

KIC 004357985

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 004357985-01 | OBS | 6406.01 | 8.653070 | 136.664589 | 328.1 | 1.289 | 10.3 | 11.7 | 0.75 | 5210 | 1.66 | 68.60 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|------------------------------------|
| 004357985-01 | OBS | FP | 0.00 | 0 | 1 | 0 | 1 | MOD_SEC_DV—MOD_SEC_ALT—EPHEM_MATCH |

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 004357985-01

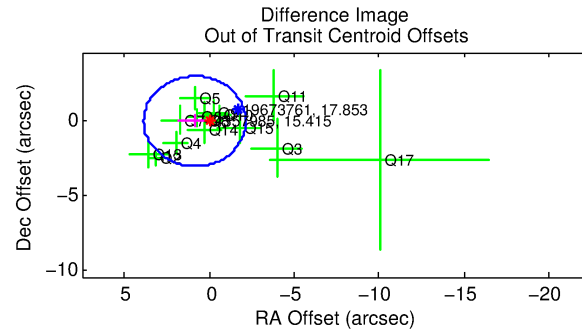
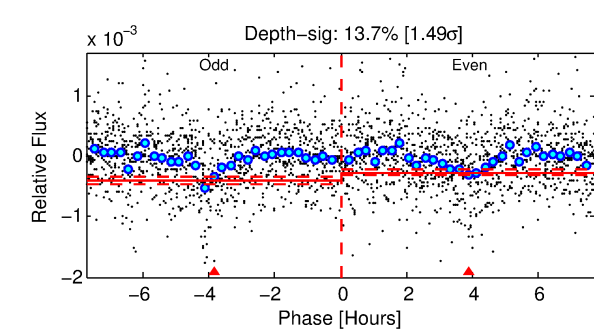
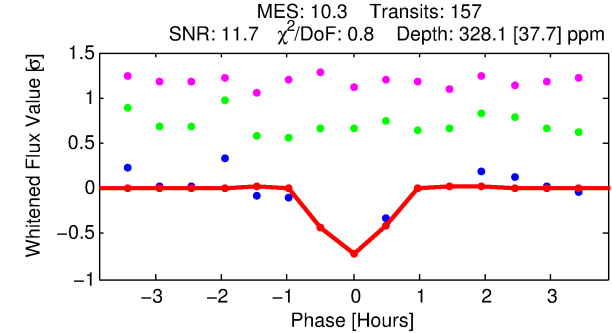
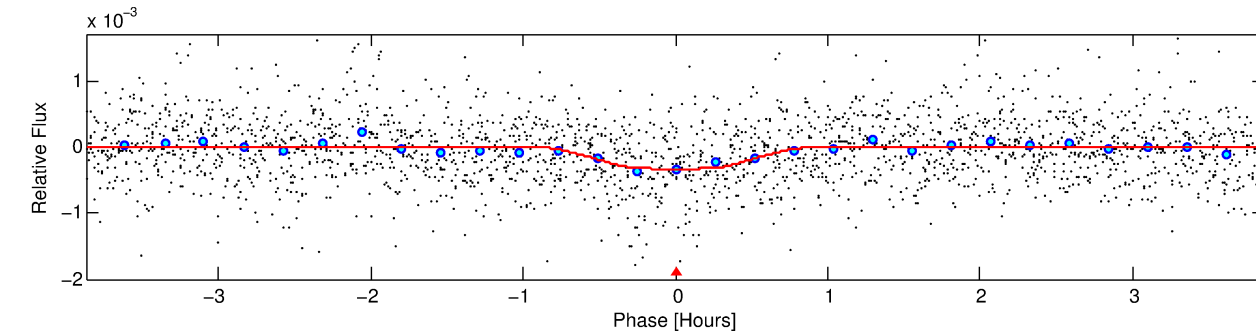
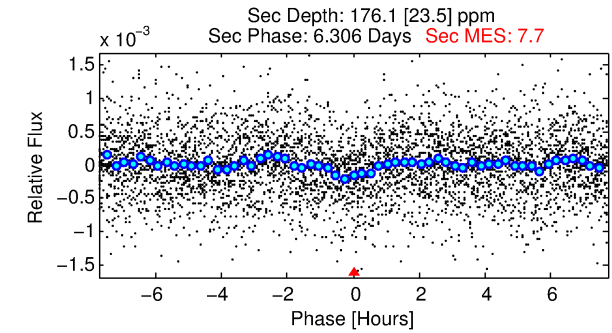
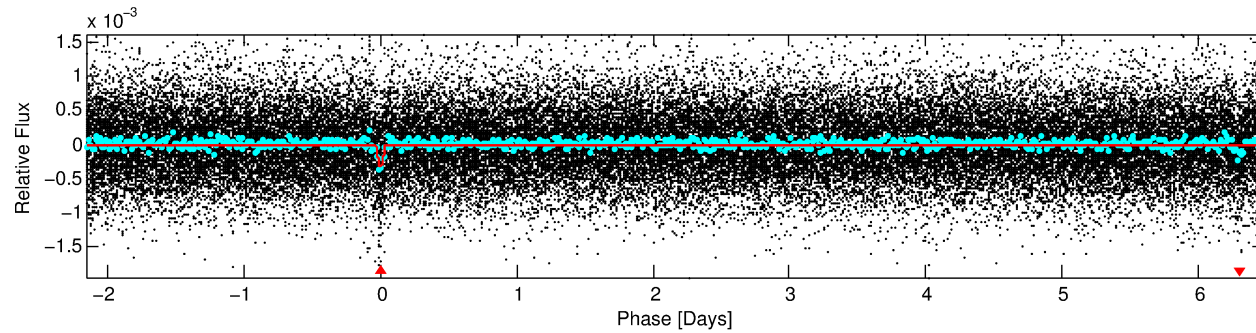
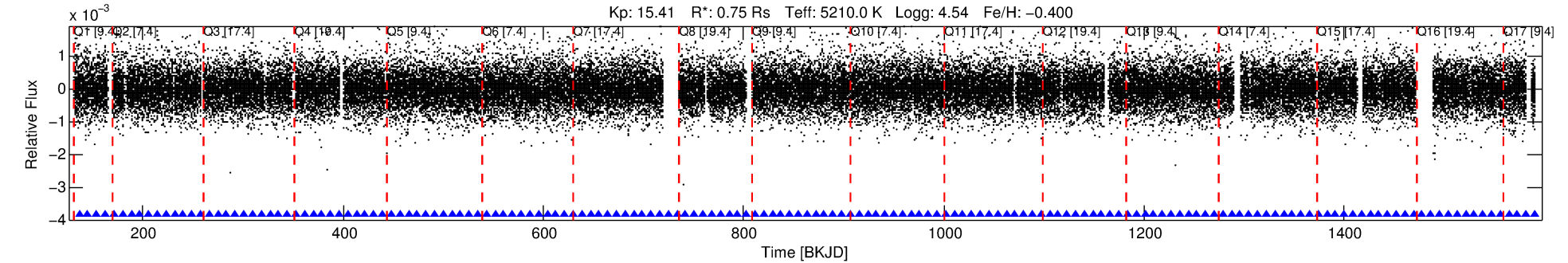
| TCE (1) | KIC | Parent (2) | Parent KIC | $P_1:P_2$ | Dist ($''$) | Δ Row | Δ Col | m_2 | m_1 | D_2/D_1 | Mechanism | Flag | σ_P | σ_T |
|--------------|---------|--------------|------------|-----------|---------------|--------------|--------------|-------|-------|-----------|------------|------|------------|------------|
| 004357985-01 | 4357985 | 004150611-01 | 4150611 | 1:1 | 712.6 | 180 | 0 | 7.90 | 15.42 | 177.05 | Direct-PRF | 0 | 0.30 | 0.31 |

Notes: $P_1:P_2$ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m_2 and m_1 are the magnitudes of the parent and child. D_2/D_1 is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match in period and epoch. For a match to be considered significant $\sigma_P < 5.0$ and $\sigma_T < 5.0$. Matches which have σ_P and σ_T very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

DV One-Page Summary

KIC: 4357985 Candidate: 1 of 1 Period: 8.653 d

KOI: K06406.01 Corr: 0.970



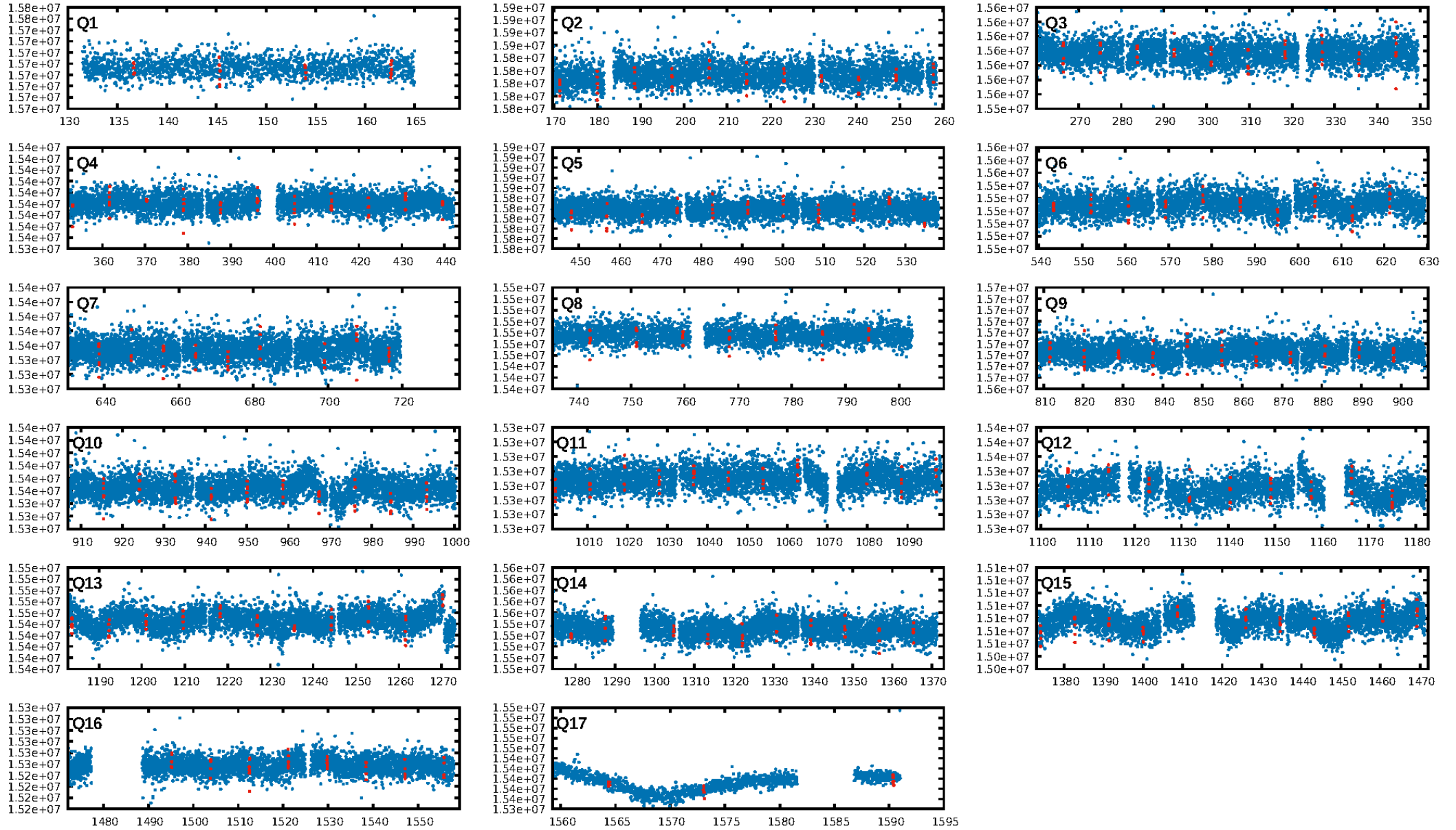
DV Fit Results:

