

KIC 003650057

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 003650057-01 | OBS | No | 0.657812 | 131.663145 | 36.1 | 0.940 | 8.5 | 7.1 | 1.94 | 7318 | 1.19 | 32695.98 |
| 003650057-02 | OBS | No | 0.966410 | 131.745901 | 36.0 | 3.621 | 7.9 | 8.7 | 1.94 | 7318 | 1.35 | 19577.11 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|---|
| 003650057-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT |
| 003650057-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT |

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

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

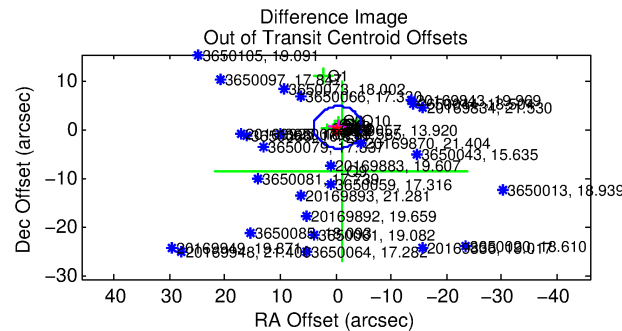
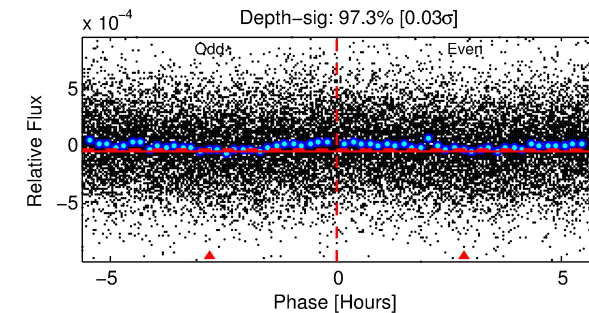
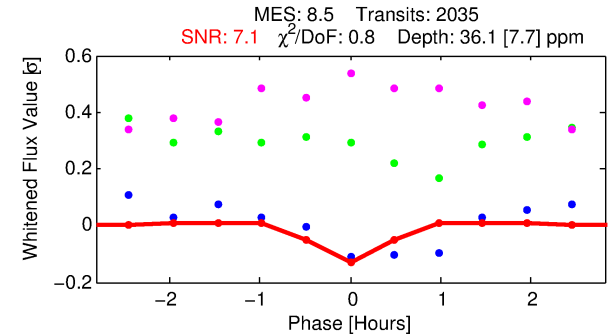
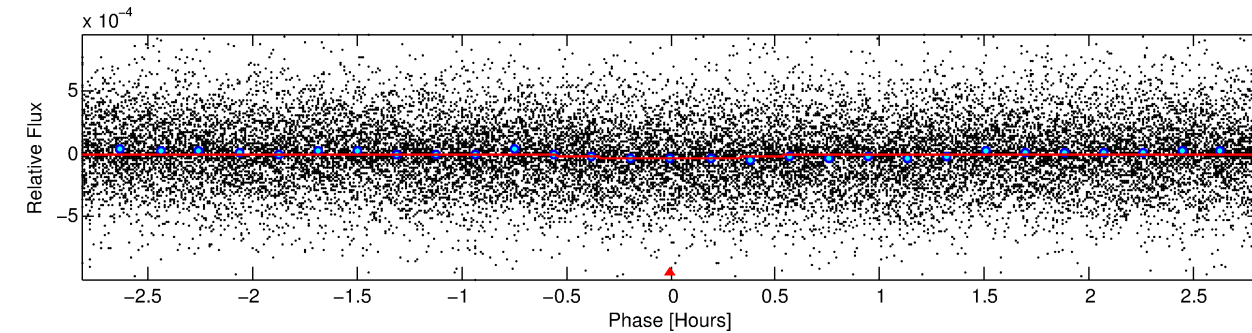
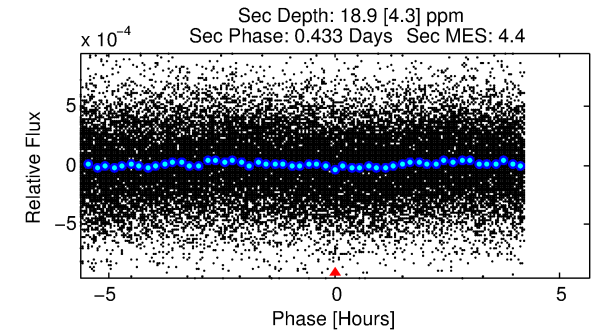
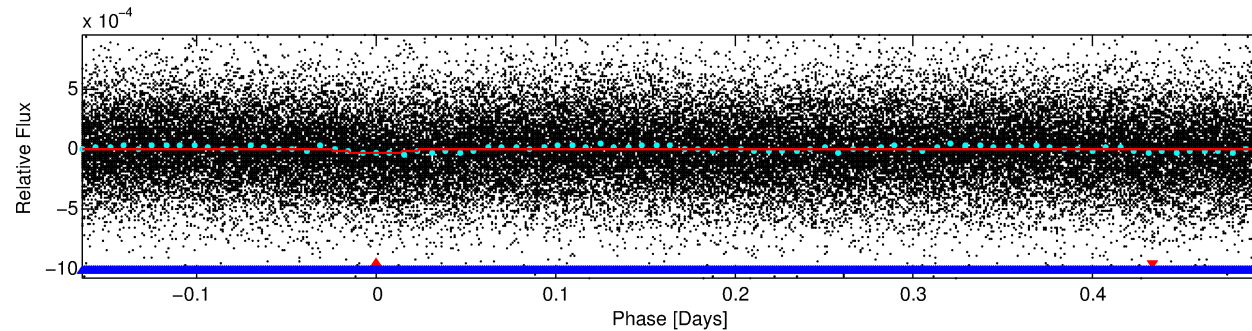
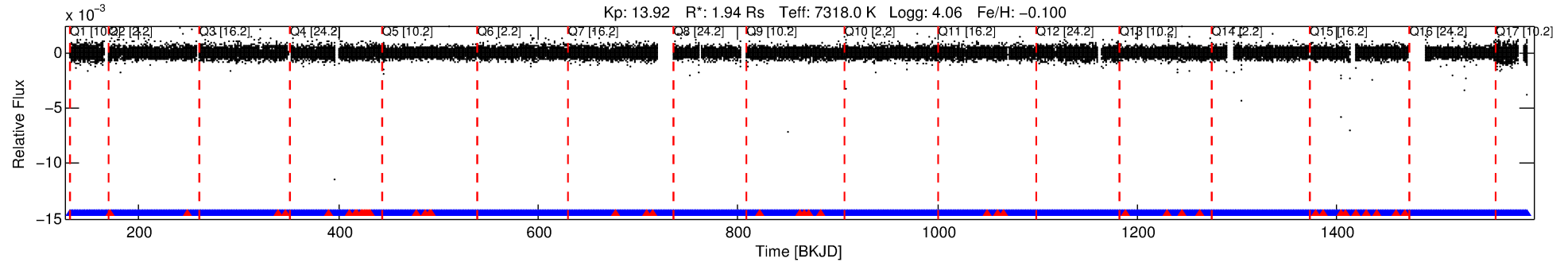
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 003650057-01

No Significant Match Found

DV One-Page Summary

KIC: 3650057 Candidate: 1 of 2 Period: 0.658 d



DV Fit Results:

Period = 0.65781 [0.00002] d
Epoch = 131.6631 [0.0024] BKJD
Rp/R* = 0.0056 [0.0094]
a/R* = 5.40 [52.04]
b = 0.06 [164.26]
Seff = 32695.98 [12131.15]
Teq = 3429 [318] K
Rp = 1.19 [2.03] Re
a = 0.0172 [0.0041] AU
Ag = 2.16 [7.31] [0.16σ]
Teffp = 6428 [5412] K [0.55σ]

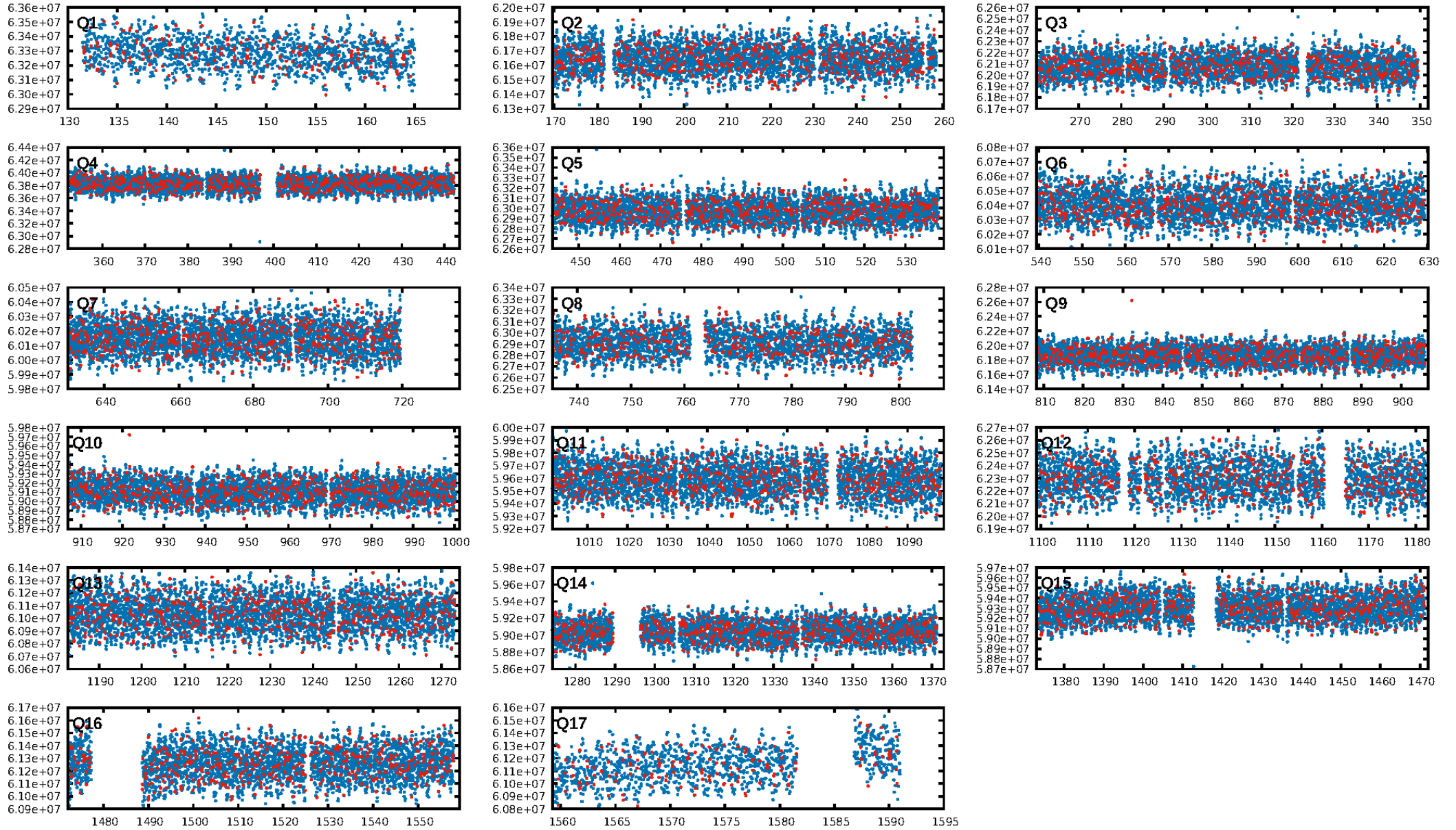
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 95.2% [1.98σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.59e-13
RollingBand-fgt: 0.98 [1896/1944]
GhostDiagnostic-chr: -9.999
Centroid-sig: 1.0%
Centroid-so: 2.642 arcsec [1.61σ]
OotOffset-rm: 0.683 arcsec [0.48σ]
OotOffset-st: 3/2/4/5 [14]
KicOffset-rm: 0.595 arcsec [0.42σ]
KicOffset-st: 3/2/4/5 [14]
DiffImageQuality-fgm: 0.57 [8/14]
DiffImageOverlap-fno: 1.00 [17/17]

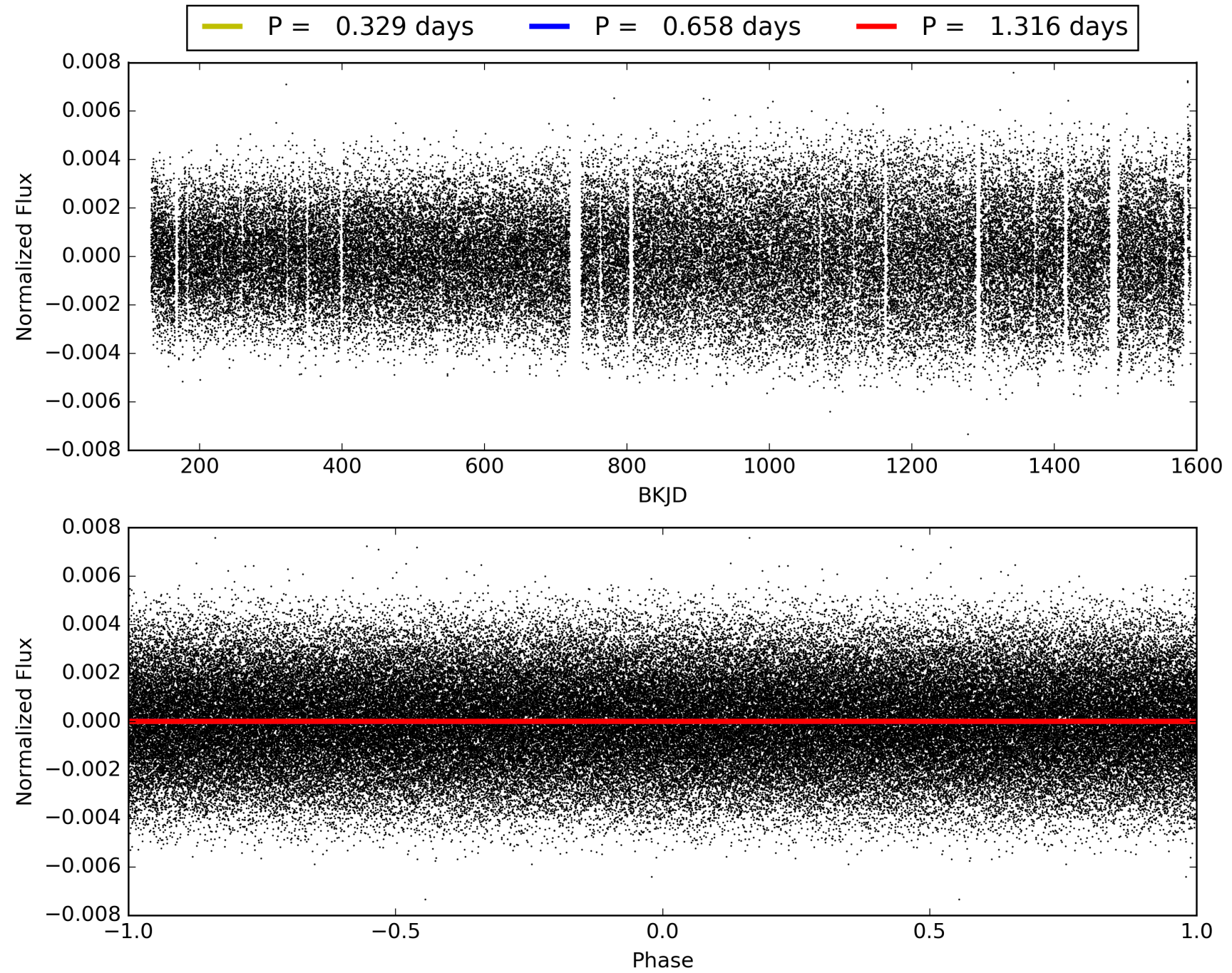
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 16:45:40 Z

