

KIC 010424228

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 010424228-01 | OBS | No | 0.892714 | 132.406249 | 116.9 | 1.409 | 11.3 | 13.0 | 1.76 | 6908 | 2.23 | 15692.28 |
| 010424228-02 | OBS | No | 1.289140 | 132.644074 | 90.6 | 10.561 | 9.9 | 13.0 | 1.76 | 6908 | 1.70 | 9613.96 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|---|
| 010424228-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT |
| 010424228-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—CENT_KIC_POS |

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

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

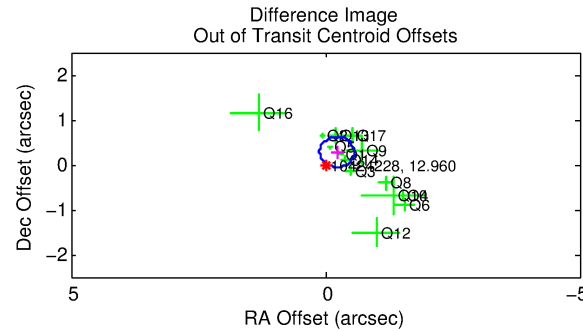
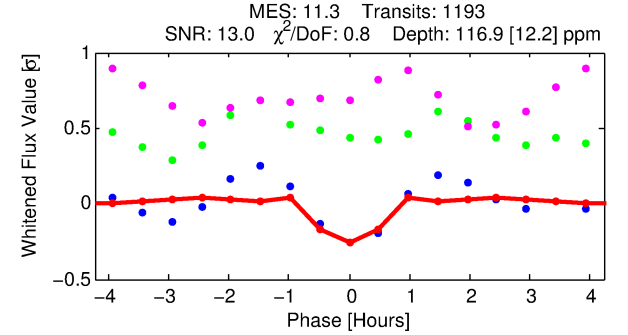
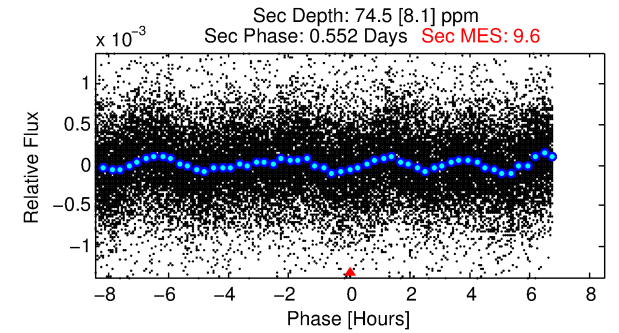
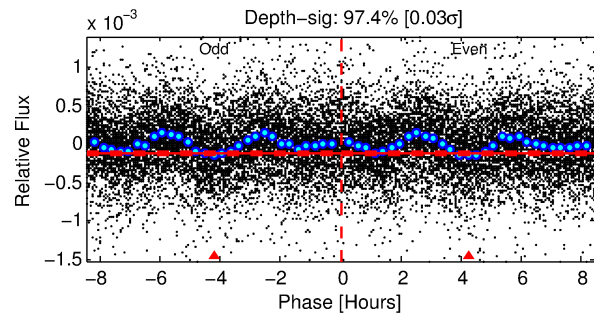
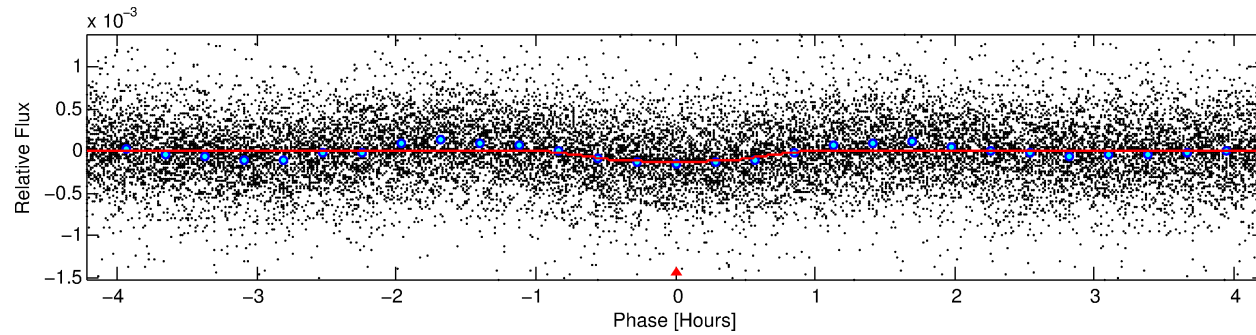
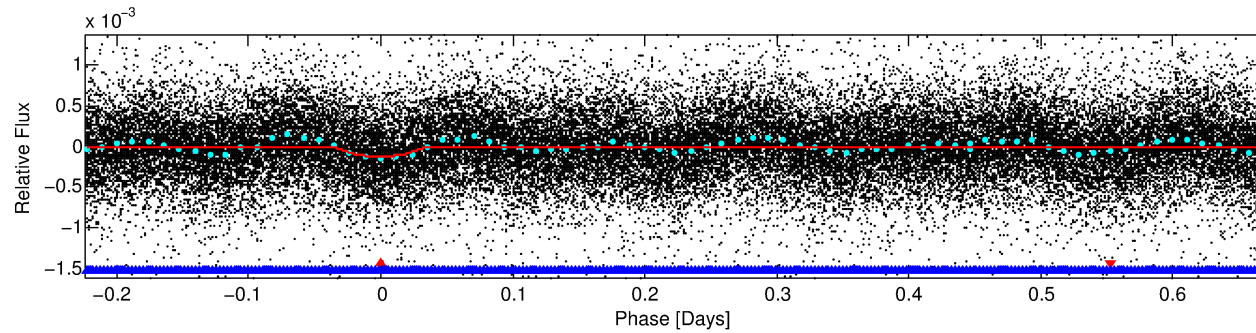
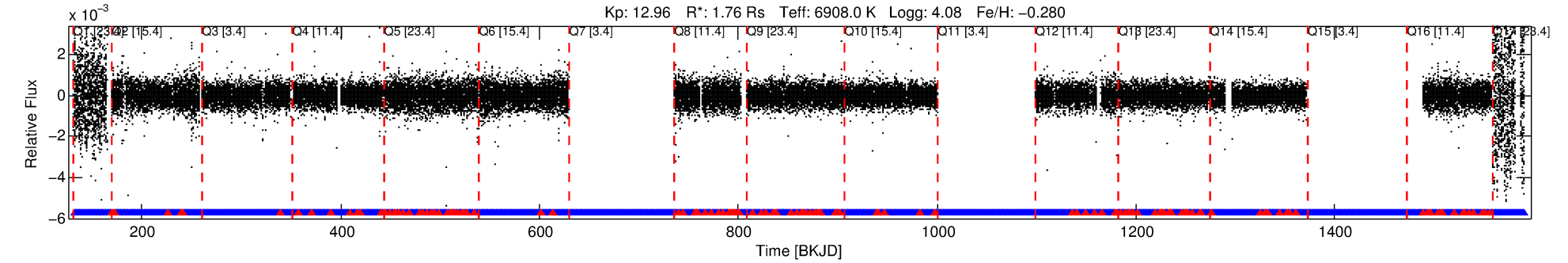
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010424228-01

No Significant Match Found

DV One-Page Summary

KIC: 10424228 Candidate: 1 of 2 Period: 0.893 d



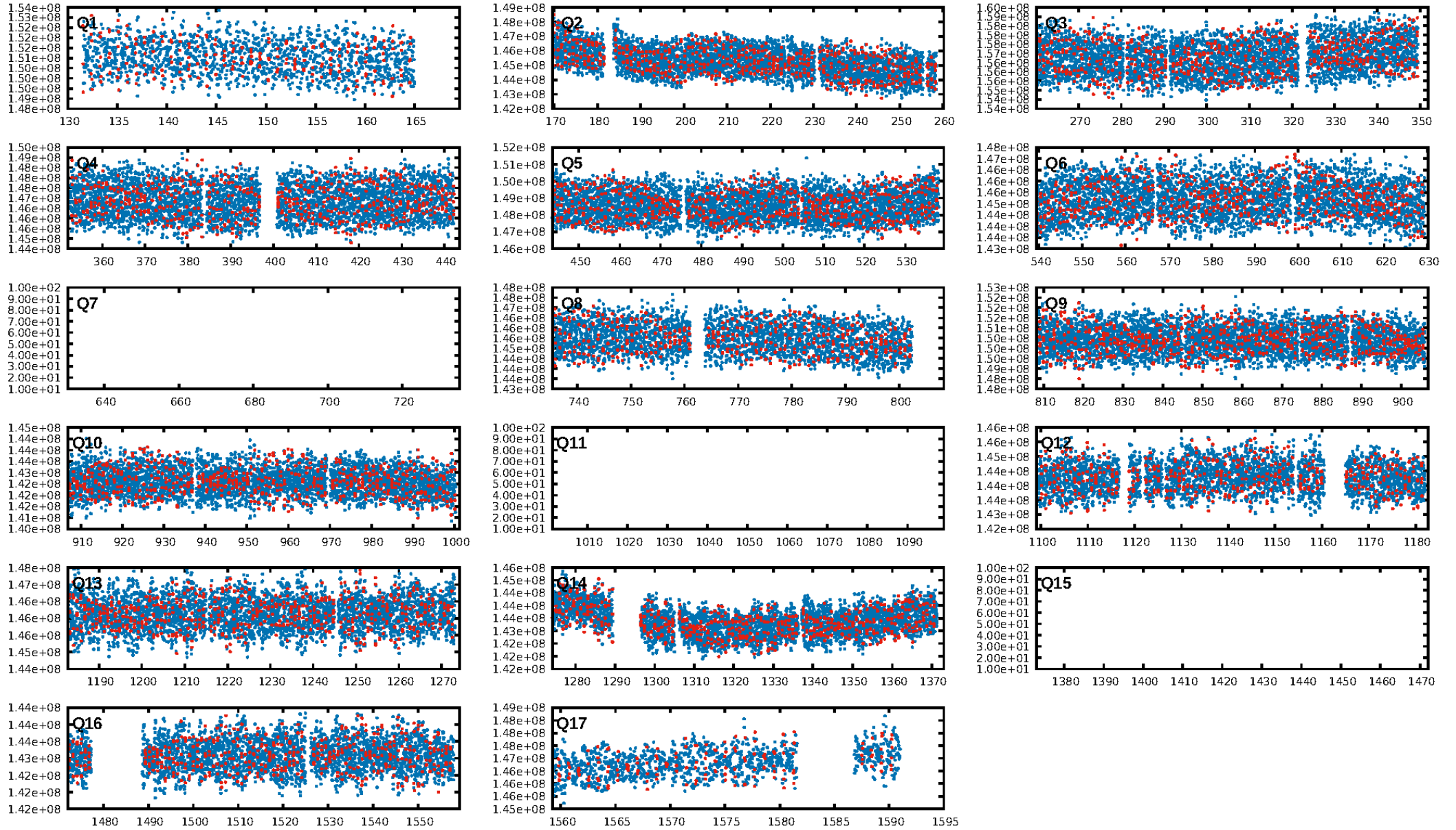
DV Fit Results:

Period = 0.89271 [0.00001] d
Epoch = 132.4062 [0.0013] BKJD
Rp/R* = 0.0116 [0.0032]
a/R* = 2.42 [3.38]
b = 0.90 [0.36]
Seff = 15692.28 [6671.41]
Teff = 2854 [303] K
Rp = 2.23 [0.94] Re
a = 0.0201 [0.0054] AU
Ag = 3.35 [2.33] [1.01 σ]
Teffp = 5969 [884] K [3.33 σ]

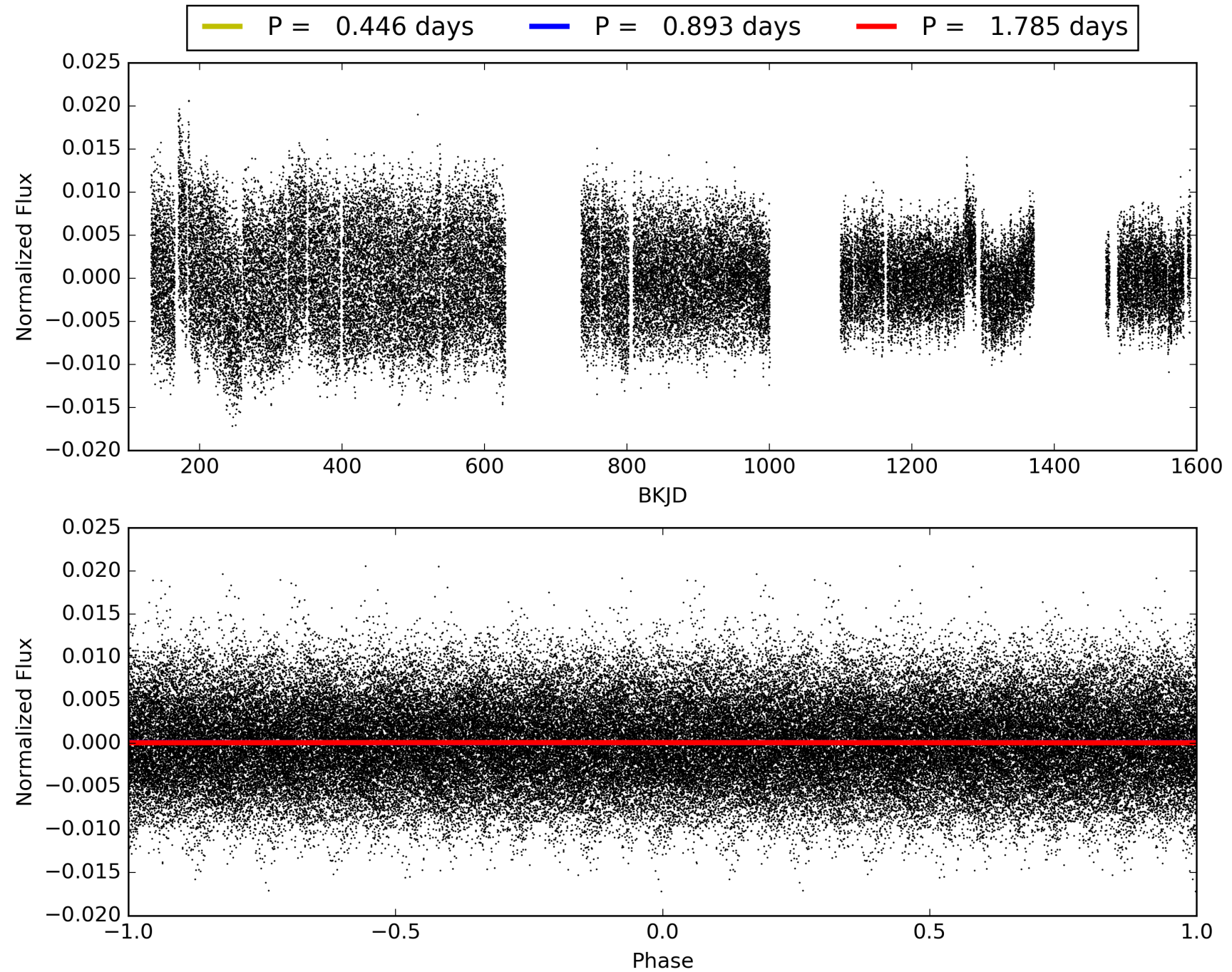
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 62.8% [0.89 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 0.87 [984/1126]
GhostDiagnostic-chr: 2.255
Centroid-sig: 0.2%
Centroid-so: 0.420 arcsec [1.24 σ]
OotOffset-rm: 0.359 arcsec [3.18 σ]
OotOffset-st: 4/1/4/5 [14]
KicOffset-rm: 0.069 arcsec [0.63 σ]
KicOffset-st: 4/1/4/5 [14]
DiffImageQuality-fgm: 0.50 [7/14]
DiffImageOverlap-fno: 1.00 [14/14]

