

KIC 009958387

Q1-17 DR25 TCE Parameters

| TCE | Run Type | KOI? | Period (Days) | Epoch (BKJD) | Depth (ppm) | Duration (Hours) | MES | SNR | R _★ (R _☉) | T _★ (K) | R _p (R _⊕) | S _p (S _⊕) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|----------------------------------|--------------------|----------------------------------|----------------------------------|
| 009958387-01 | OBS | 2677.01 | 237.787452 | 196.970073 | 1620.3 | 10.531 | 85.0 | 81.2 | 1.85 | 5185 | 9.85 | 3.74 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|------------|
| 009958387-01 | OBS | PC | 1.00 | 0 | 0 | 0 | 0 | NO_COMMENT |

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

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

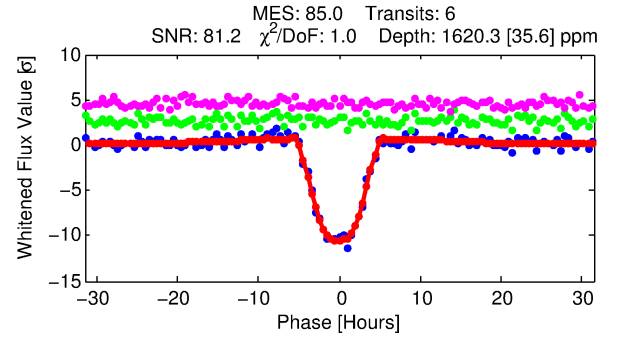
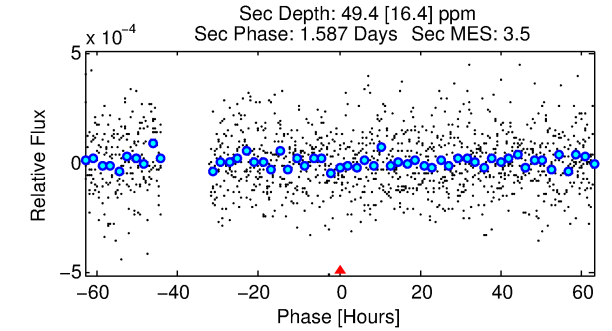
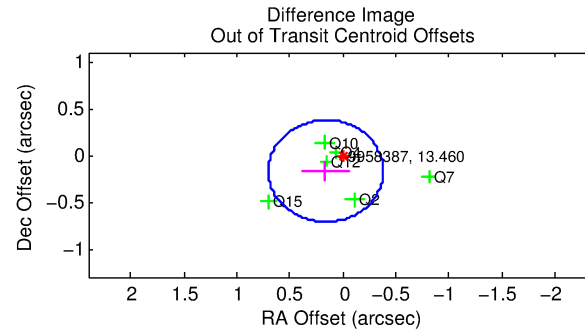
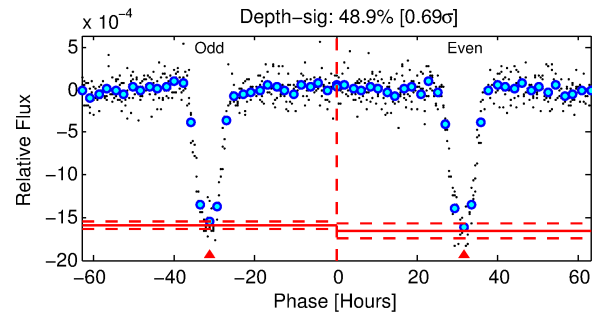
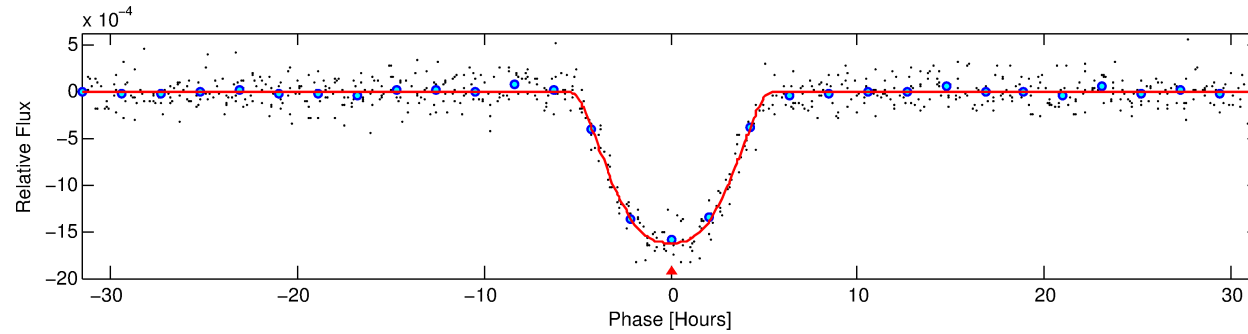
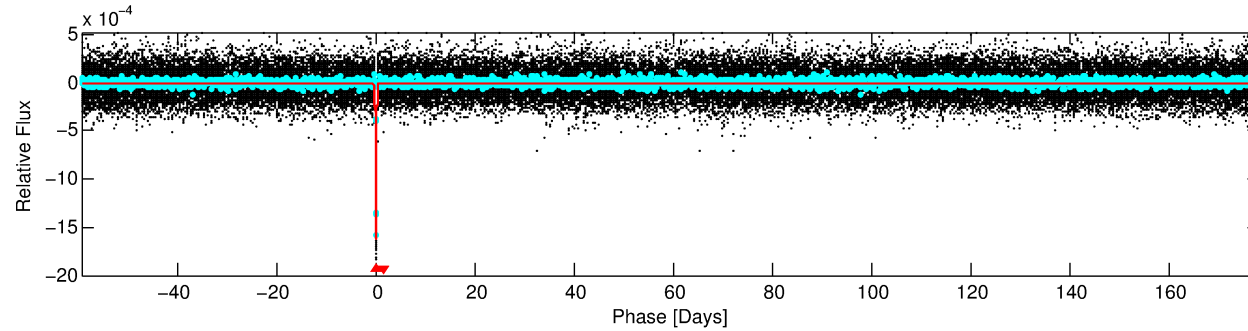
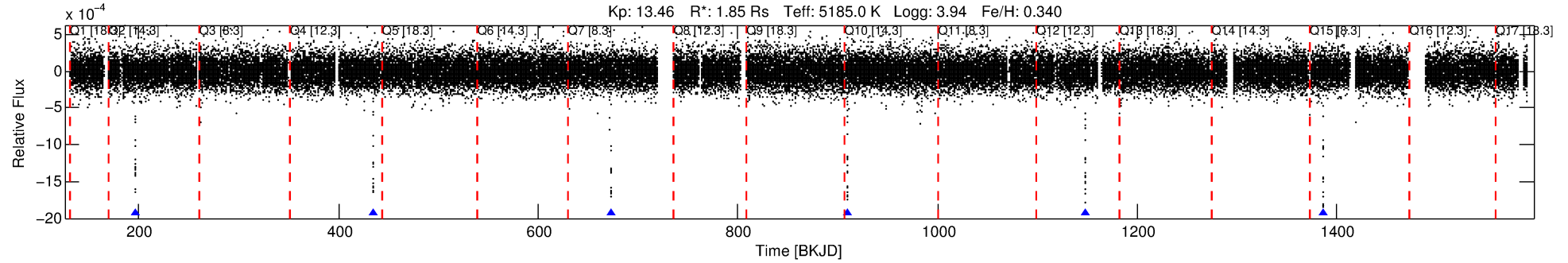
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009958387-01

No Significant Match Found

DV One-Page Summary

KIC: 9958387 Candidate: 1 of 1 Period: 237.787 d
KOI: K02677.01 Corr: 0.994



DV Fit Results:

Period = 237.78745 [0.00100] d
Epoch = 196.9701 [0.0031] BKJD
Rp/R* = 0.0487 [0.0009]
a/R* = 76.97 [2.08]
b = 0.95 [0.00]
Seff = 3.74 [2.63]
Teq = 355 [62] K
Rp = 9.85 [4.26] Re
a = 0.7710 [0.3316] AU
Ag = 166.46 [129.26] [1.28 σ]
Teffp = 1969 [169] K [8.98 σ]

