

KIC 008123170

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 008123170-01 | OBS | No | 1.011740 | 132.290283 | 3.6 | 1.817 | 8.4 | 0.9 | 1.47 | 6534 | 0.33 | 7168.21 |
| 008123170-02 | OBS | No | 1.012235 | 131.648104 | 32.7 | 4.330 | 8.8 | 9.8 | 1.47 | 6534 | 0.84 | 7163.54 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 008123170-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT |
| 008123170-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV |

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.

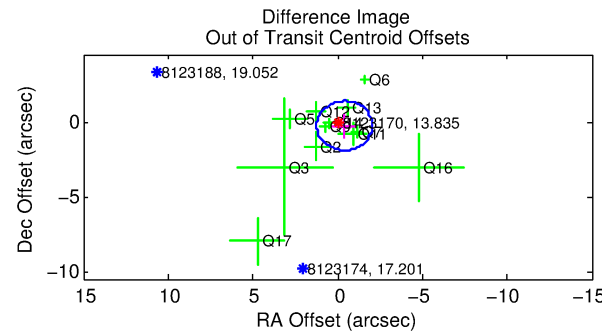
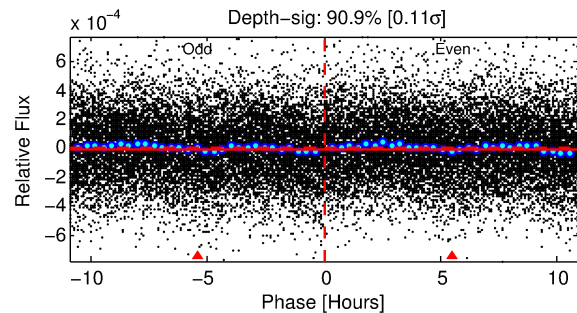
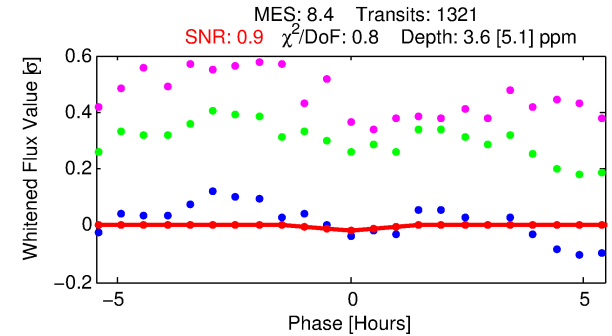
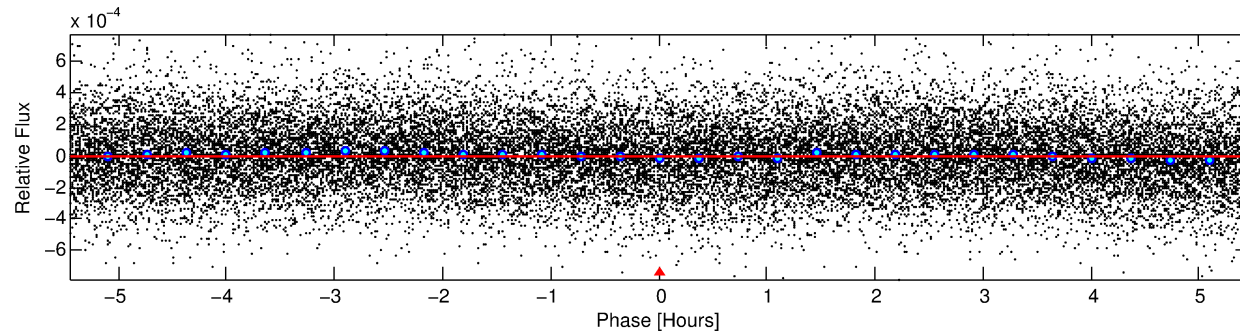
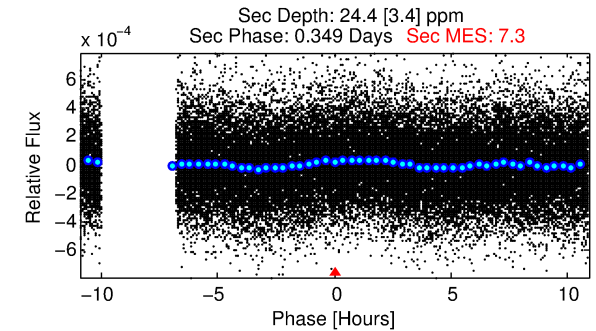
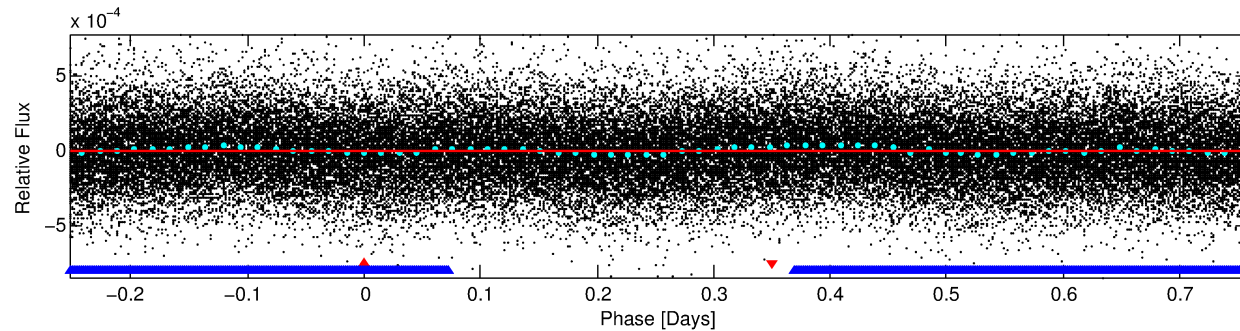
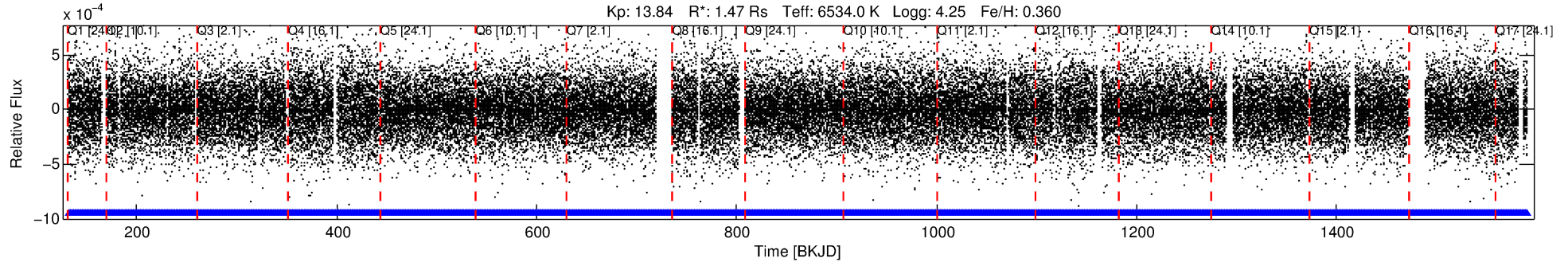
Ephemeris Match Information For 008123170-01

No Significant Match Found

DV One-Page Summary

KIC: 8123170 Candidate: 1 of 2 Period: 1.012 d
KOI: K06972 Corr: No Ephemeris Match

Kp: 13.84 R*: 1.47 Rs Teff: 6534.0 K Logg: 4.25 Fe/H: 0.360



DV Fit Results:

Period = 1.01174 [0.00011] d
Epoch = 132.2903 [0.0265] BKJD
Rp/R* = 0.0020 [0.0022]
a/R* = 2.11 [7.29]
b = 0.90 [0.97]
Seff = 7168.21 [1617.01]
Teq = 2346 [132] K
Rp = 0.33 [0.36] Re
a = 0.0221 [0.0034] AU
Ag = 61.83 [134.40] [0.45σ]
Teffp = 10172 [5501] K [1.42σ]

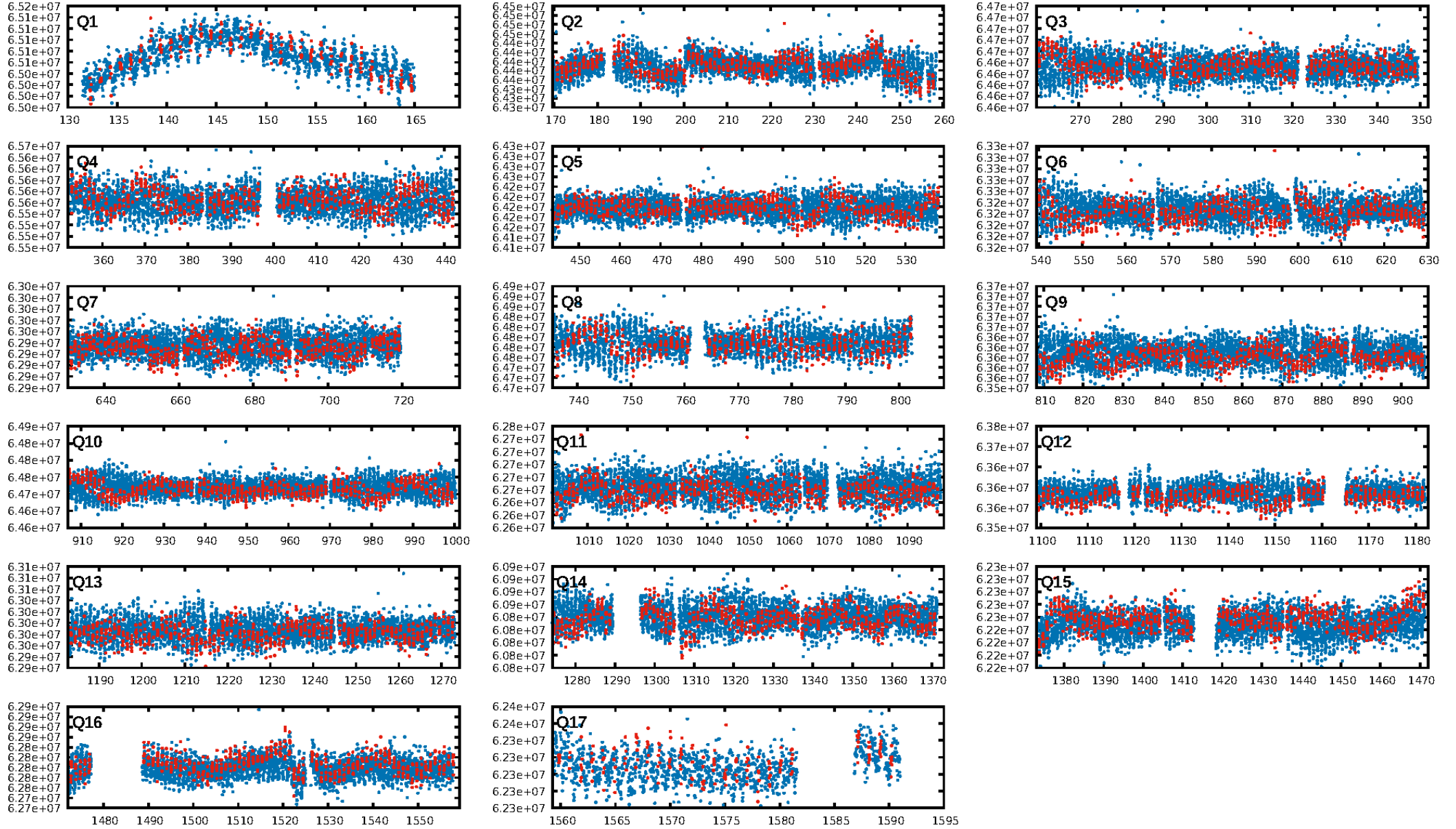
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.2% [0.00σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.80e-14
RollingBand-fgt: 1.00 [1262/1262]
GhostDiagnostic-chr: N/A
Centroid-sig: N/A
Centroid-so: N/A
OotOffset-rm: 0.479 arcsec [0.87σ]
KicOffset-rm: 0.530 arcsec [0.97σ]
OotOffset-st: 3/3/2/4 [12]
KicOffset-st: 3/3/2/4 [12]
DiffImageQuality-fgm: 0.50 [6/12]
DiffImageOverlap-fno: 0.47 [8/17]

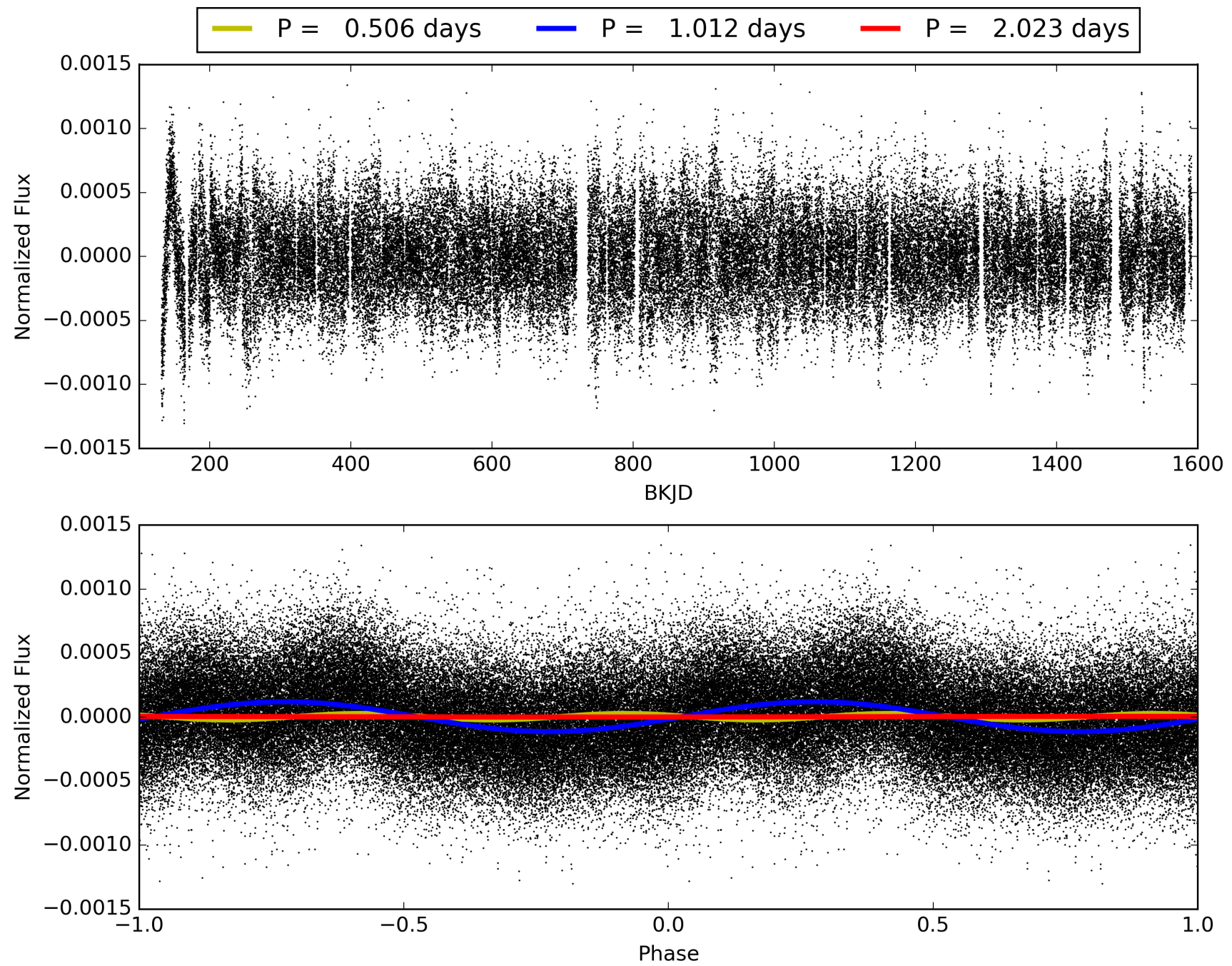
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 05:53:12 Z

