

KIC 009908486

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 009908486-01 | OBS | 5731.01 | 36.609173 | 138.774946 | 1123.1 | 2.326 | 12.1 | 14.7 | 16.11 | 4770 | 89.21 | 1643.05 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 009908486-01 | OBS | FP | 0.01 | 1 | 0 | 1 | 0 | MOD_NONUNIQ_ALT—CENT_UNRESOLVED_OFFSET |

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 009908486-01

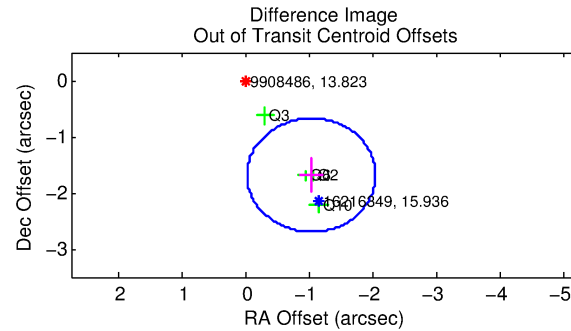
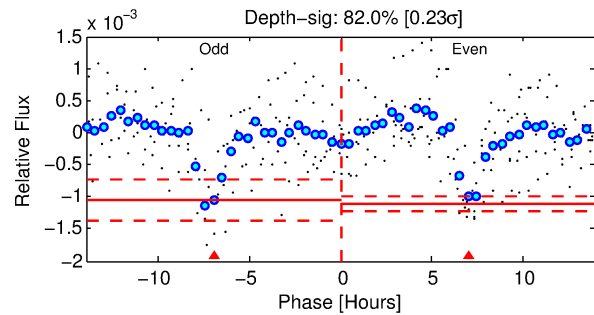
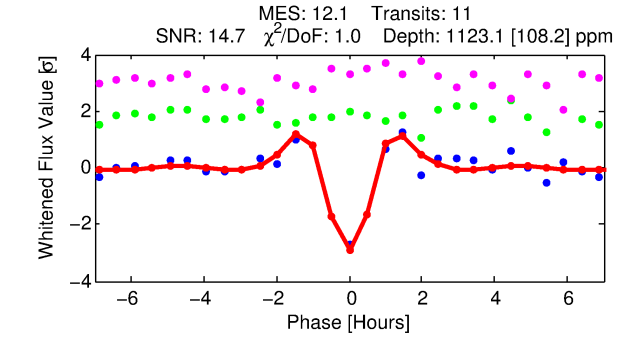
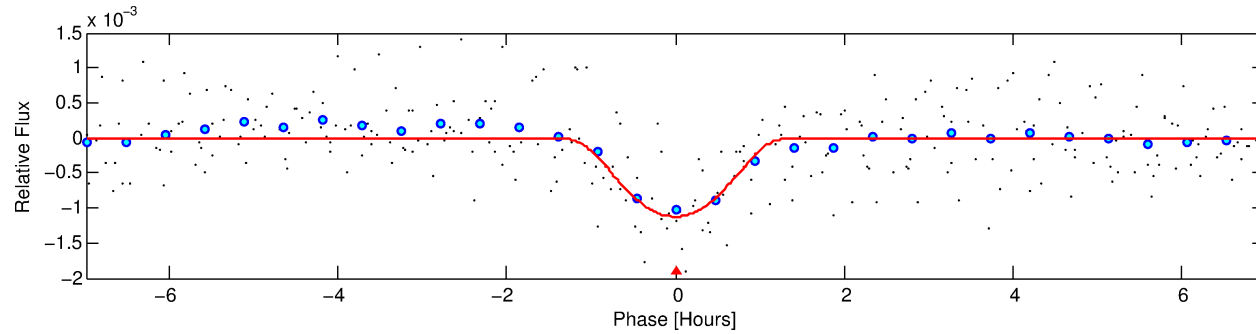
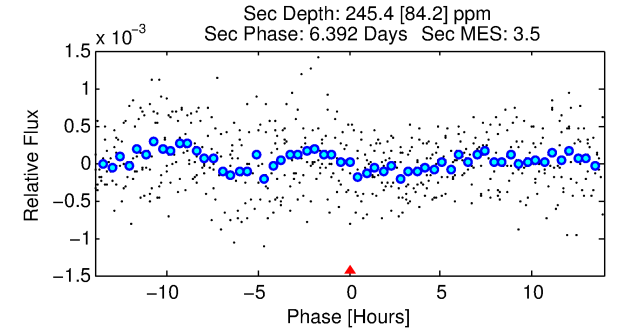
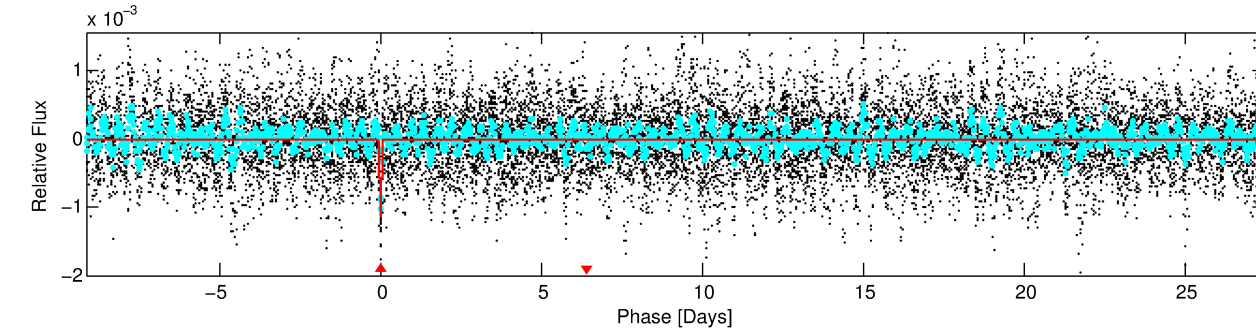
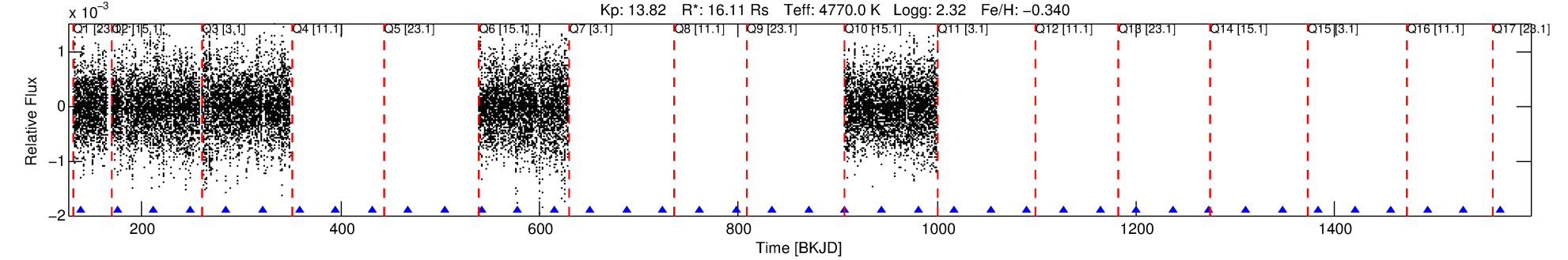
No Significant Match Found

DV One-Page Summary

KIC: 9908486 Candidate: 1 of 1 Period: 36.609 d

KOI: K05731.01 Corr: 0.875

Kp: 13.82 R*: 16.11 Rs Teff: 4770.0 K Logg: 2.32 Fe/H: -0.340



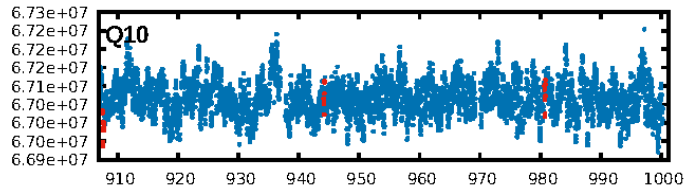
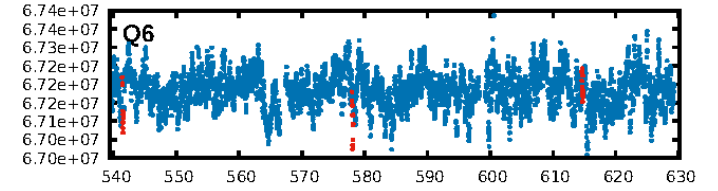
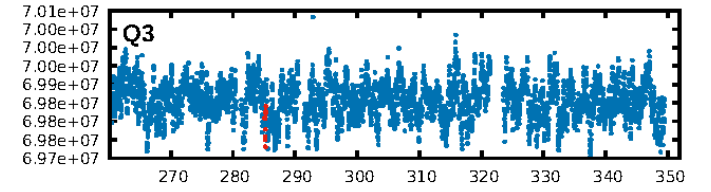
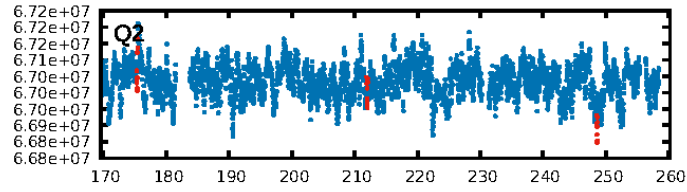
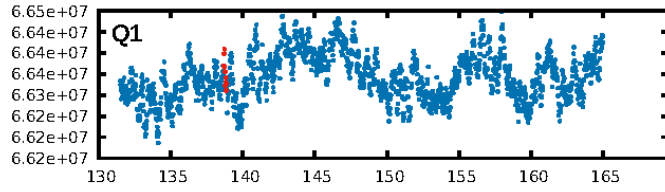
DV Fit Results:

Period = 36.60917 [0.00018] d
Epoch = 138.7749 [0.0023] BKJD
Rp/R* = 0.0507 [0.0490]
a/R* = 45.51 [15.59]
b = 0.98 [0.09]
Seff = 1643.05 [314.40]
Teff = 1623 [78] K
Rp = 89.21 [88.78] Re
a = 0.2707 [0.0433] AU
Ag = 1.24 [2.45] [0.10σ]
Teffp = 2651 [1303] K [0.79σ]

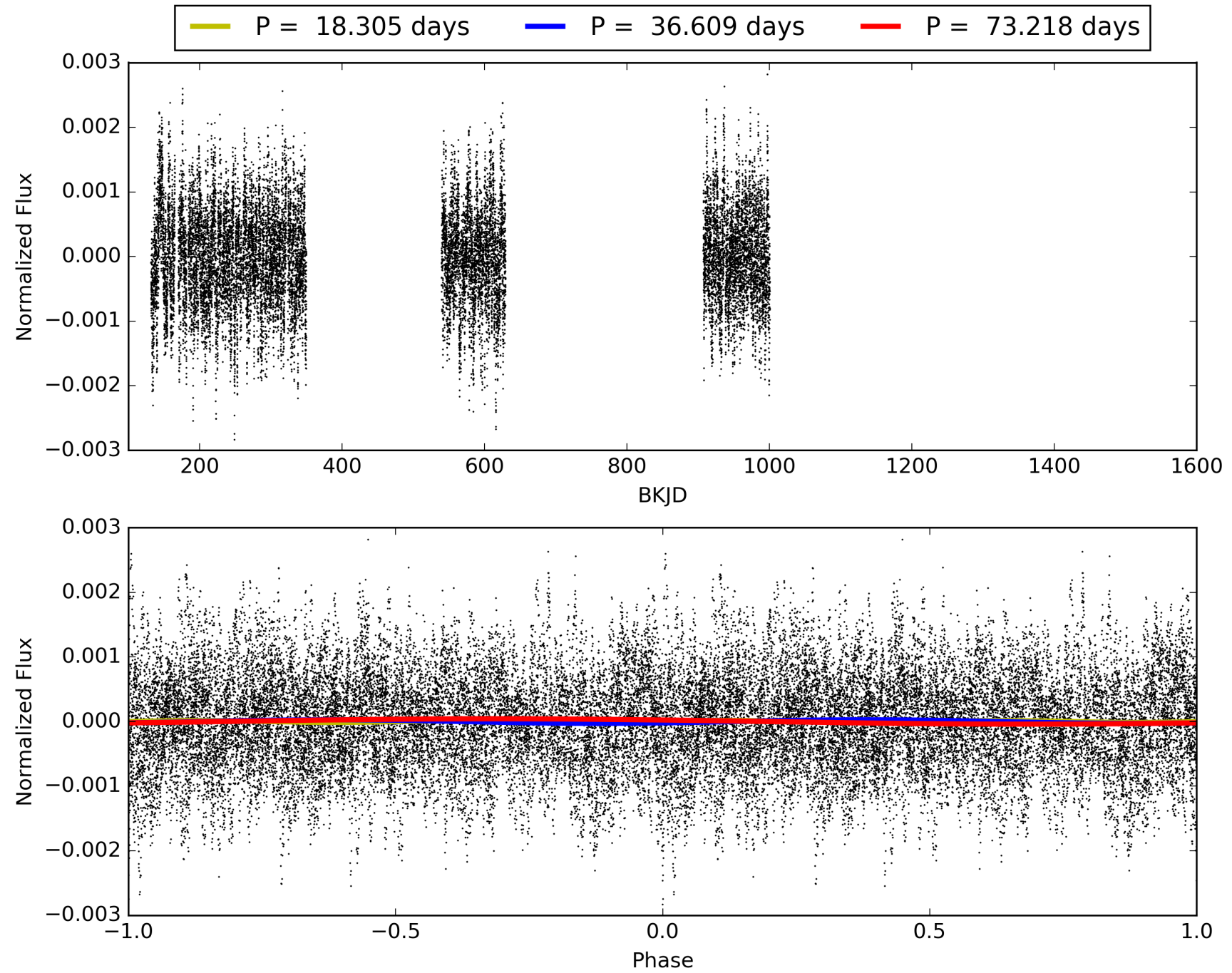
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: N/A
ModelChiSquare2-sig: 91.8%
ModelChiSquareGof-sig: 96.7%
Bootstrap-pfa: 2.43e-34
RollingBand-fgt: 1.00 [10/10]
GhostDiagnostic-chr: 1.299
Centroid-sig: 0.0%
Centroid-so: 2.716 arcsec [6.43σ]
OotOffset-rm: 1.975 arcsec [5.86σ]
KicOffset-rm: 2.081 arcsec [6.90σ]
OotOffset-st: 3/1/0/0 [4]
KicOffset-st: 3/1/0/0 [4]
DiffImageQuality-fgm: 1.00 [4/4]
DiffImageOverlap-fno: 1.00 [5/5]