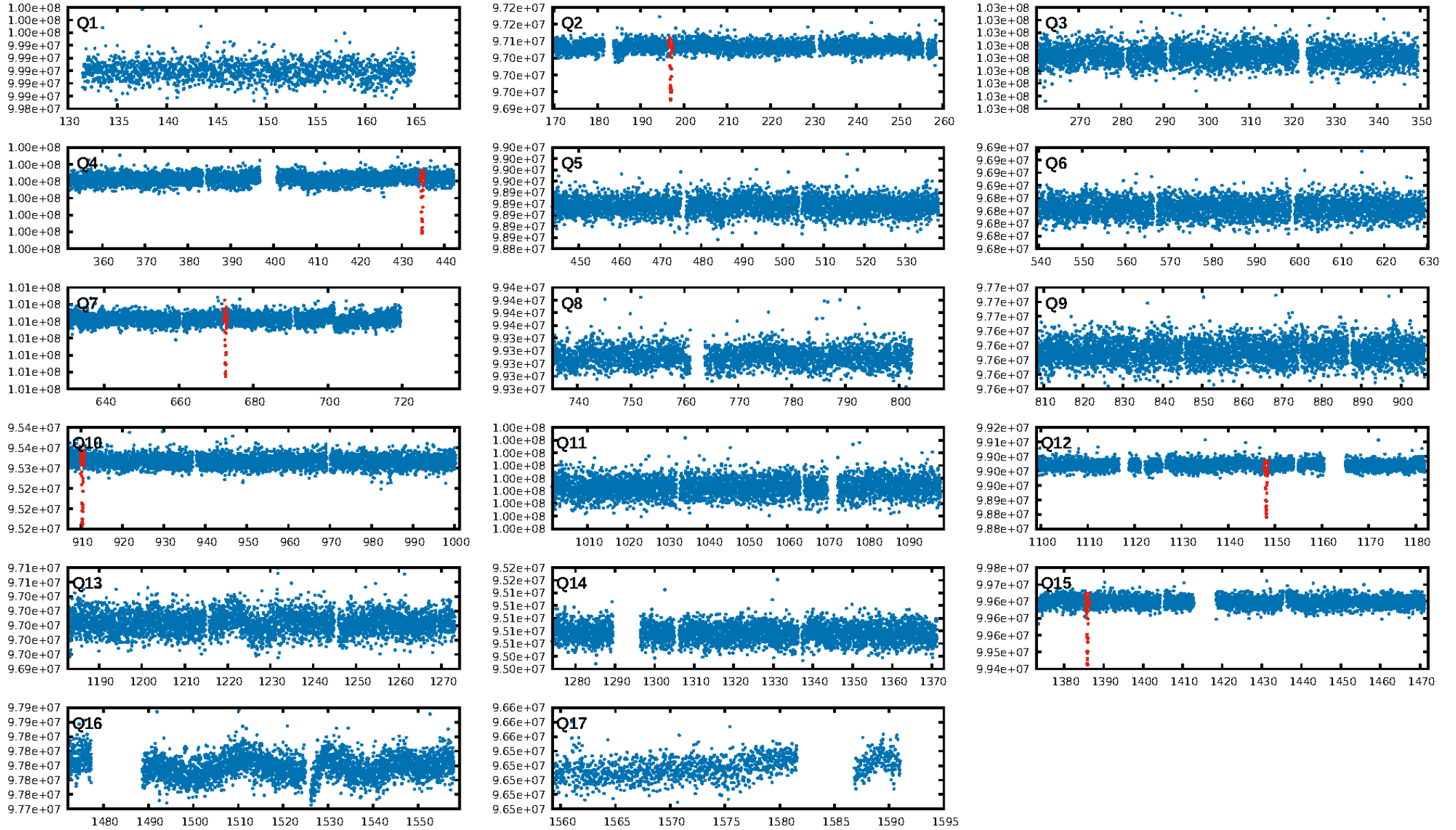
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: N/A
ModelChiSquare2-sig: 85.0%
ModelChiSquareGof-sig: 99.9%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [6/6]
GhostDiagnostic-chr: 5.174
Centroid-sig: 40.8%
Centroid-so: 0.102 arcsec [0.73 σ]
OotOffset-rm: 0.231 arcsec [1.28 σ]
KicOffset-rm: 0.380 arcsec [2.65 σ]
OotOffset-st: 2/2/2/0 [6]
KicOffset-st: 2/2/2/0 [6]
DiffImageQuality-fgm: 1.00 [6/6]
DiffImageOverlap-fno: 1.00 [6/6]

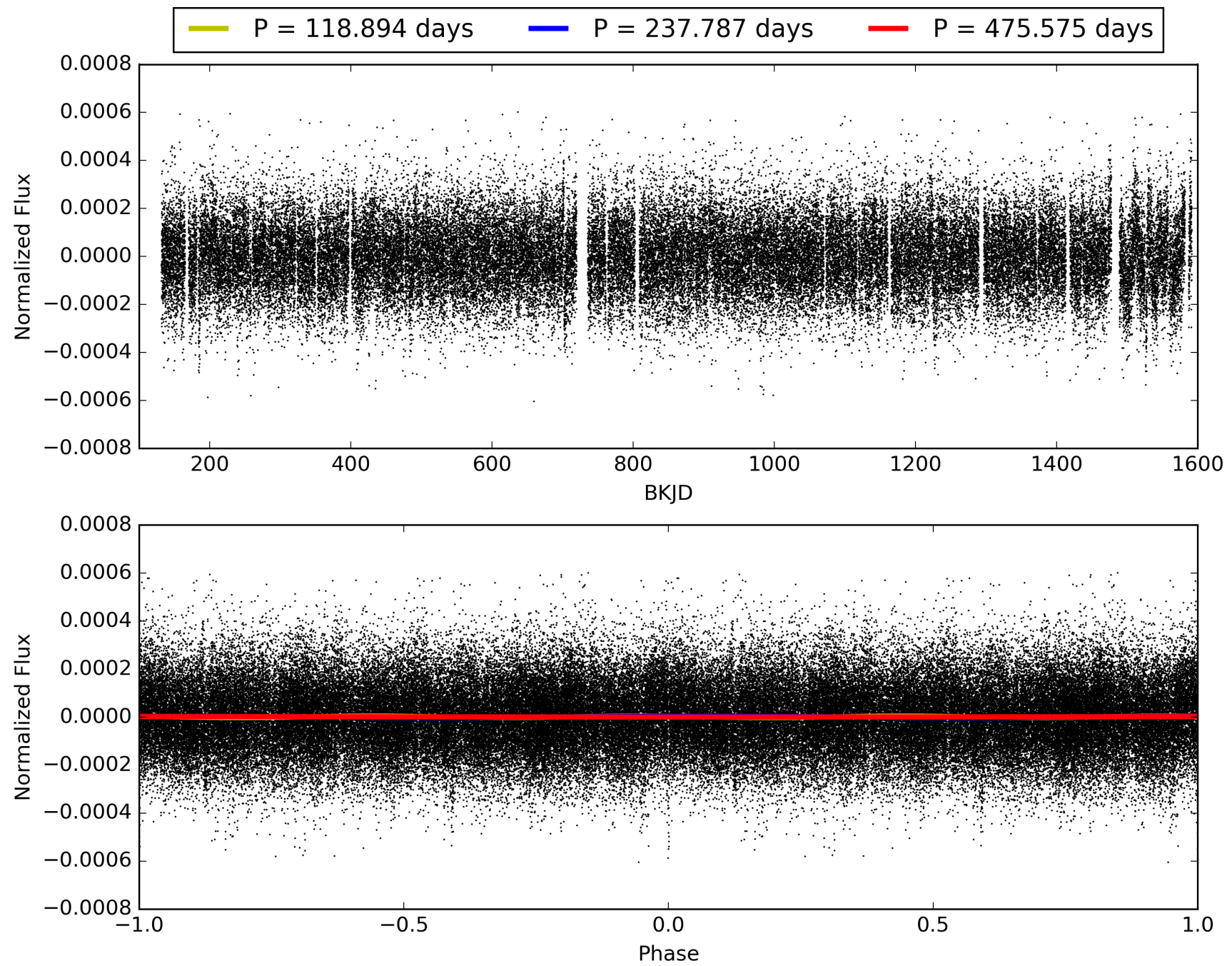
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 15:34:52 Z

