

KIC 007282042

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|-----|-----------------------------|-----------------|------------------------|------------------------|
| 007282042-01 | OBS | 4718.01 | 0.566751 | 131.879577 | 10.4 | 3.324 | 9.7 | 7.8 | 1.18 | 6473 | 0.39 | 11548.84 |
| 007282042-02 | OBS | No | 63.499265 | 186.120439 | 294.5 | 4.244 | 11.2 | 9.7 | 1.18 | 6473 | 2.36 | 21.38 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 007282042-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 1 | LPP_DV—MOD_NONUNIQ_ALT—EPHEM_MATCH |
| 007282042-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—ALL_TRANS_CHASES—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 007282042-01

| TCE (1) | KIC | Parent (2) | Parent KIC | $P_1:P_2$ | Dist ($''$) | Δ Row | Δ Col | m_2 | m_1 | D_2/D_1 | Mechanism | Flag | σ_P | σ_T |
|--------------|---------|------------|------------|-----------|---------------|--------------|--------------|-------|-------|-----------|------------|------|------------|------------|
| 007282042-01 | 7282042 | RR-Lyr-pri | 7198959 | 1:1 | 1127.9 | 112 | 260 | 7.86 | 13.45 | 62330.00 | Direct-PRF | 0 | 0.72 | 20.62 |

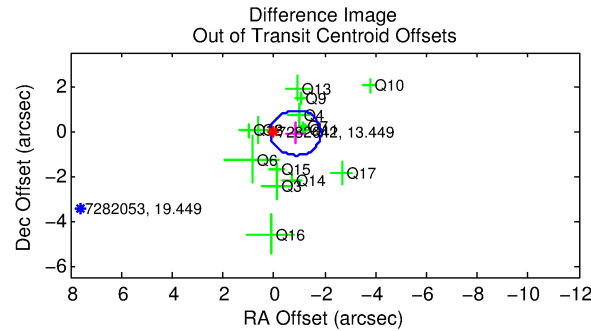
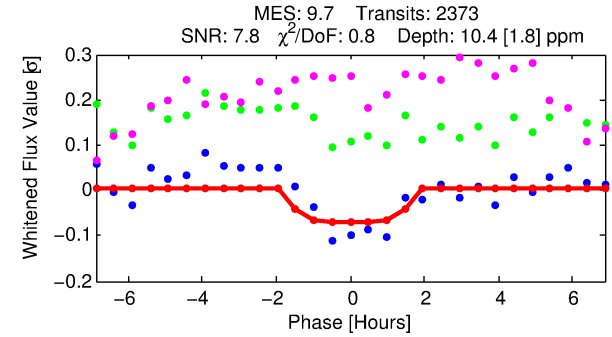
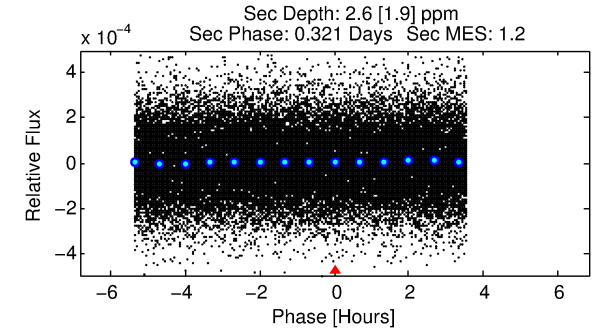
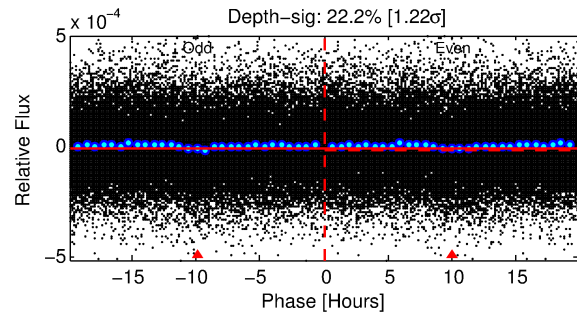
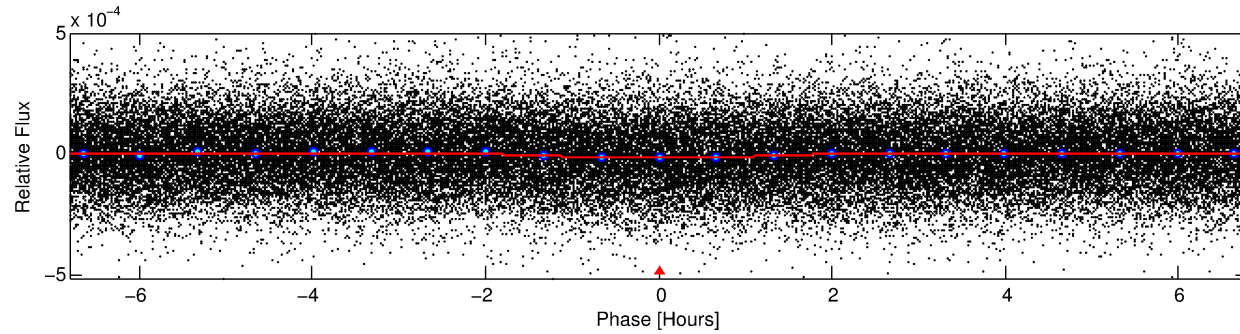
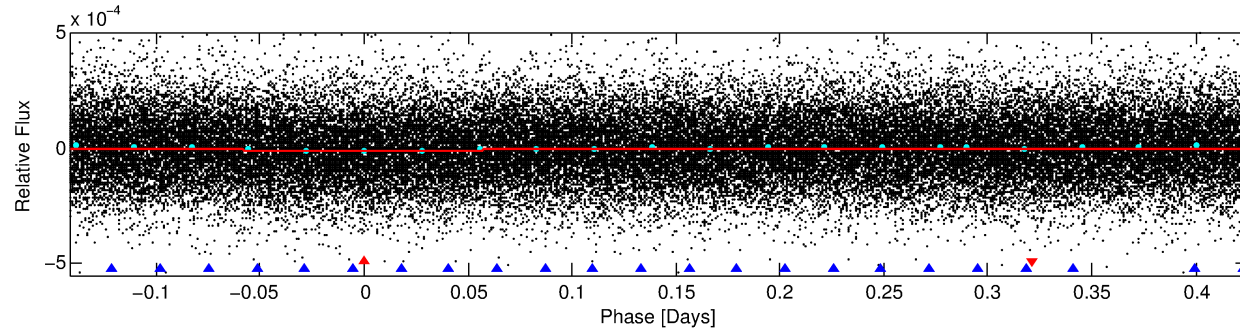
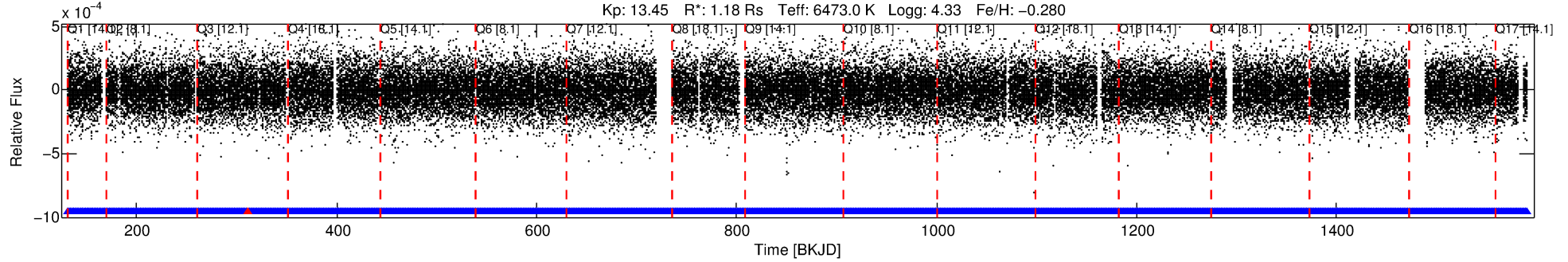
Notes: $P_1:P_2$ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m_2 and m_1 are the magnitudes of the parent and child. D_2/D_1 is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match in period and epoch. For a match to be considered significant $\sigma_P < 5.0$ and $\sigma_T < 5.0$. Matches which have σ_P and σ_T very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

DV One-Page Summary

KIC: 7282042 Candidate: 1 of 2 Period: 0.567 d

KOI: K04718 Corr: No Ephemeris Match

Kp: 13.45 R*: 1.18 Rs Teff: 6473.0 K Logg: 4.33 Fe/H: -0.280



DV Fit Results:

Period = 0.56675 [0.00001] d
Epoch = 131.8796 [0.0049] BKJD
Rp/R* = 0.0030 [0.0029]
a/R* = 1.41 [3.63]
b = 0.31 [15.52]
Seff = 11548.84 [3294.95]
Teq = 2643 [189] K
Rp = 0.39 [0.38] Re
a = 0.0138 [0.0025] AU
Ag = 1.79 [3.74] [0.21σ]
Teffp = 4730 [2453] K [0.85σ]

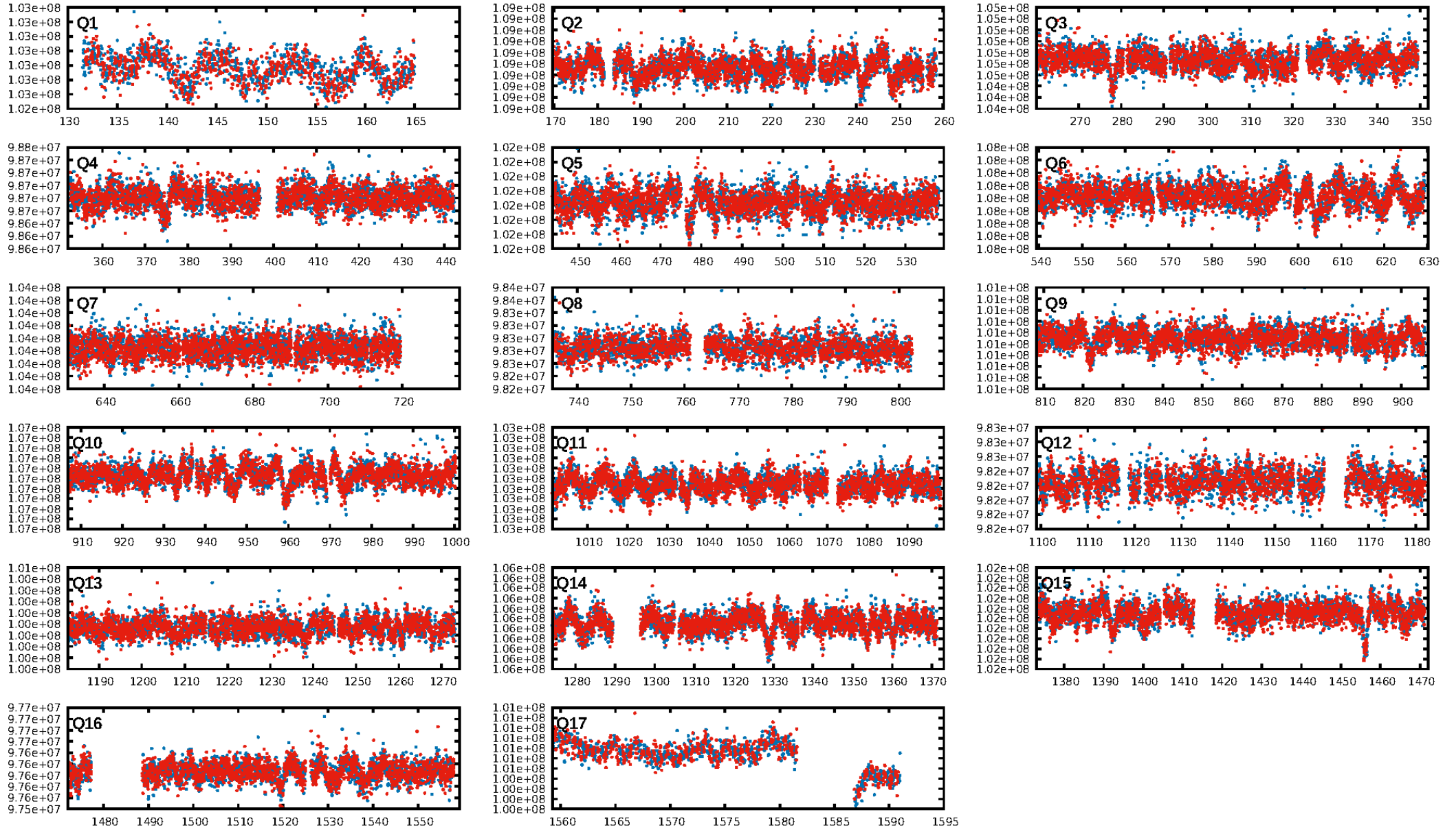
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [280.20σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 4.79e-15
RollingBand-fgt: 1.00 [2266/2267]
GhostDiagnostic-chr: 0.5476
Centroid-sig: 0.0%
Centroid-so: 6.149 arcsec [4.11σ]
OotOffset-rm: 0.869 arcsec [2.60σ]
KicOffset-rm: 0.965 arcsec [3.02σ]
OotOffset-st: 3/4/4/3 [14]
KicOffset-st: 3/4/4/3 [14]
DiffImageQuality-fgm: 0.57 [8/14]
DiffImageOverlap-fno: 1.00 [17/17]

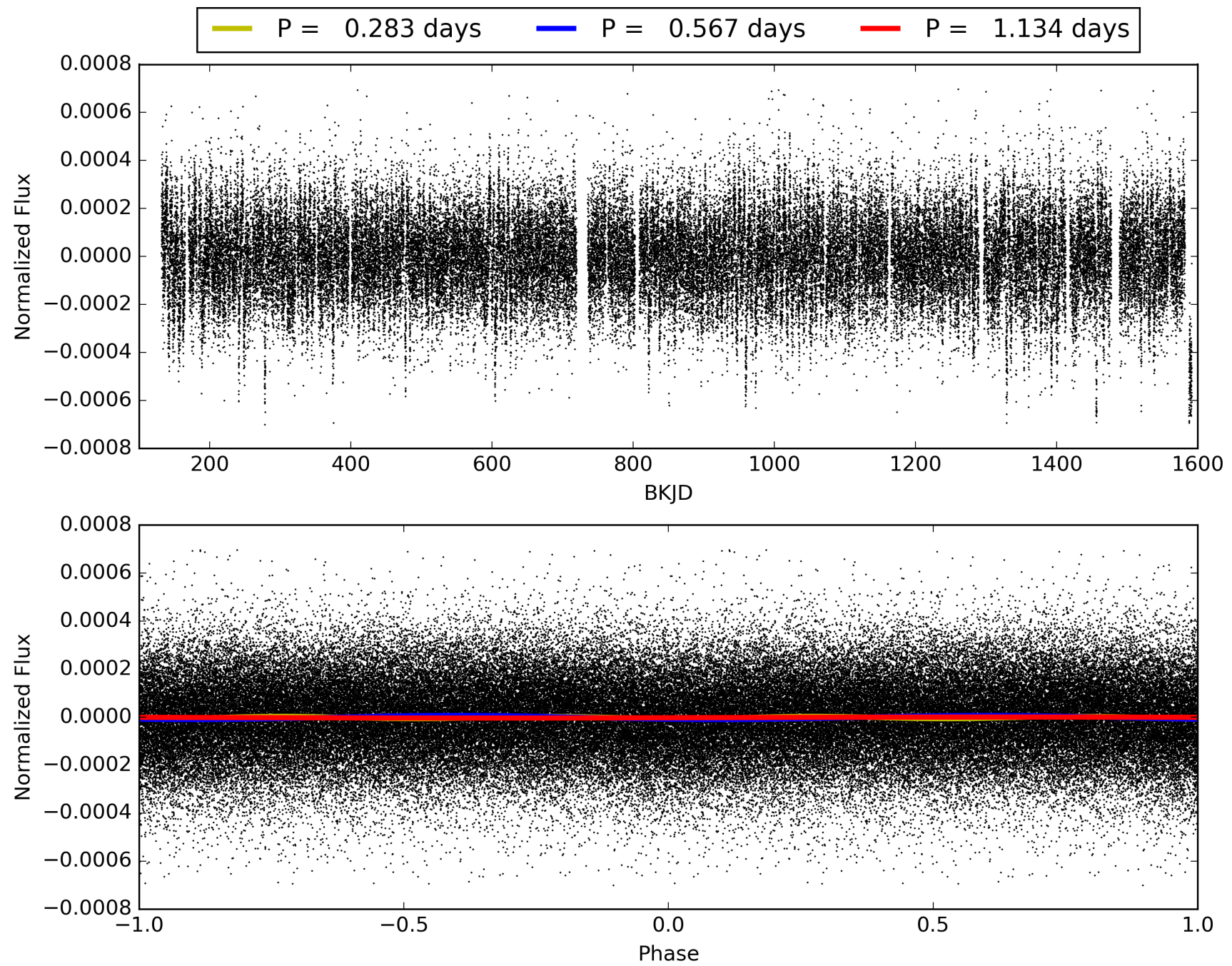
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 16:16:22 Z