Period = 8.65307 [0.00003] d
Epoch = 136.6646 [0.0030] BKJD
Rp/R* = 0.0203 [0.0146]
a/R* = 23.87 [72.98]
b = 0.91 [0.61]
Seff = 68.60 [13.54]
Teff = 734 [36] K
Rp = 1.66 [1.21] Re
a = 0.0735 [0.0077] AU
Ag = 190.30 [276.57] [0.68σ]
Teffp = 4214 [1527] K [2.28σ]

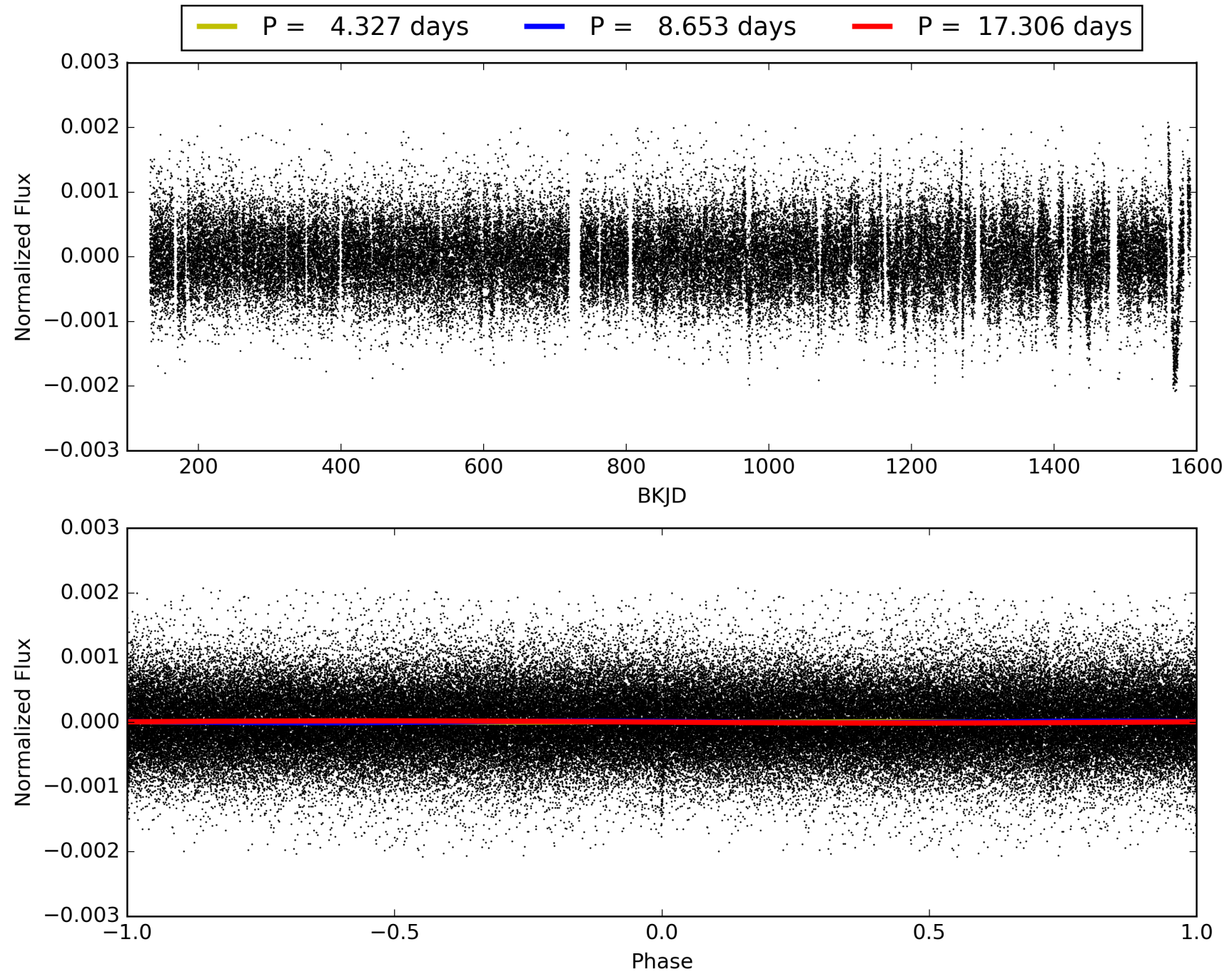
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: N/A
ModelChiSquare2-sig: 22.5%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.67e-24
RollingBand-fgt: 1.00 [150/150]
GhostDiagnostic-chr: 4.077
Centroid-sig: 29.8%
Centroid-so: 1.268 arcsec [1.11σ]
OotOffset-rm: 0.862 arcsec [0.86σ]
KicOffset-rm: 1.023 arcsec [1.04σ]
OotOffset-st: 4/4/2/4 [14]
KicOffset-st: 4/4/2/4 [14]
DiffImageQuality-fgm: 0.57 [8/14]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 004357985-01, PDC Light Curves

