

KIC 011616200

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|--------|--------|-----------------------------|-----------------|------------------------|------------------------|
| 011616200-01 | OBS | 7462.01 | 1.718637 | 132.216013 | 186768.8 | 3.839 | 5297.6 | 3329.3 | 0.86 | 6071 | 38.60 | 1195.91 |
| 011616200-02 | OBS | No | 0.859326 | 132.208911 | 5674.2 | 2.500 | 739.4 | -1.0 | 0.86 | 6071 | 6.54 | 3013.48 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|---|
| 011616200-01 | OBS | FP | 0.00 | 0 | 1 | 0 | 0 | SWEET_EB—MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE |
| 011616200-02 | 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 011616200-01

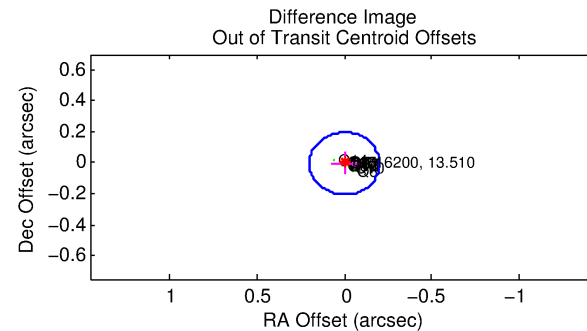
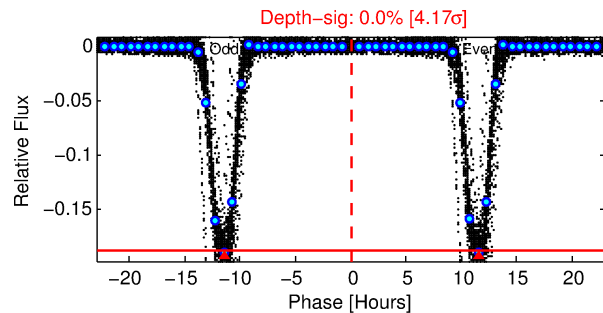
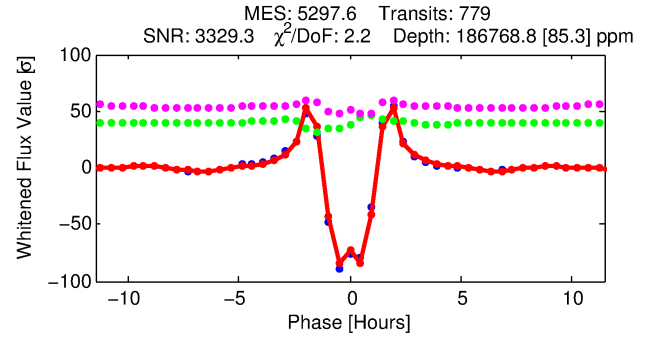
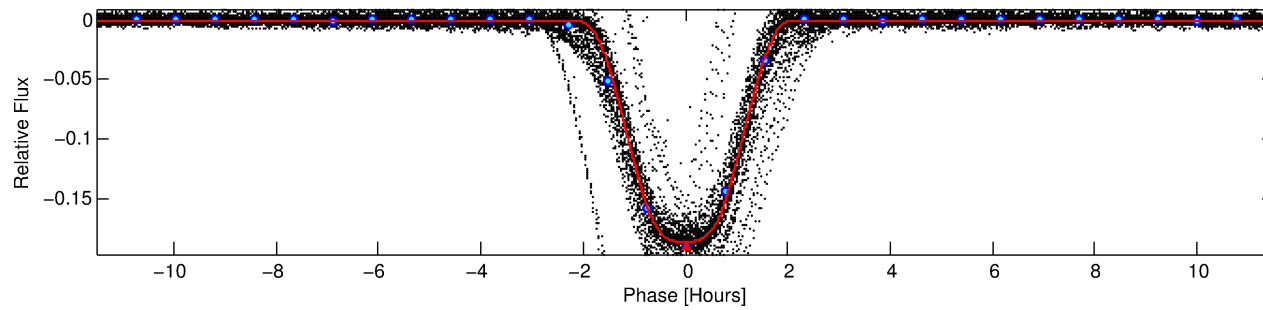
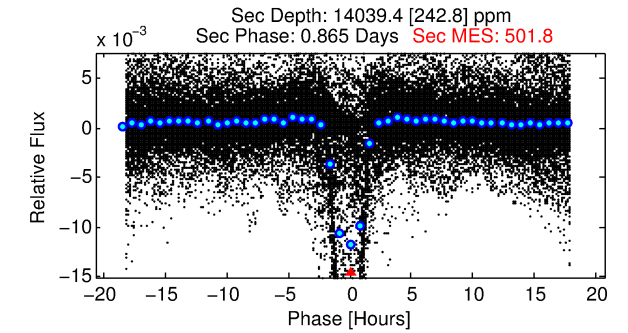
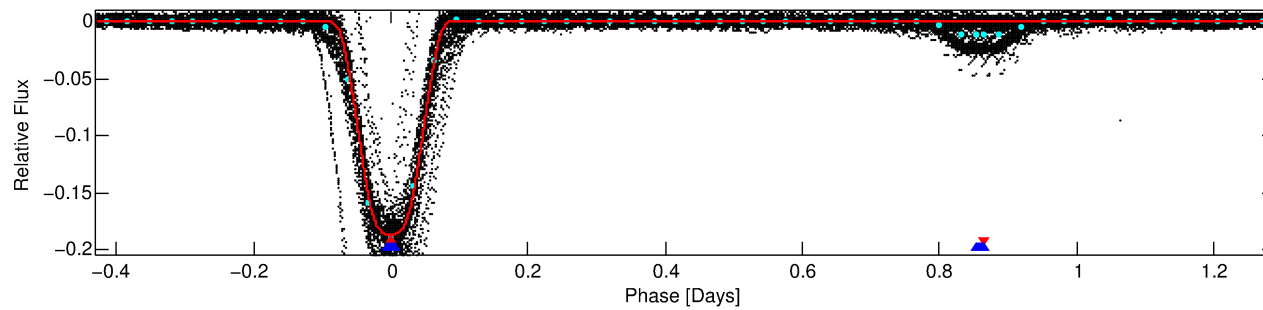
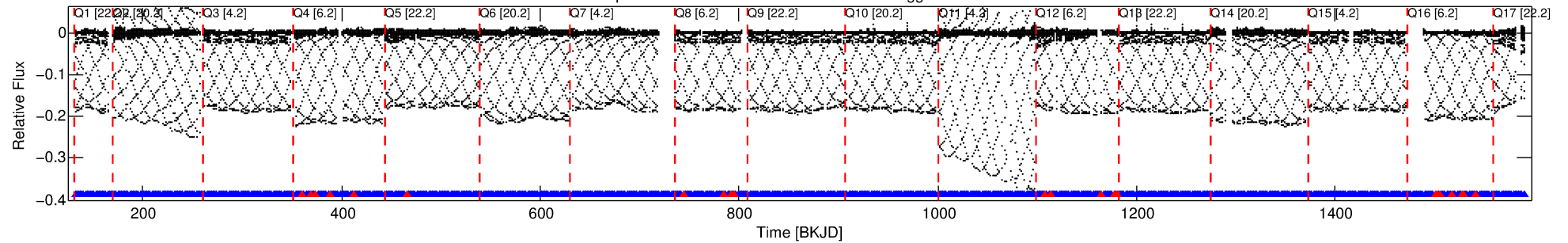
No Significant Match Found

DV One-Page Summary

KIC: 11616200 Candidate: 1 of 2 Period: 1.719 d

KOI: K07462.01 Corr: 0.982

Kp: 13.51 R*: 0.86 Rs Teff: 6071.0 K Logg: 4.54 Fe/H: -0.420



DV Fit Results:

Period = 1.71864 [0.00000] d
Epoch = 132.2160 [0.0000] BKJD
Rp/R* = 0.4089 [0.0001]
a/R* = 4.70 [0.00]
b = 0.40 [0.00]
Seff = 1195.92 [480.29]
Teff = 1500 [151] K
Rp = 38.60 [11.56] Re
a = 0.0276 [0.0071] AU
Ag = 3.95 [1.51] [1.95σ]
Teffp = 3268 [100] K [9.80σ]

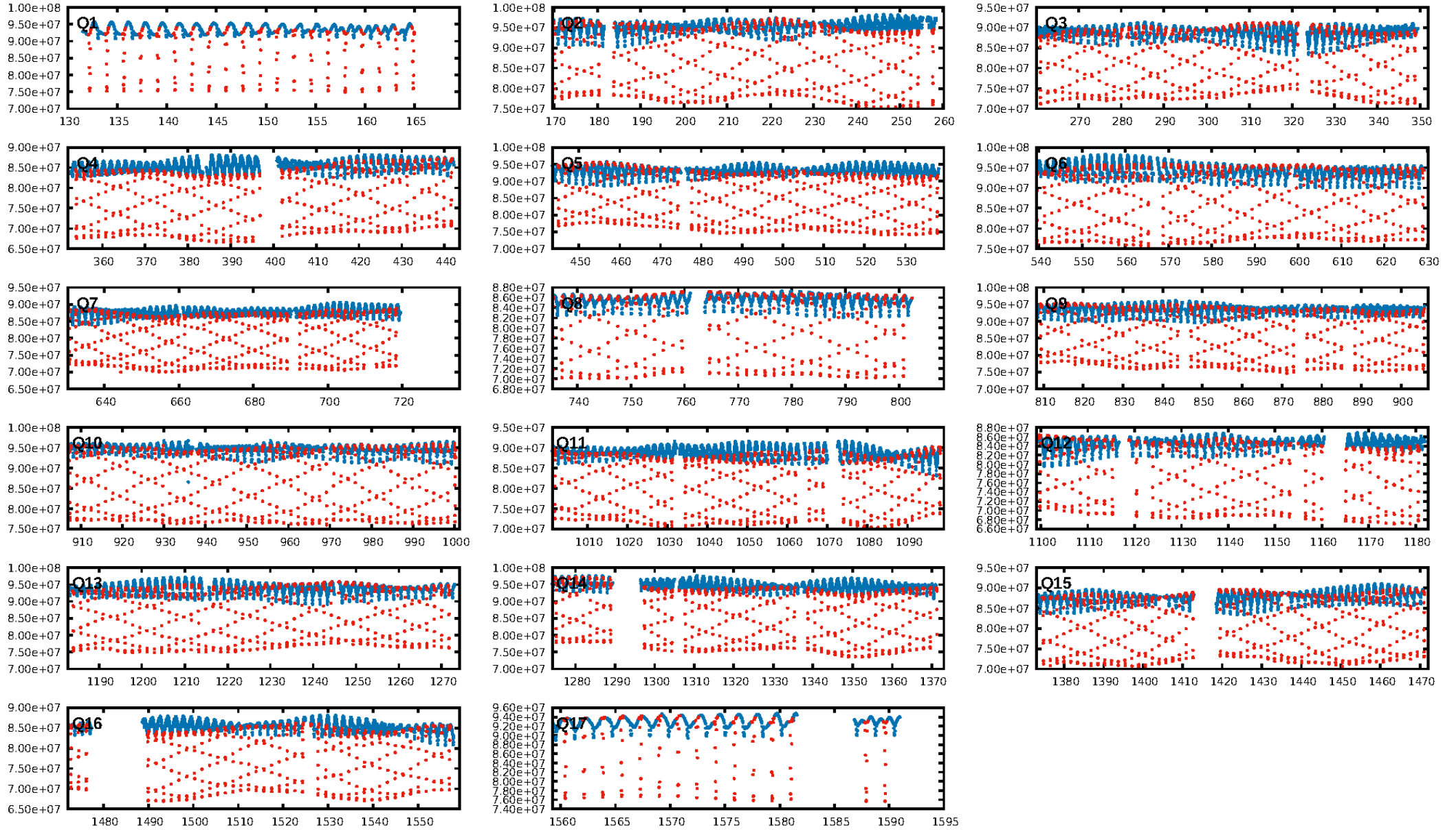
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [4.50σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 0.97 [722/744]
GhostDiagnostic-chr: 1.385
Centroid-sig: 0.0%
Centroid-so: 0.129 arcsec [302.43σ]
OotOffset-rm: 0.005 arcsec [0.07σ]
KicOffset-rm: 0.160 arcsec [2.38σ]
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]

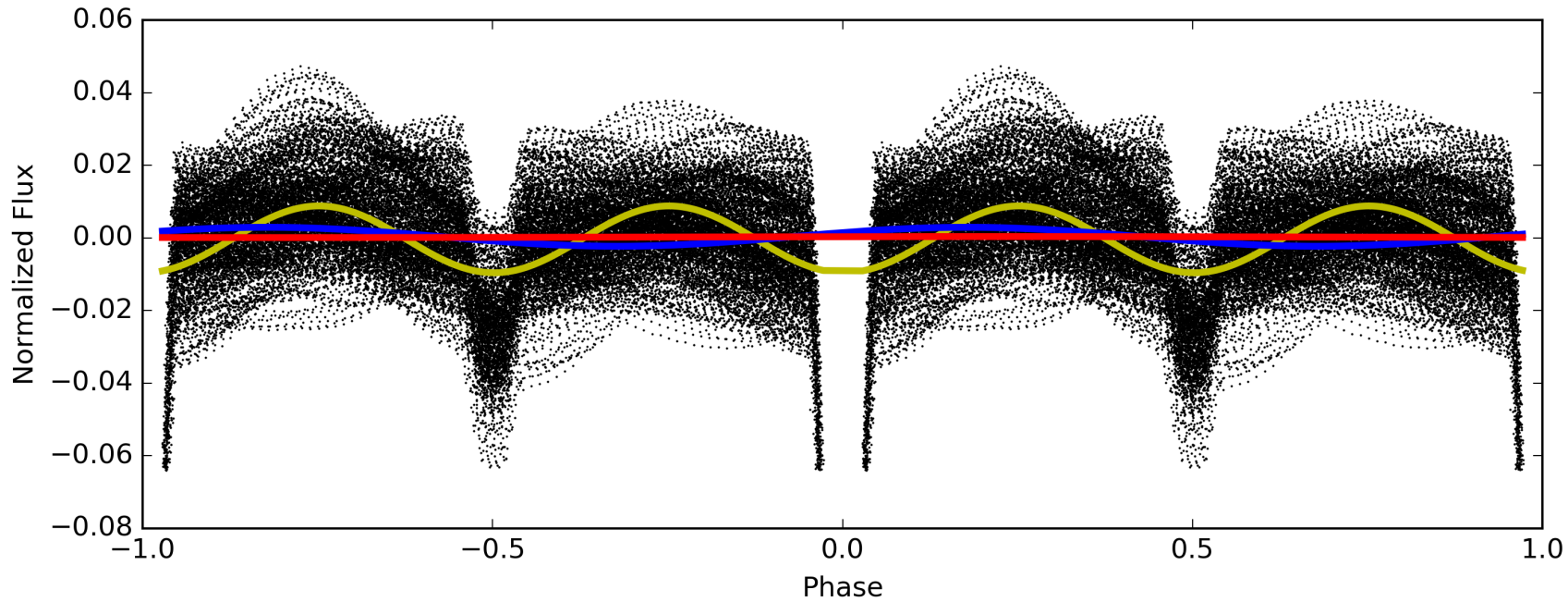
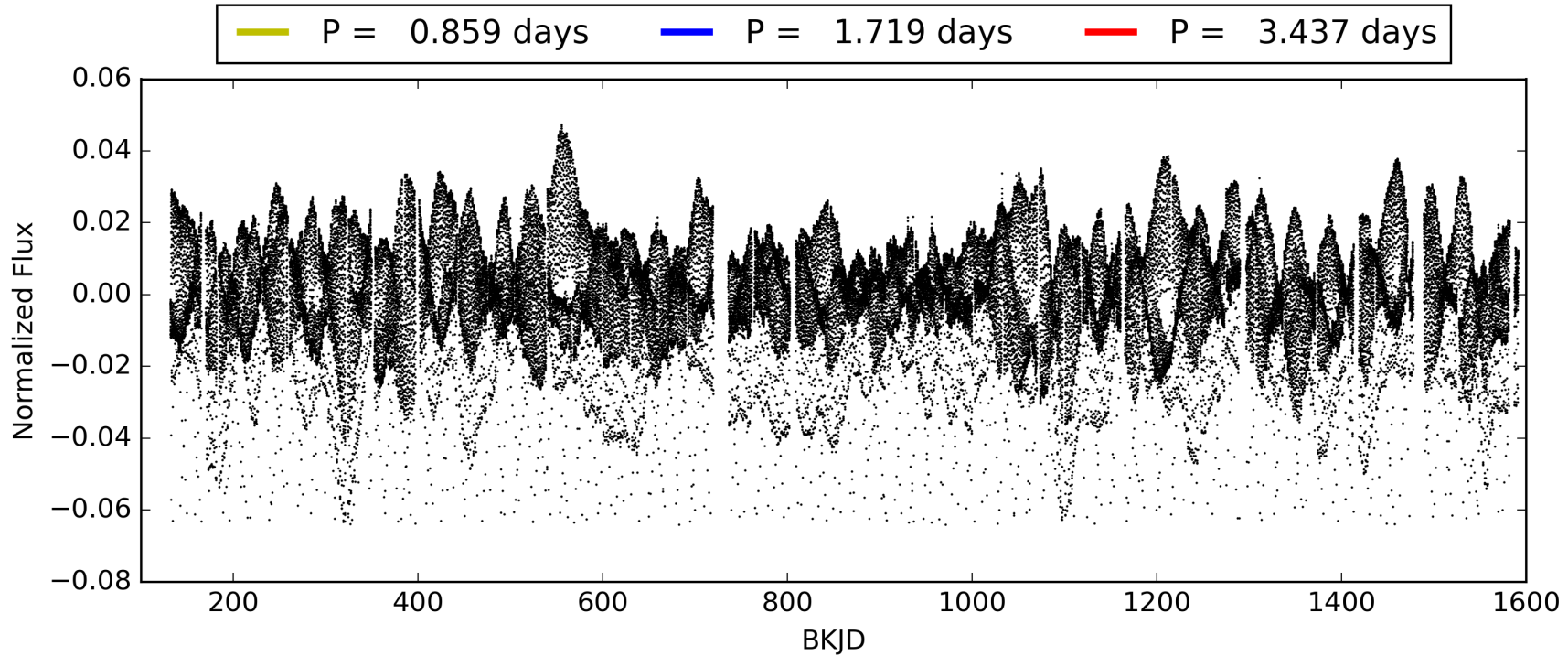
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:22:39 Z

