

# KIC 008374551

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008374551-01	OBS	No	368.417114	234.771160	1631.2	11.897	10.2	10.4	0.74	4616	3.60	0.27
008374551-02	OBS	No	368.888205	200.870931	1832.8	7.323	9.4	10.0	0.74	4616	3.10	0.27

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008374551-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—ALL_TRANS_CHASES—CENT_FEW_DIFFS
008374551-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—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.

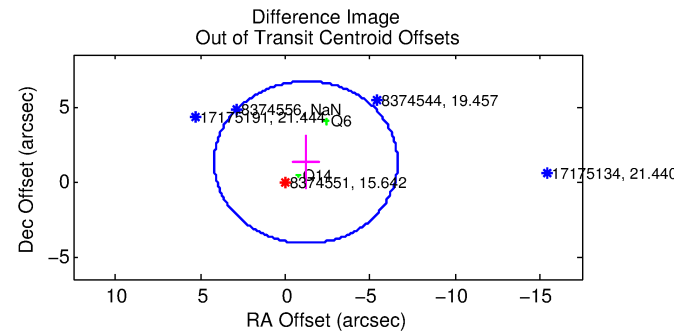
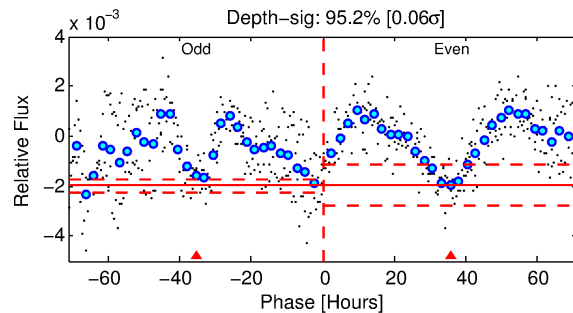
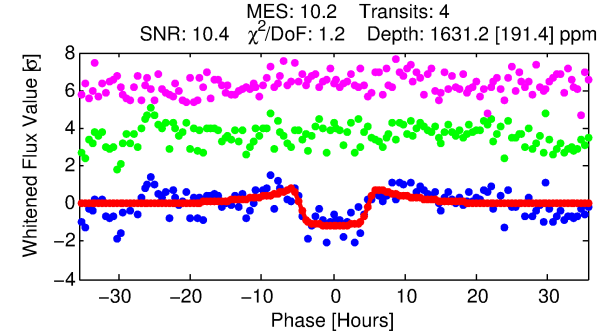
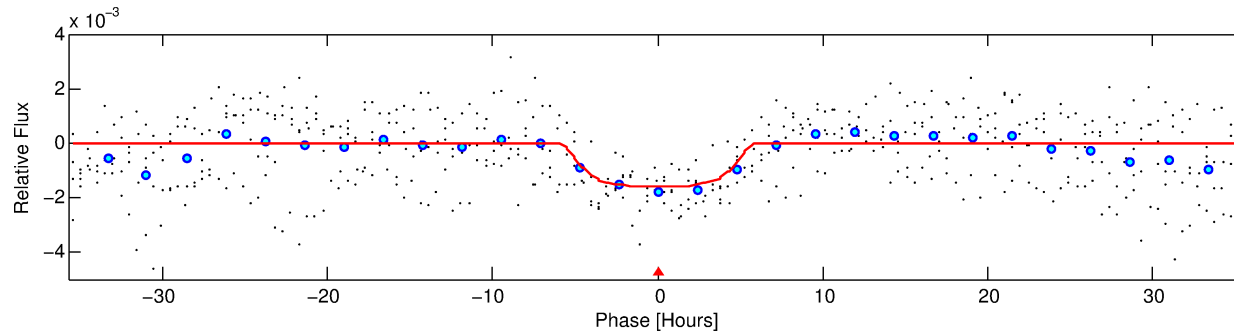
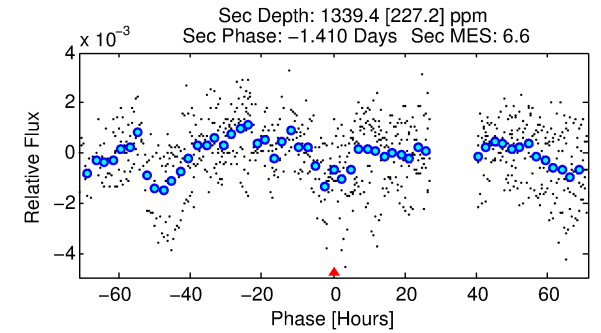
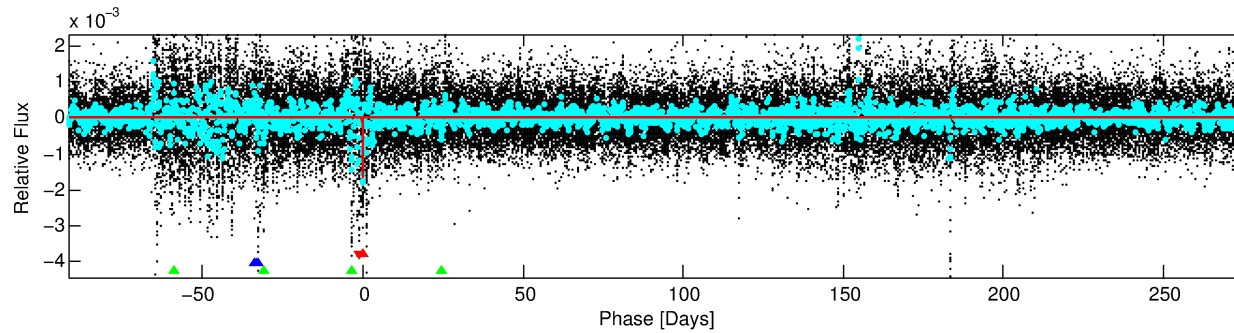
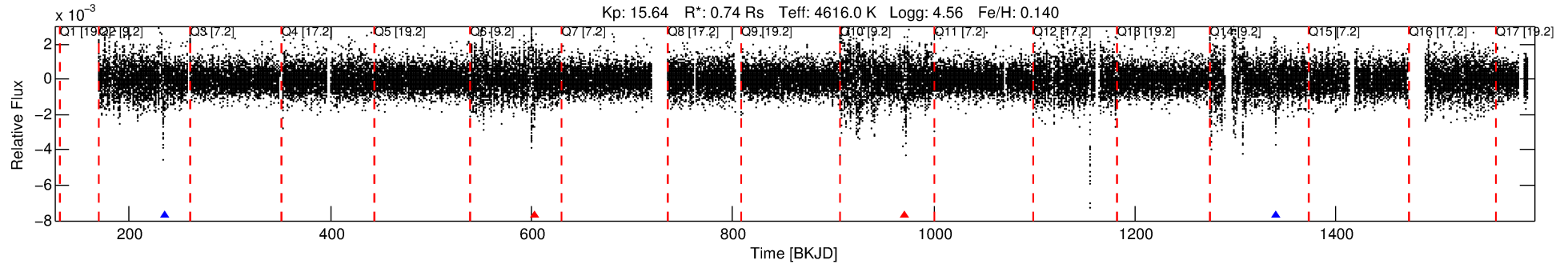
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008374551-01

No Significant Match Found

# DV One-Page Summary

KIC: 8374551 Candidate: 1 of 3 Period: 368.417 d



## DV Fit Results:

Period = 368.41711 [0.00875] d  
Epoch = 234.7712 [0.0171] BKJD  
Rp/R\* = 0.0447 [0.0049]  
a/R\* = 133.04 [37.62]  
b = 0.88 [0.08]  
Seff = 0.27 [0.05]  
Teq = 184 [8] K  
Rp = 3.60 [0.51] Re  
a = 0.9036 [0.0704] AU  
Ag = 46502.23 [13917.55] [3.34σ]  
Teffp = 4179 [314] K [12.70σ]

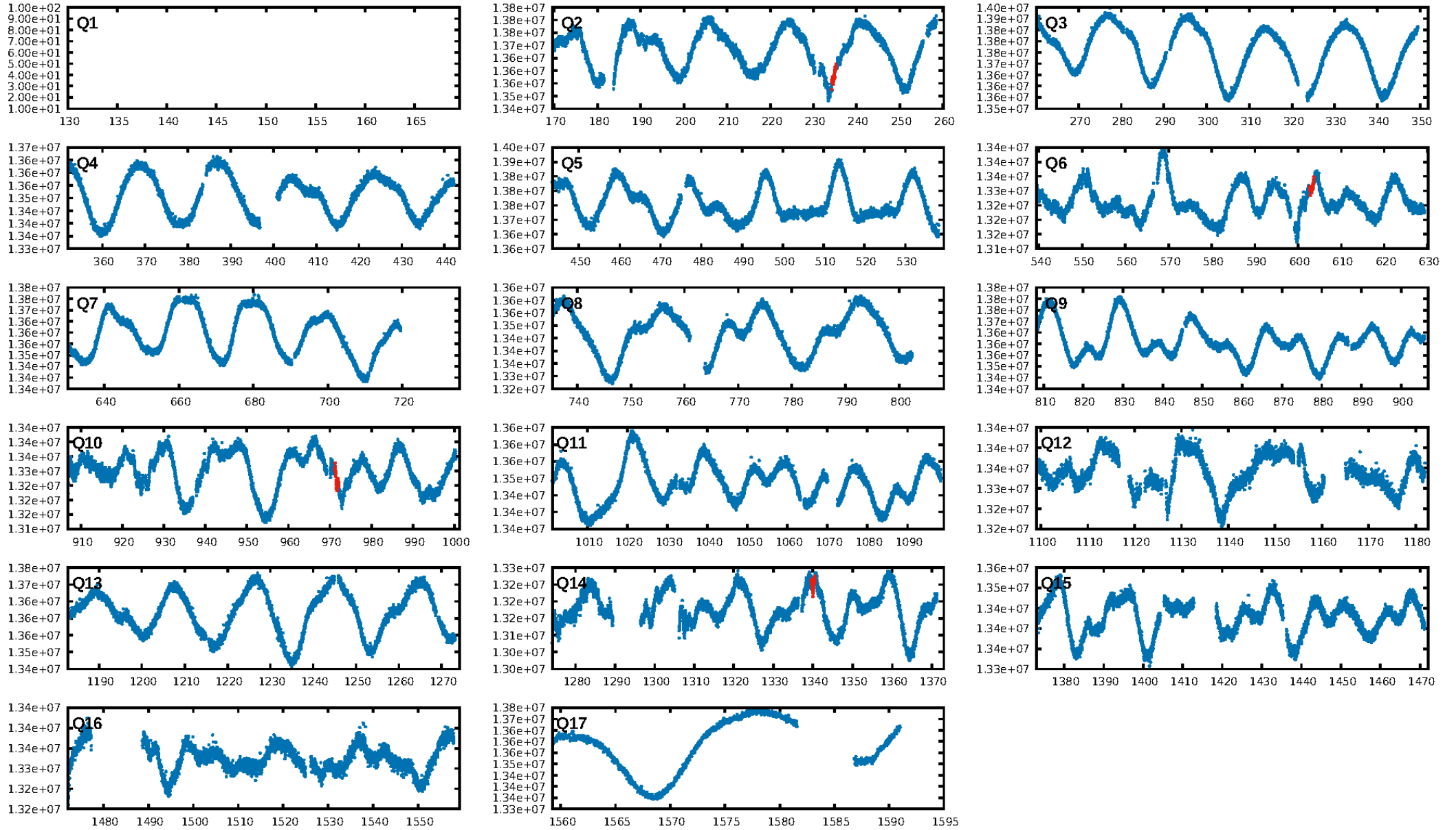
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [26.43σ]  
LongPeriod-sig: 58.2% [0.81σ]  
ModelChiSquare2-sig: 22.5%  
ModelChiSquareGof-sig: 98.9%  
**Bootstrap-pfa: 3.50e-11**  
**RollingBand-fgt: 0.50 [2/4]**  
GhostDiagnostic-chr: 1.031  
Centroid-sig: 13.4%  
Centroid-so: 2.583 arcsec [1.42σ]  
OotOffset-rm: 1.778 arcsec [0.99σ]  
OotOffset-st: 2/0/0/0 [2]  
KicOffset-rm: 1.762 arcsec [1.23σ]  
KicOffset-st: 2/0/0/0 [2]  
DiffImageQuality-fgm: 0.00 [0/2]  
DiffImageOverlap-fno: 1.00 [3/3]