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

TCE 003650057-01, PDC Light Curves

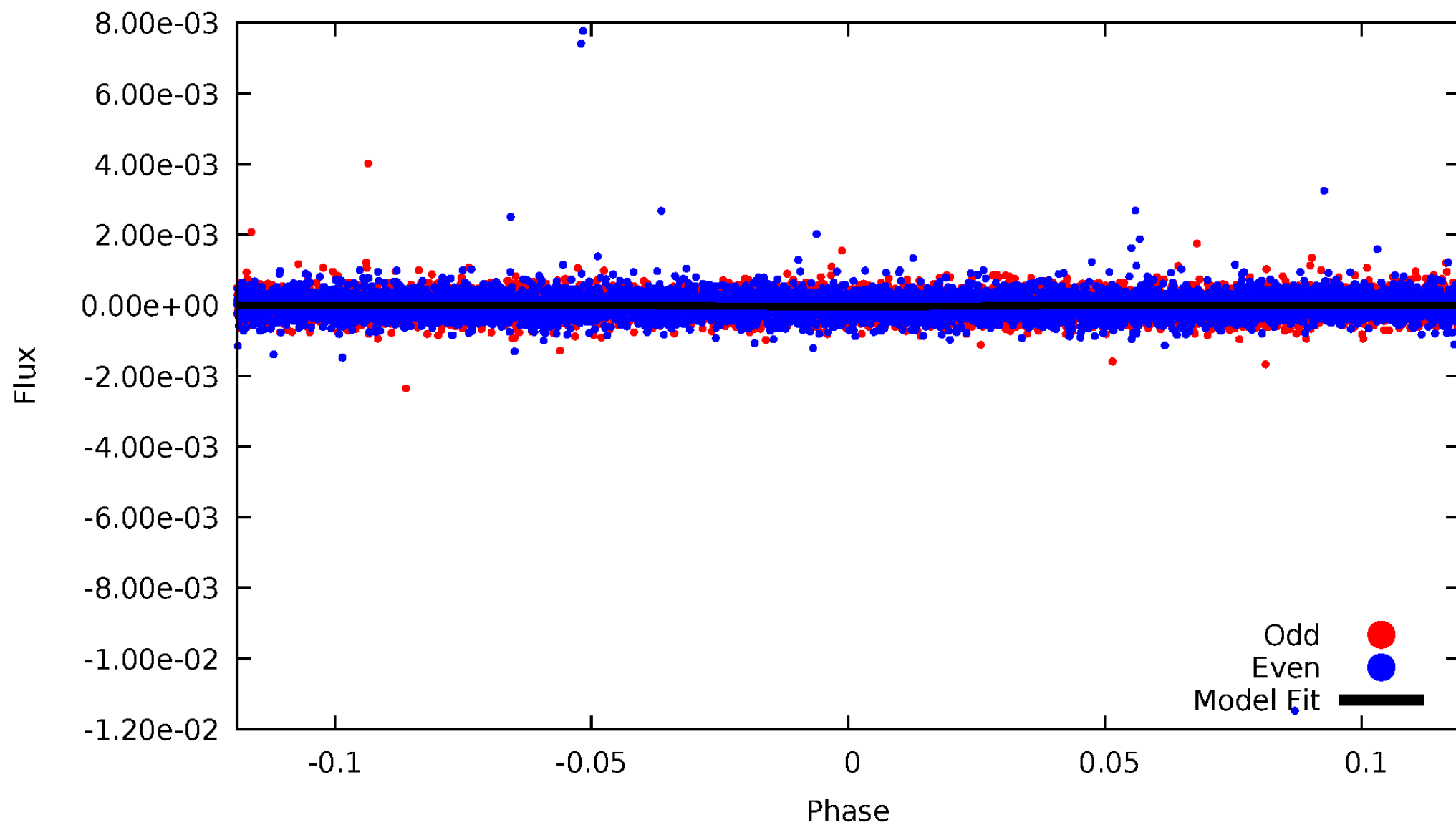


TCE 003650057-01



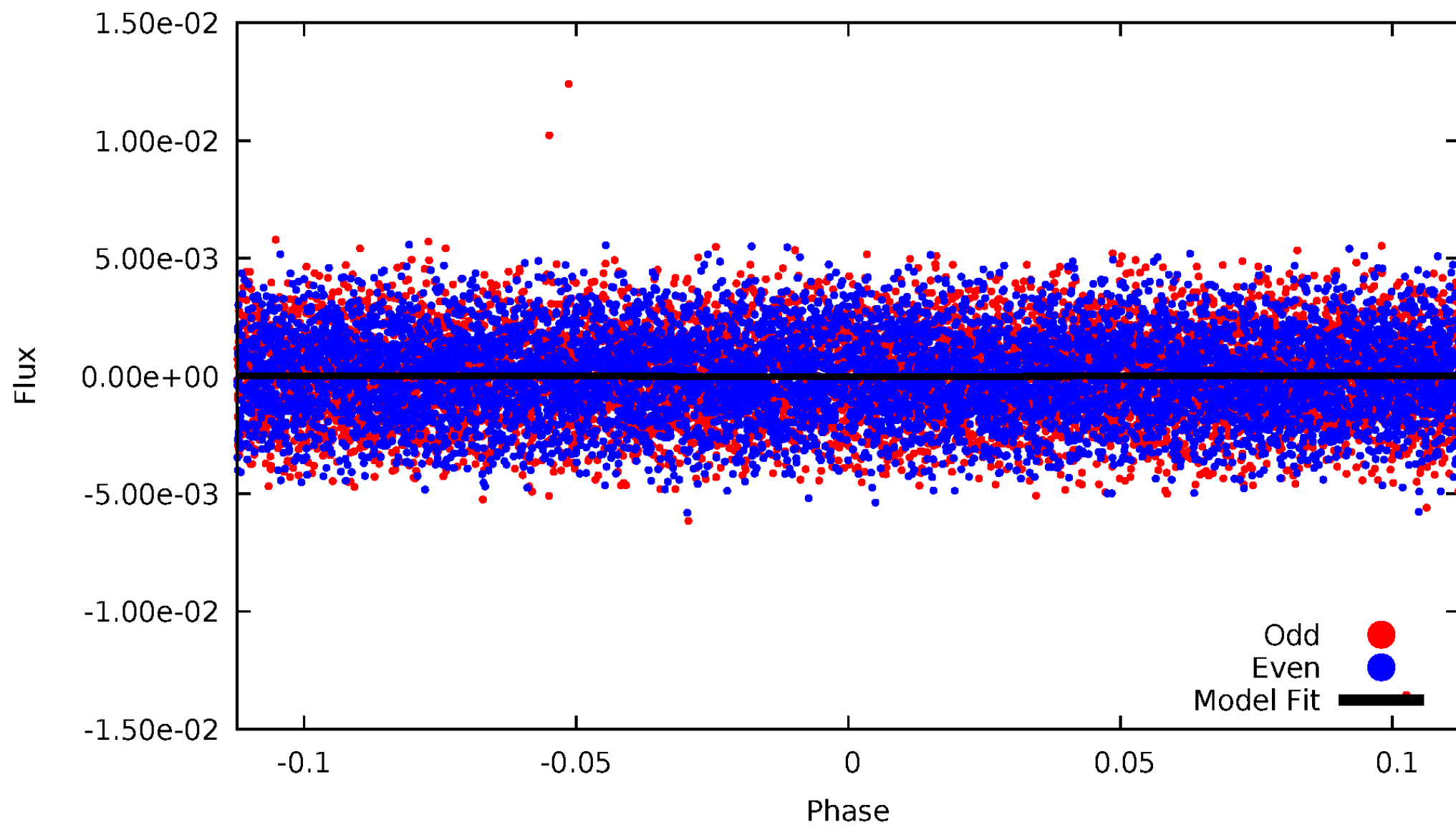
DV Odd/Even

TCE 003650057-01

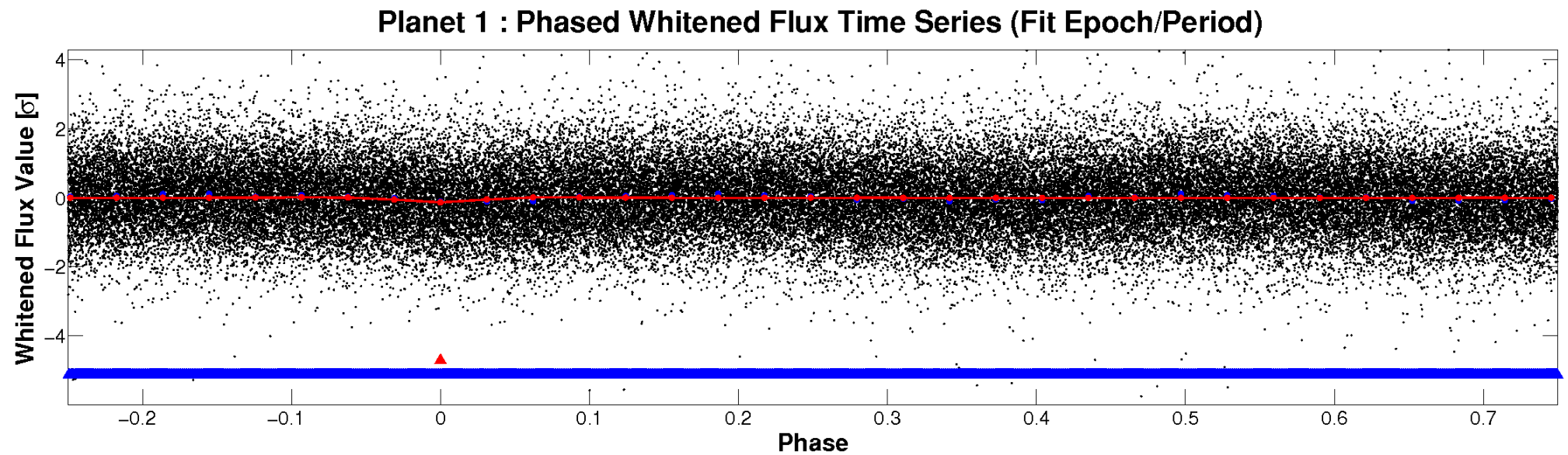
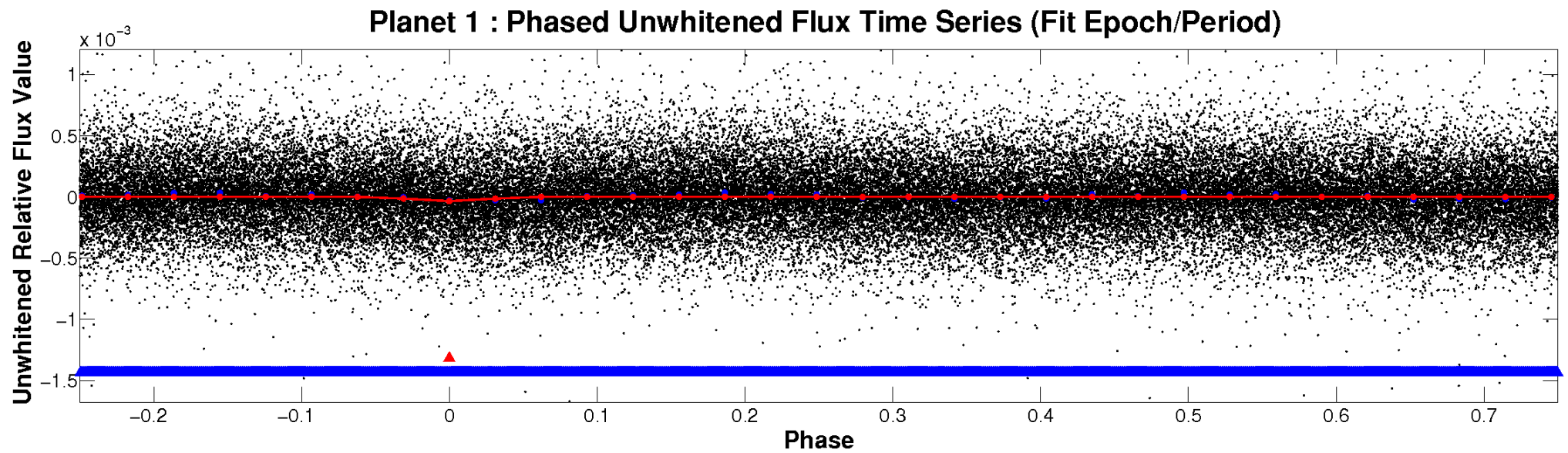


ALT Odd/Even

TCE 003650057-01

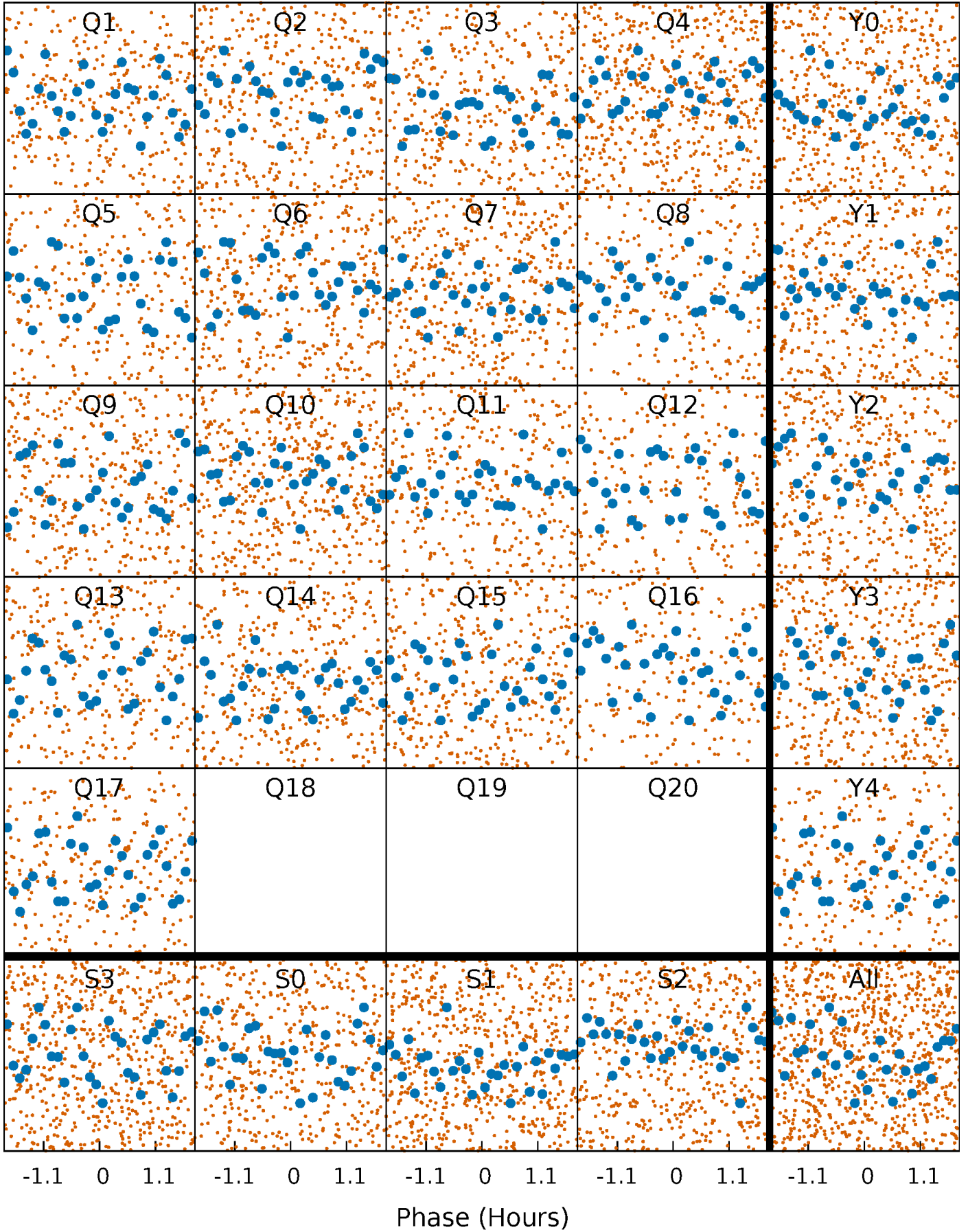


Non-Whitened Vs. Whitened Light Curve



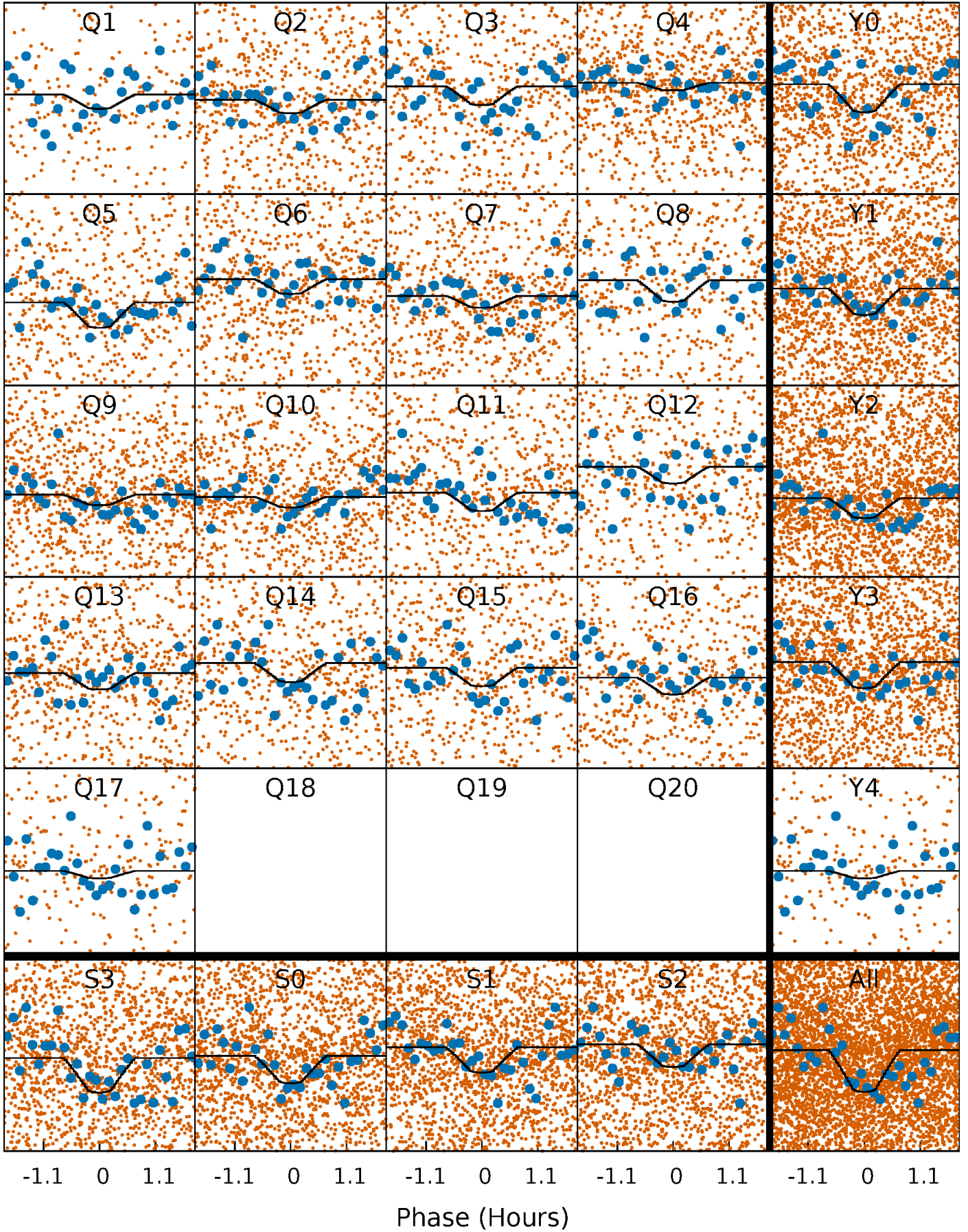
PDC Quarter-Phased Transit Curves

TCE 003650057-01 P= 0.657812 Days $T_0=131.663145$ (BKJD)



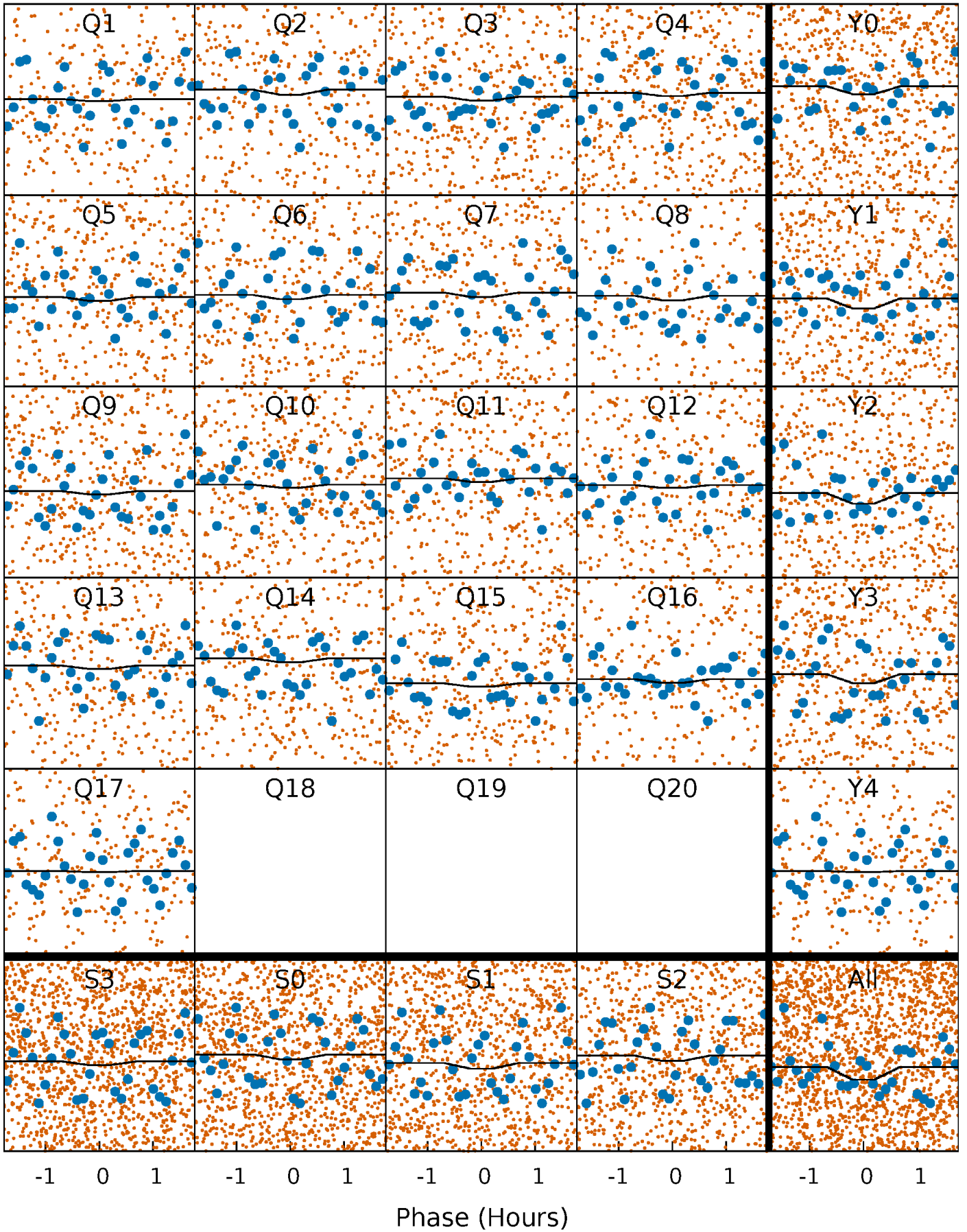
DV Quarter-Phased Transit Curves

TCE 003650057-01 P= 0.657812 Days $T_0=131.663145$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

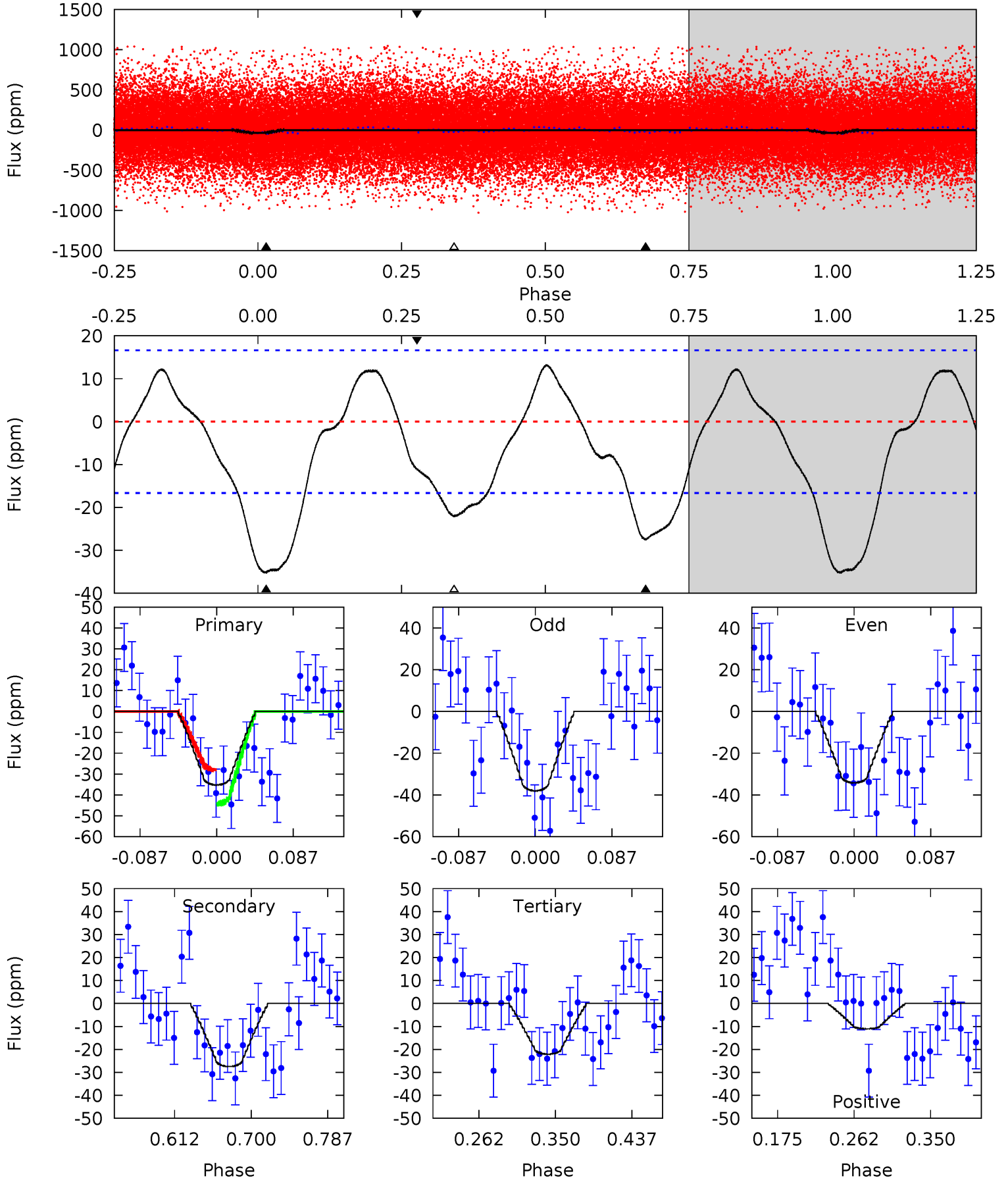
TCE 003650057-01 P= 0.657827 Days $T_0=131.646790$ (BKJD)