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

TCE 011616200-01, PDC Light Curves

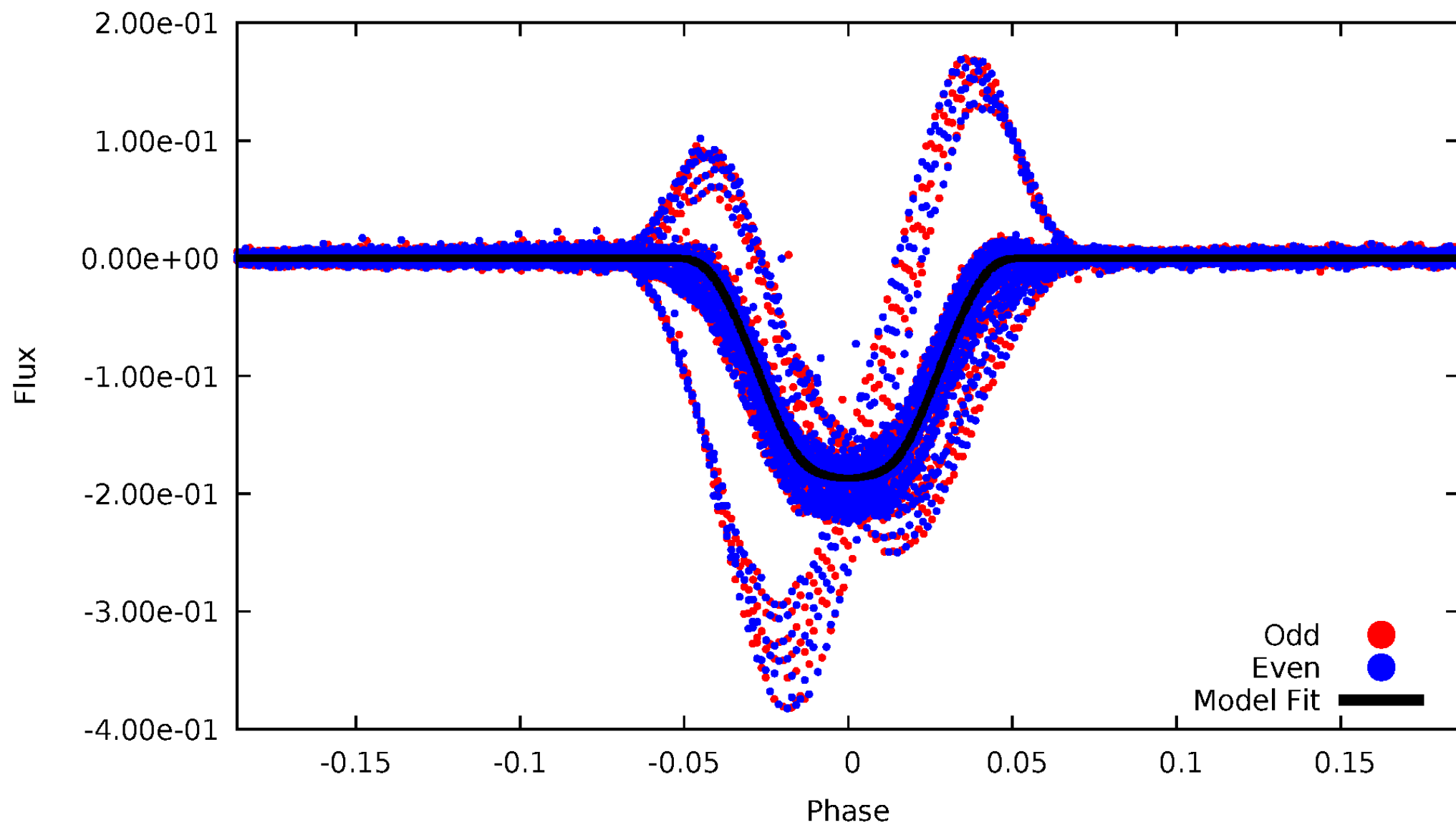


TCE 011616200-01



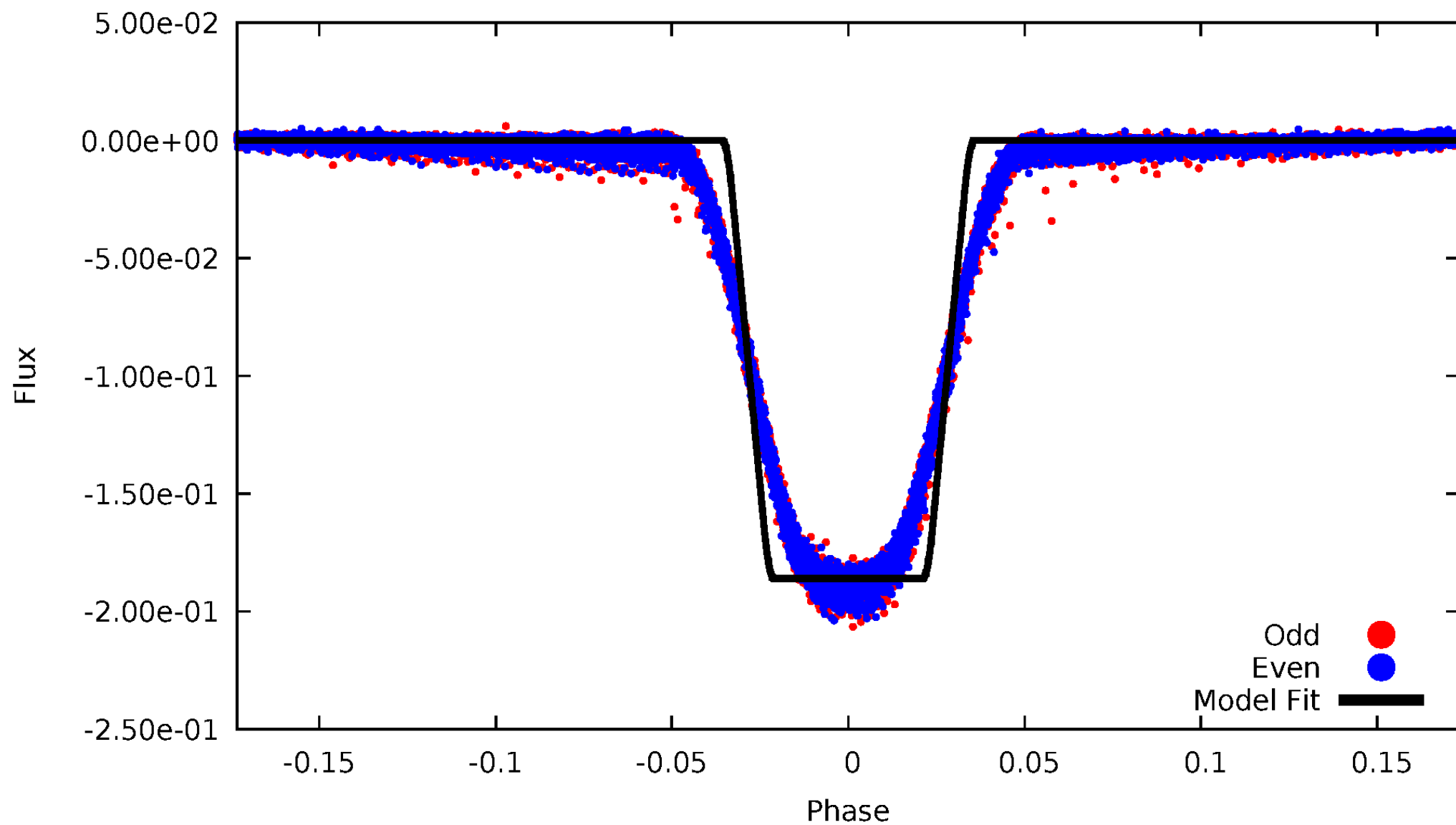
DV Odd/Even

TCE 011616200-01



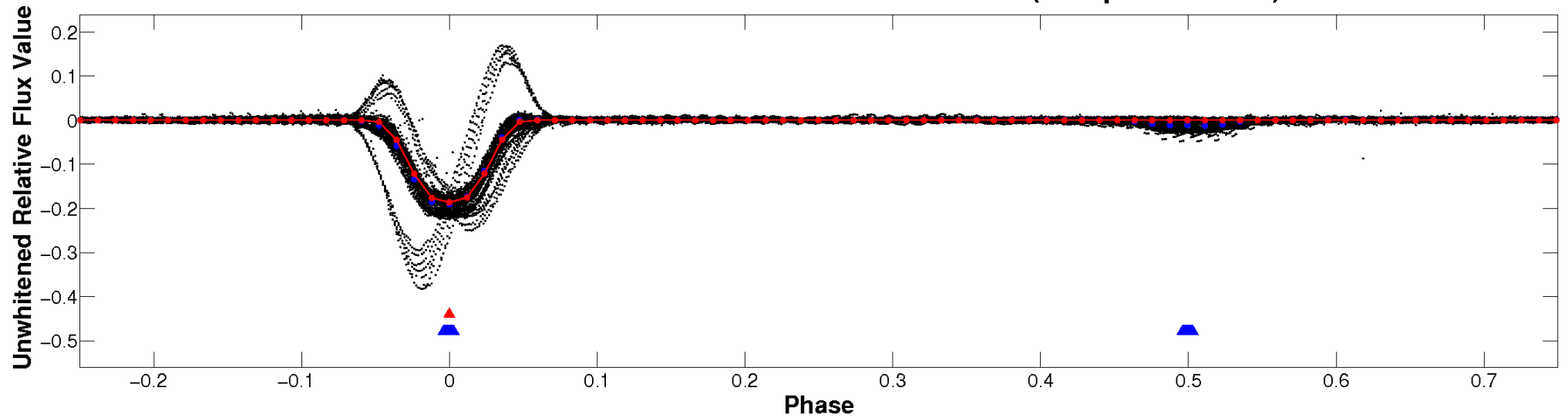
ALT Odd/Even

TCE 011616200-01

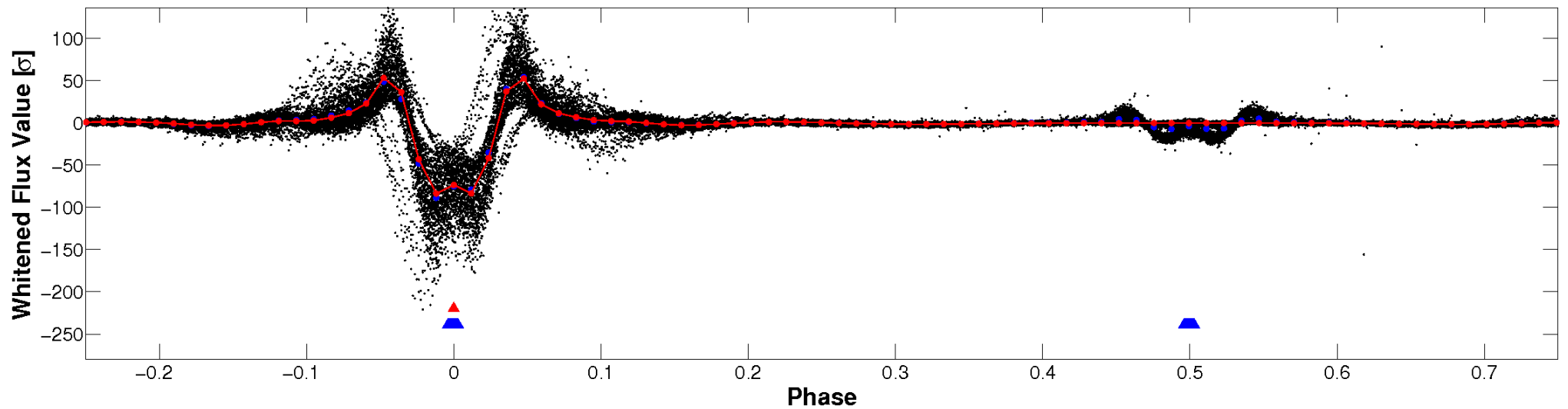


Non-Whitened Vs. Whitened Light Curve

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

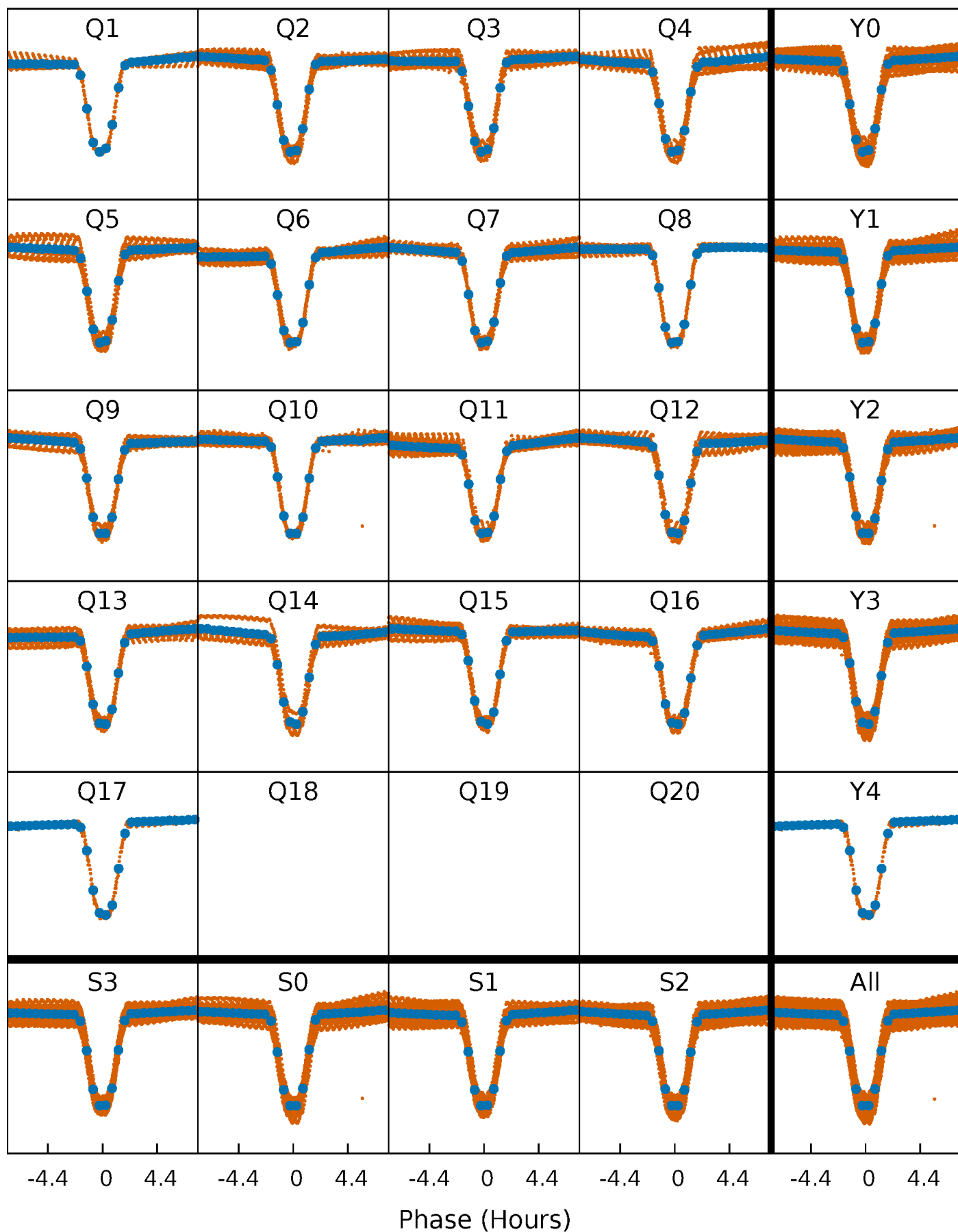


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



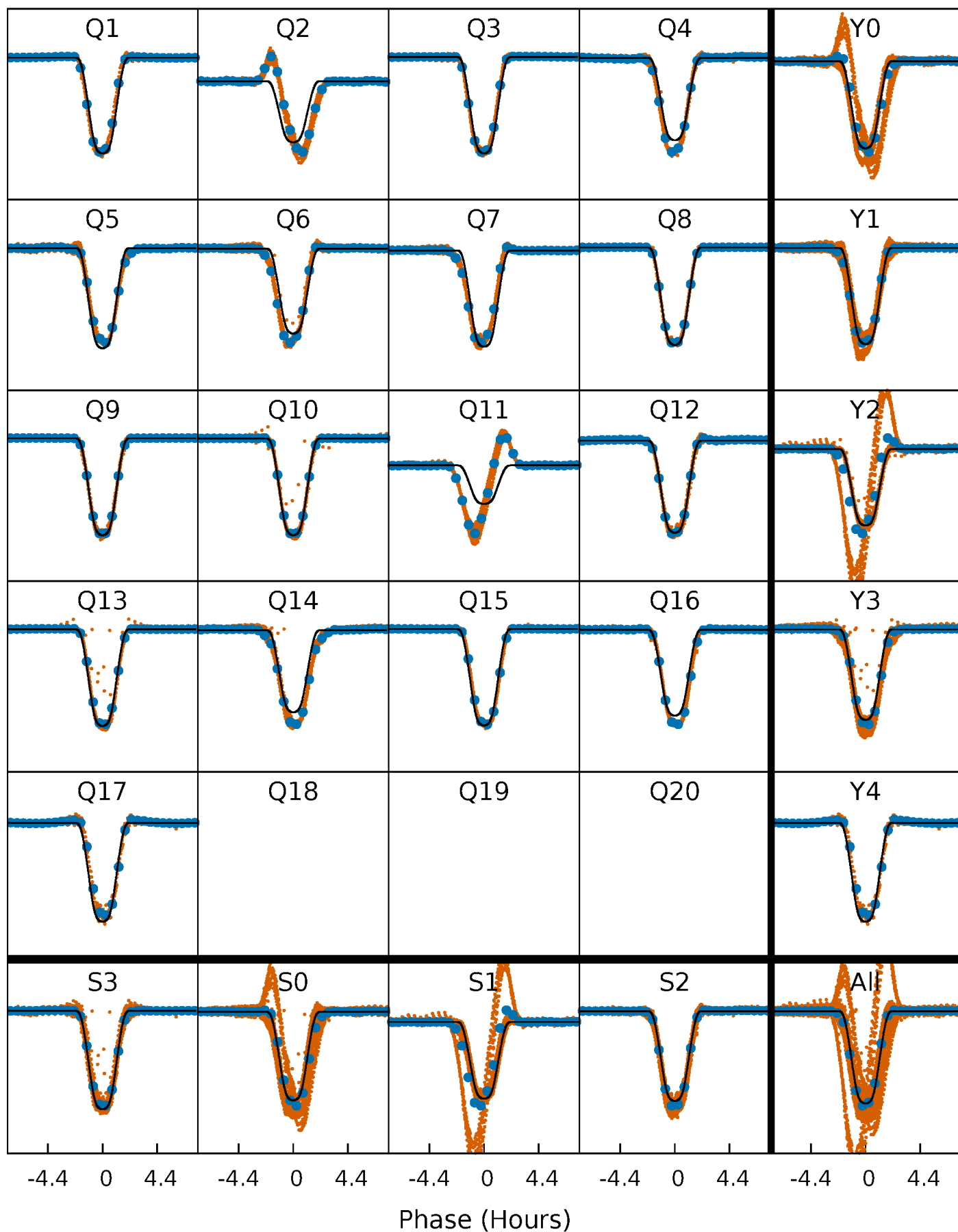
PDC Quarter-Phased Transit Curves

TCE 011616200-01 P= 1.718637 Days $T_0=132.216013$ (BKJD)



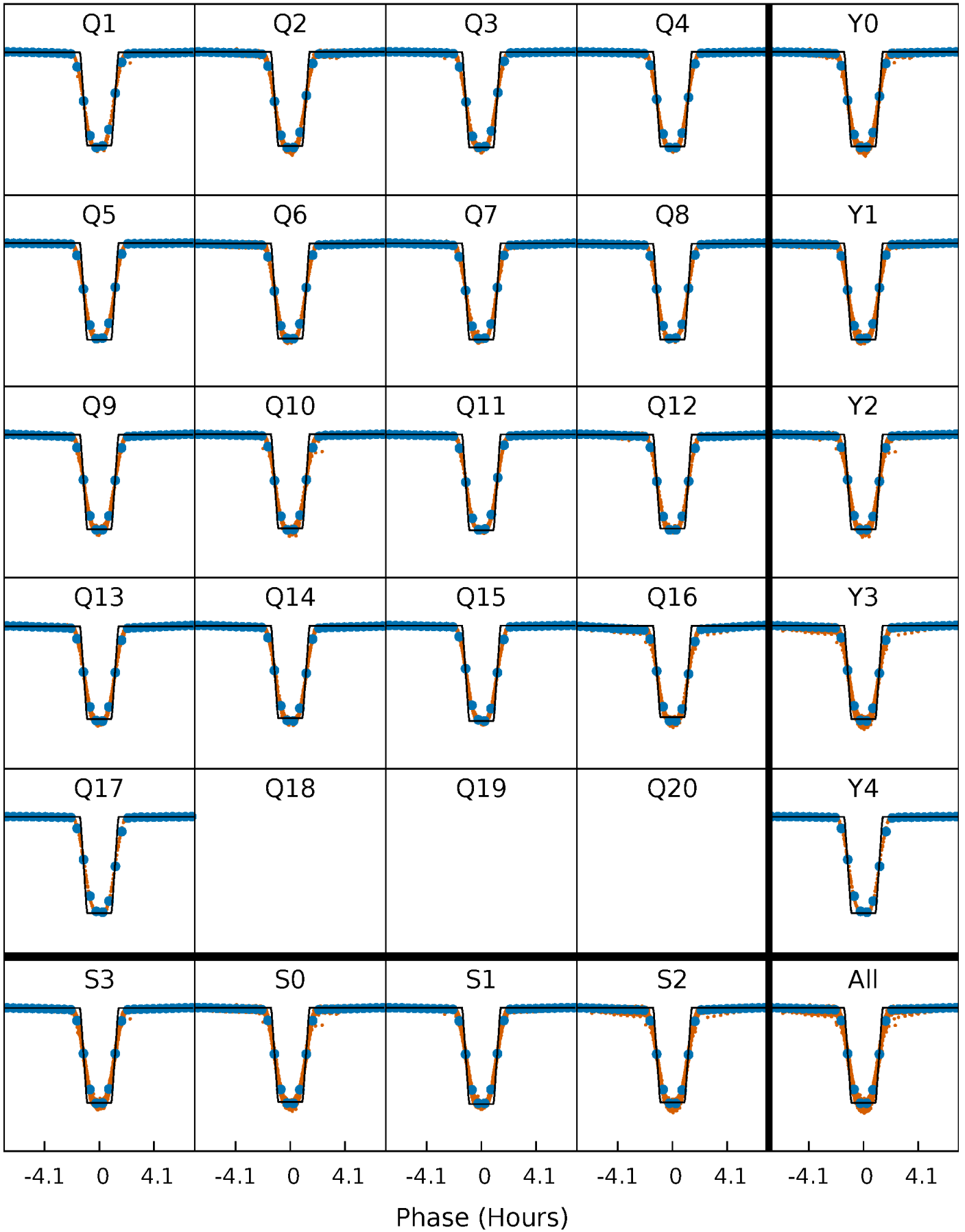
DV Quarter-Phased Transit Curves

TCE 011616200-01 P= 1.718637 Days $T_0=132.216013$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

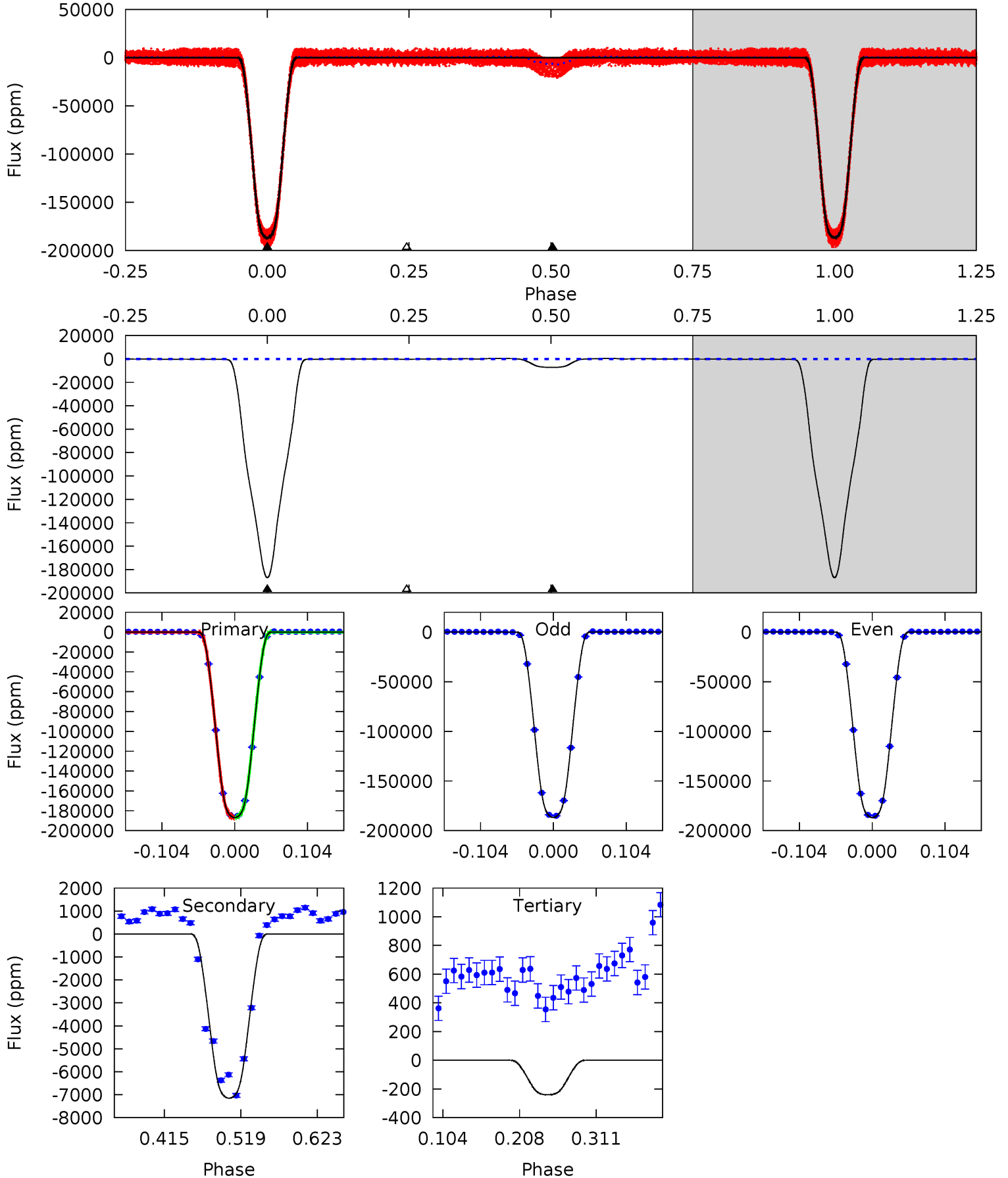
TCE 011616200-01 P= 1.718646 Days $T_0=132.212340$ (BKJD)