TCE 009908486-01, PDC Light Curves

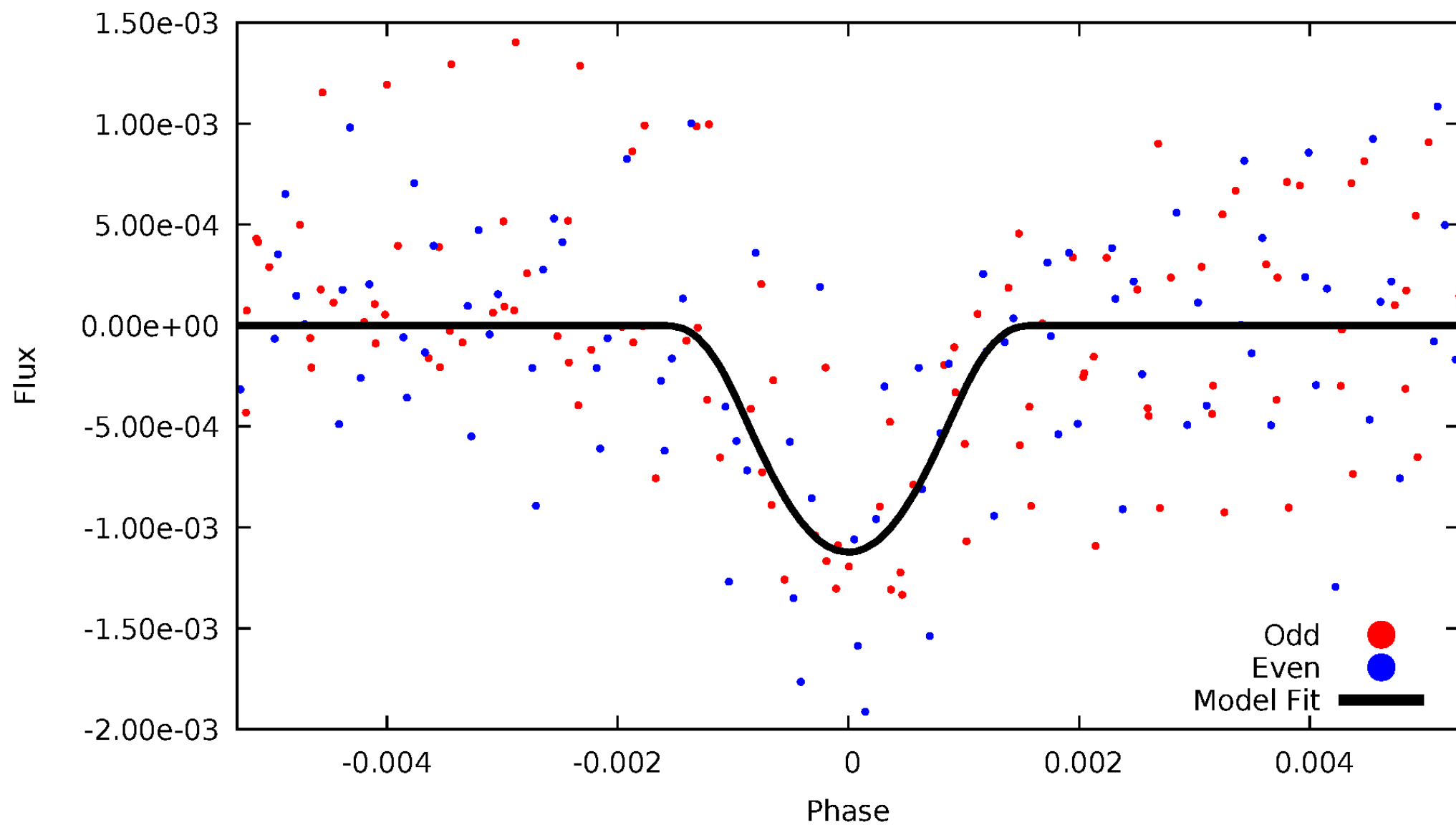


TCE 009908486-01



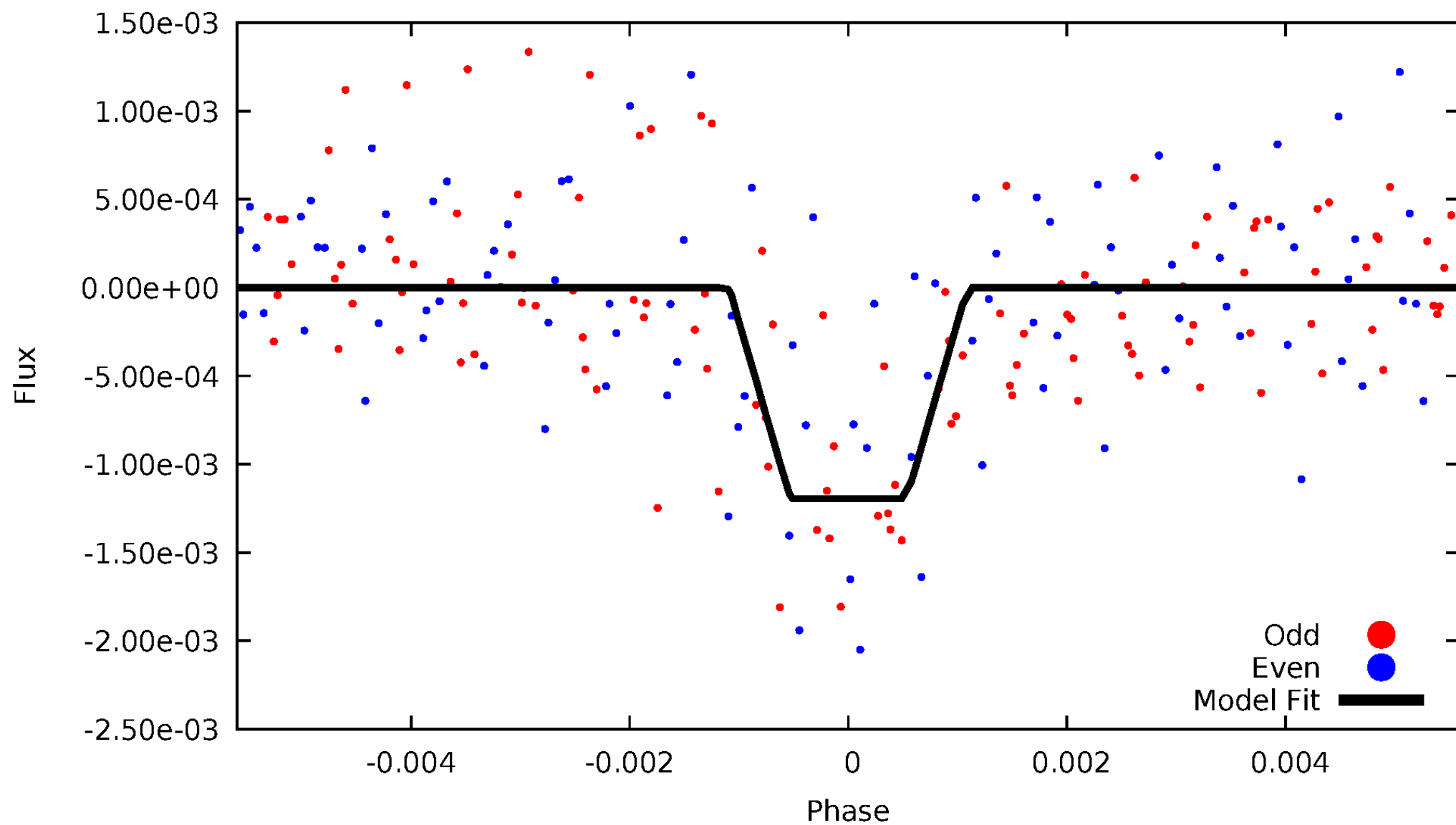
DV Odd/Even

TCE 009908486-01



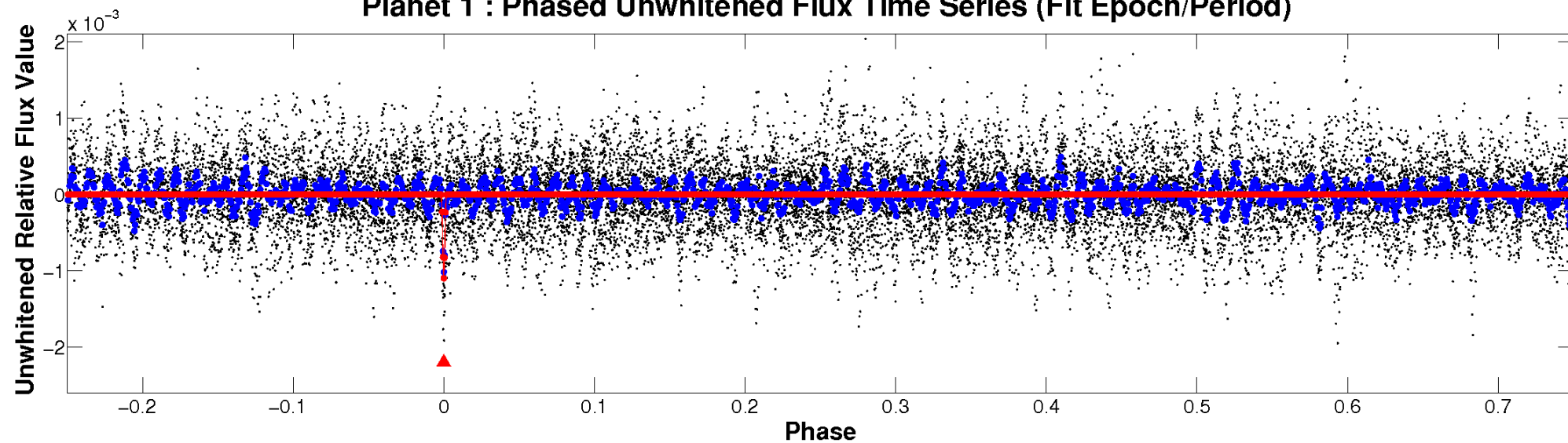
ALT Odd/Even

TCE 009908486-01

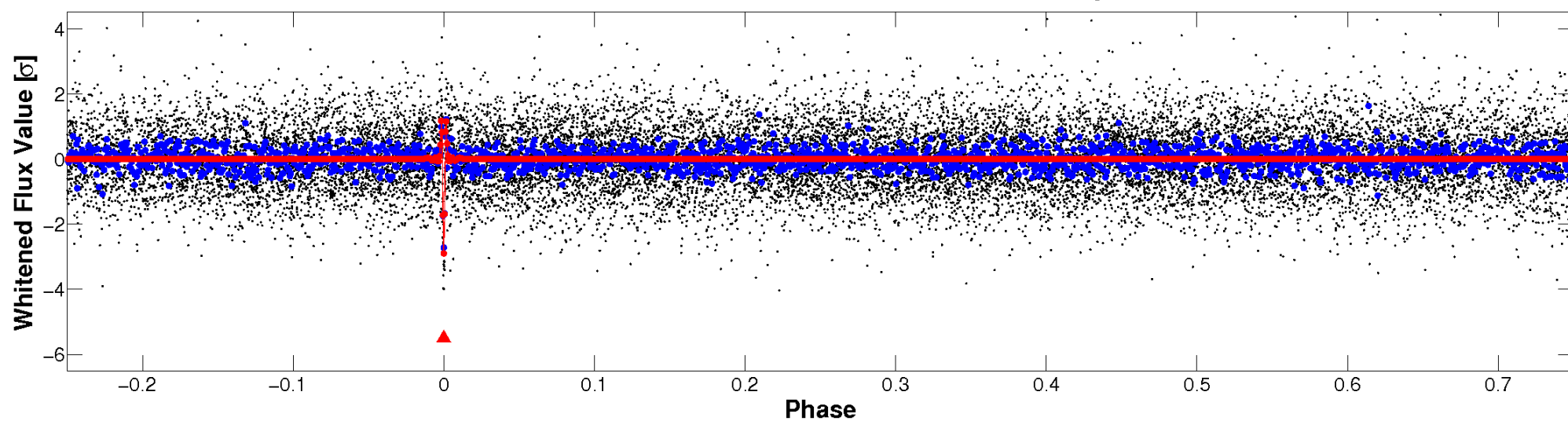


Non-Whitened Vs. Whitened Light Curve