TCE 010424228-01, PDC Light Curves

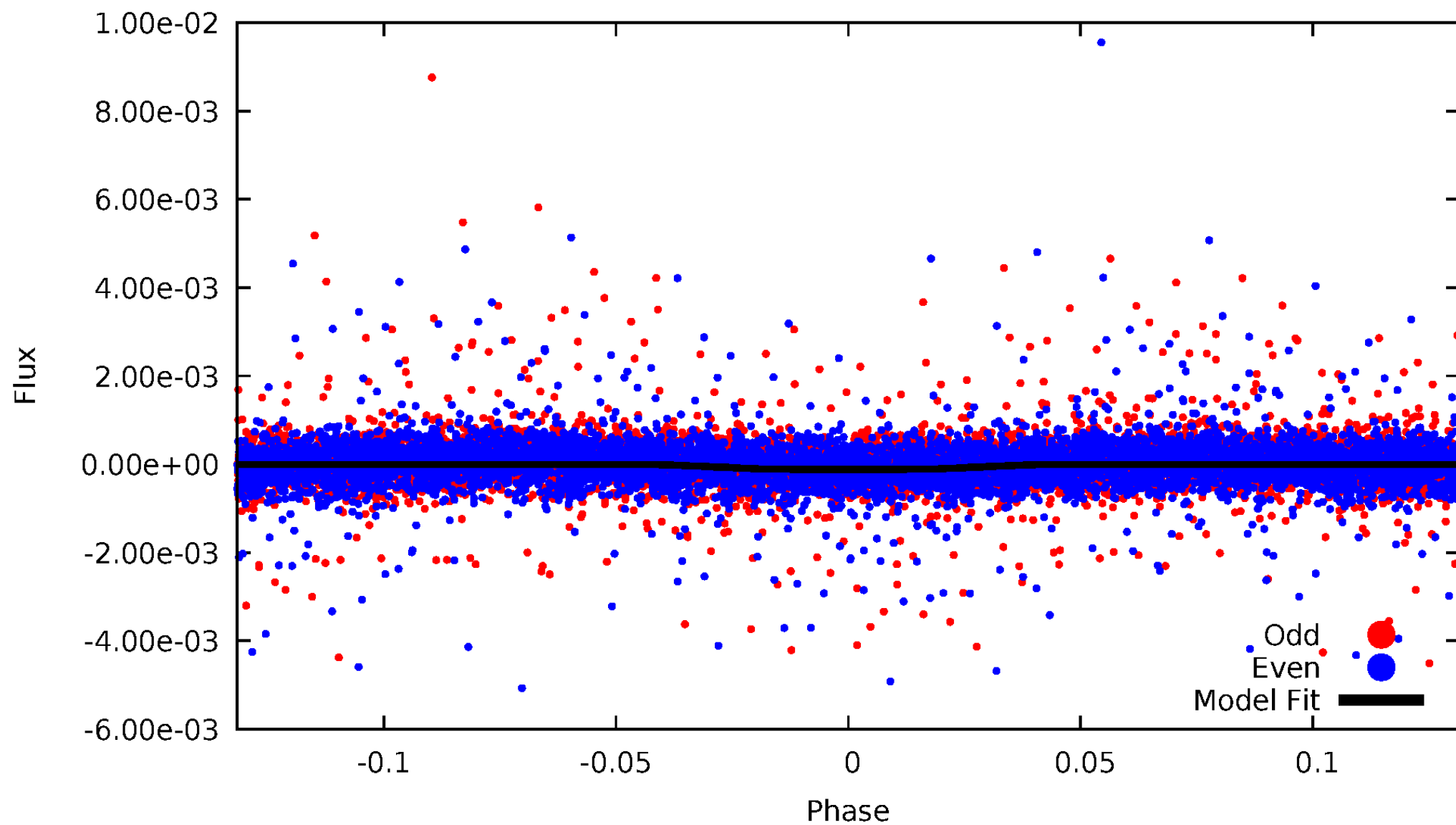


TCE 010424228-01



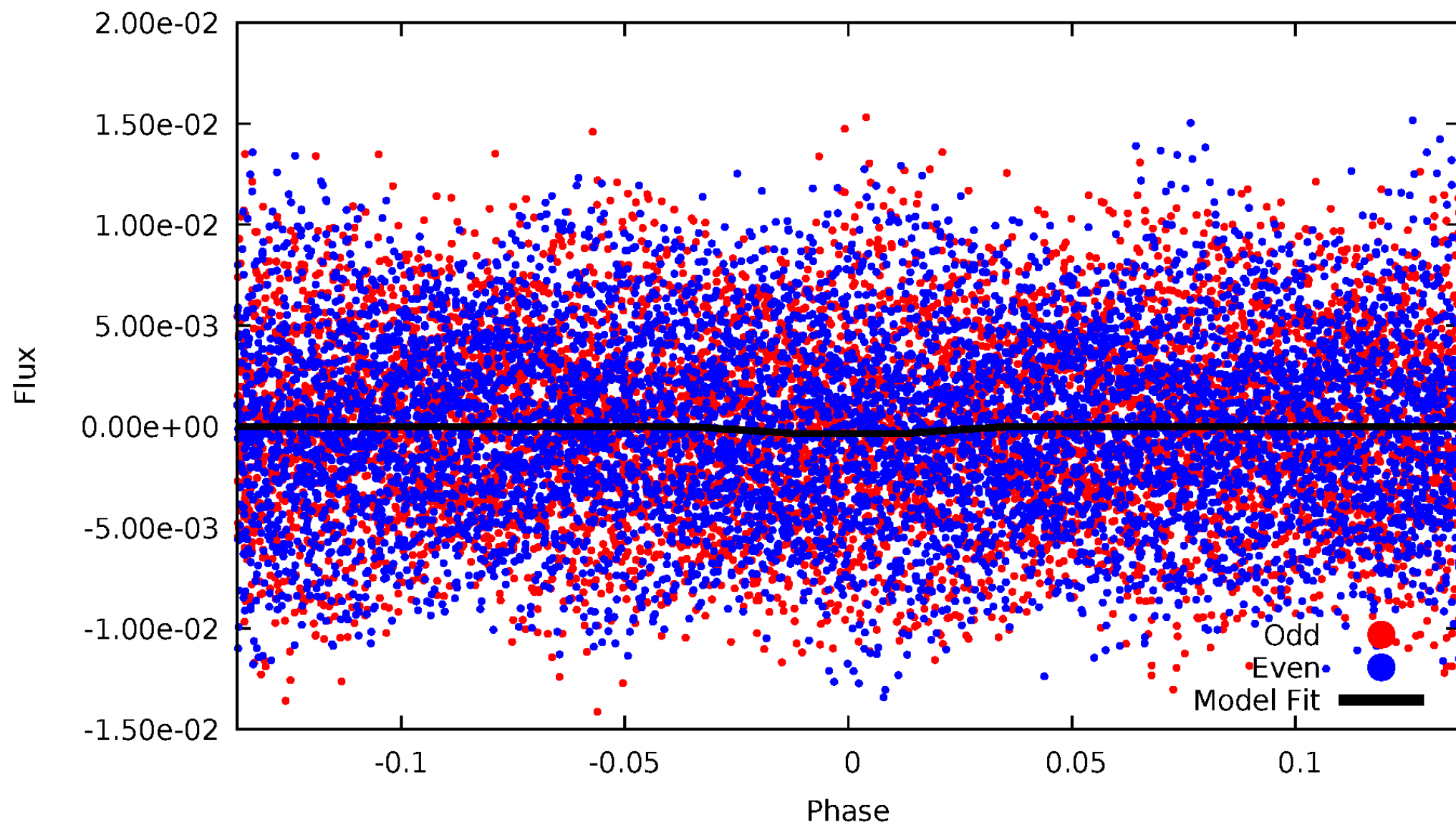
DV Odd/Even

TCE 010424228-01



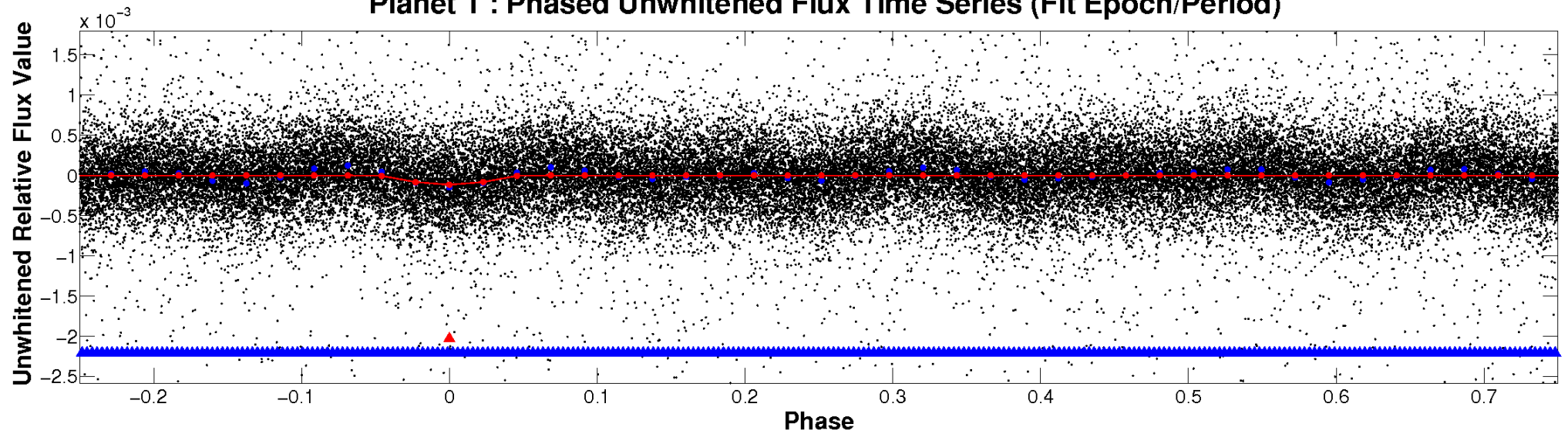
ALT Odd/Even

TCE 010424228-01

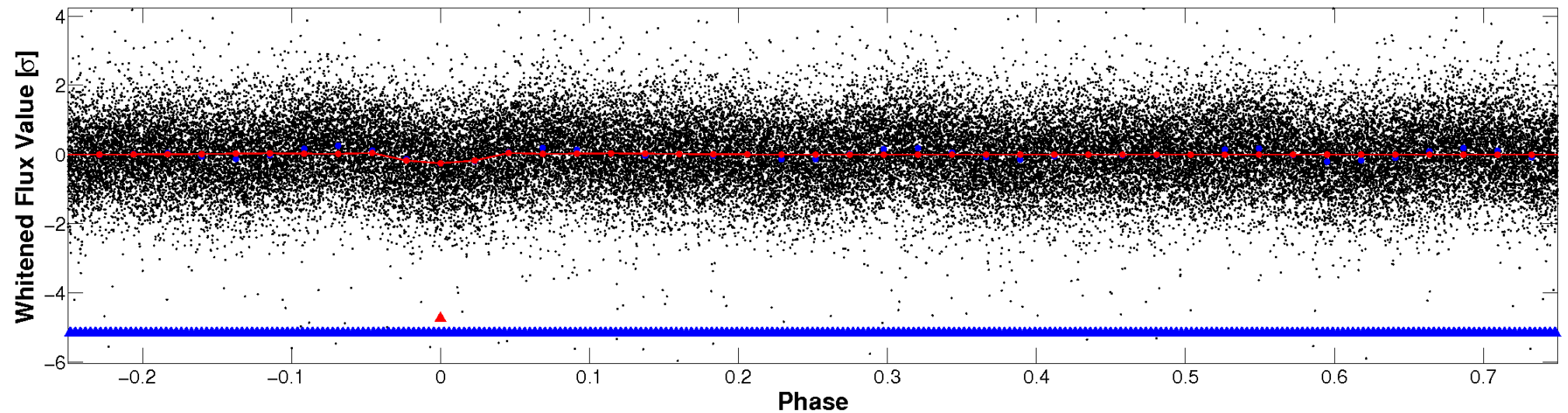


Non-Whitened Vs. Whitened Light Curve

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

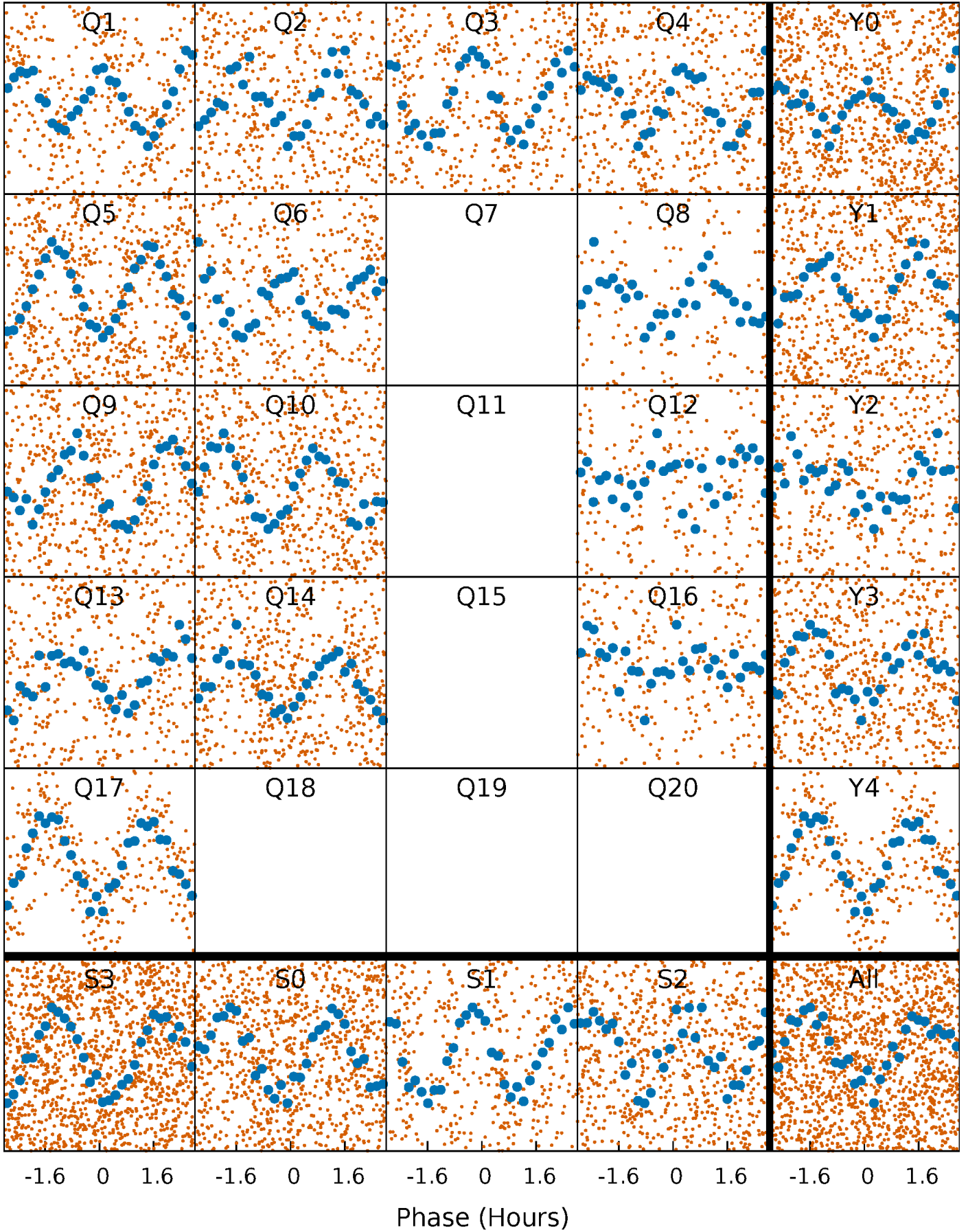


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



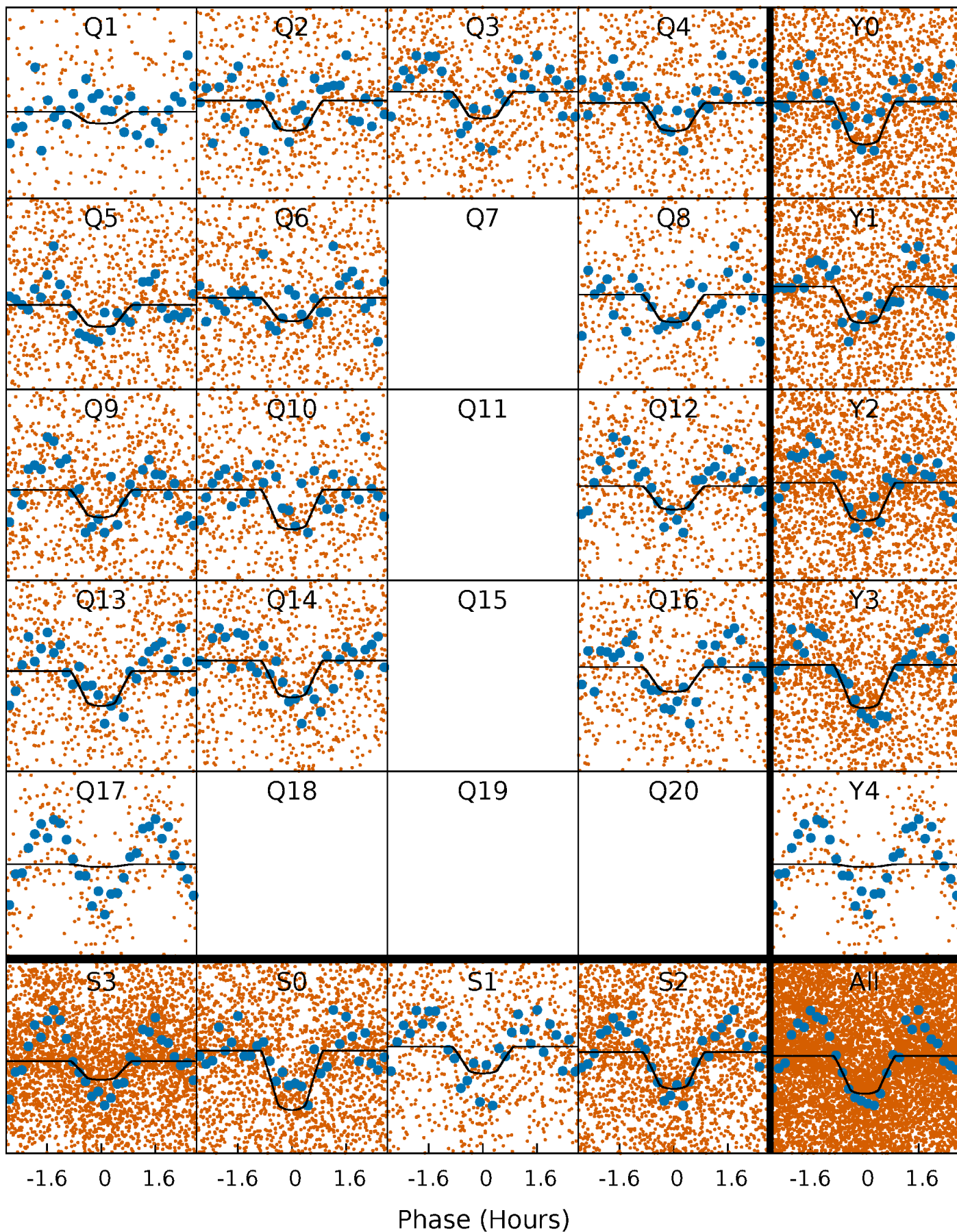
PDC Quarter-Phased Transit Curves

TCE 010424228-01 P= 0.892714 Days $T_0=132.406249$ (BKJD)



