

KIC 012155928

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-------|------|-----------------------------|-----------------|------------------------|------------------------|
| 012155928-01 | OBS | No | 0.872768 | 131.995369 | 4230.2 | 1.500 | 242.6 | -1.0 | 1.68 | 7078 | 11.11 | 16108.32 |
| 012155928-02 | OBS | No | 0.872772 | 131.516202 | 717.0 | 2.500 | 25.6 | -1.0 | 1.68 | 7078 | 4.56 | 16108.22 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 012155928-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | SWEET_NTL—LPP_DV—LPP_ALT—CENT_NOFITS |
| 012155928-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | SWEET_NTL—LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_NOFITS |

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.

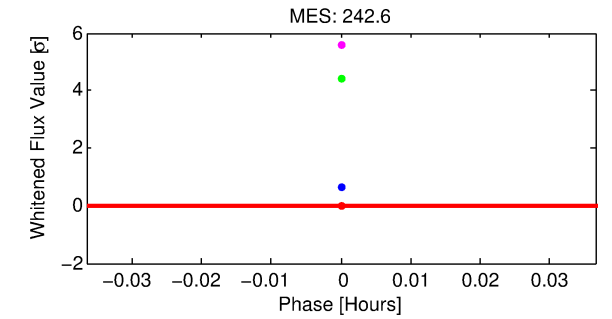
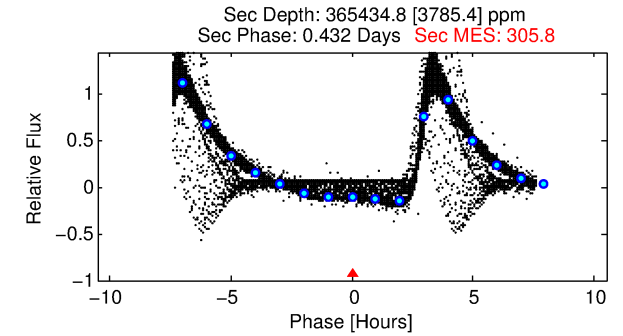
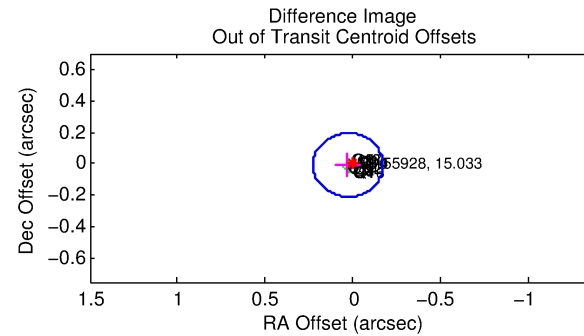
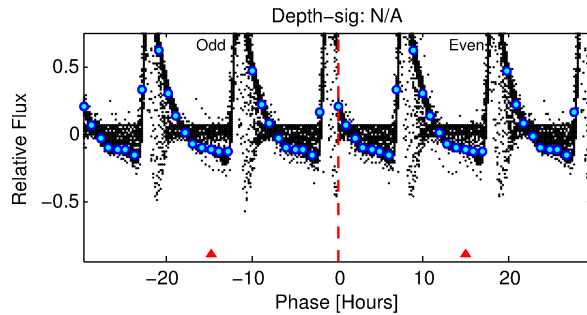
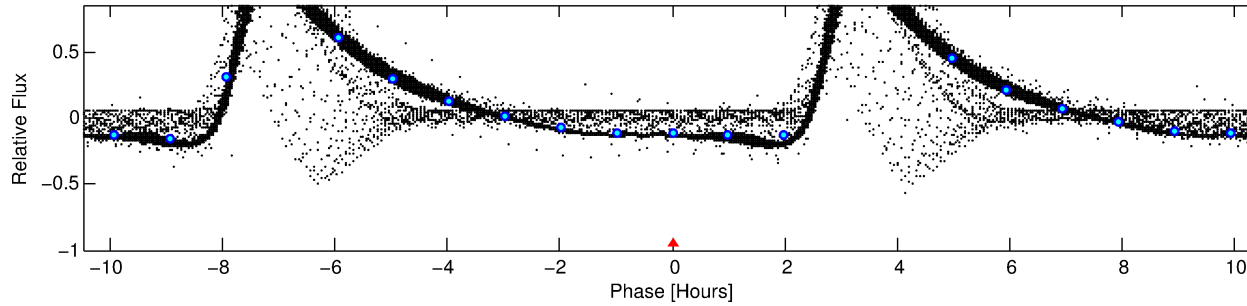
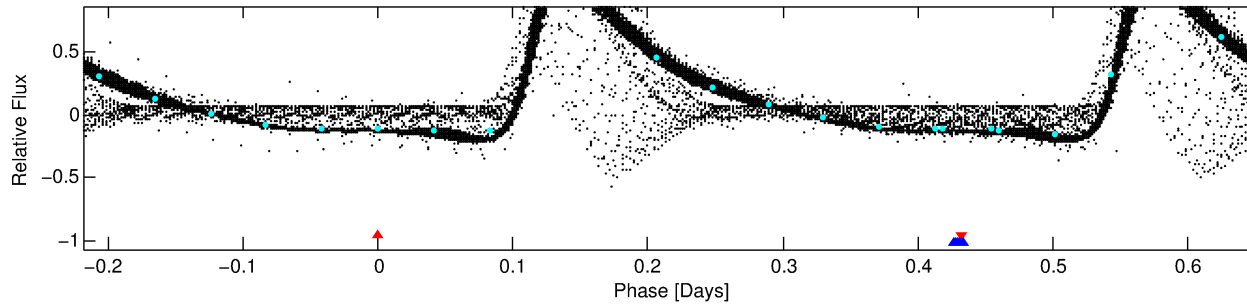
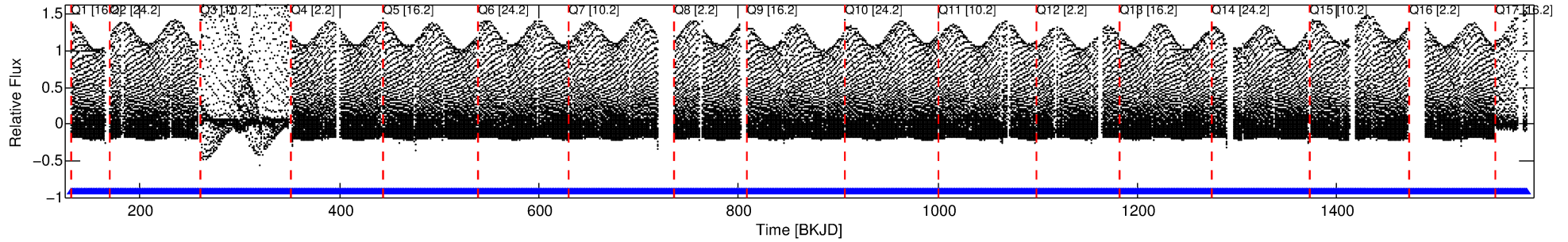
Ephemeris Match Information For 012155928-01

No Significant Match Found

DV One-Page Summary

KIC: 12155928 Candidate: 1 of 2 Period: 0.873 d

Kp: 15.03 R*: 1.68 Rs Teff: 7078.0 K Logg: 4.12 Fe/H: -0.280



TPS TCE Results:

Period = 0.87277 d
Epoch = 131.9954 BKJD

DV fit results are unavailable

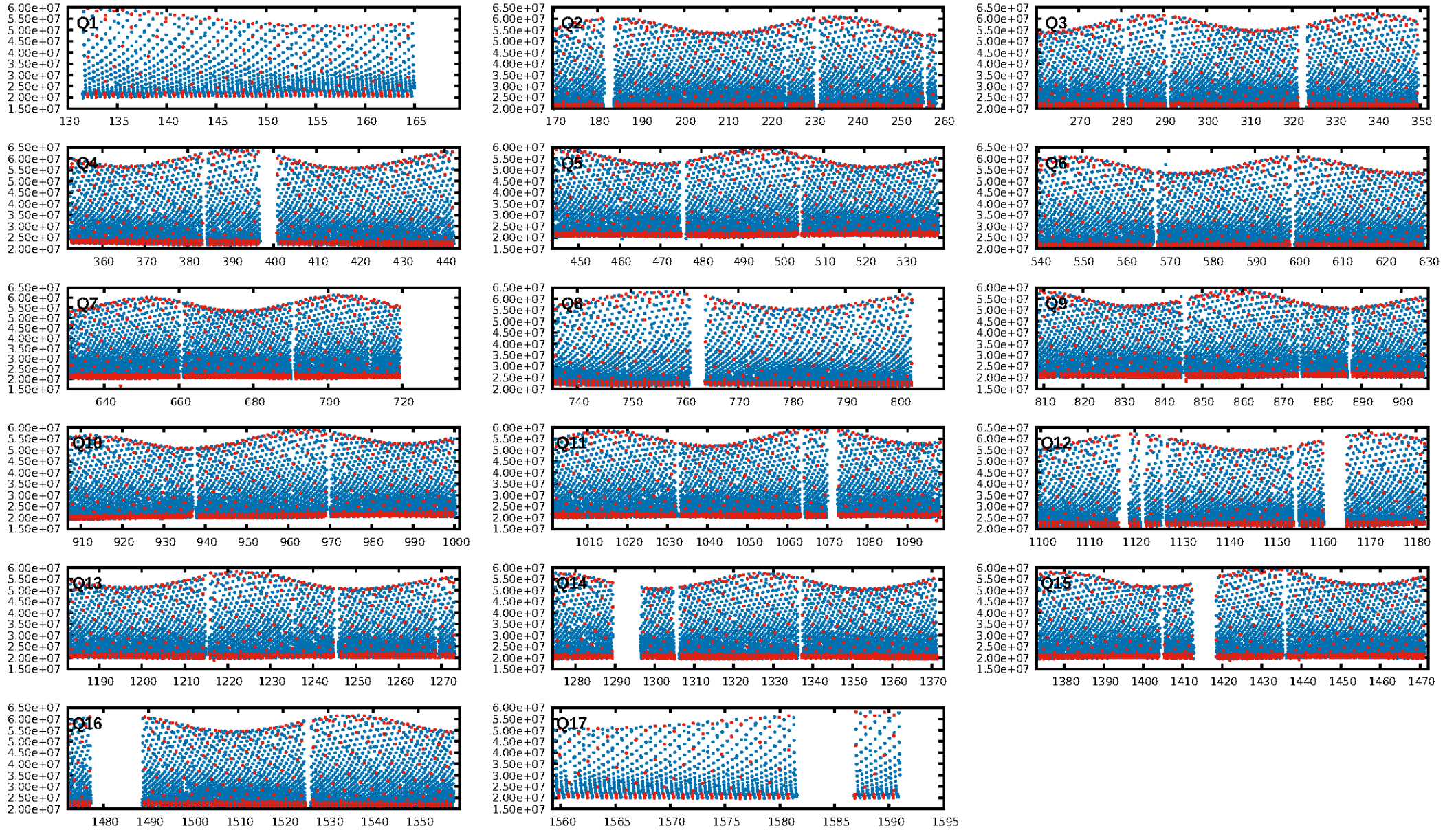
DV Diagnostic Results:

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 [1479/1479]
GhostDiagnostic-chr: 1.056
Centroid-sig: N/A
Centroid-so: 0.081 arcsec [119.90σ]
OotOffset-rm: 0.030 arcsec [0.44σ]
KicOffset-rm: 0.015 arcsec [0.21σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
DiffImageOverlap-fno: 0.00 [0/17]

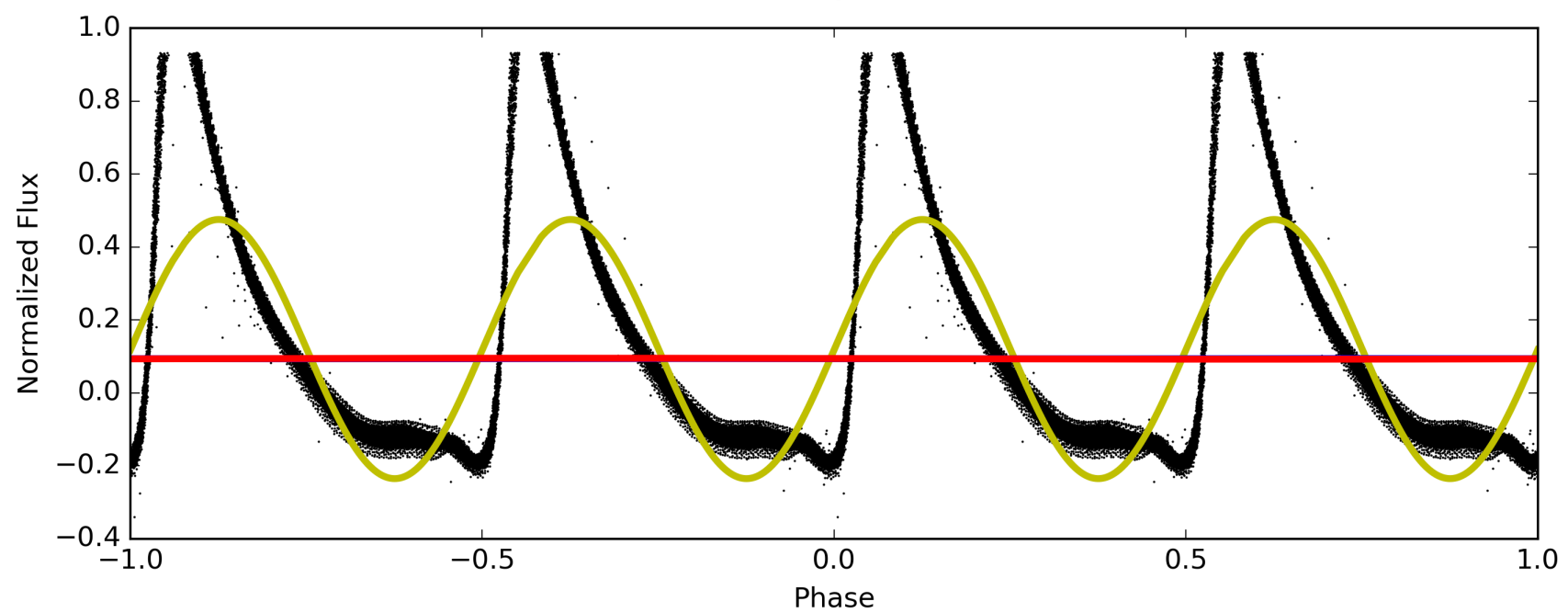
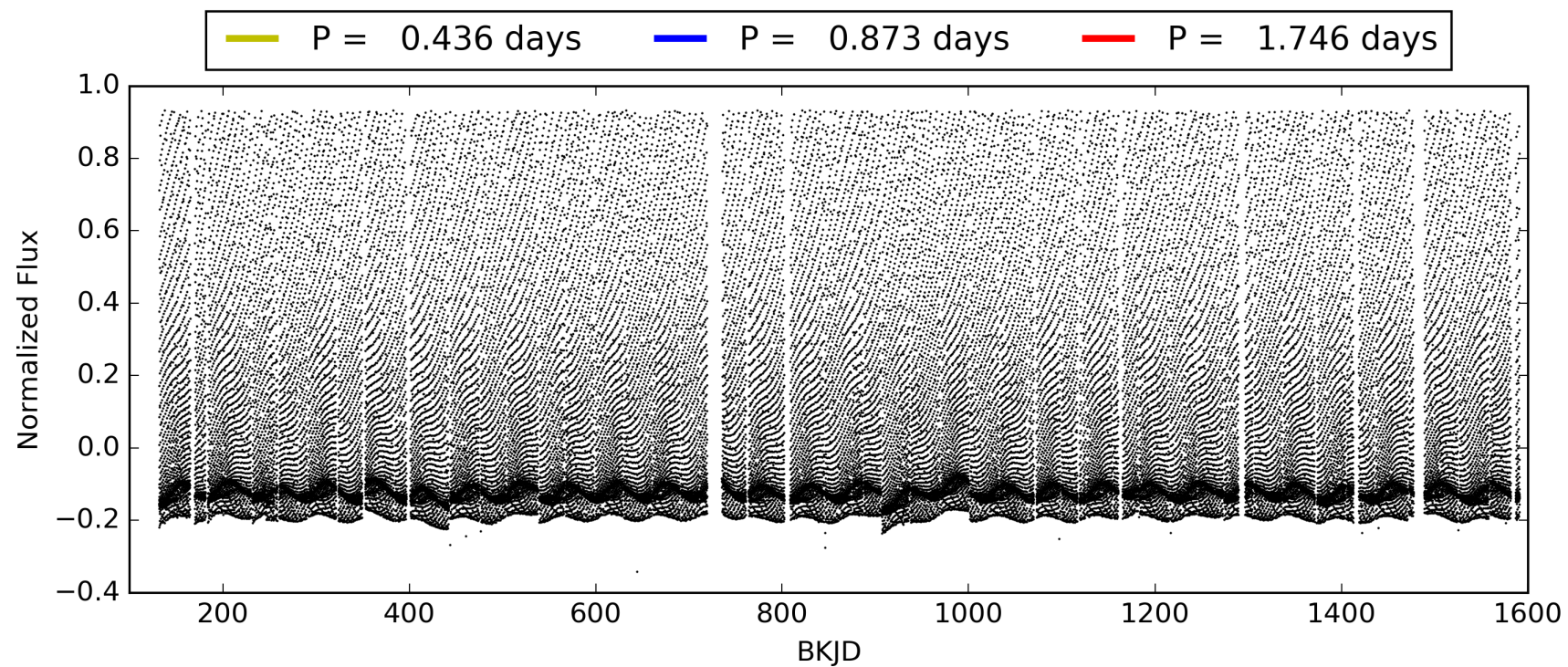
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 07:05:54 Z

