

KIC 008623053

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 008623053-01 | OBS | No | 416.258006 | 186.797614 | 120.8 | 17.758 | 9.1 | 9.0 | 1.36 | 5745 | 1.67 | 1.64 |
| 008623053-02 | OBS | No | 605.840712 | 138.316170 | 149.2 | 20.182 | 8.4 | 8.7 | 1.36 | 5745 | 1.79 | 0.99 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|---|
| 008623053-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS |
| 008623053-02 | OBS | FP | 0.00 | 1 | 0 | 1 | 0 | INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST |

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

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

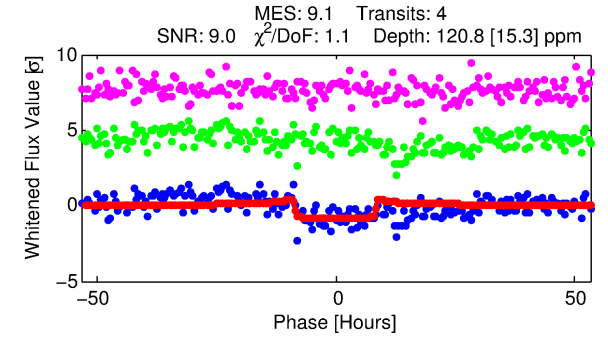
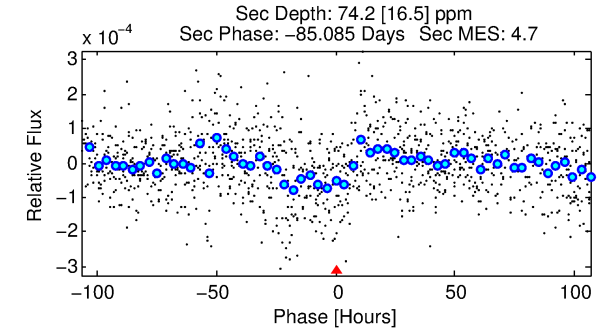
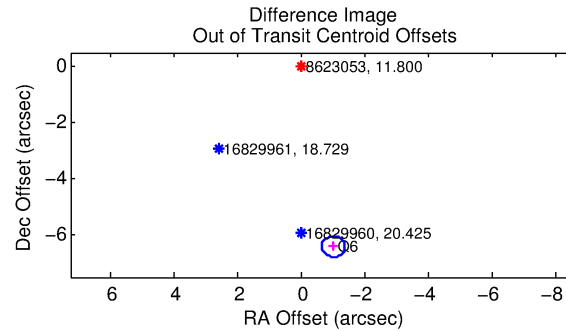
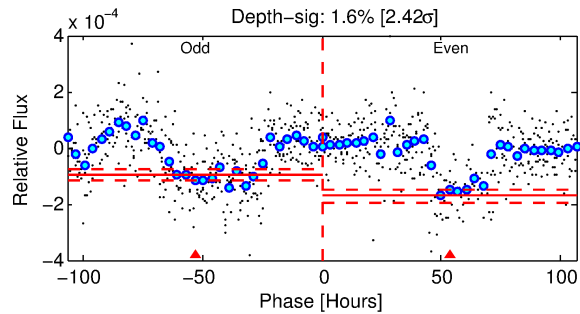
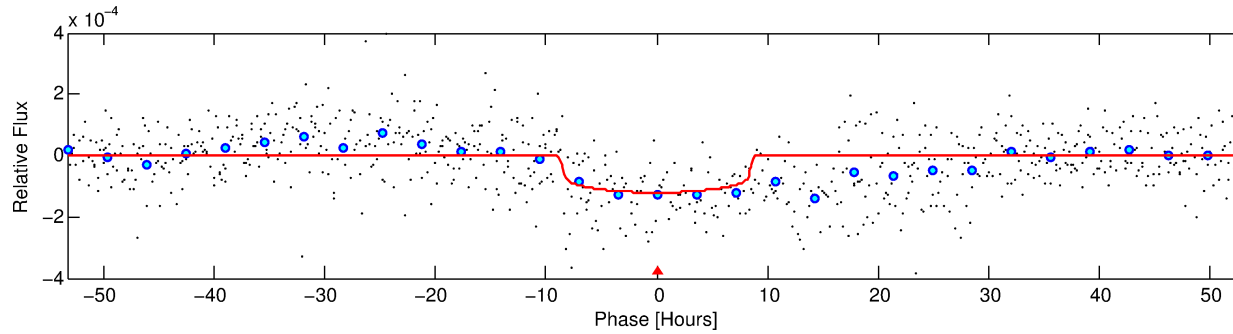
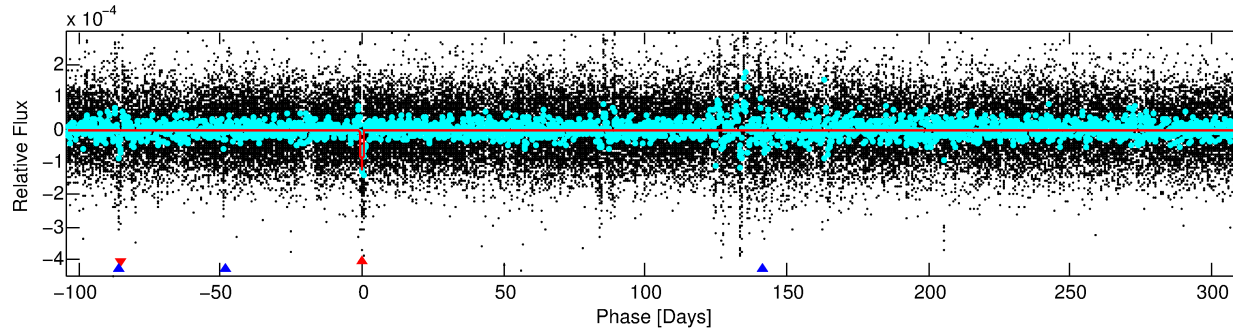
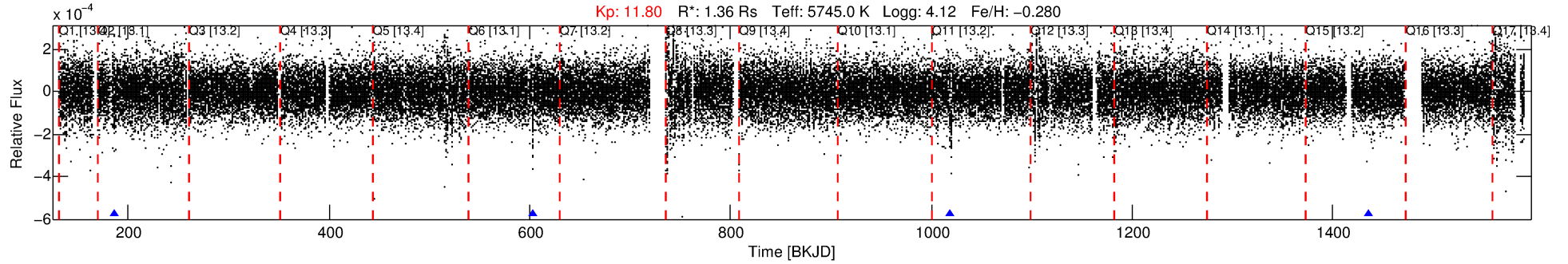
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008623053-01

No Significant Match Found

DV One-Page Summary

KIC: 8623053 Candidate: 1 of 2 Period: 416.258 d



DV Fit Results:

Period = 416.25801 [0.01012] d
Epoch = 186.7976 [0.0171] BKJD
 $R_p/R^* = 0.0113$ [0.0023]
 $a/R^* = 105.22$ [95.13]
 $b = 0.82$ [0.36]
 $\text{Seff} = 1.64$ [1.06]
 $T_{\text{eq}} = 288$ [47] K
 $R_p = 1.67$ [0.68] R_{e}
 $a = 1.0466$ [0.3942] AU
 $\text{Ag} = 16022.02$ [12588.28] [1.27 σ]
 $T_{\text{eff}} = 5018$ [603] K [7.8 σ]

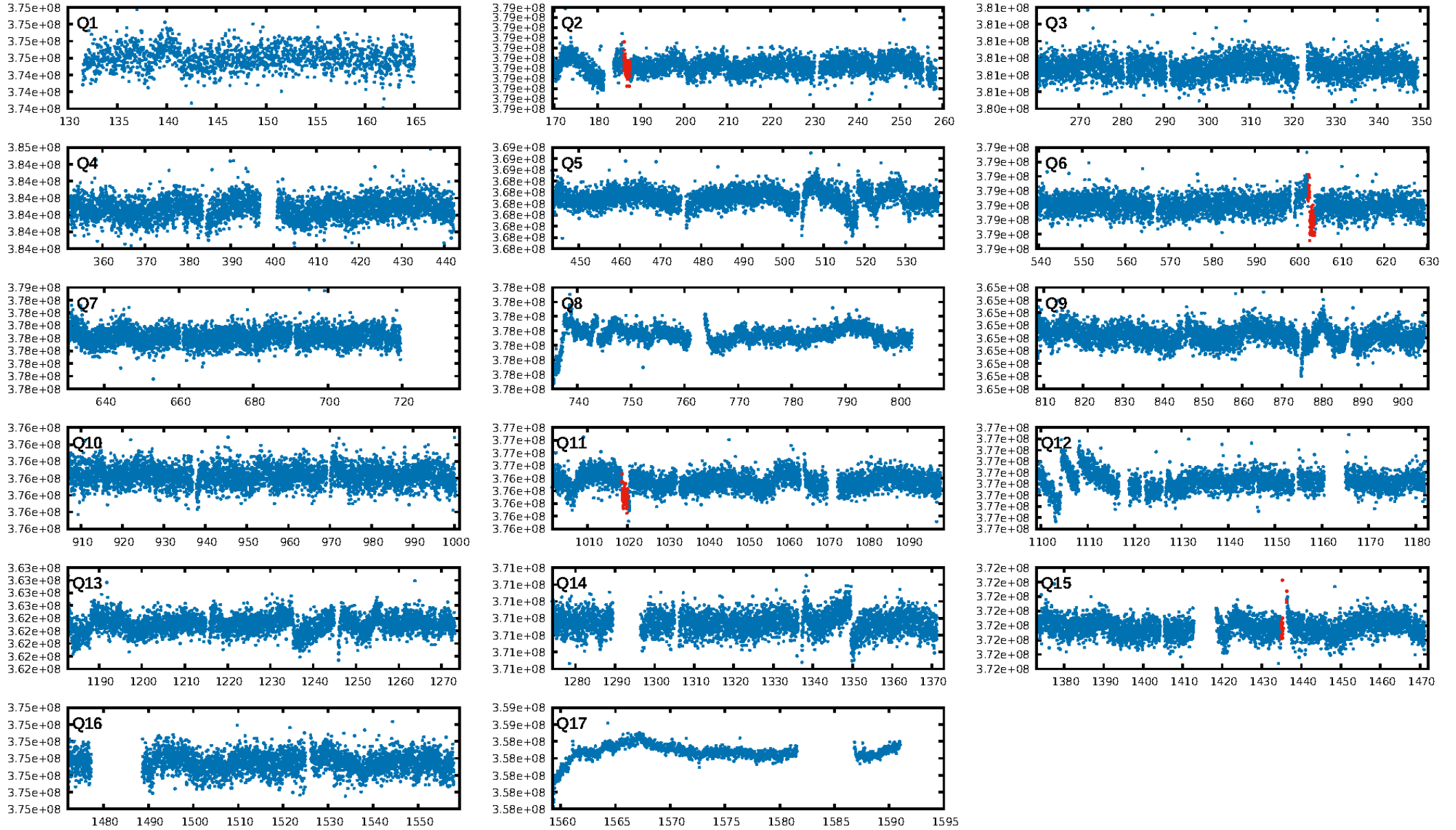
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [169.25 σ]
ModelChiSquare2-sig: 12.3%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 6.27e-13
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: -1.383
Centroid-sig: 39.5%
Centroid-so: 3.184 arcsec [2.06 σ]
OotOffset-rm: 6.498 arcsec [52.50 σ]
KicOffset-rm: 6.661 arcsec [53.85 σ]
OotOffset-st: 1/0/0/0 [1]
KicOffset-st: 1/0/0/0 [1]
DiffImageQuality-fgm: 1.00 [1/1]
DiffImageOverlap-fno: 1.00 [3/3]

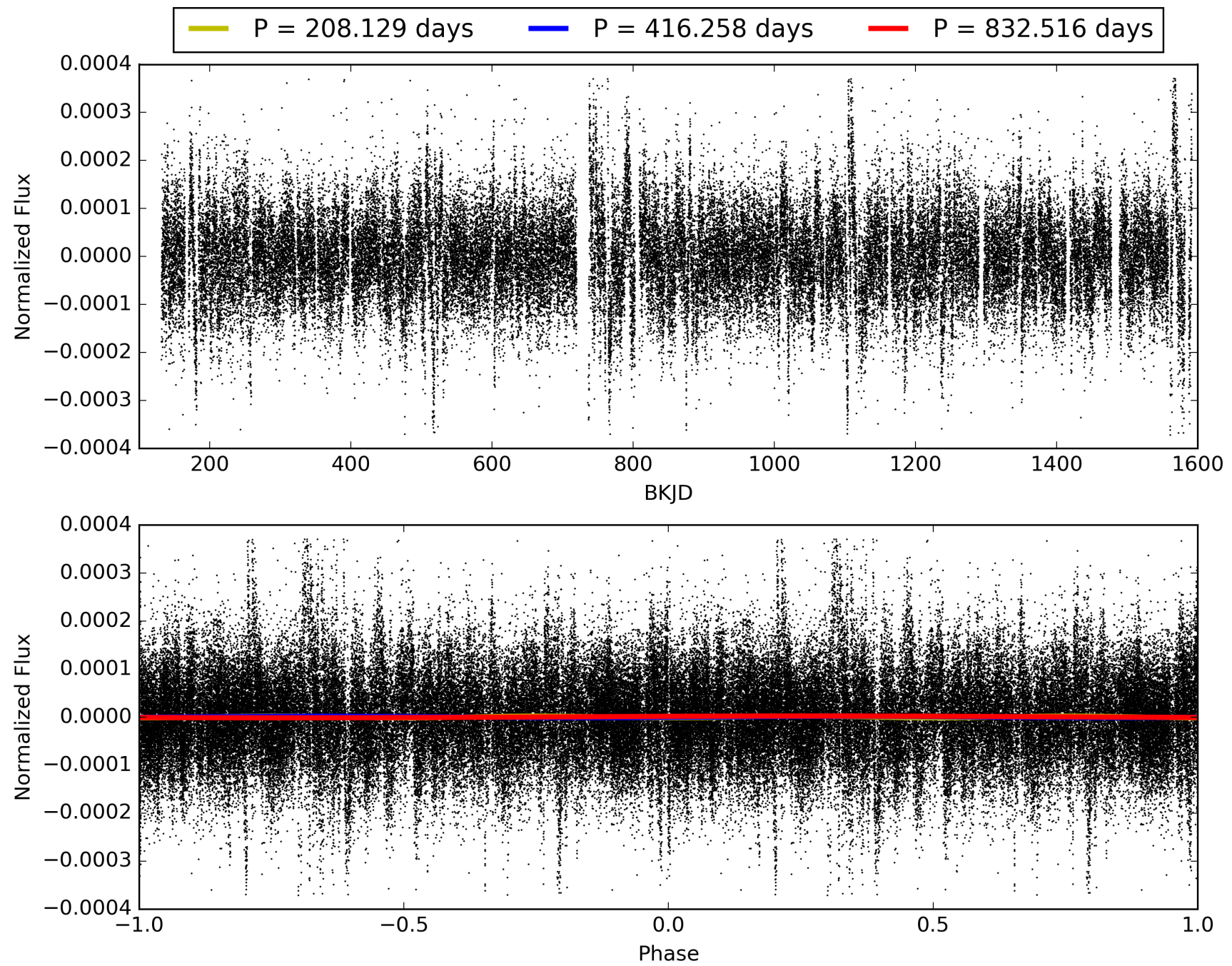
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 18:26:31 Z

