

KIC 009812716

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 009812716-01 | OBS | No | 1.993341 | 132.199653 | 87.3 | 8.061 | 12.3 | 12.4 | 1.92 | 7573 | 2.13 | 8130.57 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|---|
| 009812716-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT |

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

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

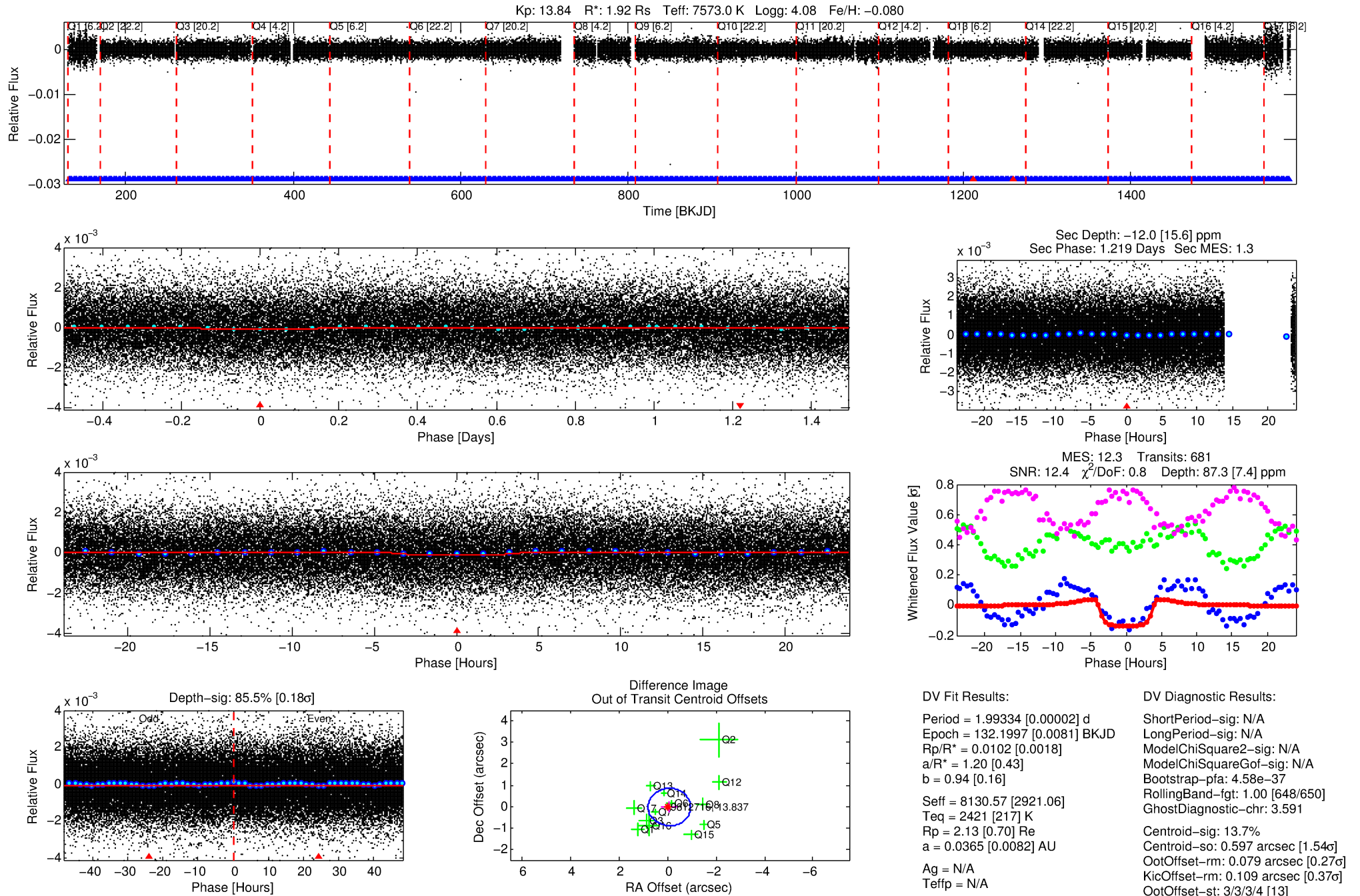
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009812716-01

No Significant Match Found

DV One-Page Summary

KIC: 9812716 Candidate: 1 of 1 Period: 1.993 d



DV Fit Results:

Period = 1.99334 [0.00002] d
Epoch = 132.1997 [0.0081] BKJD
Rp/R* = 0.0102 [0.0018]
a/R* = 1.20 [0.43]
b = 0.94 [0.16]
Seff = 8130.57 [2921.06]
Teq = 2421 [217] K
Rp = 2.13 [0.70] Re
a = 0.0365 [0.0082] AU
Ag = N/A
Teffp = N/A

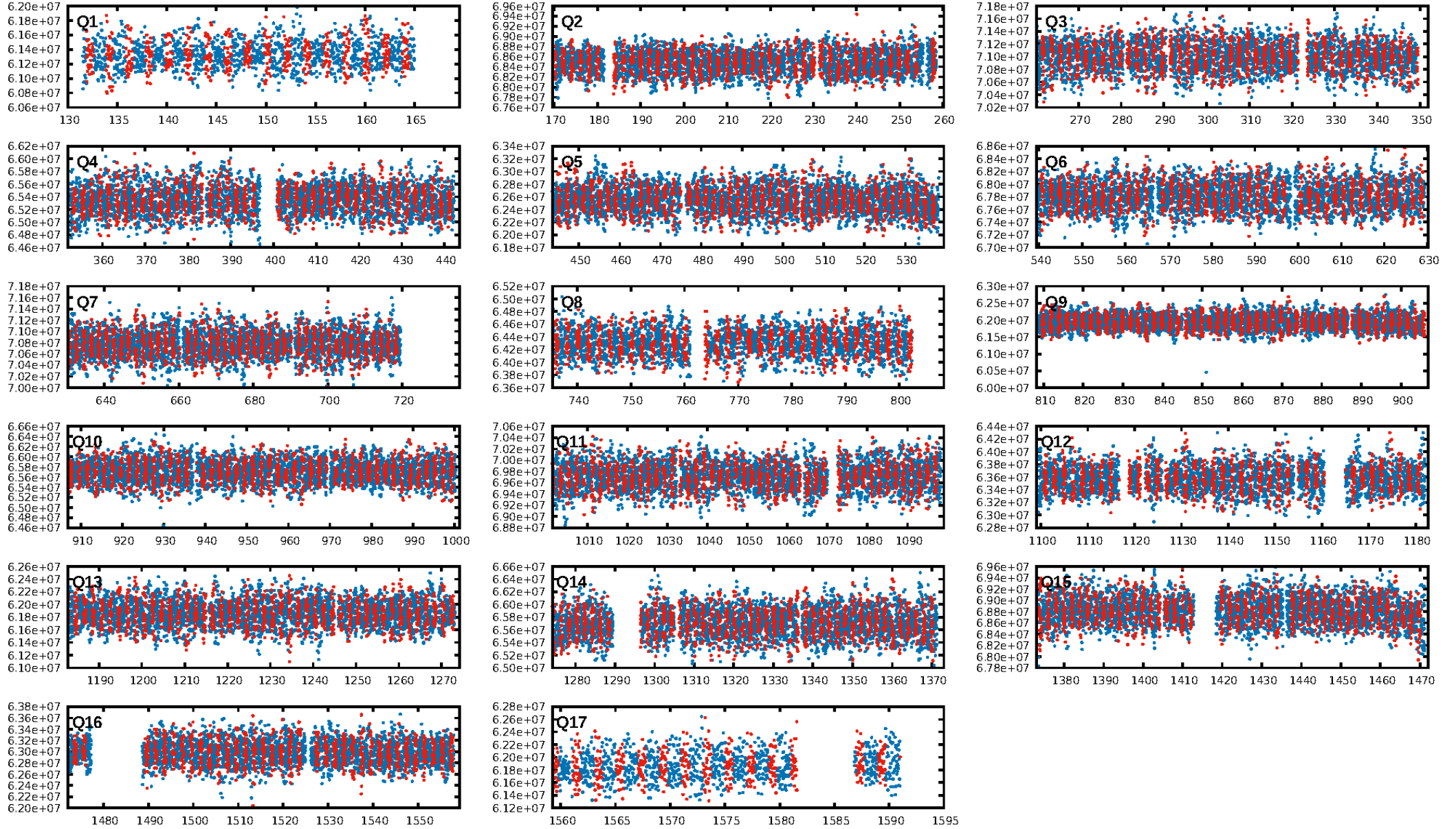
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 4.58e-37
RollingBand-fgt: 1.00 [648/650]
GhostDiagnostic-chr: 3.591
Centroid-sig: 13.7%
Centroid-so: 0.597 arcsec [1.54σ]
OotOffset-rm: 0.079 arcsec [0.27σ]
KicOffset-rm: 0.109 arcsec [0.37σ]
OotOffset-st: 3/3/3/4 [13]
KicOffset-st: 3/3/3/4 [13]
DiffImageQuality-fgm: 0.92 [12/13]
DiffImageOverlap-fno: 1.00 [17/17]