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

TCE 008123170-01, PDC Light Curves

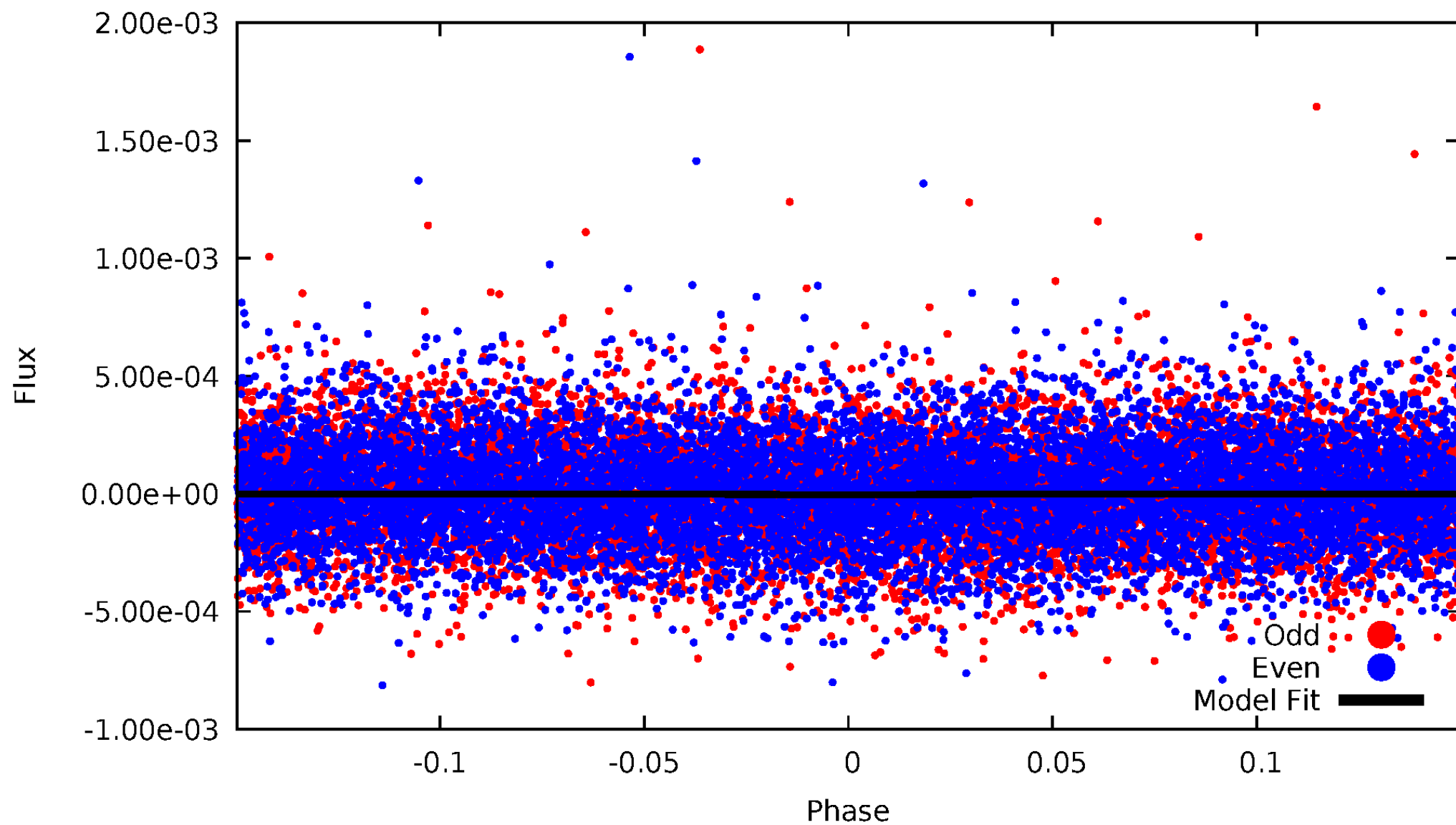


TCE 008123170-01



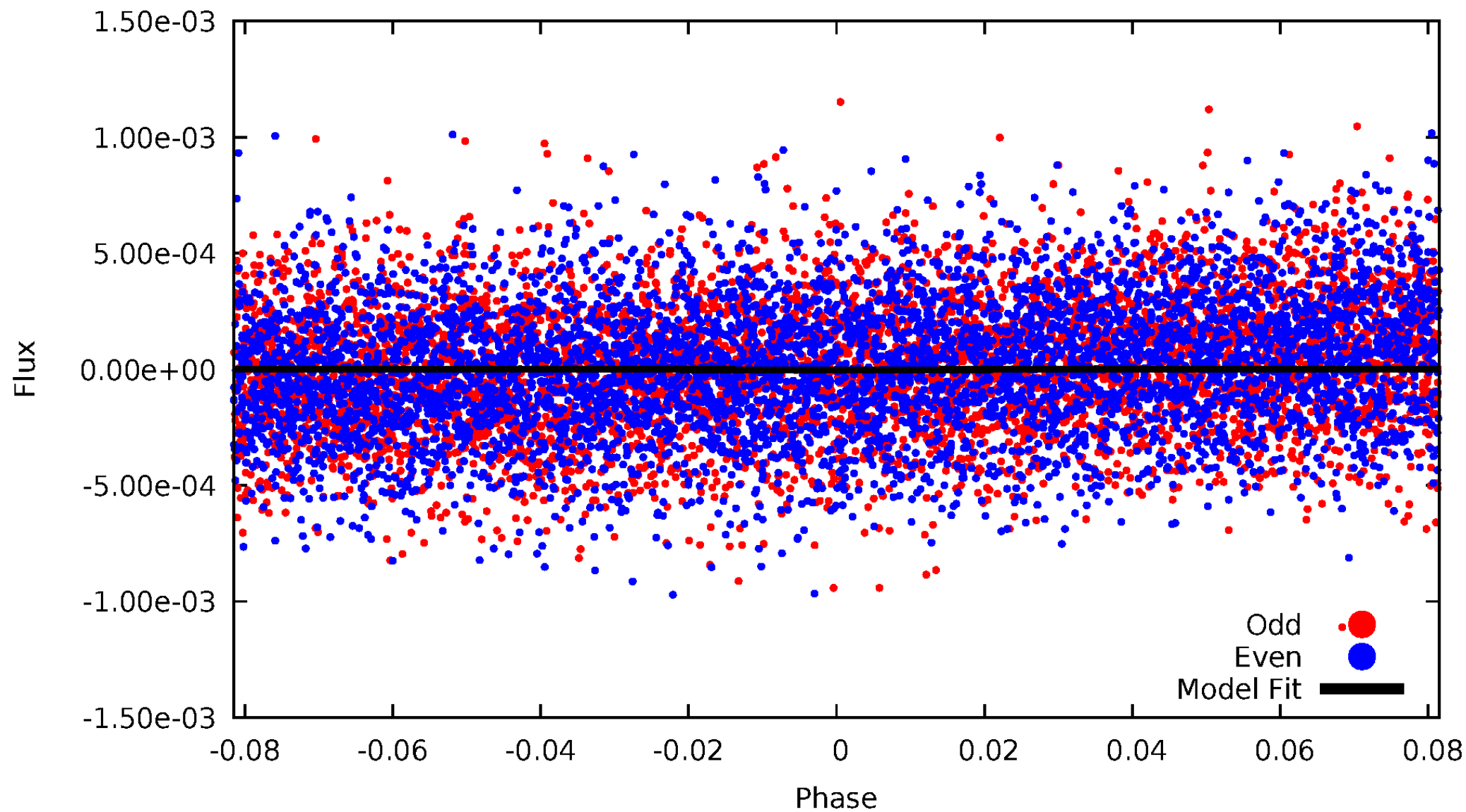
DV Odd/Even

TCE 008123170-01



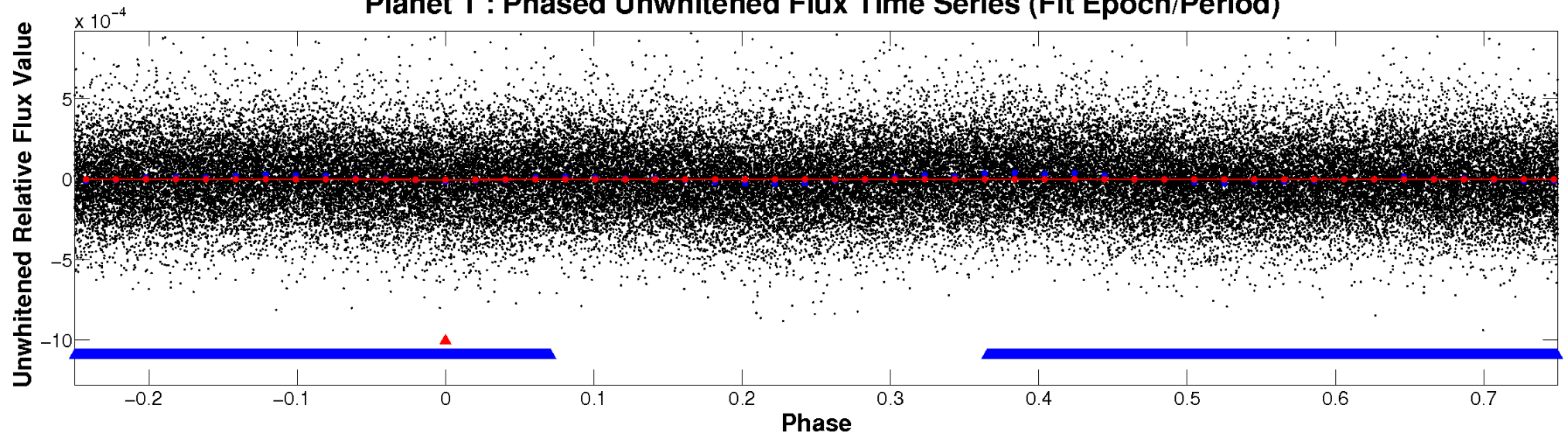
ALT Odd/Even

TCE 008123170-01

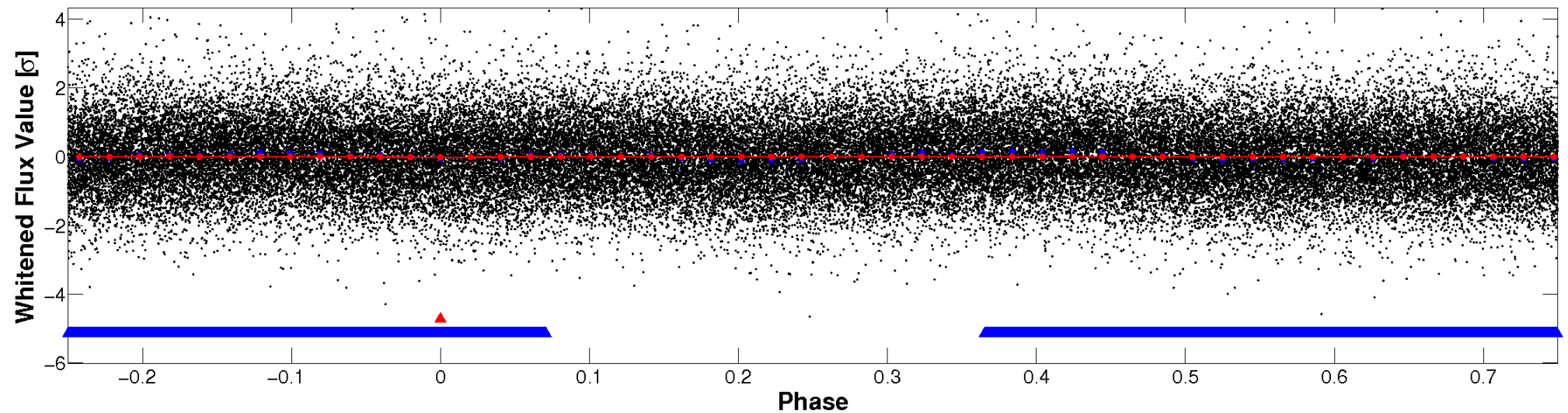


Non-Whitened Vs. Whitened Light Curve

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

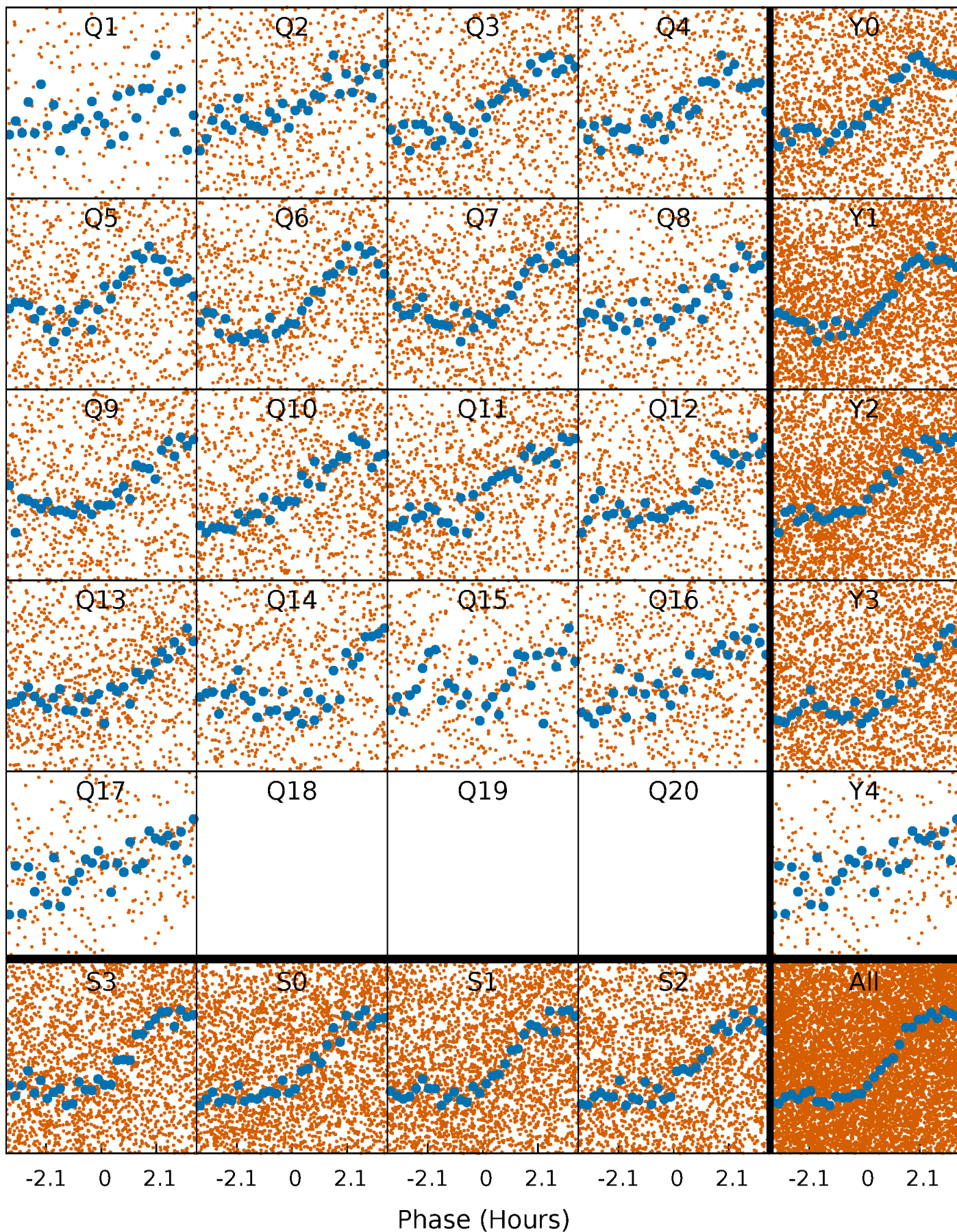


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



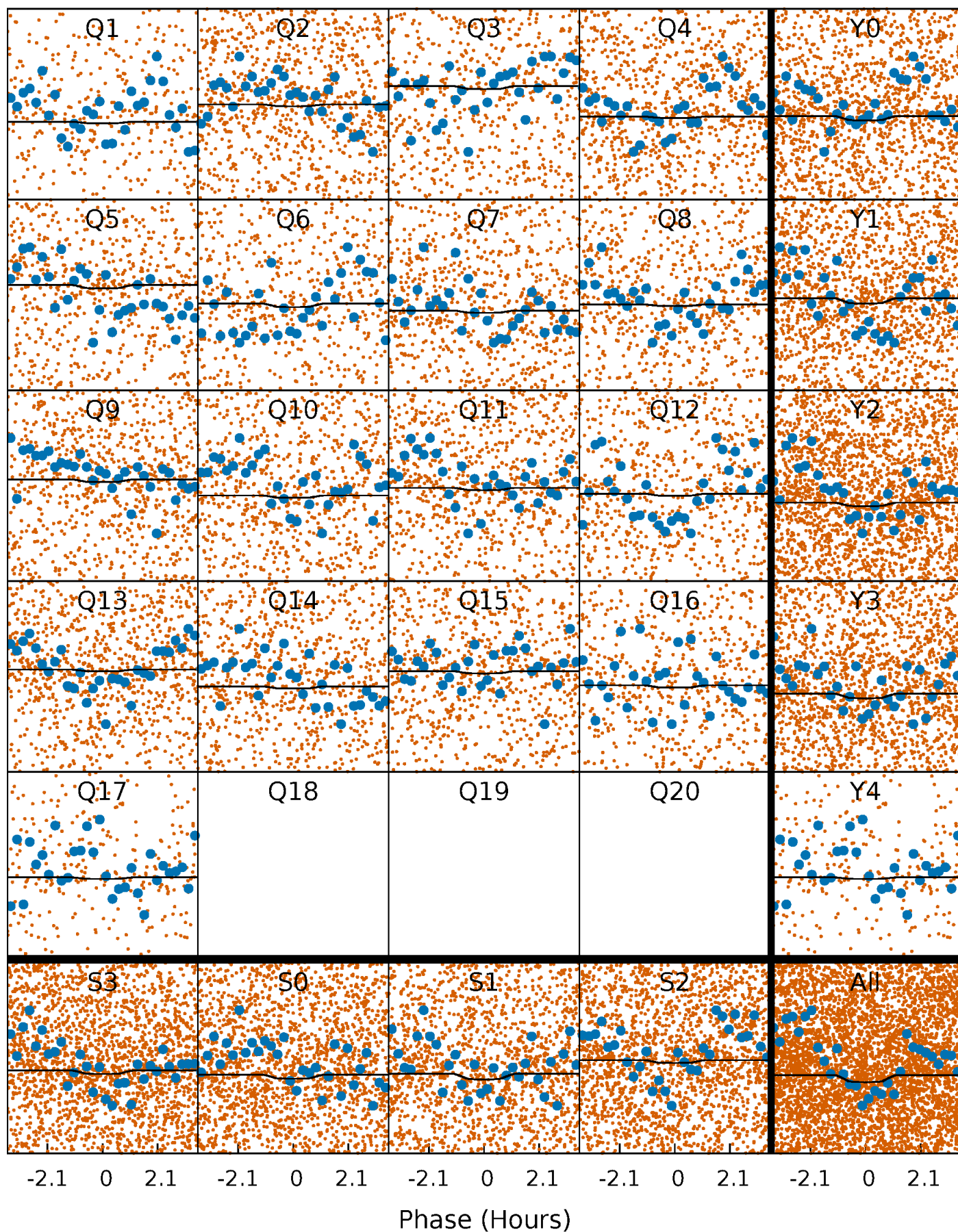
PDC Quarter-Phased Transit Curves

TCE 008123170-01 P= 1.011740 Days $T_0=132.290283$ (BKJD)



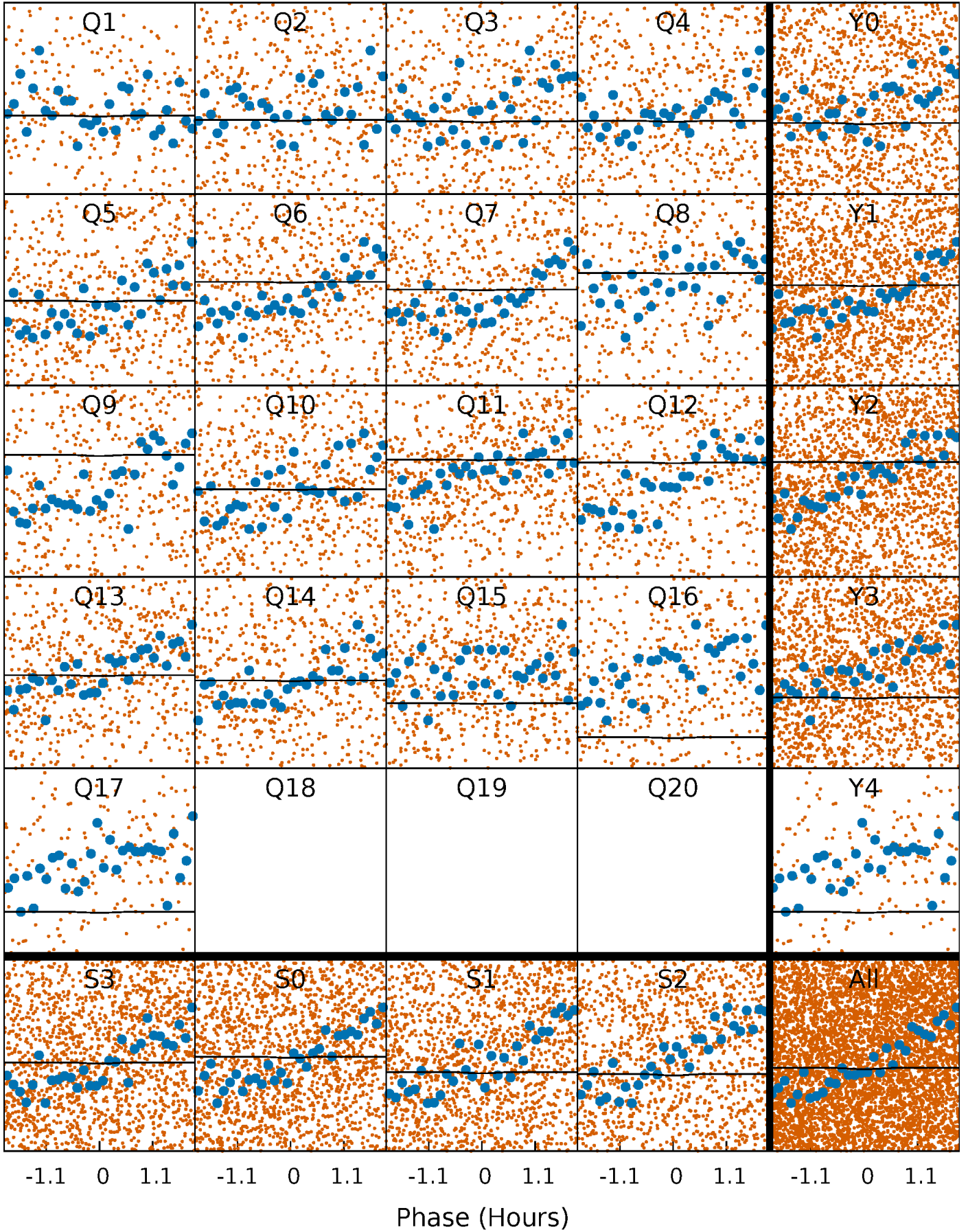
DV Quarter-Phased Transit Curves

TCE 008123170-01 P= 1.011740 Days $T_0=132.290283$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

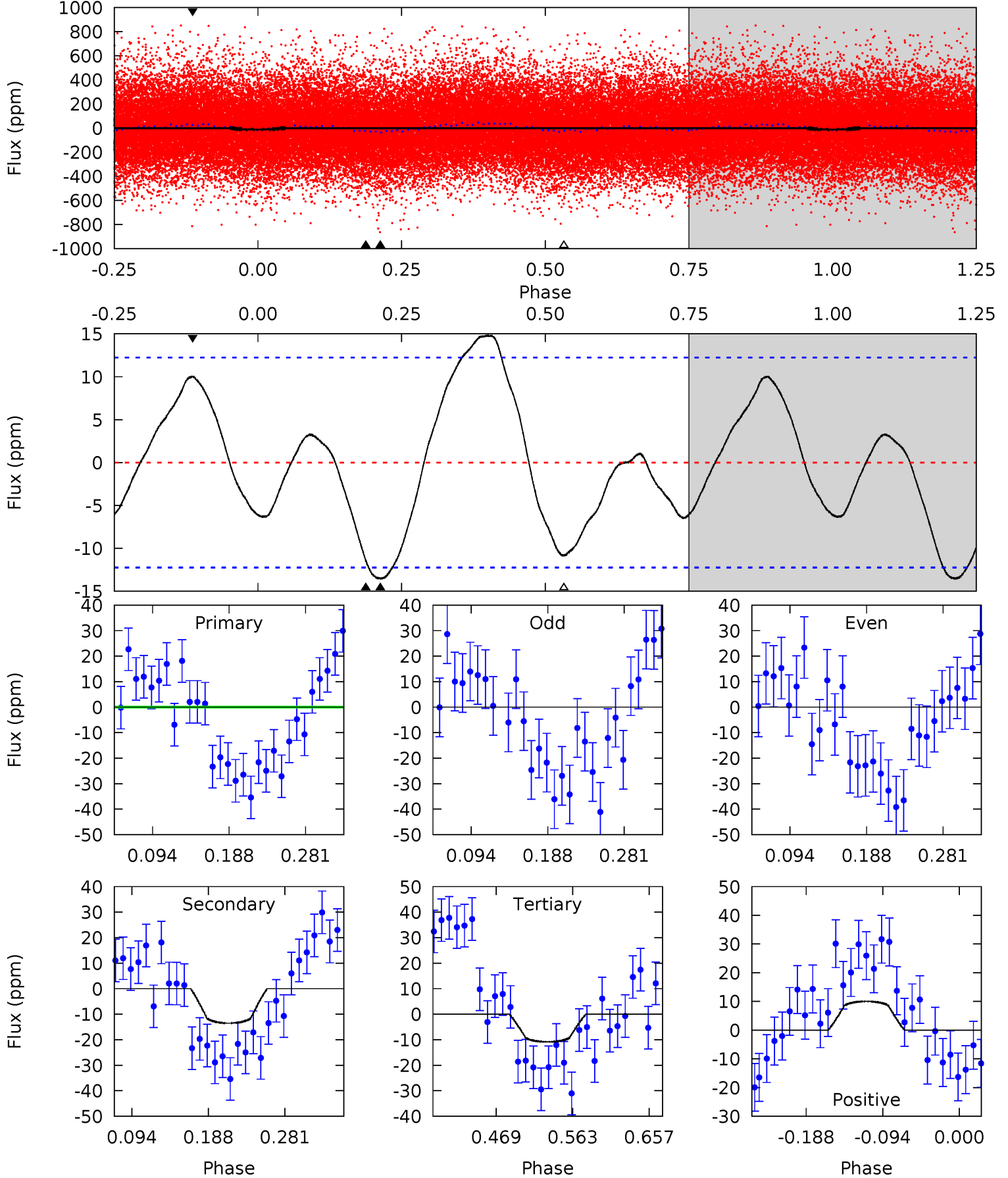
TCE 008123170-01 P= 1.011828 Days $T_0=132.243852$ (BKJD)



