

KIC 002692377

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 002692377-01 | OBS | 0299.01 | 1.541674 | 132.002024 | 210.8 | 1.915 | 46.4 | 63.0 | 1.09 | 5533 | 1.90 | 1520.89 |
| 002692377-02 | OBS | No | 1.541257 | 132.005447 | 23.3 | 5.475 | 8.0 | 7.9 | 1.09 | 5533 | 0.61 | 1521.44 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 002692377-01 | OBS | PC | 1.00 | 0 | 0 | 0 | 0 | NO_COMMENT |
| 002692377-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—RESIDUAL_TCE |

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

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

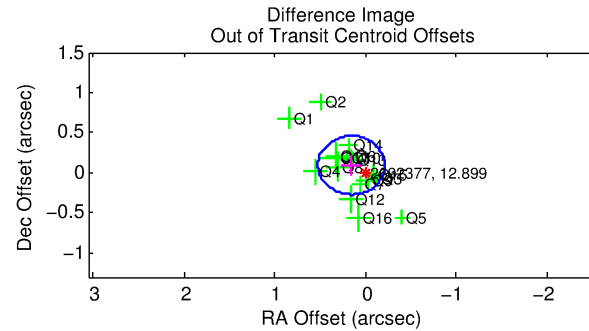
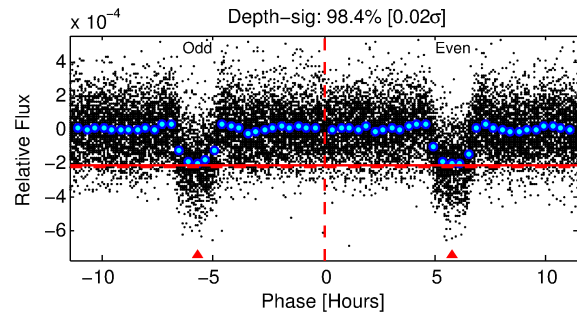
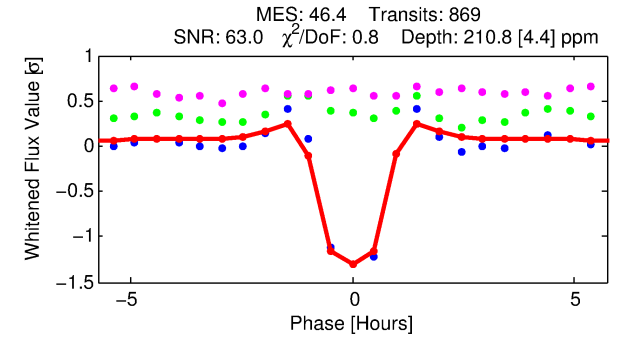
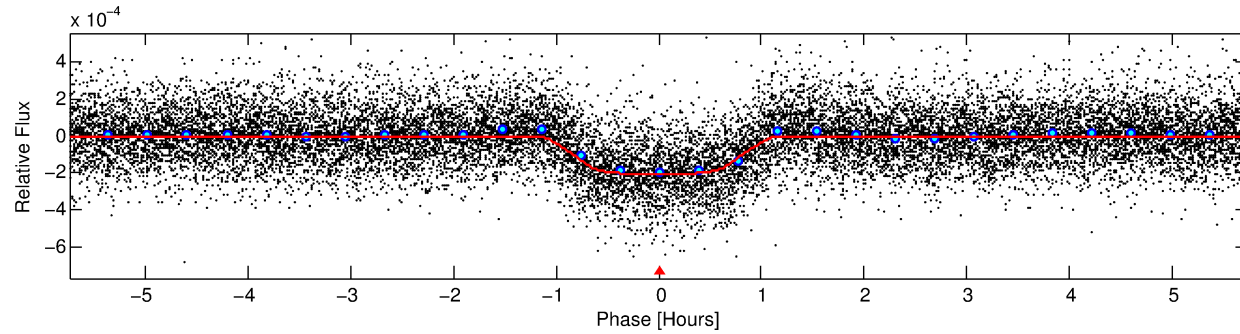
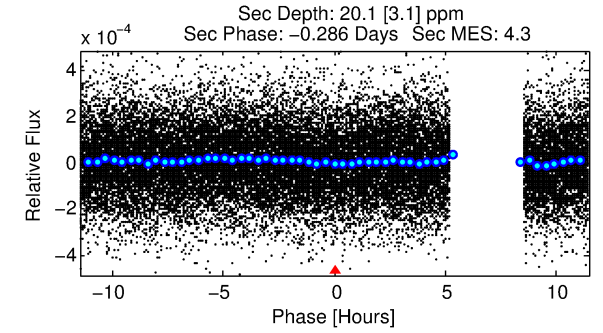
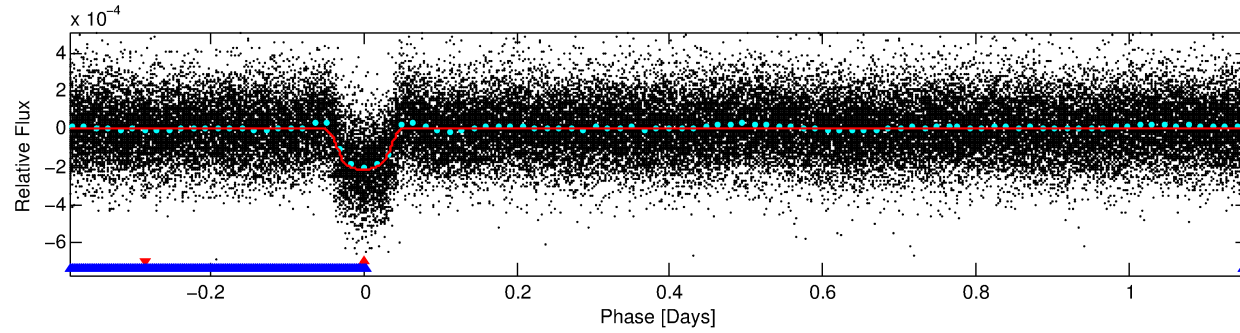
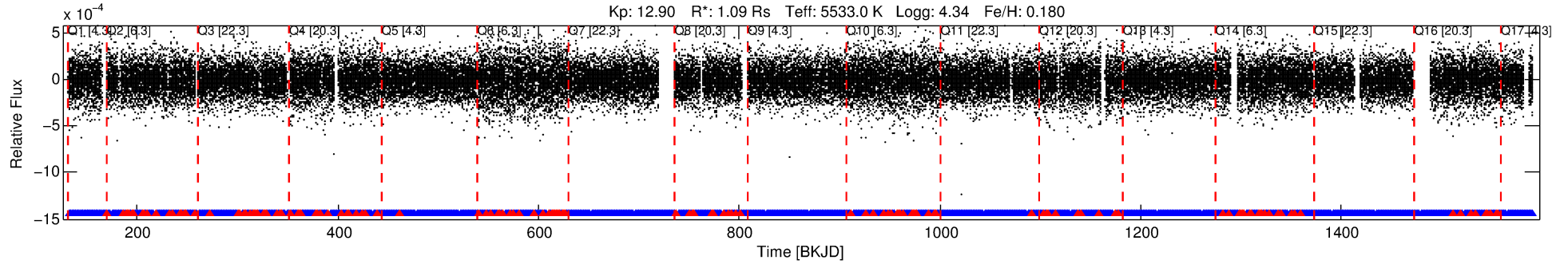
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002692377-01

No Significant Match Found

DV One-Page Summary

KIC: 2692377 Candidate: 1 of 2 Period: 1.542 d
KOI: K00299.01 Name: Kepler-98b Corr: 0.978



DV Fit Results:

Period = 1.54167 [0.00000] d
Epoch = 132.0020 [0.0004] BKJD
Rp/R* = 0.0160 [0.0019]
a/R* = 3.05 [1.40]
b = 0.90 [0.11]
Seff = 1520.89 [363.41]
Teq = 1592 [95] K
Rp = 1.90 [0.36] Re
a = 0.0256 [0.0036] AU
Ag = 2.00 [0.72] [1.39σ]
Teffp = 2928 [213] K [5.73σ]

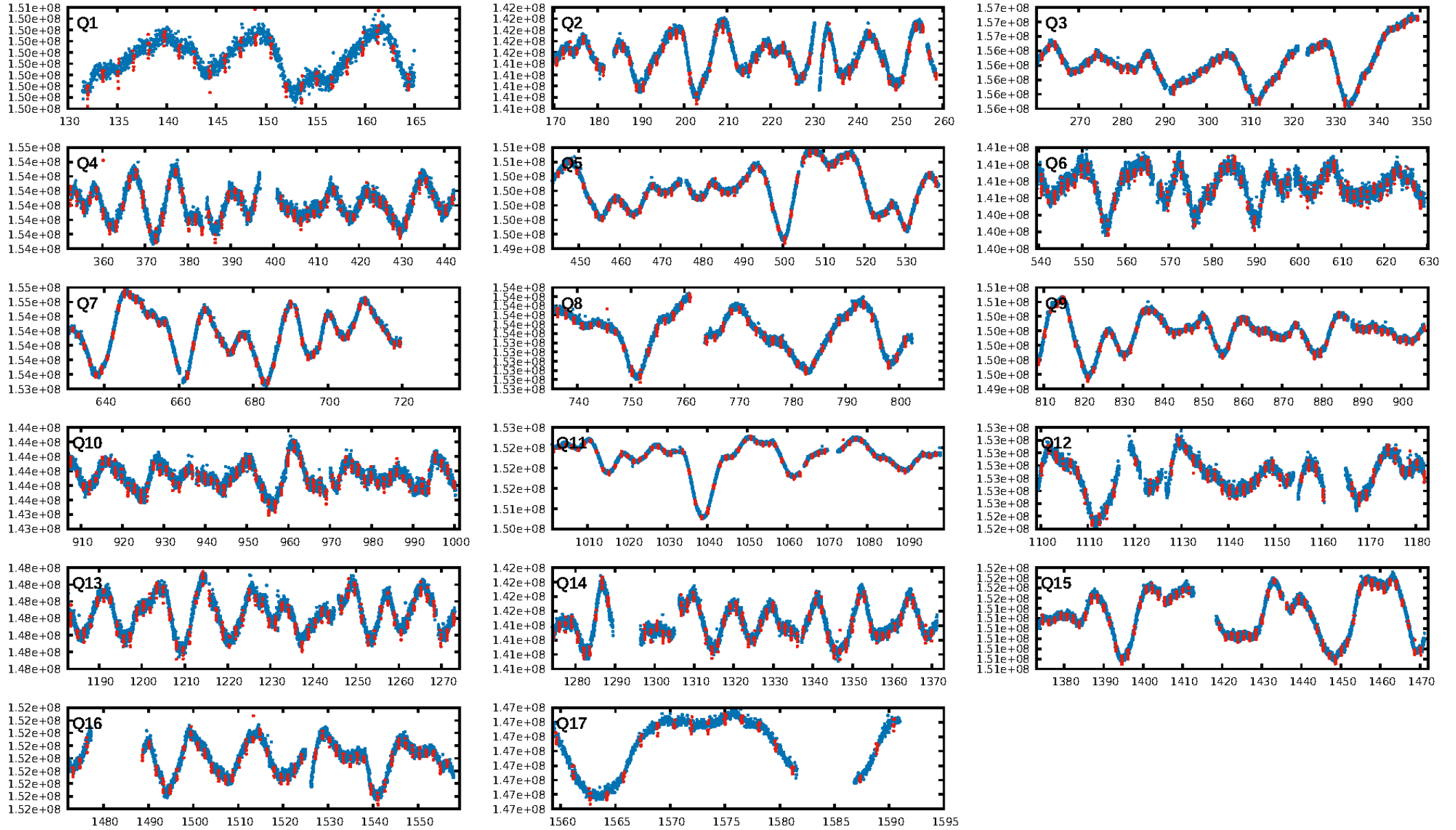
DV Diagnostic Results:

ShortPeriod-sig: 0.1% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 0.84 [693/829]
GhostDiagnostic-chr: 3.744
Centroid-sig: 6.2%
Centroid-so: 0.473 arcsec [2.65σ]
OotOffset-rm: 0.182 arcsec [1.49σ]
KicOffset-rm: 0.334 arcsec [2.87σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
DiffImageOverlap-fno: 0.12 [2/17]




Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 02:09:48 Z

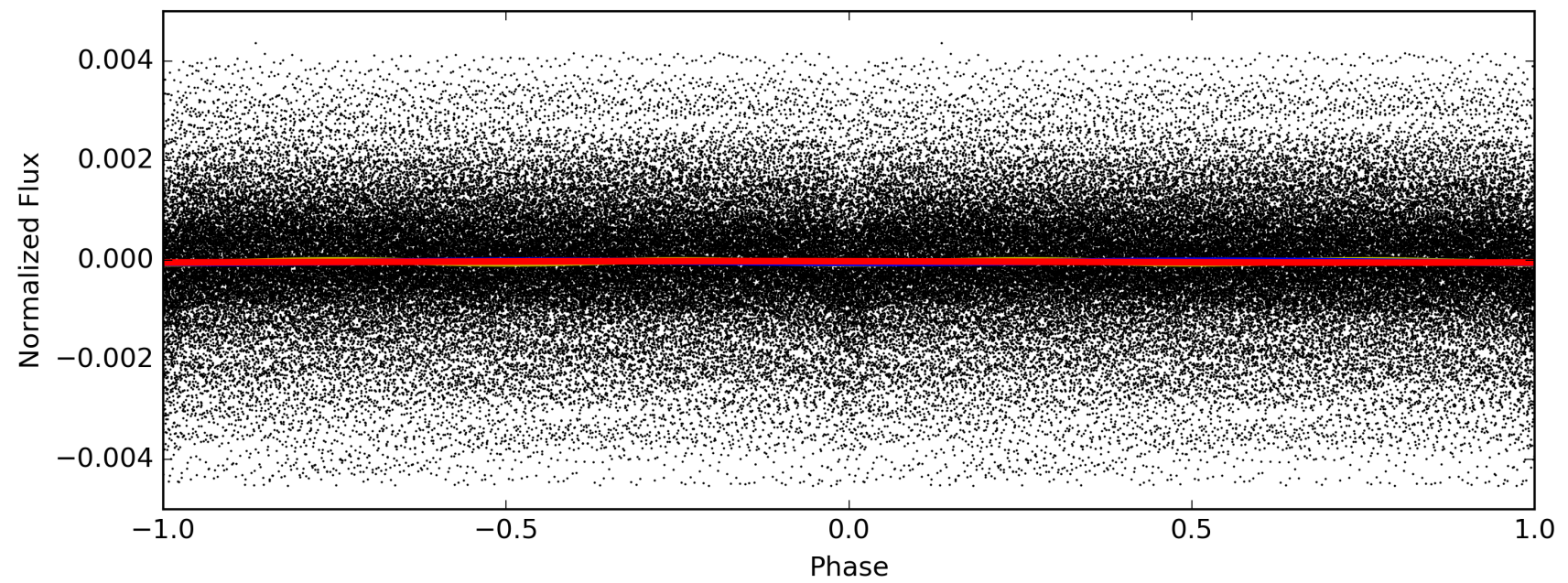
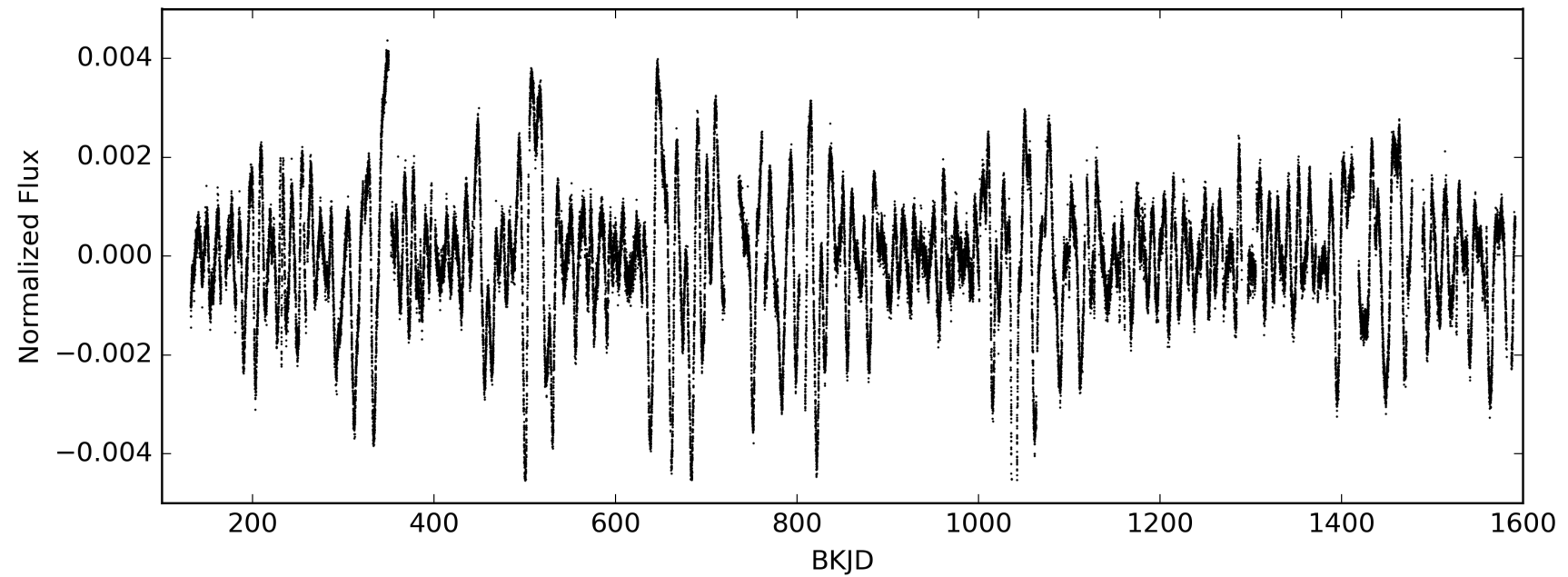
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 002692377-01, PDC Light Curves



