

KIC 009401405

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 009401405-01 | OBS | No | 537.109494 | 314.187012 | 439.7 | 9.965 | 7.6 | 6.9 | 1.10 | 6250 | 2.47 | 0.90 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 009401405-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—INCONSISTENT_TRANS—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.

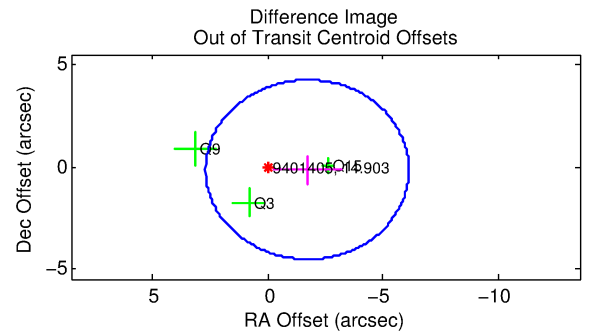
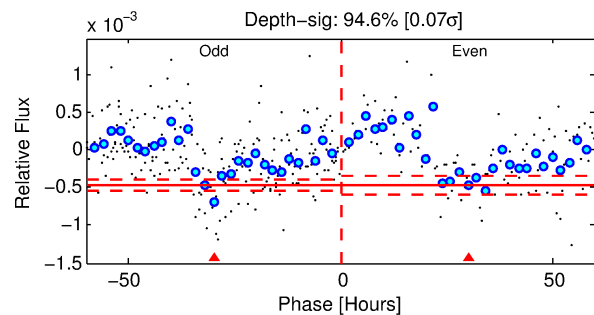
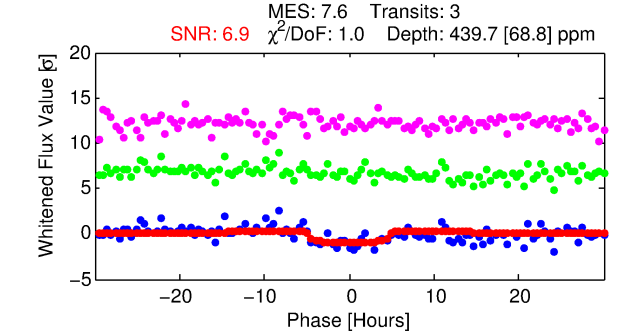
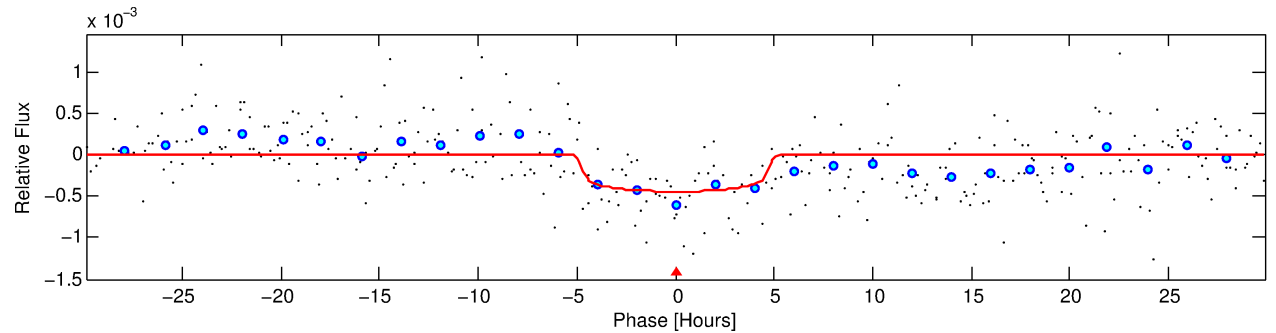
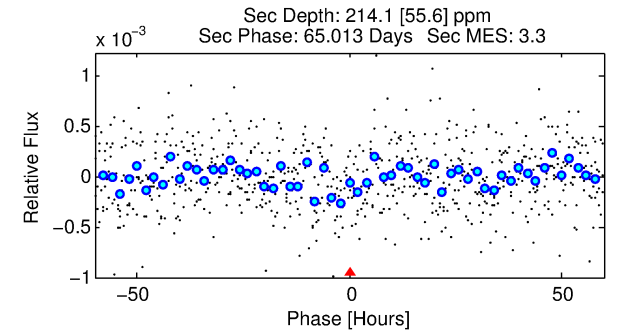
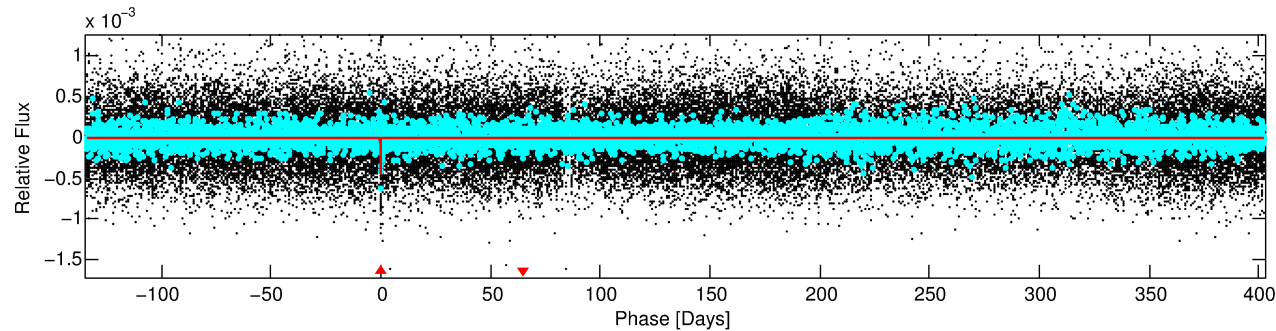
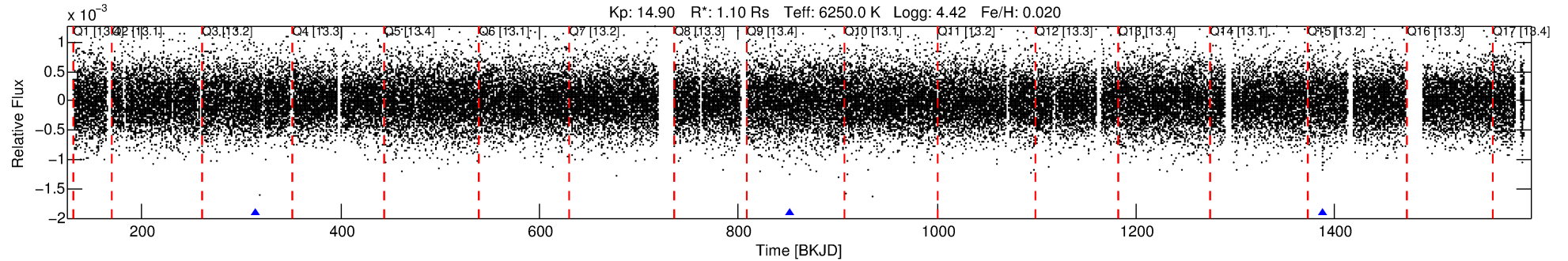
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009401405-01

No Significant Match Found

DV One-Page Summary

KIC: 9401405 Candidate: 1 of 1 Period: 537.109 d



DV Fit Results:

Period = 537.10949 [0.01446] d
Epoch = 314.1870 [0.0182] BKJD
Rp/R* = 0.0206 [0.0134]
a/R* = 302.00 [976.25]
b = 0.71 [2.28]
Seff = 0.90 [0.38]
Teff = 248 [26] K
Rp = 2.47 [1.81] Re
a = 1.3554 [0.3745] AU
Ag = 35474.13 [49192.76] [0.72σ]
Teffp = 5268 [1763] K [2.85σ]

