

KIC 009821151

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 009821151-01 | OBS | 3243.01 | 8.429340 | 132.308306 | 79.3 | 2.763 | 21.4 | 19.4 | 1.13 | 6353 | 1.17 | 265.65 |
| 009821151-02 | OBS | No | 8.429451 | 136.509251 | 36.4 | 2.767 | 9.2 | 9.2 | 1.13 | 6353 | 0.78 | 265.65 |
| 009821151-03 | OBS | No | 572.644656 | 246.931115 | 168.3 | 4.207 | 8.4 | 6.3 | 1.13 | 6353 | 1.65 | 0.96 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|---|
| 009821151-01 | OBS | FP | 0.00 | 0 | 1 | 0 | 1 | MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—EPHEM_MATCH |
| 009821151-02 | OBS | FP | 0.00 | 1 | 1 | 1 | 1 | IS_SEC_TCE—CENT_UNRESOLVED_OFFSET—EPHEM_MATCH |
| 009821151-03 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS |

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.

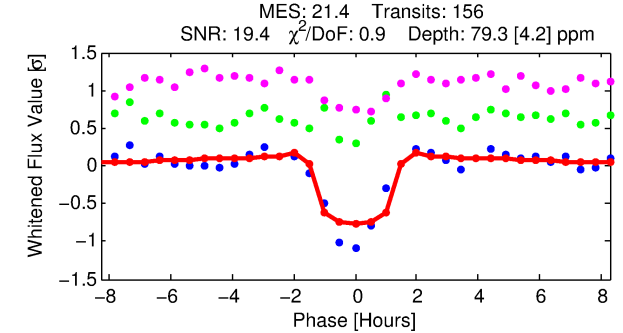
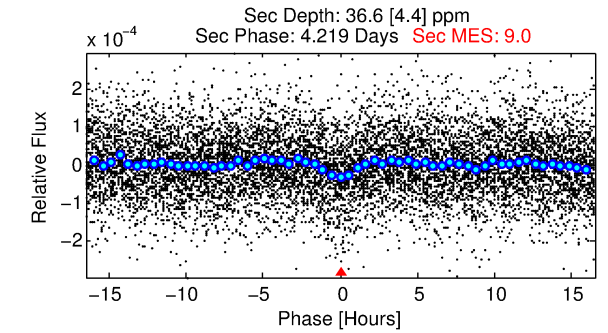
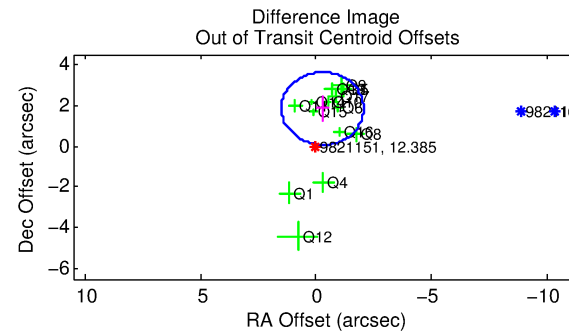
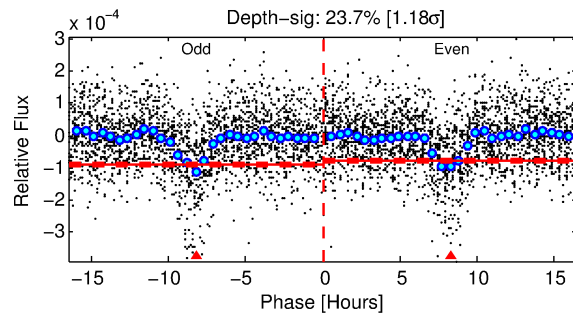
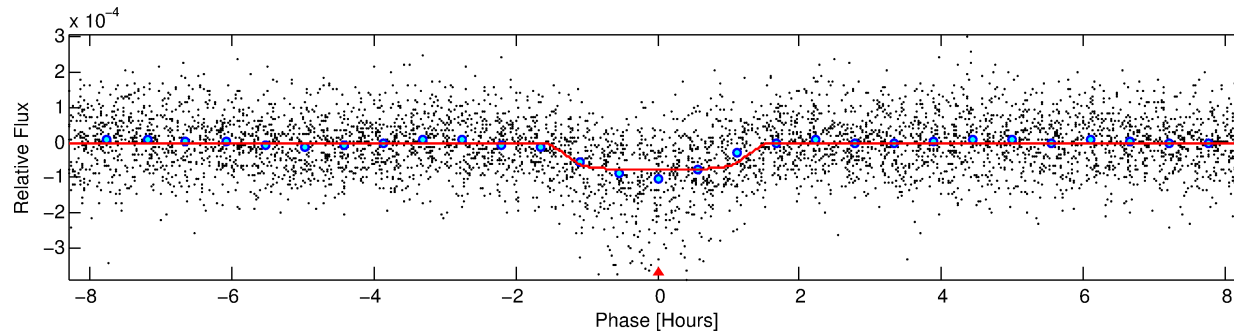
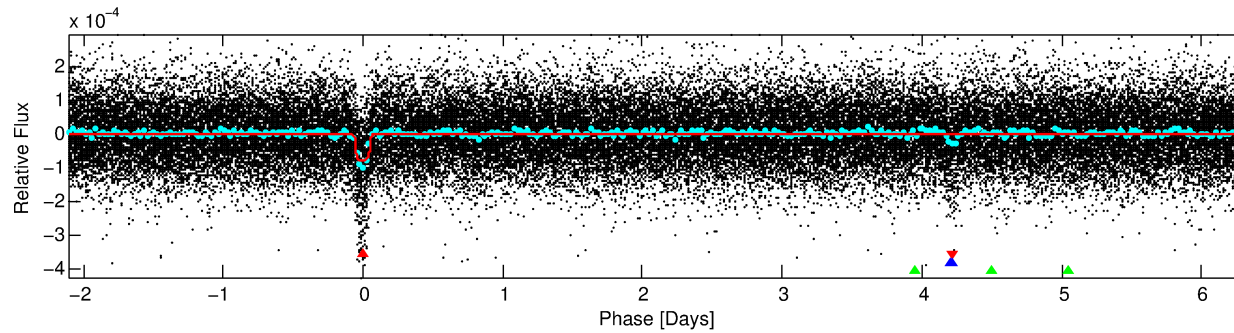
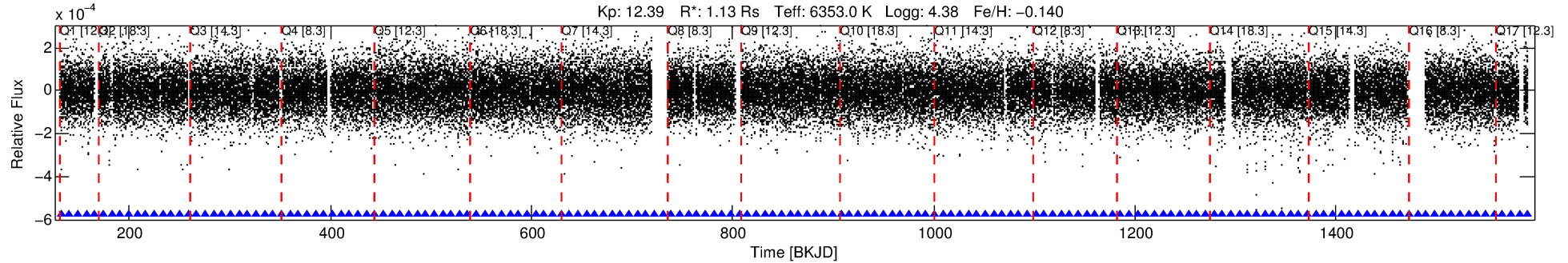
Ephemeris Match Information For 009821151-01

| TCE (1) | KIC | Parent (2) | Parent KIC | $P_1:P_2$ | Dist ($''$) | Δ Row | Δ Col | m_2 | m_1 | D_2/D_1 | Mechanism | Flag | σ_P | σ_T |
|--------------|---------|------------|------------|-----------|---------------|--------------|--------------|-------|-------|-----------|------------|------|------------|------------|
| 009821151-01 | 9821151 | 7234.01 | 9821078 | 1:1 | 173.3 | 44 | -1 | 14.12 | 12.39 | 5796.30 | Direct-PRF | 0 | 0.48 | 0.54 |

Notes: $P_1:P_2$ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m_2 and m_1 are the magnitudes of the parent and child. D_2/D_1 is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match in period and epoch. For a match to be considered significant $\sigma_P < 5.0$ and $\sigma_T < 5.0$. Matches which have σ_P and σ_T very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

DV One-Page Summary

KIC: 9821151 Candidate: 1 of 3 Period: 8.429 d
KOI: K03243.01 Corr: 0.906



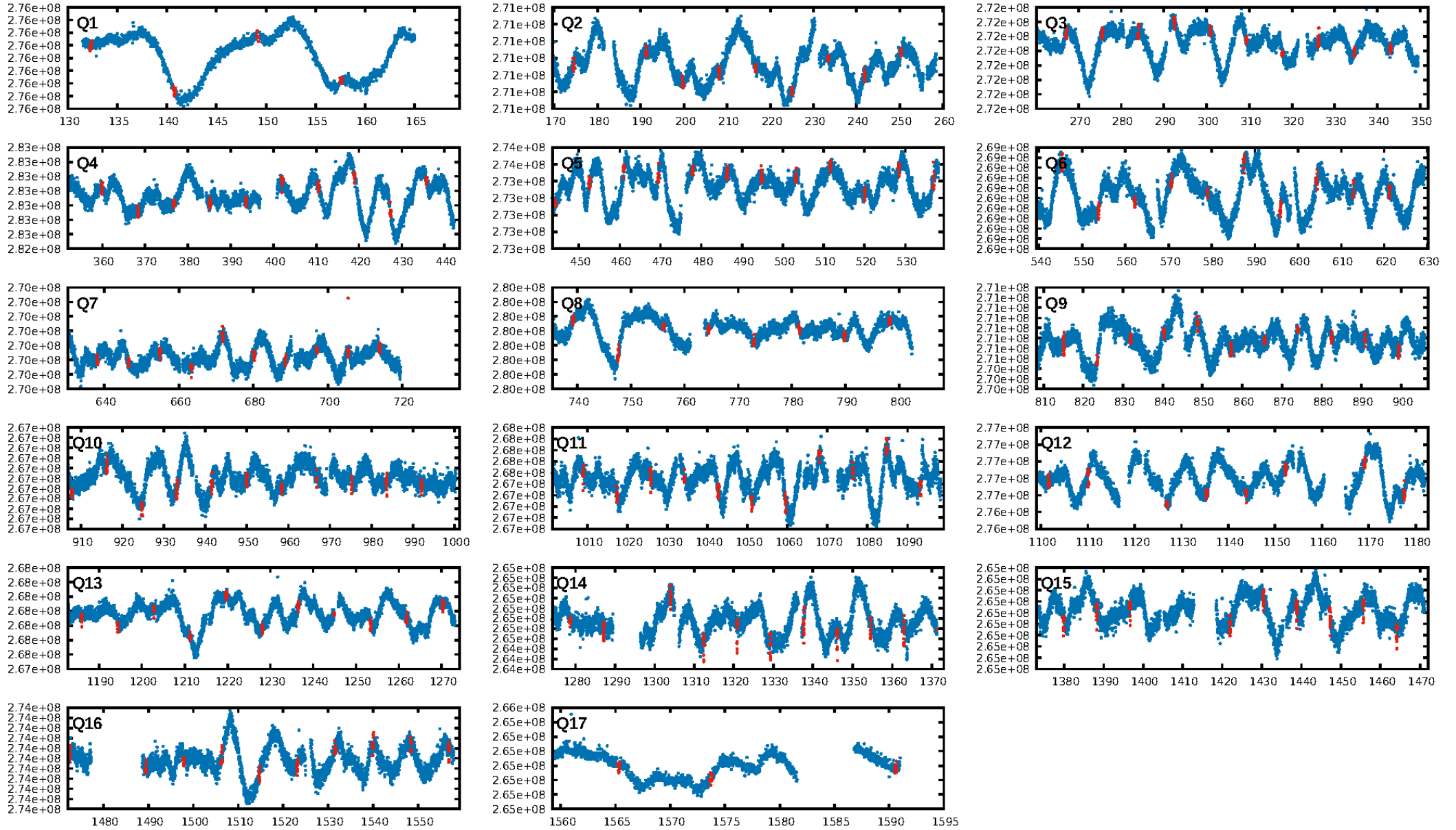
DV Fit Results:

Period = 8.42934 [0.00003] d
Epoch = 132.3083 [0.0024] BKJD
Rp/R* = 0.0095 [0.0023]
a/R* = 11.04 [14.45]
b = 0.89 [0.31]
Seff = 265.65 [77.04]
Teff = 1029 [75] K
Rp = 1.17 [0.39] Re
a = 0.0839 [0.0158] AU
Ag = 102.71 [57.42] [1.77 σ]
Teffp = 5067 [637] K [6.29 σ]

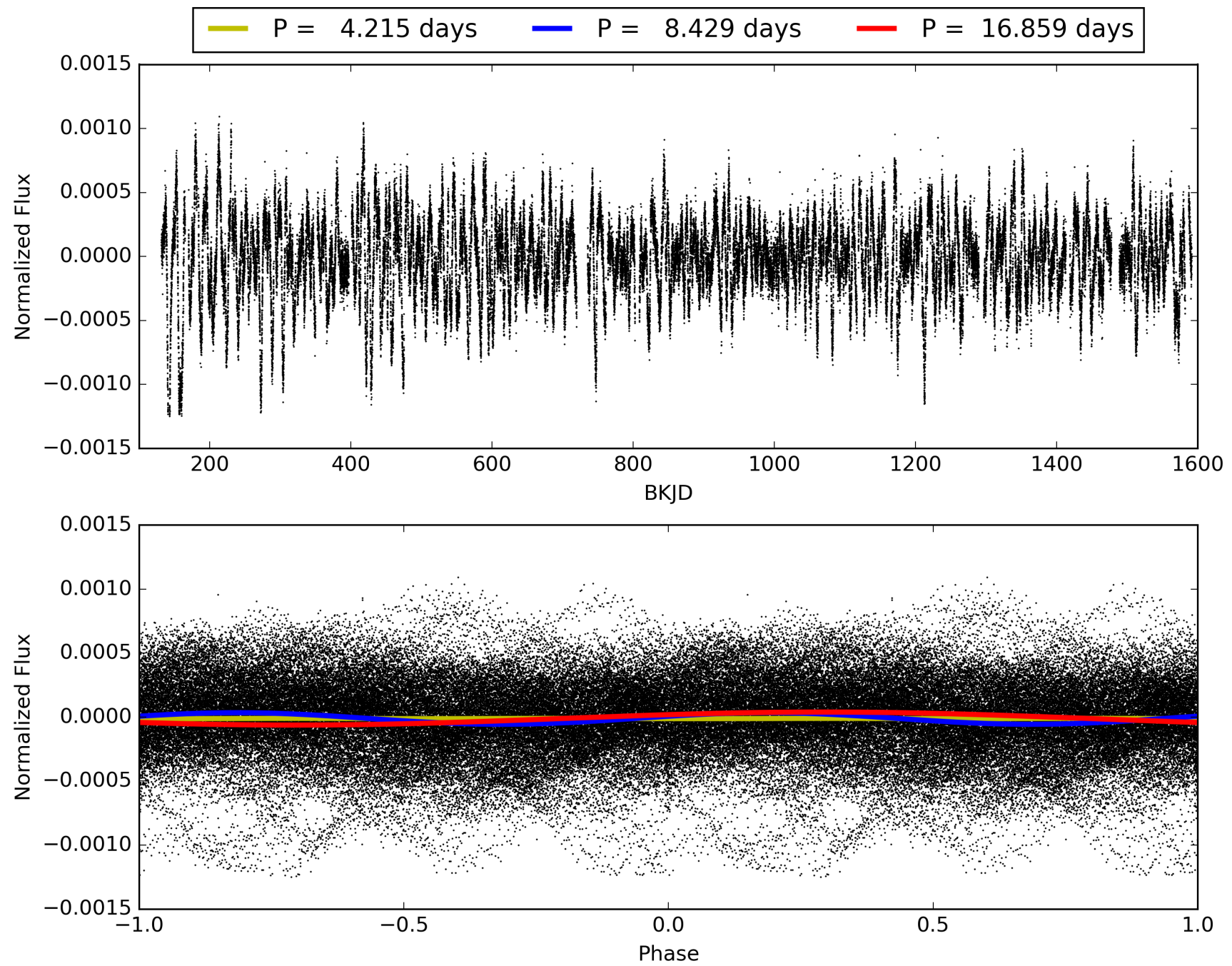
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.1% [0.00 σ]
ModelChiSquare2-sig: 0.1%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 7.45e-94
RollingBand-fgt: 1.00 [149/149]
GhostDiagnostic-chr: 6.425
Centroid-sig: N/A
Centroid-so: 0.840 arcsec [1.73 σ]
OotOffset-rm: 1.870 arcsec [3.16 σ]
KicOffset-rm: 1.904 arcsec [3.17 σ]
OotOffset-st: 3/2/4/5 [14]
KicOffset-st: 3/2/4/5 [14]
DiffImageQuality-fgm: 0.86 [12/14]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 009821151-01, PDC Light Curves

