

KIC 011513155

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 011513155-01 | OBS | No | 209.784608 | 325.547075 | 168.0 | 9.277 | 31.8 | 3.7 | 1.88 | 7232 | 2.49 | 14.24 |
| 011513155-02 | OBS | No | 490.392492 | 250.496349 | 759.9 | 4.953 | 12.7 | 12.3 | 1.88 | 7232 | 5.63 | 4.59 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 011513155-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED |
| 011513155-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED |

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

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

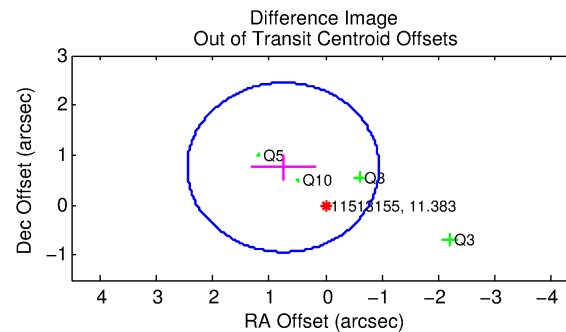
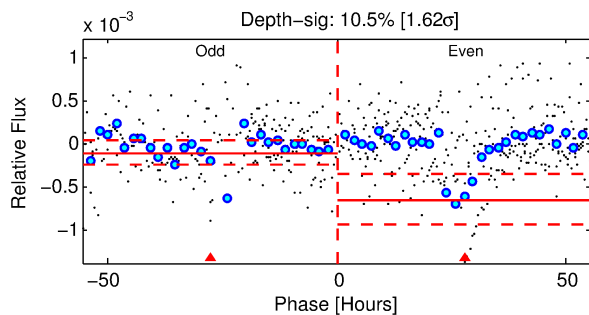
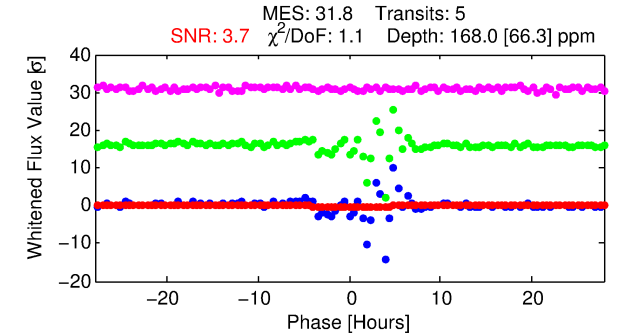
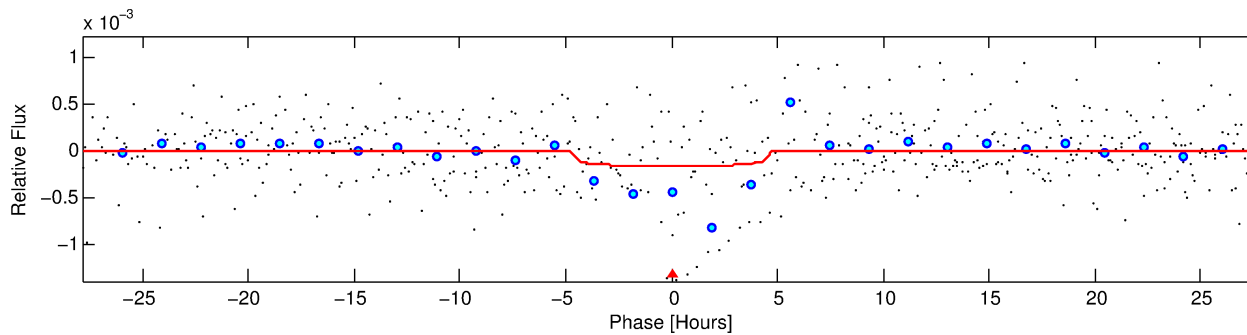
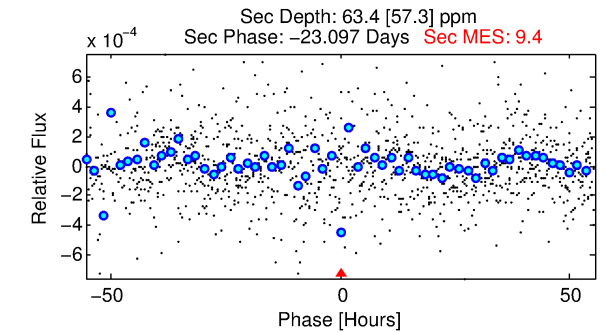
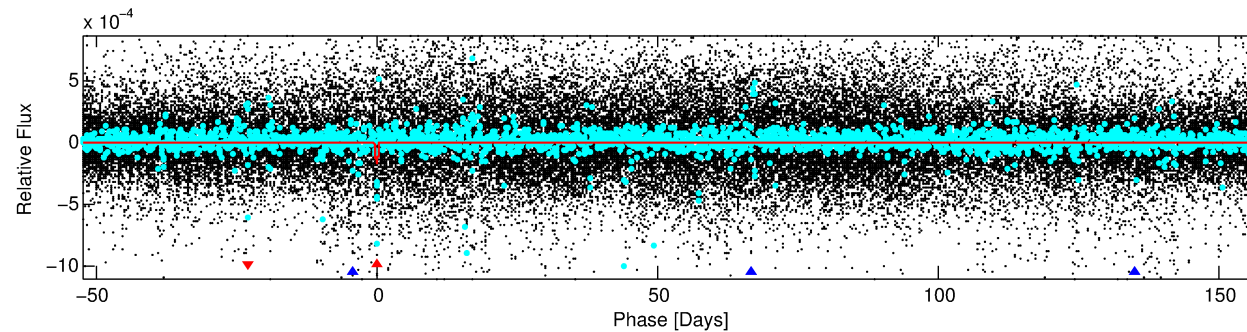
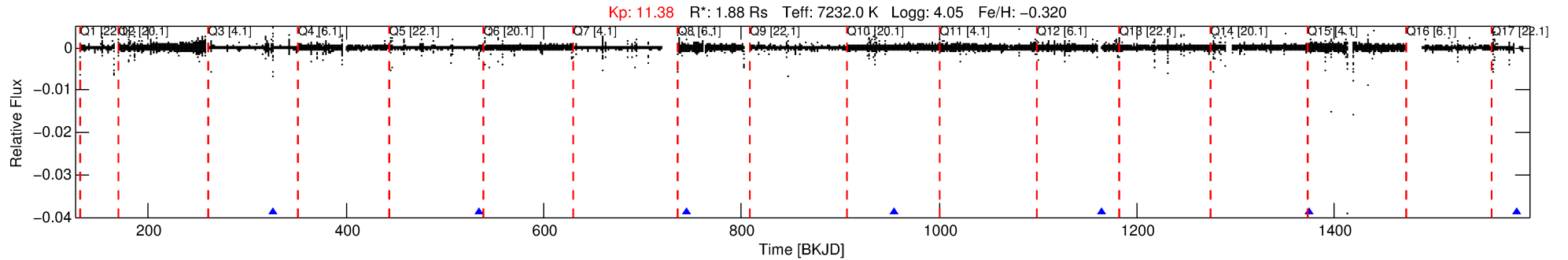
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 011513155-01

No Significant Match Found

DV One-Page Summary

KIC: 11513155 Candidate: 1 of 2 Period: 209.785 d



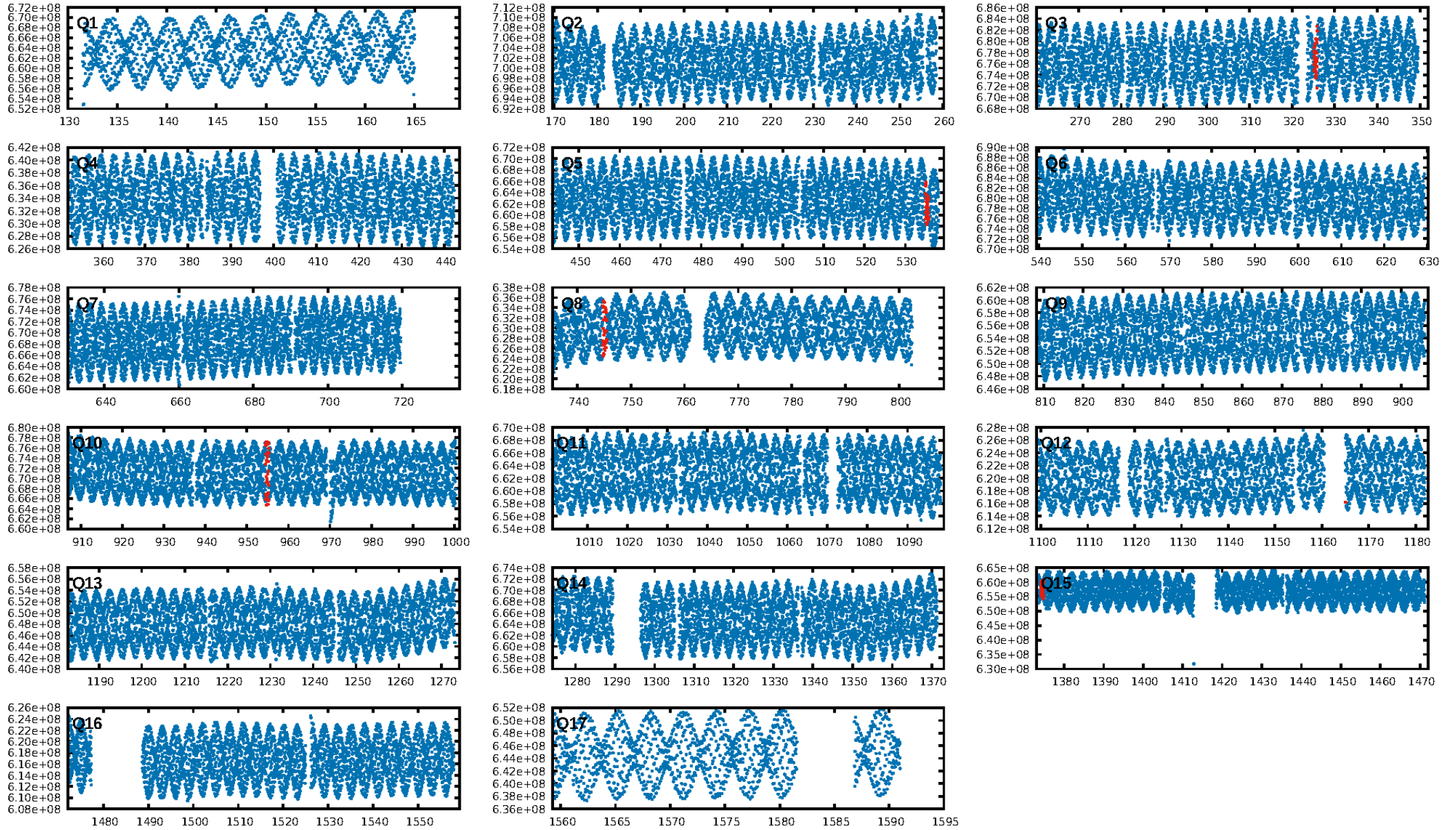
DV Fit Results:

Period = 209.78461 [0.01020] d
Epoch = 325.5471 [0.0168] BKJD
Rp/R* = 0.0121 [0.0306]
a/R* = 167.36 [2536.43]
b = 0.29 [47.41]
Seff = 14.24 [5.78]
Teq = 495 [50] K
Rp = 2.49 [6.31] Re
a = 0.7795 [0.1919] AU
Ag = 3427.74 [17617.47] [0.19σ]
Teffp = 5860 [7513] K [0.71σ]

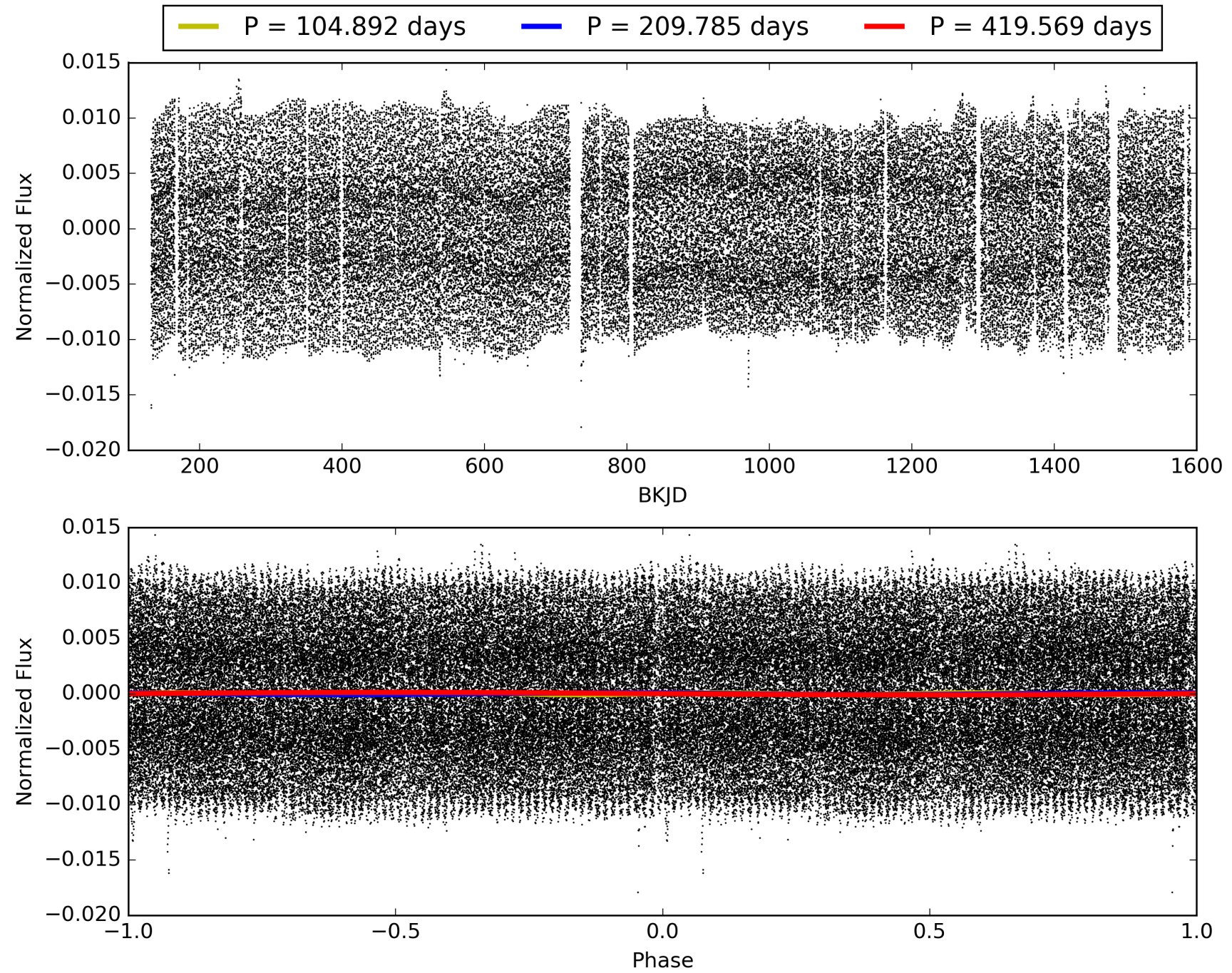
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [640.35σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 5.90e-14
RollingBand-fgt: 1.00 [5/5]
GhostDiagnostic-chr: 0.7628
Centroid-sig: 28.8%
Centroid-so: 0.657 arcsec [0.76σ]
OotOffset-rm: 1.064 arcsec [1.88σ]
KicOffset-rm: 1.038 arcsec [1.31σ]
OotOffset-st: 1/1/1/1 [4]
KicOffset-st: 1/1/1/1 [4]
DiffImageQuality-figm: 0.75 [3/4]
DiffImageOverlap-fno: 1.00 [4/4]

