

KIC 009932970

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 009932970-01 | OBS | 1587.01 | 52.971635 | 159.060335 | 3895.6 | 3.368 | 51.1 | 51.8 | 0.79 | 5204 | 7.63 | 6.20 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|---------------|
| 009932970-01 | OBS | FP | 0.00 | 0 | 1 | 0 | 0 | DEEP_V_SHAPED |

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

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

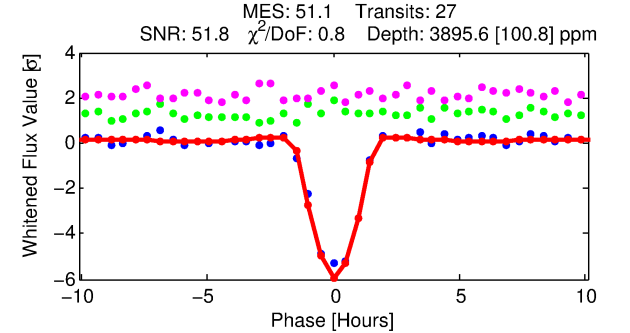
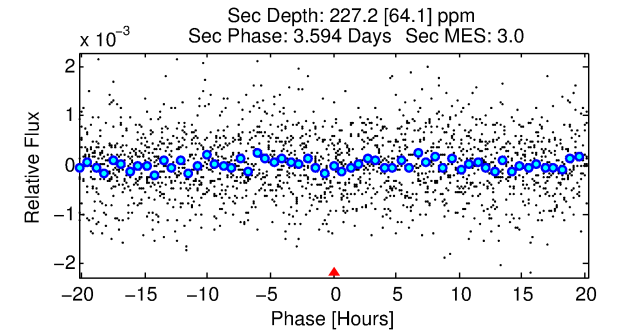
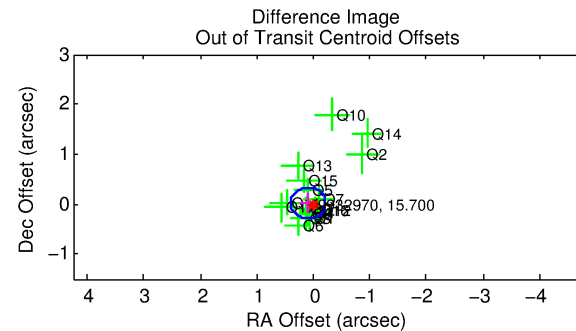
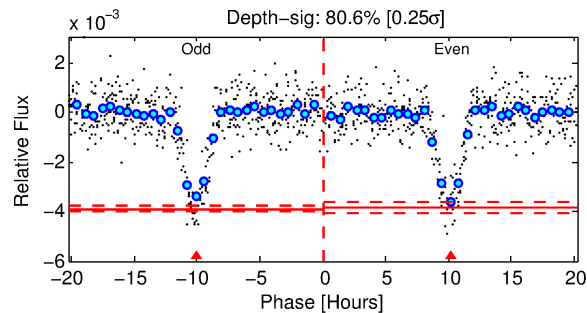
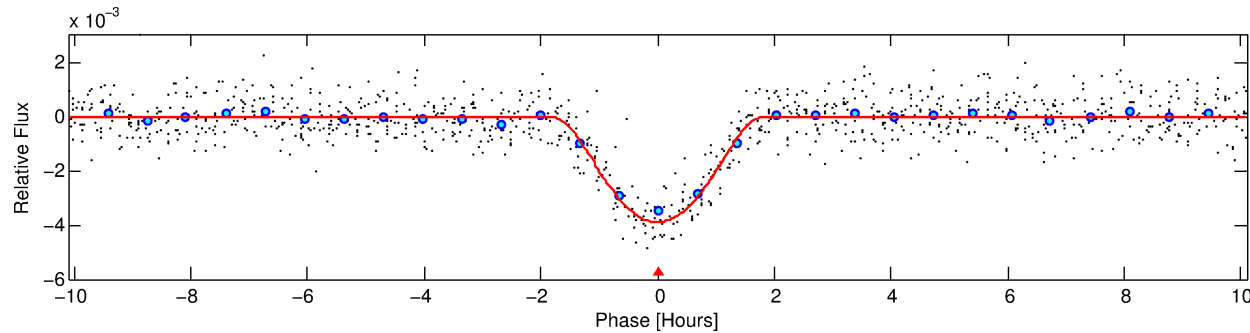
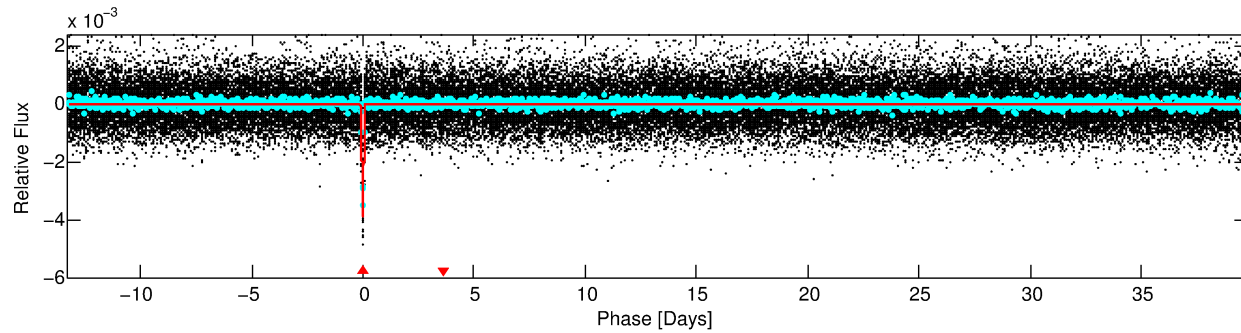
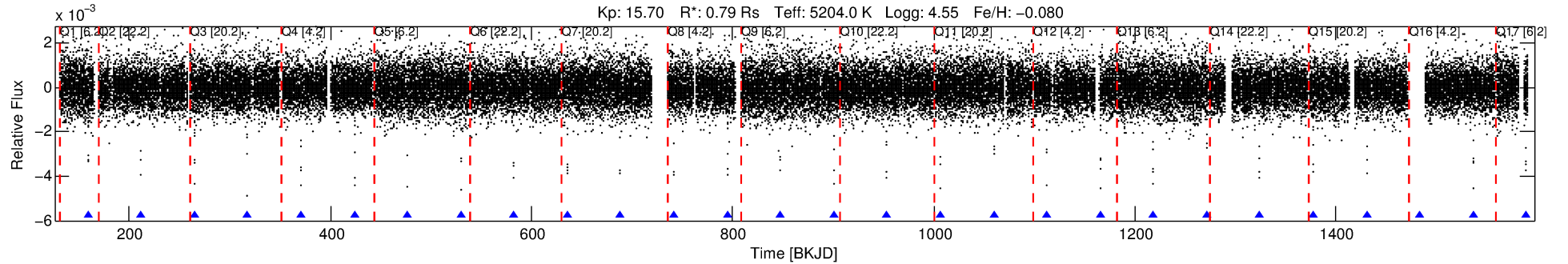
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009932970-01

No Significant Match Found

DV One-Page Summary

KIC: 9932970 Candidate: 1 of 1 Period: 52.972 d
KOI: K01587.01 Corr: 0.984



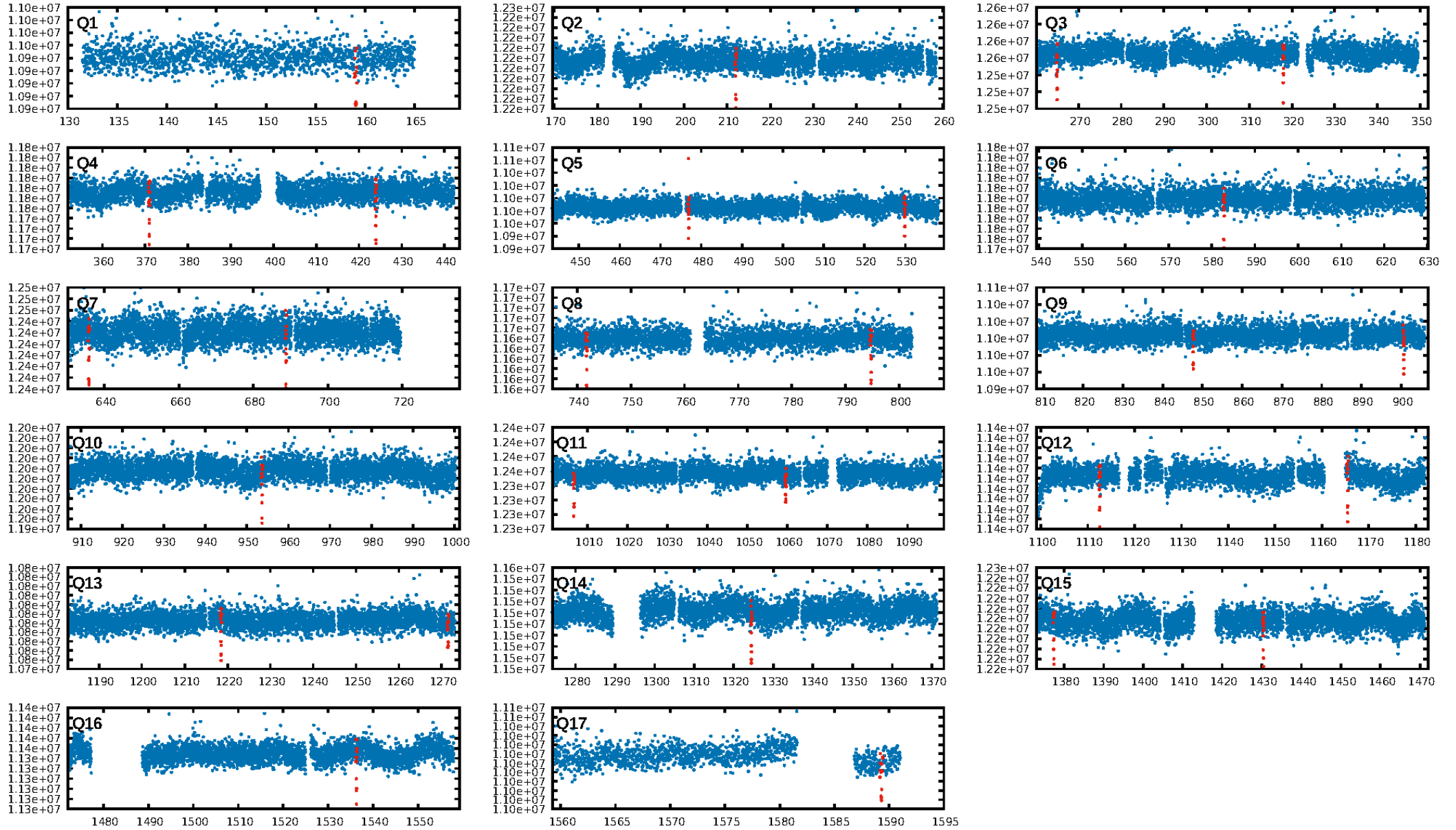
DV Fit Results:

Period = 52.97163 [0.00009] d
Epoch = 159.0603 [0.0015] BKJD
Rp/R* = 0.0886 [0.0394]
a/R* = 60.15 [8.03]
b = 0.97 [0.07]
Seff = 6.20 [1.27]
Teq = 402 [21] K
Rp = 7.63 [3.54] Re
a = 0.2569 [0.0278] AU
Ag = 141.69 [134.04] [1.05 σ]
Teffp = 2146 [506] K [3.45 σ]

