

KIC 010140665

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 010140665-01 | OBS | No | 3.389125 | 132.069892 | 21.8 | 13.847 | 7.6 | 7.7 | 1.33 | 6780 | 0.72 | 1390.43 |
| 010140665-02 | OBS | No | 283.488730 | 386.557081 | 331.9 | 1.929 | 20.0 | 11.8 | 1.33 | 6780 | 2.70 | 3.80 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 010140665-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—MOD_NONUNIQ_DV |
| 010140665-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—LPP_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS |

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

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

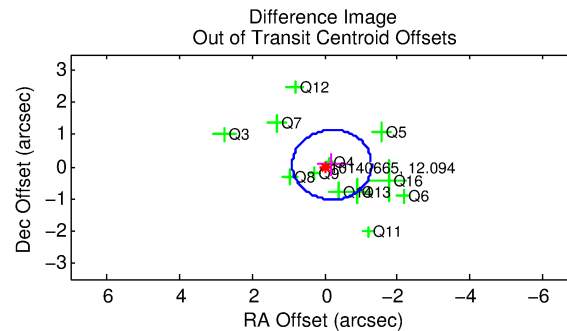
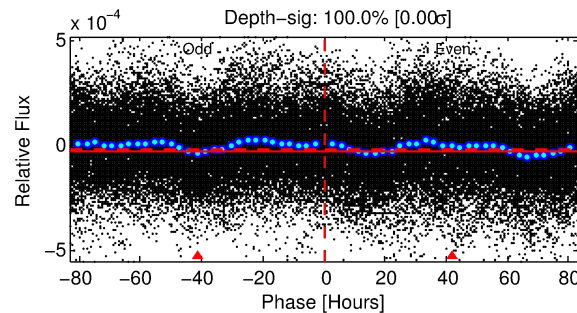
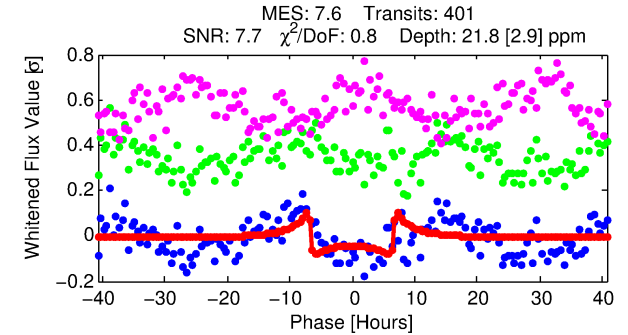
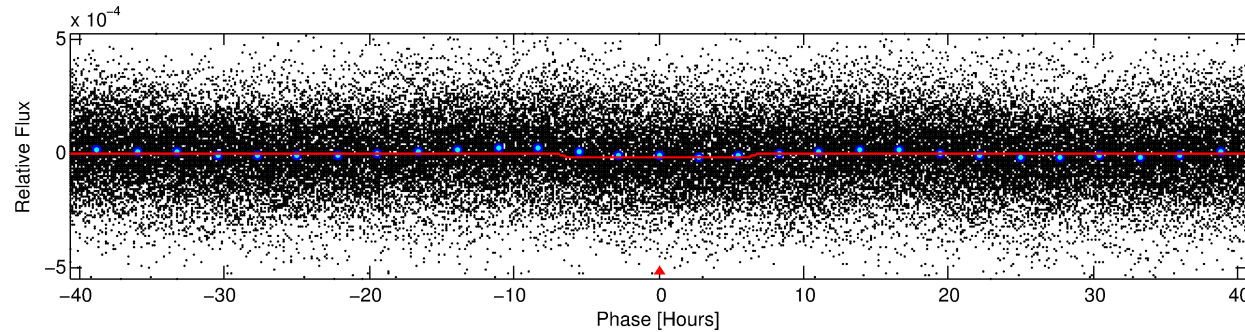
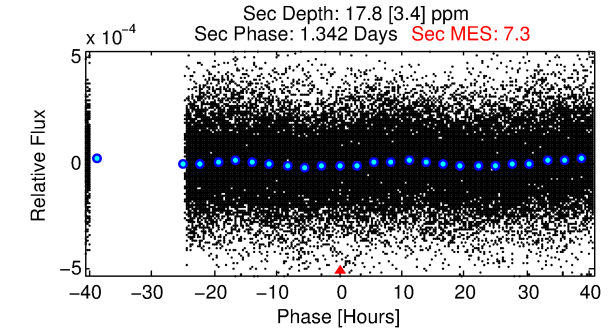
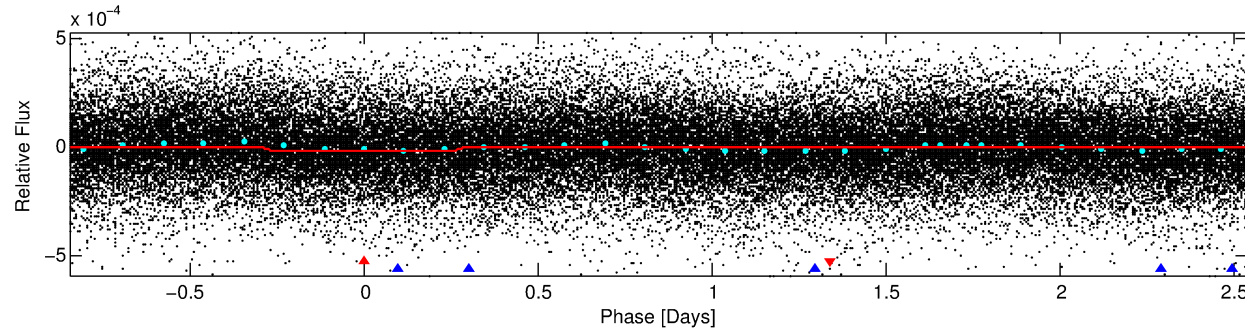
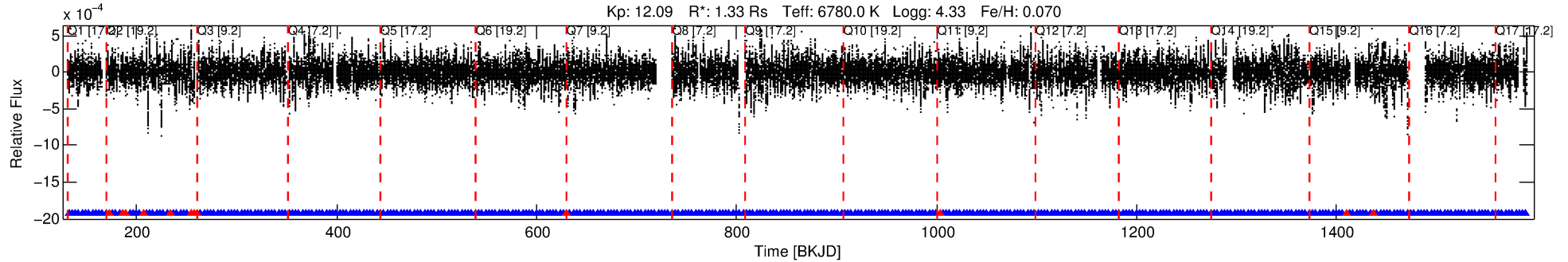
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010140665-01

No Significant Match Found

DV One-Page Summary

KIC: 10140665 Candidate: 1 of 2 Period: 3.389 d



DV Fit Results:

Period = 3.38913 [0.00003] d
Epoch = 132.0699 [0.0054] BKJD
Rp/R* = 0.0050 [0.0006]
a/R* = 1.26 [0.24]
b = 0.90 [0.11]
Seff = 1390.43 [426.07]
Teq = 1557 [119] K
Rp = 0.72 [0.18] Re
a = 0.0491 [0.0090] AU
Ag = 45.26 [18.23] [2.43σ]
Teffp = 6244 [515] K [8.87σ]

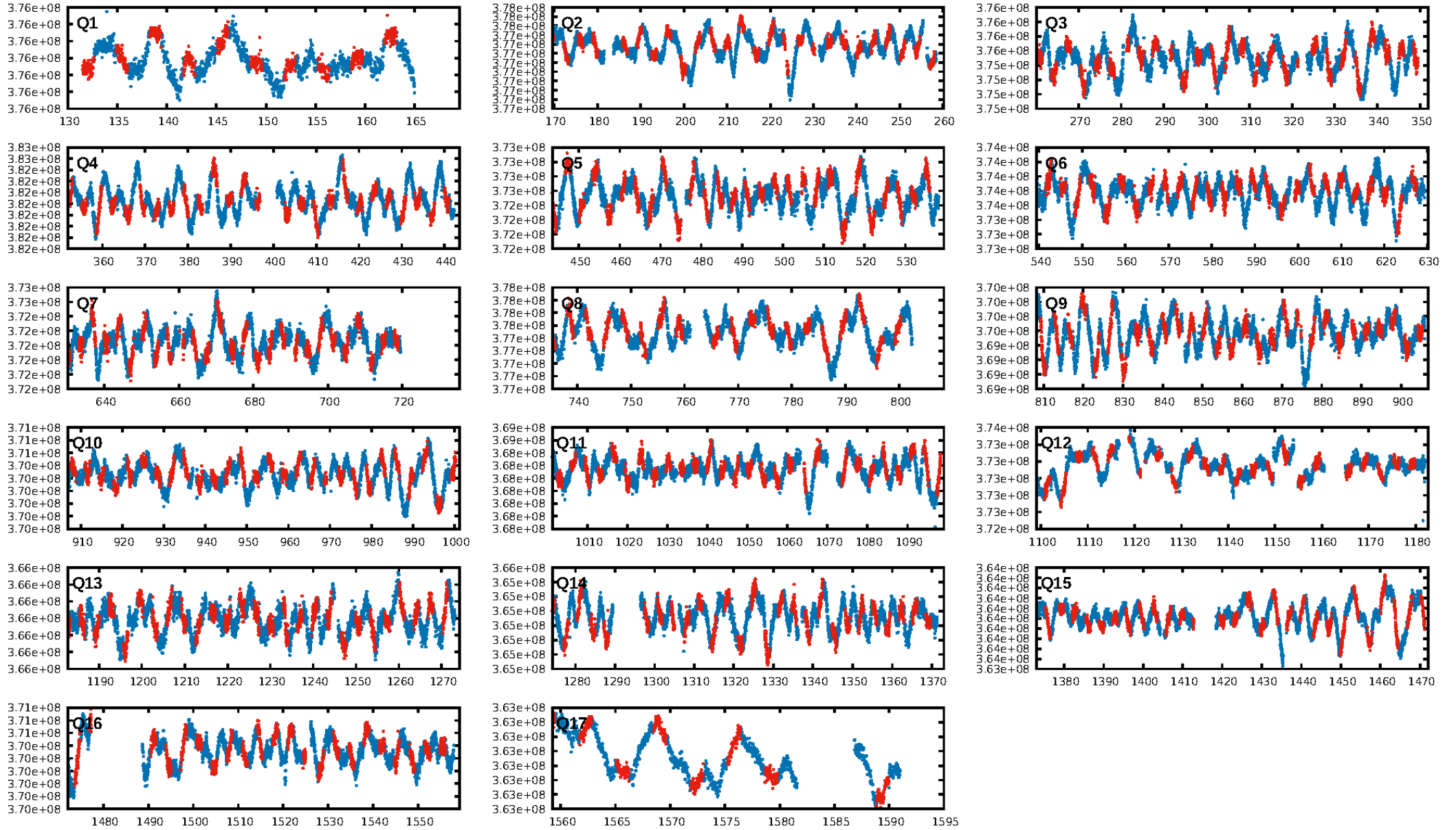
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [480.84σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 3.63e-08
RollingBand-fgt: 0.97 [372/384]
GhostDiagnostic-chr: 1.825
Centroid-sig: 3.8%
Centroid-so: 1.172 arcsec [2.09σ]
OotOffset-rm: 0.210 arcsec [0.58σ]
KicOffset-rm: 0.172 arcsec [0.39σ]
OotOffset-st: 2/3/4/3 [12]
KicOffset-st: 2/3/4/3 [12]
DiffImageQuality-fgm: 0.67 [8/12]
DiffImageOverlap-fno: 1.00 [17/17]

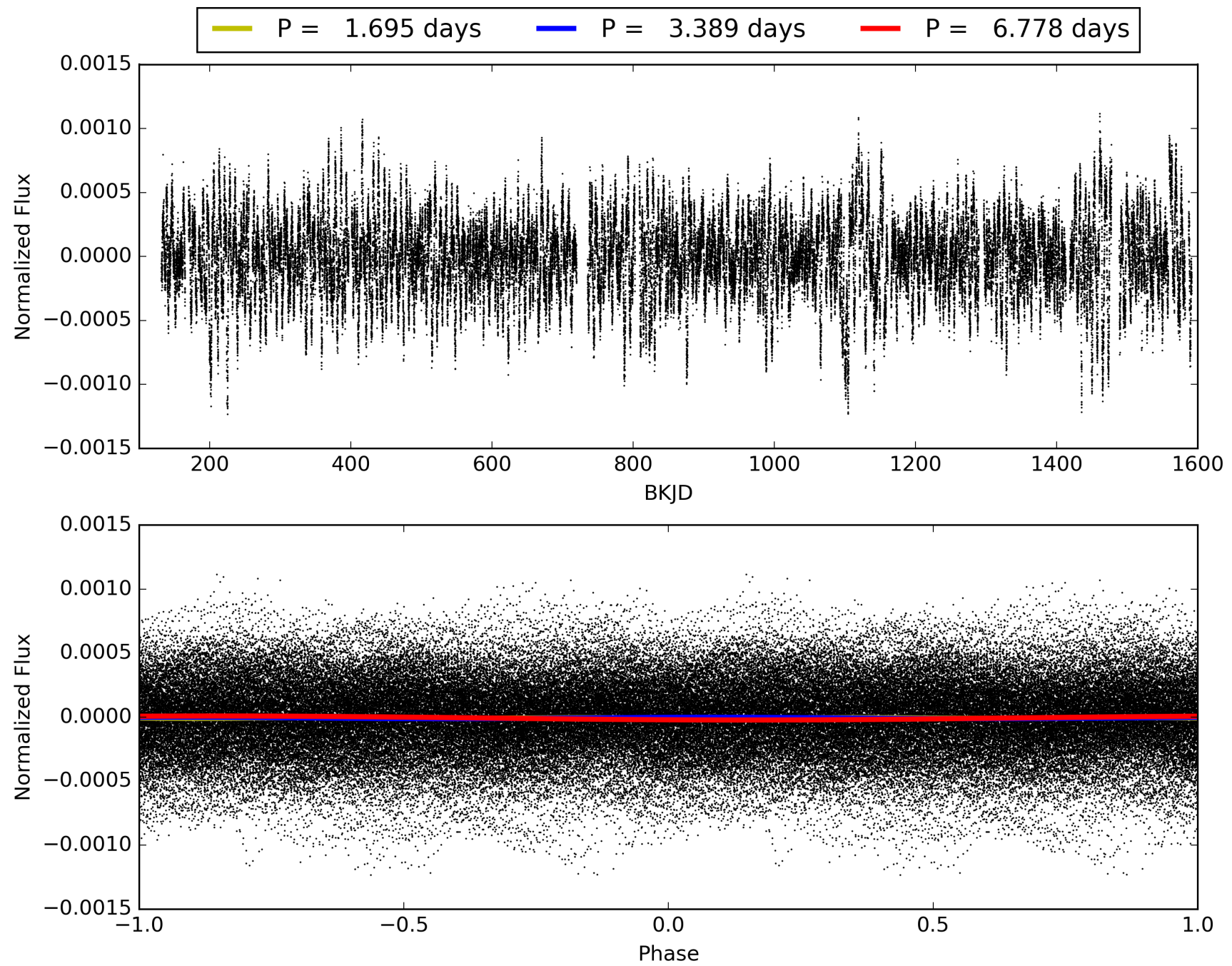
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 03:30:01 Z