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

TCE 009958387-01, PDC Light Curves

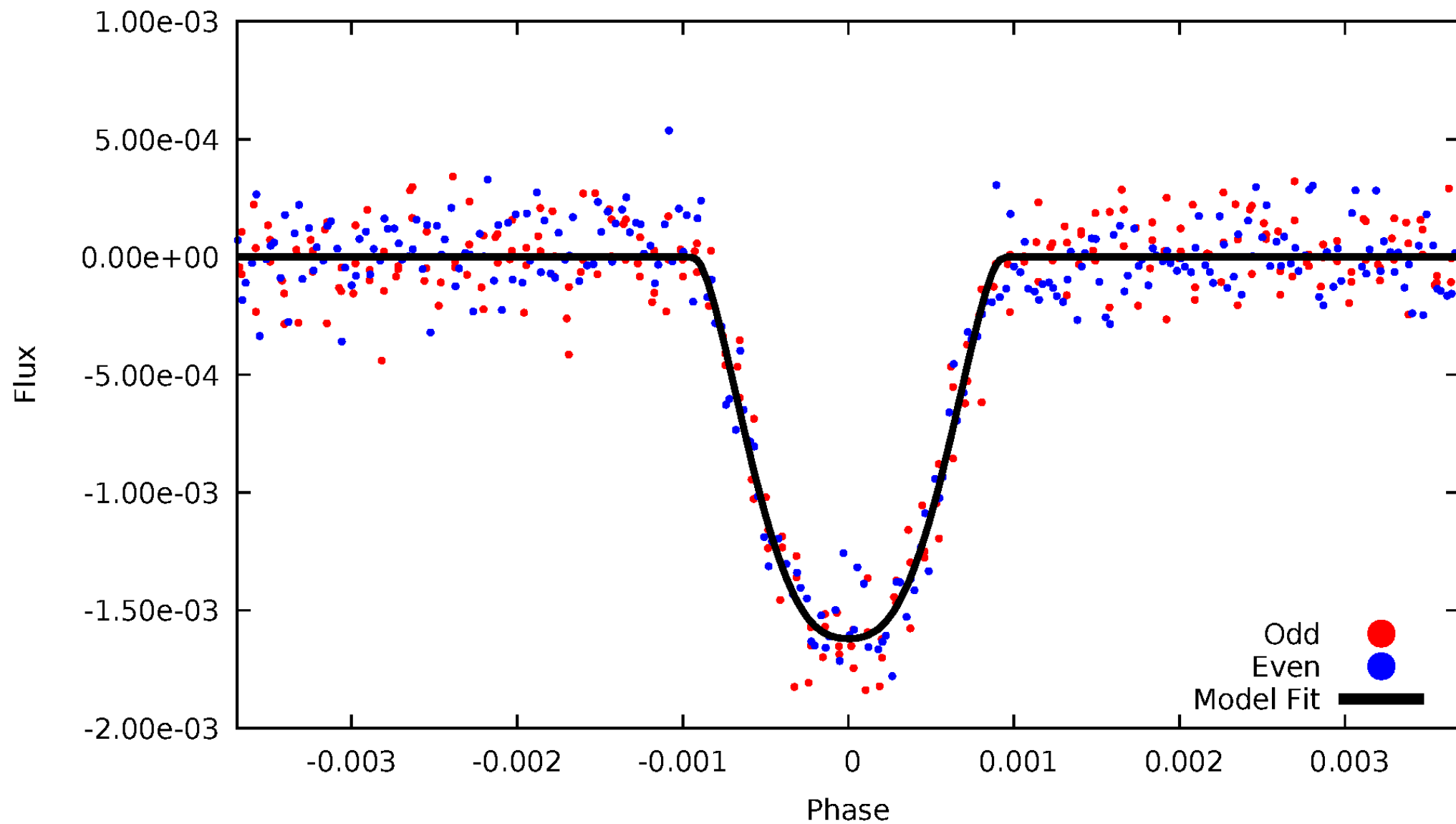


TCE 009958387-01



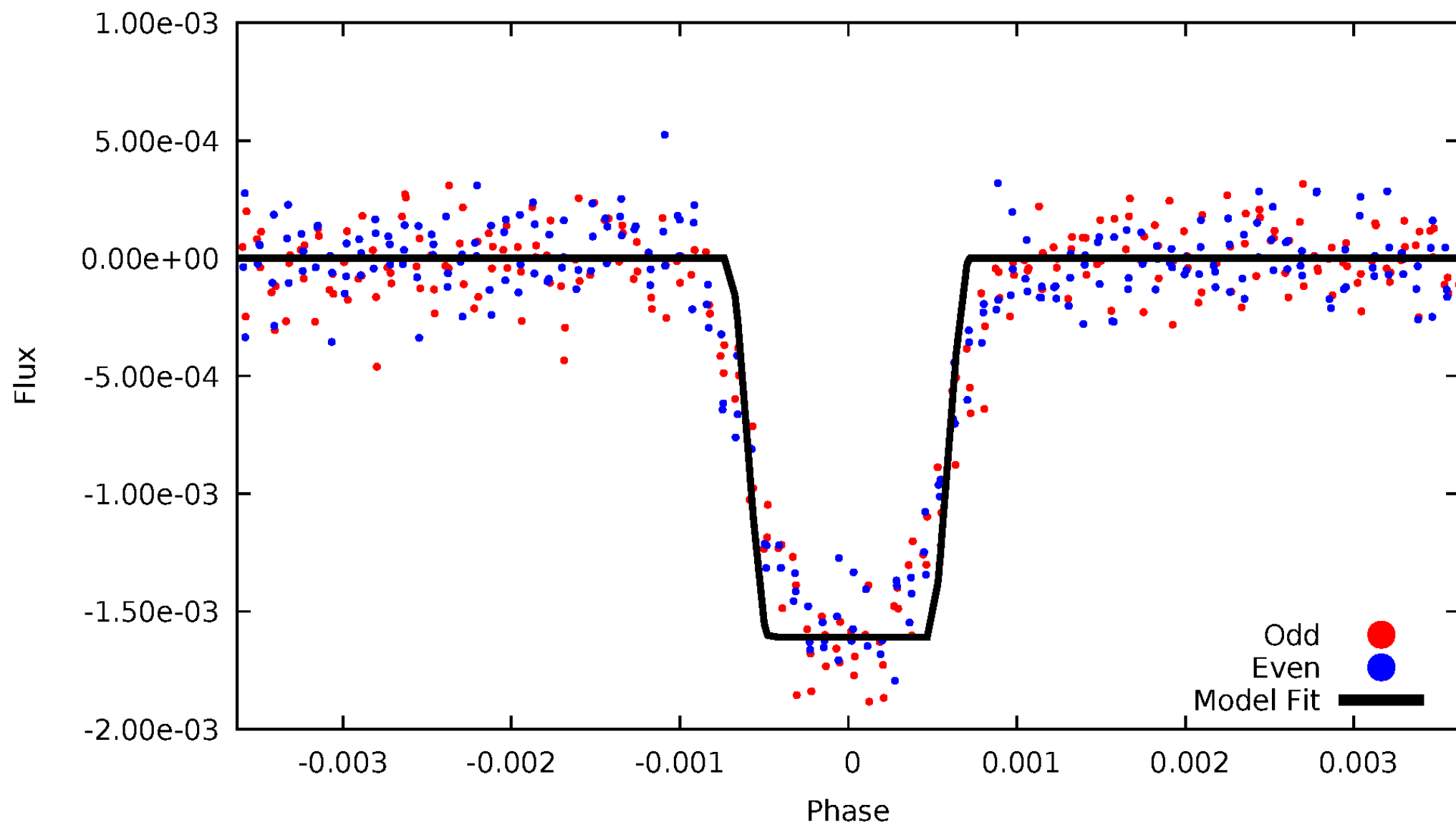
DV Odd/Even

TCE 009958387-01



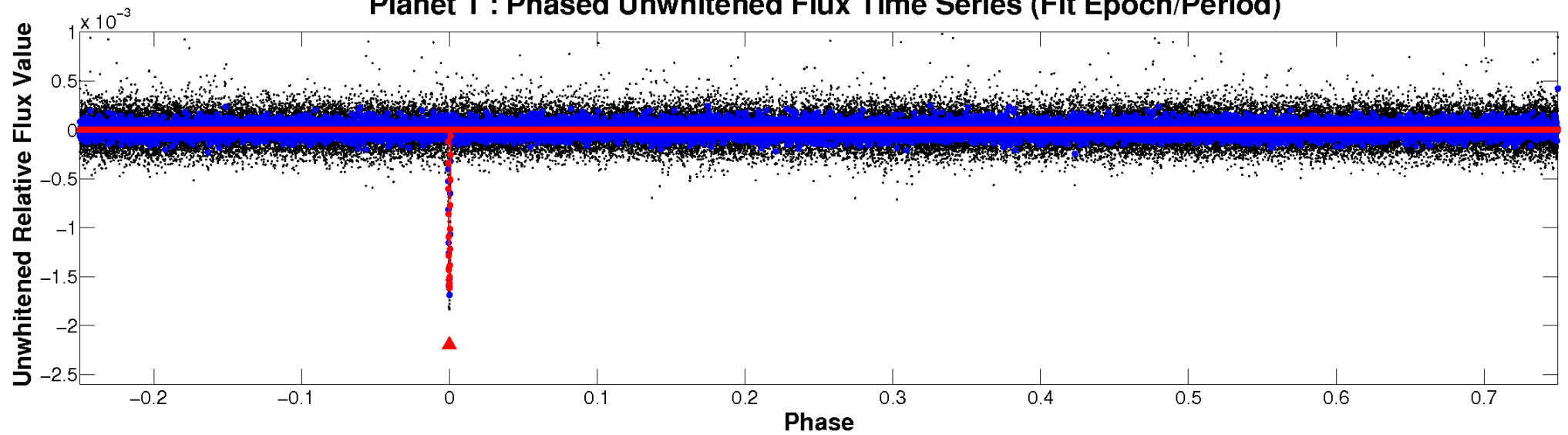
ALT Odd/Even

TCE 009958387-01

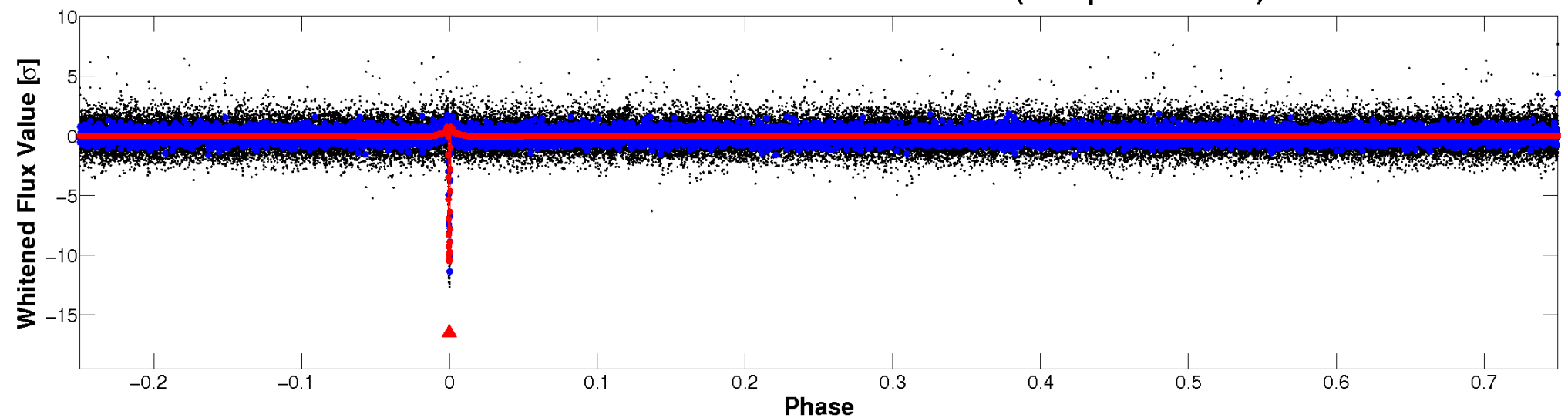