DV Model-Shift Uniqueness Test

003650057-01, P = 0.657812 Days, E = 131.005333 Days

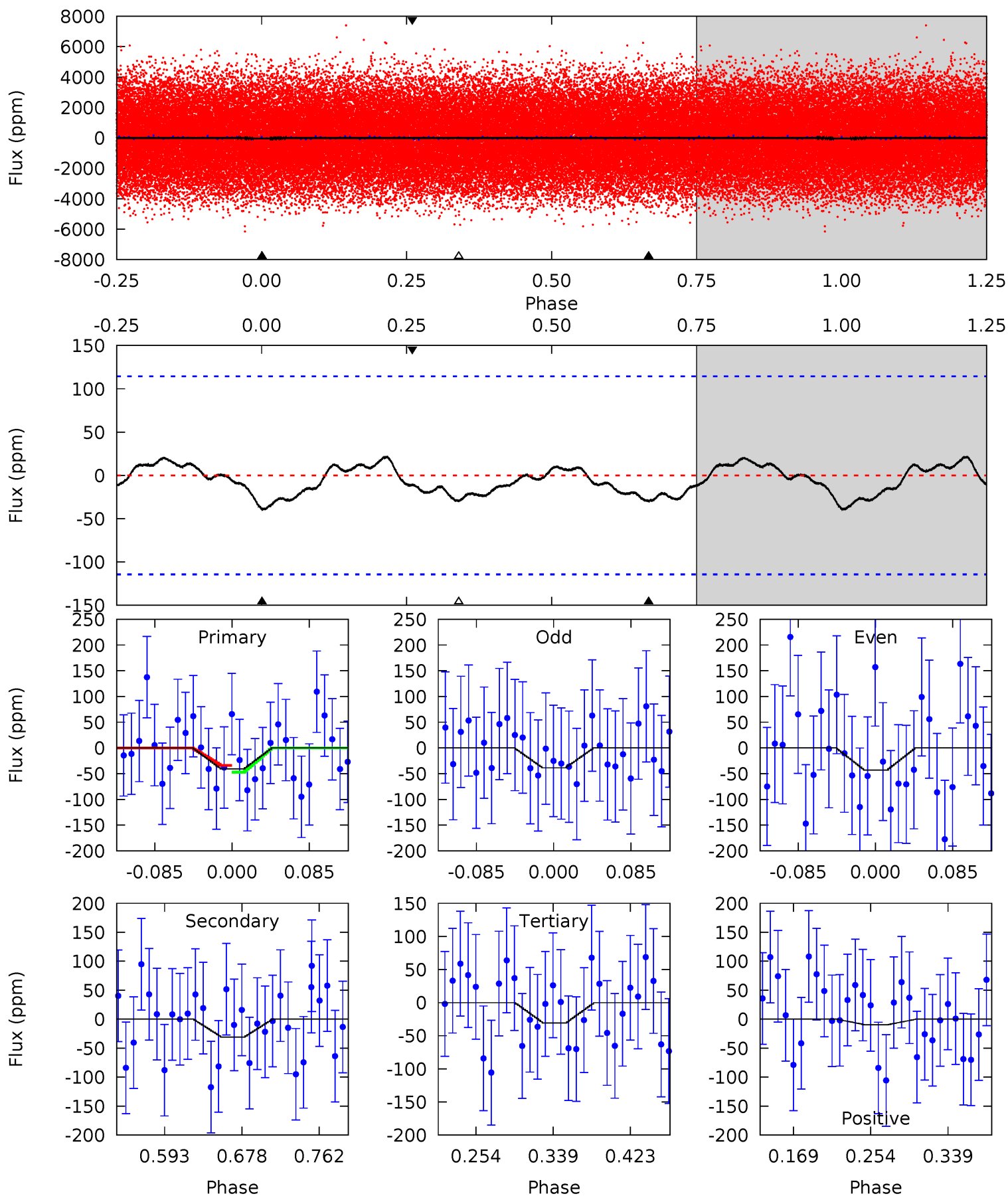
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|-------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 9.73 | 7.59 | 6.10 | -3.05 | 4.59 | 1.71 | 2.80 | 3.63 | 12.8 | 1.49 | 10.6 | 0.53 | 0.93 | 0.27 | 2.28 |



Alt Model-Shift Uniqueness Test

003650057-01, P = 0.657827 Days, E = 130.988963 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|-------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 1.64 | 1.24 | 1.23 | -0.38 | 4.60 | 1.72 | 0.53 | 0.41 | 2.02 | 0.01 | 1.62 | 0.09 | 0.48 | 0.35 | 0.26 |



Stellar Parameters For KIC 003650057

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 7318^{+228}_{-304} | $4.058^{+0.175}_{-0.175}$ | $-0.100^{+0.250}_{-0.350}$ | $1.942^{+0.567}_{-0.464}$ | $1.569^{+0.211}_{-0.257}$ | $0.302^{+0.291}_{-0.149}$ |
| | +3%/-4% | +4%/-4% | +250%/-350% | +29%/-24% | +13%/-16% | +97%/-50% |
| Source | KIC0 | KIC0 | 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 003650057-01 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|--------------|------------------------|----------------------|------------------------|----------------------------|
| DV | -27 ± 4 | $1.87^{+1.78}_{-1.29}$ | 4780^{+354}_{-353} | 5141^{+5896}_{-2274} | $1.279^{+12.046}_{-0.947}$ |
| Alt. | -31 ± 25 | $1.93^{+1.61}_{-1.22}$ | 4793^{+360}_{-361} | 5014^{+4651}_{-8879} | $1.088^{+7.949}_{-0.980}$ |

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

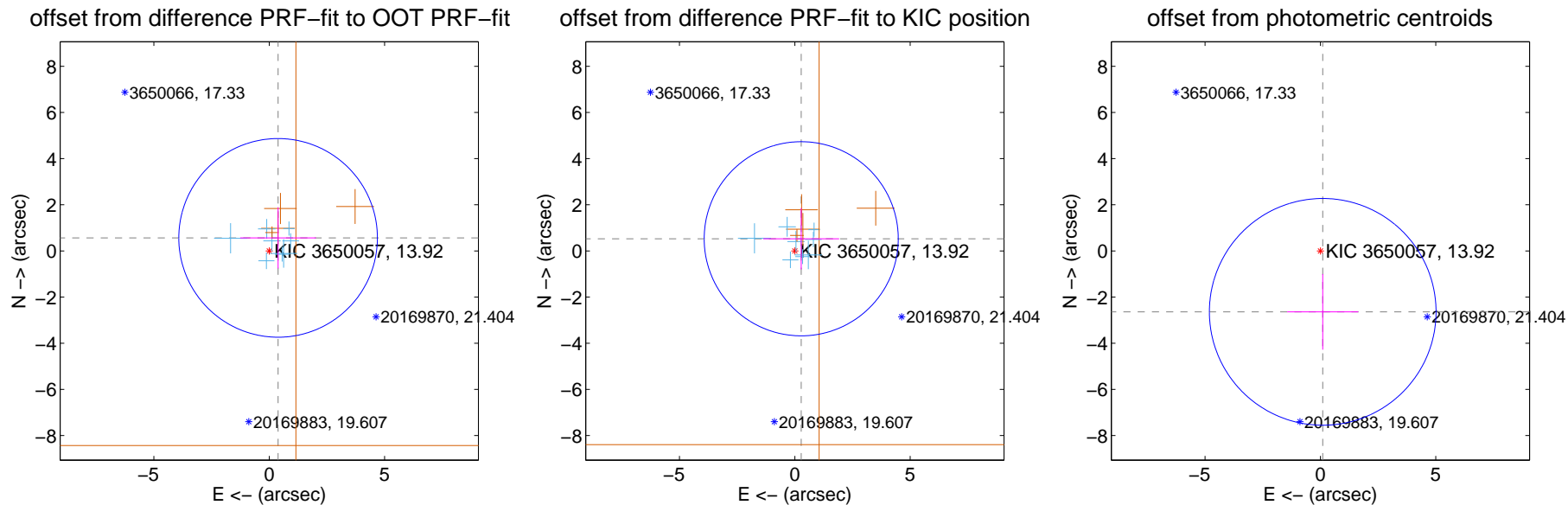
DV Centroid Data

Supplemental centroid analysis for 003650057-01. Kepler magnitude: 13.92. Transit SNR 7.08

There are 8 quarters with good PRF difference image offsets

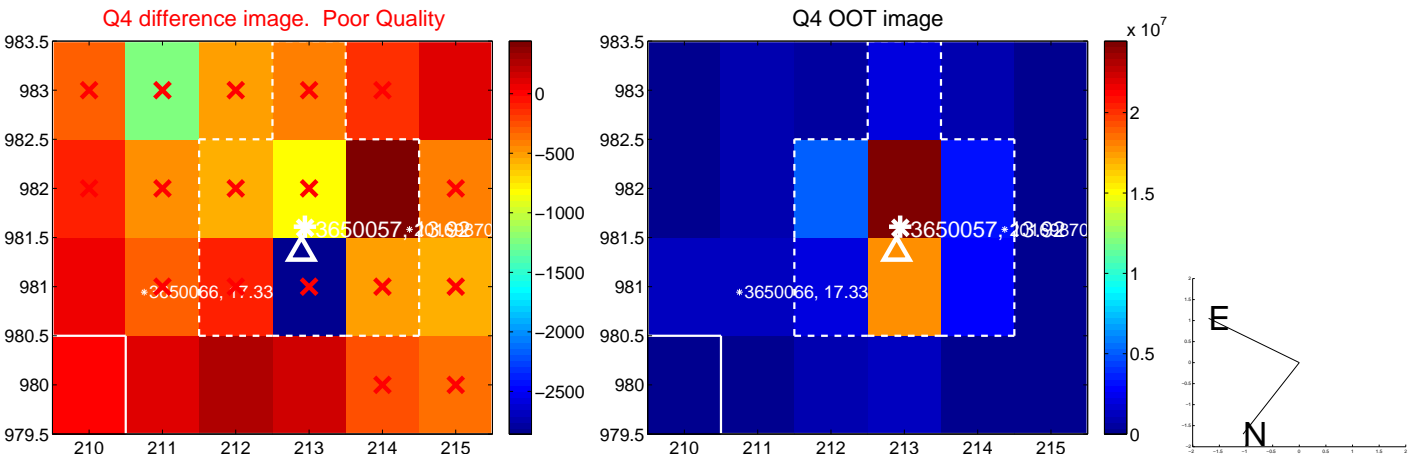
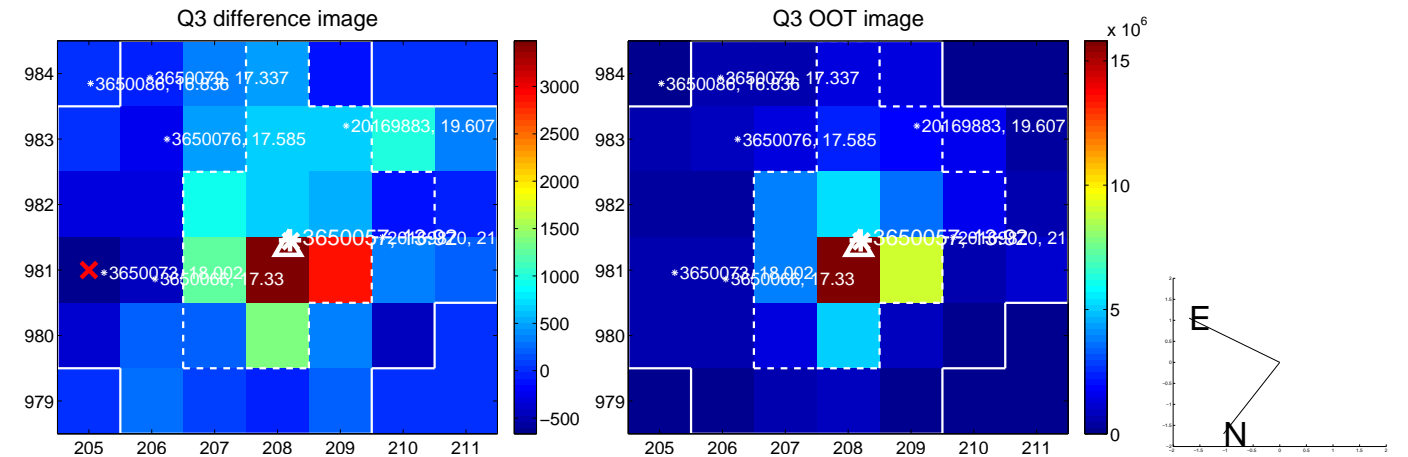
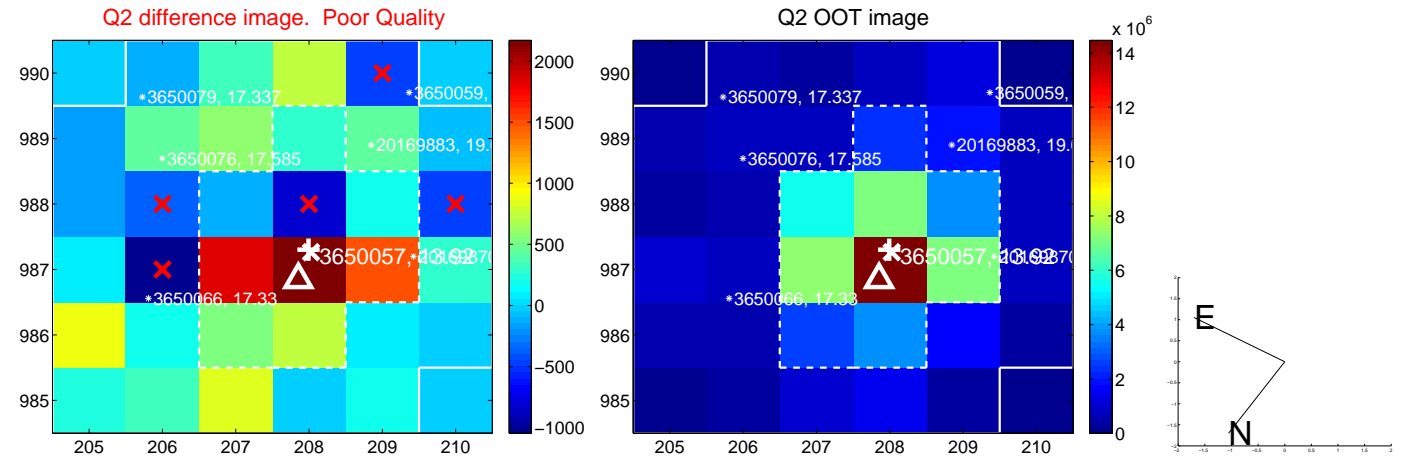
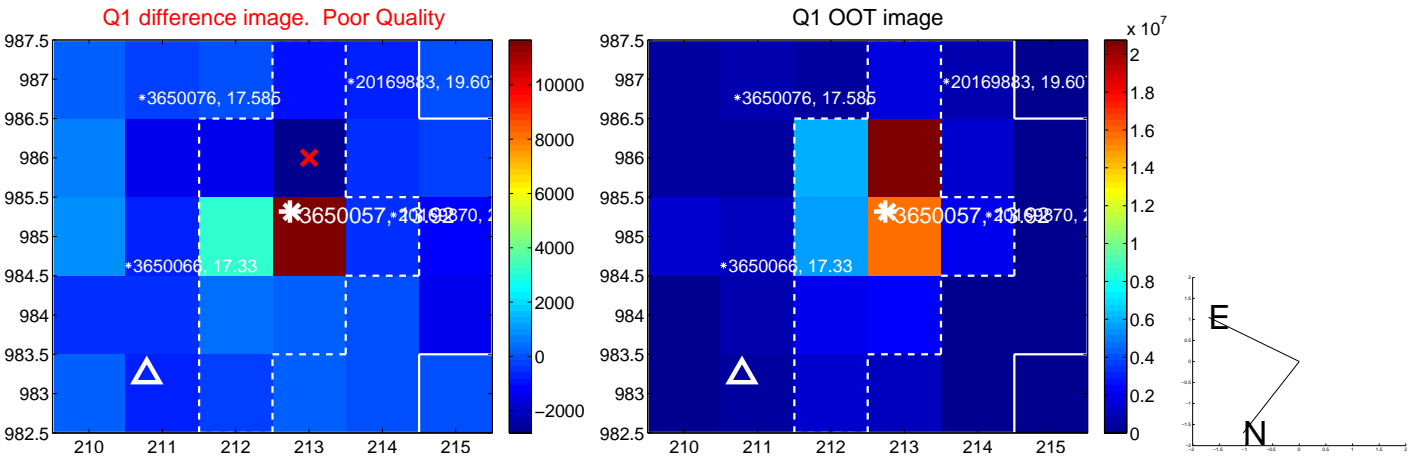
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT | 0.683 ± 1.435 | 0.48 | -0.384 ± 1.643 | 0.565 ± 1.327 |
| PRF-fit source offset from KIC position | 0.595 ± 1.402 | 0.42 | -0.277 ± 1.643 | 0.527 ± 1.327 |
| photometric centroid source offset | 2.64 ± 1.64 | 1.61 | -0.10 ± 1.54 | -2.64 ± 1.64 |

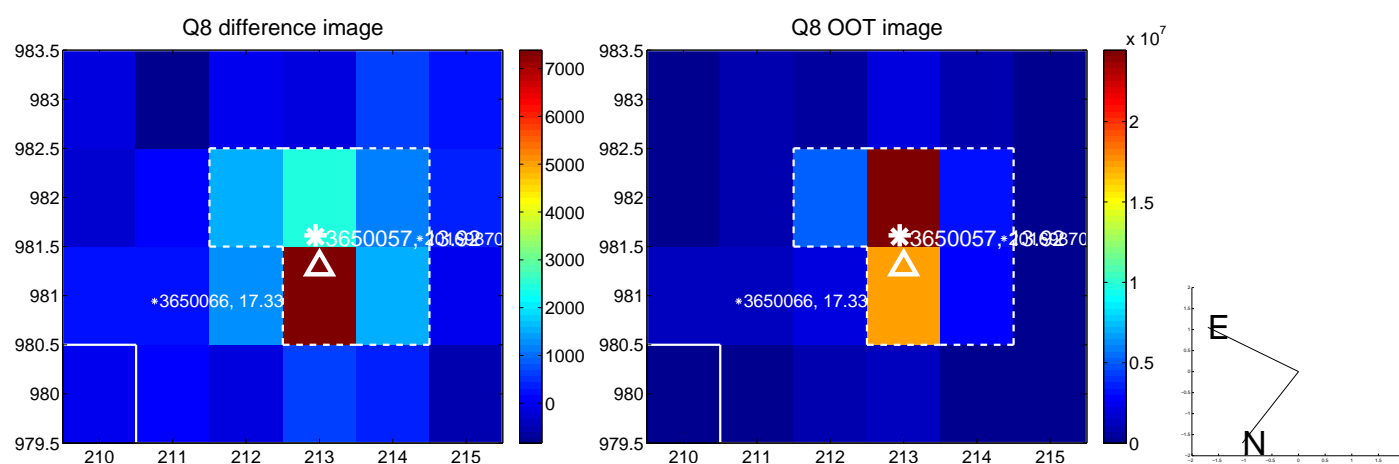
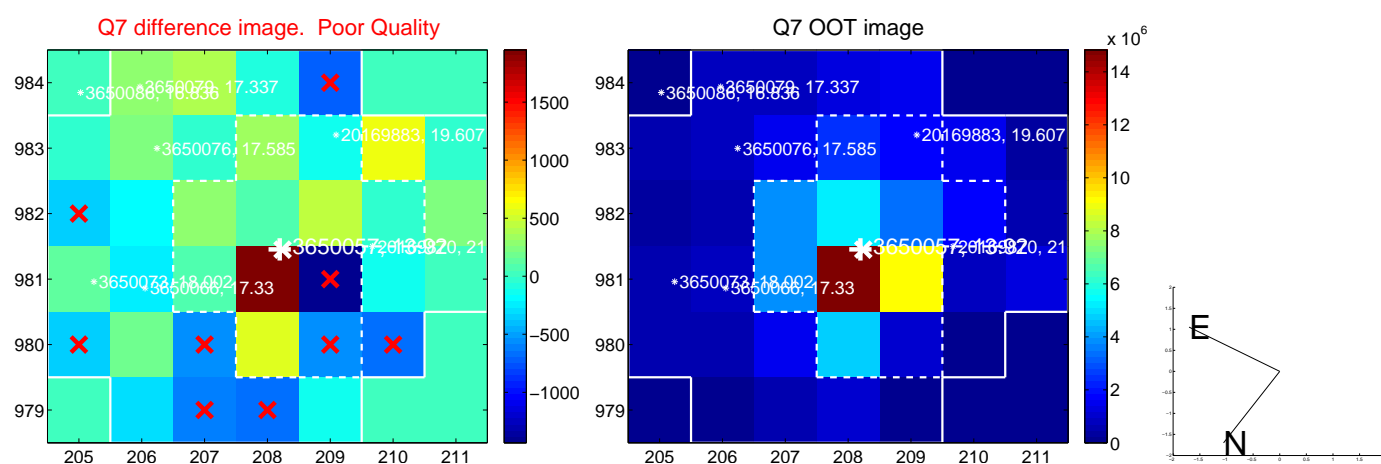
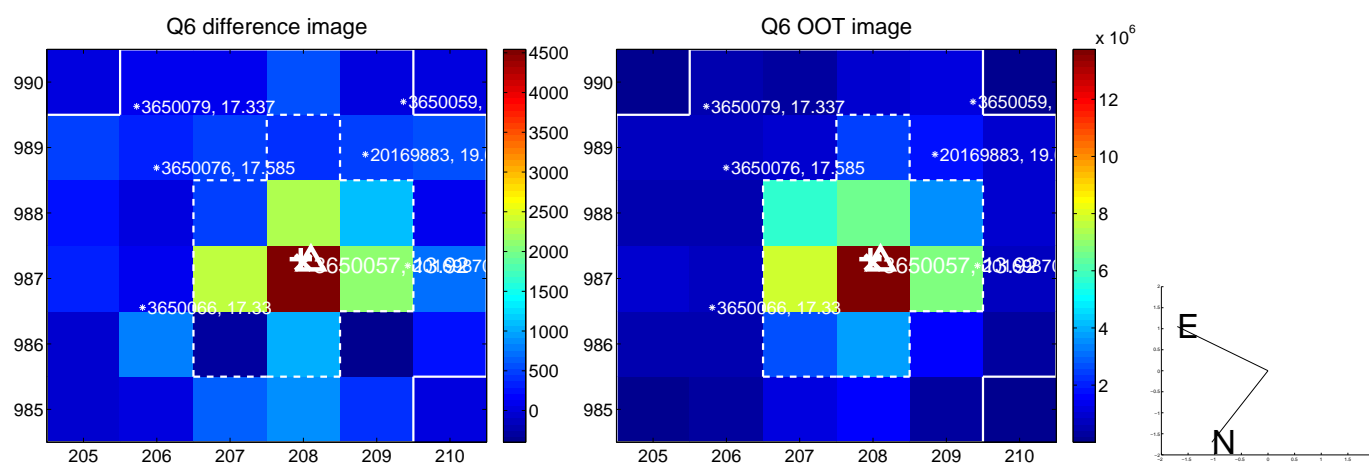
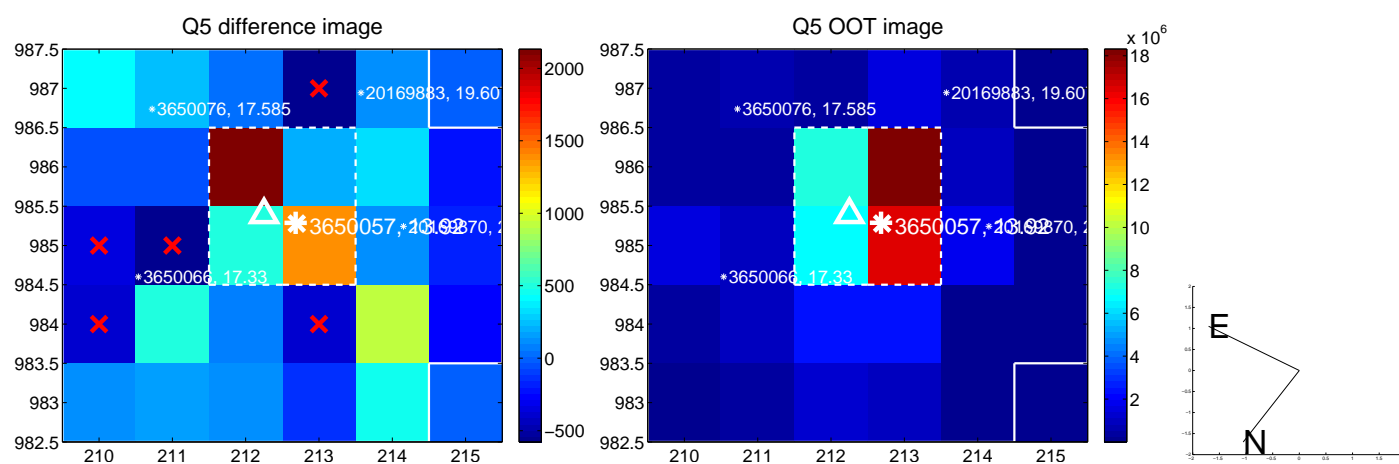