DV Model-Shift Uniqueness Test

008123170-01, P = 1.011740 Days, E = 131.278543 Days

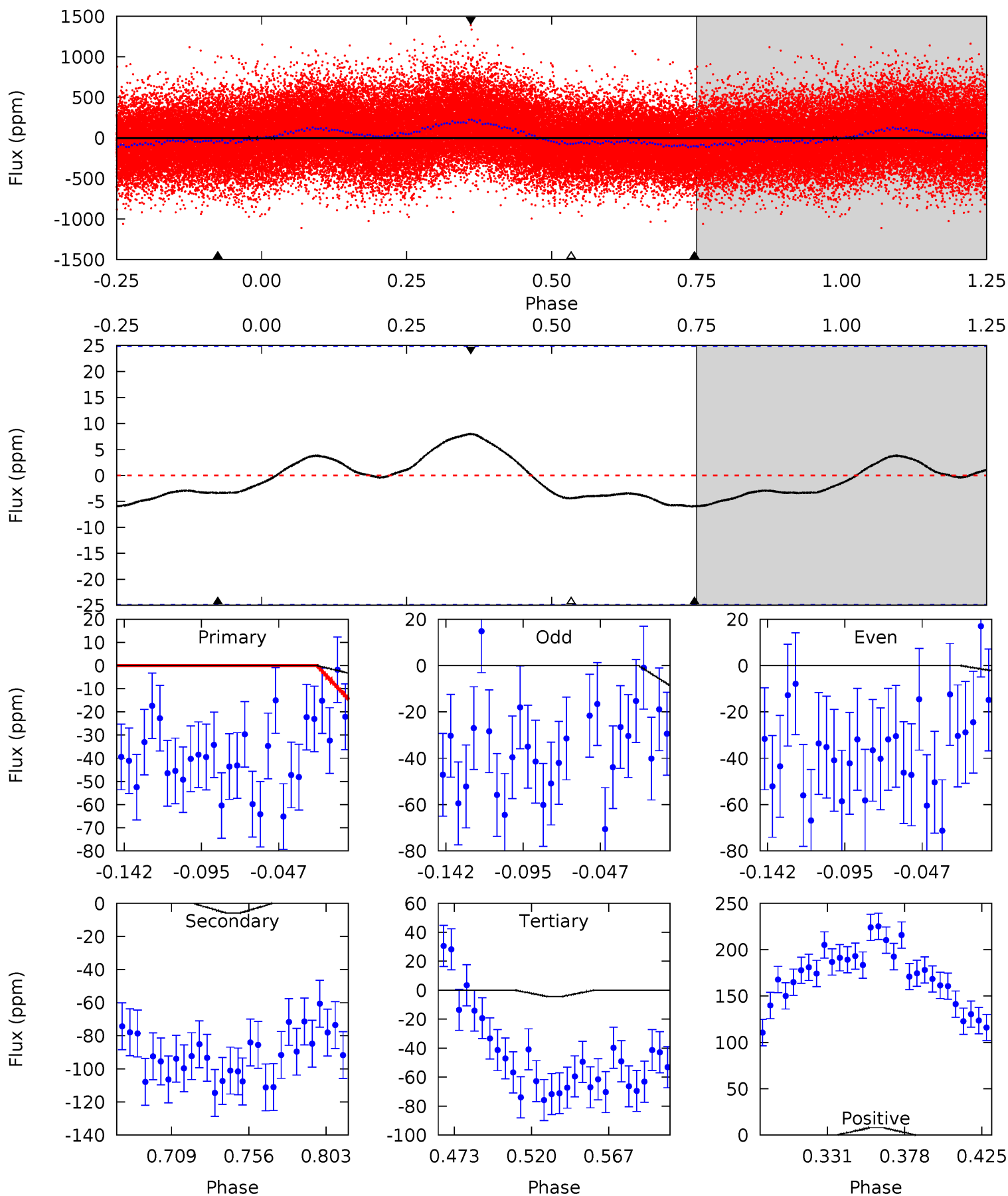
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 4.27 | 5.06 | 4.05 | 3.75 | 4.58 | 1.68 | 2.60 | 0.22 | 0.52 | 1.01 | 1.31 | 0.27 | 0.88 | 0.52 | 0.23 |



Alt Model-Shift Uniqueness Test

008123170-01, P = 1.011828 Days, E = 131.232024 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|-------|-------|------|
| 0.65 | 1.13 | 0.83 | 1.51 | 4.72 | 1.98 | 0.73 | -0.19 | -0.86 | 0.30 | -0.38 | 0.65 | -0.16 | 0.57 | 0.72 |



Stellar Parameters For KIC 008123170

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | $M(M_{\odot})$ | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|---------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 6534^{+71}_{-84} | $4.255^{+0.042}_{-0.119}$ | $0.360^{+0.100}_{-0.150}$ | $1.465^{+0.268}_{-0.107}$ | $1.409^{+0.088}_{-0.079}$ | $0.631^{+0.106}_{-0.235}$ |
| | +1%/-1% | +1%/-3% | +28%/-42% | +18%/-7% | +6%/-6% | +17%/-37% |
| Source | SPE90 | SPE90 | SPE90 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 008123170-01 / KOI

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|-------------|------------------------|---------------------|------------------------|----------------------------|
| DV | -14 ± 3 | $0.43^{+0.32}_{-0.27}$ | 3306^{+141}_{-87} | 7884^{+9916}_{-2189} | 19^{+124}_{-13} |
| Alt. | -6 ± 5 | $0.37^{+0.30}_{-0.24}$ | 3298^{+141}_{-87} | 6258^{+6146}_{-2756} | $8.946^{+61.251}_{-8.281}$ |

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

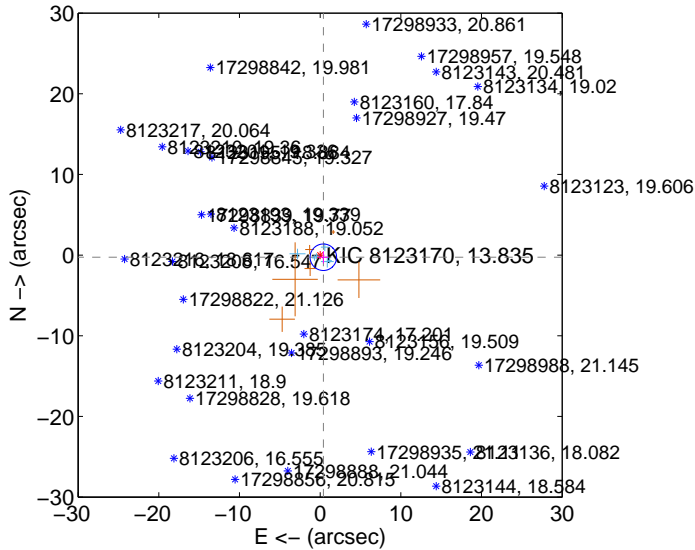
Supplemental centroid analysis for 008123170-01. Kepler magnitude: 13.84. Transit SNR 0.89

There are 6 quarters with good PRF difference image offsets

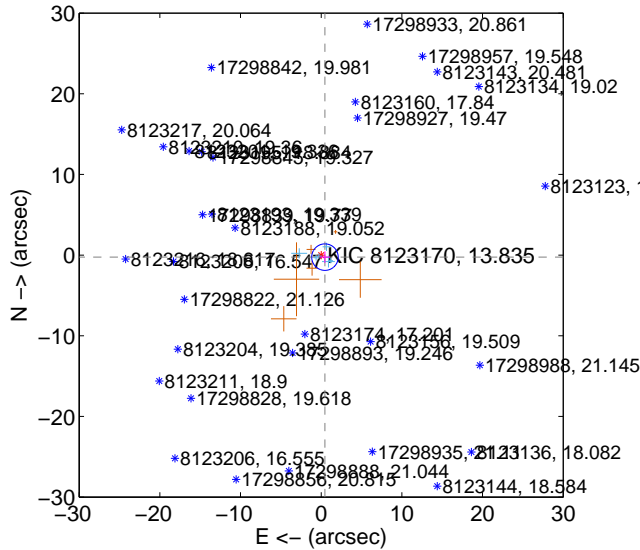
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 0.479 ± 0.548 | 0.87 | -0.398 ± 0.622 | -0.266 ± 0.759 |
| PRF-fit source offset from KIC position | 0.530 ± 0.547 | 0.97 | -0.466 ± 0.630 | -0.252 ± 0.710 |
| photometric centroid source offset | — | — | — | — |

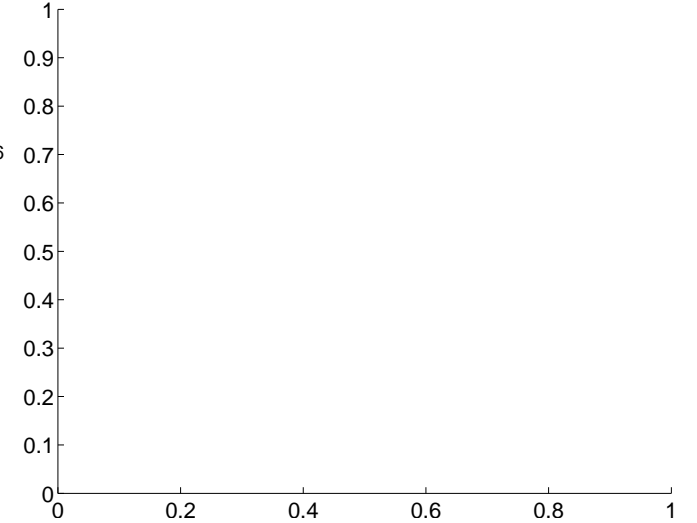
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

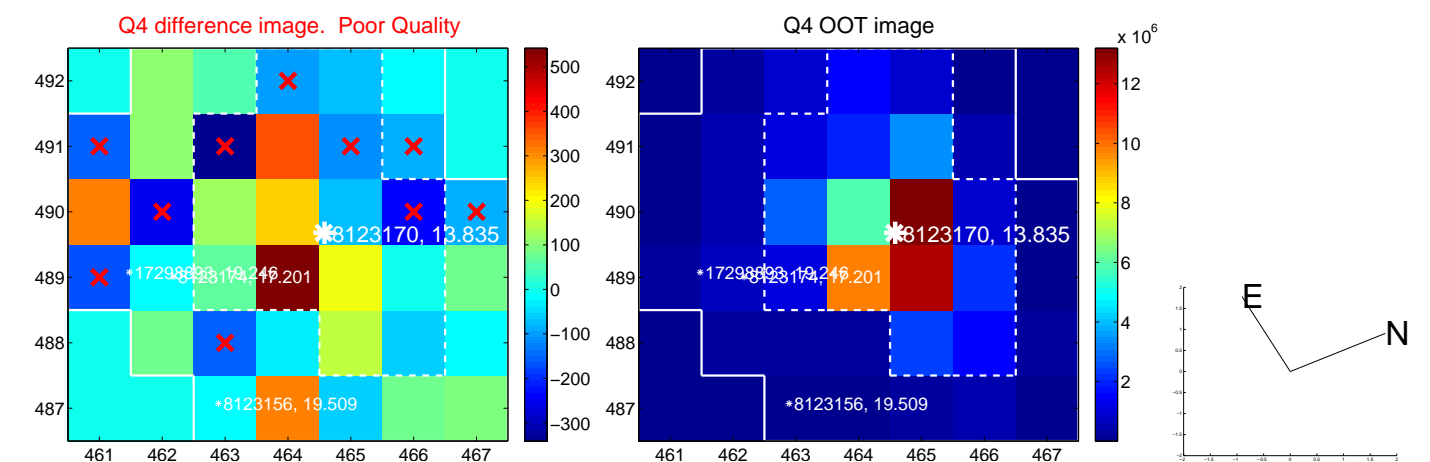
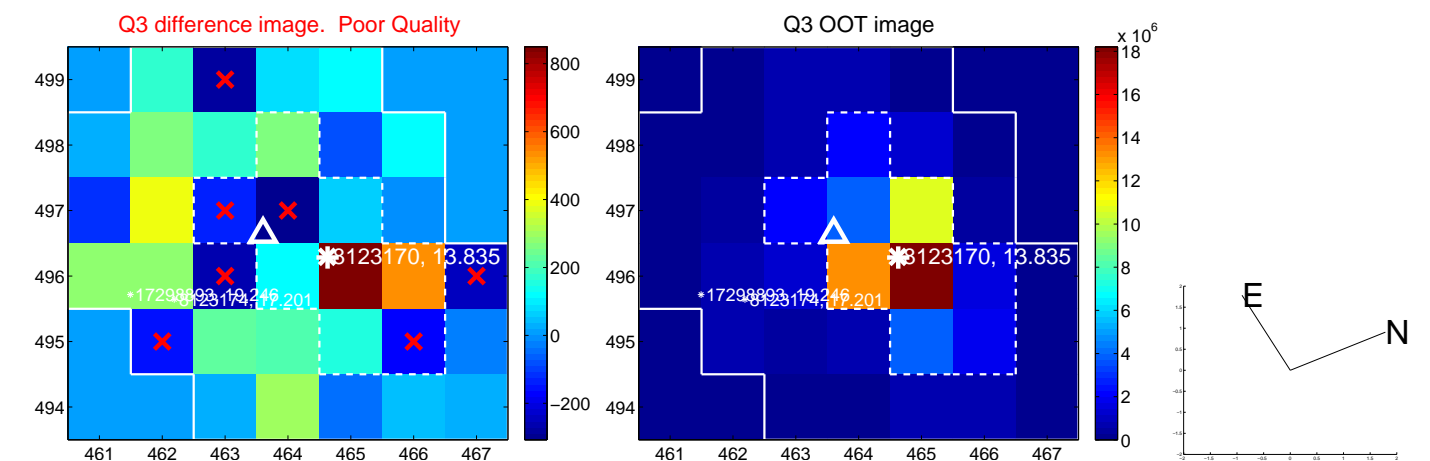
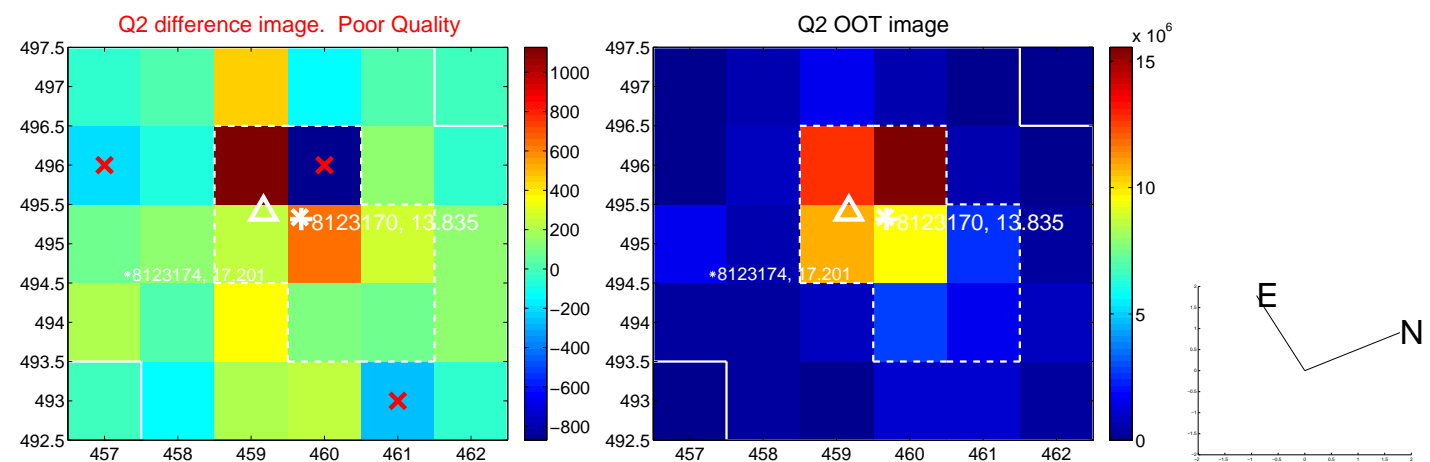
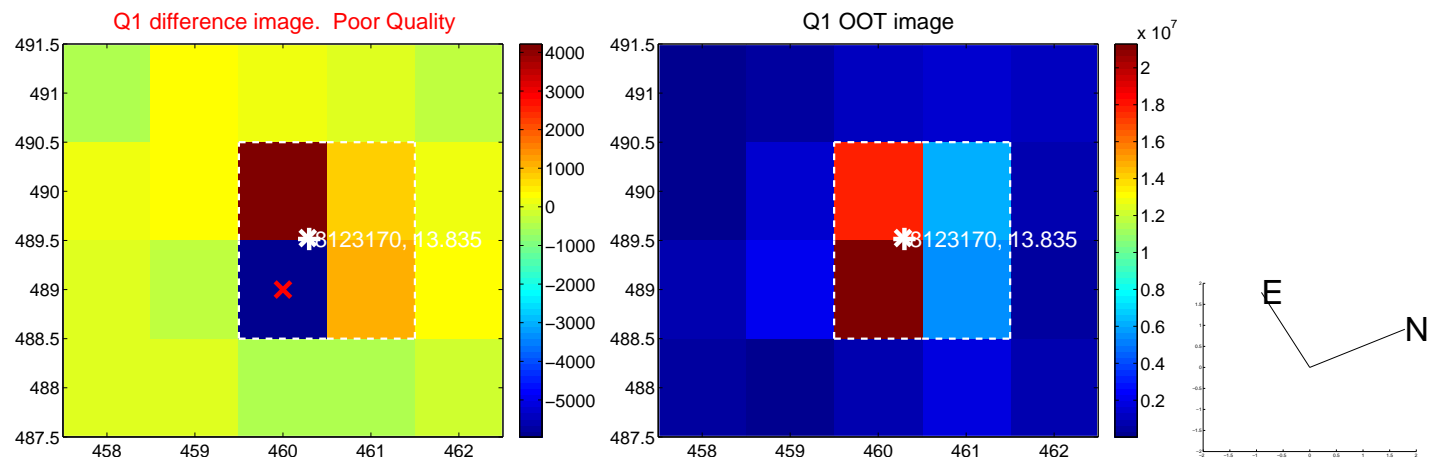


There are no photometric centroids

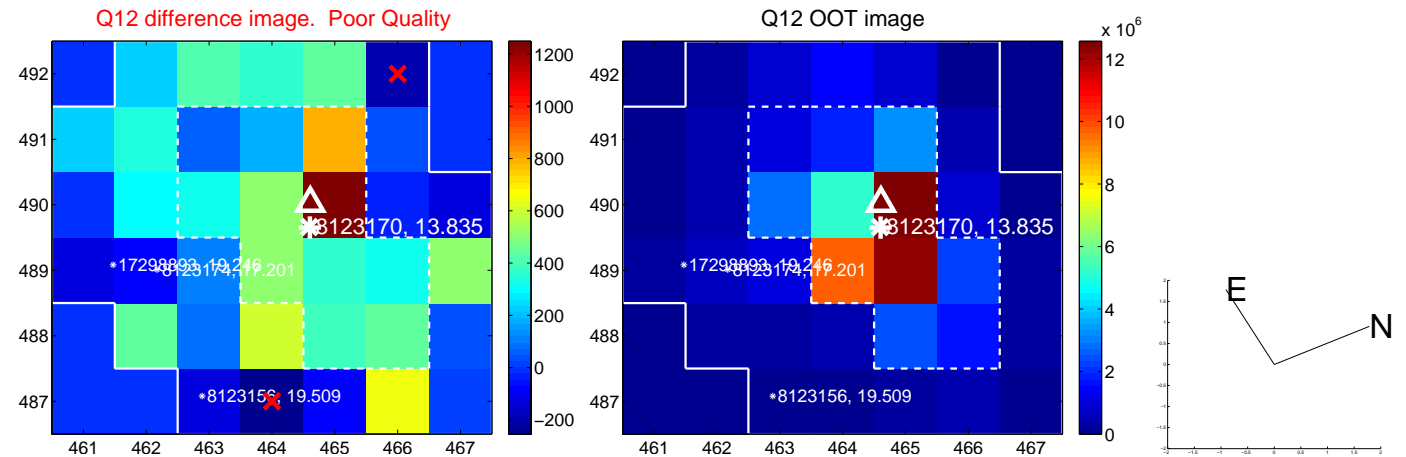
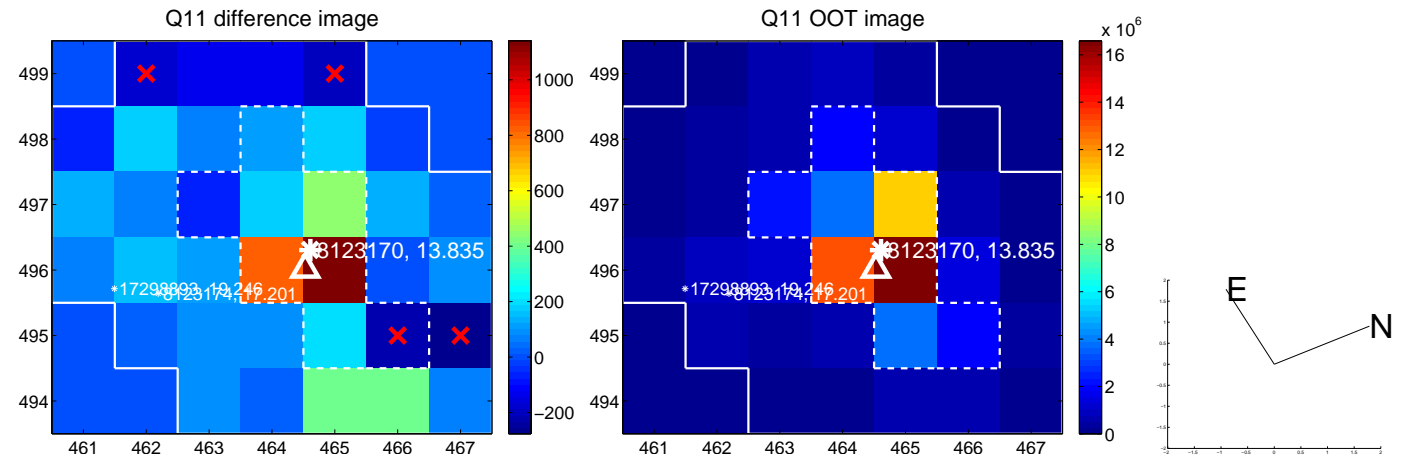
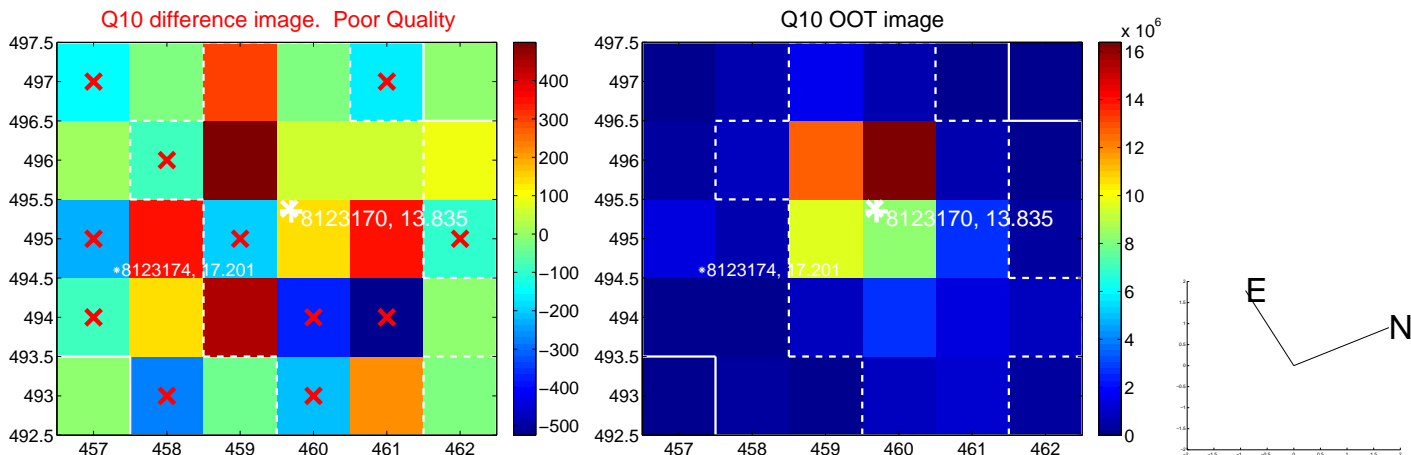
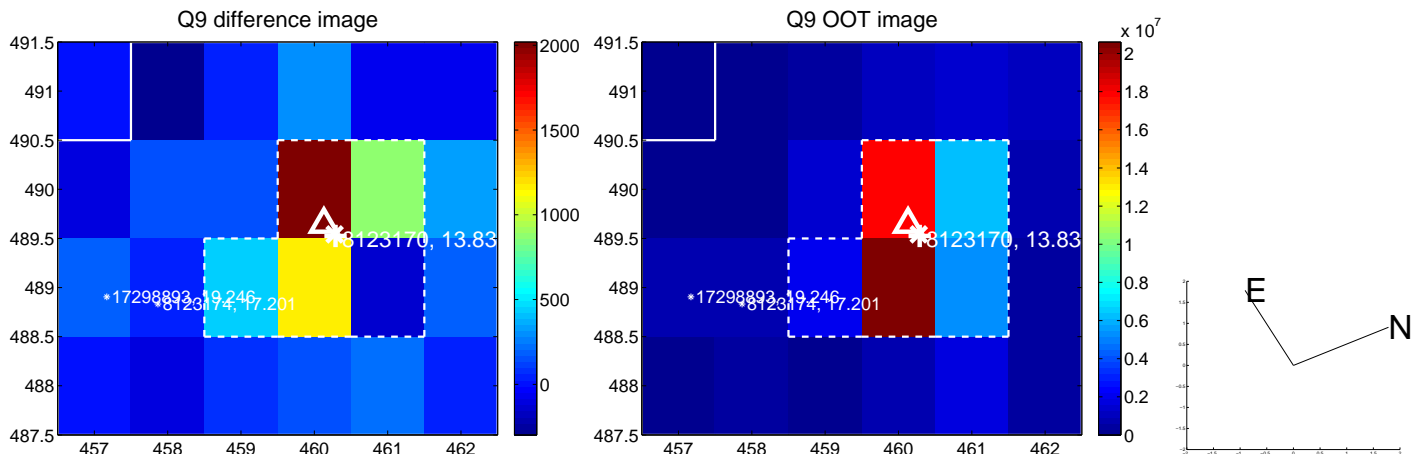


