

KIC 009273791

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|-----|-----------------------------|-----------------|------------------------|------------------------|
| 009273791-01 | OBS | No | 470.997502 | 523.859836 | 292.3 | 4.679 | 14.4 | 5.8 | 1.68 | 5482 | 3.17 | 1.69 |
| 009273791-02 | OBS | No | 2.295839 | 131.855320 | 33.2 | 6.038 | 8.7 | 8.6 | 1.68 | 5482 | 0.95 | 2045.21 |
| 009273791-03 | OBS | No | 289.014982 | 144.569471 | 305.9 | 3.278 | 10.0 | 7.0 | 1.68 | 5482 | 3.12 | 3.24 |
| 009273791-04 | OBS | No | 279.417268 | 173.675770 | 440.5 | 5.789 | 13.2 | 6.8 | 1.68 | 5482 | 3.71 | 3.39 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|---|
| 009273791-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS |
| 009273791-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | SWEET_NTL |
| 009273791-03 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_CHASES_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS |
| 009273791-04 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_CHASES_MARSHALL—TRANS_GAPPED—LPP_DV—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.

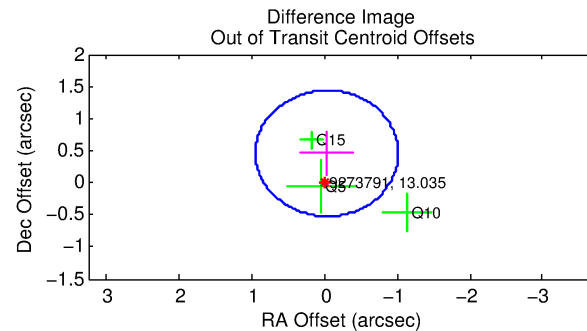
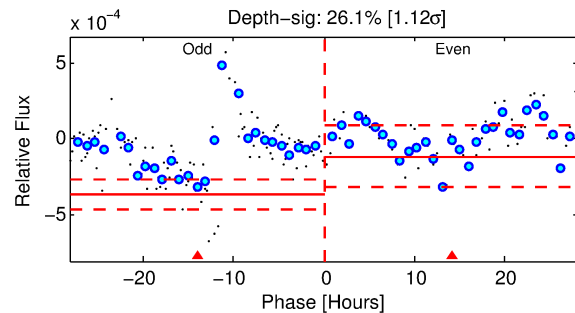
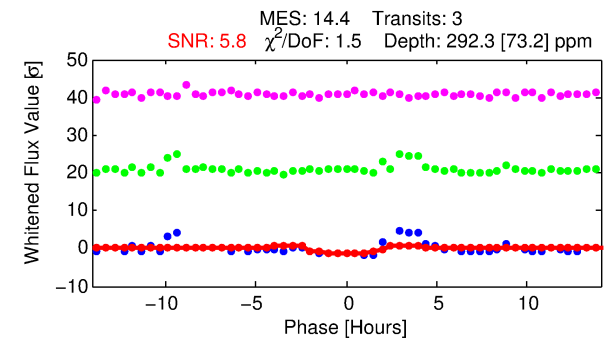
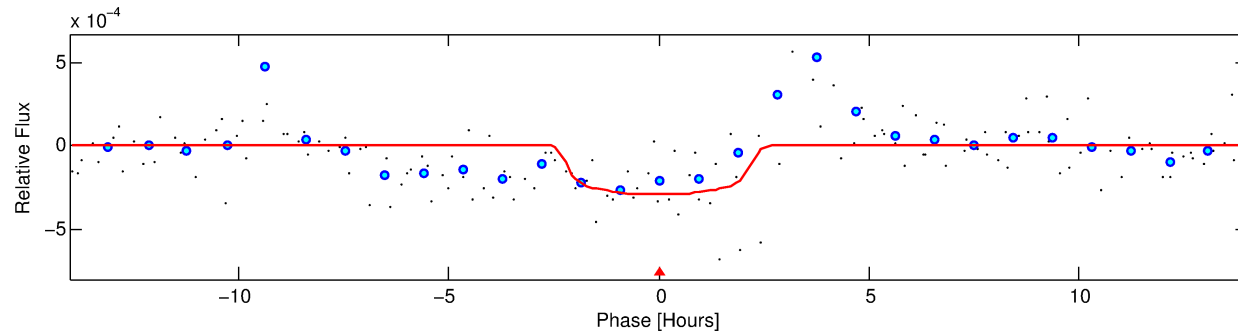
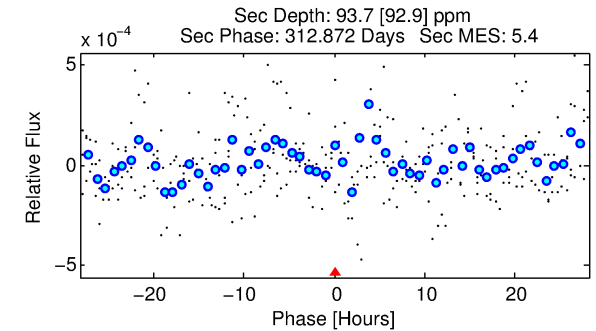
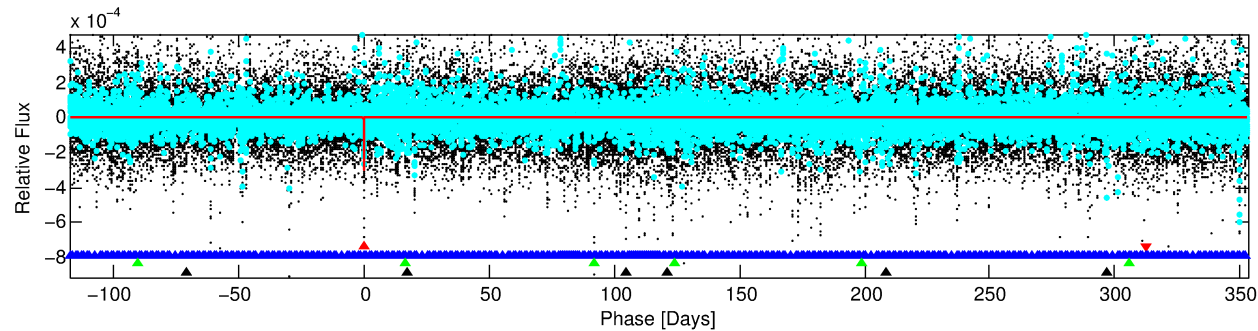
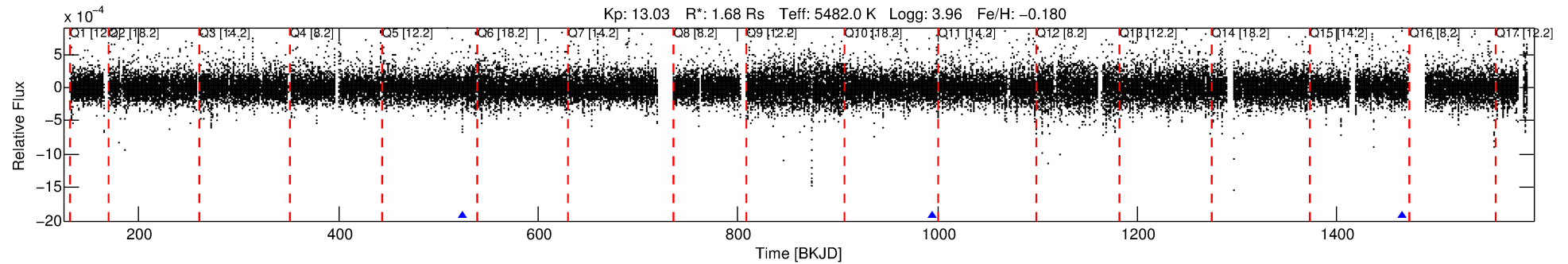
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009273791-01

No Significant Match Found

DV One-Page Summary

KIC: 9273791 Candidate: 1 of 4 Period: 470.998 d



DV Fit Results:

Period = 470.99750 [0.00919] d
Epoch = 523.8598 [0.0142] BKJD
Rp/R* = 0.0174 [0.0231]
a/R* = 489.42 [2744.66]
b = 0.79 [2.66]
Seff = 1.69 [1.60]
Teq = 291 [69] K
Rp = 3.17 [4.49] Re
a = 1.1589 [0.6271] AU
Ag = 6872.43 [20557.47] [0.33 σ]
Teffp = 4093 [2913] K [1.30 σ]

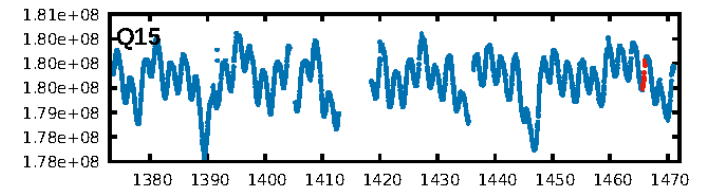
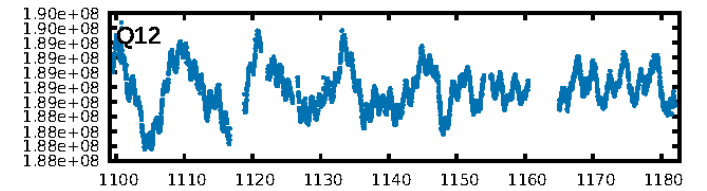
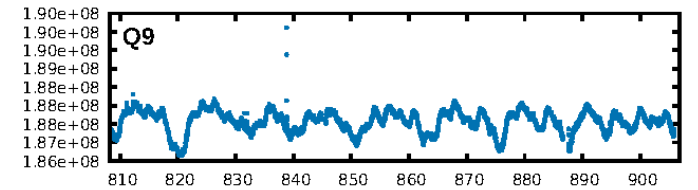
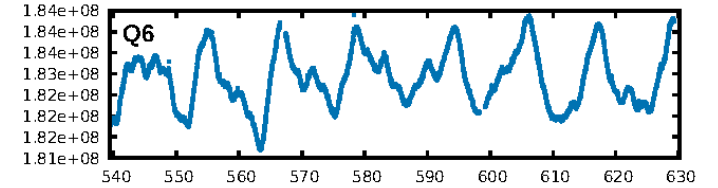
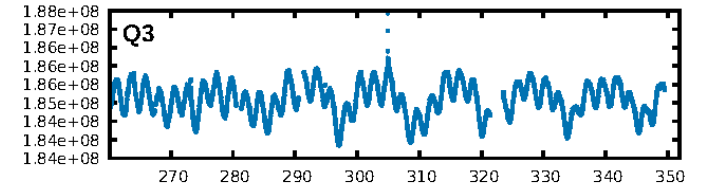
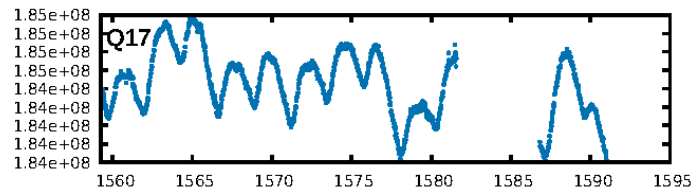
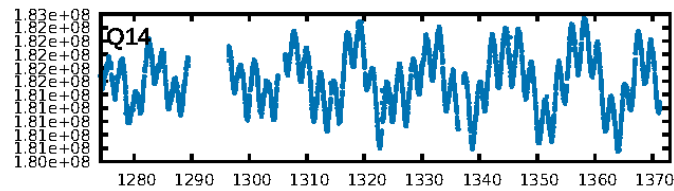
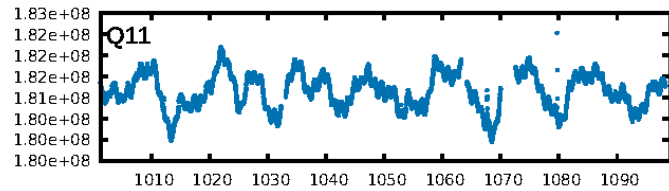
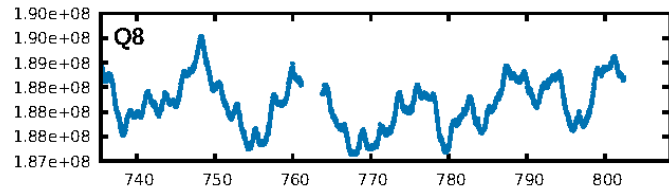
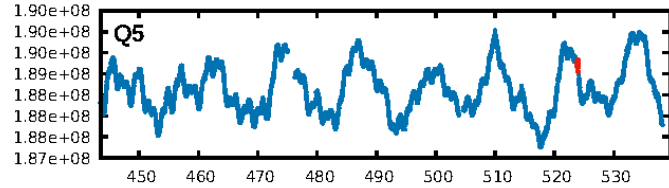
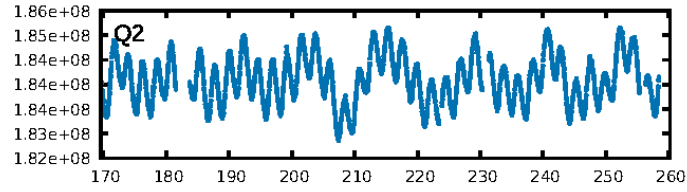
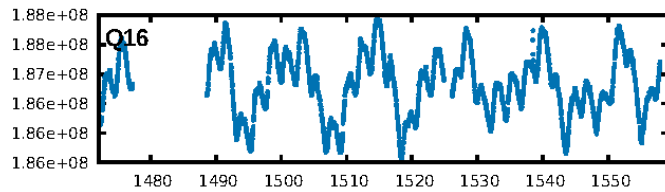
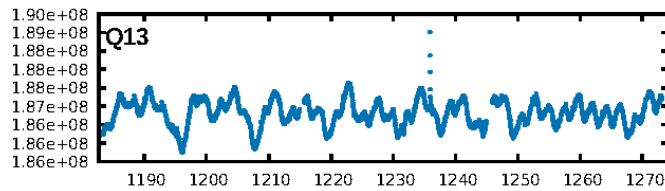
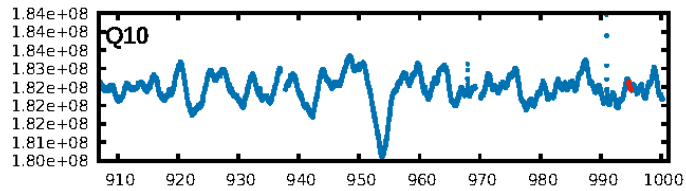
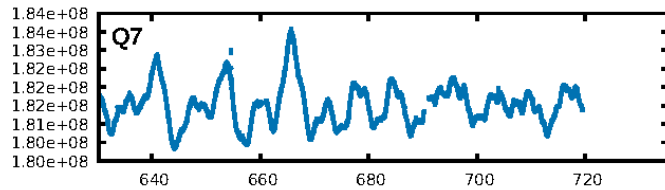
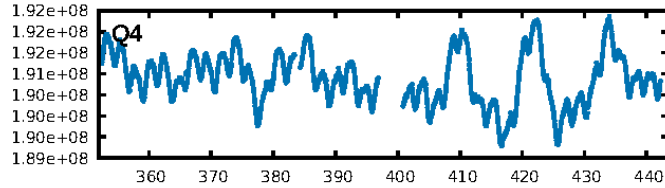
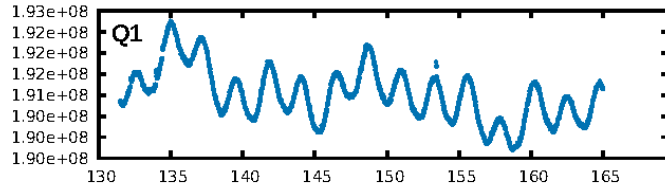
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [764.52 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 16.5%
ModelChiSquareGof-sig: 75.3%
Bootstrap-pfa: 2.65e-16
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 1.929
Centroid-sig: 60.8%
Centroid-so: 0.571 arcsec [0.55 σ]
OotOffset-rm: 0.458 arcsec [1.40 σ]
OotOffset-st: 1/1/0/1 [3]
KicOffset-rm: 0.692 arcsec [2.03 σ]
KicOffset-st: 1/1/0/1 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 0.33 [1/3]

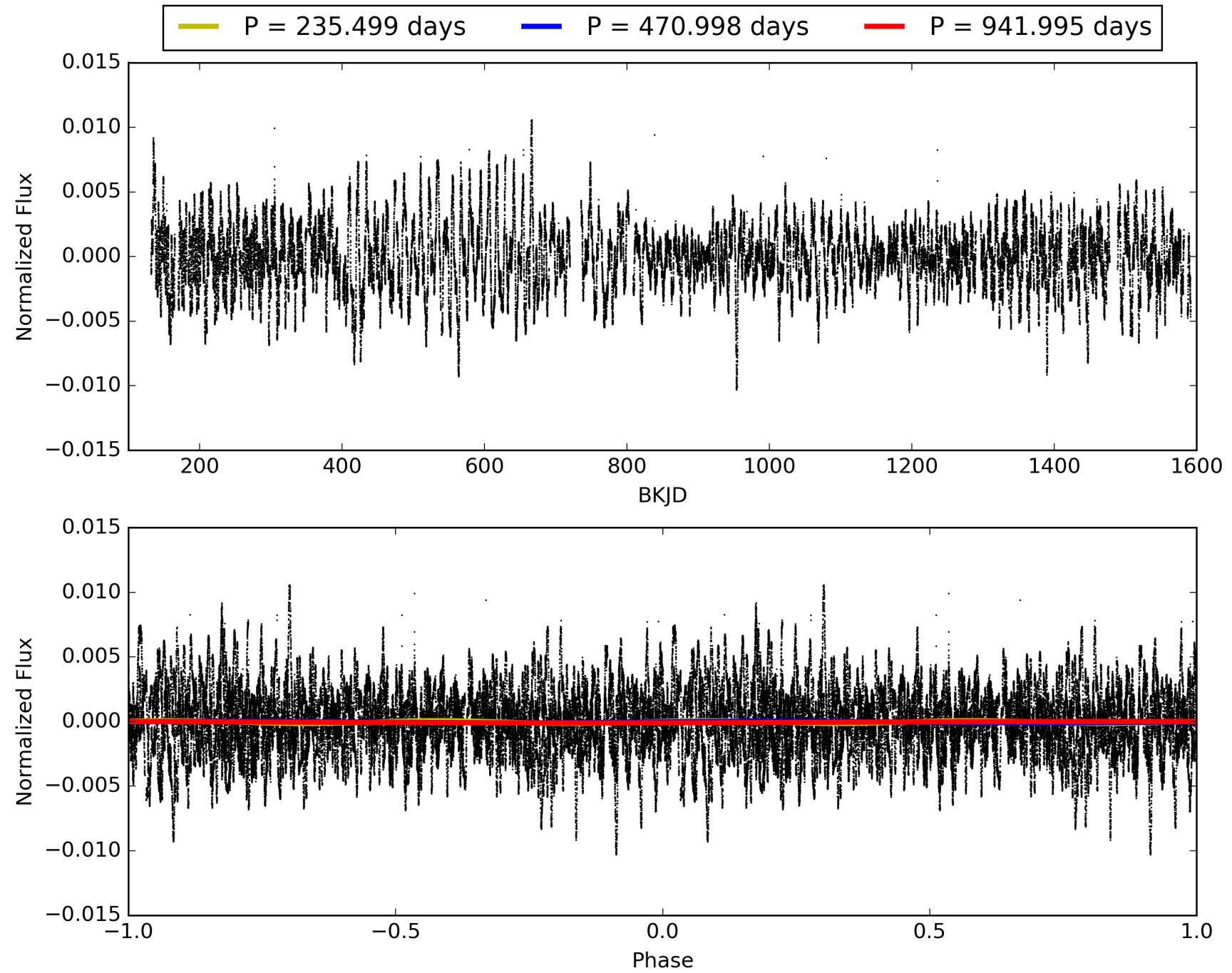
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 23:41:06 Z

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

TCE 009273791-01, PDC Light Curves

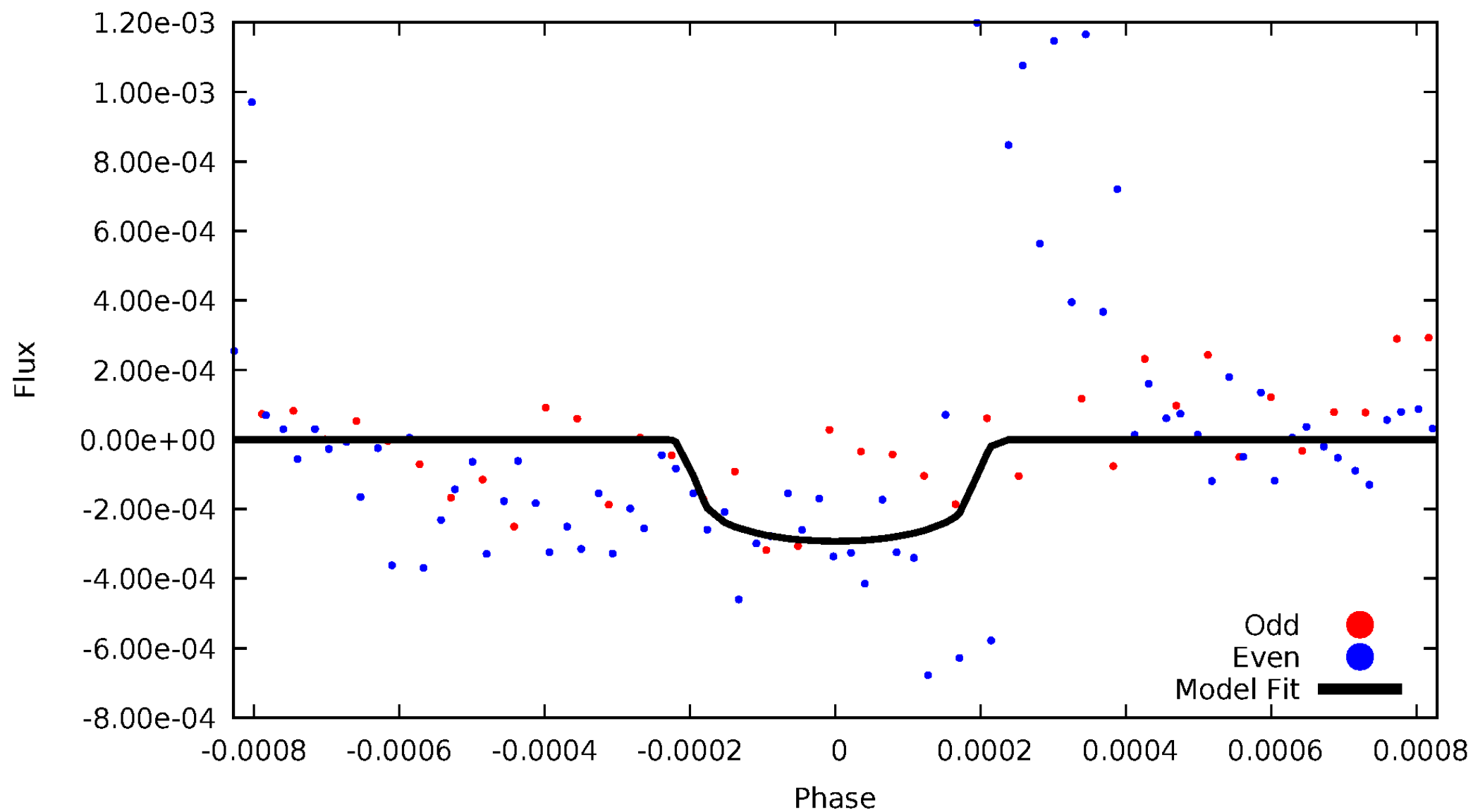


TCE 009273791-01



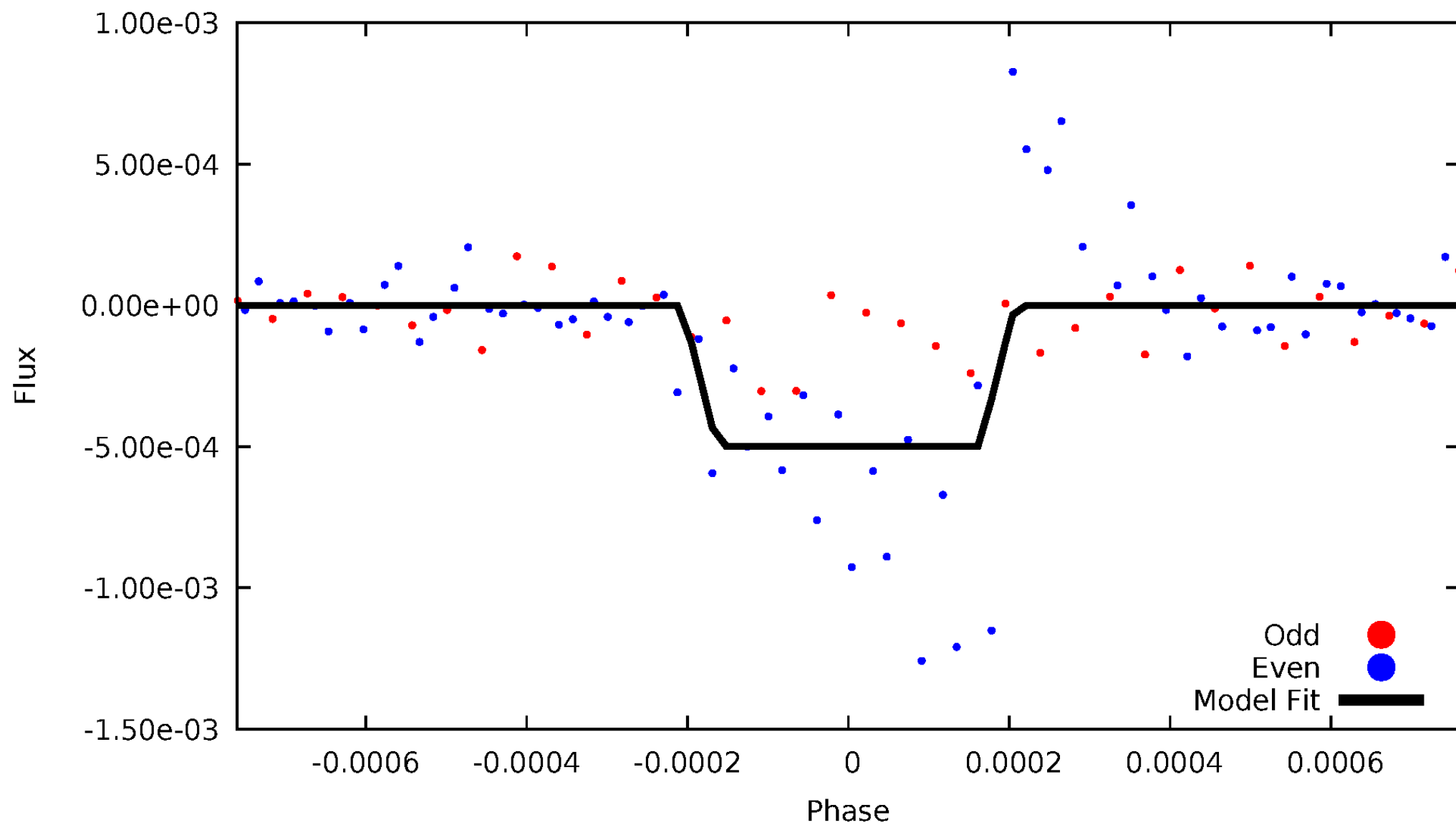
DV Odd/Even

TCE 009273791-01



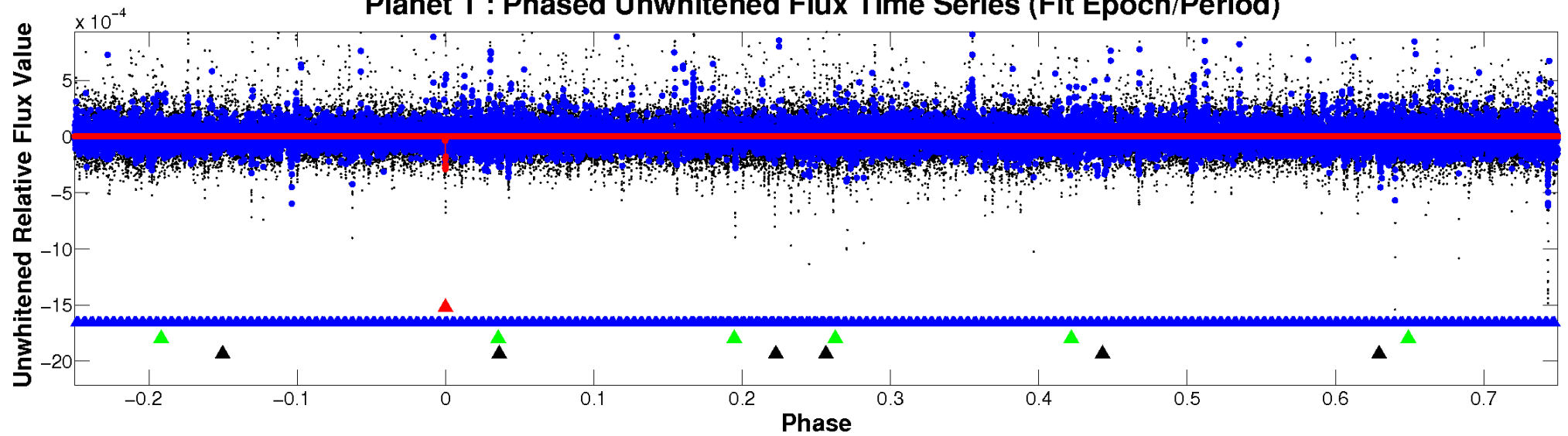
ALT Odd/Even

TCE 009273791-01

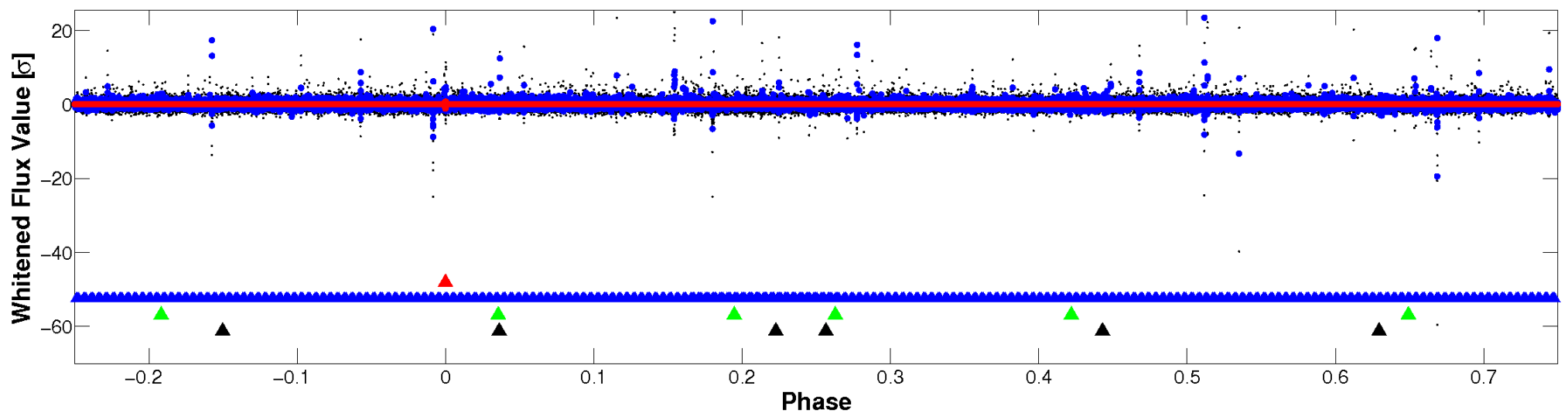


Non-Whitened Vs. Whitened Light Curve

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

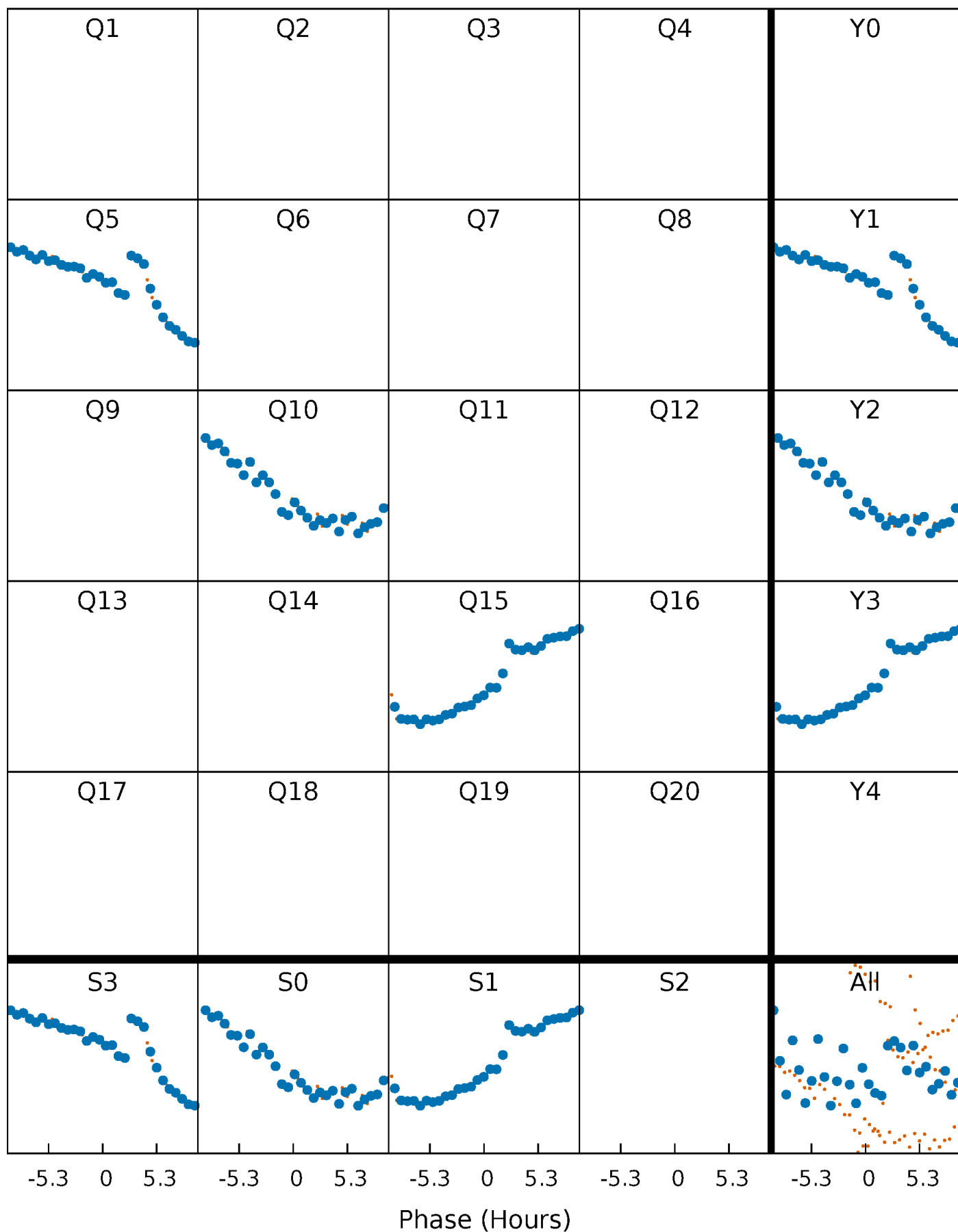


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



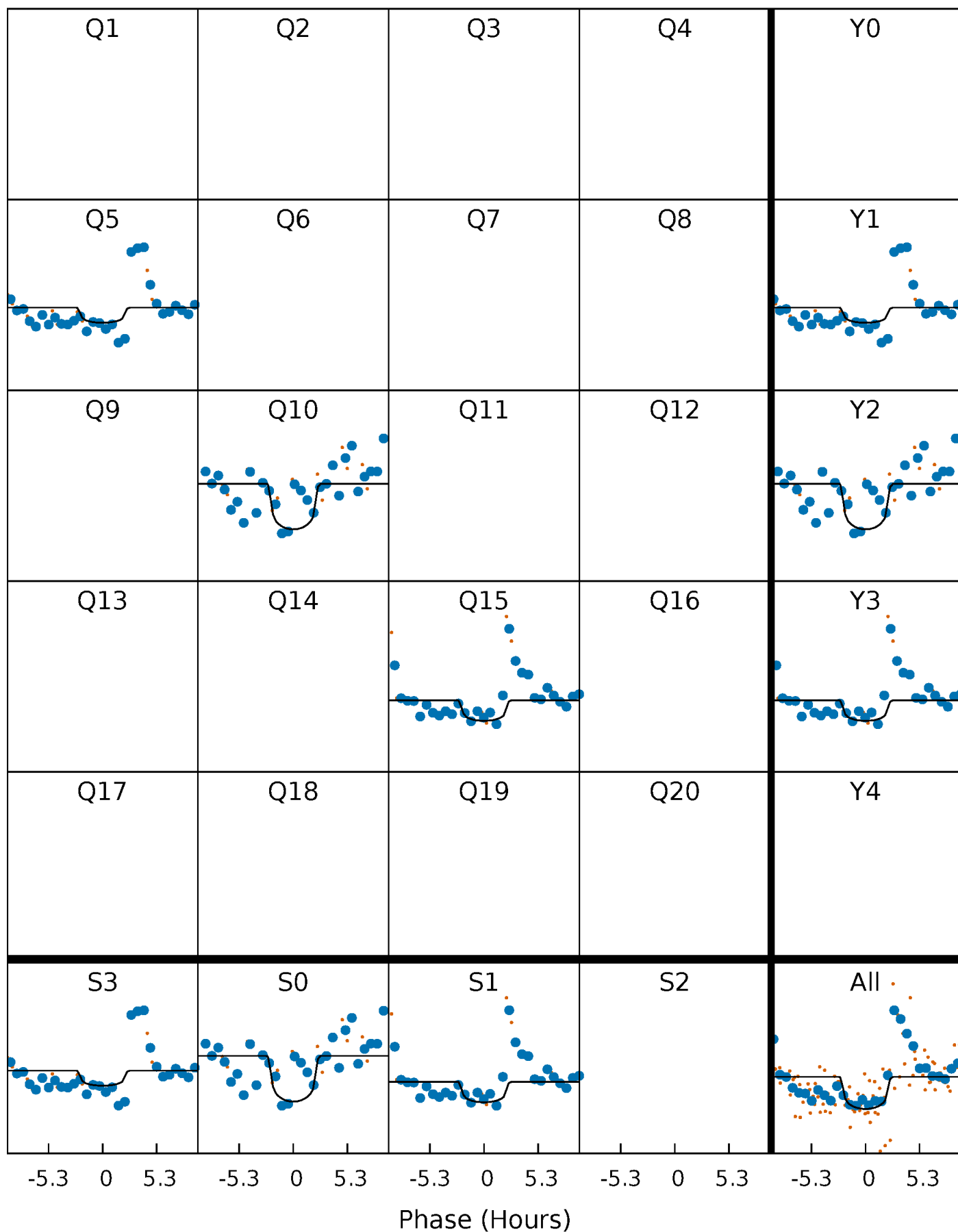
PDC Quarter-Phased Transit Curves

TCE 009273791-01 P=470.997502 Days $T_0=523.859836$ (BKJD)



