

KIC 004664743

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|-----|-----------------------------|-----------------|------------------------|------------------------|
| 004664743-01 | OBS | 4642.01 | 2.556882 | 132.057795 | 17.3 | 8.899 | 10.1 | 9.0 | 1.92 | 7758 | 0.82 | 6225.56 |
| 004664743-02 | OBS | No | 2.556623 | 133.470793 | 11.5 | 18.042 | 9.9 | 8.1 | 1.92 | 7758 | 0.66 | 6226.40 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|------------------------|
| 004664743-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV |
| 004664743-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—SAME_NTL_PERIOD |

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.

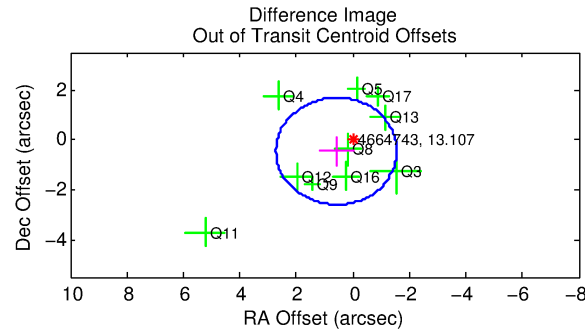
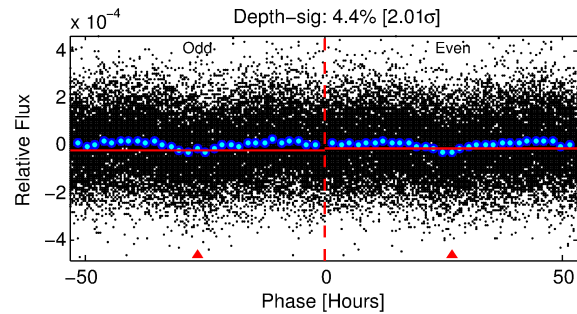
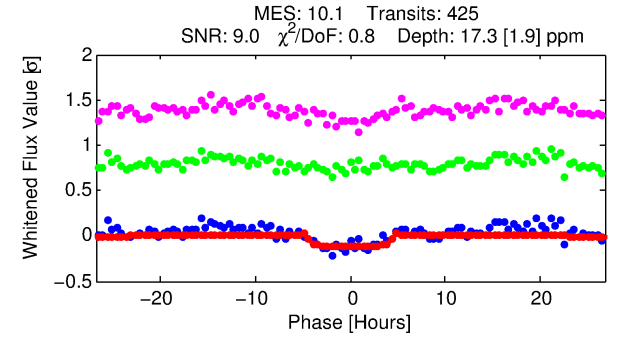
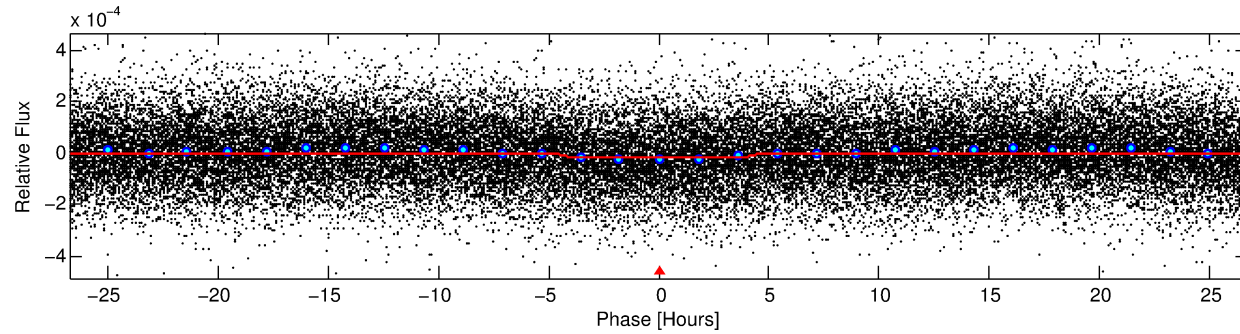
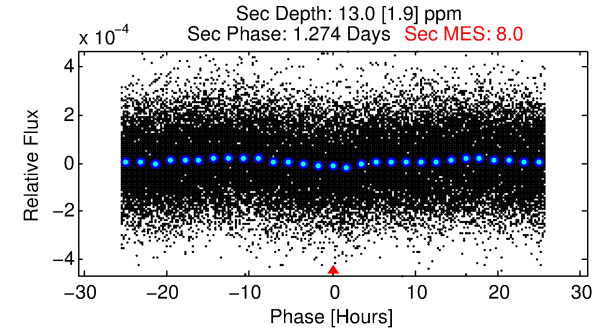
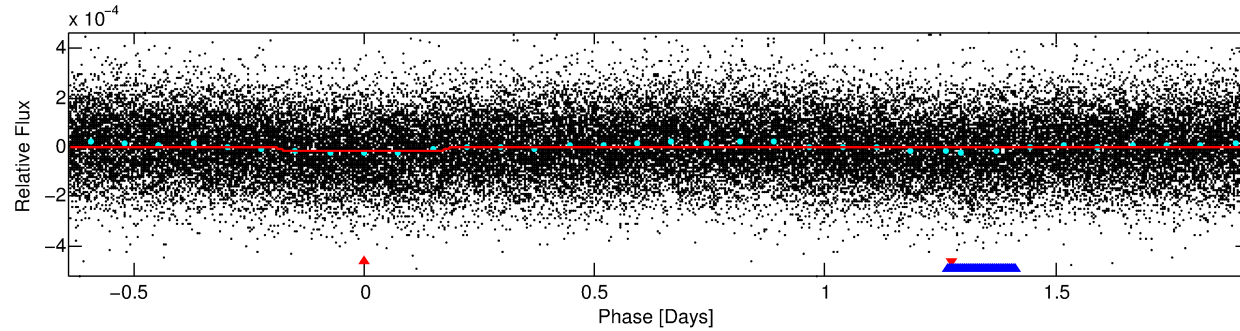
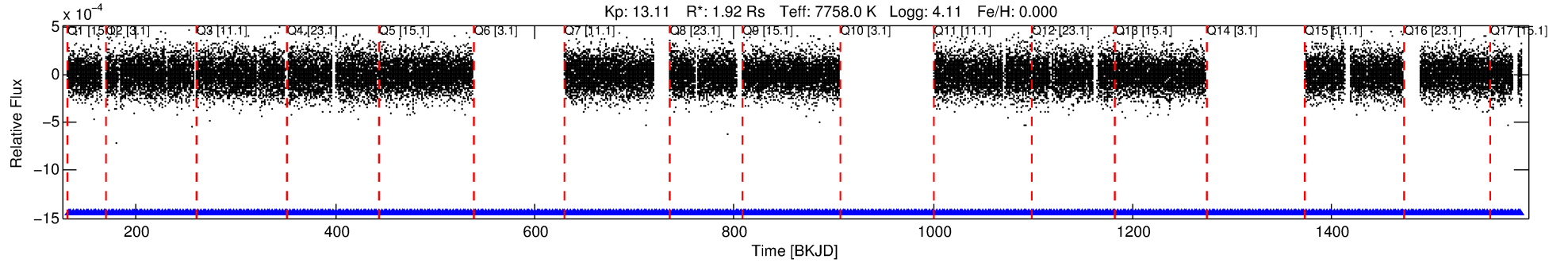
Ephemeris Match Information For 004664743-01

No Significant Match Found

DV One-Page Summary

KIC: 4664743 Candidate: 1 of 2 Period: 2.557 d

KOI: K04642 Corr: No Ephemeris Match



DV Fit Results:

Period = 2.55688 [0.00004] d
Epoch = 132.0578 [0.0085] BKJD
Rp/R* = 0.0039 [0.0015]
a/R* = 2.10 [3.81]
b = 0.43 [4.40]
Seff = 6225.56 [2189.02]
Teff = 2265 [199] K
Rp = 0.82 [0.39] Re
a = 0.0438 [0.0096] AU
Ag = 20.25 [17.03] [1.13σ]
Teffp = 7429 [1484] K [3.45σ]

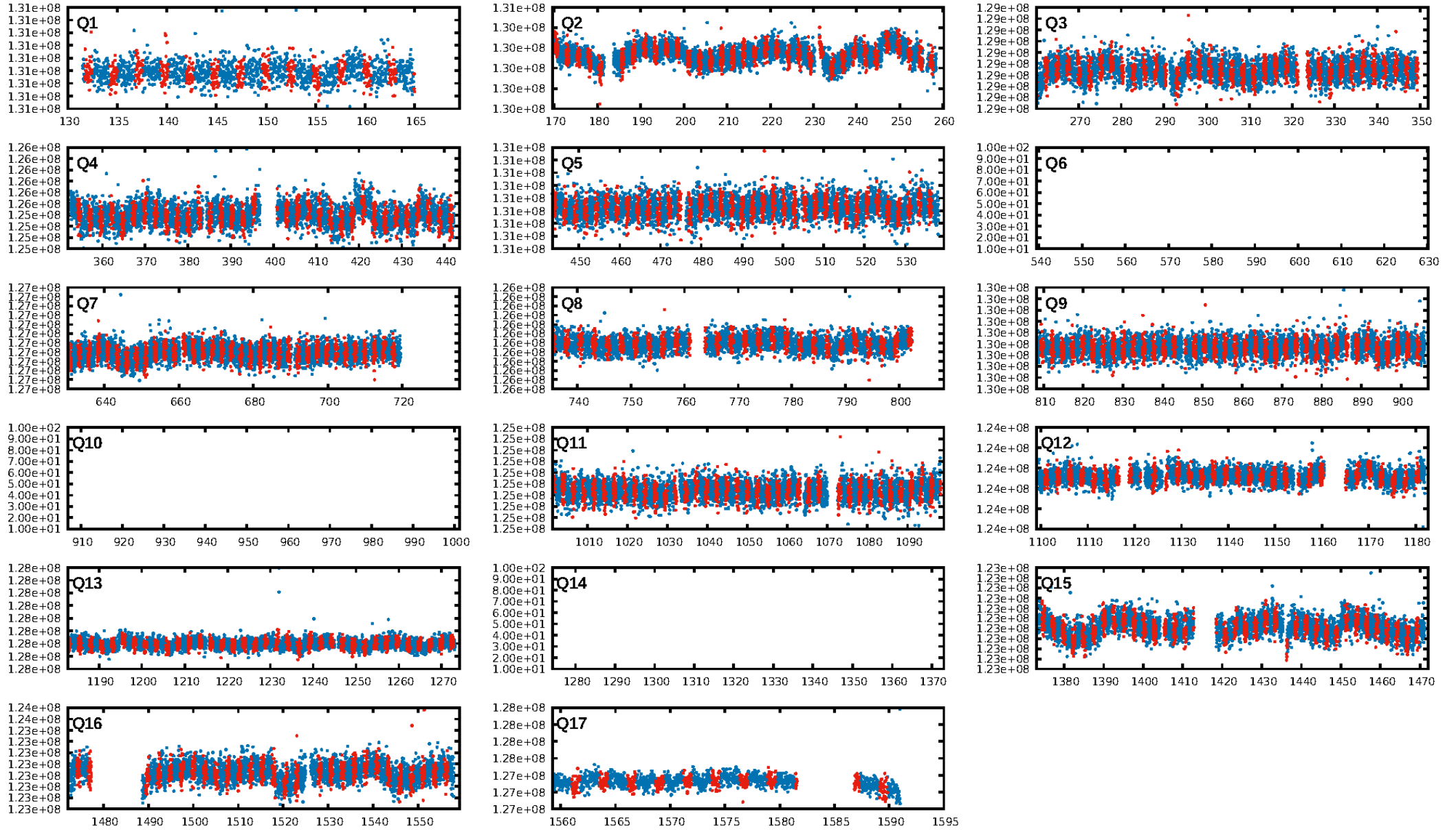
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [402/402]
GhostDiagnostic-chr: 1.463
Centroid-sig: 14.4%
Centroid-so: 1.572 arcsec [1.36σ]
OotOffset-rm: 0.745 arcsec [1.04σ]
OotOffset-st: 0/2/4/4 [10]
KicOffset-rm: 0.852 arcsec [0.96σ]
KicOffset-st: 0/2/4/4 [10]
DiffImageQuality-fgm: 0.90 [9/10]
DiffImageOverlap-fno: 1.00 [14/14]

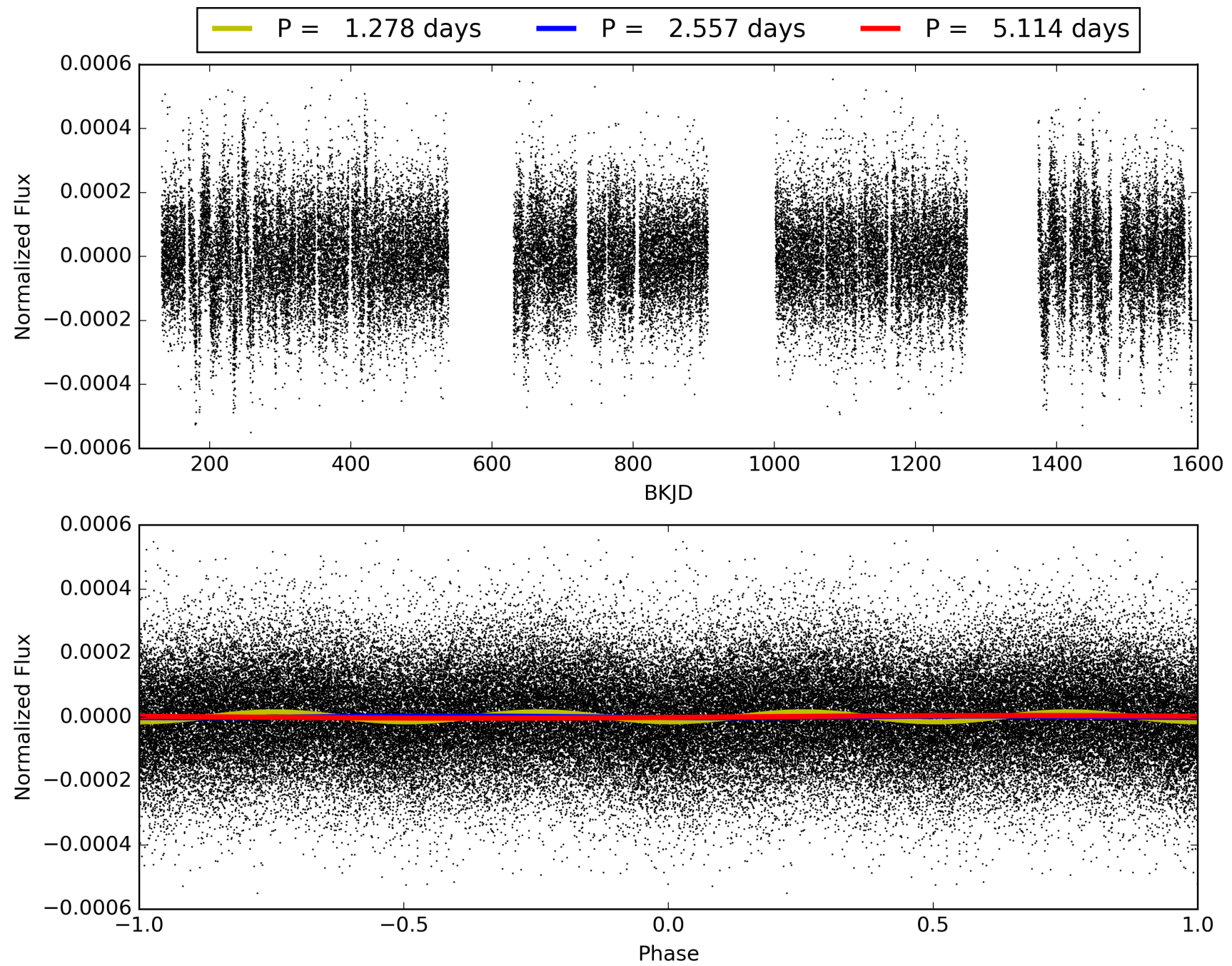
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 09:01:59 Z