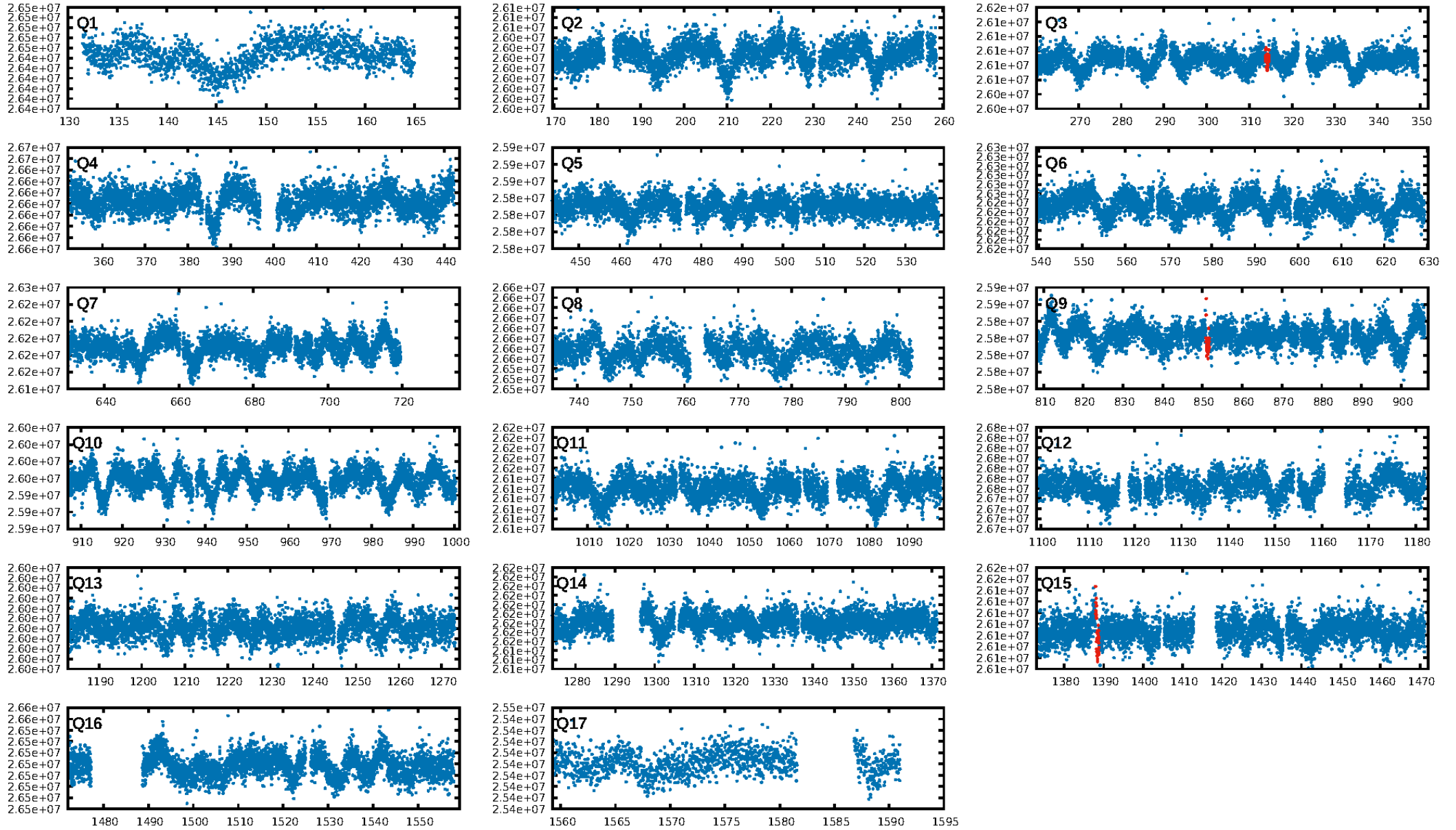
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: N/A
ModelChiSquare2-sig: 12.6%
ModelChiSquareGof-sig: 99.3%
Bootstrap-pfa: 7.34e-13
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 0.9932
Centroid-sig: 9.6%
Centroid-so: 2.185 arcsec [1.28σ]
OotOffset-rm: 1.721 arcsec [1.17σ]
OotOffset-st: 0.2/0/1 [3]
KicOffset-rm: 1.734 arcsec [1.06σ]
KicOffset-st: 0.2/0/1 [3]
DiffImageQuality-fgm: 1.00 [3/3]
DiffImageOverlap-fno: 1.00 [3/3]

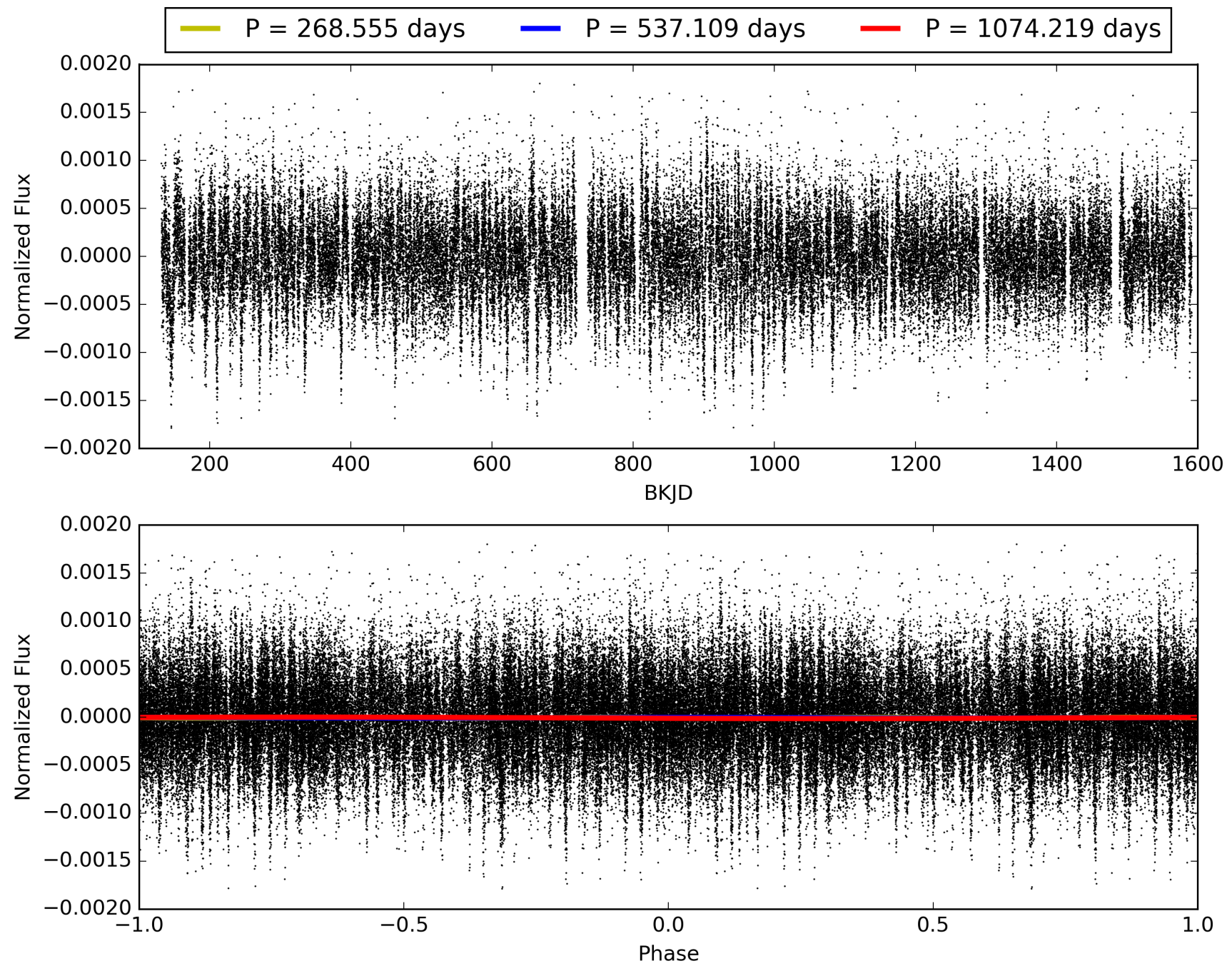
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 13:41:39 Z