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

TCE 010140665-01, PDC Light Curves

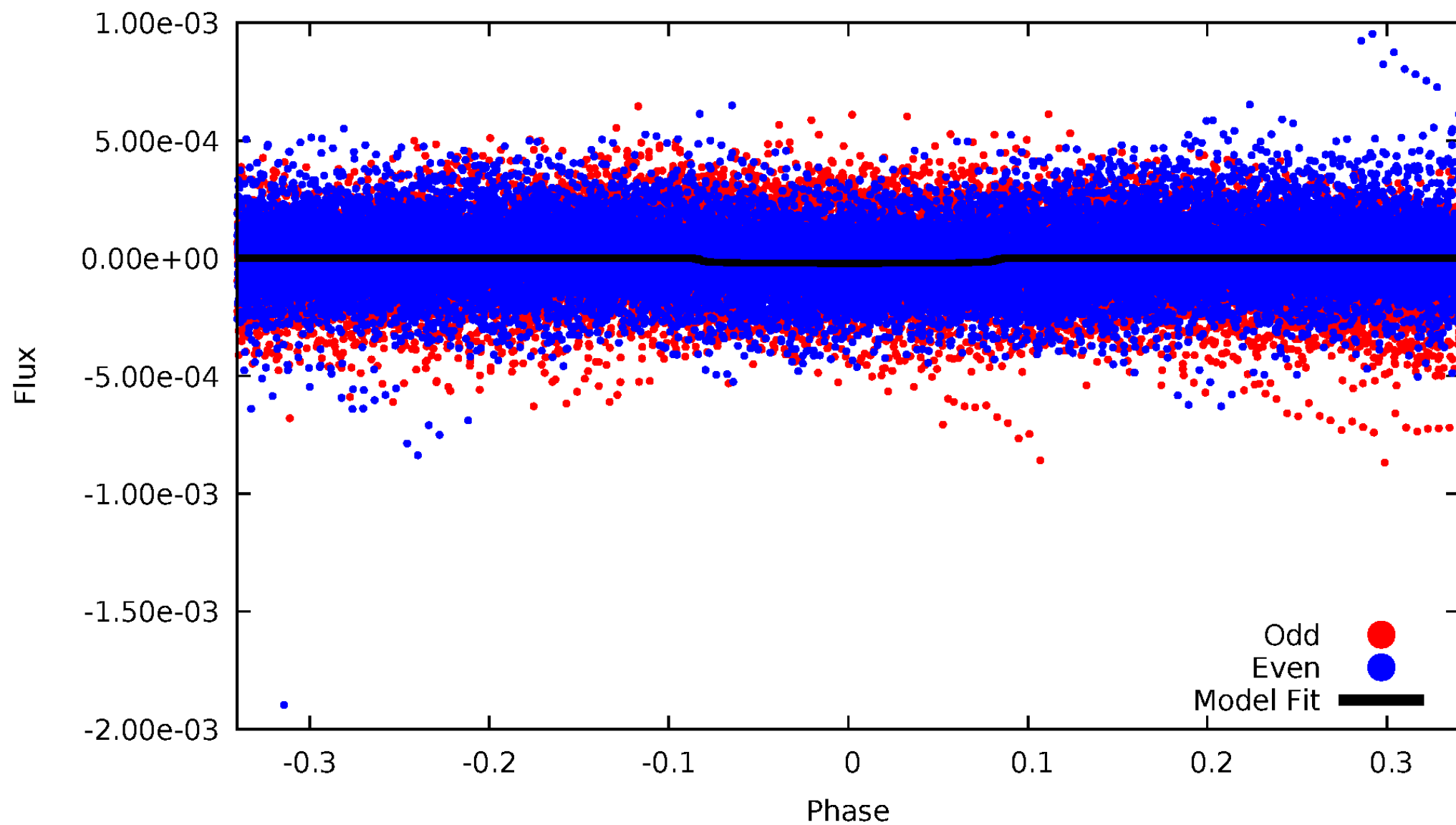


TCE 010140665-01



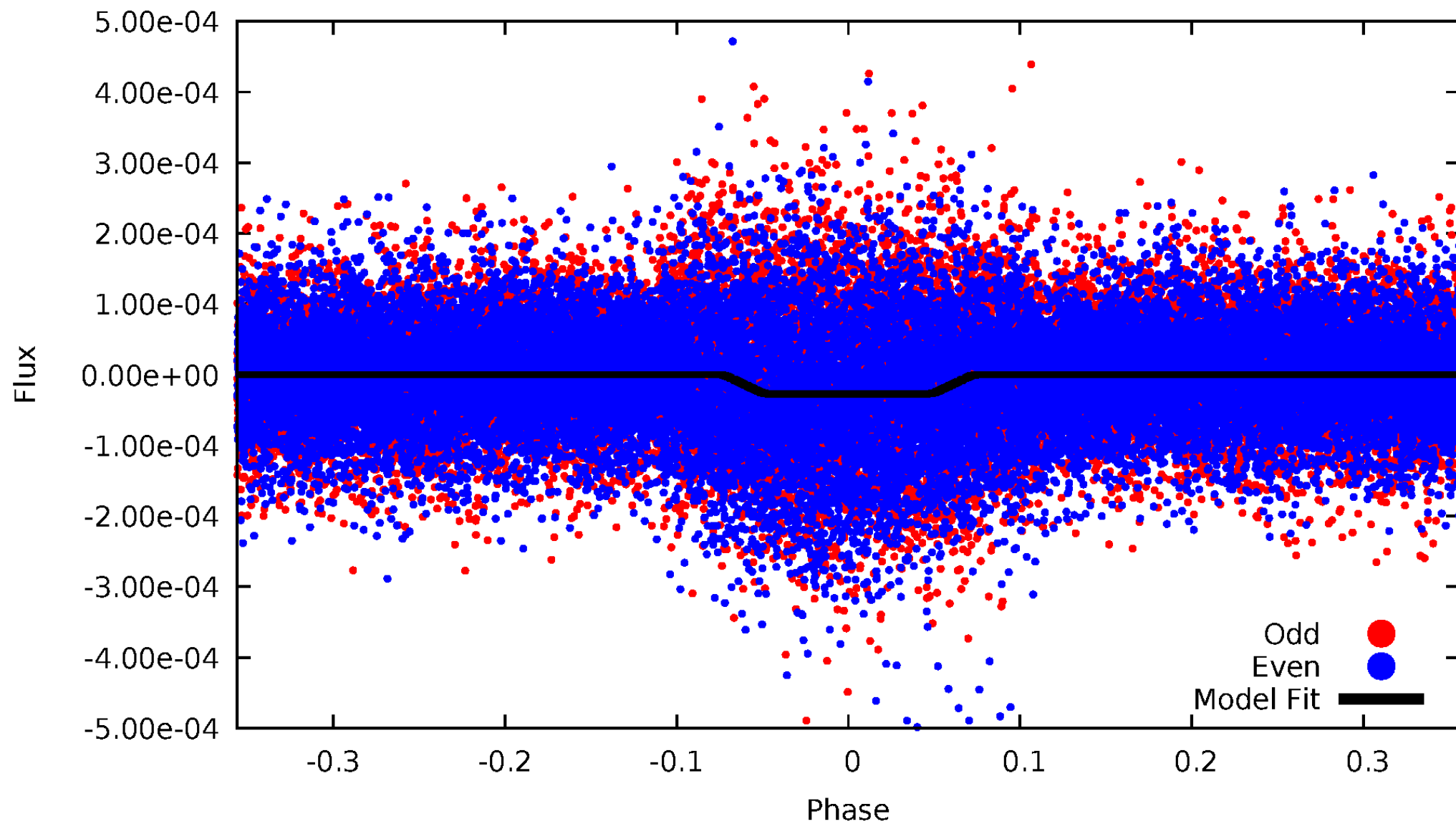
DV Odd/Even

TCE 010140665-01



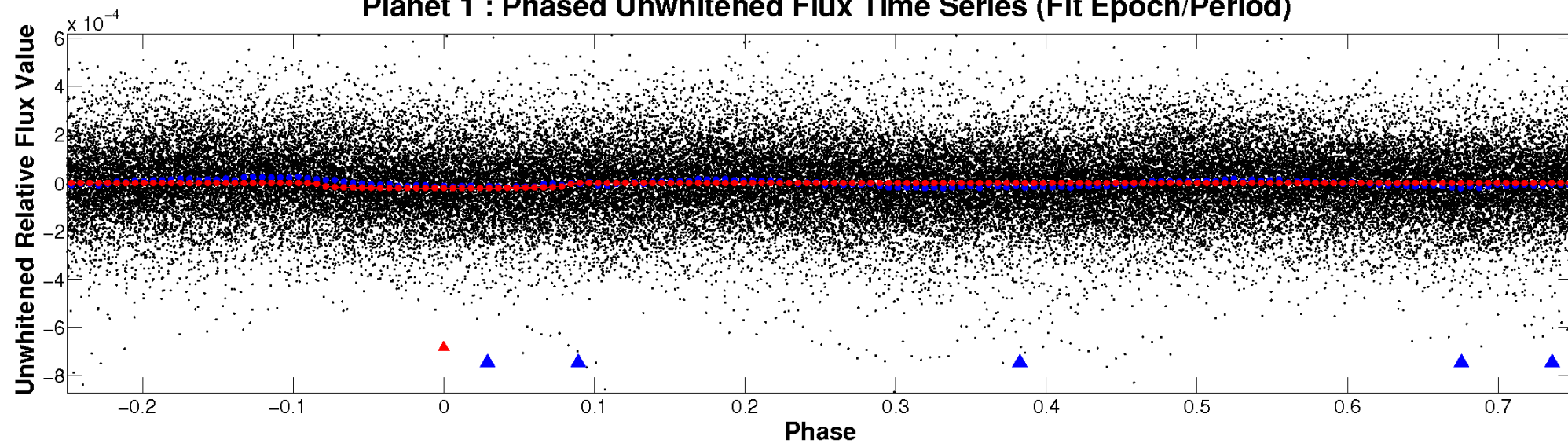
ALT Odd/Even

TCE 010140665-01

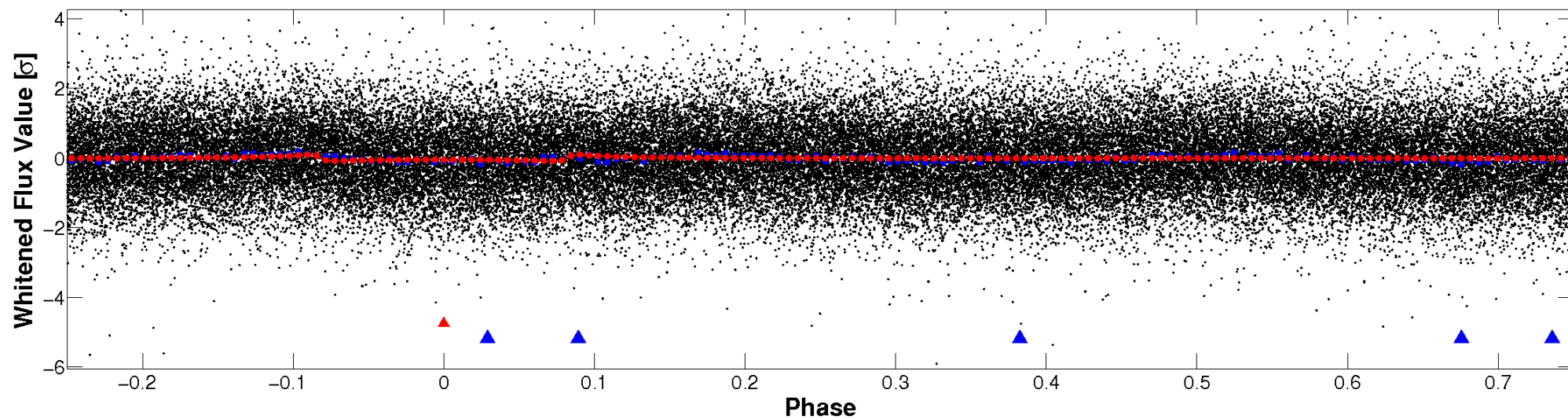


Non-Whitened Vs. Whitened Light Curve

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

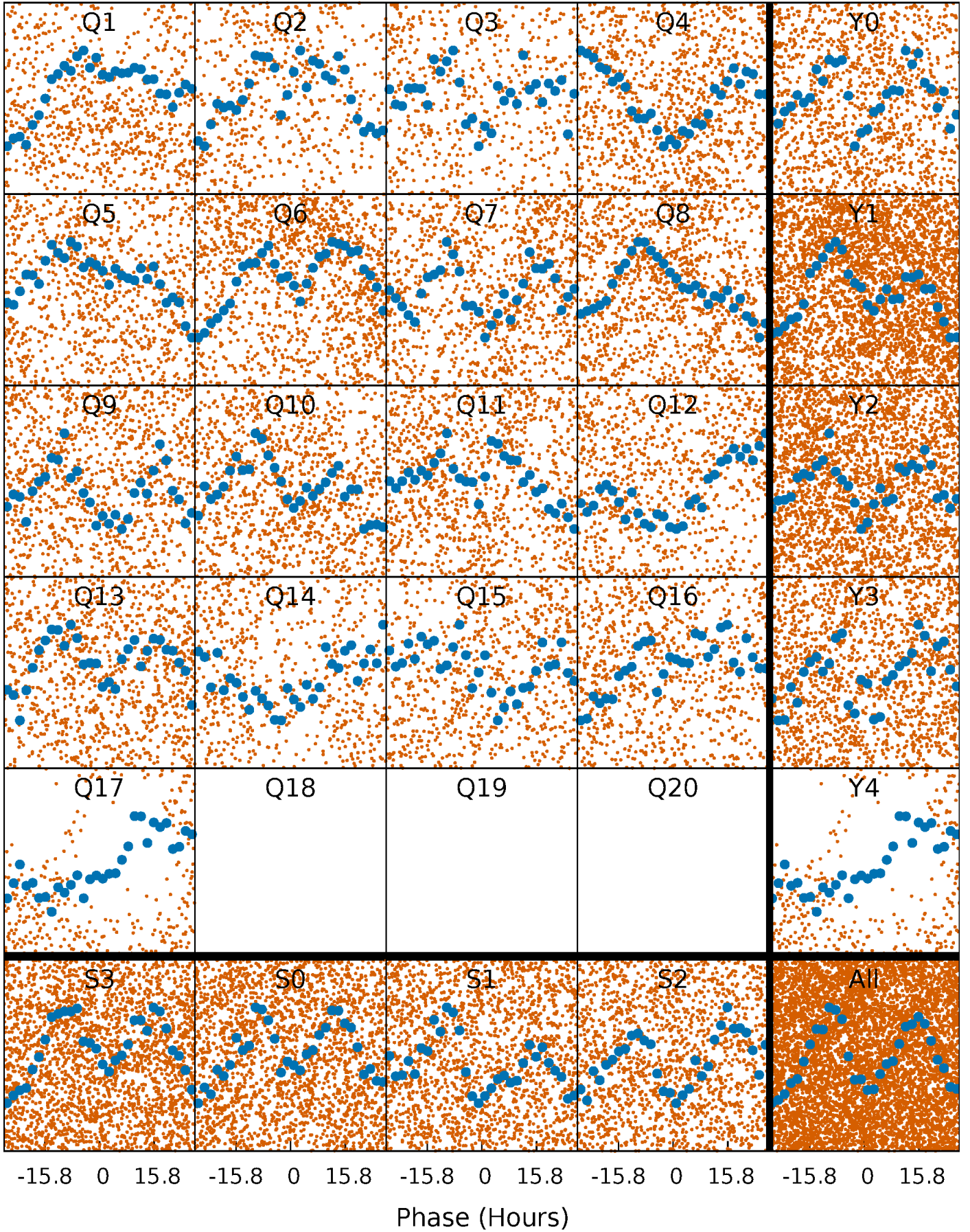


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



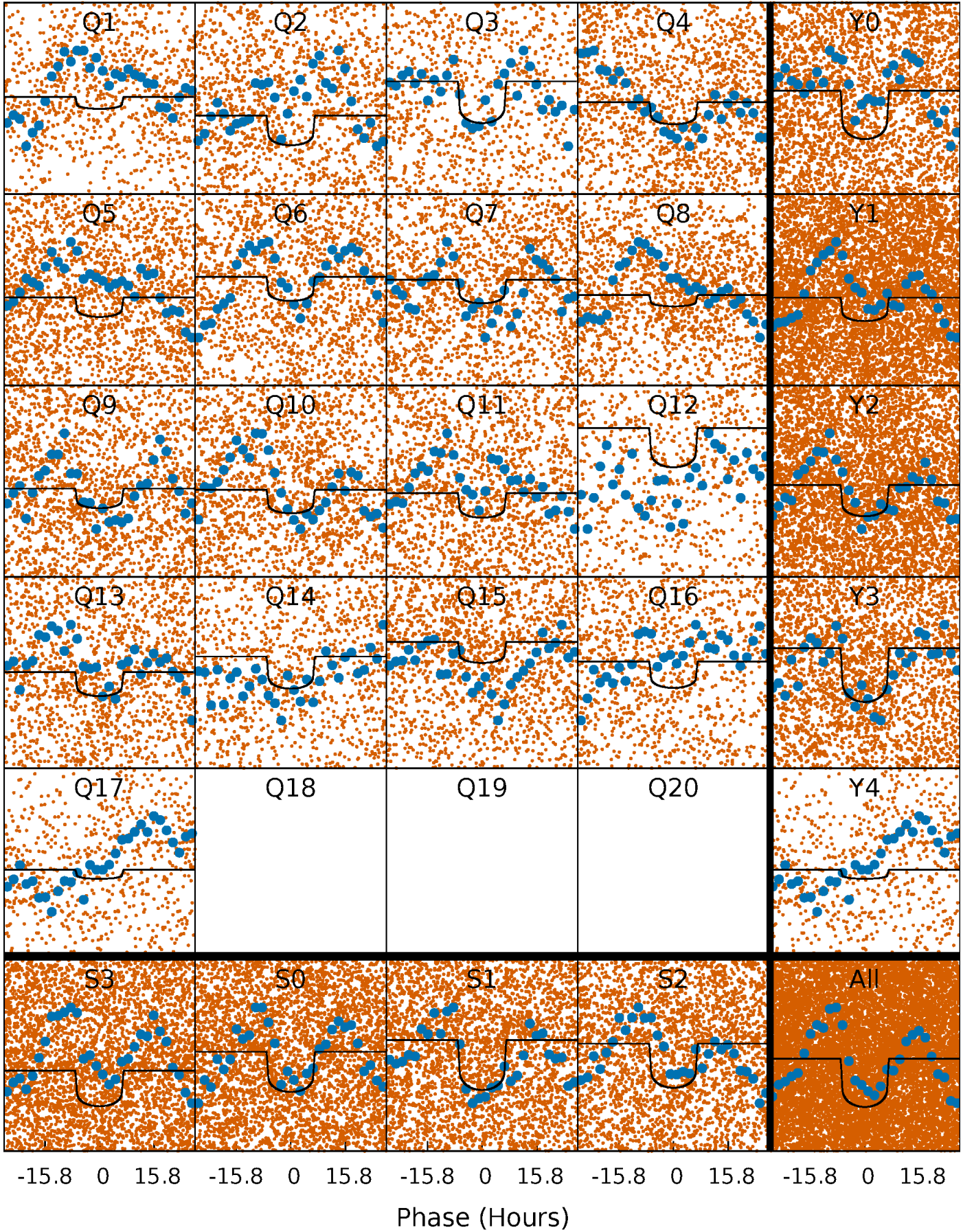
PDC Quarter-Phased Transit Curves

TCE 010140665-01 P= 3.389125 Days $T_0=132.069892$ (BKJD)



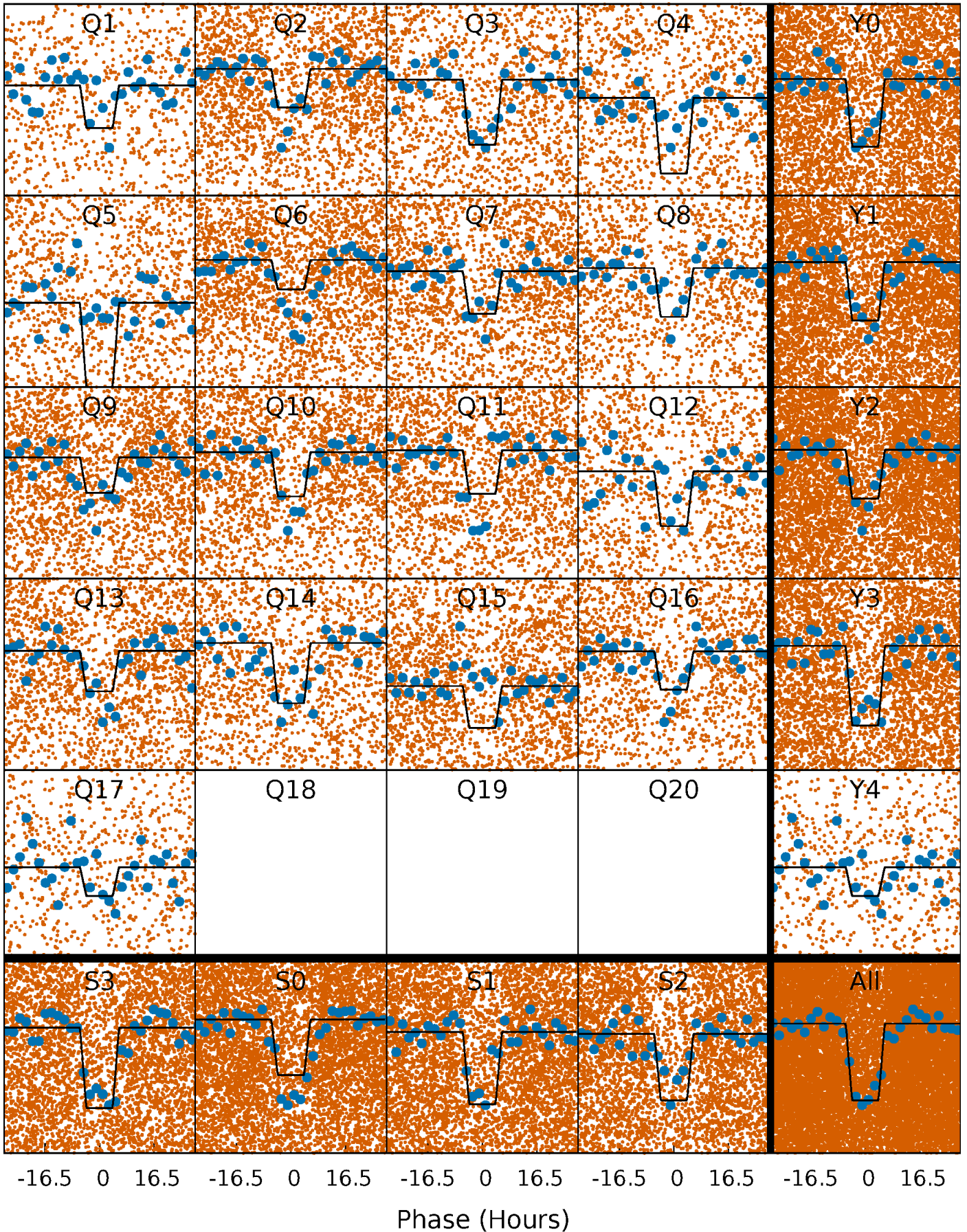
DV Quarter-Phased Transit Curves

TCE 010140665-01 P= 3.389125 Days $T_0=132.069892$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

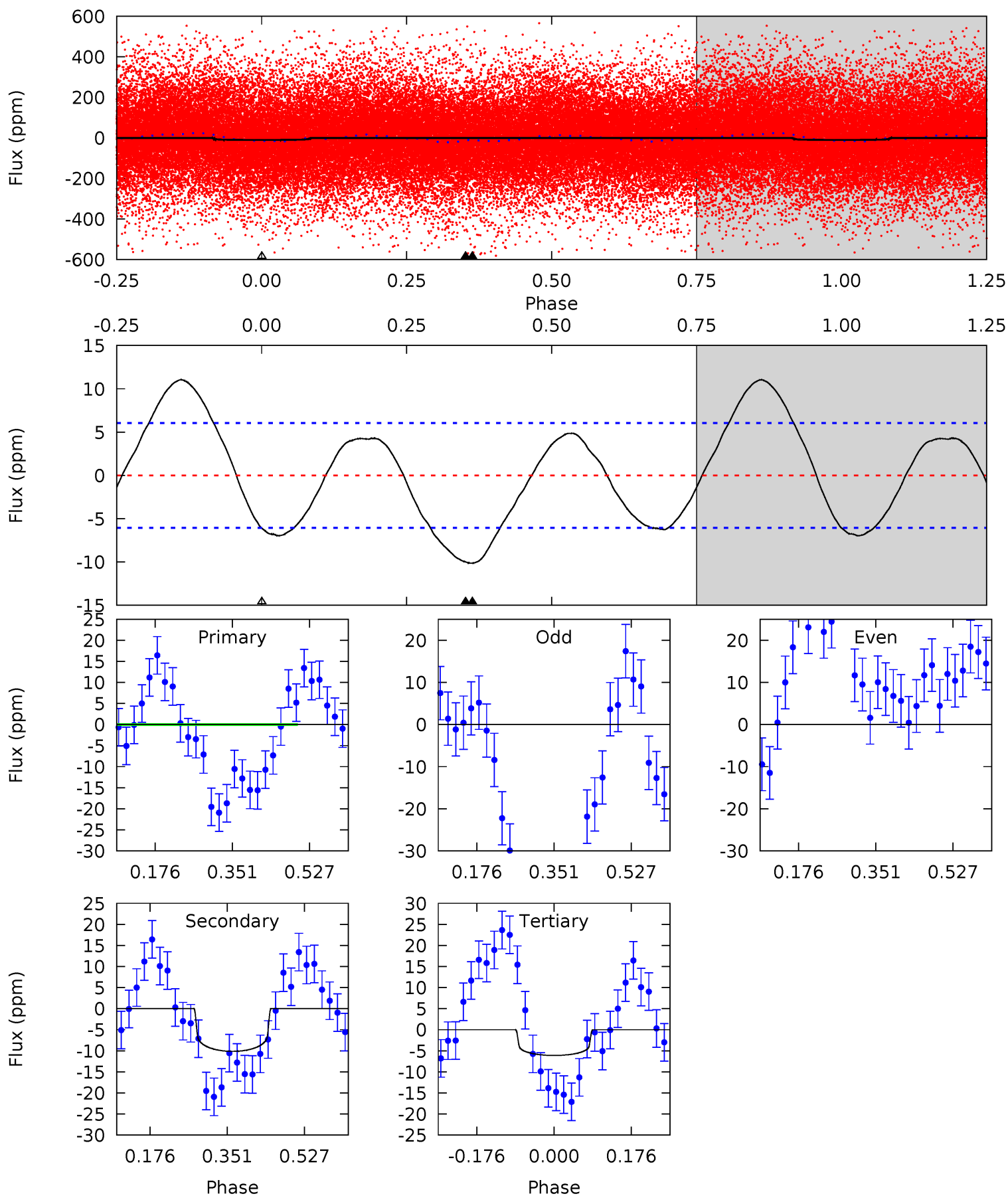
TCE 010140665-01 P= 3.388994 Days $T_0=132.082943$ (BKJD)