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

TCE 004664743-01, PDC Light Curves

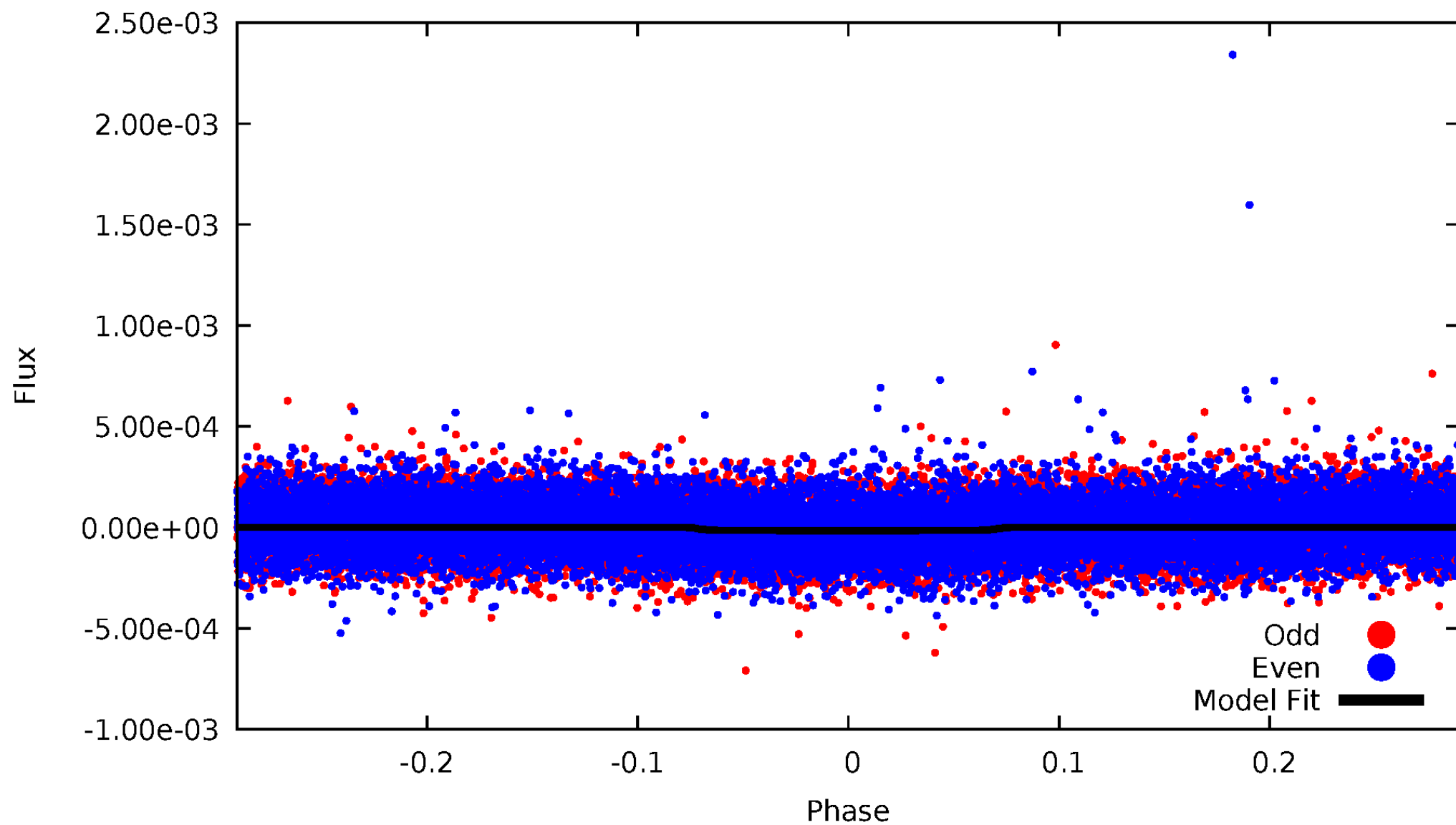


TCE 004664743-01



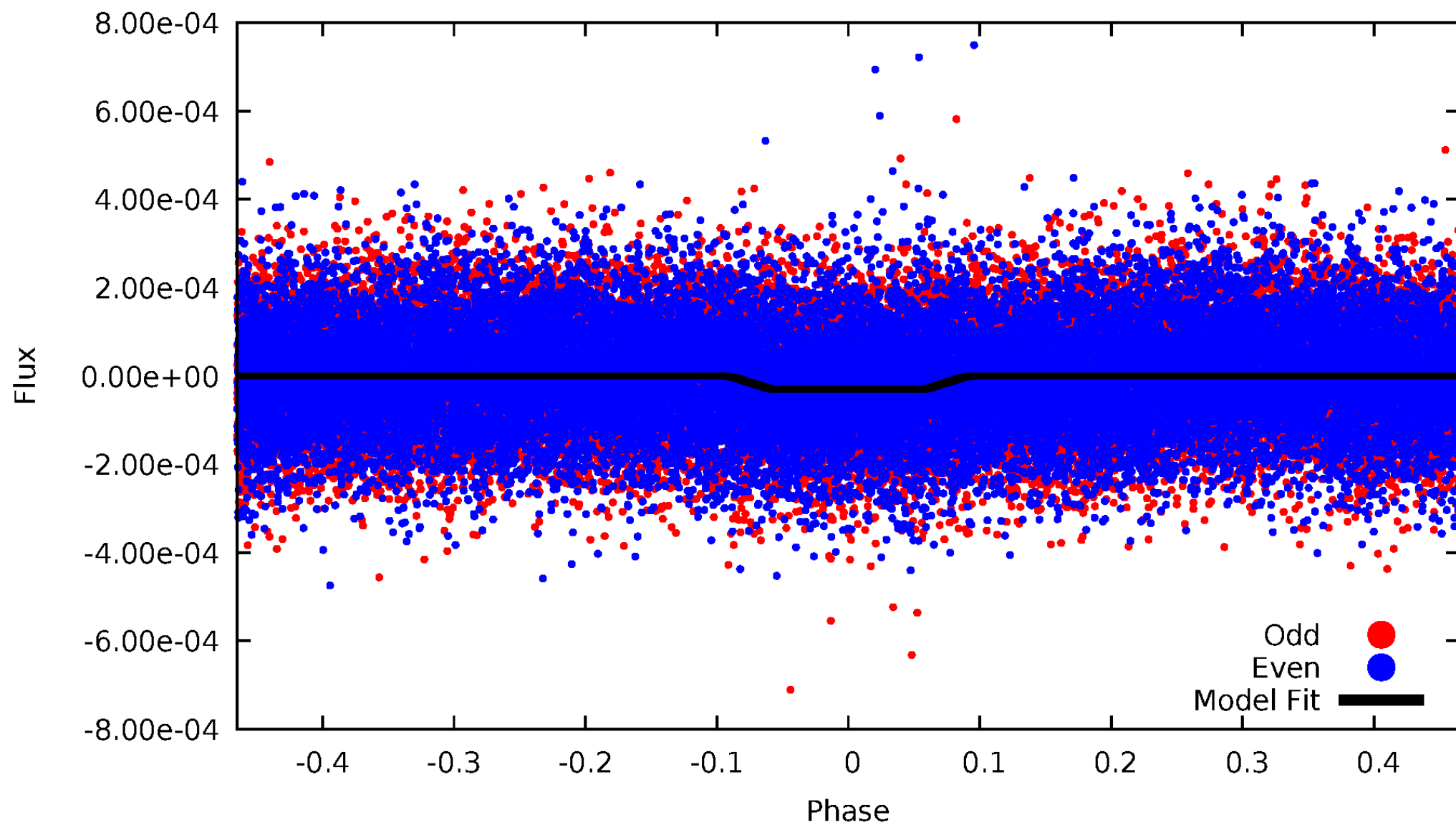
DV Odd/Even

TCE 004664743-01

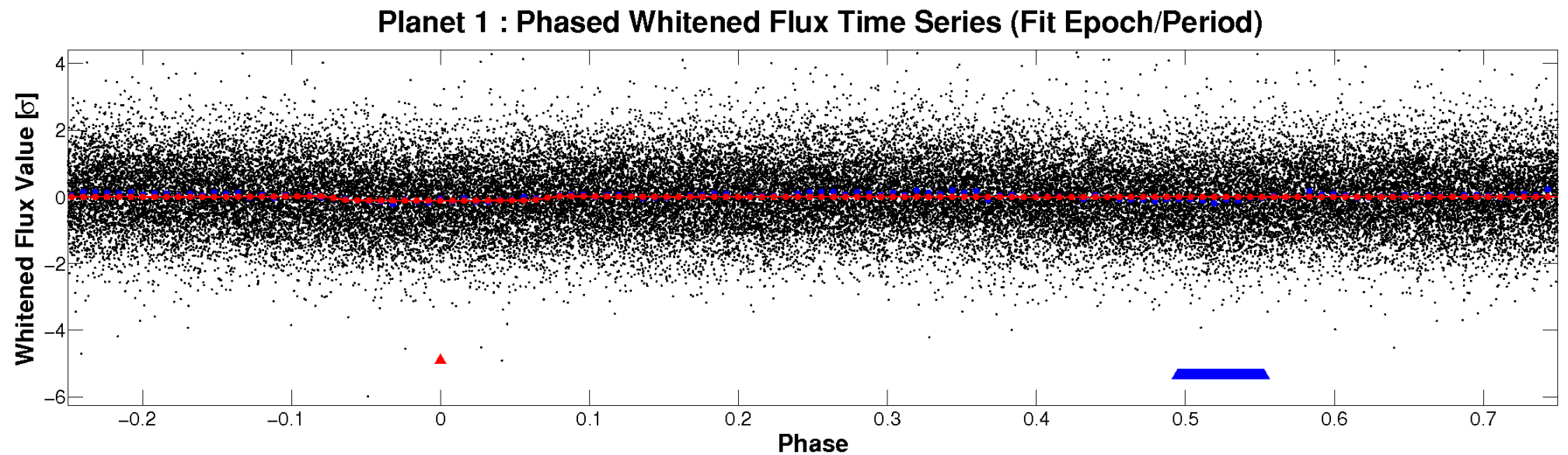
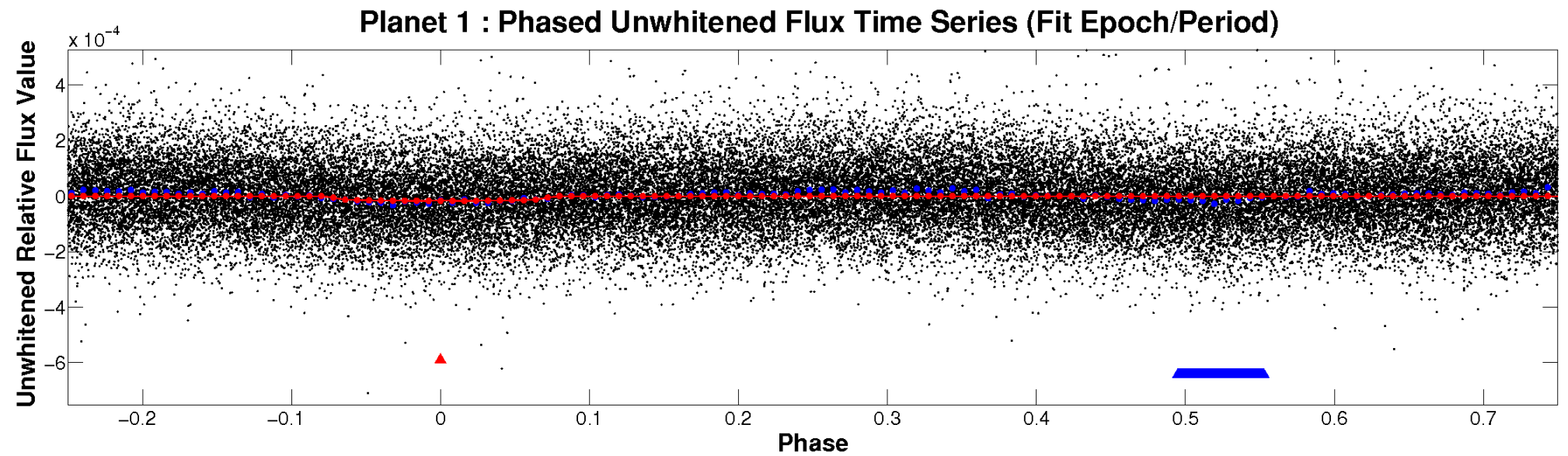


ALT Odd/Even

TCE 004664743-01

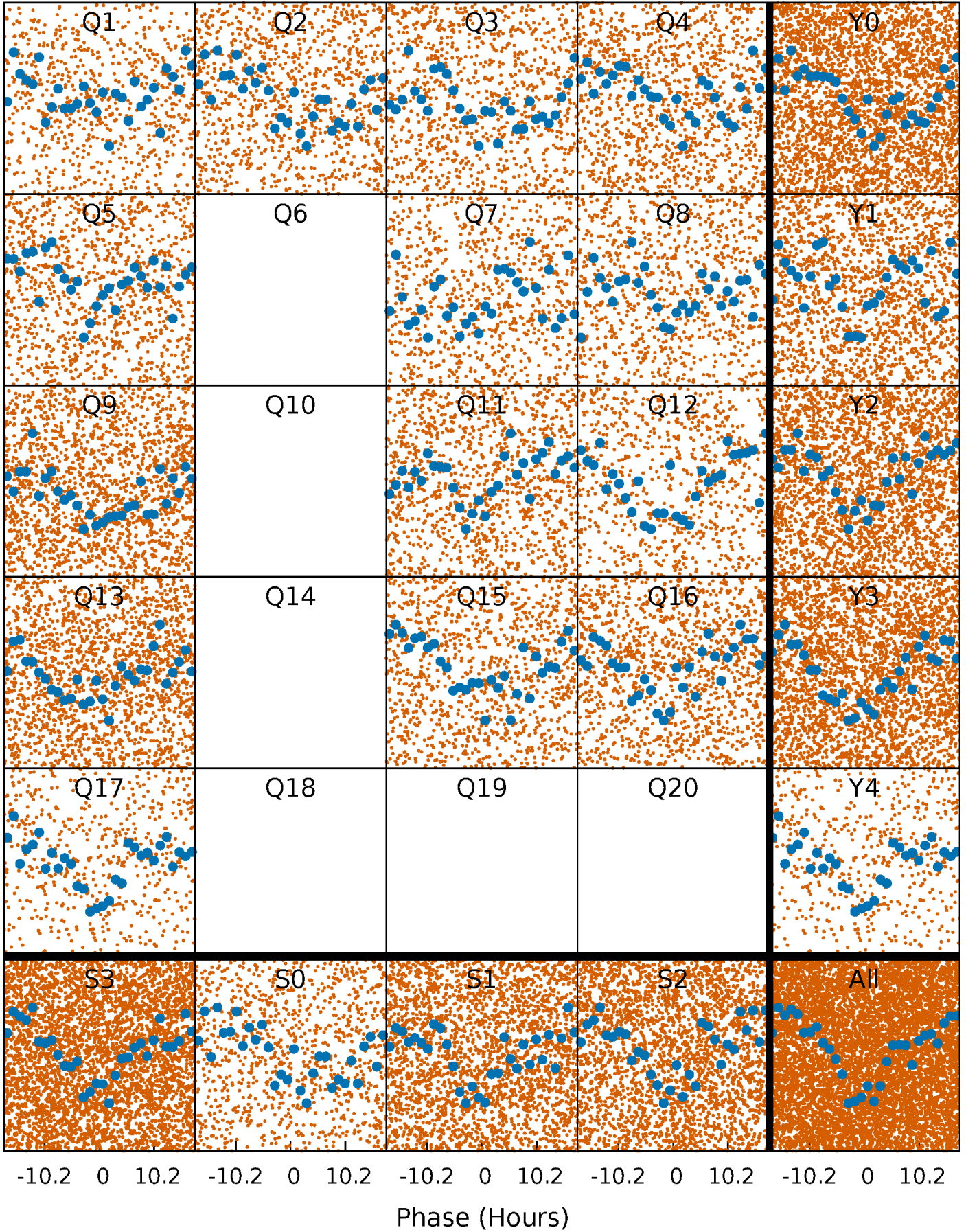


Non-Whitened Vs. Whitened Light Curve



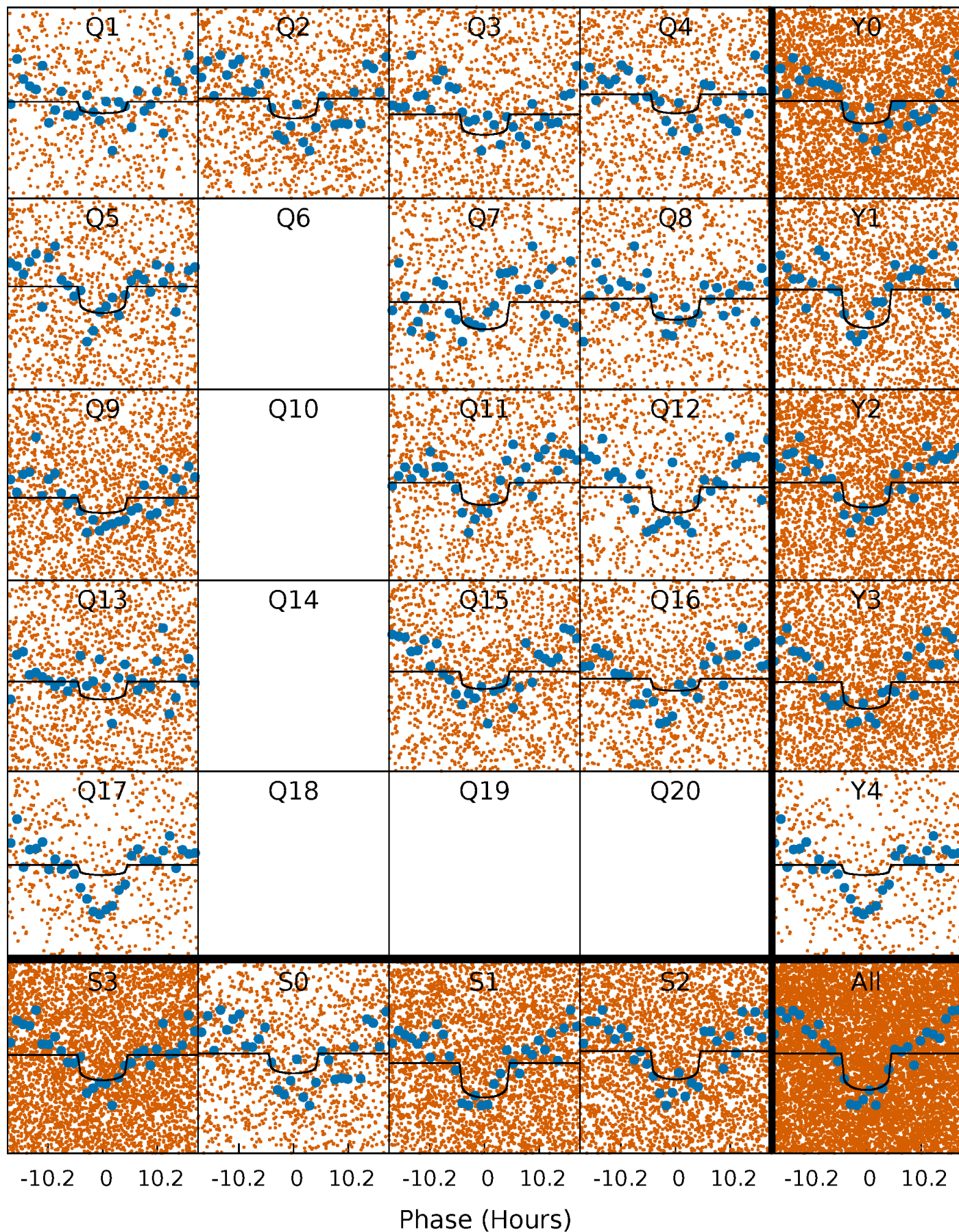
PDC Quarter-Phased Transit Curves

TCE 004664743-01 P= 2.556882 Days $T_0=132.057795$ (BKJD)



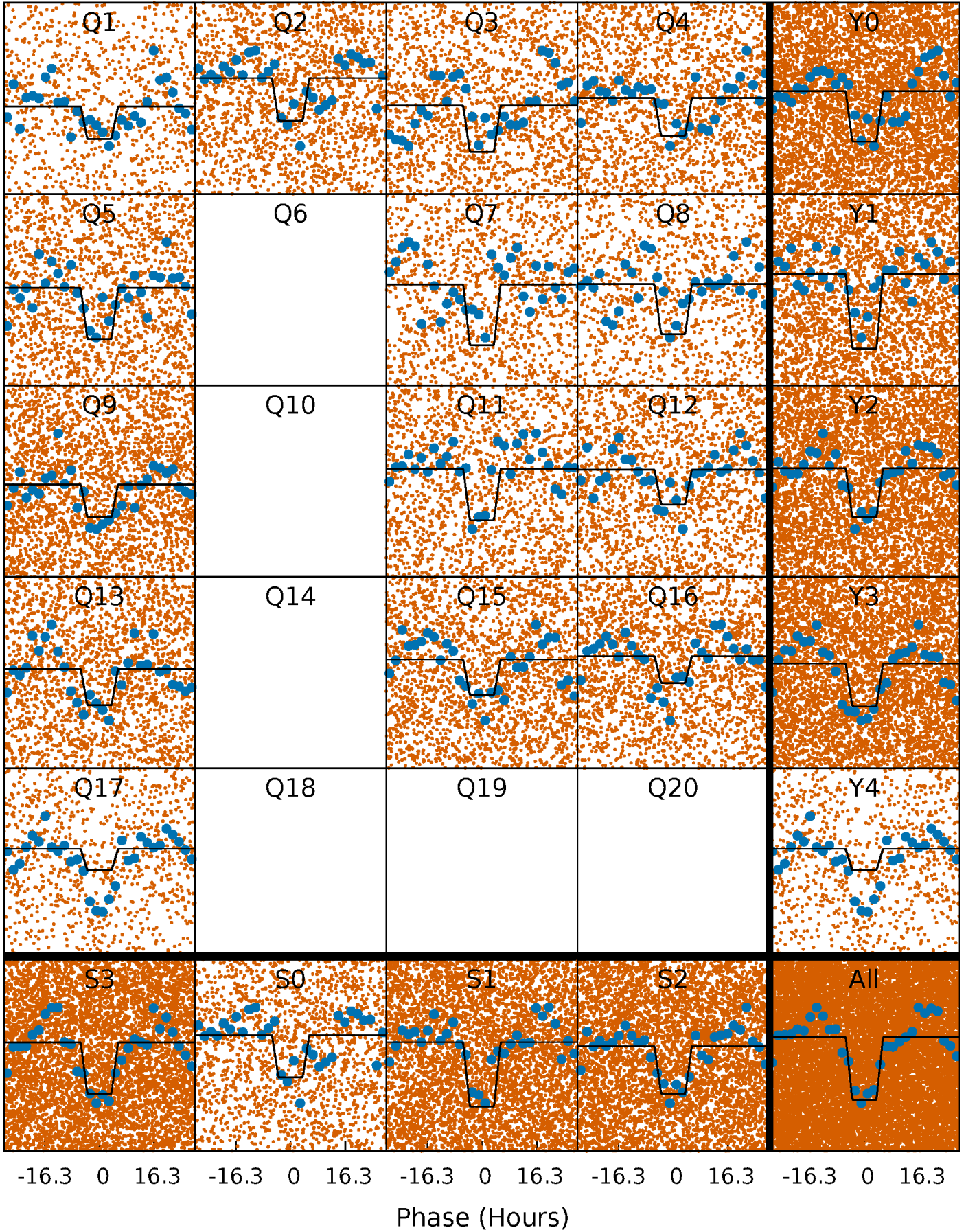
DV Quarter-Phased Transit Curves

TCE 004664743-01 P= 2.556882 Days $T_0=132.057795$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

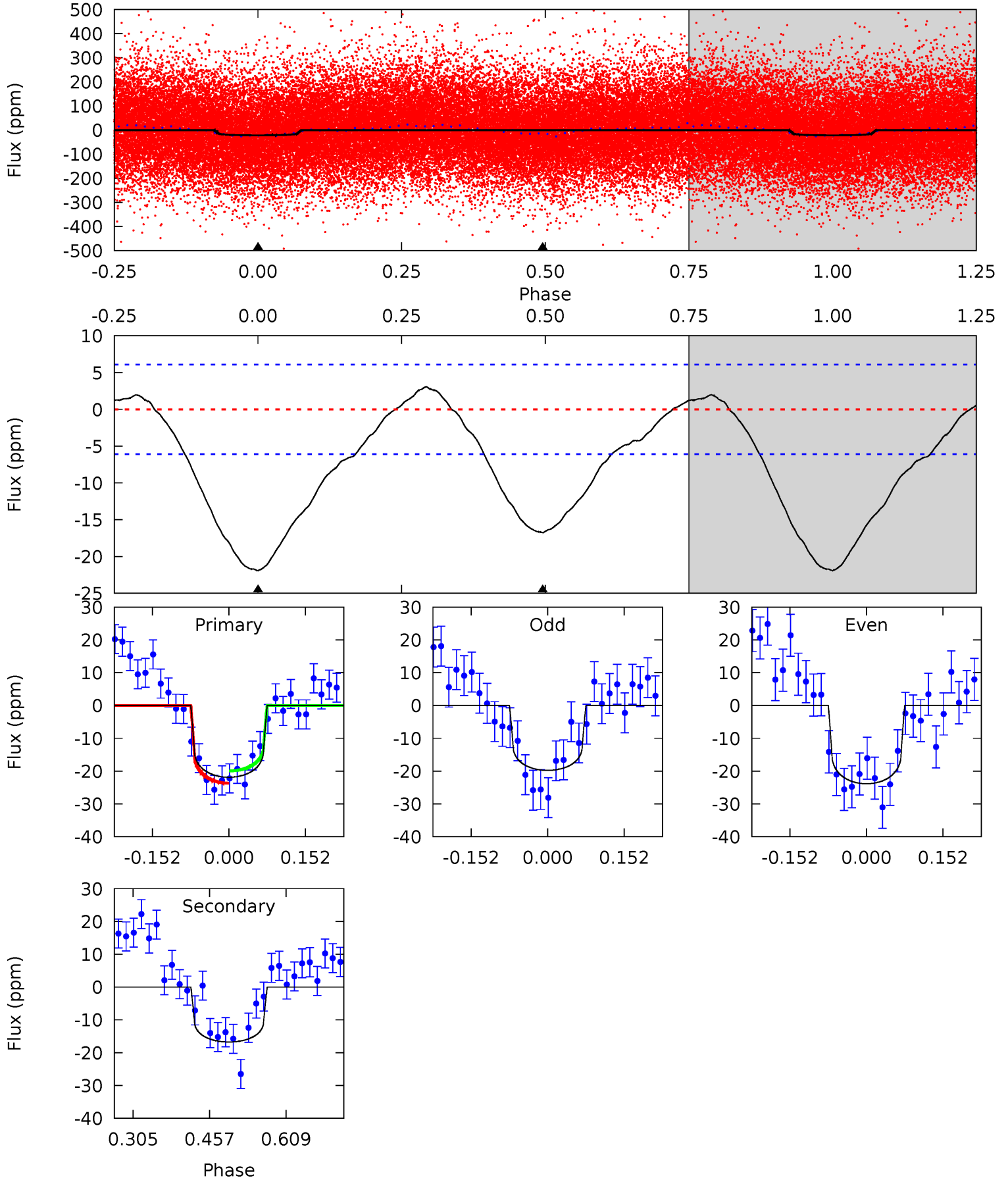
TCE 004664743-01 P= 2.556855 Days $T_0=132.046218$ (BKJD)