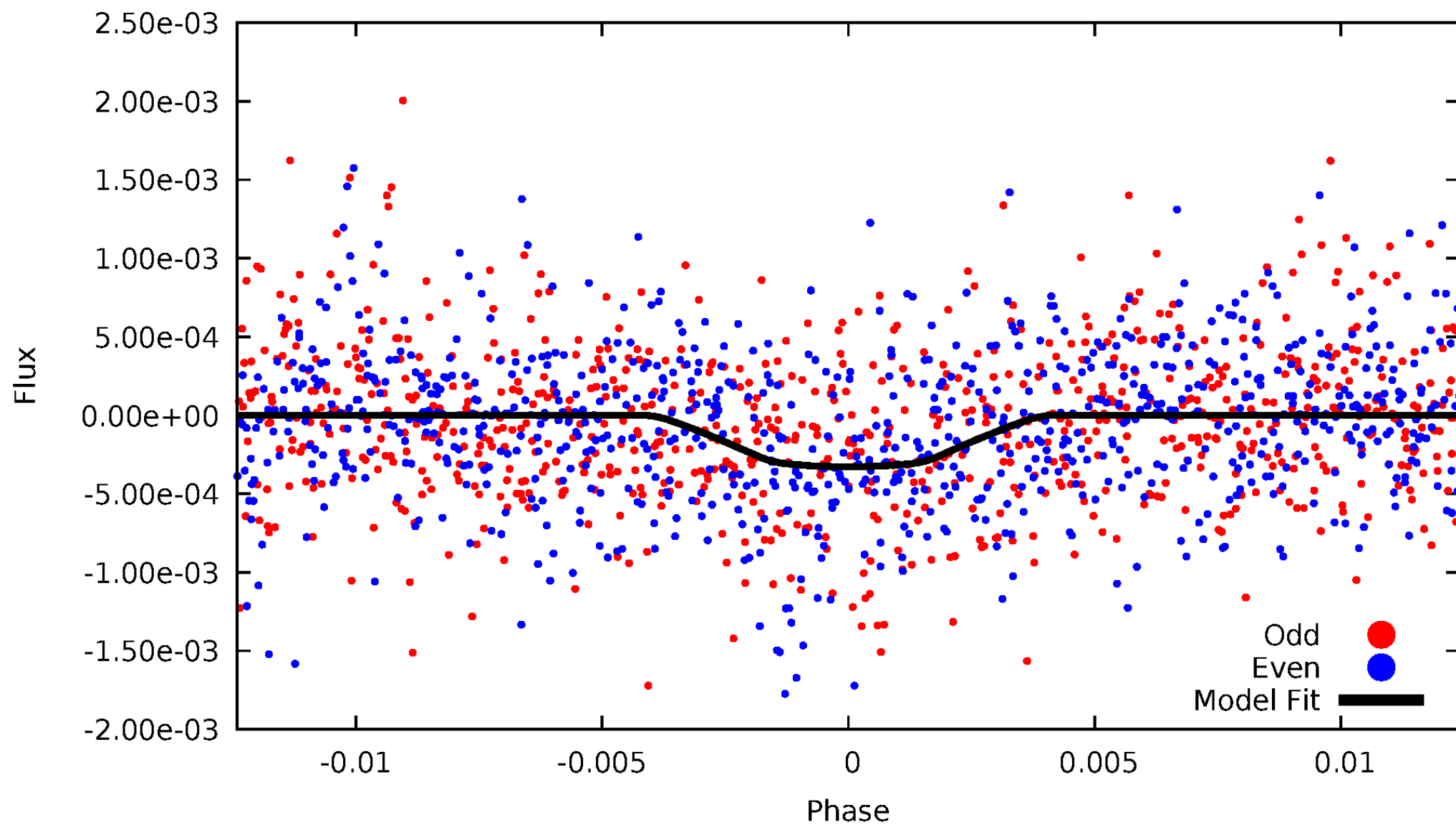


TCE 004357985-01



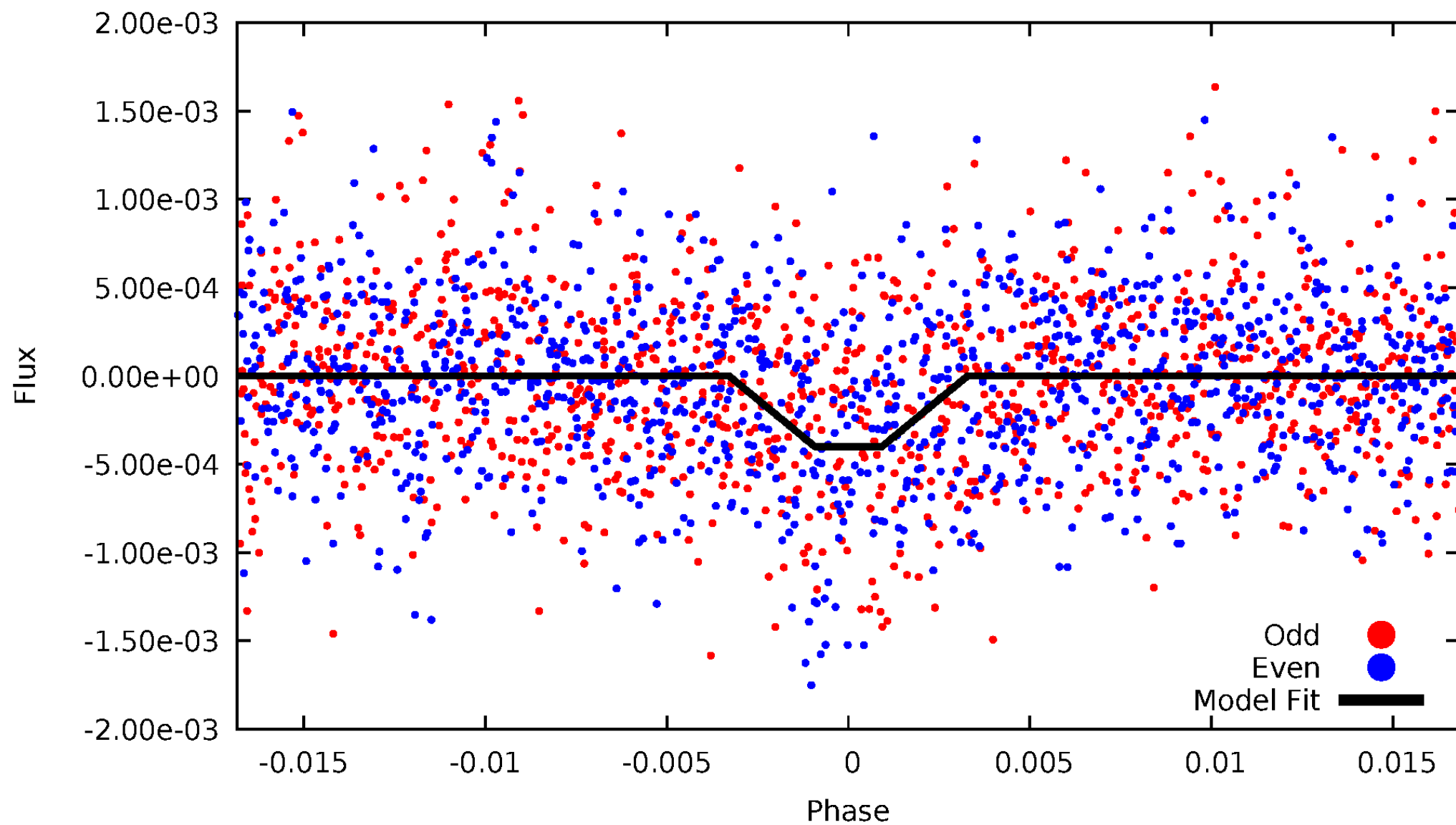
DV Odd/Even

TCE 004357985-01



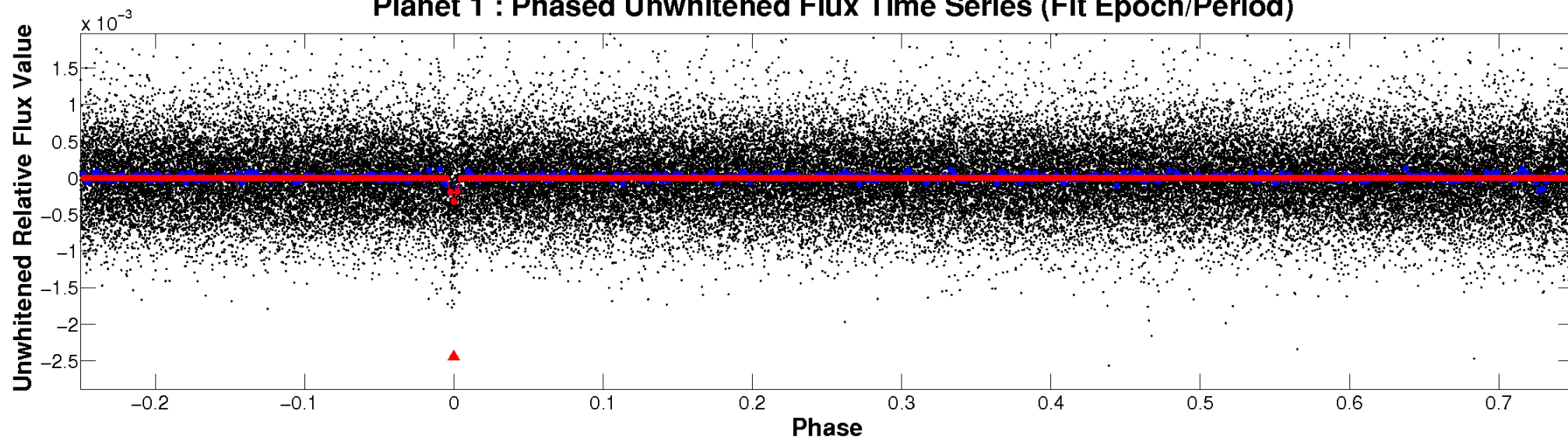
ALT Odd/Even

TCE 004357985-01

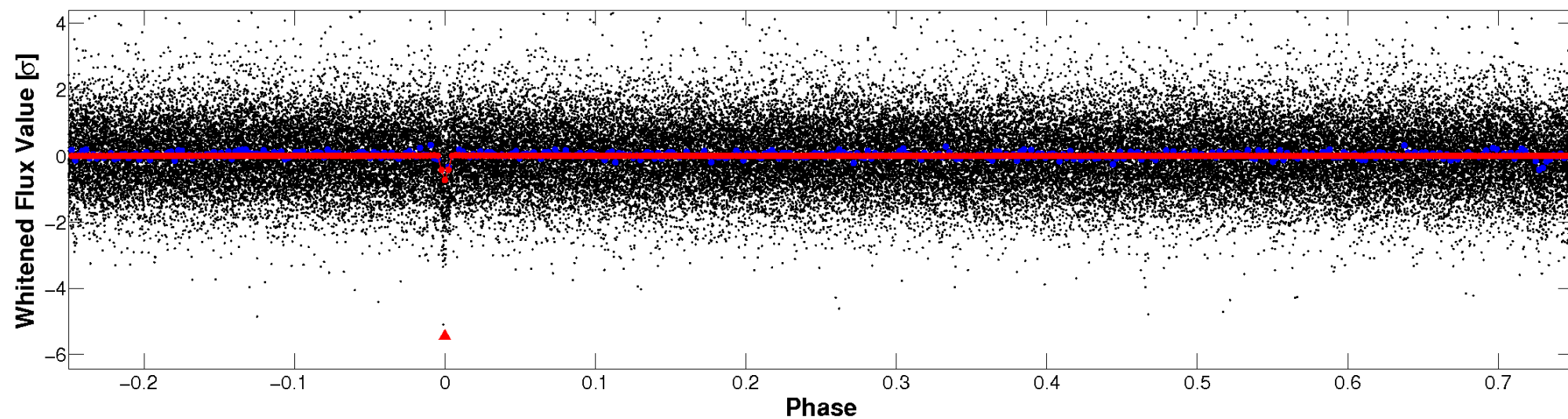


Non-Whitened Vs. Whitened Light Curve

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

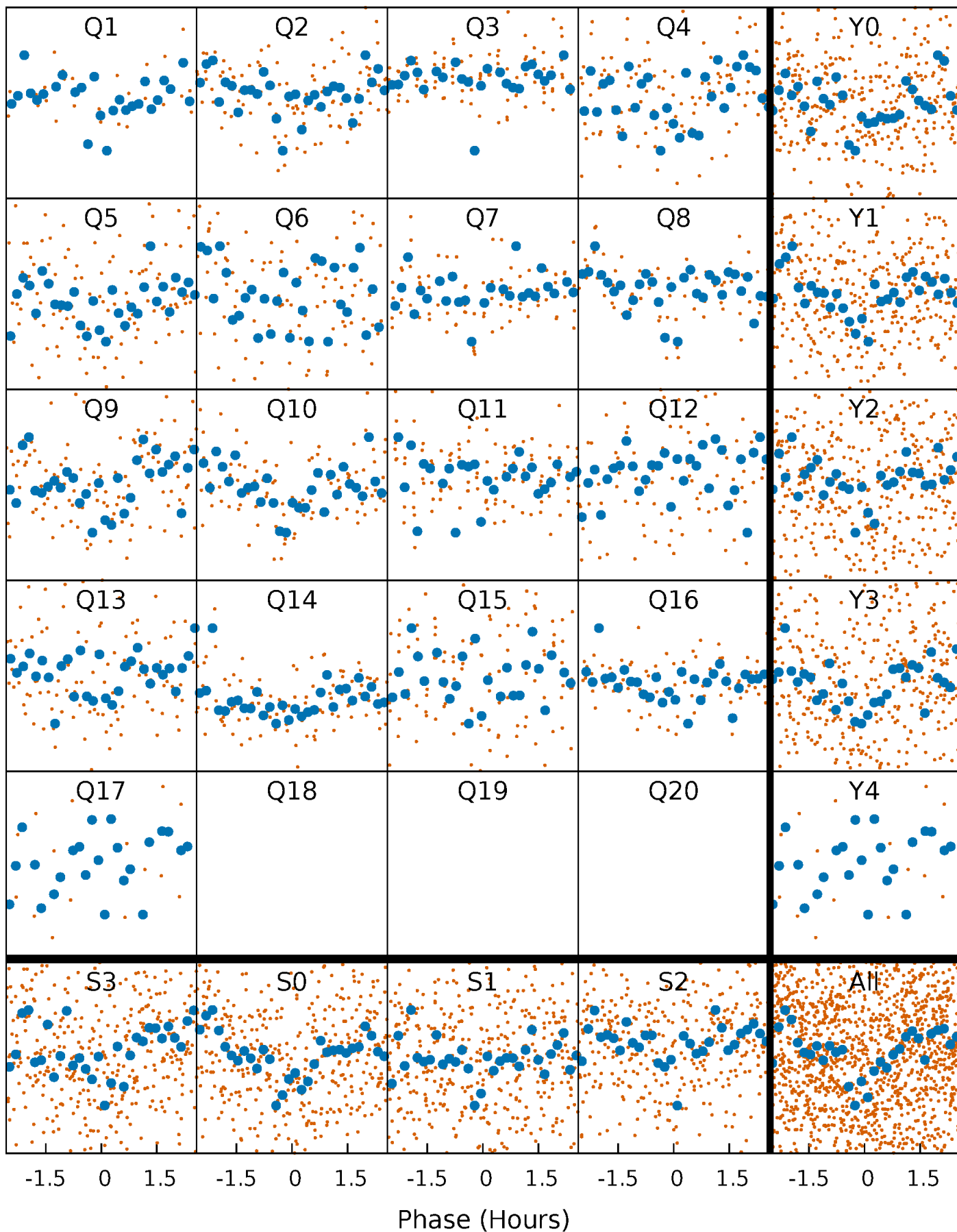


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



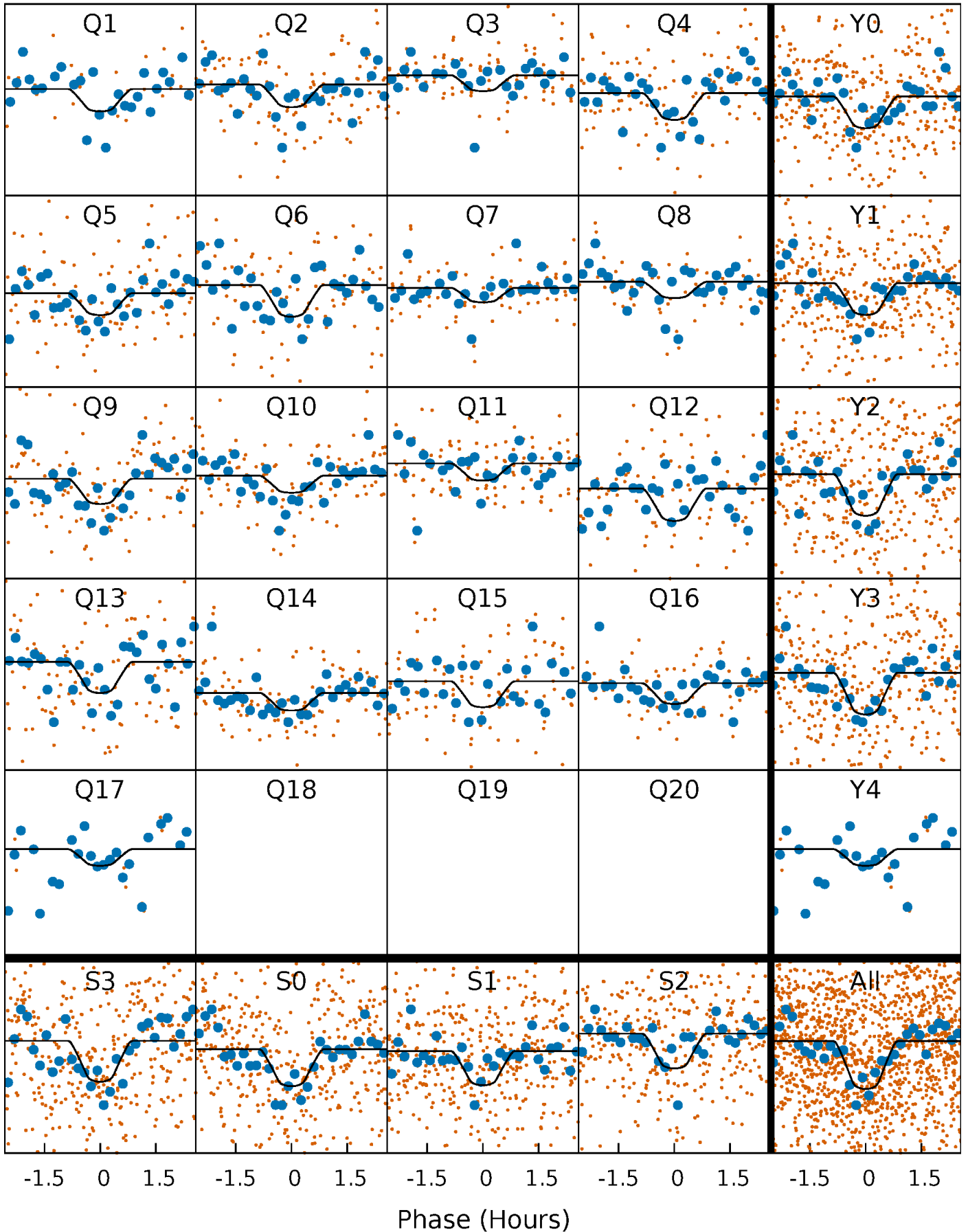
PDC Quarter-Phased Transit Curves

TCE 004357985-01 P= 8.653070 Days $T_0=136.664589$ (BKJD)