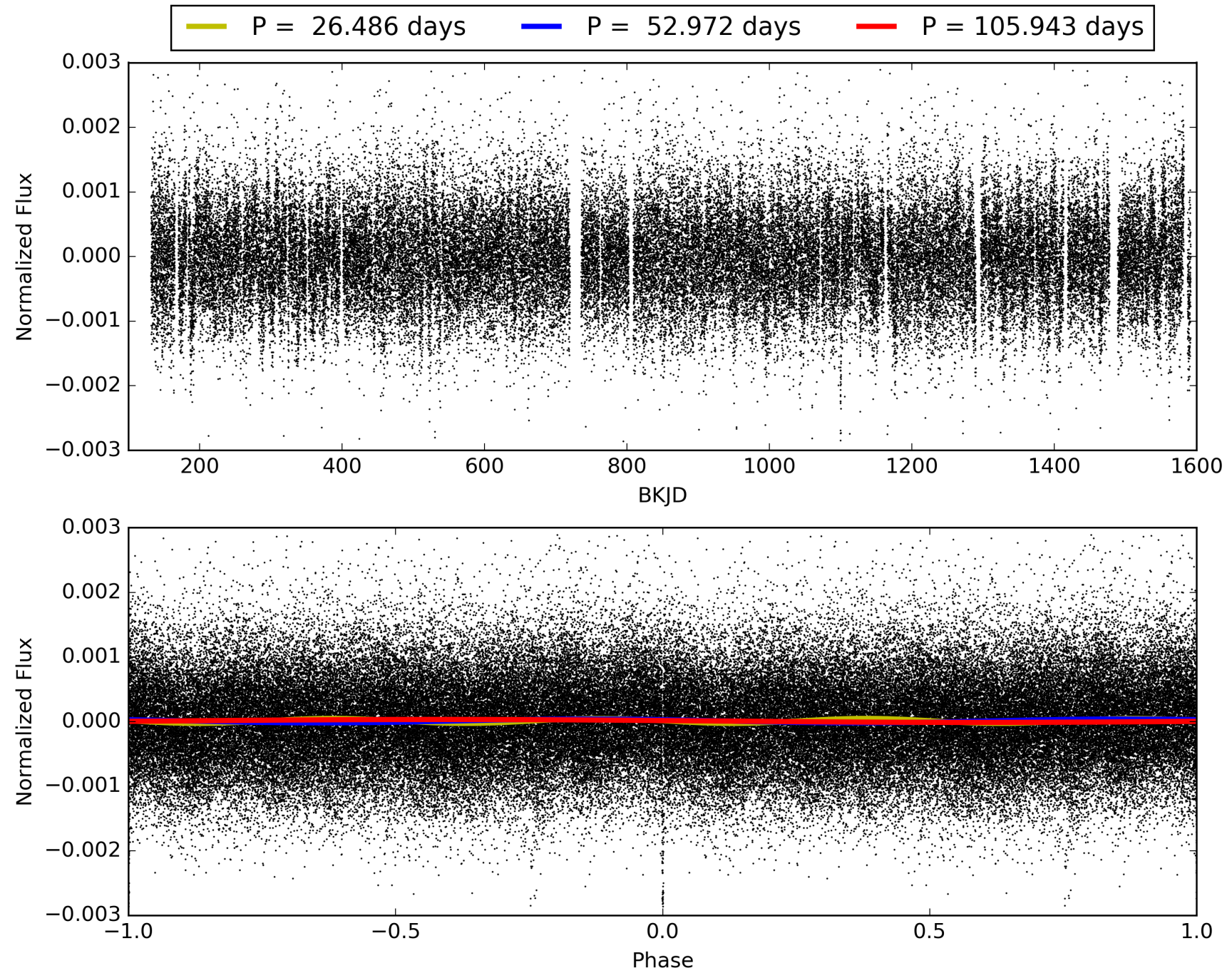
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: N/A
ModelChiSquare2-sig: 90.3%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [25/25]
GhostDiagnostic-chr: 4.846
Centroid-sig: 0.0%
Centroid-so: 0.574 arcsec [1.99 σ]
OotOffset-rm: 0.094 arcsec [0.92 σ]
KicOffset-rm: 0.194 arcsec [1.45 σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 009932970-01, PDC Light Curves