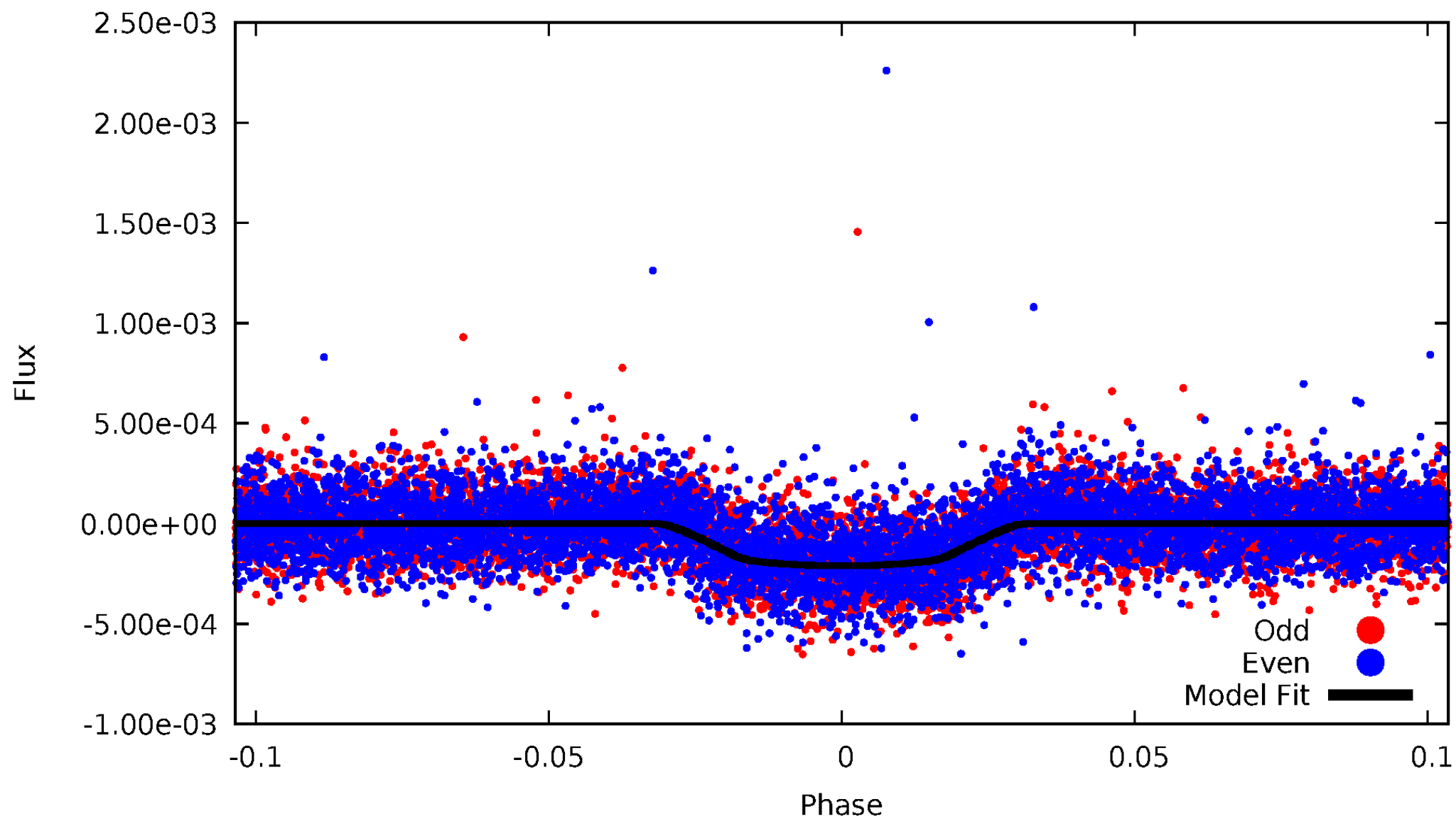
TCE 002692377-01

 P = 0.771 days  P = 1.542 days  P = 3.083 days



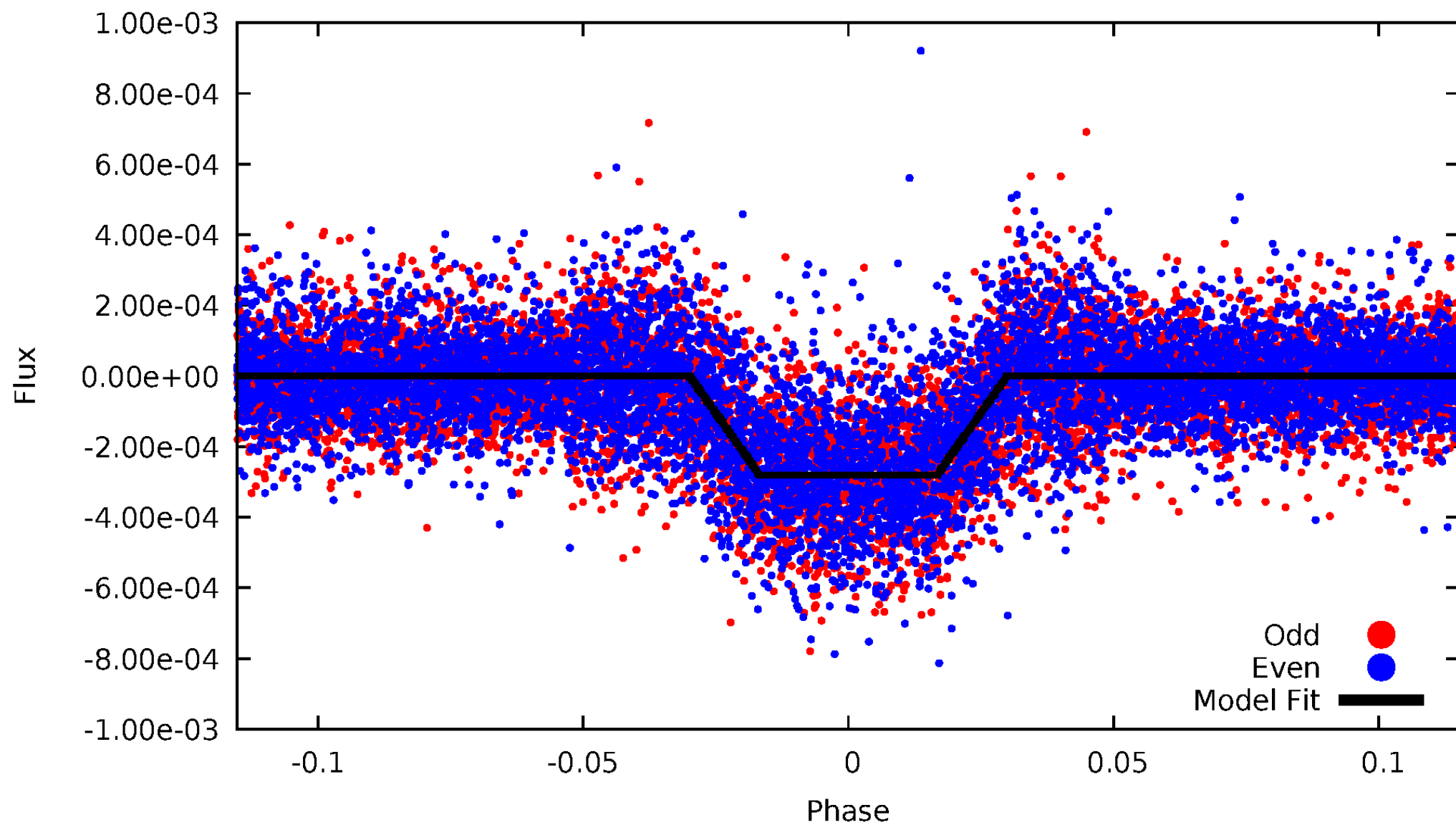
DV Odd/Even

TCE 002692377-01



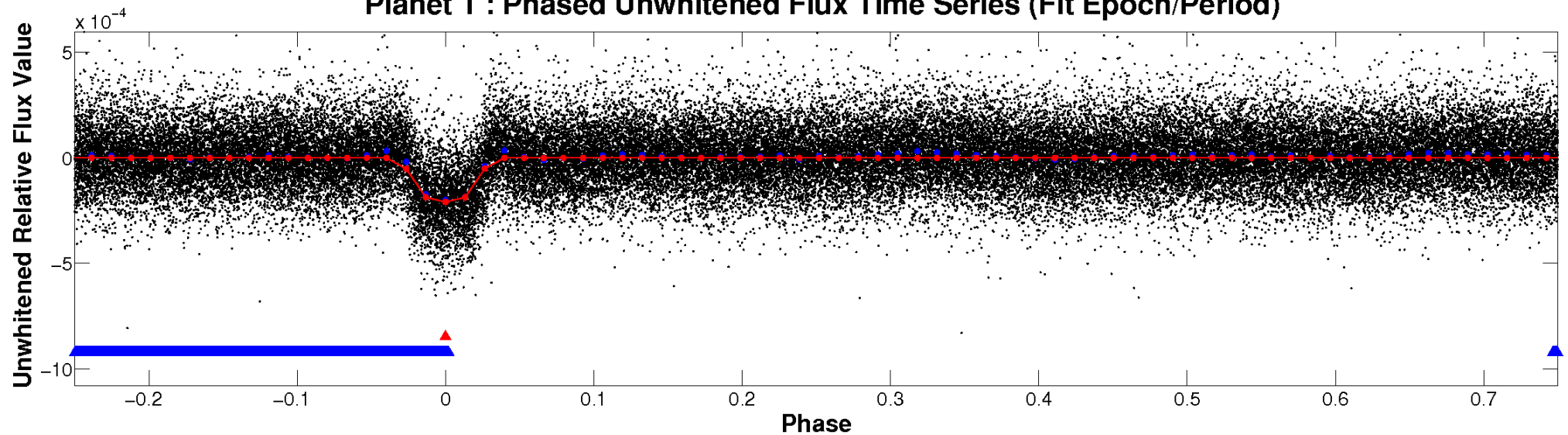
ALT Odd/Even

TCE 002692377-01

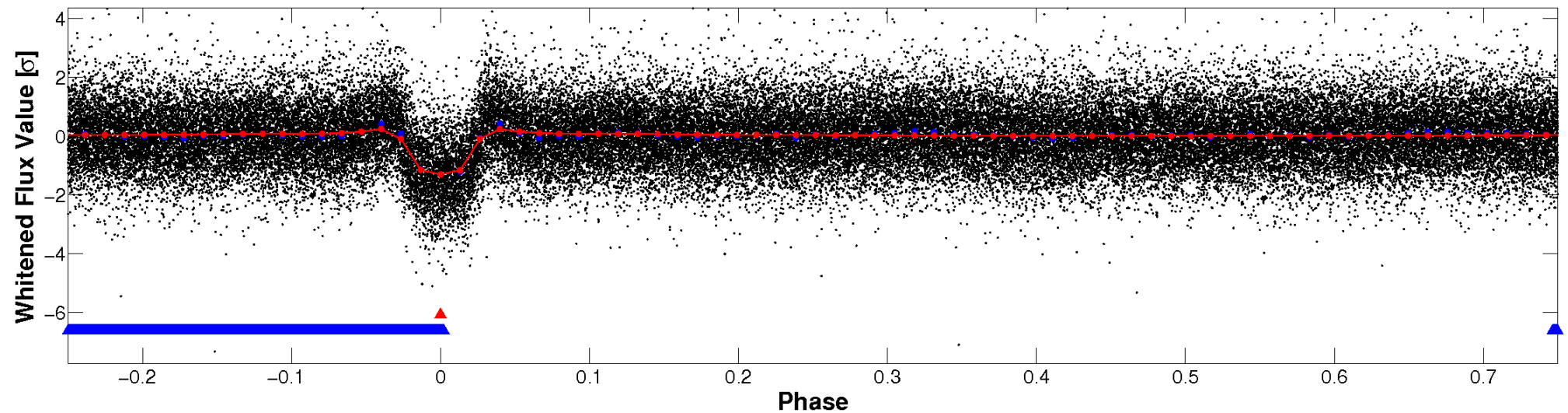


Non-Whitened Vs. Whitened Light Curve

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

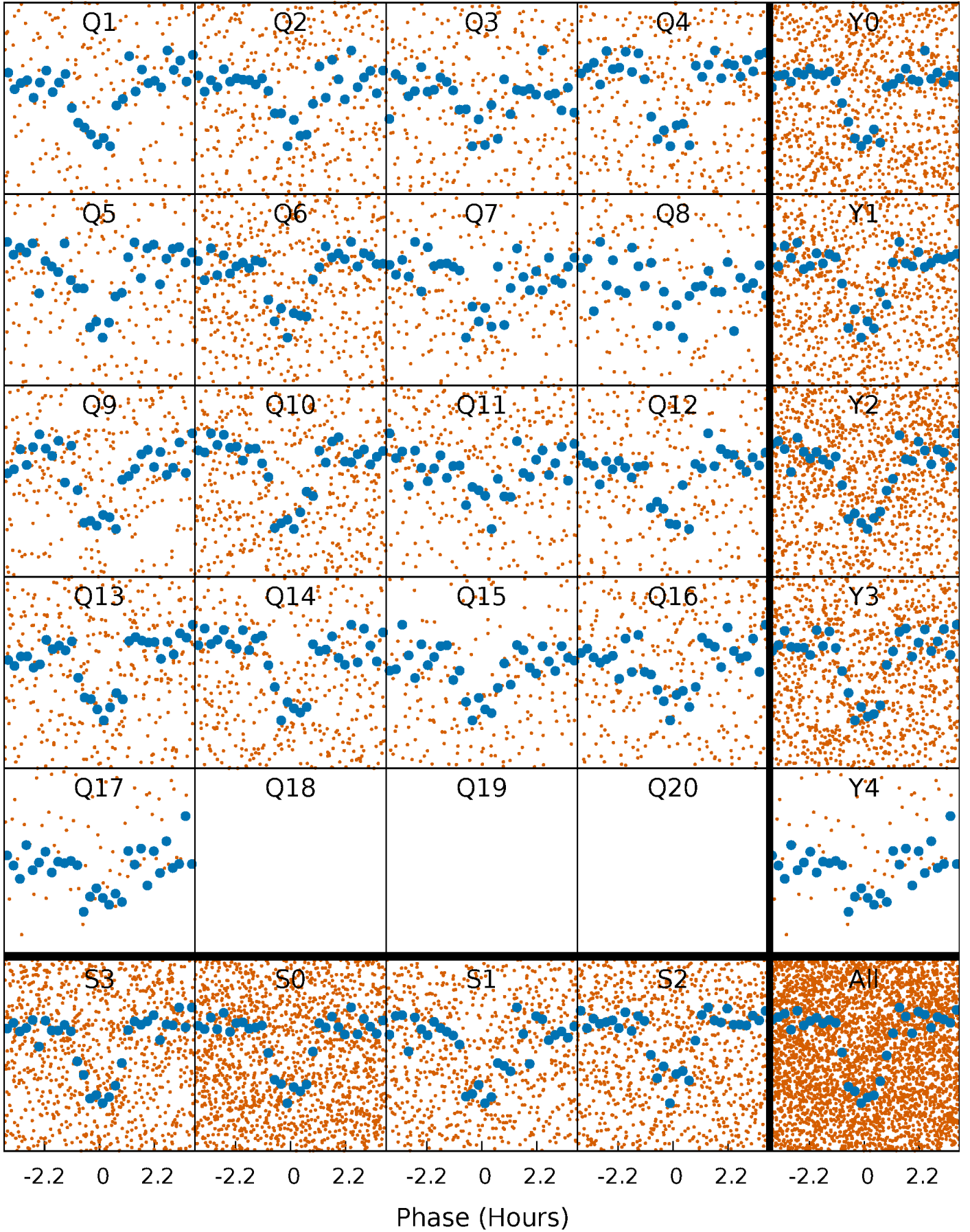


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



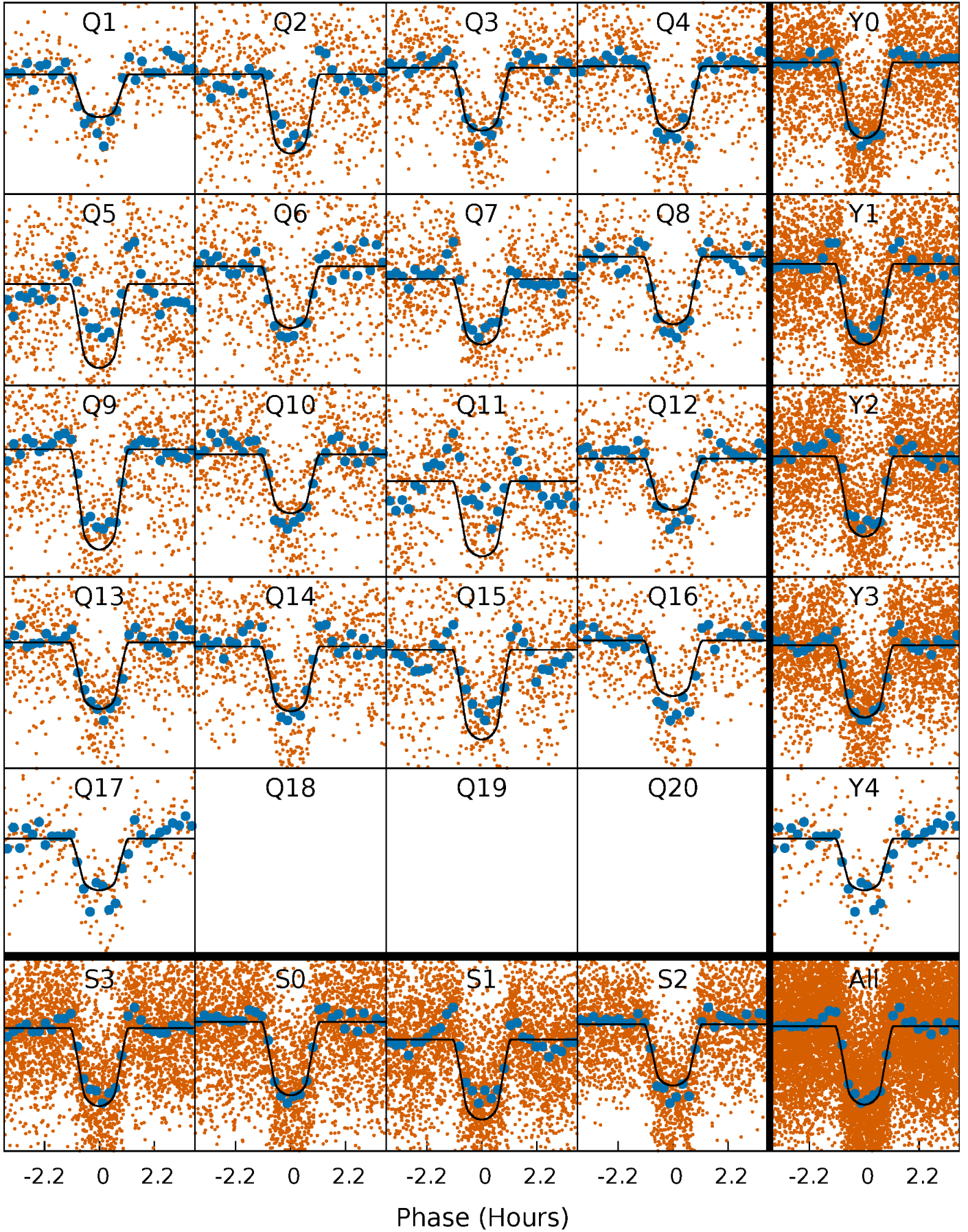
PDC Quarter-Phased Transit Curves

TCE 002692377-01 P= 1.541674 Days $T_0=132.002024$ (BKJD)



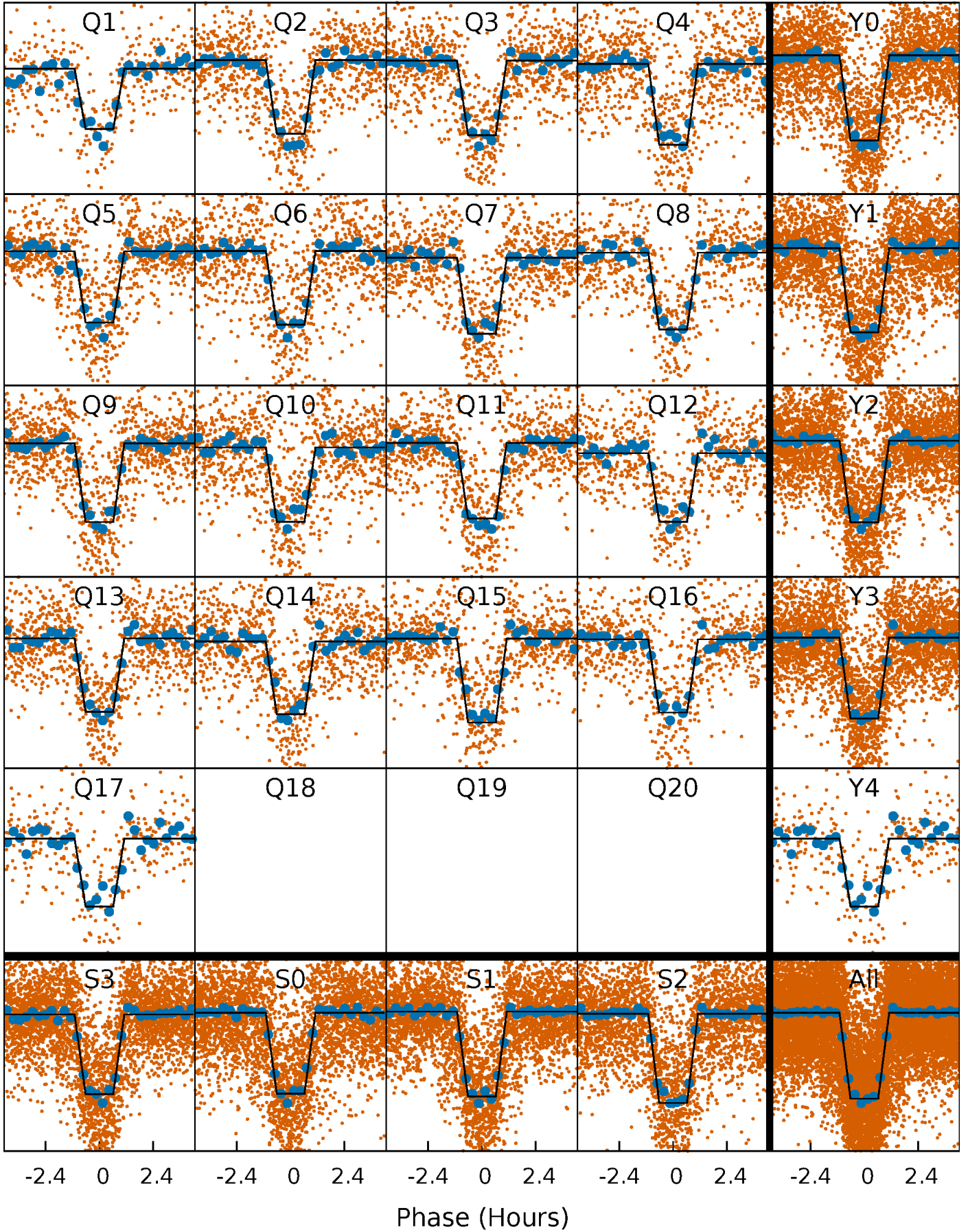
DV Quarter-Phased Transit Curves

TCE 002692377-01 P= 1.541674 Days $T_0=132.002024$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