DV Model-Shift Uniqueness Test

011616200-01, P = 1.718637 Days, E = 130.497376 Days

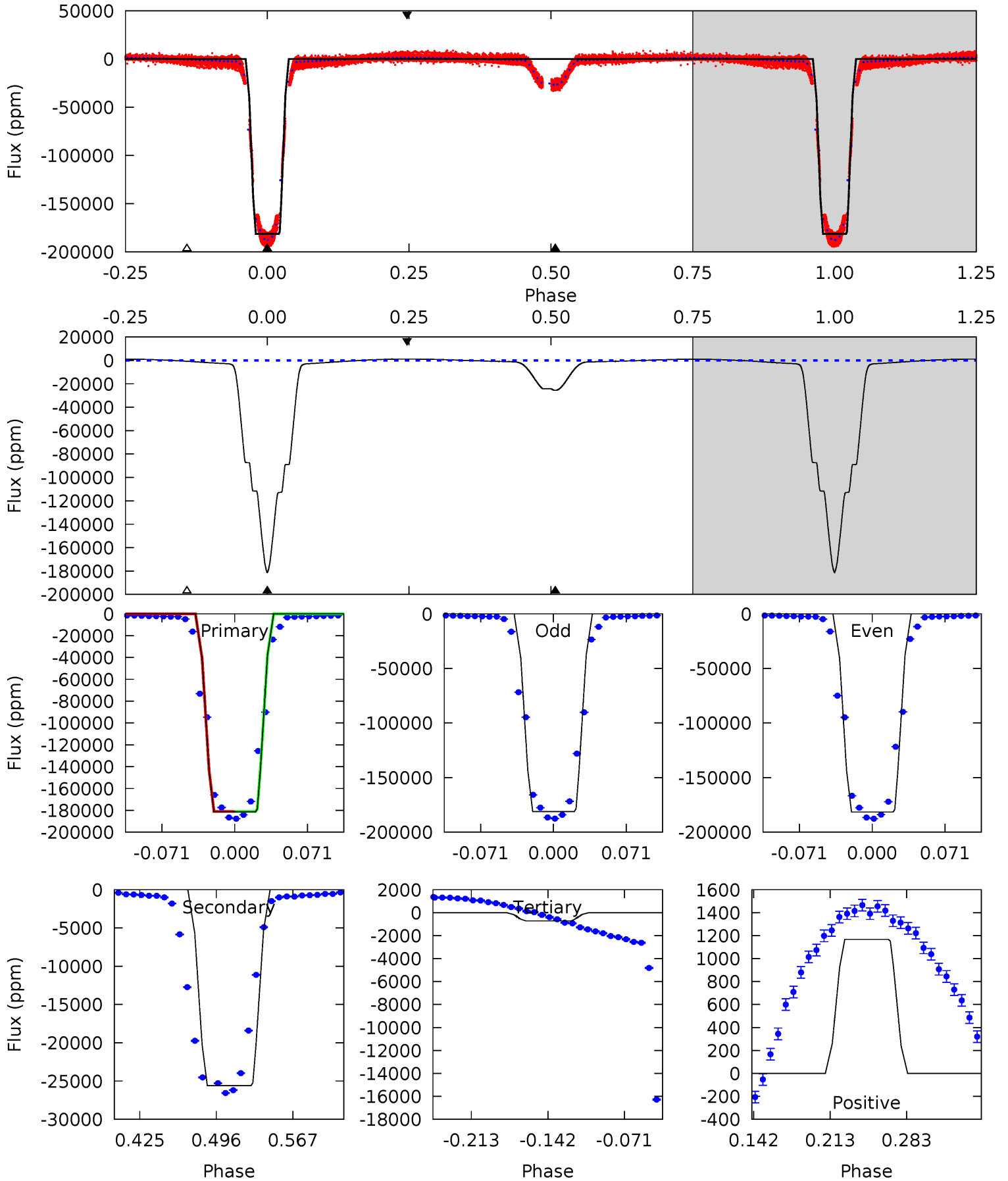
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|-------|------|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 4470 | 171.1 | 5.76 | 0 | 4.56 | 1.63 | 4.33 | 4464 | 4470 | 165.3 | 171.1 | 2.83 | 1.02 | 0.00 | 4.15 |



Alt Model-Shift Uniqueness Test

011616200-01, P = 1.718646 Days, E = 130.493694 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|-------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 5434 | 767.1 | 21.6 | 35.0 | 4.64 | 1.81 | 31.6 | 5413 | 5399 | 745.4 | 732.1 | 5.38 | 1.00 | 0.01 | 0.10 |



Stellar Parameters For KIC 011616200

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 6071^{+165}_{-183} | $4.541^{+0.037}_{-0.213}$ | $-0.420^{+0.300}_{-0.300}$ | $0.865^{+0.259}_{-0.069}$ | $0.947^{+0.106}_{-0.118}$ | $2.062^{+0.422}_{-1.077}$ |
| | +3%/-3% | +1%/-5% | +71%/-71% | +30%/-8% | +11%/-12% | +20%/-52% |
| 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 011616200-01 / KOI 7462.01

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{max} (K)$ | $T_{obs} (K)$ | A_{obs} |
|---------|-----------------|-------------------------|----------------------|--------------------|---------------------------|
| DV | -7152 ± 42 | $40.03^{+6.55}_{-3.16}$ | 2150^{+156}_{-99} | 3224^{+56}_{-67} | $1.851^{+0.251}_{-0.441}$ |
| Alt. | -25589 ± 33 | $41.82^{+6.61}_{-2.87}$ | 2146^{+146}_{-103} | 3994^{+78}_{-91} | $6.131^{+0.833}_{-1.397}$ |

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 $A_{obs} \gg 1.0$

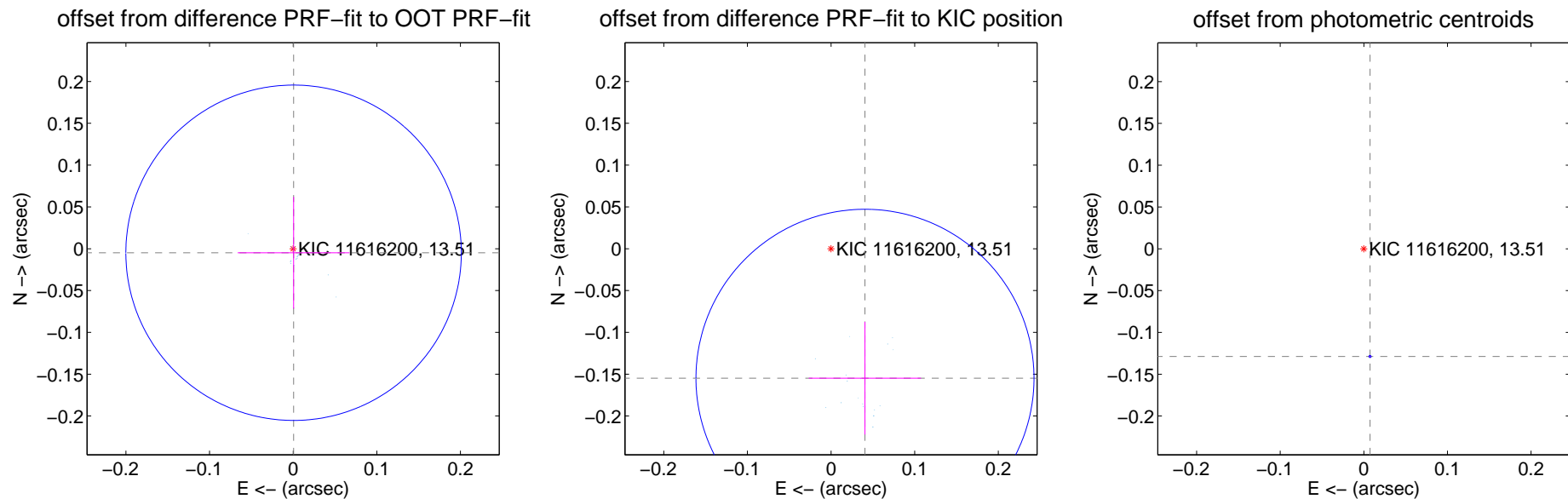
DV Centroid Data

Supplemental centroid analysis for 011616200-01. Kepler magnitude: 13.51. Transit SNR 3329.31

There are 17 quarters with good PRF difference image offsets

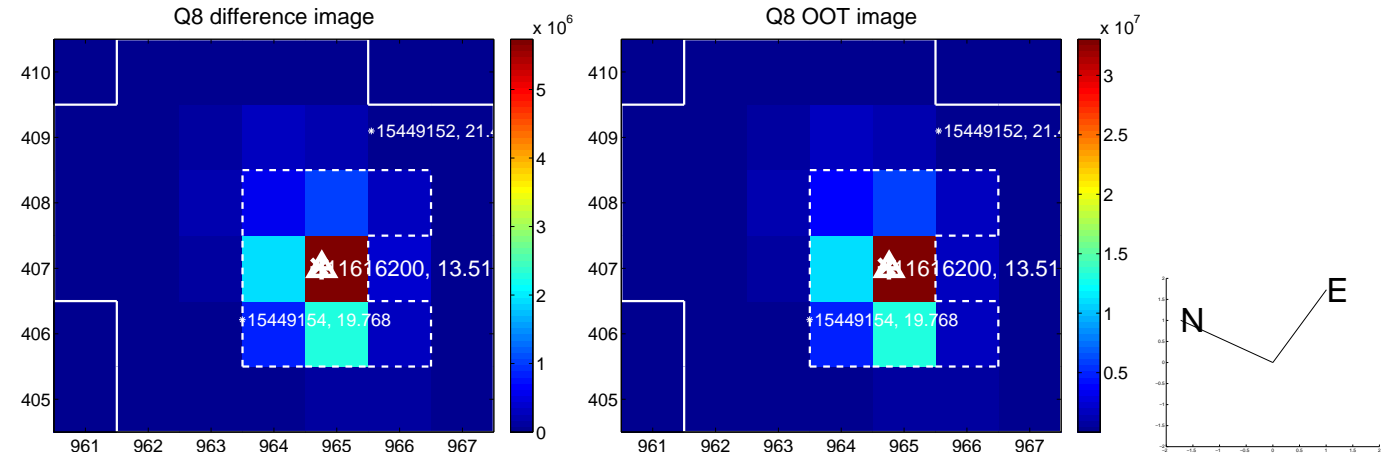
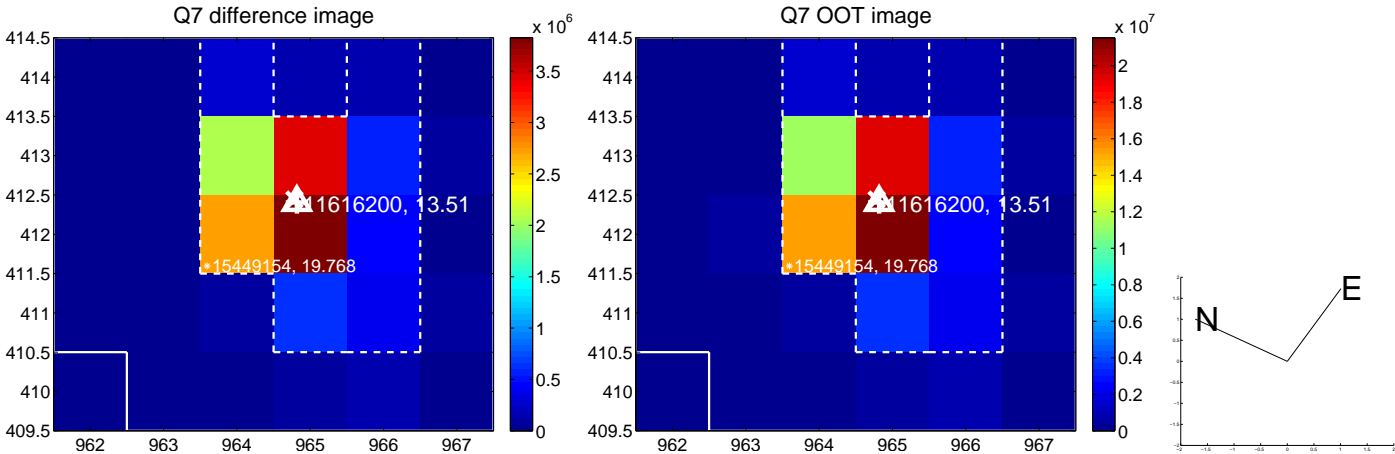
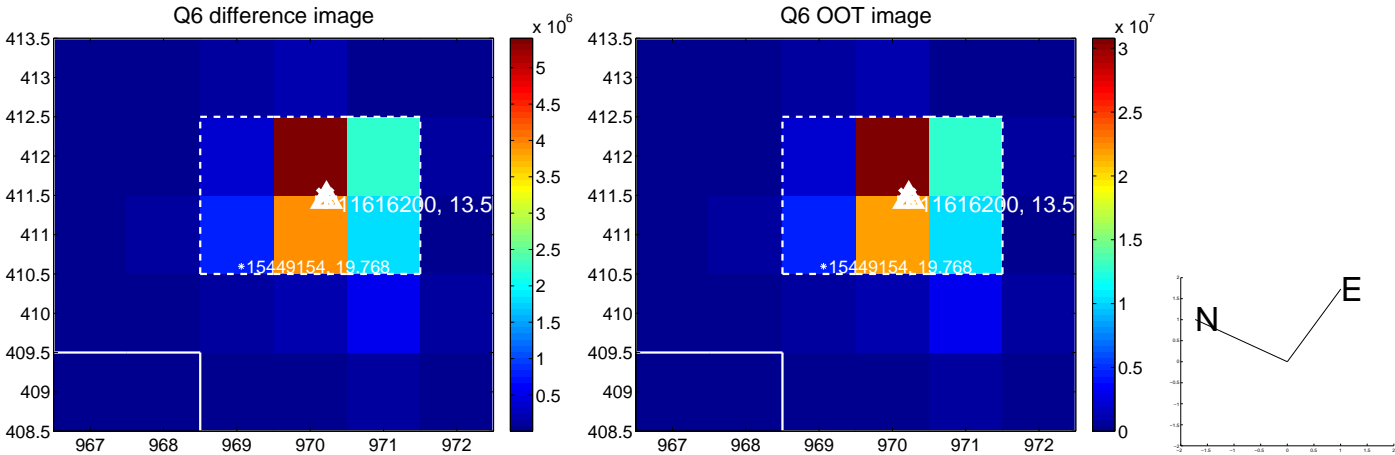
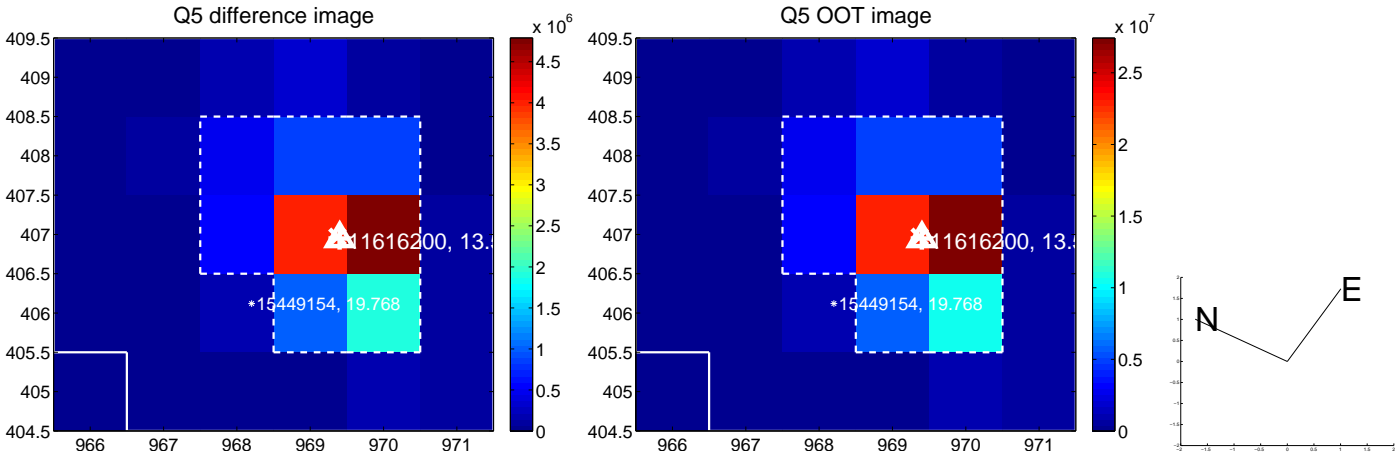
The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 0.005 ± 0.067 | 0.07 | -0.000 ± 0.067 | -0.005 ± 0.067 |
| PRF-fit source offset from KIC position | 0.160 ± 0.067 | 2.38 | -0.041 ± 0.067 | -0.155 ± 0.067 |
| photometric centroid source offset | 0.13 ± 0.00 | 302.43 | -0.01 ± 0.00 | -0.13 ± 0.00 |

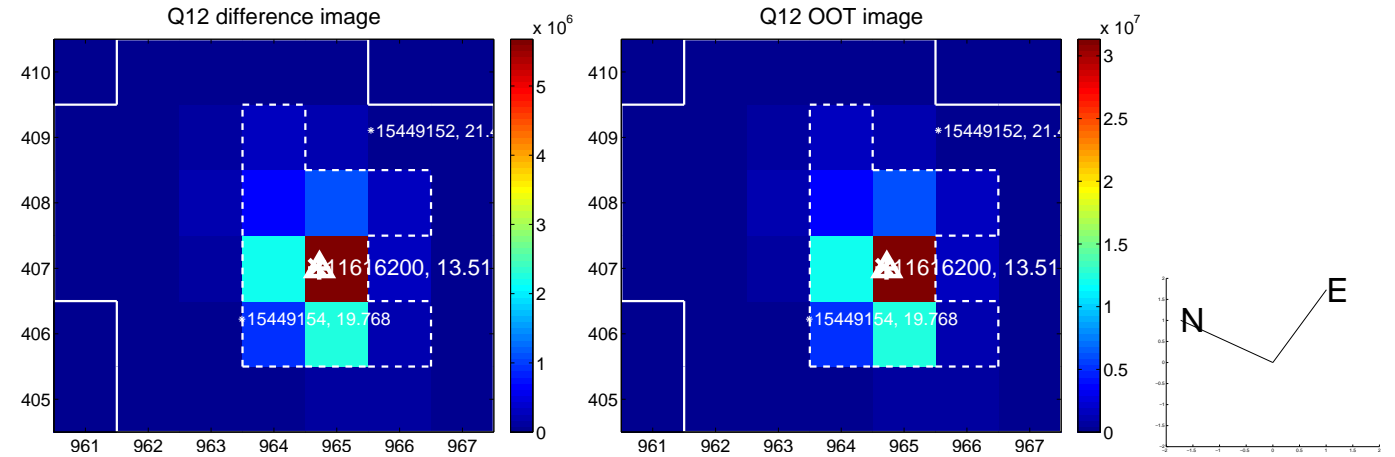
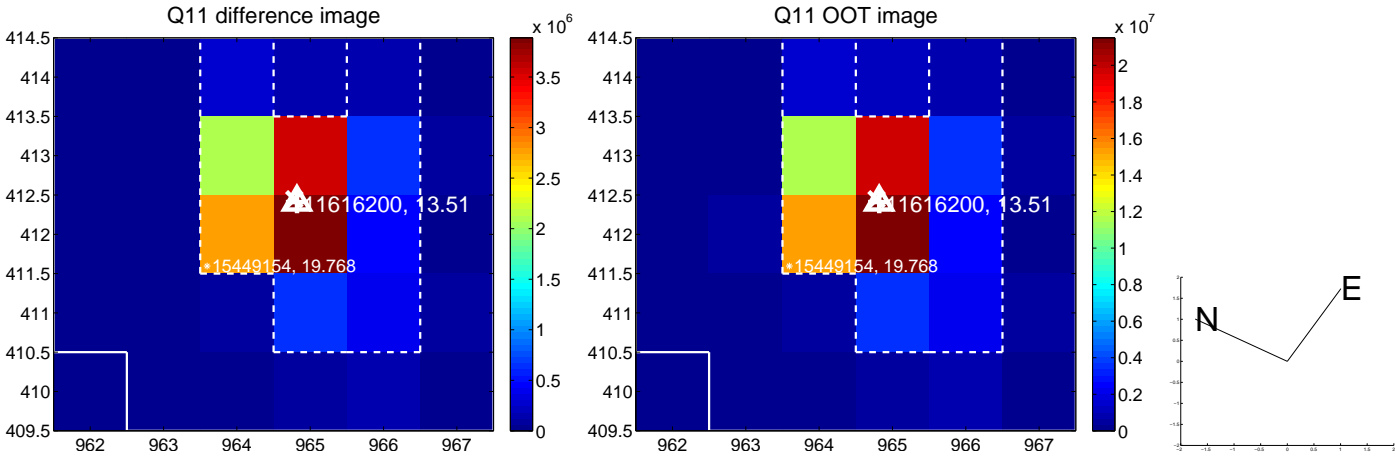
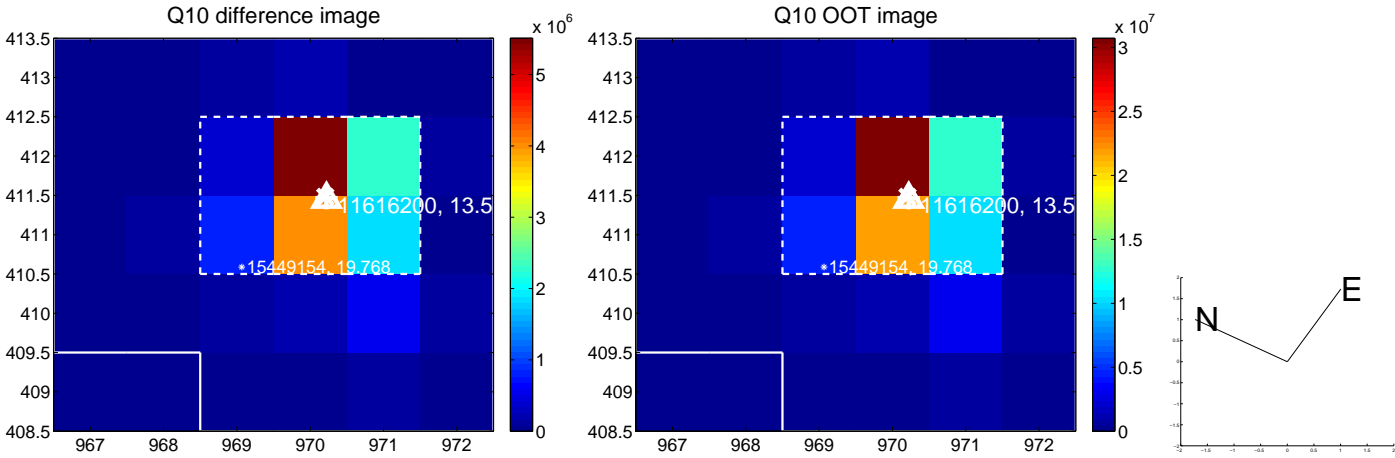
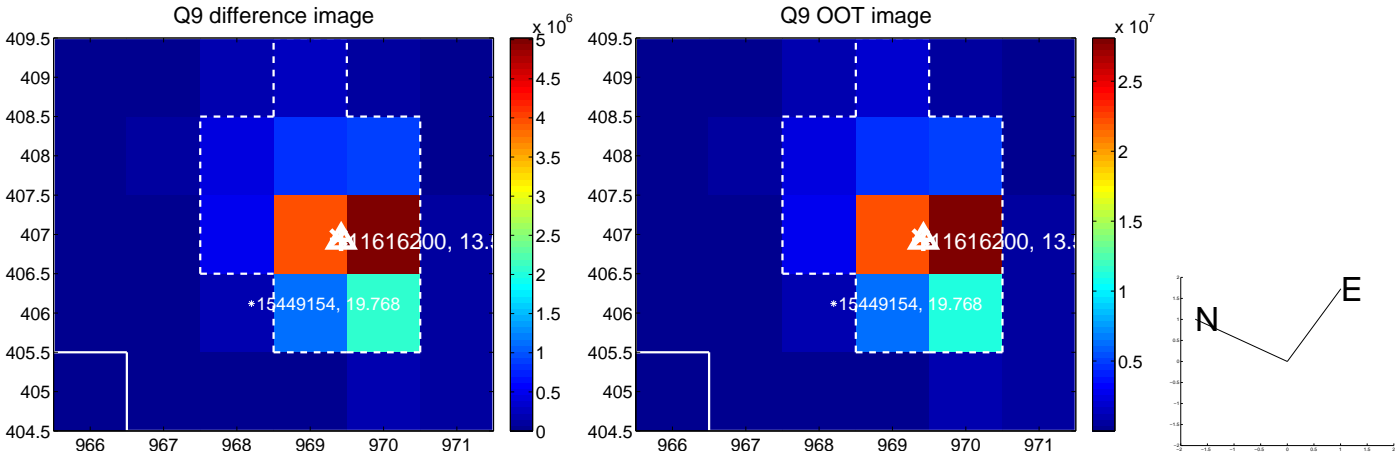