Non-Whitened Vs. Whitened Light Curve

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

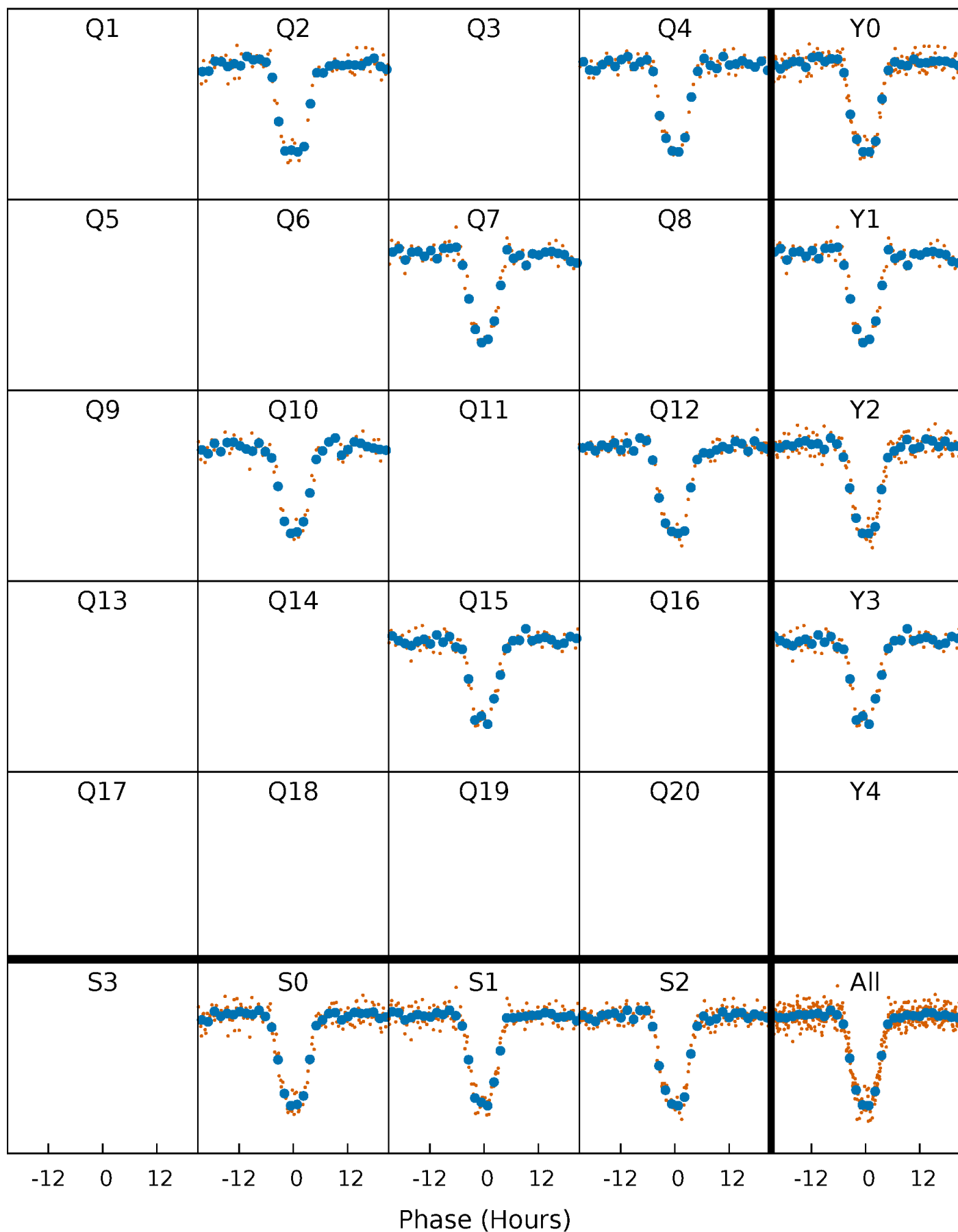


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



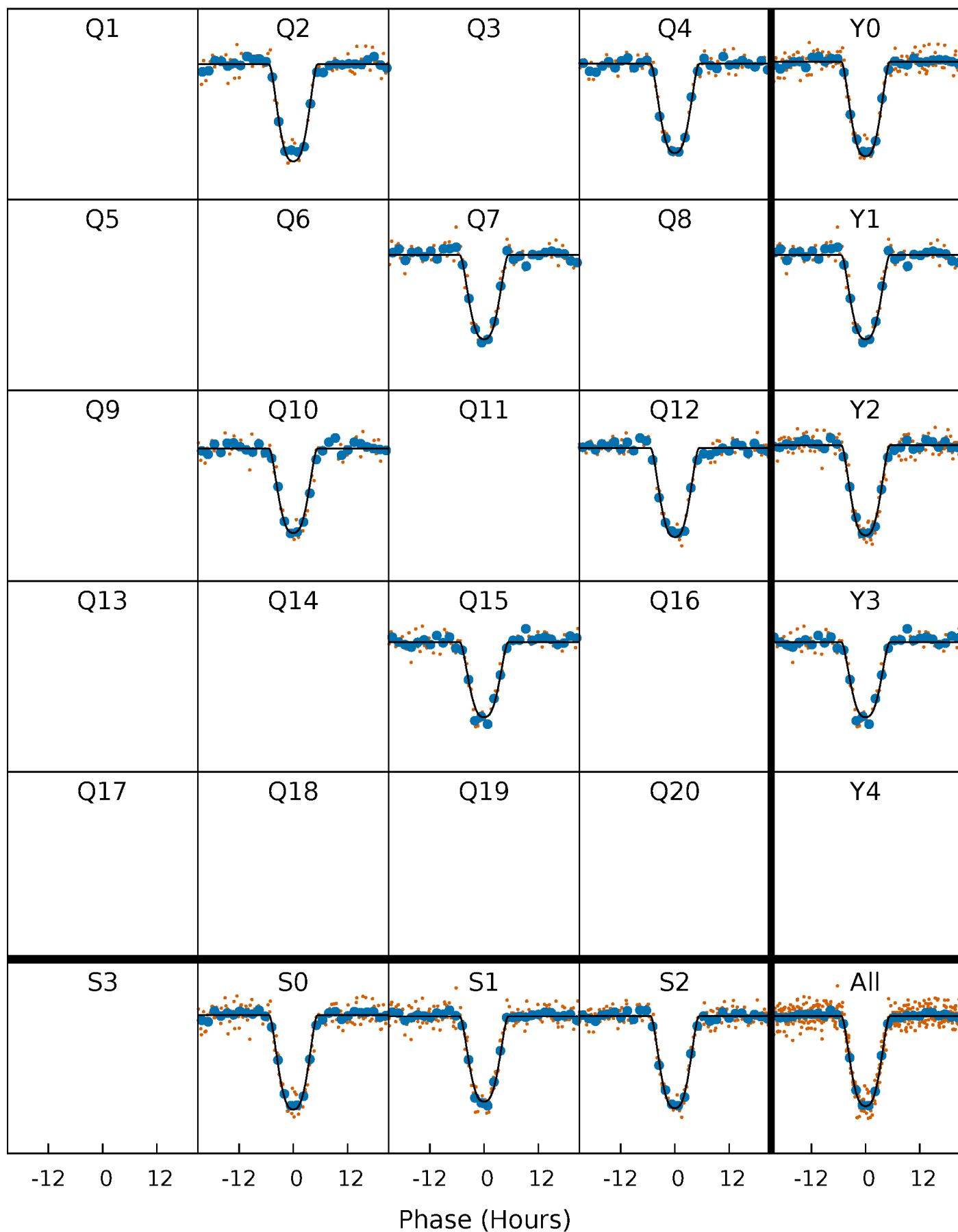
PDC Quarter-Phased Transit Curves

TCE 009958387-01 P=237.787452 Days $T_0=196.970073$ (BKJD)