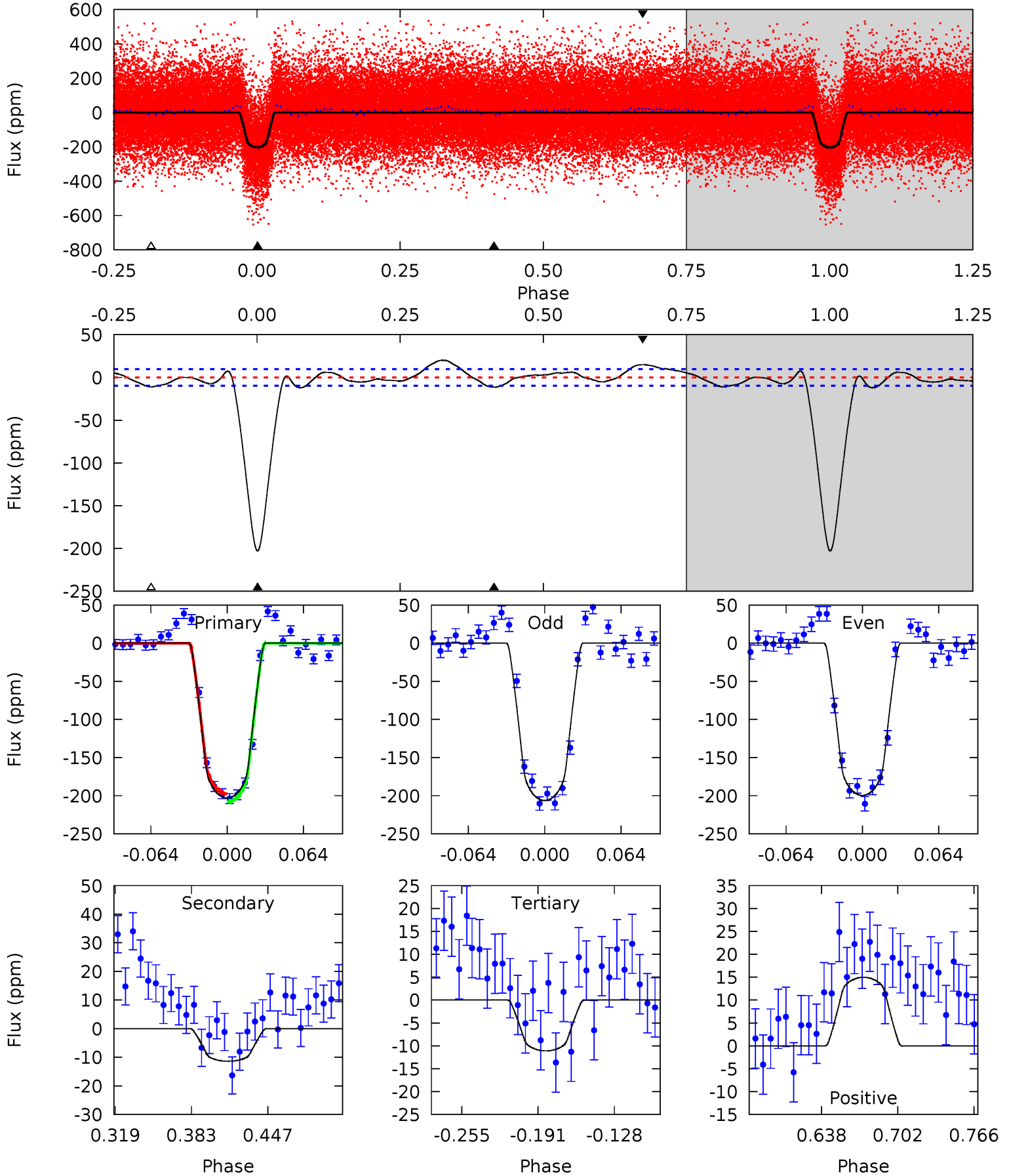
TCE 002692377-01 P= 1.541676 Days $T_0=132.002311$ (BKJD)



DV Model-Shift Uniqueness Test

002692377-01, P = 1.541674 Days, E = 130.460350 Days

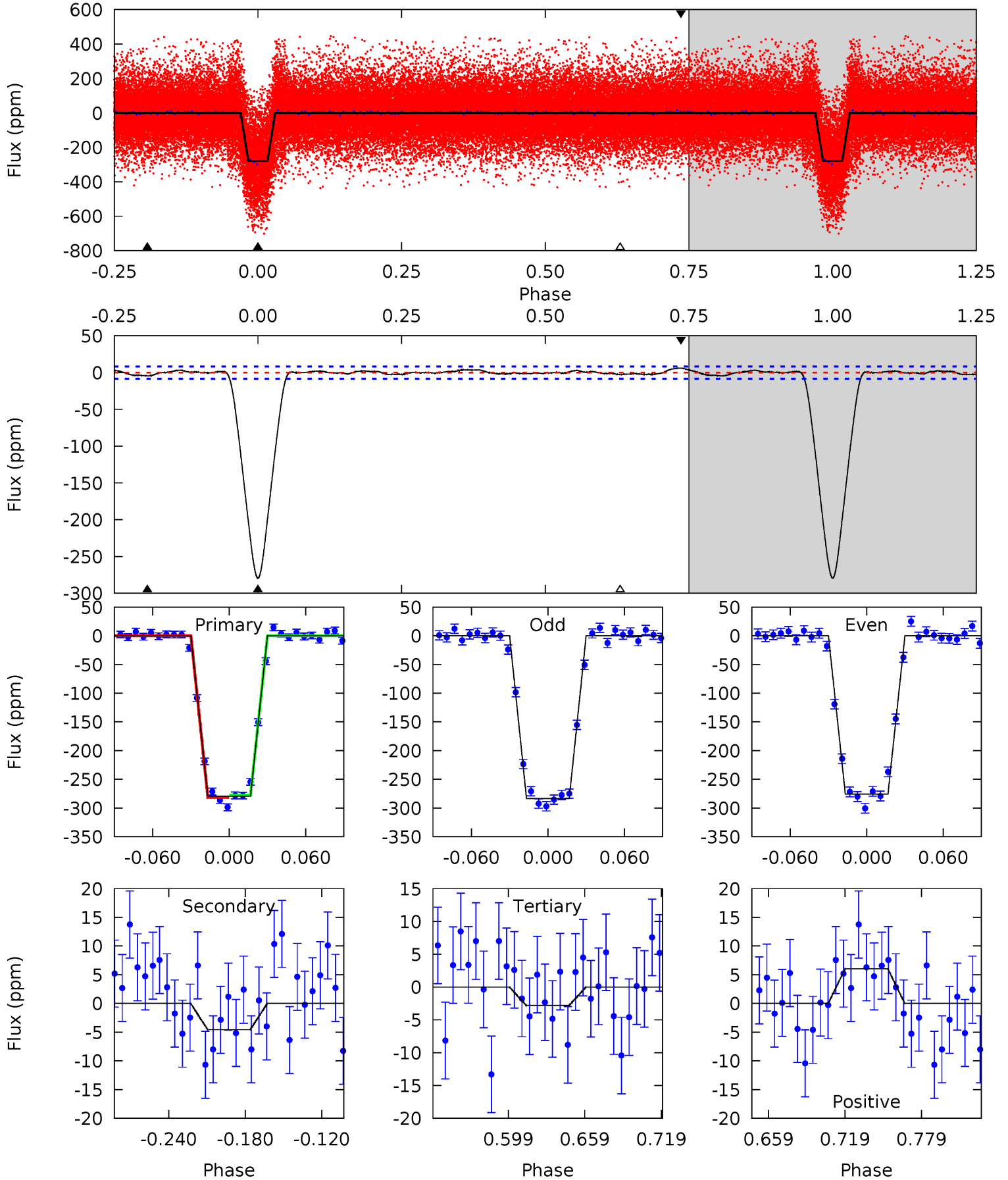
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 98.5 | 5.53 | 5.39 | 7.27 | 4.66 | 1.85 | 3.72 | 93.1 | 91.3 | 0.14 | -1.74 | 1.65 | 0.99 | 0.09 | 2.60 |



Alt Model-Shift Uniqueness Test

002692377-01, P = 1.541676 Days, E = 130.460635 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|-------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 156.6 | 2.56 | 1.58 | 3.39 | 4.67 | 1.88 | 1.06 | 155.1 | 153.2 | 0.98 | -0.83 | 2.27 | 0.98 | 0.02 | 1.16 |



Stellar Parameters For KIC 002692377

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | $M(M_{\odot})$ | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|---------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 5533^{+110}_{-1} | $4.337^{+0.132}_{-0.108}$ | $0.180^{+0.150}_{-0.150}$ | $1.089^{+0.161}_{-0.161}$ | $0.940^{+0.067}_{-0.047}$ | $1.026^{+0.615}_{-0.328}$ |
| | +2%/-0% | +3%/-2% | +83%/-83% | +15%/-15% | +7%/-5% | +60%/-32% |
| Source | SPE61 | SPE61 | SPE61 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 002692377-01 / KOI 0299.01

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|-------------|------------------------|----------------------|-----------------------|---------------------------|
| DV | -11 ± 2 | $1.89^{+0.30}_{-0.26}$ | 2210^{+109}_{-116} | 2998^{+178}_{-187} | $1.154^{+0.450}_{-0.354}$ |
| Alt. | -5 ± 2 | $1.99^{+0.31}_{-0.27}$ | 2210^{+111}_{-119} | 2314^{+327}_{-4517} | $0.415^{+0.228}_{-0.182}$ |

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 $A_{obs} \gg 1.0$

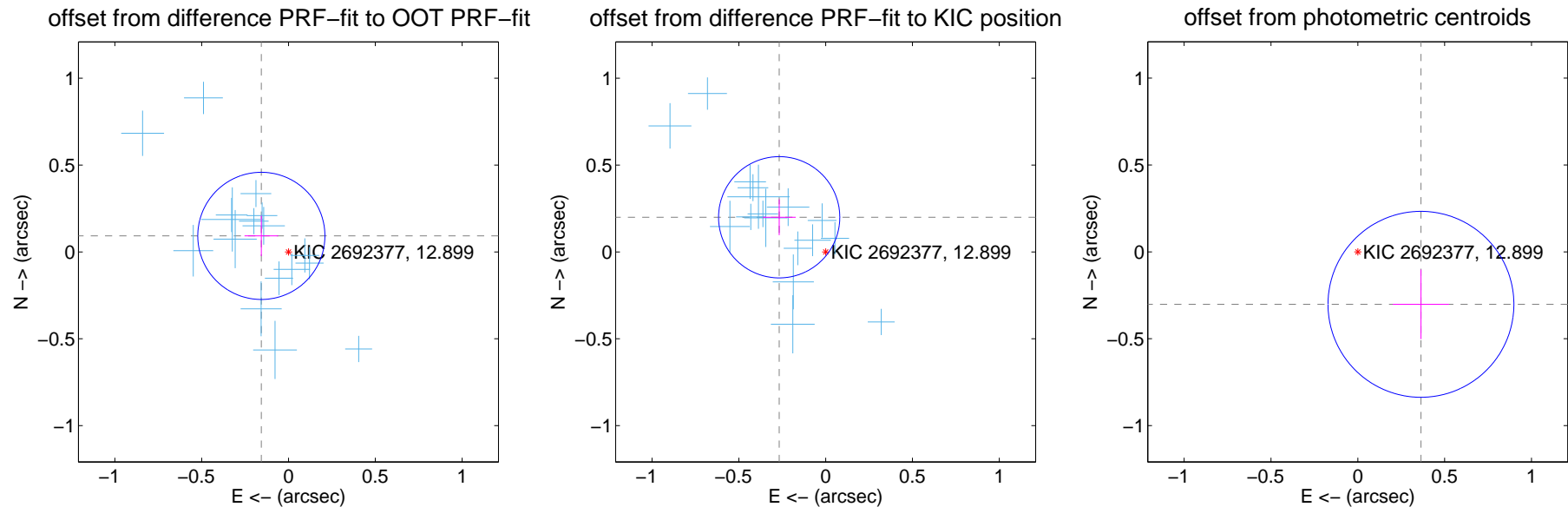
DV Centroid Data

Supplemental centroid analysis for 002692377-01. Kepler magnitude: 12.90. Transit SNR 63.03

There are 17 quarters with good PRF difference image offsets

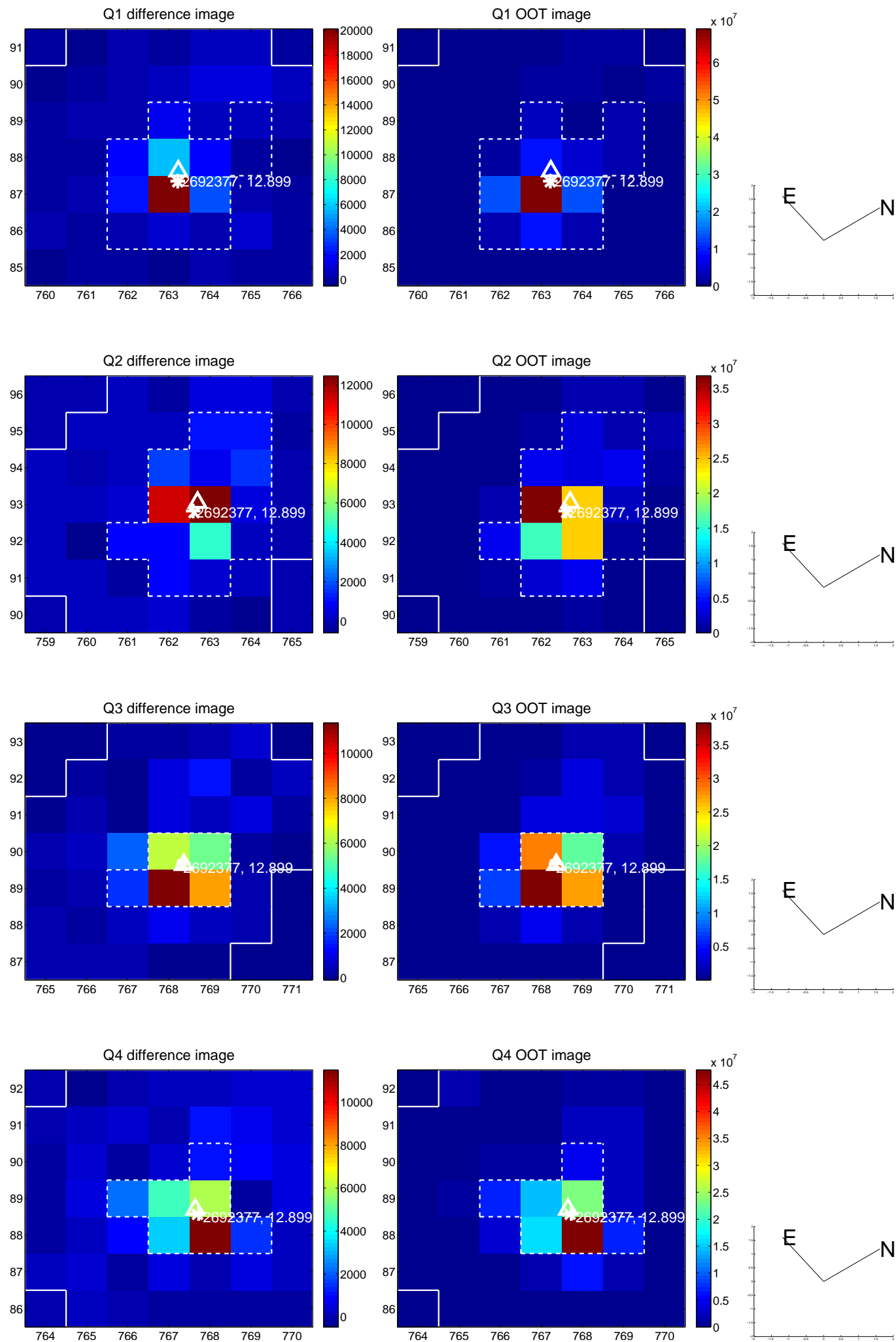
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|-------------------|
| PRF-fit source offset from OOT | 0.182 ± 0.122 | 1.49 | 0.156 ± 0.097 | 0.092 ± 0.116 |
| PRF-fit source offset from KIC position | 0.334 ± 0.116 | 2.87 | 0.268 ± 0.095 | 0.199 ± 0.103 |
| photometric centroid source offset | 0.47 ± 0.18 | 2.65 | -0.36 ± 0.16 | -0.30 ± 0.20 |

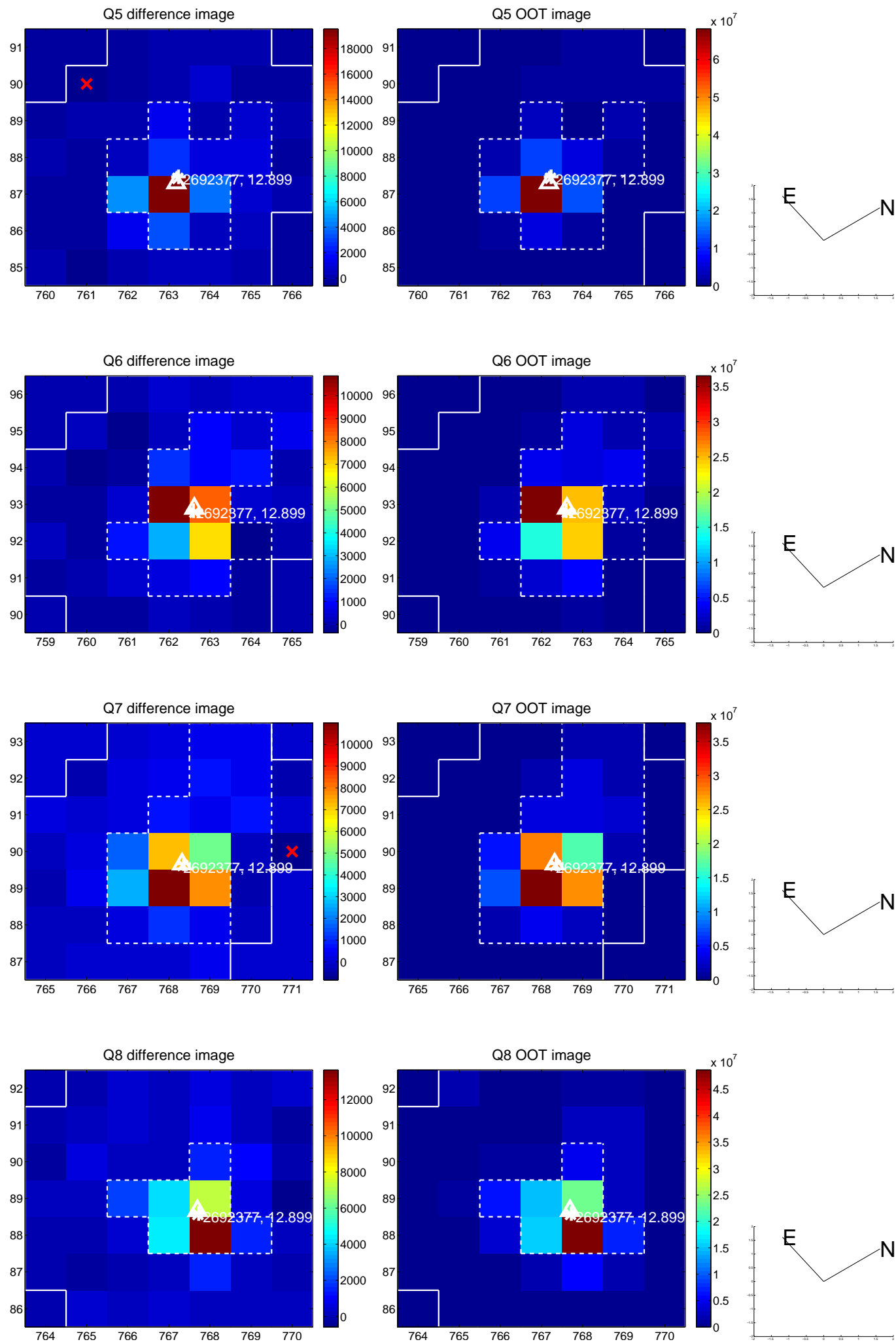


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

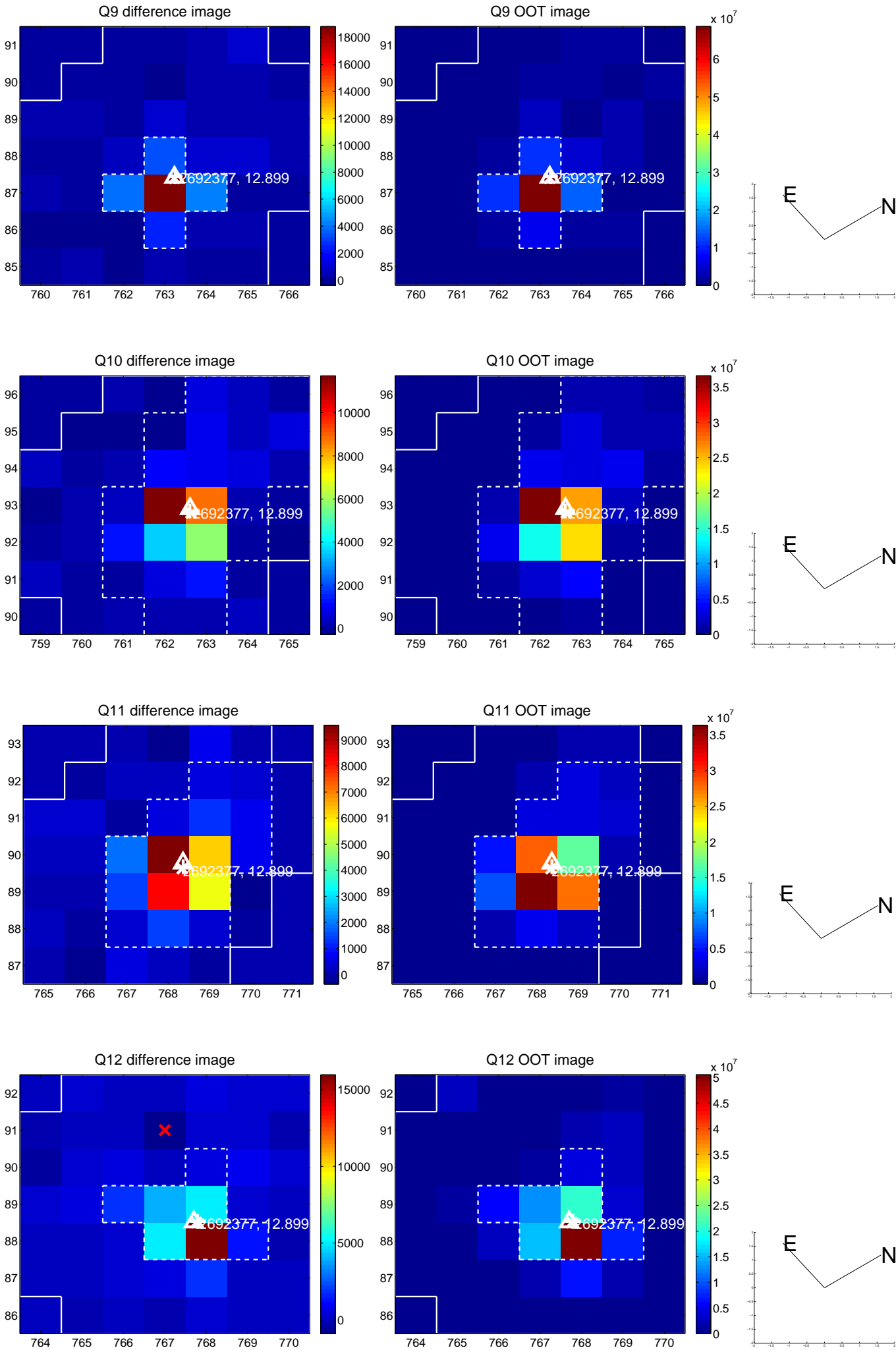
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