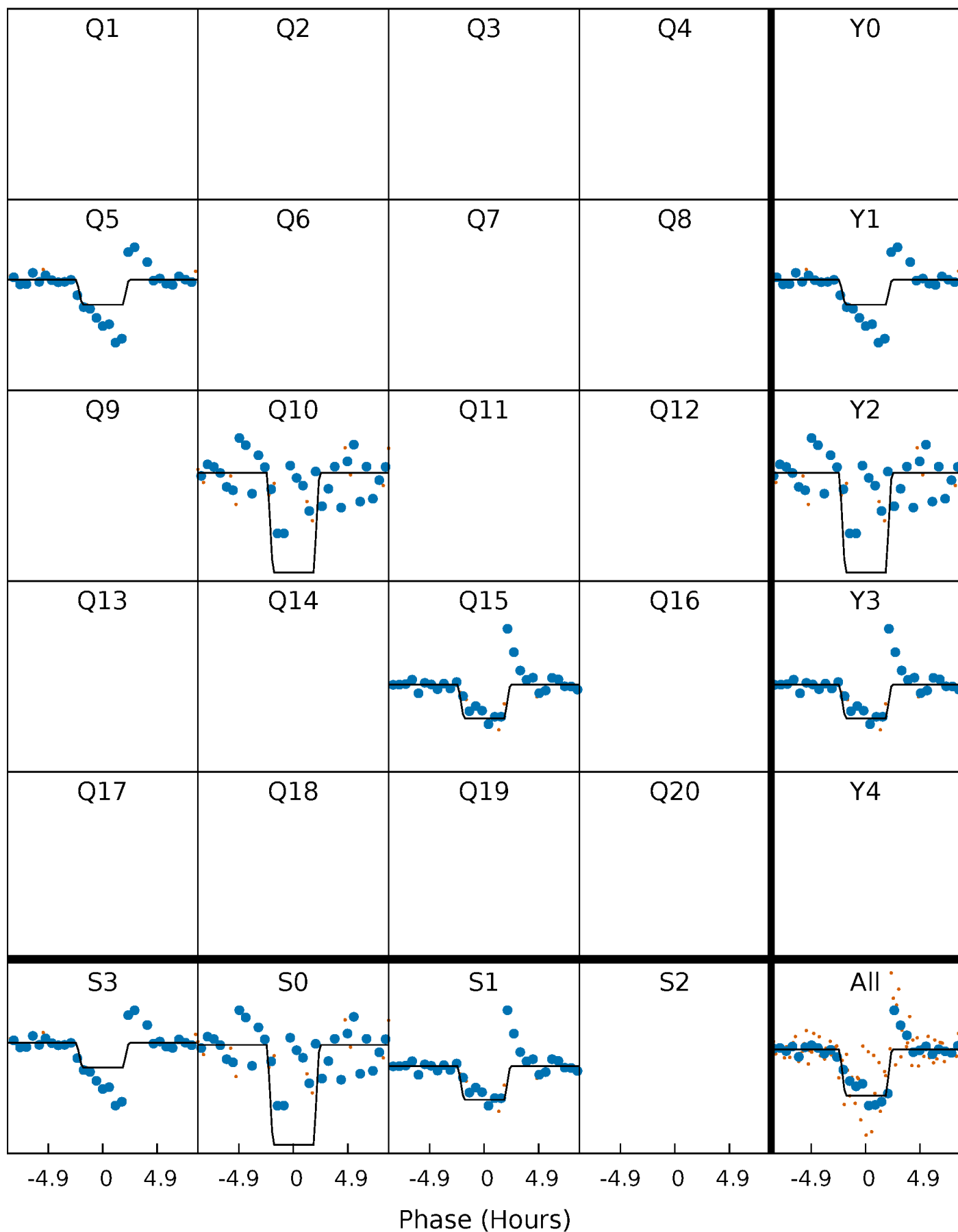
DV Quarter-Phased Transit Curves

TCE 009273791-01 P=470.997502 Days $T_0=523.859836$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

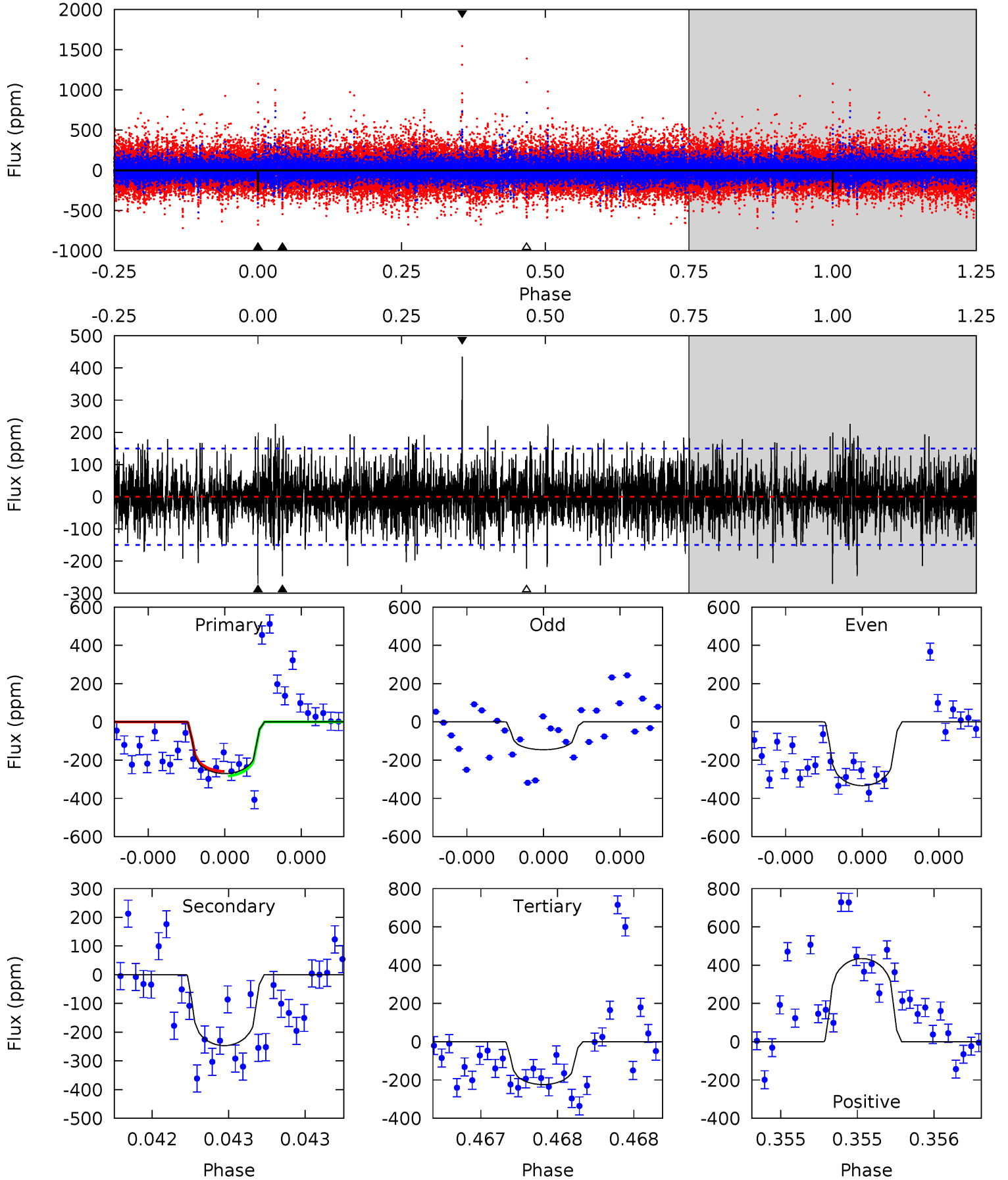
TCE 009273791-01 P=470.986747 Days $T_0=523.876964$ (BKJD)



DV Model-Shift Uniqueness Test

009273791-01, $P = 470.997502$ Days, $E = 52.862334$ Days

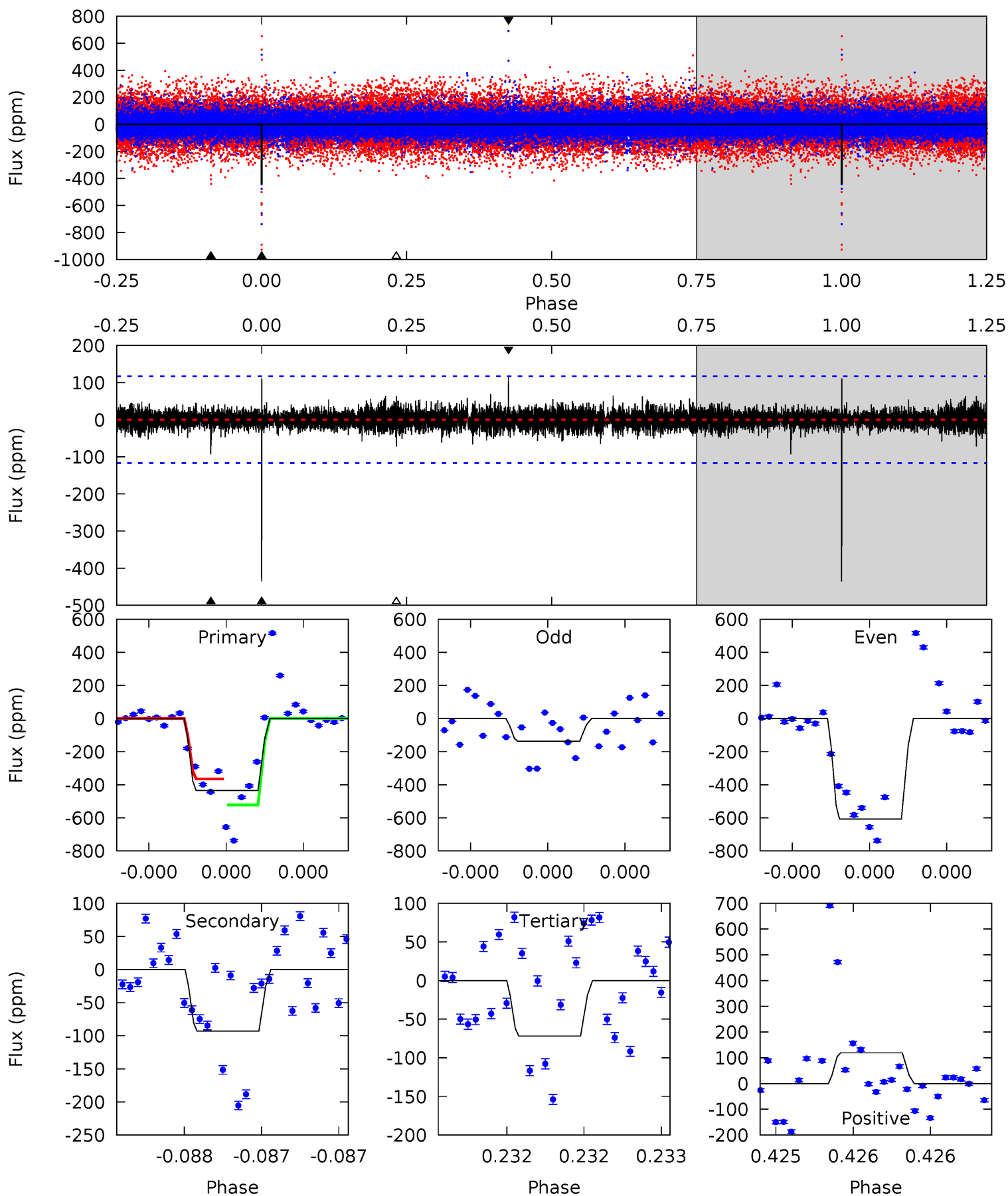
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 10.1 | 9.22 | 8.36 | 16.2 | 5.59 | 3.50 | 2.06 | 1.74 | -6.15 | 0.86 | -7.02 | 2.72 | 1.57 | 0.62 | 0.45 |



Alt Model-Shift Uniqueness Test

009273791-01, P = 470.986747 Days, E = 52.890217 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 20.9 | 4.47 | 3.45 | 5.71 | 5.62 | 3.55 | 0.71 | 17.4 | 15.2 | 1.02 | -1.24 | 11.7 | 1.19 | 0.21 | 3.78 |



Stellar Parameters For KIC 009273791

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | M (M_{\odot}) | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 5482^{+213}_{-174} | $3.961^{+0.570}_{-0.228}$ | $-0.180^{+0.350}_{-0.250}$ | $1.675^{+0.655}_{-0.800}$ | $0.936^{+0.111}_{-0.122}$ | $0.280^{+1.556}_{-0.150}$ |
| | +4%/-3% | +14%/-6% | +194%/-139% | +39%/-48% | +12%/-13% | +555%/-54% |
| Source | PHO54 | PHO54 | PHO54 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 009273791-01 / KOI

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|---------------|------------------------|----------------------|-----------------------|--------------------------|
| DV | -247 ± 27 | $3.96^{+3.98}_{-2.59}$ | 398^{+43}_{-63} | 4524^{+2903}_{-903} | 11567^{+79300}_{-8713} |
| Alt. | -93 ± 21 | $4.37^{+4.12}_{-2.67}$ | 398^{+45}_{-56} | 3693^{+1714}_{-628} | 3362^{+21749}_{-2419} |

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

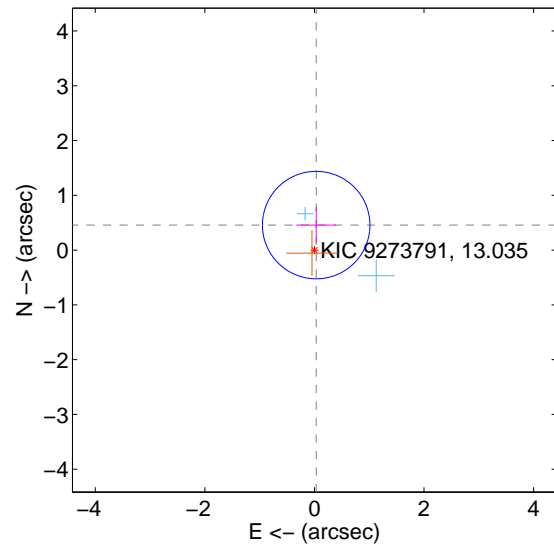
Supplemental centroid analysis for 009273791-01. Kepler magnitude: 13.04. Transit SNR 5.81

There are 2 quarters with good PRF difference image offsets

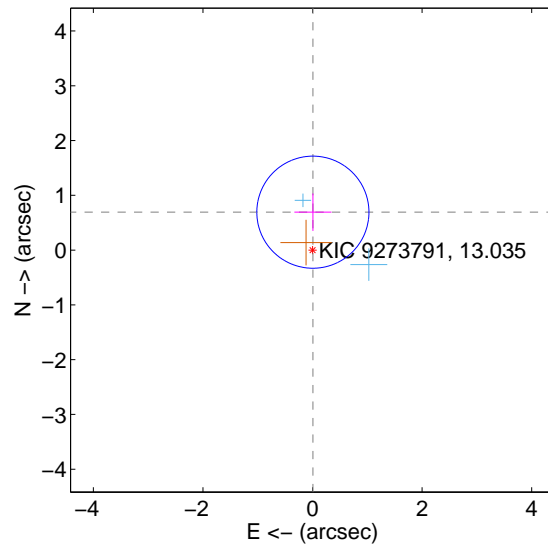
The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT | 0.458 ± 0.327 | 1.40 | -0.032 ± 0.363 | 0.457 ± 0.327 |
| PRF-fit source offset from KIC position | 0.692 ± 0.341 | 2.03 | -0.007 ± 0.339 | 0.692 ± 0.341 |
| photometric centroid source offset | 0.57 ± 1.04 | 0.55 | -0.41 ± 1.03 | 0.39 ± 1.04 |

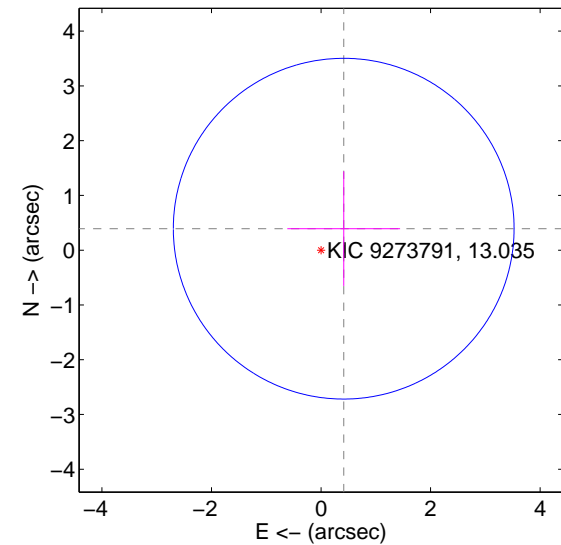
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

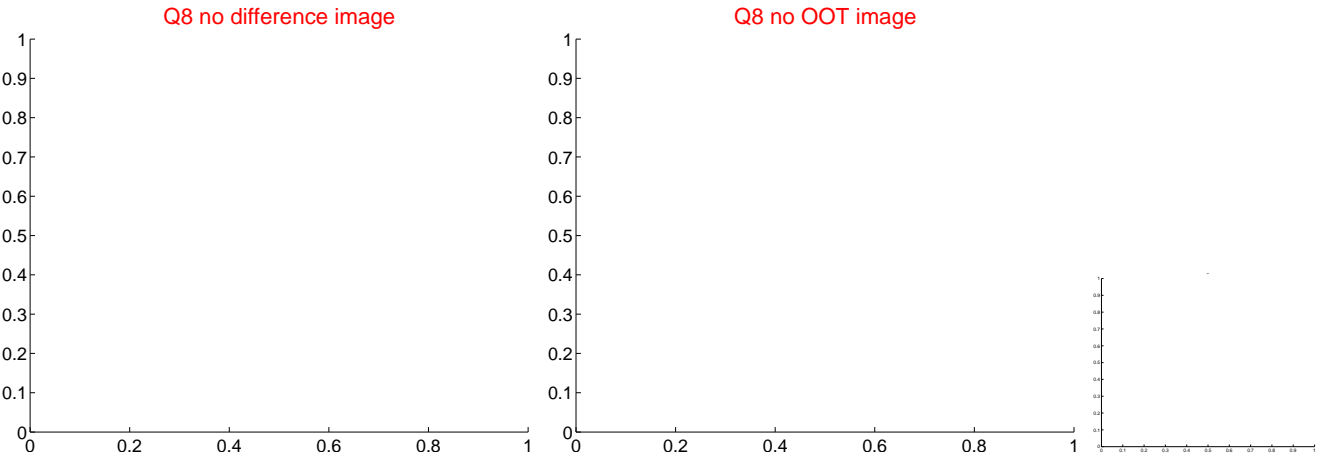
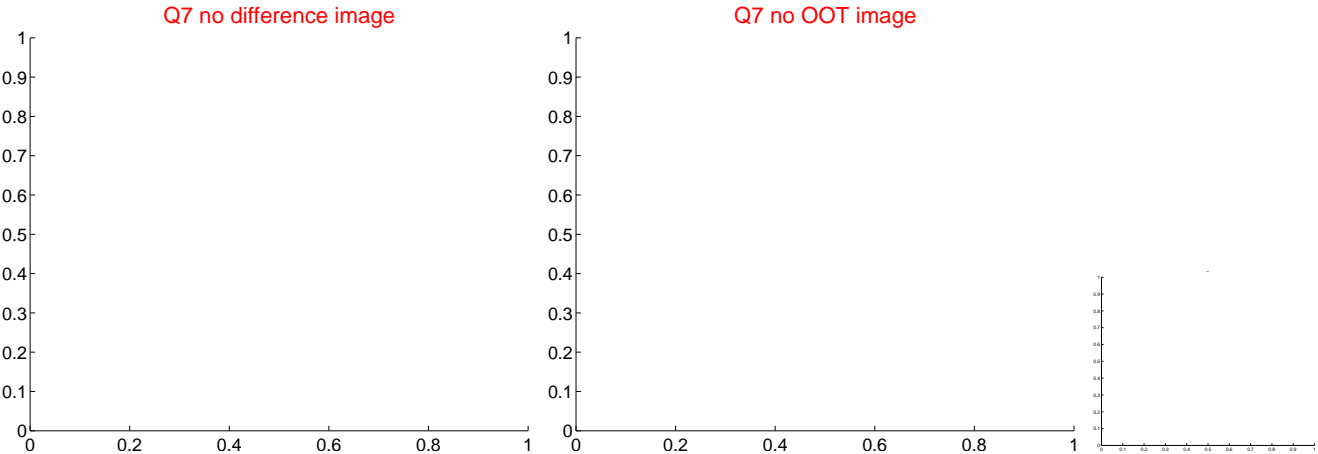
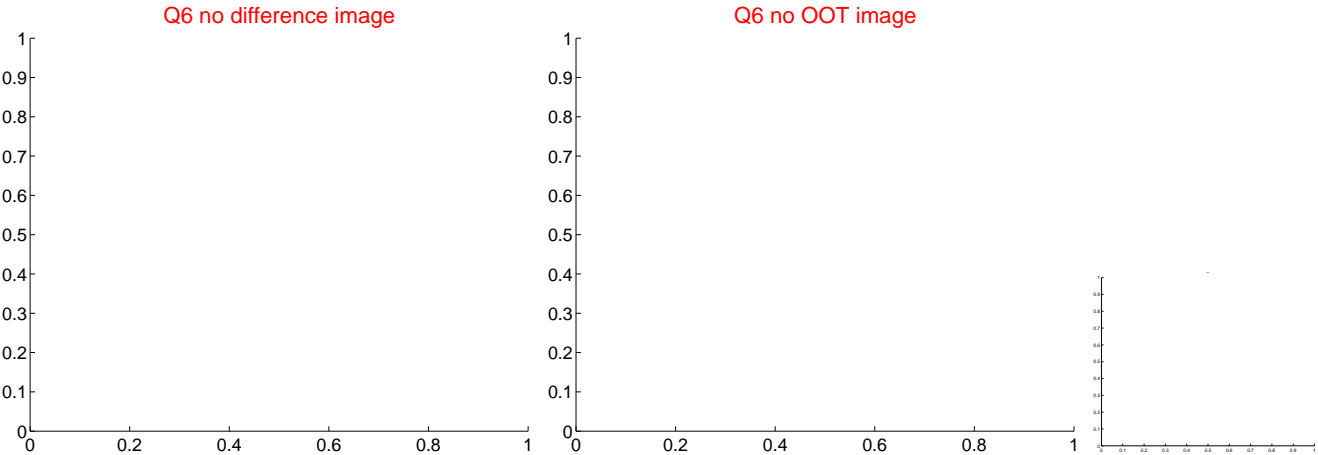
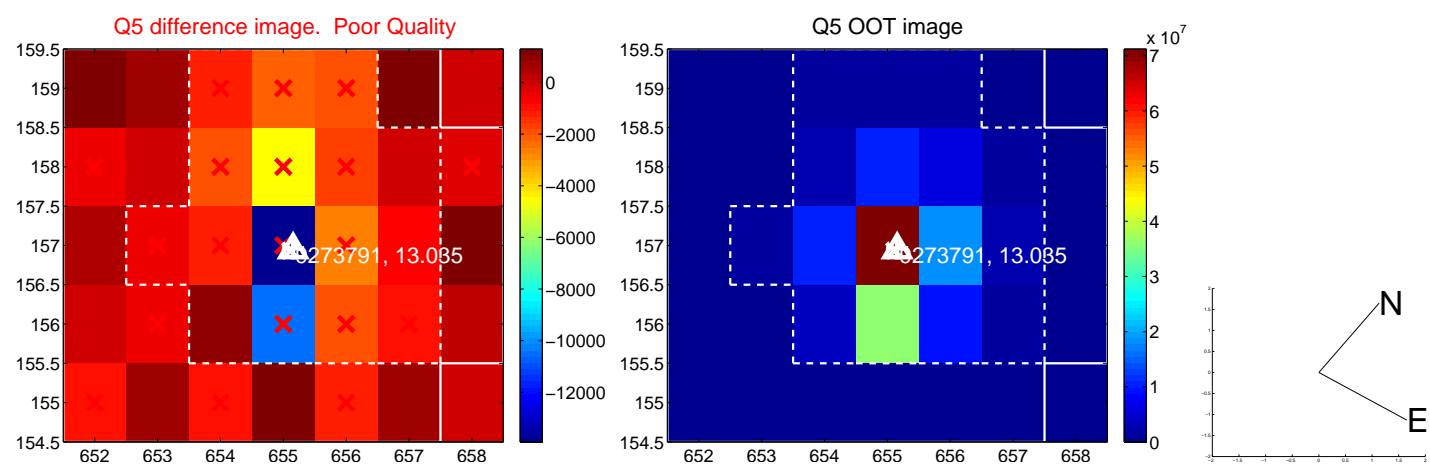


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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



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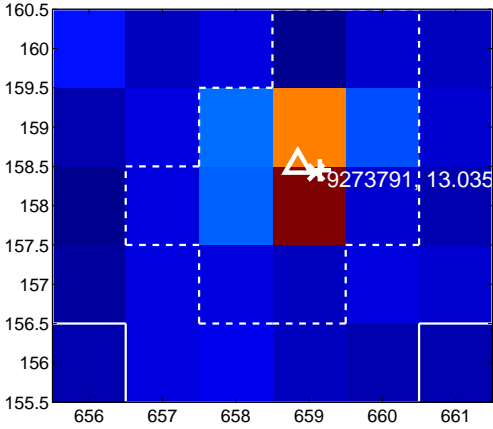
Q9 no difference image



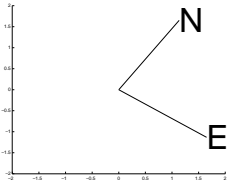
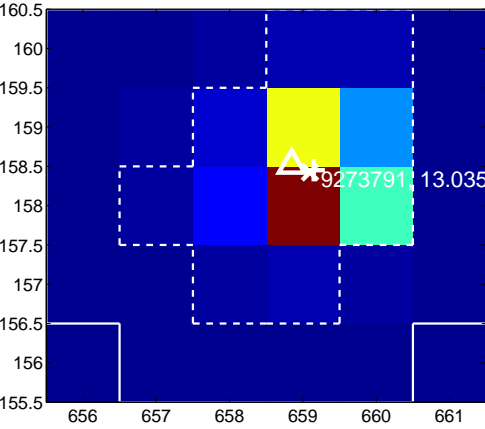
Q9 no OOT image



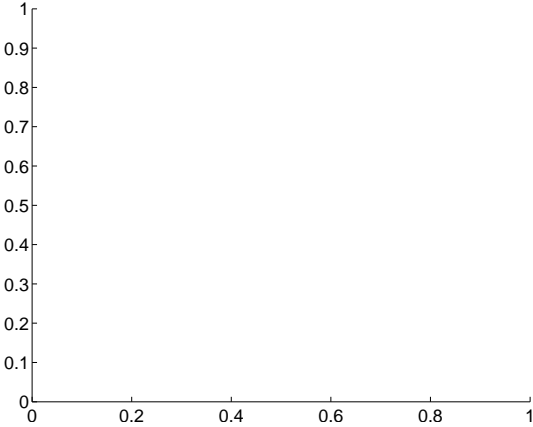
Q10 difference image



Q10 OOT image



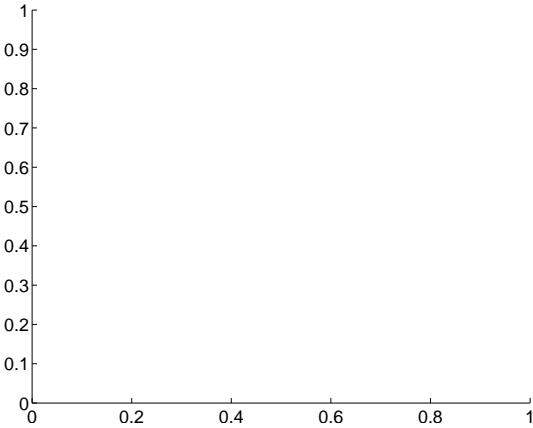
Q11 no difference image



Q11 no OOT image



Q12 no difference image



Q12 no 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



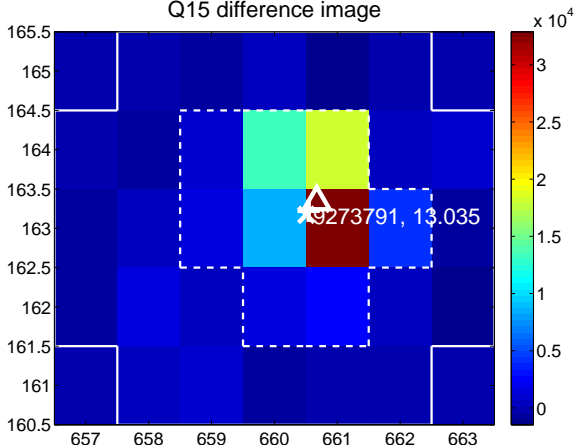
Q14 no difference image



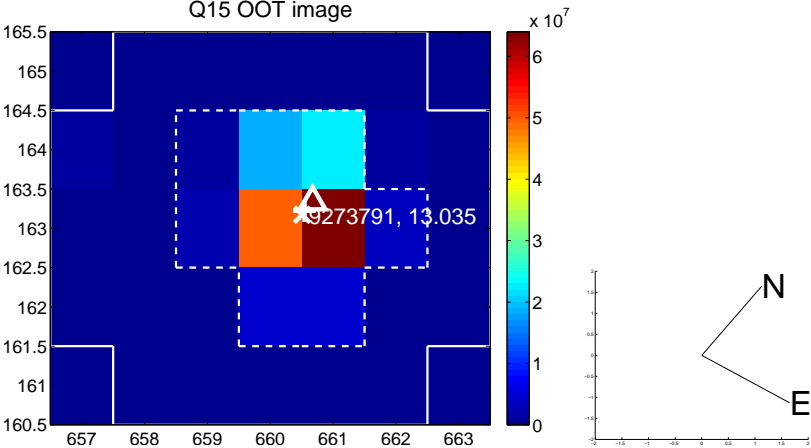
Q14 no OOT image



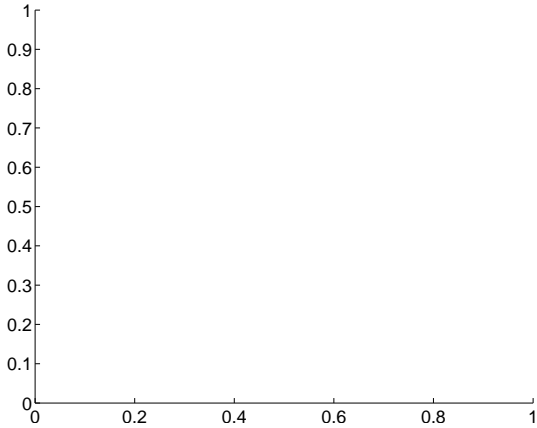
Q15 difference image



Q15 OOT image



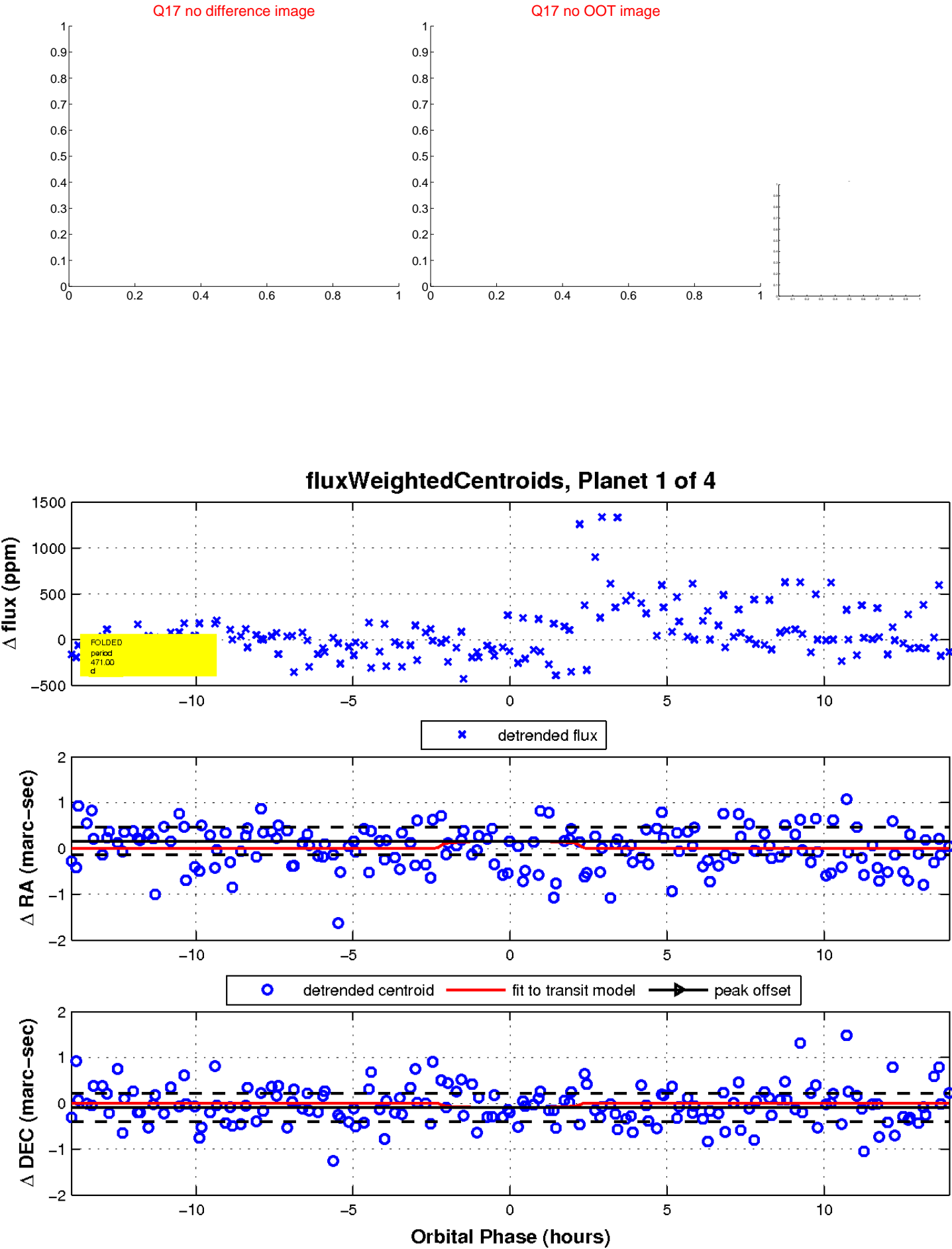
Q16 no difference image



Q16 no OOT image

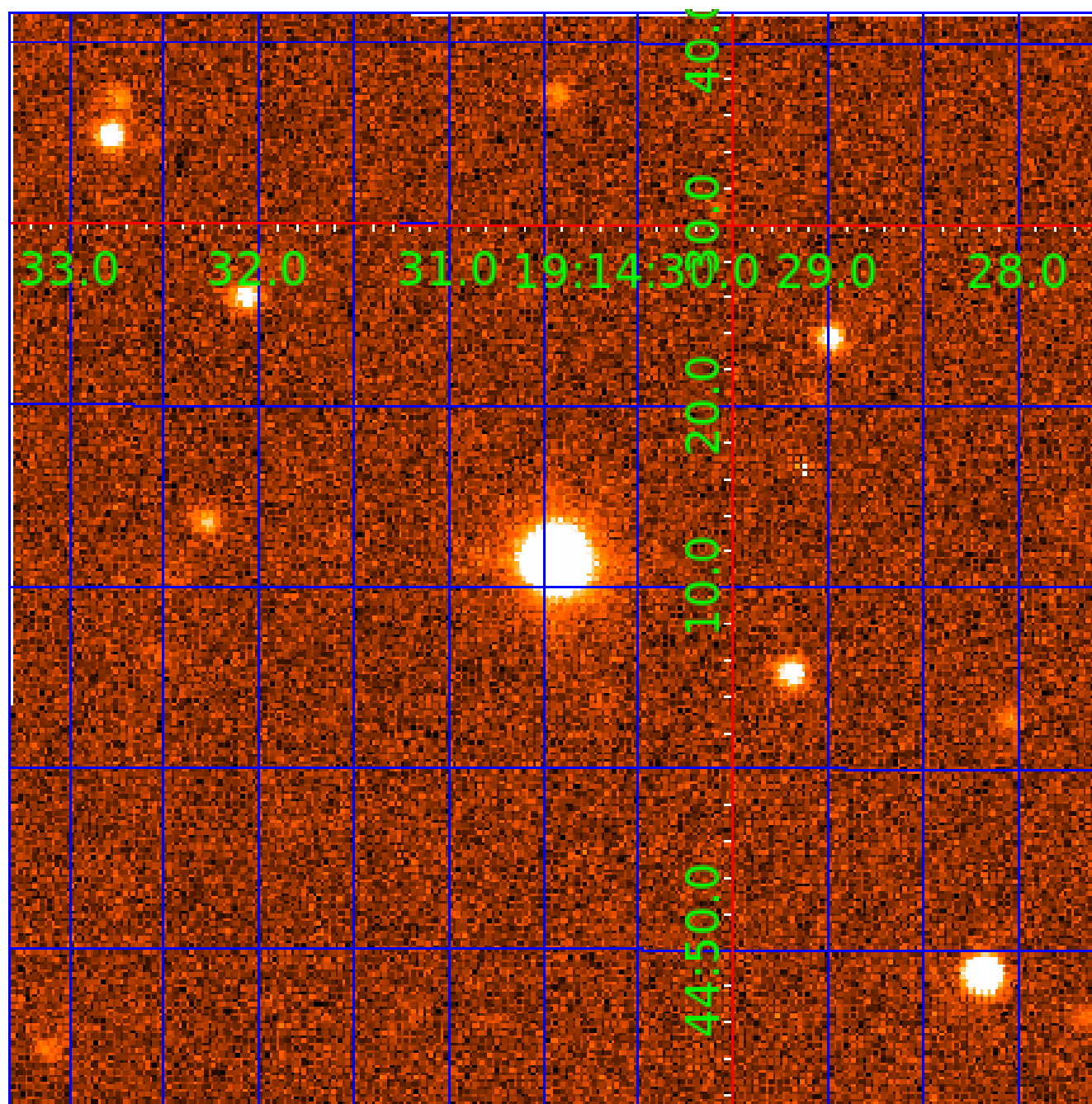


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009273791

Q1-17 DR25 TCE Parameters

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Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|---|
| 009273791-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS |
| 009273791-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | SWEET_NTL |
| 009273791-03 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_CHASES_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS |
| 009273791-04 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_CHASES_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS |