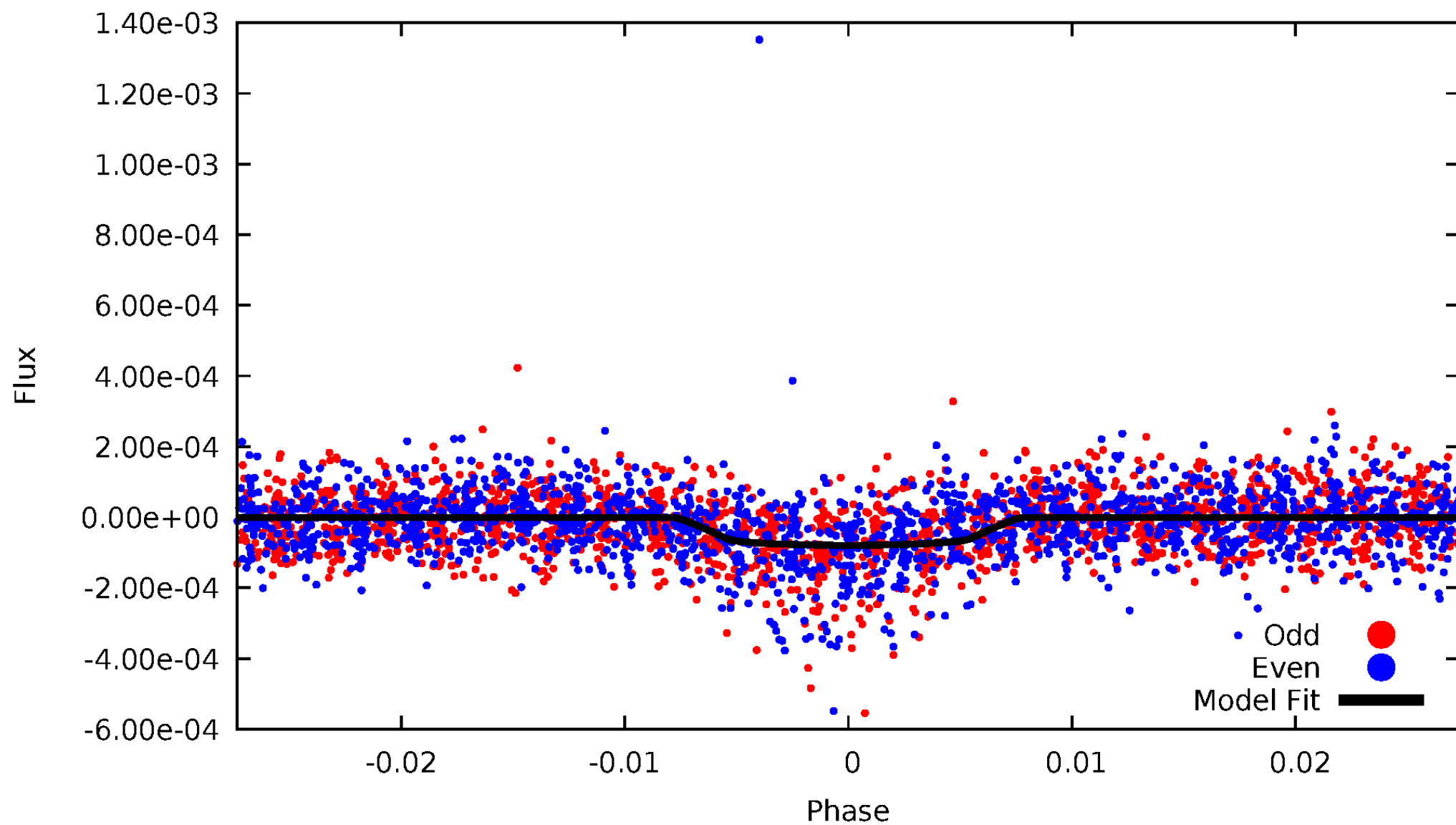


TCE 009821151-01



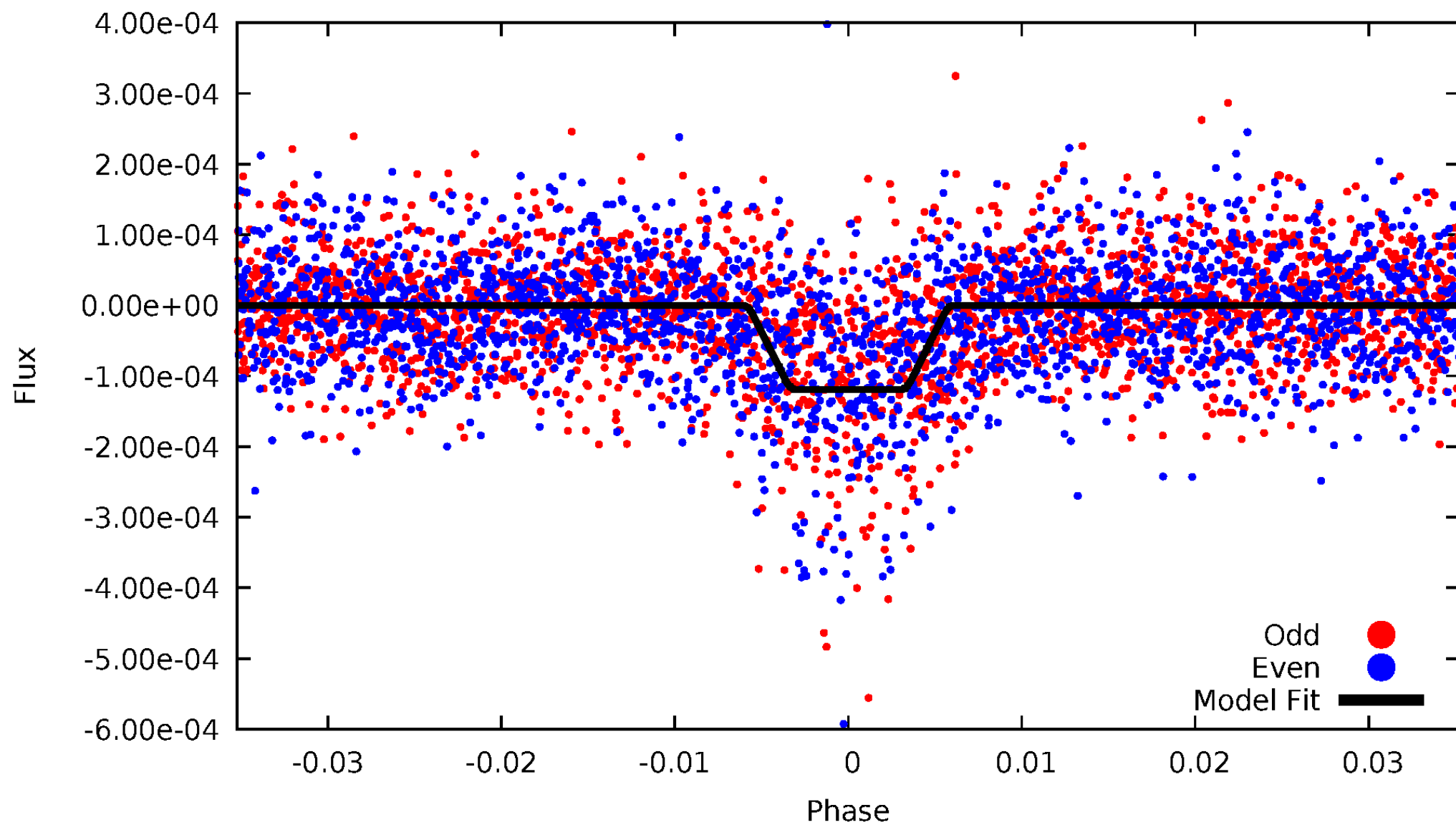
DV Odd/Even

TCE 009821151-01



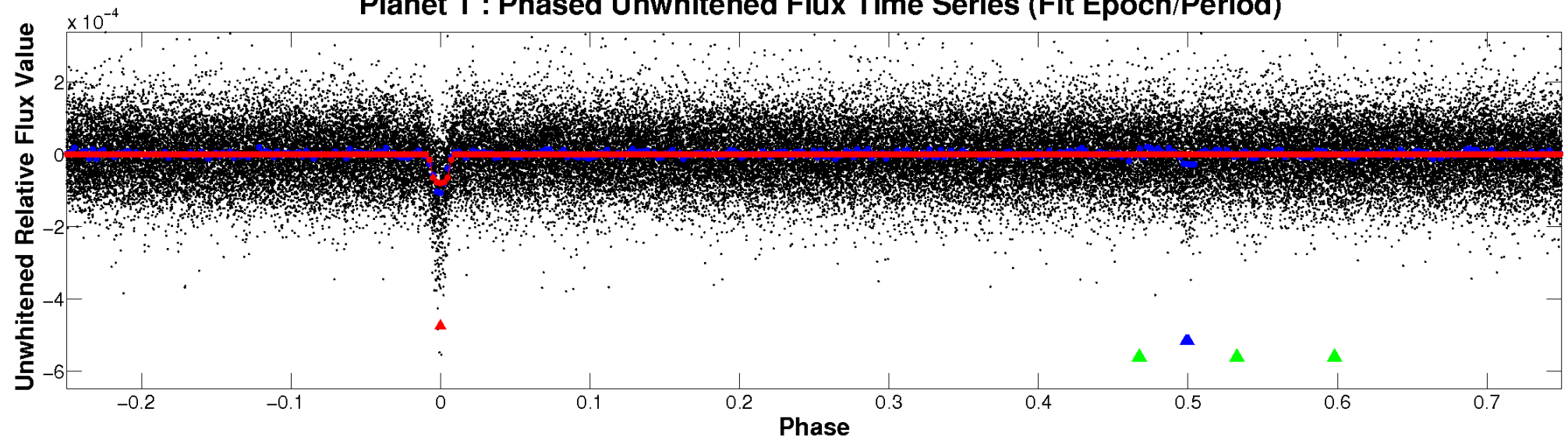
ALT Odd/Even

TCE 009821151-01

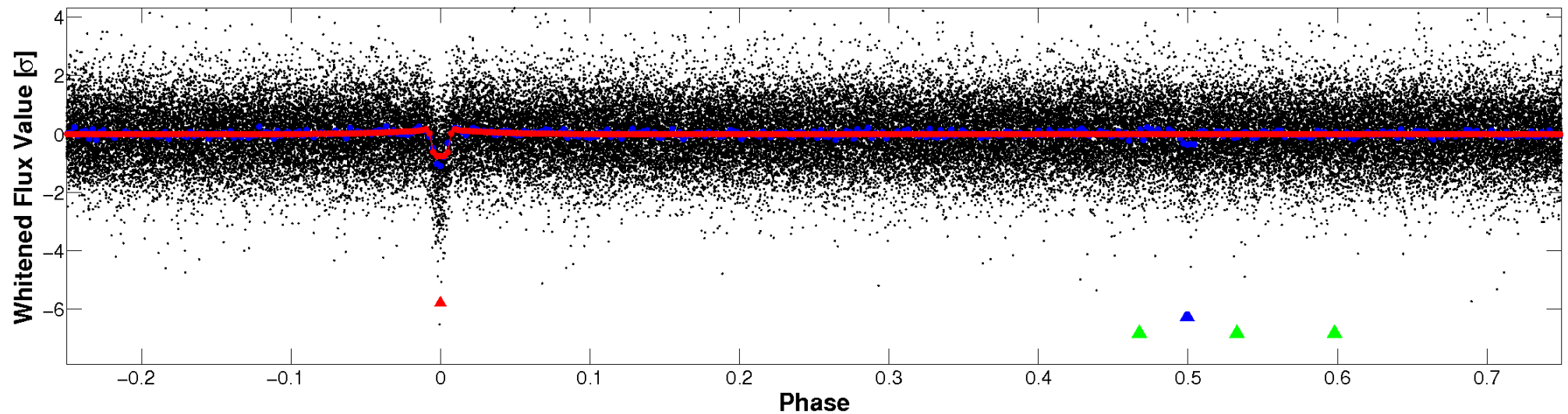


Non-Whitened Vs. Whitened Light Curve

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

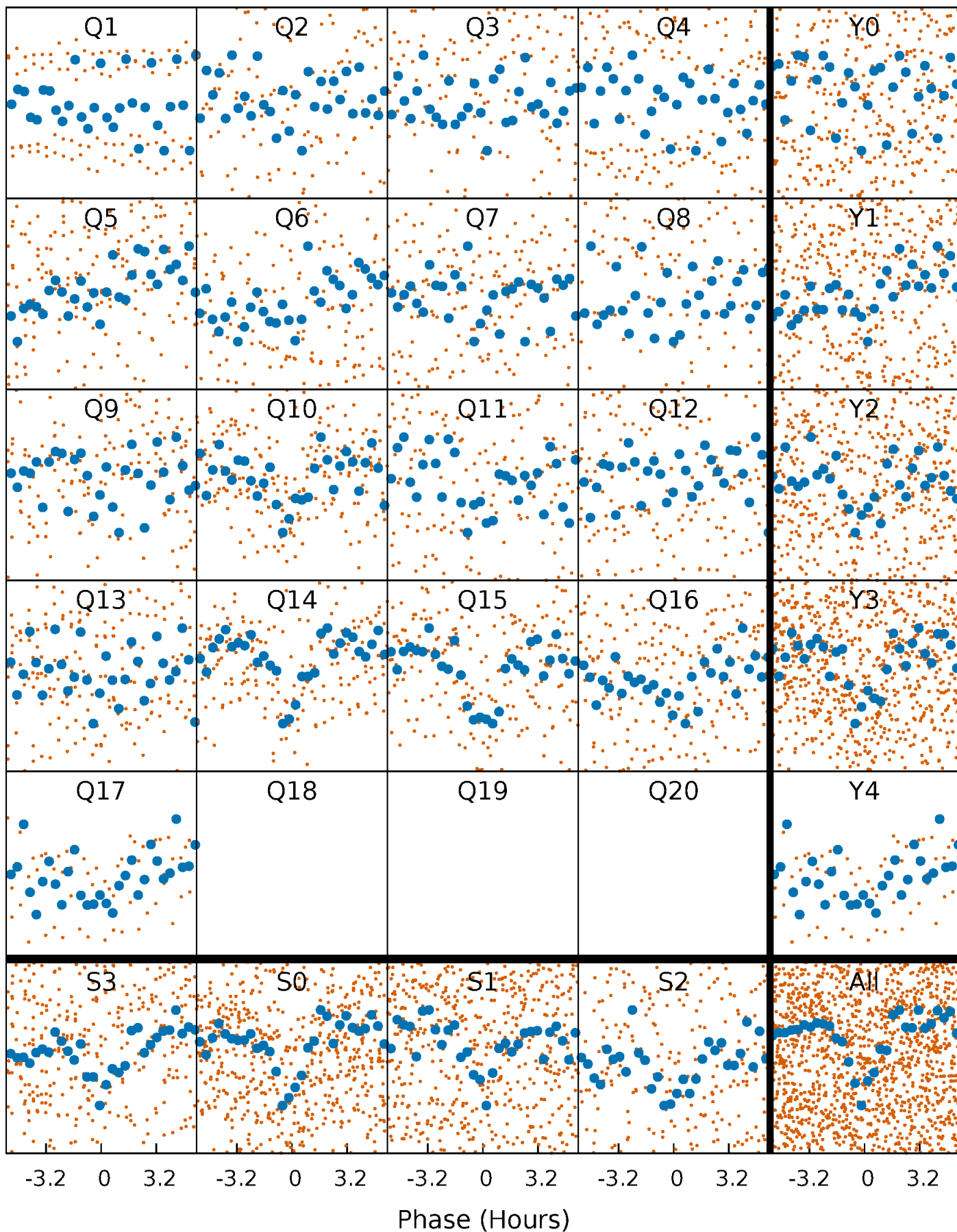


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



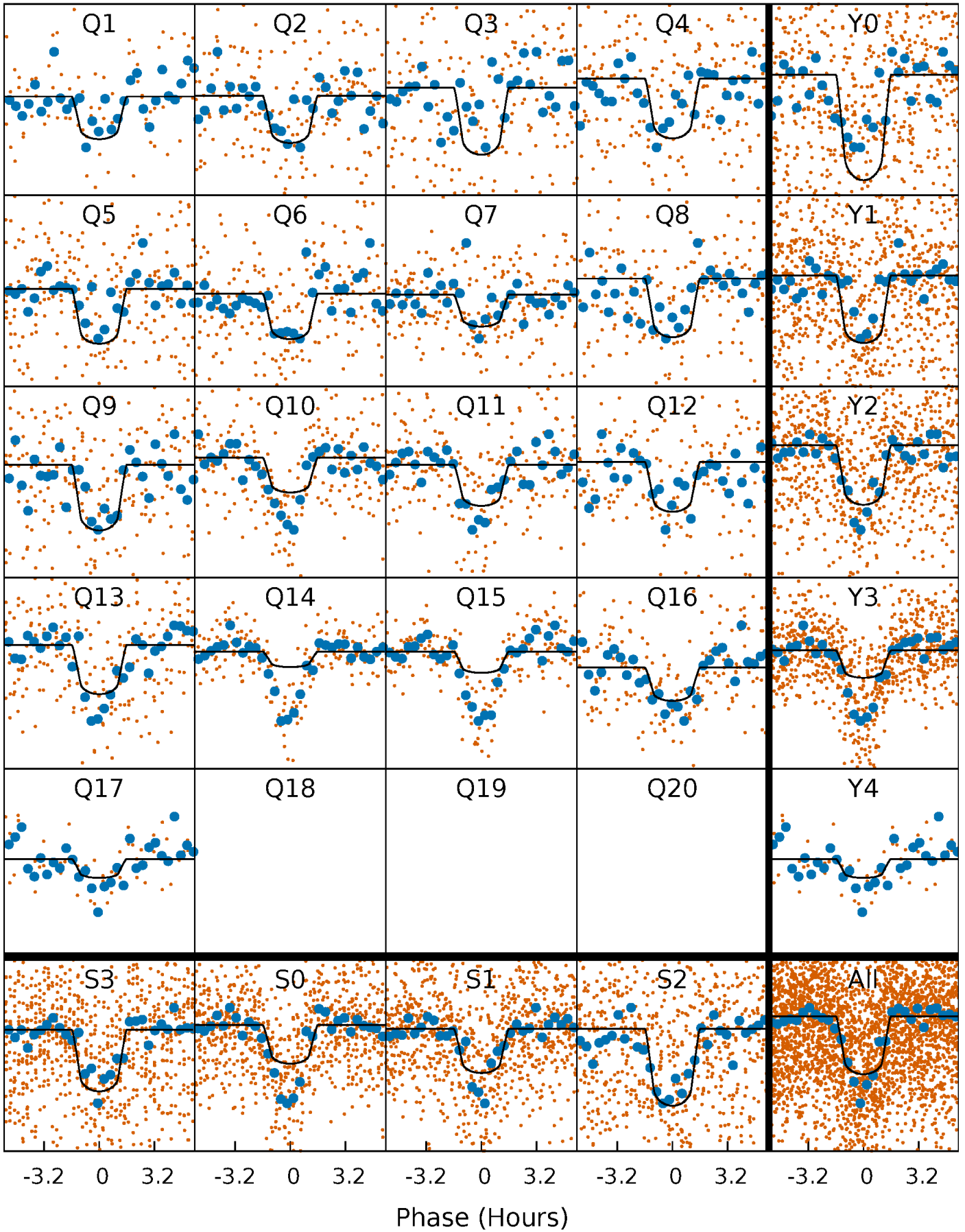
PDC Quarter-Phased Transit Curves

TCE 009821151-01 P= 8.429340 Days $T_0=132.308306$ (BKJD)



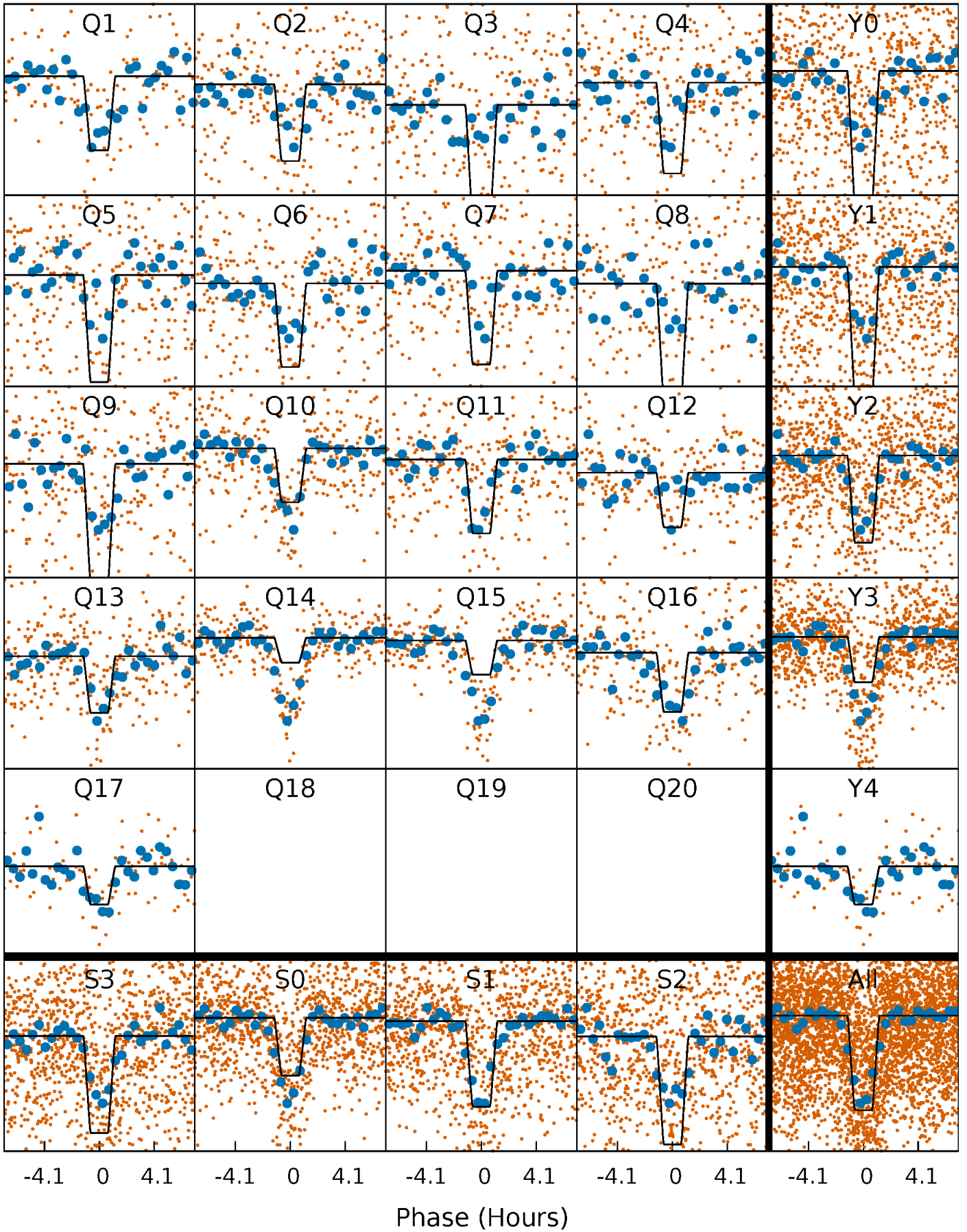
DV Quarter-Phased Transit Curves

TCE 009821151-01 P= 8.429340 Days $T_0=132.308306$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

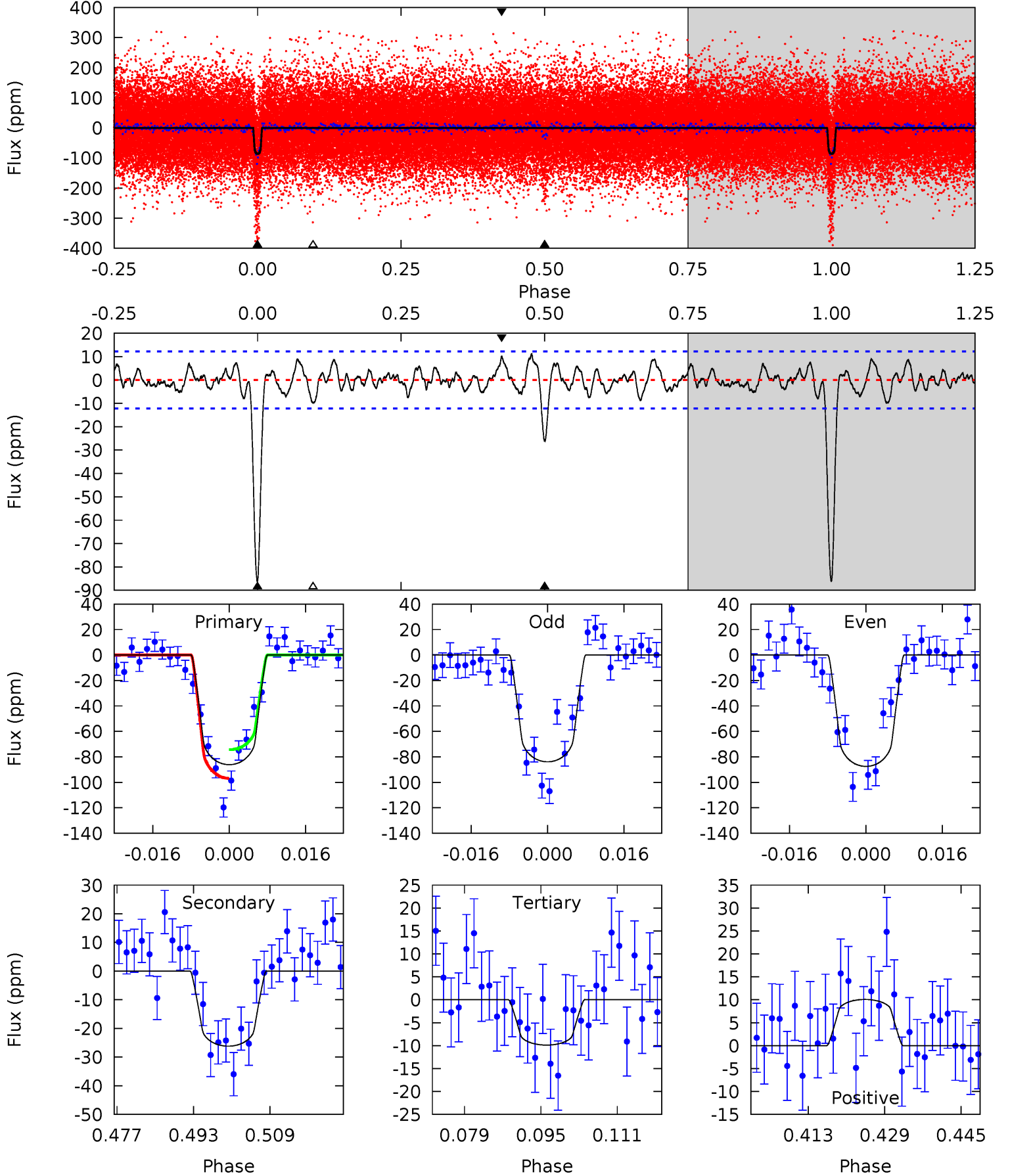
TCE 009821151-01 P= 8.429418 Days $T_0=132.293884$ (BKJD)



DV Model-Shift Uniqueness Test

009821151-01, P = 8.429340 Days, E = 123.878966 Days

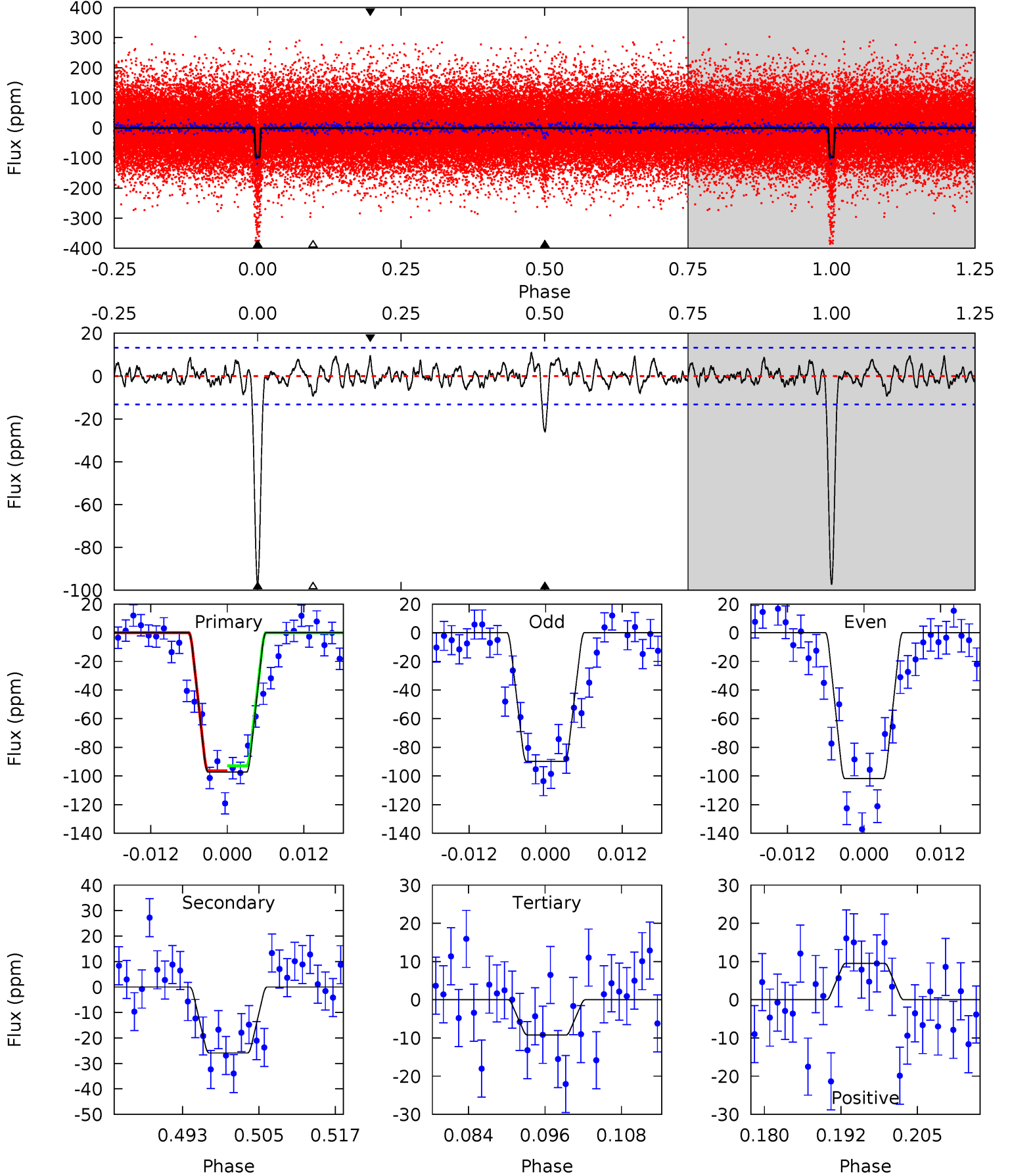
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 34.8 | 10.6 | 3.99 | 4.07 | 4.94 | 2.41 | 1.54 | 30.8 | 30.7 | 6.59 | 6.52 | 0.73 | 1.22 | 0.12 | 4.56 |



Alt Model-Shift Uniqueness Test

009821151-01, P = 8.429418 Days, E = 123.864466 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 36.6 | 9.74 | 3.47 | 3.59 | 4.99 | 2.51 | 1.28 | 33.1 | 33.0 | 6.27 | 6.15 | 2.25 | 1.18 | 0.10 | 0.66 |



Stellar Parameters For KIC 009821151

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 6353^{+144}_{-176} | $4.375^{+0.077}_{-0.143}$ | $-0.140^{+0.250}_{-0.300}$ | $1.132^{+0.261}_{-0.140}$ | $1.104^{+0.140}_{-0.127}$ | $1.073^{+0.368}_{-0.455}$ |
| | +2%/-3% | +2%/-3% | +179%/-214% | +23%/-12% | +13%/-12% | +34%/-42% |
| 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 009821151-01 / KOI 3243.01

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{max} (K)$ | $T_{obs} (K)$ | A_{obs} |
|---------|-------------|------------------------|--------------------|----------------------|------------------|
| DV | -26 ± 2 | $1.19^{+0.34}_{-0.28}$ | 1446^{+83}_{-63} | 4777^{+570}_{-387} | 70^{+54}_{-26} |
| Alt. | -26 ± 3 | $1.36^{+0.33}_{-0.28}$ | 1452^{+69}_{-66} | 4514^{+449}_{-345} | 53^{+31}_{-18} |

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 $A_{obs} \gg 1.0$

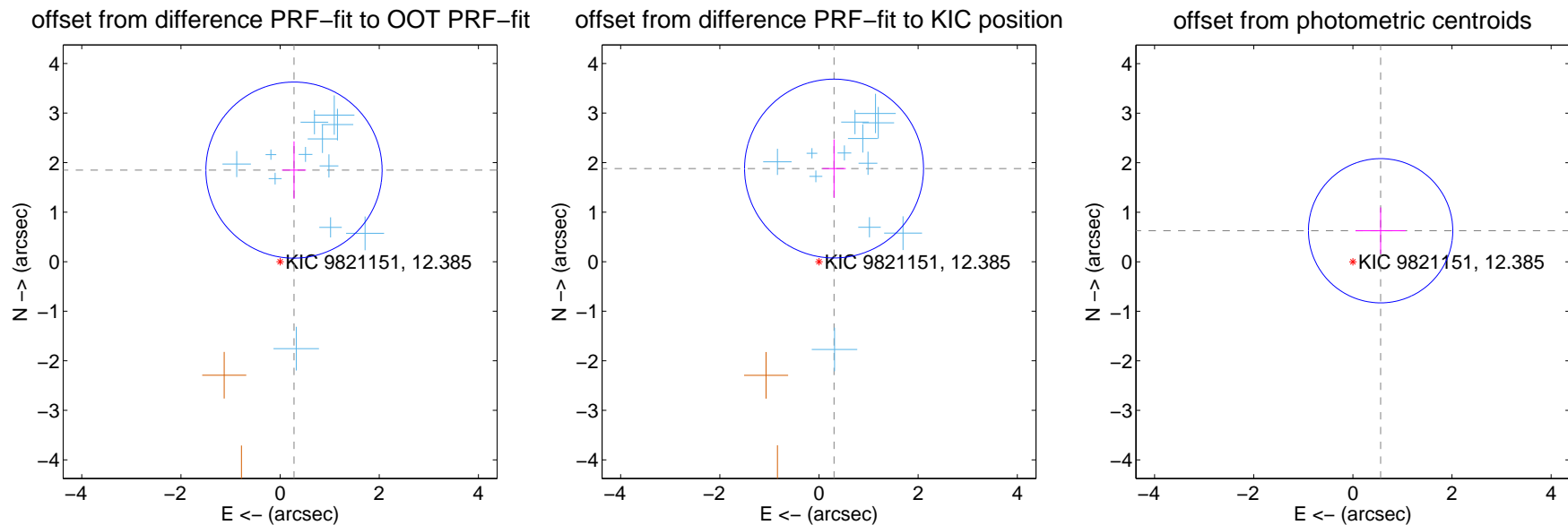
DV Centroid Data

Supplemental centroid analysis for 009821151-01. Kepler magnitude: 12.38. Transit SNR 19.42

There are 12 quarters with good PRF difference image offsets

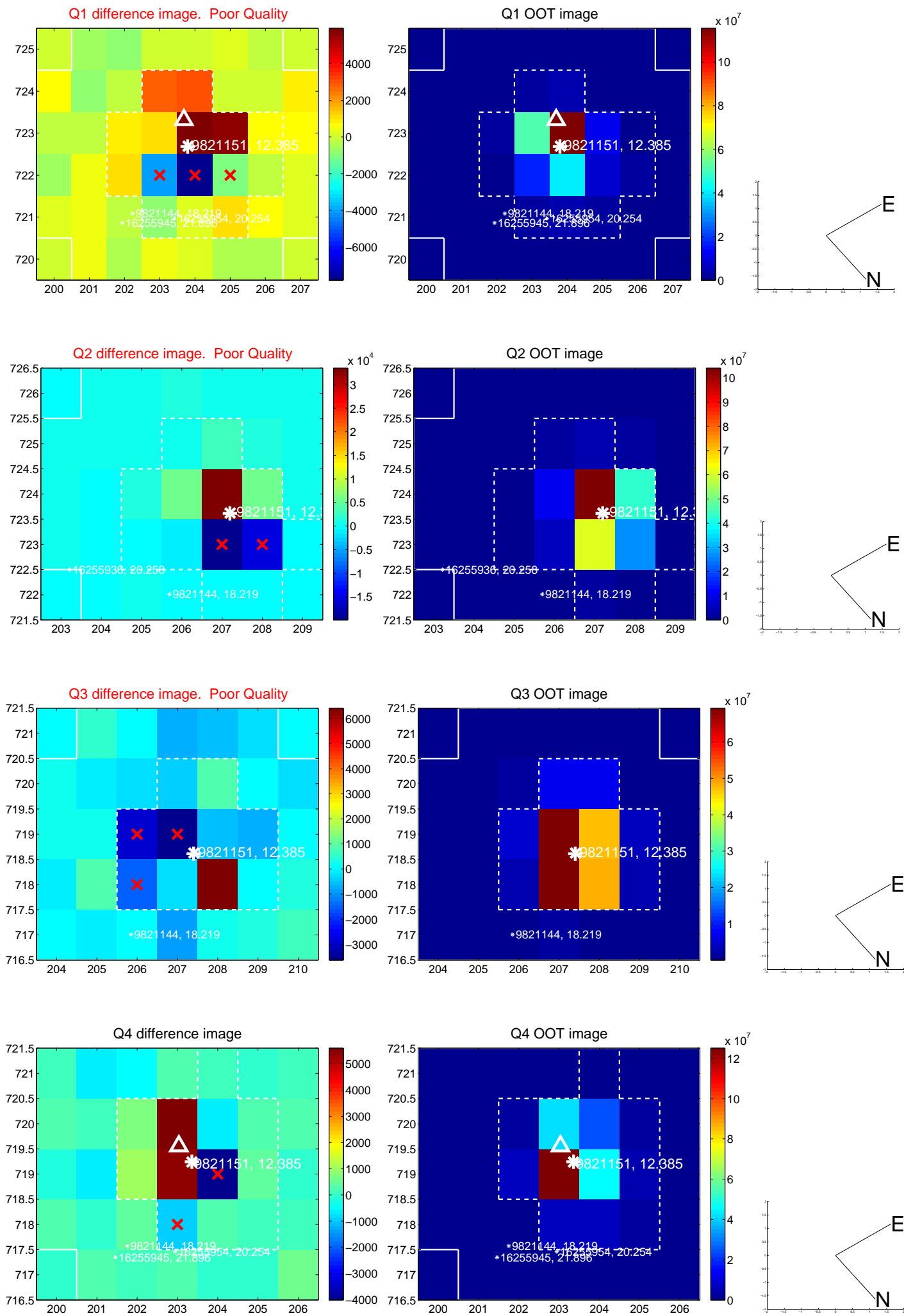
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT | 1.870 ± 0.592 | 3.16 | -0.280 ± 0.242 | 1.849 ± 0.581 |
| PRF-fit source offset from KIC position | 1.904 ± 0.602 | 3.17 | -0.304 ± 0.235 | 1.880 ± 0.587 |
| photometric centroid source offset | 0.84 ± 0.49 | 1.73 | -0.56 ± 0.50 | 0.63 ± 0.47 |