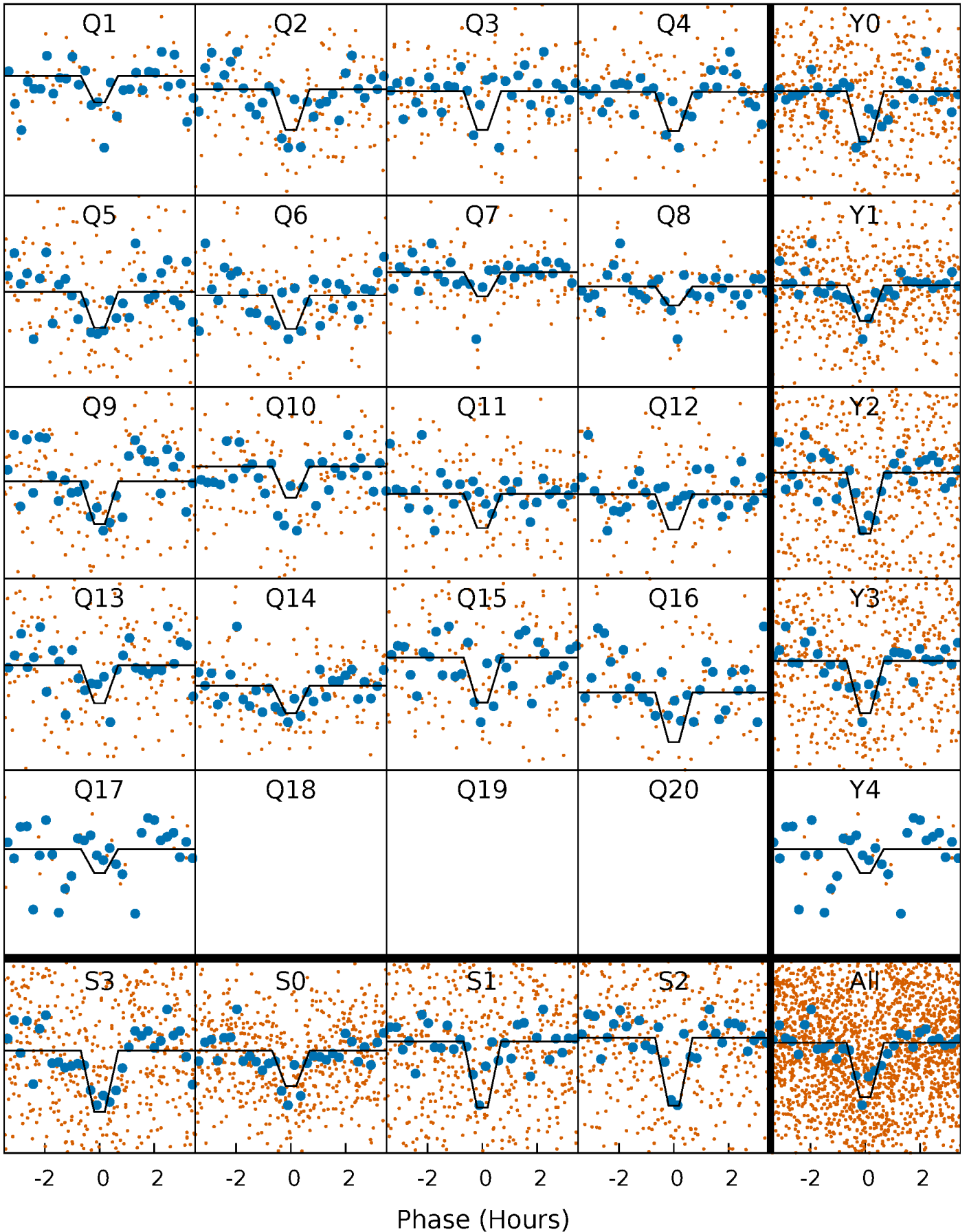
DV Quarter-Phased Transit Curves

TCE 004357985-01 P= 8.653070 Days $T_0=136.664589$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

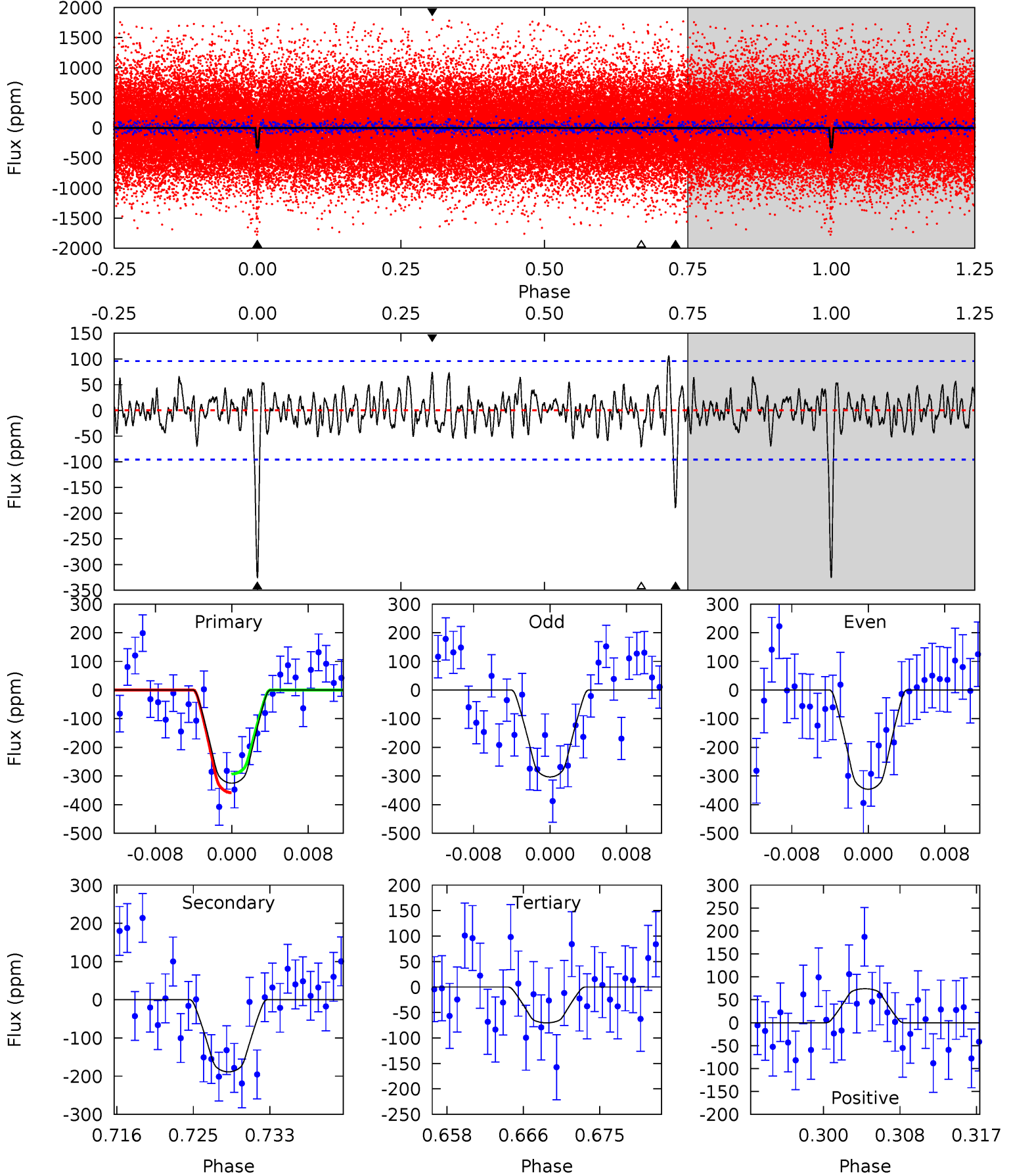
TCE 004357985-01 P= 8.653064 Days $T_0=136.662441$ (BKJD)



DV Model-Shift Uniqueness Test

004357985-01, P = 8.653070 Days, E = 128.011519 Days

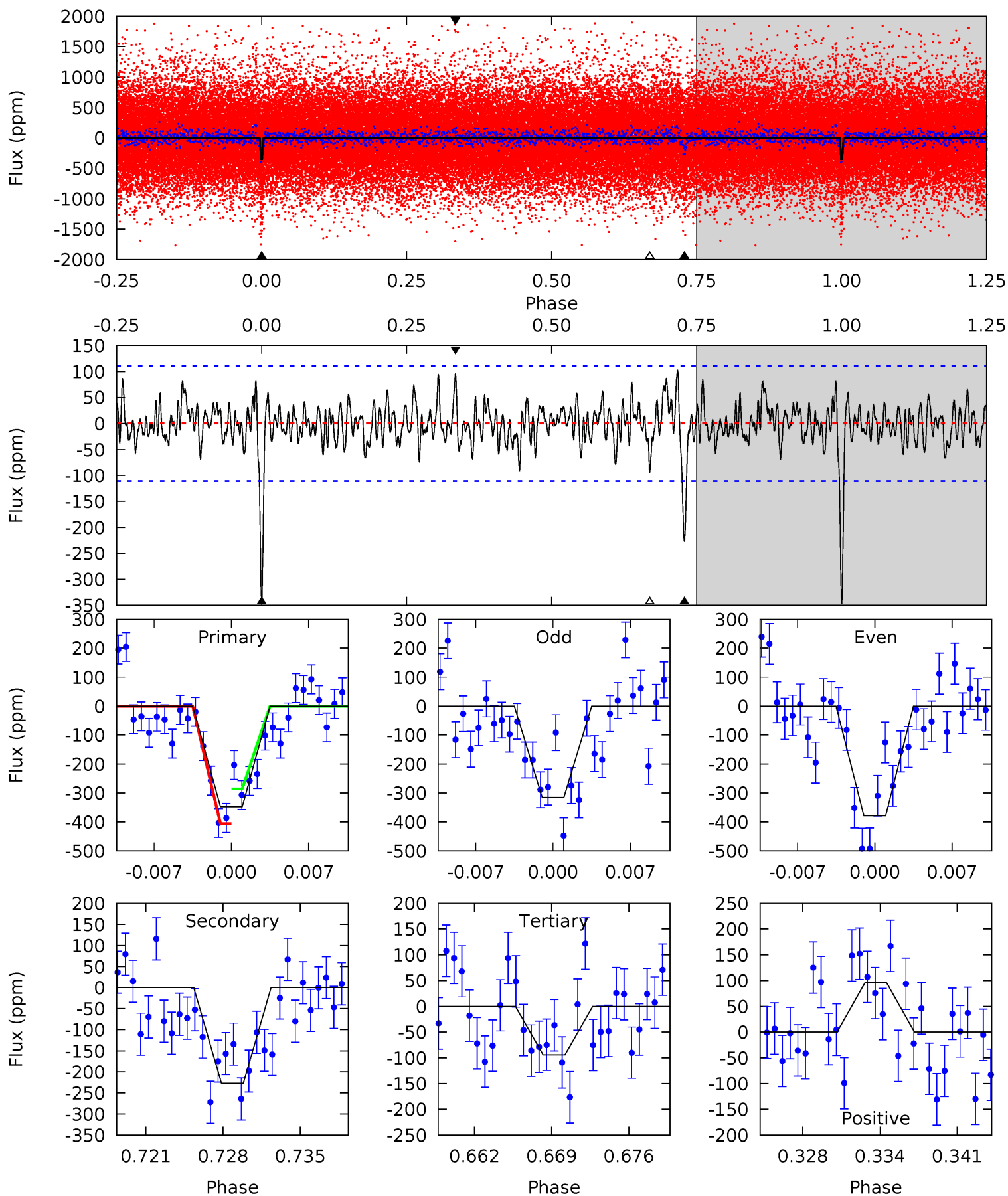
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 17.2 | 9.96 | 3.71 | 3.91 | 5.06 | 2.64 | 1.37 | 13.4 | 13.3 | 6.25 | 6.05 | 1.13 | 0.99 | 0.25 | 1.74 |