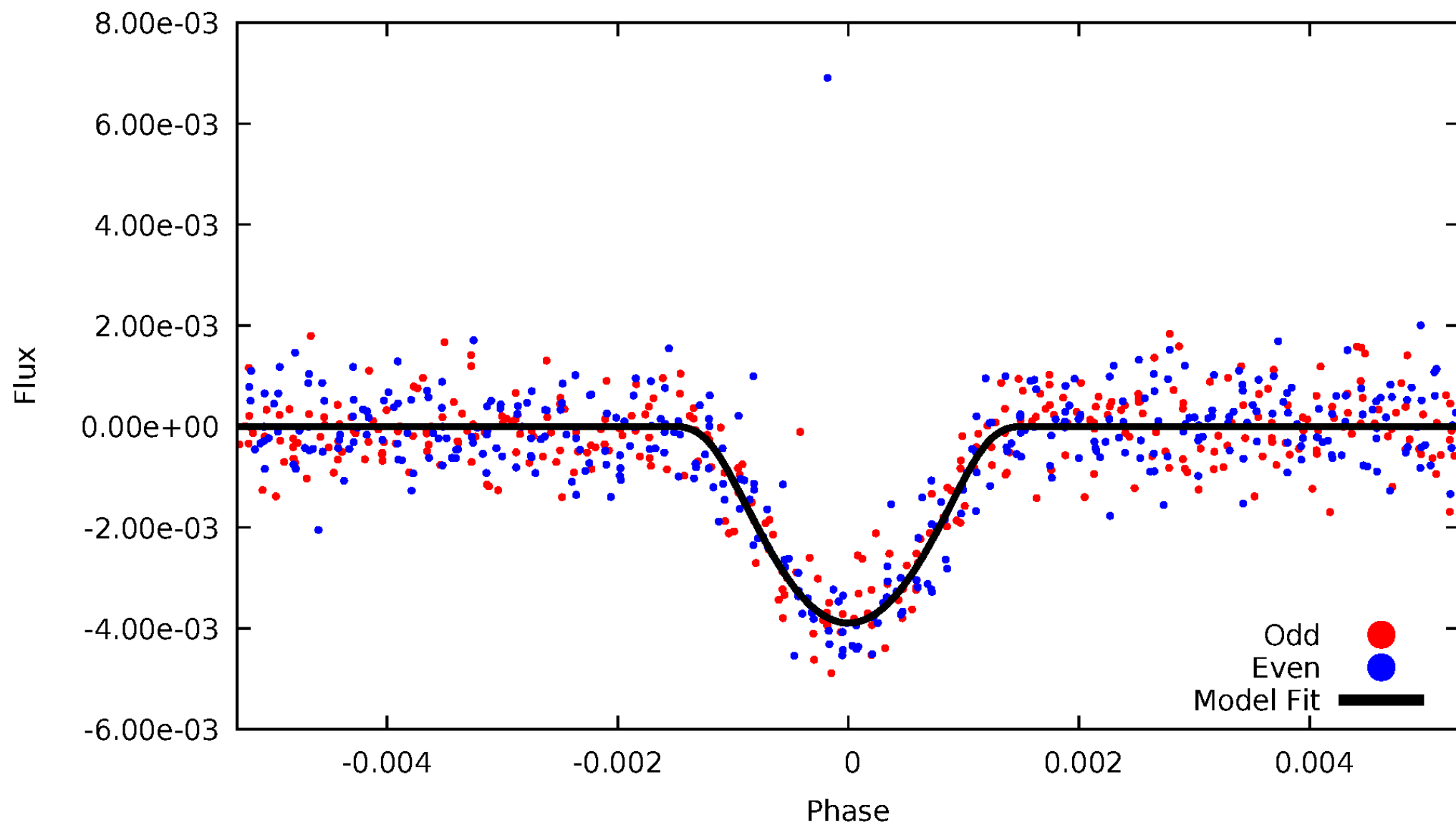


TCE 009932970-01



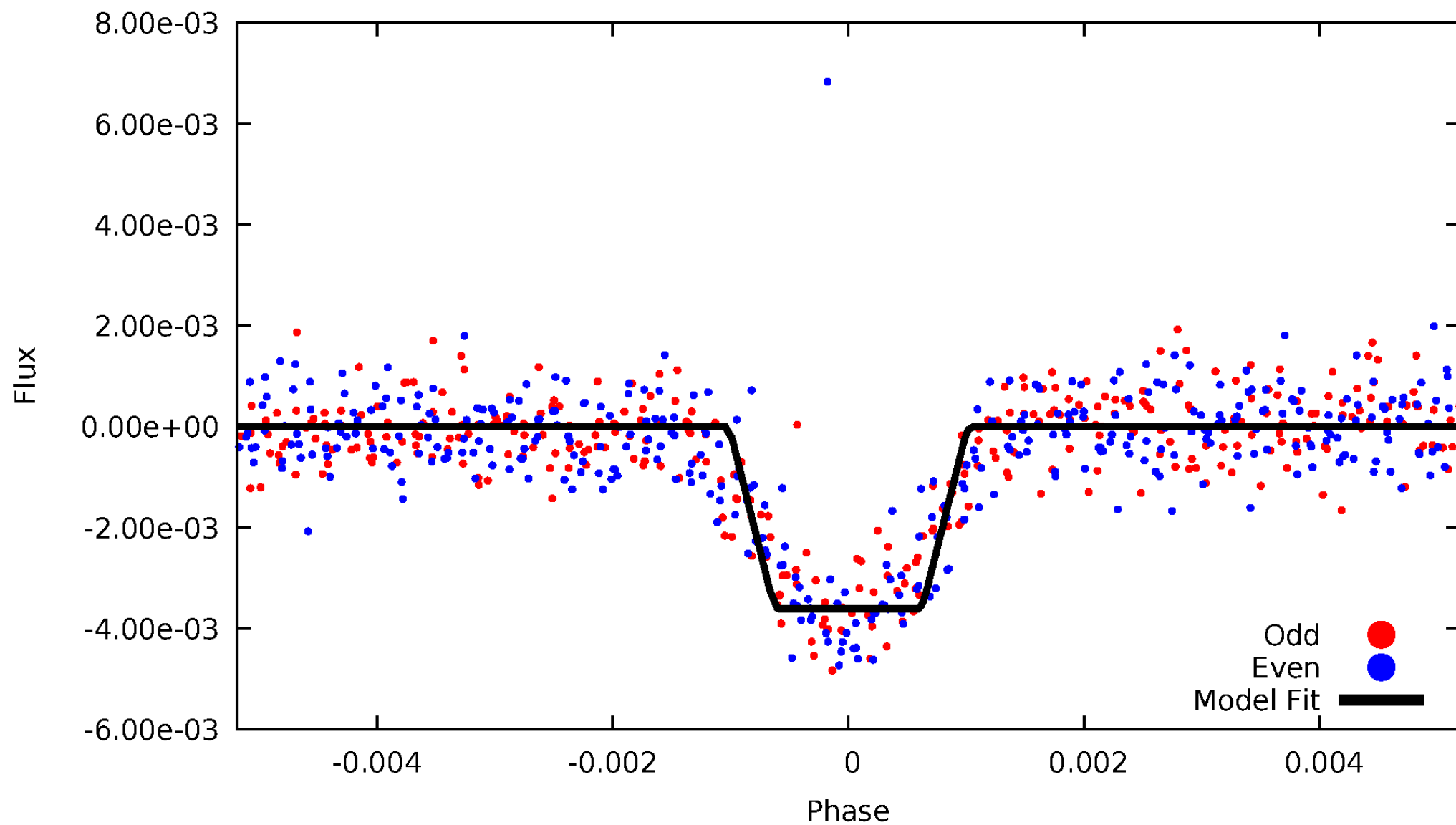
DV Odd/Even

TCE 009932970-01



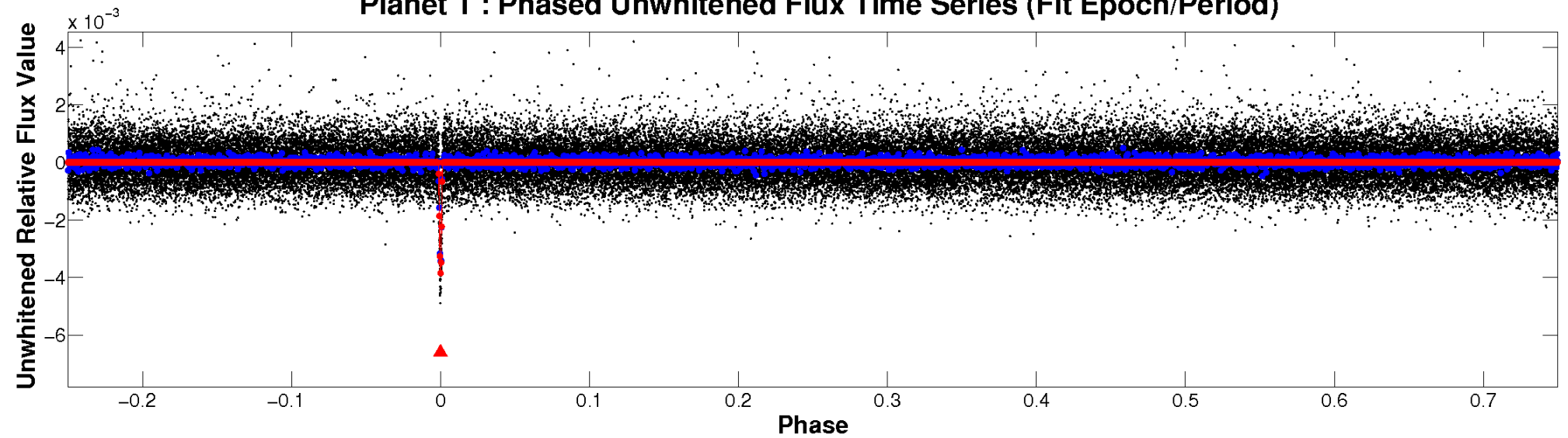
ALT Odd/Even

TCE 009932970-01

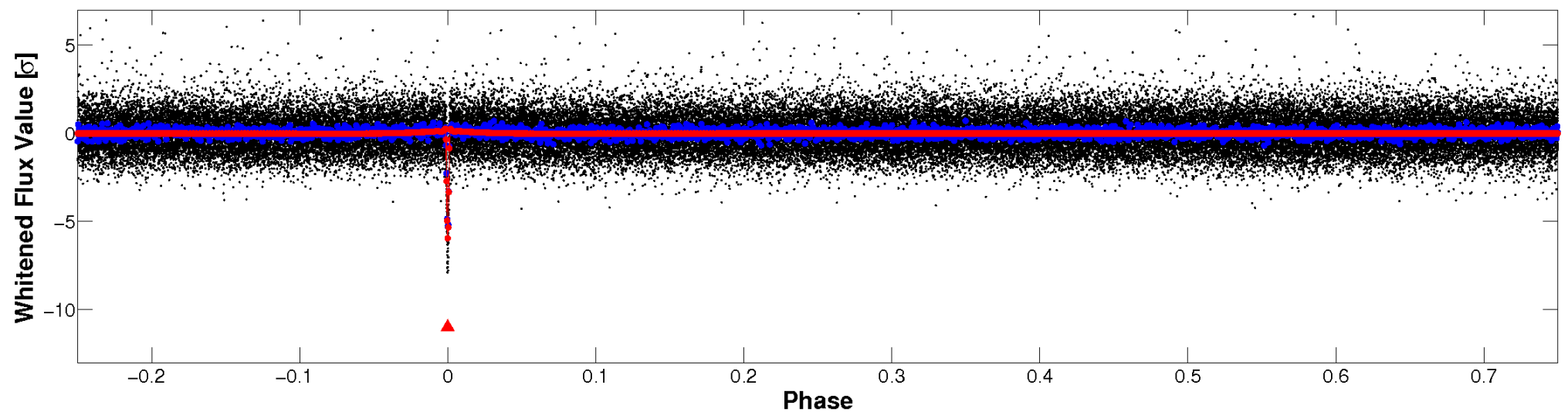


Non-Whitened Vs. Whitened Light Curve

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

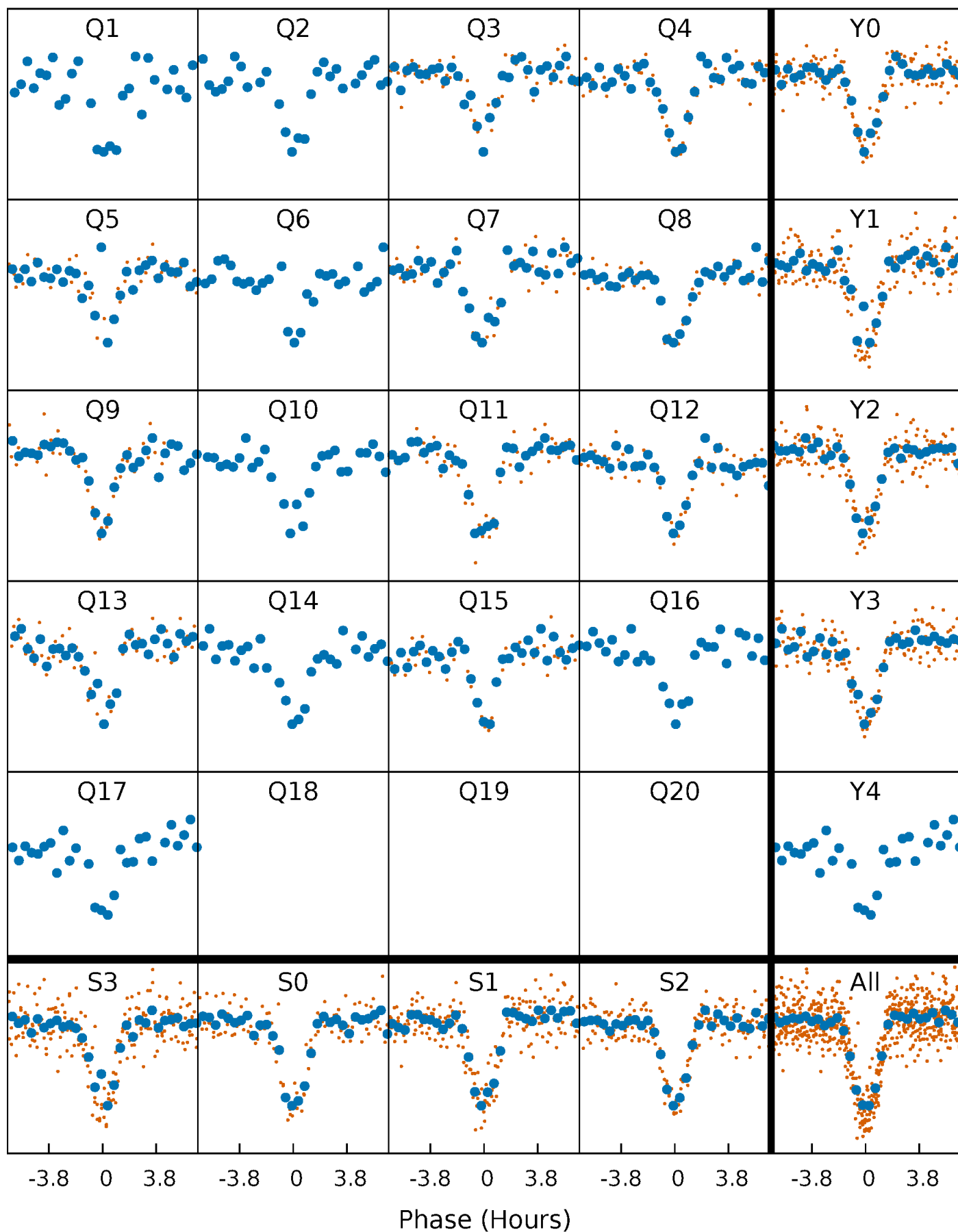


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



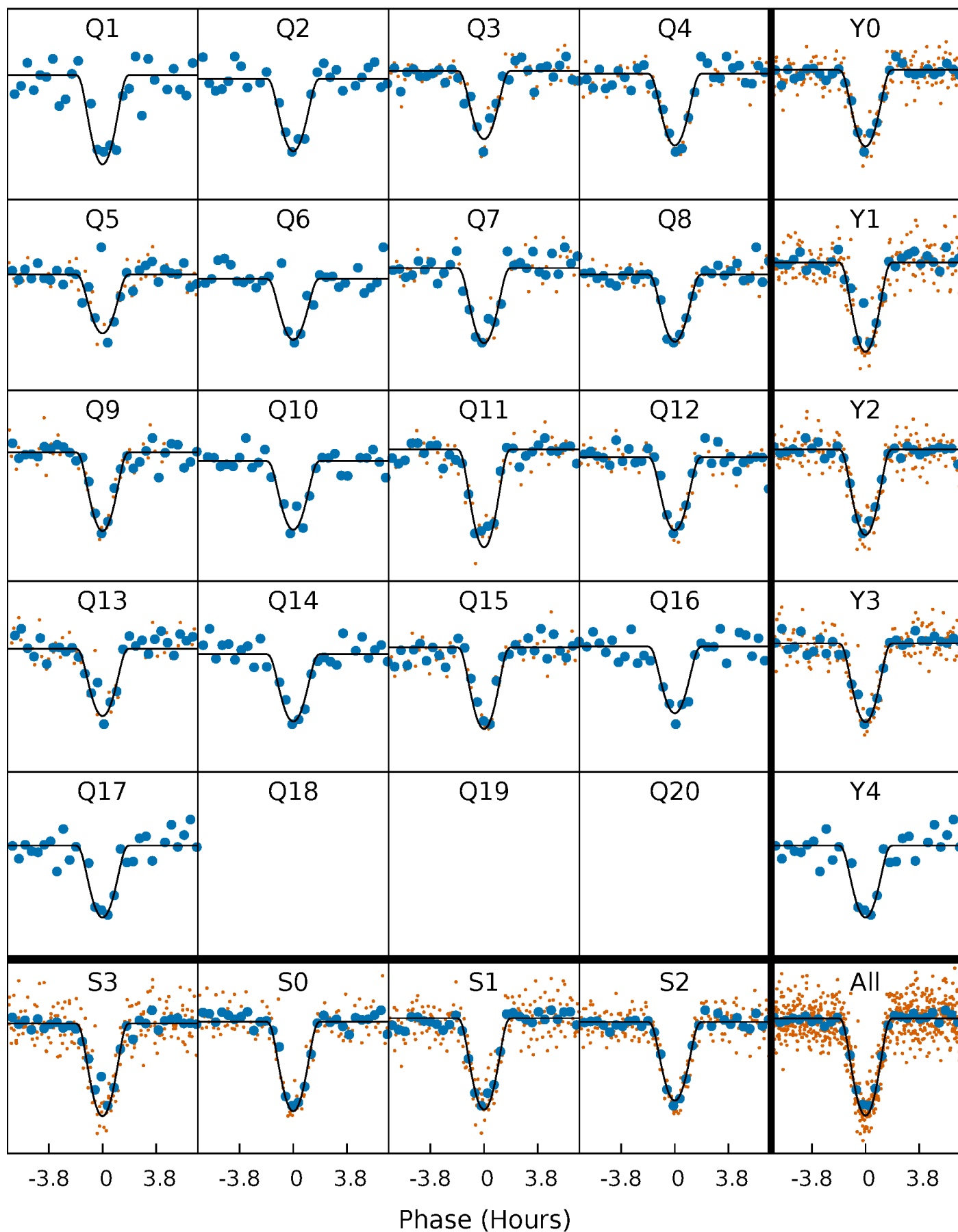
PDC Quarter-Phased Transit Curves

TCE 009932970-01 P= 52.971635 Days $T_0=159.060335$ (BKJD)



