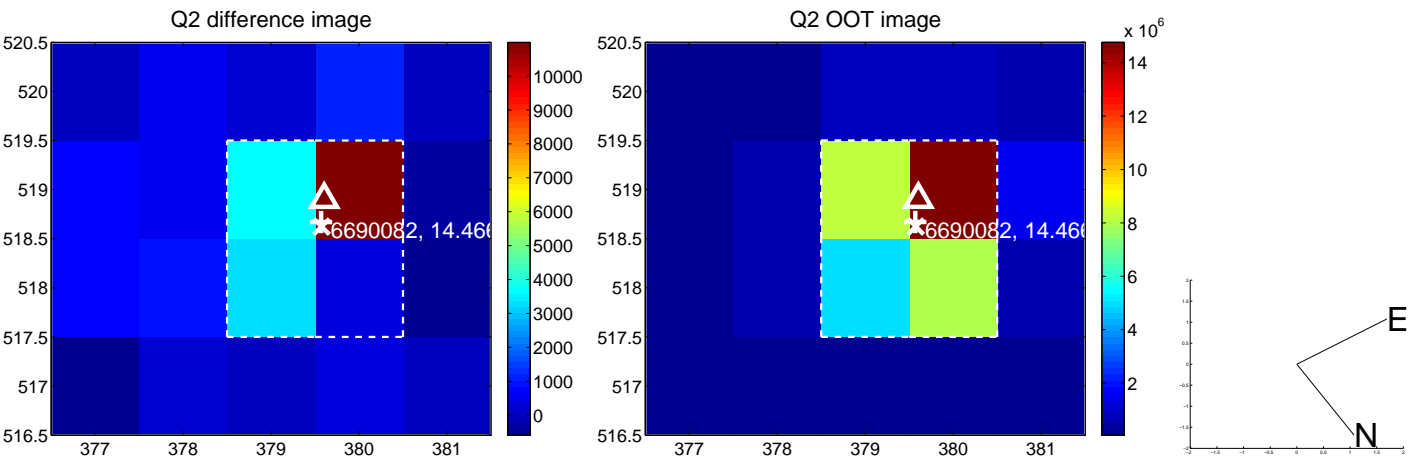
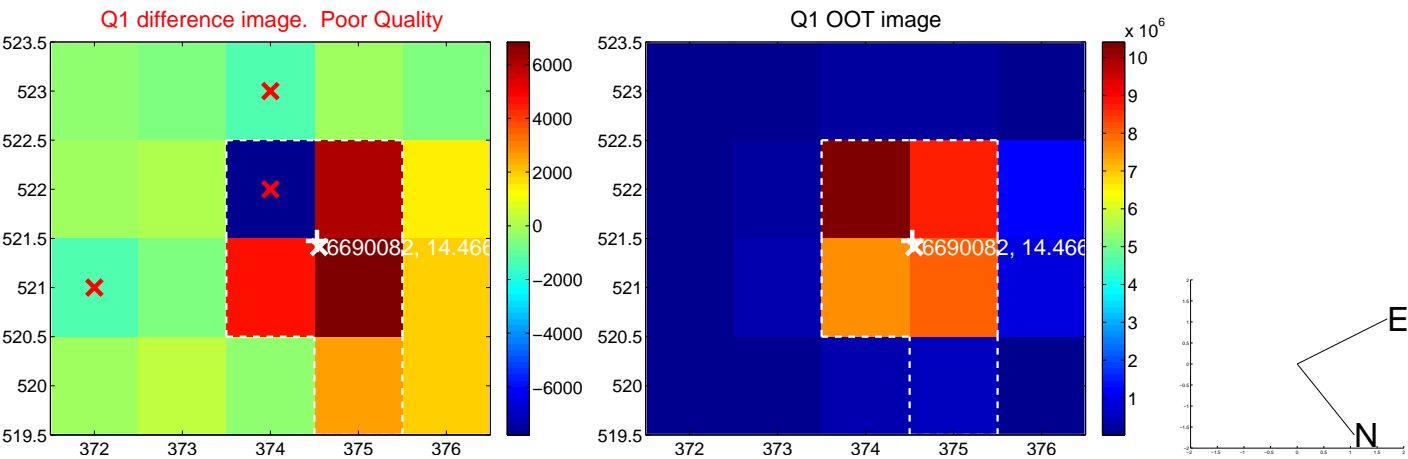
The direct PRF centroid is offset from the target star catalog position by about 0.33 