

# KIC 007456230

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-------|------|-----------------------------|-----------------|------------------------|------------------------|
| 007456230-01 | OBS      | No   | 375.424157    | 220.399418   | 18858.2     | 24.120           | 109.9 | 42.0 | 5.91                        | 4765            | 148.20                 | 12.10                  |
| 007456230-02 | OBS      | No   | 354.896881    | 256.676766   | 2000.3      | 12.000           | 51.6  | -1.0 | 5.91                        | 4765            | 25.34                  | 13.04                  |
| 007456230-04 | OBS      | No   | 357.332695    | 253.238349   | 19916.2     | 45.713           | 40.2  | 21.0 | 5.91                        | 4765            | 150.78                 | 12.92                  |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|--|
| 007456230-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS                      |
| 007456230-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_NOFITS                           |
| 007456230-04 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_CHASES_SKYE_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—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](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

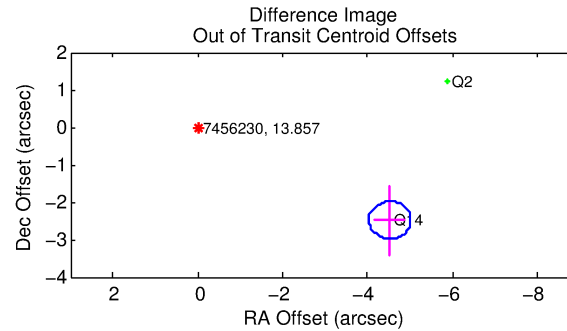
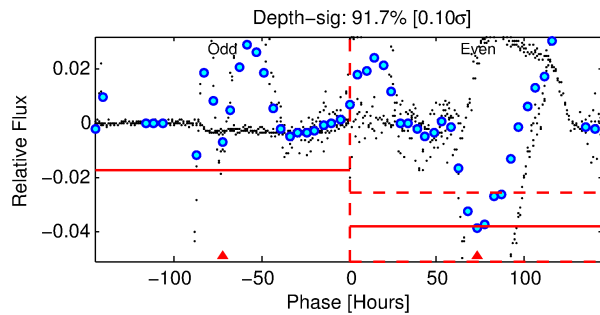
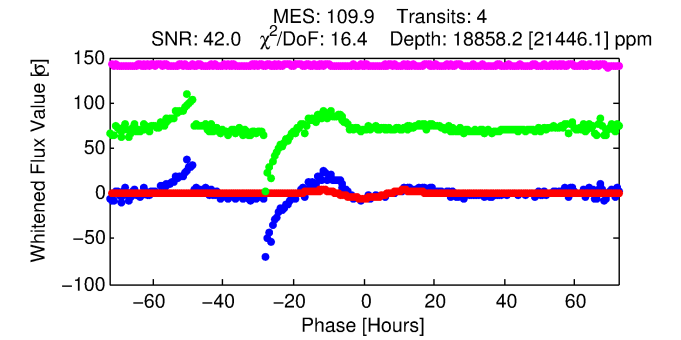
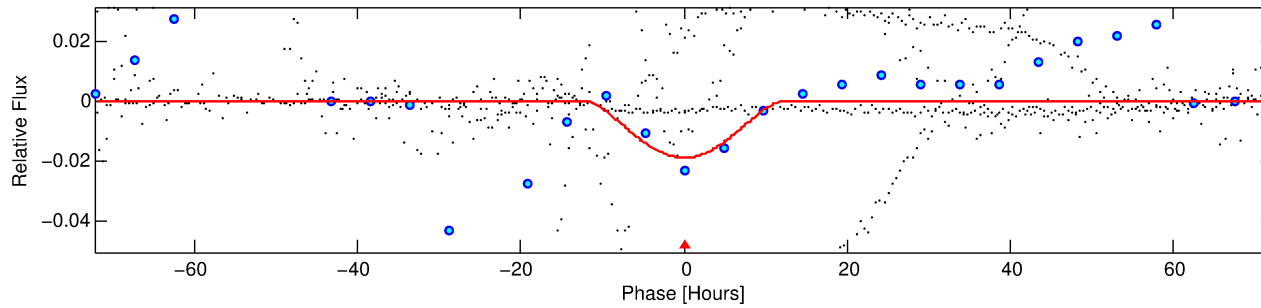
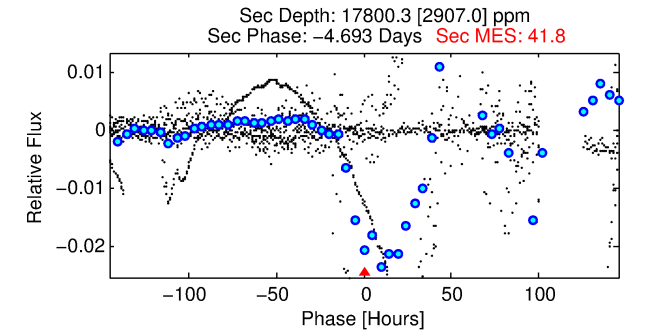
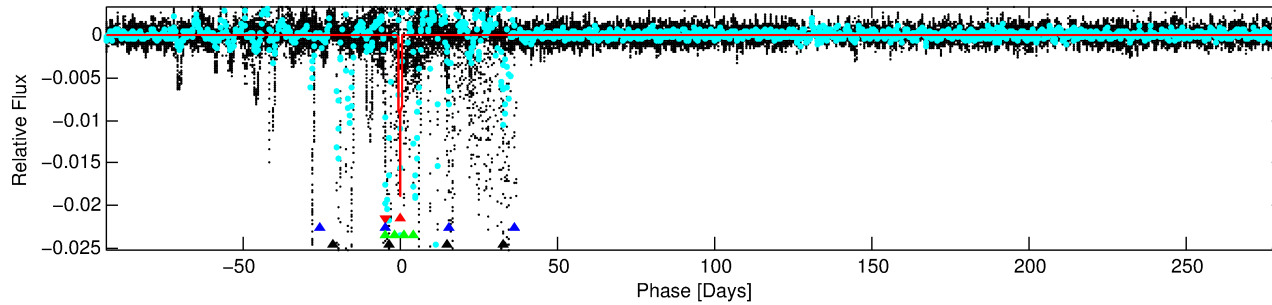
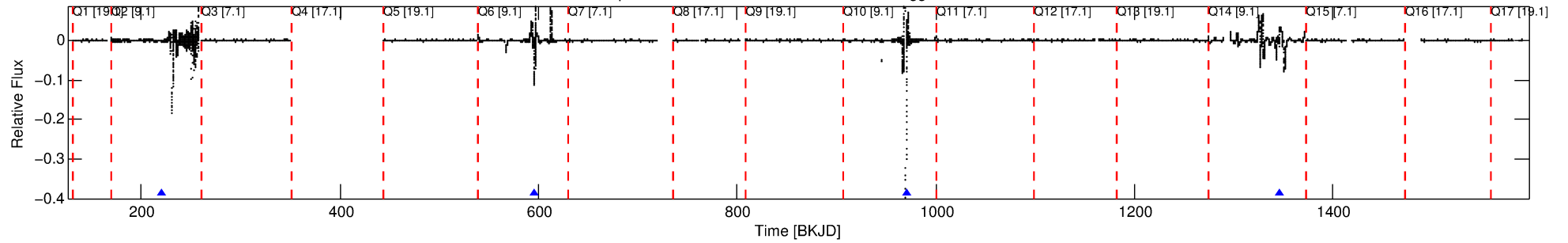
Ephemeris Match Information For 007456230-01

No Significant Match Found

# DV One-Page Summary

KIC: 7456230 Candidate: 1 of 4 Period: 375.424 d

Kp: 13.86 R\*: 5.91 Rs Teff: 4765.0 K Logg: 3.06 Fe/H: 0.210



## DV Fit Results:

Period = 375.42416 [0.02021] d  
Epoch = 220.3994 [0.0346] BKJD  
Rp/R\* = 0.2300 [0.6911]  
a/R\* = 85.16 [21.61]  
b = 1.00 [1.10]  
Seff = 12.09 [8.33]  
Teq = 476 [82] K  
Rp = 148.20 [450.55] Re  
a = 1.1540 [0.4991] AU  
Ag = 593.76 [3592.63] [0.16σ]  
Teffp = 3629 [5456] K [0.58σ]

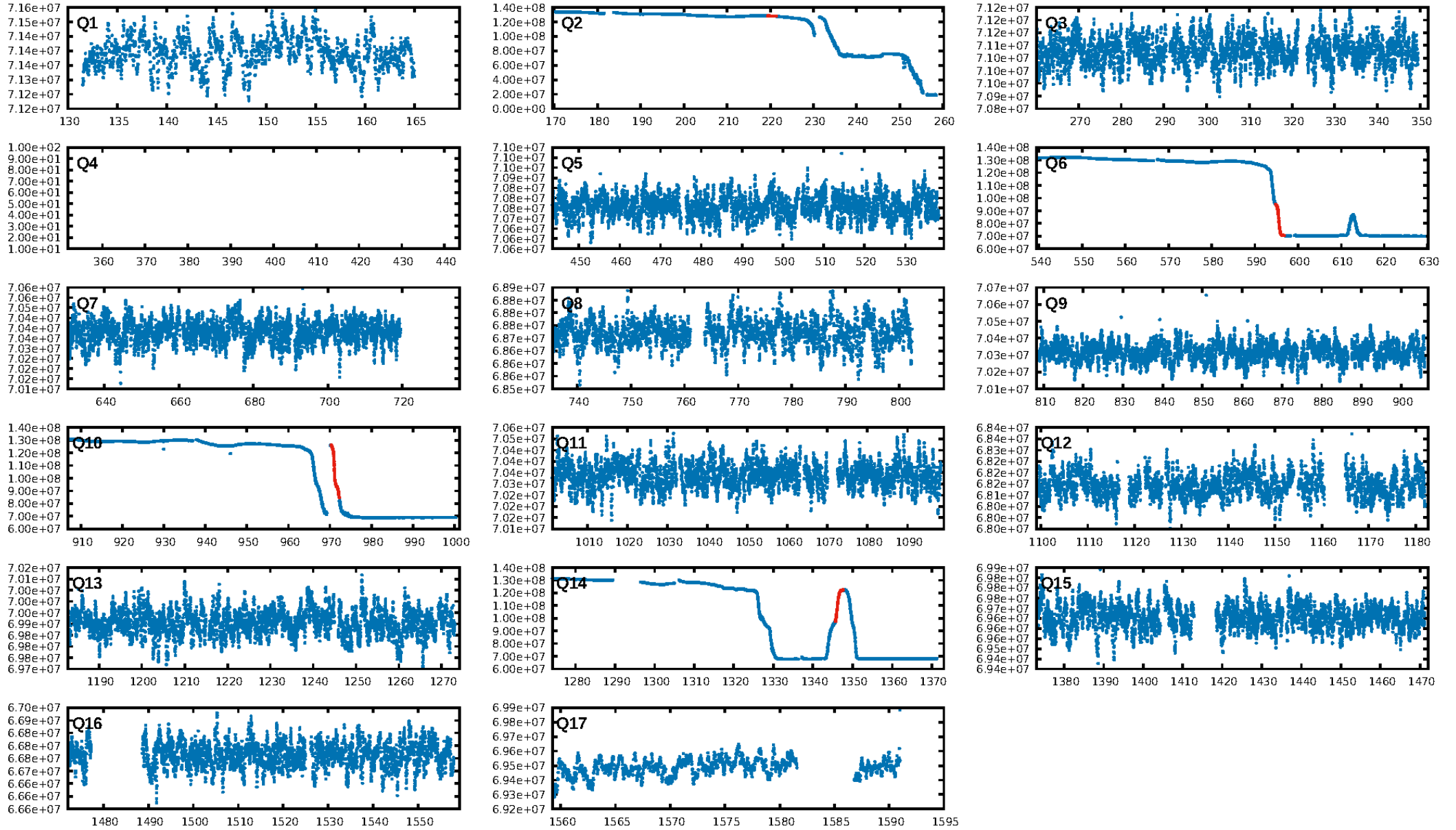
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [8.40σ]  
LongPeriod-sig: 99.2% [2.67σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 0.0%  
Bootstrap-pfa: 7.93e-118  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -0.4881  
Centroid-sig: N/A  
Centroid-so: 11.923 arcsec [1.46σ]  
OotOffset-rm: 5.164 arcsec [31.17σ]  
KicOffset-rm: 7.577 arcsec [6.78σ]  
OotOffset-st: 2/0/0/0 [2]  
KicOffset-st: 2/0/0/0 [2]  
DiffImageQuality-fgm: 0.00 [0/2]  
DiffImageOverlap-fno: 1.00 [3/3]

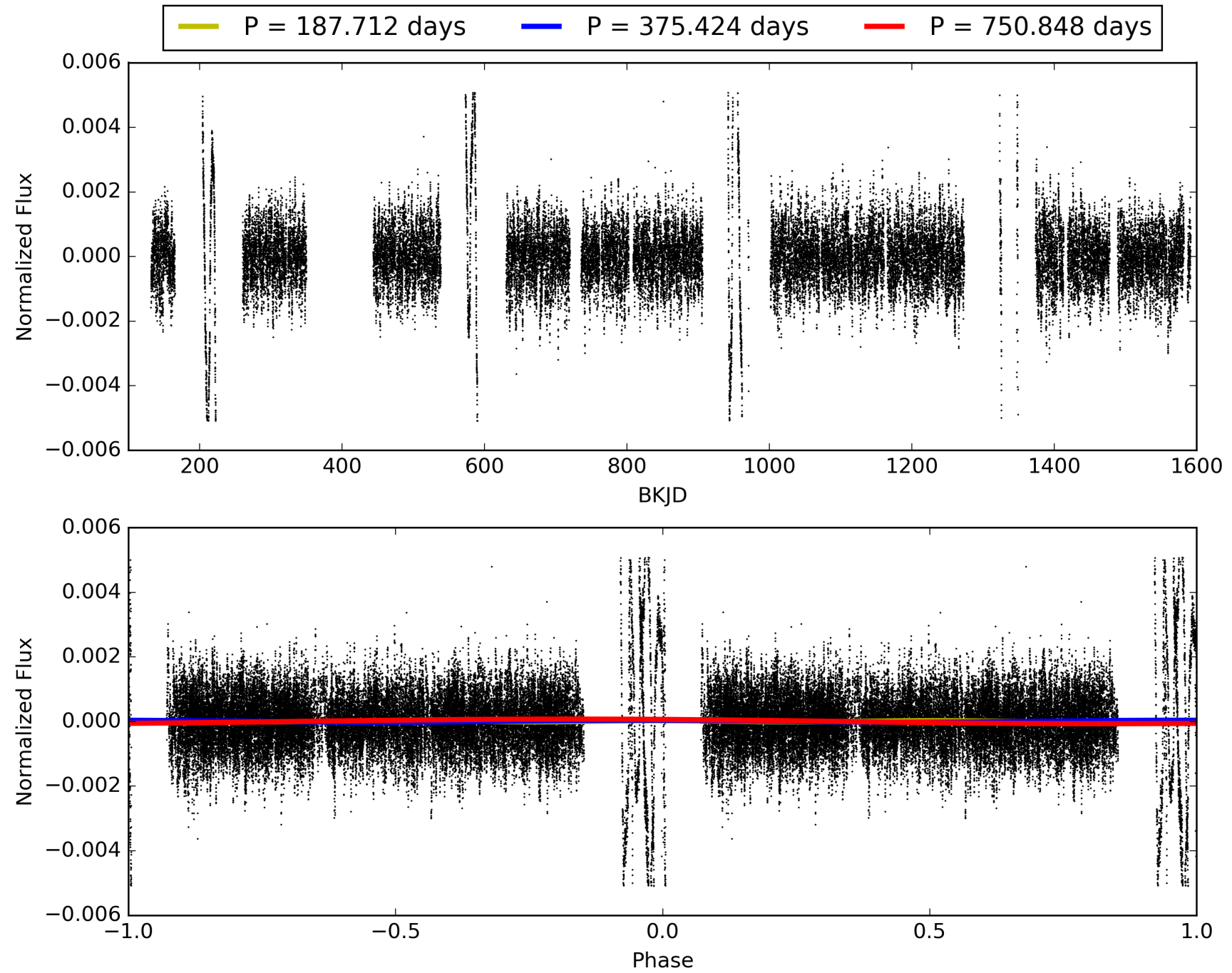
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 16:42:46 Z