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

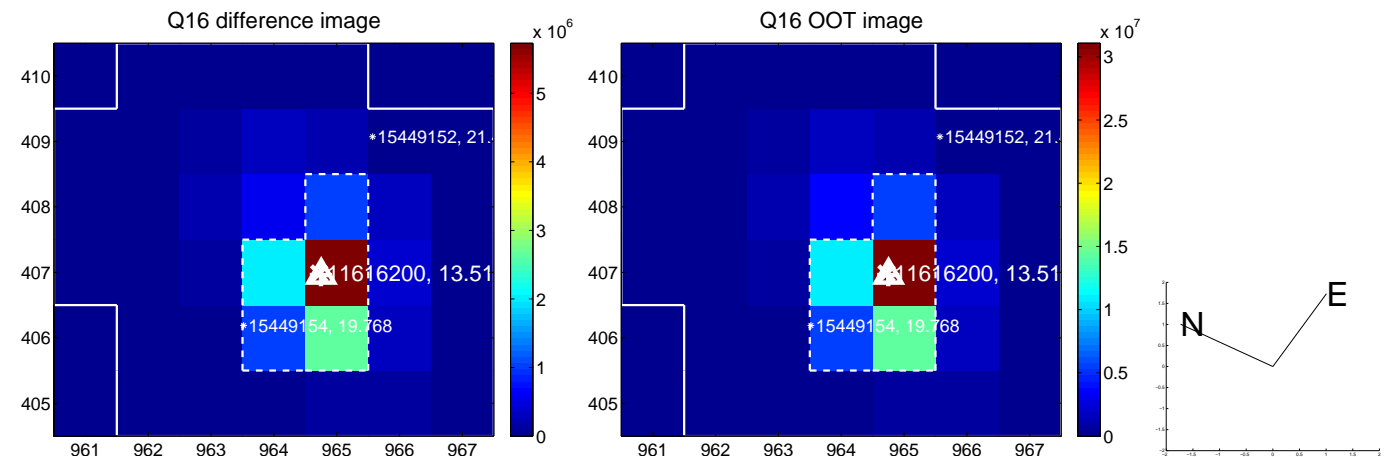
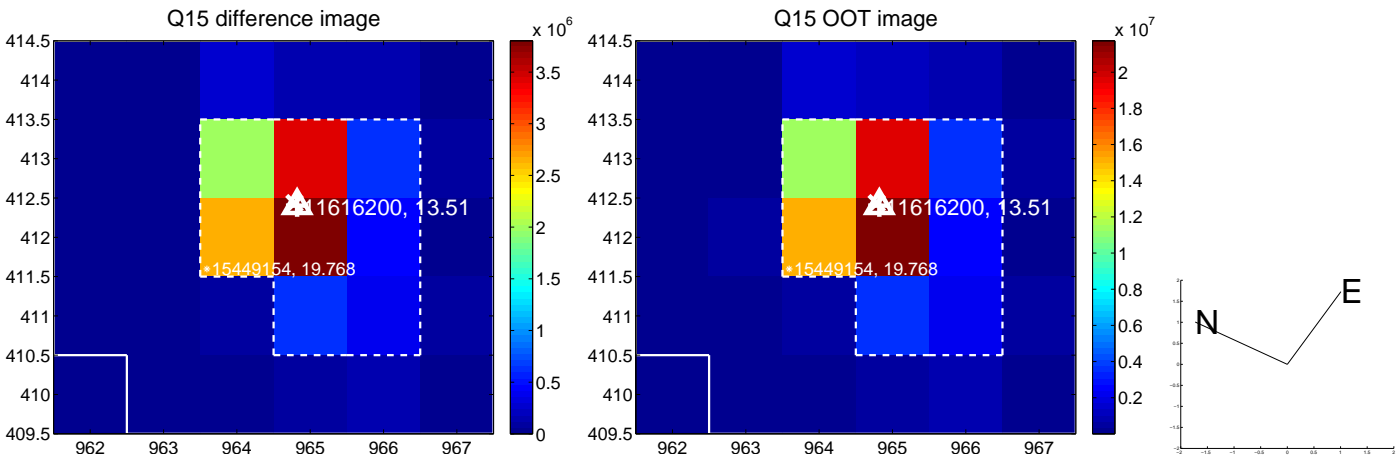
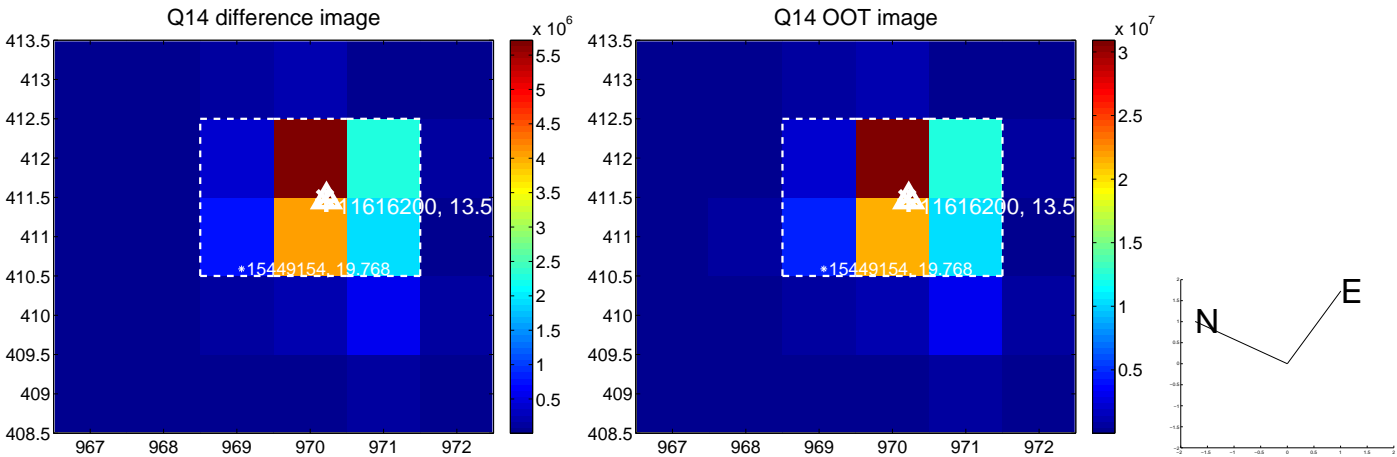
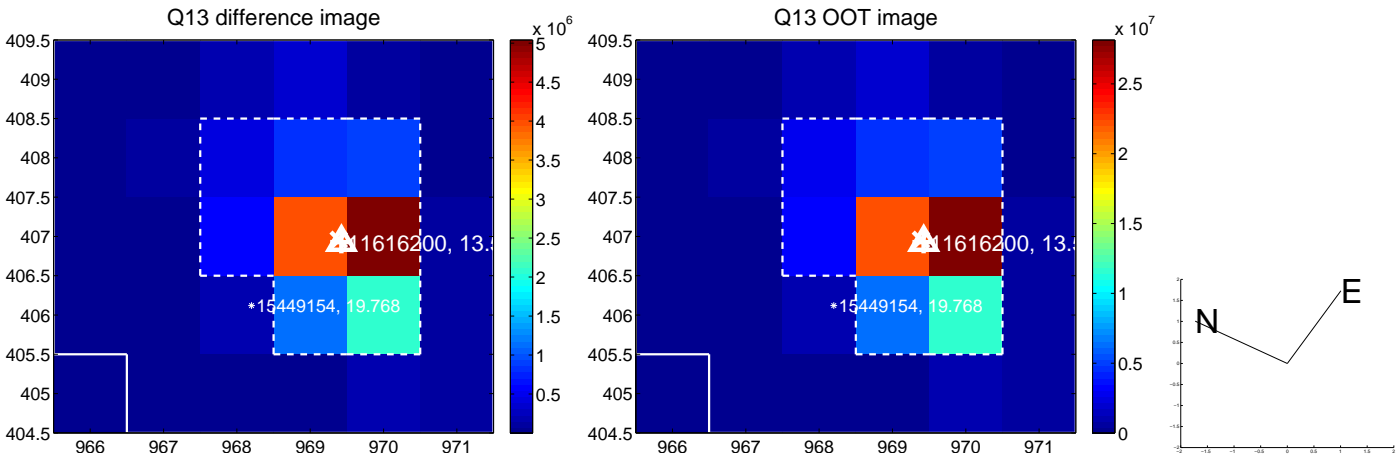
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



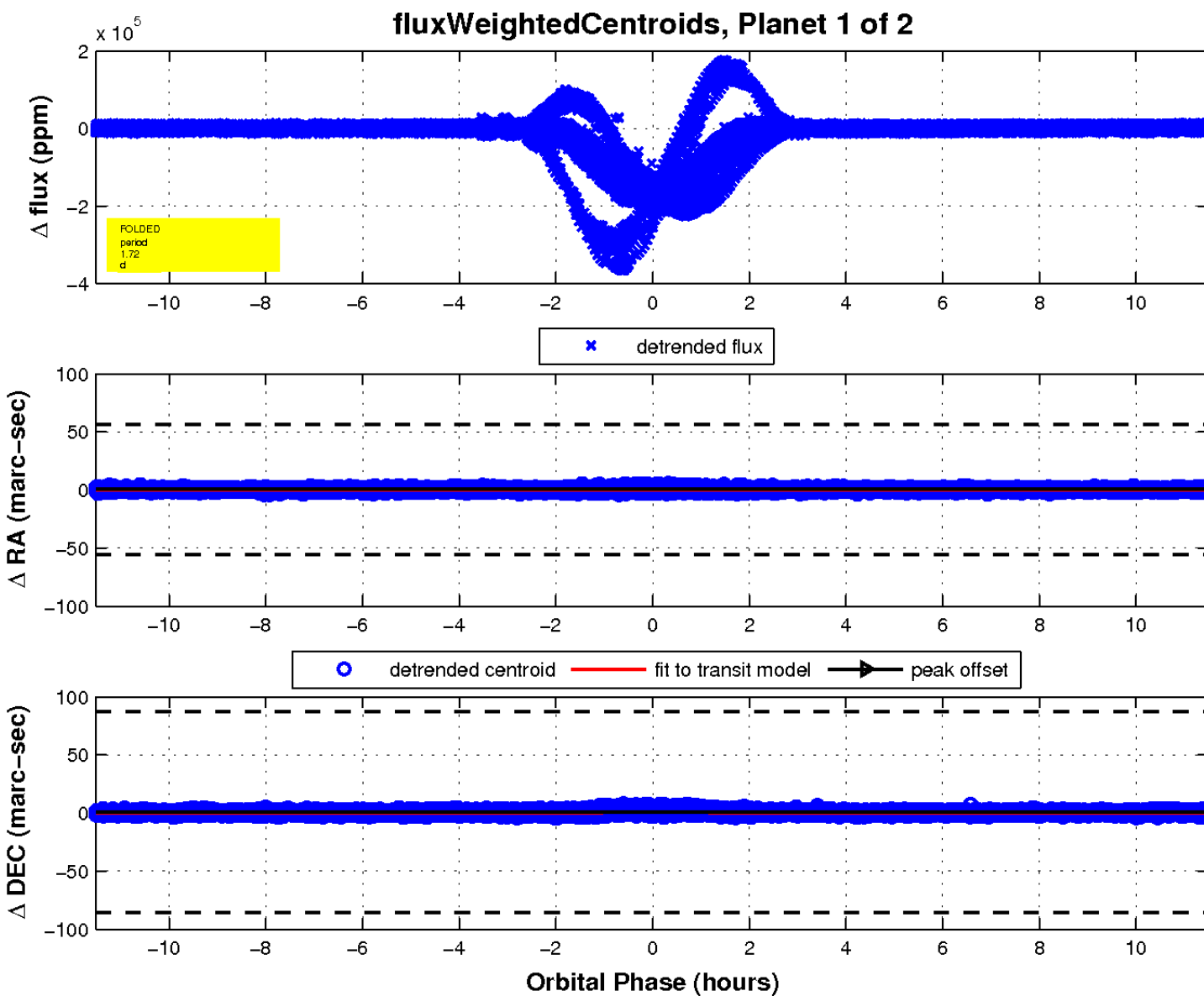
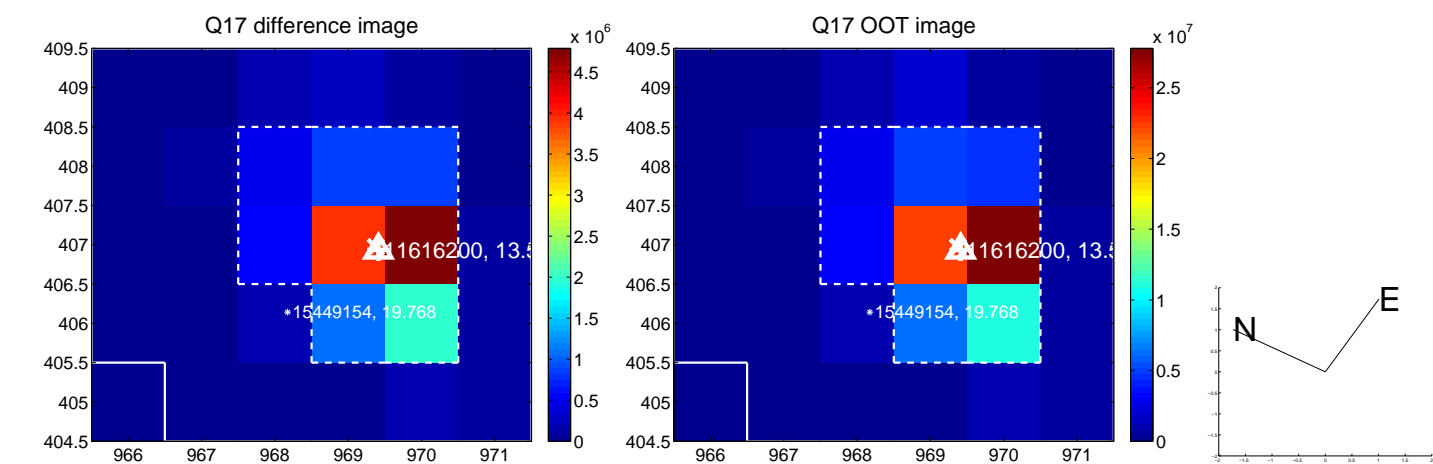
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

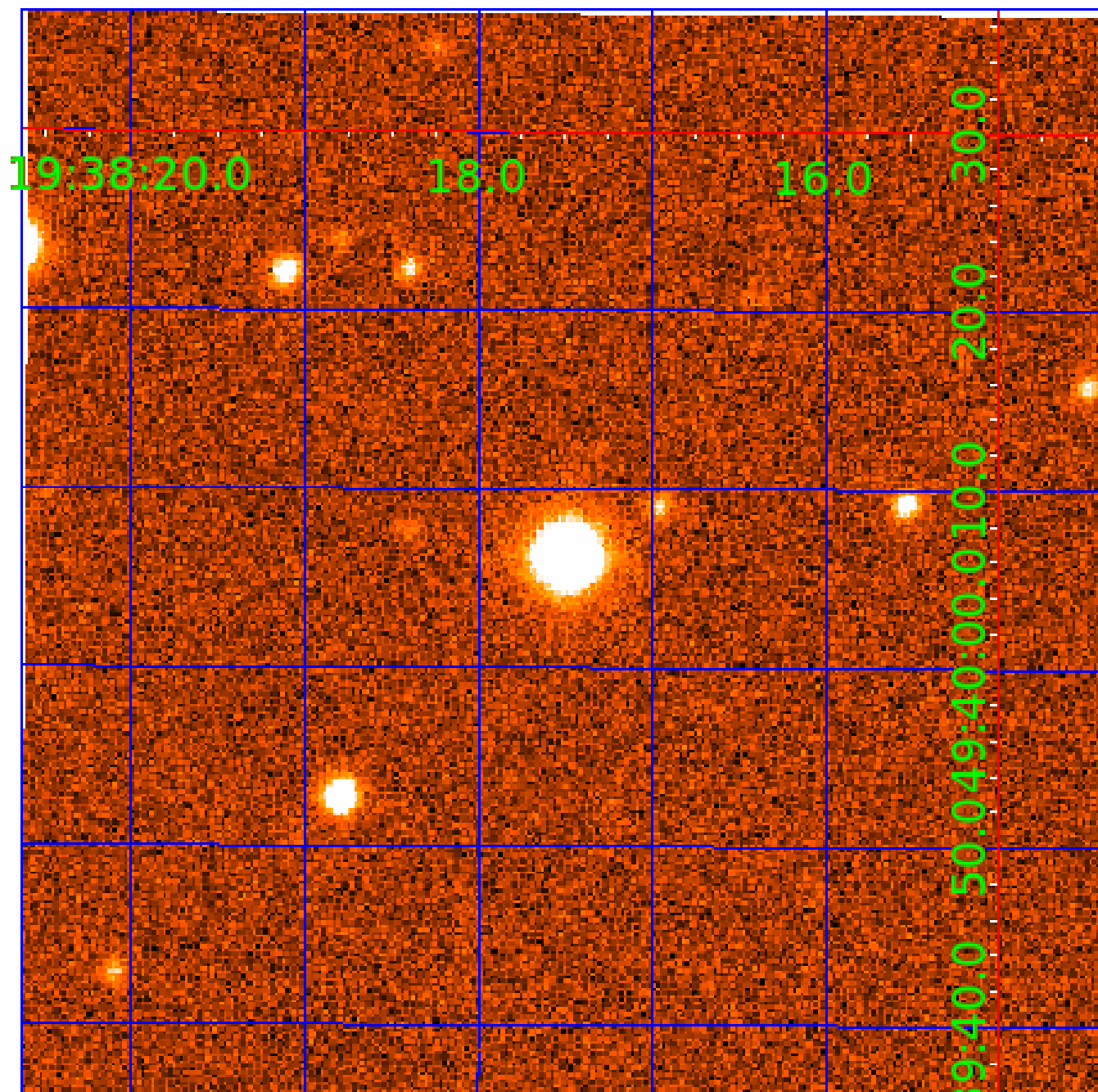


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 011616200

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|--------|--------|-----------------------------|-----------------|------------------------|------------------------|
| 011616200-01 | OBS | 7462.01 | 1.718637 | 132.216013 | 186768.8 | 3.839 | 5297.6 | 3329.3 | 0.86 | 6071 | 38.60 | 1195.91 |
| 011616200-02 | OBS | No | 0.859326 | 132.208911 | 5674.2 | 2.500 | 739.4 | -1.0 | 0.86 | 6071 | 6.54 | 3013.48 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|---|
| 011616200-01 | OBS | FP | 0.00 | 0 | 1 | 0 | 0 | SWEET_EB—MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE |
| 011616200-02 | 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.