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

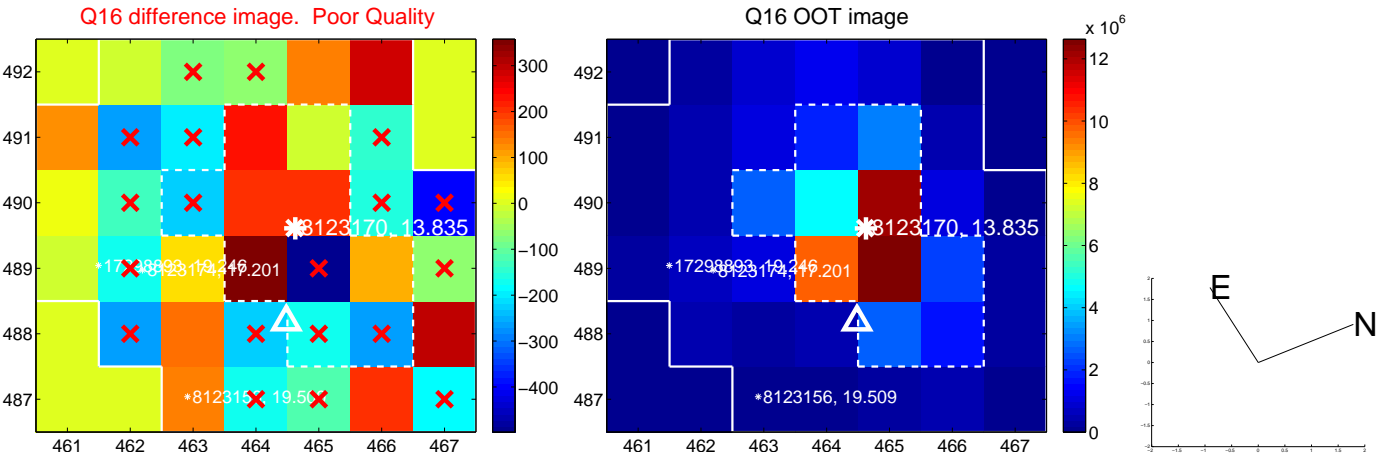
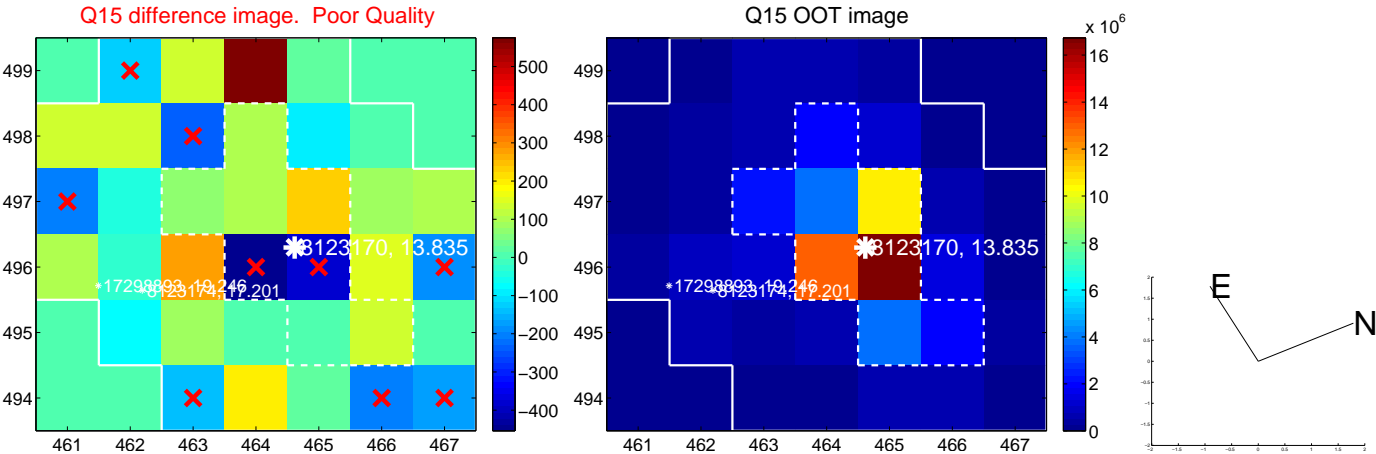
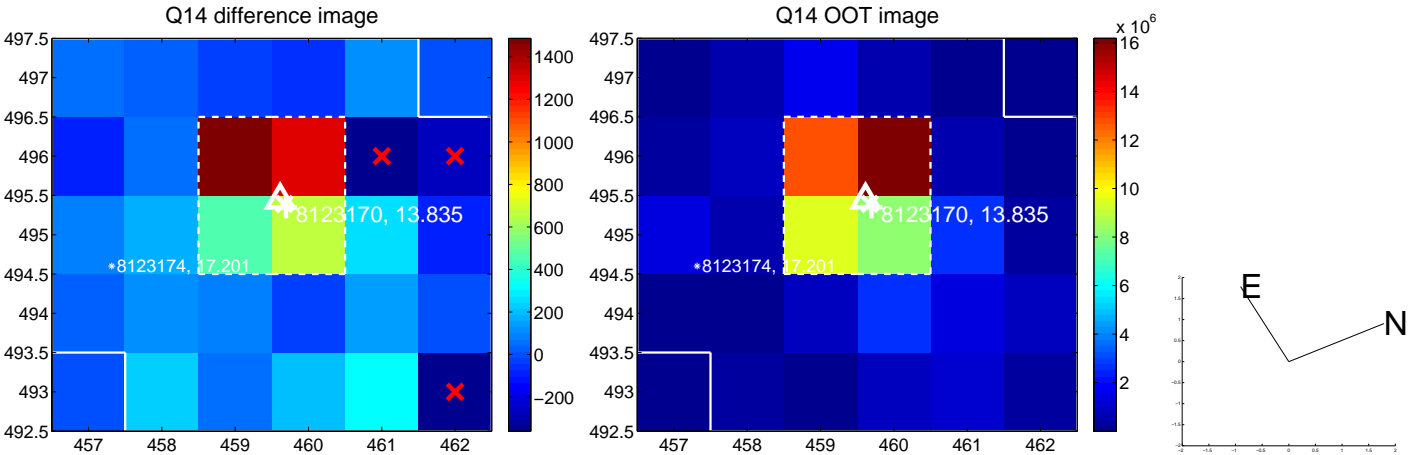
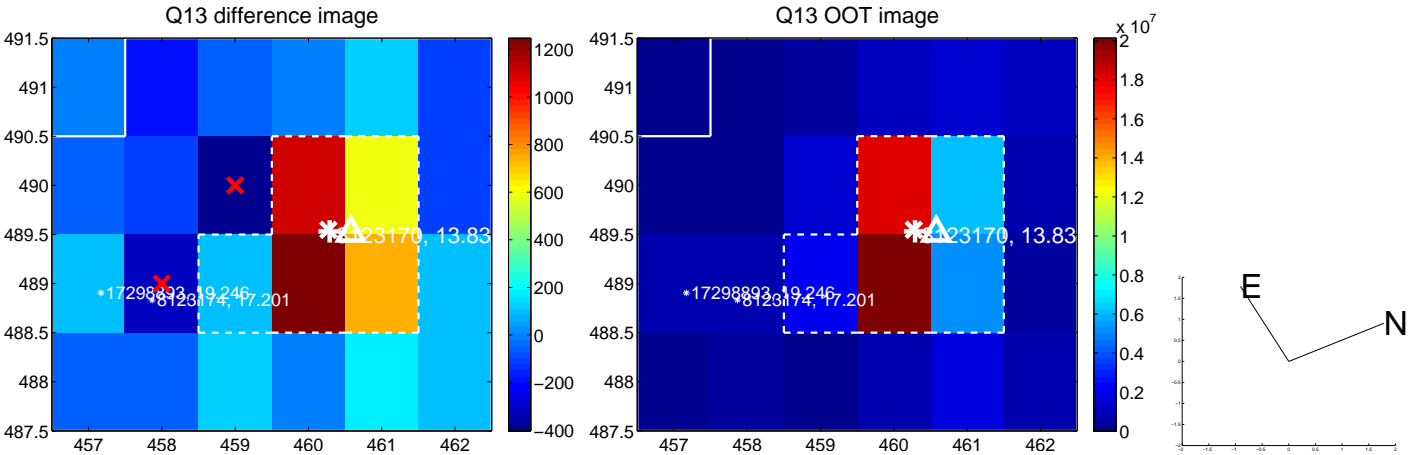
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



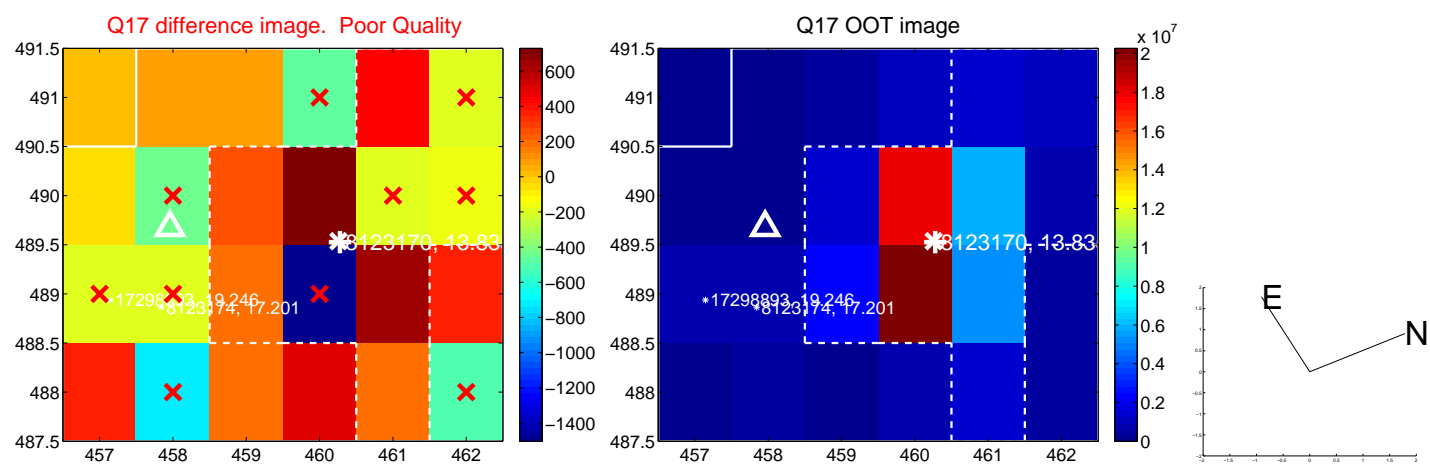
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

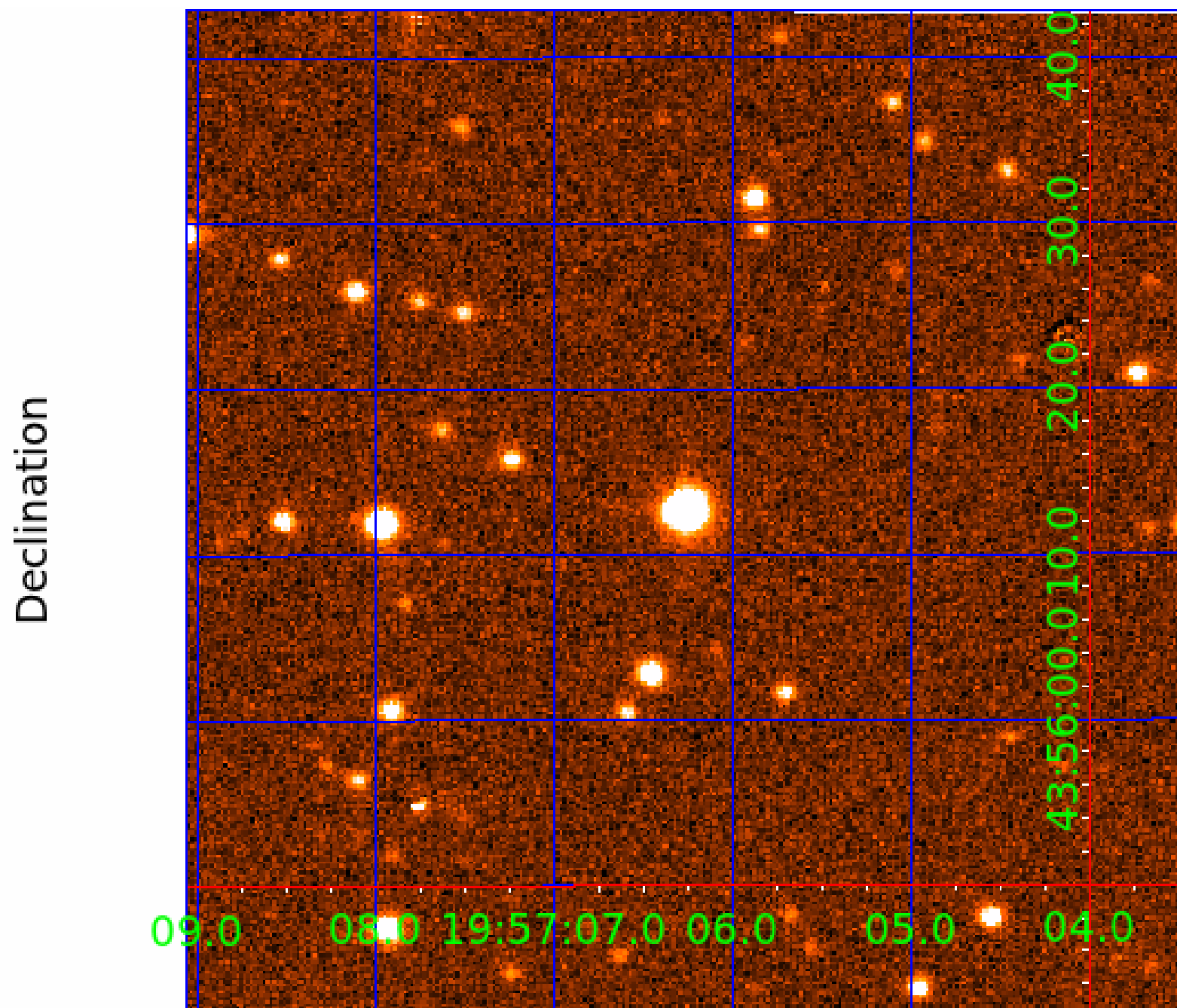


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



folded centroid time series figure for this object.

UKIRT Image



KIC 008123170

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 008123170-01 | OBS | No | 1.011740 | 132.290283 | 3.6 | 1.817 | 8.4 | 0.9 | 1.47 | 6534 | 0.33 | 7168.21 |
| 008123170-02 | OBS | No | 1.012235 | 131.648104 | 32.7 | 4.330 | 8.8 | 9.8 | 1.47 | 6534 | 0.84 | 7163.54 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 008123170-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT |
| 008123170-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV |