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

TCE 008623053-01, PDC Light Curves

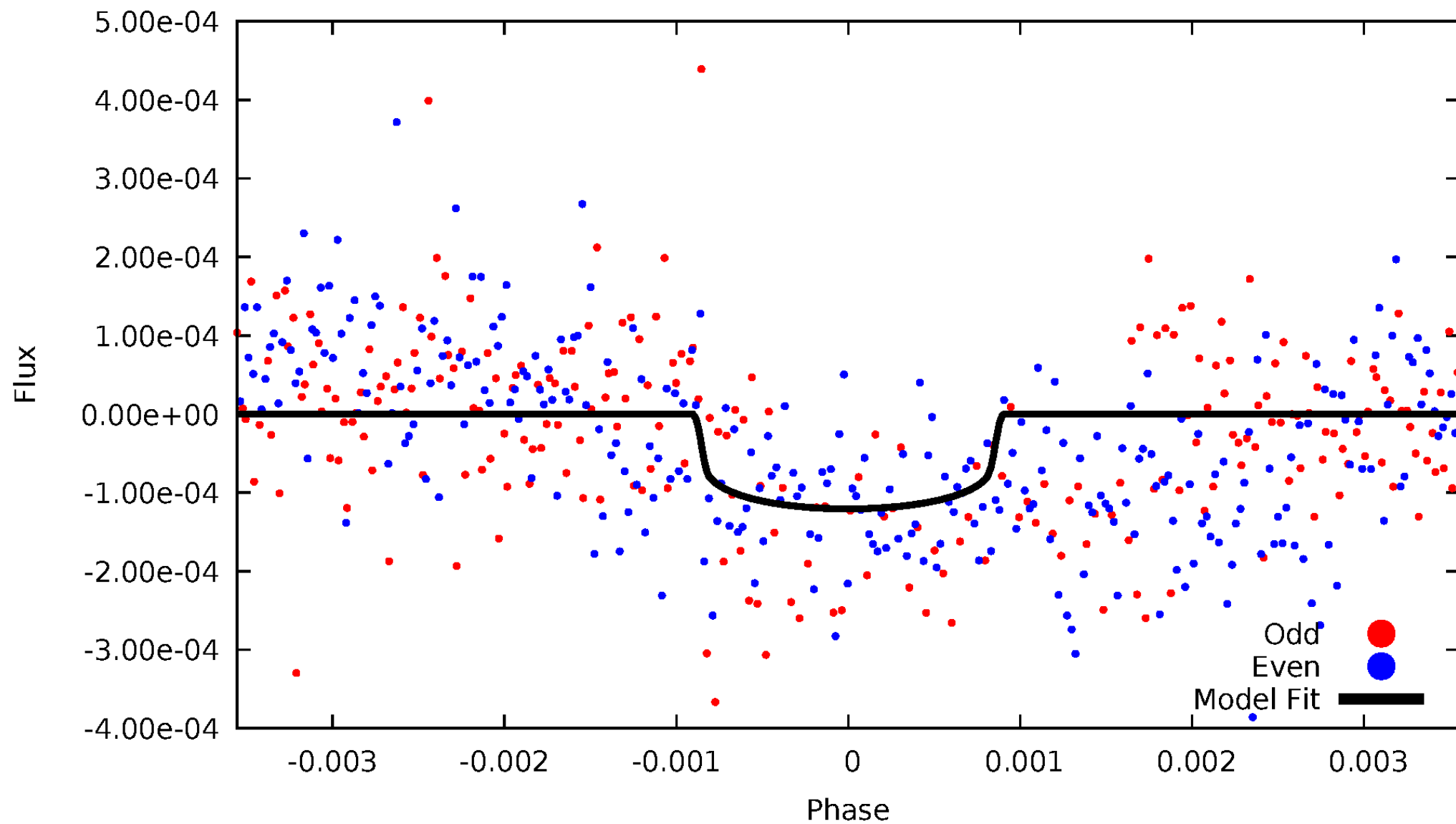


TCE 008623053-01



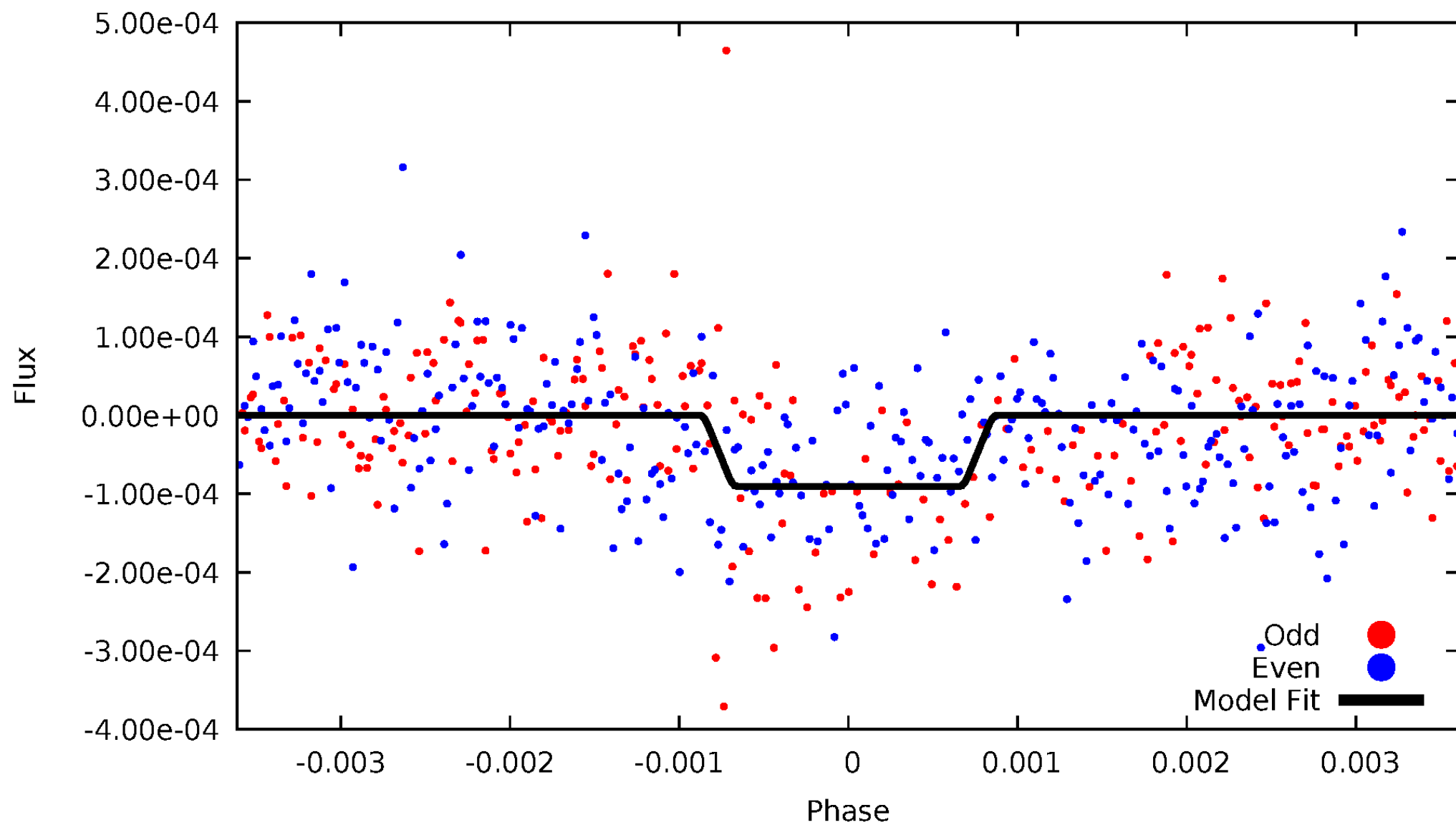
DV Odd/Even

TCE 008623053-01



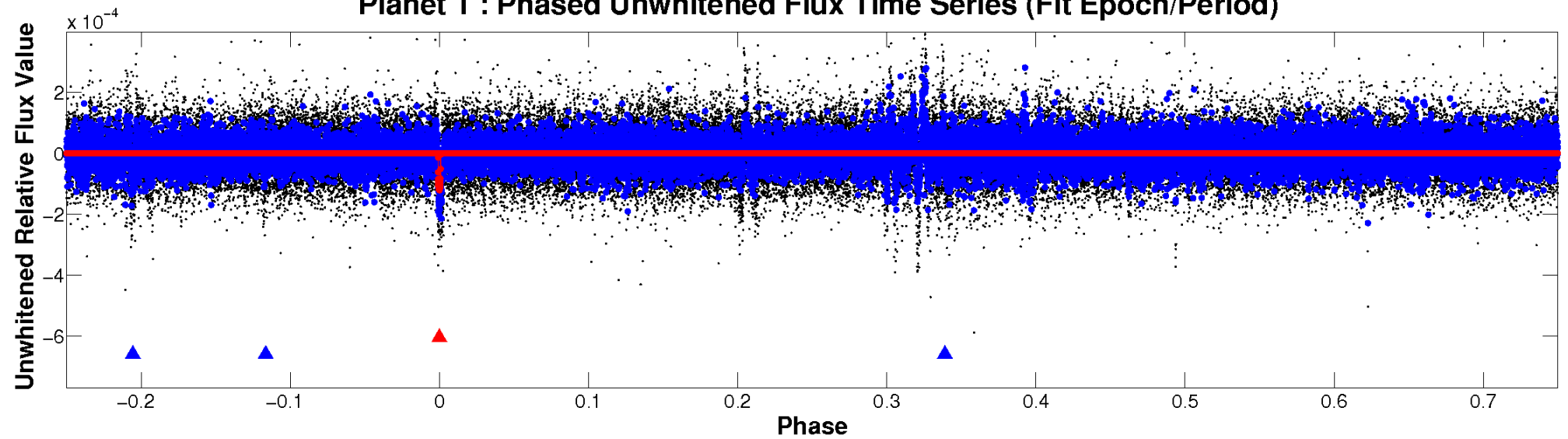
ALT Odd/Even

TCE 008623053-01

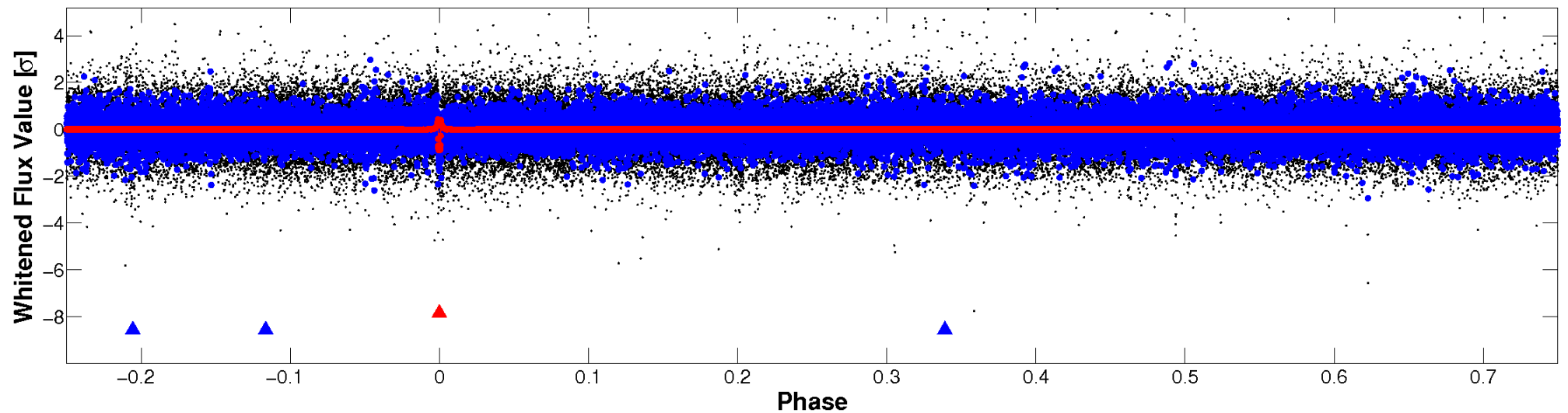


Non-Whitened Vs. Whitened Light Curve

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

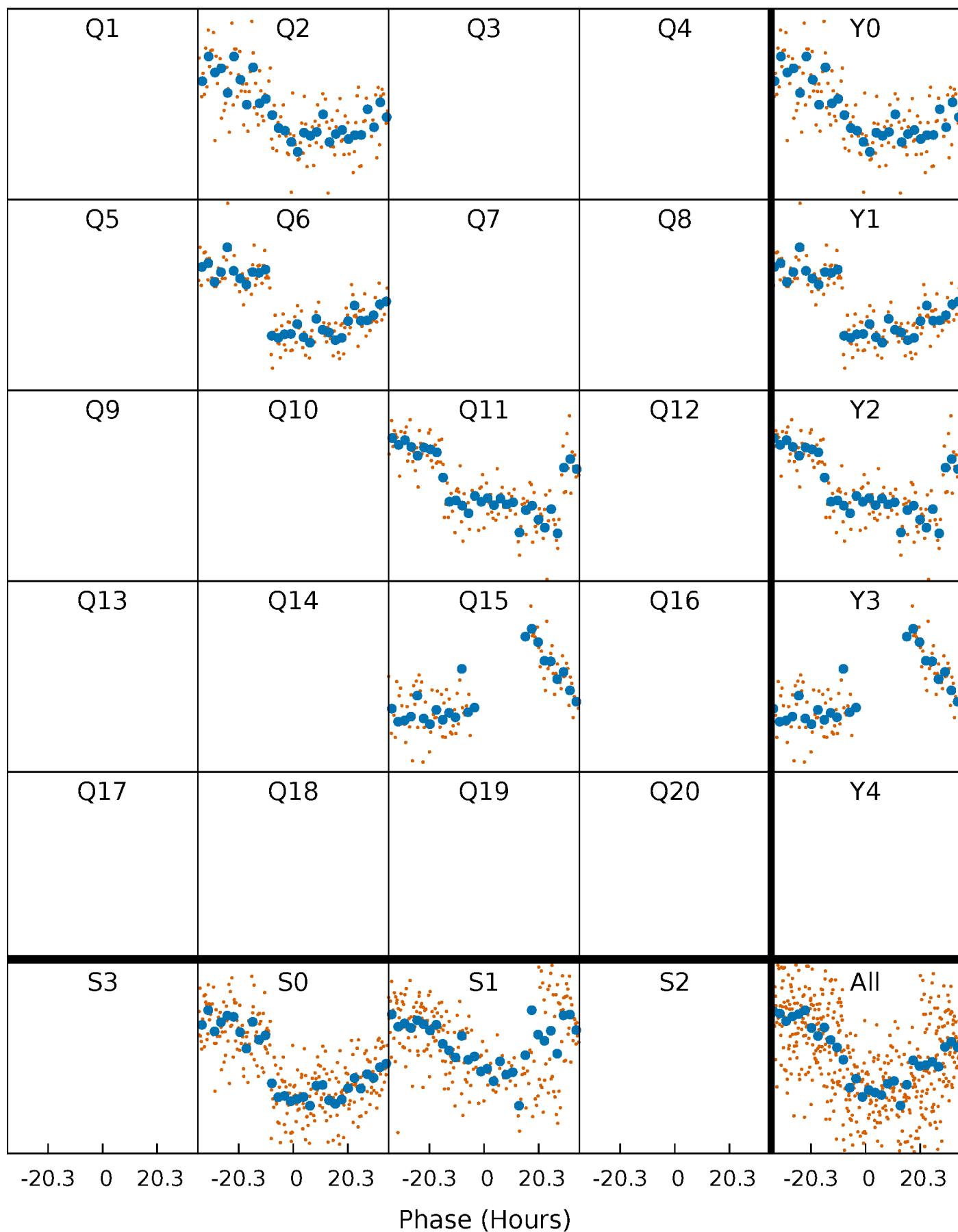


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



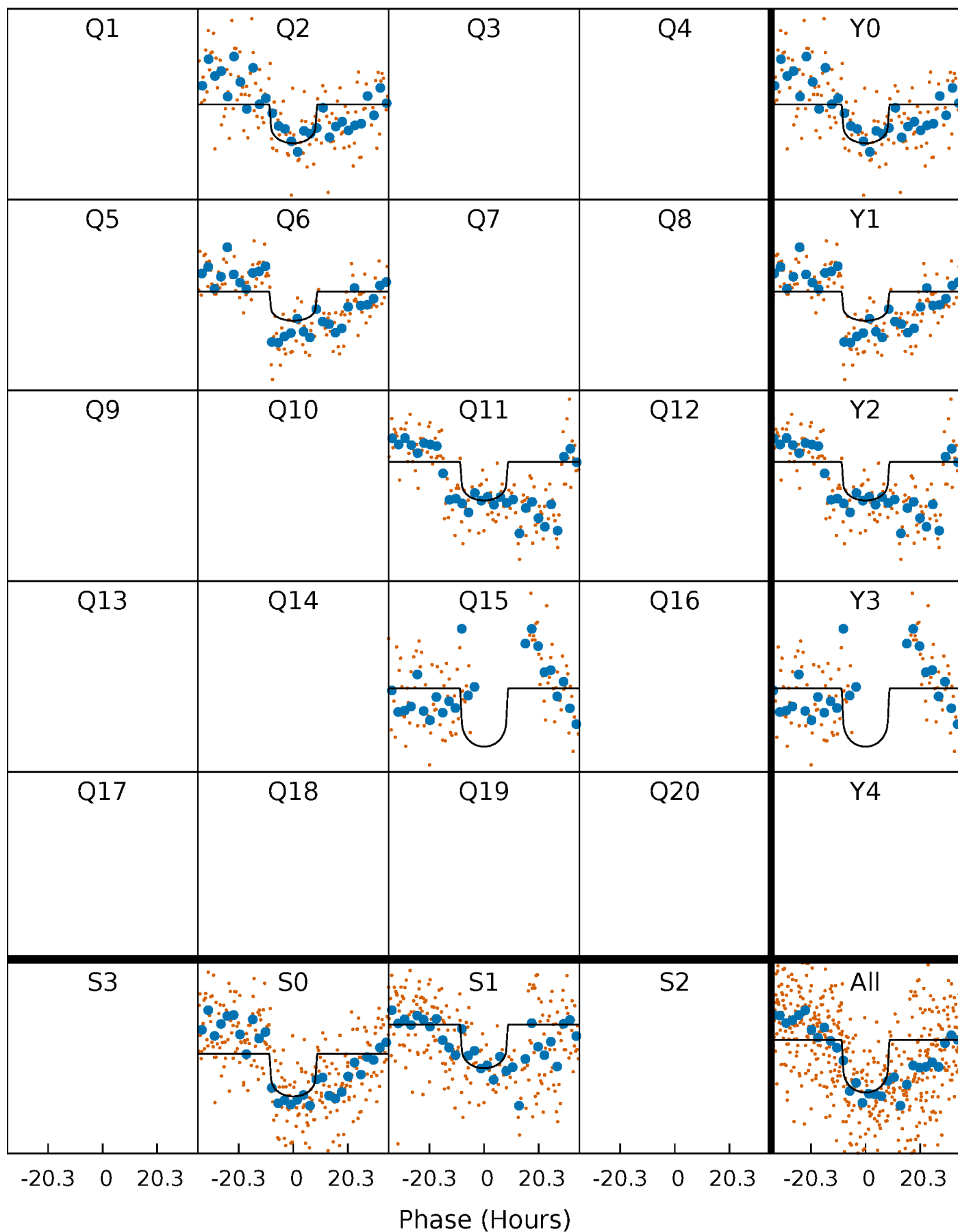
PDC Quarter-Phased Transit Curves

TCE 008623053-01 P=416.258006 Days $T_0=186.797614$ (BKJD)



