

# KIC 003442054

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003442054-01	OBS	3593.01	117.681368	147.206961	45394.7	12.759	940.8	1367.1	2.08	6429	45.56	25.81
003442054-02	OBS	No	117.681231	178.233451	1988.2	17.185	40.5	50.8	2.08	6429	11.12	25.81

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003442054-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE
003442054-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

**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.

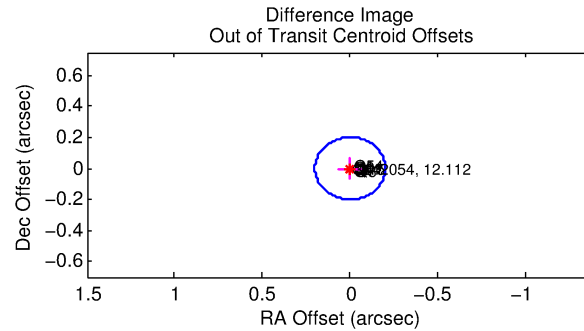
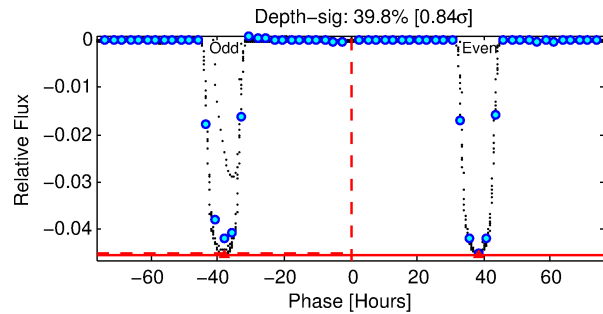
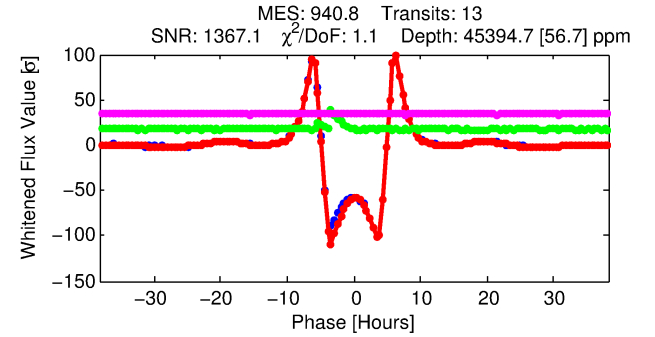
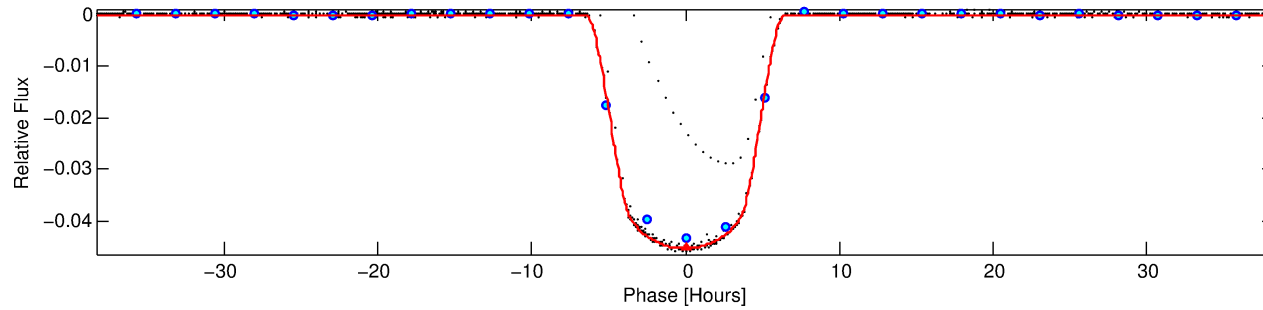
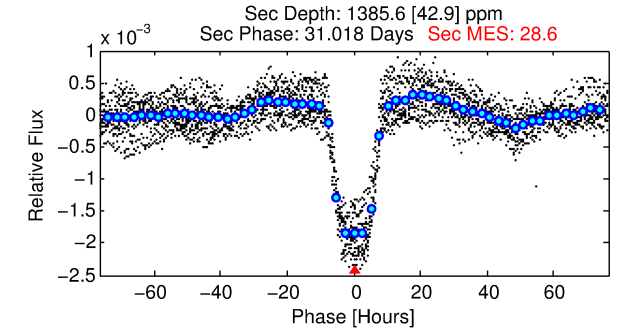
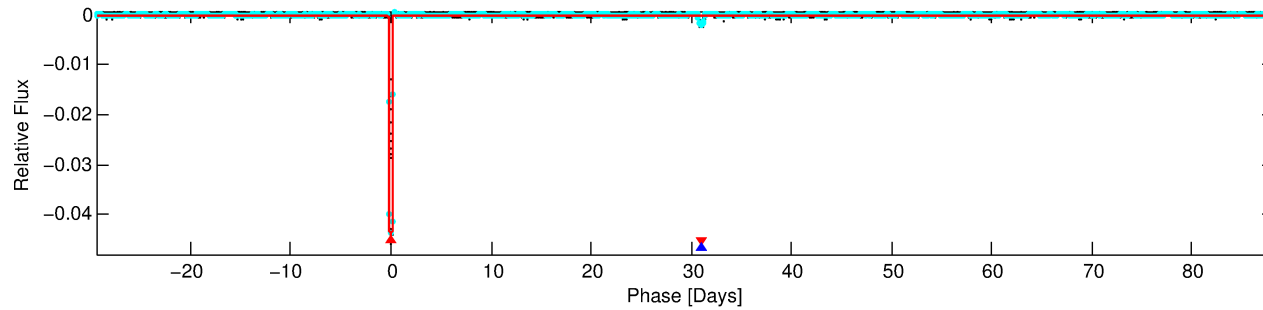
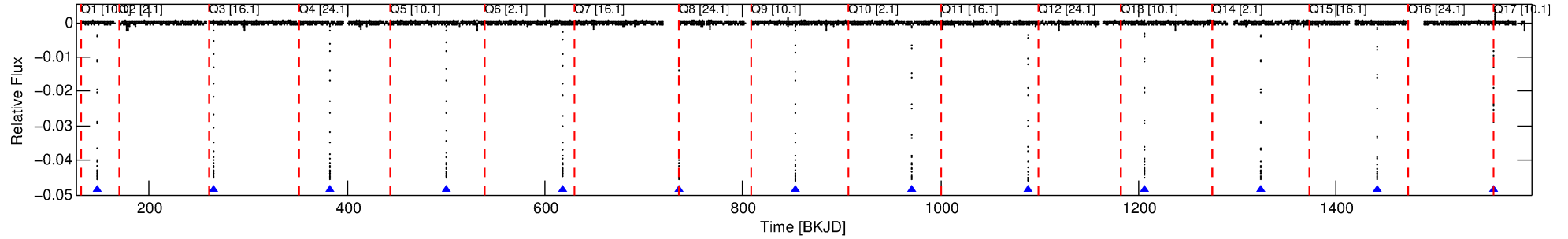
## Ephemeris Match Information For 003442054-01

No Significant Match Found

# DV One-Page Summary

KIC: 3442054 Candidate: 1 of 2 Period: 117.681 d  
KOI: K03593.01 Corr: 1.000

Kp: 12.11 R\*: 2.08 Rs Teff: 6429.0 K Logg: 3.90 Fe/H: -0.260



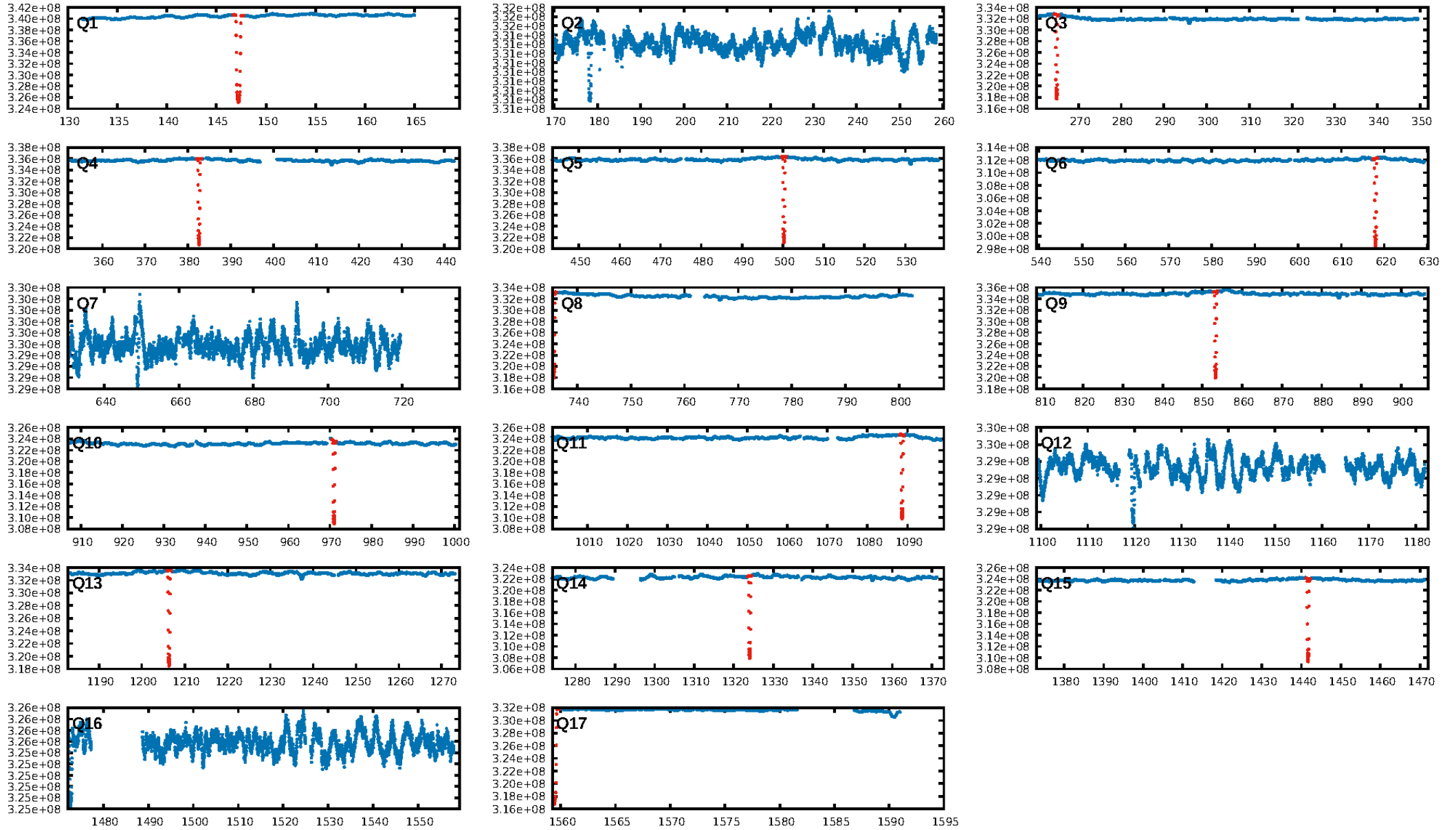
## DV Fit Results:

Period = 117.68137 [0.00002] d  
Epoch = 147.2070 [0.0001] BKJD  
Rp/R\* = 0.2008 [0.0001]  
a/R\* = 78.59 [0.08]  
b = 0.45 [0.00]  
Seff = 25.81 [12.82]  
Teff = 575 [71] K  
Rp = 45.56 [15.58] Re  
a = 0.5063 [0.1586] AU  
Ag = 94.12 [45.89] [2.03σ]  
Teffp = 2768 [73] K [21.48σ]

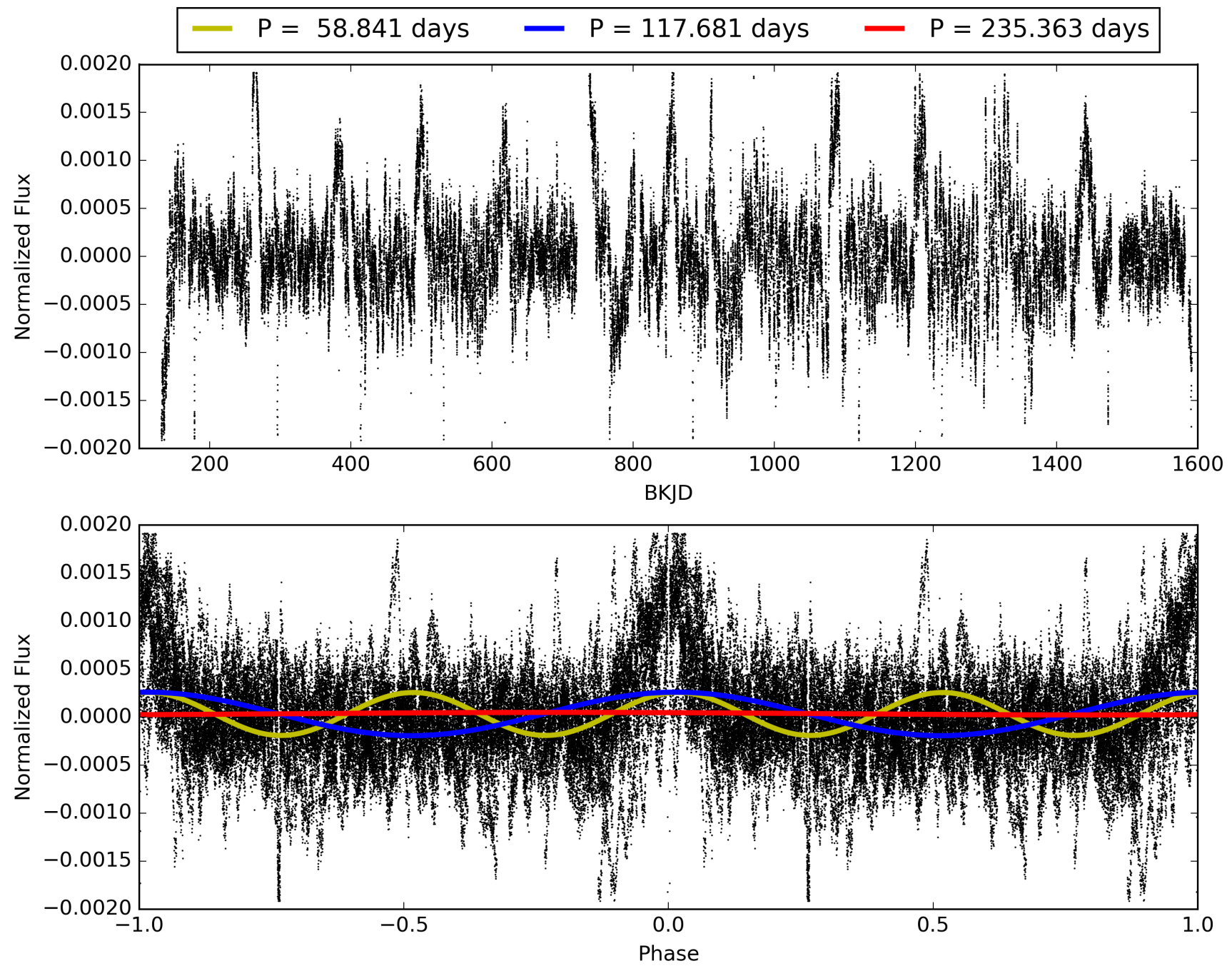
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 0.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [11/11]  
GhostDiagnostic-chr: 3.279  
Centroid-sig: 0.1%  
Centroid-so: 0.298 arcsec [132.16σ]  
OotOffset-rm: 0.001 arcsec [0.02σ]  
OotOffset-st: 2/3/0/3 [8]  
KicOffset-rm: 0.210 arcsec [3.09σ]  
KicOffset-st: 2/3/0/3 [8]  
DiffImageQuality-fgm: 1.00 [8/8]  
DiffImageOverlap-fno: 1.00 [8/8]