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

TCE 007282042-01, PDC Light Curves

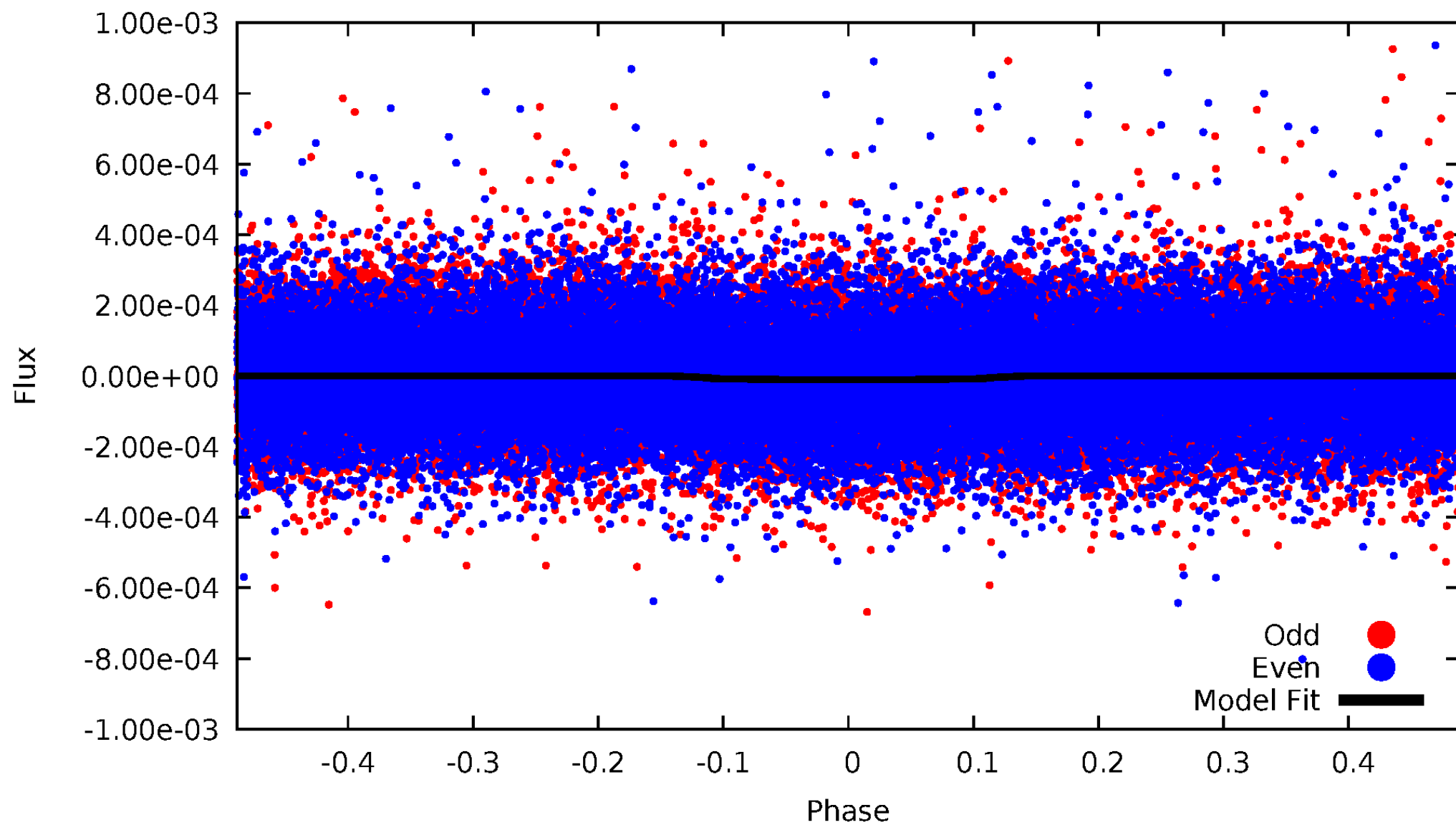


TCE 007282042-01



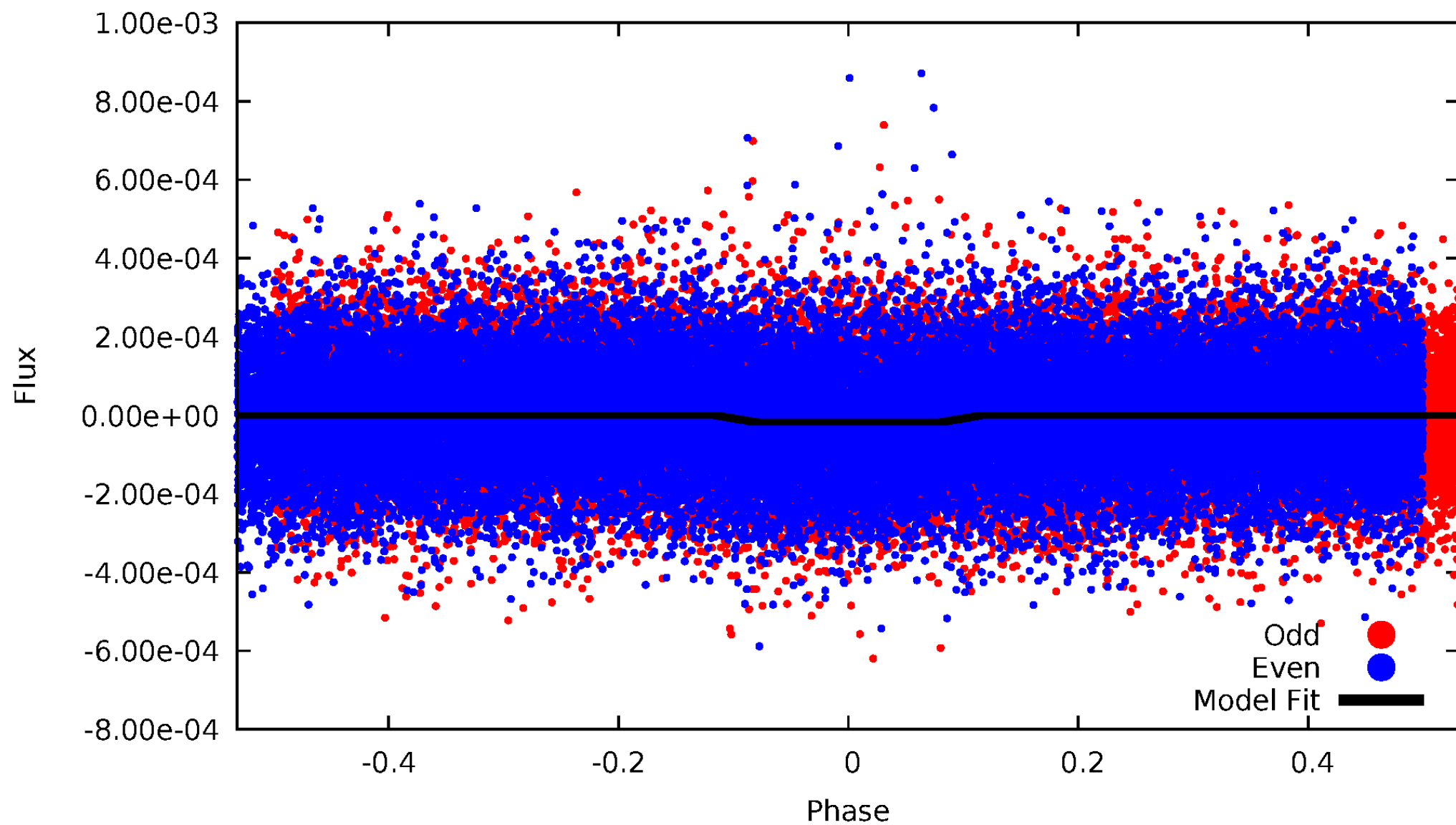
DV Odd/Even

TCE 007282042-01



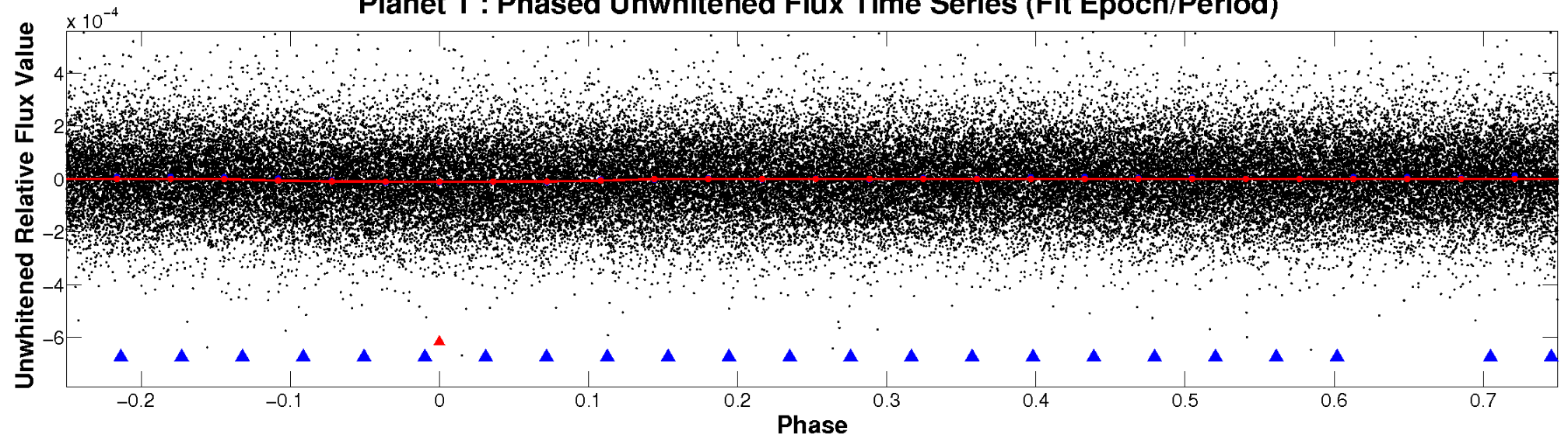
ALT Odd/Even

TCE 007282042-01

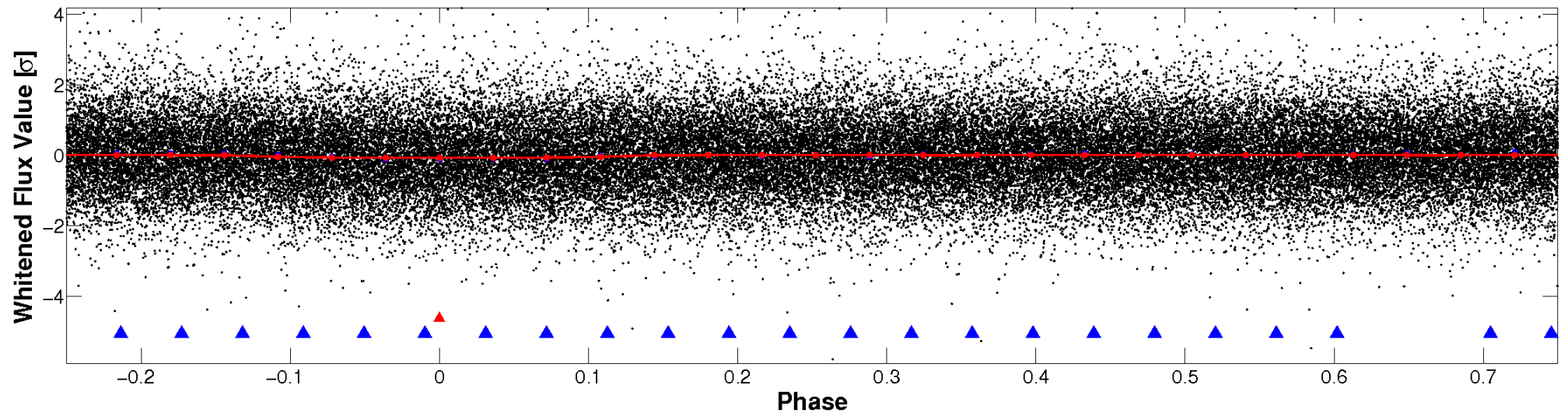


Non-Whitened Vs. Whitened Light Curve

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

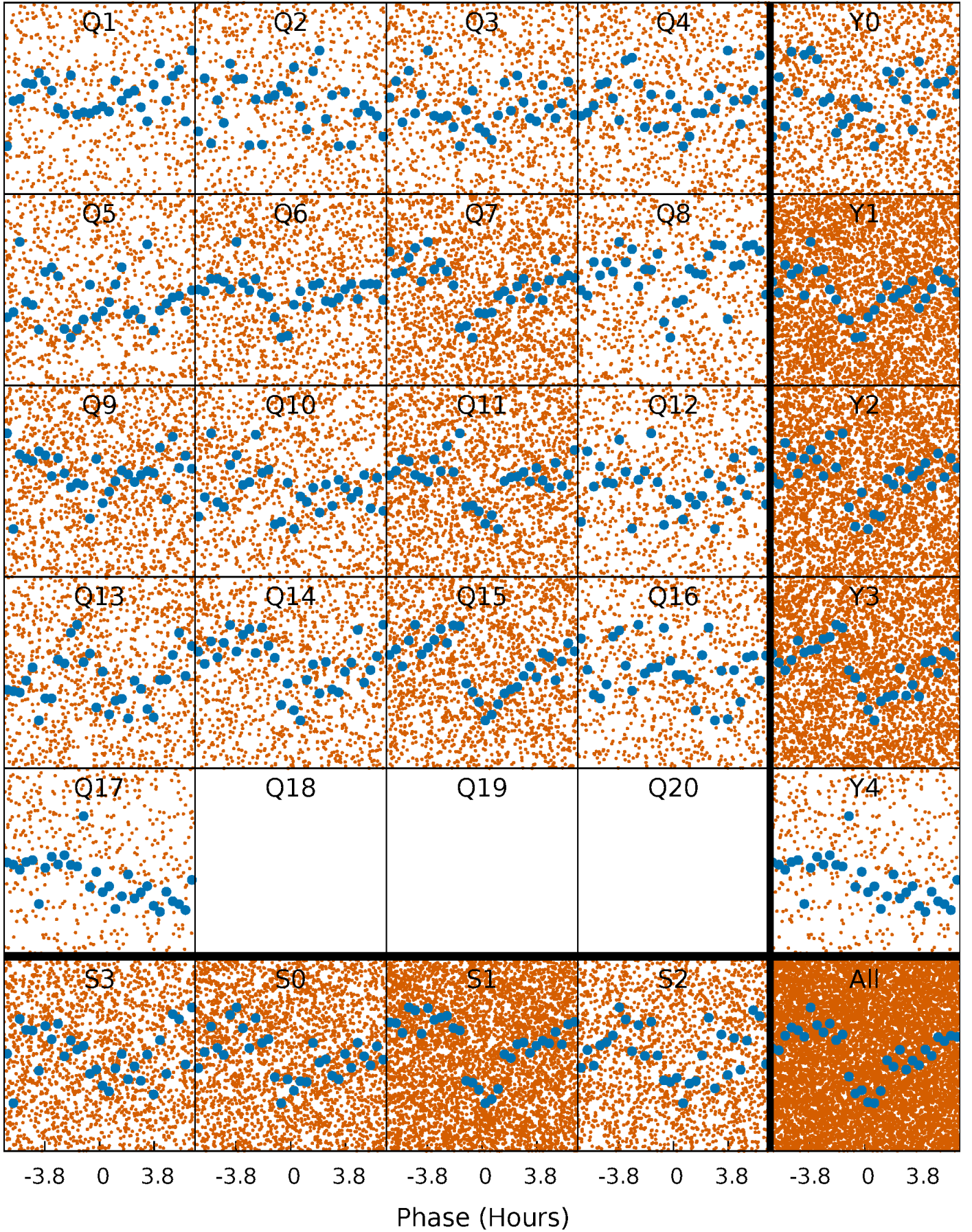


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



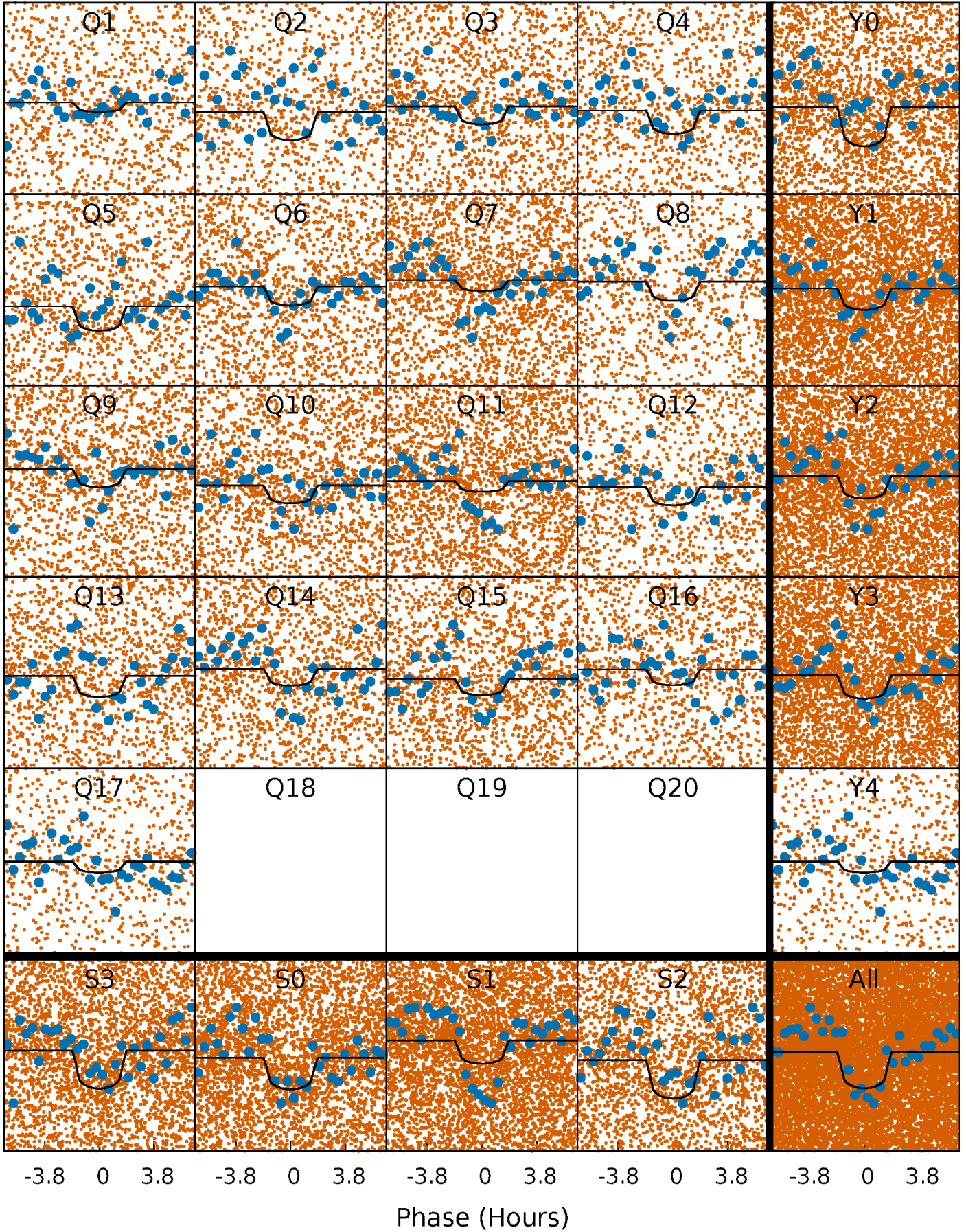
PDC Quarter-Phased Transit Curves

TCE 007282042-01 P= 0.566751 Days $T_0=131.879577$ (BKJD)



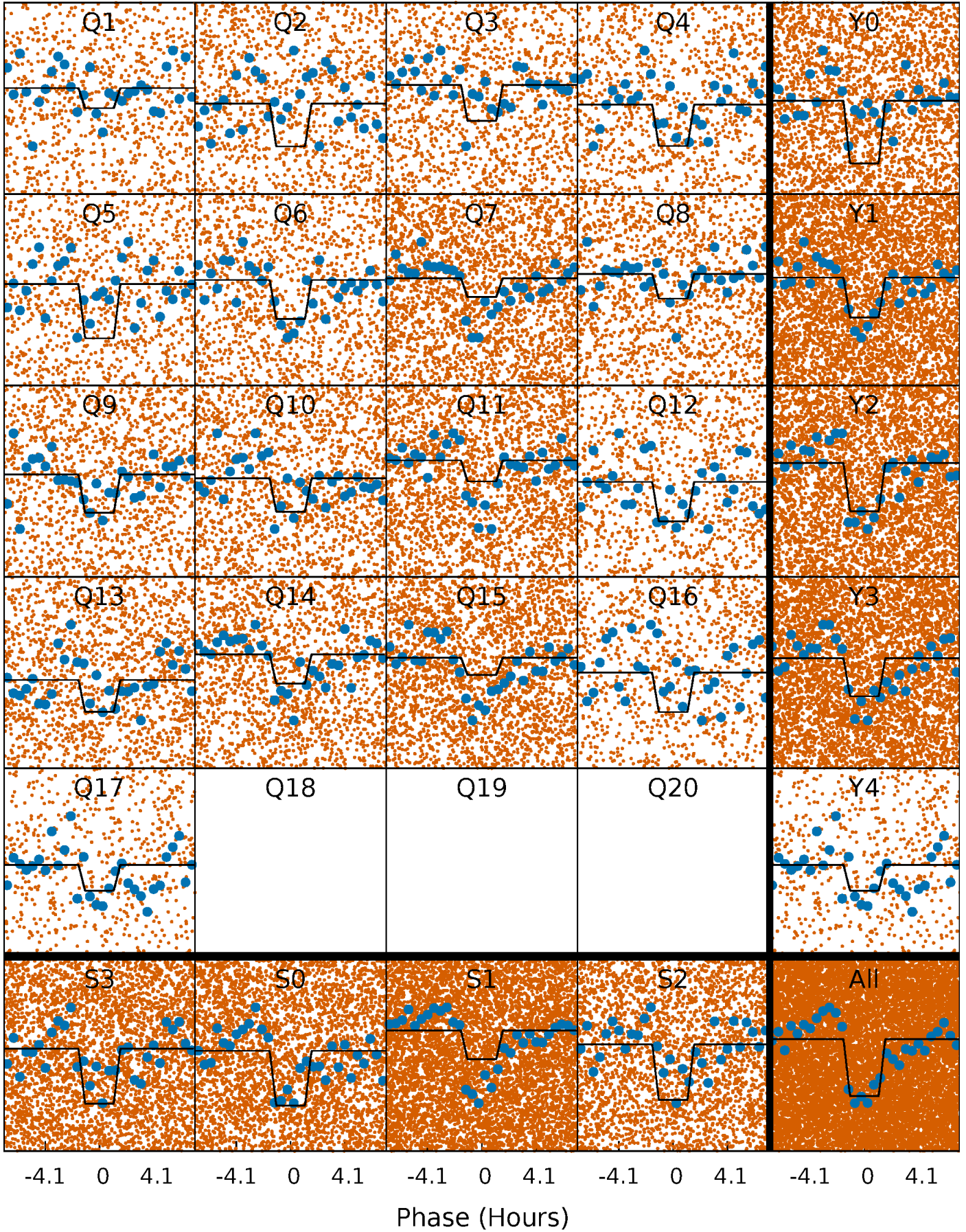
DV Quarter-Phased Transit Curves

TCE 007282042-01 P= 0.566751 Days $T_0=131.879577$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

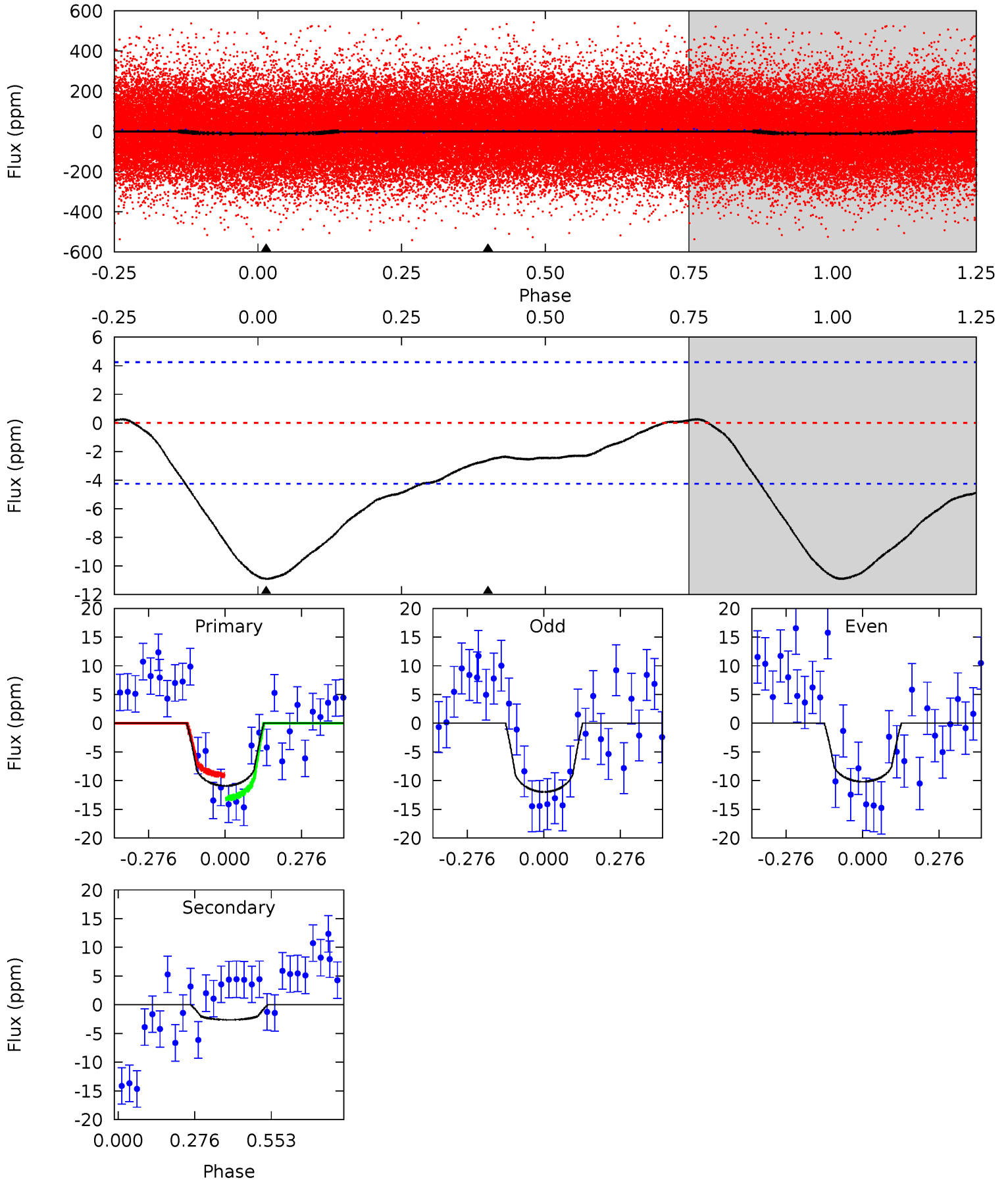
TCE 007282042-01 P= 0.566788 Days $T_0=131.829145$ (BKJD)