TCE 011513155-01, PDC Light Curves

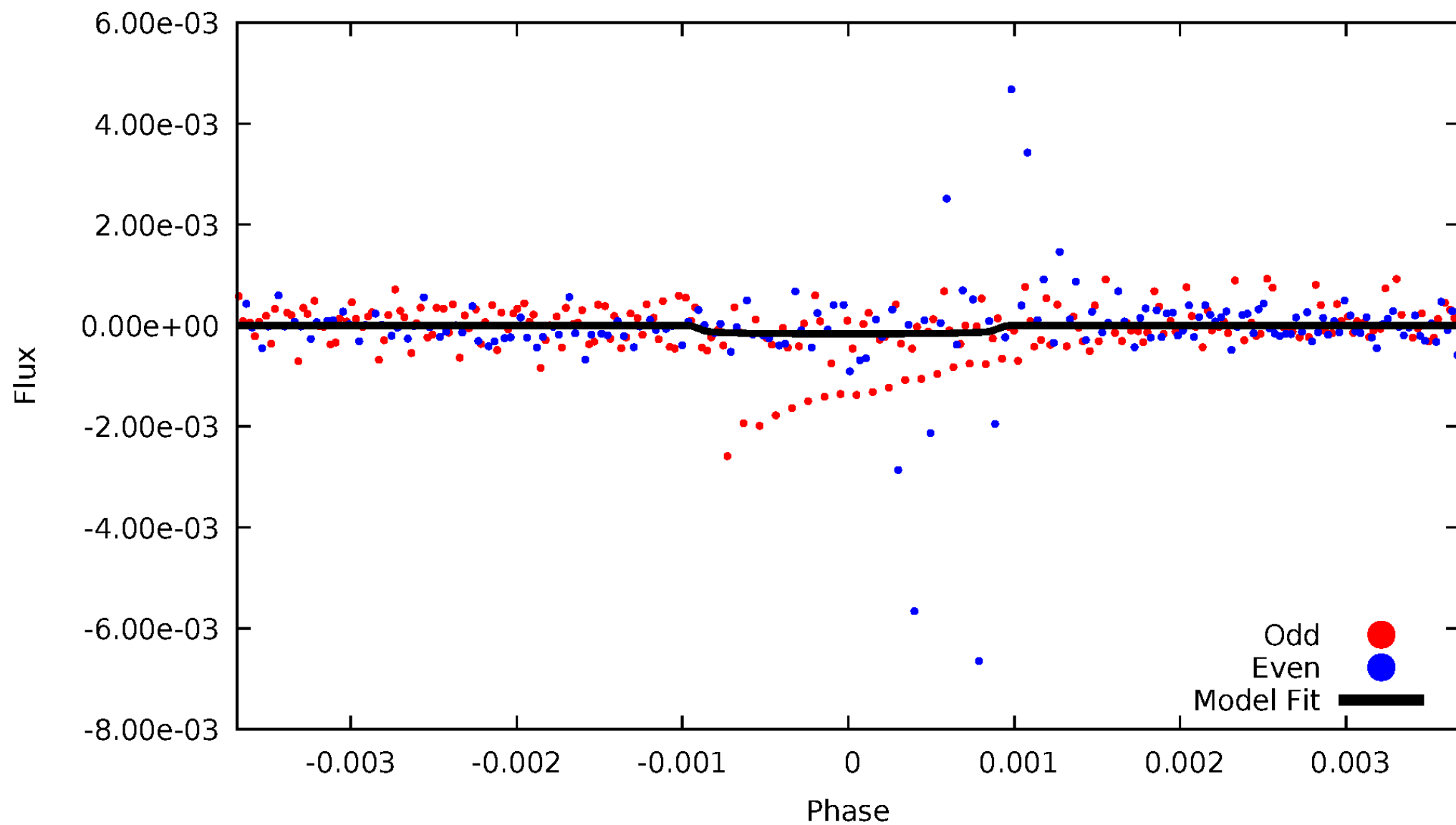


TCE 011513155-01



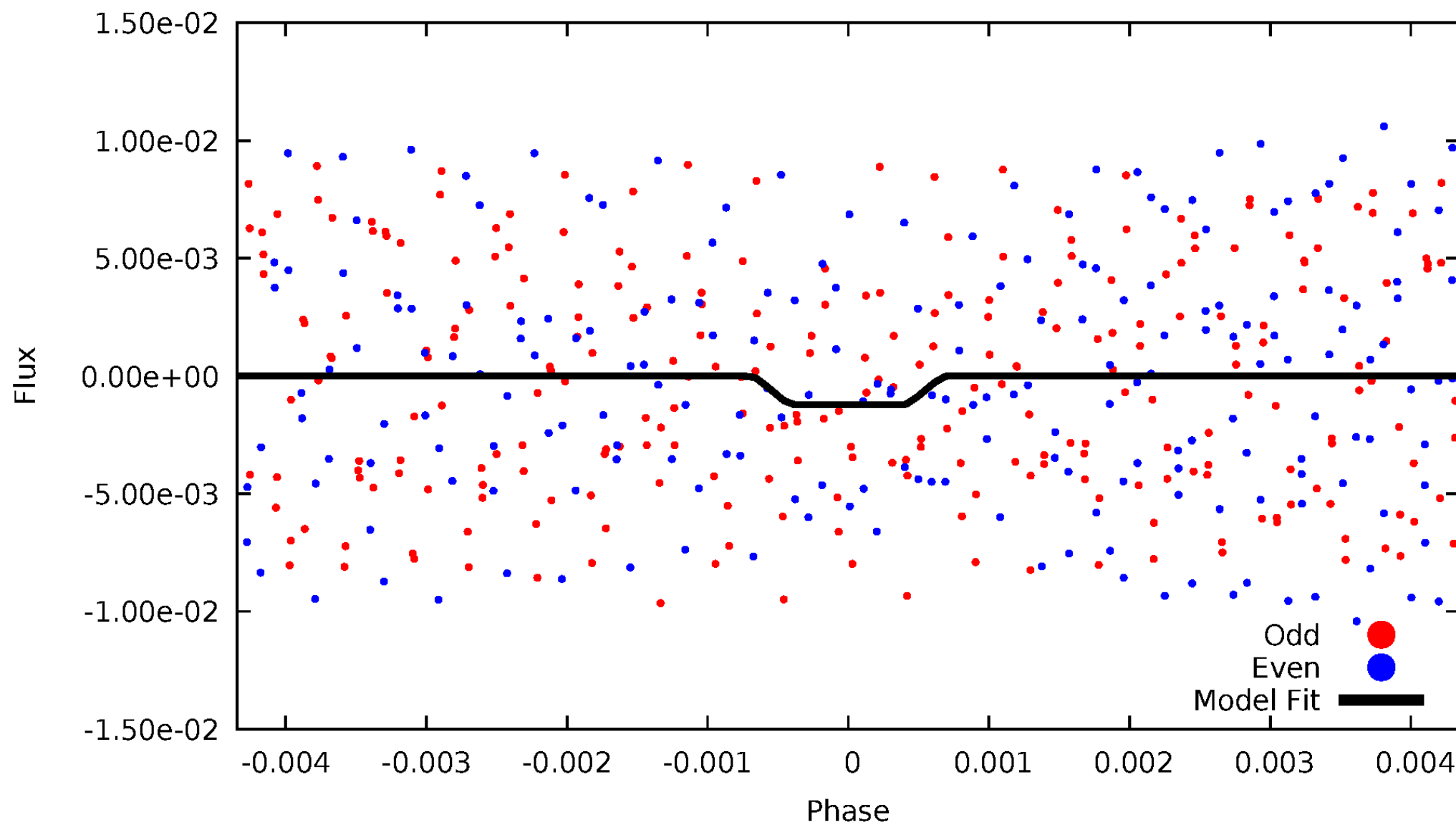
DV Odd/Even

TCE 011513155-01



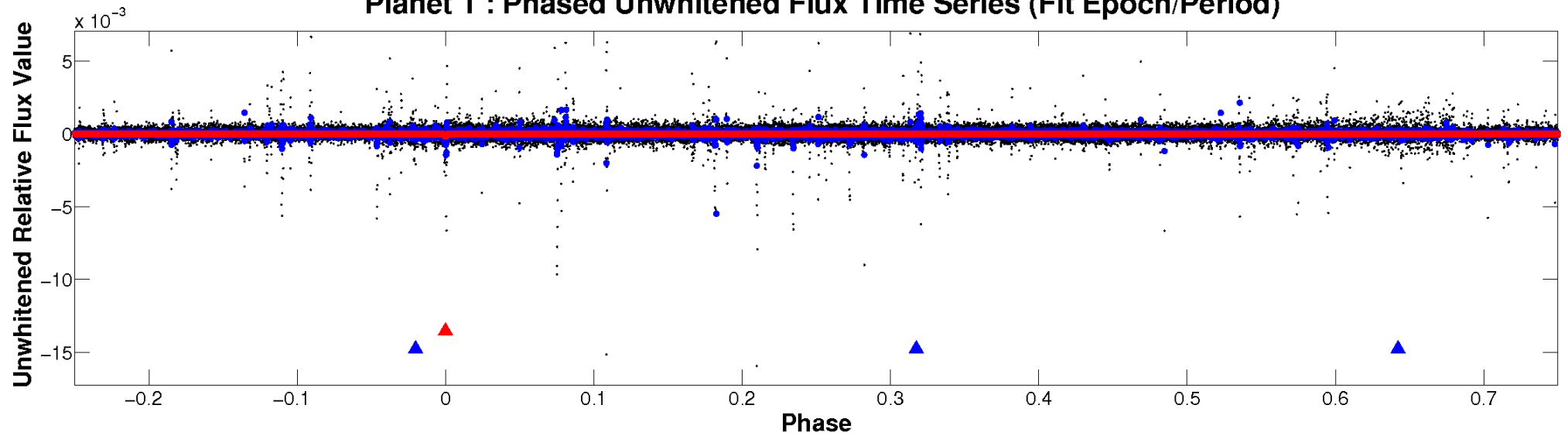
ALT Odd/Even

TCE 011513155-01

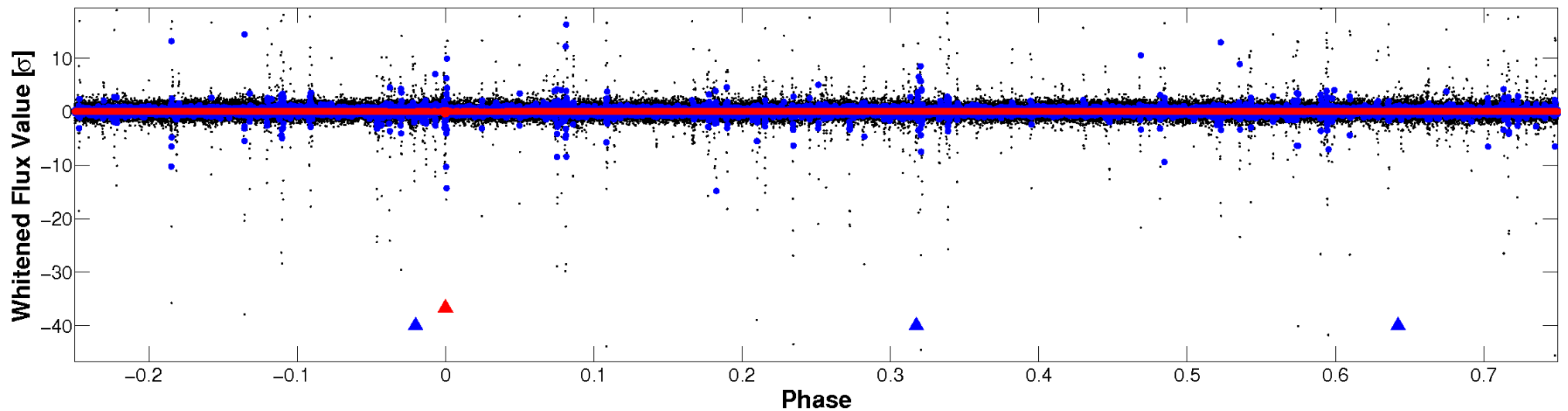


Non-Whitened Vs. Whitened Light Curve

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

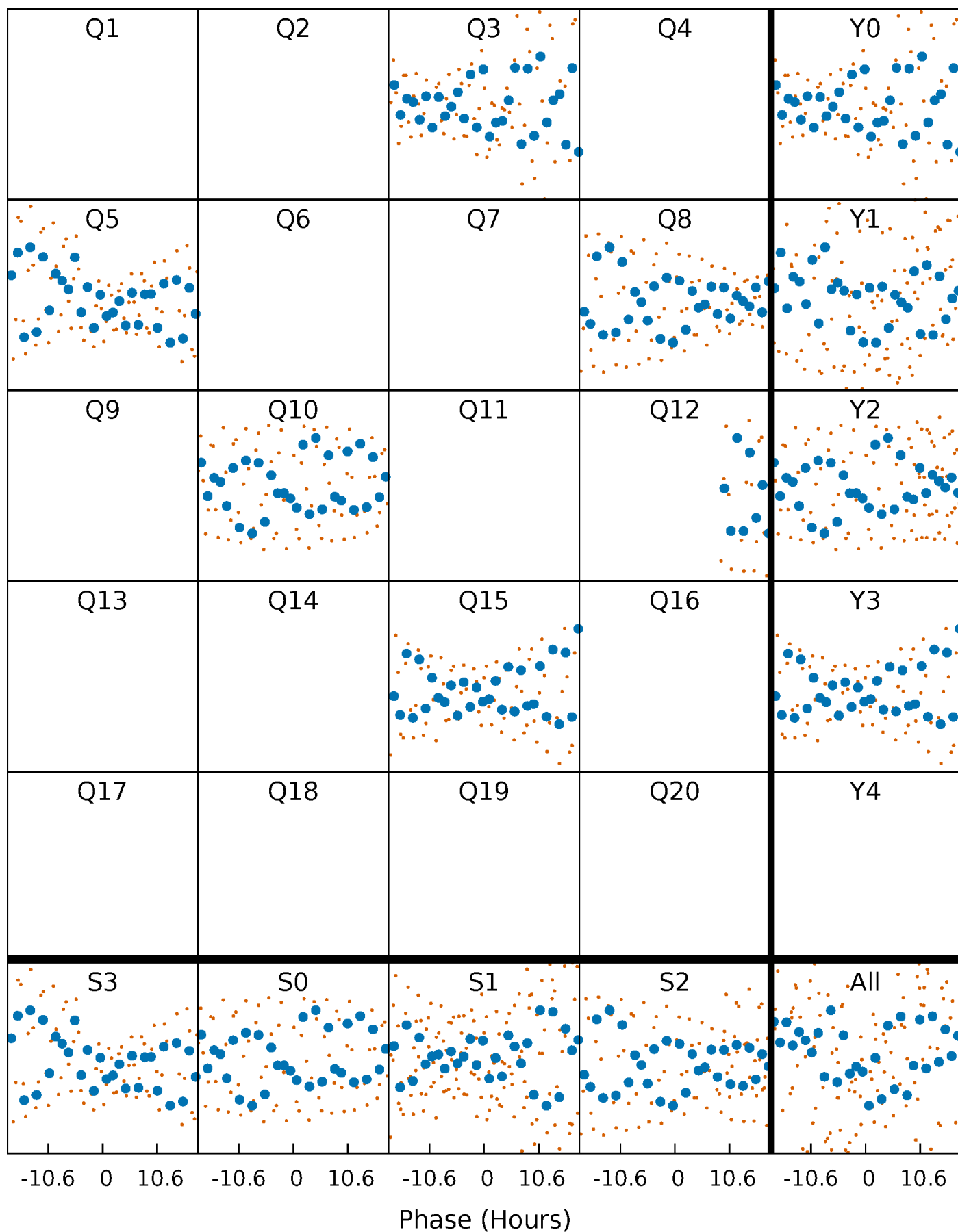


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



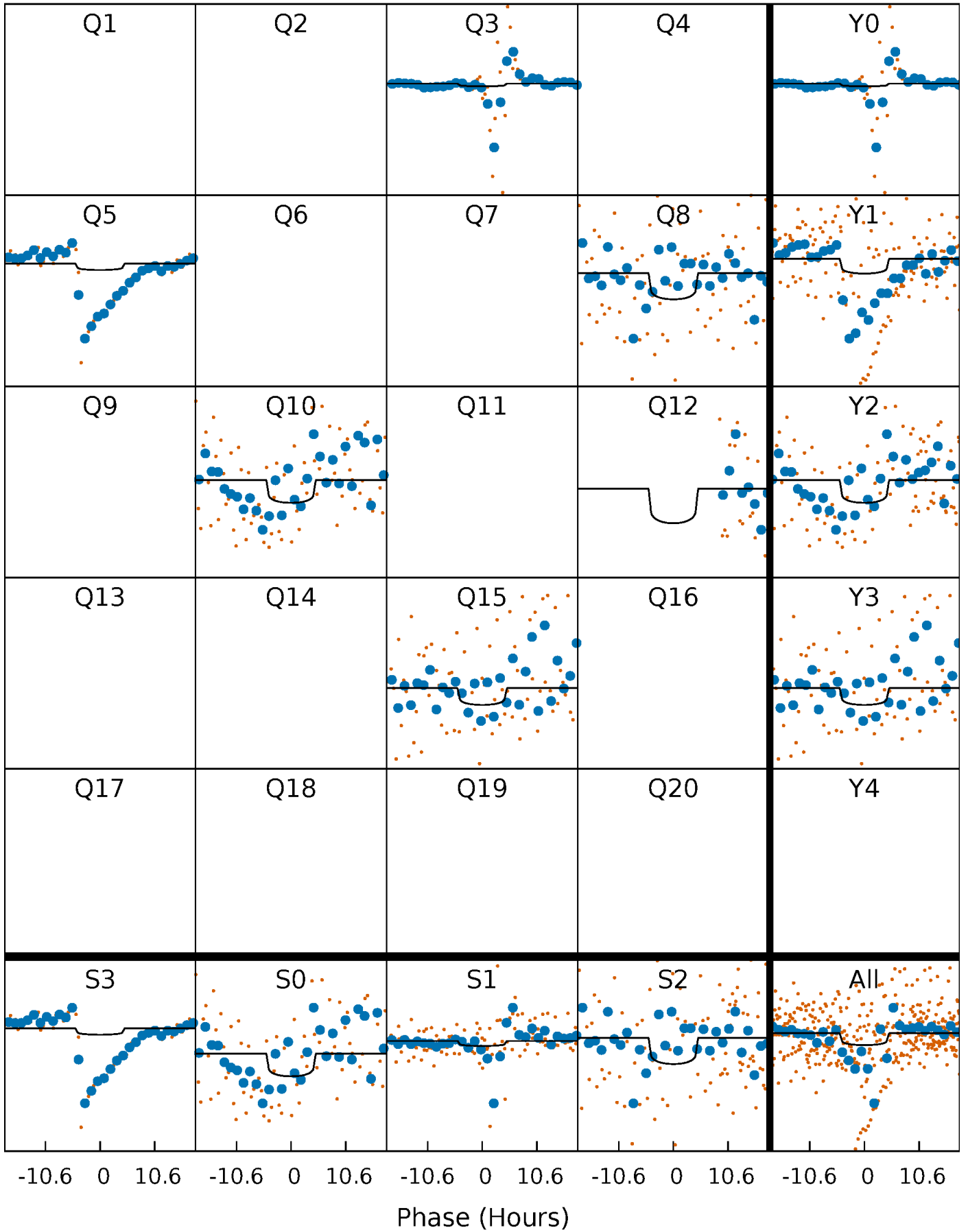
PDC Quarter-Phased Transit Curves

TCE 011513155-01 P=209.784608 Days $T_0=325.547075$ (BKJD)



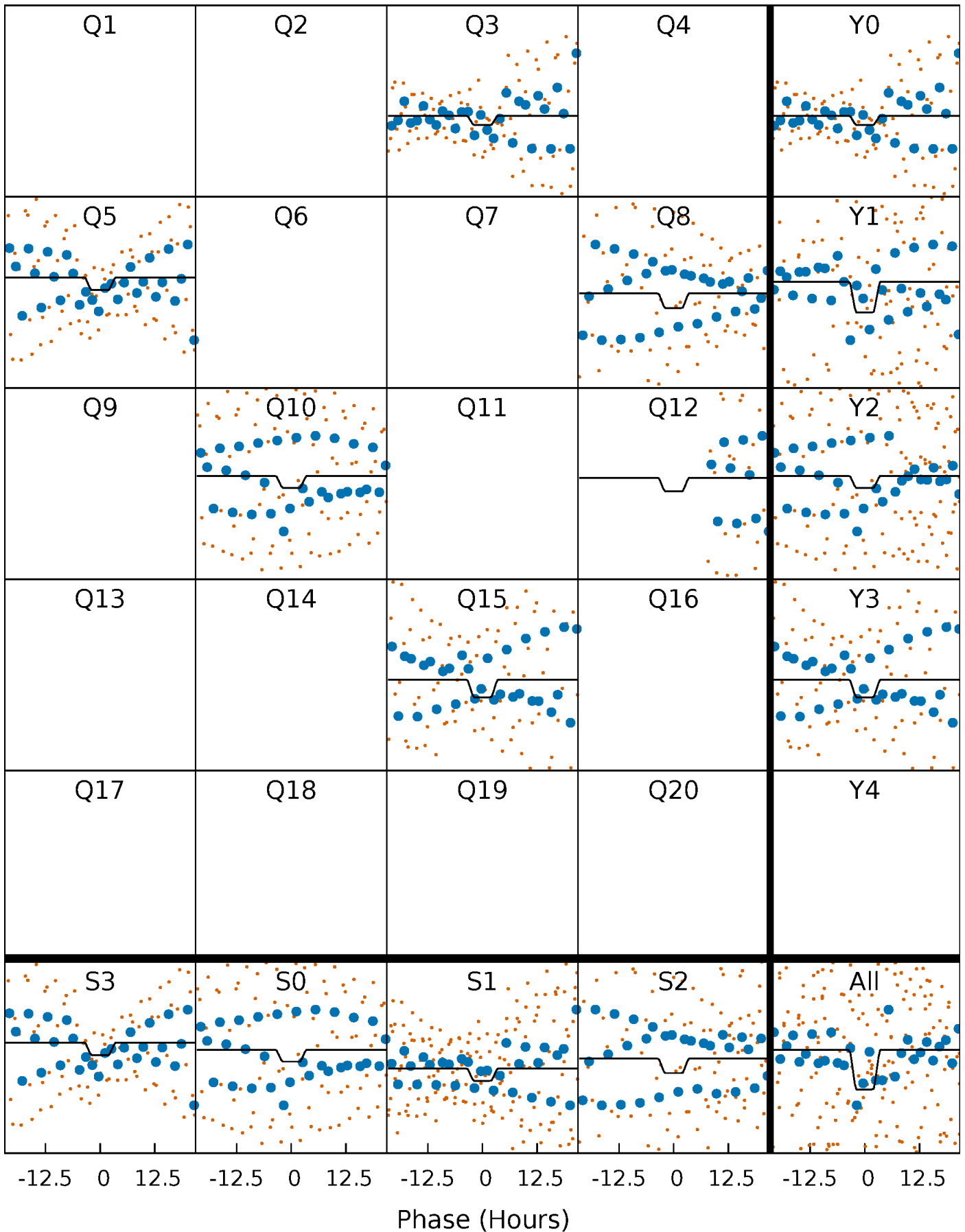
DV Quarter-Phased Transit Curves

TCE 011513155-01 P=209.784608 Days $T_0=325.547075$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