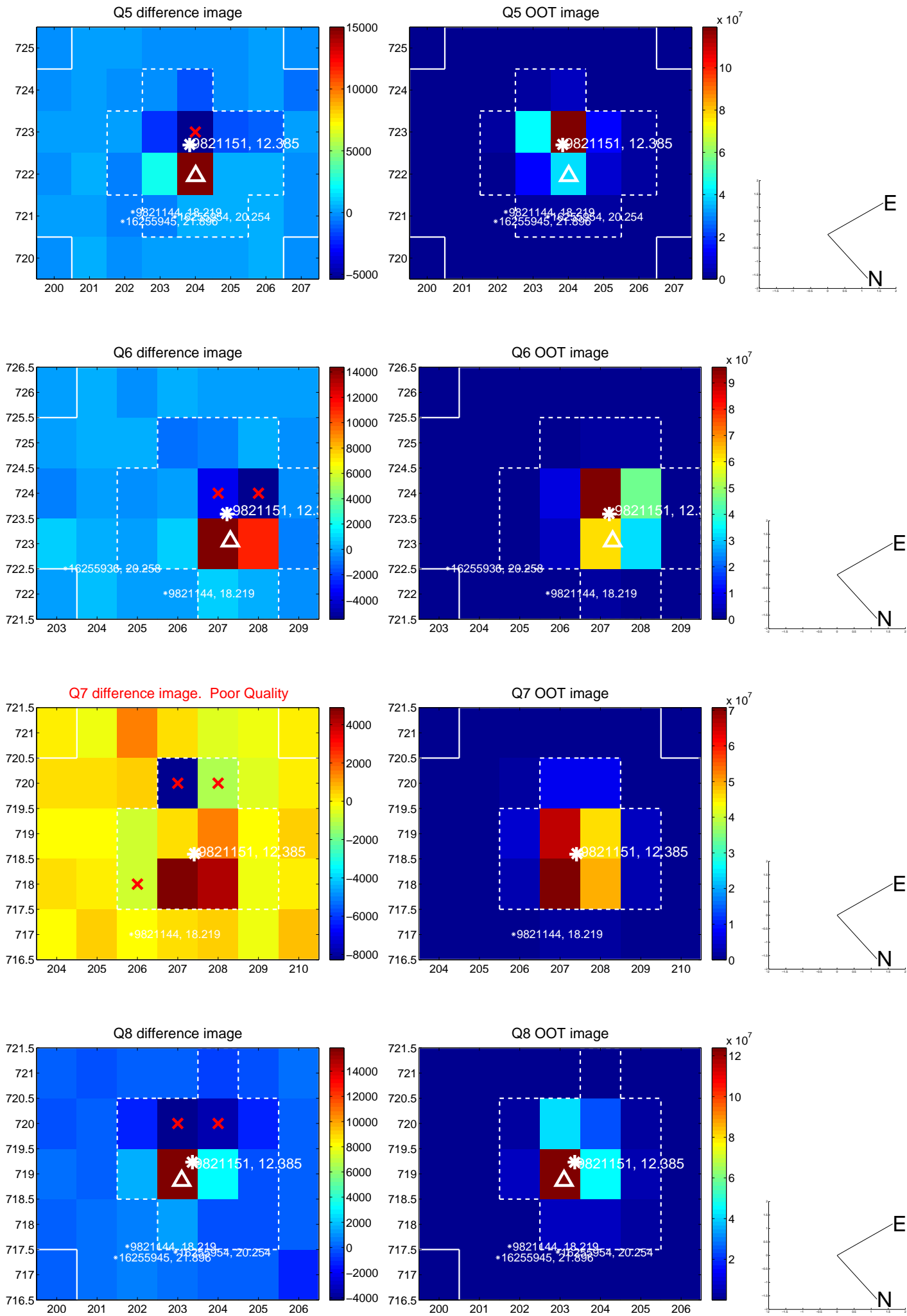


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

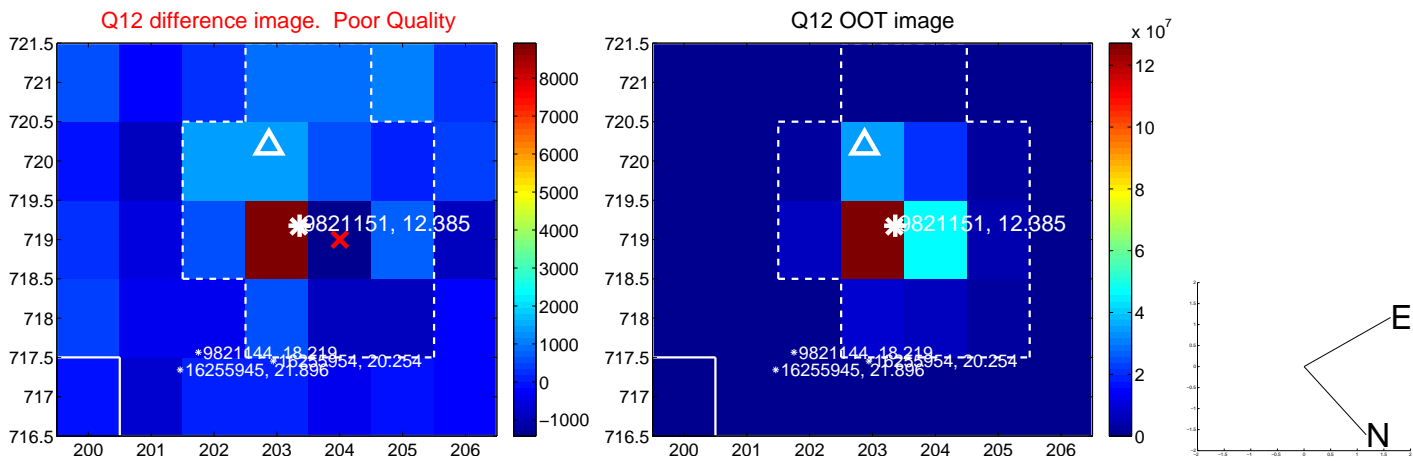
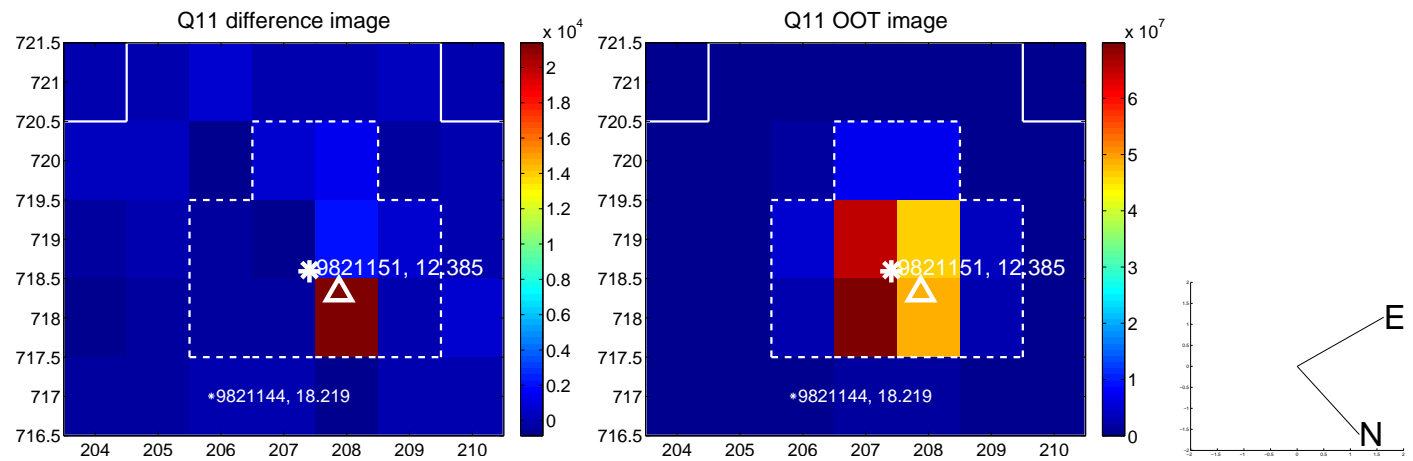
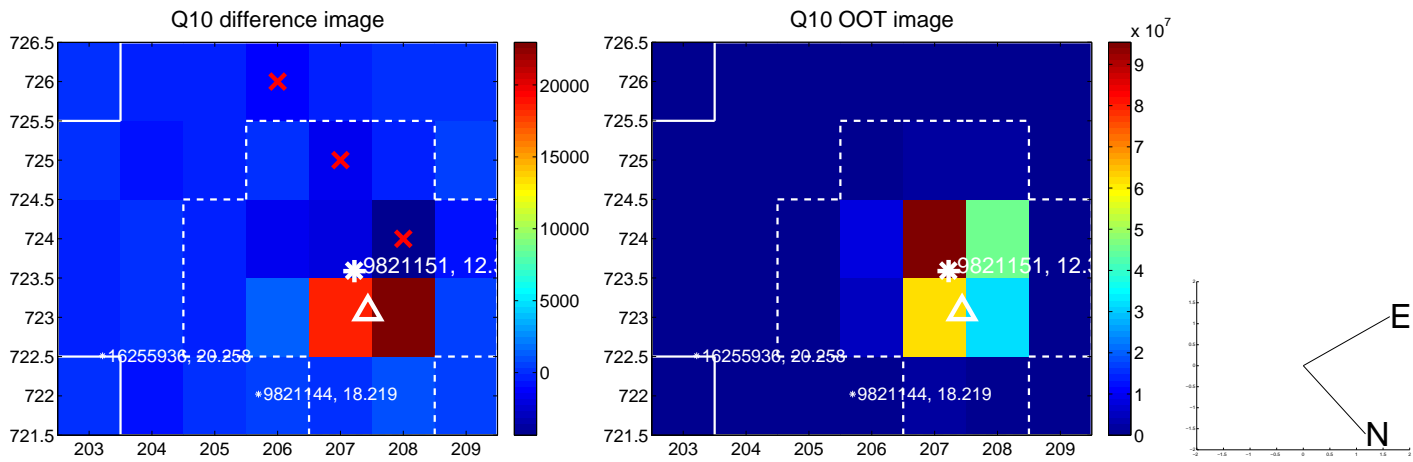
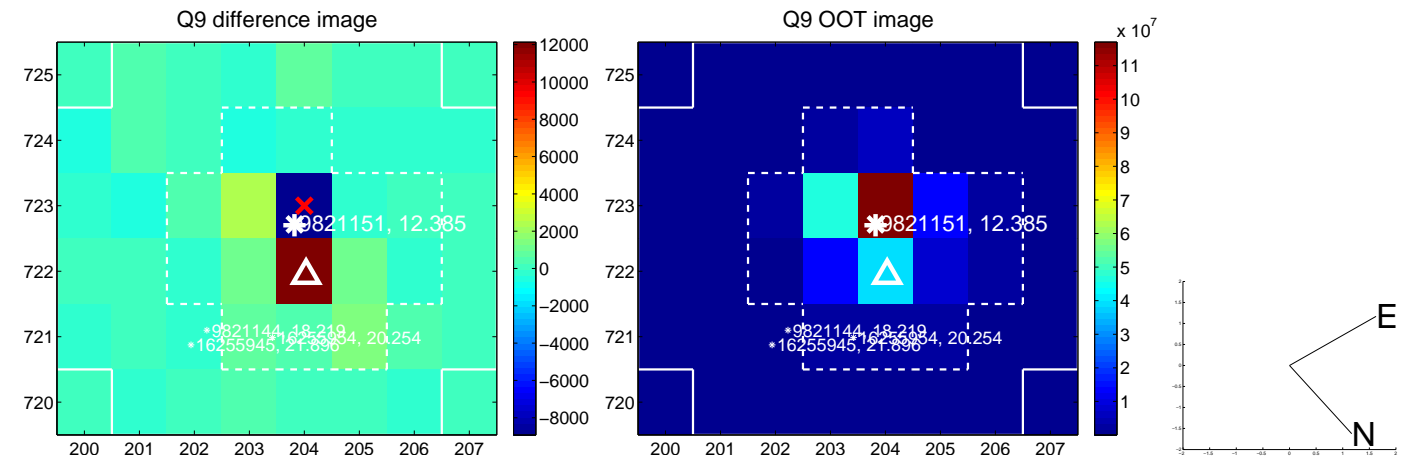
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



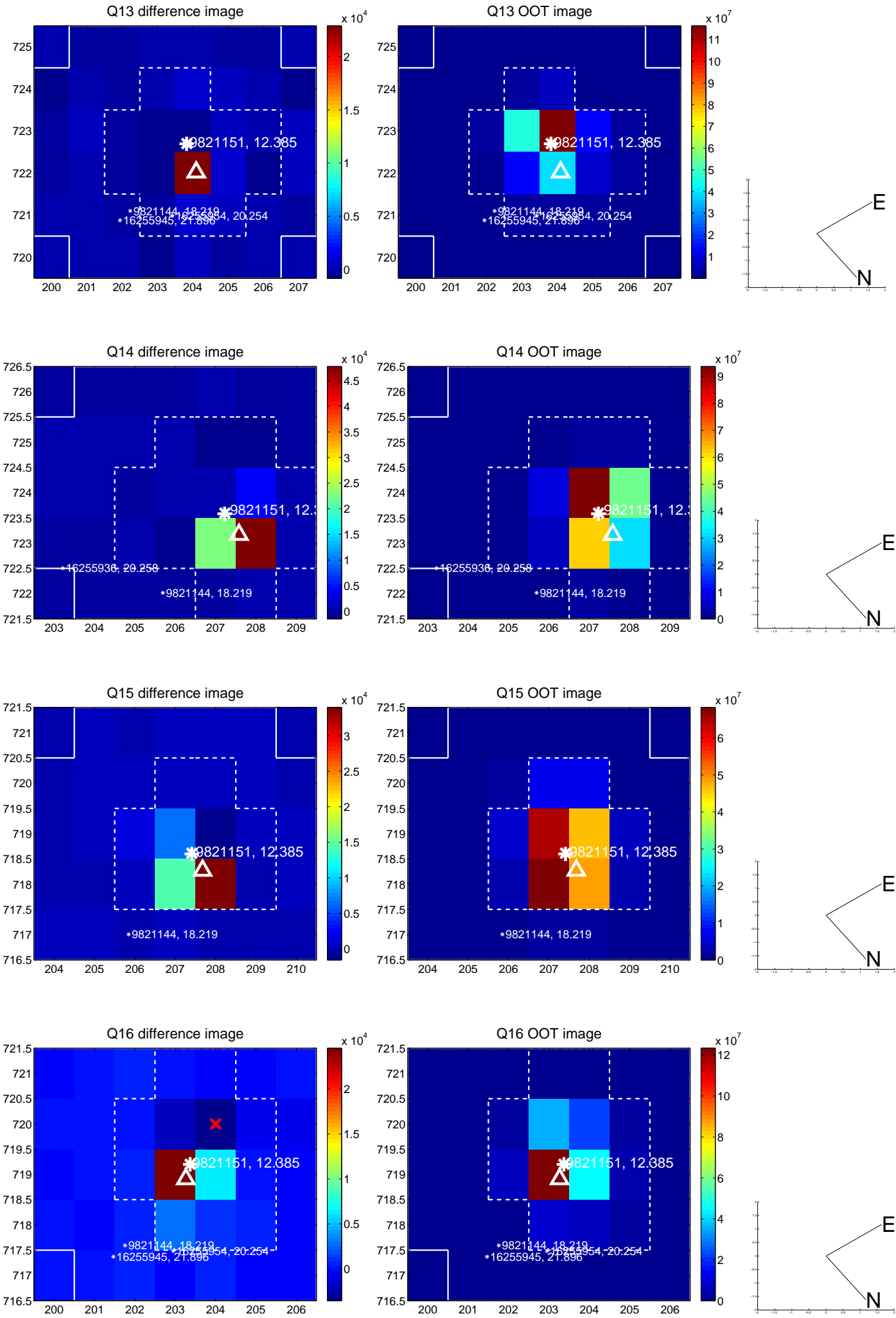
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

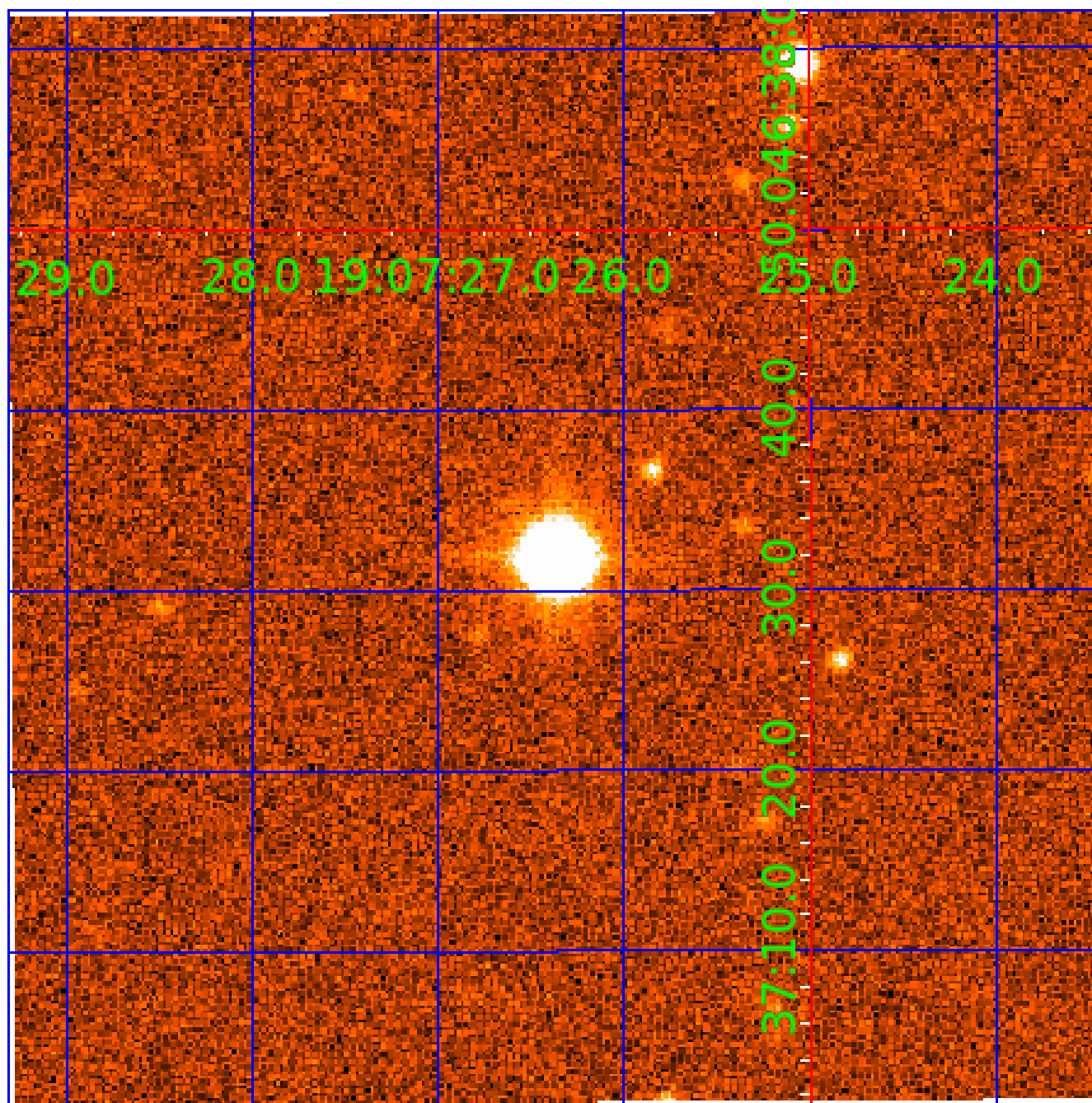


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009821151

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 009821151-01 | OBS | 3243.01 | 8.429340 | 132.308306 | 79.3 | 2.763 | 21.4 | 19.4 | 1.13 | 6353 | 1.17 | 265.65 |
| 009821151-02 | OBS | No | 8.429451 | 136.509251 | 36.4 | 2.767 | 9.2 | 9.2 | 1.13 | 6353 | 0.78 | 265.65 |
| 009821151-03 | OBS | No | 572.644656 | 246.931115 | 168.3 | 4.207 | 8.4 | 6.3 | 1.13 | 6353 | 1.65 | 0.96 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|---|
| 009821151-01 | OBS | FP | 0.00 | 0 | 1 | 0 | 1 | MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—EPHEM_MATCH |
| 009821151-02 | OBS | FP | 0.00 | 1 | 1 | 1 | 1 | IS_SEC_TCE—CENT_UNRESOLVED_OFFSET—EPHEM_MATCH |
| 009821151-03 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS |

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.

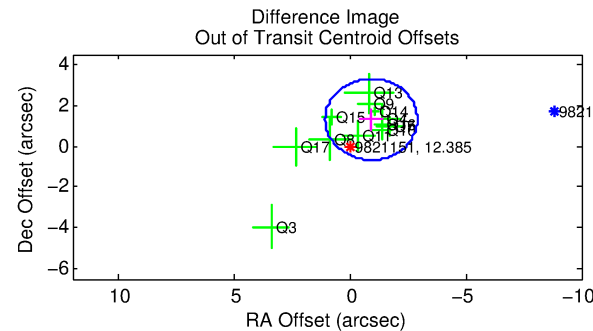
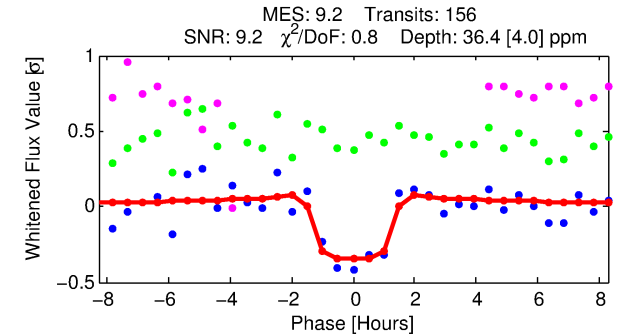
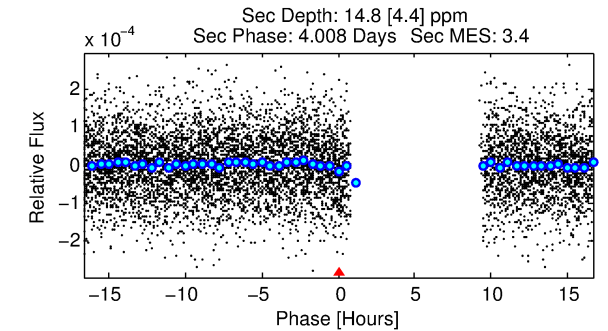
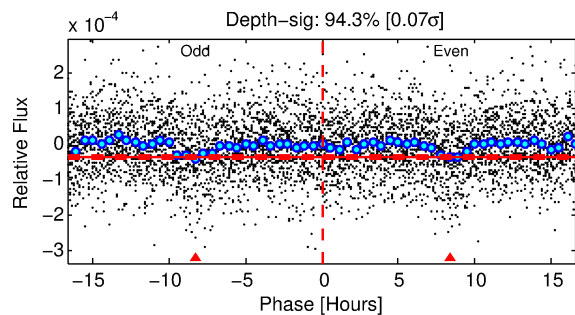
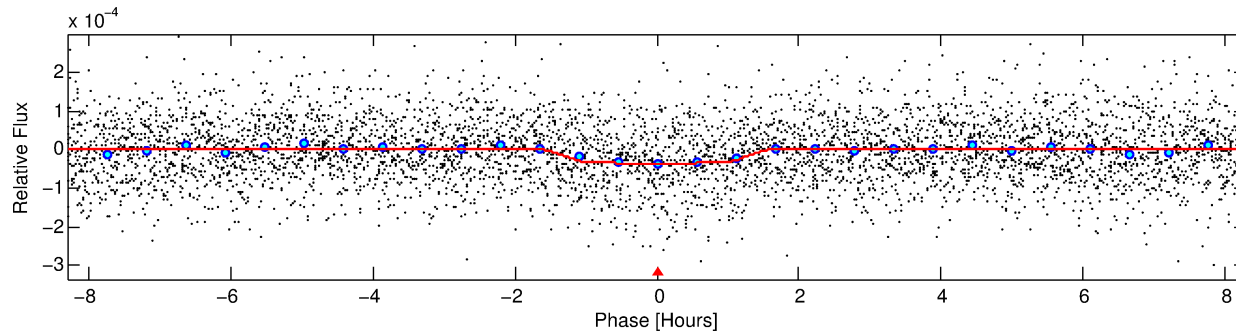
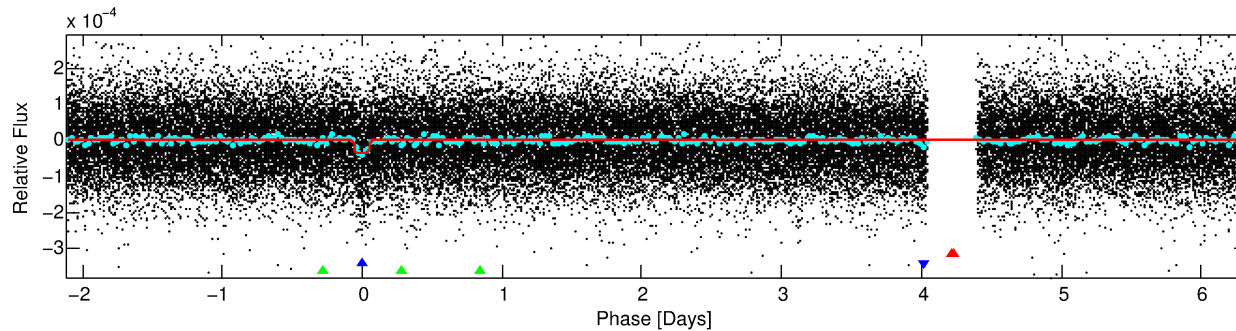
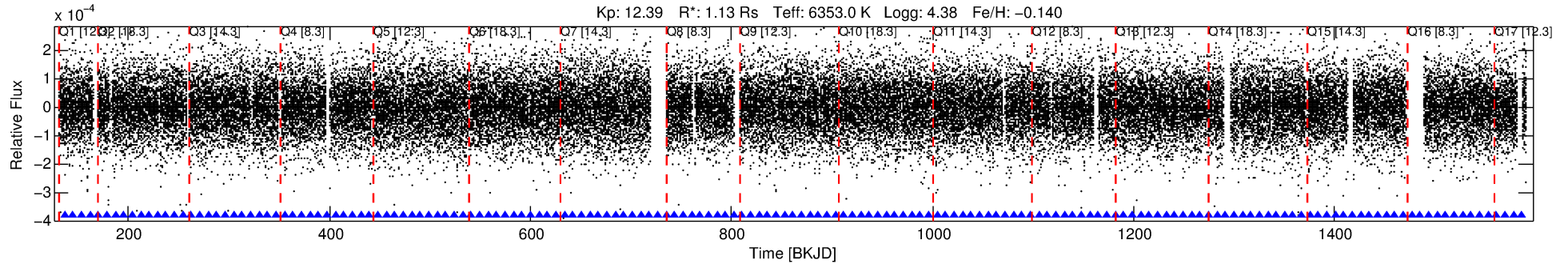
Ephemeris Match Information For 009821151-02

| TCE (1) | KIC | Parent (2) | Parent KIC | $P_1:P_2$ | Dist ($''$) | Δ Row | Δ Col | m_2 | m_1 | D_2/D_1 | Mechanism | Flag | σ_P | σ_T |
|--------------|---------|--------------|------------|-----------|---------------|--------------|--------------|-------|-------|-----------|------------|------|------------|------------|
| 009821151-02 | 9821151 | 009821078-02 | 9821078 | 1:1 | 173.3 | 44 | -1 | 14.12 | 12.39 | 4121.50 | Direct-PRF | 0 | 0.07 | 0.06 |

Notes: $P_1:P_2$ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m_2 and m_1 are the magnitudes of the parent and child. D_2/D_1 is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match in period and epoch. For a match to be considered significant $\sigma_P < 5.0$ and $\sigma_T < 5.0$. Matches which have σ_P and σ_T very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

DV One-Page Summary

KIC: 9821151 Candidate: 2 of 3 Period: 8.429 d
KOI: K03243 Corr: No Ephemeris Match



DV Fit Results:

Period = 8.42945 [0.00006] d
Epoch = 136.5093 [0.0051] BKJD
Rp/R* = 0.0063 [0.0023]
a/R* = 12.39 [25.05]
b = 0.85 [0.65]
Seff = 265.65 [77.03]
Teq = 1029 [75] K
Rp = 0.78 [0.34] Re
a = 0.0839 [0.0158] AU
Ag = 95.00 [80.19] [1.17 σ]
Teffp = 4969 [1004] K [3.91 σ]