DV Model-Shift Uniqueness Test

007282042-01, P = 0.566751 Days, E = 131.312826 Days

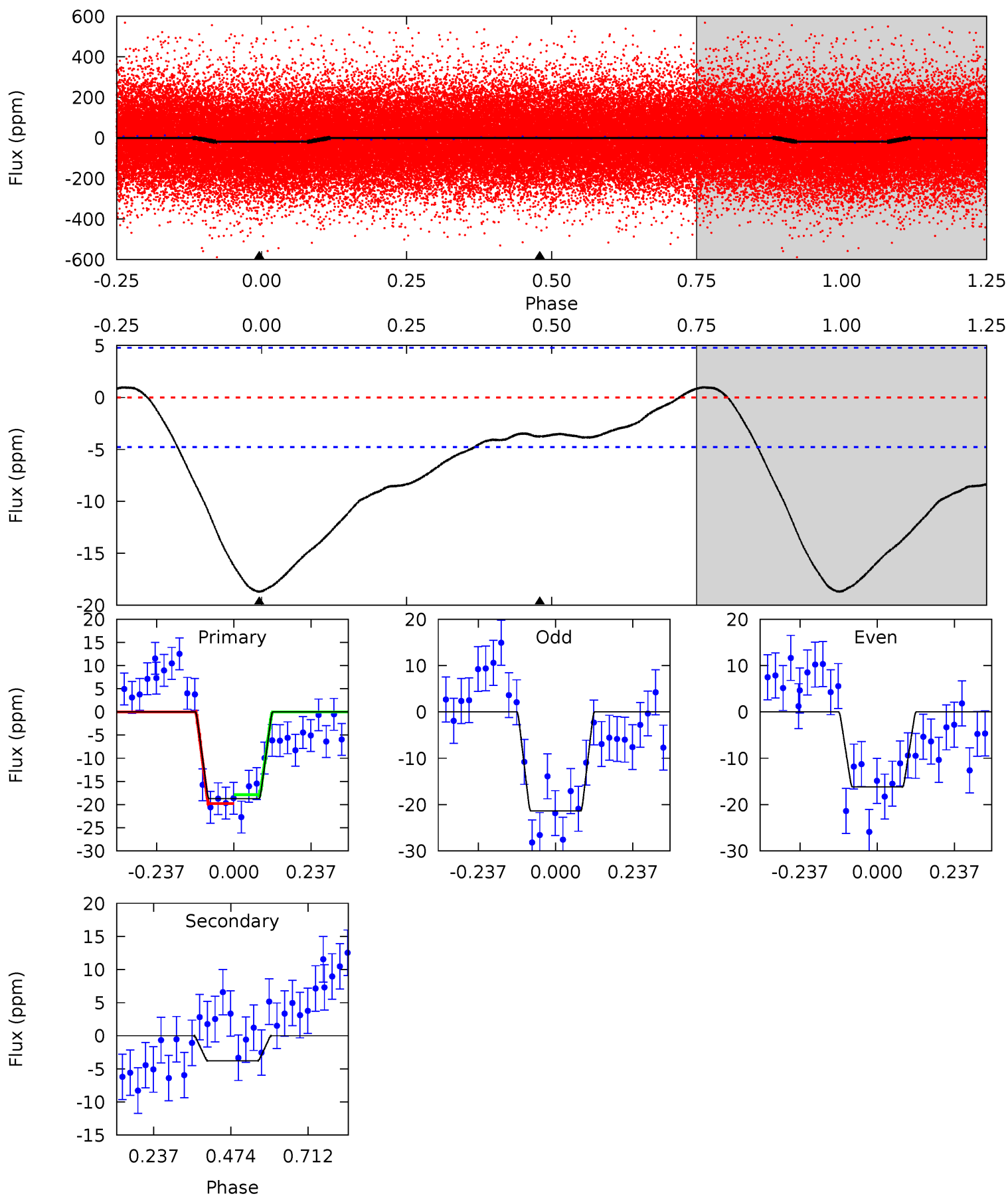
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 11.2 | 2.68 | 0 | 0 | 4.35 | 1.09 | 0.31 | 11.2 | 11.2 | 2.68 | 2.68 | 0.92 | 0.90 | 0.02 | 2.03 |



Alt Model-Shift Uniqueness Test

007282042-01, P = 0.566788 Days, E = 131.262357 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 17.2 | 3.46 | 0 | 0 | 4.38 | 1.18 | 3.89 | 17.2 | 17.2 | 3.46 | 3.46 | 2.37 | 0.97 | 0.05 | 0.88 |



Stellar Parameters For KIC 007282042

| | $T_{\text{eff}}(K)$ | $\log(g)$ | $[\text{Fe}/\text{H}]$ | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 6473^{+146}_{-195} | $4.330^{+0.092}_{-0.138}$ | $-0.280^{+0.250}_{-0.300}$ | $1.182^{+0.263}_{-0.162}$ | $1.087^{+0.146}_{-0.119}$ | $0.927^{+0.377}_{-0.371}$ |
| | +2%/-3% | +2%/-3% | +89%/-107% | +22%/-14% | +13%/-11% | +41%/-40% |
| Source | PHO1 | FLK73 | KIC0 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 007282042-01 / KOI 4718.01

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{max} (K)$ | $T_{obs} (K)$ | A_{obs} |
|---------|-------------|------------------------|----------------------|------------------------|---------------------------|
| DV | -3 ± 1 | $0.46^{+0.36}_{-0.29}$ | 3711^{+203}_{-177} | 4286^{+2931}_{-1482} | $1.245^{+8.183}_{-0.886}$ |
| Alt. | -4 ± 1 | $0.61^{+0.37}_{-0.33}$ | 3713^{+200}_{-182} | 4081^{+1940}_{-1175} | $1.031^{+4.068}_{-0.647}$ |

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

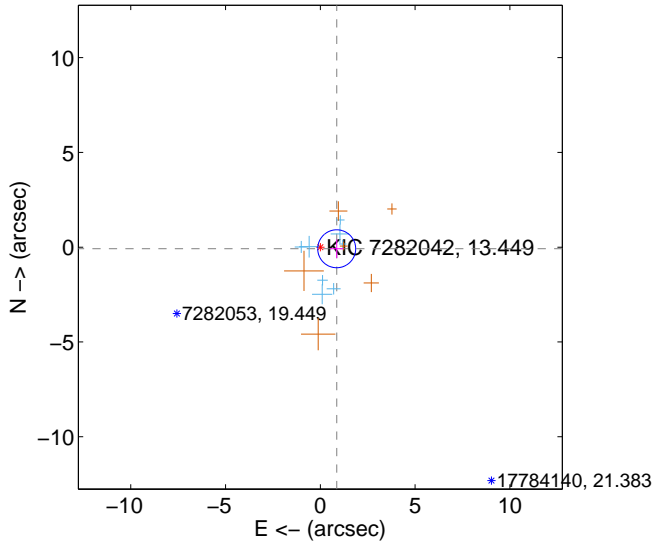
Supplemental centroid analysis for 007282042-01. Kepler magnitude: 13.45. Transit SNR 7.78

There are 8 quarters with good PRF difference image offsets

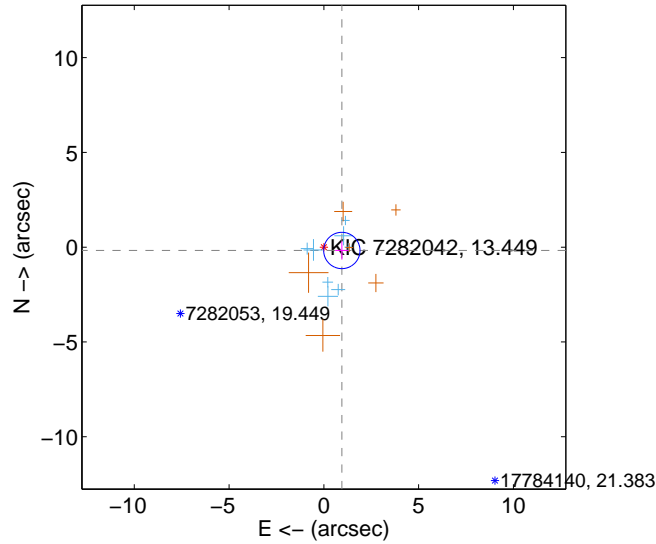
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 0.869 ± 0.334 | 2.60 | -0.864 ± 0.350 | -0.084 ± 0.492 |
| PRF-fit source offset from KIC position | 0.965 ± 0.319 | 3.02 | -0.949 ± 0.352 | -0.175 ± 0.481 |
| photometric centroid source offset | 6.15 ± 1.50 | 4.11 | -5.14 ± 1.48 | -3.37 ± 1.54 |

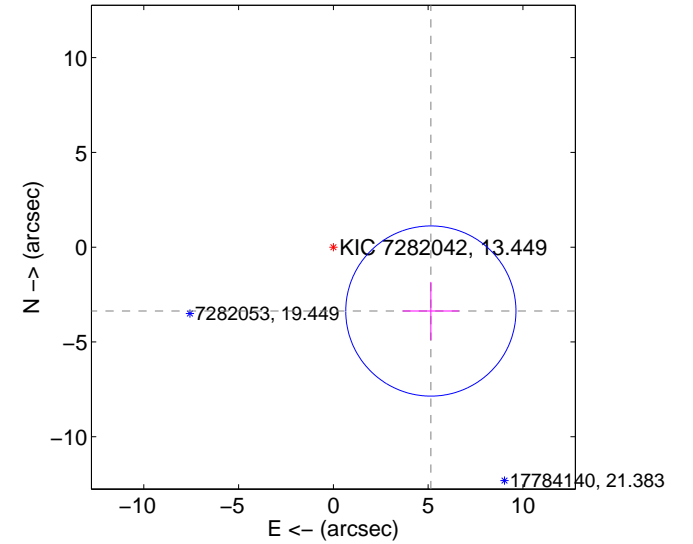
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

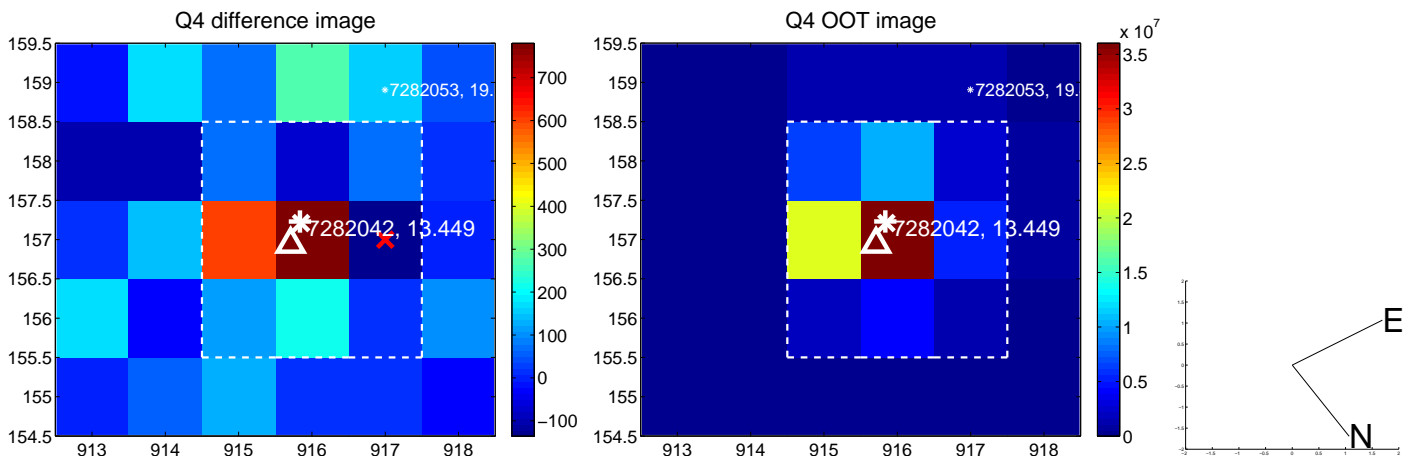
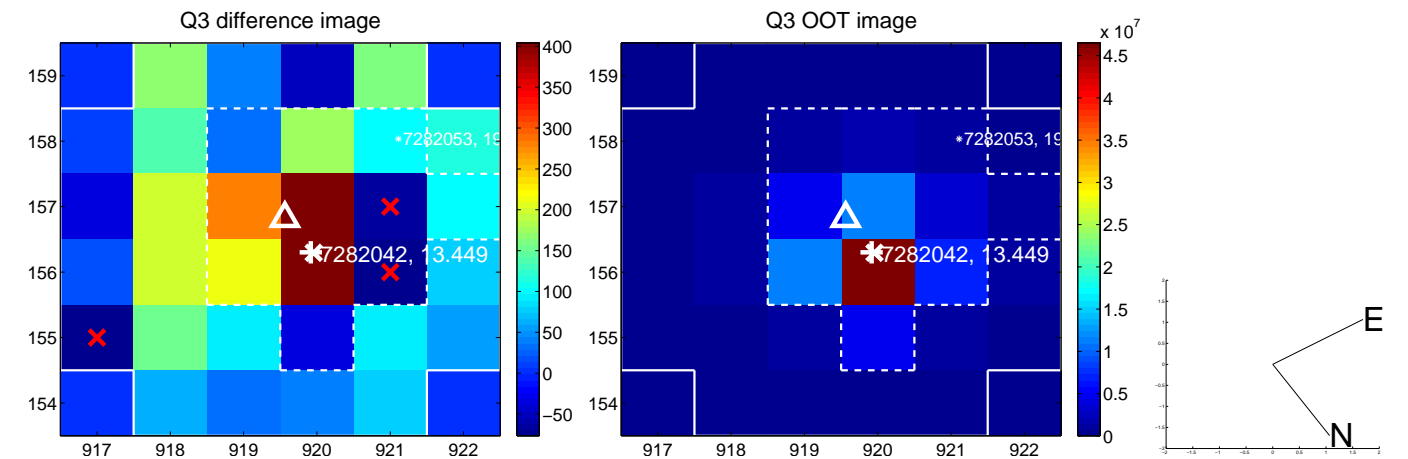
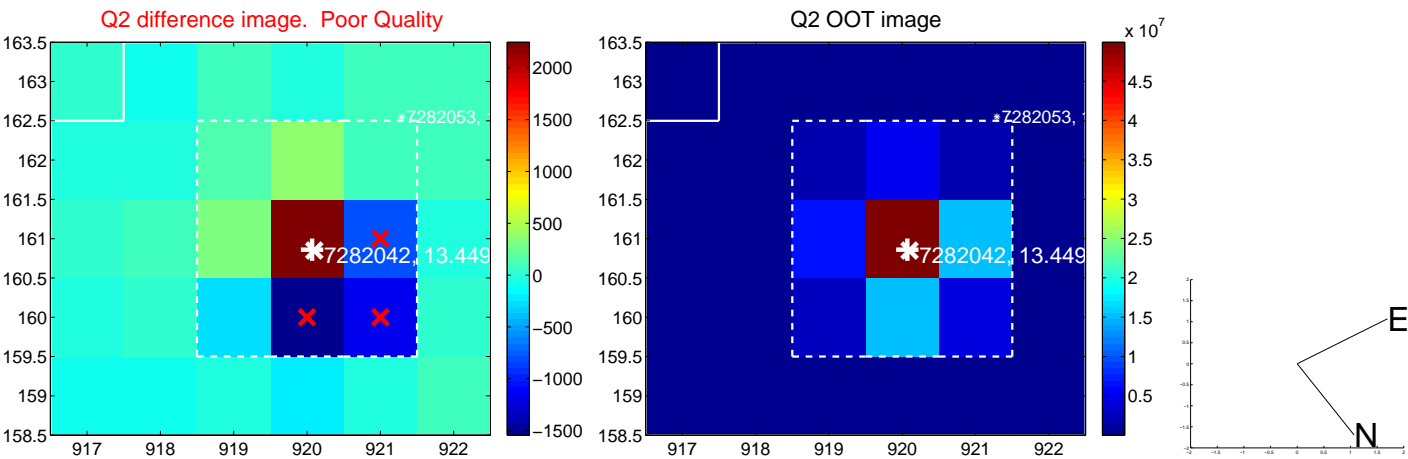
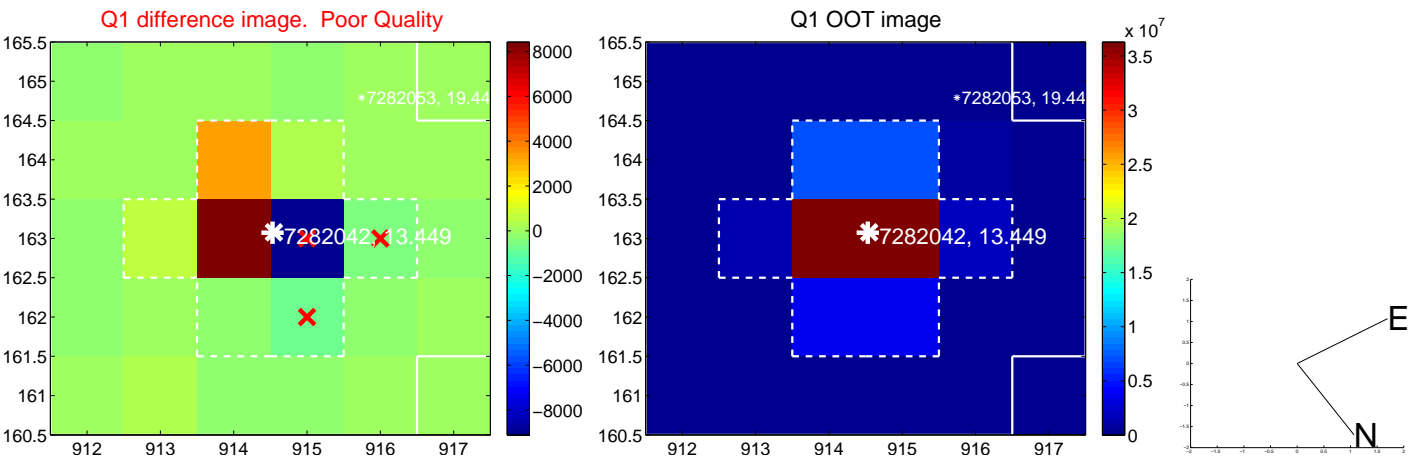


offset from photometric centroids

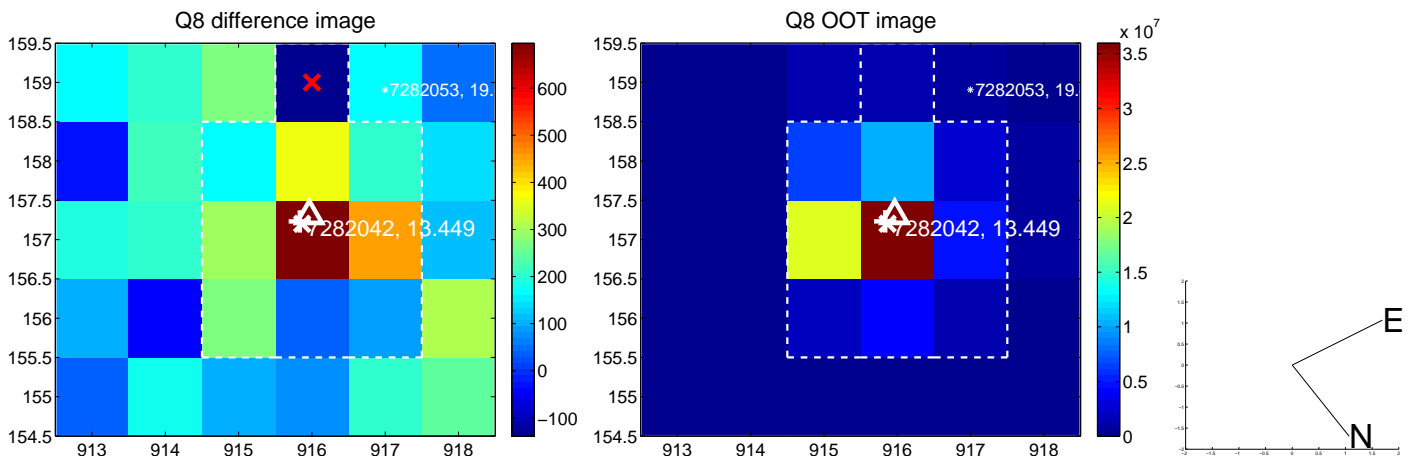
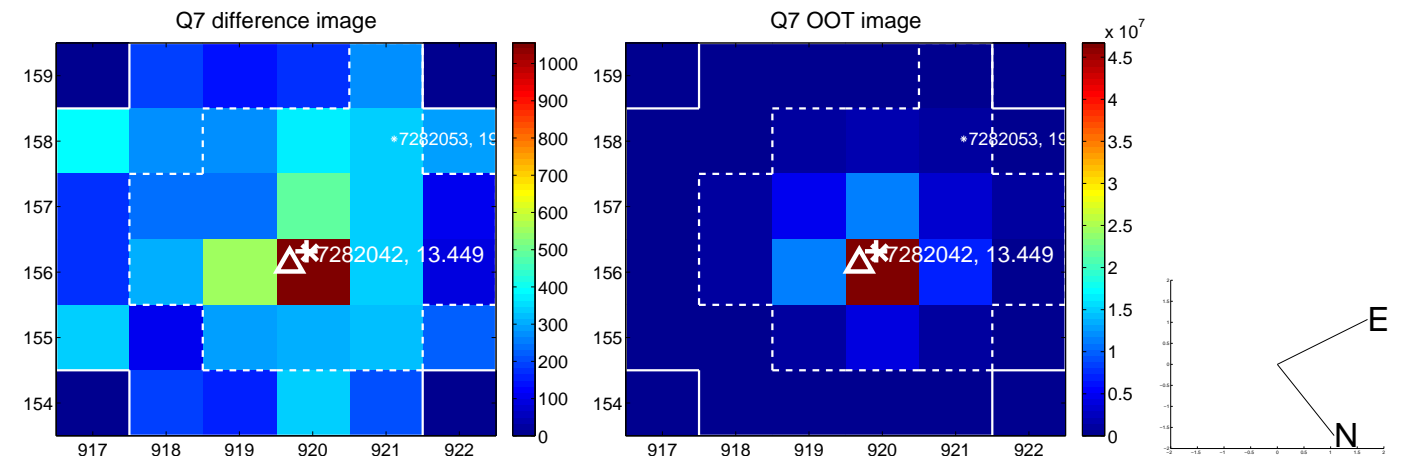
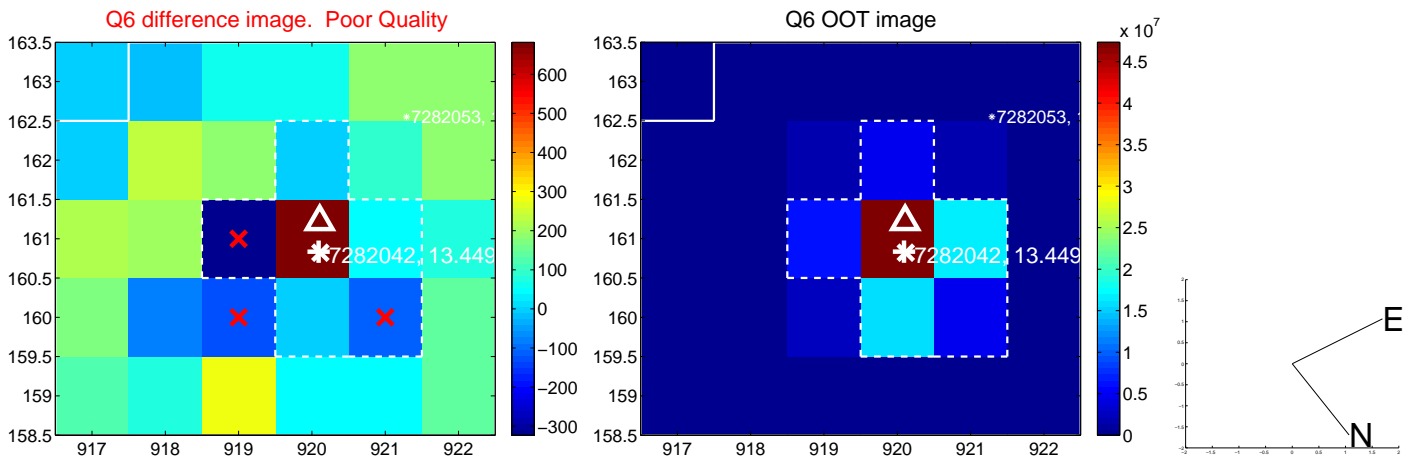
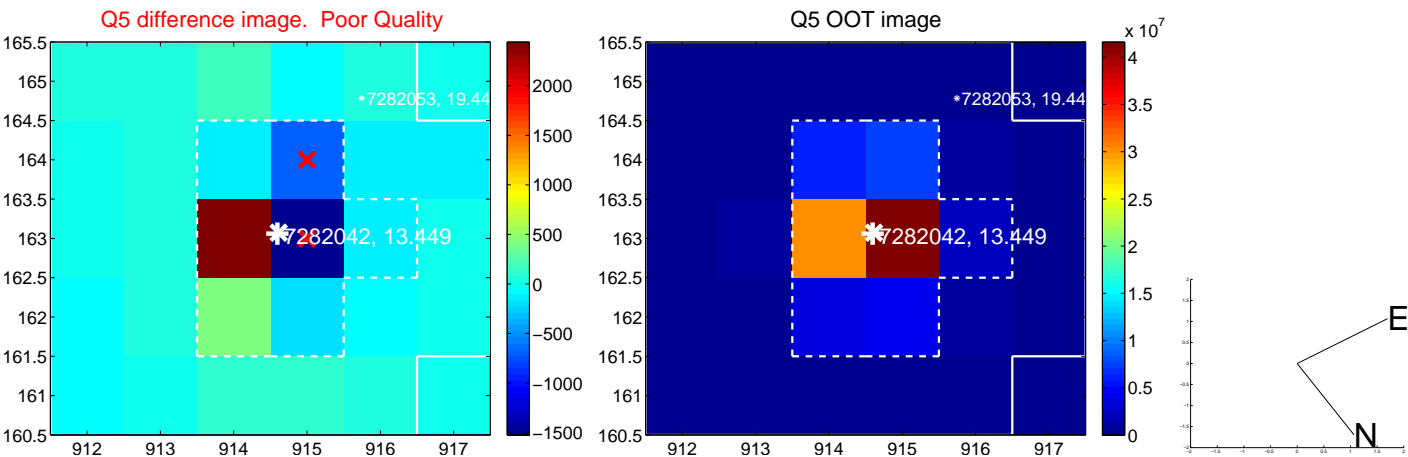