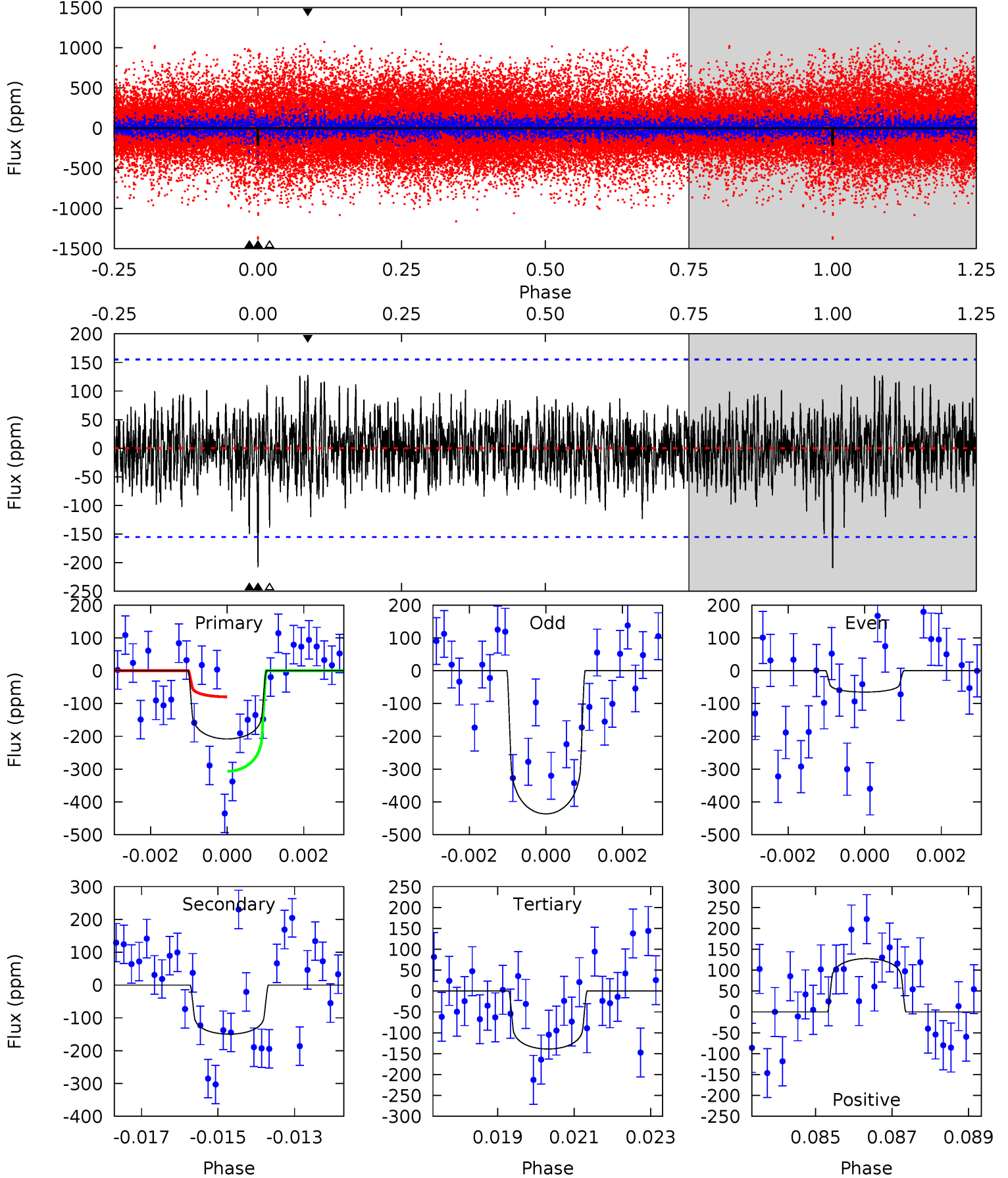
TCE 011513155-01 P=209.791360 Days $T_0=325.567005$ (BKJD)



DV Model-Shift Uniqueness Test

011513155-01, P = 209.784608 Days, E = 115.762467 Days

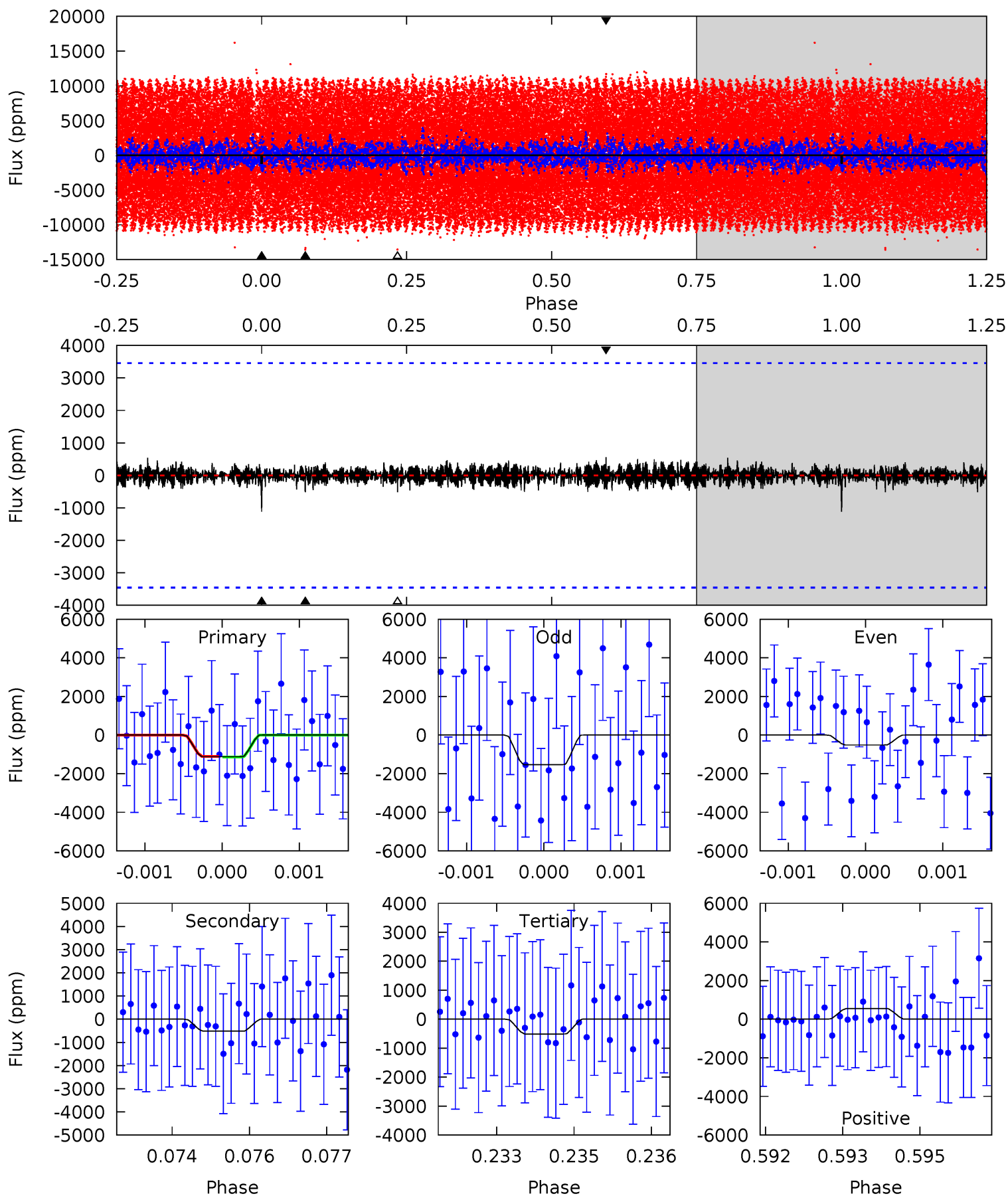
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 7.16 | 5.15 | 4.78 | 4.40 | 5.34 | 3.11 | 1.30 | 2.38 | 2.77 | 0.37 | 0.76 | 6.46 | 4.63 | 0.38 | 4.00 |



Alt Model-Shift Uniqueness Test

011513155-01, P = 209.791360 Days, E = 115.775645 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 1.75 | 0.81 | 0.80 | 0.86 | 5.38 | 3.18 | 0.19 | 0.95 | 0.88 | 0.01 | -0.06 | 0.78 | 0.64 | 0.33 | 0.02 |



Stellar Parameters For KIC 011513155

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | $M(M_{\odot})$ | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 7232^{+201}_{-277} | $4.047^{+0.214}_{-0.175}$ | $-0.320^{+0.300}_{-0.300}$ | $1.879^{+0.517}_{-0.517}$ | $1.435^{+0.228}_{-0.228}$ | $0.304^{+0.420}_{-0.132}$ |
| | +3%/-4% | +5%/-4% | +94%/-94% | +28%/-28% | +16%/-16% | +138%/-43% |
| 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 011513155-01 / KOI

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|----------------|------------------------|-------------------|------------------------|-------------------------|
| DV | -150 ± 29 | $5.18^{+5.10}_{-3.70}$ | 688^{+54}_{-56} | 5017^{+4863}_{-1184} | 1792^{+19095}_{-1354} |
| Alt. | -518 ± 642 | $8.03^{+5.87}_{-4.79}$ | 691^{+53}_{-53} | 5200^{+3941}_{-9122} | 2152^{+13747}_{-2699} |

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 $A_{obs} \gg 1.0$

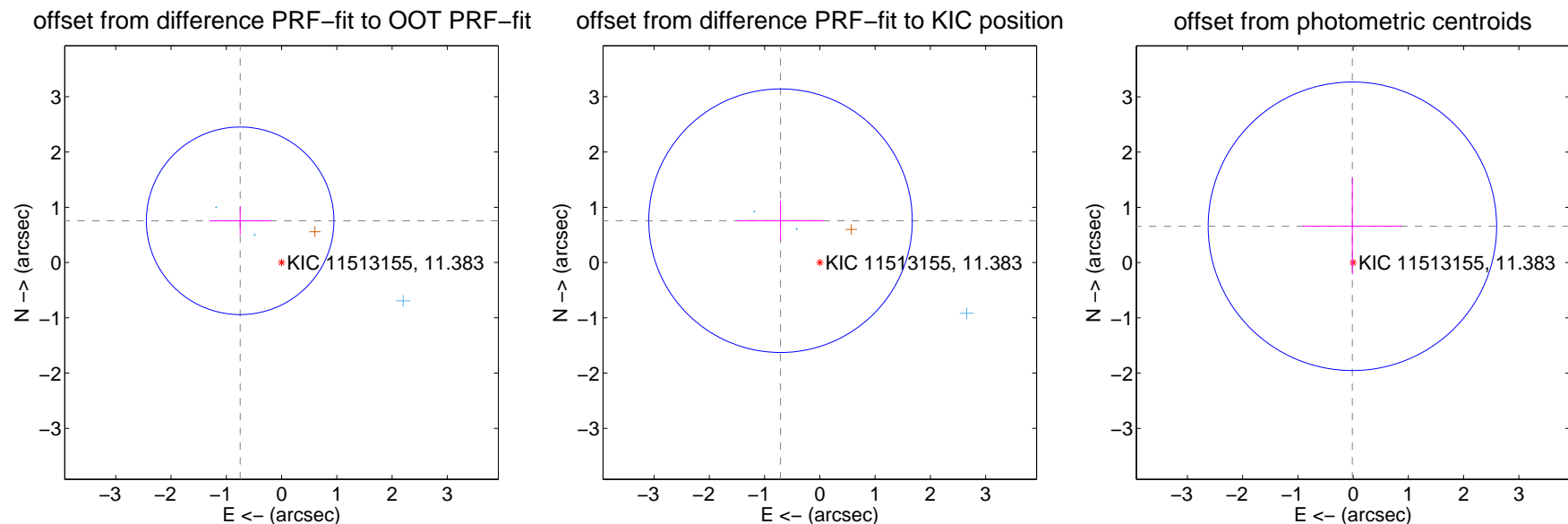
DV Centroid Data

Supplemental centroid analysis for 011513155-01. **Kepler magnitude: 11.38.** Transit SNR 3.65

There are 3 quarters with good PRF difference image offsets

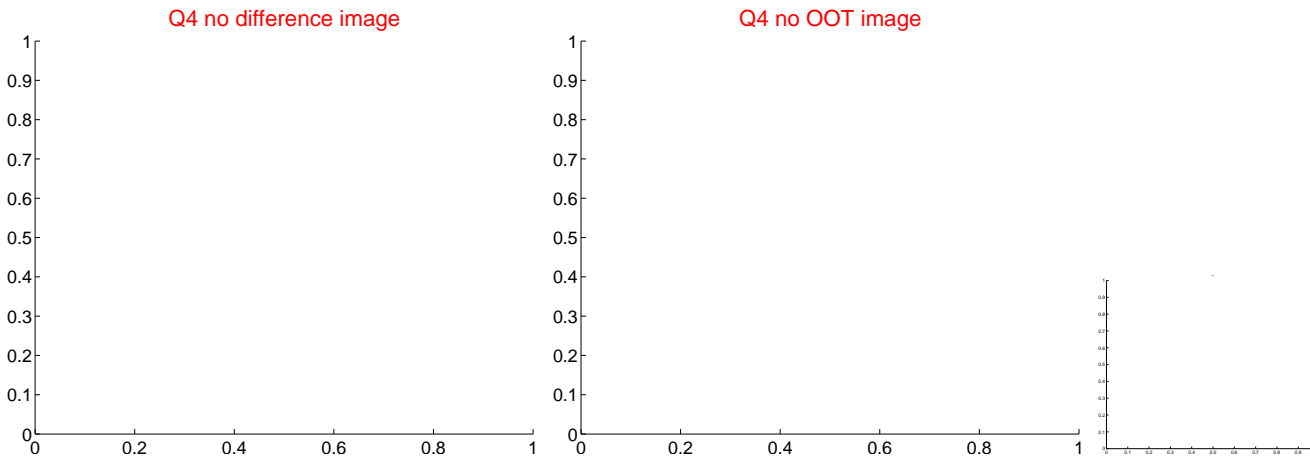
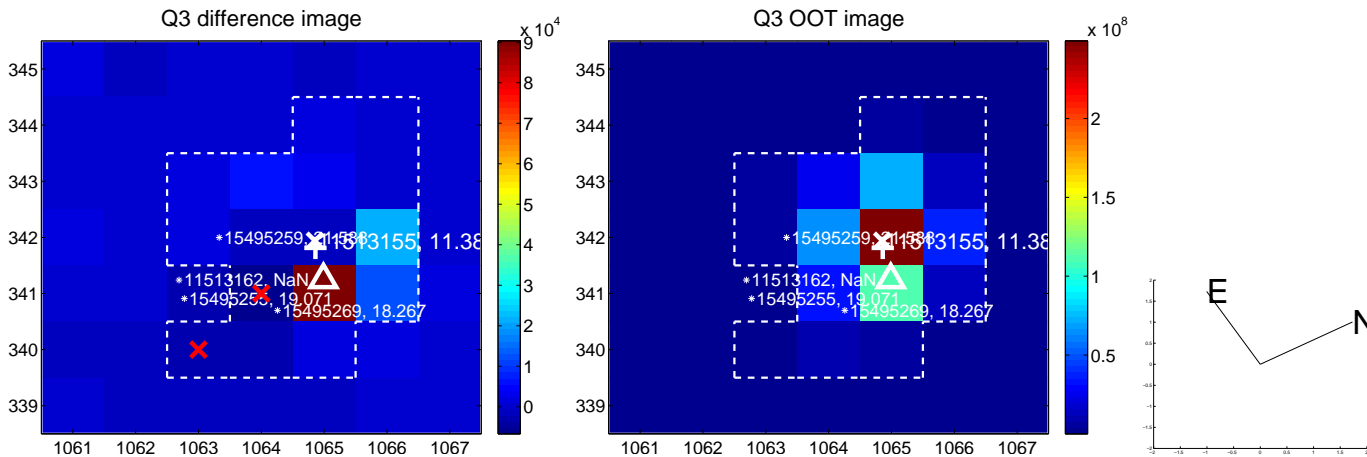
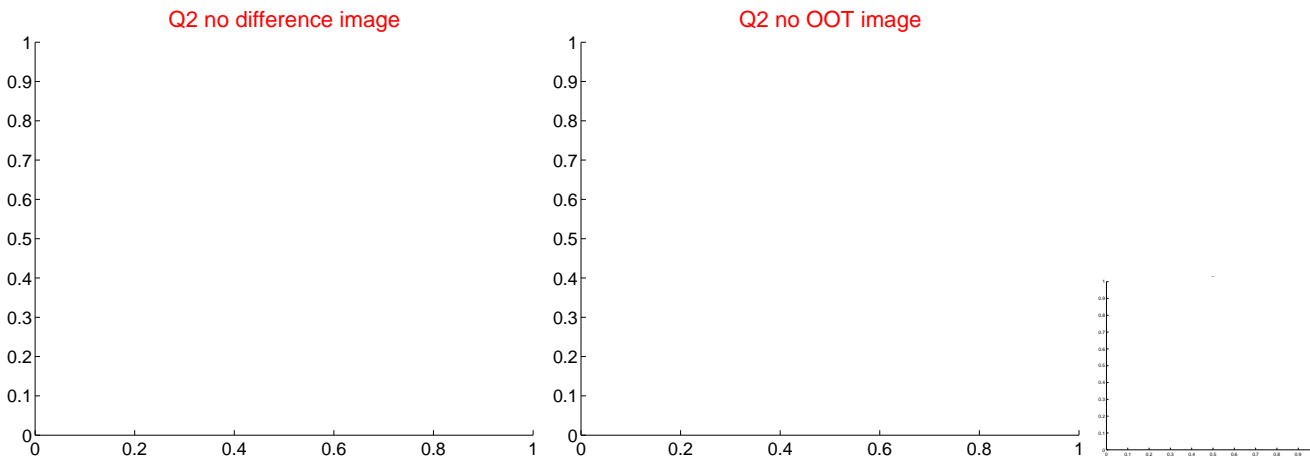
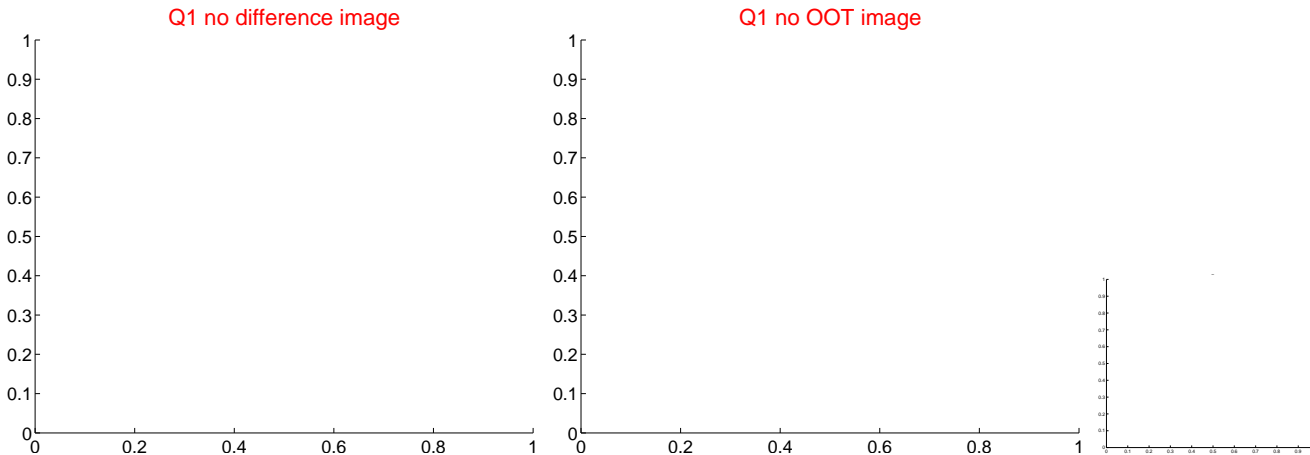
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|-------------------|
| PRF-fit source offset from OOT | 1.064 ± 0.565 | 1.88 | 0.749 ± 0.559 | 0.755 ± 0.255 |
| PRF-fit source offset from KIC position | 1.038 ± 0.794 | 1.31 | 0.711 ± 0.791 | 0.756 ± 0.361 |
| photometric centroid source offset | 0.66 ± 0.87 | 0.76 | 0.01 ± 0.90 | 0.66 ± 0.87 |

