

KIC 010616829

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|--------|--------|-----------------------------|-----------------|------------------------|------------------------|
| 010616829-01 | OBS | 8028.01 | 1.072938 | 132.291174 | 95187.7 | 3.896 | 4700.7 | 2870.3 | 1.52 | 7031 | 70.19 | 9593.93 |
| 010616829-02 | OBS | No | 1.072934 | 131.763277 | 63597.1 | 2.000 | 1926.2 | -1.0 | 1.52 | 7031 | 39.05 | 9593.98 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|---|
| 010616829-01 | OBS | FP | 0.00 | 0 | 1 | 0 | 0 | SWEET_EB—MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE |
| 010616829-02 | OBS | FP | 0.00 | 1 | 1 | 0 | 0 | IS_SEC_TCE—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.

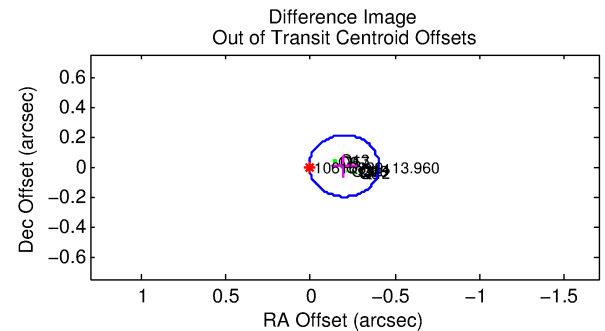
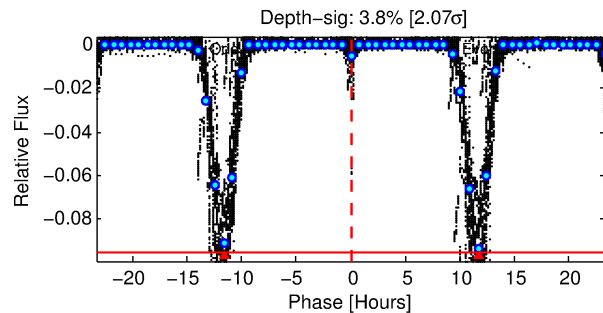
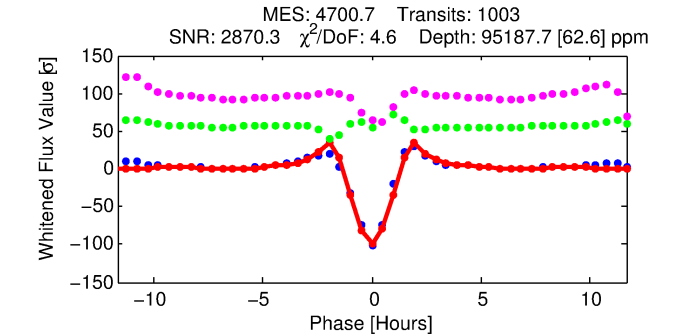
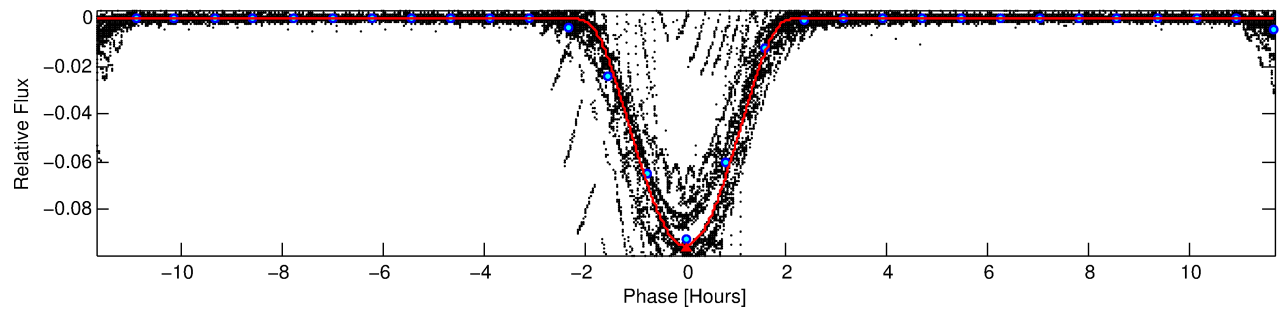
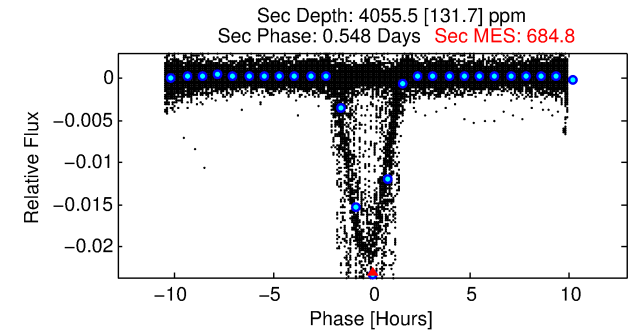
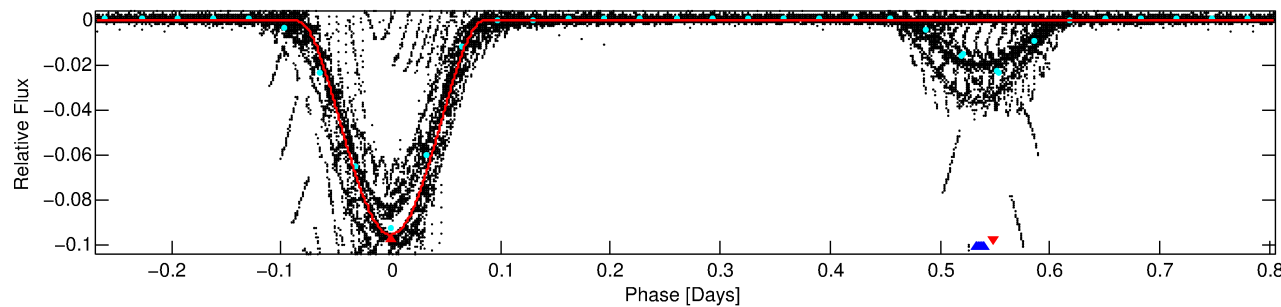
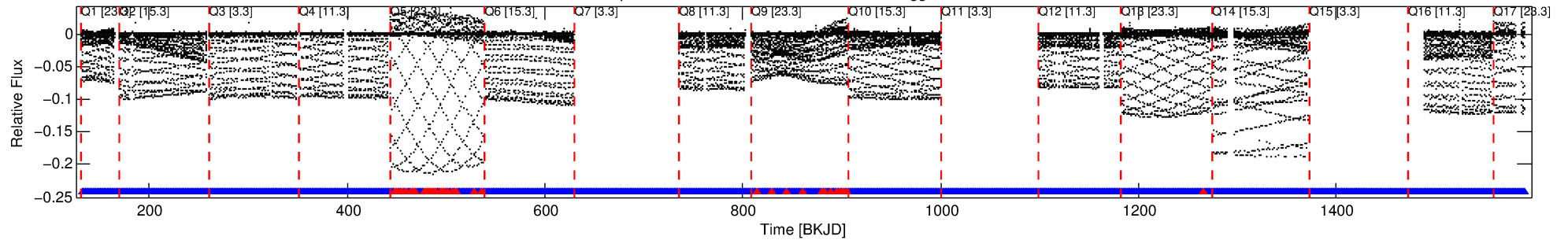
Ephemeris Match Information For 010616829-01

No Significant Match Found

DV One-Page Summary

KIC: 10616829 Candidate: 1 of 2 Period: 1.073 d

Kp: 13.96 R*: 1.52 Rs Teff: 7031.0 K Logg: 4.22 Fe/H: -0.060



DV Fit Results:

Period = 1.07294 [0.00000] d
Epoch = 132.2912 [0.0000] BKJD
Rp/R* = 0.4223 [0.0102]
a/R* = 2.54 [0.01]
b = 0.92 [0.01]
Seff = 9593.93 [4224.67]
Teff = 2524 [278] K
Rp = 70.19 [24.30] Re
a = 0.0230 [0.0065] AU
Ag = 0.24 [0.10] [-7.92σ]
Teffp = 2730 [137] K [0.67σ]

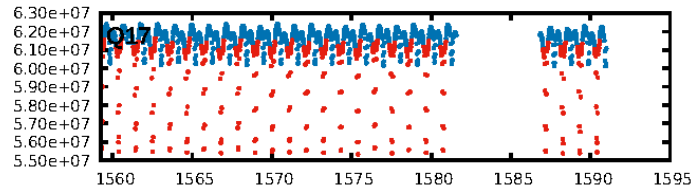
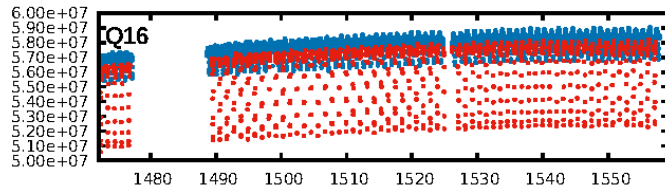
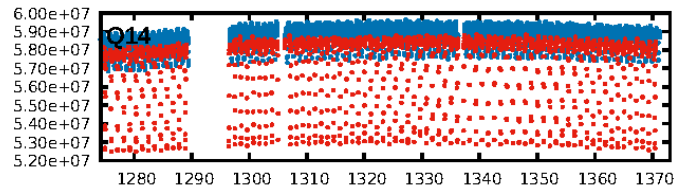
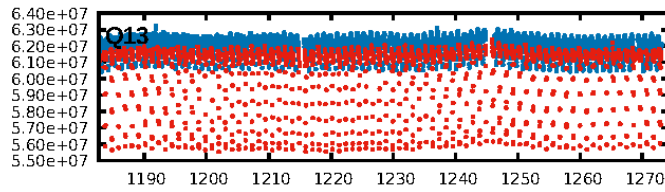
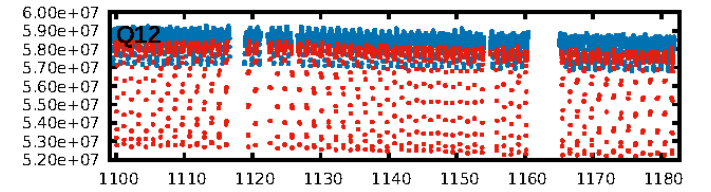
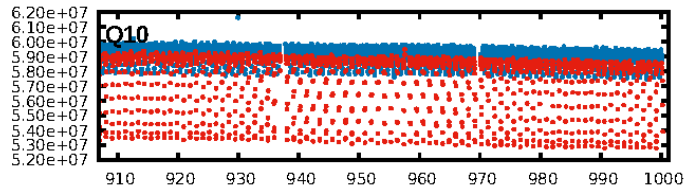
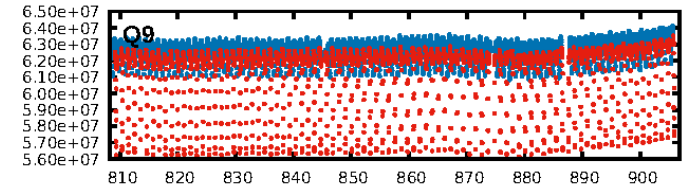
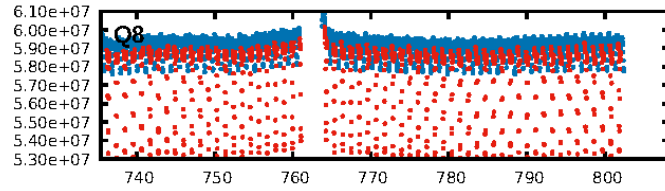
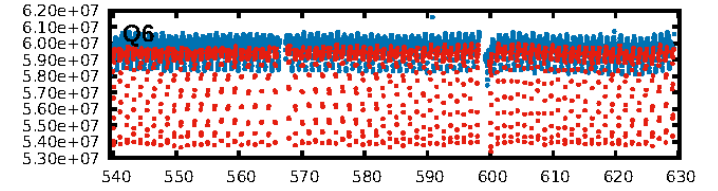
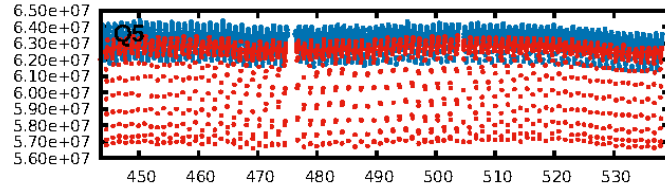
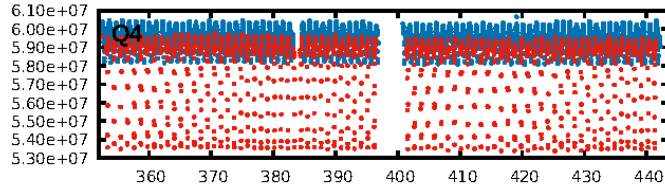
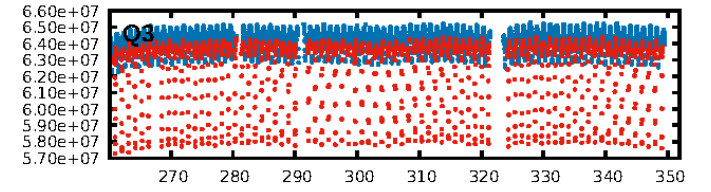
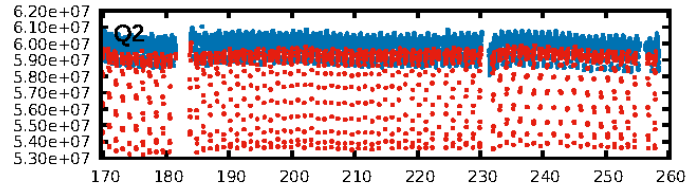
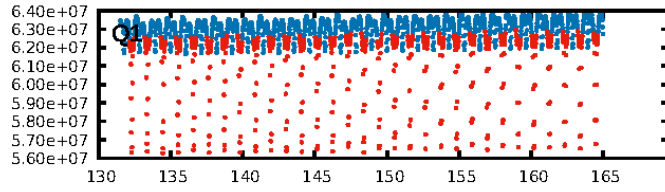
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 0.95 [896/947]
GhostDiagnostic-chr: N/A
Centroid-sig: 0.0%
Centroid-so: 0.170 arcsec [203.39σ]
OotOffset-rm: 0.198 arcsec [2.88σ]
KicOffset-rm: 0.244 arcsec [3.56σ]
OotOffset-st: 4/1/4/5 [14]
KicOffset-st: 4/1/4/5 [14]
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DiffImageOverlap-fno: 1.00 [14/14]

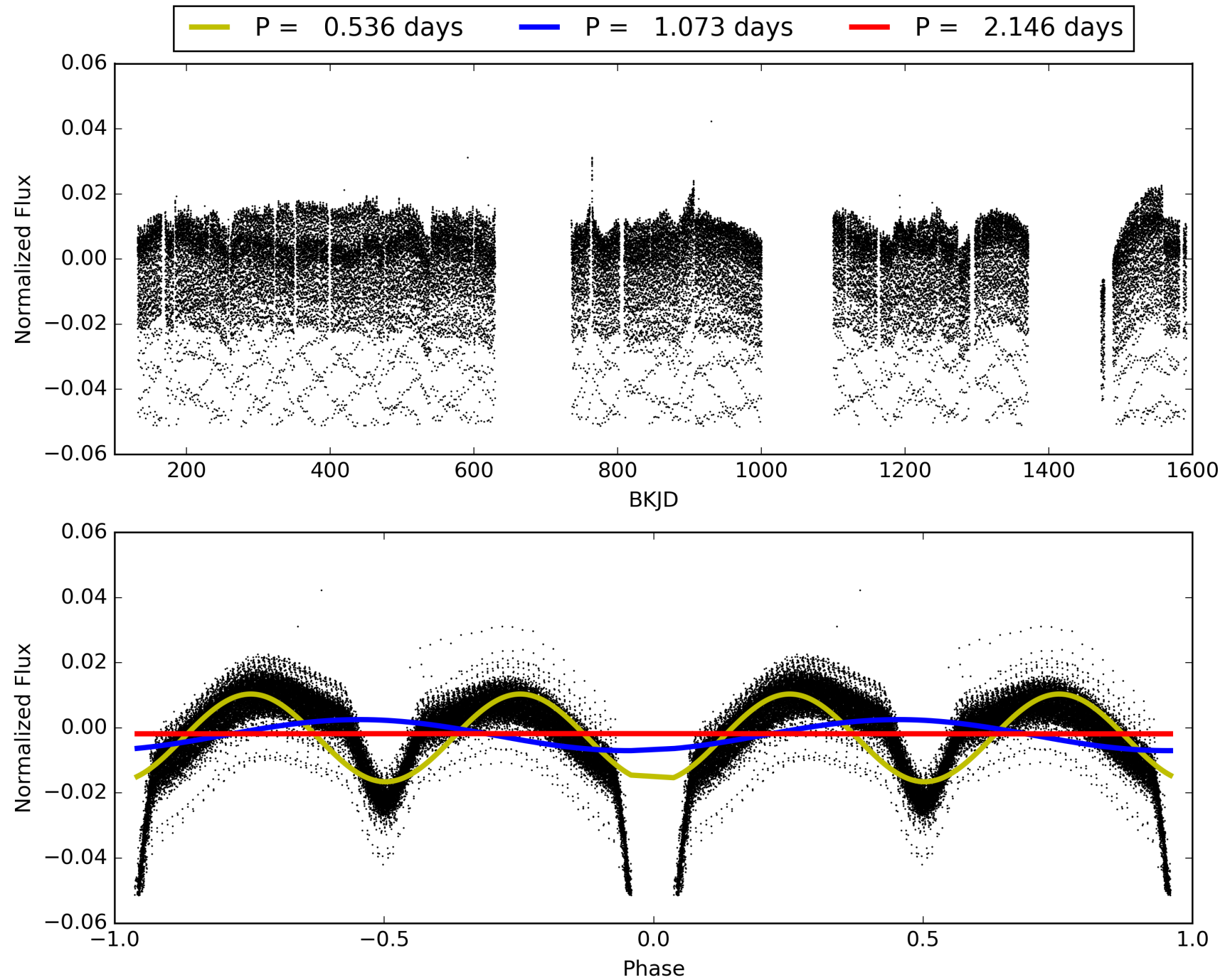
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 13:43:56 Z