DV Model-Shift Uniqueness Test

004664743-01, P = 2.556882 Days, E = 129.500913 Days

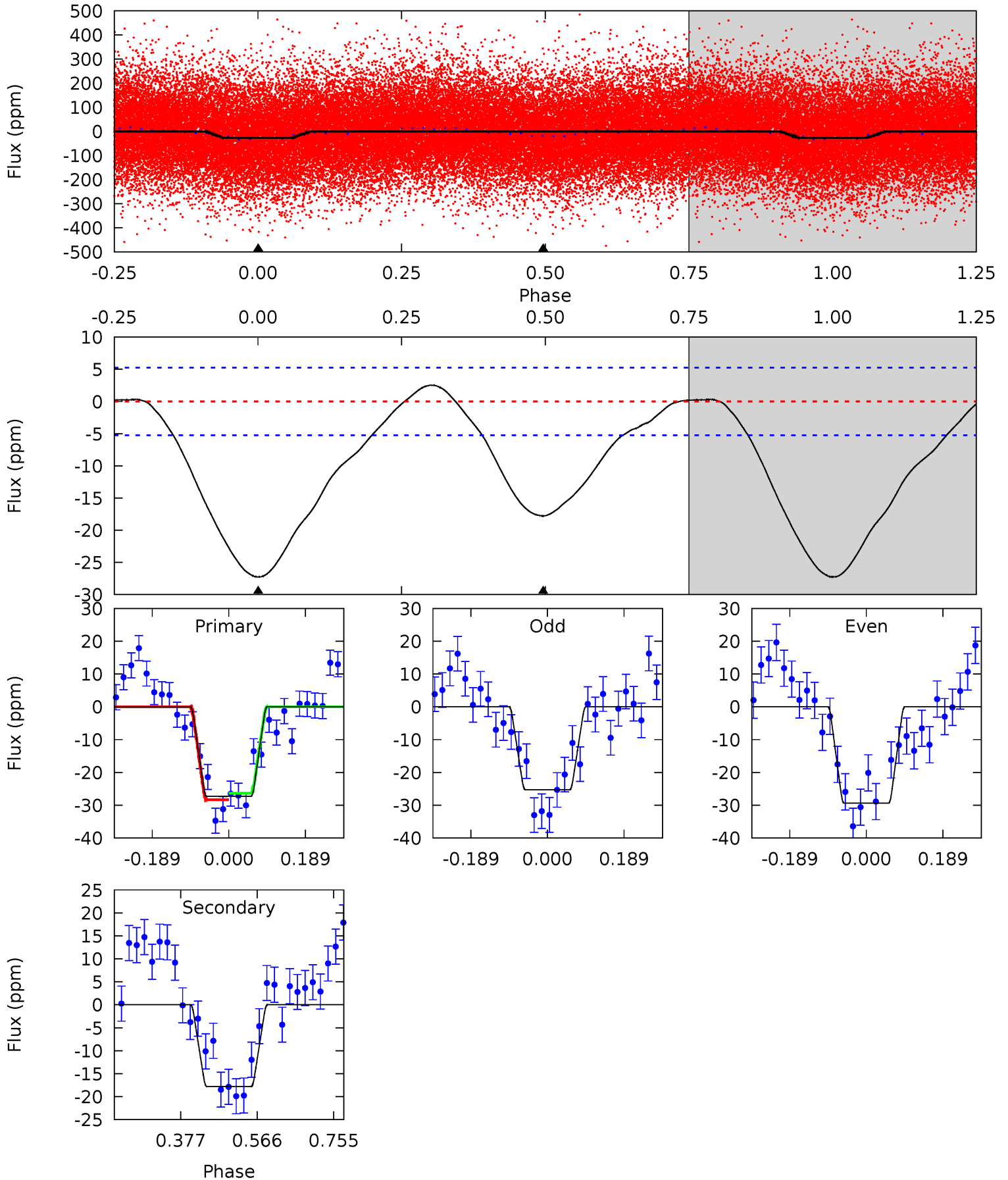
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 16.1 | 12.3 | 0 | 0 | 4.48 | 1.43 | 1.90 | 16.1 | 16.1 | 12.3 | 12.3 | 1.50 | 1.01 | 0.12 | 1.38 |



Alt Model-Shift Uniqueness Test

004664743-01, P = 2.556855 Days, E = 129.489363 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 23.0 | 15.0 | 0 | 0 | 4.43 | 1.31 | 1.70 | 23.0 | 23.0 | 15.0 | 15.0 | 1.74 | 1.06 | 0.09 | 0.84 |



Stellar Parameters For KIC 004664743

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 7758^{+214}_{-322} | $4.106^{+0.135}_{-0.165}$ | $0.000^{+0.200}_{-0.350}$ | $1.918^{+0.514}_{-0.420}$ | $1.713^{+0.181}_{-0.294}$ | $0.342^{+0.230}_{-0.159}$ |
| | +3%/-4% | +3%/-4% | +inf%/-inf% | +27%/-22% | +11%/-17% | +67%/-46% |
| Source | KIC0 | KIC0 | KIC0 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 004664743-01 / KOI 4642.01

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{max} (K)$ | $T_{obs} (K)$ | A_{obs} |
|---------|-------------|------------------------|----------------------|------------------------|------------------|
| DV | -17 ± 1 | $0.82^{+0.35}_{-0.33}$ | 3176^{+216}_{-196} | 7930^{+3377}_{-1509} | 26^{+43}_{-13} |
| Alt. | -18 ± 1 | $1.14^{+0.36}_{-0.33}$ | 3161^{+229}_{-203} | 6612^{+1344}_{-799} | 14^{+13}_{-6} |

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 $A_{obs} \gg 1.0$

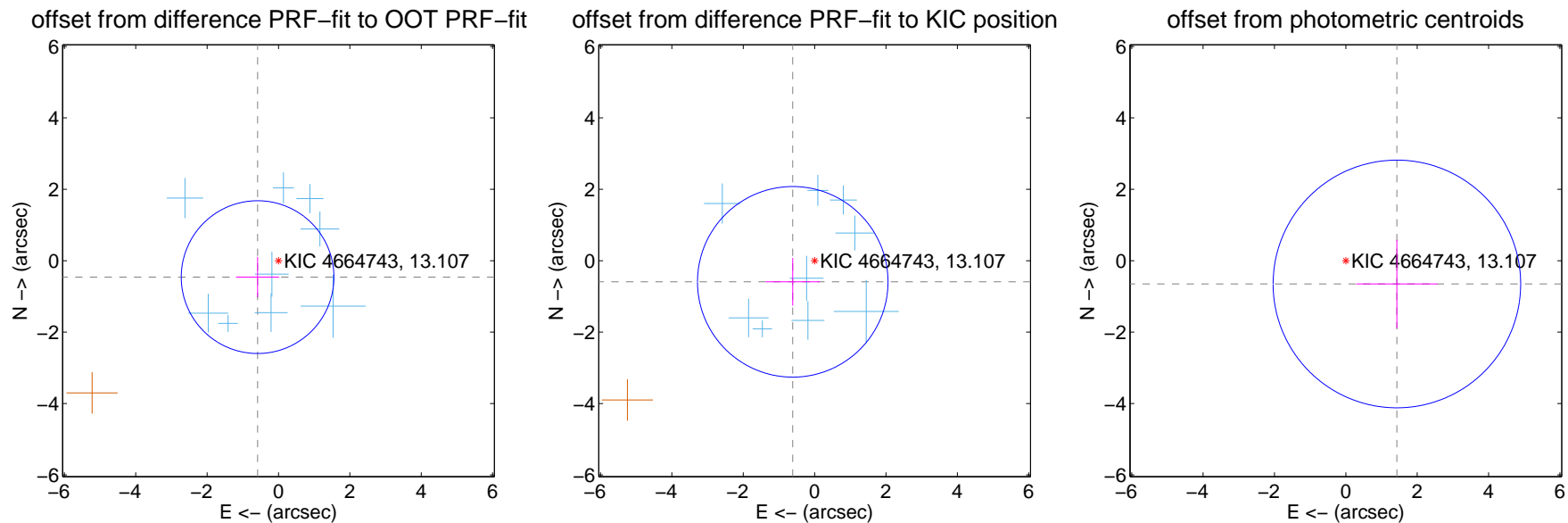
DV Centroid Data

Supplemental centroid analysis for 004664743-01. Kepler magnitude: 13.11. Transit SNR 9.02

There are 9 quarters with good PRF difference image offsets

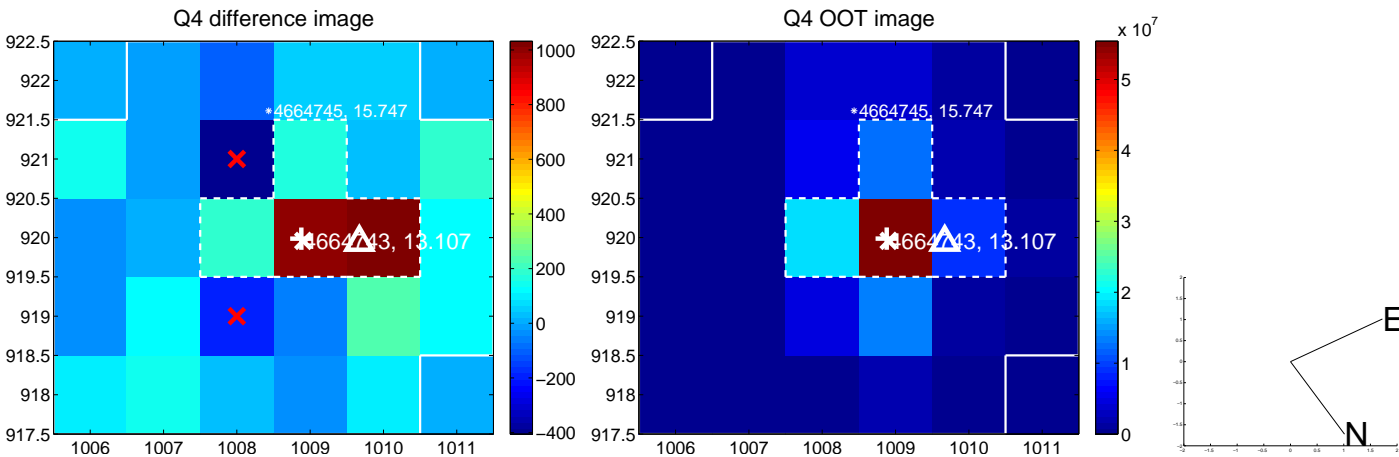
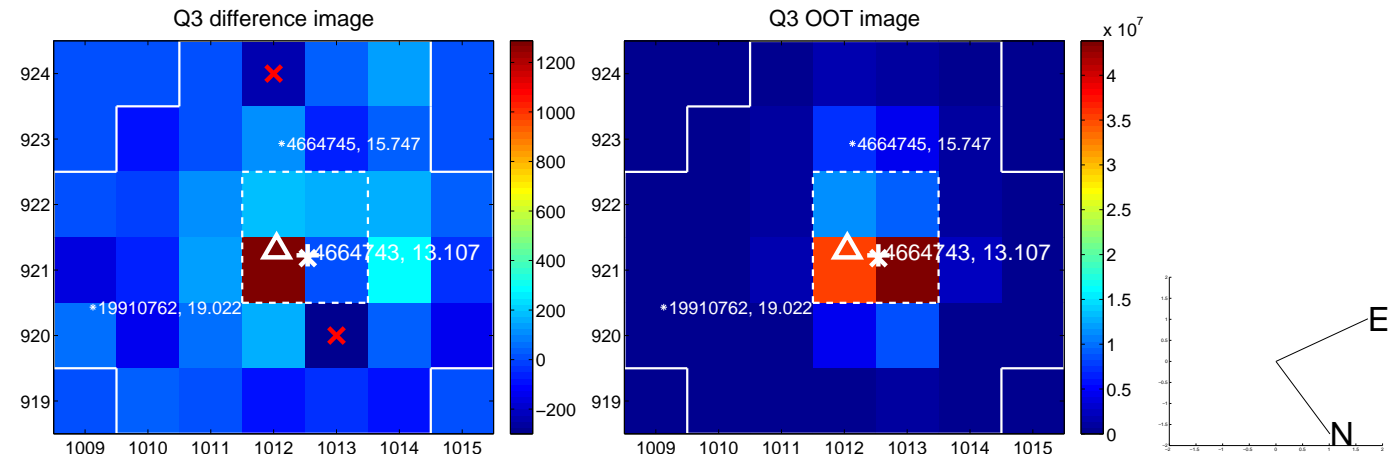
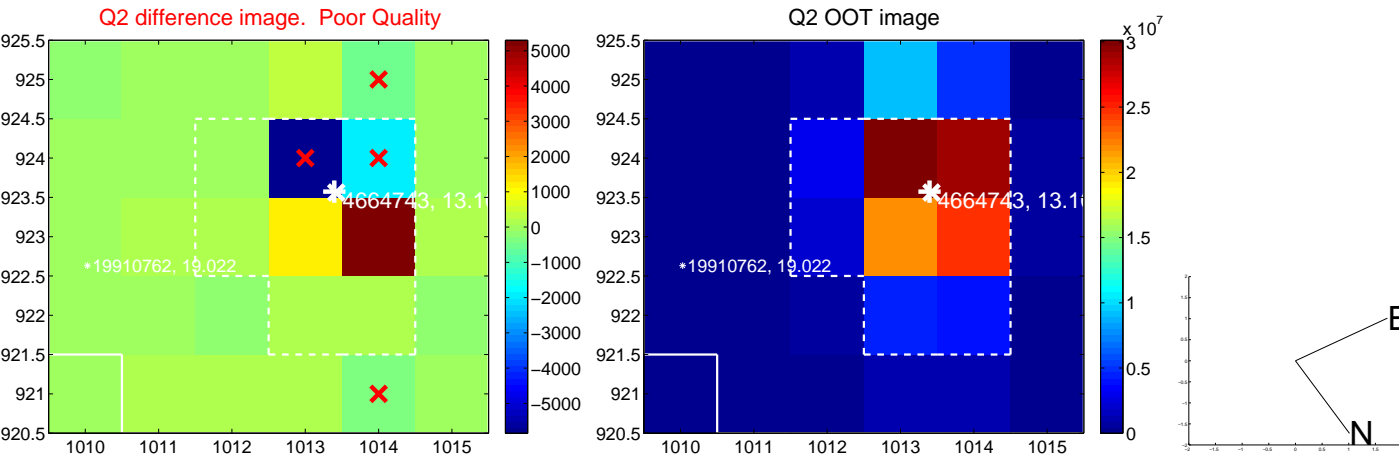
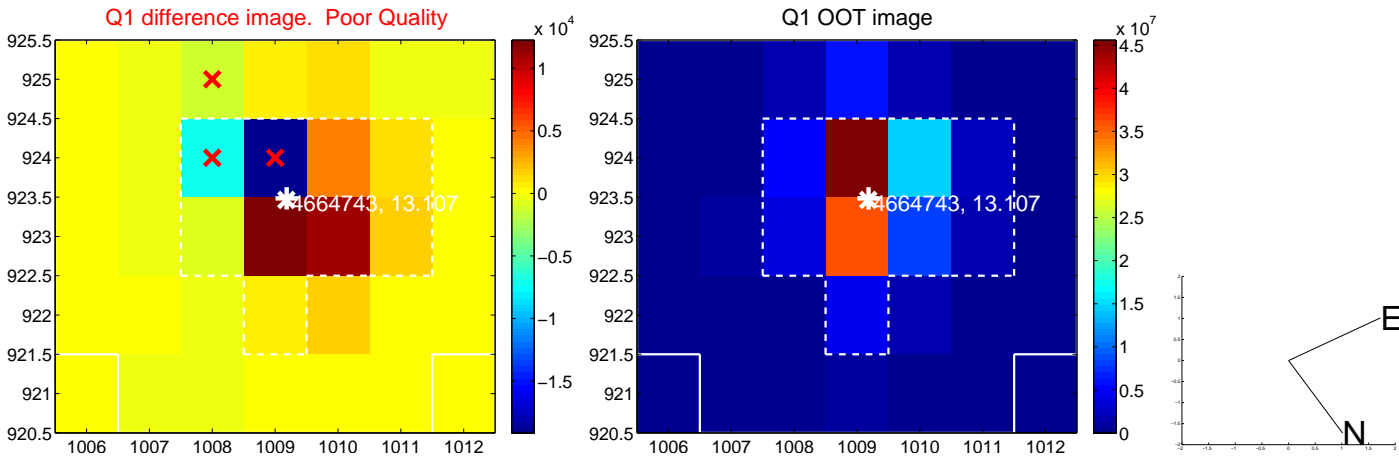
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT | 0.745 ± 0.713 | 1.04 | 0.586 ± 0.603 | -0.460 ± 0.563 |
| PRF-fit source offset from KIC position | 0.852 ± 0.890 | 0.96 | 0.613 ± 0.757 | -0.592 ± 0.669 |
| photometric centroid source offset | 1.57 ± 1.16 | 1.36 | -1.43 ± 1.14 | -0.65 ± 1.24 |

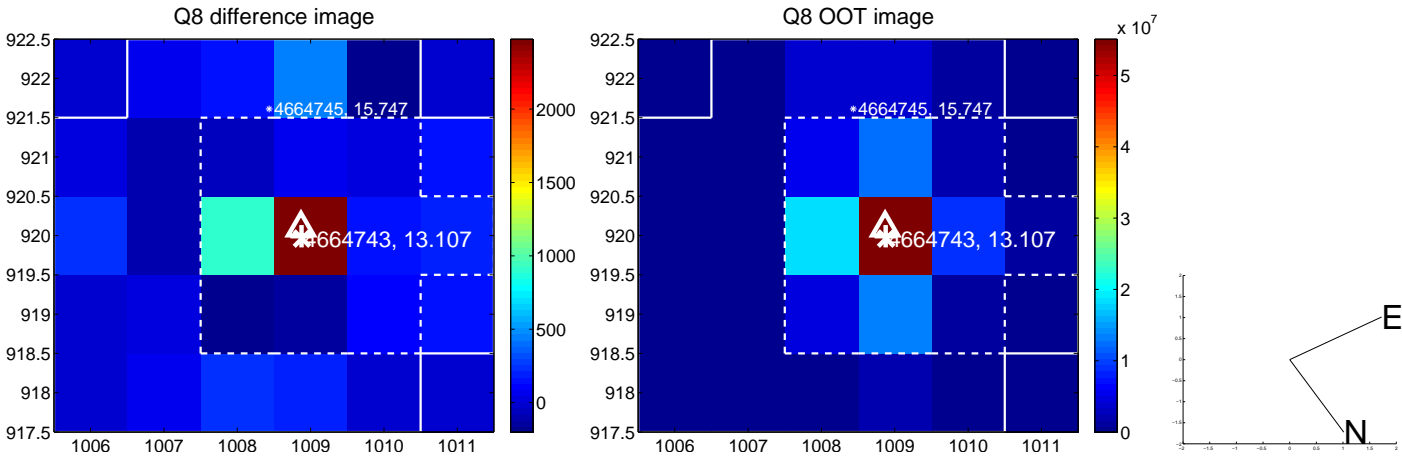
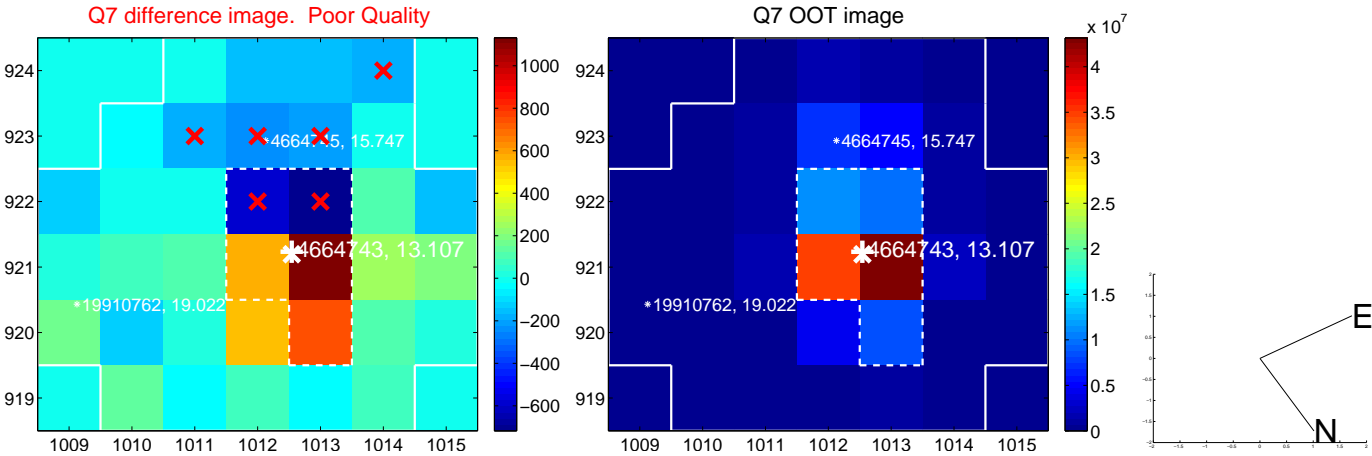
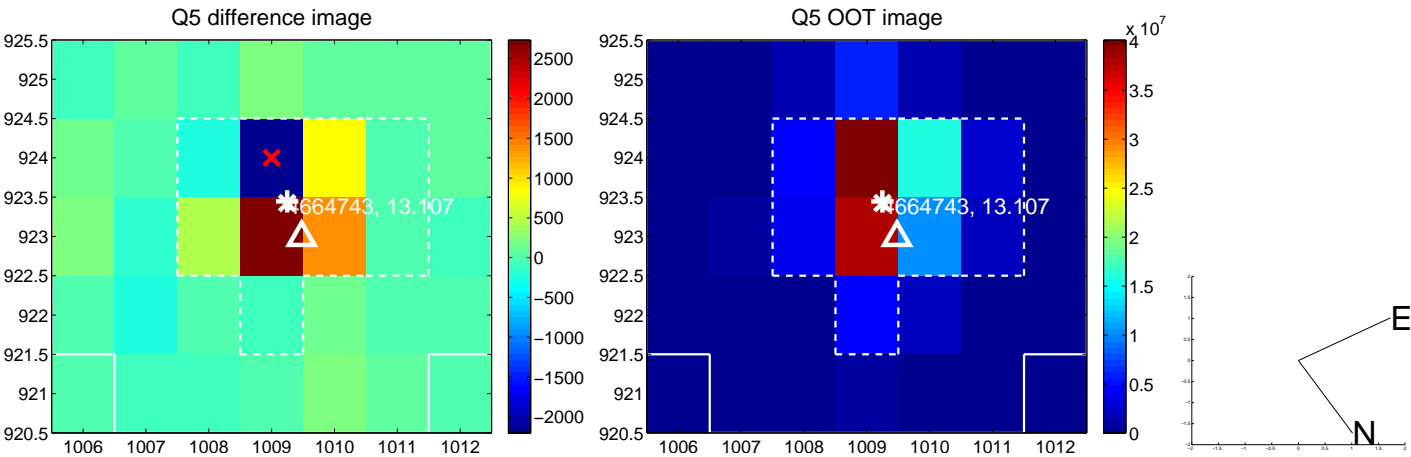