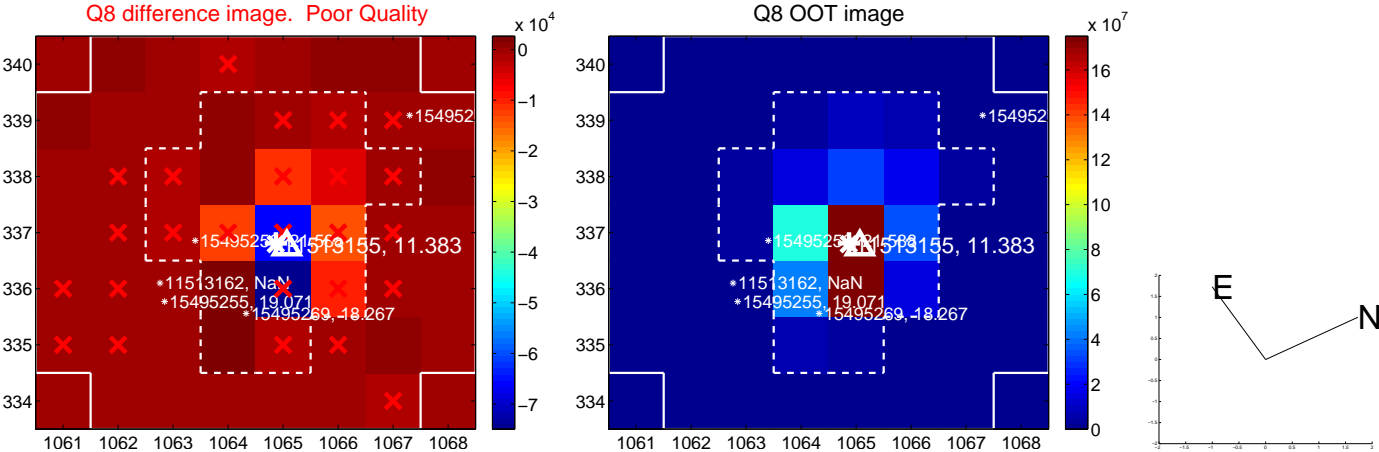
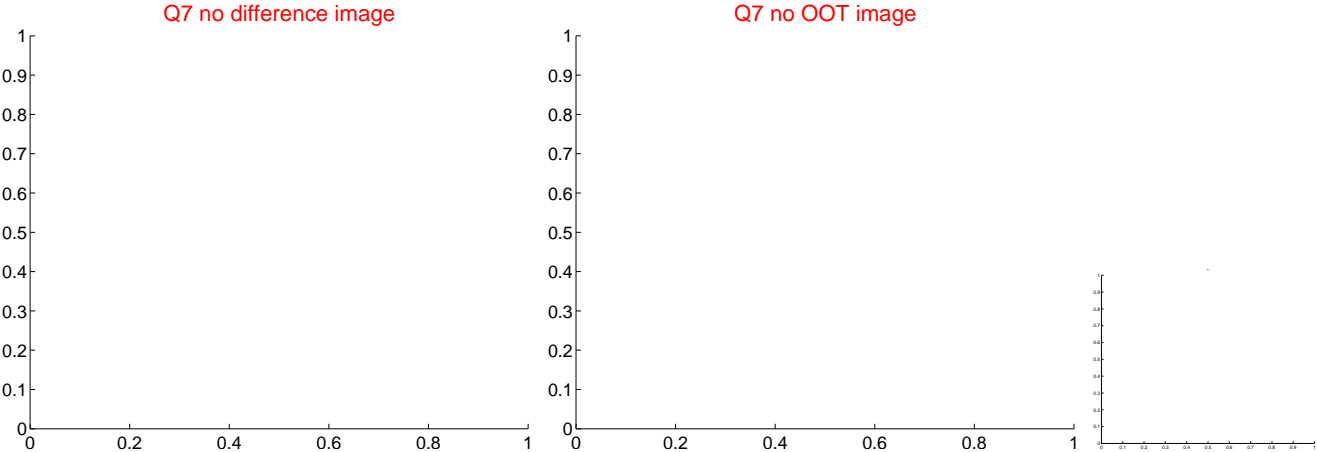
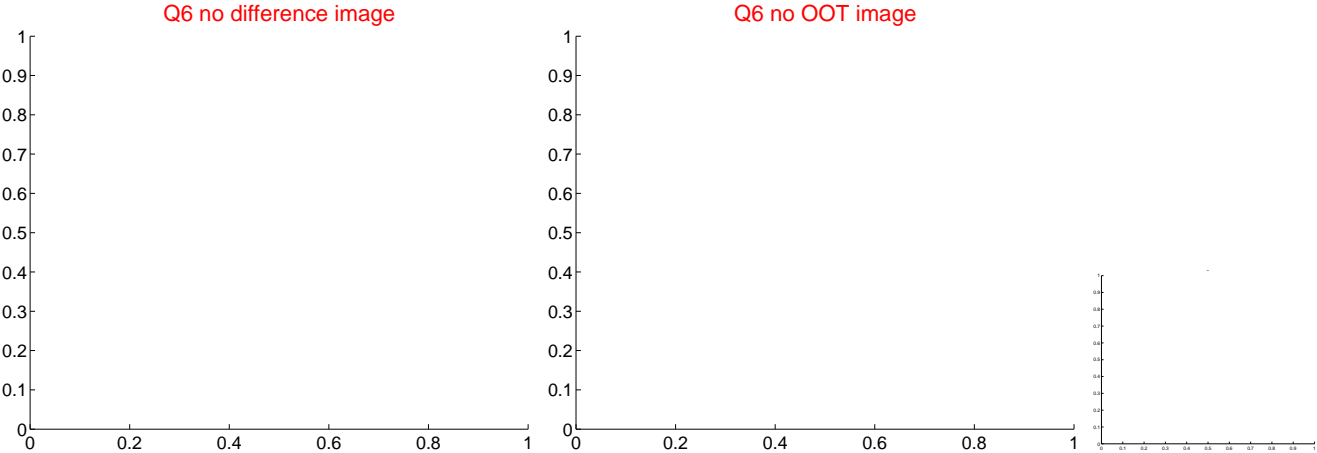
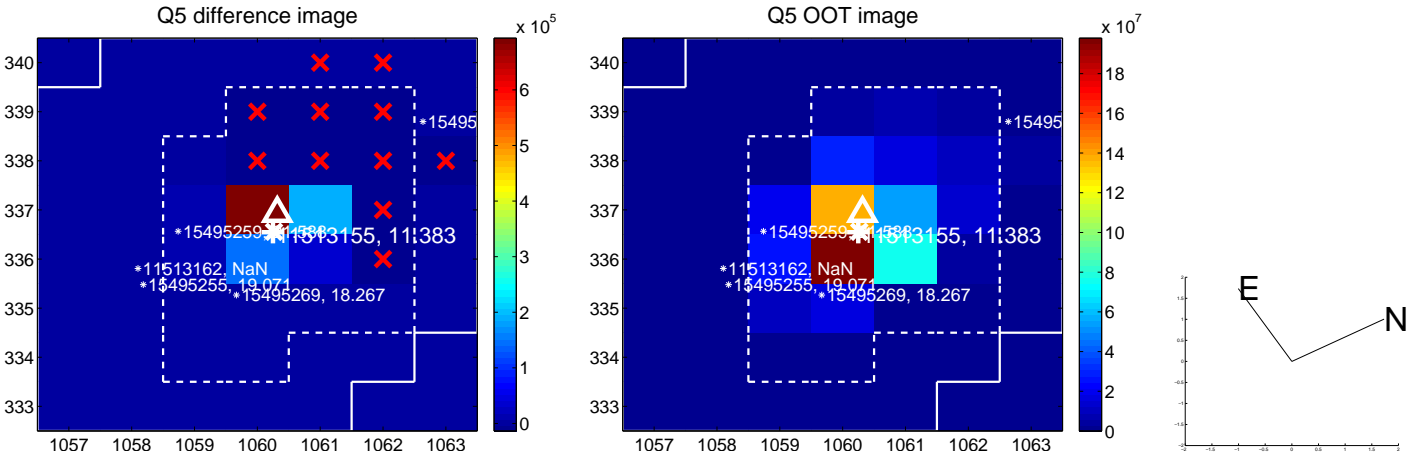


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

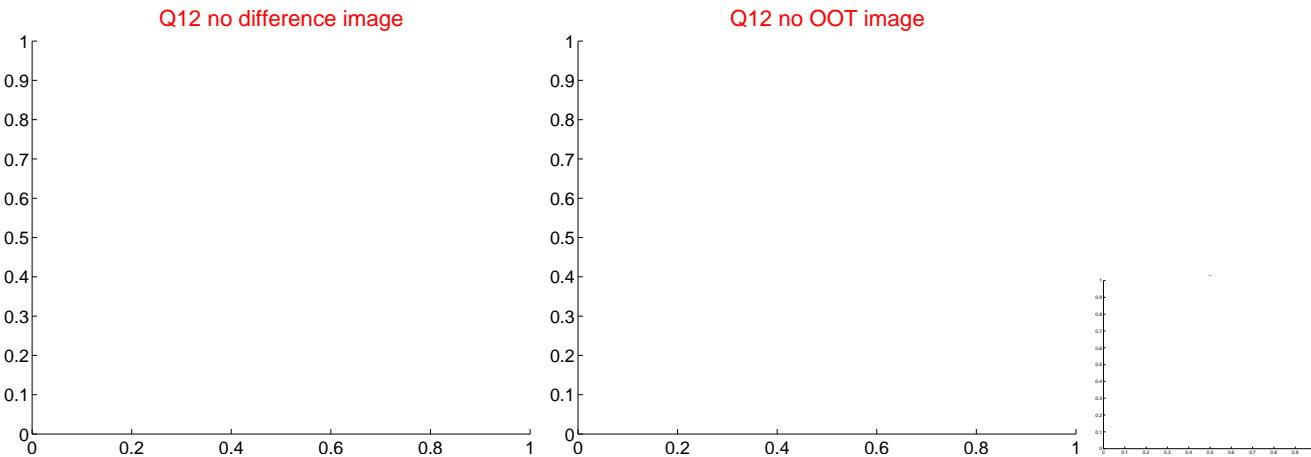
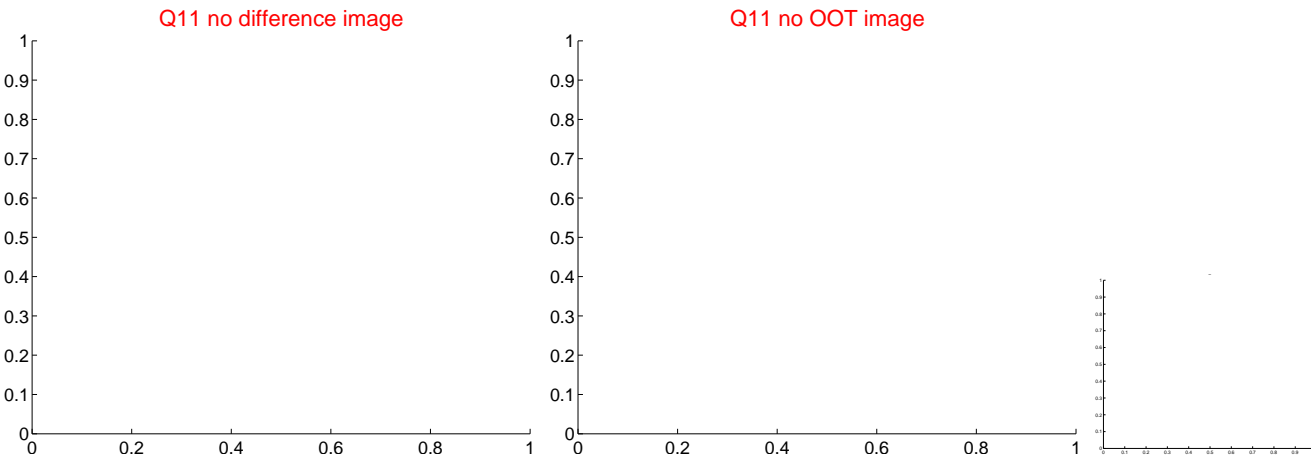
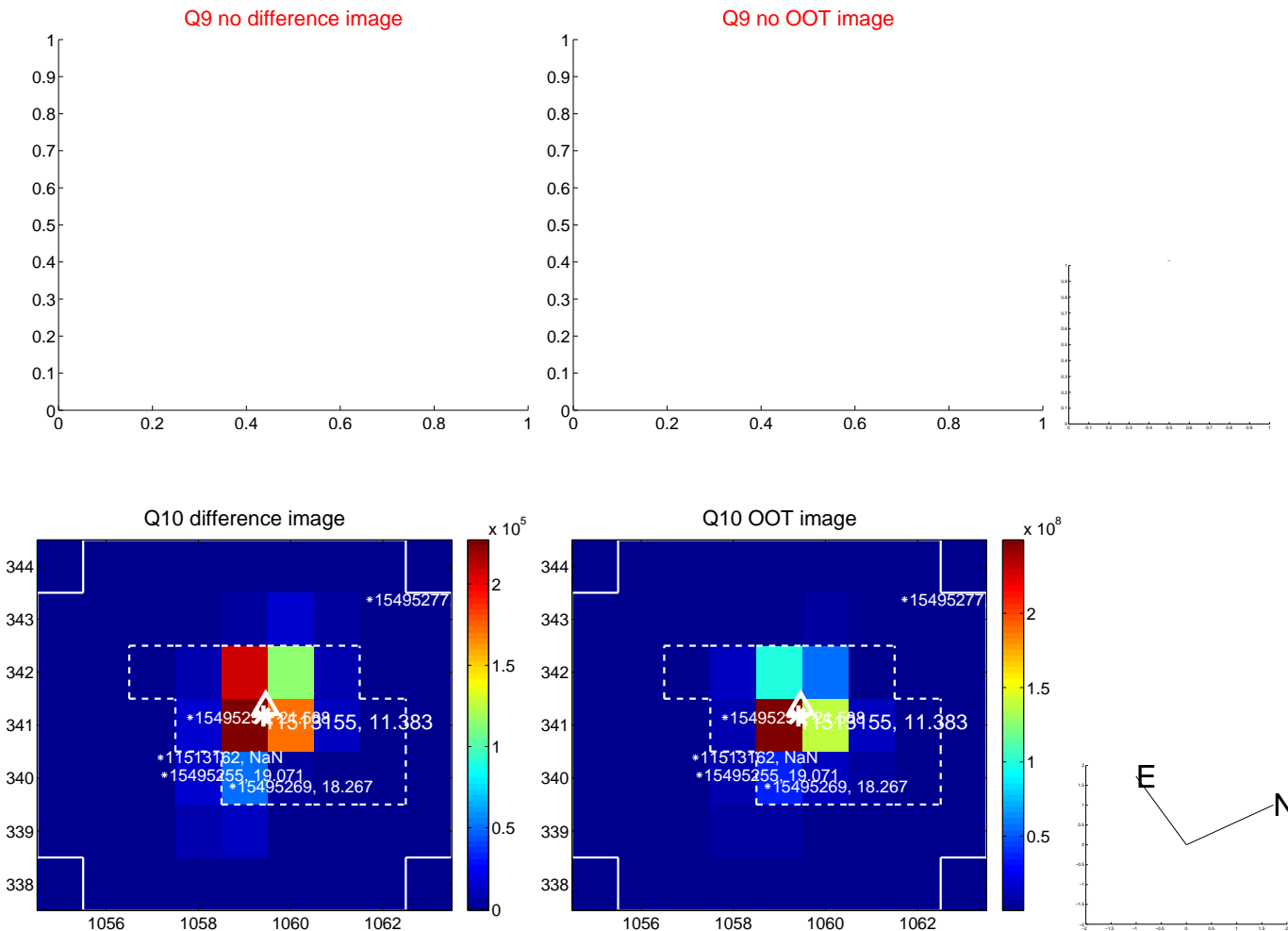
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