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

TCE 010616829-01, PDC Light Curves

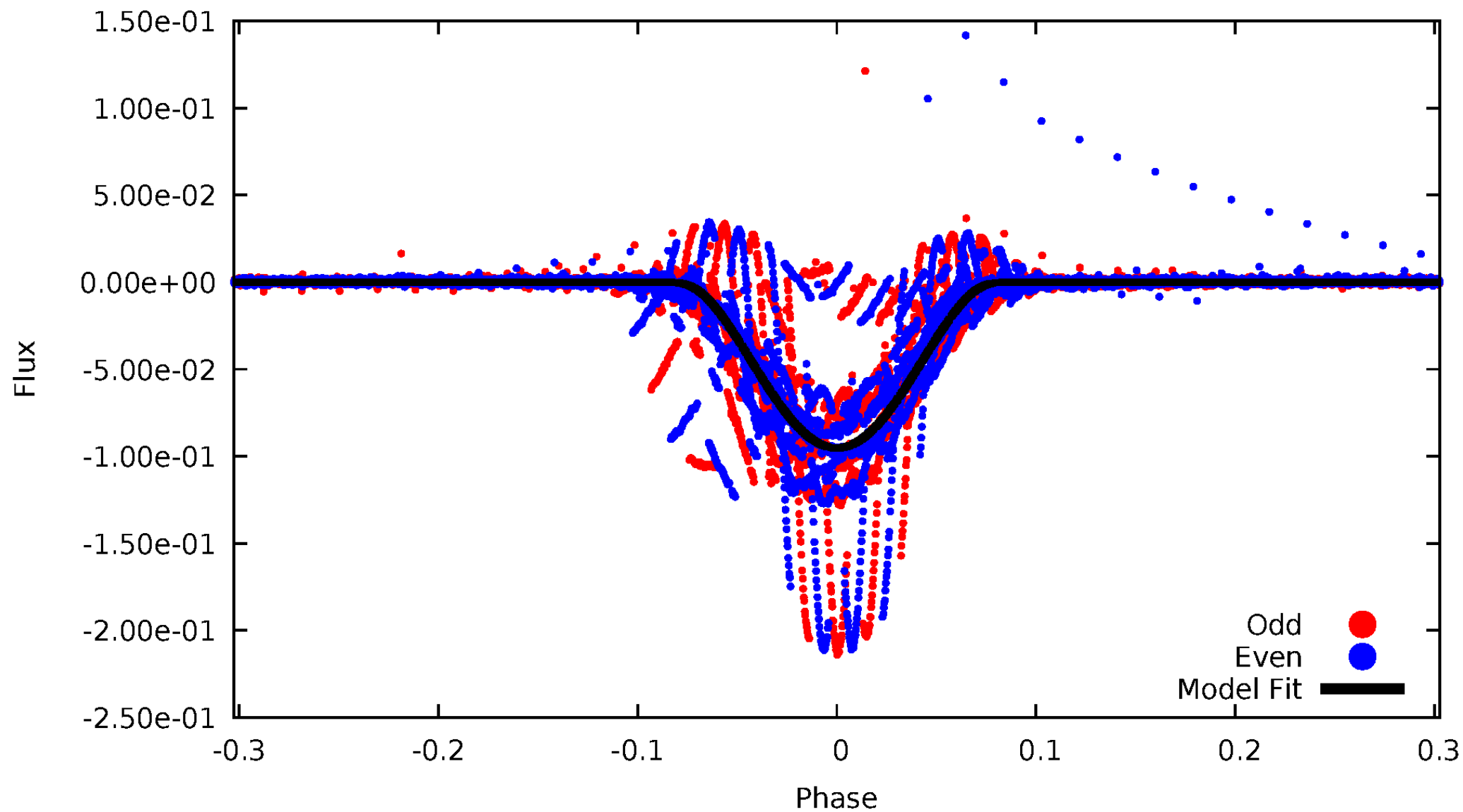


TCE 010616829-01



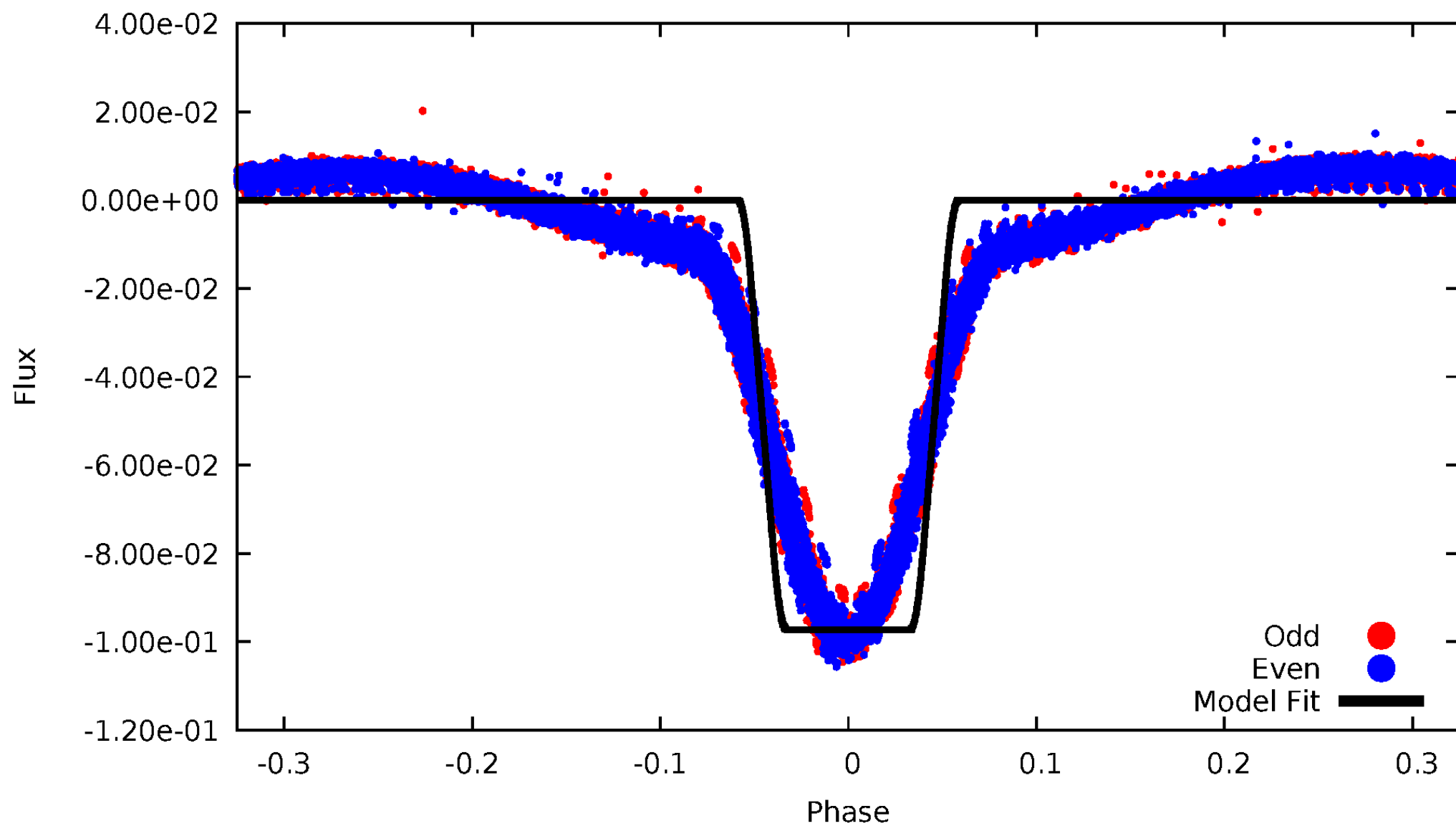
DV Odd/Even

TCE 010616829-01



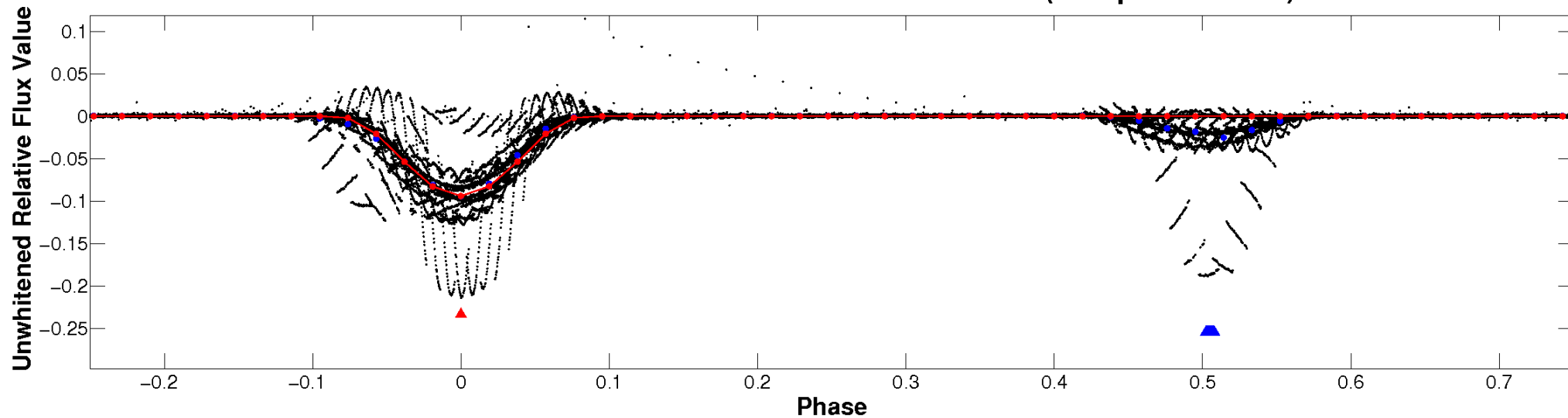
ALT Odd/Even

TCE 010616829-01

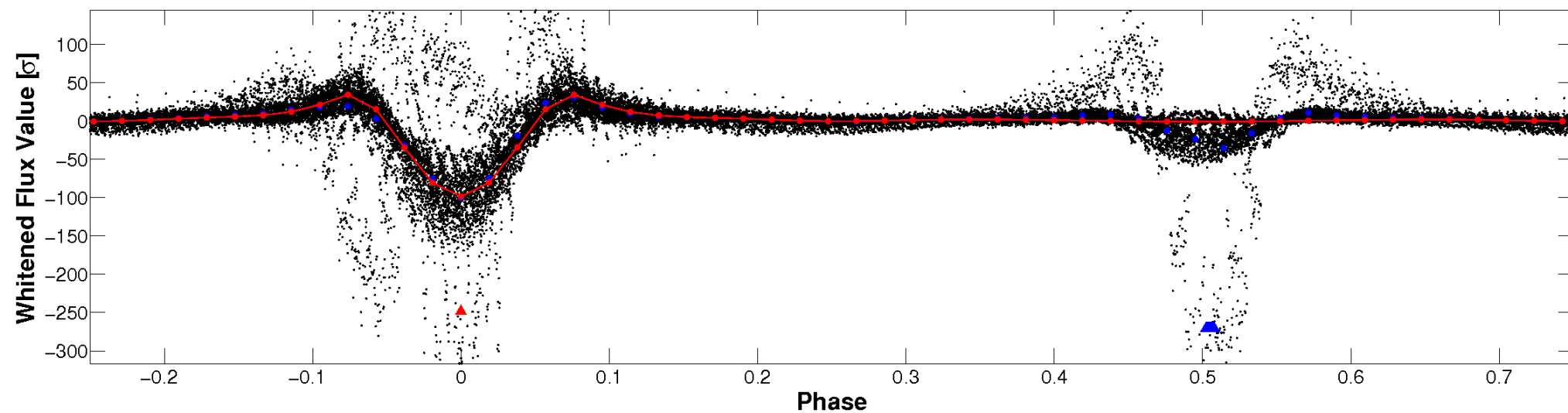


Non-Whitened Vs. Whitened Light Curve

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

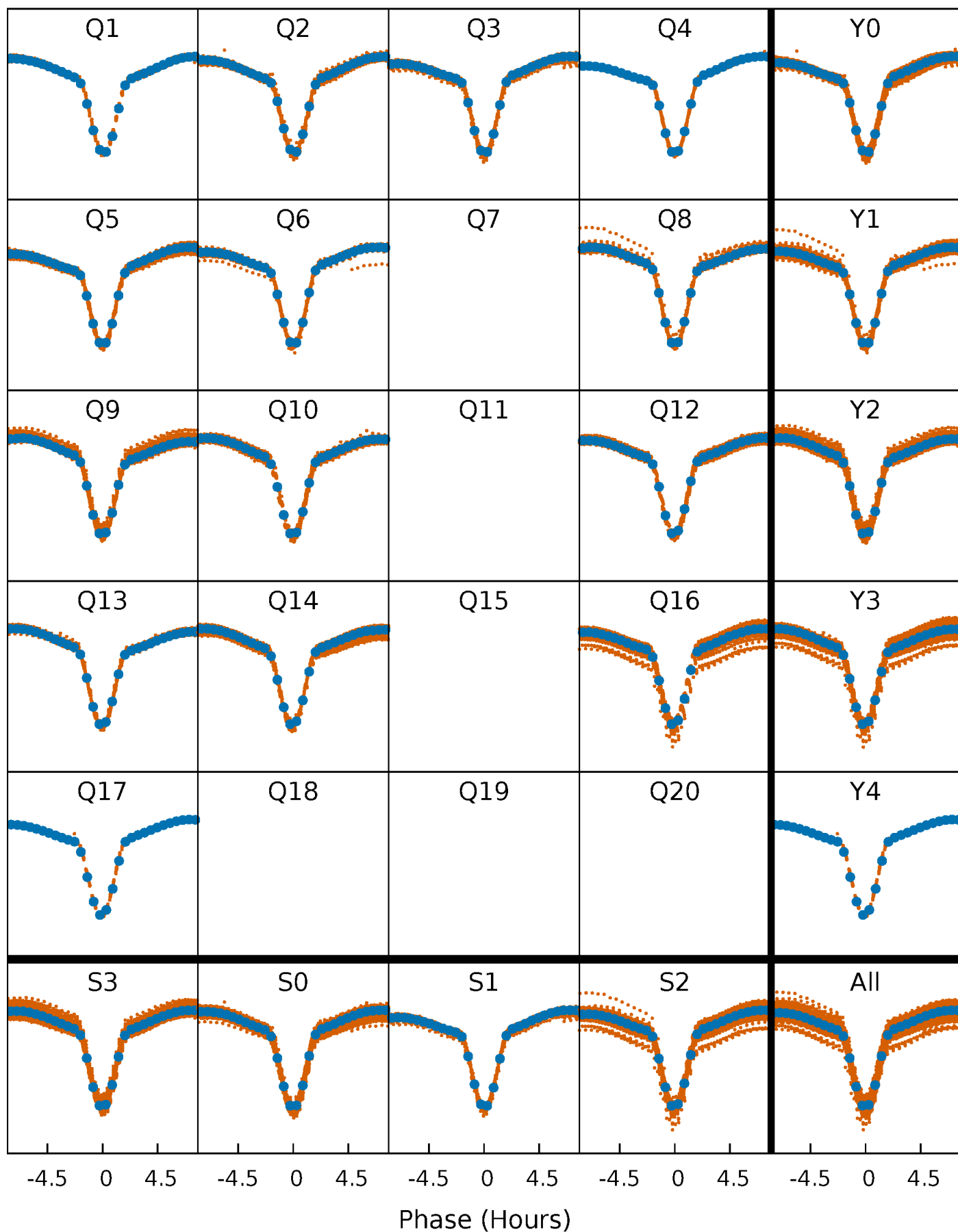


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



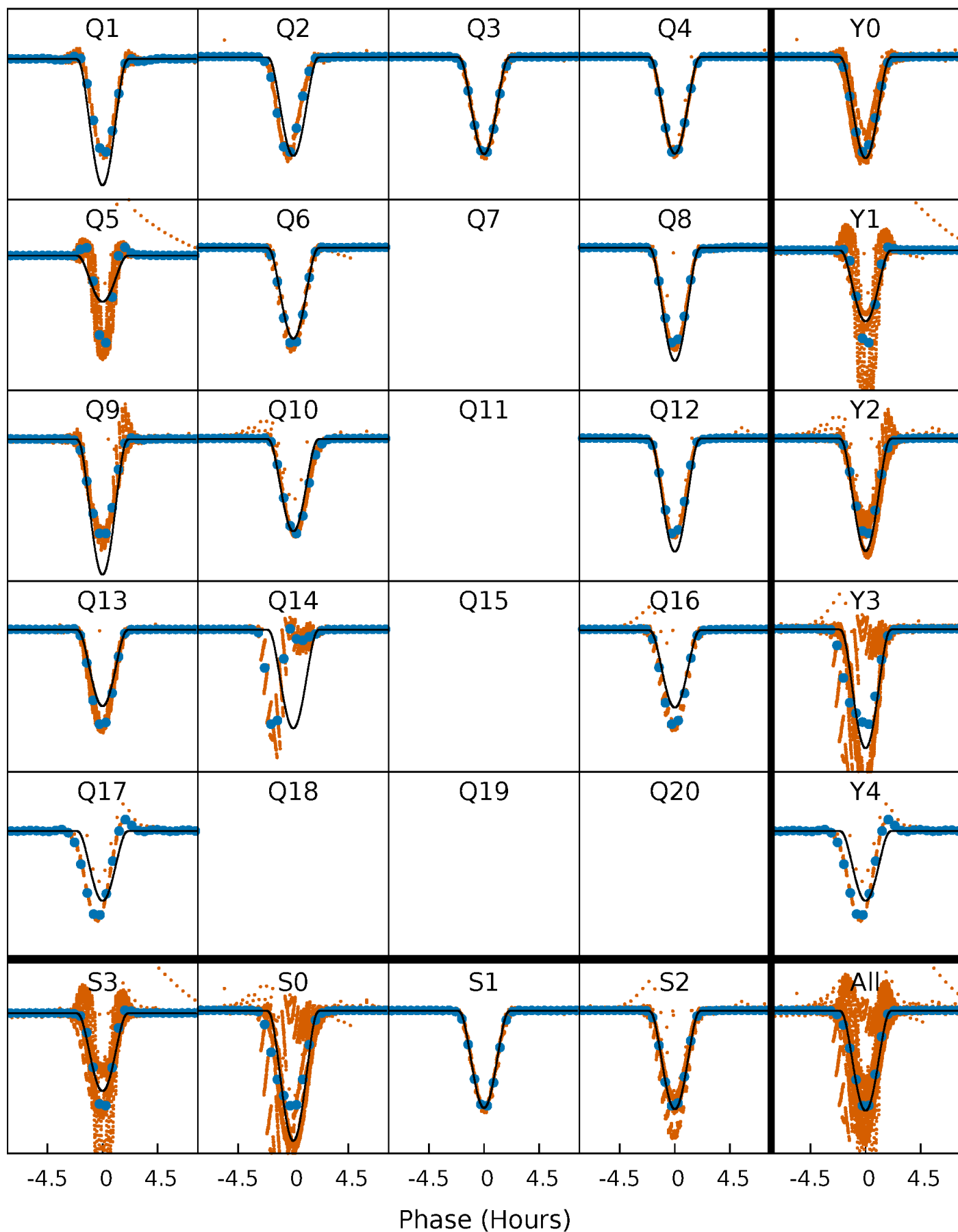
PDC Quarter-Phased Transit Curves

TCE 010616829-01 P= 1.072938 Days $T_0=132.291174$ (BKJD)



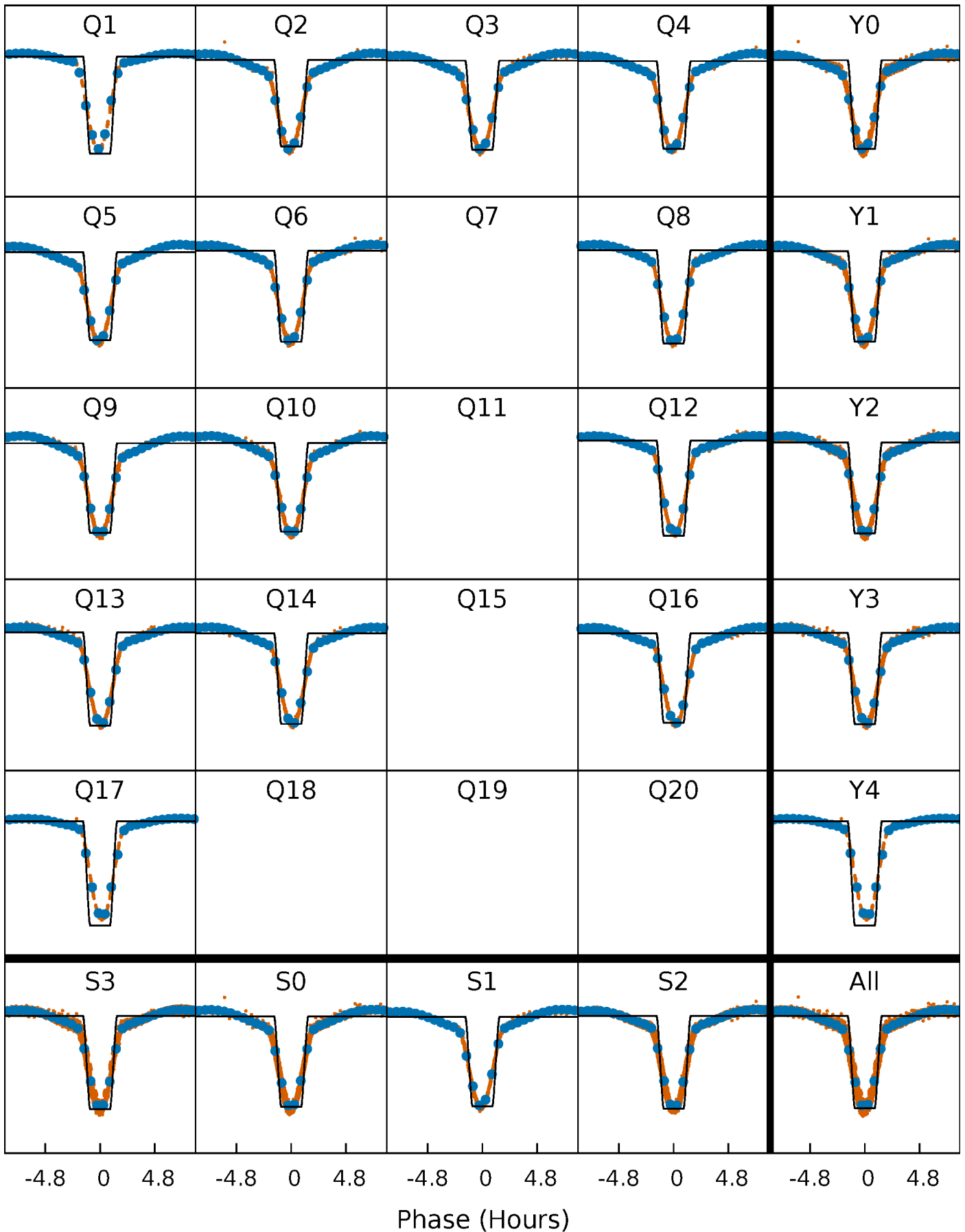
DV Quarter-Phased Transit Curves

TCE 010616829-01 P= 1.072938 Days $T_0=132.291174$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