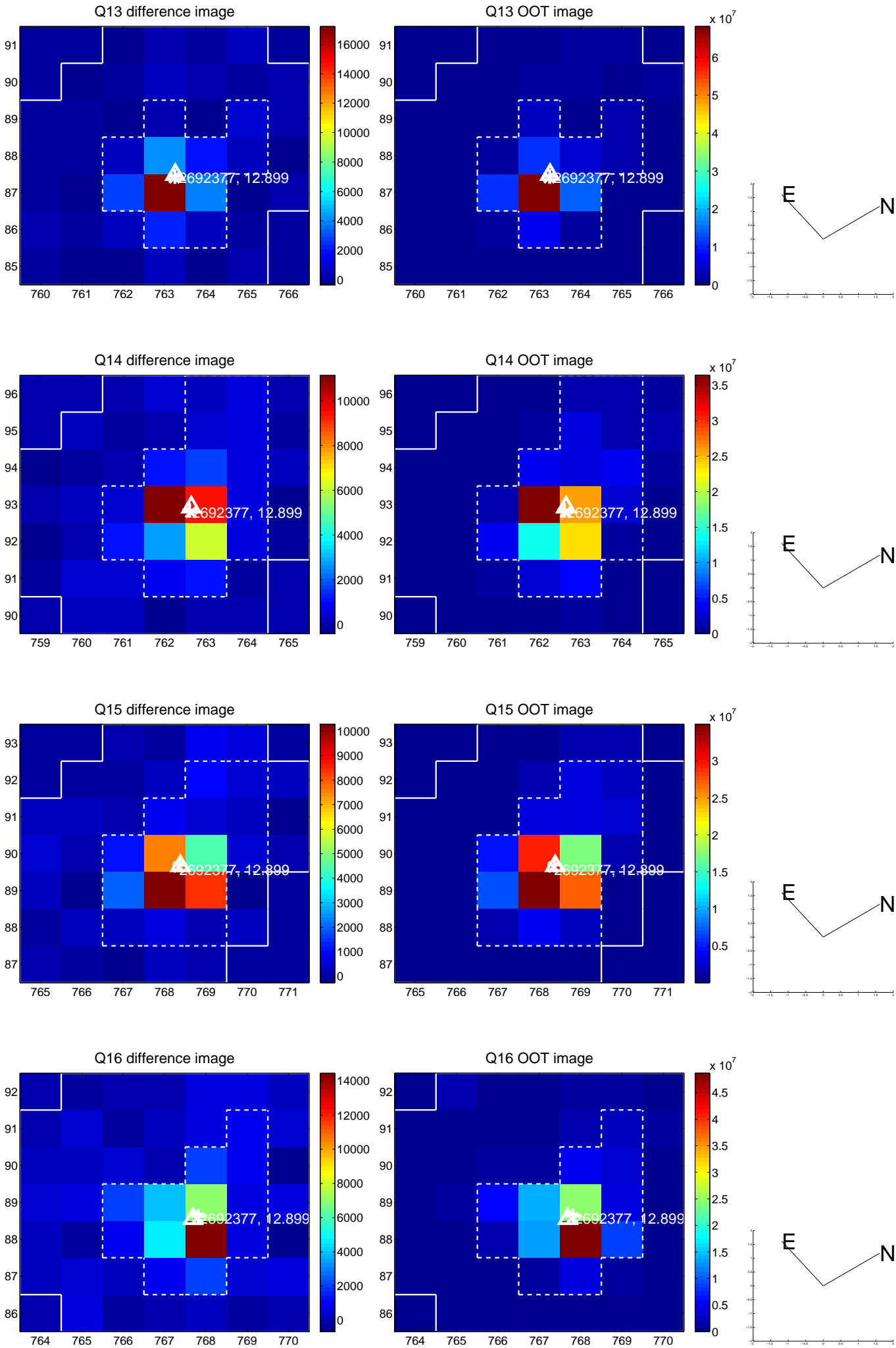
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



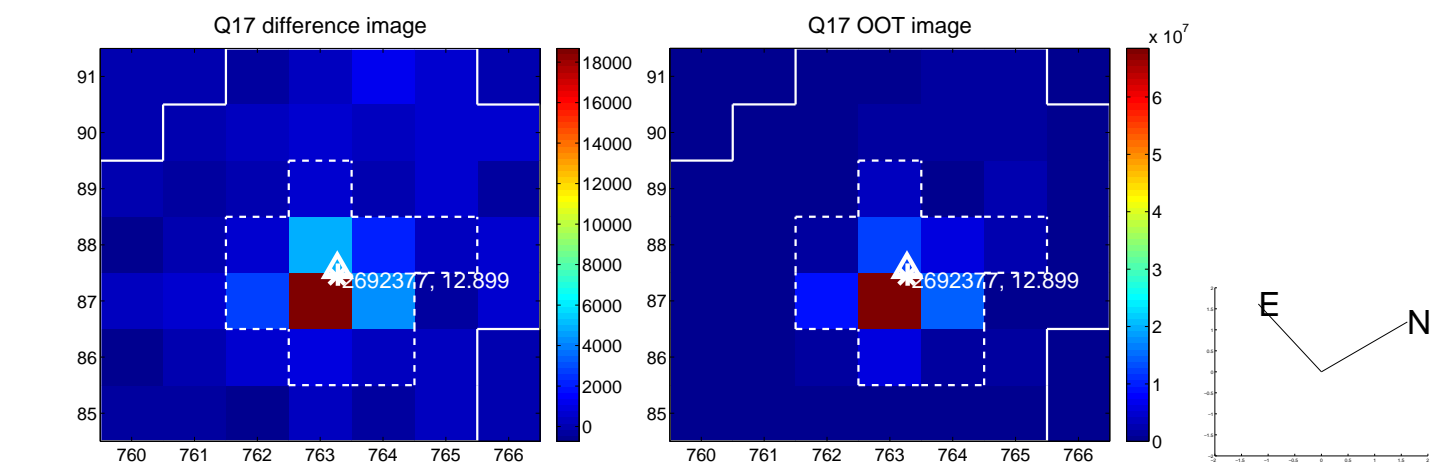
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



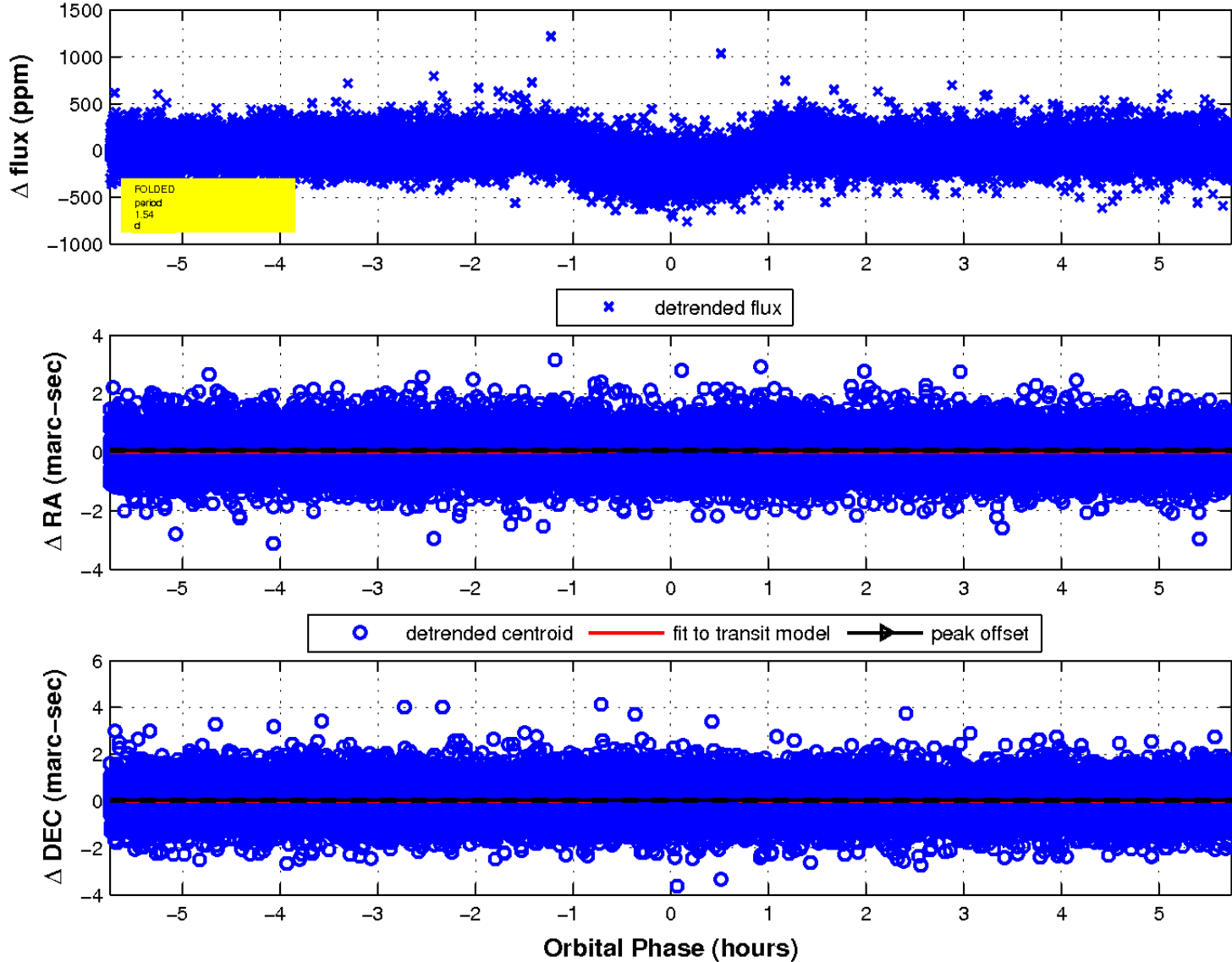
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

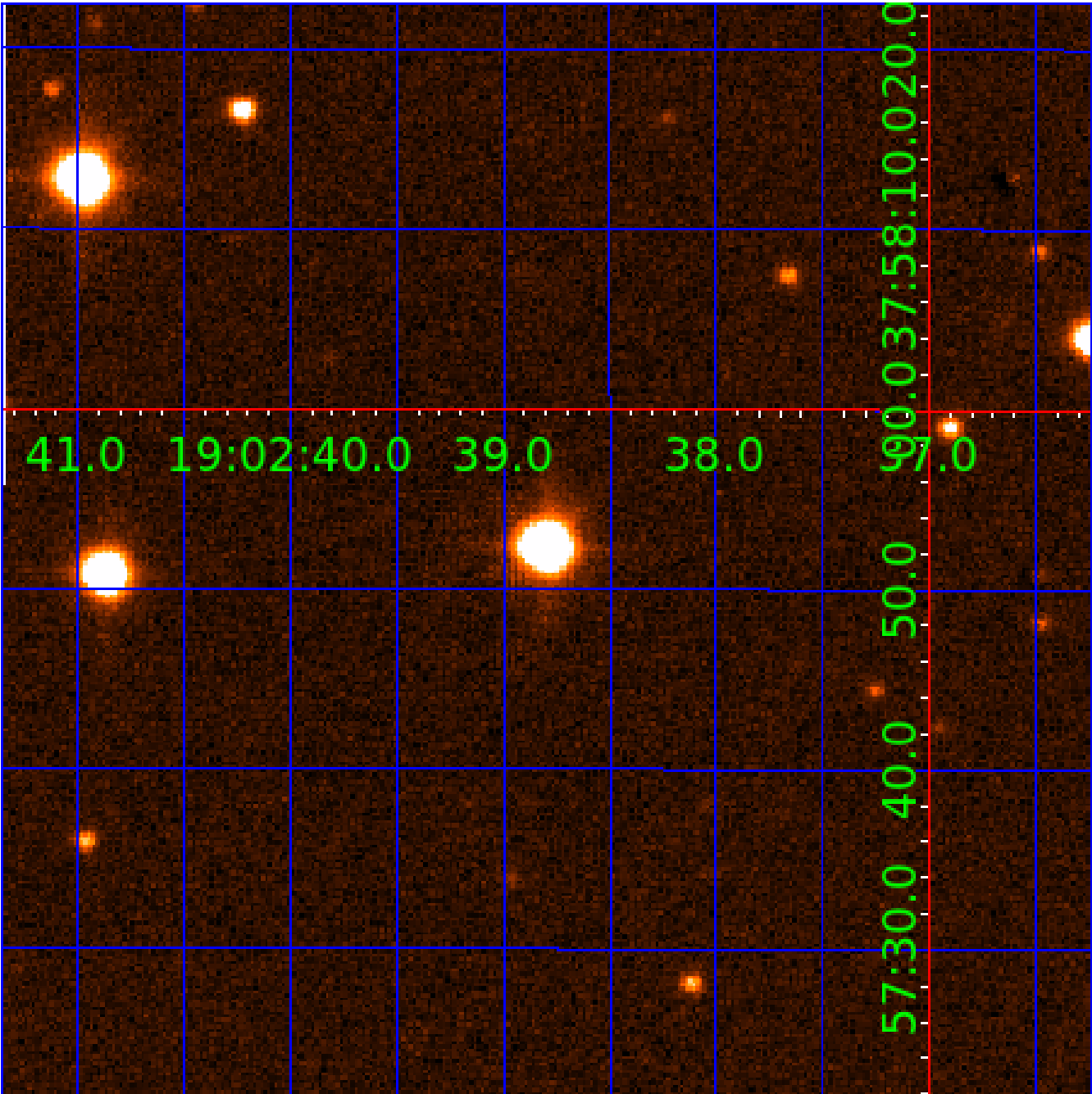


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 002692377

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 002692377-01 | OBS | 0299.01 | 1.541674 | 132.002024 | 210.8 | 1.915 | 46.4 | 63.0 | 1.09 | 5533 | 1.90 | 1520.89 |
| 002692377-02 | OBS | No | 1.541257 | 132.005447 | 23.3 | 5.475 | 8.0 | 7.9 | 1.09 | 5533 | 0.61 | 1521.44 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 002692377-01 | OBS | PC | 1.00 | 0 | 0 | 0 | 0 | NO_COMMENT |
| 002692377-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—RESIDUAL_TCE |

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

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

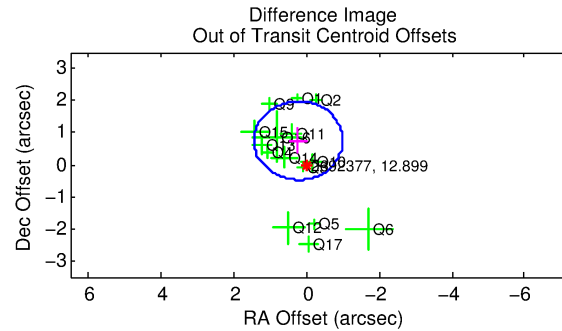
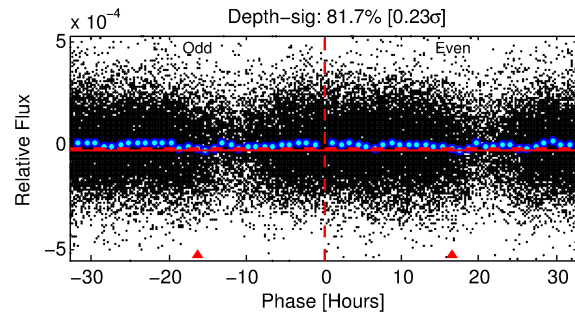
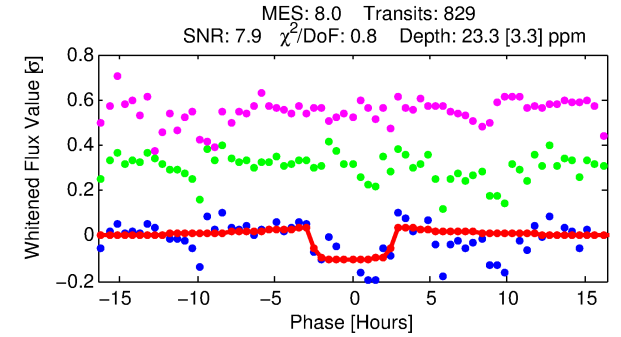
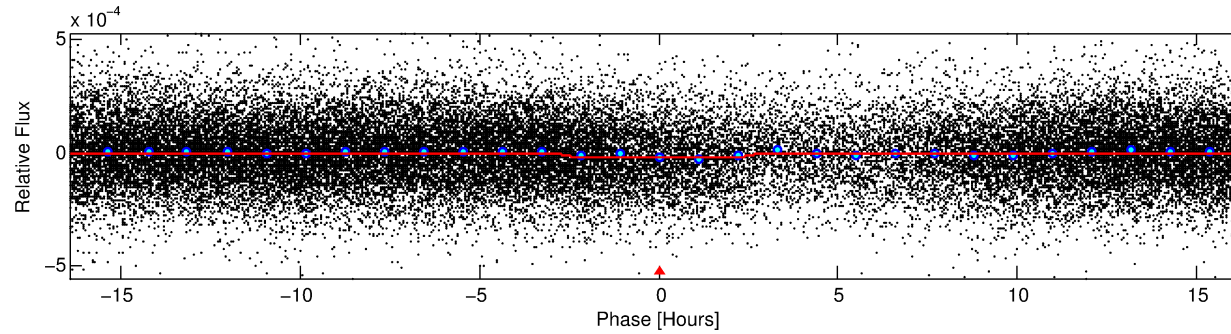
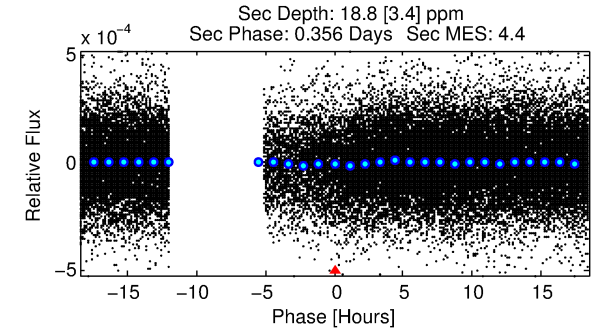
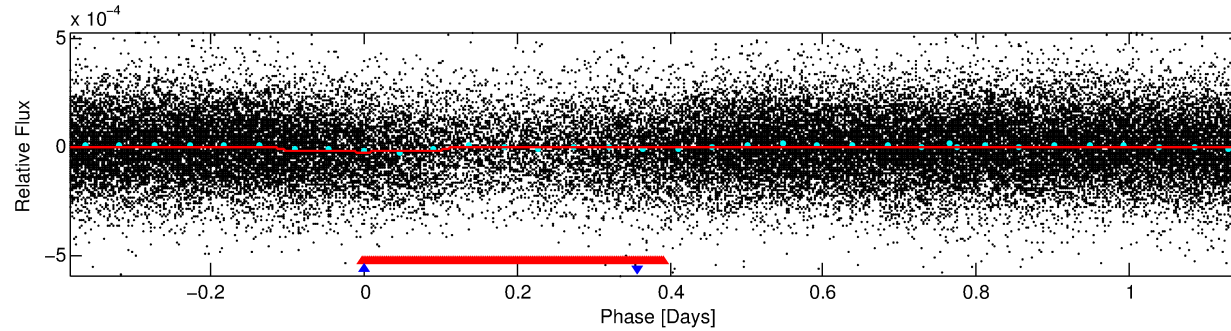
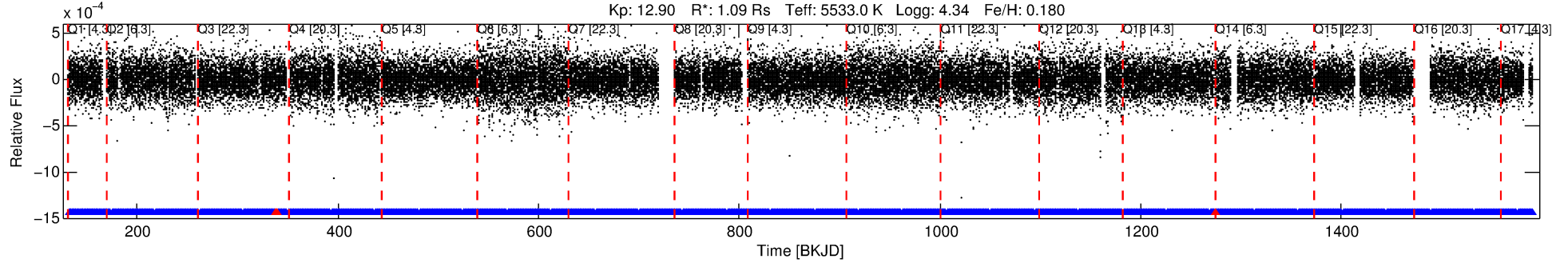
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002692377-02