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

TCE 009401405-01, PDC Light Curves

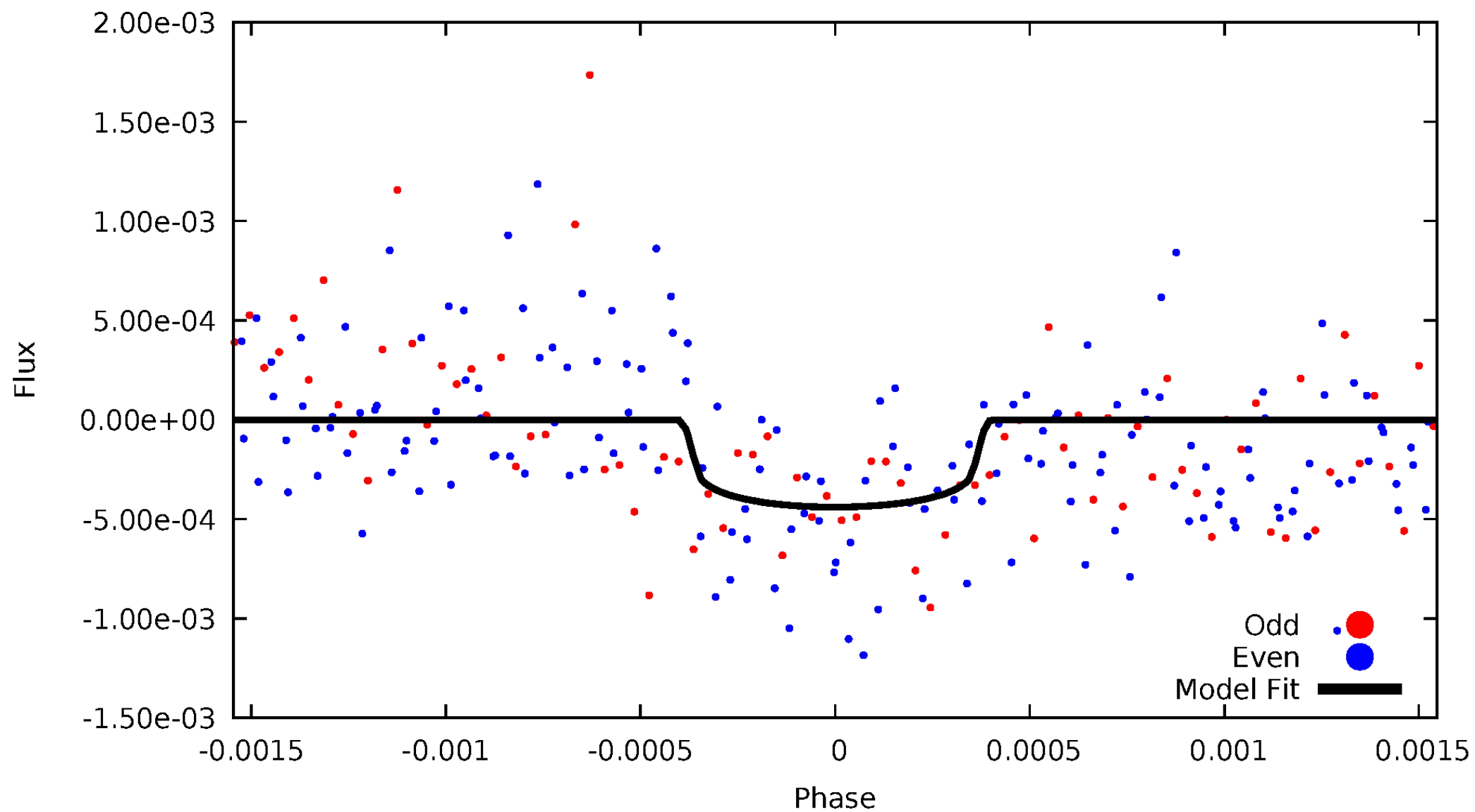


TCE 009401405-01



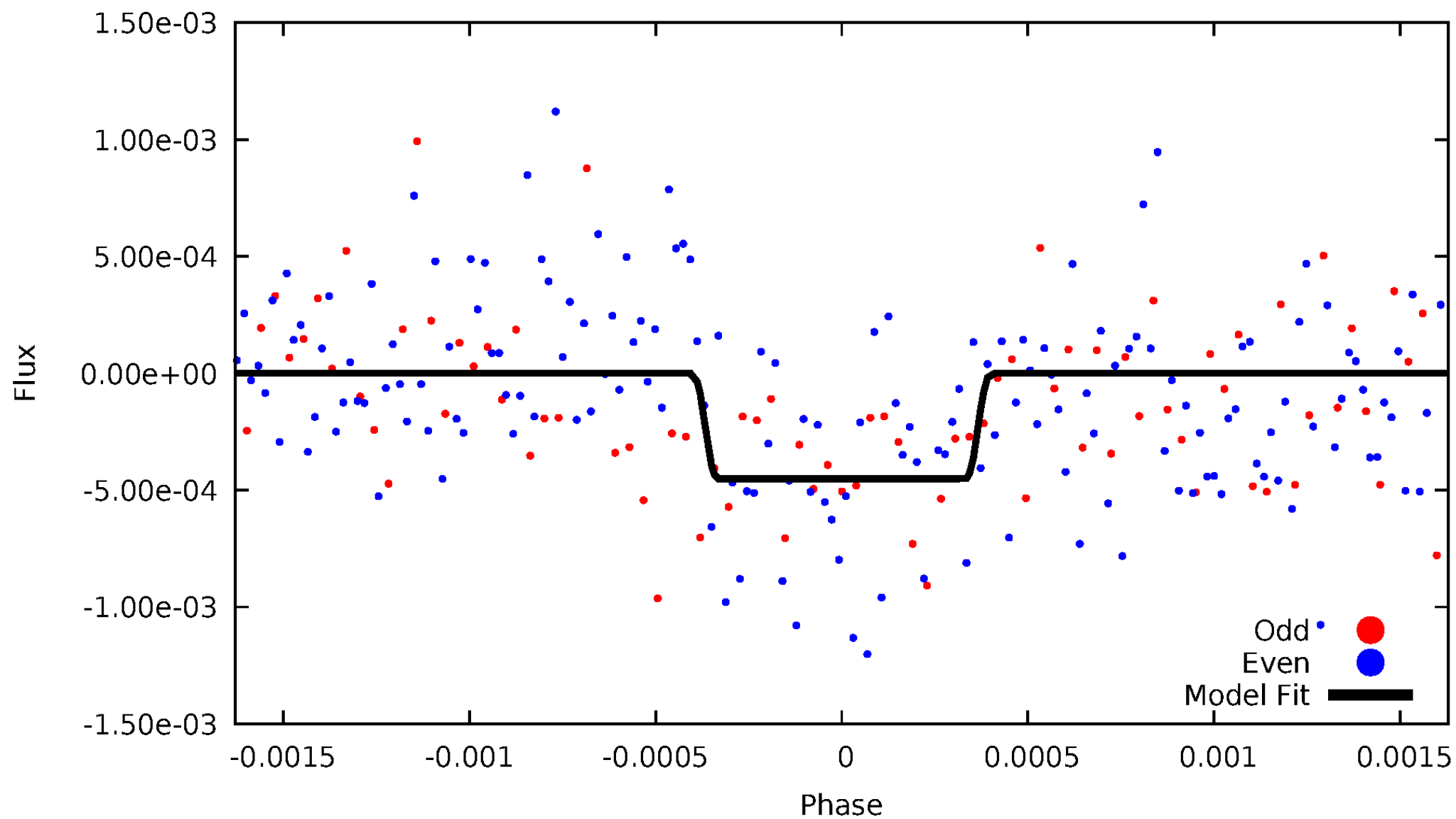
DV Odd/Even

TCE 009401405-01

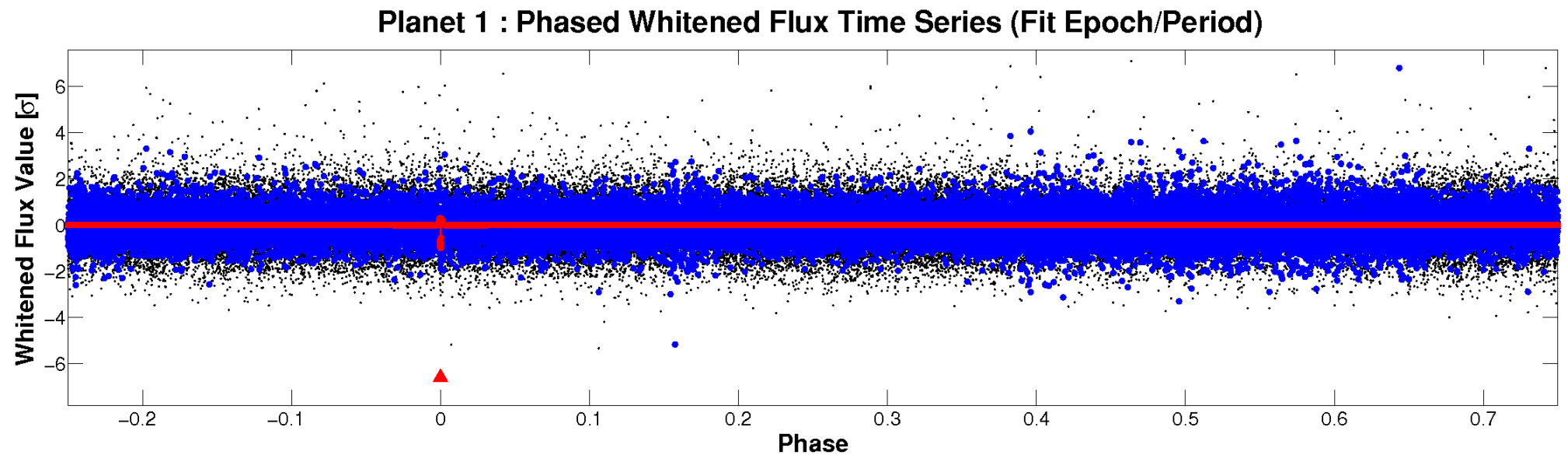
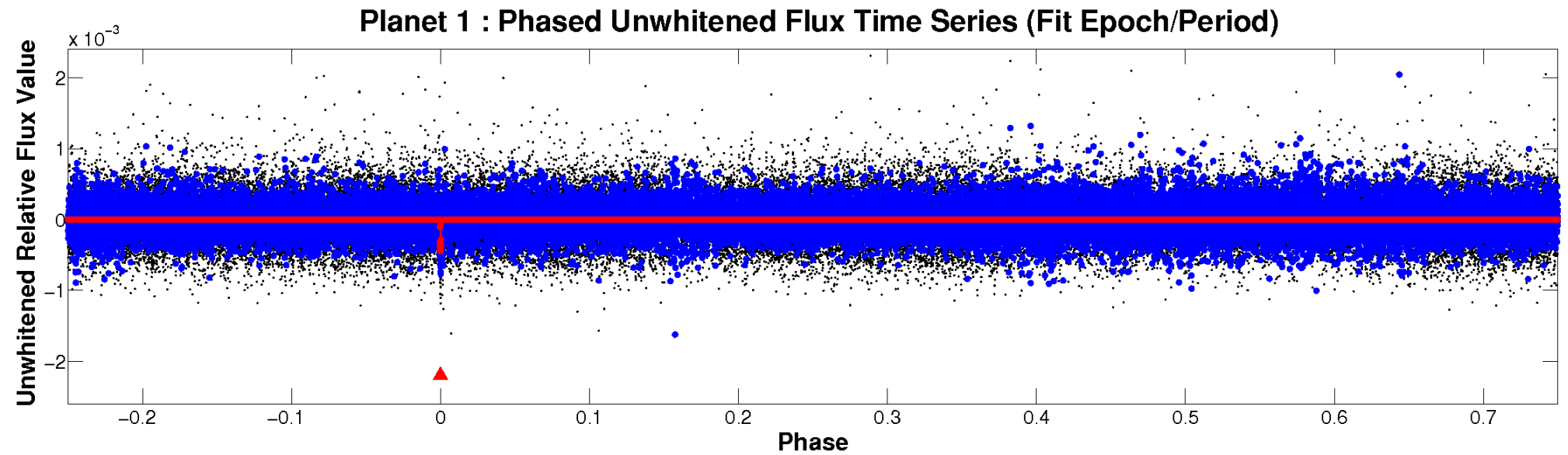