DV Quarter-Phased Transit Curves

TCE 008623053-01 P=416.258006 Days $T_0=186.797614$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

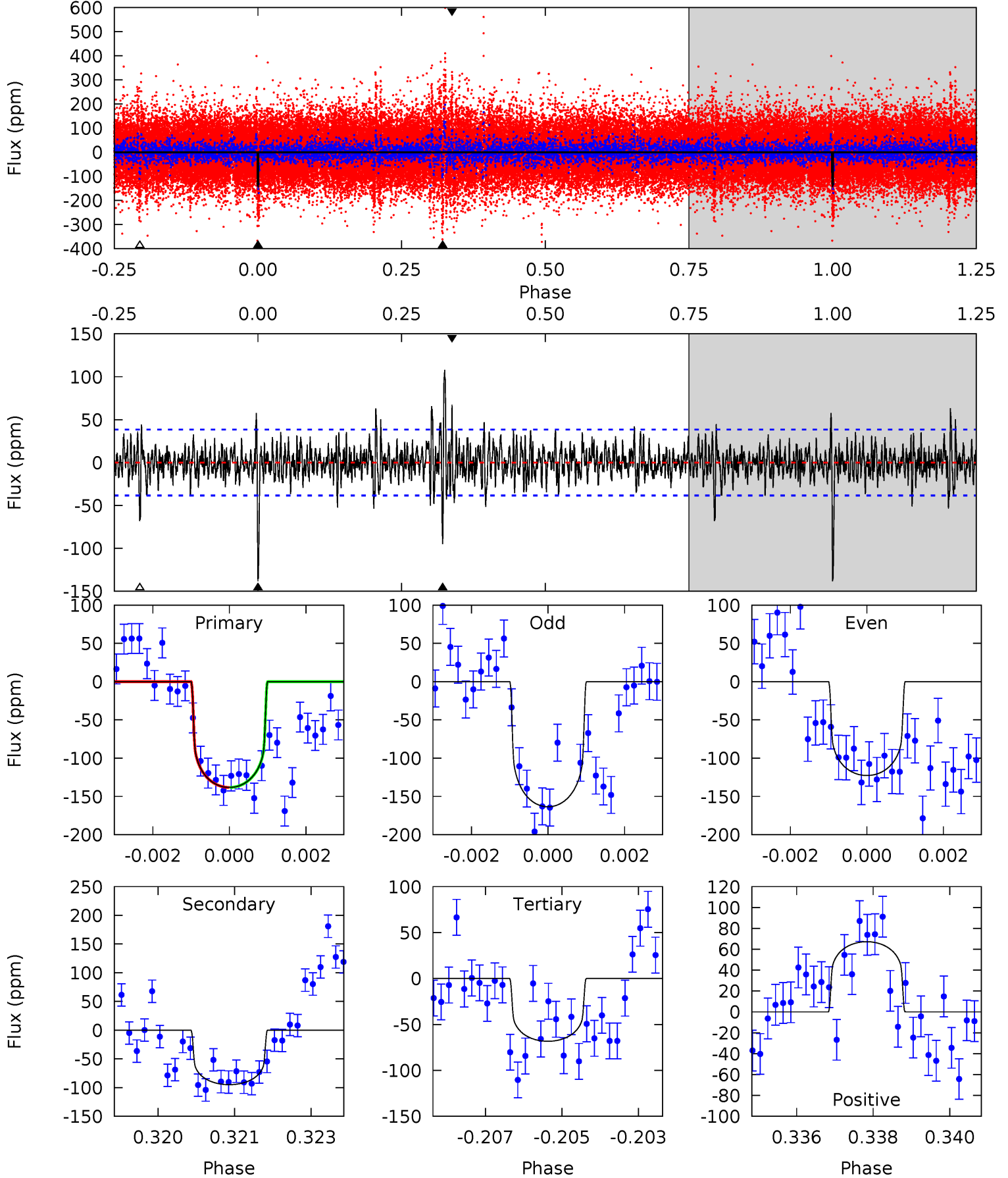
TCE 008623053-01 P=416.238428 Days $T_0=186.800543$ (BKJD)



DV Model-Shift Uniqueness Test

008623053-01, P = 416.258006 Days, E = 186.797614 Days

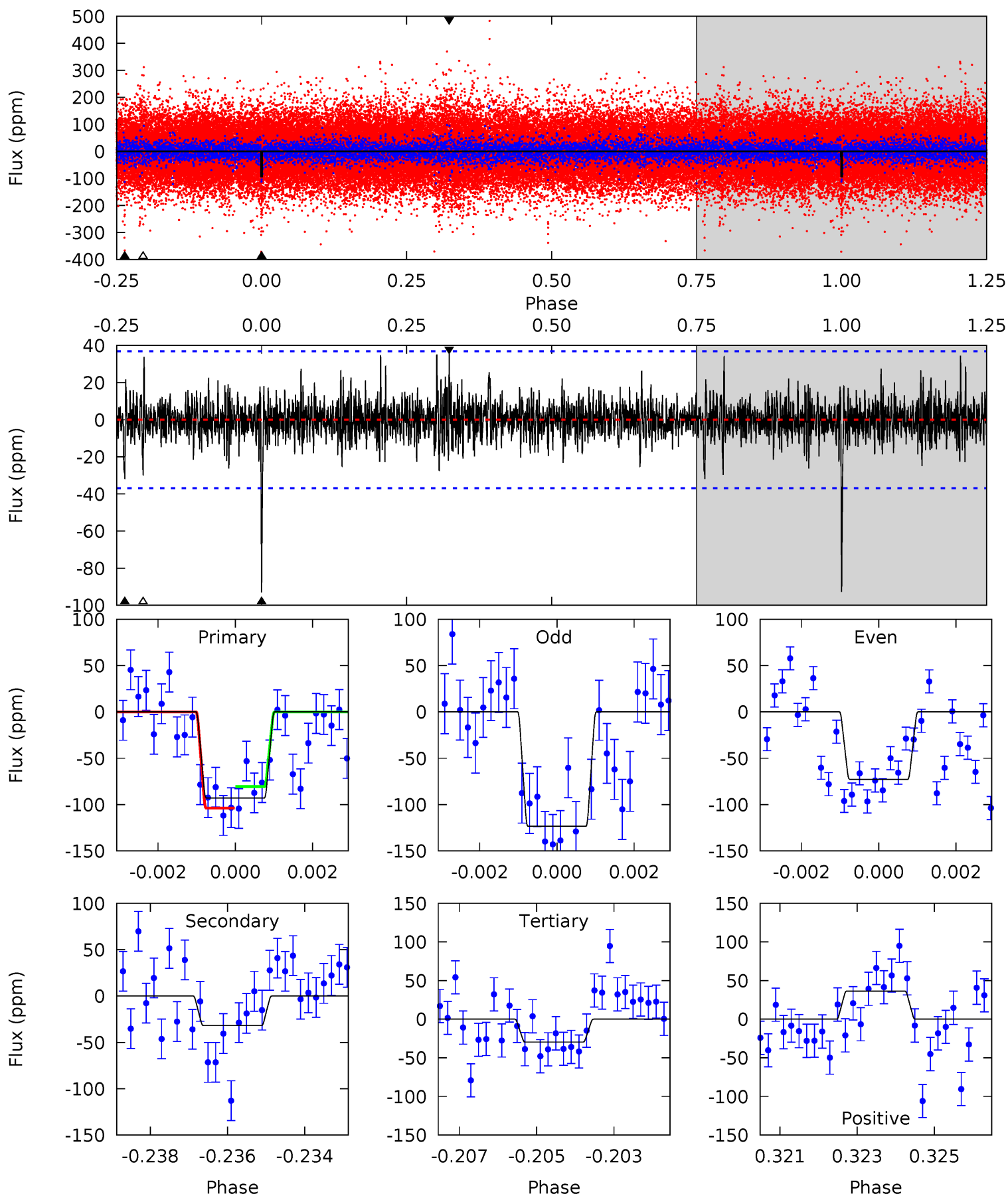
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 19.2 | 13.2 | 9.50 | 9.35 | 5.34 | 3.12 | 2.29 | 9.72 | 9.88 | 3.70 | 3.85 | 2.77 | 0.87 | 0.44 | 0.00 |



Alt Model-Shift Uniqueness Test

008623053-01, P = 416.238428 Days, E = 186.800543 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 13.5 | 4.62 | 4.29 | 5.28 | 5.35 | 3.13 | 1.13 | 9.17 | 8.19 | 0.33 | -0.65 | 3.59 | 0.88 | 0.28 | 1.67 |



Stellar Parameters For KIC 008623053

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 5745^{+189}_{-172} | $4.119^{+0.385}_{-0.165}$ | $-0.280^{+0.300}_{-0.250}$ | $1.356^{+0.388}_{-0.475}$ | $0.883^{+0.131}_{-0.087}$ | $0.499^{+1.404}_{-0.237}$ |
| | +3%/-3% | +9%/-4% | +107%/-89% | +29%/-35% | +15%/-10% | +281%/-48% |
| 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 008623053-01 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{max} (K)$ | $T_{obs} (K)$ | A_{obs} |
|---------|-------------|------------------------|-------------------|----------------------|--------------------------|
| DV | -95 ± 7 | $1.60^{+0.47}_{-0.46}$ | 396^{+36}_{-40} | 5374^{+669}_{-438} | 22880^{+21747}_{-9512} |
| Alt. | -32 ± 7 | $1.36^{+0.44}_{-0.40}$ | 398^{+32}_{-39} | 4582^{+568}_{-408} | 10603^{+11331}_{-4801} |

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

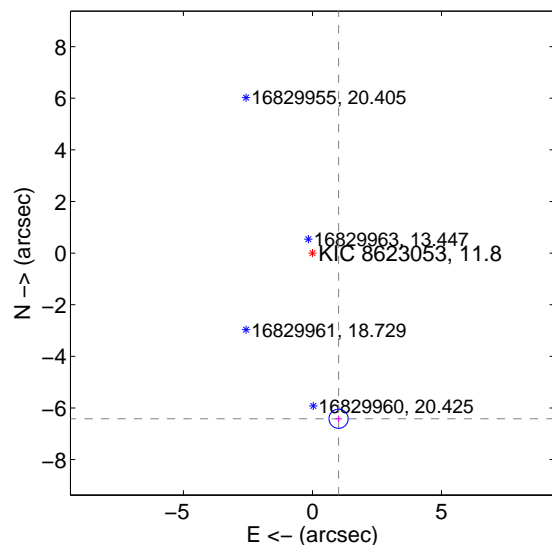
Supplemental centroid analysis for 008623053-01. **Kepler magnitude: 11.80.** Transit SNR 8.97

There are 1 quarters with good PRF difference image offsets

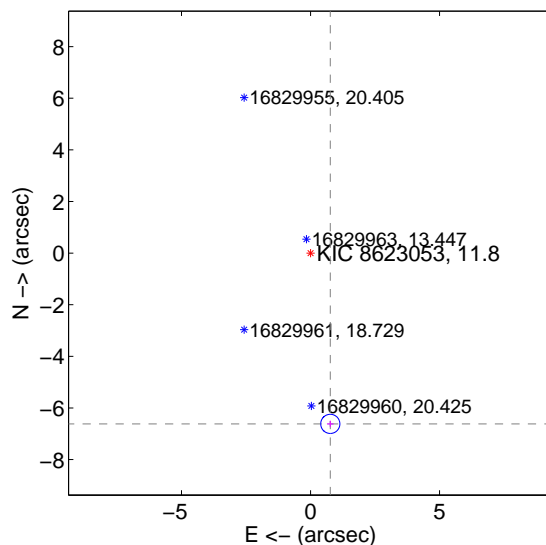
The direct PRF centroid is offset from the target star catalog position by about 0.32 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|-------------------------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 6.498 ± 0.124 | 52.50 | -1.013 ± 0.130 | -6.418 ± 0.124 |
| PRF-fit source offset from KIC position | 6.661 ± 0.124 | 53.85 | -0.766 ± 0.130 | -6.617 ± 0.124 |
| photometric centroid source offset | 3.18 ± 1.54 | 2.06 | 0.74 ± 1.16 | -3.10 ± 1.56 |

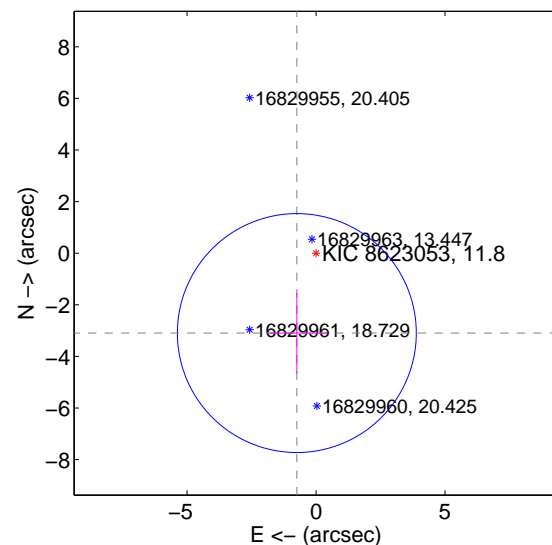
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