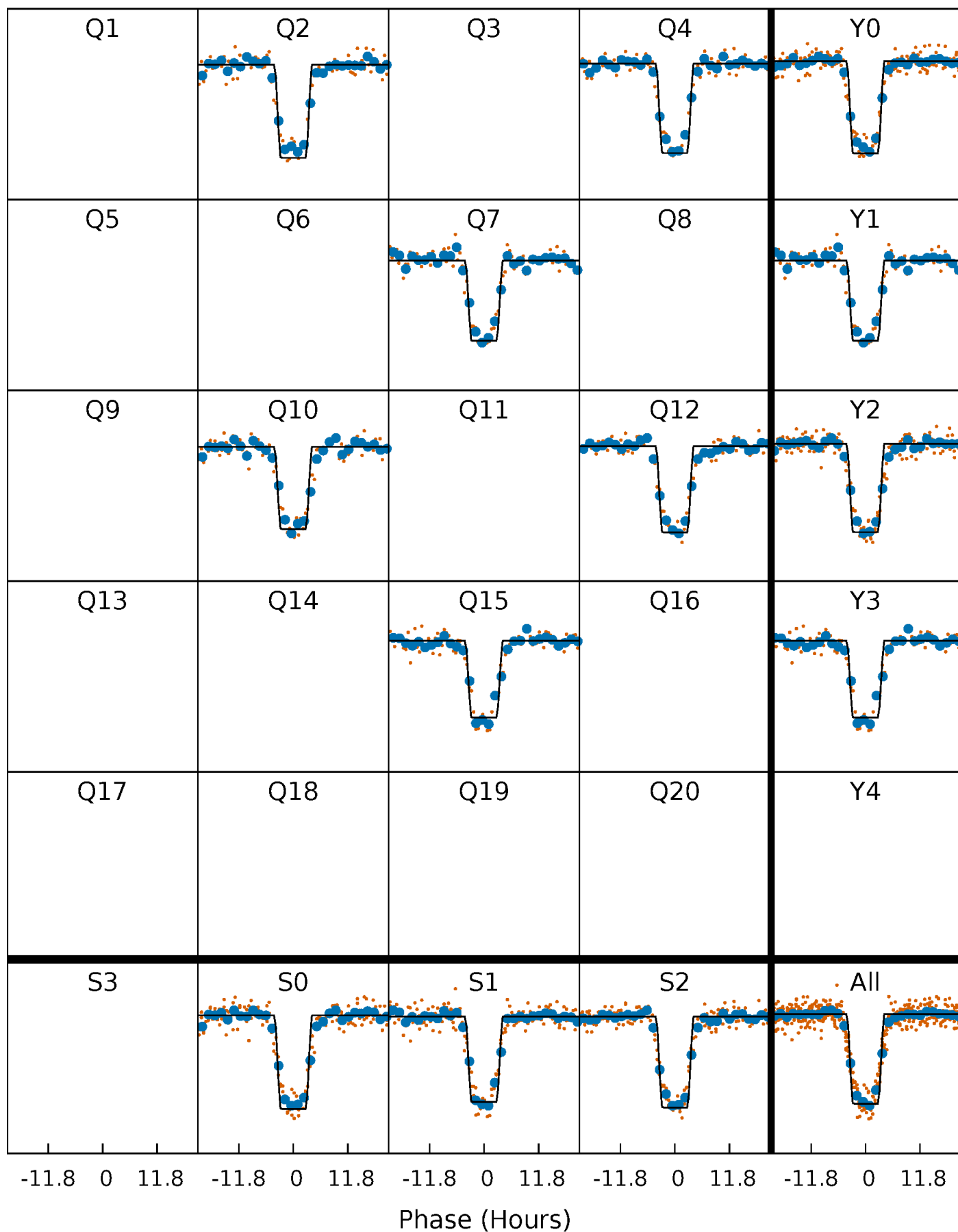
DV Quarter-Phased Transit Curves

TCE 009958387-01 $P=237.787452$ Days $T_0=196.970073$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

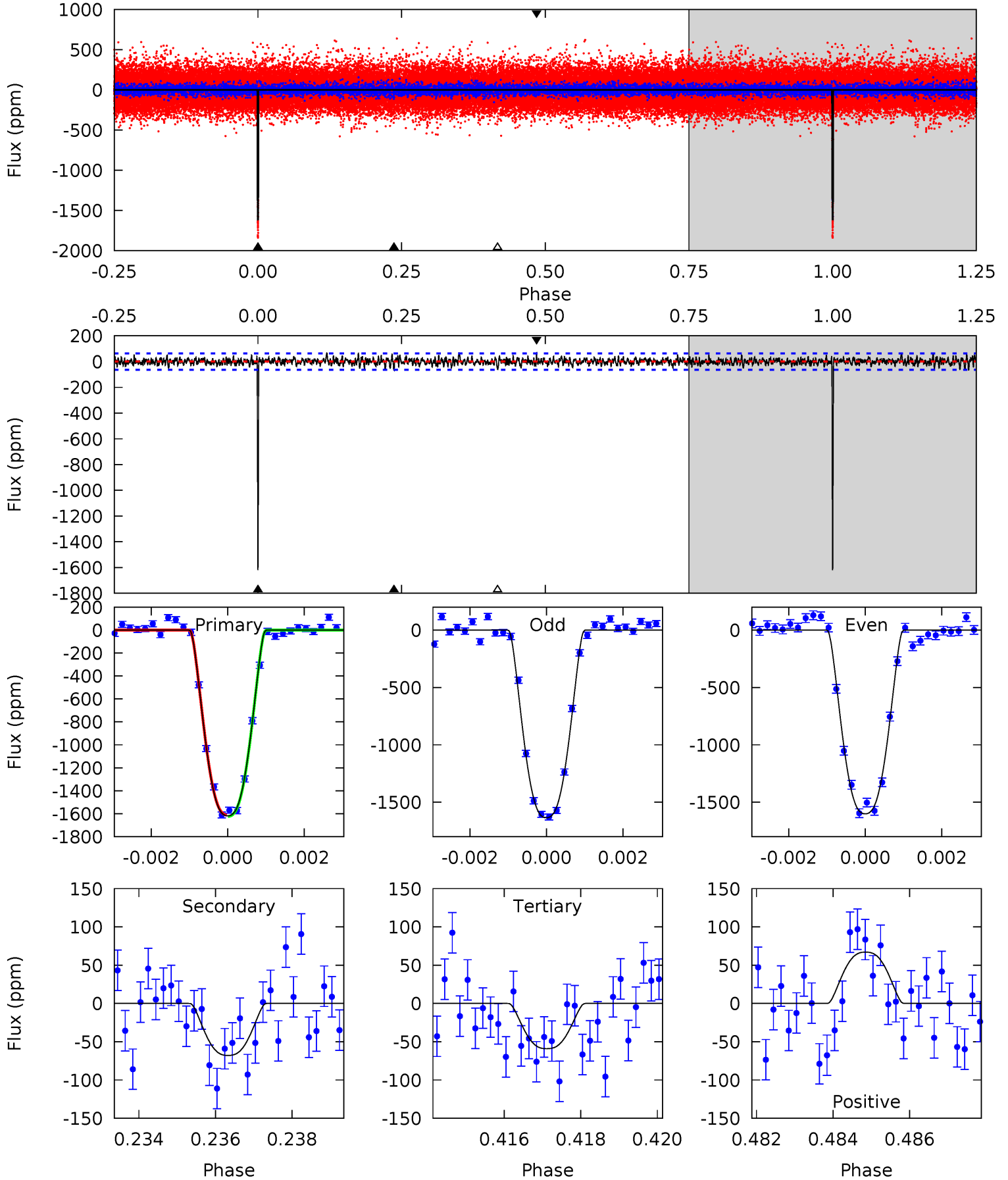
TCE 009958387-01 P=237.785338 Days $T_0=196.975904$ (BKJD)



DV Model-Shift Uniqueness Test

009958387-01, P = 237.787452 Days, E = 196.970073 Days

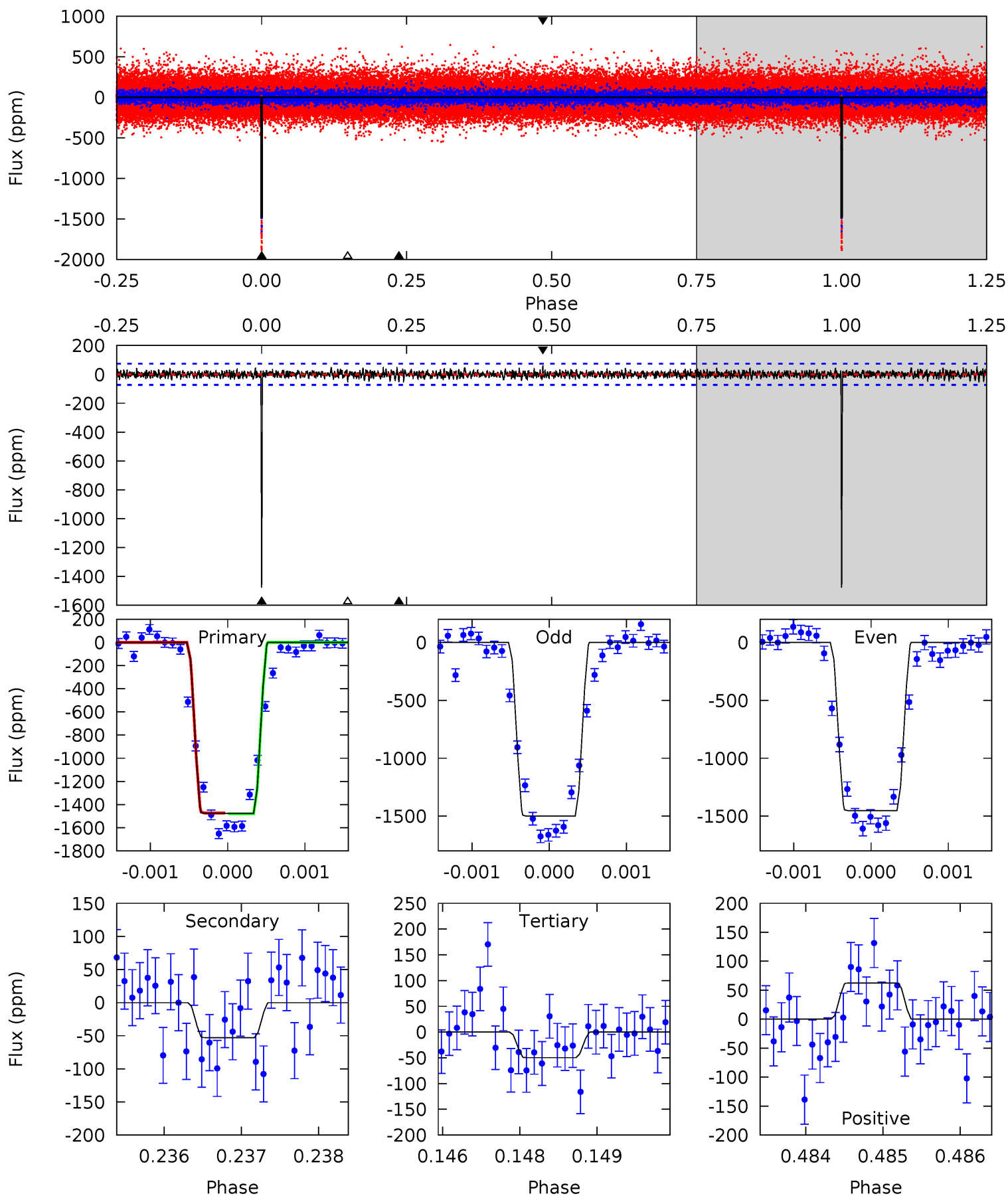
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|-------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 135.3 | 5.68 | 4.94 | 5.61 | 5.34 | 3.11 | 1.52 | 130.3 | 129.7 | 0.74 | 0.07 | 1.43 | 1.00 | 0.04 | 0.47 |



