

KIC 009693006

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 009693006-01 | OBS | 2913.01 | 2.888760 | 132.342876 | 39.8 | 3.191 | 14.3 | 15.8 | 1.33 | 5696 | 0.91 | 970.53 |
| 009693006-02 | OBS | No | 381.883865 | 240.942932 | 127.8 | 15.332 | 7.5 | 7.0 | 1.33 | 5696 | 1.66 | 1.44 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 009693006-01 | OBS | PC | 1.00 | 0 | 0 | 0 | 0 | NO_COMMENT |
| 009693006-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—INCONSISTENT_TRANS—CENT_FEW_DIFFS |

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

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

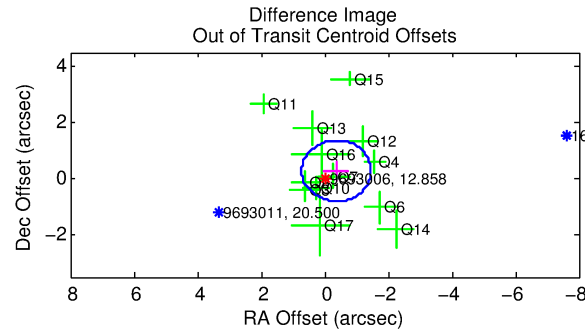
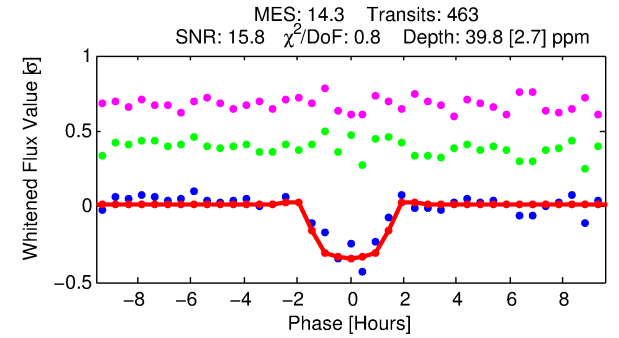
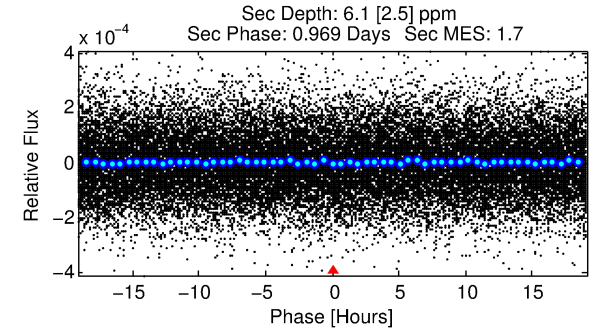
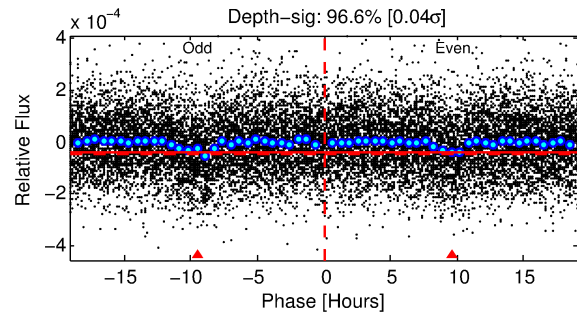
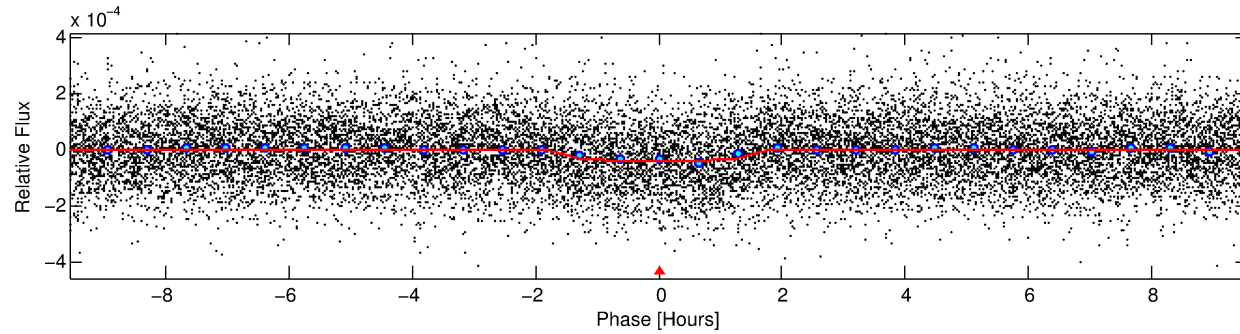
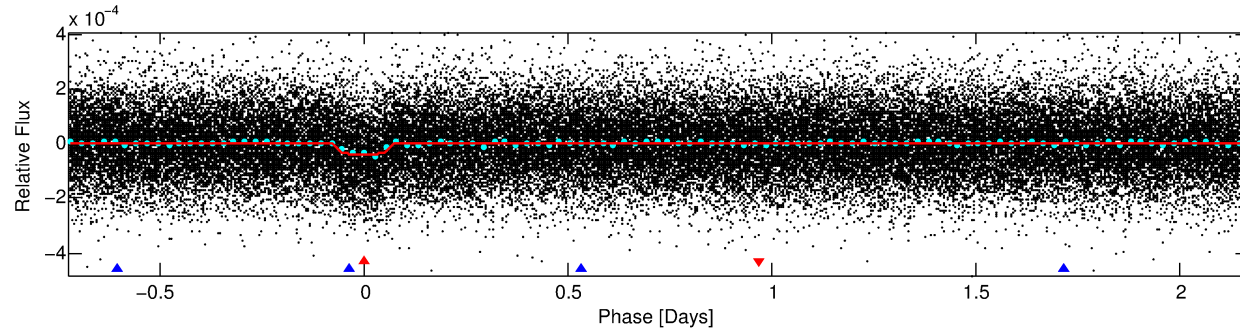
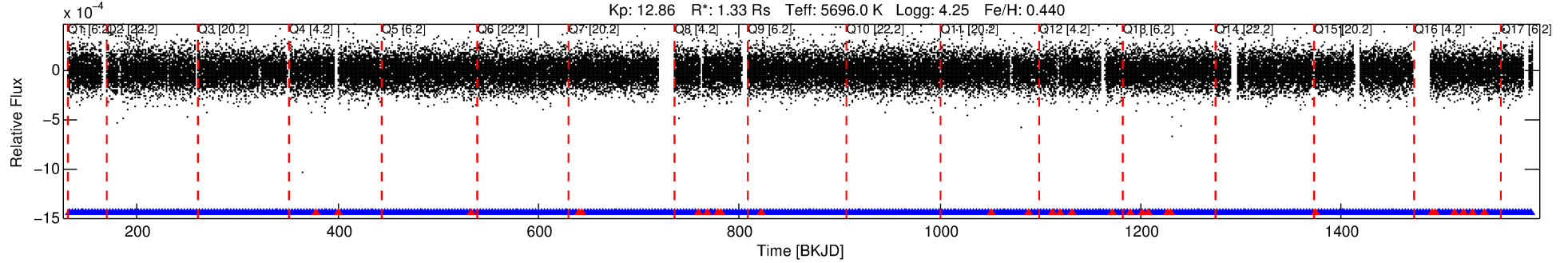
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009693006-01

No Significant Match Found

DV One-Page Summary

KIC: 9693006 Candidate: 1 of 2 Period: 2.889 d
KOI: K02913.01 Corr: 0.954



DV Fit Results:

Period = 2.88876 [0.00001] d
Epoch = 132.3429 [0.0031] BKJD
Rp/R* = 0.0063 [0.0015]
R/R* = 4.78 [4.53]
b = 0.74 [0.61]
Seff = 970.53 [239.82]
Teq = 1423 [88] K
Rp = 0.91 [0.28] Re
a = 0.0415 [0.0065] AU
Ag = 6.96 [4.73] [1.26σ]
Teffp = 3574 [574] K [3.70σ]

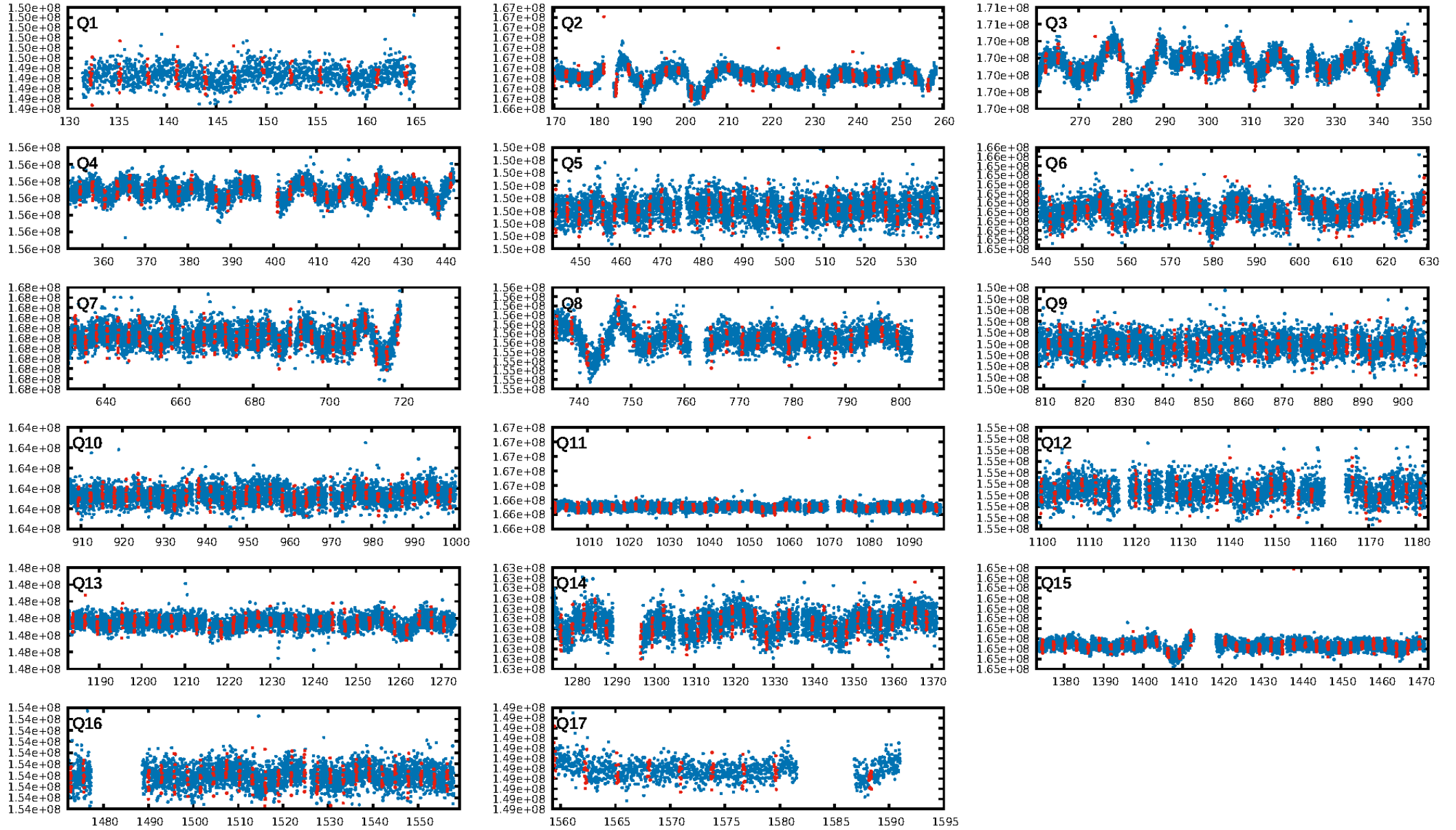
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [580.81σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 2.59e-45
RollingBand-fgt: 0.94 [414/442]
GhostDiagnostic-chr: 12.19
Centroid-sig: 10.7%
Centroid-so: 1.430 arcsec [1.61σ]
OotOffset-rm: 0.460 arcsec [1.27σ]
KicOffset-rm: 0.423 arcsec [1.14σ]
OotOffset-st: 3/4/3/3 [13]
KicOffset-st: 3/4/3/3 [13]
DiffImageQuality-fgm: 0.85 [11/13]
DiffImageOverlap-fno: 1.00 [17/17]

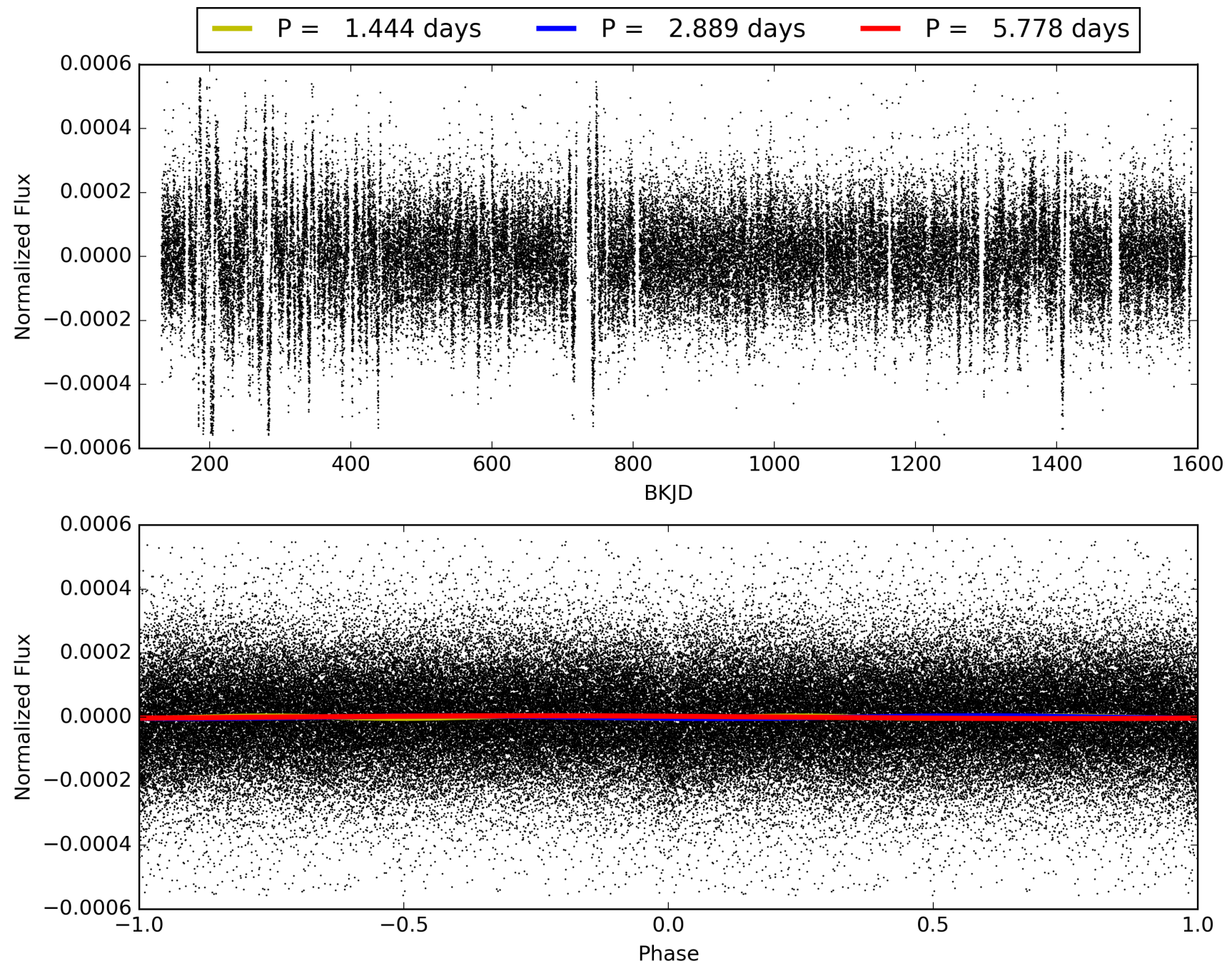
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 02:35:41 Z