ALT Odd/Even

TCE 009401405-01

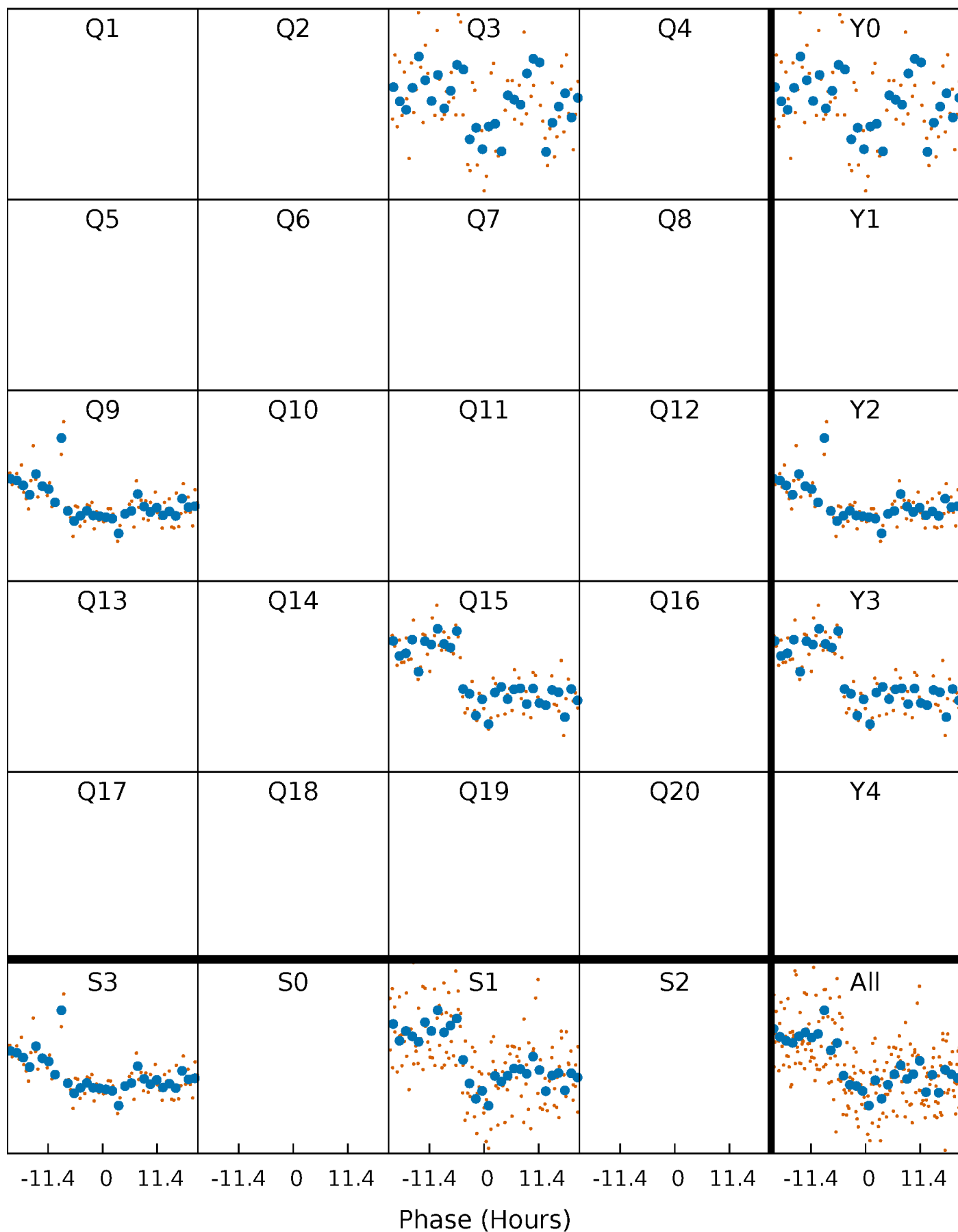


Non-Whitened Vs. Whitened Light Curve



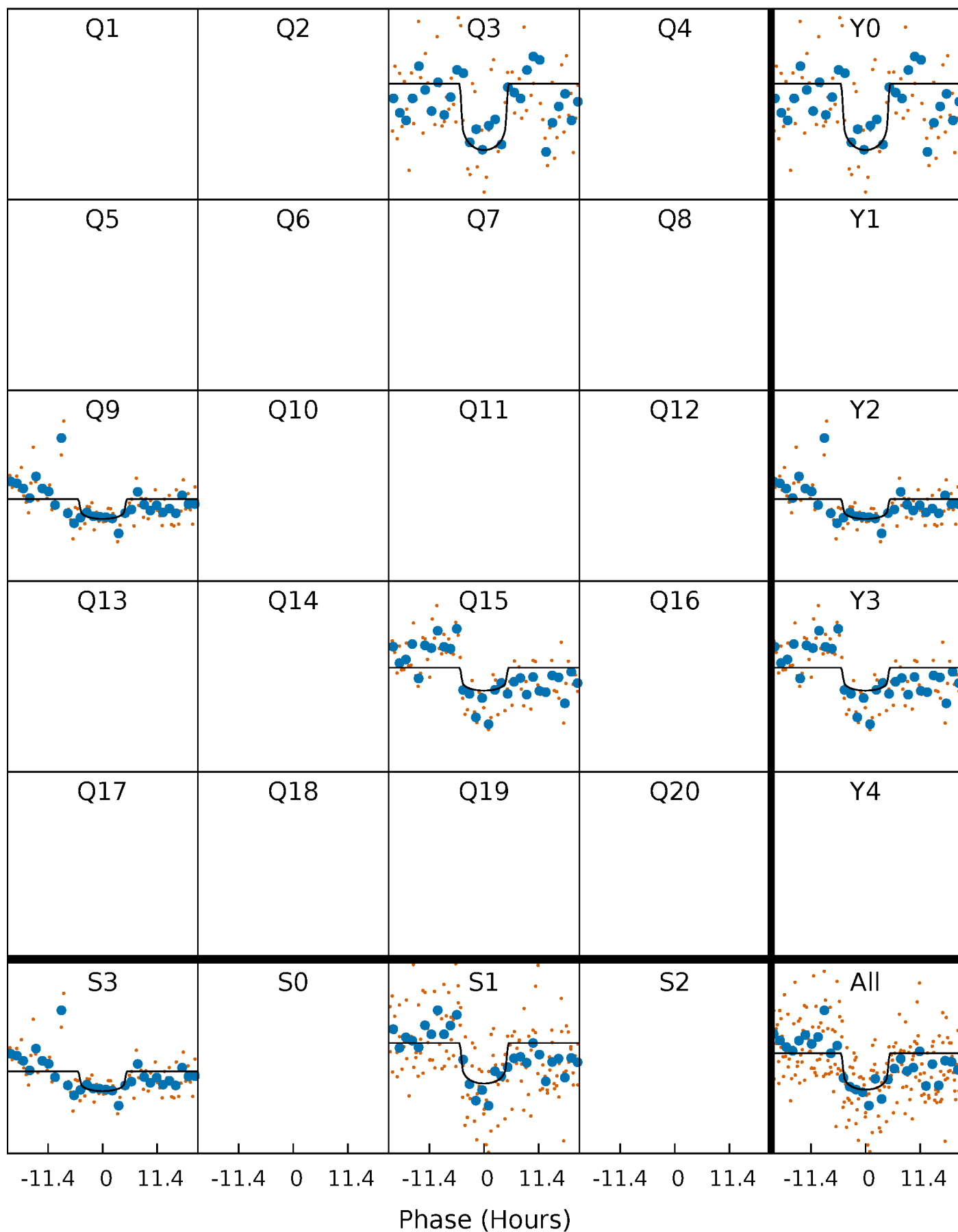
PDC Quarter-Phased Transit Curves

TCE 009401405-01 P=537.109494 Days $T_0=314.187012$ (BKJD)