DV Model-Shift Uniqueness Test

010140665-01, P = 3.389125 Days, E = 128.680767 Days

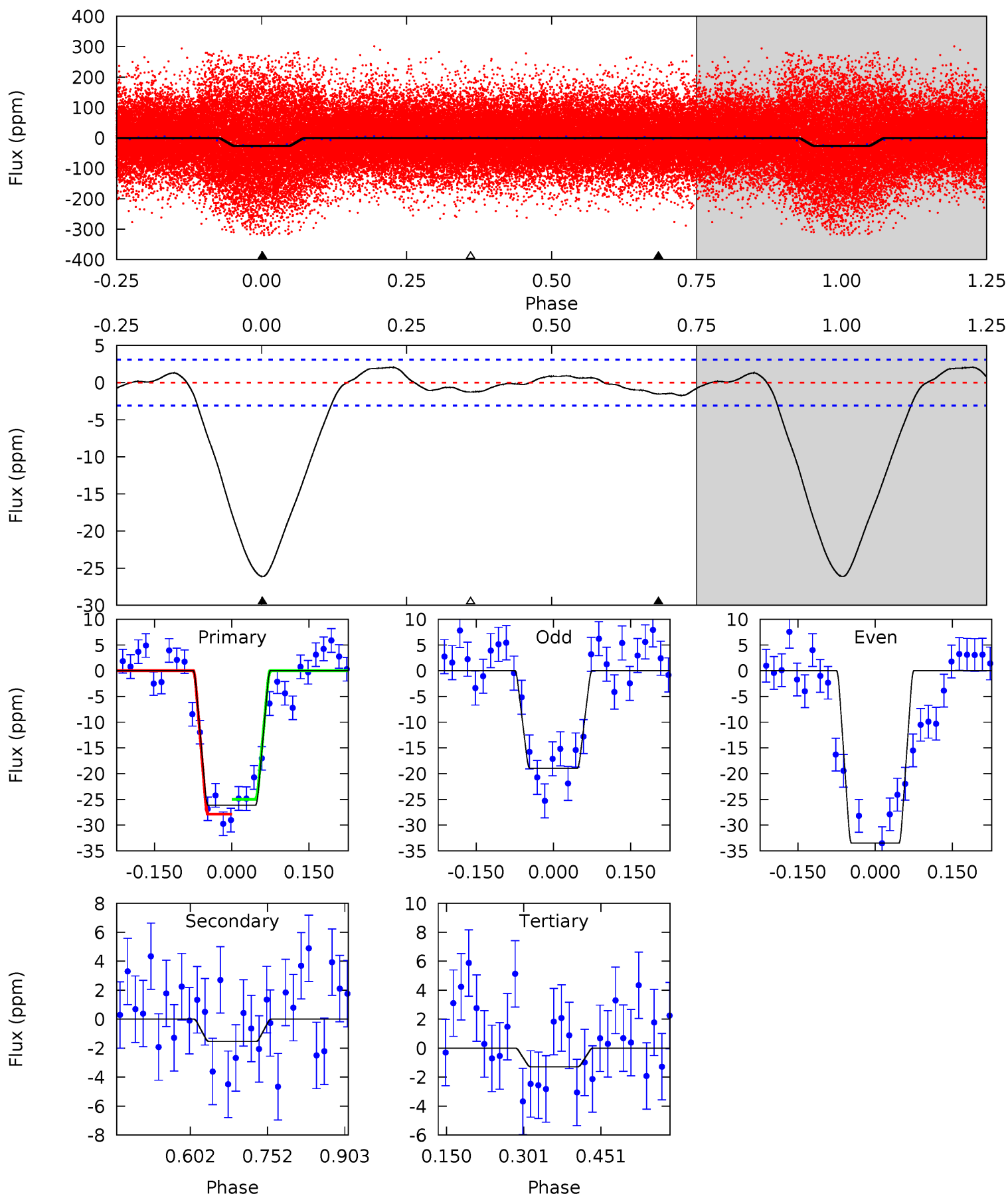
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 7.35 | 7.45 | 4.49 | 0 | 4.45 | 1.35 | 4.02 | 2.86 | 7.35 | 2.96 | 7.45 | 7.30 | 0.69 | 0.52 | 2.94 |



Alt Model-Shift Uniqueness Test

010140665-01, P = 3.388994 Days, E = 128.693949 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 37.8 | 2.23 | 1.86 | 0 | 4.48 | 1.44 | 1.51 | 36.0 | 37.8 | 0.37 | 2.23 | 10.4 | 0.98 | 0.07 | 2.07 |



Stellar Parameters For KIC 010140665

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 6780^{+161}_{-241} | $4.328^{+0.050}_{-0.150}$ | $0.070^{+0.200}_{-0.350}$ | $1.331^{+0.287}_{-0.154}$ | $1.373^{+0.121}_{-0.208}$ | $0.821^{+0.219}_{-0.349}$ |
| | +2%/-4% | +1%/-3% | +286%/-500% | +22%/-12% | +9%/-15% | +27%/-43% |
| Source | PHO1 | FLK73 | 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 010140665-01 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{max} (K)$ | $T_{obs} (K)$ | A_{obs} |
|---------|-------------|------------------------|----------------------|----------------------|---------------------------|
| DV | -10 ± 1 | $0.74^{+0.11}_{-0.11}$ | 2209^{+113}_{-105} | 5414^{+397}_{-329} | 24^{+9}_{-6} |
| Alt. | -2 ± 1 | $0.77^{+0.12}_{-0.10}$ | 2204^{+113}_{-98} | 3650^{+309}_{-386} | $3.272^{+2.091}_{-1.512}$ |

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 $A_{obs} \gg 1.0$

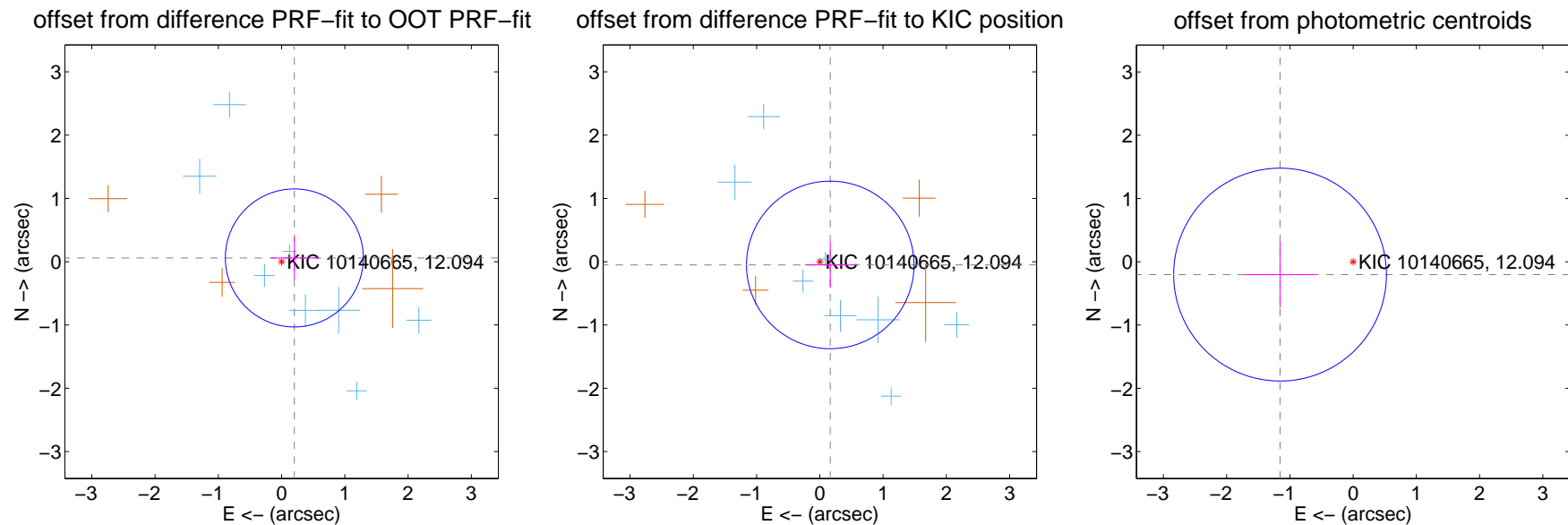
DV Centroid Data

Supplemental centroid analysis for 010140665-01. Kepler magnitude: 12.09. Transit SNR 7.72

There are 8 quarters with good PRF difference image offsets

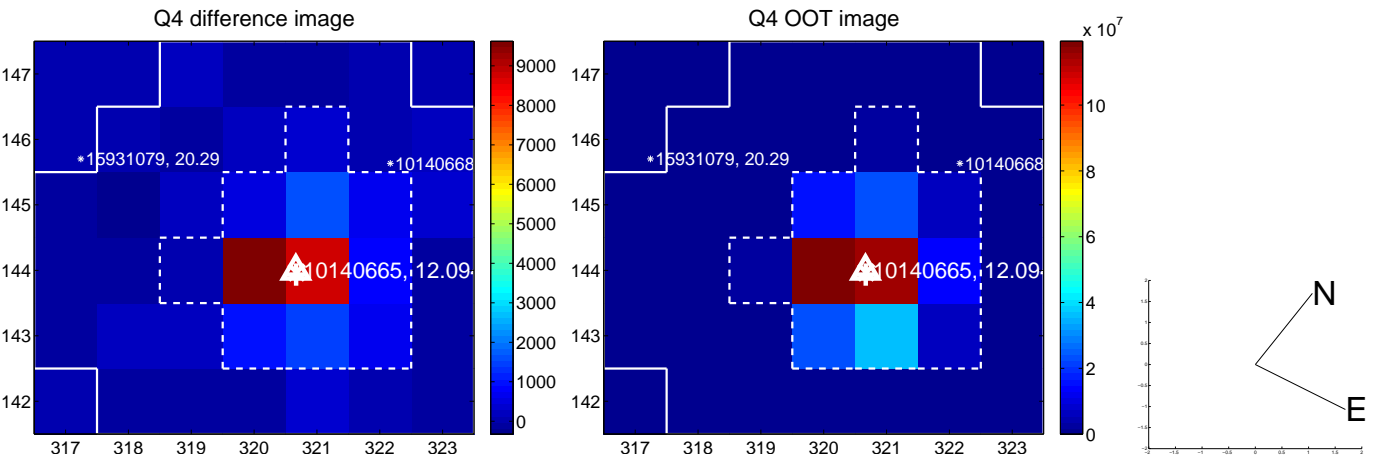
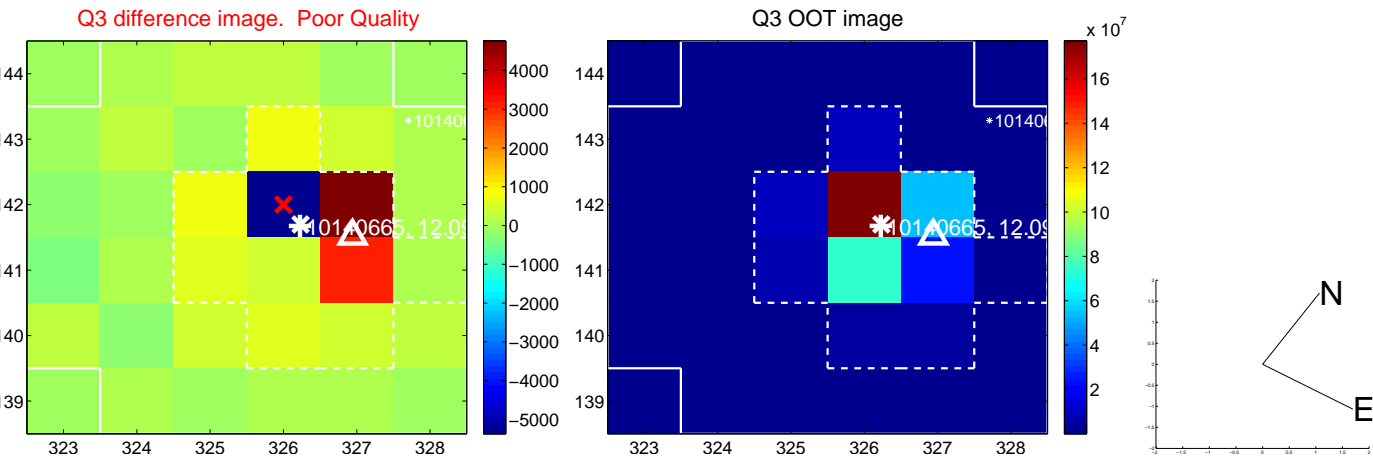
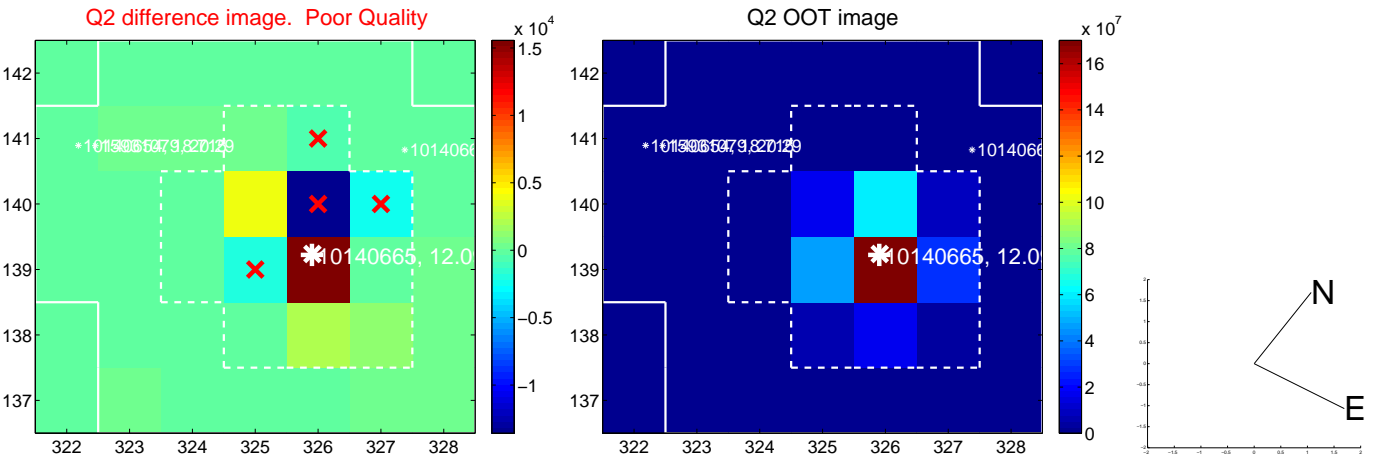
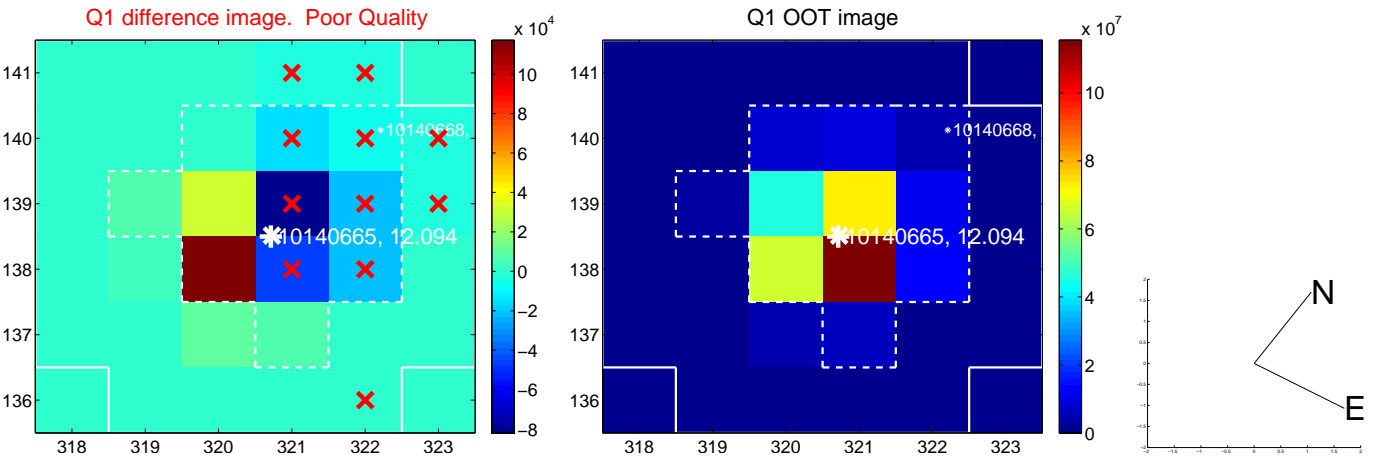
The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 0.210 ± 0.363 | 0.58 | -0.201 ± 0.366 | 0.059 ± 0.336 |
| PRF-fit source offset from KIC position | 0.172 ± 0.441 | 0.39 | -0.165 ± 0.401 | -0.051 ± 0.363 |
| photometric centroid source offset | 1.17 ± 0.56 | 2.09 | 1.15 ± 0.56 | -0.20 ± 0.52 |