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

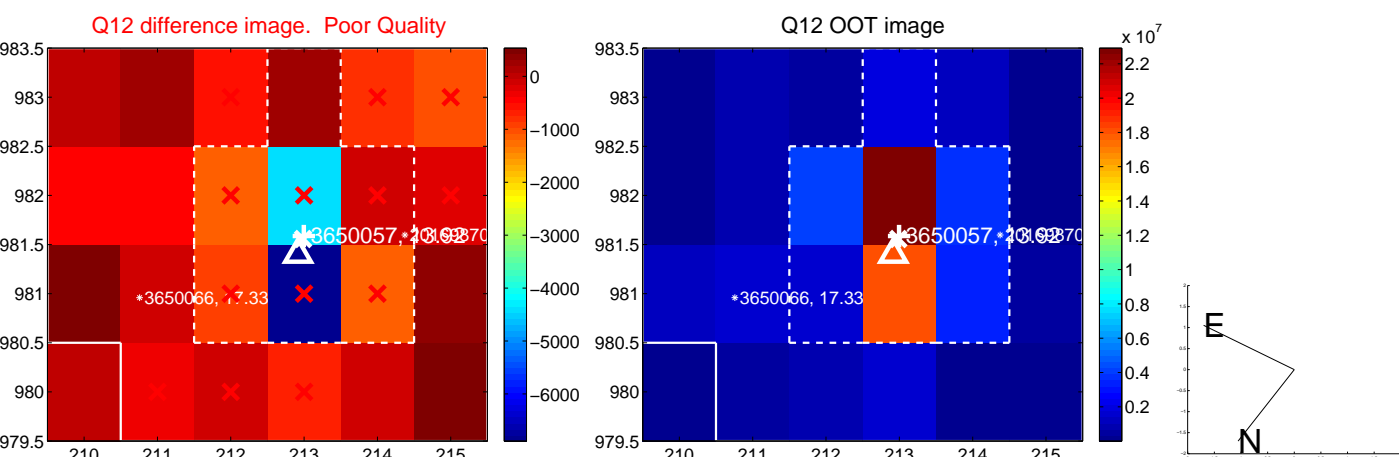
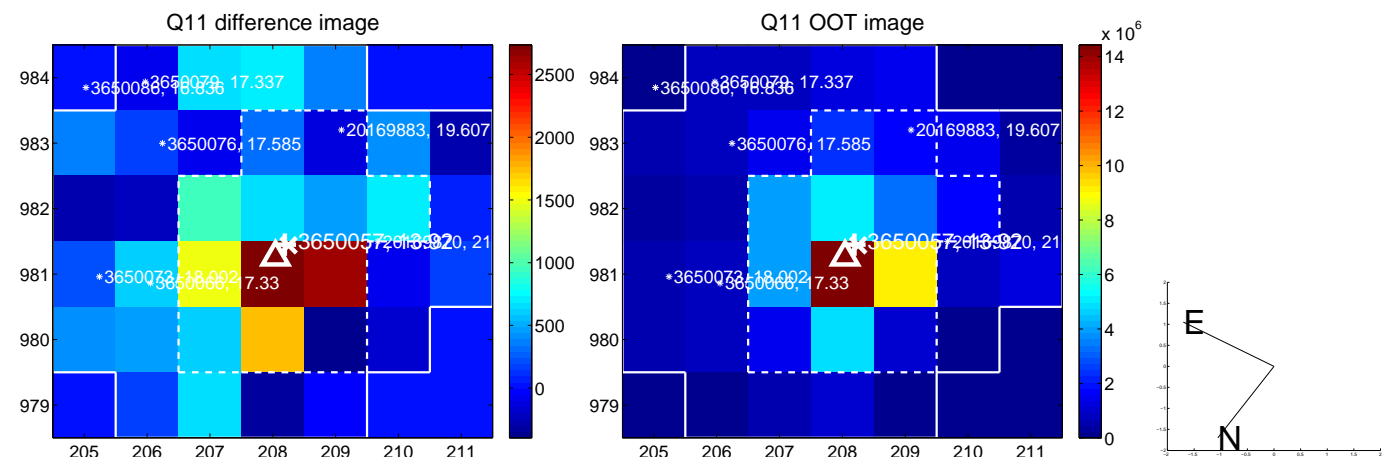
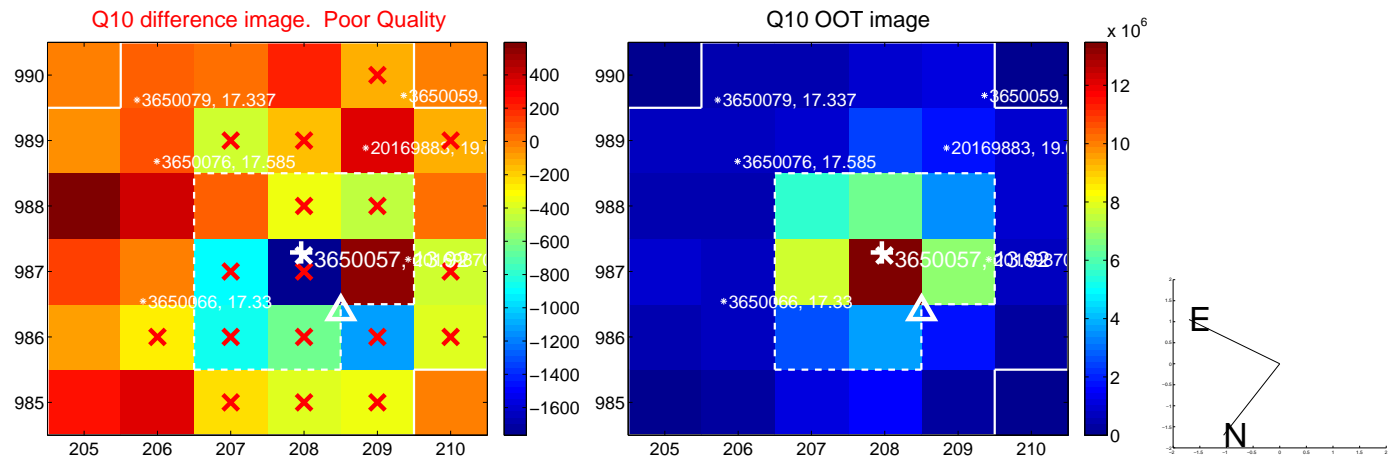
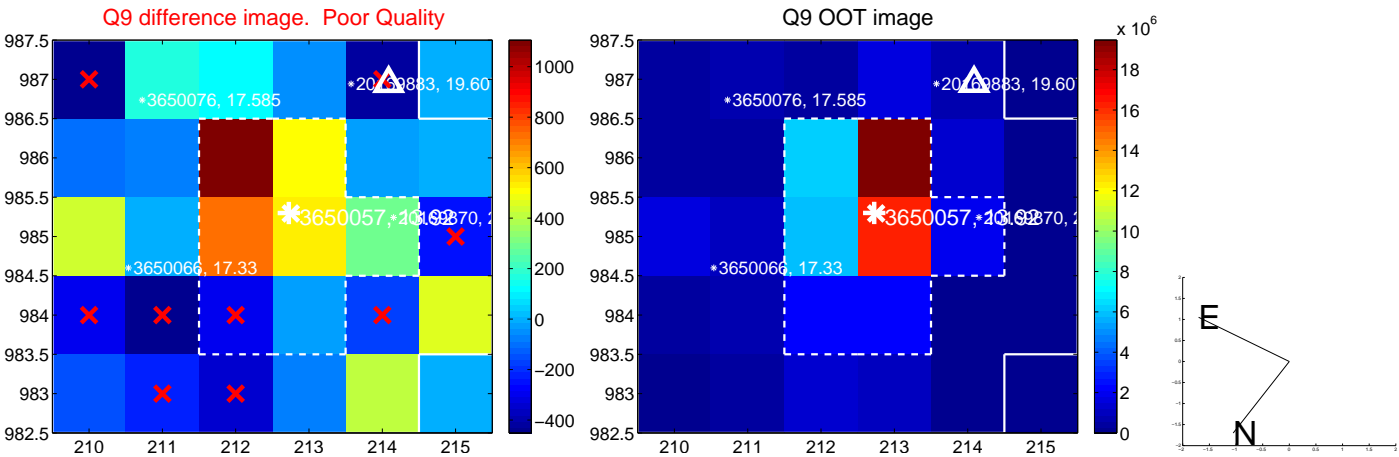
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



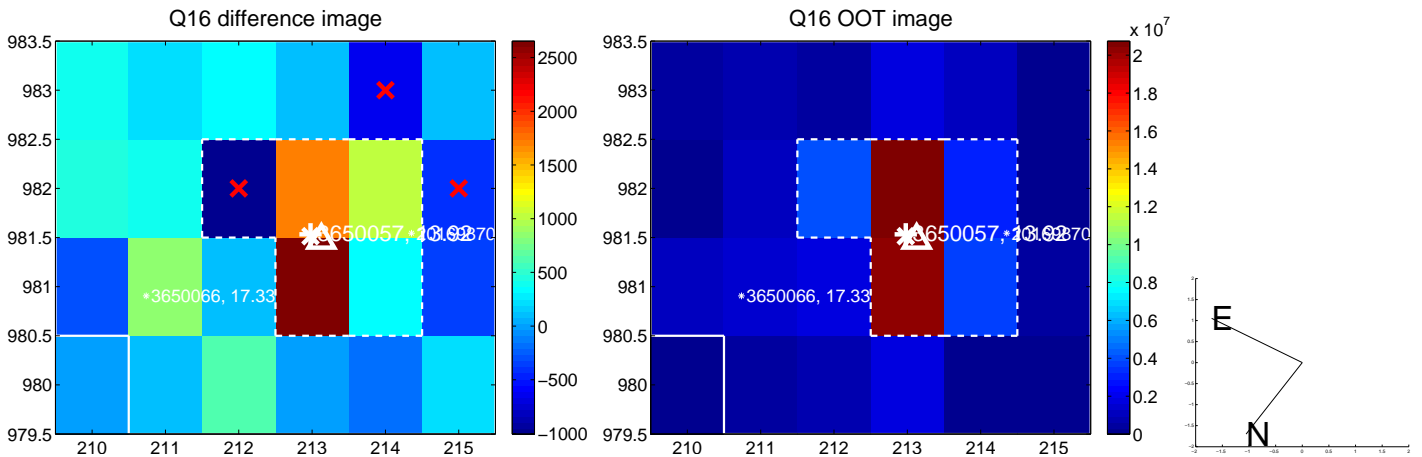
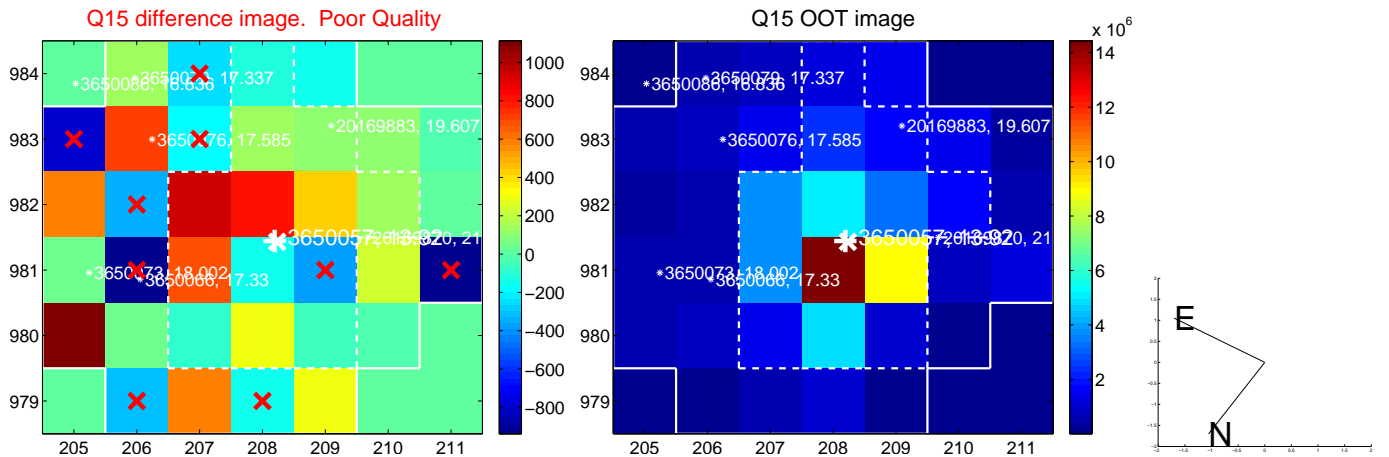
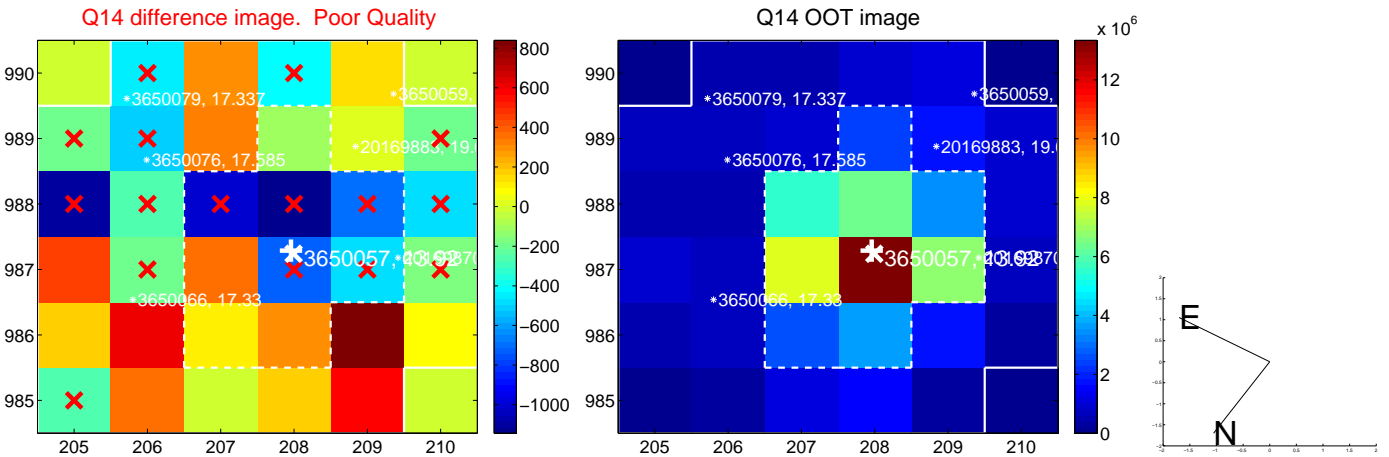
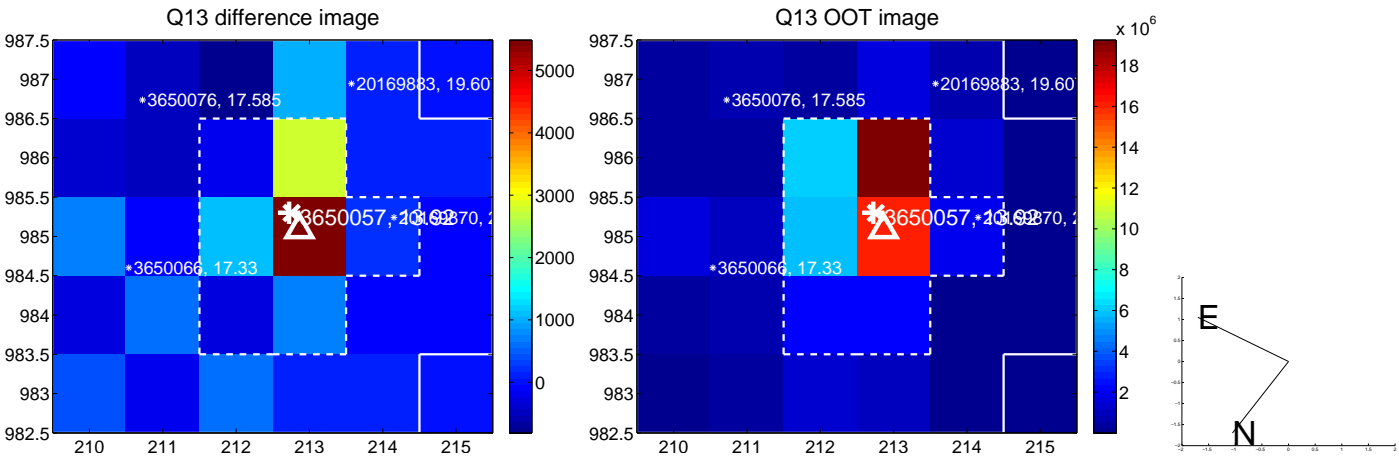
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



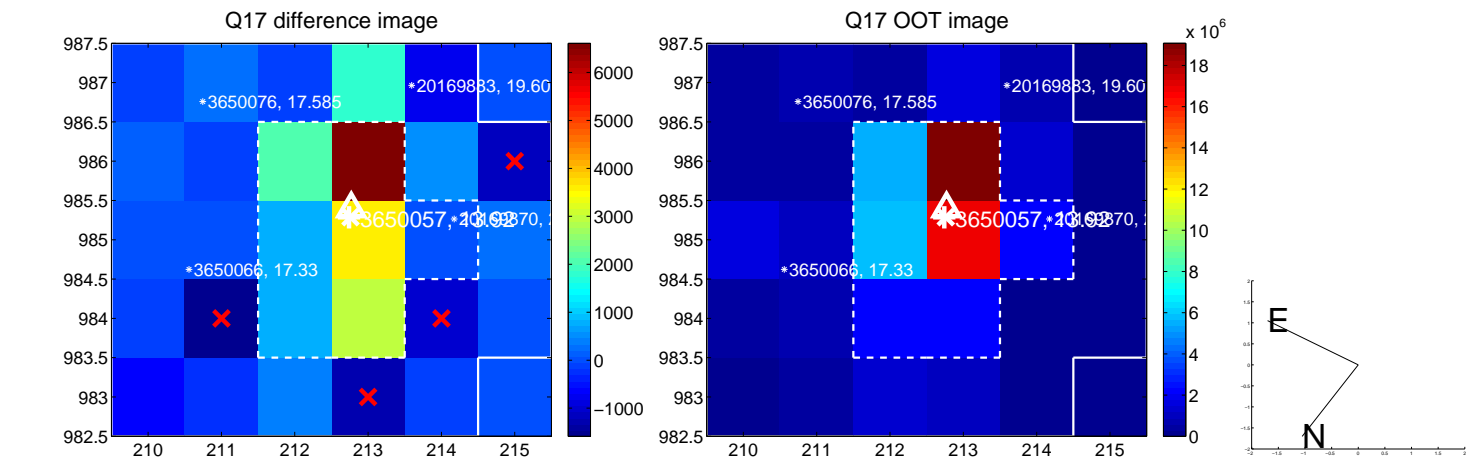
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