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

# TCE 007456230-01, PDC Light Curves

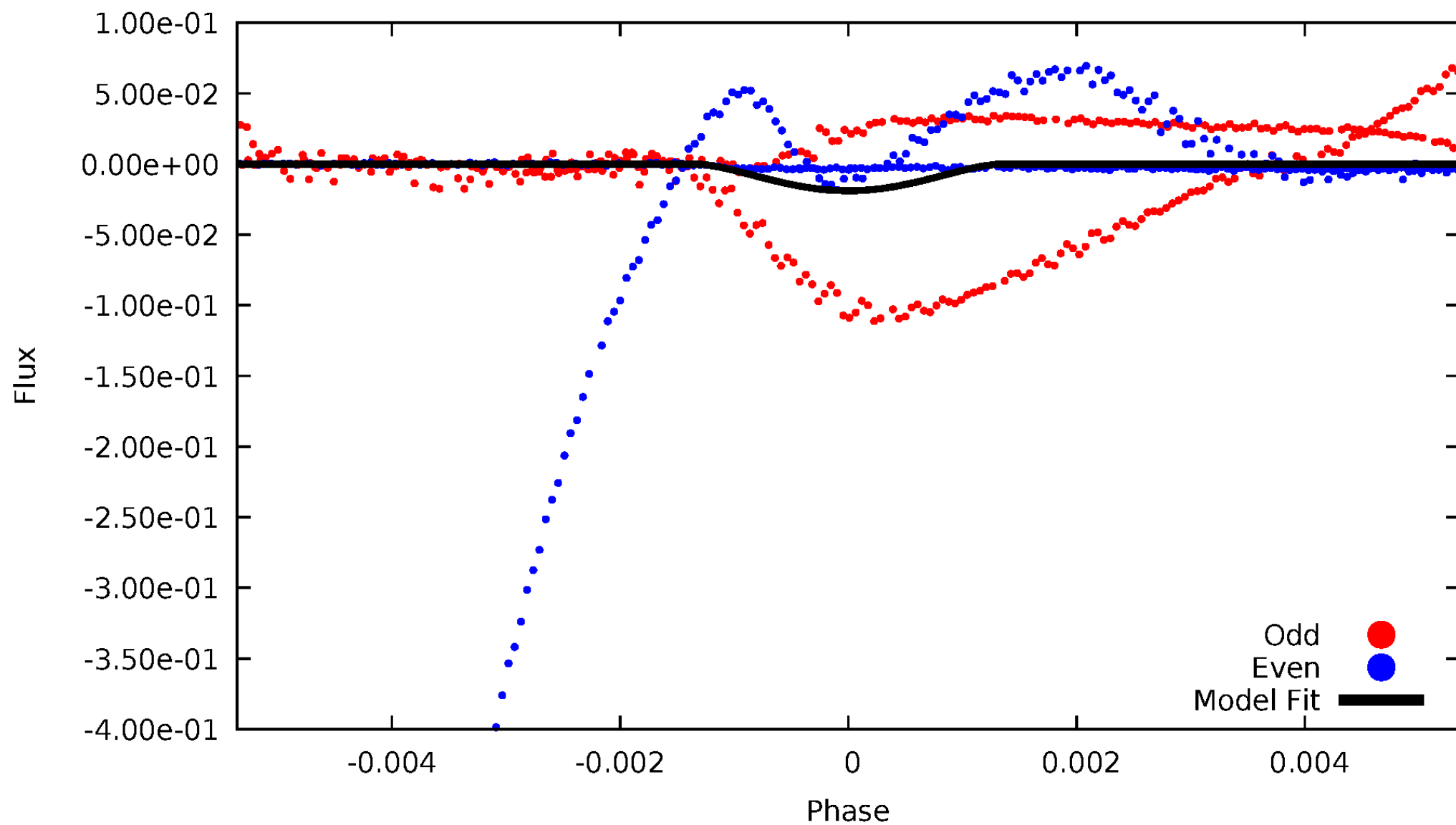


TCE 007456230-01



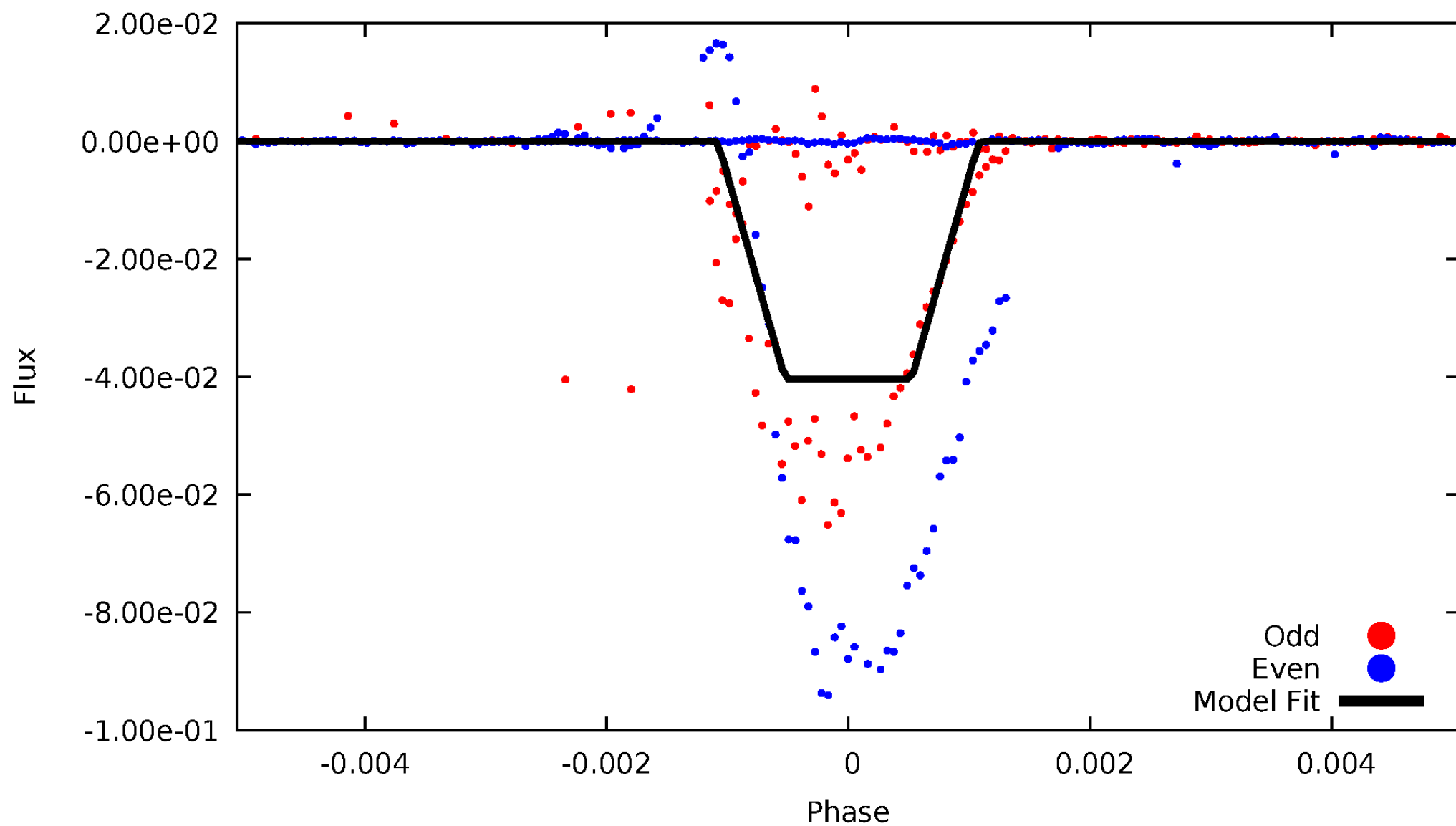
# DV Odd/Even

TCE 007456230-01



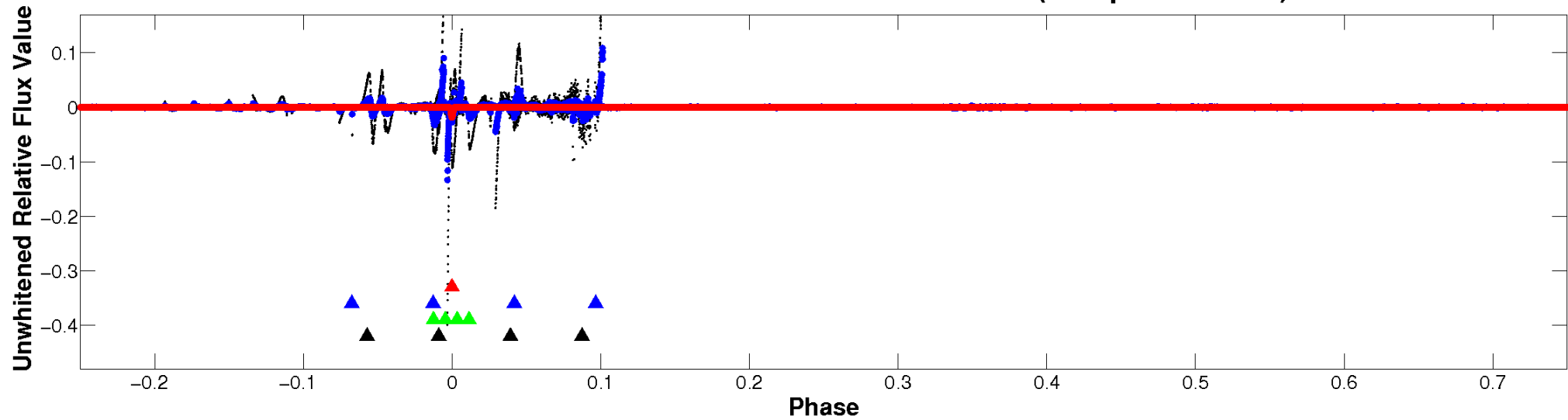
# ALT Odd/Even

TCE 007456230-01

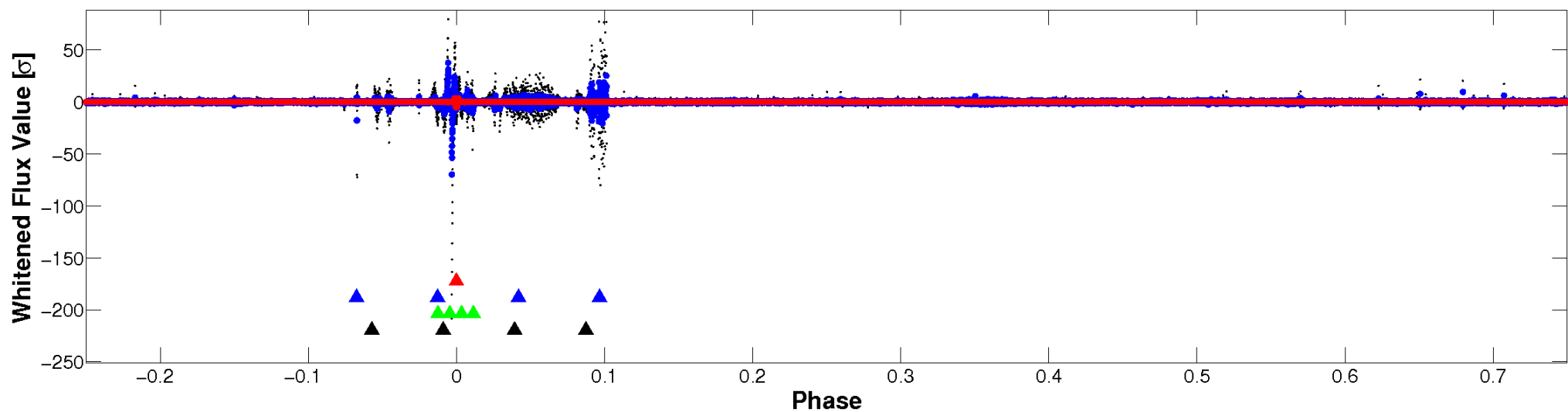


# Non-Whitened Vs. Whitened Light Curve

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

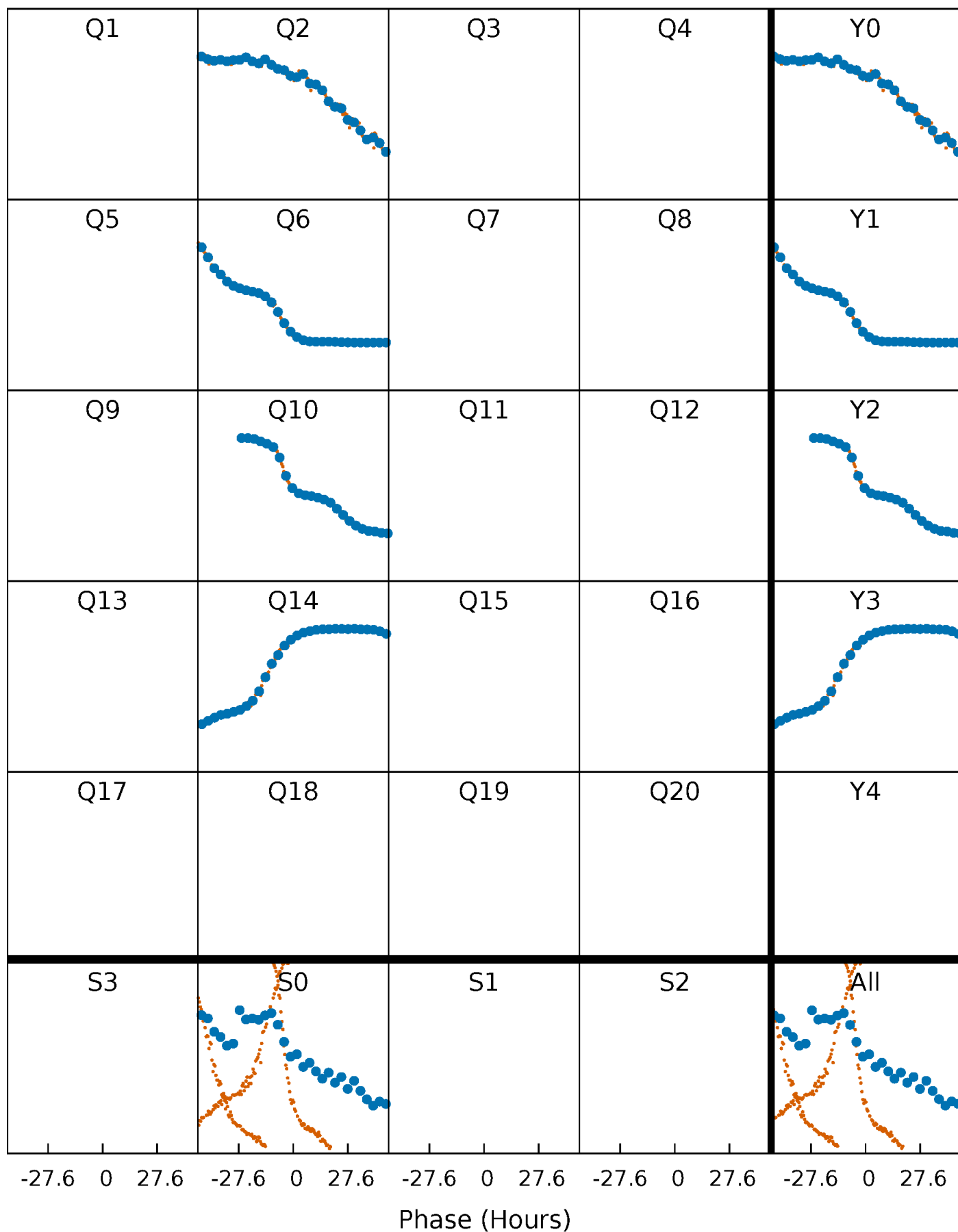


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

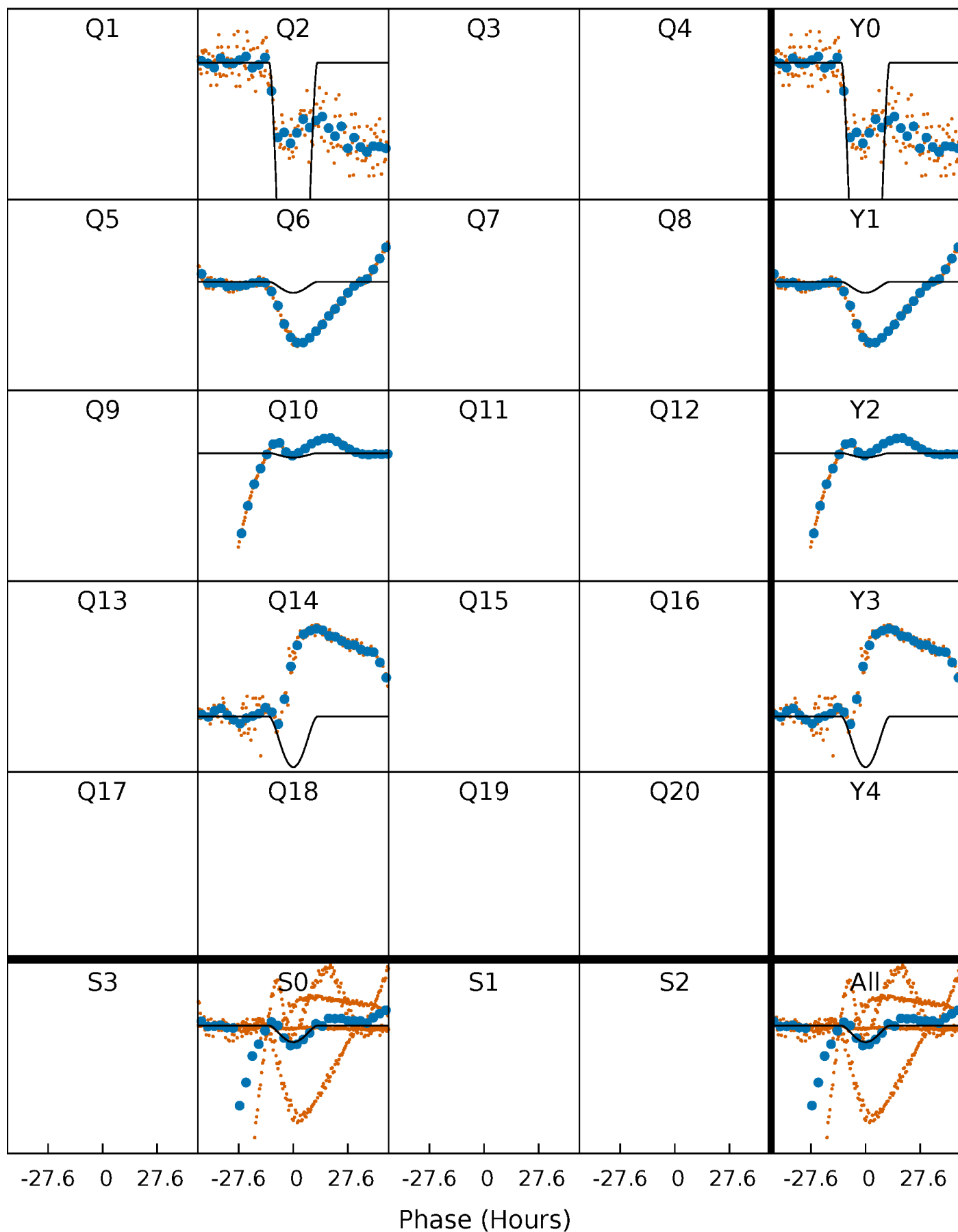
TCE 007456230-01 P=375.424157 Days  $T_0=220.399418$  (BKJD)





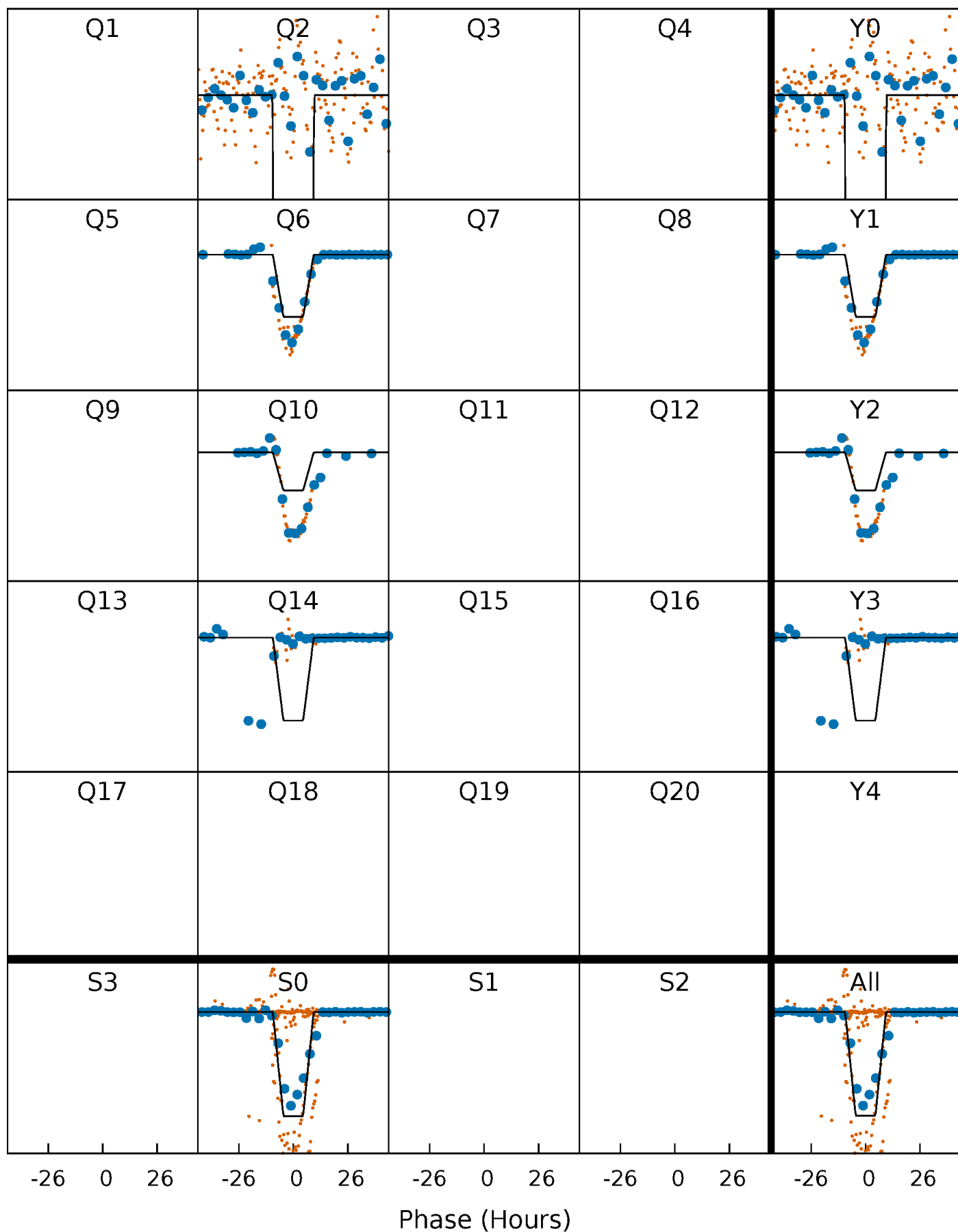
# DV Quarter-Phased Transit Curves

TCE 007456230-01 P=375.424157 Days  $T_0=220.399418$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

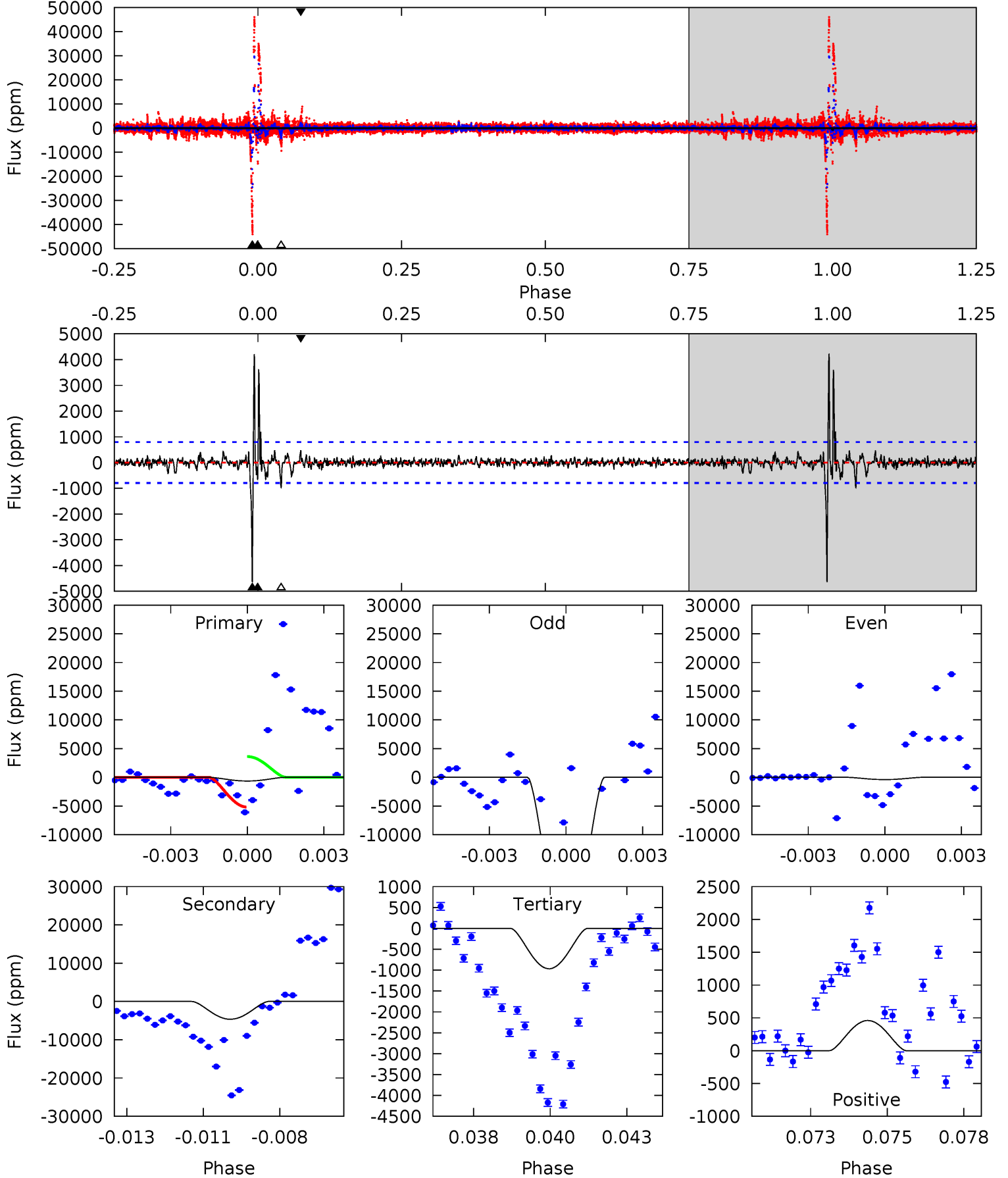
TCE 007456230-01 P=375.405364 Days  $T_0=220.464630$  (BKJD)



# DV Model-Shift Uniqueness Test

007456230-01, P = 375.424157 Days, E = 220.399418 Days

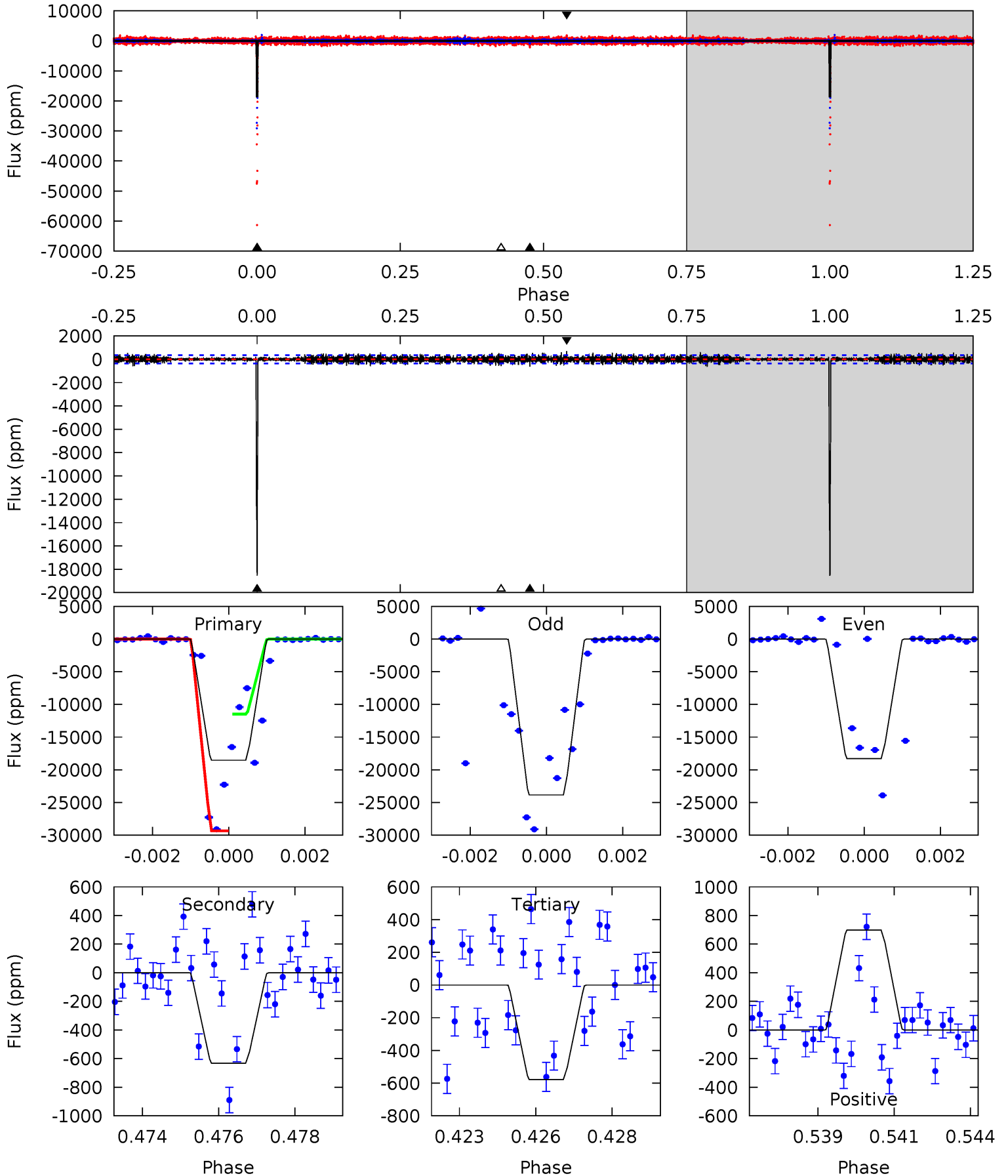
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM   | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|-------|-------|-----|
| 4.33 | 30.9 | 6.42 | 3.05 | 5.27            | 3.00            | 1.12             | -2.10   | 1.27    | 24.4    | 27.8    | 26.7    | -4.84 | 0.47  | 0   |



# Alt Model-Shift Uniqueness Test

007456230-01, P = 375.405364 Days, E = 220.464630 Days

| Pri   | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT   |
|-------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|-------|
| 273.2 | 9.31 | 8.51 | 10.3 | 5.31            | 3.06            | 2.16             | 264.7   | 262.9   | 0.80    | -0.98   | 51.2    | 1.26 | 0.04  | 131.4 |



### Stellar Parameters For KIC 007456230

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | $[\text{Fe}/\text{H}]$    | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
|        | $4765^{+117}_{-105}$ | $3.058^{+0.396}_{-0.324}$ | $0.210^{+0.200}_{-0.250}$ | $5.905^{+2.725}_{-2.452}$ | $1.451^{+0.276}_{-0.414}$ | $0.010^{+0.039}_{-0.007}$                 |
|        | +2%/-2%              | +13%/-11%                 | +95%/-119%                | +46%/-42%                 | +19%/-29%                 | +392%/-66%                                |
| 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 007456230-01 / KOI

| Detrend | Depth (ppm)     | $R_p (R_{\oplus})$           | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | $A_{\text{obs}}$           |
|---------|-----------------|------------------------------|----------------------|----------------------|----------------------------|
| DV      | $-4647 \pm 151$ | $360.21^{+421.20}_{-250.69}$ | $669^{+81}_{-75}$    | $2455^{+951}_{-363}$ | $24^{+241}_{-19}$          |
| Alt.    | $-632 \pm 68$   | $339.82^{+379.89}_{-245.06}$ | $668^{+84}_{-75}$    | $1979^{+652}_{-305}$ | $3.885^{+43.967}_{-2.987}$ |

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature  
 $T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )  
 $A_{\text{obs}}$  = 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  $A_{\text{obs}} \gg 1.0$