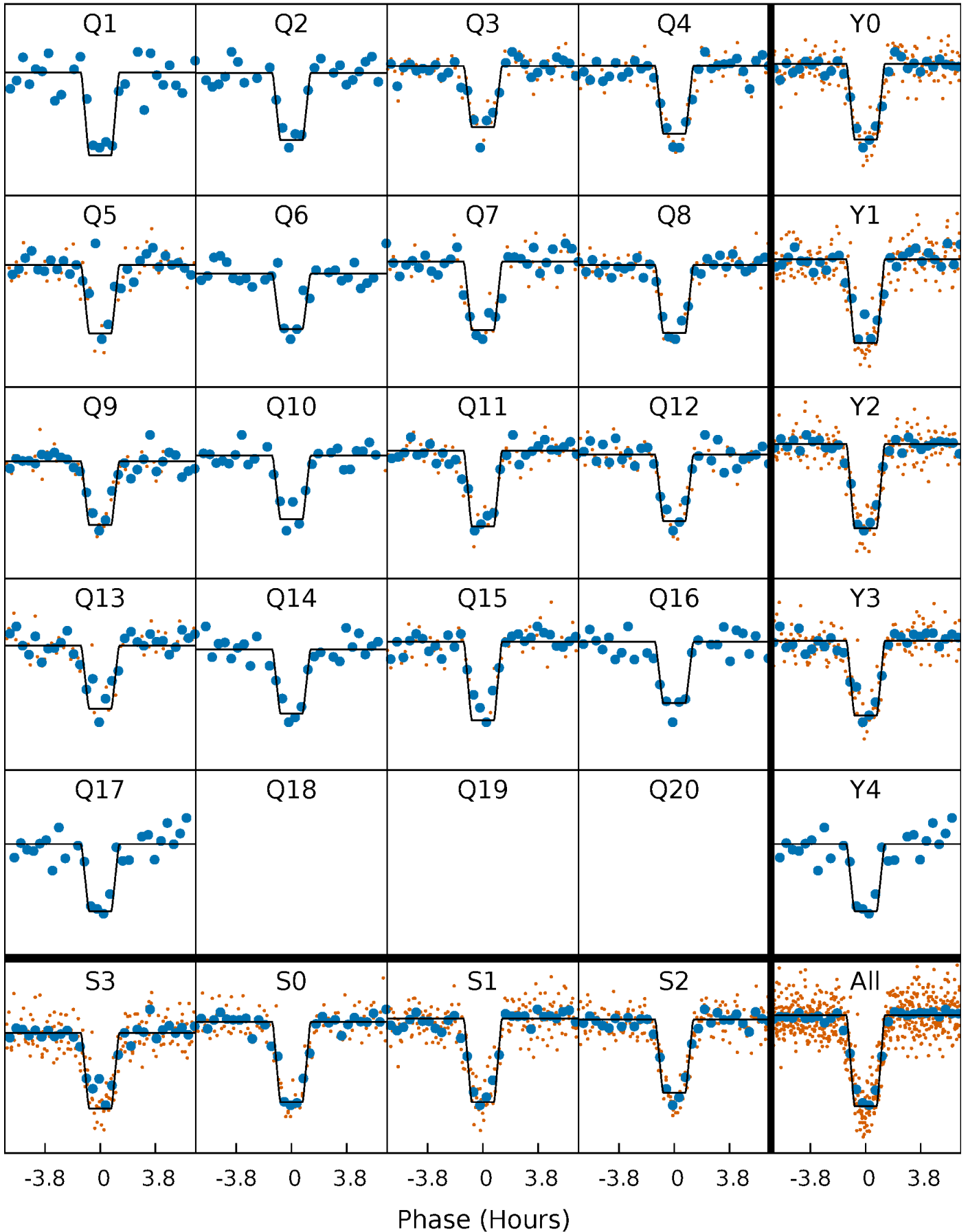
DV Quarter-Phased Transit Curves

TCE 009932970-01 P= 52.971635 Days $T_0=159.060335$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

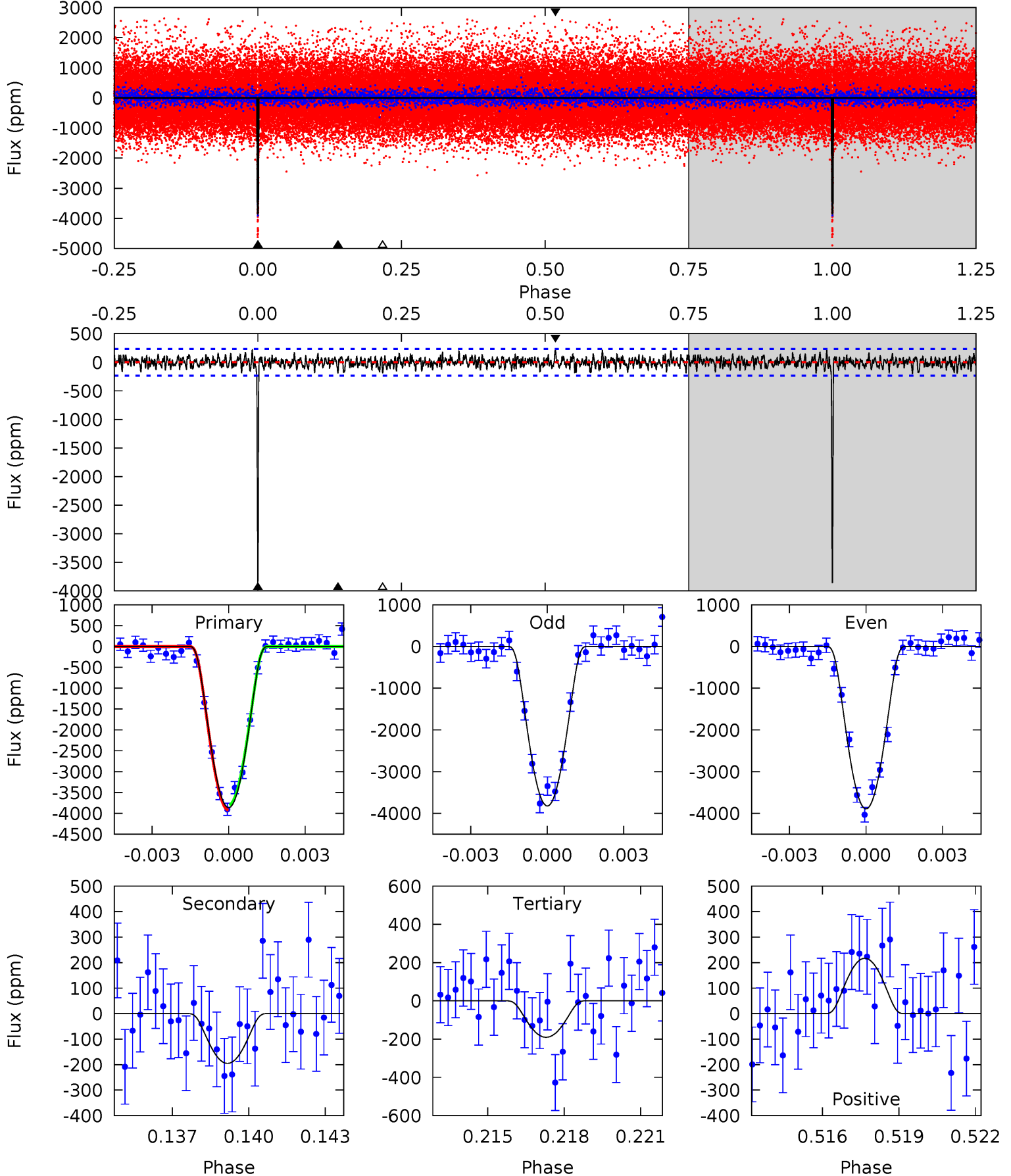
TCE 009932970-01 P= 52.971719 Days $T_0=159.059538$ (BKJD)



DV Model-Shift Uniqueness Test

009932970-01, P = 52.971635 Days, E = 106.088700 Days

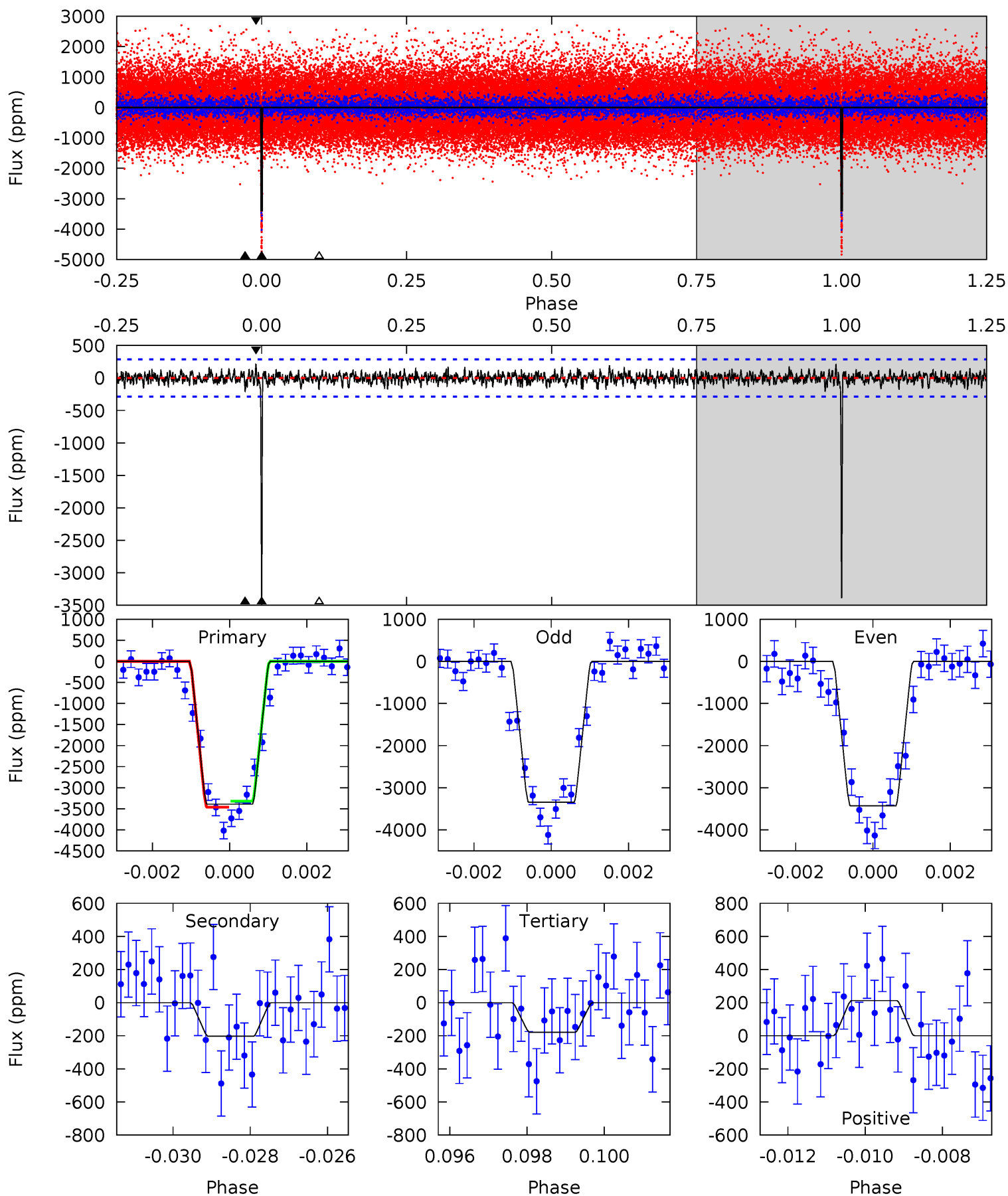
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 86.6 | 4.37 | 4.27 | 4.86 | 5.25 | 2.97 | 1.47 | 82.3 | 81.7 | 0.10 | -0.49 | 0.76 | 0.96 | 0.05 | 1.44 |