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 008123170-02

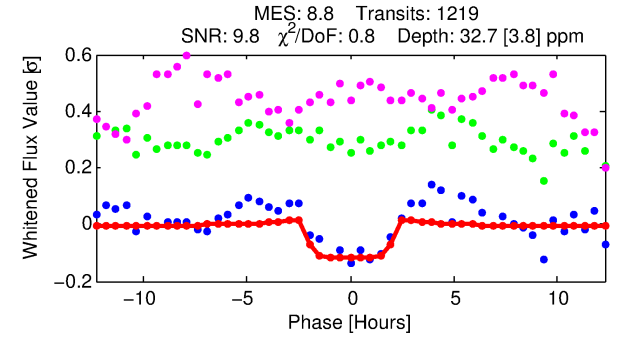
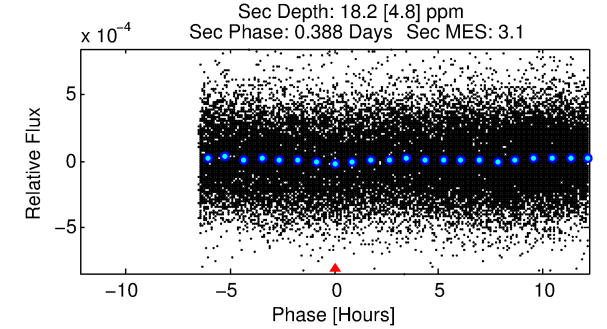
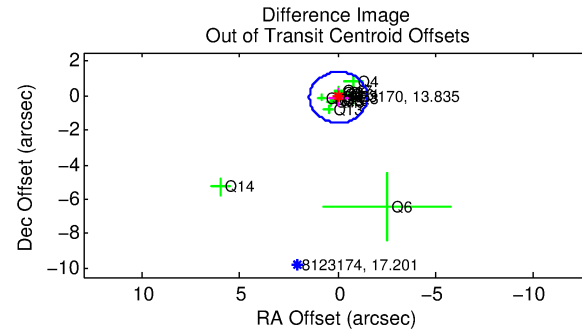
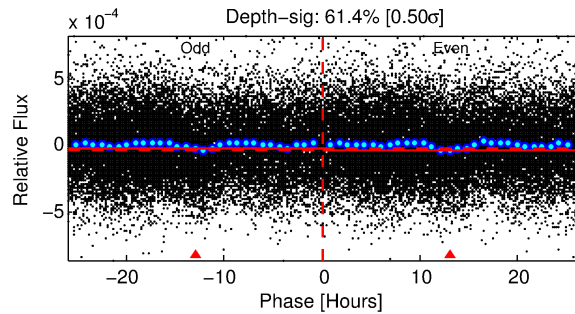
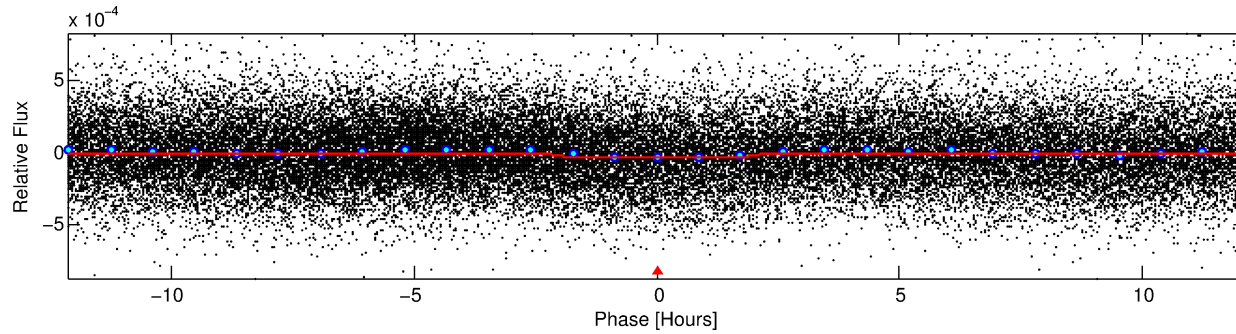
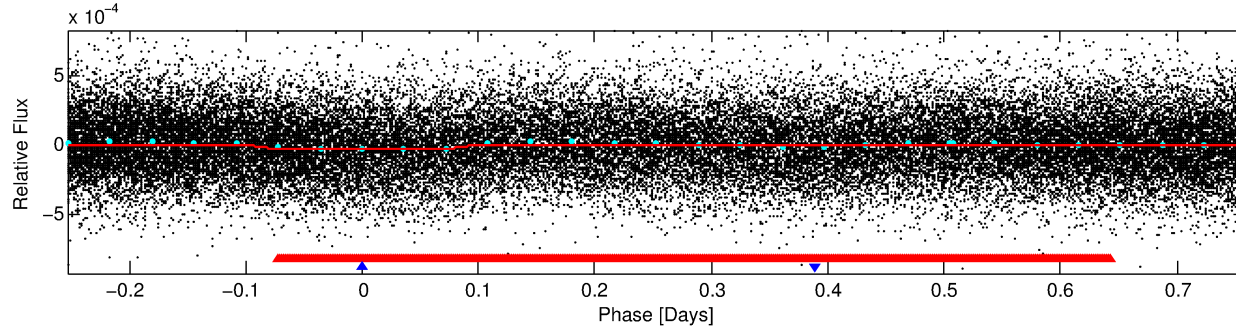
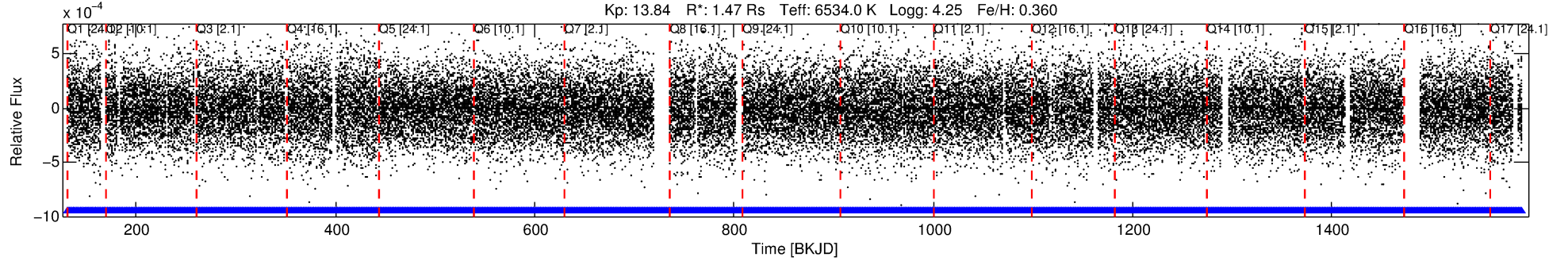
No Significant Match Found

DV One-Page Summary

KIC: 8123170 Candidate: 2 of 2 Period: 1.012 d

KOI: K06972 Corr: No Ephemeris Match

Kp: 13.84 R*: 1.47 Rs Teff: 6534.0 K Logg: 4.25 Fe/H: 0.360



DV Fit Results:

Period = 1.01223 [0.00001] d
Epoch = 131.6481 [0.0044] BKJD
Rp/R* = 0.0053 [0.0048]
a/R* = 1.85 [6.08]
b = 0.26 [16.91]
Seff = 7163.54 [1615.96]
Teq = 2346 [132] K
Rp = 0.85 [0.78] Re
a = 0.0221 [0.0034] AU
Ag = 6.84 [12.59] [0.46σ]
Teffp = 5865 [2682] K [1.31σ]

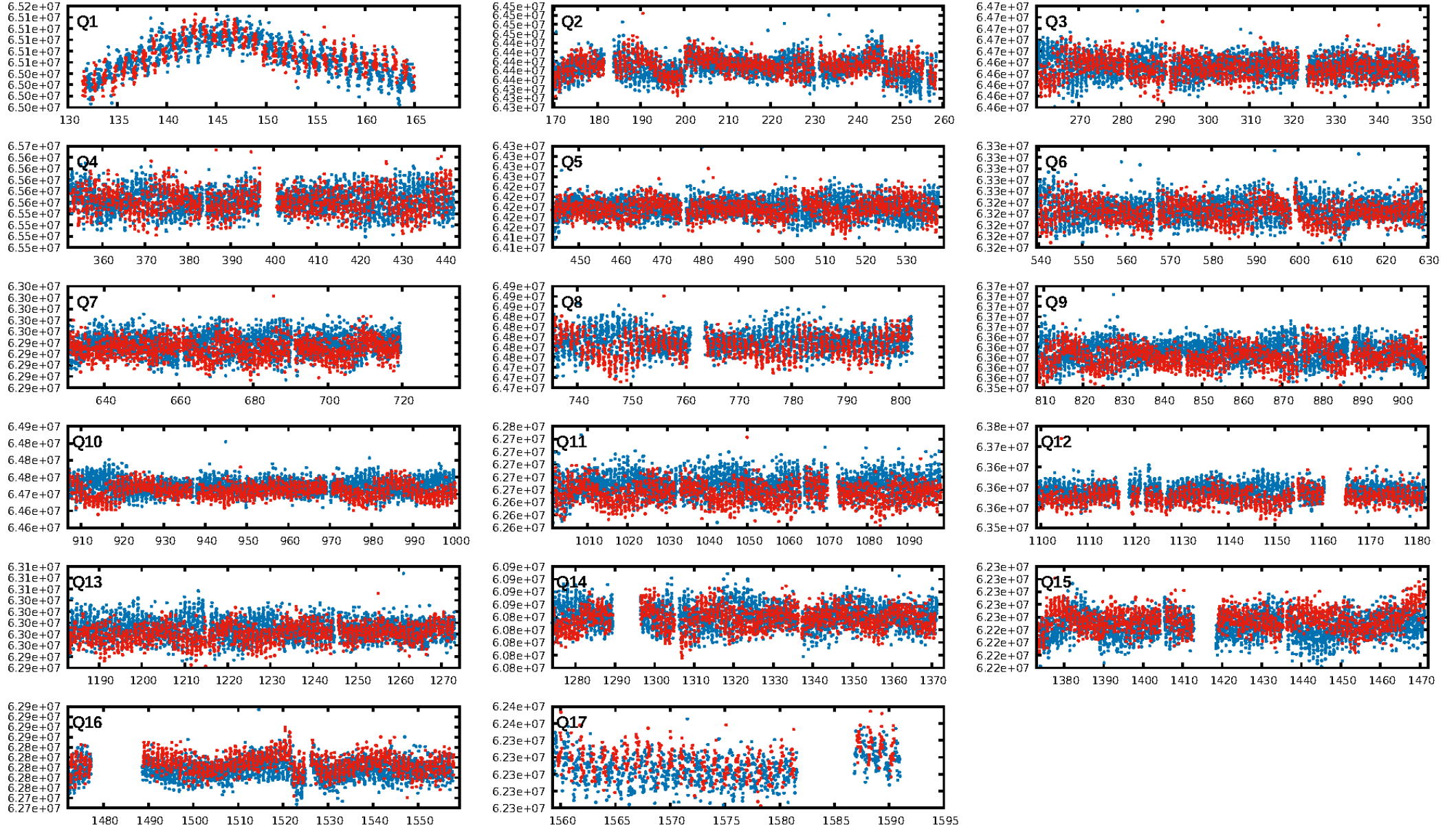
DV Diagnostic Results:

ShortPeriod-sig: 0.2% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 8.54e-17
RollingBand-fgt: 1.00 [1159/1159]
GhostDiagnostic-chr: 0.921
Centroid-sig: 11.1%
Centroid-so: 1.279 arcsec [1.34σ]
OotOffset-rm: 0.111 arcsec [0.22σ]
KicOffset-rm: 0.139 arcsec [0.36σ]
OotOffset-st: 3/4/4/4 [15]
KicOffset-st: 3/4/4/4 [15]
DiffImageQuality-fgm: 0.67 [10/15]
DiffImageOverlap-fno: 0.24 [4/17]

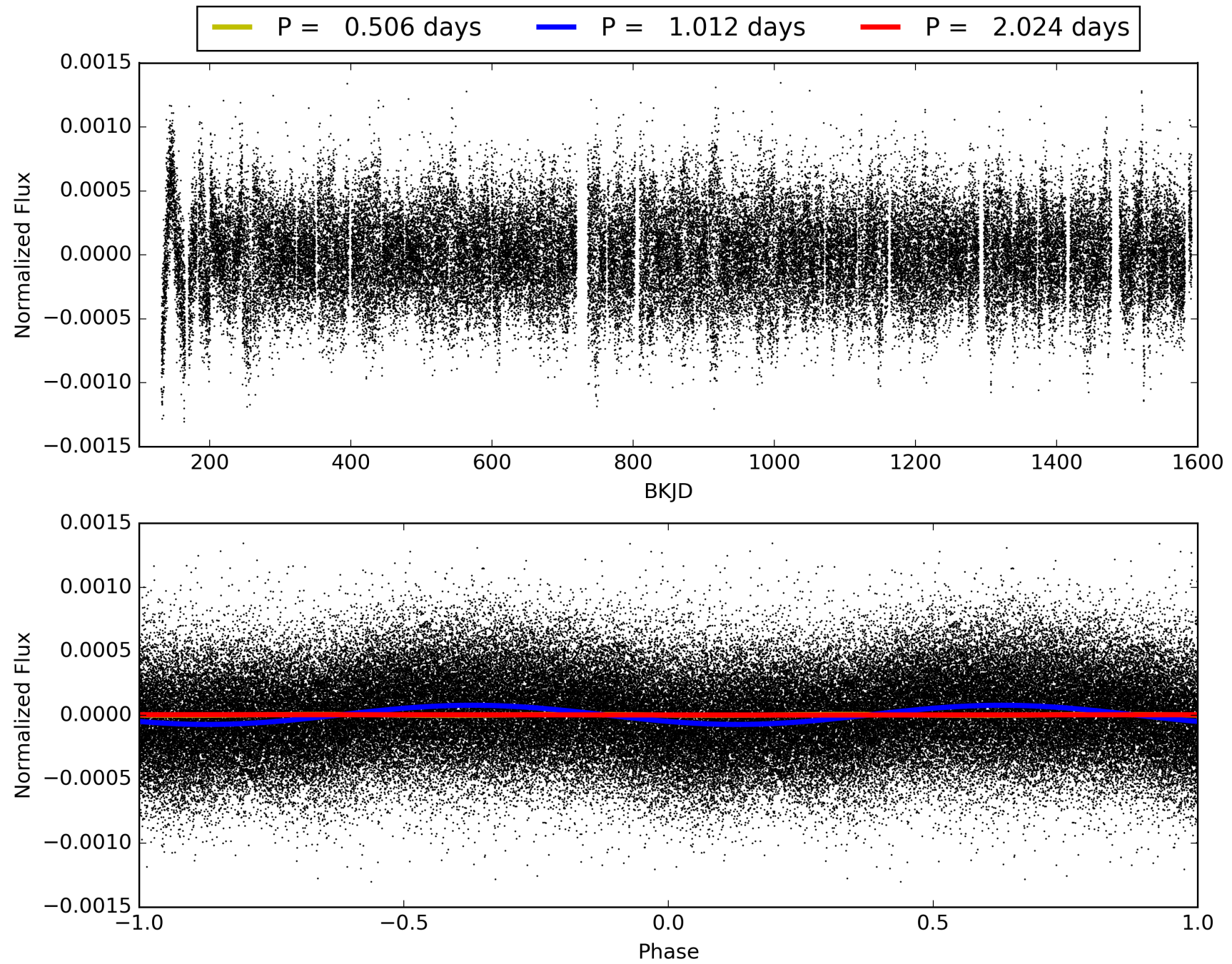
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 05:53:23 Z