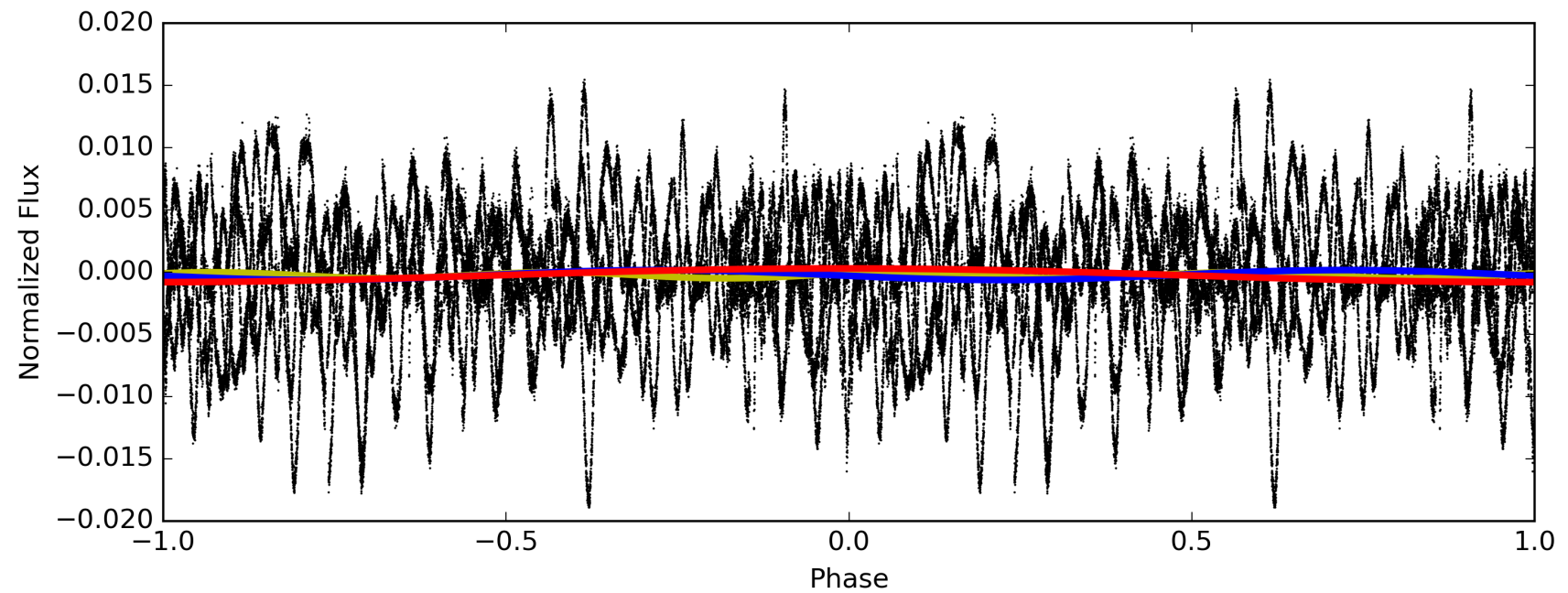
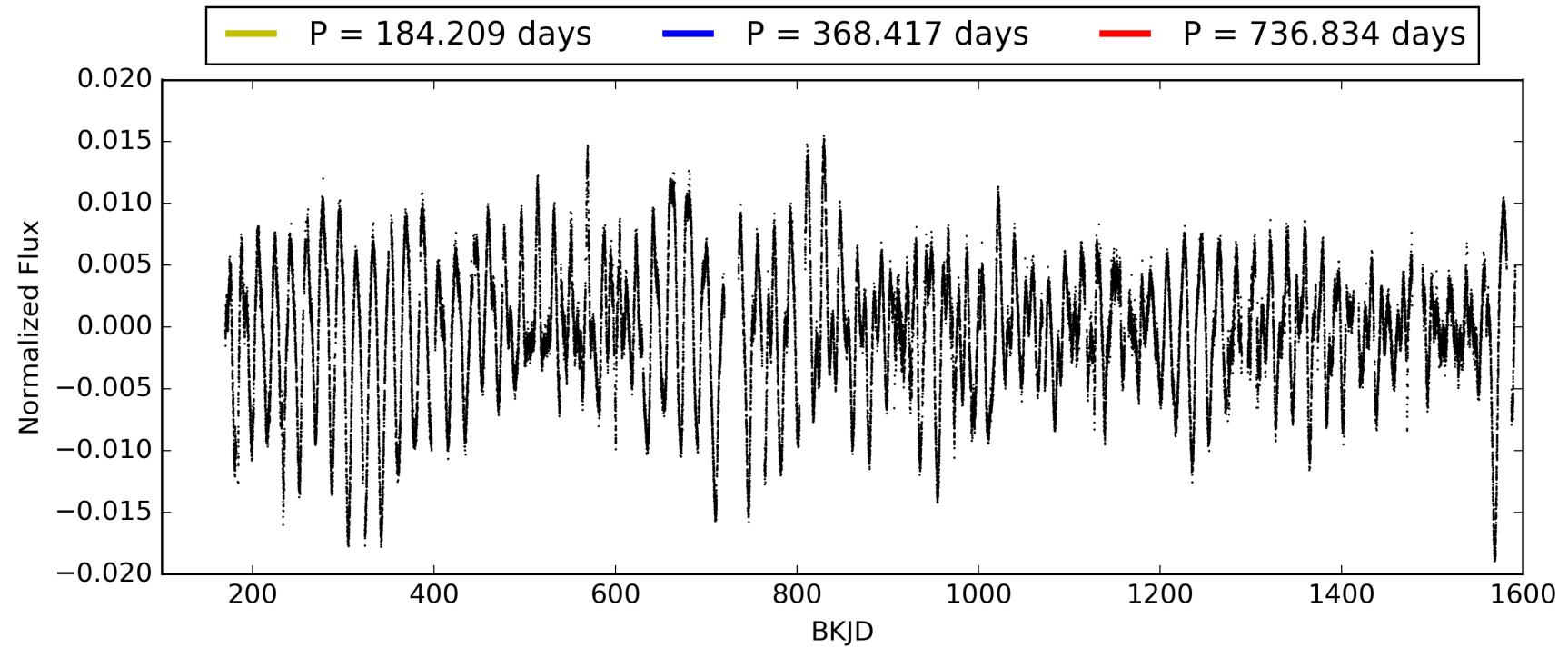
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 10:23:54 Z