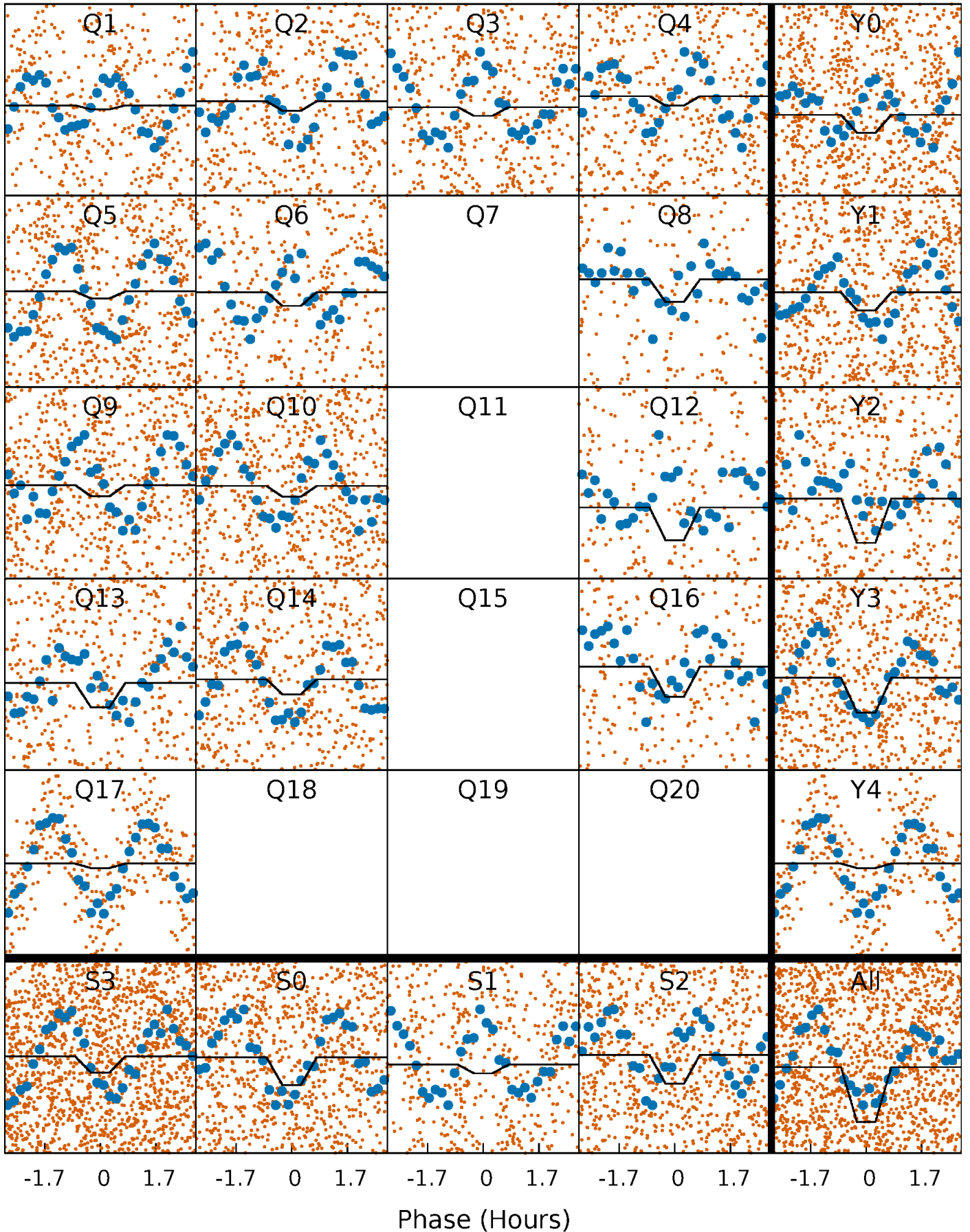
DV Quarter-Phased Transit Curves

TCE 010424228-01 P= 0.892714 Days $T_0=132.406249$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

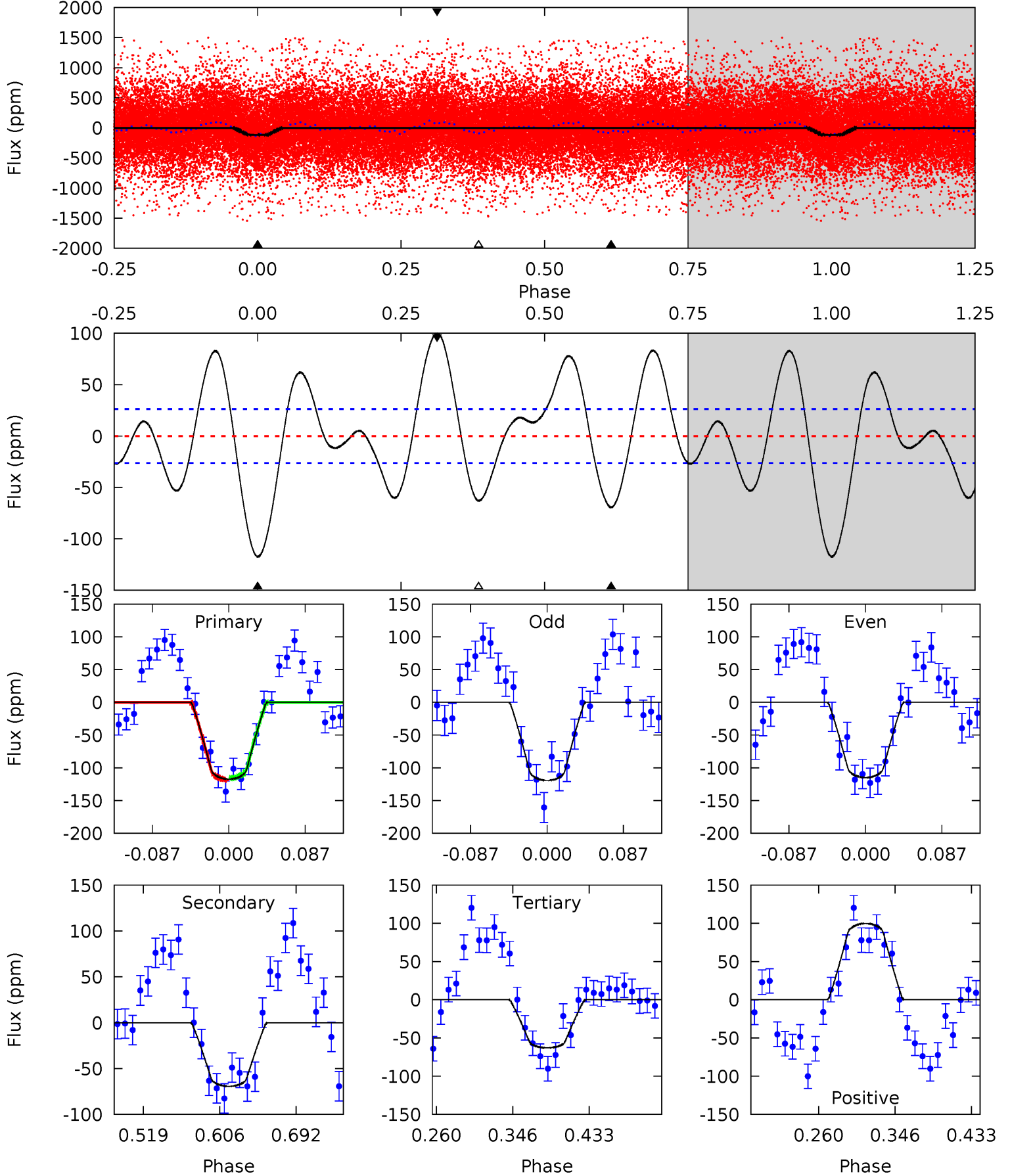
TCE 010424228-01 P= 0.892720 Days $T_0=132.396233$ (BKJD)



DV Model-Shift Uniqueness Test

010424228-01, P = 0.892714 Days, E = 130.620821 Days

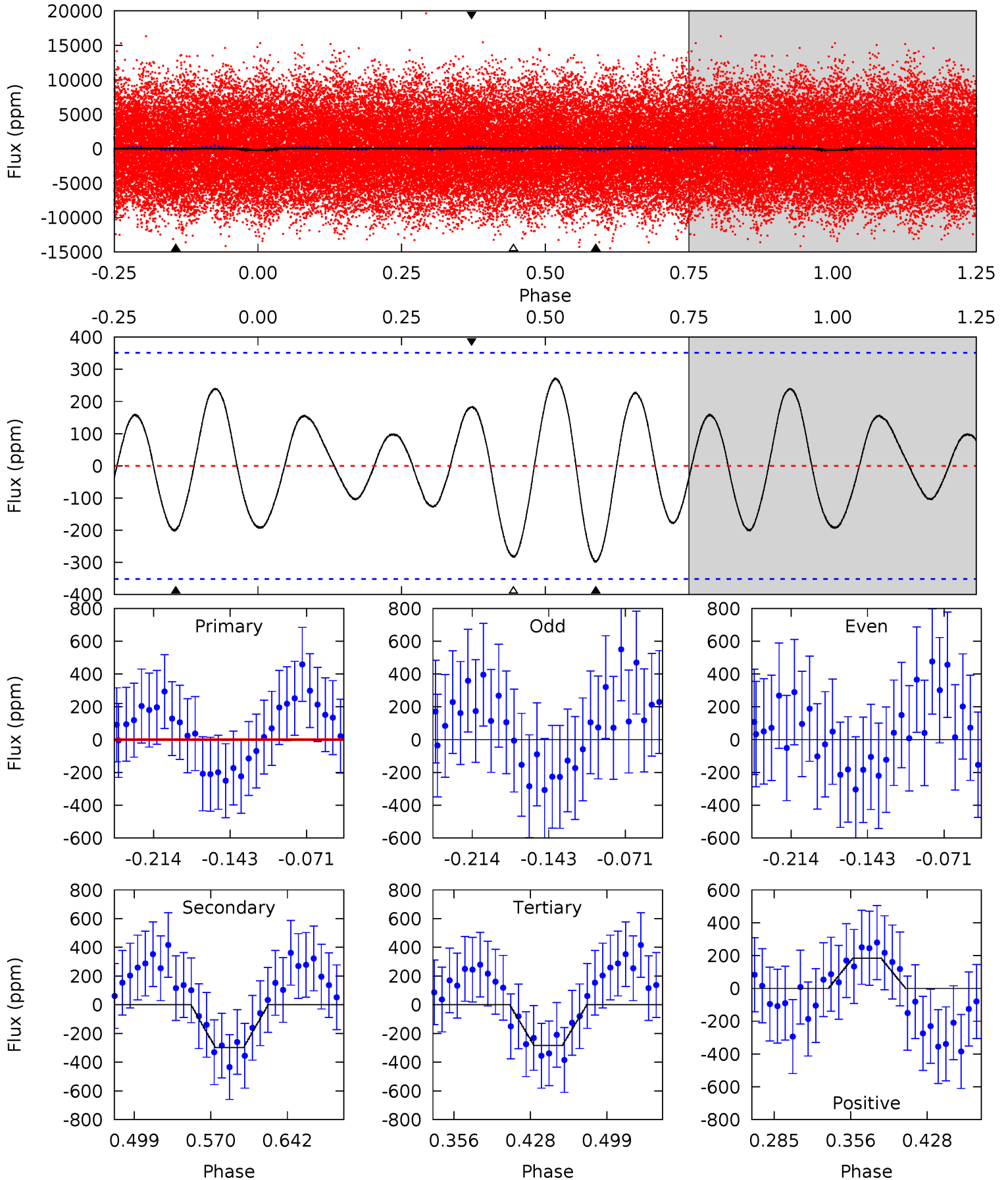
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 20.6 | 12.2 | 11.0 | 17.5 | 4.60 | 1.71 | 6.81 | 9.54 | 3.07 | 1.13 | -5.34 | 0.40 | 1.15 | 0.46 | 0.22 |



Alt Model-Shift Uniqueness Test

010424228-01, P = 0.892720 Days, E = 131.503513 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 2.64 | 3.94 | 3.74 | 2.43 | 4.64 | 1.80 | 1.73 | -1.10 | 0.22 | 0.19 | 1.51 | 0.28 | 0.73 | 0.48 | 0.07 |



Stellar Parameters For KIC 010424228

| | $T_{\text{eff}} (K)$ | $\log(g)$ | $[\text{Fe}/\text{H}]$ | $R (R_{\odot})$ | $M (M_{\odot})$ | $\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|--|
| | 6908^{+190}_{-262} | $4.079^{+0.220}_{-0.180}$ | $-0.280^{+0.300}_{-0.300}$ | $1.764^{+0.502}_{-0.553}$ | $1.364^{+0.184}_{-0.253}$ | $0.350^{+0.502}_{-0.154}$ |
| | +3%/-4% | +5%/-4% | +107%/-107% | +28%/-31% | +13%/-19% | +144%/-44% |
| Source | PHO1 | KIC0 | KIC0 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 010424228-01 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|---------------|------------------------|----------------------|-----------------------|---------------------------|
| DV | -69 ± 6 | $2.21^{+0.74}_{-0.69}$ | 3993^{+320}_{-315} | 5665^{+1110}_{-666} | $3.117^{+3.428}_{-1.358}$ |
| Alt. | -298 ± 76 | $3.50^{+0.85}_{-0.75}$ | 3973^{+310}_{-313} | 6536^{+920}_{-769} | $5.372^{+3.457}_{-2.261}$ |

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

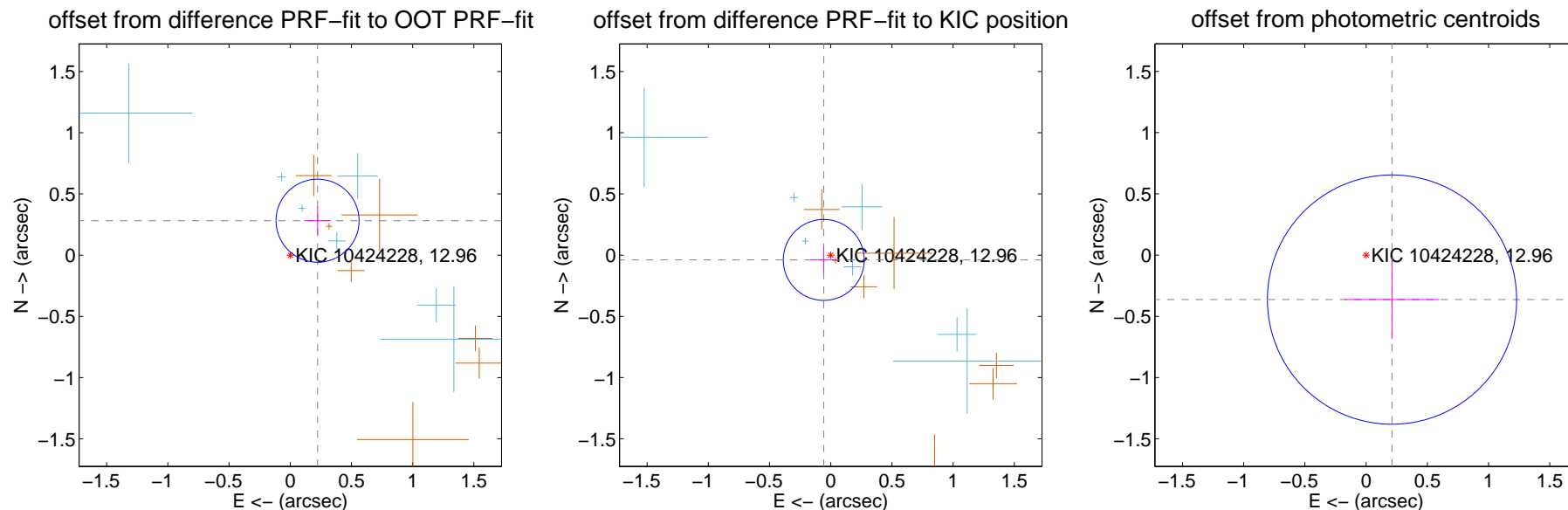
DV Centroid Data

Supplemental centroid analysis for 010424228-01. Kepler magnitude: 12.96. Transit SNR 13.02

There are 7 quarters with good PRF difference image offsets

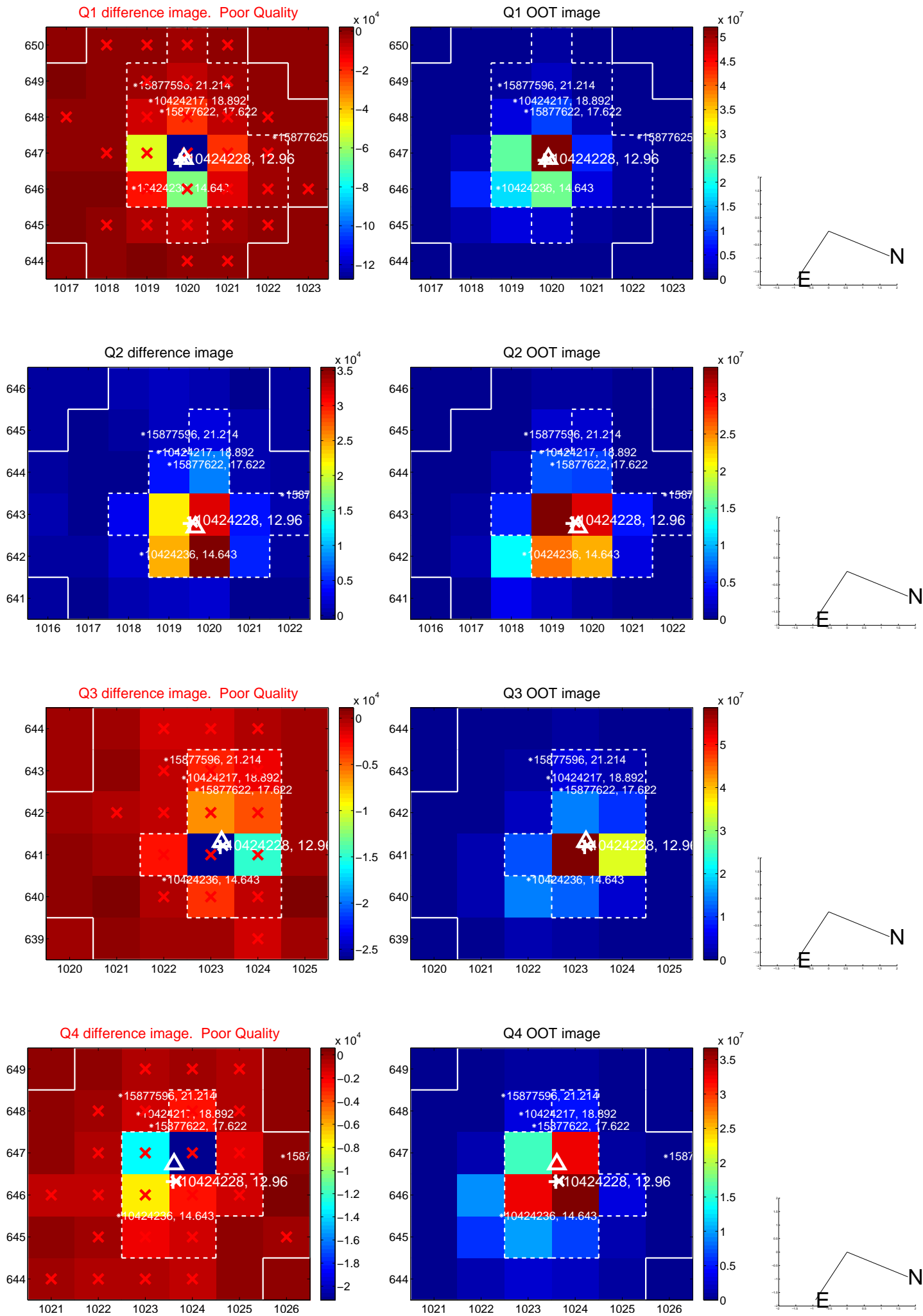
The direct PRF centroid is offset from the target star catalog position by about 0.39 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 0.359 ± 0.113 | 3.18 | -0.223 ± 0.109 | 0.282 ± 0.116 |
| PRF-fit source offset from KIC position | 0.069 ± 0.110 | 0.63 | 0.057 ± 0.111 | -0.039 ± 0.108 |
| photometric centroid source offset | 0.42 ± 0.34 | 1.24 | -0.21 ± 0.39 | -0.36 ± 0.32 |