# TCE 003442054-01, PDC Light Curves

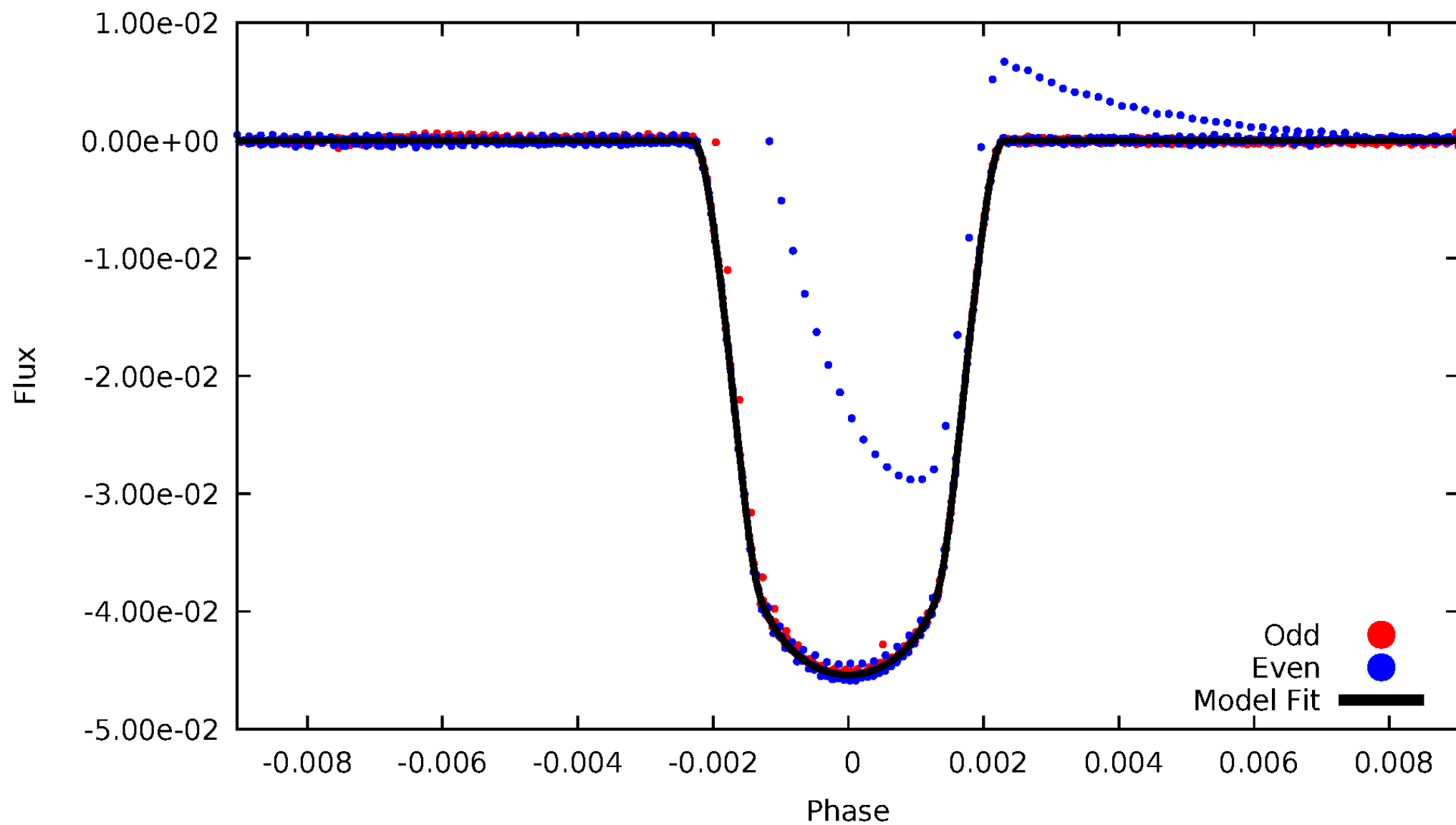


TCE 003442054-01



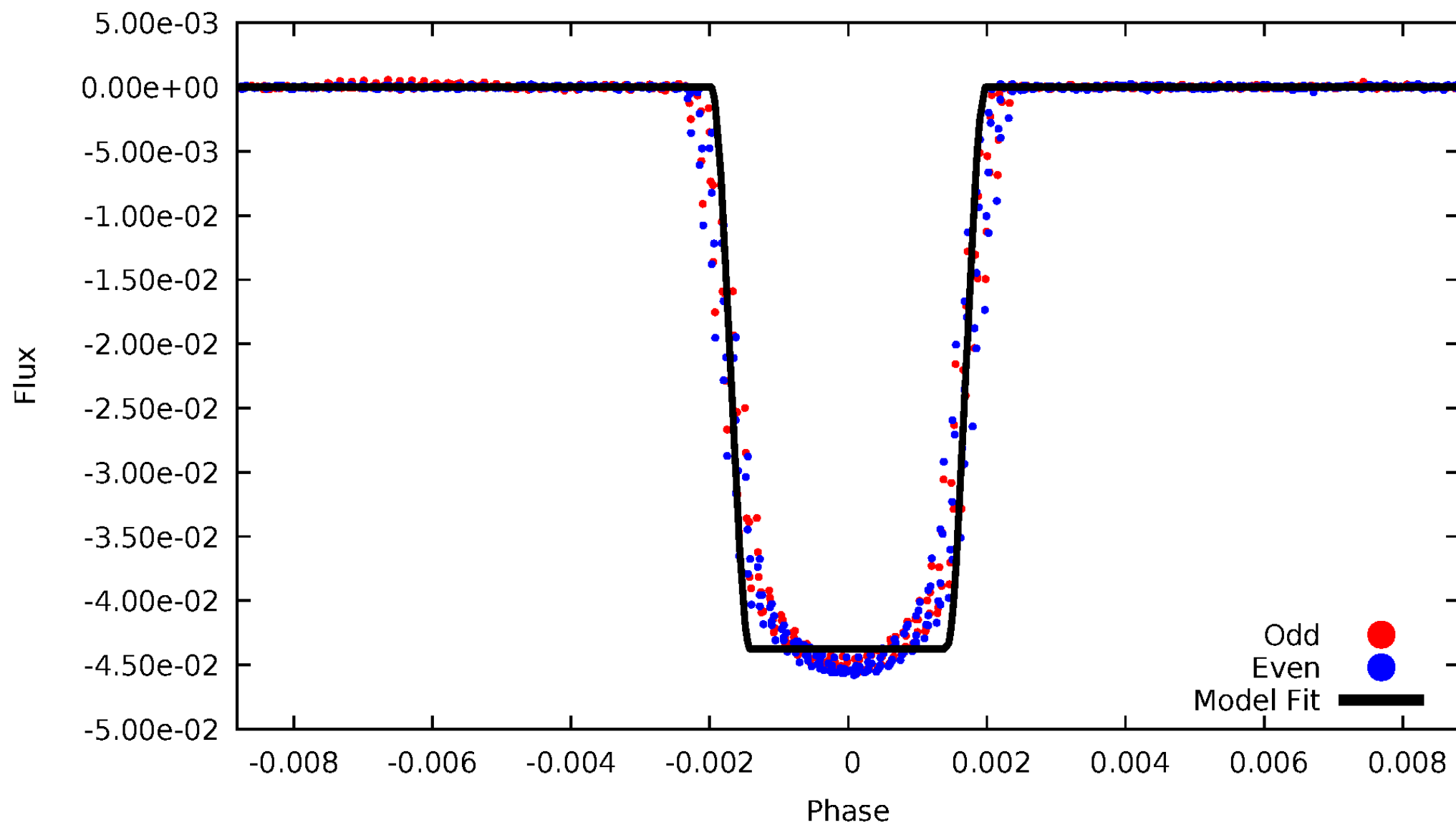
# DV Odd/Even

TCE 003442054-01



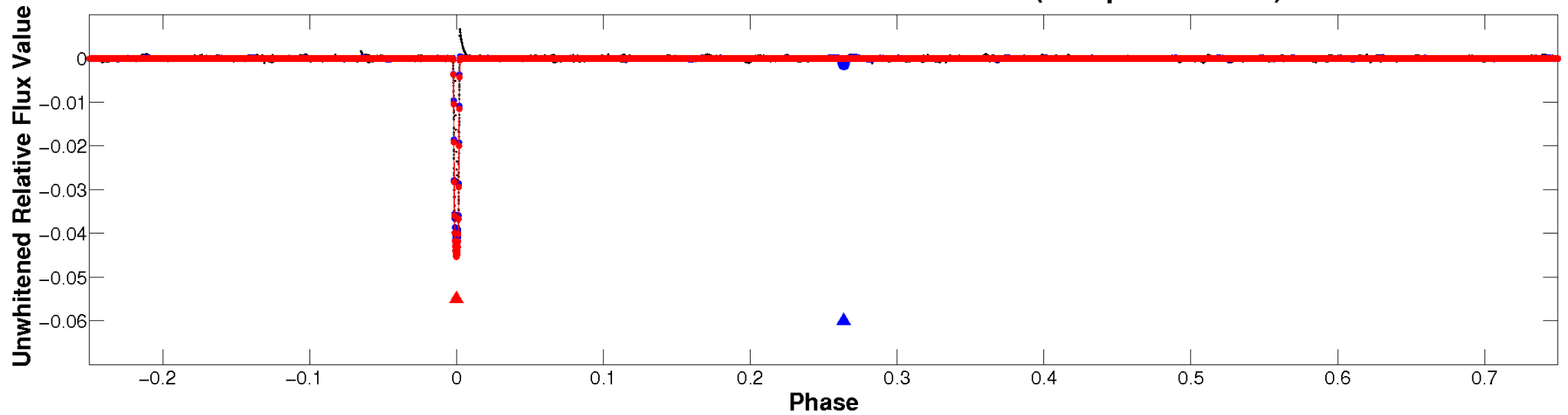
# ALT Odd/Even

TCE 003442054-01

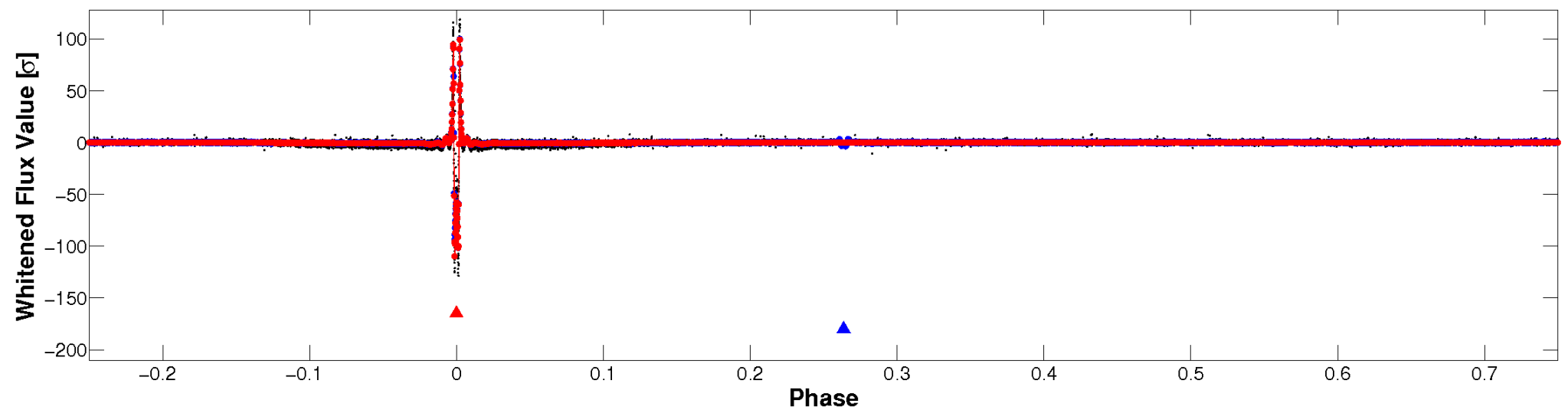


# Non-Whitened Vs. Whitened Light Curve

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

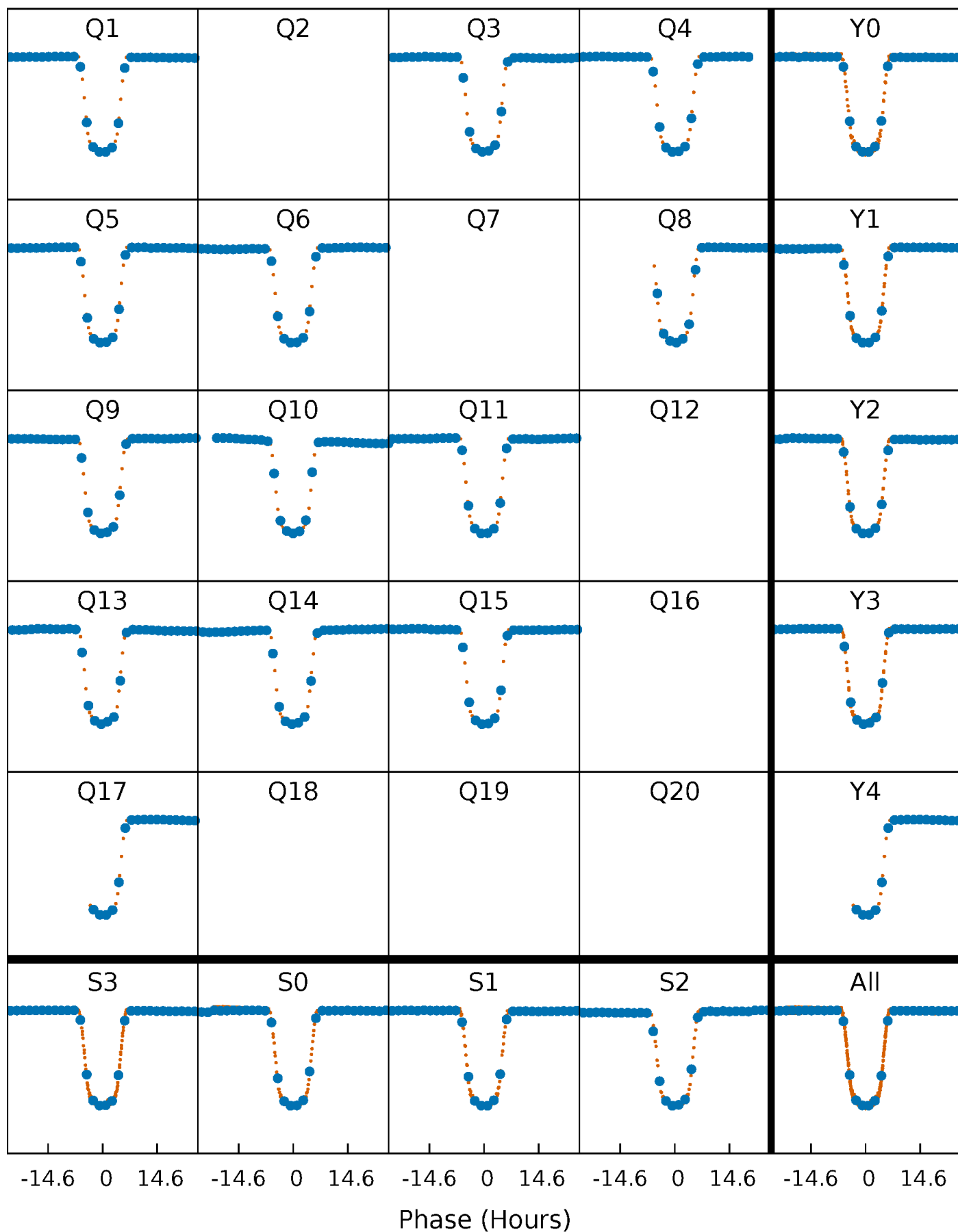


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

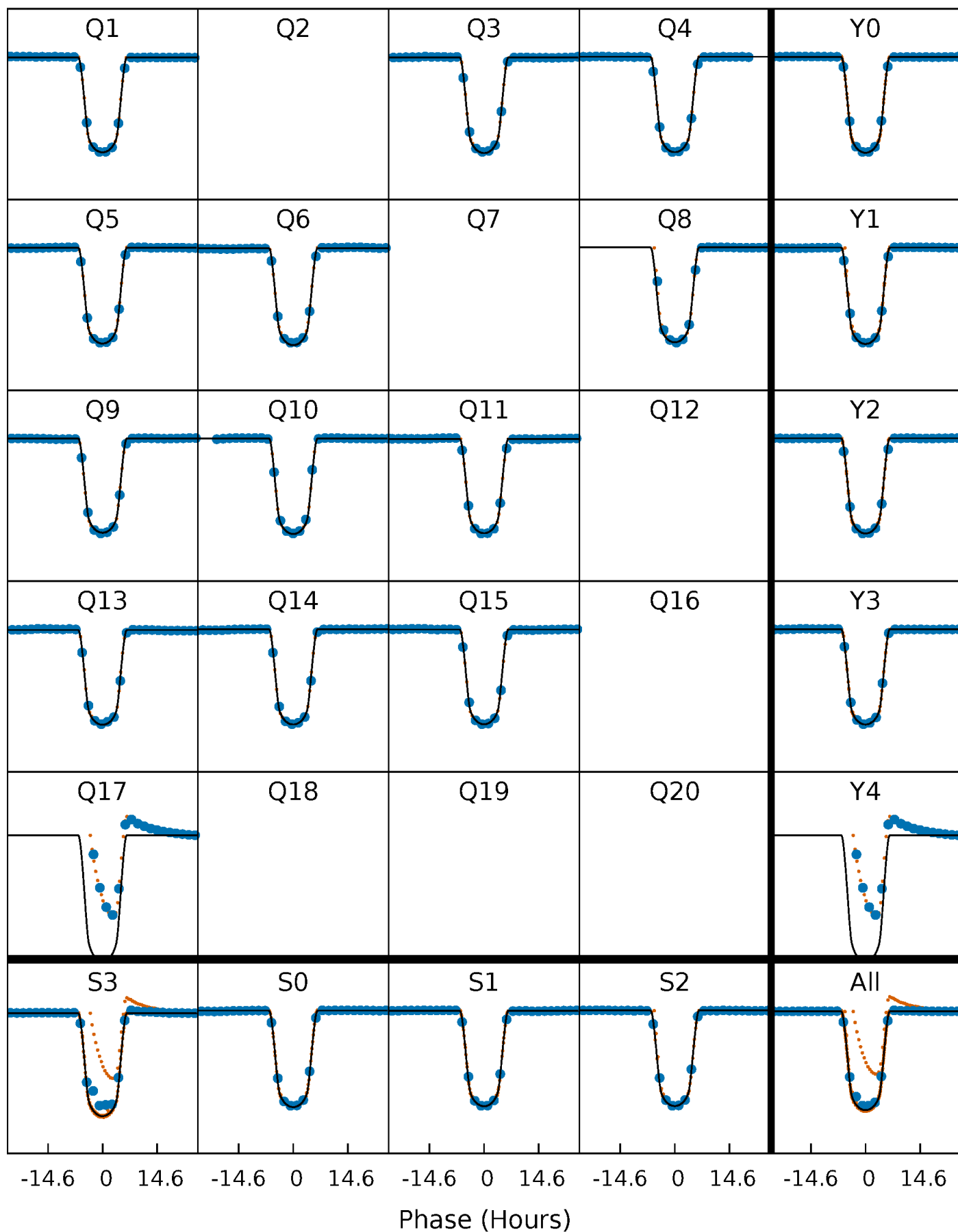
TCE 003442054-01 P=117.681368 Days  $T_0=147.206961$  (BKJD)





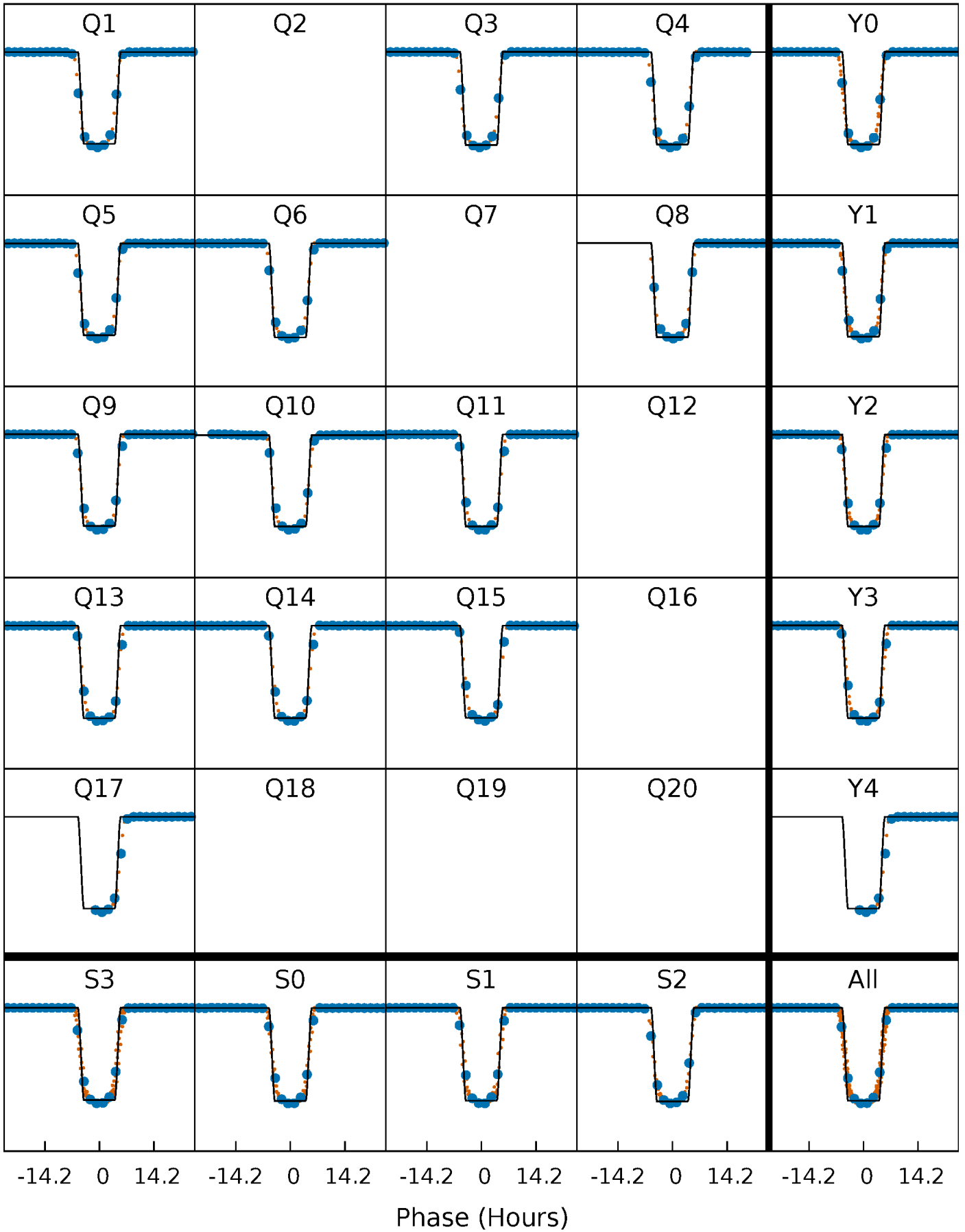
# DV Quarter-Phased Transit Curves

TCE 003442054-01 P=117.681368 Days  $T_0=147.206961$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