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

# TCE 008374551-01, PDC Light Curves

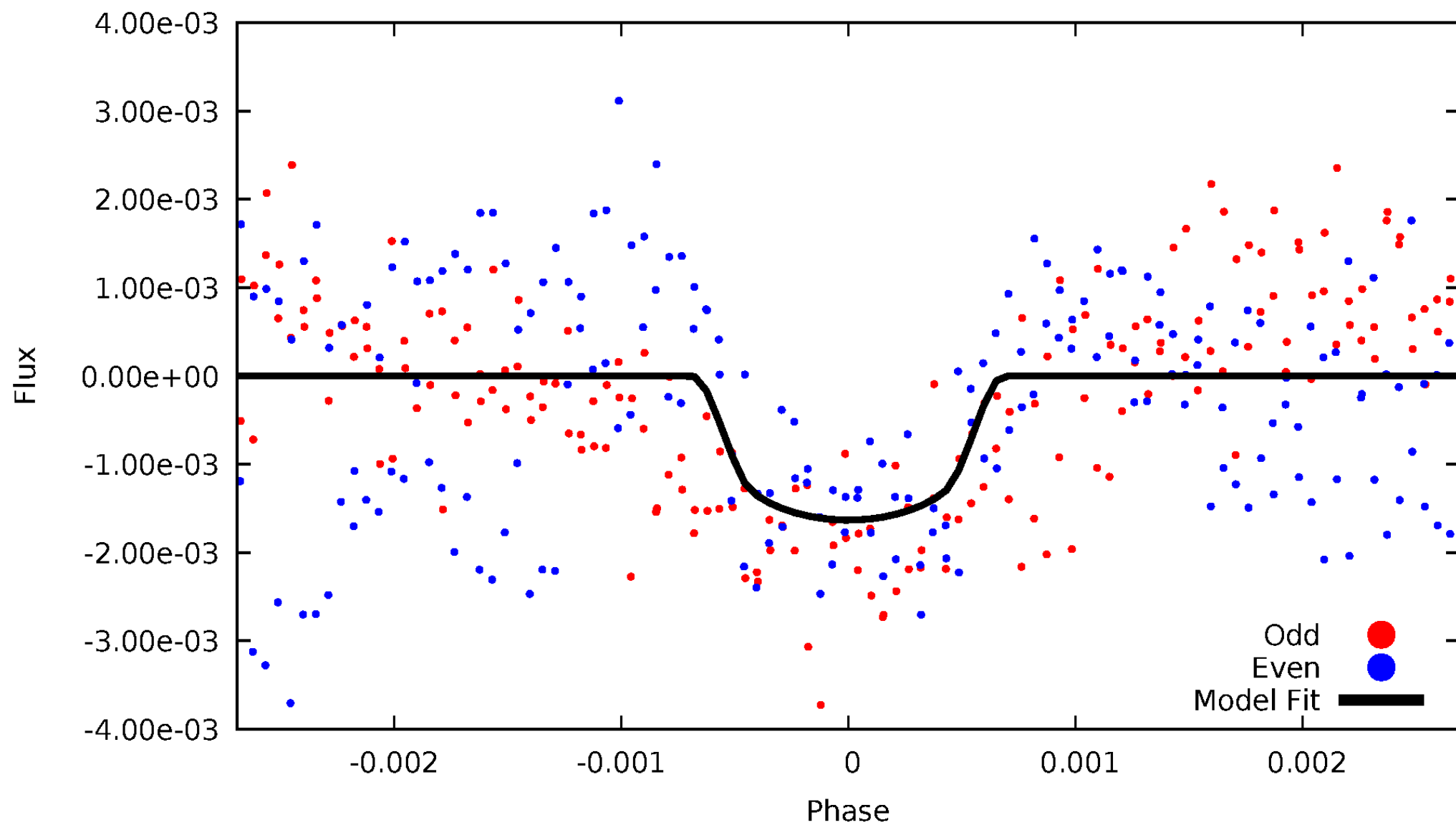


TCE 008374551-01



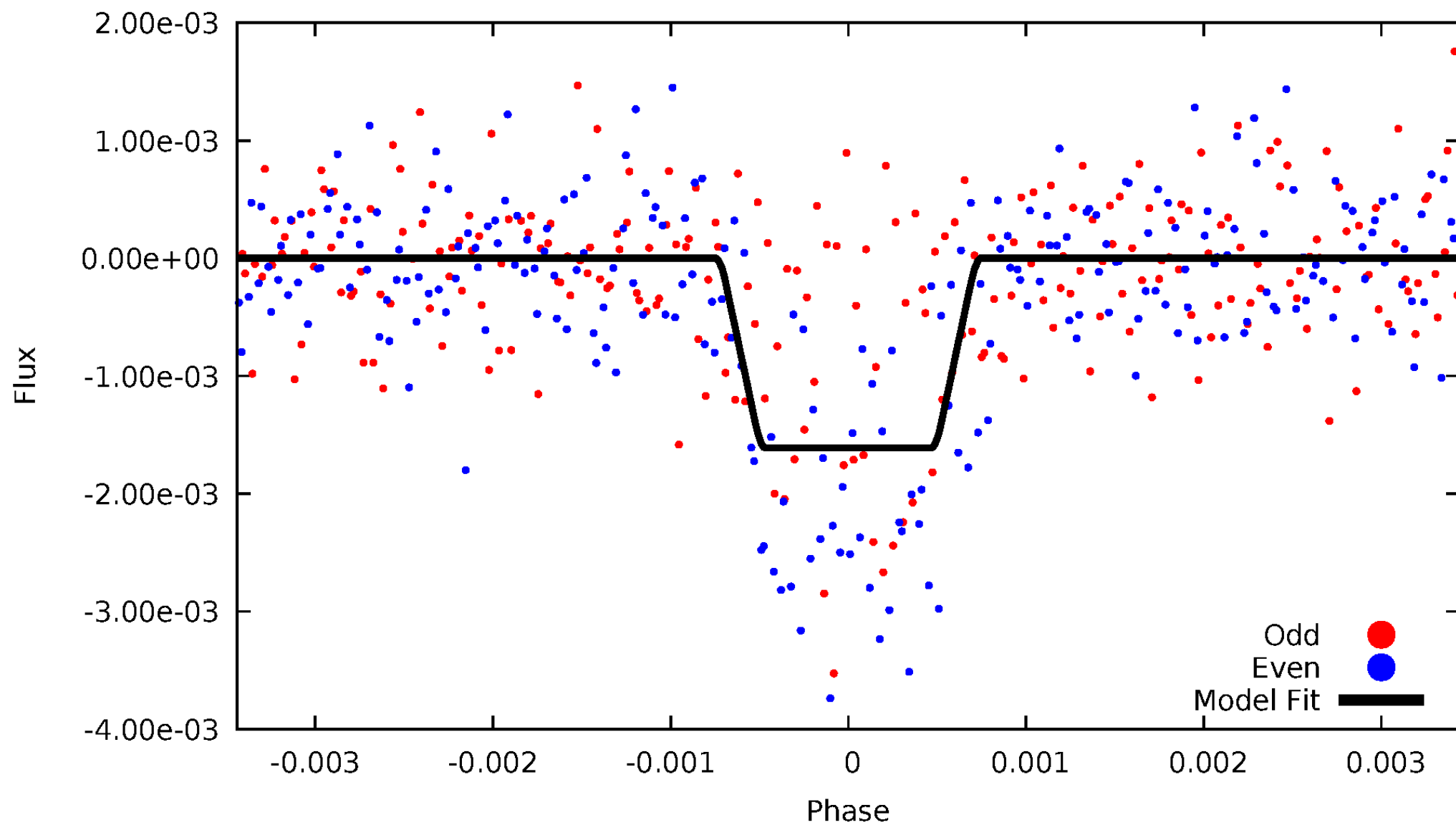
# DV Odd/Even

TCE 008374551-01



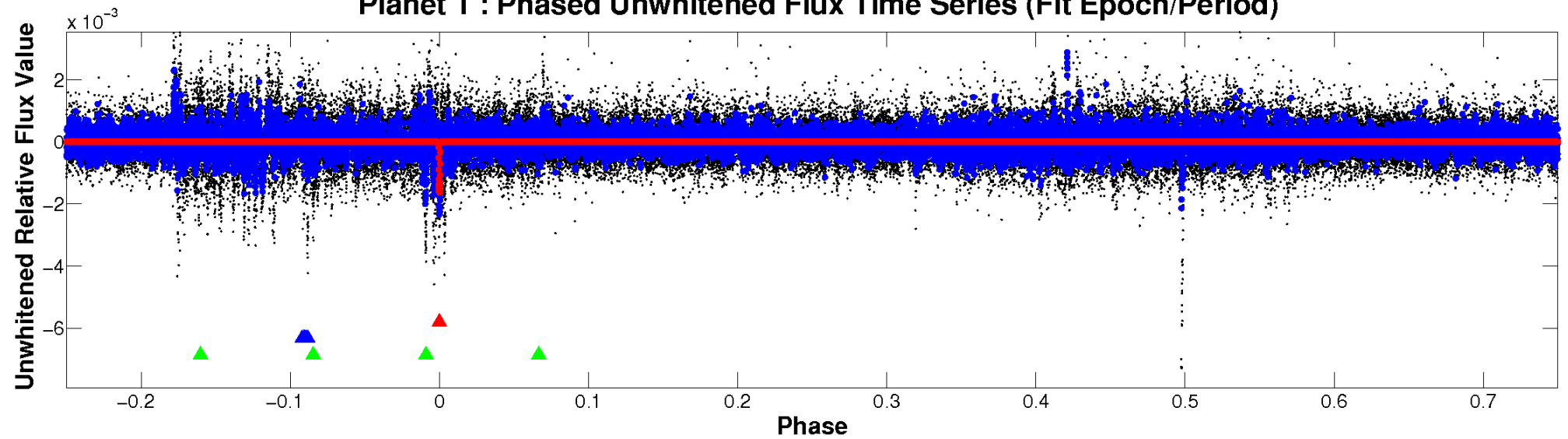
# ALT Odd/Even

TCE 008374551-01

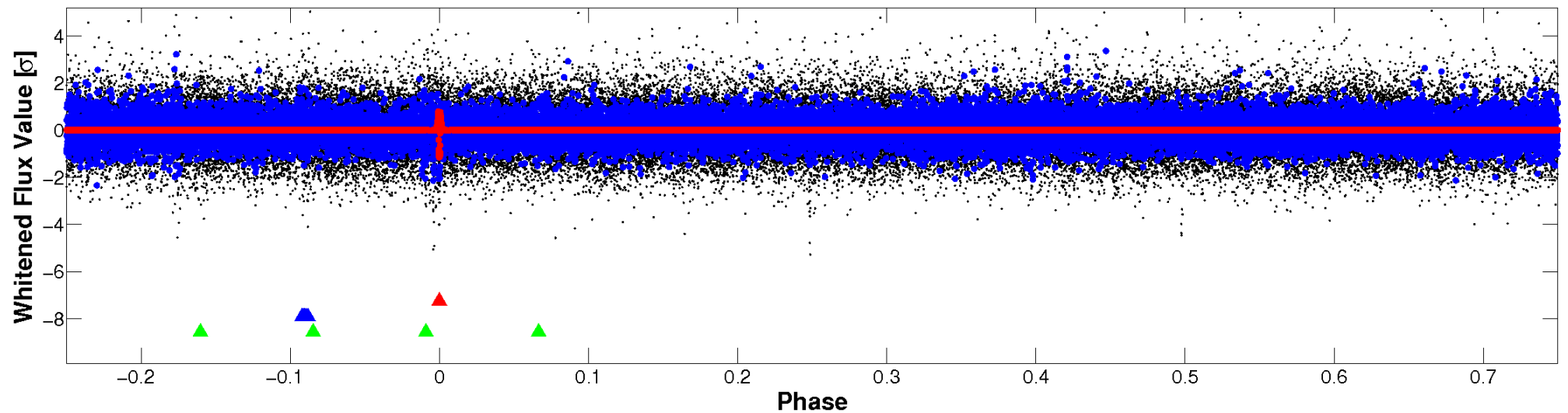


# Non-Whitened Vs. Whitened Light Curve

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

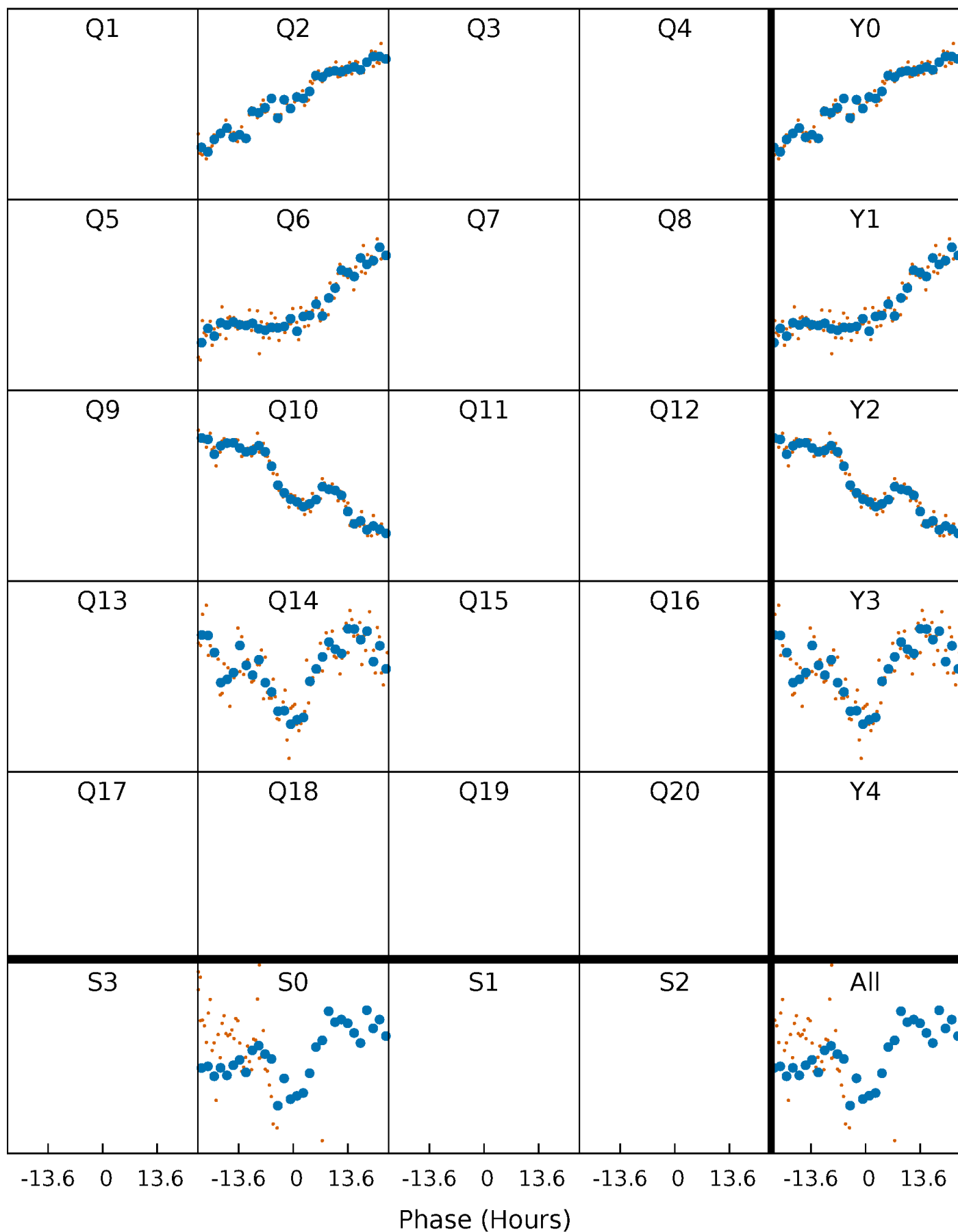