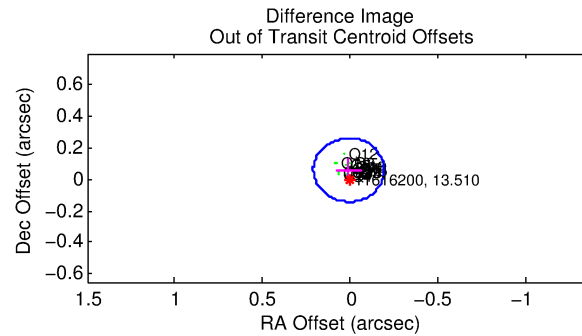
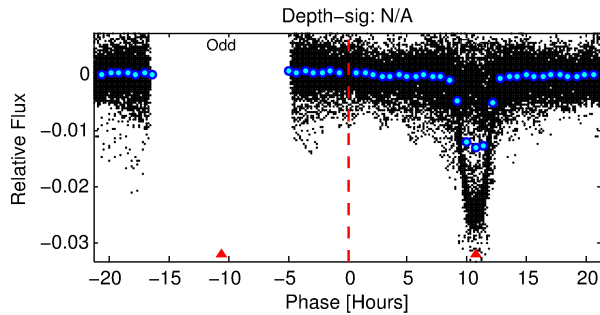
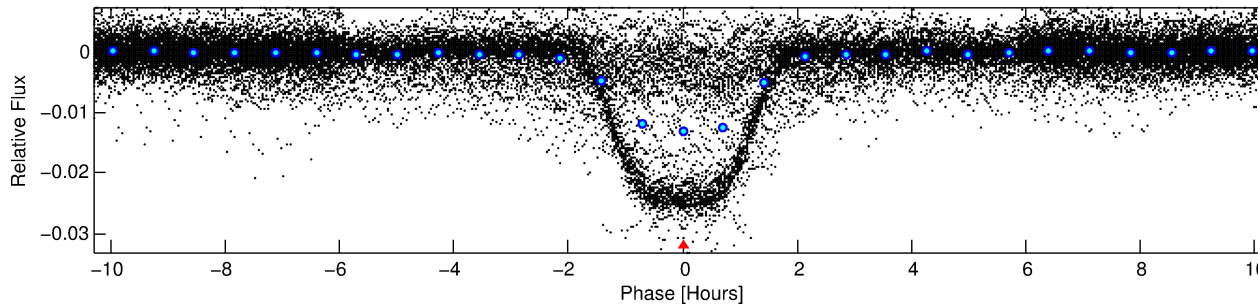
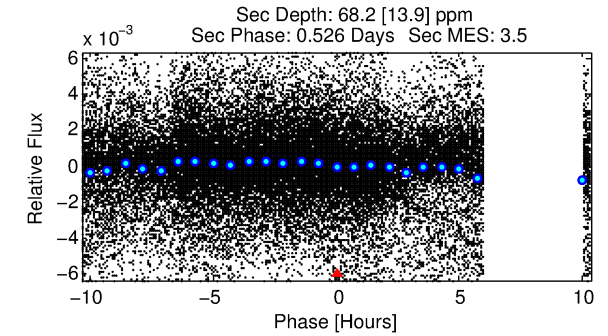
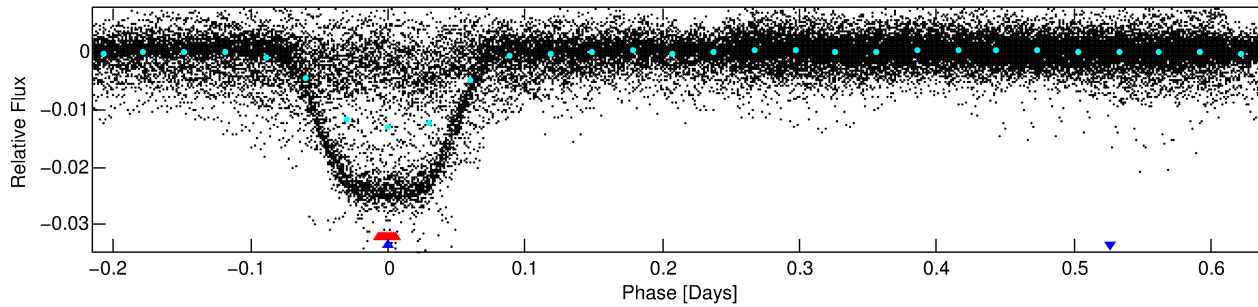
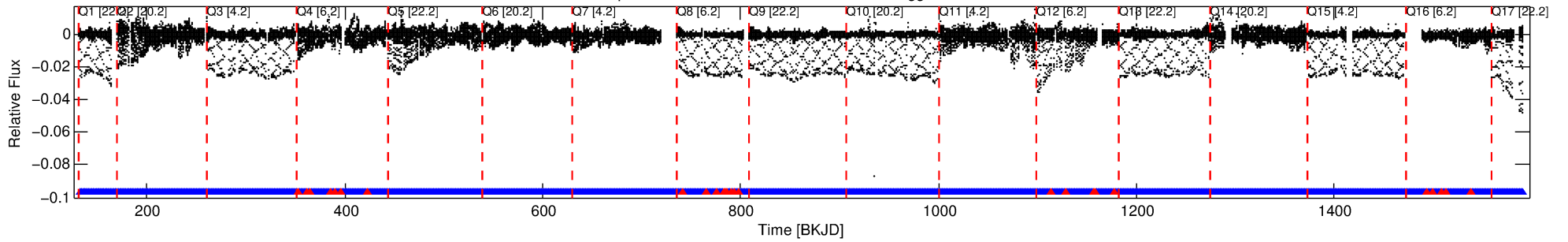
Ephemeris Match Information For 011616200-02

No Significant Match Found

DV One-Page Summary

KIC: 11616200 Candidate: 2 of 2 Period: 0.859 d
KOI: K07462 Corr: No Ephemeris Match

Kp: 13.51 R*: 0.86 Rs Teff: 6071.0 K Logg: 4.54 Fe/H: -0.420



TPS TCE Results:

Period = 0.85933 d
Epoch = 132.2089 BKJD

DV fit results are unavailable

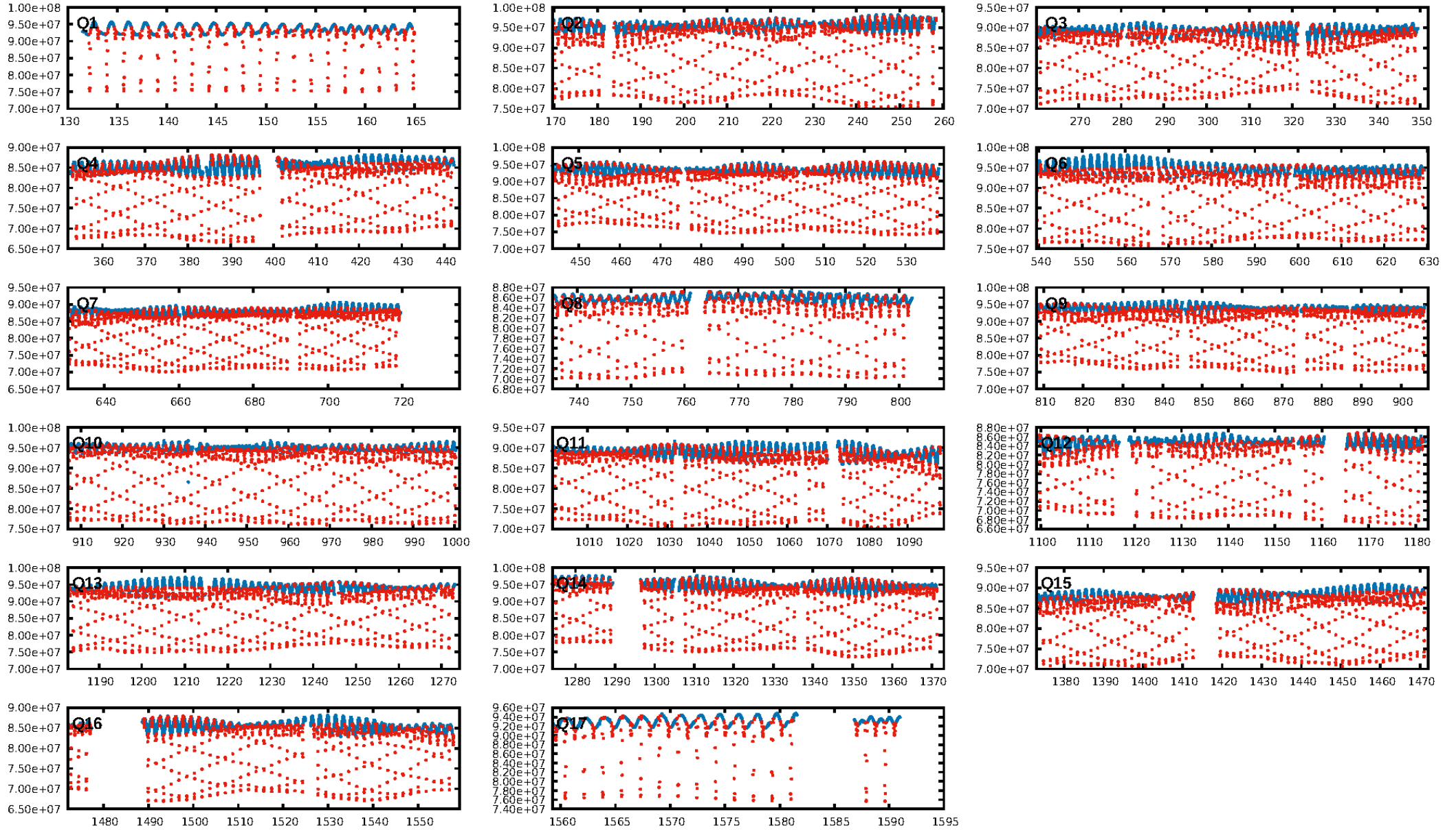
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [4.50 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 0.97 [719/745]
GhostDiagnostic-chr: 0.9758
Centroid-sig: 0.0%
Centroid-so: 0.114 arcsec [71.83 σ]
OotOffset-rm: 0.061 arcsec [0.91 σ]
KicOffset-rm: 0.090 arcsec [1.32 σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
DiffImageOverlap-fno: 1.00 [17/17]

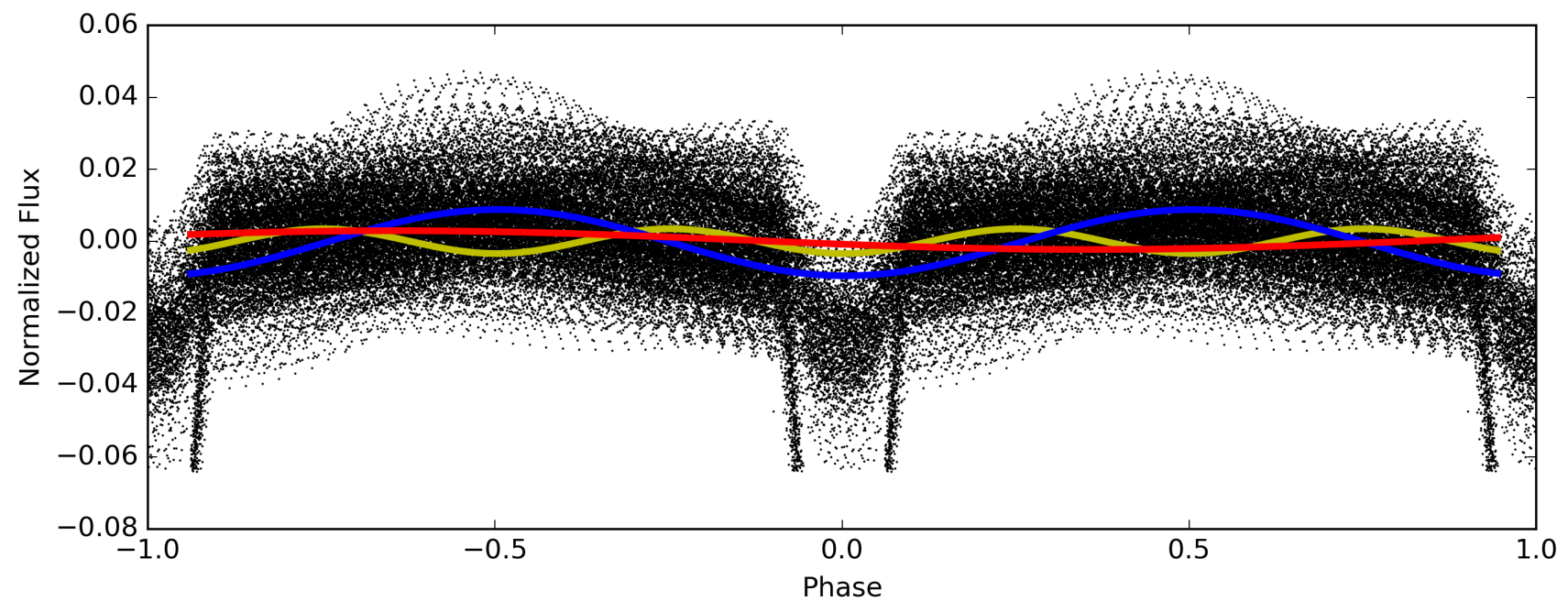
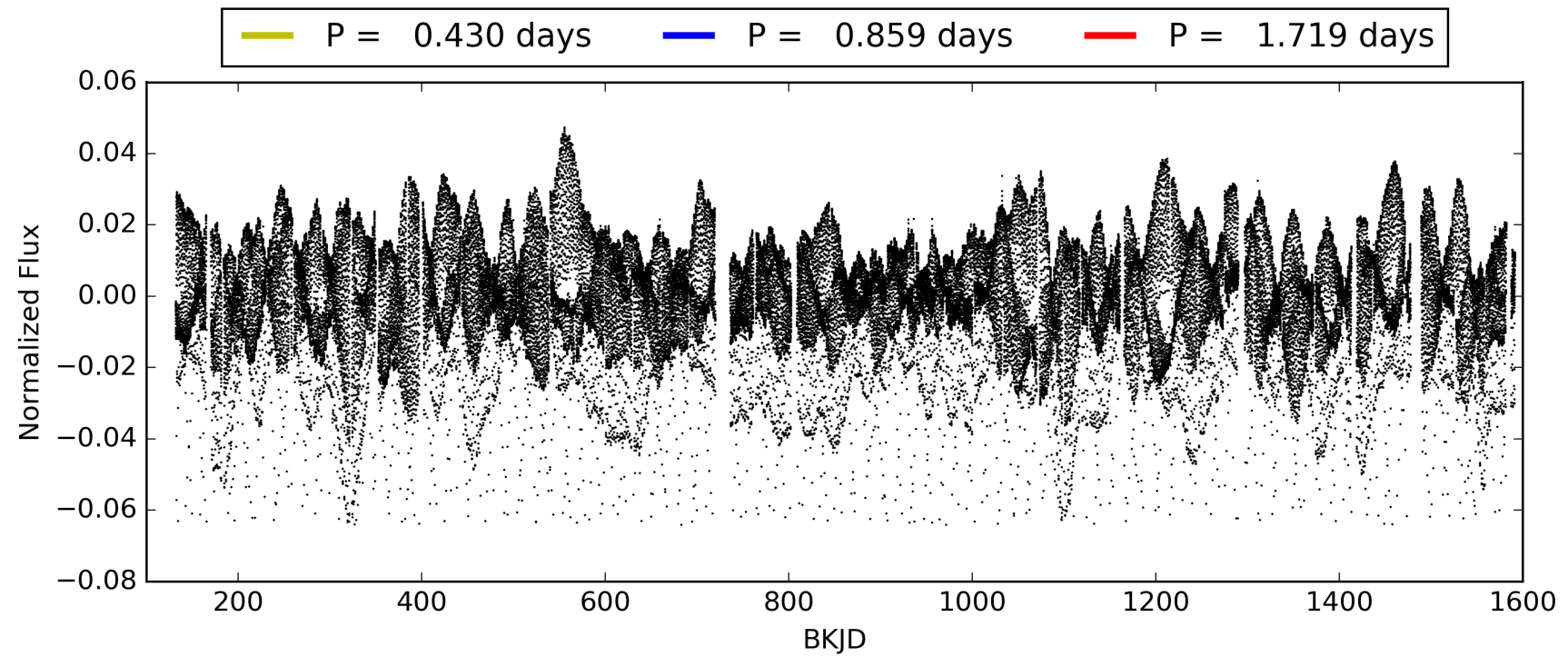
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:22:48 Z

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TCE 011616200-02, PDC Light Curves