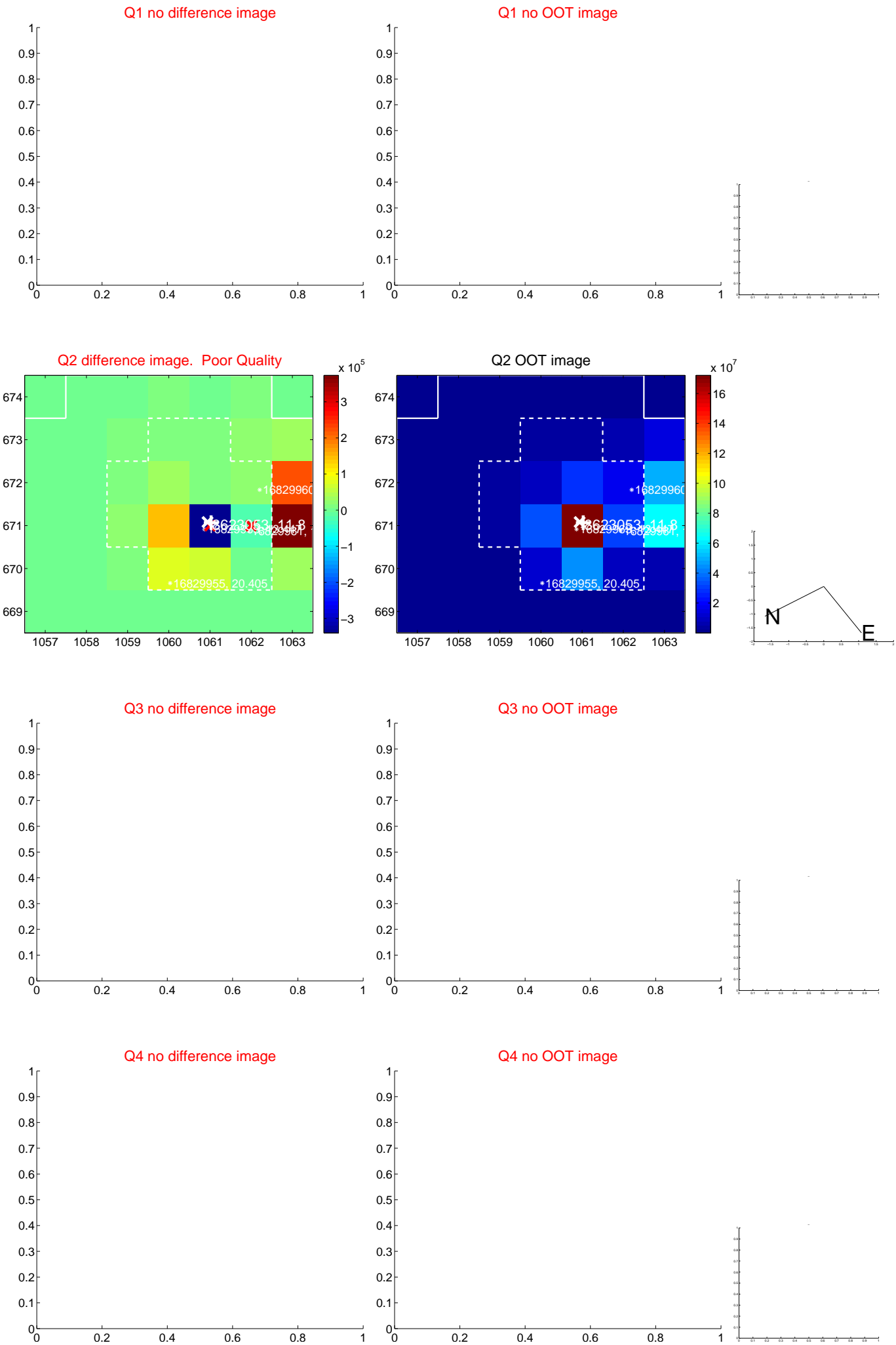


offset from photometric centroids

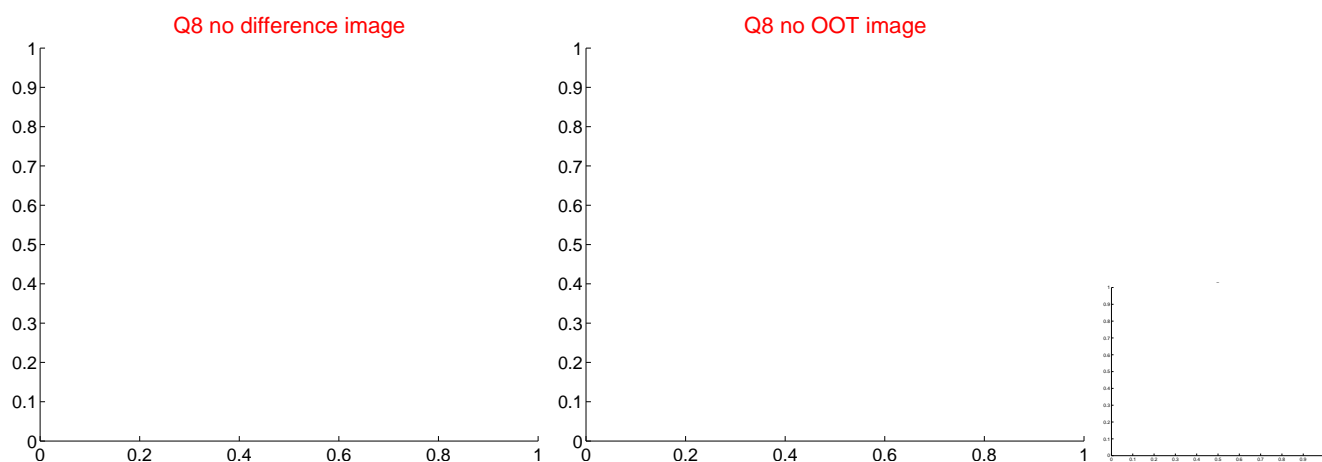
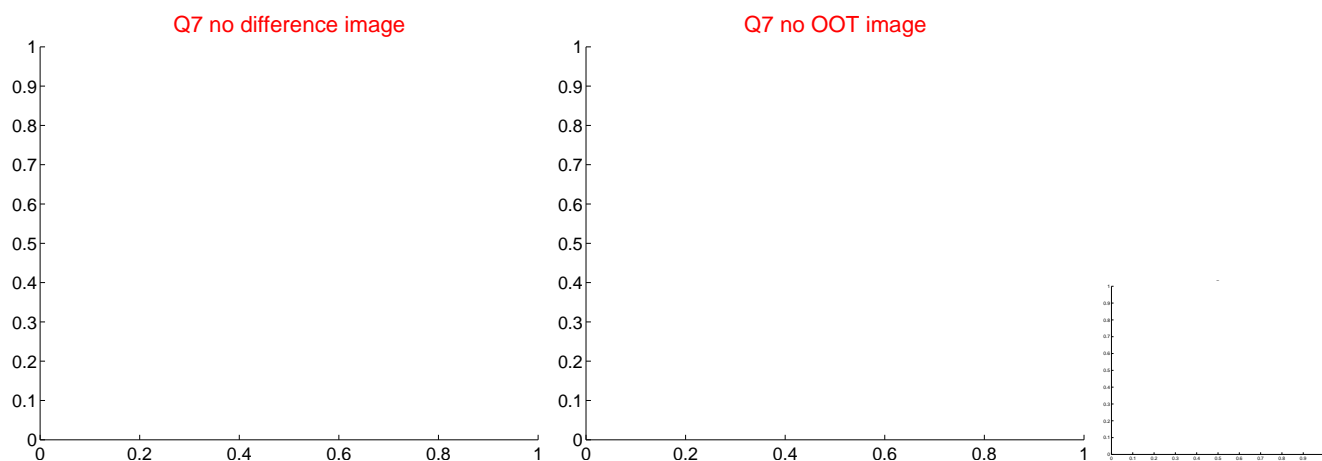
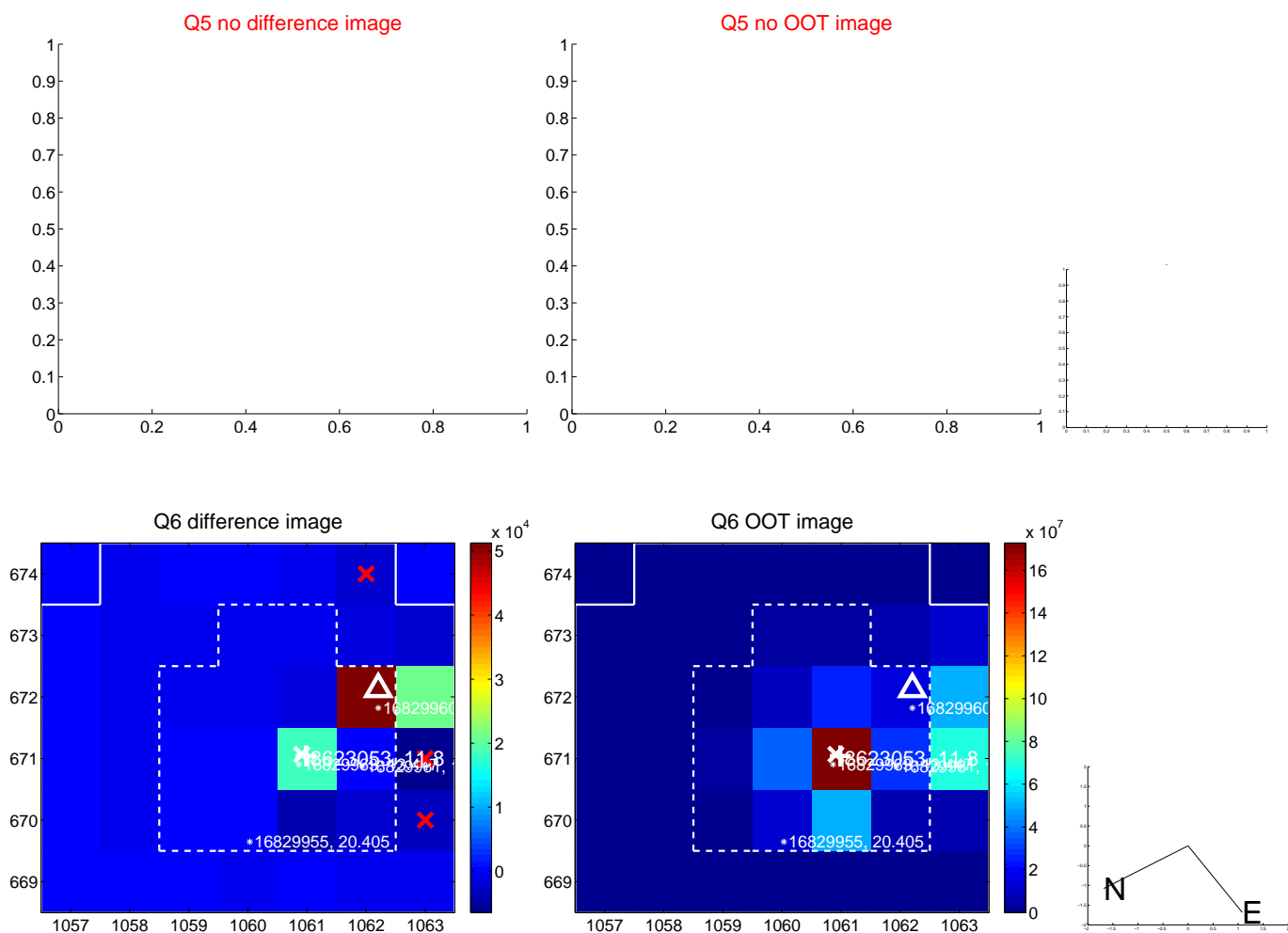


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

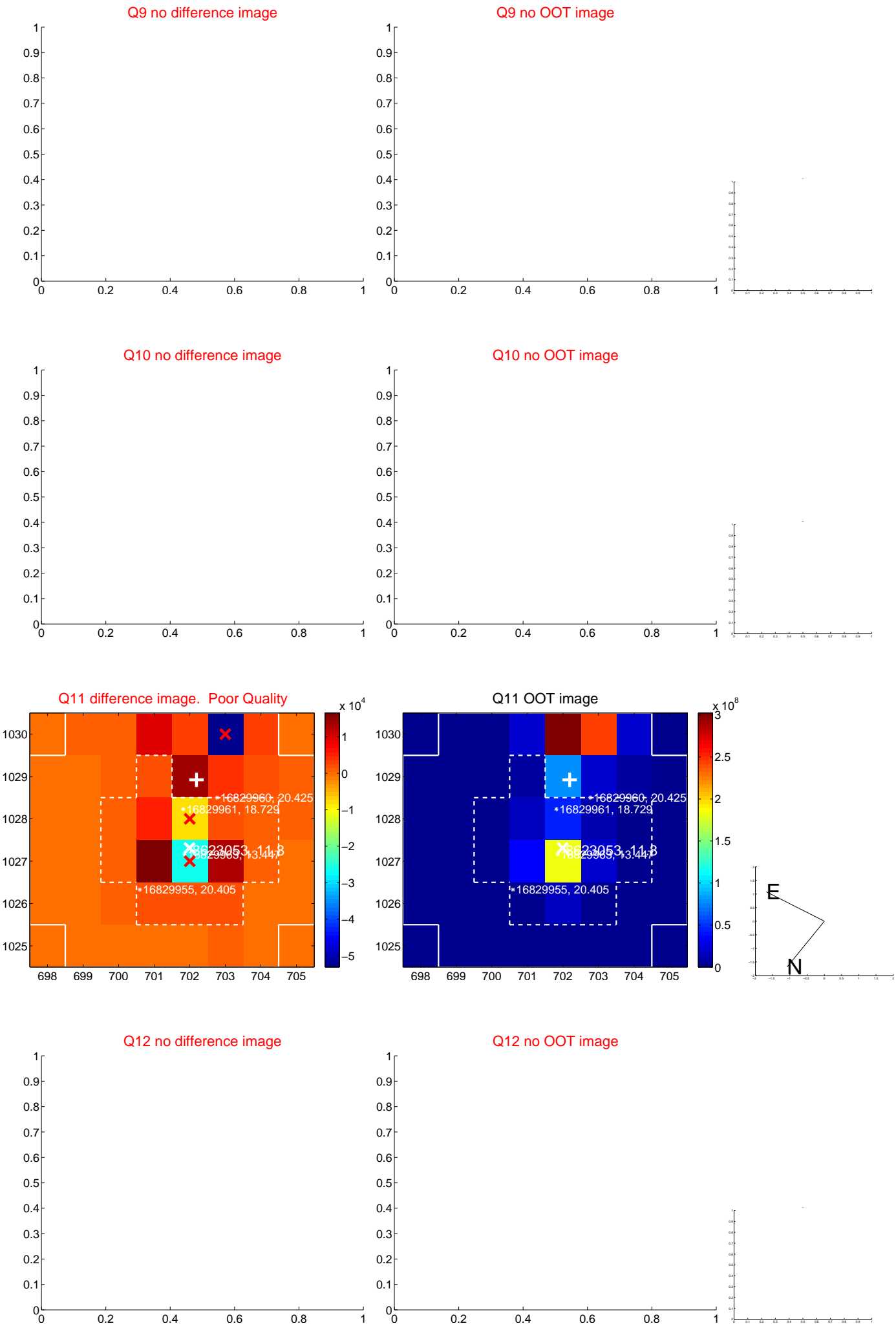
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



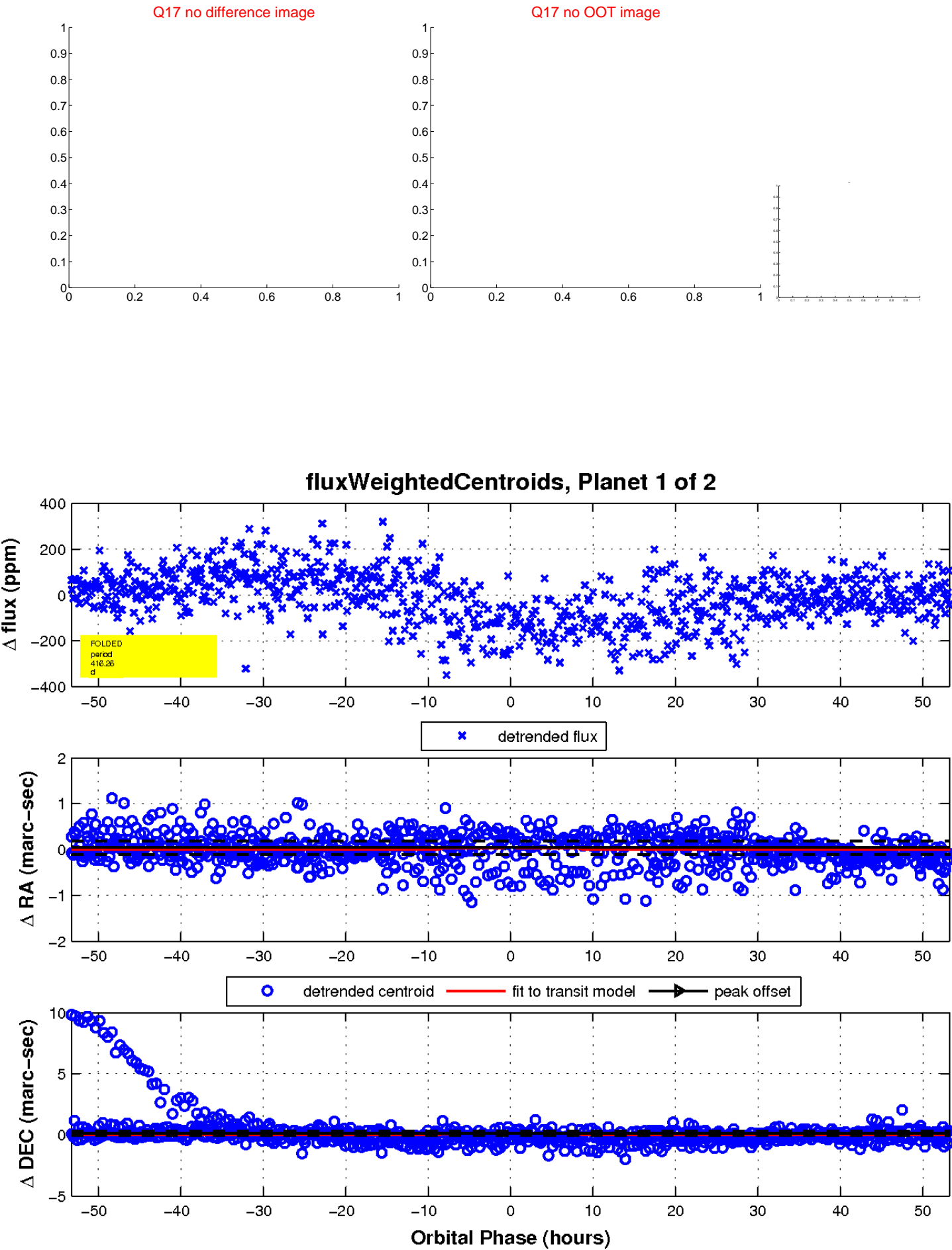
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