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

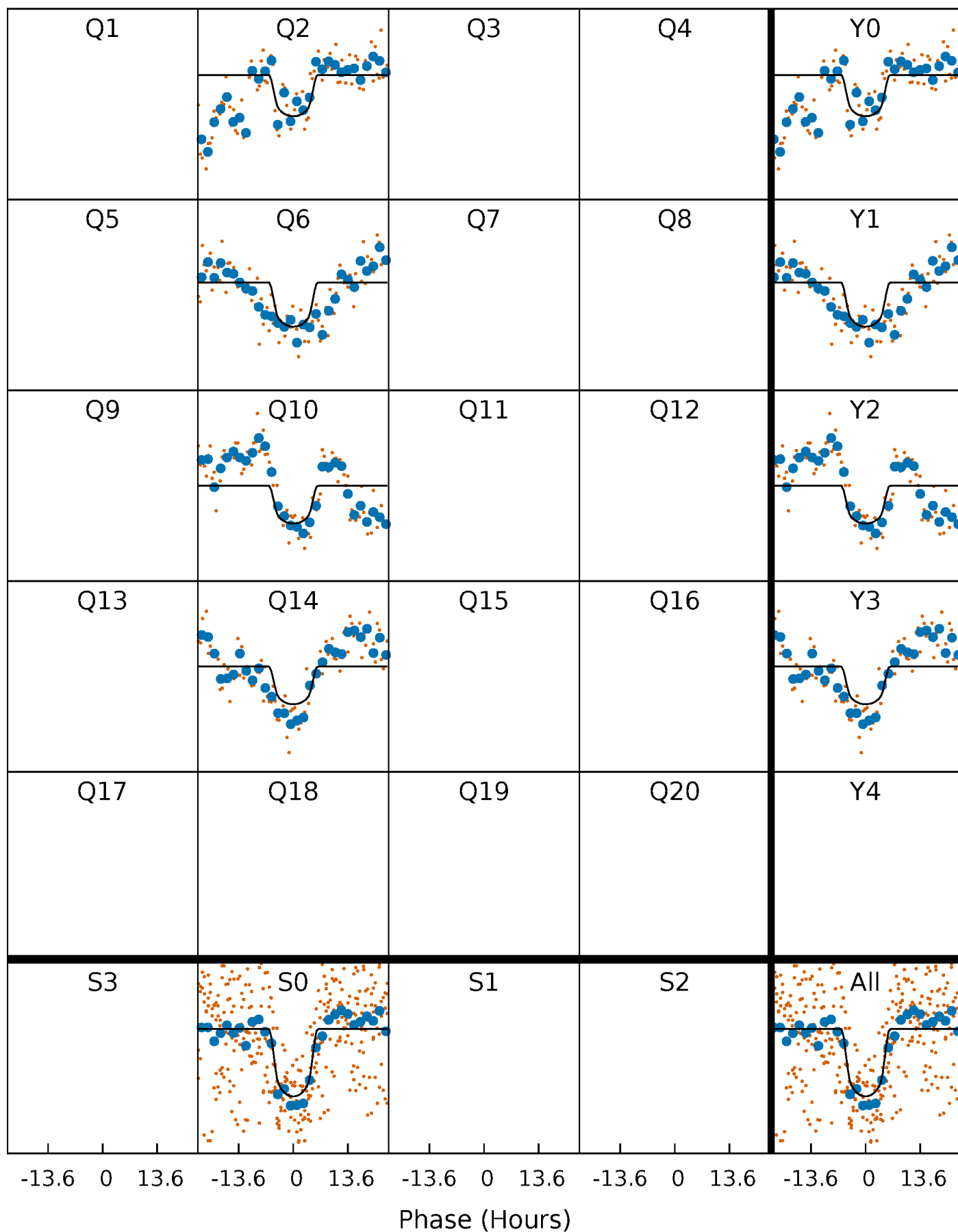
TCE 008374551-01     $P=368.417114$  Days     $T_0=234.771160$  (BKJD)





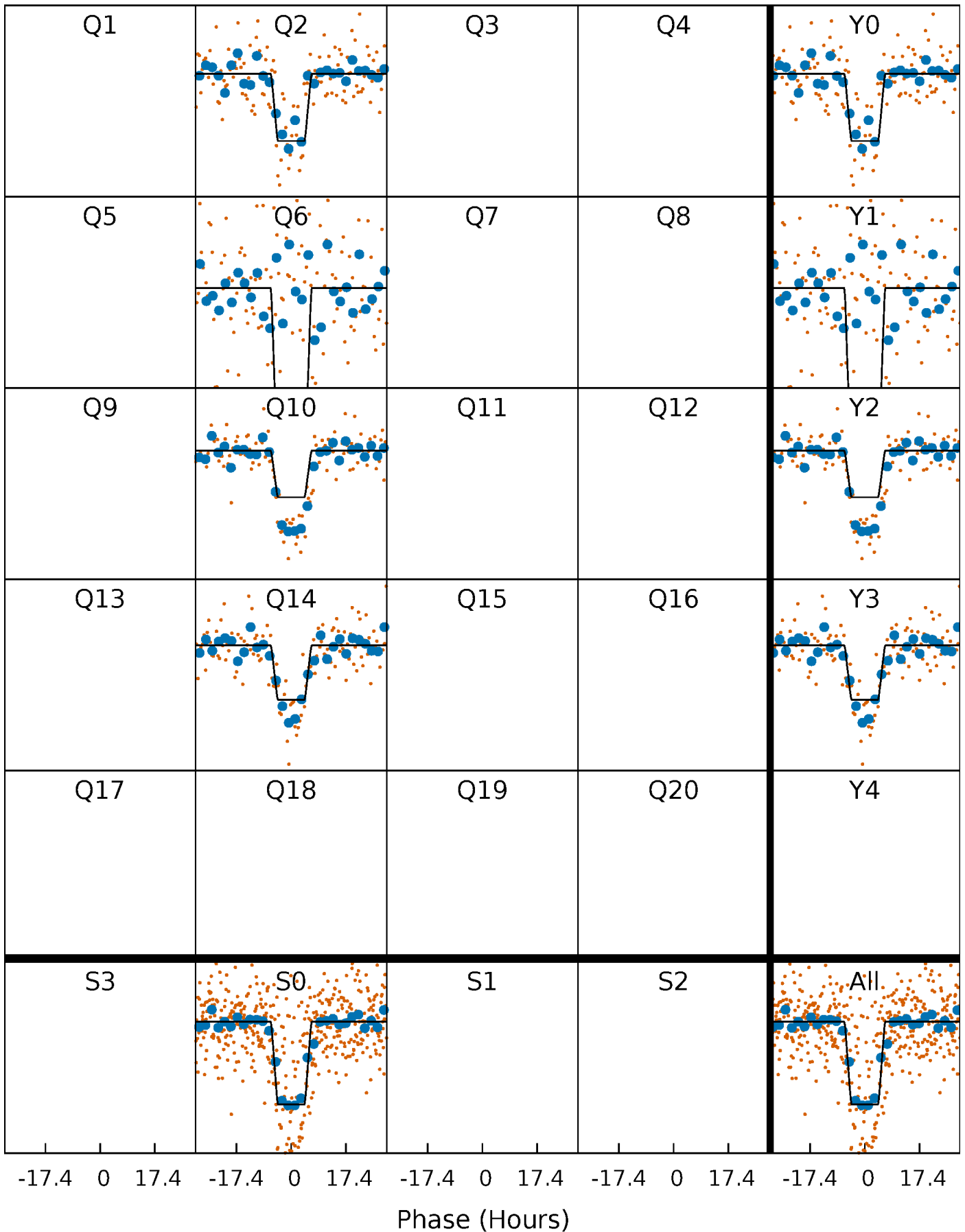
# DV Quarter-Phased Transit Curves

TCE 008374551-01 P=368.417114 Days  $T_0=234.771160$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

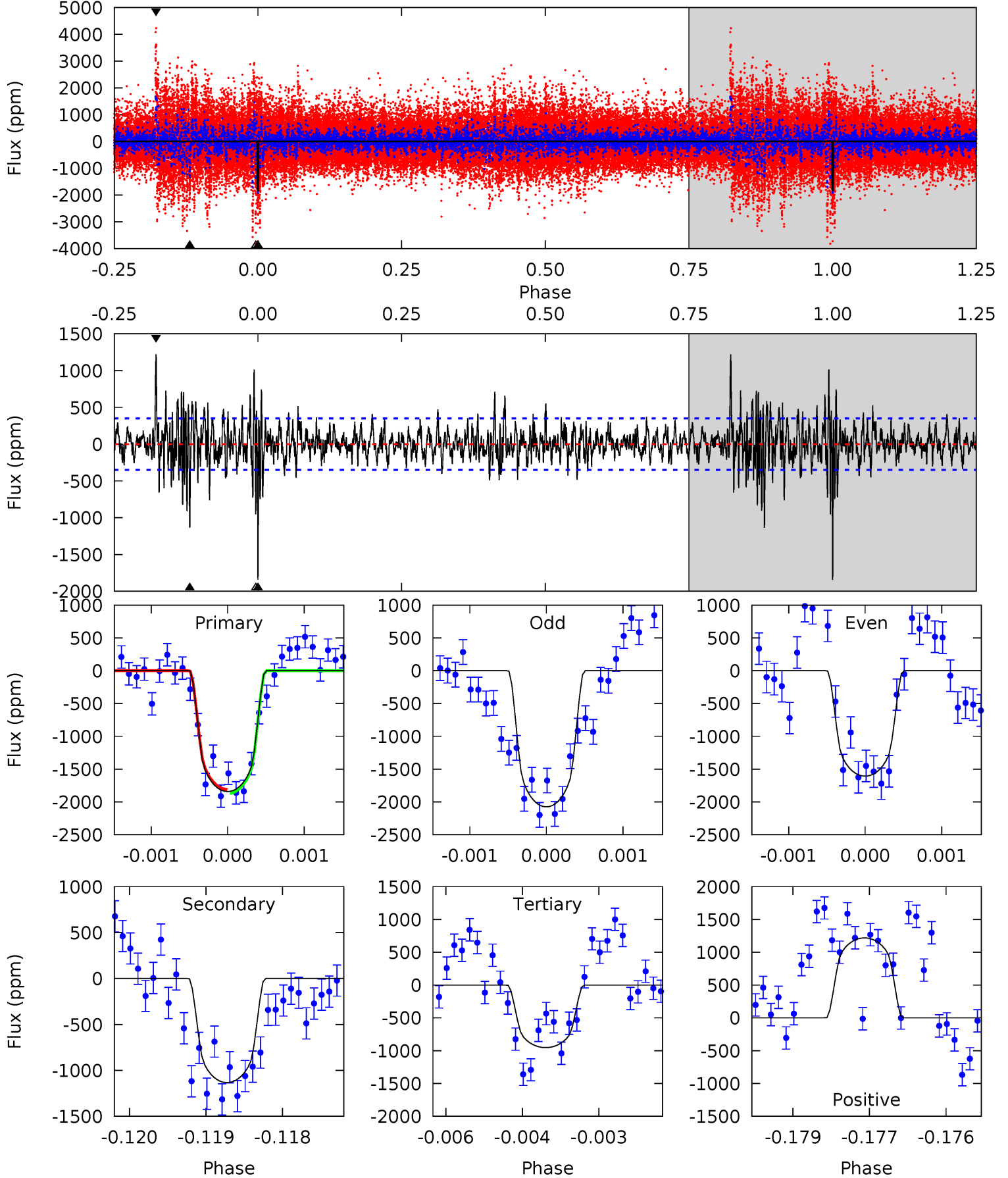
TCE 008374551-01 P=368.410276 Days  $T_0=234.776897$  (BKJD)