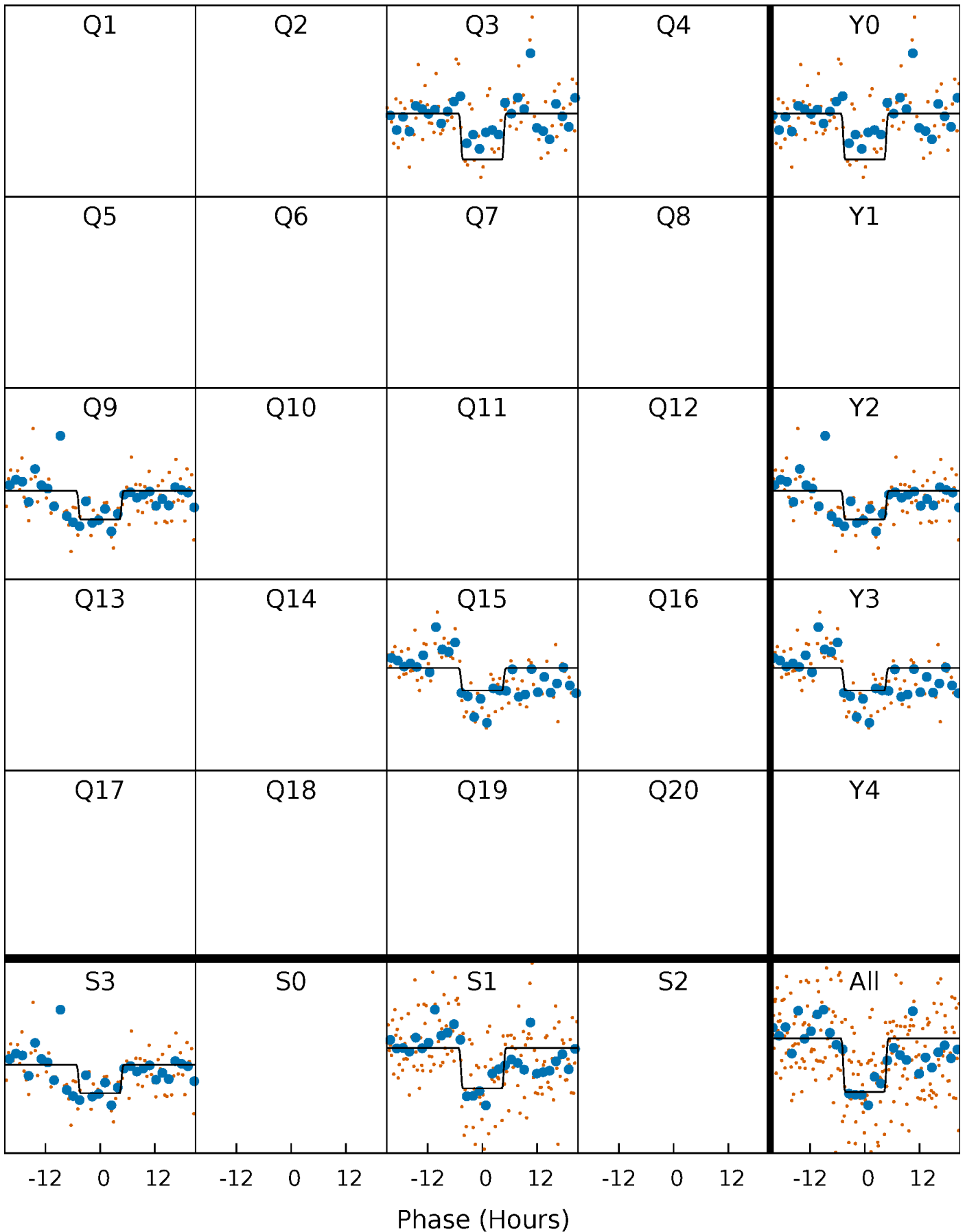
DV Quarter-Phased Transit Curves

TCE 009401405-01 $P=537.109494$ Days $T_0=314.187012$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

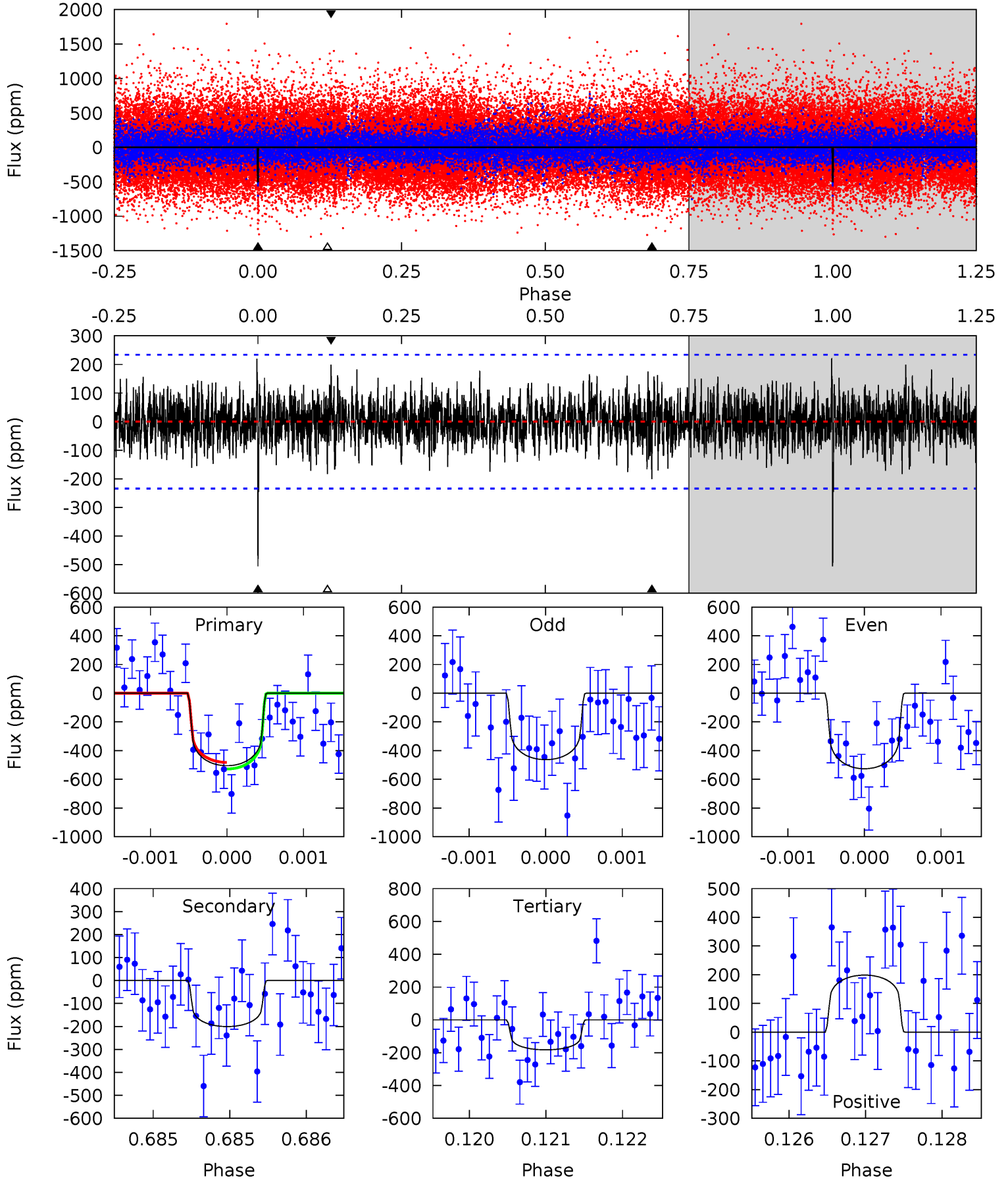
TCE 009401405-01 P=537.102936 Days $T_0=314.202192$ (BKJD)