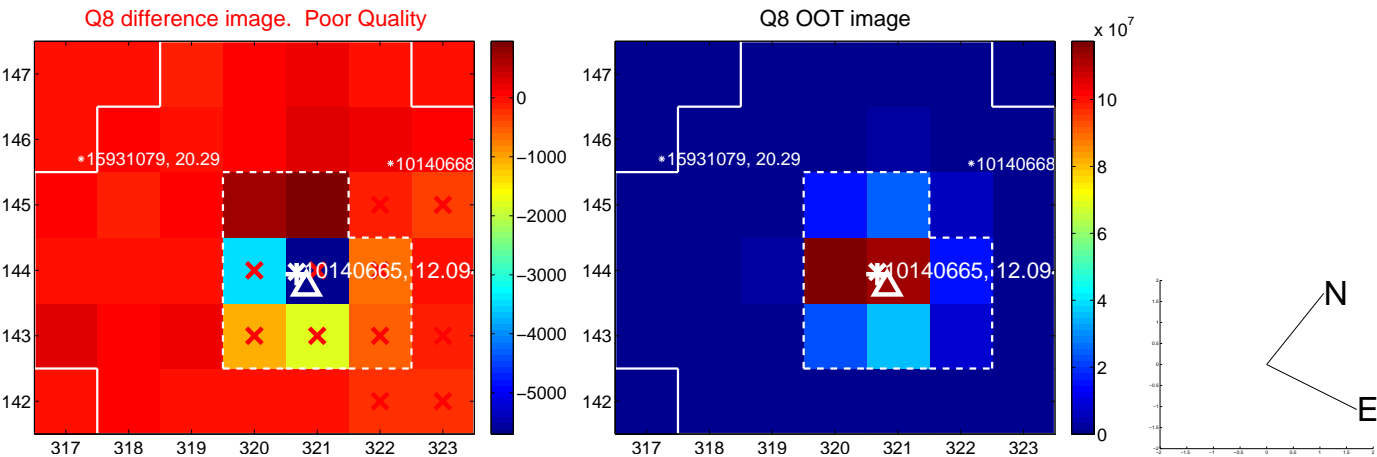
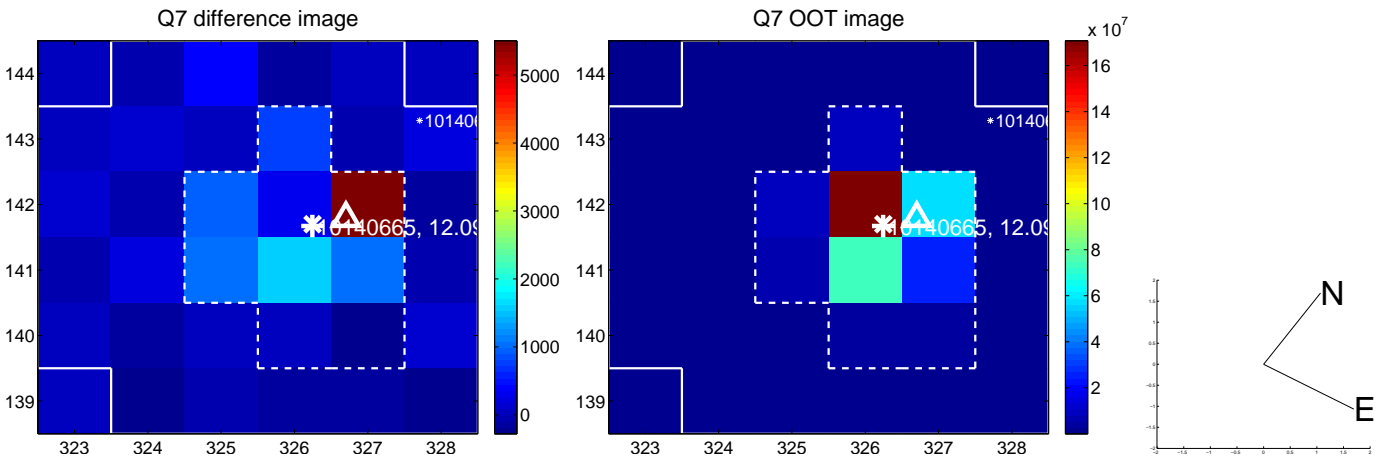
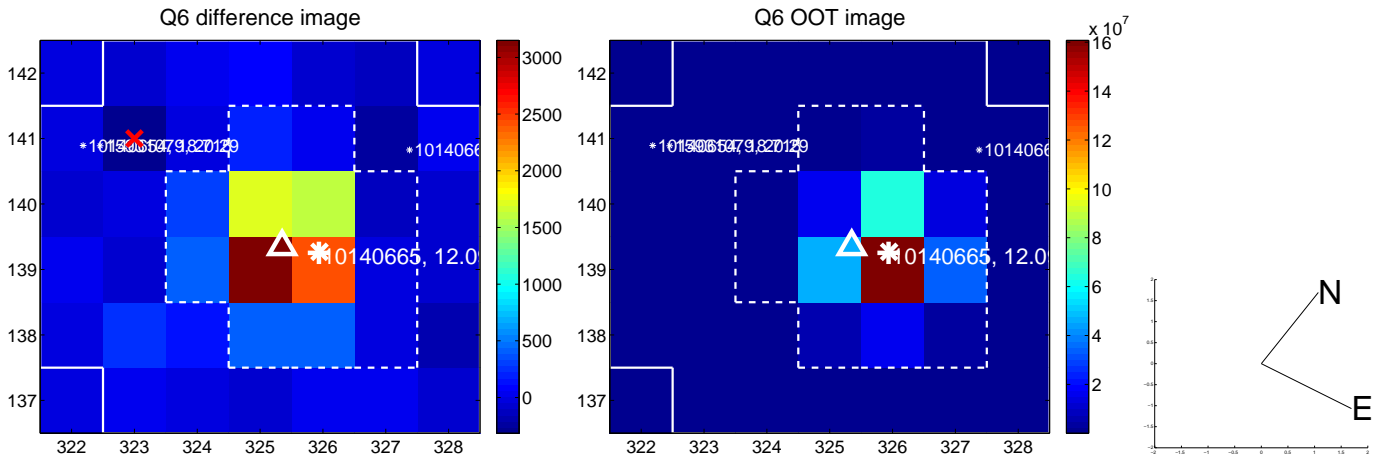
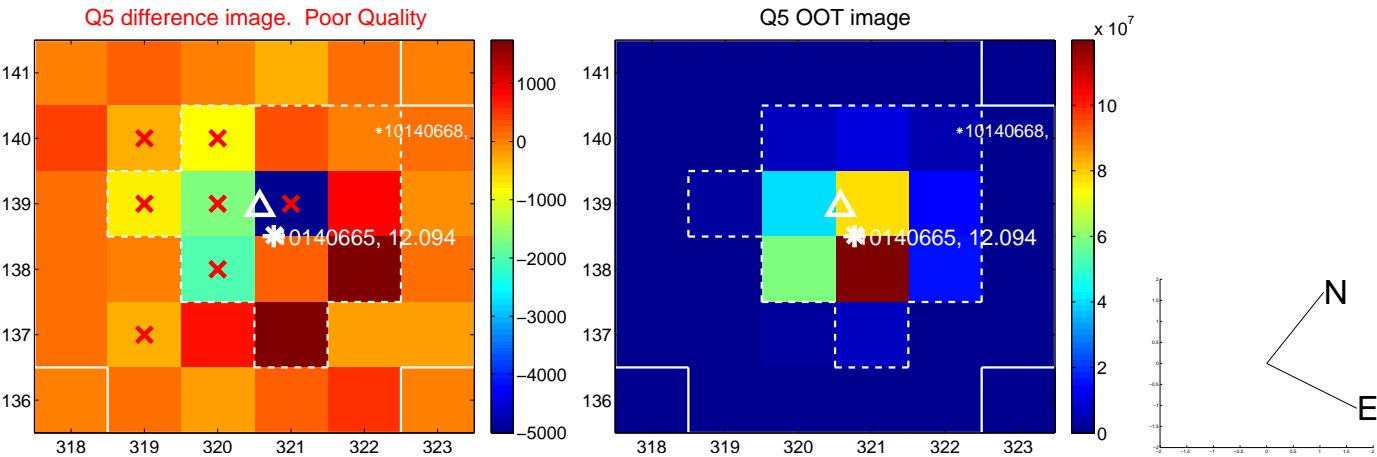


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

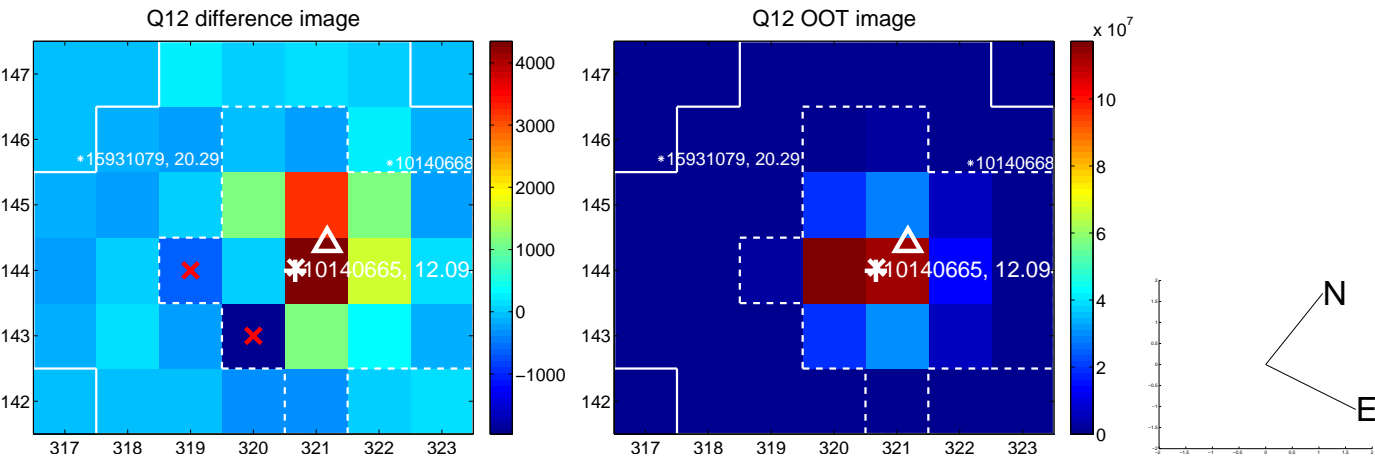
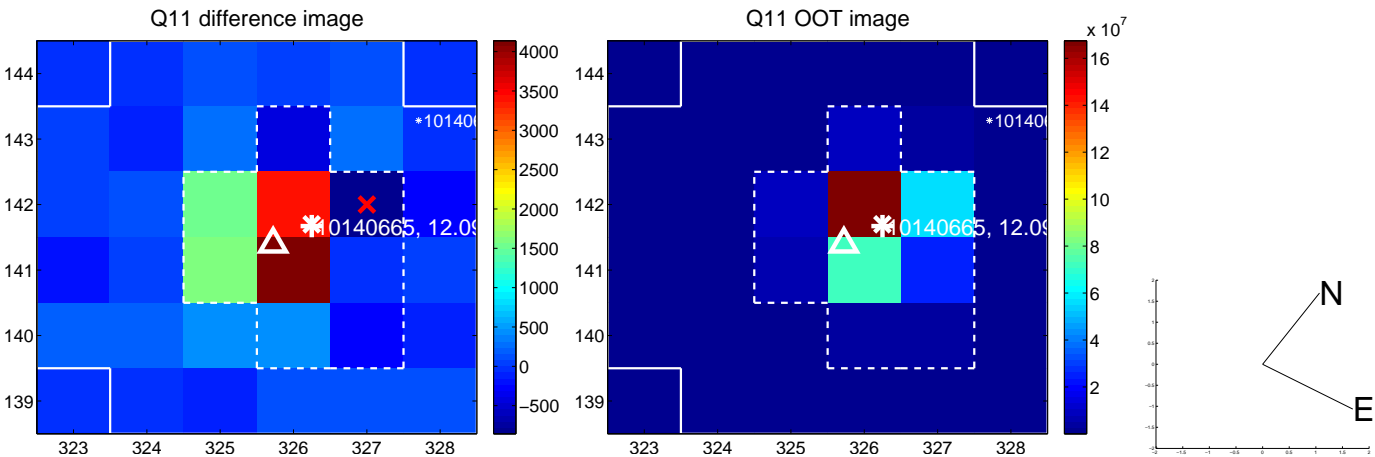
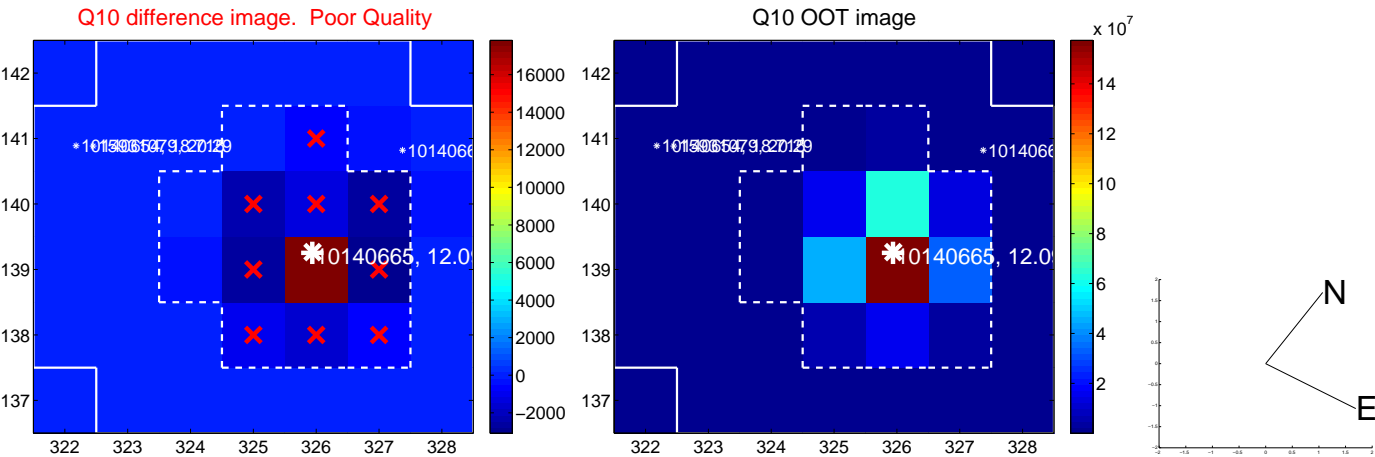
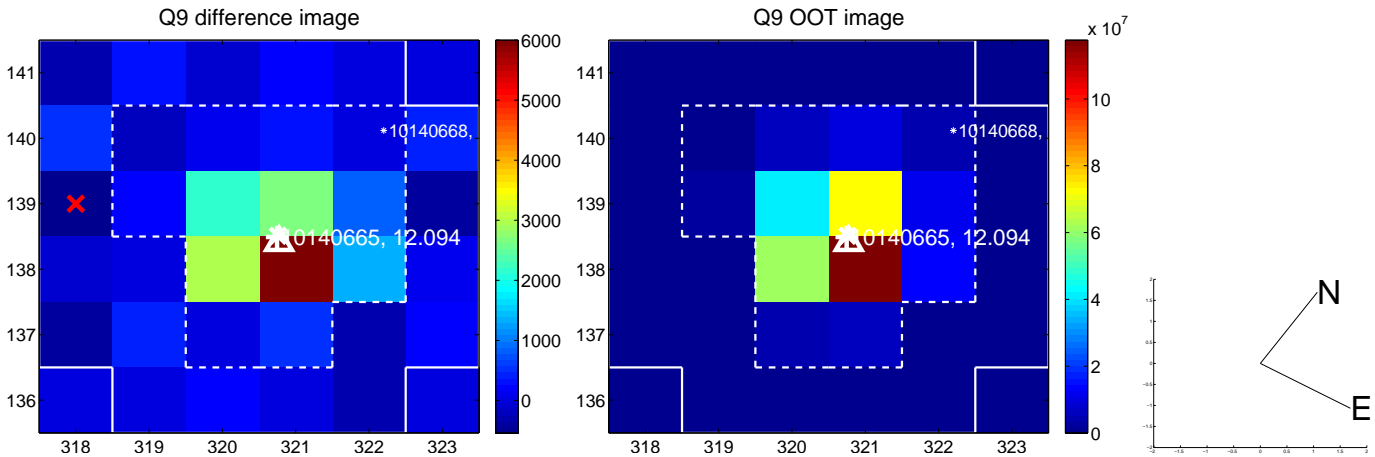
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



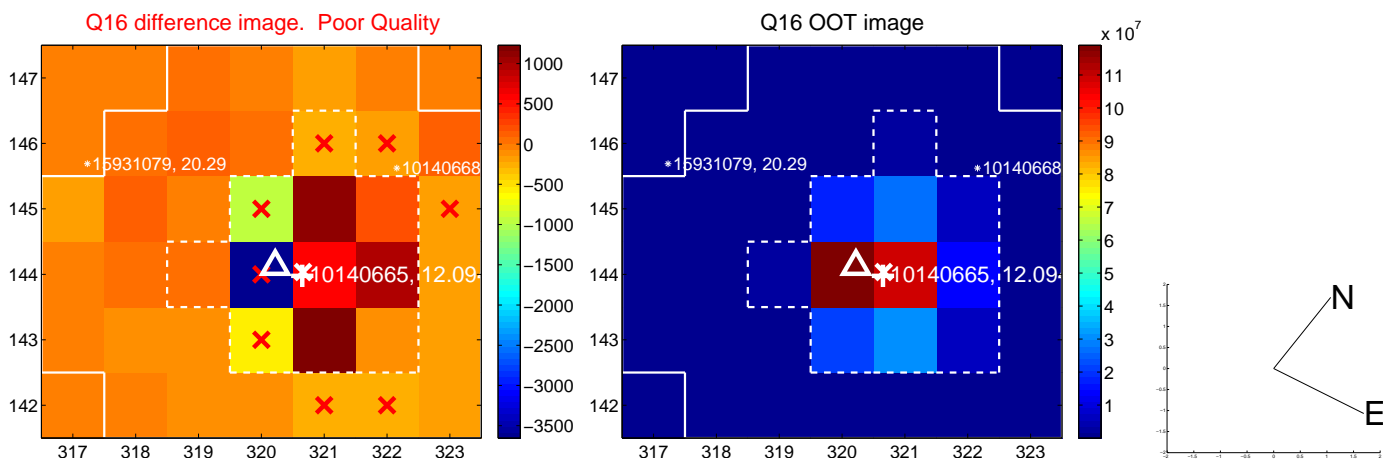
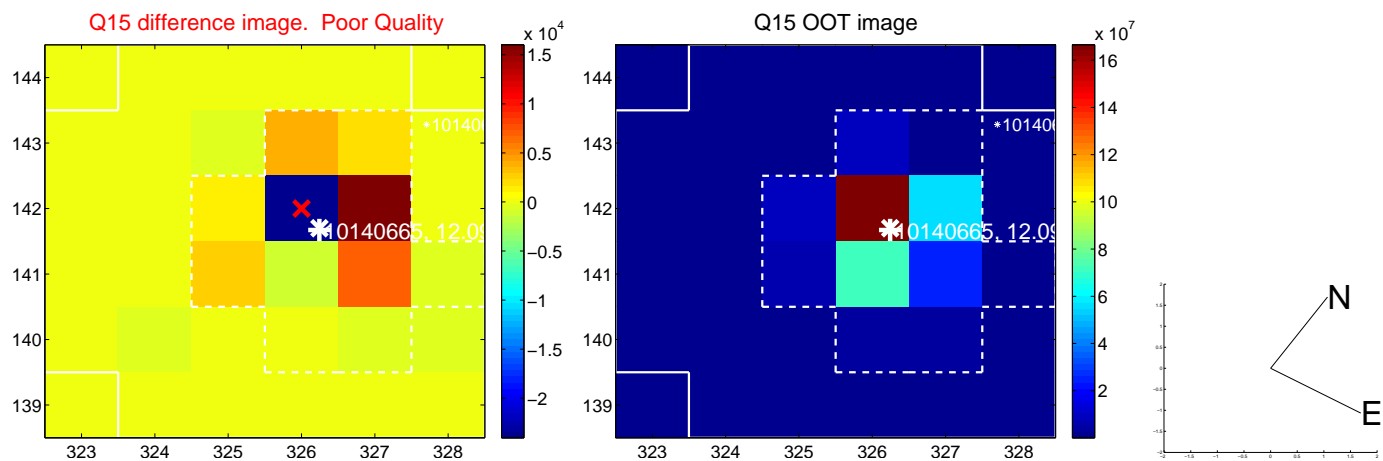
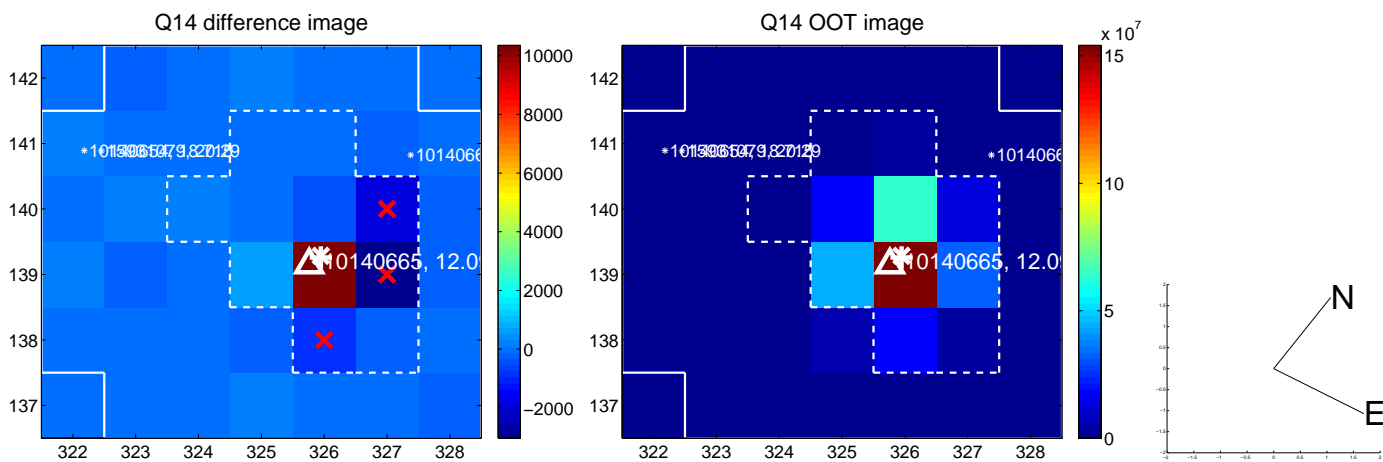
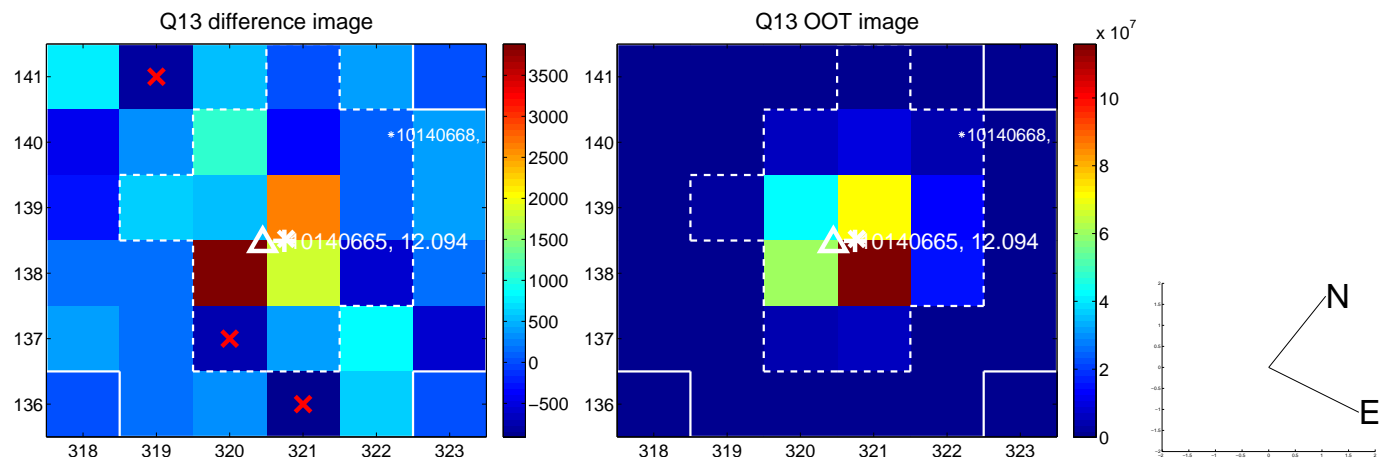
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