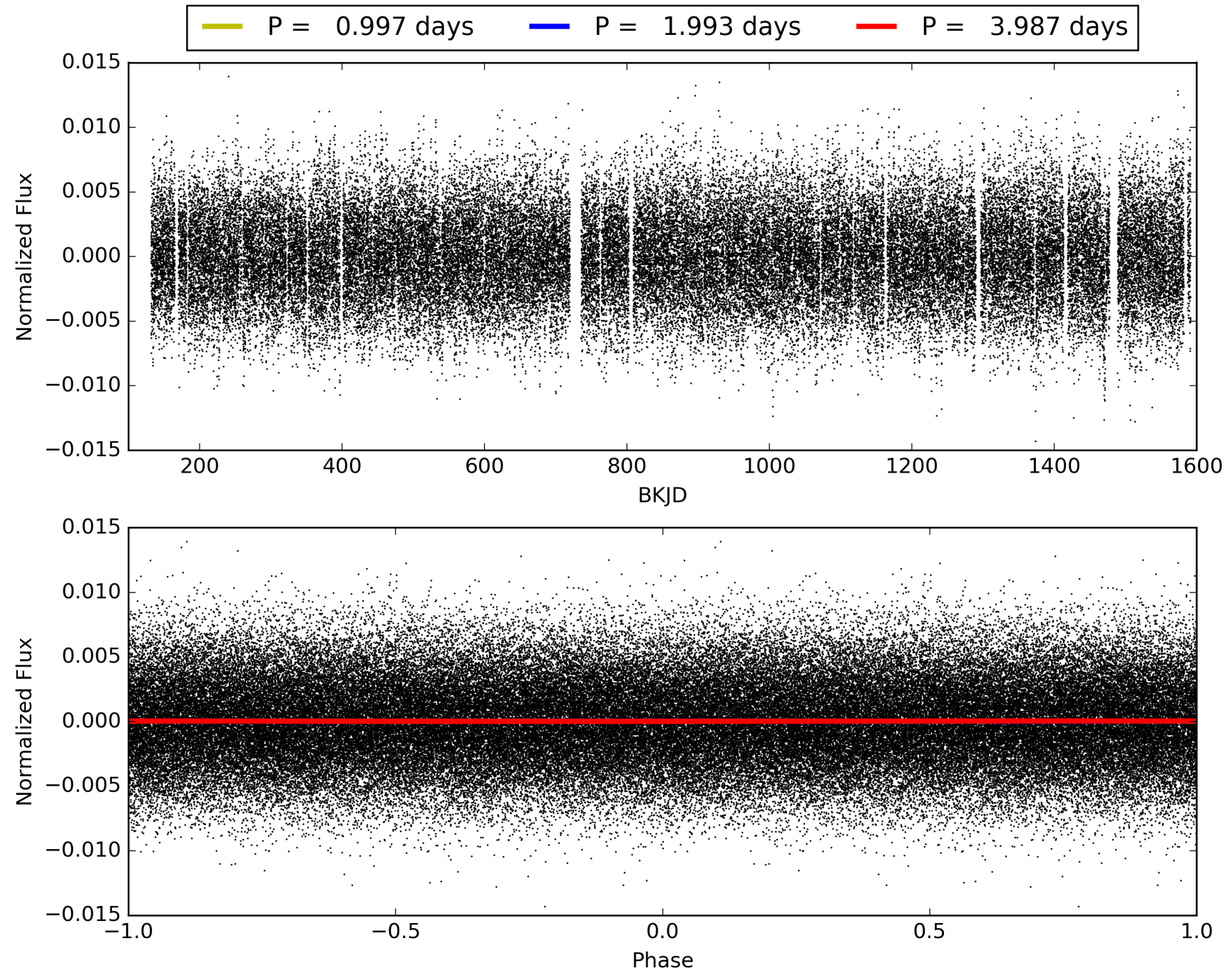
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 03:37:23 Z