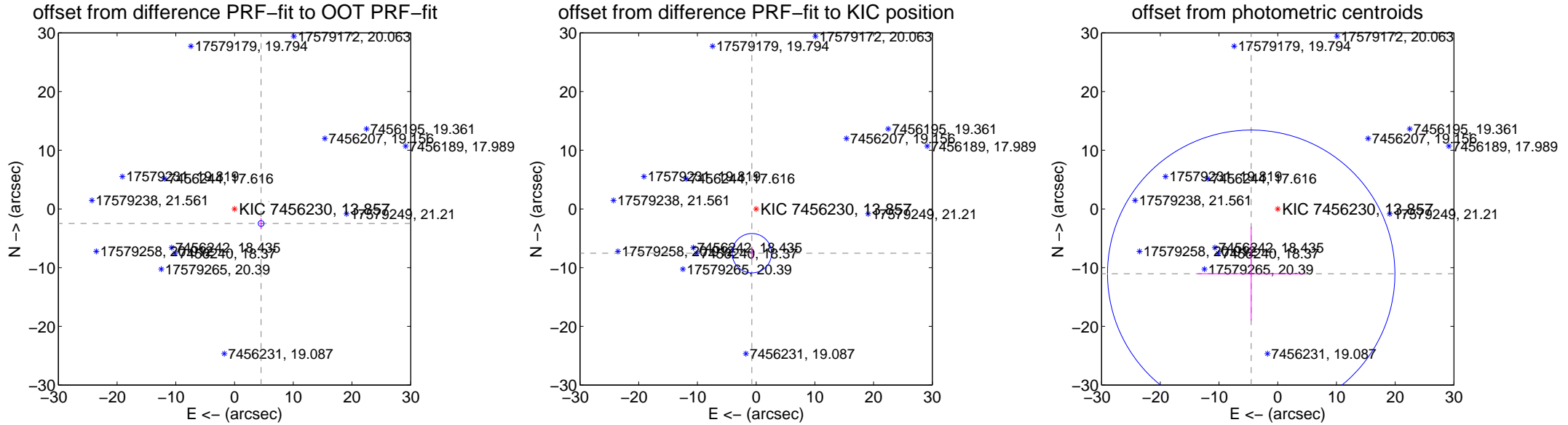
## DV Centroid Data

Supplemental centroid analysis for 007456230-01. Kepler magnitude: 13.86. Transit SNR 42.04

There are 0 quarters with good PRF difference image offsets

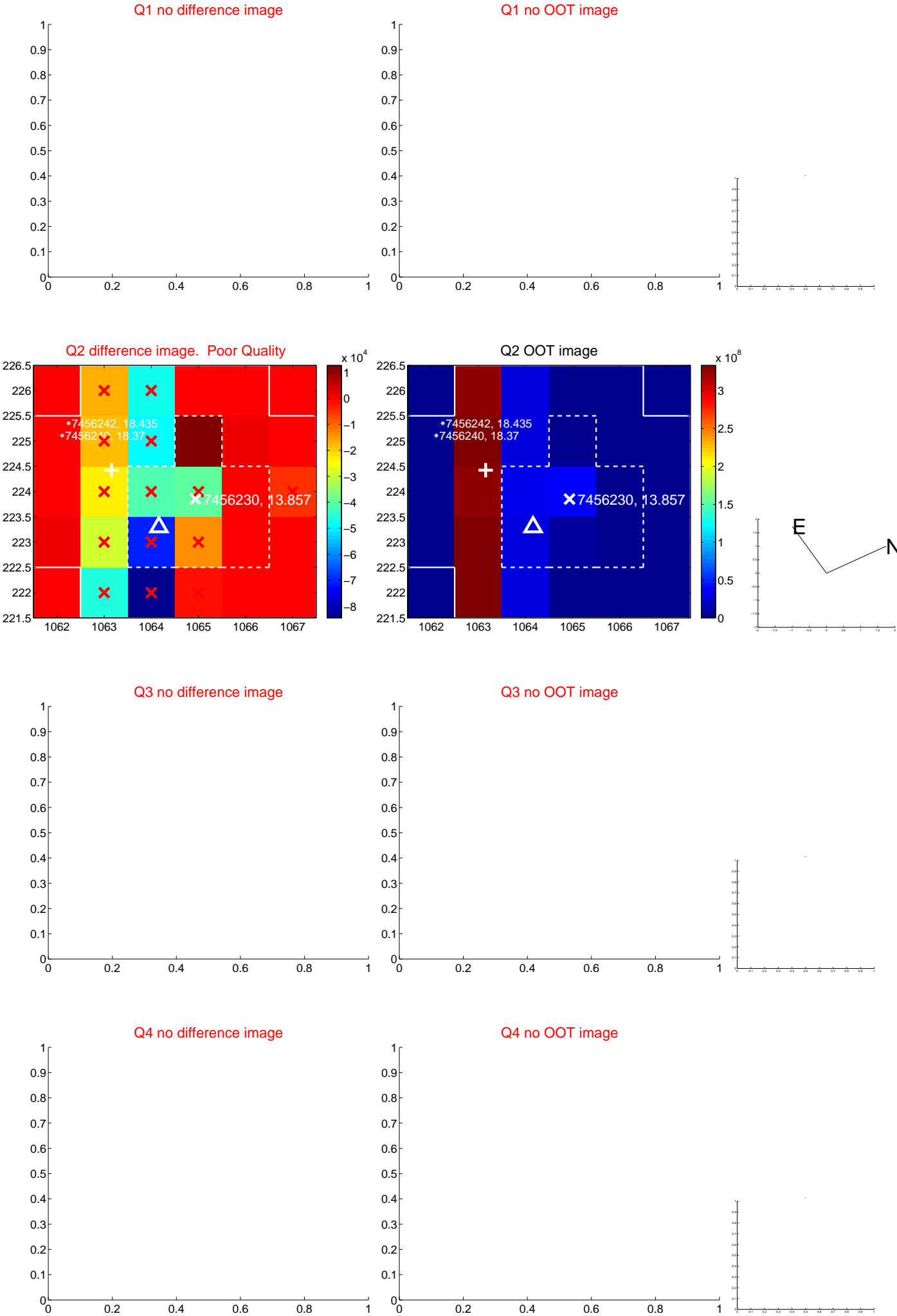
The OOT PRF centroid is offset from the target star catalog position by about 7.30 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec       |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT          | $5.164 \pm 0.166$  | 31.17               | $-4.528 \pm 0.343$ | $-2.482 \pm 0.931$ |
| PRF-fit source offset from KIC position | $7.577 \pm 1.118$  | 6.78                | $0.728 \pm 0.324$  | $-7.542 \pm 1.092$ |
| photometric centroid source offset      | $11.92 \pm 8.16$   | 1.46                | $4.52 \pm 9.10$    | $-11.03 \pm 7.99$  |

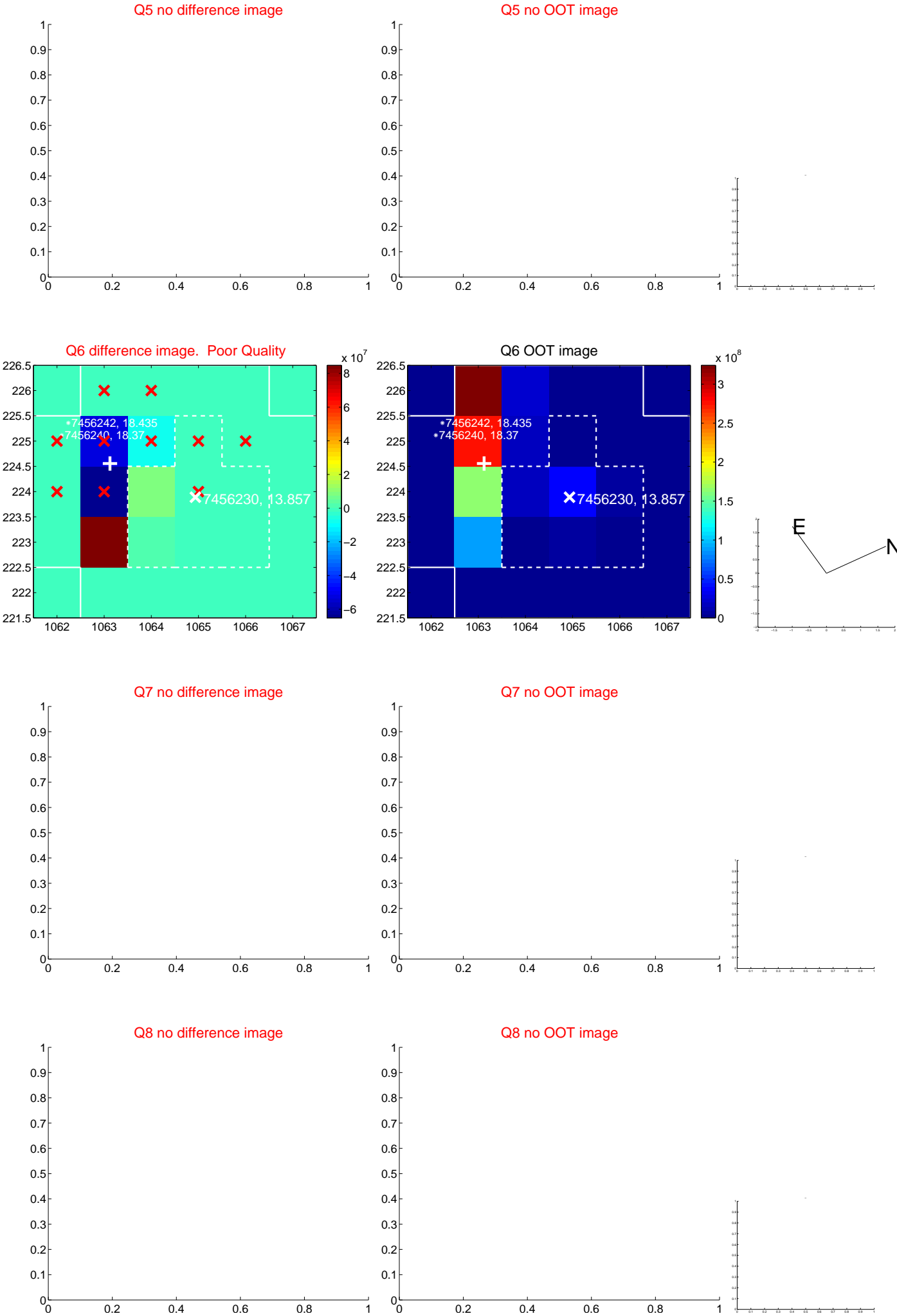


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

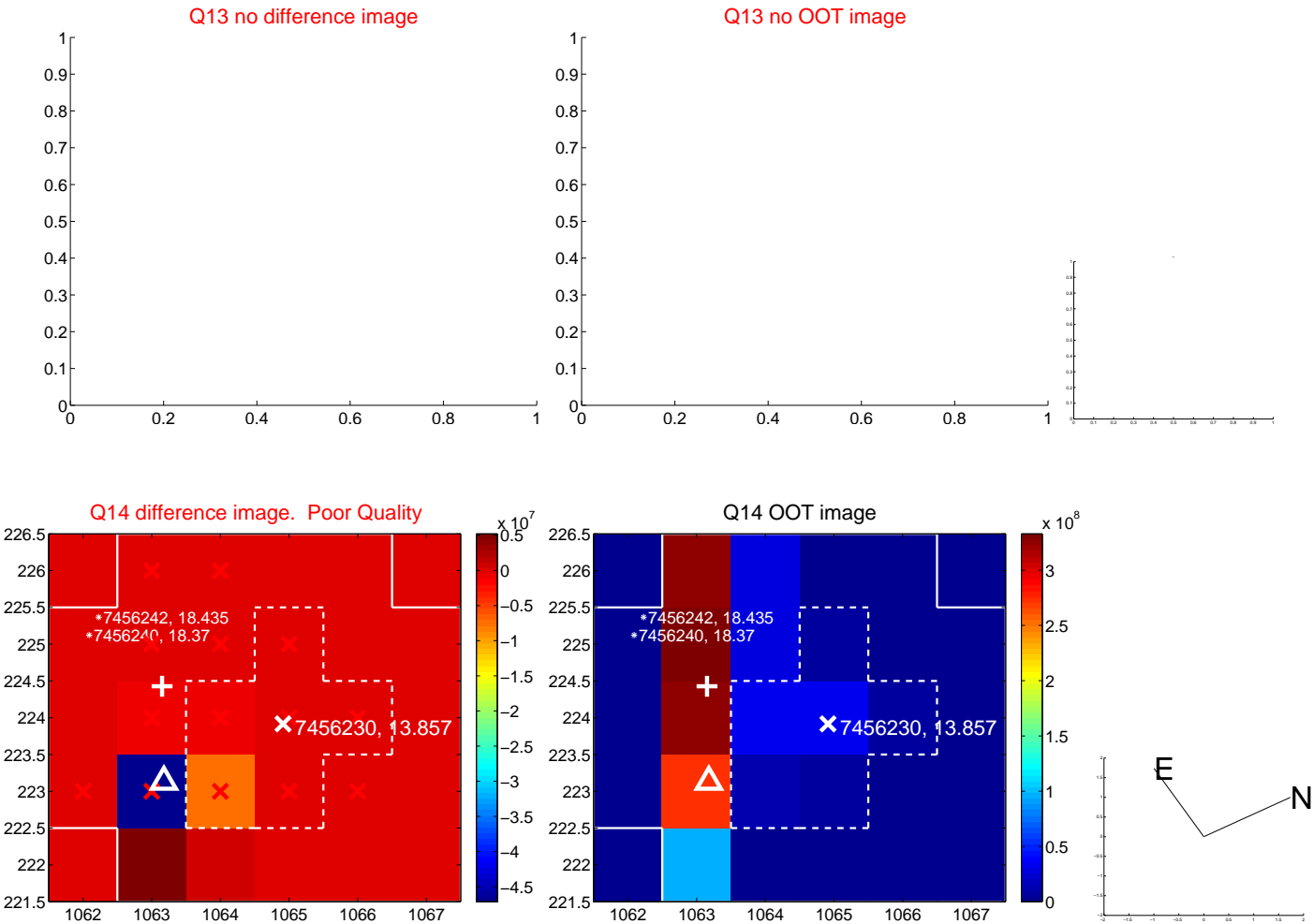




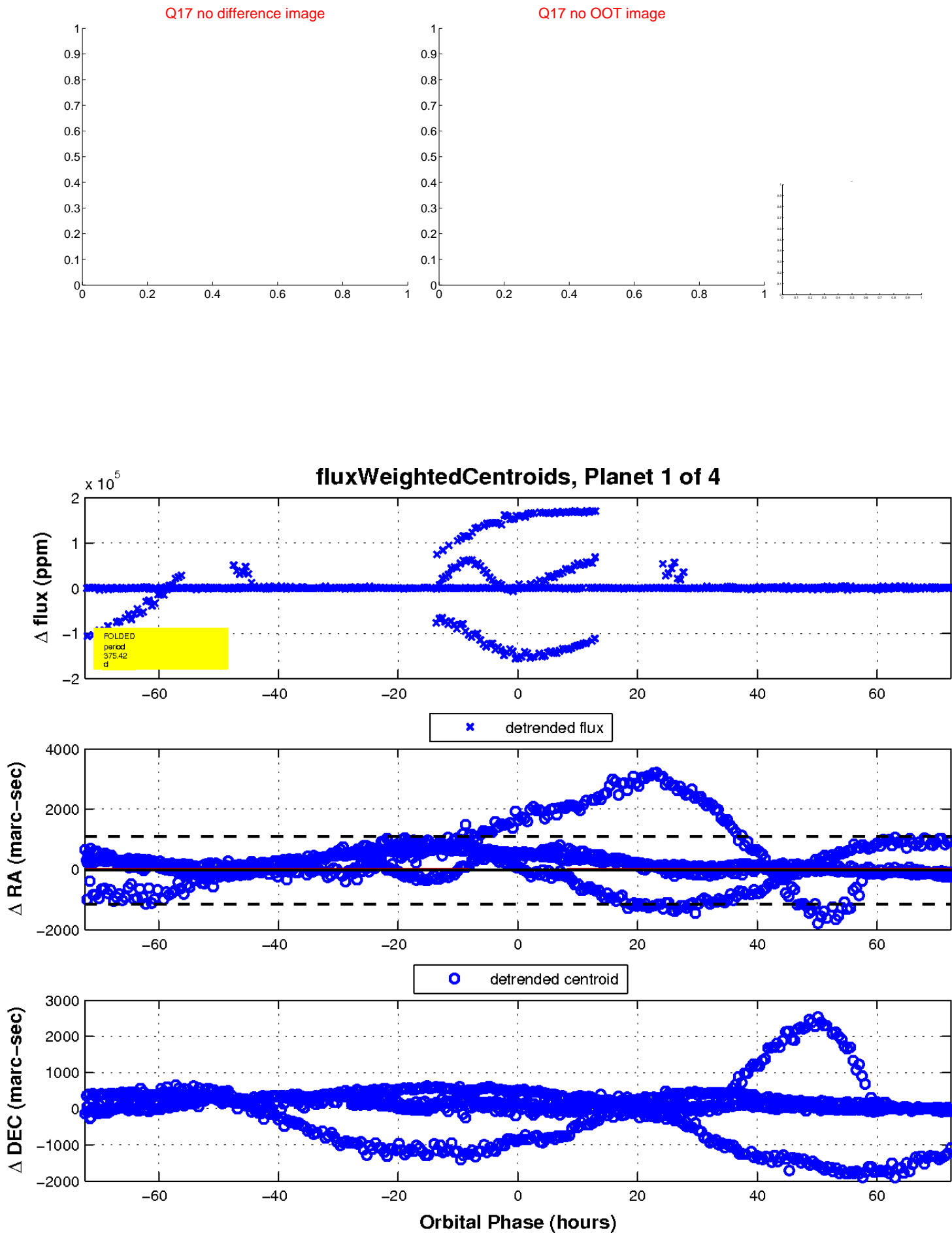
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

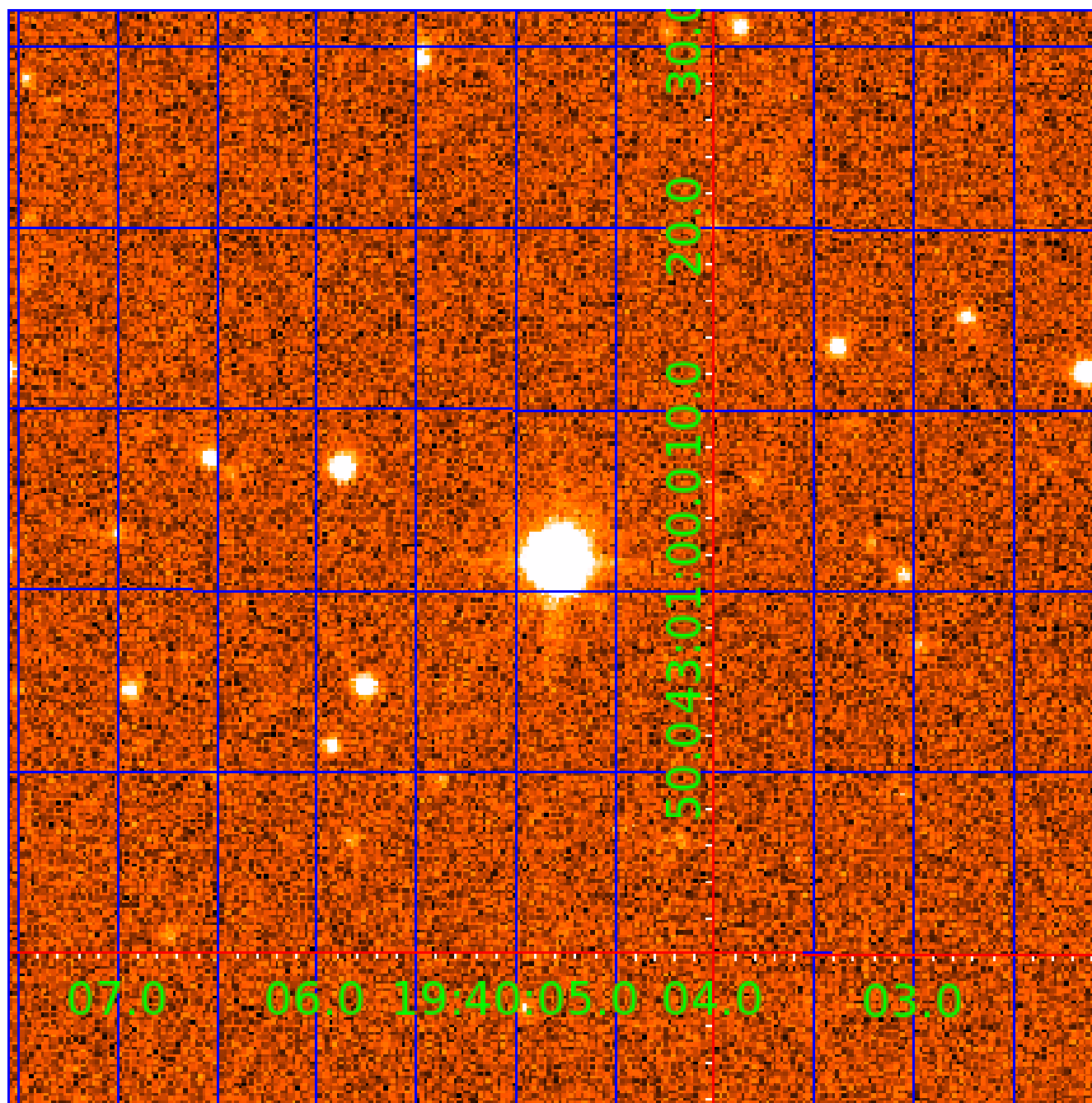


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination



# KIC 007456230

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-------|------|-----------------------------|-----------------|------------------------|------------------------|
| 007456230-01 | OBS      | No   | 375.424157    | 220.399418   | 18858.2     | 24.120           | 109.9 | 42.0 | 5.91                        | 4765            | 148.20                 | 12.10                  |
| 007456230-02 | OBS      | No   | 354.896881    | 256.676766   | 2000.3      | 12.000           | 51.6  | -1.0 | 5.91                        | 4765            | 25.34                  | 13.04                  |
| 007456230-04 | OBS      | No   | 357.332695    | 253.238349   | 19916.2     | 45.713           | 40.2  | 21.0 | 5.91                        | 4765            | 150.78                 | 12.92                  |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|--|
| 007456230-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS                      |
| 007456230-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_NOFITS                           |
| 007456230-04 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_CHASES_SKYE_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—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](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