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

TCE 009693006-01, PDC Light Curves

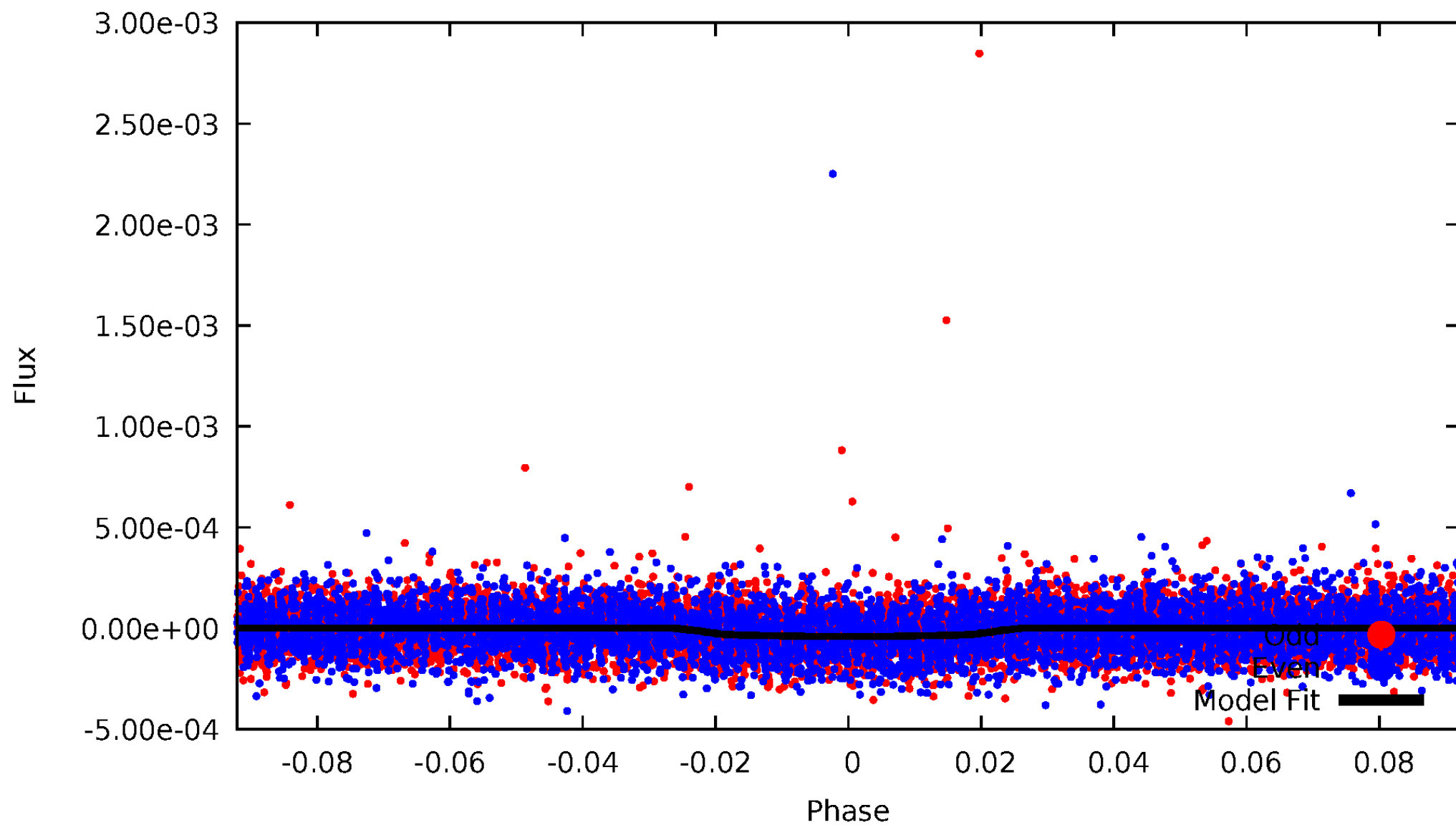


TCE 009693006-01



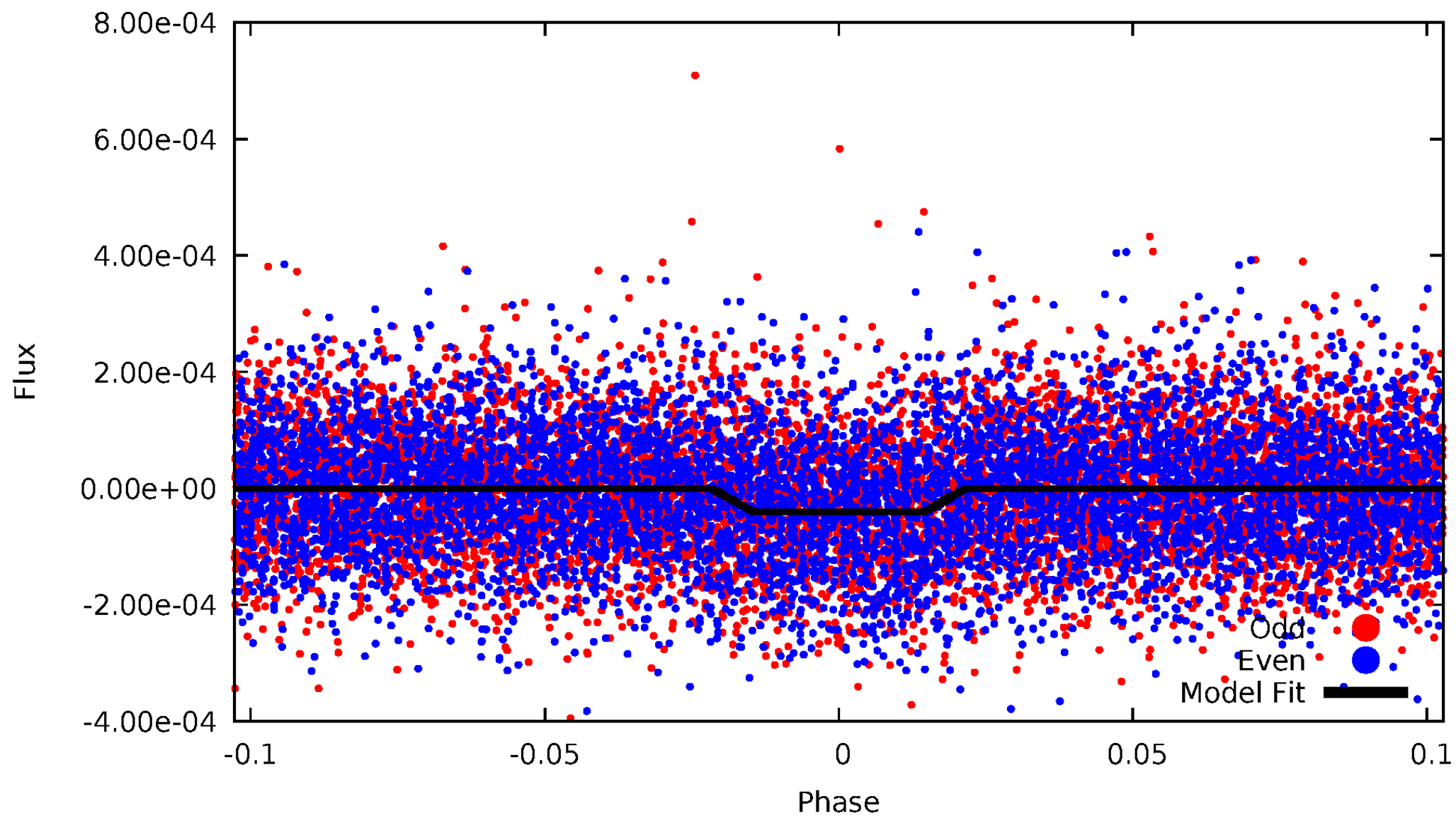
DV Odd/Even

TCE 009693006-01



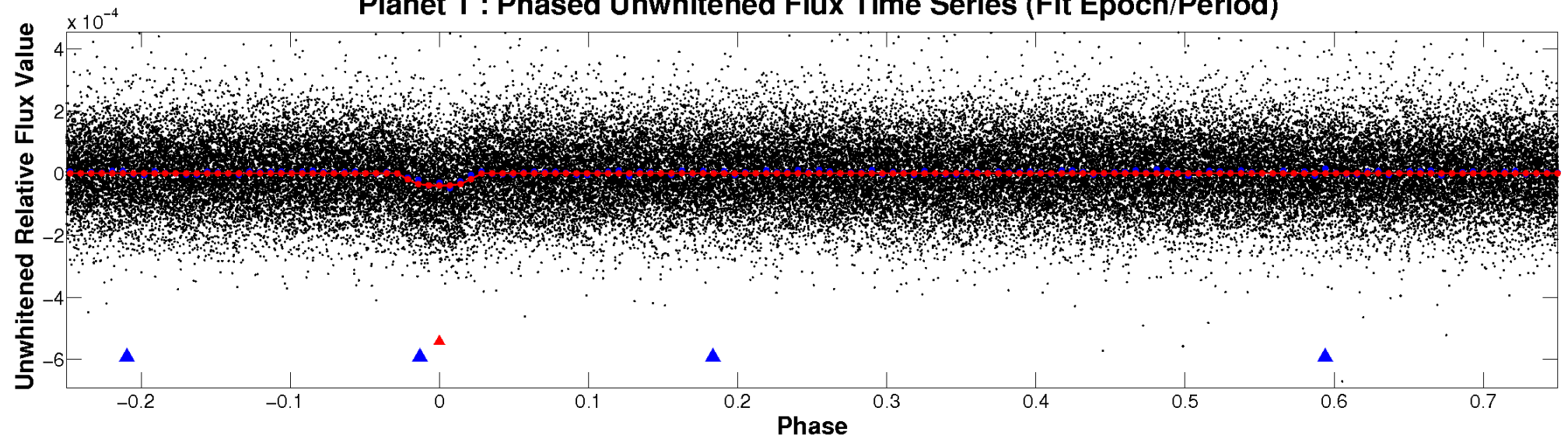
ALT Odd/Even

TCE 009693006-01

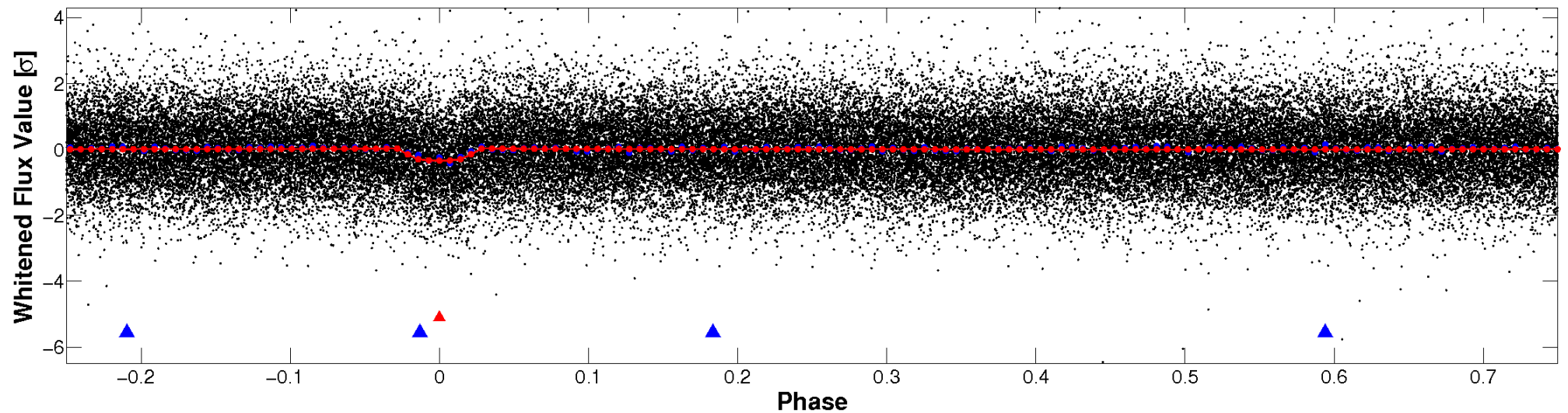


Non-Whitened Vs. Whitened Light Curve

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

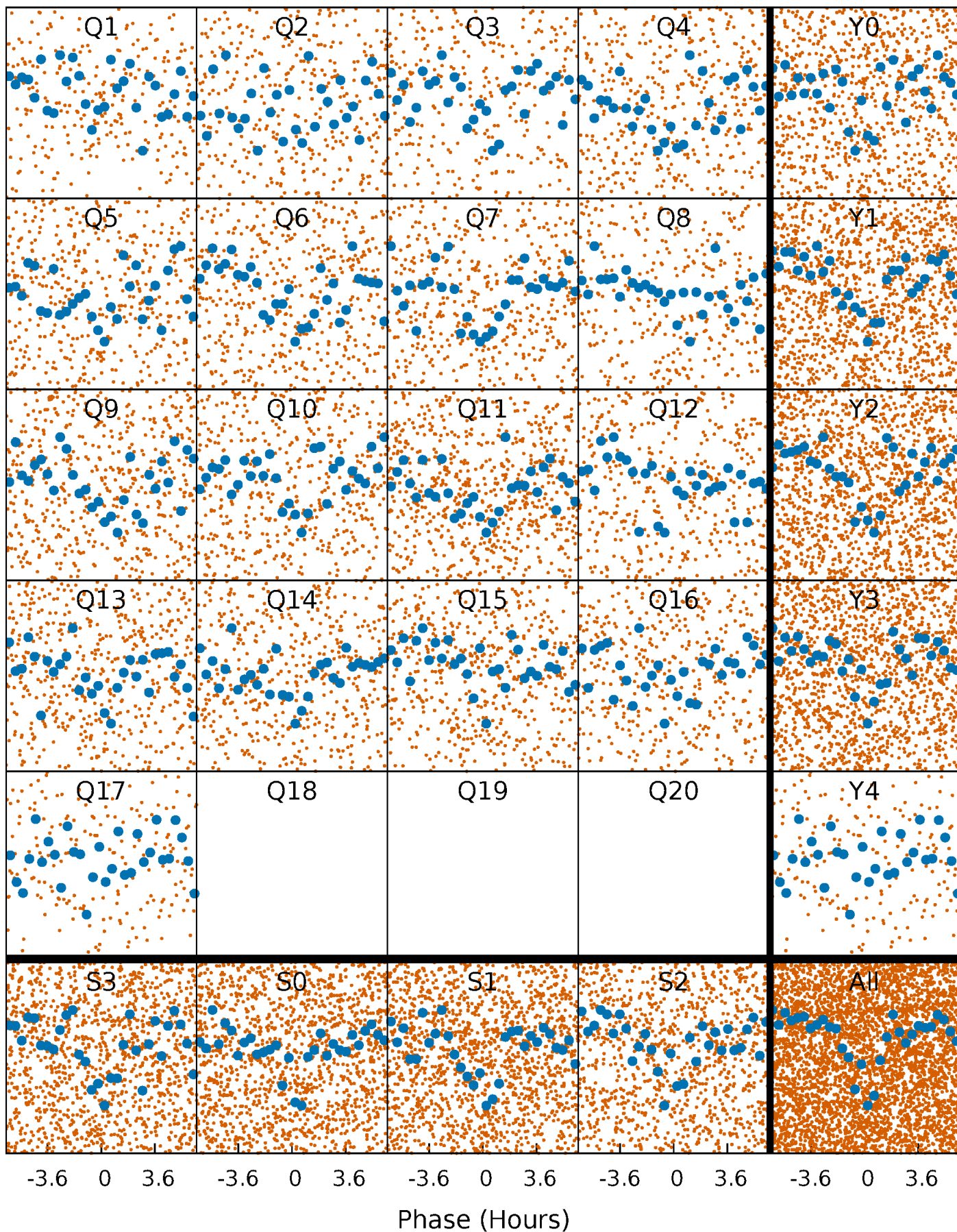


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



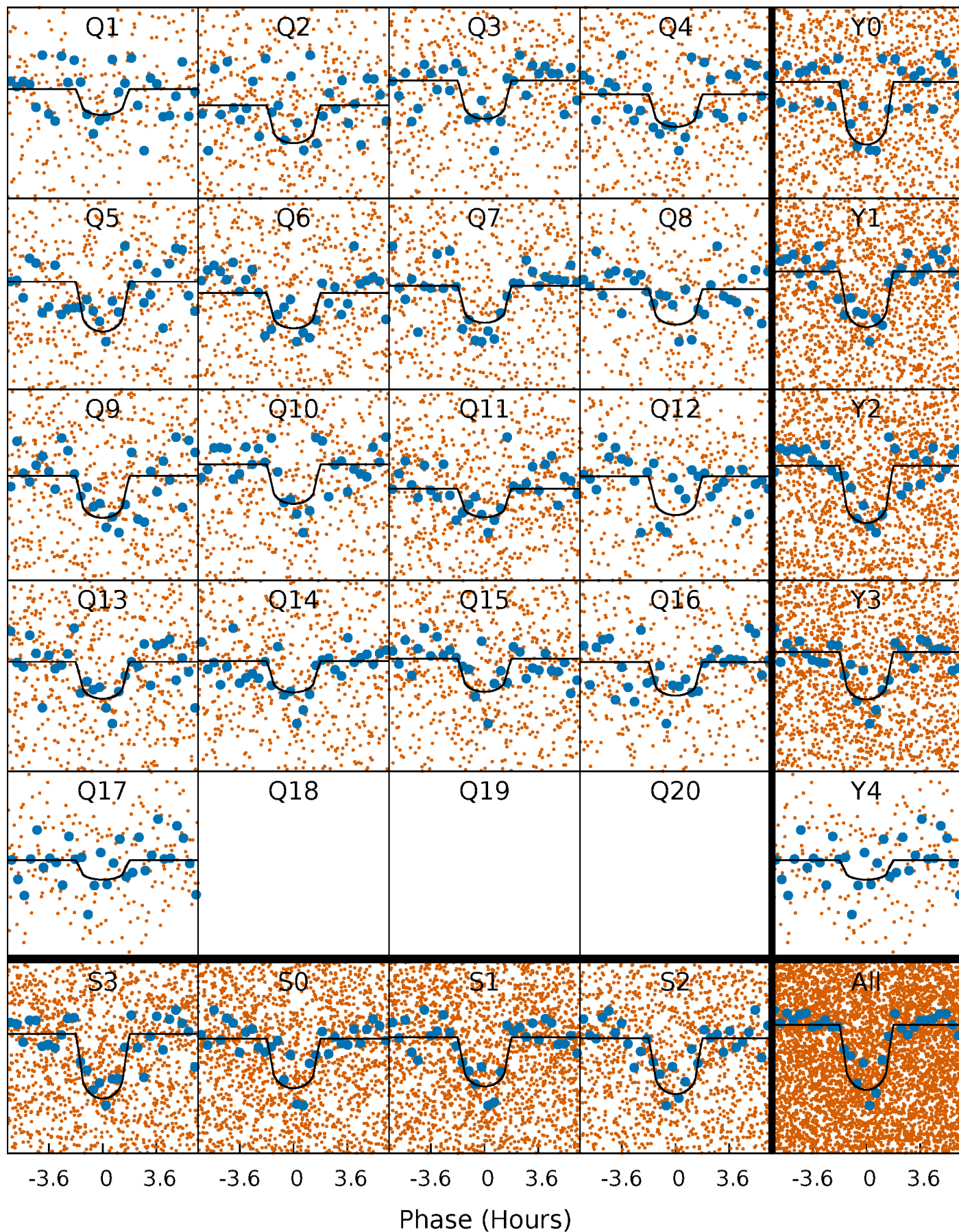
PDC Quarter-Phased Transit Curves

TCE 009693006-01 P= 2.888760 Days $T_0=132.342876$ (BKJD)