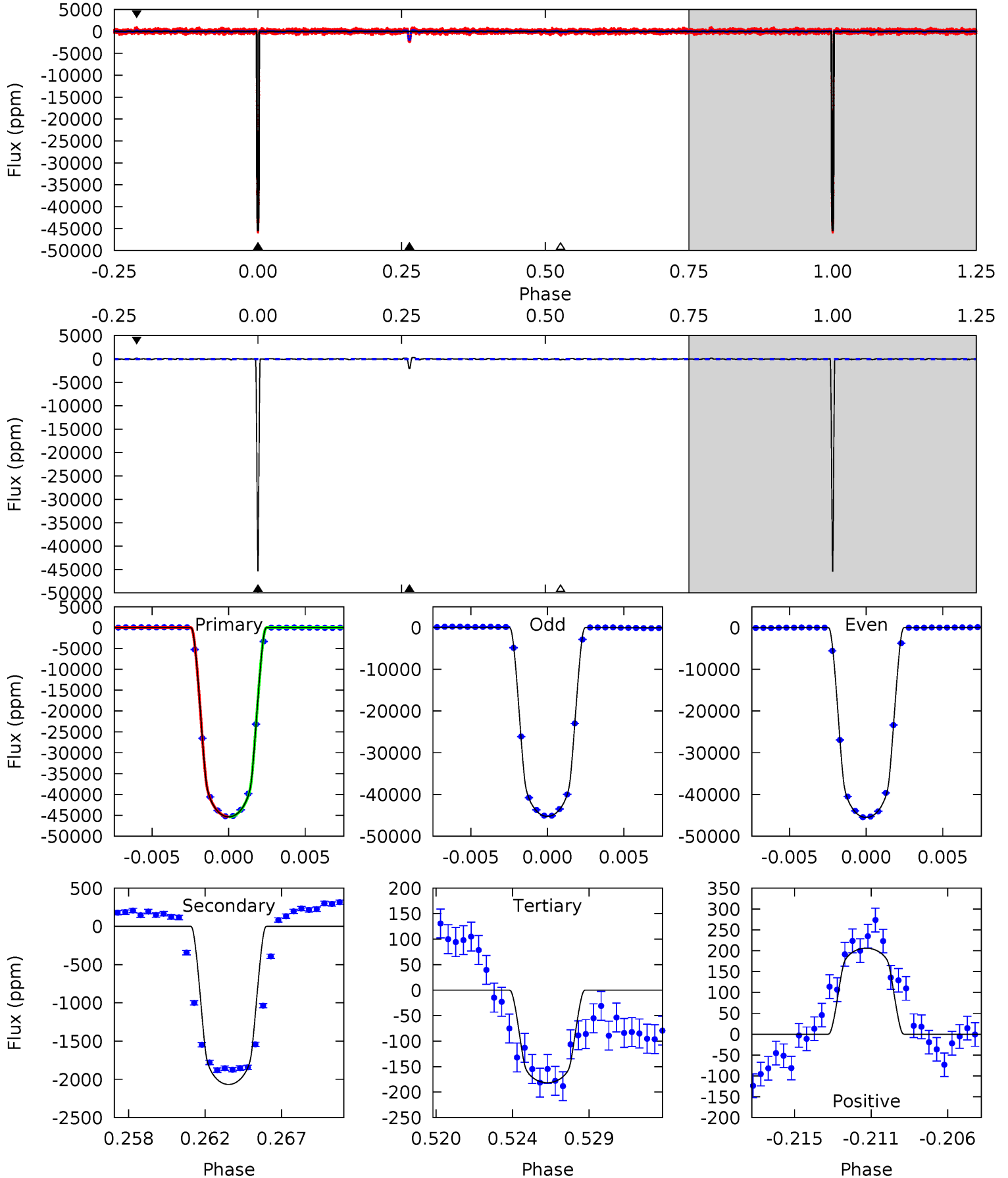
TCE 003442054-01 P=117.677841 Days  $T_0=147.228002$  (BKJD)



# DV Model-Shift Uniqueness Test

003442054-01, P = 117.681368 Days, E = 29.525593 Days

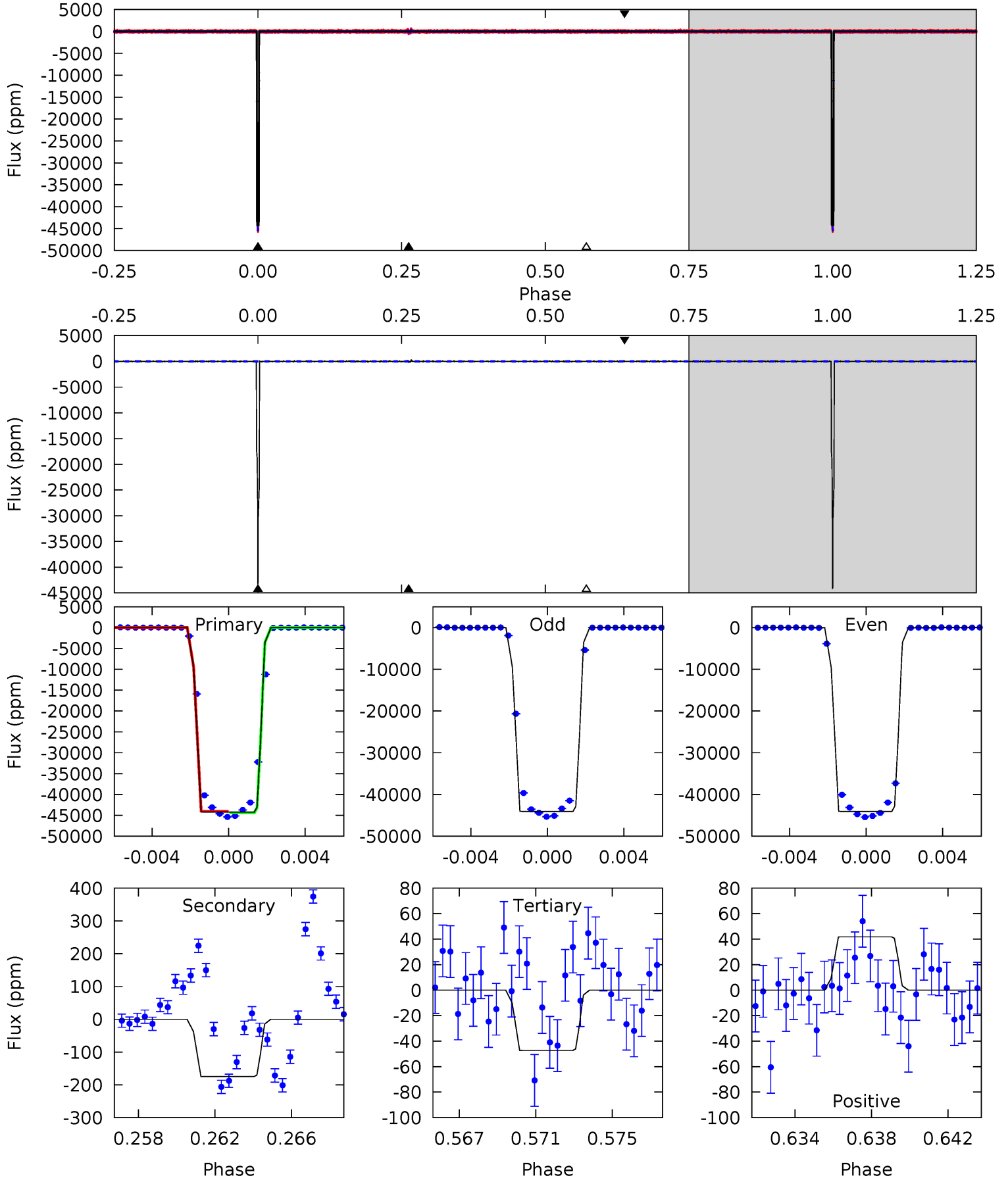
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3772	171.8	15.1	17.1	5.17	2.83	5.38	3757	3754	156.7	154.7	10.9	0.96	0.01	3.56



# Alt Model-Shift Uniqueness Test

003442054-01, P = 117.677841 Days, E = 29.550161 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
4515	17.8	4.84	4.26	5.20	2.88	1.48	4511	4511	13.0	13.6	0.02	1.00	0.01	16.7



### Stellar Parameters For KIC 003442054

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6429^{+162}_{-162}$	$3.899^{+0.280}_{-0.100}$	$-0.260^{+0.300}_{-0.250}$	$2.079^{+0.438}_{-0.711}$	$1.250^{+0.220}_{-0.198}$	$0.196^{+0.353}_{-0.070}$
	+3%/-3%	+7%/-3%	+115%/-96%	+21%/-34%	+18%/-16%	+180%/-36%
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 003442054-01 / KOI 3593.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-2066 \pm 12$	$44.65^{+5.59}_{-7.62}$	$787^{+47}_{-66}$	$3531^{+56}_{-57}$	$149^{+63}_{-27}$
Alt.	$-175 \pm 10$	$46.61^{+5.92}_{-7.97}$	$789^{+49}_{-61}$	$2470^{+35}_{-34}$	$12^{+5}_{-2}$

$T_{max}$  = 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

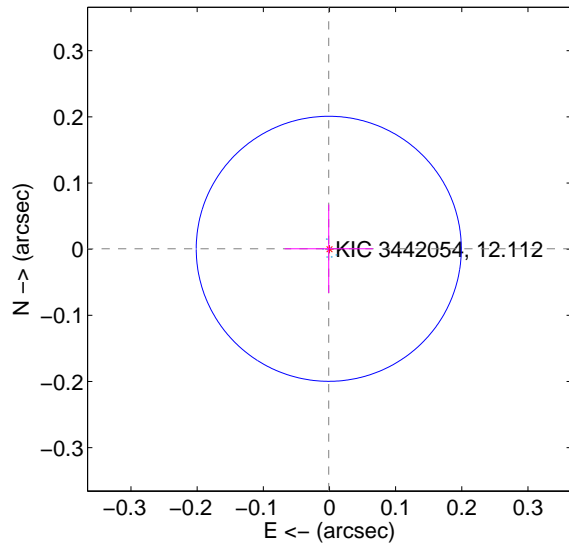
Supplemental centroid analysis for 003442054-01. Kepler magnitude: 12.11. Transit SNR 1367.05

There are 8 quarters with good PRF difference image offsets

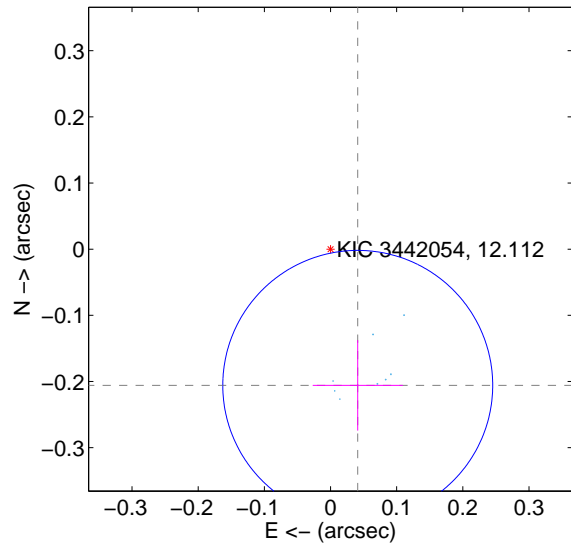
The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.001 \pm 0.067$	0.02	$0.001 \pm 0.067$	$0.001 \pm 0.067$
PRF-fit source offset from KIC position	$0.210 \pm 0.068$	3.09	$-0.041 \pm 0.068$	$-0.206 \pm 0.068$
photometric centroid source offset	$0.30 \pm 0.00$	132.16	$-0.03 \pm 0.00$	$-0.30 \pm 0.00$

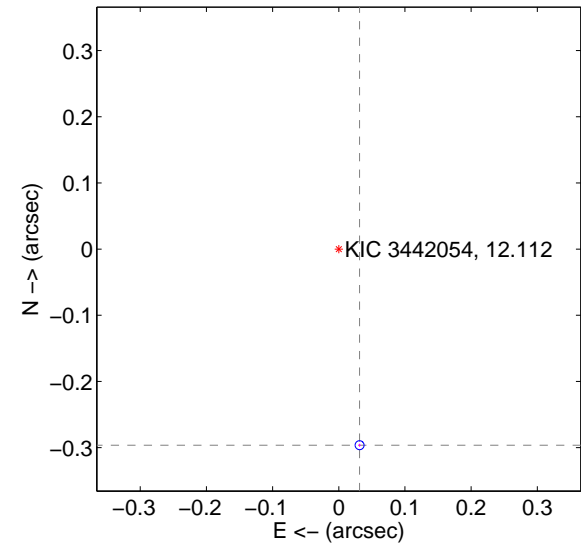
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

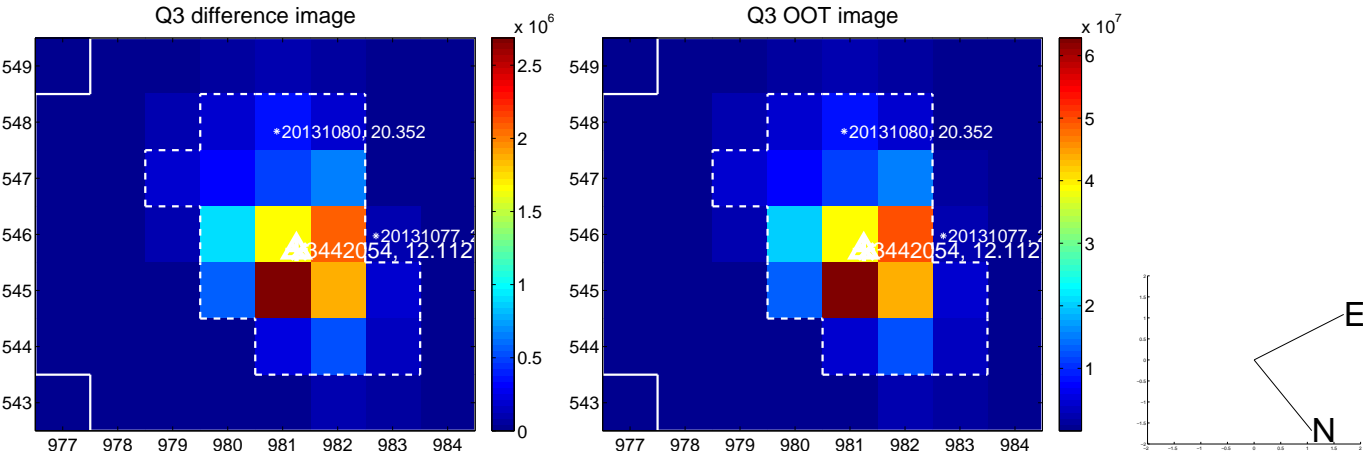
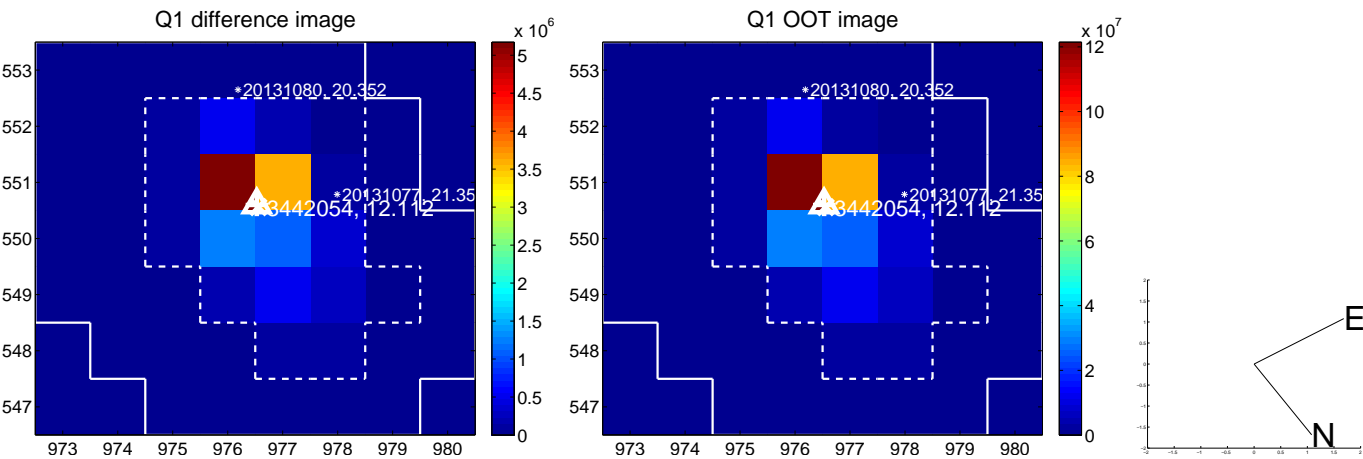