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

TCE 012155928-01, PDC Light Curves

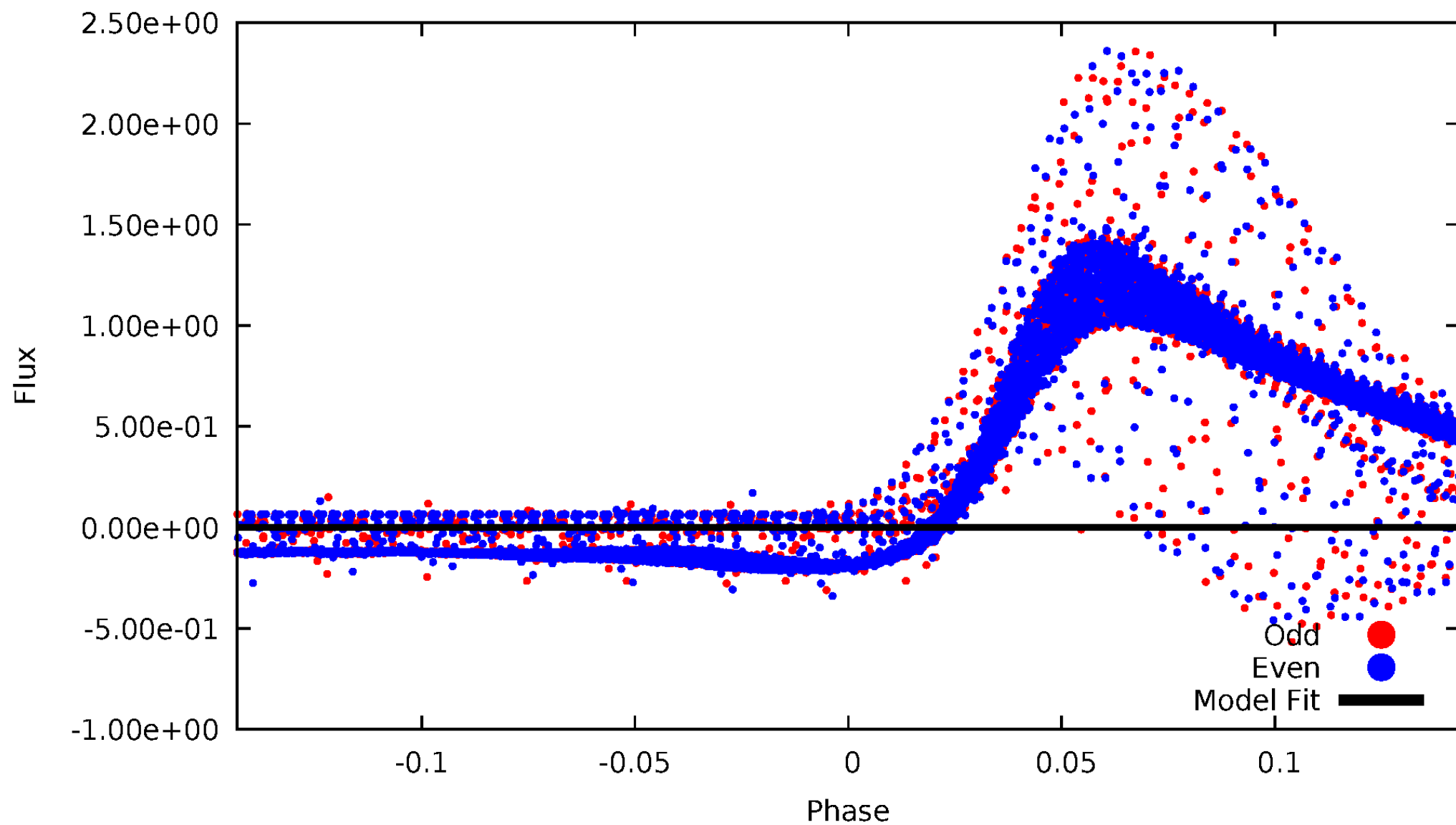


TCE 012155928-01



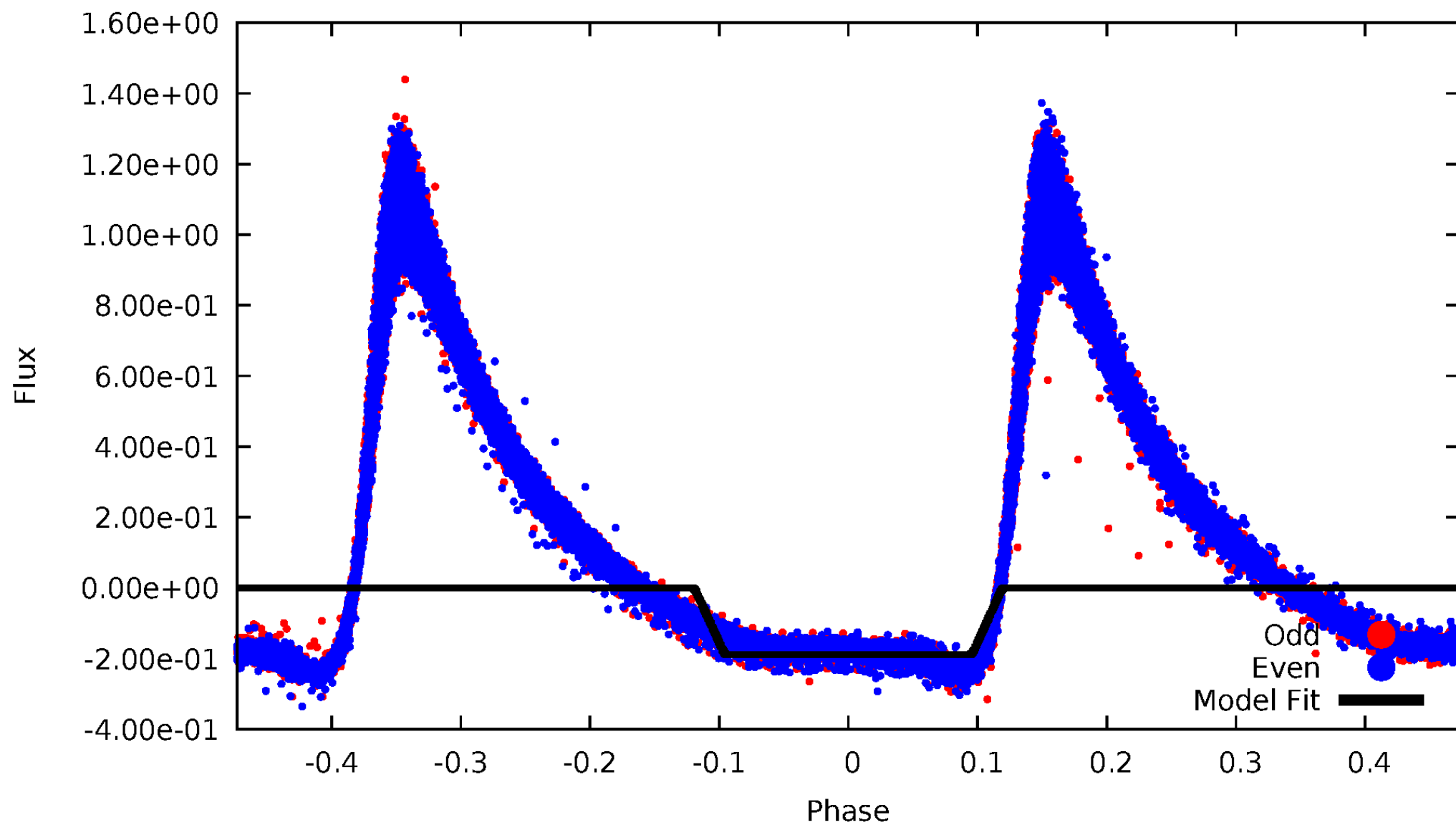
DV Odd/Even

TCE 012155928-01



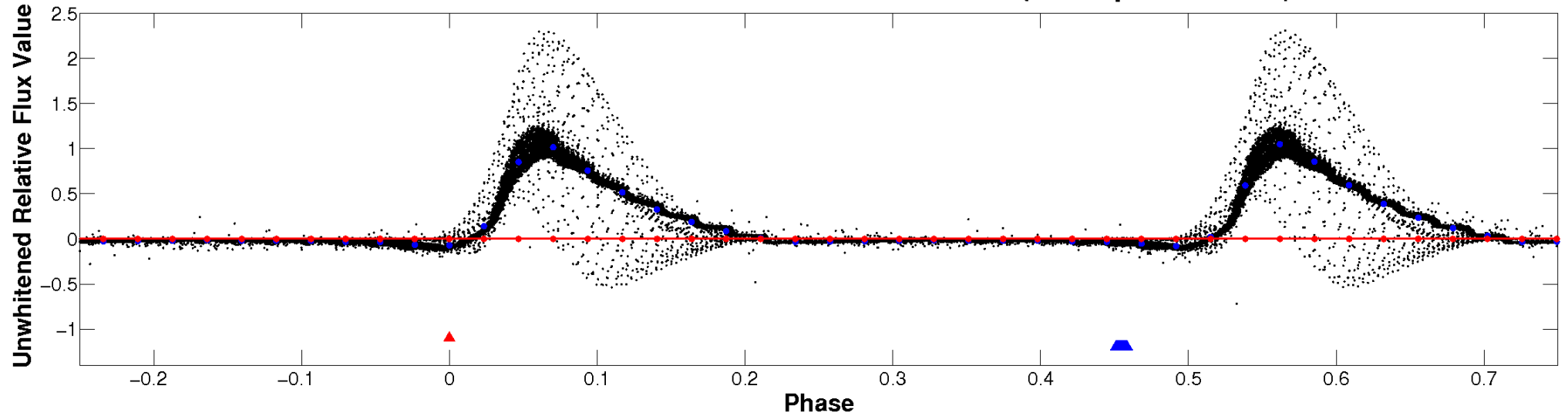
ALT Odd/Even

TCE 012155928-01

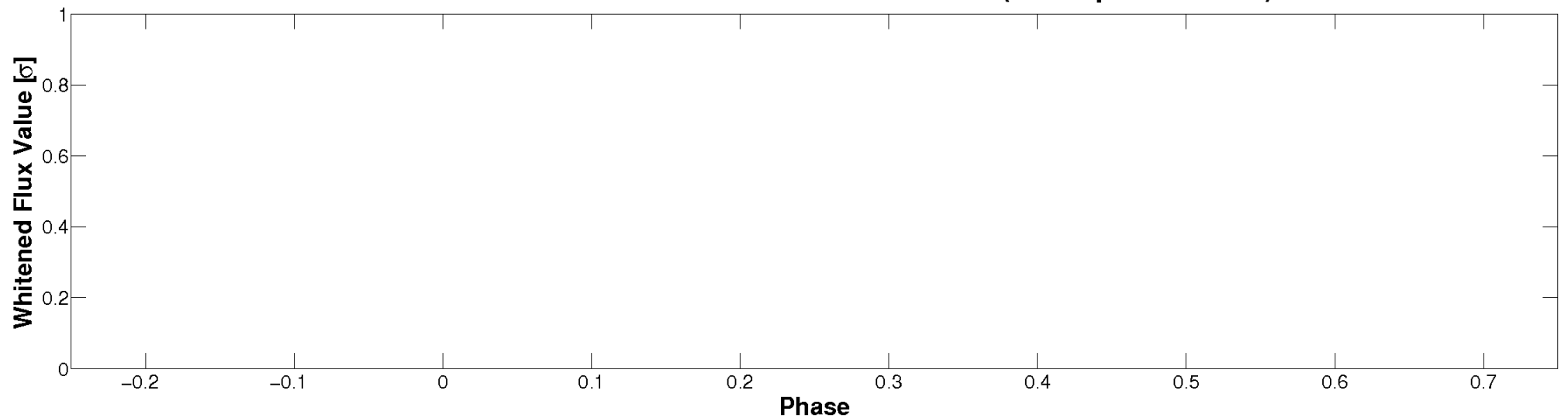


Non-Whitened Vs. Whitened Light Curve

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

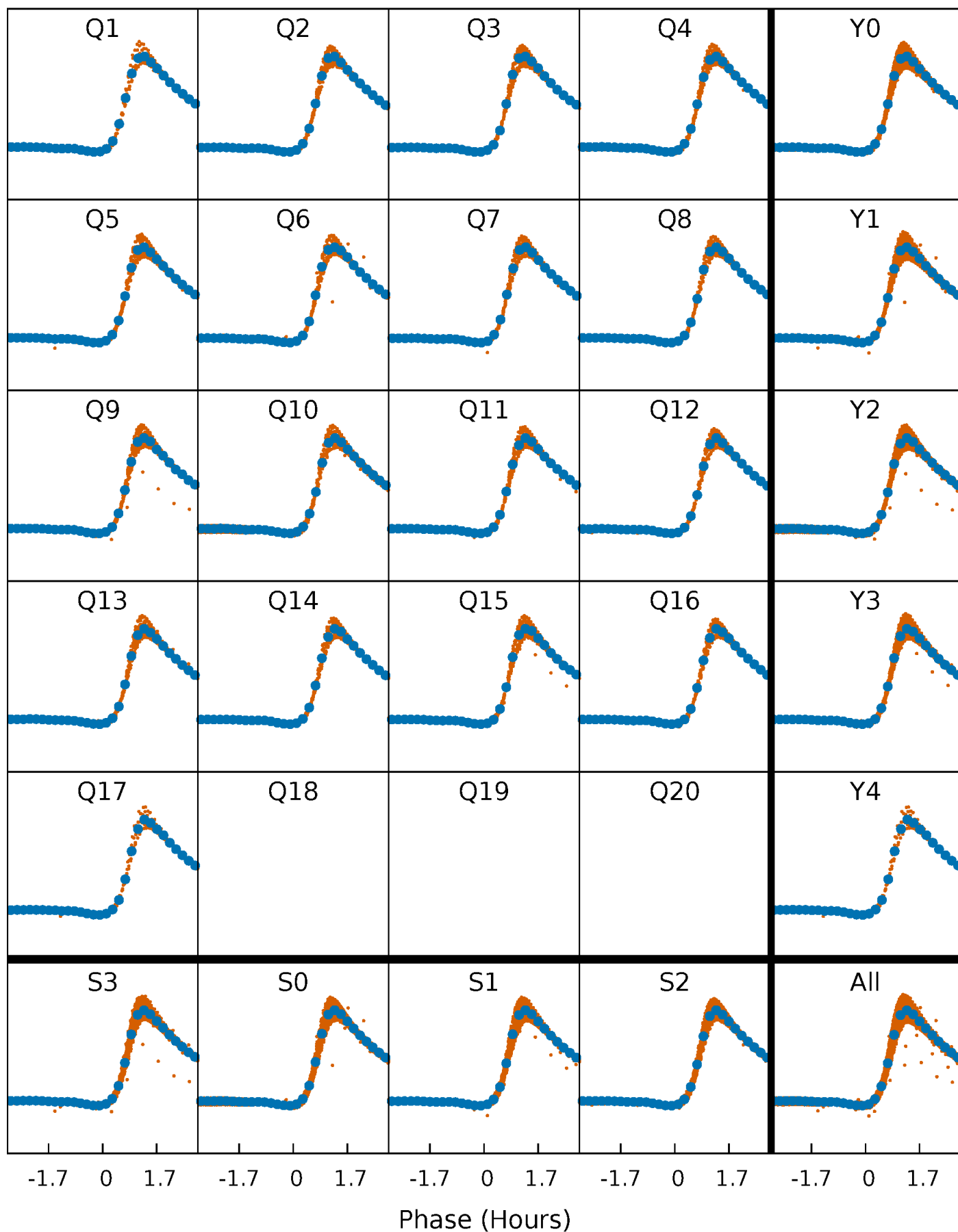


Planet 1 : Phased Whitened Flux Time Series (TPS Epoch/Period)



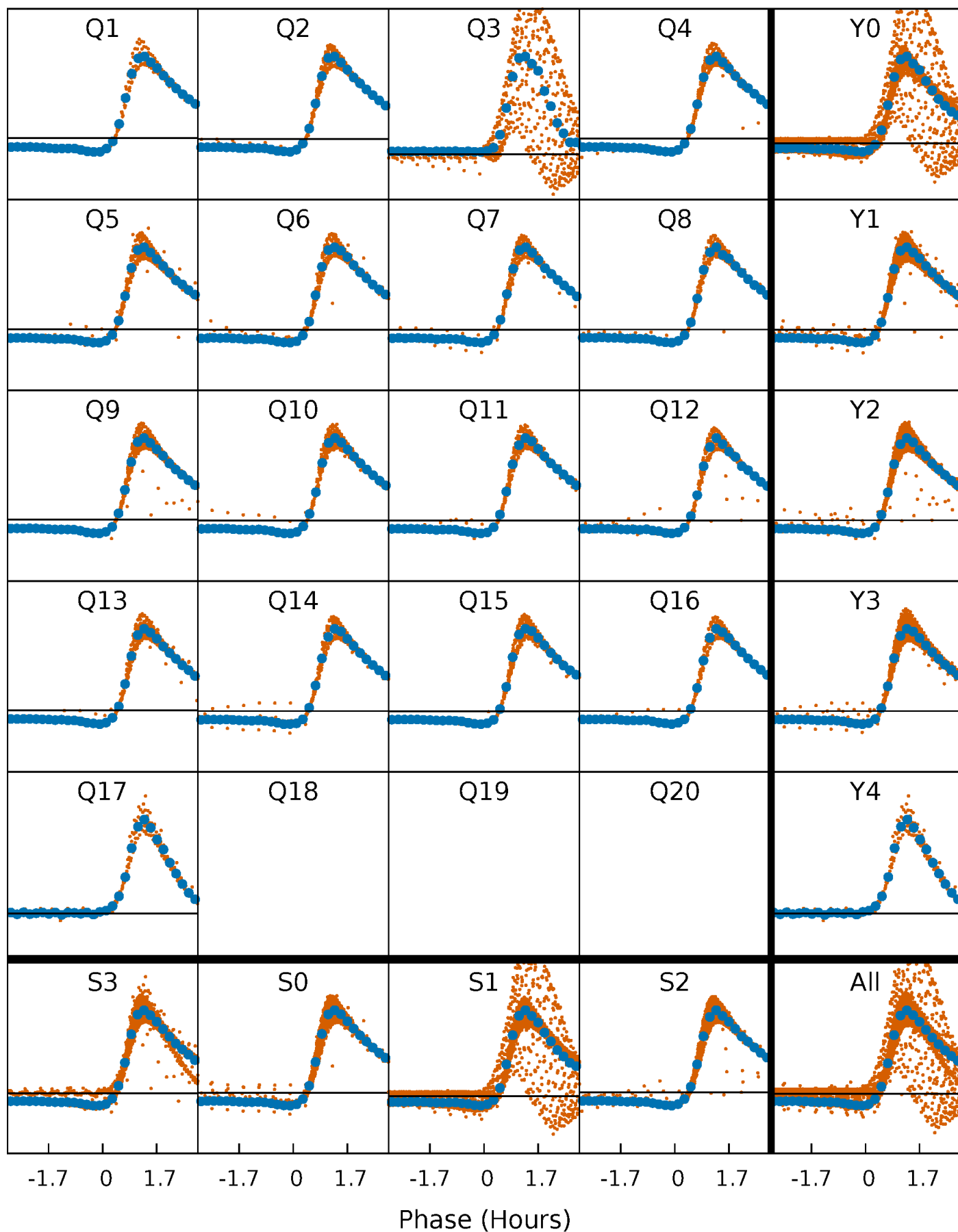
PDC Quarter-Phased Transit Curves

TCE 012155928-01 P= 0.872768 Days $T_0=131.995369$ (BKJD)



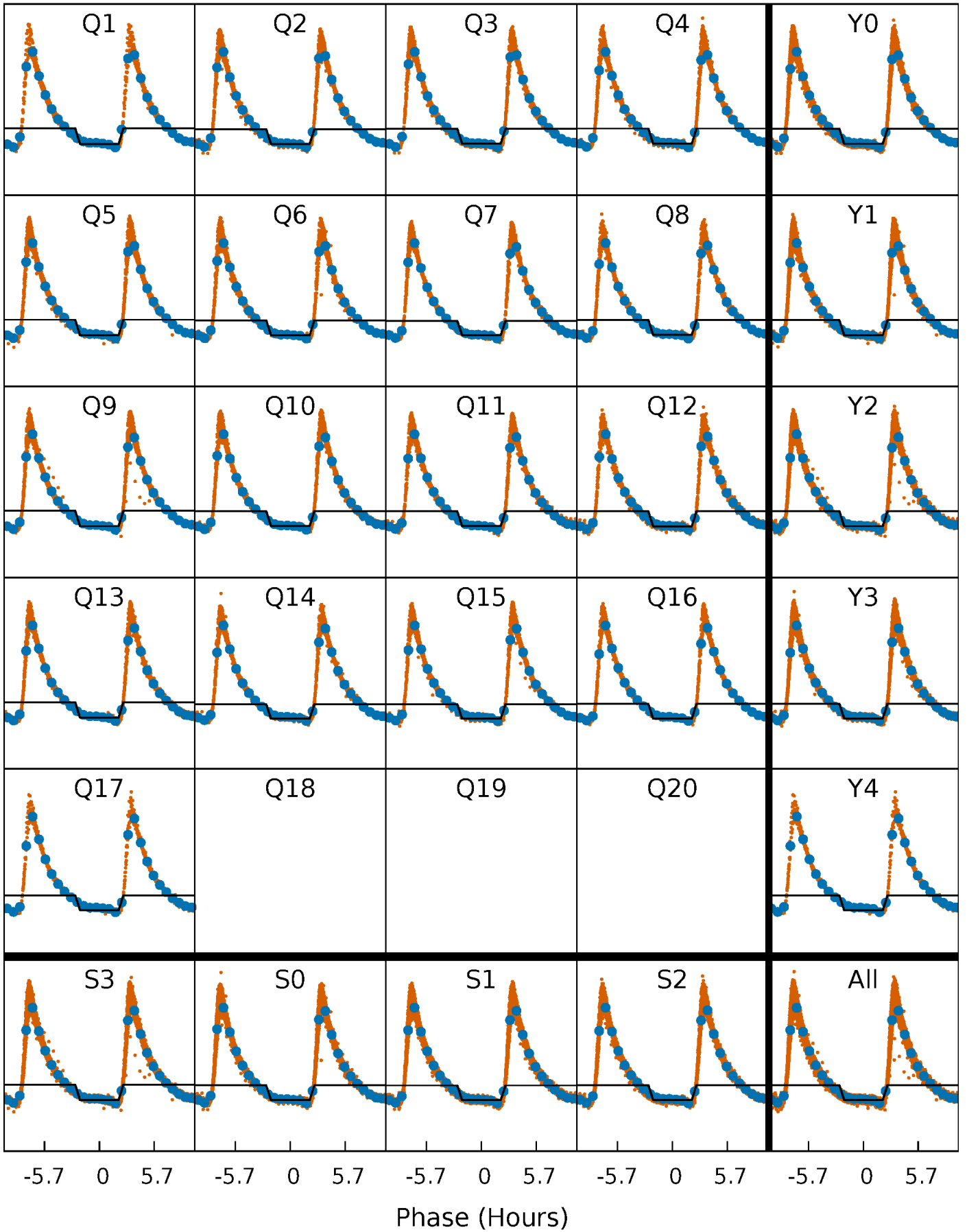
DV Quarter-Phased Transit Curves

TCE 012155928-01 P= 0.872768 Days $T_0=131.995369$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