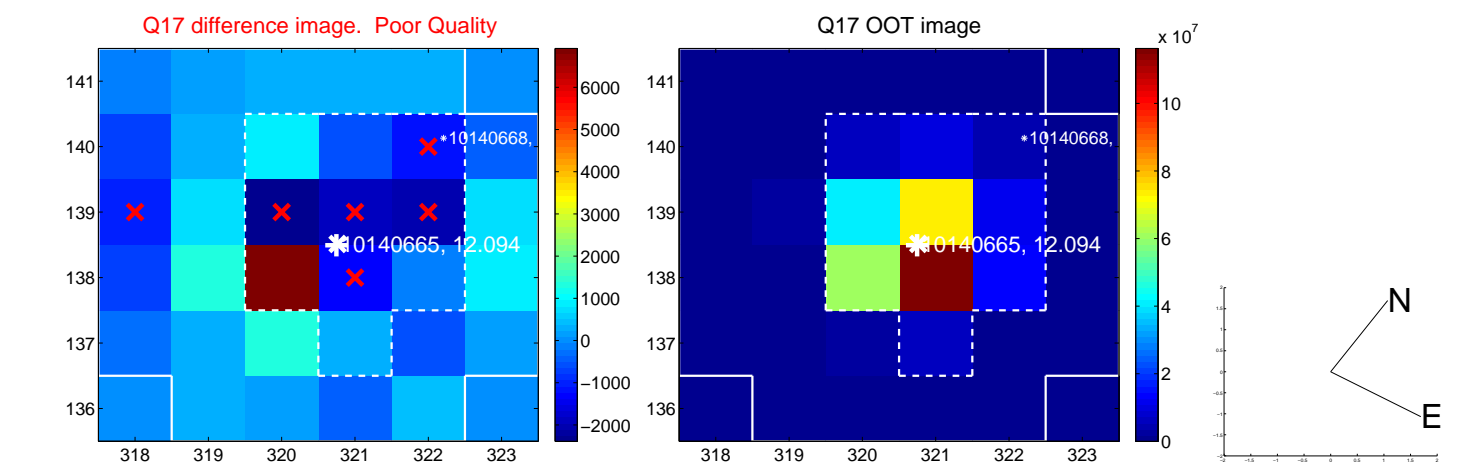
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



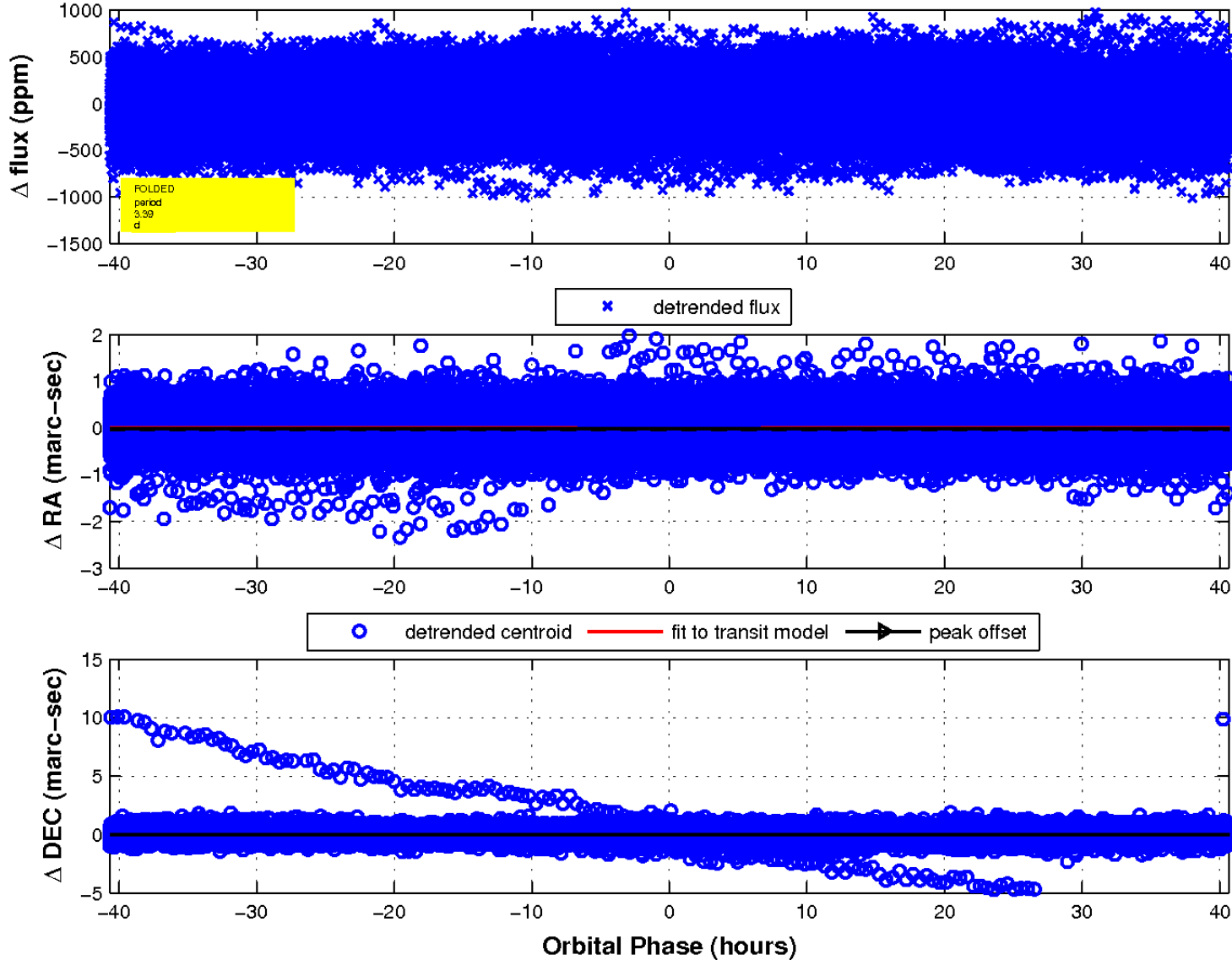
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

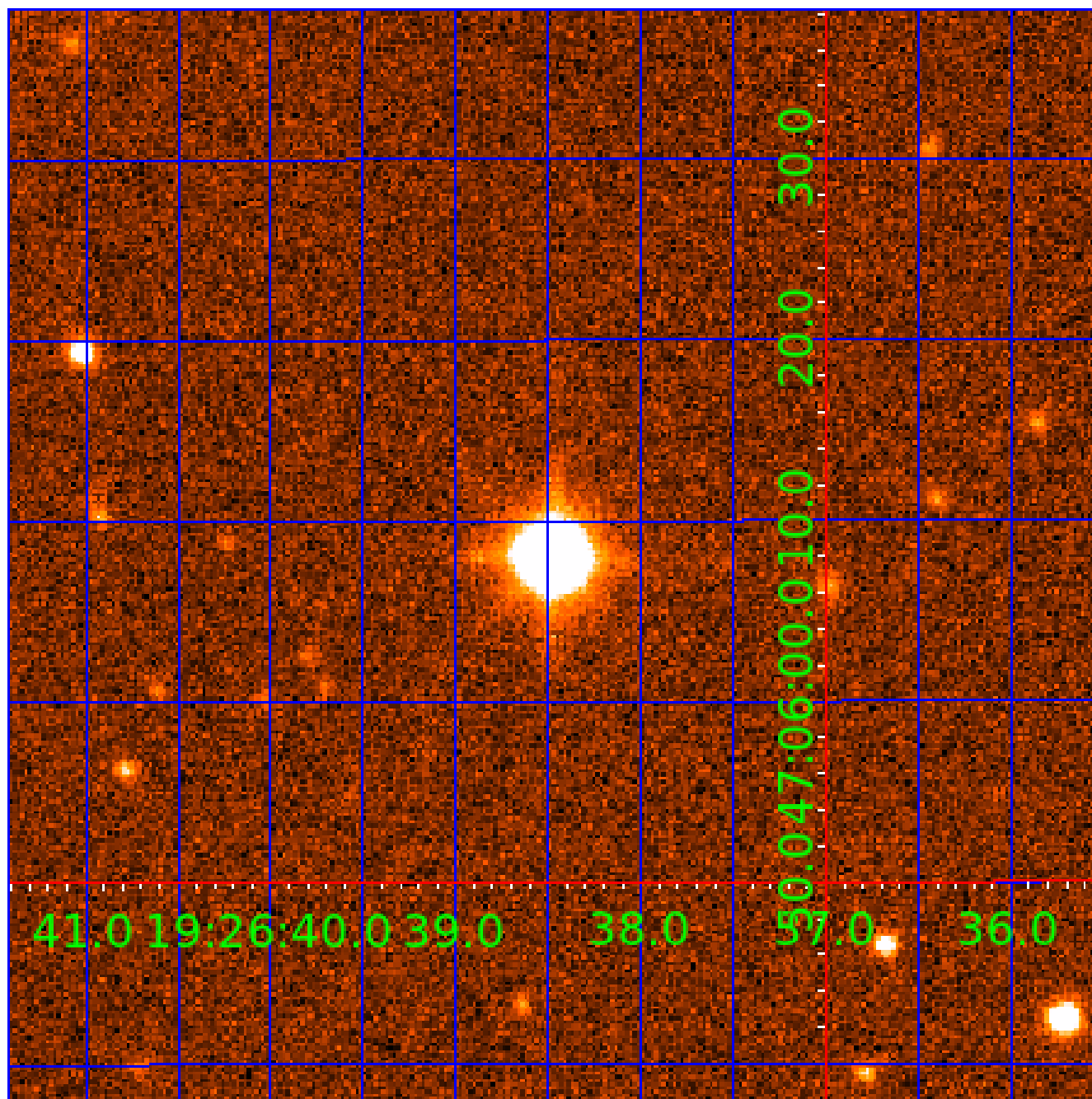


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 010140665

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 010140665-01 | OBS | No | 3.389125 | 132.069892 | 21.8 | 13.847 | 7.6 | 7.7 | 1.33 | 6780 | 0.72 | 1390.43 |
| 010140665-02 | OBS | No | 283.488730 | 386.557081 | 331.9 | 1.929 | 20.0 | 11.8 | 1.33 | 6780 | 2.70 | 3.80 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 010140665-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—MOD_NONUNIQ_DV |
| 010140665-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—LPP_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS |

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

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

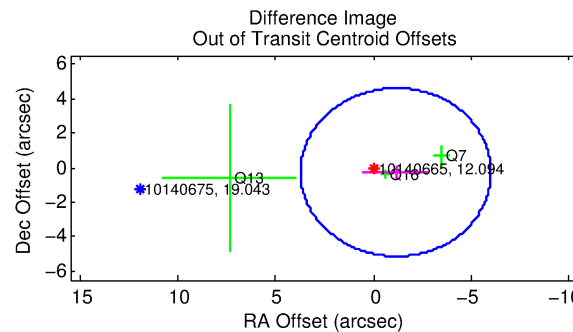
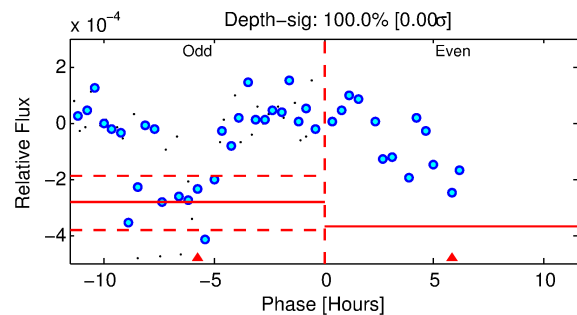
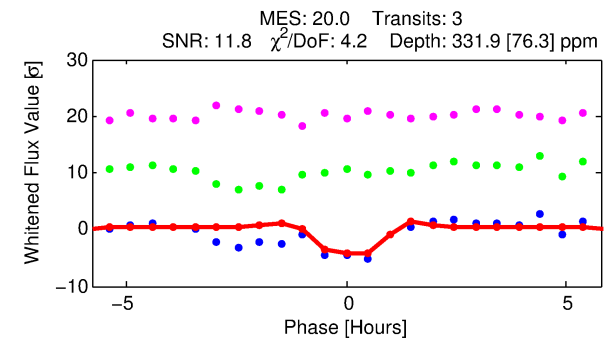
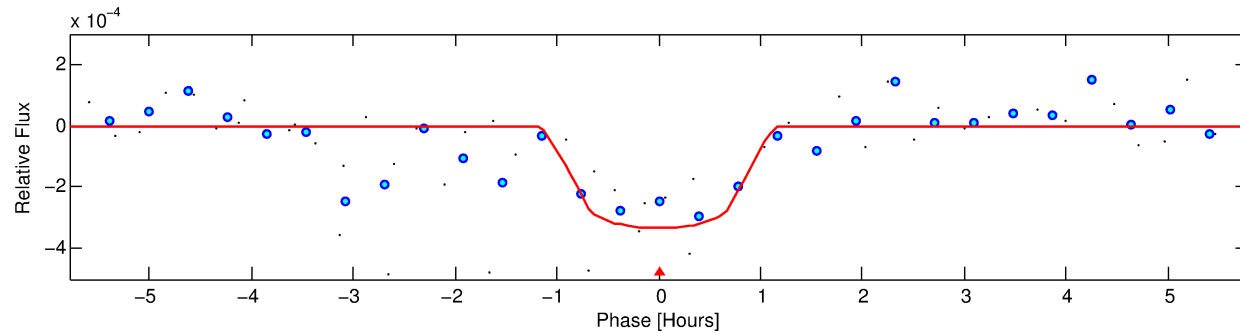
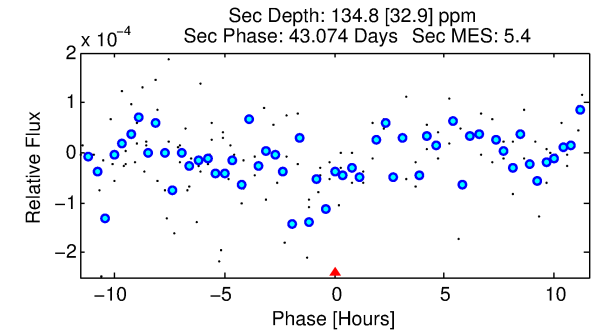
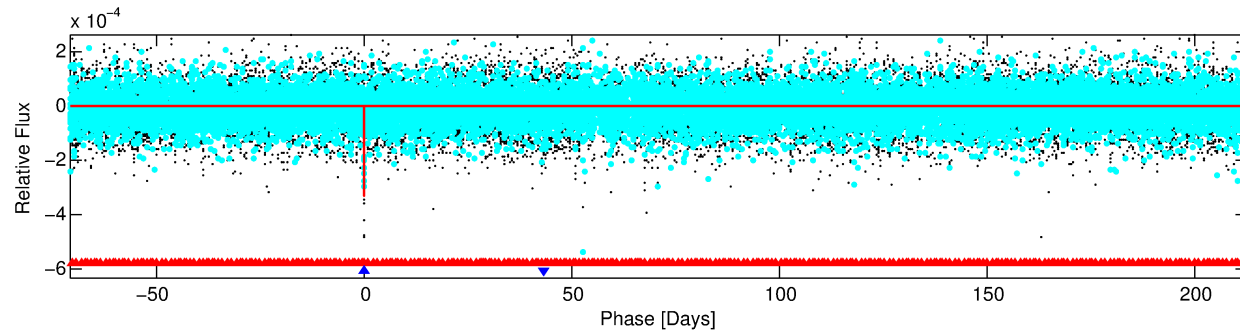
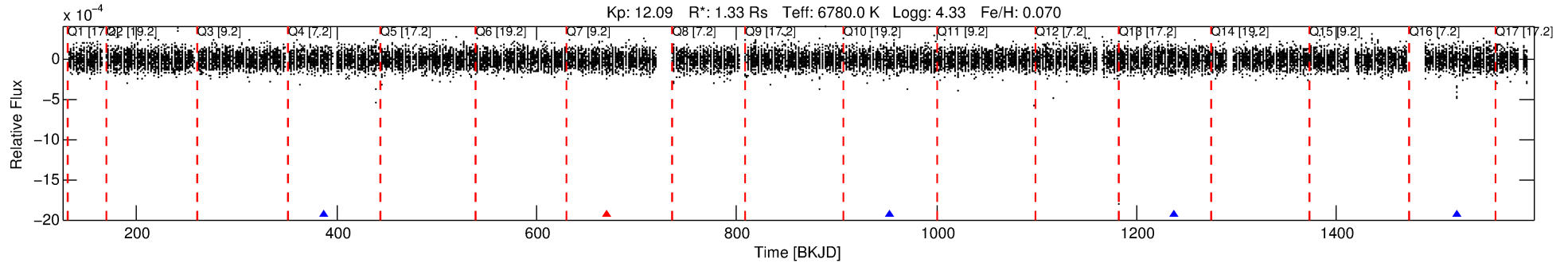
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010140665-02

No Significant Match Found

DV One-Page Summary

KIC: 10140665 Candidate: 2 of 2 Period: 283.489 d



DV Fit Results:

Period = 283.48873 [0.00387] d
Epoch = 386.5571 [0.0106] BKJD
Rp/R* = 0.0186 [0.0292]
a/R* = 678.53 [5974.15]
b = 0.82 [3.55]
Seff = 3.80 [1.16]
Teq = 356 [27] K
Rp = 2.70 [4.28] Re
a = 0.9394 [0.1730] AU
Ag = 8944.44 [28249.04] [0.32σ]
Teffp = 5353 [4215] K [1.19σ]

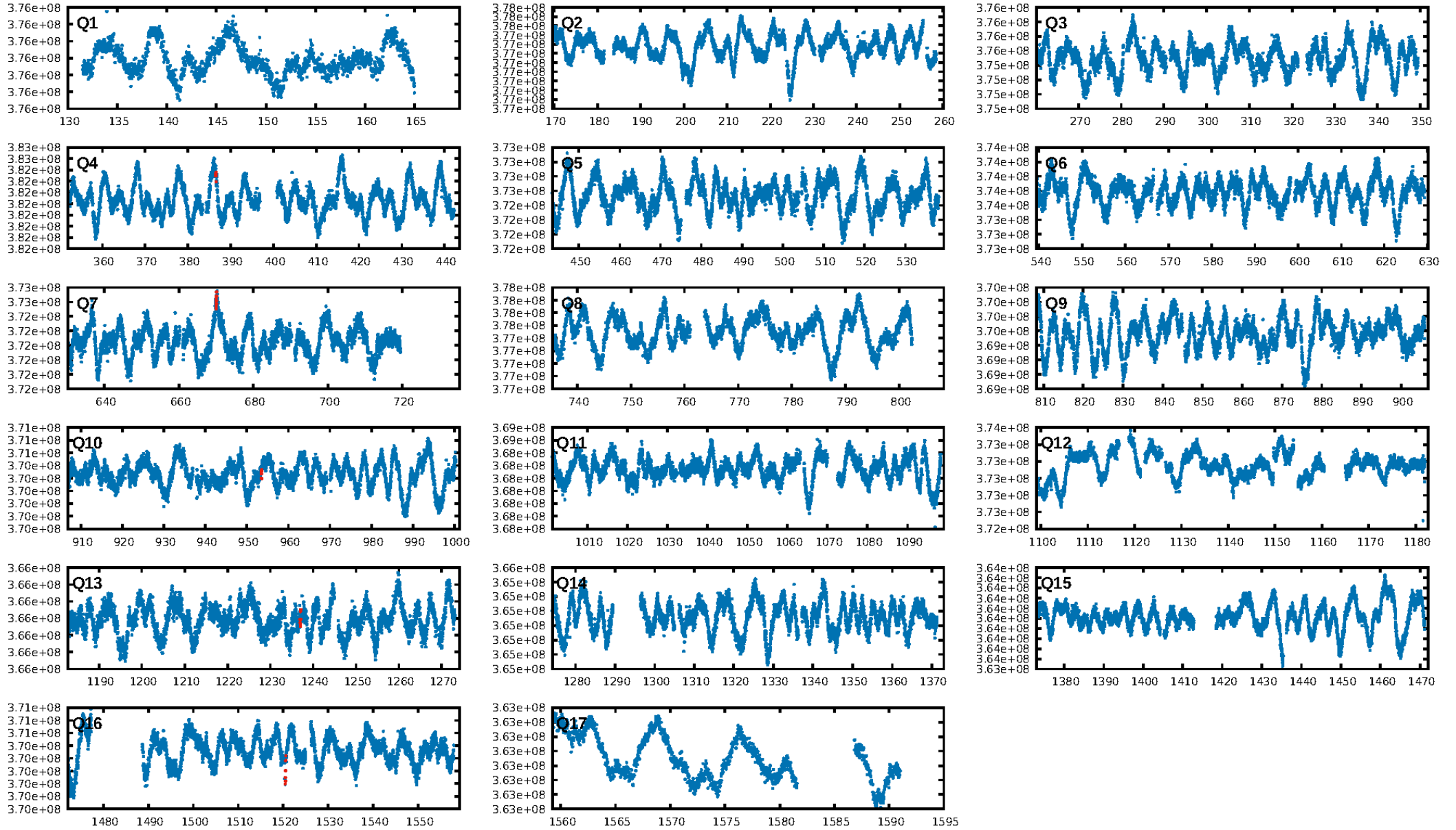
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [480.84σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 1.9%
ModelChiSquareGof-sig: 8.9%
Bootstrap-pfa: 5.47e-38
RollingBand-fgt: 0.67 [2/3]
GhostDiagnostic-chr: 26
Centroid-sig: 4.6%
Centroid-so: 0.920 arcsec [1.43σ]
OotOffset-rm: 1.168 arcsec [0.72σ]
KicOffset-rm: 1.159 arcsec [0.68σ]
OotOffset-st: 0/1/1/1 [3]
KicOffset-st: 0/1/1/1 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 0.60 [3/5]