Alt Model-Shift Uniqueness Test

009932970-01, $P = 52.971719$ Days, $E = 106.087819$ Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 62.9 | 3.78 | 3.33 | 3.94 | 5.33 | 3.09 | 1.10 | 59.6 | 59.0 | 0.45 | -0.16 | 0.79 | 0.98 | 0.06 | 1.31 |



Stellar Parameters For KIC 009932970

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 5204^{+174}_{-158} | $4.550^{+0.052}_{-0.084}$ | $-0.080^{+0.300}_{-0.300}$ | $0.789^{+0.103}_{-0.075}$ | $0.808^{+0.085}_{-0.070}$ | $2.313^{+0.586}_{-0.600}$ |
| | +3%/-3% | +1%/-2% | +375%/-375% | +13%/-10% | +11%/-9% | +25%/-26% |
| Source | PHO1 | 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 009932970-01 / KOI 1587.01

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{max} (K)$ | $T_{obs} (K)$ | A_{obs} |
|---------|---------------|------------------------|-------------------|----------------------|---------------------|
| DV | -195 ± 45 | $7.81^{+3.52}_{-3.64}$ | 566^{+25}_{-25} | 2780^{+569}_{-264} | 117^{+304}_{-65} |
| Alt. | -203 ± 54 | $5.52^{+3.17}_{-3.05}$ | 566^{+25}_{-25} | 3075^{+905}_{-376} | 232^{+973}_{-142} |

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 $A_{obs} \gg 1.0$

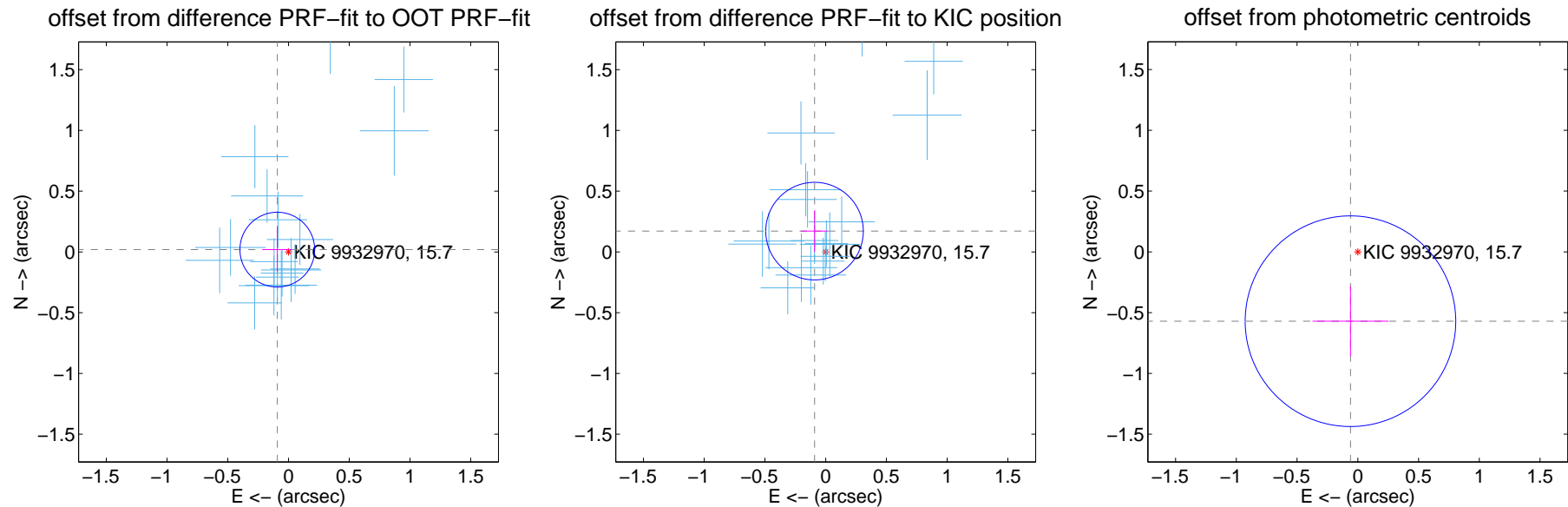
DV Centroid Data

Supplemental centroid analysis for 009932970-01. Kepler magnitude: 15.70. Transit SNR 51.76

There are 17 quarters with good PRF difference image offsets

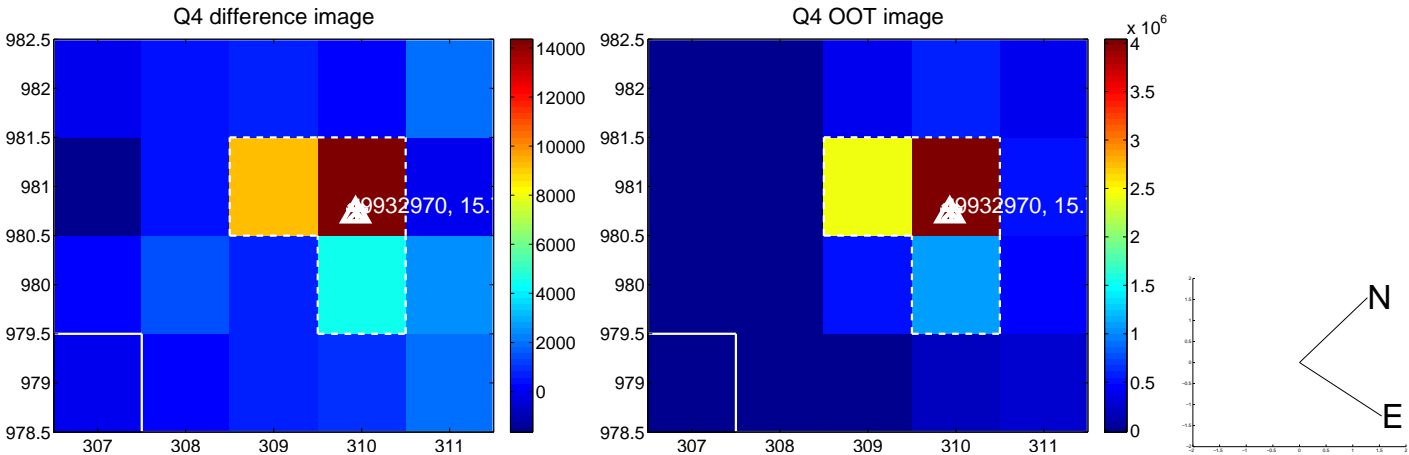
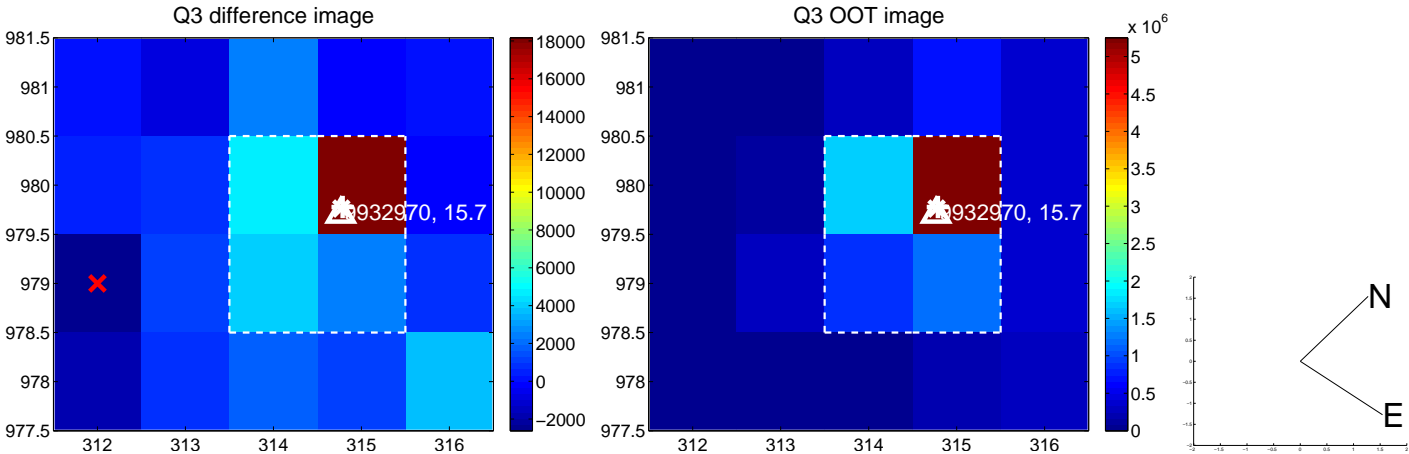
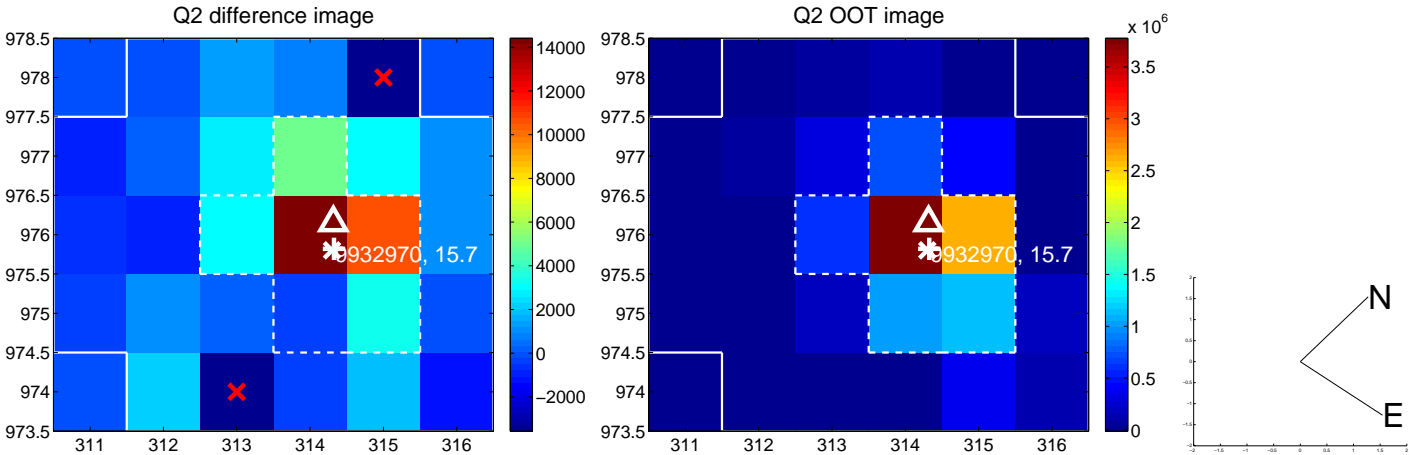
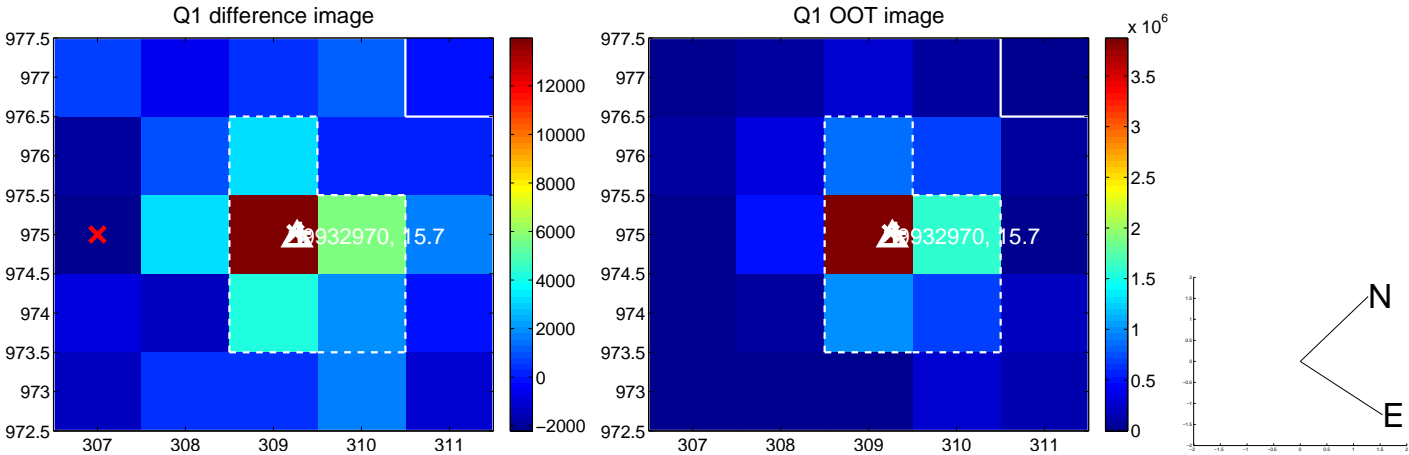
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|-------------------|
| PRF-fit source offset from OOT | 0.094 ± 0.103 | 0.92 | 0.092 ± 0.122 | 0.019 ± 0.183 |
| PRF-fit source offset from KIC position | 0.194 ± 0.134 | 1.45 | 0.092 ± 0.112 | 0.171 ± 0.173 |
| photometric centroid source offset | 0.57 ± 0.29 | 1.99 | 0.06 ± 0.31 | -0.57 ± 0.29 |