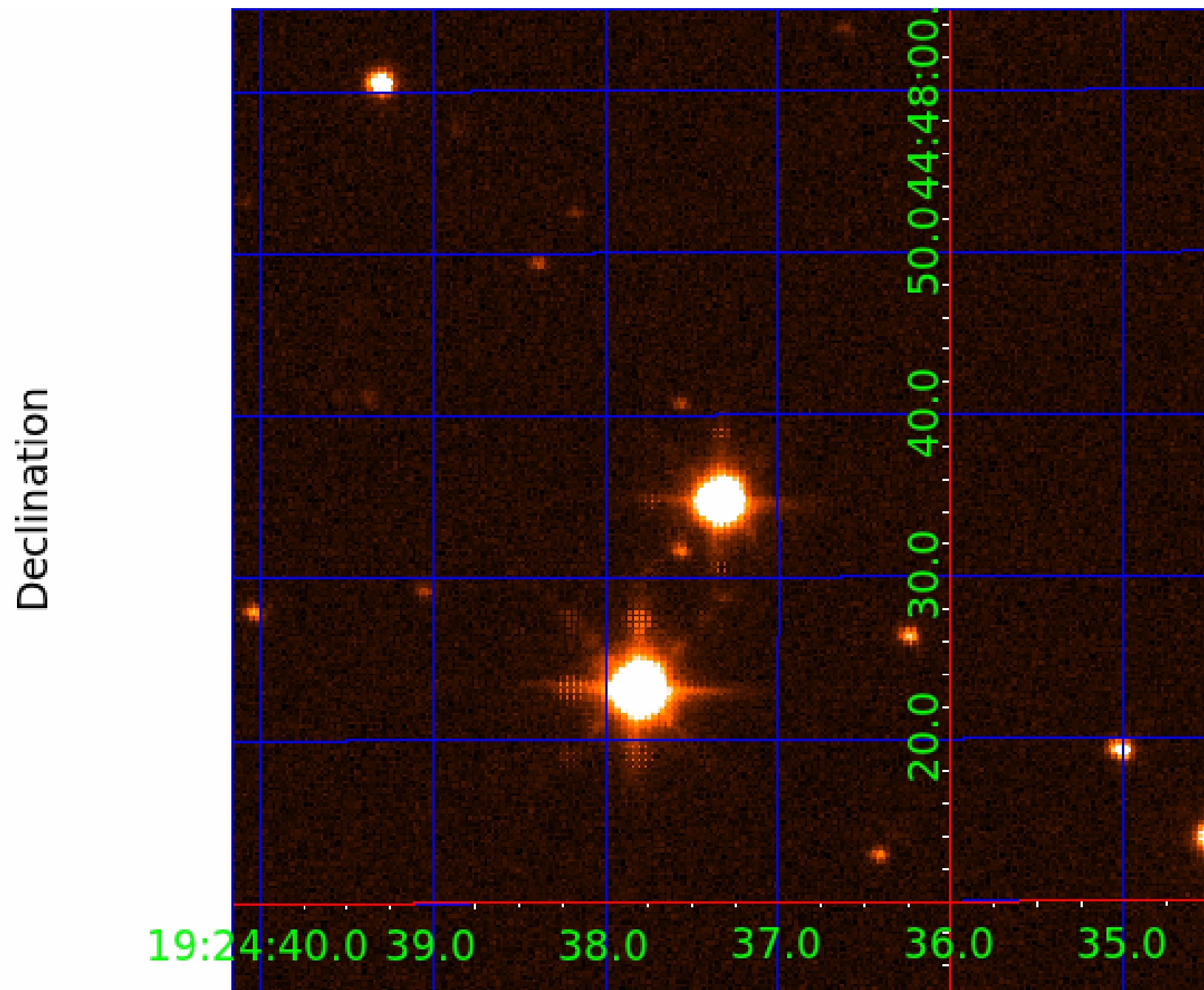
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 008623053

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 008623053-01 | OBS | No | 416.258006 | 186.797614 | 120.8 | 17.758 | 9.1 | 9.0 | 1.36 | 5745 | 1.67 | 1.64 |
| 008623053-02 | OBS | No | 605.840712 | 138.316170 | 149.2 | 20.182 | 8.4 | 8.7 | 1.36 | 5745 | 1.79 | 0.99 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|---|
| 008623053-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS |
| 008623053-02 | OBS | FP | 0.00 | 1 | 0 | 1 | 0 | INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST |

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

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

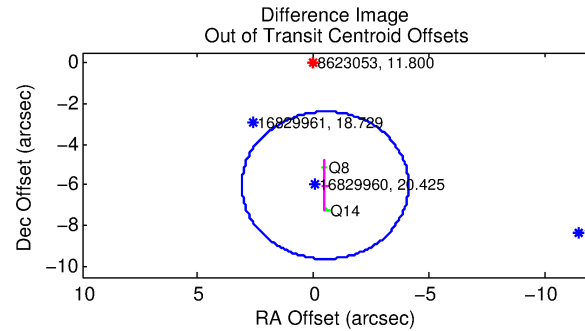
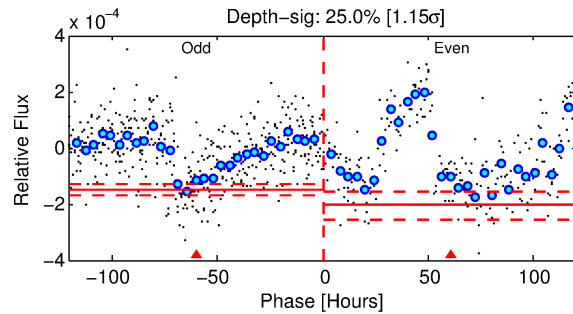
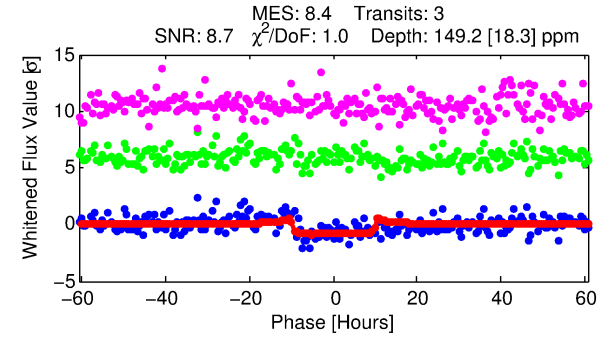
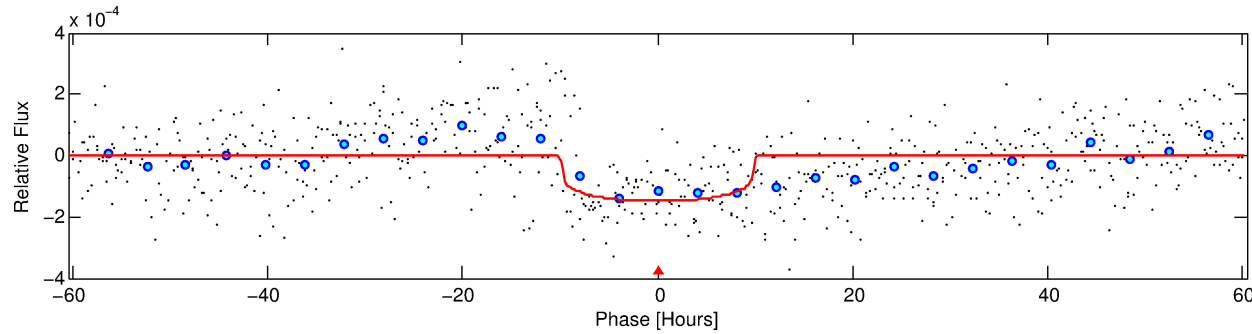
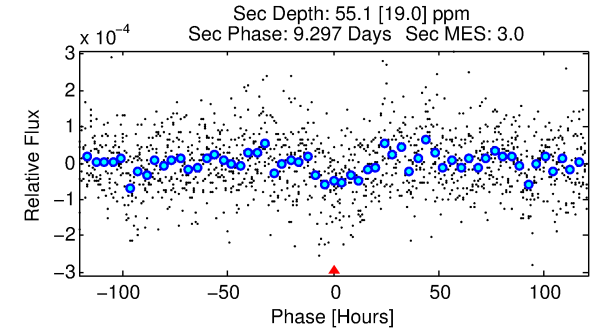
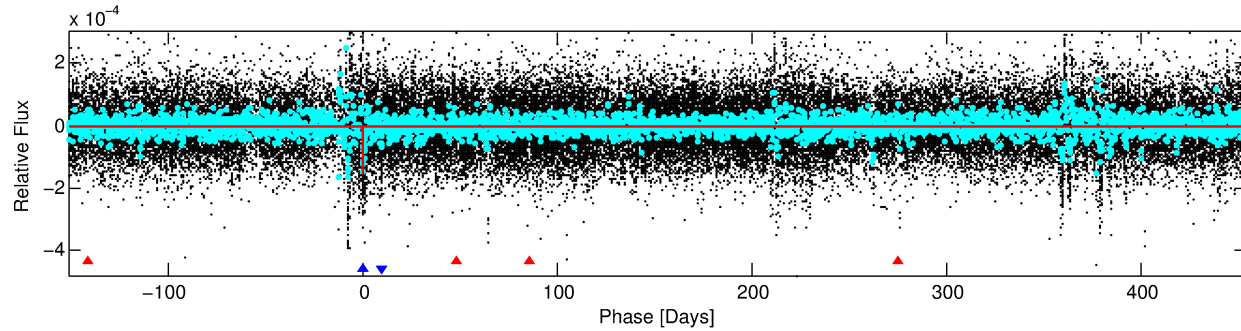
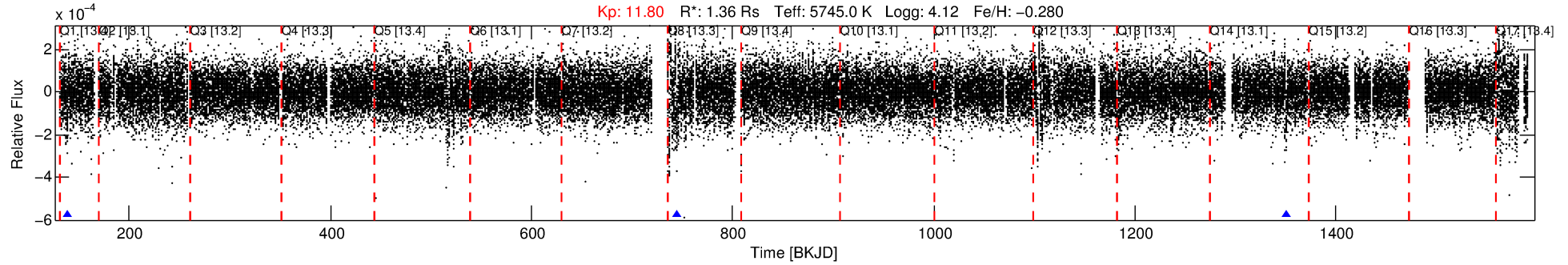
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008623053-02

No Significant Match Found

DV One-Page Summary

KIC: 8623053 Candidate: 2 of 2 Period: 605.841 d



DV Fit Results:

Period = 605.84071 [0.01196] d
Epoch = 138.3162 [0.0158] BKJD
Rp/R* = 0.0121 [0.0027]
a/R* = 158.53 [158.80]
b = 0.74 [0.62]
Seff = 0.99 [0.64]
Teq = 255 [41] K
Rp = 1.79 [0.75] Re
a = 1.3441 [0.5063] AU
Ag = 17081.54 [14573.24] [1.17σ]
Teffp = 4500 [657] K [6.45σ]

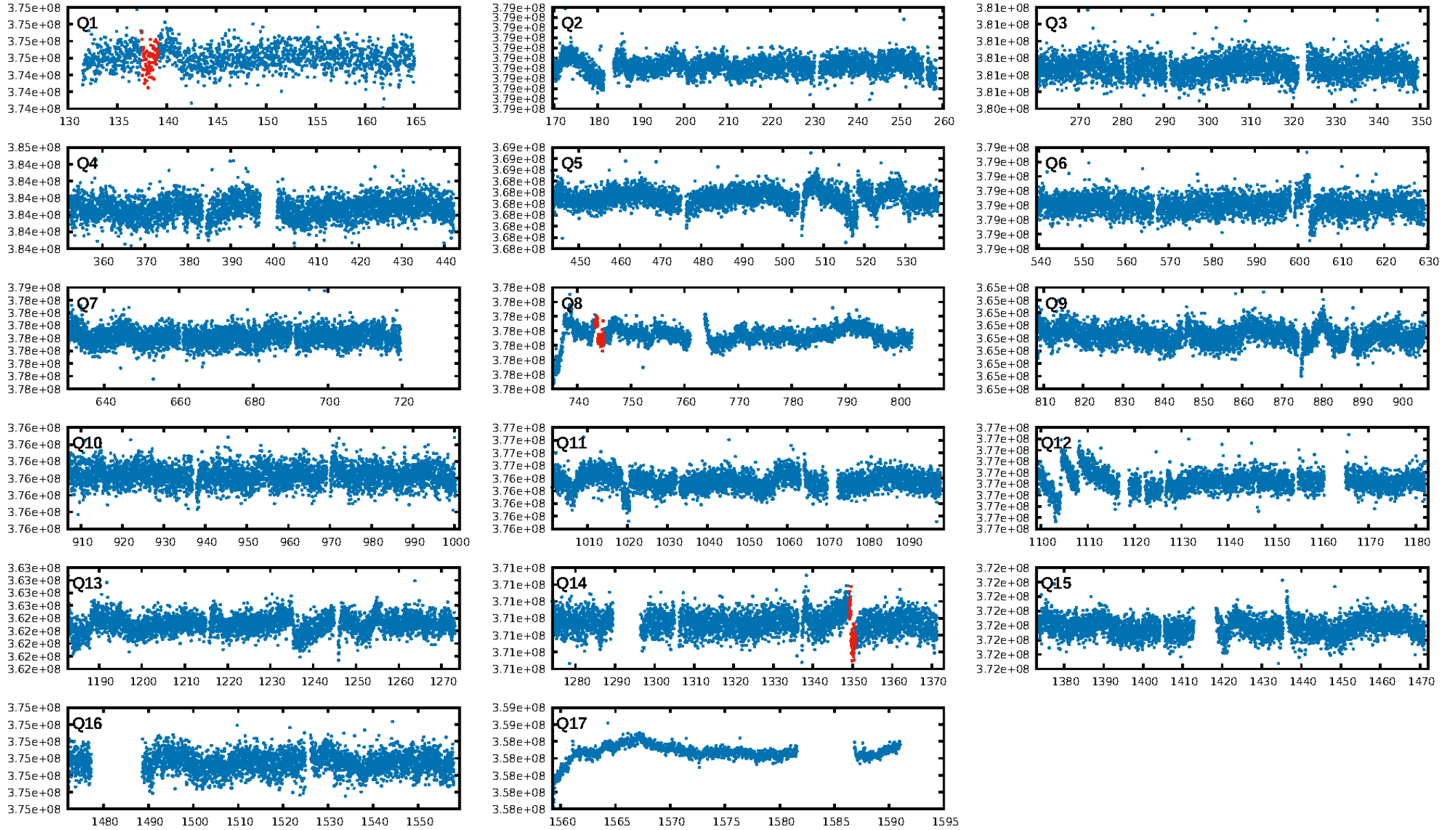
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [169.25σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 10.2%
ModelChiSquareGof-sig: 99.9%
Bootstrap-pfa: 7.10e-11
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: -0.1333
Centroid-sig: 14.6%
Centroid-so: 1.099 arcsec [0.98σ]
OotOffset-rm: 6.033 arcsec [5.02σ]
KicOffset-rm: 6.109 arcsec [4.88σ]
OotOffset-st: 1/0/1/0 [2]
KicOffset-st: 1/0/1/0 [2]
DiffImageQuality-fgm: 0.00 [0/2]
DiffImageOverlap-fno: 1.00 [3/3]

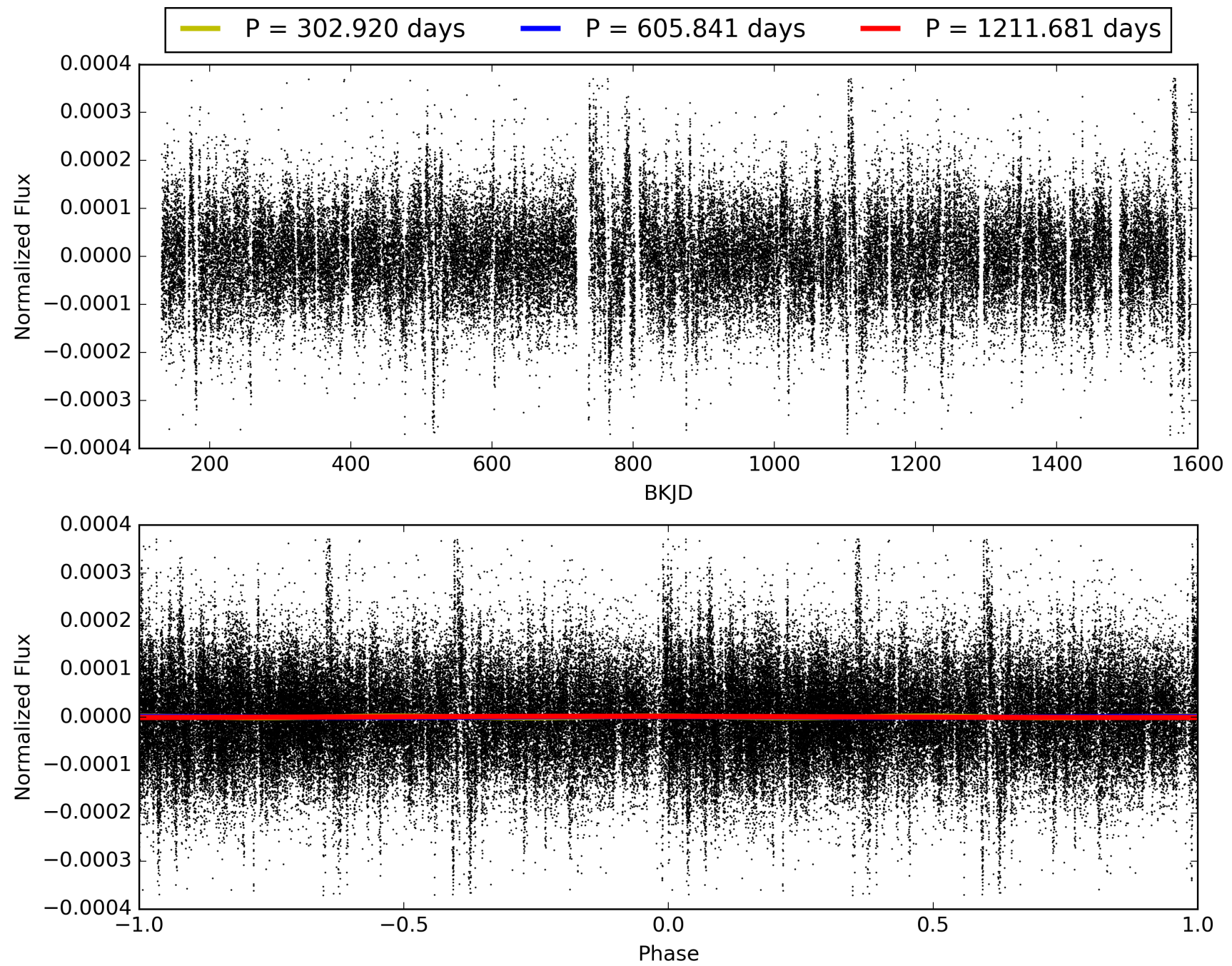
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 18:26:46 Z