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

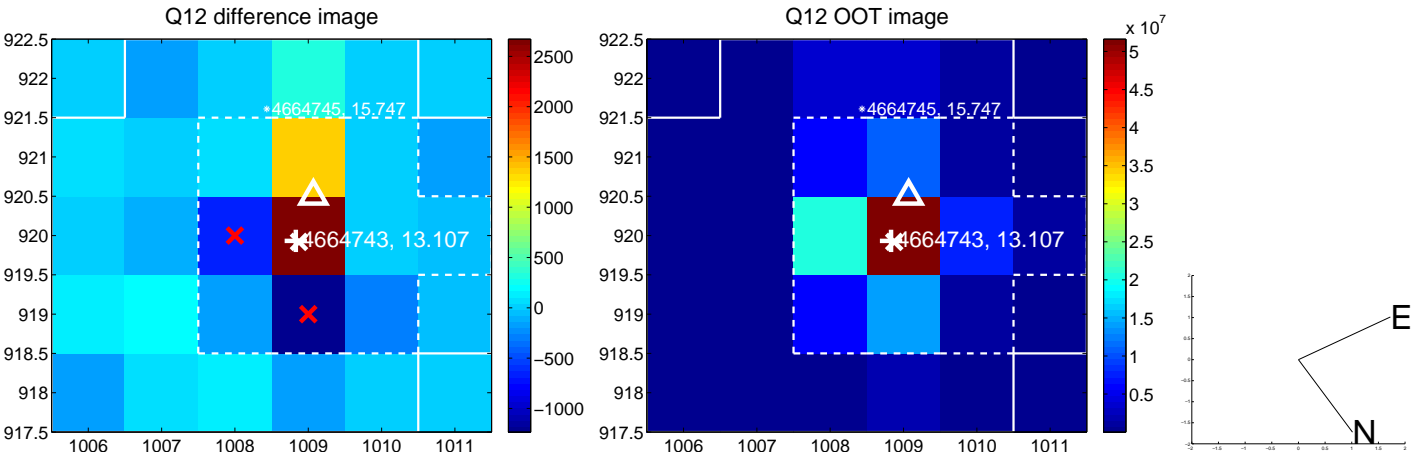
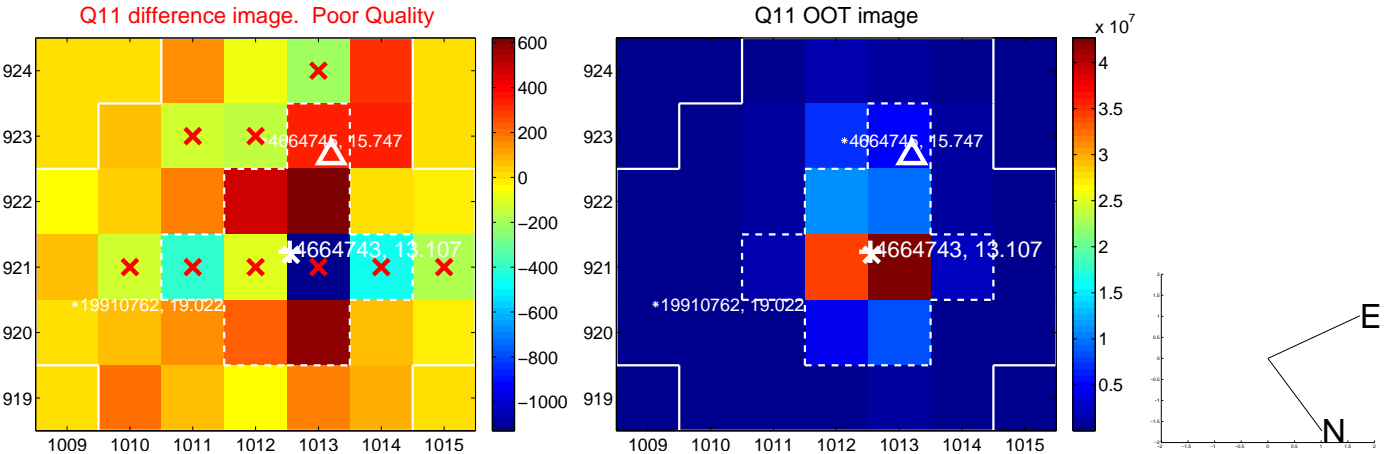
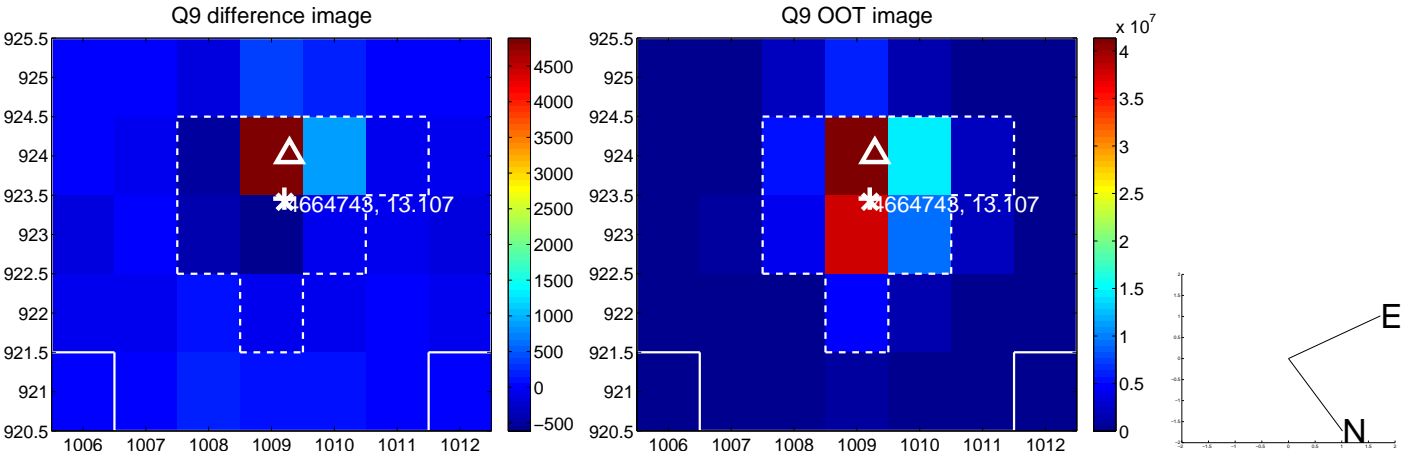
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



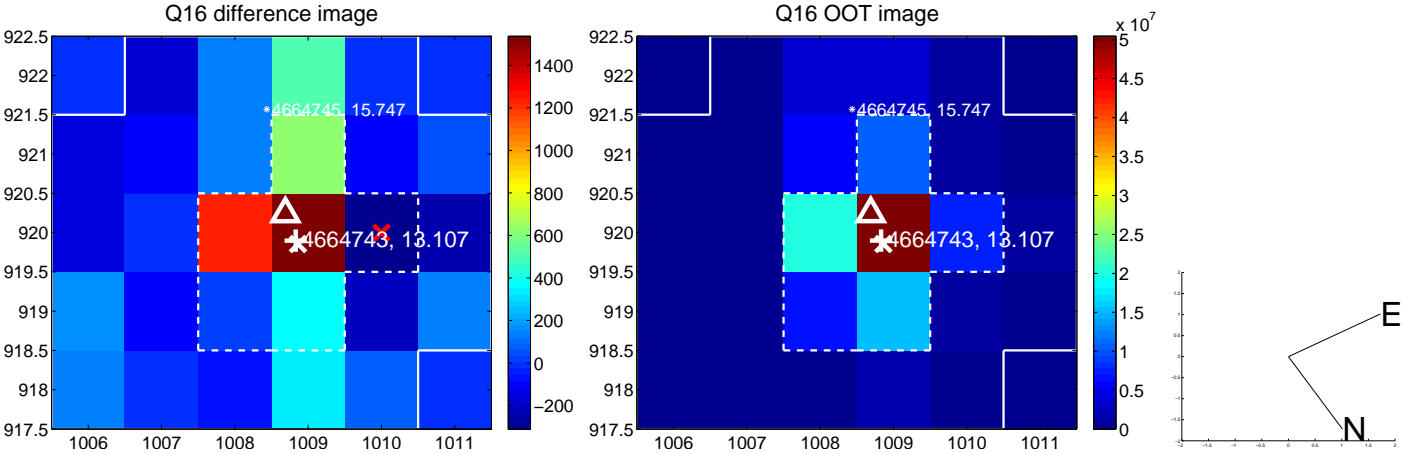
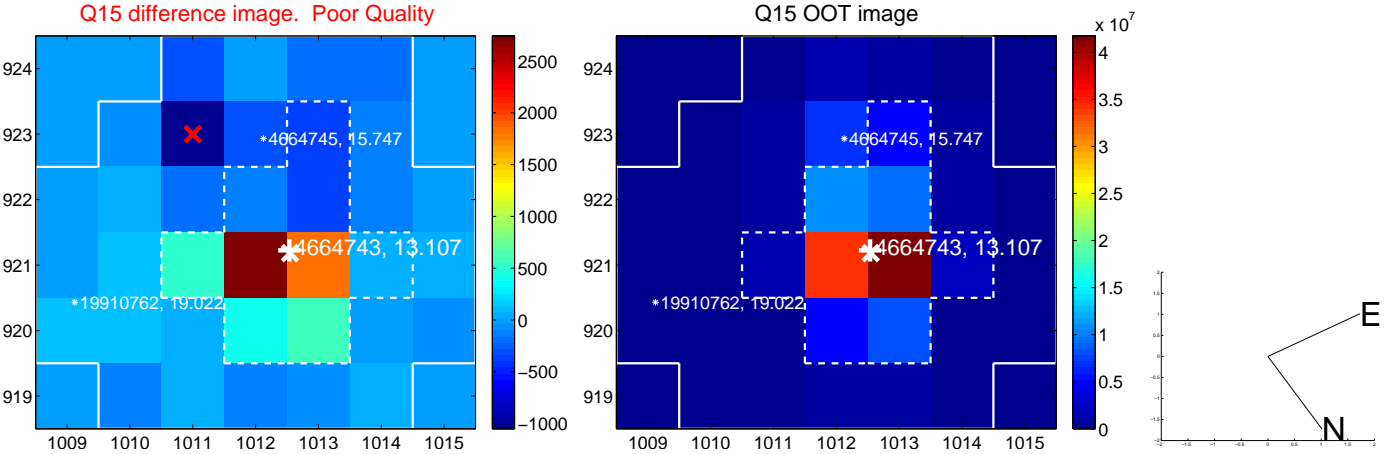
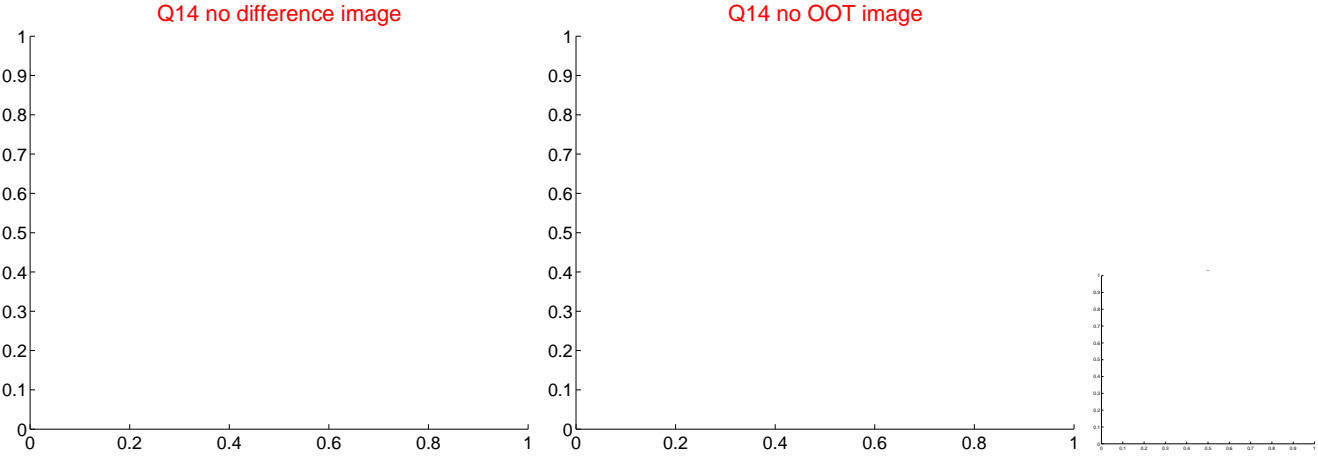
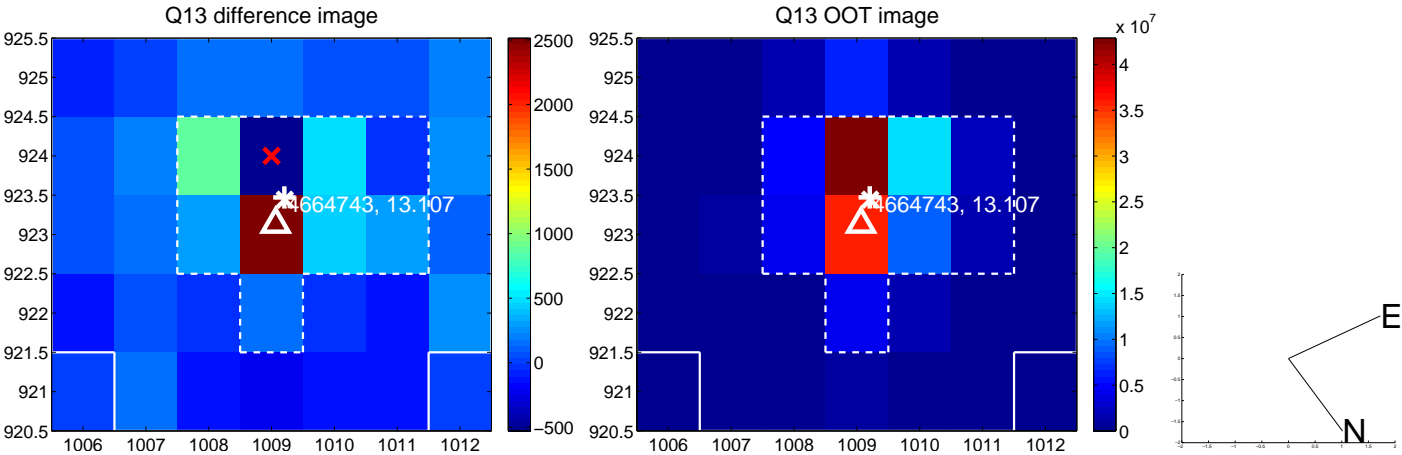
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



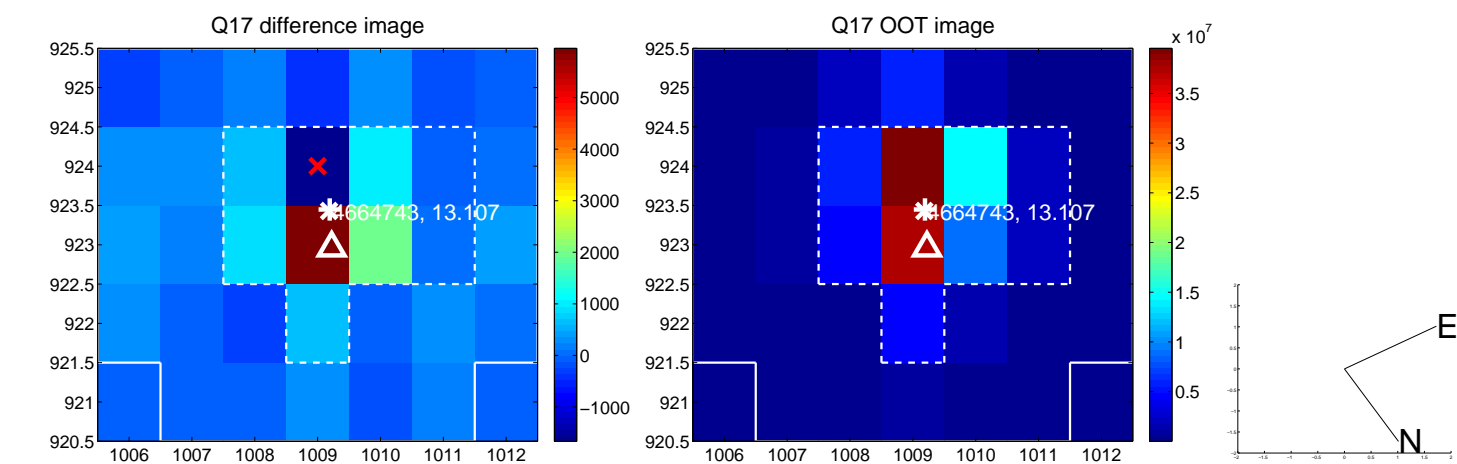
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



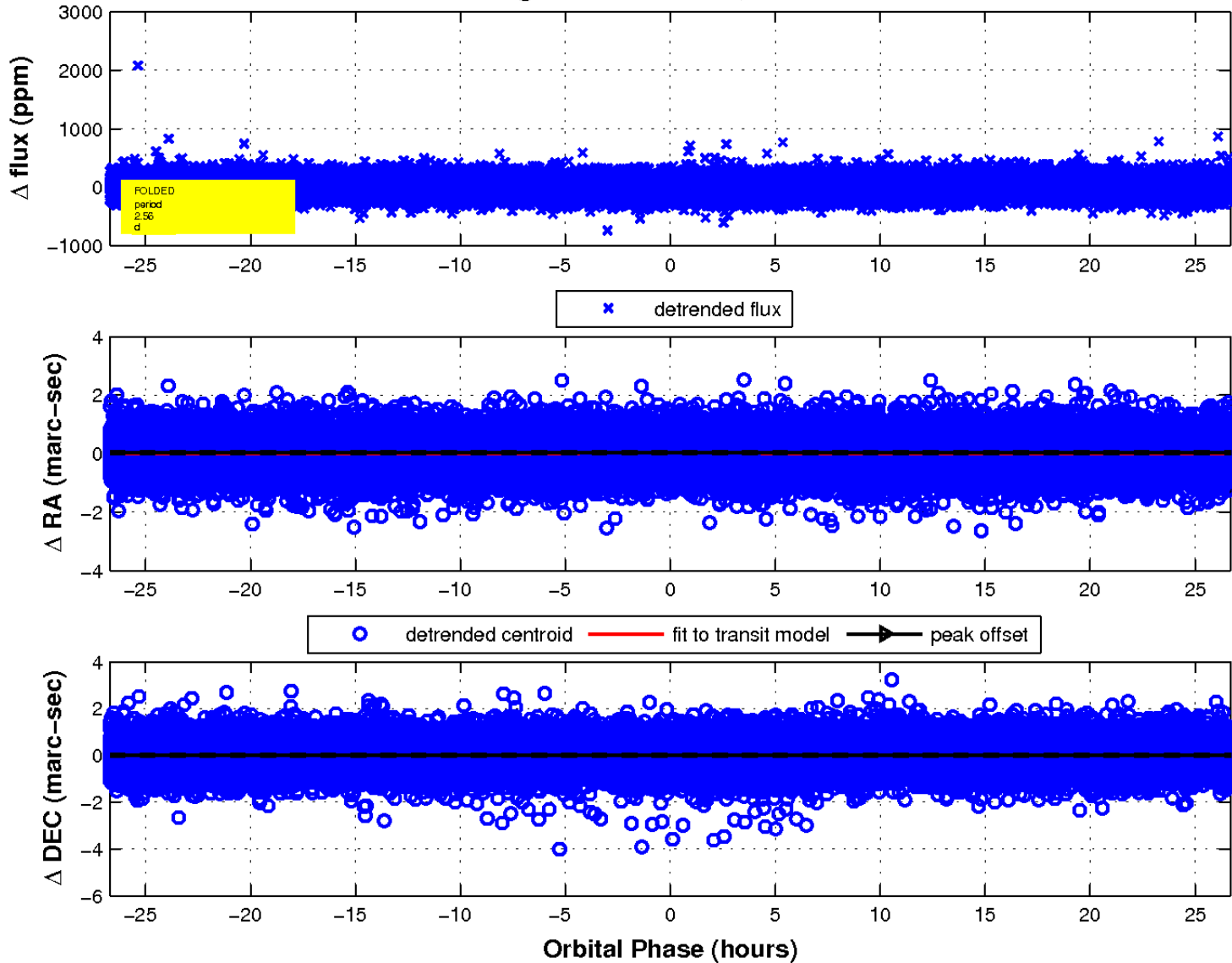
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