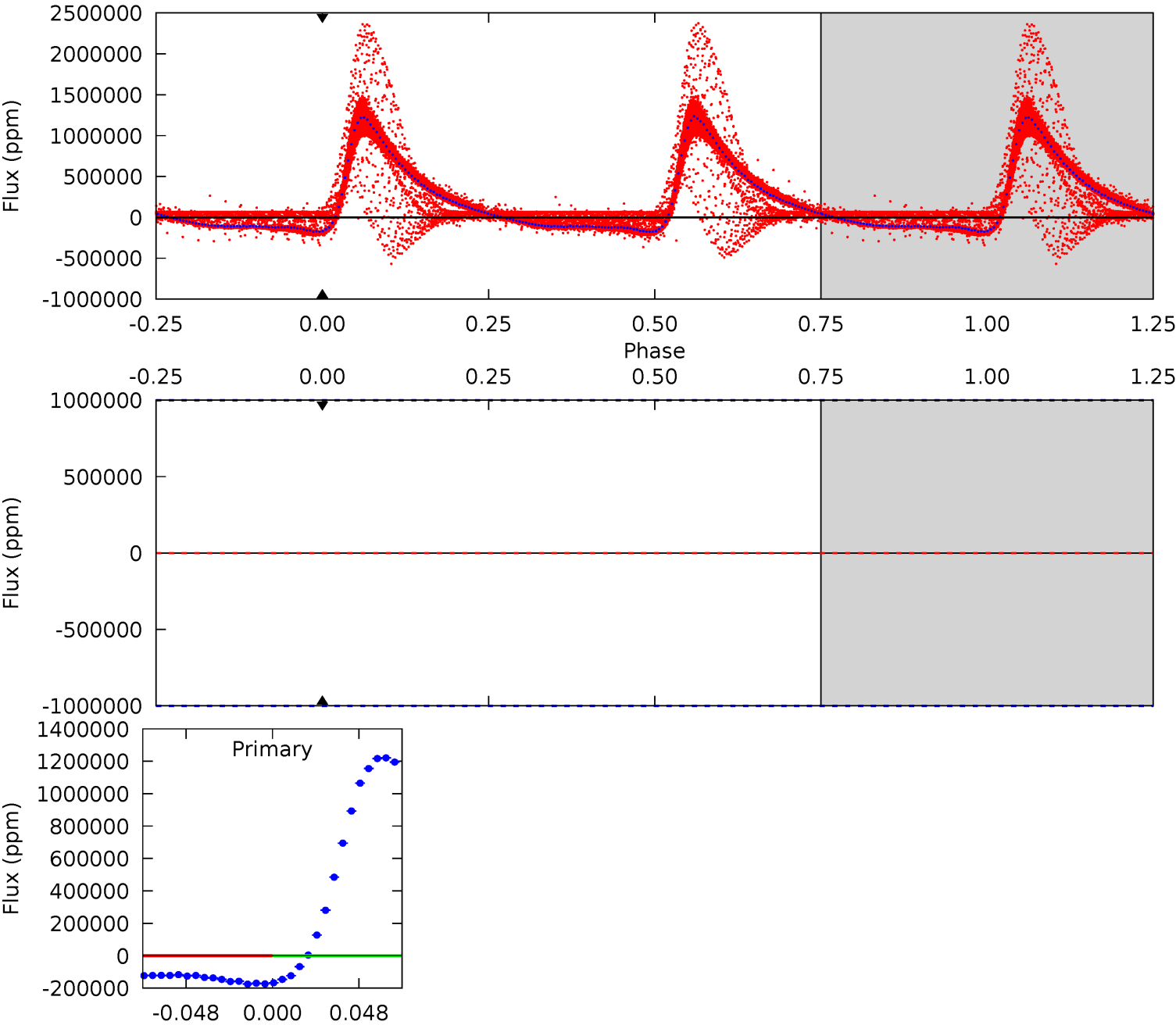
TCE 012155928-01 P= 0.872768 Days $T_0=131.913188$ (BKJD)



DV Model-Shift Uniqueness Test

012155928-01, P = 0.872768 Days, E = 131.122601 Days

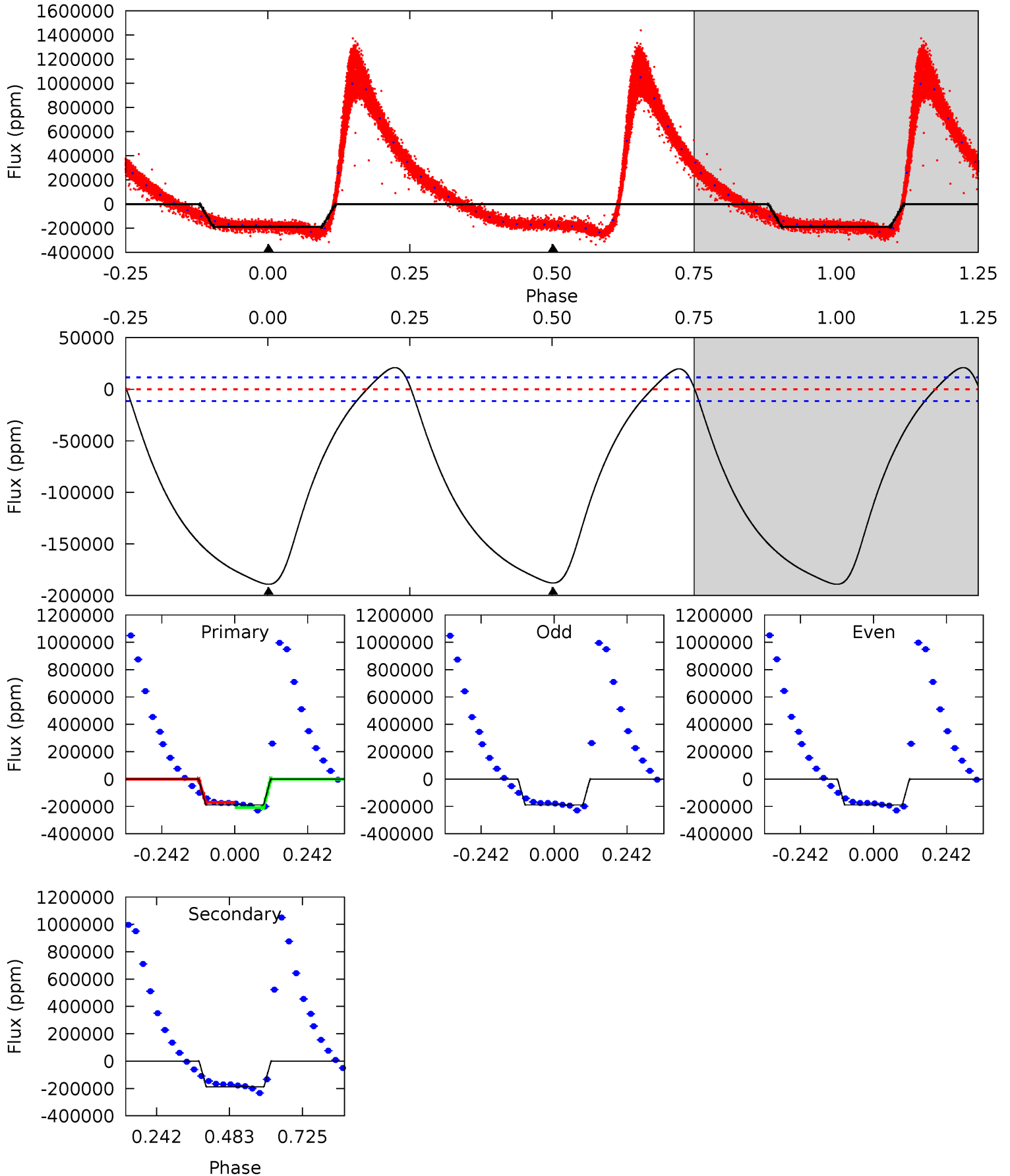
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|-----|-----|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|-----|-------|-----|
| 0 | 0 | 0 | 0 | 1.00 | 1.00 | 1.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |



Alt Model-Shift Uniqueness Test

012155928-01, P = 0.872768 Days, E = 131.040420 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 71.9 | 71.4 | 0 | 0 | 4.38 | 1.17 | 7.35 | 71.9 | 71.9 | 71.4 | 71.4 | 0.06 | 1.00 | 0.10 | 9.53 |



Stellar Parameters For KIC 012155928

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 7078^{+199}_{-274} | $4.124^{+0.180}_{-0.180}$ | $-0.280^{+0.250}_{-0.350}$ | $1.681^{+0.502}_{-0.457}$ | $1.374^{+0.214}_{-0.235}$ | $0.408^{+0.407}_{-0.206}$ |
| | +3%/-4% | +4%/-4% | +89%/-125% | +30%/-27% | +16%/-17% | +100%/-51% |
| 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 012155928-01 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|--------------------|---------------------------|----------------------|--------------------------|------------------------------|
| DV | 0 ± 1000000 | $17.81^{+14.75}_{-11.17}$ | 4027^{+308}_{-297} | 2826^{+20578}_{-23416} | $0.342^{+118.768}_{-92.692}$ |
| Alt. | -187829 ± 2630 | $80.74^{+22.58}_{-20.05}$ | 4022^{+293}_{-305} | 7348^{+1295}_{-881} | $7.528^{+6.323}_{-2.769}$ |

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

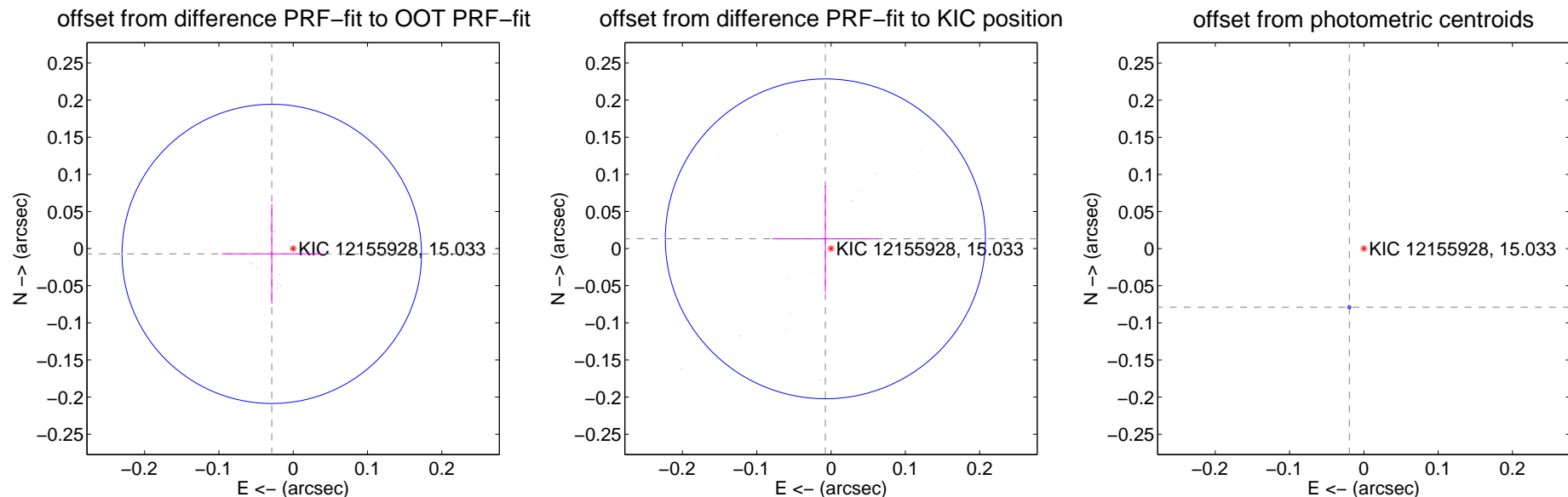
DV Centroid Data

Supplemental centroid analysis for 012155928-01. Kepler magnitude: 15.03. Transit SNR -1.00

There are 17 quarters with good PRF difference image offsets

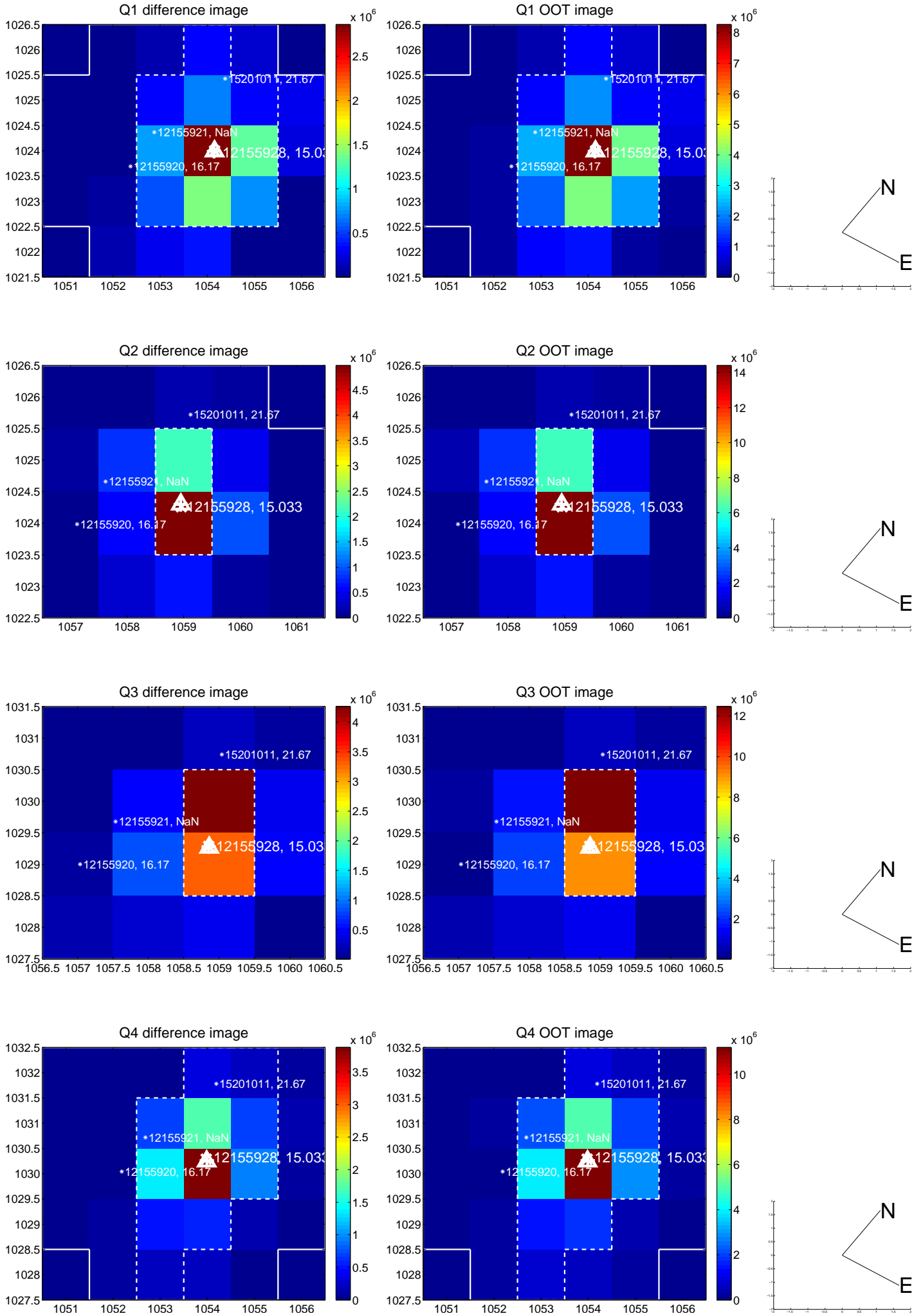
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT | 0.030 ± 0.067 | 0.44 | 0.029 ± 0.067 | -0.007 ± 0.067 |
| PRF-fit source offset from KIC position | 0.015 ± 0.072 | 0.21 | 0.008 ± 0.072 | 0.013 ± 0.072 |
| photometric centroid source offset | 0.08 ± 0.00 | 119.90 | 0.02 ± 0.00 | -0.08 ± 0.00 |