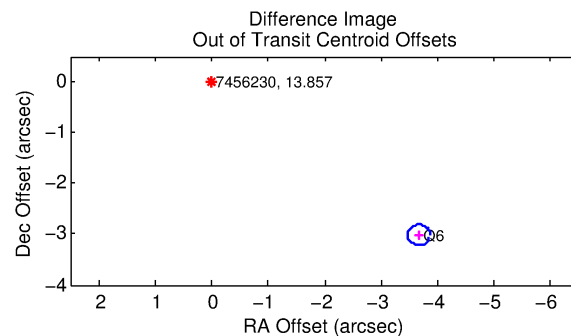
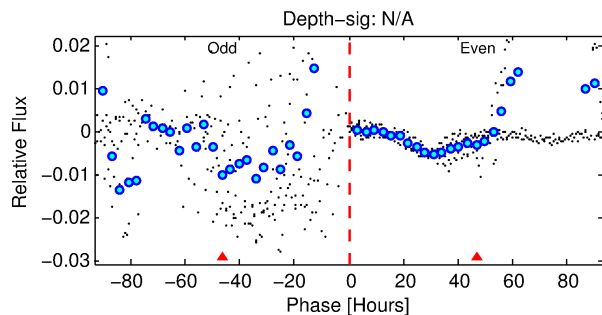
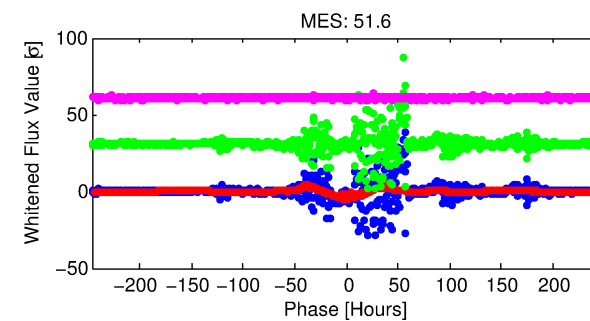
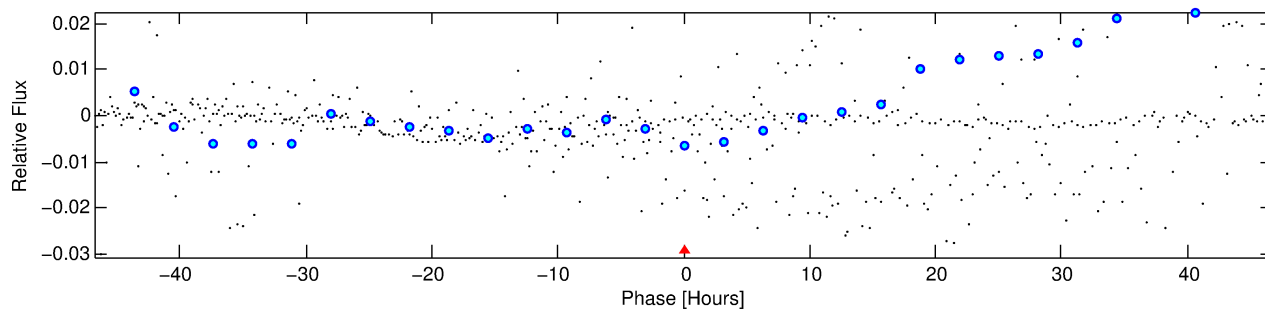
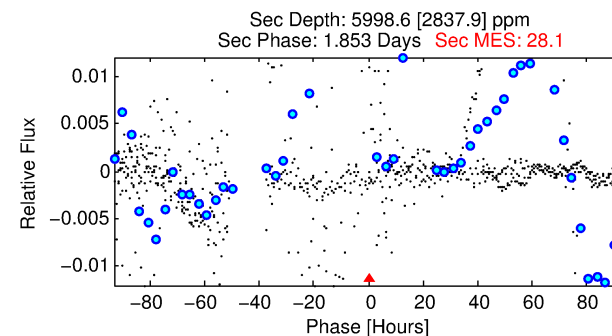
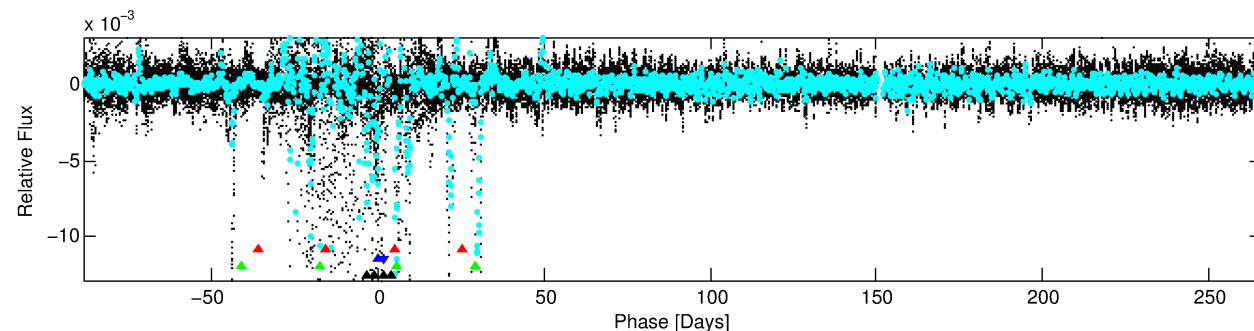
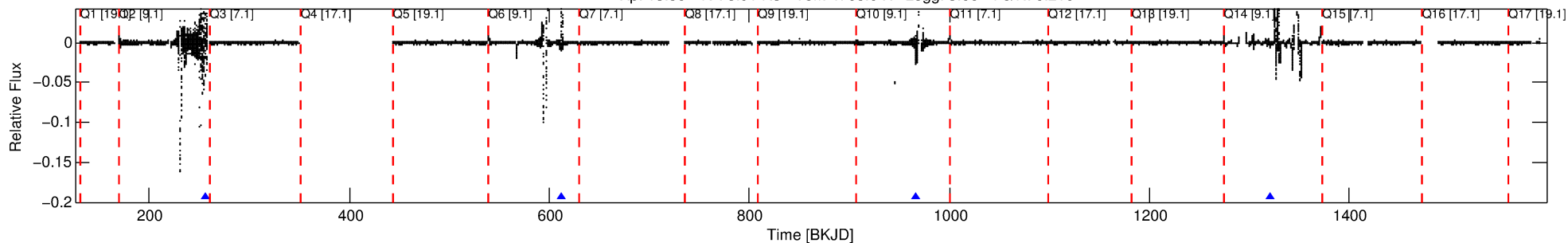
## Ephemeris Match Information For 007456230-02

No Significant Match Found

# DV One-Page Summary

KIC: 7456230 Candidate: 2 of 4 Period: 354.897 d

Kp: 13.86 R\*: 5.91 Rs Teff: 4765.0 K Logg: 3.06 Fe/H: 0.210



## TPS TCE Results:

Period = 354.89688 d  
Epoch = 256.6768 BKJD

DV fit results are unavailable

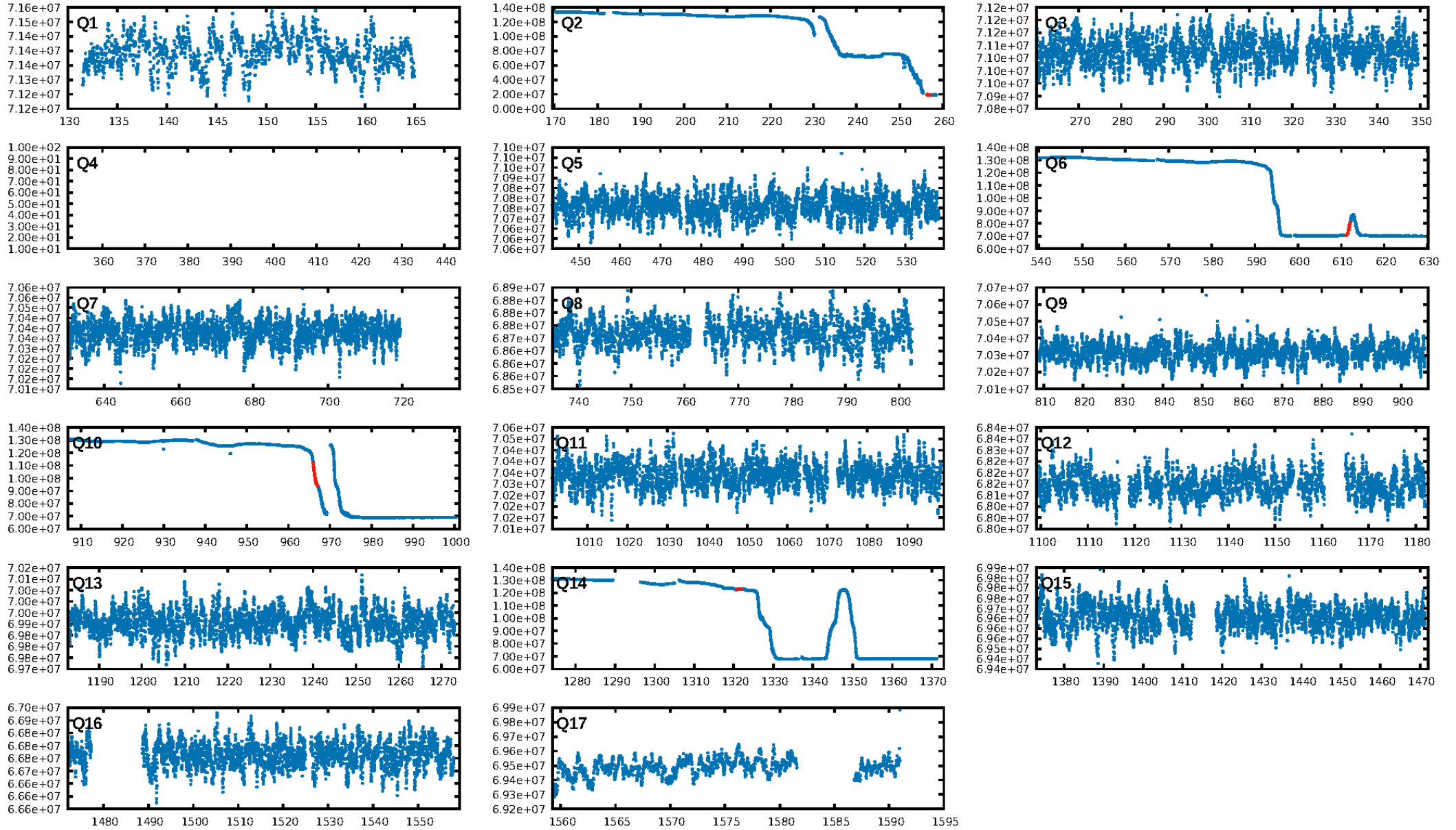
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 78.4% [1.24σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 5.23e-25  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 0.5639  
Centroid-sig: N/A  
Centroid-so: 11.323 arcsec [1.12σ]  
OotOffset-rm: 4.743 arcsec [71.08σ]  
KicOffset-rm: 8.156 arcsec [122.24σ]  
OotOffset-st: 1/0/0/0 [1]  
KicOffset-st: 1/0/0/0 [1]  
DiffImageQuality-fgm: 0.00 [0/1]  
DiffImageOverlap-fno: 0.50 [1/2]

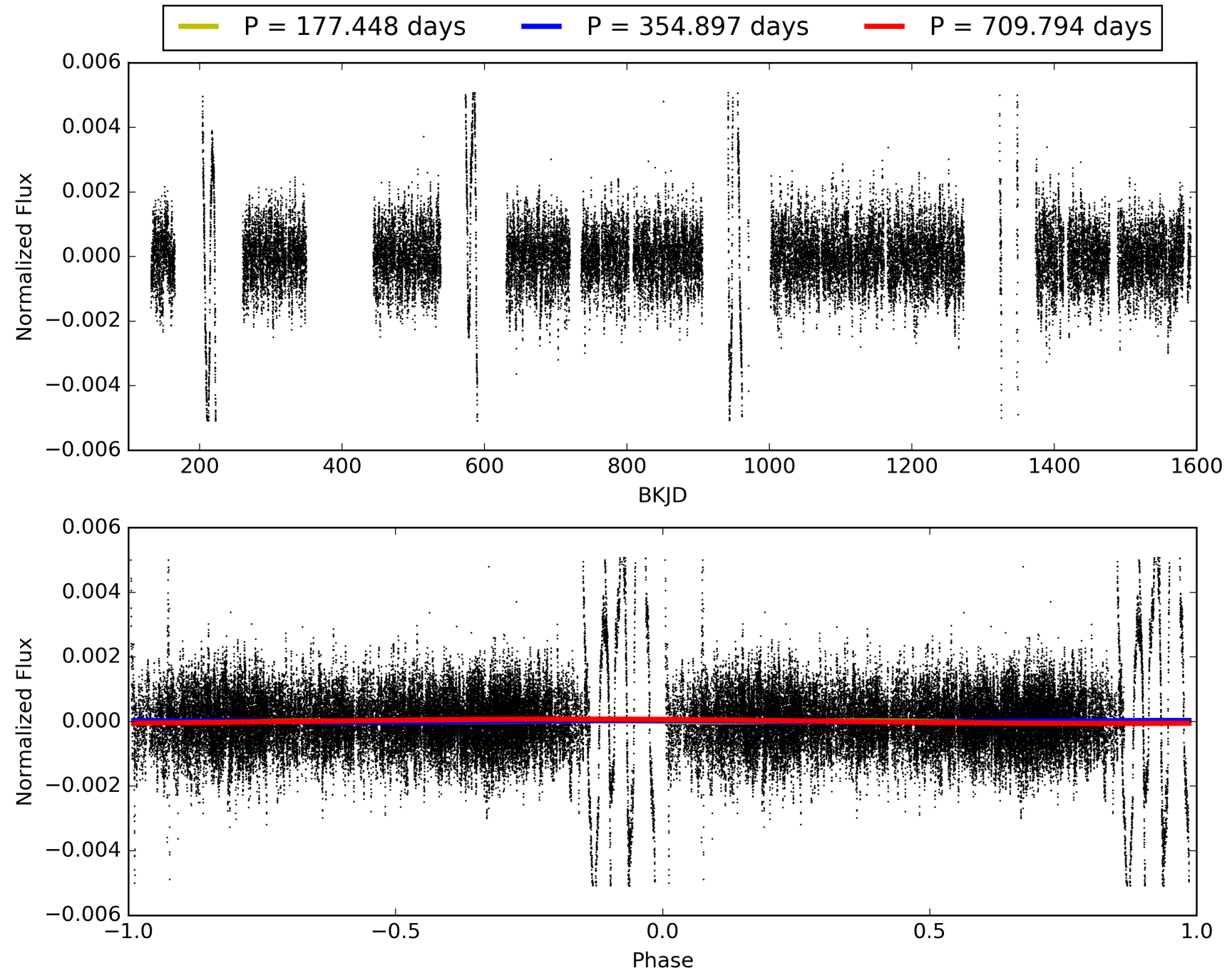
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 16:42:52 Z

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

# TCE 007456230-02, PDC Light Curves



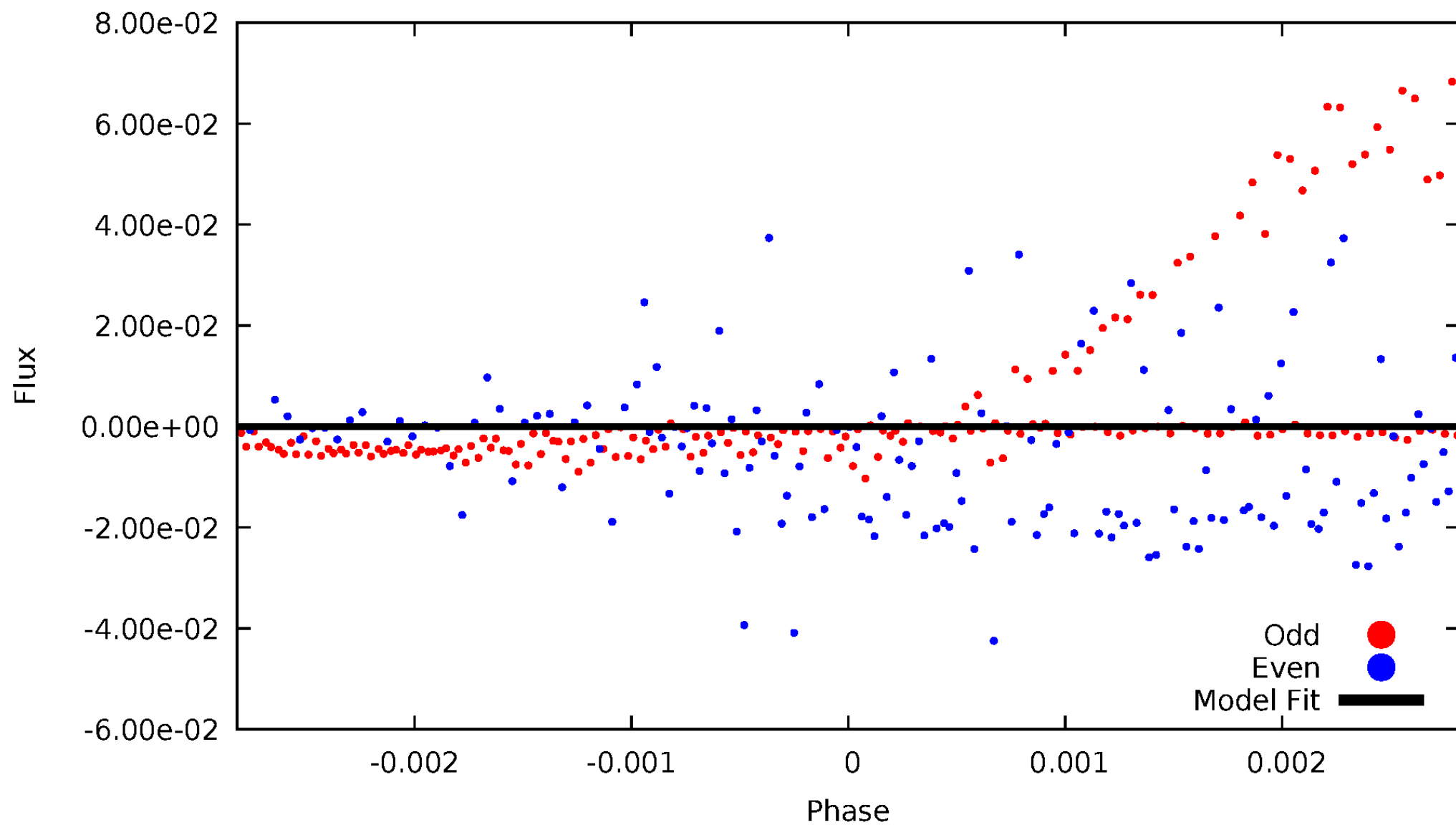
# TCE 007456230-02





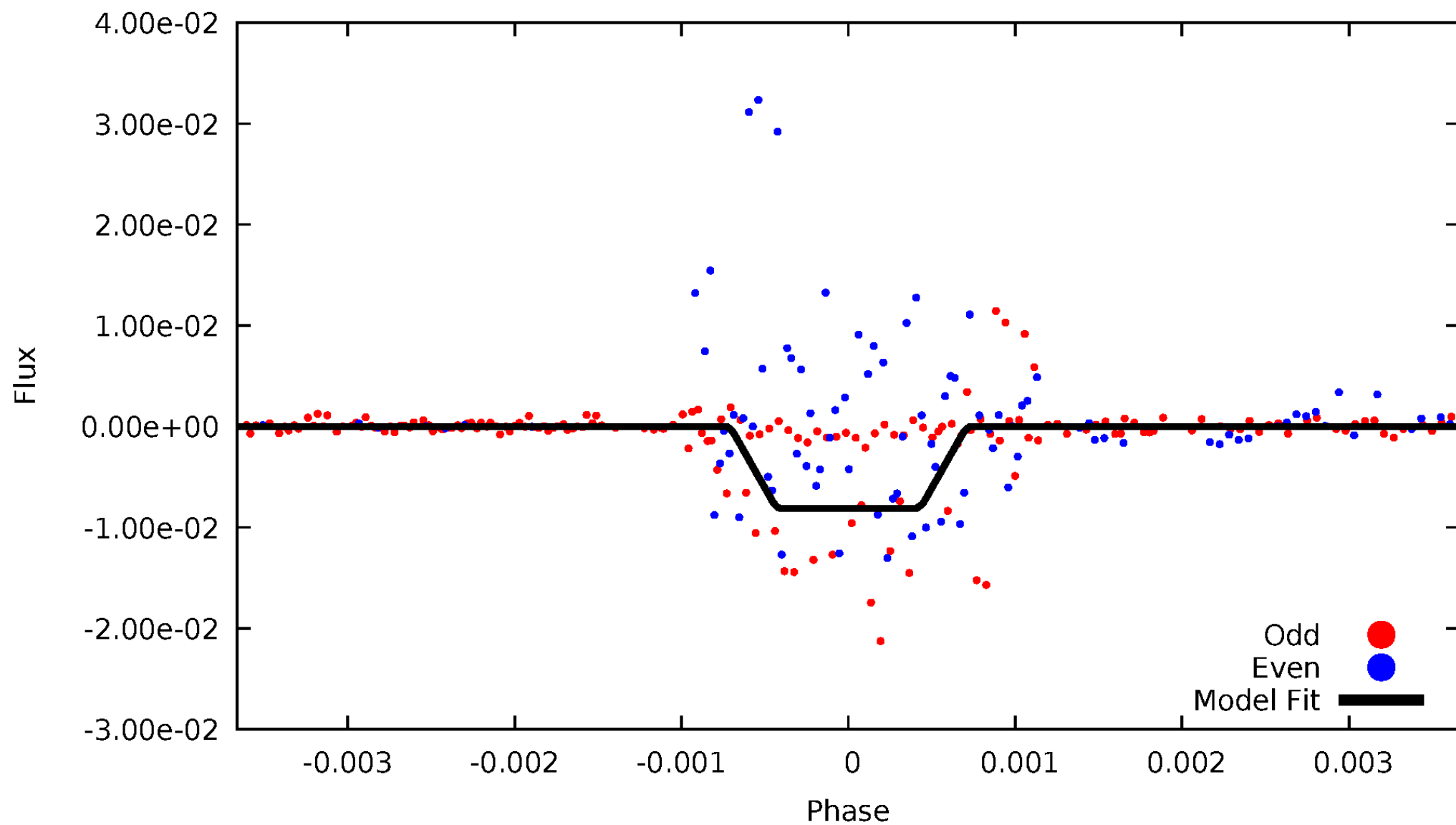
# DV Odd/Even

TCE 007456230-02



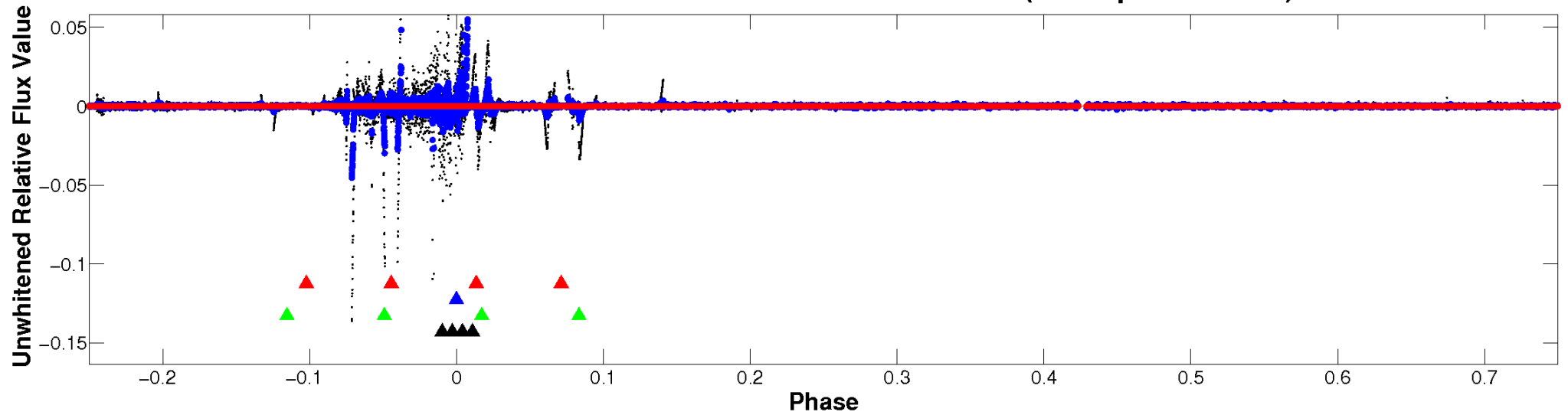
# ALT Odd/Even

TCE 007456230-02



# Non-Whitened Vs. Whitened Light Curve

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

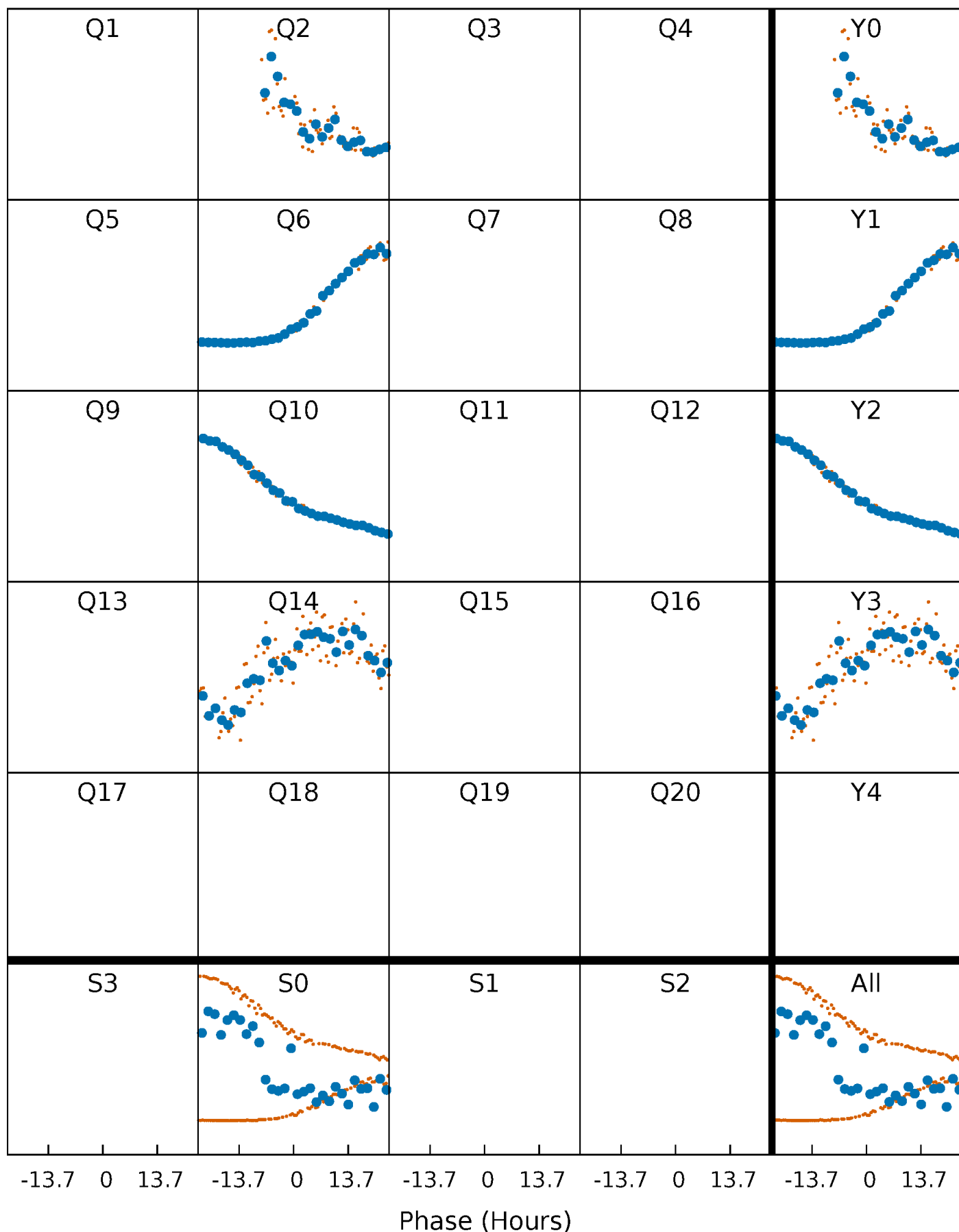


**Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



# PDC Quarter-Phased Transit Curves

TCE 007456230-02 P=354.896881 Days  $T_0=256.676766$  (BKJD)