# DV Model-Shift Uniqueness Test

008374551-01, P = 368.417114 Days, E = 234.771160 Days

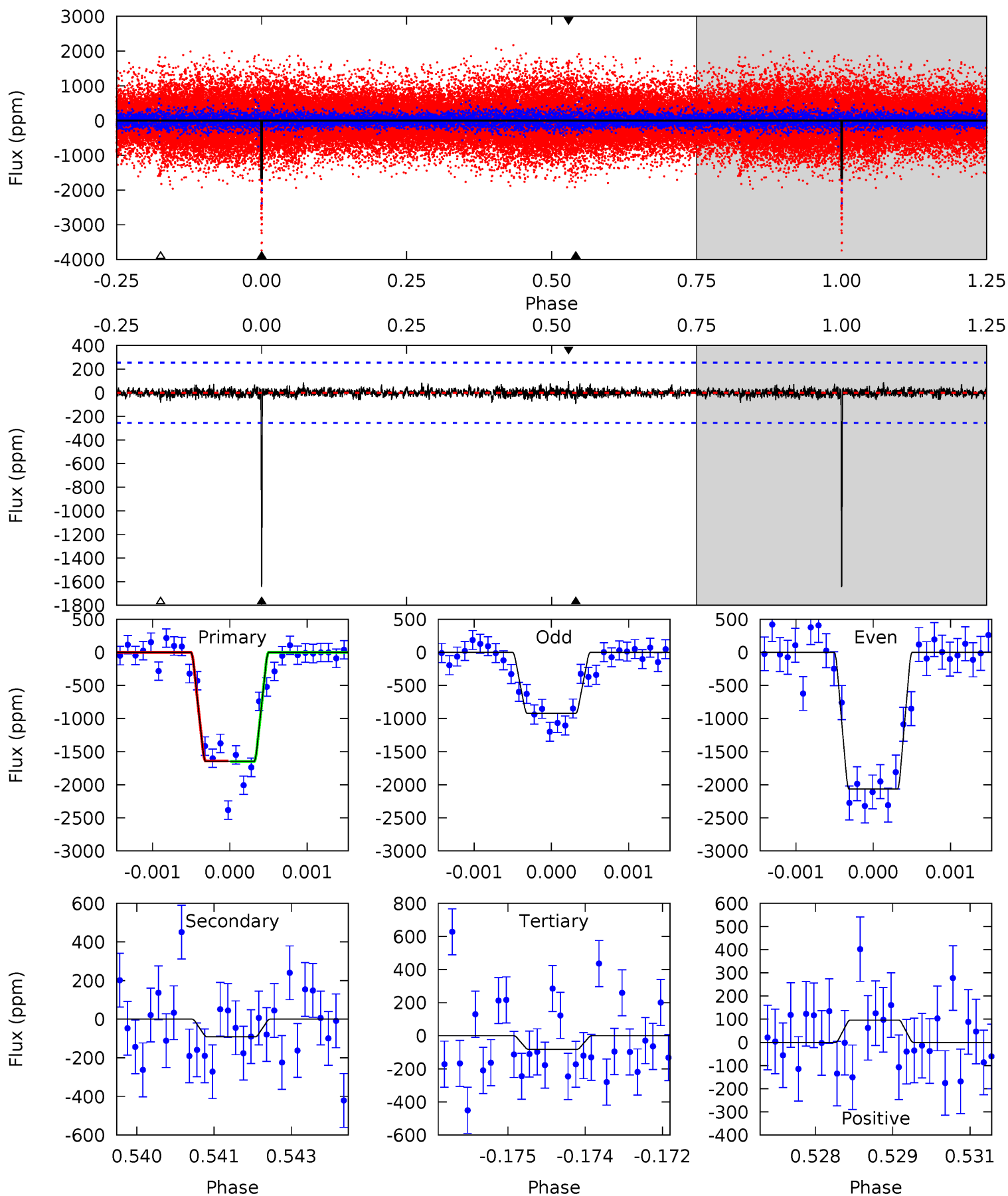
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
28.4	17.5	14.7	18.8	5.39	3.20	3.01	13.7	9.60	2.77	-1.31	3.55	1.01	0.40	0.48



# Alt Model-Shift Uniqueness Test

008374551-01, P = 368.410276 Days, E = 234.776897 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
34.8	1.92	1.74	2.03	5.38	3.18	0.43	33.0	32.7	0.18	-0.11	12.5	0.90	0.06	0



### Stellar Parameters For KIC 008374551

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4616^{+124}_{-138}$	$4.562^{+0.064}_{-0.024}$	$0.140^{+0.250}_{-0.300}$	$0.738^{+0.036}_{-0.067}$	$0.726^{+0.058}_{-0.053}$	$2.541^{+0.641}_{-0.234}$
	+3%/-3%	+1%/-1%	+179%/-214%	+5%/-9%	+8%/-7%	+25%/-9%
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 008374551-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-1133 \pm 65$	$3.55^{+0.46}_{-0.40}$	$255^{+8}_{-9}$	$4144^{+211}_{-202}$	$40532^{+11944}_{-8448}$
Alt.	$-91 \pm 47$	$3.22^{+0.42}_{-0.43}$	$256^{+8}_{-8}$	$2861^{+242}_{-290}$	$3776^{+2777}_{-2120}$

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

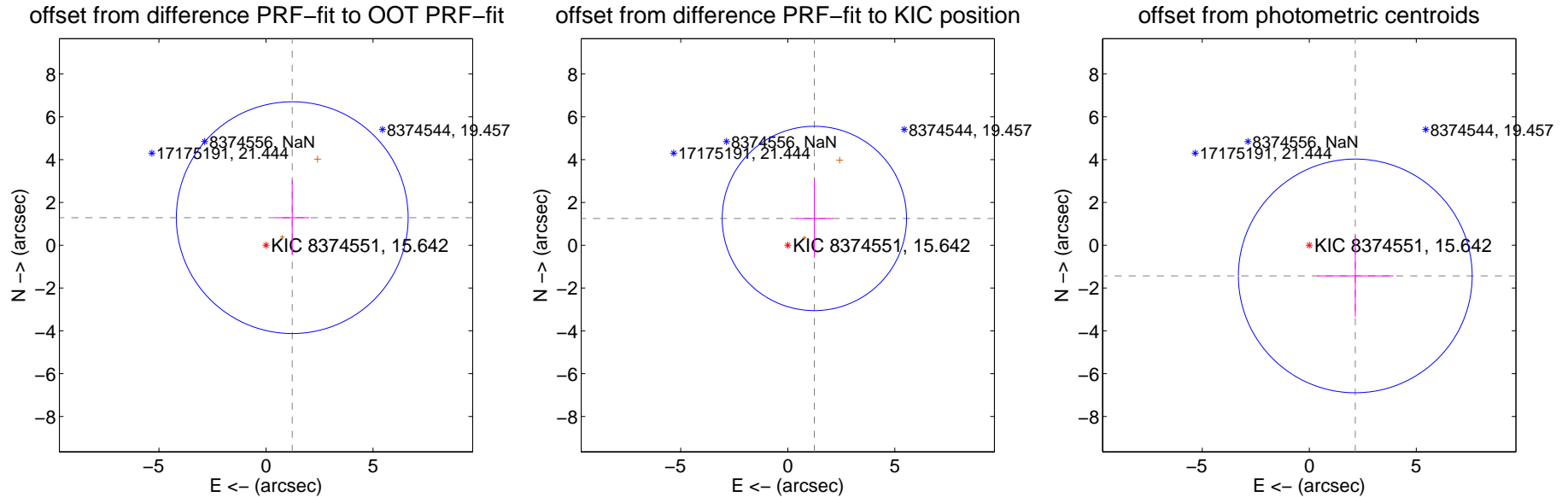
## DV Centroid Data

Supplemental centroid analysis for 008374551-01. Kepler magnitude: 15.64. Transit SNR 10.38