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

TCE 009812716-01, PDC Light Curves

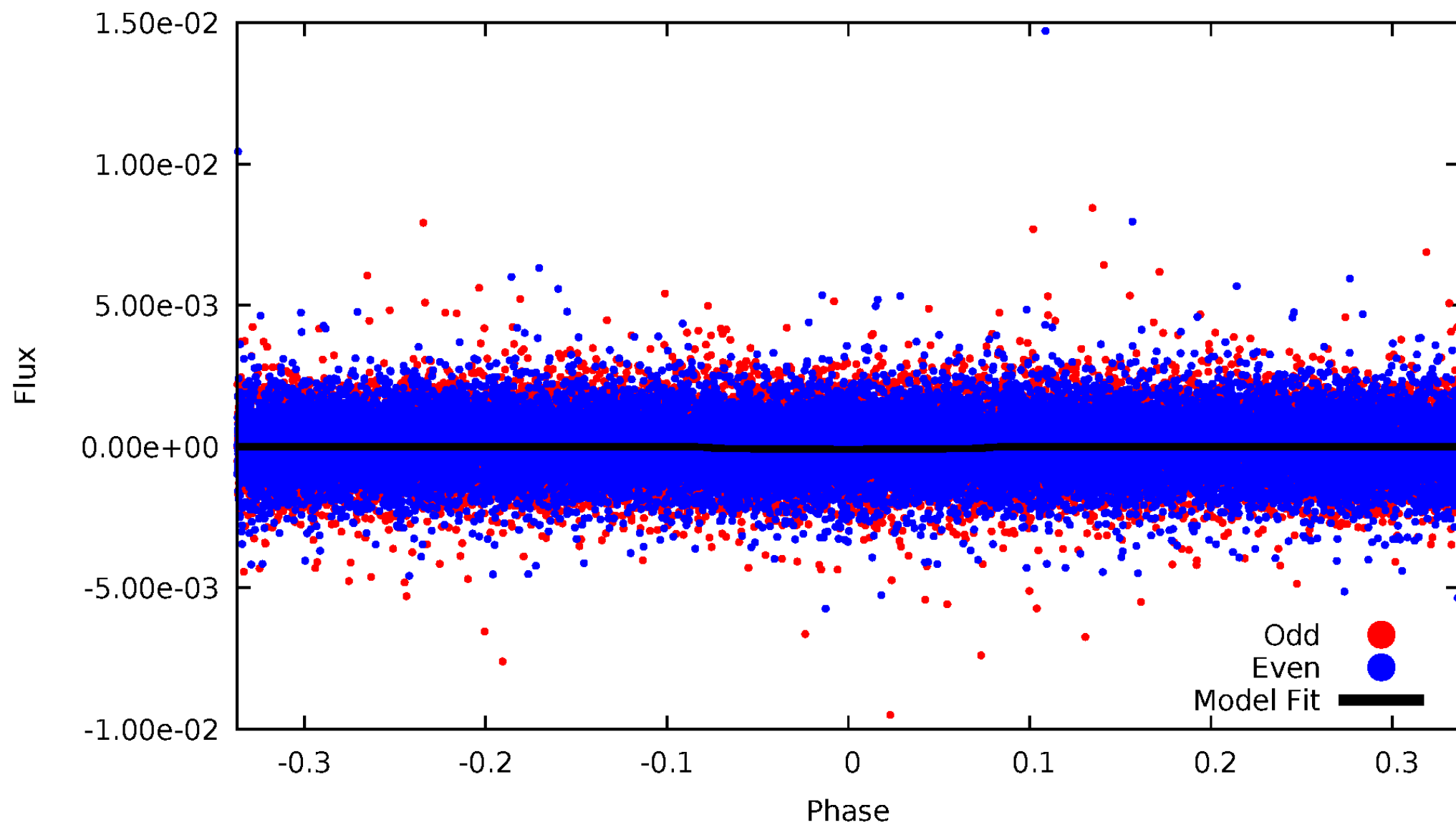


TCE 009812716-01



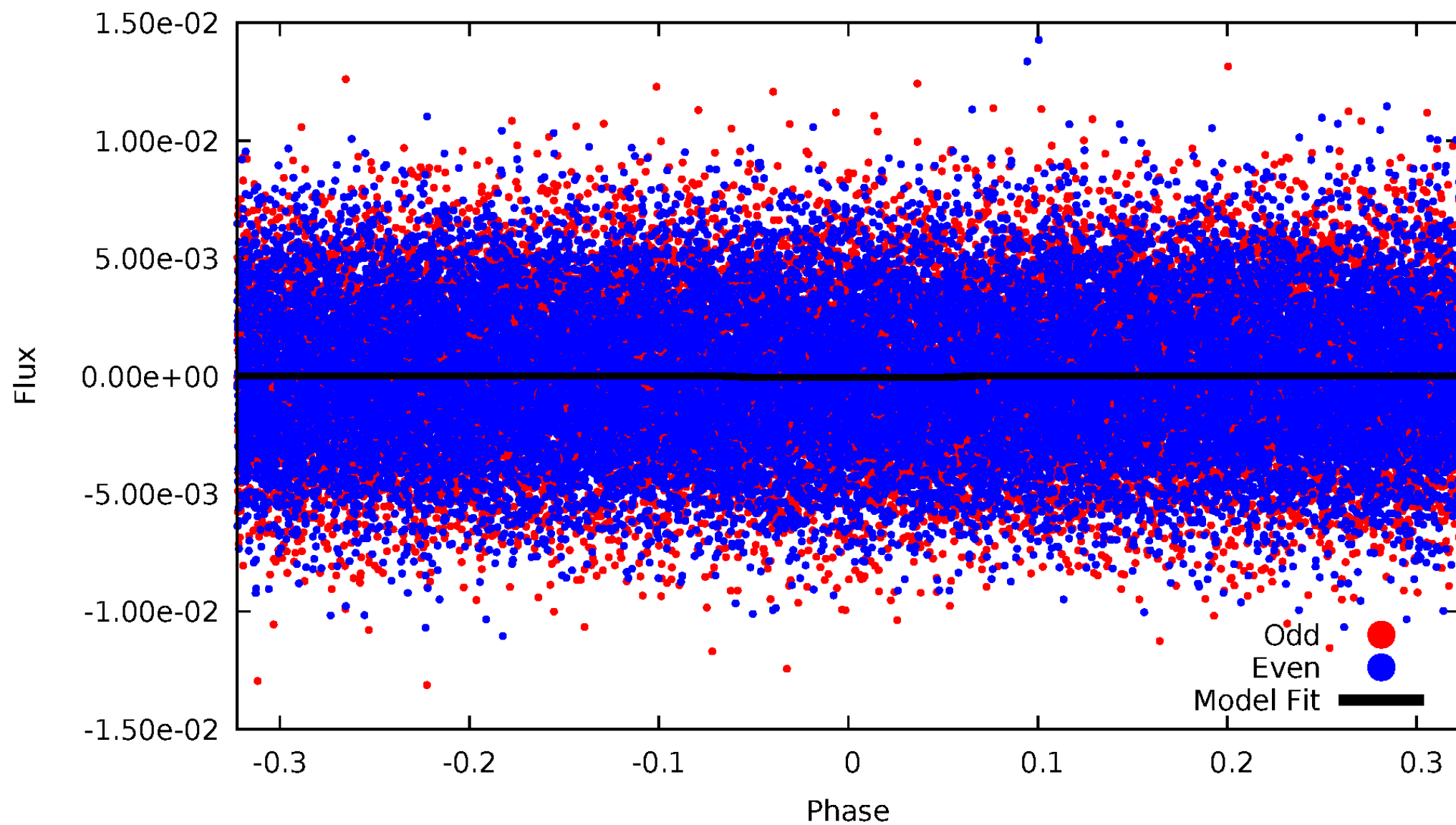
DV Odd/Even

TCE 009812716-01



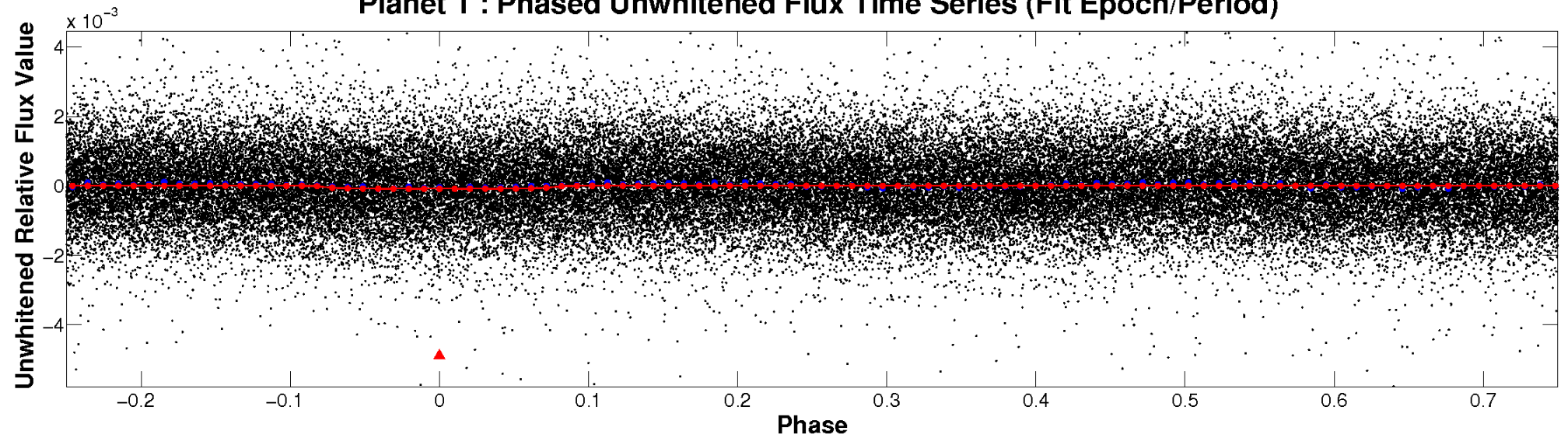
ALT Odd/Even

TCE 009812716-01

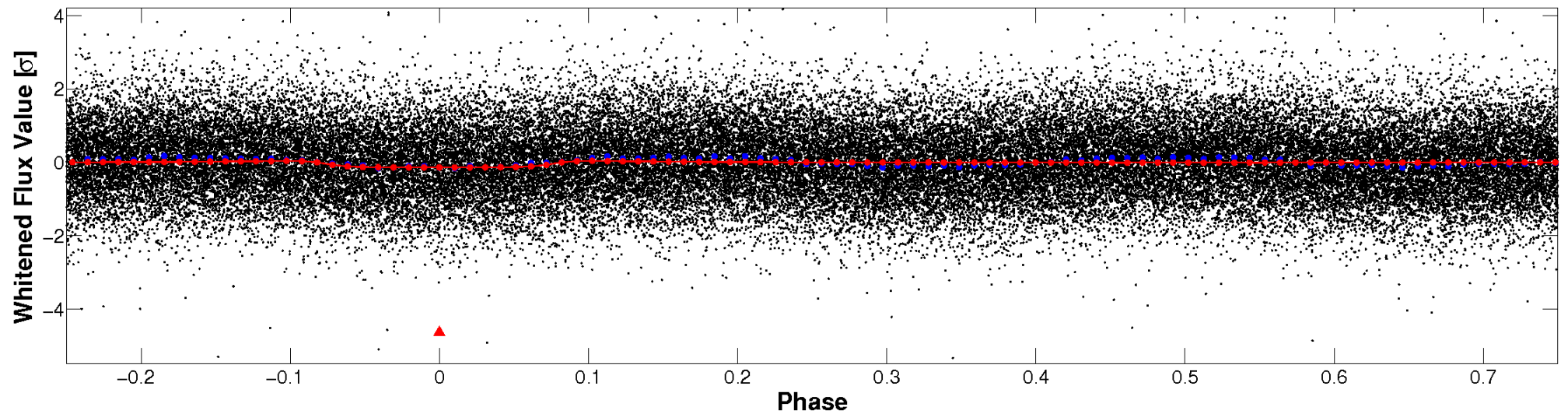


Non-Whitened Vs. Whitened Light Curve

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