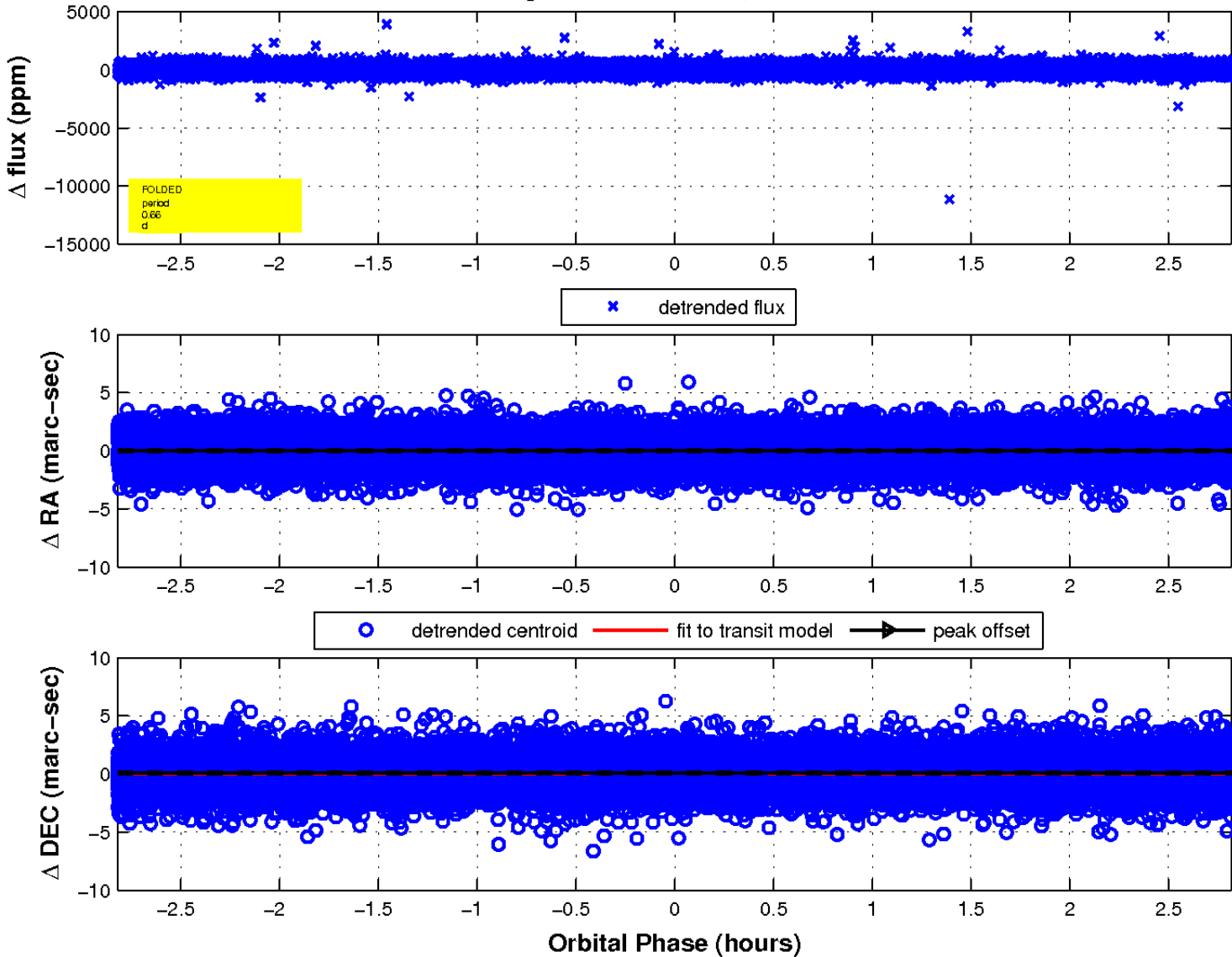
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

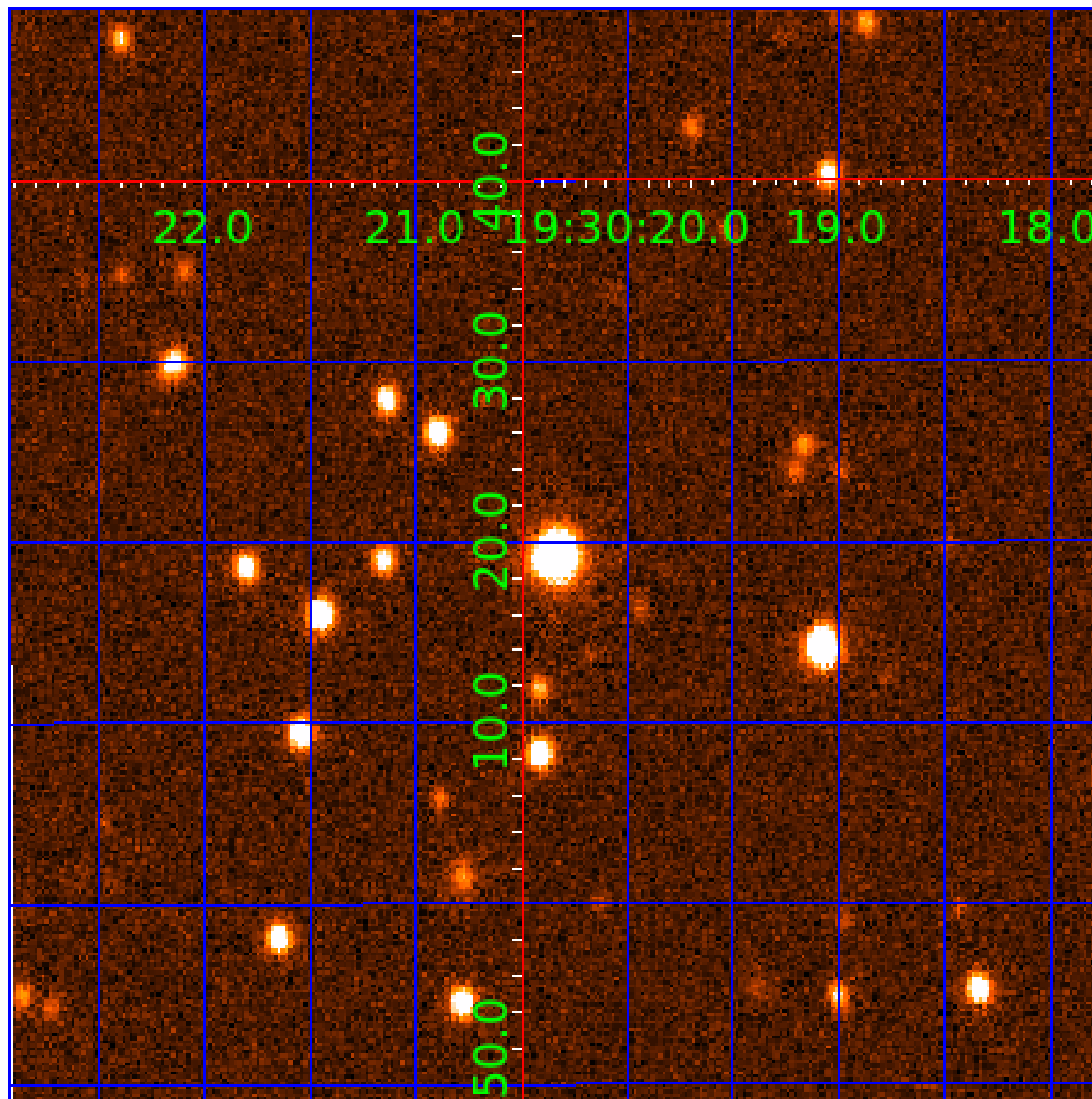


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 003650057

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 003650057-01 | OBS | No | 0.657812 | 131.663145 | 36.1 | 0.940 | 8.5 | 7.1 | 1.94 | 7318 | 1.19 | 32695.98 |
| 003650057-02 | OBS | No | 0.966410 | 131.745901 | 36.0 | 3.621 | 7.9 | 8.7 | 1.94 | 7318 | 1.35 | 19577.11 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|---|
| 003650057-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT |
| 003650057-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT |

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

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

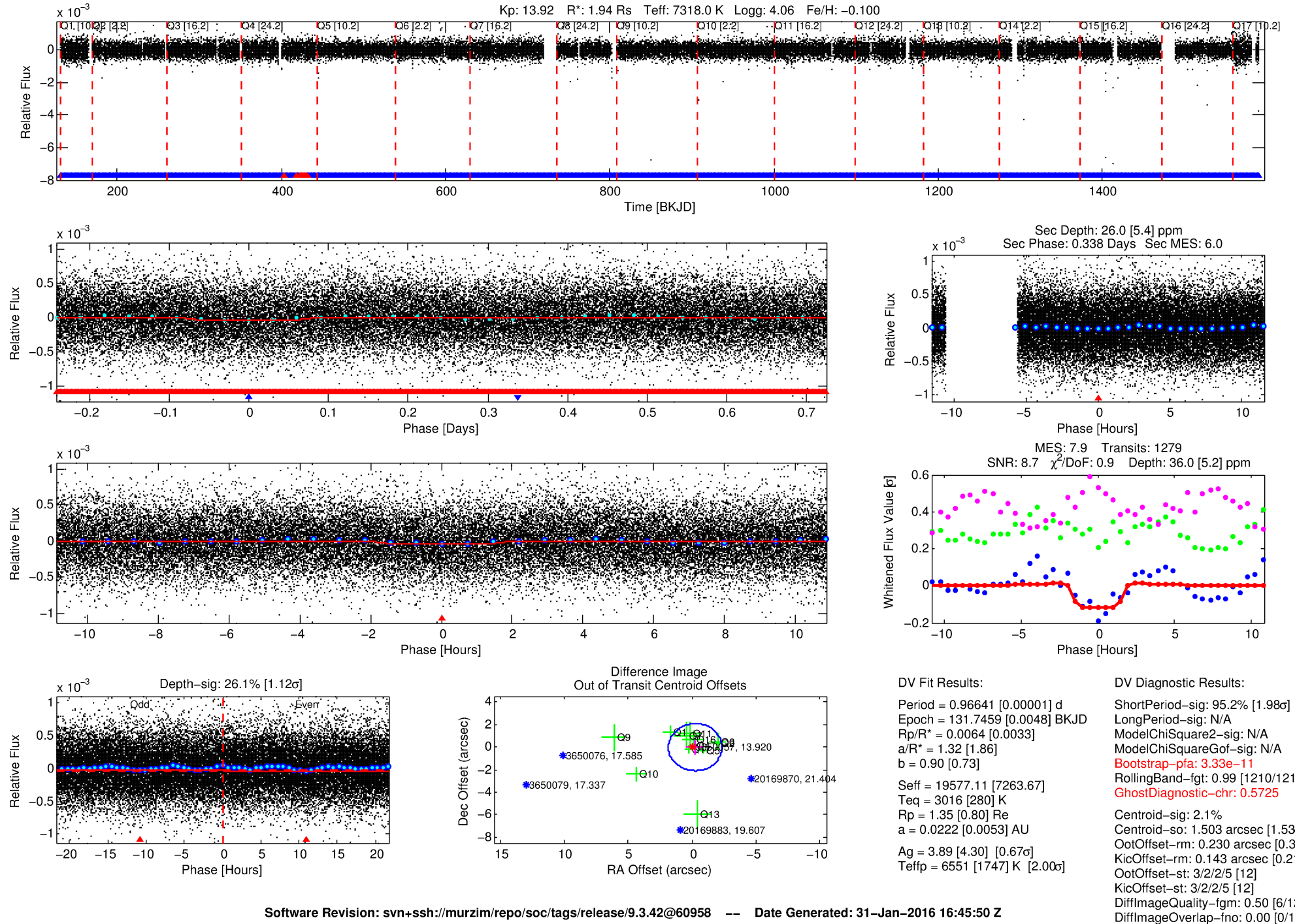
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 003650057-02

No Significant Match Found

DV One-Page Summary

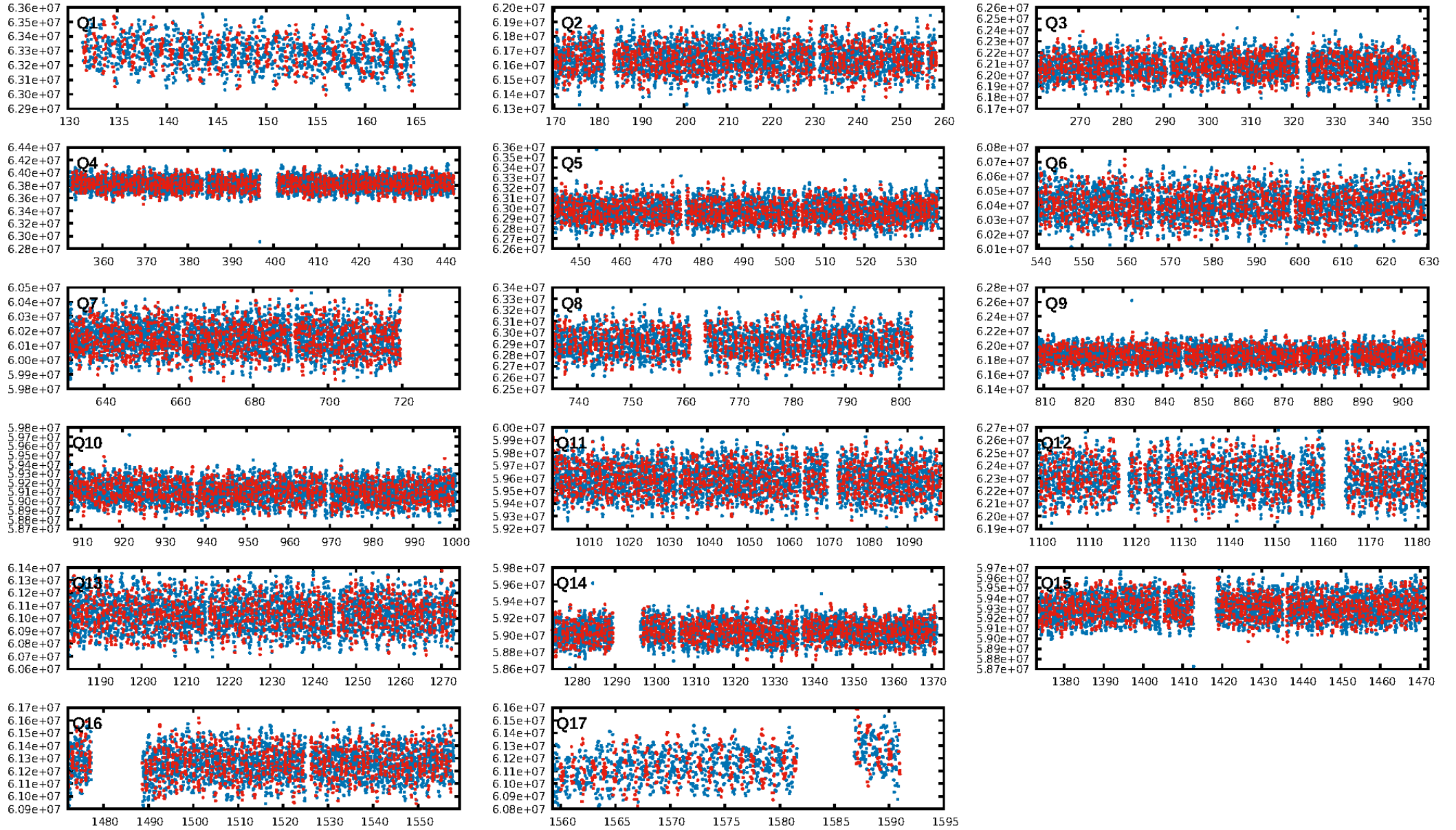
KIC: 3650057 Candidate: 2 of 2 Period: 0.966 d



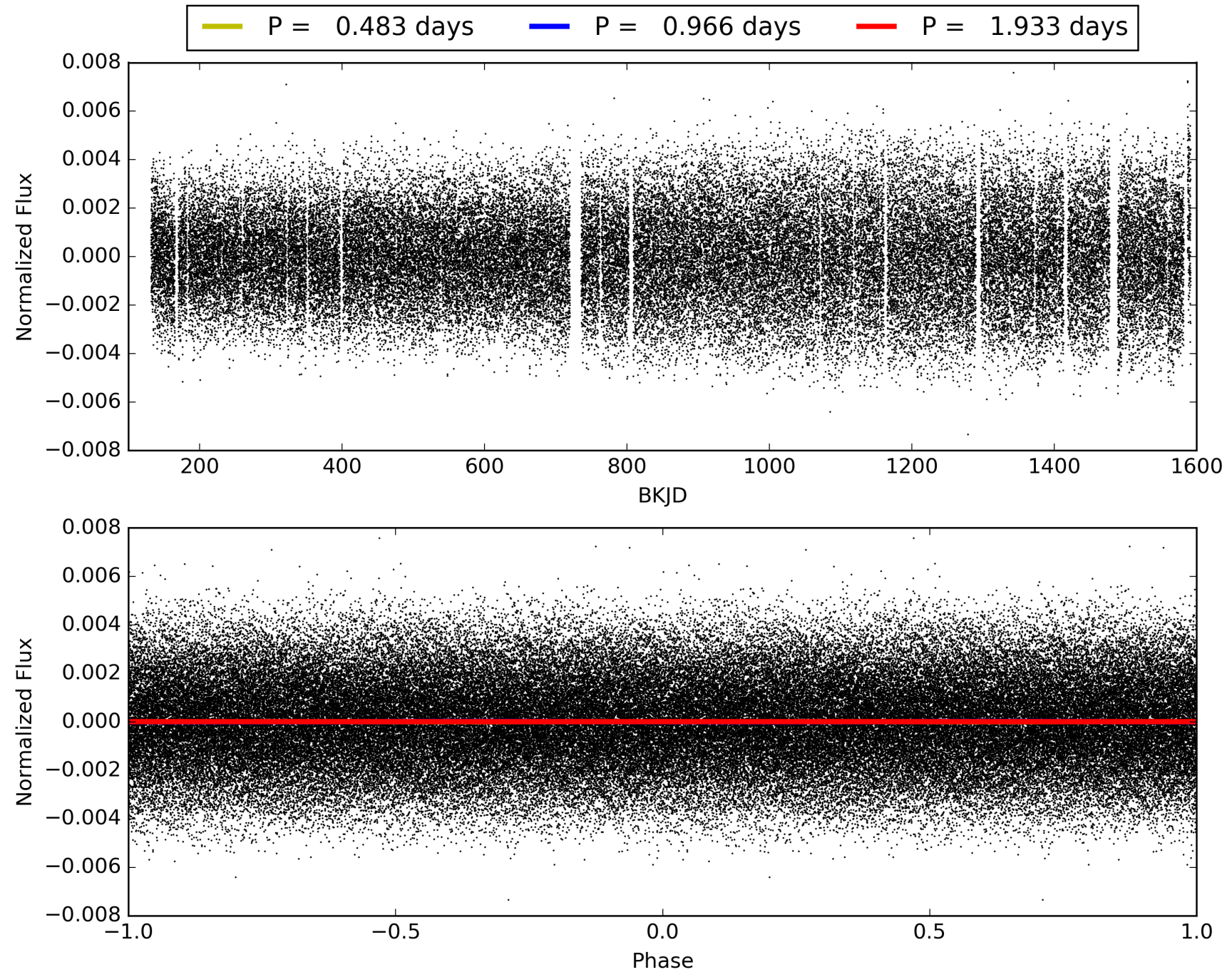
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 16:45:50 Z