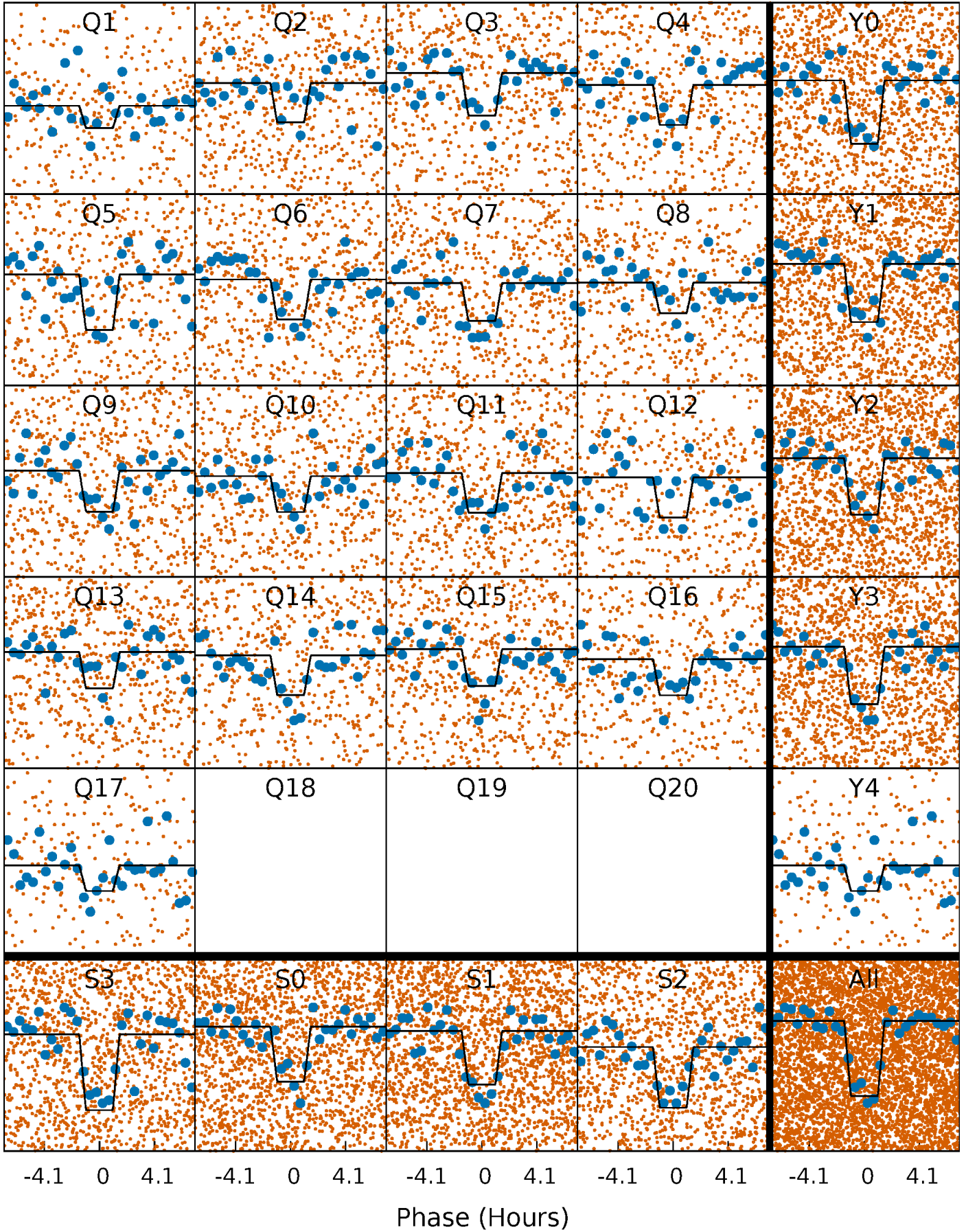
DV Quarter-Phased Transit Curves

TCE 009693006-01 P= 2.888760 Days $T_0=132.342876$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

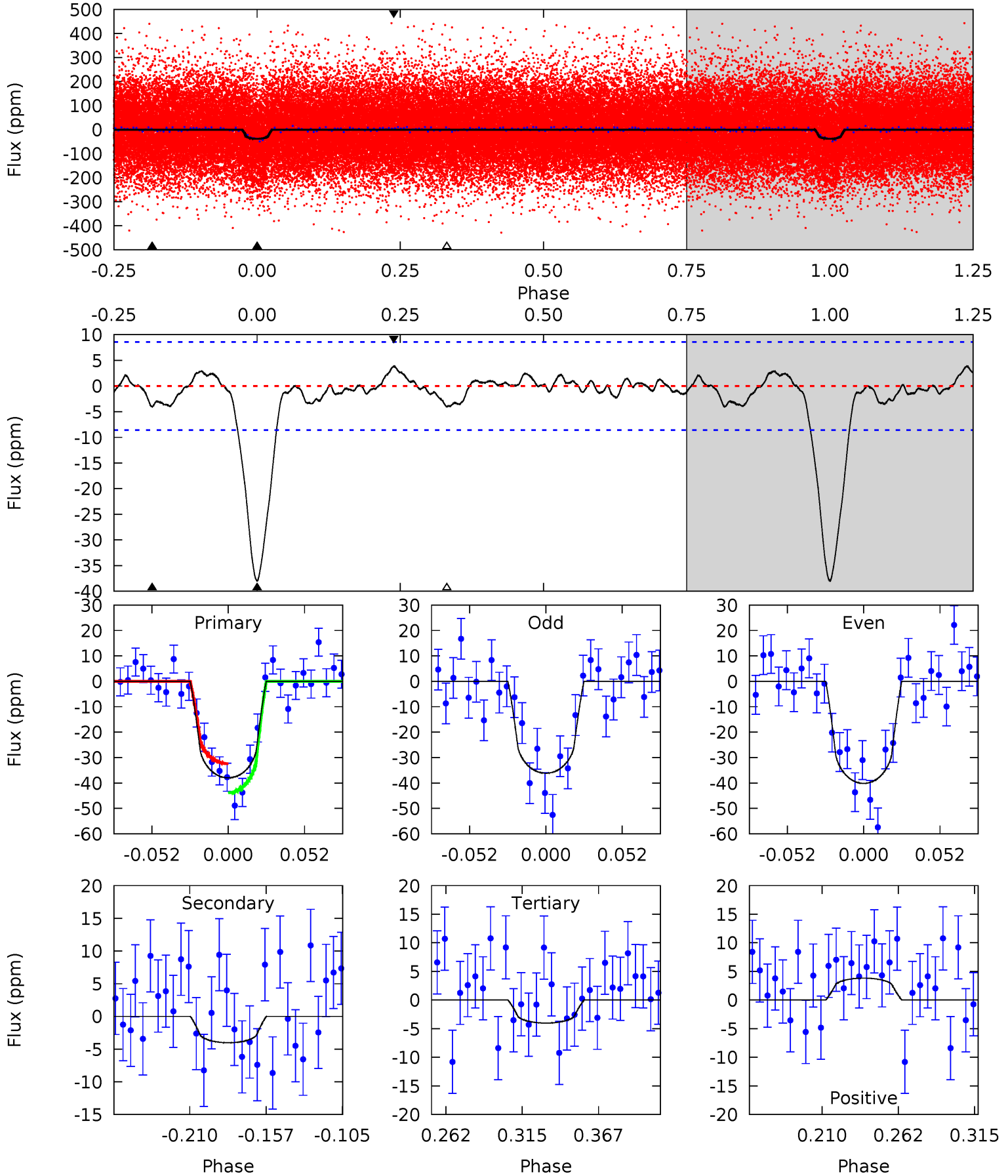
TCE 009693006-01 P= 2.888760 Days $T_0=132.344106$ (BKJD)



DV Model-Shift Uniqueness Test

009693006-01, P = 2.888760 Days, E = 129.454116 Days

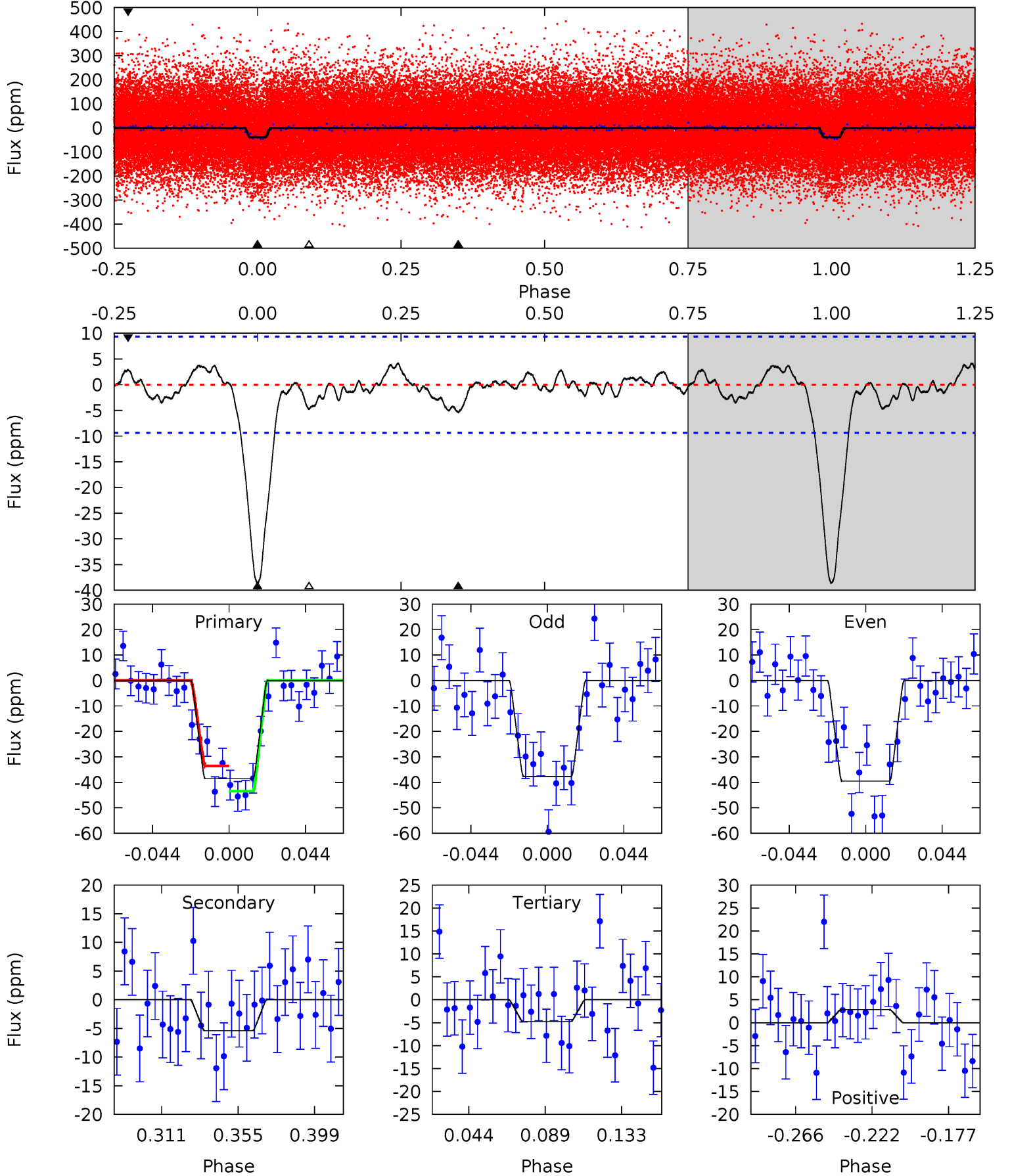
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 20.8 | 2.20 | 2.20 | 2.10 | 4.70 | 1.94 | 0.85 | 18.6 | 18.7 | 0.00 | 0.11 | 1.10 | 0.90 | 0.09 | 3.13 |



Alt Model-Shift Uniqueness Test

009693006-01, P = 2.888760 Days, E = 129.455346 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 19.5 | 2.73 | 2.39 | 1.45 | 4.73 | 2.01 | 0.88 | 17.1 | 18.1 | 0.34 | 1.28 | 0.47 | 0.91 | 0.10 | 2.51 |



Stellar Parameters For KIC 009693006

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | $M(M_{\odot})$ | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 5696^{+113}_{-101} | $4.247^{+0.130}_{-0.117}$ | $0.440^{+0.050}_{-0.150}$ | $1.331^{+0.244}_{-0.220}$ | $1.139^{+0.083}_{-0.101}$ | $0.681^{+0.465}_{-0.236}$ |
| | +2%/-2% | +3%/-3% | +11%/-34% | +18%/-17% | +7%/-9% | +68%/-35% |
| Source | SPE59 | SPE59 | SPE59 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 009693006-01 / KOI 2913.01

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|-------------|------------------------|----------------------|----------------------|---------------------------|
| DV | -4 ± 2 | $0.89^{+0.23}_{-0.24}$ | 1989^{+102}_{-93} | 3611^{+502}_{-466} | $4.608^{+5.031}_{-2.627}$ |
| Alt. | -5 ± 2 | $0.92^{+0.24}_{-0.23}$ | 1988^{+109}_{-91} | 3775^{+447}_{-405} | $5.810^{+5.394}_{-2.846}$ |

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

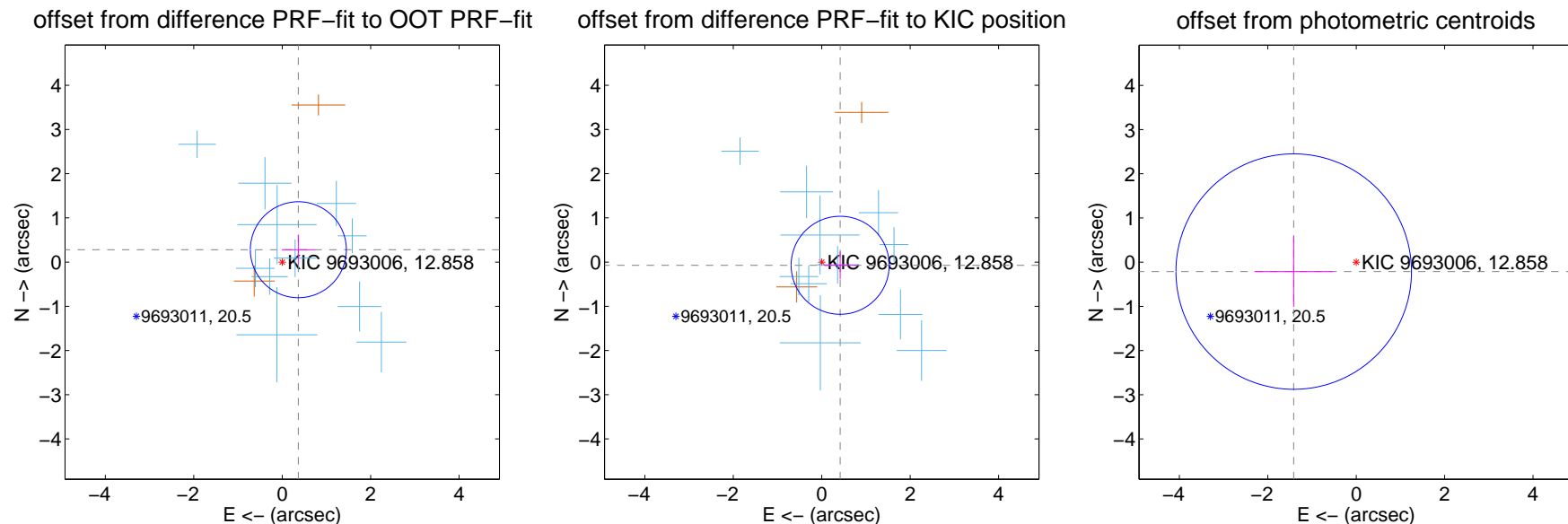
DV Centroid Data

Supplemental centroid analysis for 009693006-01. Kepler magnitude: 12.86. Transit SNR 15.81

There are 11 quarters with good PRF difference image offsets

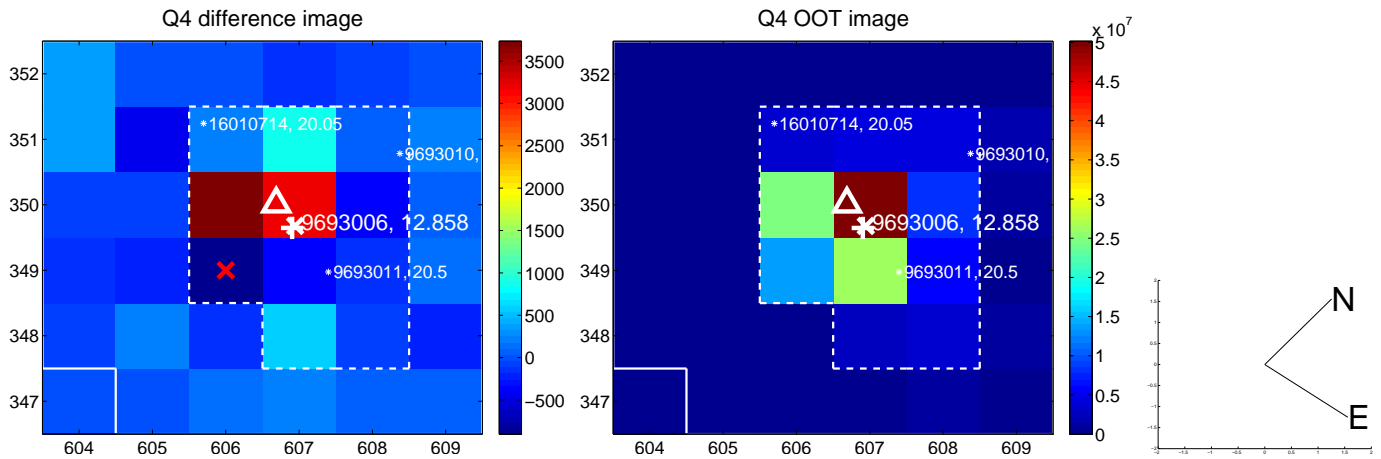
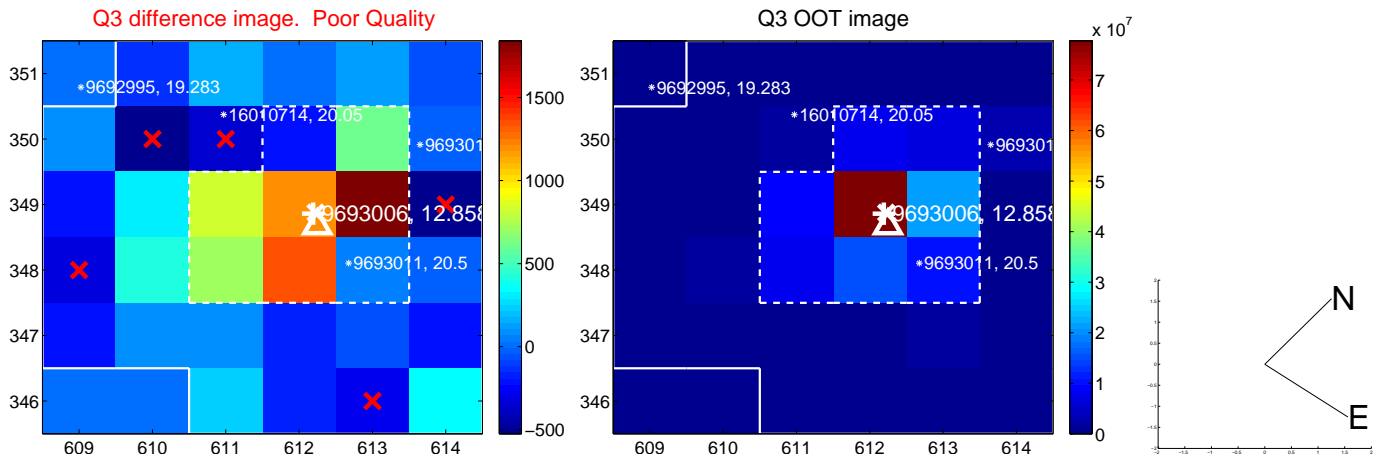
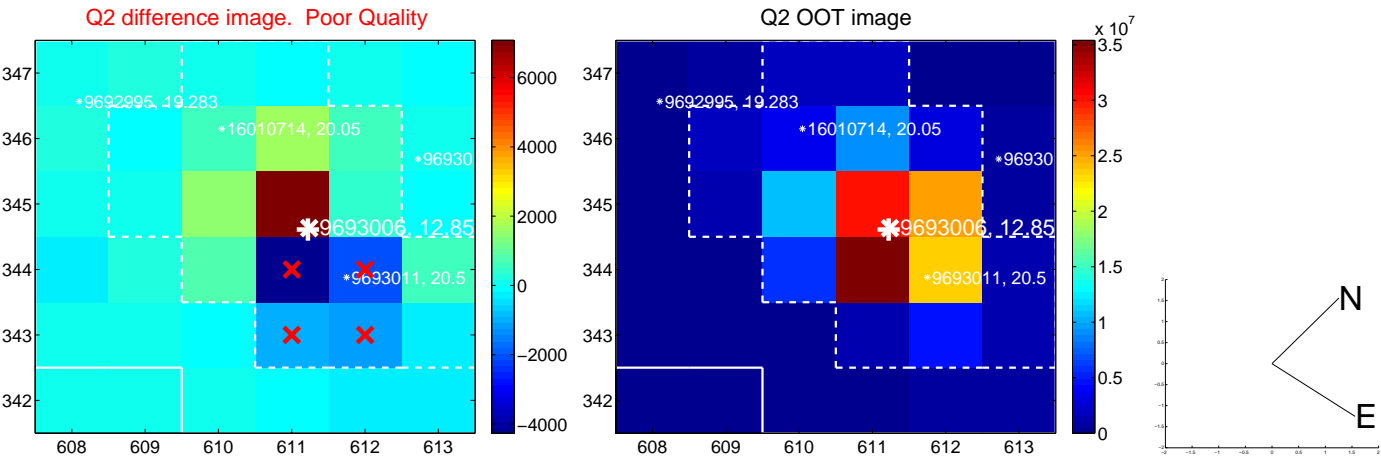
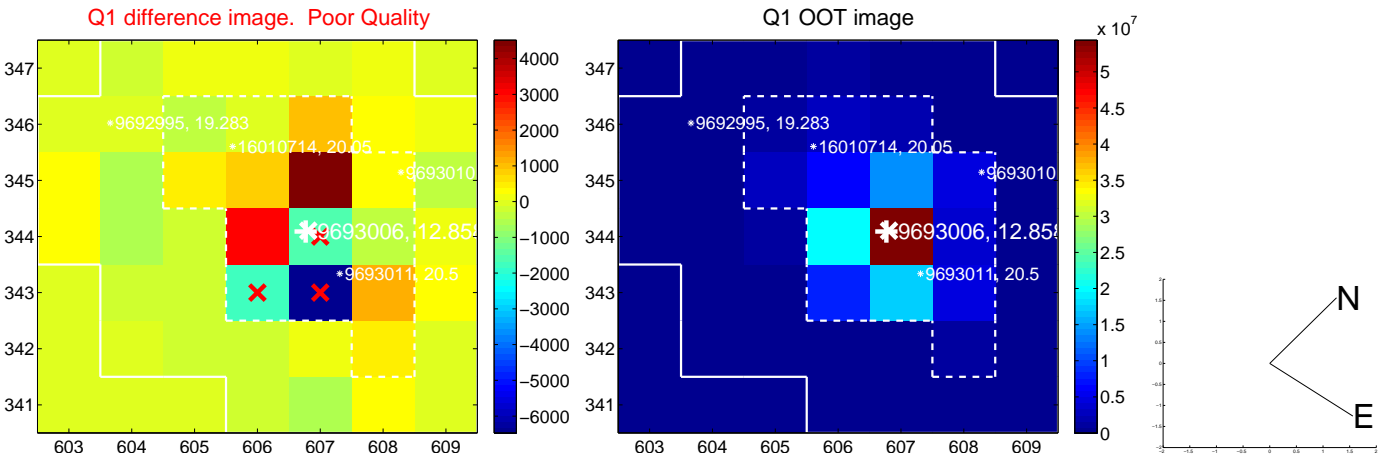
The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 0.460 ± 0.362 | 1.27 | -0.365 ± 0.374 | 0.280 ± 0.340 |
| PRF-fit source offset from KIC position | 0.423 ± 0.370 | 1.14 | -0.417 ± 0.371 | -0.072 ± 0.310 |
| photometric centroid source offset | 1.43 ± 0.89 | 1.61 | 1.41 ± 0.89 | -0.21 ± 0.80 |