Alt Model-Shift Uniqueness Test

004357985-01, P = 8.653064 Days, E = 128.009377 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 16.0 | 10.4 | 4.34 | 4.40 | 5.11 | 2.72 | 1.42 | 11.6 | 11.6 | 6.11 | 6.05 | 1.47 | 0.95 | 0.23 | 2.78 |



Stellar Parameters For KIC 004357985

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | $M(M_{\odot})$ | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 5210^{+155}_{-155} | $4.538^{+0.088}_{-0.064}$ | $-0.400^{+0.350}_{-0.300}$ | $0.749^{+0.091}_{-0.083}$ | $0.707^{+0.101}_{-0.043}$ | $2.366^{+0.884}_{-0.542}$ |
| | +3%/-3% | +2%/-1% | +87%/-75% | +12%/-11% | +14%/-6% | +37%/-23% |
| 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 004357985-01 / KOI 6406.01

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|---------------|------------------------|--------------------|-----------------------|----------------------|
| DV | -189 ± 19 | $1.77^{+1.09}_{-0.97}$ | 1021^{+40}_{-41} | 4342^{+1753}_{-713} | 182^{+702}_{-112} |
| Alt. | -227 ± 22 | $1.75^{+1.13}_{-1.09}$ | 1020^{+43}_{-41} | 4535^{+2548}_{-813} | 222^{+1289}_{-140} |

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 $A_{obs} \gg 1.0$

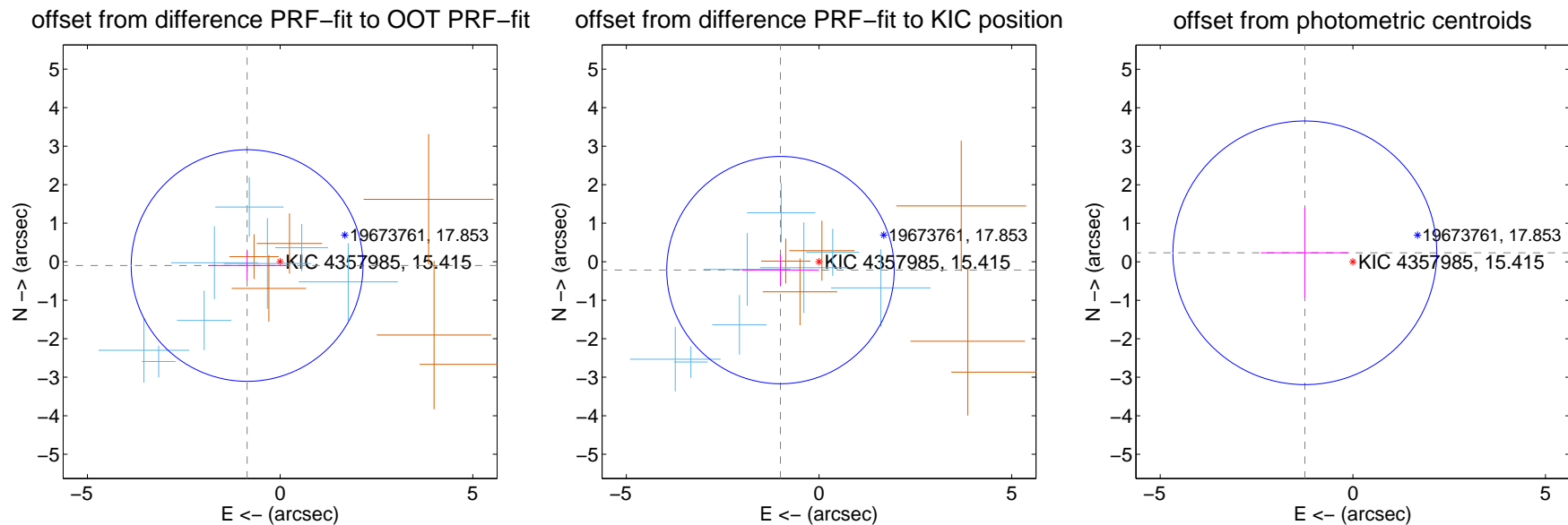
DV Centroid Data

Supplemental centroid analysis for 004357985-01. Kepler magnitude: 15.41. Transit SNR 11.73

There are 8 quarters with good PRF difference image offsets

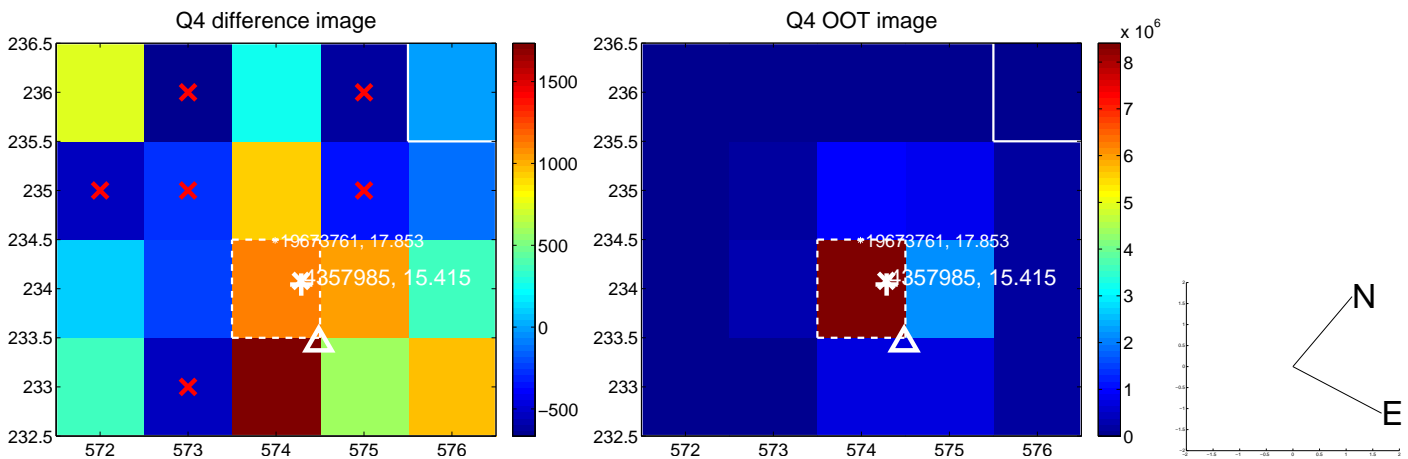
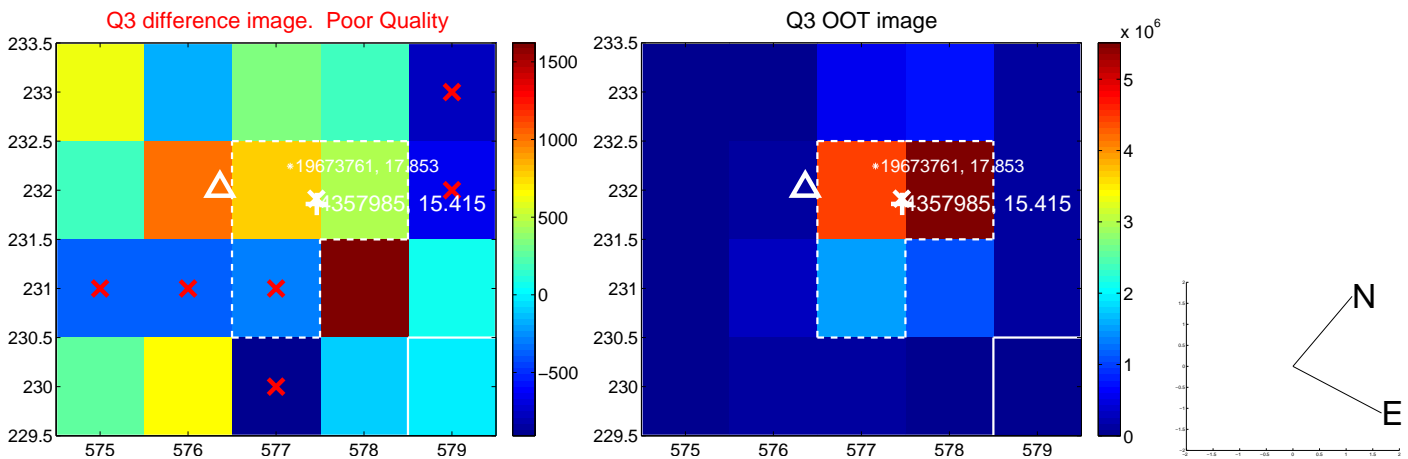
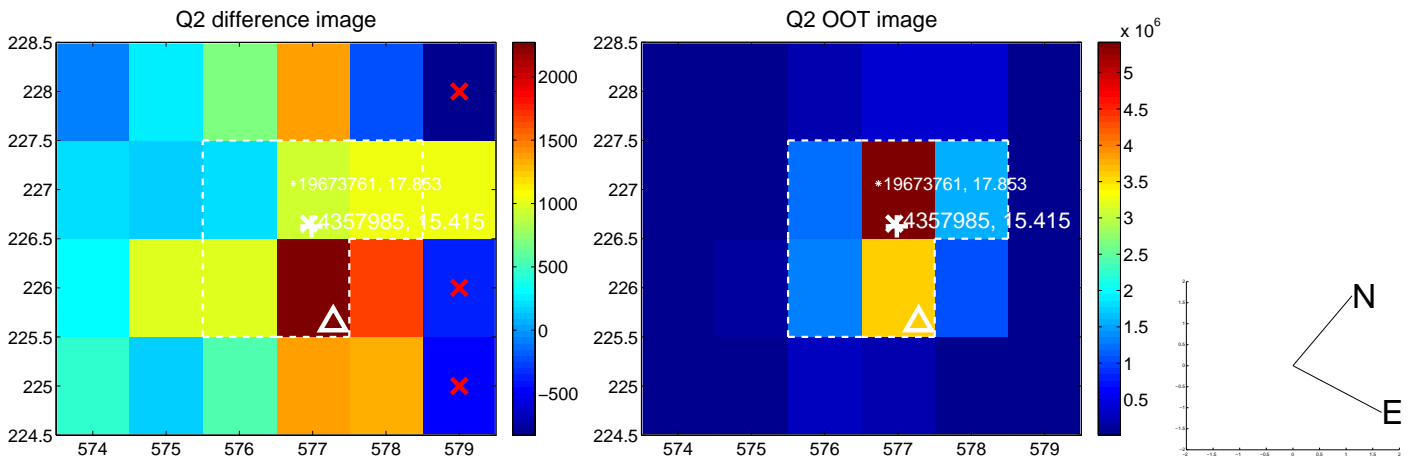
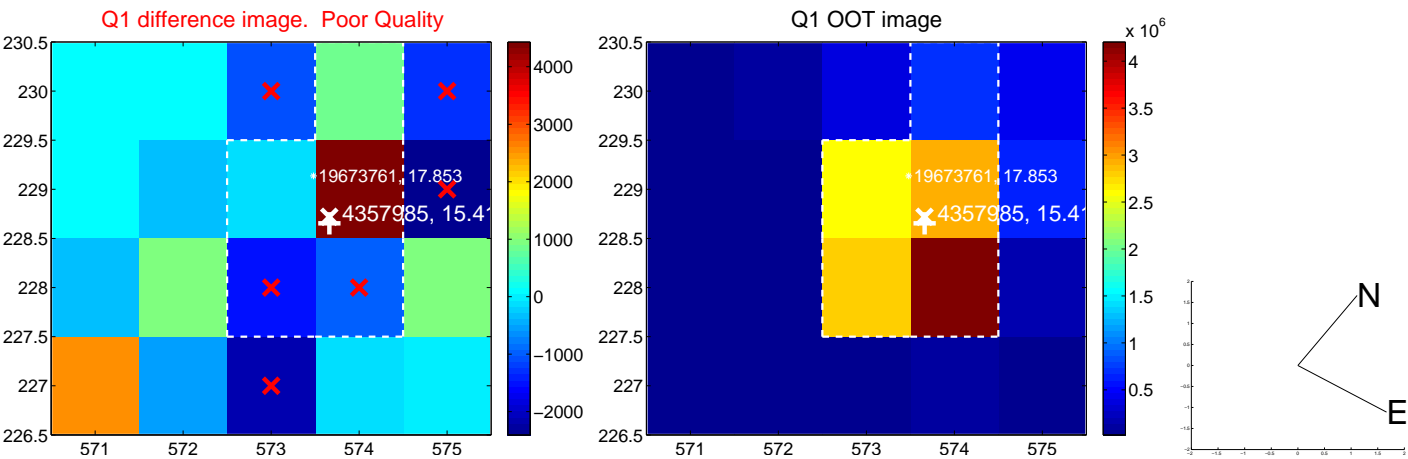
The direct PRF centroid is offset from the target star catalog position by about 0.28 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT | 0.862 ± 1.002 | 0.86 | 0.857 ± 1.013 | -0.100 ± 0.378 |
| PRF-fit source offset from KIC position | 1.023 ± 0.984 | 1.04 | 0.999 ± 1.001 | -0.218 ± 0.403 |
| photometric centroid source offset | 1.27 ± 1.14 | 1.11 | 1.25 ± 1.14 | 0.23 ± 1.17 |