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

TCE 008623053-02, PDC Light Curves

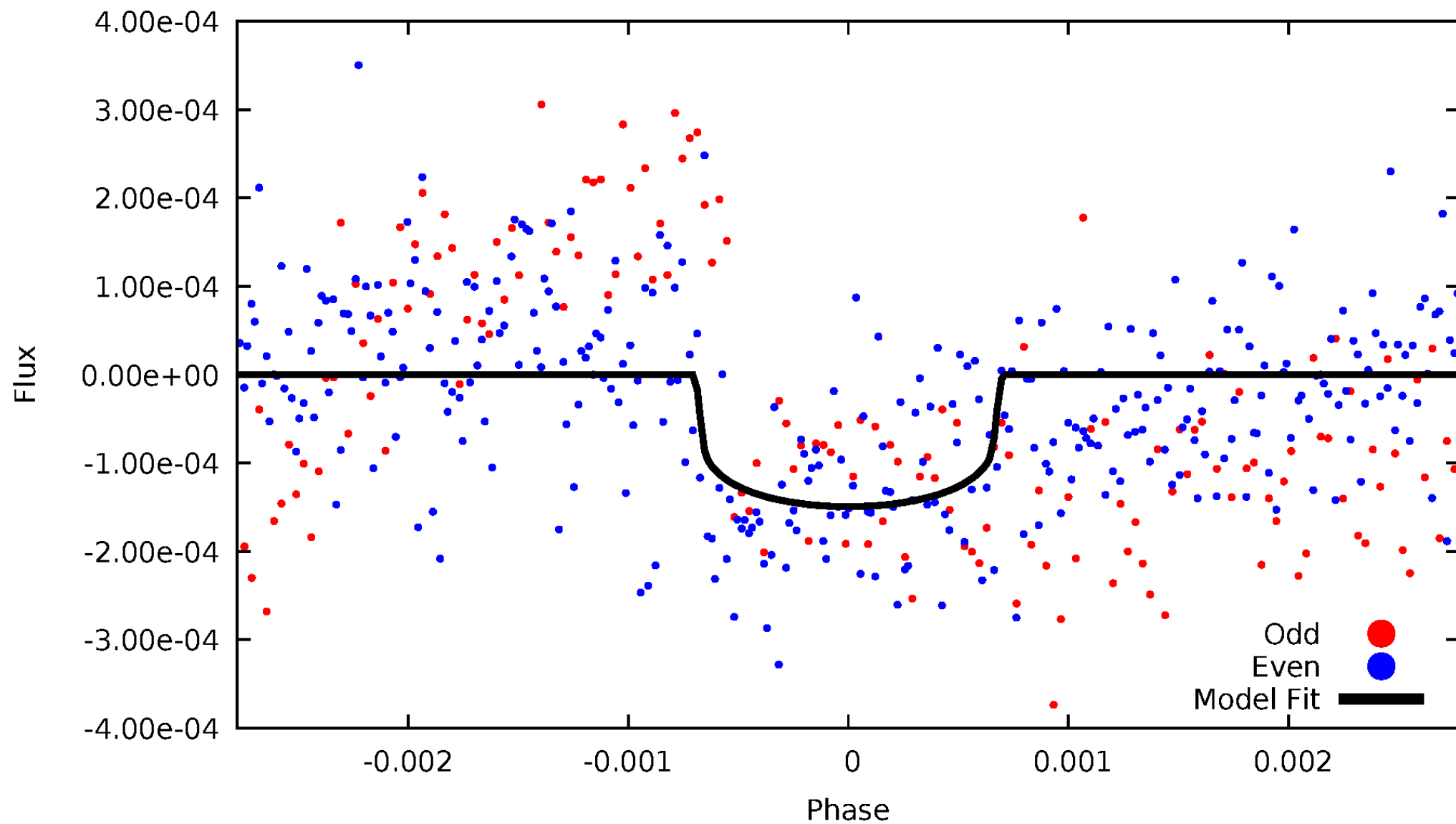


TCE 008623053-02



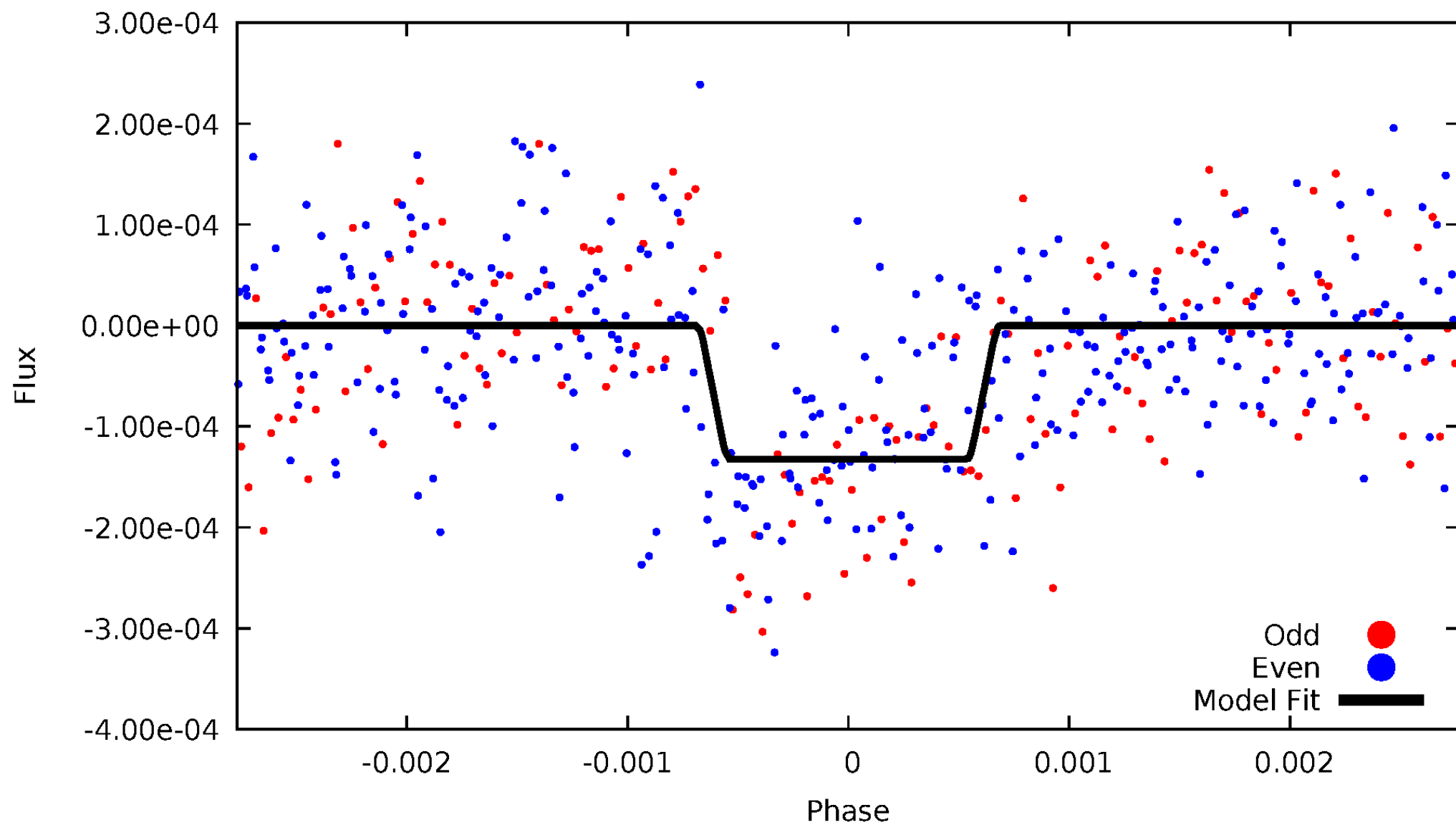
DV Odd/Even

TCE 008623053-02



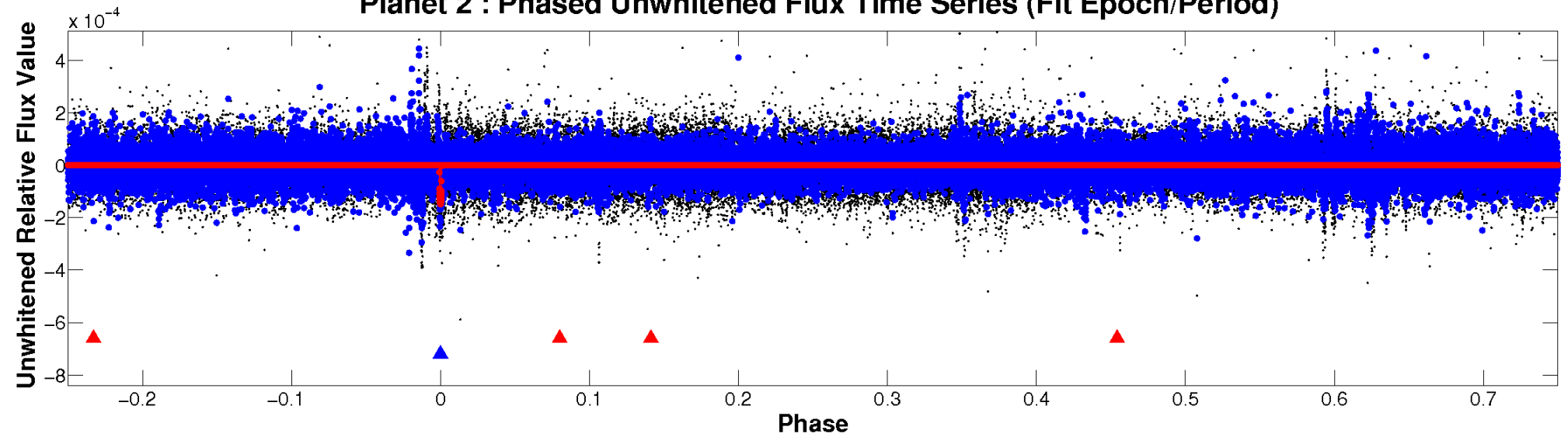
ALT Odd/Even

TCE 008623053-02

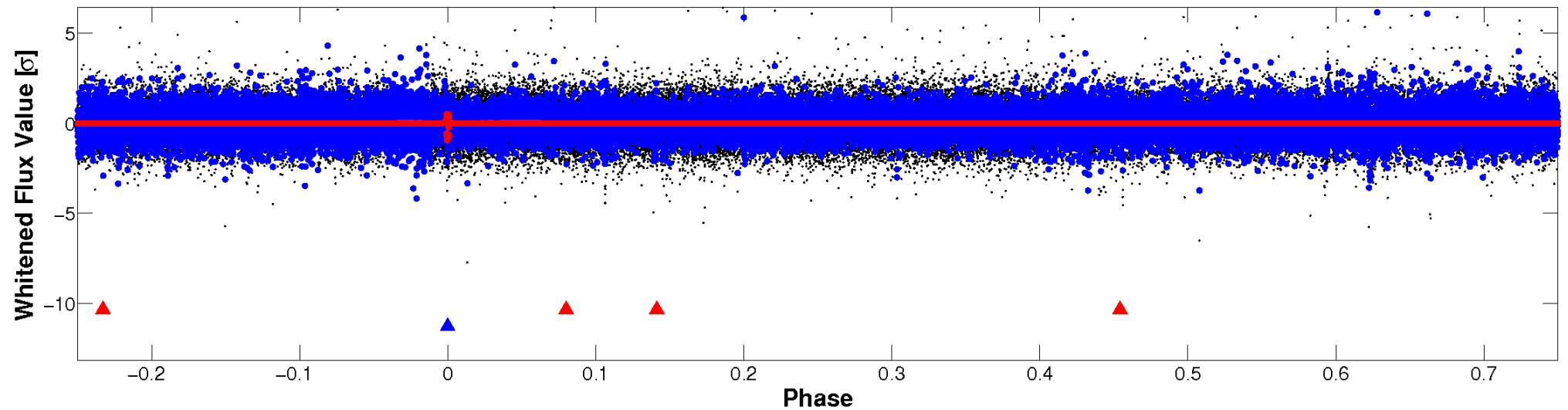


Non-Whitened Vs. Whitened Light Curve

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

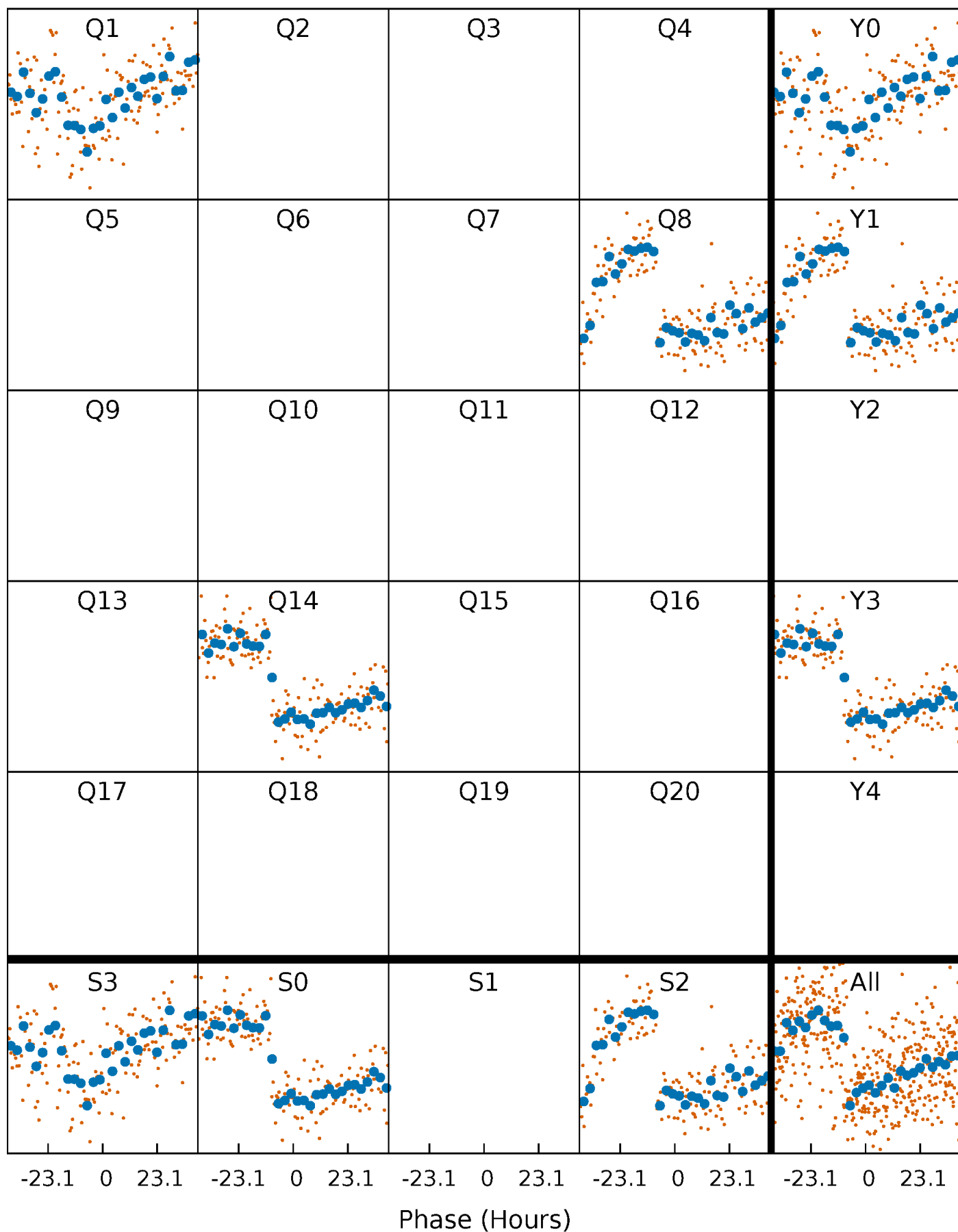


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



PDC Quarter-Phased Transit Curves

TCE 008623053-02 P=605.840712 Days $T_0=138.316170$ (BKJD)