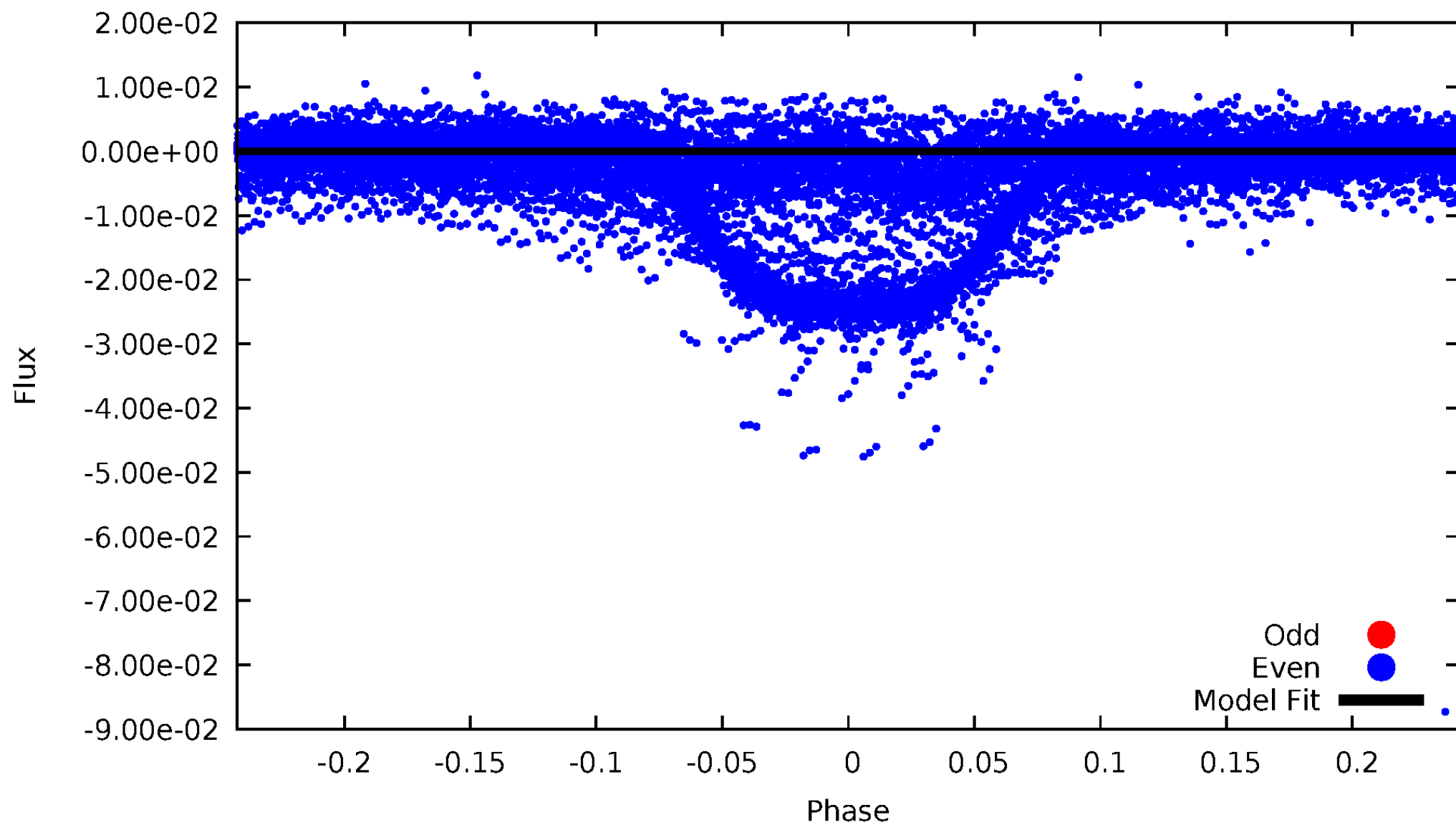


TCE 011616200-02



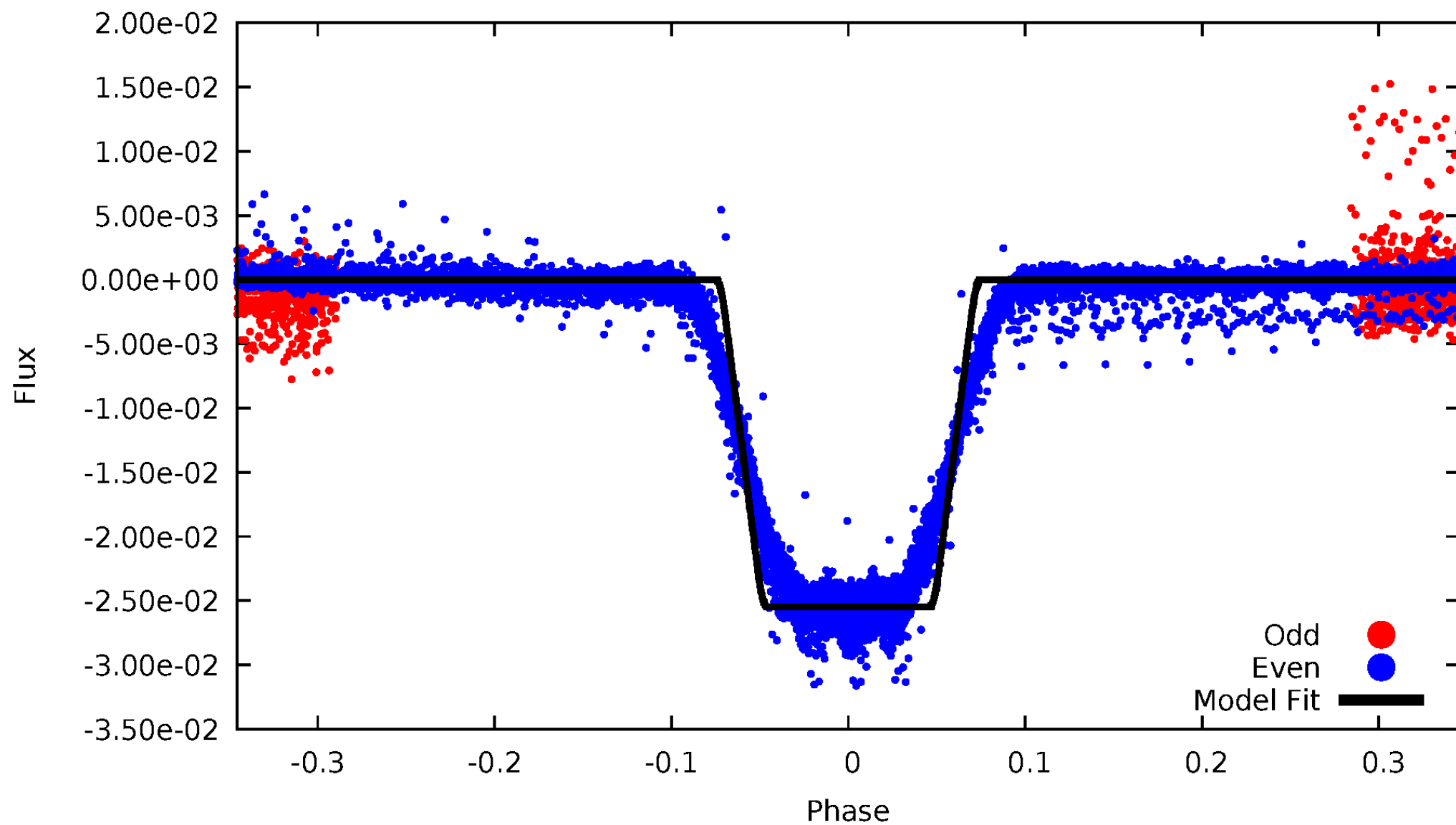
DV Odd/Even

TCE 011616200-02



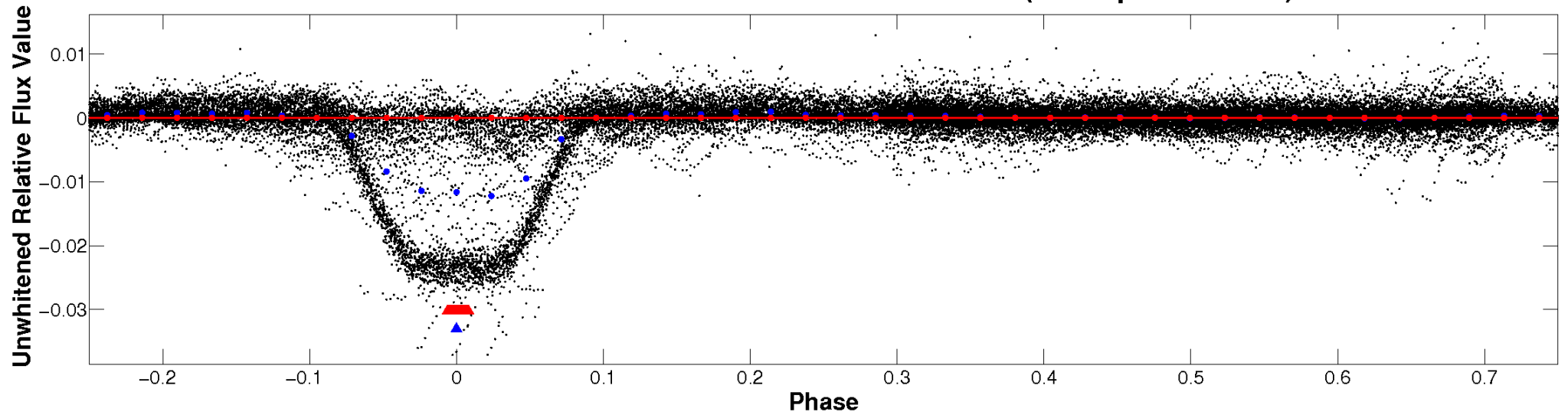
ALT Odd/Even

TCE 011616200-02

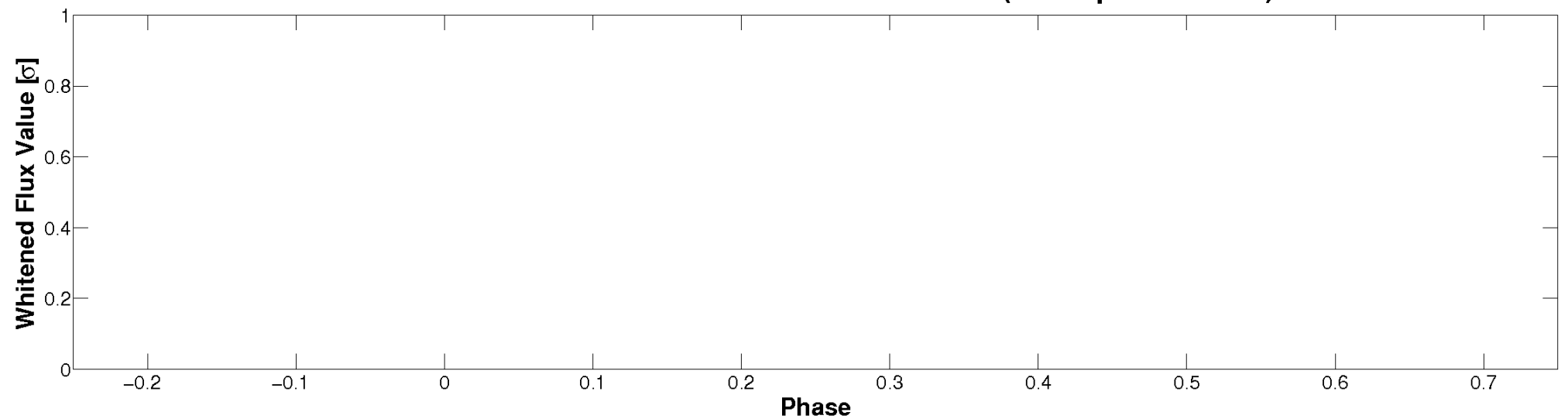


Non-Whitened Vs. Whitened Light Curve

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

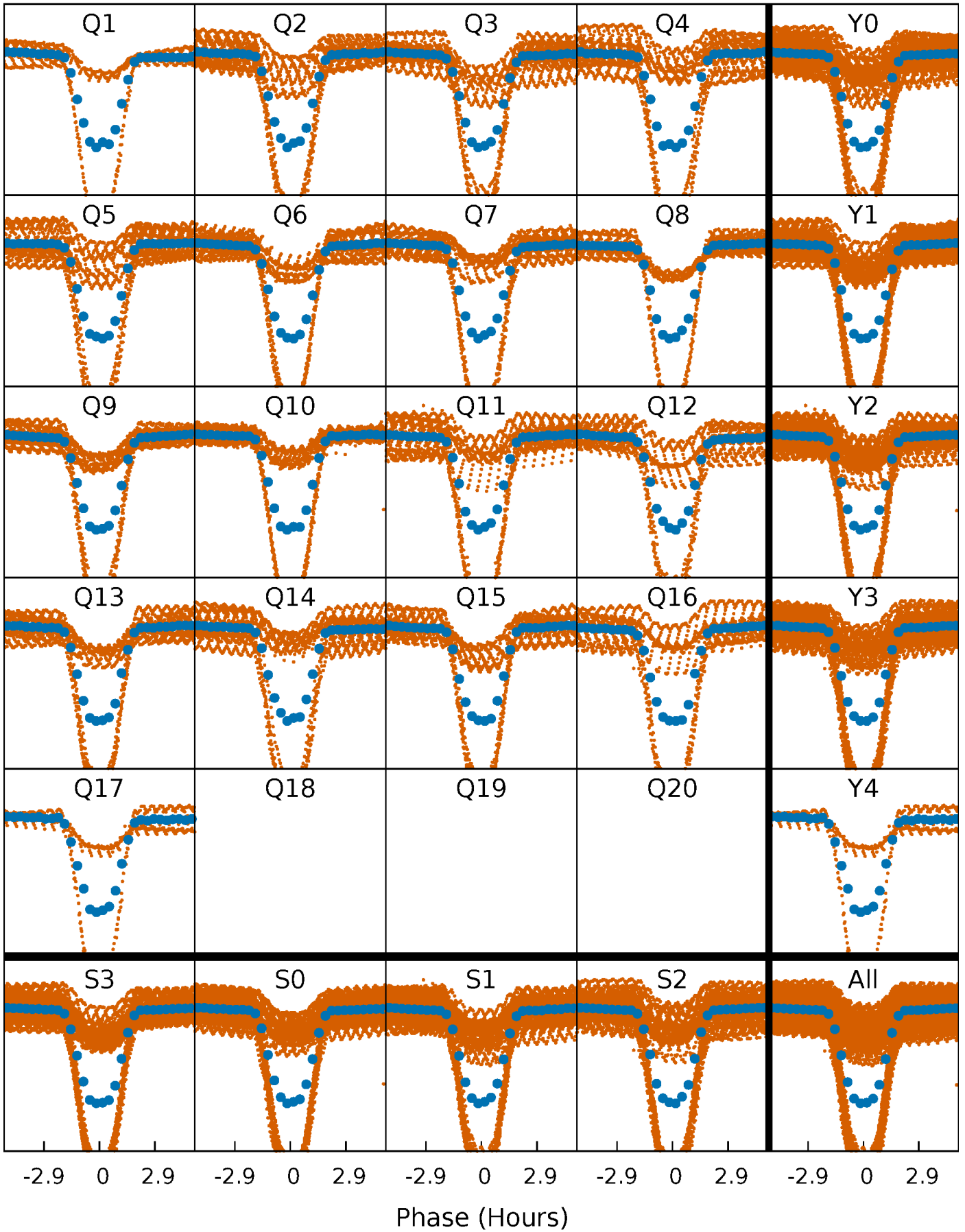


Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)



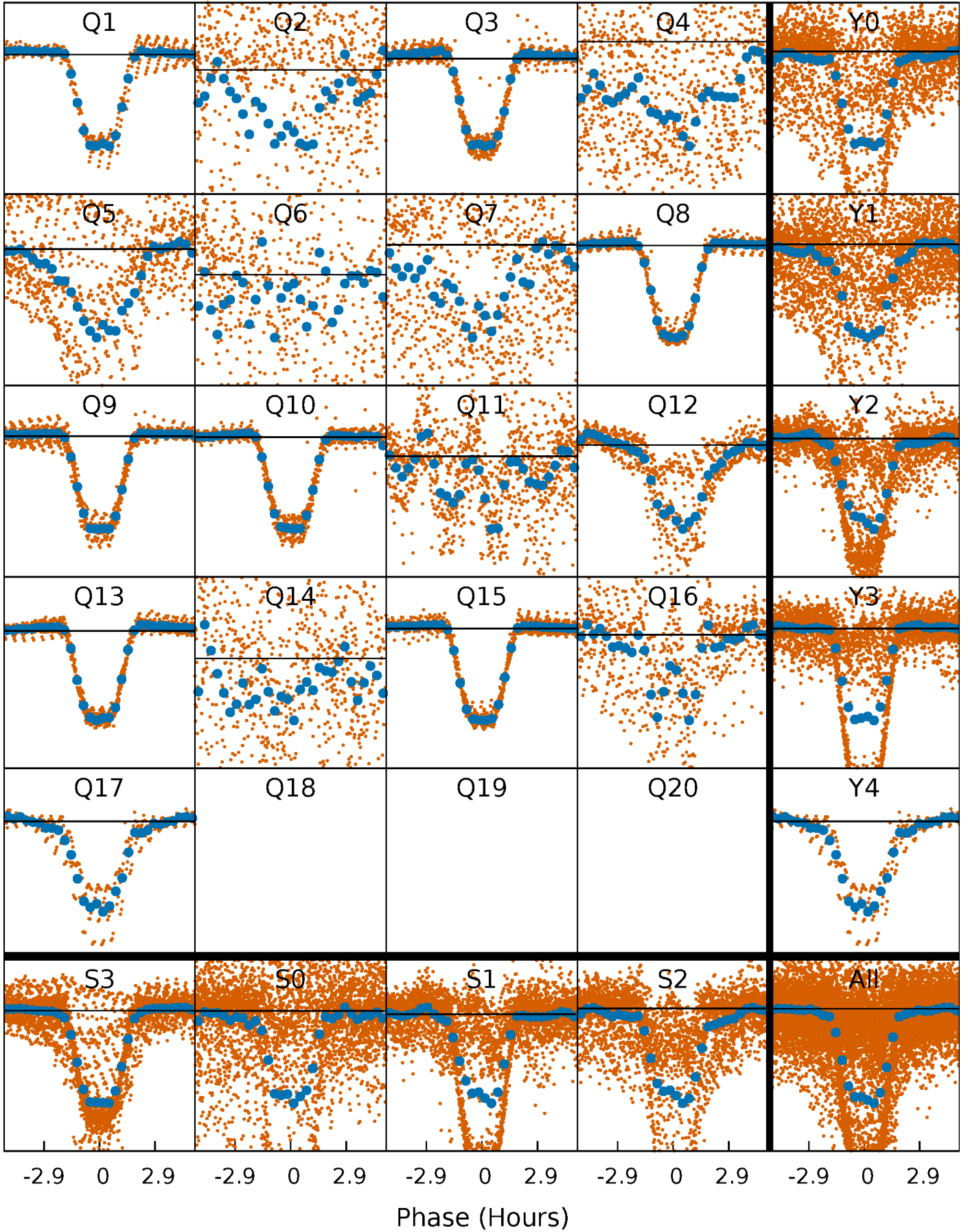
PDC Quarter-Phased Transit Curves

TCE 011616200-02 P= 0.859326 Days $T_0=132.208911$ (BKJD)



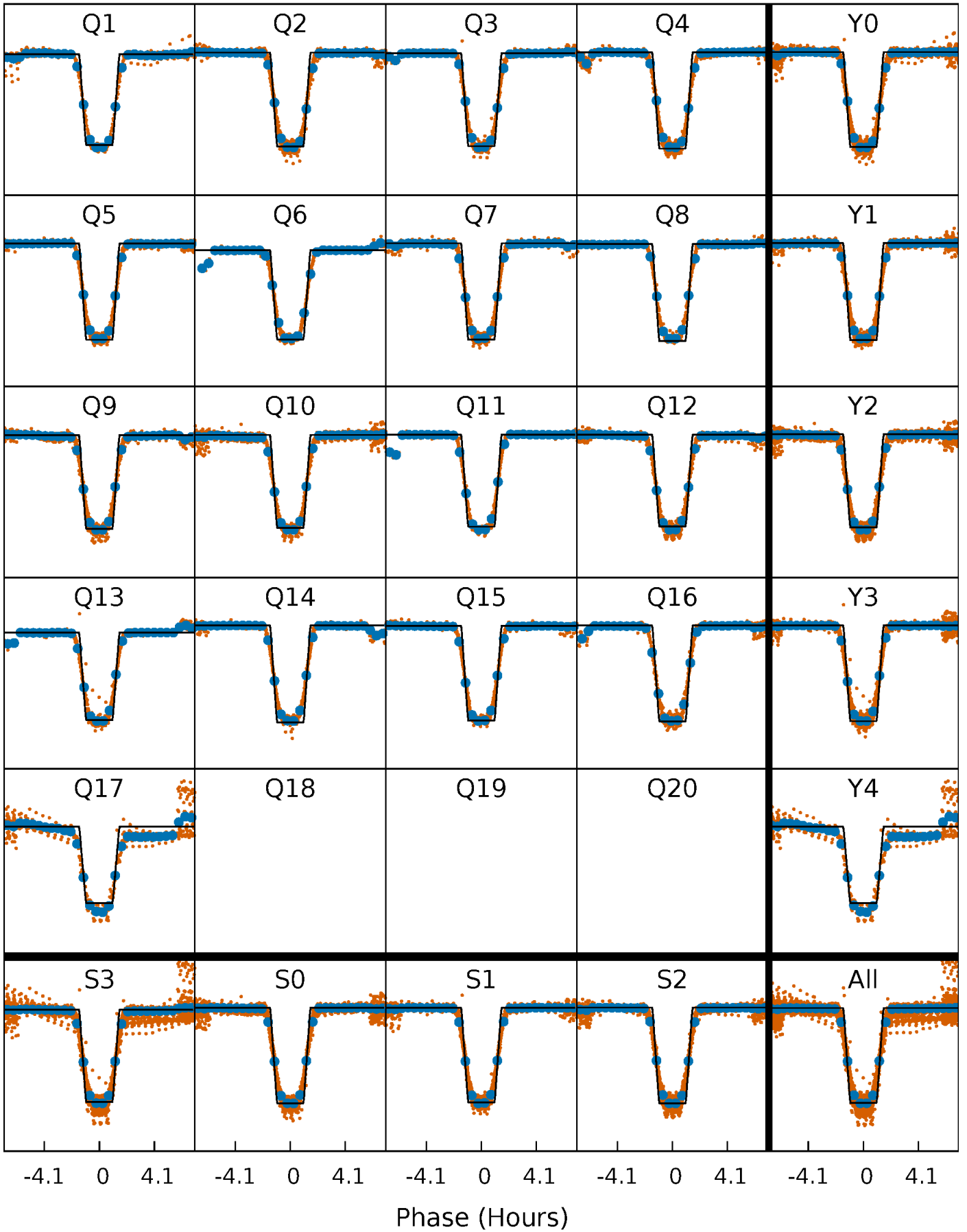
DV Quarter-Phased Transit Curves

TCE 011616200-02 P= 0.859326 Days $T_0=132.208911$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

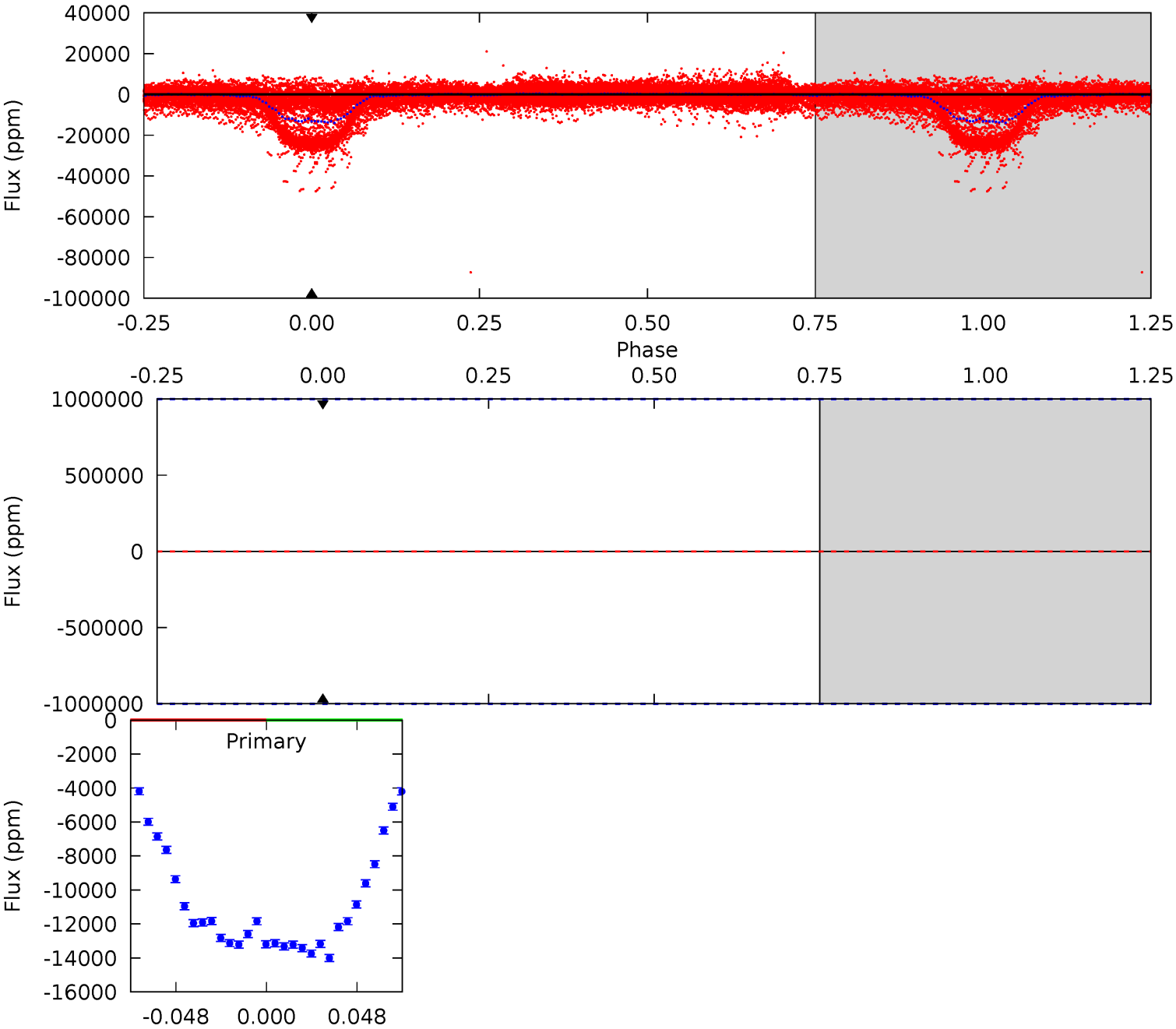
TCE 011616200-02 P= 0.859326 Days $T_0=132.210150$ (BKJD)



DV Model-Shift Uniqueness Test

011616200-02, P = 0.859326 Days, E = 131.349585 Days

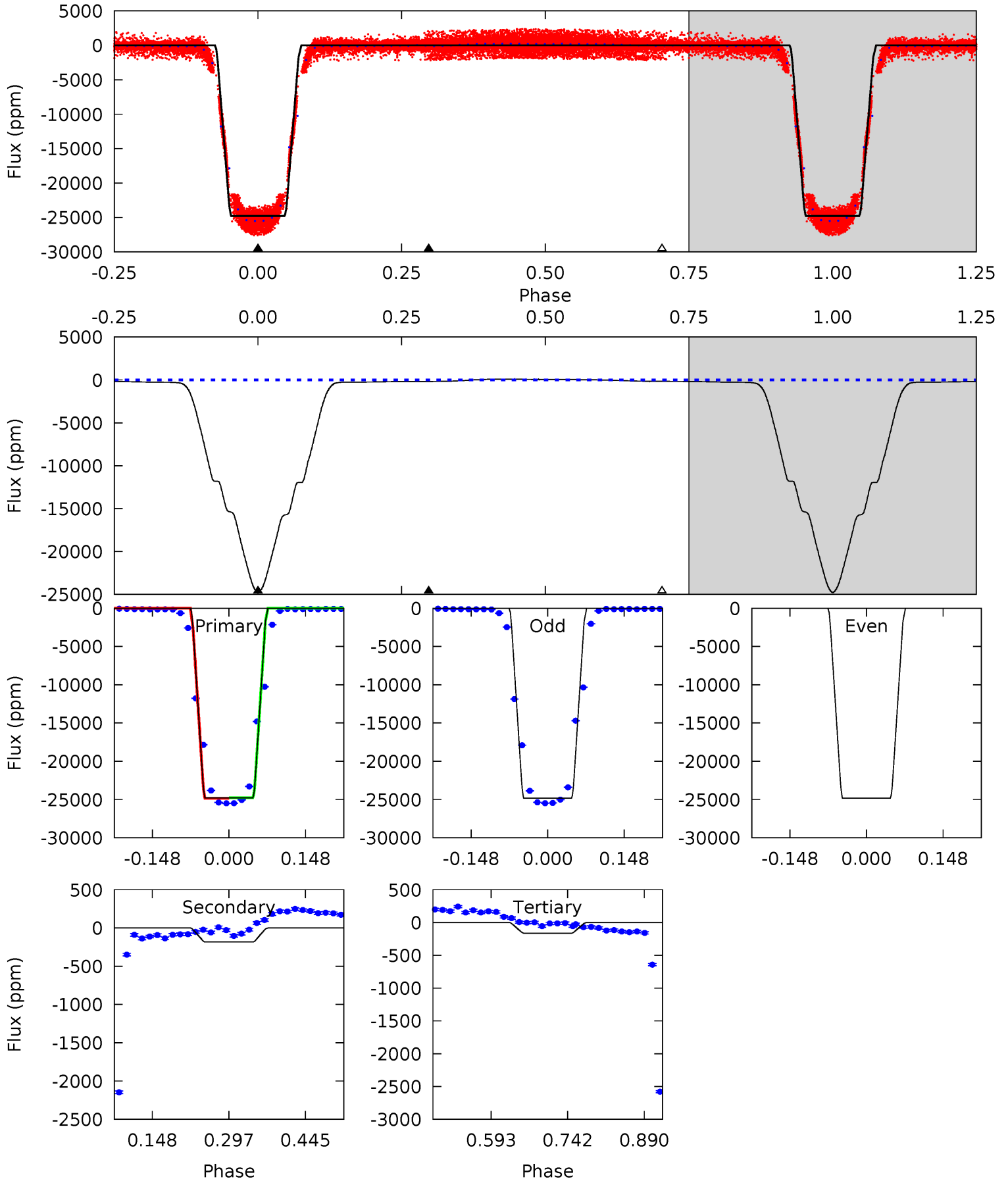
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|-----|-----|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|-----|-------|-----|
| 0 | 0 | 0 | 0 | 1.00 | 1.00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