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

TCE 008123170-02, PDC Light Curves

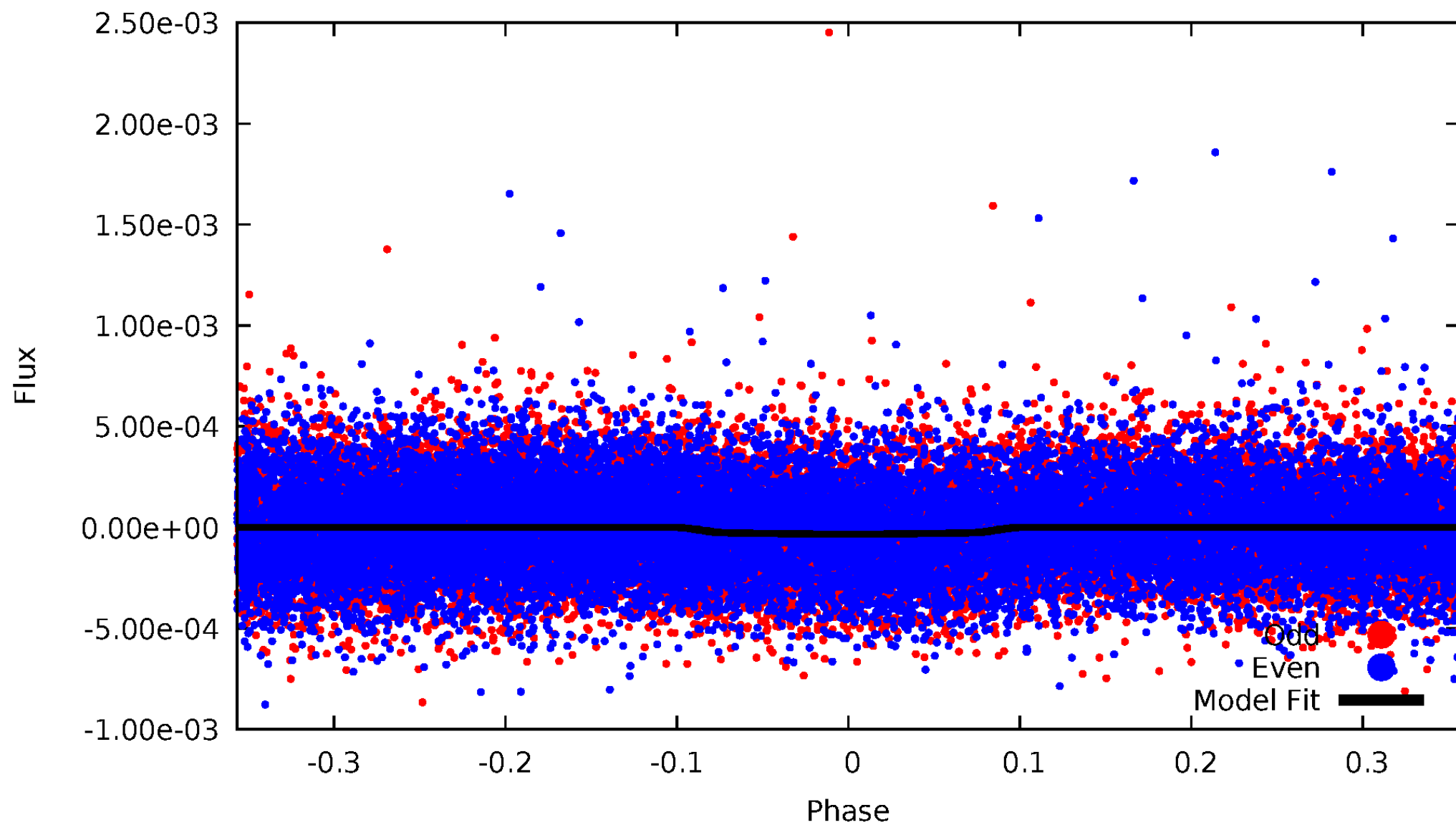


TCE 008123170-02



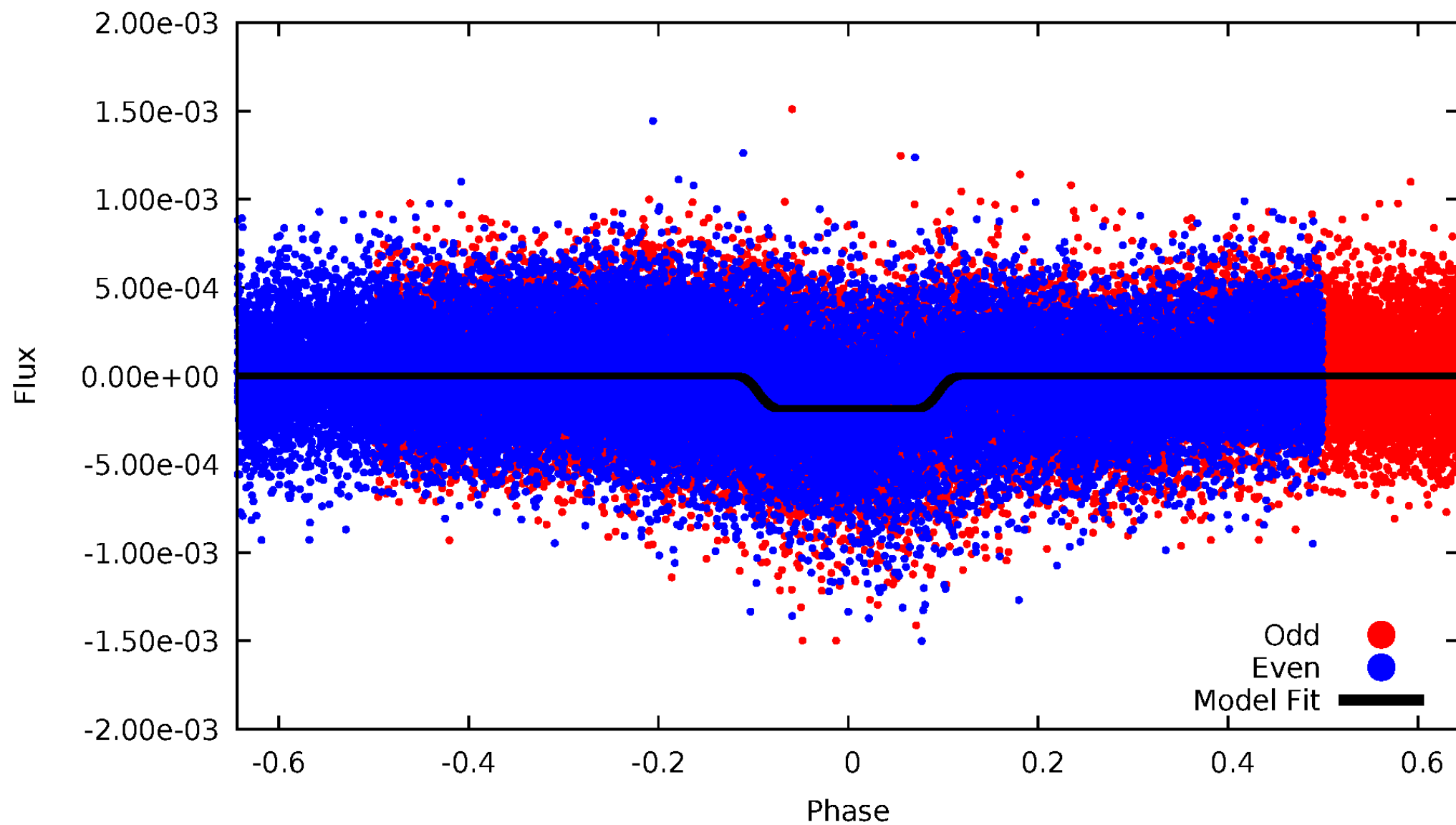
DV Odd/Even

TCE 008123170-02



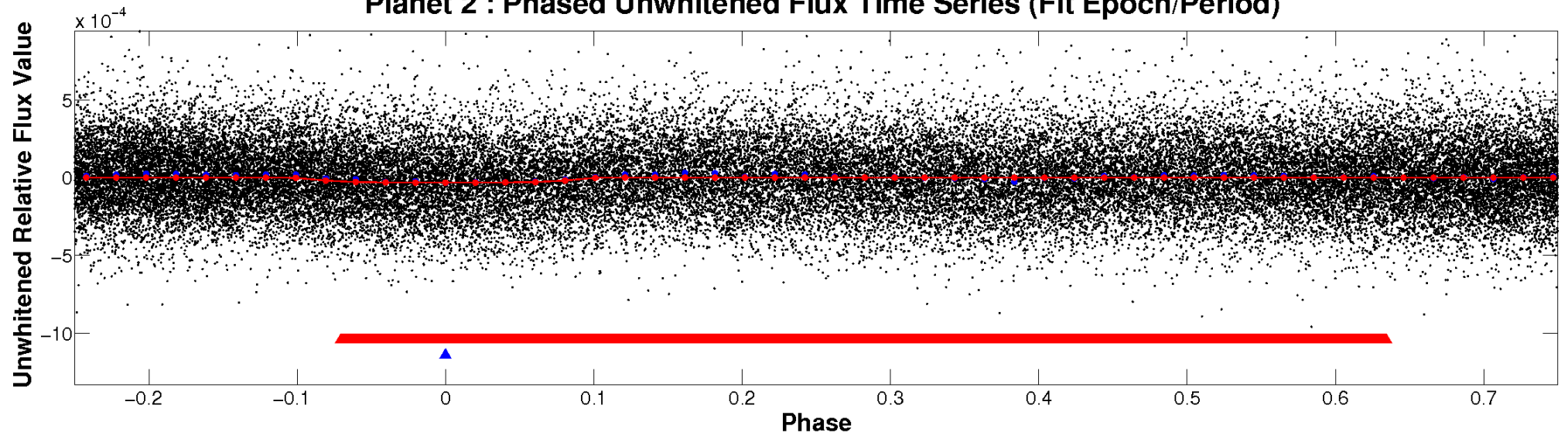
ALT Odd/Even

TCE 008123170-02

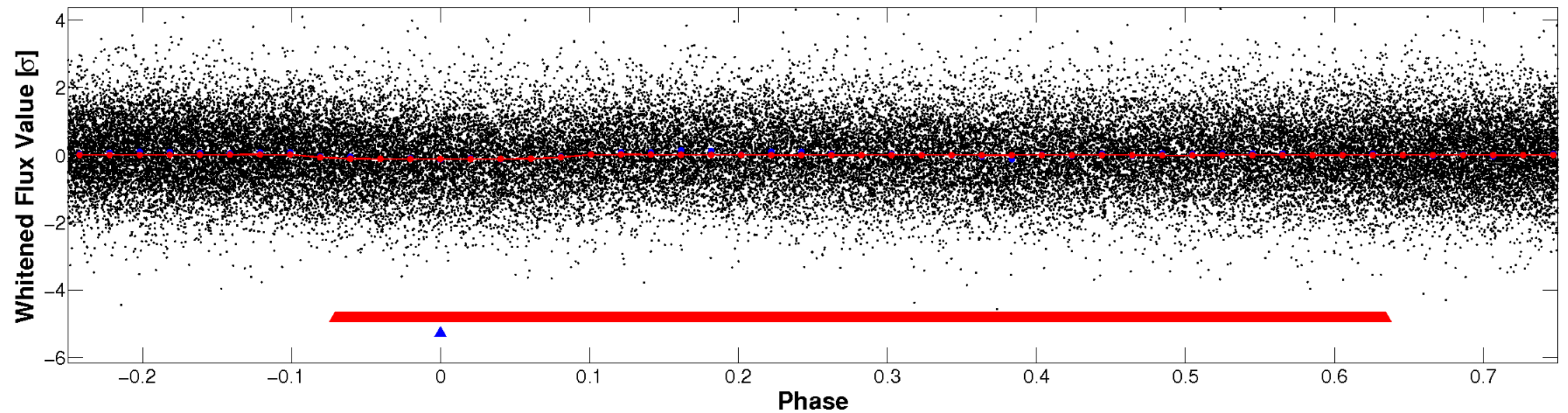


Non-Whitened Vs. Whitened Light Curve

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

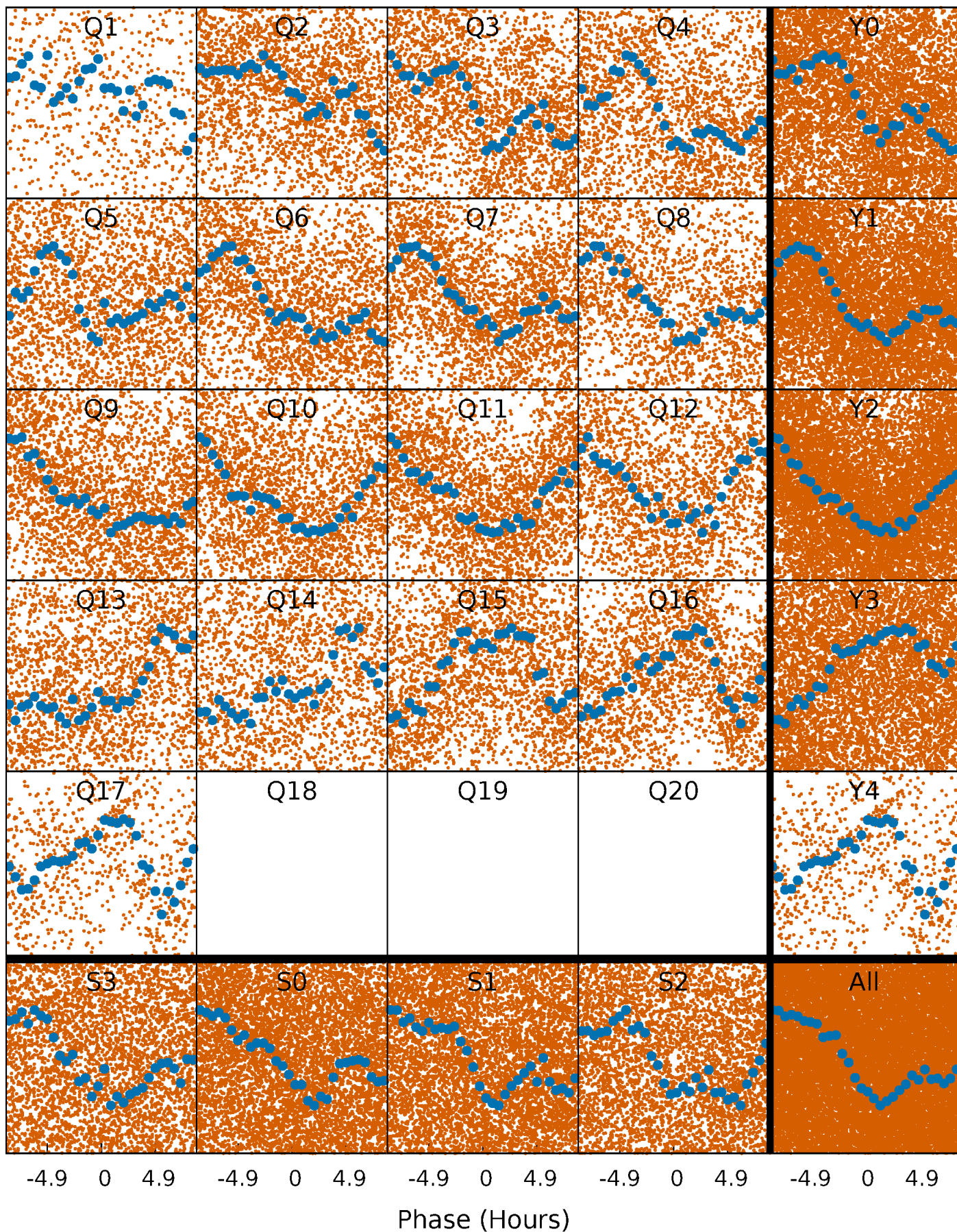


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



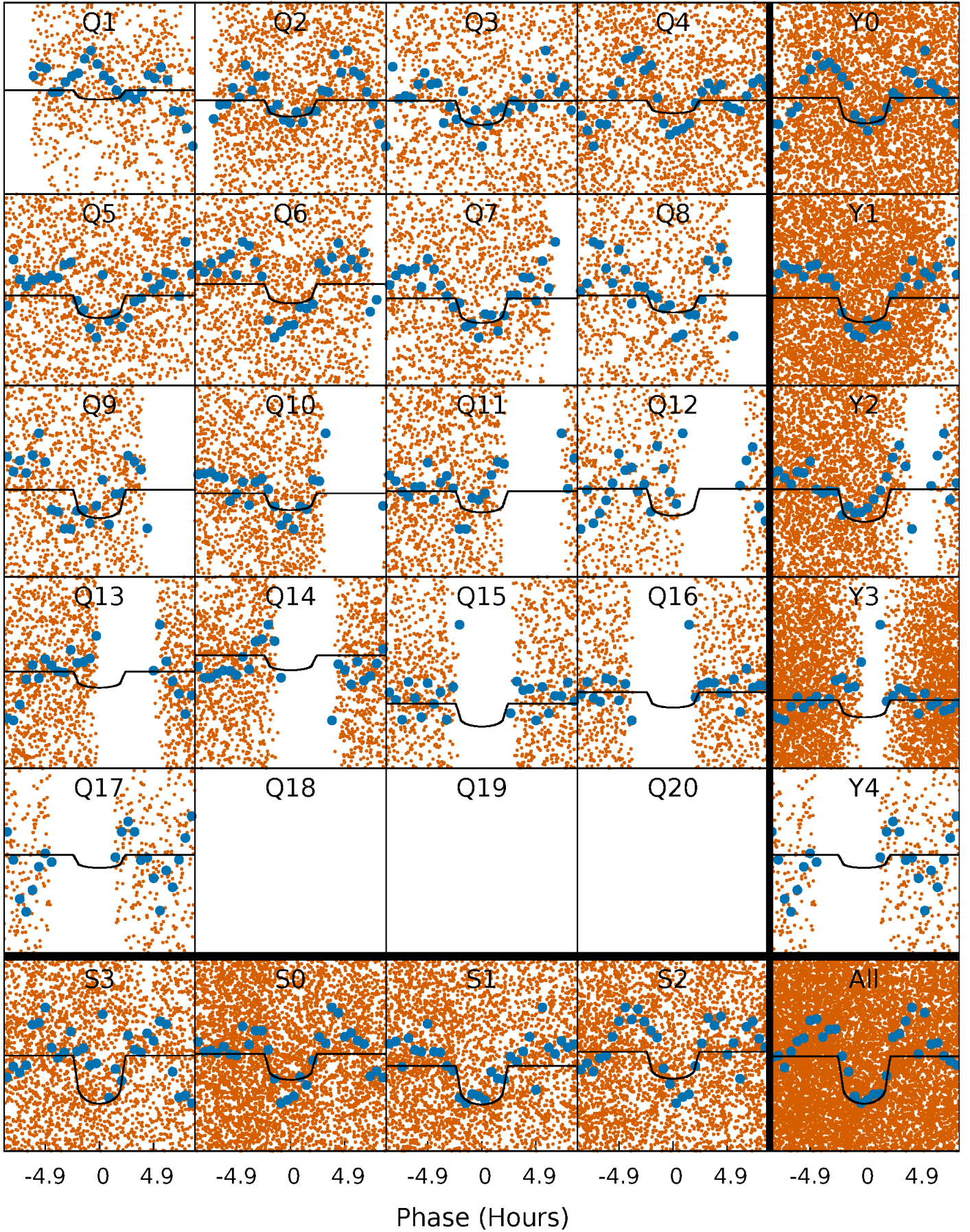
PDC Quarter-Phased Transit Curves

TCE 008123170-02 P= 1.012235 Days $T_0=131.648104$ (BKJD)



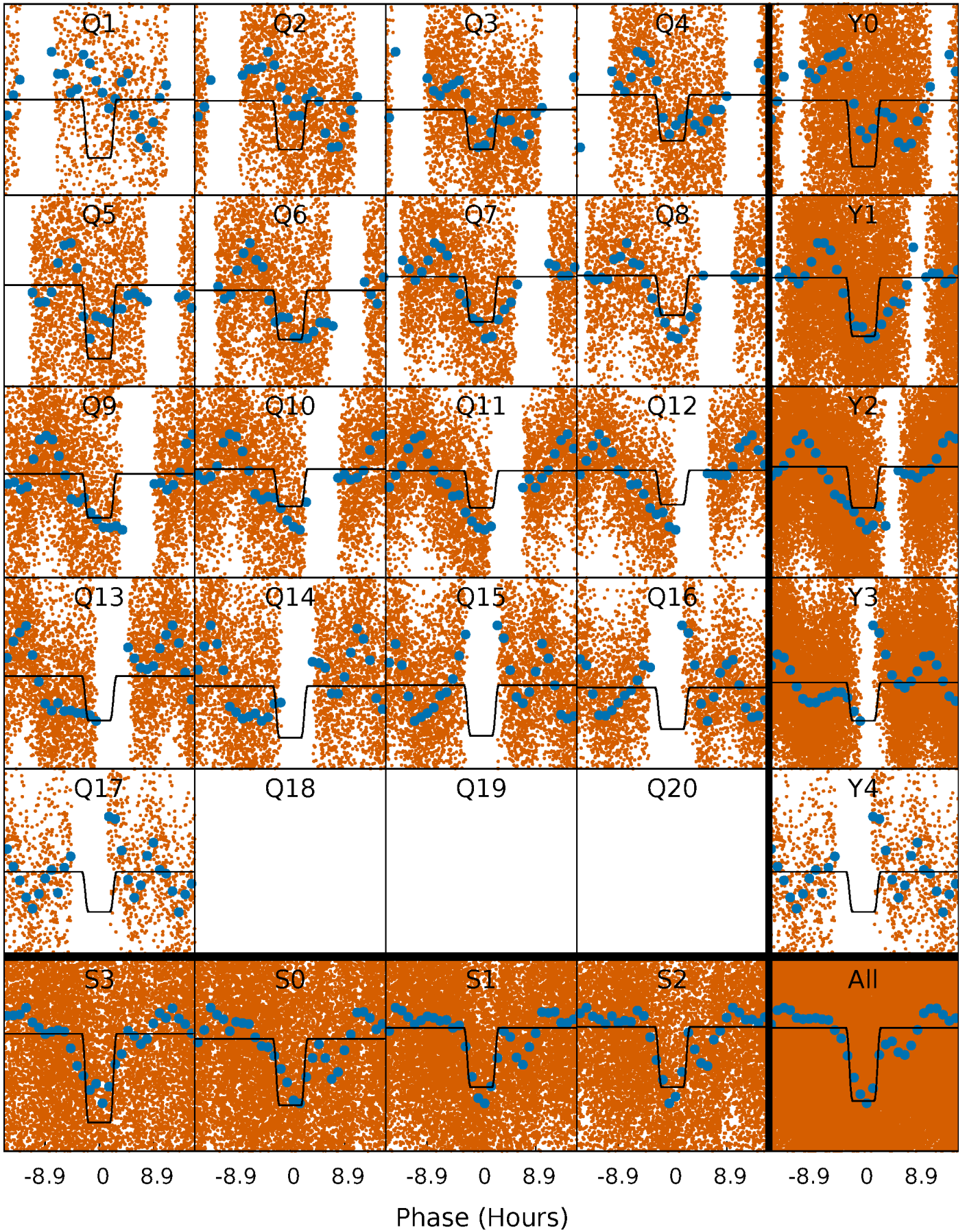
DV Quarter-Phased Transit Curves

TCE 008123170-02 P= 1.012235 Days $T_0=131.648104$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

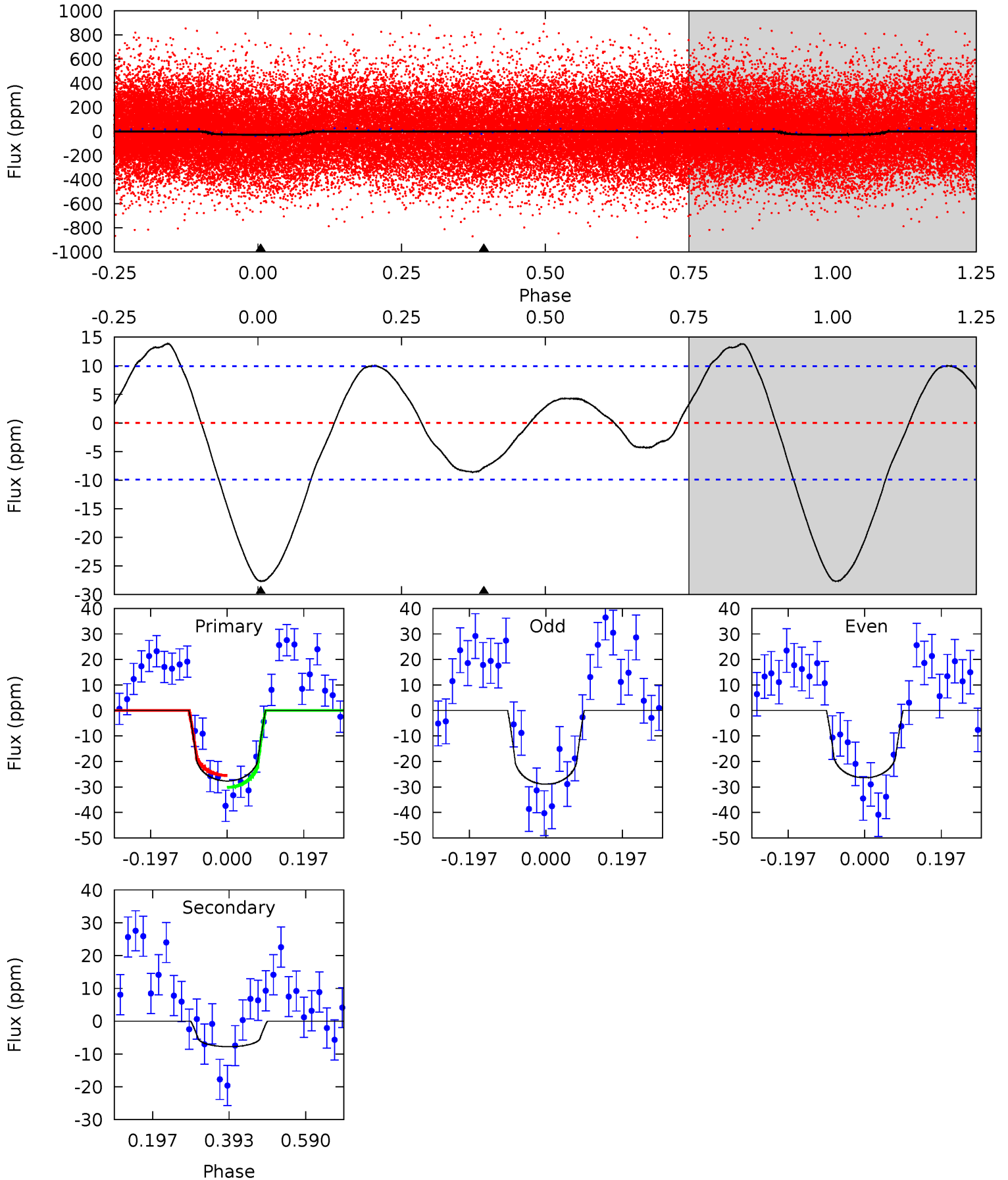
TCE 008123170-02 P= 1.012204 Days $T_0=131.694233$ (BKJD)



DV Model-Shift Uniqueness Test

008123170-02, P = 1.012235 Days, E = 130.635869 Days

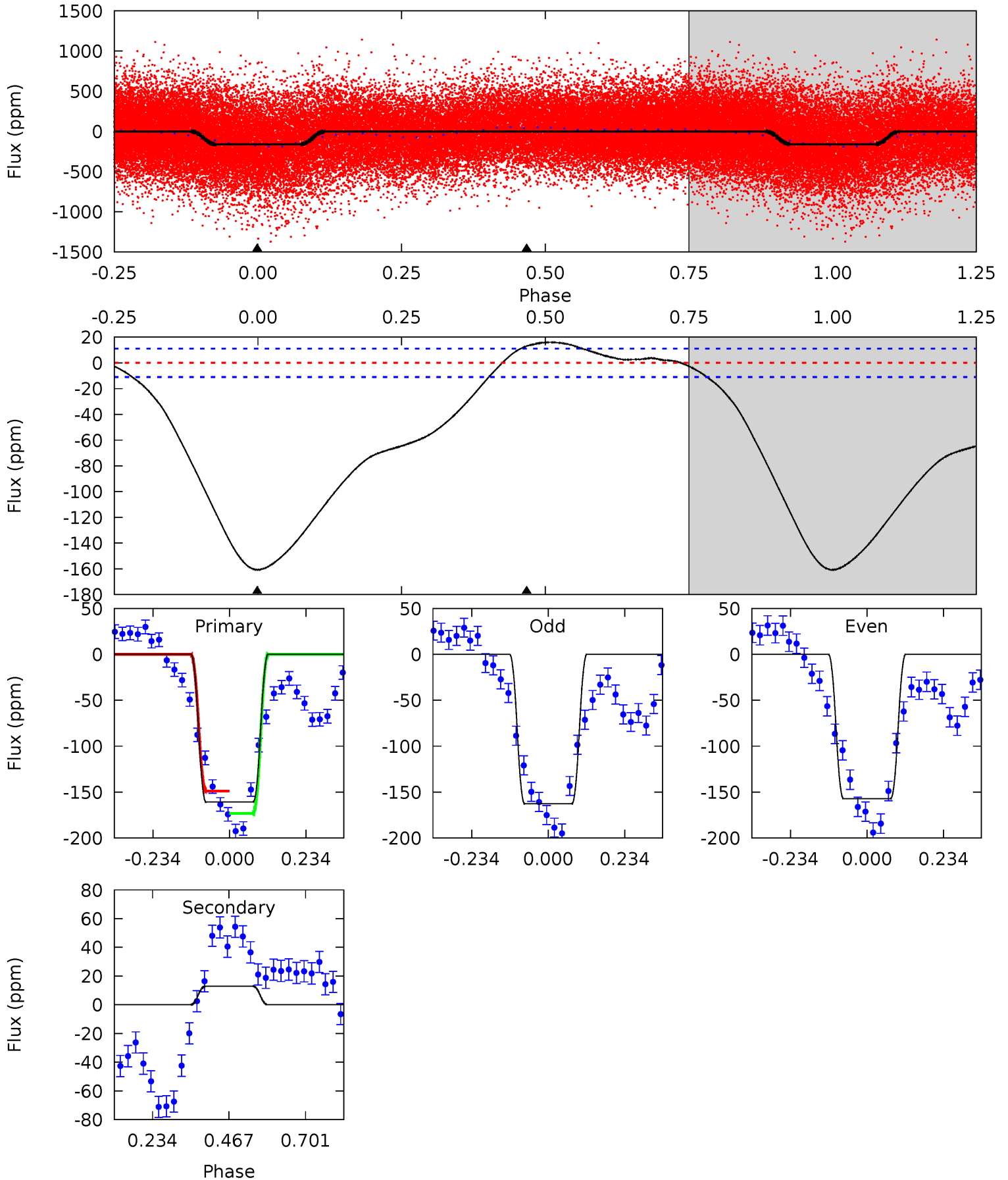
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 12.3 | 3.47 | 0 | 0 | 4.42 | 1.29 | 2.30 | 12.3 | 12.3 | 3.47 | 3.47 | 0.56 | 0.74 | 0.33 | 1.04 |



Alt Model-Shift Uniqueness Test

008123170-02, P = 1.012204 Days, E = 130.682029 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|-------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 63.6 | -5.12 | 0 | 0 | 4.38 | 1.19 | 6.68 | 63.6 | 63.6 | -5.12 | -5.12 | 1.14 | 0.91 | 0.09 | 4.56 |