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

TCE 003650057-02, PDC Light Curves

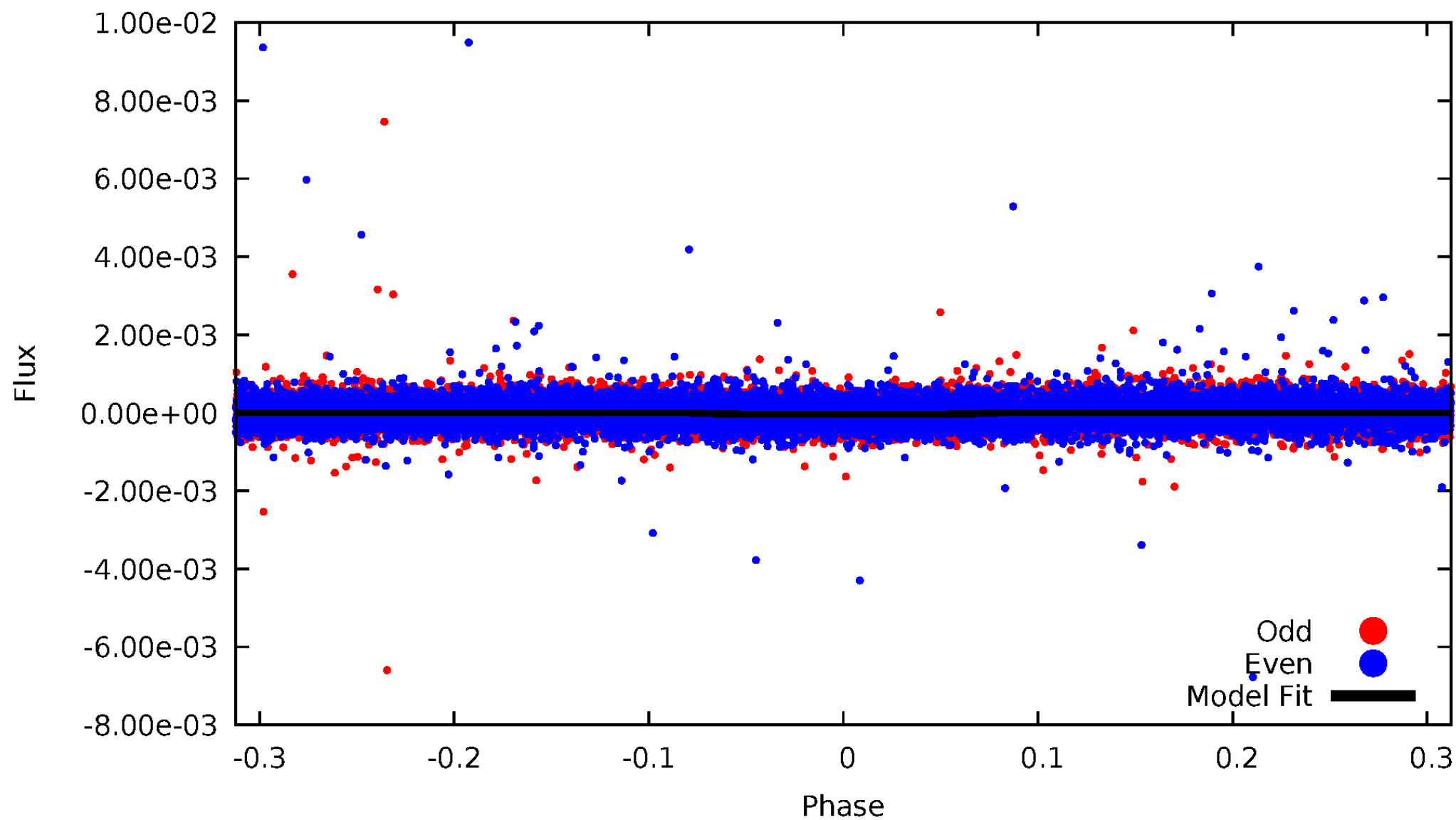


TCE 003650057-02



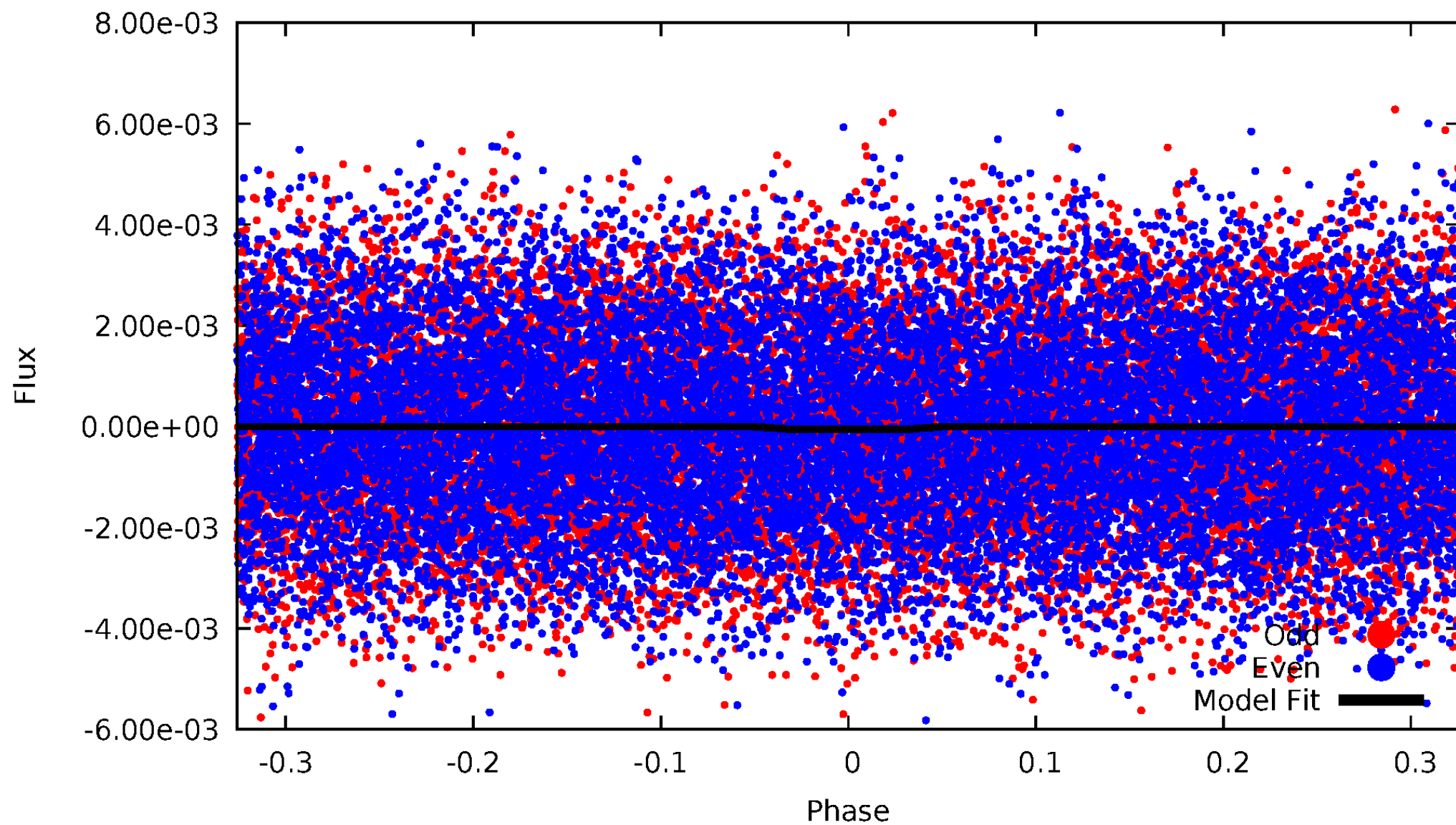
DV Odd/Even

TCE 003650057-02



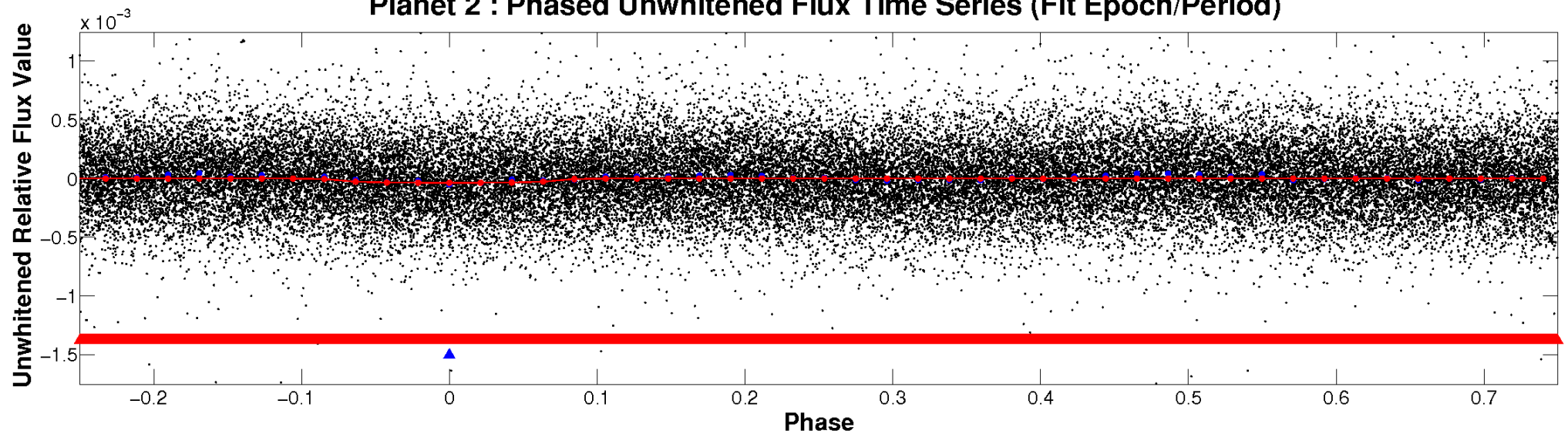
ALT Odd/Even

TCE 003650057-02

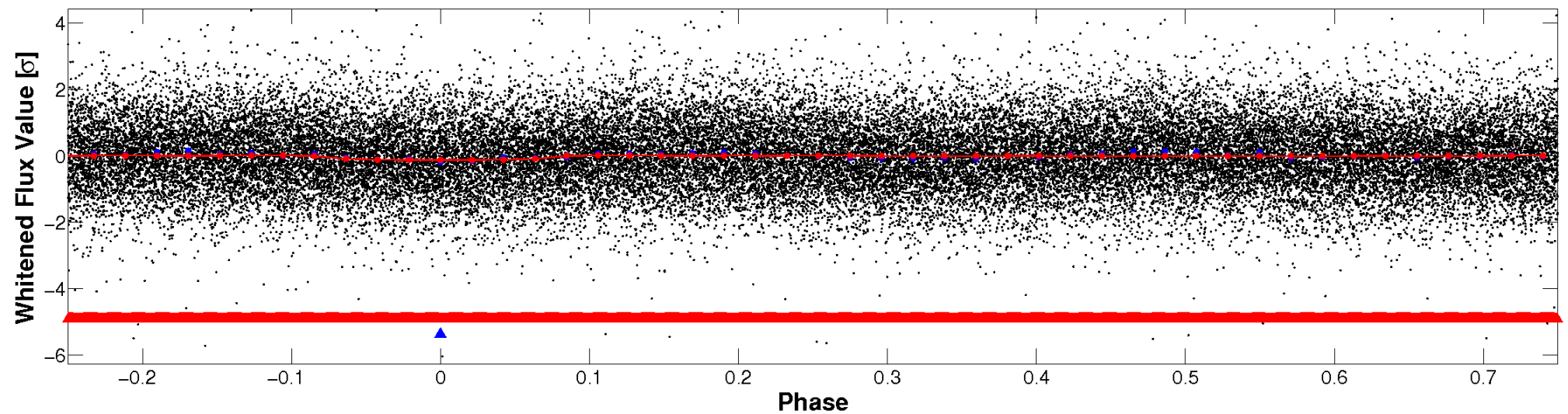


Non-Whitened Vs. Whitened Light Curve

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

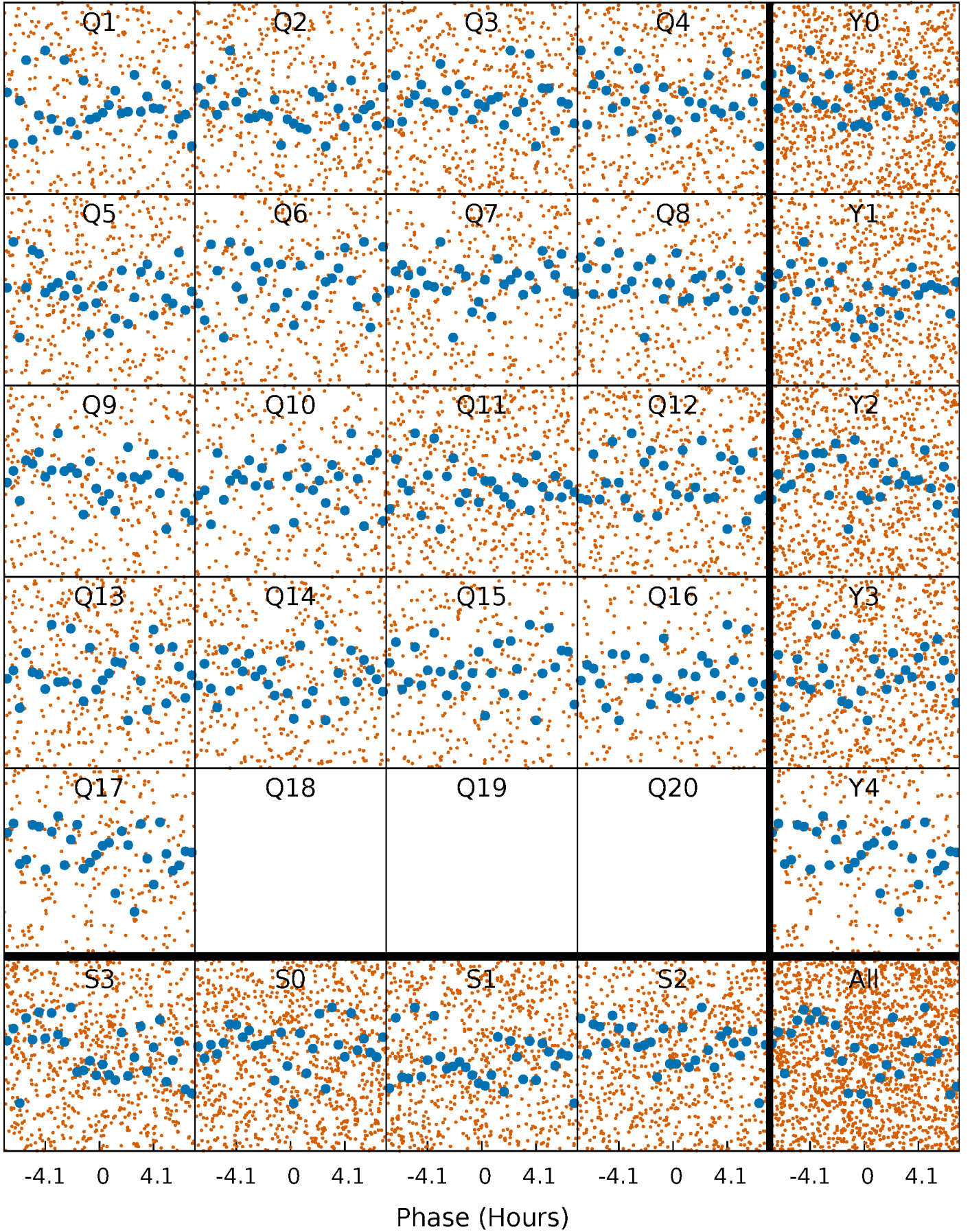


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



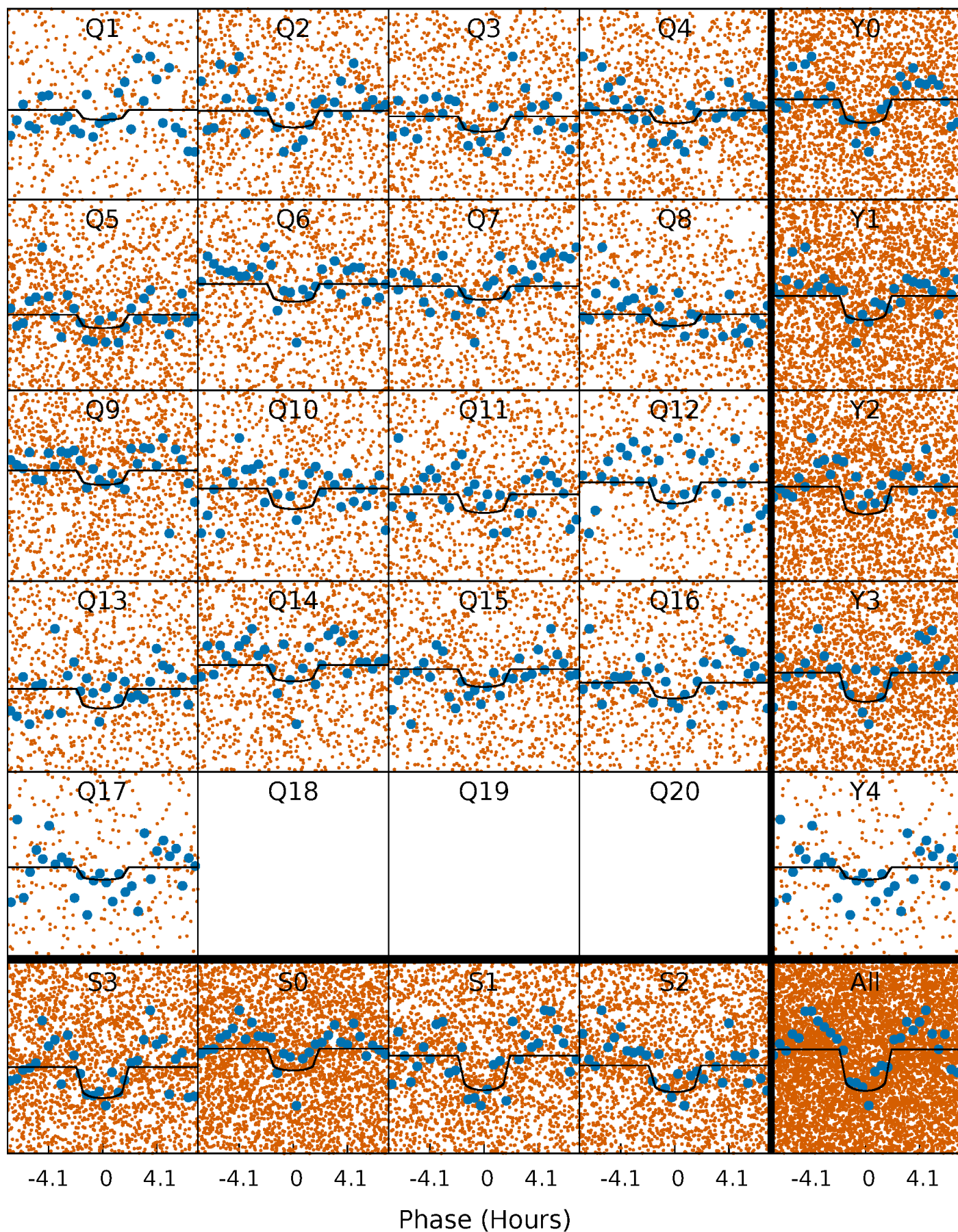
PDC Quarter-Phased Transit Curves

TCE 003650057-02 P= 0.966410 Days $T_0=131.745901$ (BKJD)



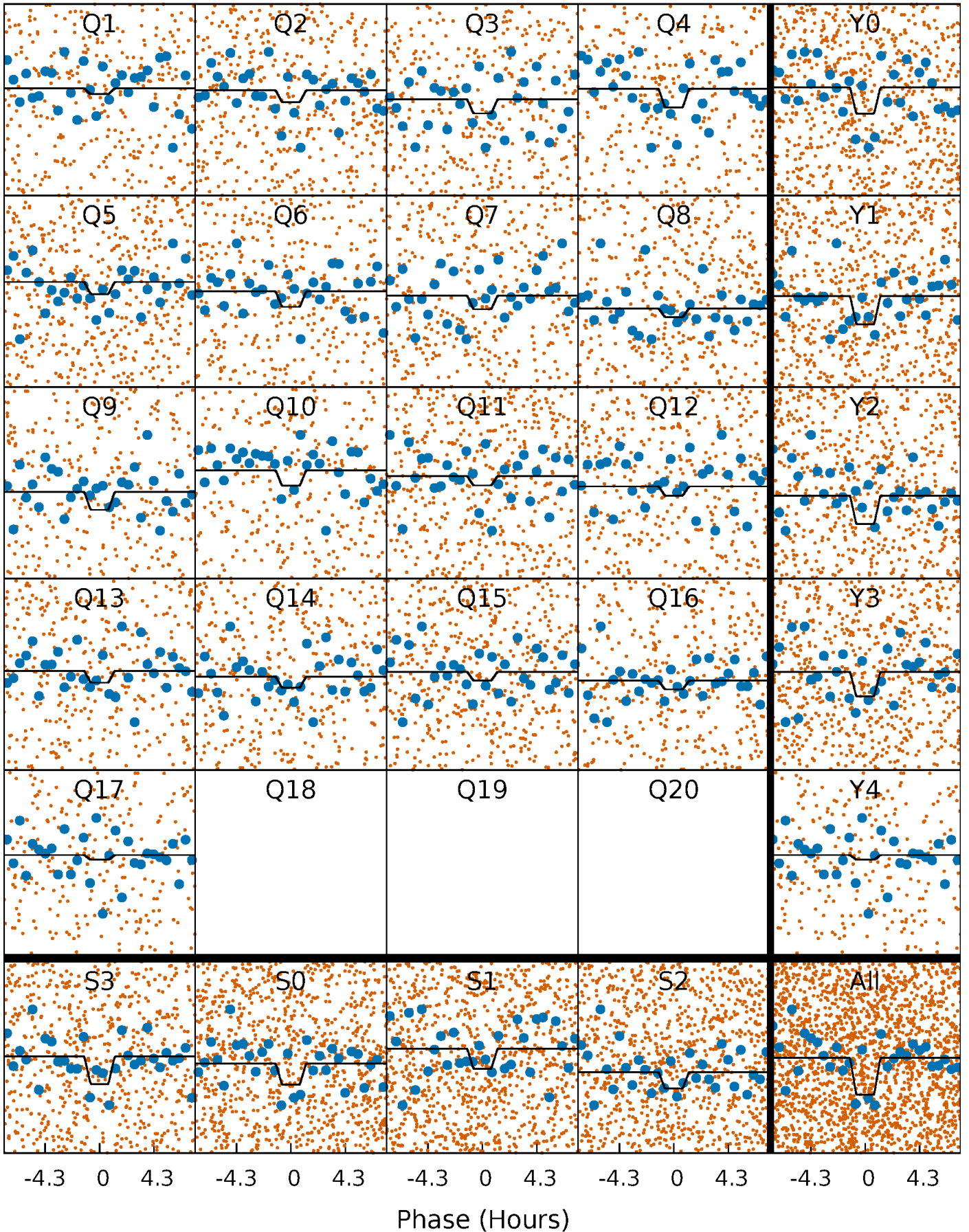
DV Quarter-Phased Transit Curves

TCE 003650057-02 P= 0.966410 Days $T_0=131.745901$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