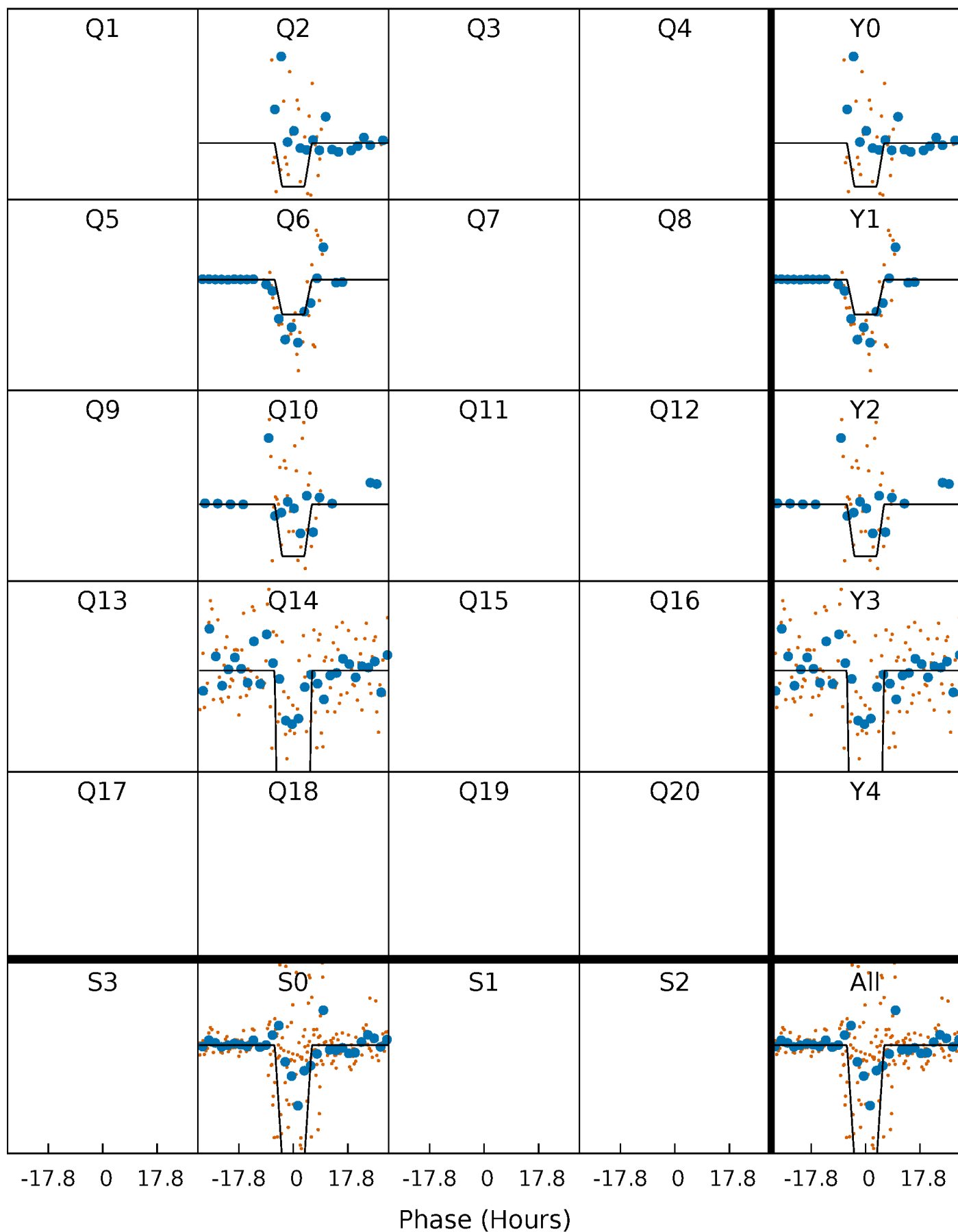
# DV Quarter-Phased Transit Curves

TCE 007456230-02 P=354.896881 Days  $T_0=256.676766$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

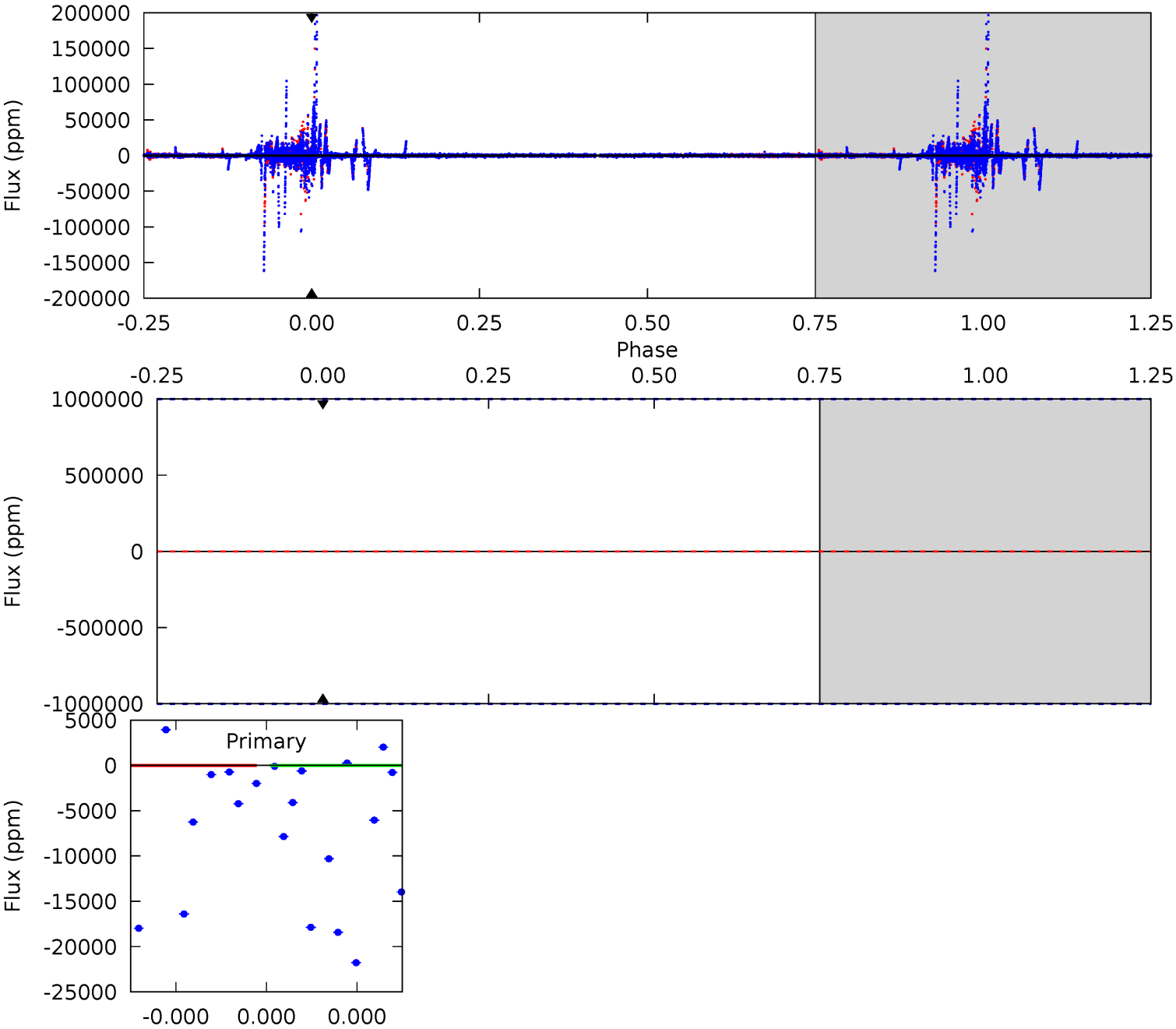
TCE 007456230-02 P=354.896881 Days  $T_0=256.636203$  (BKJD)



# DV Model-Shift Uniqueness Test

007456230-02, P = 354.896881 Days, E = 256.676766 Days

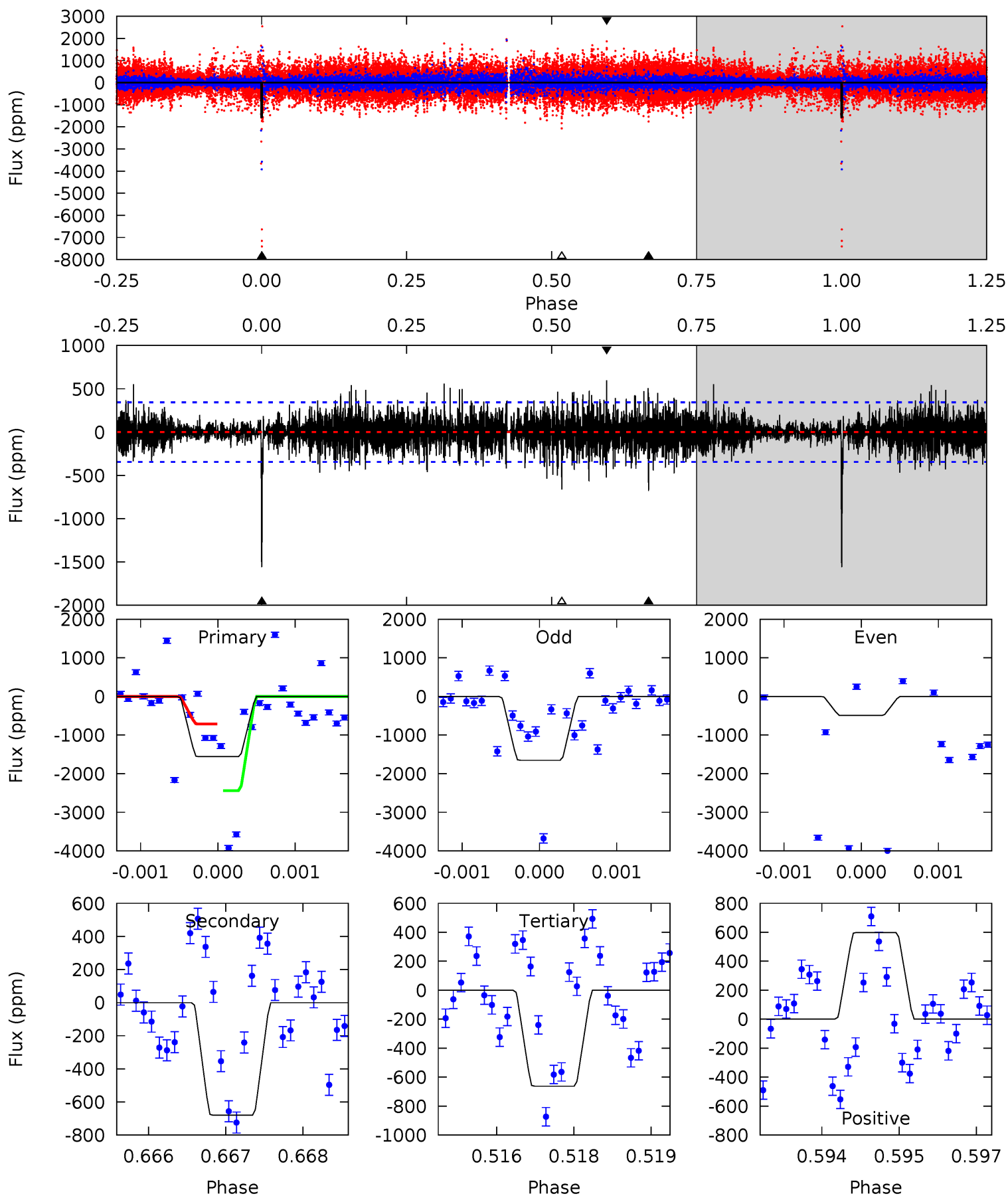
| Pri | Sec | Ter | Pos | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|-----|-----|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|-----|-------|-----|
| 0   | 0   | 0   | 0   | 1.00            | 1.00            | 1.00             | 0       | 0       | 0       | 0       | 0       | 0   | 0     | 0   |



# Alt Model-Shift Uniqueness Test

007456230-02, P = 354.896881 Days, E = 256.636203 Days

| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 24.4 | 10.7 | 10.4 | 9.38 | 5.38            | 3.18            | 2.16             | 14.0    | 15.0    | 0.28    | 1.28    | 8.15    | 2.89 | 0.28  | 13.3 |





### Stellar Parameters For KIC 007456230

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | $[\text{Fe}/\text{H}]$    | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
|        | $4765^{+117}_{-105}$ | $3.058^{+0.396}_{-0.324}$ | $0.210^{+0.200}_{-0.250}$ | $5.905^{+2.725}_{-2.452}$ | $1.451^{+0.276}_{-0.414}$ | $0.010^{+0.039}_{-0.007}$                 |
|        | +2%/-2%              | +13%/-11%                 | +95%/-119%                | +46%/-42%                 | +19%/-29%                 | +392%/-66%                                |
| 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 007456230-02 / KOI

| Detrend | Depth (ppm)     | $R_p (R_{\oplus})$        | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$     | $A_{\text{obs}}$                     |
|---------|-----------------|---------------------------|----------------------|--------------------------|--------------------------------------|
| DV      | $0 \pm 1000000$ | $50.17^{+59.01}_{-35.39}$ | $683^{+83}_{-88}$    | $-3710^{+16423}_{-9349}$ | $-351.293^{+47481.432}_{-46795.249}$ |
| Alt.    | $-680 \pm 64$   | $72.13^{+64.04}_{-45.65}$ | $681^{+89}_{-80}$    | $2916^{+1043}_{-412}$    | $88^{+569}_{-63}$                    |

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature  
 $T_{\text{obs}}$  = Observed Planetary Temperature (Assuming A=0.3)  
 $A_{\text{obs}}$  = 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  $A_{\text{obs}} \gg 1.0$

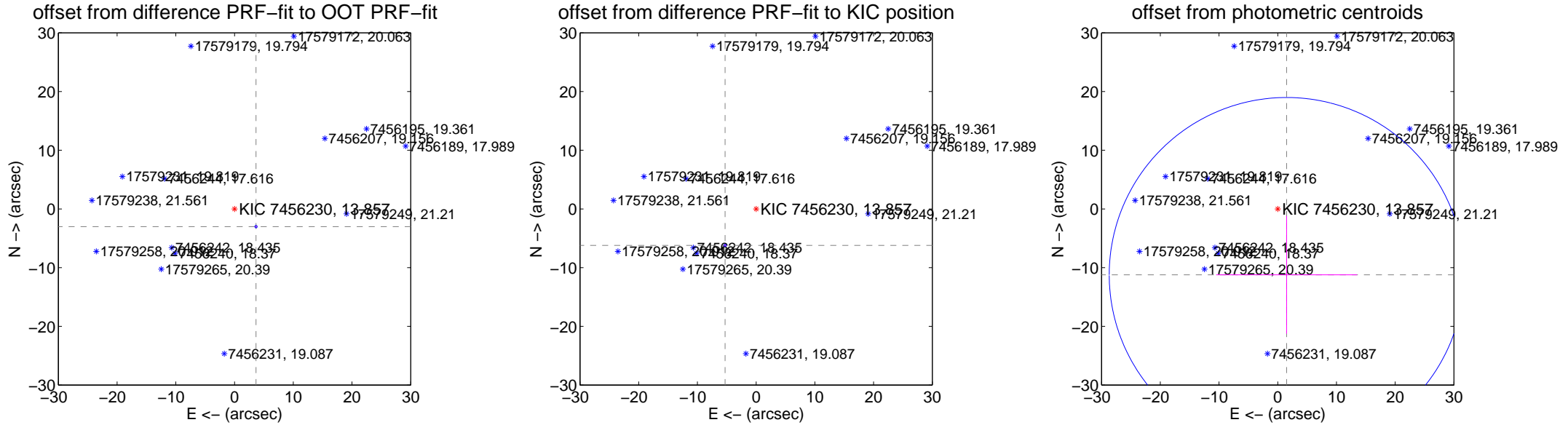
## DV Centroid Data

Supplemental centroid analysis for 007456230-02. Kepler magnitude: 13.86. Transit SNR -1.00

There are 0 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 9.50 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec       |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT          | $4.743 \pm 0.067$  | 71.08               | $-3.662 \pm 0.067$ | $-3.014 \pm 0.067$ |
| PRF-fit source offset from KIC position | $8.156 \pm 0.067$  | 122.24              | $5.285 \pm 0.067$  | $-6.212 \pm 0.067$ |
| photometric centroid source offset      | $11.32 \pm 10.07$  | 1.12                | $-1.51 \pm 11.99$  | $-11.22 \pm 10.03$ |

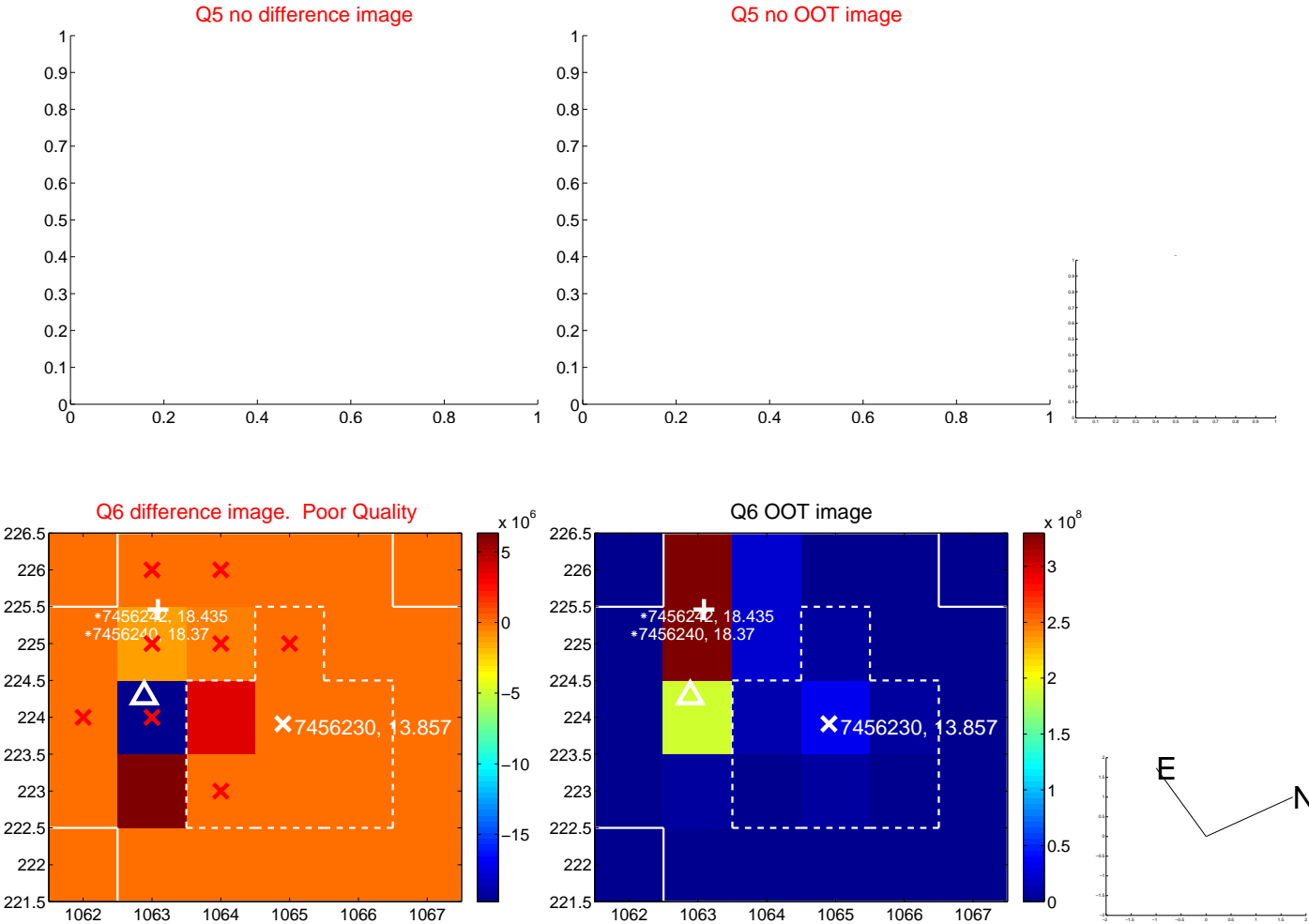


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



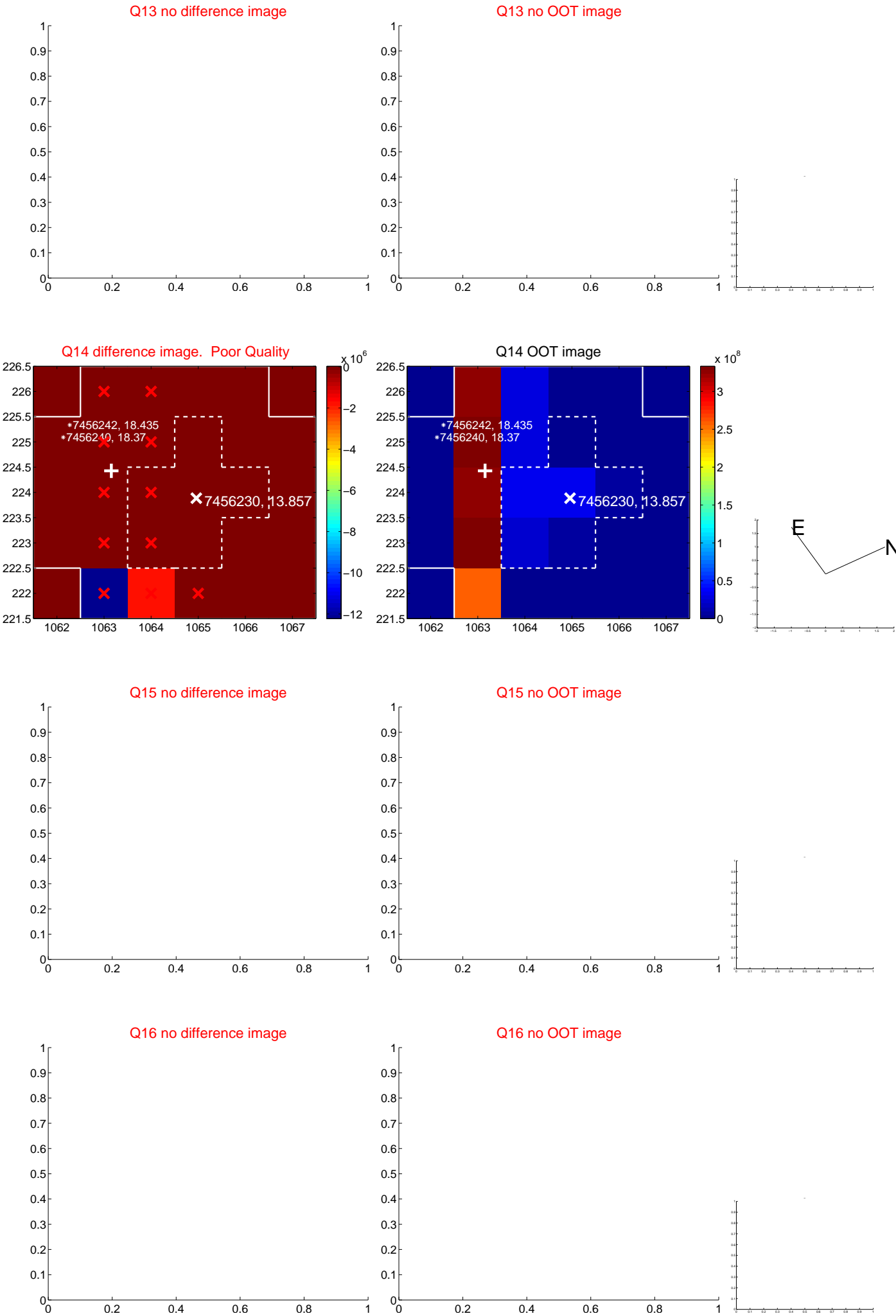
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