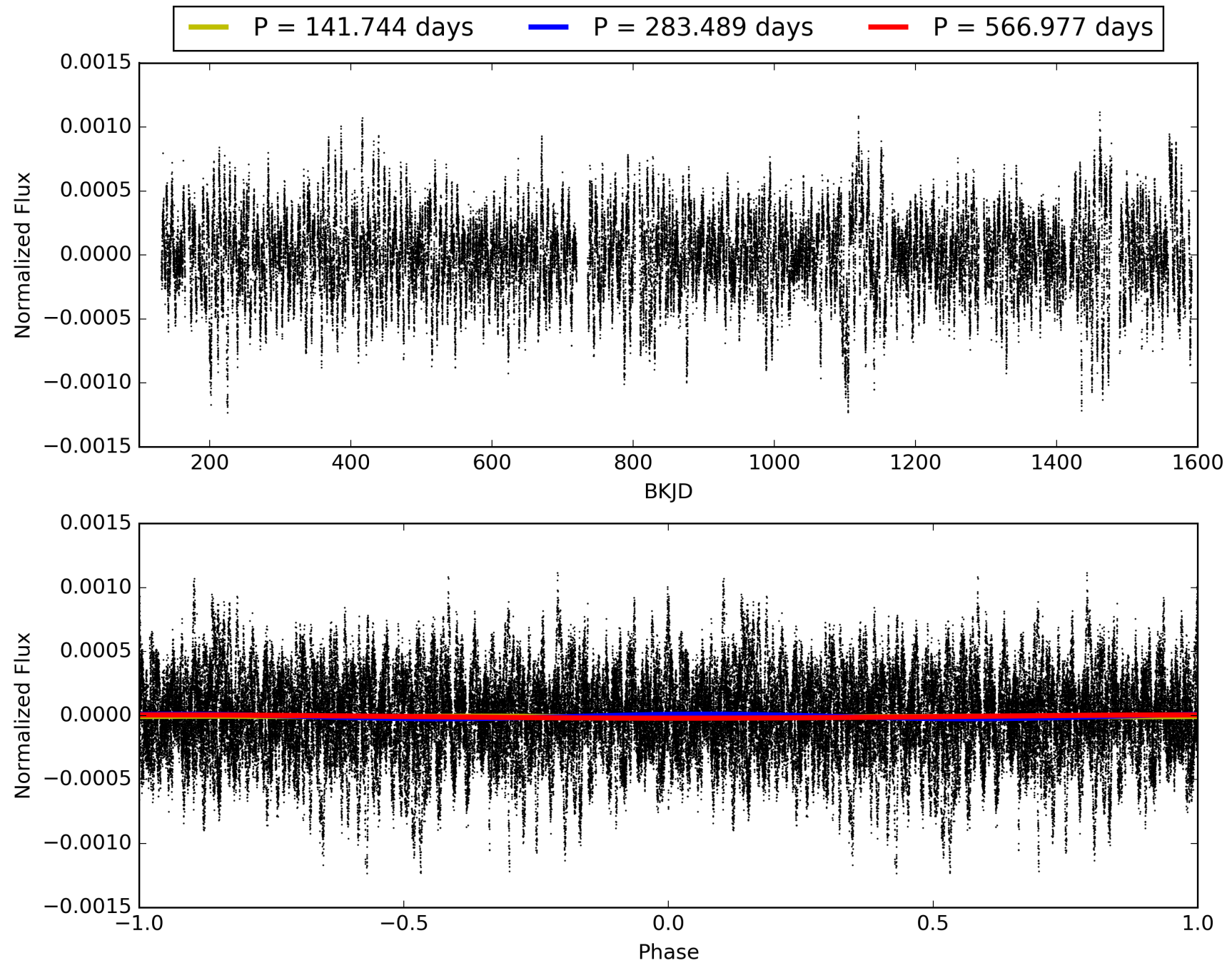
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 03:30:18 Z

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

TCE 010140665-02, PDC Light Curves

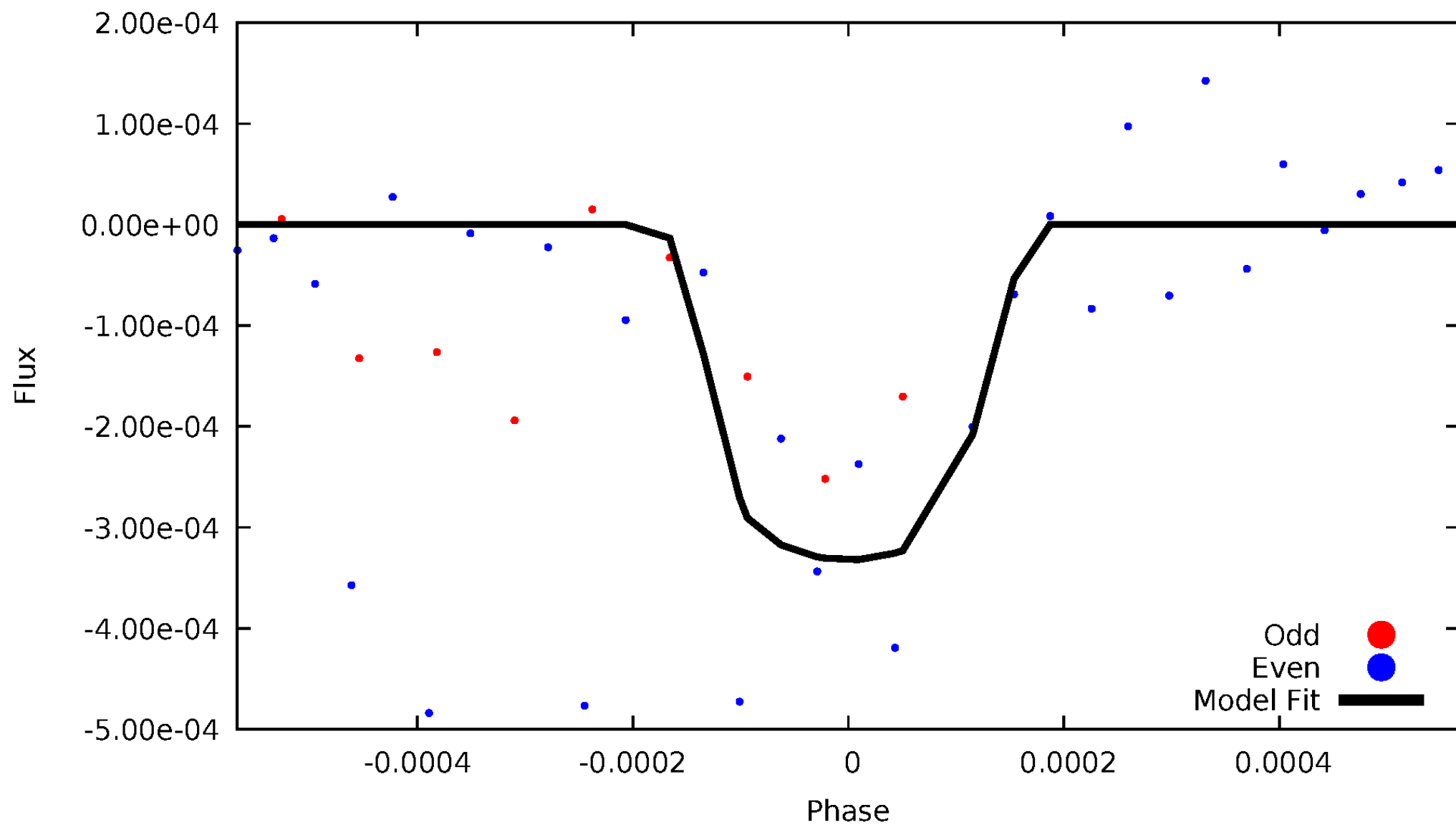


TCE 010140665-02



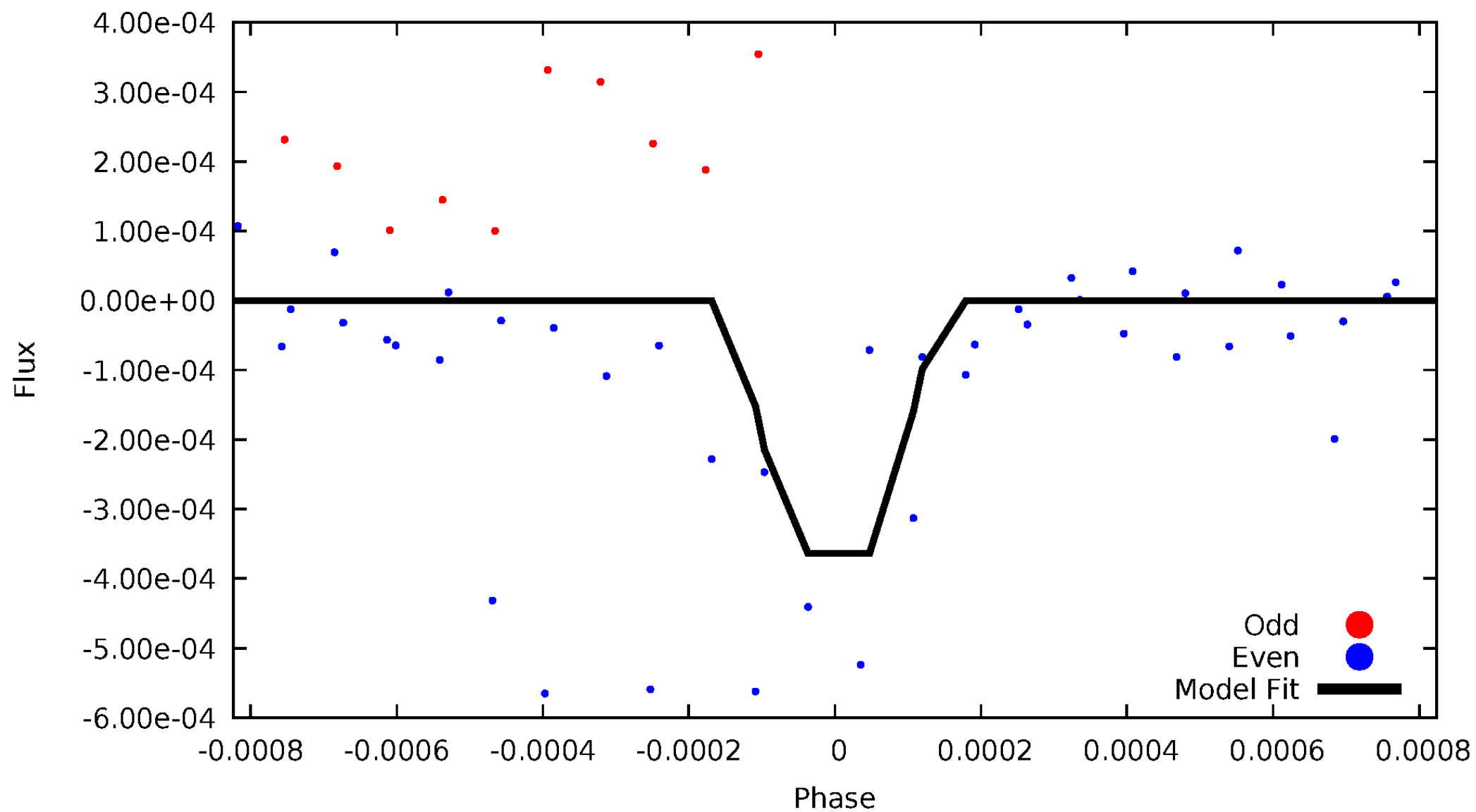
DV Odd/Even

TCE 010140665-02



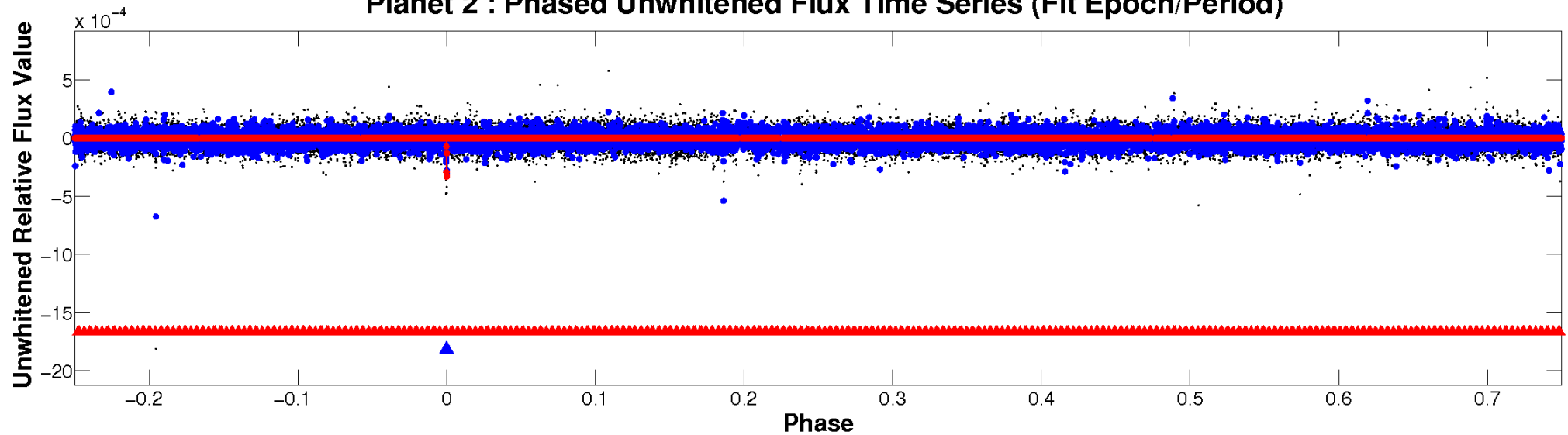
ALT Odd/Even

TCE 010140665-02

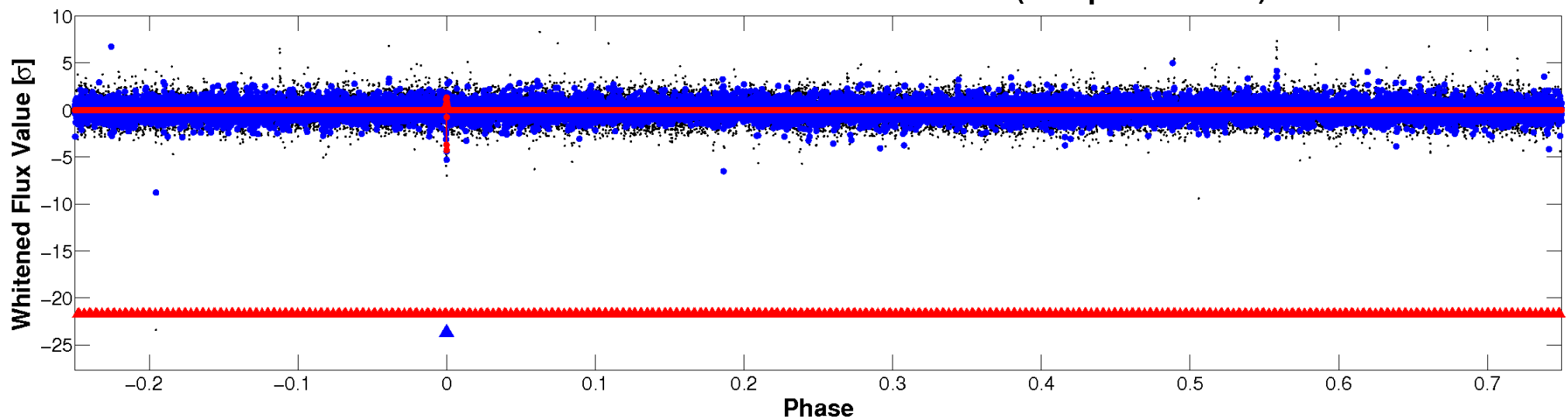


Non-Whitened Vs. Whitened Light Curve

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

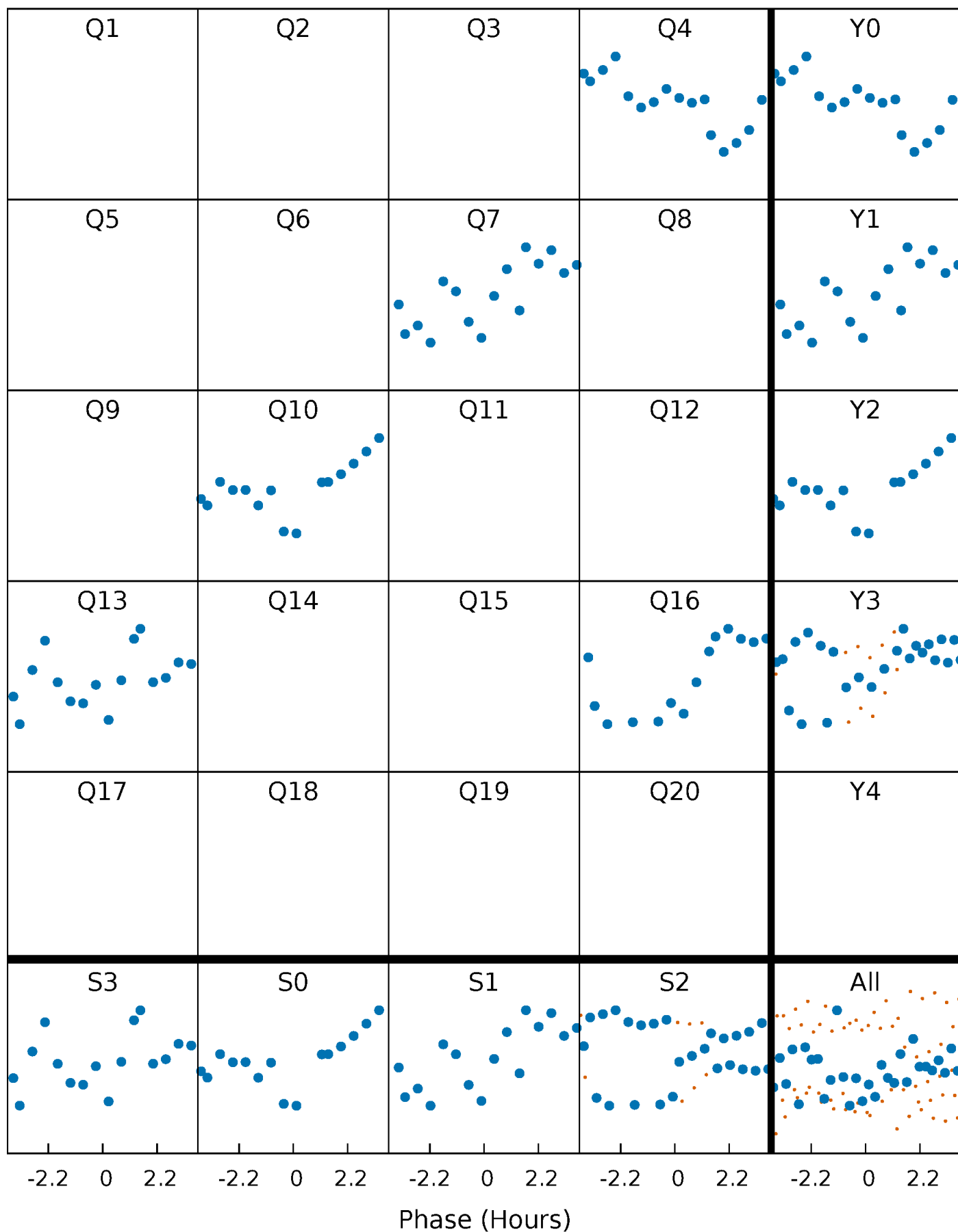


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



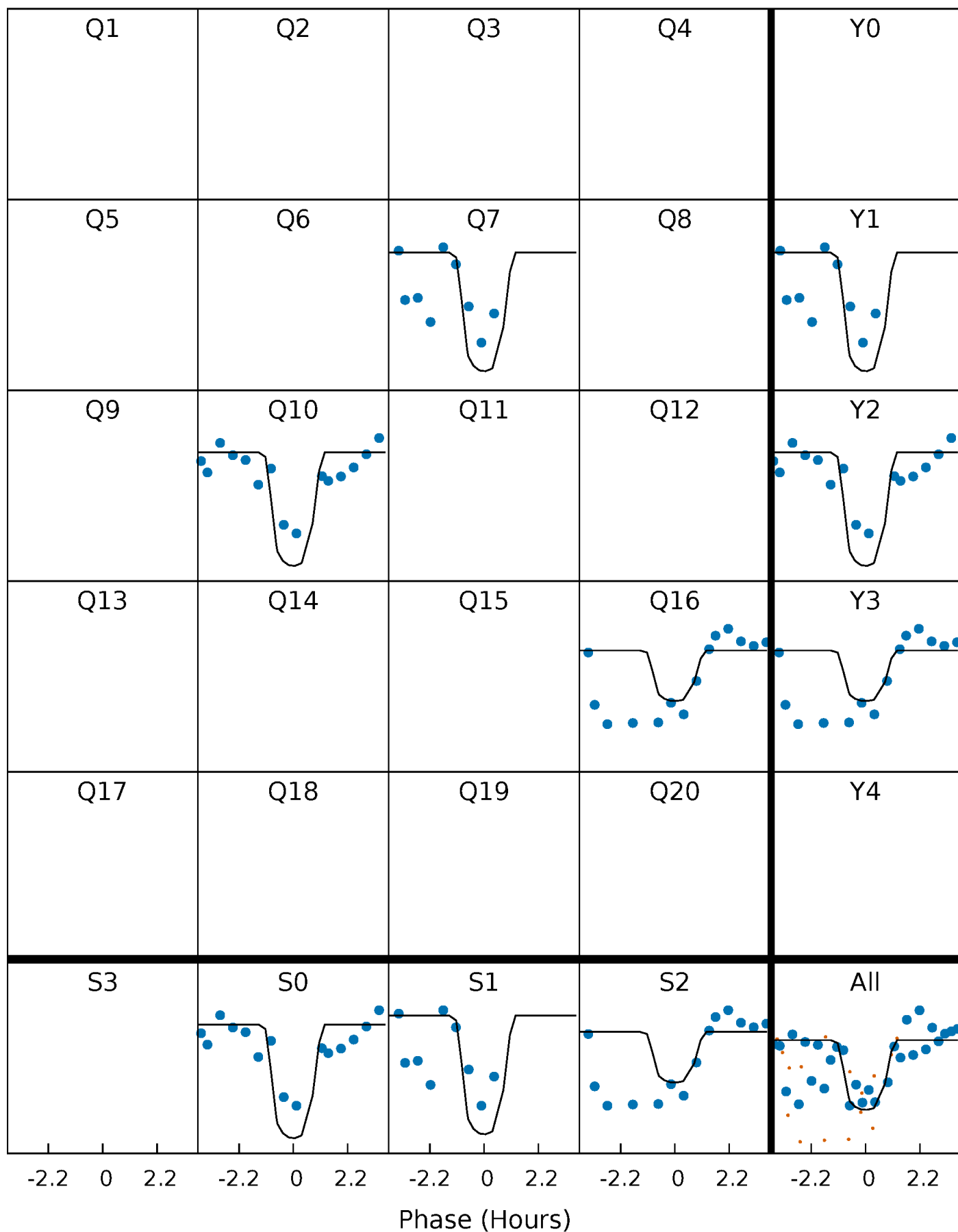
PDC Quarter-Phased Transit Curves

TCE 010140665-02 P=283.488730 Days $T_0=386.557081$ (BKJD)