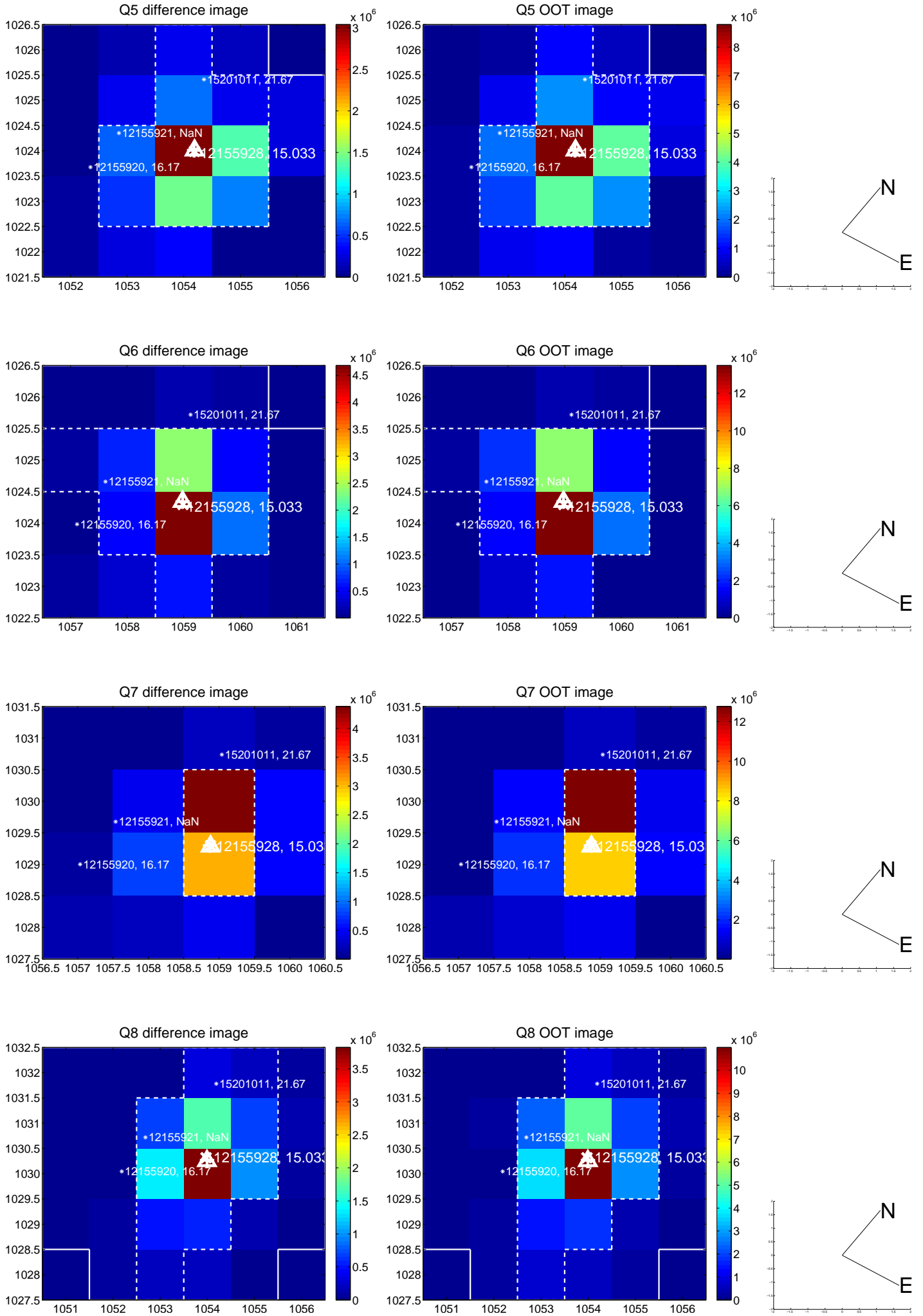


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

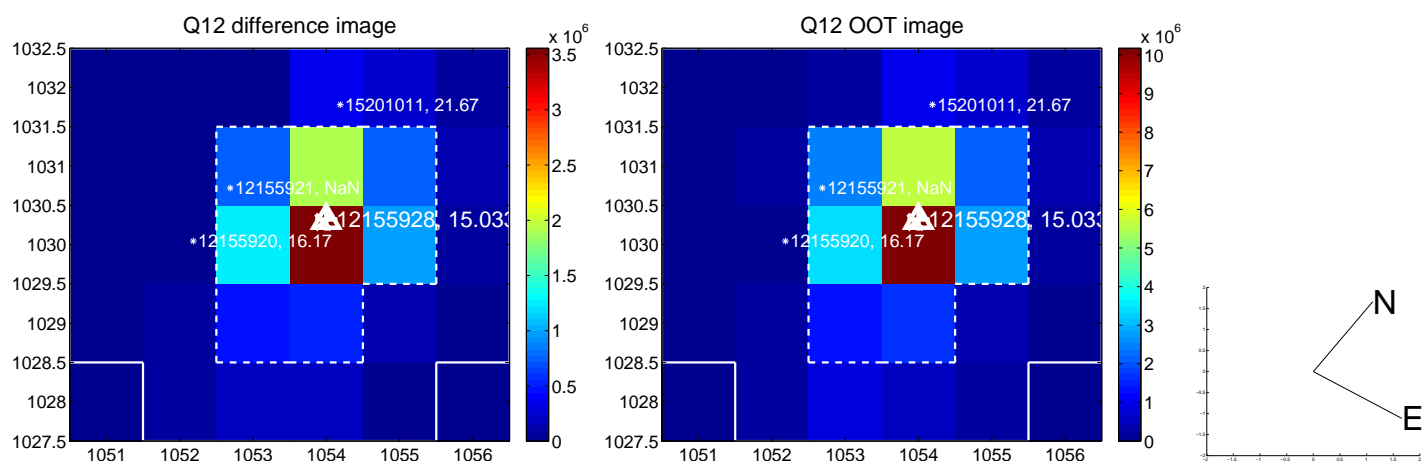
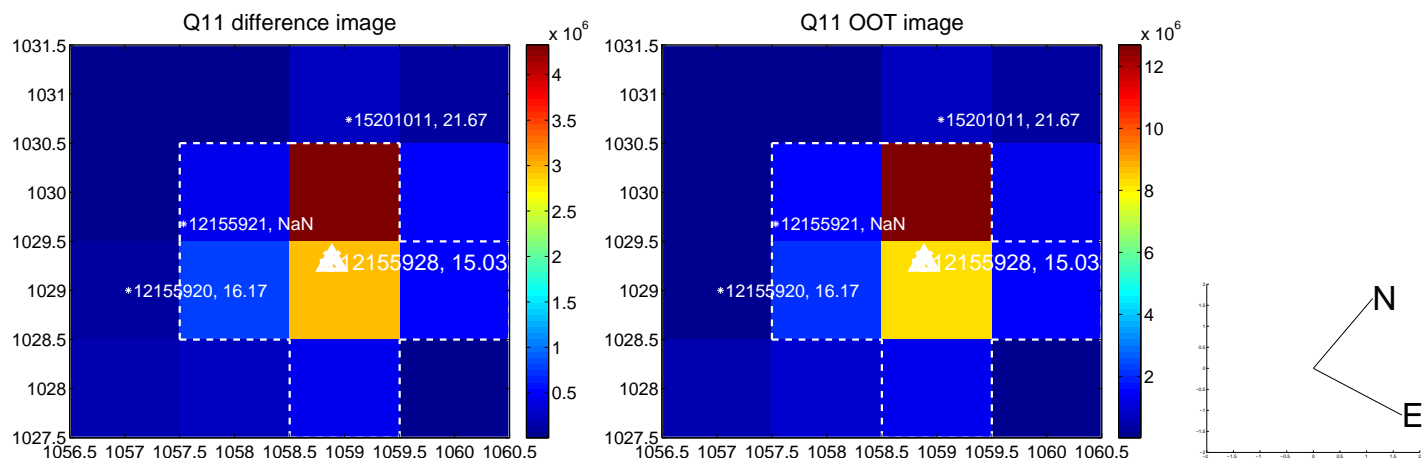
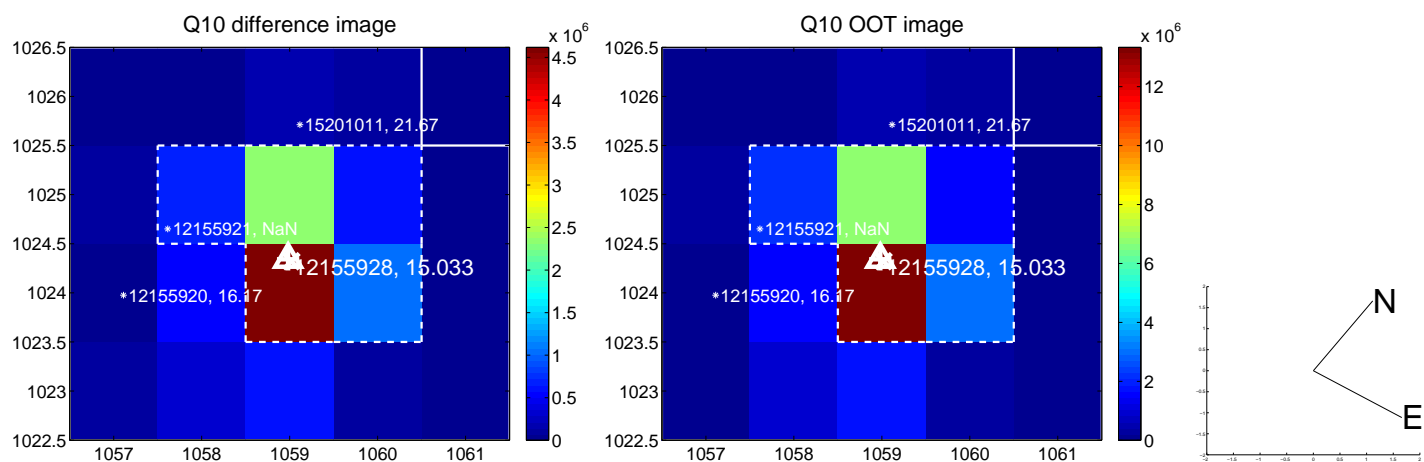
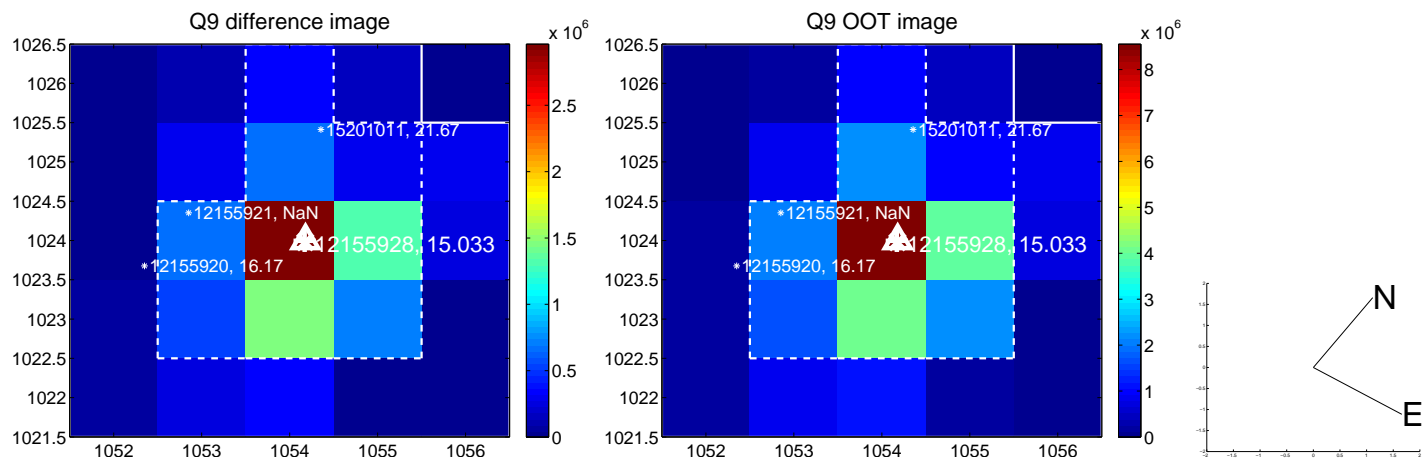
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



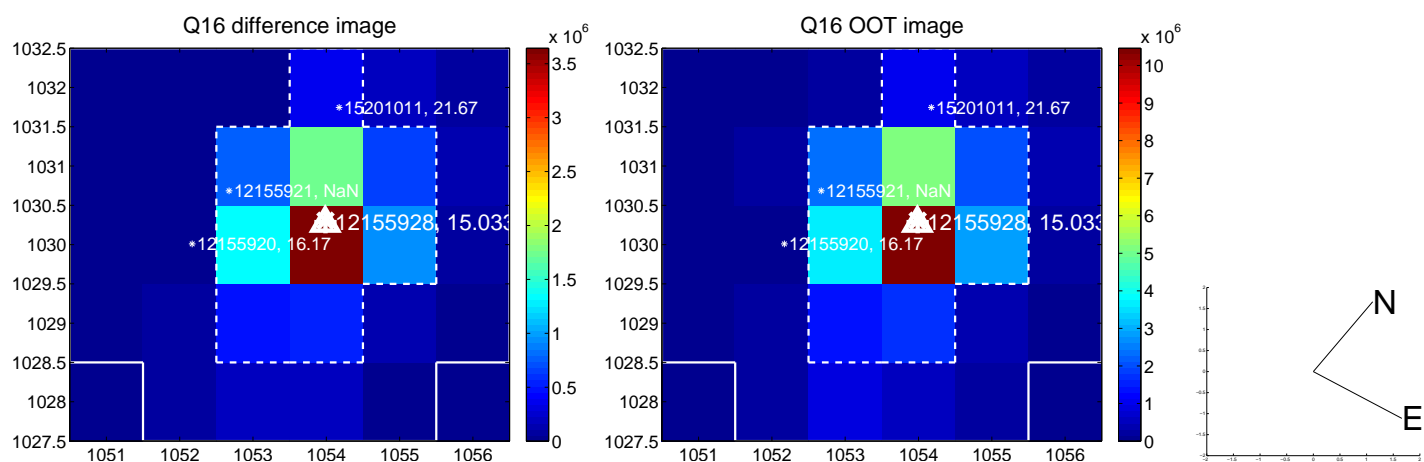
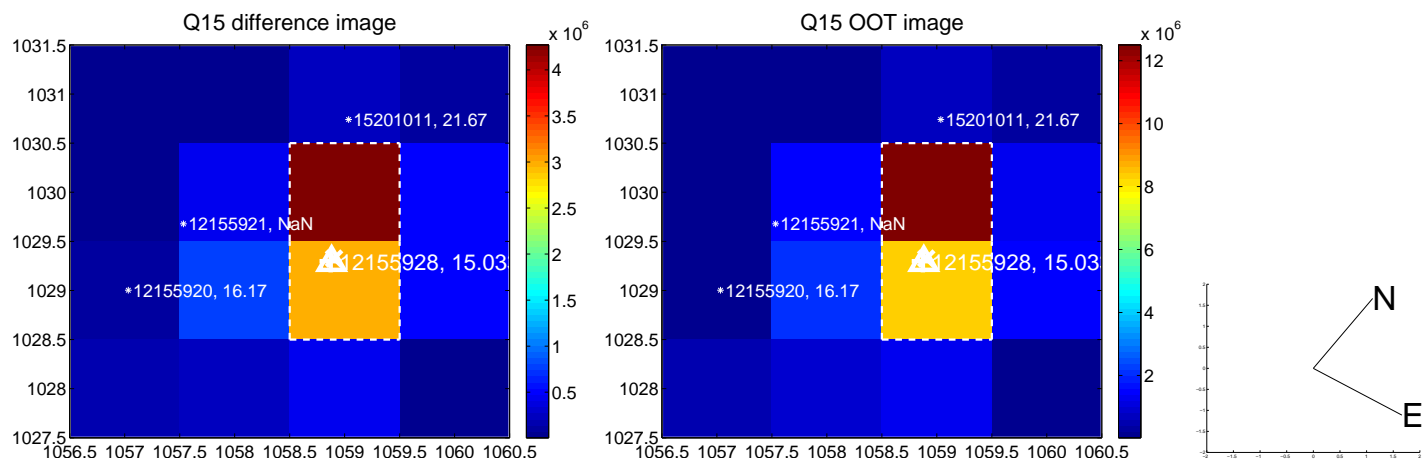
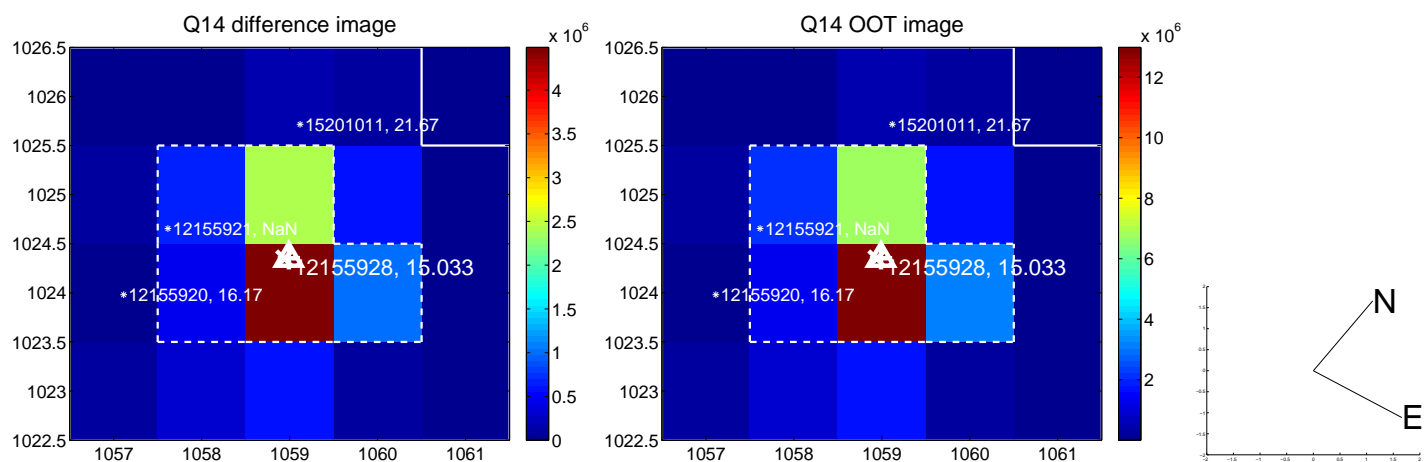
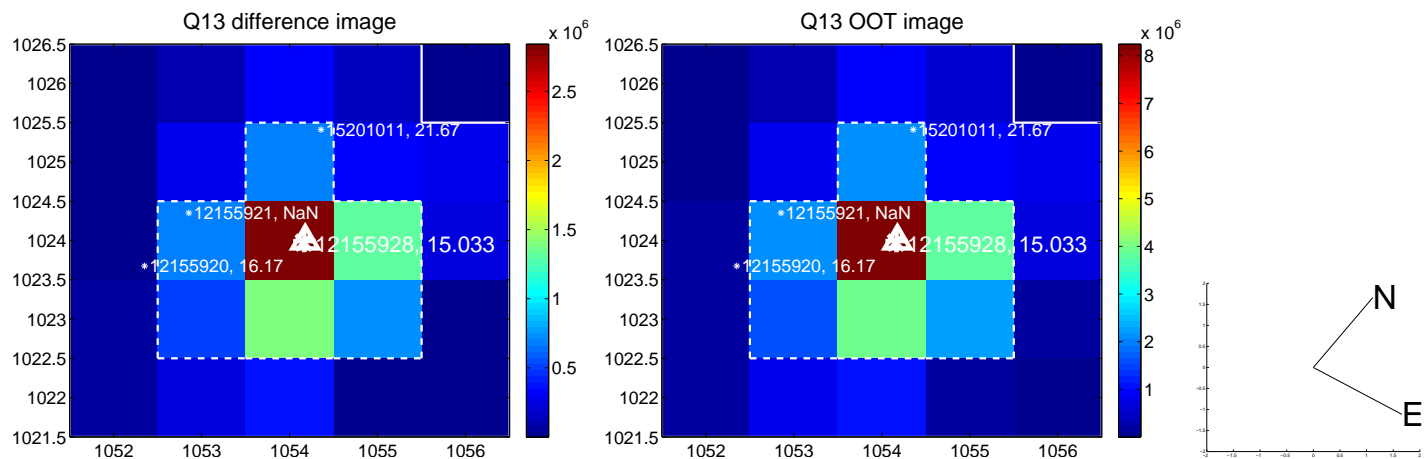
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



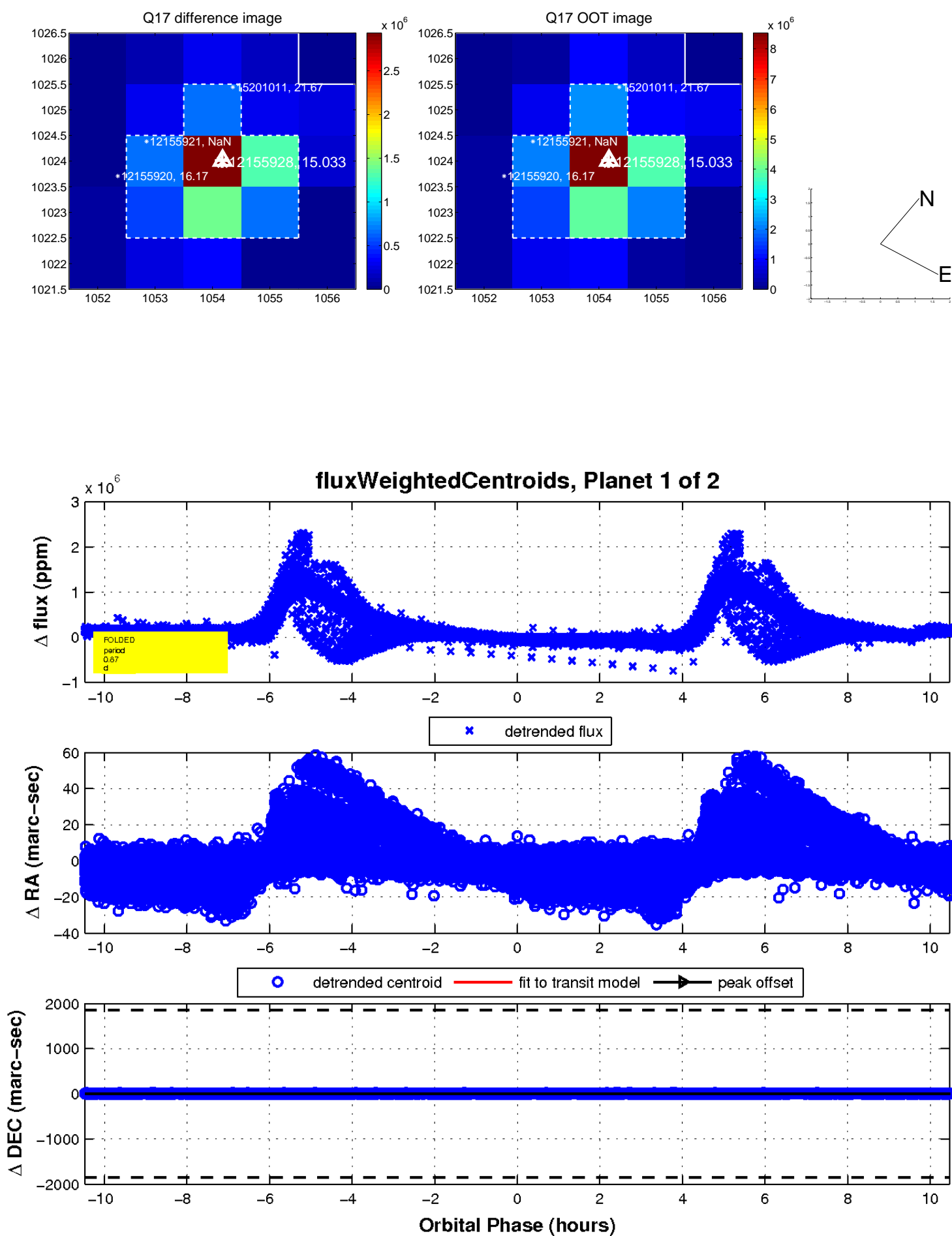
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

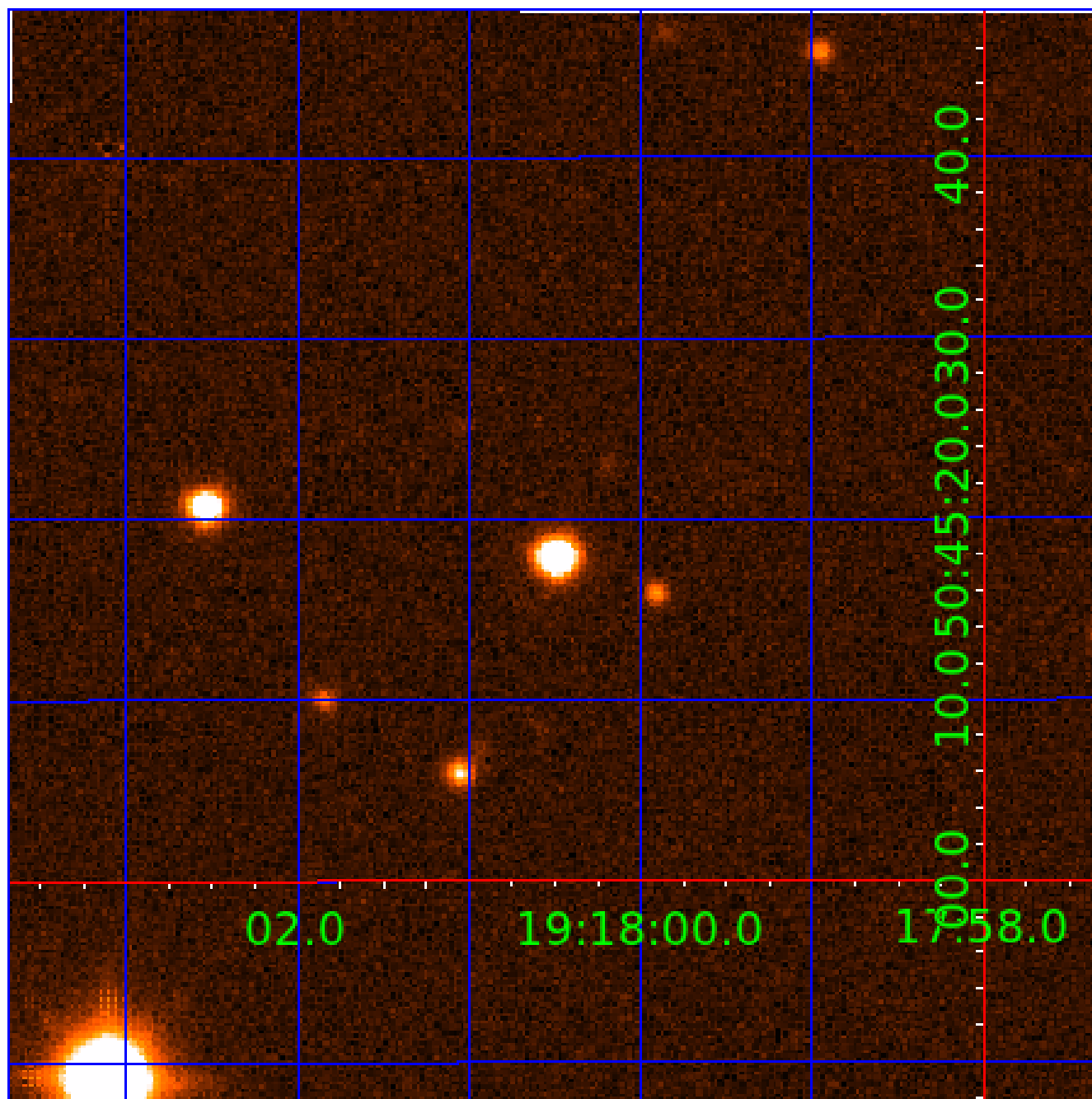


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 012155928

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-------|------|-----------------------------|-----------------|------------------------|------------------------|
| 012155928-01 | OBS | No | 0.872768 | 131.995369 | 4230.2 | 1.500 | 242.6 | -1.0 | 1.68 | 7078 | 11.11 | 16108.32 |
| 012155928-02 | OBS | No | 0.872772 | 131.516202 | 717.0 | 2.500 | 25.6 | -1.0 | 1.68 | 7078 | 4.56 | 16108.22 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 012155928-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | SWEET_NTL—LPP_DV—LPP_ALT—CENT_NOFITS |
| 012155928-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | SWEET_NTL—LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_NOFITS |

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.