offset from photometric centroids

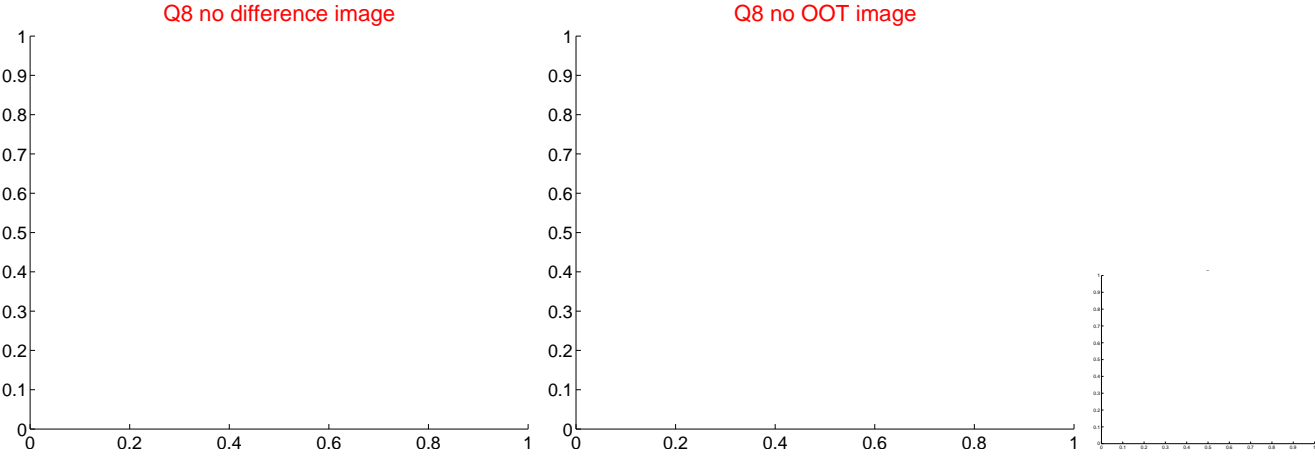
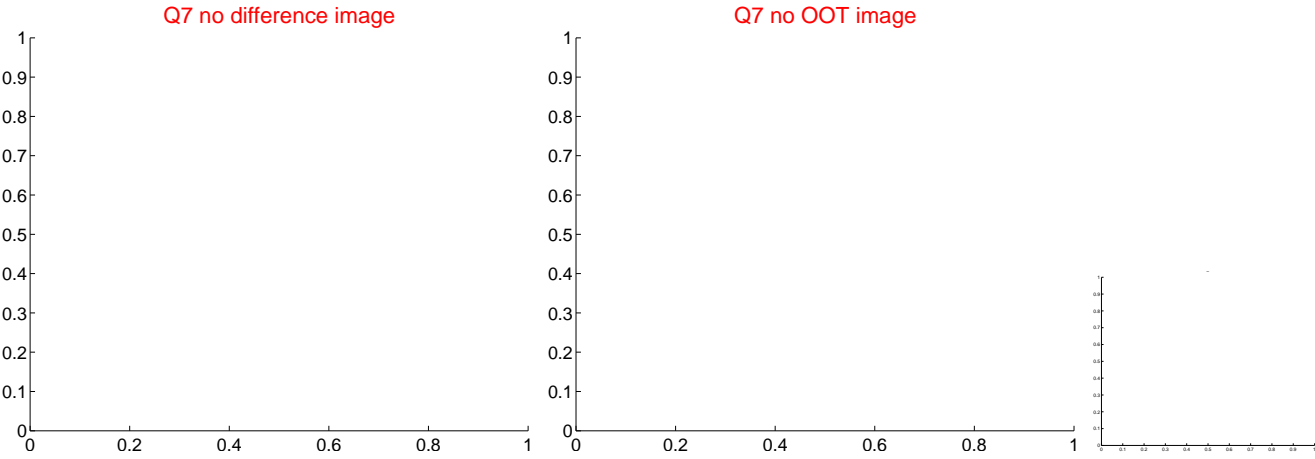
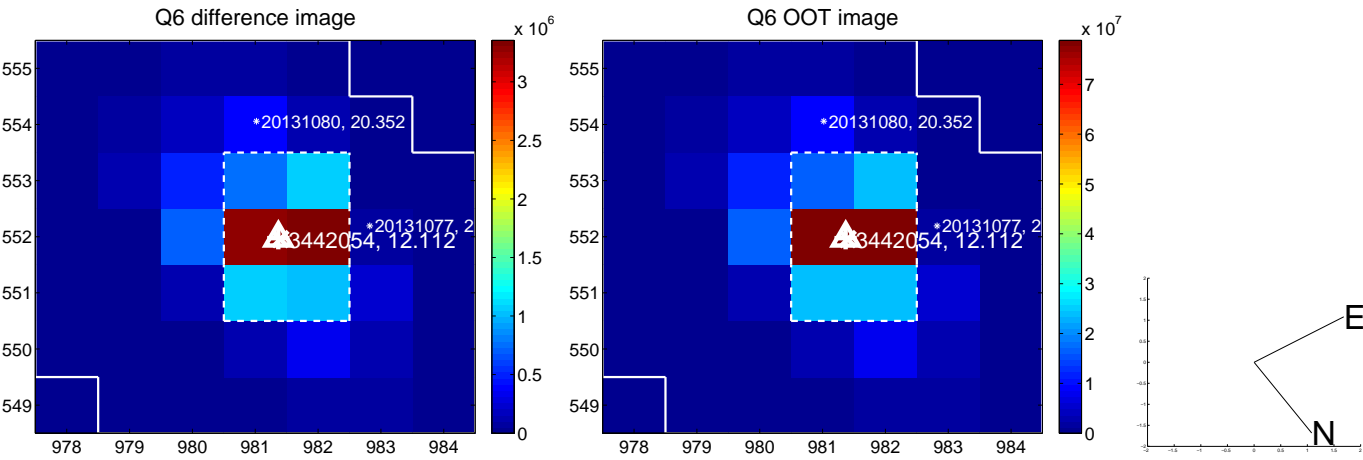
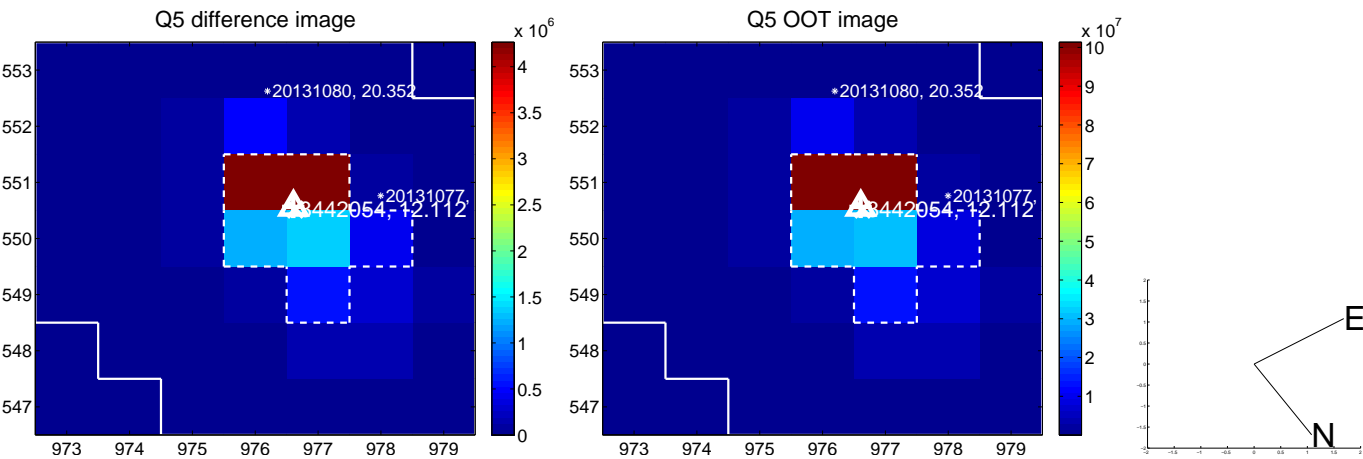


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

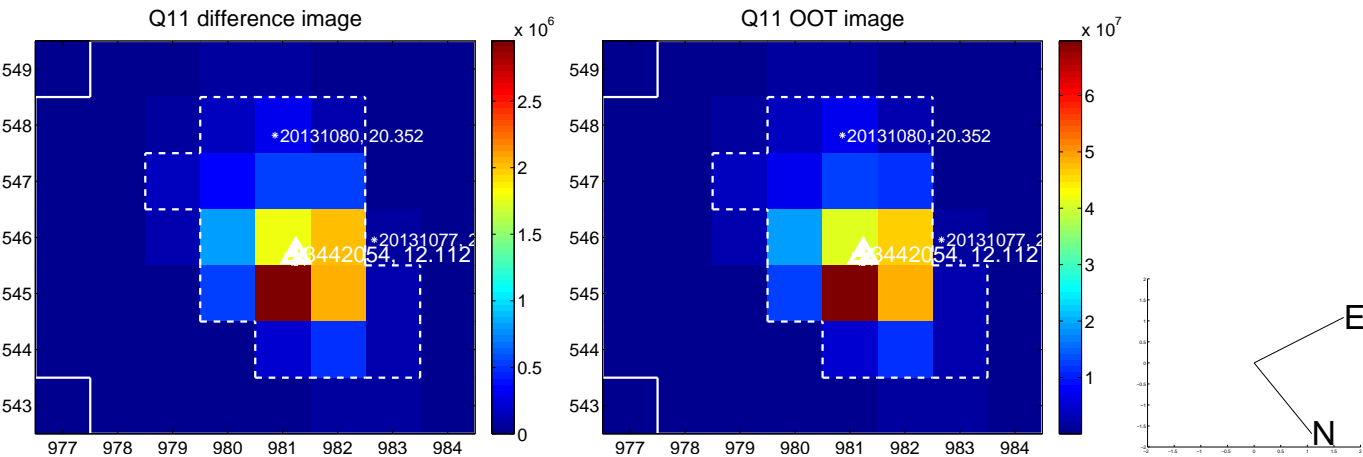
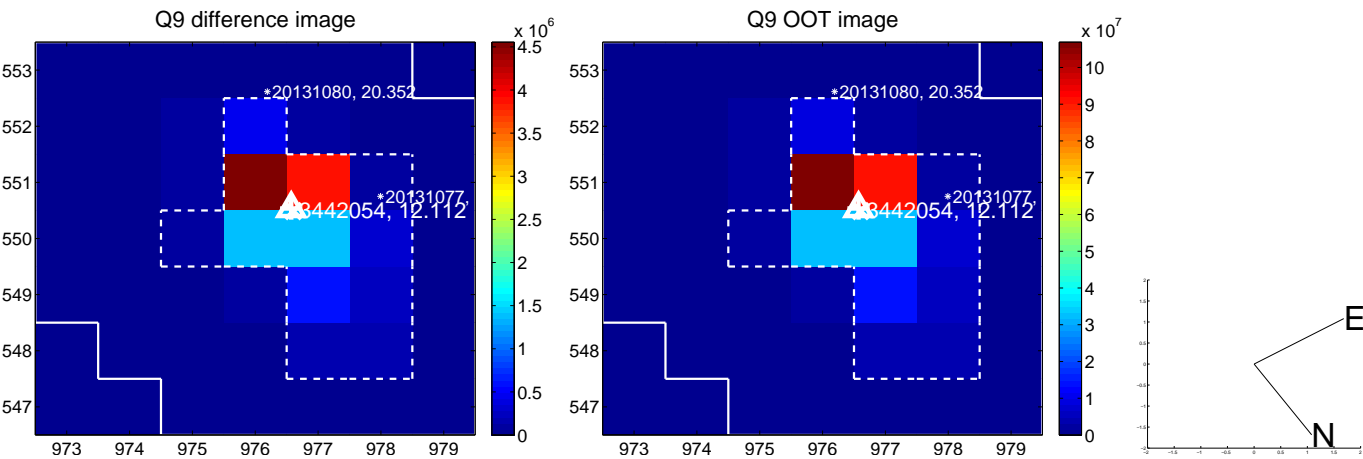


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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.

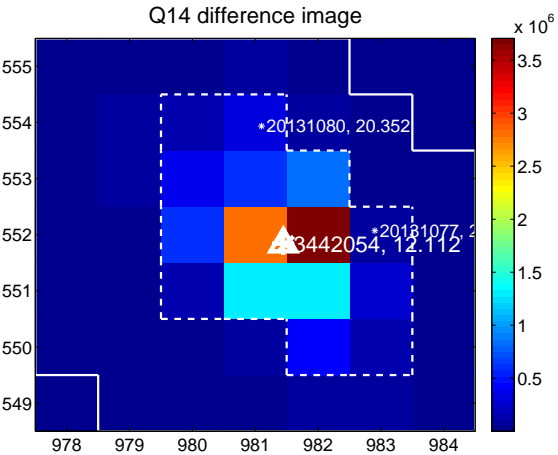
Q13 no difference image



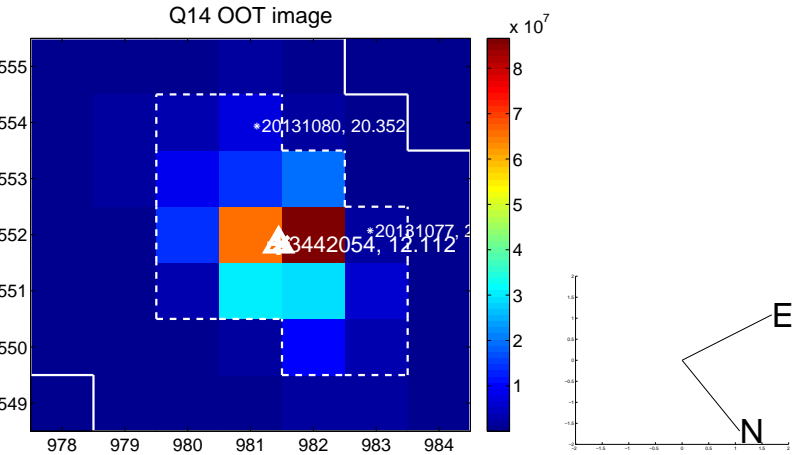
Q13 no OOT image



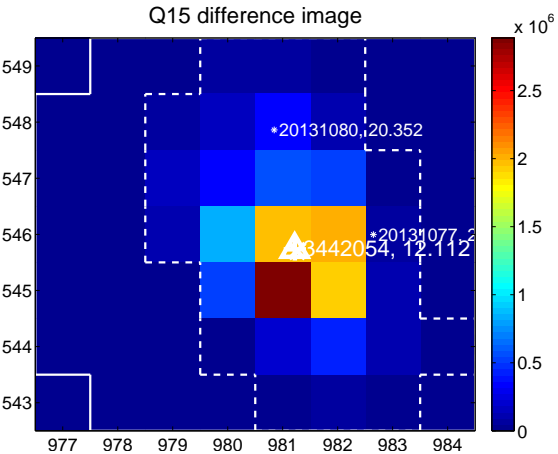
Q14 difference image



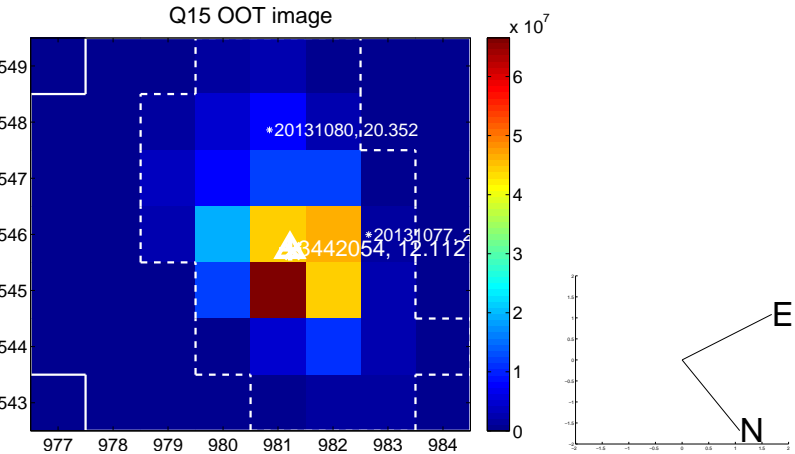
Q14 OOT image



Q15 difference image



Q15 OOT image



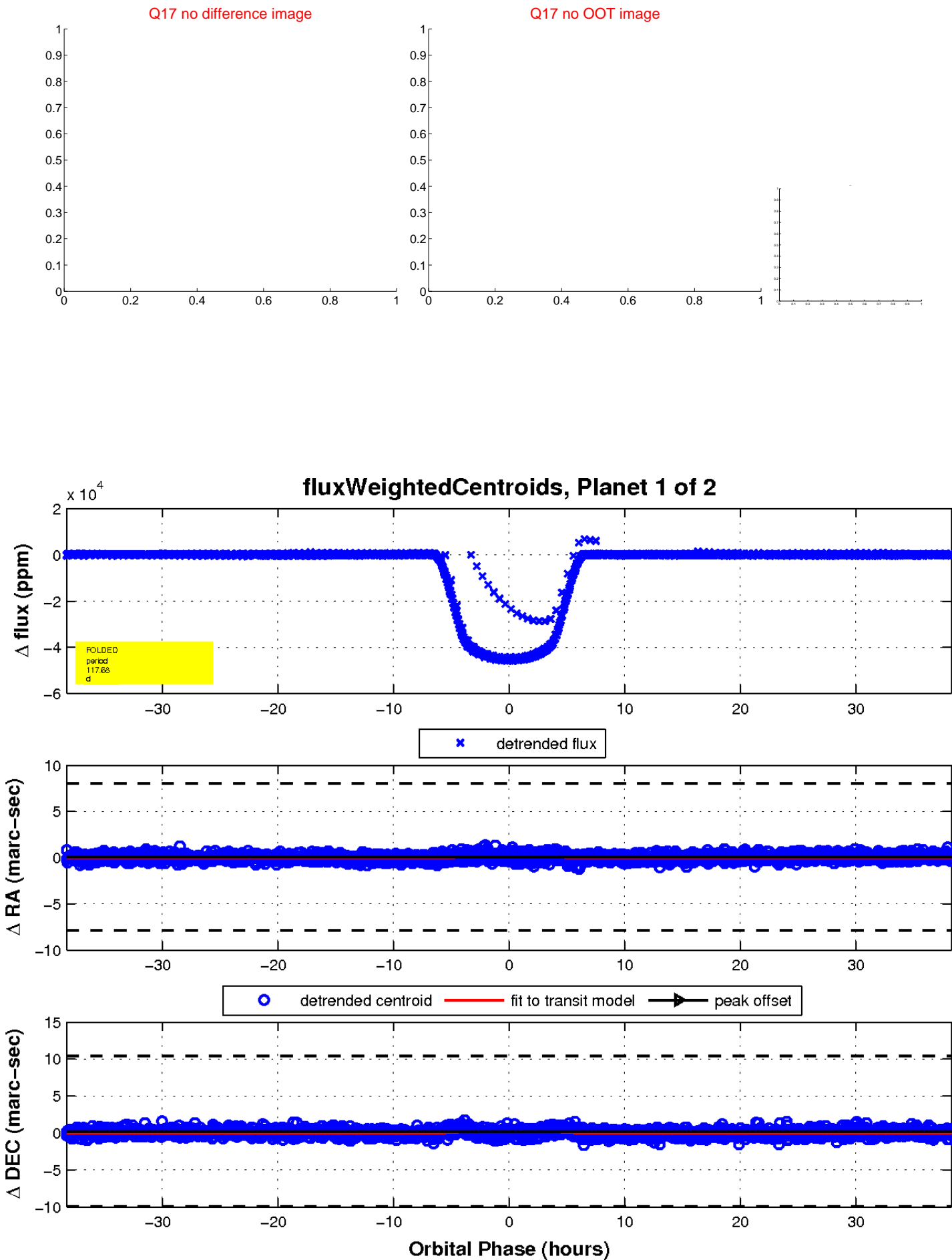
Q16 no difference image



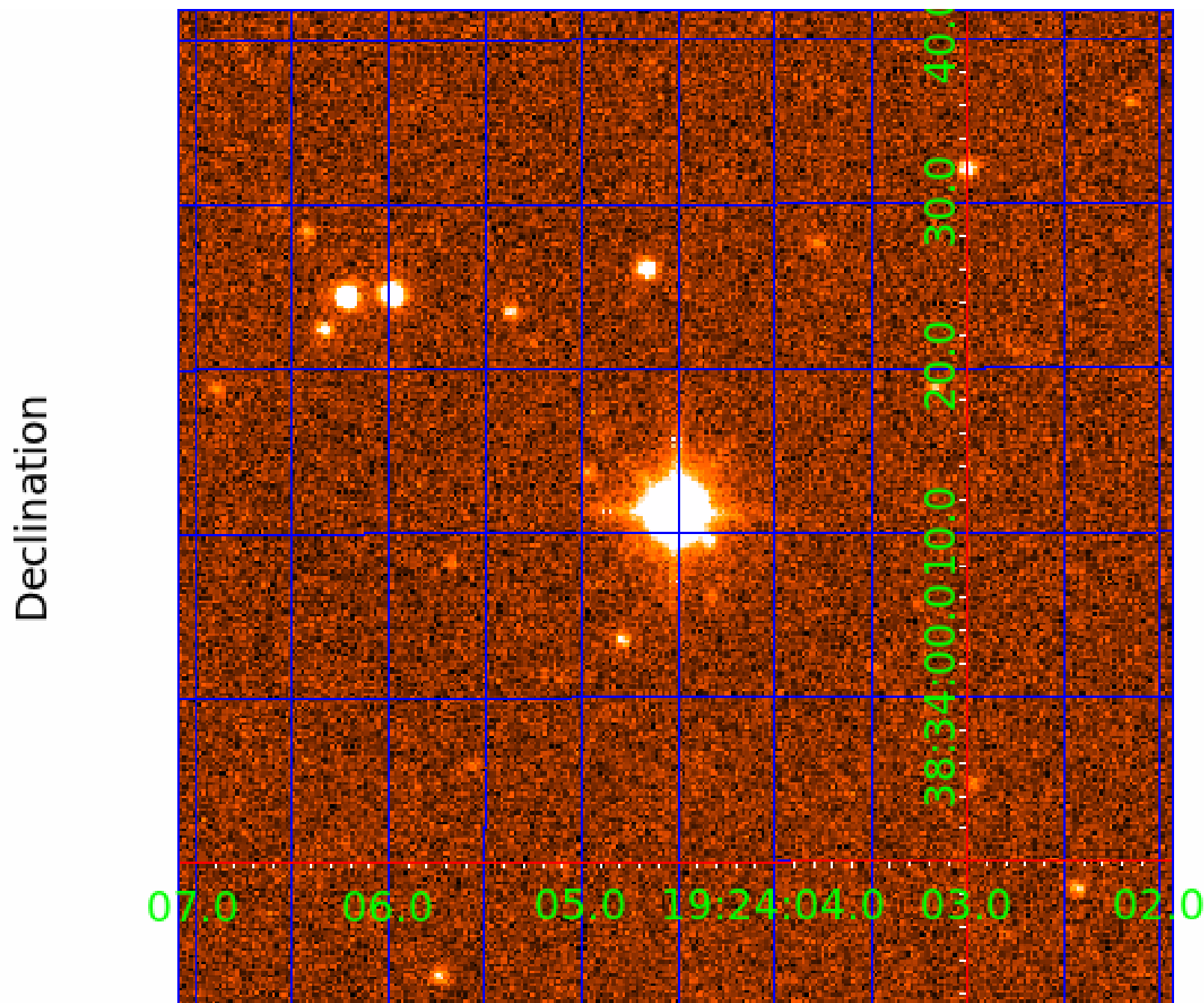
Q16 no OOT image



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



UKIRT Image



# KIC 003442054

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003442054-01	OBS	3593.01	117.681368	147.206961	45394.7	12.759	940.8	1367.1	2.08	6429	45.56	25.81
003442054-02	OBS	No	117.681231	178.233451	1988.2	17.185	40.5	50.8	2.08	6429	11.12	25.81