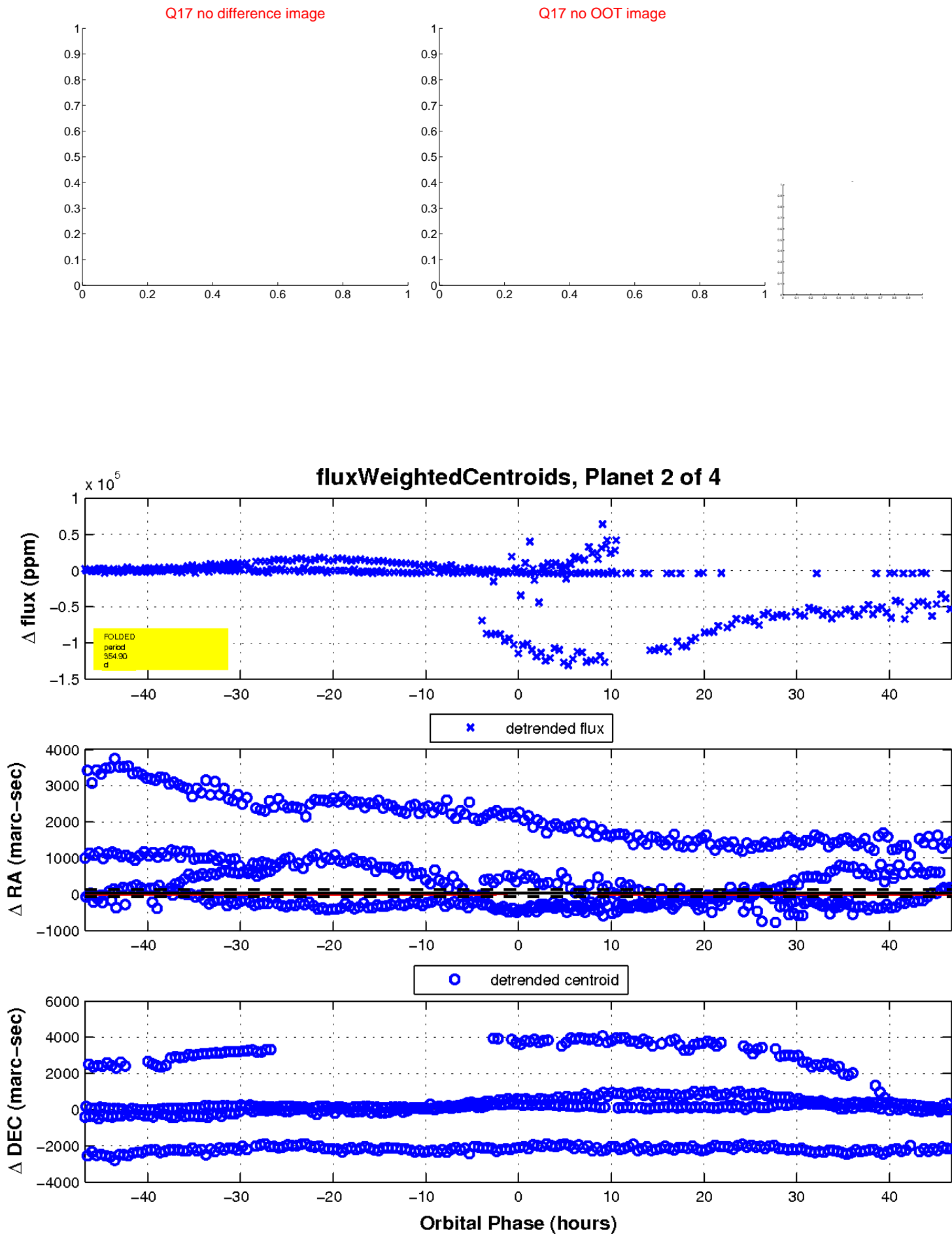
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

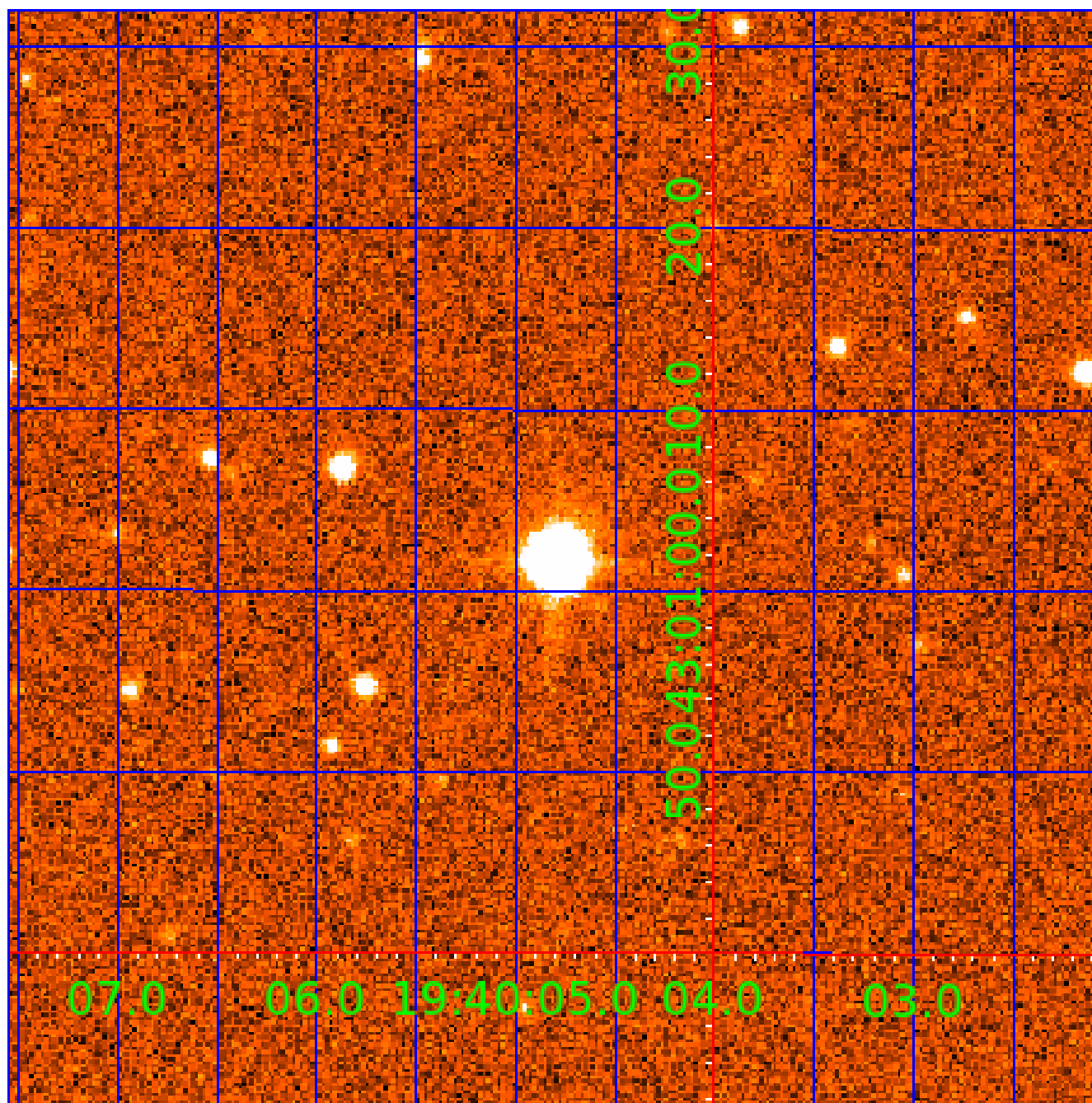


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination





# KIC 007456230

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-------|------|-----------------------------|-----------------|------------------------|------------------------|
| 007456230-01 | OBS      | No   | 375.424157    | 220.399418   | 18858.2     | 24.120           | 109.9 | 42.0 | 5.91                        | 4765            | 148.20                 | 12.10                  |
| 007456230-02 | OBS      | No   | 354.896881    | 256.676766   | 2000.3      | 12.000           | 51.6  | -1.0 | 5.91                        | 4765            | 25.34                  | 13.04                  |
| 007456230-04 | OBS      | No   | 357.332695    | 253.238349   | 19916.2     | 45.713           | 40.2  | 21.0 | 5.91                        | 4765            | 150.78                 | 12.92                  |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|--|
| 007456230-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS                      |
| 007456230-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_NOFITS                           |
| 007456230-04 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE_CHASES_SKYE_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—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.

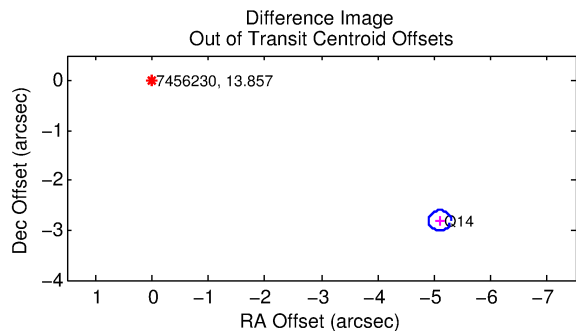
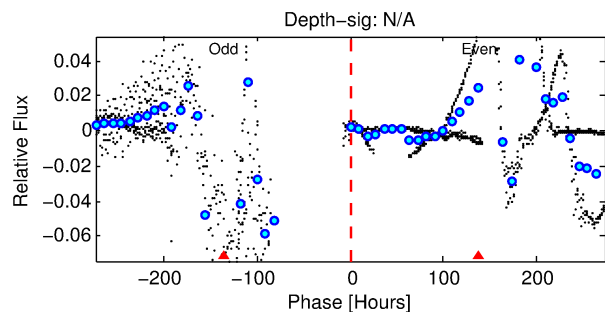
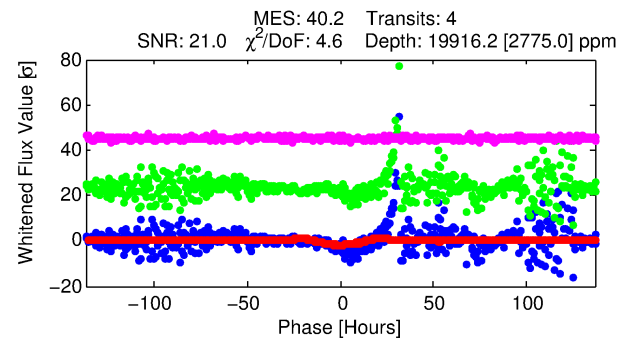
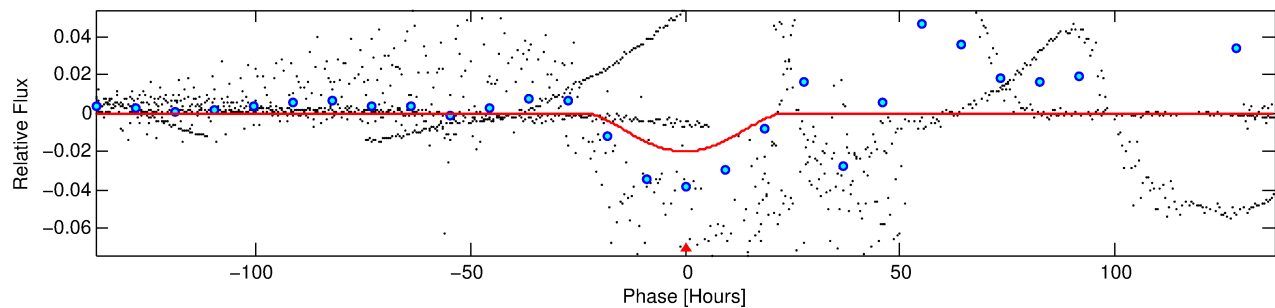
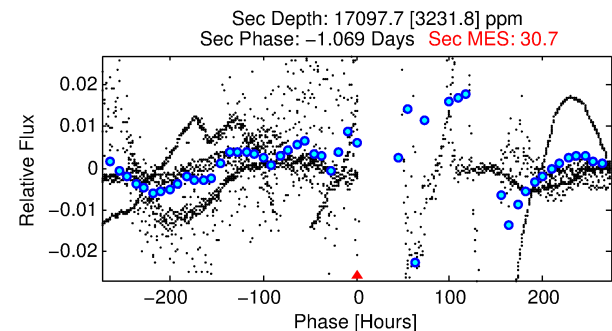
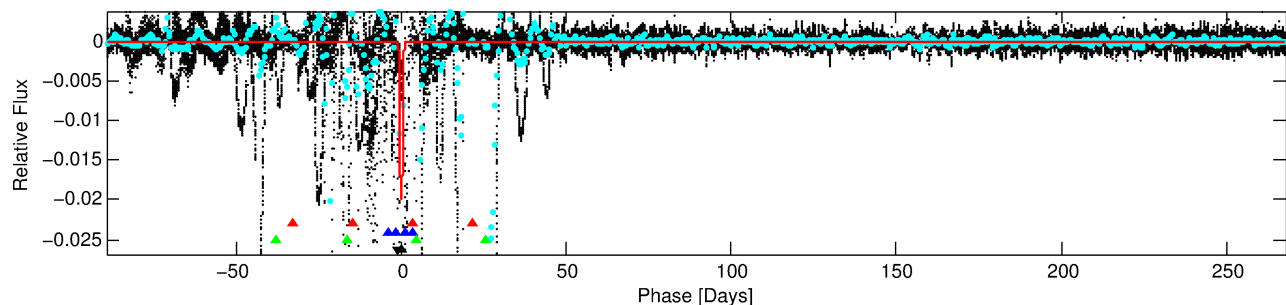
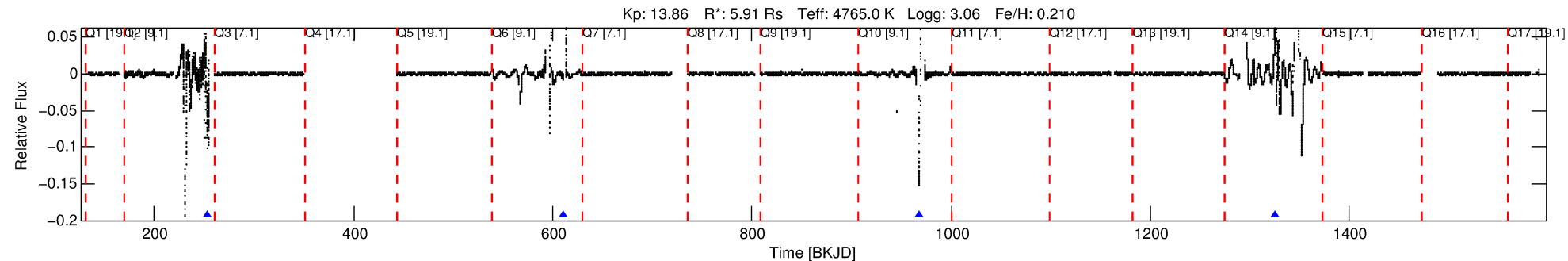
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 007456230-04

No Significant Match Found

# DV One-Page Summary

KIC: 7456230 Candidate: 4 of 4 Period: 357.333 d



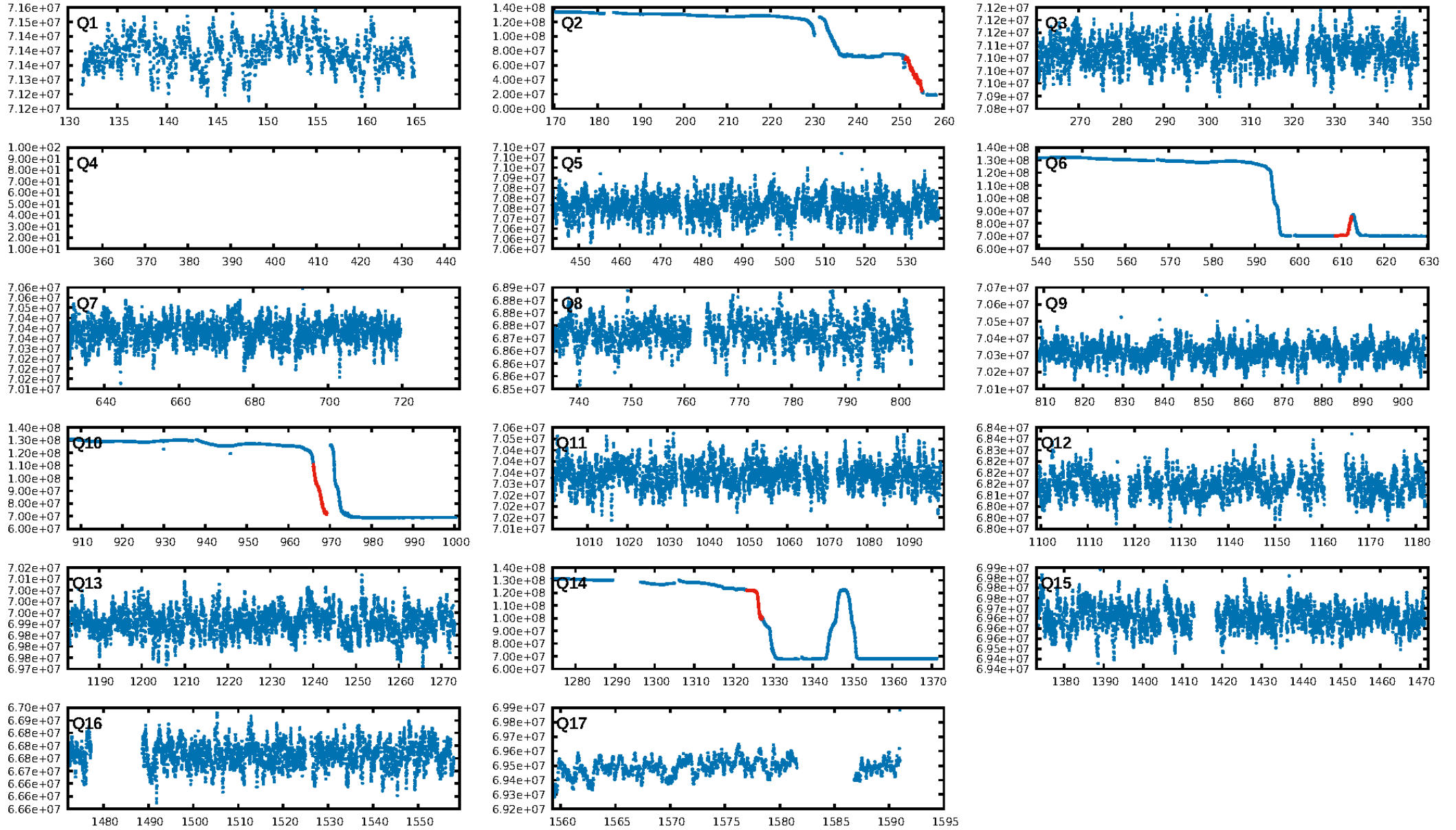
## DV Fit Results:

Period = 357.33269 [0.04932] d  
Epoch = 253.2383 [0.0974] BKJD  
Rp/R\* = 0.2340 [0.4402]  
a/R\* = 43.40 [6.96]  
b = 1.00 [0.61]  
Seff = 12.92 [8.89]  
Teq = 483 [83] K  
**Rp = 150.78 [292.06] Re**  
a = 1.1166 [0.4829] AU  
Ag = 515.81 [1974.68] [0.26σ]  
Teffp = 3562 [3356] K [0.92σ]

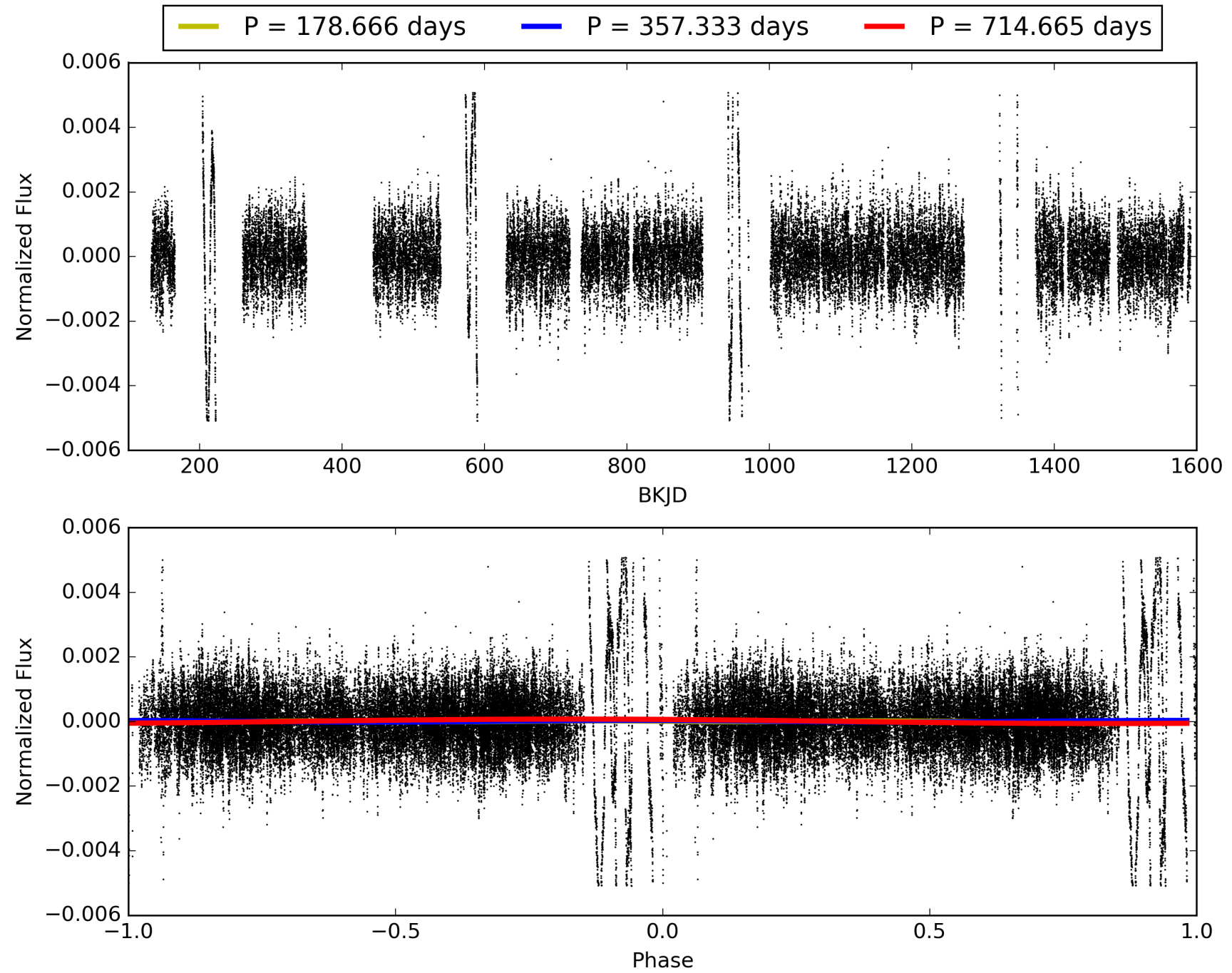
## DV Diagnostic Results:

ShortPeriod-sig: 78.4% [1.24σ]  
LongPeriod-sig: 100.0% [8.40σ]  
**ModelChiSquare2-sig: 0.0%**  
**ModelChiSquareGof-sig: 0.0%**  
Bootstrap-pfa: 1.98e-16  
RollingBand-fgt: 1.00 [4/4]  
**GhostDiagnostic-chr: -0.6383**  
Centroid-sig: N/A  
Centroid-so: 32.616 arcsec [2.52σ]  
**OotOffset-rm: 5.814 arcsec [87.16σ]**  
**KicOffset-rm: 7.951 arcsec [119.21σ]**  
OotOffset-st: 1/0/0/0 [1]  
KicOffset-st: 1/0/0/0 [1]  
DiffImageQuality-fgm: 0.00 [0/1]  
DiffImageOverlap-fno: 0.50 [1/2]