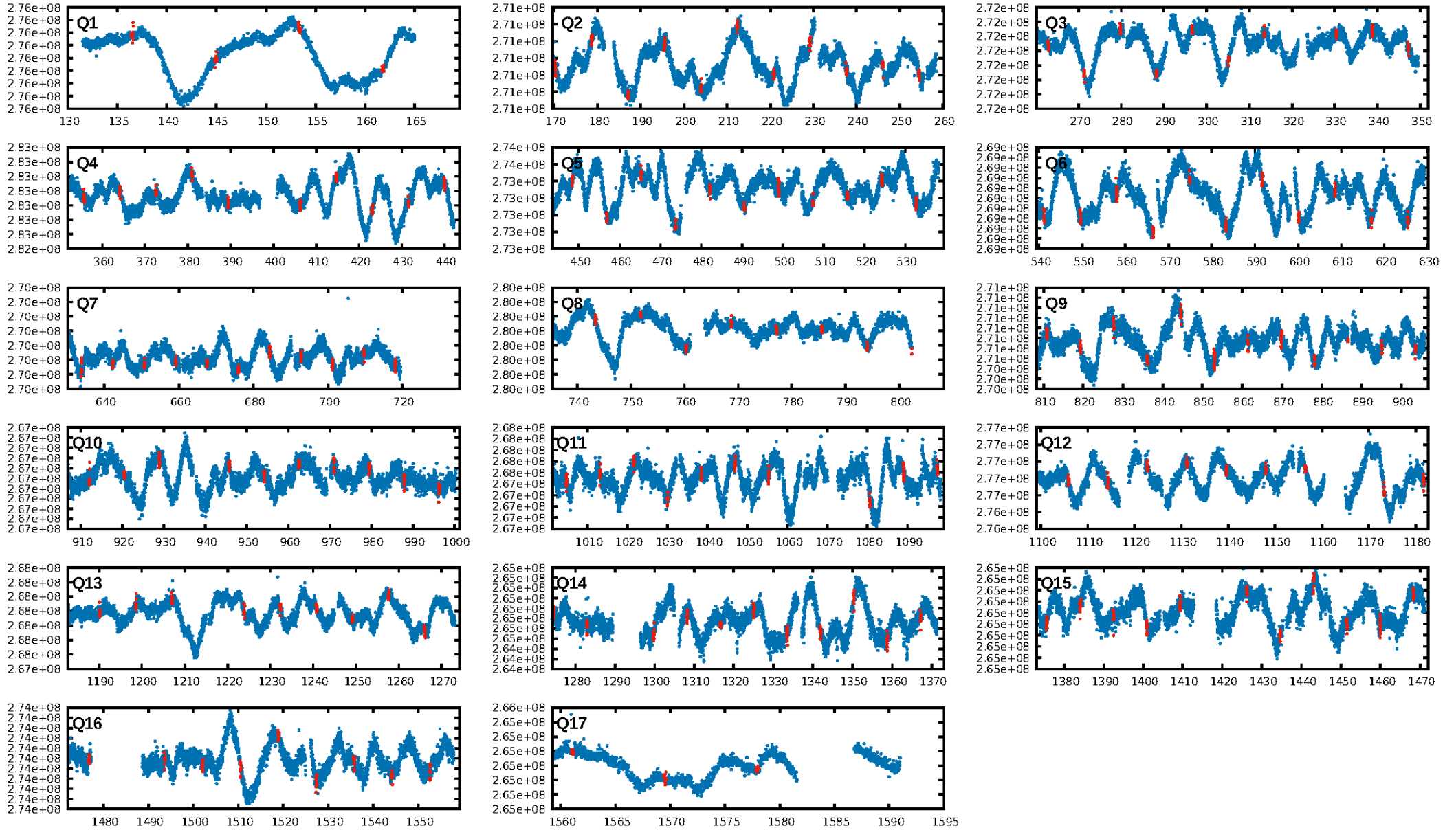
DV Diagnostic Results:

ShortPeriod-sig: 0.1% [0.00 σ]
LongPeriod-sig: 100.0% [2689.38 σ]
ModelChiSquare2-sig: 98.2%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 3.14e-19
RollingBand-fgt: 1.00 [149/149]
GhostDiagnostic-chr: 1.753
Centroid-sig: N/A
Centroid-so: 2.255 arcsec [2.24 σ]
OotOffset-rm: 1.595 arcsec [2.40 σ]
KicOffset-rm: 1.621 arcsec [2.88 σ]
OotOffset-st: 2/4/3/3 [12]
KicOffset-st: 2/4/3/3 [12]
DiffImageQuality-fgm: 0.75 [9/12]
DiffImageOverlap-fno: 1.00 [17/17]

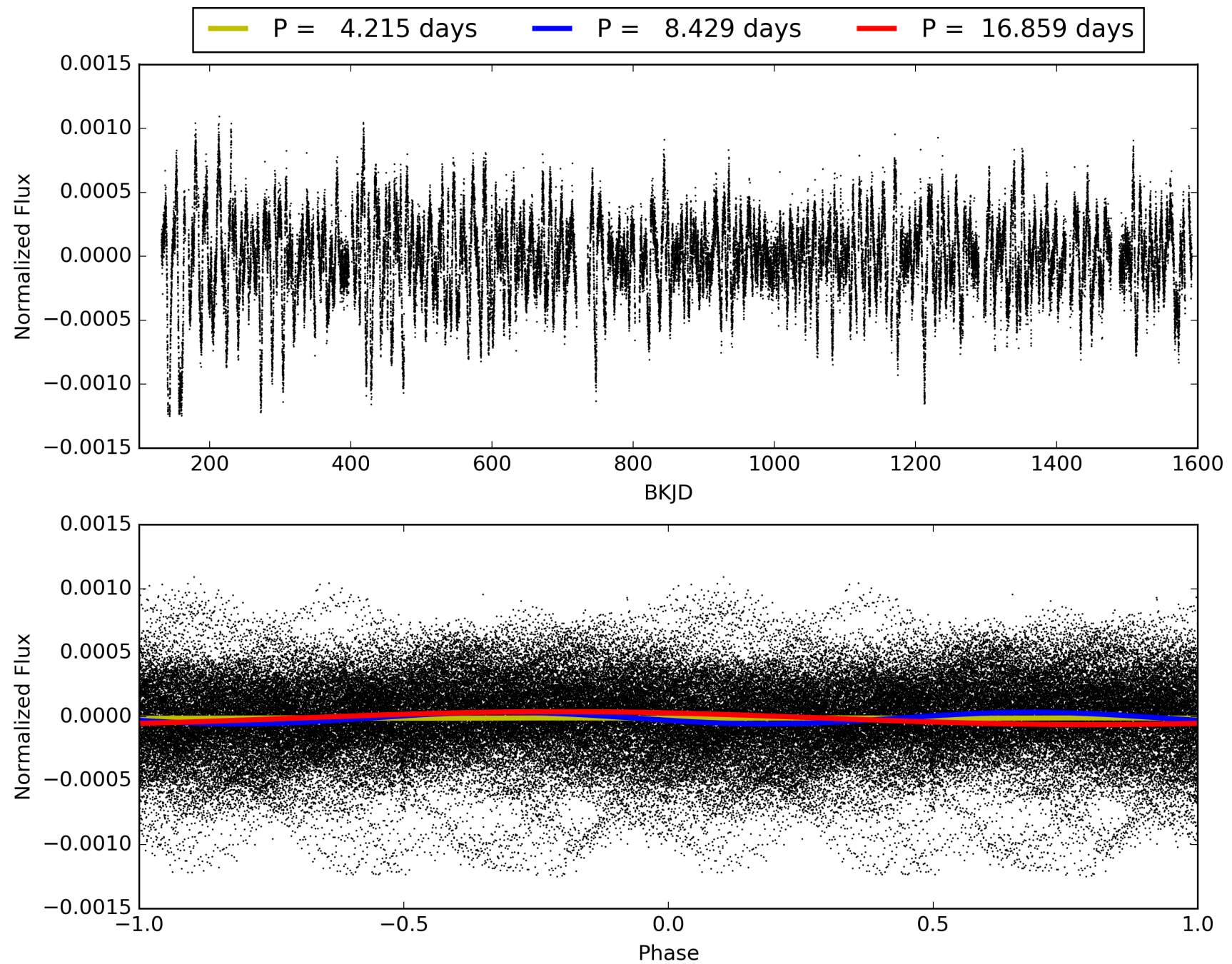
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 10:32:19 Z

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

TCE 009821151-02, PDC Light Curves

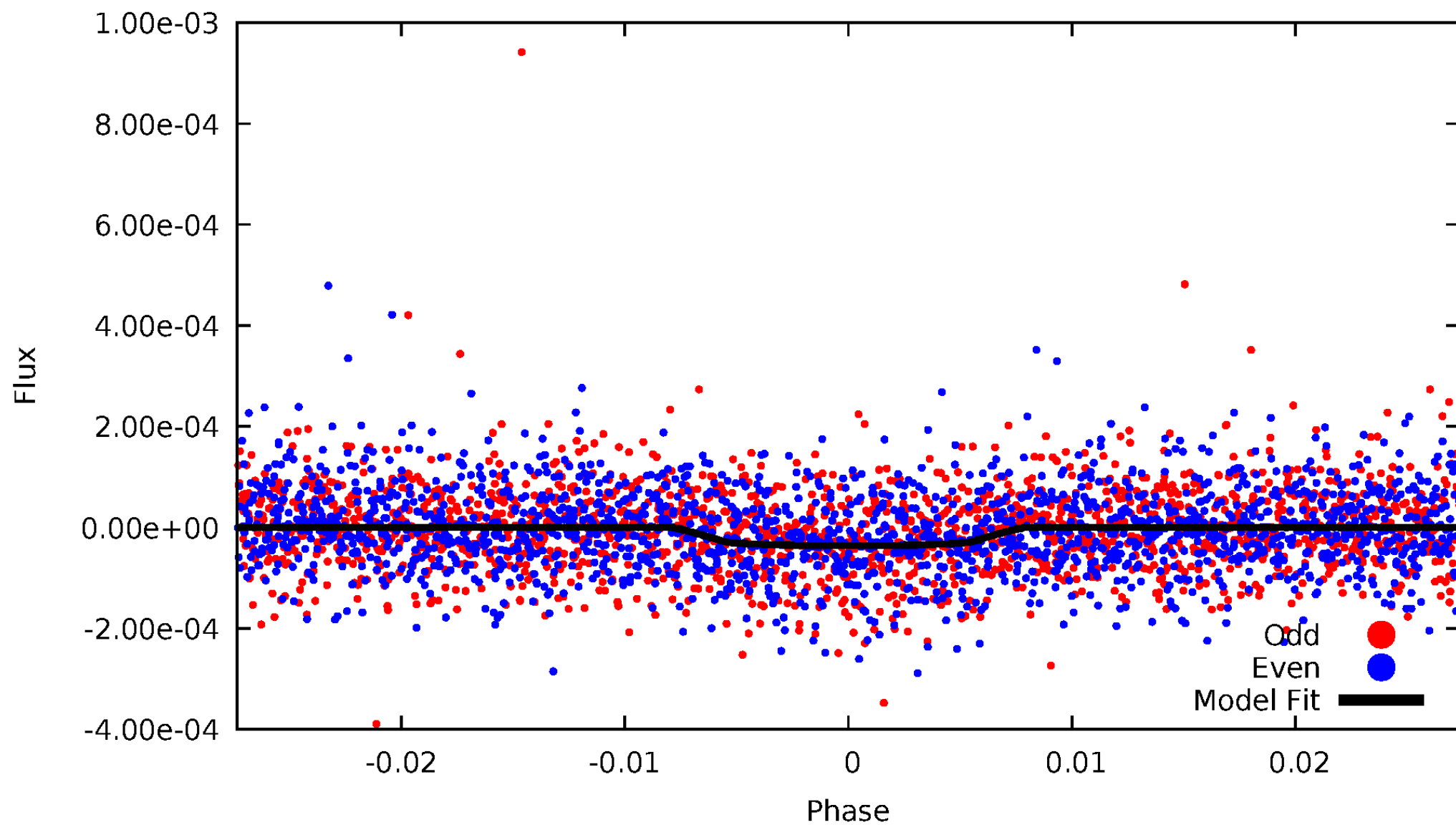


TCE 009821151-02



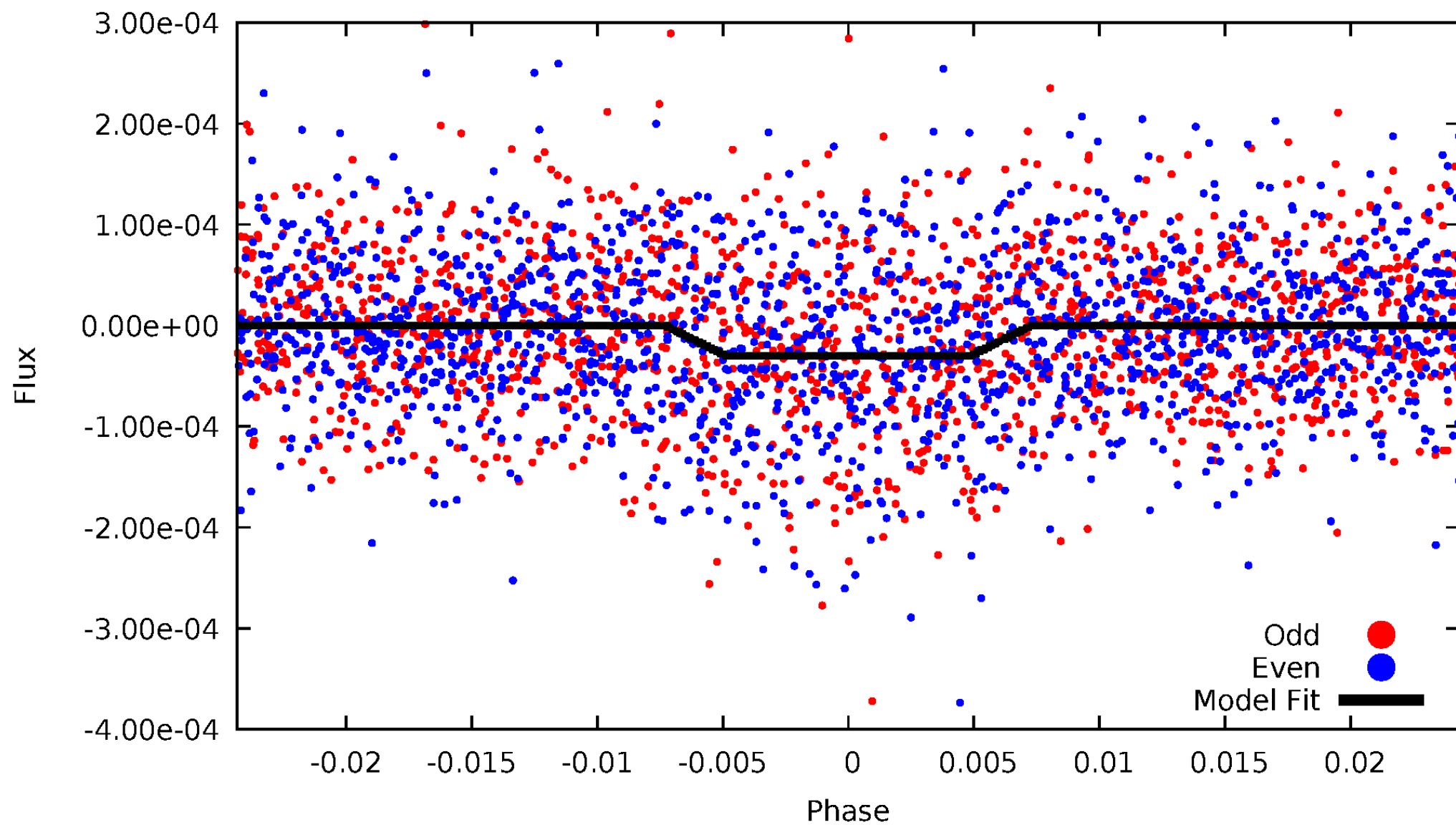
DV Odd/Even

TCE 009821151-02



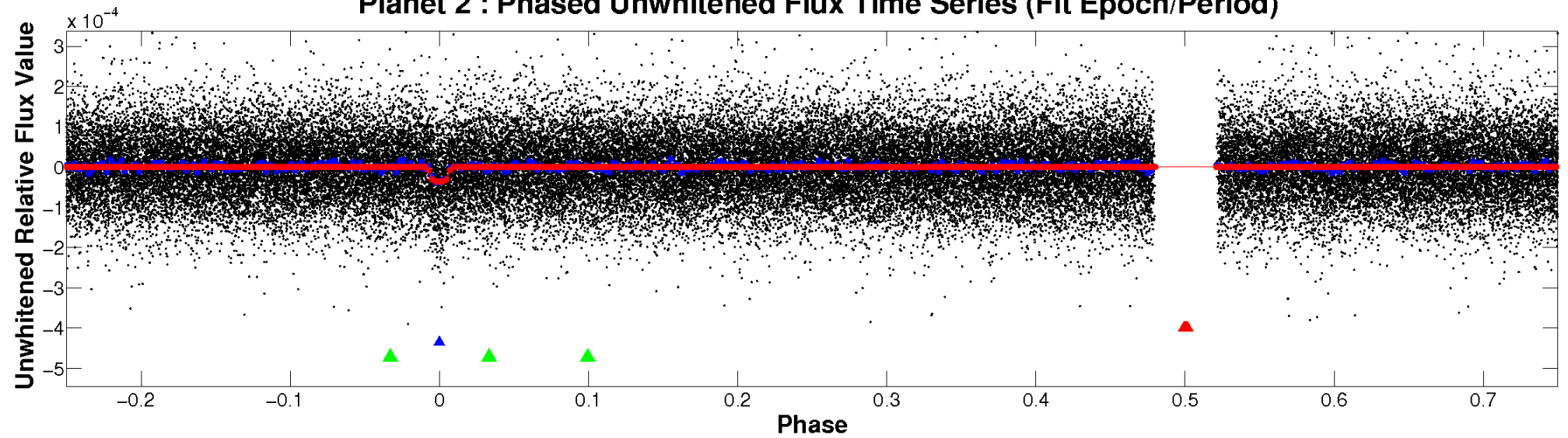
ALT Odd/Even

TCE 009821151-02

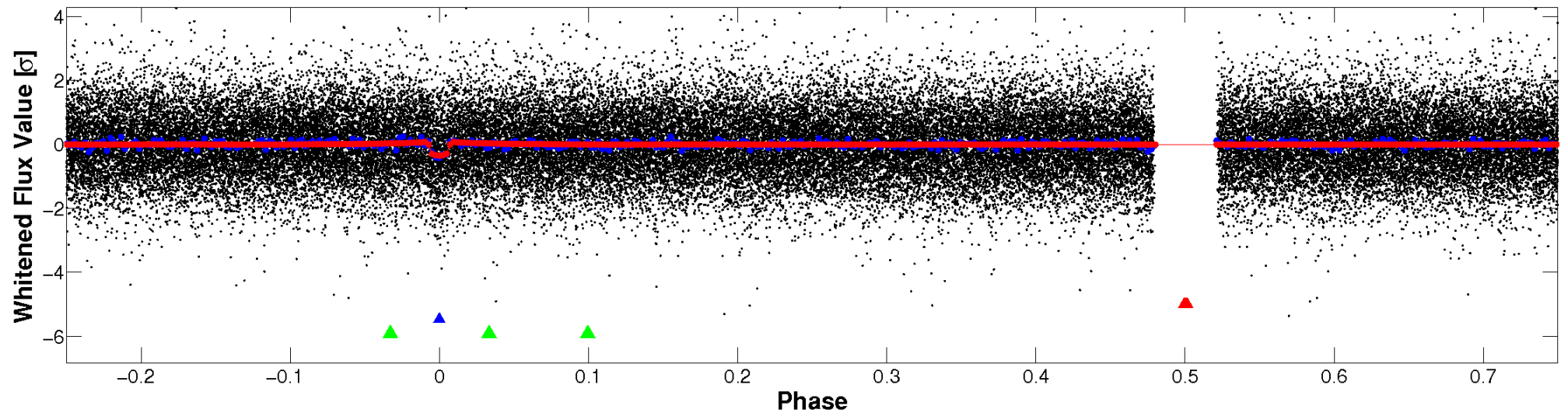


Non-Whitened Vs. Whitened Light Curve

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

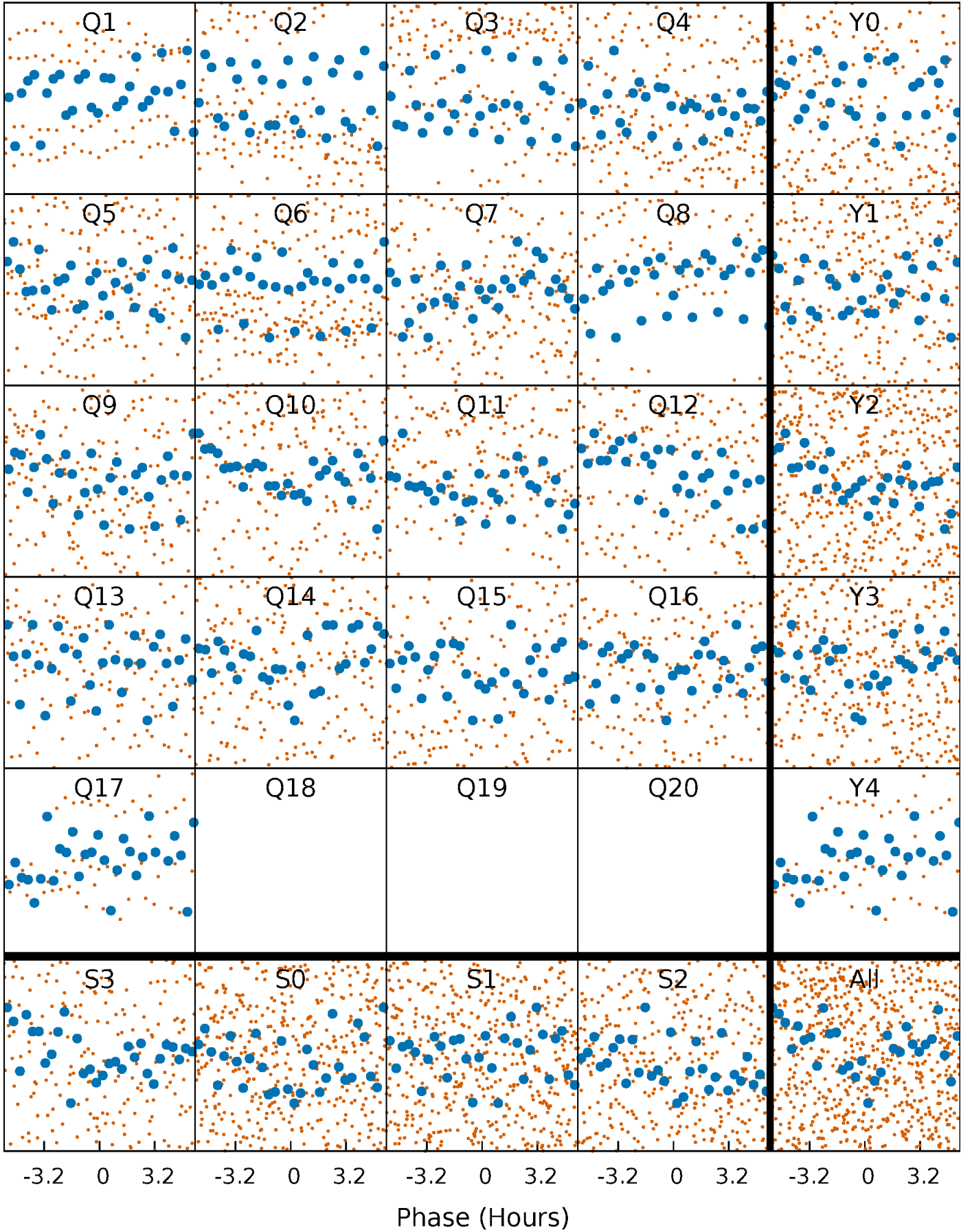


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



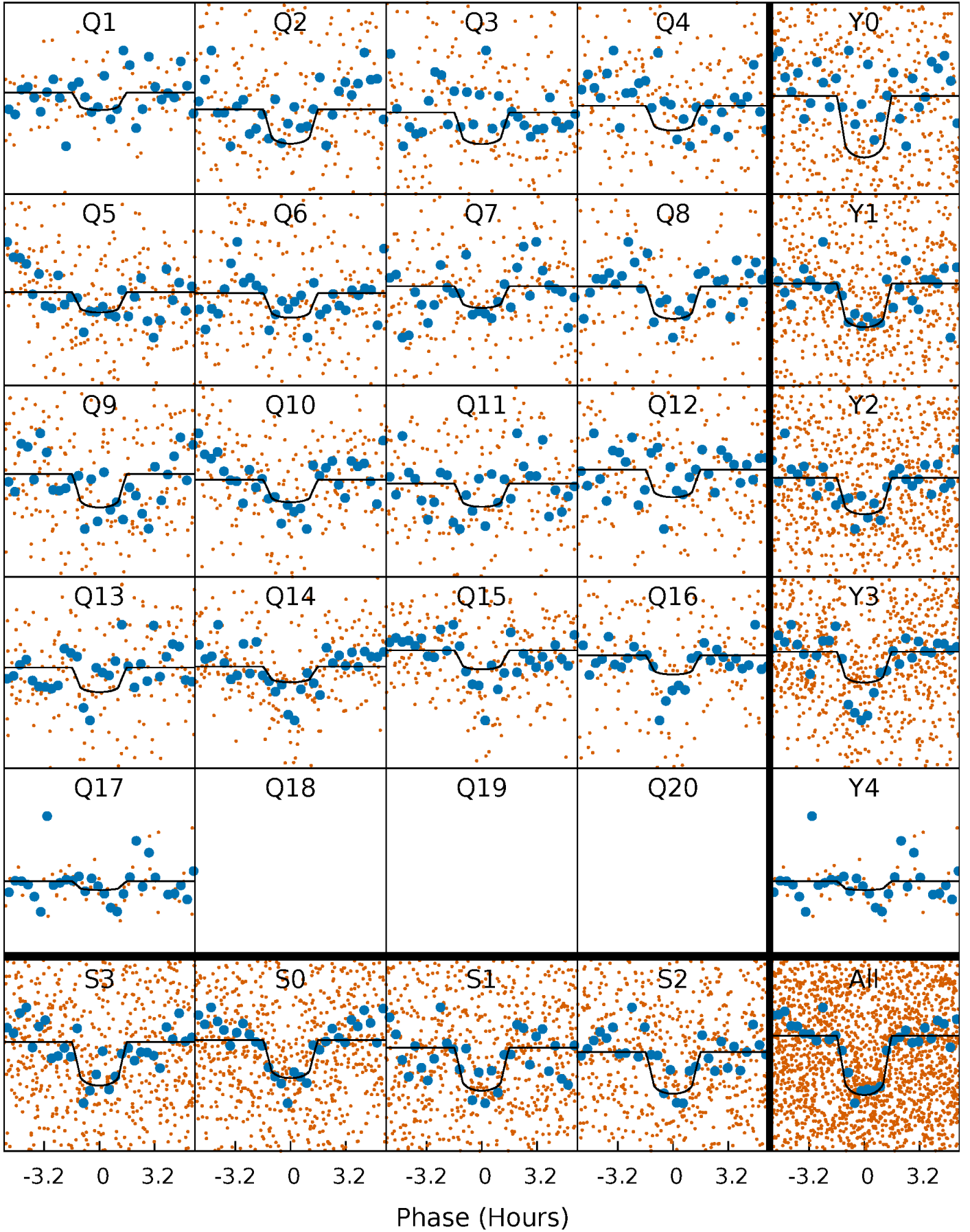
PDC Quarter-Phased Transit Curves

TCE 009821151-02 P= 8.429451 Days $T_0=136.509251$ (BKJD)



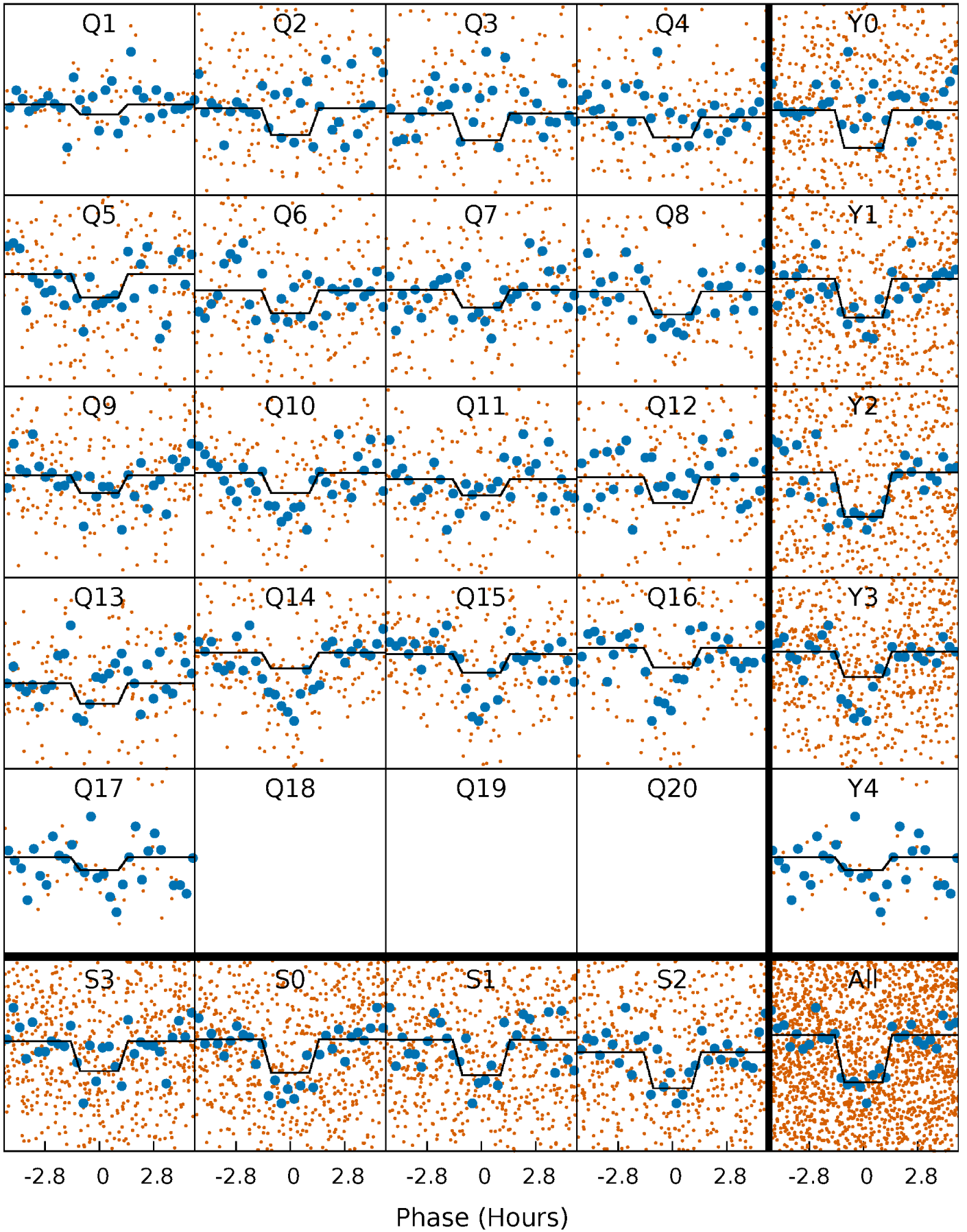
DV Quarter-Phased Transit Curves

TCE 009821151-02 P= 8.429451 Days $T_0=136.509251$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