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003442054-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE
003442054-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

**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 003442054-02

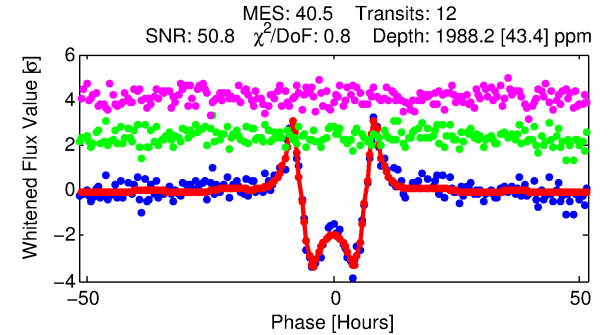
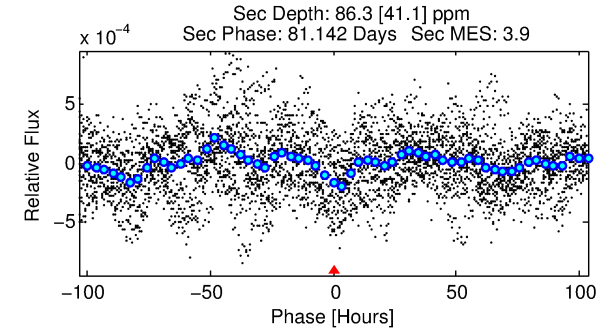
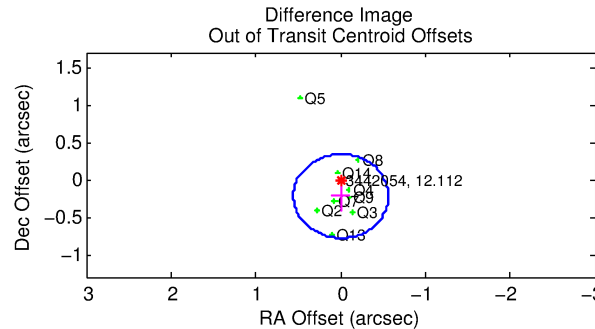
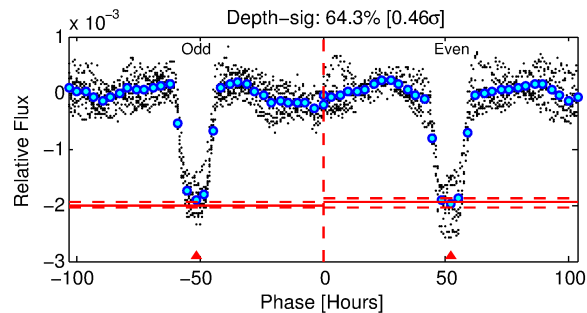
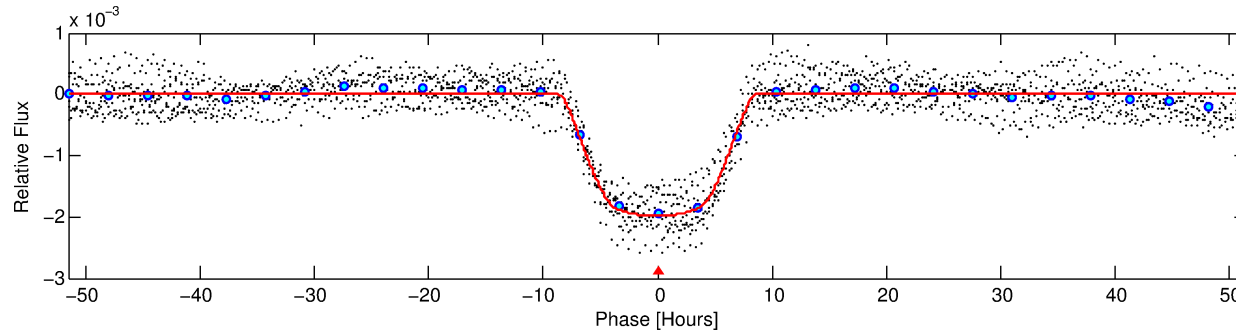
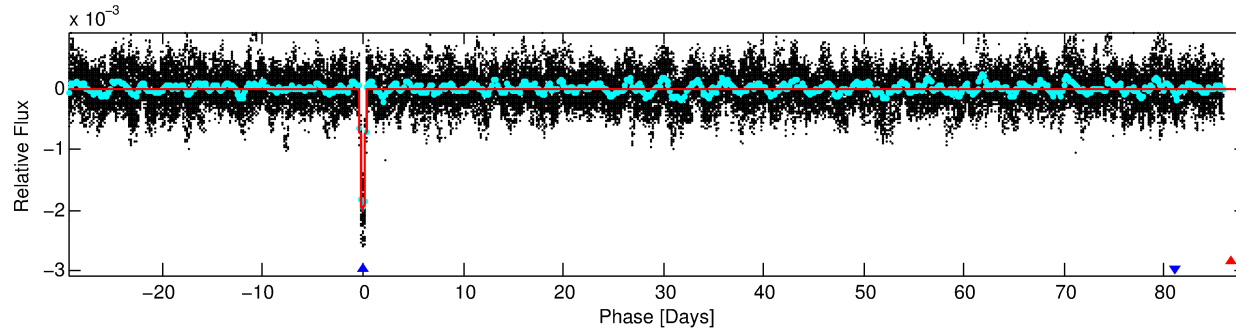
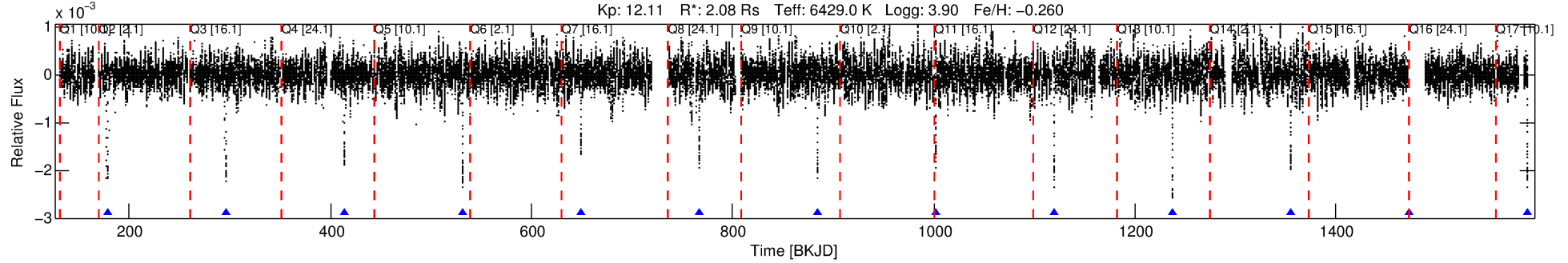
No Significant Match Found

# DV One-Page Summary

KIC: 3442054 Candidate: 2 of 2 Period: 117.681 d

KOI: K03593 Corr: No Ephemeris Match

Kp: 12.11 R\*: 2.08 Rs Teff: 6429.0 K Logg: 3.90 Fe/H: -0.260



## DV Fit Results:

Period = 117.68123 [0.00042] d  
Epoch = 178.2335 [0.0028] BKJD  
Rp/R\* = 0.0490 [0.0006]  
a/R\* = 25.99 [0.29]  
b = 0.92 [0.00]  
Seff = 25.81 [12.82]  
Teq = 575 [71] K  
Rp = 11.12 [3.80] Re  
a = 0.5063 [0.1586] AU  
Ag = 98.43 [67.10] [1.45σ]  
Teffp = 2799 [341] K [6.38σ]

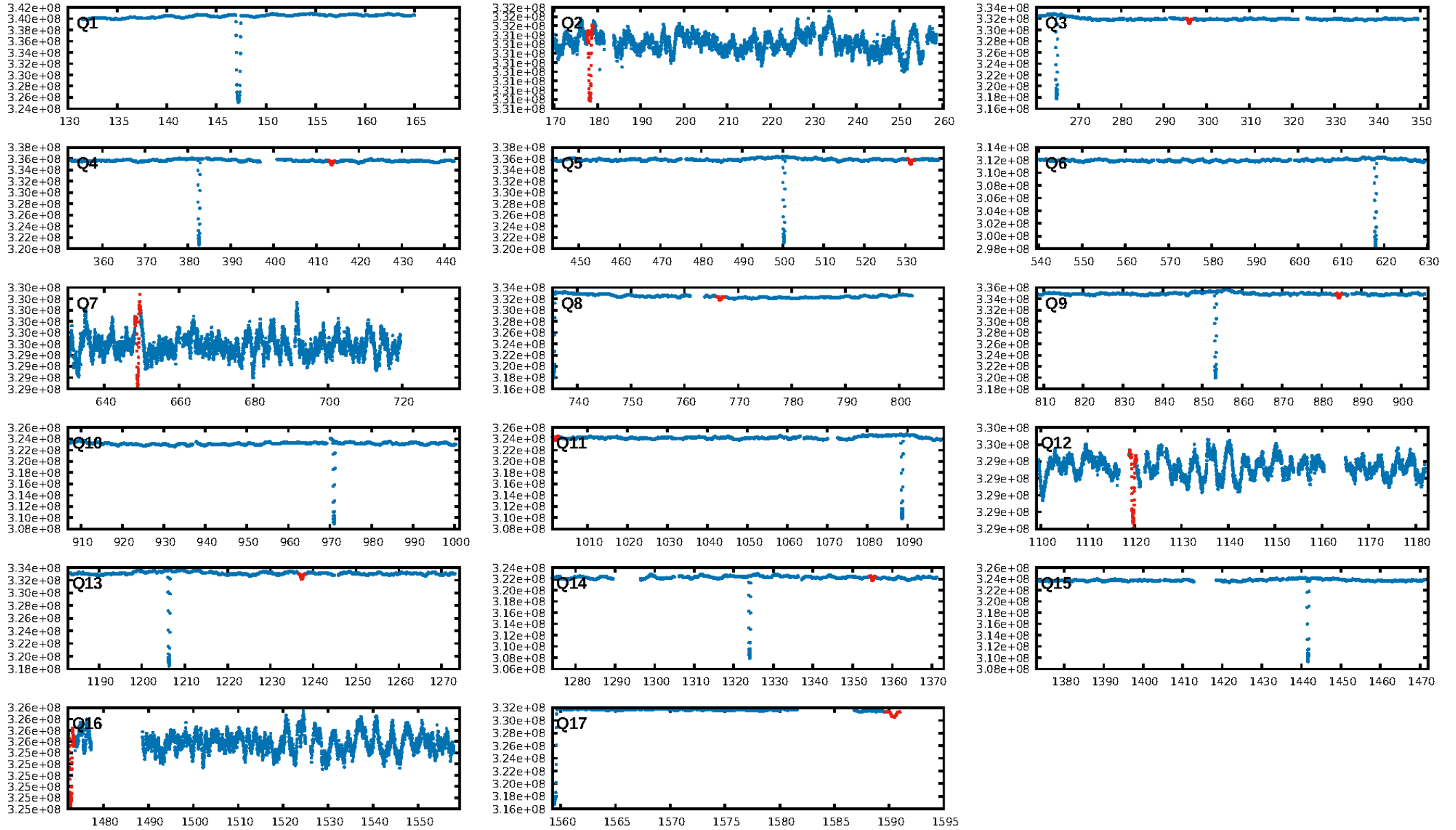
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: 18.3%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 3.75e-252  
RollingBand-fgt: 1.00 [11/11]  
GhostDiagnostic-chr: 2.955  
Centroid-sig: 0.0%  
Centroid-so: 0.549 arcsec [10.26σ]  
OotOffset-rm: 0.221 arcsec [1.18σ]  
KicOffset-rm: 0.391 arcsec [2.39σ]  
OotOffset-st: 2/2/2/3 [9]  
KicOffset-st: 2/2/2/3 [9]  
DiffImageQuality-fgm: 1.00 [9/9]  
DiffImageOverlap-fno: 1.00 [9/9]

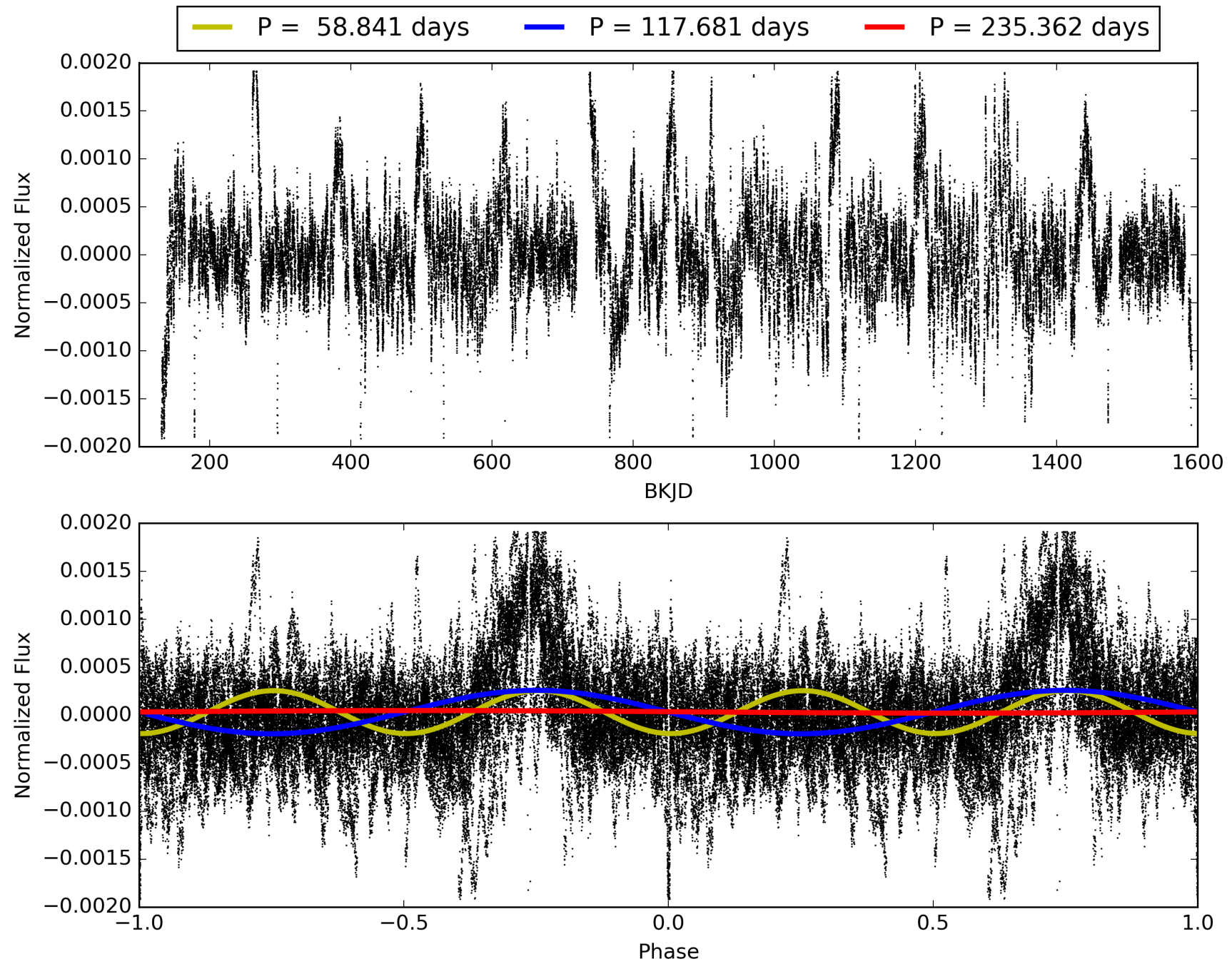
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 19:52:53 Z