# TCE 007456230-04, PDC Light Curves

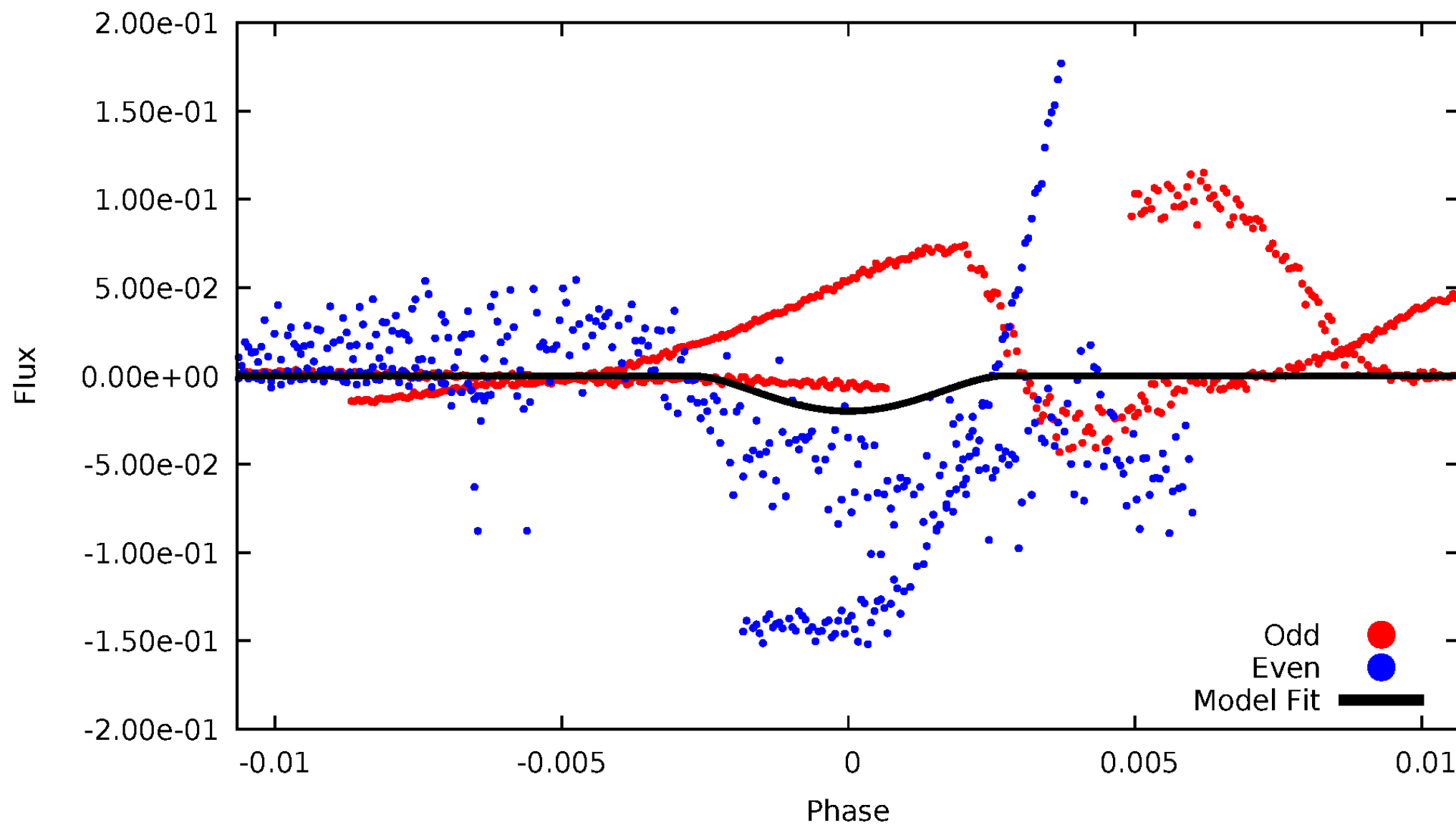


# TCE 007456230-04



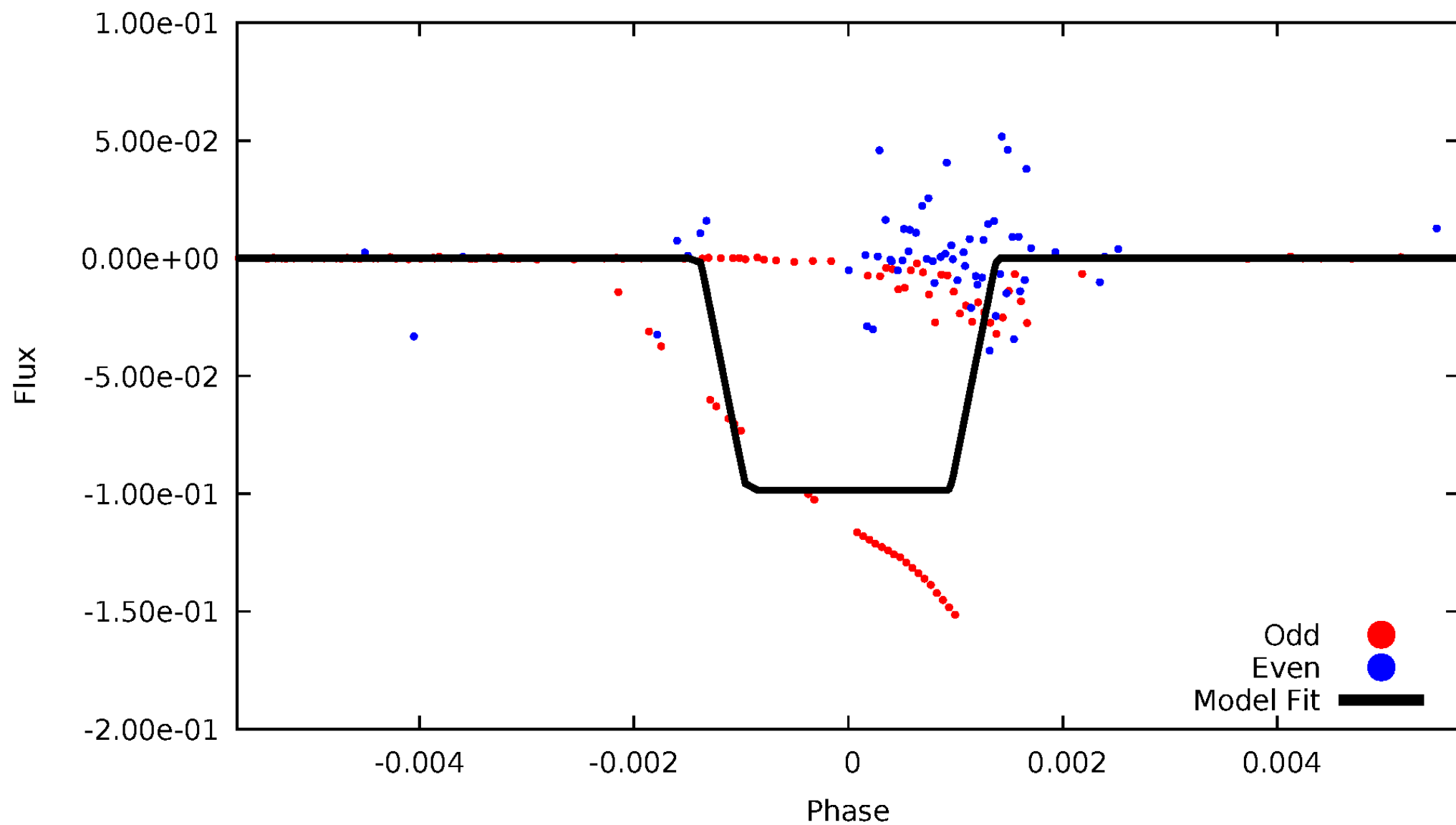
# DV Odd/Even

TCE 007456230-04



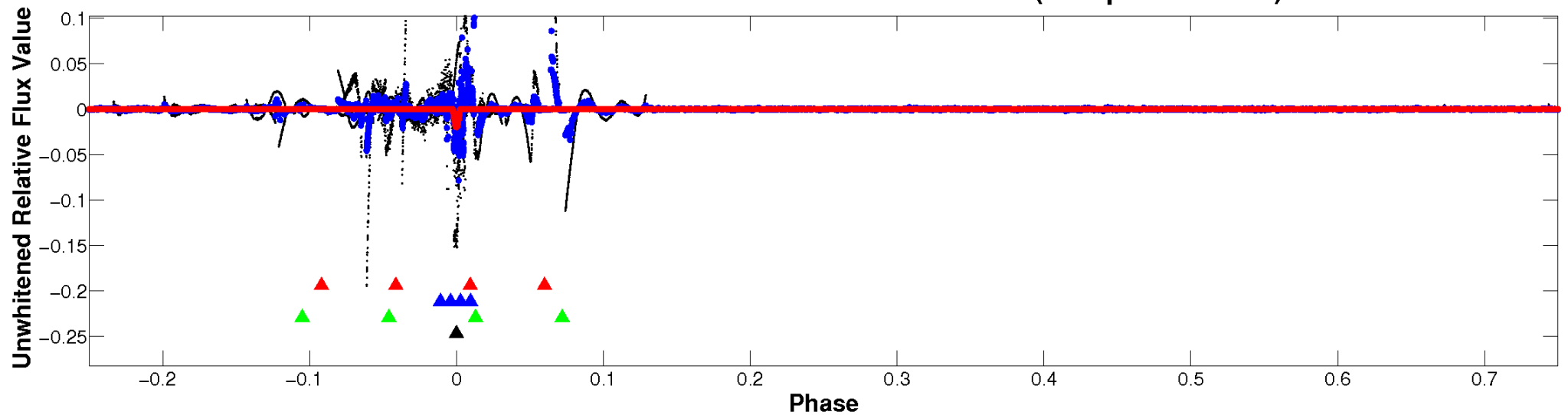
# ALT Odd/Even

TCE 007456230-04

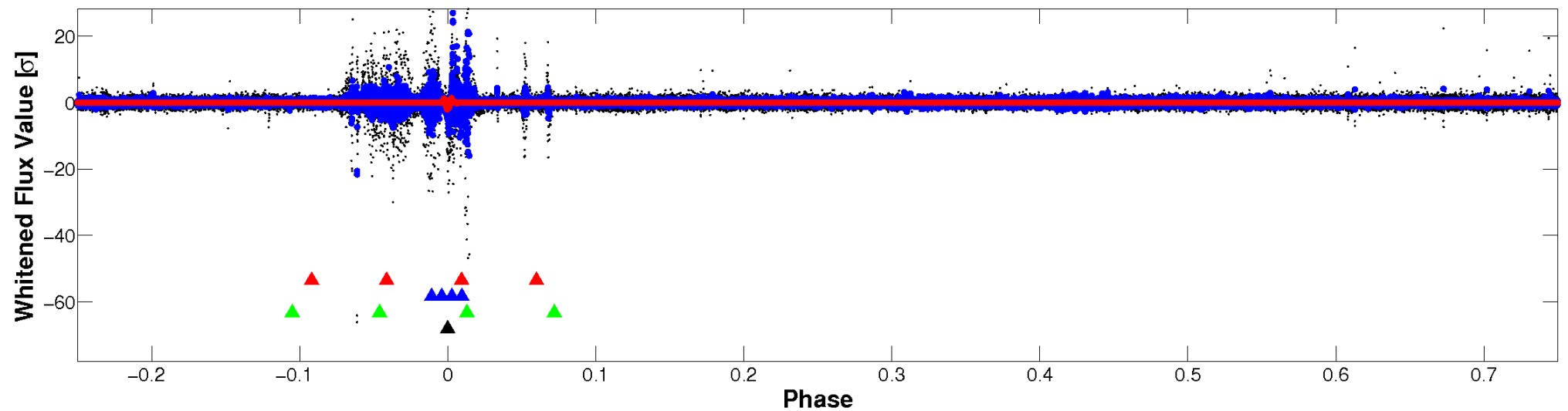


# Non-Whitened Vs. Whitened Light Curve

## Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

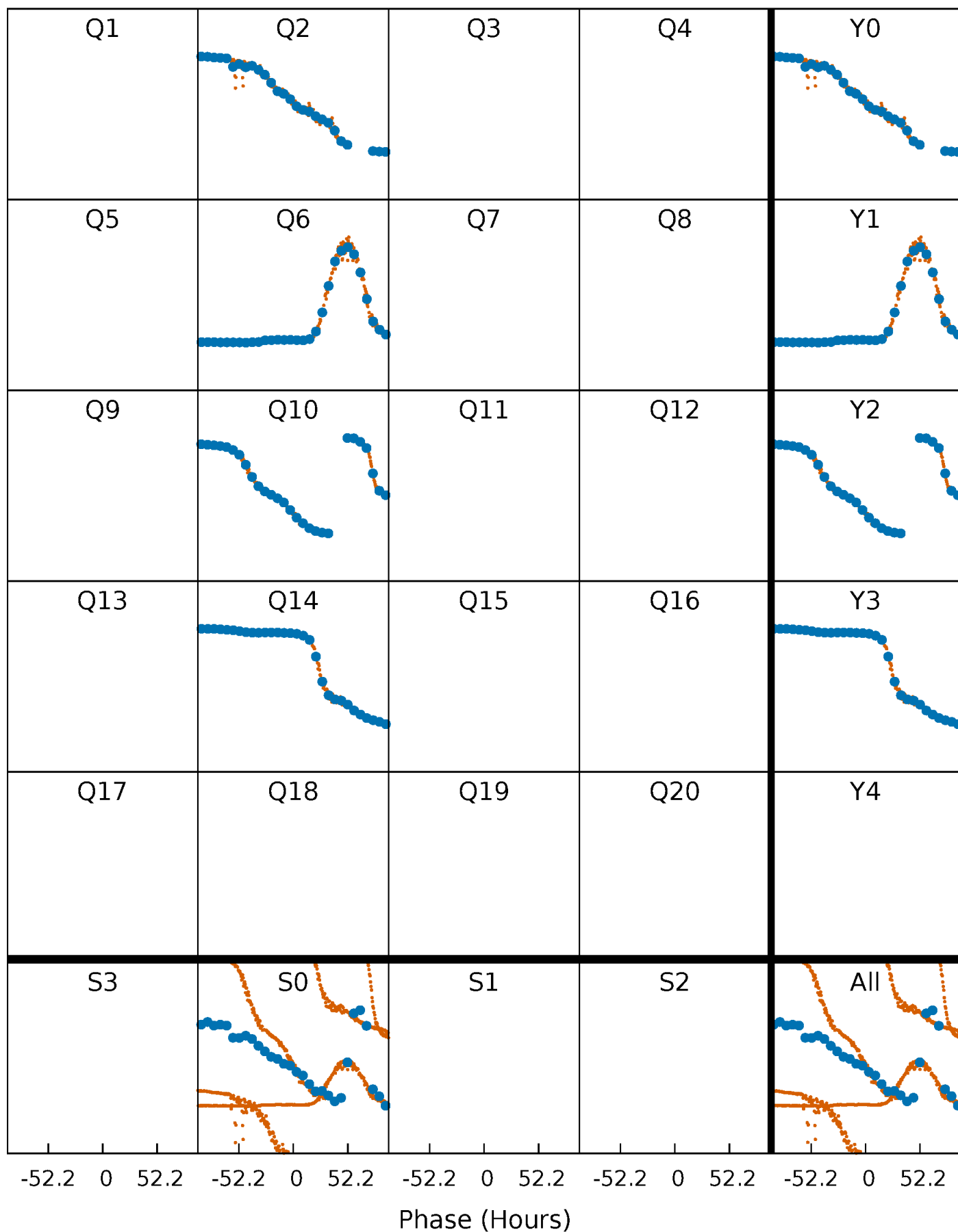


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

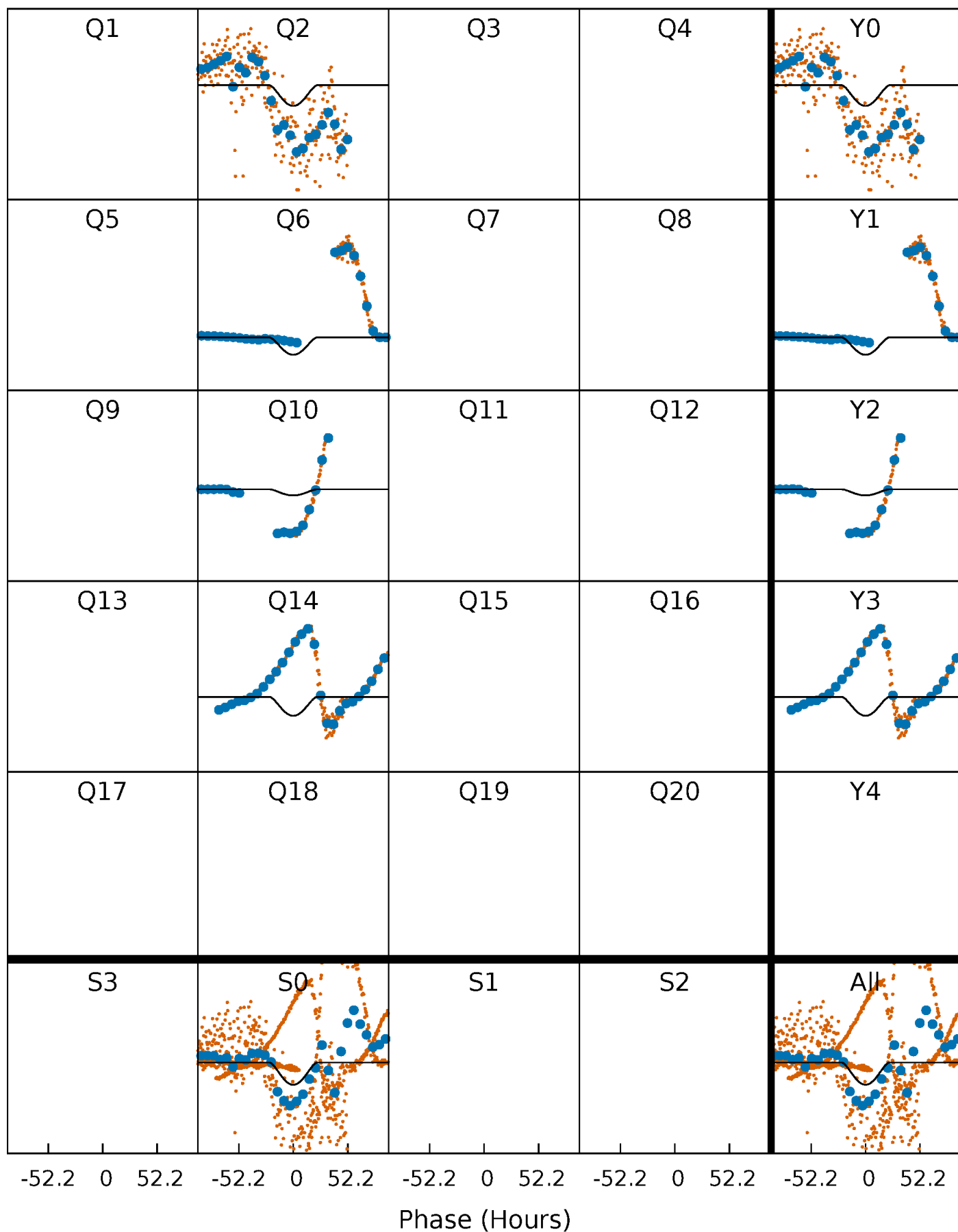
TCE 007456230-04 P=357.332695 Days  $T_0=253.238349$  (BKJD)





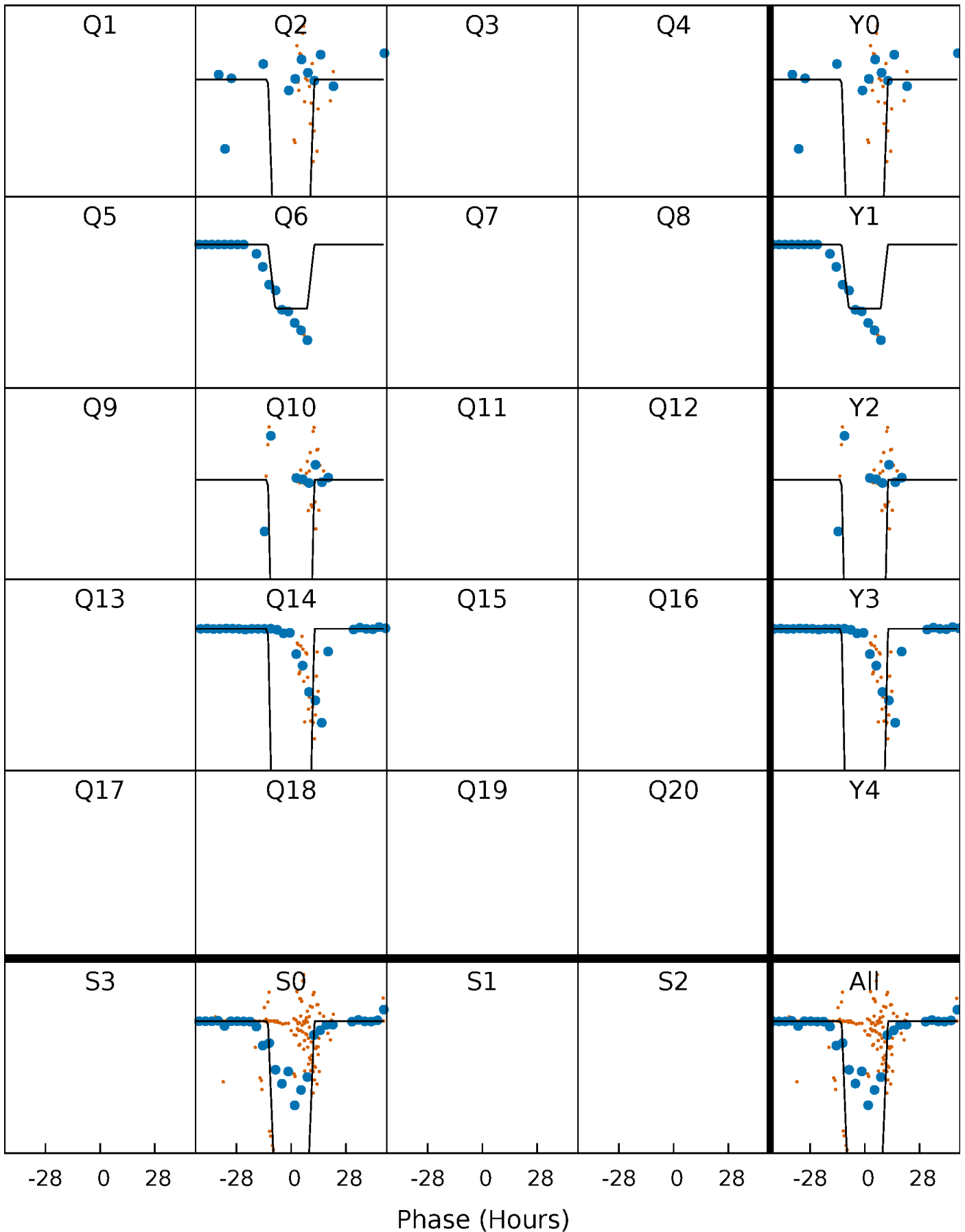
# DV Quarter-Phased Transit Curves

TCE 007456230-04 P=357.332695 Days  $T_0=253.238349$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