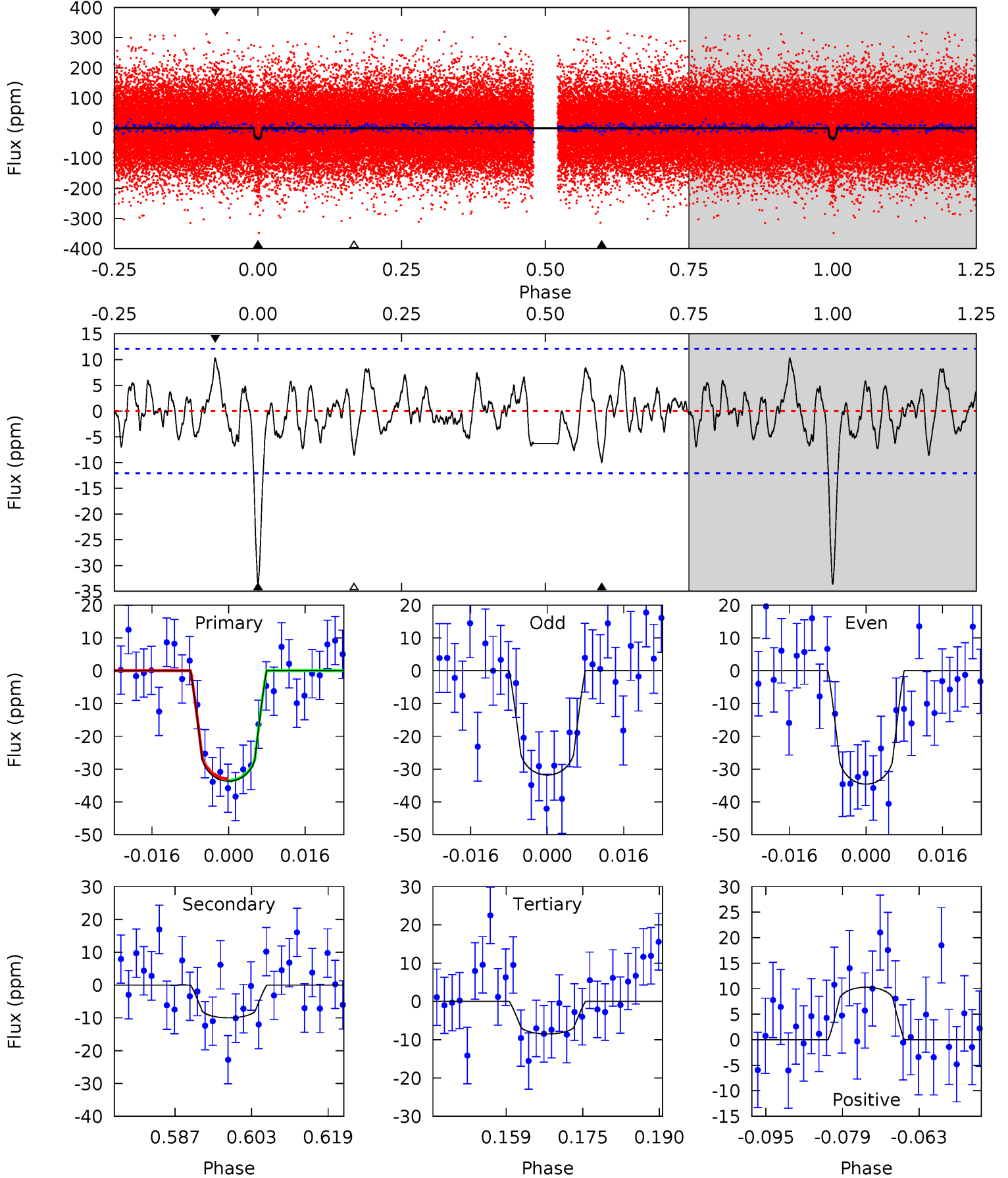
TCE 009821151-02 P= 8.429538 Days $T_0=136.501769$ (BKJD)



DV Model-Shift Uniqueness Test

009821151-02, P = 8.429451 Days, E = 128.079800 Days

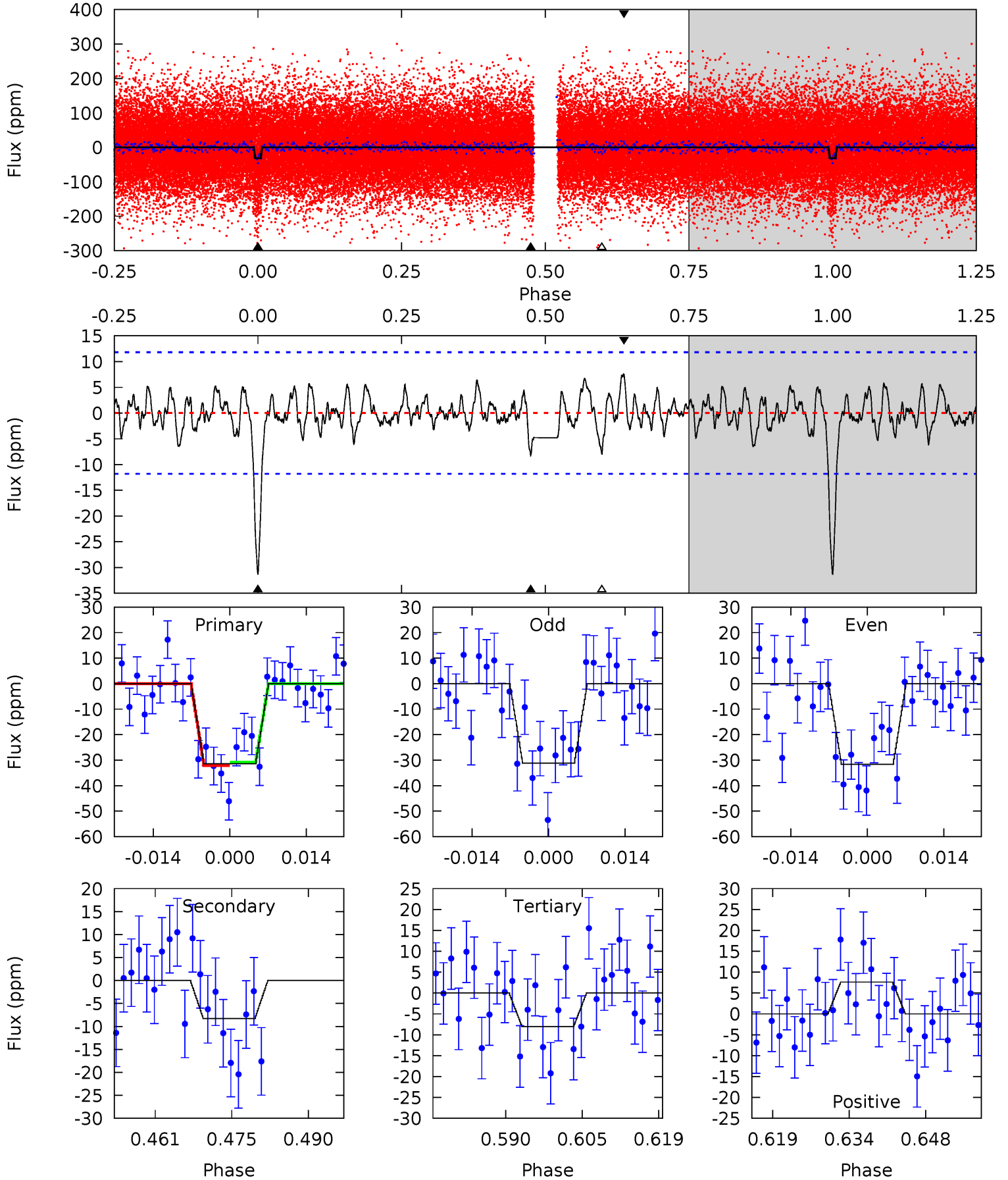
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 13.8 | 4.08 | 3.47 | 4.21 | 4.94 | 2.41 | 1.45 | 10.3 | 9.57 | 0.61 | -0.13 | 0.57 | 0.99 | 0.23 | 0.11 |



Alt Model-Shift Uniqueness Test

009821151-02, P = 8.429538 Days, E = 128.072231 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 13.2 | 3.48 | 3.36 | 3.20 | 4.96 | 2.45 | 1.08 | 9.81 | 9.98 | 0.11 | 0.28 | 0.10 | 0.91 | 0.20 | 0.29 |



Stellar Parameters For KIC 009821151

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 6353^{+144}_{-176} | $4.375^{+0.077}_{-0.143}$ | $-0.140^{+0.250}_{-0.300}$ | $1.132^{+0.261}_{-0.140}$ | $1.104^{+0.140}_{-0.127}$ | $1.073^{+0.368}_{-0.455}$ |
| | +2%/-3% | +2%/-3% | +179%/-214% | +23%/-12% | +13%/-12% | +34%/-42% |
| 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 009821151-02 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|-------------|------------------------|----------------------|-----------------------|-------------------|
| DV | -10 ± 2 | $0.79^{+0.31}_{-0.29}$ | 1450^{+86}_{-65} | 4634^{+1079}_{-602} | 59^{+98}_{-29} |
| Alt. | -8 ± 2 | $0.70^{+0.33}_{-0.29}$ | 1448^{+82}_{-67} | 4652^{+1283}_{-667} | 63^{+120}_{-37} |

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

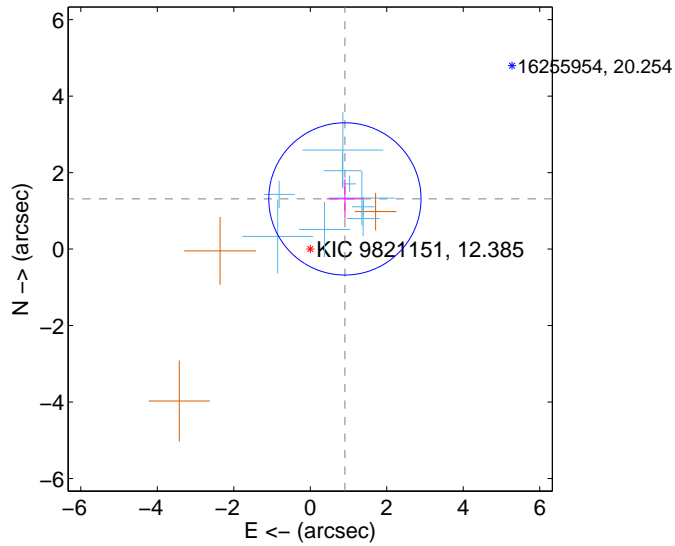
Supplemental centroid analysis for 009821151-02. Kepler magnitude: 12.38. Transit SNR 9.22

There are 9 quarters with good PRF difference image offsets

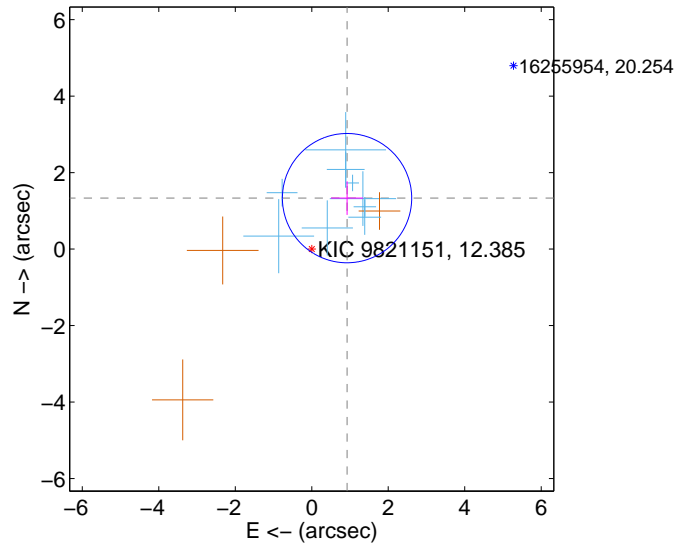
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT | 1.595 ± 0.664 | 2.40 | -0.906 ± 0.475 | 1.312 ± 0.516 |
| PRF-fit source offset from KIC position | 1.621 ± 0.563 | 2.88 | -0.923 ± 0.421 | 1.333 ± 0.439 |
| photometric centroid source offset | 2.26 ± 1.01 | 2.24 | -0.14 ± 1.09 | 2.25 ± 1.01 |

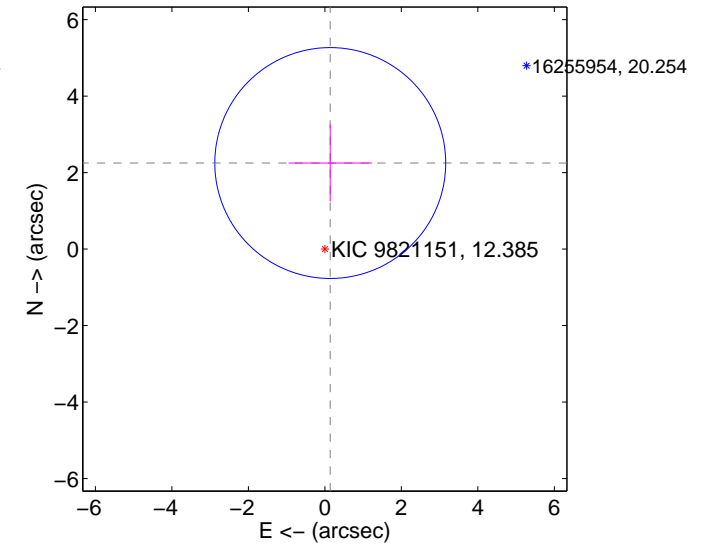
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

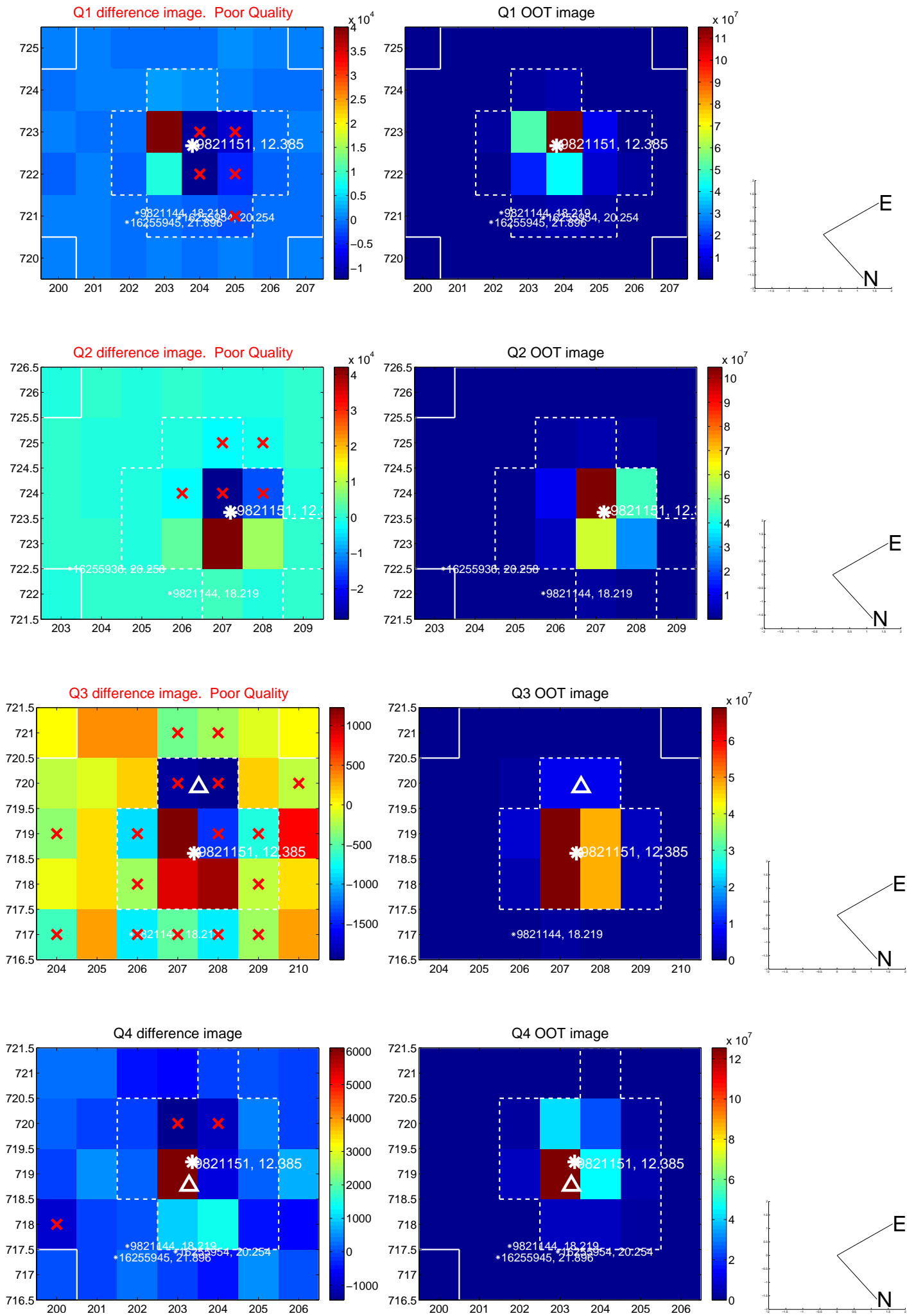


offset from photometric centroids

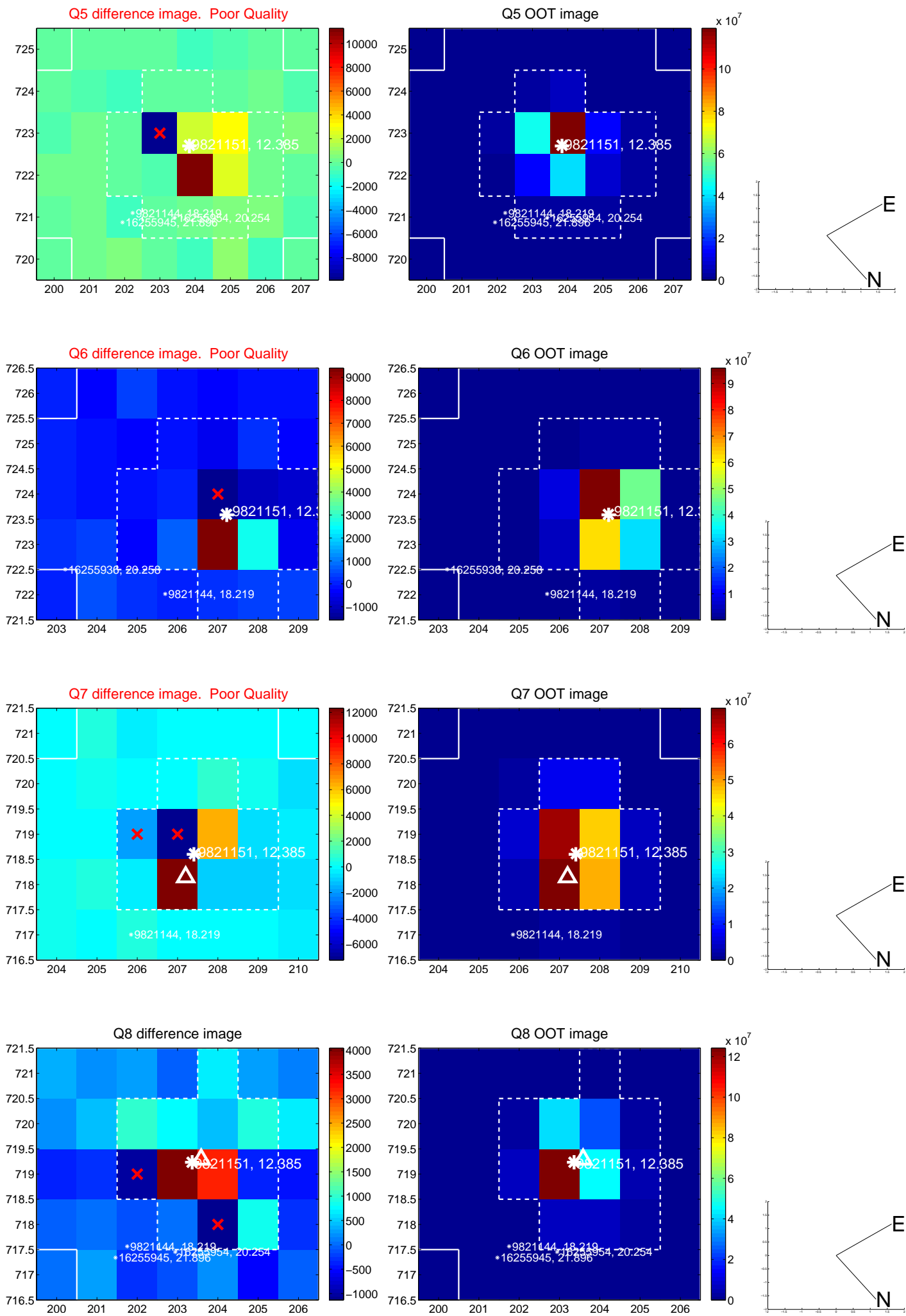


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

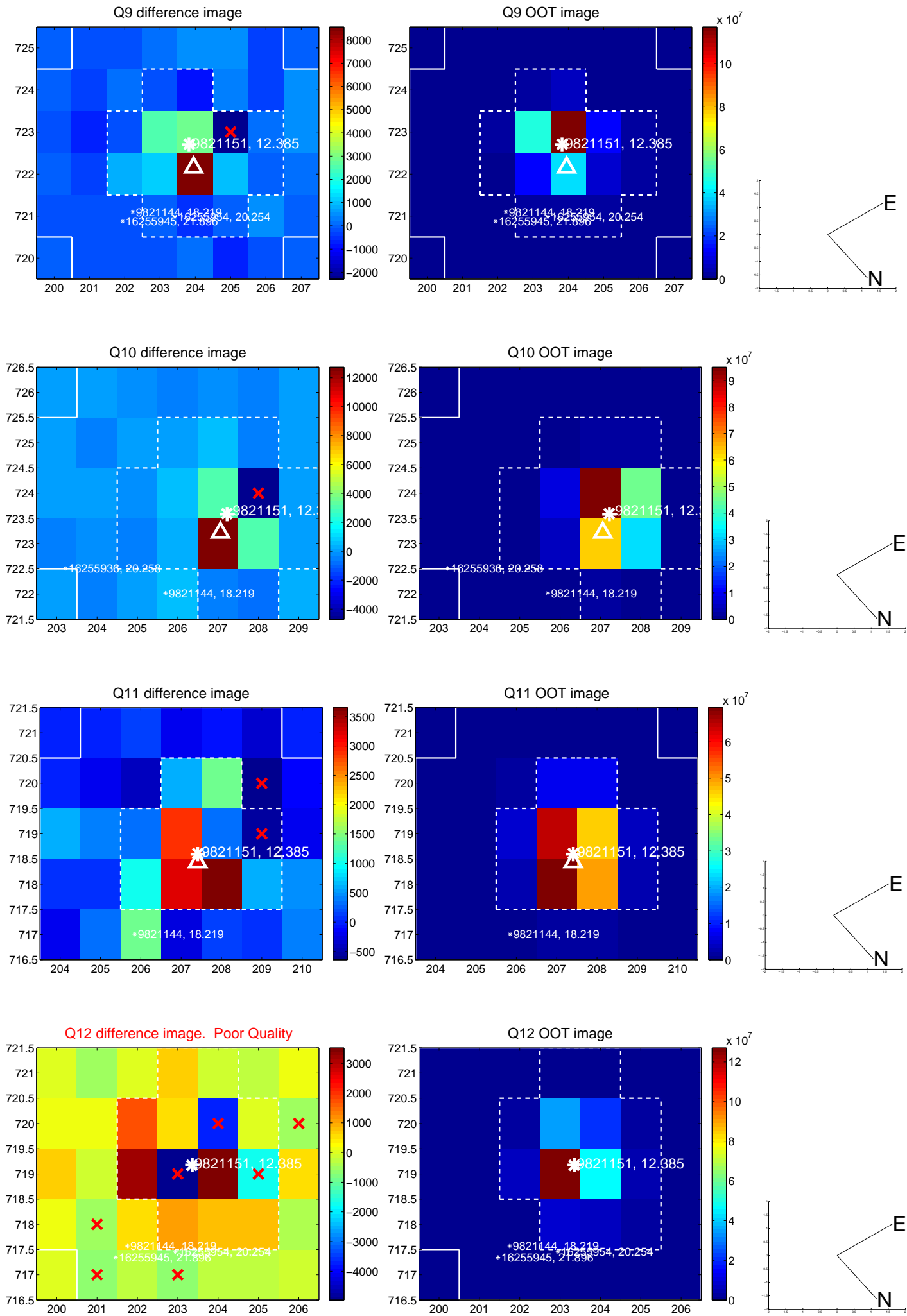
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



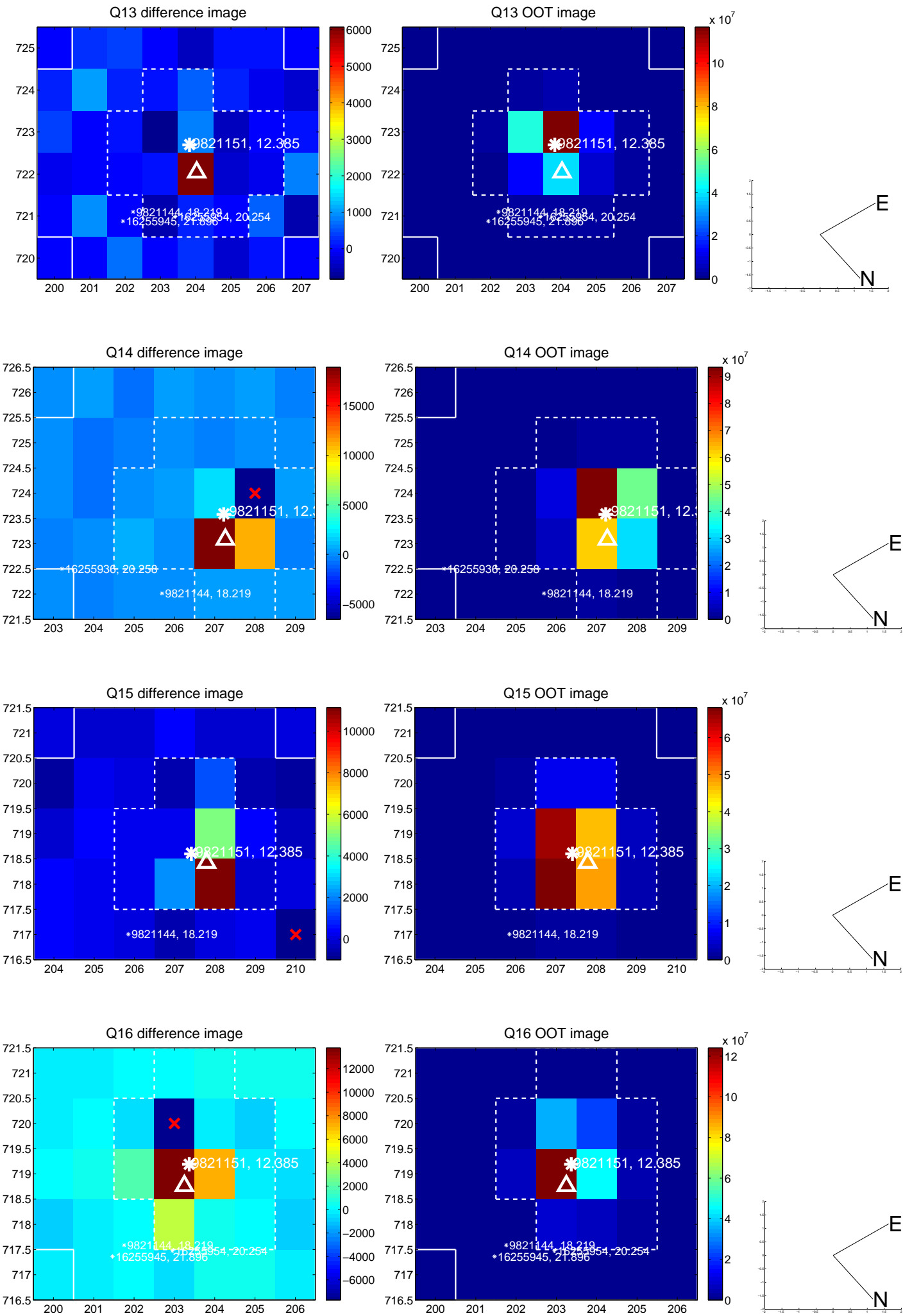
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