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

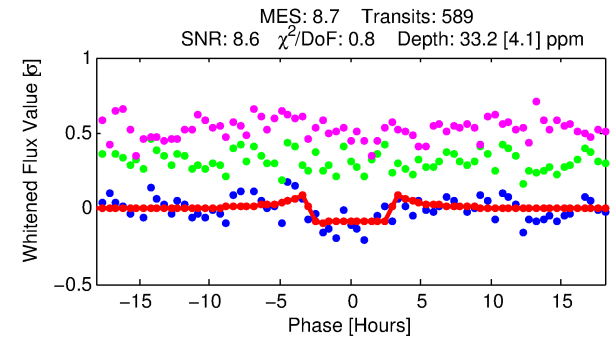
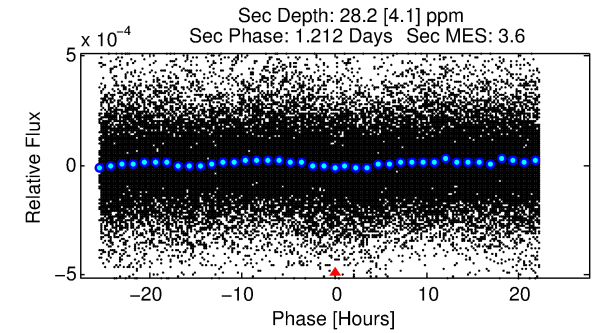
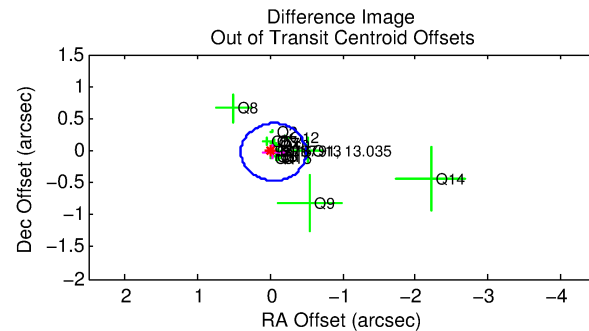
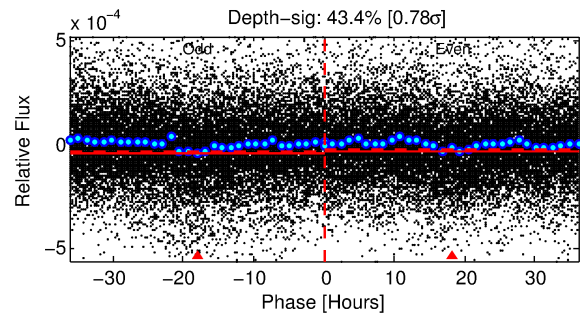
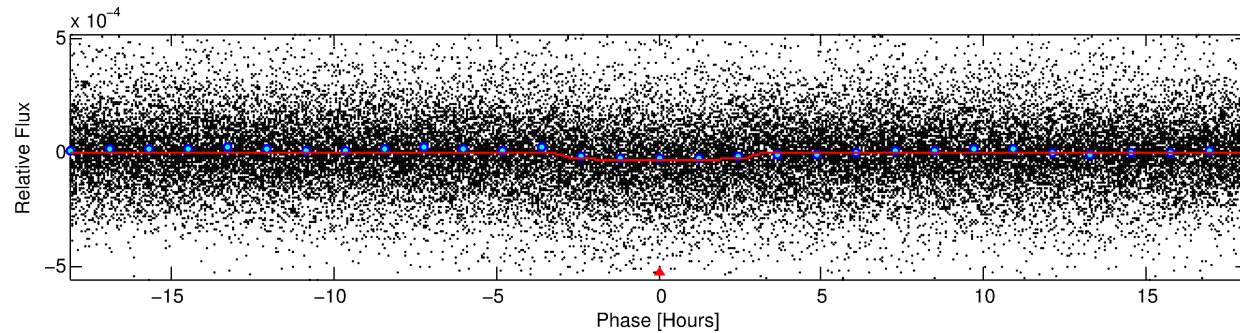
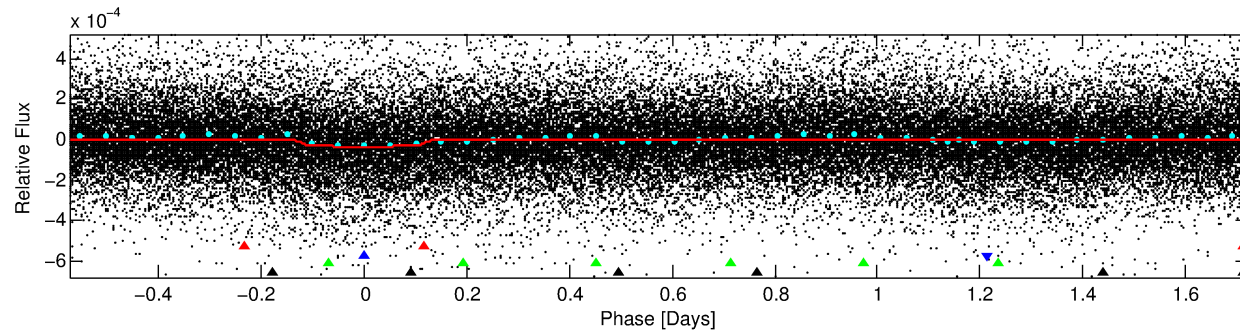
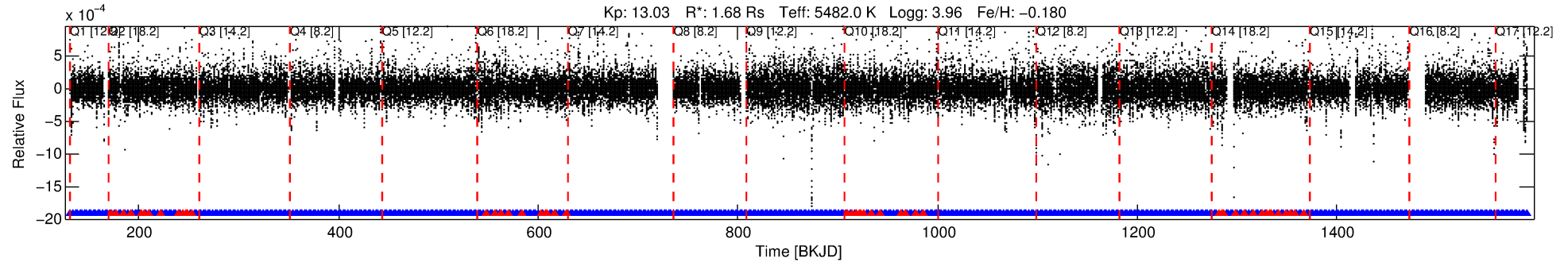
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009273791-02

No Significant Match Found

DV One-Page Summary

KIC: 9273791 Candidate: 2 of 4 Period: 2.296 d



DV Fit Results:

Period = 2.29584 [0.00002] d
Epoch = 131.8553 [0.0038] BKJD
Rp/R* = 0.0052 [0.0041]
a/R* = 2.93 [8.47]
b = 0.19 [16.46]
Seff = 2045.21 [1930.68]
Teff = 1715 [405] K
Rp = 0.95 [0.88] Re
a = 0.0333 [0.0180] AU
Ag = 18.91 [34.74] [0.52 σ]
Teffp = 5529 [2200] K [1.71 σ]

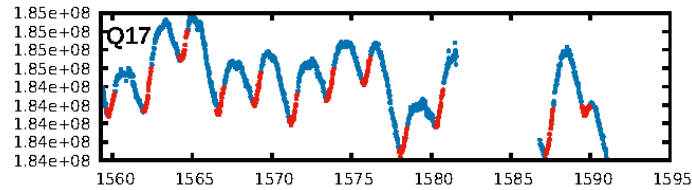
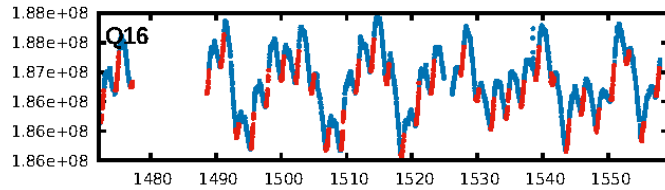
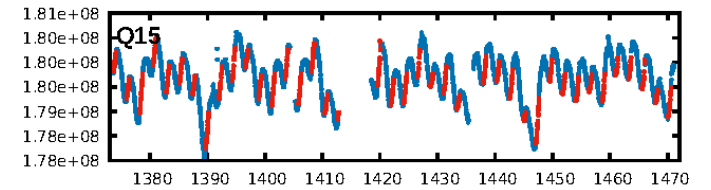
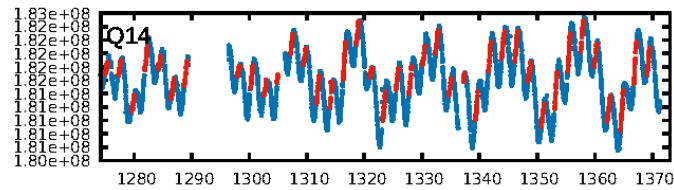
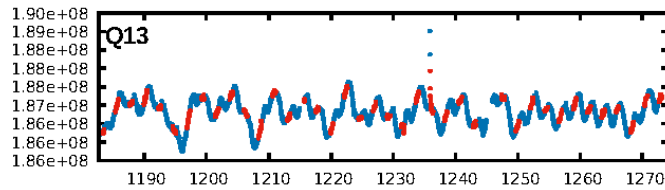
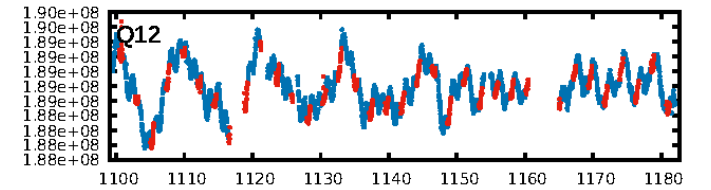
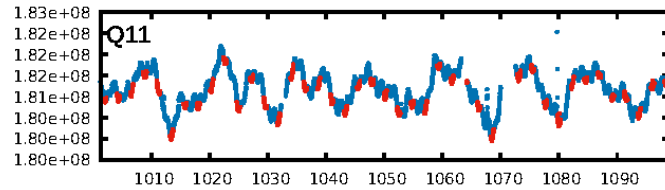
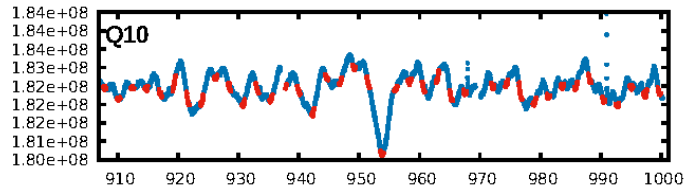
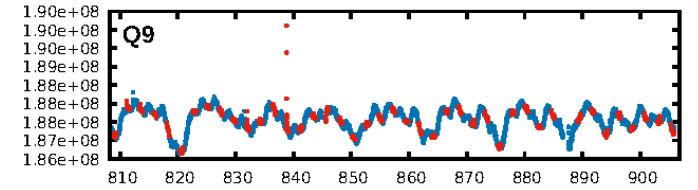
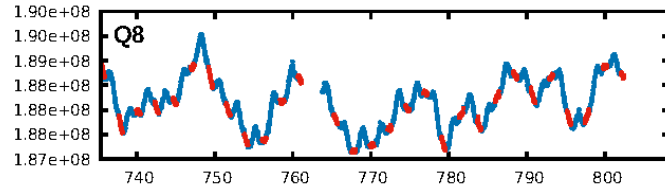
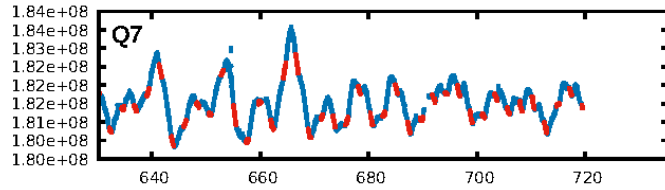
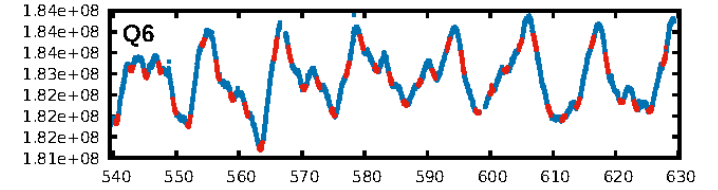
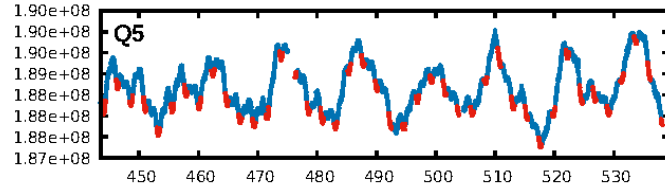
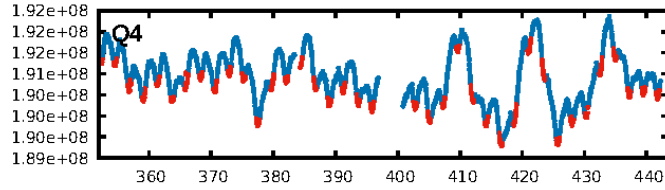
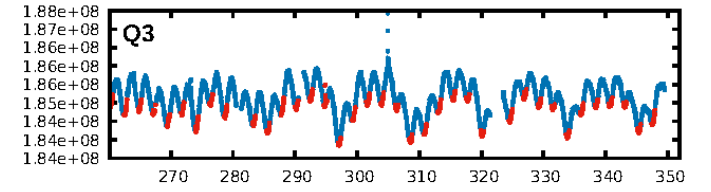
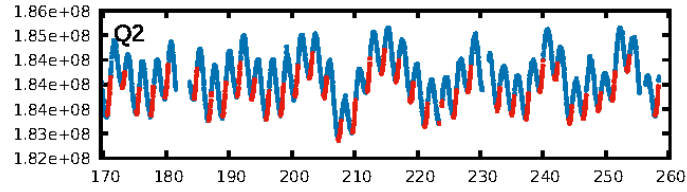
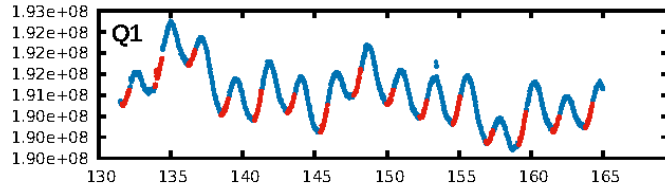
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [795.12 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGoF-sig: N/A
Bootstrap-pfa: 4.73e-14
RollingBand-fgt: 0.91 [512/562]
GhostDiagnostic-chr: 0.8917
Centroid-sig: 27.7%
Centroid-so: 0.567 arcsec [1.06 σ]
OotOffset-rm: 0.052 arcsec [0.35 σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-rm: 0.244 arcsec [2.45 σ]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.88 [15/17]
DiffImageOverlap-fno: 1.00 [17/17]

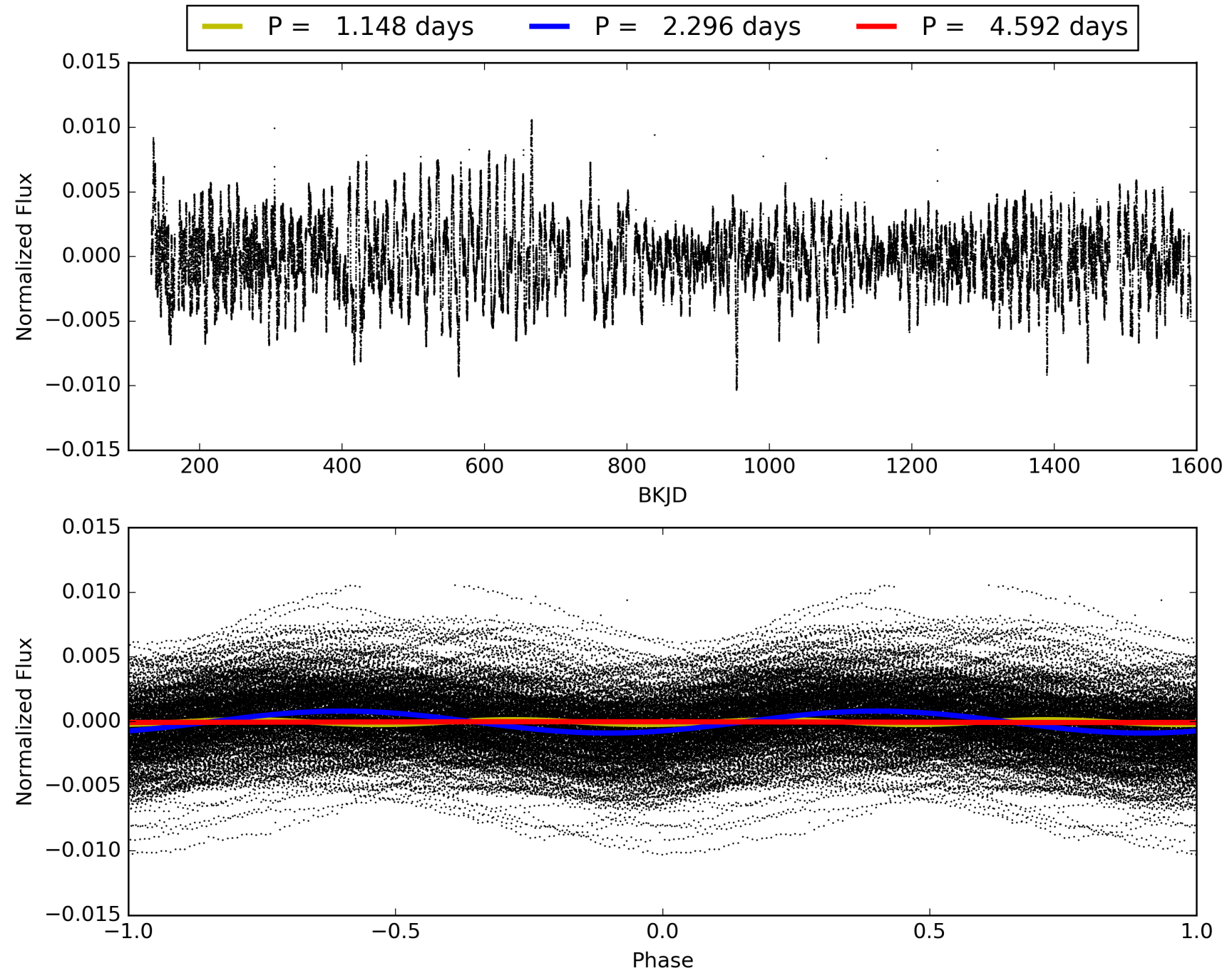
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 23:41:15 Z

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

TCE 009273791-02, PDC Light Curves

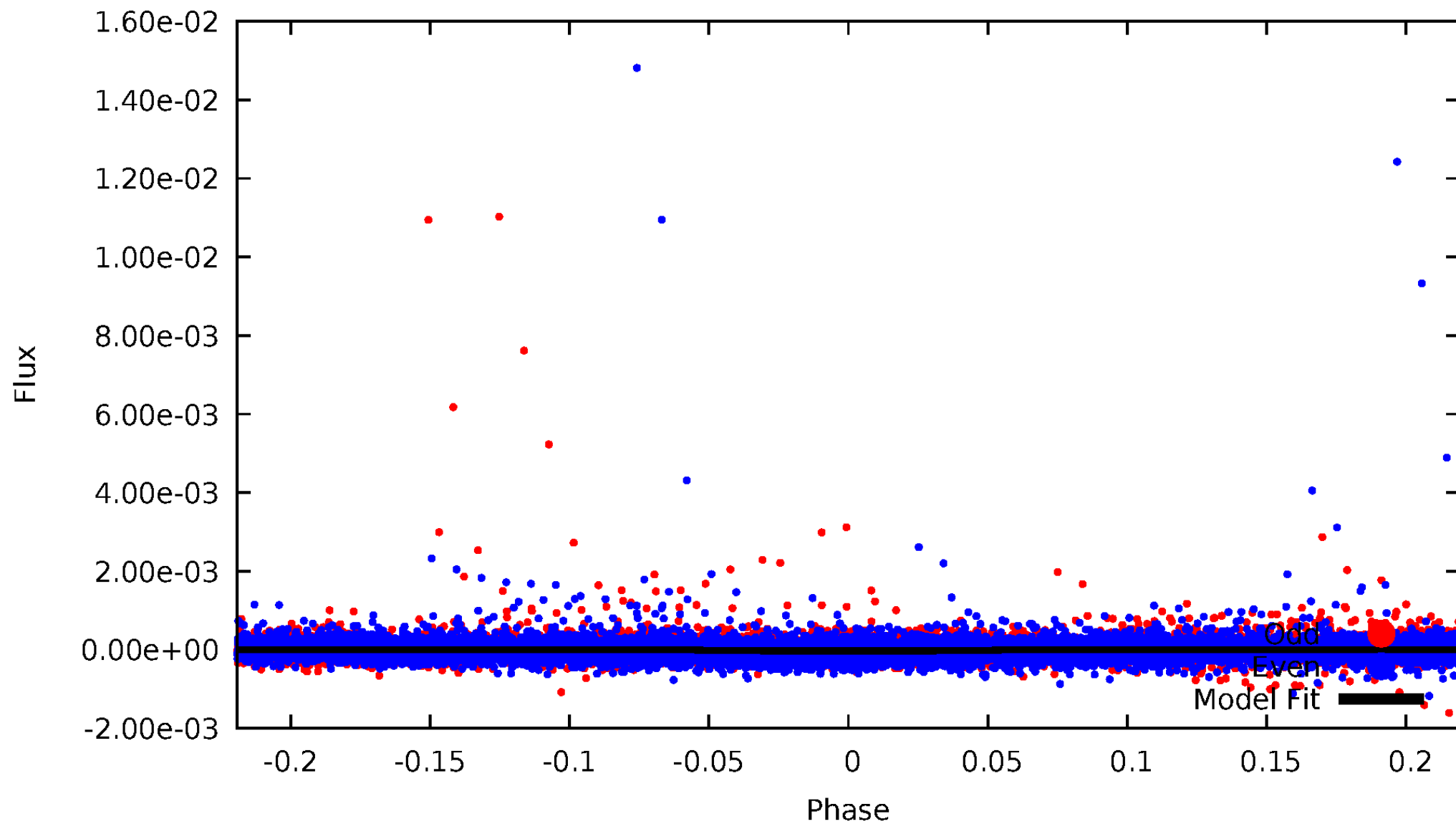


TCE 009273791-02



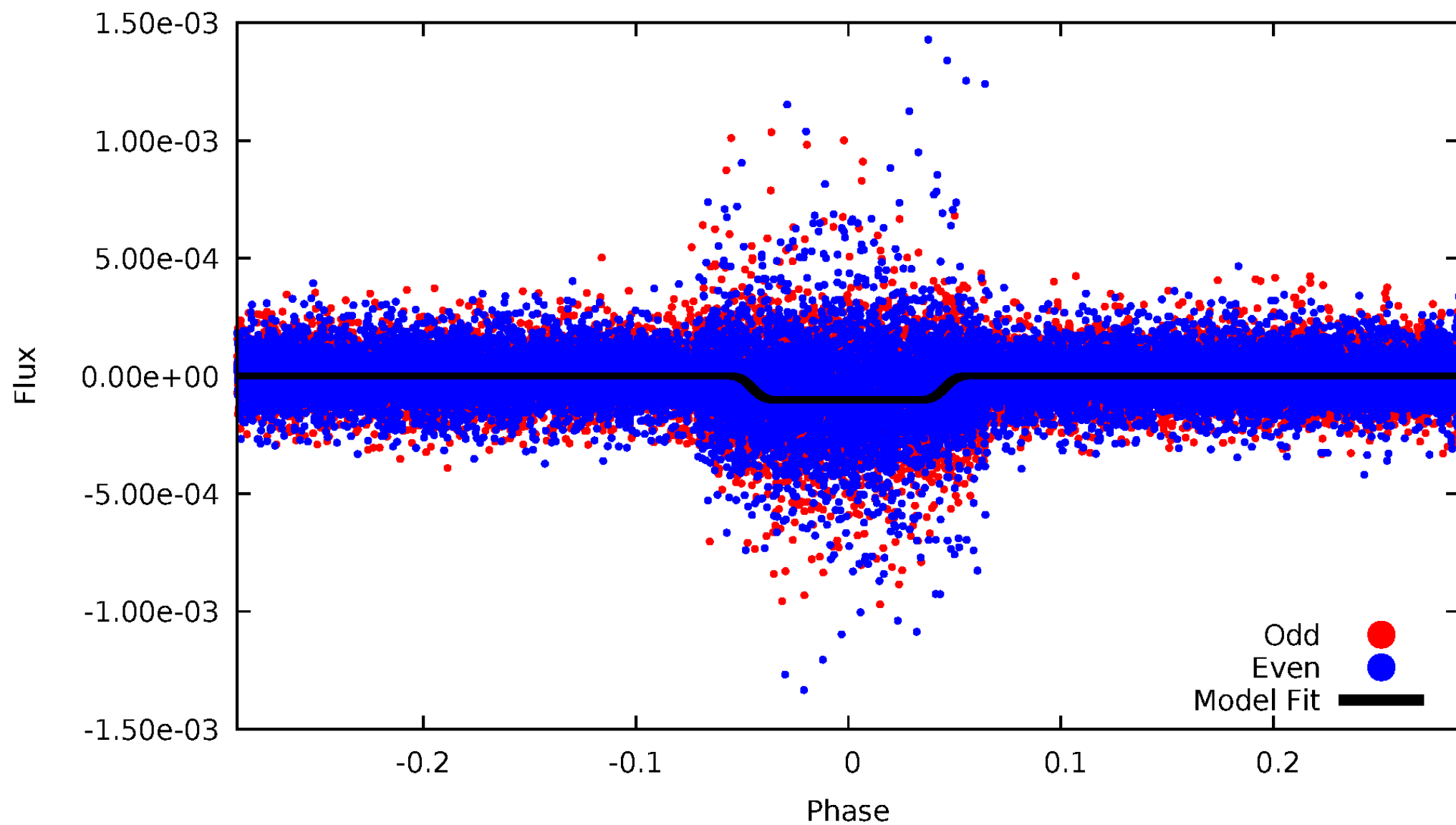
DV Odd/Even

TCE 009273791-02



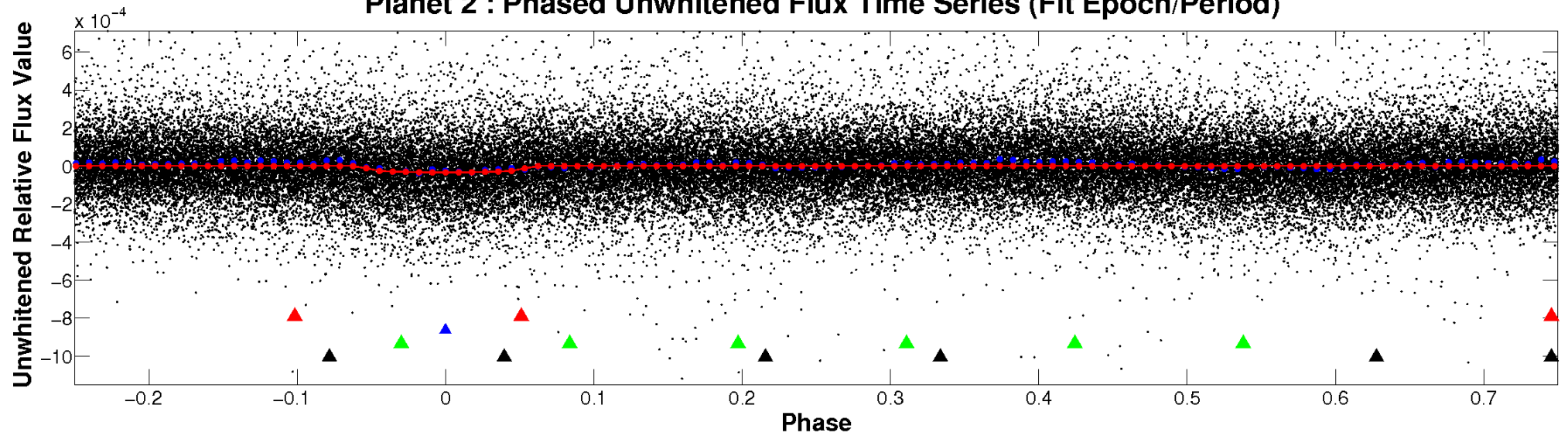
ALT Odd/Even

TCE 009273791-02

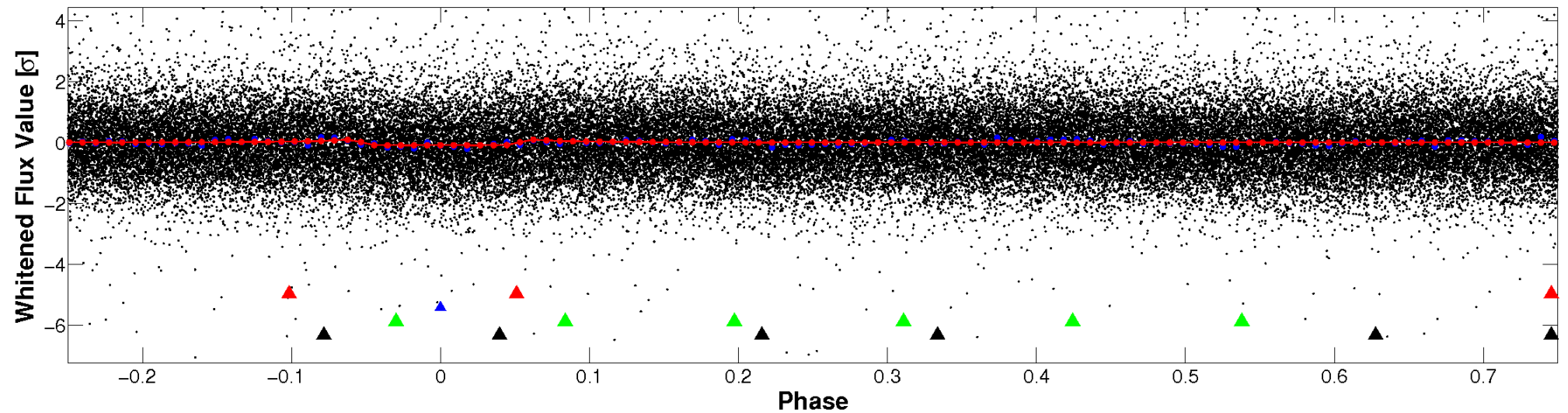


Non-Whitened Vs. Whitened Light Curve

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

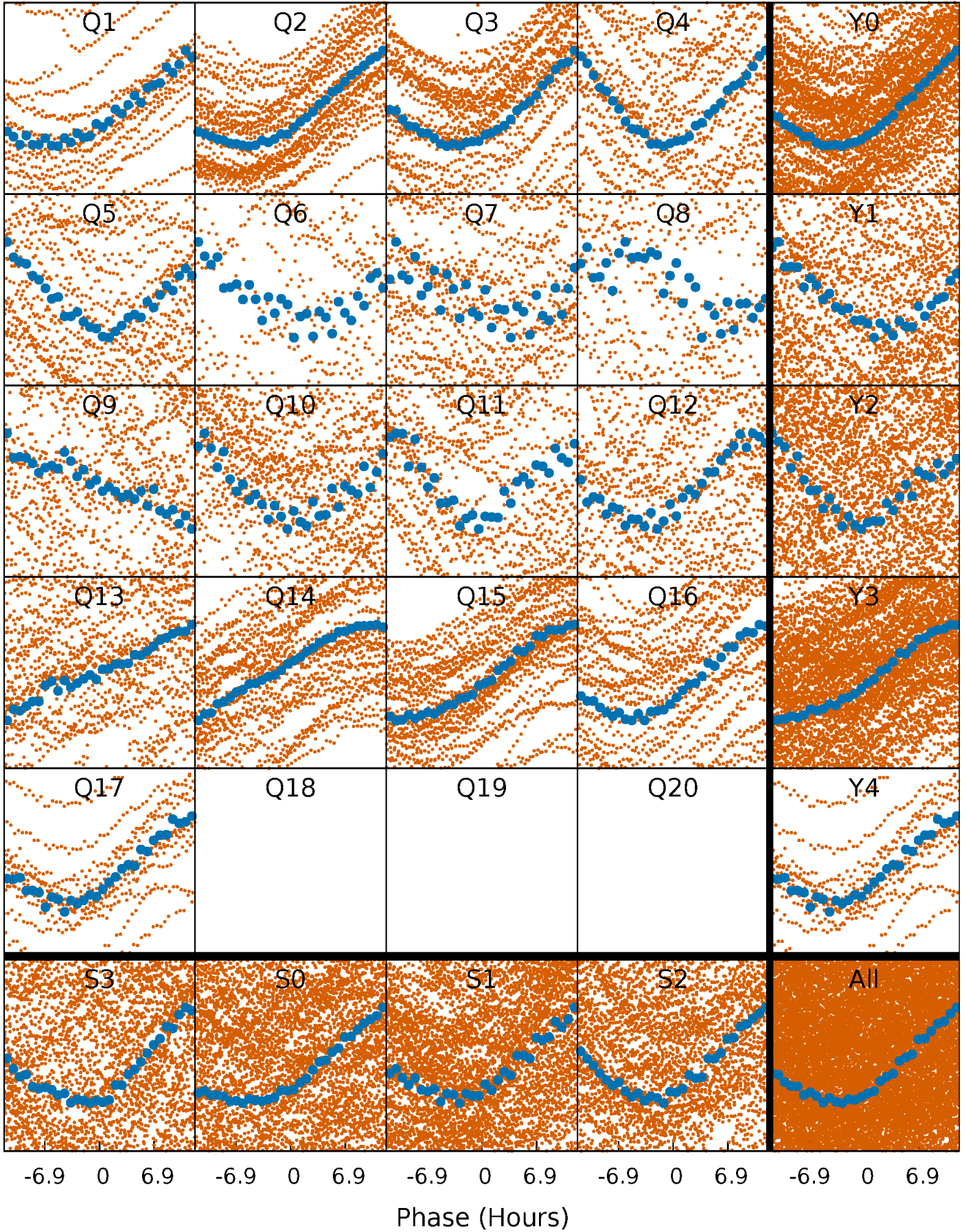


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



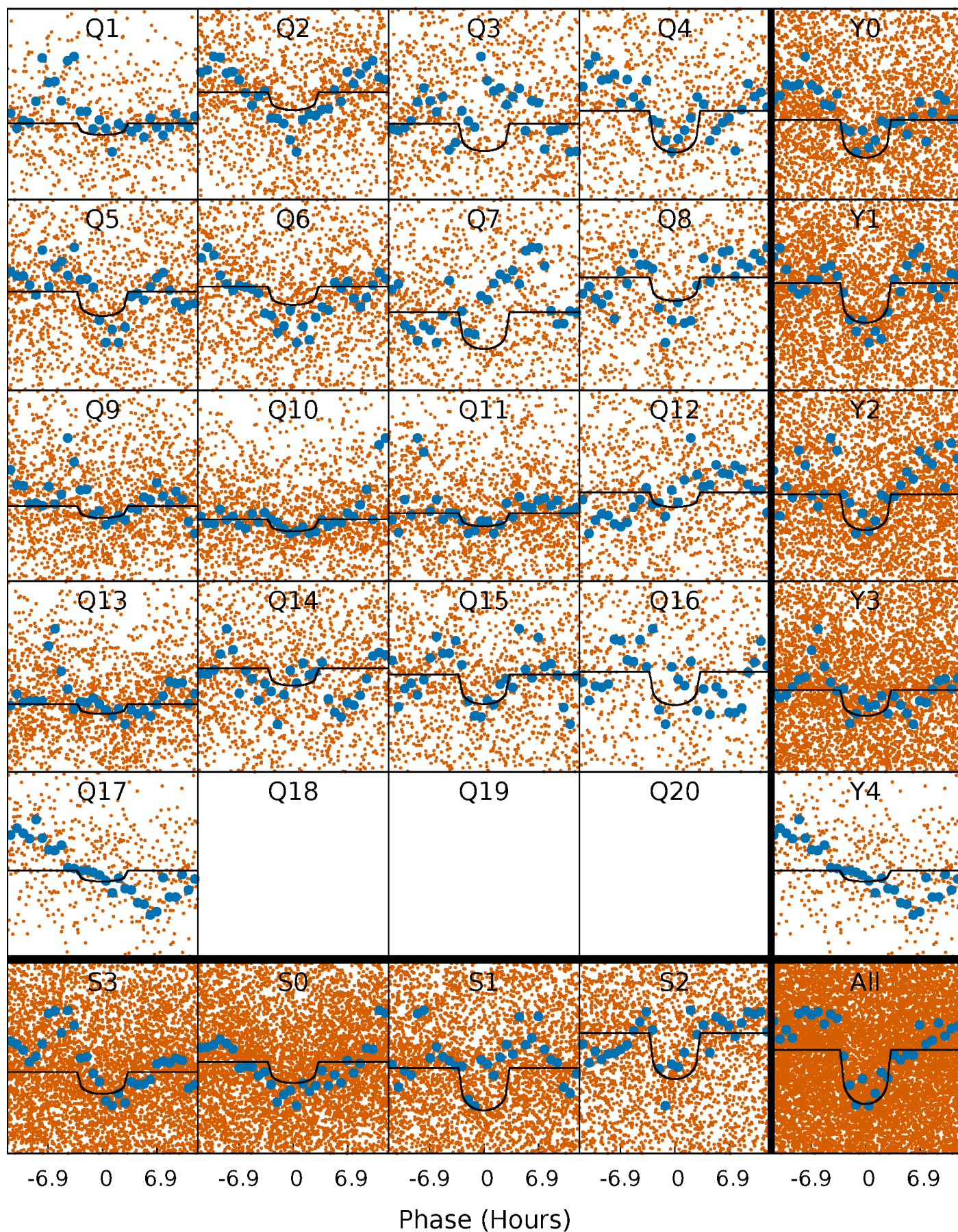
PDC Quarter-Phased Transit Curves

TCE 009273791-02 P= 2.295839 Days $T_0=131.855320$ (BKJD)



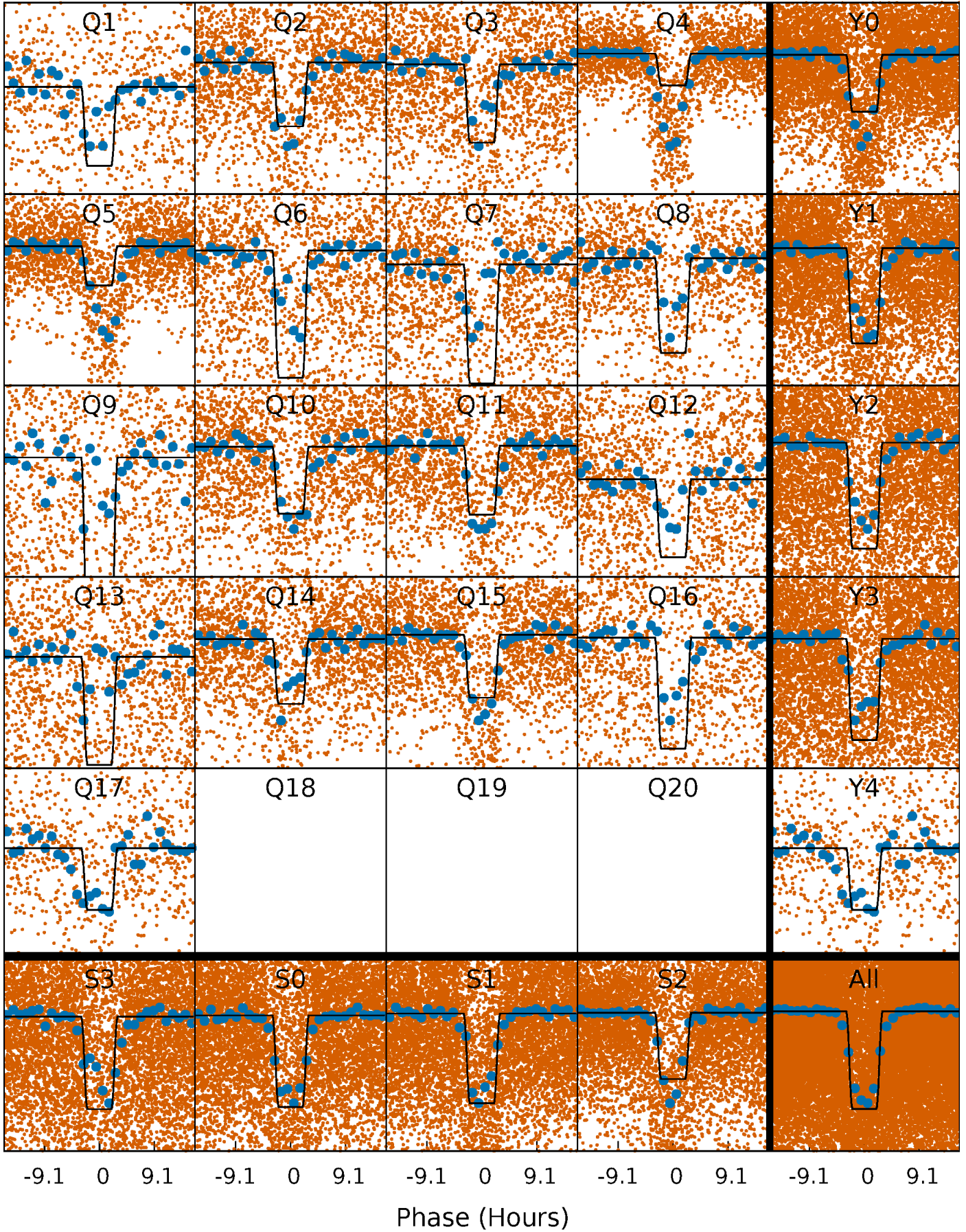
DV Quarter-Phased Transit Curves

TCE 009273791-02 P= 2.295839 Days $T_0=131.855320$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