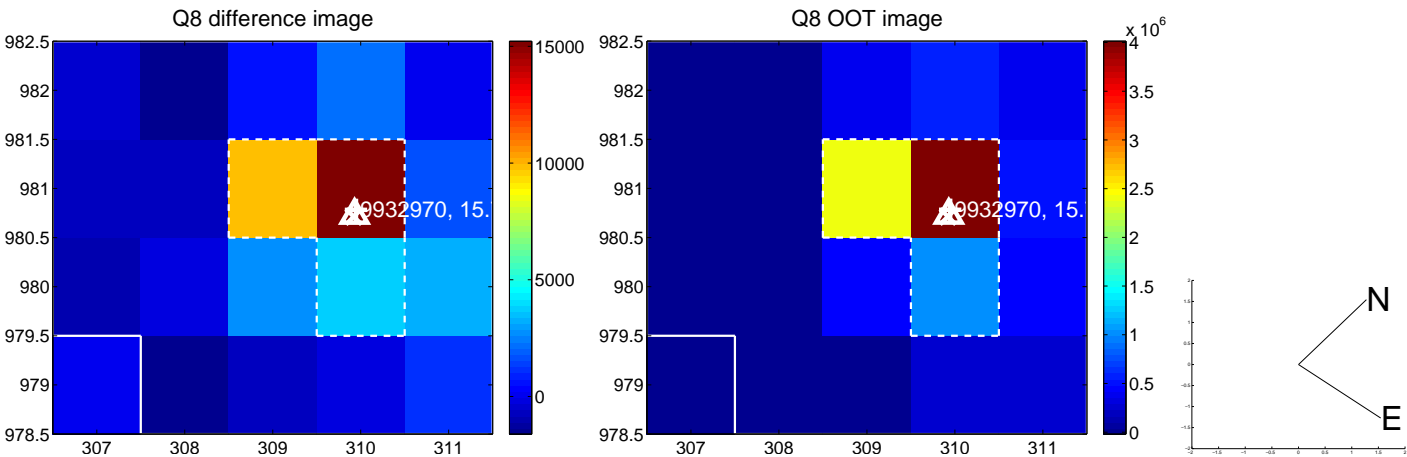
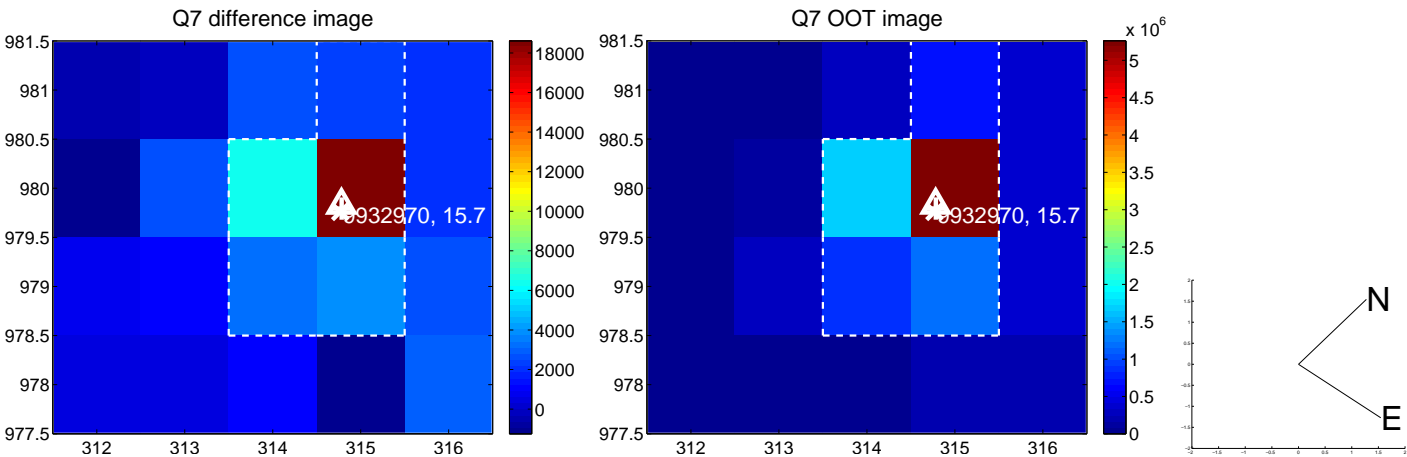
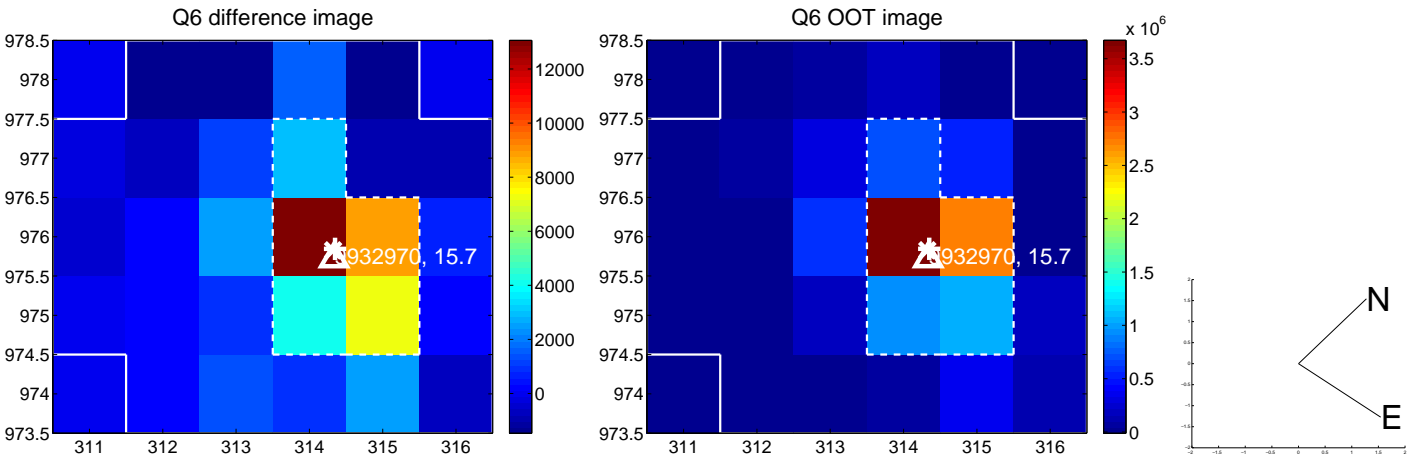
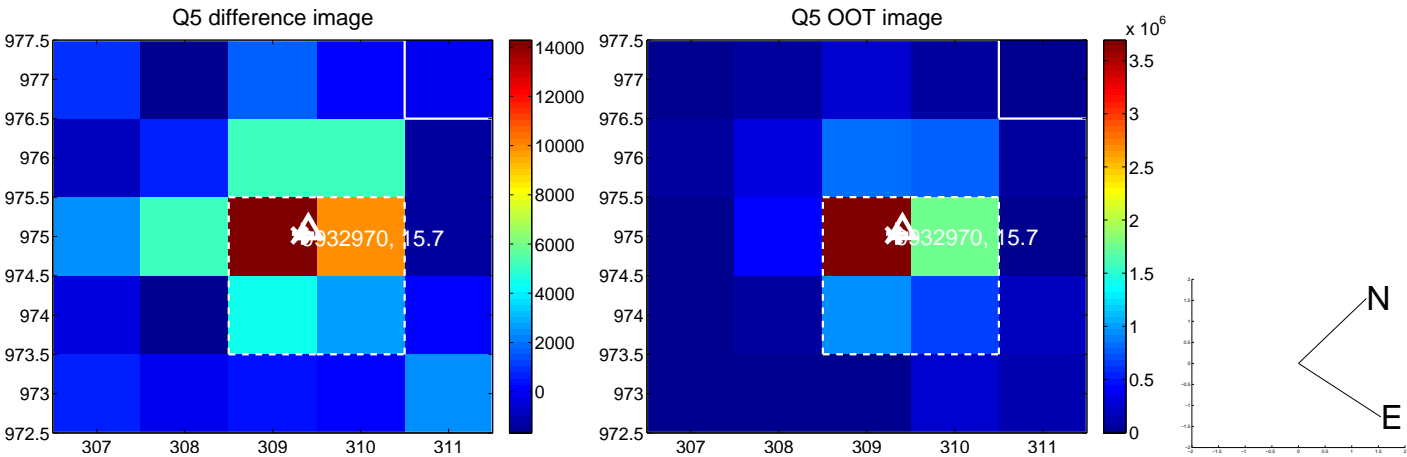