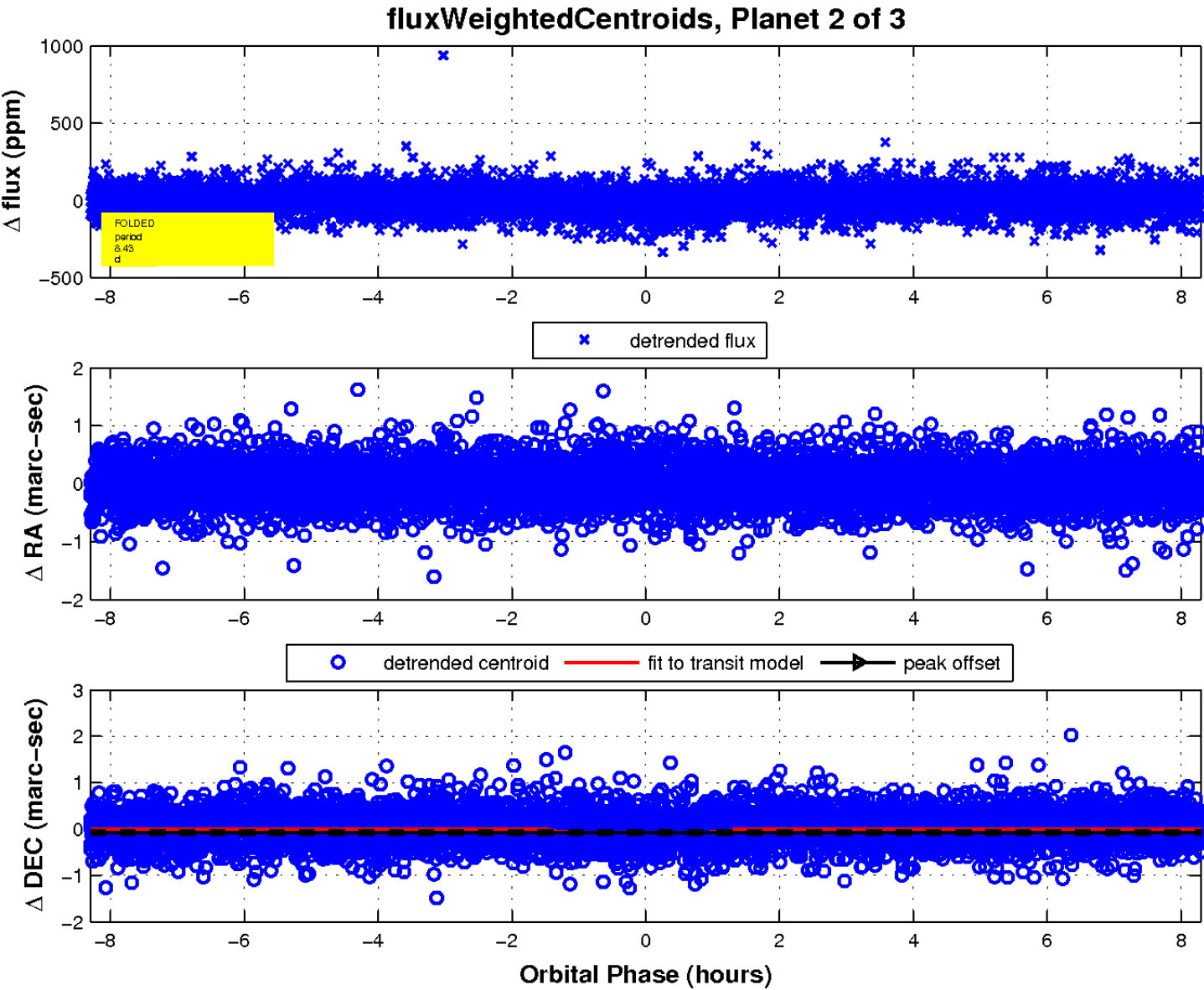
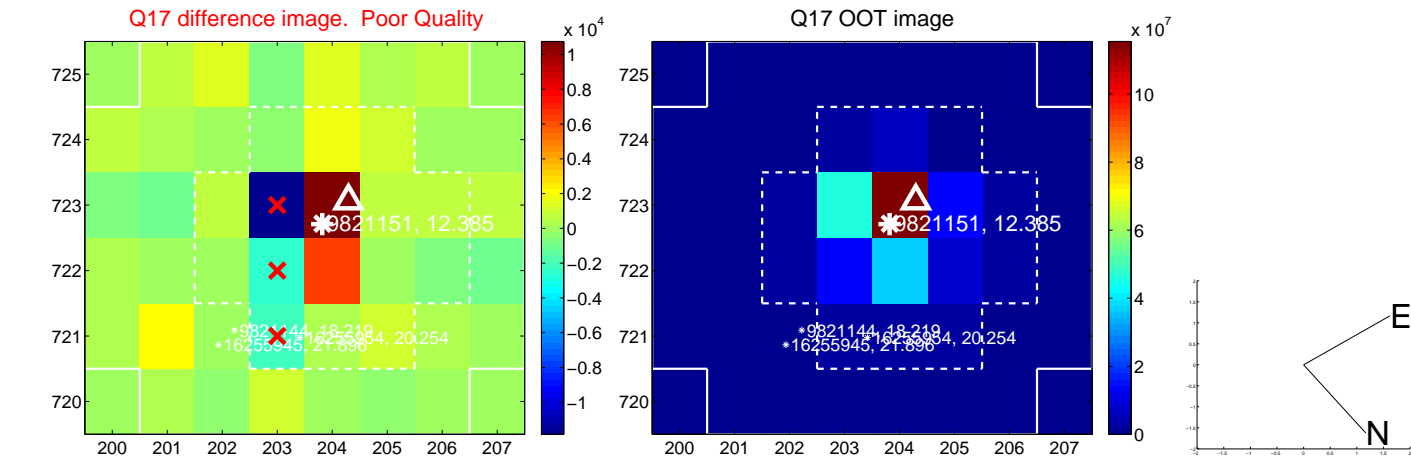
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

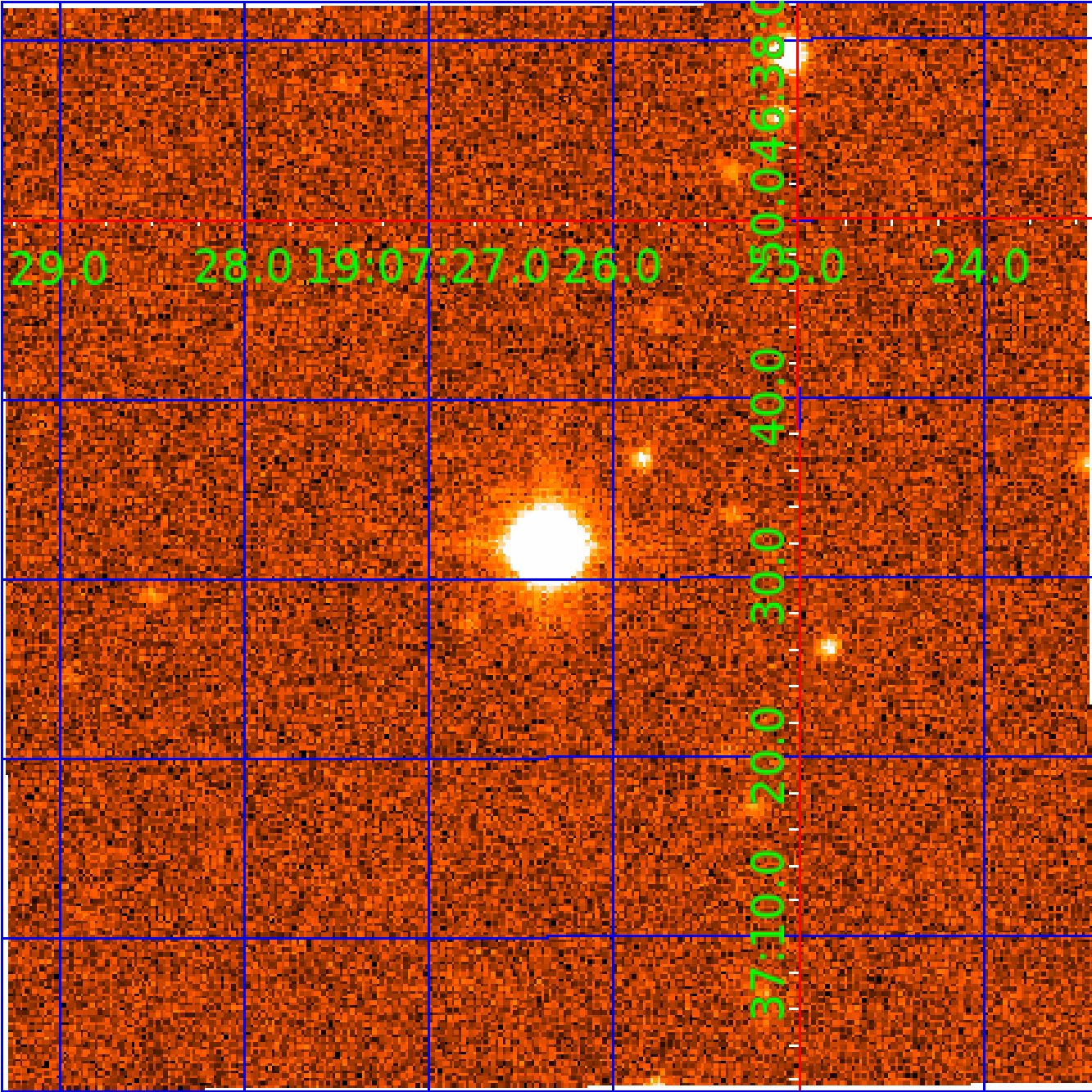


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009821151

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 009821151-01 | OBS | 3243.01 | 8.429340 | 132.308306 | 79.3 | 2.763 | 21.4 | 19.4 | 1.13 | 6353 | 1.17 | 265.65 |
| 009821151-02 | OBS | No | 8.429451 | 136.509251 | 36.4 | 2.767 | 9.2 | 9.2 | 1.13 | 6353 | 0.78 | 265.65 |
| 009821151-03 | OBS | No | 572.644656 | 246.931115 | 168.3 | 4.207 | 8.4 | 6.3 | 1.13 | 6353 | 1.65 | 0.96 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|---|
| 009821151-01 | OBS | FP | 0.00 | 0 | 1 | 0 | 1 | MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—EPHEM_MATCH |
| 009821151-02 | OBS | FP | 0.00 | 1 | 1 | 1 | 1 | IS_SEC_TCE—CENT_UNRESOLVED_OFFSET—EPHEM_MATCH |
| 009821151-03 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS |

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.

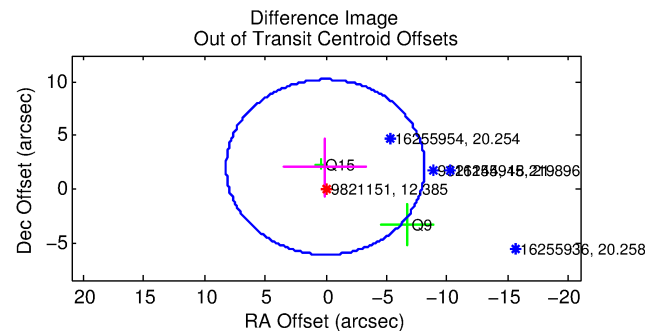
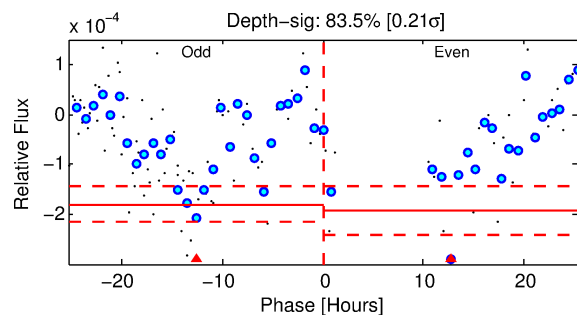
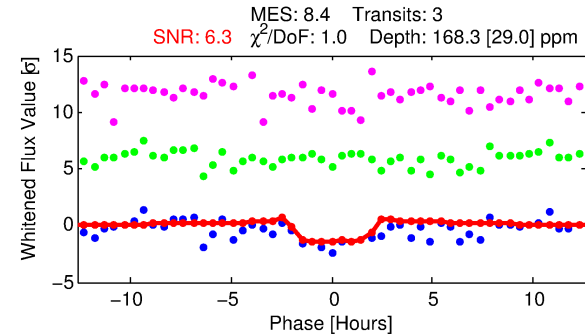
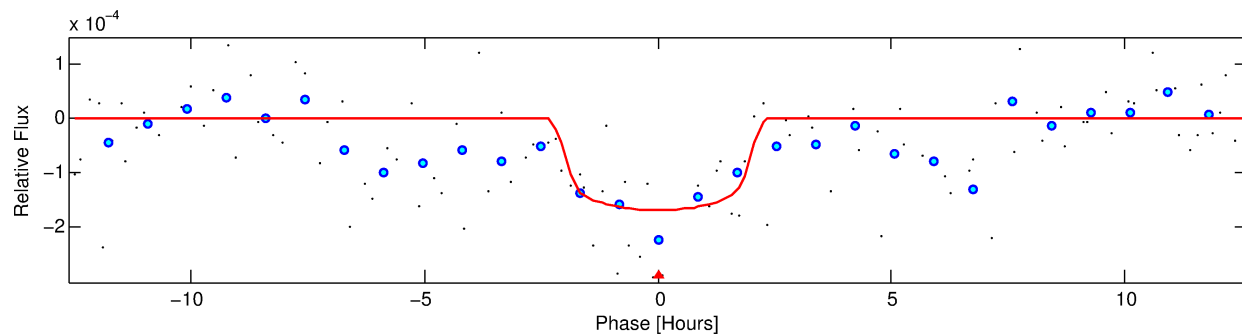
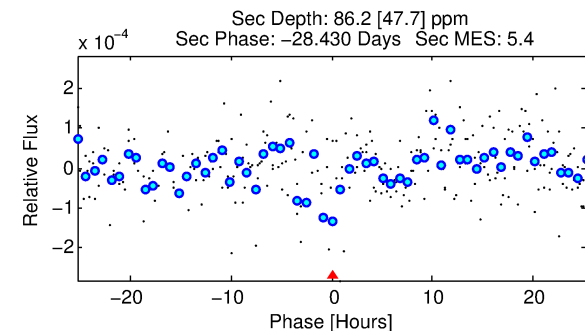
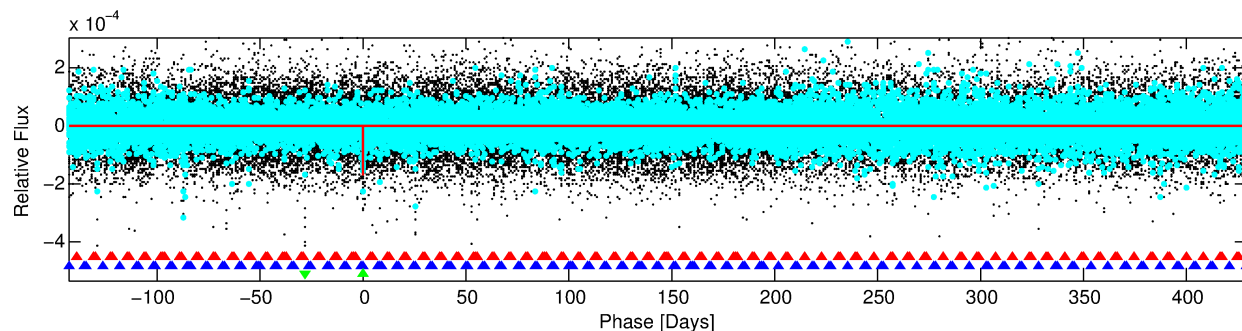
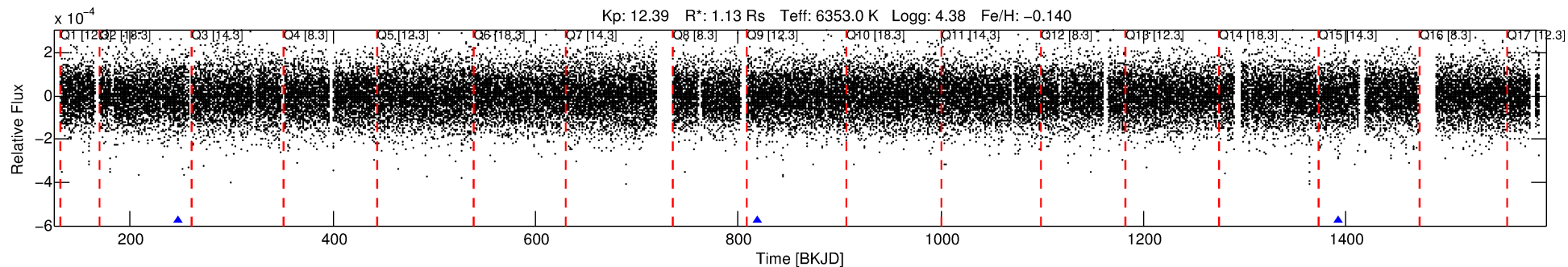
Ephemeris Match Information For 009821151-03

No Significant Match Found

DV One-Page Summary

KIC: 9821151 Candidate: 3 of 3 Period: 572.645 d
KOI: K03243 Corr: No Ephemeris Match

Kp: 12.39 R*: 1.13 Rs Teff: 6353.0 K Logg: 4.38 Fe/H: -0.140



DV Fit Results:

Period = 572.64466 [0.00687] d
Epoch = 246.9311 [0.0097] BKJD
Rp/R* = 0.0133 [0.0106]
a/R* = 600.53 [2583.31]
b = 0.83 [1.59]
Seff = 0.96 [0.28]
Teq = 252 [18] K
Rp = 1.65 [1.37] Re
a = 1.3970 [0.2638] AU
Ag = 34092.13 [58166.37] [0.59σ]
Teff = 5300 [2238] K [2.26σ]

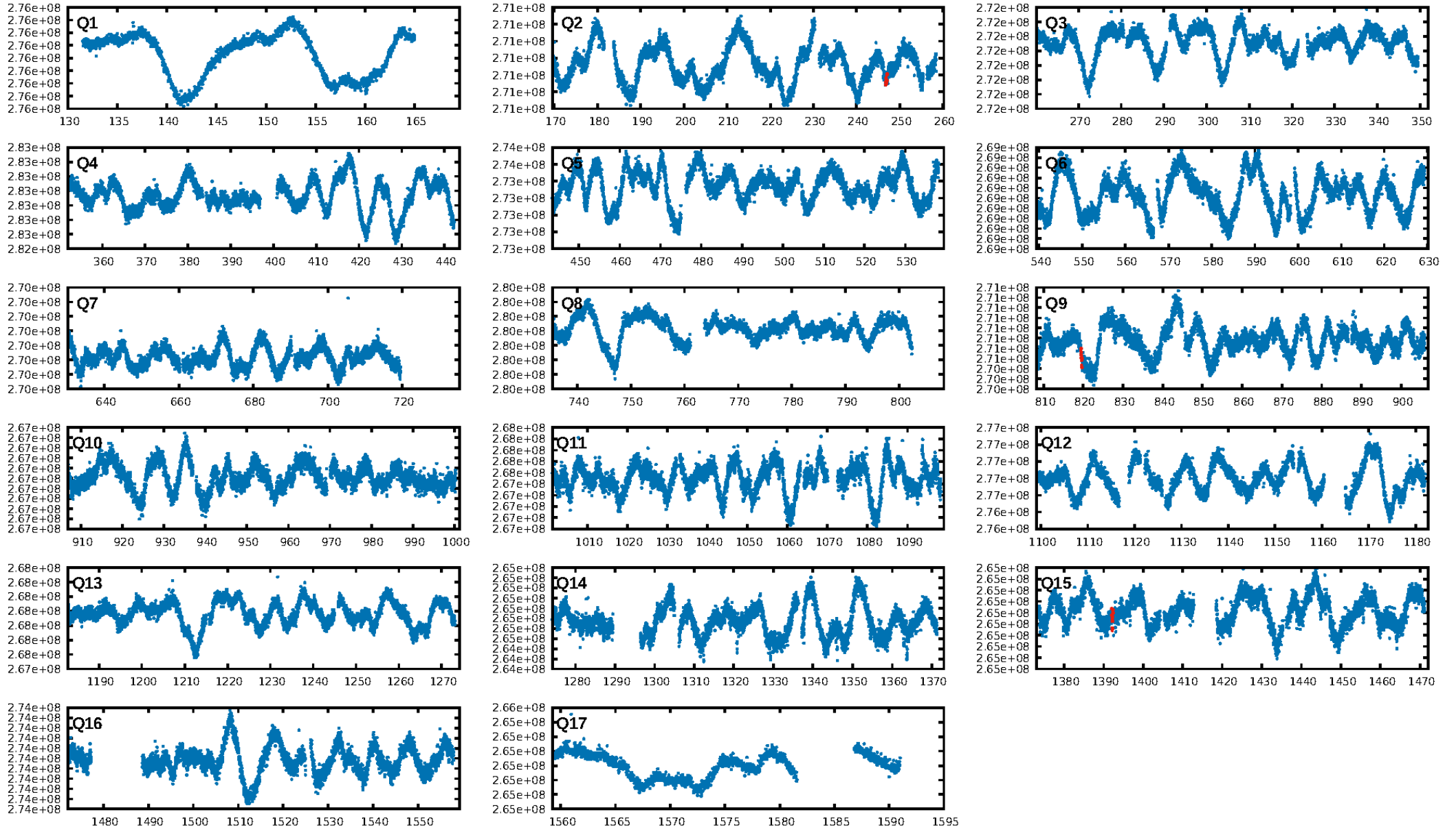
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [2689.38σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 3.2%
ModelChiSquareGof-sig: 97.5%
Bootstrap-pfa: 1.59e-10
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 11.99
Centroid-sig: N/A
Centroid-so: 1.138 arcsec [0.68σ]
OotOffset-rm: 2.051 arcsec [0.75σ]
KicOffset-rm: 2.098 arcsec [1.49σ]
OotOffset-st: 0/1/0/1 [2]
KicOffset-st: 0/1/0/1 [2]
DiffImageQuality-fgm: 0.50 [1/2]
DiffImageOverlap-fno: 0.33 [1/3]

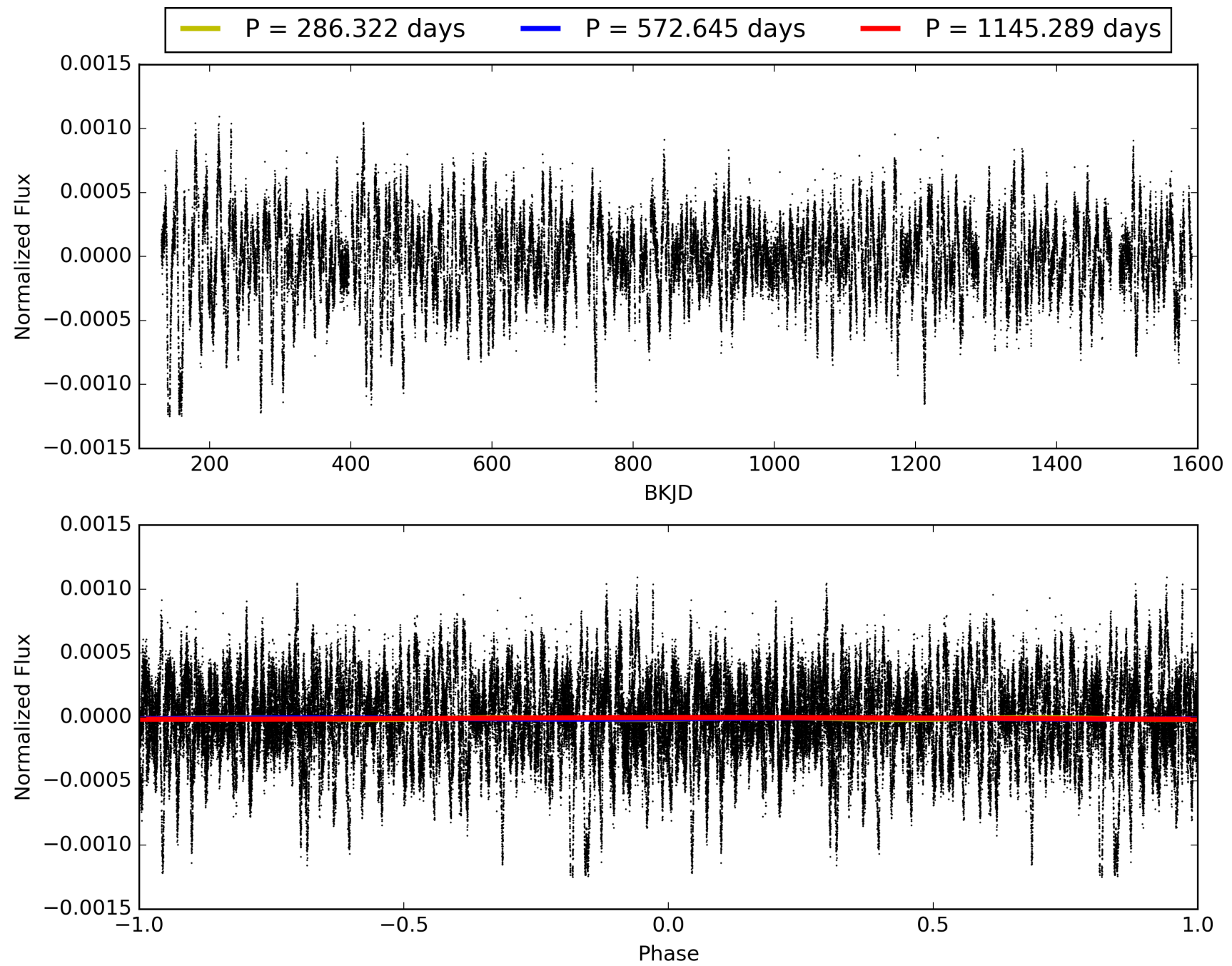
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 10:32:38 Z