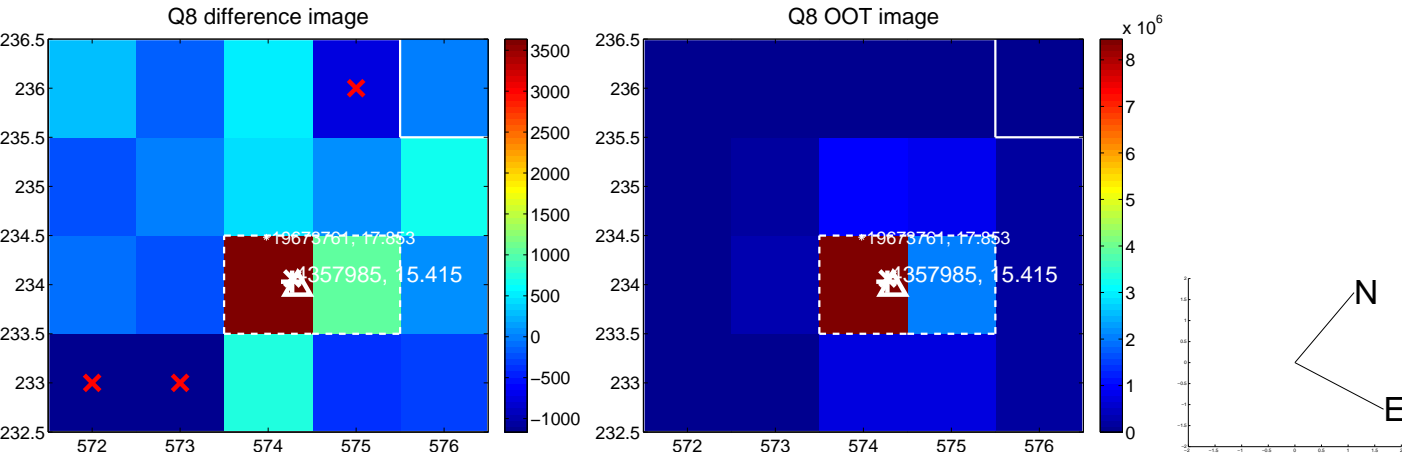
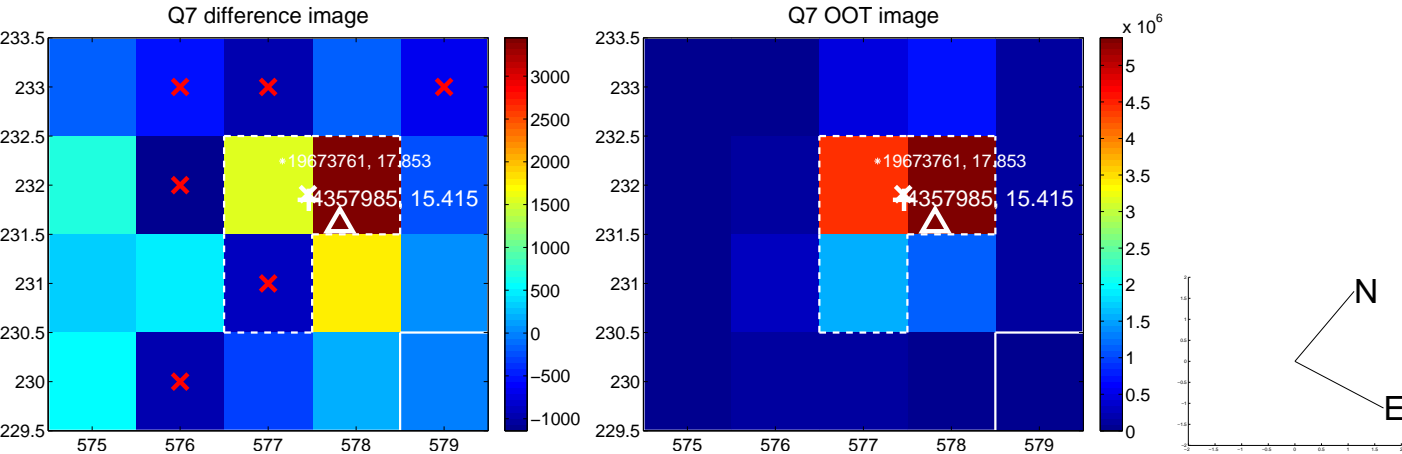
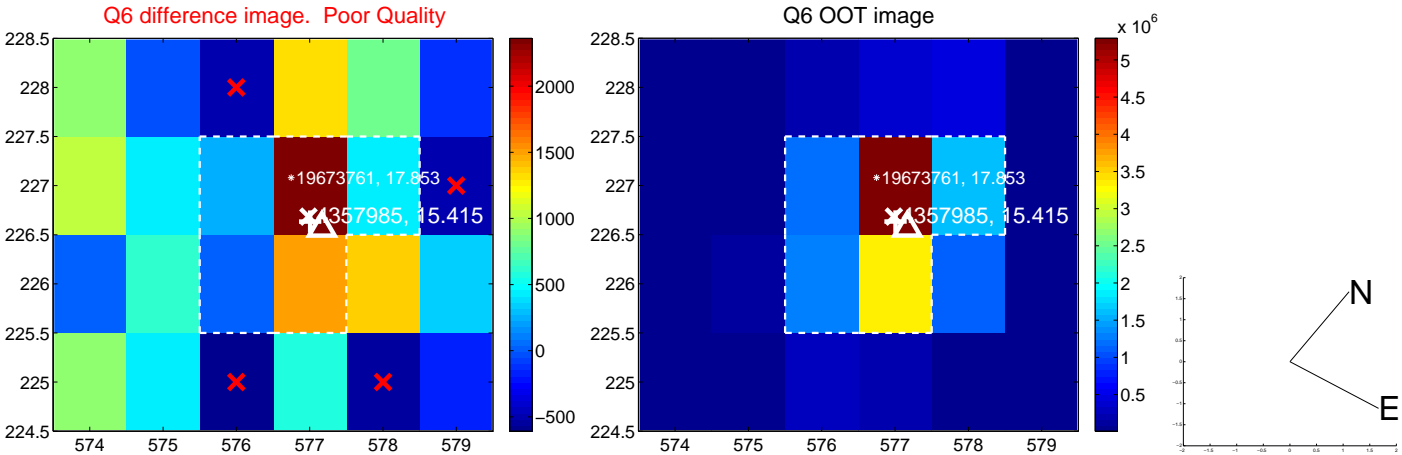
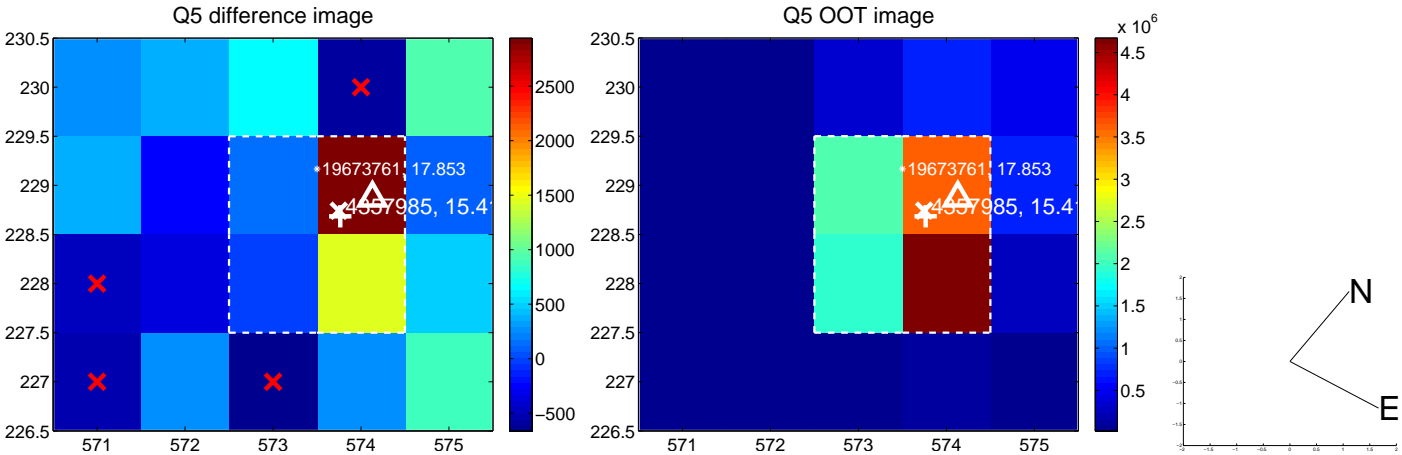