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT | 0.214 ± 0.651 | 0.33 | 0.193 ± 0.653 | -0.091 ± 0.642 |
| PRF-fit source offset from KIC position | 0.452 ± 0.647 | 0.70 | 0.295 ± 0.653 | -0.342 ± 0.642 |
| photometric centroid source offset | 0.56 ± 0.43 | 1.29 | 0.56 ± 0.43 | 0.03 ± 0.36 |

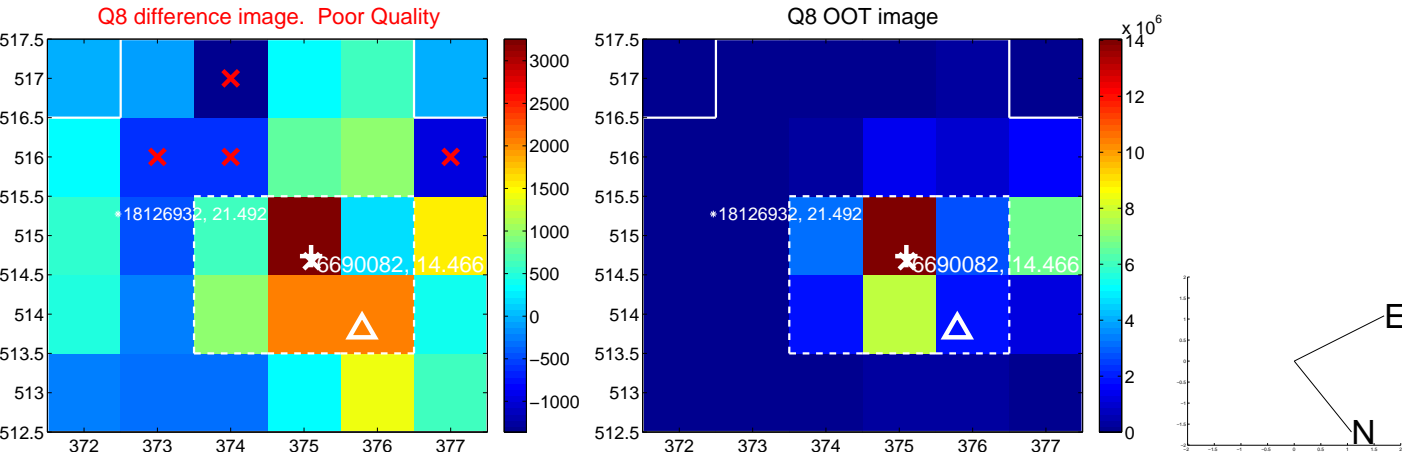