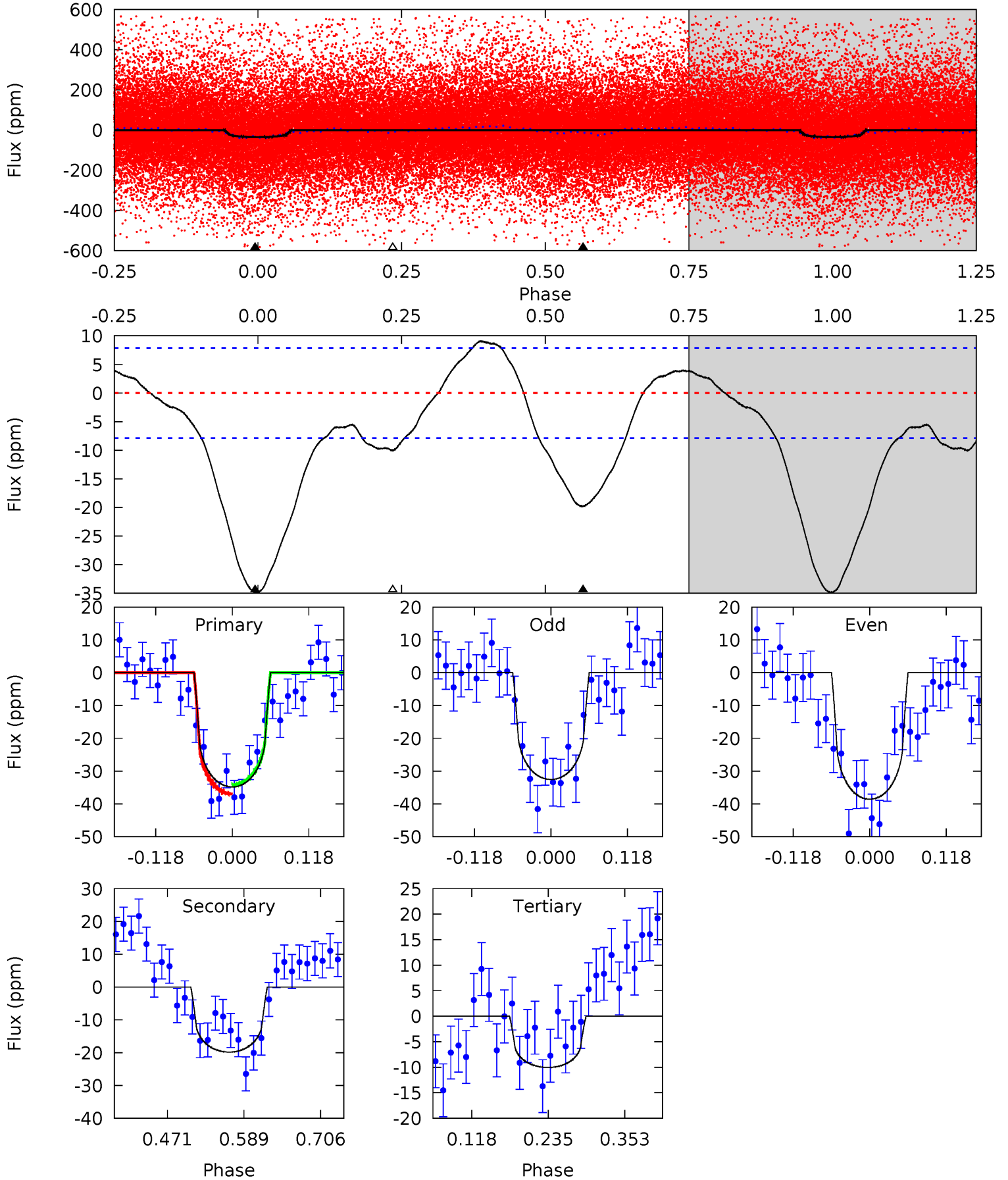
TCE 009273791-02 $P = 2.295783$ Days $T_0 = 131.866690$ (BKJD)



DV Model-Shift Uniqueness Test

009273791-02, P = 2.295839 Days, E = 129.559481 Days

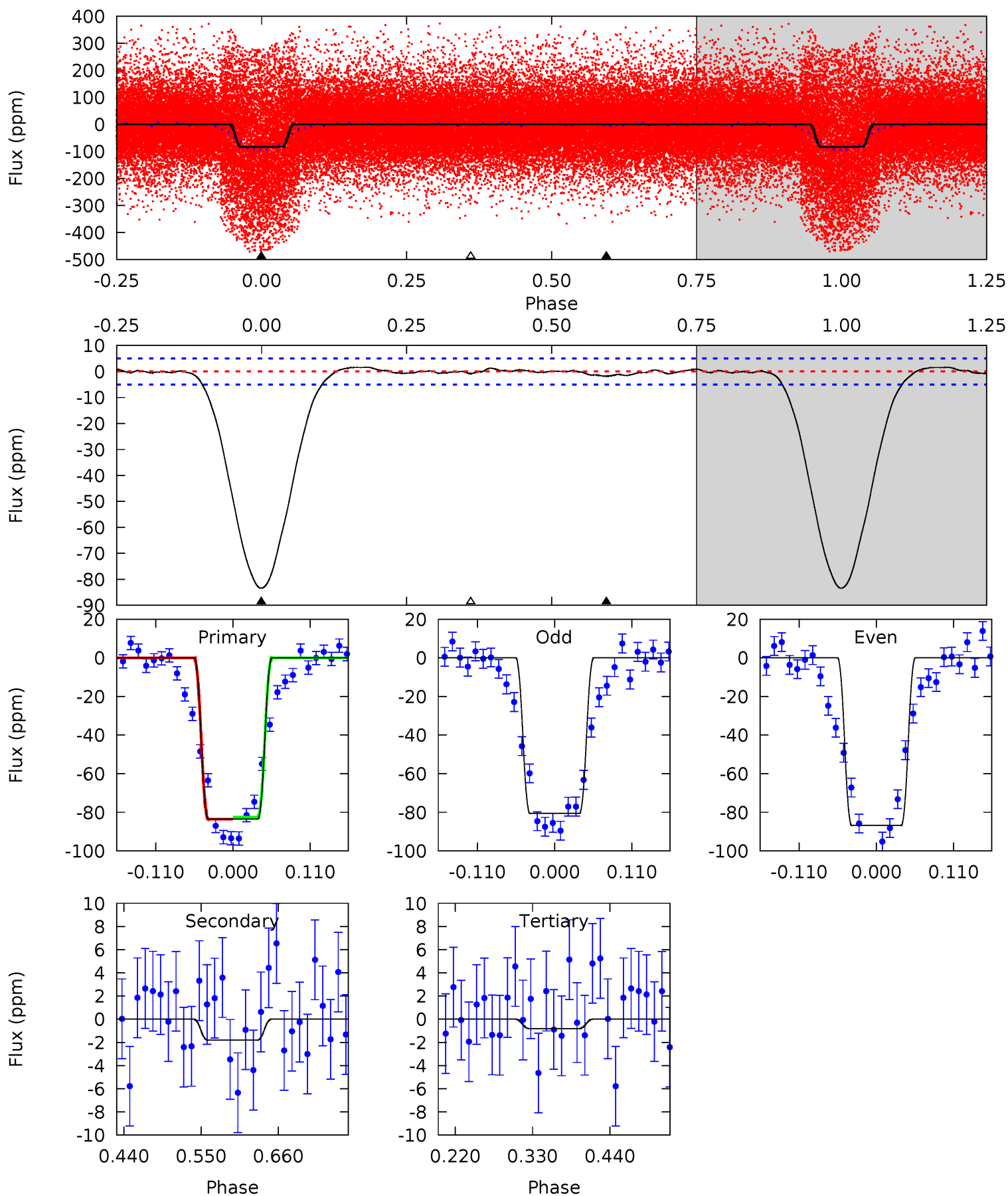
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 20.0 | 11.4 | 5.78 | 0 | 4.53 | 1.56 | 3.35 | 14.3 | 20.0 | 5.63 | 11.4 | 1.74 | 0.74 | 0.21 | 0.81 |



Alt Model-Shift Uniqueness Test

009273791-02, P = 2.295783 Days, E = 129.570907 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 75.4 | 1.64 | 0.74 | 0 | 4.54 | 1.60 | 0.68 | 74.7 | 75.4 | 0.90 | 1.64 | 2.77 | 1.05 | 0.02 | 0.50 |



Stellar Parameters For KIC 009273791

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | $M(M_{\odot})$ | ρ_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|--|
| | 5482^{+213}_{-174} | $3.961^{+0.570}_{-0.228}$ | $-0.180^{+0.350}_{-0.250}$ | $1.675^{+0.655}_{-0.800}$ | $0.936^{+0.111}_{-0.122}$ | $0.280^{+1.556}_{-0.150}$ |
| | +4%/-3% | +14%/-6% | +194%/-139% | +39%/-48% | +12%/-13% | +555%/-54% |
| Source | PHO54 | PHO54 | PHO54 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 009273791-02 / KOI

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|-------------|------------------------|----------------------|-----------------------|---------------------------|
| DV | -20 ± 2 | $0.98^{+0.78}_{-0.61}$ | 2336^{+284}_{-311} | 4850^{+2857}_{-901} | 13^{+80}_{-9} |
| Alt. | -2 ± 1 | $1.67^{+0.91}_{-0.74}$ | 2348^{+273}_{-341} | 2181^{+819}_{-4831} | $0.353^{+1.021}_{-0.263}$ |

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 $A_{\text{obs}} \gg 1.0$

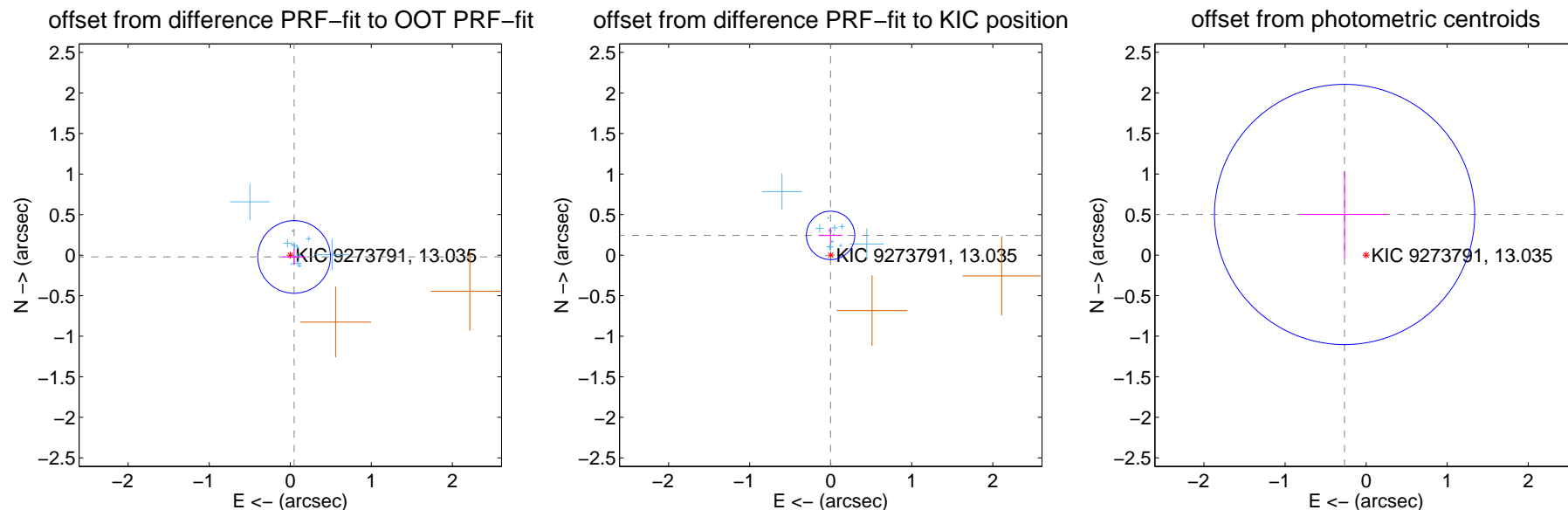
DV Centroid Data

Supplemental centroid analysis for 009273791-02. Kepler magnitude: 13.04. Transit SNR 8.55

There are 15 quarters with good PRF difference image offsets

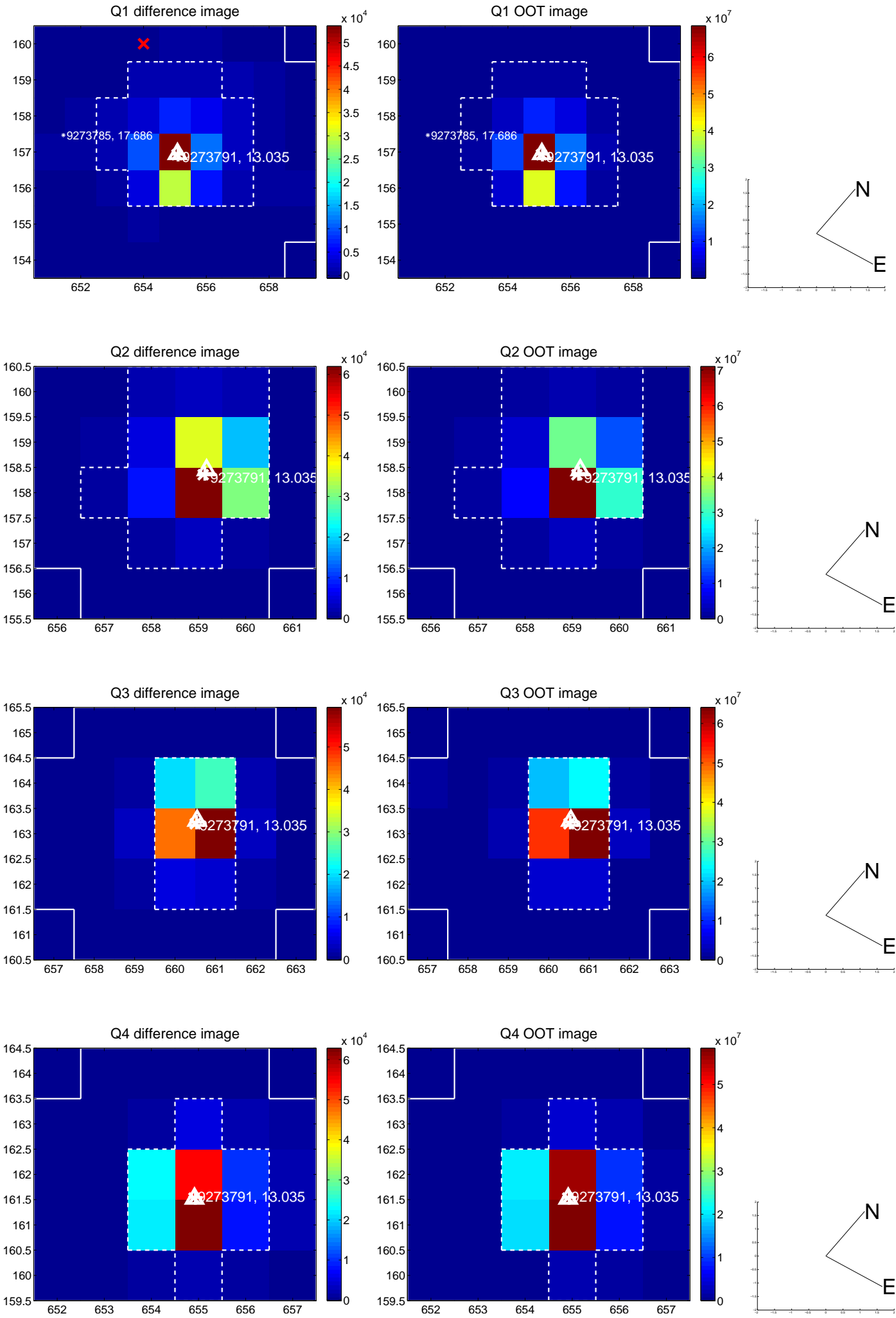
The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 0.052 ± 0.149 | 0.35 | -0.048 ± 0.143 | -0.022 ± 0.099 |
| PRF-fit source offset from KIC position | 0.244 ± 0.099 | 2.45 | 0.002 ± 0.148 | 0.244 ± 0.099 |
| photometric centroid source offset | 0.57 ± 0.53 | 1.06 | 0.27 ± 0.53 | 0.50 ± 0.54 |

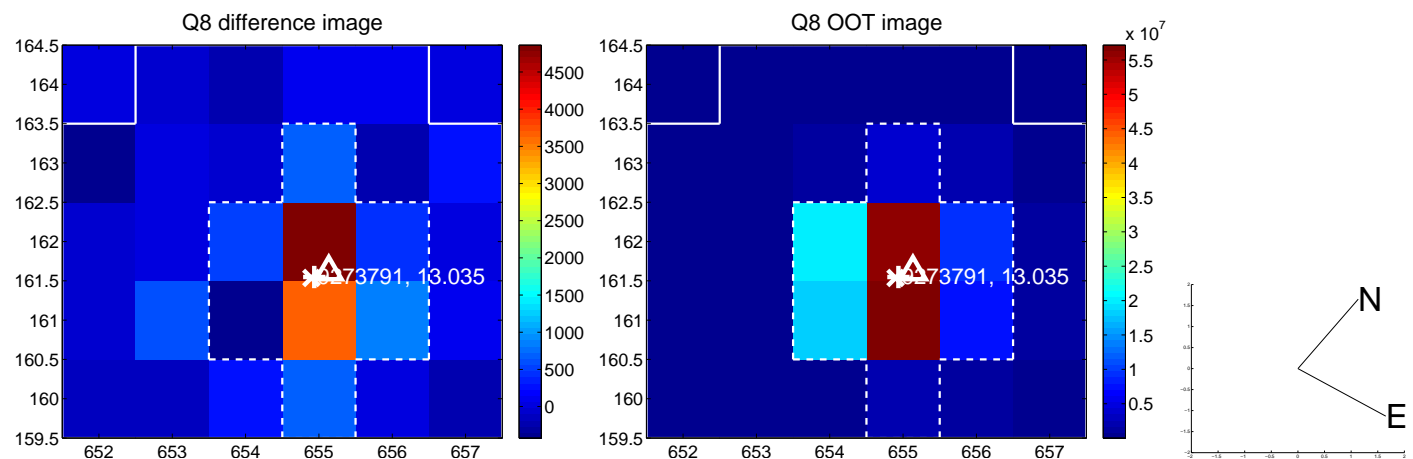
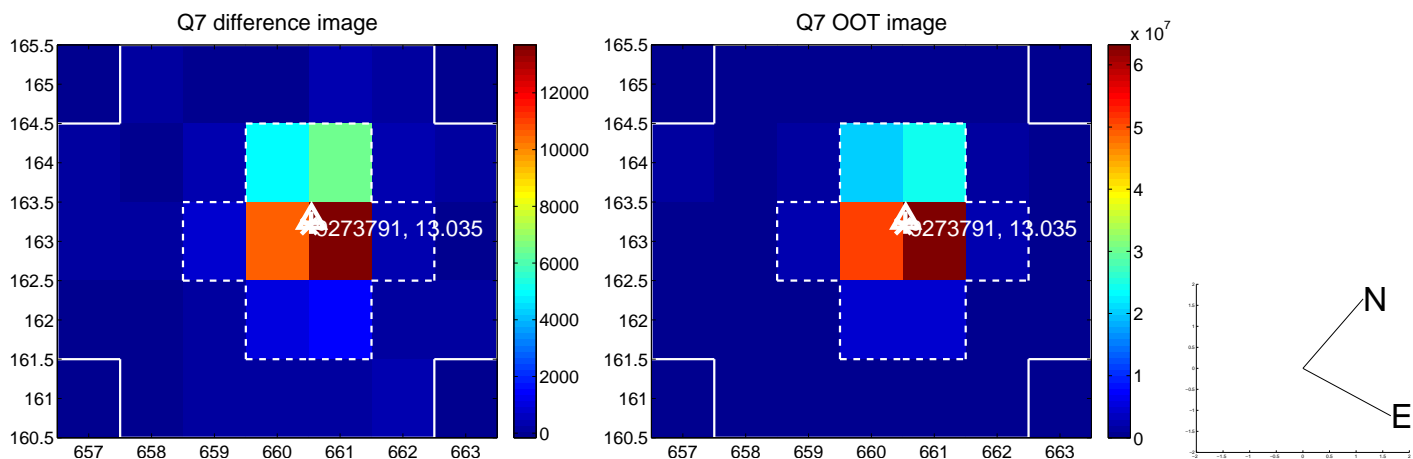
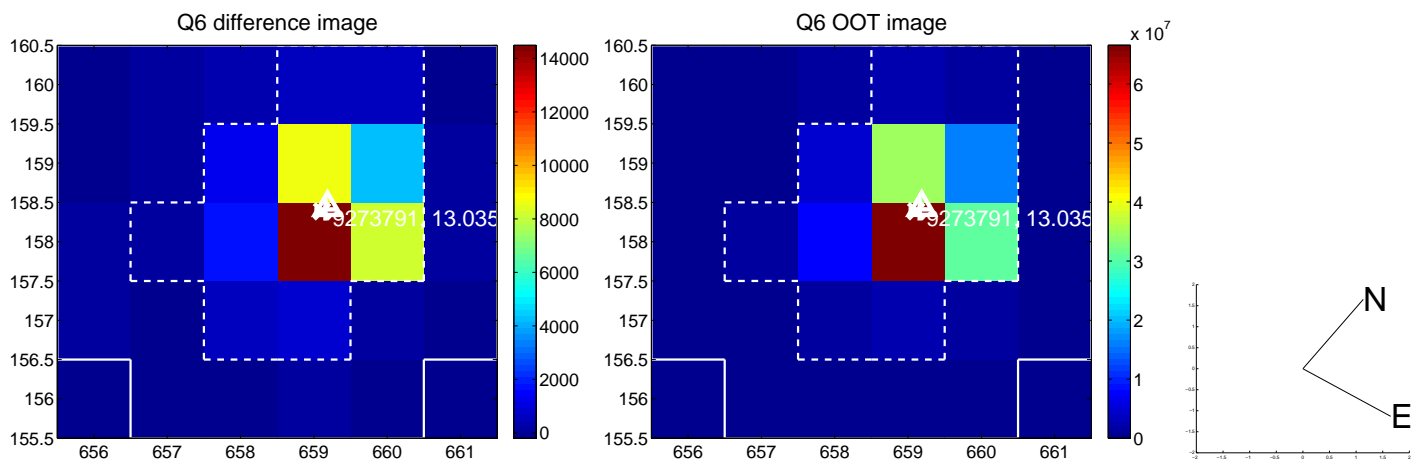
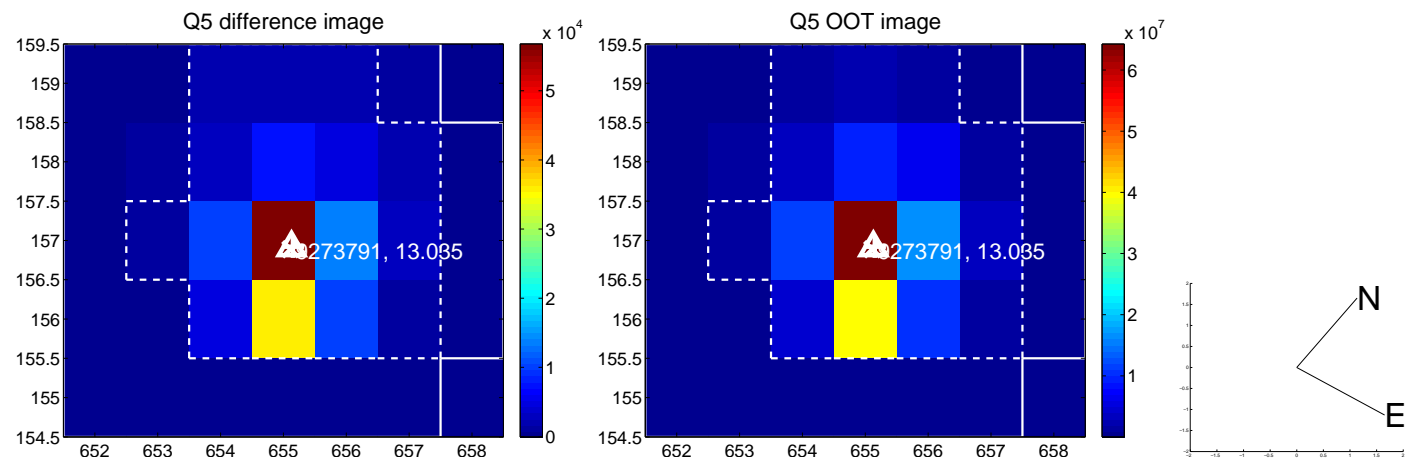


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

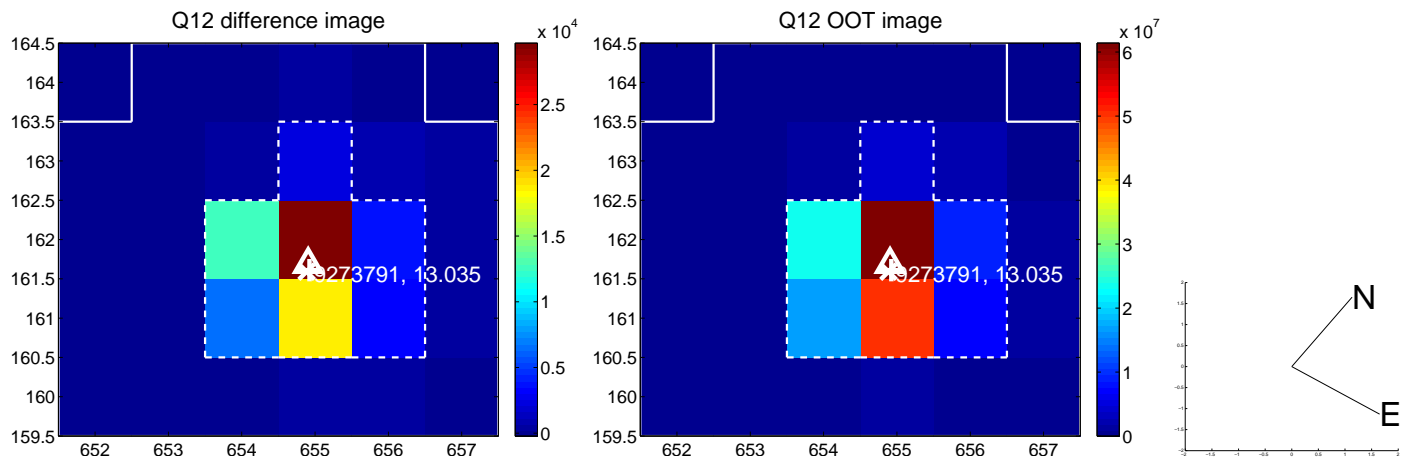
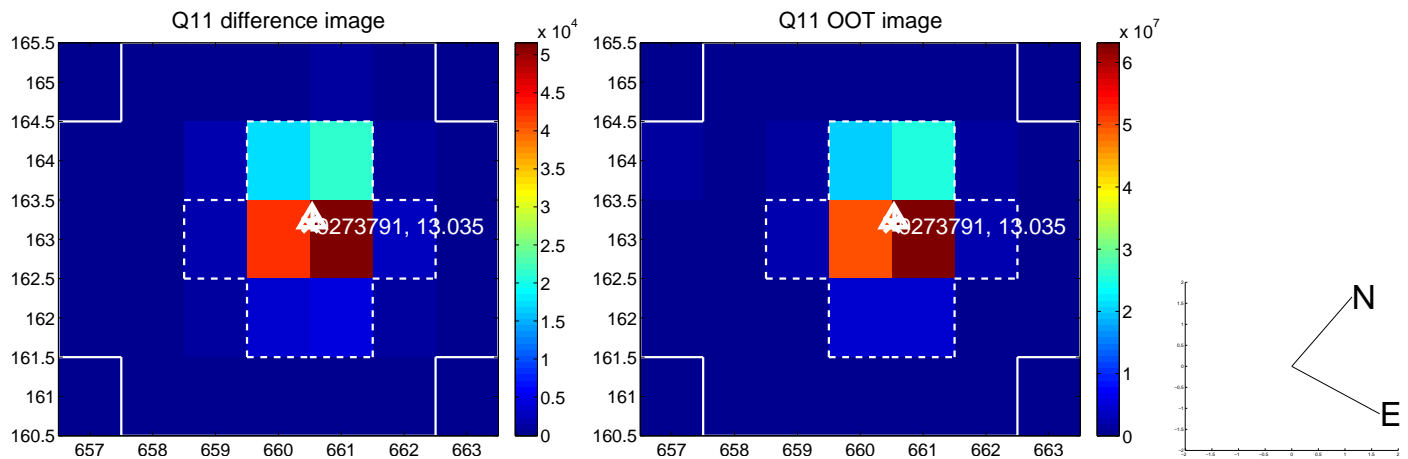
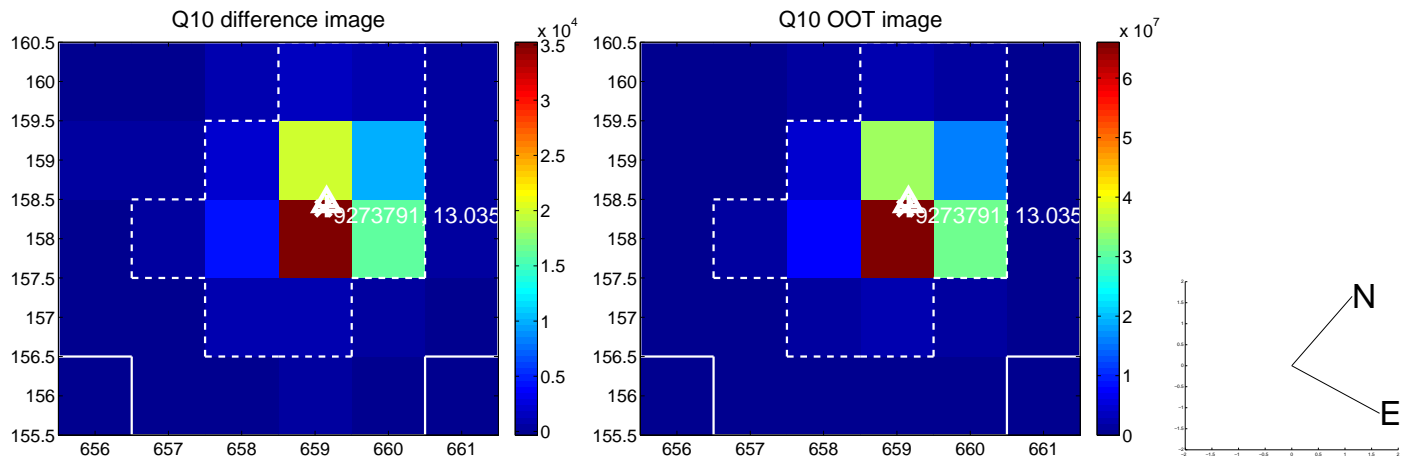
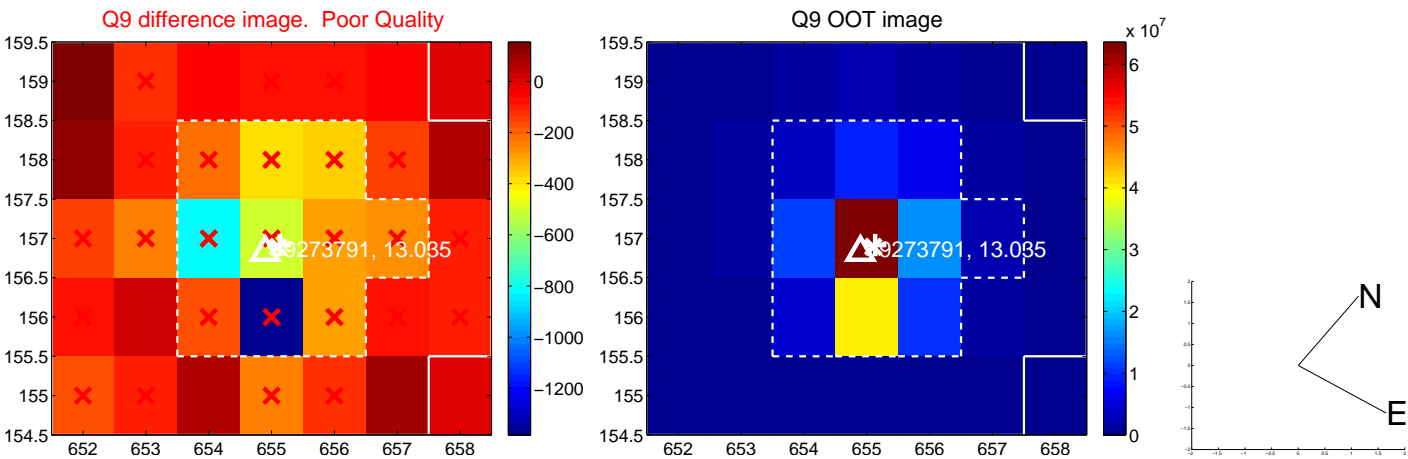
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



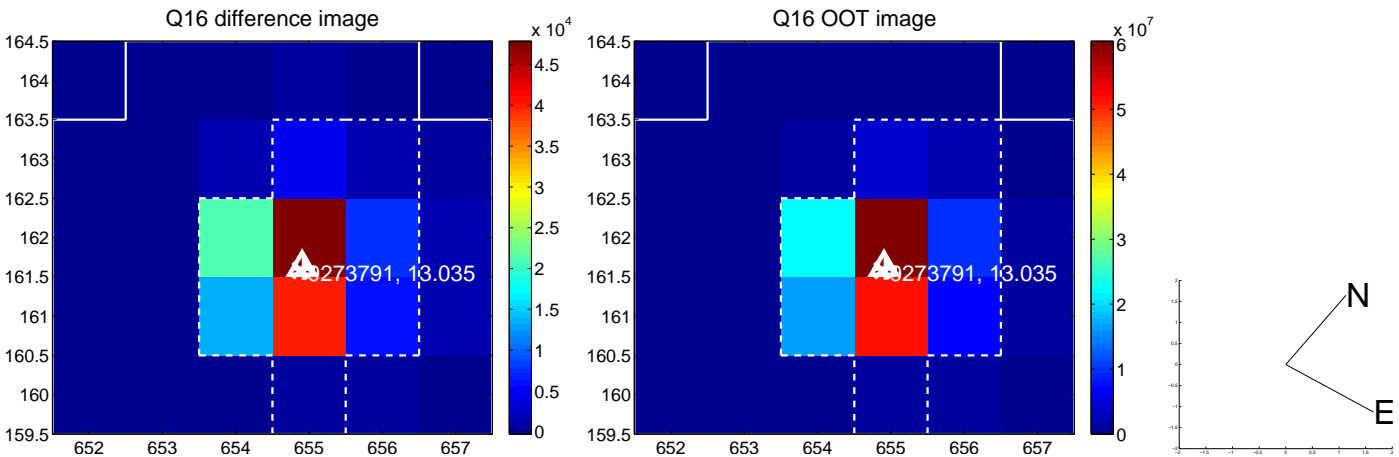
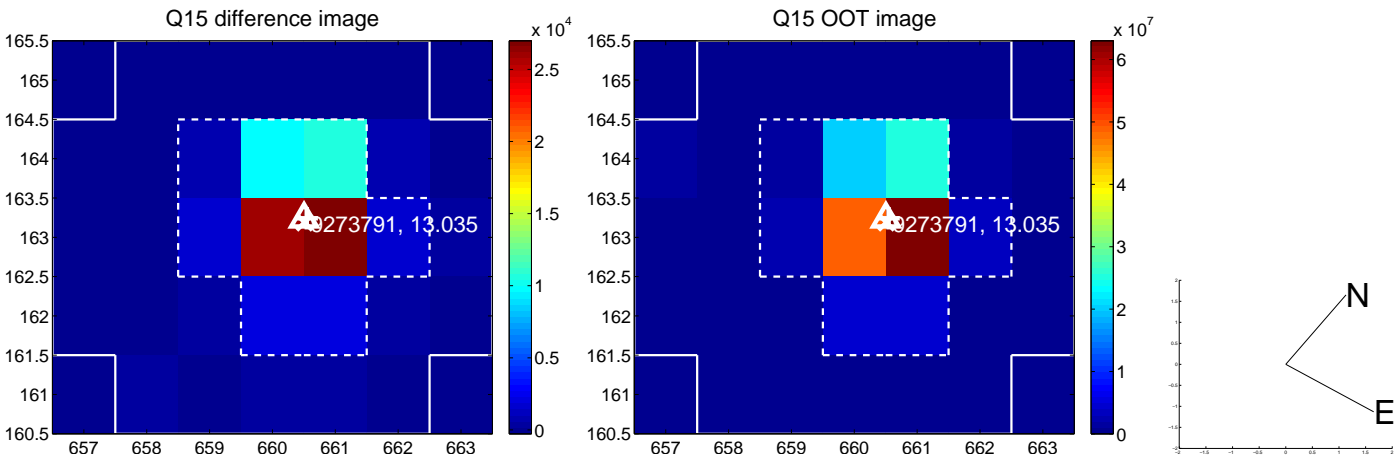
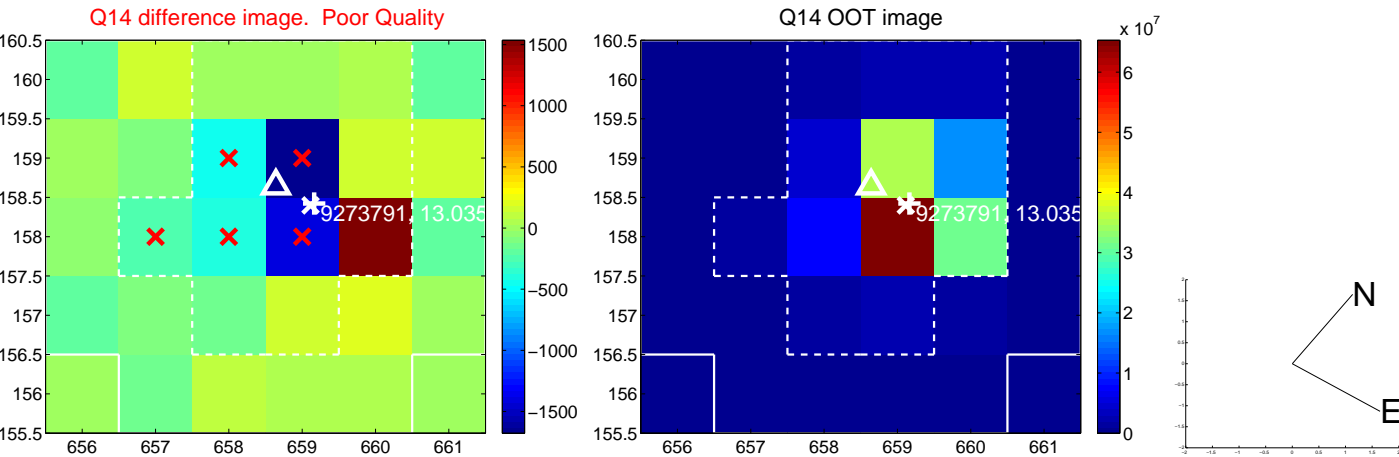
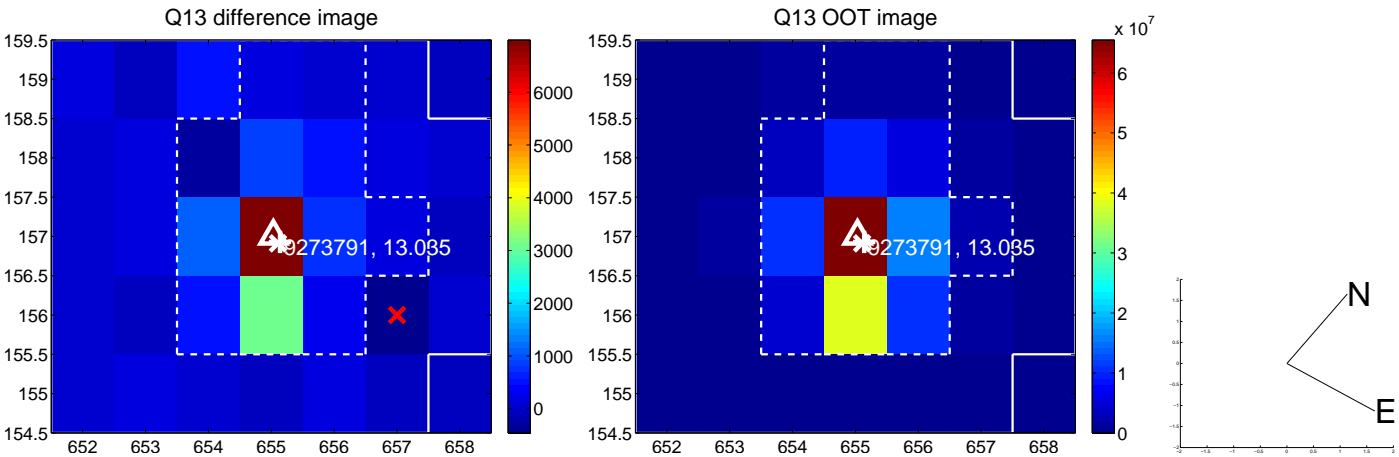
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