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

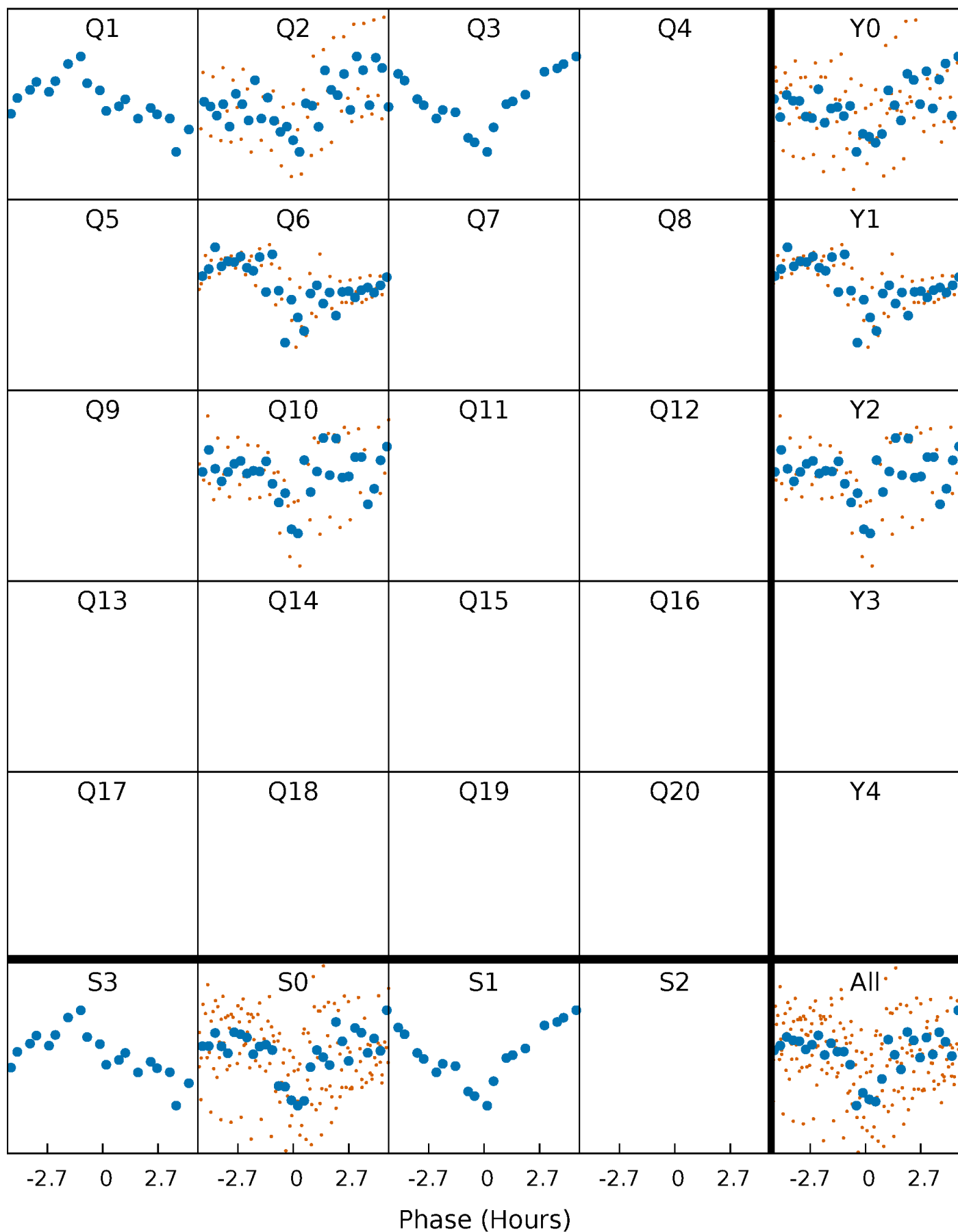


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



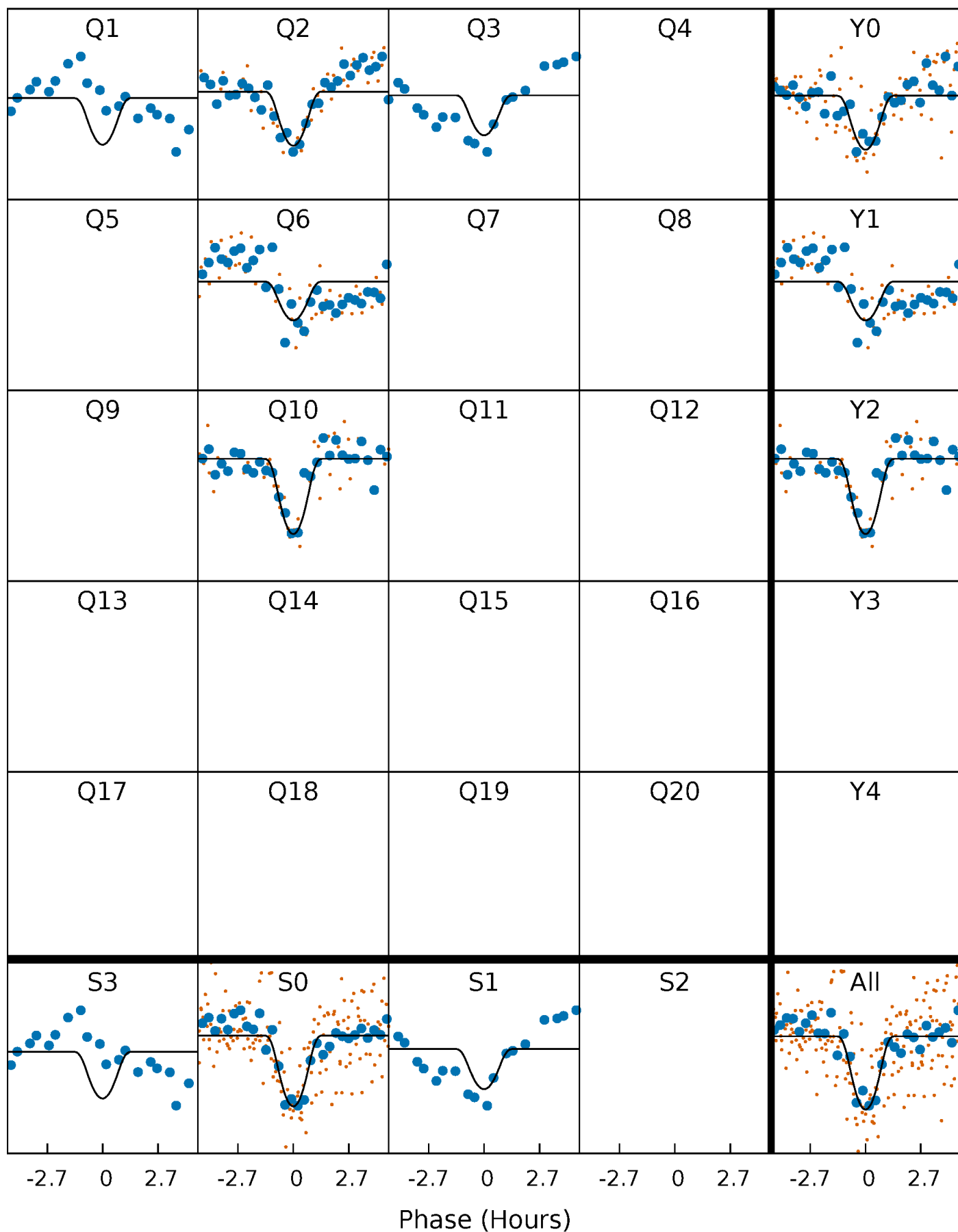
PDC Quarter-Phased Transit Curves

TCE 009908486-01 P= 36.609173 Days $T_0=138.774946$ (BKJD)