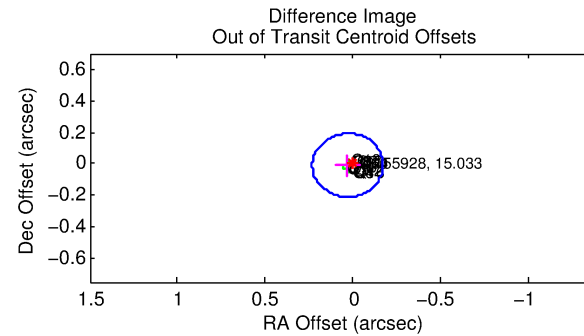
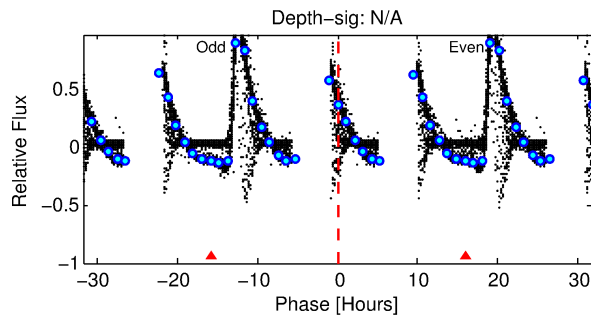
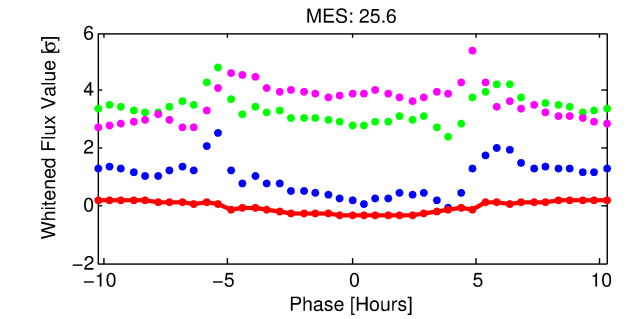
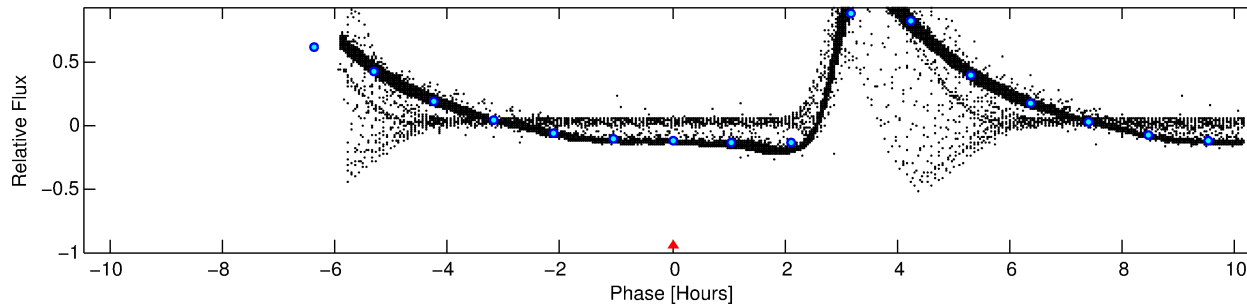
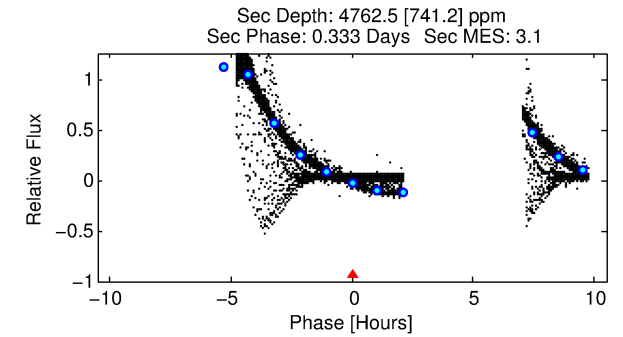
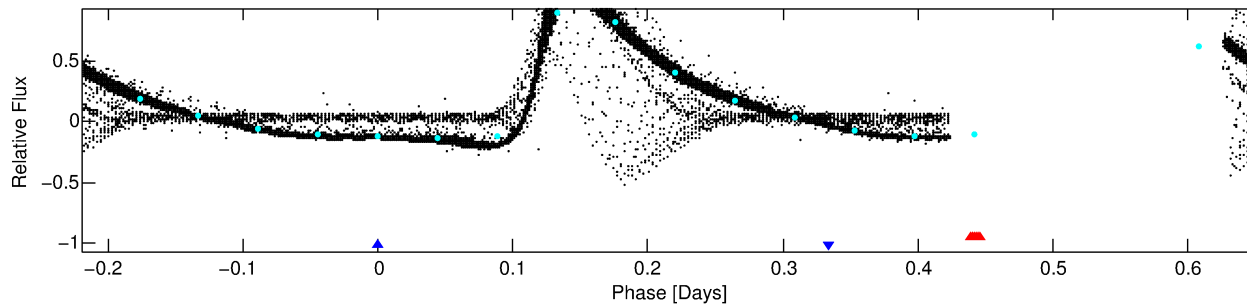
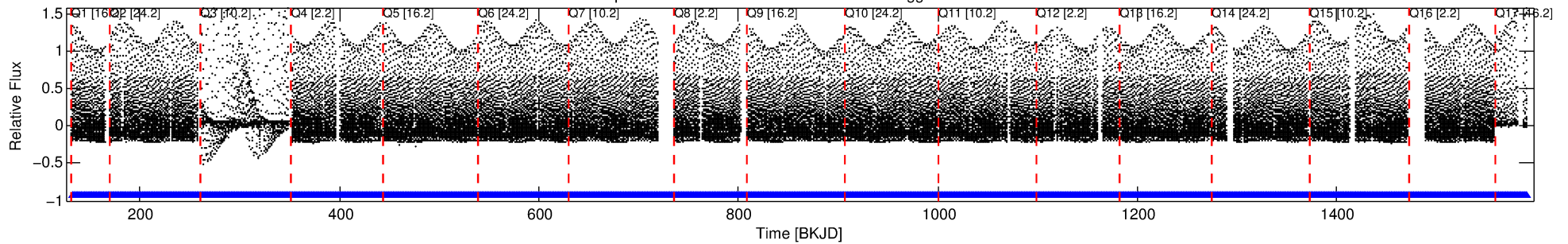
Ephemeris Match Information For 012155928-02

No Significant Match Found

DV One-Page Summary

KIC: 12155928 Candidate: 2 of 2 Period: 0.873 d

Kp: 15.03 R*: 1.68 Rs Teff: 7078.0 K Logg: 4.12 Fe/H: -0.280



TPS TCE Results:

Period = 0.87277 d
Epoch = 131.5162 BKJD

DV fit results are unavailable

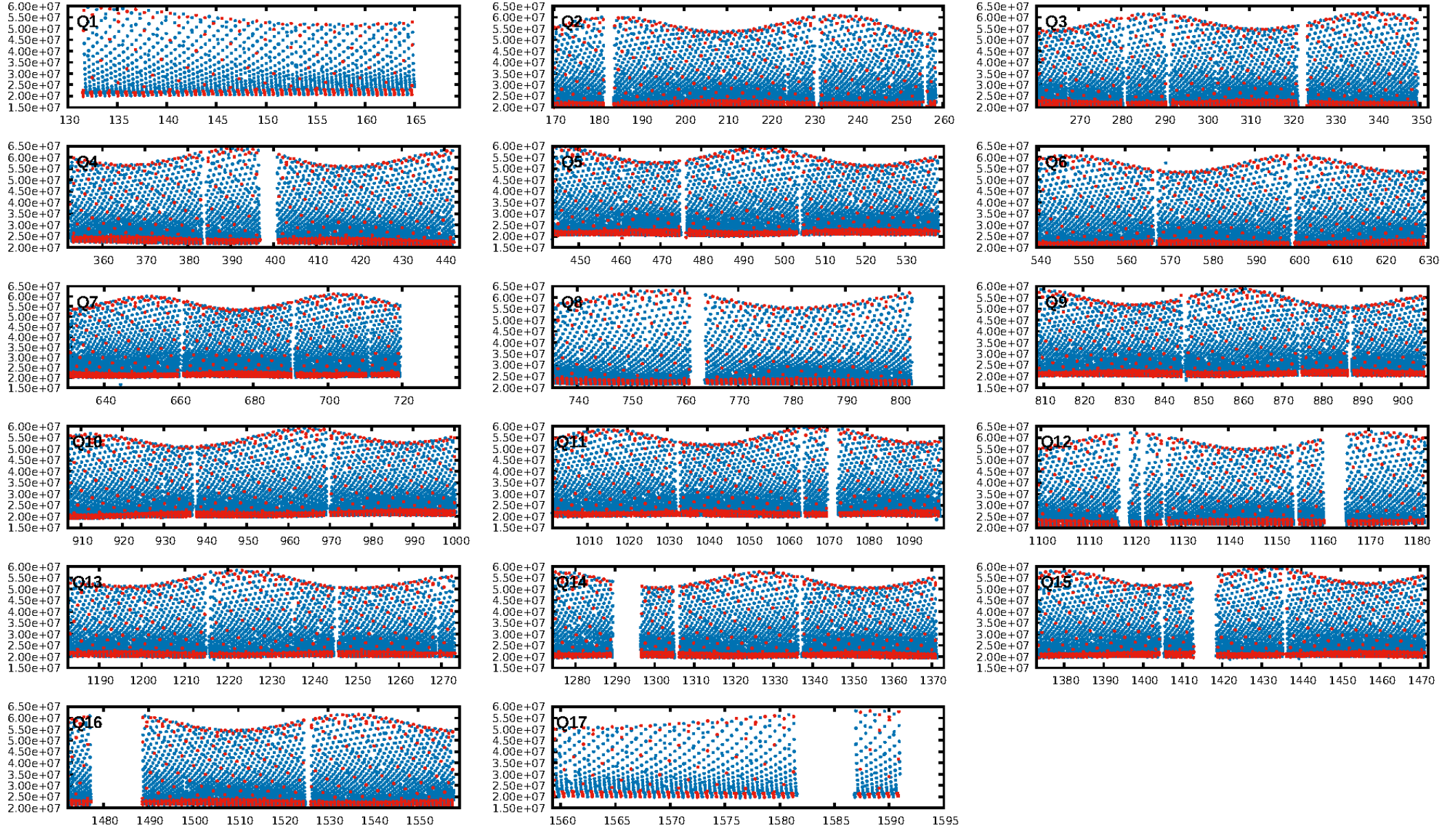
DV Diagnostic Results:

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 [1475/1475]
GhostDiagnostic-chr: 1.063
Centroid-sig: N/A
Centroid-so: 0.082 arcsec [121.67σ]
OotOffset-rm: 0.032 arcsec [0.47σ]
KicOffset-rm: 0.015 arcsec [0.20σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
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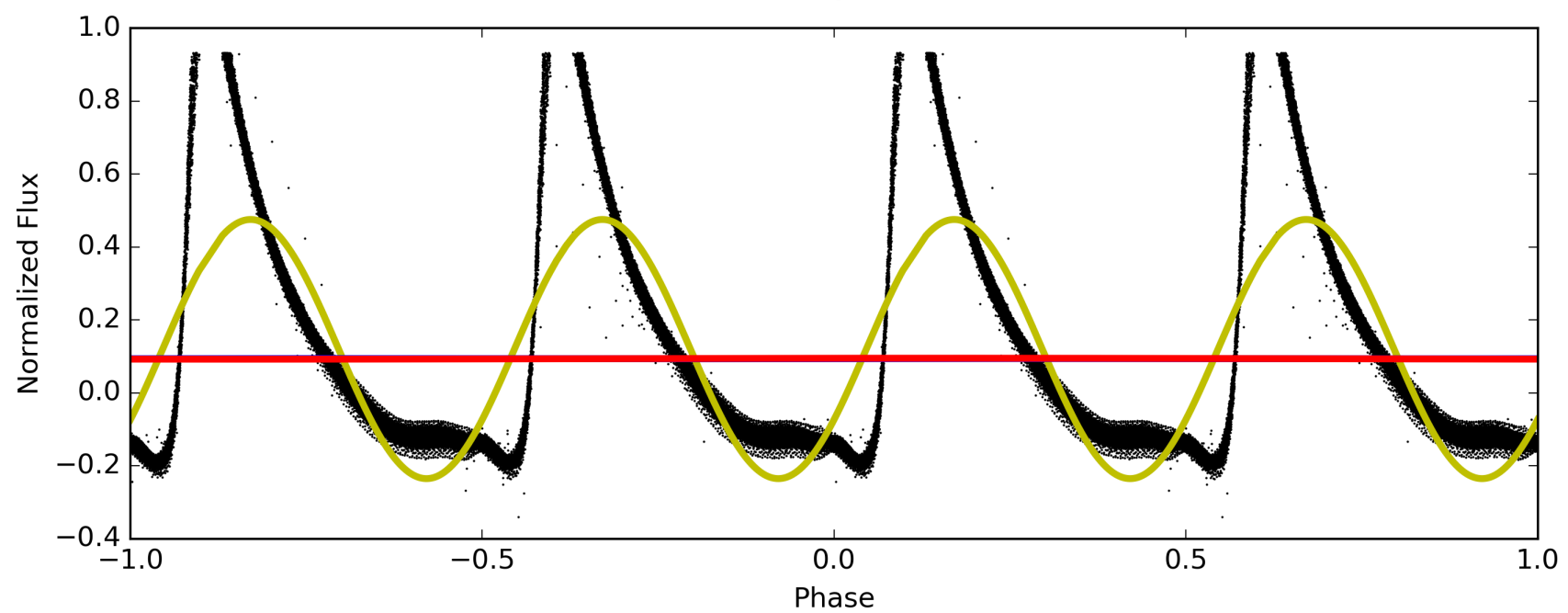
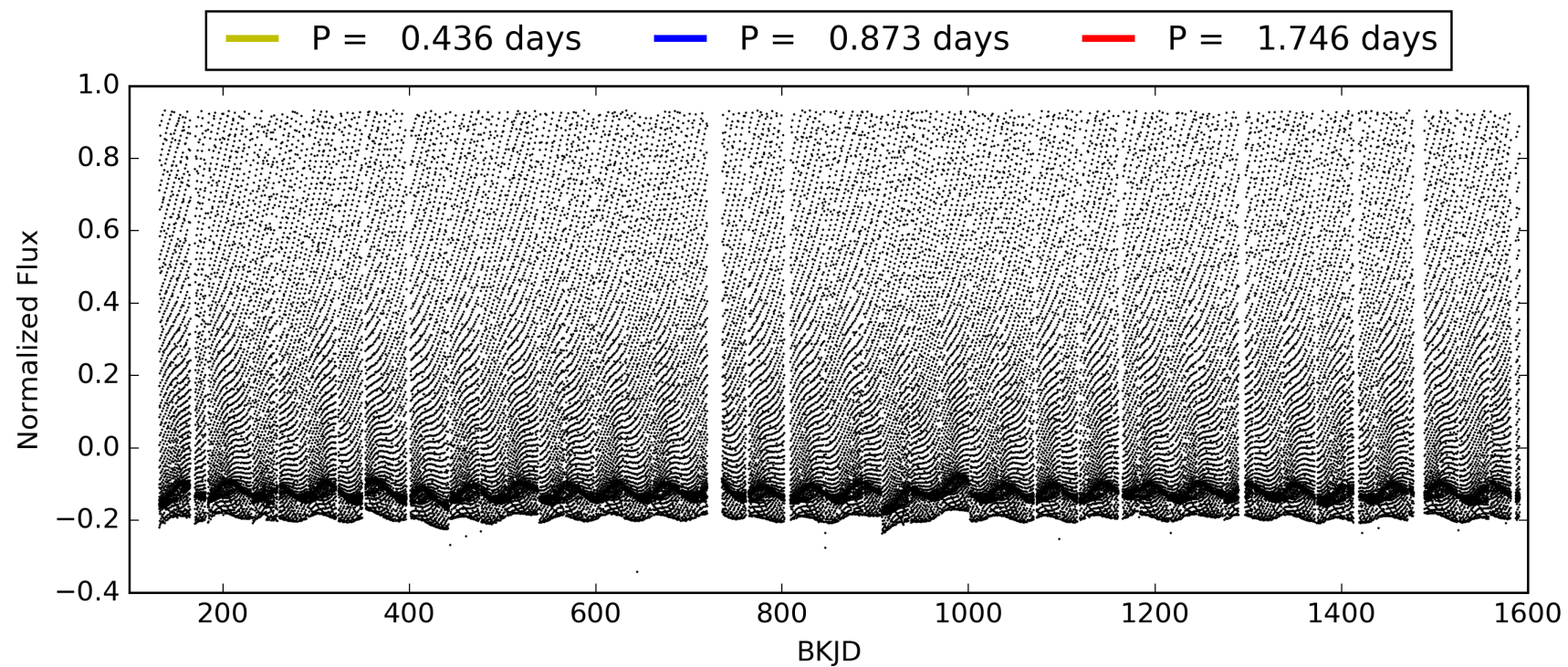
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 07:06:06 Z