Alt Model-Shift Uniqueness Test

009958387-01, P = 237.785338 Days, E = 196.975904 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|-------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 108.2 | 3.87 | 3.64 | 4.57 | 5.39 | 3.20 | 1.05 | 104.6 | 103.7 | 0.23 | -0.70 | 1.71 | 1.01 | 0.04 | 0.27 |



Stellar Parameters For KIC 009958387

| | $T_{\text{eff}} (K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M (M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 5185^{+93}_{-70} | $3.936^{+0.416}_{-0.104}$ | $0.340^{+0.100}_{-0.150}$ | $1.853^{+0.343}_{-0.801}$ | $1.080^{+0.149}_{-0.149}$ | $0.239^{+0.885}_{-0.076}$ |
| | +2%/-1% | +11%/-3% | +29%/-44% | +19%/-43% | +14%/-14% | +370%/-32% |
| Source | SPE90 | FLK73 | SPE90 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 009958387-01 / KOI 2677.01

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{max} (K)$ | $T_{obs} (K)$ | A_{obs} |
|---------|--------------|------------------------|-------------------|----------------------|--------------------|
| DV | -68 ± 12 | $9.67^{+1.15}_{-2.26}$ | 488^{+28}_{-56} | 2844^{+77}_{-77} | 252^{+155}_{-69} |
| Alt. | -53 ± 14 | $7.81^{+1.09}_{-1.72}$ | 486^{+27}_{-54} | 2895^{+103}_{-120} | 289^{+207}_{-91} |

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

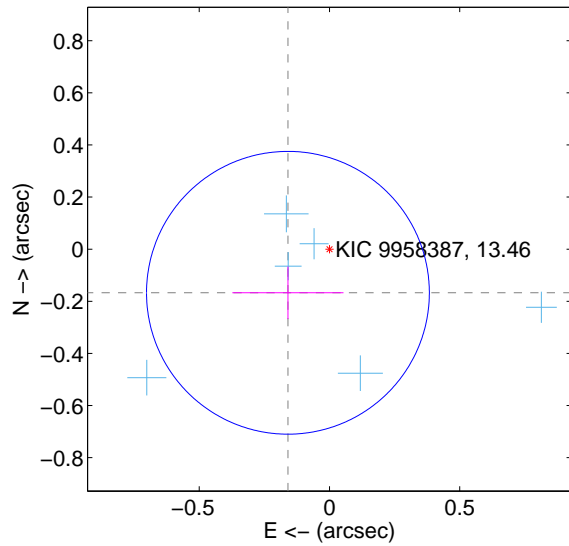
Supplemental centroid analysis for 009958387-01. Kepler magnitude: 13.46. Transit SNR 81.21

There are 6 quarters with good PRF difference image offsets

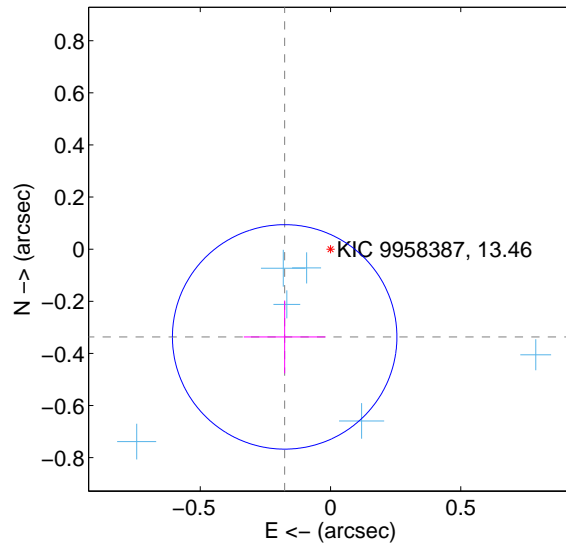
The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT | 0.231 ± 0.181 | 1.28 | 0.159 ± 0.213 | -0.167 ± 0.101 |
| PRF-fit source offset from KIC position | 0.380 ± 0.144 | 2.65 | 0.176 ± 0.157 | -0.337 ± 0.140 |
| photometric centroid source offset | 0.10 ± 0.14 | 0.73 | 0.09 ± 0.13 | 0.05 ± 0.15 |

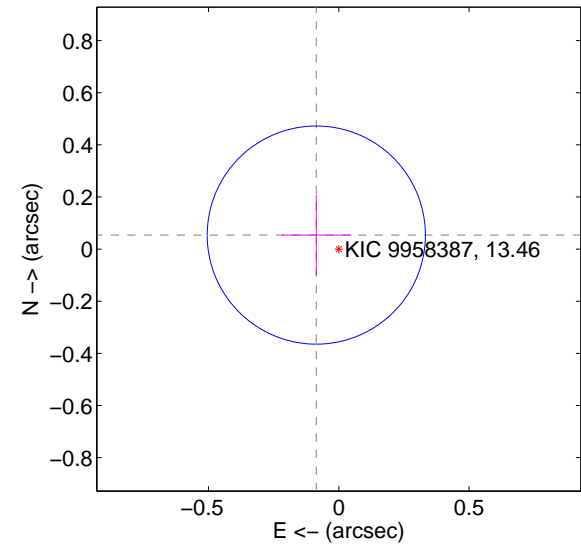
offset from difference PRF-fit to OOT PRF-fit



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.