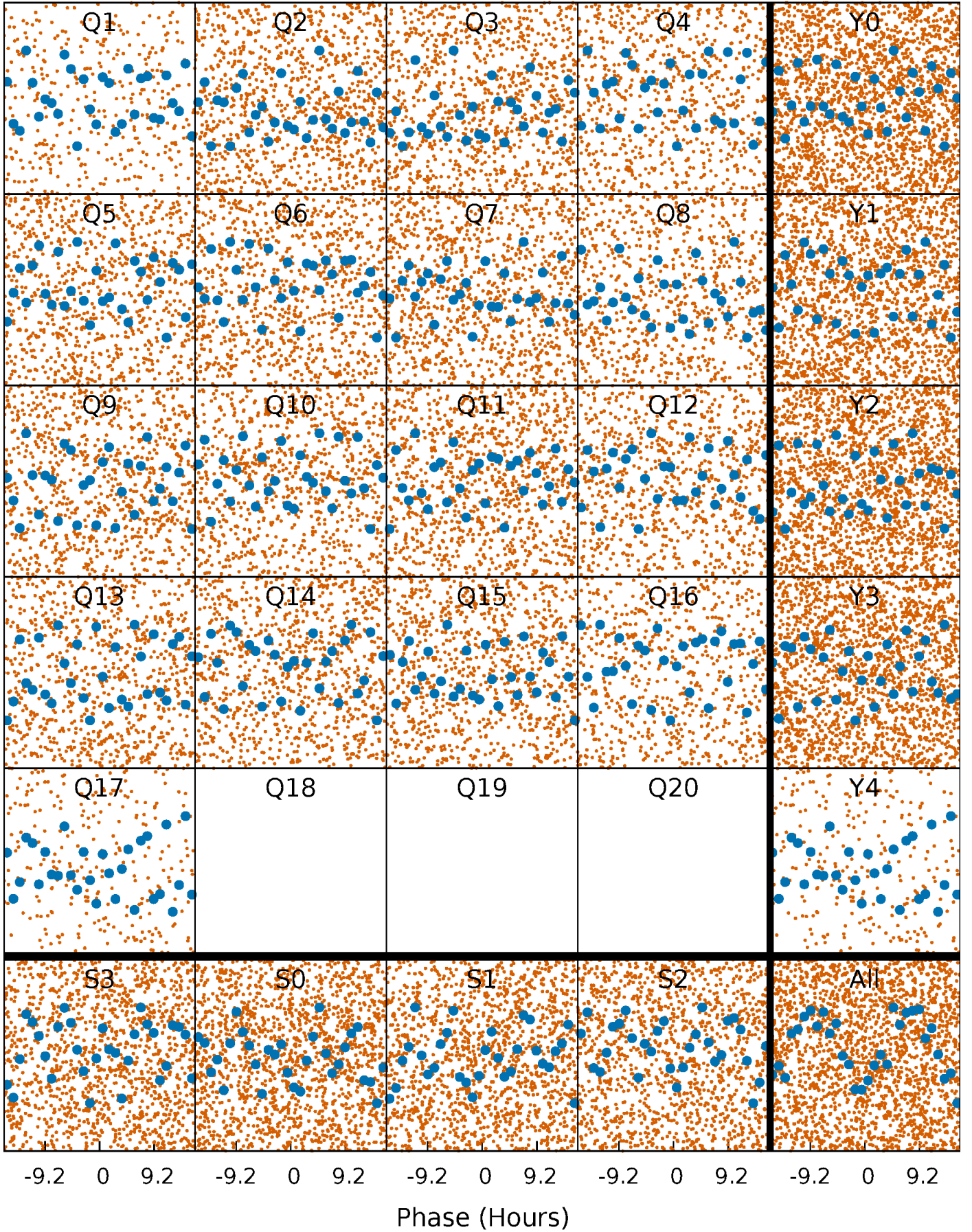


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



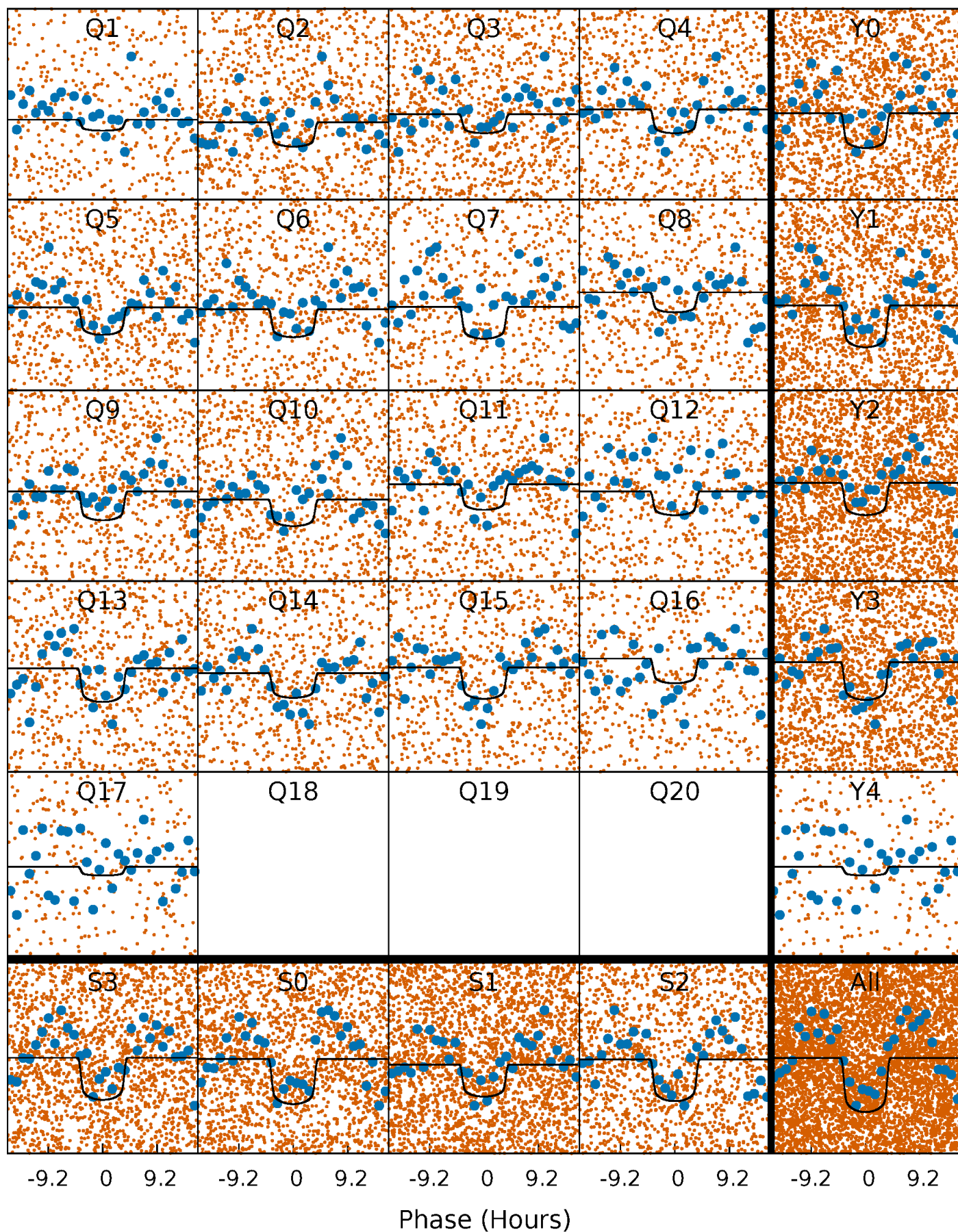
PDC Quarter-Phased Transit Curves

TCE 009812716-01 P= 1.993341 Days $T_0=132.199653$ (BKJD)



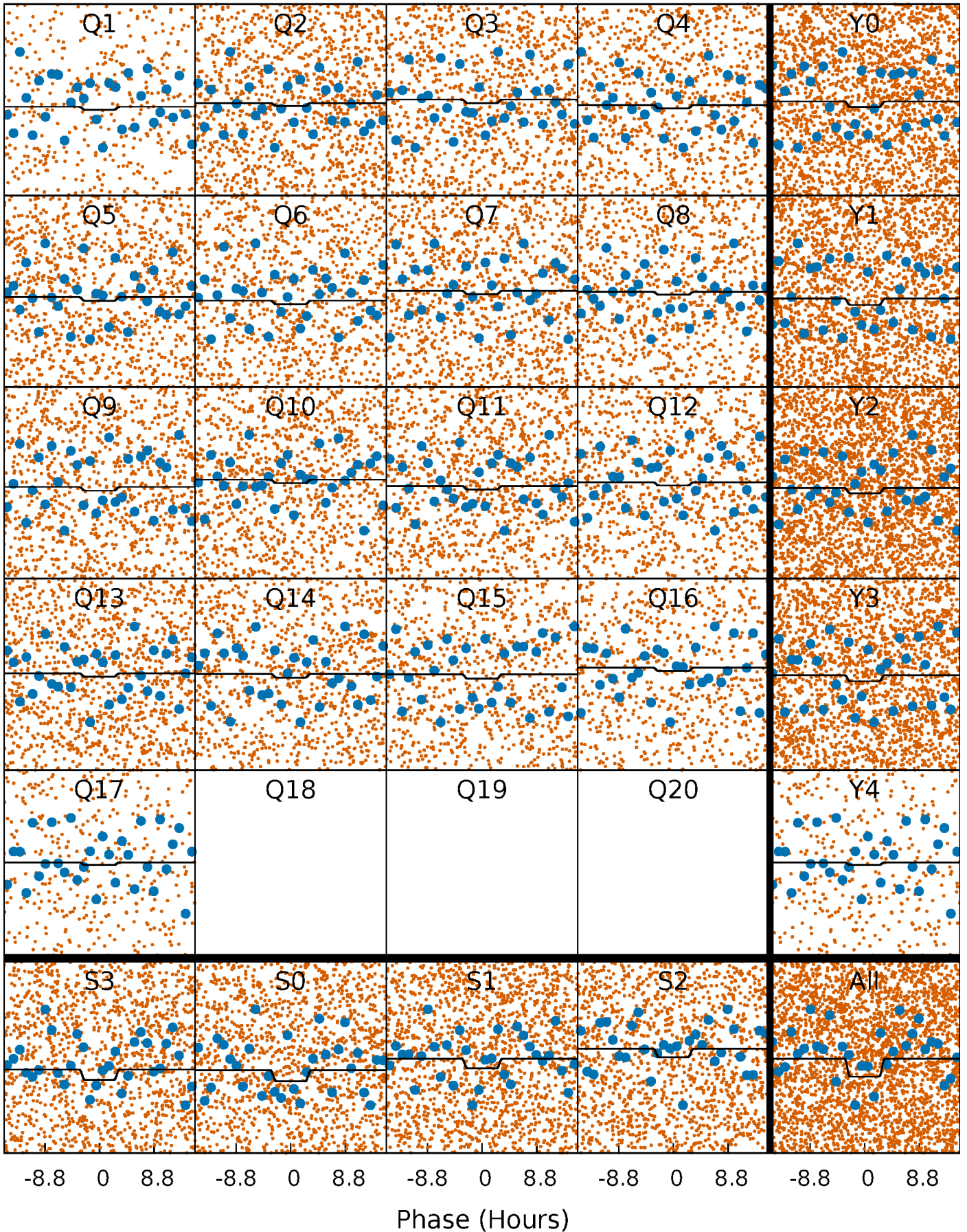
DV Quarter-Phased Transit Curves

TCE 009812716-01 P= 1.993341 Days $T_0=132.199653$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