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

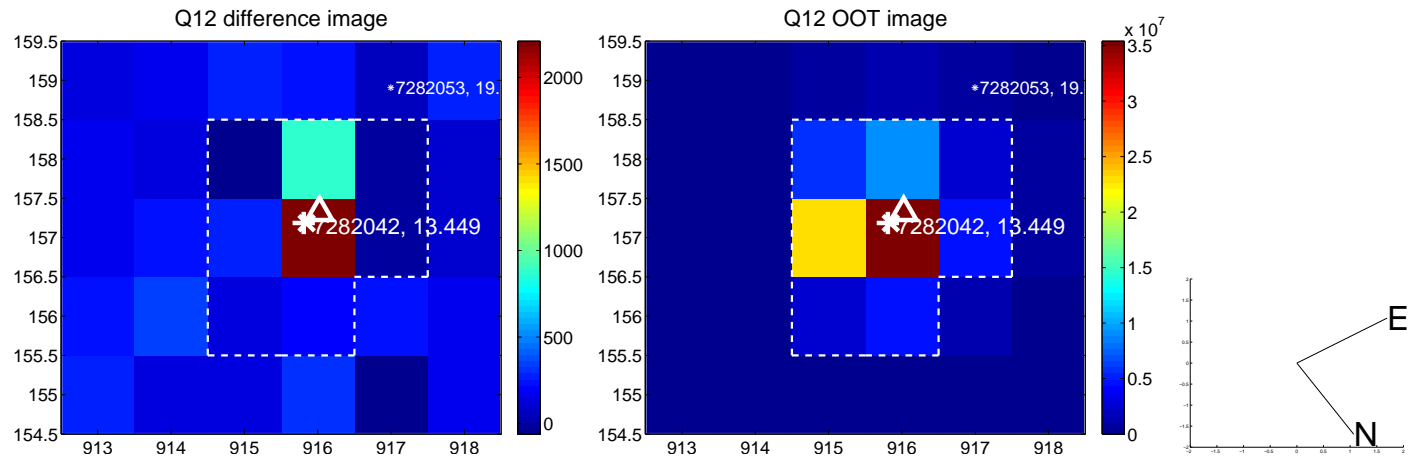
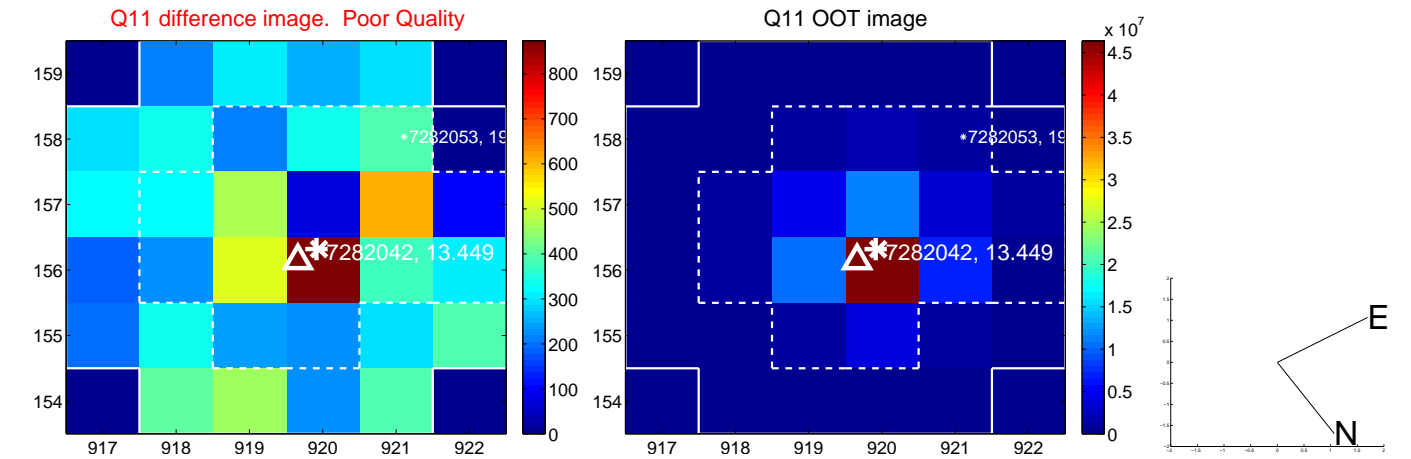
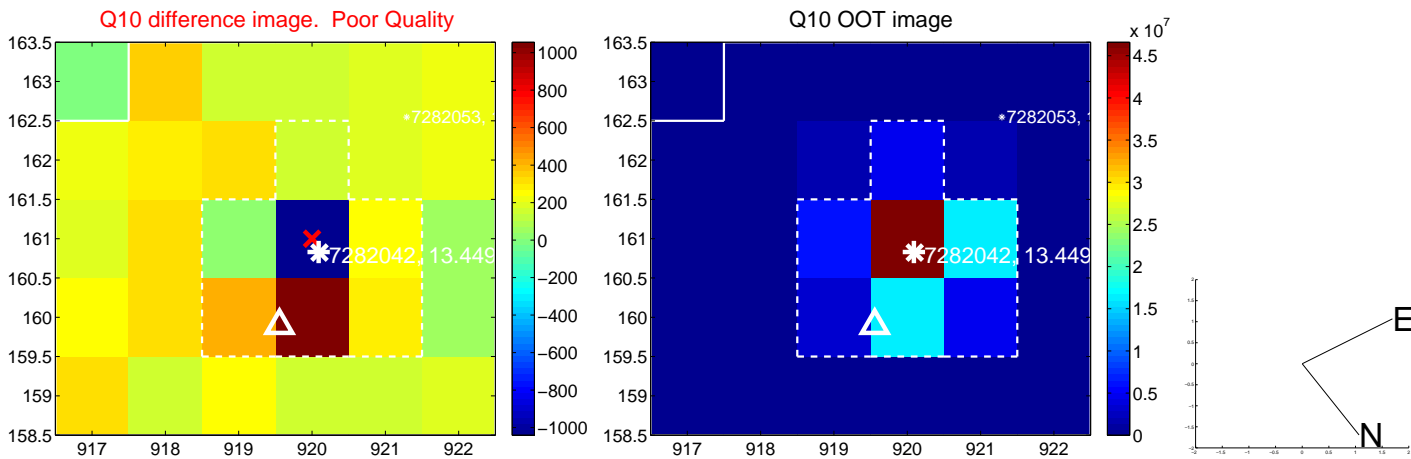
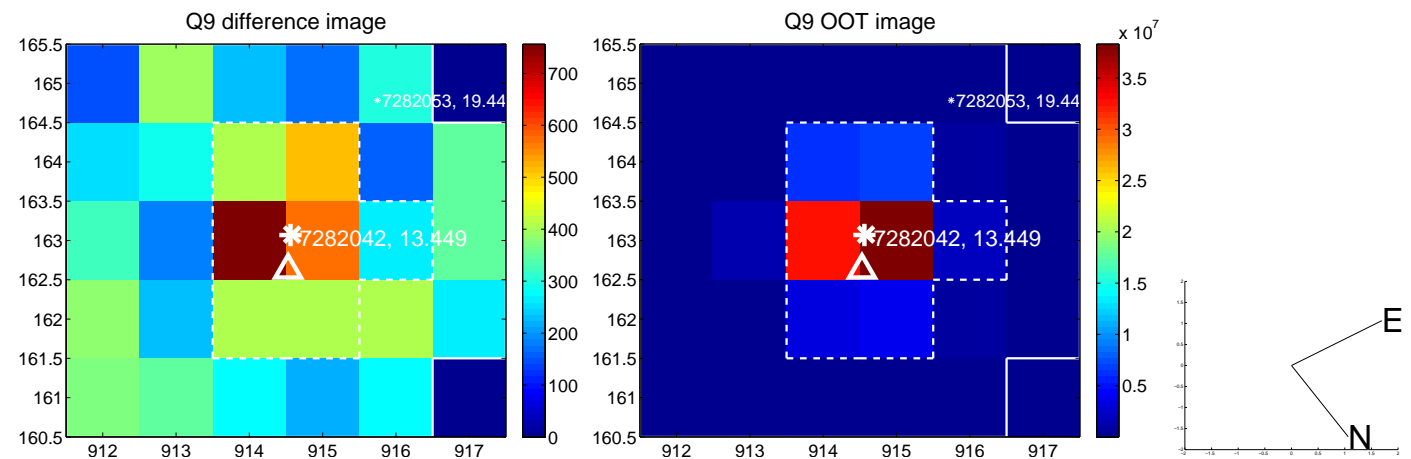
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



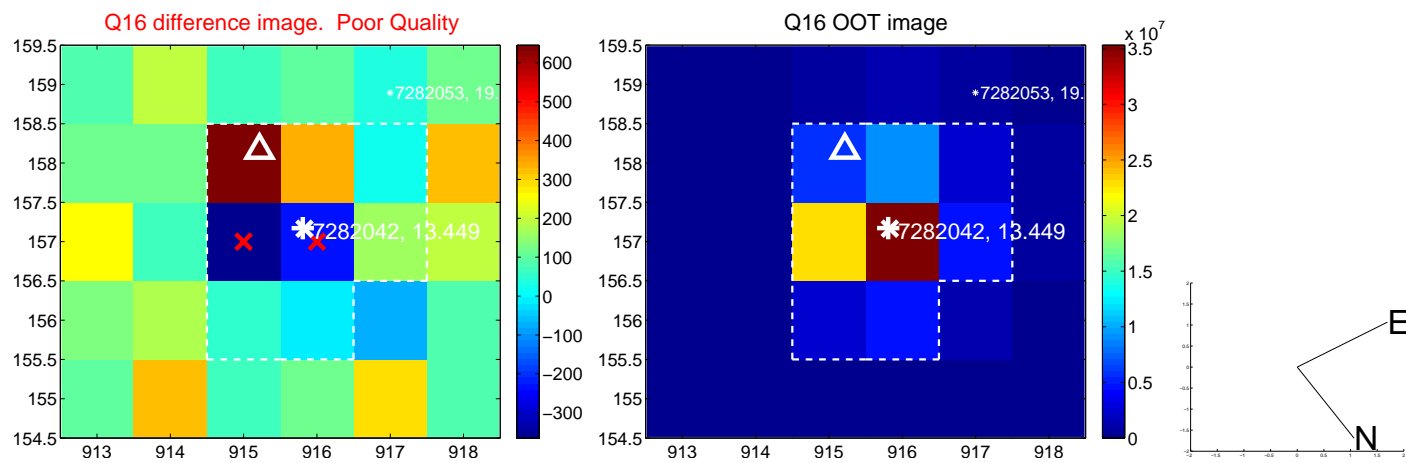
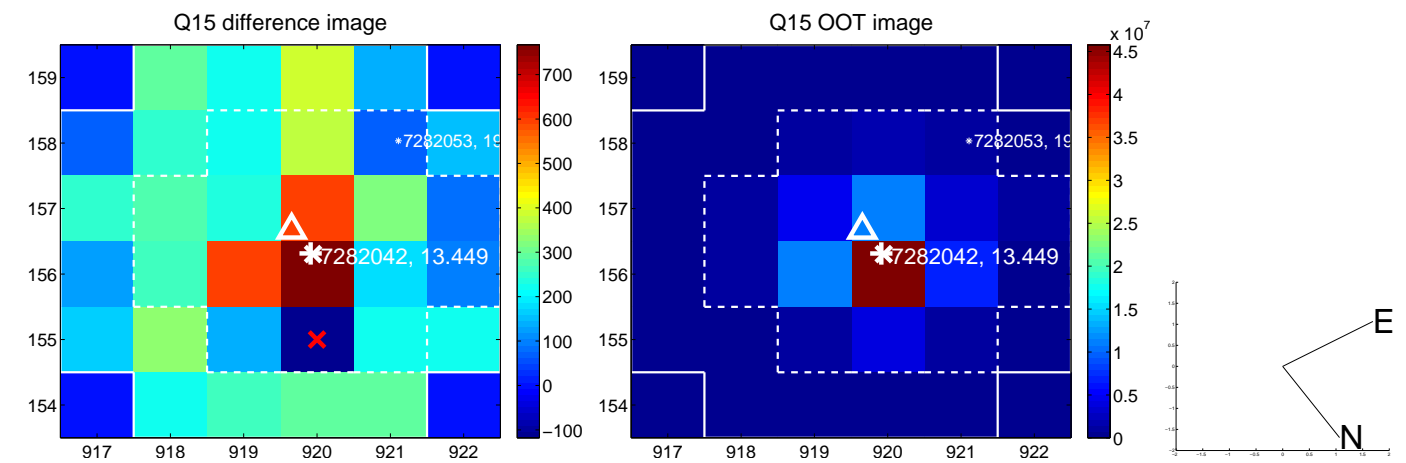
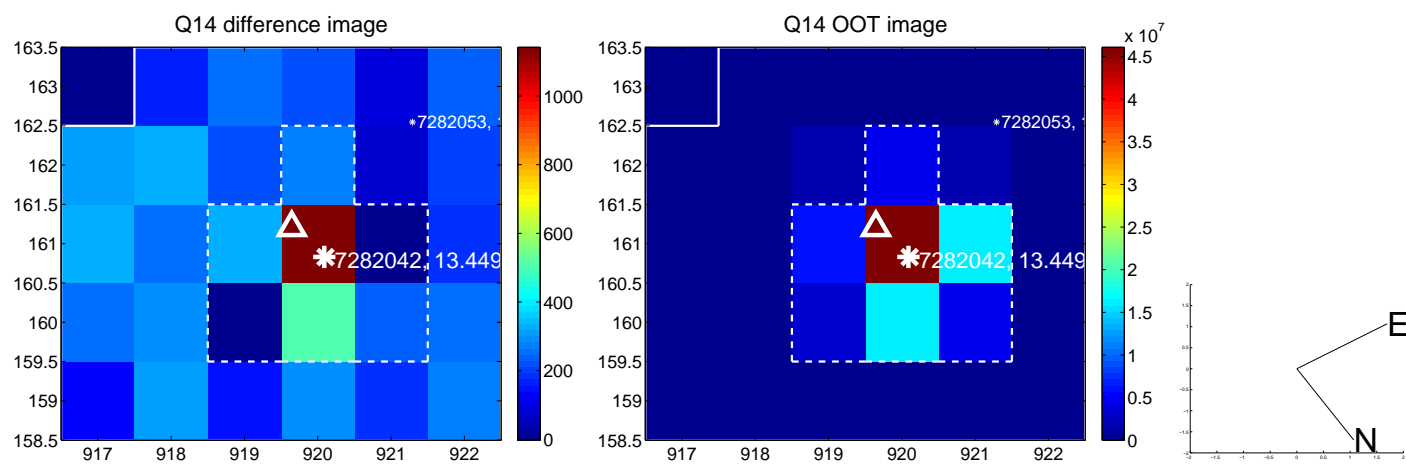
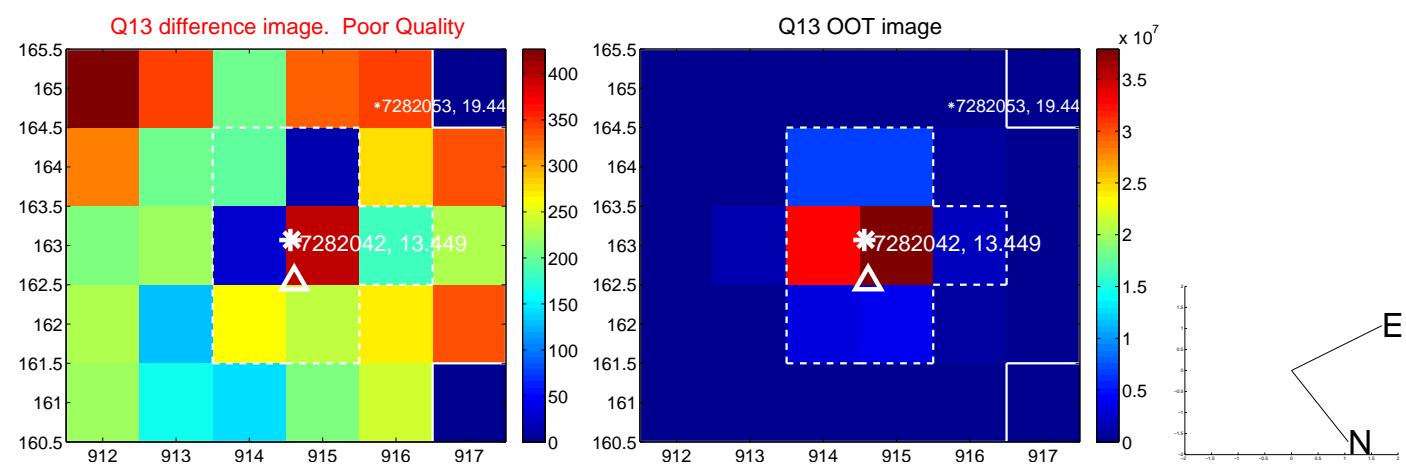
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



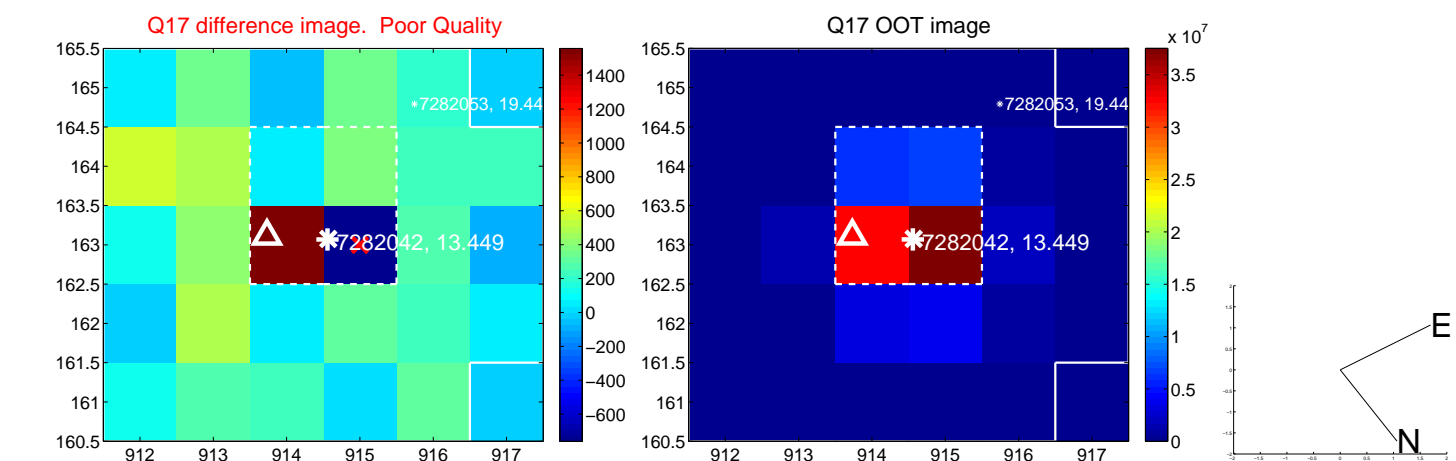
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