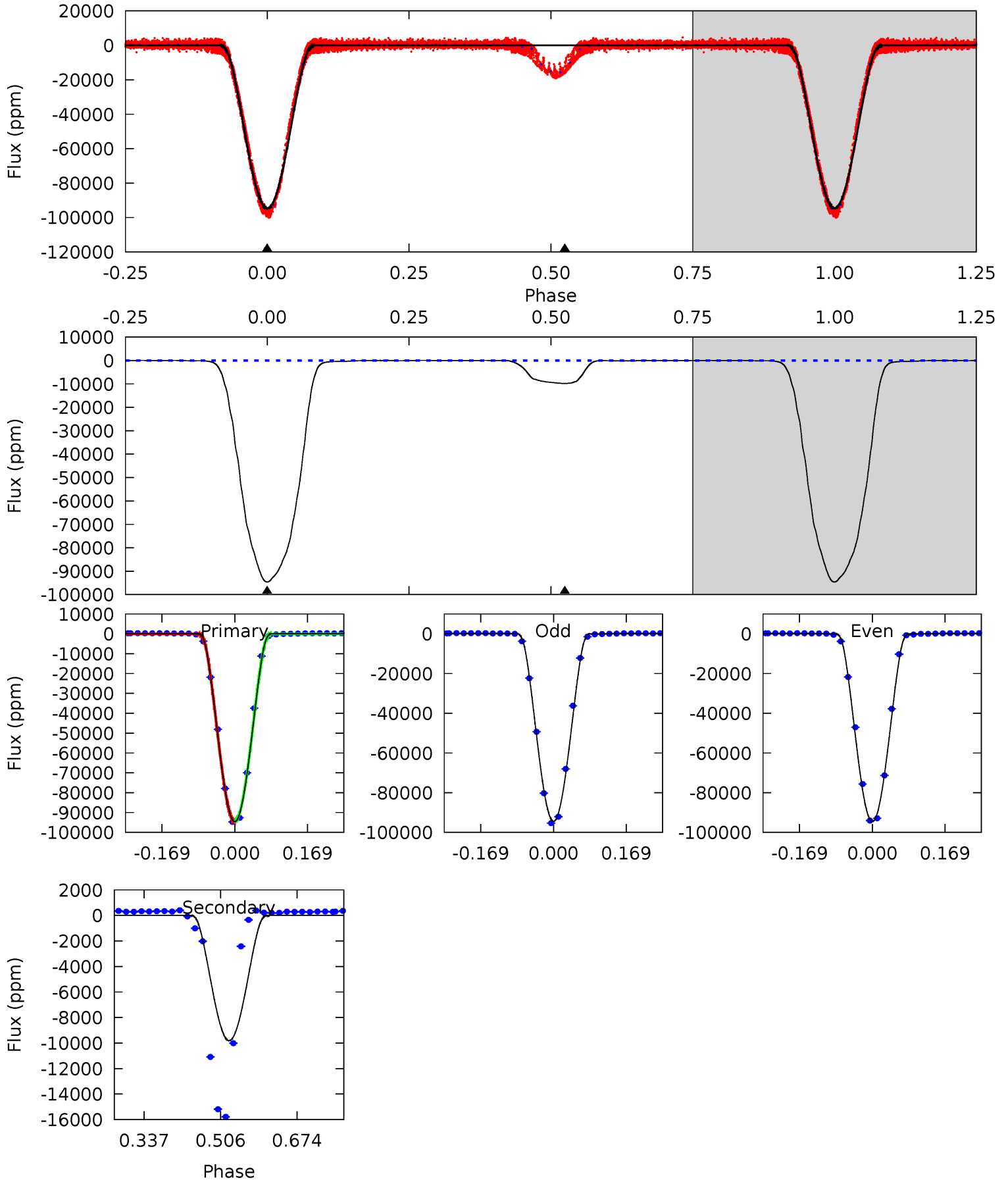
TCE 010616829-01 P= 1.072924 Days $T_0=132.300155$ (BKJD)



DV Model-Shift Uniqueness Test

010616829-01, P = 1.072938 Days, E = 131.218236 Days

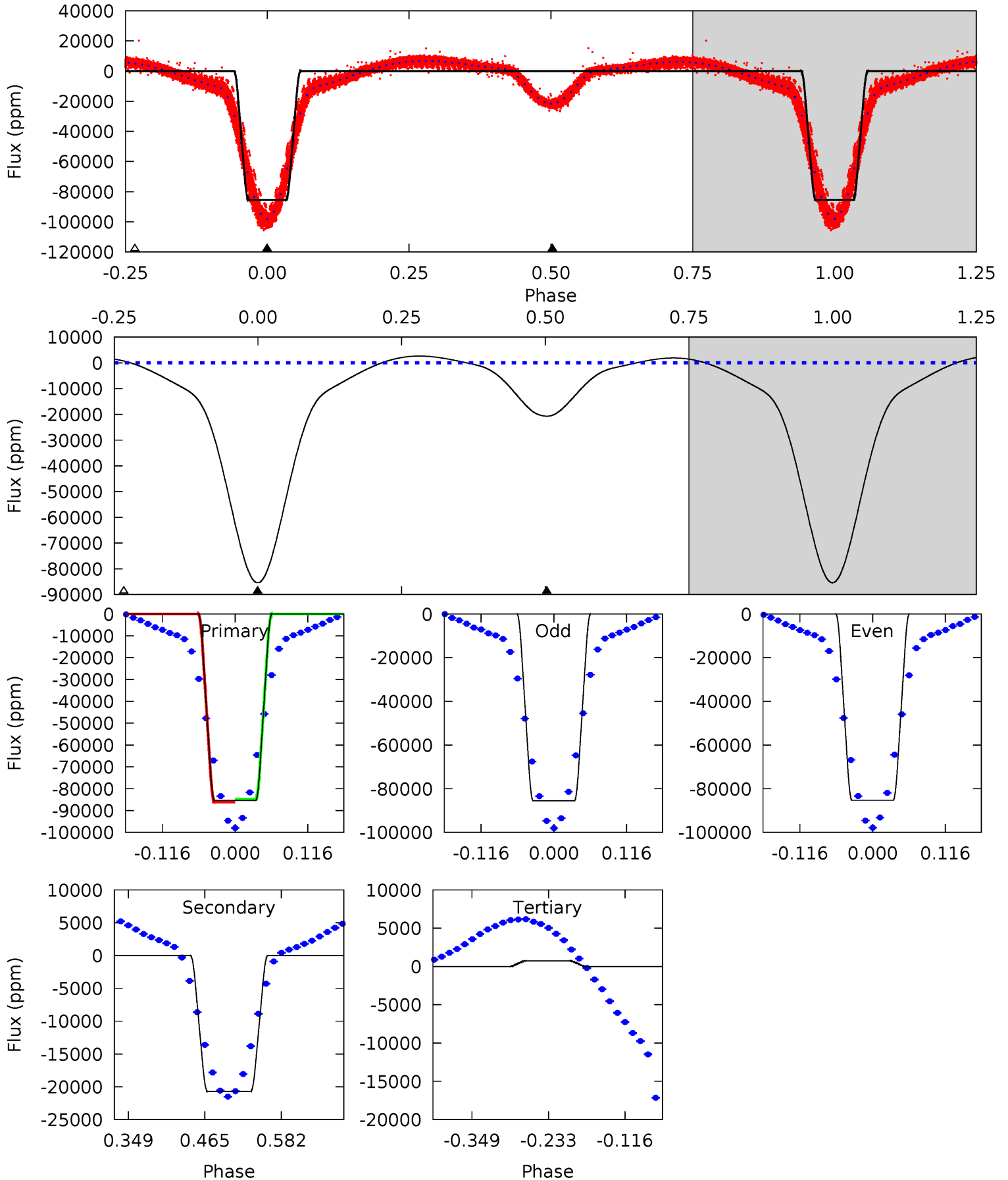
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|-------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|-----|
| 6952 | 721.1 | 0 | 0 | 4.45 | 1.38 | 2.59 | 6952 | 6952 | 721.1 | 721.1 | 6.64 | 0.96 | 0.00 | 0 |



Alt Model-Shift Uniqueness Test

010616829-01, P = 1.072924 Days, E = 131.227231 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|-------|-------|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 1329 | 322.1 | -11.4 | 0 | 4.53 | 1.57 | 59.8 | 1340 | 1329 | 333.5 | 322.1 | 1.99 | 1.00 | 0.03 | 10.0 |



Stellar Parameters For KIC 010616829

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 7031^{+225}_{-338} | $4.222^{+0.105}_{-0.210}$ | $-0.060^{+0.250}_{-0.350}$ | $1.523^{+0.526}_{-0.263}$ | $1.415^{+0.220}_{-0.220}$ | $0.564^{+0.287}_{-0.298}$ |
| | +3%/-5% | +2%/-5% | +417%/-583% | +35%/-17% | +16%/-16% | +51%/-53% |
| 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 010616829-01 / KOI 8028.01

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{max} (K)$ | $T_{obs} (K)$ | A_{obs} |
|---------|-----------------|--------------------------|----------------------|----------------------|---------------------------|
| DV | -9812 ± 14 | $71.50^{+12.92}_{-7.55}$ | 3557^{+284}_{-233} | 3312^{+151}_{-248} | $0.557^{+0.134}_{-0.143}$ |
| Alt. | -20705 ± 64 | $52.25^{+9.62}_{-5.86}$ | 3535^{+307}_{-230} | 4706^{+150}_{-178} | $2.221^{+0.494}_{-0.546}$ |

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 $A_{obs} \gg 1.0$

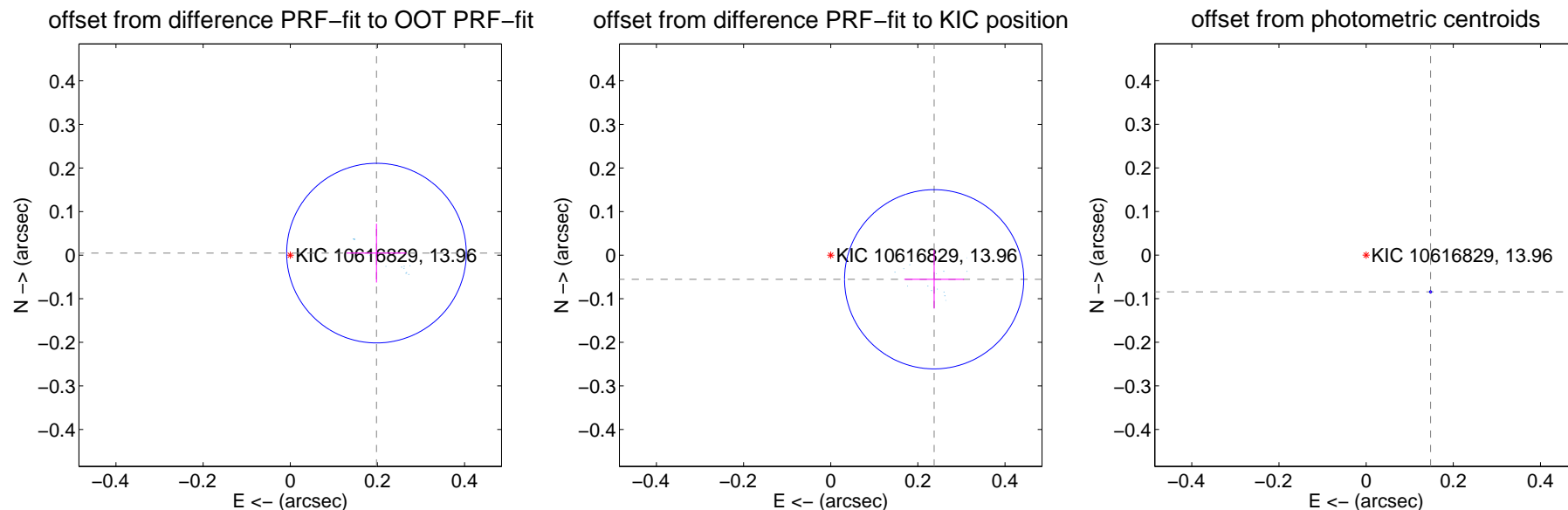
DV Centroid Data

Supplemental centroid analysis for 010616829-01. Kepler magnitude: 13.96. Transit SNR 2870.34

There are 14 quarters with good PRF difference image offsets

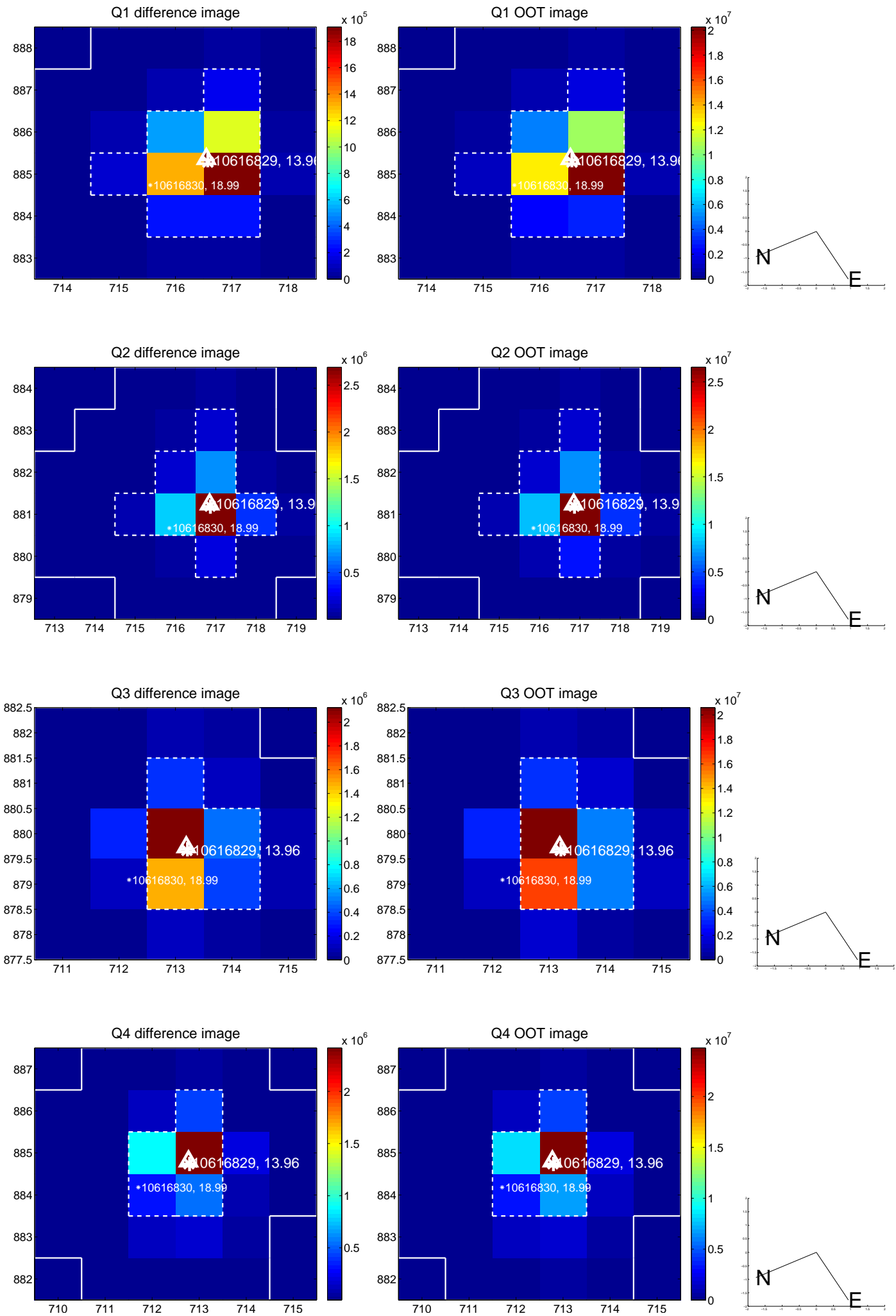
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 0.198 ± 0.069 | 2.88 | -0.198 ± 0.069 | 0.005 ± 0.068 |
| PRF-fit source offset from KIC position | 0.244 ± 0.069 | 3.56 | -0.237 ± 0.069 | -0.055 ± 0.067 |
| photometric centroid source offset | 0.17 ± 0.00 | 203.39 | -0.15 ± 0.00 | -0.08 ± 0.00 |