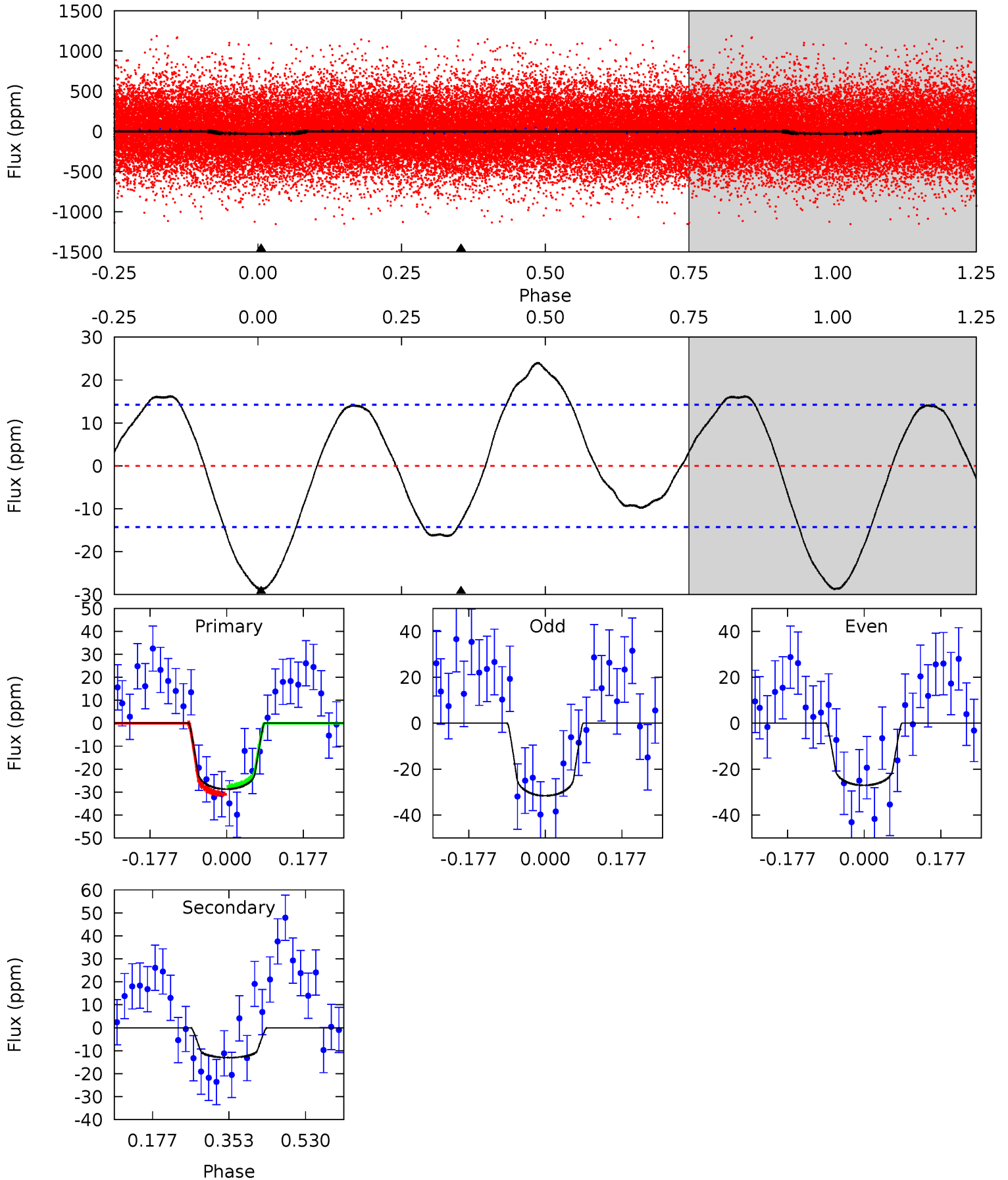
TCE 003650057-02 P= 0.966445 Days $T_0=131.741712$ (BKJD)



DV Model-Shift Uniqueness Test

003650057-02, P = 0.966410 Days, E = 130.779491 Days

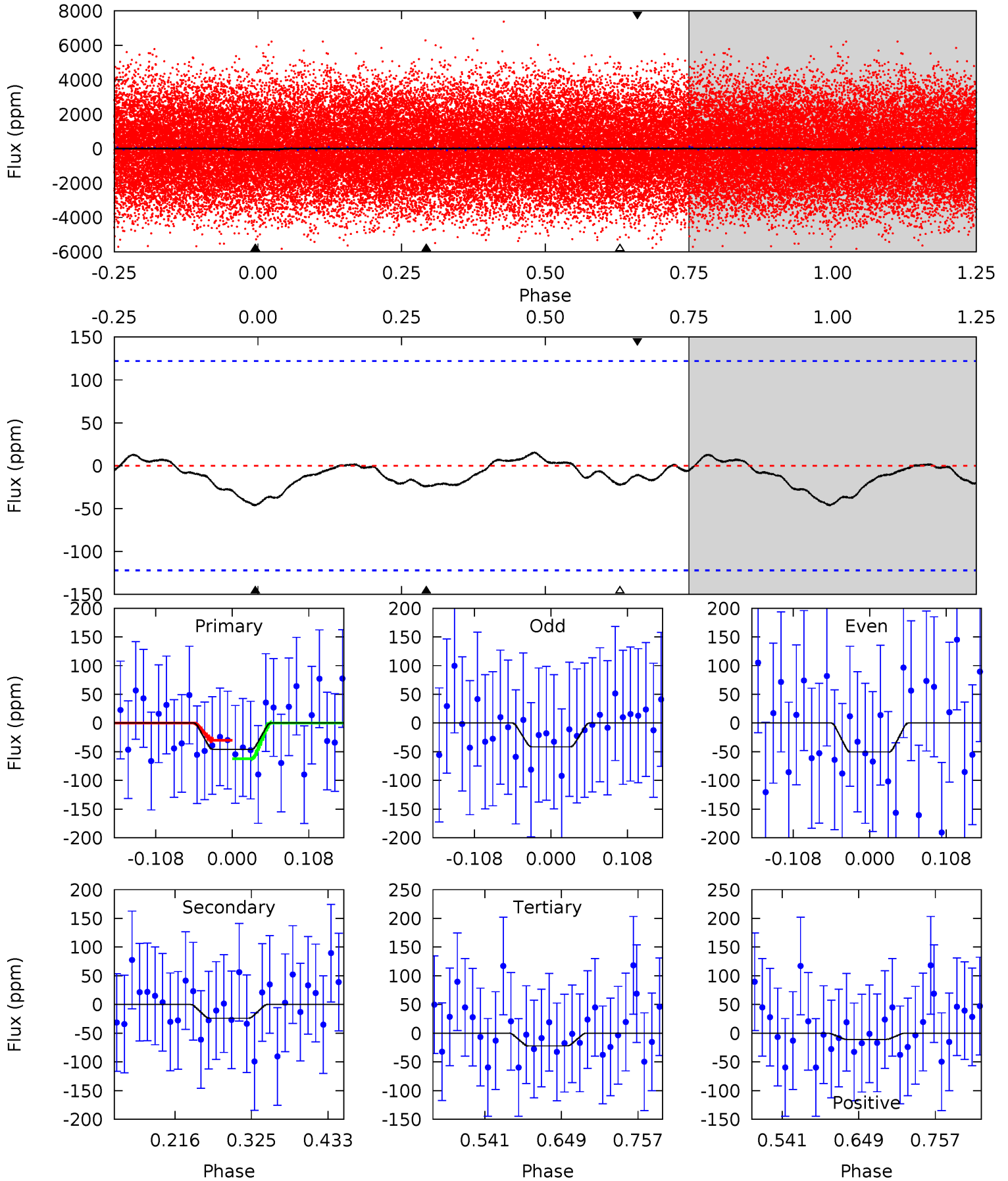
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 8.95 | 4.06 | 0 | 0 | 4.44 | 1.35 | 2.82 | 8.95 | 8.95 | 4.06 | 4.06 | 0.71 | 0.89 | 0.46 | 0.53 |



Alt Model-Shift Uniqueness Test

003650057-02, P = 0.966445 Days, E = 130.775267 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|-------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 1.71 | 0.89 | 0.82 | -0.40 | 4.55 | 1.61 | 0.34 | 0.89 | 2.12 | 0.07 | 1.30 | 0.17 | 0.72 | 0.25 | 0.60 |



Stellar Parameters For KIC 003650057

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 7318^{+228}_{-304} | $4.058^{+0.175}_{-0.175}$ | $-0.100^{+0.250}_{-0.350}$ | $1.942^{+0.567}_{-0.464}$ | $1.569^{+0.211}_{-0.257}$ | $0.302^{+0.291}_{-0.149}$ |
| | +3%/-4% | +4%/-4% | +250%/-350% | +29%/-24% | +13%/-16% | +97%/-50% |
| Source | KIC0 | KIC0 | 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 003650057-02 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{max} (K)$ | $T_{obs} (K)$ | A_{obs} |
|---------|--------------|------------------------|----------------------|------------------------|---------------------------|
| DV | -13 ± 3 | $1.39^{+0.76}_{-0.63}$ | 4205^{+314}_{-299} | 5157^{+1895}_{-1163} | $1.800^{+4.023}_{-1.105}$ |
| Alt. | -24 ± 27 | $1.62^{+0.74}_{-0.67}$ | 4229^{+285}_{-303} | 5442^{+2466}_{-9490} | $2.219^{+6.203}_{-2.363}$ |

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 $A_{obs} \gg 1.0$

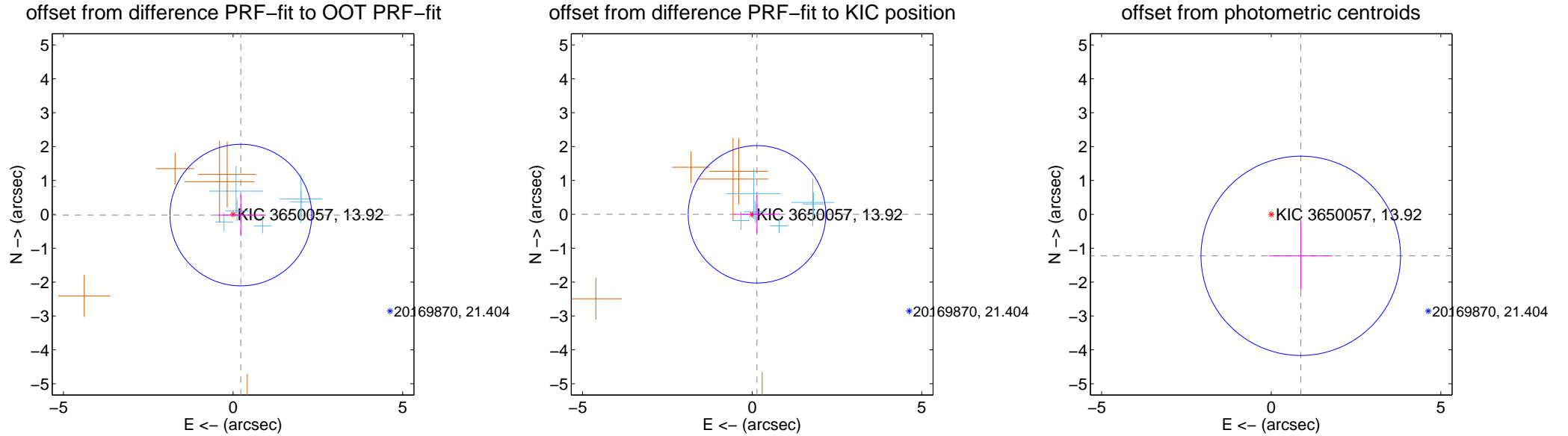
DV Centroid Data

Supplemental centroid analysis for 003650057-02. Kepler magnitude: 13.92. Transit SNR 8.74

There are 6 quarters with good PRF difference image offsets

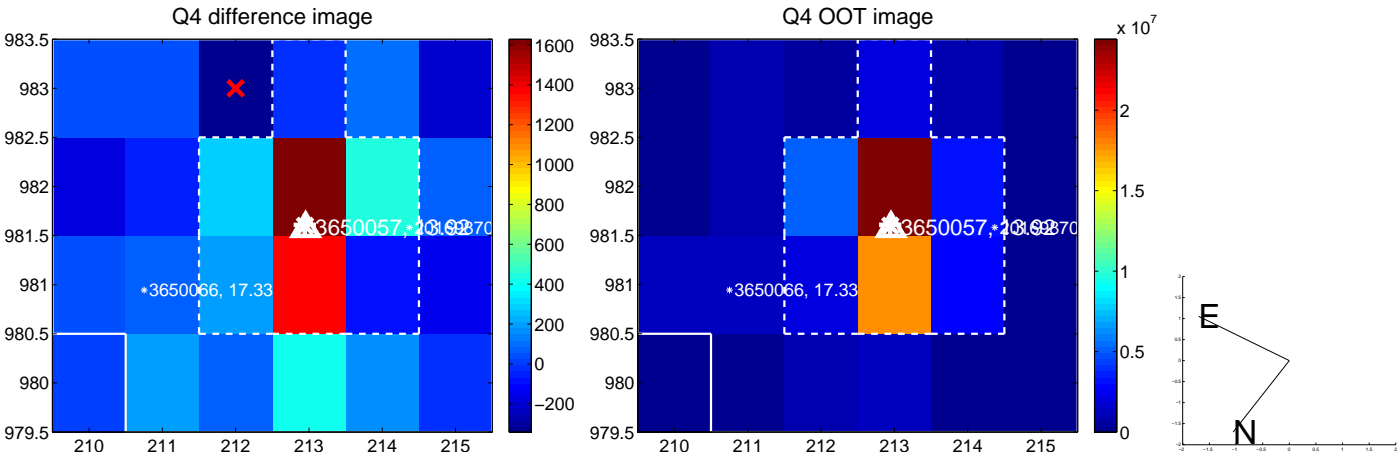
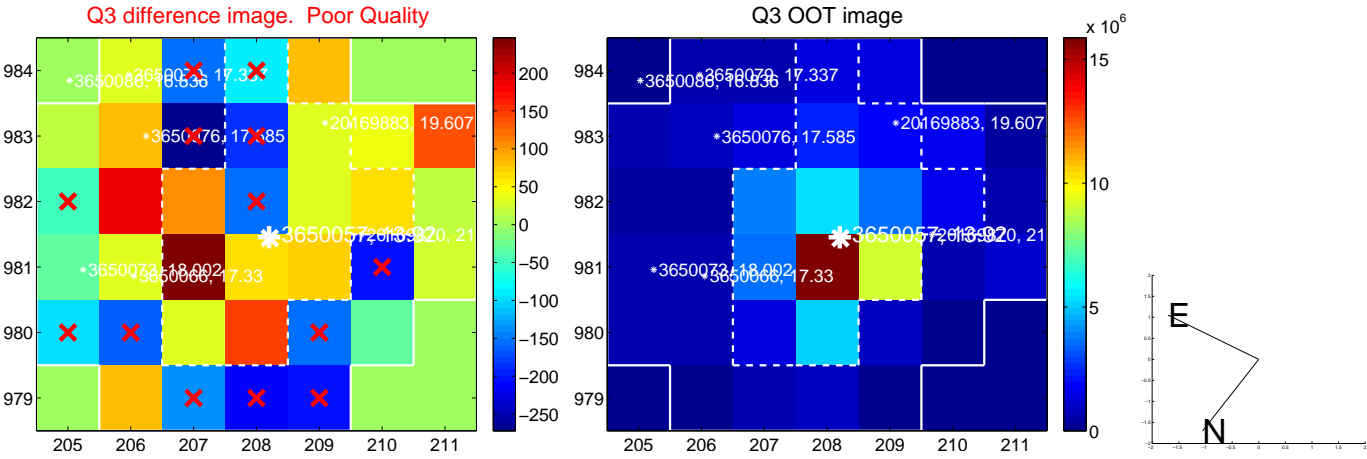
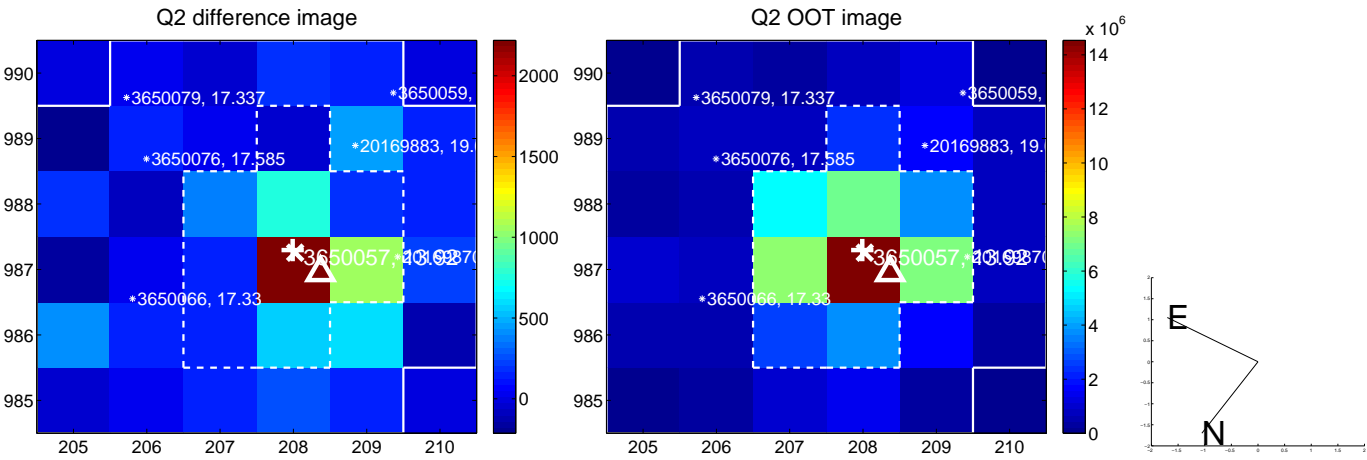
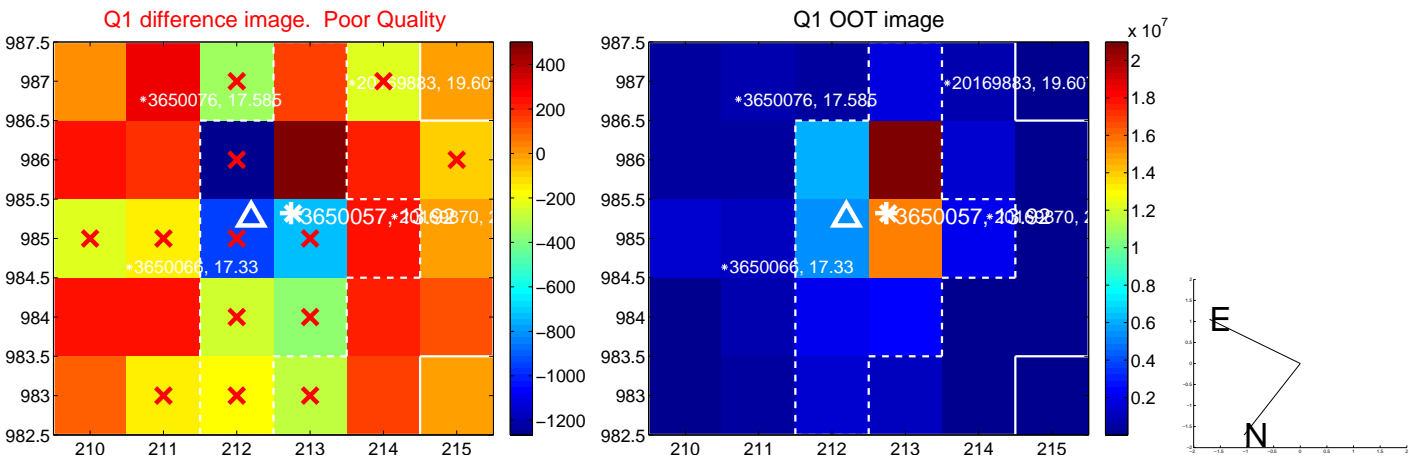
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 0.230 ± 0.696 | 0.33 | -0.229 ± 0.702 | -0.022 ± 0.611 |
| PRF-fit source offset from KIC position | 0.143 ± 0.676 | 0.21 | -0.143 ± 0.676 | 0.000 ± 0.566 |
| photometric centroid source offset | 1.50 ± 0.98 | 1.53 | -0.87 ± 0.93 | -1.22 ± 1.00 |