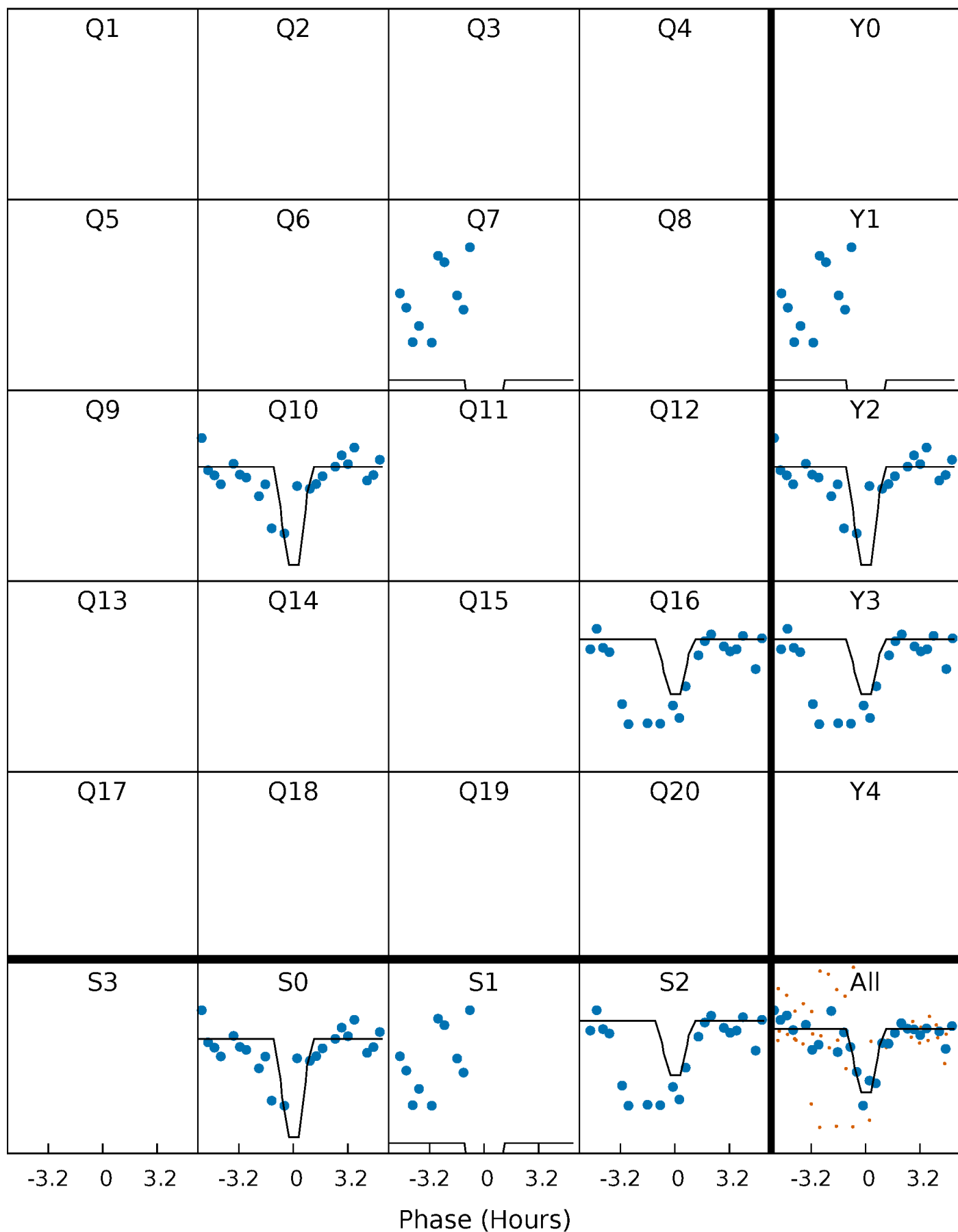
DV Quarter-Phased Transit Curves

TCE 010140665-02 P=283.488730 Days $T_0=386.557081$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

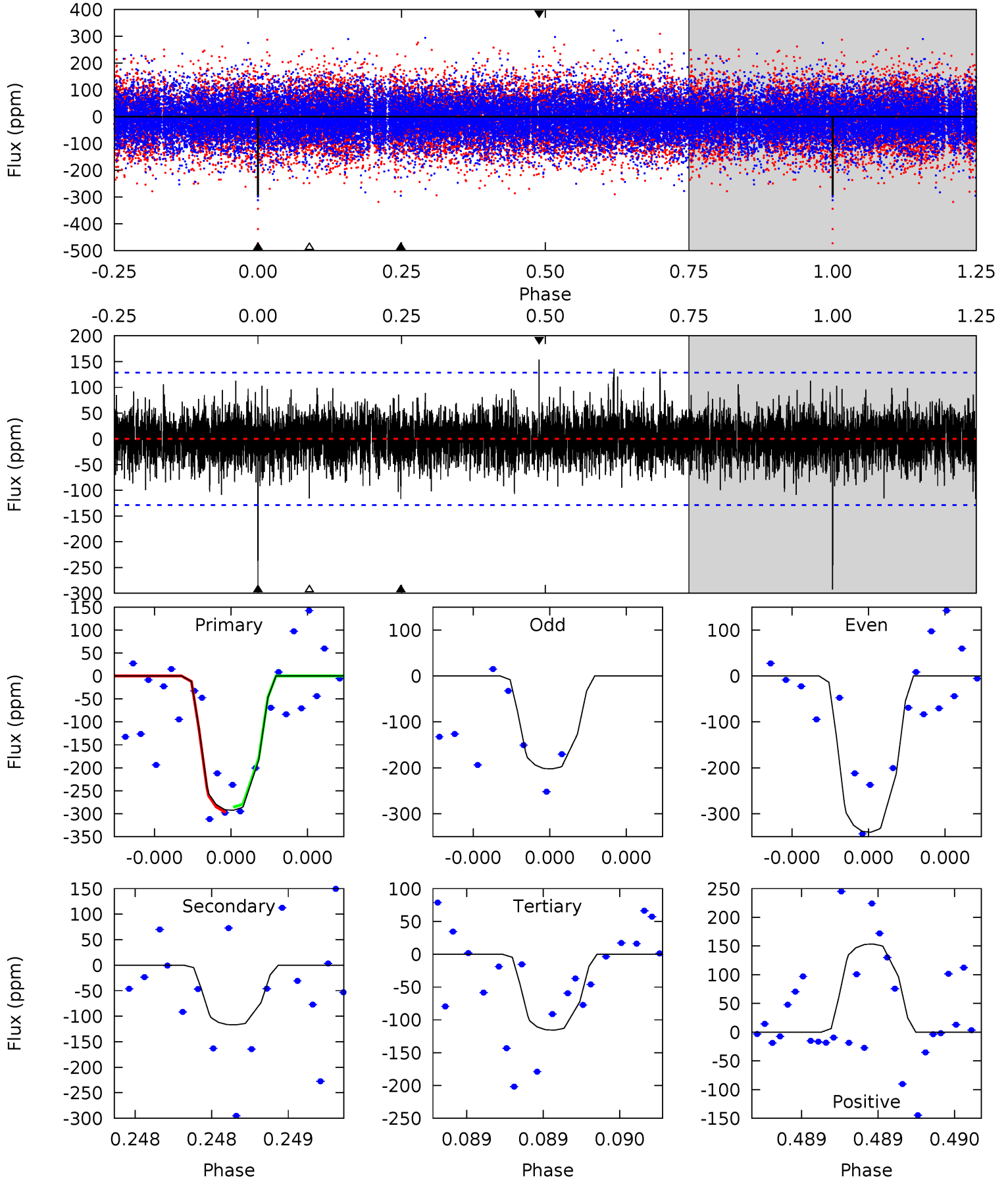
TCE 010140665-02 P=283.474778 Days $T_0=386.615130$ (BKJD)



DV Model-Shift Uniqueness Test

010140665-02, P = 283.488730 Days, E = 103.068351 Days

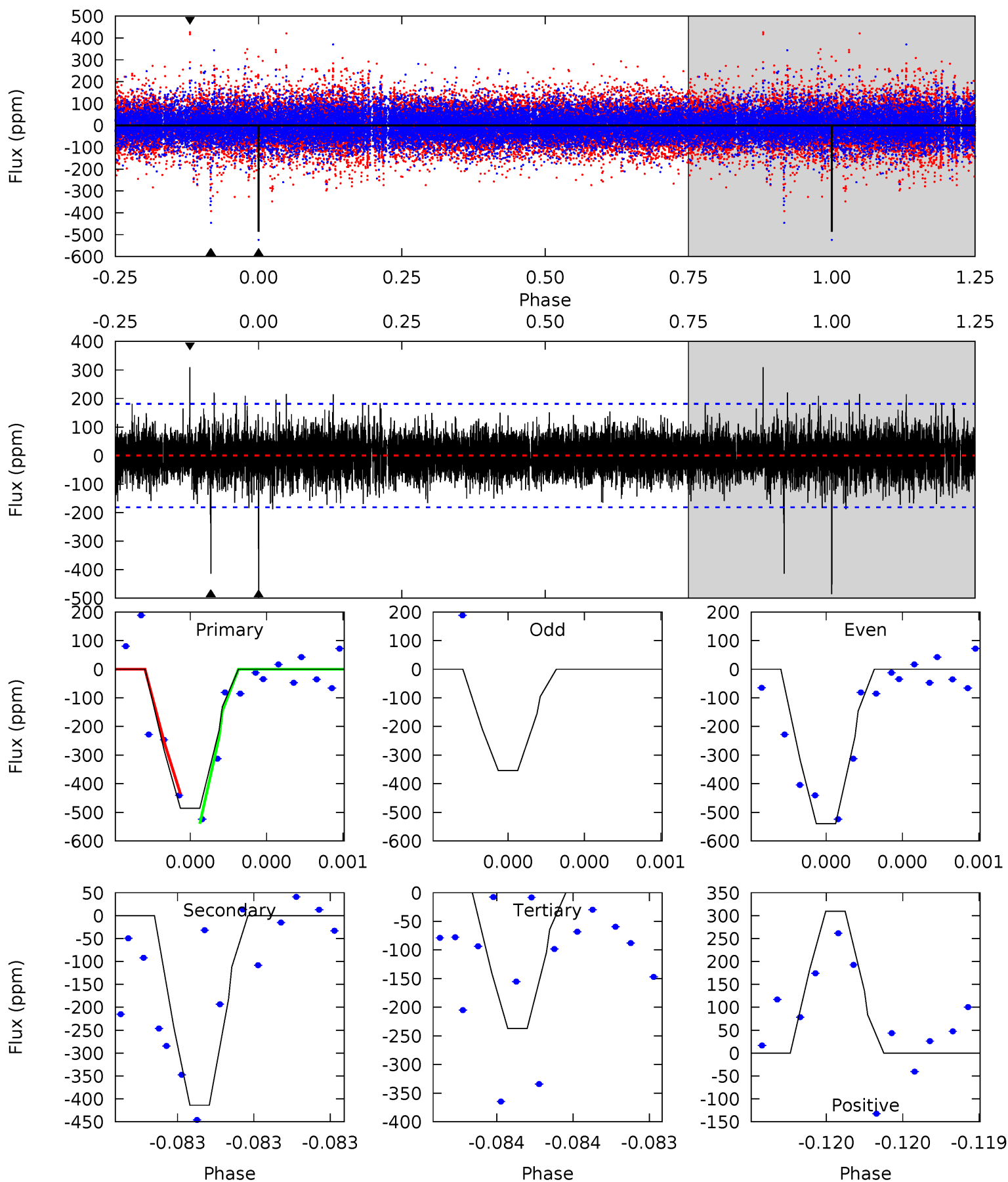
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 12.9 | 5.14 | 5.08 | 6.75 | 5.65 | 3.60 | 1.29 | 7.77 | 6.11 | 0.06 | -1.61 | 2.77 | 1.26 | 0.34 | 0.23 |



Alt Model-Shift Uniqueness Test

010140665-02, P = 283.474778 Days, E = 103.140352 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 15.2 | 12.9 | 7.42 | 9.69 | 5.67 | 3.63 | 1.44 | 7.78 | 5.51 | 5.52 | 3.26 | 3.53 | 1.00 | 0.39 | 1.61 |



Stellar Parameters For KIC 010140665

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | M (M_{\odot}) | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 6780^{+161}_{-241} | $4.328^{+0.050}_{-0.150}$ | $0.070^{+0.200}_{-0.350}$ | $1.331^{+0.287}_{-0.154}$ | $1.373^{+0.121}_{-0.208}$ | $0.821^{+0.219}_{-0.349}$ |
| | +2%/-4% | +1%/-3% | +286%/-500% | +22%/-12% | +9%/-15% | +27%/-43% |
| Source | PHO1 | FLK73 | 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 010140665-02 / KOI

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|---------------|------------------------|-------------------|------------------------|--------------------------|
| DV | -117 ± 23 | $4.16^{+3.75}_{-2.80}$ | 504^{+26}_{-23} | 4395^{+3073}_{-905} | 3205^{+28088}_{-2332} |
| Alt. | -414 ± 32 | $4.38^{+3.50}_{-2.88}$ | 504^{+27}_{-21} | 5654^{+4942}_{-1281} | 10210^{+72758}_{-7098} |

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 $A_{obs} \gg 1.0$

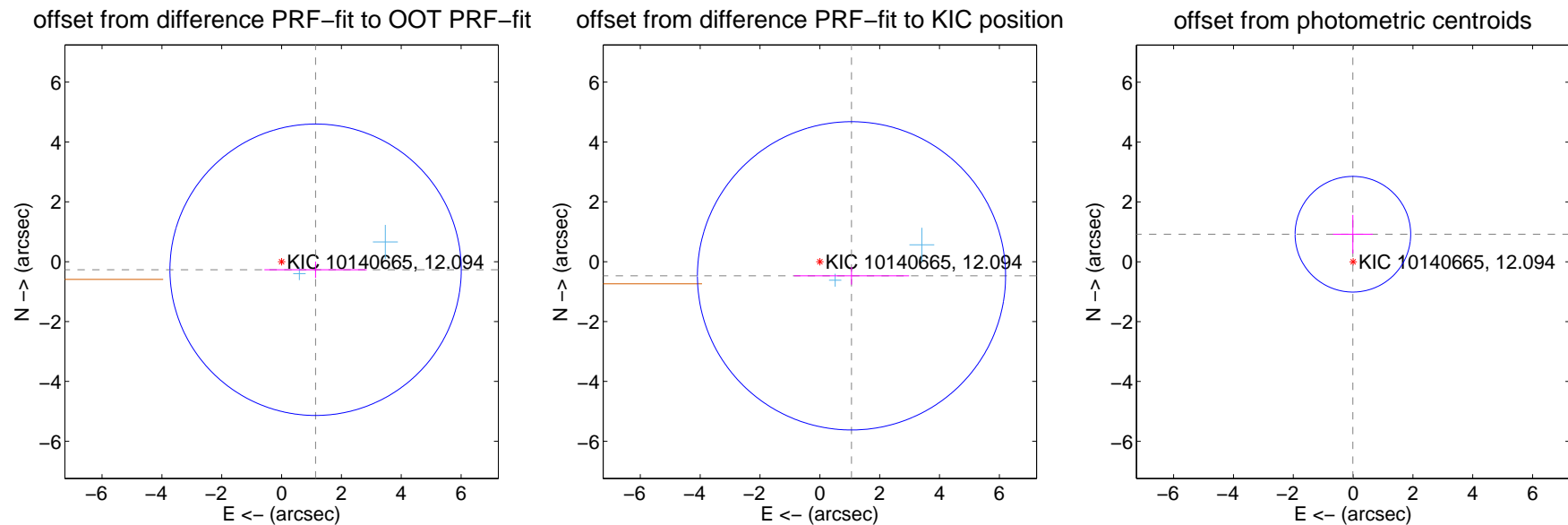
DV Centroid Data

Supplemental centroid analysis for 010140665-02. Kepler magnitude: 12.09. Transit SNR 11.83

There are 2 quarters with good PRF difference image offsets

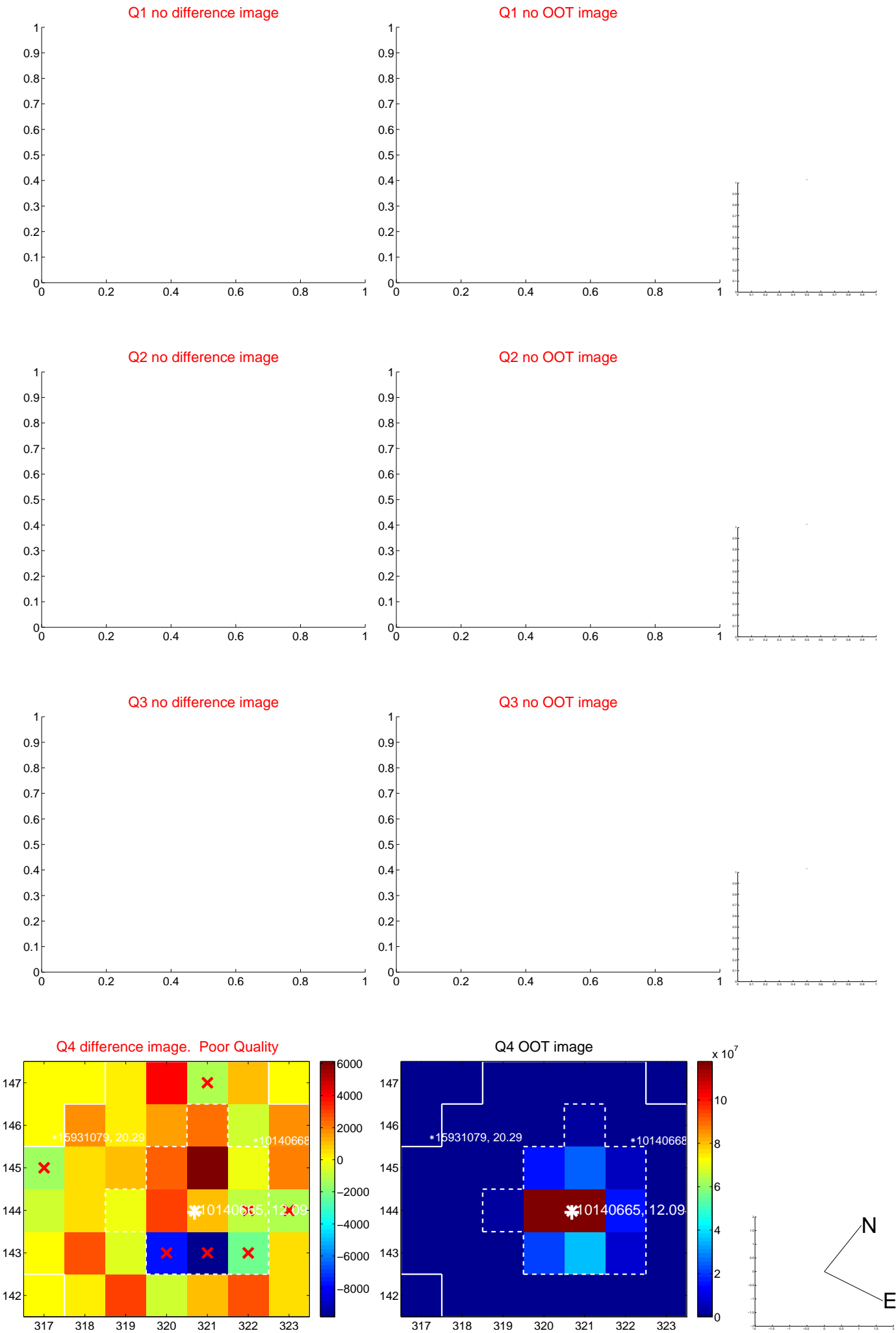
The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 1.168 ± 1.623 | 0.72 | -1.137 ± 1.711 | -0.269 ± 0.276 |
| PRF-fit source offset from KIC position | 1.159 ± 1.716 | 0.68 | -1.059 ± 1.924 | -0.472 ± 0.293 |
| photometric centroid source offset | 0.92 ± 0.64 | 1.43 | 0.01 ± 0.67 | 0.92 ± 0.64 |



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.