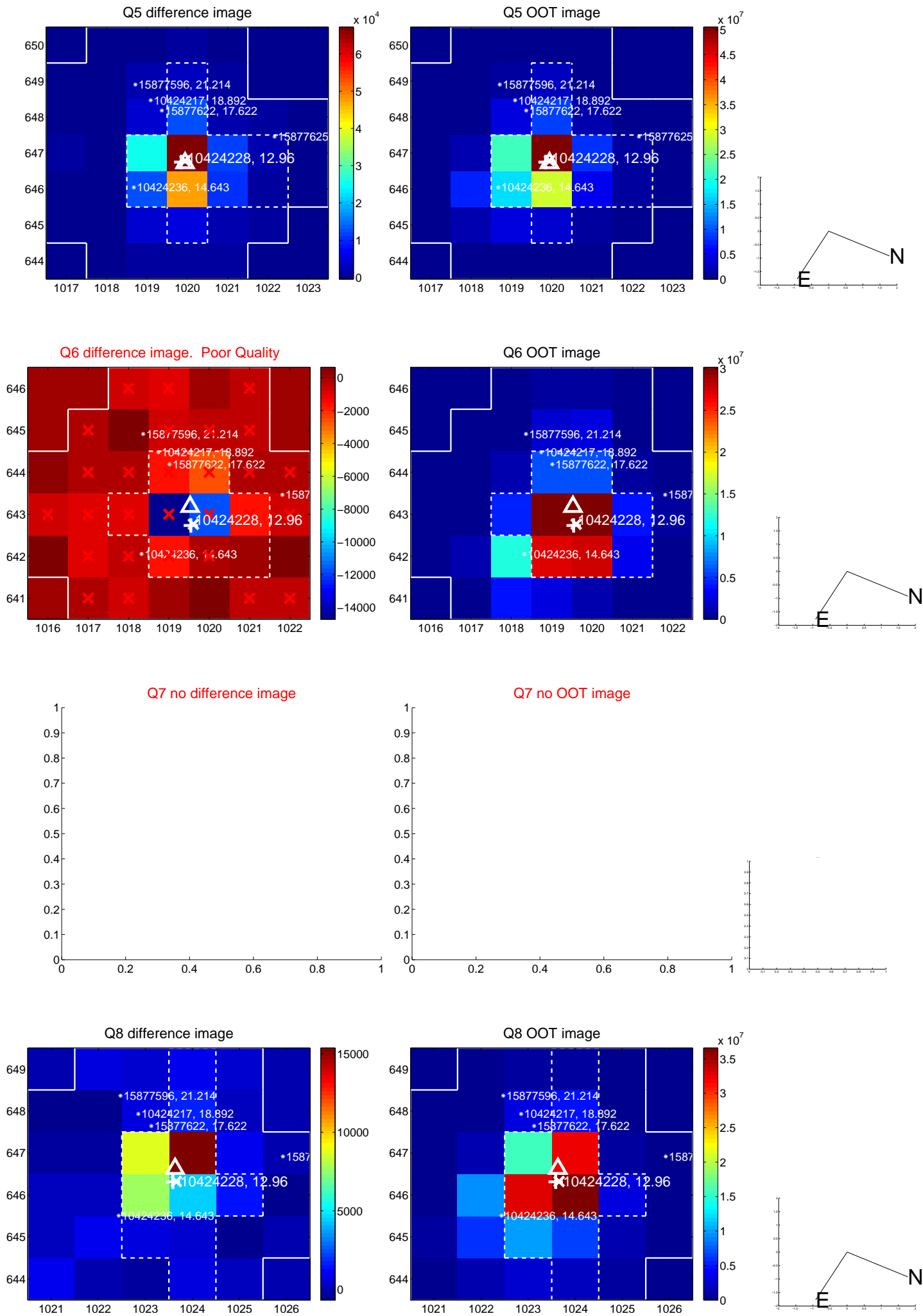


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

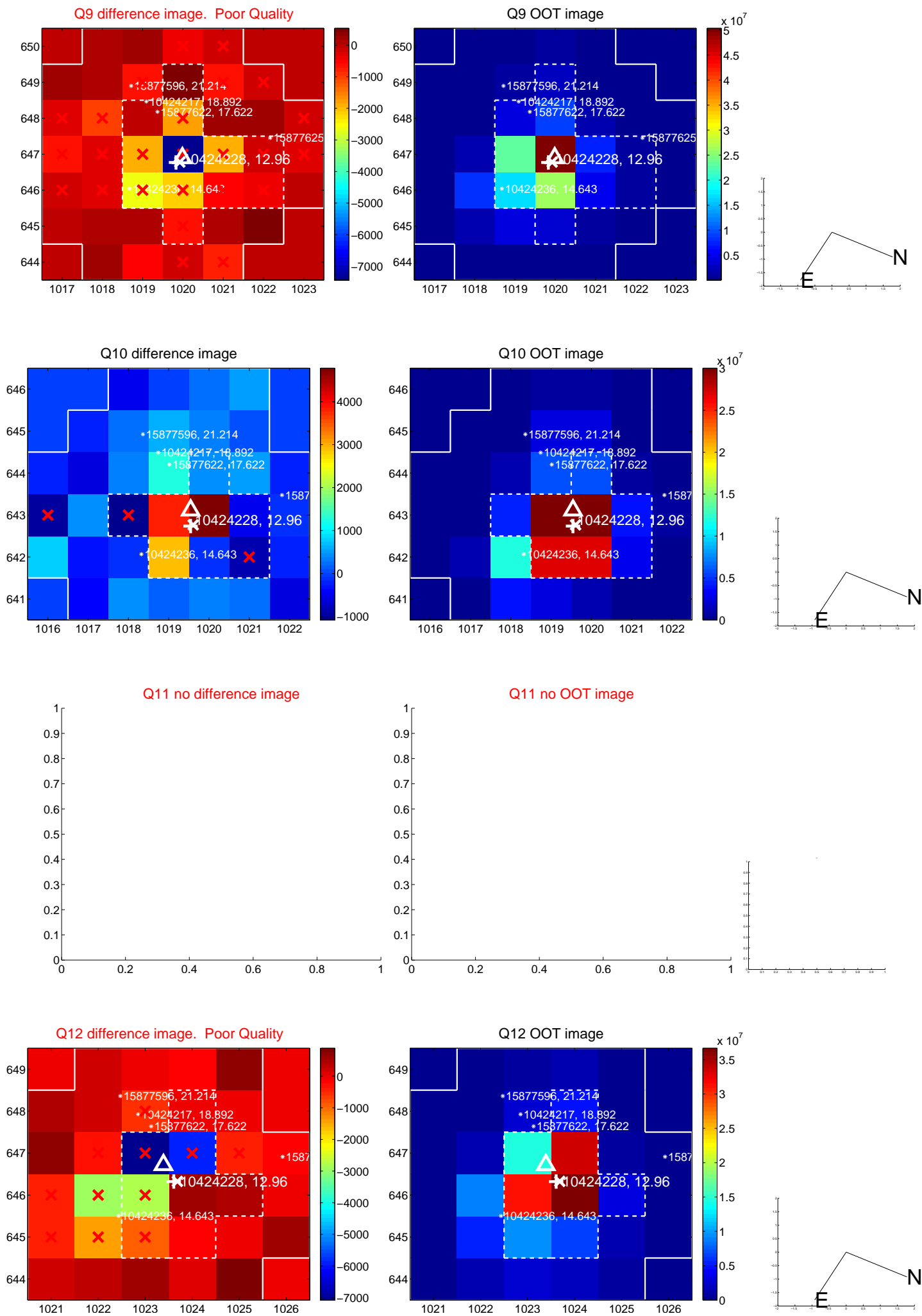
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



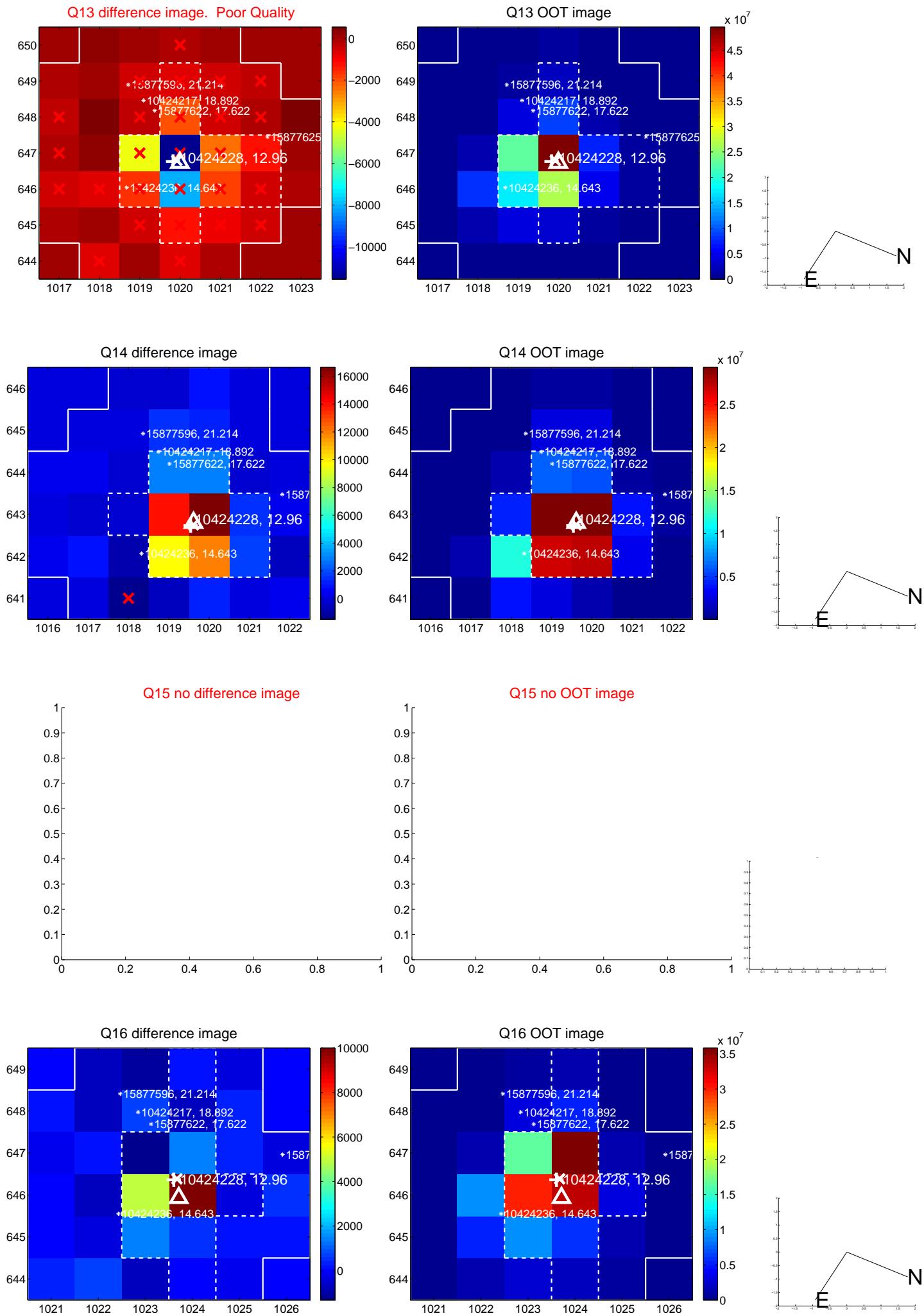
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



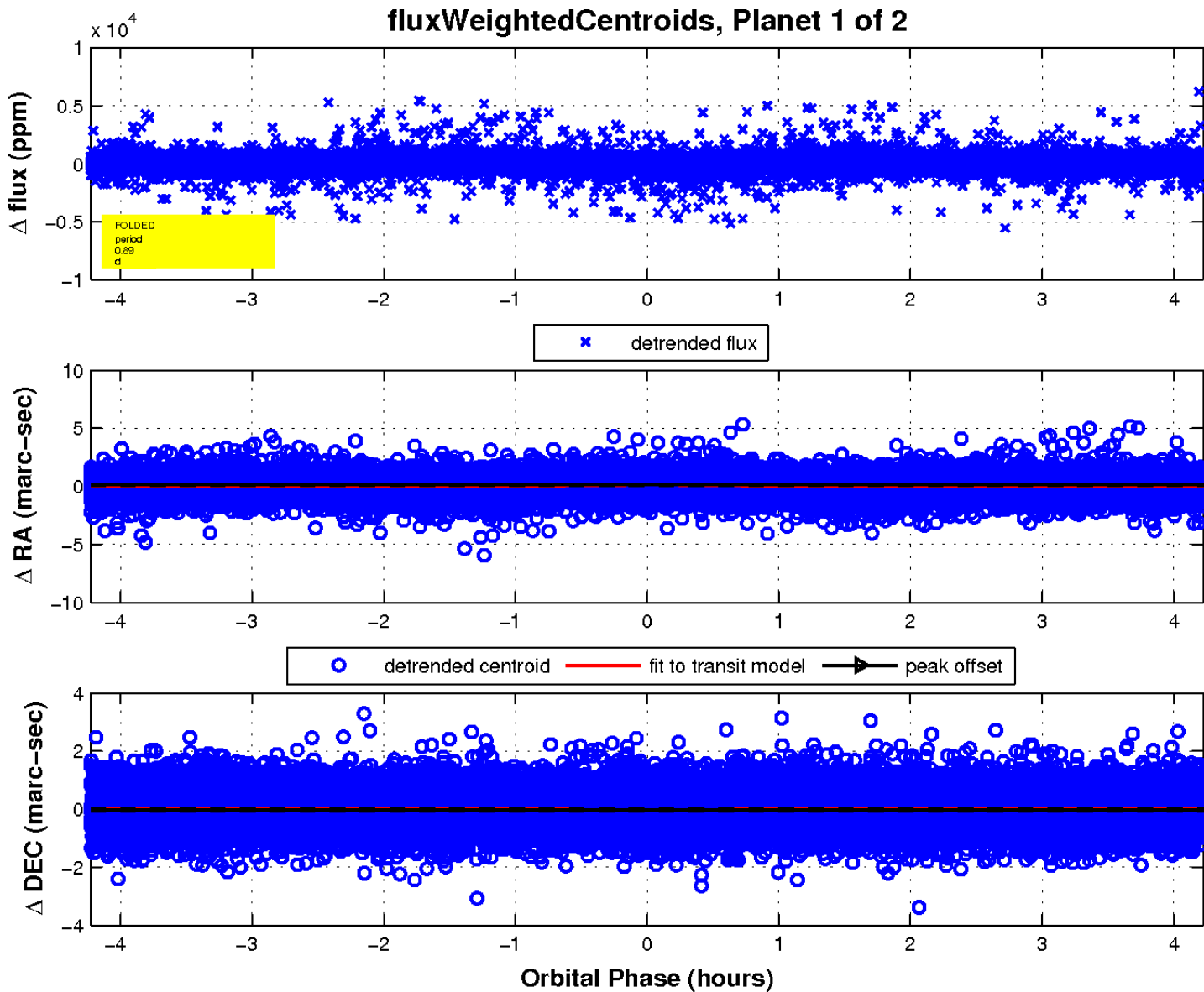
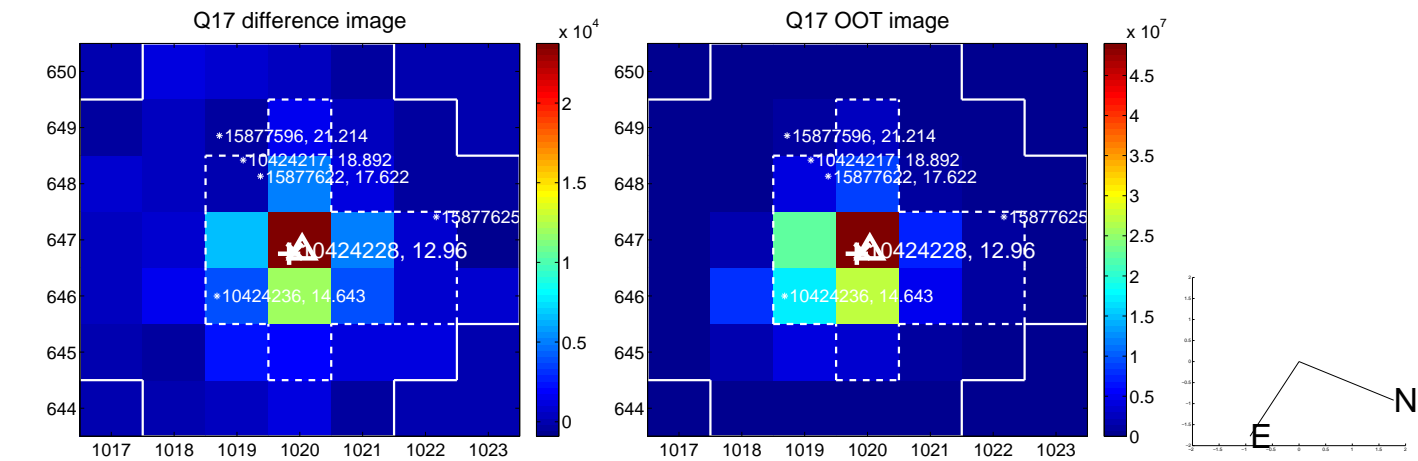
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