There are 0 quarters with good PRF difference image offsets

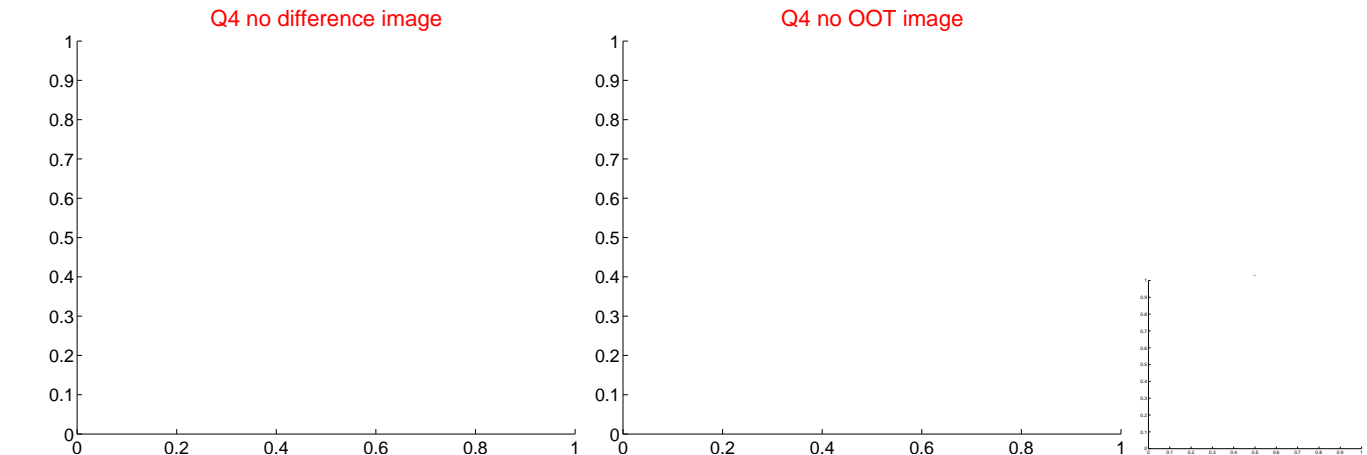
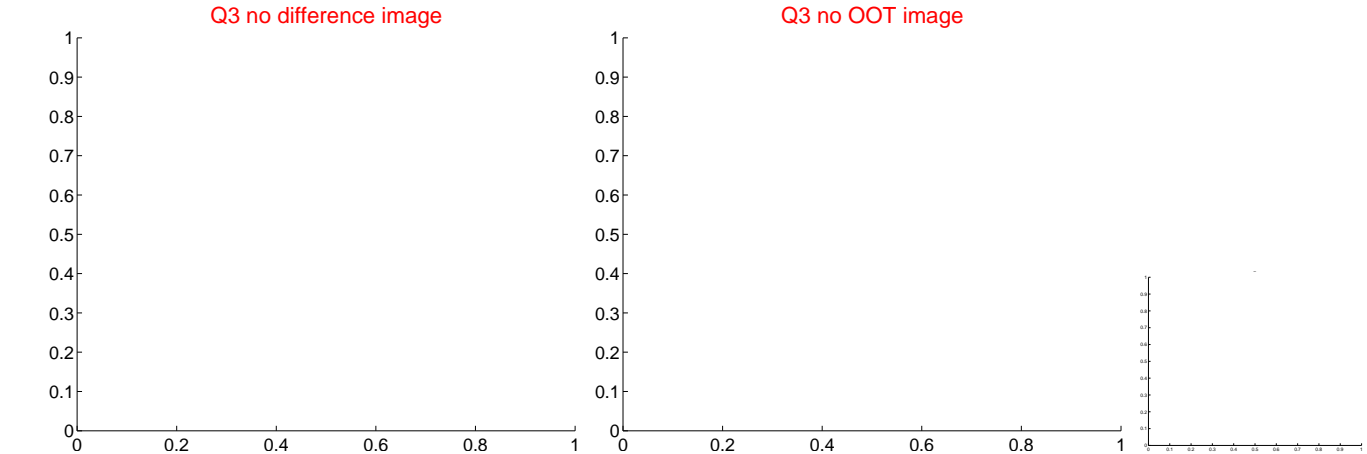
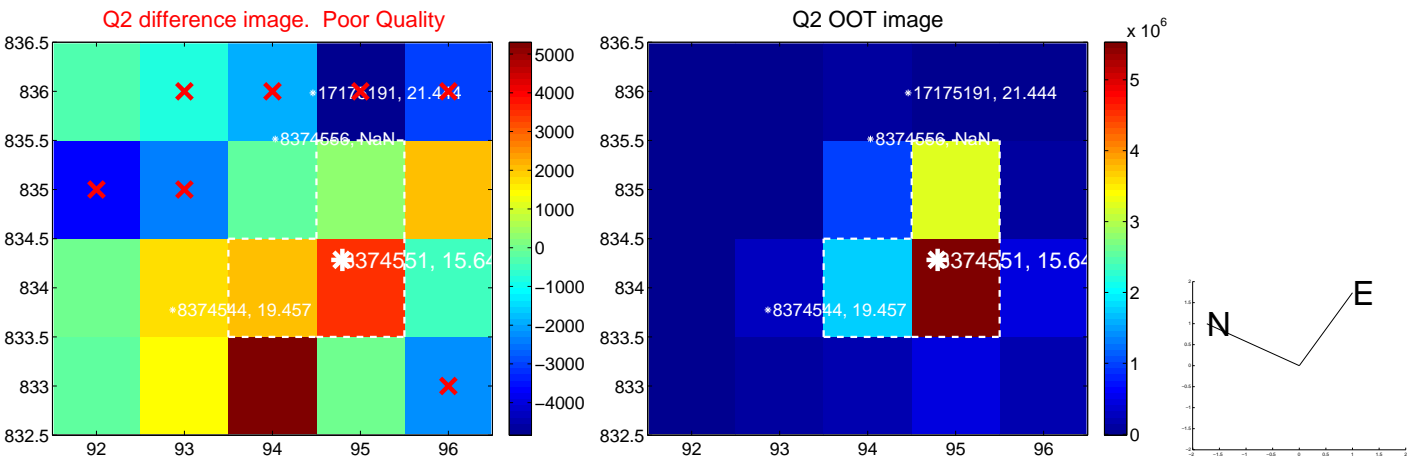
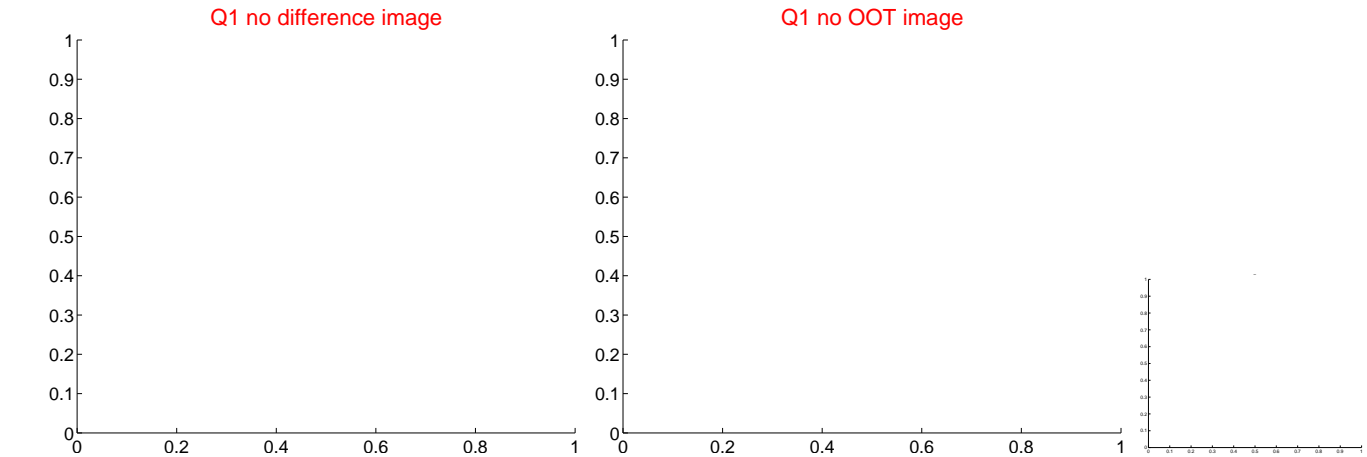
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.778 \pm 1.804$	0.99	$-1.226 \pm 0.791$	$1.288 \pm 1.741$
PRF-fit source offset from KIC position	$1.762 \pm 1.435$	1.23	$-1.241 \pm 0.867$	$1.251 \pm 1.829$
photometric centroid source offset	$2.58 \pm 1.82$	1.42	$-2.15 \pm 1.78$	$-1.43 \pm 1.91$