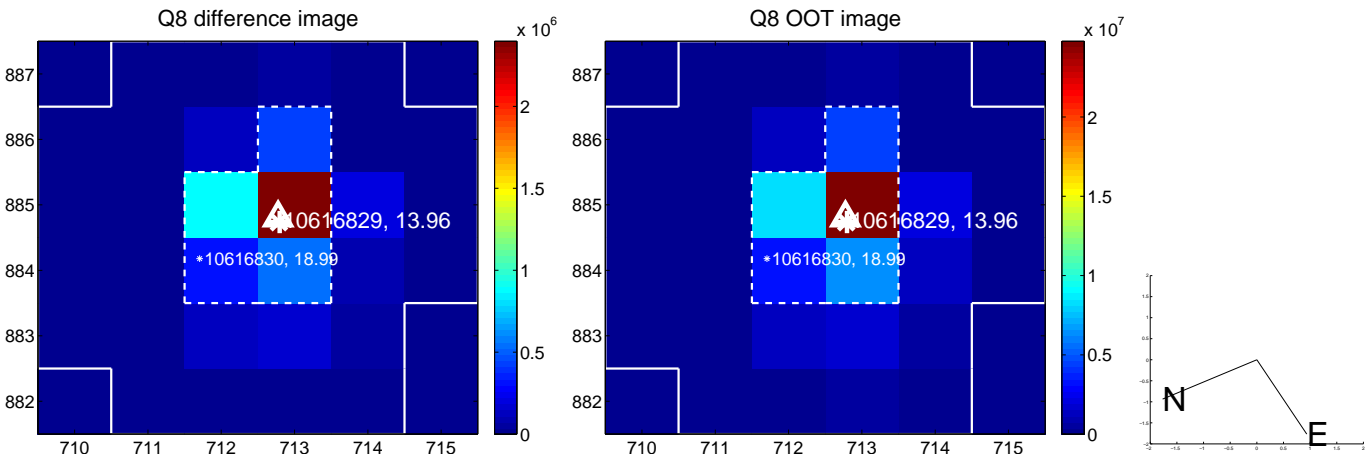
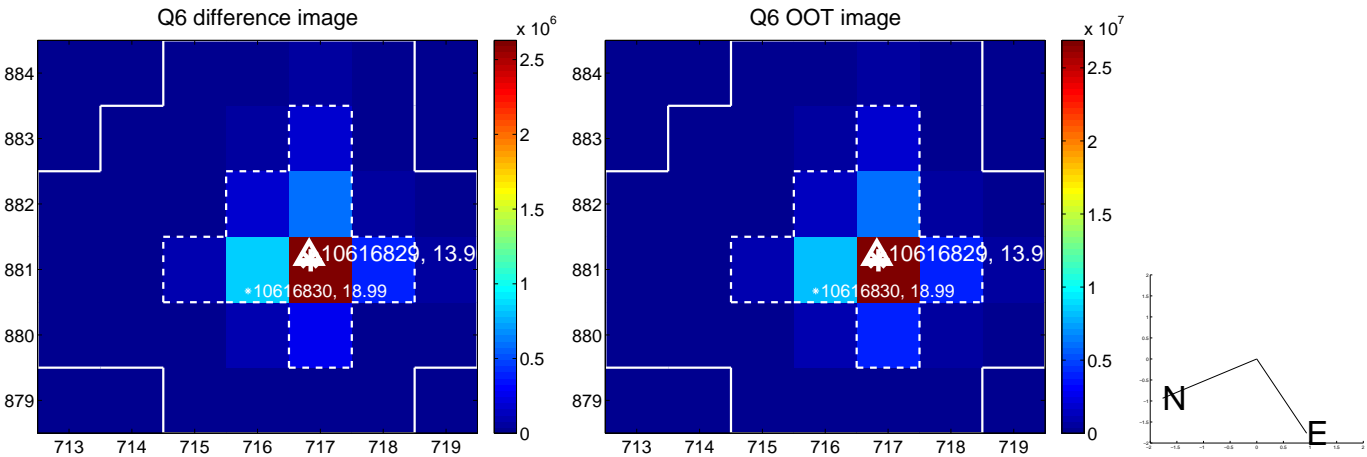
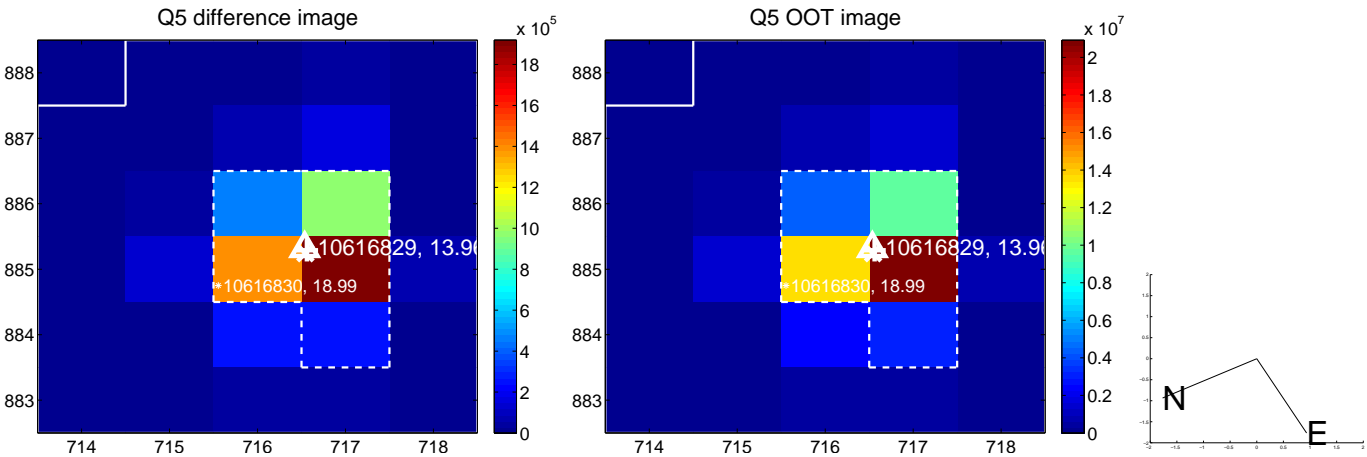


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

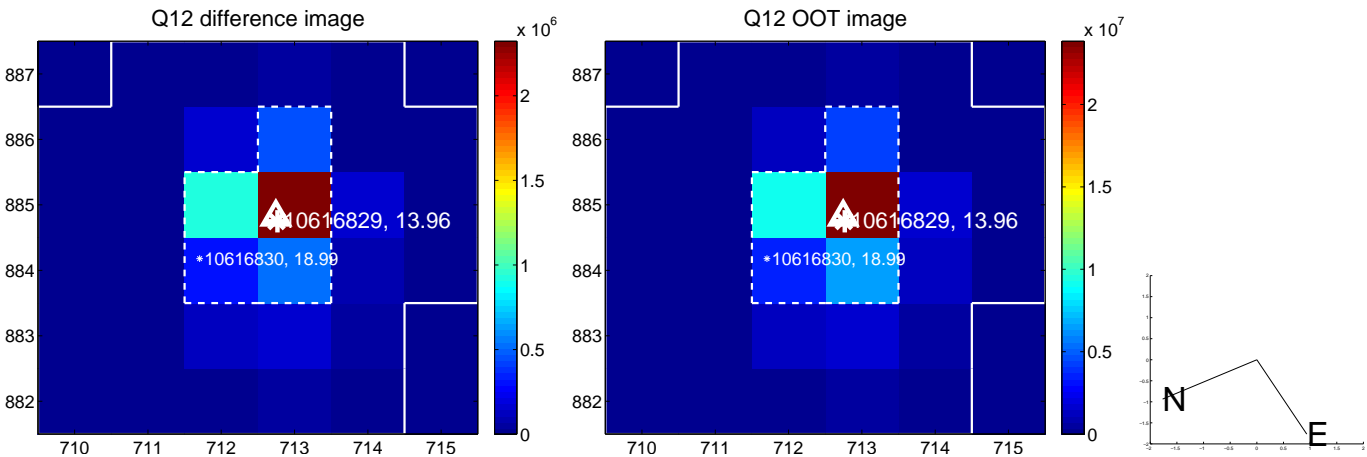
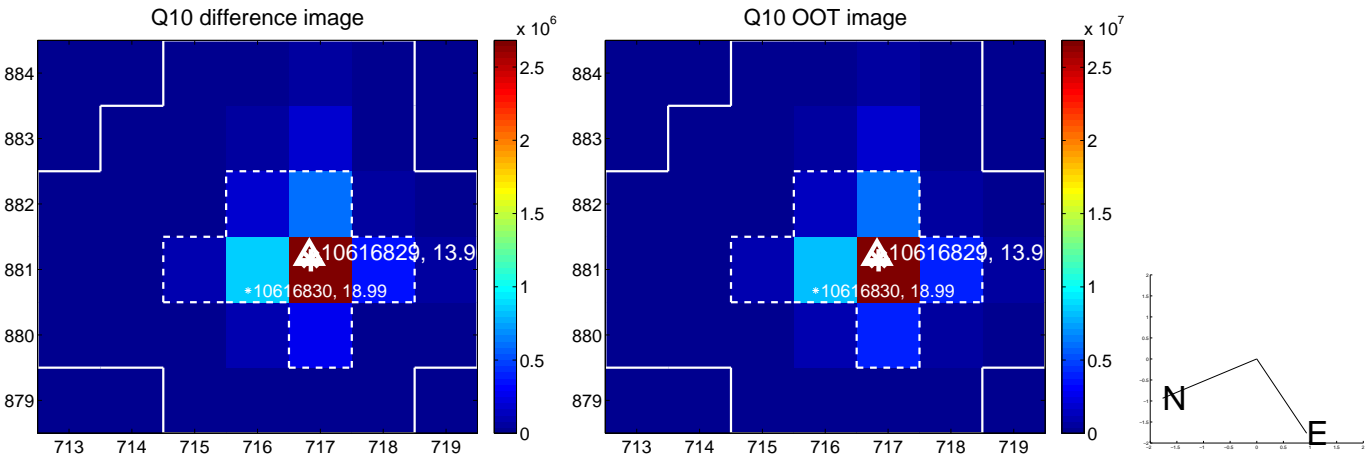
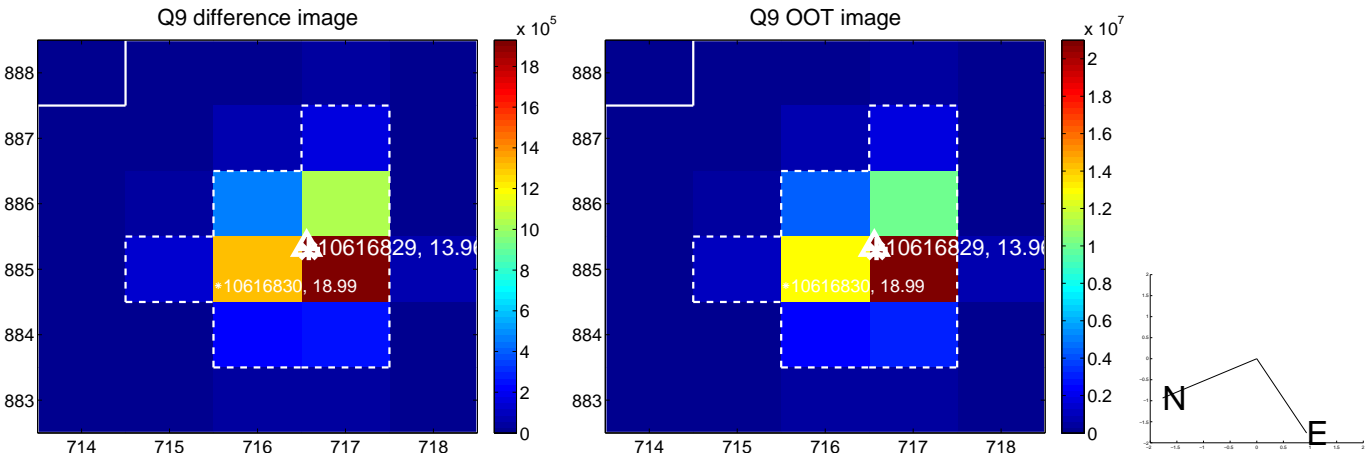
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



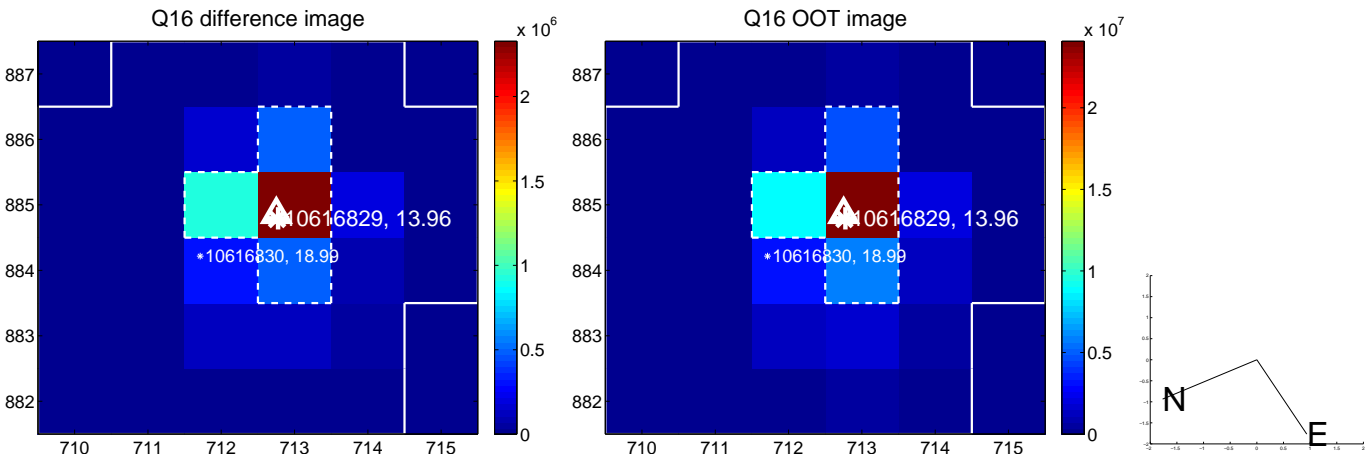
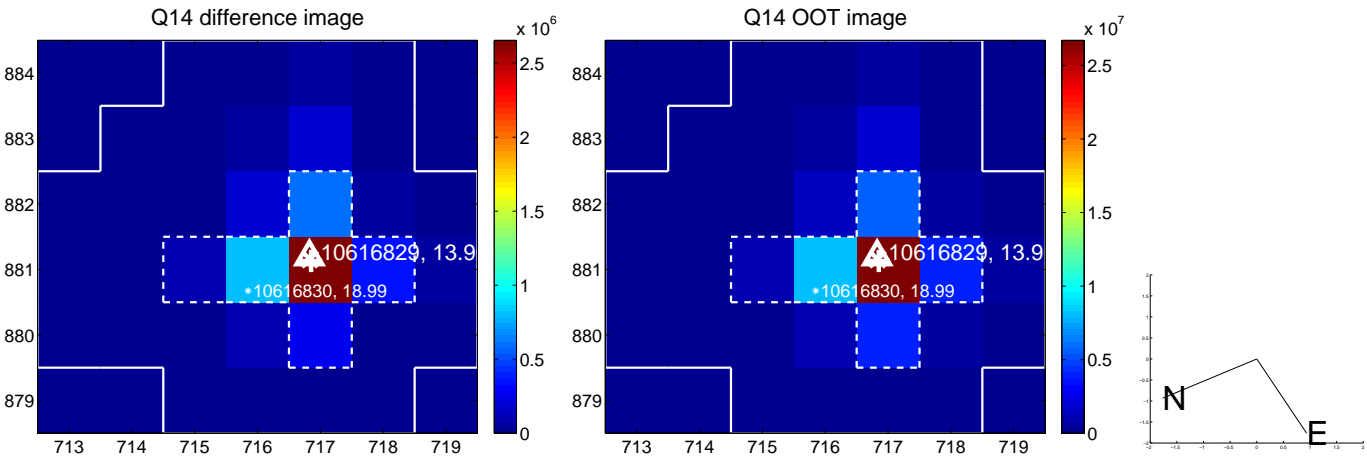
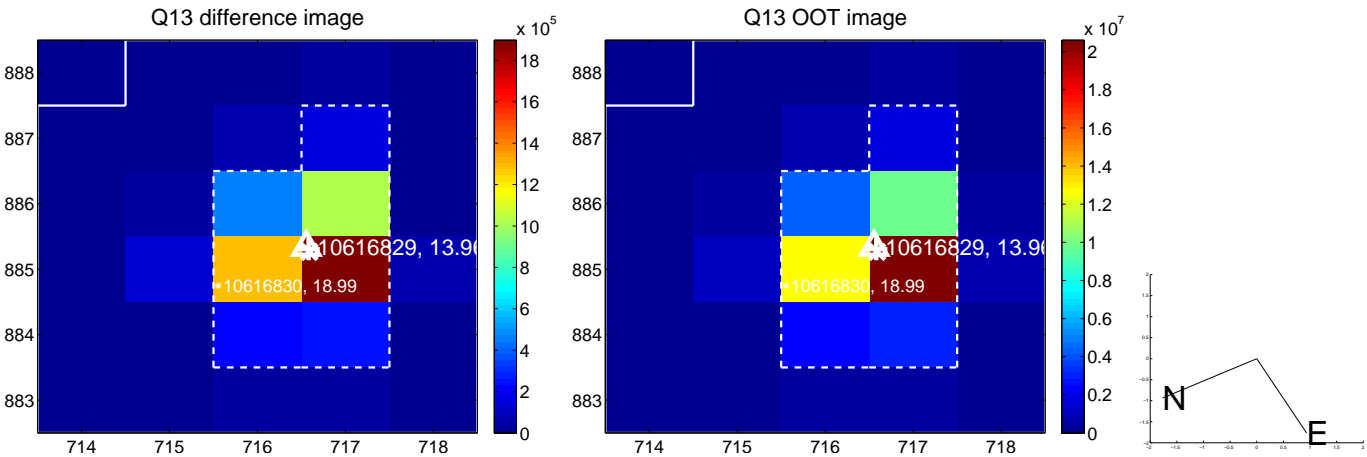
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



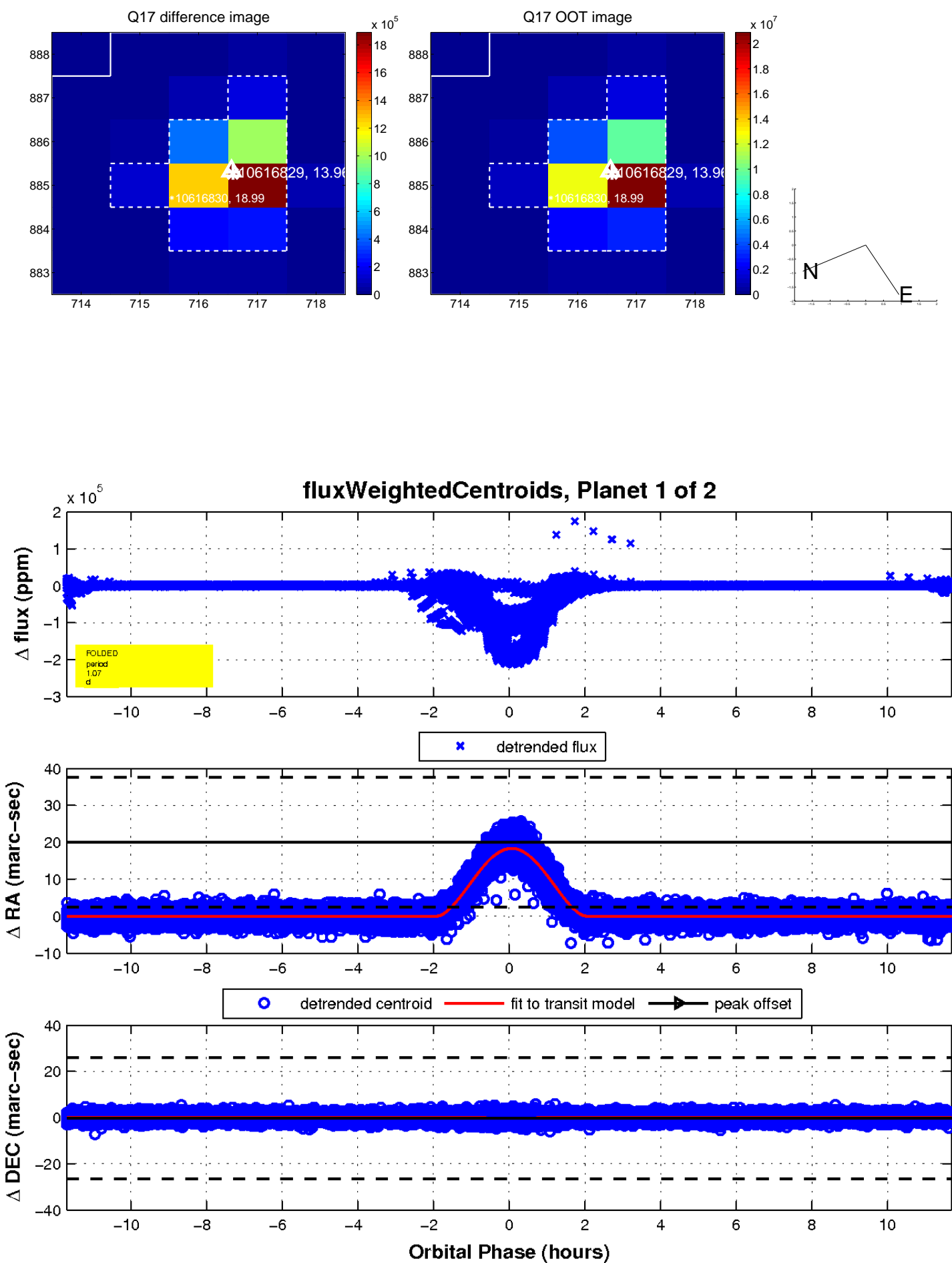
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