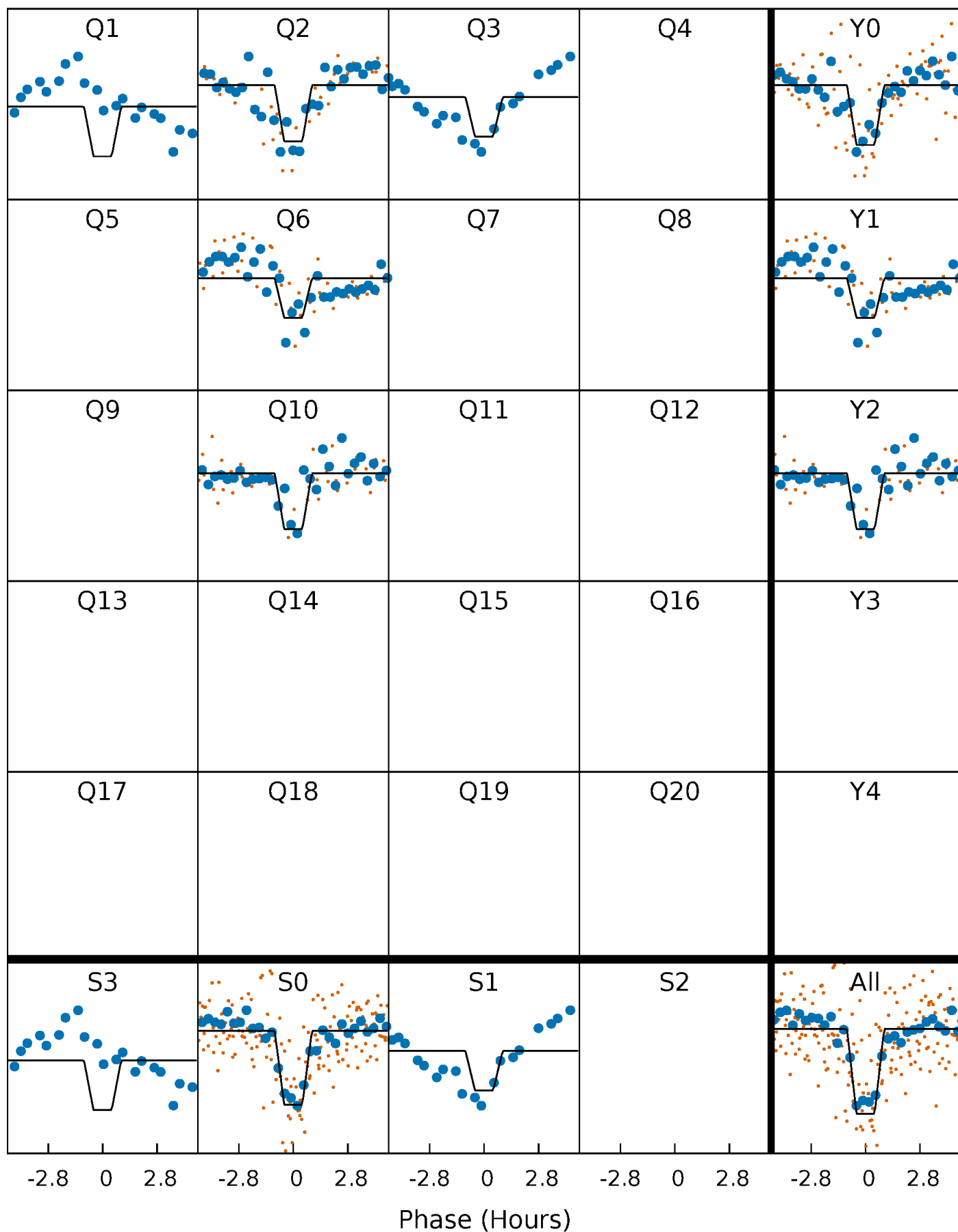
DV Quarter-Phased Transit Curves

TCE 009908486-01 P= 36.609173 Days $T_0=138.774946$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

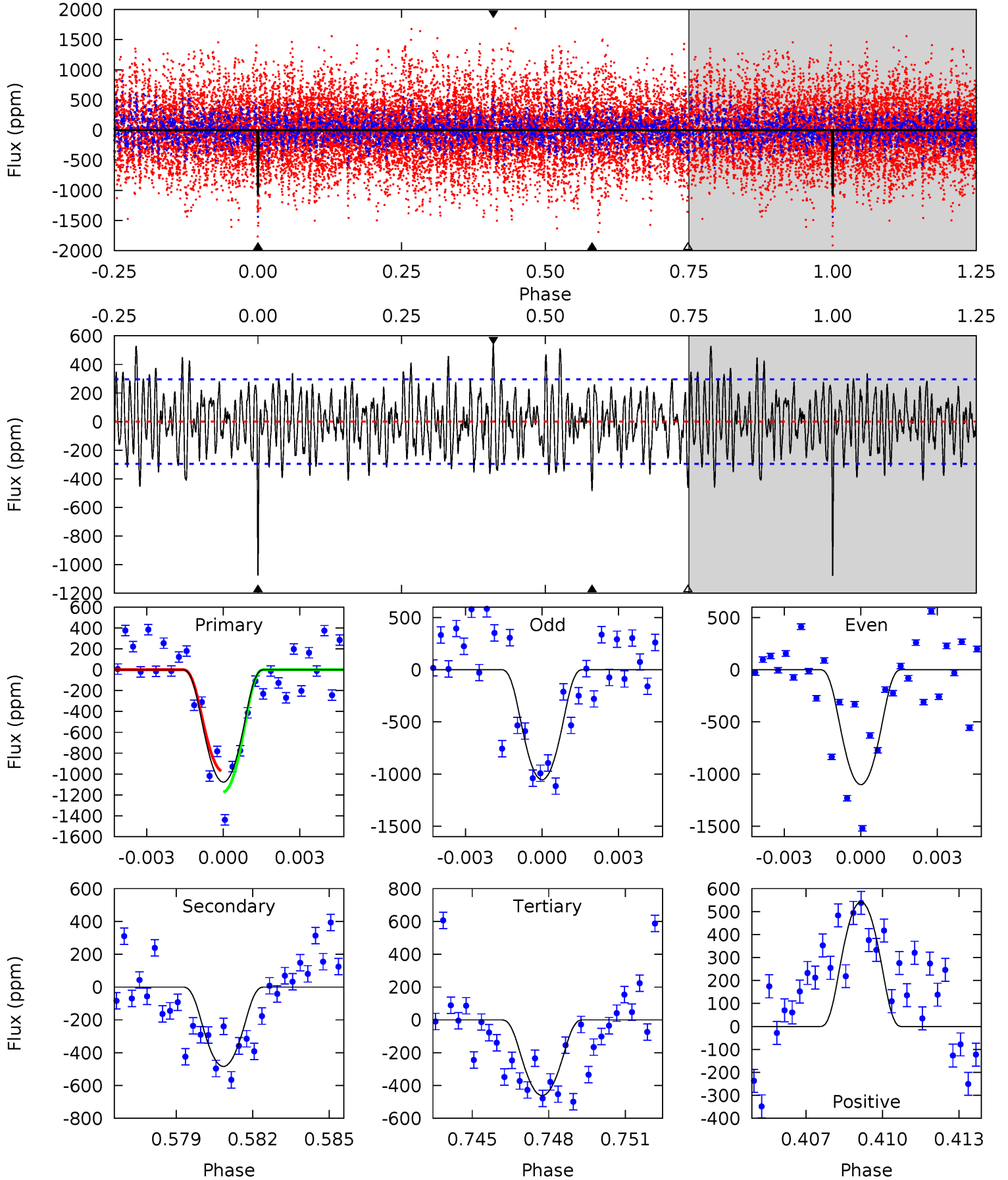
TCE 009908486-01 P= 36.609049 Days $T_0=138.777783$ (BKJD)



DV Model-Shift Uniqueness Test

009908486-01, P = 36.609173 Days, E = 102.165773 Days

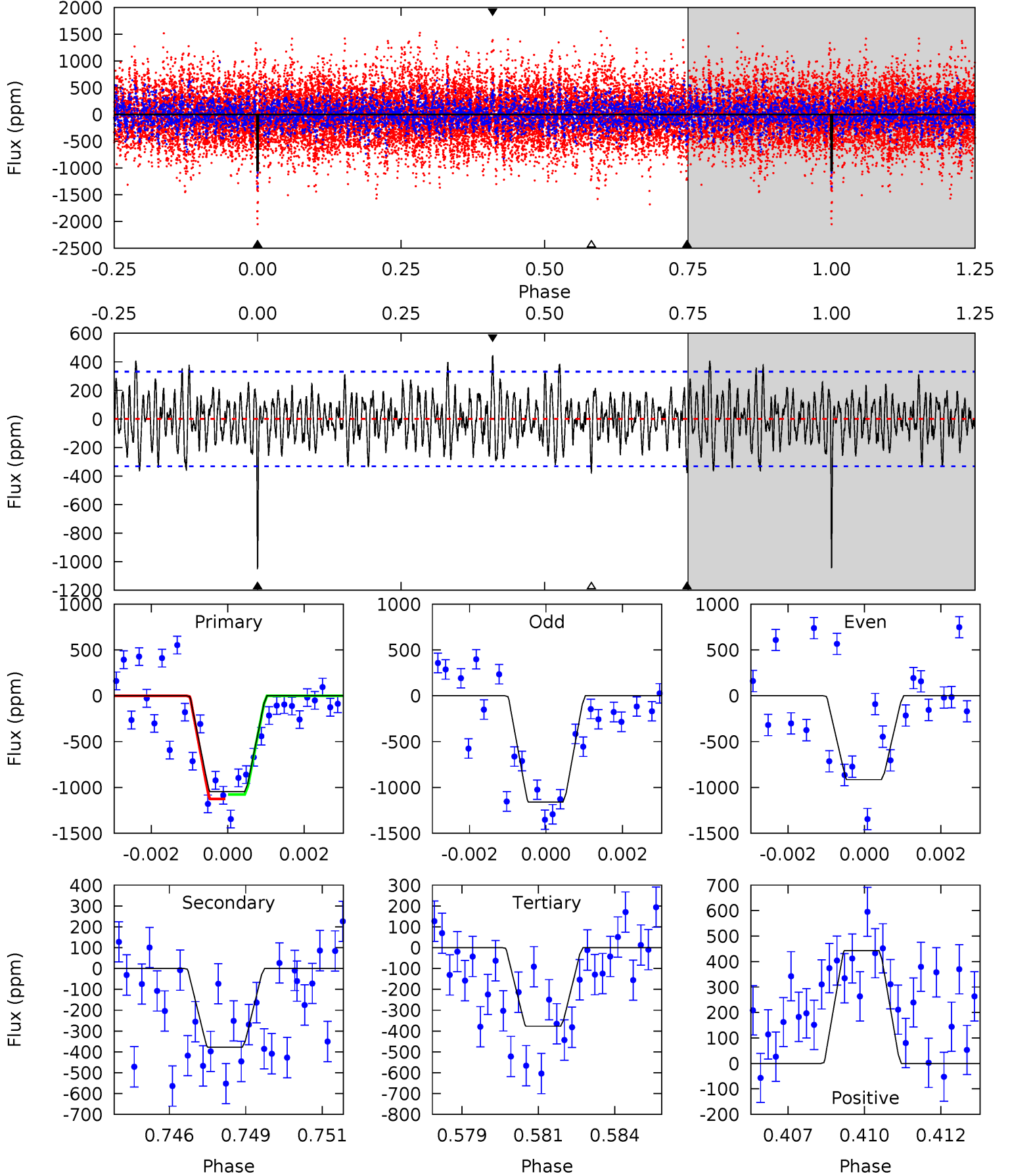
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 19.2 | 8.62 | 8.21 | 9.64 | 5.25 | 2.97 | 3.02 | 11.0 | 9.53 | 0.41 | -1.03 | 0.42 | 0.93 | 0.33 | 1.79 |