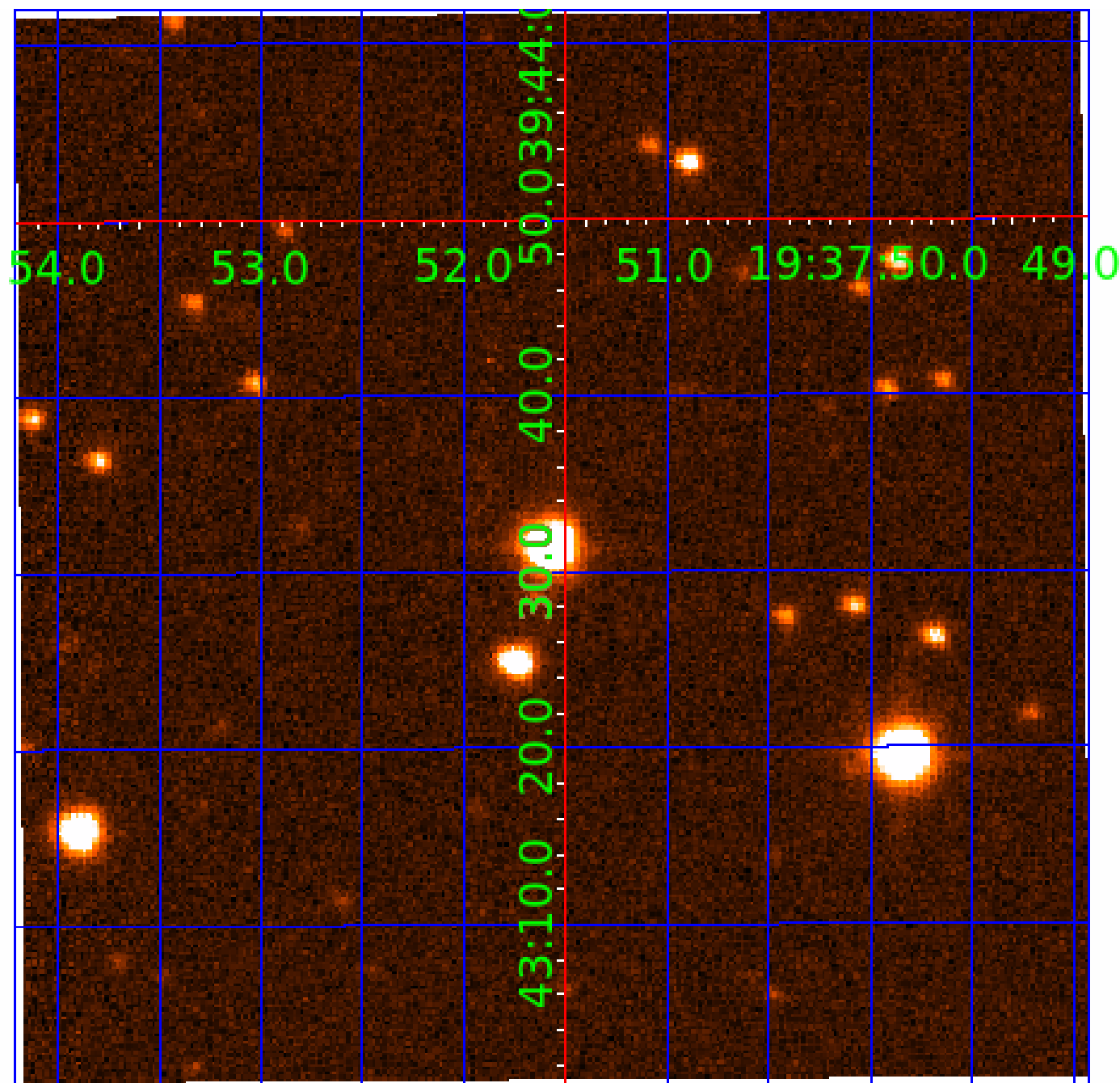


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 004664743

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|-----|-----------------------------|-----------------|------------------------|------------------------|
| 004664743-01 | OBS | 4642.01 | 2.556882 | 132.057795 | 17.3 | 8.899 | 10.1 | 9.0 | 1.92 | 7758 | 0.82 | 6225.56 |
| 004664743-02 | OBS | No | 2.556623 | 133.470793 | 11.5 | 18.042 | 9.9 | 8.1 | 1.92 | 7758 | 0.66 | 6226.40 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|------------------------|
| 004664743-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV |
| 004664743-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—SAME_NTL_PERIOD |

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 004664743-02

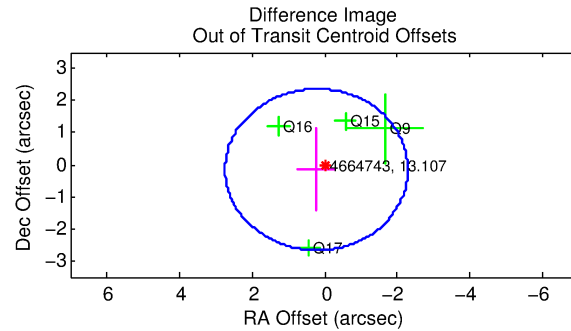
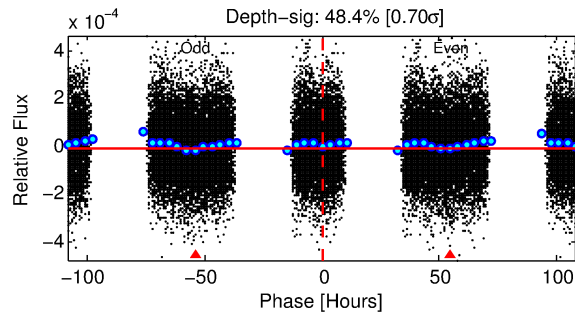
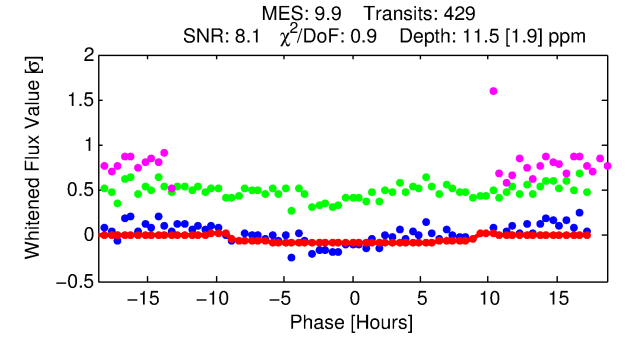
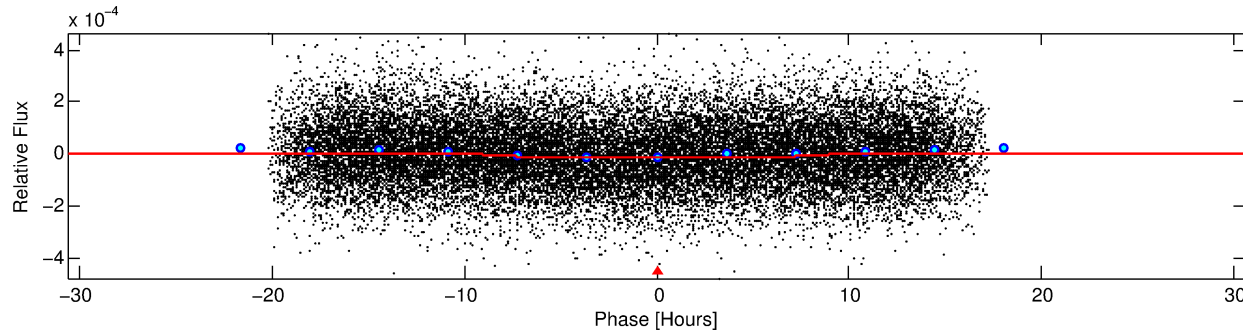
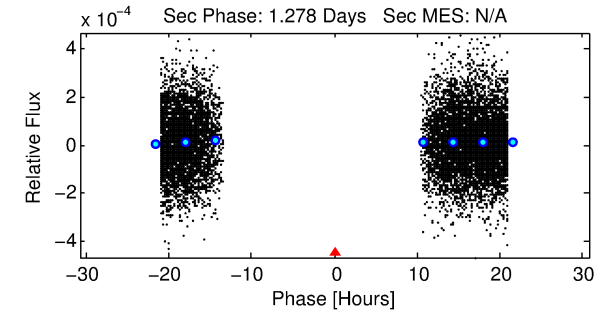
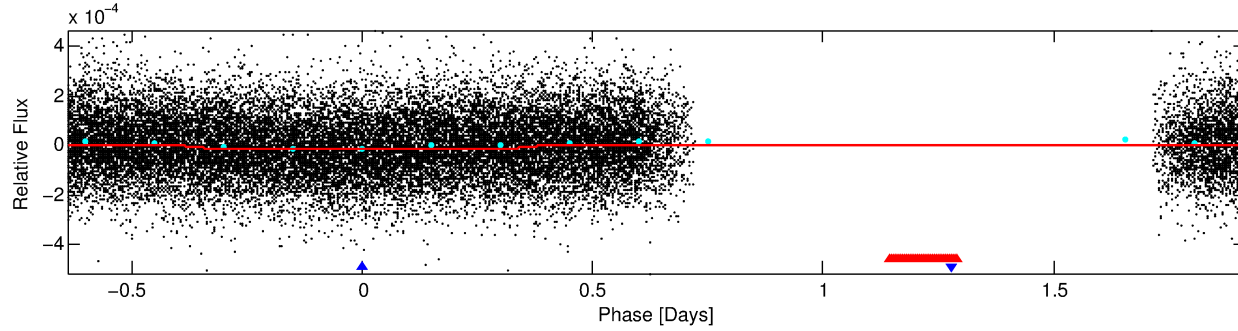
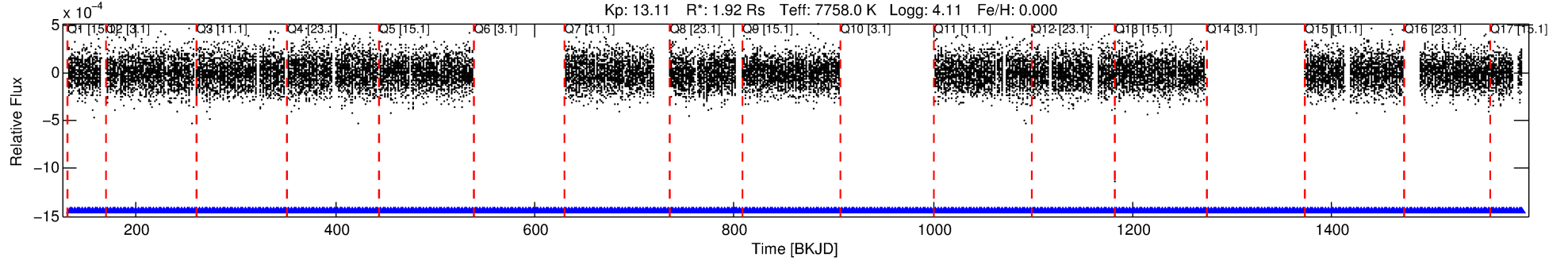
No Significant Match Found

DV One-Page Summary

KIC: 4664743 Candidate: 2 of 2 Period: 2.557 d

KOI: K04642 Corr: No Ephemeris Match

Kp: 13.11 R*: 1.92 Rs Teff: 7758.0 K Logg: 4.11 Fe/H: 0.000



DV Fit Results:

Period = 2.55662 [0.00007] d
Epoch = 133.4708 [0.0147] BKJD
Rp/R* = 0.0032 [0.0038]
a/R* = 1.26 [3.39]
b = 0.03 [237.38]
Seff = 6226.40 [2189.31]
Teq = 2265 [199] K
Rp = 0.66 [0.81] Re
a = 0.0438 [0.0096] AU

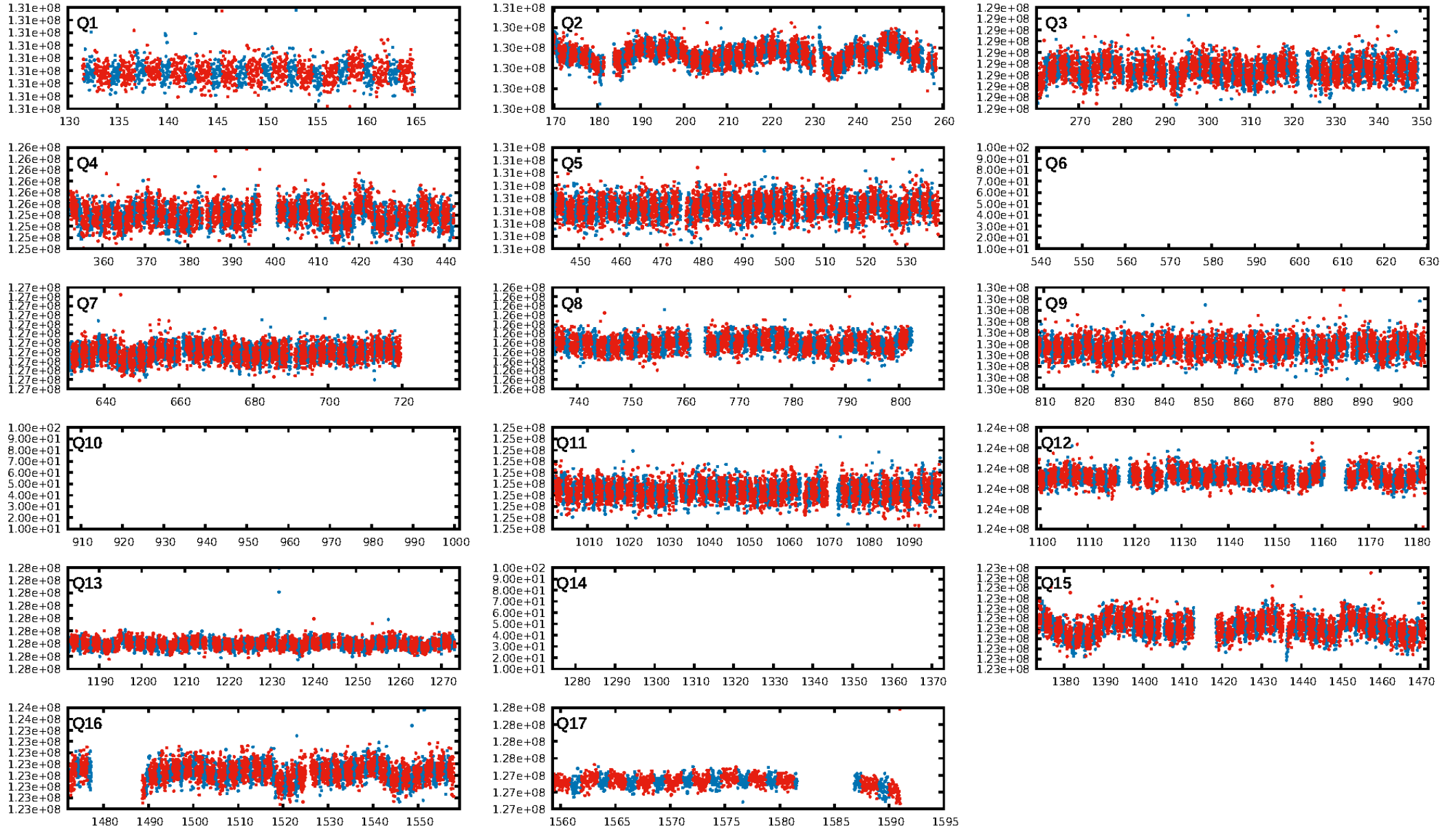
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [405/405]
GhostDiagnostic-chr: 6.898
Centroid-sig: 61.9%
Centroid-so: 1.177 arcsec [0.90σ]
OotOffset-rm: 0.272 arcsec [0.32σ]
KicOffset-rm: 0.391 arcsec [0.41σ]
OotOffset-st: 0/1/1/2 [4]
KicOffset-st: 0/1/1/2 [4]
DiffImageQuality-fgm: 0.75 [3/4]
DiffImageOverlap-fno: 0.00 [0/14]

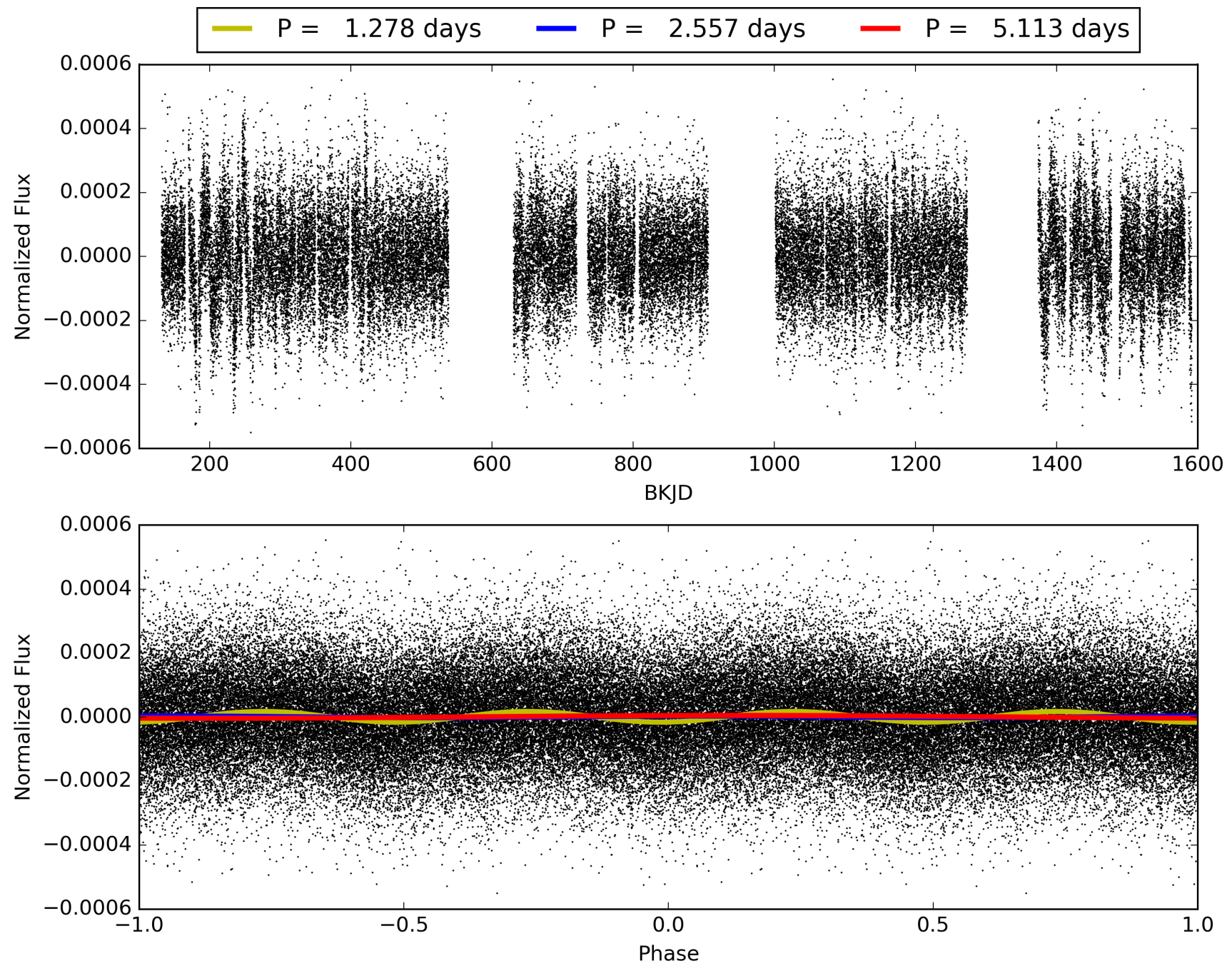
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 09:02:11 Z