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

TCE 012155928-02, PDC Light Curves

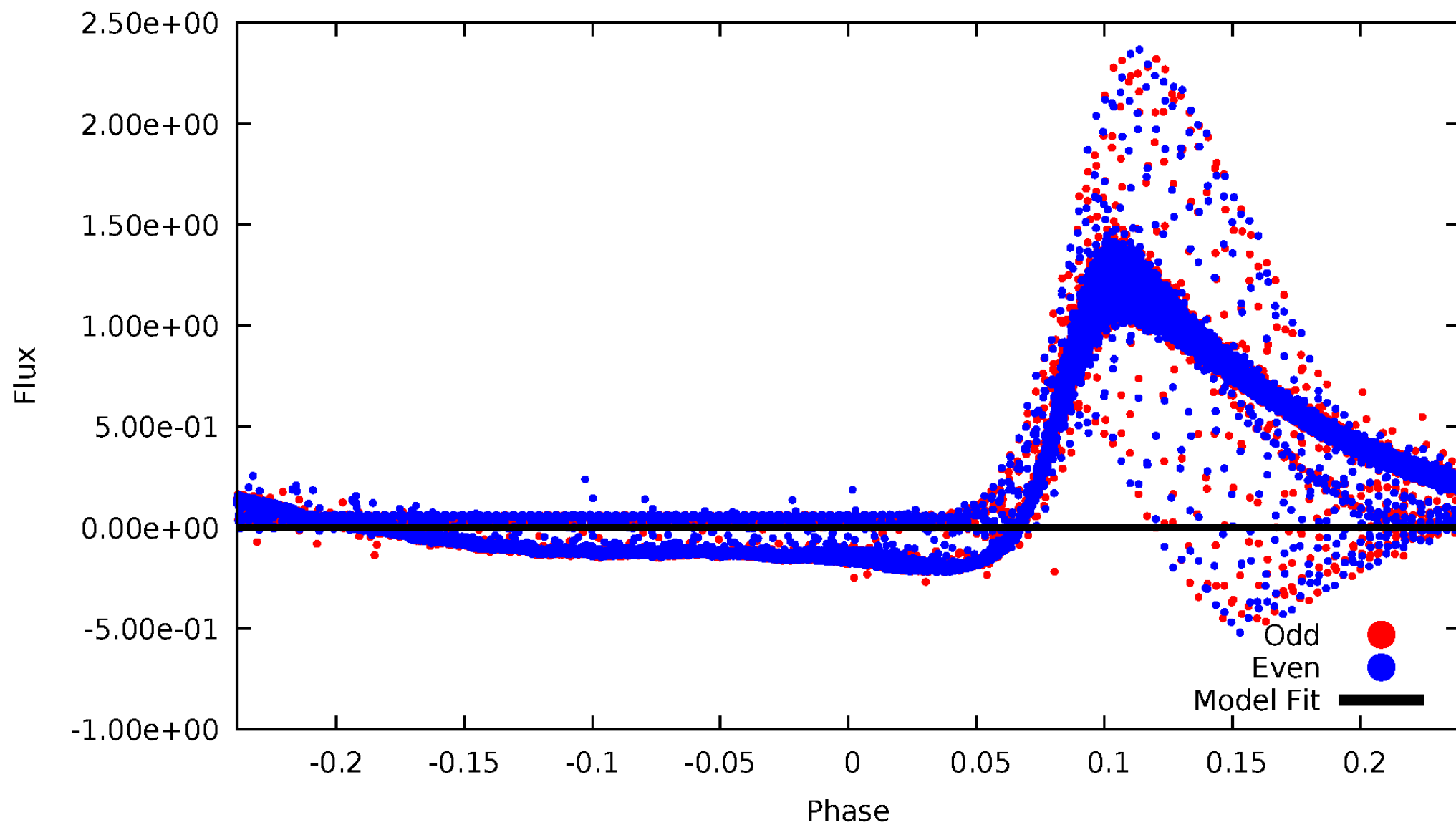


TCE 012155928-02



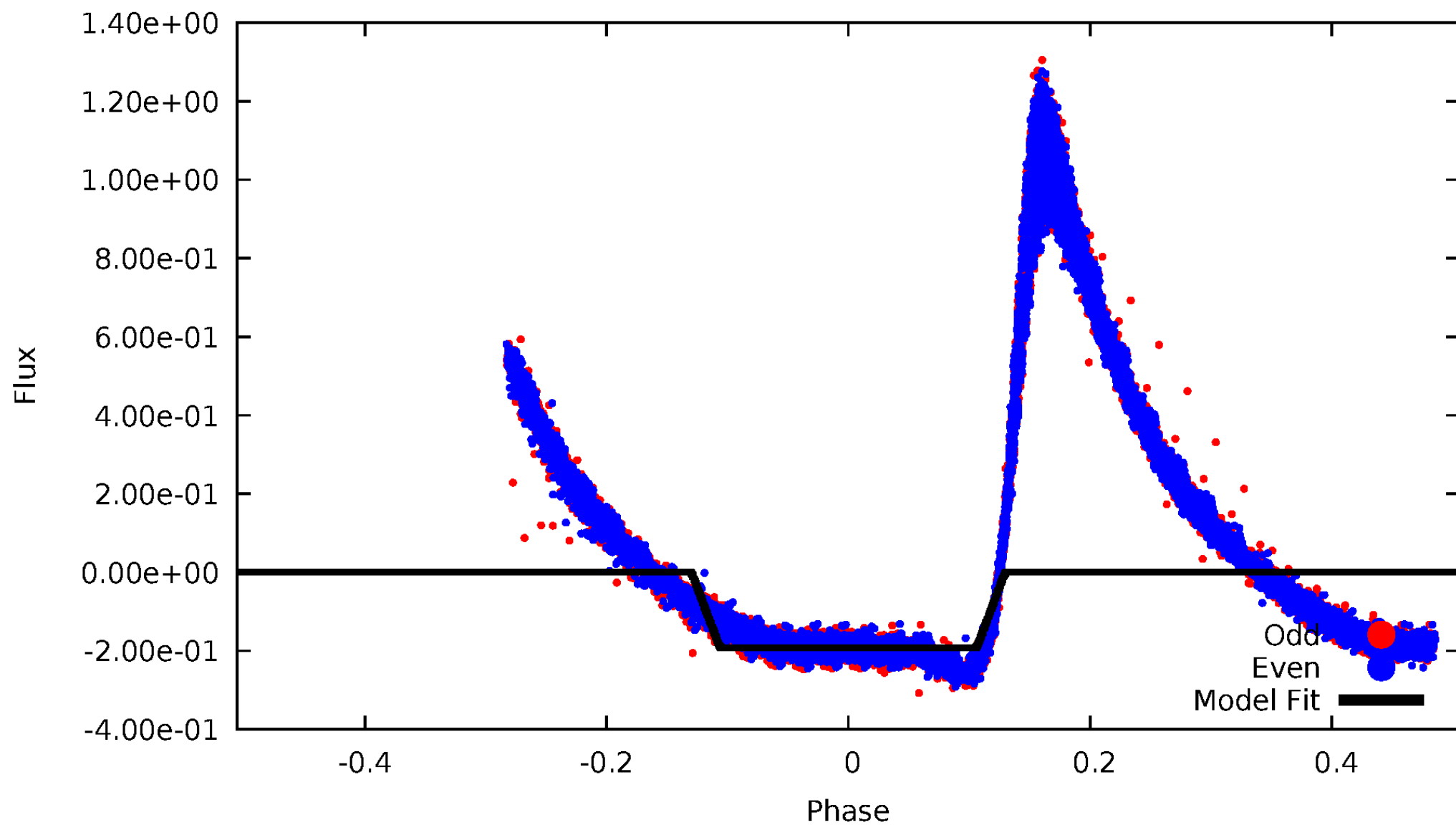
DV Odd/Even

TCE 012155928-02



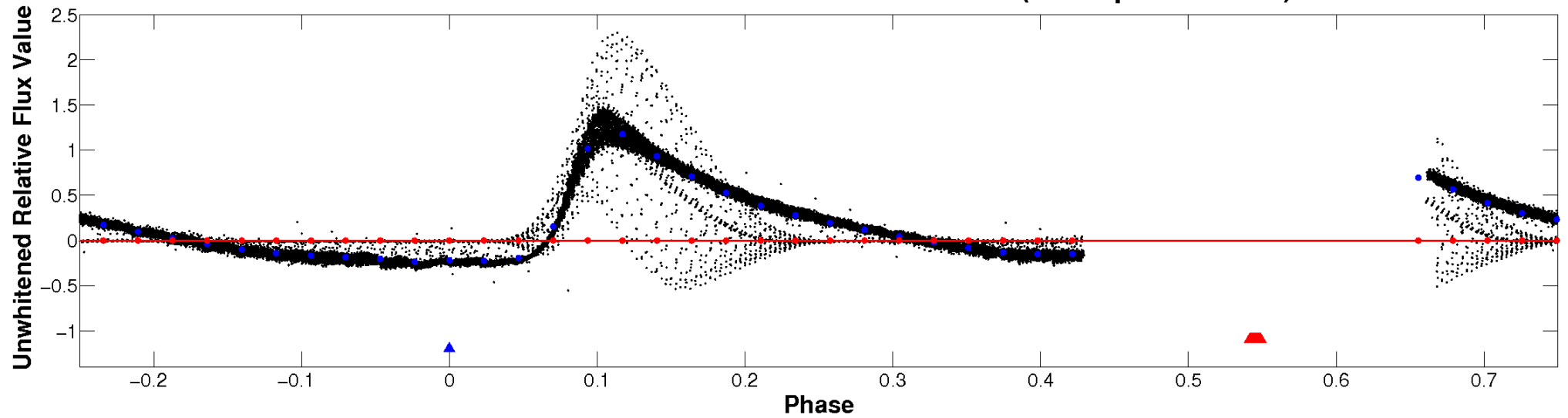
ALT Odd/Even

TCE 012155928-02

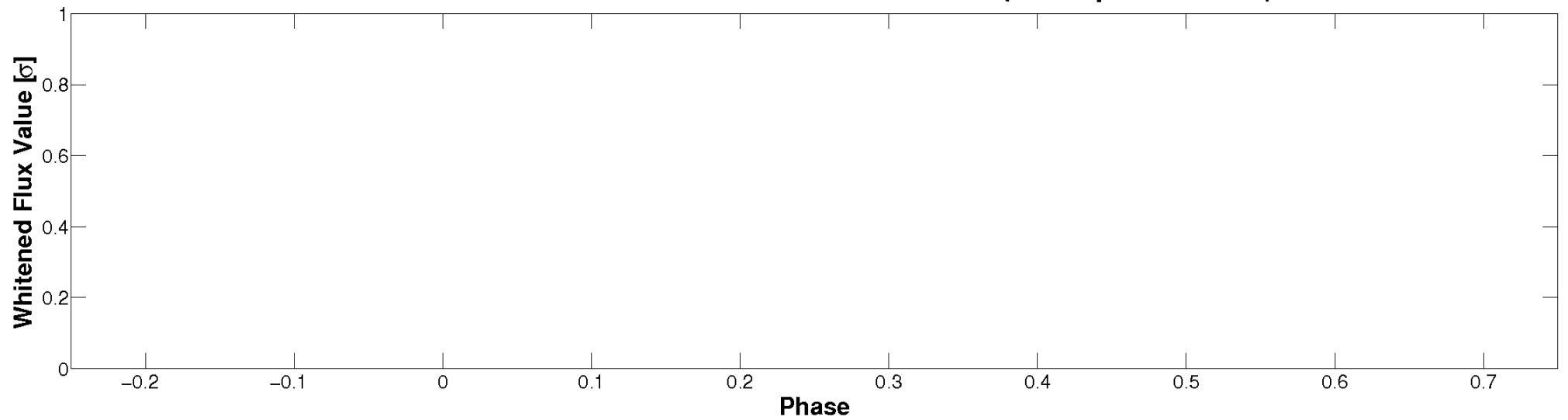


Non-Whitened Vs. Whitened Light Curve

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

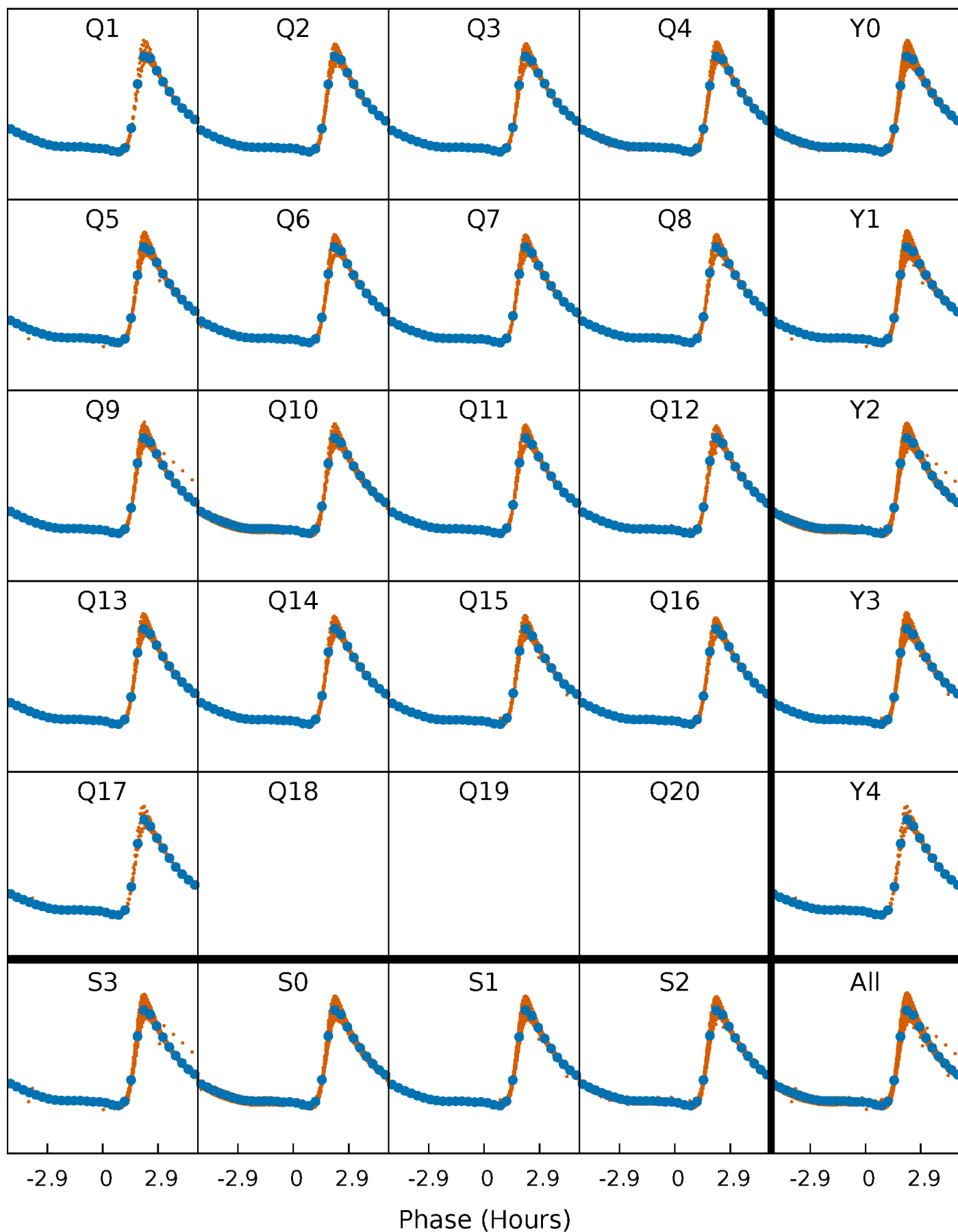


Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)



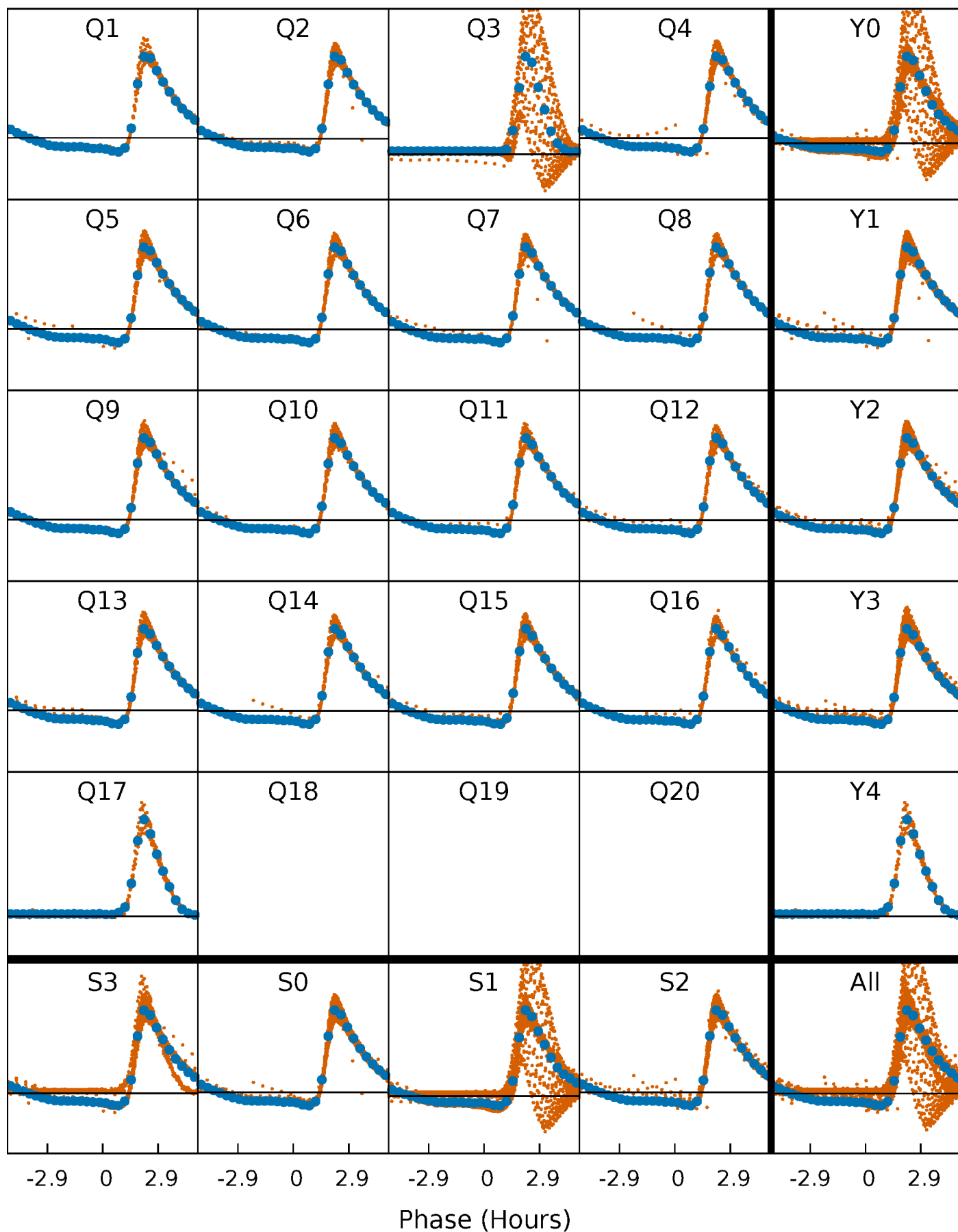
PDC Quarter-Phased Transit Curves

TCE 012155928-02 P= 0.872772 Days $T_0=131.516202$ (BKJD)



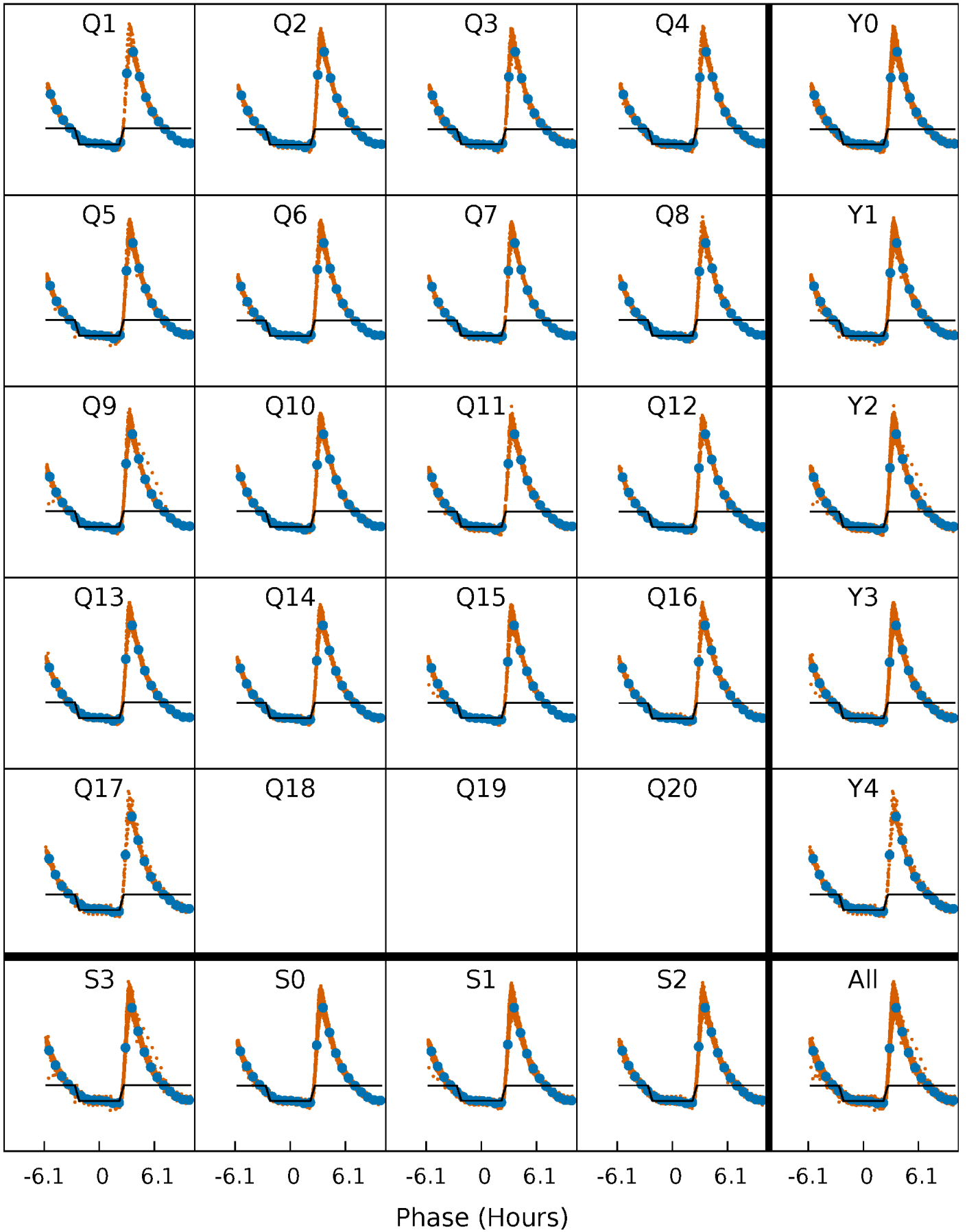
DV Quarter-Phased Transit Curves

TCE 012155928-02 P= 0.872772 Days $T_0=131.516202$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