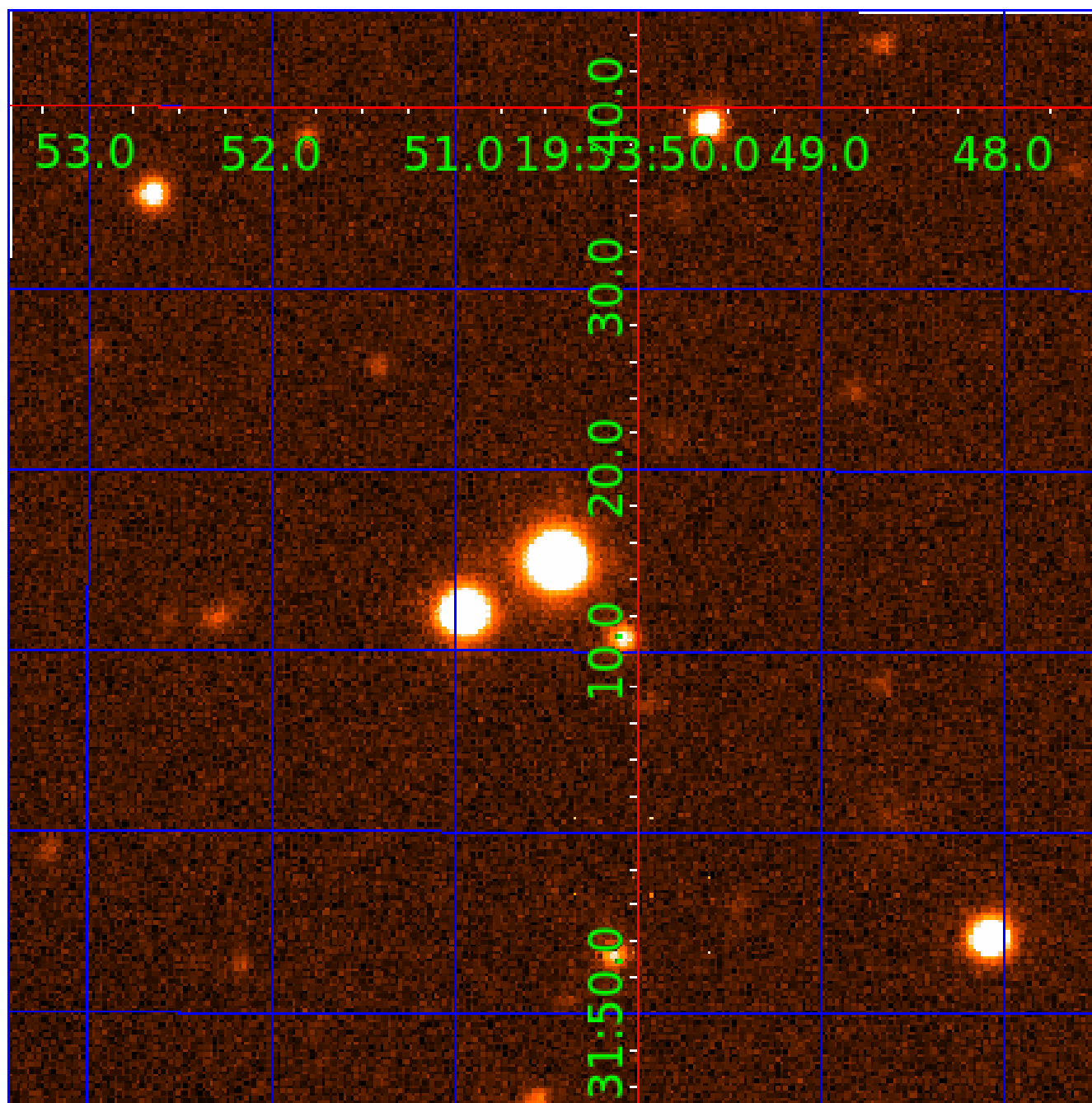


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010424228

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 010424228-01 | OBS | No | 0.892714 | 132.406249 | 116.9 | 1.409 | 11.3 | 13.0 | 1.76 | 6908 | 2.23 | 15692.28 |
| 010424228-02 | OBS | No | 1.289140 | 132.644074 | 90.6 | 10.561 | 9.9 | 13.0 | 1.76 | 6908 | 1.70 | 9613.96 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|---|
| 010424228-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT |
| 010424228-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—CENT_KIC_POS |

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

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

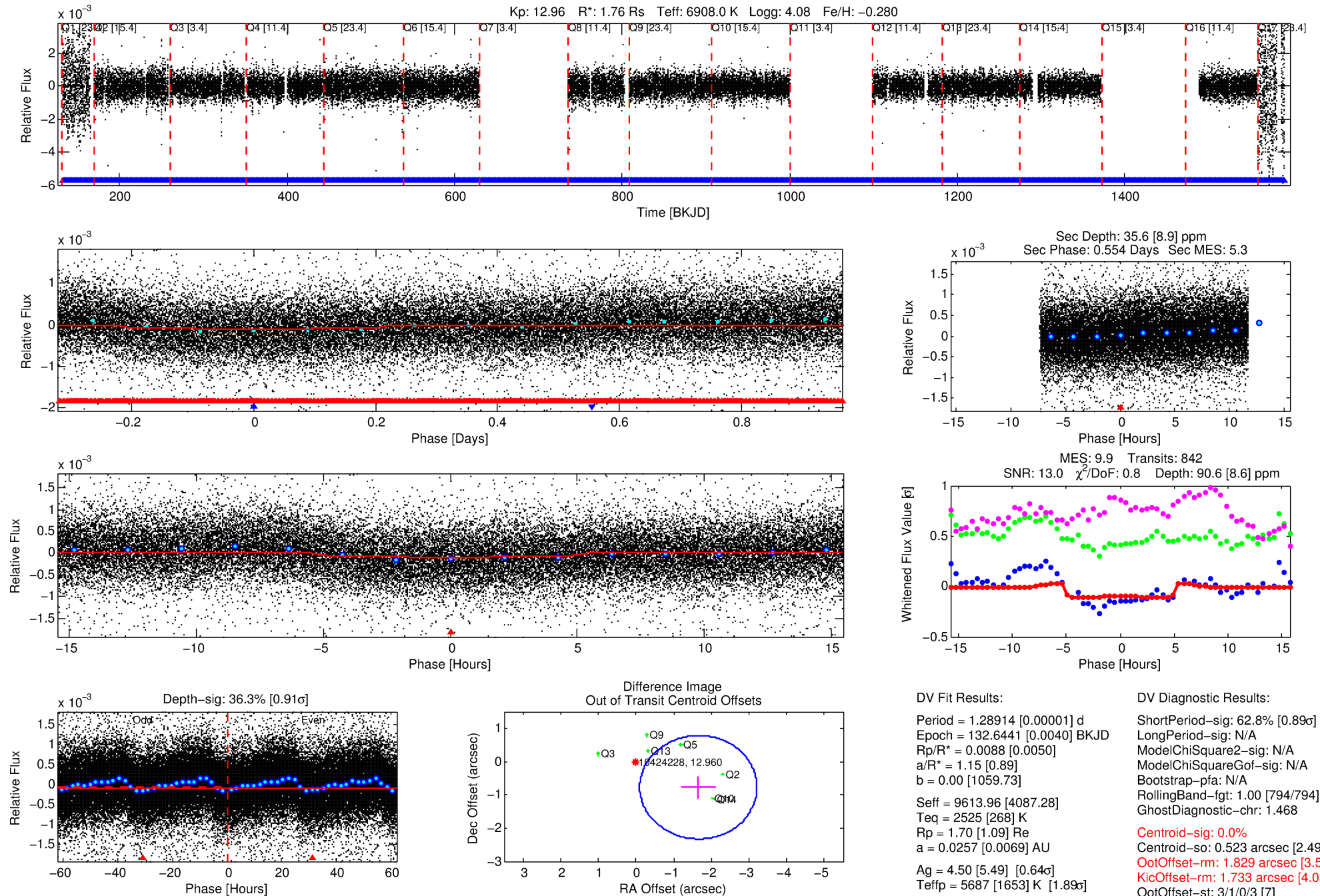
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010424228-02

No Significant Match Found

DV One-Page Summary

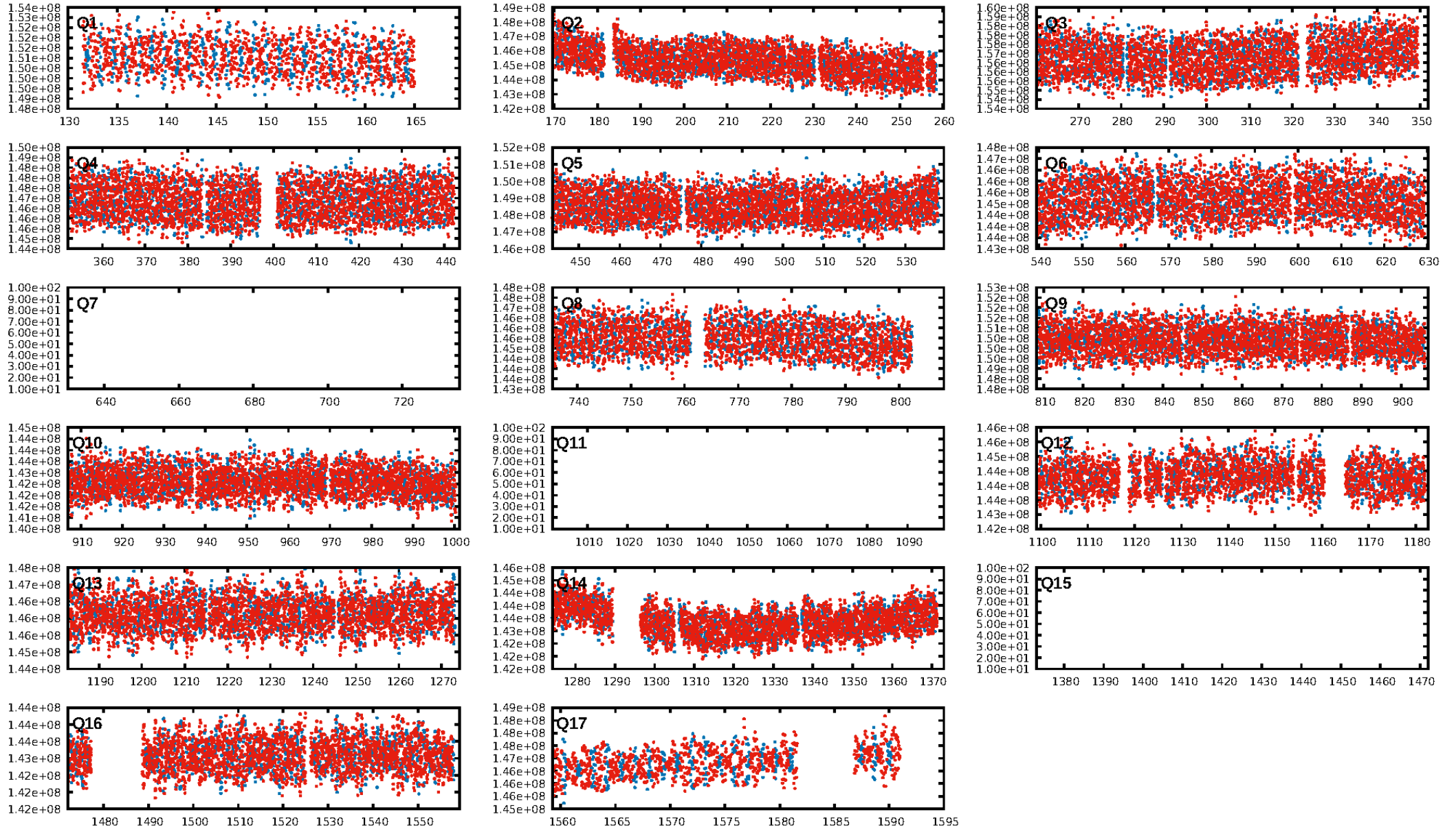
KIC: 10424228 Candidate: 2 of 2 Period: 1.289 d



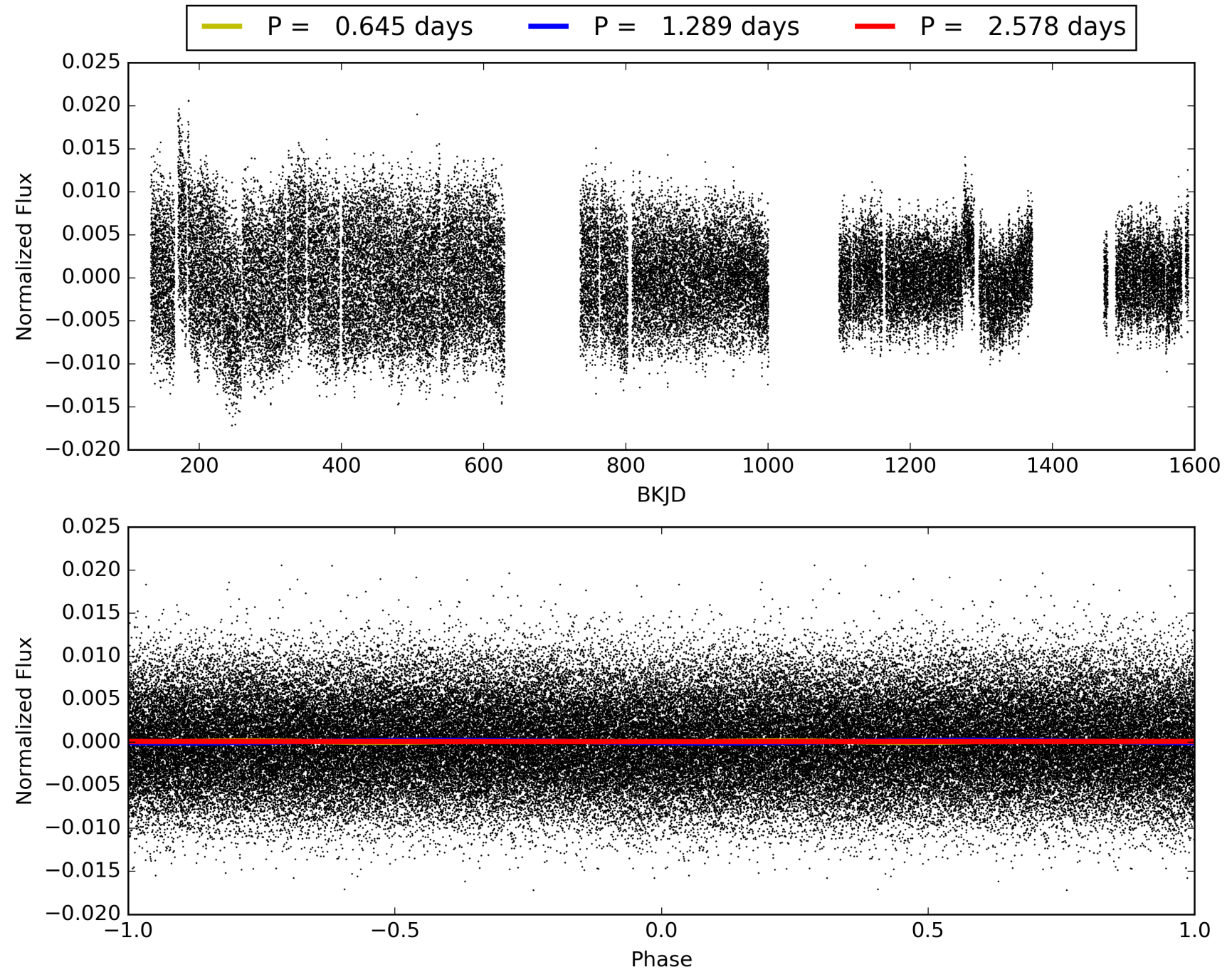
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 04:09:21 Z