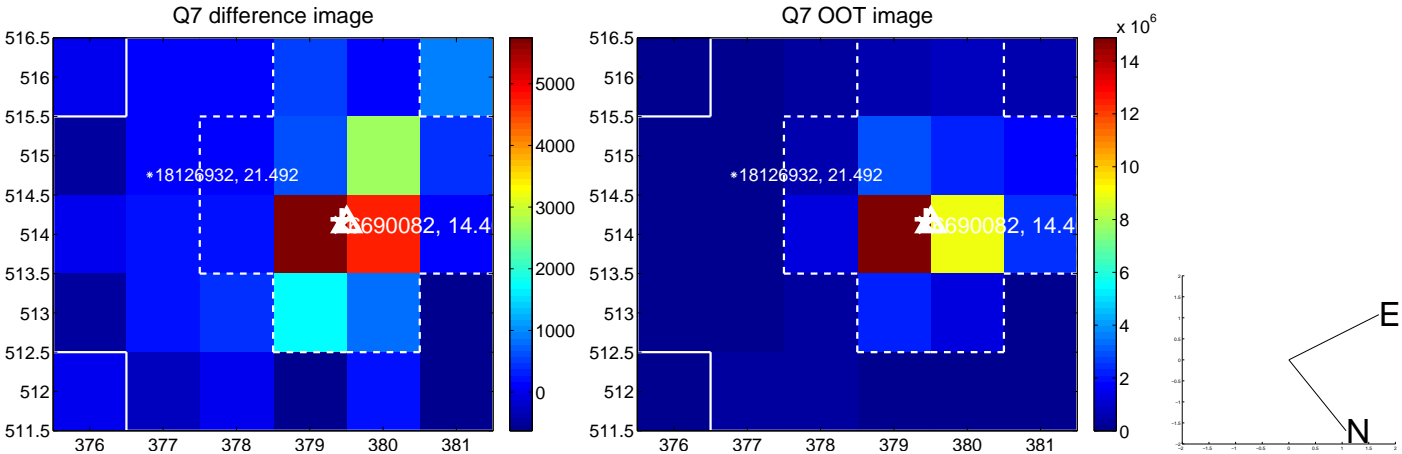
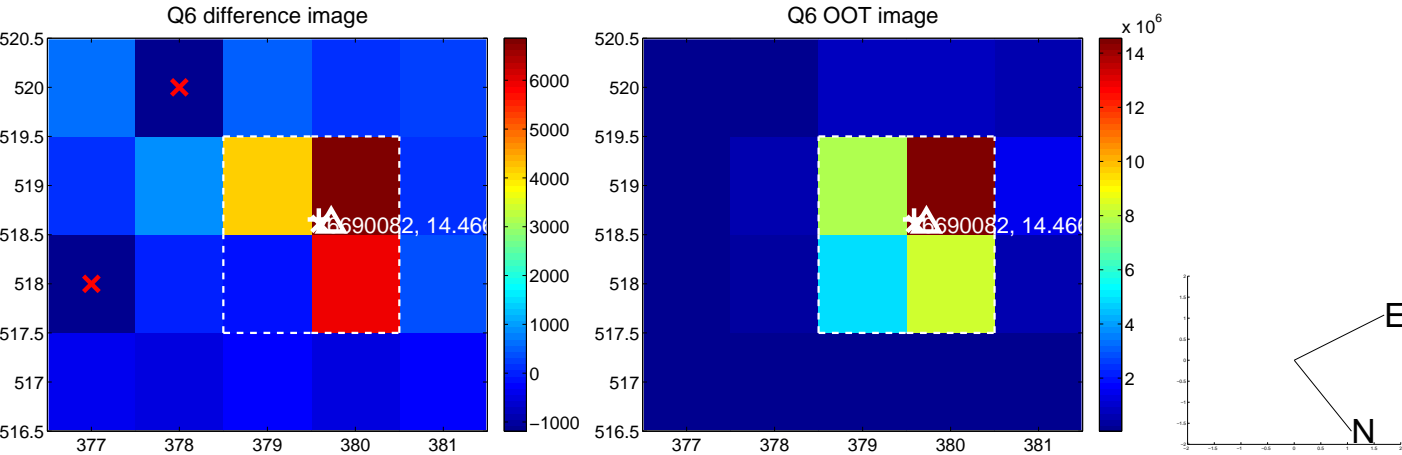
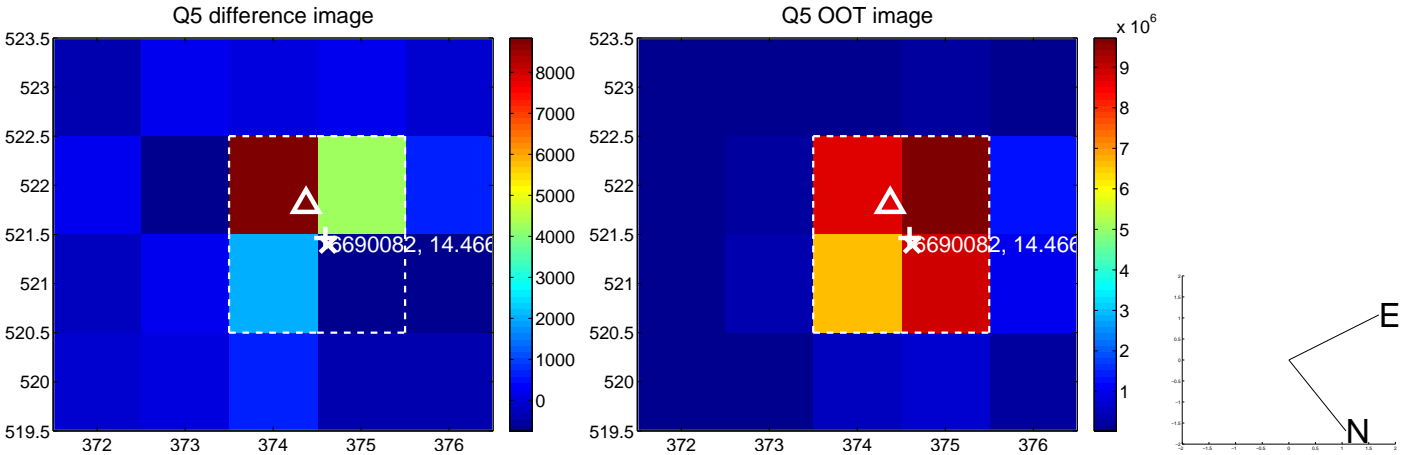


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