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

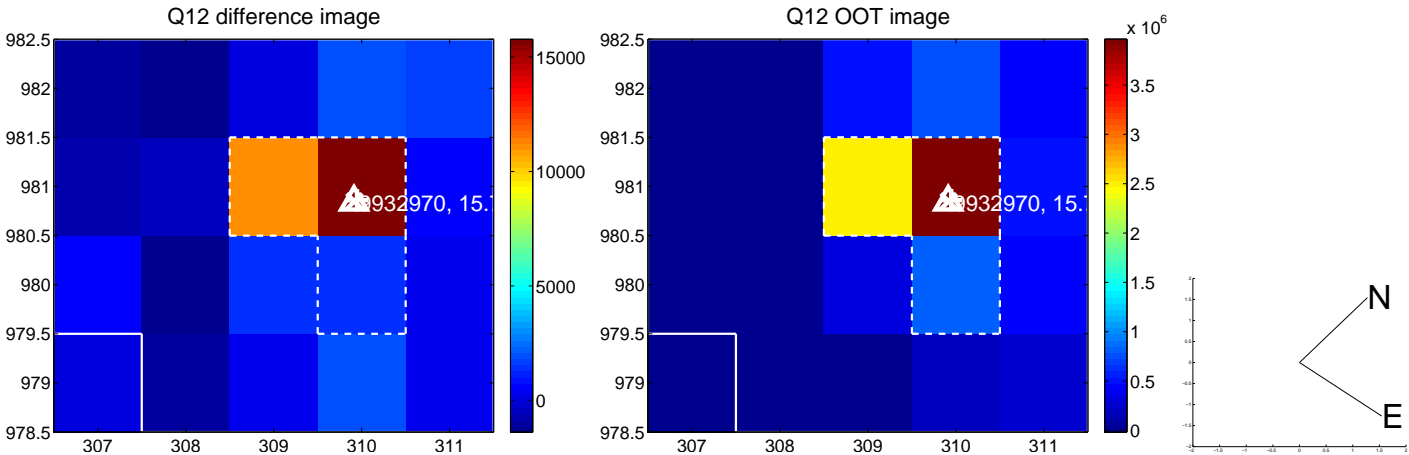
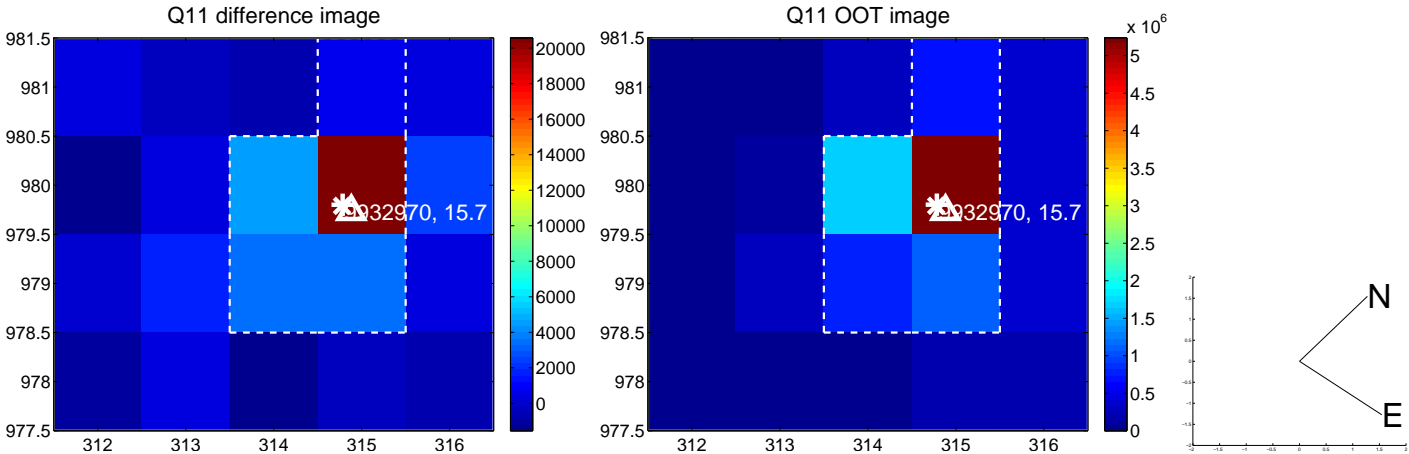
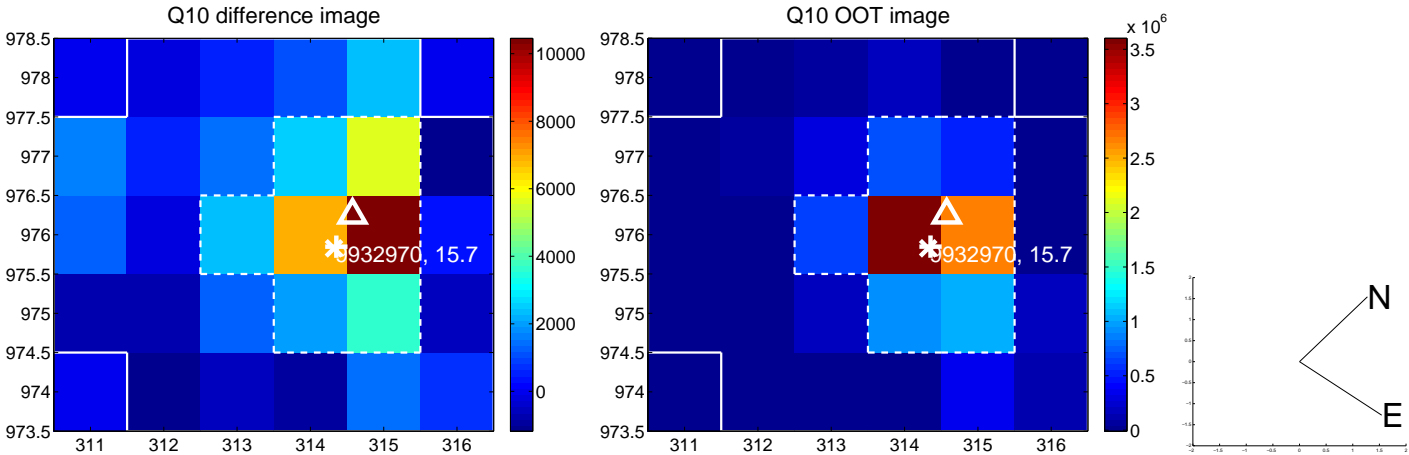
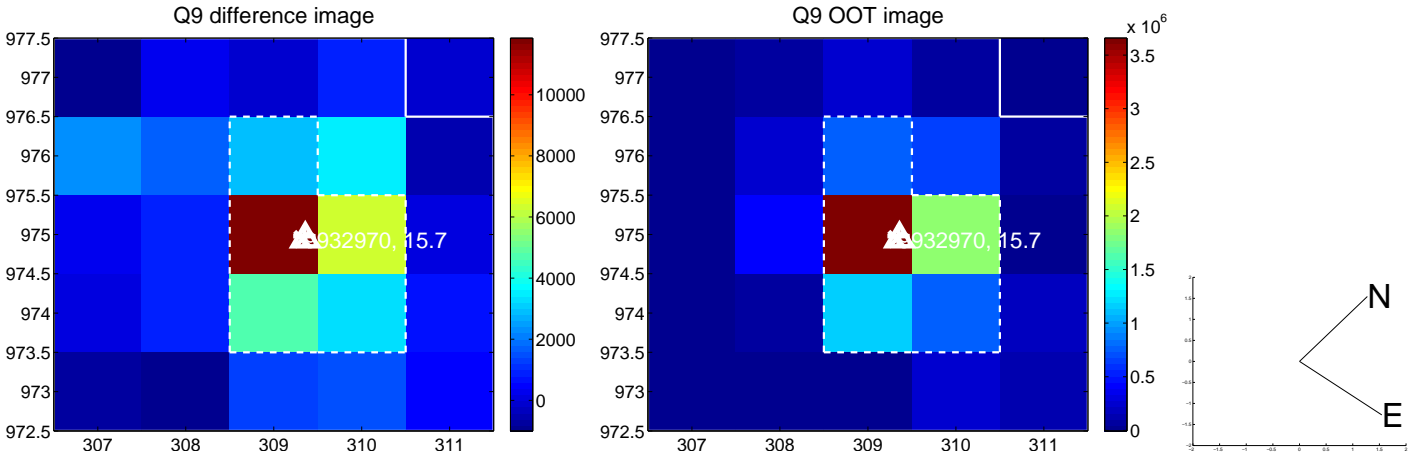
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