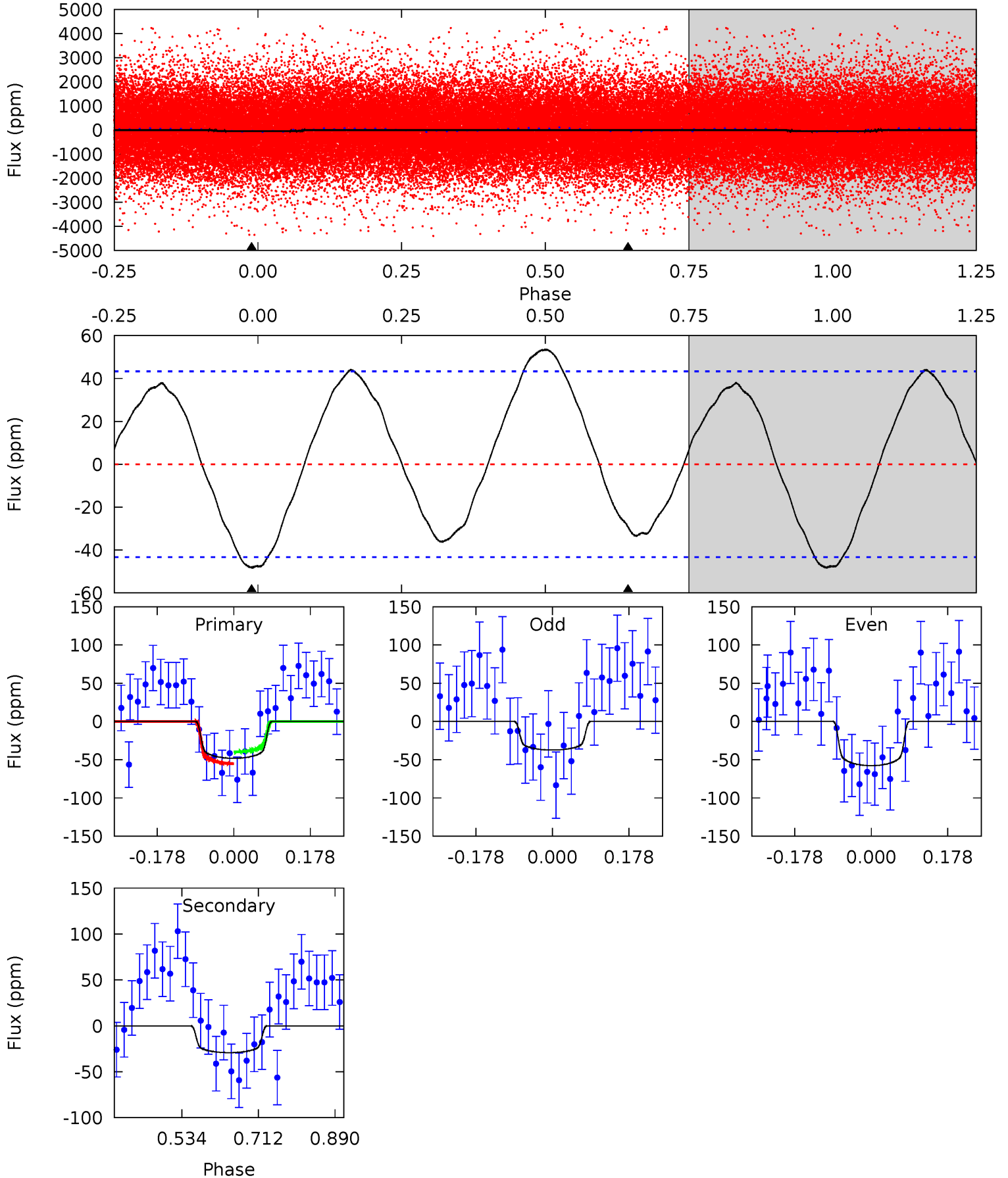
TCE 009812716-01 P= 1.993317 Days $T_0=132.217021$ (BKJD)



DV Model-Shift Uniqueness Test

009812716-01, P = 1.993341 Days, E = 130.206312 Days

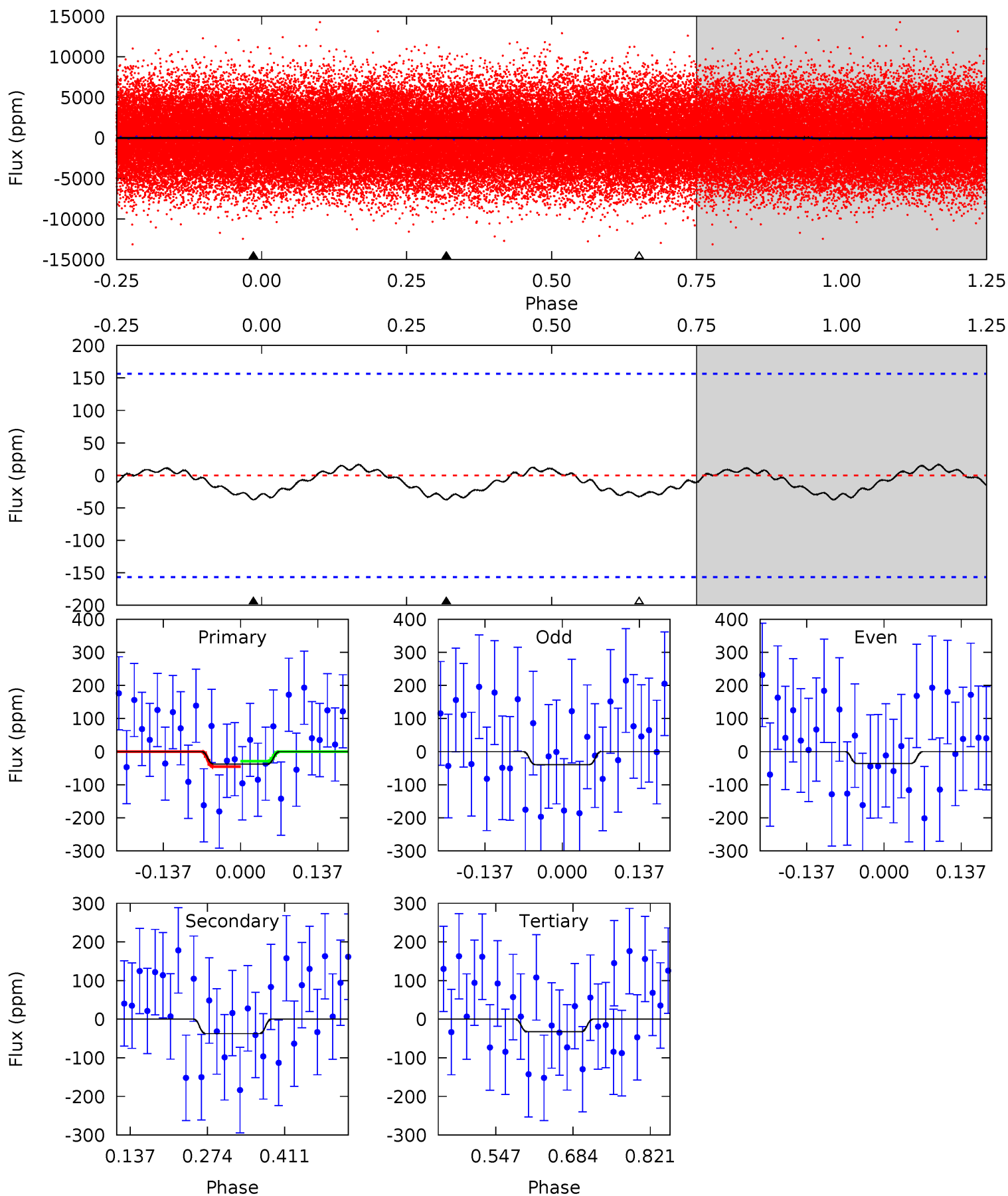
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 4.94 | 2.99 | 0 | 0 | 4.44 | 1.35 | 2.69 | 4.94 | 4.94 | 2.99 | 2.99 | 1.05 | 0.90 | 0.53 | 0.78 |



Alt Model-Shift Uniqueness Test

009812716-01, P = 1.993317 Days, E = 130.223704 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 1.08 | 1.07 | 0.93 | 0 | 4.50 | 1.49 | 0.43 | 0.14 | 1.08 | 0.14 | 1.07 | 0.05 | 1.14 | 0.30 | 0.24 |



Stellar Parameters For KIC 009812716

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 7573^{+237}_{-316} | $4.085^{+0.155}_{-0.170}$ | $-0.080^{+0.200}_{-0.350}$ | $1.916^{+0.523}_{-0.428}$ | $1.630^{+0.210}_{-0.257}$ | $0.326^{+0.270}_{-0.147}$ |
| | +3%/-4% | +4%/-4% | +250%/-438% | +27%/-22% | +13%/-16% | +83%/-45% |
| 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 009812716-01 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{max} (K)$ | $T_{obs} (K)$ | A_{obs} |
|---------|--------------|------------------------|----------------------|------------------------|---------------------------|
| DV | -29 ± 10 | $2.15^{+0.51}_{-0.47}$ | 3380^{+259}_{-239} | 5315^{+753}_{-642} | $4.538^{+3.488}_{-2.072}$ |
| Alt. | -37 ± 35 | $1.51^{+0.46}_{-0.40}$ | 3387^{+246}_{-255} | 6760^{+2017}_{-3198} | 12^{+17}_{-11} |