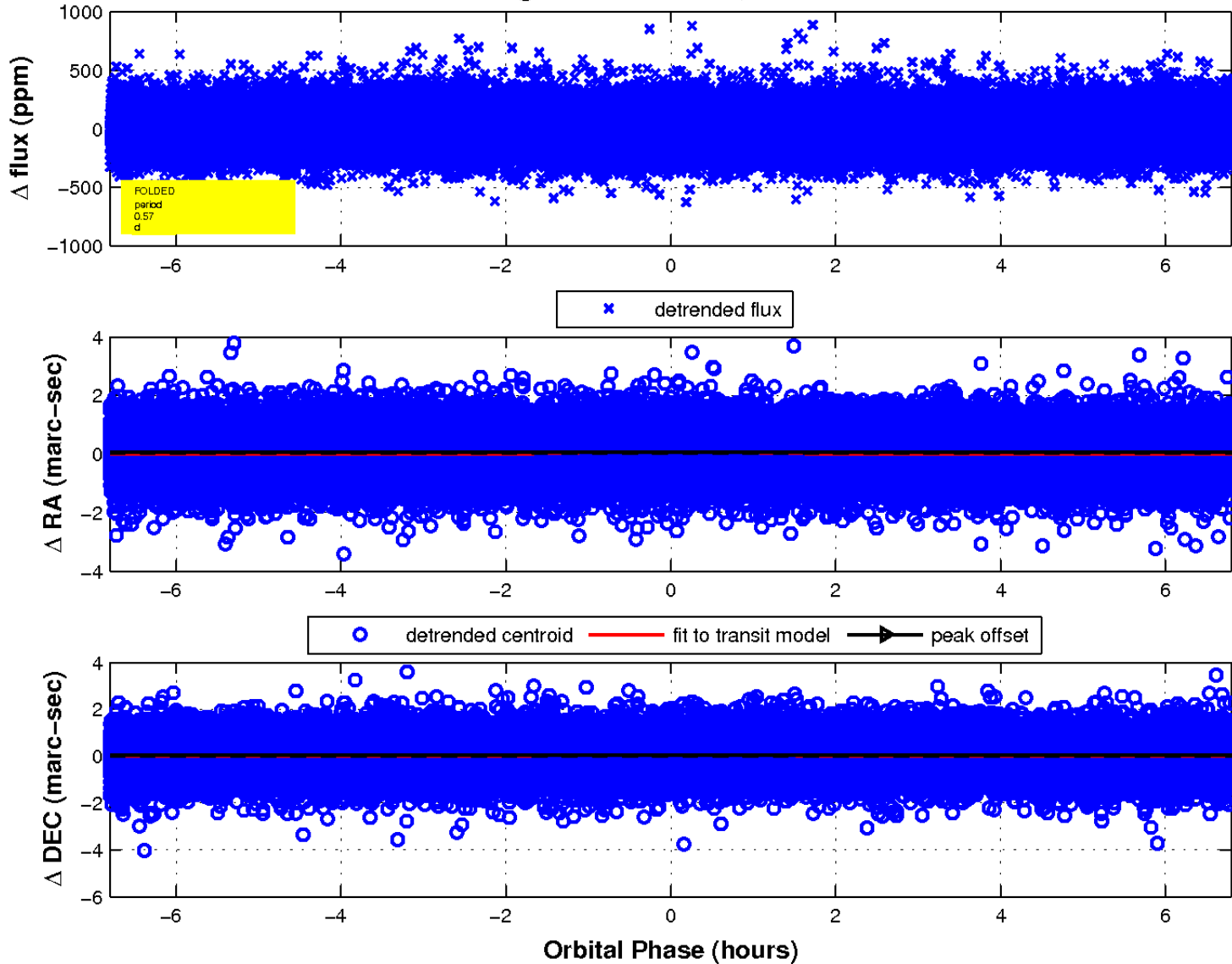
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

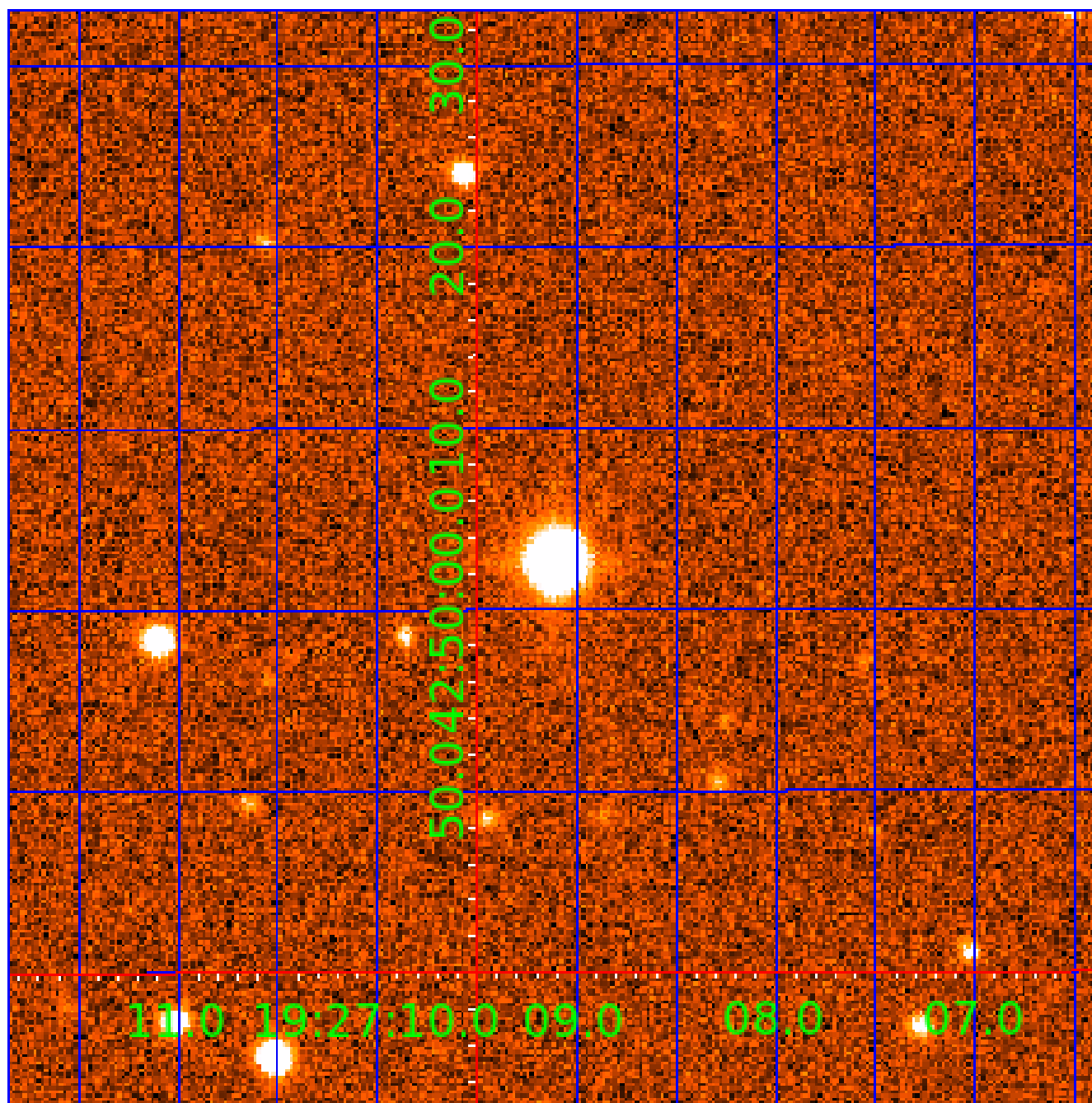


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 007282042

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|-----|-----------------------------|-----------------|------------------------|------------------------|
| 007282042-01 | OBS | 4718.01 | 0.566751 | 131.879577 | 10.4 | 3.324 | 9.7 | 7.8 | 1.18 | 6473 | 0.39 | 11548.84 |
| 007282042-02 | OBS | No | 63.499265 | 186.120439 | 294.5 | 4.244 | 11.2 | 9.7 | 1.18 | 6473 | 2.36 | 21.38 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 007282042-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 1 | LPP_DV—MOD_NONUNIQ_ALT—EPHEM_MATCH |
| 007282042-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—ALL_TRANS_CHASES—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.

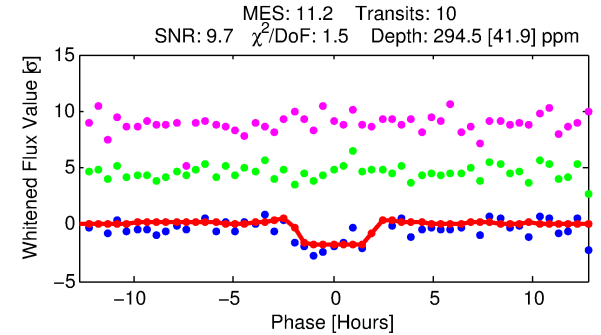
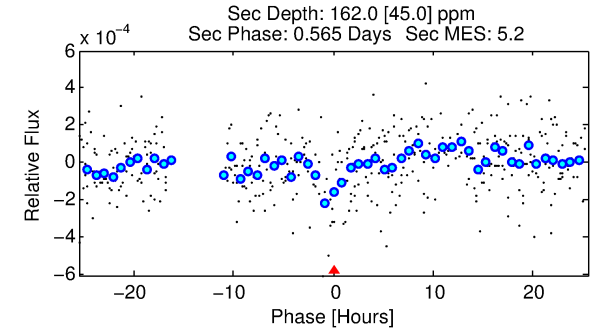
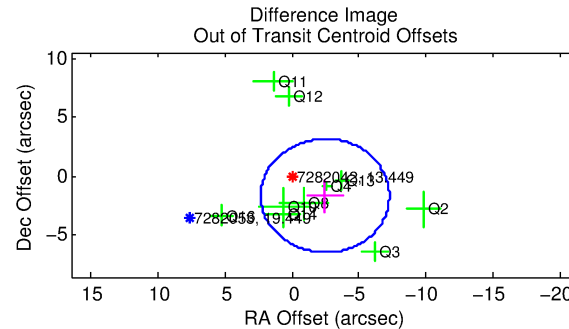
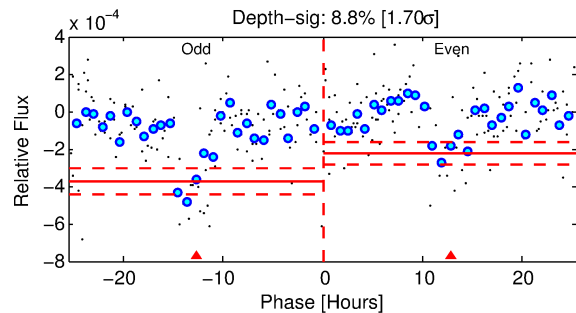
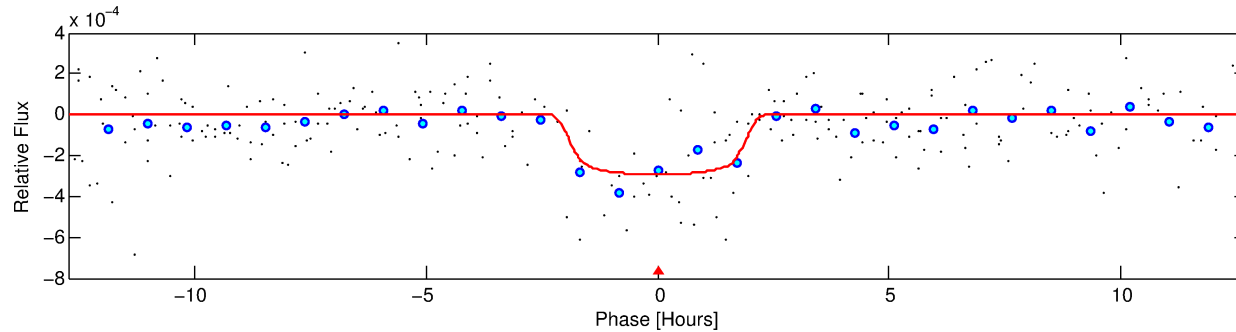
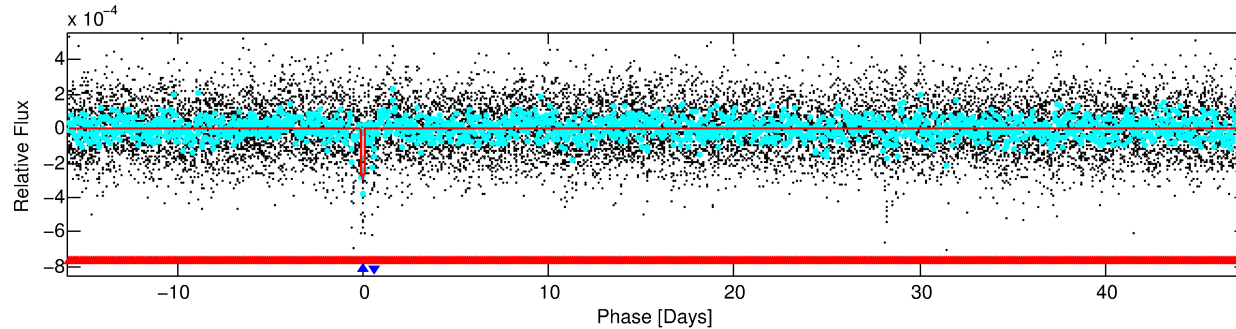
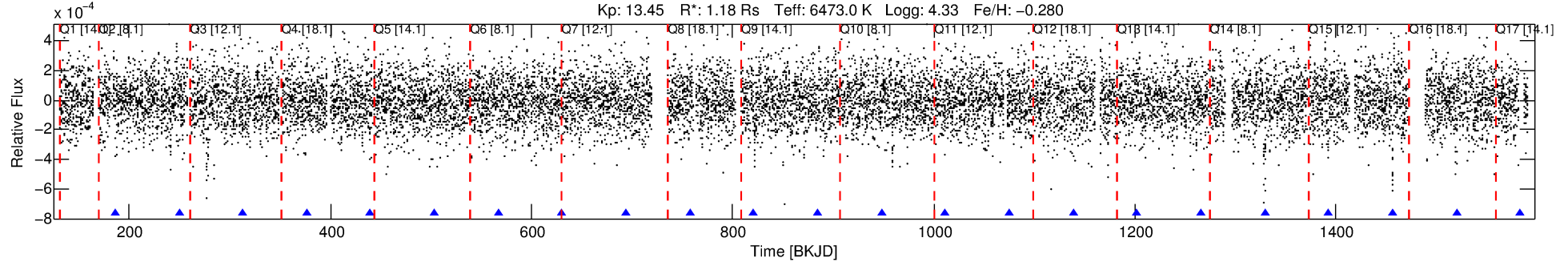
Ephemeris Match Information For 007282042-02

No Significant Match Found

DV One-Page Summary

KIC: 7282042 Candidate: 2 of 2 Period: 63.499 d
KOI: K04718 Corr: No Ephemeris Match

Kp: 13.45 R*: 1.18 Rs Teff: 6473.0 K Logg: 4.33 Fe/H: -0.280



DV Fit Results:

Period = 63.49927 [0.00071] d
Epoch = 186.1204 [0.0101] BKJD
Rp/R* = 0.0183 [0.0053]
a/R* = 55.33 [84.91]
b = 0.90 [0.34]
Seff = 21.38 [6.10]
Teq = 548 [39] K
Rp = 2.36 [0.86] Re
a = 0.3206 [0.0584] AU
Ag = 1642.43 [1138.94] [1.44σ]
Teffp = 5397 [883] K [5.48σ]

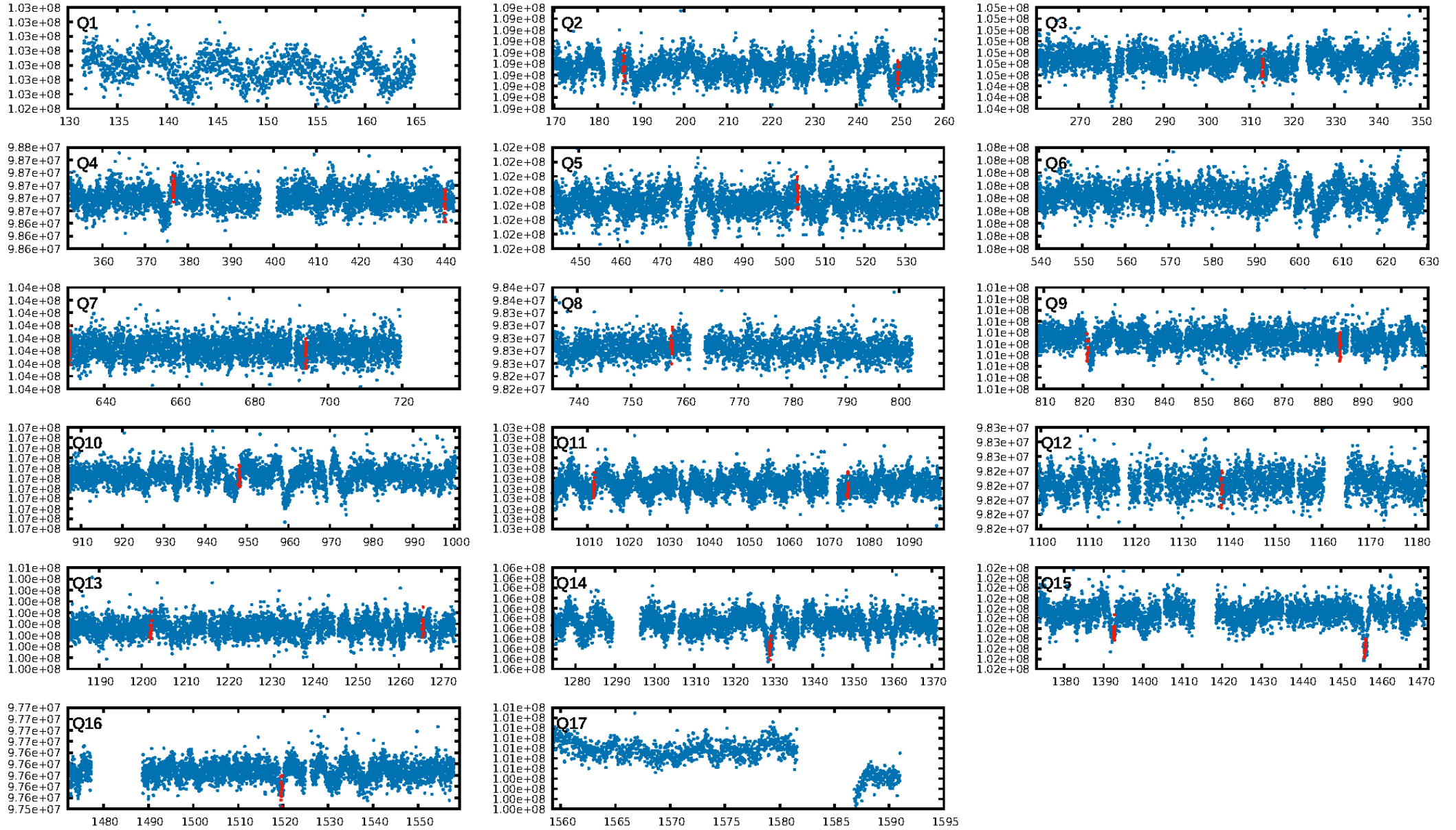
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [280.20σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.68e-16
RollingBand-fgt: 1.00 [10/10]
GhostDiagnostic-chr: 4.595
Centroid-sig: 44.4%
Centroid-so: 0.446 arcsec [0.84σ]
OotOffset-rm: 2.956 arcsec [1.85σ]
OotOffset-st: 3/2/4/1 [10]
KicOffset-rm: 3.040 arcsec [2.15σ]
KicOffset-st: 3/2/4/1 [10]
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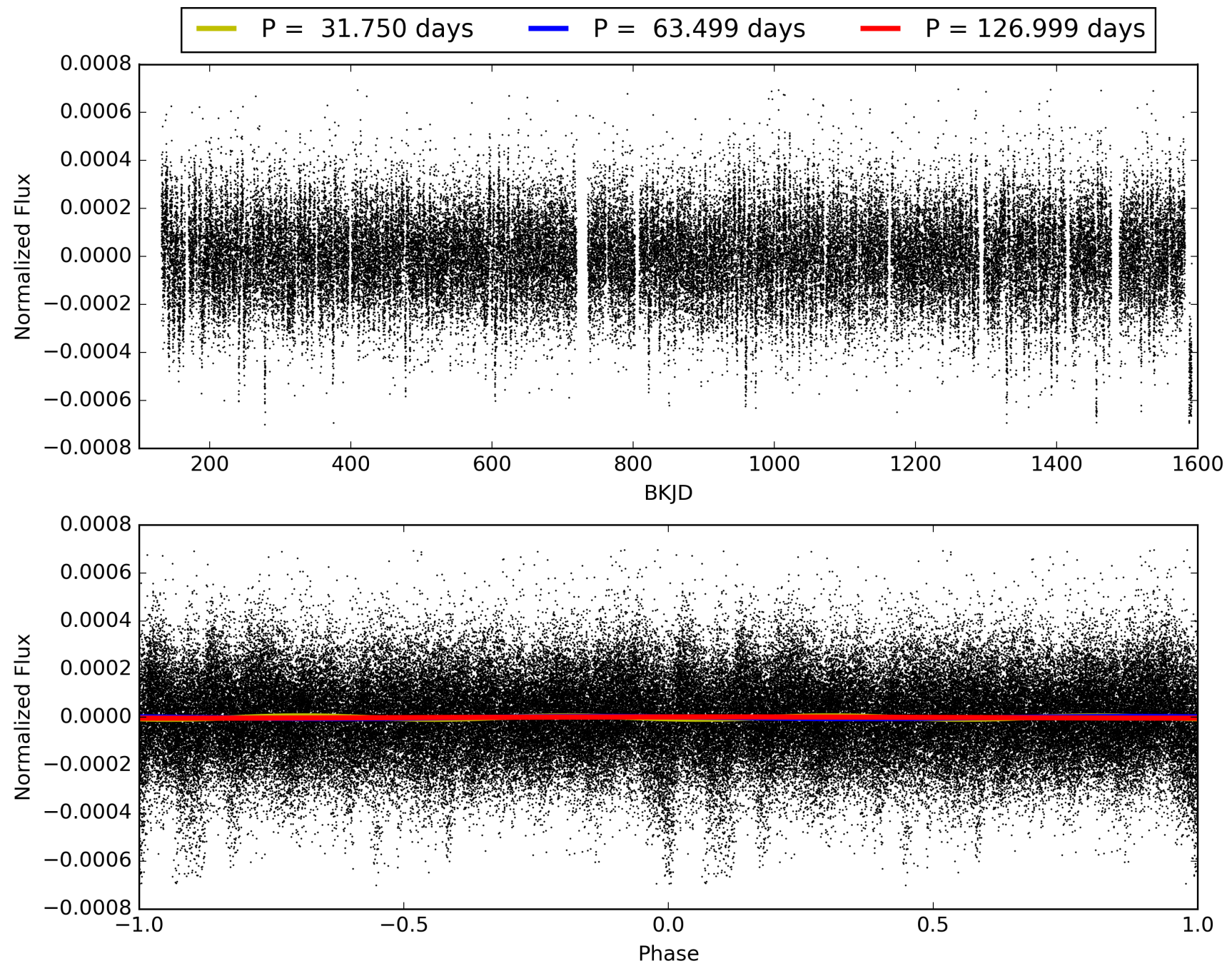
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 16:16:33 Z