Stellar Parameters For KIC 008123170

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | $M(M_{\odot})$ | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|---------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 6534^{+71}_{-84} | $4.255^{+0.042}_{-0.119}$ | $0.360^{+0.100}_{-0.150}$ | $1.465^{+0.268}_{-0.107}$ | $1.409^{+0.088}_{-0.079}$ | $0.631^{+0.106}_{-0.235}$ |
| | +1%/-1% | +1%/-3% | +28%/-42% | +18%/-7% | +6%/-6% | +17%/-37% |
| Source | SPE90 | SPE90 | SPE90 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 008123170-02 / KOI

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|-------------|------------------------|---------------------|------------------------|----------------------------|
| DV | -8 ± 2 | $0.96^{+0.71}_{-0.61}$ | 3298^{+142}_{-79} | 4501^{+2743}_{-1023} | $2.276^{+12.800}_{-1.549}$ |
| Alt. | 13 ± 3 | $2.18^{+0.85}_{-0.73}$ | 3298^{+133}_{-80} | -4022^{+295}_{-488} | $-0.726^{+0.358}_{-0.965}$ |

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 $A_{obs} \gg 1.0$

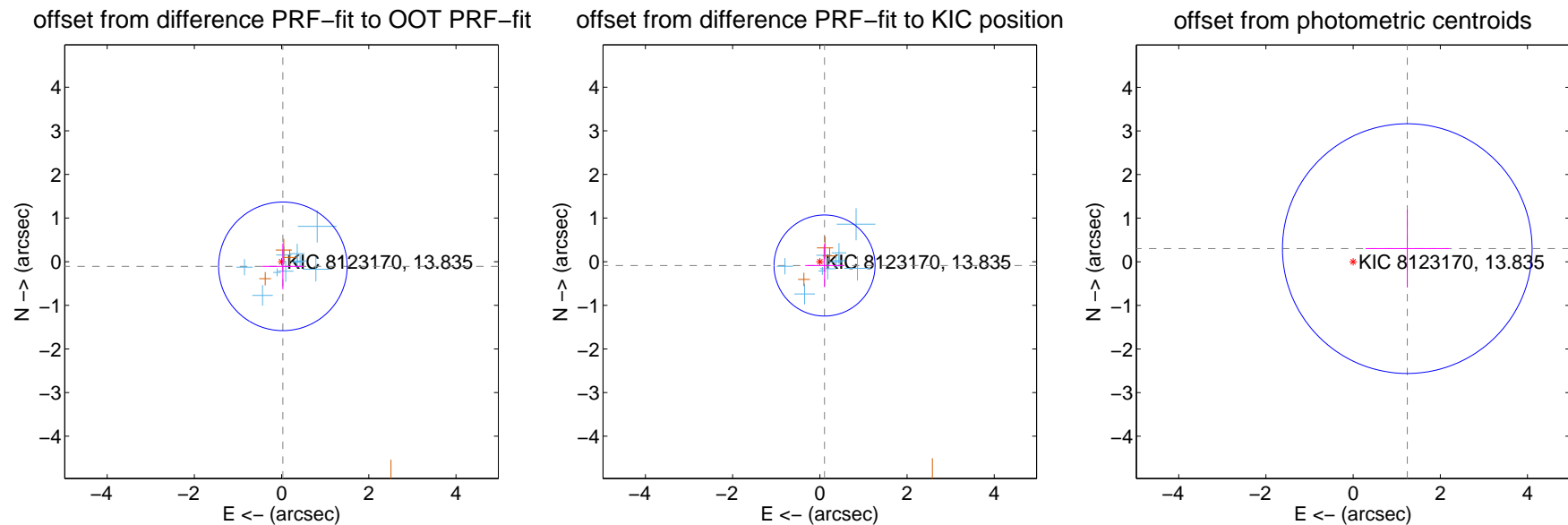
DV Centroid Data

Supplemental centroid analysis for 008123170-02. Kepler magnitude: 13.84. Transit SNR 9.83

There are 10 quarters with good PRF difference image offsets

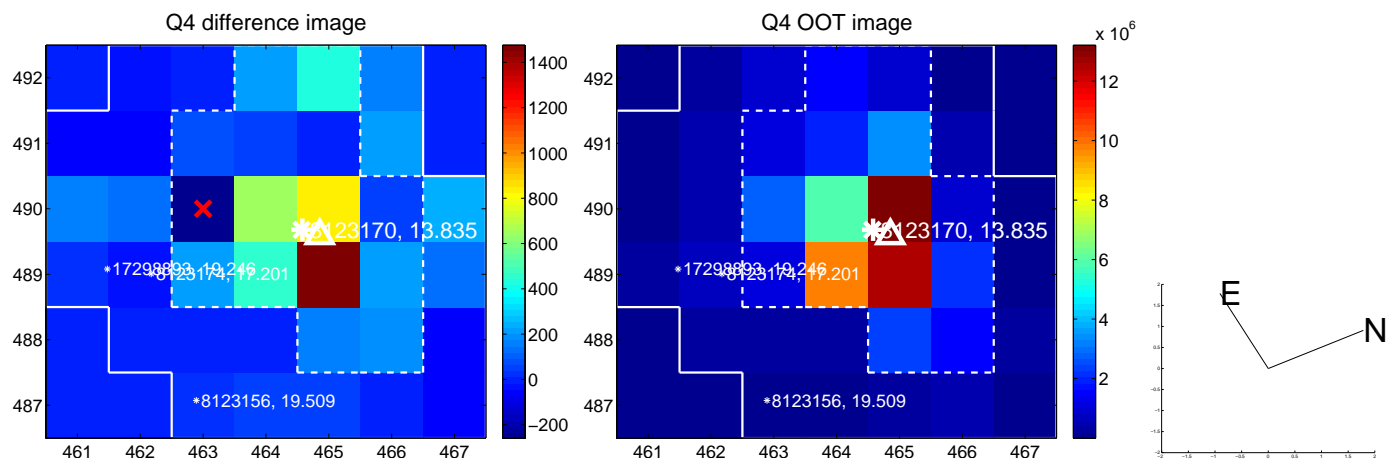
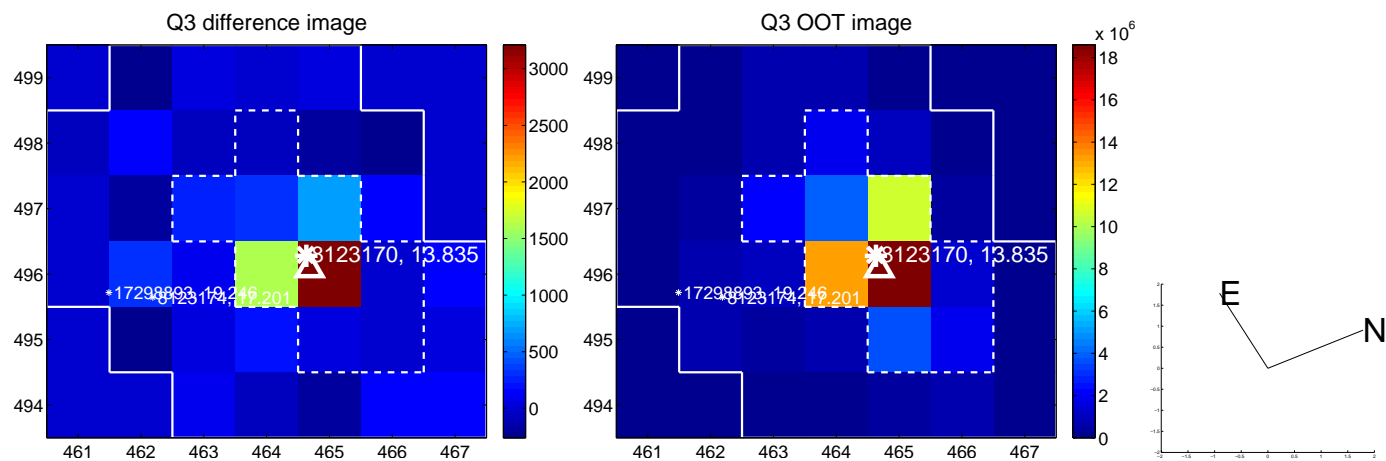
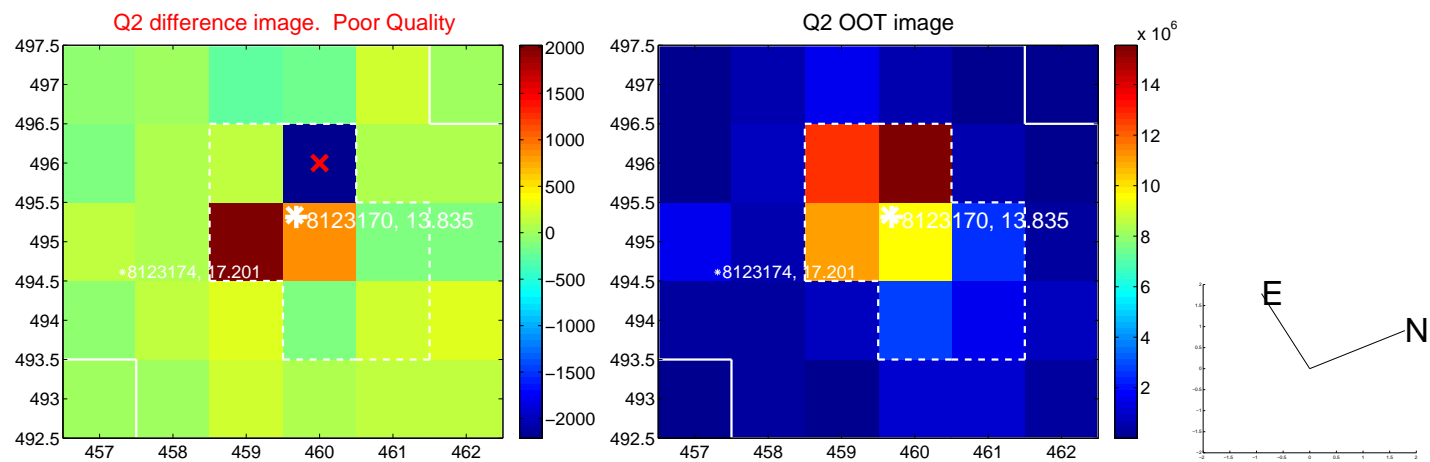
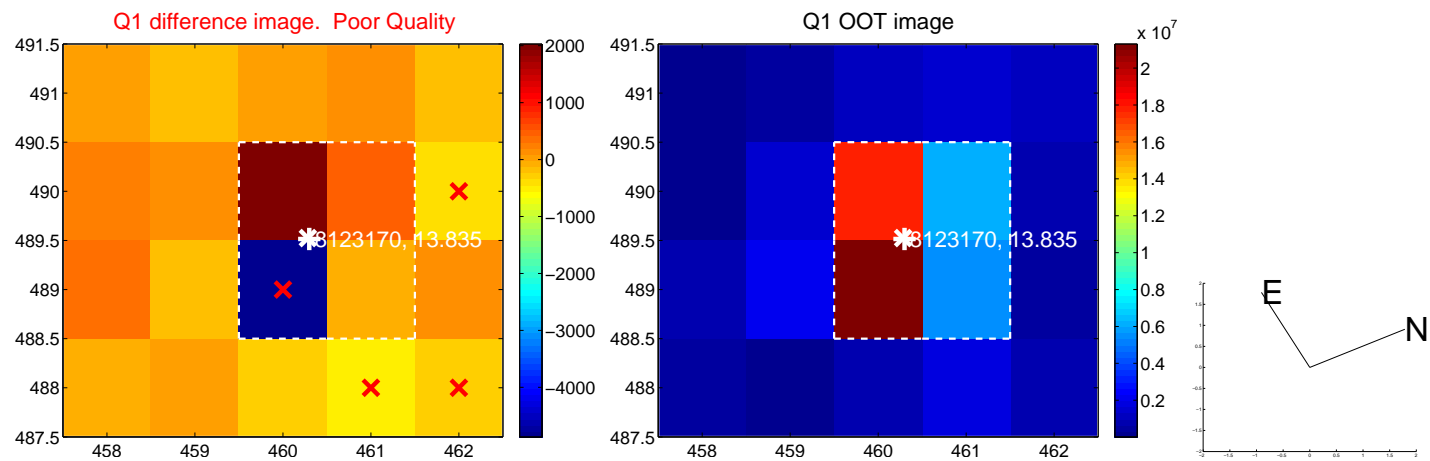
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 0.111 ± 0.491 | 0.22 | -0.030 ± 0.474 | -0.106 ± 0.525 |
| PRF-fit source offset from KIC position | 0.139 ± 0.386 | 0.36 | -0.108 ± 0.442 | -0.088 ± 0.495 |
| photometric centroid source offset | 1.28 ± 0.95 | 1.34 | -1.24 ± 0.96 | 0.30 ± 0.89 |

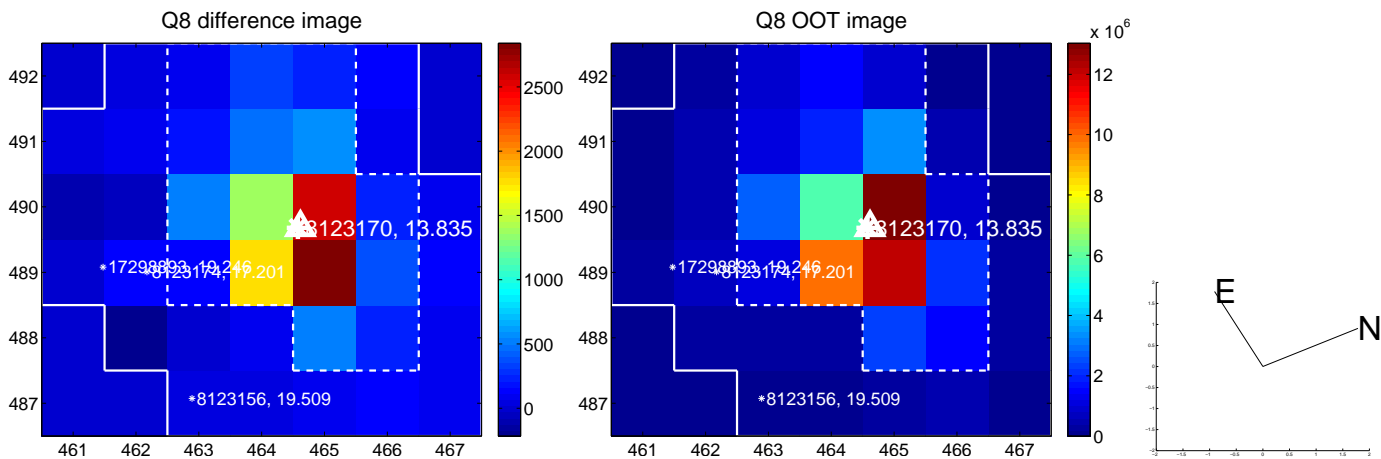
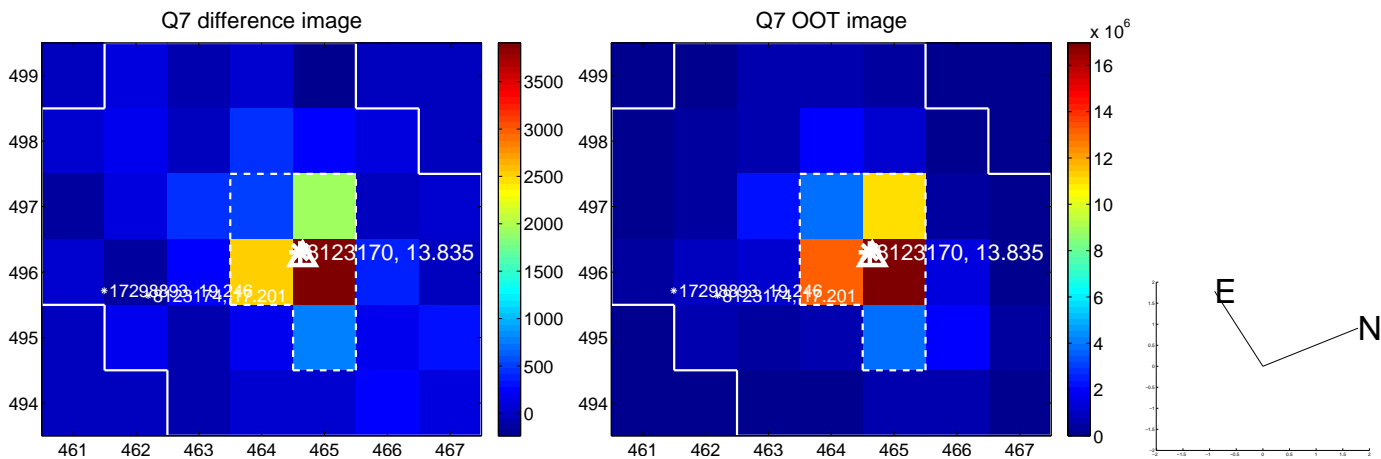
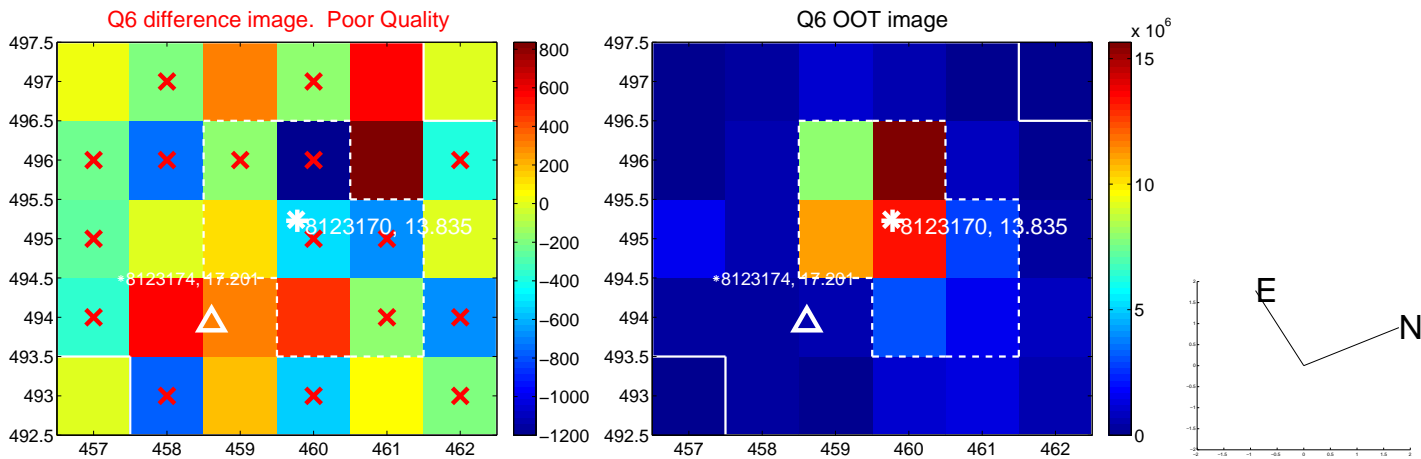
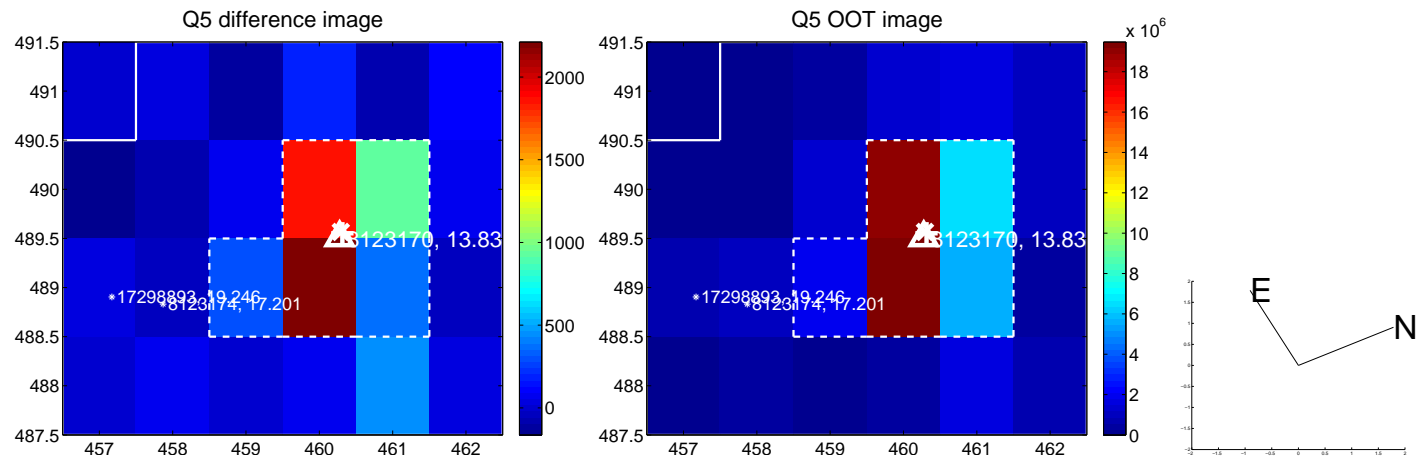