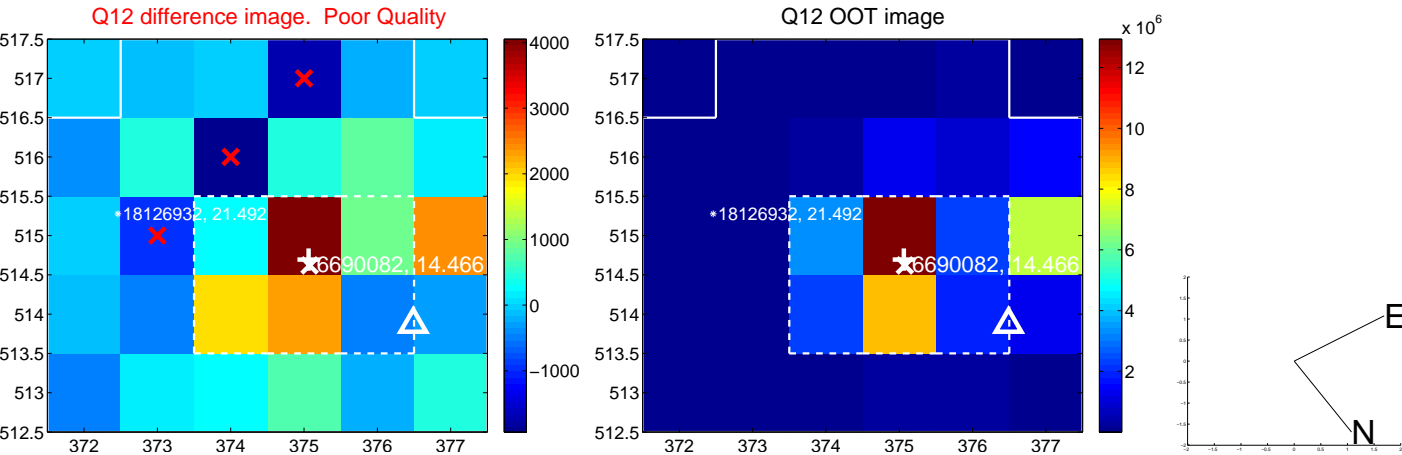
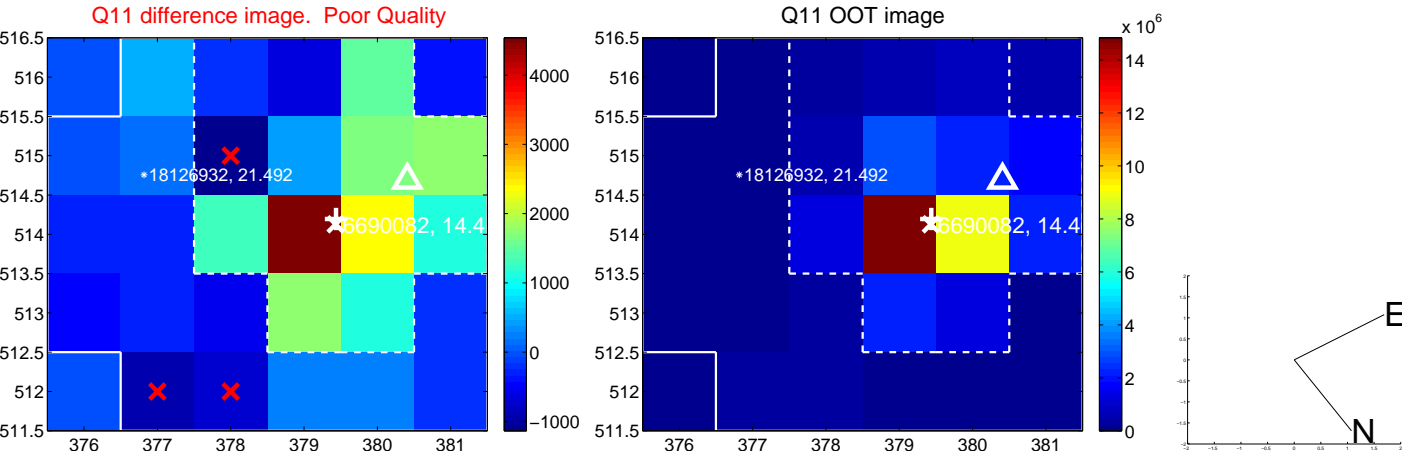
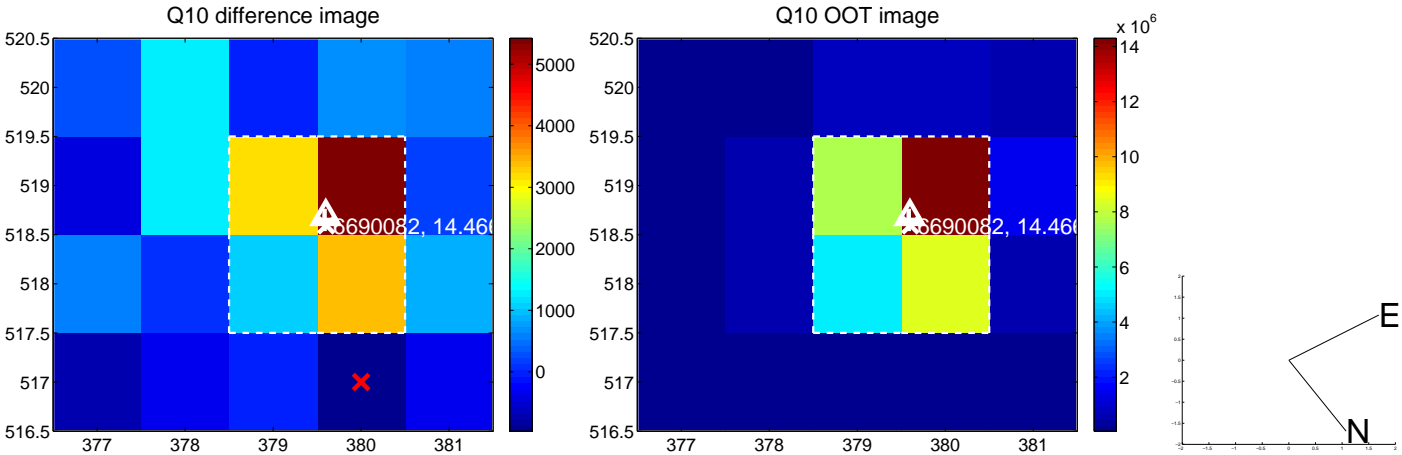