Alt Model-Shift Uniqueness Test

011616200-02, P = 0.859326 Days, E = 131.350824 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 2424 | 18.0 | 15.9 | 0 | 4.48 | 1.45 | 12.1 | 2409 | 2424 | 2.14 | 18.0 | 0 | 1.00 | 0.00 | 4.40 |



Stellar Parameters For KIC 011616200

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 6071^{+165}_{-183} | $4.541^{+0.037}_{-0.213}$ | $-0.420^{+0.300}_{-0.300}$ | $0.865^{+0.259}_{-0.069}$ | $0.947^{+0.106}_{-0.118}$ | $2.062^{+0.422}_{-1.077}$ |
| | +3%/-3% | +1%/-5% | +71%/-71% | +30%/-8% | +11%/-12% | +20%/-52% |
| 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 011616200-02 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{max} (K)$ | $T_{obs} (K)$ | A_{obs} |
|---------|-----------------|-------------------------|----------------------|--------------------------|-------------------------------|
| DV | 0 ± 1000000 | $10.08^{+8.95}_{-6.41}$ | 2711^{+192}_{-127} | 4299^{+12884}_{-18766} | $2.882^{+270.330}_{-213.738}$ |
| Alt. | -184 ± 10 | $16.84^{+9.64}_{-9.16}$ | 2710^{+189}_{-124} | -2743^{+5484}_{-160} | $0.106^{+0.368}_{-0.063}$ |

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 $A_{obs} \gg 1.0$

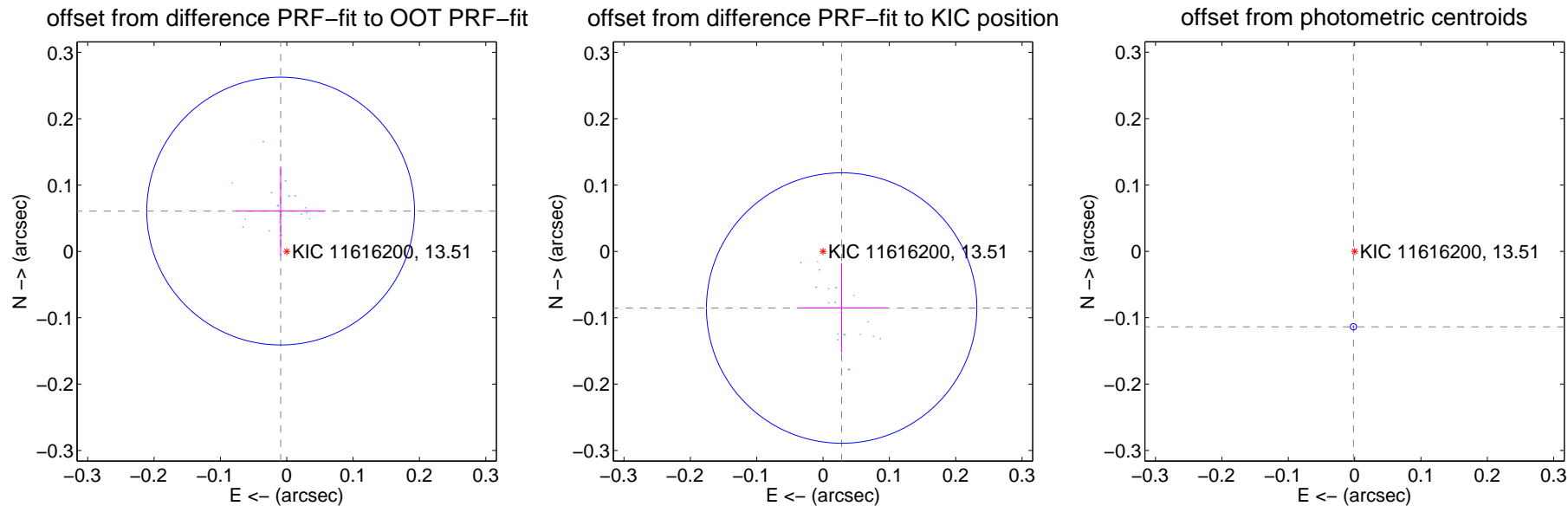
DV Centroid Data

Supplemental centroid analysis for 011616200-02. Kepler magnitude: 13.51. Transit SNR -1.00

There are 17 quarters with good PRF difference image offsets

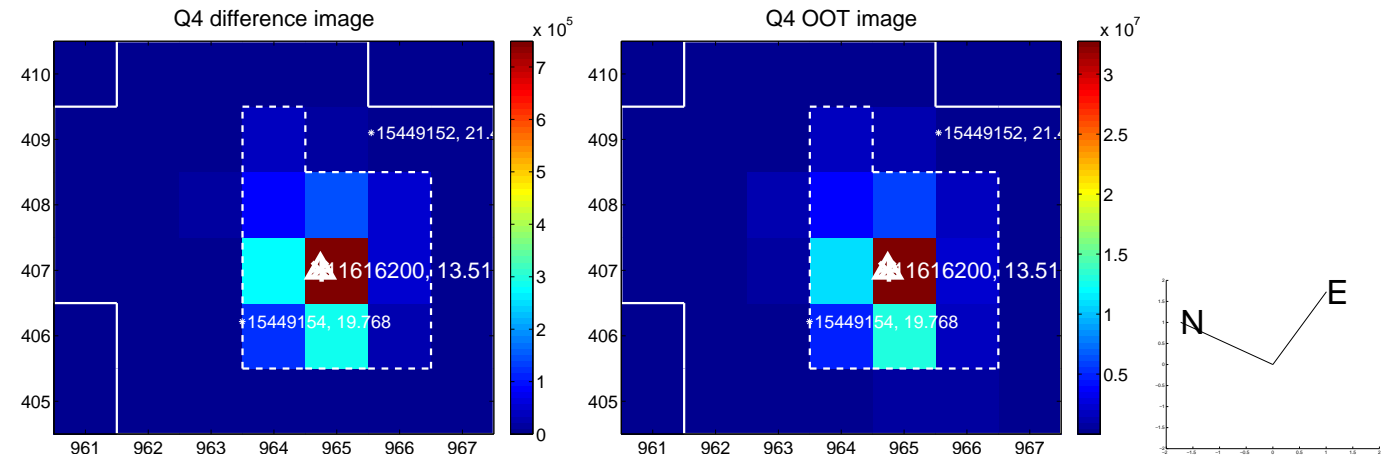
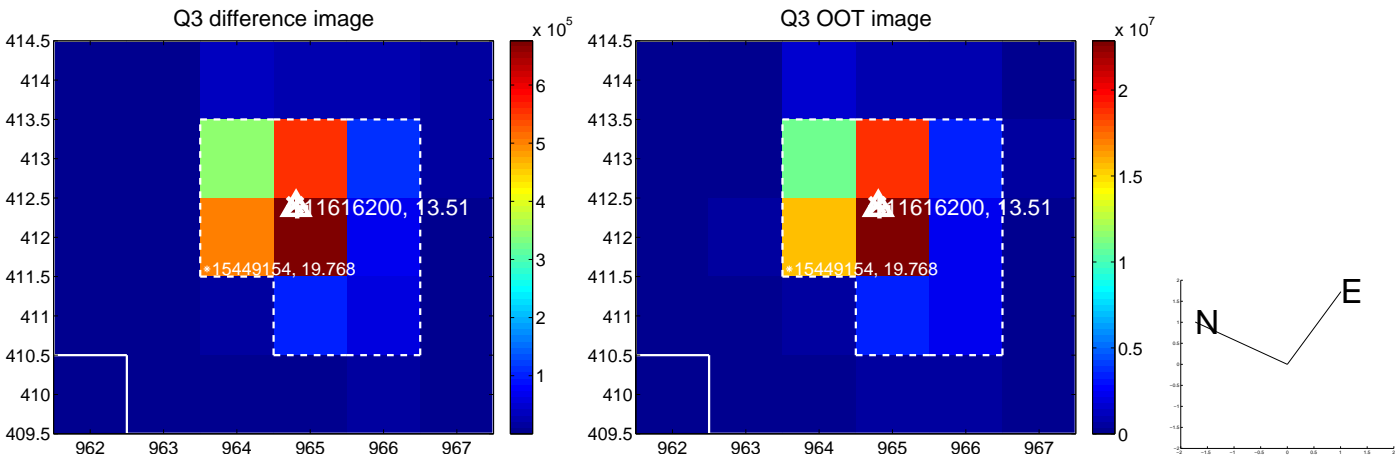
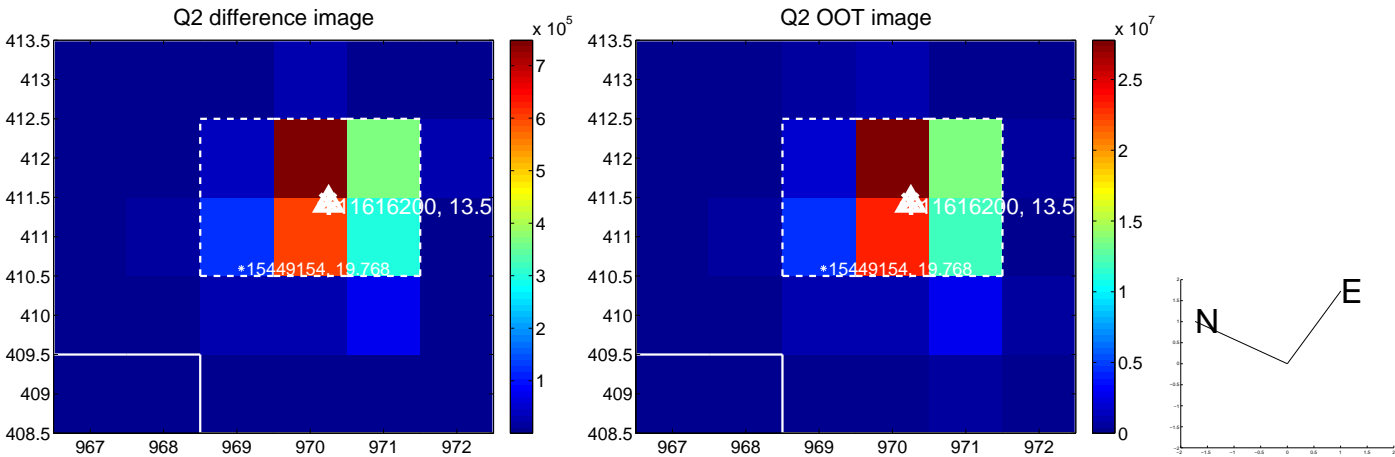
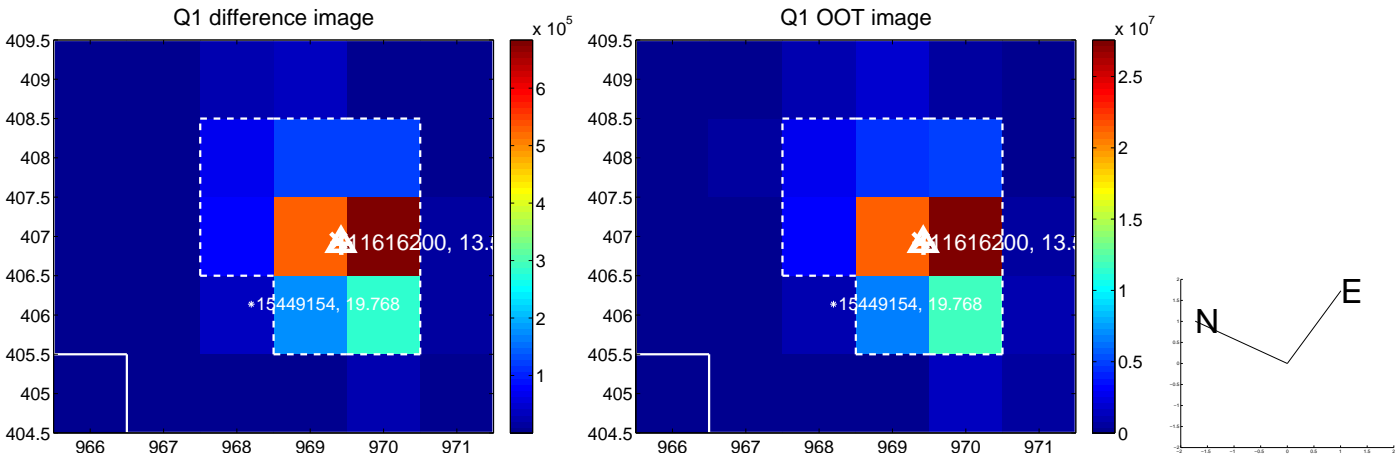
The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 0.061 ± 0.067 | 0.91 | 0.009 ± 0.067 | 0.061 ± 0.067 |
| PRF-fit source offset from KIC position | 0.090 ± 0.068 | 1.32 | -0.028 ± 0.067 | -0.085 ± 0.068 |
| photometric centroid source offset | 0.11 ± 0.00 | 71.83 | 0.00 ± 0.00 | -0.11 ± 0.00 |

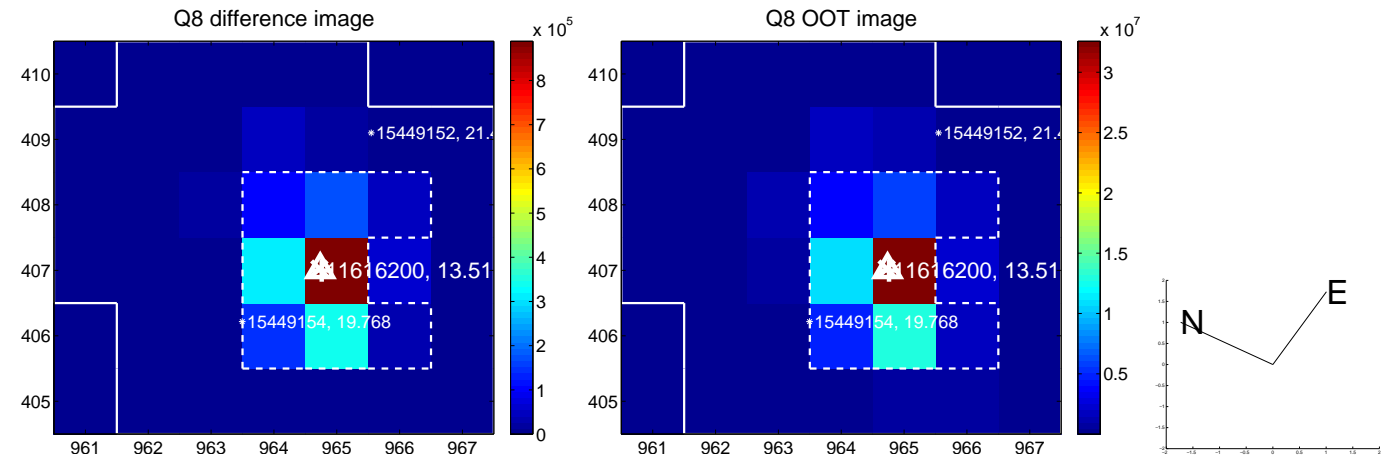
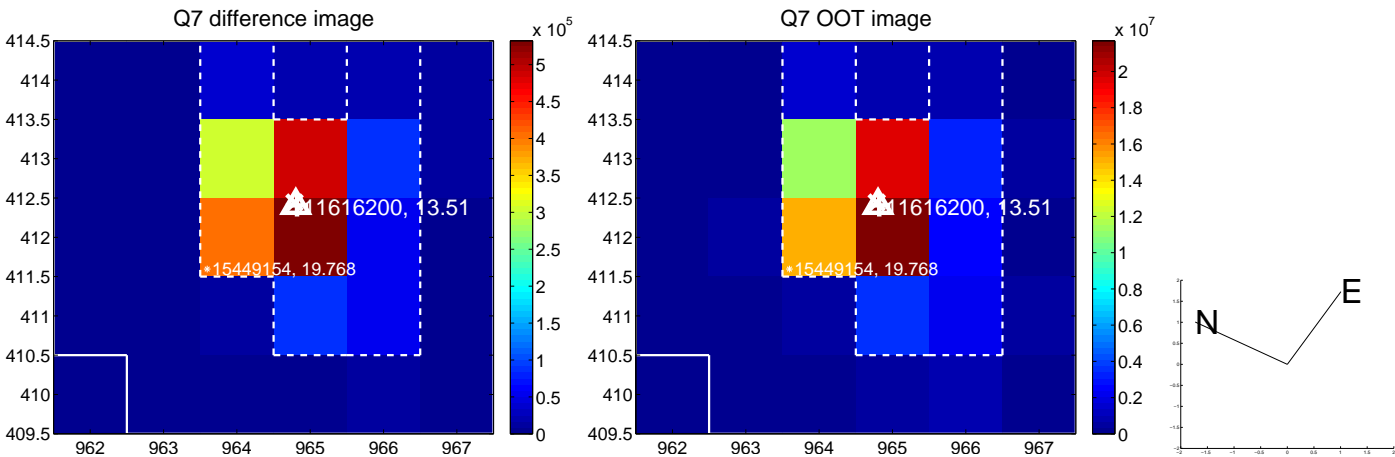
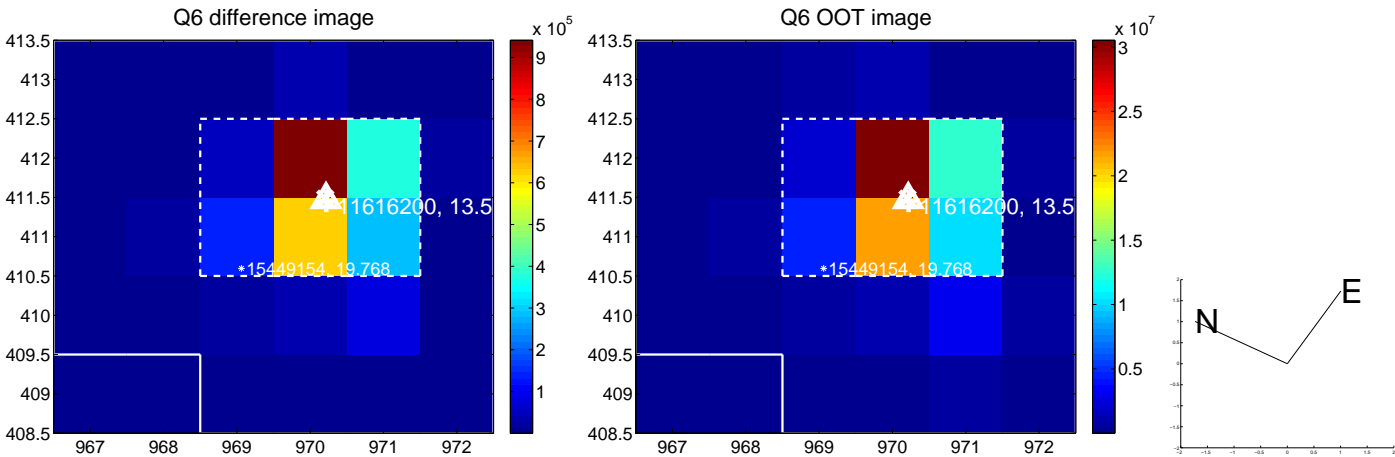
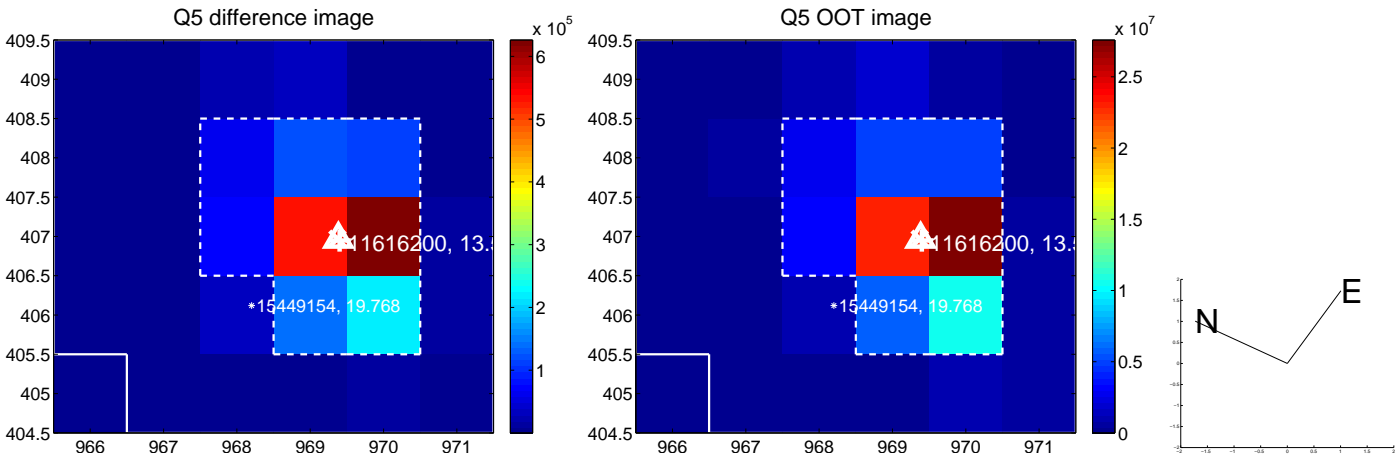