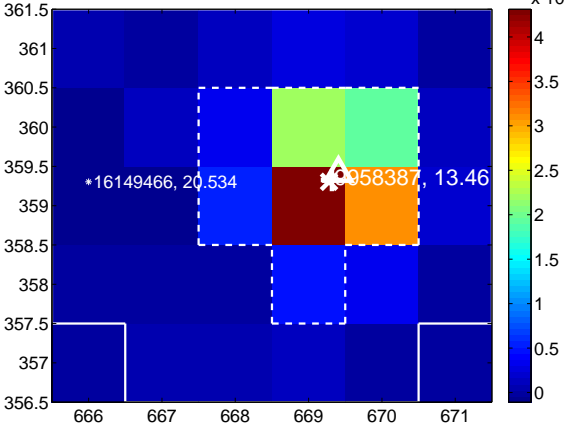
Q1 no difference image



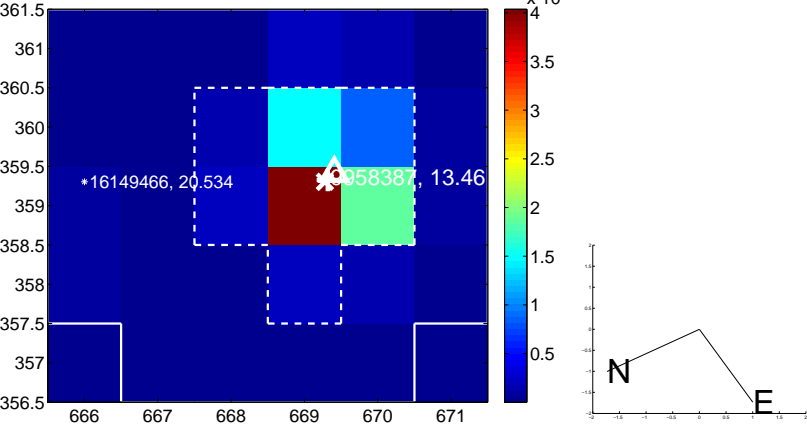
Q1 no OOT image



Q2 difference image



Q2 OOT image



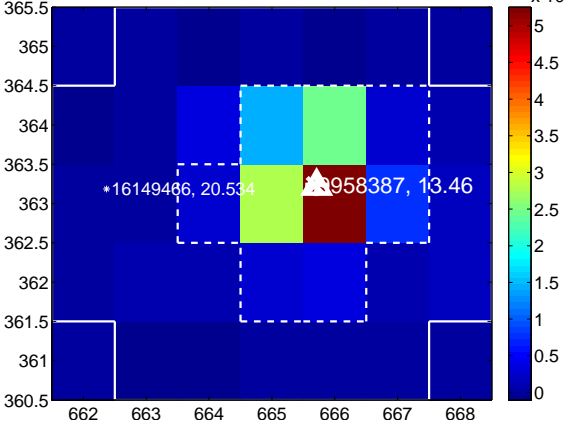
Q3 no difference image



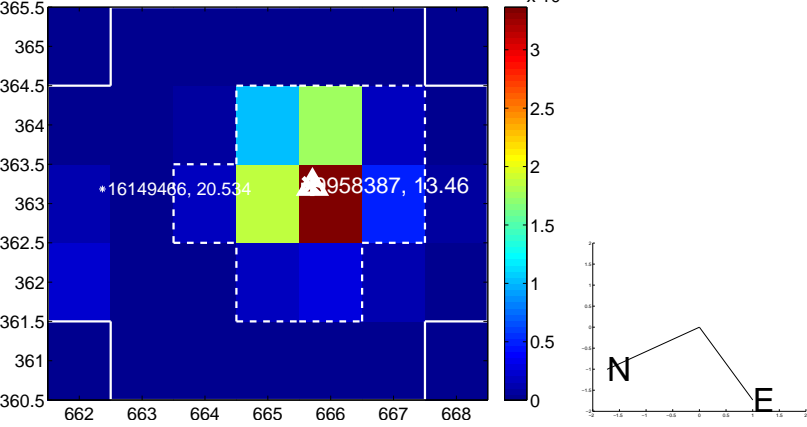
Q3 no OOT image



Q4 difference image



Q4 OOT image

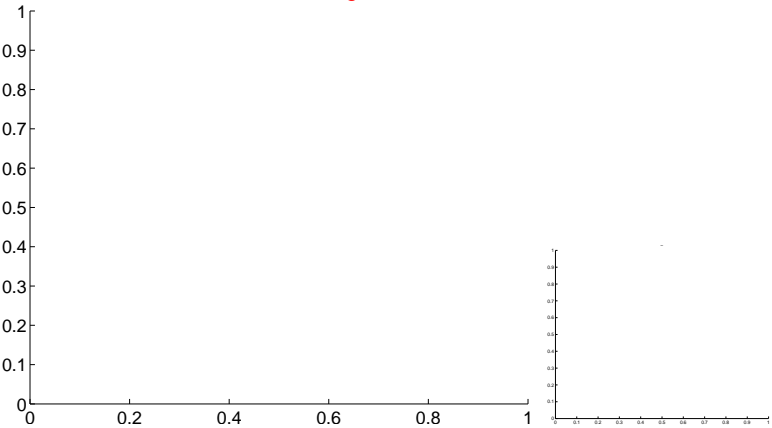


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

Q5 no difference image



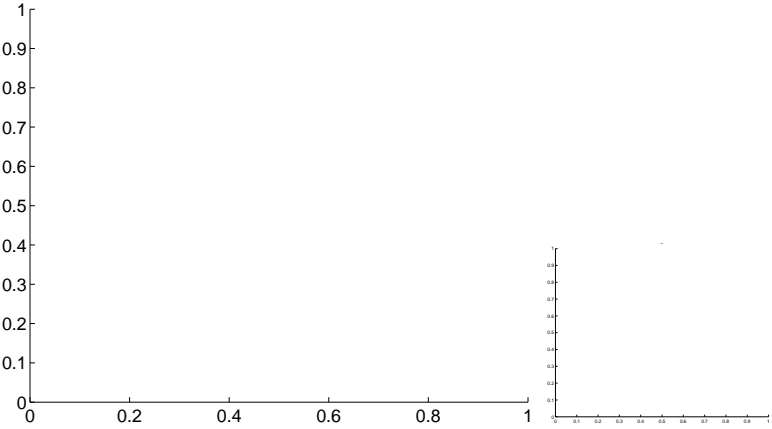
Q5 no OOT image



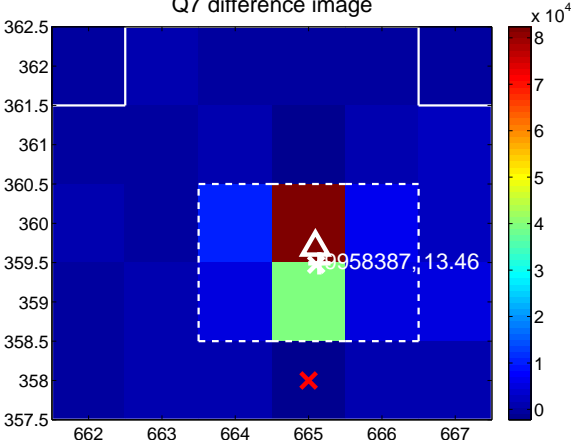
Q6 no difference image



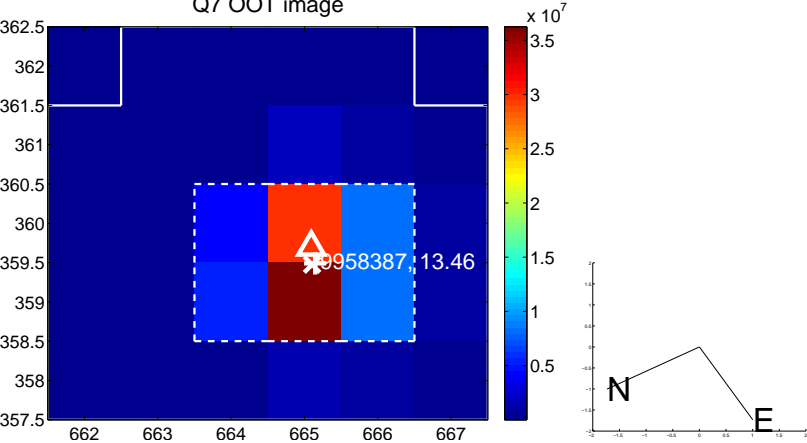
Q6 no OOT image



Q7 difference image



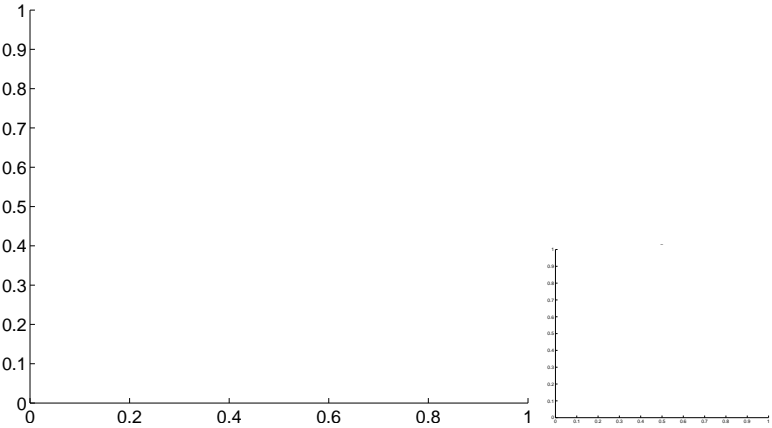
Q7 OOT image



Q8 no difference image



Q8 no OOT image



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