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

# TCE 003442054-02, PDC Light Curves



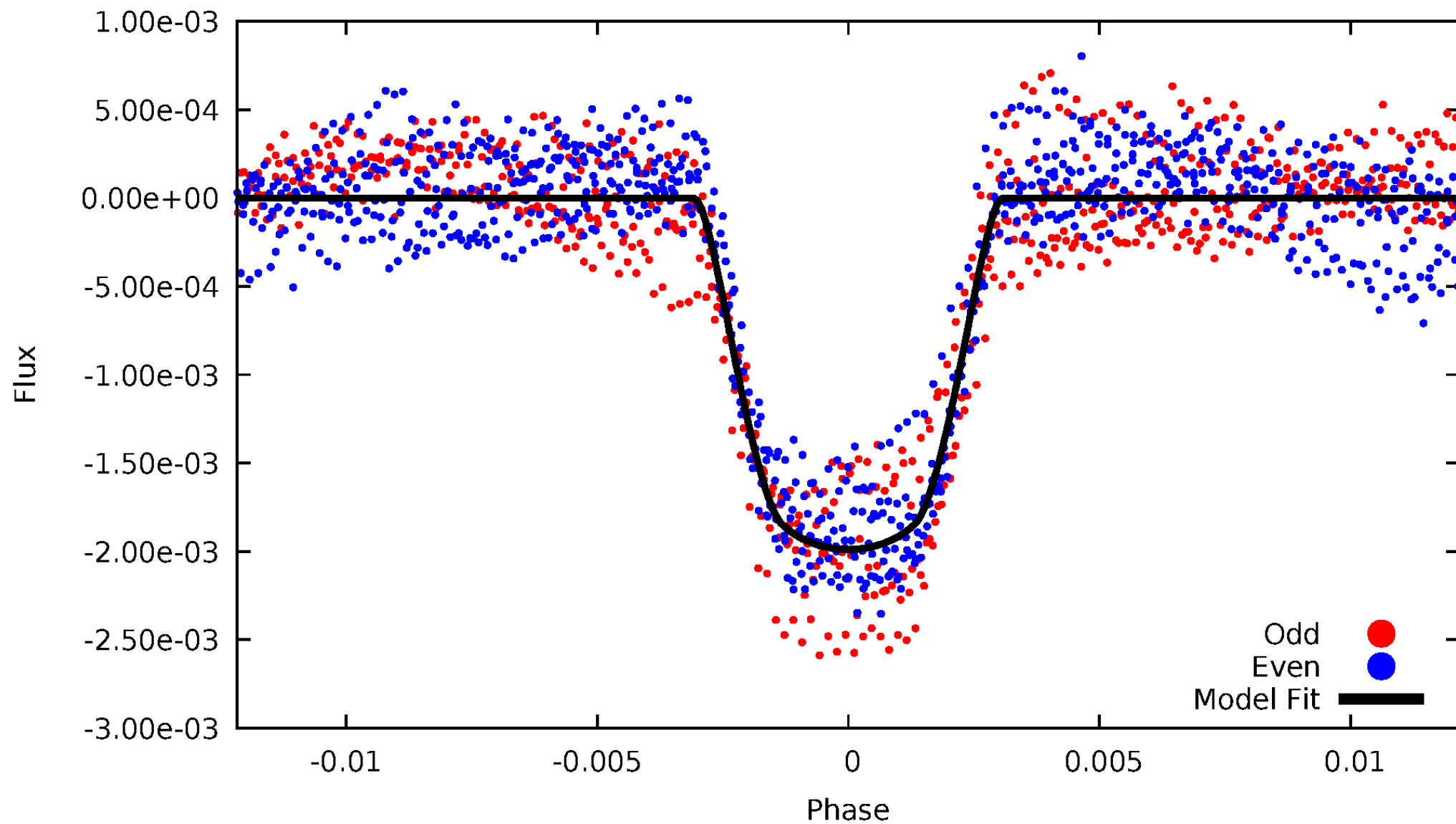
TCE 003442054-02





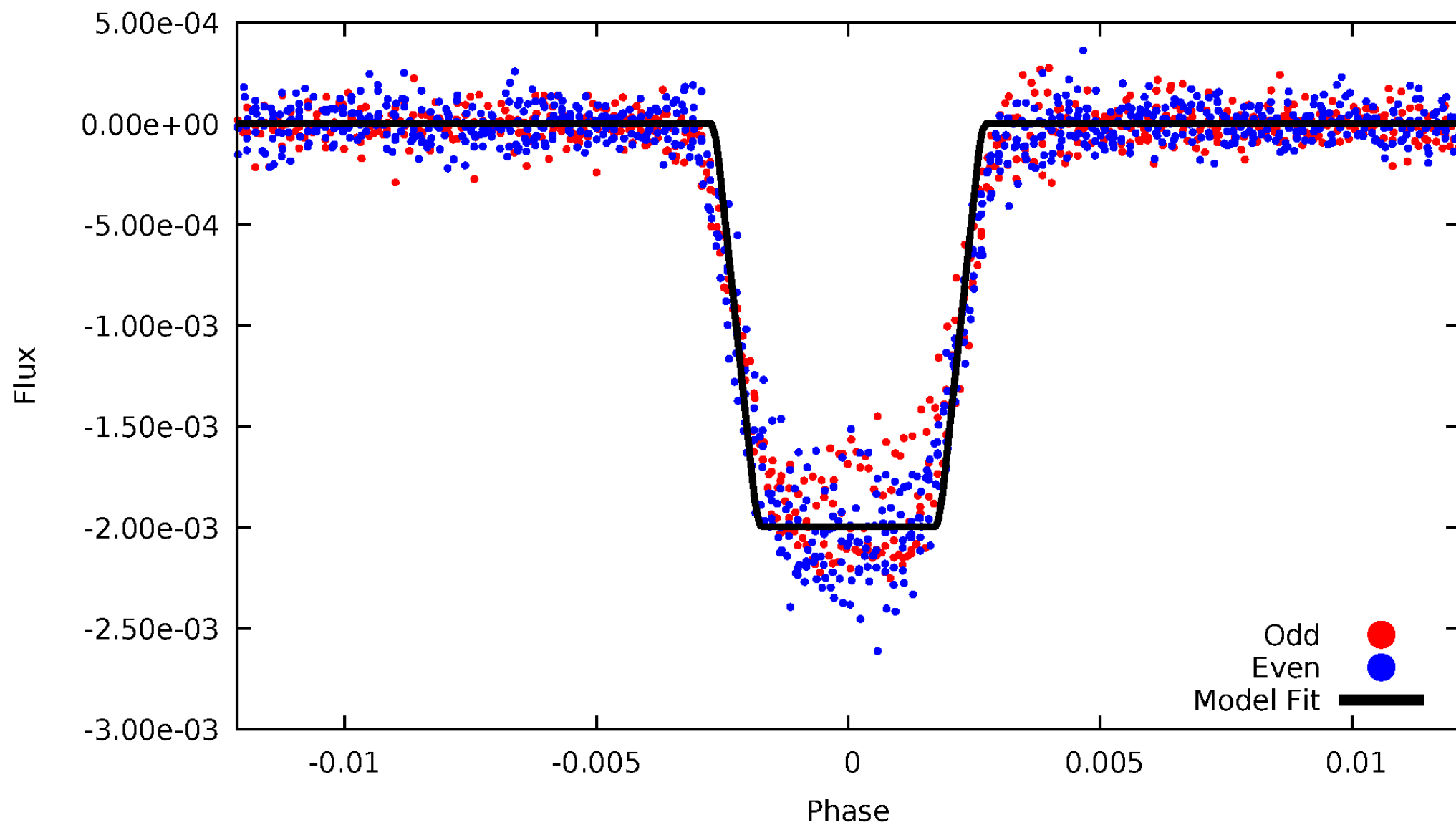
# DV Odd/Even

TCE 003442054-02



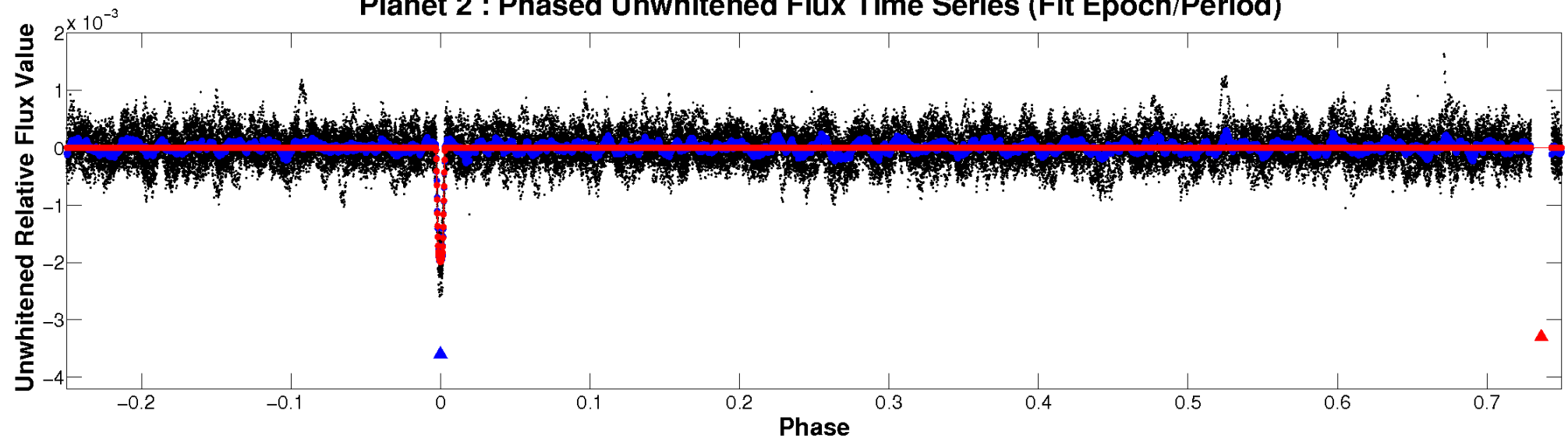
# ALT Odd/Even

TCE 003442054-02

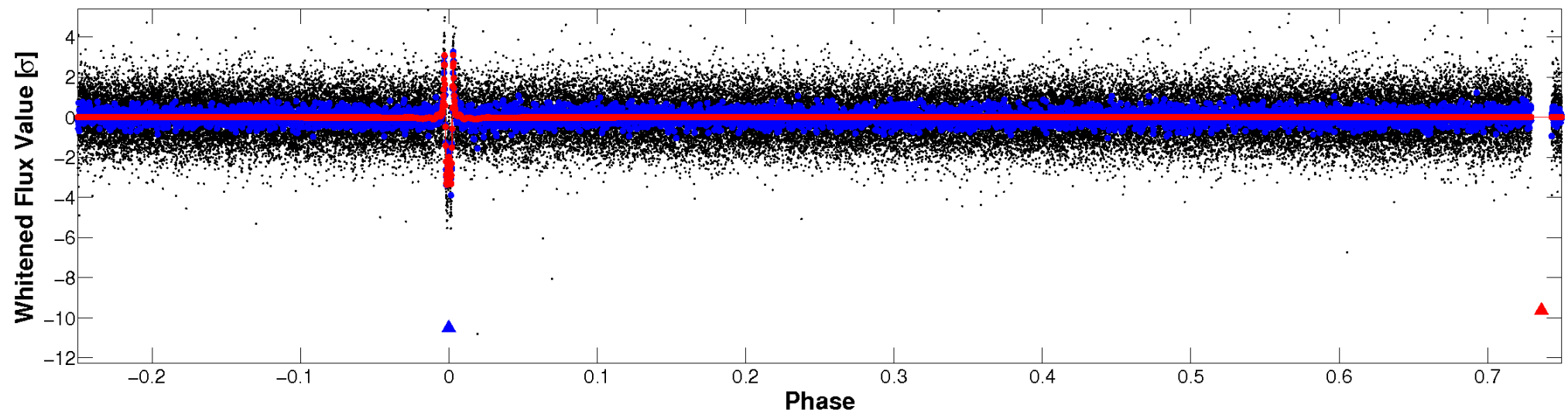


# Non-Whitened Vs. Whitened Light Curve

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

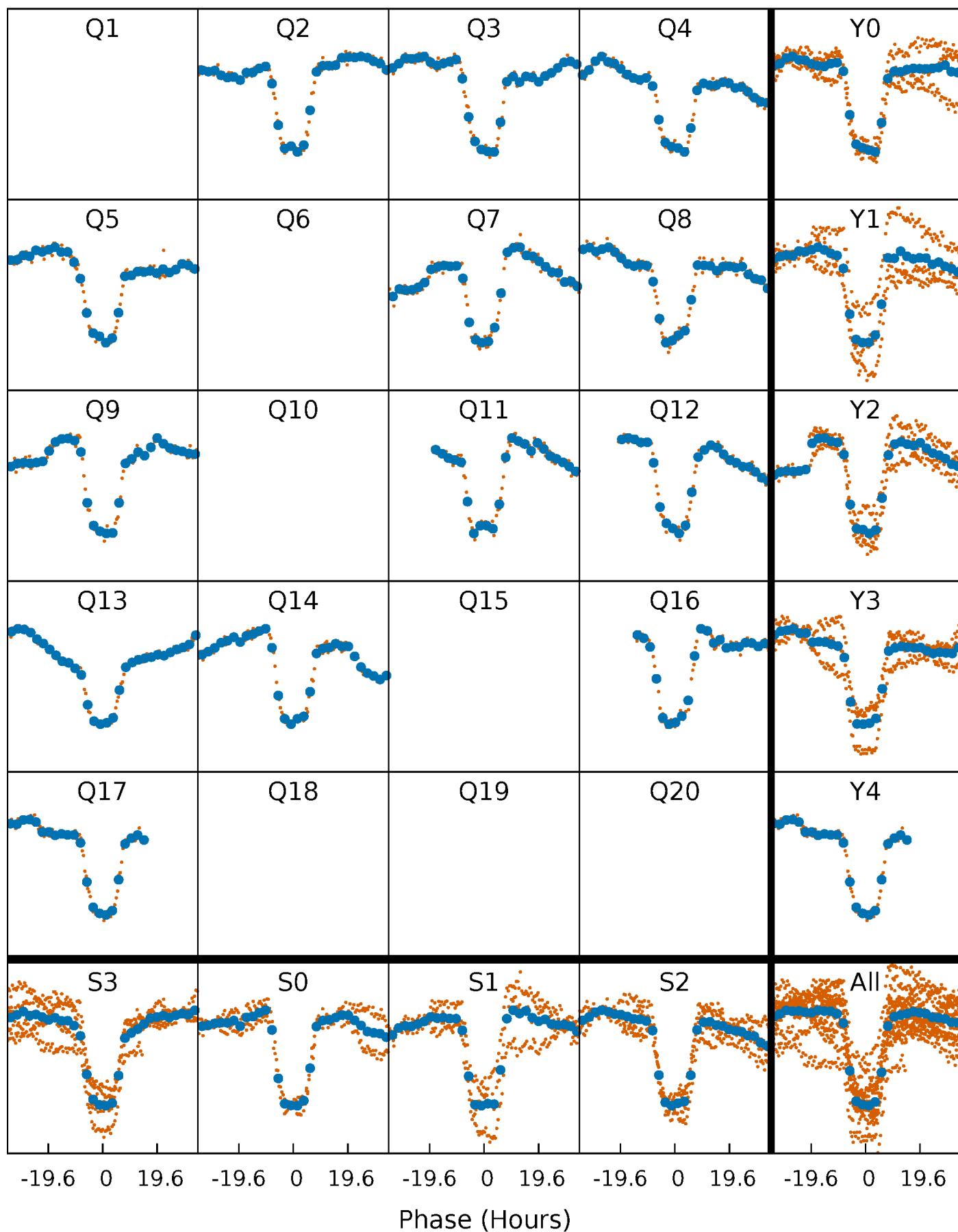


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



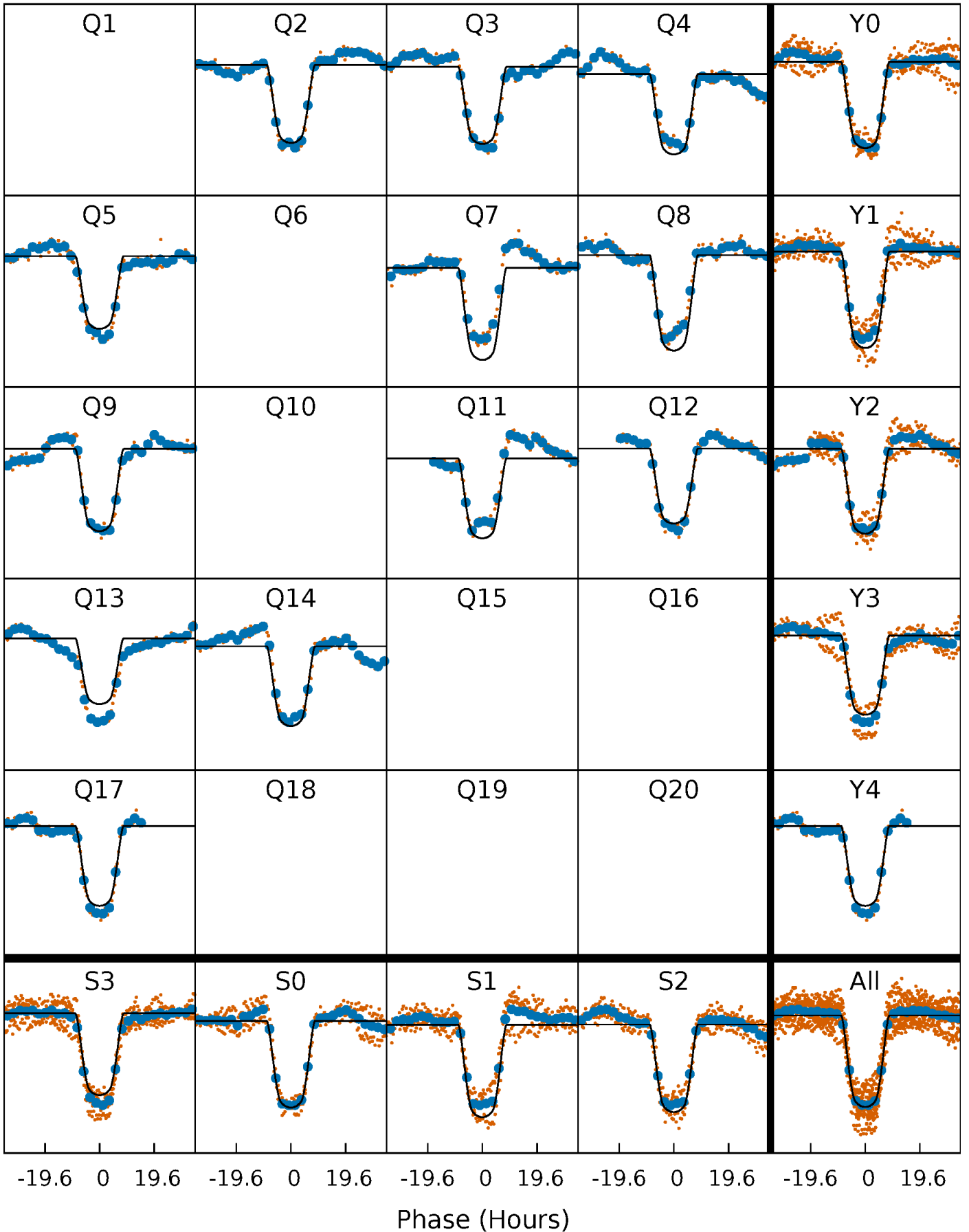
# PDC Quarter-Phased Transit Curves

TCE 003442054-02 P=117.681231 Days  $T_0=178.233451$  (BKJD)