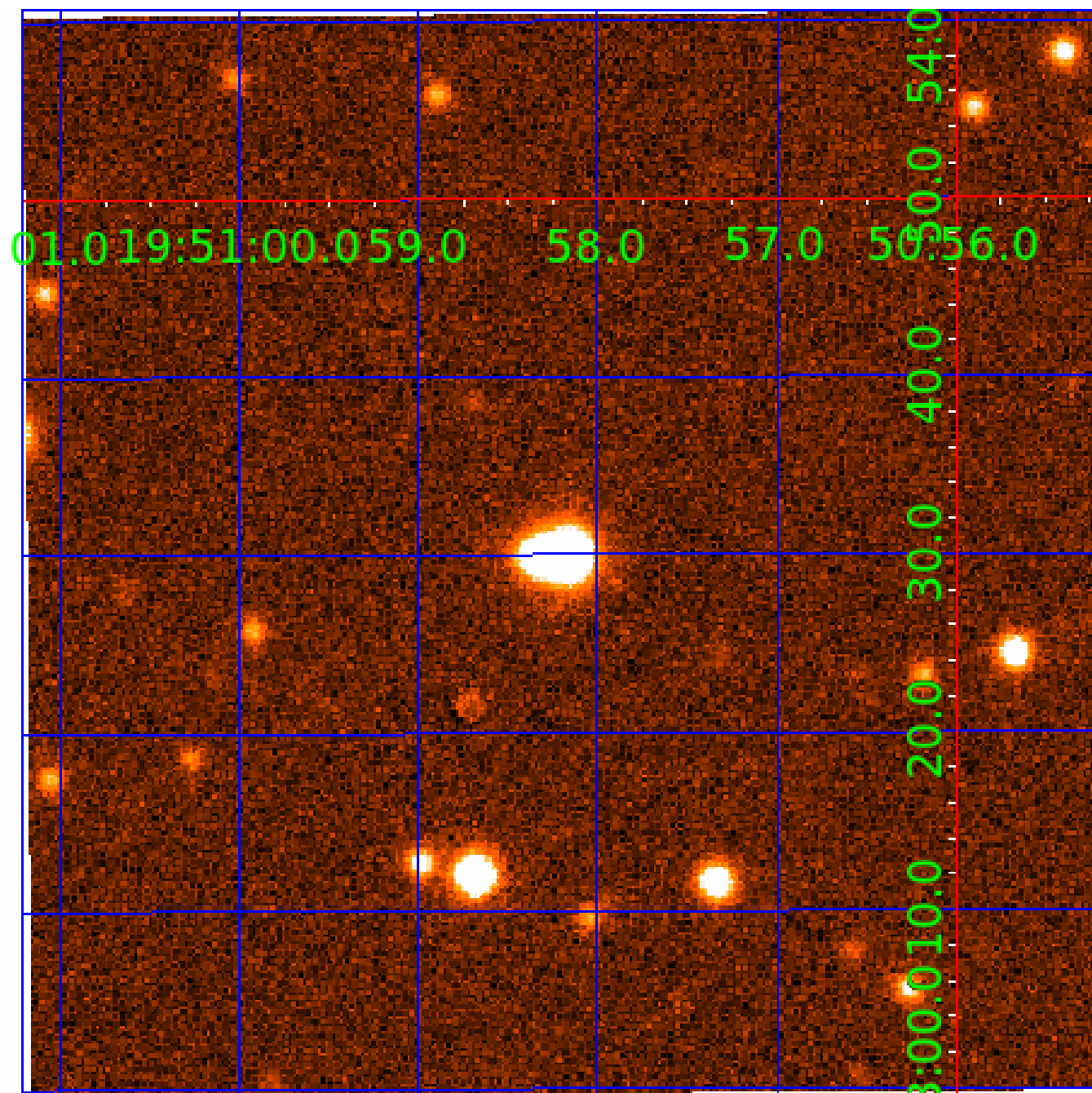


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010616829

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|--------|--------|-----------------------------|-----------------|------------------------|------------------------|
| 010616829-01 | OBS | 8028.01 | 1.072938 | 132.291174 | 95187.7 | 3.896 | 4700.7 | 2870.3 | 1.52 | 7031 | 70.19 | 9593.93 |
| 010616829-02 | OBS | No | 1.072934 | 131.763277 | 63597.1 | 2.000 | 1926.2 | -1.0 | 1.52 | 7031 | 39.05 | 9593.98 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|---|
| 010616829-01 | OBS | FP | 0.00 | 0 | 1 | 0 | 0 | SWEET_EB—MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE |
| 010616829-02 | OBS | FP | 0.00 | 1 | 1 | 0 | 0 | IS_SEC_TCE—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.

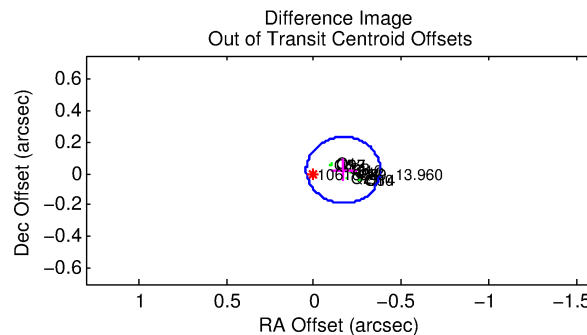
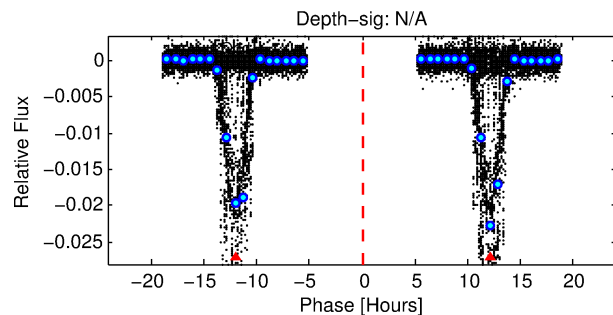
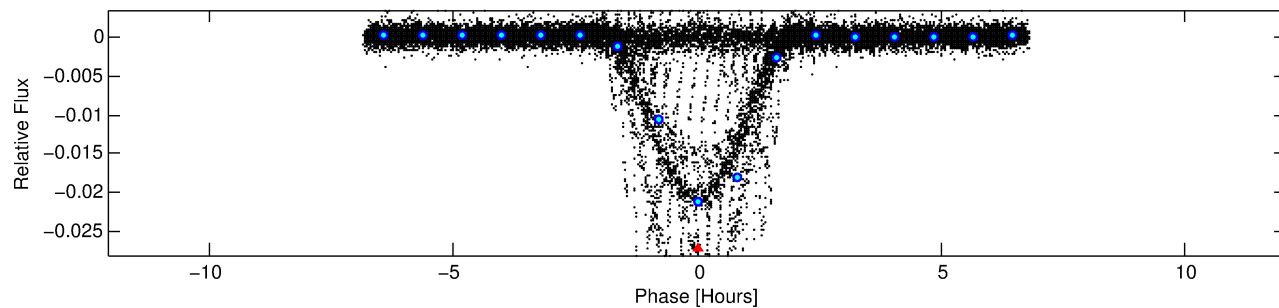
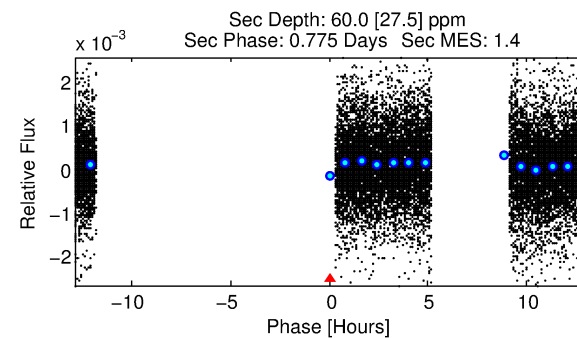
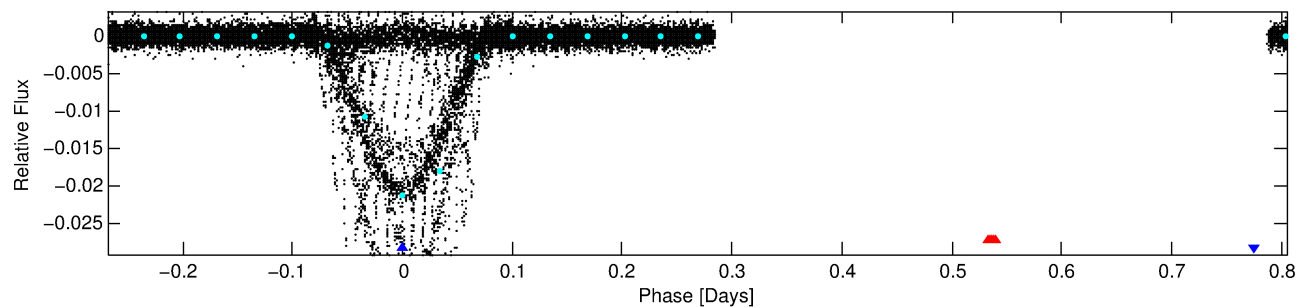
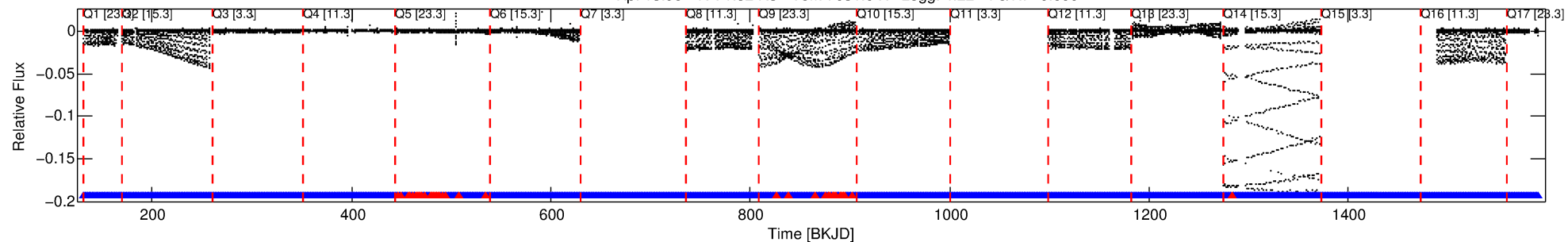
Ephemeris Match Information For 010616829-02

No Significant Match Found

DV One-Page Summary

KIC: 10616829 Candidate: 2 of 2 Period: 1.073 d

Kp: 13.96 R*: 1.52 Rs Teff: 7031.0 K Logg: 4.22 Fe/H: -0.060



TPS TCE Results:

Period = 1.07293 d
Epoch = 131.7633 BKJD

DV fit results are unavailable

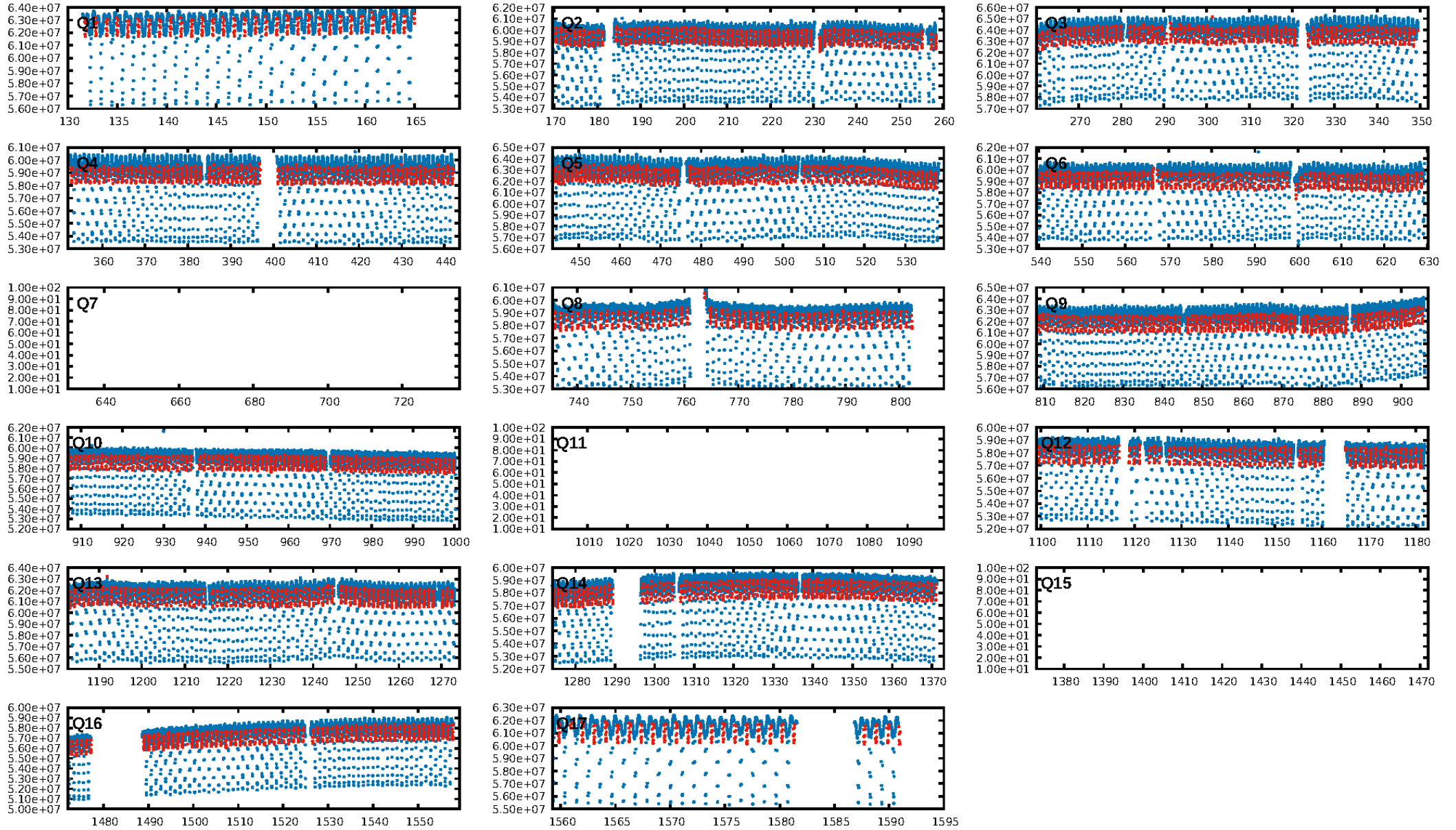
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 0.96 [897/939]
GhostDiagnostic-chr: N/A
Centroid-sig: 0.0%
Centroid-so: 0.089 arcsec [43.20σ]
OotOffset-rm: 0.170 arcsec [2.42σ]
KicOffset-rm: 0.205 arcsec [3.02σ]
OotOffset-st: 4/1/4/5 [14]
KicOffset-st: 4/1/4/5 [14]
DiffImageQuality-fgm: 1.00 [14/14]
DiffImageOverlap-fno: 1.00 [14/14]

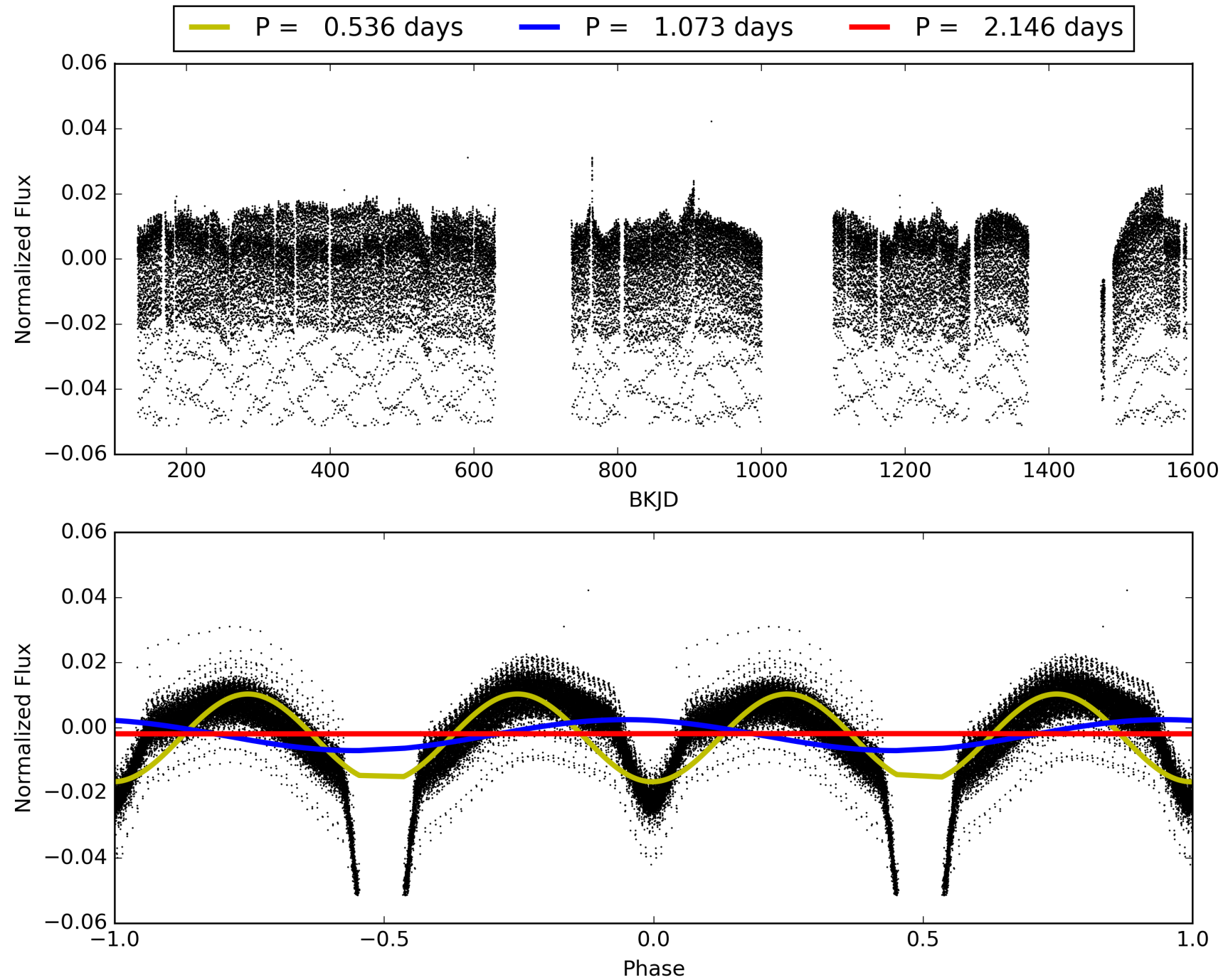
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 13:44:04 Z