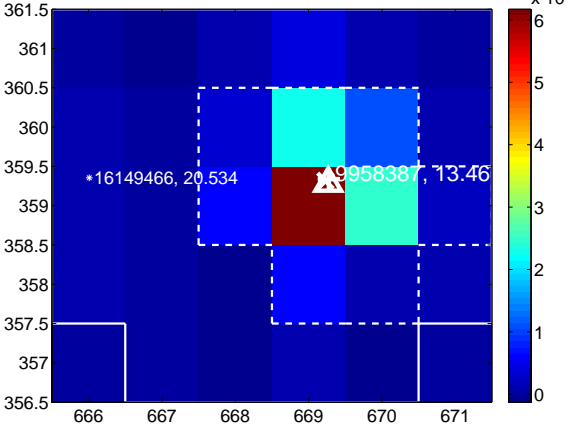
Q9 no difference image



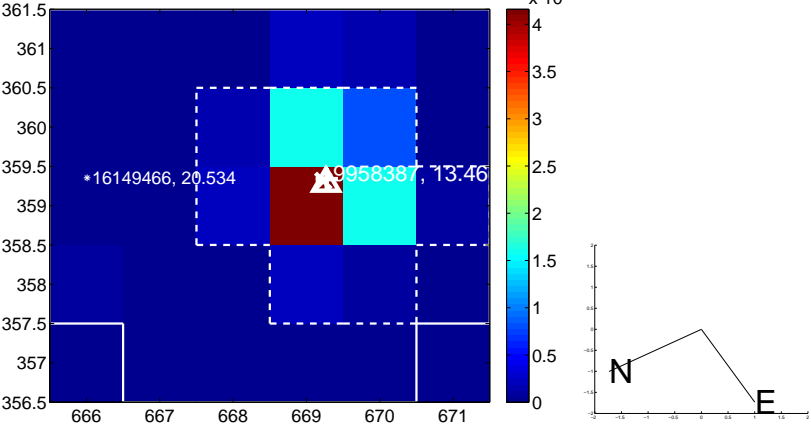
Q9 no OOT image



Q10 difference image



Q10 OOT image



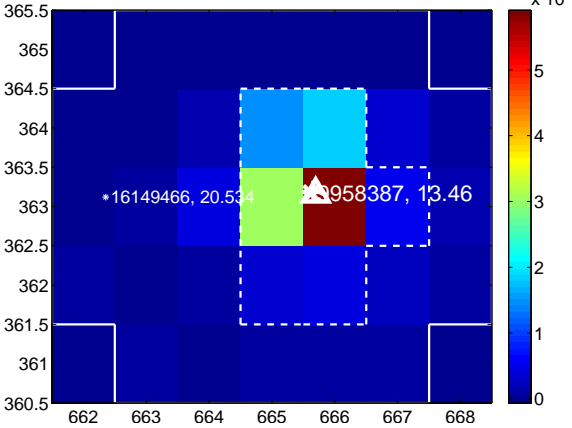
Q11 no difference image



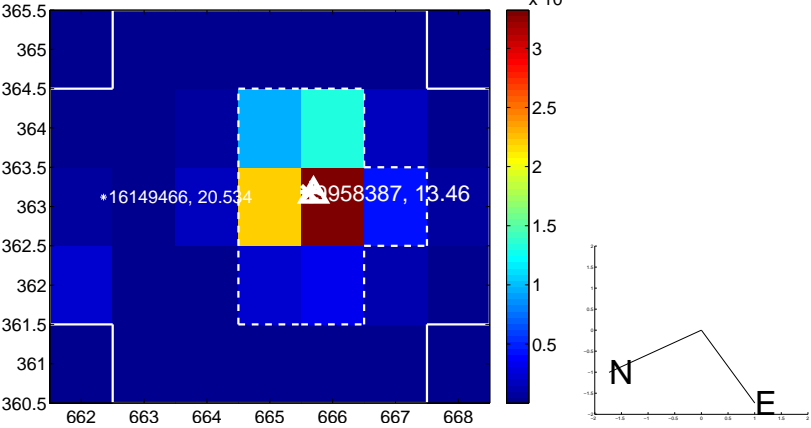
Q11 no OOT image



Q12 difference image



Q12 OOT image



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

Q13 no difference image



Q13 no OOT image



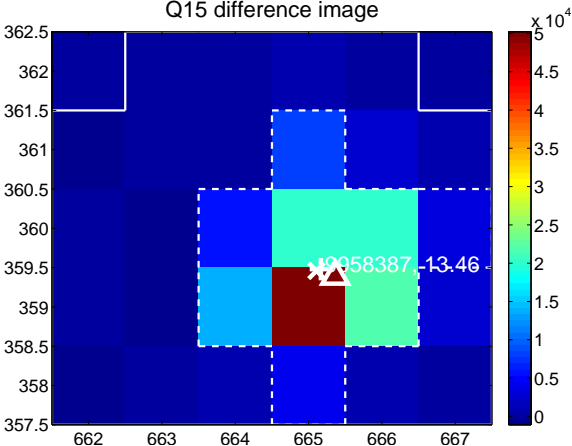
Q14 no difference image



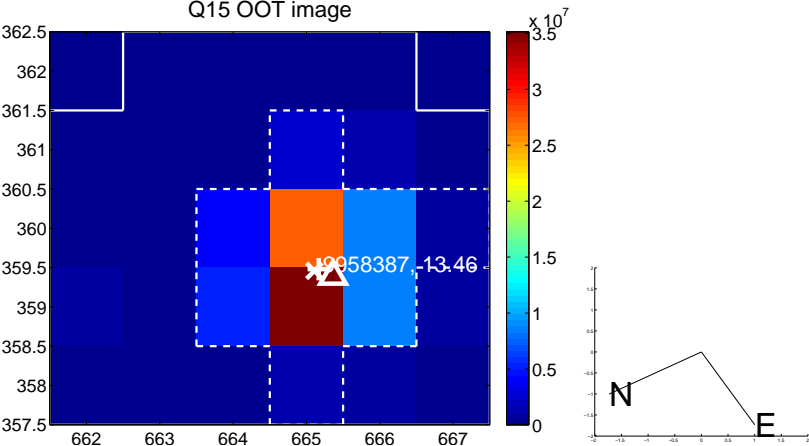
Q14 no OOT image



Q15 difference image



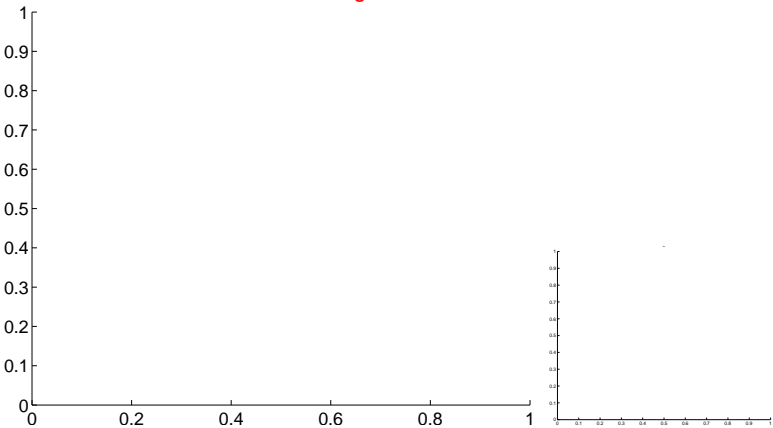
Q15 OOT image



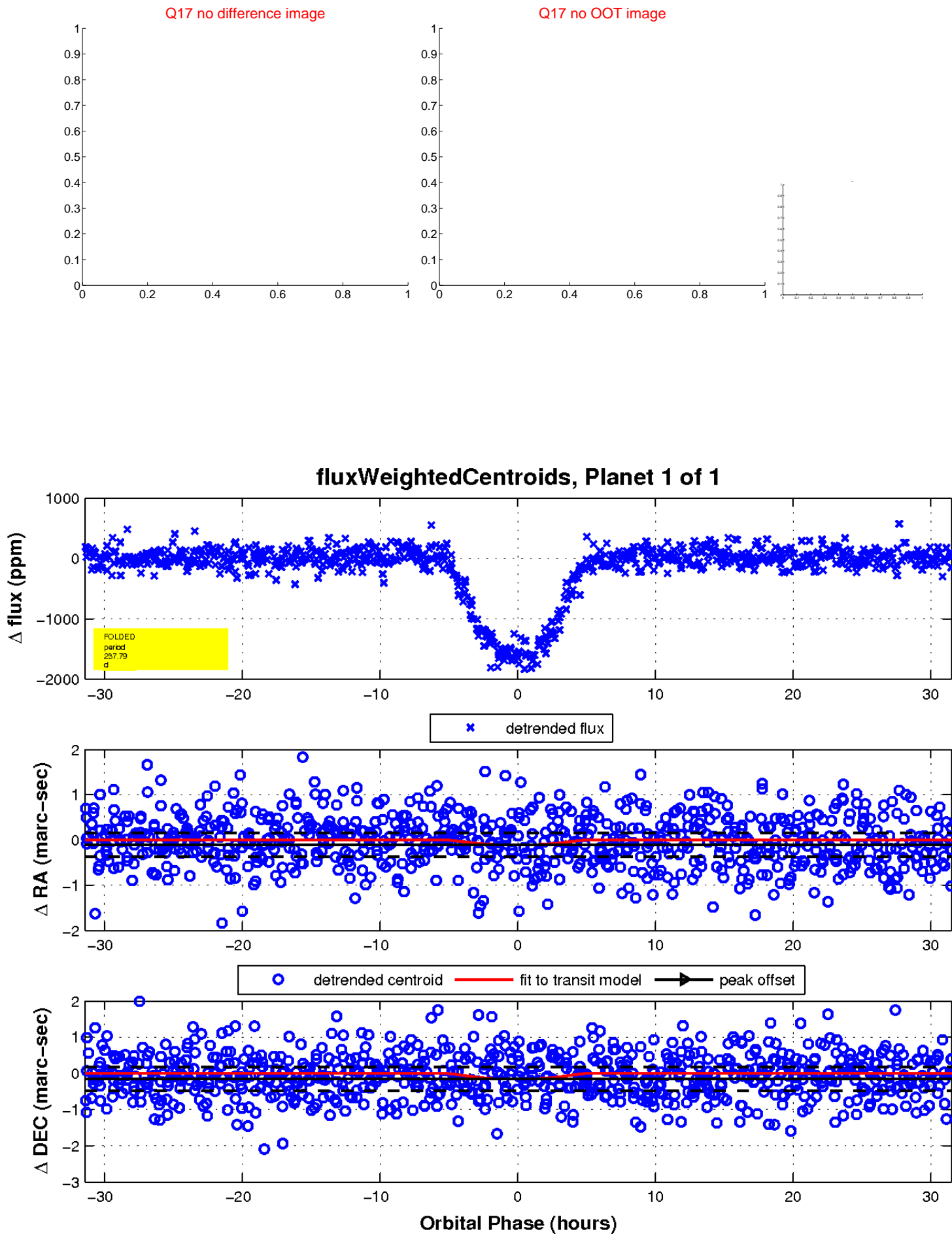
Q16 no difference image



Q16 no OOT image



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



UKIRT Image

Declination