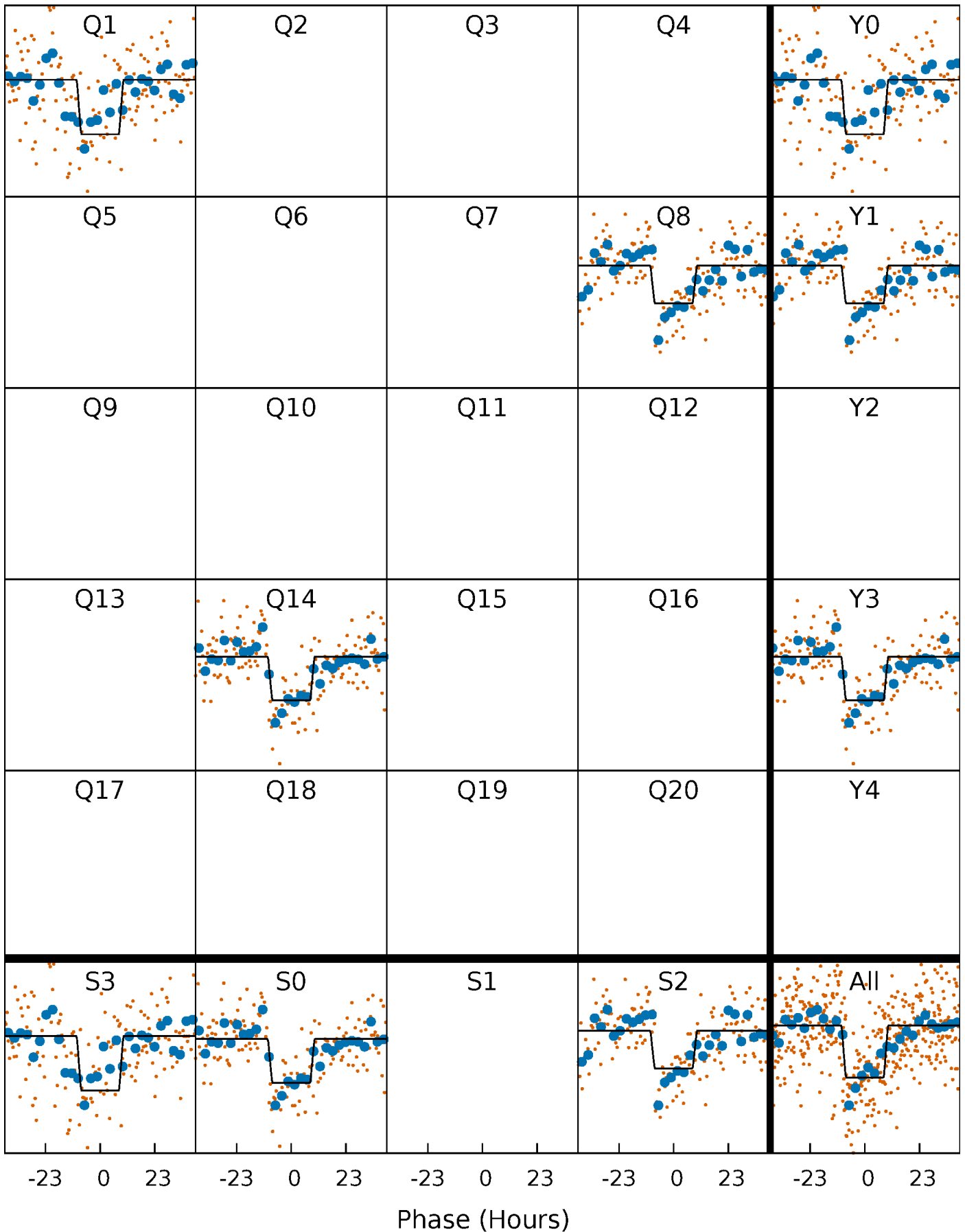
DV Quarter-Phased Transit Curves

TCE 008623053-02 $P=605.840712$ Days $T_0=138.316170$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

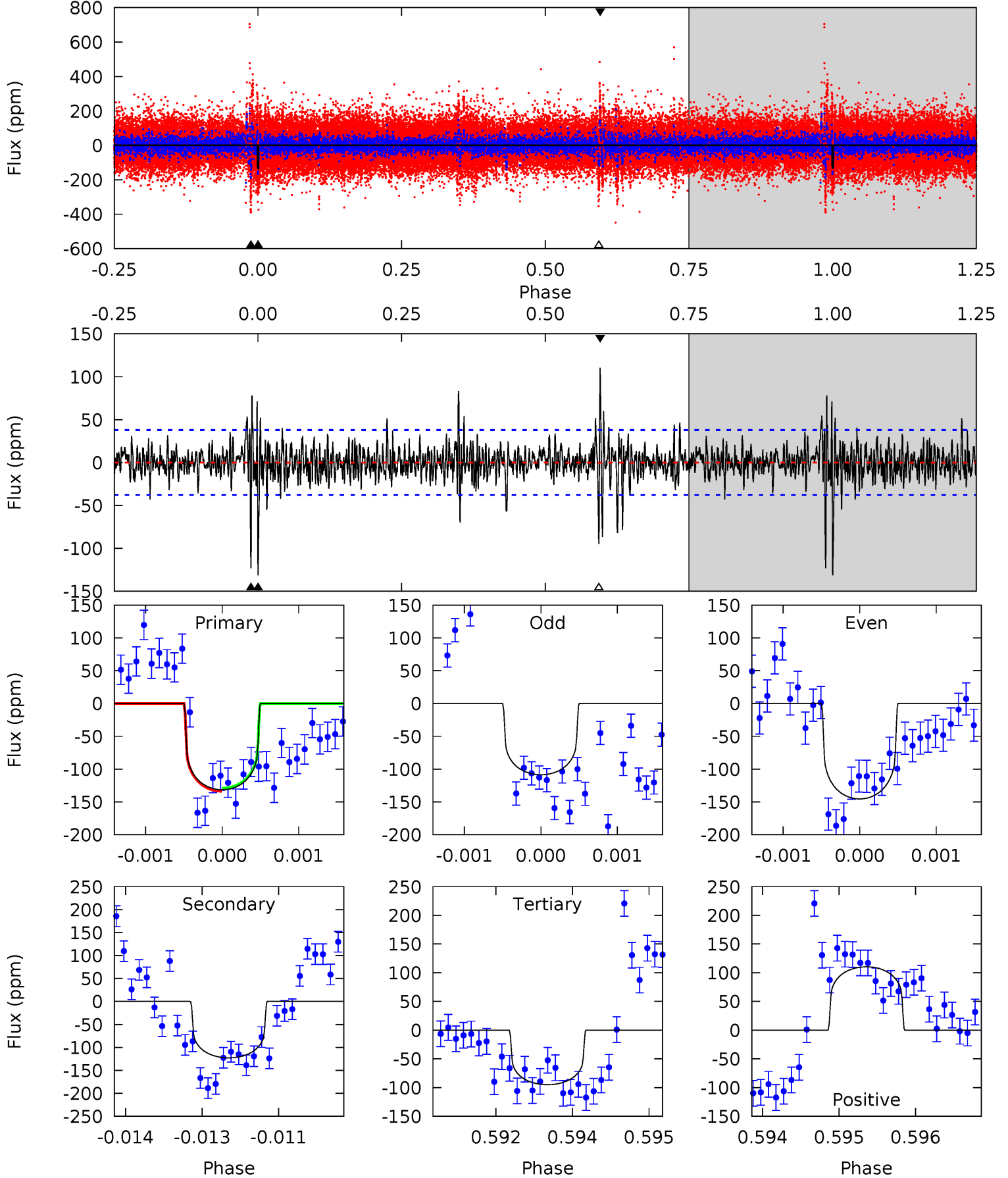
TCE 008623053-02 P=605.848243 Days $T_0=138.312261$ (BKJD)



DV Model-Shift Uniqueness Test

008623053-02, P = 605.840712 Days, E = 138.316170 Days

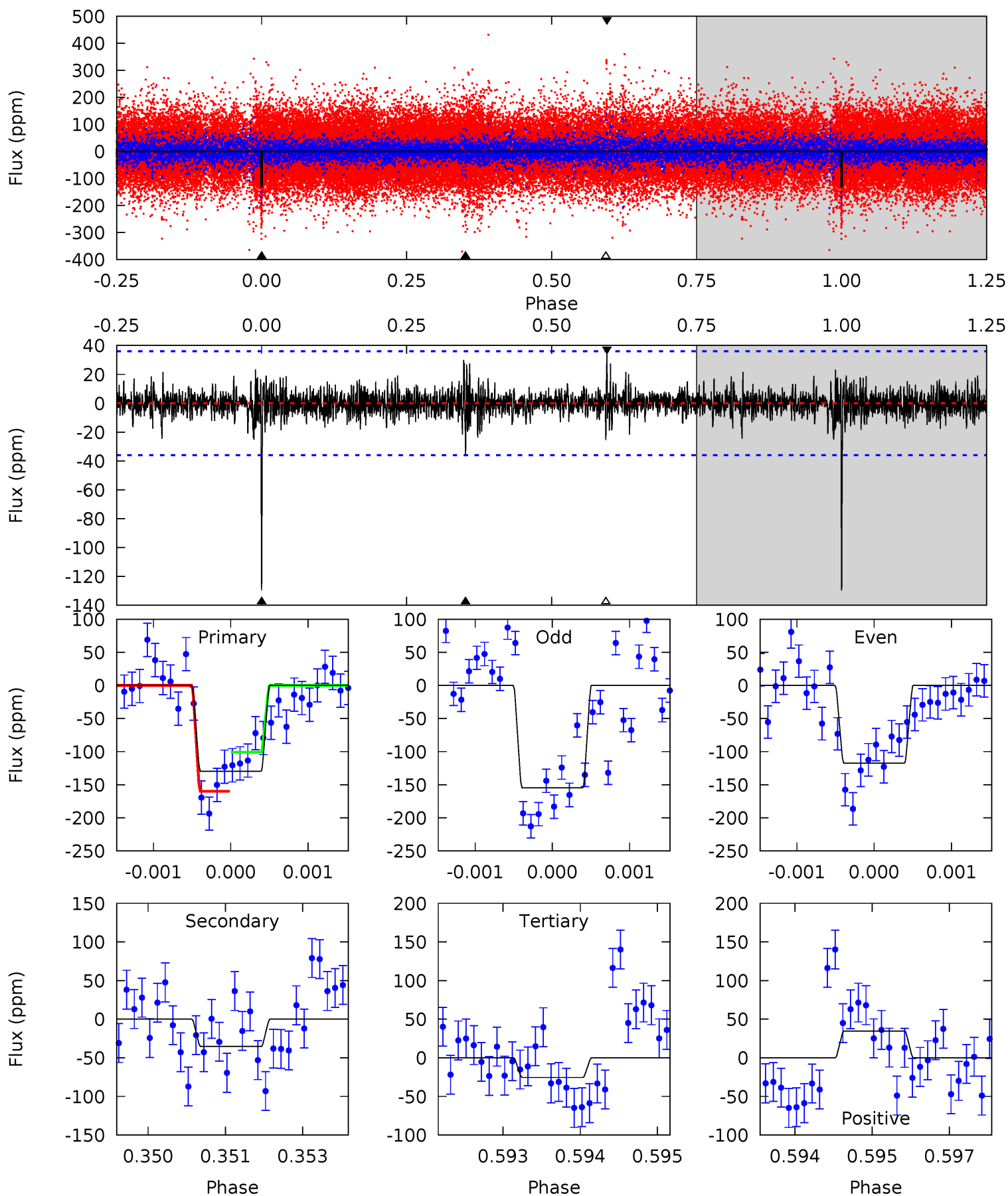
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 18.7 | 17.5 | 13.5 | 15.7 | 5.39 | 3.19 | 2.30 | 5.20 | 3.00 | 3.97 | 1.78 | 2.46 | 1.18 | 0.46 | 0.32 |



Alt Model-Shift Uniqueness Test

008623053-02, $P = 605.848243$ Days, $E = 138.312261$ Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 19.4 | 5.29 | 3.82 | 5.20 | 5.40 | 3.20 | 0.91 | 15.6 | 14.2 | 1.47 | 0.09 | 2.63 | 0.87 | 0.21 | 4.43 |



Stellar Parameters For KIC 008623053

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 5745^{+189}_{-172} | $4.119^{+0.385}_{-0.165}$ | $-0.280^{+0.300}_{-0.250}$ | $1.356^{+0.388}_{-0.475}$ | $0.883^{+0.131}_{-0.087}$ | $0.499^{+1.404}_{-0.237}$ |
| | +3%/-3% | +9%/-4% | +107%/-89% | +29%/-35% | +15%/-10% | +281%/-48% |
| 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 008623053-02 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|--------------|------------------------|----------------------|----------------------|---------------------------|
| DV | -123 ± 7 | $1.68^{+0.57}_{-0.43}$ | 351^{+32}_{-34} | 5521^{+774}_{-506} | 43302^{+37114}_{-18807} |
| Alt. | -35 ± 7 | $1.64^{+0.54}_{-0.48}$ | 349^{+33}_{-34} | 4315^{+565}_{-357} | 13148^{+13189}_{-5788} |

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

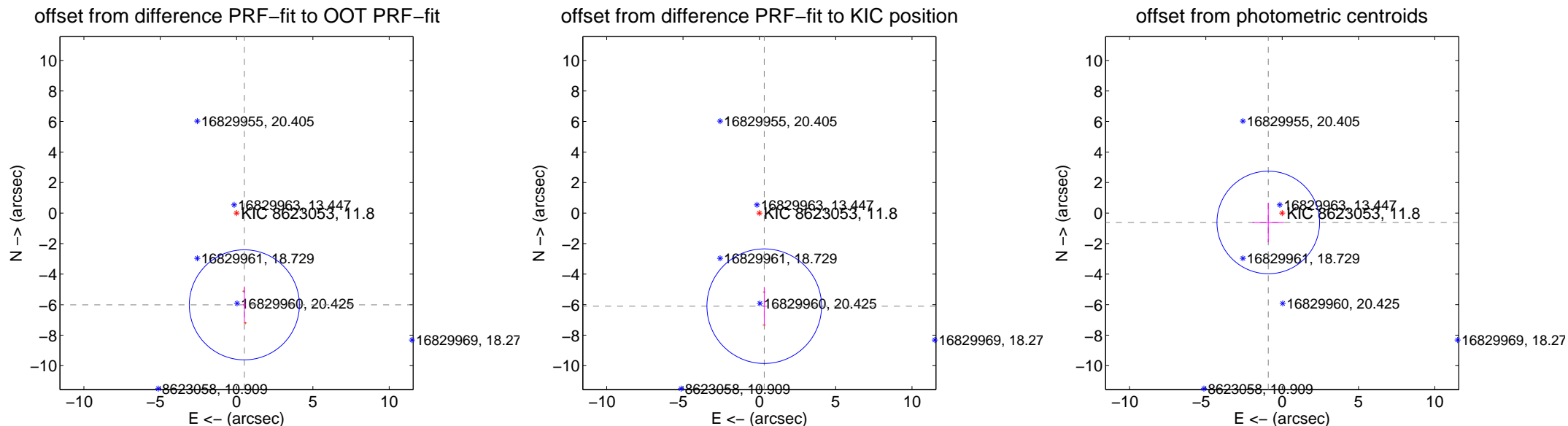
DV Centroid Data

Supplemental centroid analysis for 008623053-02. **Kepler magnitude: 11.80.** Transit SNR 8.73