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

TCE 010616829-02, PDC Light Curves

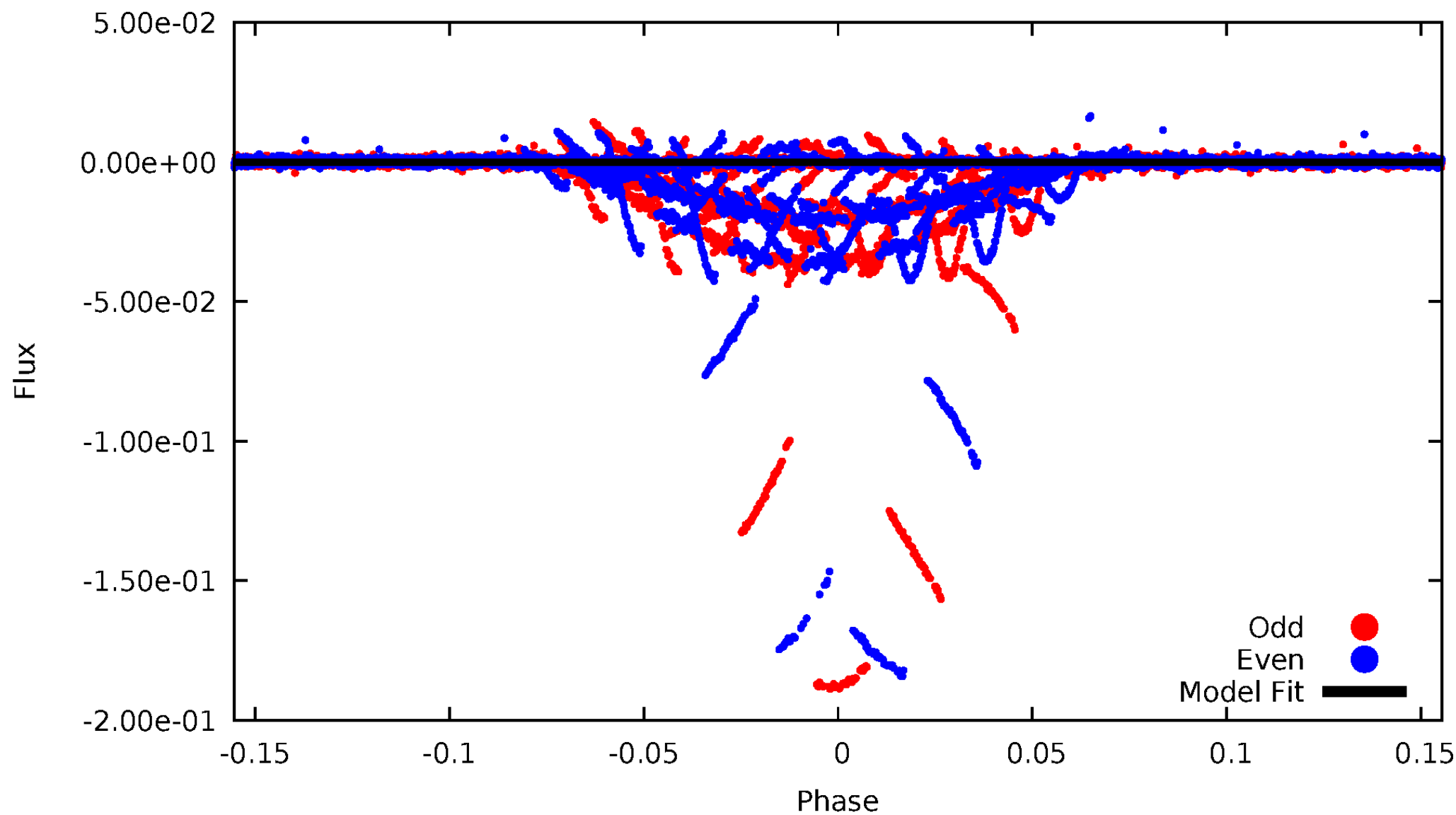


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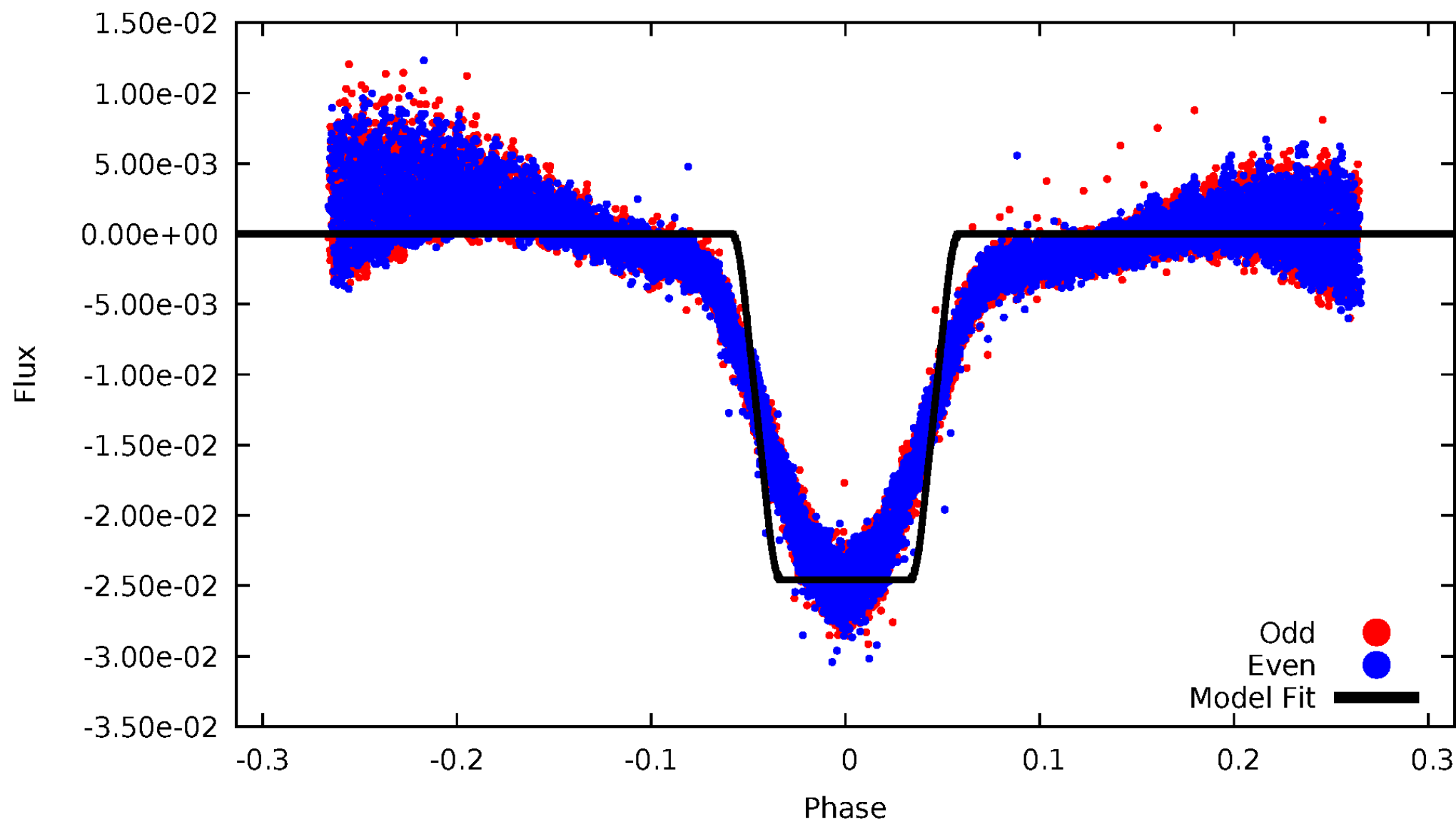
DV Odd/Even

TCE 010616829-02



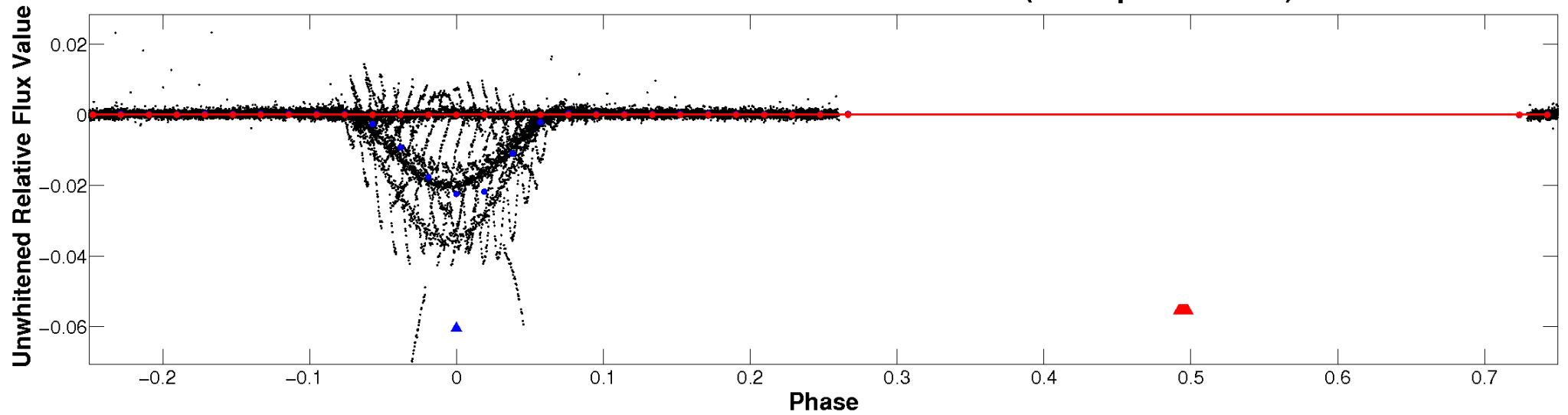
ALT Odd/Even

TCE 010616829-02

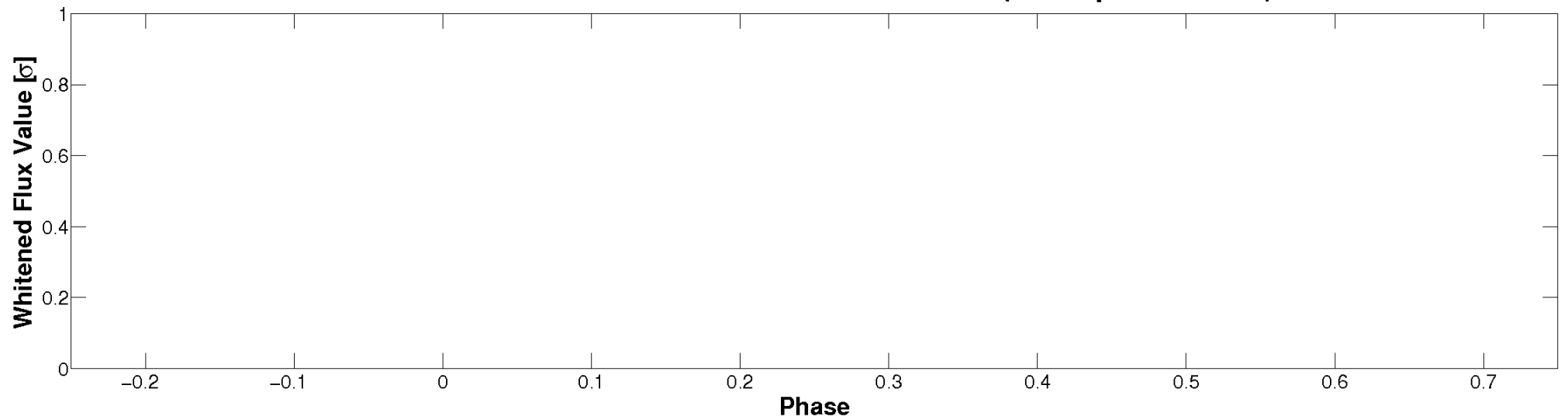


Non-Whitened Vs. Whitened Light Curve

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

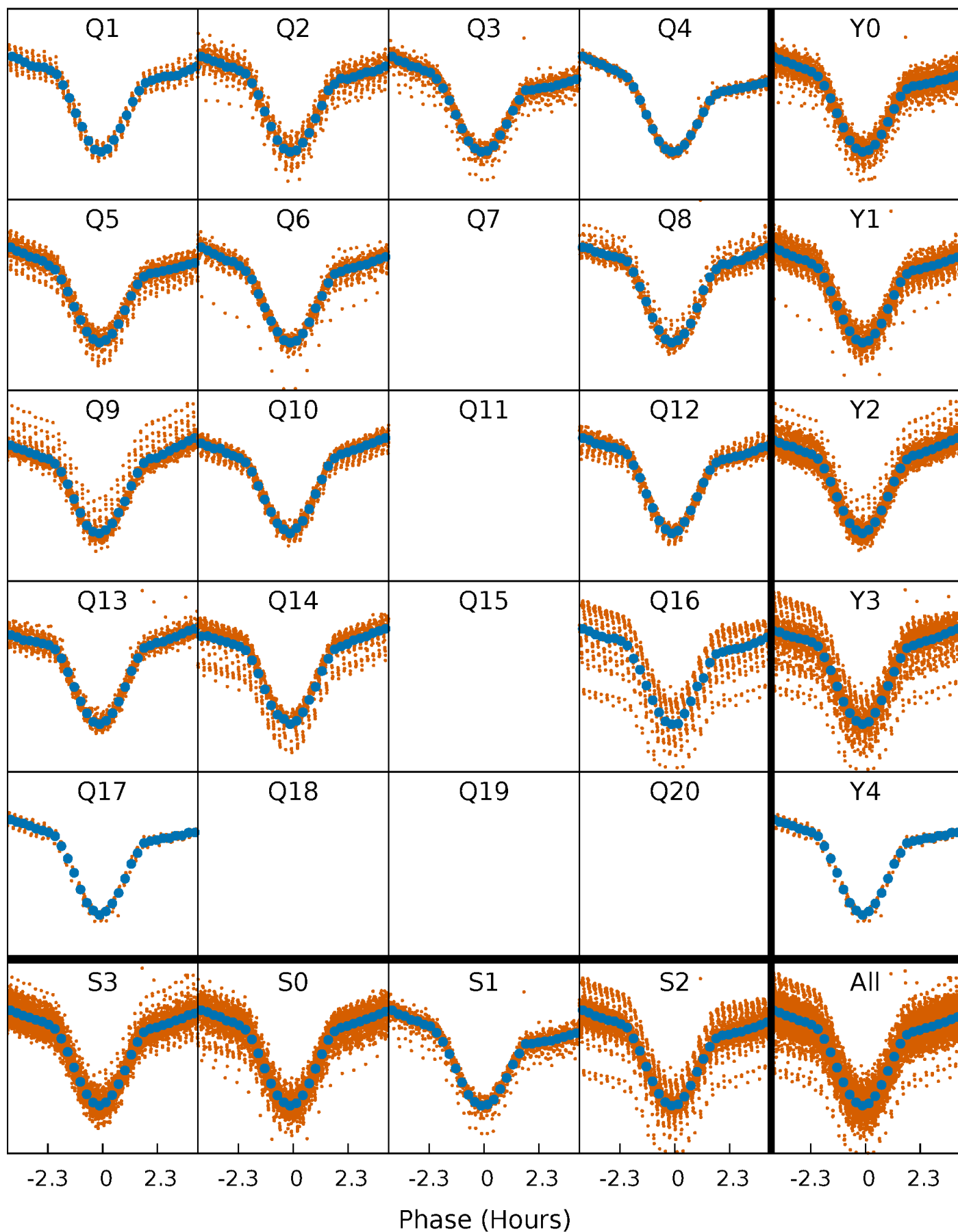


Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)



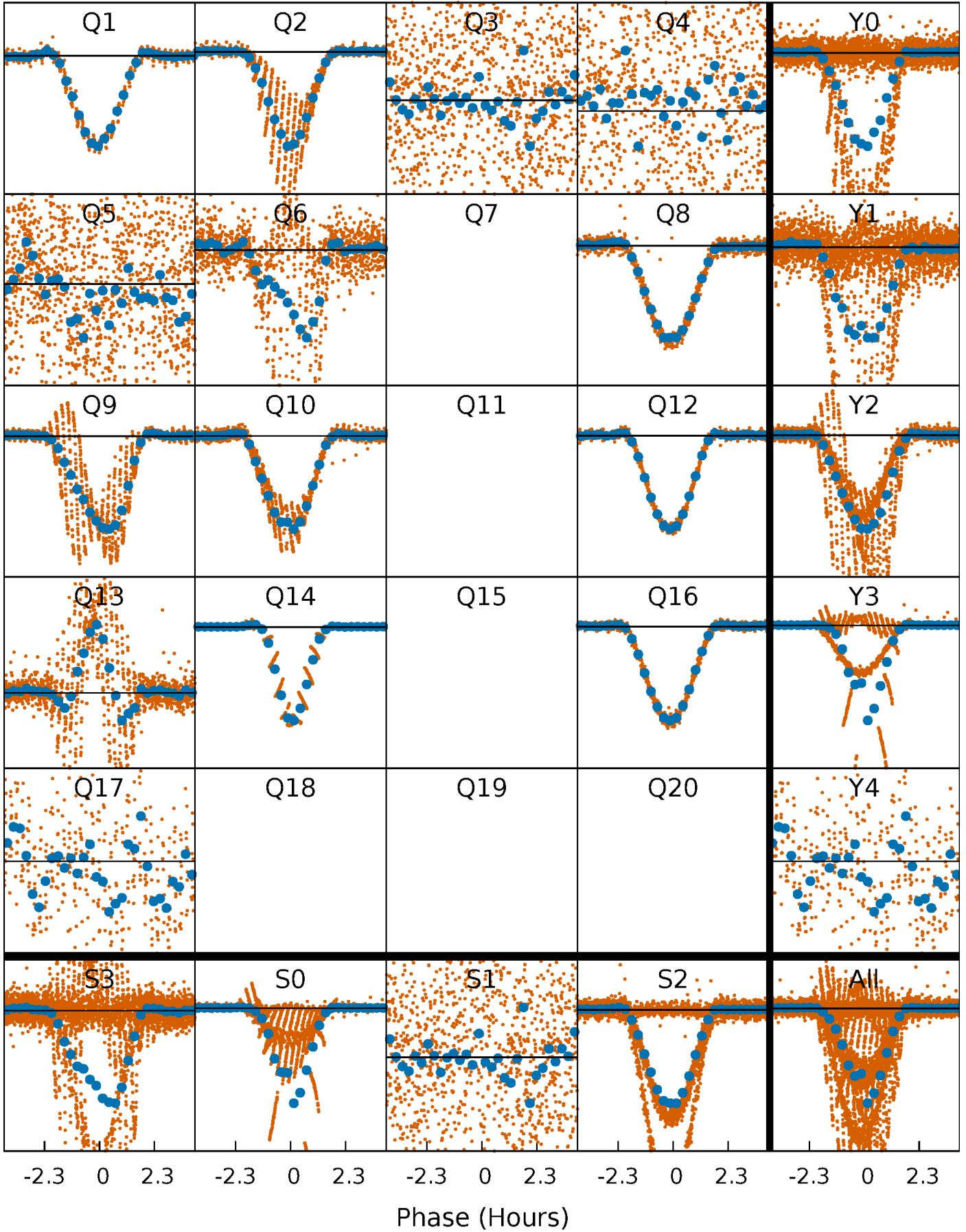
PDC Quarter-Phased Transit Curves

TCE 010616829-02 P= 1.072934 Days $T_0=131.763277$ (BKJD)



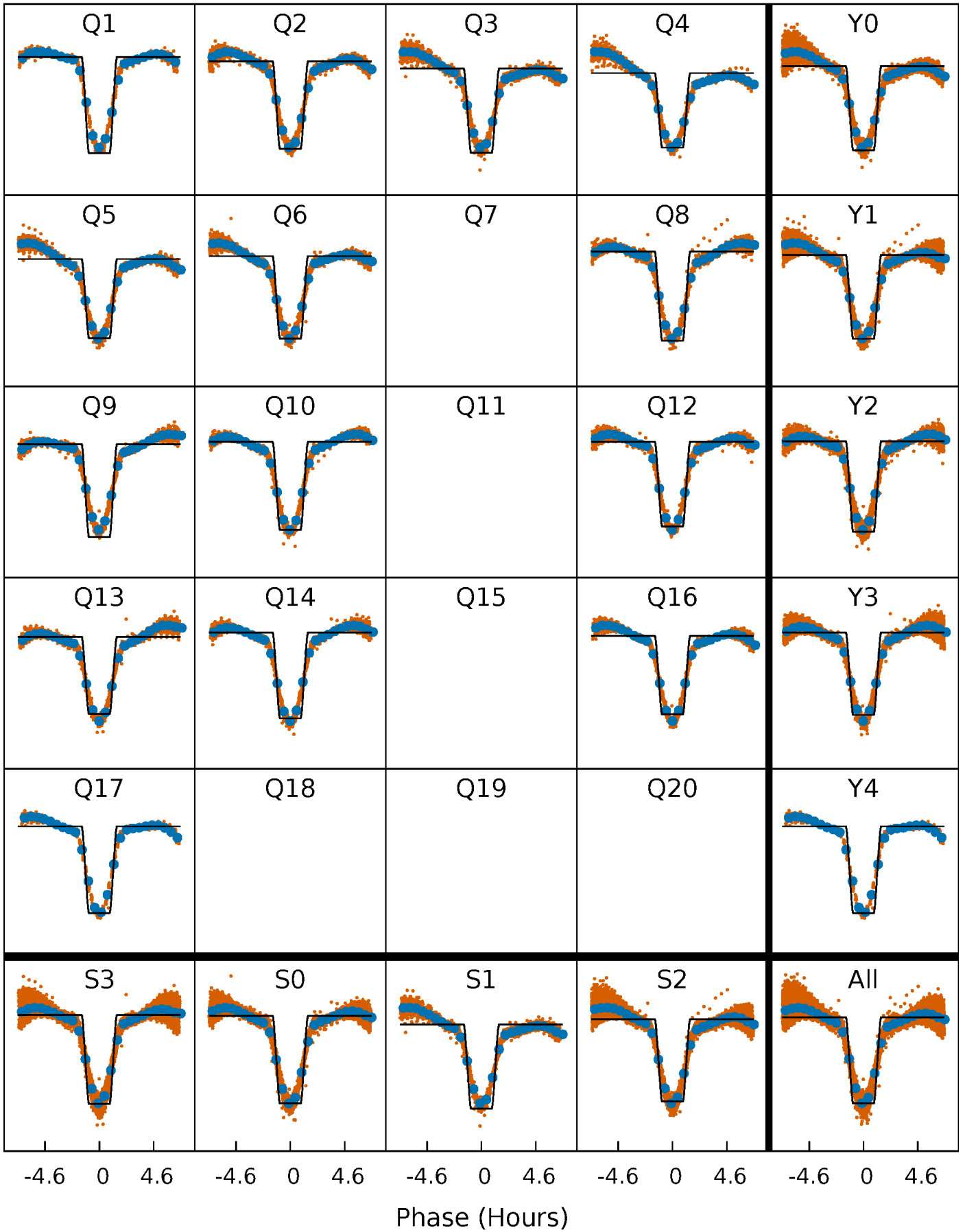
DV Quarter-Phased Transit Curves

TCE 010616829-02 P= 1.072934 Days $T_0=131.763277$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