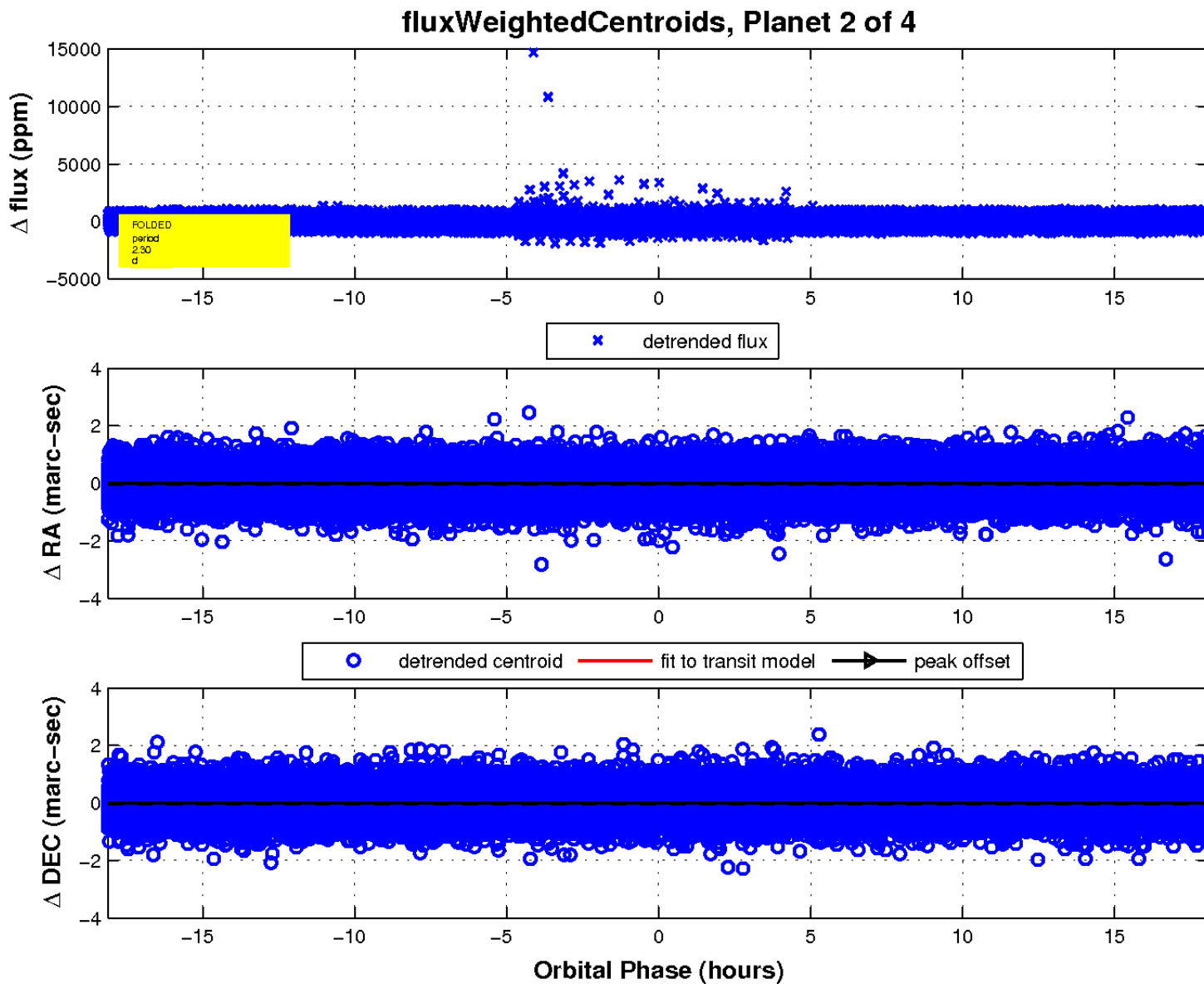
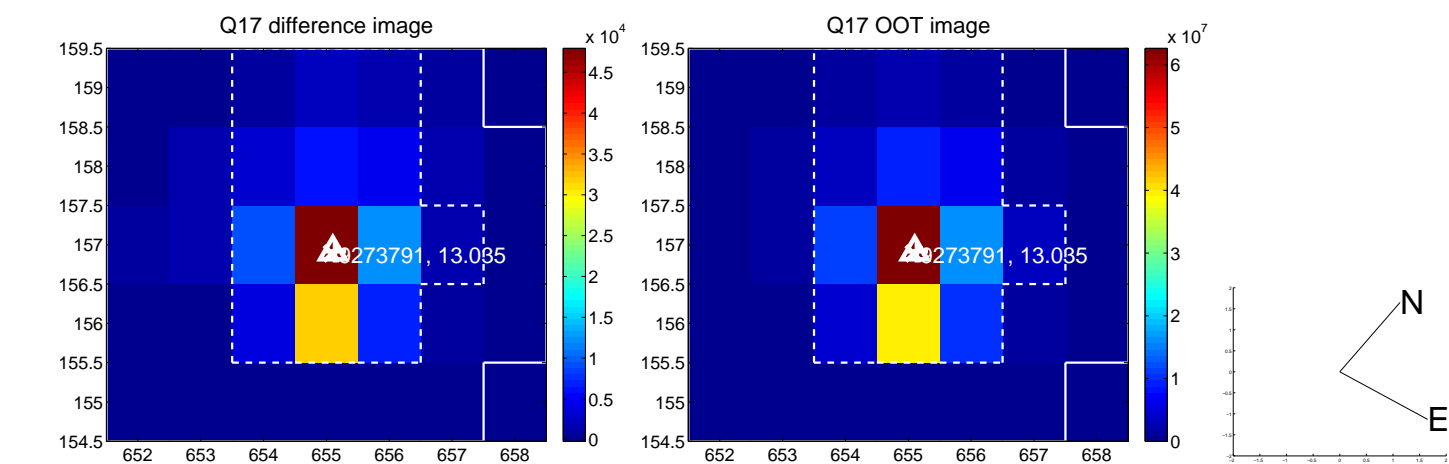
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

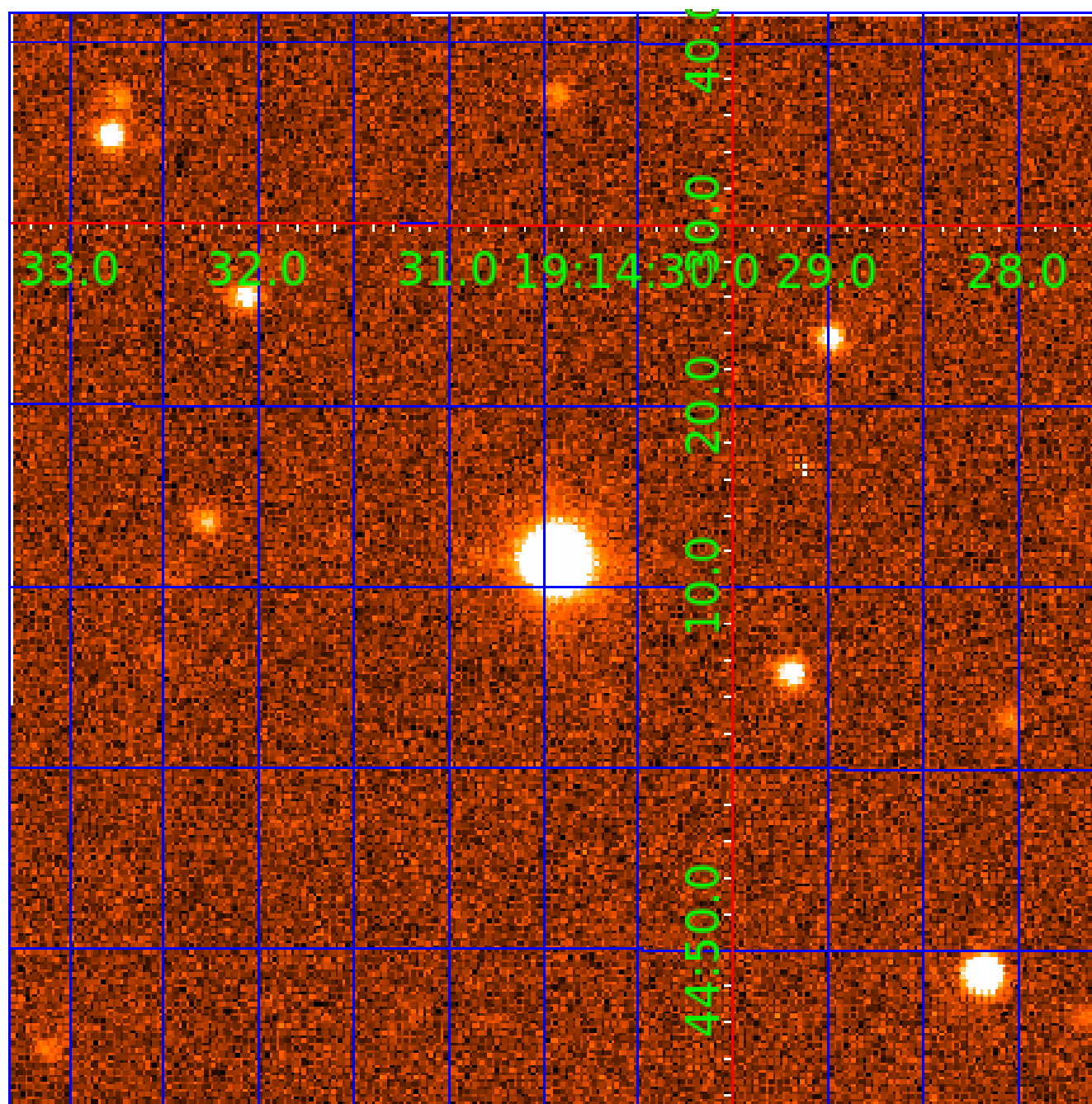


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009273791

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|-----|-----------------------------|-----------------|------------------------|------------------------|
| 009273791-01 | OBS | No | 470.997502 | 523.859836 | 292.3 | 4.679 | 14.4 | 5.8 | 1.68 | 5482 | 3.17 | 1.69 |
| 009273791-02 | OBS | No | 2.295839 | 131.855320 | 33.2 | 6.038 | 8.7 | 8.6 | 1.68 | 5482 | 0.95 | 2045.21 |
| 009273791-03 | OBS | No | 289.014982 | 144.569471 | 305.9 | 3.278 | 10.0 | 7.0 | 1.68 | 5482 | 3.12 | 3.24 |
| 009273791-04 | OBS | No | 279.417268 | 173.675770 | 440.5 | 5.789 | 13.2 | 6.8 | 1.68 | 5482 | 3.71 | 3.39 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|---|
| 009273791-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS |
| 009273791-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | SWEET_NTL |
| 009273791-03 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_CHASES_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS |
| 009273791-04 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_CHASES_MARSHALL—TRANS_GAPPED—LPP_DV—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.

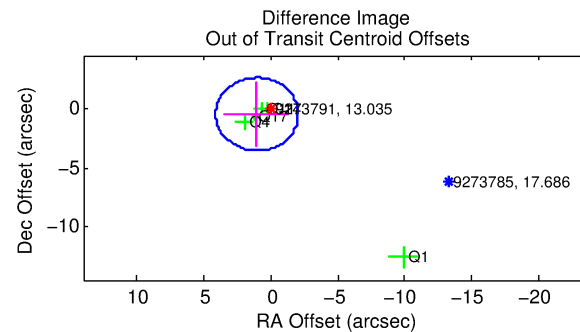
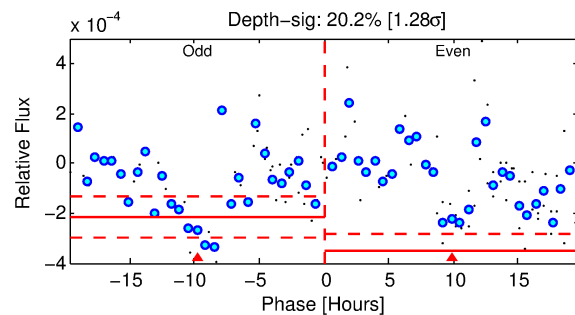
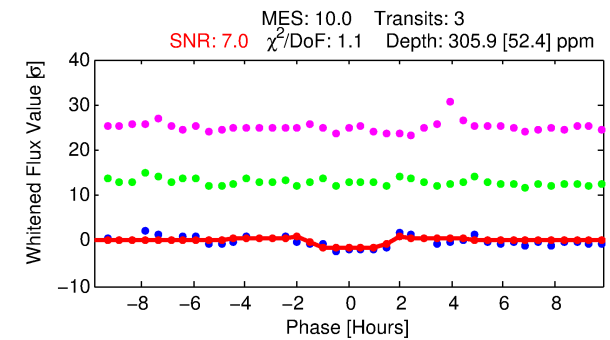
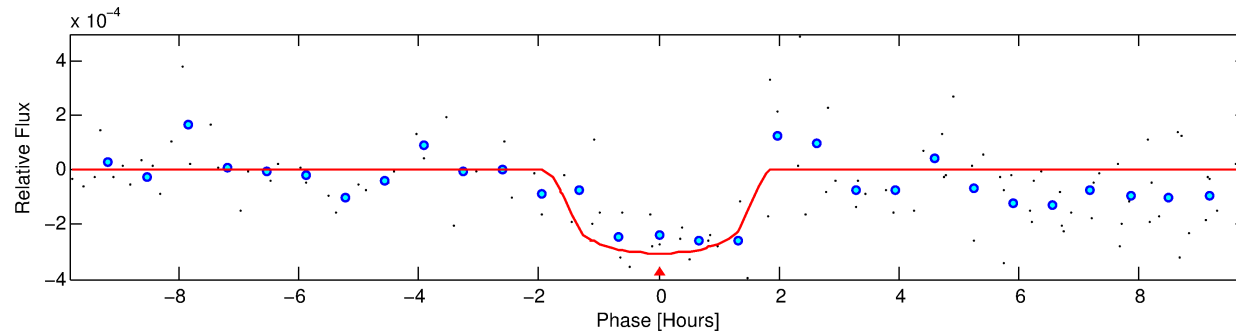
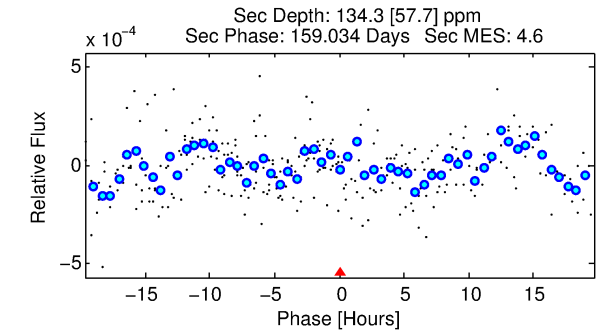
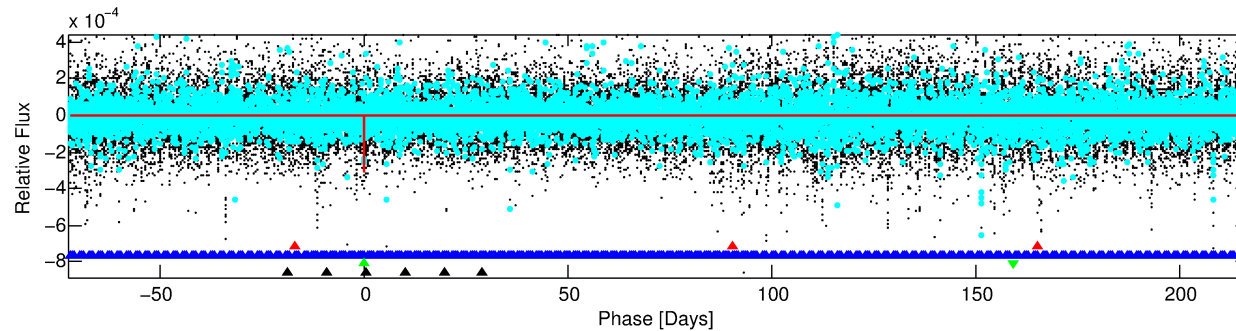
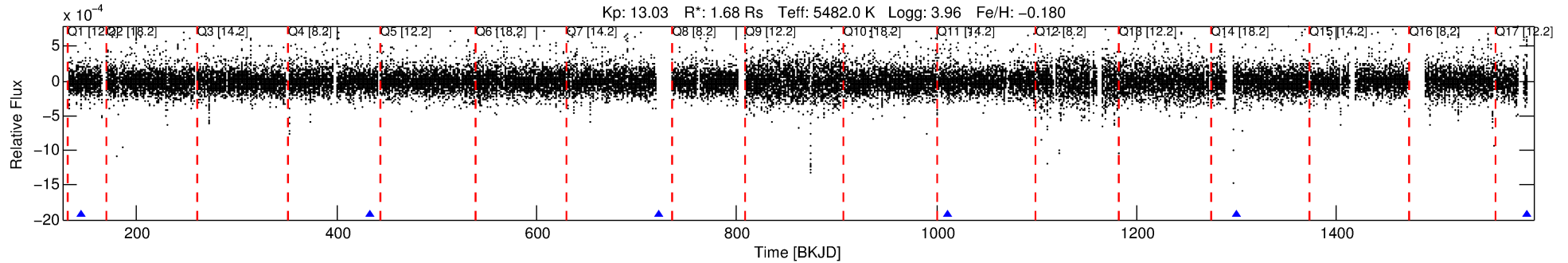
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009273791-03

No Significant Match Found

DV One-Page Summary

KIC: 9273791 Candidate: 3 of 4 Period: 289.015 d



DV Fit Results:

Period = 289.01498 [0.00605] d
Epoch = 144.5695 [0.0068] BKJD
Rp/R* = 0.0171 [0.0270]
a/R* = 502.70 [3280.06]
b = 0.69 [5.03]
Seff = 3.24 [3.06]
Teq = 342 [81] K
Rp = 3.12 [5.16] Re
a = 0.8369 [0.4528] AU
Ag = 5319.46 [17713.98] [0.30 σ]
Teffp = 4518 [3615] K [1.15 σ]

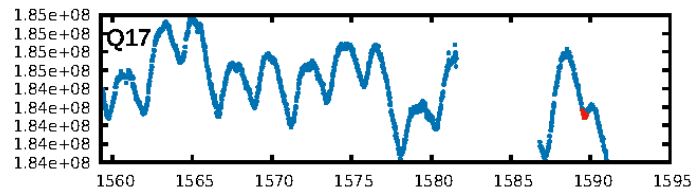
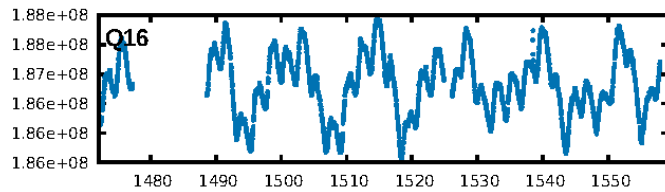
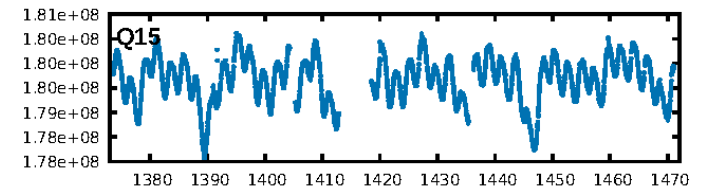
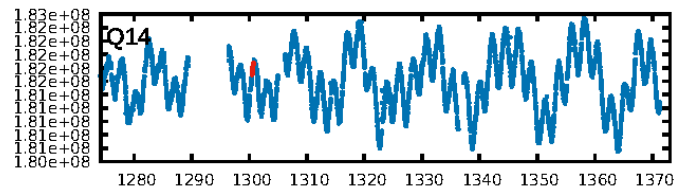
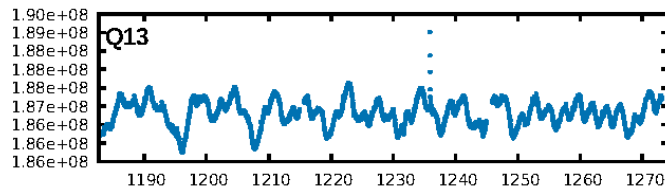
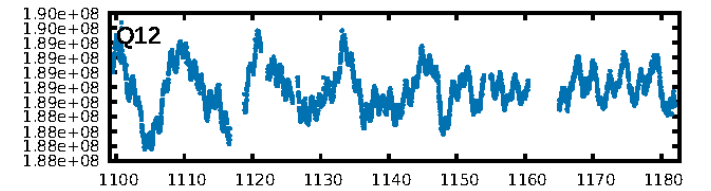
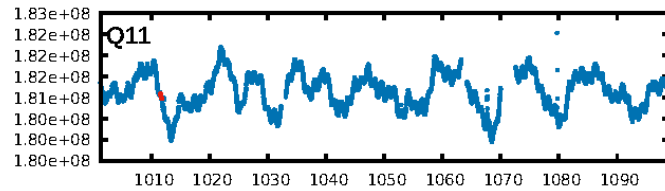
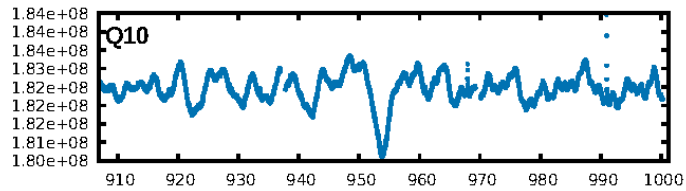
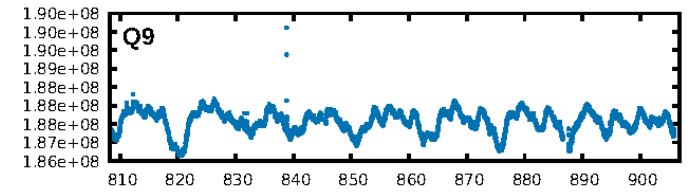
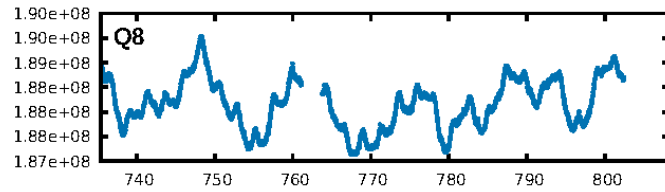
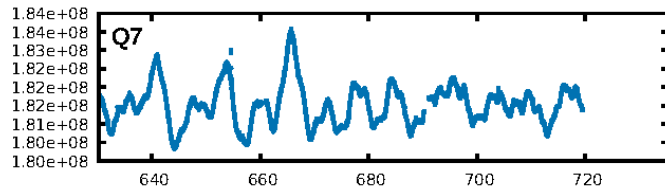
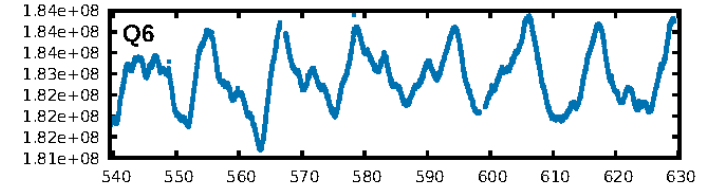
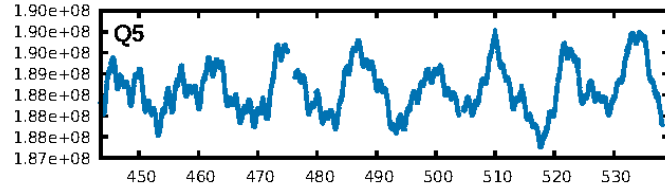
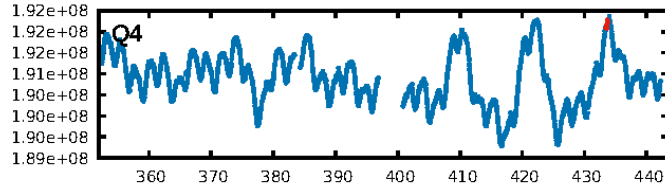
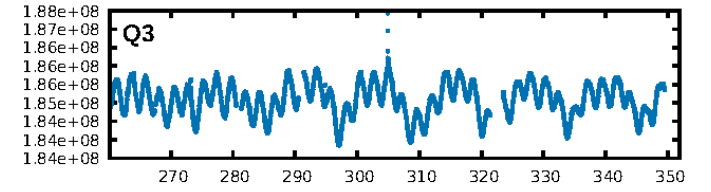
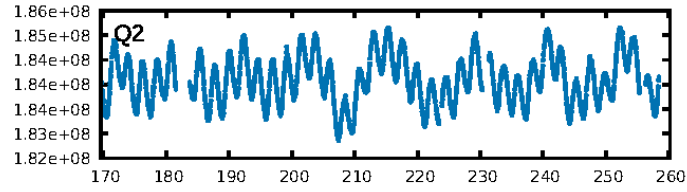
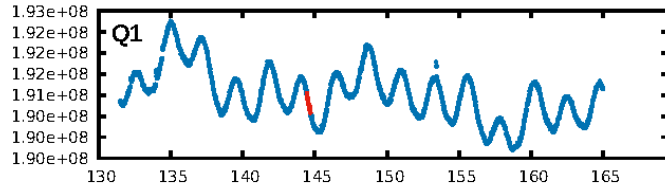
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [34.62 σ]
LongPeriod-sig: 100.0% [764.52 σ]
ModelChiSquare2-sig: 22.7%
ModelChiSquareGof-sig: 98.4%
Bootstrap-pfa: 2.92e-12
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: 1.102
Centroid-sig: 48.0%
Centroid-so: 0.719 arcsec [0.81 σ]
OotOffset-rm: 1.139 arcsec [1.11 σ]
KicOffset-rm: 1.156 arcsec [0.69 σ]
OotOffset-st: 1/1/1/2 [5]
KicOffset-st: 1/1/1/2 [5]
DiffImageQuality-fgm: 0.40 [2/5]
DiffImageOverlap-fno: 0.40 [2/5]

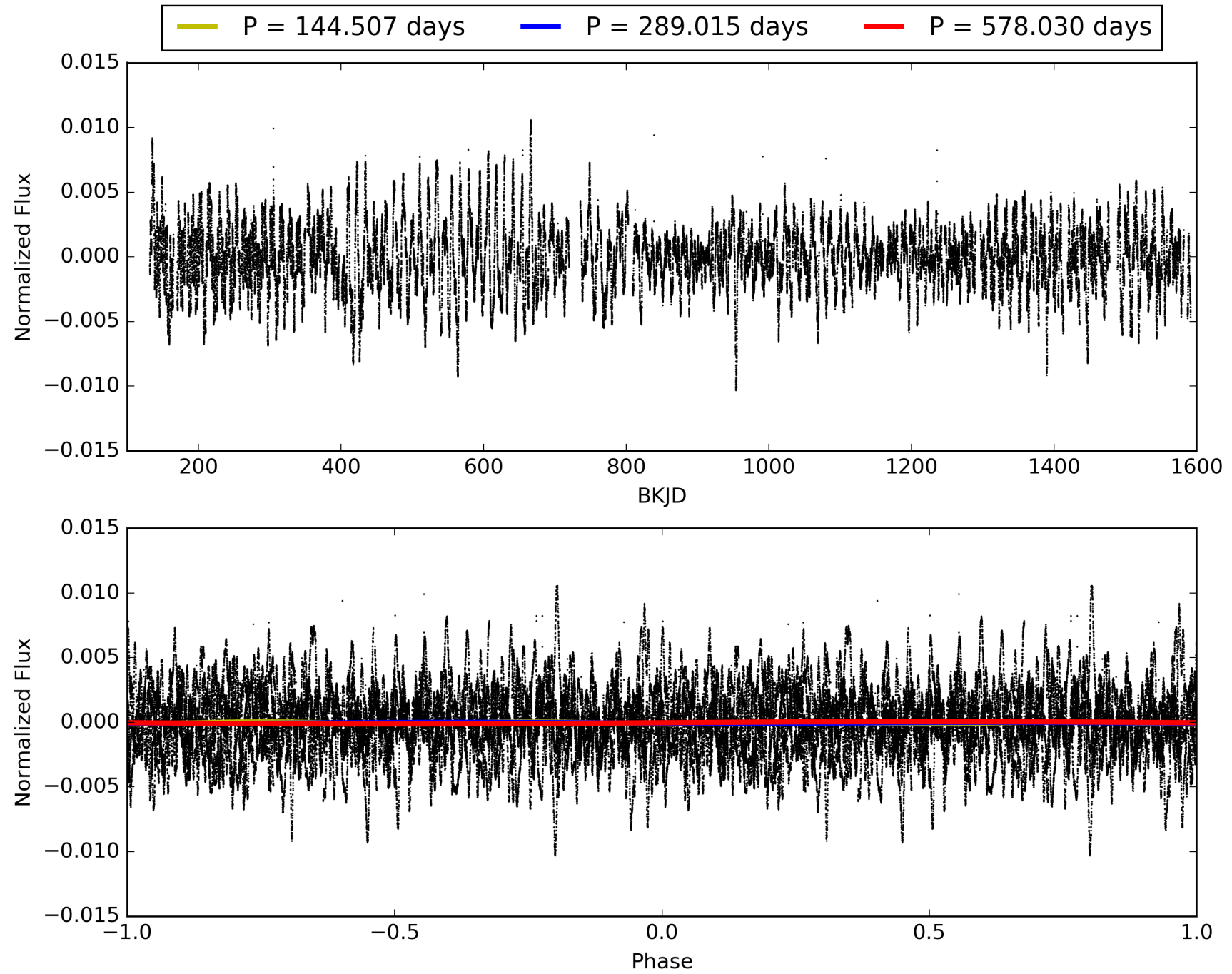
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 23:41:30 Z

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

TCE 009273791-03, PDC Light Curves

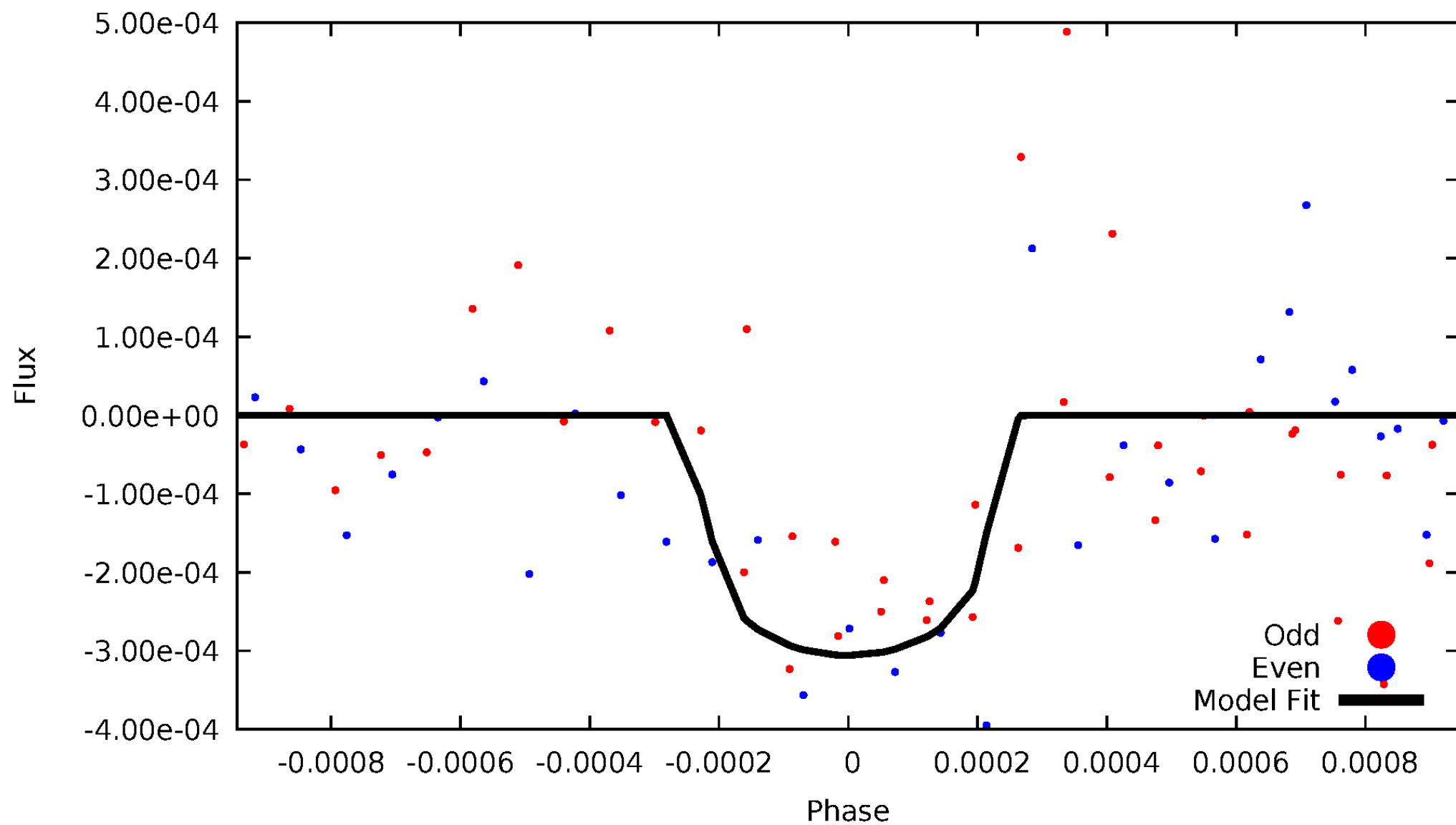


TCE 009273791-03



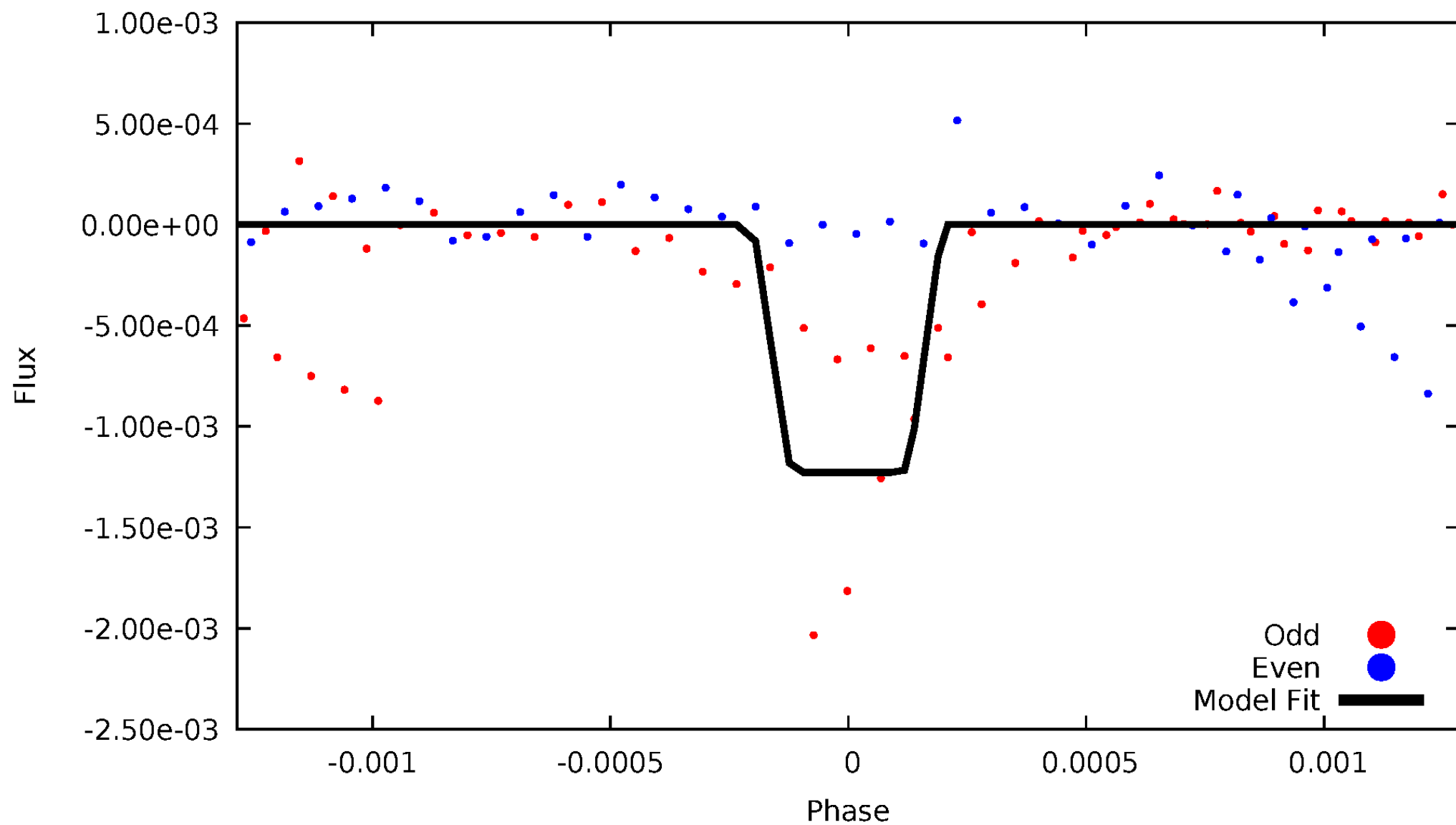
DV Odd/Even

TCE 009273791-03

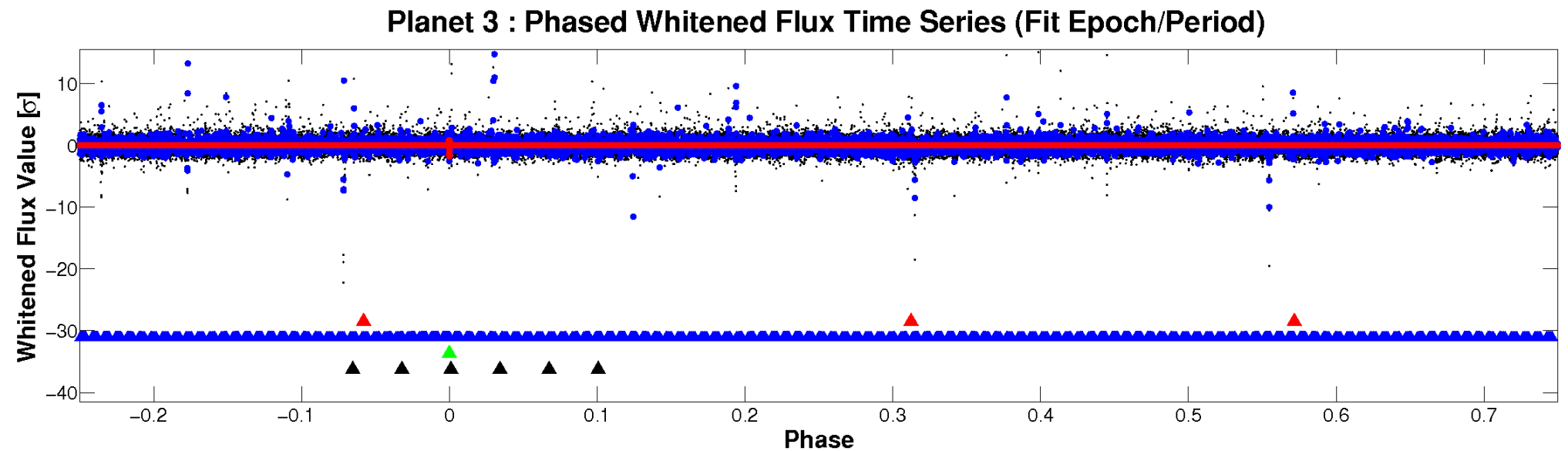
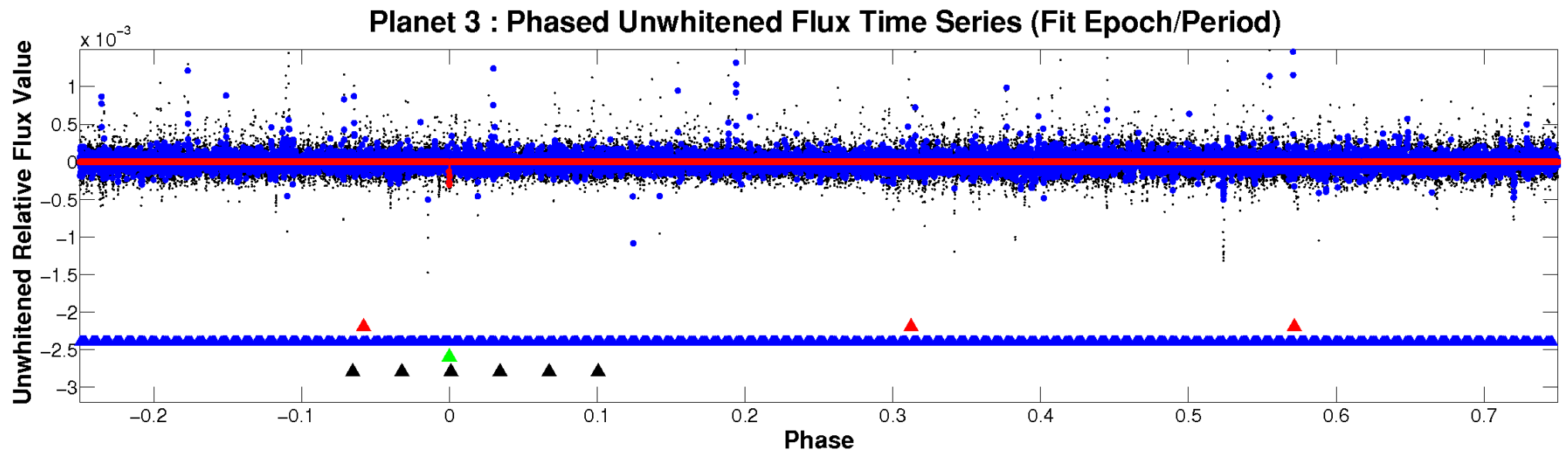