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

TCE 009821151-03, PDC Light Curves

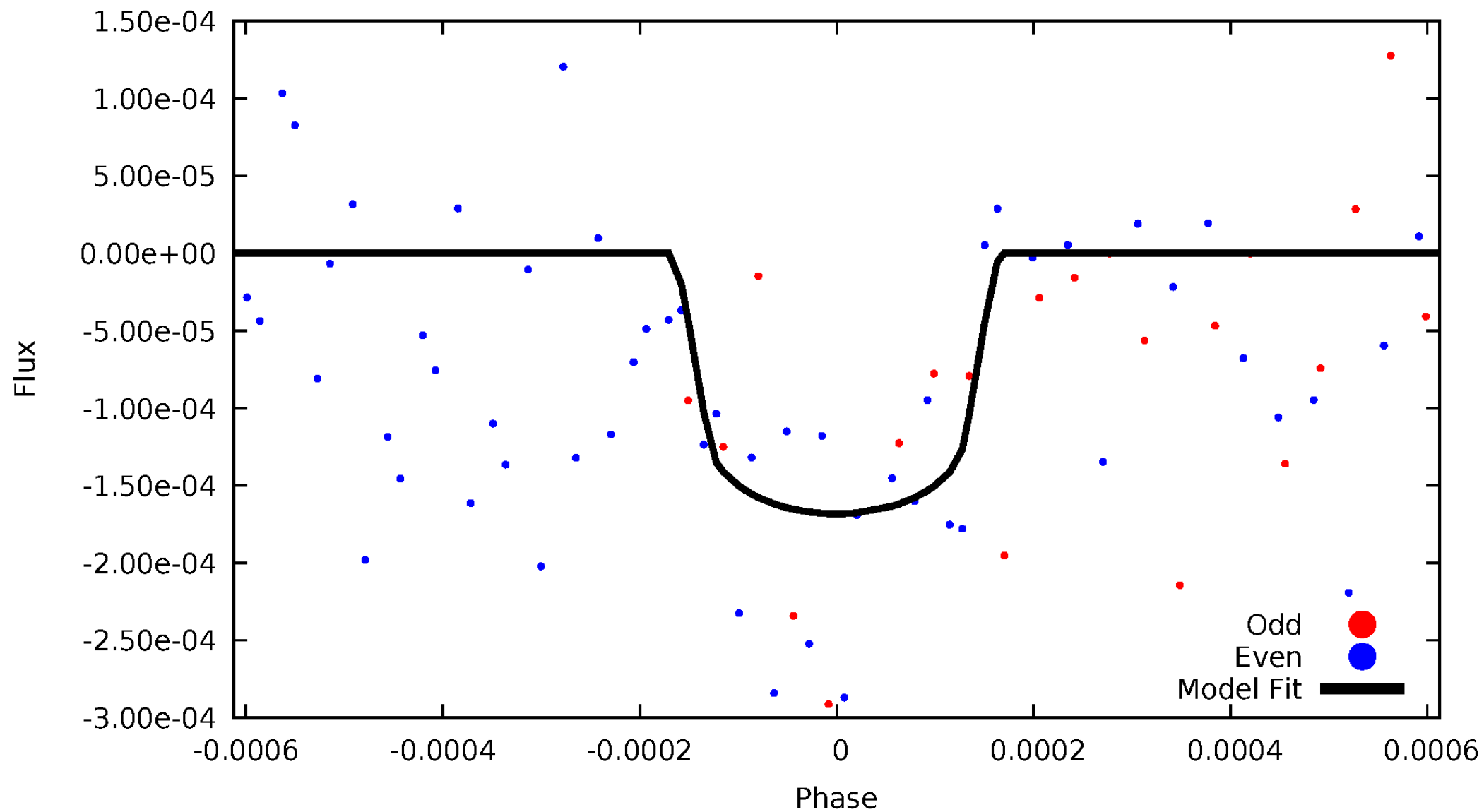


TCE 009821151-03



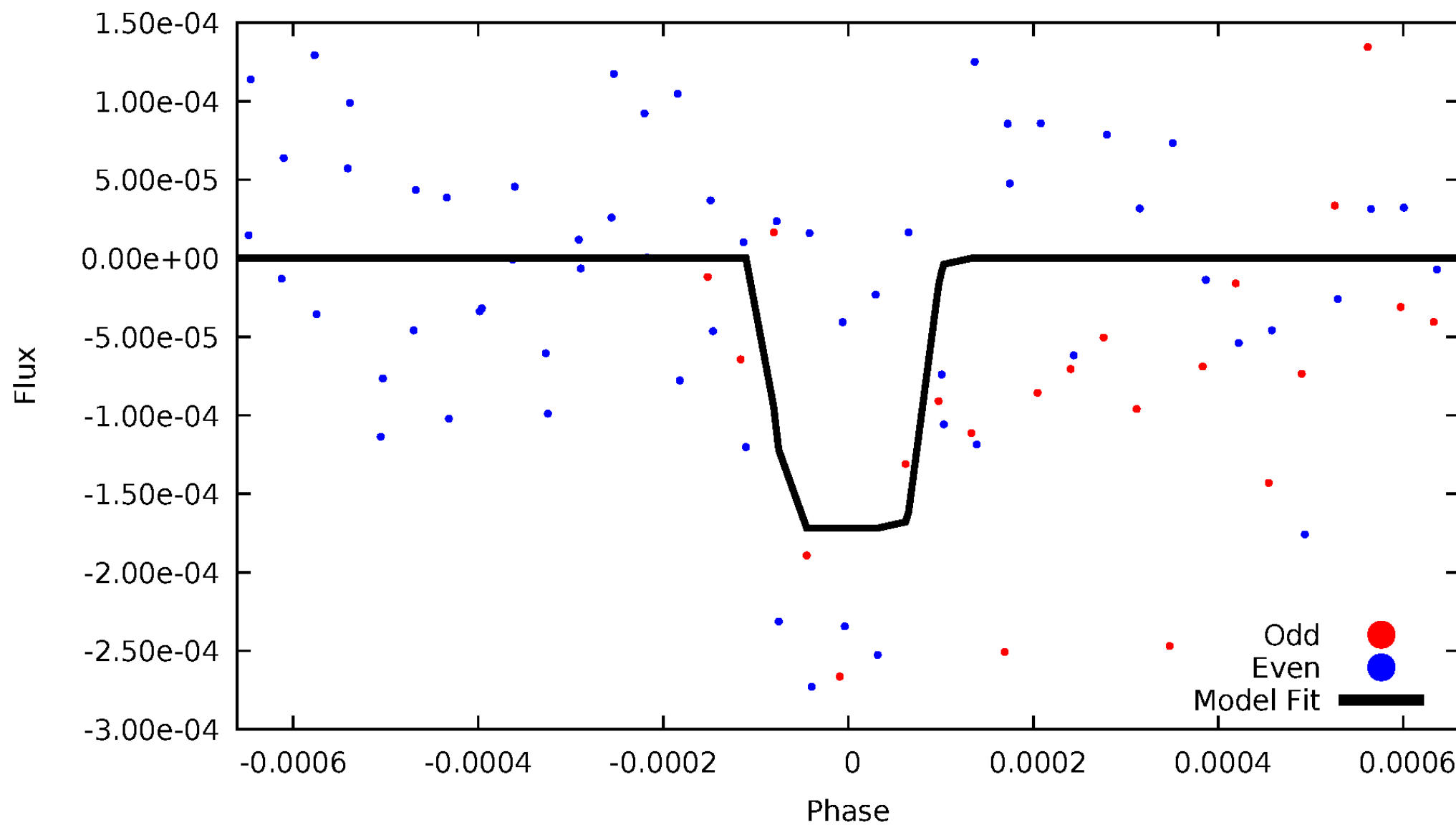
DV Odd/Even

TCE 009821151-03

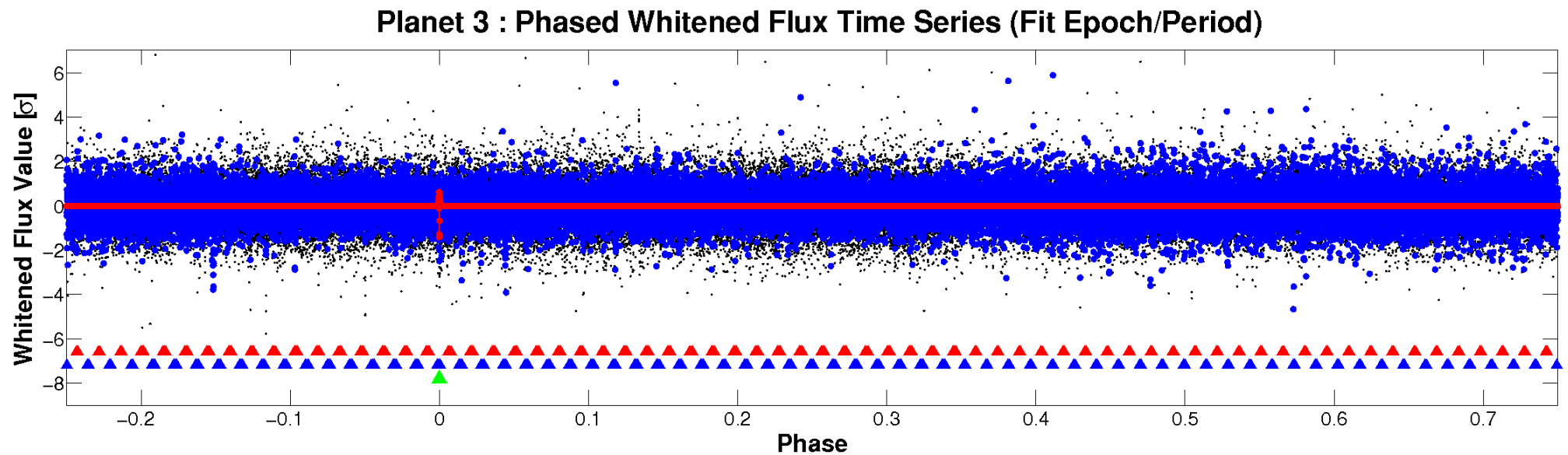
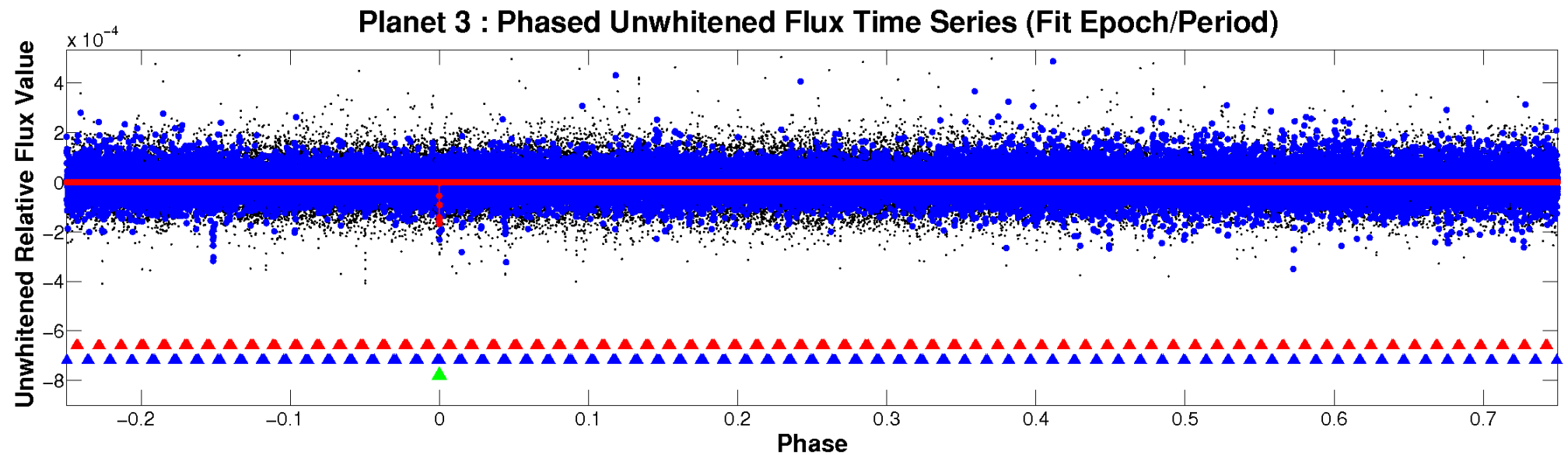


ALT Odd/Even

TCE 009821151-03

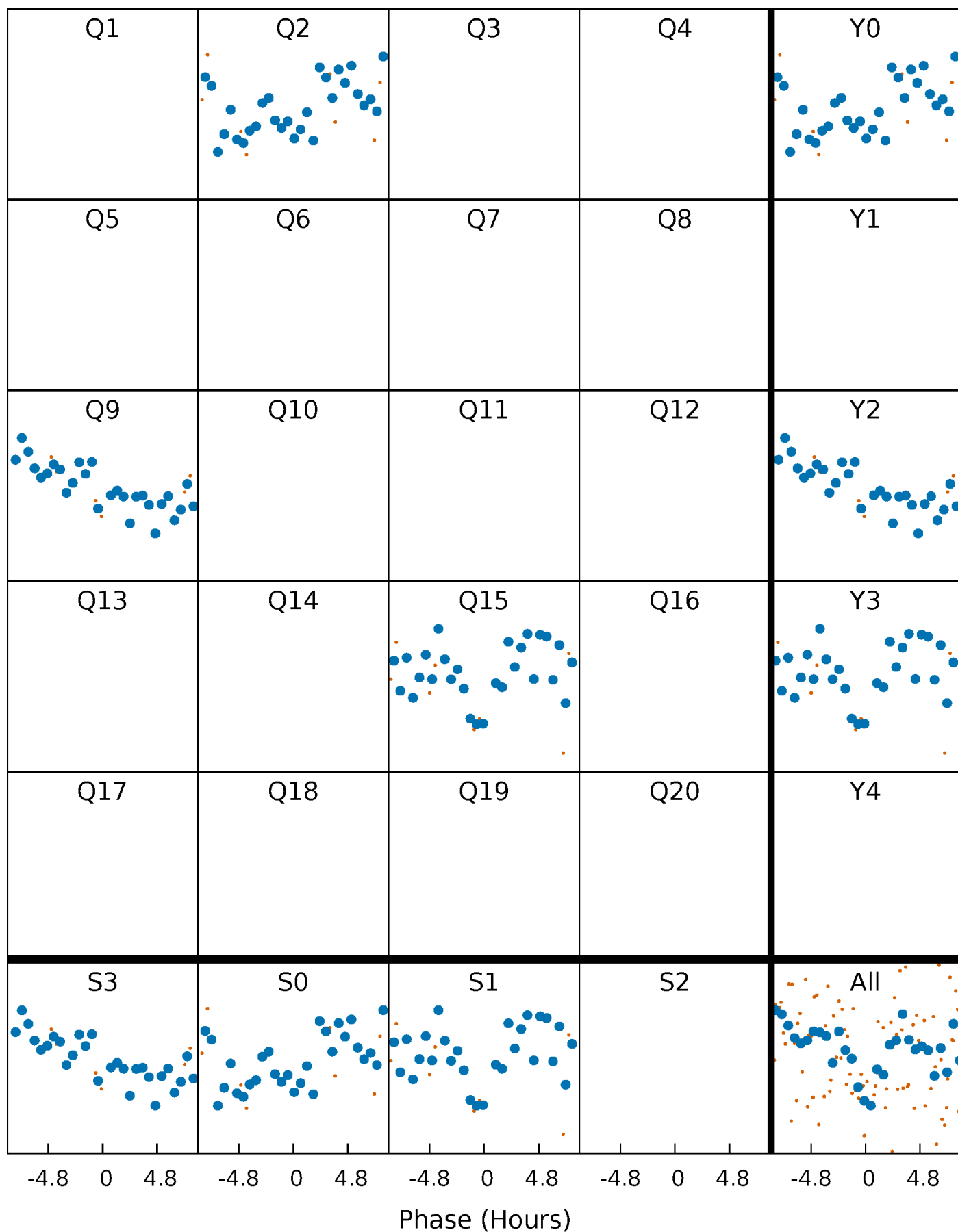


Non-Whitened Vs. Whitened Light Curve



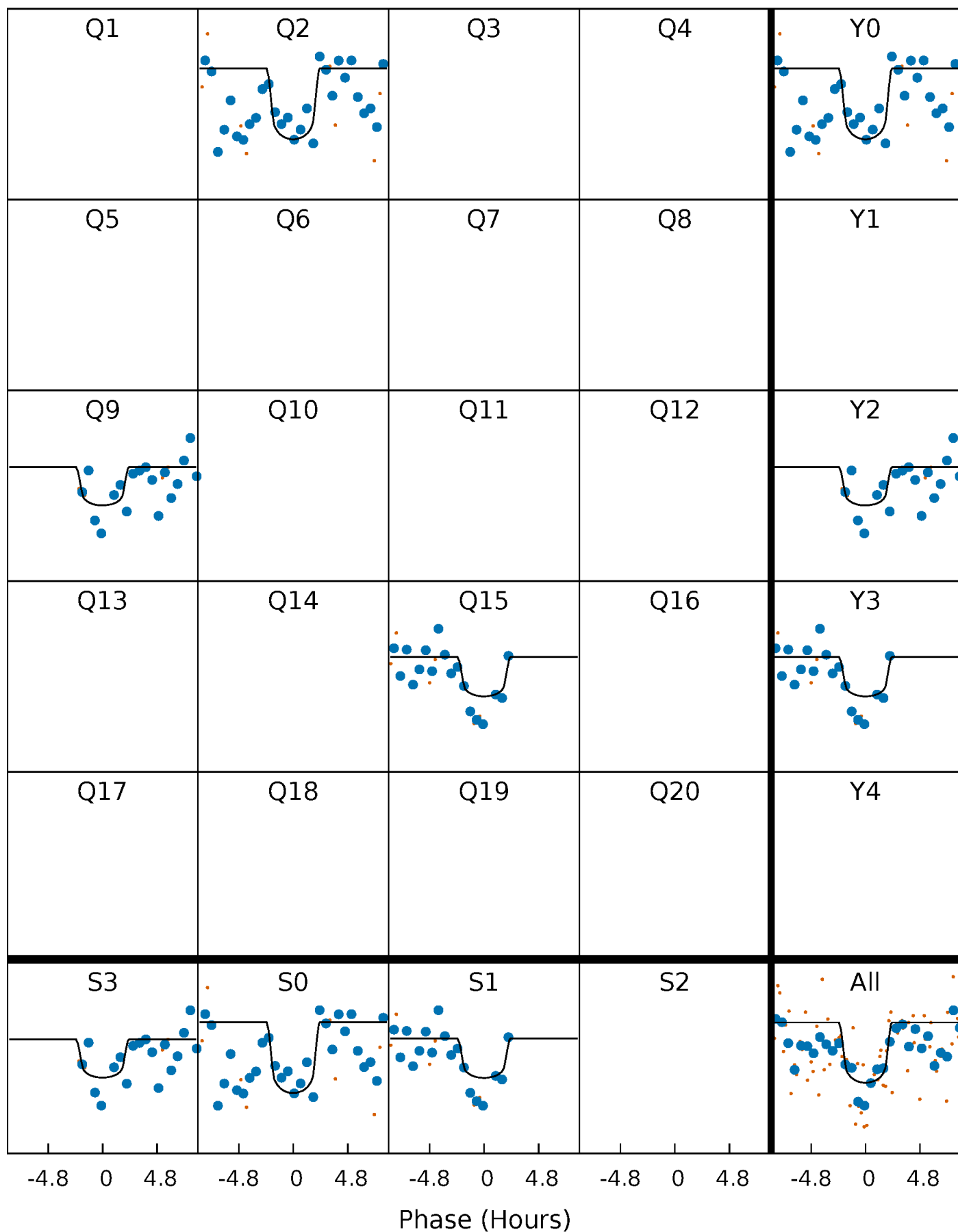
PDC Quarter-Phased Transit Curves

TCE 009821151-03 $P=572.644656$ Days $T_0=246.931115$ (BKJD)



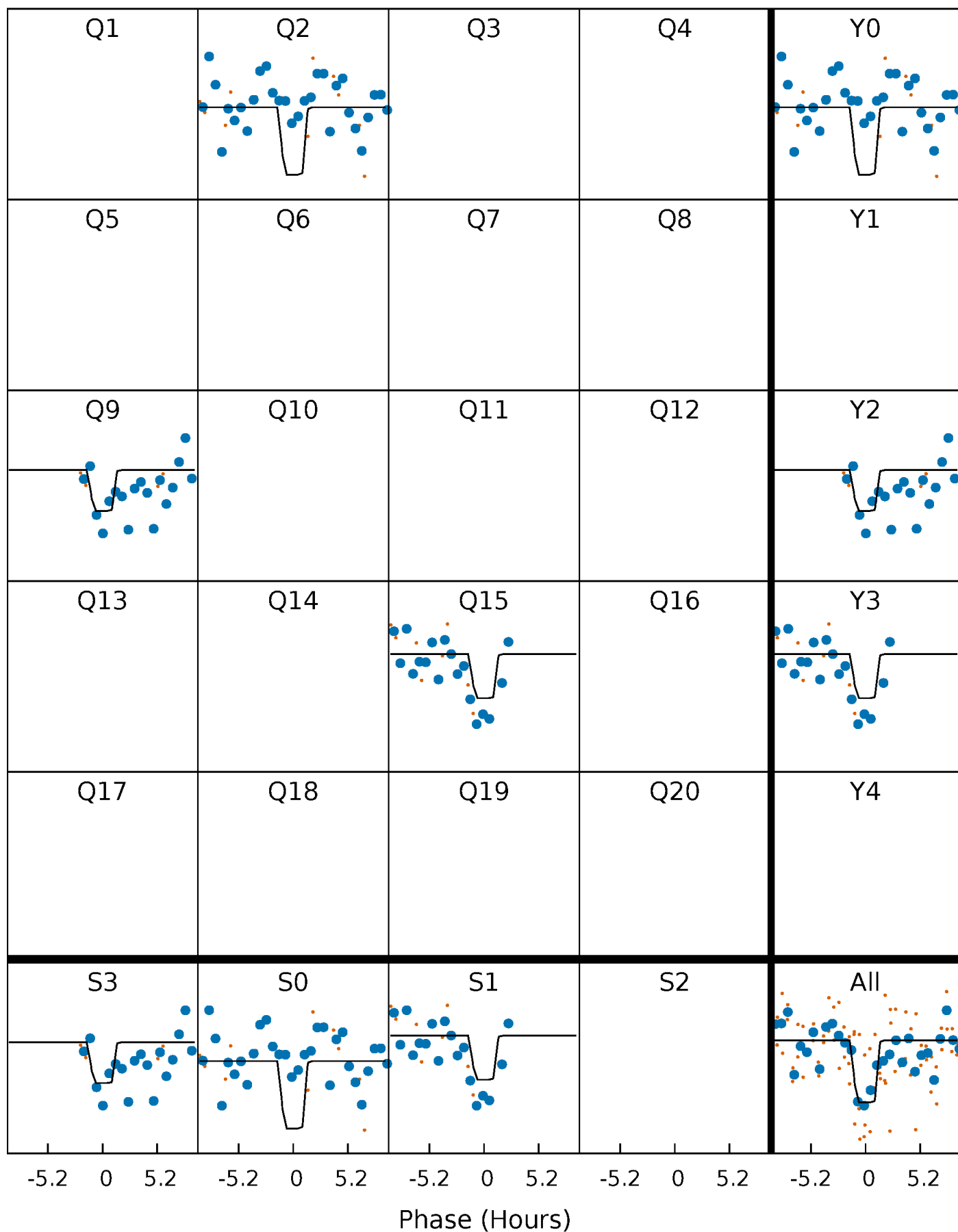
DV Quarter-Phased Transit Curves

TCE 009821151-03 P=572.644656 Days $T_0=246.931115$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

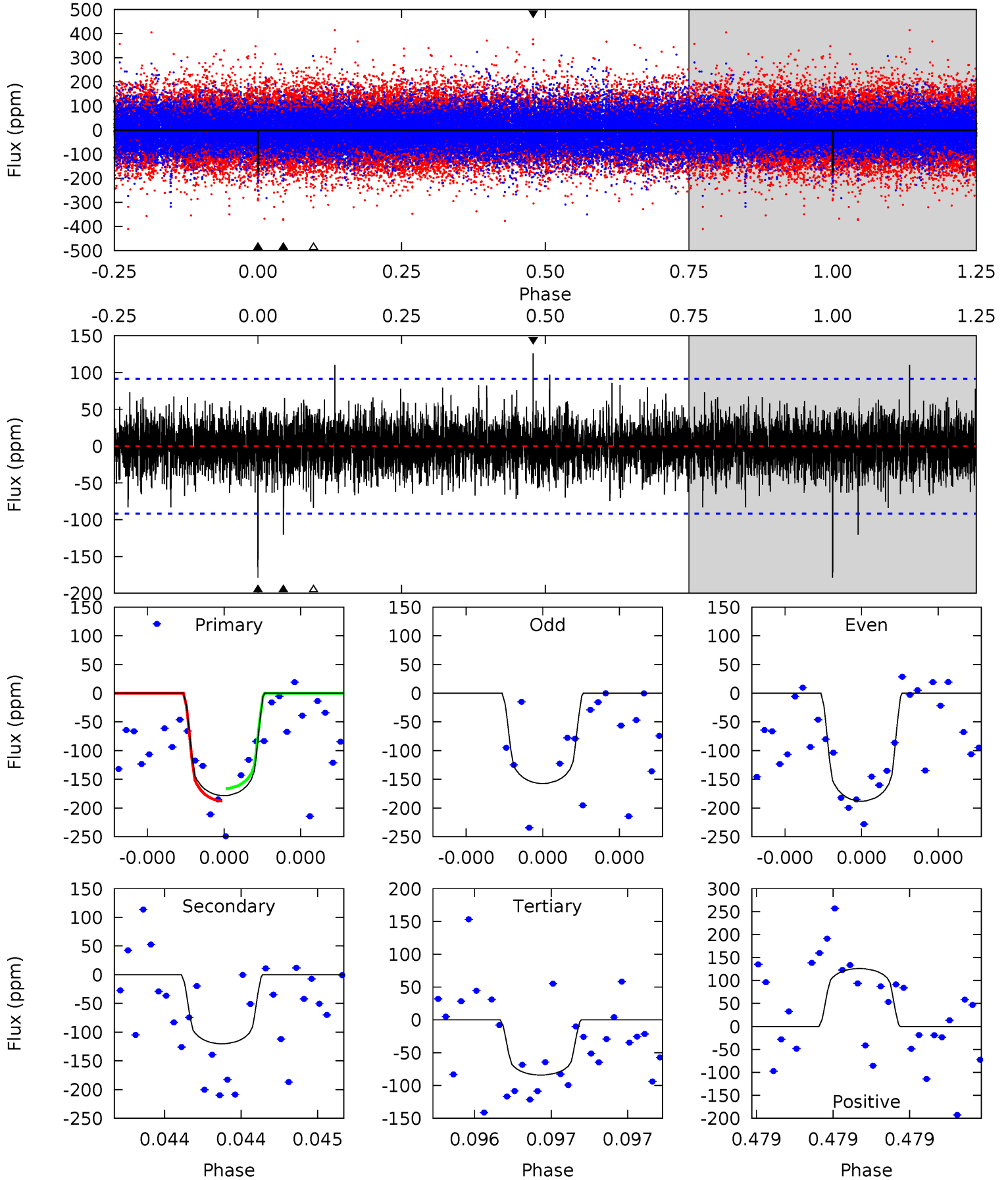
TCE 009821151-03 P=572.630085 Days $T_0=246.946419$ (BKJD)



DV Model-Shift Uniqueness Test

009821151-03, P = 572.644656 Days, E = 246.931115 Days

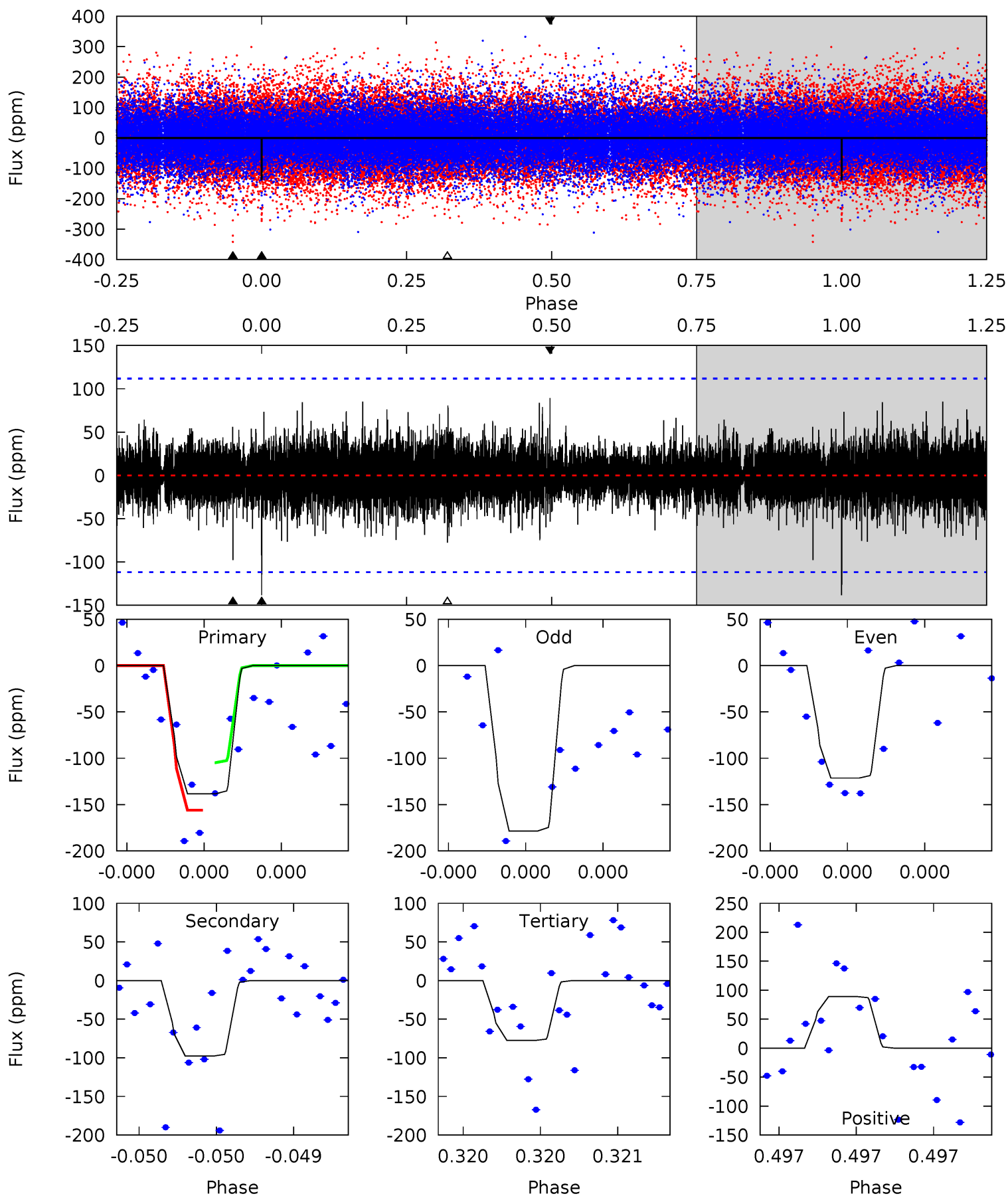
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 11.0 | 7.41 | 5.18 | 7.77 | 5.65 | 3.60 | 1.37 | 5.82 | 3.23 | 2.23 | -0.36 | 0.86 | 1.15 | 0.41 | 0.67 |



Alt Model-Shift Uniqueness Test

009821151-03, P = 572.630085 Days, E = 246.946419 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 7.08 | 5.00 | 3.97 | 4.56 | 5.72 | 3.71 | 0.92 | 3.11 | 2.52 | 1.03 | 0.44 | 1.32 | 0.84 | 0.39 | 1.32 |