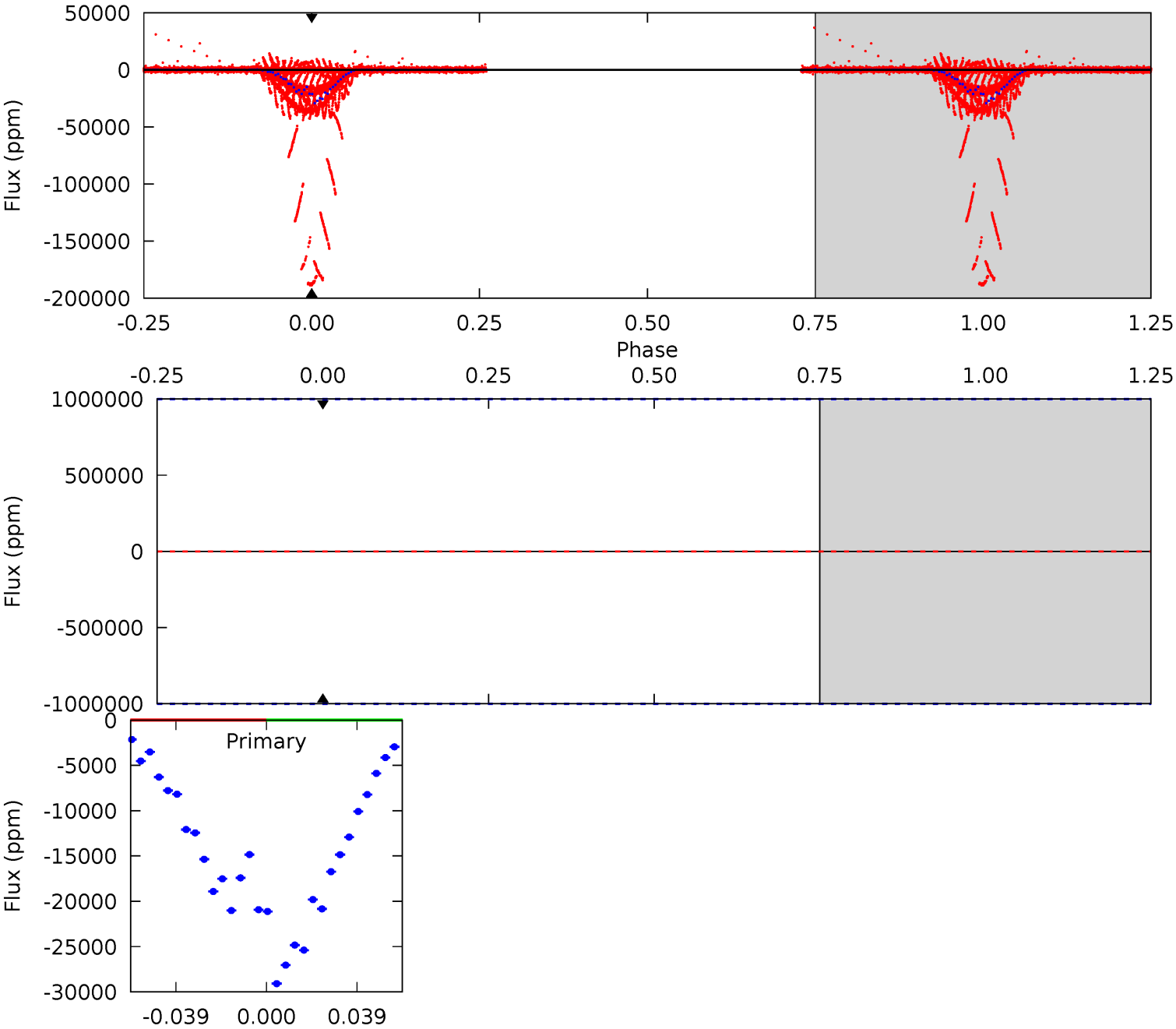
TCE 010616829-02 P= 1.072934 Days $T_0=131.758125$ (BKJD)



DV Model-Shift Uniqueness Test

010616829-02, P = 1.072934 Days, E = 130.690343 Days

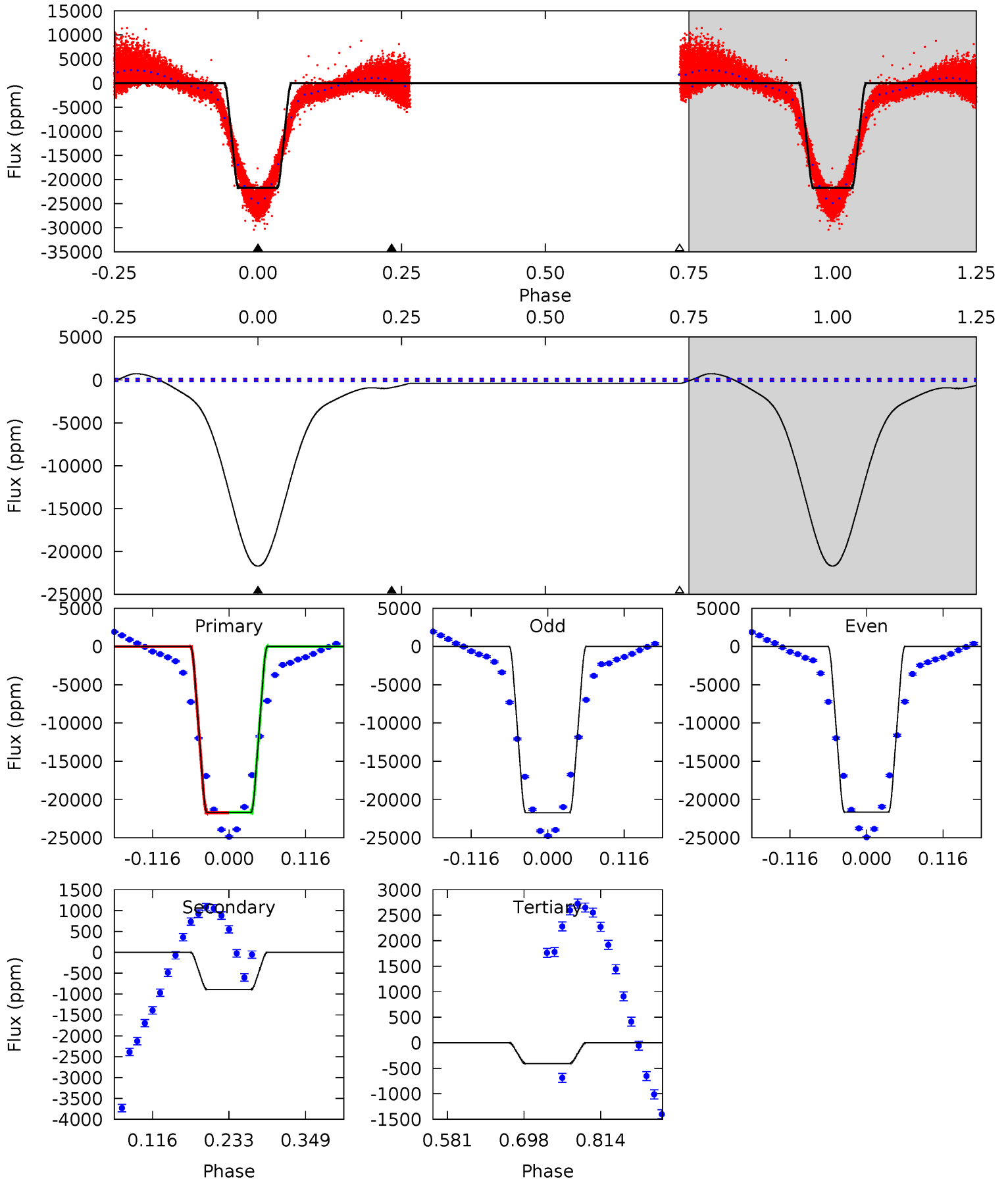
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|-----|-----|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|-----|-------|-----|
| 0 | 0 | 0 | 0 | 1.00 | 1.00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



Alt Model-Shift Uniqueness Test

010616829-02, P = 1.072934 Days, E = 130.685191 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|-------|------|------|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 611.6 | 25.1 | 11.5 | 0 | 4.53 | 1.57 | 22.8 | 600.1 | 611.6 | 13.6 | 25.1 | 0.80 | 1.00 | 0.03 | 2.68 |



Stellar Parameters For KIC 010616829

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|--|
| | 7031^{+225}_{-338} | $4.222^{+0.105}_{-0.210}$ | $-0.060^{+0.250}_{-0.350}$ | $1.523^{+0.526}_{-0.263}$ | $1.415^{+0.220}_{-0.220}$ | $0.564^{+0.287}_{-0.298}$ |
| | +3%/-5% | +2%/-5% | +417%/-583% | +35%/-17% | +16%/-16% | +51%/-53% |
| 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 010616829-02 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|-----------------|---------------------------|----------------------|--------------------------|-----------------------------|
| DV | 0 ± 1000000 | $40.26^{+18.96}_{-16.34}$ | 3562^{+304}_{-238} | -3221^{+12596}_{-5259} | $0.084^{+25.512}_{-16.688}$ |
| Alt. | -892 ± 35 | $27.73^{+17.86}_{-15.68}$ | 3556^{+313}_{-221} | 2601^{+1789}_{-5767} | $0.343^{+1.367}_{-0.217}$ |

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

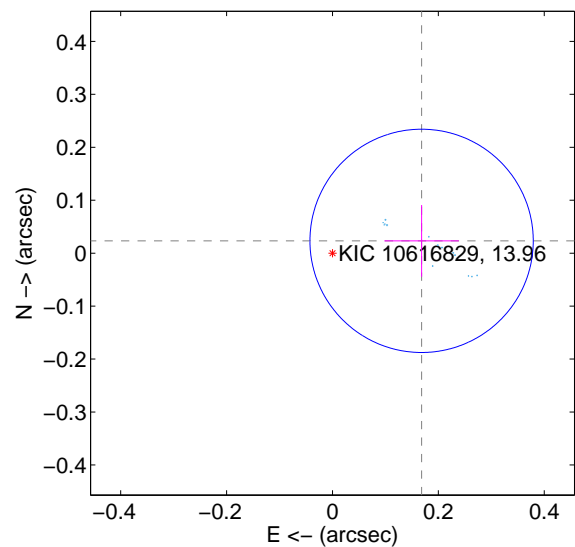
Supplemental centroid analysis for 010616829-02. Kepler magnitude: 13.96. Transit SNR -1.00

There are 14 quarters with good PRF difference image offsets

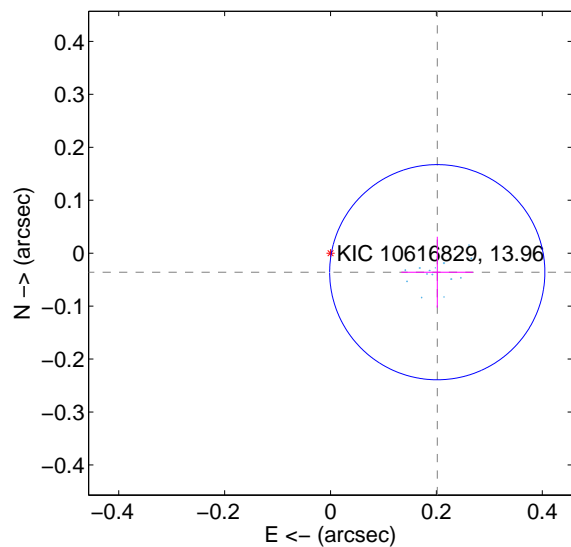
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 0.170 ± 0.070 | 2.42 | -0.168 ± 0.070 | 0.023 ± 0.068 |
| PRF-fit source offset from KIC position | 0.205 ± 0.068 | 3.02 | -0.202 ± 0.068 | -0.036 ± 0.067 |
| photometric centroid source offset | 0.09 ± 0.00 | 43.20 | 0.03 ± 0.00 | -0.08 ± 0.00 |

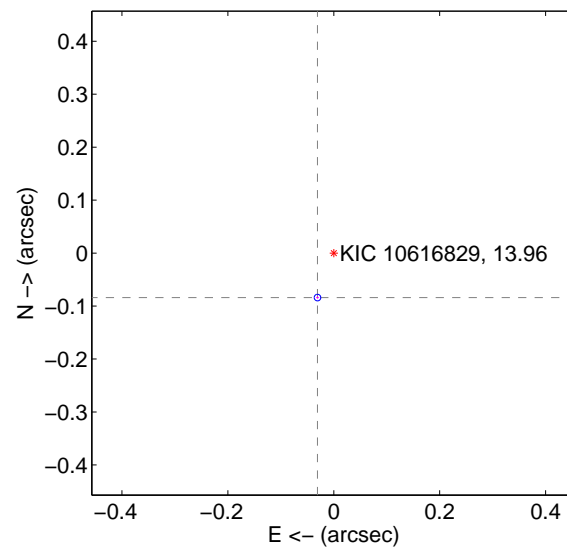
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