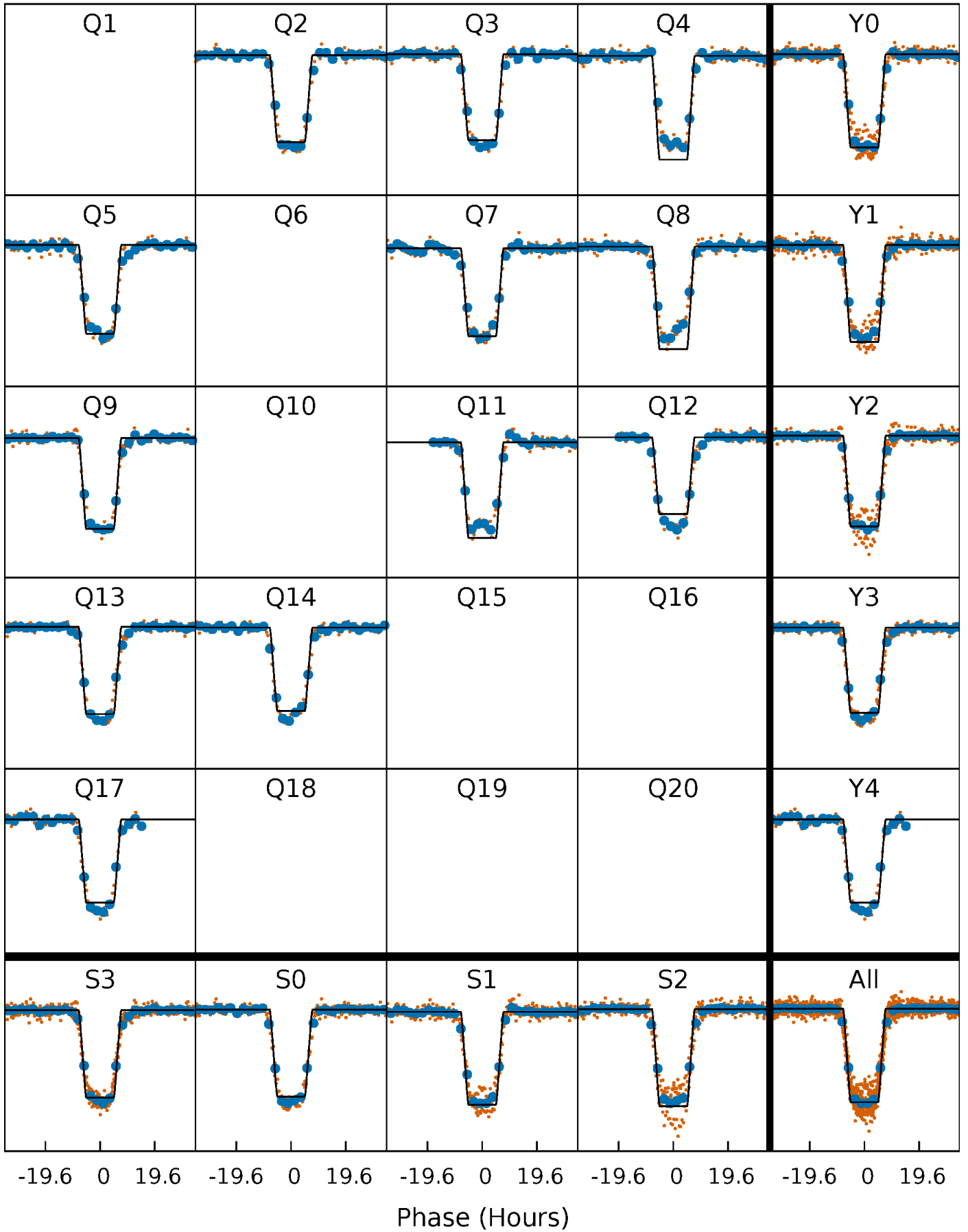
# DV Quarter-Phased Transit Curves

TCE 003442054-02     $P=117.681231$  Days     $T_0=178.233451$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

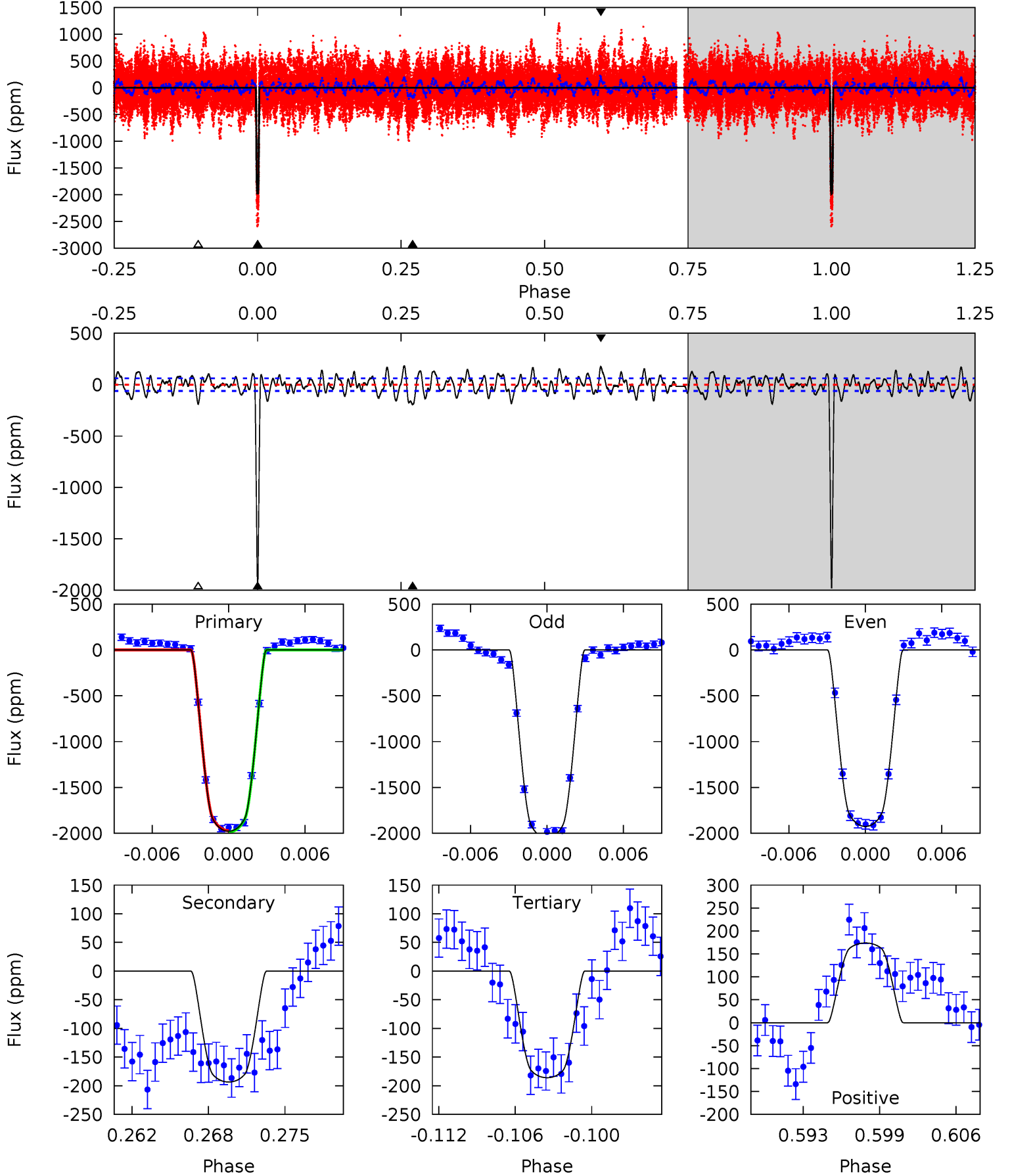
TCE 003442054-02 P=117.683683 Days  $T_0=178.221091$  (BKJD)



# DV Model-Shift Uniqueness Test

003442054-02,  $P = 117.681231$  Days,  $E = 60.552220$  Days

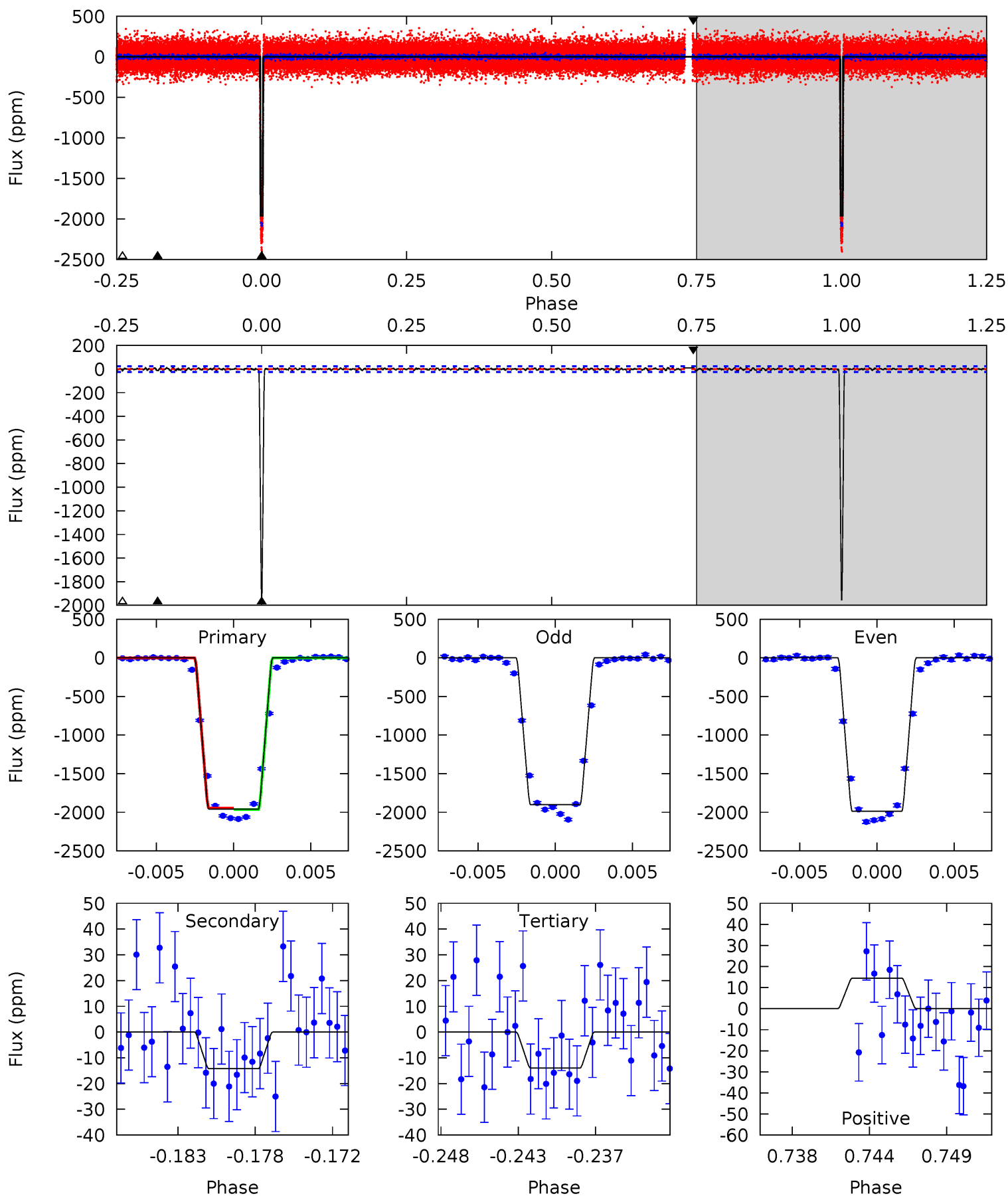
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
163.6	16.0	15.4	14.4	5.12	2.73	5.76	148.2	149.2	0.62	1.63	5.12	0.97	0.08	0.58



# Alt Model-Shift Uniqueness Test

003442054-02, P = 117.683683 Days, E = 60.537408 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
424.6	3.08	3.03	3.14	5.14	2.78	0.95	421.6	421.5	0.06	-0.06	9.41	0.98	0.01	2.14





### Stellar Parameters For KIC 003442054

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6429^{+162}_{-162}$	$3.899^{+0.280}_{-0.100}$	$-0.260^{+0.300}_{-0.250}$	$2.079^{+0.438}_{-0.711}$	$1.250^{+0.220}_{-0.198}$	$0.196^{+0.353}_{-0.070}$
	+3%/-3%	+7%/-3%	+115%/-96%	+21%/-34%	+18%/-16%	+180%/-36%
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 003442054-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-194 \pm 12$	$10.95^{+1.41}_{-1.85}$	$791^{+49}_{-67}$	$3806^{+73}_{-80}$	$233^{+90}_{-48}$
Alt.	$-14 \pm 5$	$9.94^{+1.24}_{-1.71}$	$791^{+41}_{-70}$	$2663^{+101}_{-142}$	$21^{+12}_{-8}$

$T_{max}$  = 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  $A_{obs} \gg 1.0$

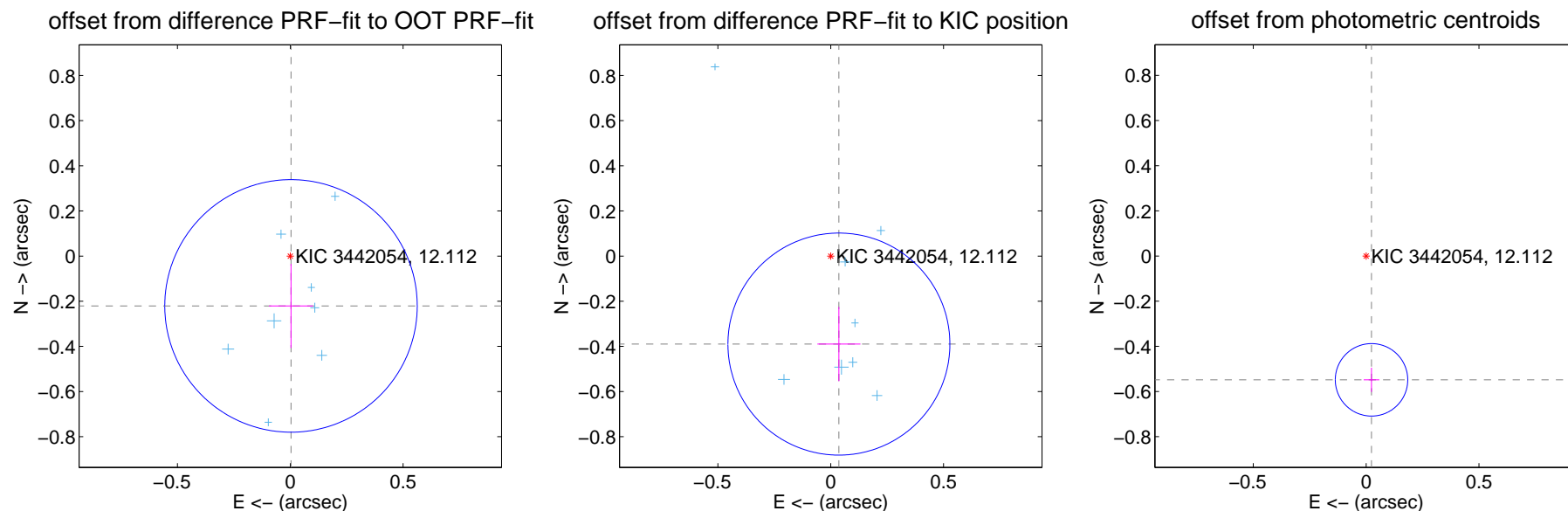
## DV Centroid Data

Supplemental centroid analysis for 003442054-02. Kepler magnitude: 12.11. Transit SNR 50.76

There are 9 quarters with good PRF difference image offsets

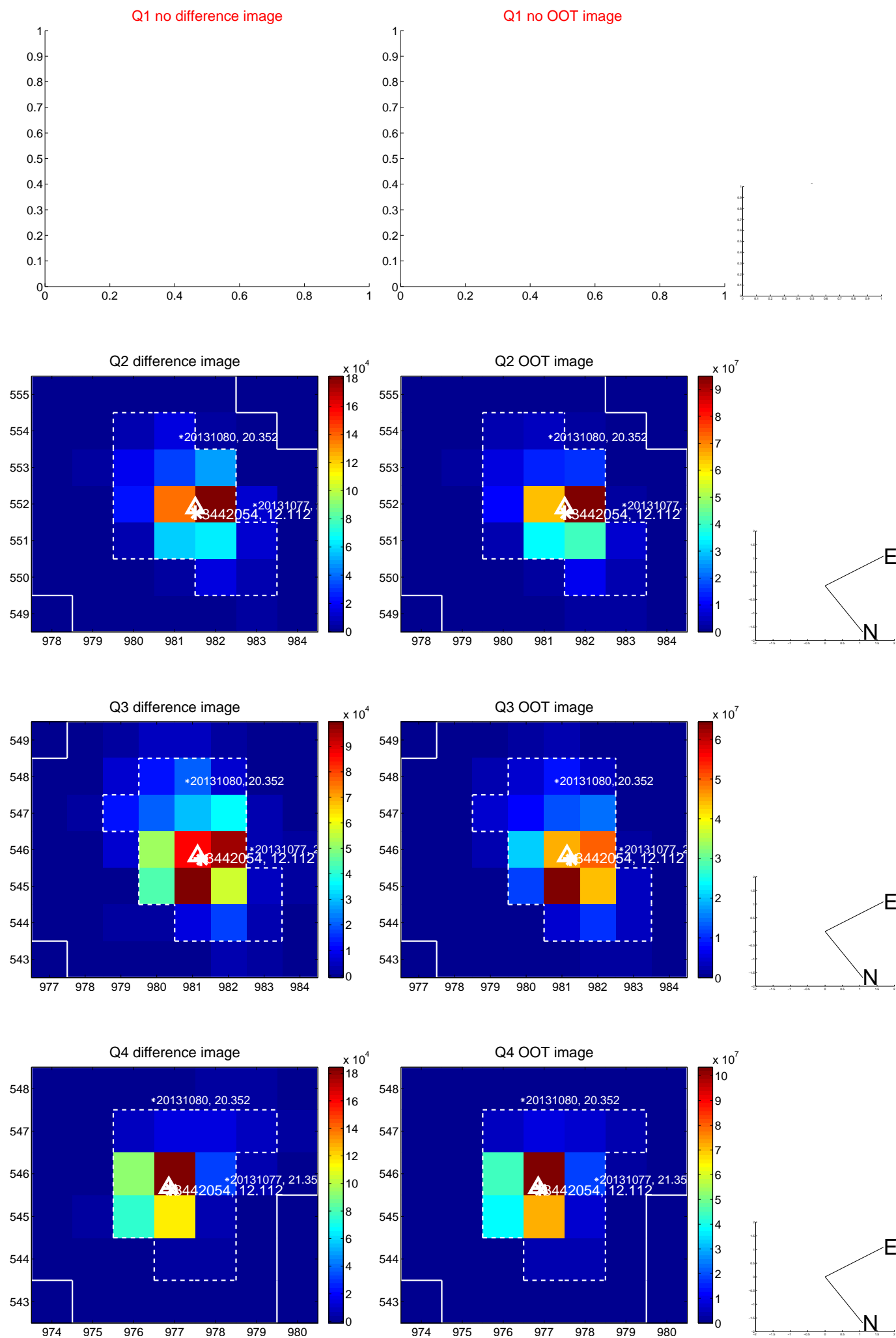
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.221 \pm 0.186$	1.18	$-0.003 \pm 0.098$	$-0.221 \pm 0.186$
PRF-fit source offset from KIC position	$0.391 \pm 0.164$	2.39	$-0.036 \pm 0.096$	$-0.390 \pm 0.164$
photometric centroid source offset	$0.55 \pm 0.05$	10.26	$-0.02 \pm 0.03$	$-0.55 \pm 0.05$