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 $A_{obs} \gg 1.0$

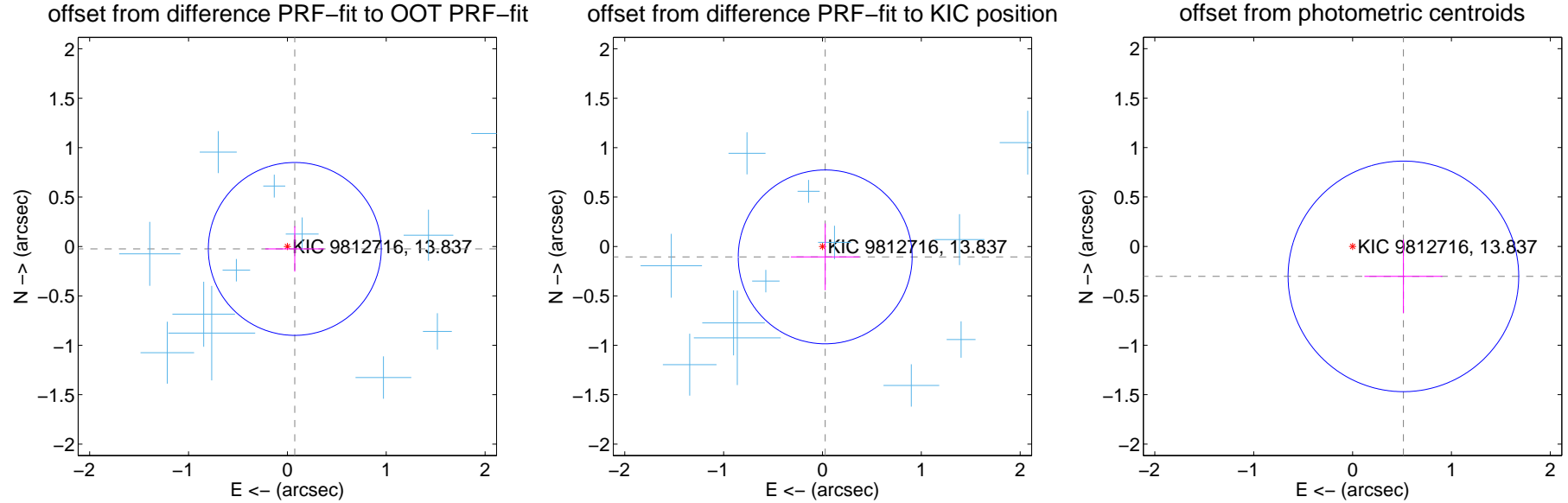
DV Centroid Data

Supplemental centroid analysis for 009812716-01. Kepler magnitude: 13.84. Transit SNR 12.35

There are 12 quarters with good PRF difference image offsets

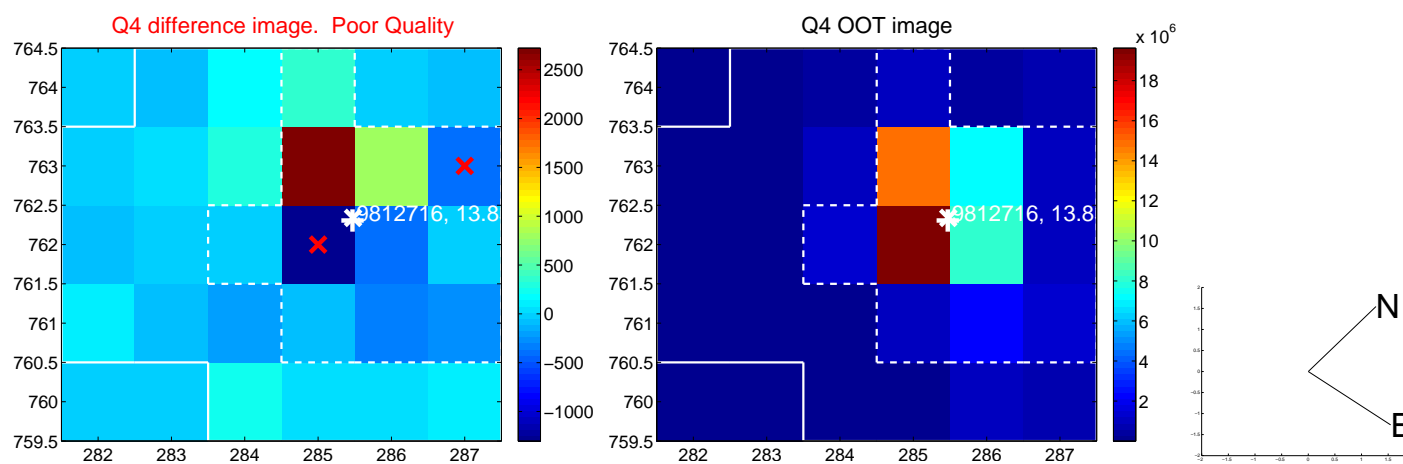
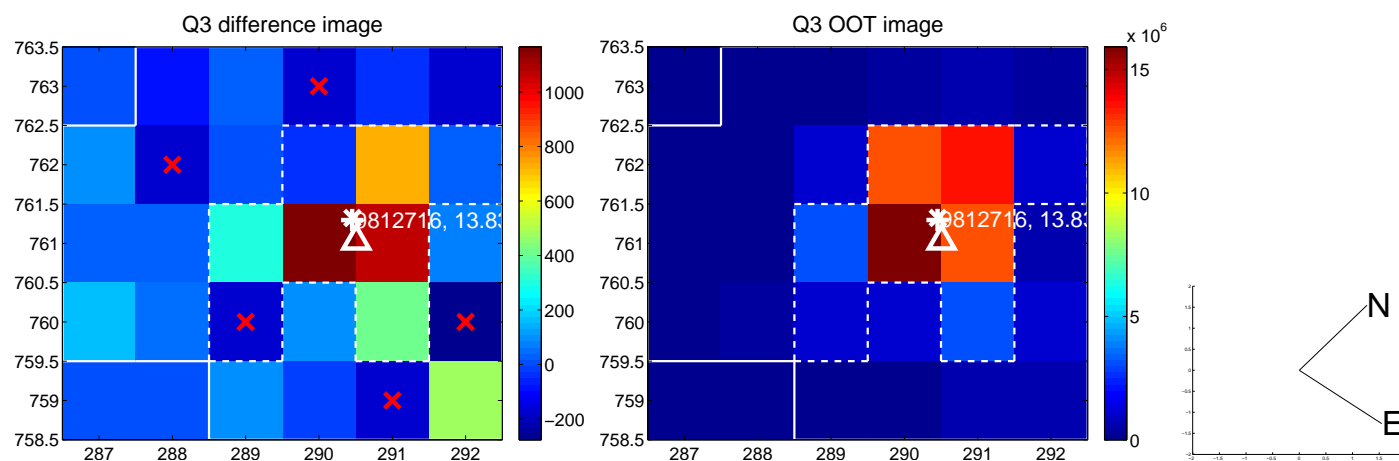
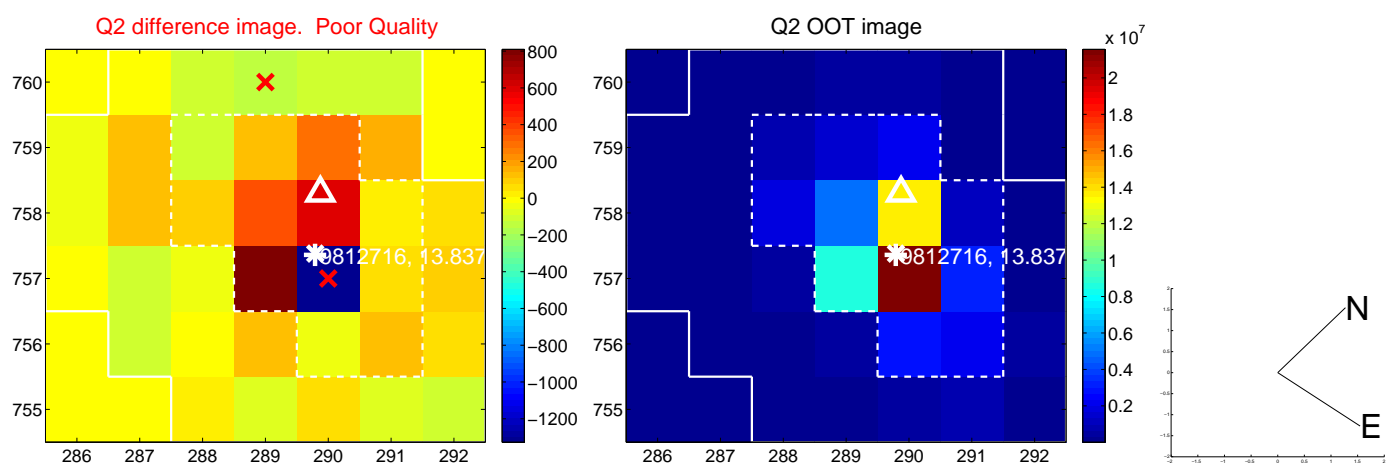
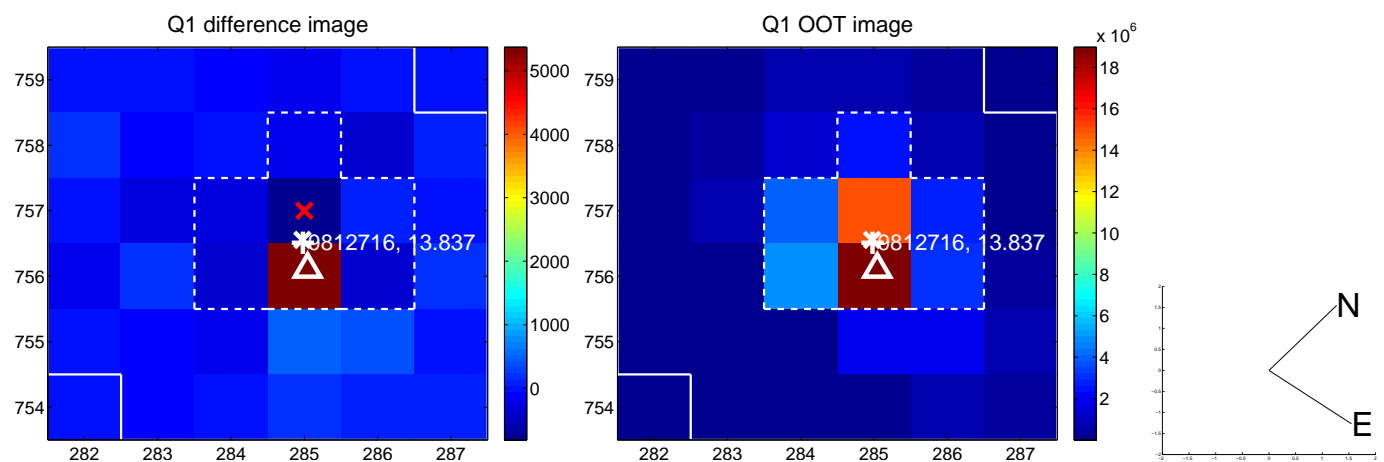
The direct PRF centroid is offset from the target star catalog position by about 0.18 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 0.079 ± 0.292 | 0.27 | -0.075 ± 0.298 | -0.025 ± 0.230 |
| PRF-fit source offset from KIC position | 0.109 ± 0.293 | 0.37 | -0.027 ± 0.347 | -0.105 ± 0.338 |
| photometric centroid source offset | 0.60 ± 0.39 | 1.54 | -0.51 ± 0.39 | -0.30 ± 0.37 |