DV Model-Shift Uniqueness Test

009401405-01, $P = 537.109494$ Days, $E = 314.187012$ Days

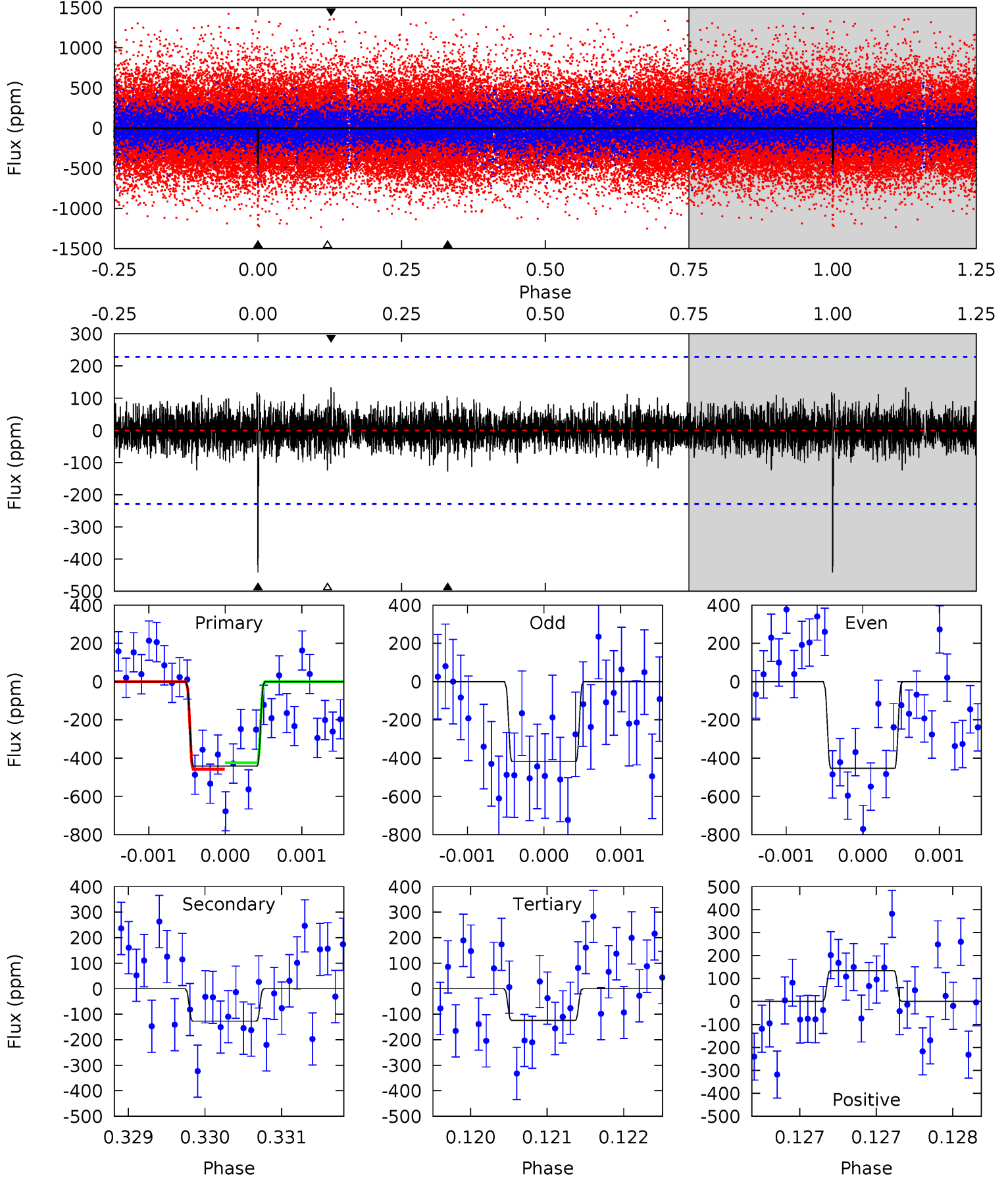
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 11.9 | 4.72 | 4.30 | 4.67 | 5.50 | 3.36 | 1.30 | 7.58 | 7.21 | 0.42 | 0.04 | 0.70 | 1.08 | 0.30 | 0.54 |



Alt Model-Shift Uniqueness Test

009401405-01, P = 537.102936 Days, E = 314.202192 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 | 3.06 | 2.99 | 3.22 | 5.49 | 3.36 | 0.81 | 7.64 | 7.41 | 0.07 | -0.16 | 0.40 | 1.05 | 0.23 | 0.40 |



Stellar Parameters For KIC 009401405

| | $T_{\text{eff}}(K)$ | $\log(g)$ | $[\text{Fe}/\text{H}]$ | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 6250^{+196}_{-239} | $4.417^{+0.070}_{-0.210}$ | $0.020^{+0.250}_{-0.300}$ | $1.099^{+0.370}_{-0.123}$ | $1.151^{+0.152}_{-0.169}$ | $1.222^{+0.358}_{-0.655}$ |
| | +3%/-4% | +2%/-5% | +1250%/-1500% | +34%/-11% | +13%/-15% | +29%/-54% |
| 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 009401405-01 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|---------------|------------------------|----------------------|-----------------------|---------------------------|
| DV | -201 ± 43 | $2.75^{+1.71}_{-1.53}$ | 353^{+25}_{-20} | 5002^{+2475}_{-865} | 24466^{+98280}_{-15029} |
| Alt. | -127 ± 42 | $2.77^{+1.83}_{-1.45}$ | 352^{+26}_{-19} | 4553^{+1784}_{-745} | 15927^{+55080}_{-10363} |

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

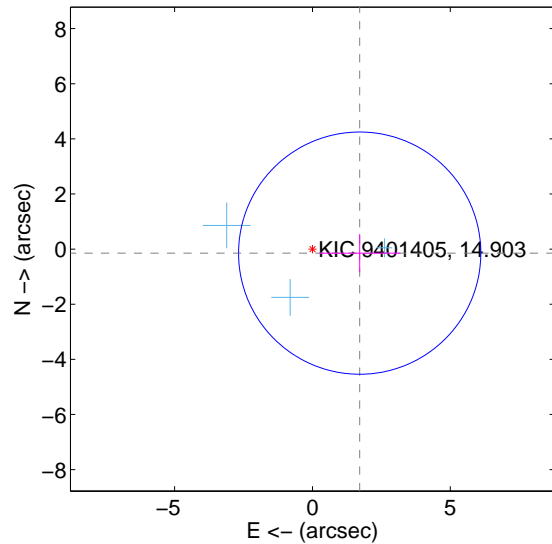
Supplemental centroid analysis for 009401405-01. Kepler magnitude: 14.90. Transit SNR 6.95

There are 3 quarters with good PRF difference image offsets

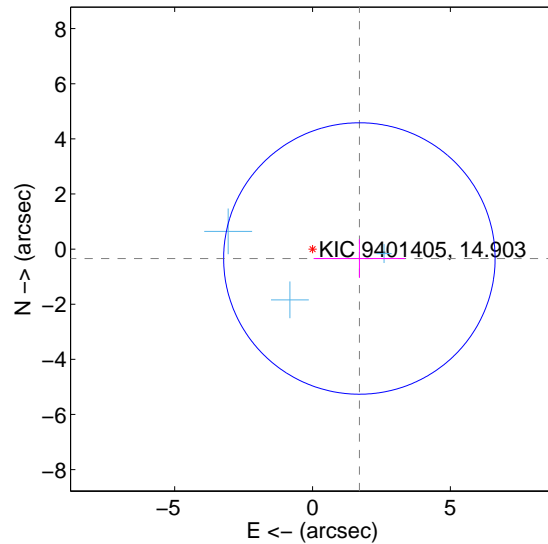
The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 1.721 ± 1.465 | 1.17 | -1.715 ± 1.469 | -0.146 ± 0.691 |
| PRF-fit source offset from KIC position | 1.734 ± 1.642 | 1.06 | -1.700 ± 1.659 | -0.341 ± 0.702 |
| photometric centroid source offset | 2.18 ± 1.71 | 1.28 | 0.03 ± 2.06 | -2.18 ± 1.71 |

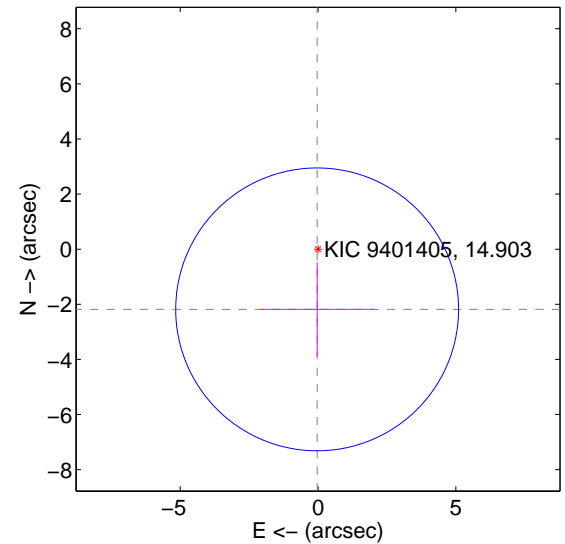
offset from difference PRF-fit to OOT PRF-fit



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.