ALT Odd/Even

TCE 009273791-03

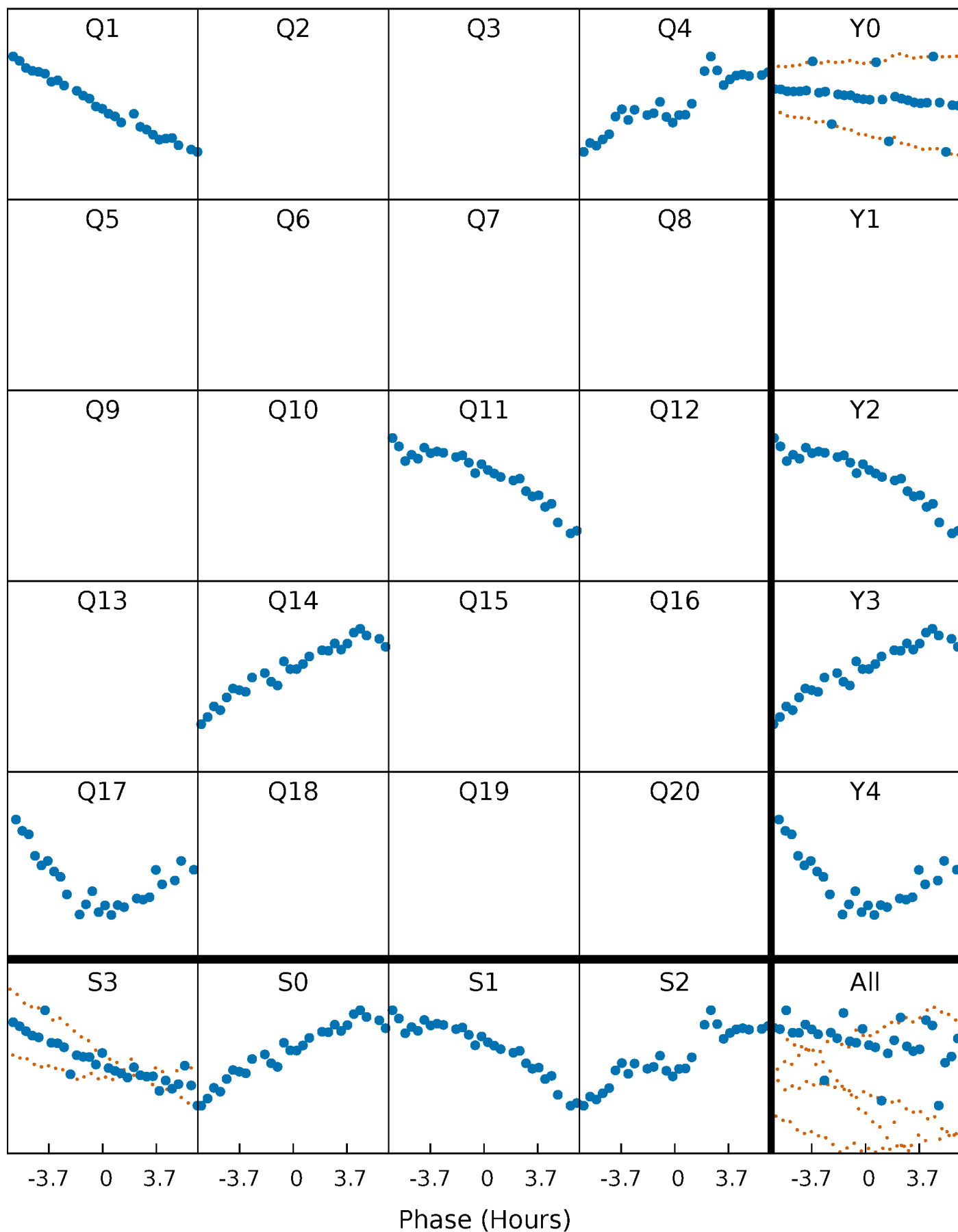


Non-Whitened Vs. Whitened Light Curve



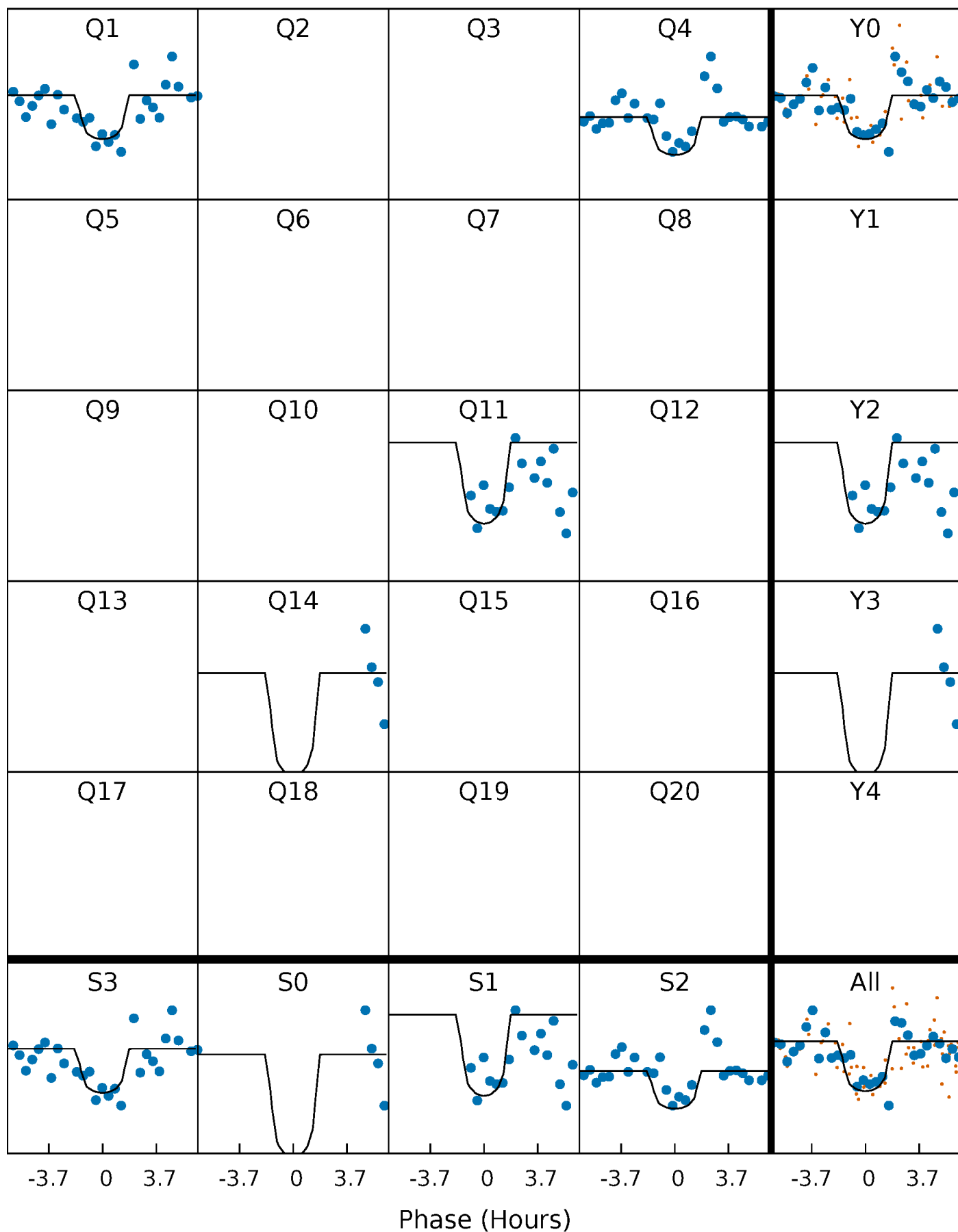
PDC Quarter-Phased Transit Curves

TCE 009273791-03 $P=289.014982$ Days $T_0=144.569471$ (BKJD)



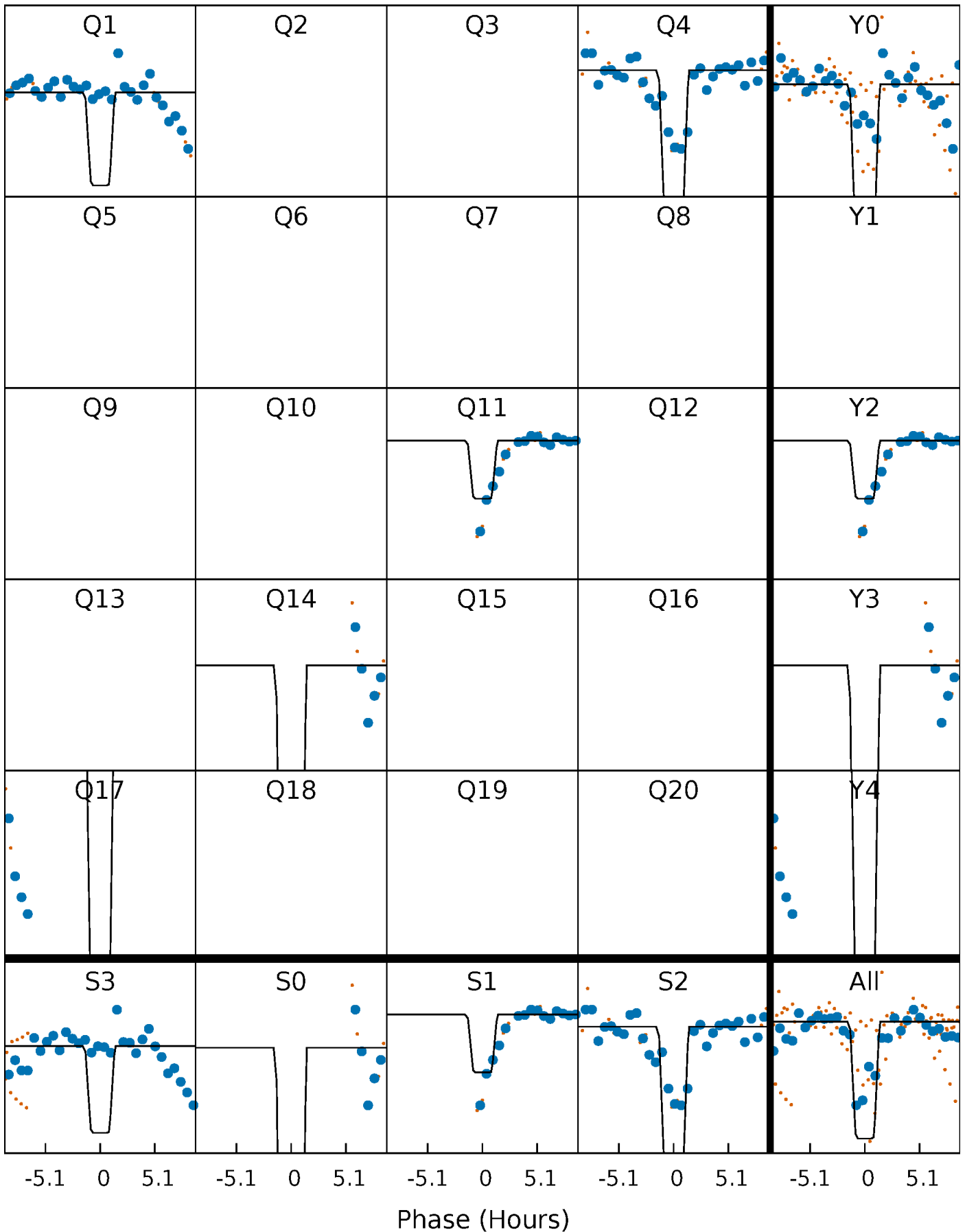
DV Quarter-Phased Transit Curves

TCE 009273791-03 $P=289.014982$ Days $T_0=144.569471$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

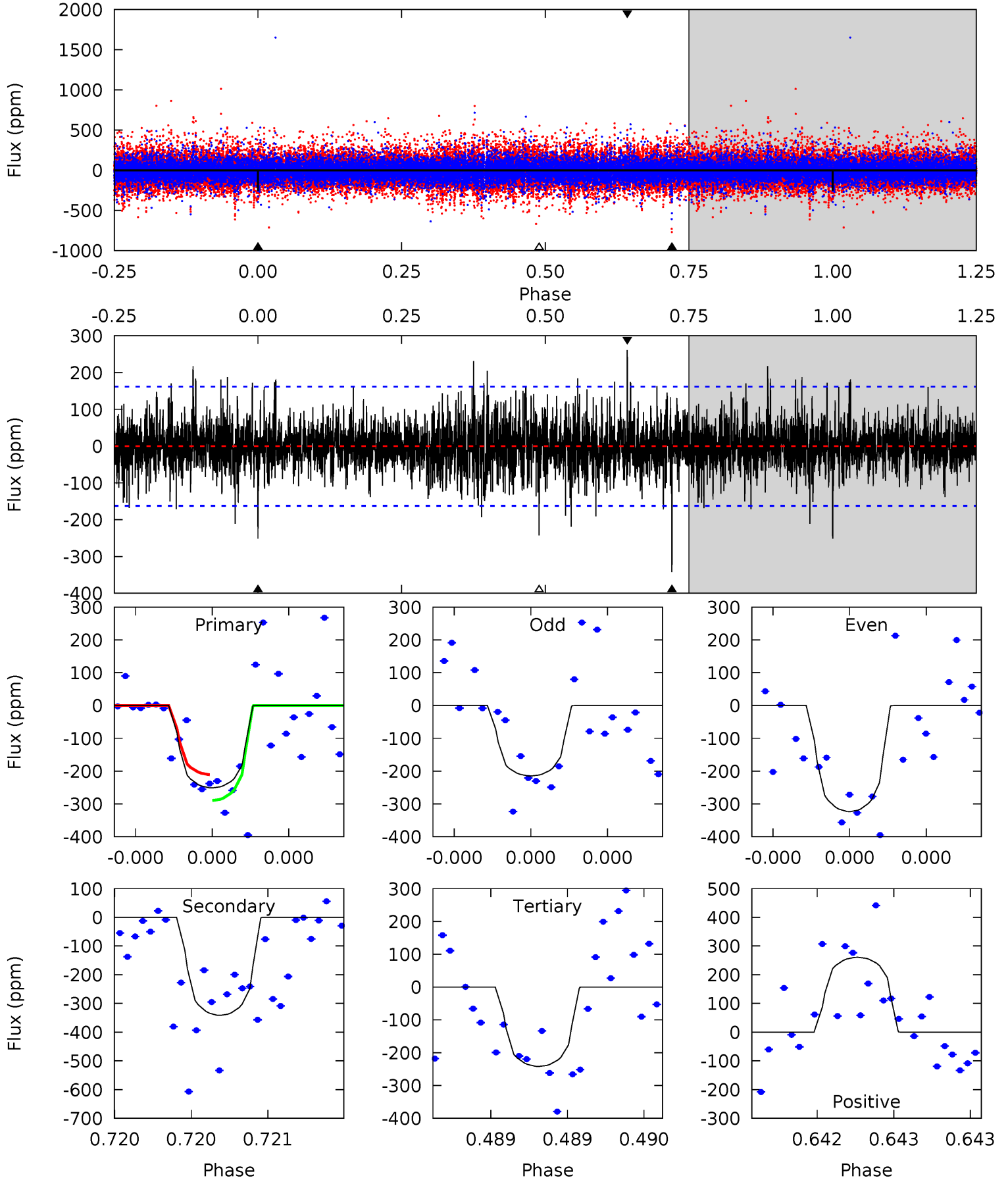
TCE 009273791-03 $P=289.001145$ Days $T_0=144.585445$ (BKJD)



DV Model-Shift Uniqueness Test

009273791-03, P = 289.014982 Days, E = 144.569471 Days

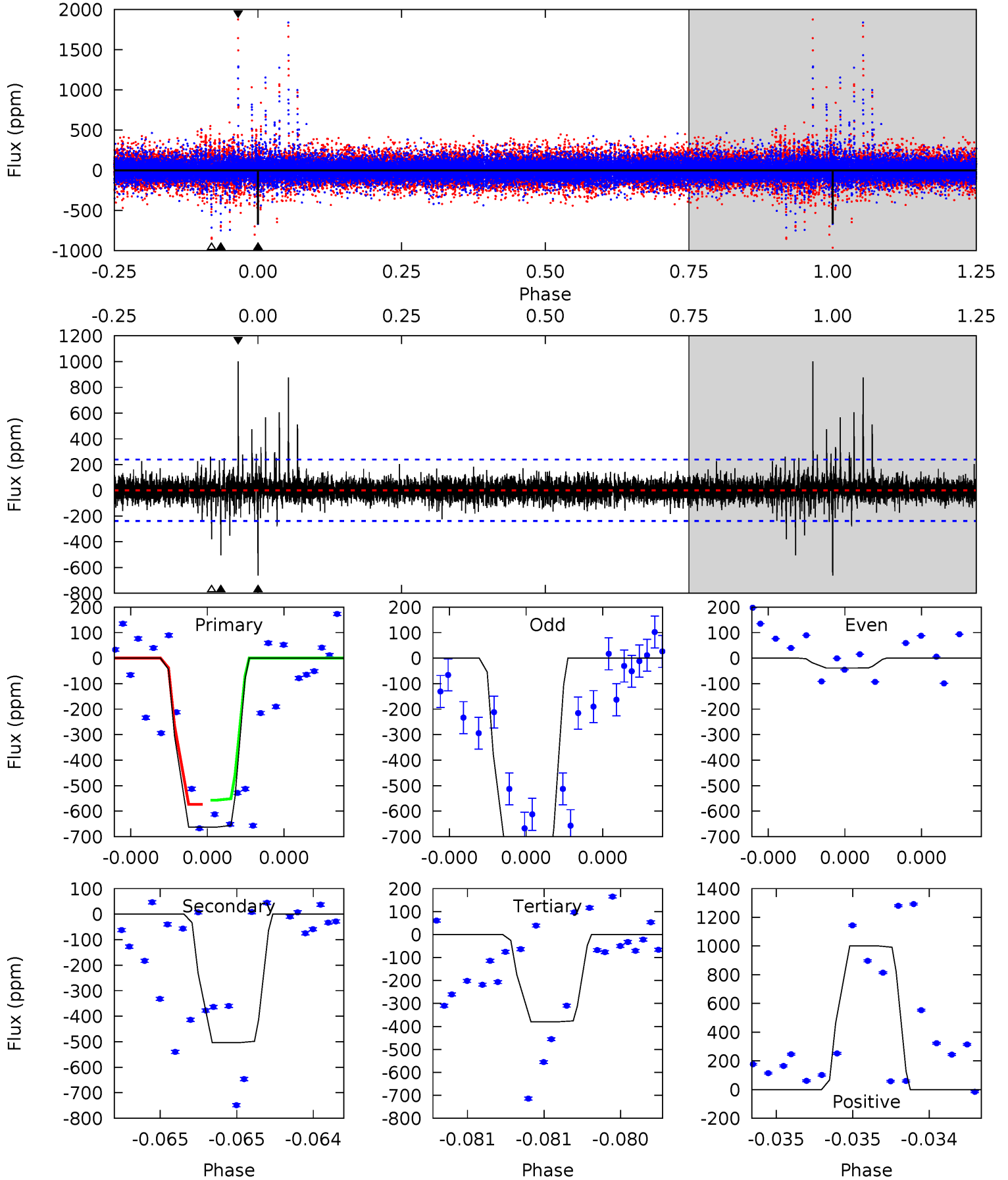
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 8.64 | 11.7 | 8.32 | 8.97 | 5.58 | 3.48 | 1.69 | 0.32 | -0.33 | 3.43 | 2.78 | 1.68 | 0.95 | 0.43 | 1.35 |



Alt Model-Shift Uniqueness Test

009273791-03, P = 289.001145 Days, E = 144.585445 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|-----|
| 15.6 | 11.8 | 8.93 | 23.6 | 5.62 | 3.55 | 1.30 | 6.65 | -7.97 | 2.91 | -11.7 | 9.43 | 1.22 | 0.60 | 0 |



Stellar Parameters For KIC 009273791

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | $M(M_{\odot})$ | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 5482^{+213}_{-174} | $3.961^{+0.570}_{-0.228}$ | $-0.180^{+0.350}_{-0.250}$ | $1.675^{+0.655}_{-0.800}$ | $0.936^{+0.111}_{-0.122}$ | $0.280^{+1.556}_{-0.150}$ |
| | +4%/-3% | +14%/-6% | +194%/-139% | +39%/-48% | +12%/-13% | +555%/-54% |
| Source | PHO54 | PHO54 | PHO54 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 009273791-03 / KOI

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|---------------|------------------------|-------------------|-----------------------|-------------------------|
| DV | -342 ± 29 | $4.33^{+4.27}_{-2.77}$ | 470^{+57}_{-68} | 4734^{+3223}_{-994} | 7069^{+47183}_{-5335} |
| Alt. | -503 ± 43 | $5.98^{+5.19}_{-3.79}$ | 466^{+58}_{-68} | 4517^{+2244}_{-849} | 5387^{+31993}_{-3839} |

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 $A_{obs} \gg 1.0$

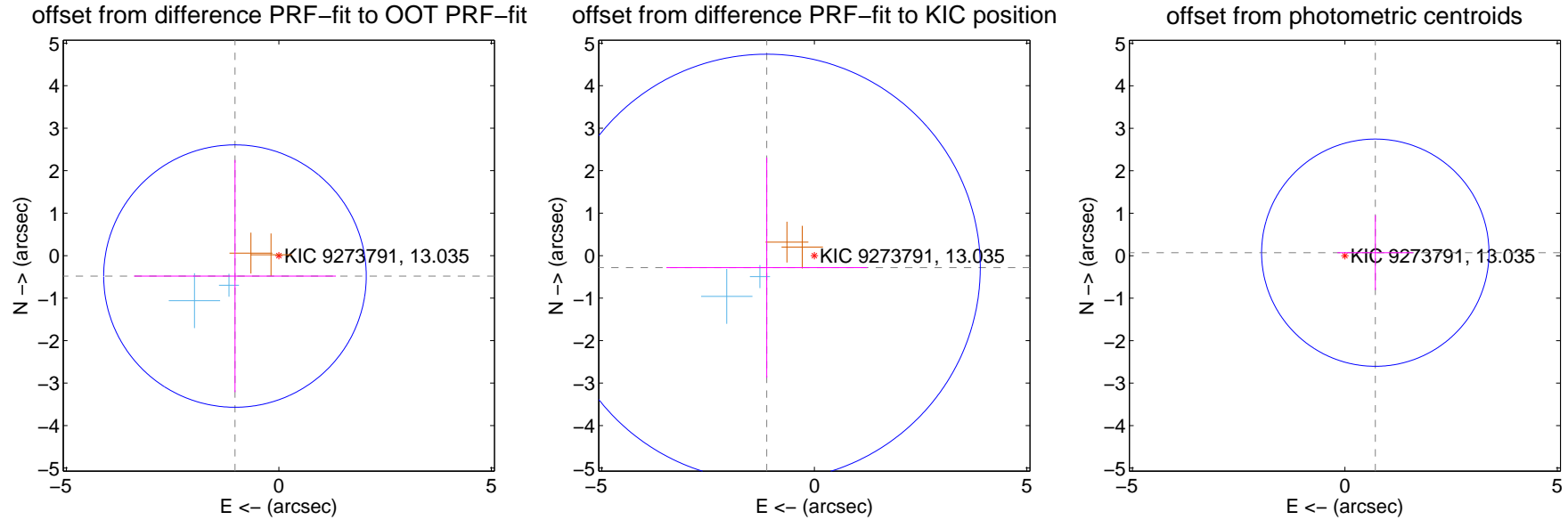
DV Centroid Data

Supplemental centroid analysis for 009273791-03. Kepler magnitude: 13.04. Transit SNR 6.98

There are 2 quarters with good PRF difference image offsets

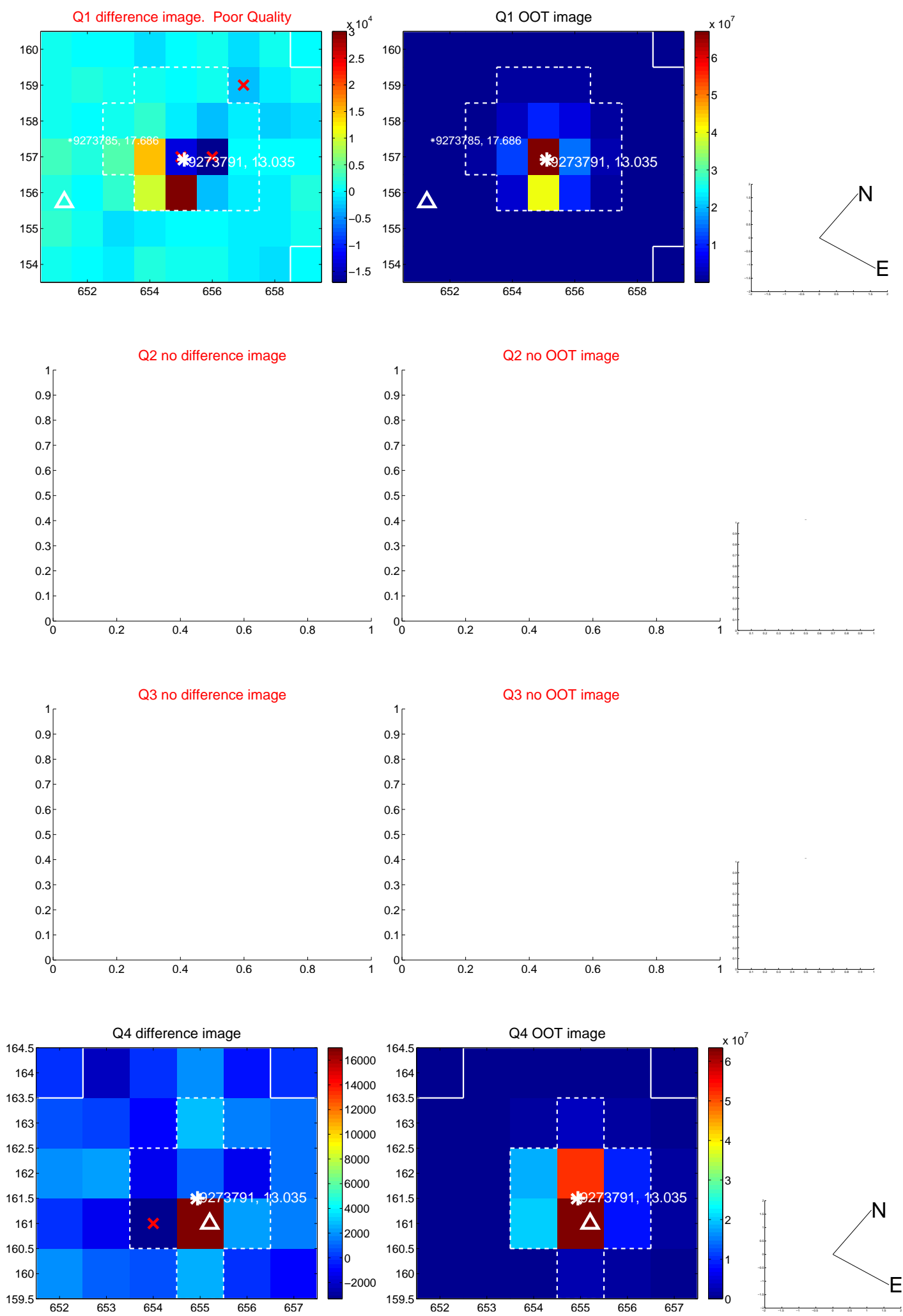
The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT | 1.139 ± 1.029 | 1.11 | 1.032 ± 2.375 | -0.481 ± 2.731 |
| PRF-fit source offset from KIC position | 1.156 ± 1.675 | 0.69 | 1.120 ± 2.363 | -0.283 ± 2.591 |
| photometric centroid source offset | 0.72 ± 0.89 | 0.81 | -0.72 ± 0.89 | 0.07 ± 0.88 |



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.

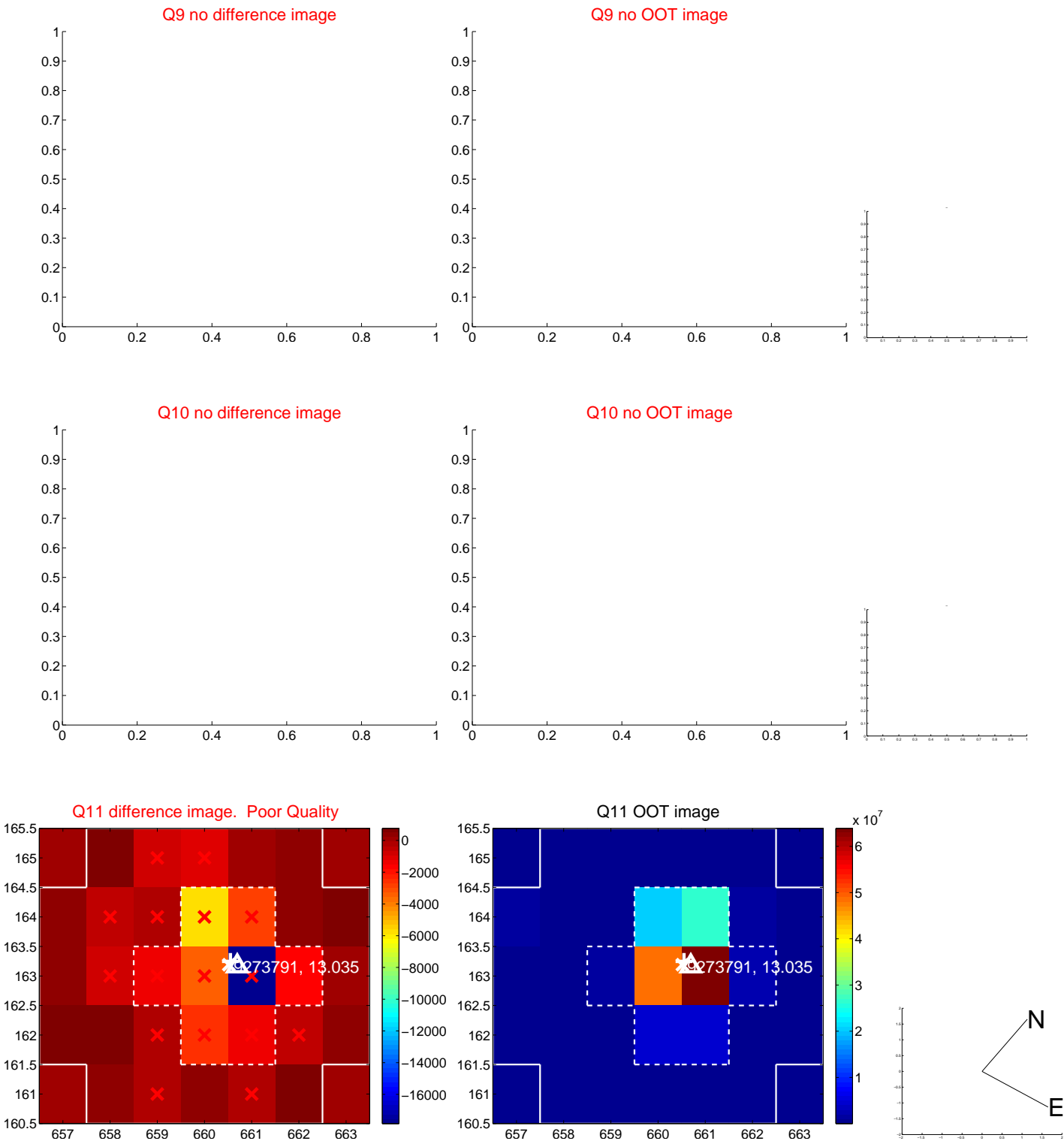
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



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



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

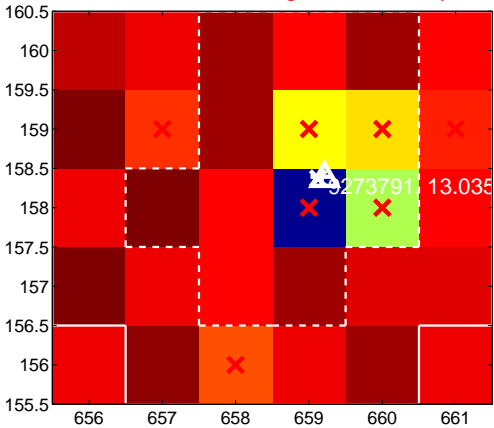
Q13 no difference image



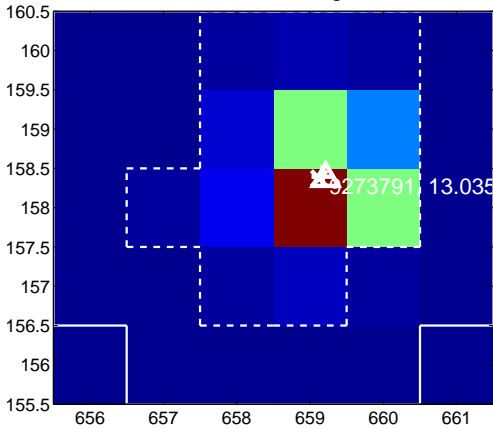
Q13 no OOT image



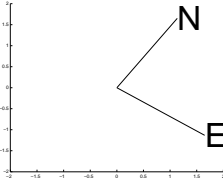
Q14 difference image. Poor Quality



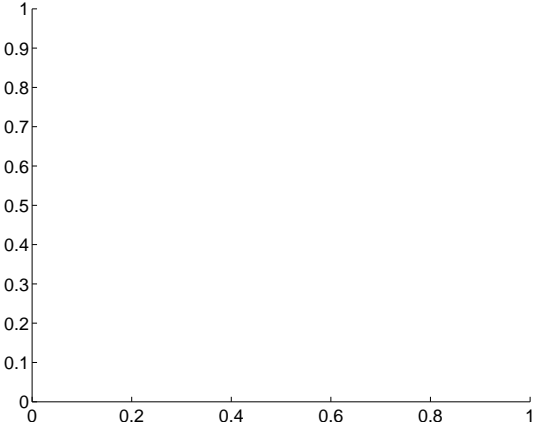
Q14 OOT image



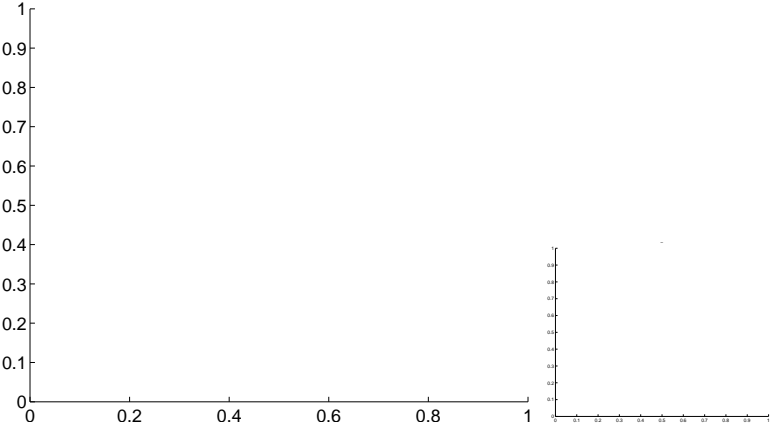
$\times 10^7$



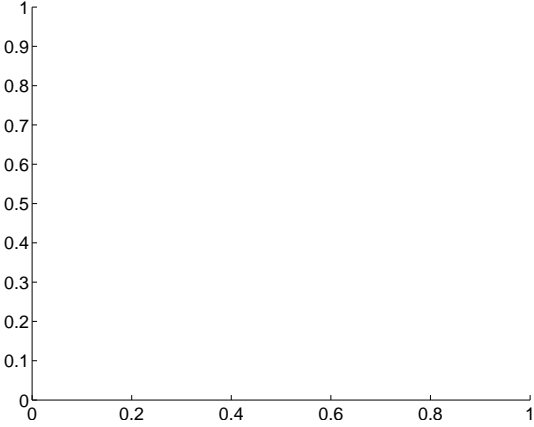
Q15 no difference image



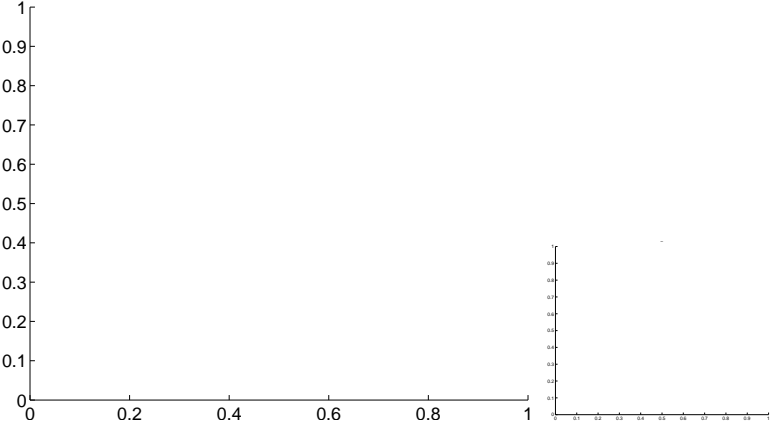
Q15 no OOT image



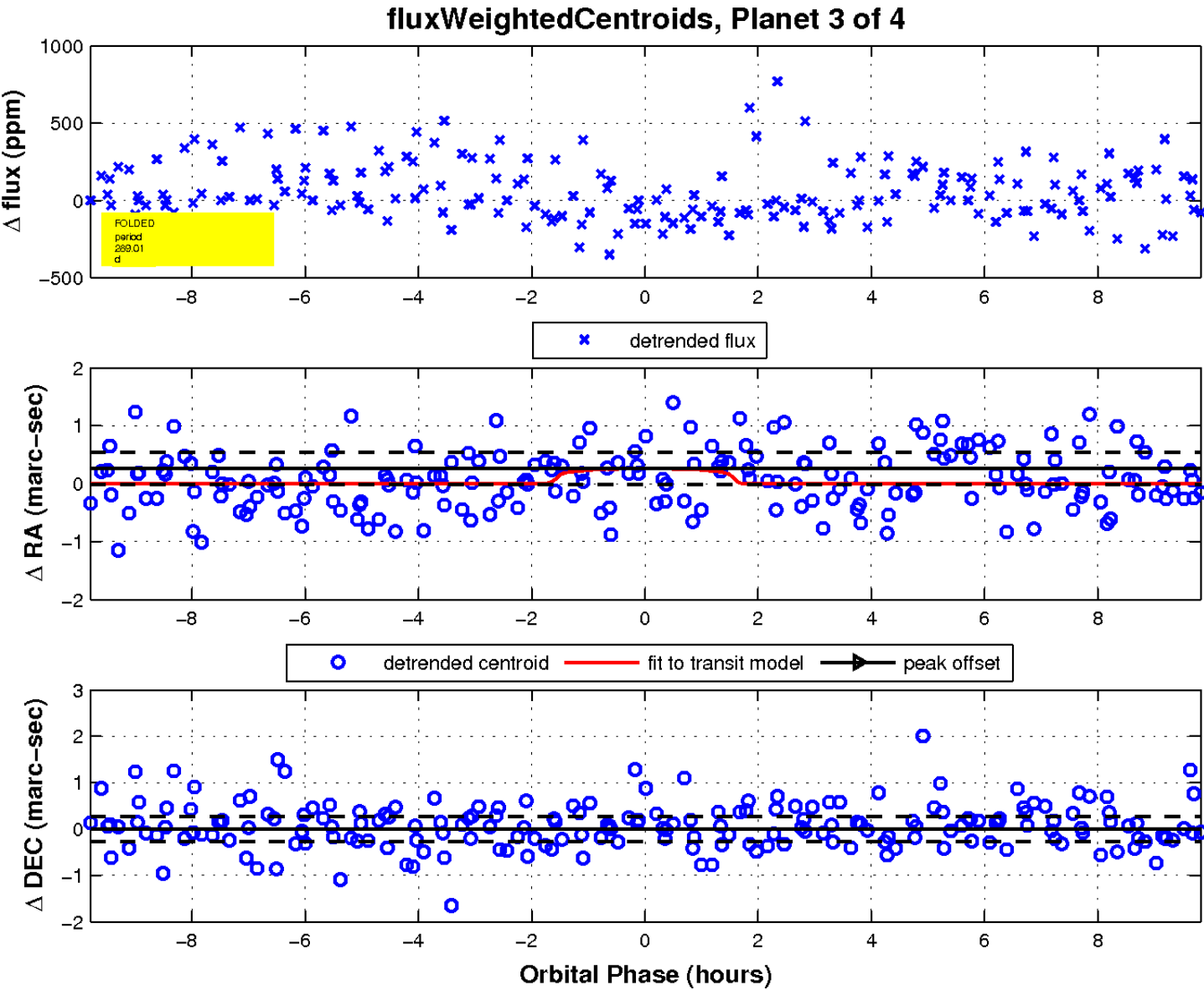
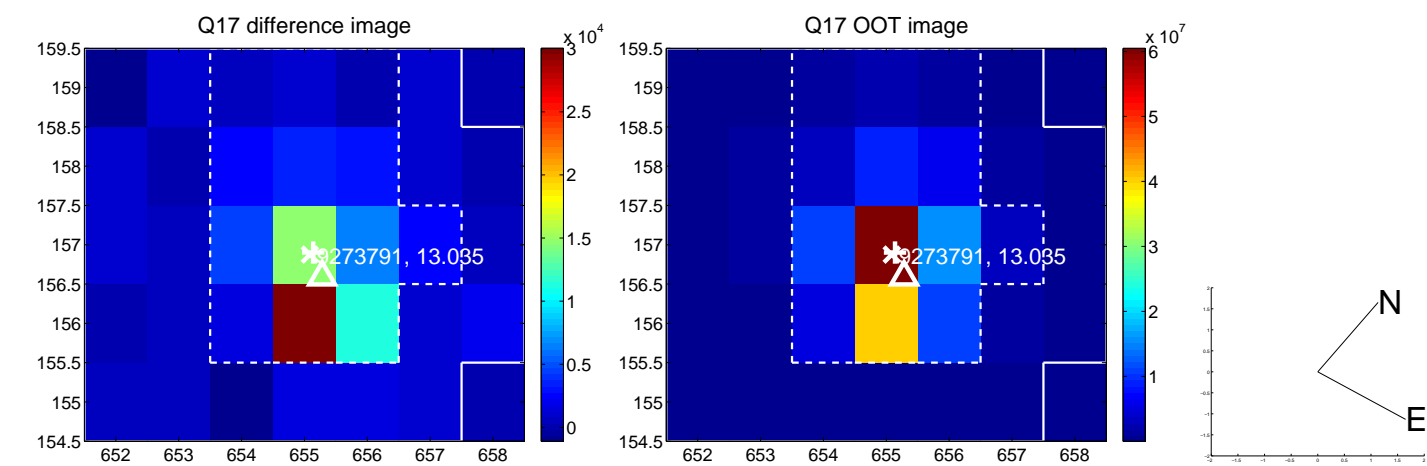
Q16 no difference image