Alt Model-Shift Uniqueness Test

009908486-01, P = 36.609049 Days, E = 102.168734 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 16.7 | 6.05 | 6.04 | 7.10 | 5.31 | 3.06 | 2.15 | 10.7 | 9.65 | 0.01 | -1.05 | 1.95 | 0.86 | 0.30 | 0.39 |



Stellar Parameters For KIC 009908486

| | $T_{\text{eff}} (K)$ | $\log(g)$ | $[\text{Fe}/\text{H}]$ | $R (R_{\odot})$ | $M (M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|----------------------------|---------------------------|---|
| | 4770^{+76}_{-114} | $2.319^{+0.033}_{-0.024}$ | $-0.340^{+0.150}_{-0.250}$ | $16.114^{+3.121}_{-3.815}$ | $1.973^{+1.063}_{-0.773}$ | $0.001^{+0.000}_{-0.000}$ |
| | +2%/-2% | +1%/-1% | +44%/-74% | +19%/-24% | +54%/-39% | +36%/-10% |
| Source | PHO1 | AST9 | 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 009908486-01 / KOI 5731.01

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|---------------|----------------------------|----------------------|-----------------------|----------------------------|
| DV | -484 ± 56 | $102.17^{+86.88}_{-64.16}$ | 2267^{+69}_{-80} | 3277^{+1482}_{-688} | $1.926^{+10.861}_{-1.354}$ |
| Alt. | -377 ± 62 | $83.58^{+84.77}_{-55.03}$ | 2266^{+72}_{-89} | 3340^{+1770}_{-736} | $2.188^{+17.181}_{-1.596}$ |

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

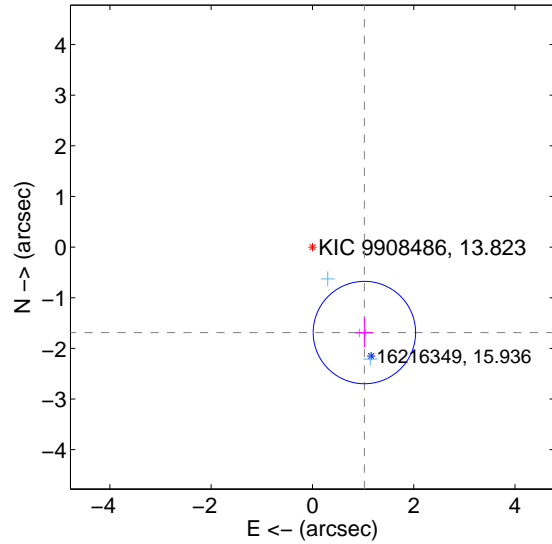
Supplemental centroid analysis for 009908486-01. Kepler magnitude: 13.82. Transit SNR 14.73

There are 4 quarters with good PRF difference image offsets

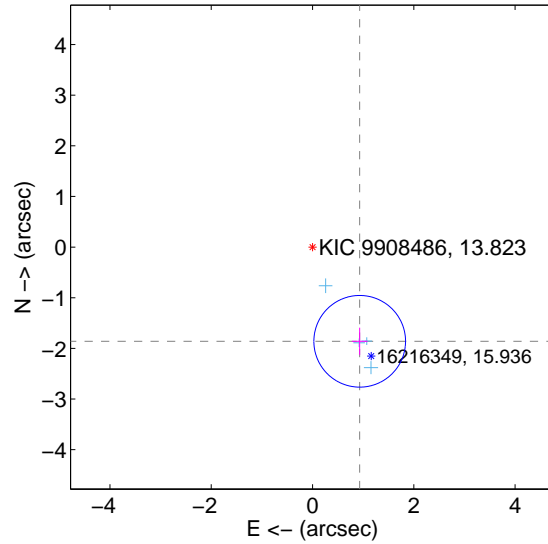
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 1.975 ± 0.337 | 5.86 | -1.026 ± 0.177 | -1.687 ± 0.296 |
| PRF-fit source offset from KIC position | 2.081 ± 0.302 | 6.90 | -0.932 ± 0.154 | -1.860 ± 0.270 |
| photometric centroid source offset | 2.72 ± 0.42 | 6.43 | -1.61 ± 0.41 | -2.18 ± 0.43 |

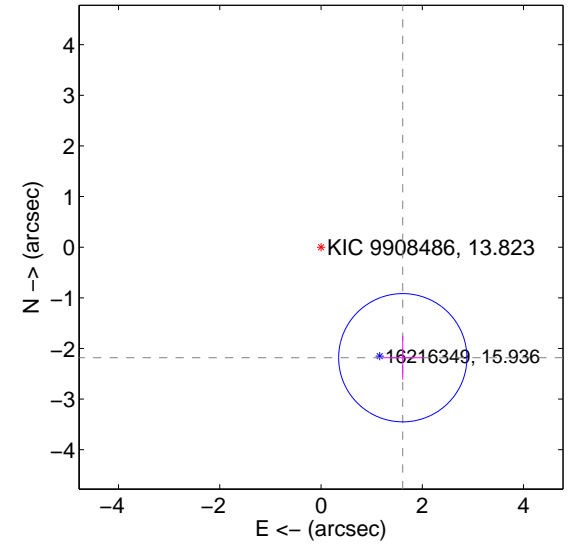
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