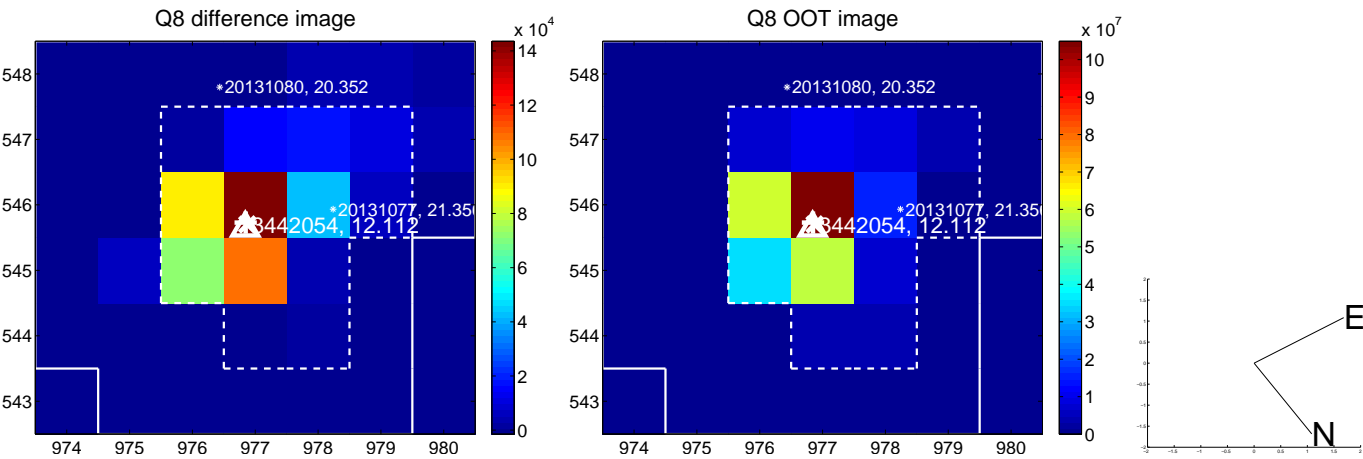
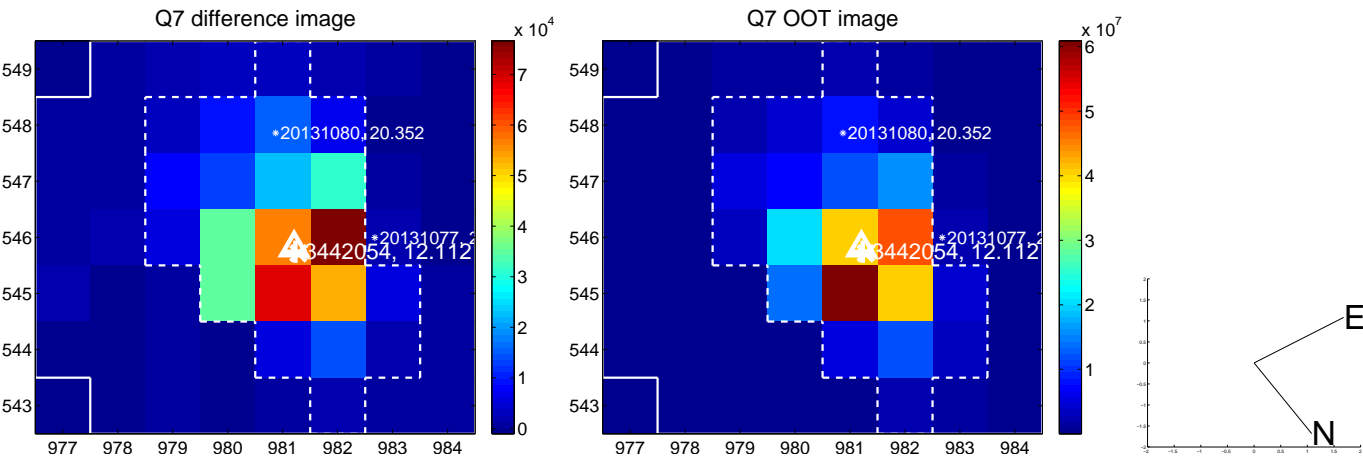
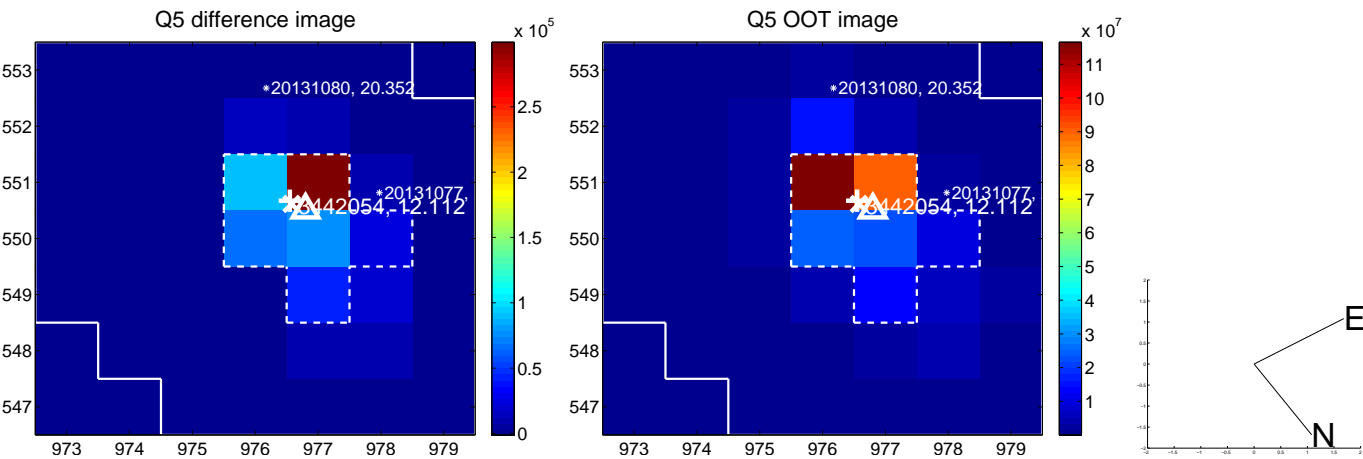


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

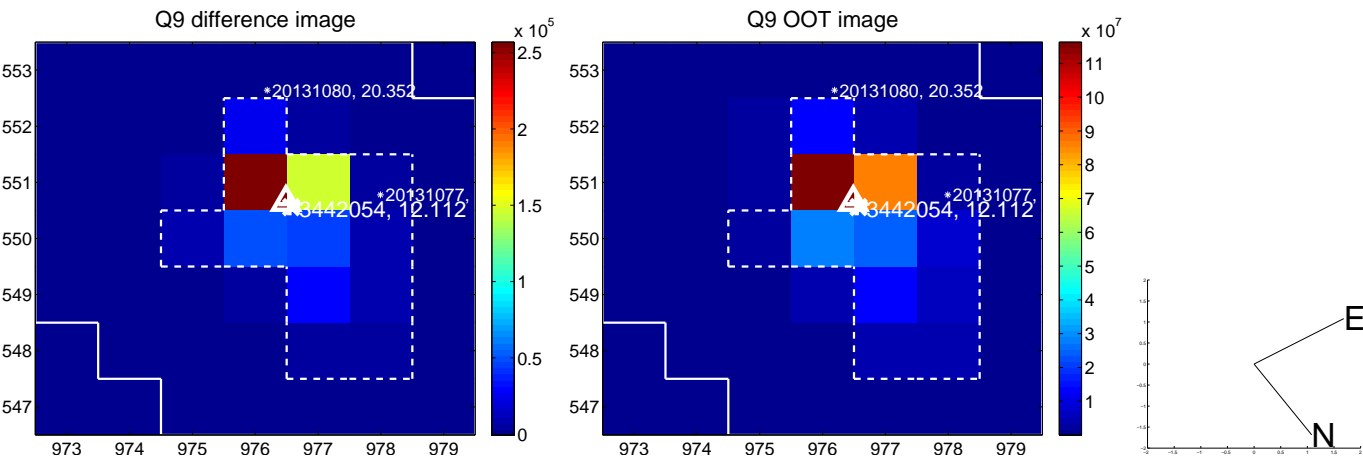
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



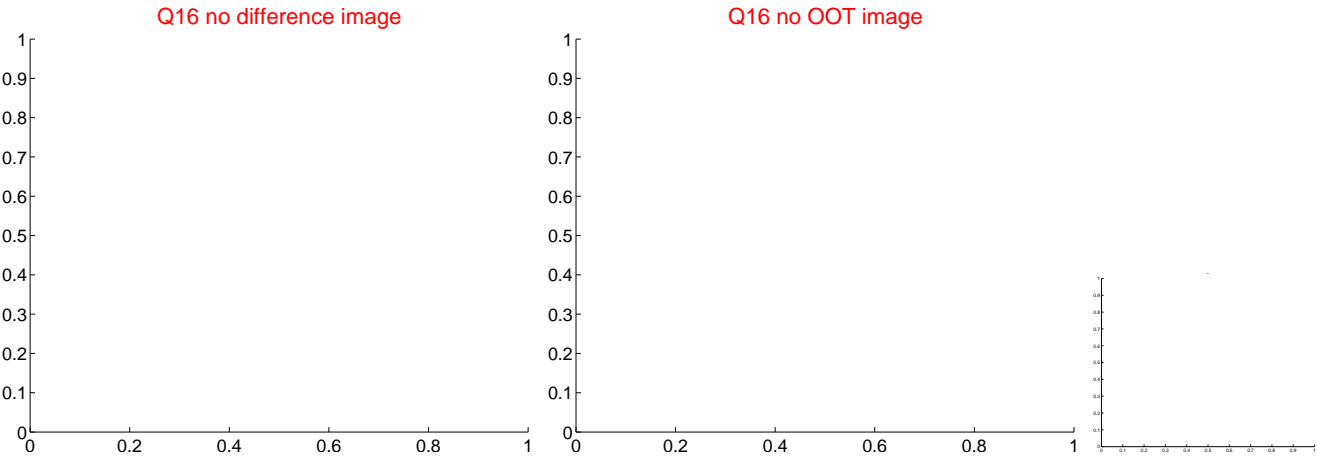
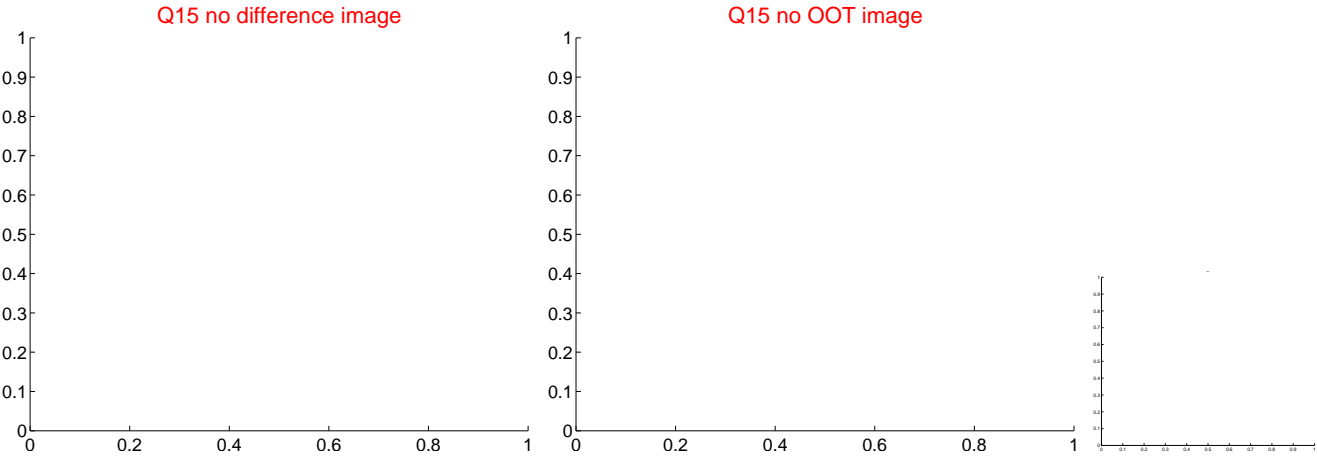
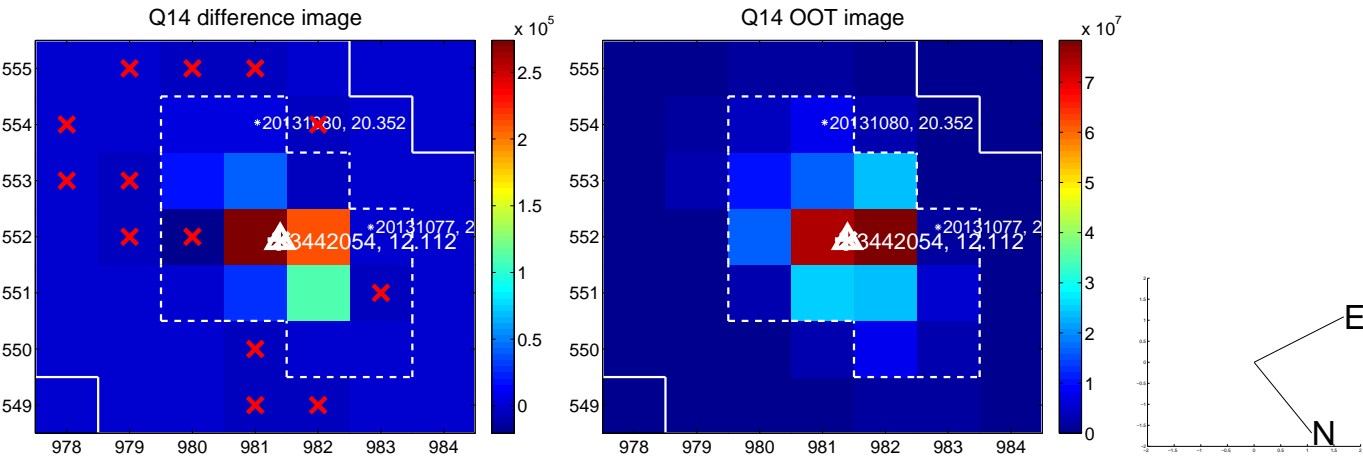
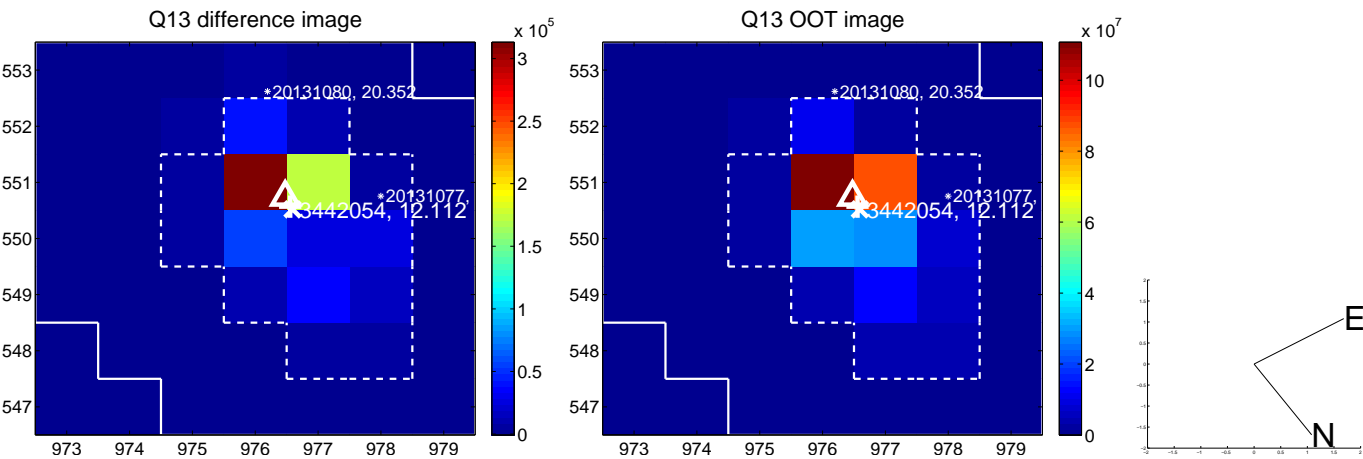
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



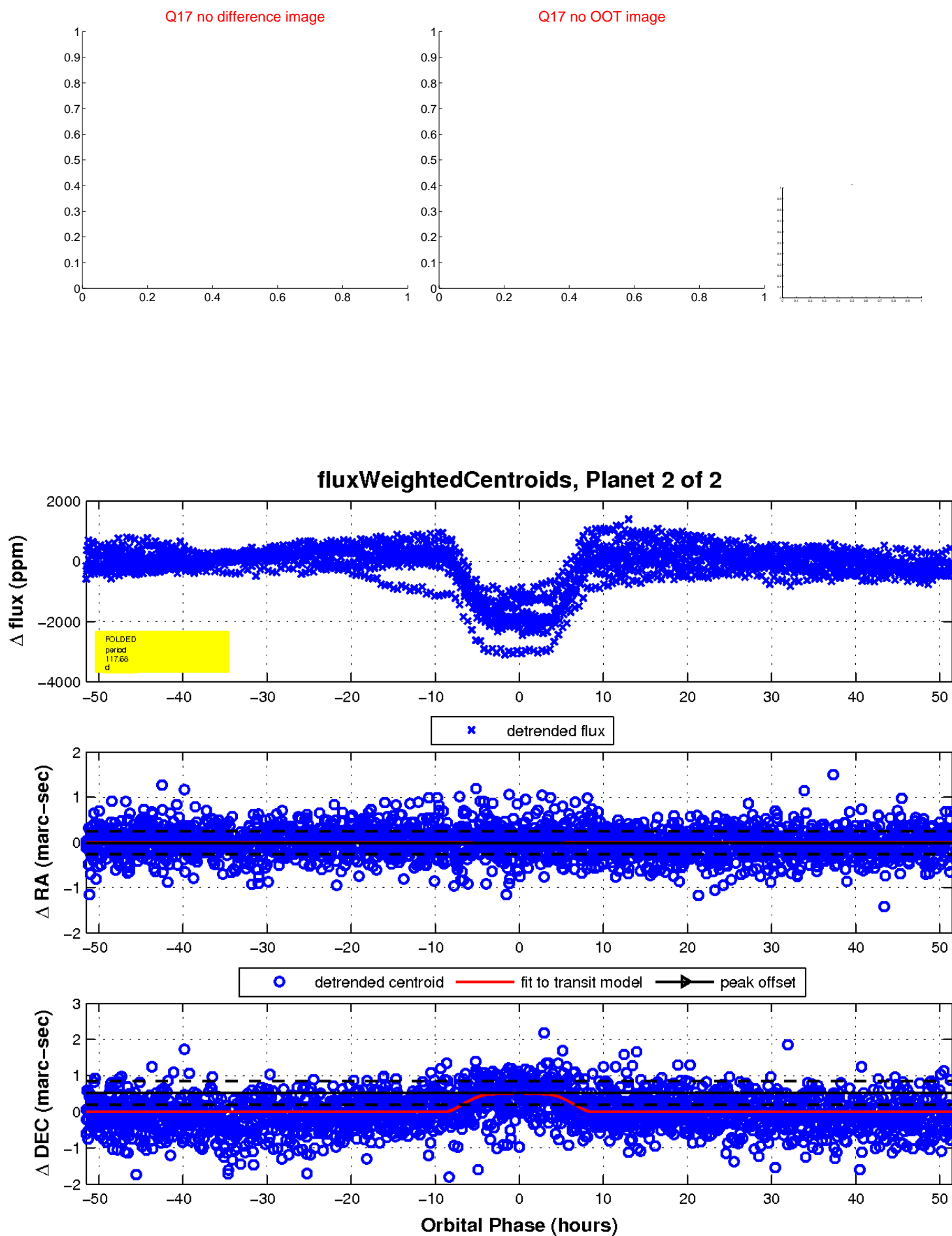
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image