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

TCE 010424228-02, PDC Light Curves

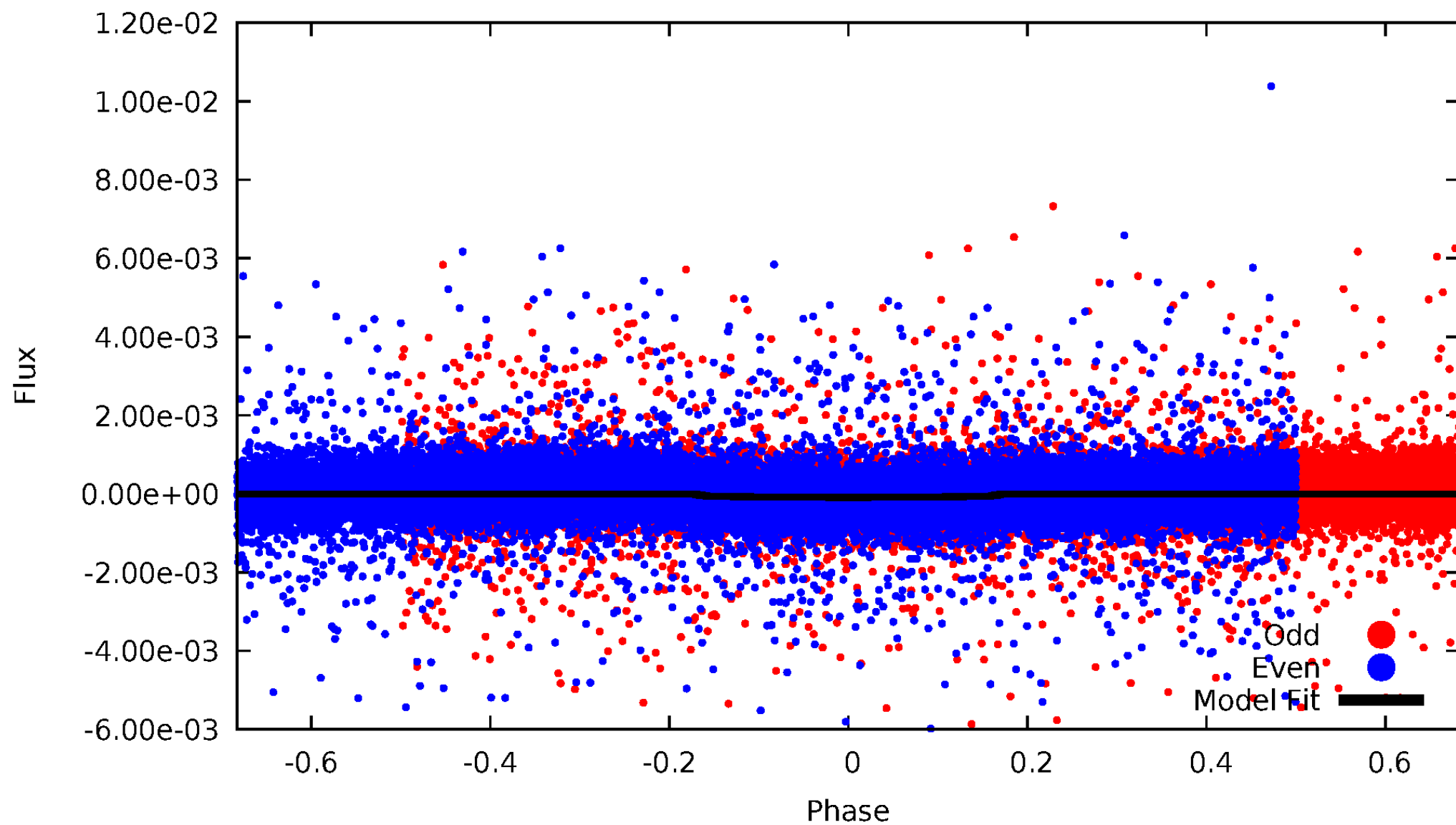


TCE 010424228-02



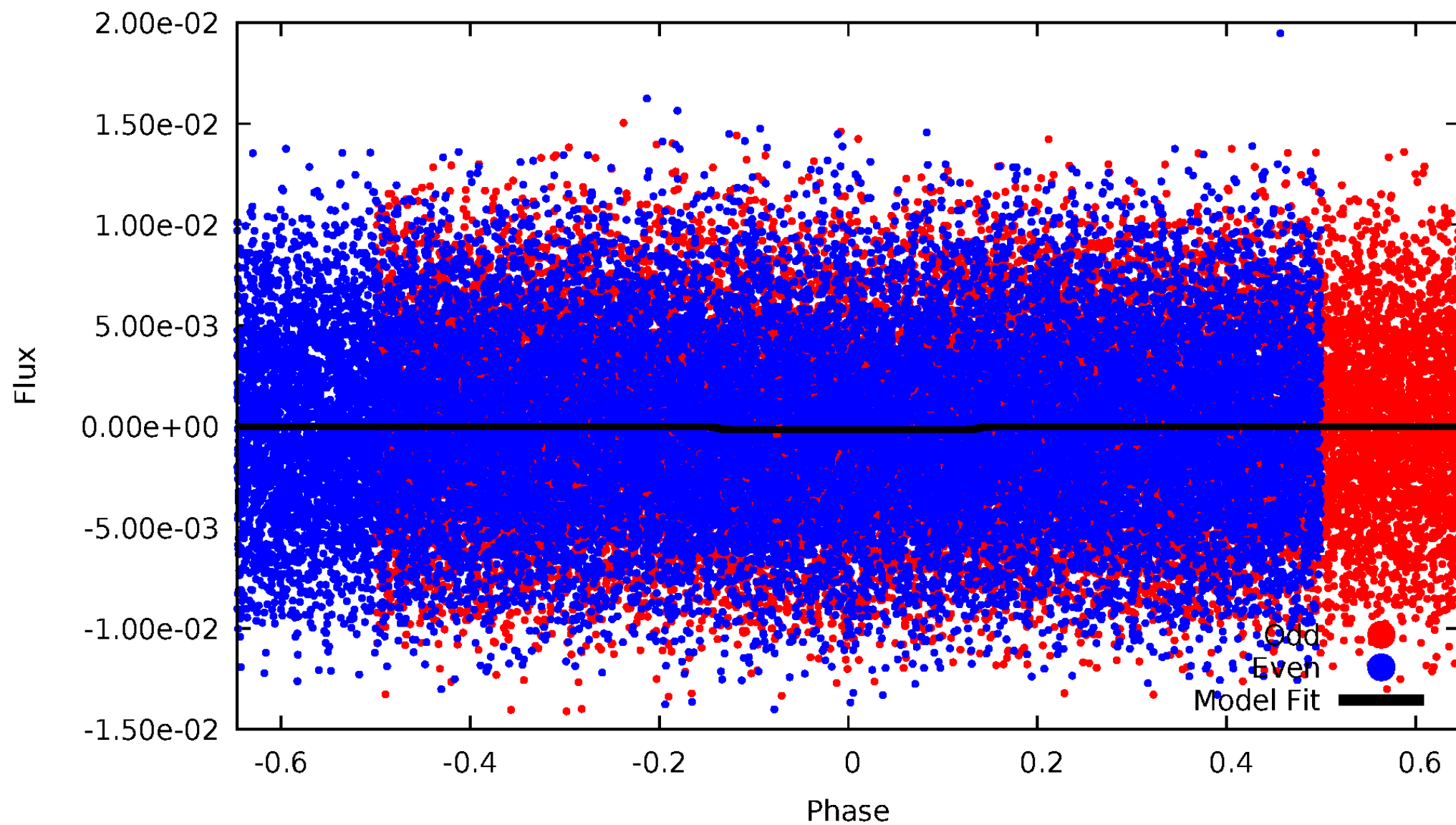
DV Odd/Even

TCE 010424228-02



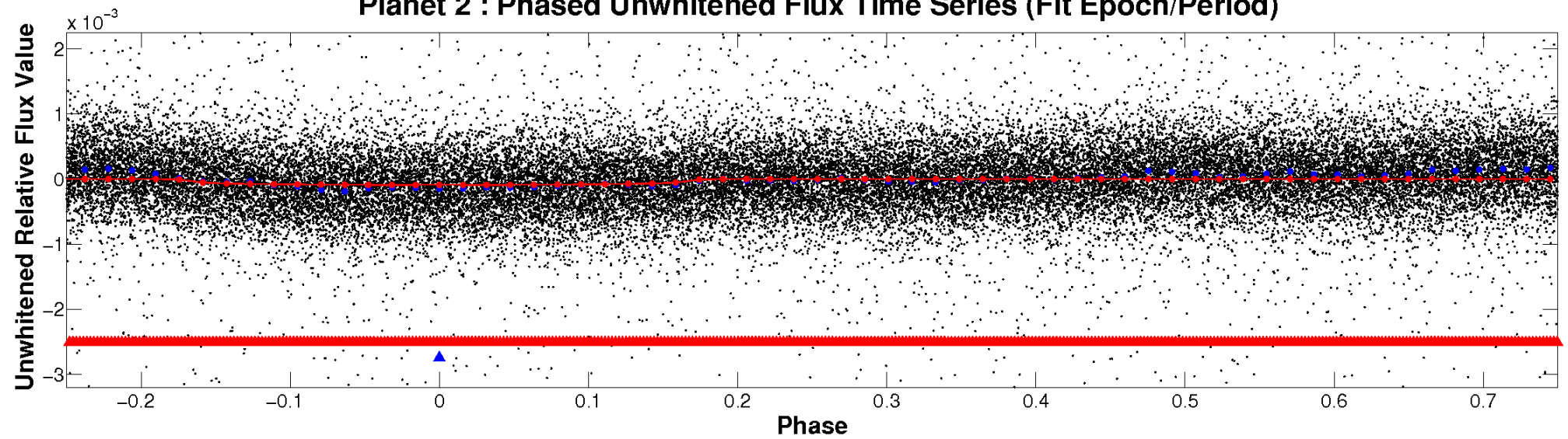
ALT Odd/Even

TCE 010424228-02

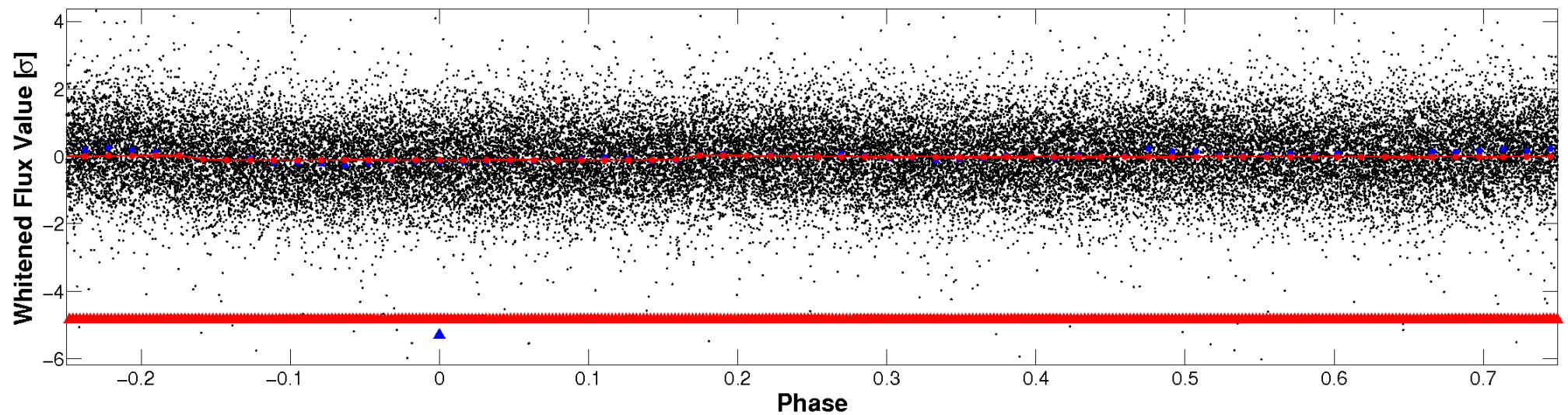


Non-Whitened Vs. Whitened Light Curve

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

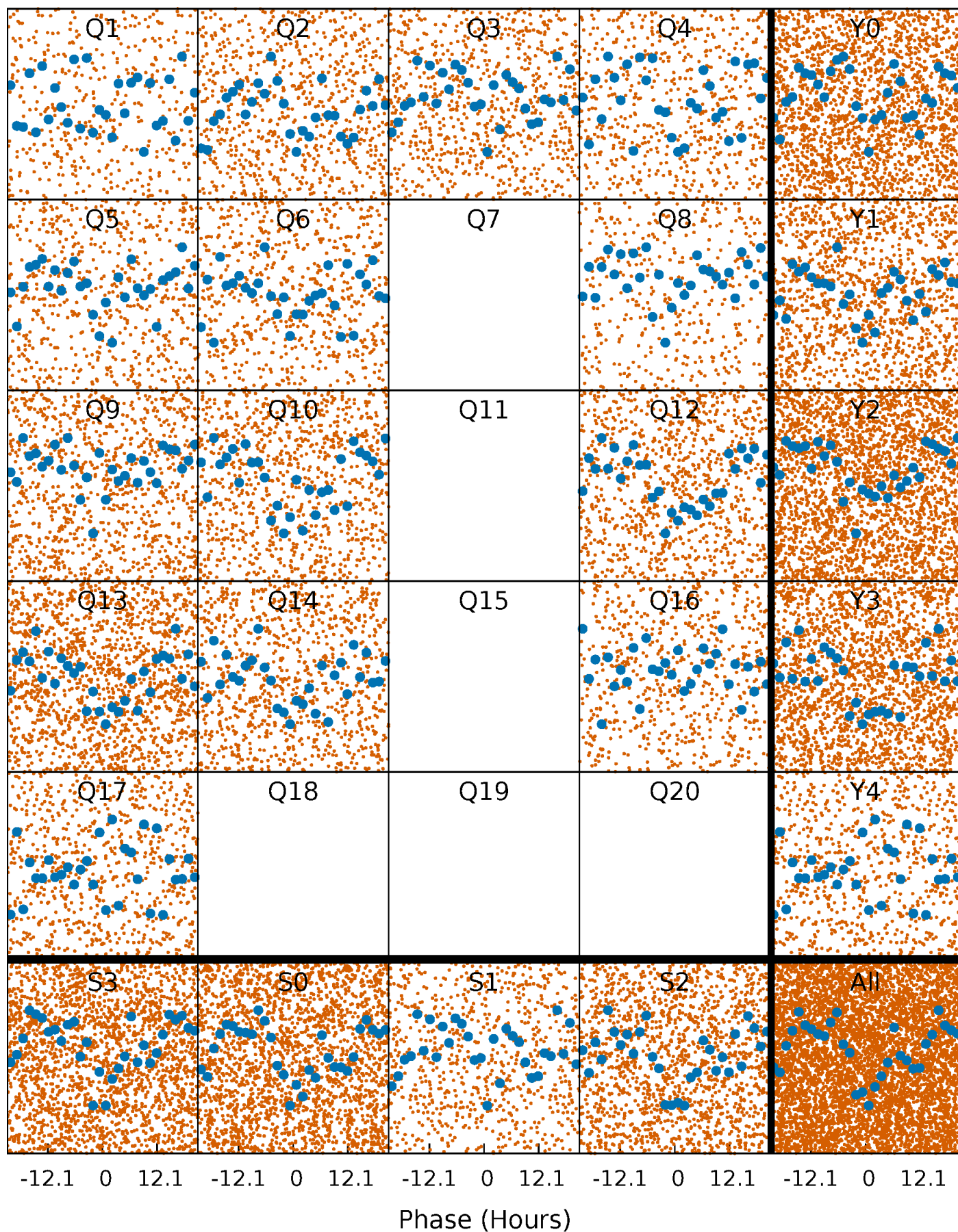


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



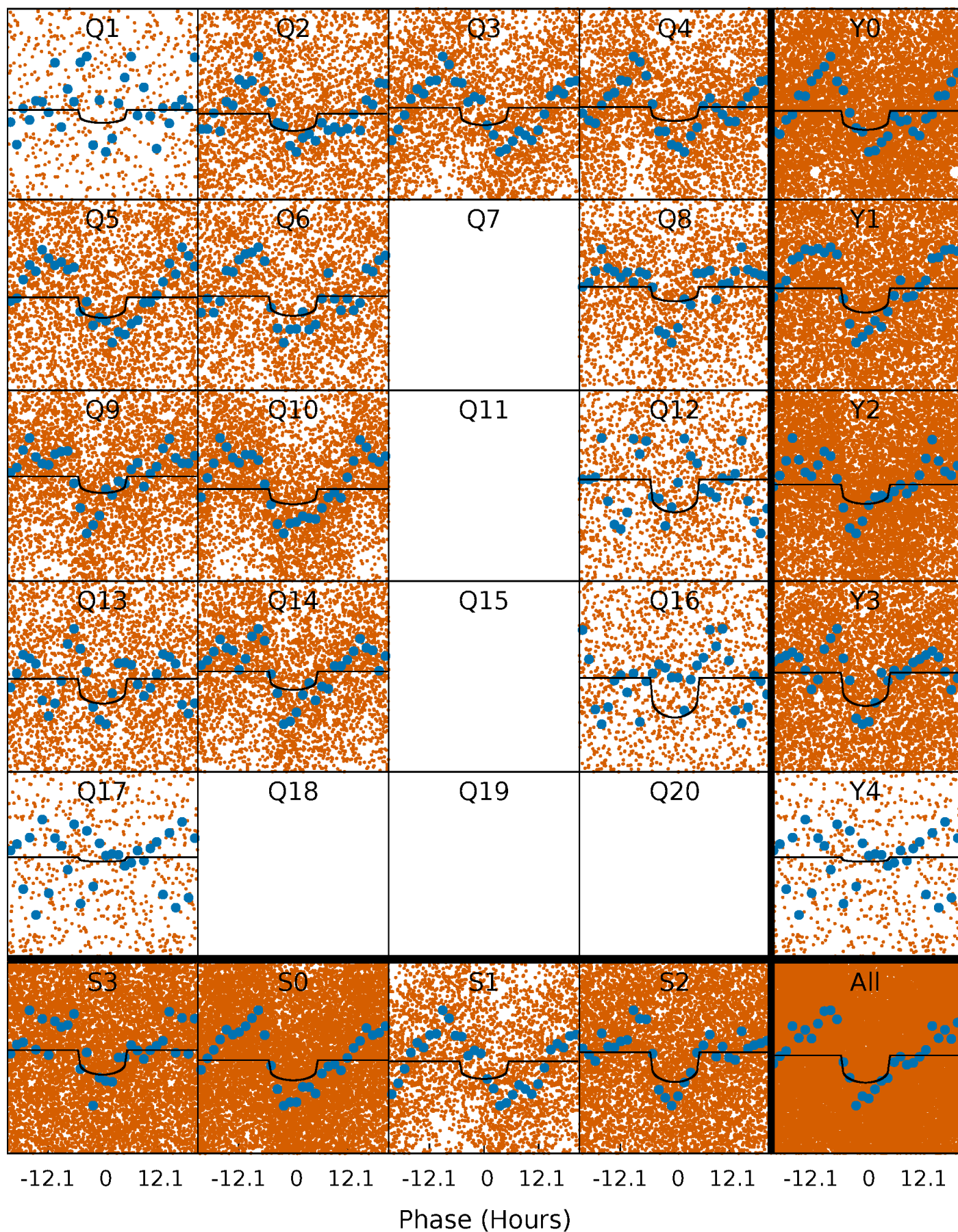
PDC Quarter-Phased Transit Curves

TCE 010424228-02 P= 1.289140 Days $T_0=132.644074$ (BKJD)