No Significant Match Found

DV One-Page Summary

KIC: 2692377 Candidate: 2 of 2 Period: 1.541 d
KOI: K00299 Name: Kepler-98 Corr: No Ephemeris Match



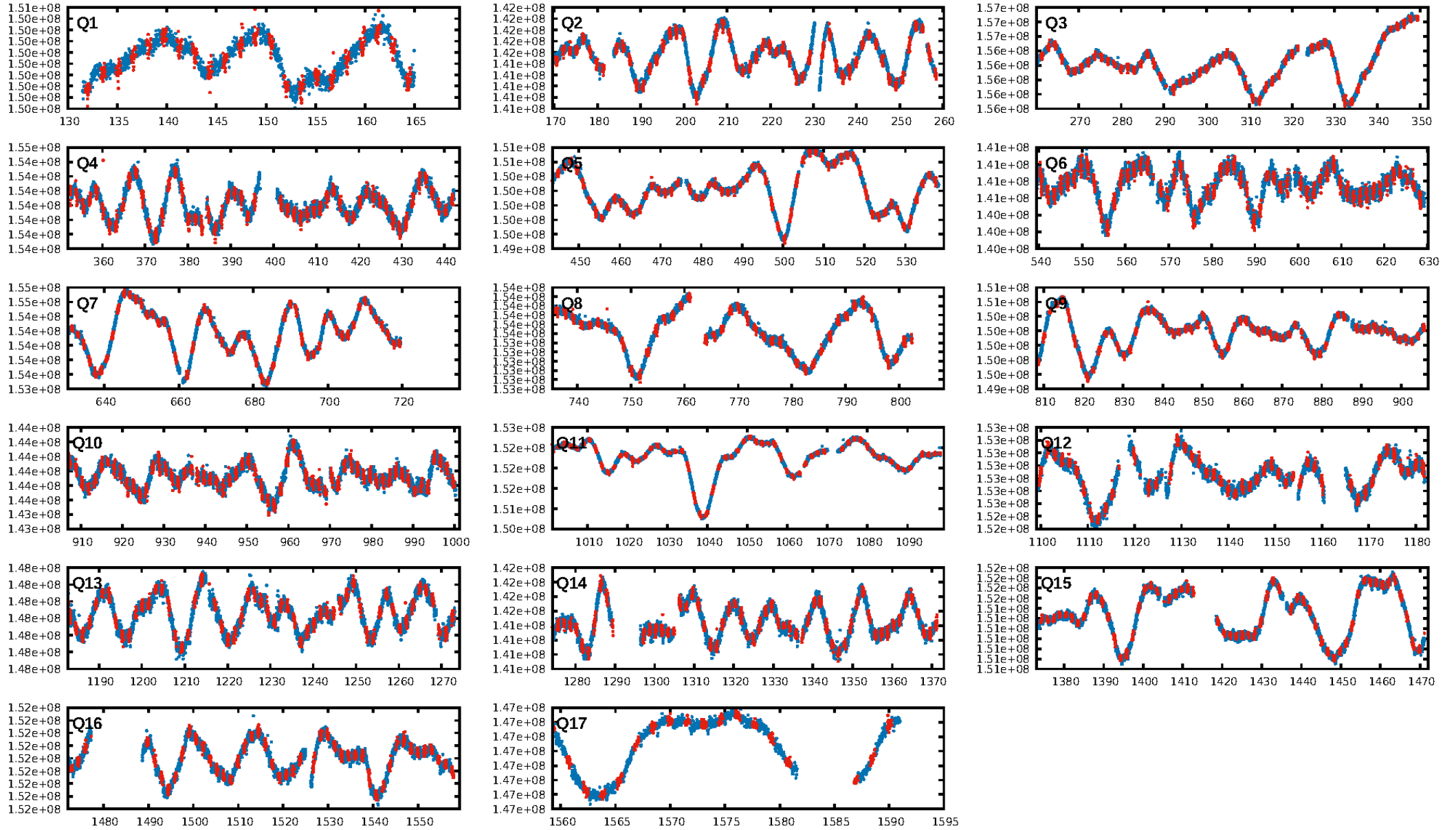
DV Fit Results:

Period = 1.54126 [0.00002] d
Epoch = 132.0054 [0.0062] BKJD
Rp/R* = 0.0051 [0.0024]
a/R* = 1.44 [1.53]
b = 0.86 [0.62]
Seff = 1521.44 [363.55]
Teq = 1593 [95] K
Rp = 0.61 [0.30] Re
a = 0.0256 [0.0036] AU
Ag = 18.30 [18.19] [0.95σ]
Teffp = 5093 [1236] K [2.82σ]




DV Diagnostic Results:

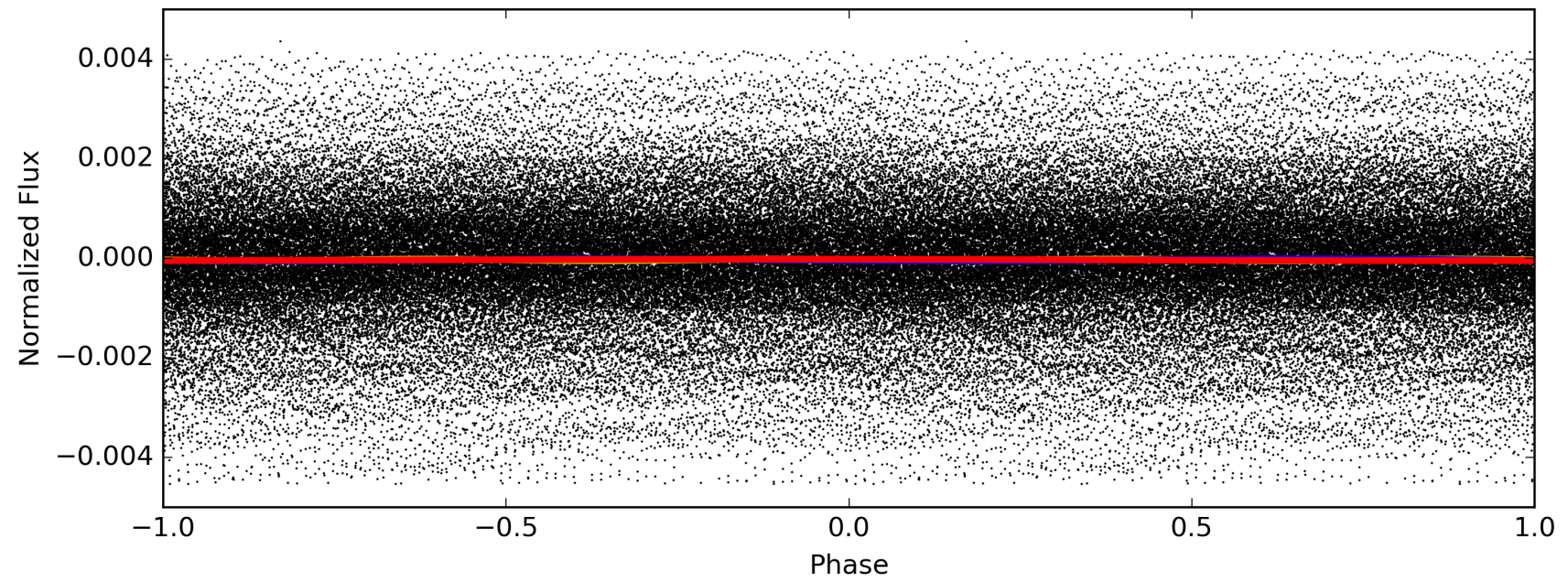
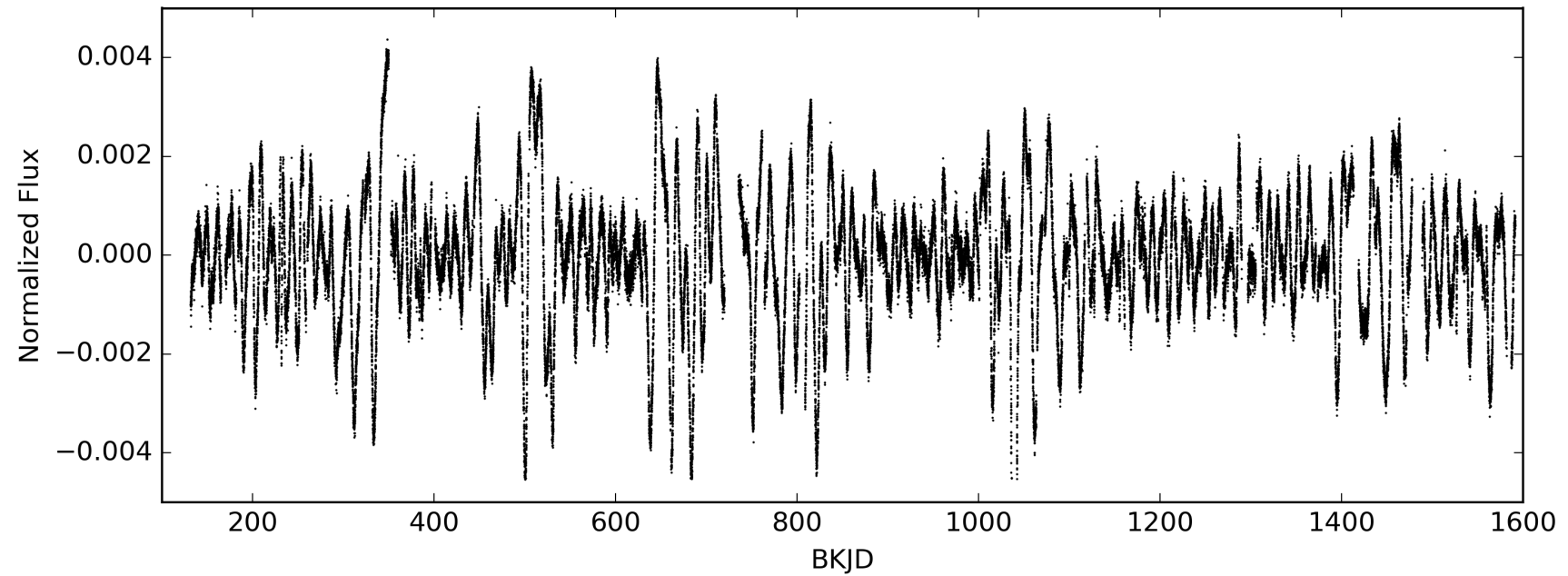
ShortPeriod-sig: N/A
LongPeriod-sig: 0.1% [0.00σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 7.45e-14
RollingBand-fgt: 1.00 [808/811]
GhostDiagnostic-chr: 0.835
Centroid-sig: 28.6%
Centroid-so: 0.694 arcsec [0.76σ]
OotOffset-rm: 0.783 arcsec [1.92σ]
KicOffset-rm: 0.895 arcsec [2.38σ]
OotOffset-st: 4/3/3/5 [15]
KicOffset-st: 4/3/3/5 [15]
DiffImageQuality-fgm: 0.40 [6/15]
DiffImageOverlap-fno: 0.00 [0/17]