There are 0 quarters with good PRF difference image offsets

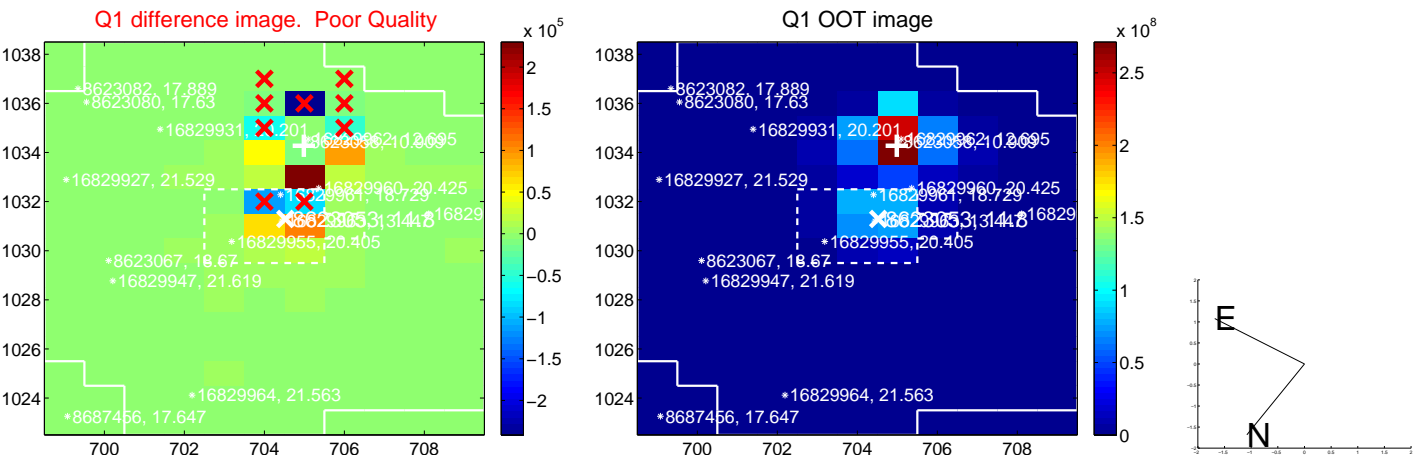
The direct PRF centroid is offset from the target star catalog position by about 0.29 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|-------------------------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 6.033 ± 1.202 | 5.02 | -0.511 ± 0.091 | -6.012 ± 1.206 |
| PRF-fit source offset from KIC position | 6.109 ± 1.251 | 4.88 | -0.320 ± 0.067 | -6.100 ± 1.253 |
| photometric centroid source offset | 1.10 ± 1.12 | 0.98 | 0.91 ± 1.03 | -0.61 ± 1.30 |

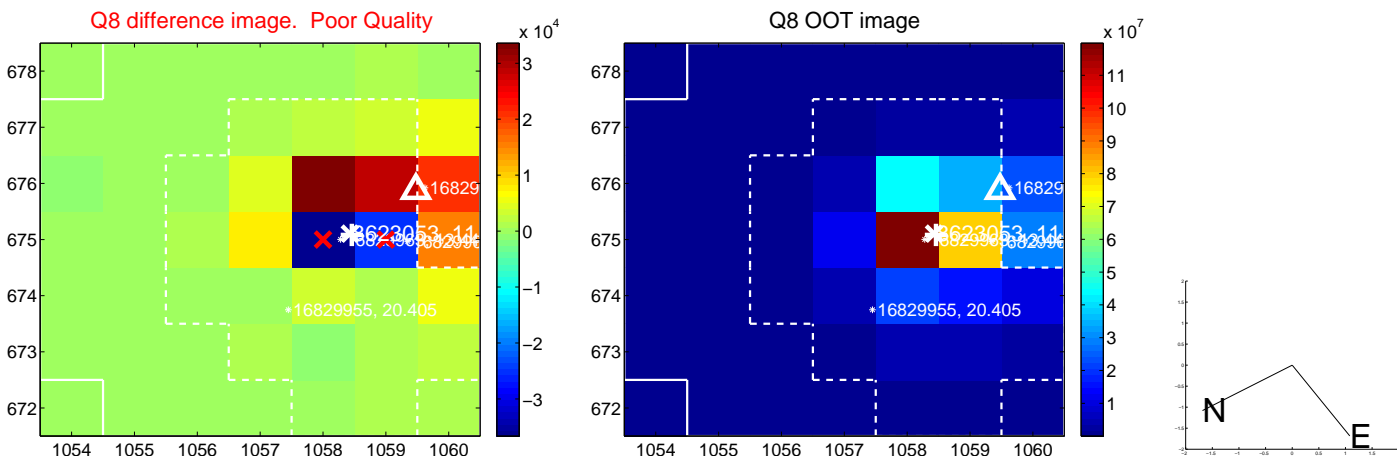
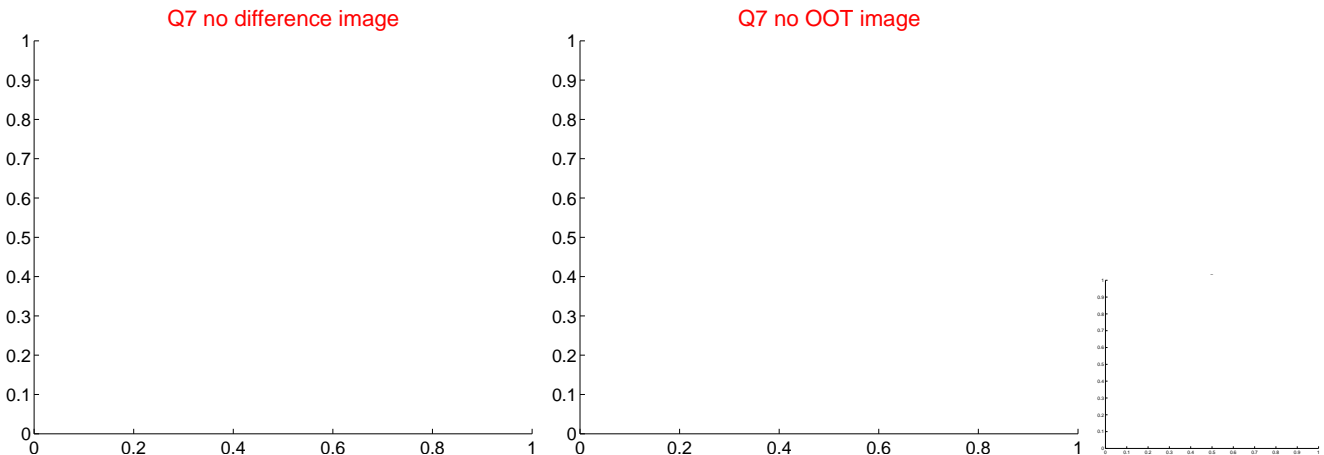
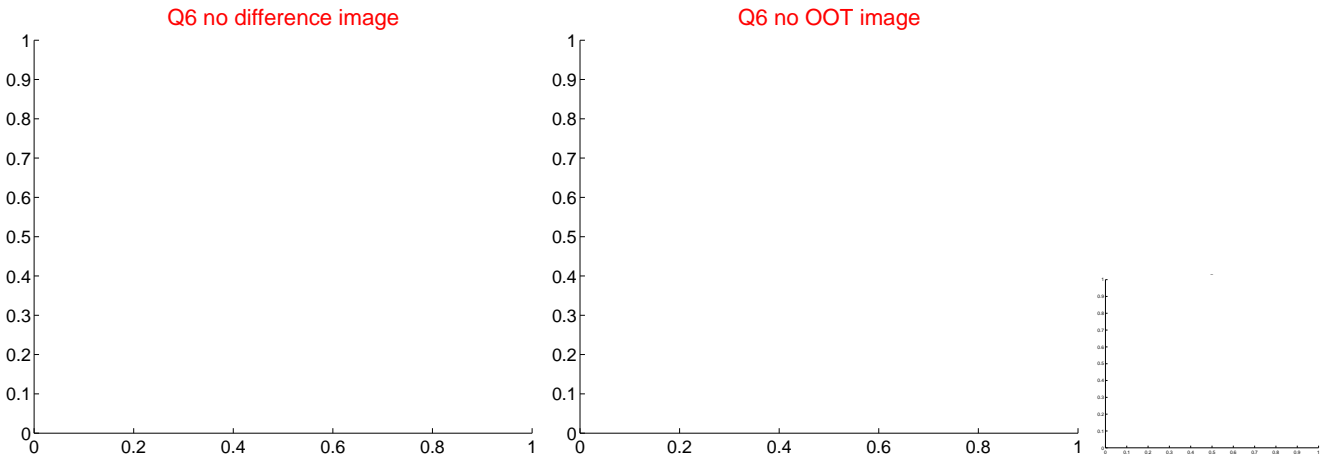
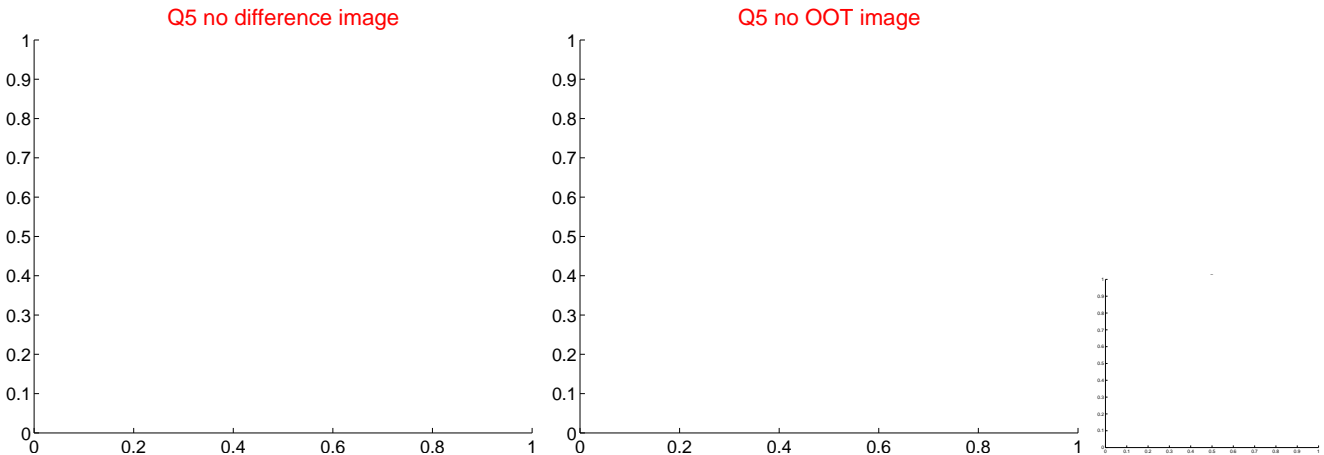


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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



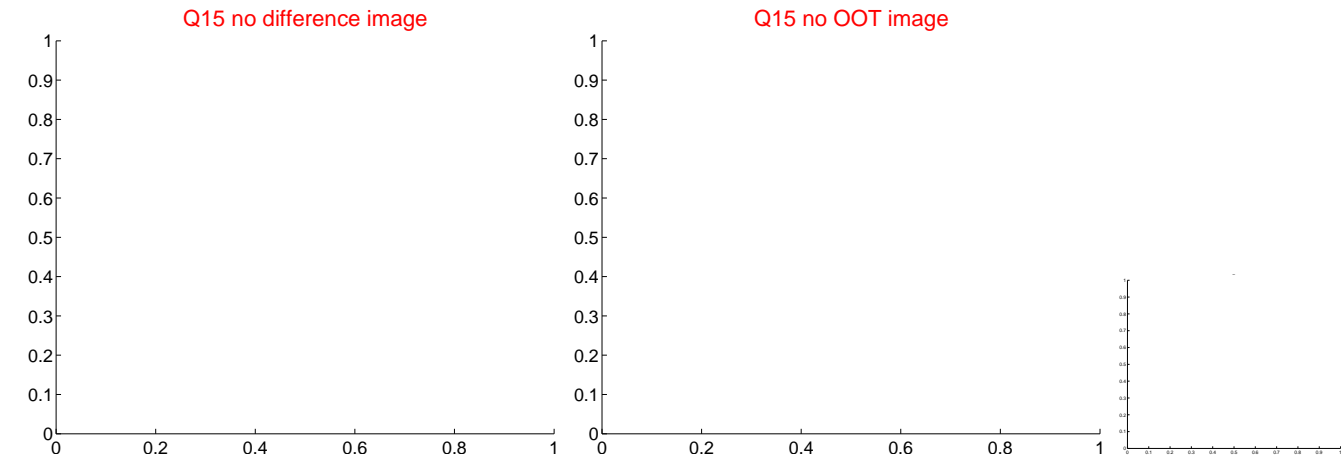
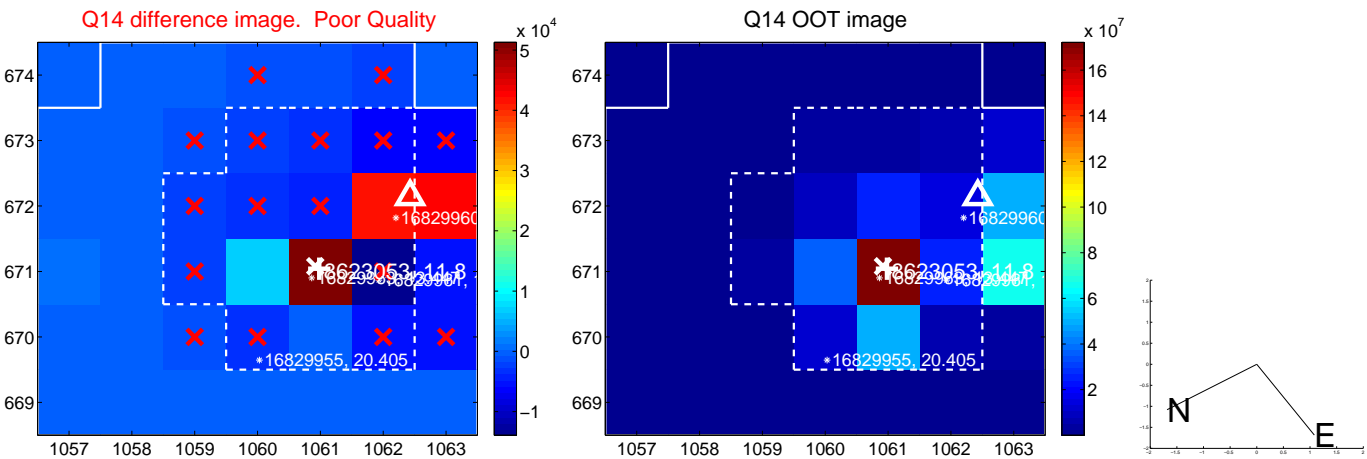
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



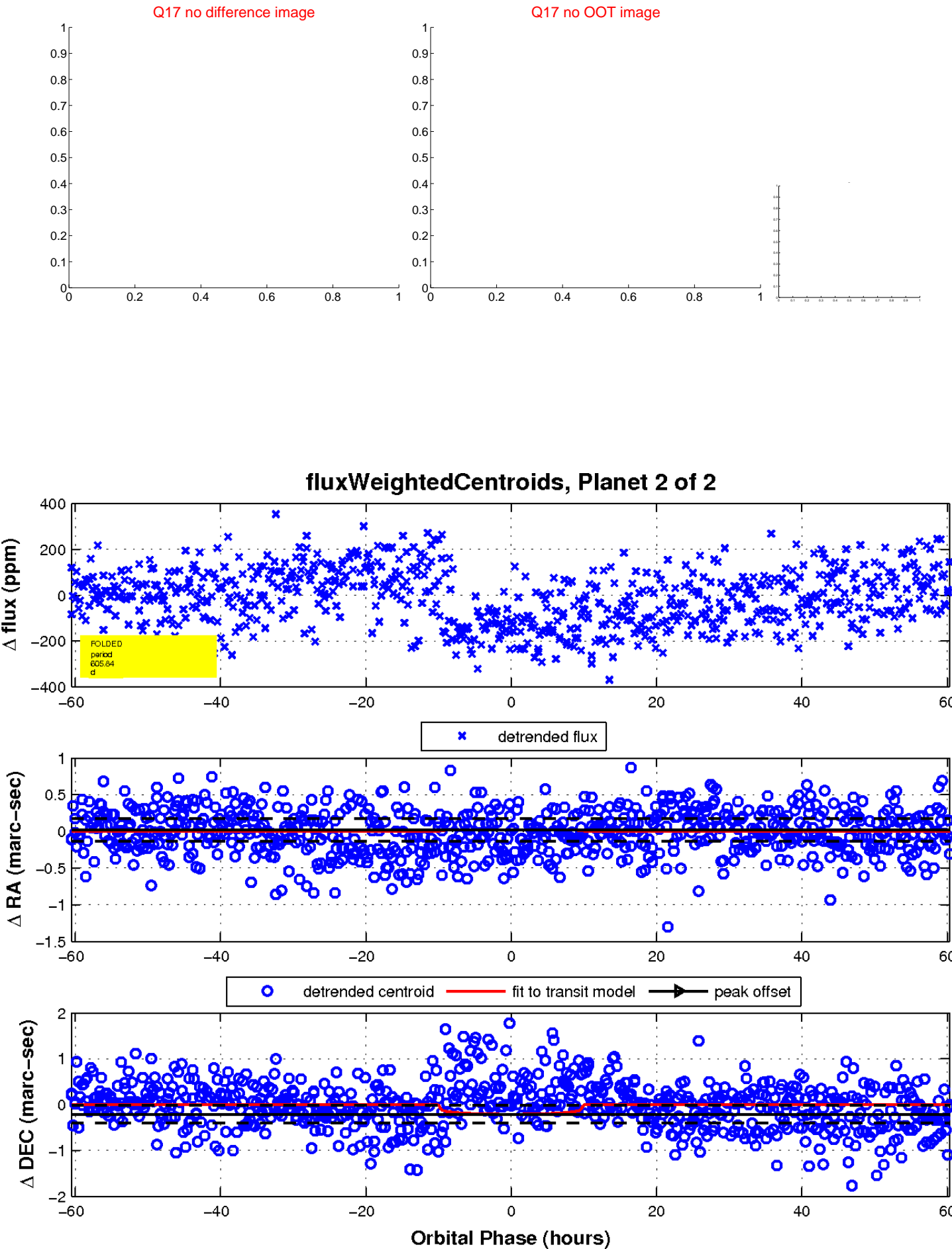
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