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

TCE 007282042-02, PDC Light Curves

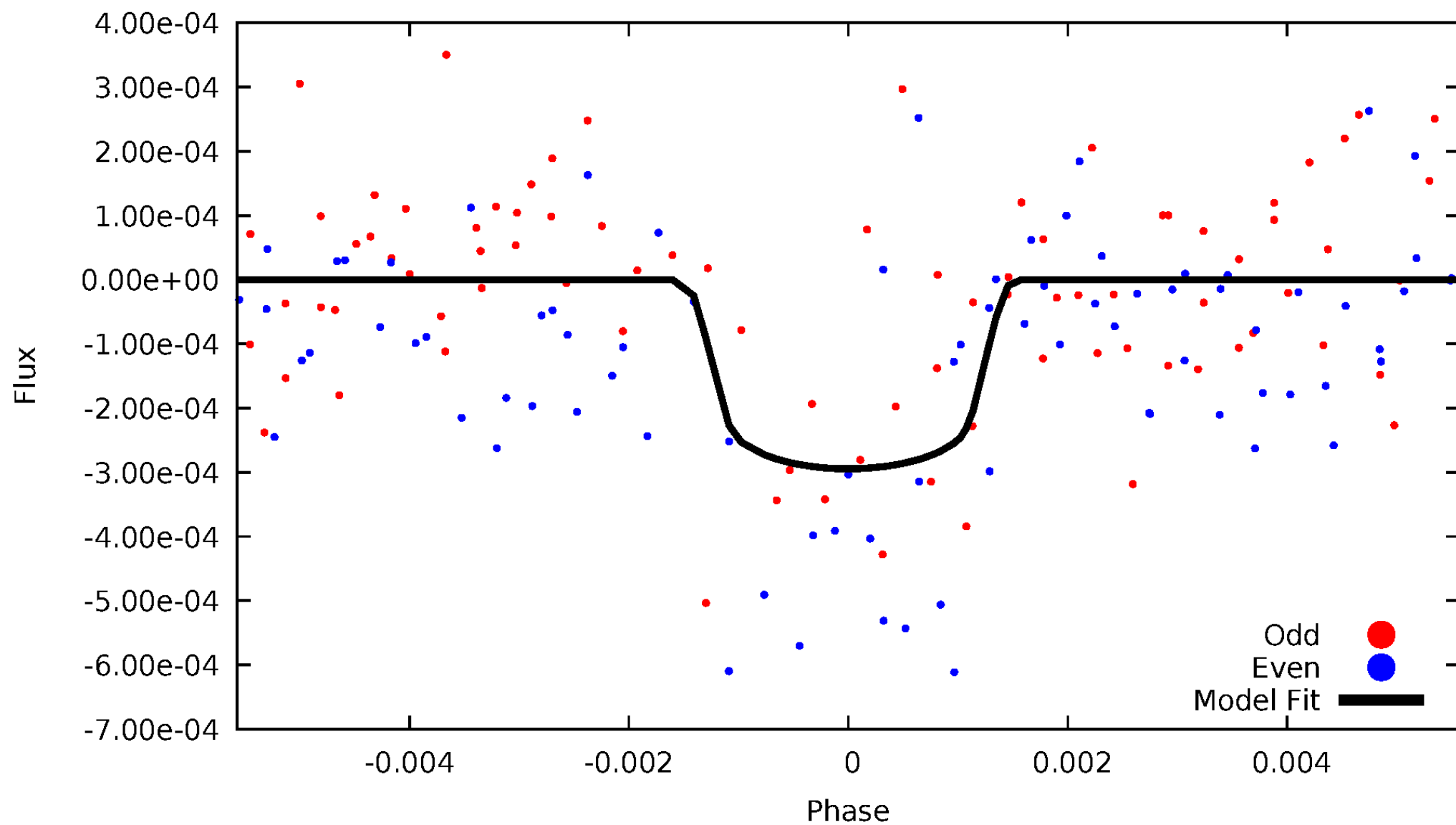


TCE 007282042-02



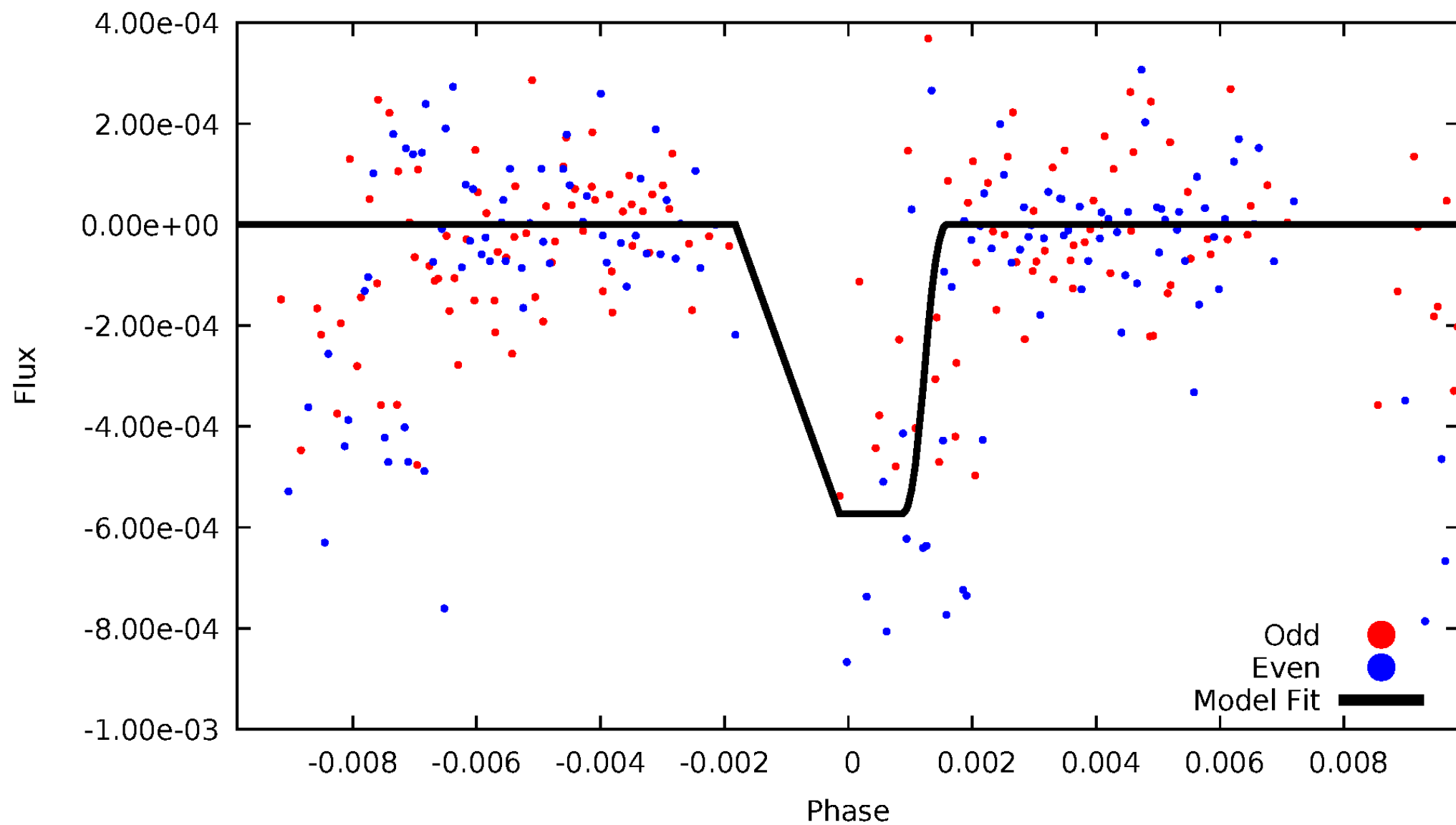
DV Odd/Even

TCE 007282042-02



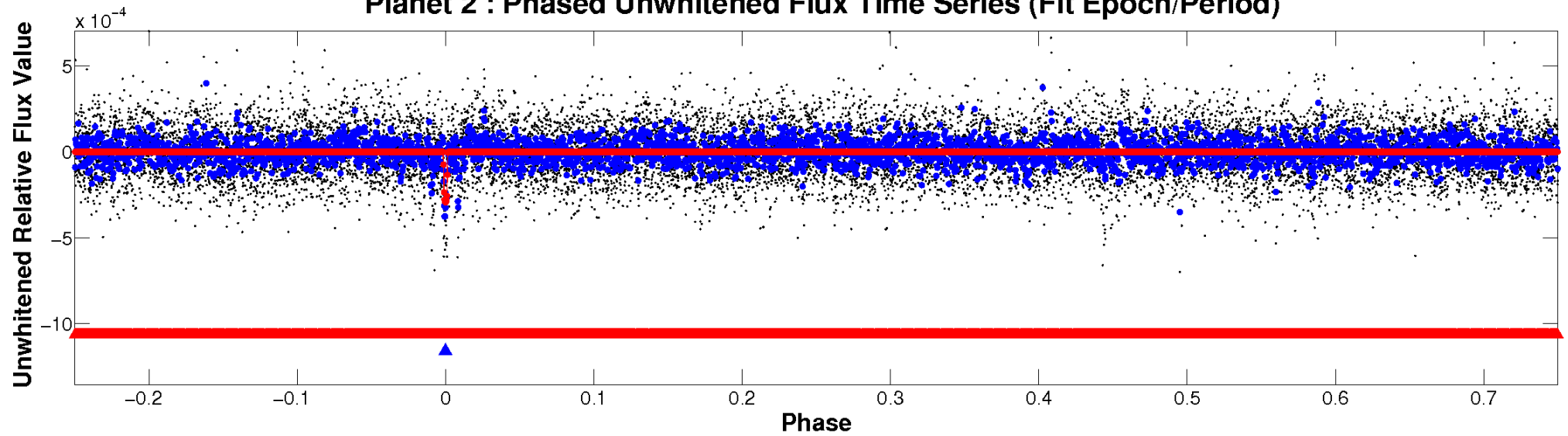
ALT Odd/Even

TCE 007282042-02

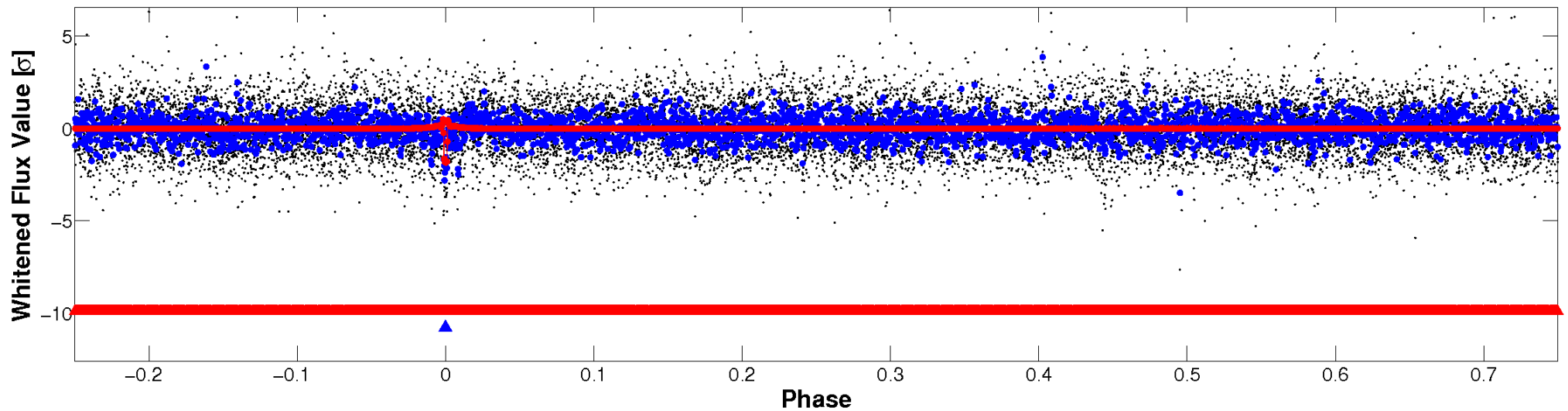


Non-Whitened Vs. Whitened Light Curve

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

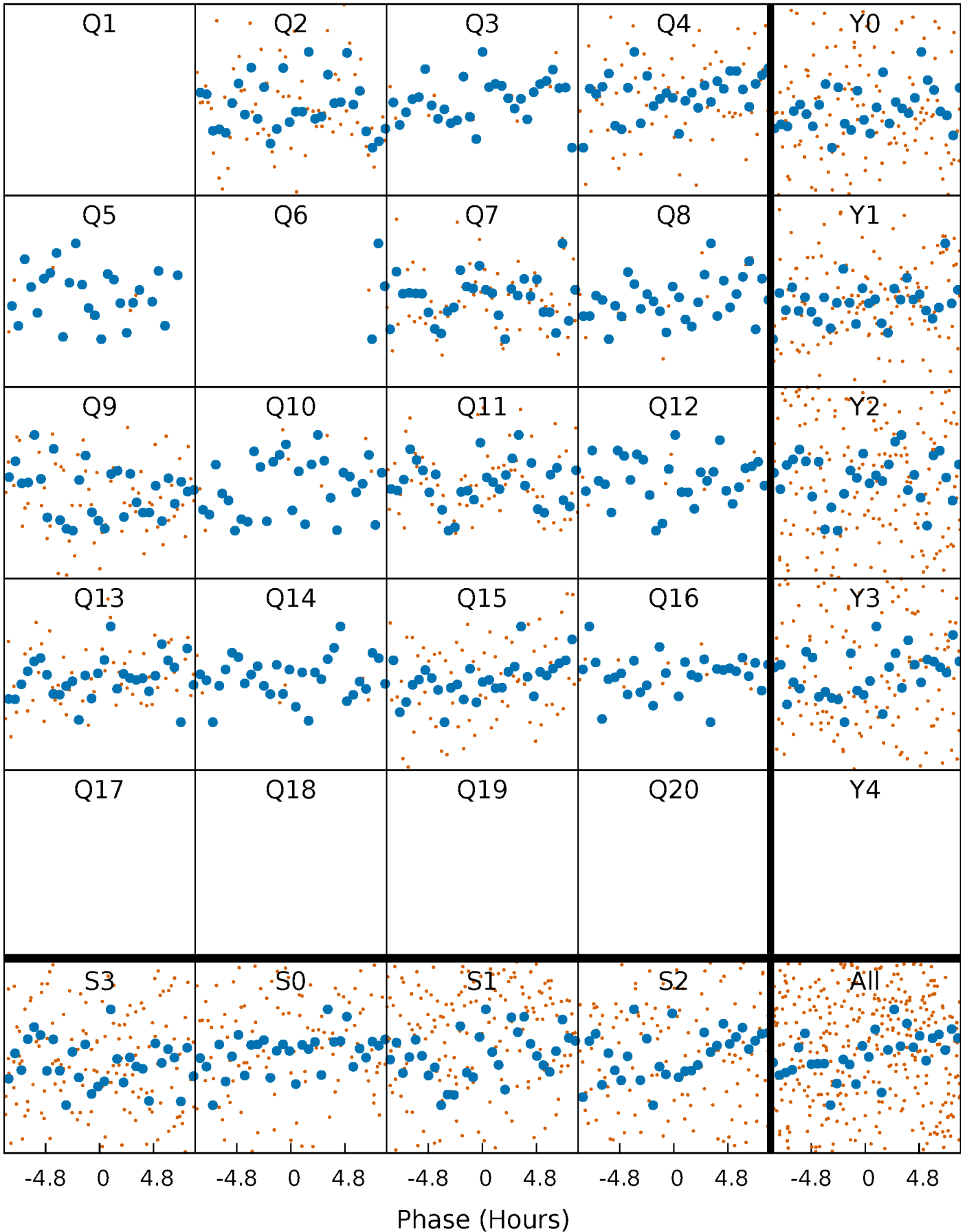


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



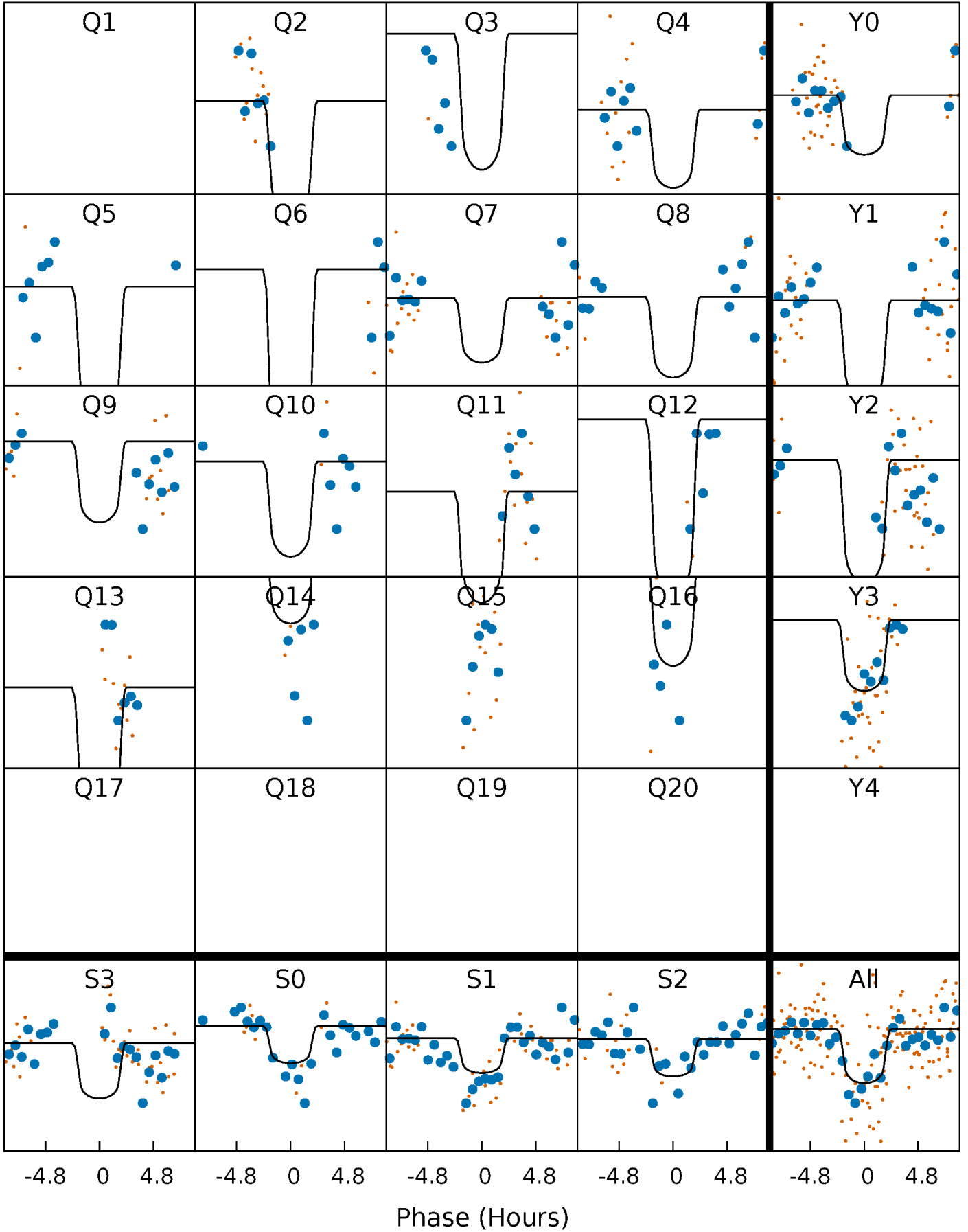
PDC Quarter-Phased Transit Curves

TCE 007282042-02 P= 63.499265 Days $T_0=186.120439$ (BKJD)