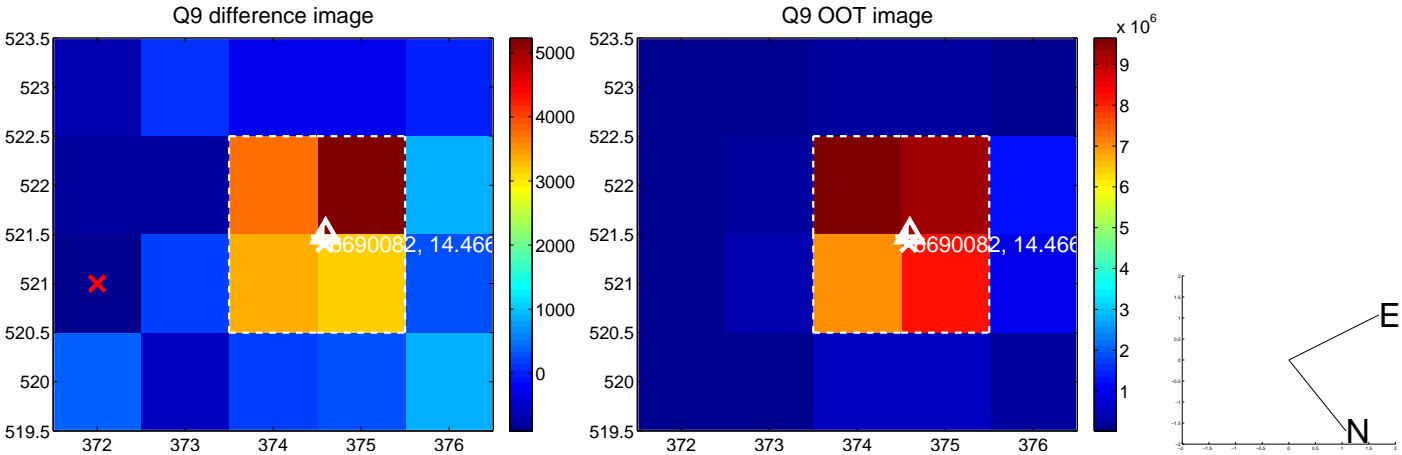
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



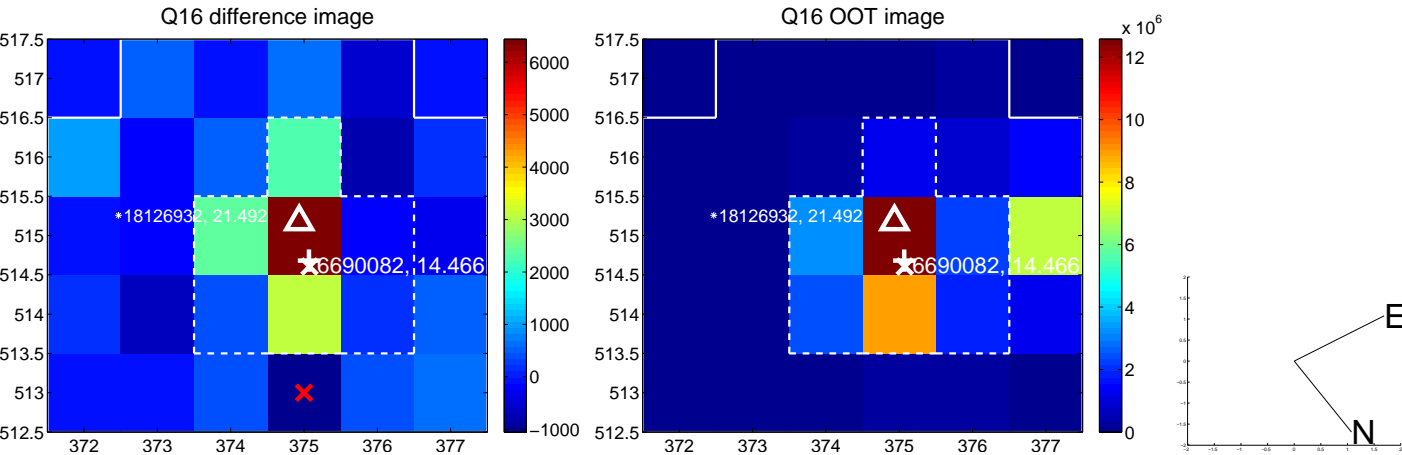
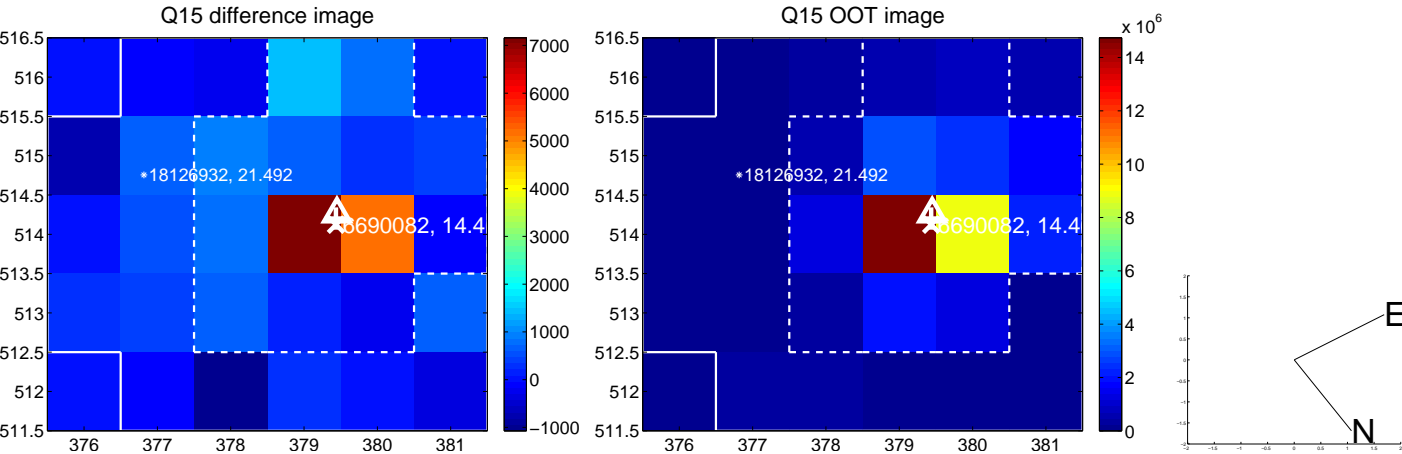