Q1 no difference image



Q1 no OOT image



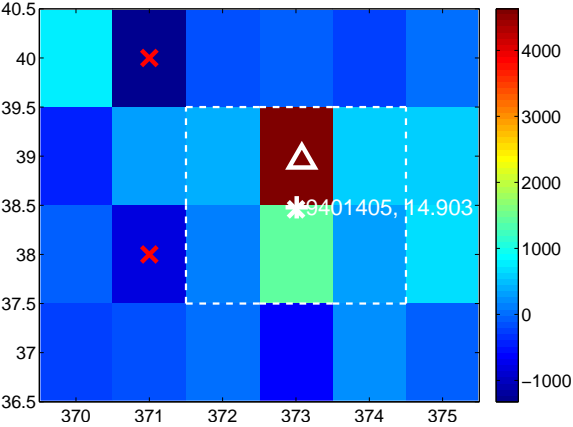
Q2 no difference image



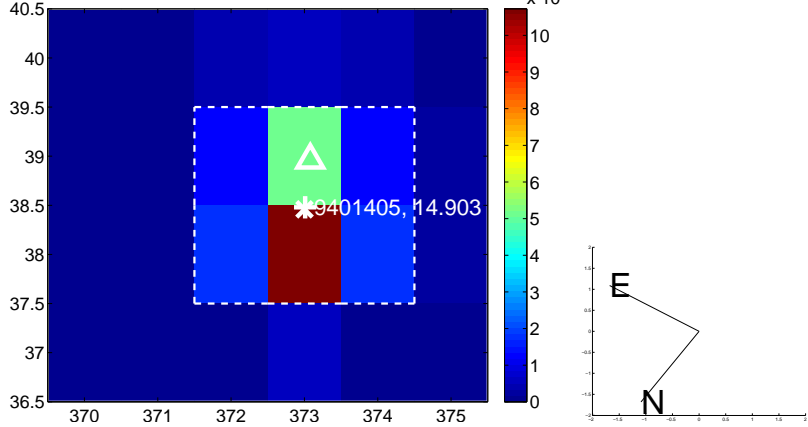
Q2 no OOT image



Q3 difference image



Q3 OOT image



Q4 no difference image



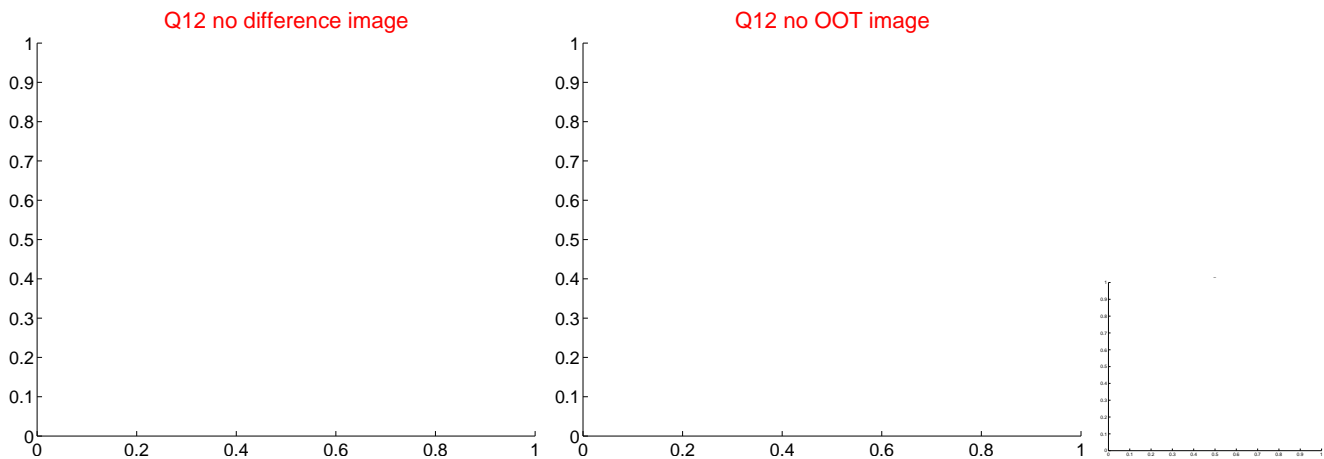
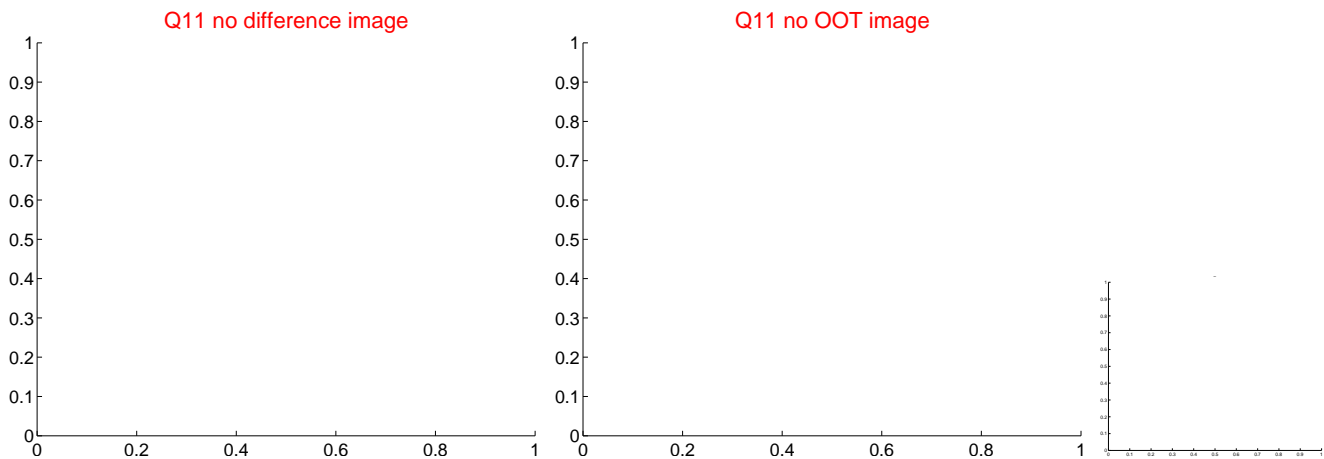
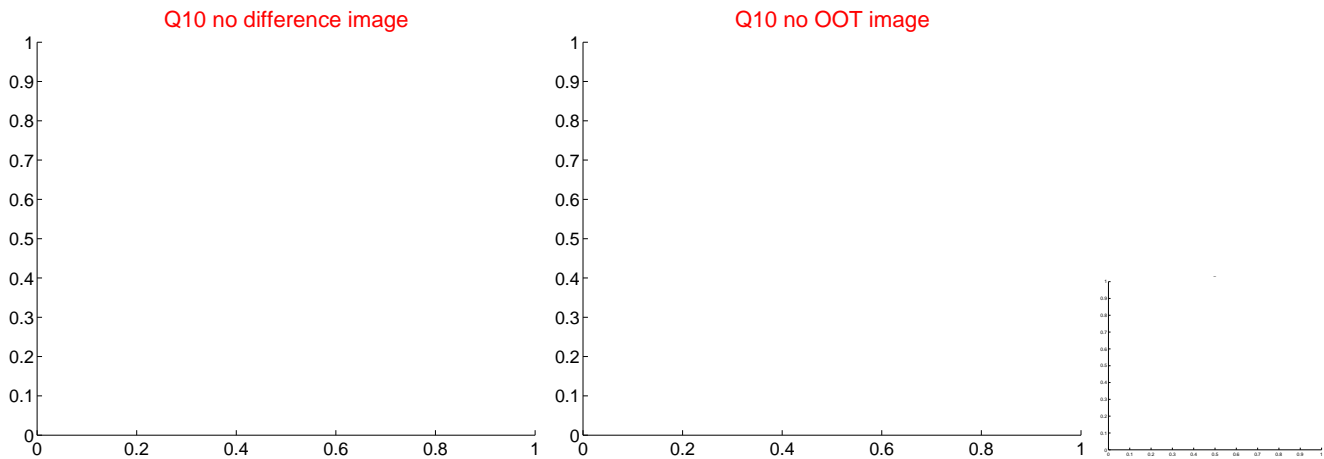
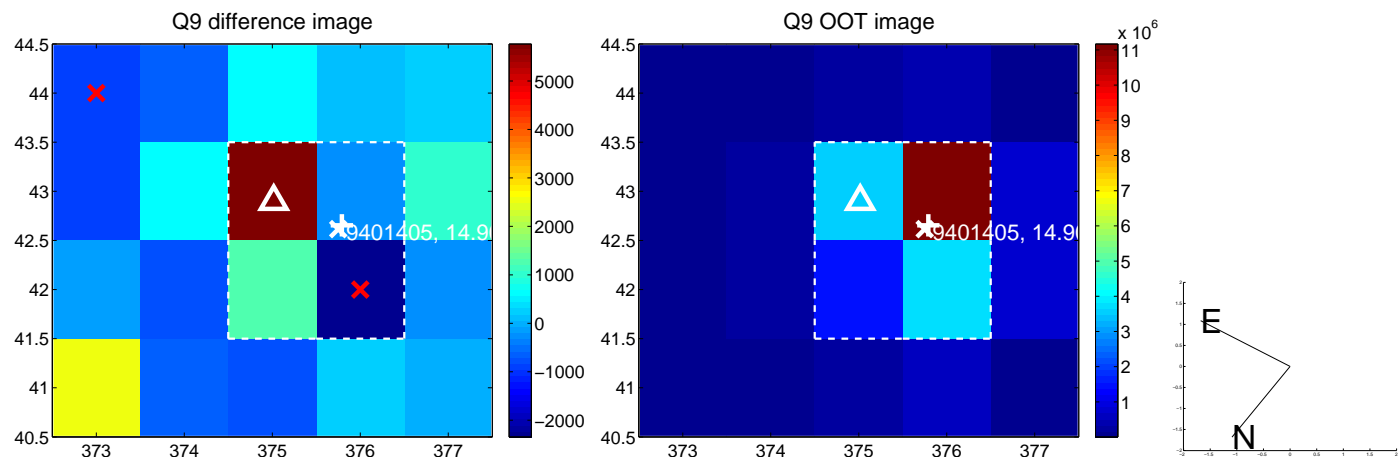
Q4 no OOT image