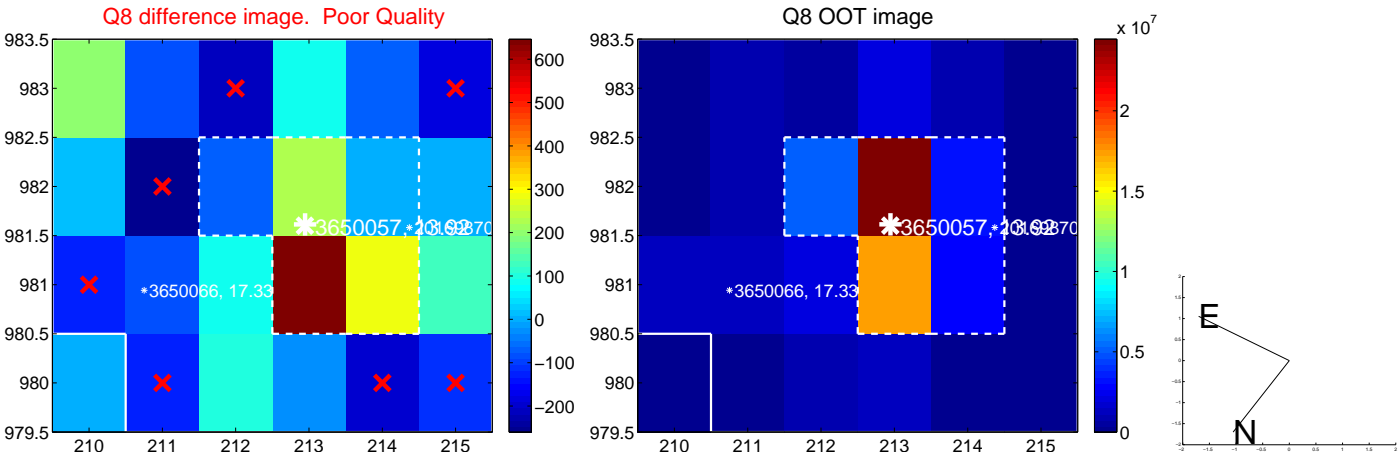
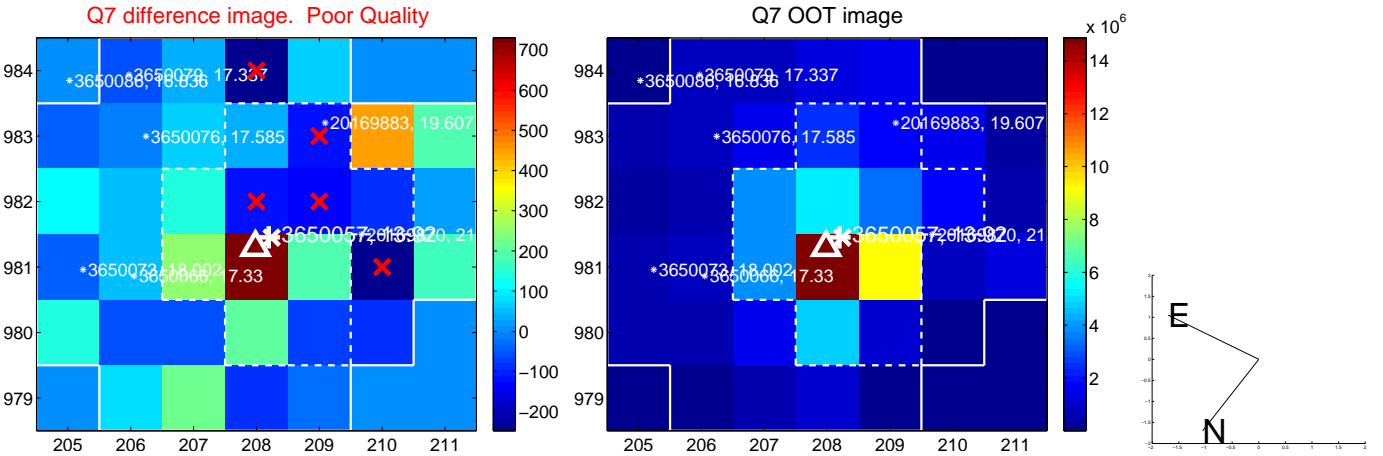
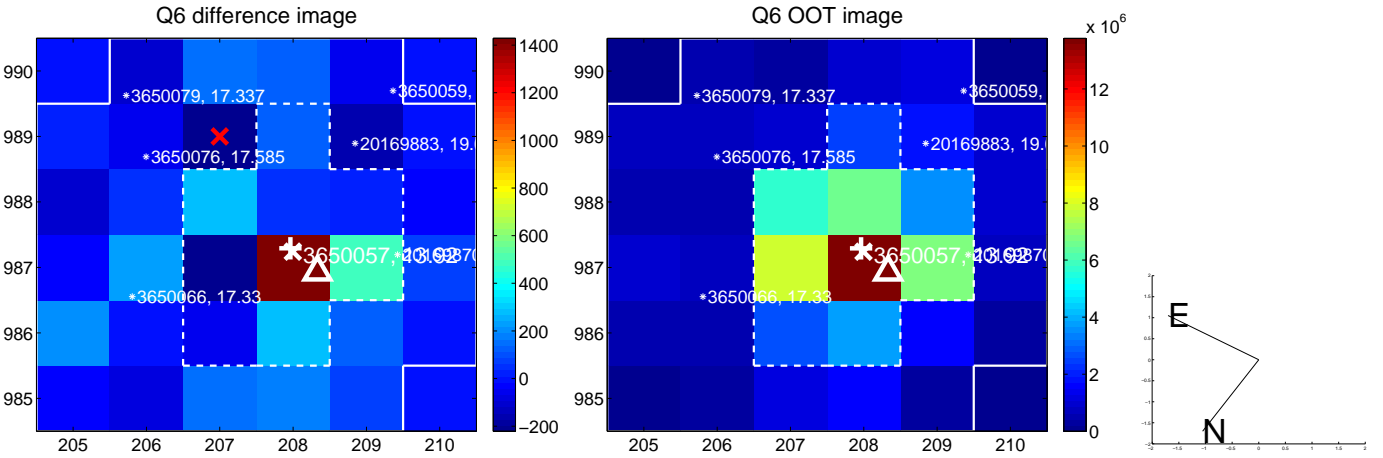
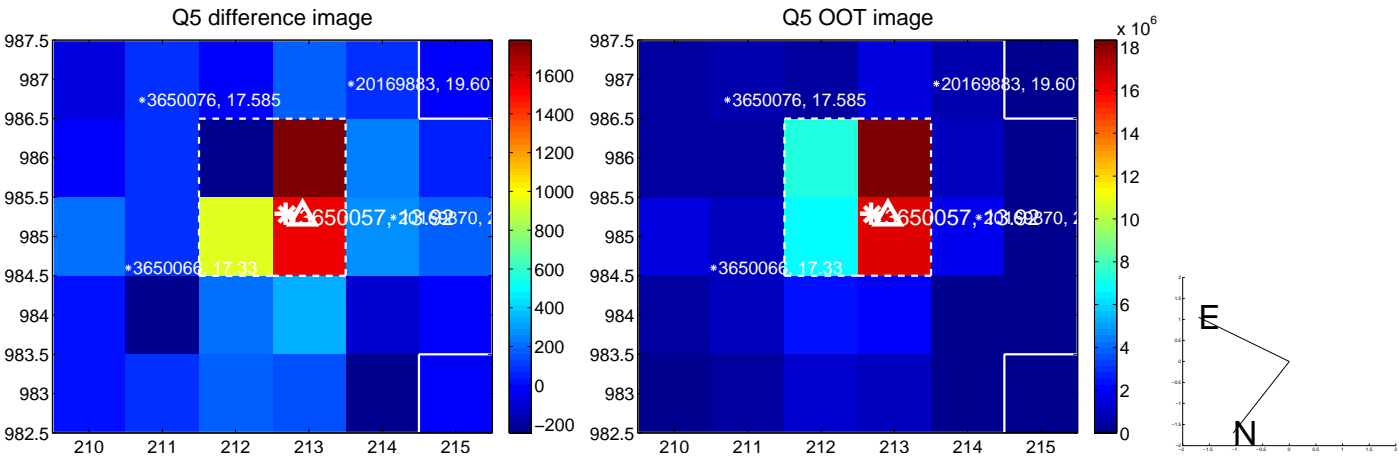


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

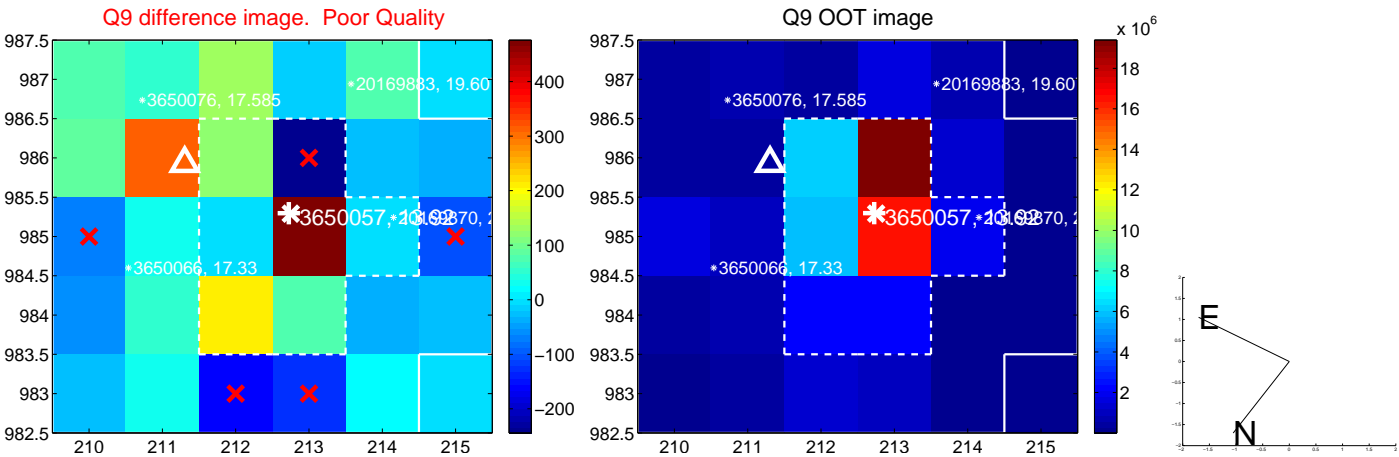
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



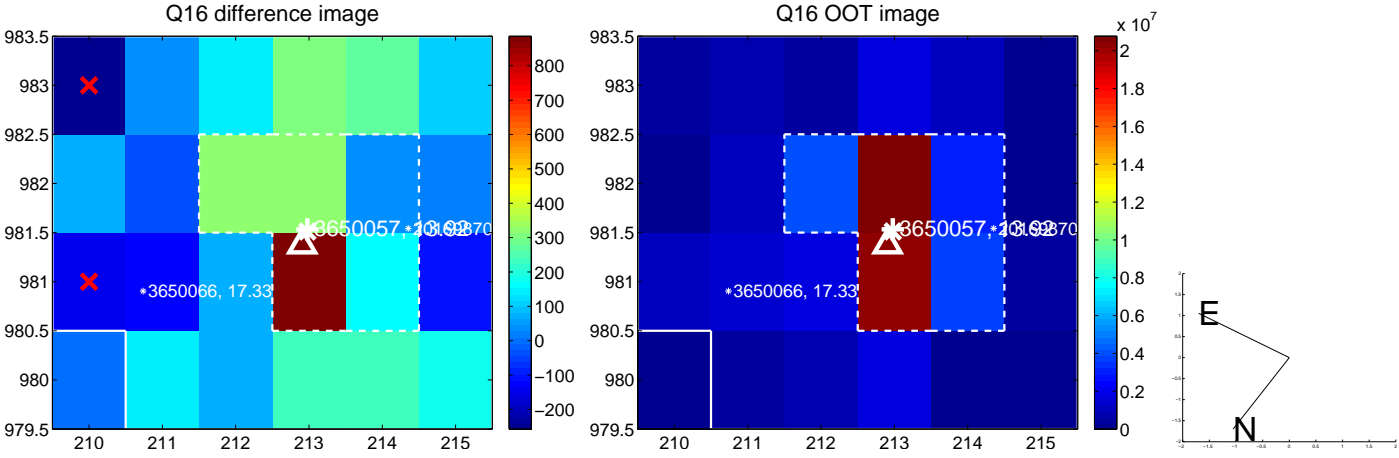
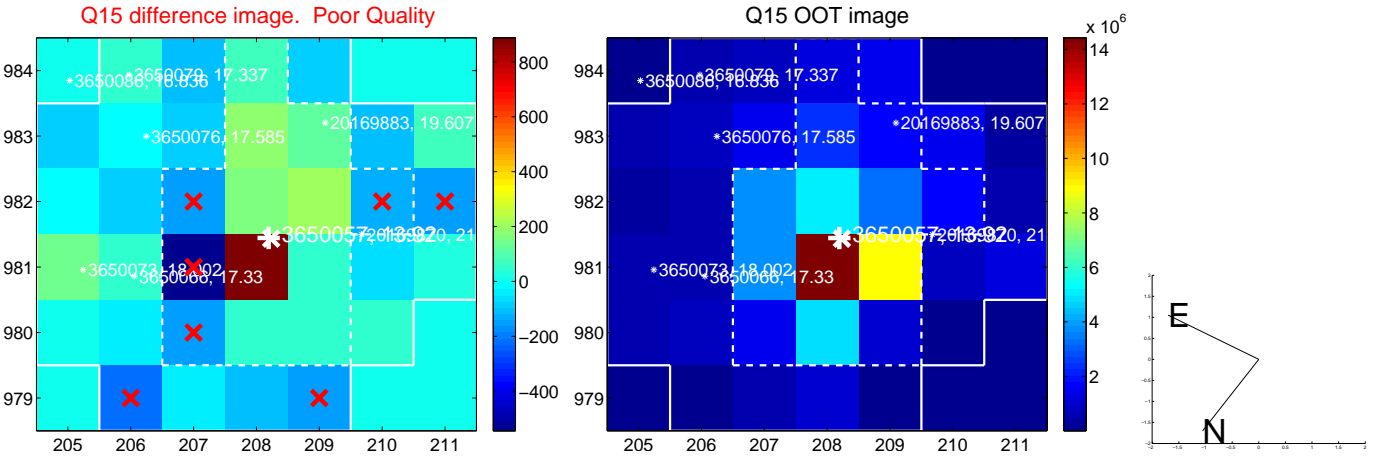
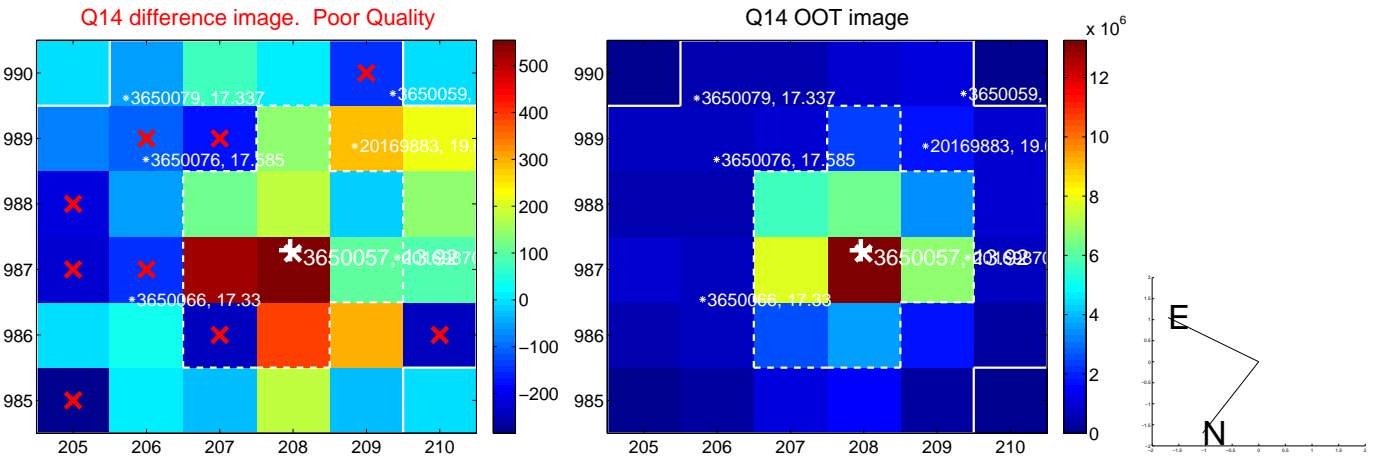
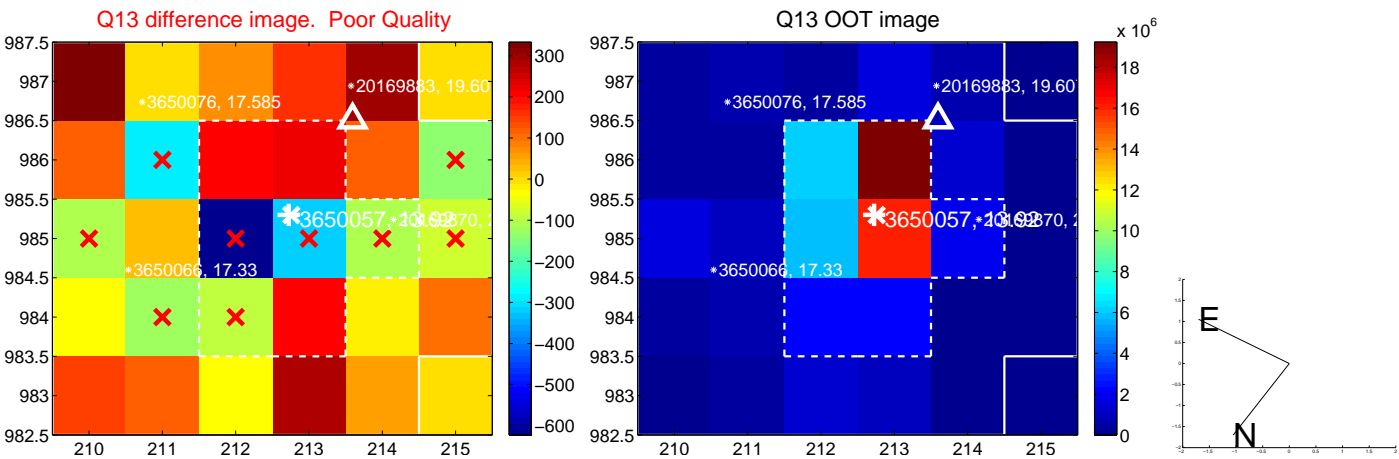
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



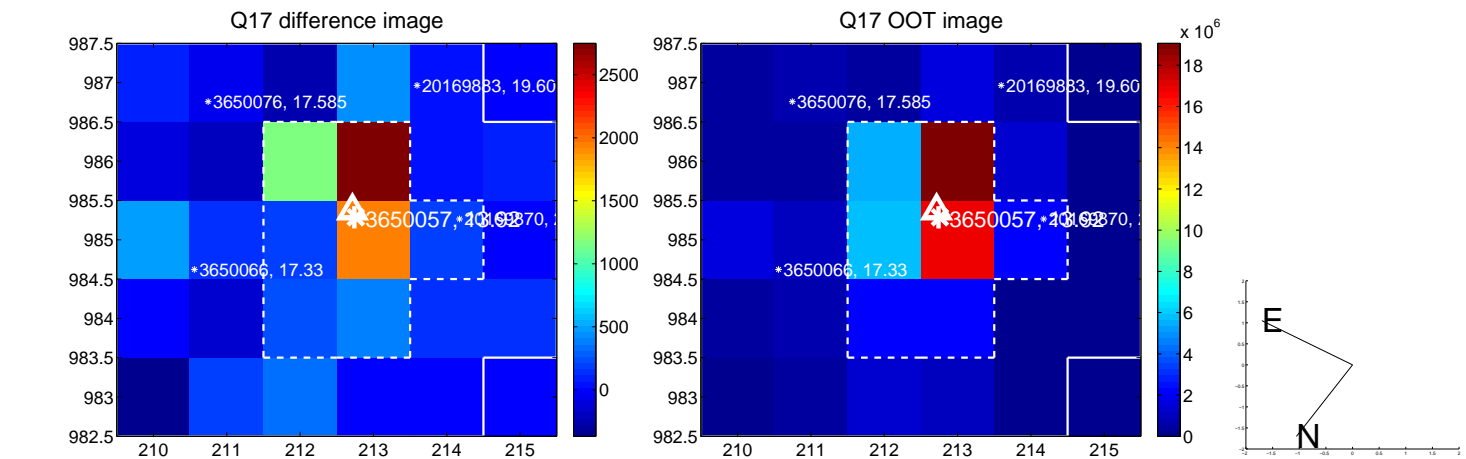
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



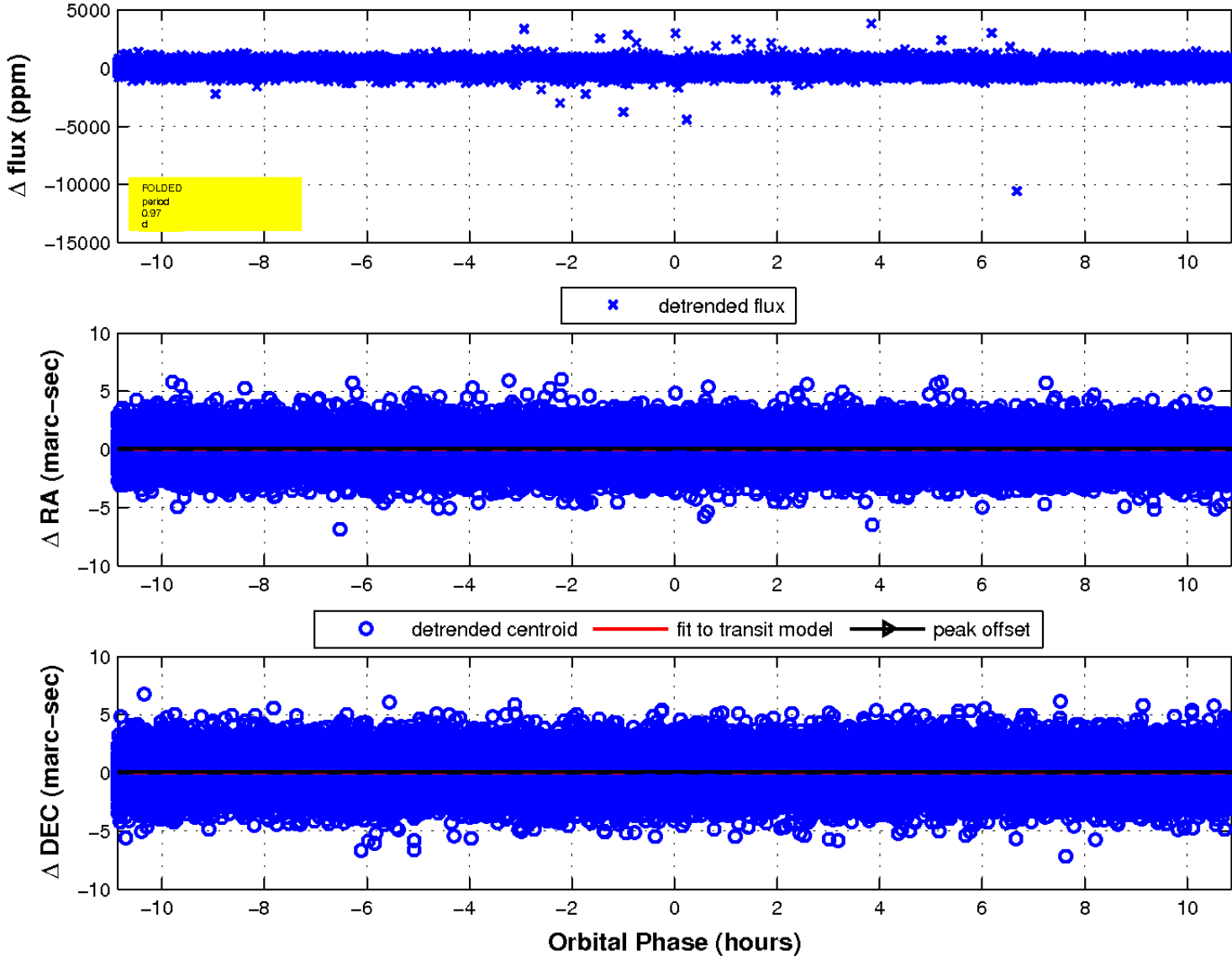
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