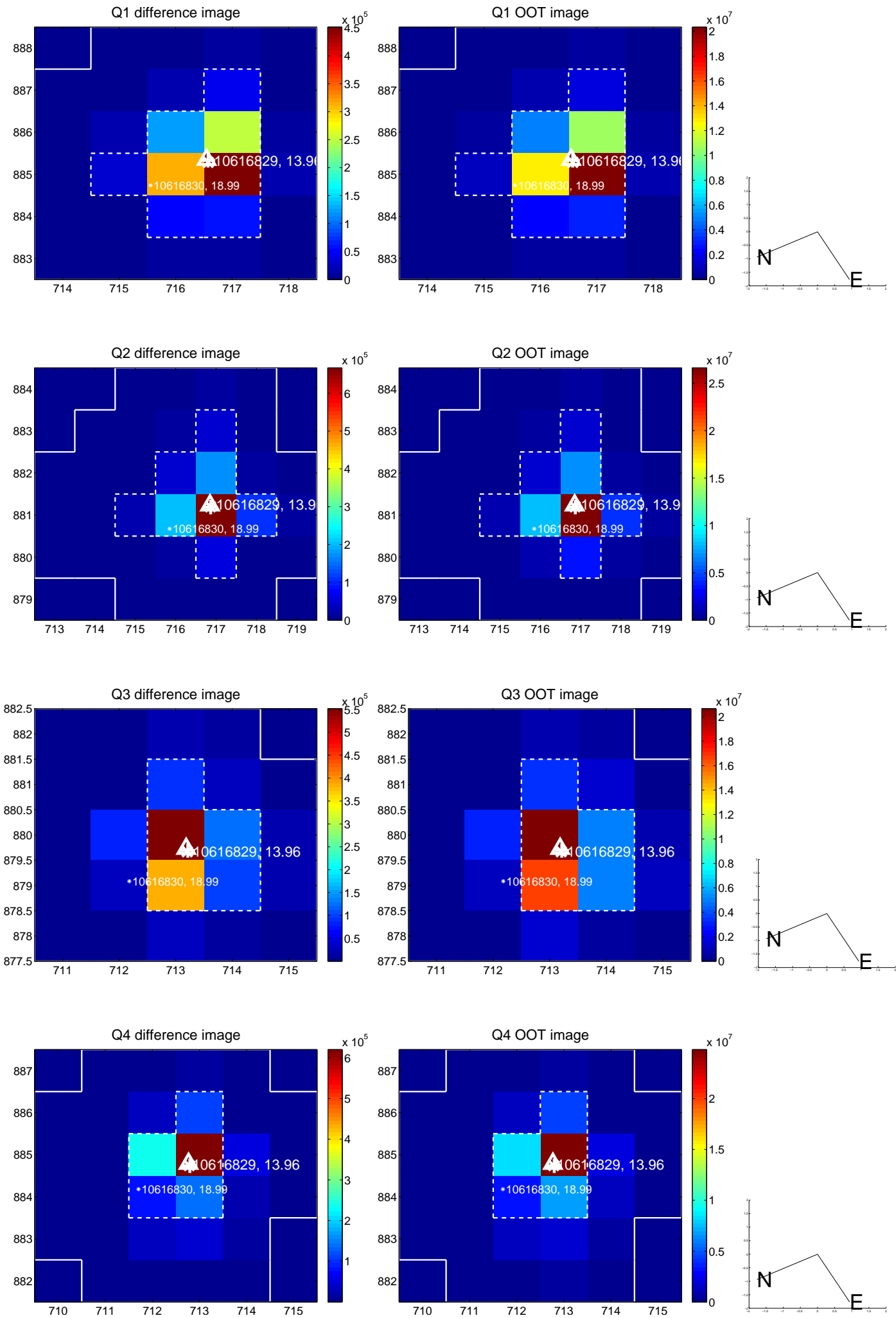


offset from photometric centroids

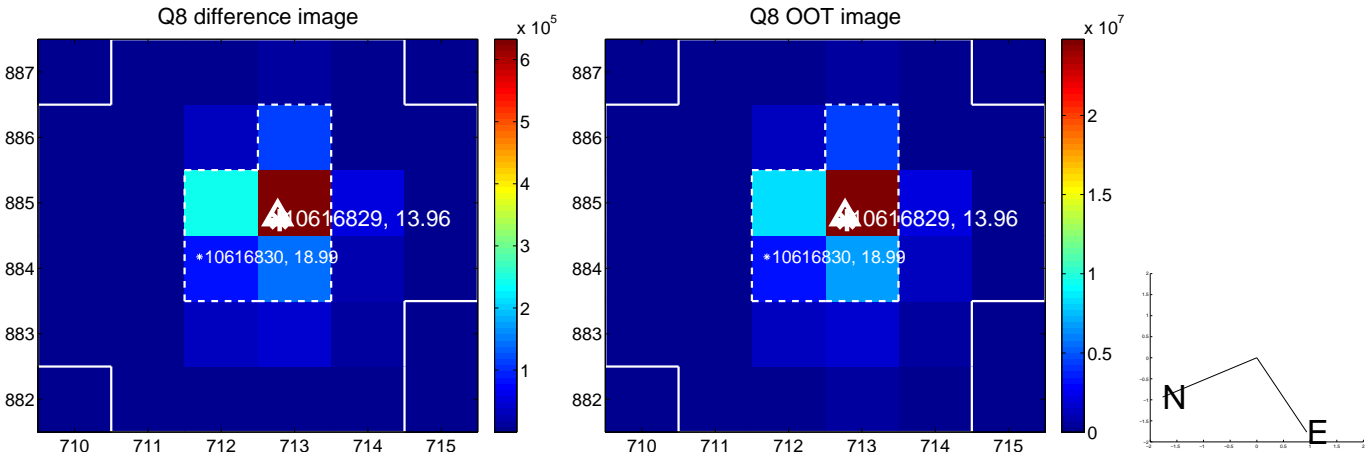
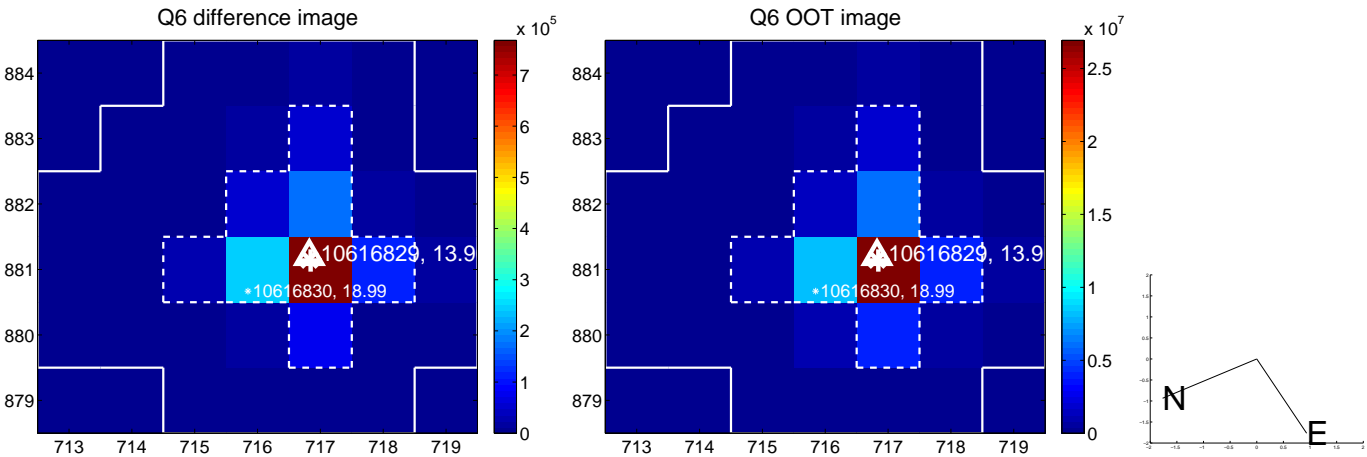
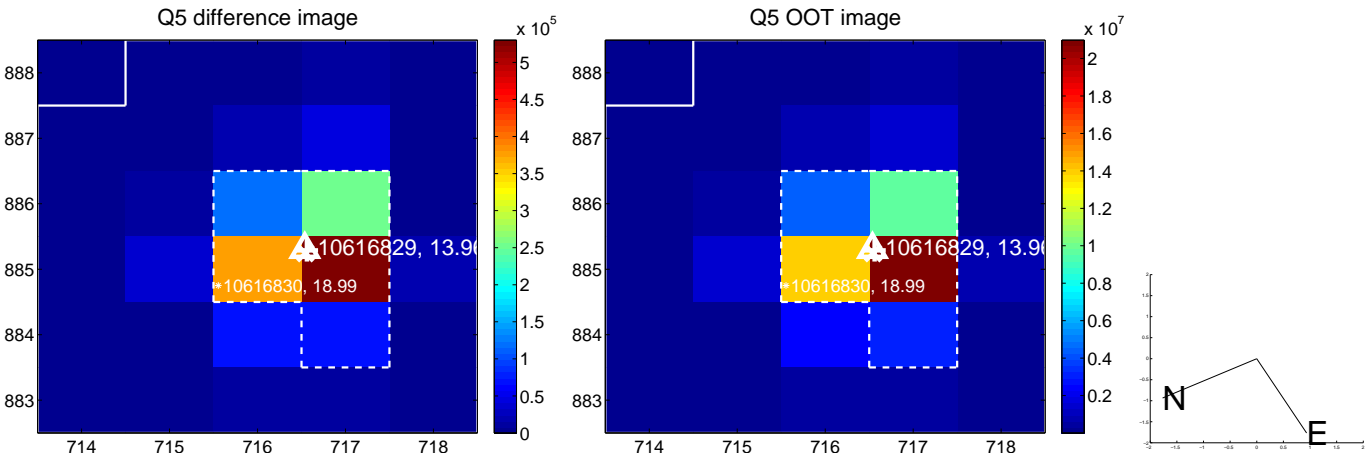


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

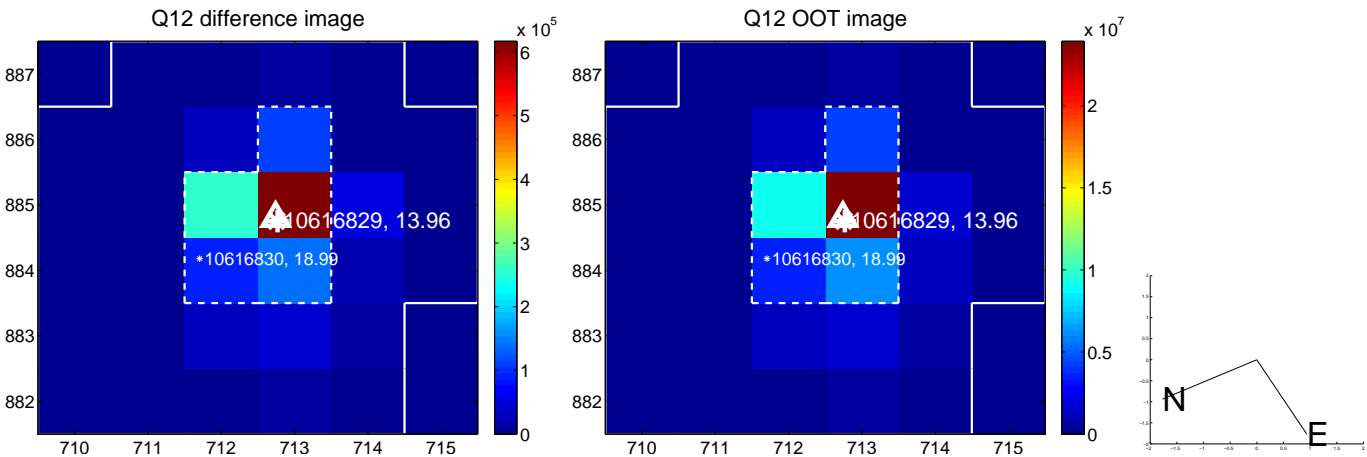
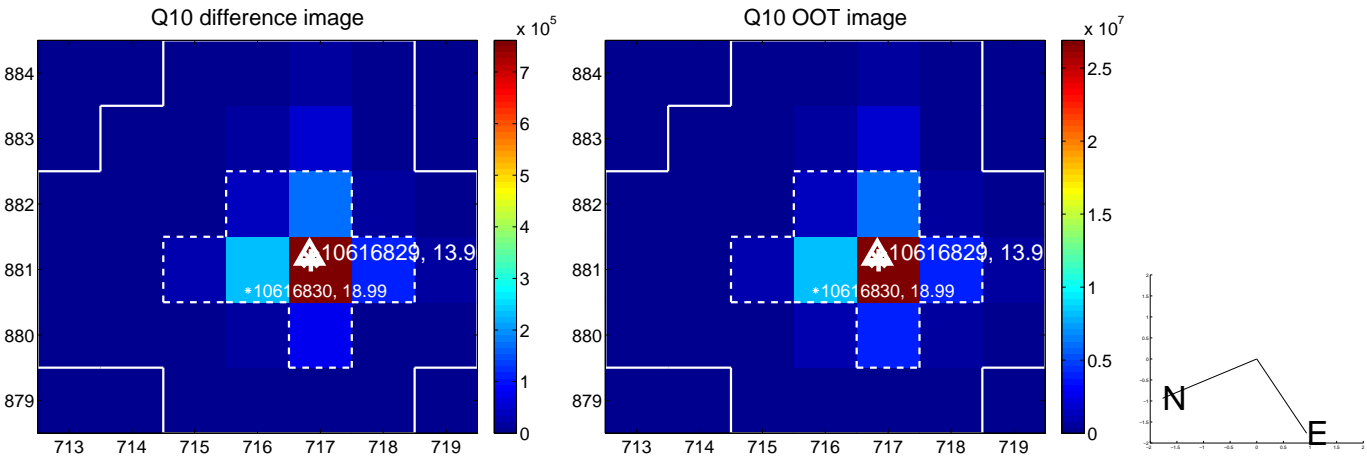
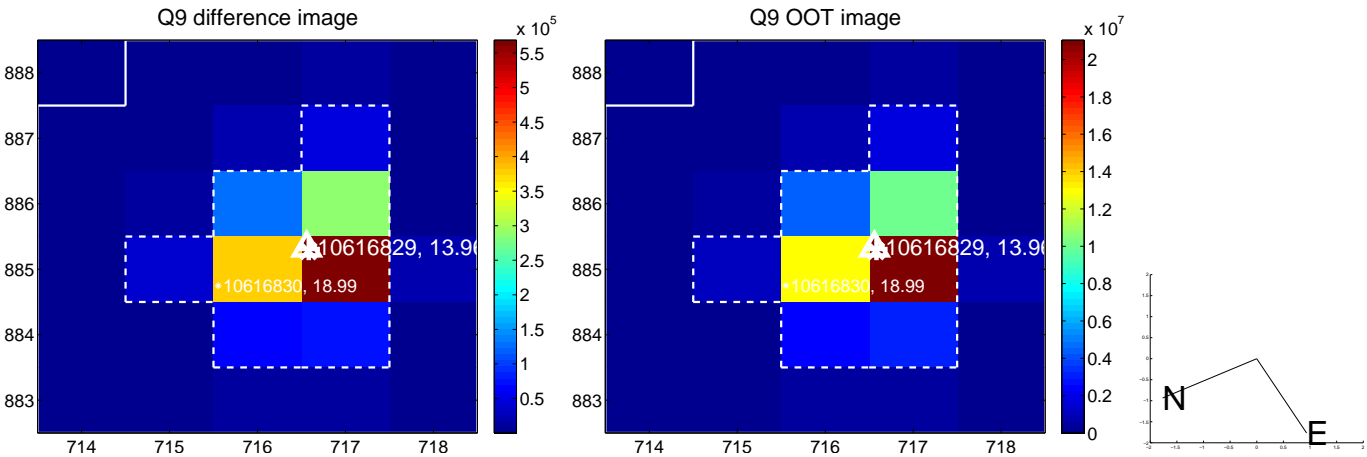
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



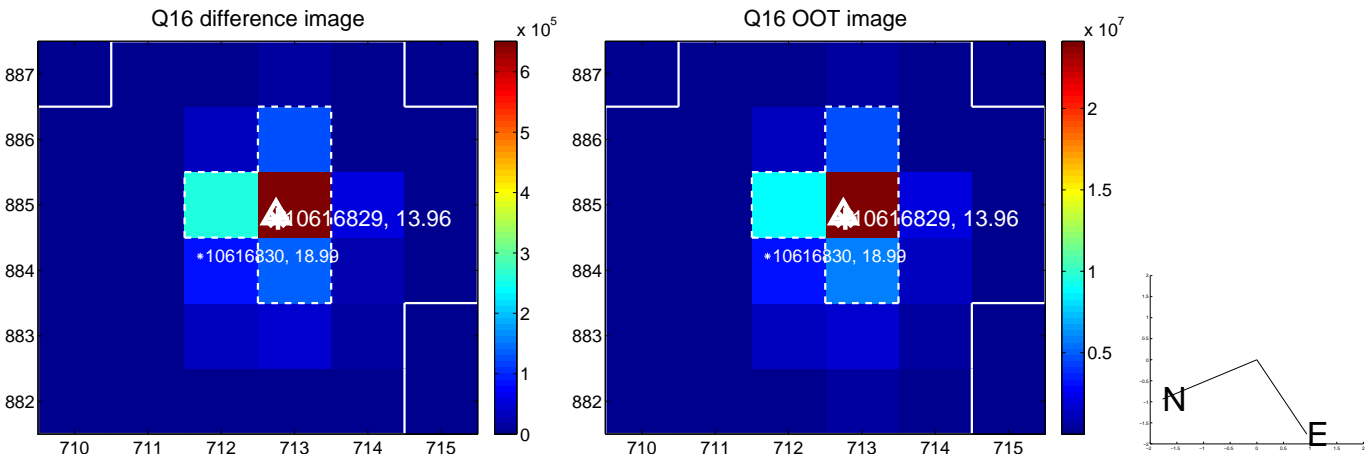
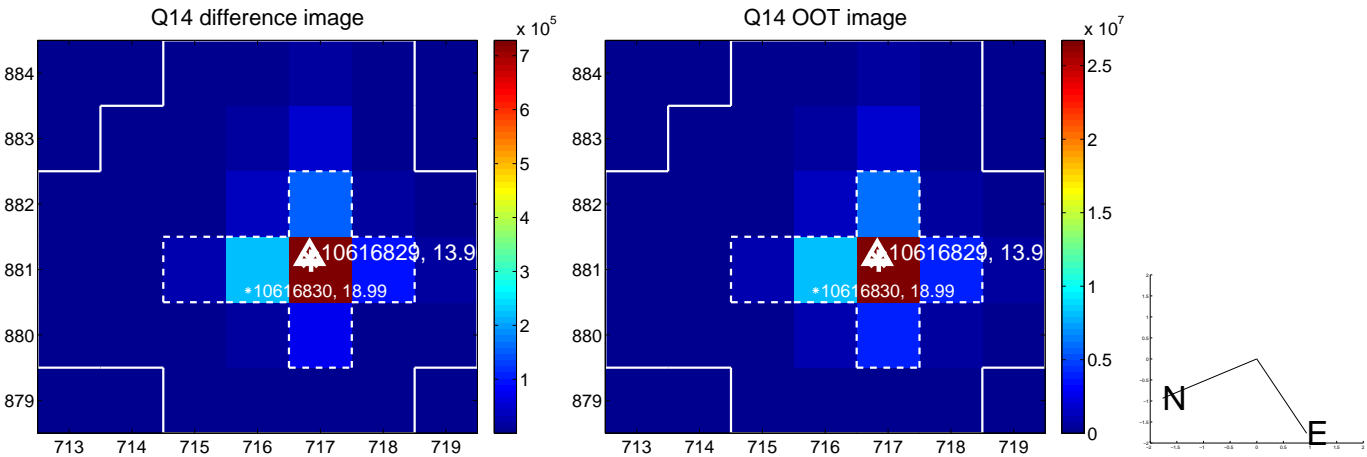
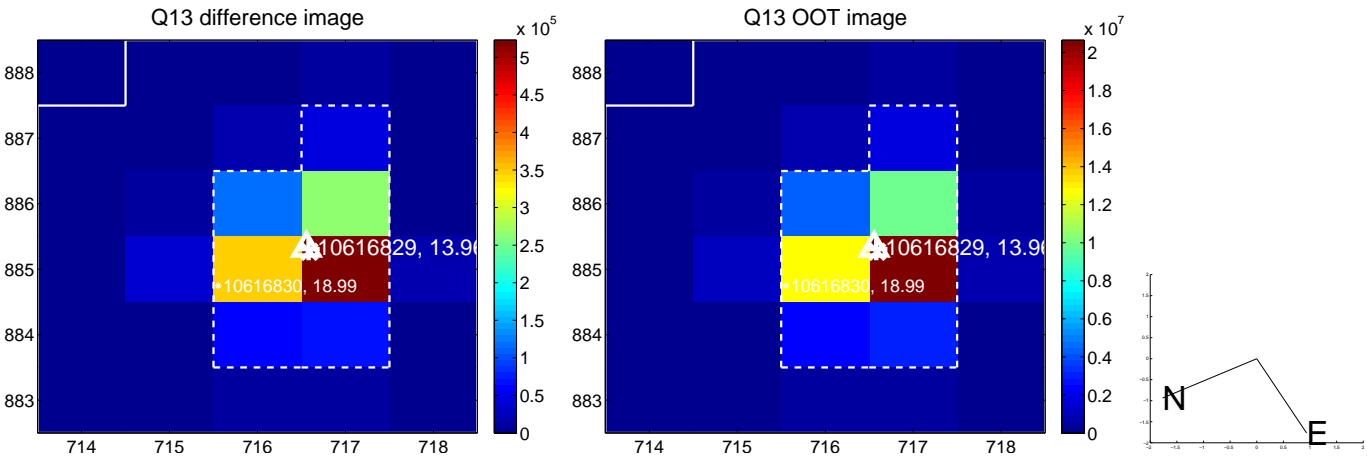
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



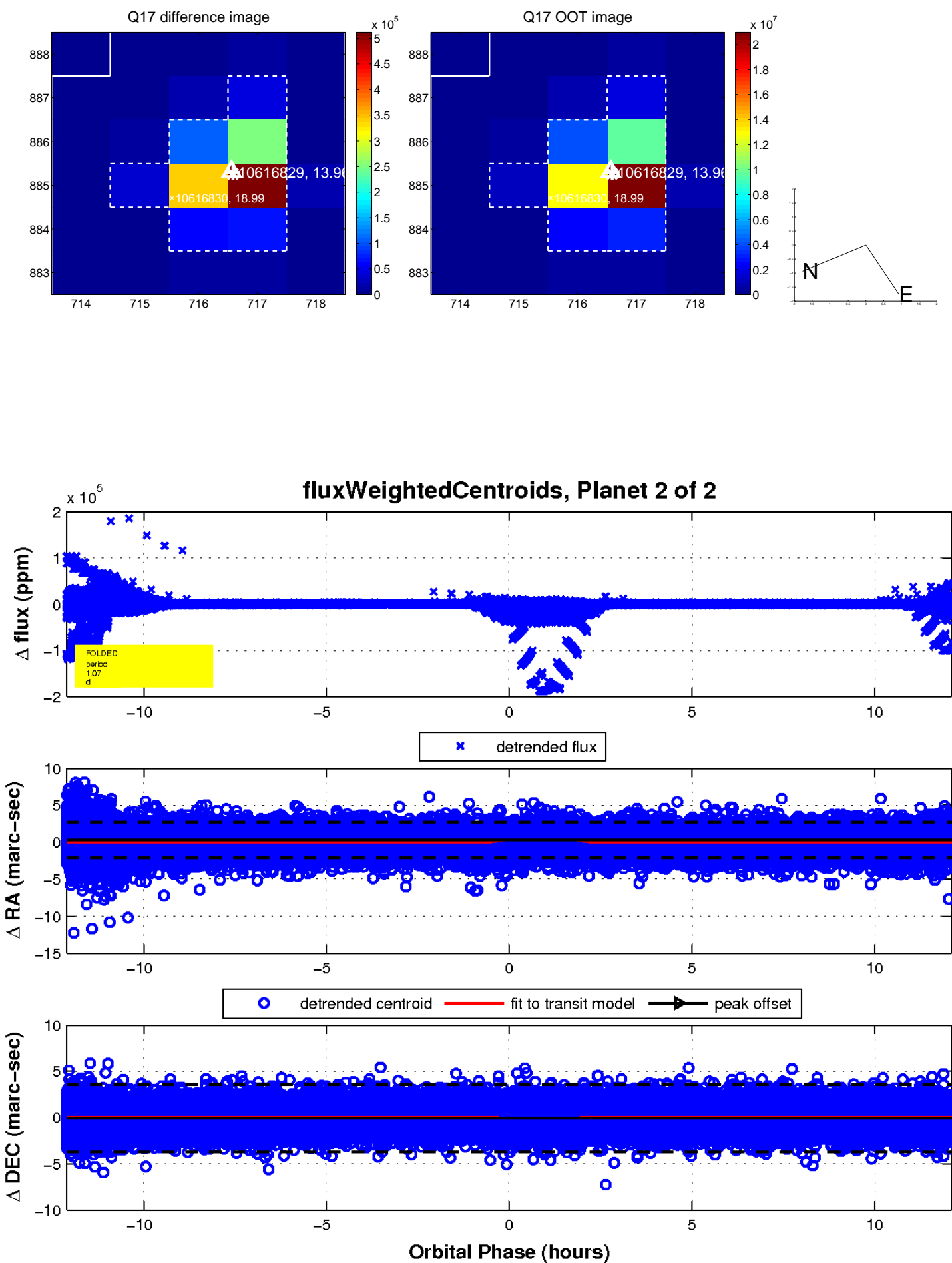
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



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



UKIRT Image

Declination