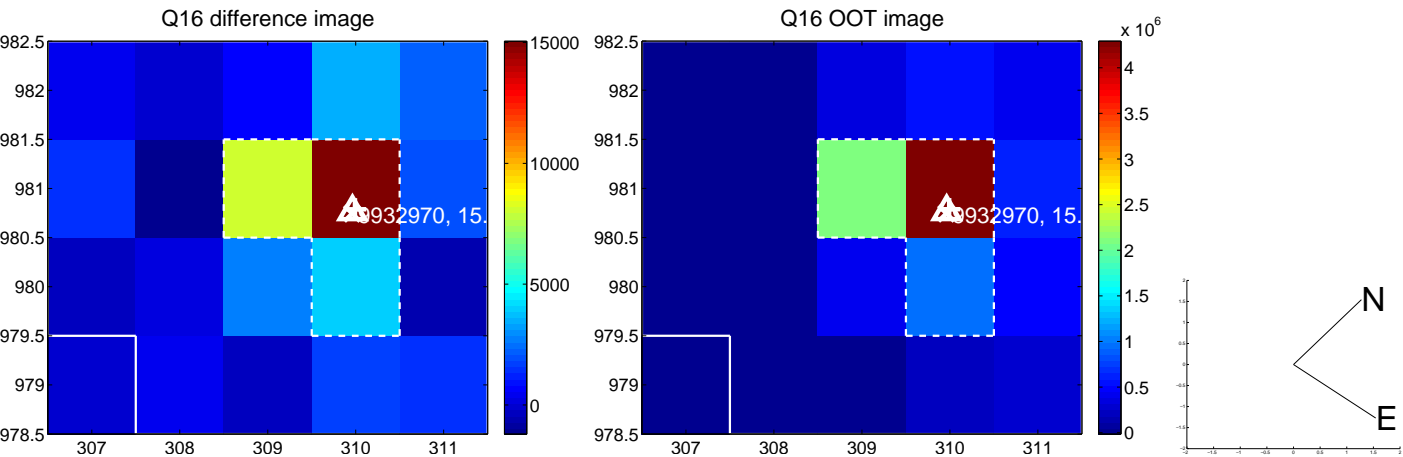
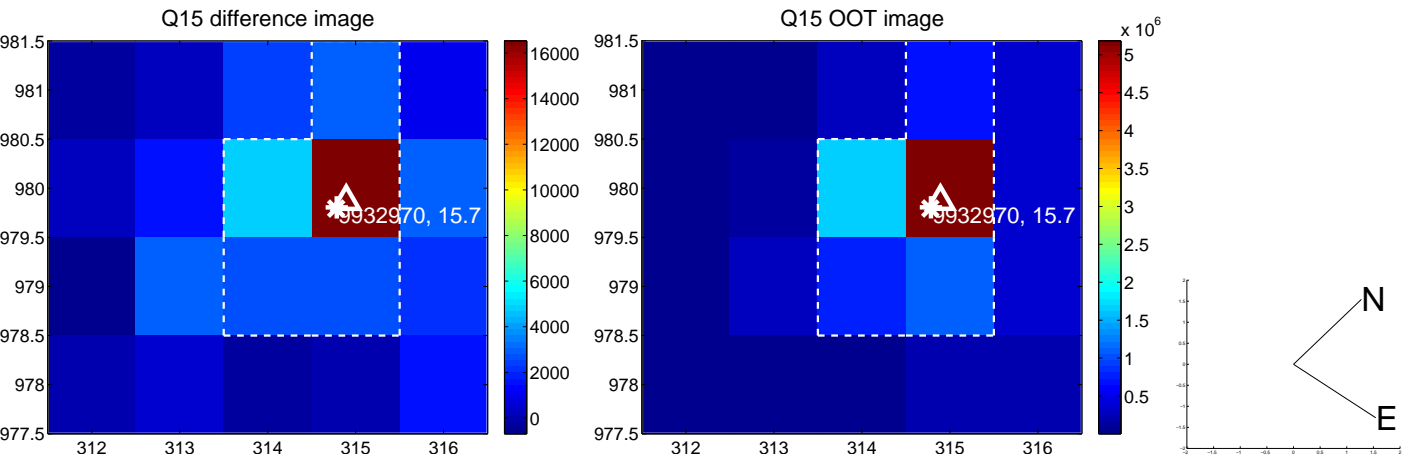
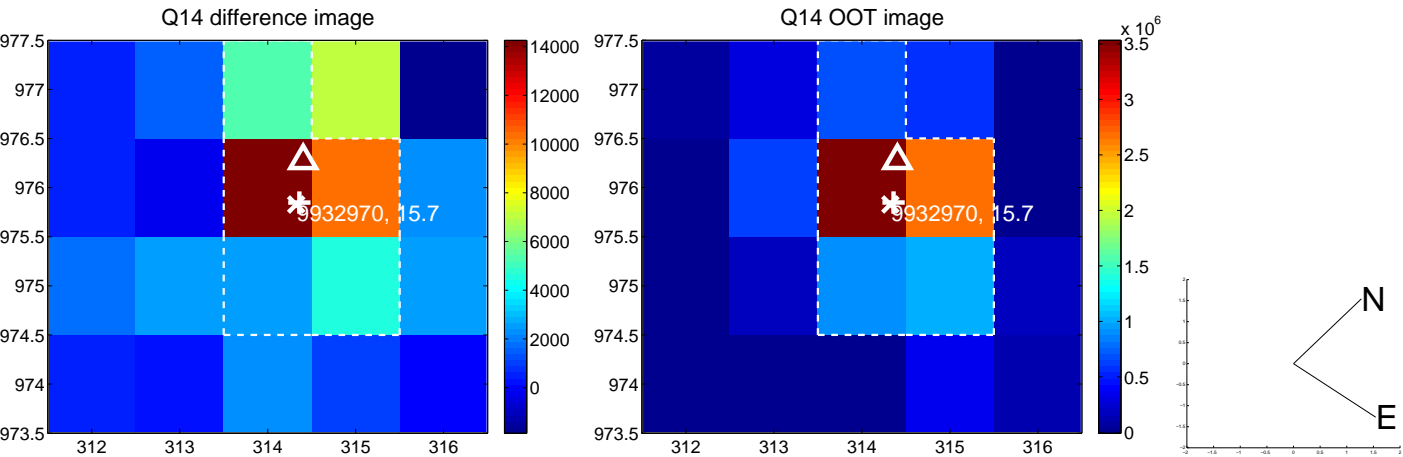
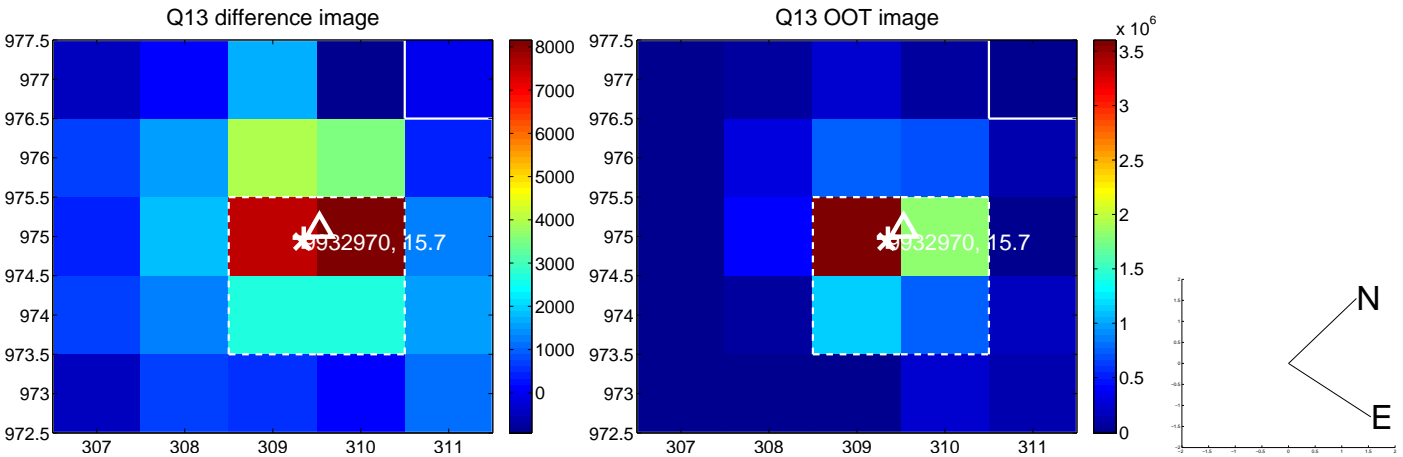
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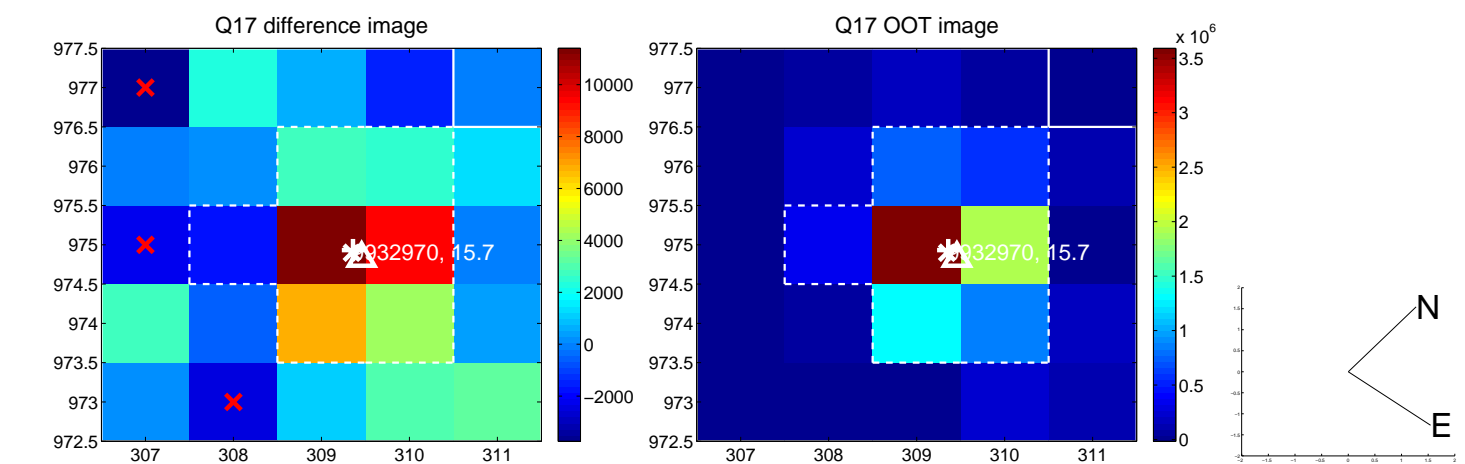
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



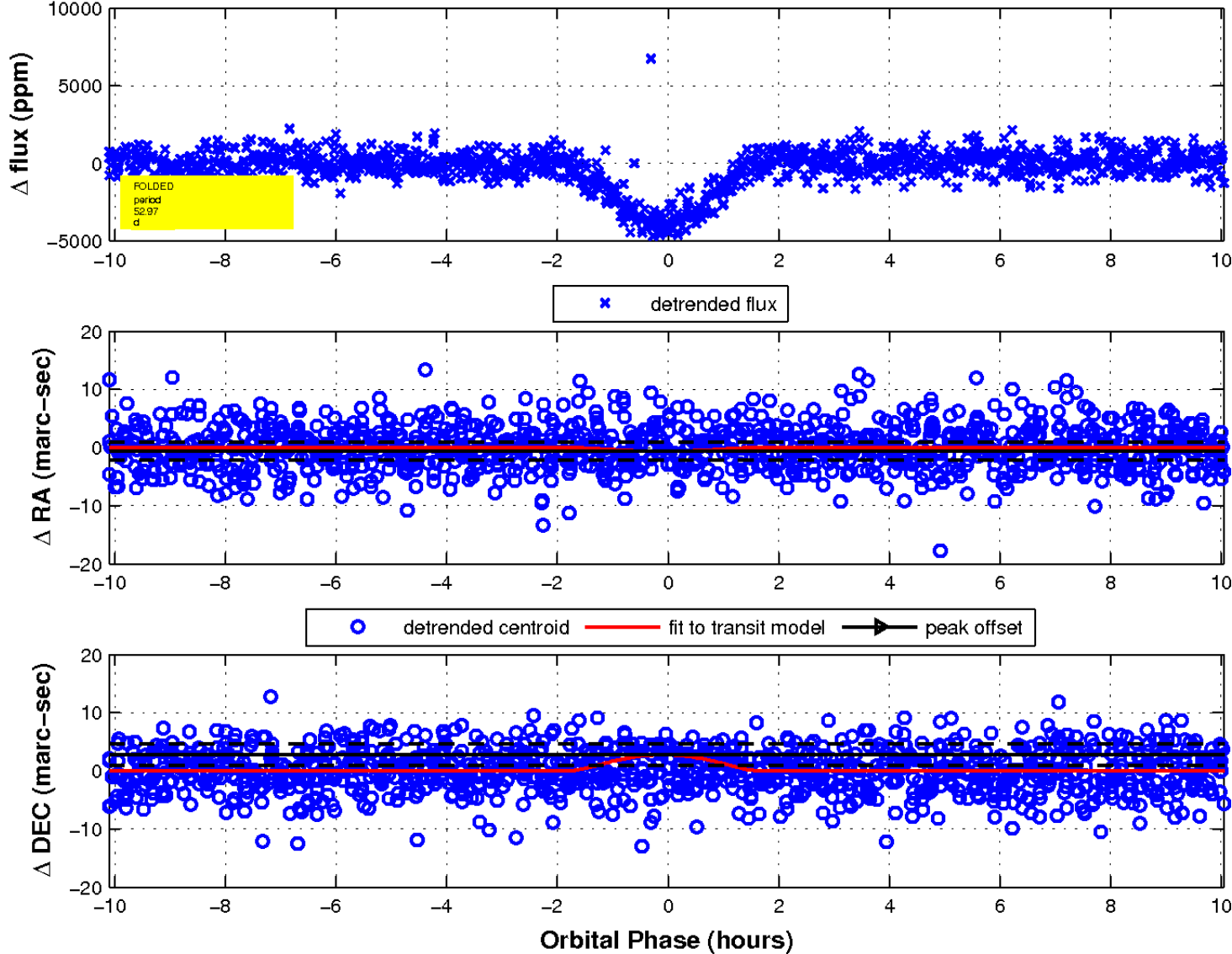
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 1 of 1



UKIRT Image

Declination