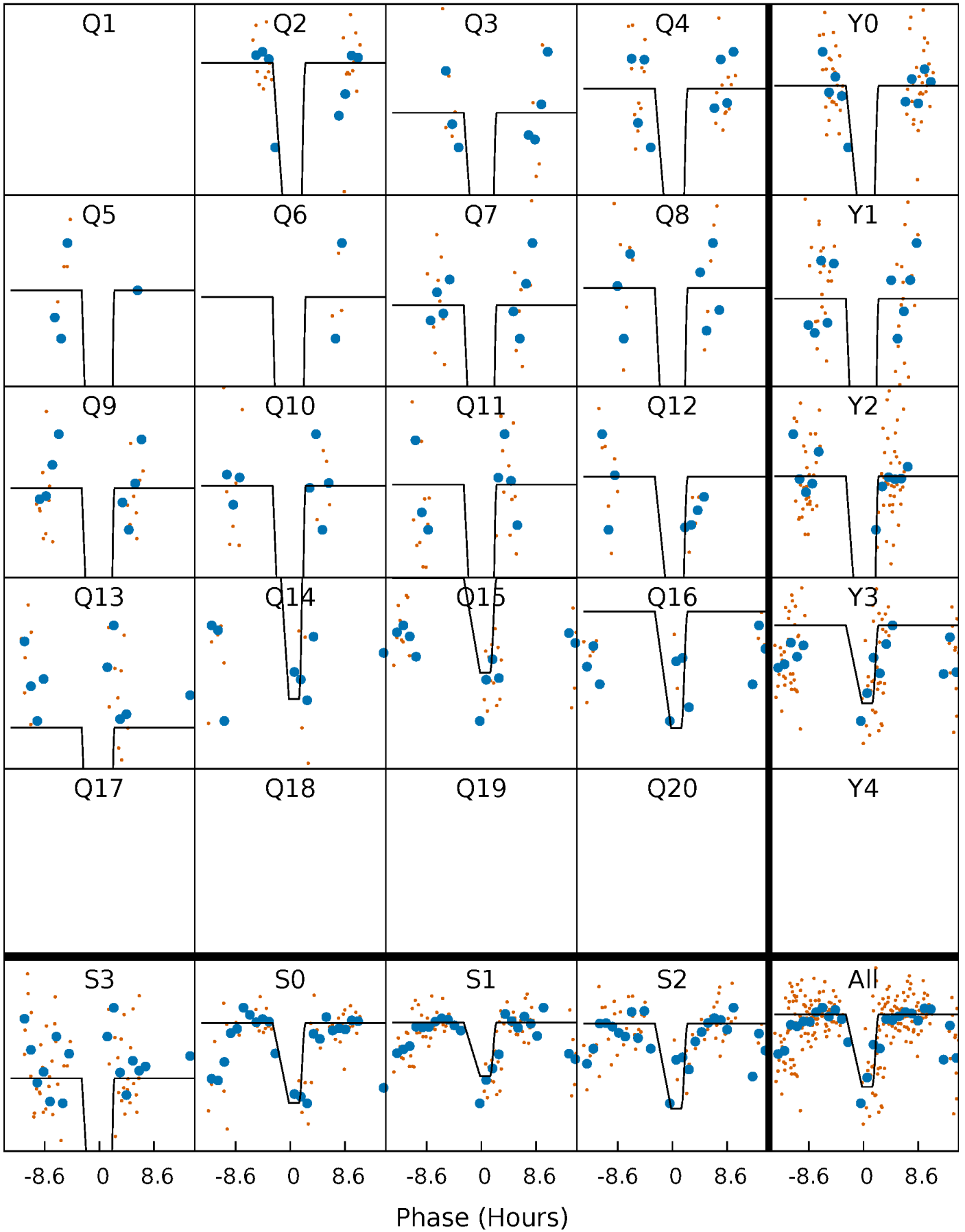
DV Quarter-Phased Transit Curves

TCE 007282042-02 P= 63.499265 Days $T_0=186.120439$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

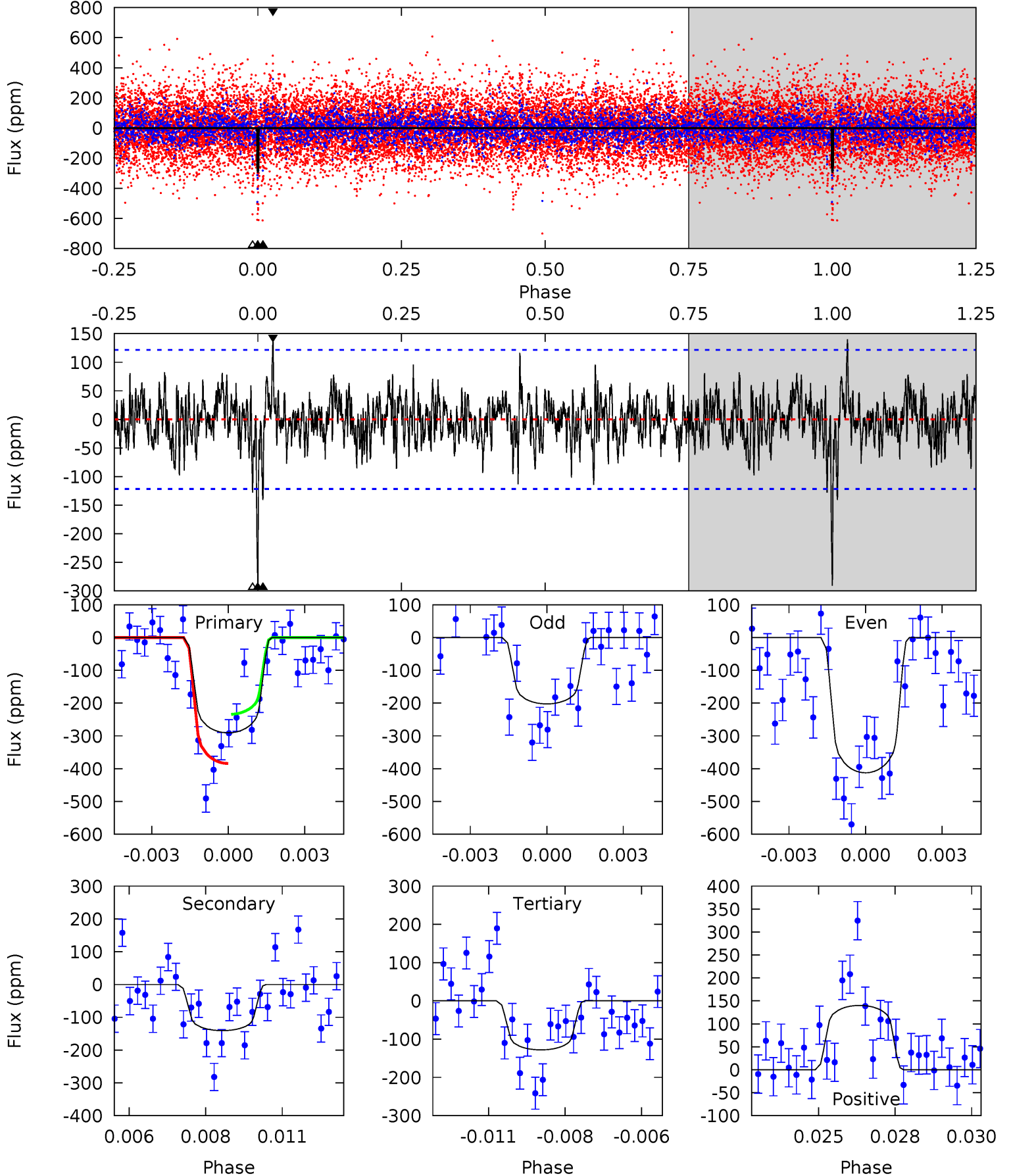
TCE 007282042-02 $P = 63.493556$ Days $T_0 = 186.167072$ (BKJD)



DV Model-Shift Uniqueness Test

007282042-02, P = 63.499265 Days, E = 122.621174 Days

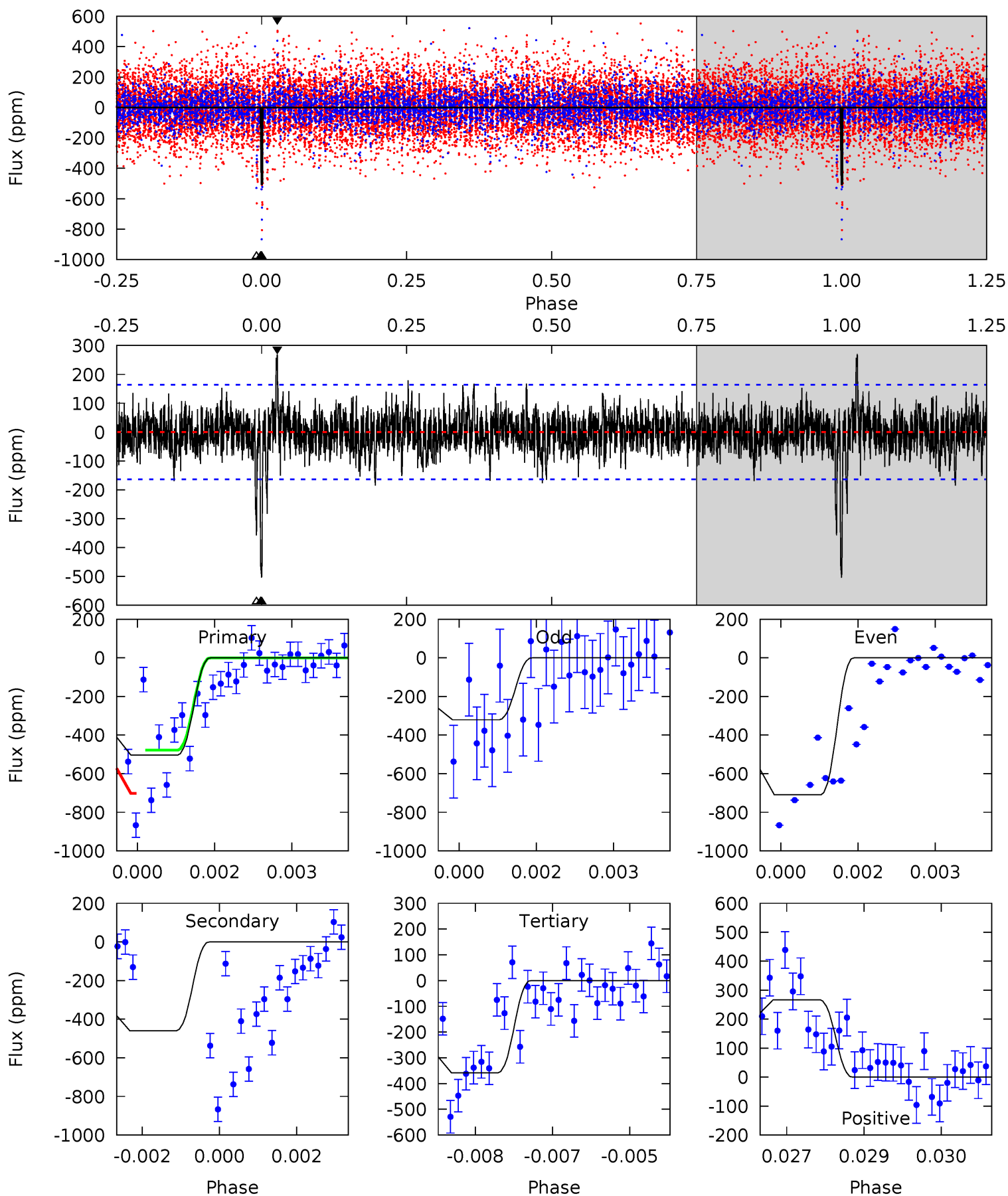
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 12.6 | 6.09 | 5.54 | 6.06 | 5.27 | 2.99 | 1.41 | 7.04 | 6.52 | 0.54 | 0.03 | 4.49 | 0.75 | 0.33 | 3.08 |



Alt Model-Shift Uniqueness Test

007282042-02, P = 63.493556 Days, E = 122.673516 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 16.5 | 15.0 | 11.7 | 8.73 | 5.36 | 3.14 | 1.51 | 4.76 | 7.73 | 3.33 | 6.29 | 6.20 | 0.75 | 0.35 | 1.64 |



Stellar Parameters For KIC 007282042

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | M (M_{\odot}) | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 6473^{+146}_{-195} | $4.330^{+0.092}_{-0.138}$ | $-0.280^{+0.250}_{-0.300}$ | $1.182^{+0.263}_{-0.162}$ | $1.087^{+0.146}_{-0.119}$ | $0.927^{+0.377}_{-0.371}$ |
| | +2%/-3% | +2%/-3% | +89%/-107% | +22%/-14% | +13%/-11% | +41%/-40% |
| Source | PHO1 | FLK73 | KIC0 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 007282042-02 / KOI

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|---------------|------------------------|-------------------|----------------------|-----------------------|
| DV | -141 ± 23 | $2.37^{+0.81}_{-0.68}$ | 771^{+44}_{-37} | 5275^{+945}_{-596} | 1440^{+1435}_{-665} |
| Alt. | -460 ± 31 | $3.13^{+0.79}_{-0.72}$ | 768^{+43}_{-34} | 6078^{+860}_{-545} | 2685^{+1716}_{-973} |

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 $A_{obs} \gg 1.0$

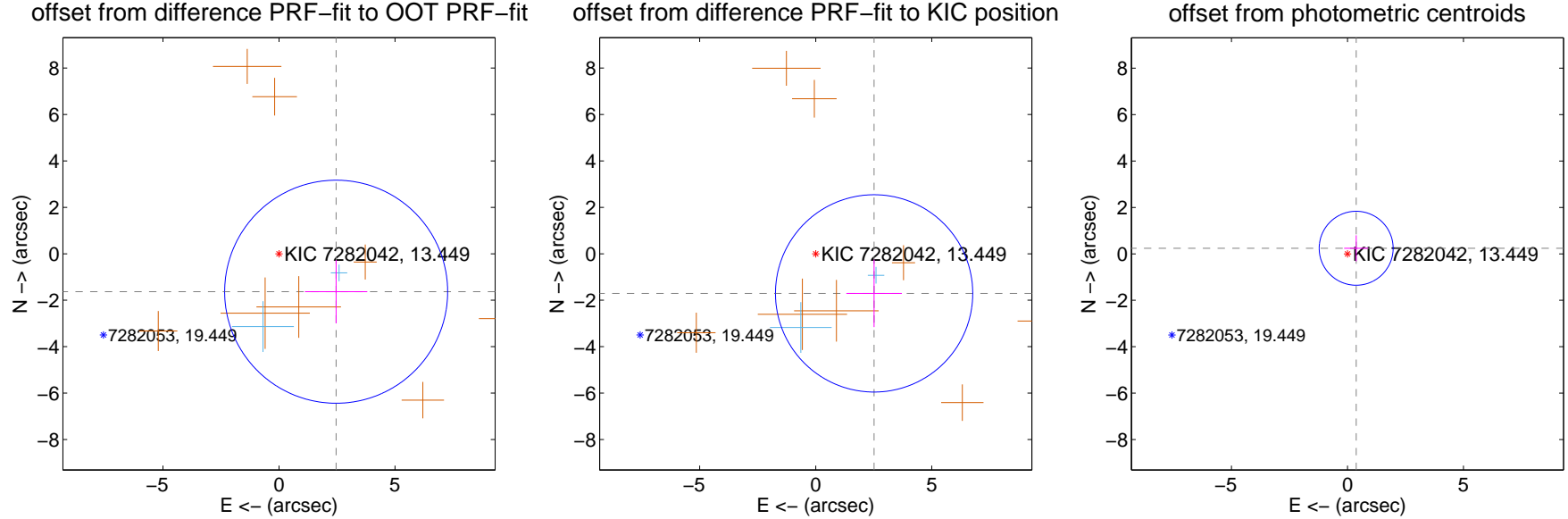
DV Centroid Data

Supplemental centroid analysis for 007282042-02. Kepler magnitude: 13.45. Transit SNR 9.66

There are 2 quarters with good PRF difference image offsets

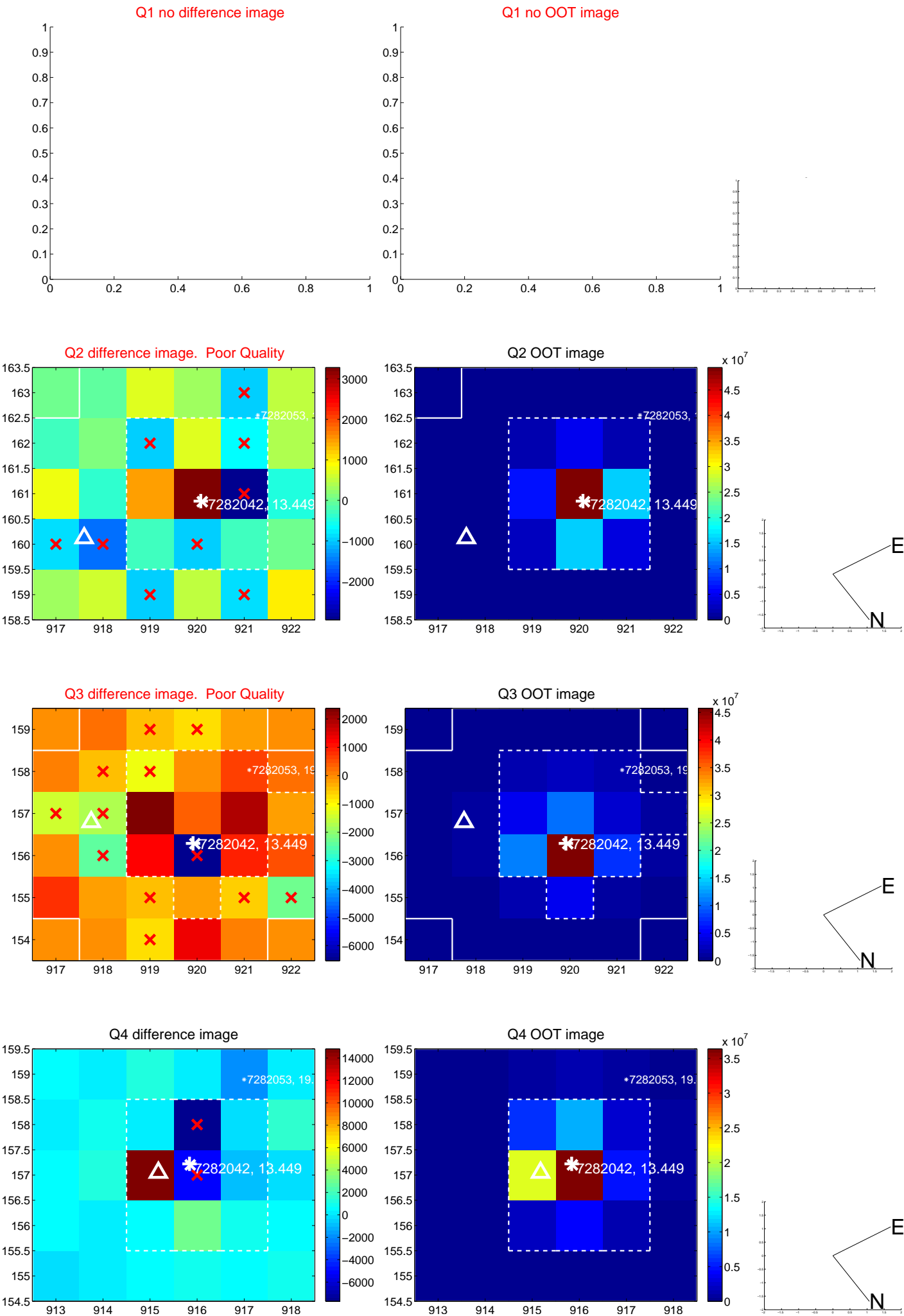
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 2.956 ± 1.602 | 1.85 | -2.463 ± 1.344 | -1.634 ± 1.366 |
| PRF-fit source offset from KIC position | 3.040 ± 1.417 | 2.15 | -2.516 ± 1.198 | -1.707 ± 1.452 |
| photometric centroid source offset | 0.45 ± 0.53 | 0.84 | -0.37 ± 0.52 | 0.24 ± 0.56 |