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



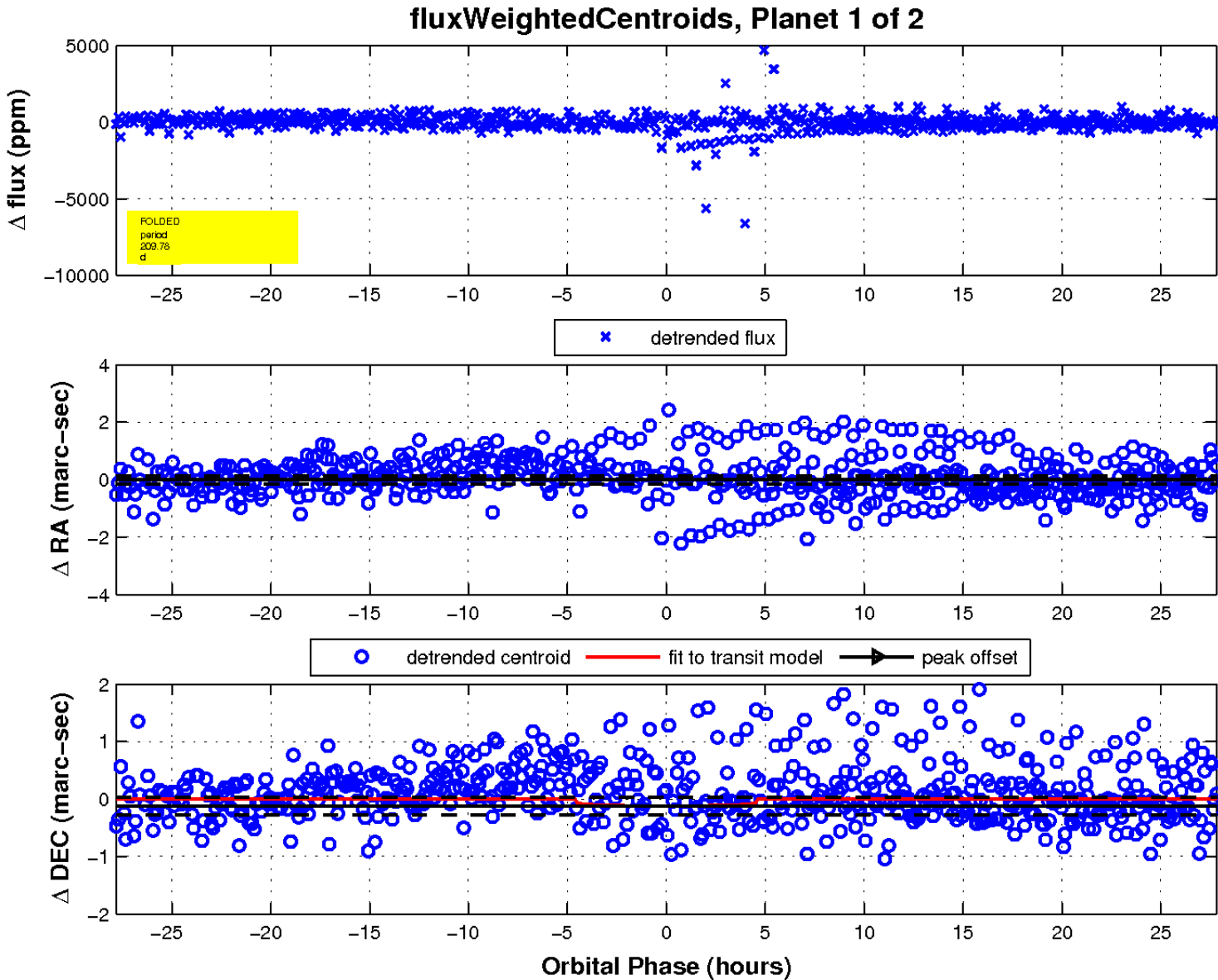
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



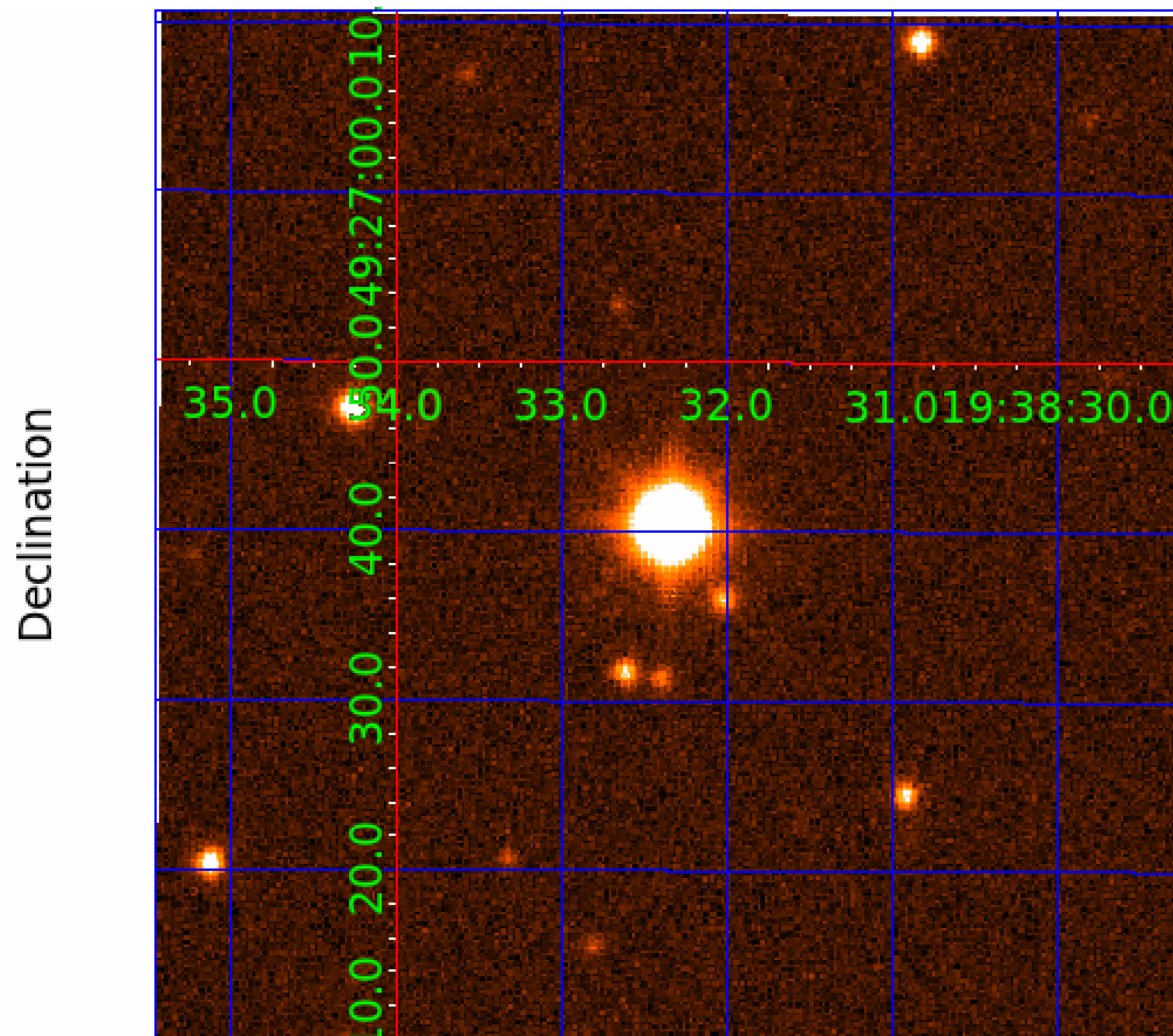
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

Q17 no difference image

Q17 no OOT image



UKIRT Image



KIC 011513155

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 011513155-01 | OBS | No | 209.784608 | 325.547075 | 168.0 | 9.277 | 31.8 | 3.7 | 1.88 | 7232 | 2.49 | 14.24 |
| 011513155-02 | OBS | No | 490.392492 | 250.496349 | 759.9 | 4.953 | 12.7 | 12.3 | 1.88 | 7232 | 5.63 | 4.59 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 011513155-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED |
| 011513155-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED |

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

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

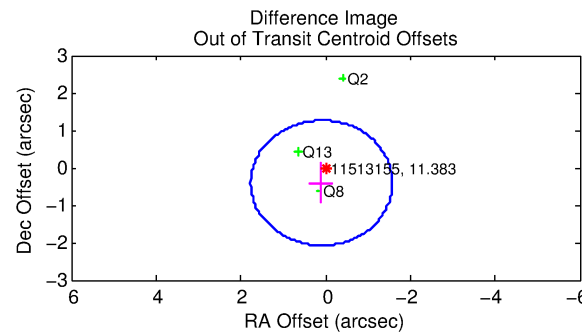
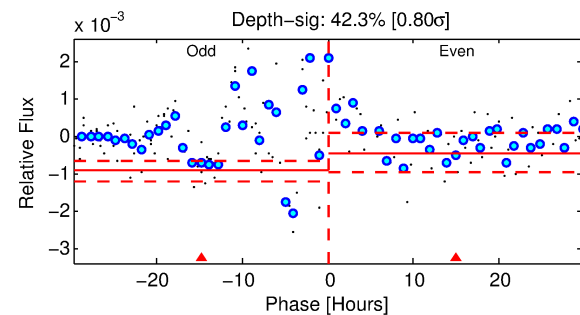
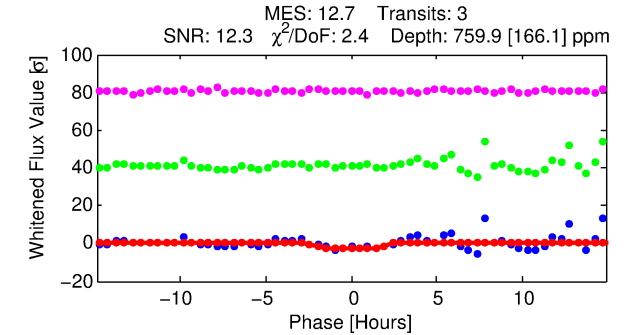
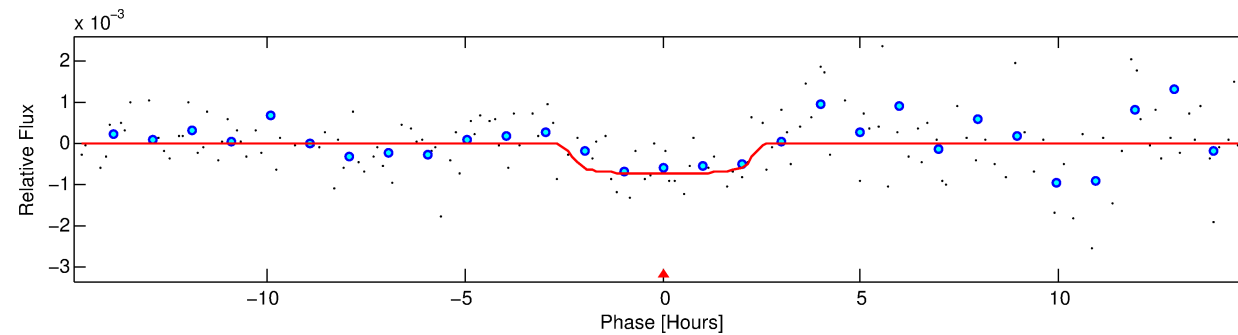
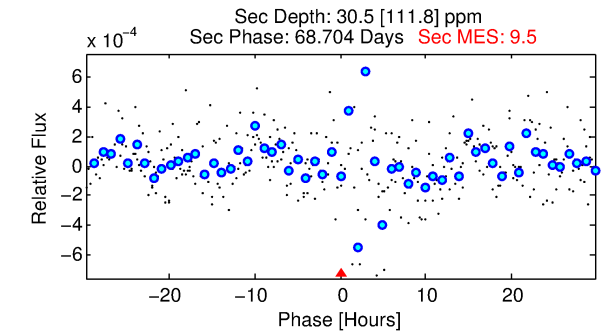
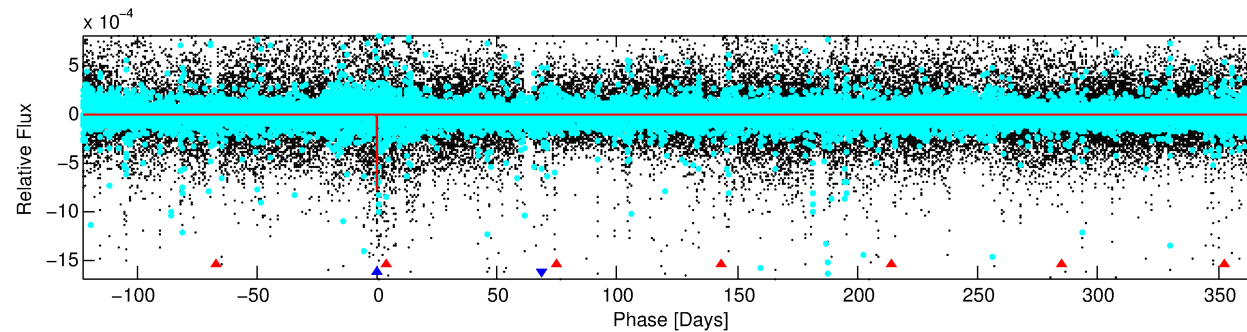
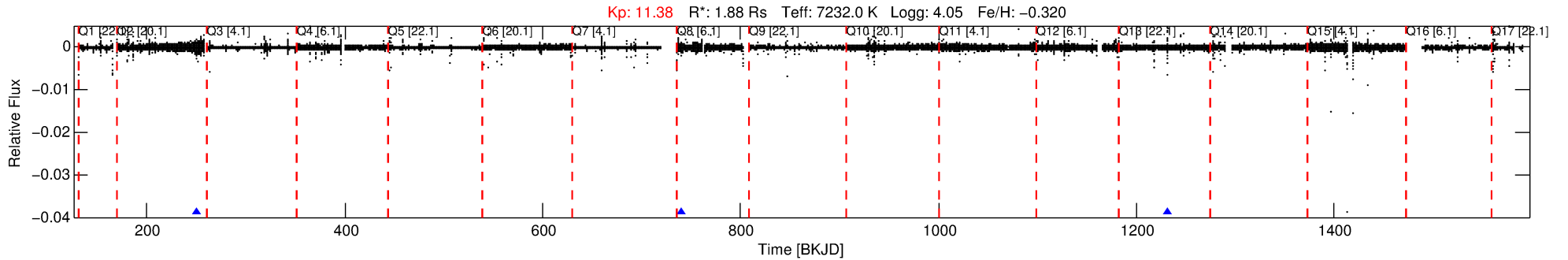
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 011513155-02

No Significant Match Found

DV One-Page Summary

KIC: 11513155 Candidate: 2 of 2 Period: 490.392 d



DV Fit Results:

Period = 490.39249 [0.01438] d
Epoch = 250.4963 [0.0226] BKJD
Rp/R* = 0.0275 [0.0308]
a/R* = 524.52 [3586.87]
b = 0.76 [3.84]
Seff = 4.59 [1.86]
Teq = 373 [38] K
Rp = 5.63 [6.50] Re
a = 1.3730 [0.3381] AU
Ag = 997.37 [4300.79] [0.23σ]
Teffp = 3243 [3485] K [0.82σ]

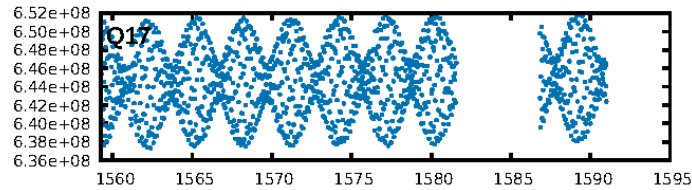
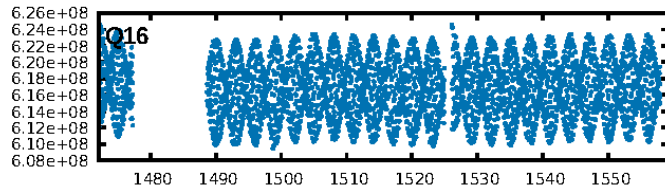
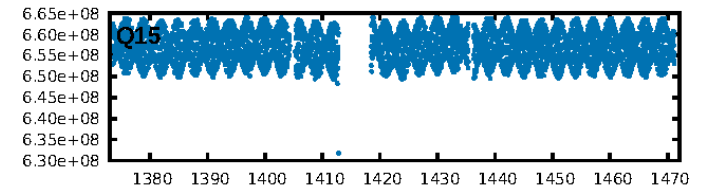
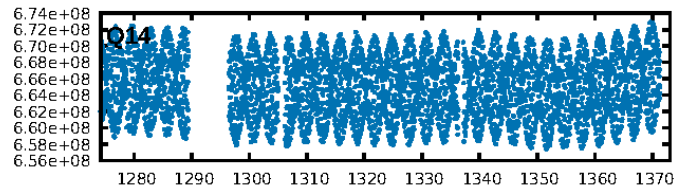
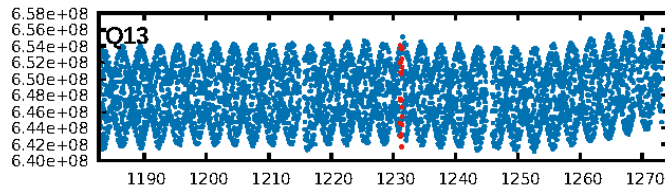
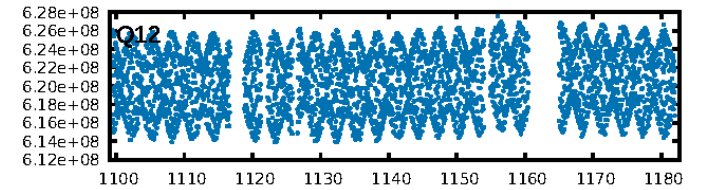
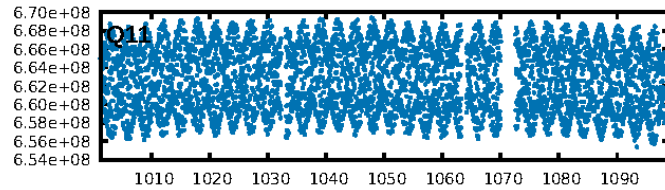
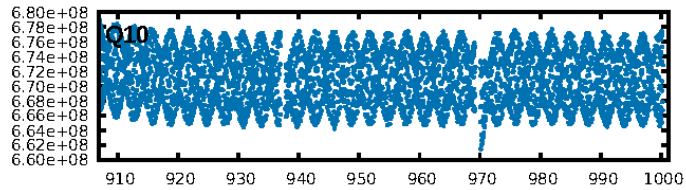
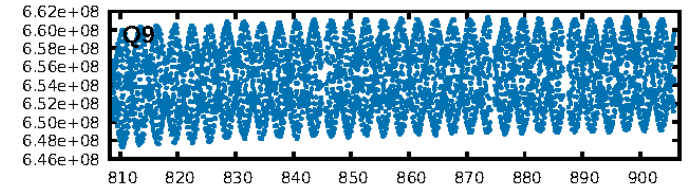
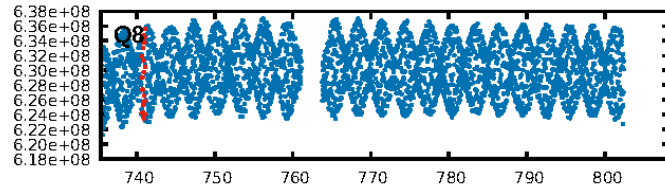
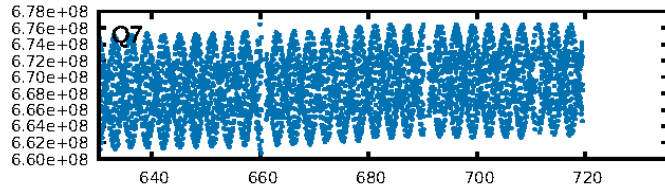
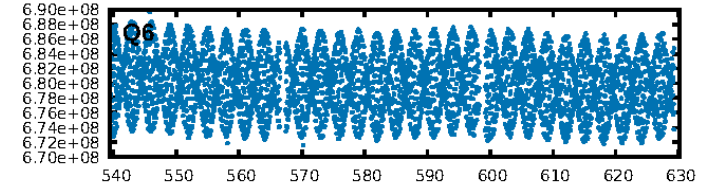
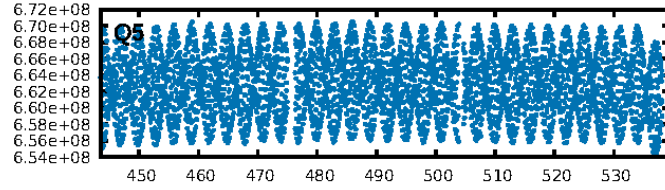
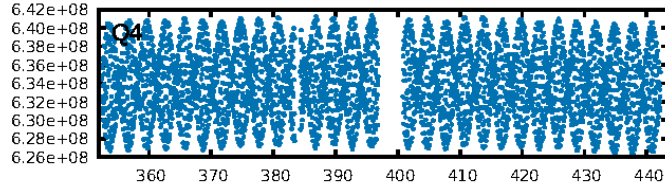
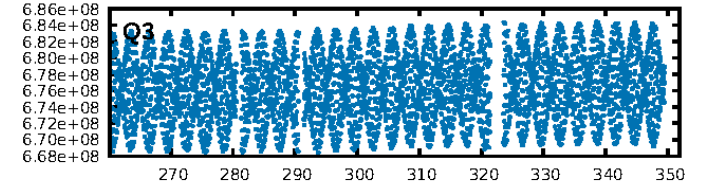
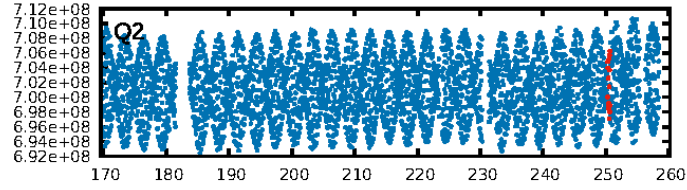
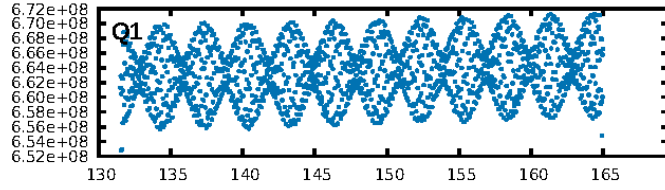
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [640.35σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.1%
ModelChiSquareGof-sig: 14.0%
Bootstrap-pfa: 1.56e-04
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 0.8649
Centroid-sig: 92.0%
Centroid-so: 0.044 arcsec [0.17σ]
OotOffset-rm: 0.420 arcsec [0.75σ]
KicOffset-rm: 0.388 arcsec [0.50σ]
OotOffset-st: 1/0/1/1 [3]
KicOffset-st: 1/0/1/1 [3]
DiffImageQuality-fgm: 1.00 [3/3]
DiffImageOverlap-fno: 1.00 [3/3]