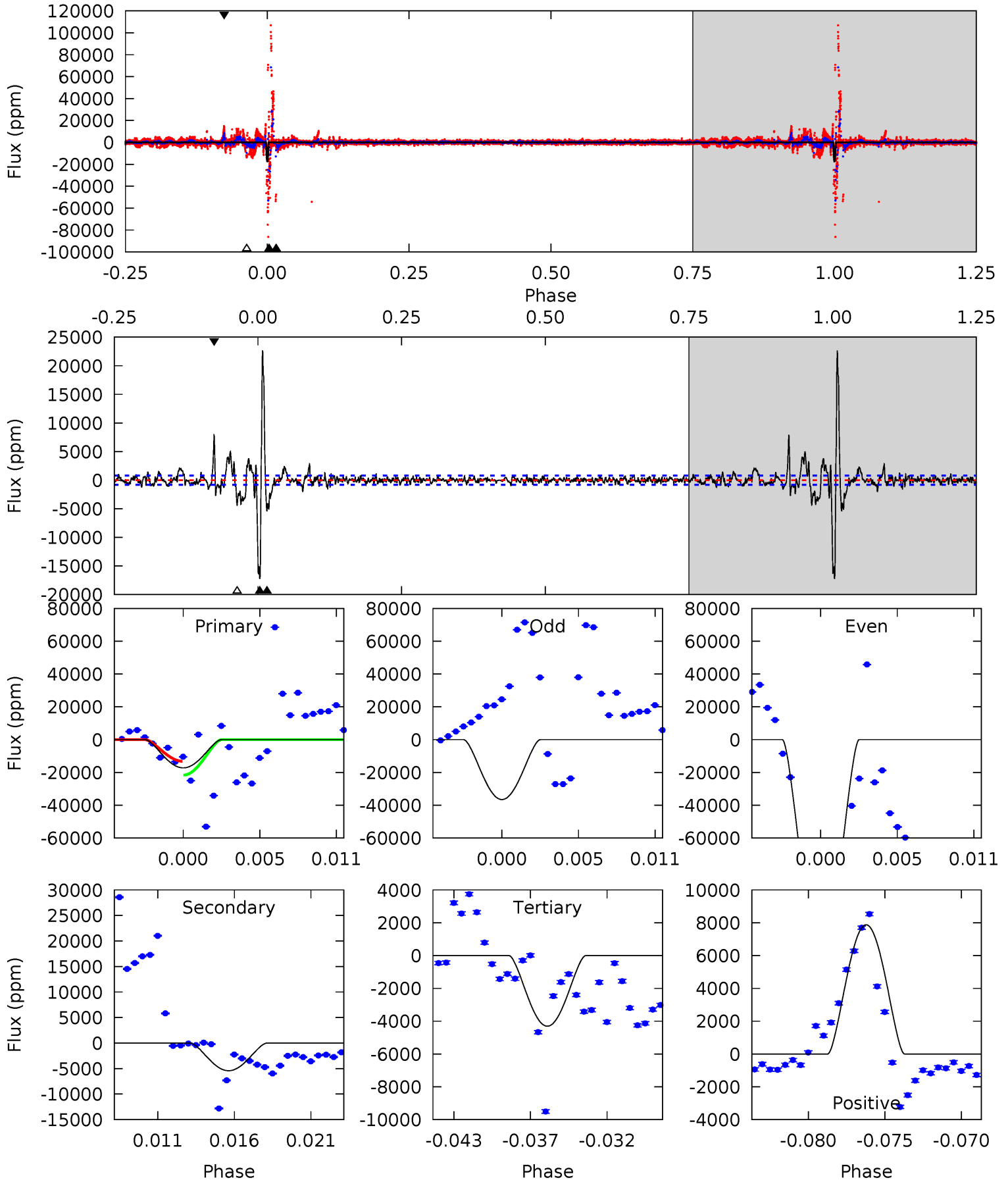
TCE 007456230-04 P=357.743957 Days  $T_0=252.704408$  (BKJD)



# DV Model-Shift Uniqueness Test

007456230-04, P = 357.332695 Days, E = 253.238349 Days

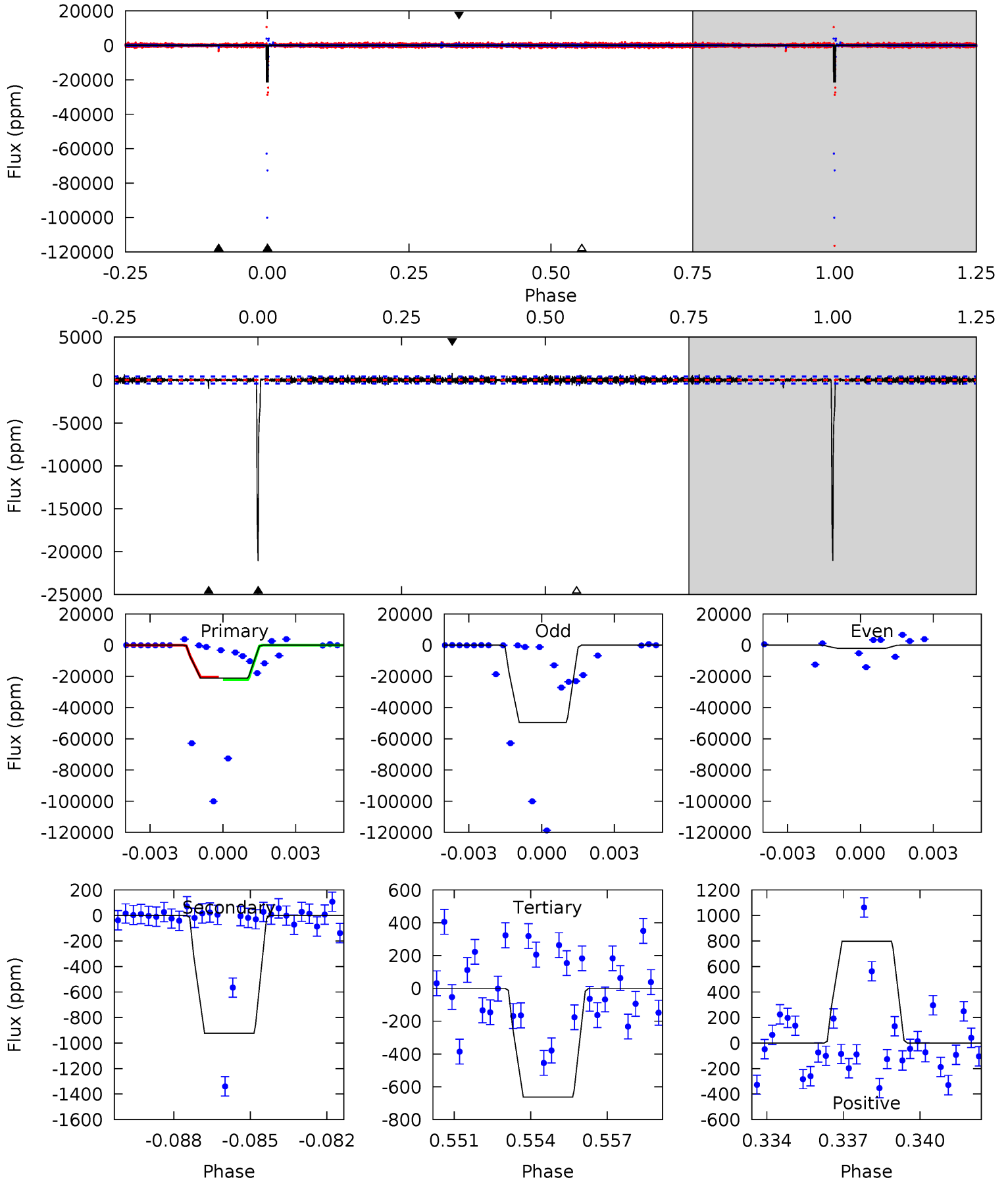
| Pri   | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT |
|-------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|-----|
| 110.2 | 34.6 | 27.5 | 50.3 | 5.15            | 2.79            | 6.24             | 82.7    | 59.9    | 7.09    | -15.7   | 51.4    | 1.15 | 0.57  | 0   |



# Alt Model-Shift Uniqueness Test

007456230-04, P = 357.743957 Days, E = 252.704408 Days

| Pri   | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|-------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 262.1 | 11.5 | 8.24 | 9.91 | 5.27            | 3.00            | 1.87             | 253.8   | 252.2   | 3.24    | 1.57    | 291.4   | 8.35 | 0.04  | 10.0 |



### Stellar Parameters For KIC 007456230

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | $[\text{Fe}/\text{H}]$    | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
|        | $4765^{+117}_{-105}$ | $3.058^{+0.396}_{-0.324}$ | $0.210^{+0.200}_{-0.250}$ | $5.905^{+2.725}_{-2.452}$ | $1.451^{+0.276}_{-0.414}$ | $0.010^{+0.039}_{-0.007}$                 |
|        | +2%/-2%              | +13%/-11%                 | +95%/-119%                | +46%/-42%                 | +19%/-29%                 | +392%/-66%                                |
| 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 007456230-04 / KOI

| Detrend | Depth (ppm)     | $R_p (R_{\oplus})$           | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$  | $A_{\text{obs}}$           |
|---------|-----------------|------------------------------|----------------------|-----------------------|----------------------------|
| DV      | $-5415 \pm 156$ | $242.15^{+222.78}_{-170.44}$ | $682^{+79}_{-85}$    | $2788^{+1256}_{-425}$ | $63^{+618}_{-47}$          |
| Alt.    | $-923 \pm 80$   | $293.10^{+265.68}_{-196.62}$ | $678^{+85}_{-77}$    | $2129^{+649}_{-260}$  | $7.172^{+60.700}_{-5.162}$ |

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature  
 $T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )  
 $A_{\text{obs}}$  = 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  $A_{\text{obs}} \gg 1.0$

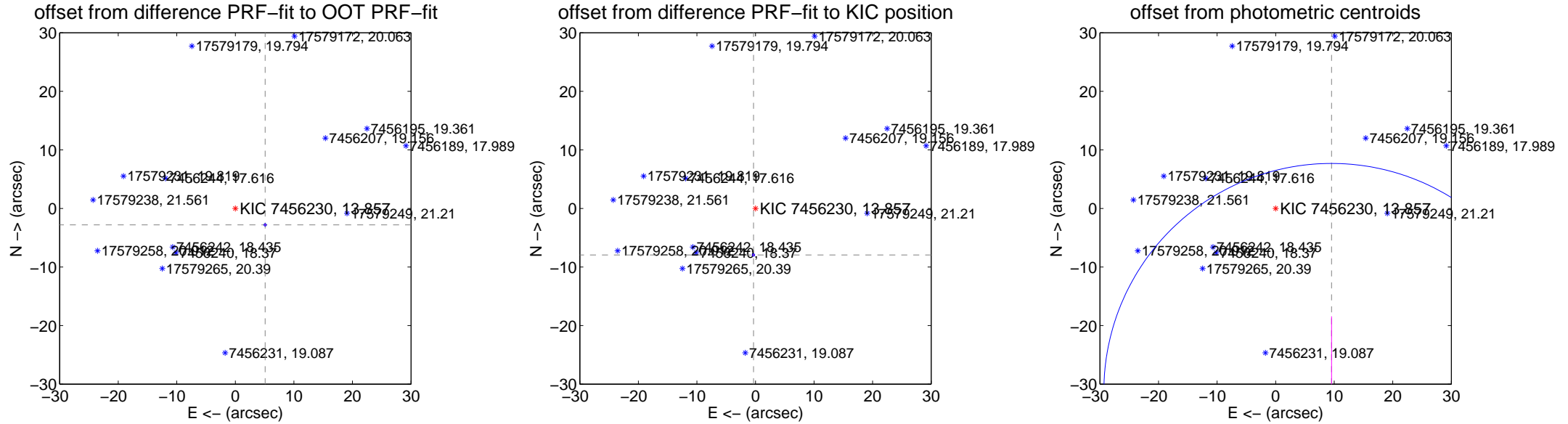
# DV Centroid Data

Supplemental centroid analysis for 007456230-04. Kepler magnitude: 13.86. Transit SNR 21.00

There are 0 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 7.47 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec       |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT          | $5.814 \pm 0.067$  | 87.16               | $-5.090 \pm 0.067$ | $-2.809 \pm 0.067$ |
| PRF-fit source offset from KIC position | $7.951 \pm 0.067$  | 119.21              | $0.339 \pm 0.067$  | $-7.944 \pm 0.067$ |
| photometric centroid source offset      | $32.62 \pm 12.96$  | 2.52                | $-9.54 \pm 14.80$  | $-31.19 \pm 12.77$ |

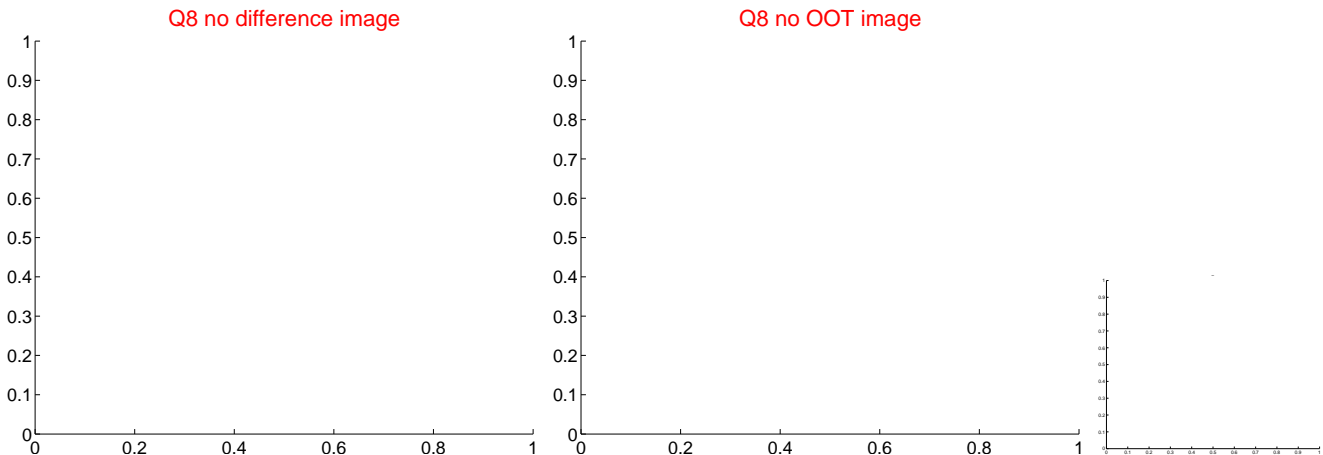
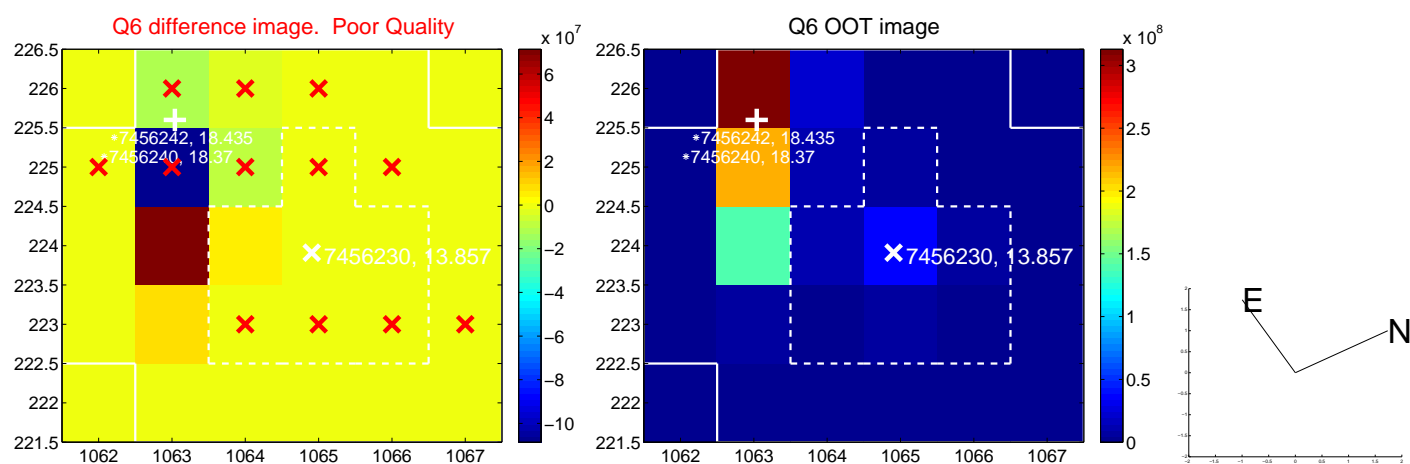


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

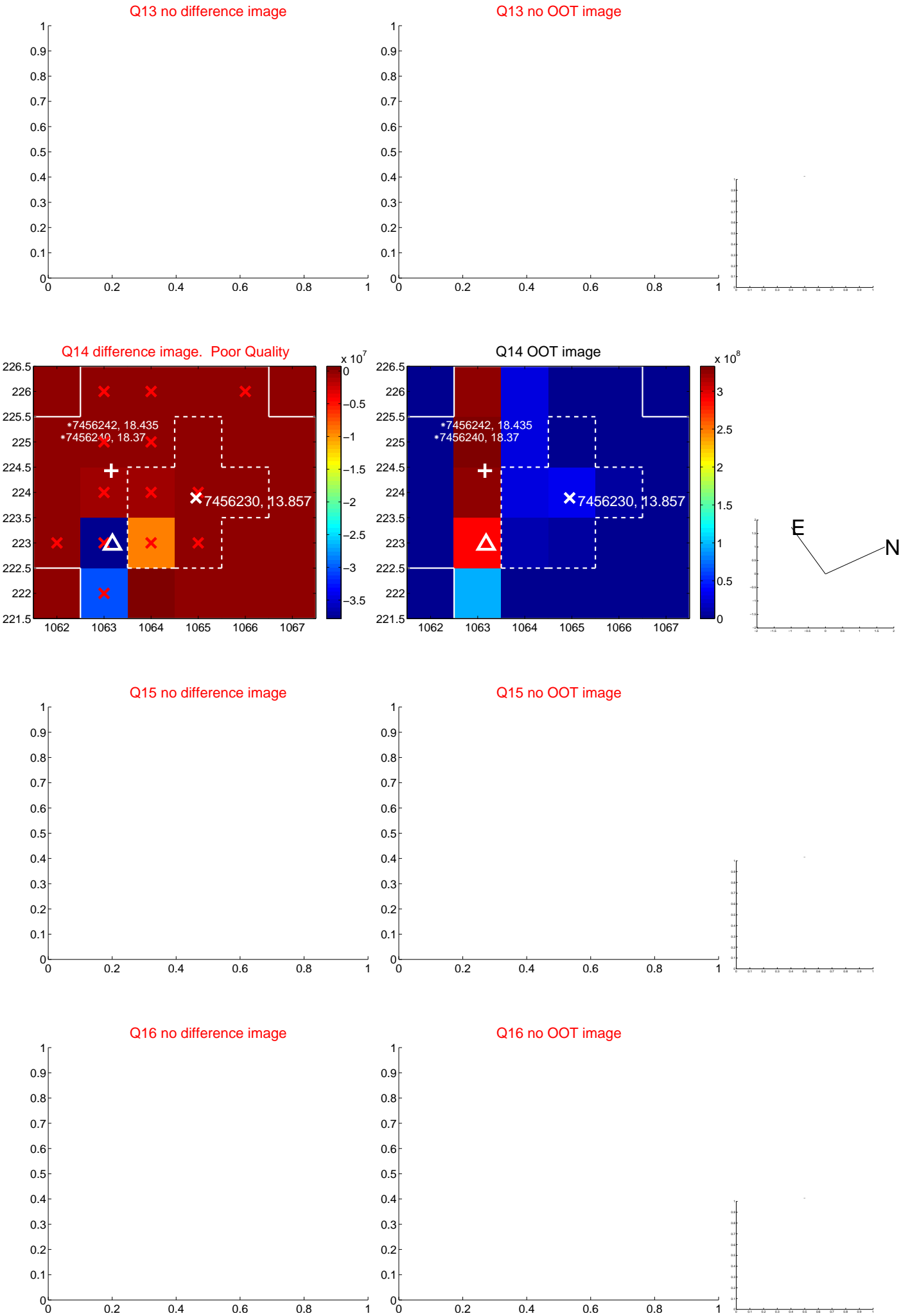




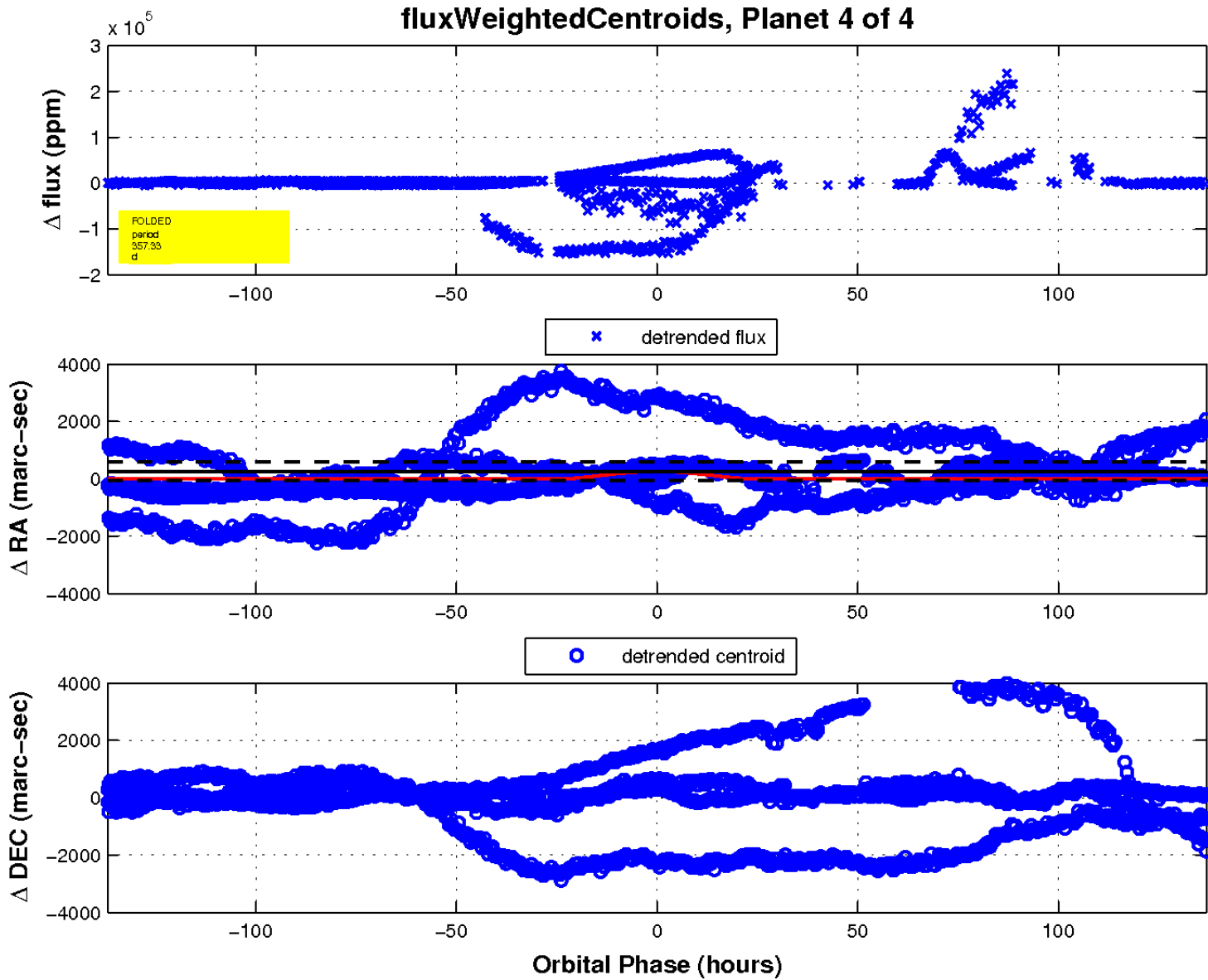
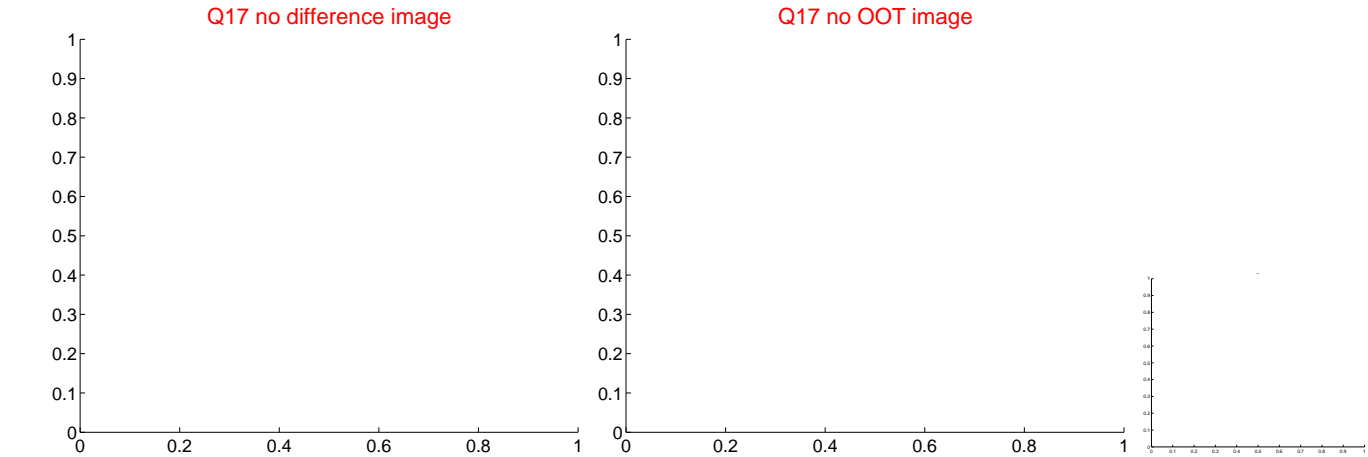
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