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

TCE 004664743-02, PDC Light Curves

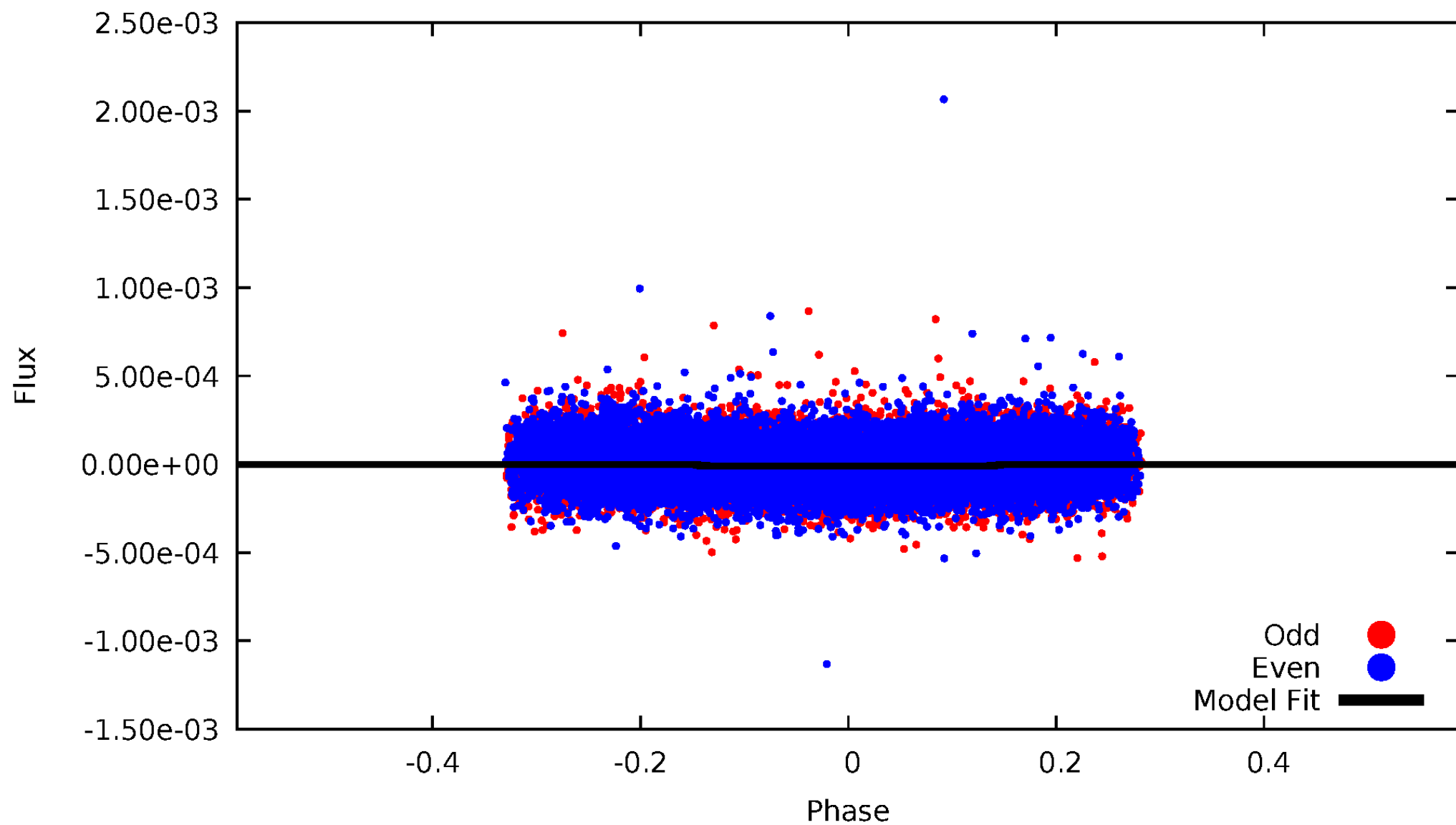


TCE 004664743-02



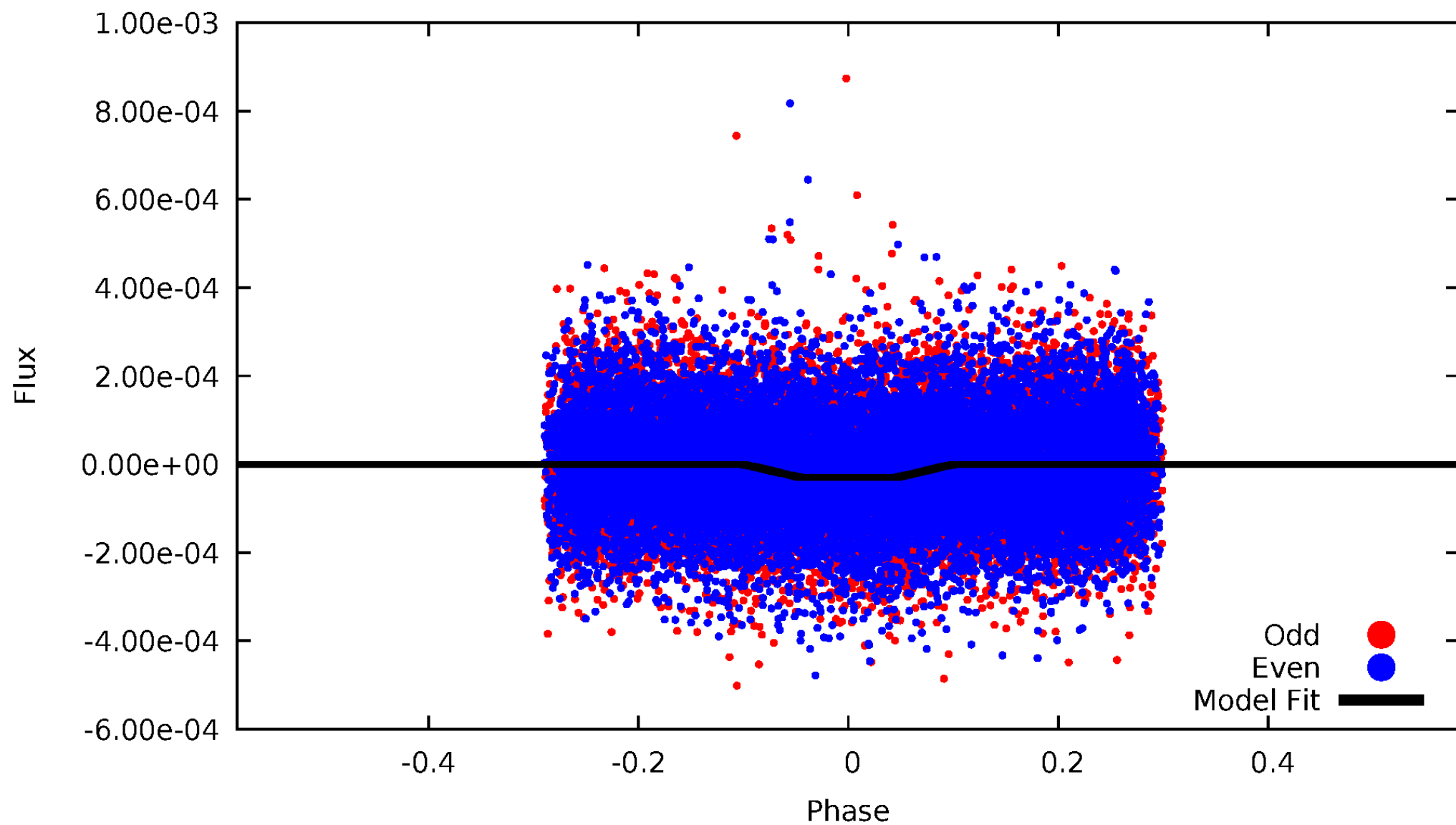
DV Odd/Even

TCE 004664743-02



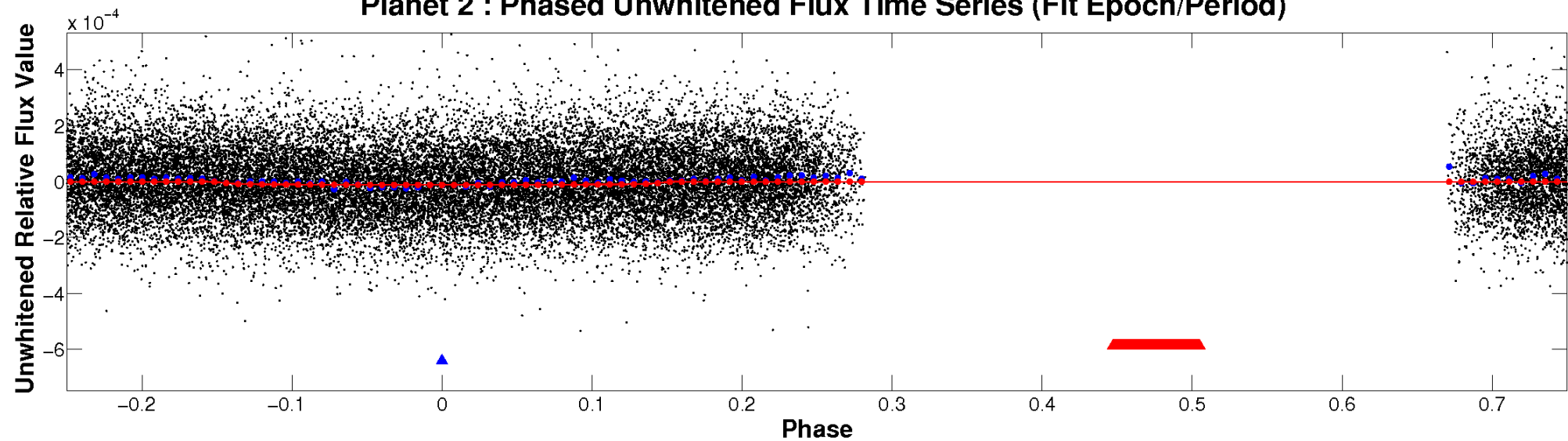
ALT Odd/Even

TCE 004664743-02

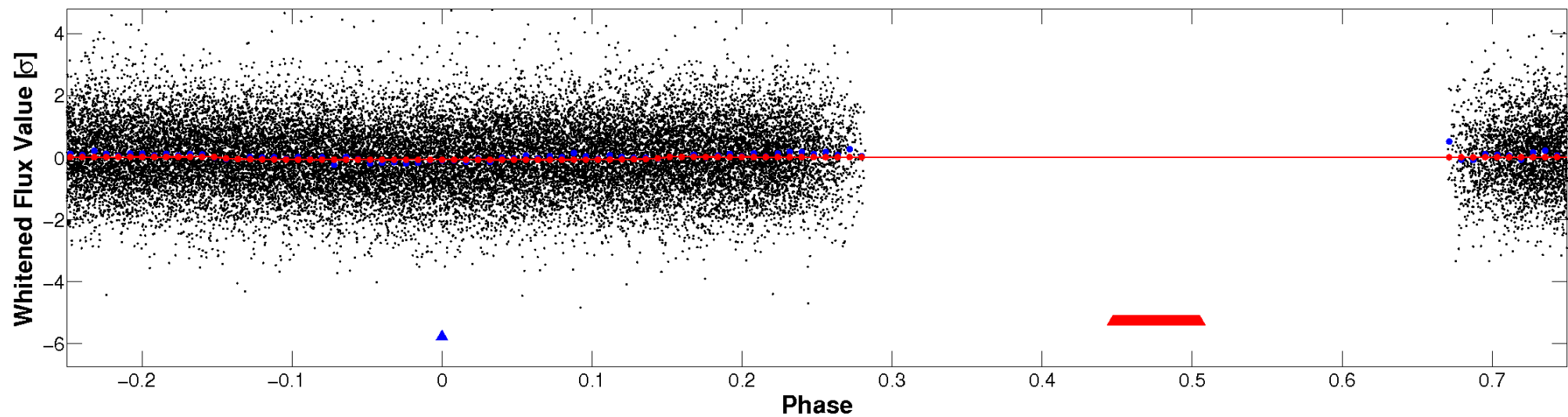


Non-Whitened Vs. Whitened Light Curve

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

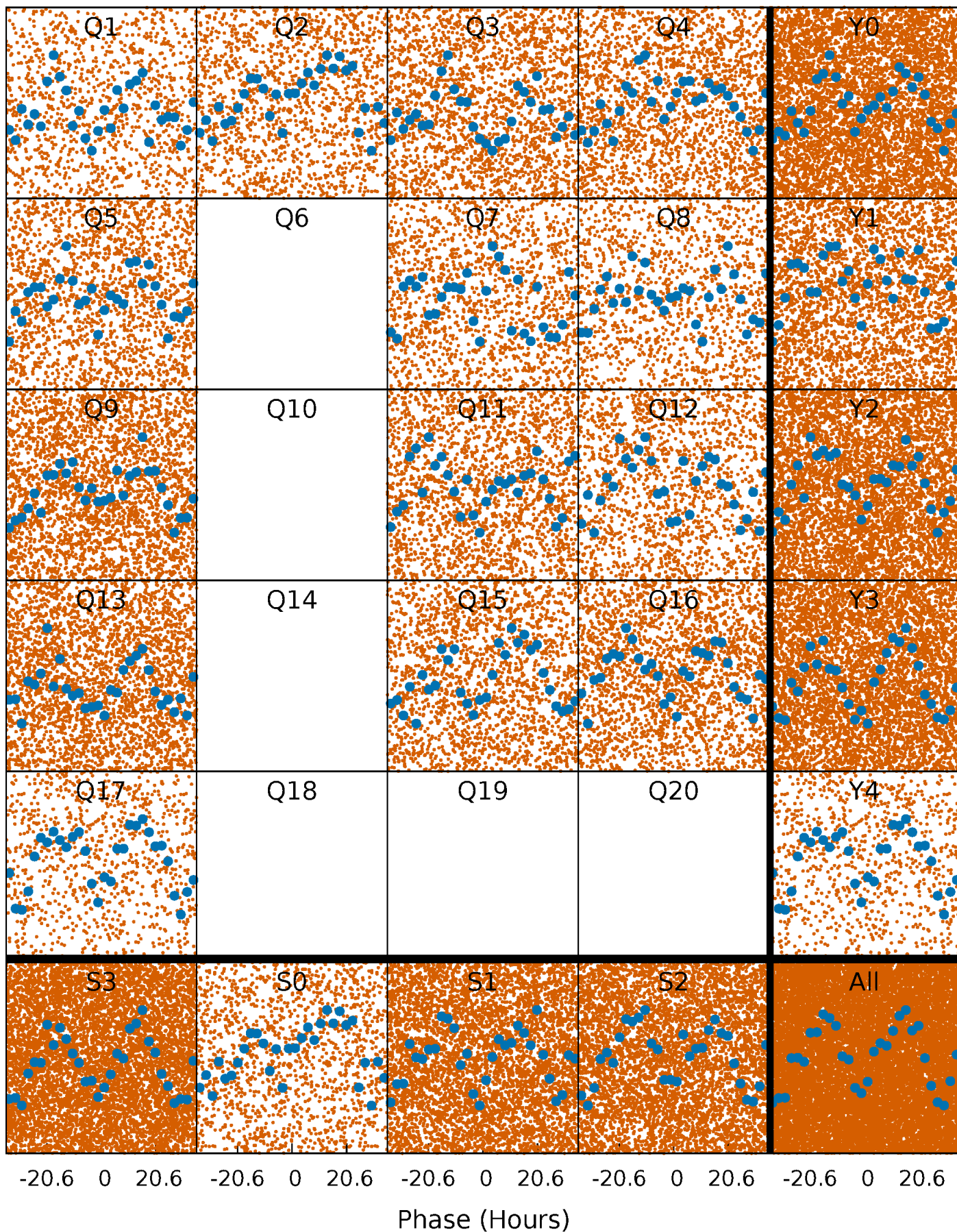


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



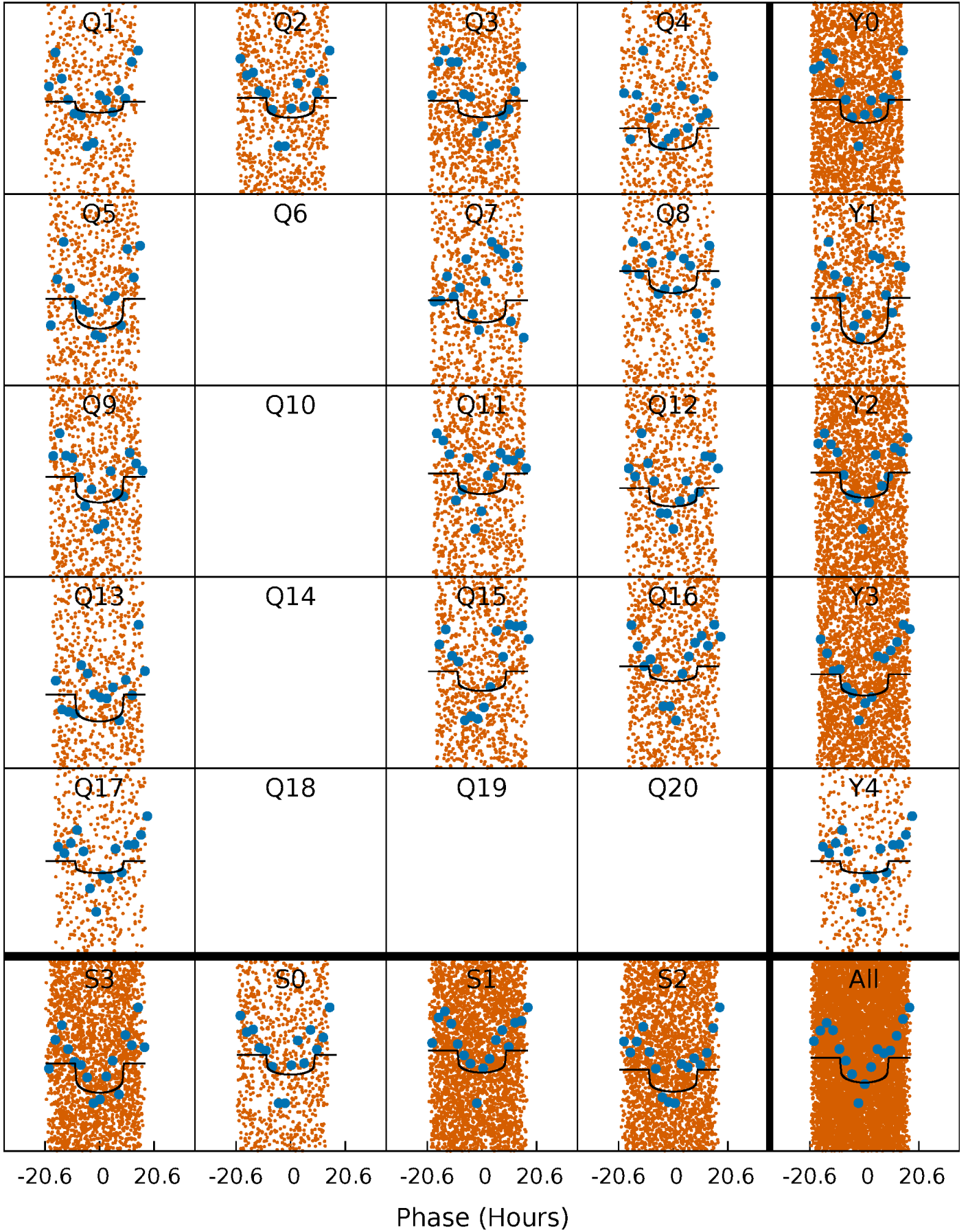
PDC Quarter-Phased Transit Curves

TCE 004664743-02 P= 2.556623 Days $T_0=133.470793$ (BKJD)



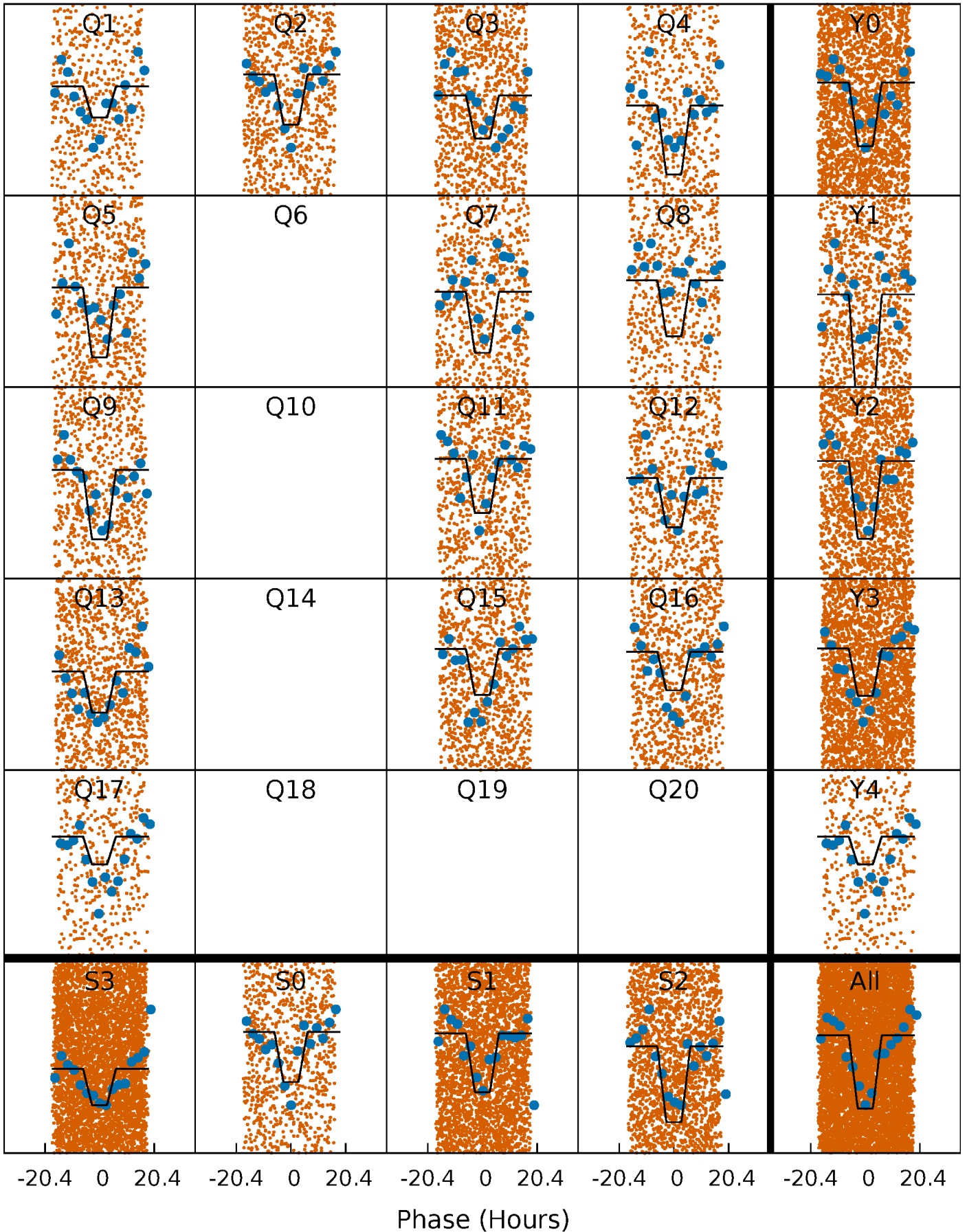
DV Quarter-Phased Transit Curves

TCE 004664743-02 P= 2.556623 Days $T_0=133.470793$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