Q16 no OOT image

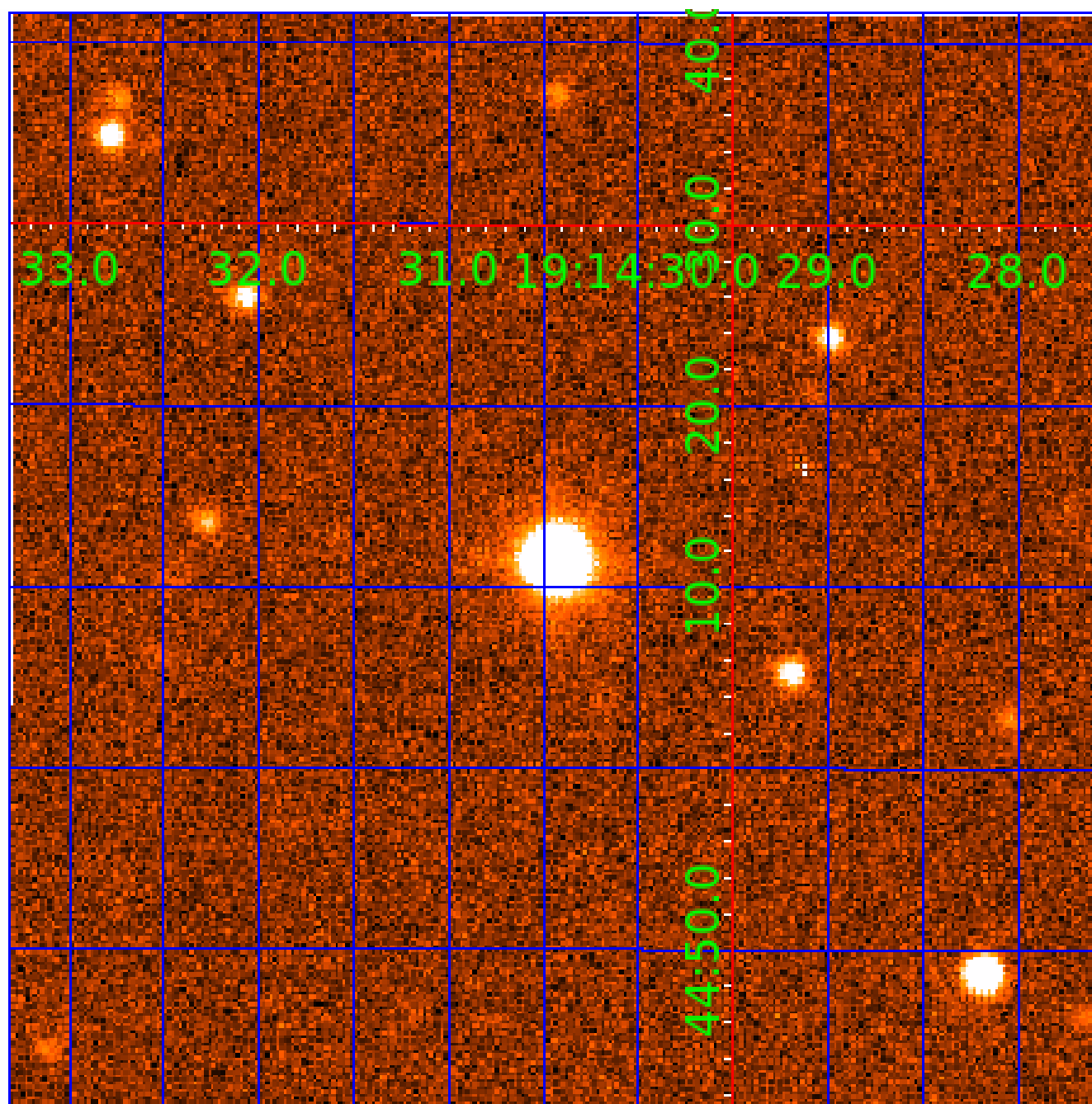


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009273791

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|-----|-----------------------------|-----------------|------------------------|------------------------|
| 009273791-01 | OBS | No | 470.997502 | 523.859836 | 292.3 | 4.679 | 14.4 | 5.8 | 1.68 | 5482 | 3.17 | 1.69 |
| 009273791-02 | OBS | No | 2.295839 | 131.855320 | 33.2 | 6.038 | 8.7 | 8.6 | 1.68 | 5482 | 0.95 | 2045.21 |
| 009273791-03 | OBS | No | 289.014982 | 144.569471 | 305.9 | 3.278 | 10.0 | 7.0 | 1.68 | 5482 | 3.12 | 3.24 |
| 009273791-04 | OBS | No | 279.417268 | 173.675770 | 440.5 | 5.789 | 13.2 | 6.8 | 1.68 | 5482 | 3.71 | 3.39 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|---|
| 009273791-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS |
| 009273791-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | SWEET_NTL |
| 009273791-03 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_CHASES_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS |
| 009273791-04 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_CHASES_MARSHALL—TRANS_GAPPED—LPP_DV—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.

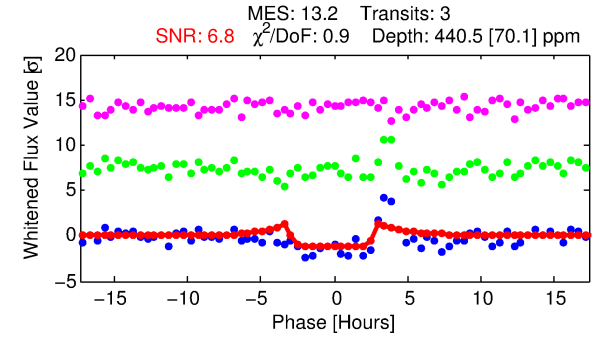
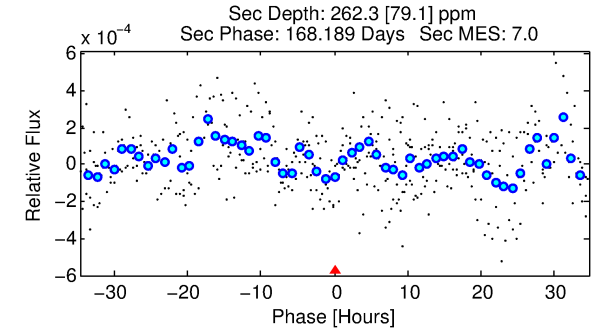
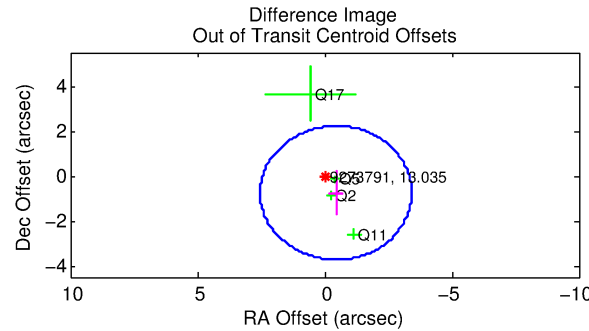
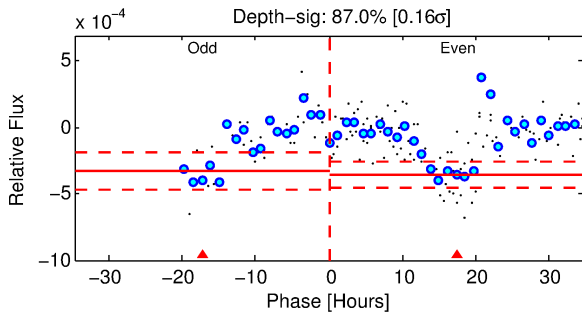
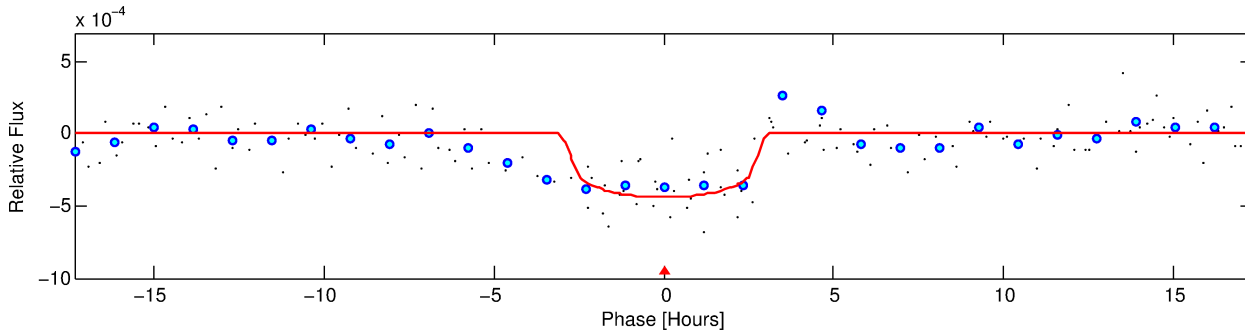
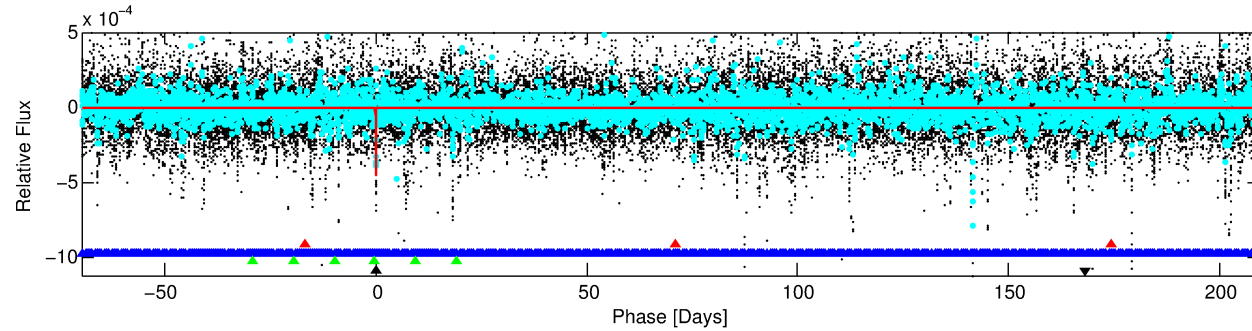
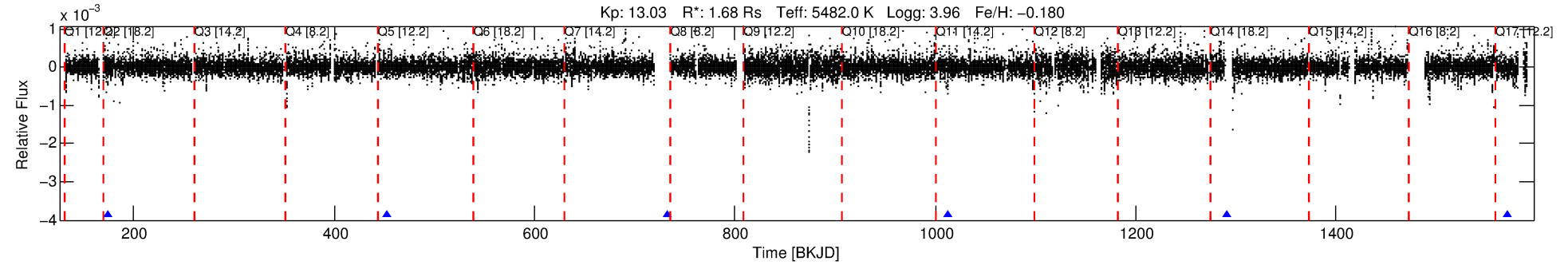
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009273791-04

No Significant Match Found

DV One-Page Summary

KIC: 9273791 Candidate: 4 of 4 Period: 279.417 d



DV Fit Results:

Period = 279.41727 [0.00529] d
Epoch = 173.6758 [0.0247] BKJD
Rp/R* = 0.0203 [0.0350]
a/R* = 285.66 [2049.34]
b = 0.66 [6.16]
Seff = 3.39 [3.20]
Teq = 346 [82] K
Rp = 3.71 [6.63] Re
a = 0.8182 [0.4427] AU
Ag = 7019.24 [25144.76] [0.28 σ]
Teffp = 4897 [4239] K [1.07 σ]

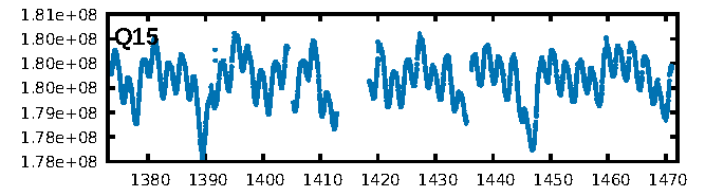
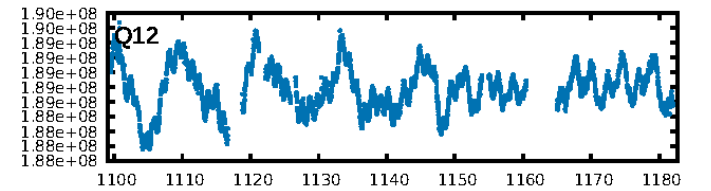
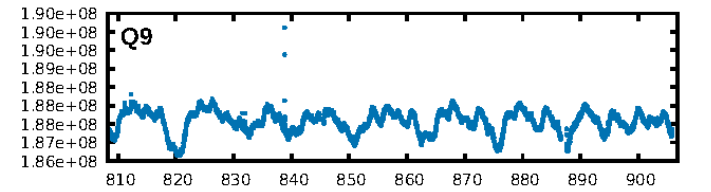
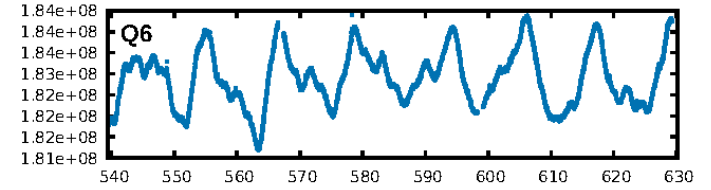
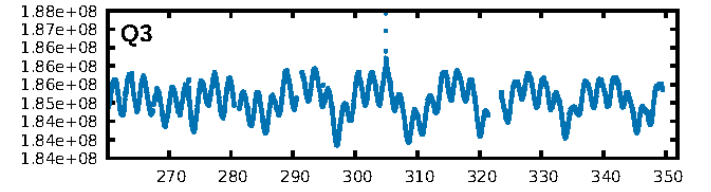
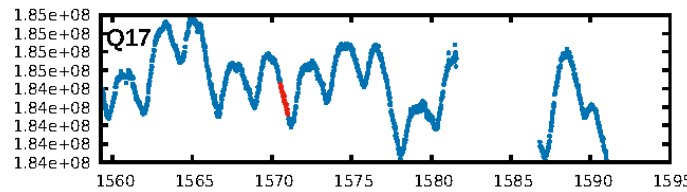
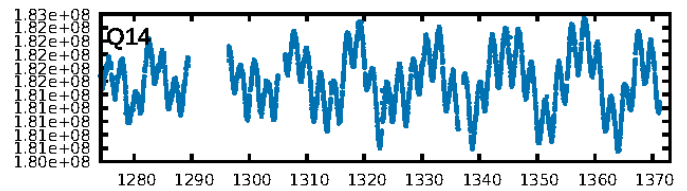
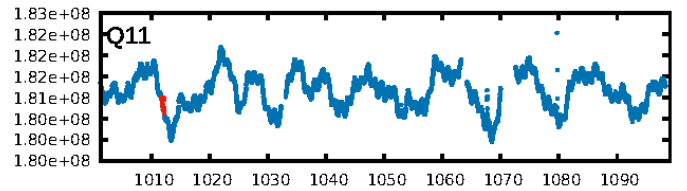
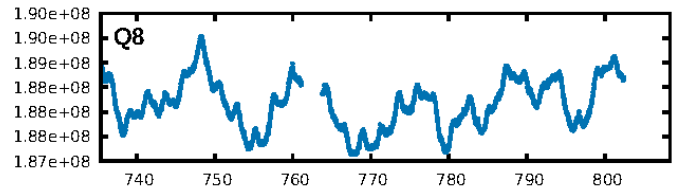
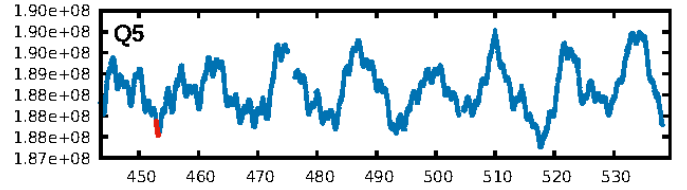
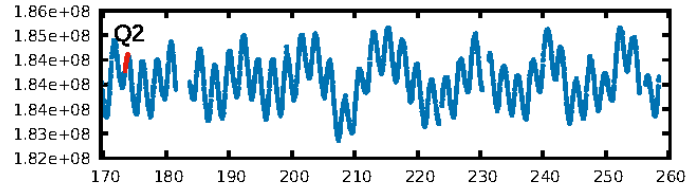
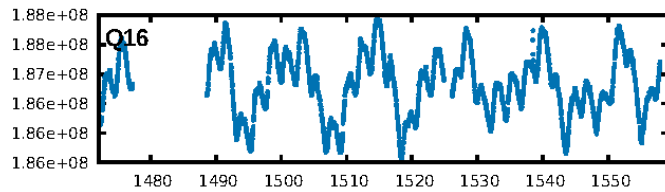
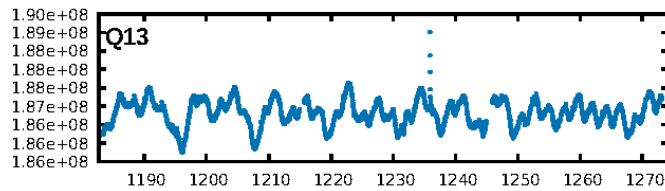
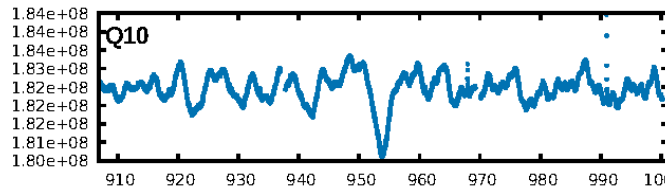
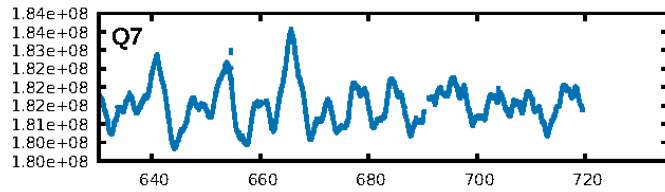
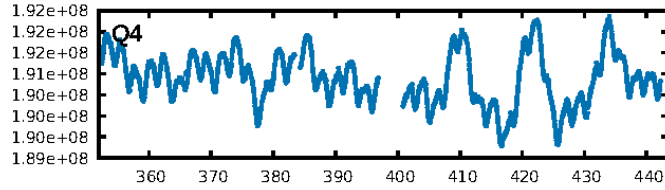
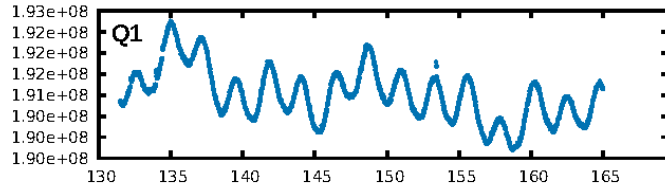
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [795.12 σ]
LongPeriod-sig: 100.0% [34.62 σ]
ModelChiSquare2-sig: 0.6%
ModelChiSquareGof-sig: 88.5%
Bootstrap-pfa: 1.08e-16
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: 1.45
Centroid-sig: 21.2%
Centroid-so: 0.945 arcsec [1.63 σ]
OotOffset-rm: 0.876 arcsec [0.88 σ]
OotOffset-st: 1/1/0/2 [4]
KicOffset-rm: 0.695 arcsec [0.76 σ]
KicOffset-st: 1/1/0/2 [4]
DiffImageQuality-fgm: 0.25 [1/4]
DiffImageOverlap-fno: 0.00 [0/4]

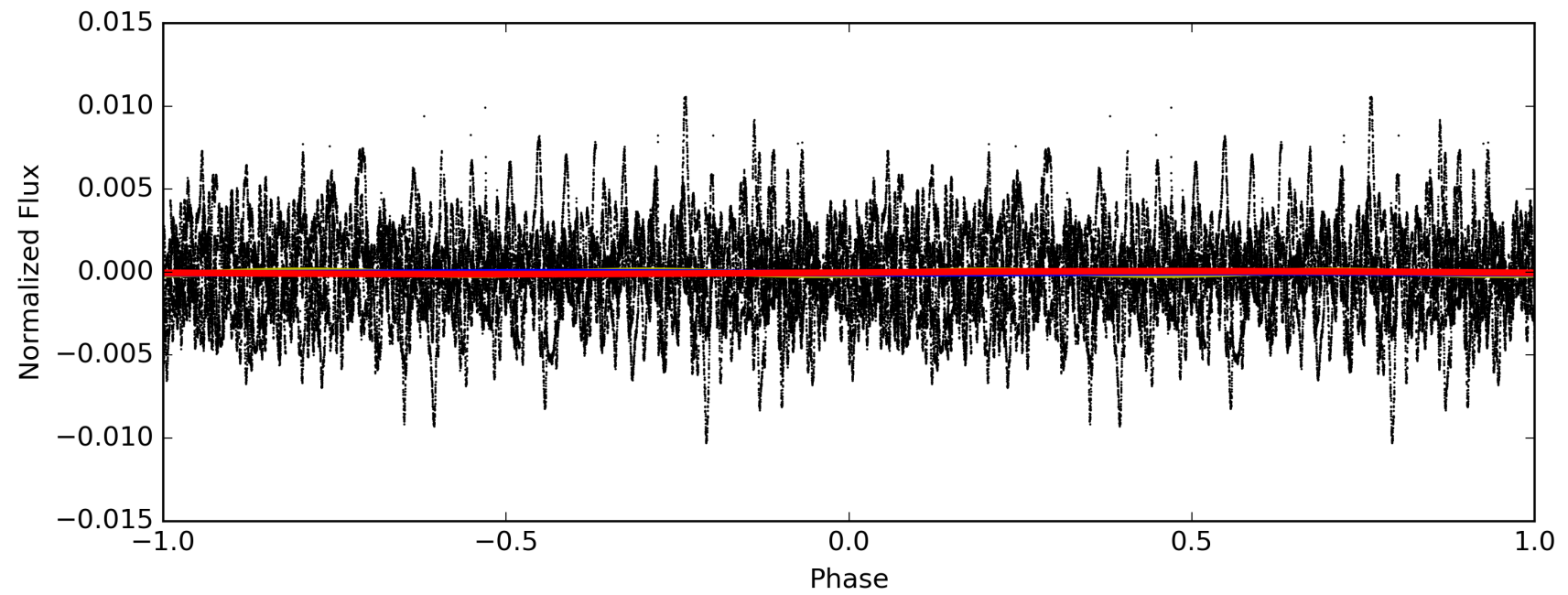
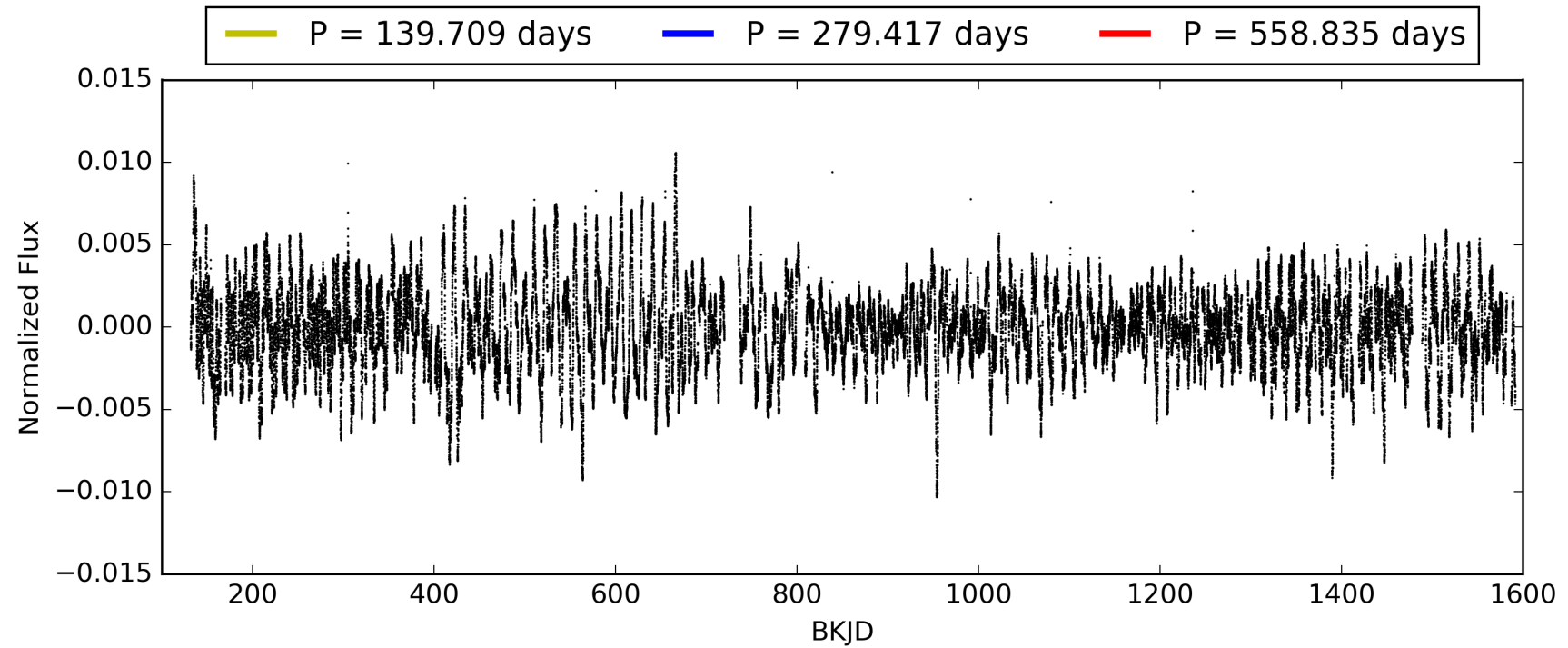
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 23:41:38 Z