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

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



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

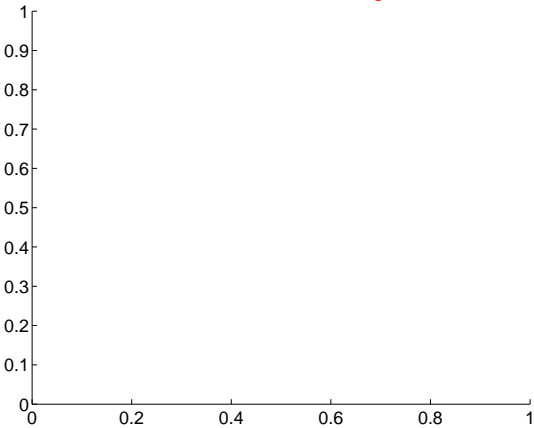
Q5 no difference image



Q5 no OOT image



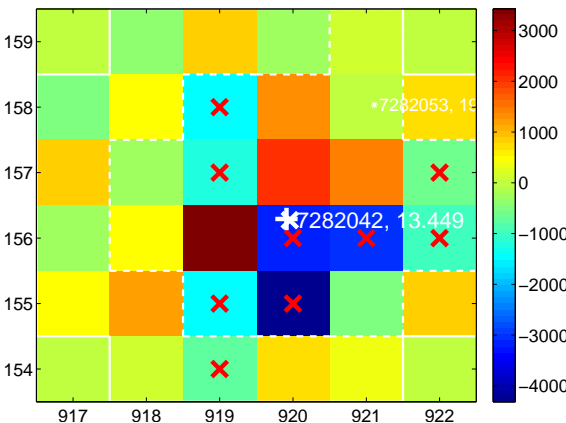
Q6 no difference image



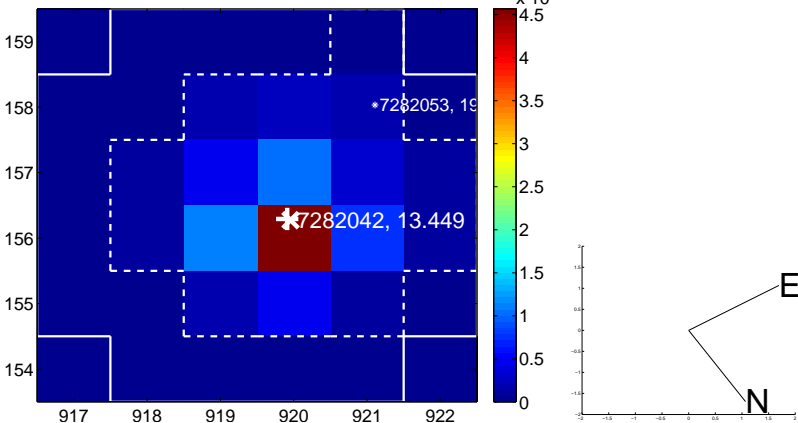
Q6 no OOT image



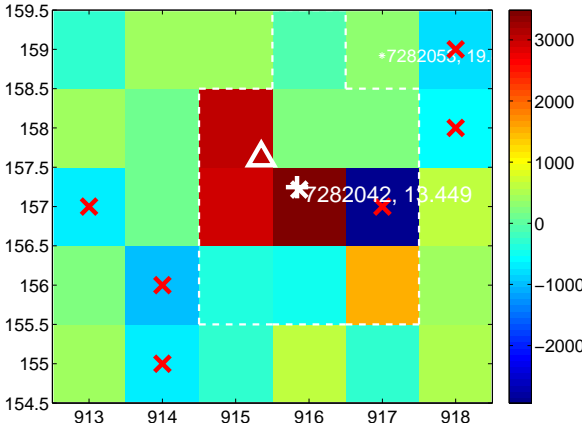
Q7 difference image. Poor Quality



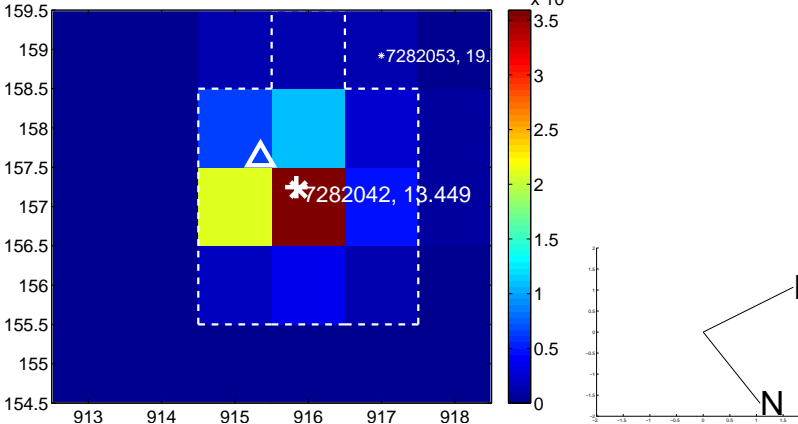
Q7 OOT image



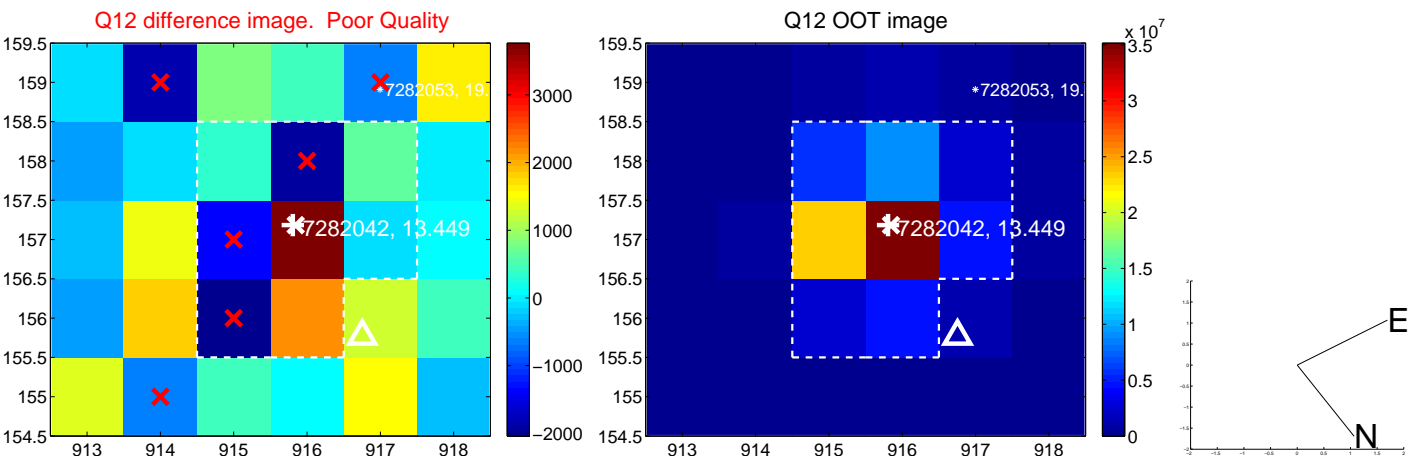
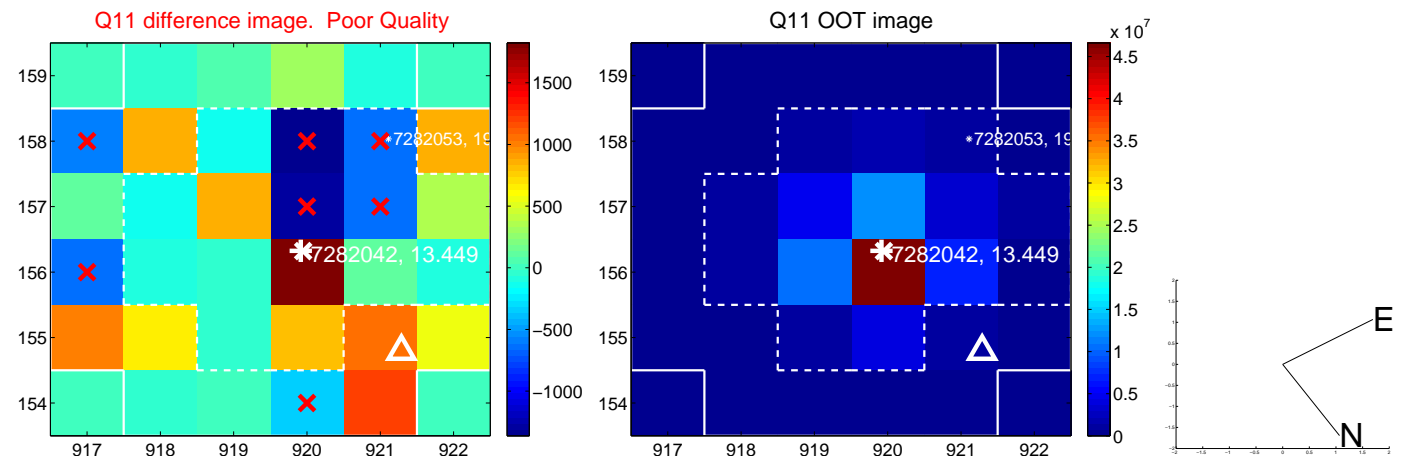
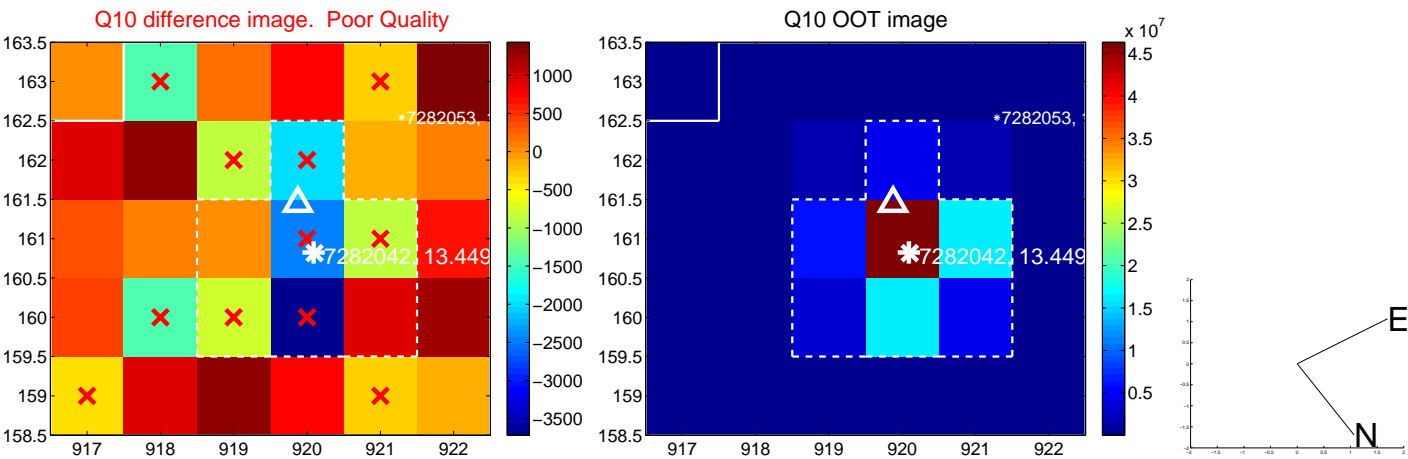
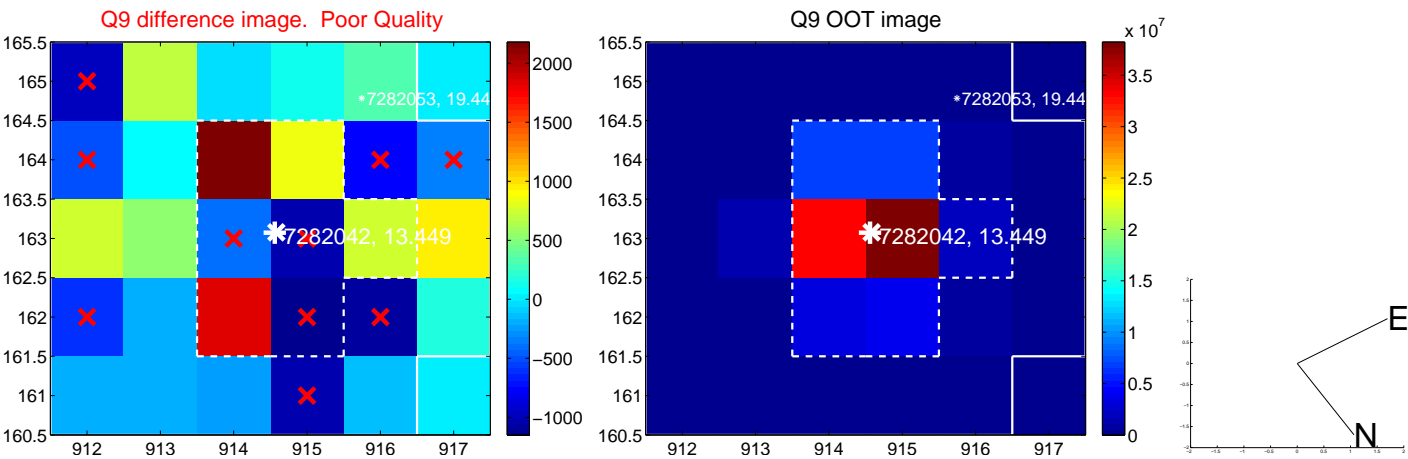
Q8 difference image. Poor Quality



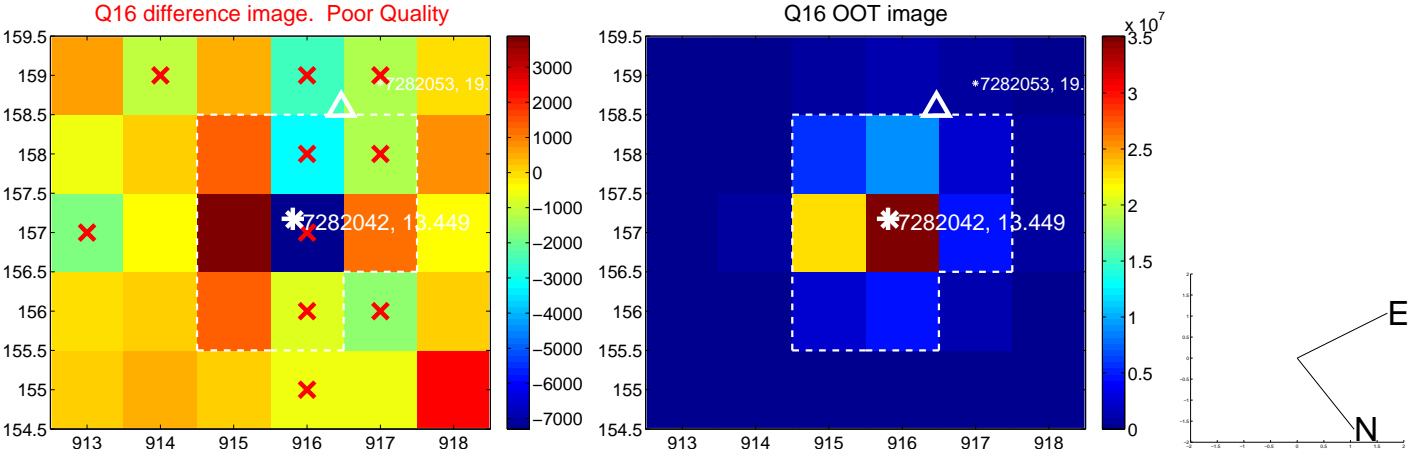
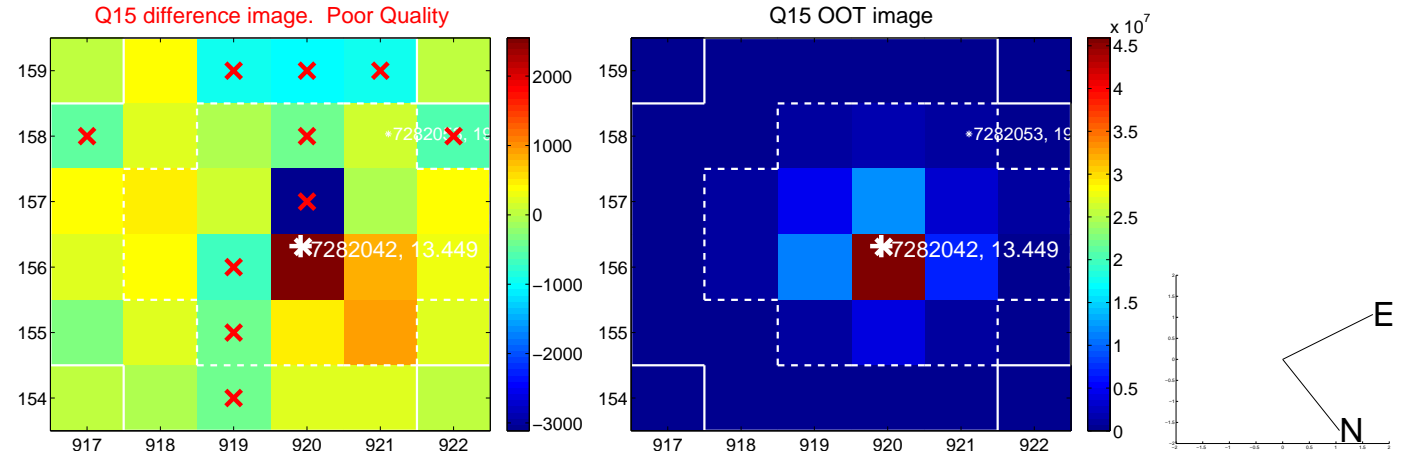
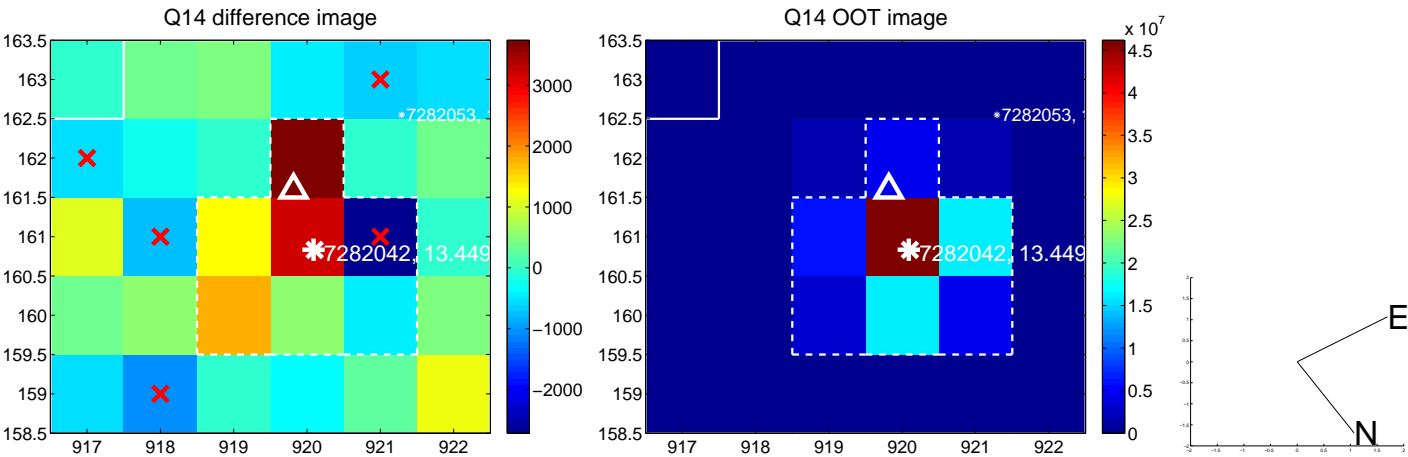
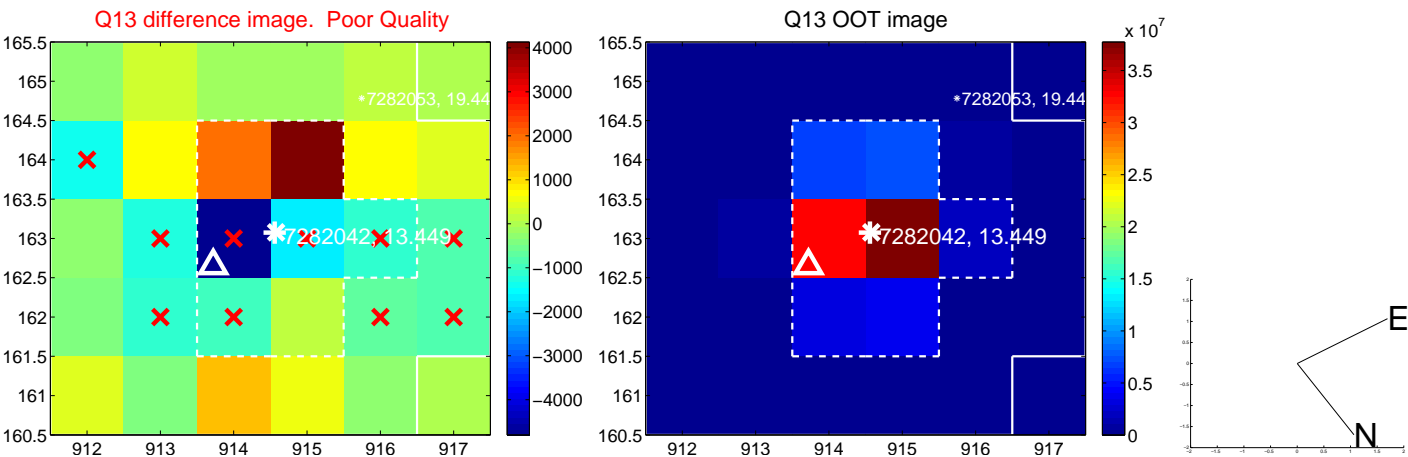
Q8 OOT image



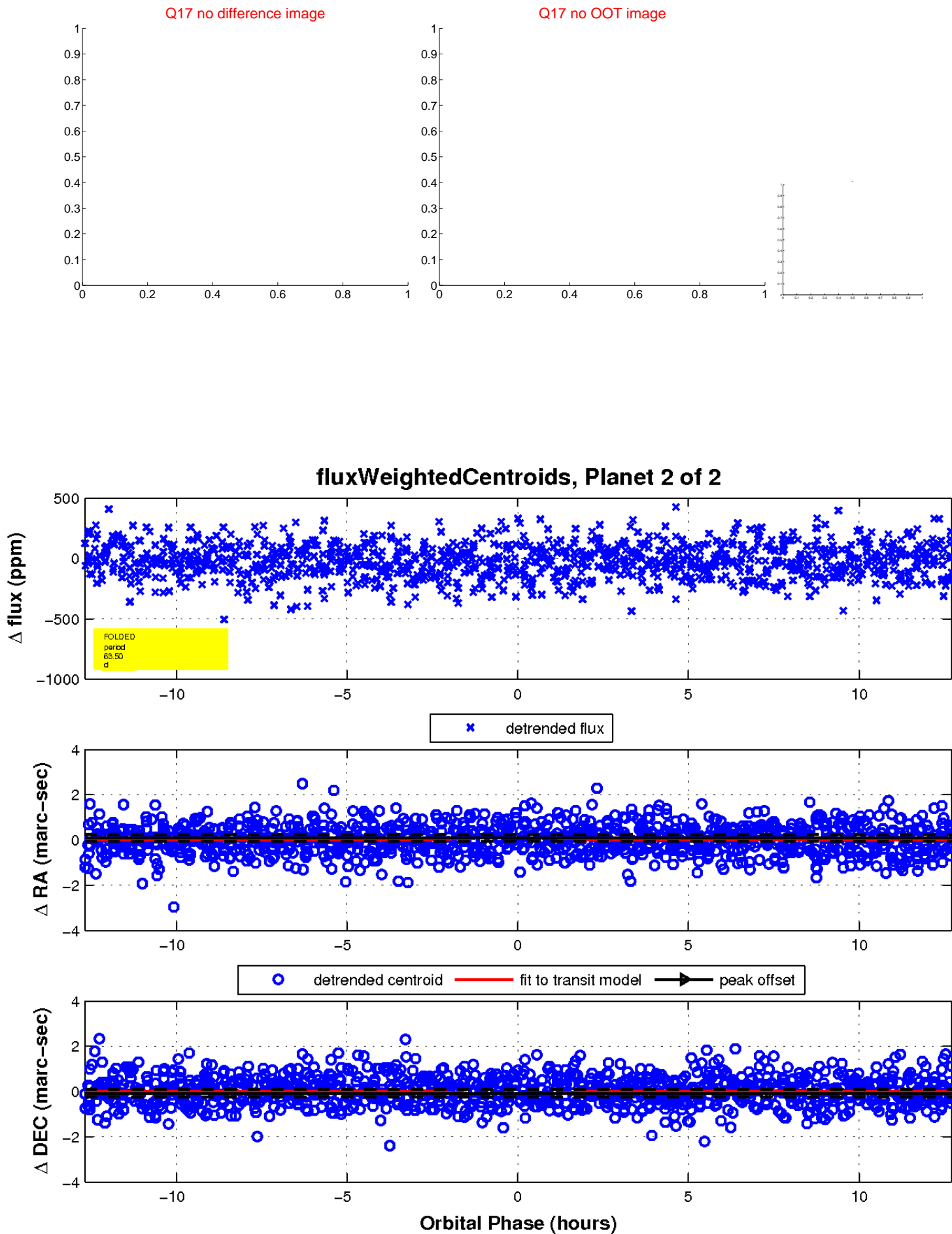
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



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



UKIRT Image

Declination