Q5 no difference image



Q5 no OOT image



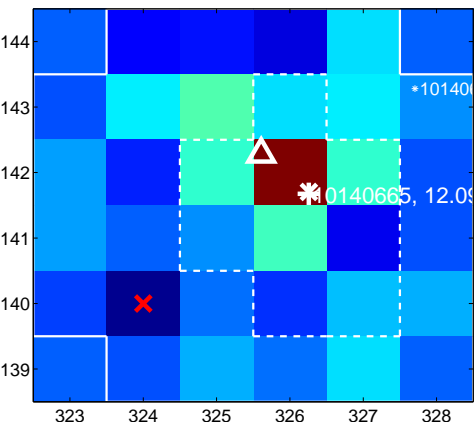
Q6 no difference image



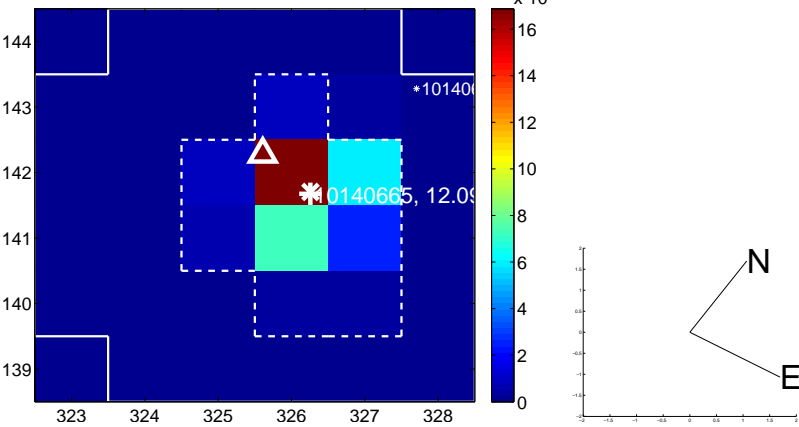
Q6 no OOT image



Q7 difference image



Q7 OOT image



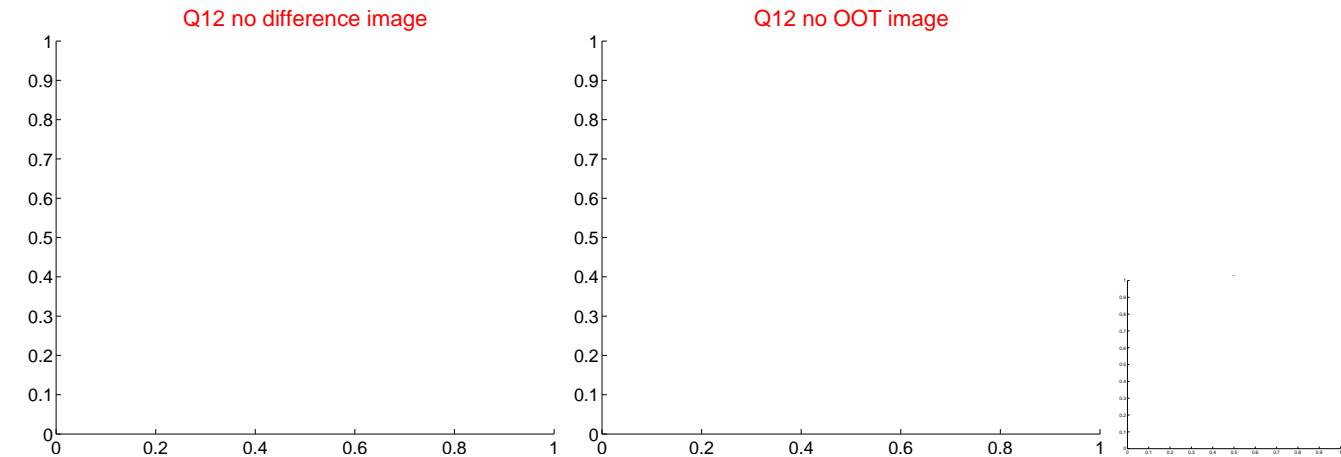
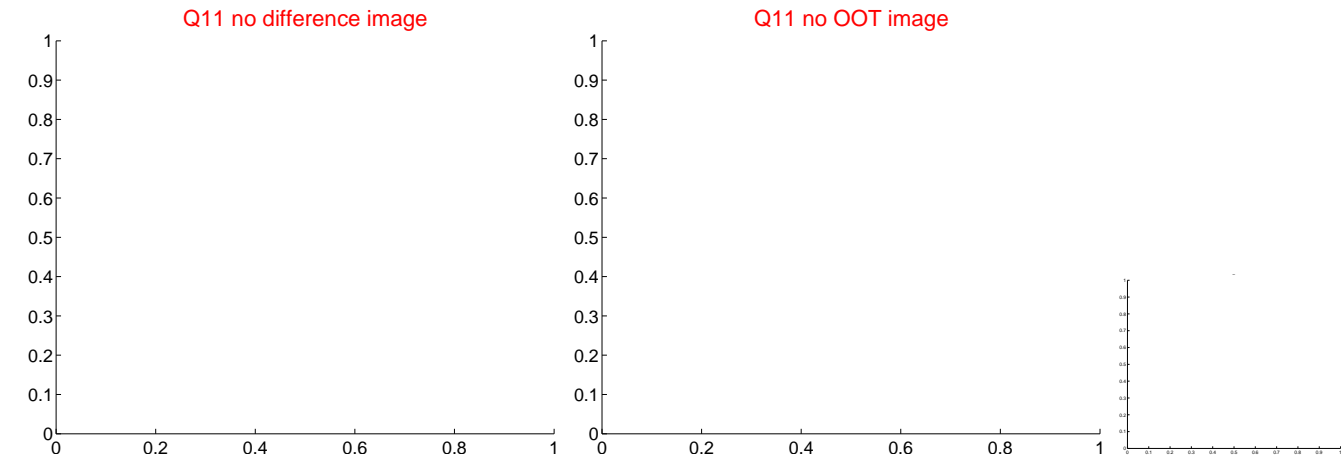
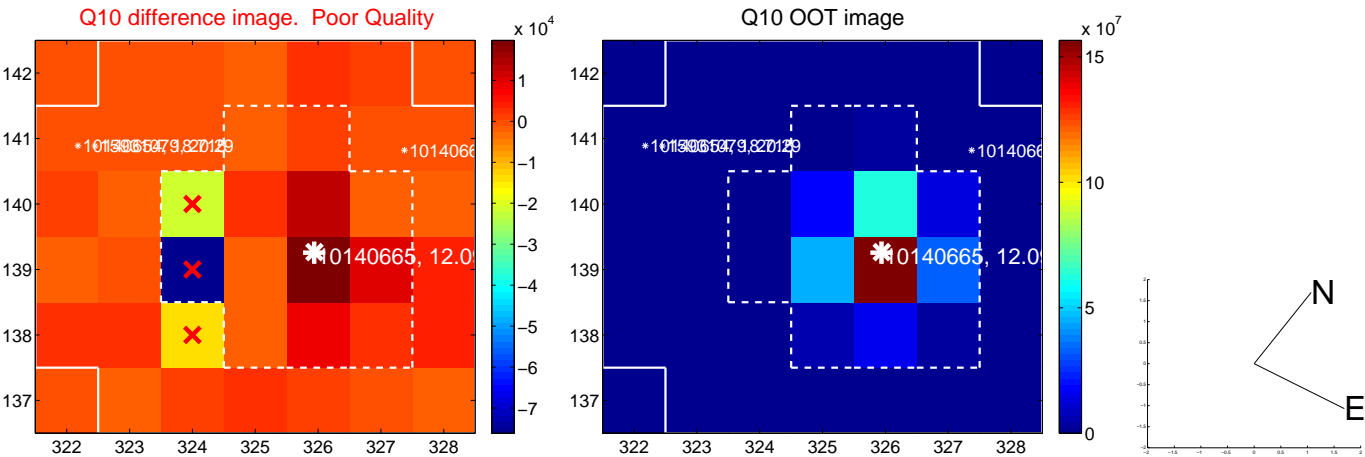
Q8 no difference image



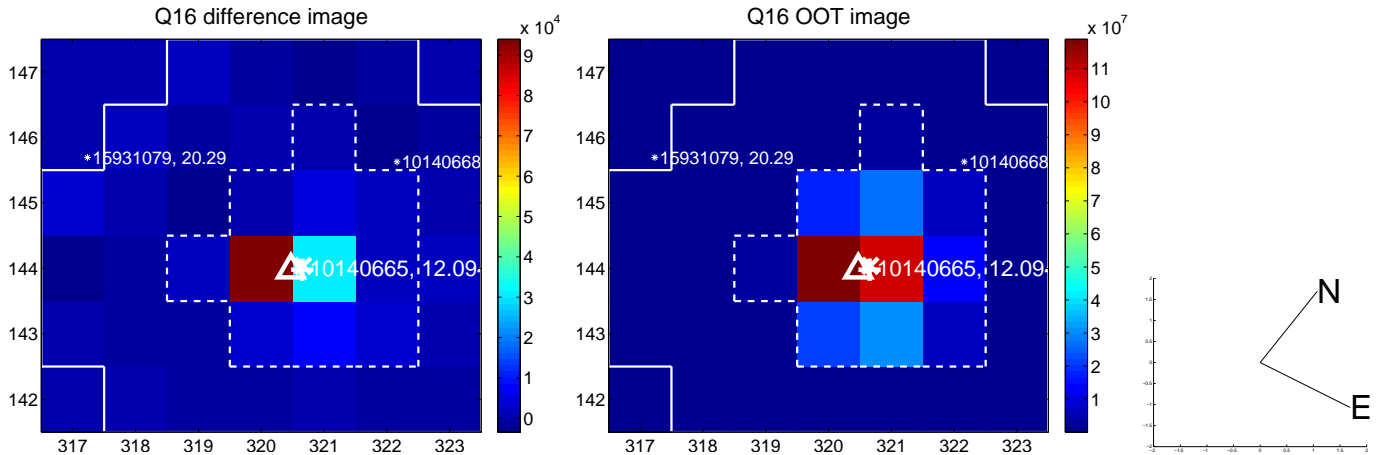
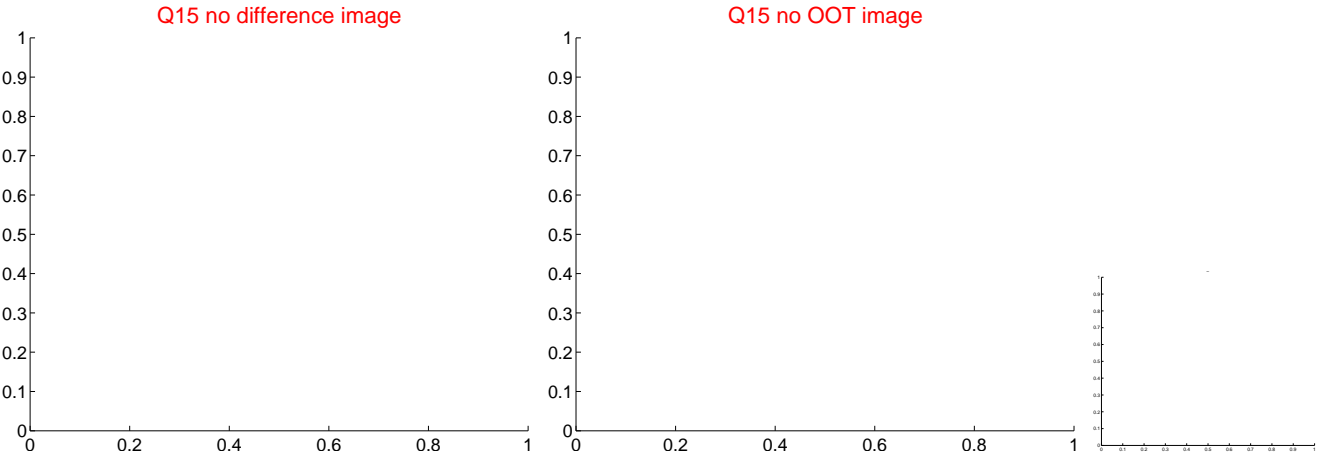
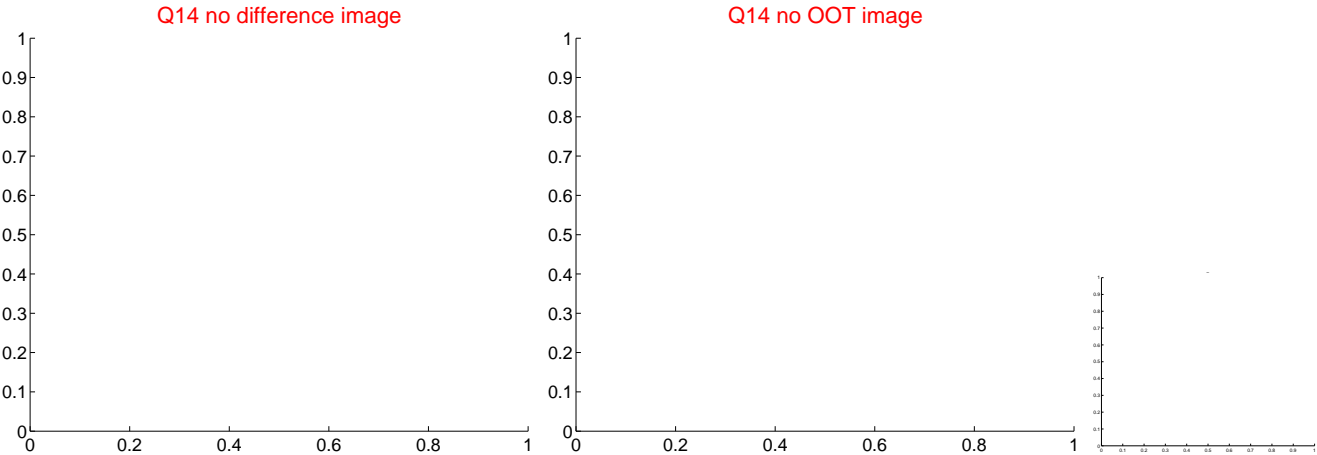
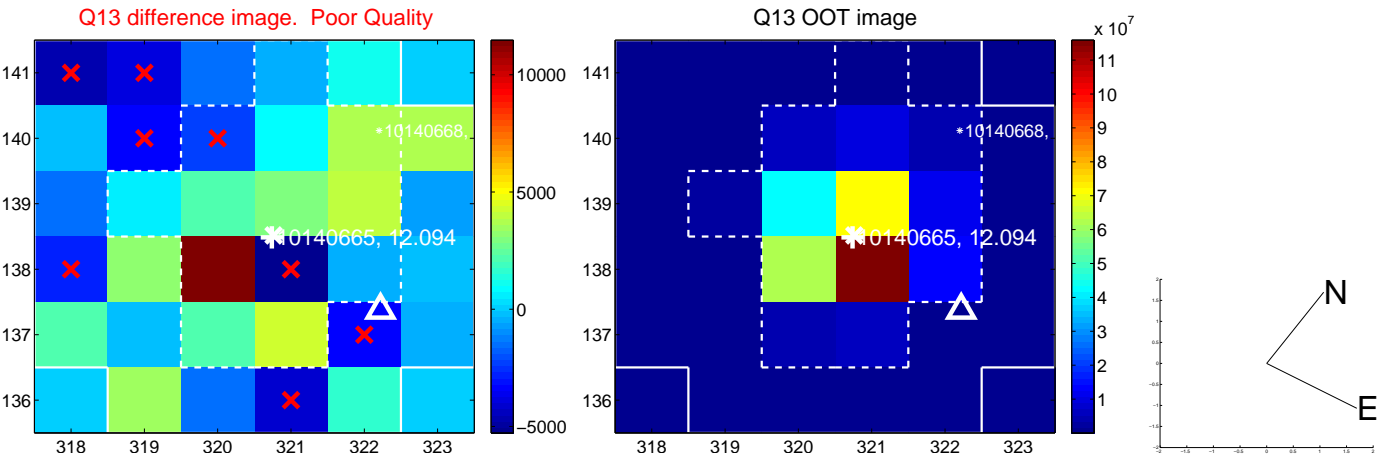
Q8 no OOT image



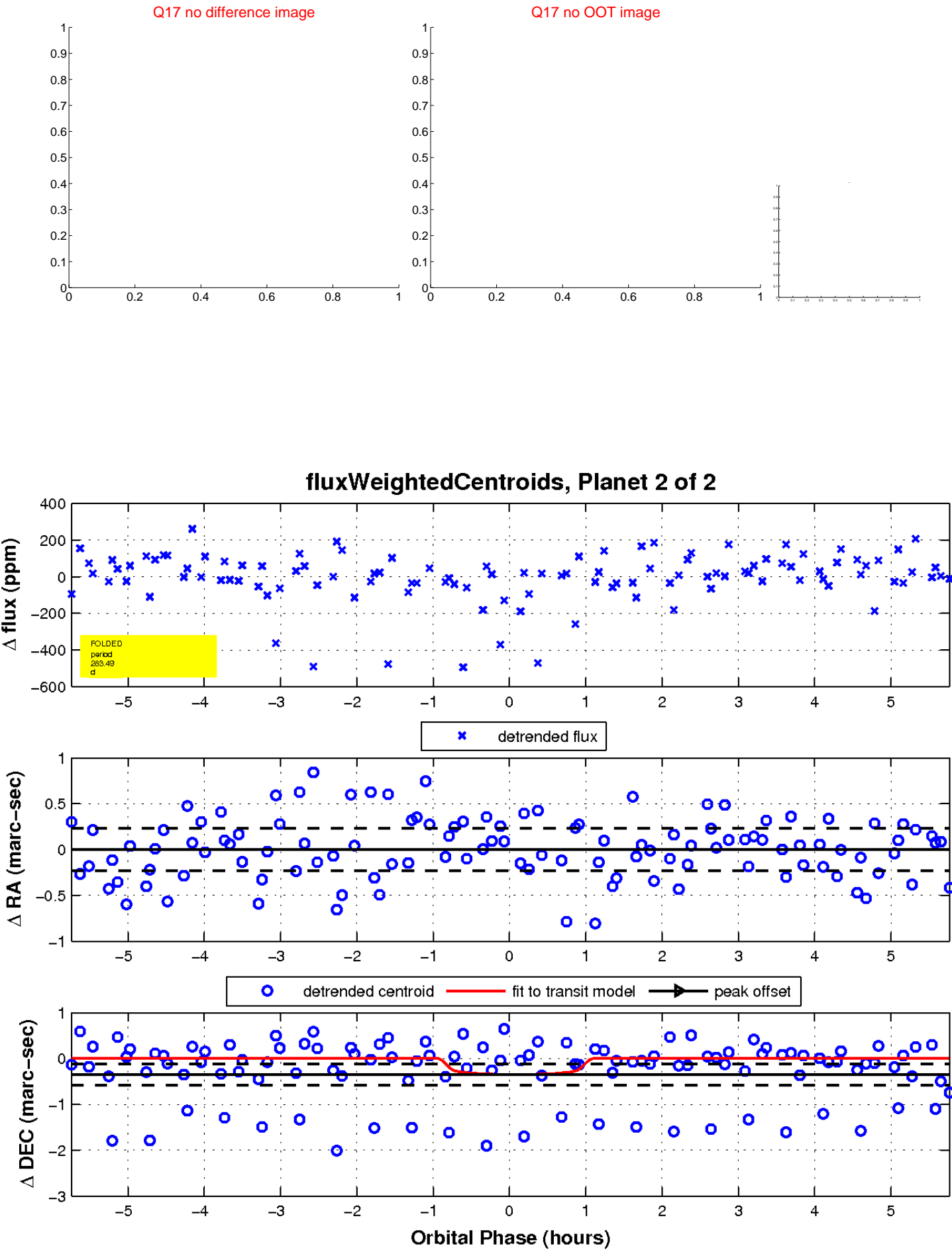
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image

Declination