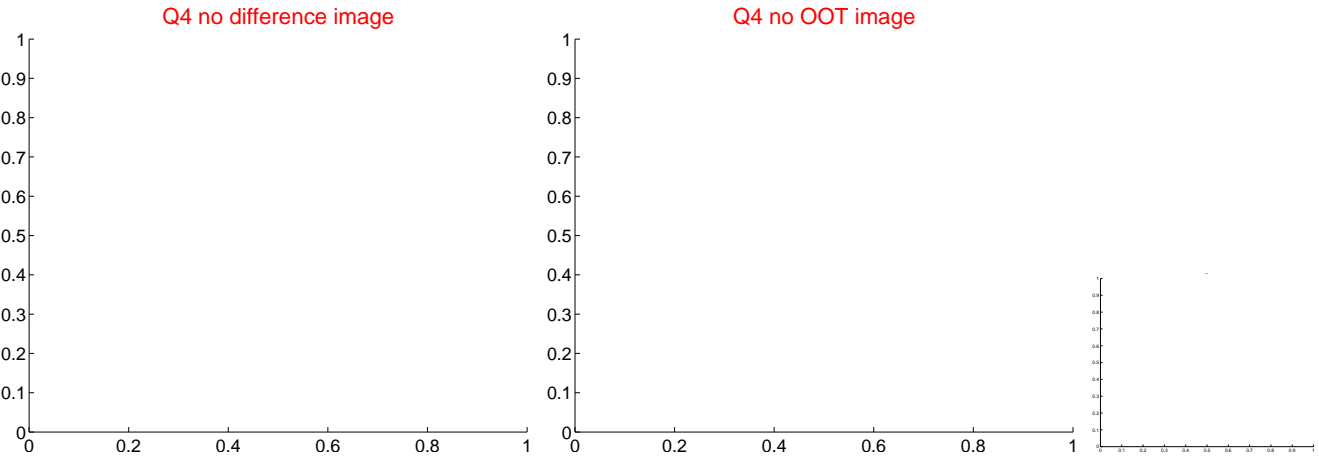
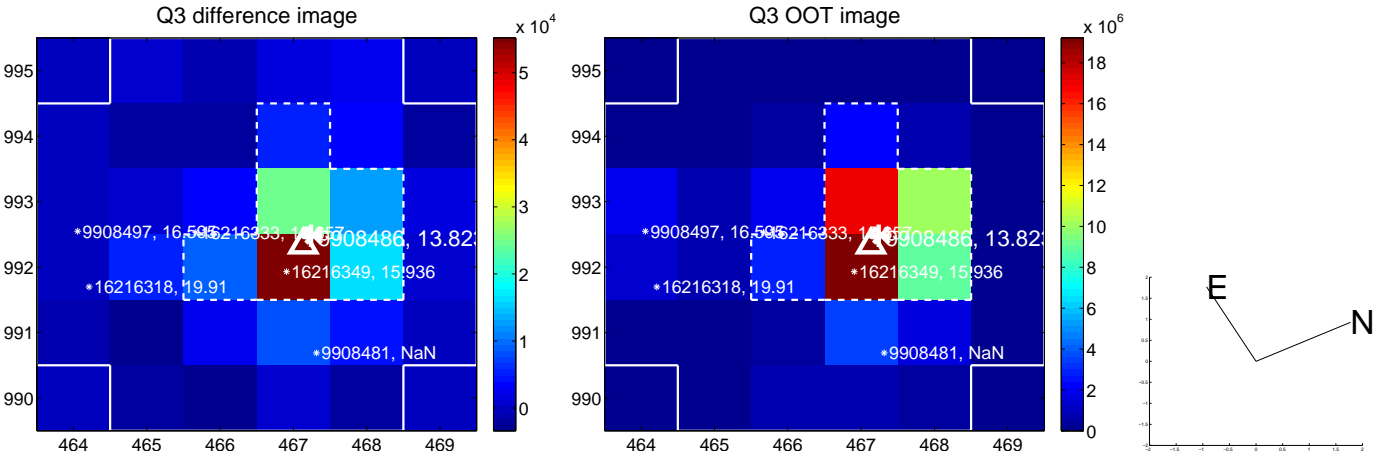
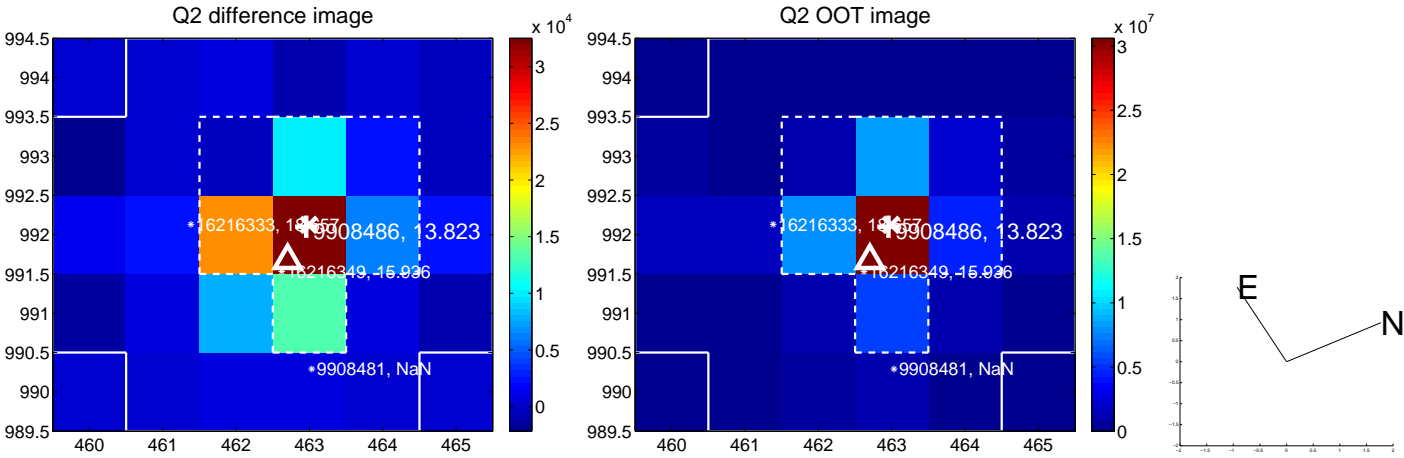
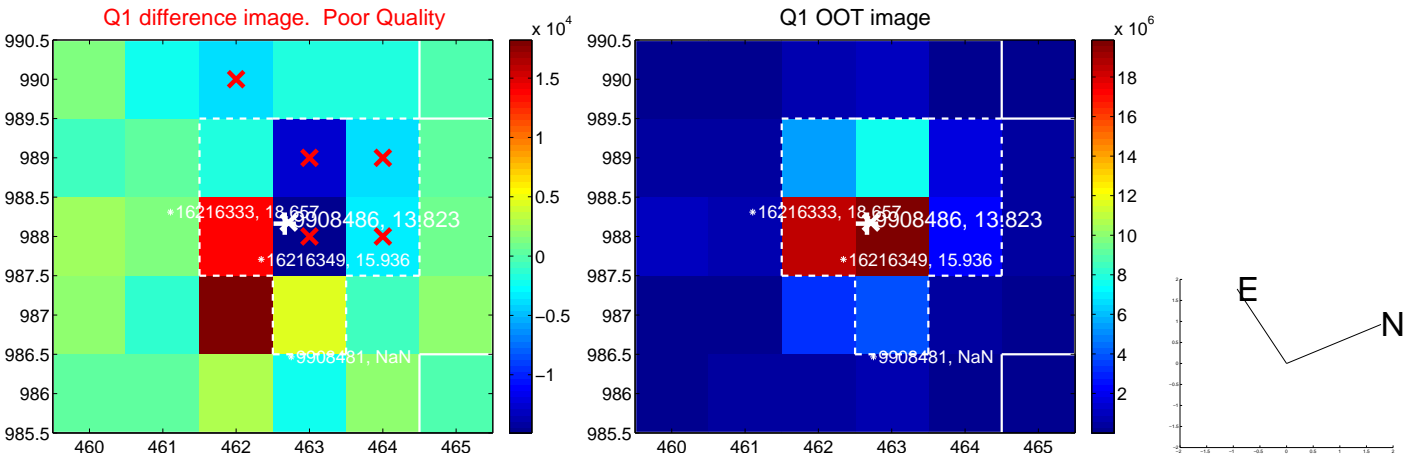


offset from photometric centroids



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.

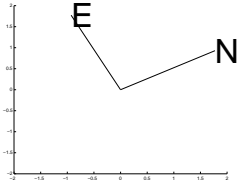
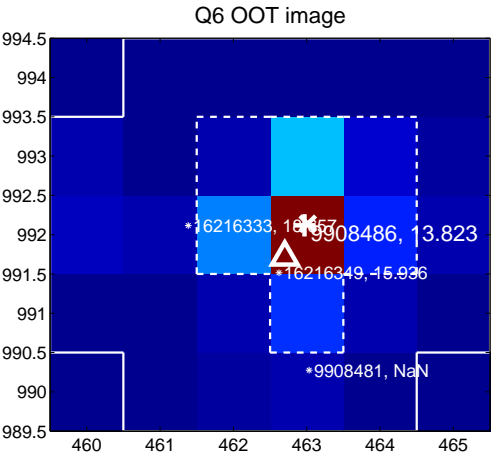
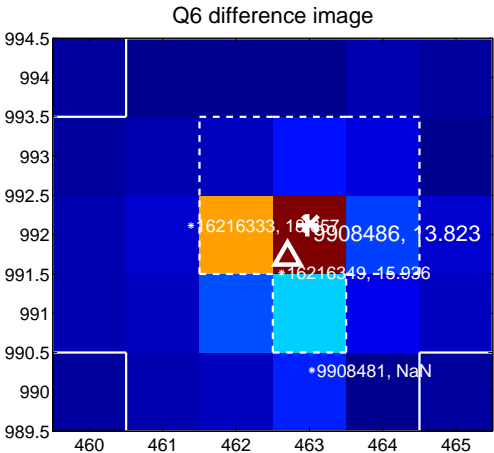