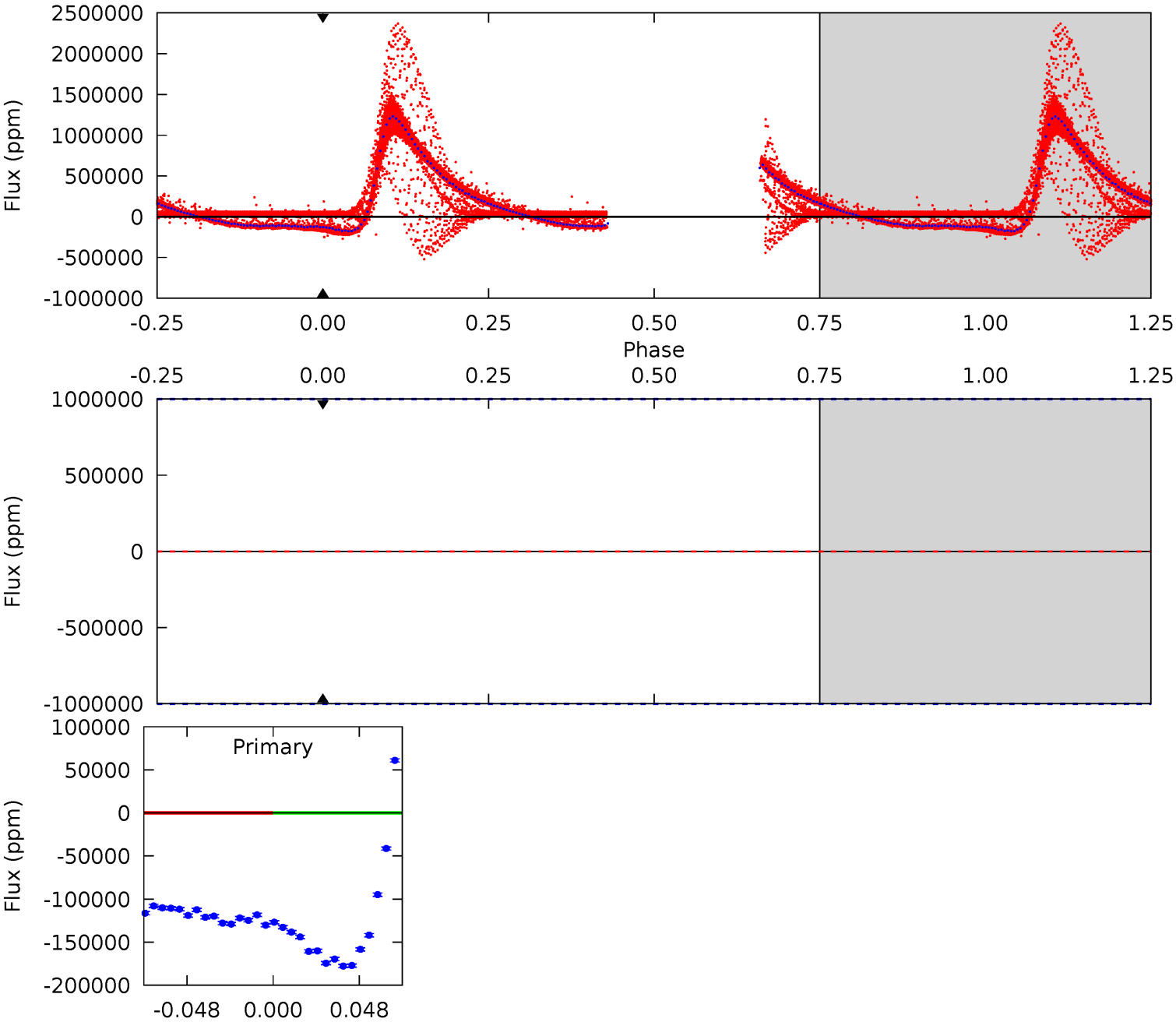
TCE 012155928-02 $P = 0.872772$ Days $T_0 = 132.339860$ (BKJD)



DV Model-Shift Uniqueness Test

012155928-02, P = 0.872772 Days, E = 130.643430 Days

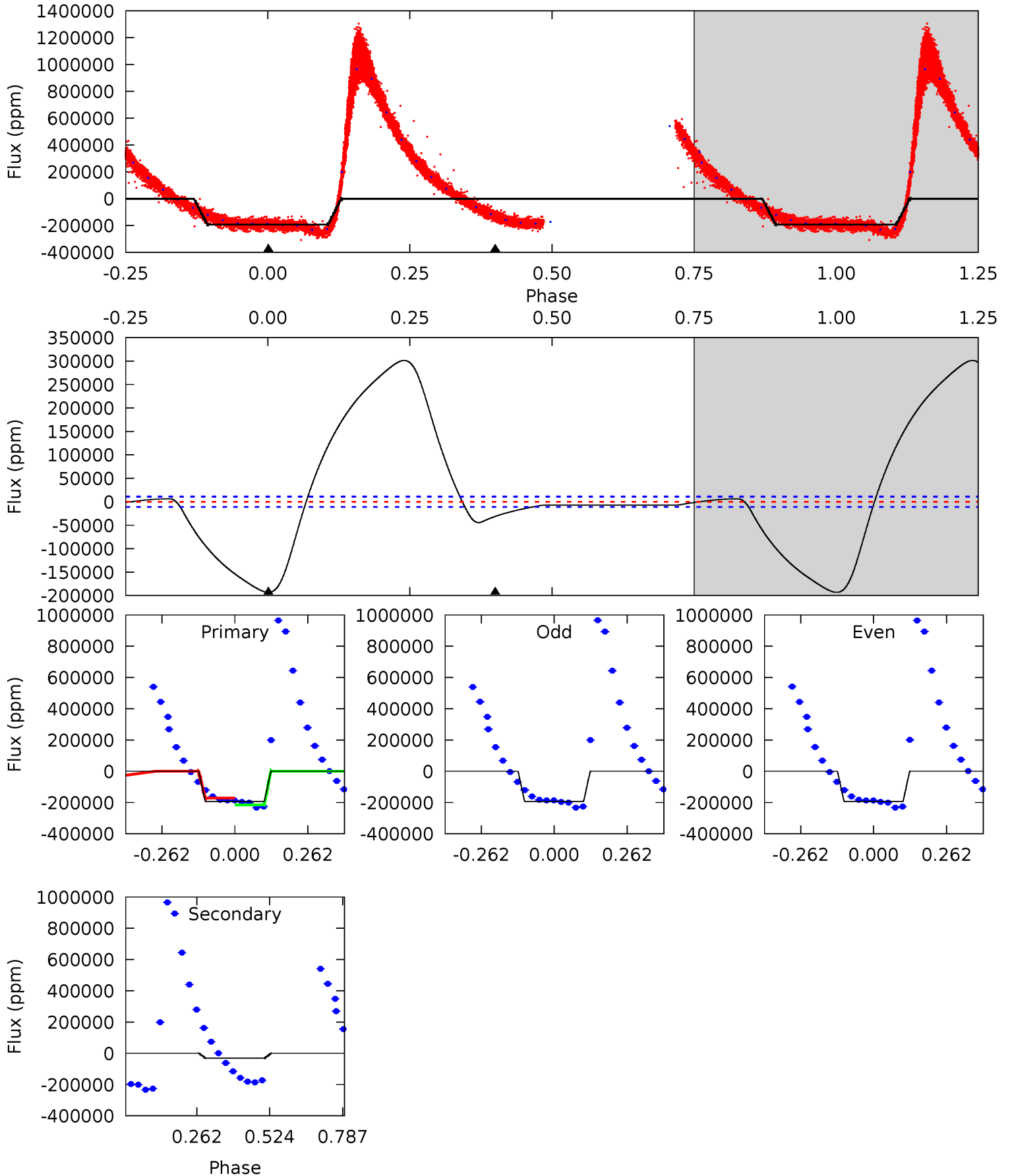
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|-----|-----|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|-----|-------|-----|
| 0 | 0 | 0 | 0 | 1.00 | 1.00 | 1.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |



Alt Model-Shift Uniqueness Test

012155928-02, P = 0.872772 Days, E = 131.467088 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 76.6 | 12.4 | 0 | 0 | 4.36 | 1.12 | 1.43 | 76.6 | 76.6 | 12.4 | 12.4 | 0.02 | 1.00 | 0.61 | 6.03 |



Stellar Parameters For KIC 012155928

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 7078^{+199}_{-274} | $4.124^{+0.180}_{-0.180}$ | $-0.280^{+0.250}_{-0.350}$ | $1.681^{+0.502}_{-0.457}$ | $1.374^{+0.214}_{-0.235}$ | $0.408^{+0.407}_{-0.206}$ |
| | +3%/-4% | +4%/-4% | +89%/-125% | +30%/-27% | +16%/-17% | +100%/-51% |
| 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 012155928-02 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{max} (K)$ | $T_{obs} (K)$ | A_{obs} |
|---------|-------------------|---------------------------|----------------------|--------------------------|-------------------------------|
| DV | 0 ± 1000000 | $14.50^{+15.91}_{-9.57}$ | 4027^{+322}_{-309} | 6180^{+33673}_{-30829} | $3.637^{+240.171}_{-135.008}$ |
| Alt. | -31259 ± 2522 | $80.99^{+24.38}_{-20.69}$ | 4011^{+304}_{-269} | 4340^{+601}_{-552} | $1.055^{+0.850}_{-0.434}$ |

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 $A_{obs} \gg 1.0$

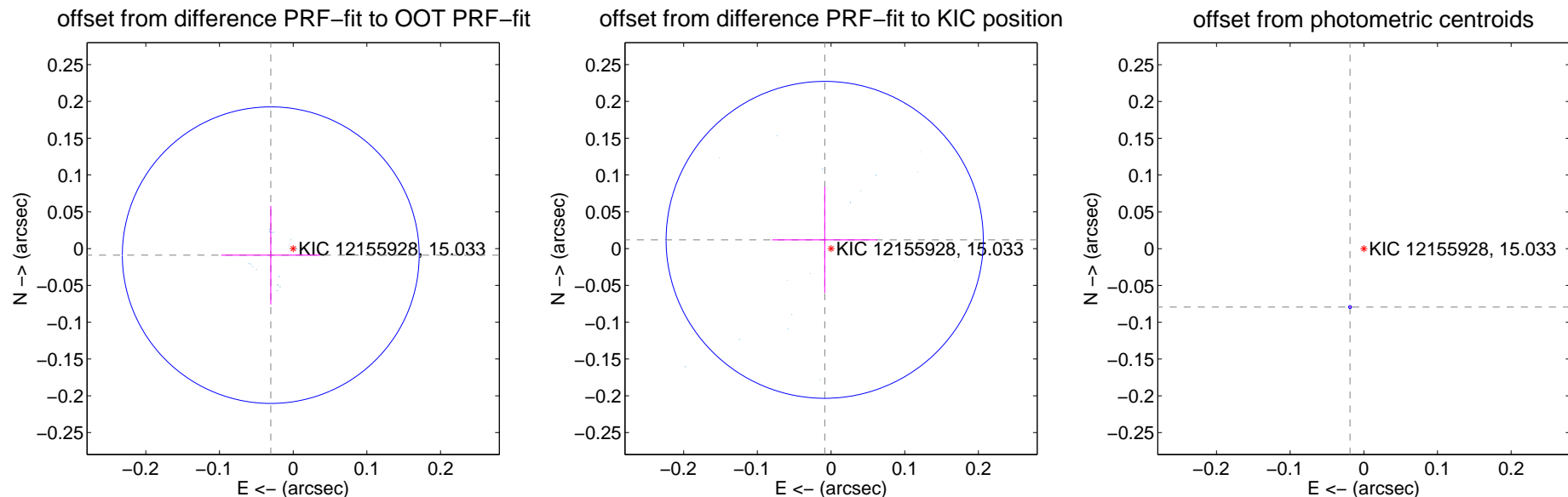
DV Centroid Data

Supplemental centroid analysis for 012155928-02. Kepler magnitude: 15.03. Transit SNR -1.00

There are 17 quarters with good PRF difference image offsets

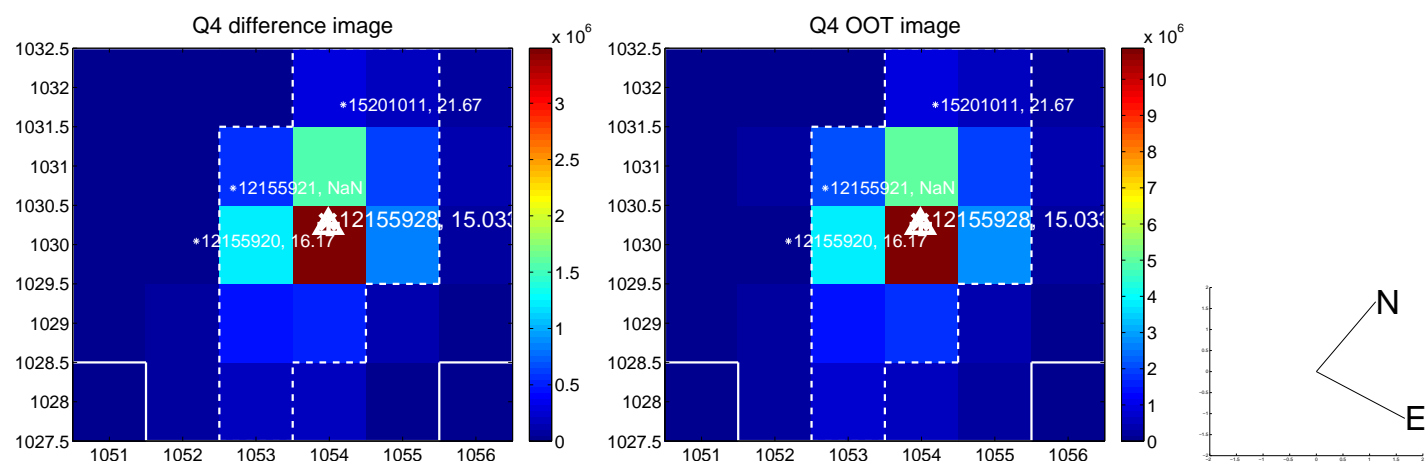
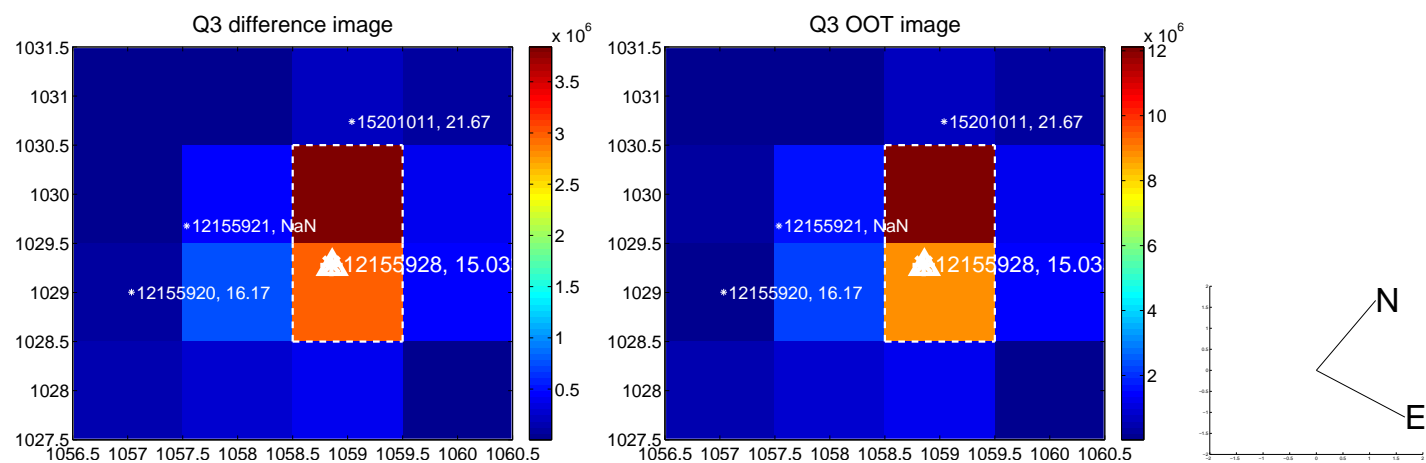
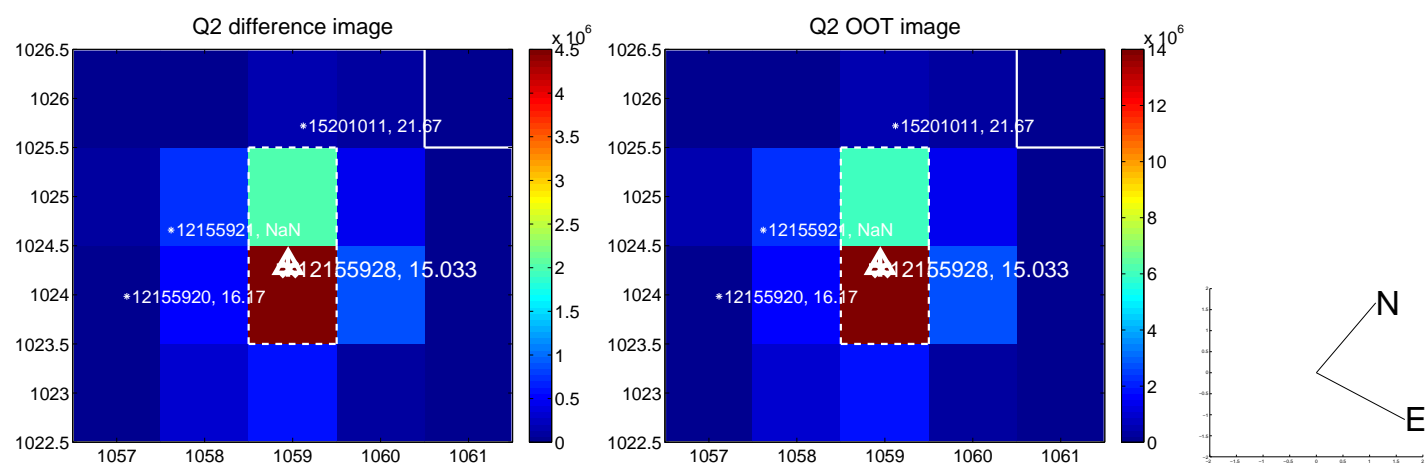
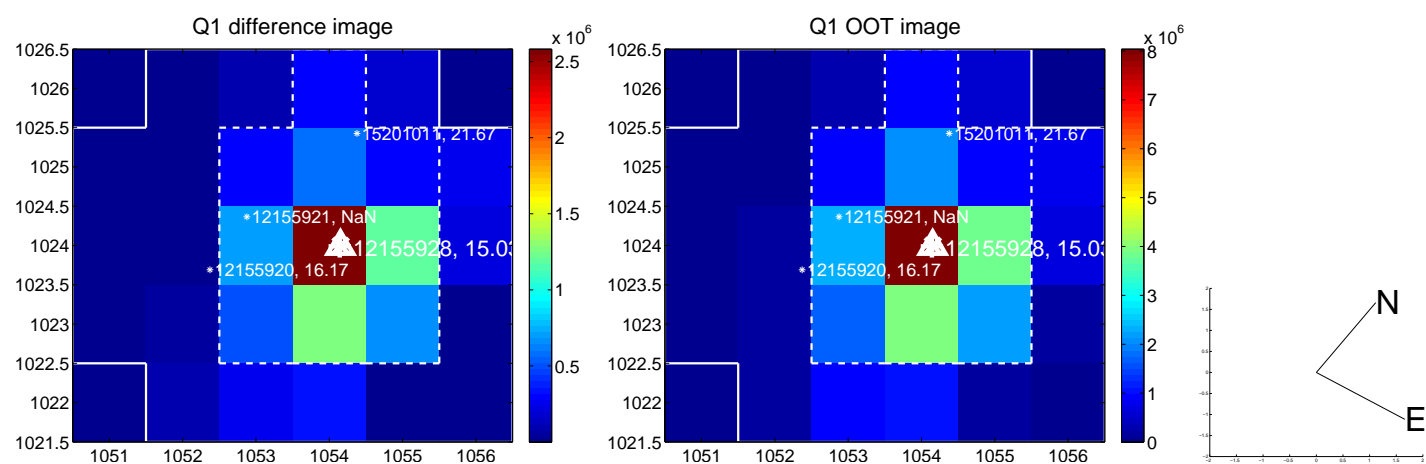
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT | 0.032 ± 0.067 | 0.47 | 0.030 ± 0.067 | -0.009 ± 0.067 |
| PRF-fit source offset from KIC position | 0.015 ± 0.072 | 0.20 | 0.009 ± 0.071 | 0.012 ± 0.072 |
| photometric centroid source offset | 0.08 ± 0.00 | 121.67 | 0.02 ± 0.00 | -0.08 ± 0.00 |