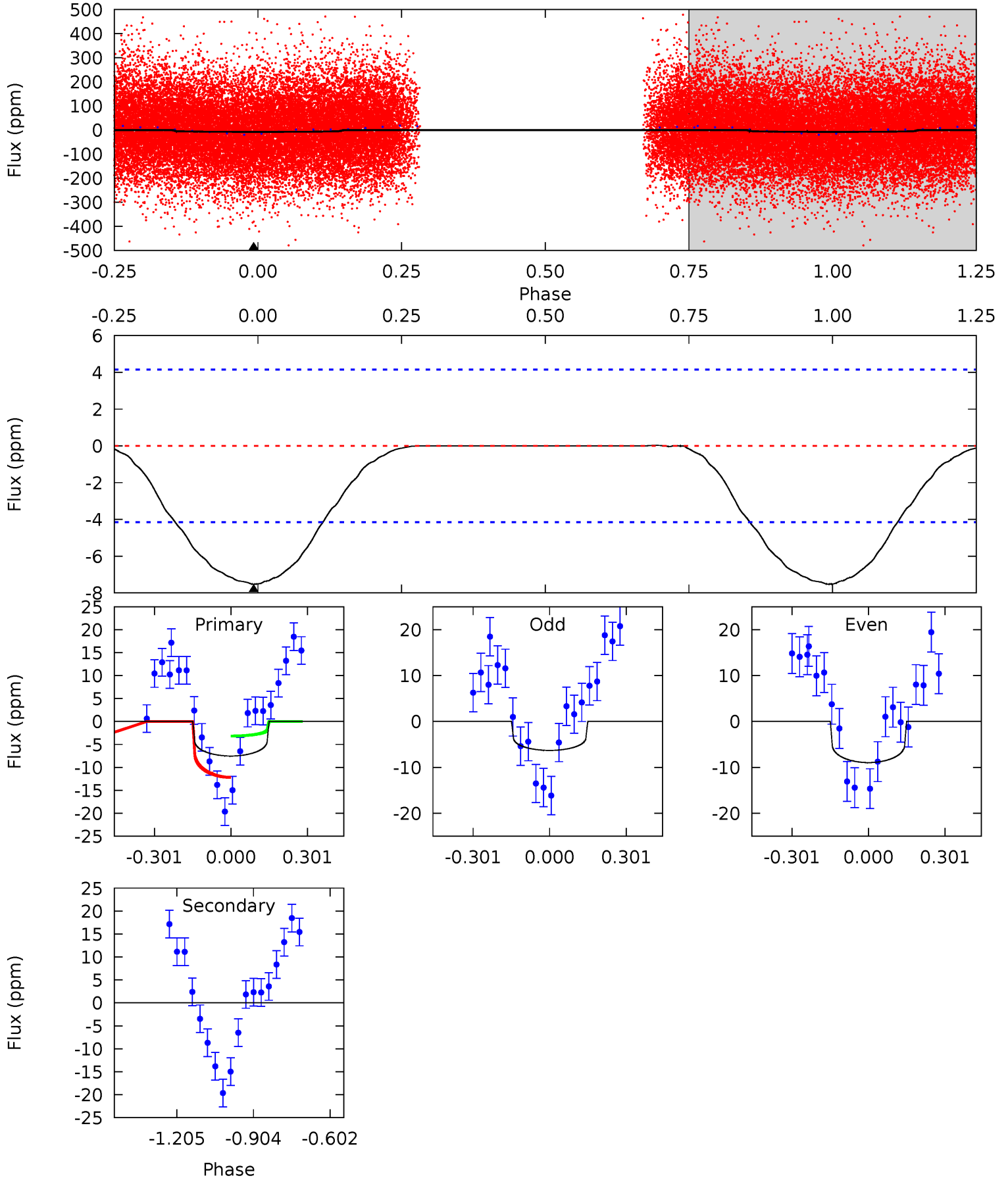
TCE 004664743-02 P= 2.556724 Days $T_0=133.368570$ (BKJD)



DV Model-Shift Uniqueness Test

004664743-02, P = 2.556623 Days, E = 130.914170 Days

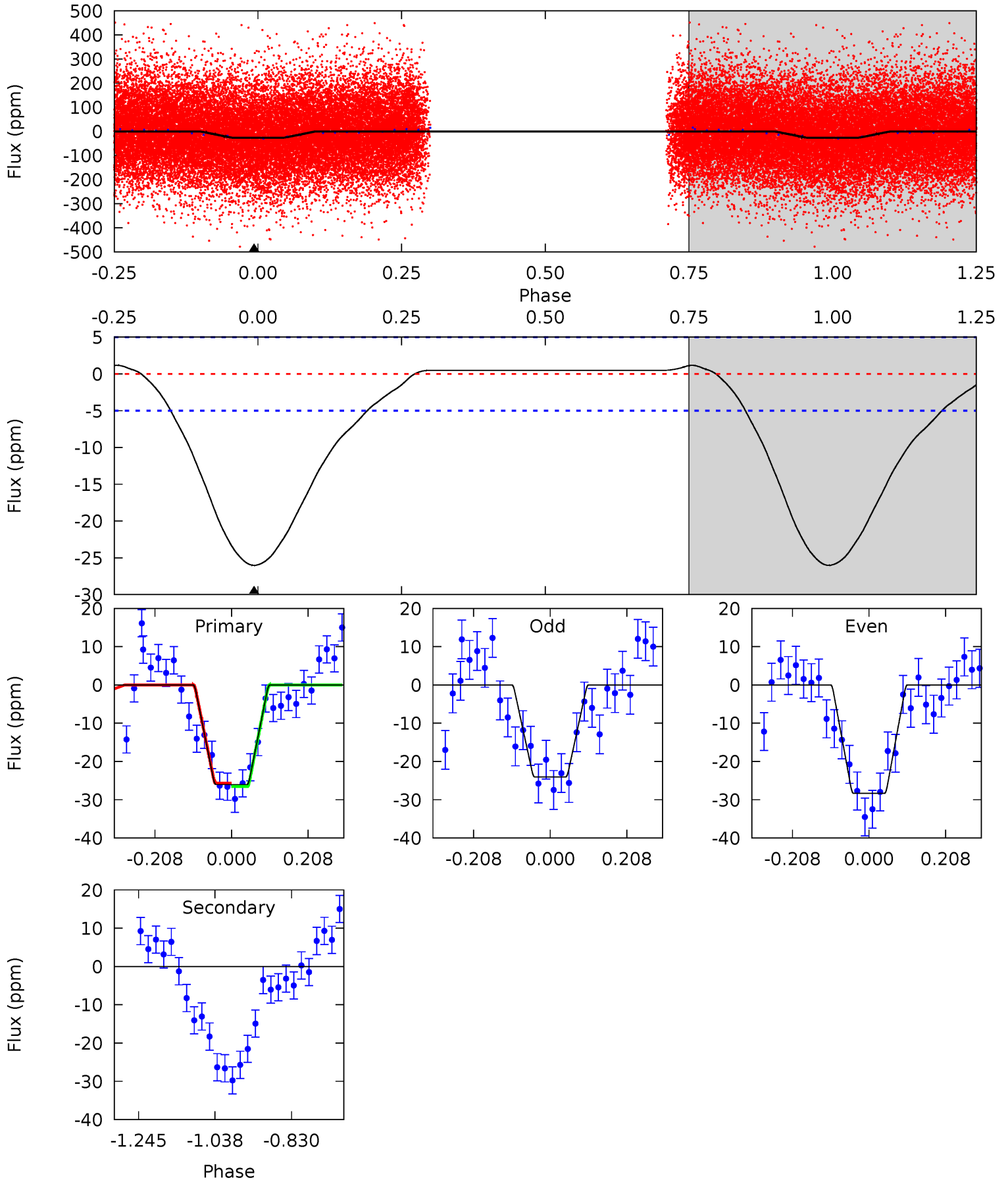
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|-----|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 7.84 | 0 | 0 | 0 | 4.33 | 1.03 | 0.05 | 7.84 | 7.84 | 0 | 0 | 1.39 | 0.99 | 0.00 | 4.74 |



Alt Model-Shift Uniqueness Test

004664743-02, P = 2.556724 Days, E = 130.811846 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|-----|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 23.0 | 0 | 0 | 0 | 4.41 | 1.26 | 1.52 | 23.0 | 23.0 | 0 | 0 | 1.88 | 0.99 | 0.04 | 0.36 |



Stellar Parameters For KIC 004664743

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 7758^{+214}_{-322} | $4.106^{+0.135}_{-0.165}$ | $0.000^{+0.200}_{-0.350}$ | $1.918^{+0.514}_{-0.420}$ | $1.713^{+0.181}_{-0.294}$ | $0.342^{+0.230}_{-0.159}$ |
| | +3%/-4% | +3%/-4% | +inf%/-inf% | +27%/-22% | +11%/-17% | +67%/-46% |
| Source | KIC0 | KIC0 | KIC0 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 004664743-02 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{max} (K)$ | $T_{obs} (K)$ | A_{obs} |
|---------|-------------|------------------------|----------------------|-------------------------|---------------------------|
| DV | 0 ± 1 | $0.89^{+0.70}_{-0.57}$ | 3164^{+231}_{-199} | -3088^{+7285}_{-1261} | $0.049^{+1.834}_{-1.734}$ |
| Alt. | 0 ± 1 | $1.22^{+0.89}_{-0.68}$ | 3173^{+226}_{-208} | -3124^{+6909}_{-911} | $0.029^{+1.186}_{-1.083}$ |

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

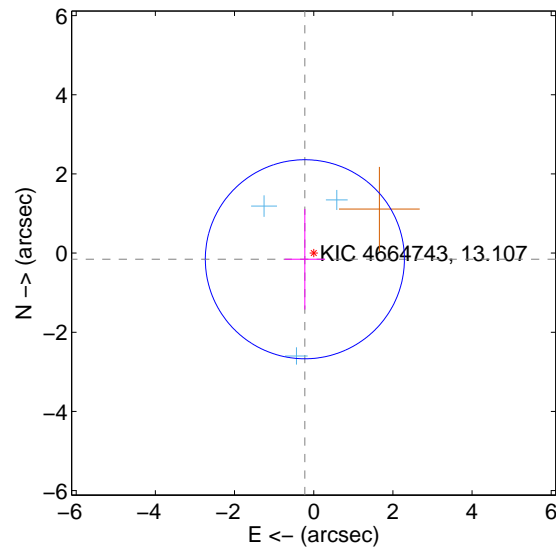
Supplemental centroid analysis for 004664743-02. Kepler magnitude: 13.11. Transit SNR 8.10

There are 3 quarters with good PRF difference image offsets

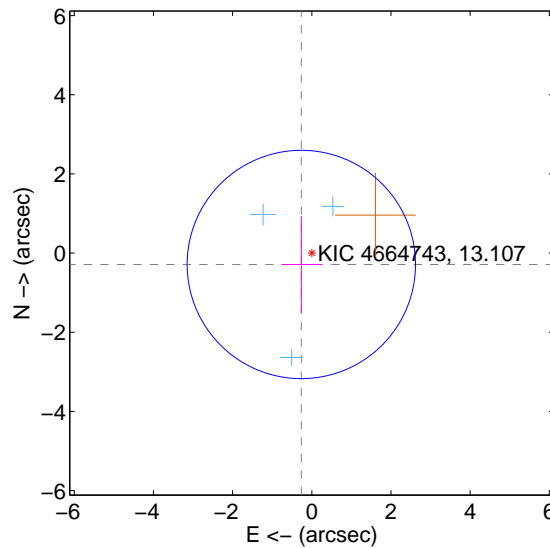
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT | 0.272 ± 0.838 | 0.32 | 0.223 ± 0.511 | -0.156 ± 1.270 |
| PRF-fit source offset from KIC position | 0.391 ± 0.961 | 0.41 | 0.265 ± 0.500 | -0.288 ± 1.223 |
| photometric centroid source offset | 1.18 ± 1.31 | 0.90 | 0.97 ± 1.26 | -0.67 ± 1.39 |

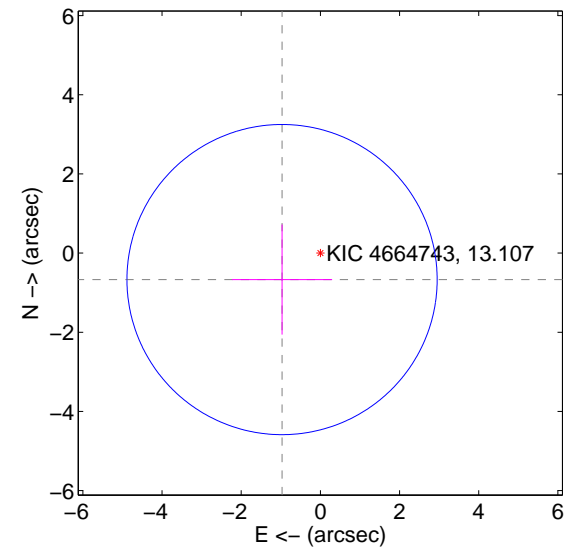
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

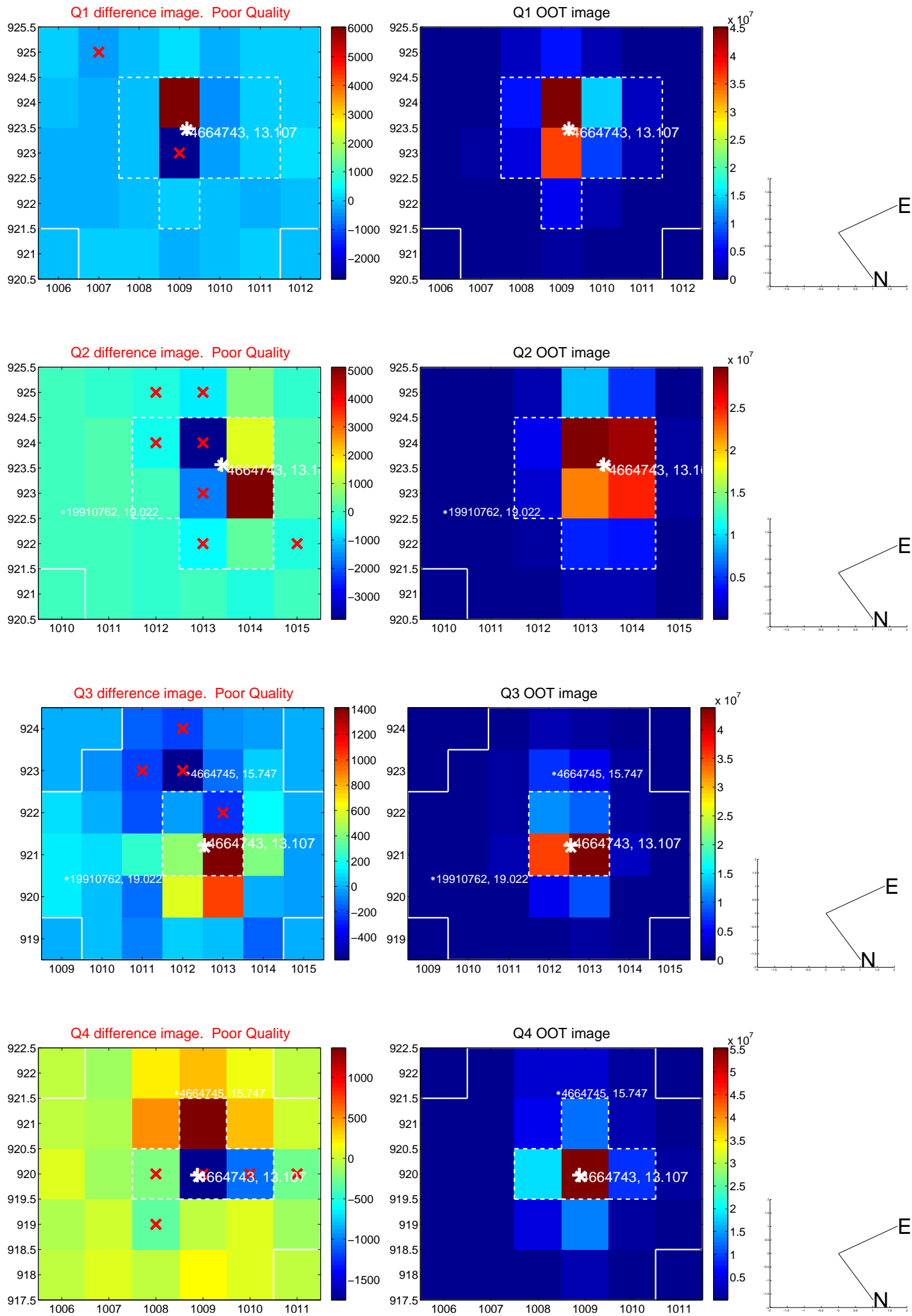


offset from photometric centroids

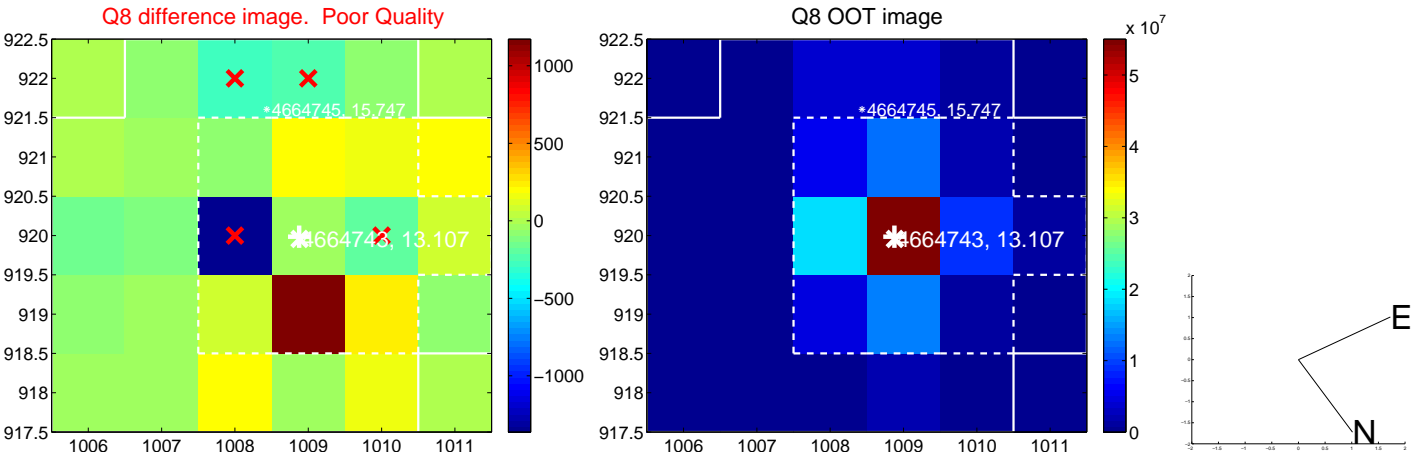
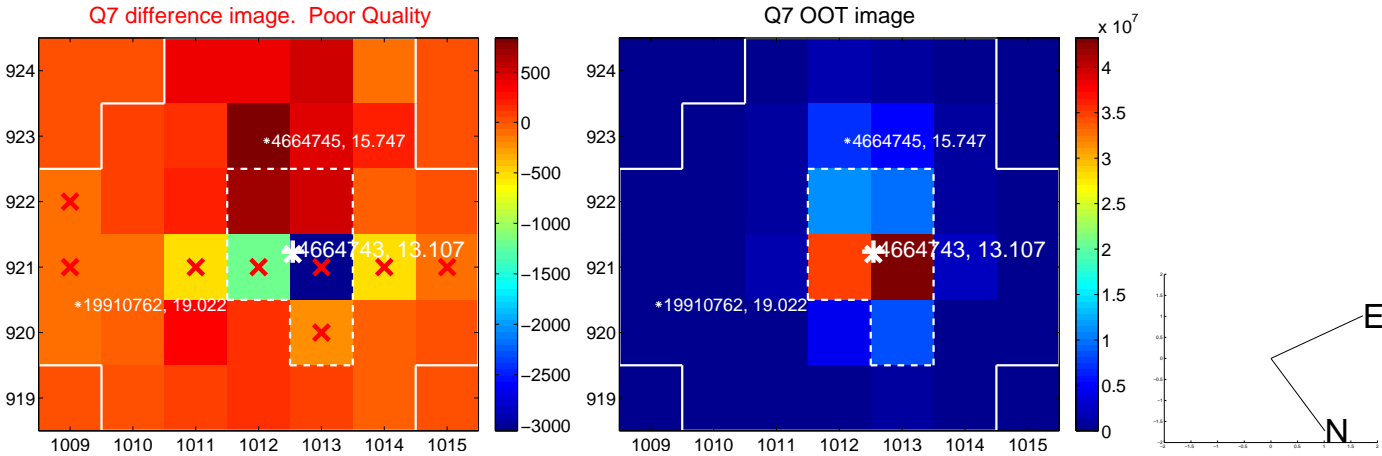
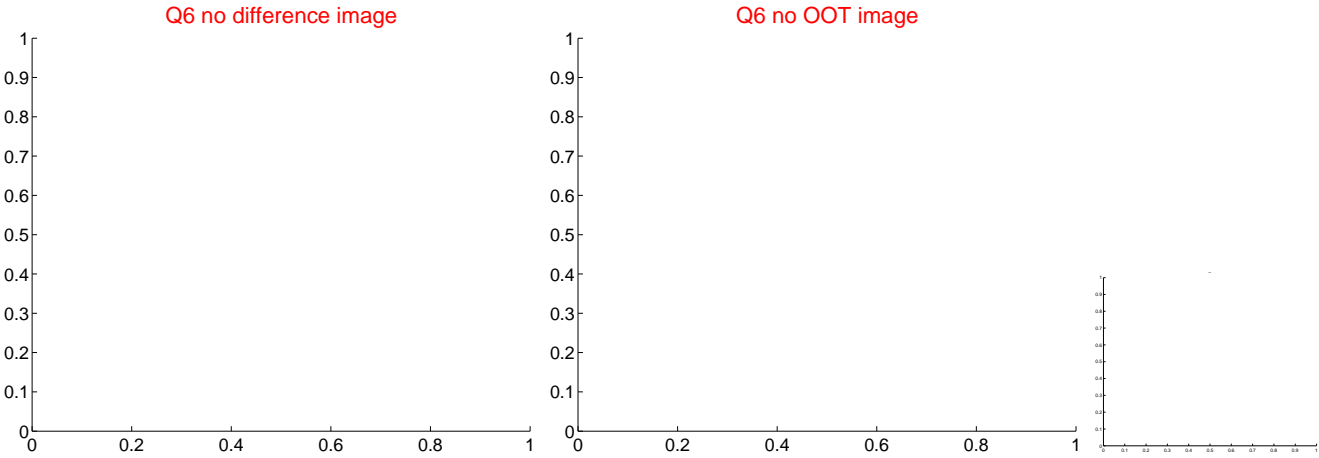
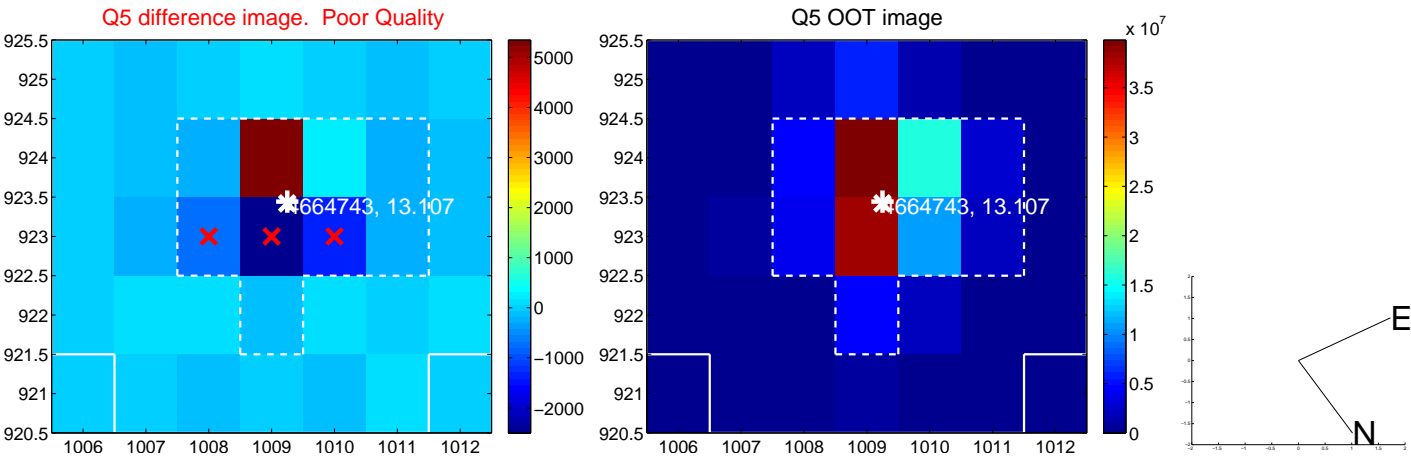