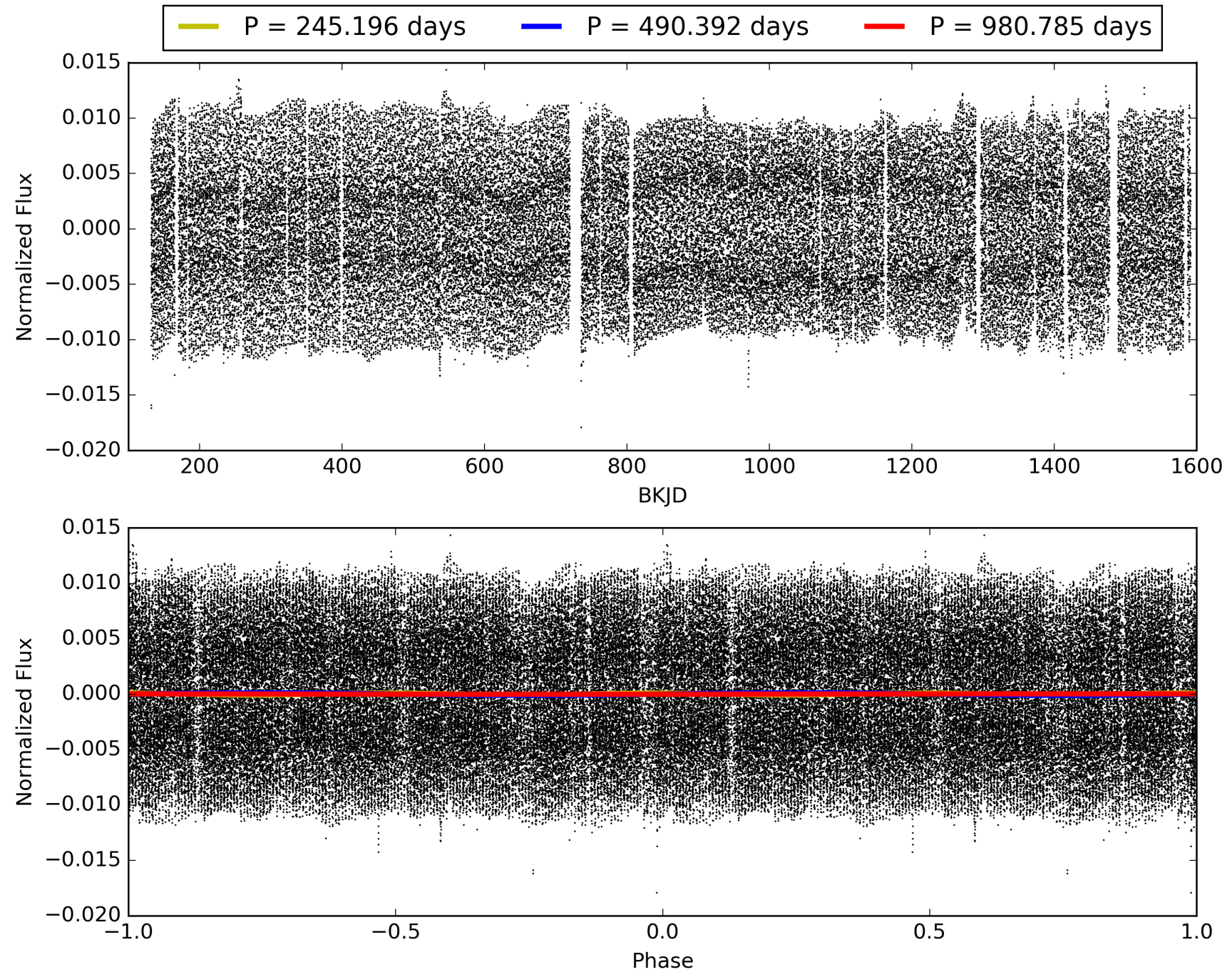
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 17:50:51 Z