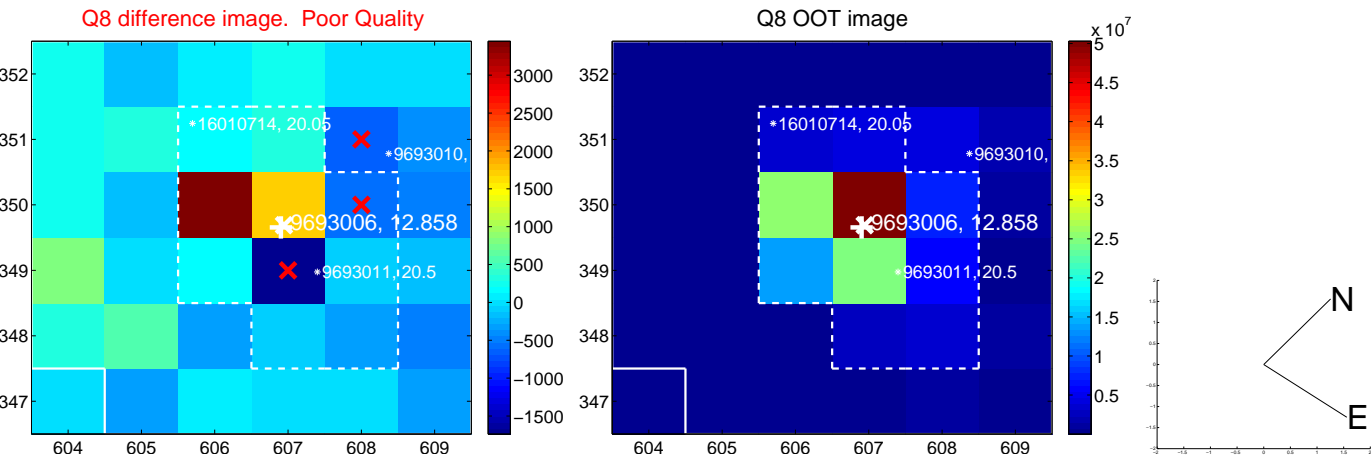
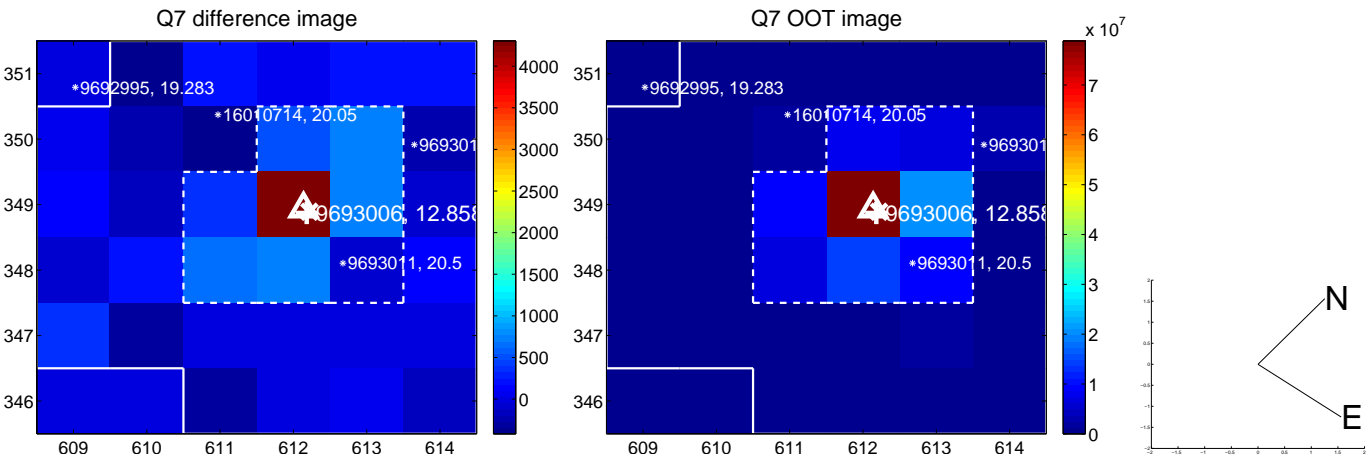
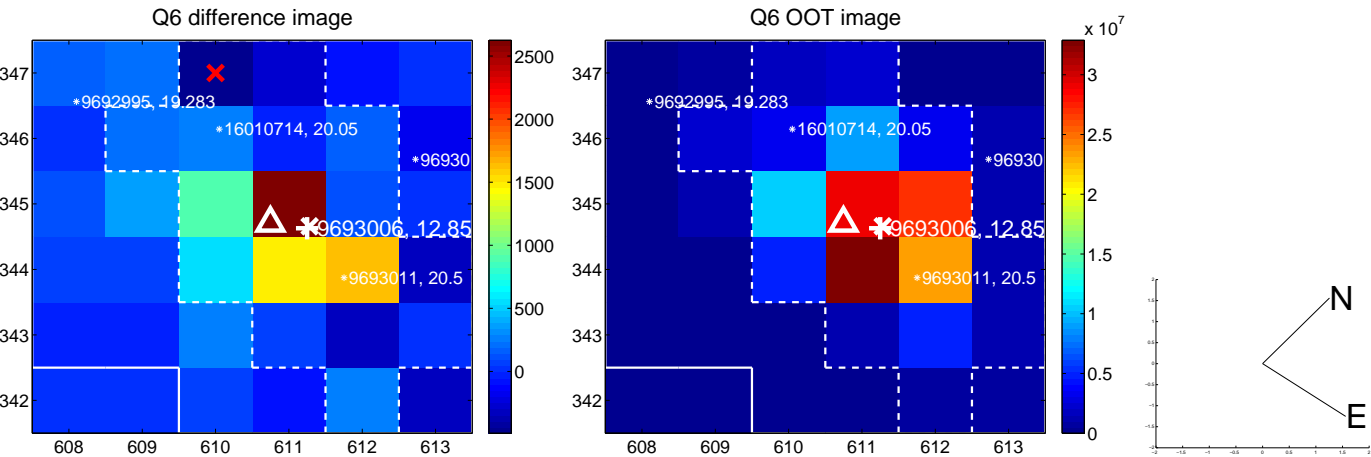
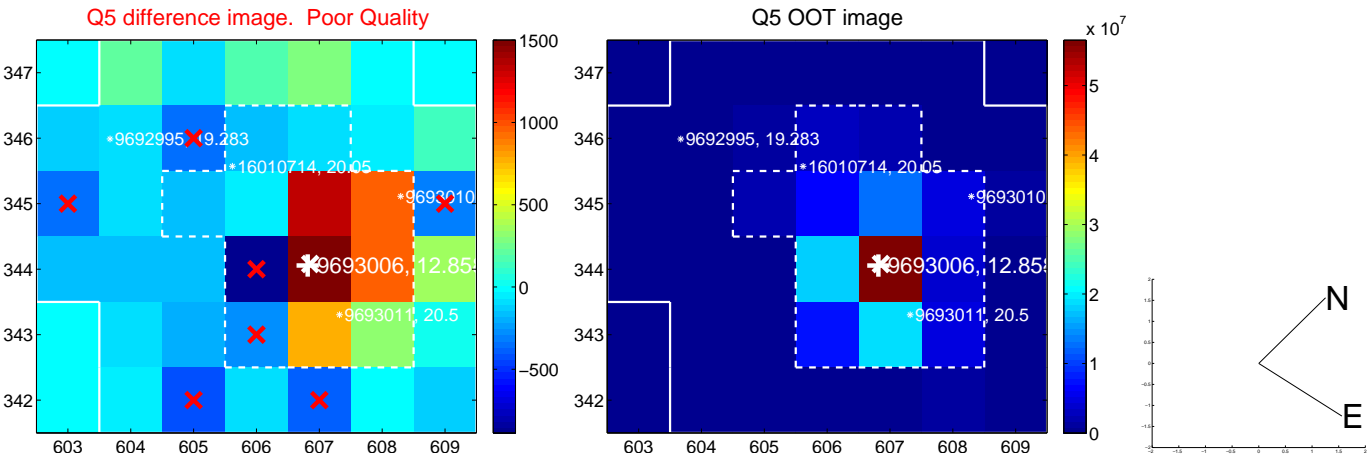


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

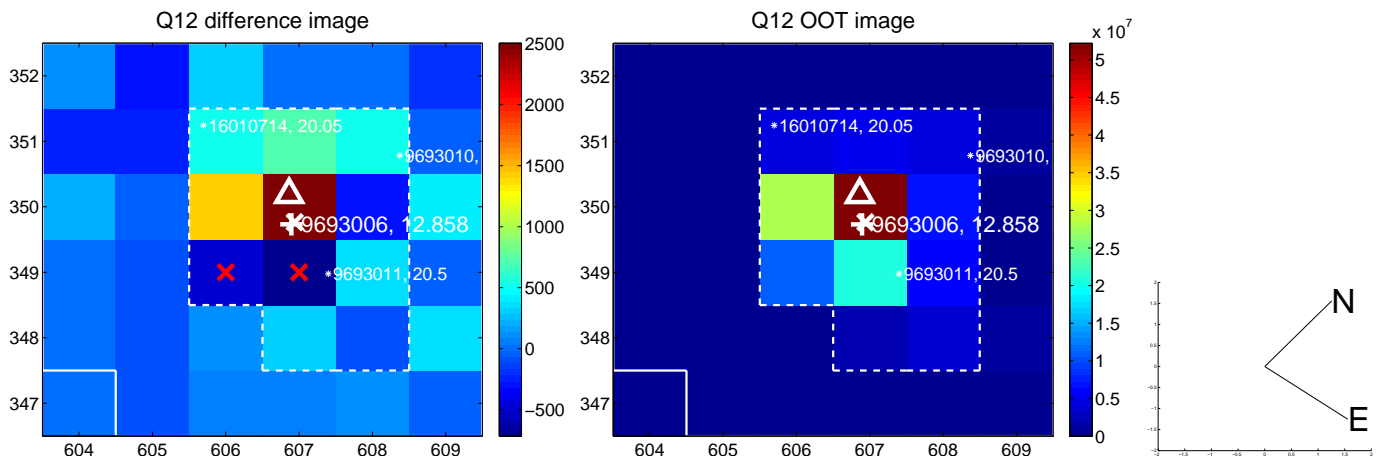
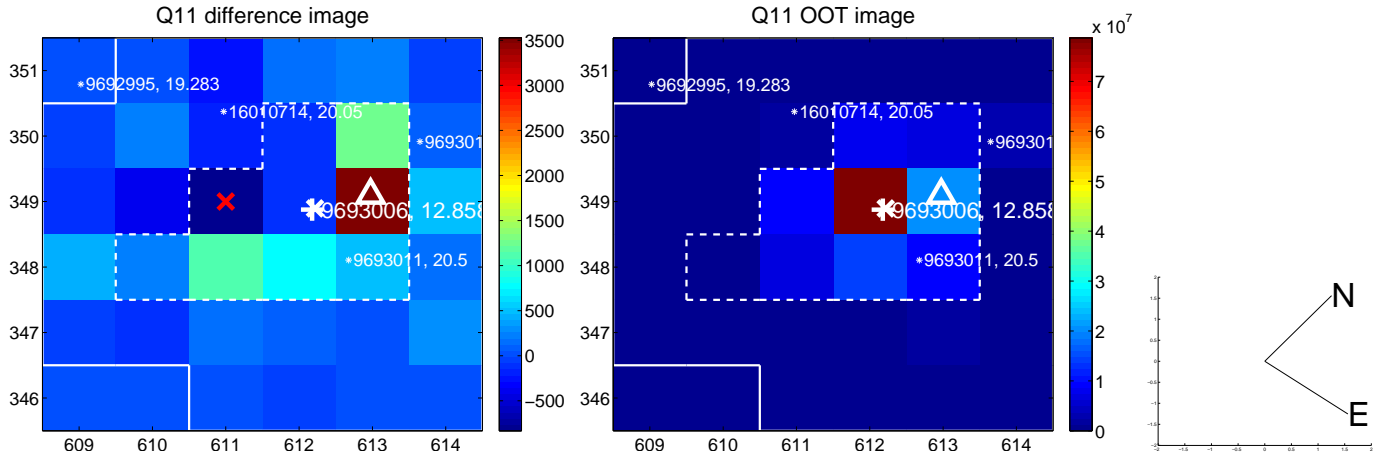
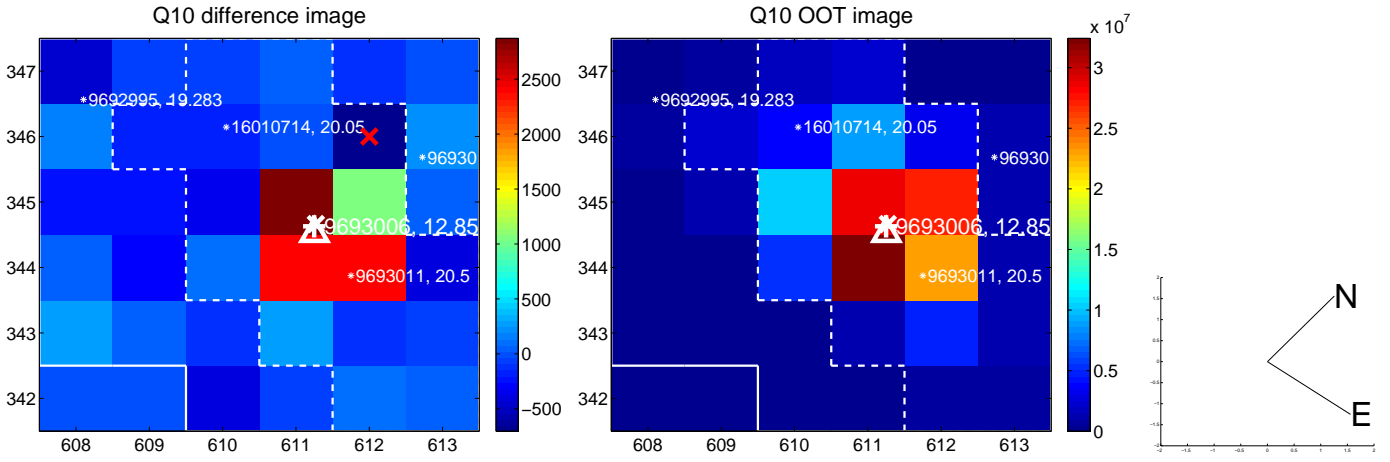
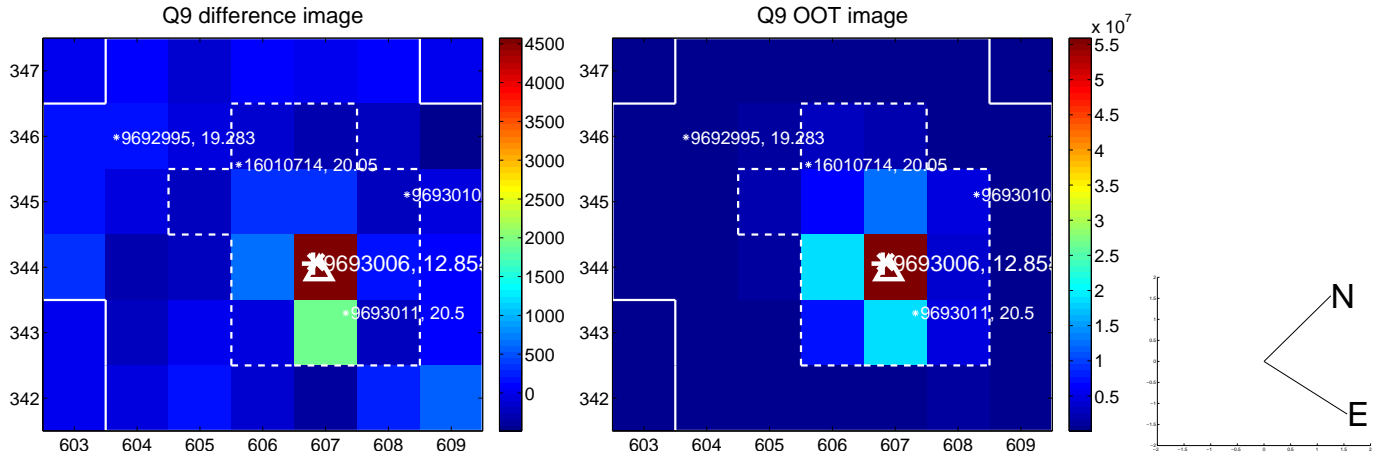
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