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.



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

Q13 no difference image



Q13 no OOT image



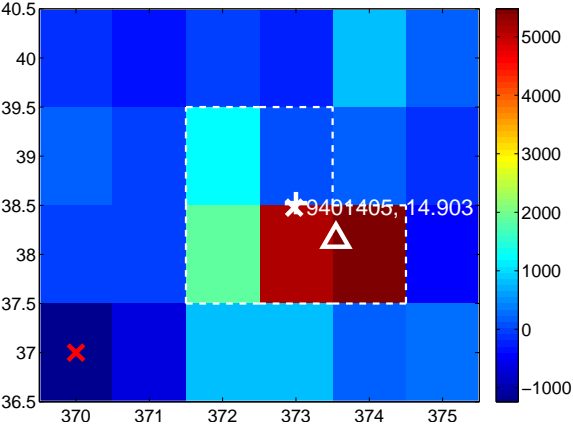
Q14 no difference image



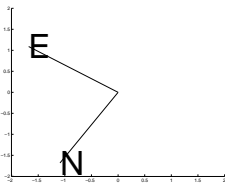
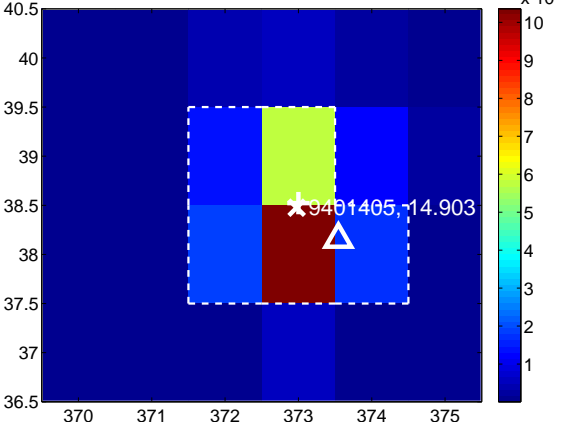
Q14 no OOT image



Q15 difference image



Q15 OOT image



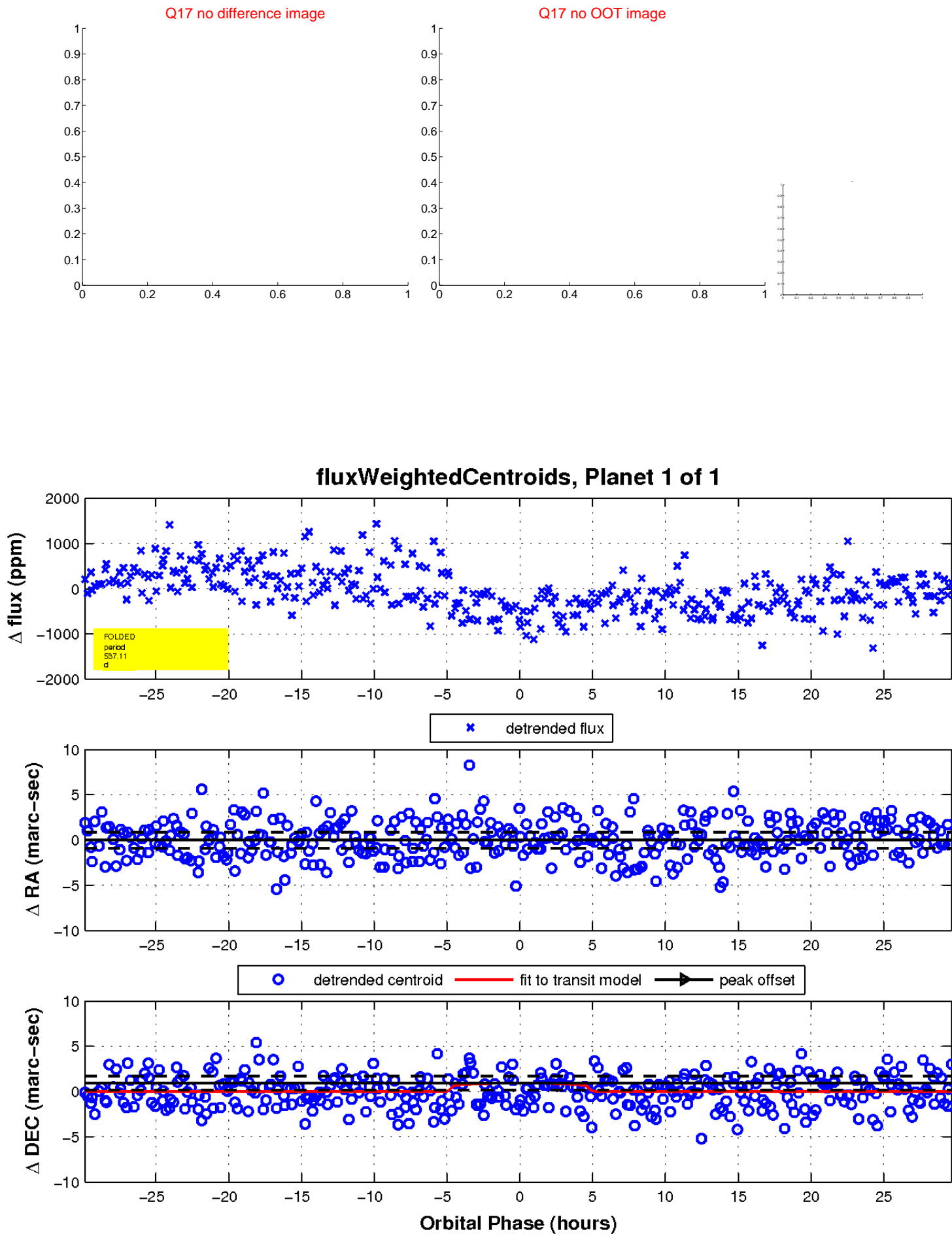
Q16 no difference image



Q16 no OOT image



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



UKIRT Image

Declination