Stellar Parameters For KIC 009821151

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 6353^{+144}_{-176} | $4.375^{+0.077}_{-0.143}$ | $-0.140^{+0.250}_{-0.300}$ | $1.132^{+0.261}_{-0.140}$ | $1.104^{+0.140}_{-0.127}$ | $1.073^{+0.368}_{-0.455}$ |
| | +2%/-3% | +2%/-3% | +179%/-214% | +23%/-12% | +13%/-12% | +34%/-42% |
| 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 009821151-03 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{max} (K)$ | $T_{obs} (K)$ | A_{obs} |
|---------|---------------|------------------------|-------------------|------------------------|----------------------------|
| DV | -120 ± 16 | $1.86^{+1.24}_{-1.07}$ | 356^{+20}_{-16} | 5458^{+3237}_{-1034} | $35821^{+161592}_{-22859}$ |
| Alt. | -98 ± 20 | $1.88^{+1.29}_{-1.10}$ | 356^{+19}_{-16} | 5261^{+3022}_{-1031} | $30345^{+142149}_{-20472}$ |

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 $A_{obs} \gg 1.0$

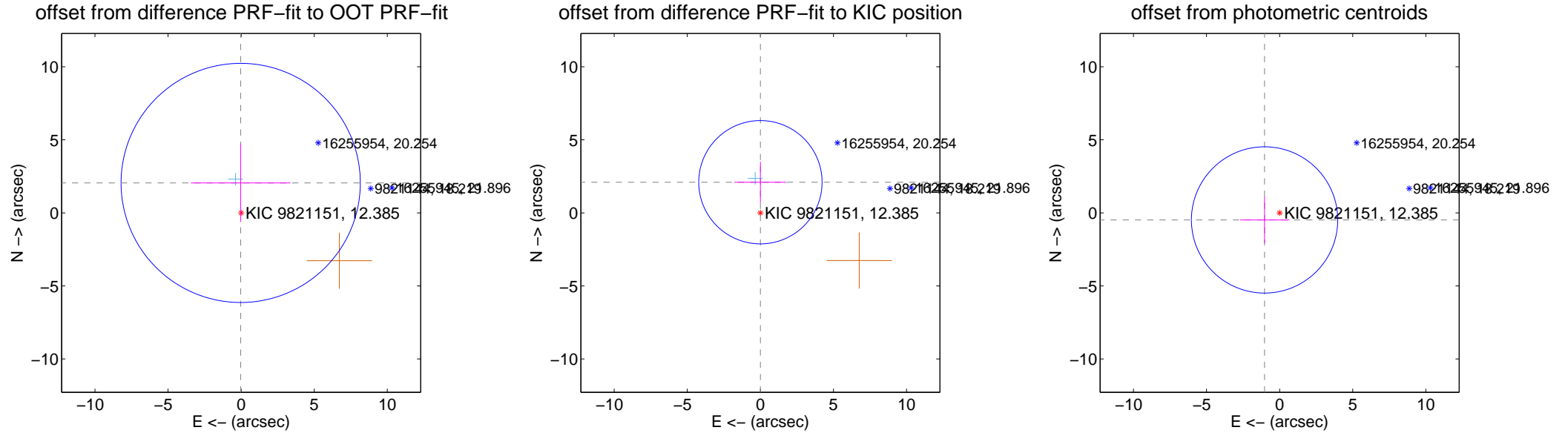
DV Centroid Data

Supplemental centroid analysis for 009821151-03. Kepler magnitude: 12.38. Transit SNR 6.28

There are 1 quarters with good PRF difference image offsets

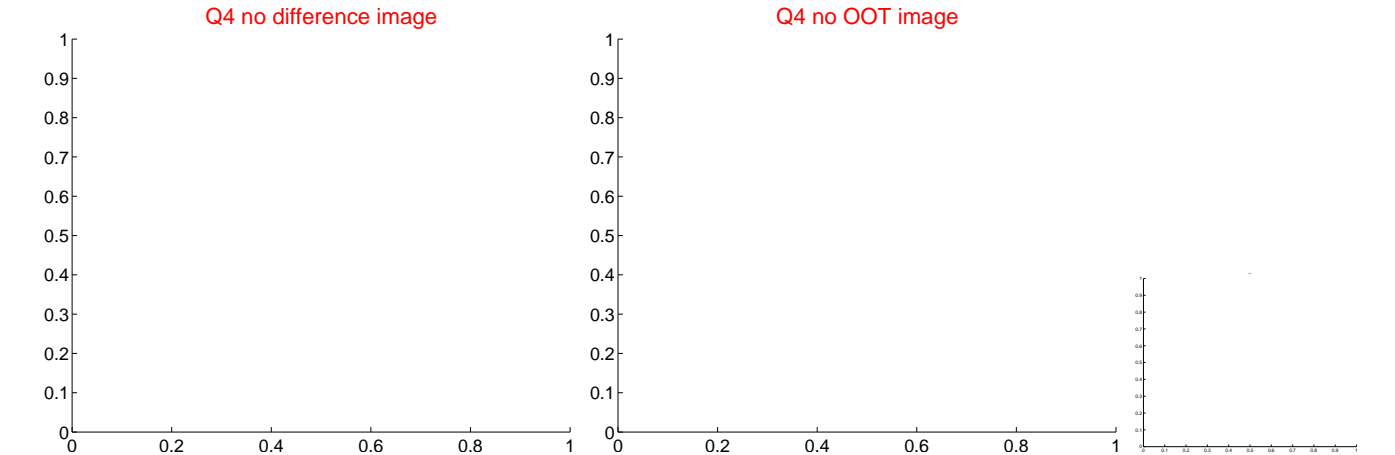
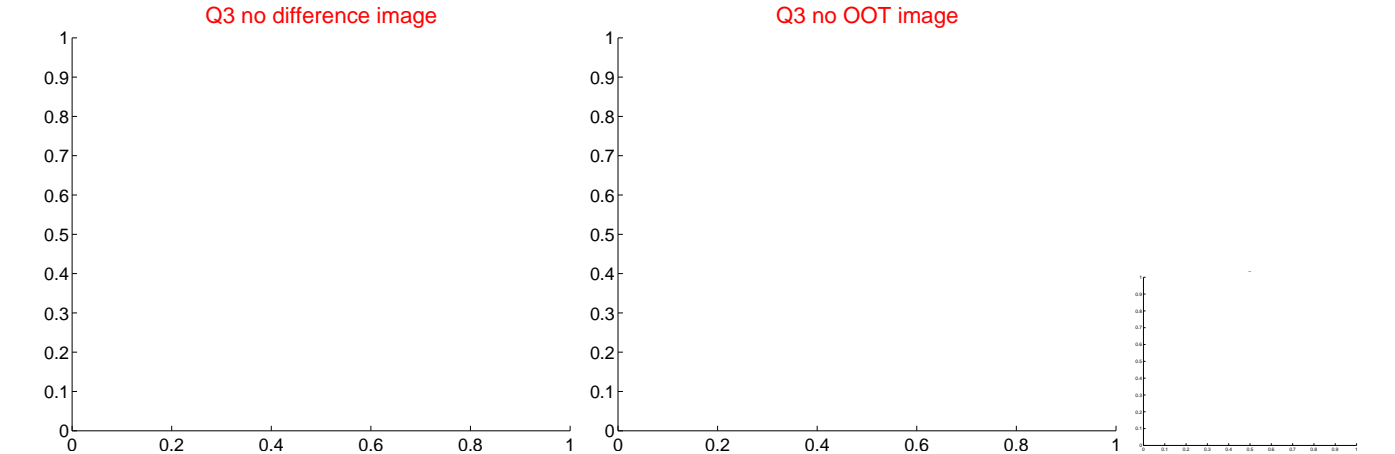
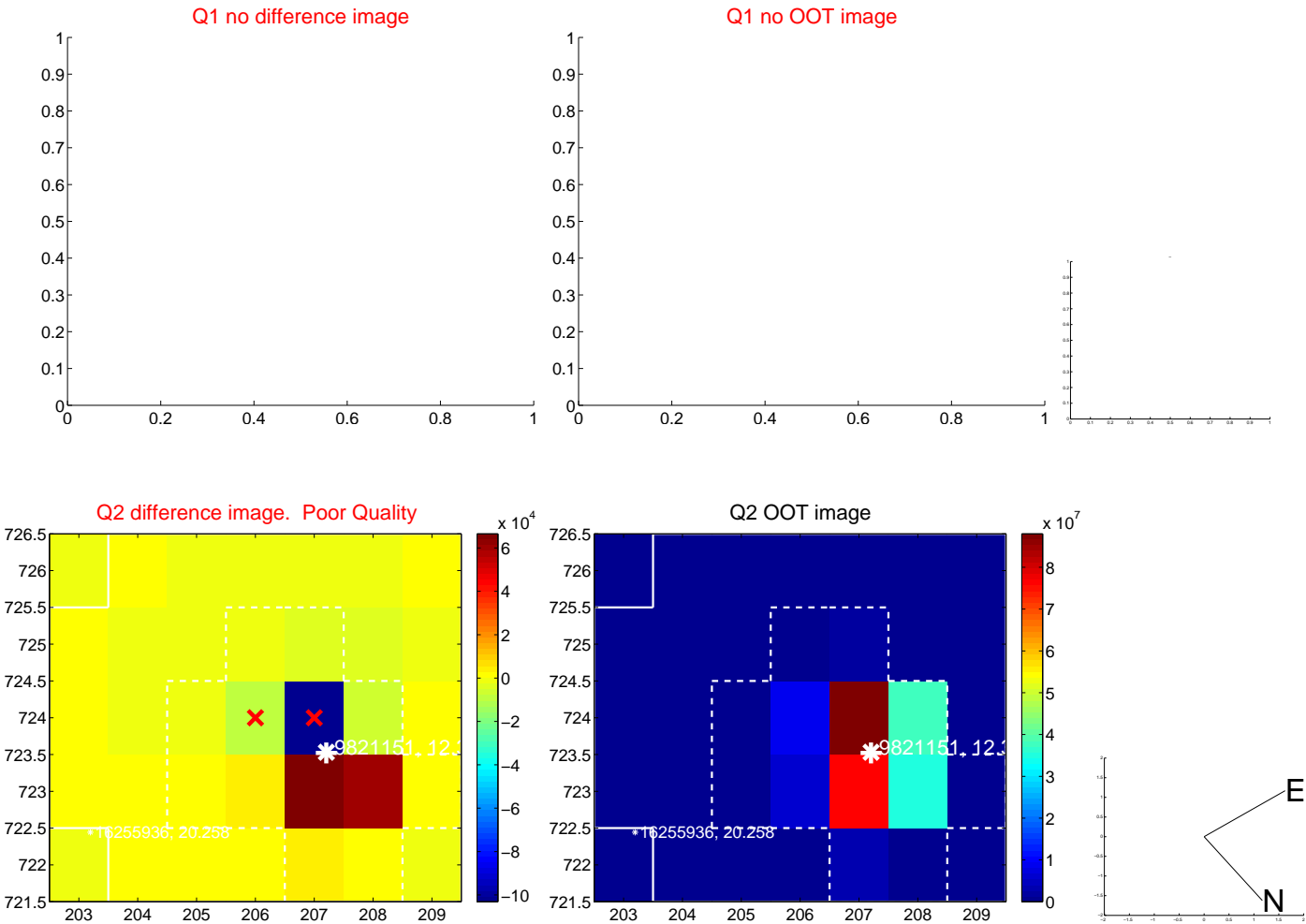
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT | 2.051 ± 2.729 | 0.75 | 0.032 ± 3.402 | 2.050 ± 2.677 |
| PRF-fit source offset from KIC position | 2.098 ± 1.407 | 1.49 | -0.001 ± 1.780 | 2.098 ± 1.408 |
| photometric centroid source offset | 1.14 ± 1.67 | 0.68 | 1.03 ± 1.68 | -0.48 ± 1.60 |

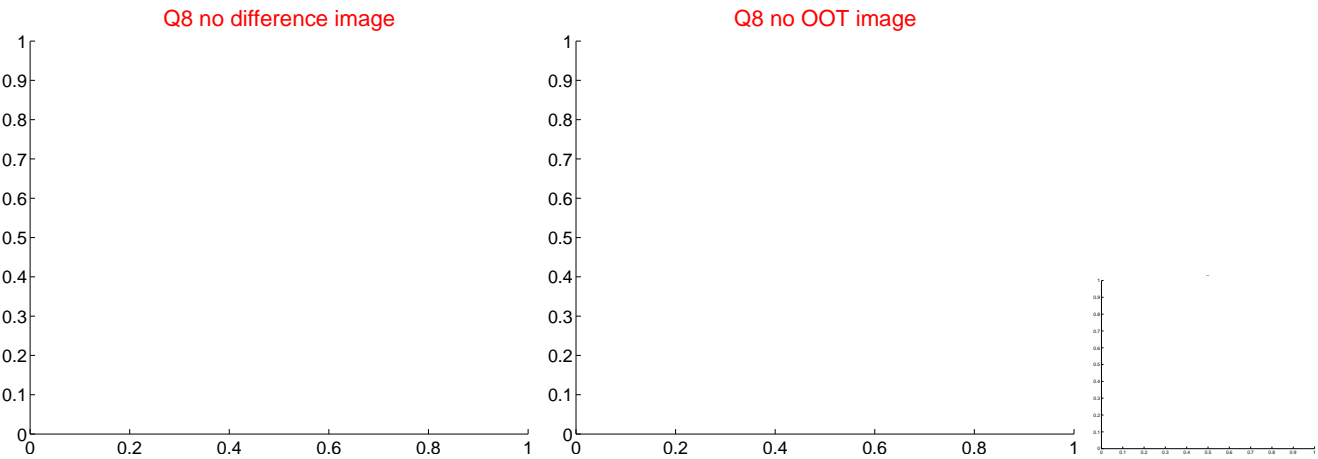
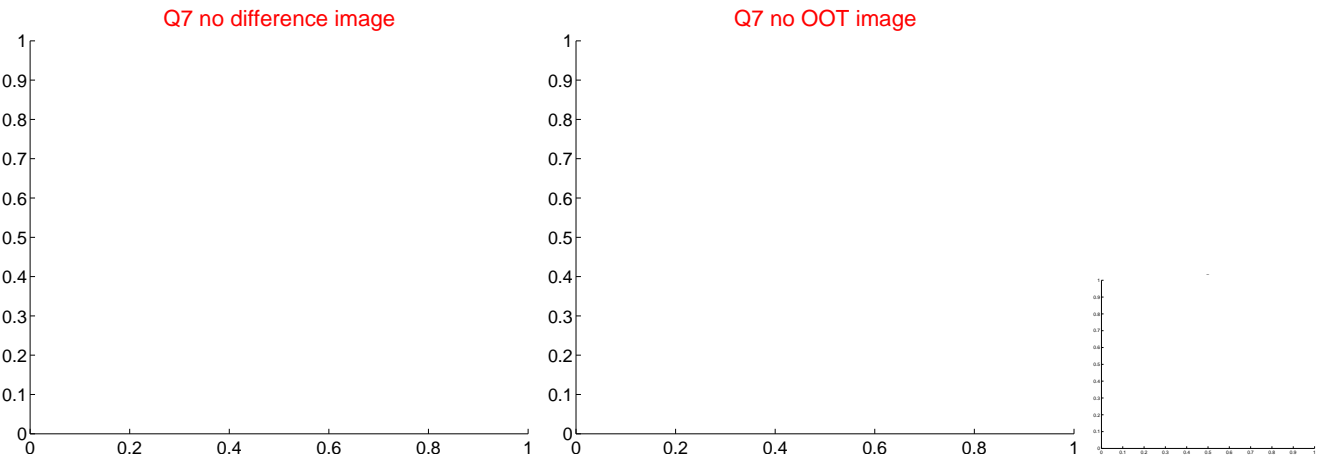
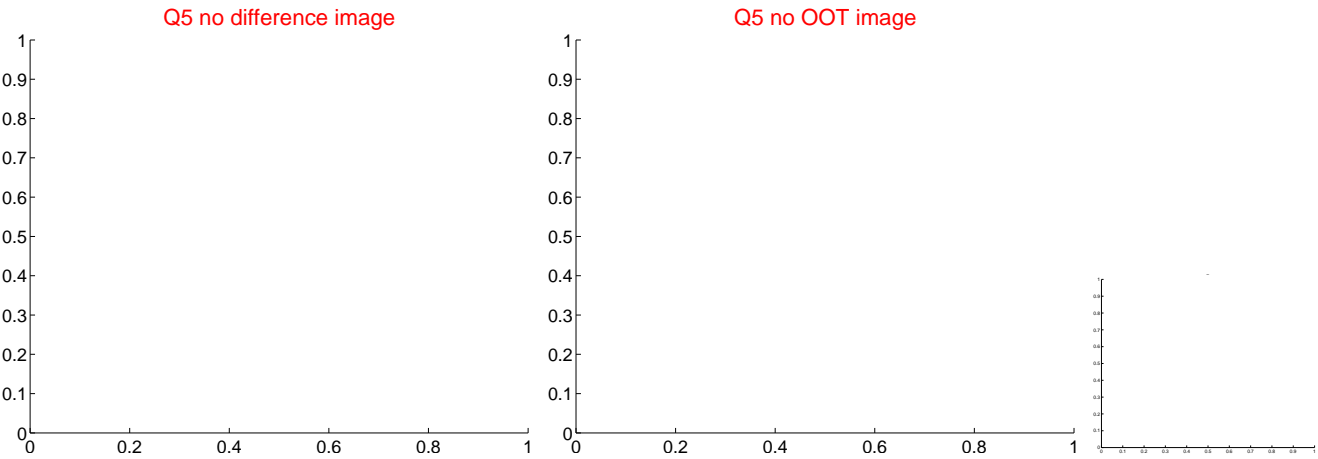


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . 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 ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

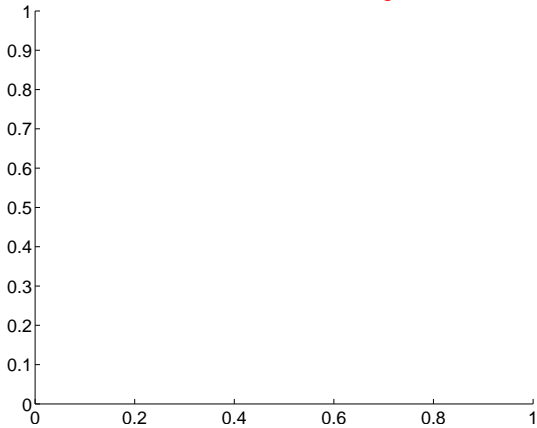


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

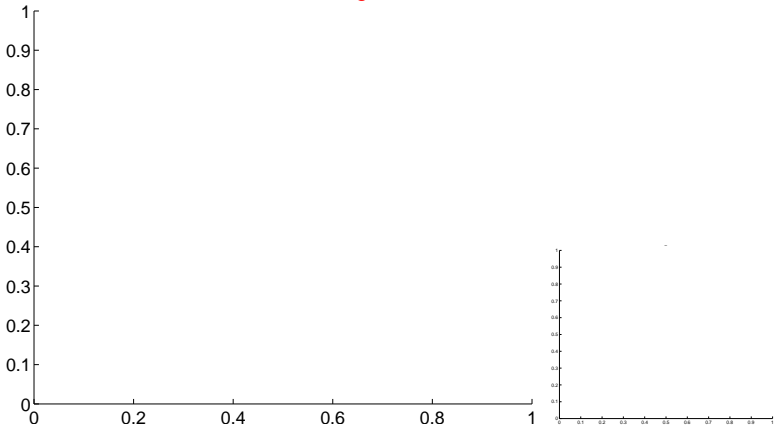


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

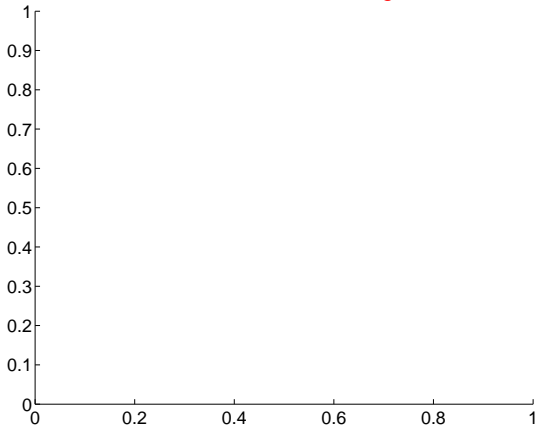
Q13 no difference image



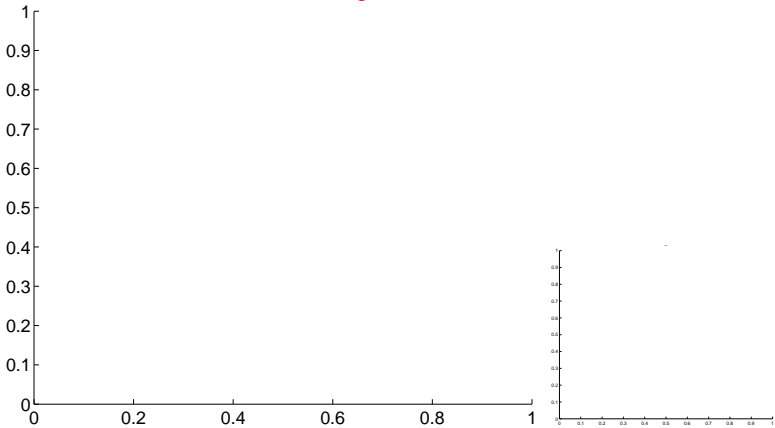
Q13 no OOT image



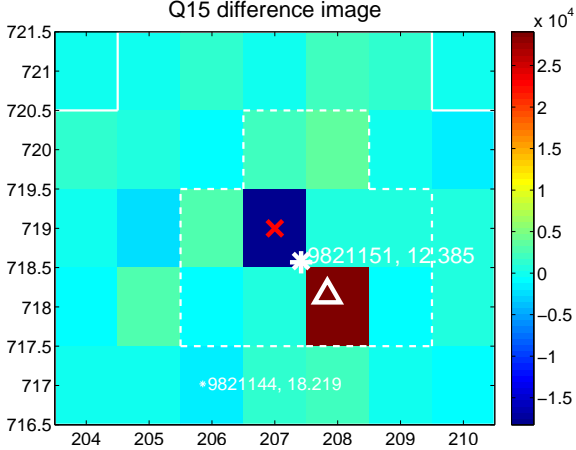
Q14 no difference image



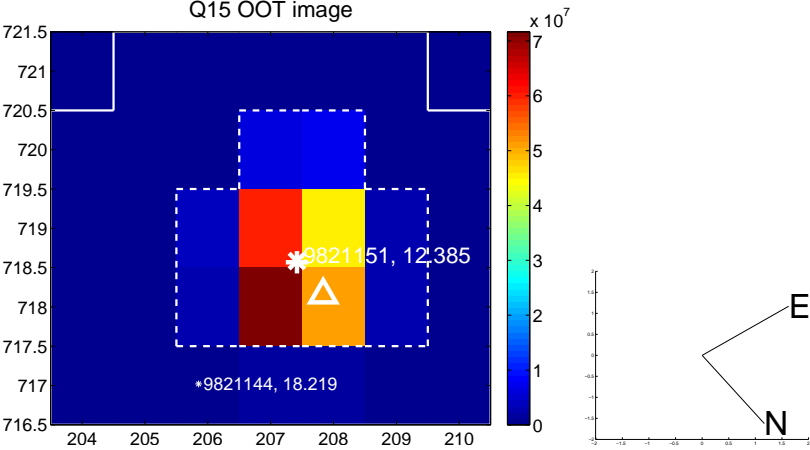
Q14 no OOT image



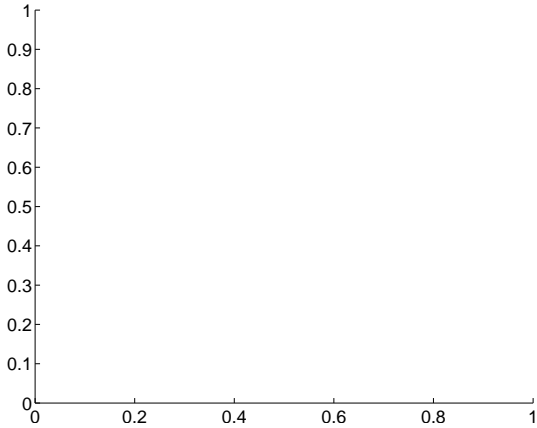
Q15 difference image



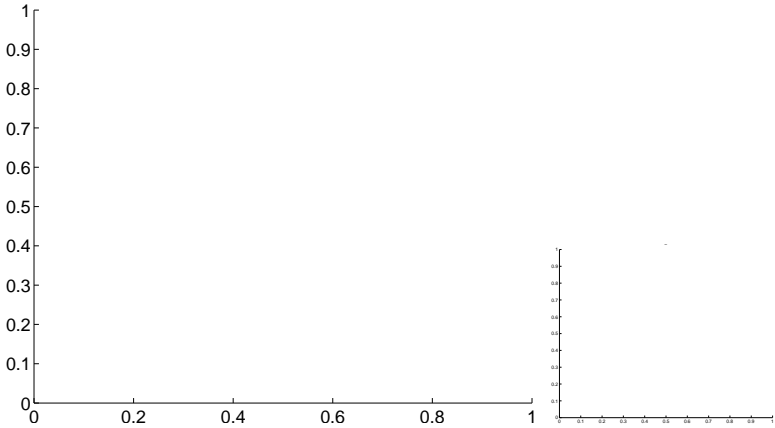
Q15 OOT image



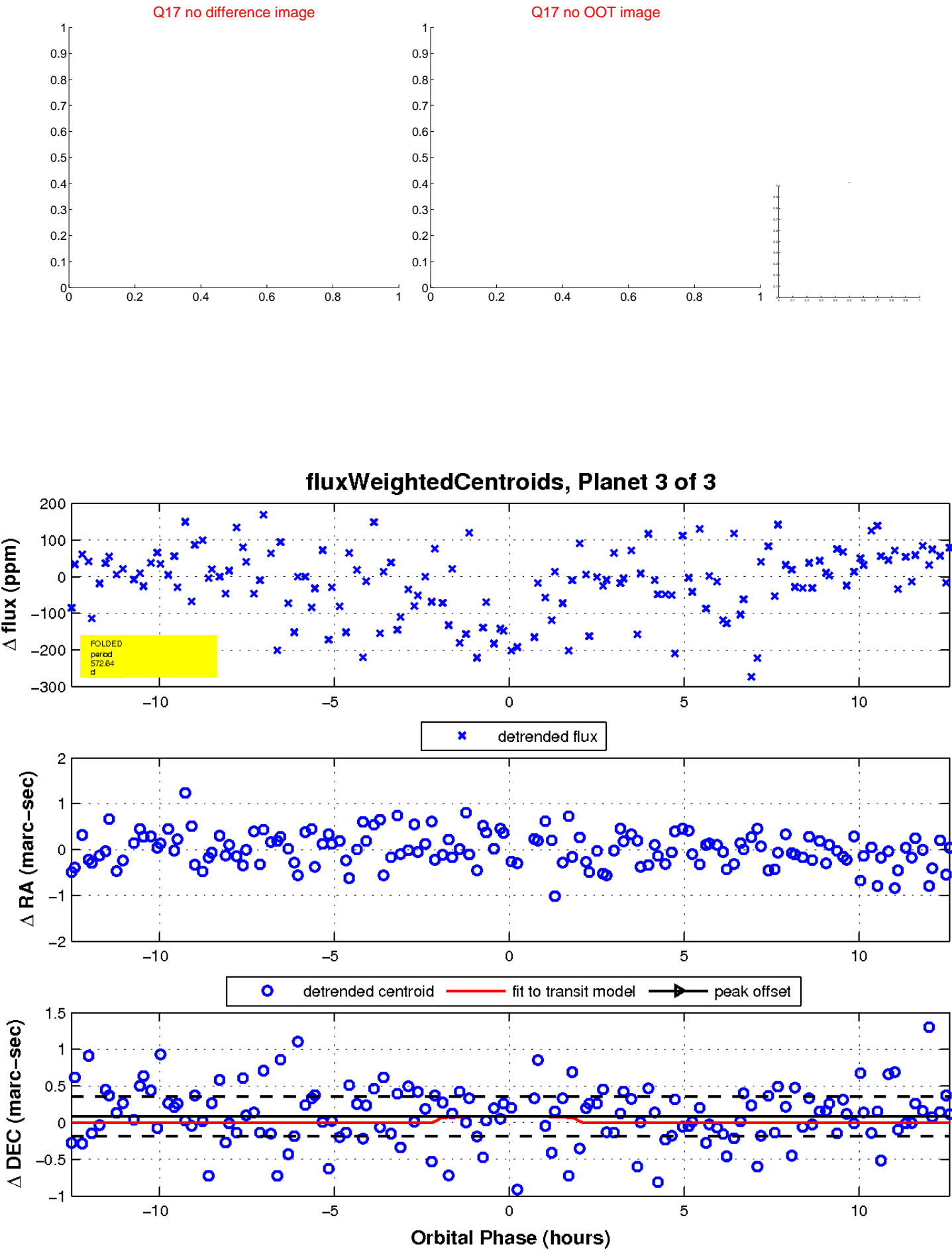
Q16 no difference image



Q16 no OOT image



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



UKIRT Image

Declination