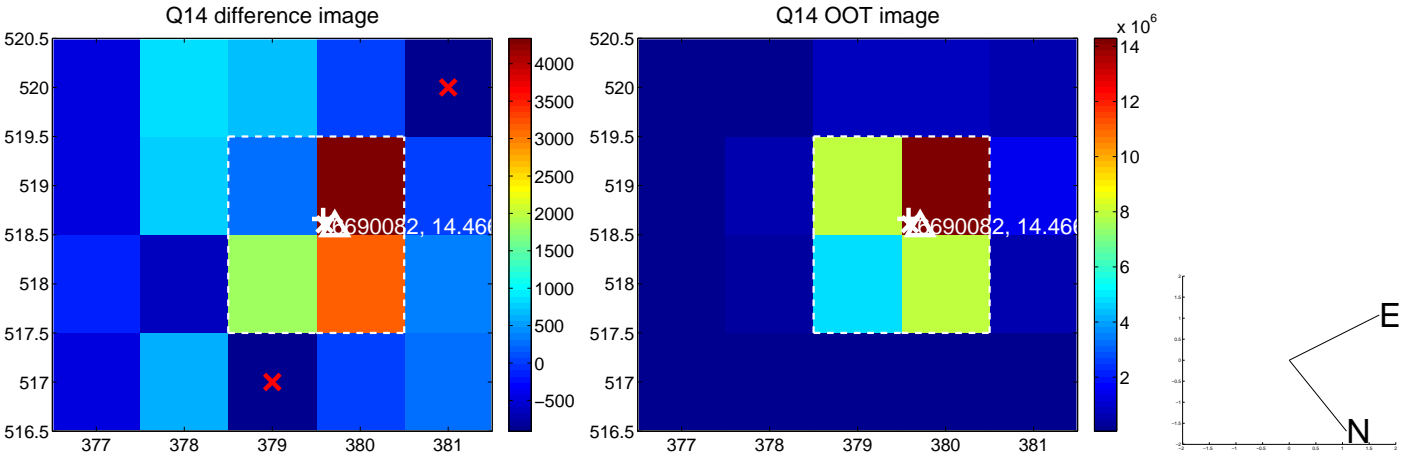
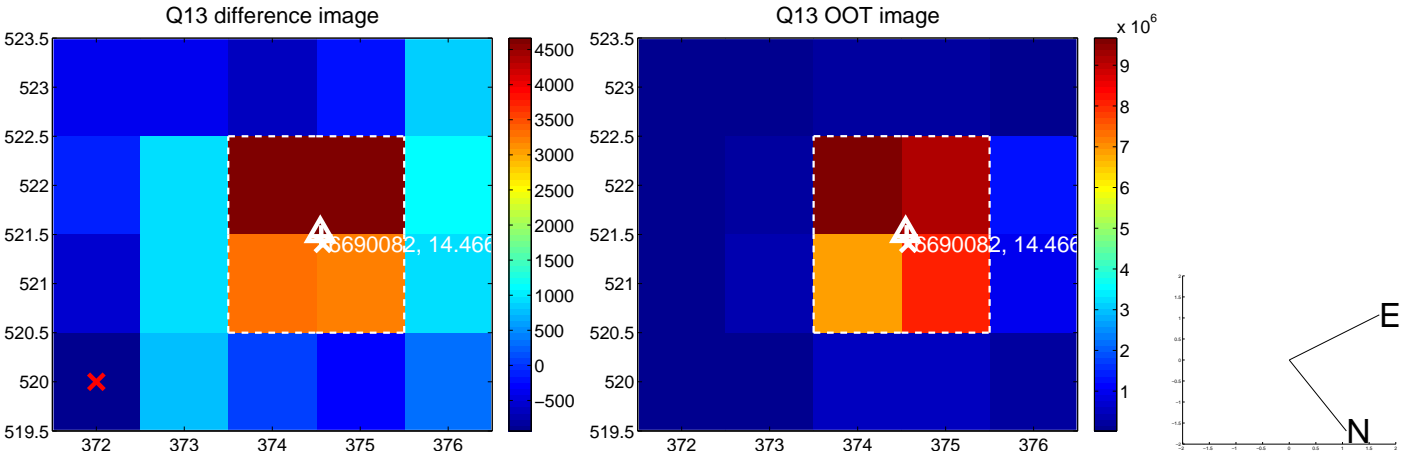
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



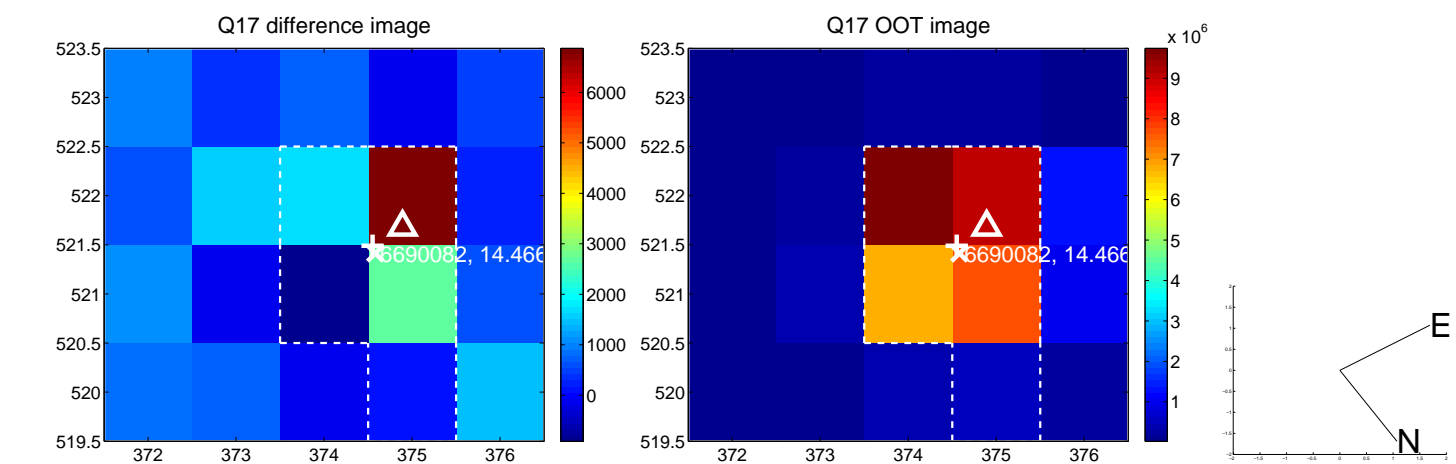