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

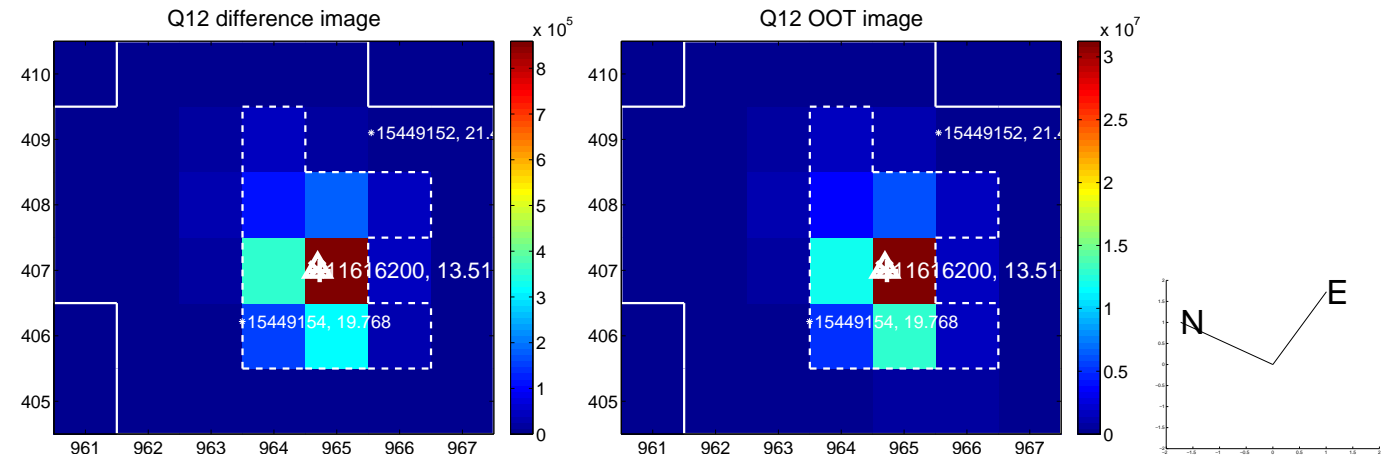
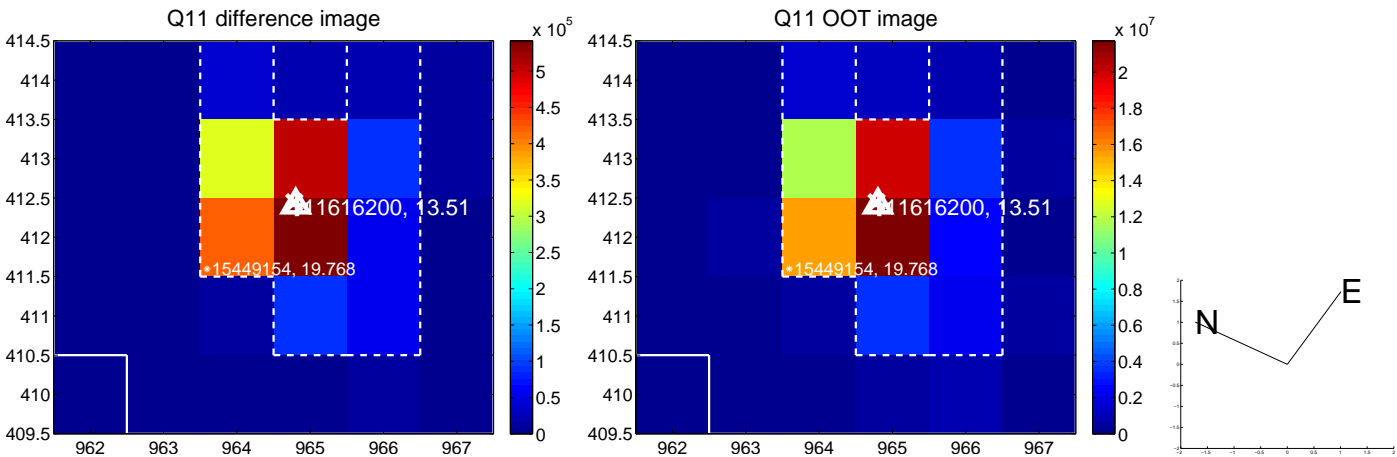
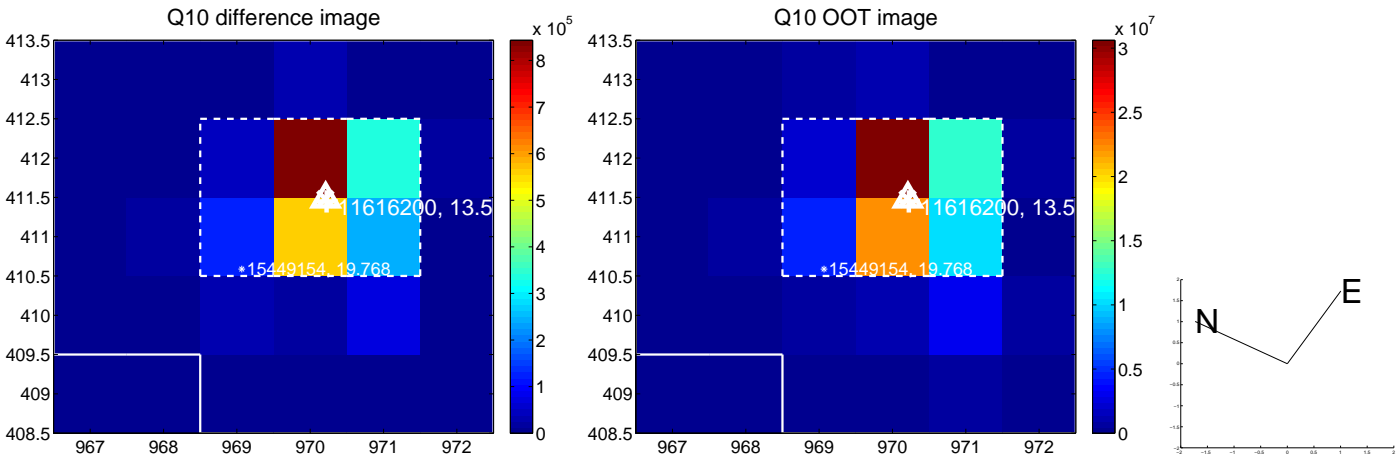
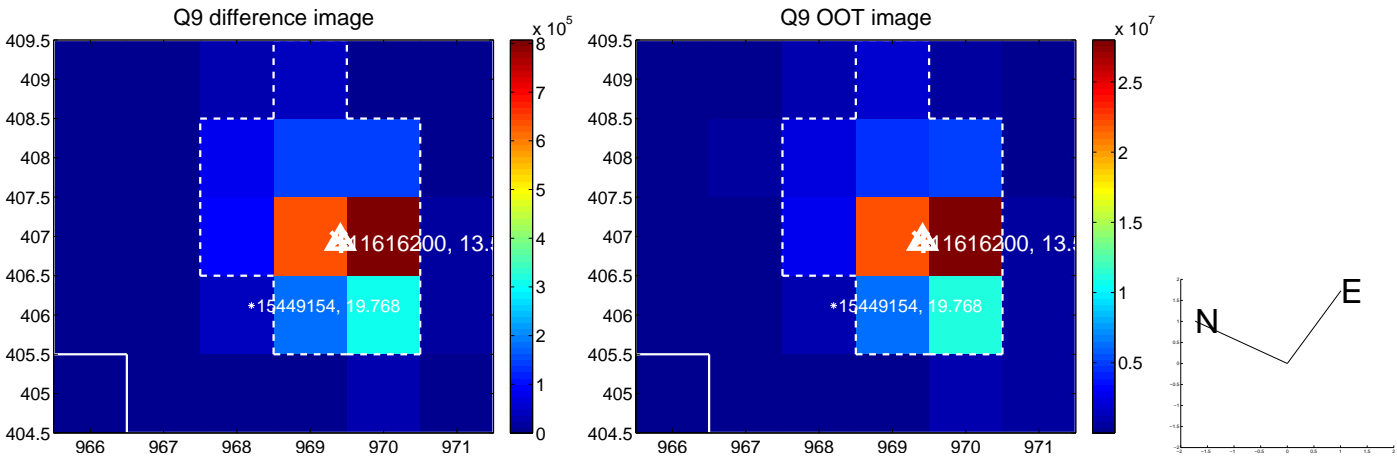
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



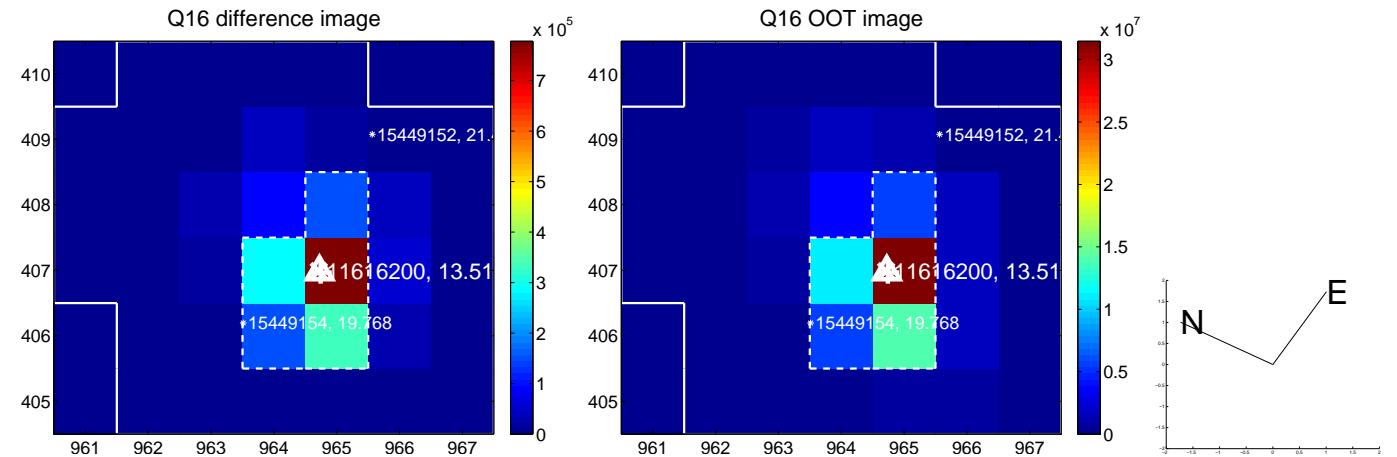
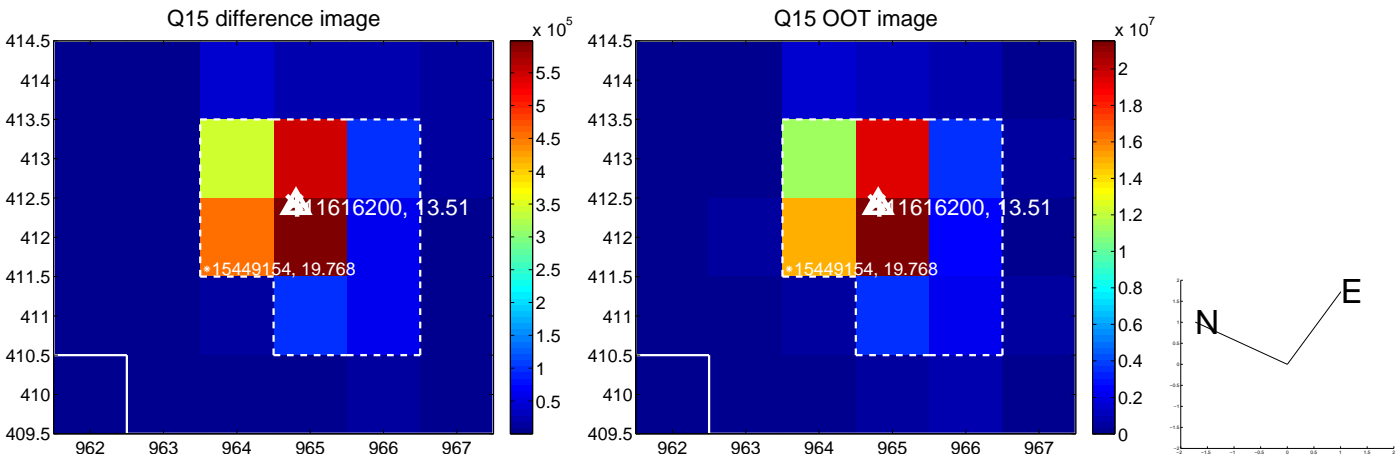
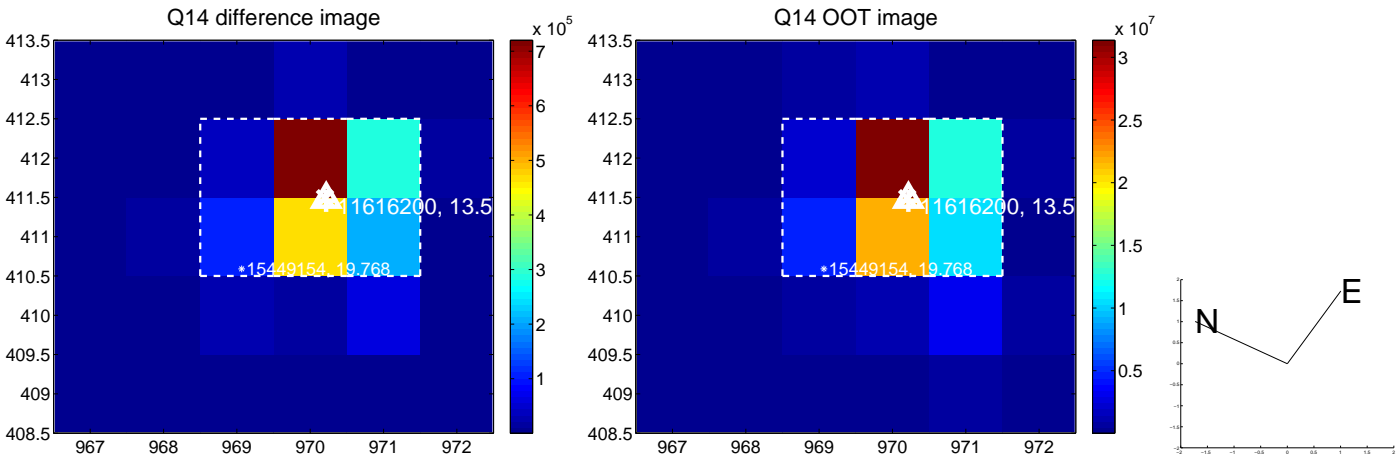
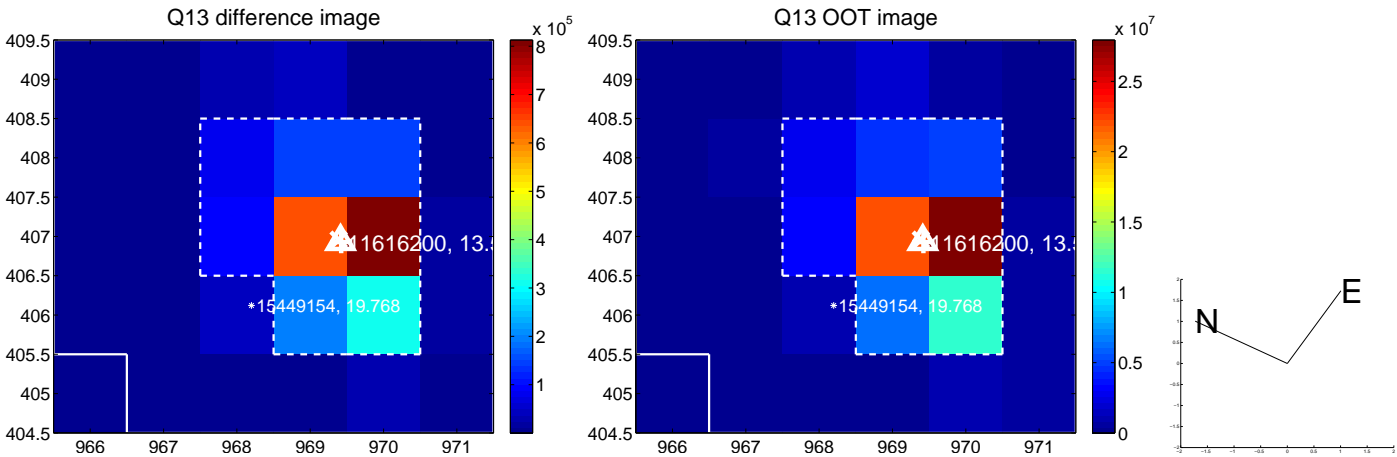
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



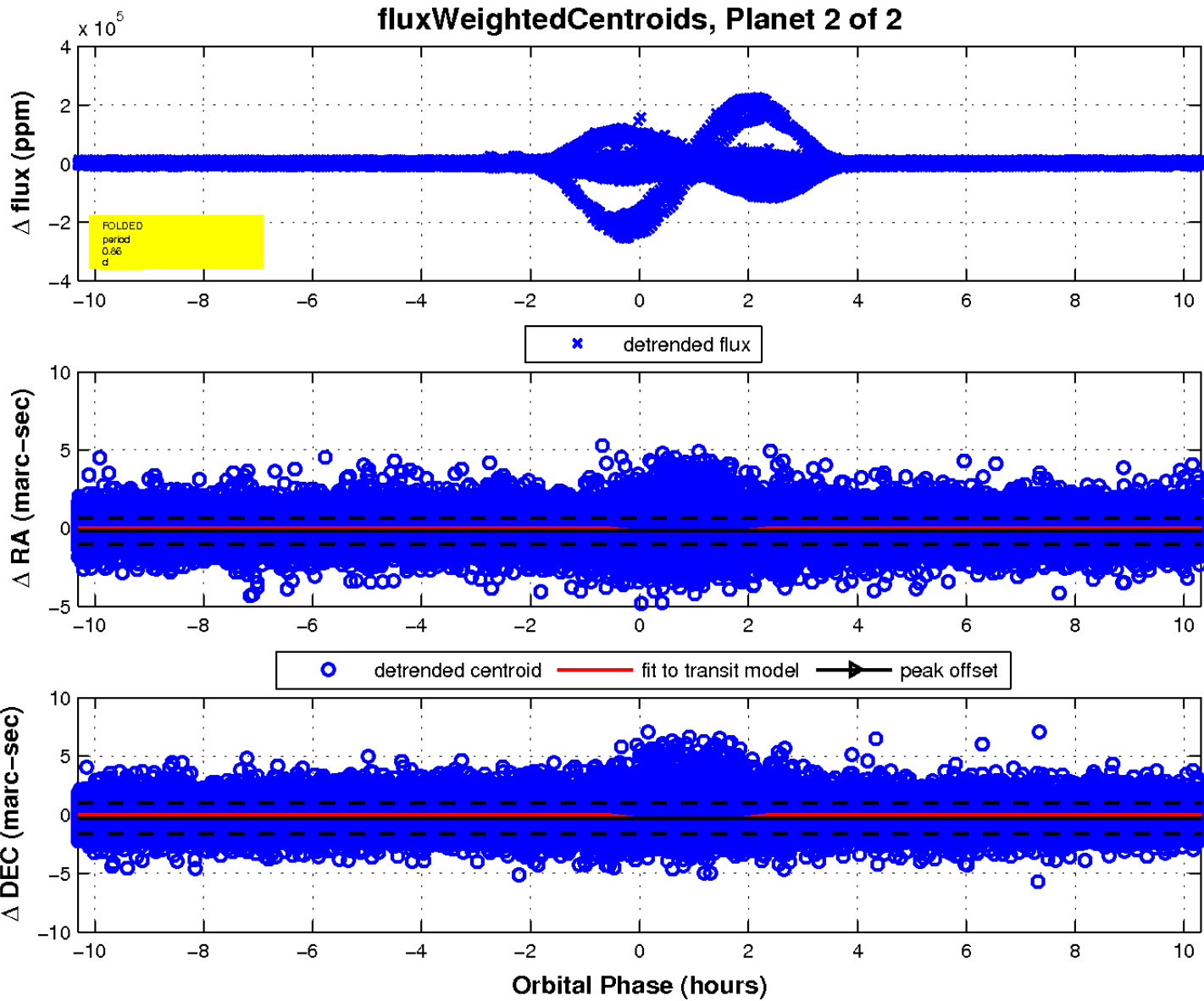
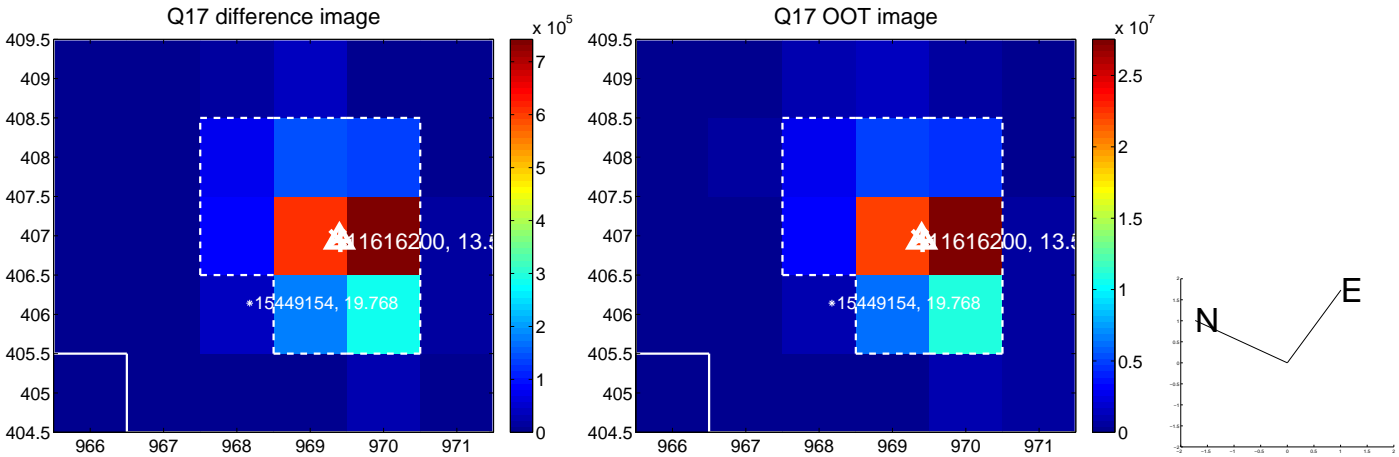
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