TCE 002692377-02, PDC Light Curves



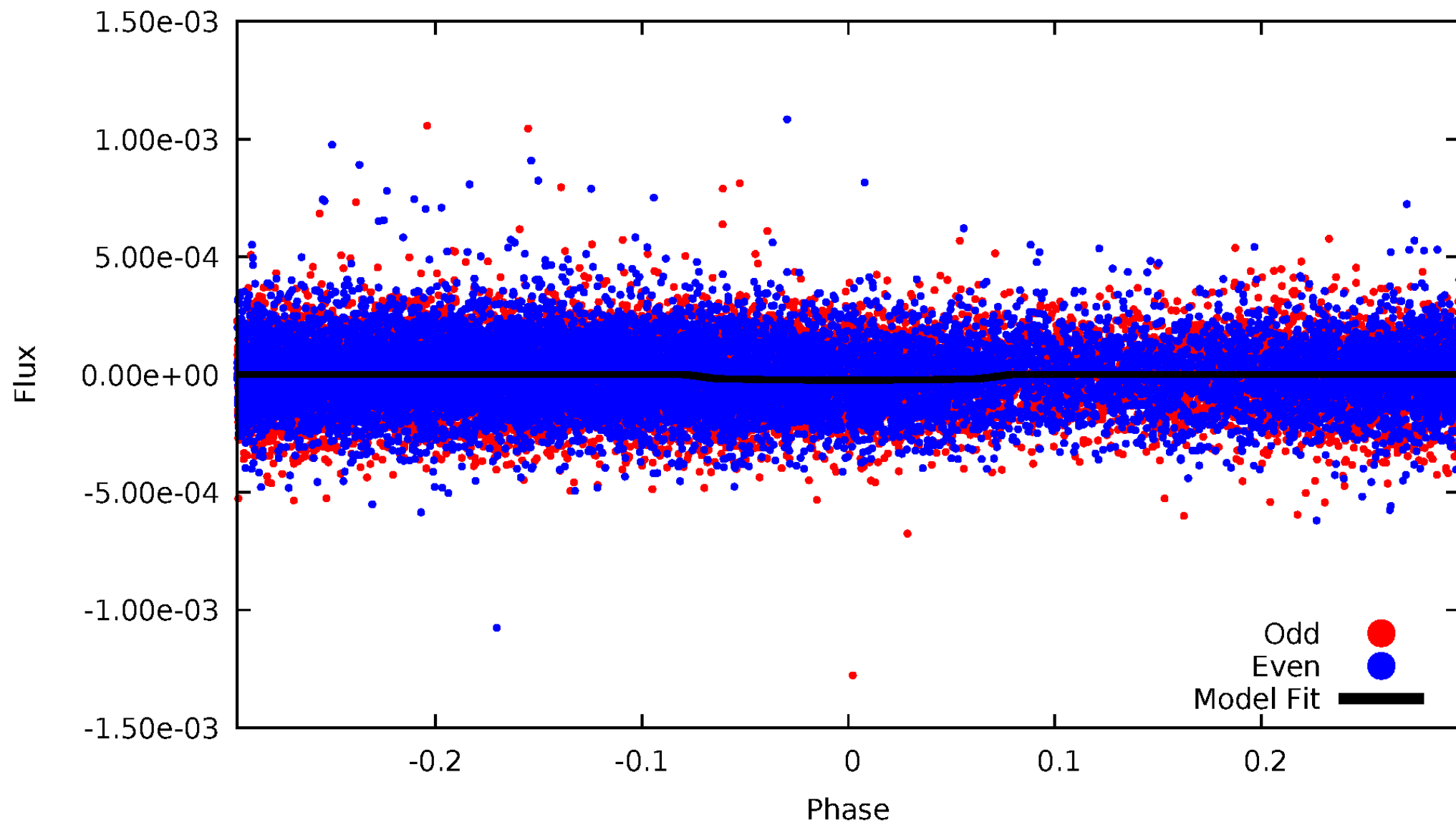
TCE 002692377-02

 P = 0.771 days  P = 1.541 days  P = 3.083 days



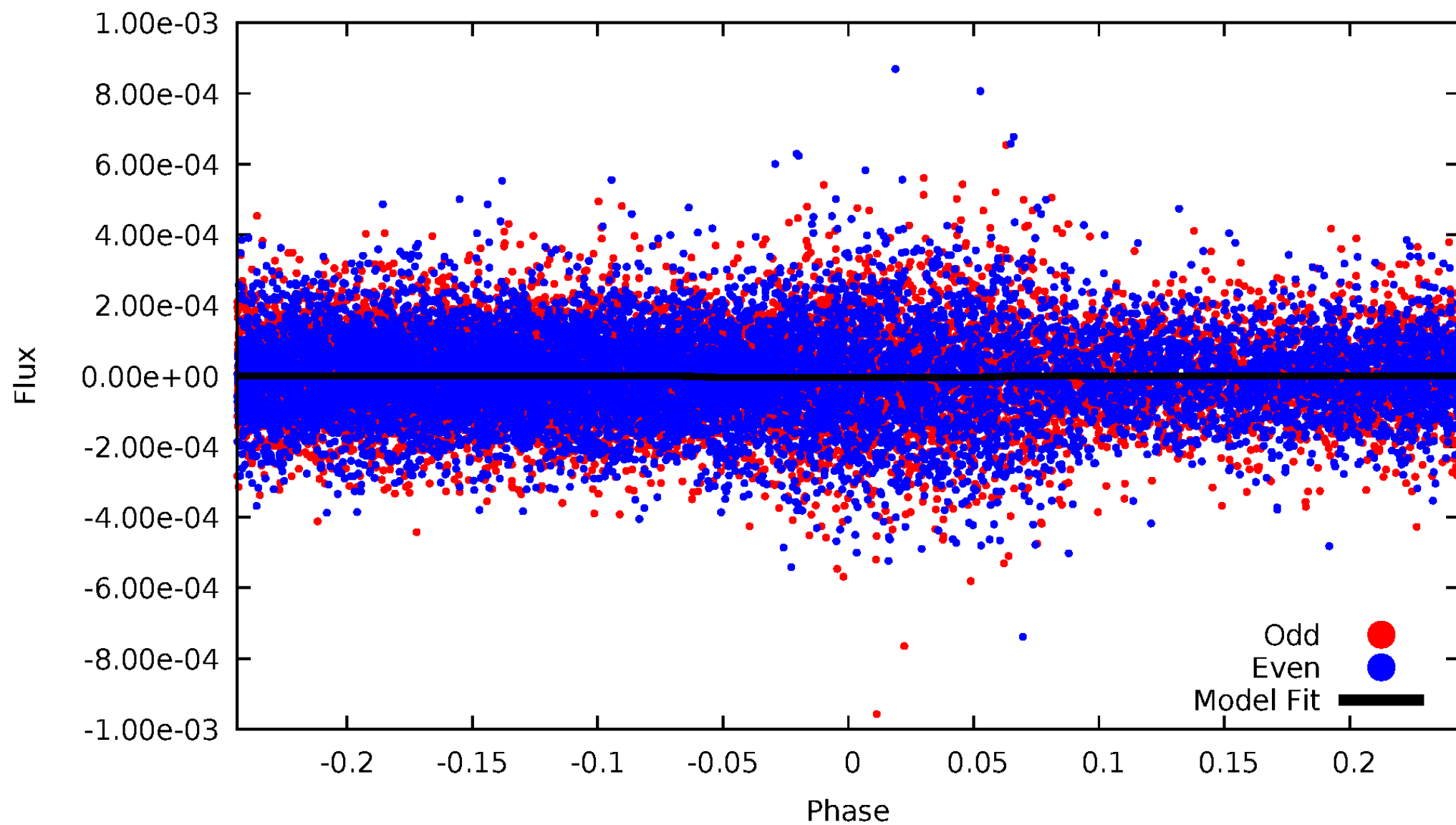
DV Odd/Even

TCE 002692377-02



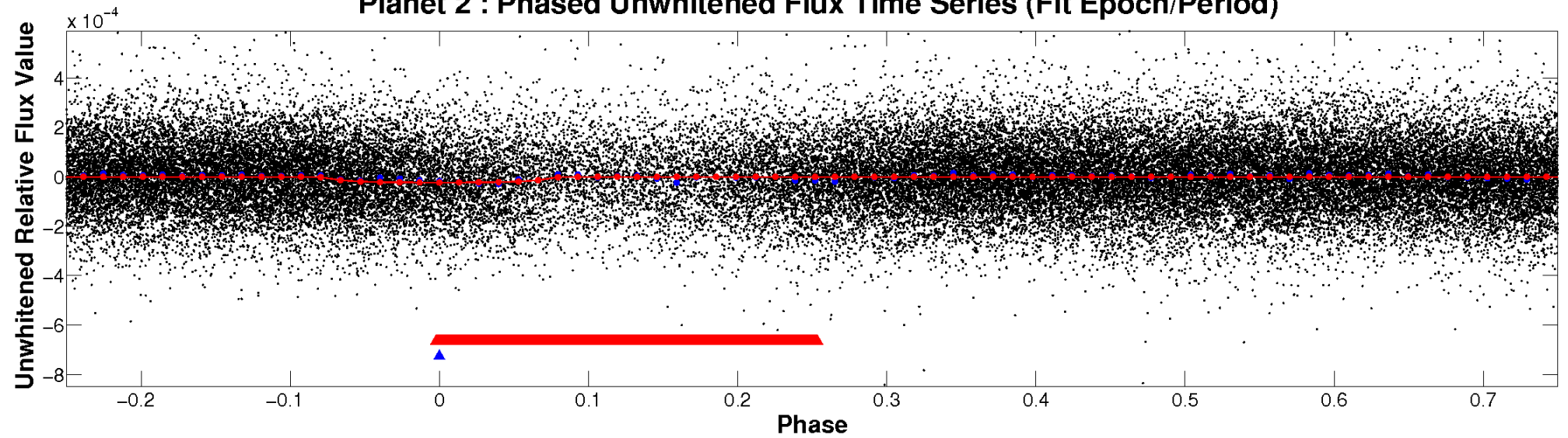
ALT Odd/Even

TCE 002692377-02

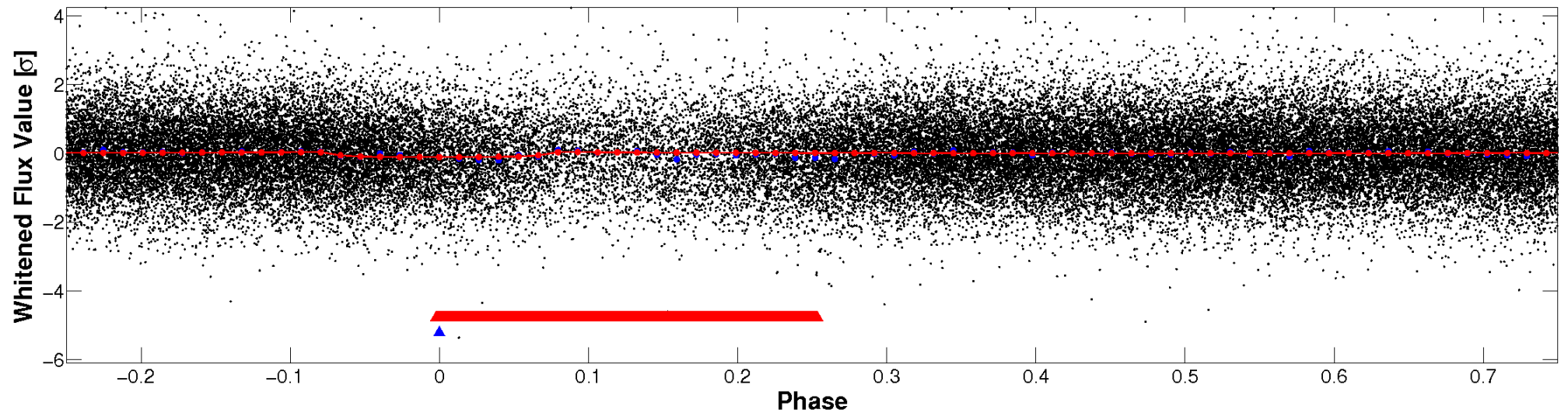


Non-Whitened Vs. Whitened Light Curve

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

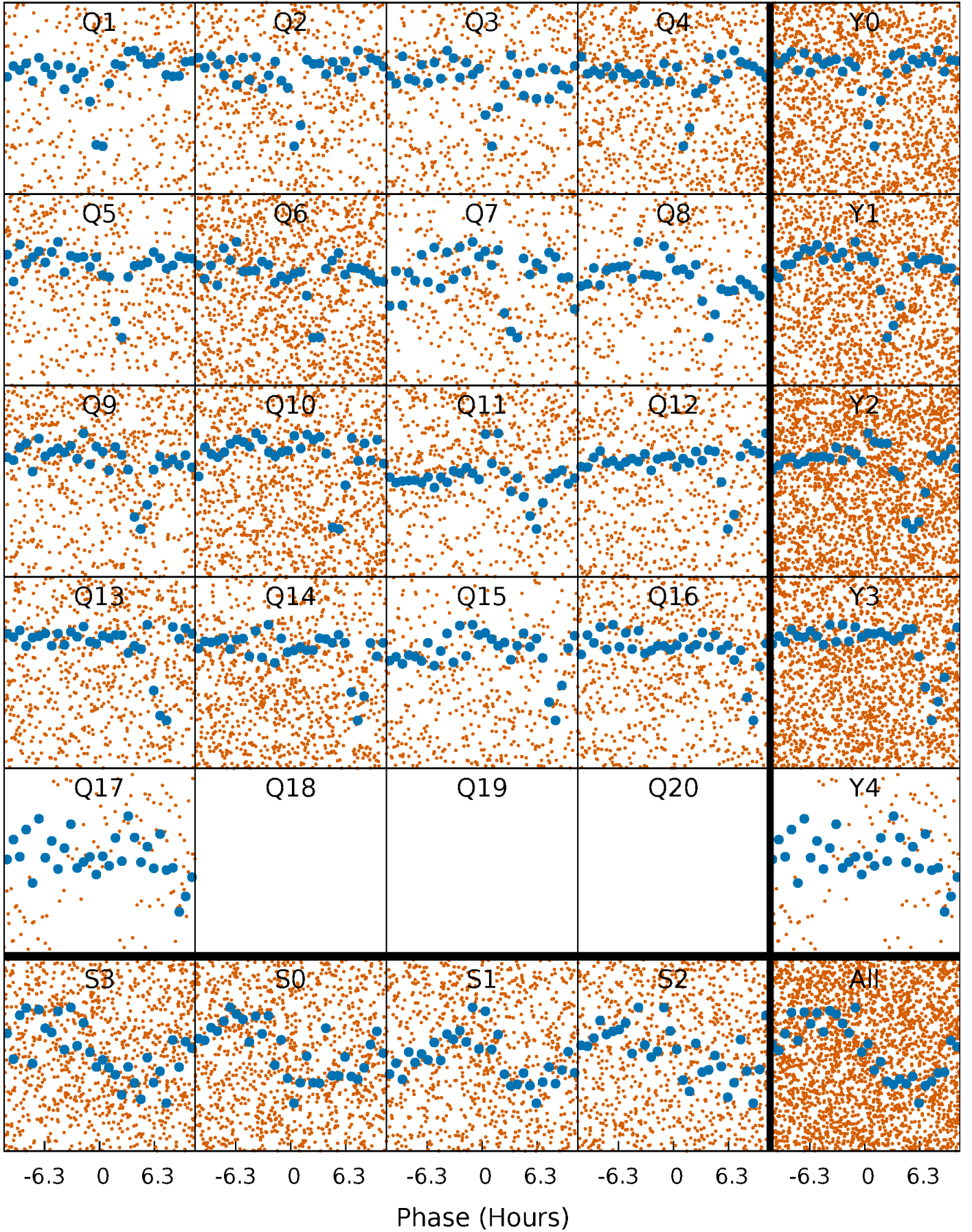


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



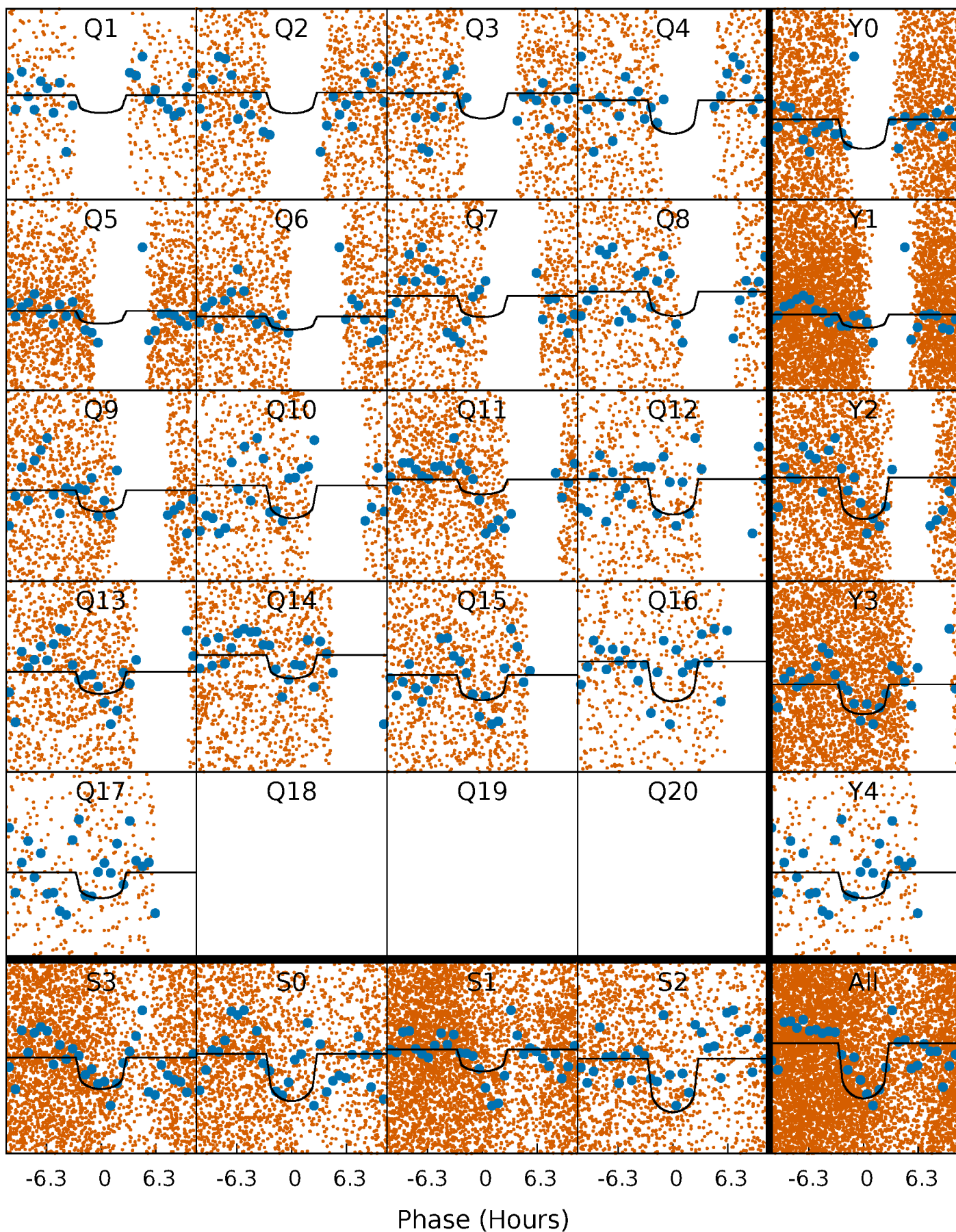
PDC Quarter-Phased Transit Curves

TCE 002692377-02 P= 1.541257 Days $T_0=132.005447$ (BKJD)



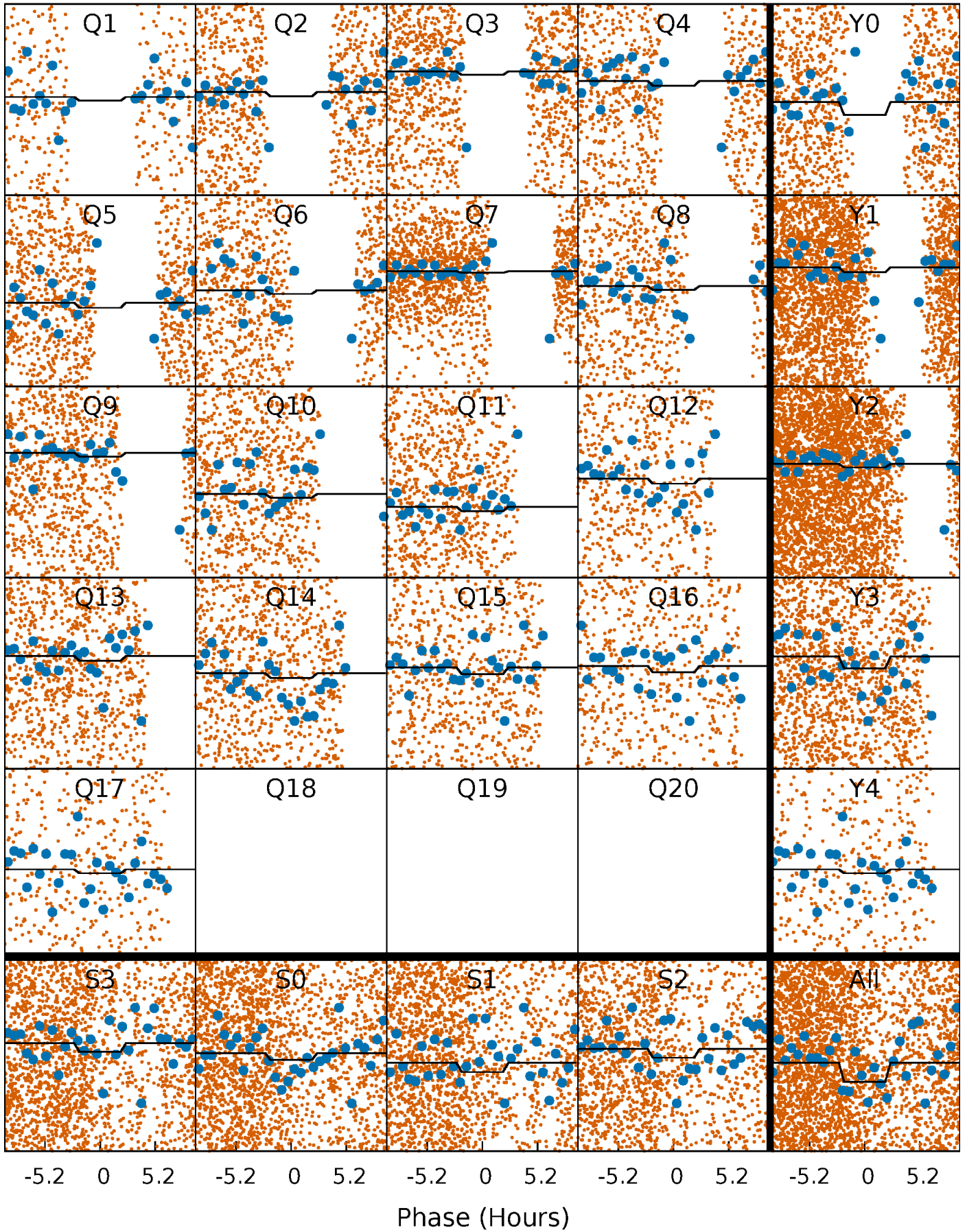
DV Quarter-Phased Transit Curves

TCE 002692377-02 $P = 1.541257$ Days $T_0 = 132.005447$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

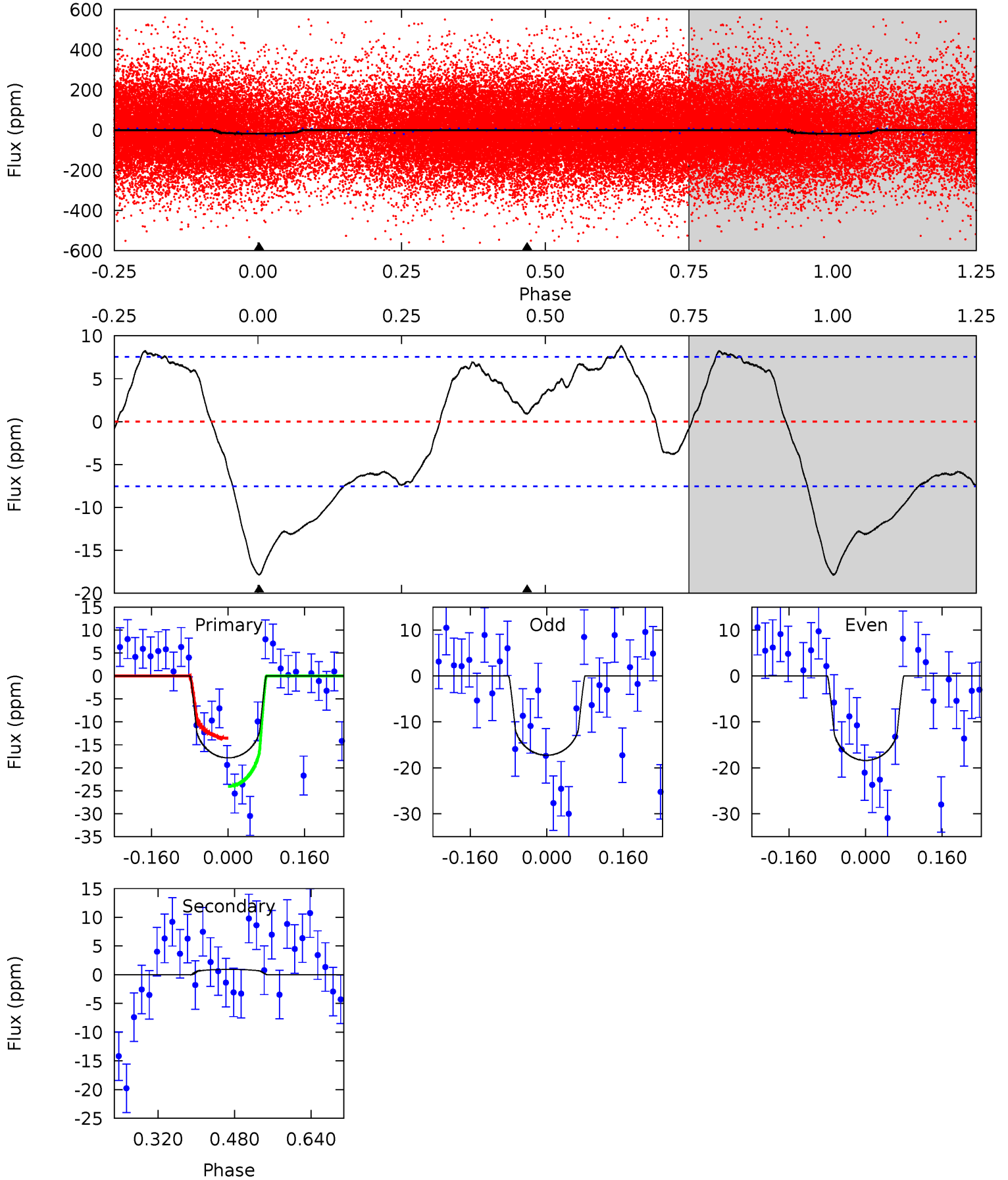
TCE 002692377-02 P= 1.541243 Days $T_0=131.999554$ (BKJD)