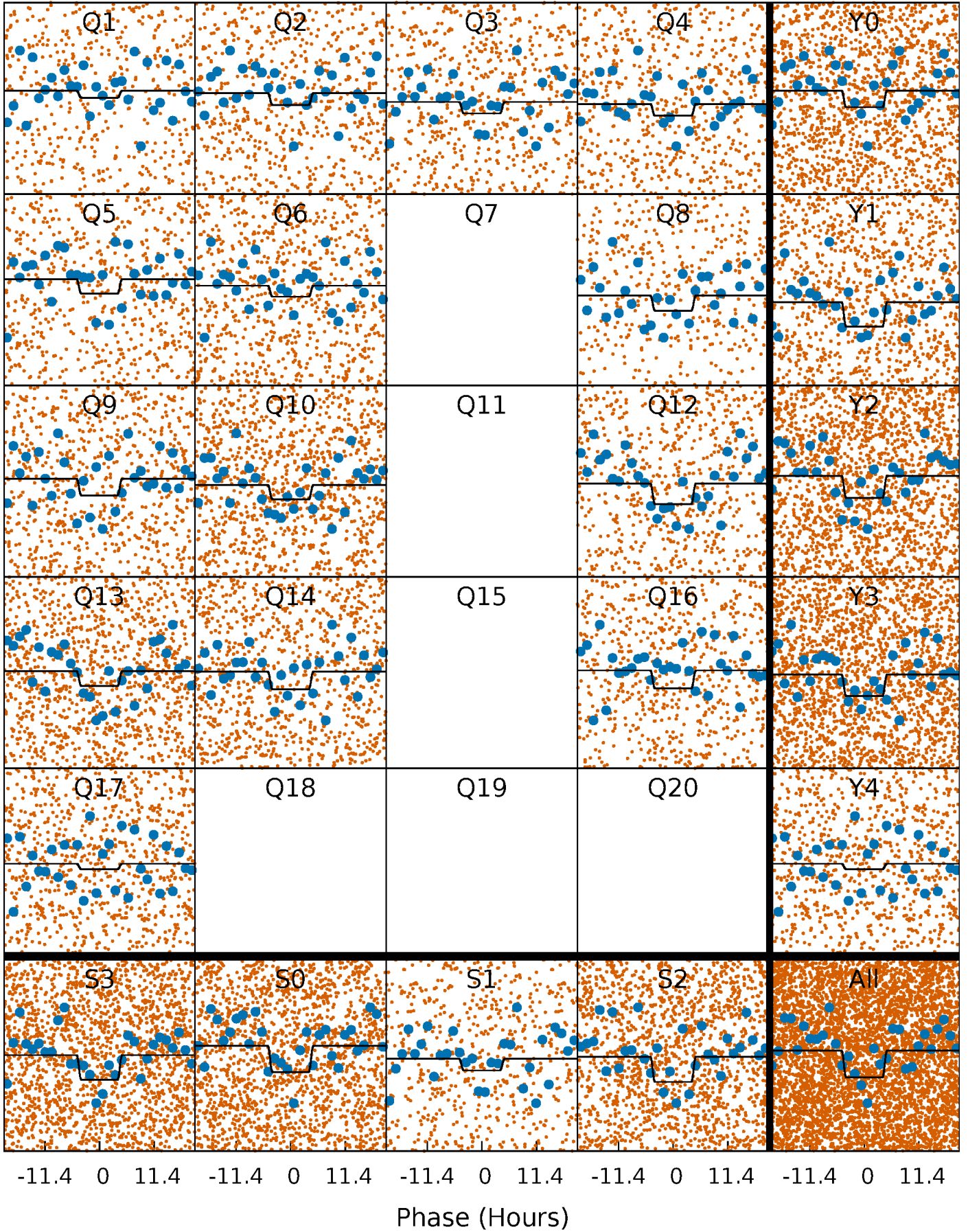
DV Quarter-Phased Transit Curves

TCE 010424228-02 P= 1.289140 Days $T_0=132.644074$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

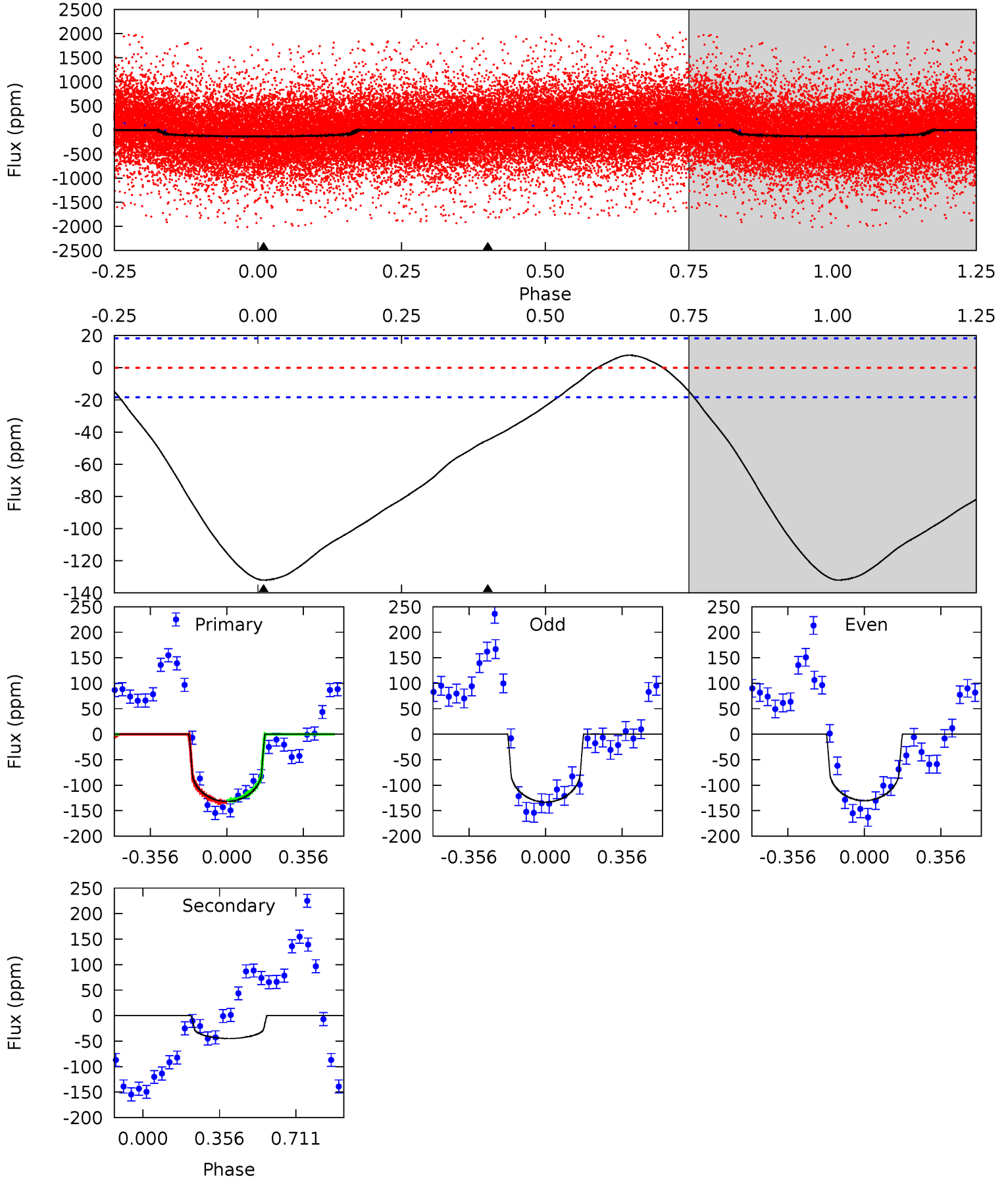
TCE 010424228-02 $P = 1.289159$ Days $T_0 = 132.658484$ (BKJD)



DV Model-Shift Uniqueness Test

010424228-02, P = 1.289140 Days, E = 131.354934 Days

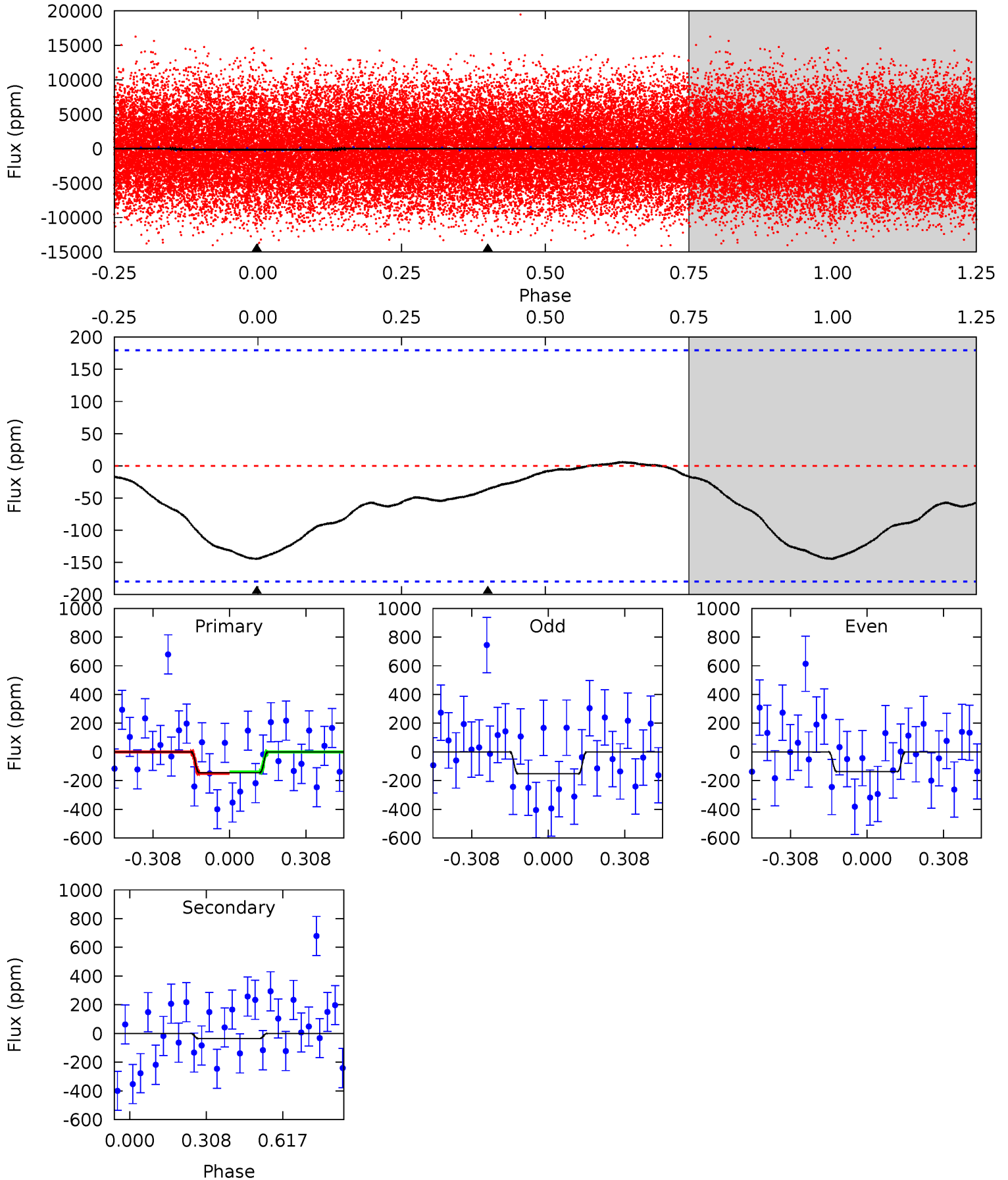
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 30.9 | 10.5 | 0 | 0 | 4.29 | 0.92 | 1.70 | 30.9 | 30.9 | 10.5 | 10.5 | 0.35 | 1.06 | 0.06 | 0.52 |



Alt Model-Shift Uniqueness Test

010424228-02, P = 1.289159 Days, E = 131.369325 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 3.48 | 0.87 | 0 | 0 | 4.32 | 1.02 | 0.15 | 3.48 | 3.48 | 0.87 | 0.87 | 0.17 | 1.07 | 0.04 | 0.11 |



Stellar Parameters For KIC 010424228

| | $T_{\text{eff}} (K)$ | $\log(g)$ | $[\text{Fe}/\text{H}]$ | $R (R_{\odot})$ | $M (M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 6908^{+190}_{-262} | $4.079^{+0.220}_{-0.180}$ | $-0.280^{+0.300}_{-0.300}$ | $1.764^{+0.502}_{-0.553}$ | $1.364^{+0.184}_{-0.253}$ | $0.350^{+0.502}_{-0.154}$ |
| | +3%/-4% | +5%/-4% | +107%/-107% | +28%/-31% | +13%/-19% | +144%/-44% |
| Source | PHO1 | KIC0 | KIC0 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 010424228-02 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{max} (K)$ | $T_{obs} (K)$ | A_{obs} |
|---------|--------------|------------------------|----------------------|------------------------|----------------------------|
| DV | -45 ± 4 | $1.67^{+1.04}_{-0.83}$ | 3513^{+275}_{-274} | 5828^{+3025}_{-1062} | $5.607^{+16.959}_{-3.306}$ |
| Alt. | -36 ± 42 | $2.34^{+1.20}_{-0.94}$ | 3511^{+292}_{-294} | 4633^{+1689}_{-8437} | $2.079^{+6.240}_{-2.327}$ |

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 $A_{obs} \gg 1.0$

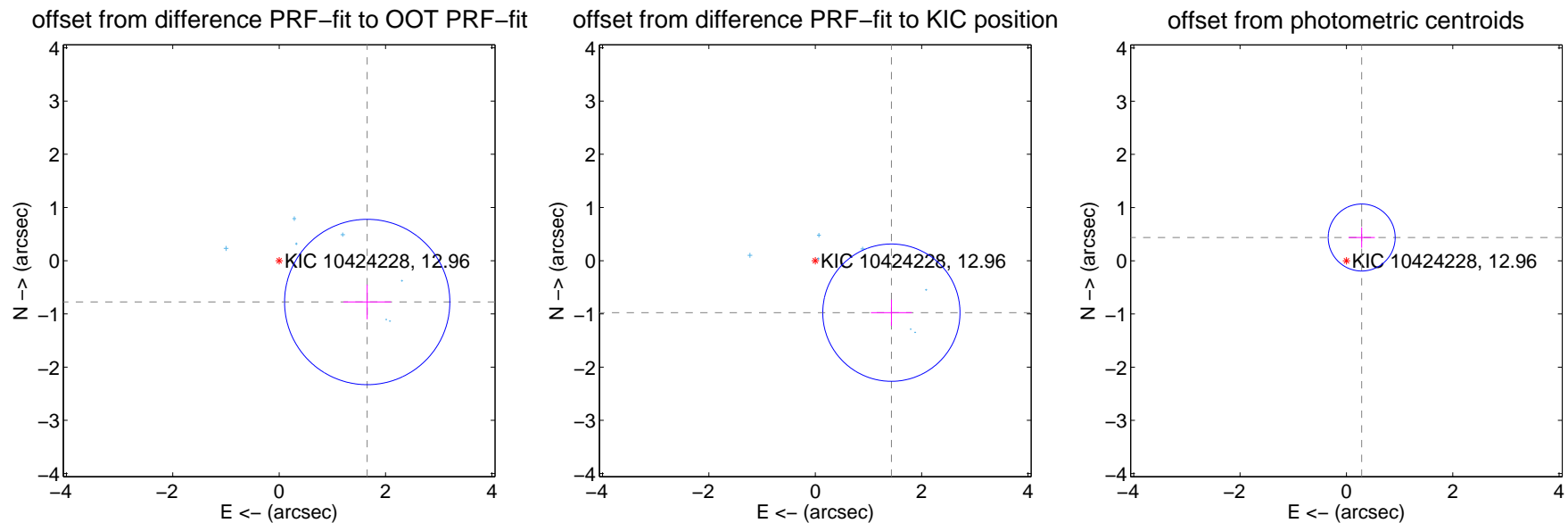
DV Centroid Data

Supplemental centroid analysis for 010424228-02. Kepler magnitude: 12.96. Transit SNR 13.02

There are 7 quarters with good PRF difference image offsets

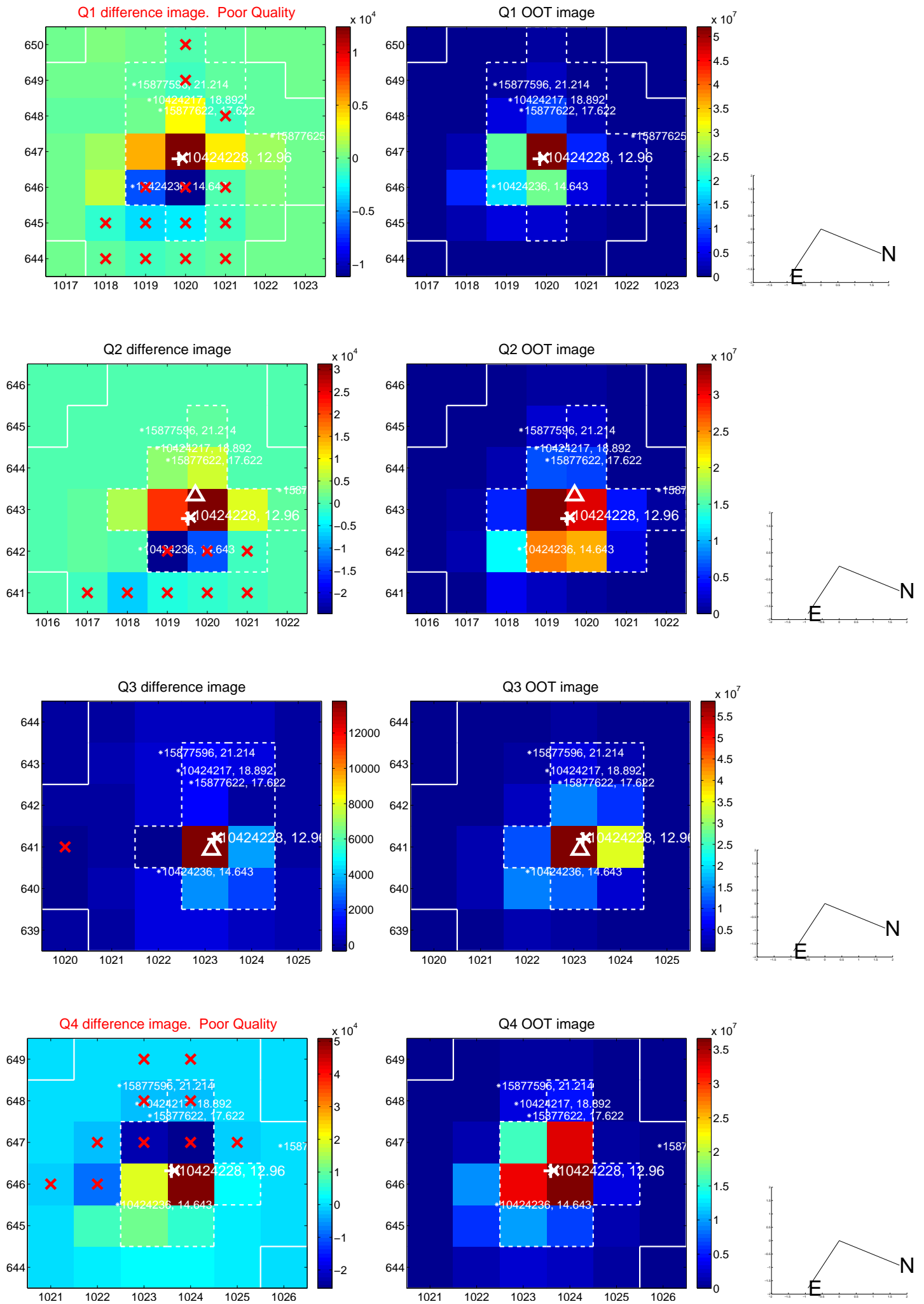
The direct PRF centroid is offset from the target star catalog position by about 0.30 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 1.829 ± 0.518 | 3.53 | -1.656 ± 0.448 | -0.776 ± 0.325 |
| PRF-fit source offset from KIC position | 1.733 ± 0.430 | 4.03 | -1.431 ± 0.385 | -0.977 ± 0.245 |
| photometric centroid source offset | 0.52 ± 0.21 | 2.49 | -0.29 ± 0.25 | 0.44 ± 0.19 |