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

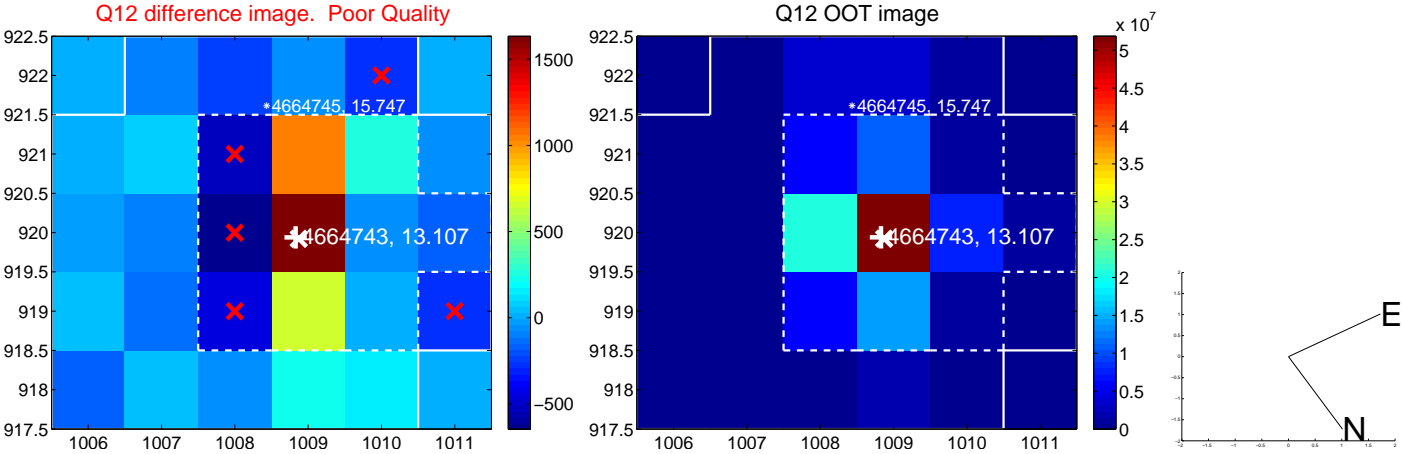
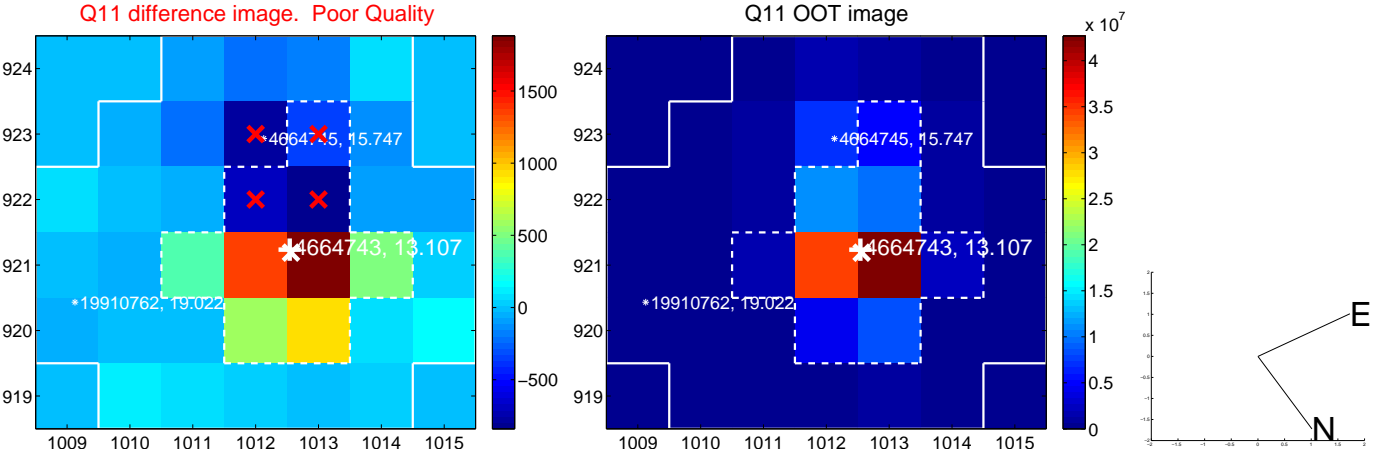
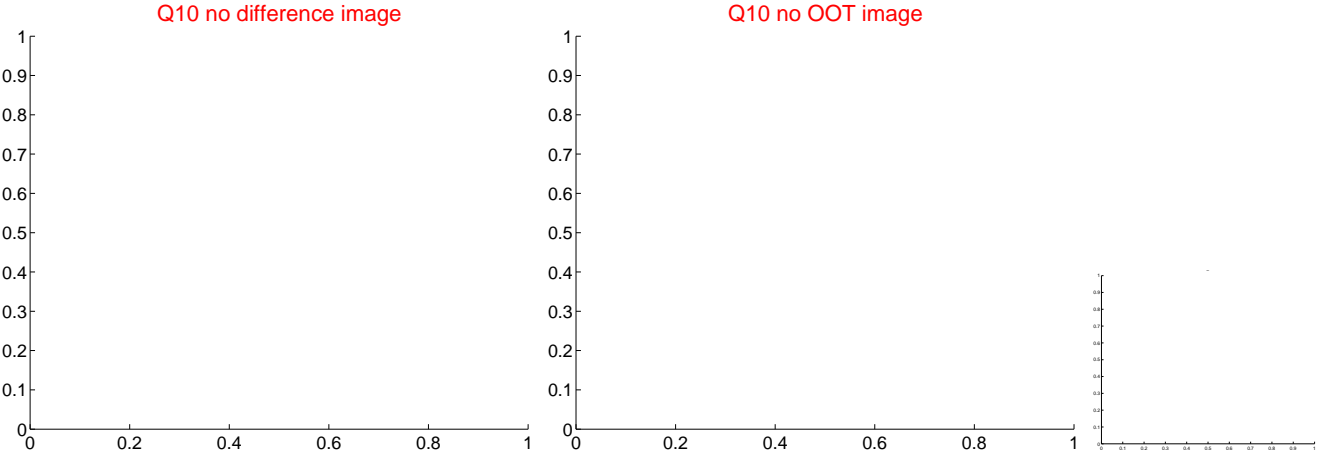
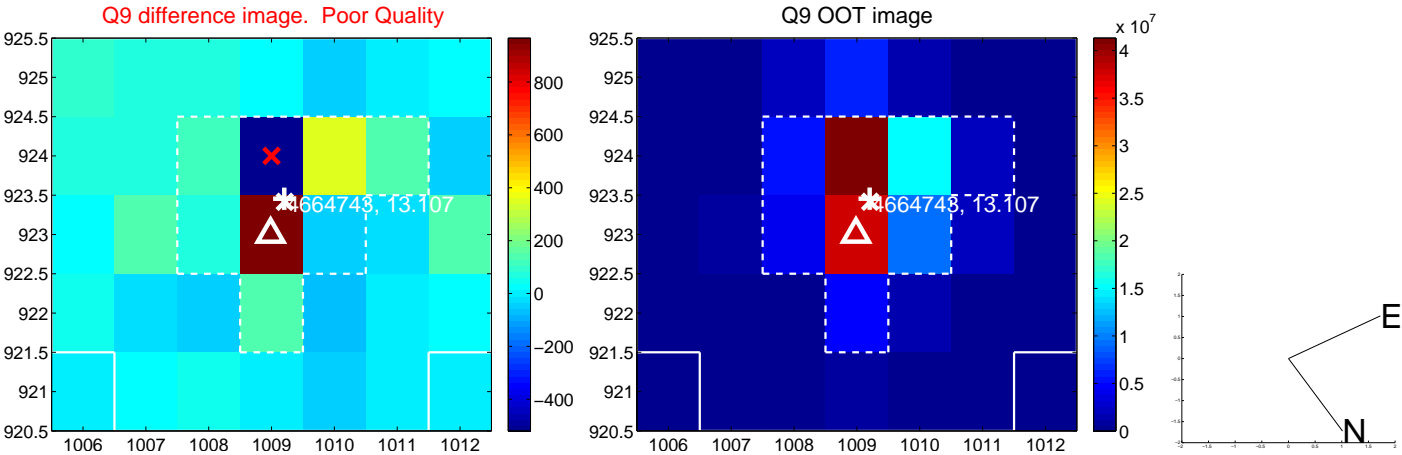
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



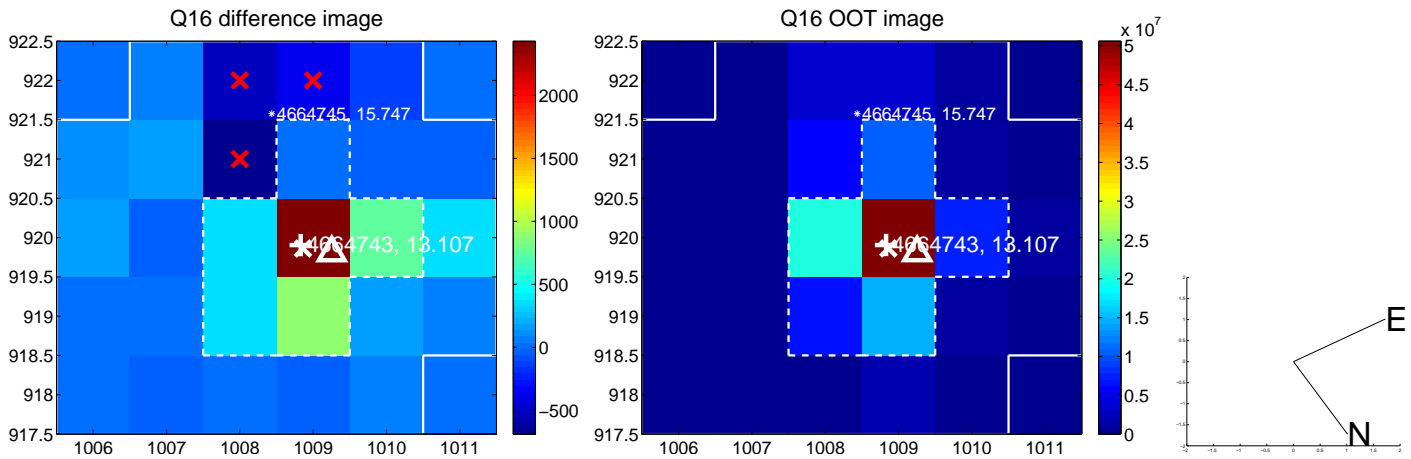
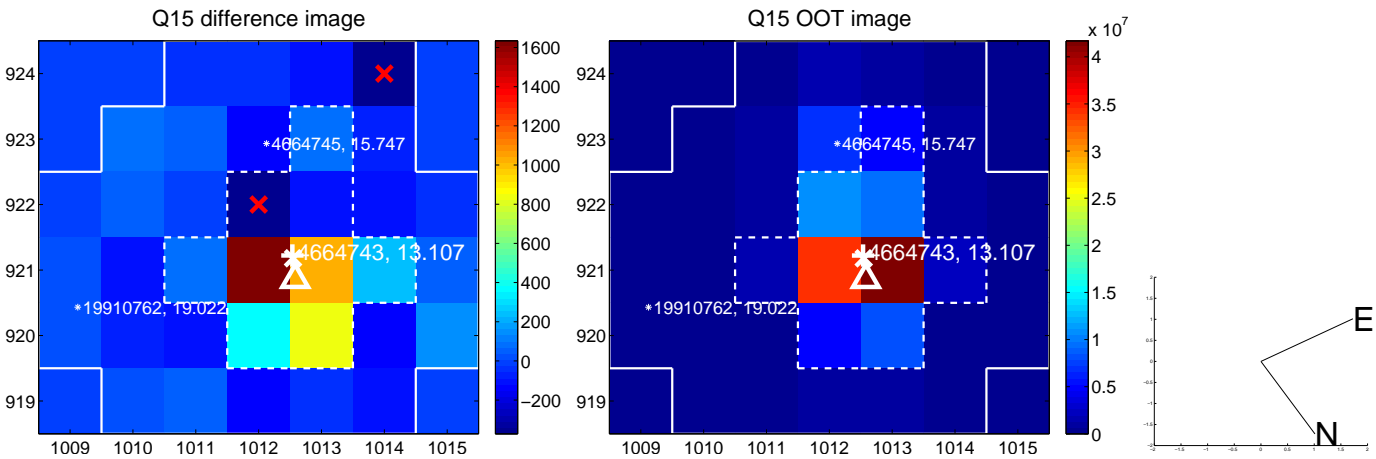
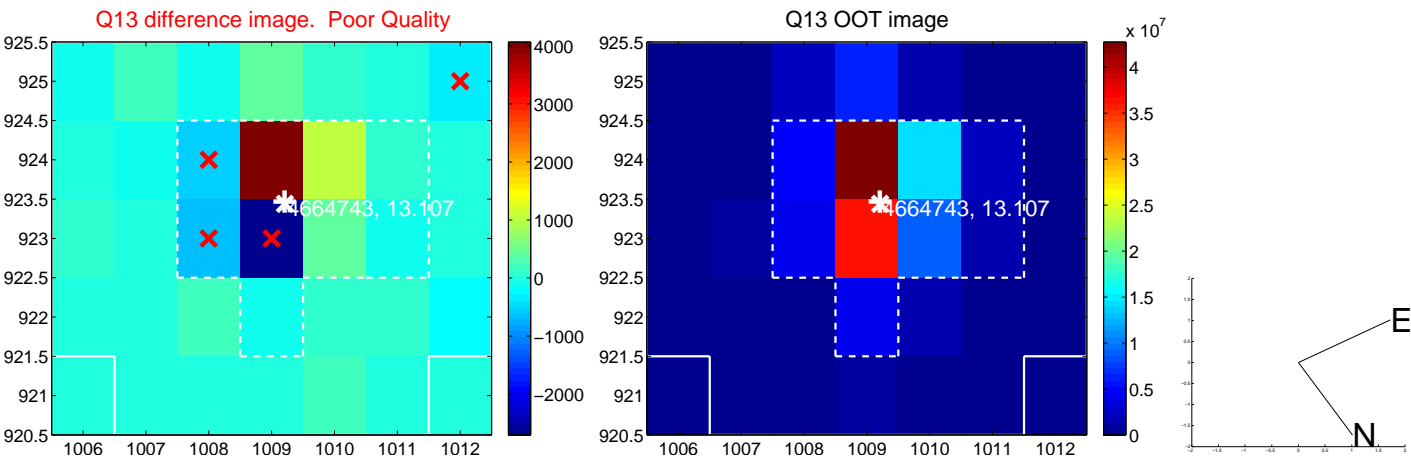
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



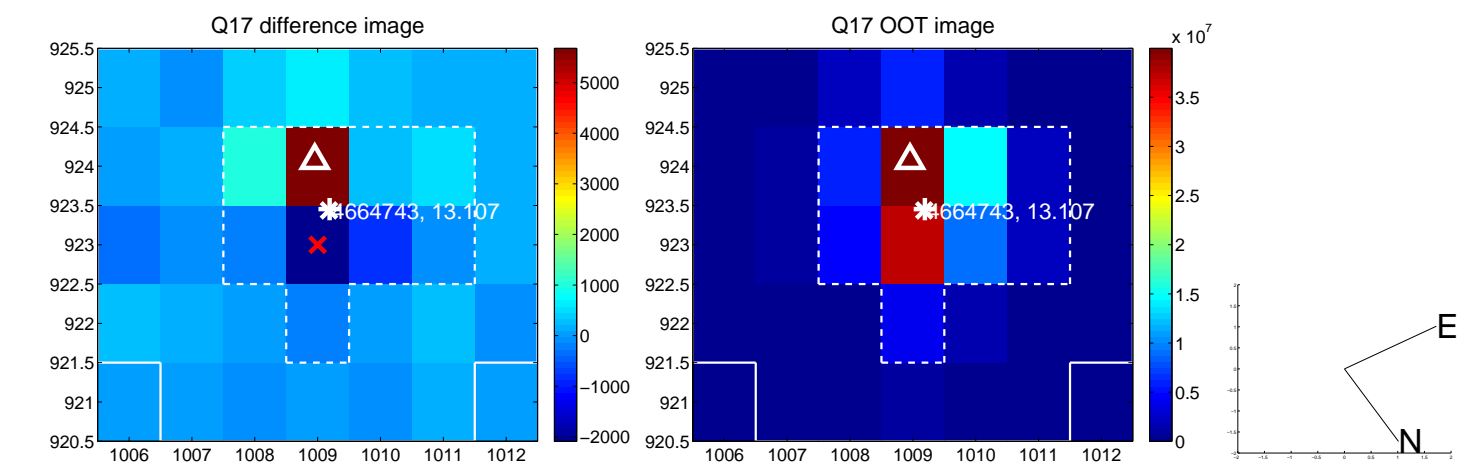
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



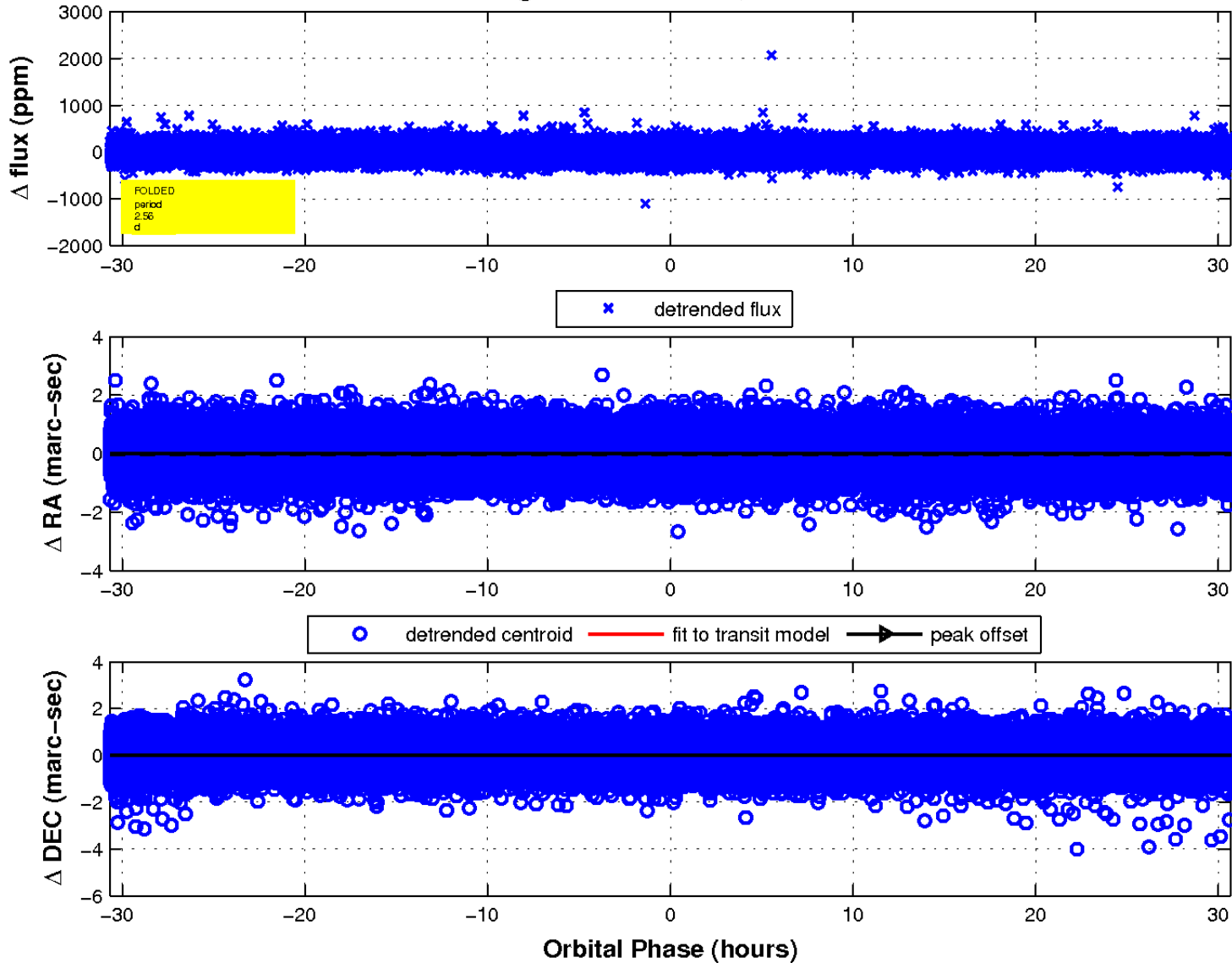
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