DV Model-Shift Uniqueness Test

002692377-02, P = 1.541257 Days, E = 130.464190 Days

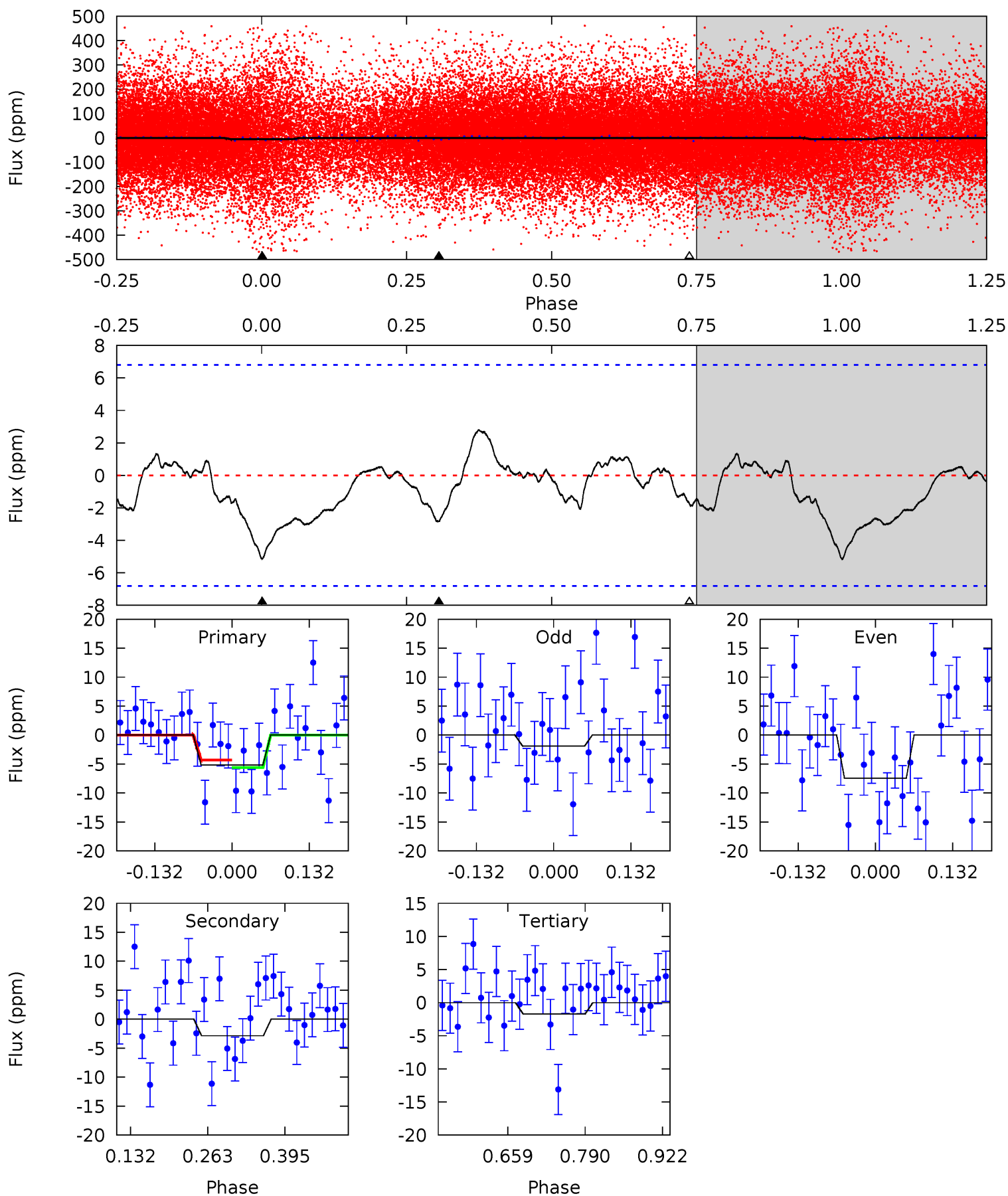
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|-------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 10.6 | -0.55 | 0 | 0 | 4.47 | 1.41 | 3.26 | 10.6 | 10.6 | -0.55 | -0.55 | 0.34 | 0.92 | 0.33 | 3.03 |



Alt Model-Shift Uniqueness Test

002692377-02, P = 1.541243 Days, E = 130.458311 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 3.41 | 1.88 | 1.14 | 0 | 4.51 | 1.51 | 0.63 | 2.27 | 3.41 | 0.74 | 1.88 | 1.77 | 2.58 | 0.35 | 0.42 |



Stellar Parameters For KIC 002692377

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | $M(M_{\odot})$ | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|---------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 5533^{+110}_{-1} | $4.337^{+0.132}_{-0.108}$ | $0.180^{+0.150}_{-0.150}$ | $1.089^{+0.161}_{-0.161}$ | $0.940^{+0.067}_{-0.047}$ | $1.026^{+0.615}_{-0.328}$ |
| | +2%/-0% | +3%/-2% | +83%/-83% | +15%/-15% | +7%/-5% | +60%/-32% |
| Source | SPE61 | SPE61 | SPE61 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 002692377-02 / KOI

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|-------------|------------------------|----------------------|------------------------|----------------------------|
| DV | 1 ± 2 | $0.61^{+0.30}_{-0.26}$ | 2210^{+105}_{-118} | -3077^{+5812}_{-776} | $-0.753^{+1.457}_{-3.292}$ |
| Alt. | -3 ± 2 | $0.29^{+0.26}_{-0.18}$ | 2209^{+105}_{-121} | 4429^{+2969}_{-1005} | $9.820^{+72.962}_{-7.608}$ |

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

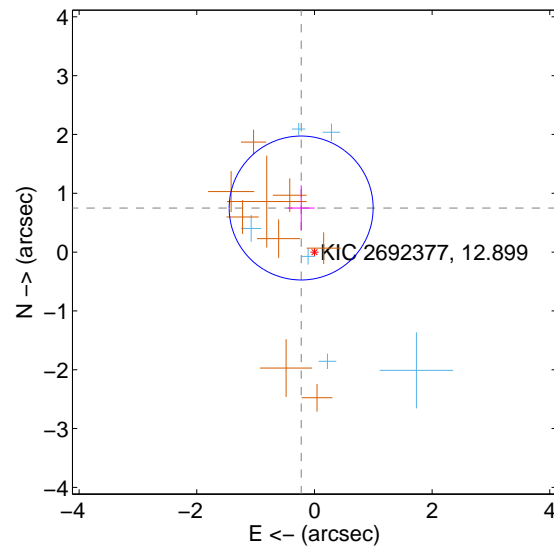
Supplemental centroid analysis for 002692377-02. Kepler magnitude: 12.90. Transit SNR 7.95

There are 6 quarters with good PRF difference image offsets

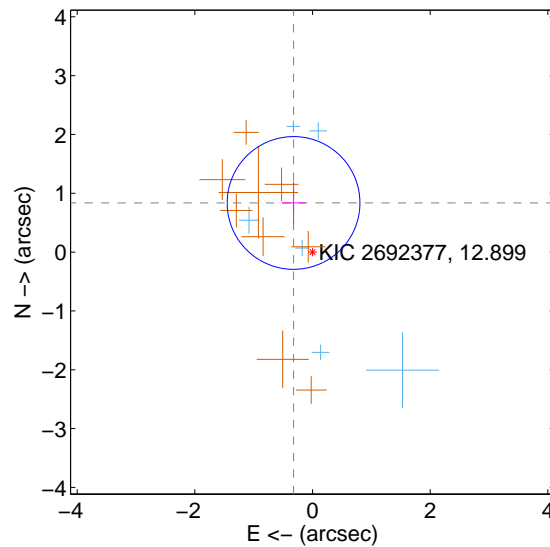
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|-------------------|
| PRF-fit source offset from OOT | 0.783 ± 0.408 | 1.92 | 0.226 ± 0.229 | 0.750 ± 0.384 |
| PRF-fit source offset from KIC position | 0.895 ± 0.376 | 2.38 | 0.322 ± 0.203 | 0.835 ± 0.362 |
| photometric centroid source offset | 0.69 ± 0.91 | 0.76 | 0.62 ± 0.87 | 0.30 ± 1.07 |

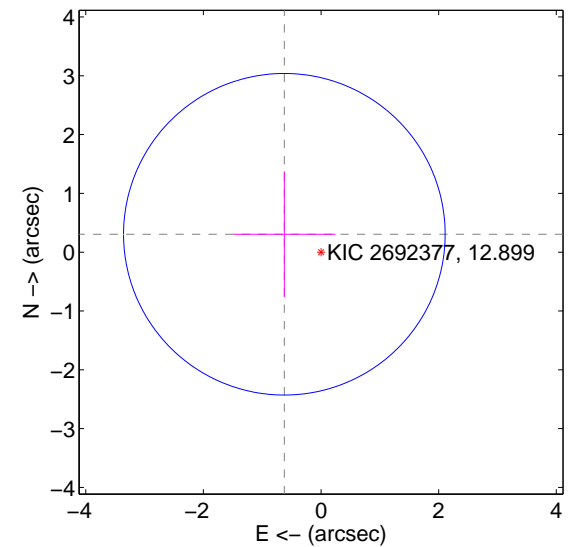
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

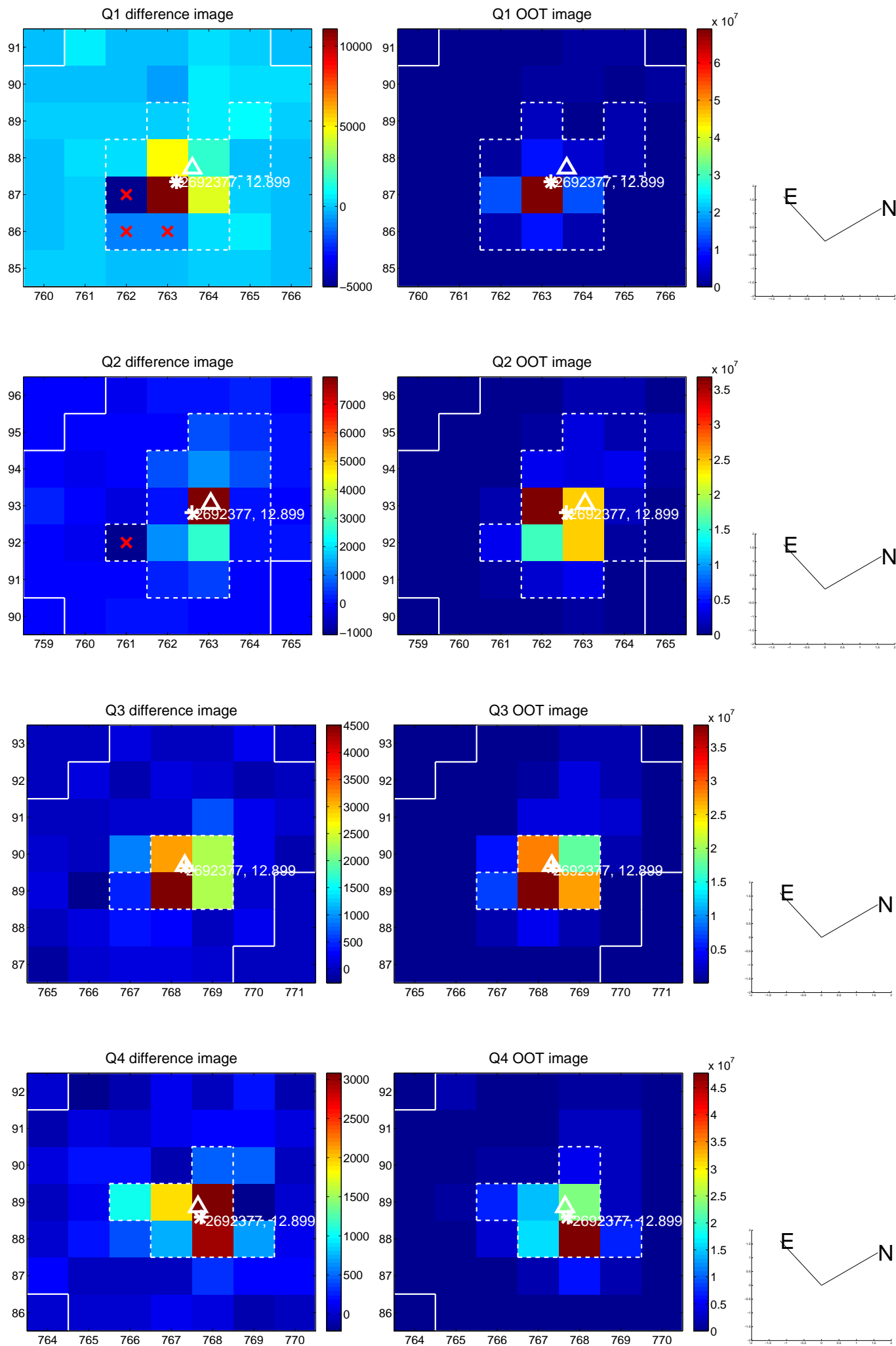


offset from photometric centroids

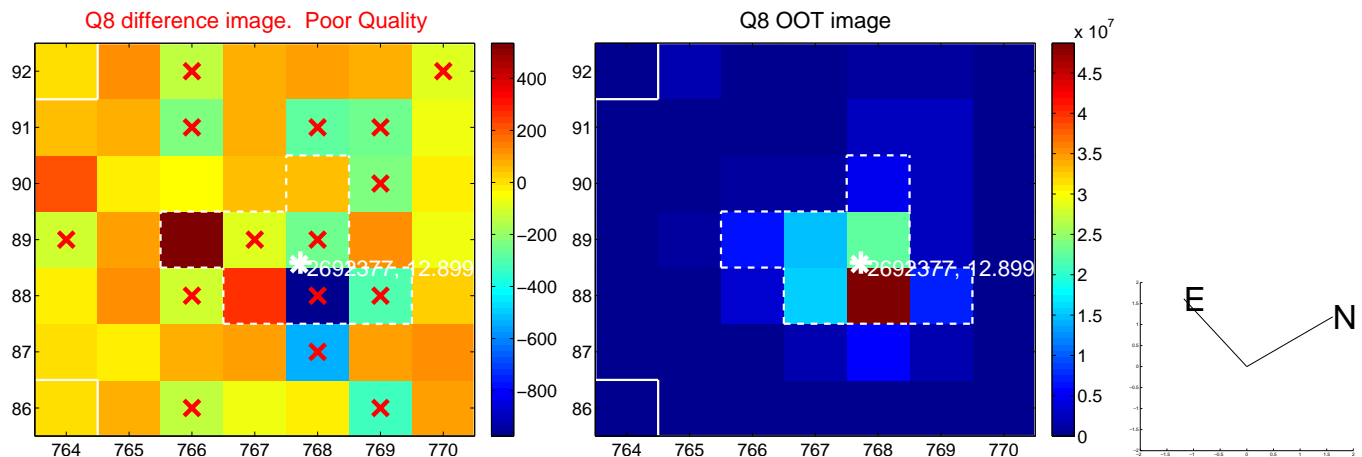
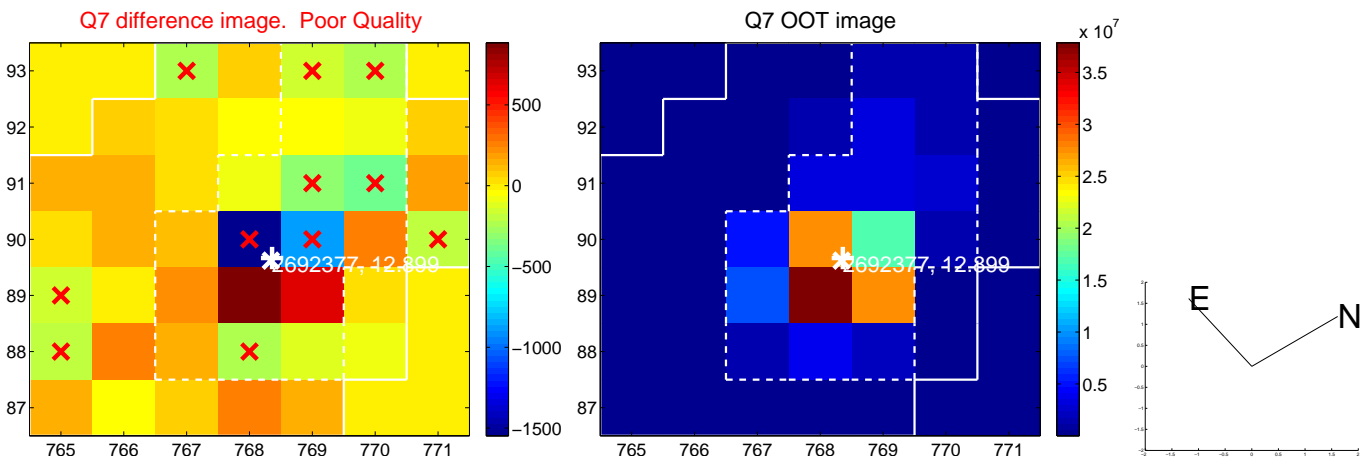
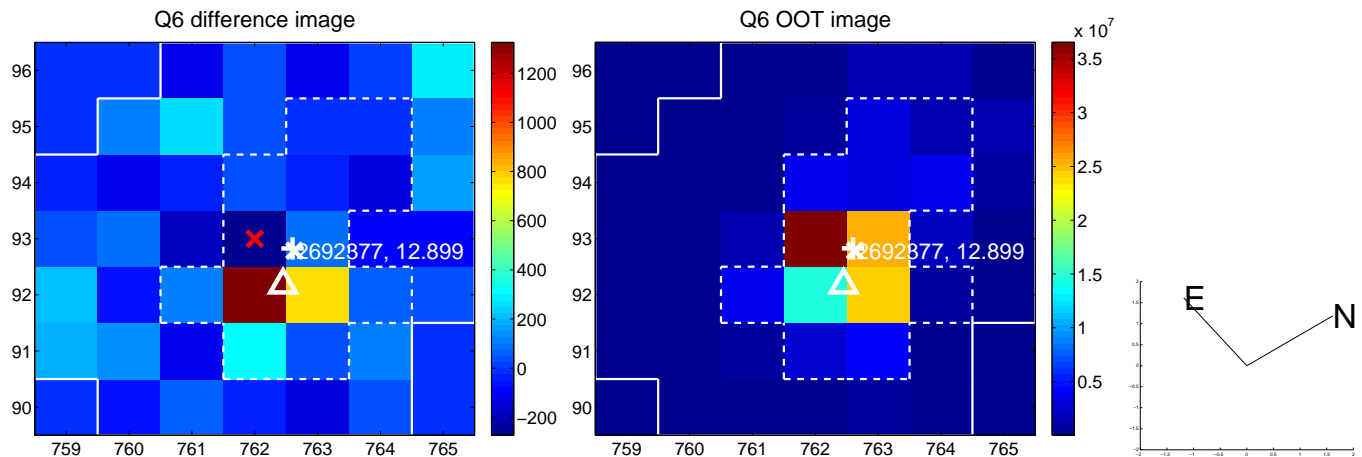
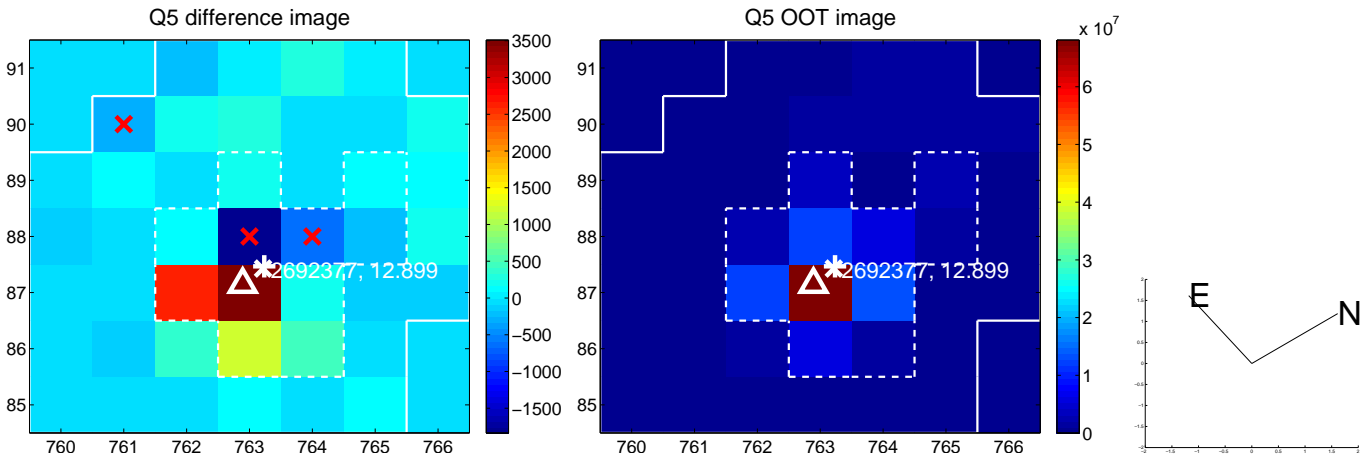