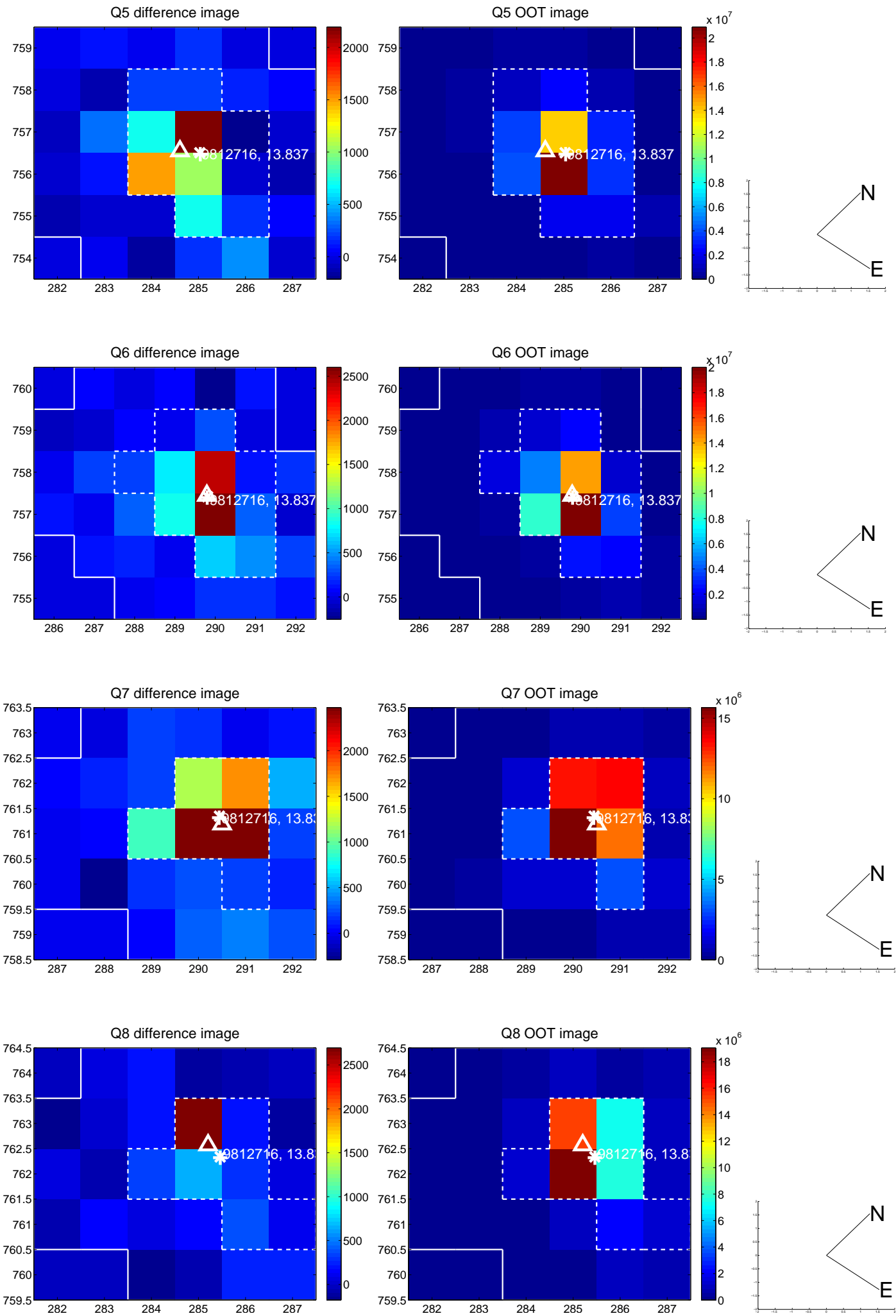


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

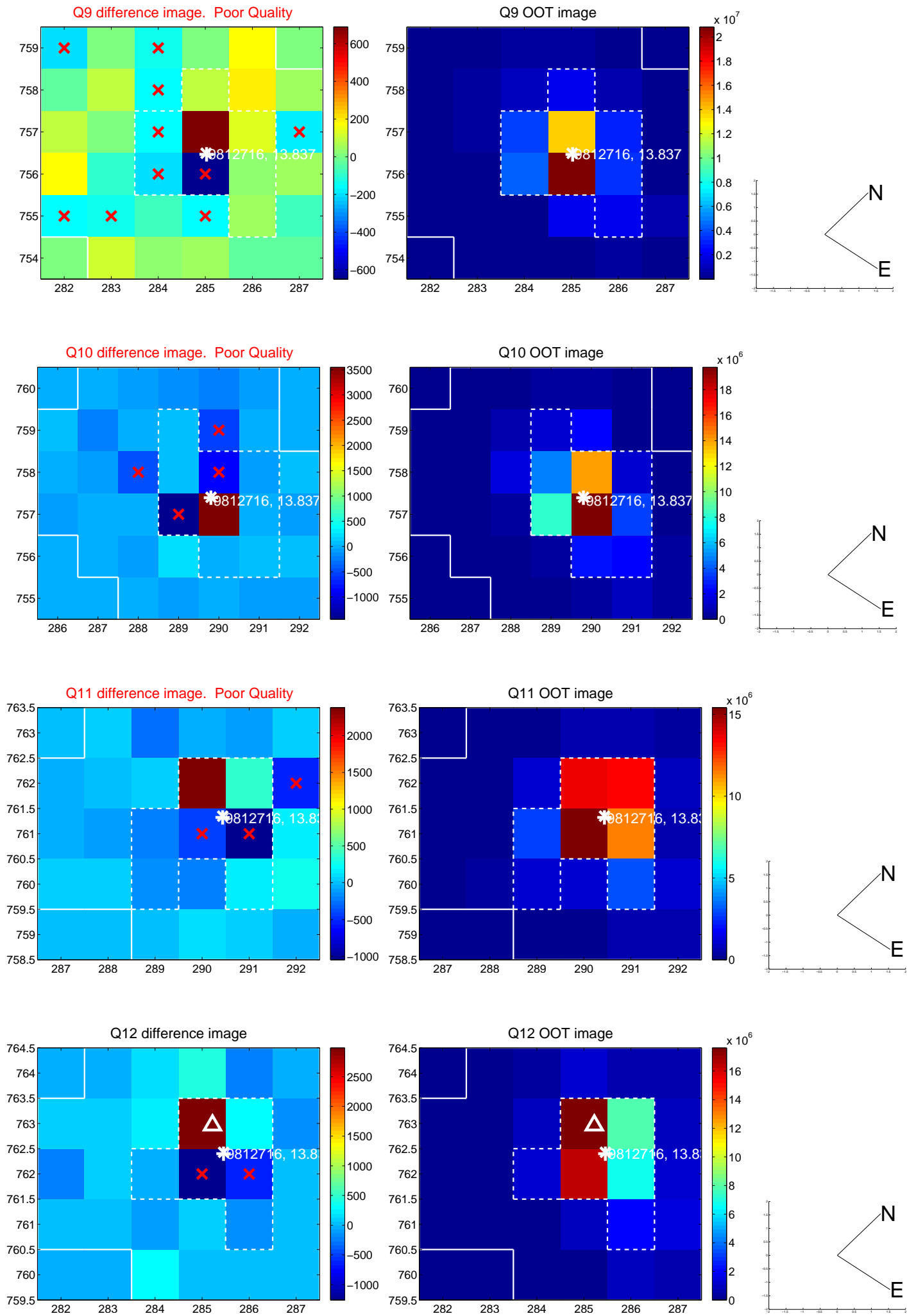
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