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



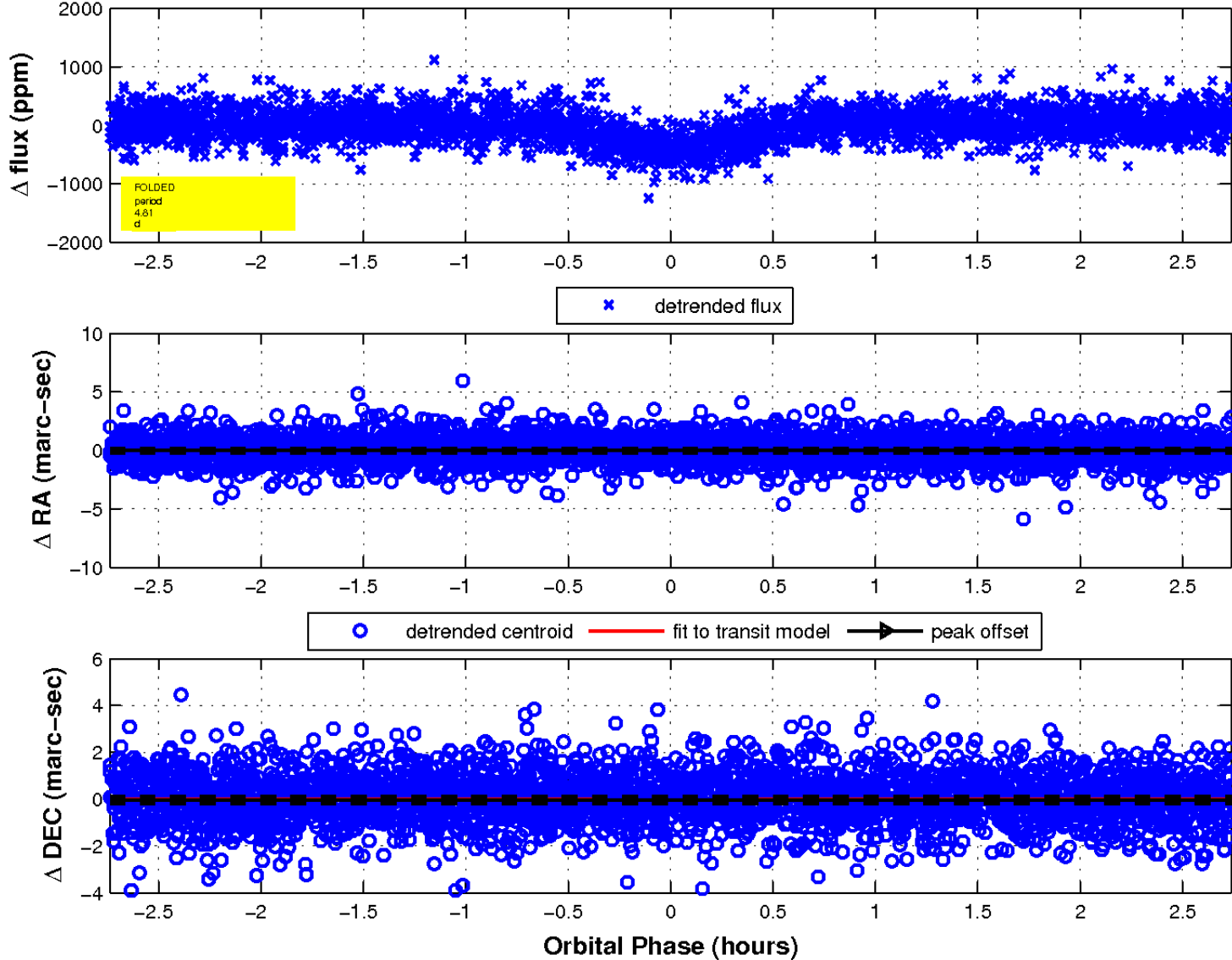
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