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

TCE 011513155-02, PDC Light Curves

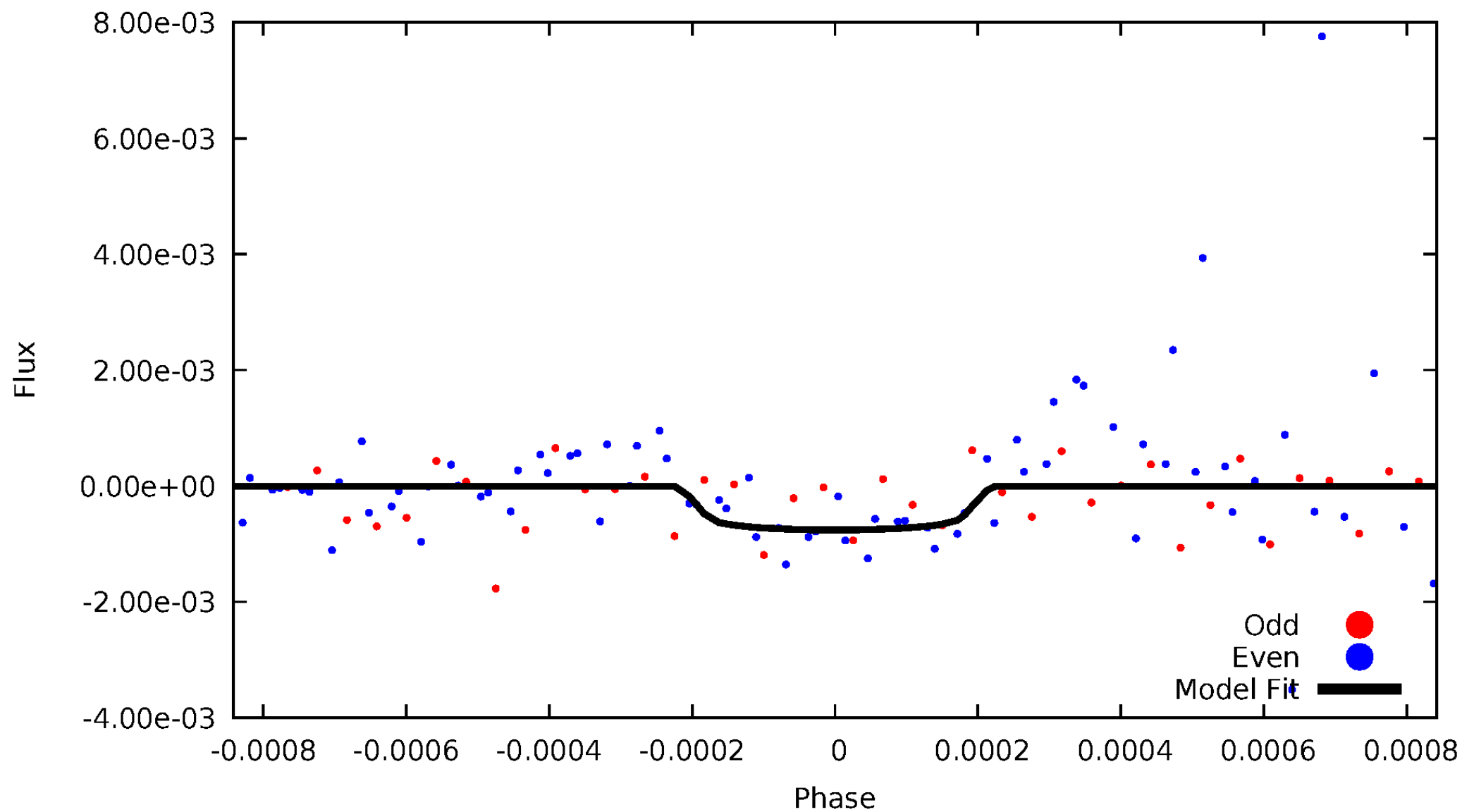


TCE 011513155-02



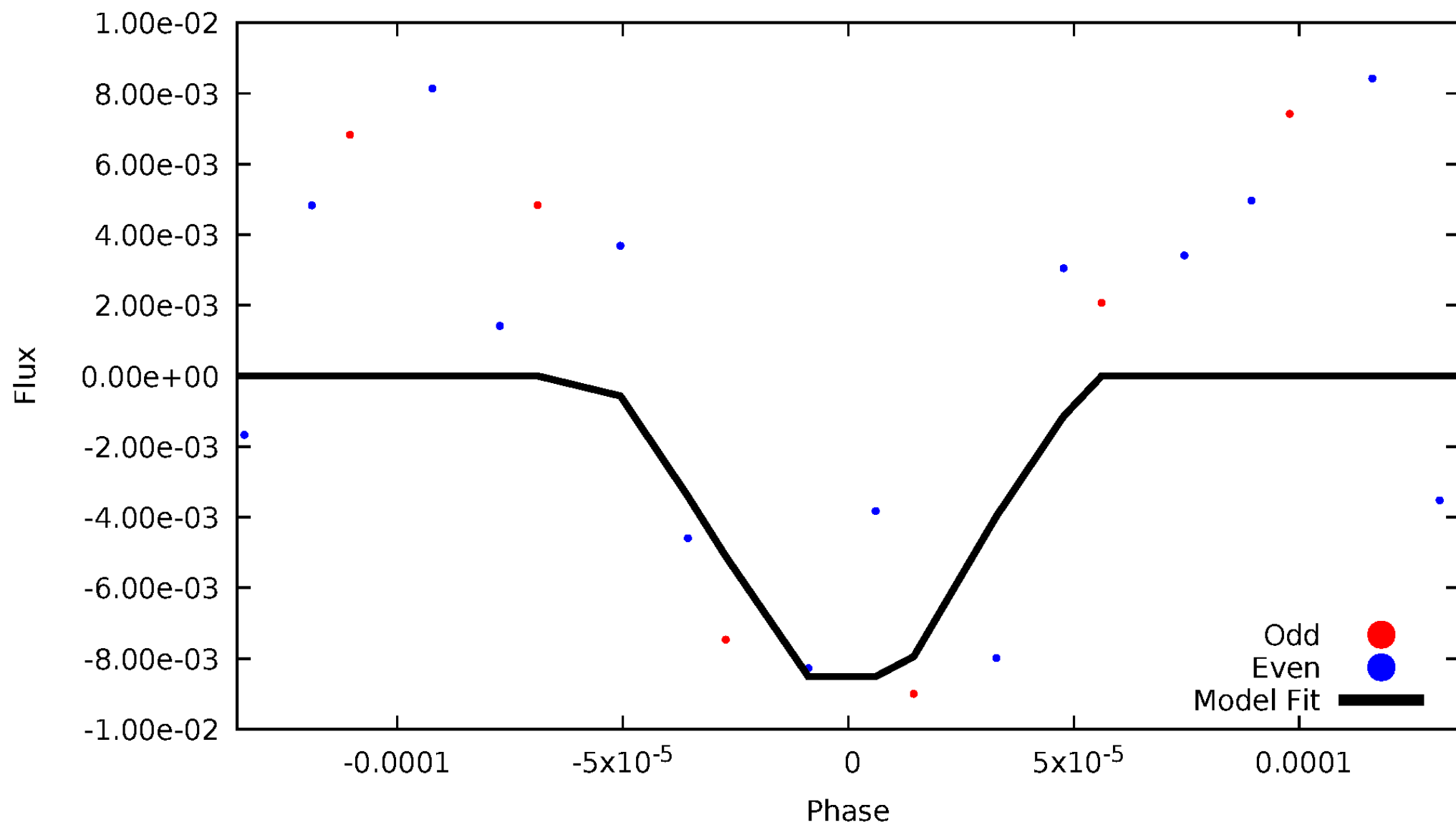
DV Odd/Even

TCE 011513155-02



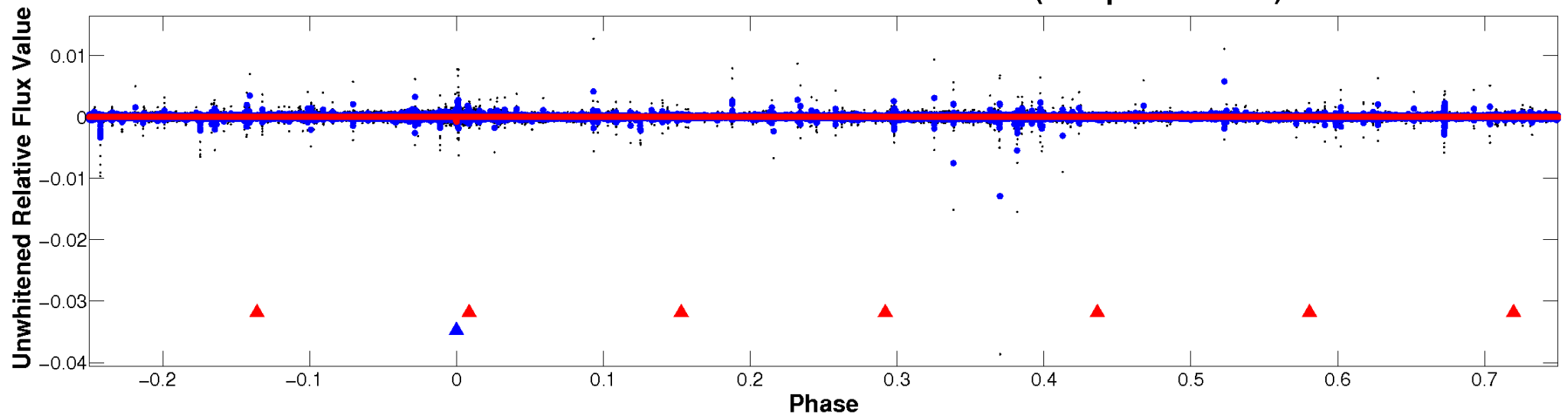
ALT Odd/Even

TCE 011513155-02

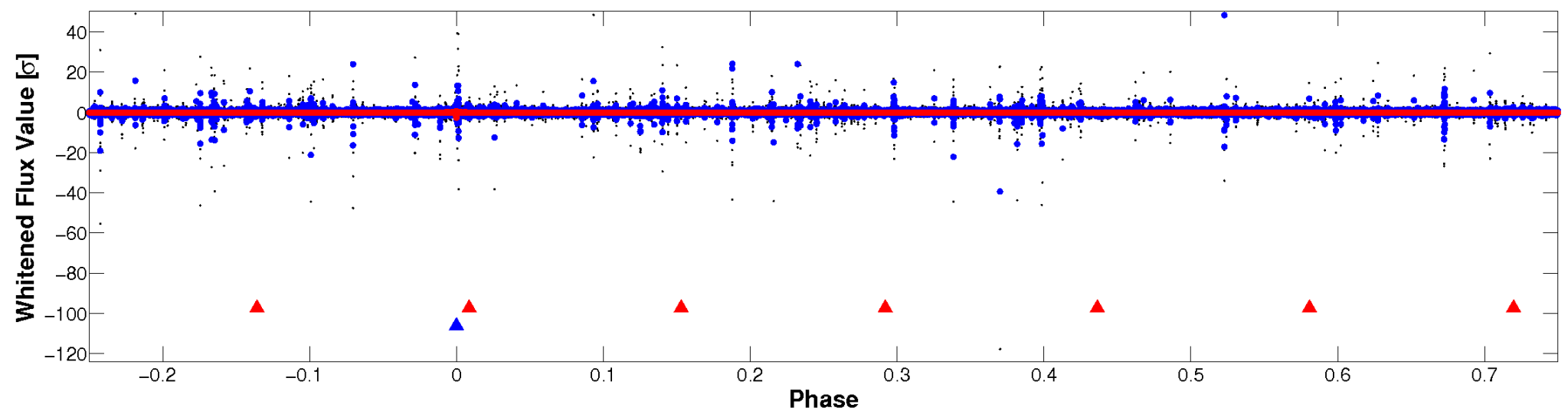


Non-Whitened Vs. Whitened Light Curve

Planet 2 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

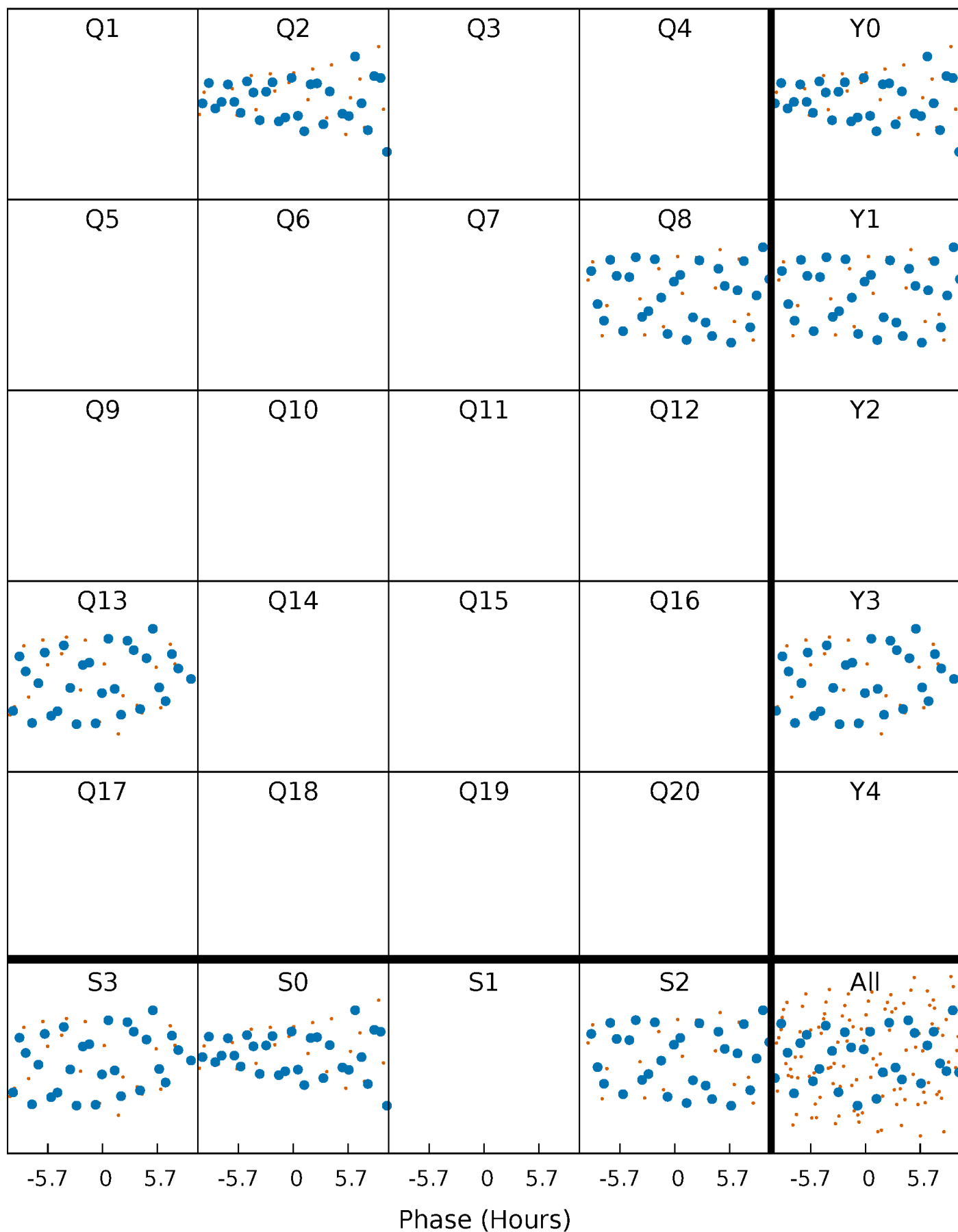


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



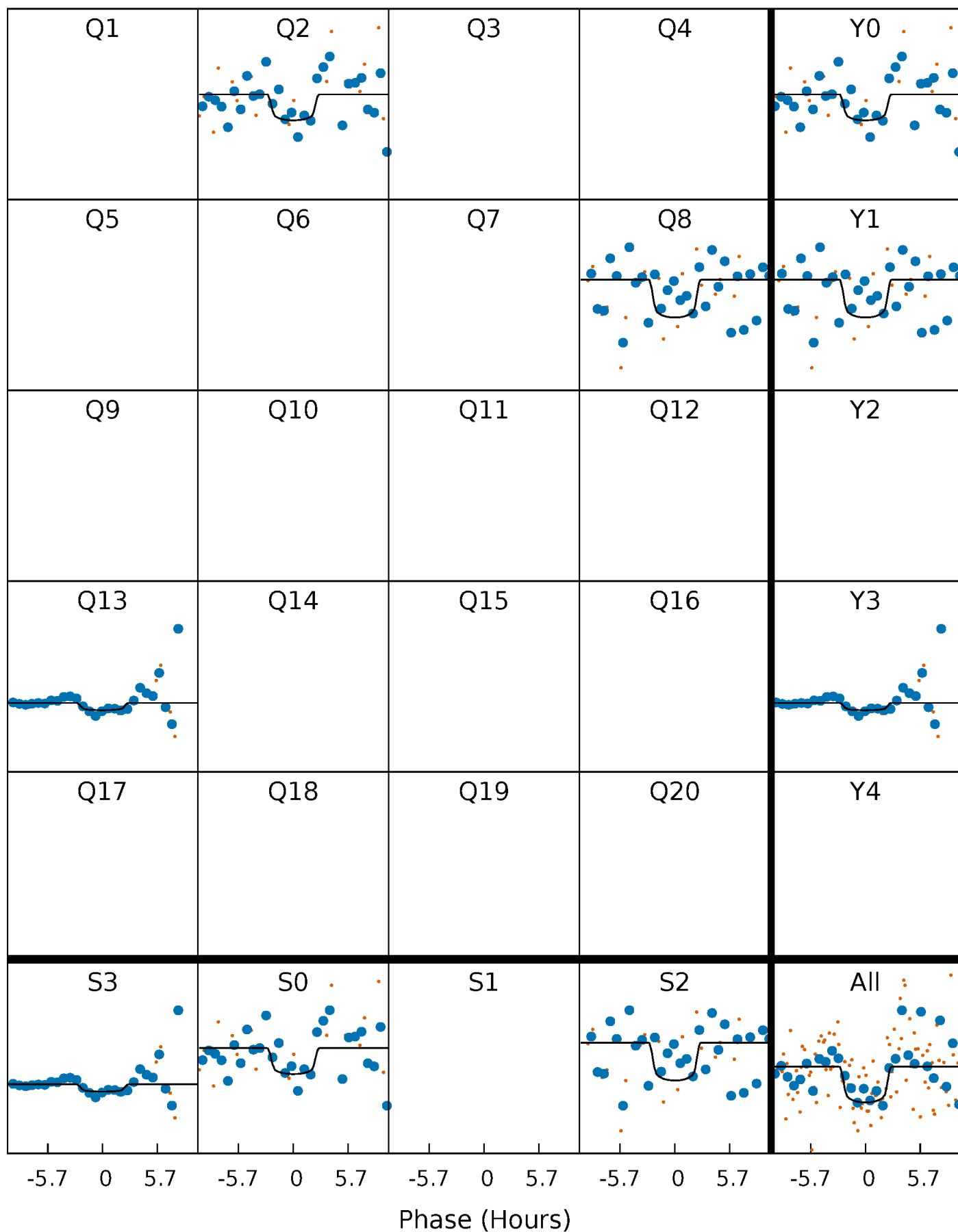
PDC Quarter-Phased Transit Curves

TCE 011513155-02 P=490.392492 Days $T_0=250.496349$ (BKJD)



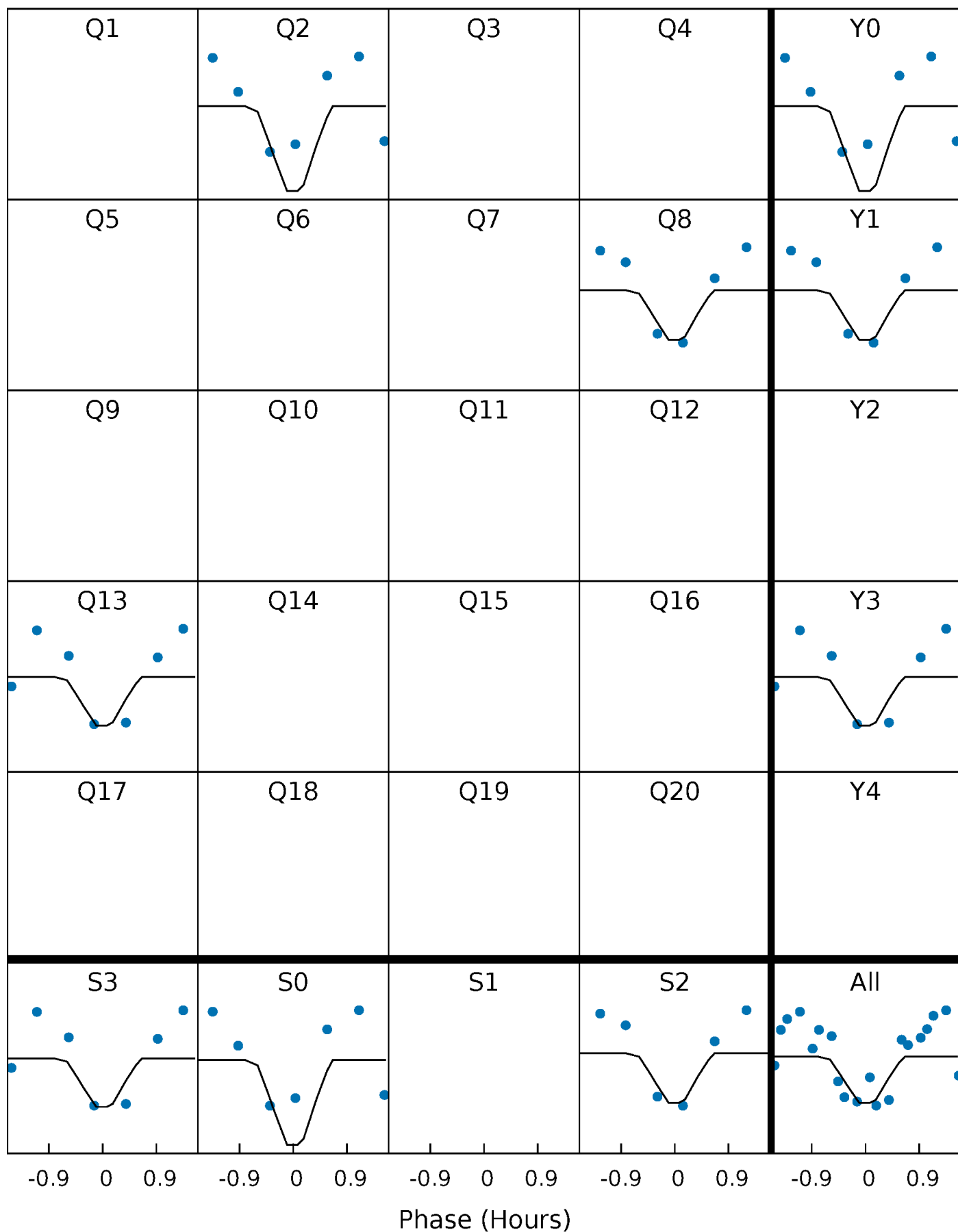
DV Quarter-Phased Transit Curves

TCE 011513155-02 P=490.392492 Days $T_0=250.496349$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

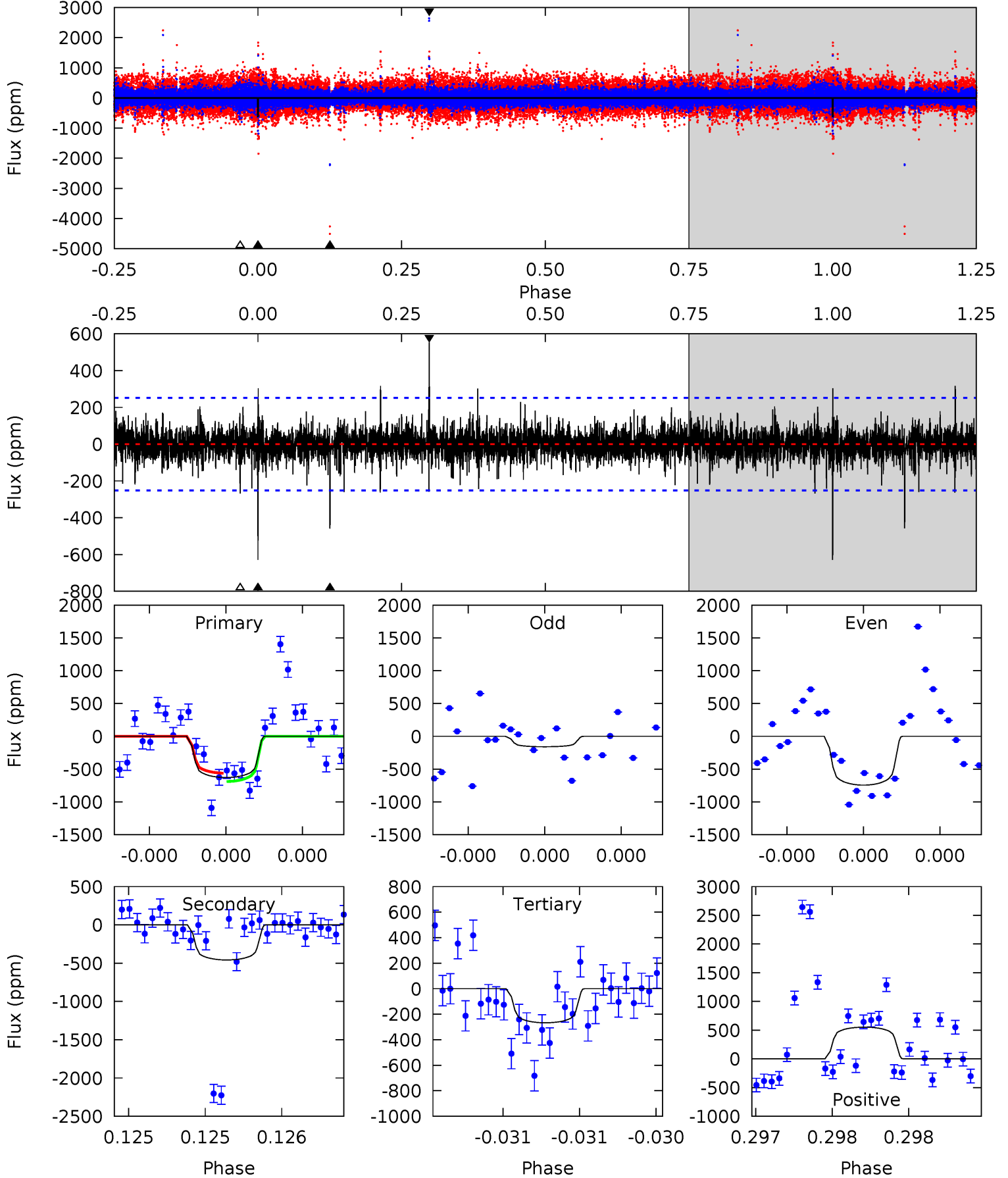
TCE 011513155-02 P=490.398629 Days $T_0=250.454687$ (BKJD)



DV Model-Shift Uniqueness Test

011513155-02, P = 490.392492 Days, E = 250.496349 Days

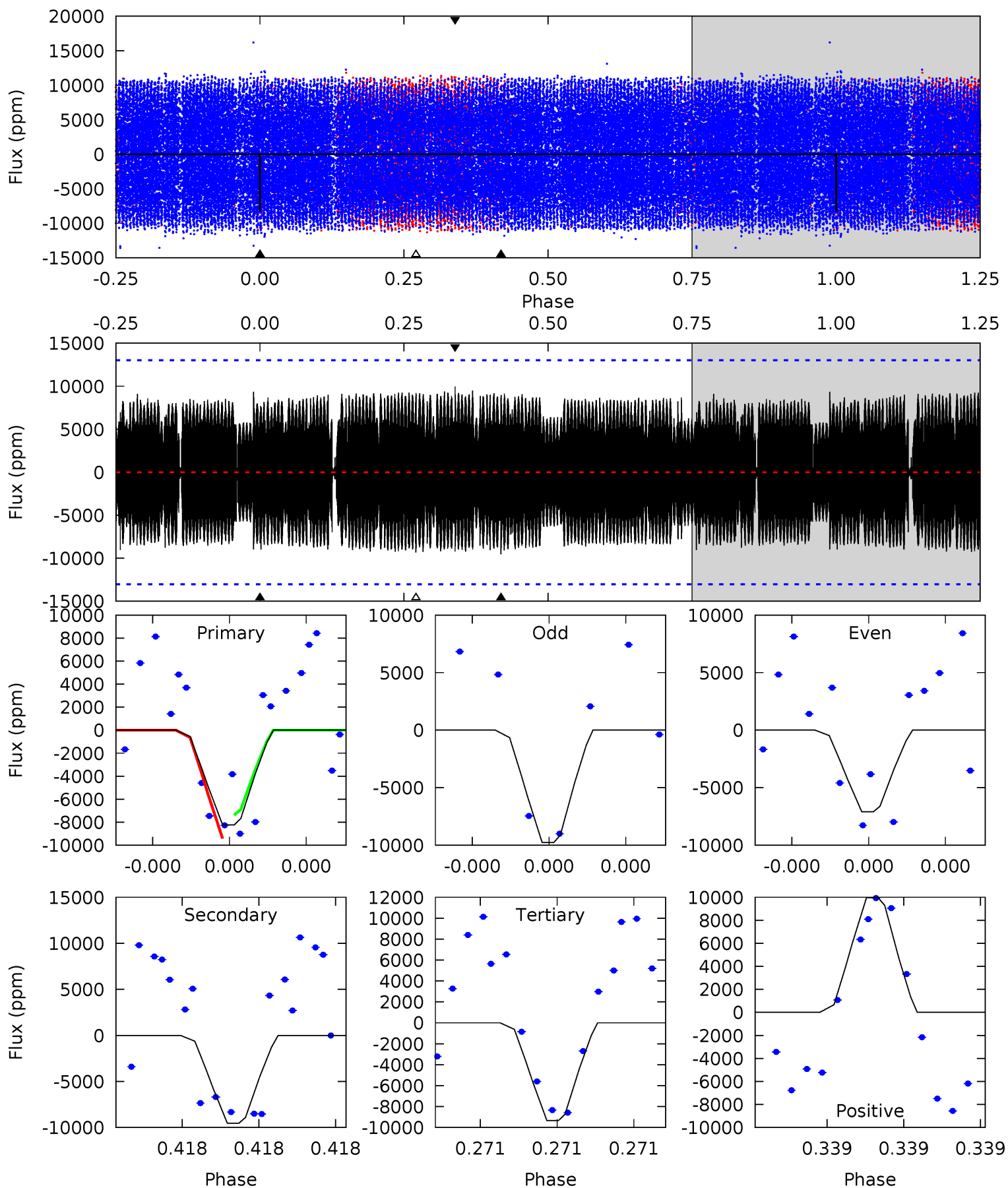
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 13.9 | 10.2 | 5.93 | 12.3 | 5.59 | 3.50 | 1.24 | 8.02 | 1.68 | 4.23 | -2.10 | 5.54 | 0.97 | 0.47 | 1.39 |



Alt Model-Shift Uniqueness Test

011513155-02, P = 490.398629 Days, E = 250.454687 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 3.70 | 4.28 | 4.19 | 4.47 | 5.85 | 3.89 | 1.99 | -0.50 | -0.77 | 0.09 | -0.19 | 0.57 | 0.85 | 0.51 | 0.46 |



Stellar Parameters For KIC 011513155

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | M (M_{\odot}) | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 7232^{+201}_{-277} | $4.047^{+0.214}_{-0.175}$ | $-0.320^{+0.300}_{-0.300}$ | $1.879^{+0.517}_{-0.517}$ | $1.435^{+0.228}_{-0.228}$ | $0.304^{+0.420}_{-0.132}$ |
| | +3%/-4% | +5%/-4% | +94%/-94% | +28%/-28% | +16%/-16% | +138%/-43% |
| 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 011513155-02 / KOI

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|------------------|-------------------------|-------------------|------------------------|---------------------------|
| DV | -458 ± 45 | $6.84^{+6.04}_{-4.28}$ | 520^{+40}_{-39} | 5662^{+4399}_{-1272} | 9968^{+61415}_{-7168} |
| Alt. | -9536 ± 2226 | $18.69^{+7.36}_{-6.29}$ | 520^{+40}_{-40} | 7491^{+2246}_{-1247} | 28160^{+36571}_{-14500} |