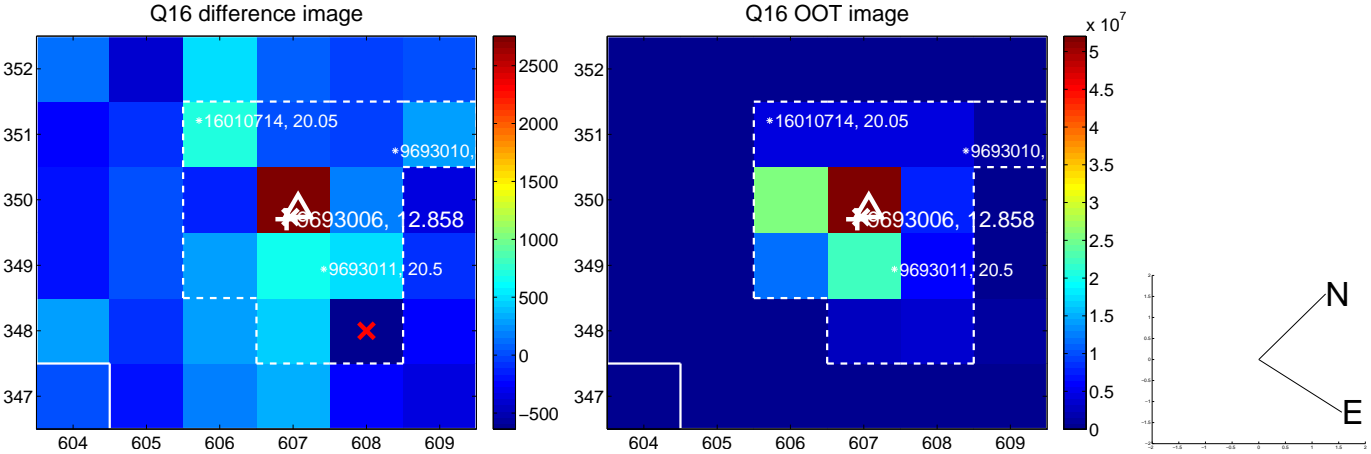
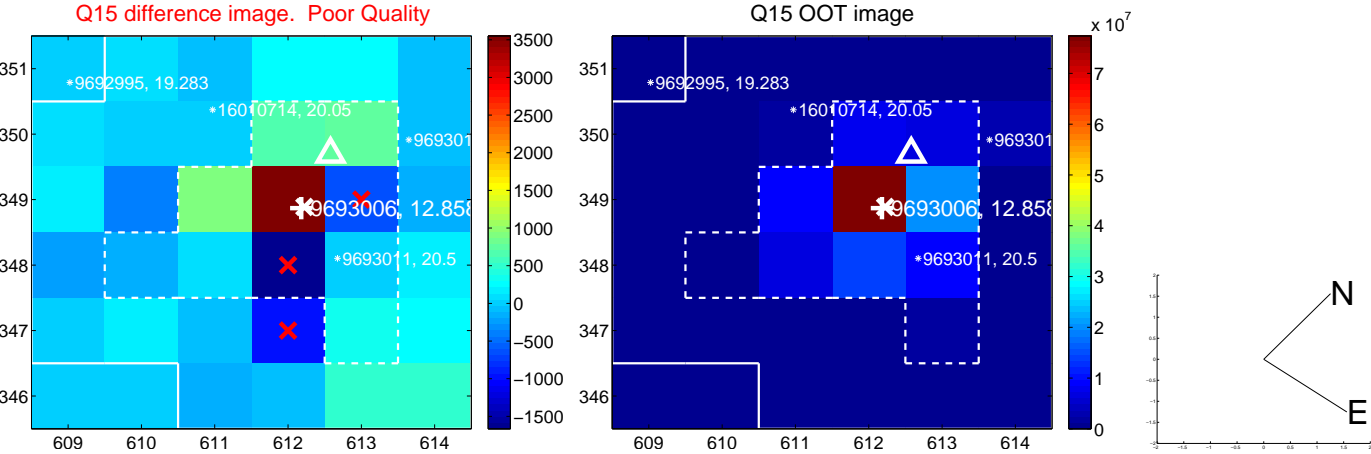
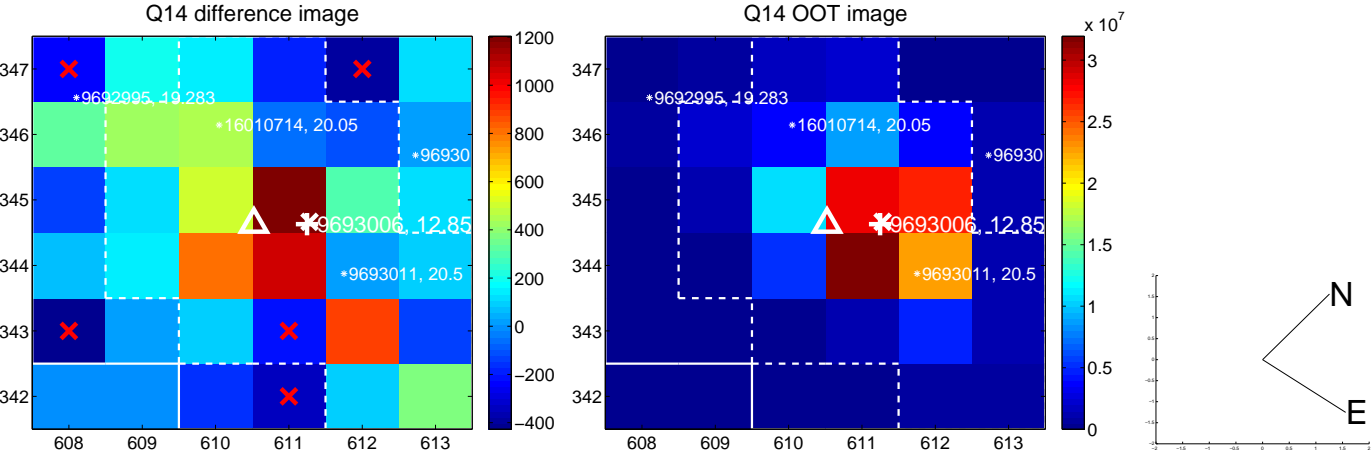
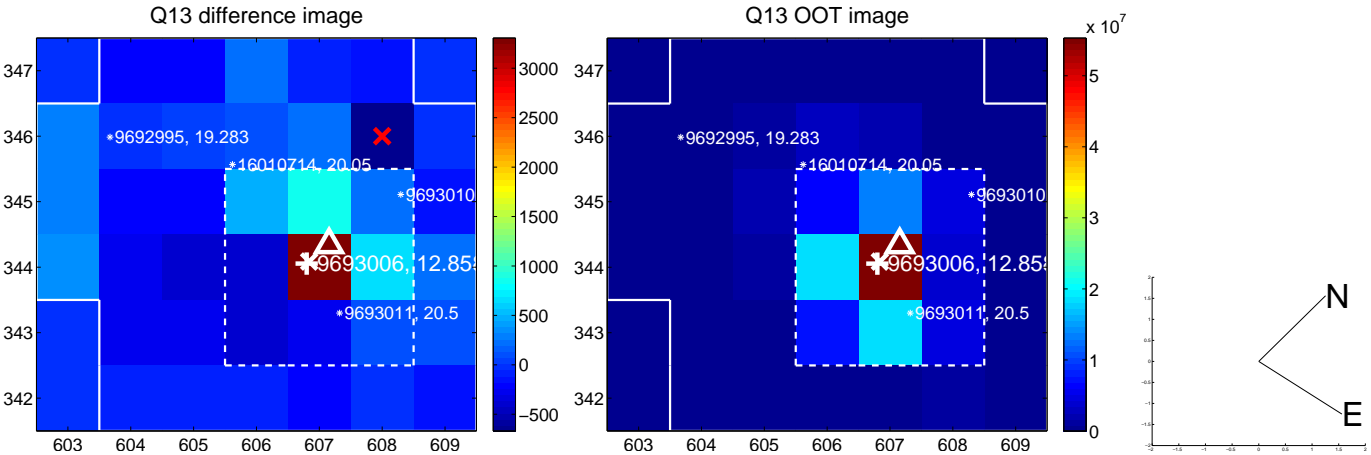
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



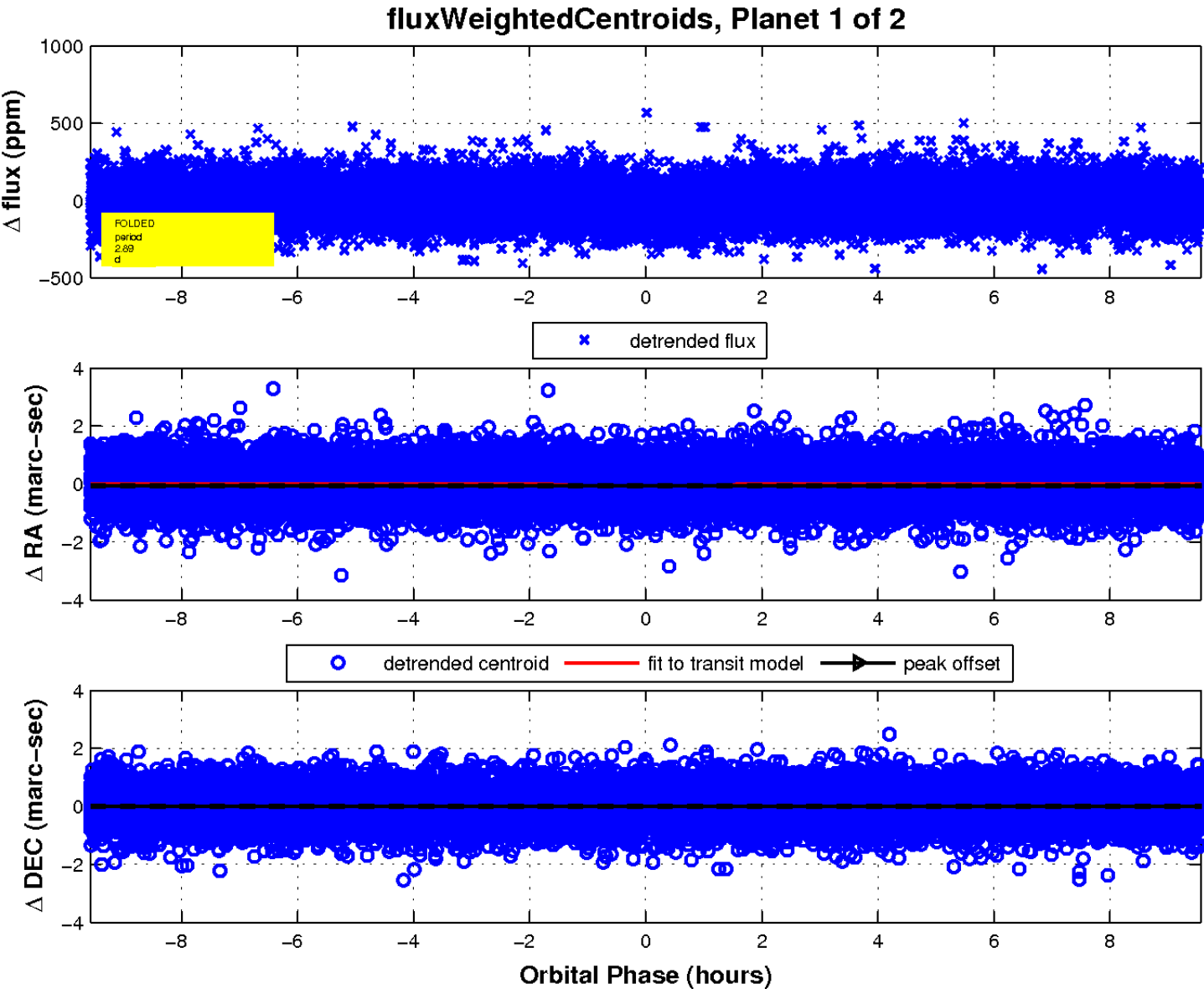
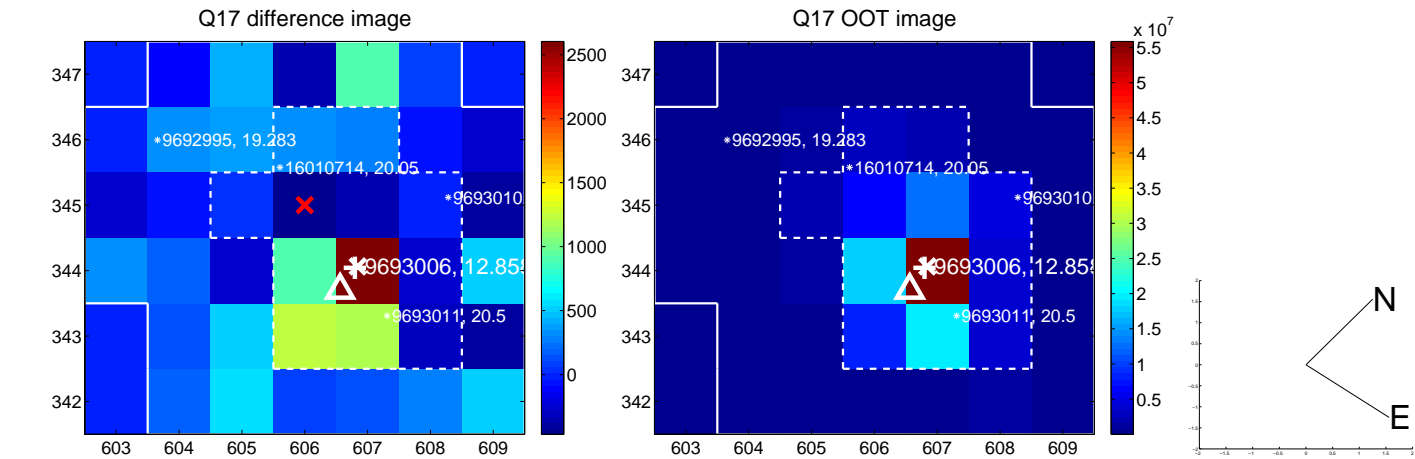
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



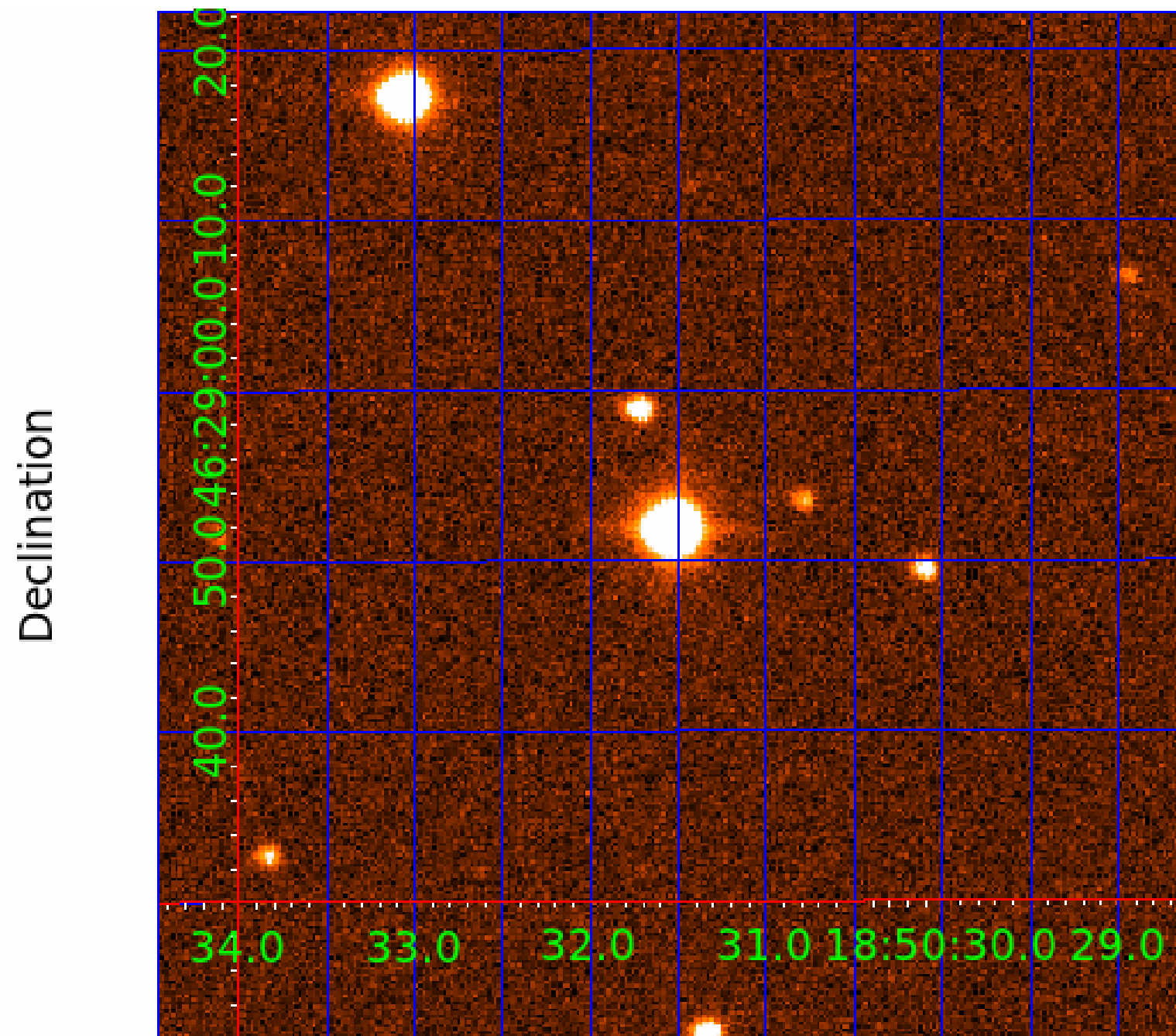
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 009693006