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

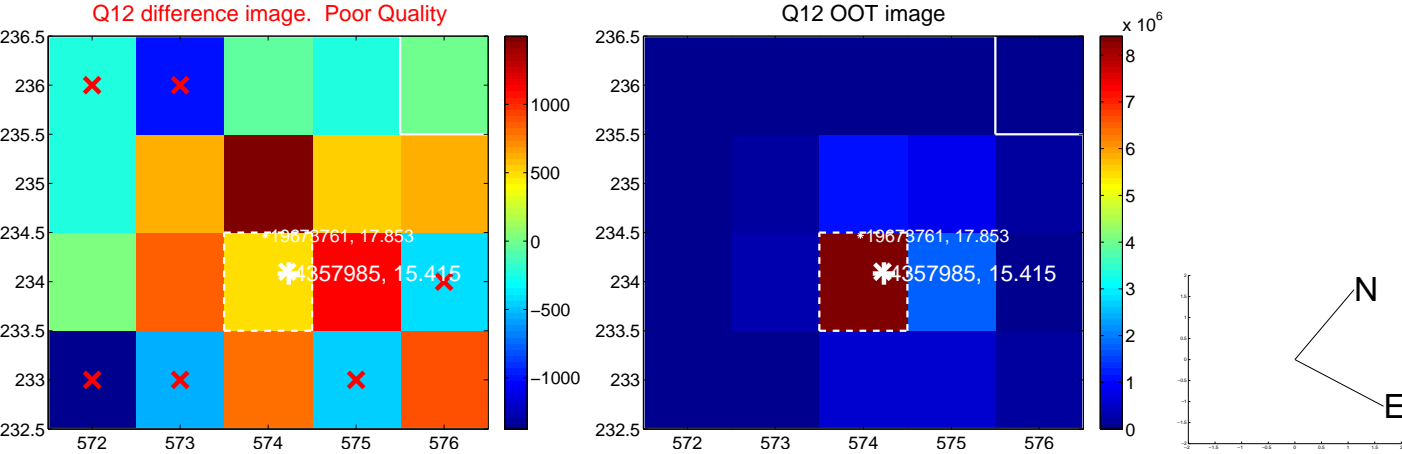
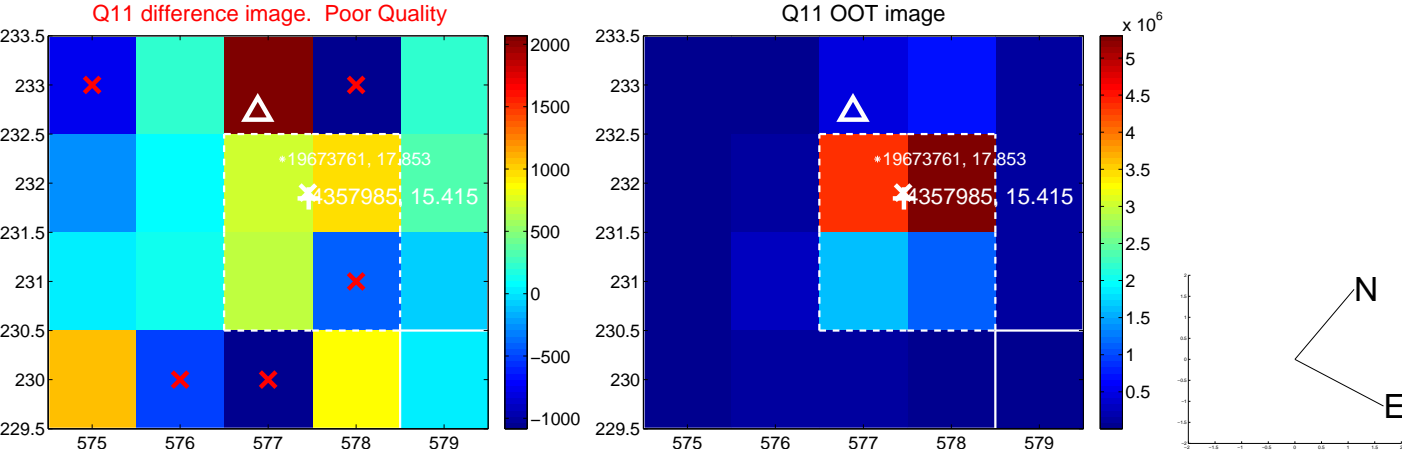
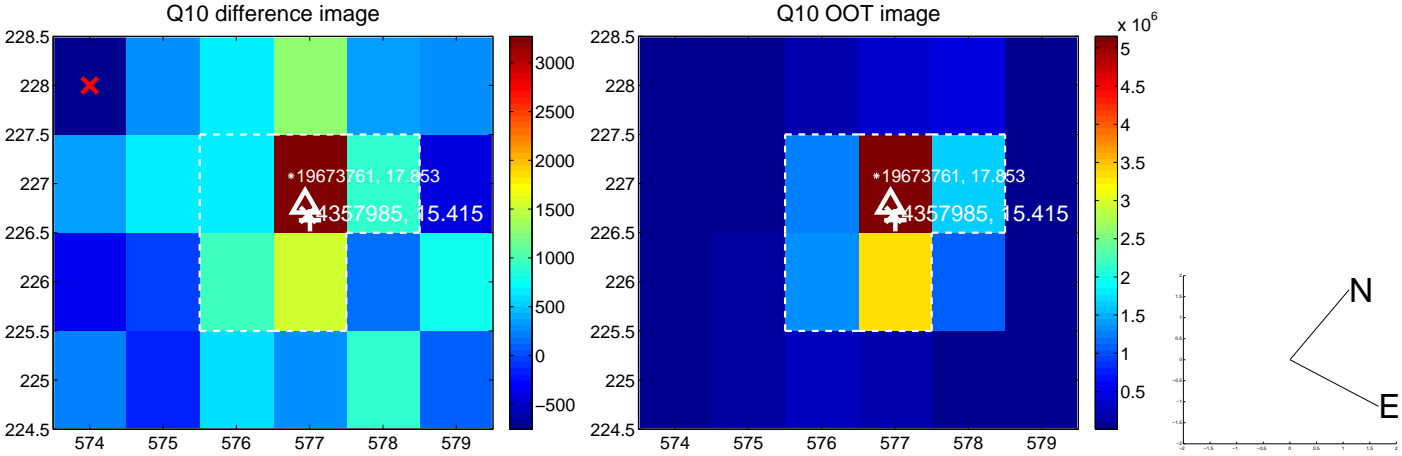
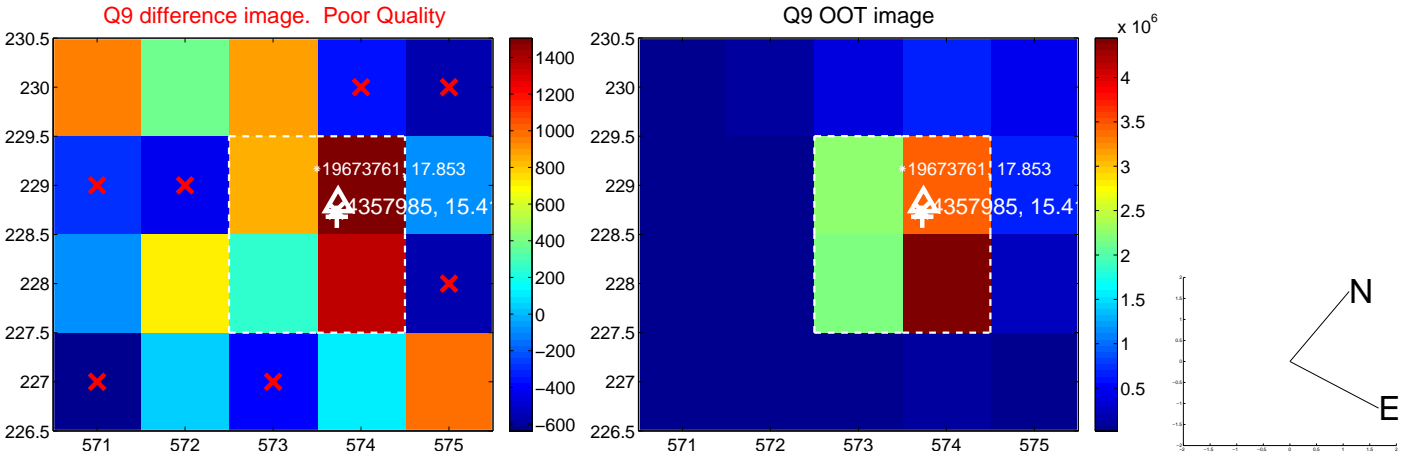
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