white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

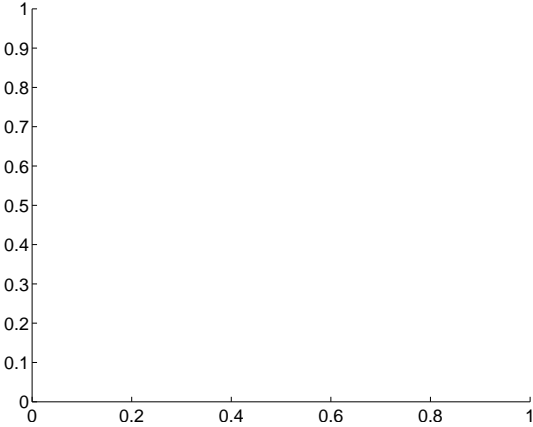
Q5 no difference image



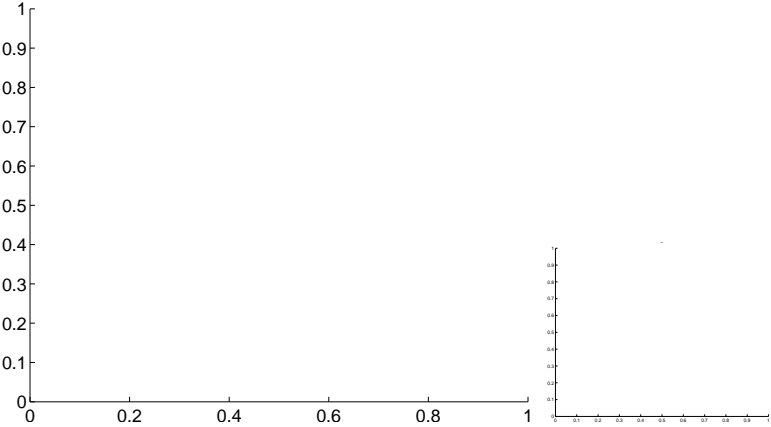
Q5 no OOT image



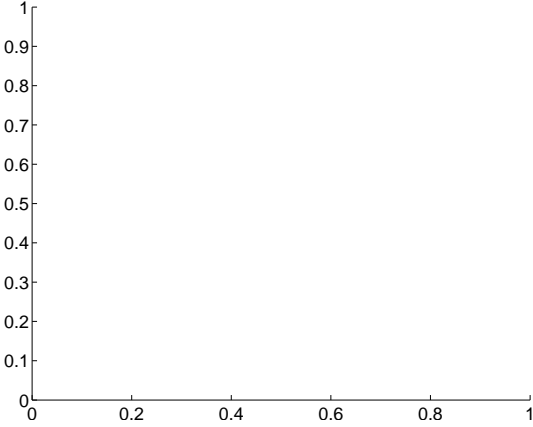
Q7 no difference image



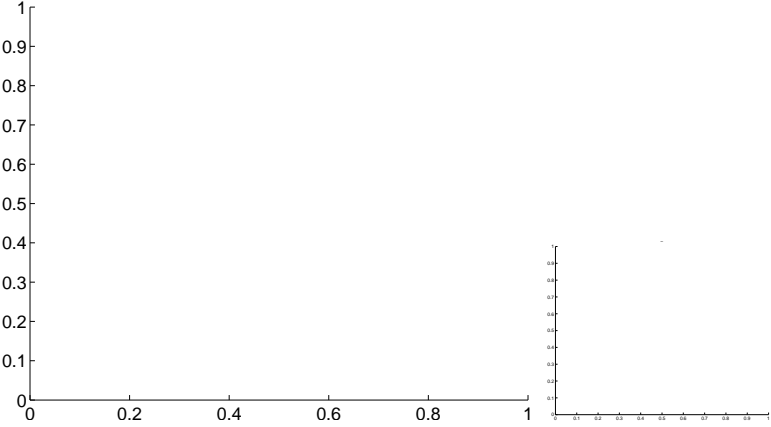
Q7 no OOT image



Q8 no difference image



Q8 no OOT image



white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

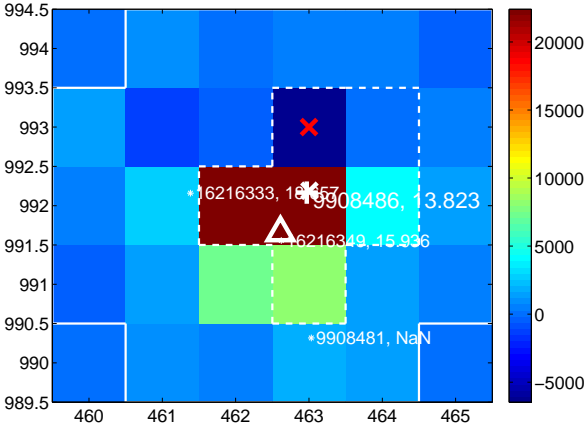
Q9 no difference image



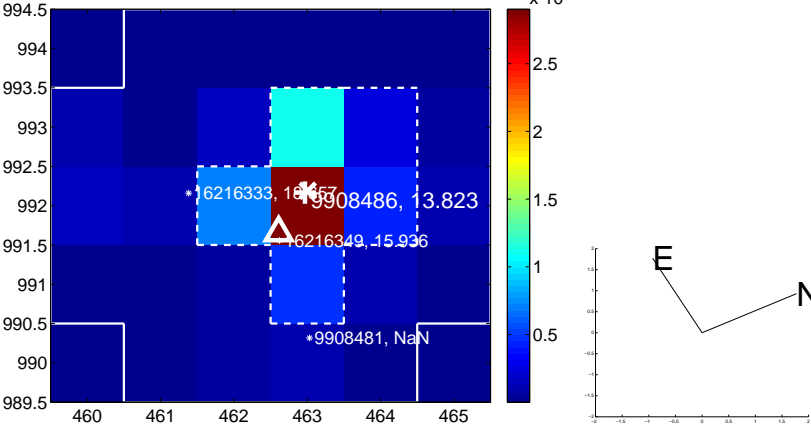
Q9 no OOT image



Q10 difference image



Q10 OOT image



Q11 no difference image



Q11 no OOT image



Q12 no difference image



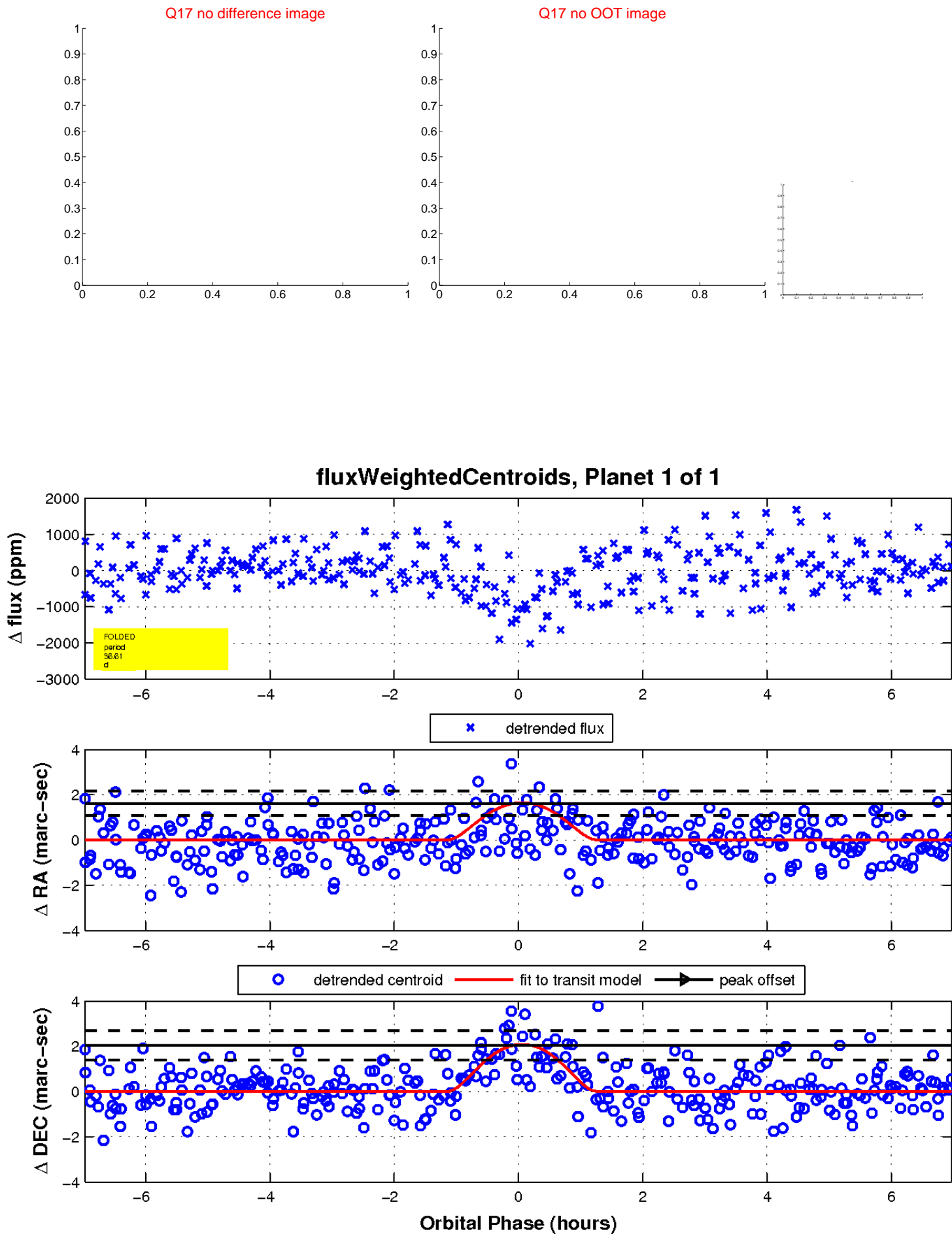
Q12 no OOT image



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.



UKIRT Image

Declination