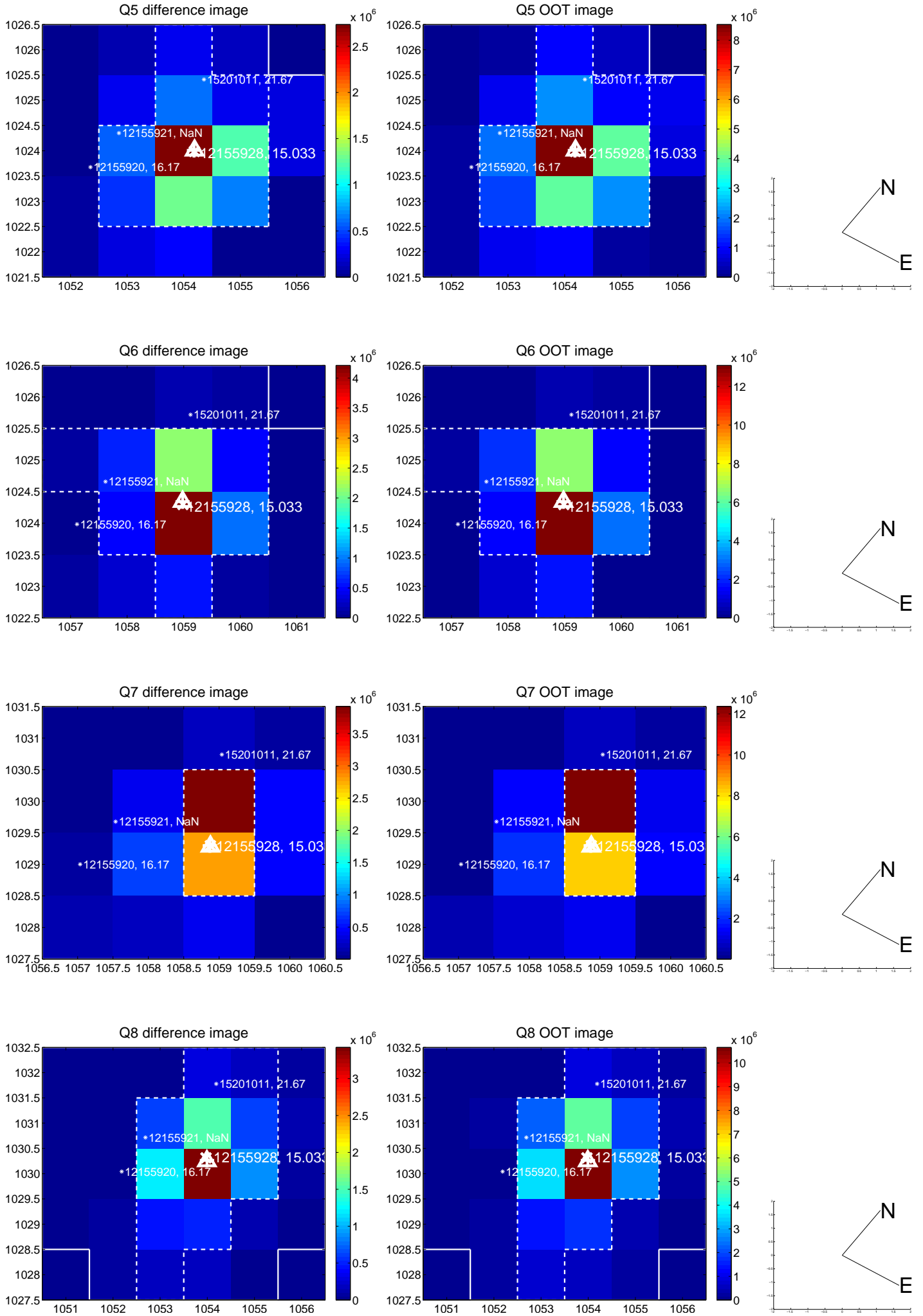


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

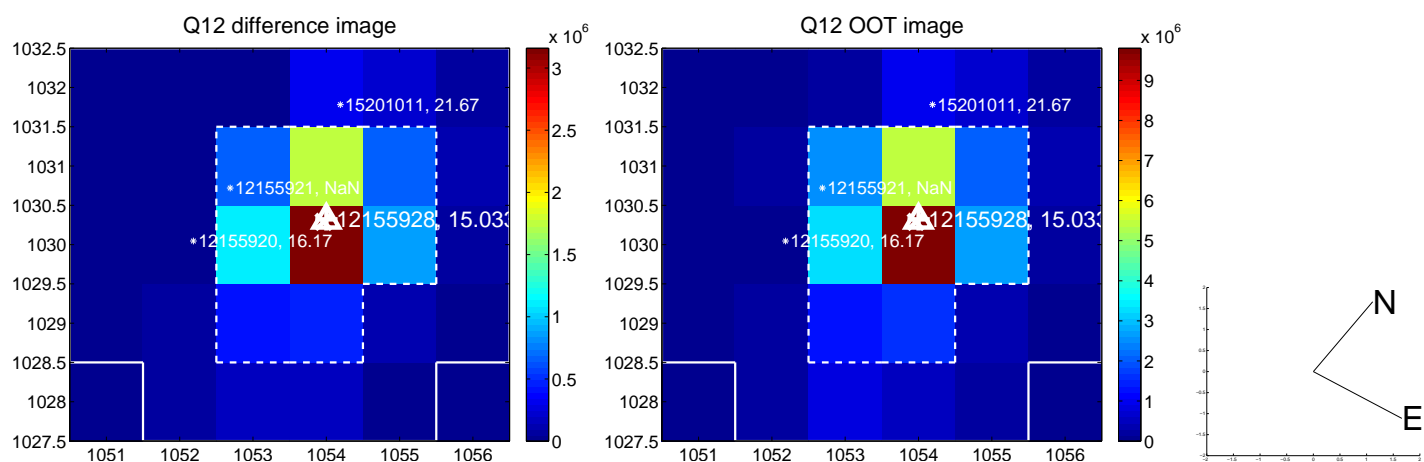
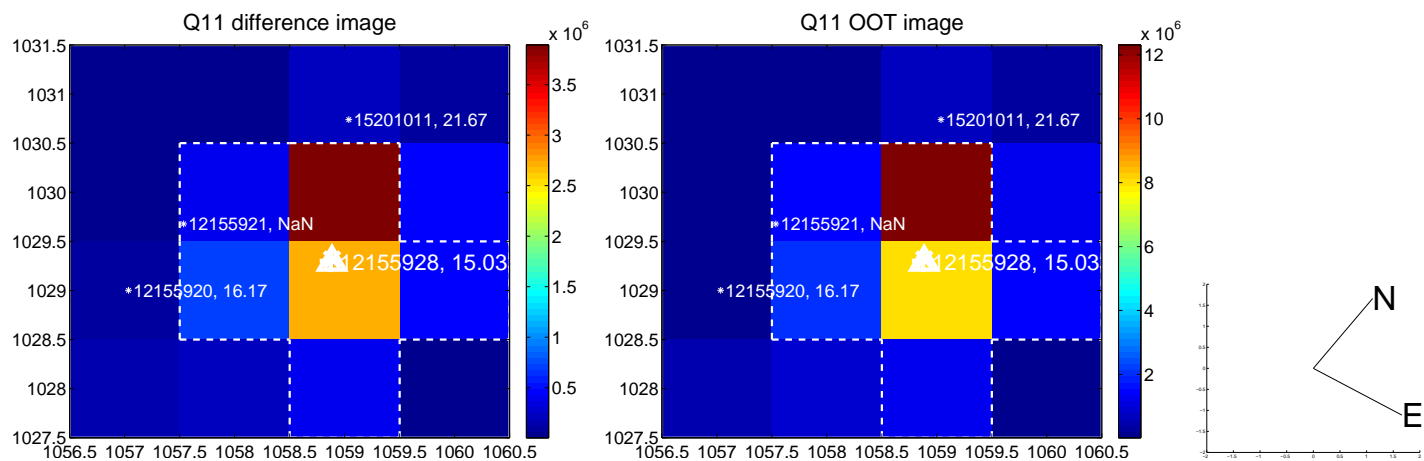
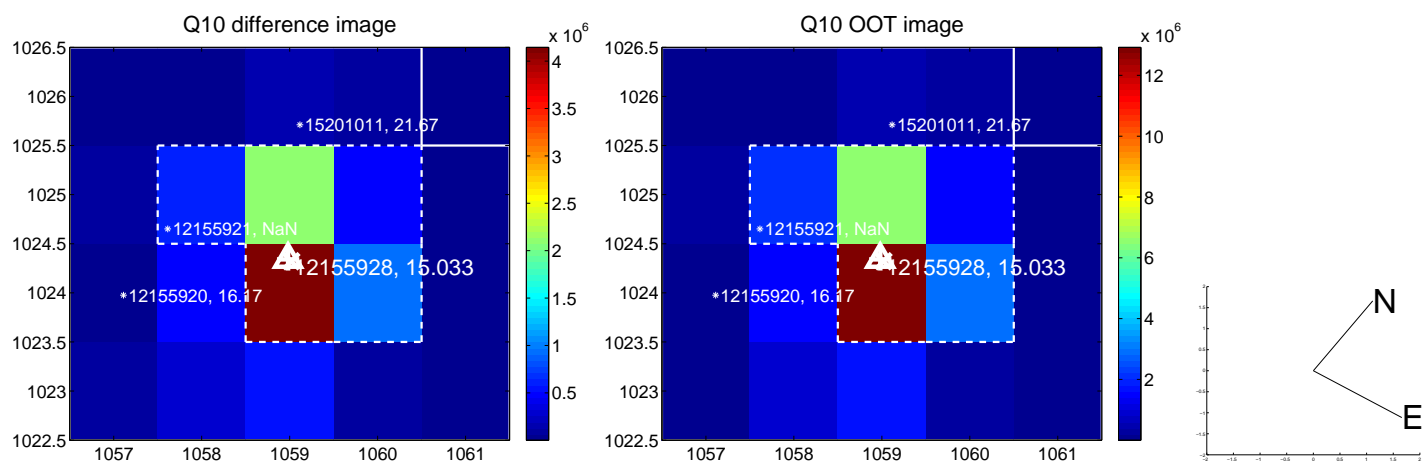
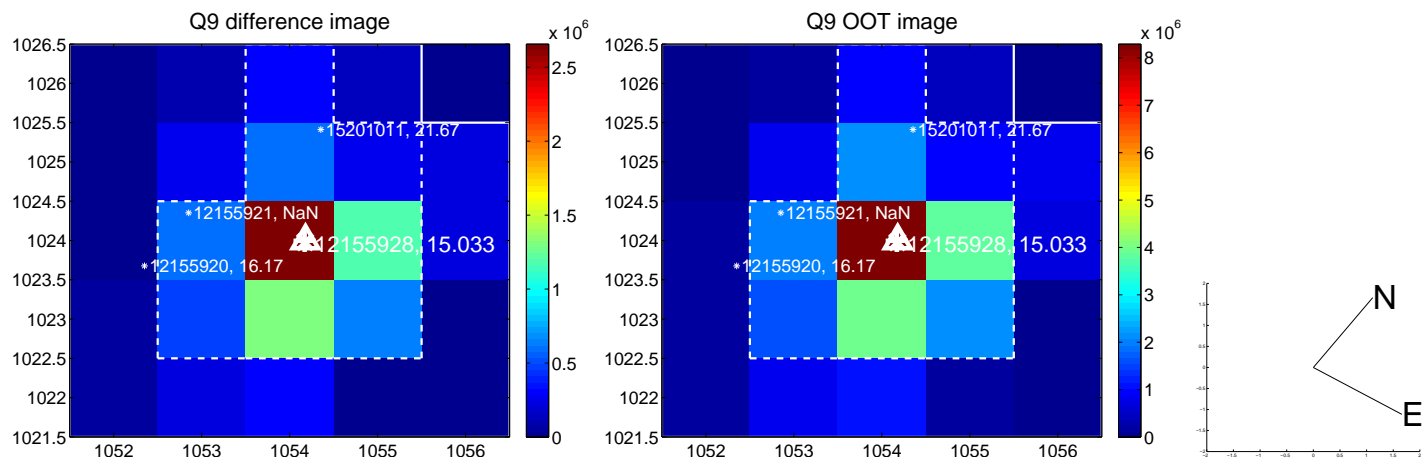
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



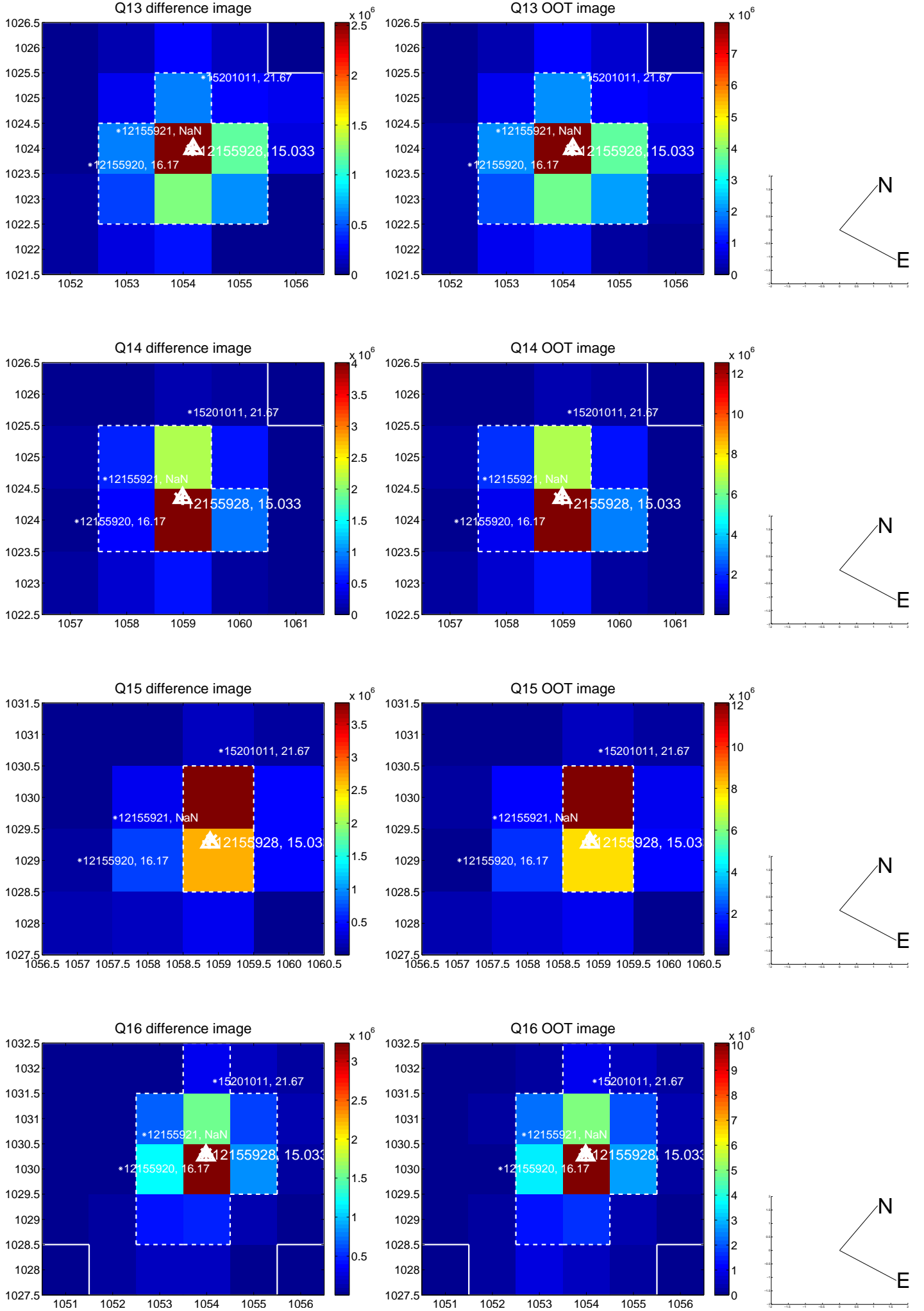
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



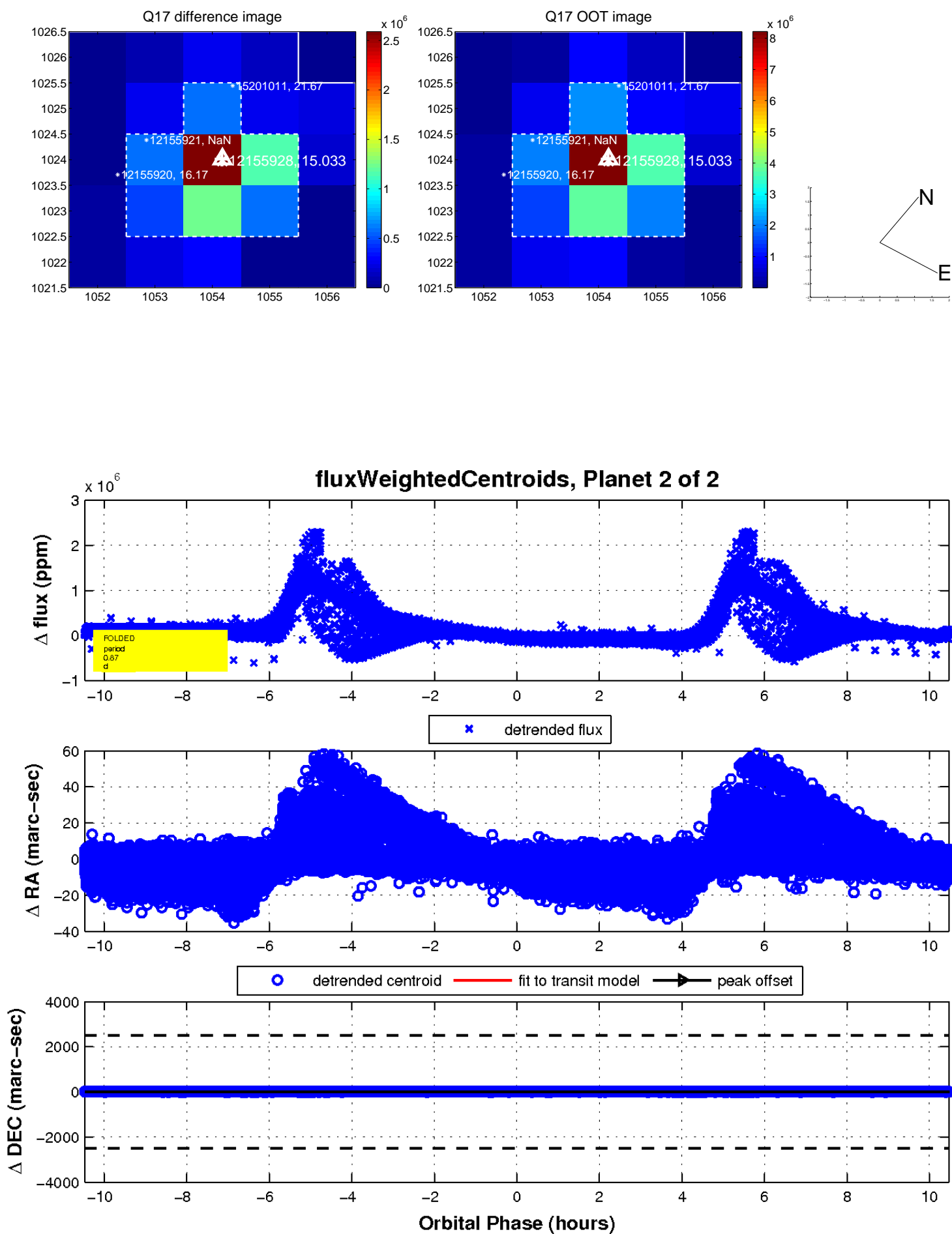
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image

Declination