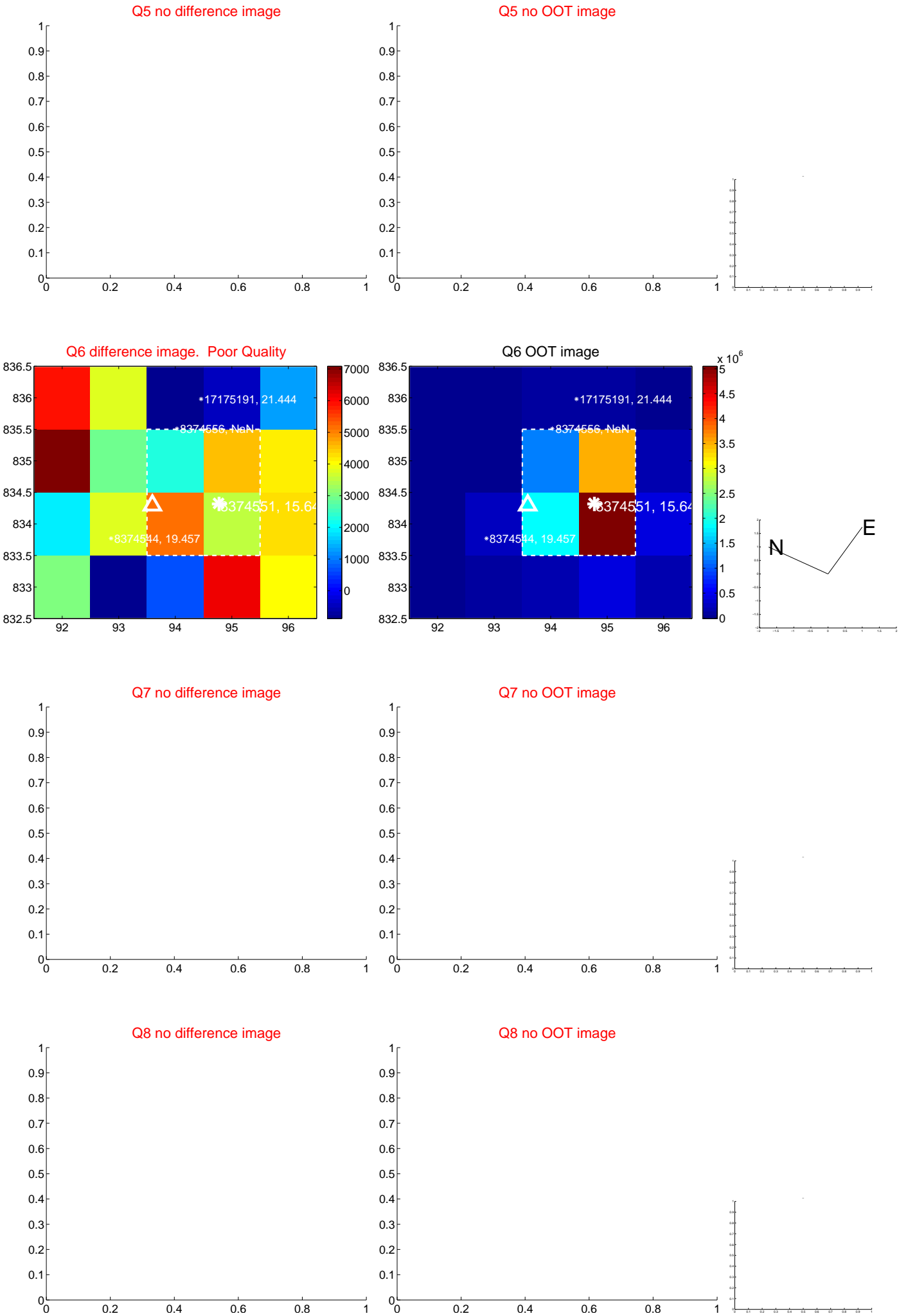


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

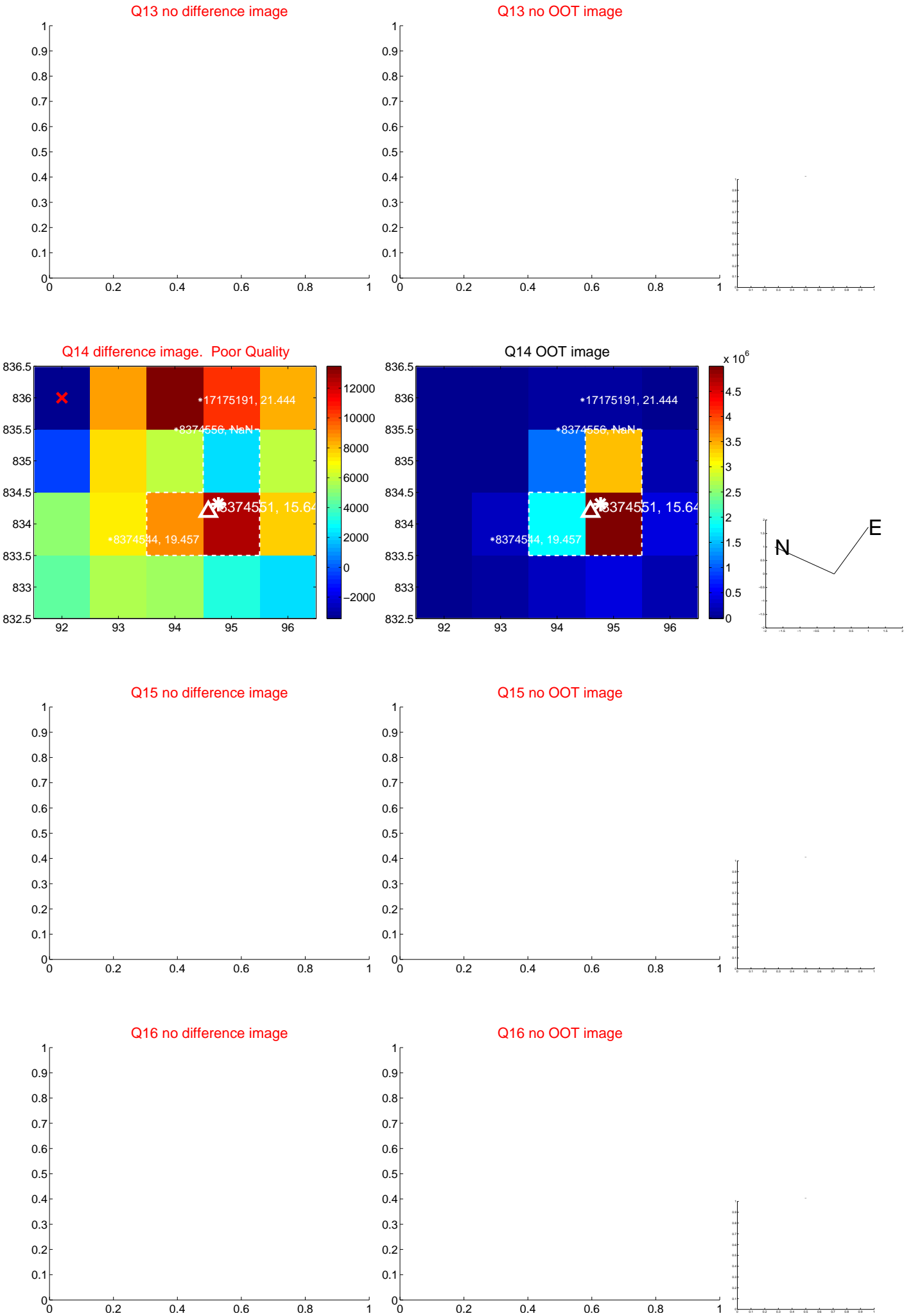




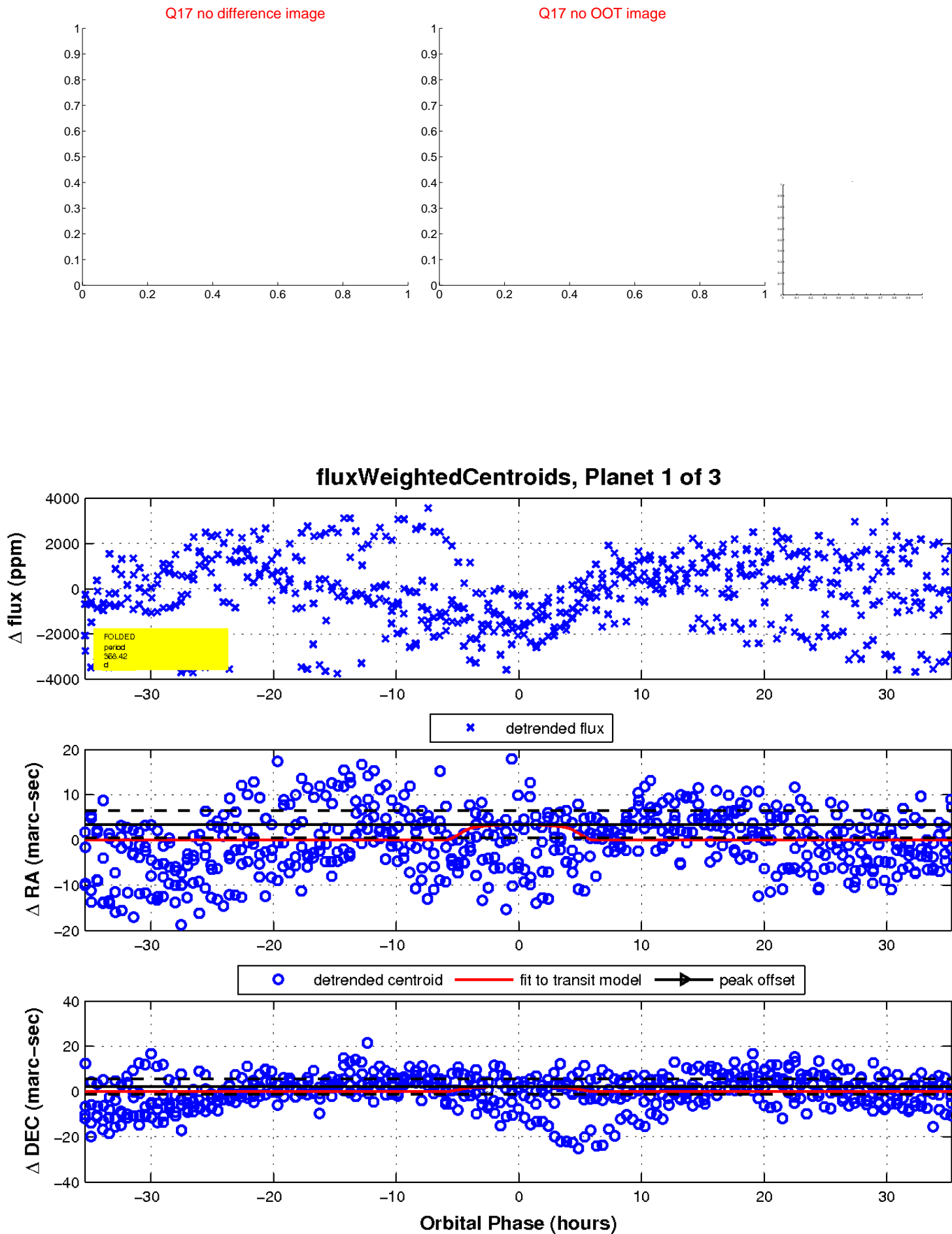
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

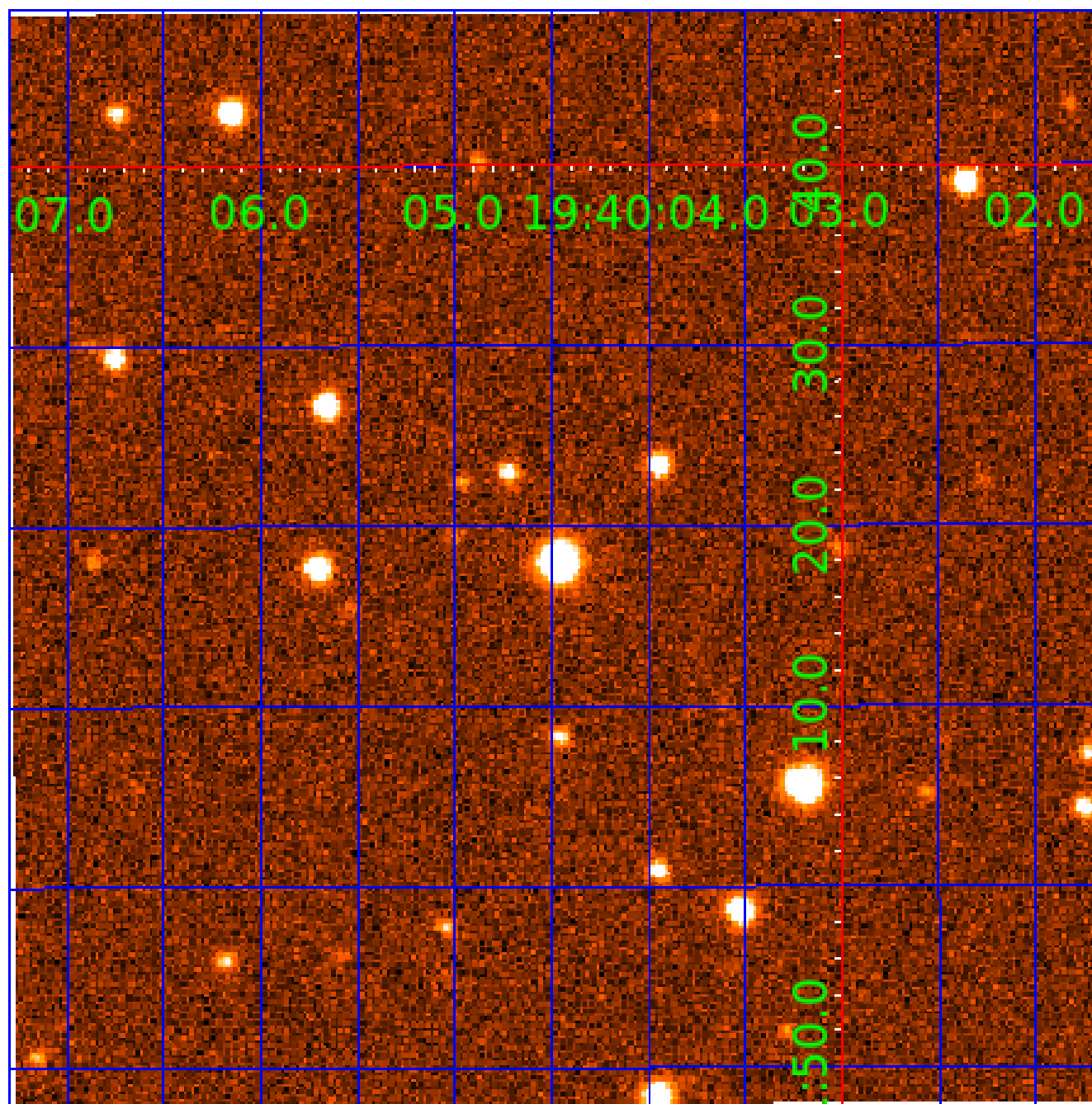


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 008374551

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008374551-01	OBS	No	368.417114	234.771160	1631.2	11.897	10.2	10.4	0.74	4616	3.60	0.27
008374551-02	OBS	No	368.888205	200.870931	1832.8	7.323	9.4	10.0	0.74	4616	3.10	0.27

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008374551-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—ALL_TRANS_CHASES—CENT_FEW_DIFFS
008374551-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—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.

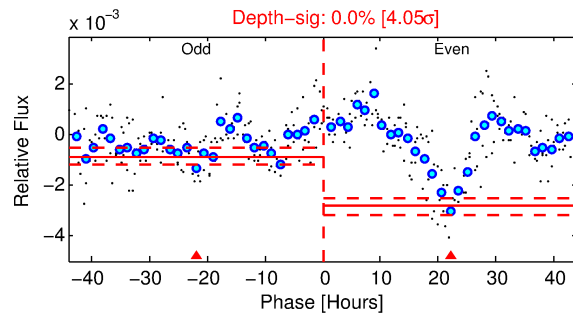
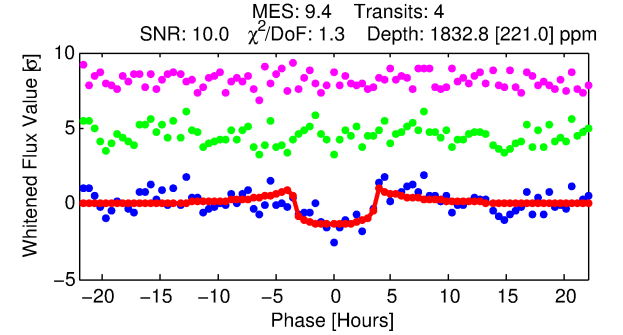
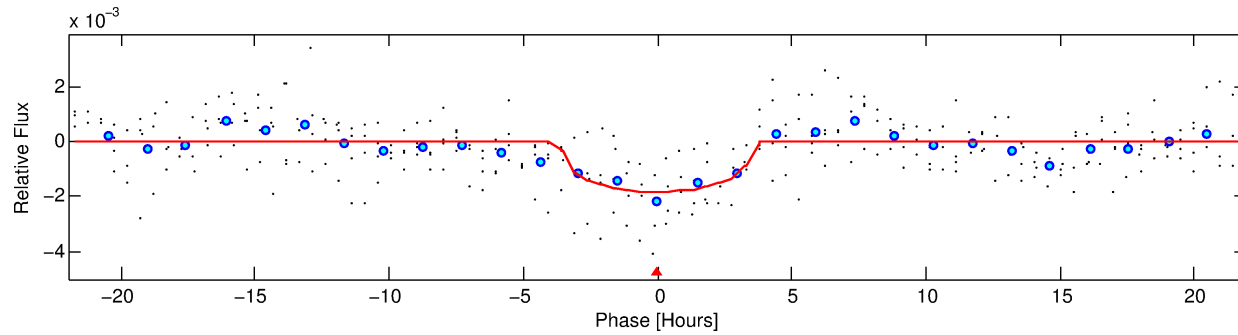
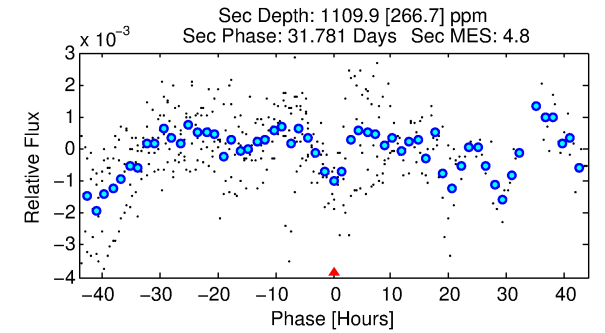
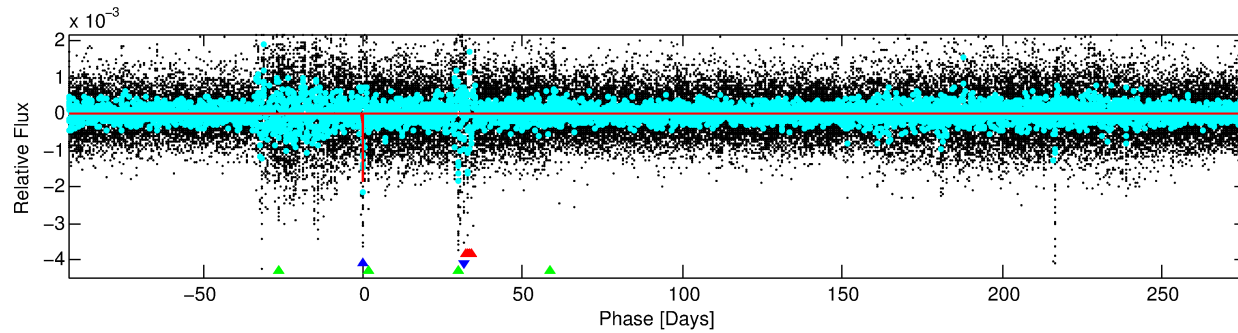
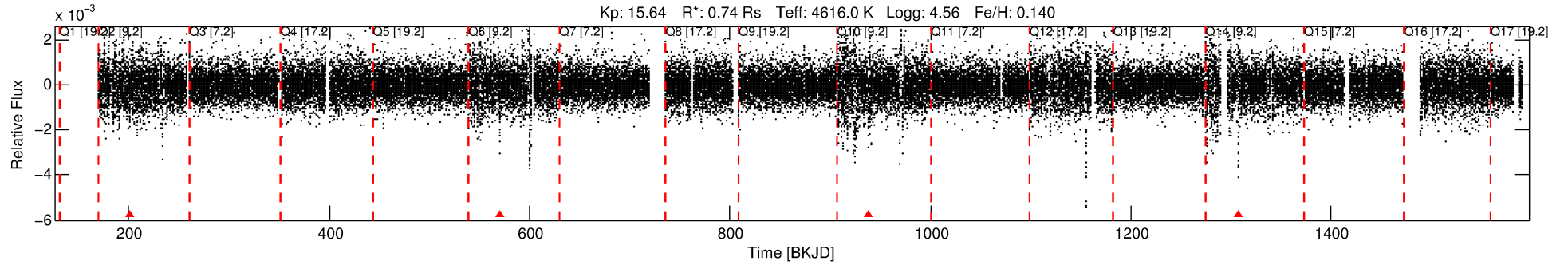
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008374551-02