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

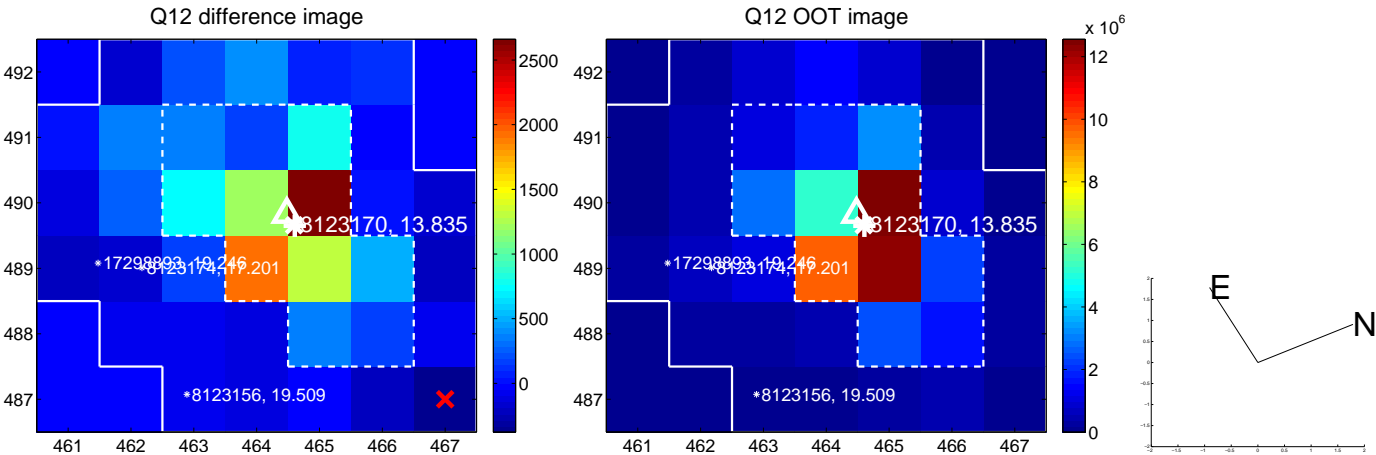
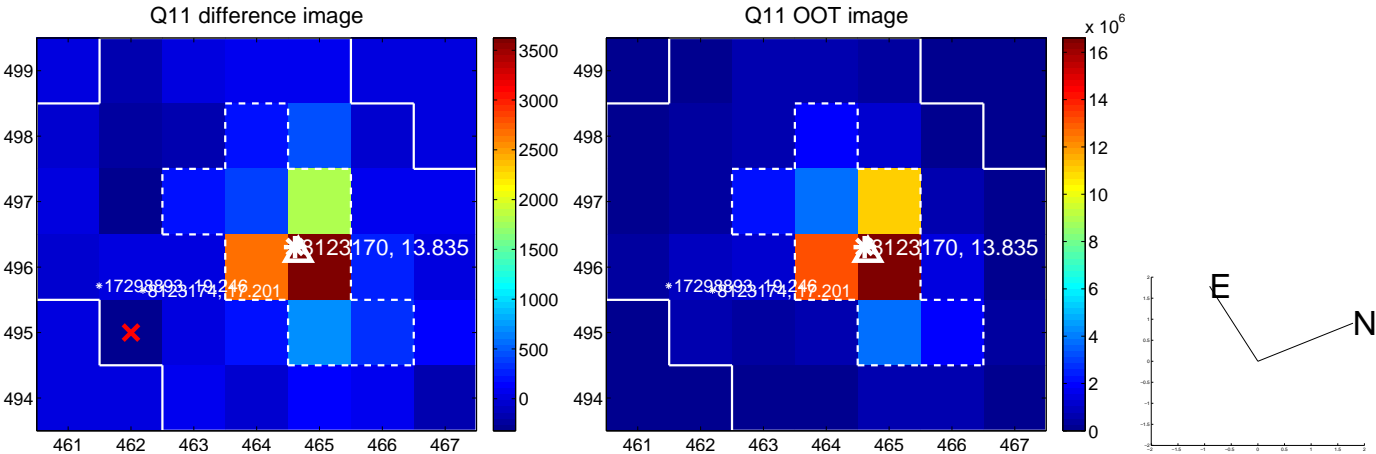
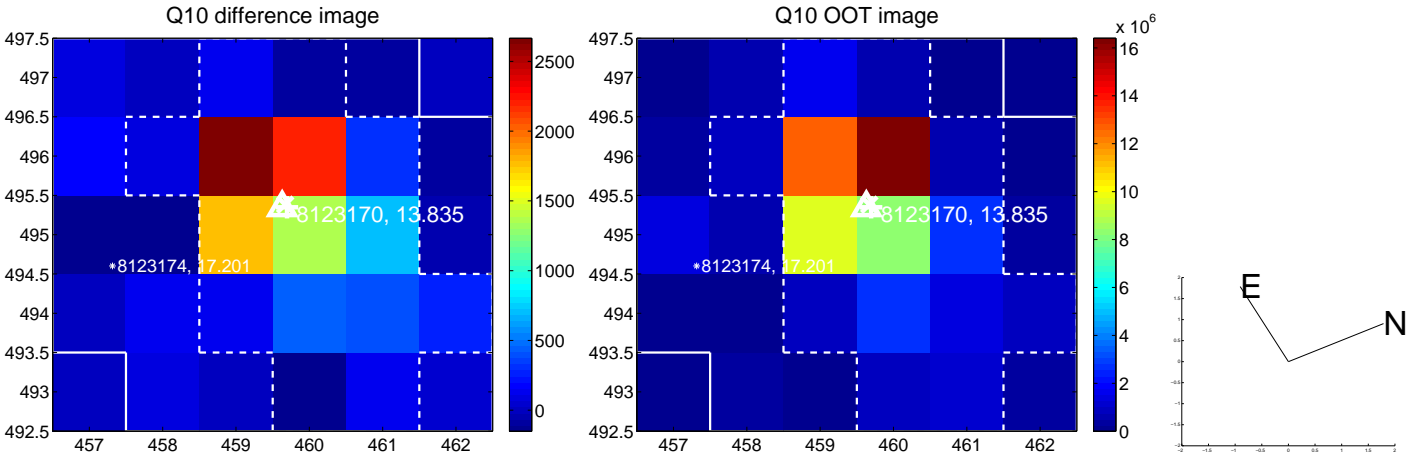
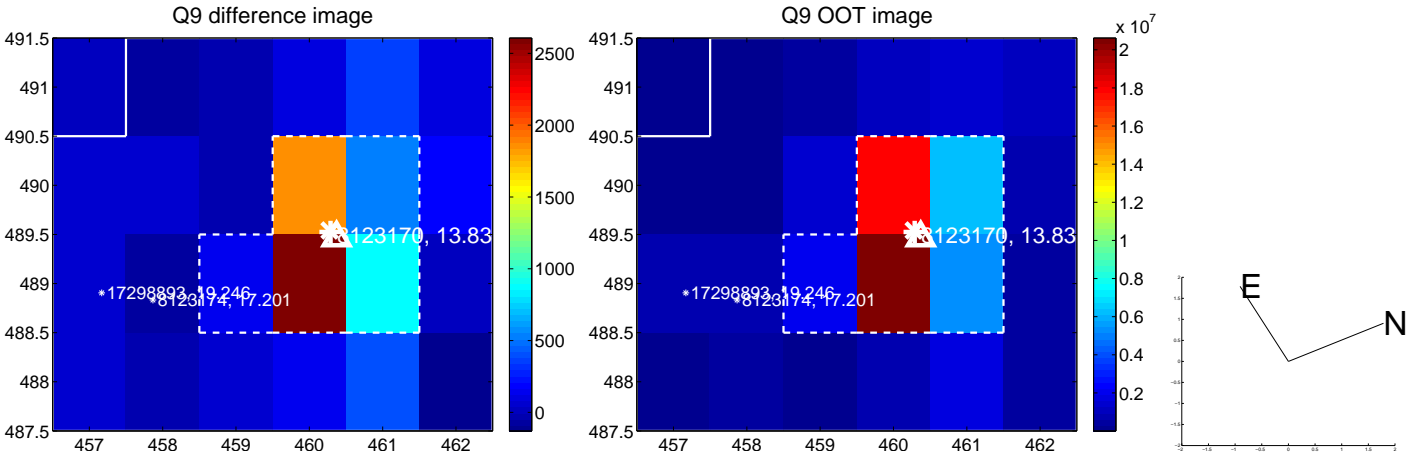
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



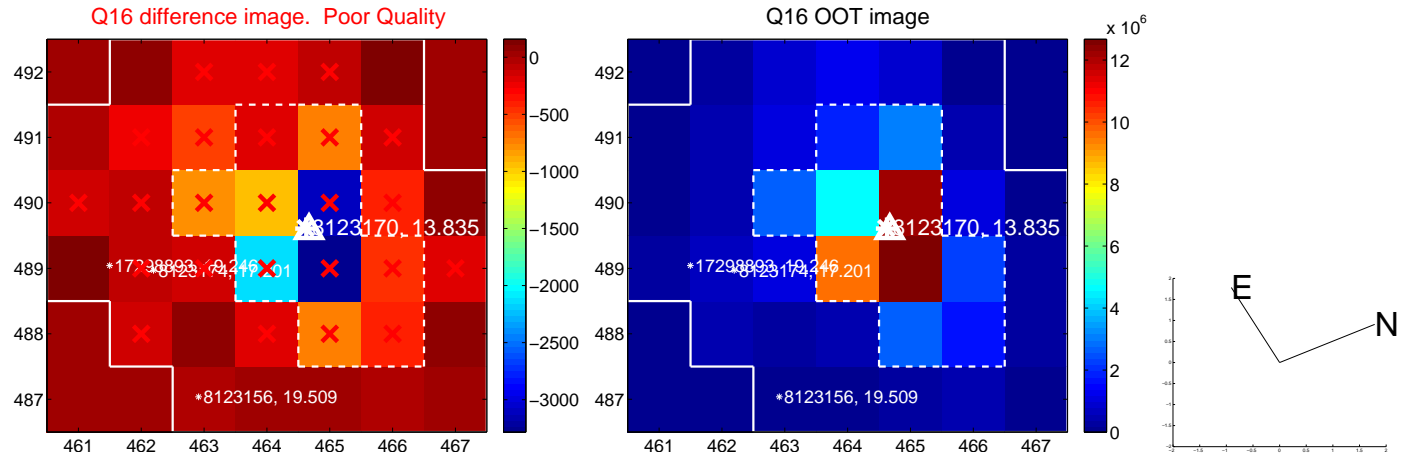
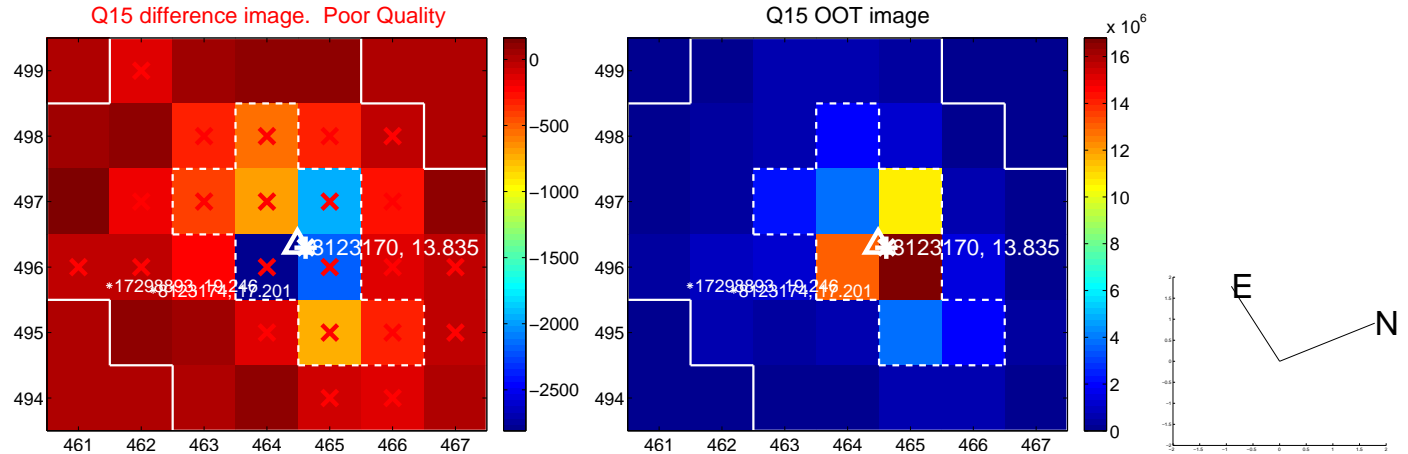
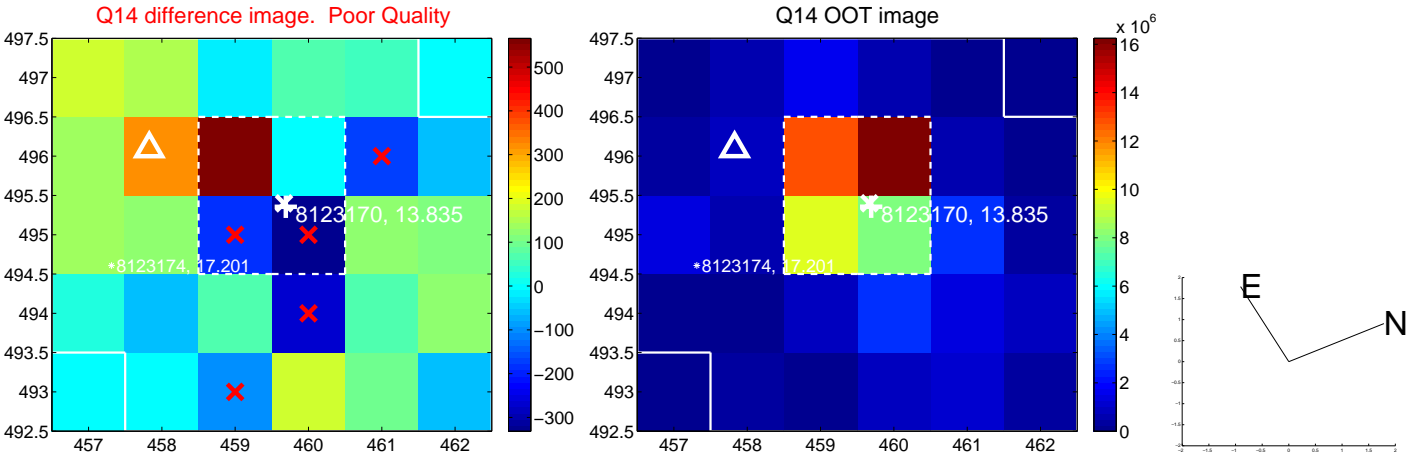
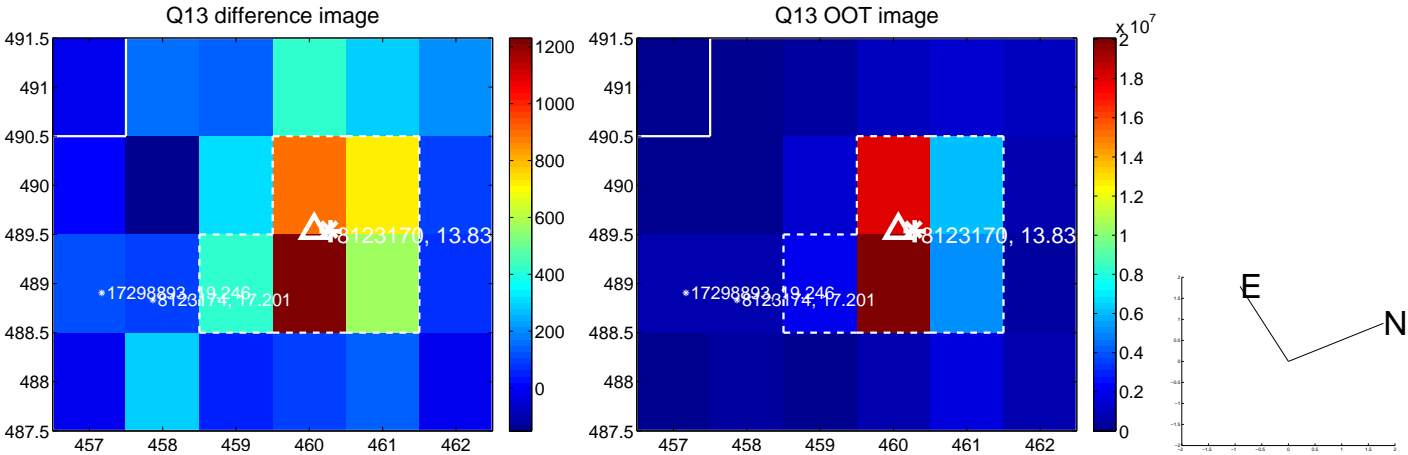
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



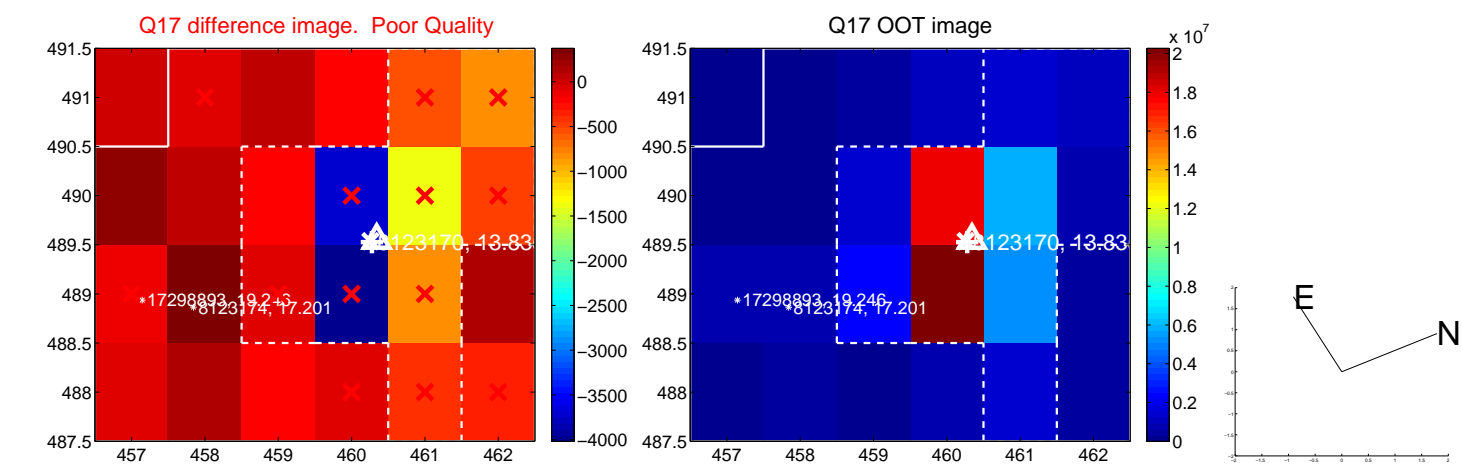
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



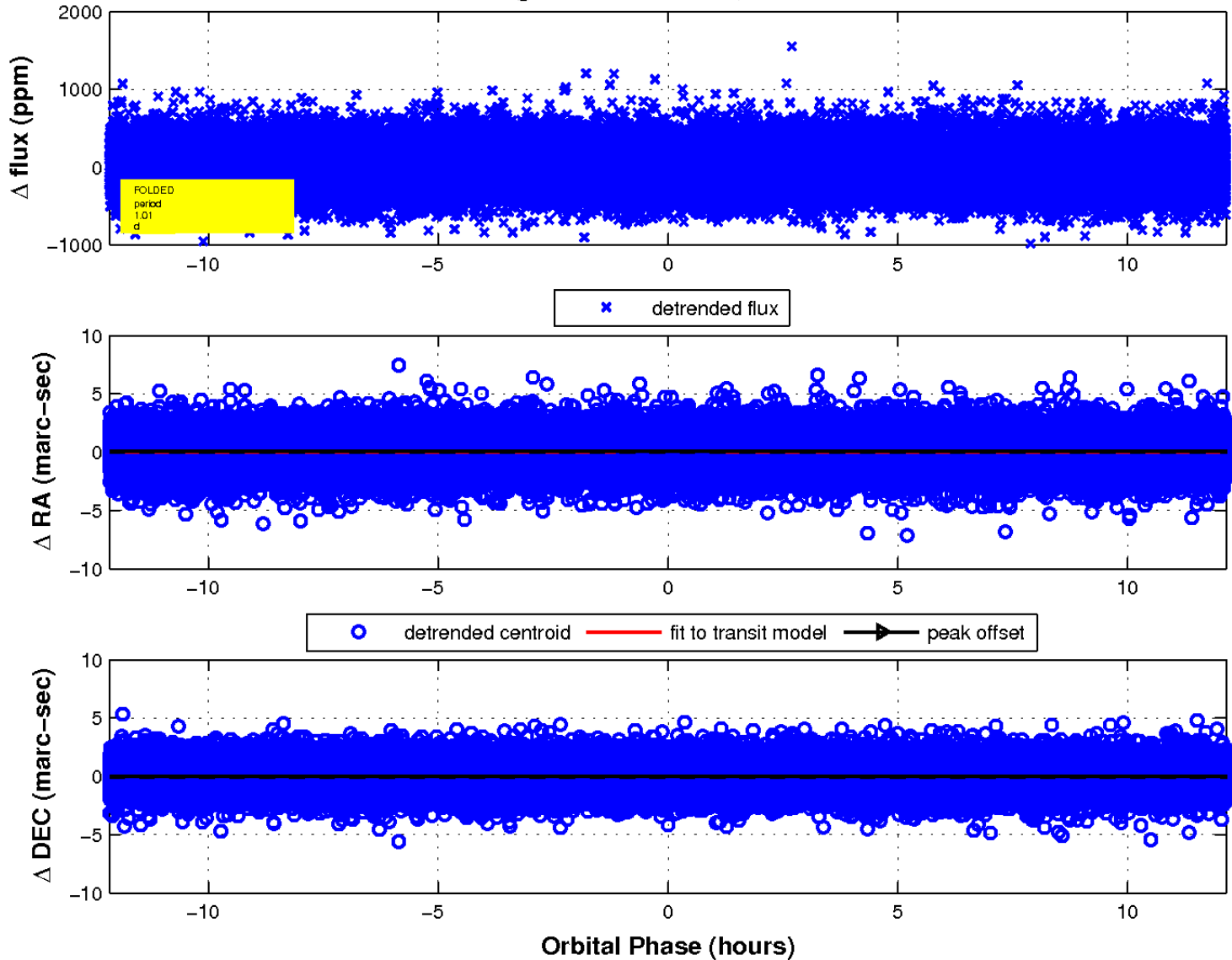
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