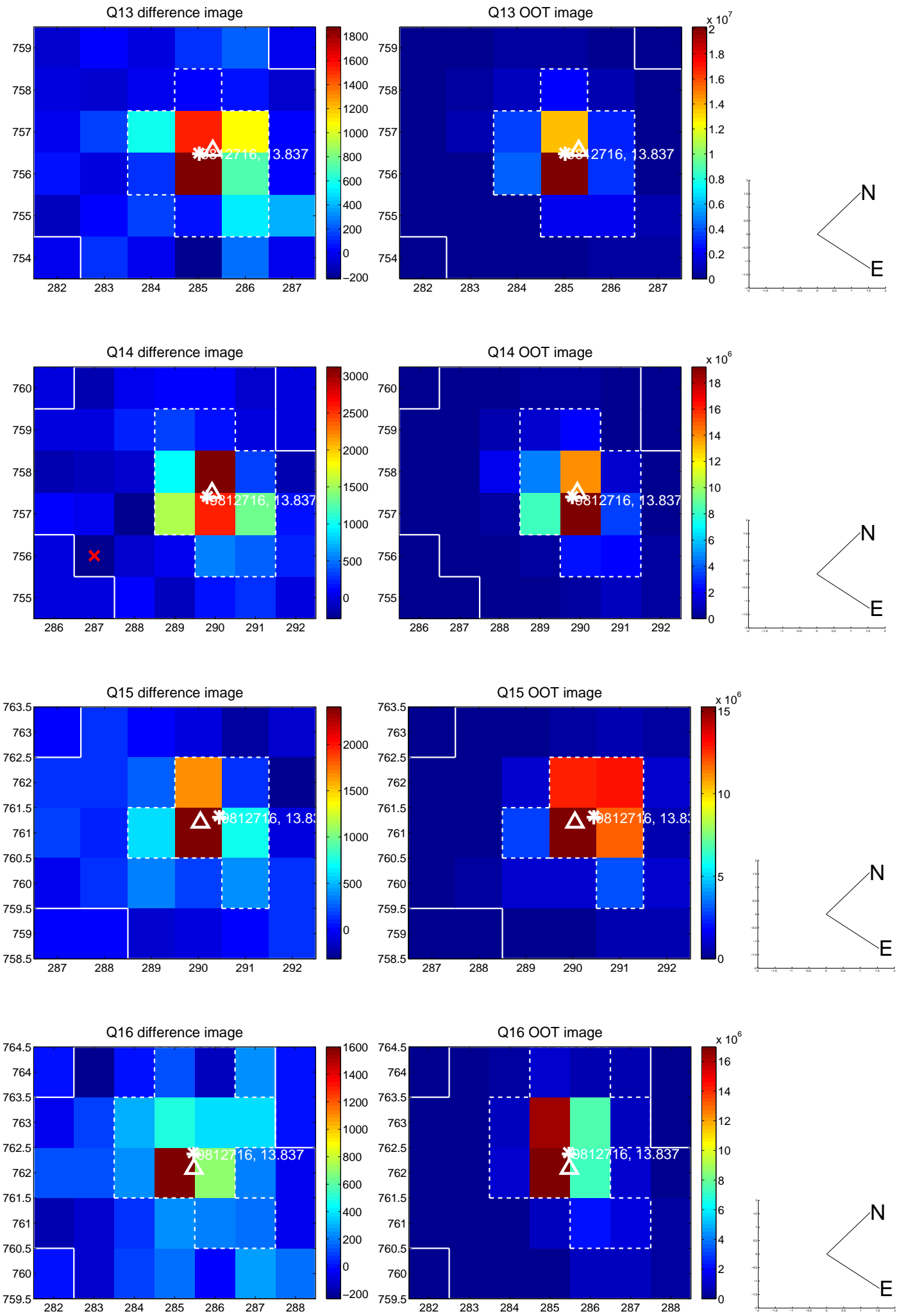
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



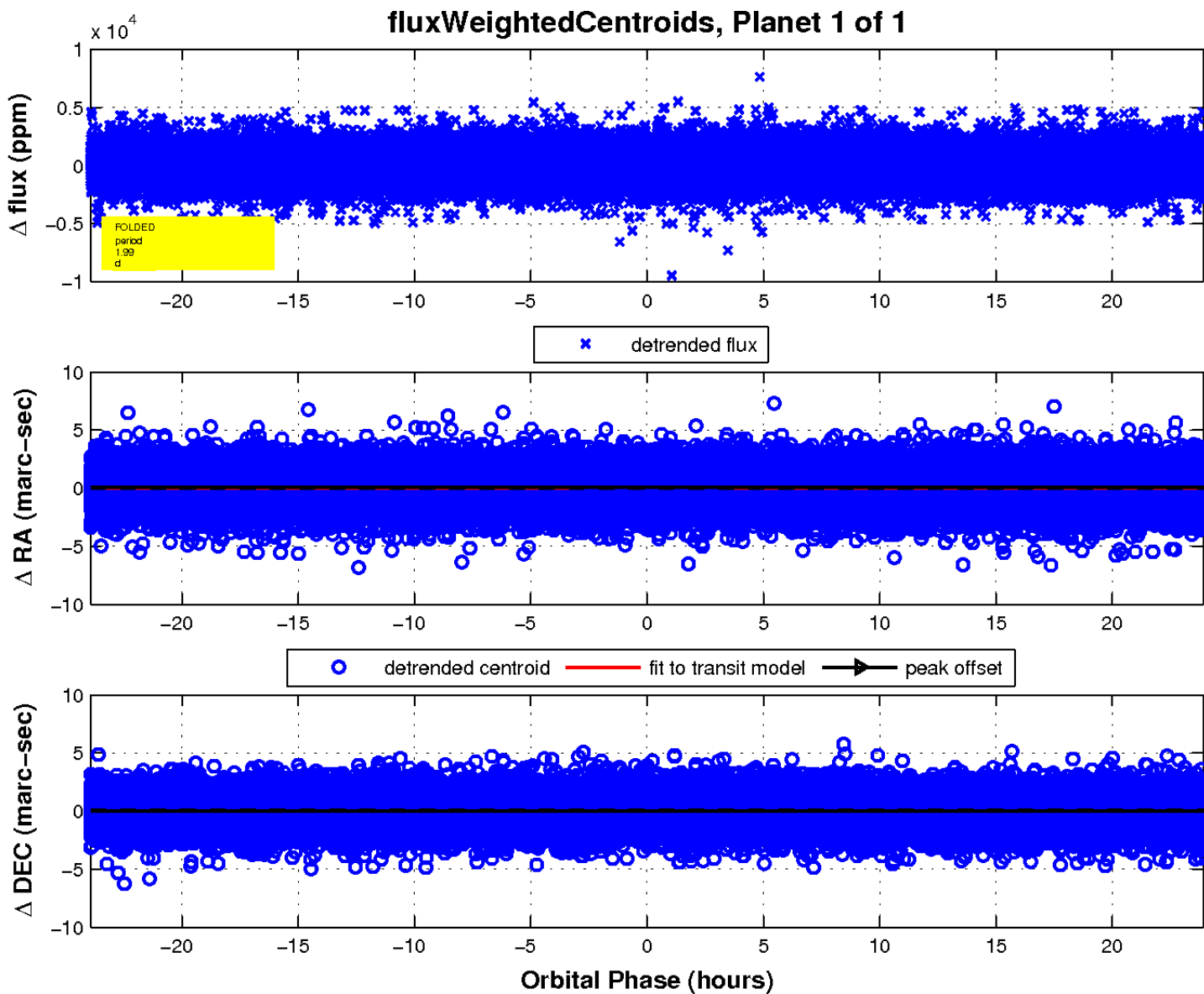
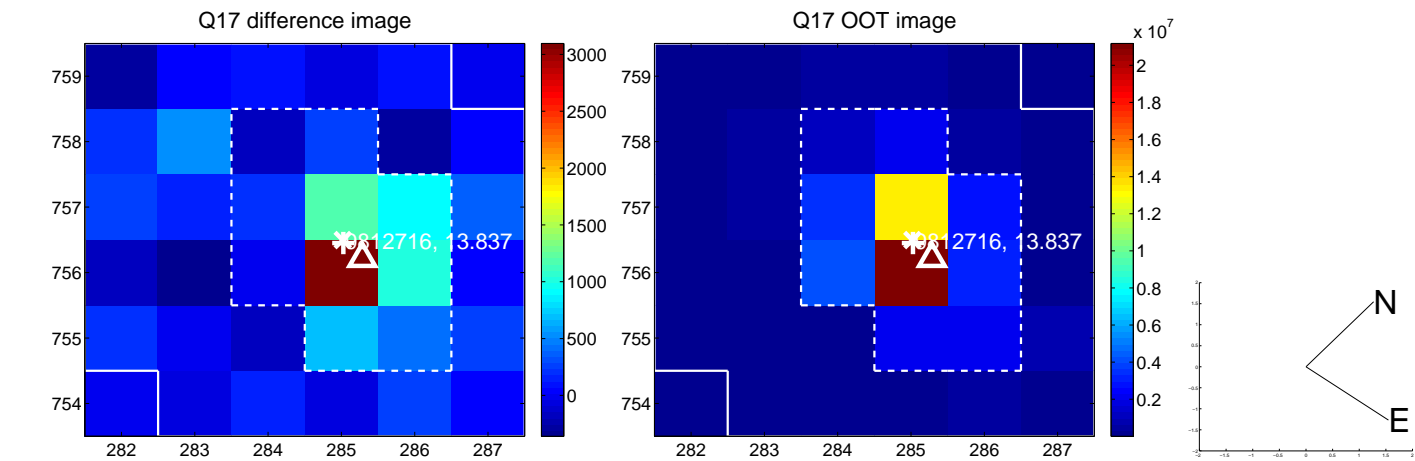
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white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination