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 009693006-01 | OBS | 2913.01 | 2.888760 | 132.342876 | 39.8 | 3.191 | 14.3 | 15.8 | 1.33 | 5696 | 0.91 | 970.53 |
| 009693006-02 | OBS | No | 381.883865 | 240.942932 | 127.8 | 15.332 | 7.5 | 7.0 | 1.33 | 5696 | 1.66 | 1.44 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 009693006-01 | OBS | PC | 1.00 | 0 | 0 | 0 | 0 | NO_COMMENT |
| 009693006-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—INCONSISTENT_TRANS—CENT_FEW_DIFFS |

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

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

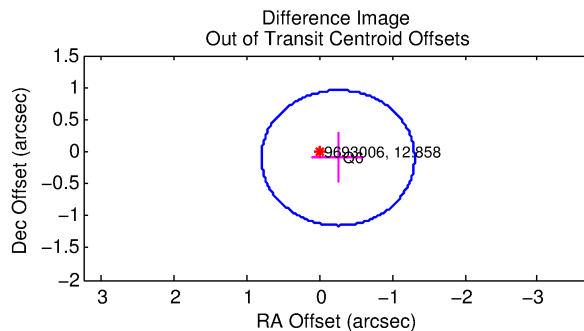
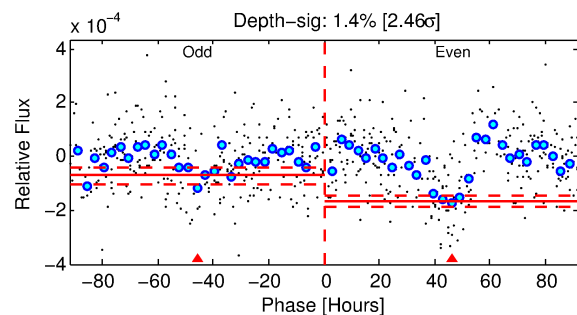
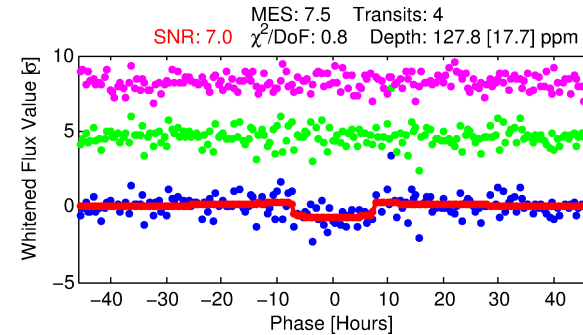
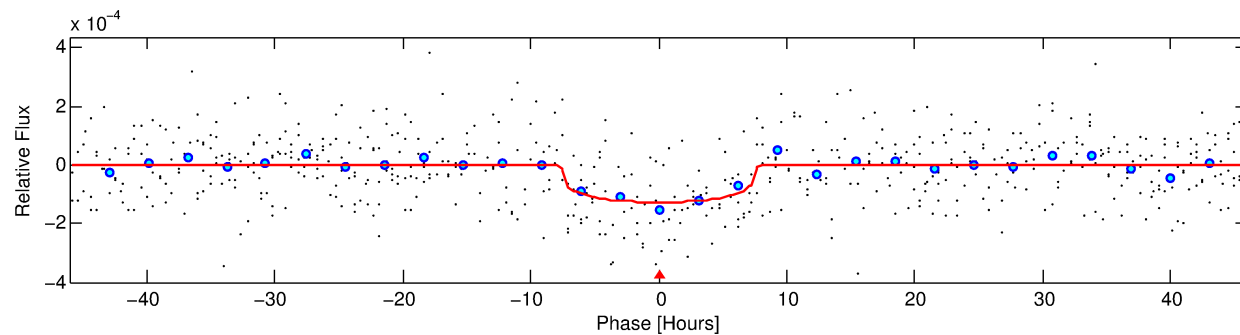
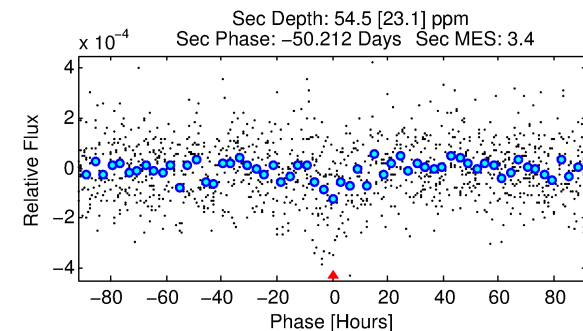
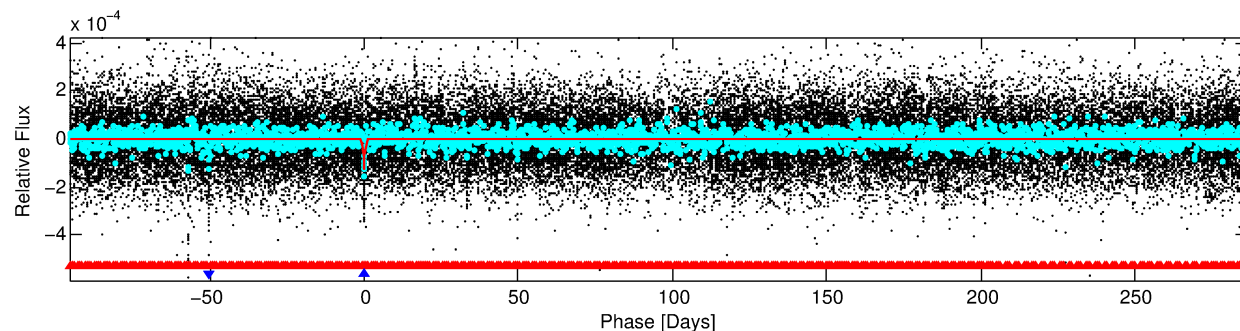
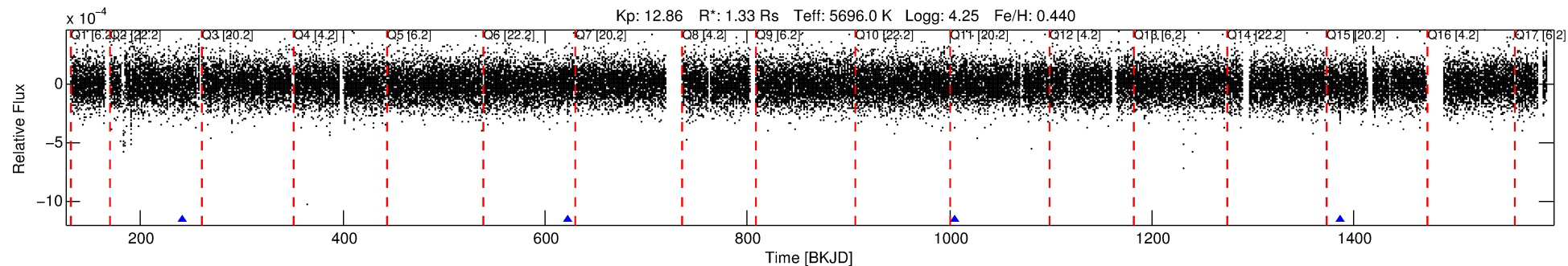
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009693006-02

No Significant Match Found

DV One-Page Summary

KIC: 9693006 Candidate: 2 of 2 Period: 381.884 d
KOI: K02913 Corr: No Ephemeris Match



DV Fit Results:

Period = 381.88387 [0.01302] d
Epoch = 240.9429 [0.0234] BKJD
Rp/R* = 0.0114 [0.0039]
a/R* = 122.15 [166.30]
b = 0.78 [0.69]
Seff = 1.44 [0.36]
Teq = 279 [17] K
Rp = 1.66 [0.64] Re
a = 1.0767 [0.1699] AU
Ag = 12640.90 [10526.87] [1.20σ]
Teff = 4580 [920] K [4.68σ]

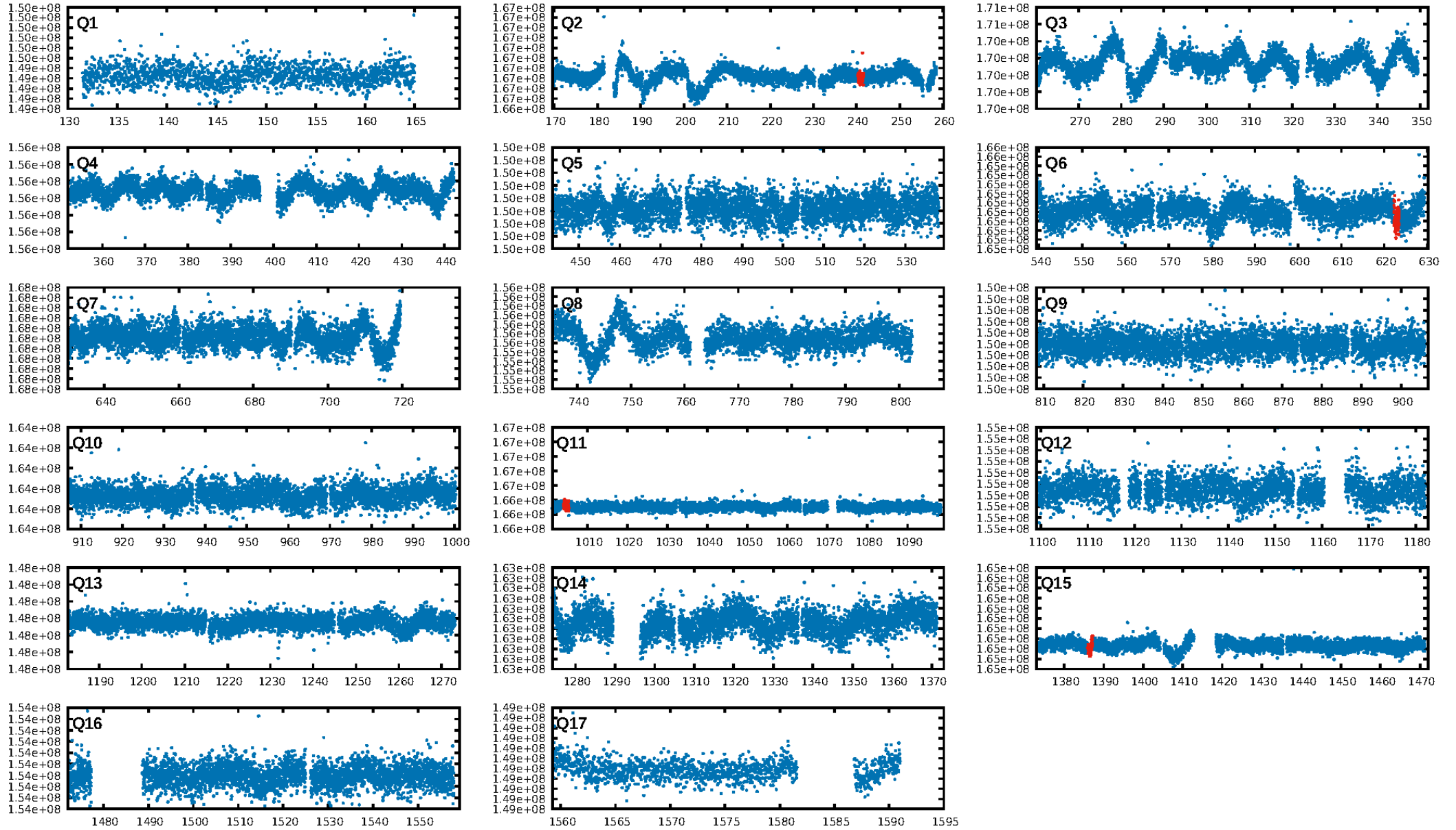
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [580.81σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 5.4%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.05e-10
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: 60.43
Centroid-sig: 1.2%
Centroid-so: 3.951 arcsec [1.93σ]
OotOffset-rm: 0.274 arcsec [0.78σ]
OotOffset-st: 1/0/0/0 [1]
KicOffset-rm: 0.406 arcsec [1.10σ]
KicOffset-st: 1/0/0/0 [1]
DiffImageQuality-fgm: 1.00 [1/1]
DiffImageOverlap-fno: 0.50 [1/2]

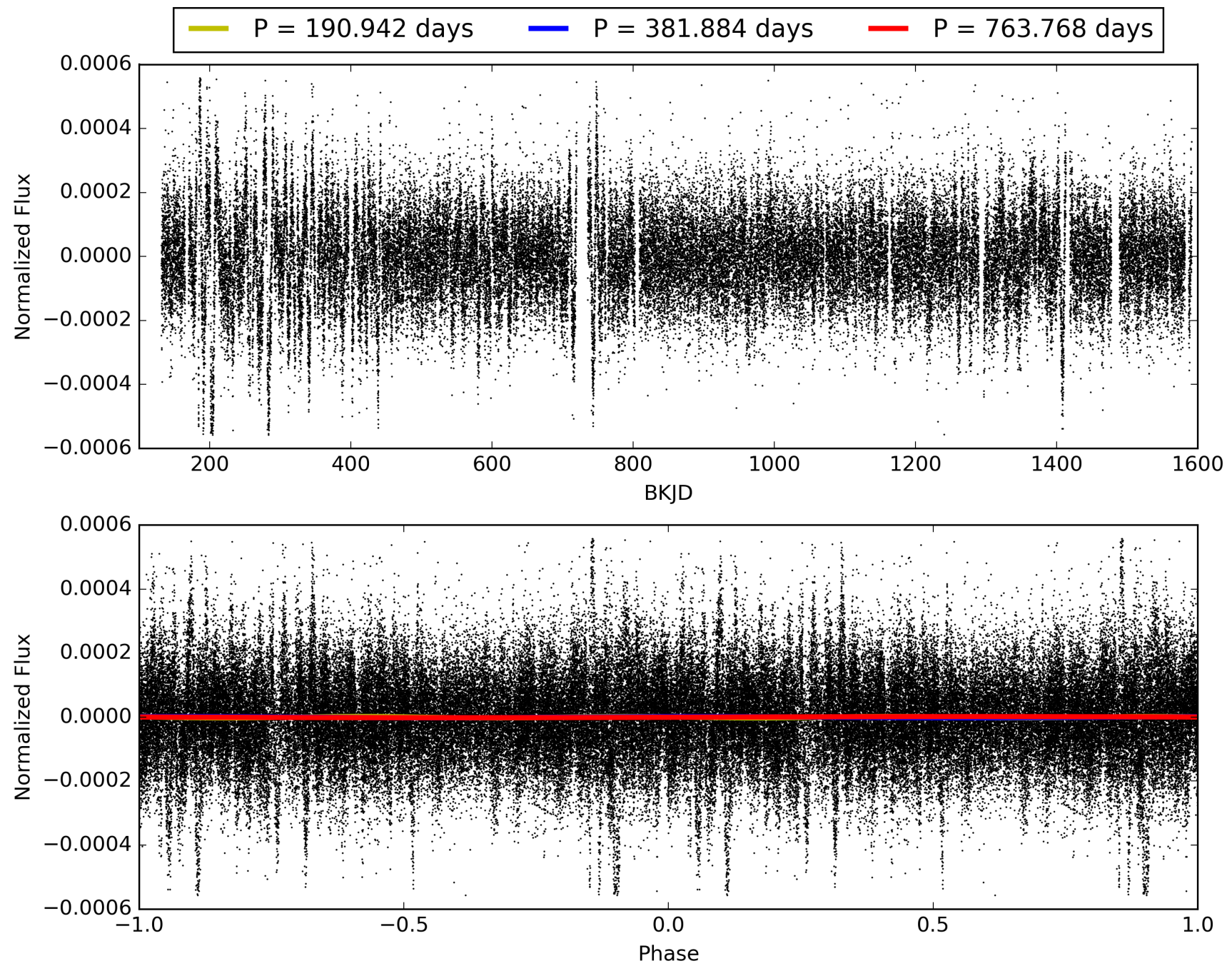
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 02:35:51 Z