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 $A_{obs} \gg 1.0$

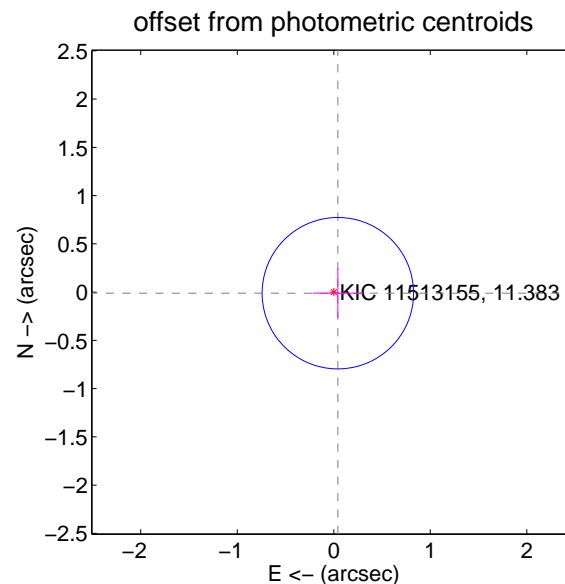
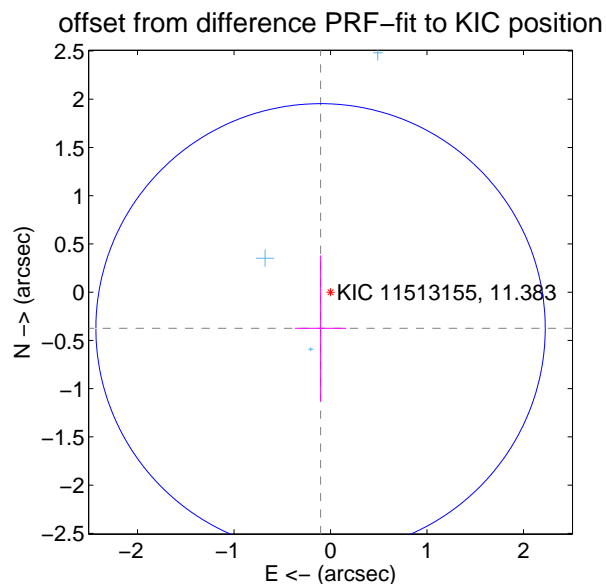
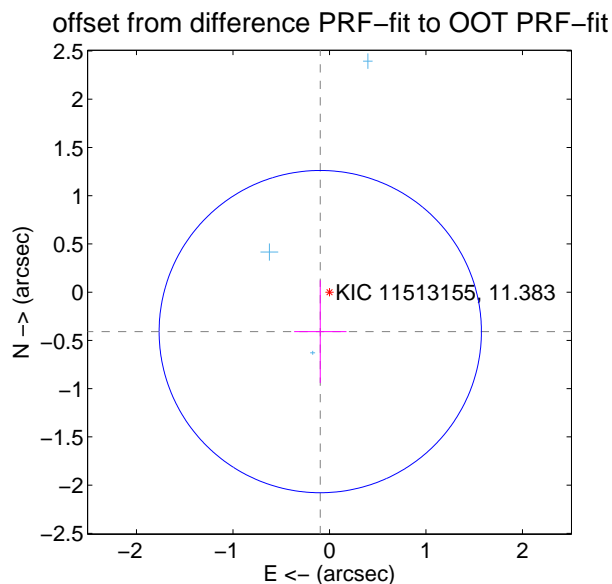
DV Centroid Data

Supplemental centroid analysis for 011513155-02. **Kepler magnitude: 11.38.** Transit SNR 12.33

There are 3 quarters with good PRF difference image offsets

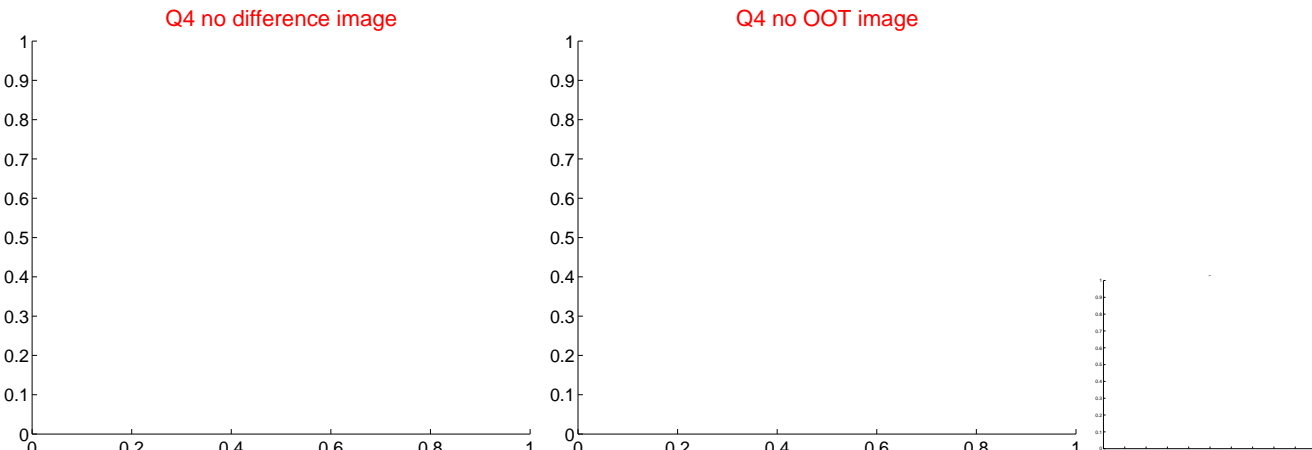
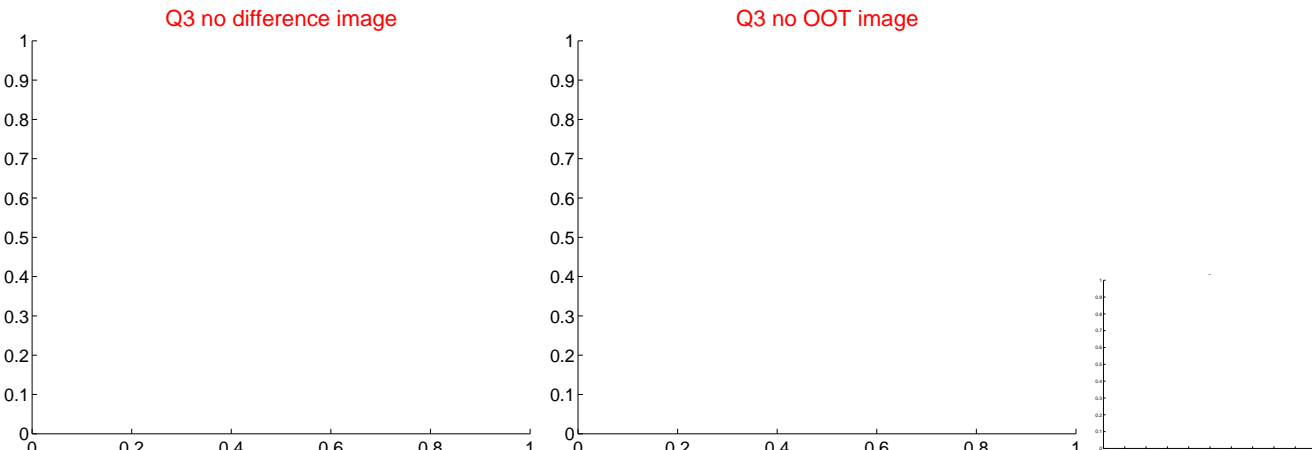
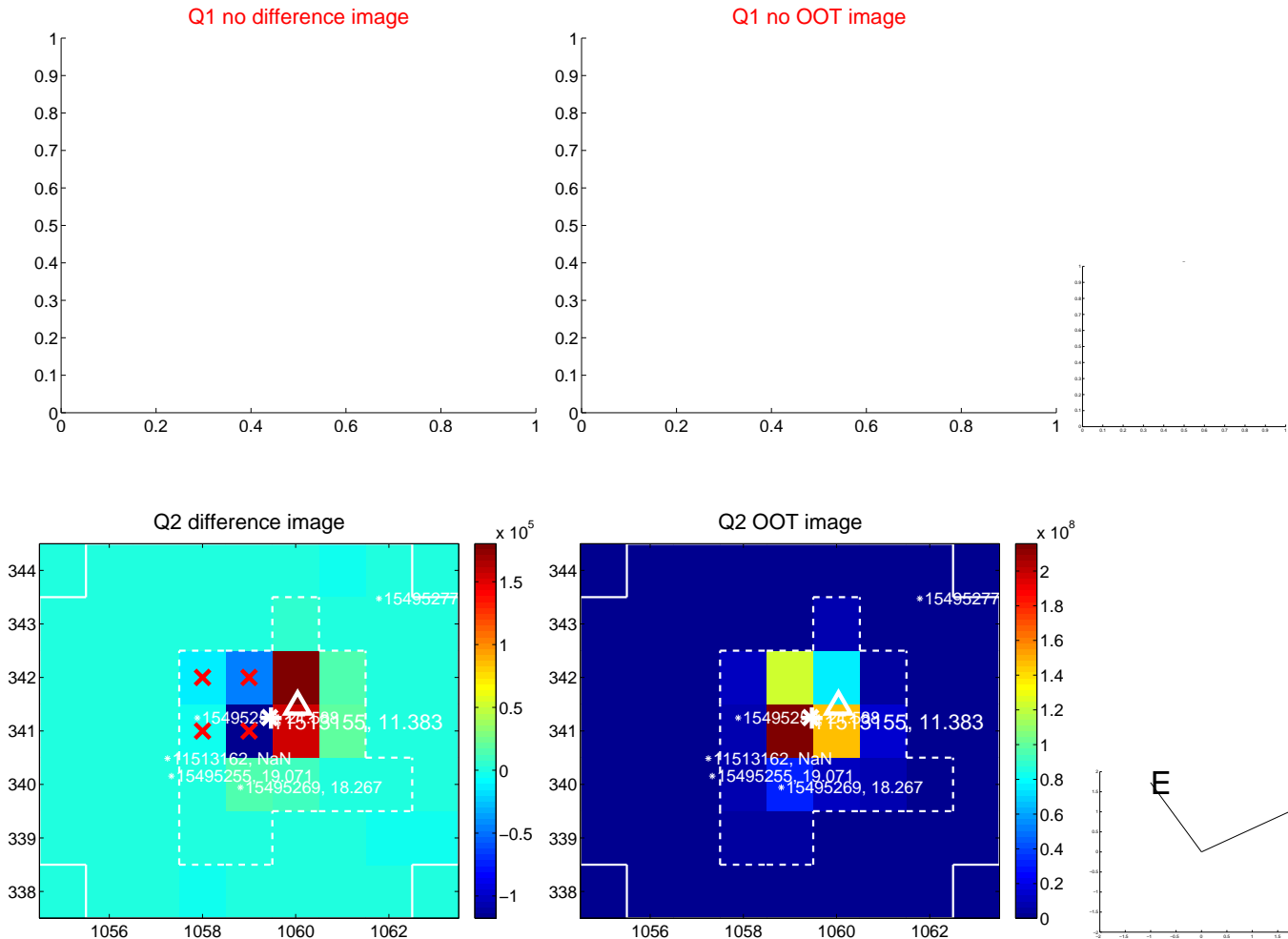
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT | 0.420 ± 0.557 | 0.75 | 0.095 ± 0.271 | -0.409 ± 0.532 |
| PRF-fit source offset from KIC position | 0.388 ± 0.776 | 0.50 | 0.103 ± 0.266 | -0.375 ± 0.756 |
| photometric centroid source offset | 0.04 ± 0.26 | 0.17 | -0.04 ± 0.26 | -0.01 ± 0.26 |



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



Q6 no difference image



Q6 no OOT image



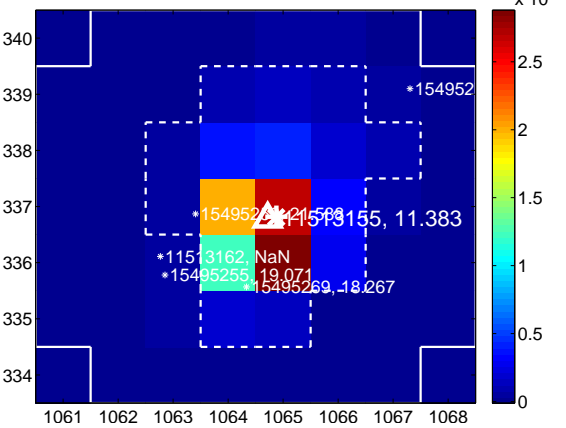
Q7 no difference image



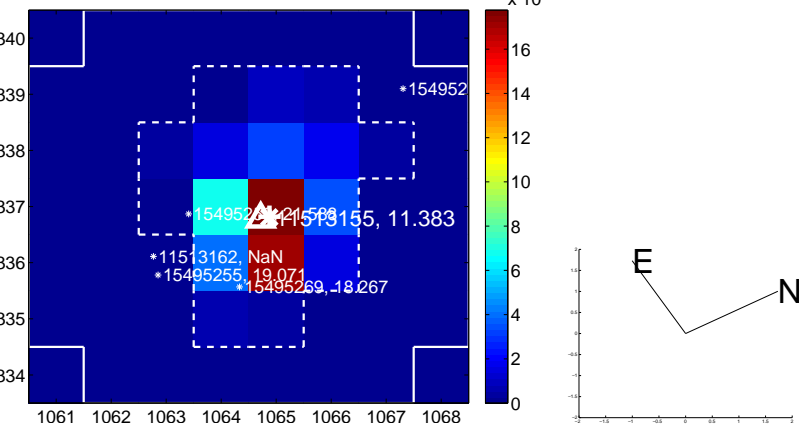
Q7 no OOT image



Q8 difference image



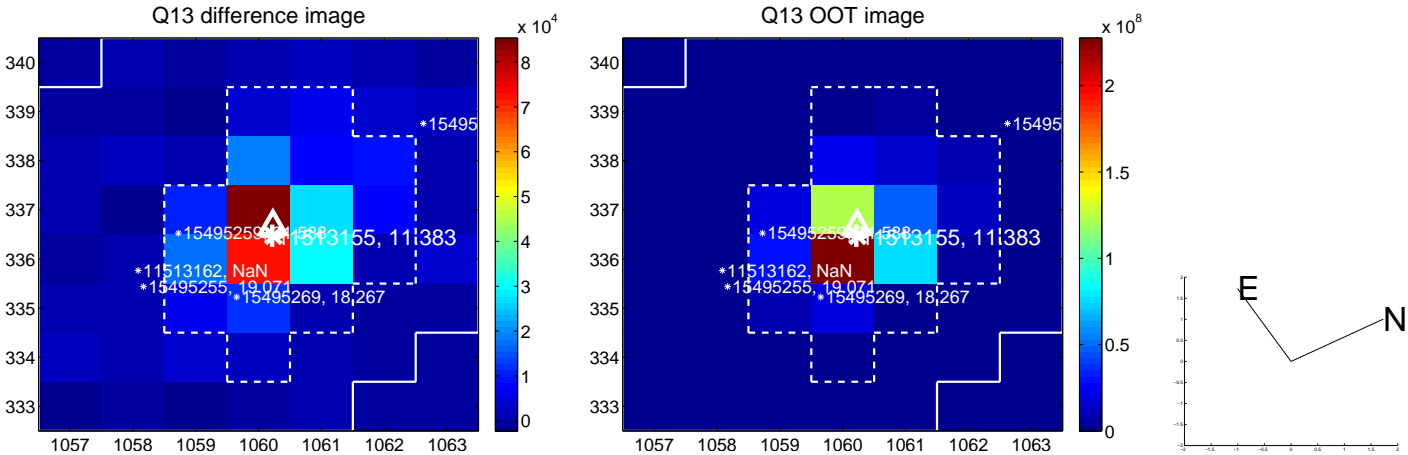
Q8 OOT image



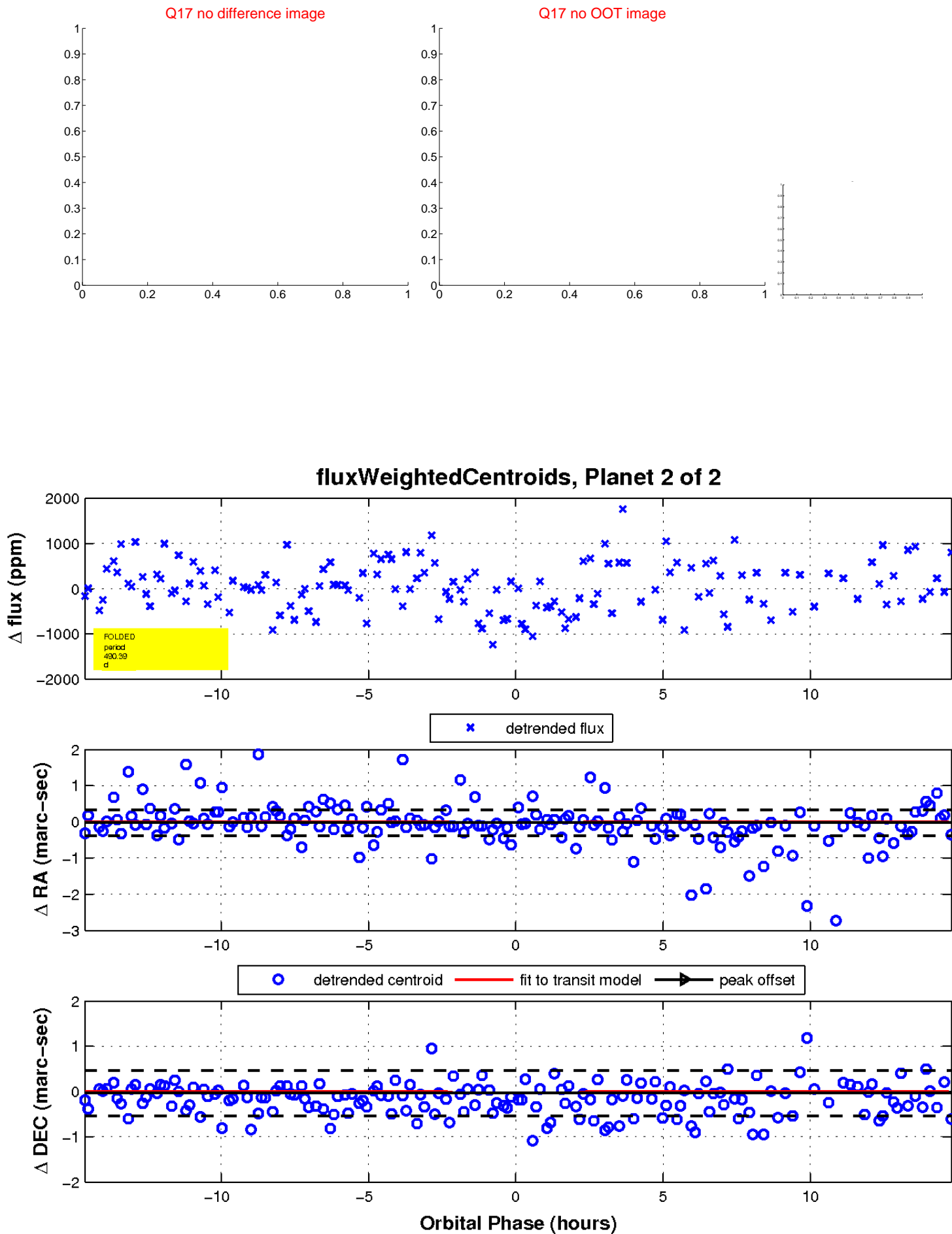
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



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



UKIRT Image