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

TCE 009273791-04, PDC Light Curves

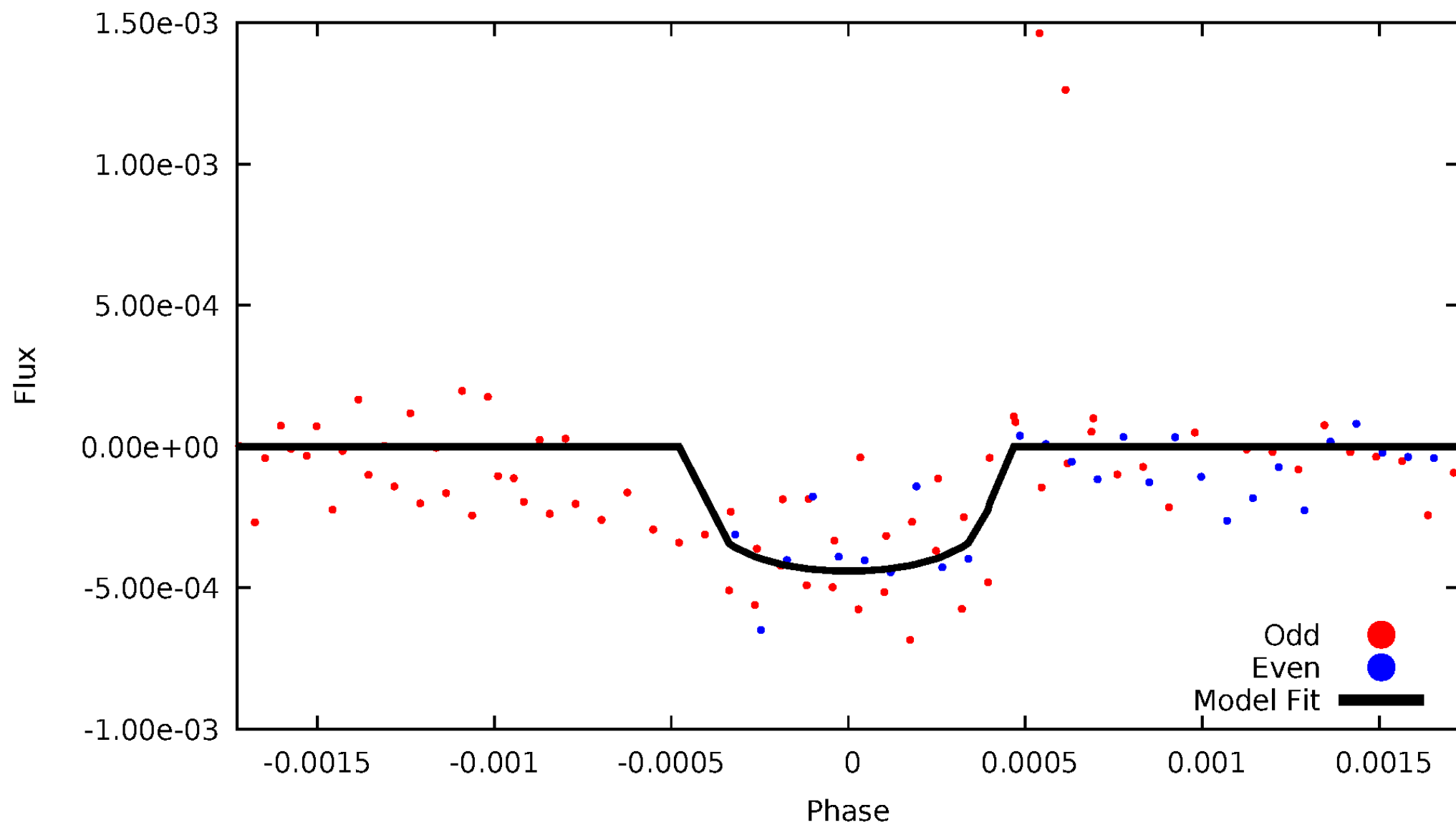


TCE 009273791-04



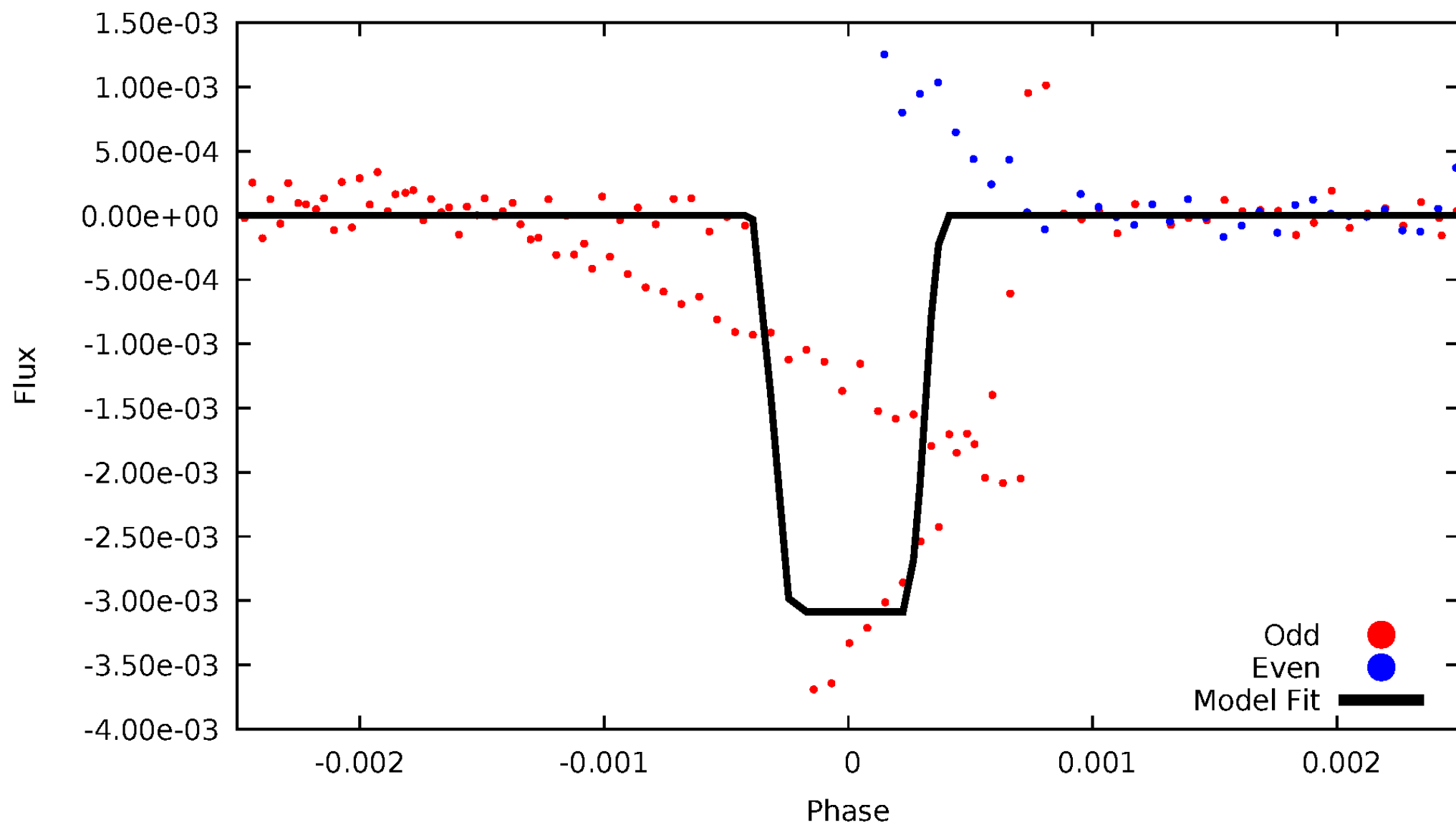
DV Odd/Even

TCE 009273791-04



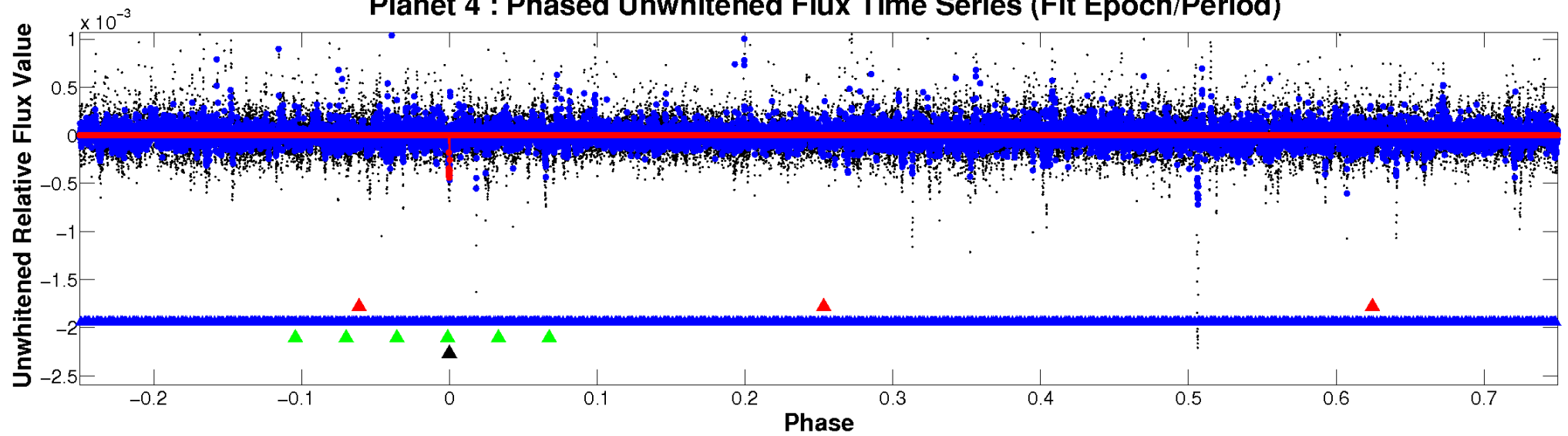
ALT Odd/Even

TCE 009273791-04

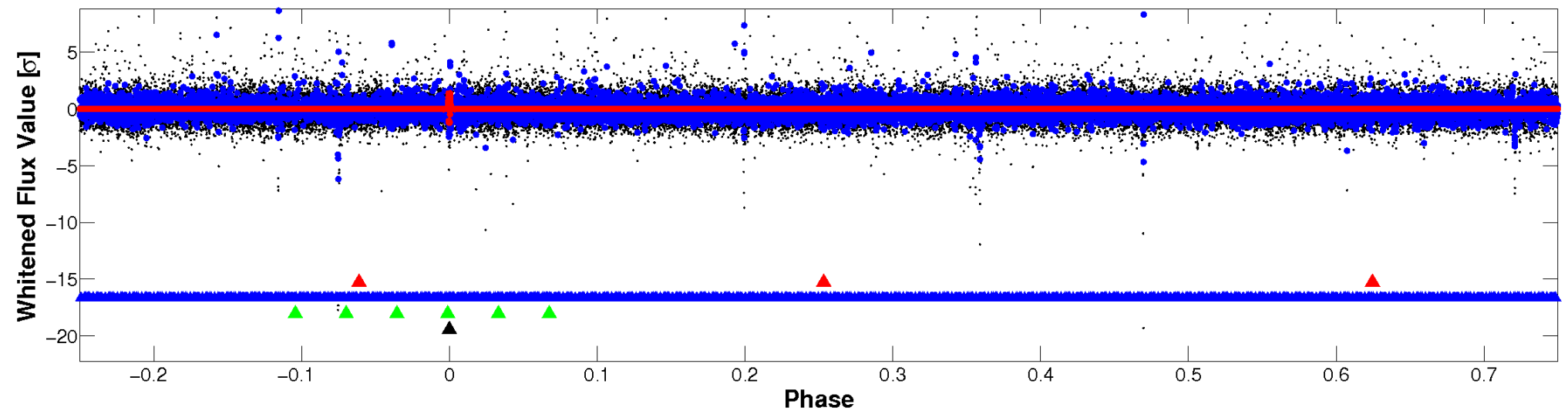


Non-Whitened Vs. Whitened Light Curve

Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

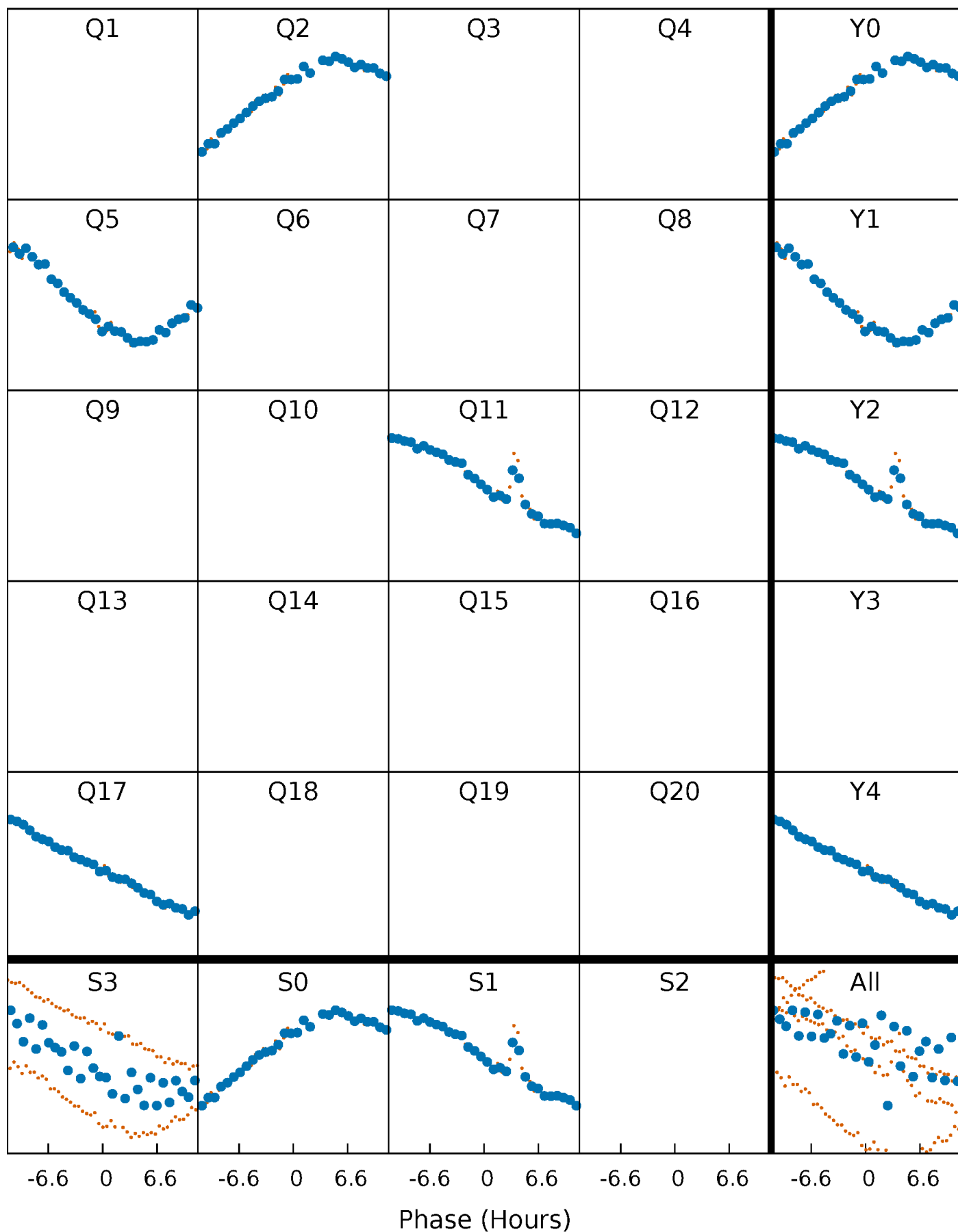


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



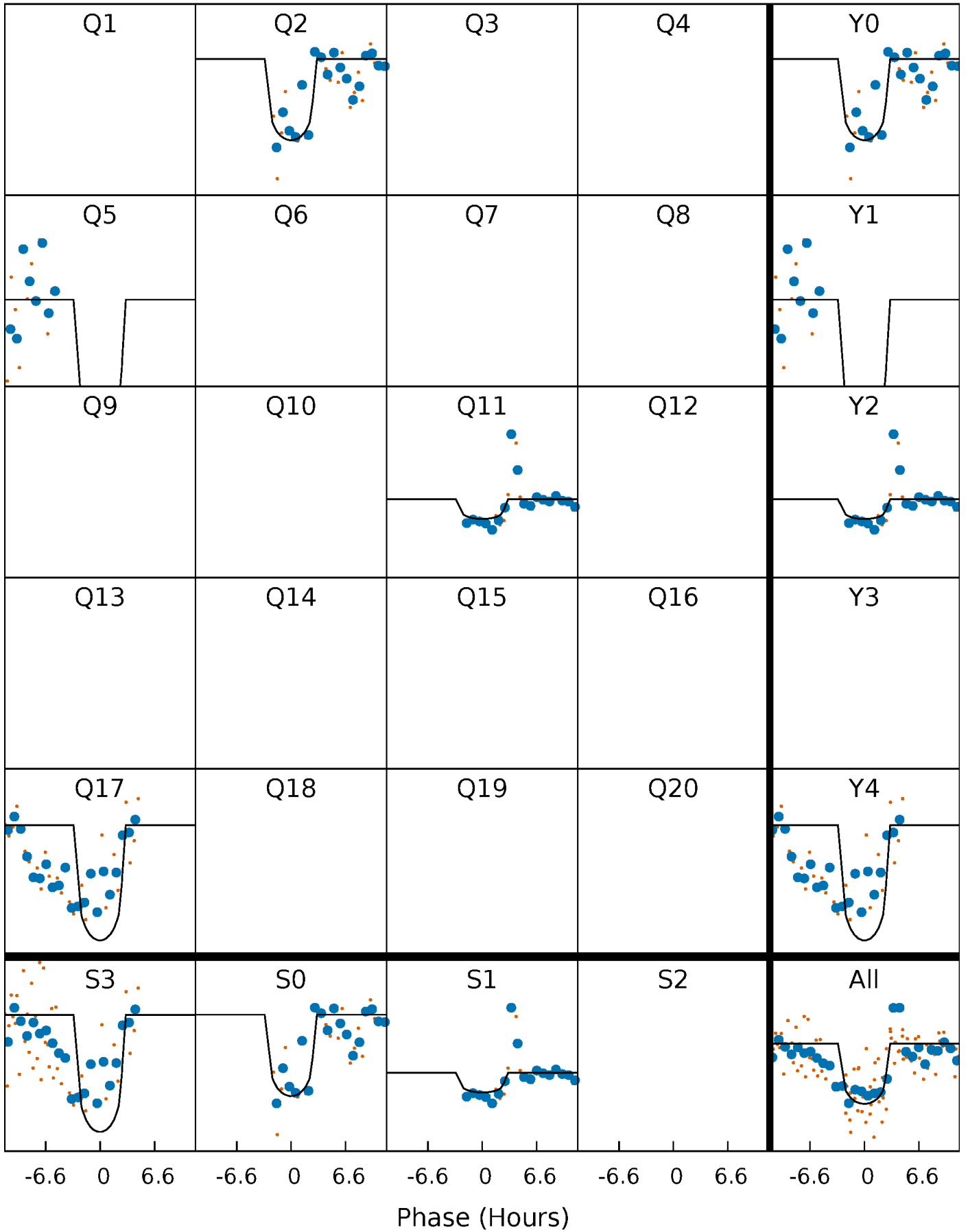
PDC Quarter-Phased Transit Curves

TCE 009273791-04 $P=279.417268$ Days $T_0=173.675770$ (BKJD)



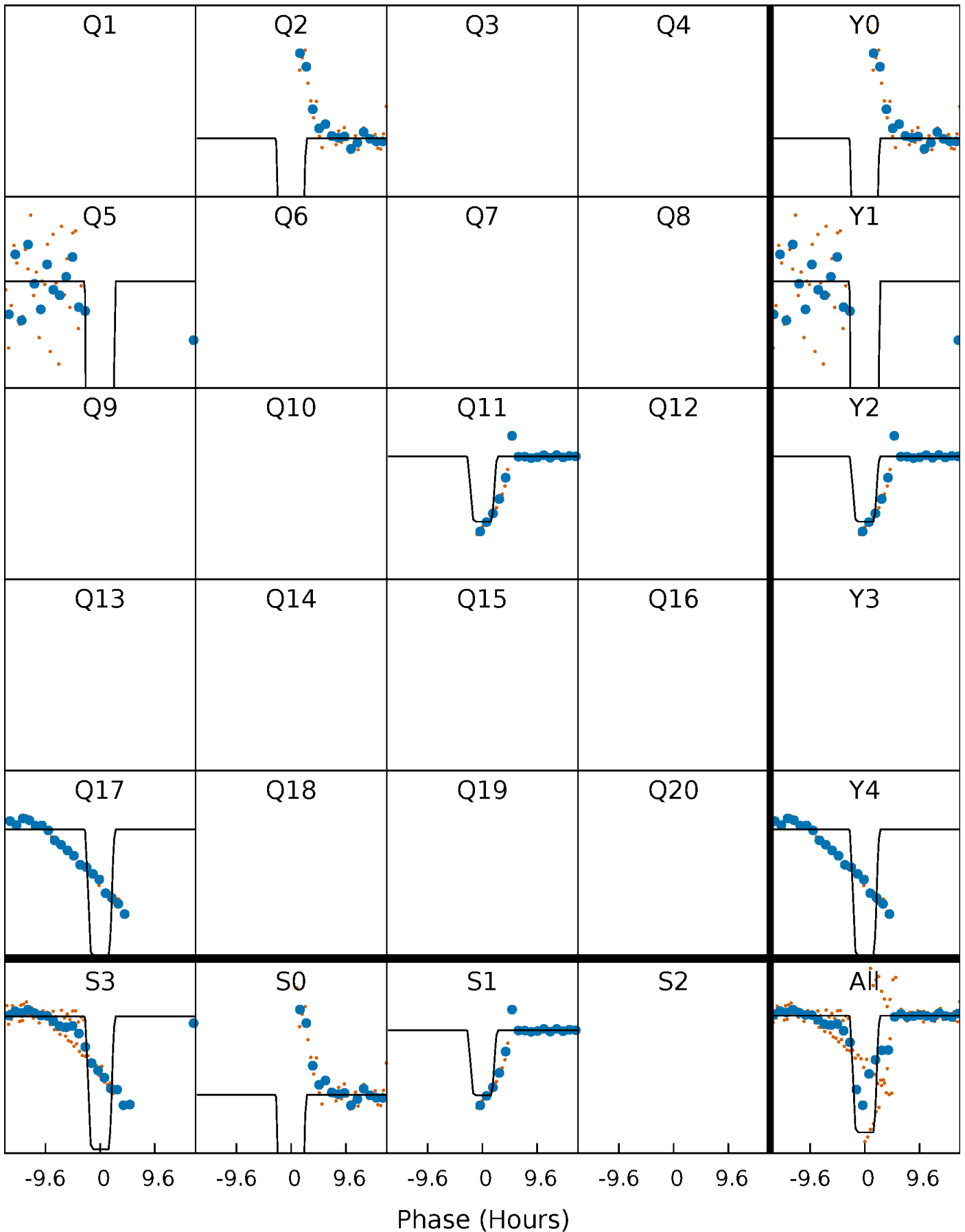
DV Quarter-Phased Transit Curves

TCE 009273791-04 $P=279.417268$ Days $T_0=173.675770$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

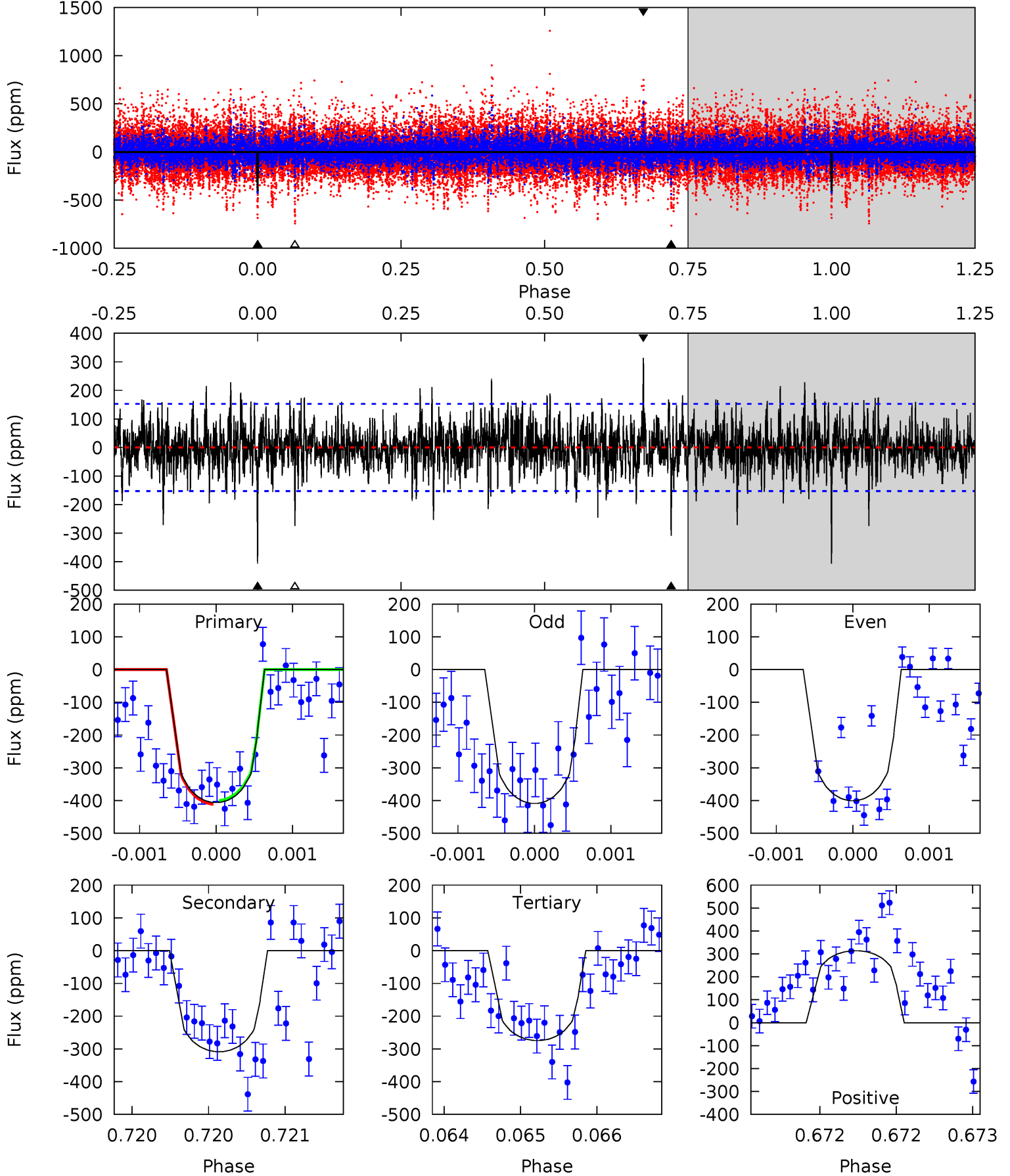
TCE 009273791-04 $P=279.442555$ Days $T_0=173.545422$ (BKJD)



DV Model-Shift Uniqueness Test

009273791-04, P = 279.417268 Days, E = 173.675770 Days

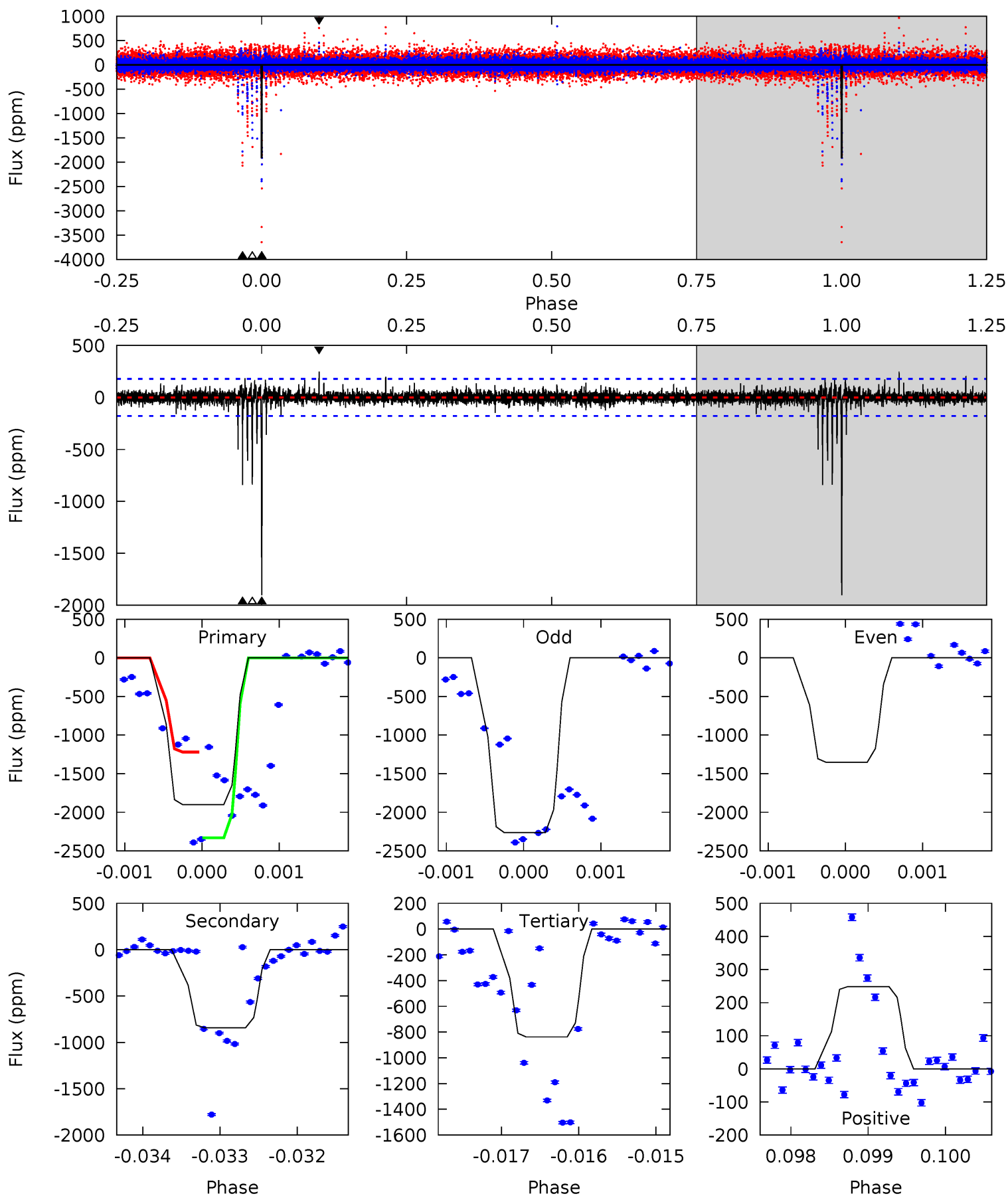
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 14.6 | 11.1 | 9.88 | 11.3 | 5.51 | 3.38 | 2.20 | 4.74 | 3.32 | 1.23 | -0.19 | 0.13 | 1.02 | 0.44 | 0.21 |



Alt Model-Shift Uniqueness Test

009273791-04, P = 279.442555 Days, E = 173.545422 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 58.8 | 26.0 | 25.9 | 7.69 | 5.52 | 3.39 | 1.24 | 32.9 | 51.1 | 0.13 | 18.4 | 11.6 | 0.86 | 0.12 | 15.3 |



Stellar Parameters For KIC 009273791

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | $M(M_{\odot})$ | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 5482^{+213}_{-174} | $3.961^{+0.570}_{-0.228}$ | $-0.180^{+0.350}_{-0.250}$ | $1.675^{+0.655}_{-0.800}$ | $0.936^{+0.111}_{-0.122}$ | $0.280^{+1.556}_{-0.150}$ |
| | +4%/-3% | +14%/-6% | +194%/-139% | +39%/-48% | +12%/-13% | +555%/-54% |
| Source | PHO54 | PHO54 | PHO54 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 009273791-04 / KOI

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|---------------|------------------------|-------------------|-----------------------|-------------------------|
| DV | -308 ± 28 | $5.60^{+5.28}_{-3.83}$ | 475^{+52}_{-66} | 4207^{+2646}_{-816} | 3551^{+31657}_{-2610} |
| Alt. | -842 ± 32 | $9.68^{+6.55}_{-5.73}$ | 474^{+52}_{-59} | 4149^{+1675}_{-605} | 3381^{+15556}_{-2217} |

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

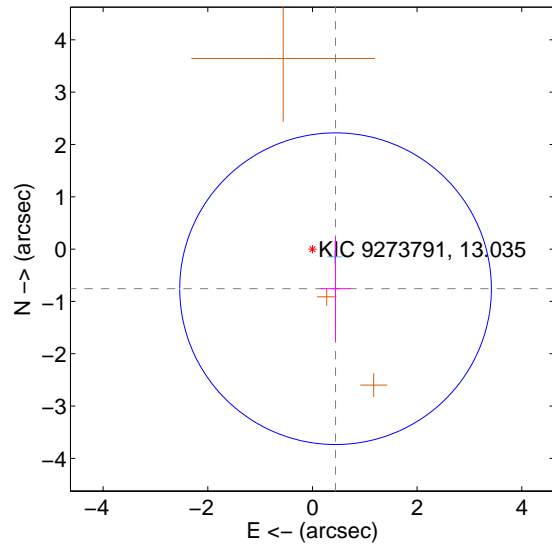
Supplemental centroid analysis for 009273791-04. Kepler magnitude: 13.04. Transit SNR 6.84

There are 1 quarters with good PRF difference image offsets

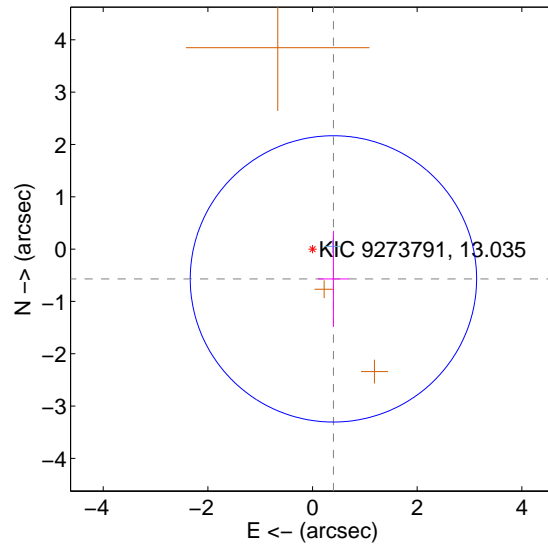
The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 0.876 ± 0.993 | 0.88 | -0.442 ± 0.285 | -0.757 ± 0.992 |
| PRF-fit source offset from KIC position | 0.695 ± 0.912 | 0.76 | -0.399 ± 0.296 | -0.569 ± 0.916 |
| photometric centroid source offset | 0.94 ± 0.58 | 1.63 | 0.94 ± 0.58 | 0.05 ± 0.55 |

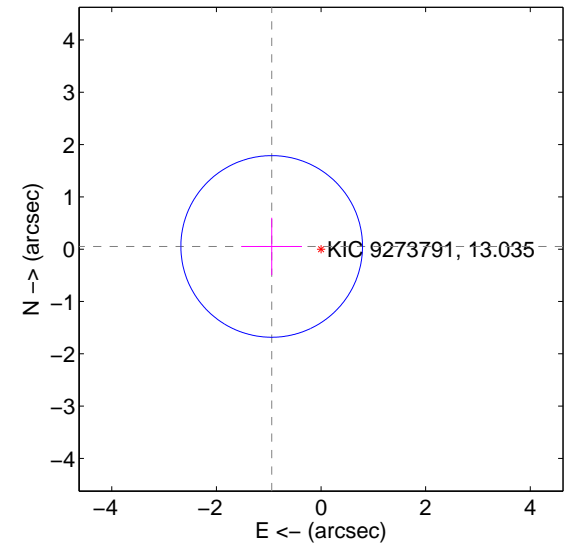
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

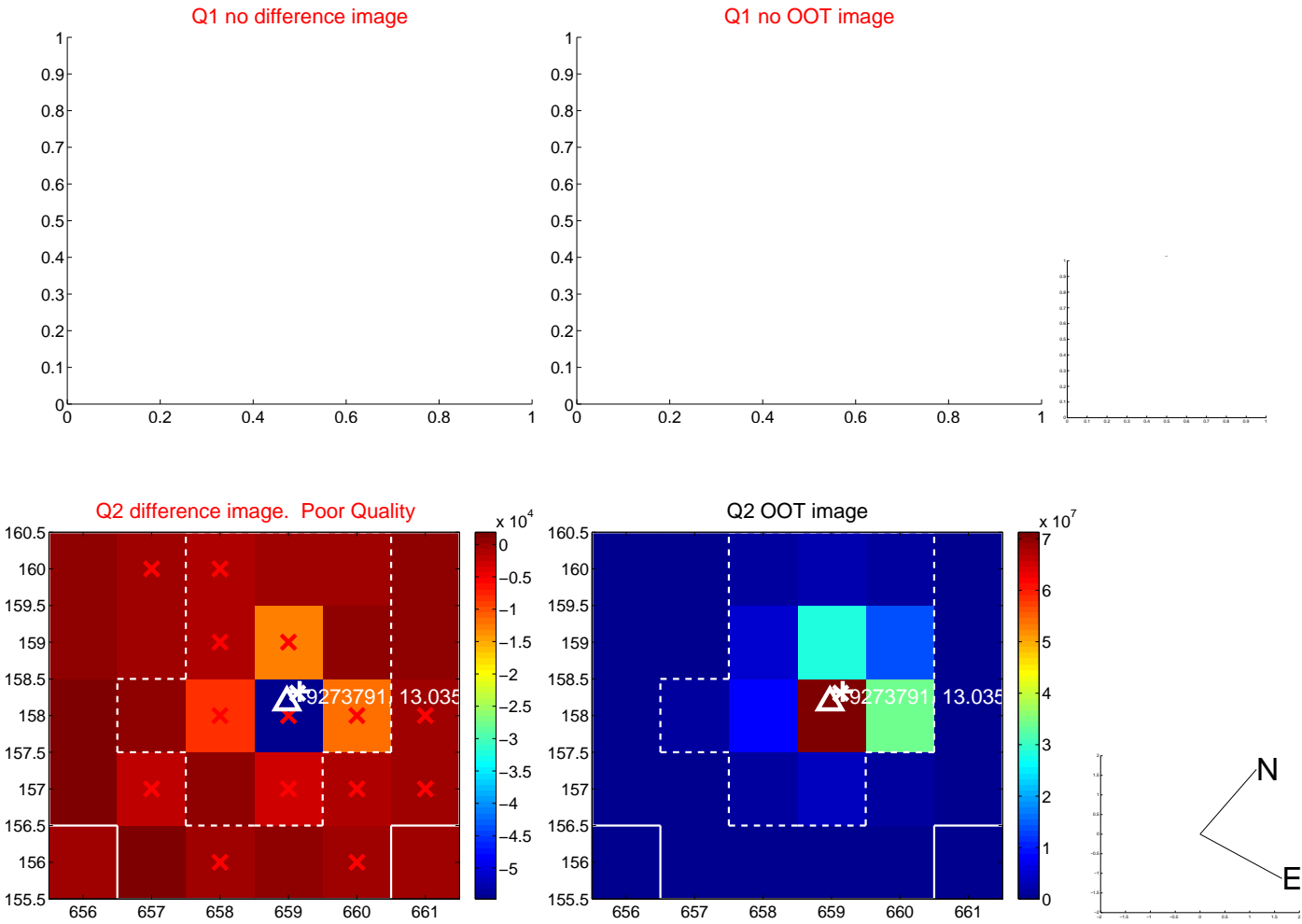


offset from photometric centroids

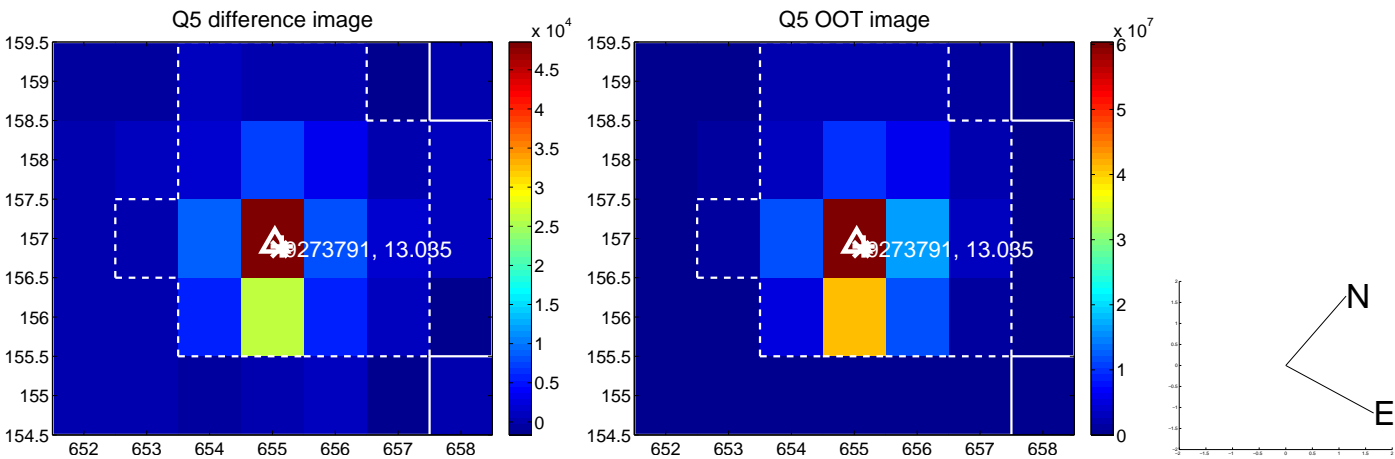


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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



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.

Q9 no difference image



Q9 no OOT image



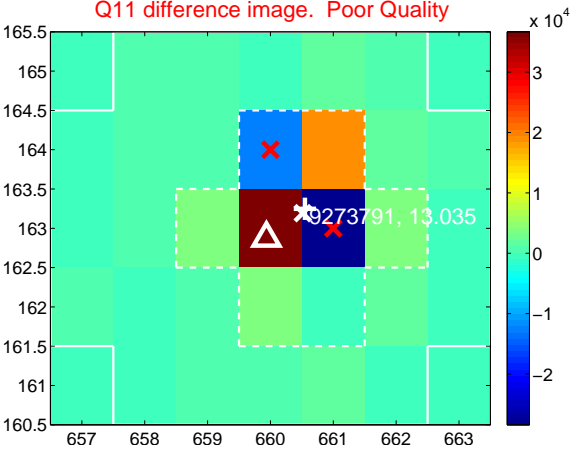
Q10 no difference image



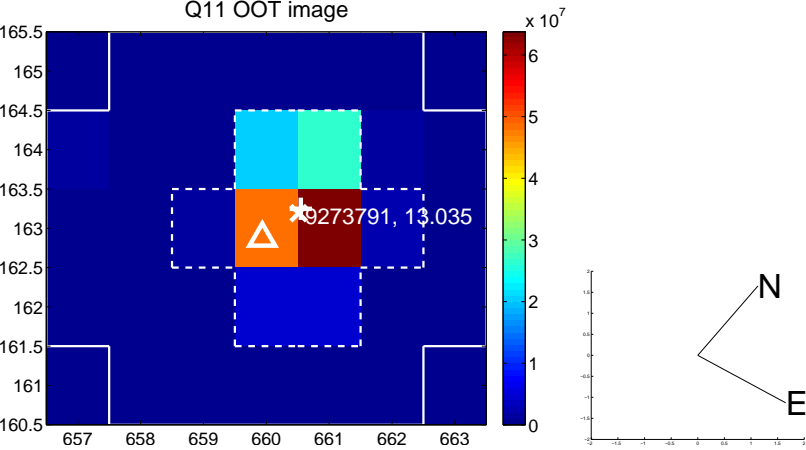
Q10 no OOT image



Q11 difference image. Poor Quality



Q11 OOT image



Q12 no difference image



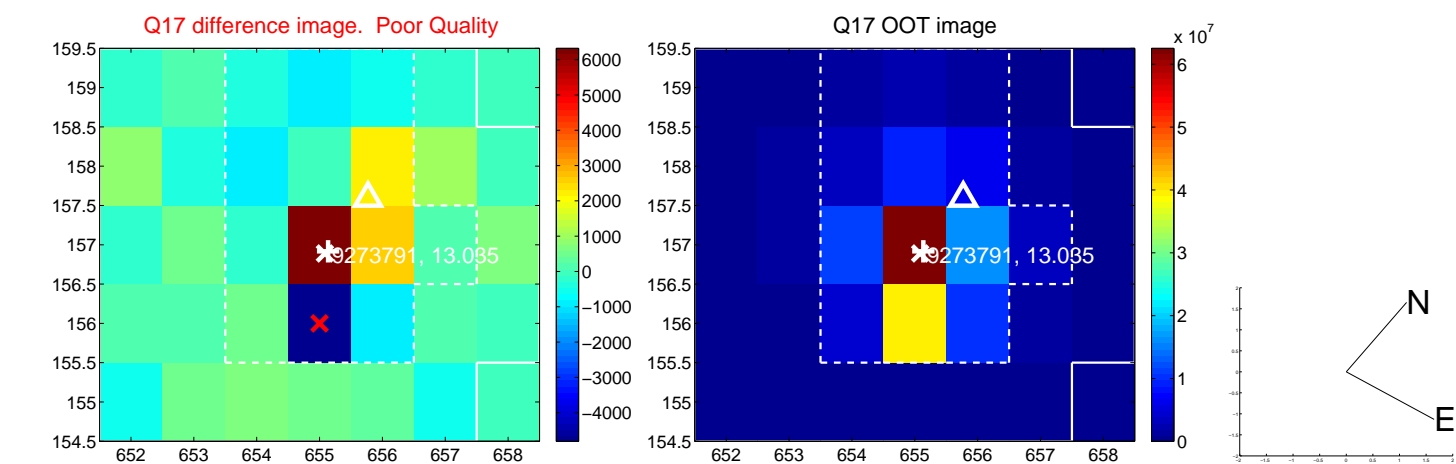
Q12 no OOT image



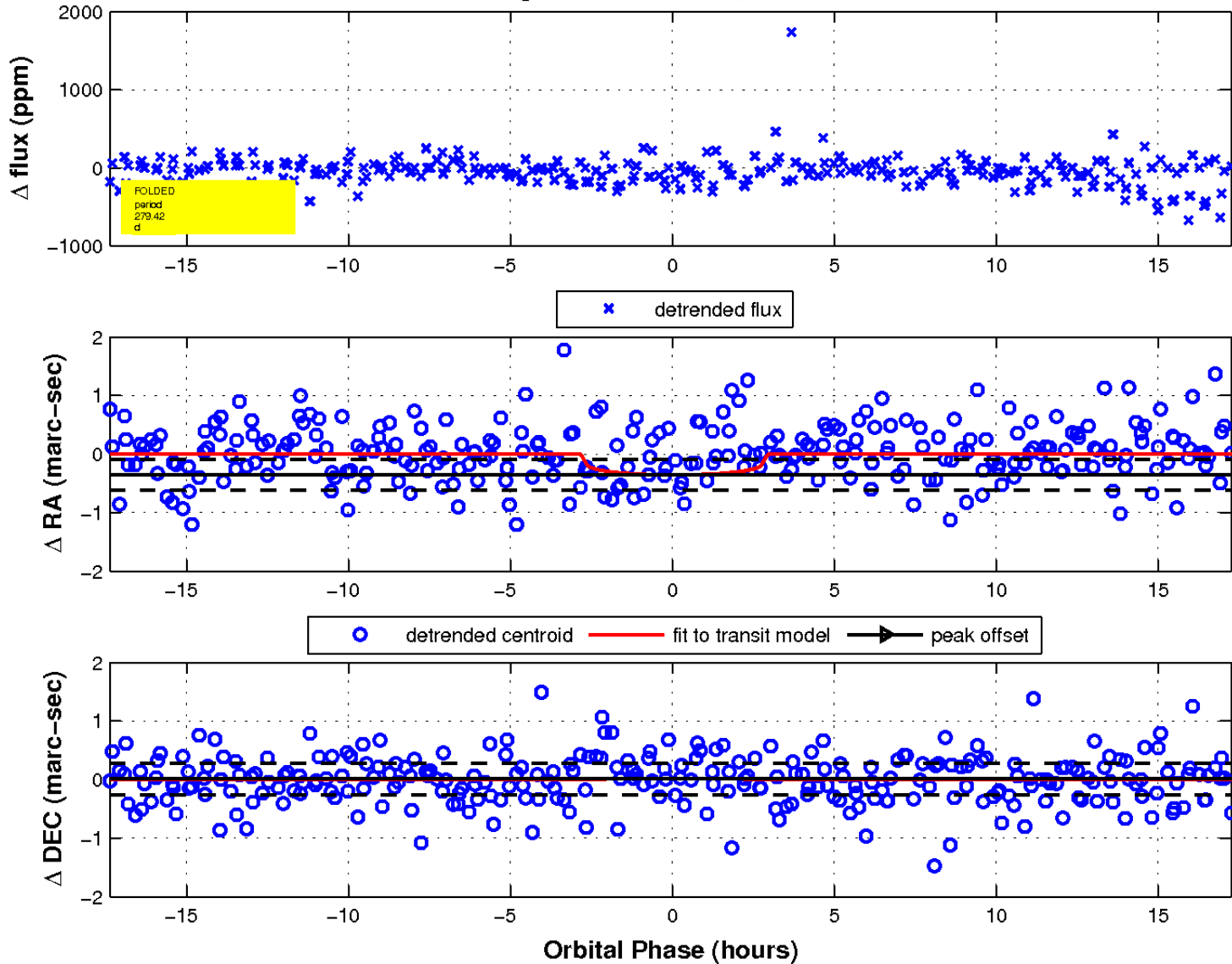
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 4 of 4



UKIRT Image

Declination