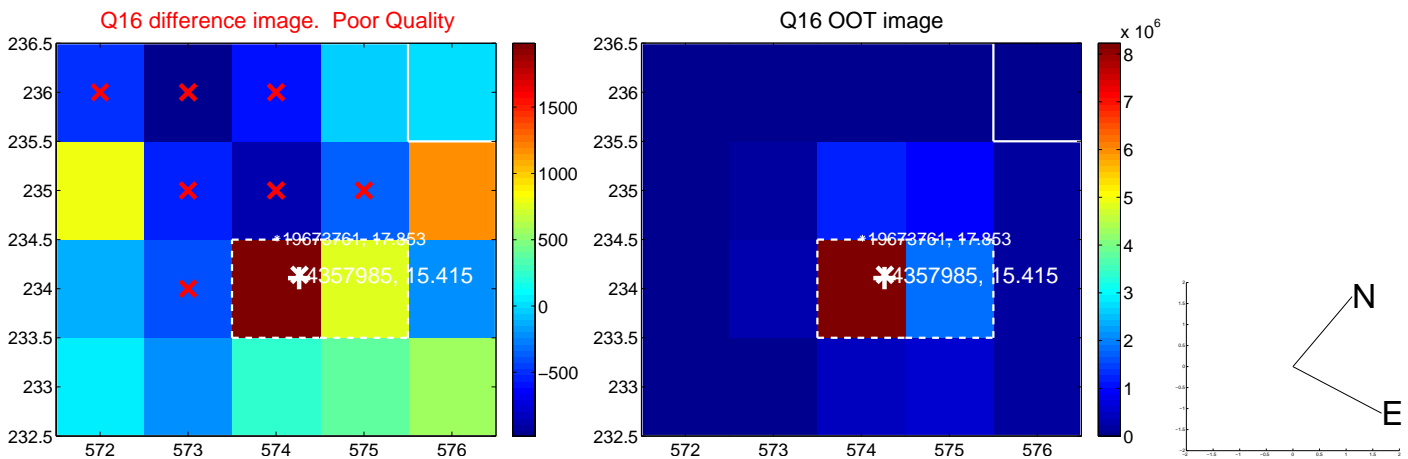
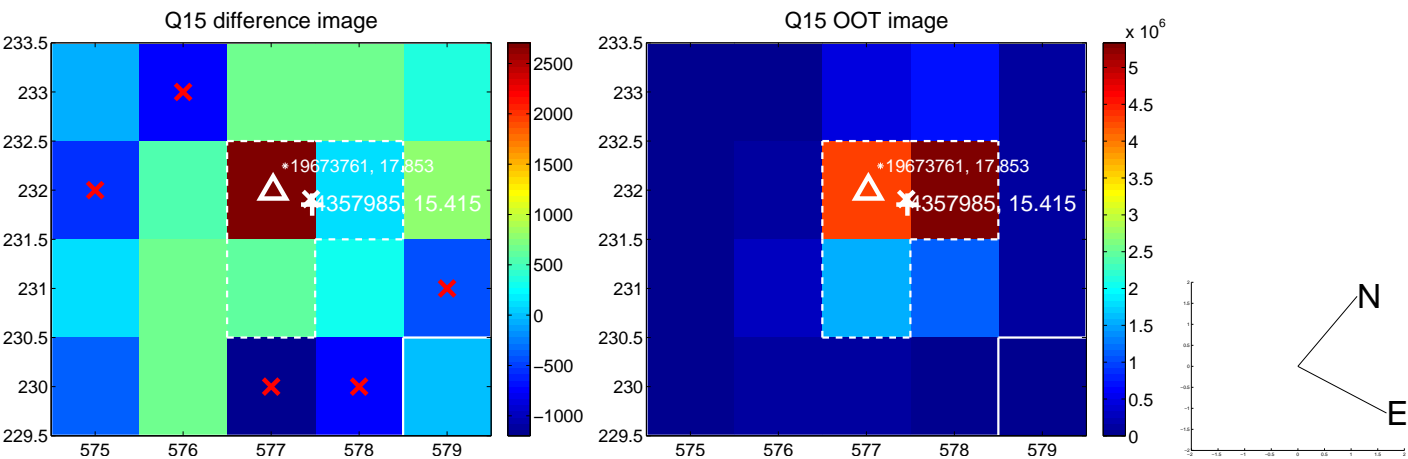
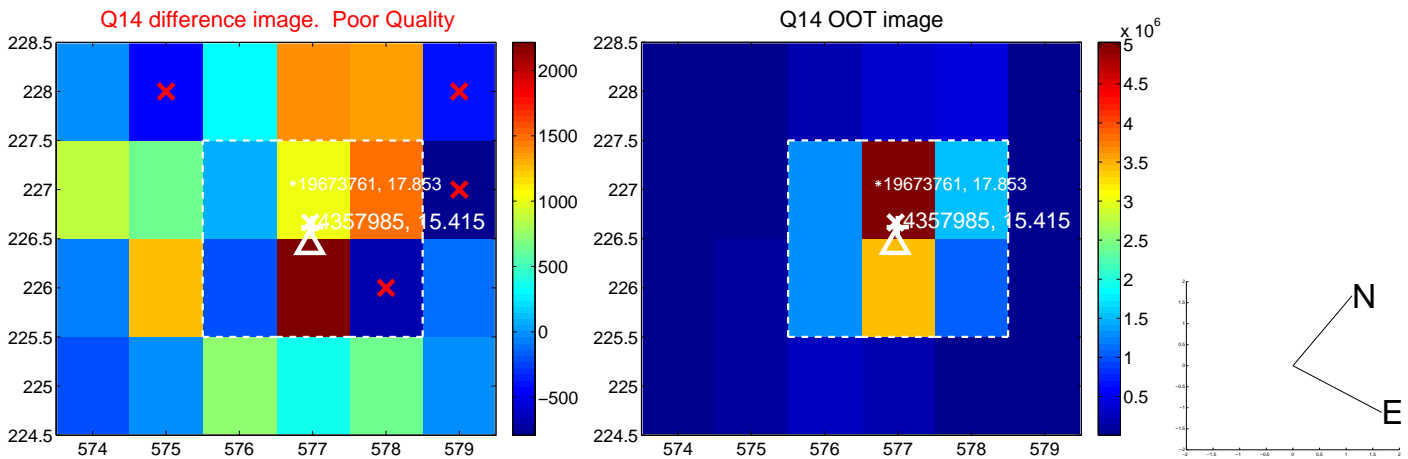
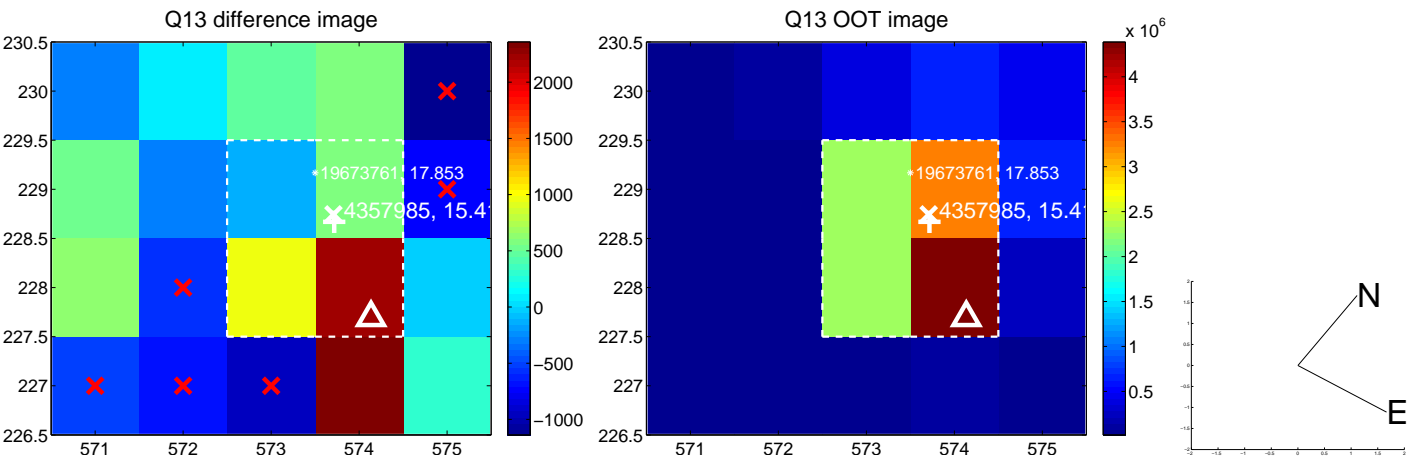
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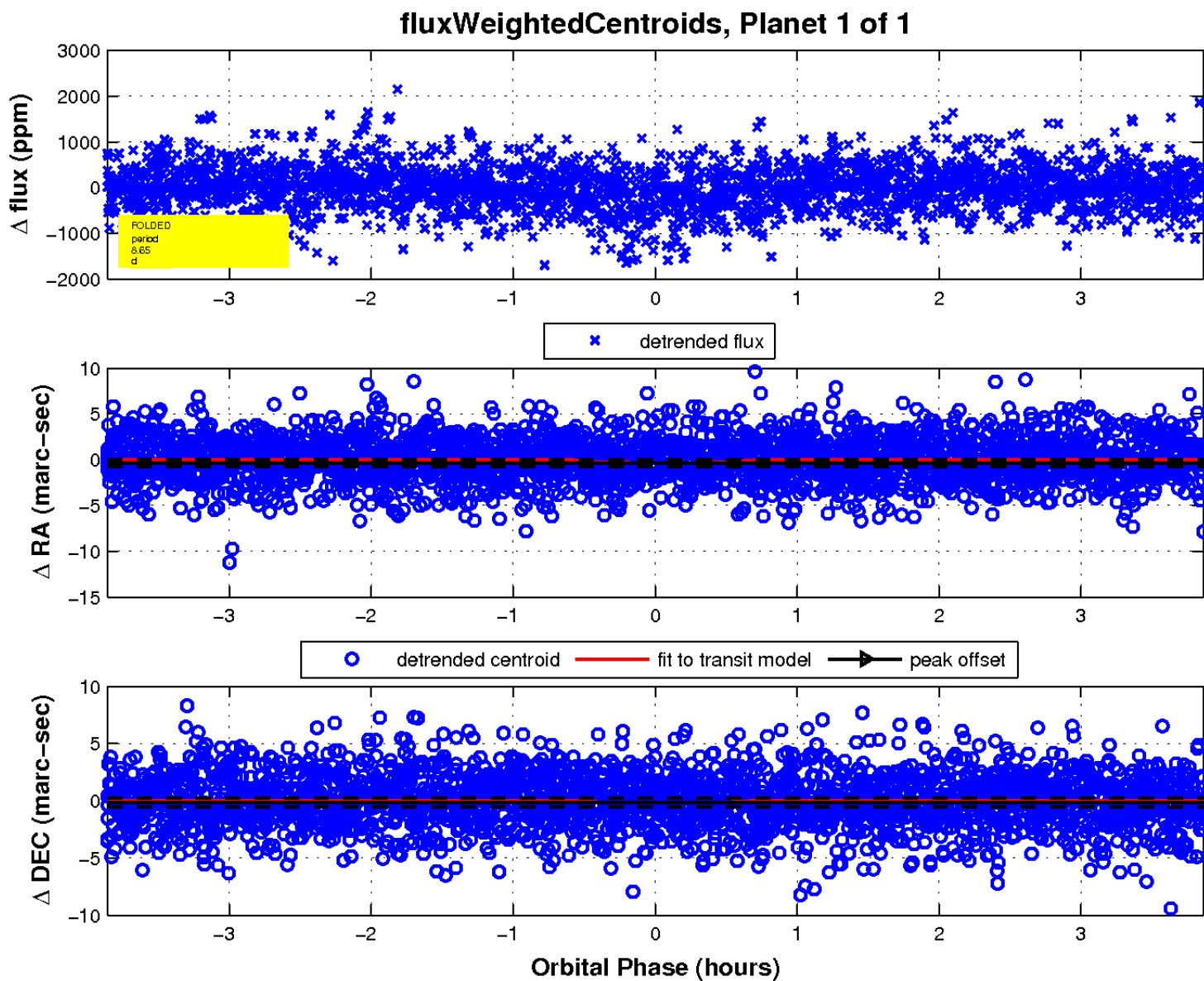
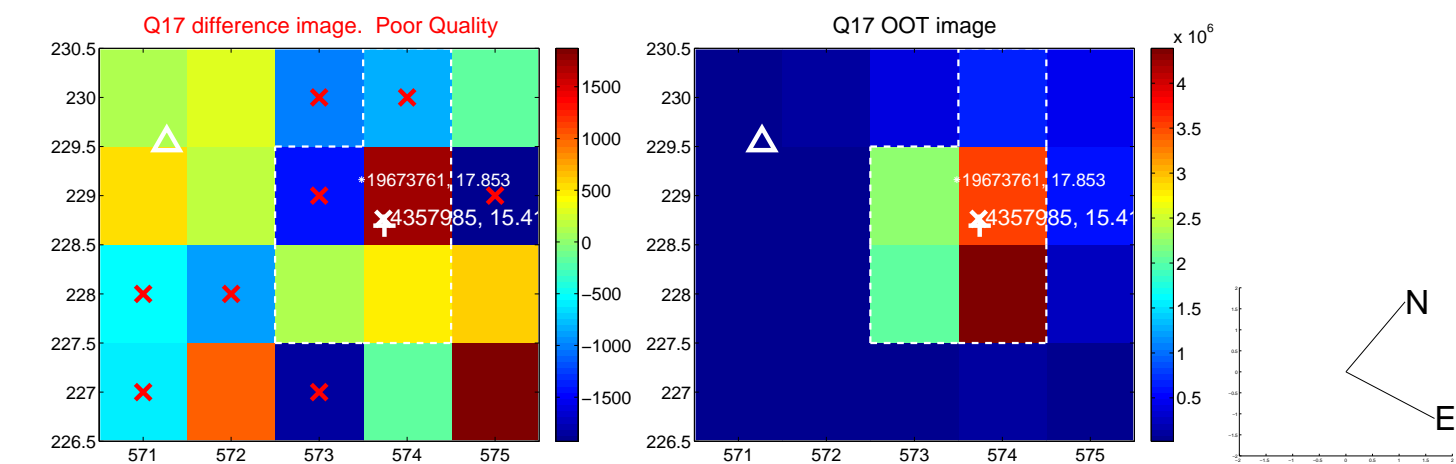
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white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination