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

TCE 009693006-02, PDC Light Curves

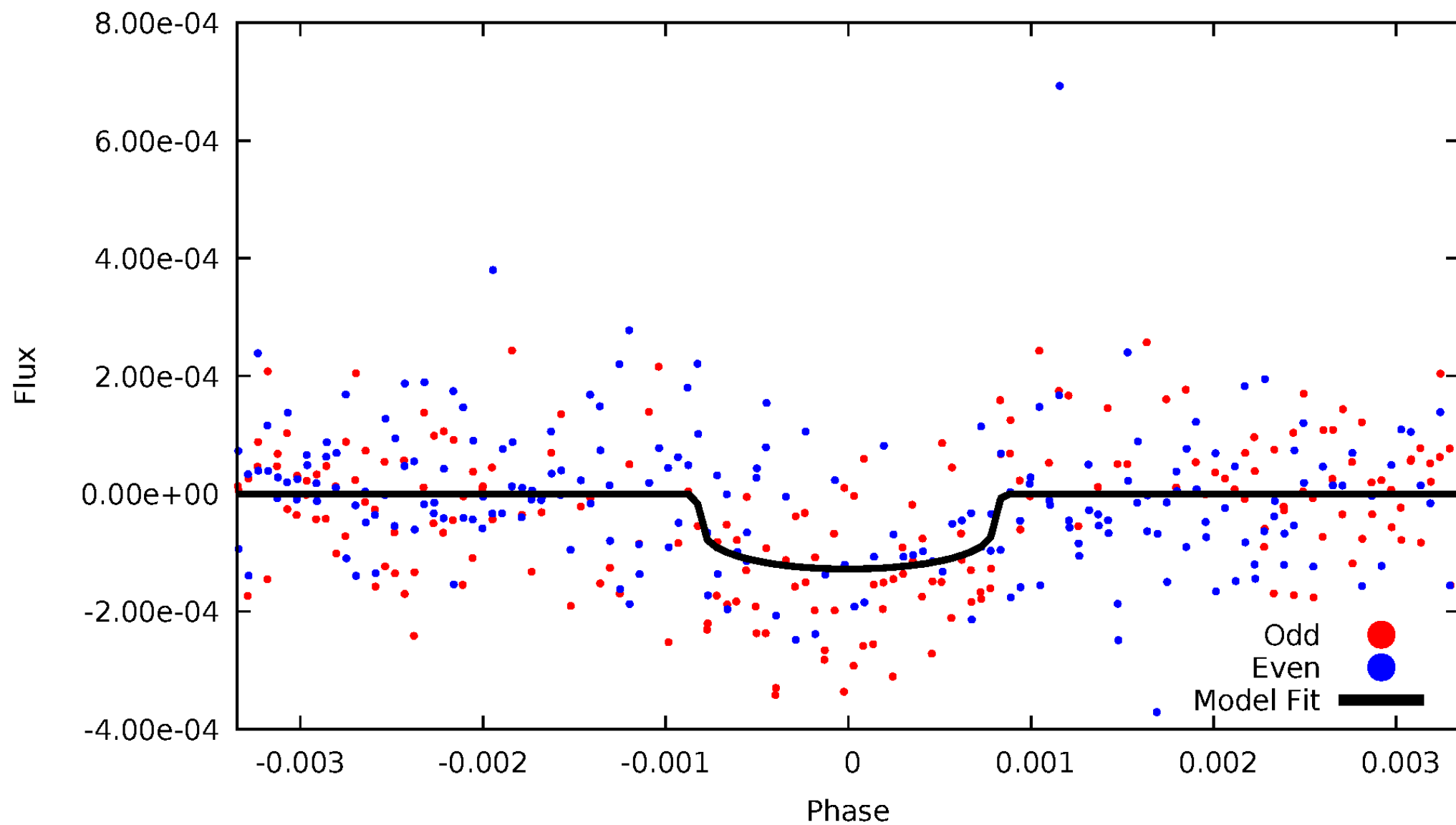


TCE 009693006-02



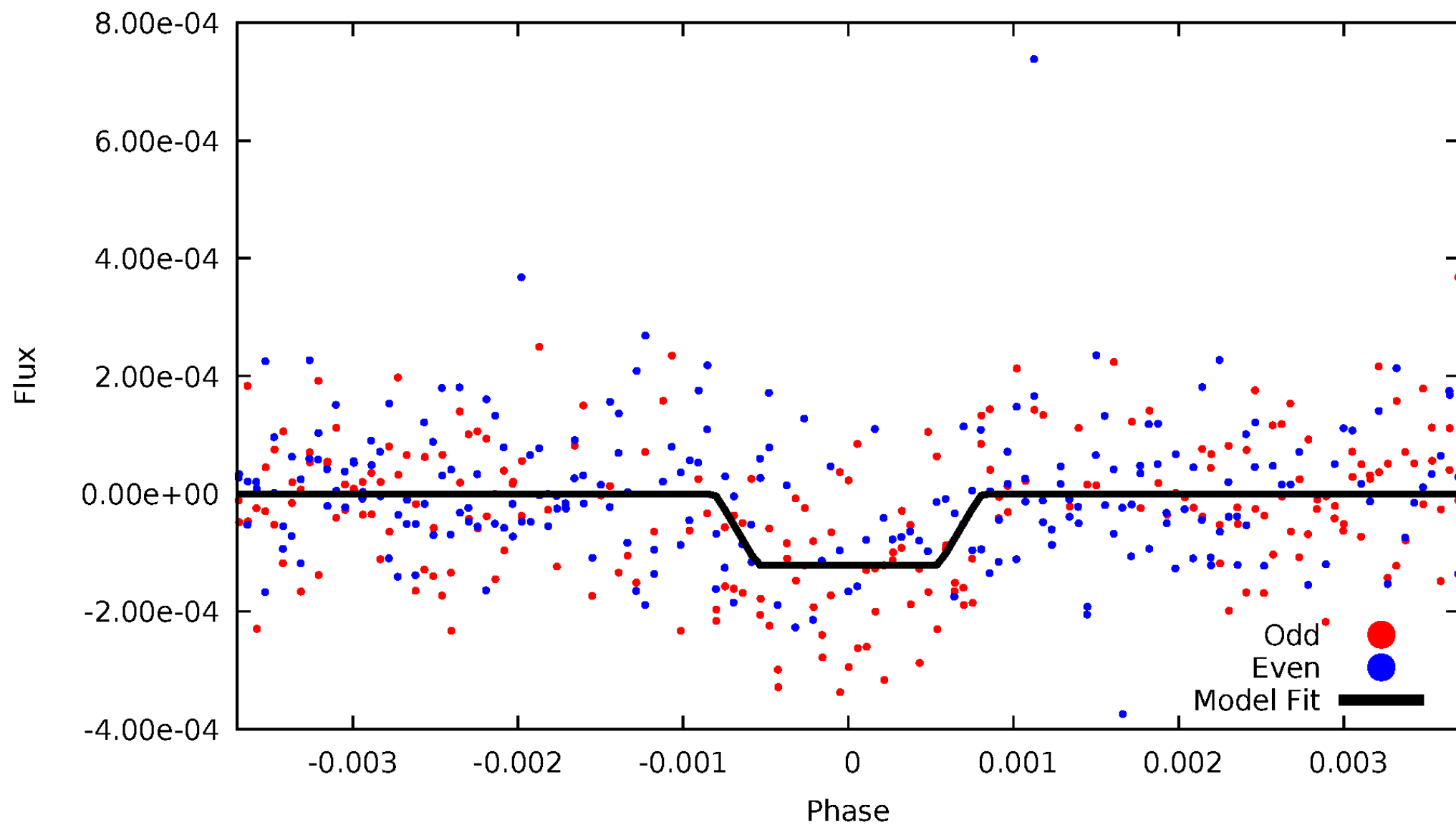
DV Odd/Even

TCE 009693006-02



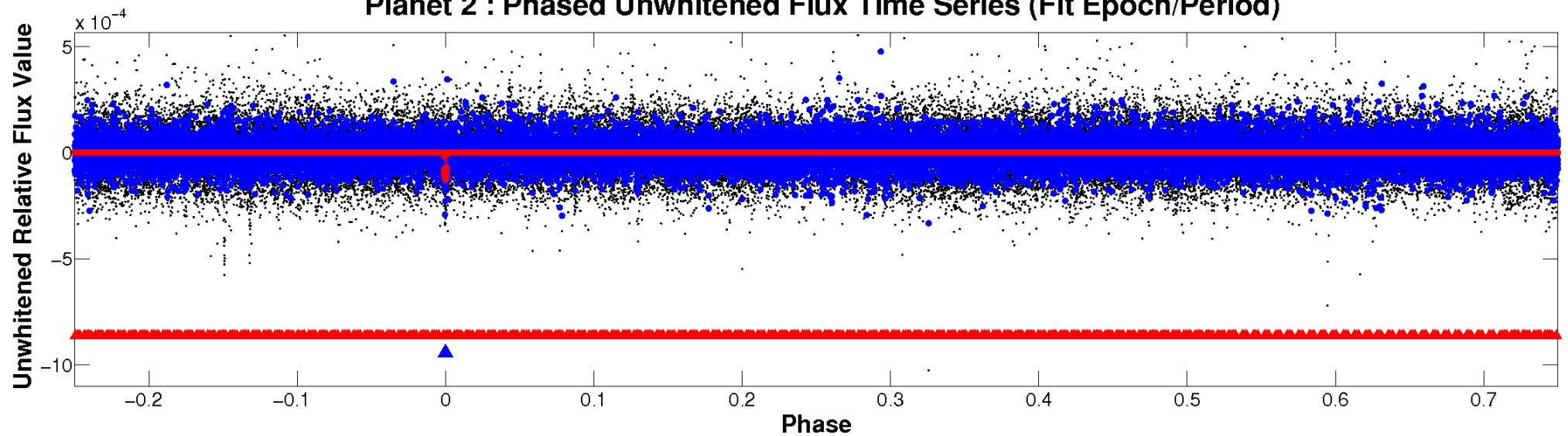
ALT Odd/Even

TCE 009693006-02

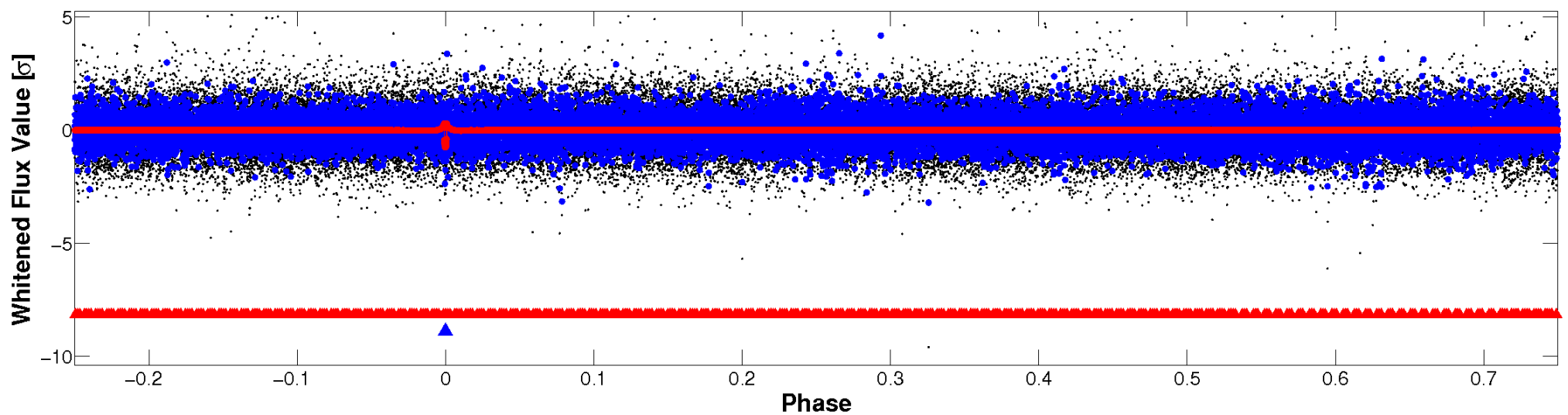


Non-Whitened Vs. Whitened Light Curve

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



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



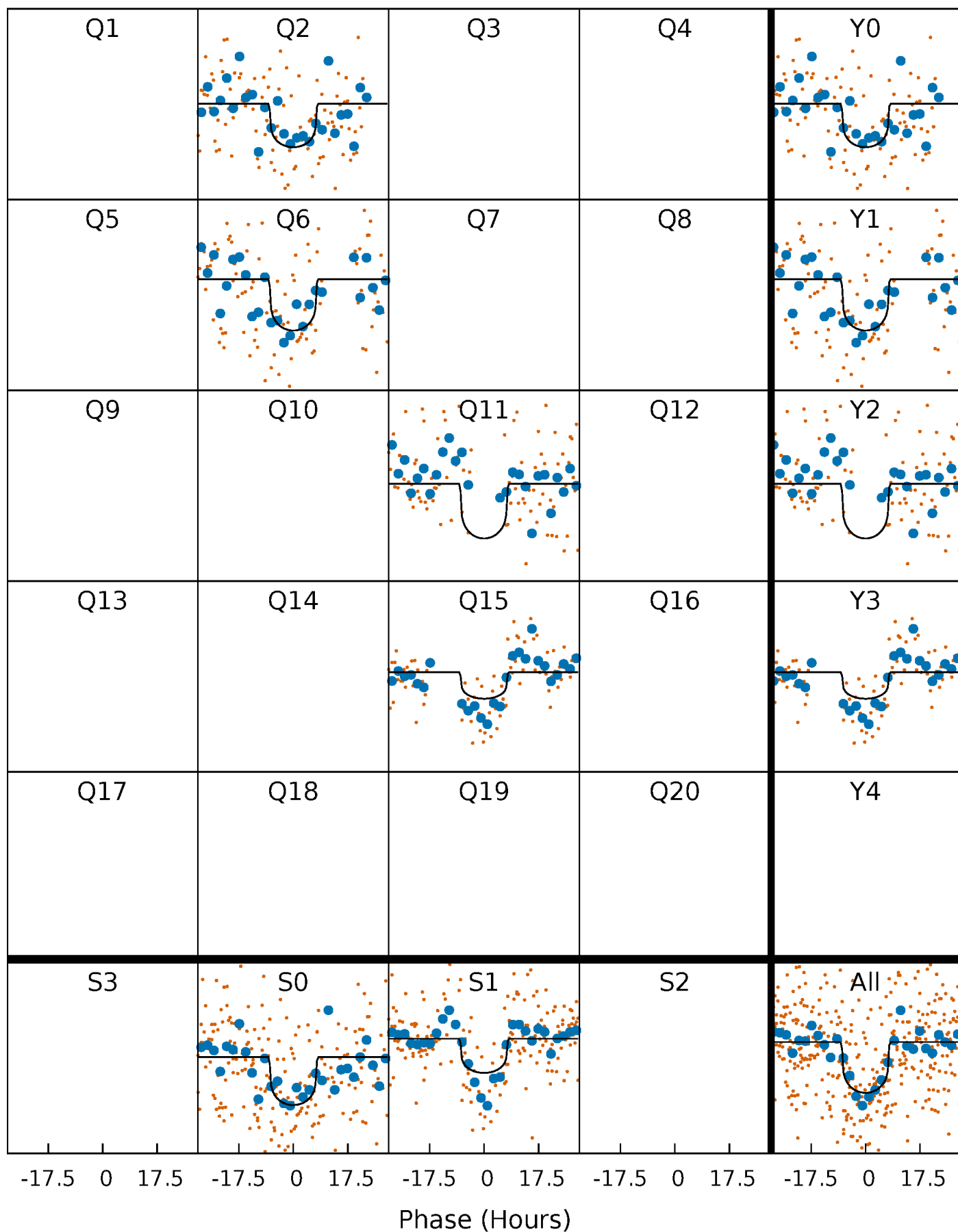
PDC Quarter-Phased Transit Curves

TCE 009693006-02 P=381.883865 Days $T_0=240.942932$ (BKJD)



DV Quarter-Phased Transit Curves

TCE 009693006-02 P=381.883865 Days $T_0=240.942932$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

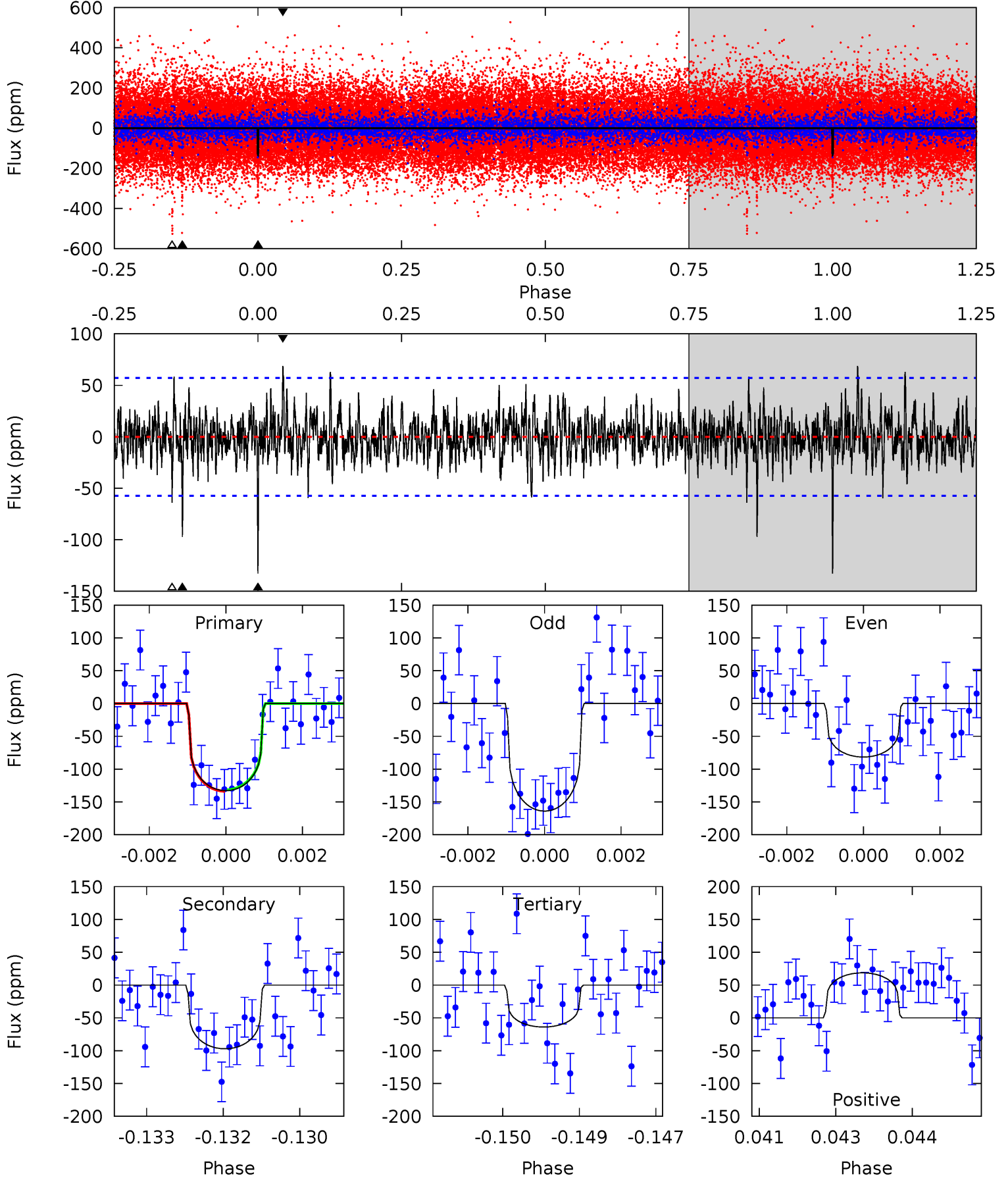
TCE 009693006-02 $P=381.882803$ Days $T_0=240.955761$ (BKJD)