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

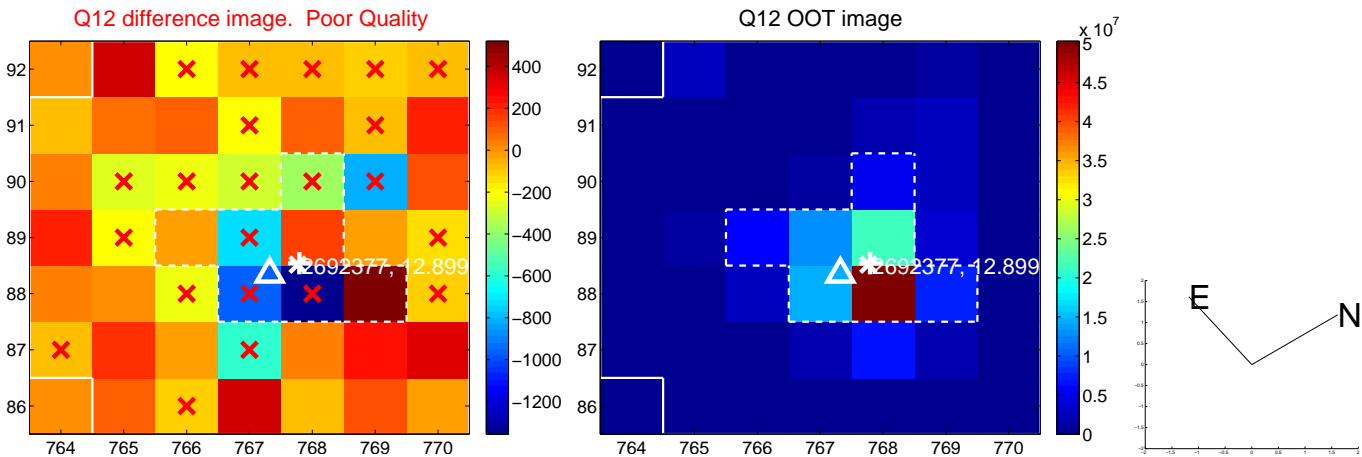
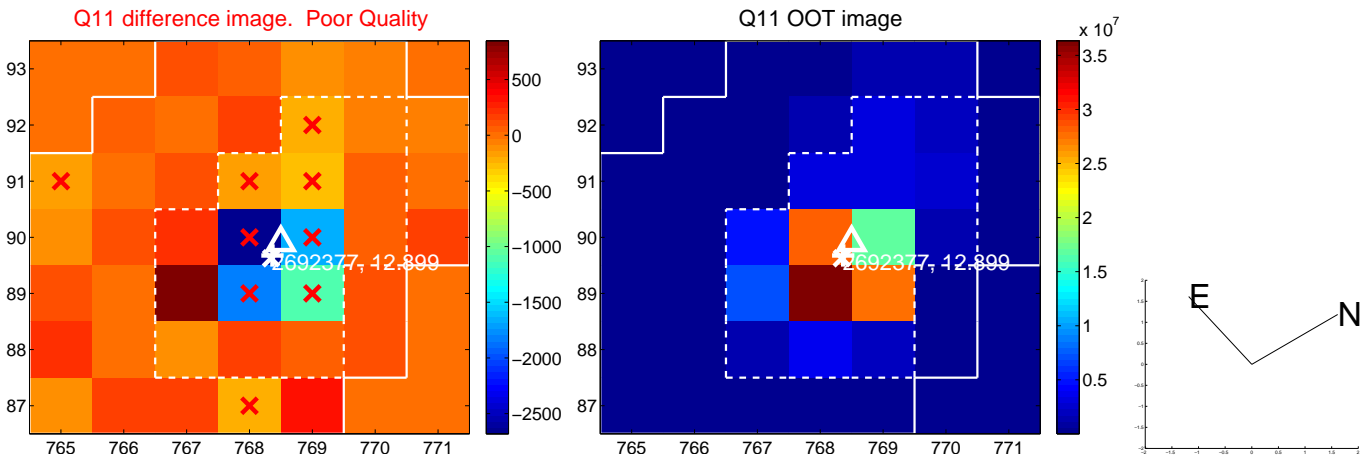
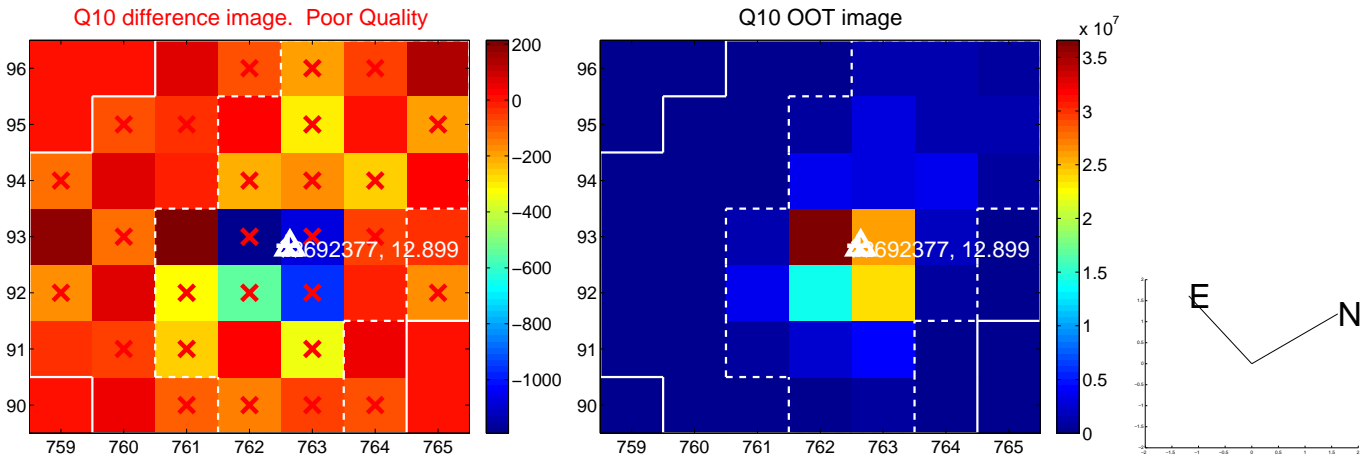
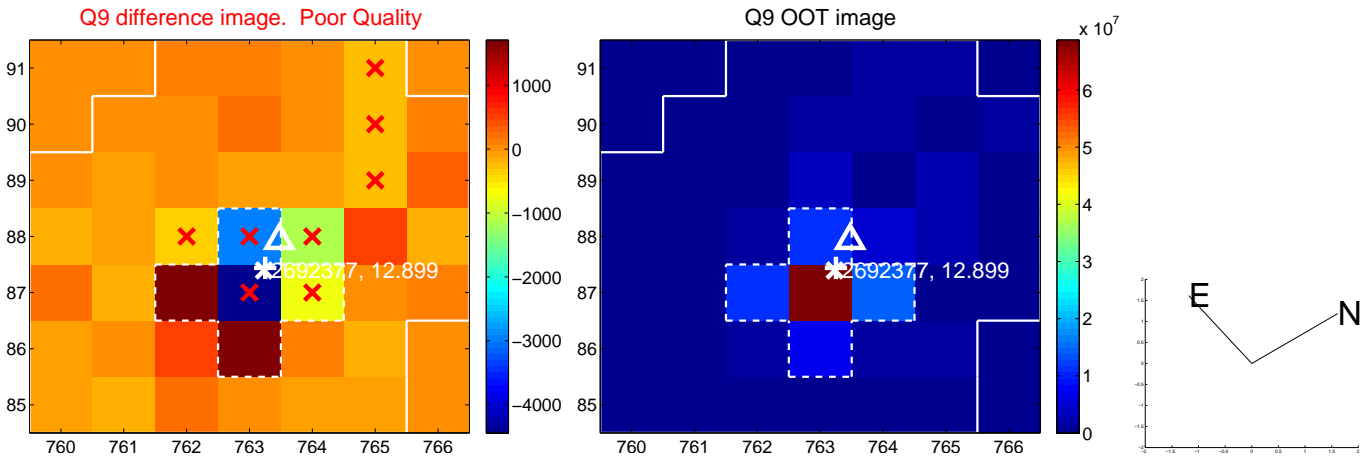
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



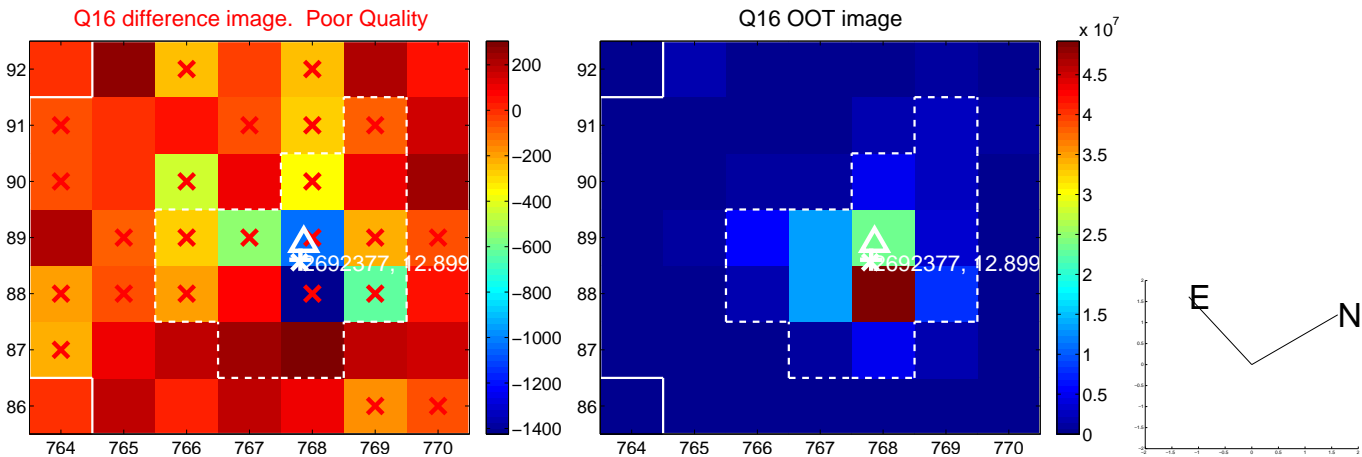
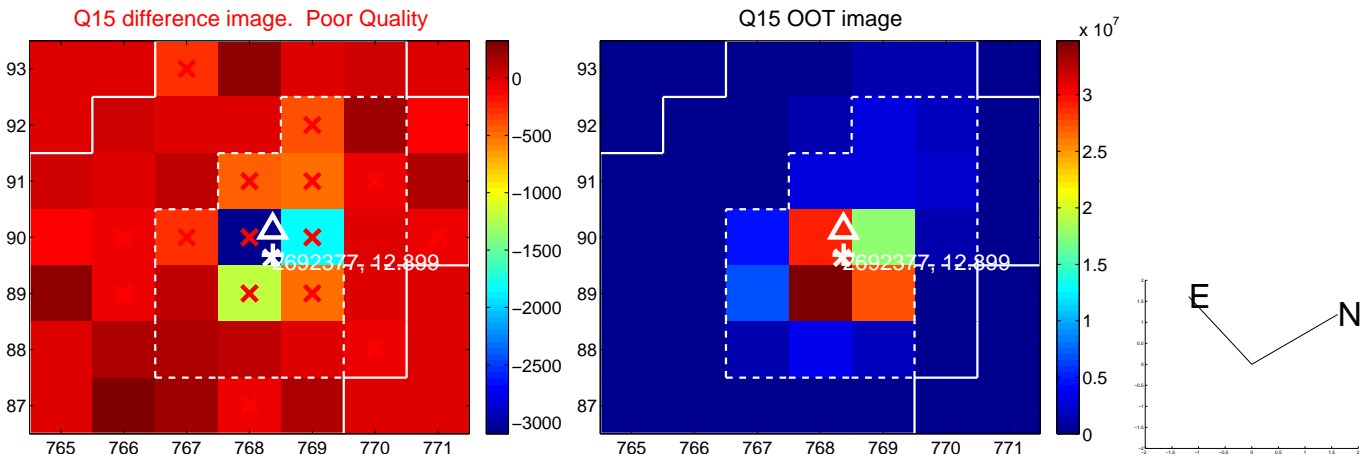
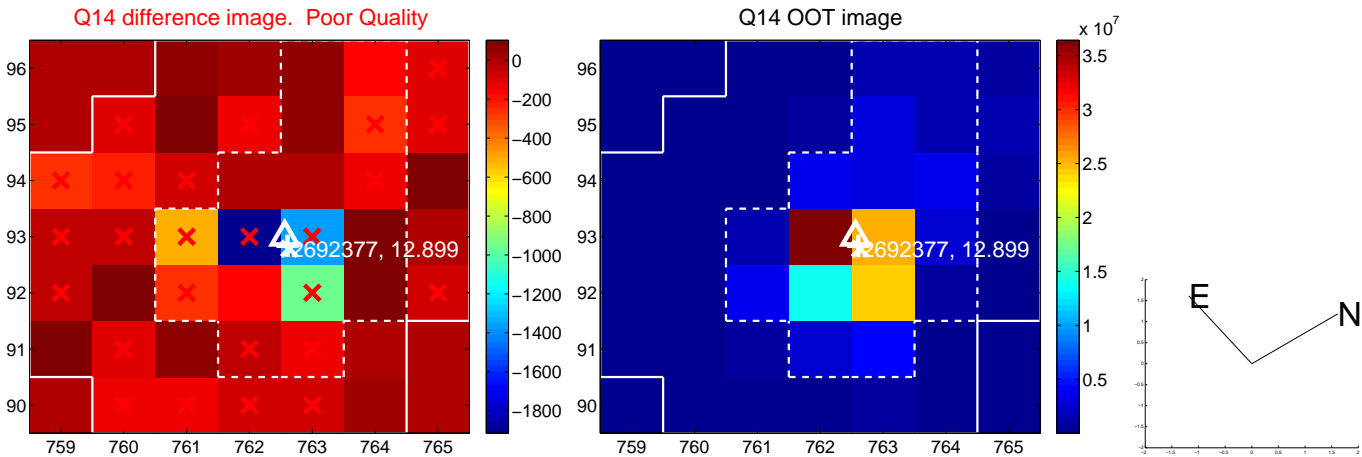
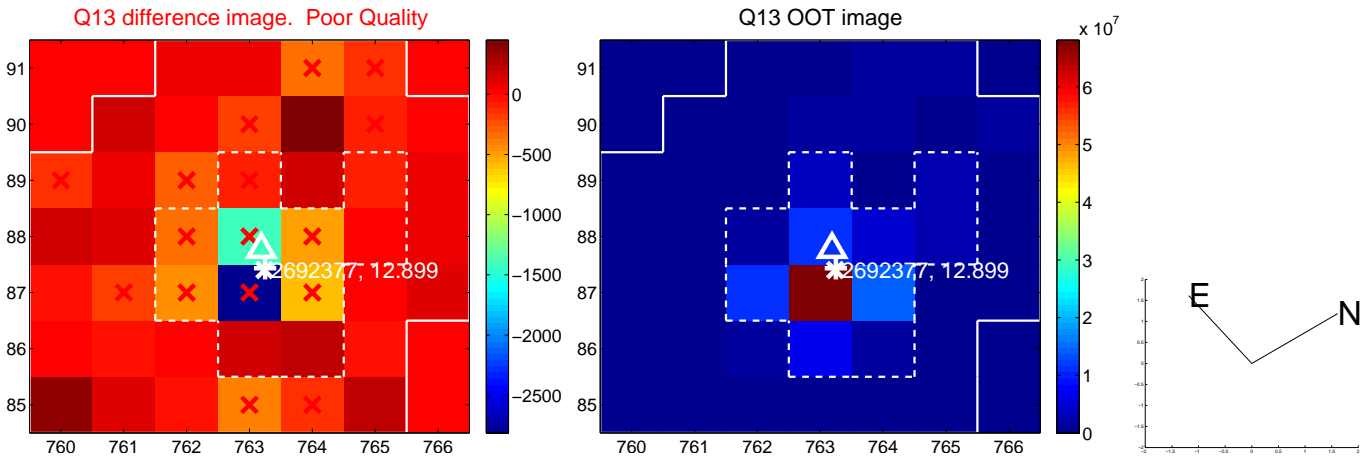
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



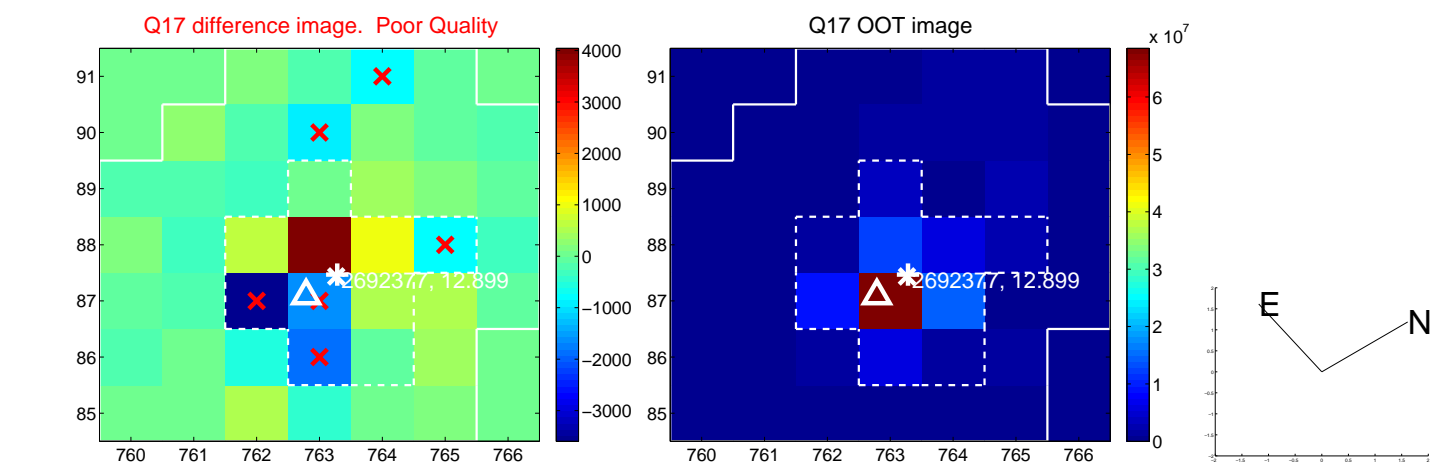
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



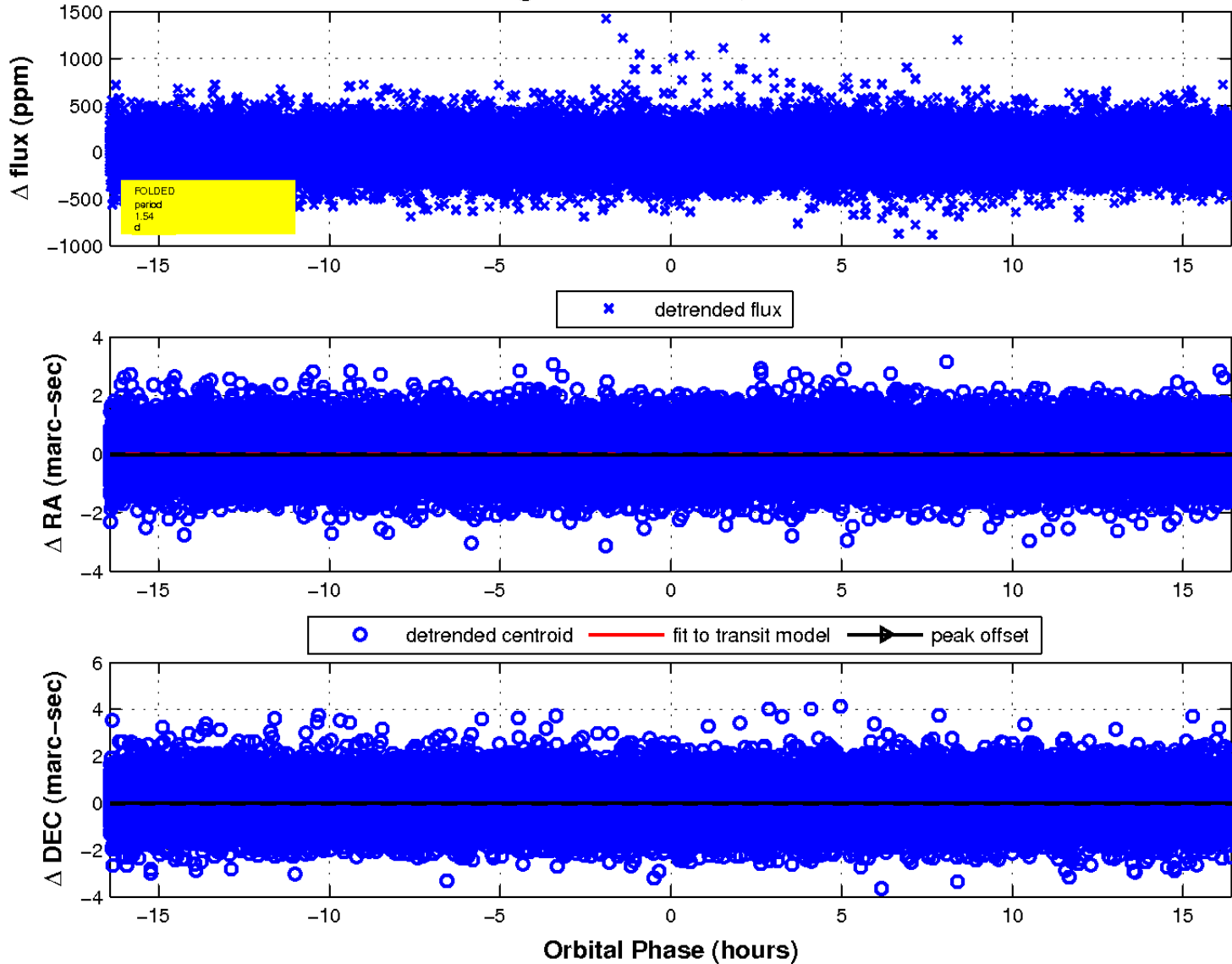
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