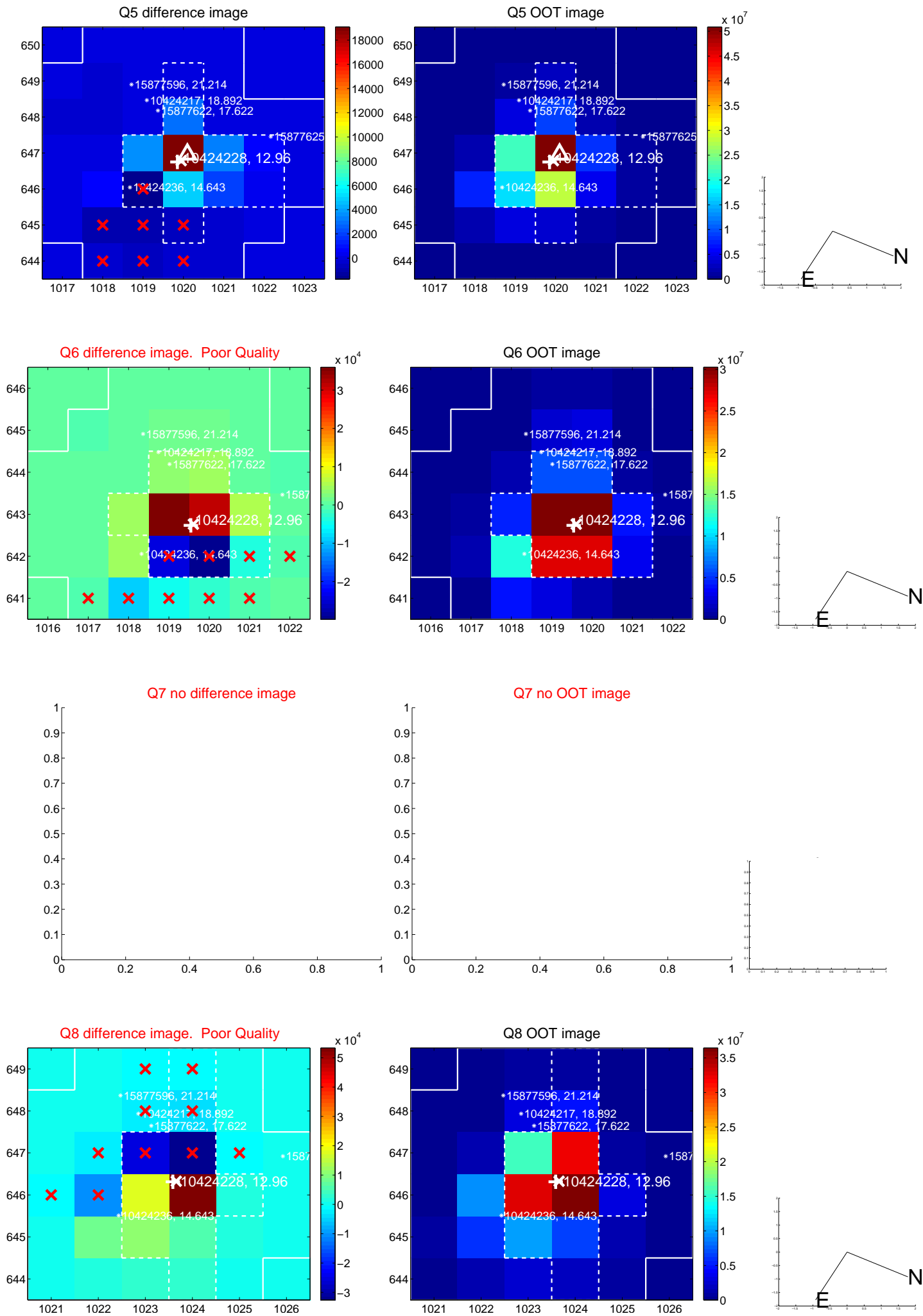


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

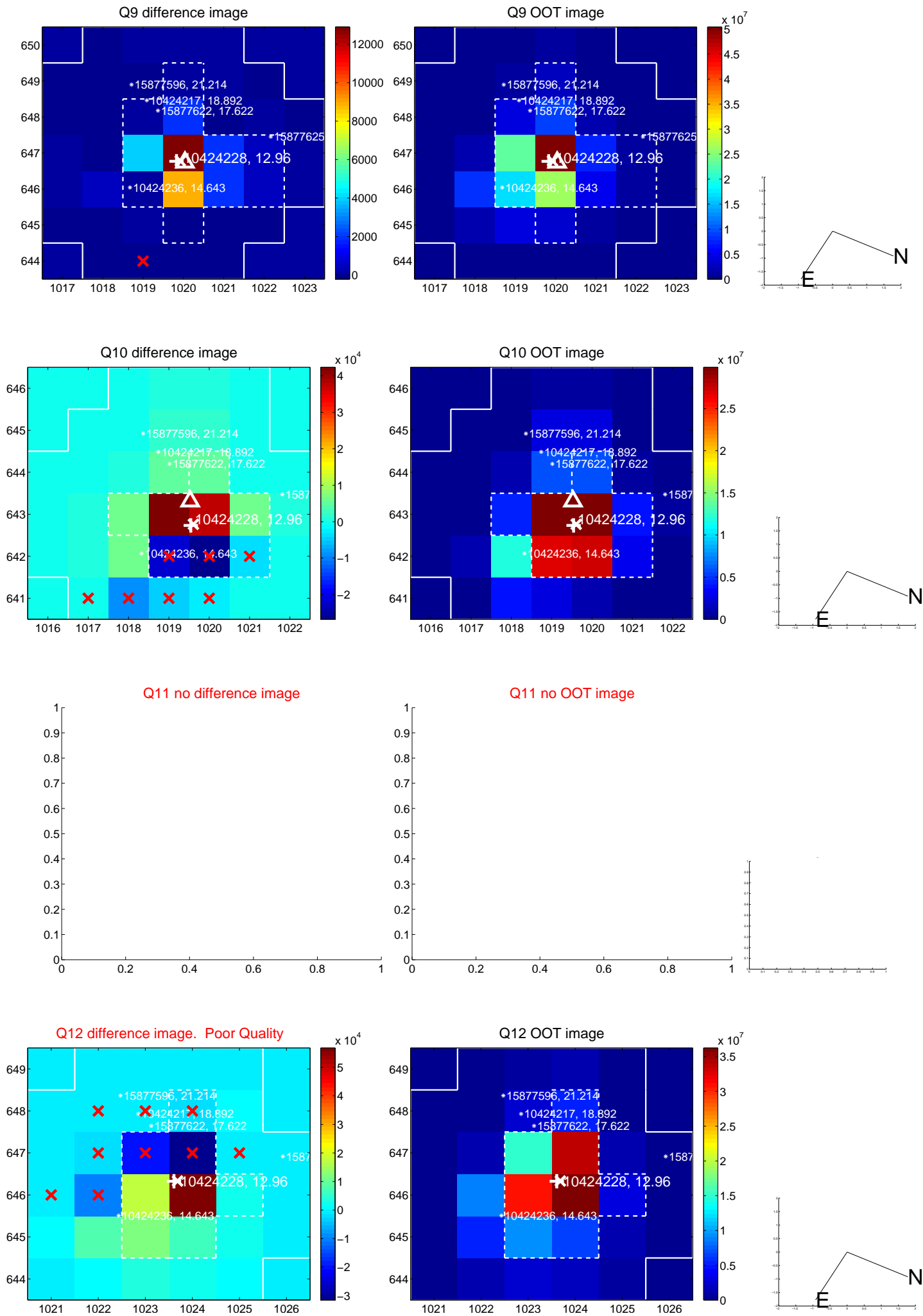
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



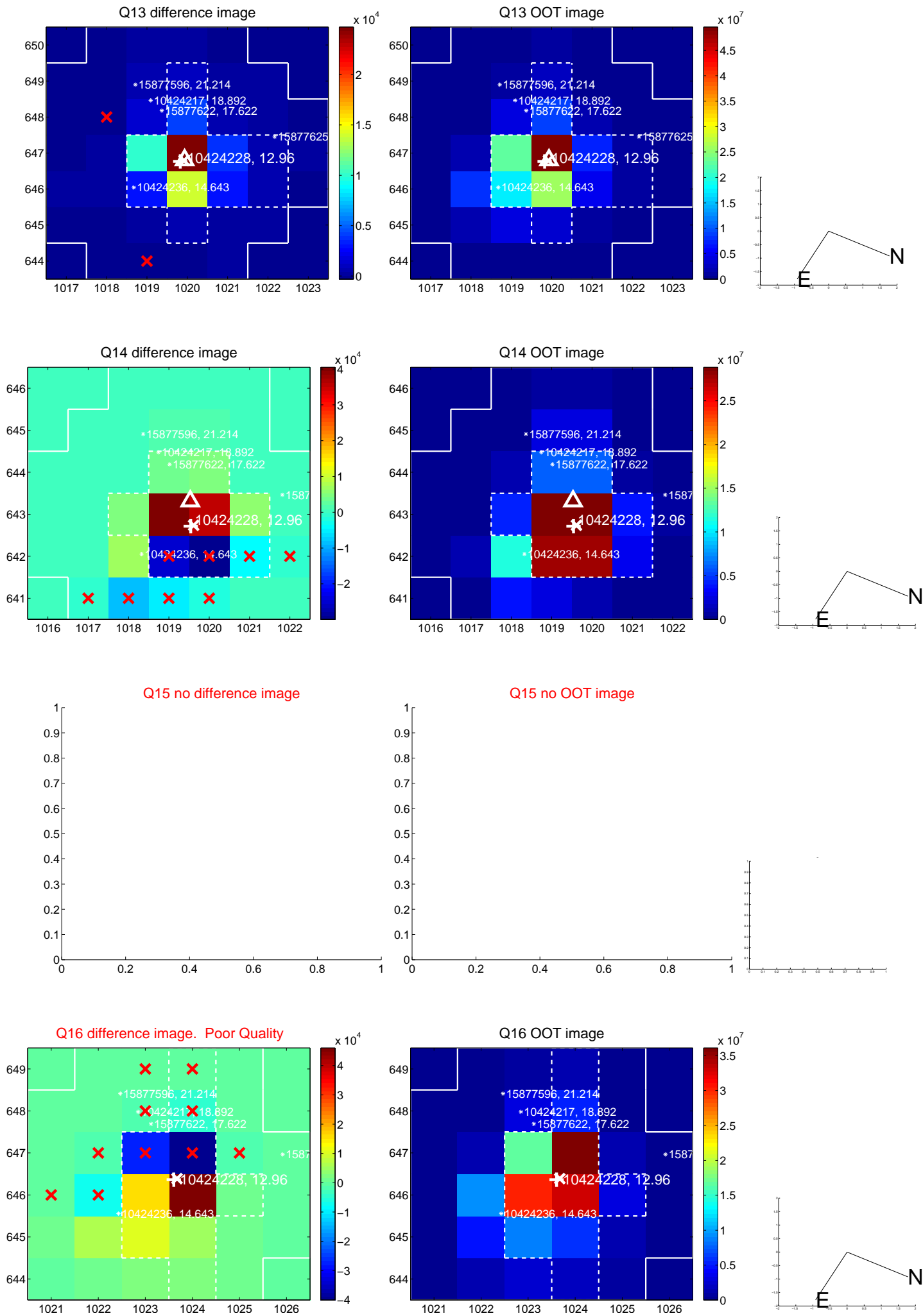
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



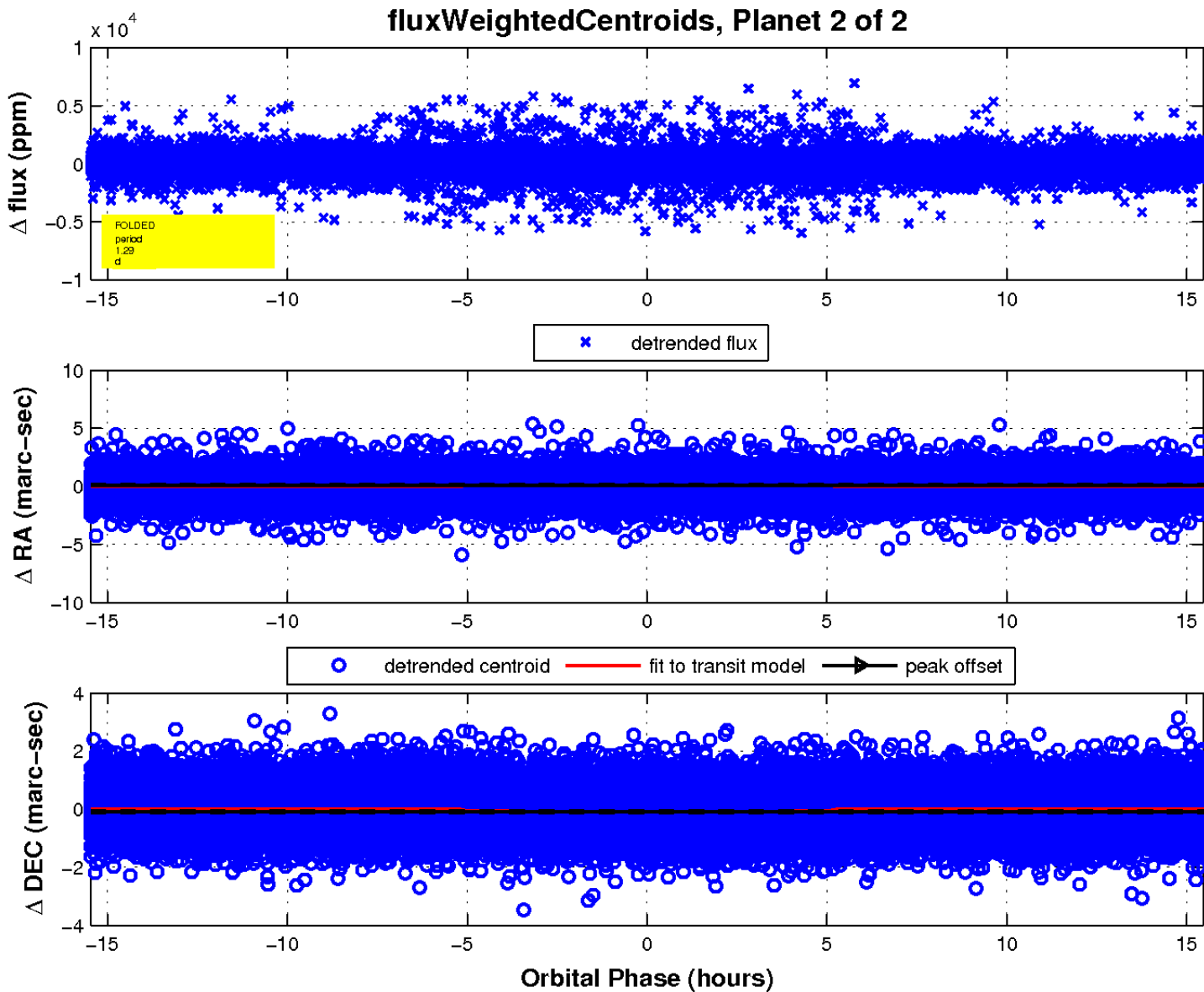
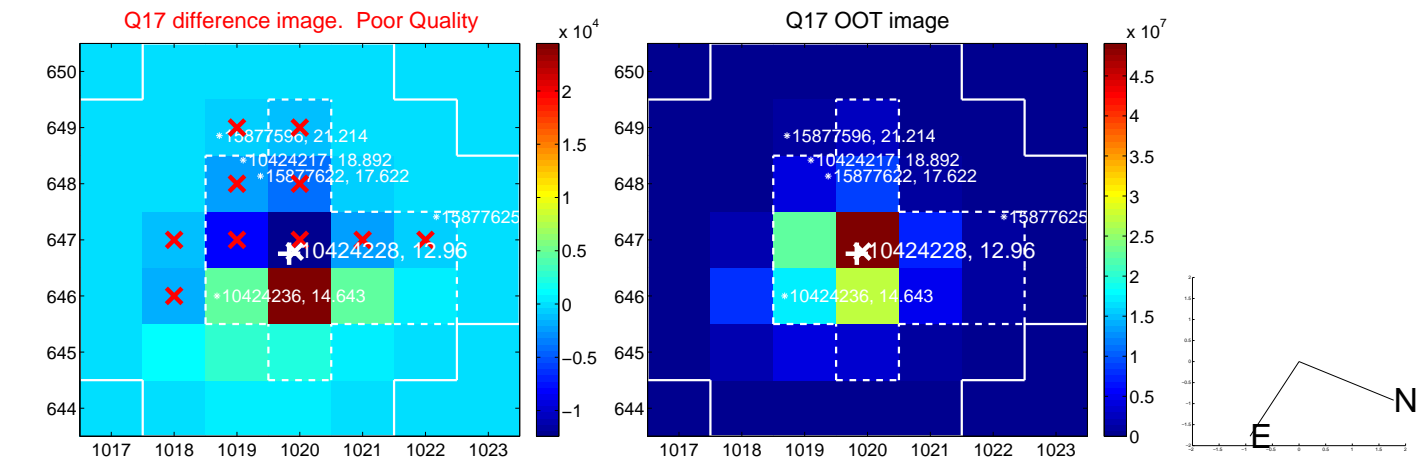
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