DV Model-Shift Uniqueness Test

009693006-02, P = 381.883865 Days, E = 240.942932 Days

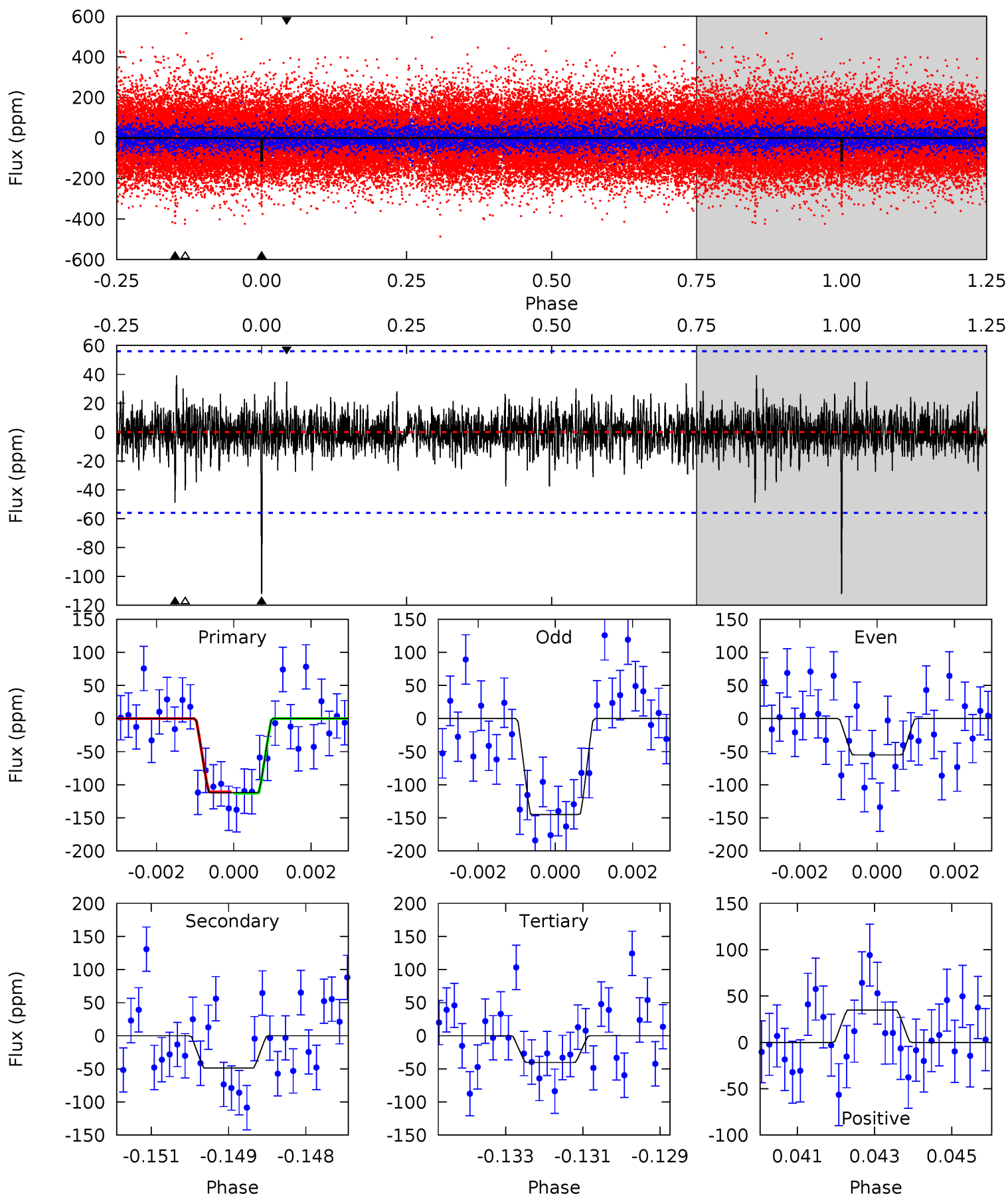
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 12.4 | 9.10 | 5.99 | 6.42 | 5.36 | 3.14 | 1.55 | 6.45 | 6.02 | 3.11 | 2.67 | 3.77 | 0.95 | 0.34 | 0.10 |



Alt Model-Shift Uniqueness Test

009693006-02, P = 381.882803 Days, E = 240.955761 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 10.7 | 4.67 | 3.86 | 3.34 | 5.36 | 3.15 | 0.90 | 6.87 | 7.39 | 0.81 | 1.33 | 4.24 | 1.15 | 0.26 | 0.10 |



Stellar Parameters For KIC 009693006

| | $T_{\text{eff}} (K)$ | $\log(g)$ | $[\text{Fe}/\text{H}]$ | $R (R_{\odot})$ | $M (M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 5696^{+113}_{-101} | $4.247^{+0.130}_{-0.117}$ | $0.440^{+0.050}_{-0.150}$ | $1.331^{+0.244}_{-0.220}$ | $1.139^{+0.083}_{-0.101}$ | $0.681^{+0.465}_{-0.236}$ |
| | +2%/-2% | +3%/-3% | +11%/-34% | +18%/-17% | +7%/-9% | +68%/-35% |
| Source | SPE59 | SPE59 | SPE59 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 009693006-02 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|--------------|------------------------|----------------------|-----------------------|--------------------------|
| DV | -97 ± 11 | $1.66^{+0.61}_{-0.59}$ | 391^{+19}_{-19} | 5271^{+1235}_{-611} | 21435^{+32794}_{-9710} |
| Alt. | -49 ± 10 | $1.62^{+0.59}_{-0.54}$ | 391^{+19}_{-19} | 4648^{+903}_{-555} | 11594^{+16667}_{-5526} |

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

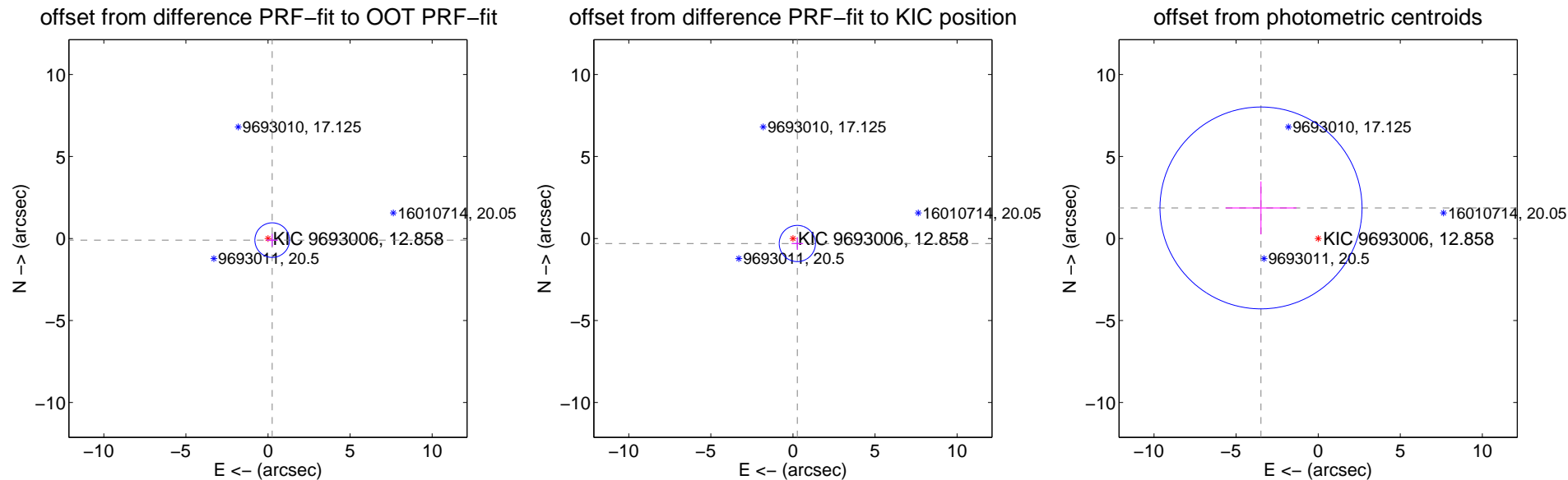
DV Centroid Data

Supplemental centroid analysis for 009693006-02. Kepler magnitude: 12.86. Transit SNR 6.99

There are 1 quarters with good PRF difference image offsets

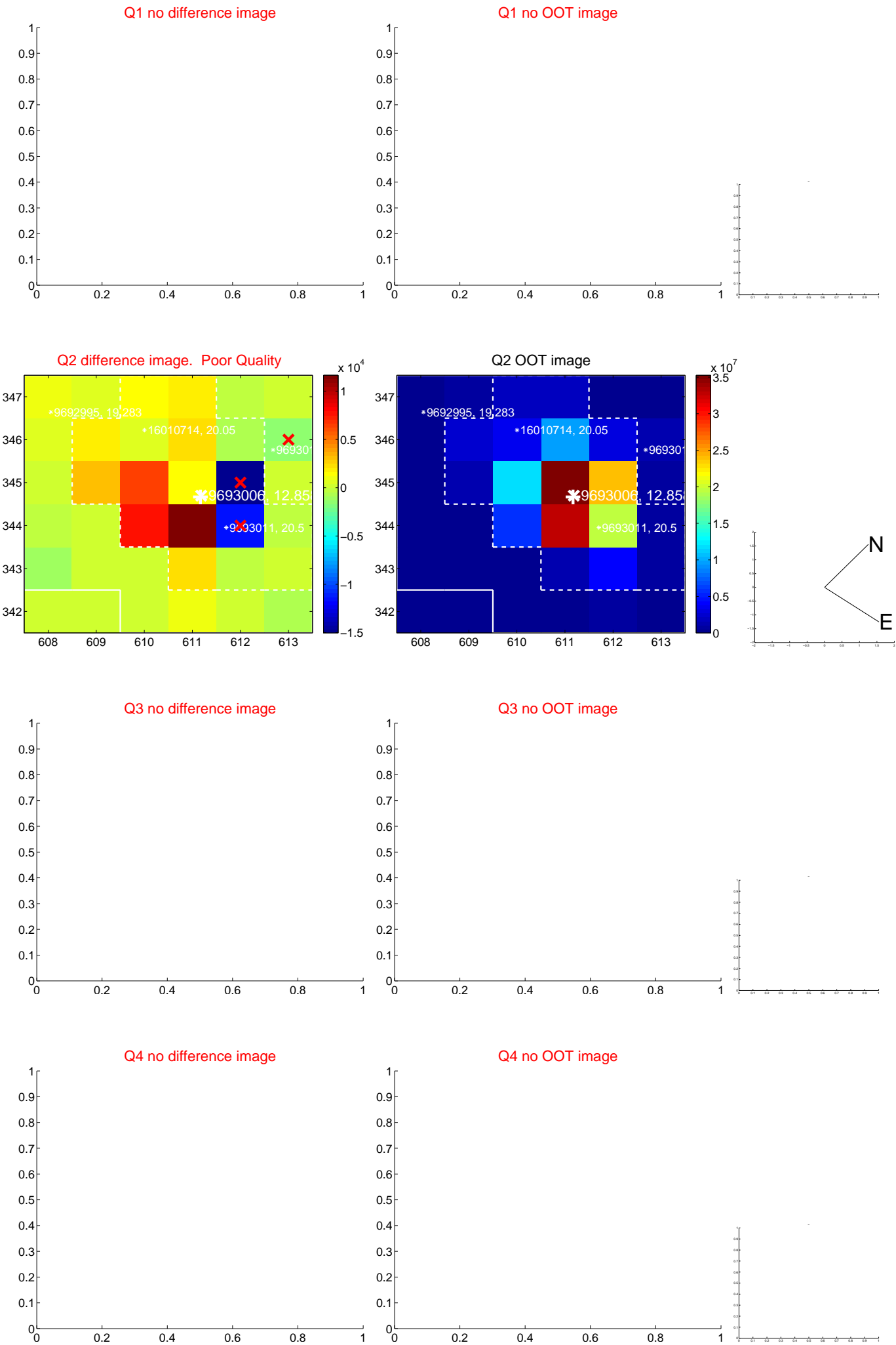
The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 0.274 ± 0.352 | 0.78 | -0.256 ± 0.347 | -0.099 ± 0.384 |
| PRF-fit source offset from KIC position | 0.406 ± 0.368 | 1.10 | -0.268 ± 0.347 | -0.305 ± 0.384 |
| photometric centroid source offset | 3.95 ± 2.05 | 1.93 | 3.48 ± 2.16 | 1.86 ± 1.62 |

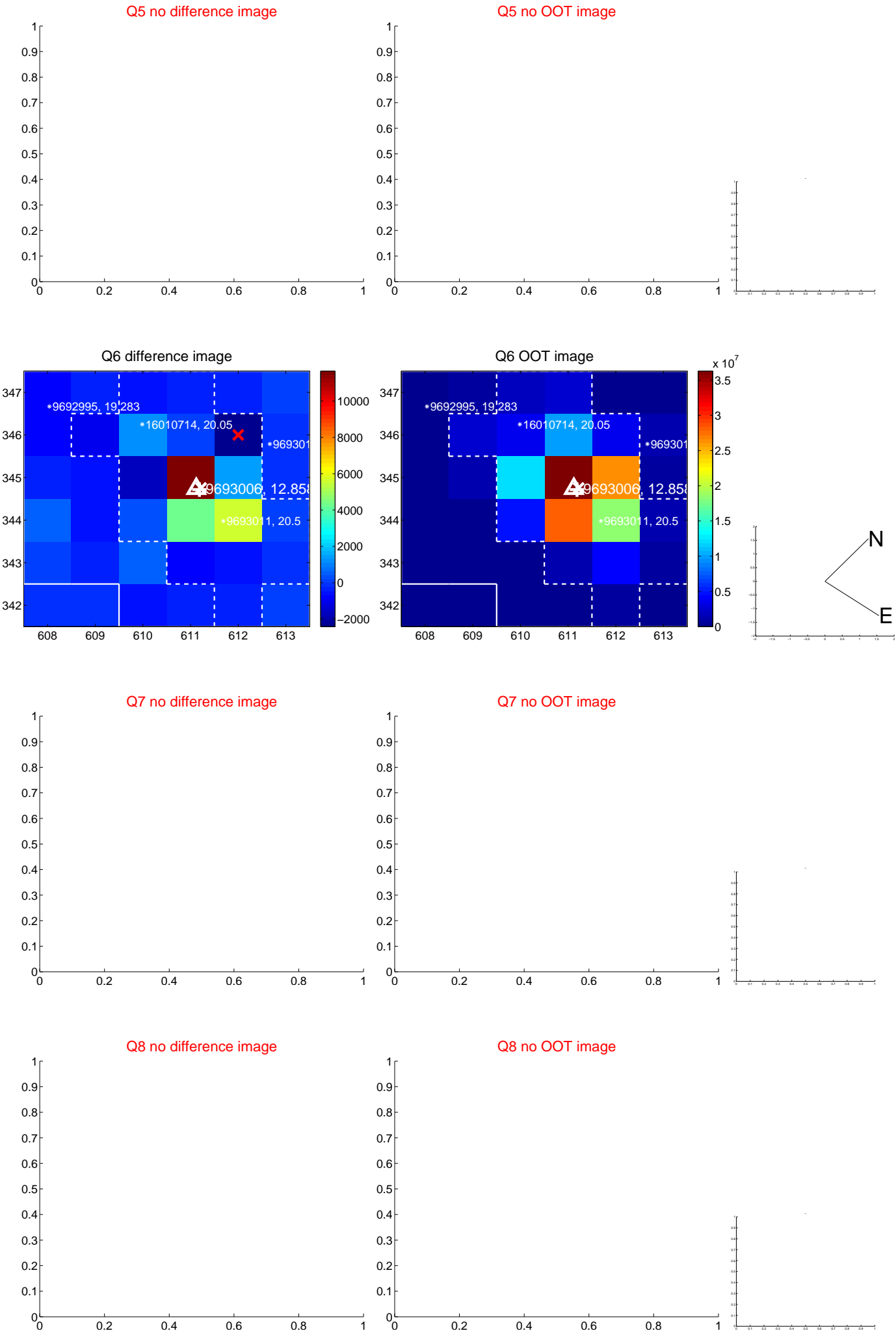


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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



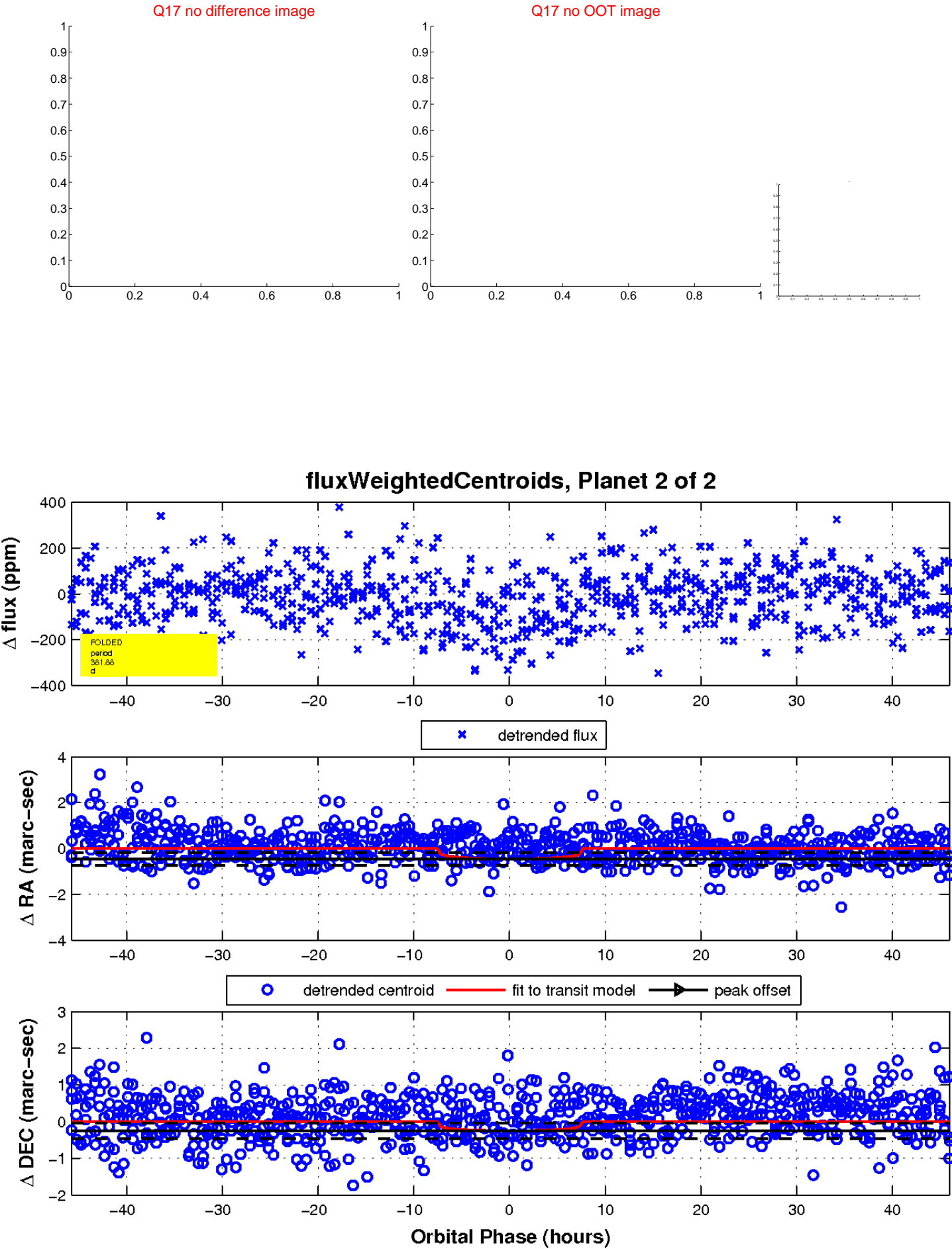
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