No Significant Match Found

# DV One-Page Summary

KIC: 8374551 Candidate: 2 of 3 Period: 368.888 d



## DV Fit Results:

Period = 368.88821 [0.00457] d  
Epoch = 200.8709 [0.0092] BKJD  
Rp/R\* = 0.0385 [0.0275]  
a/R\* = 371.71 [783.50]  
b = 0.38 [4.80]  
Seff = 0.27 [0.05]  
Teq = 184 [8] K  
Rp = 3.10 [2.23] Re  
a = 0.9043 [0.0705] AU  
Ag = 52070.87 [75663.18] [0.69σ]  
Teffp = 4297 [1561] K [2.63σ]

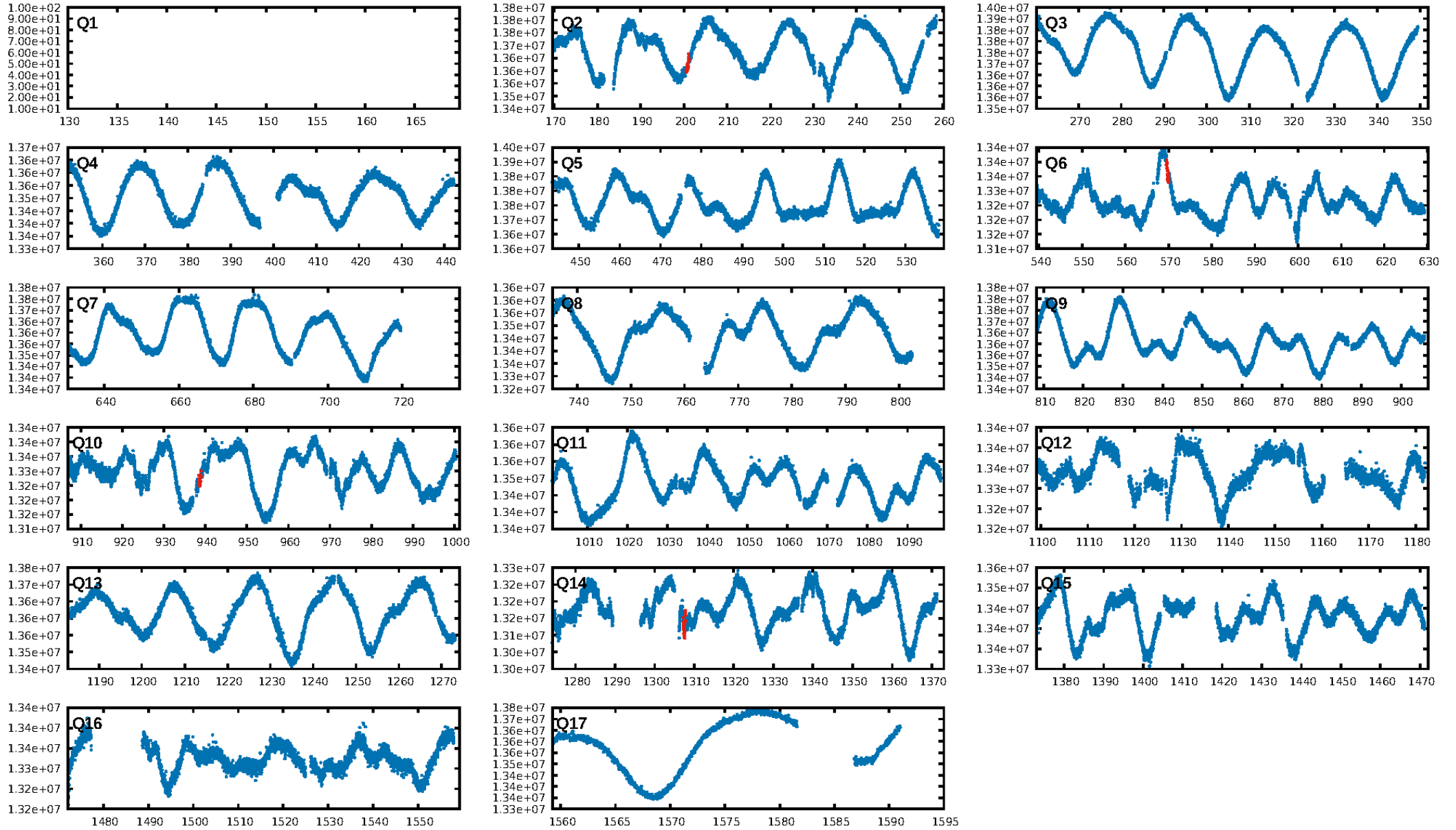
## DV Diagnostic Results:

ShortPeriod-sig: 58.2% [0.81σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.5%  
ModelChiSquareGof-sig: 68.5%  
Bootstrap-pfa: 5.99e-14  
RollingBand-fgt: 0.00 [0/4]  
GhostDiagnostic-chr: 0.6332  
Centroid-sig: 41.2%  
Centroid-so: 1.730 arcsec [0.93σ]  
OotOffset-rm: N/A  
KicOffset-rm: N/A  
OotOffset-st: 0/0/0/0 [0]  
KicOffset-st: 0/0/0/0 [0]  
DiffImageQuality-fgm: N/A  
DiffImageOverlap-fno: 1.00 [2/2]

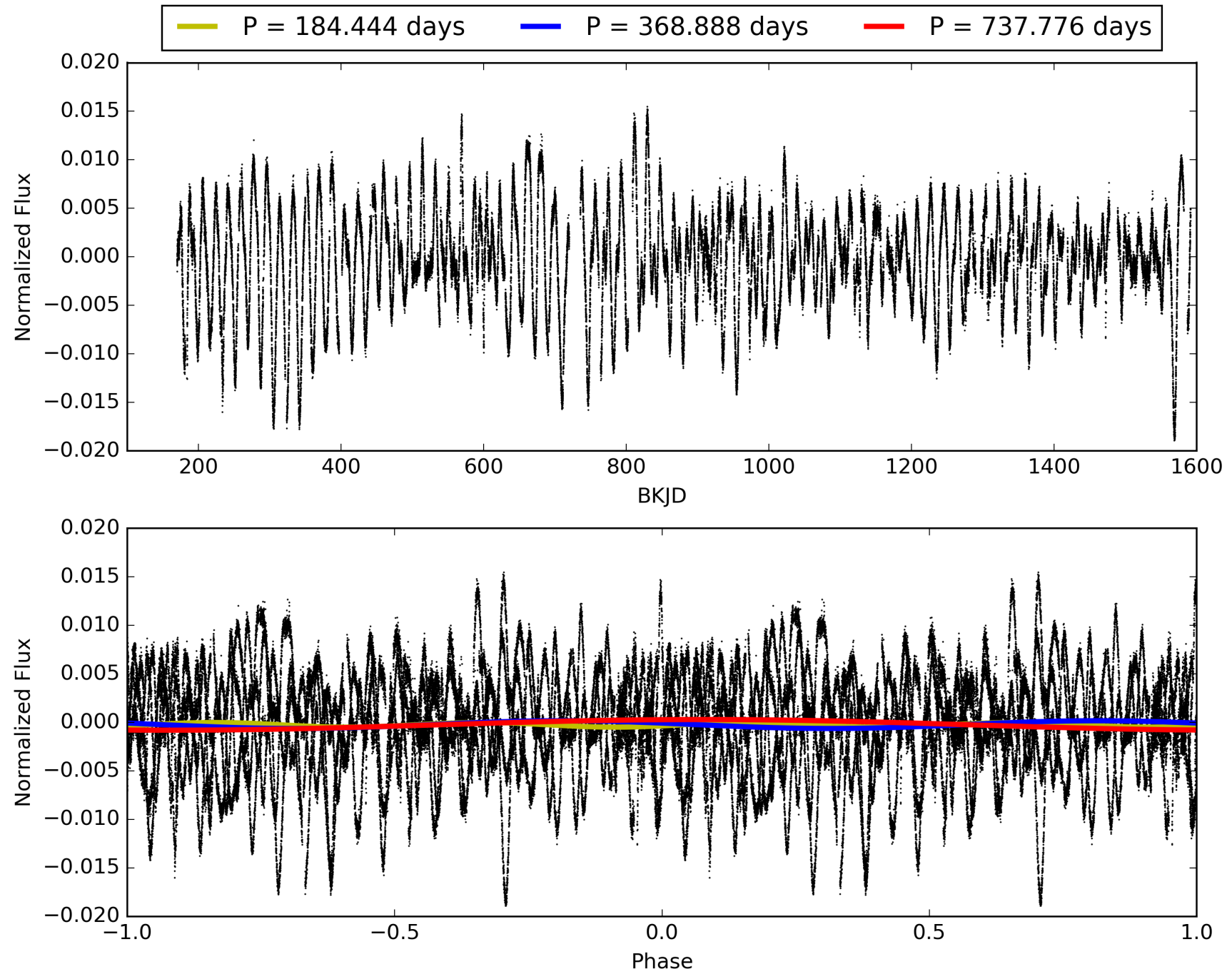
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 10:24:05 Z

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

# TCE 008374551-02, PDC Light Curves



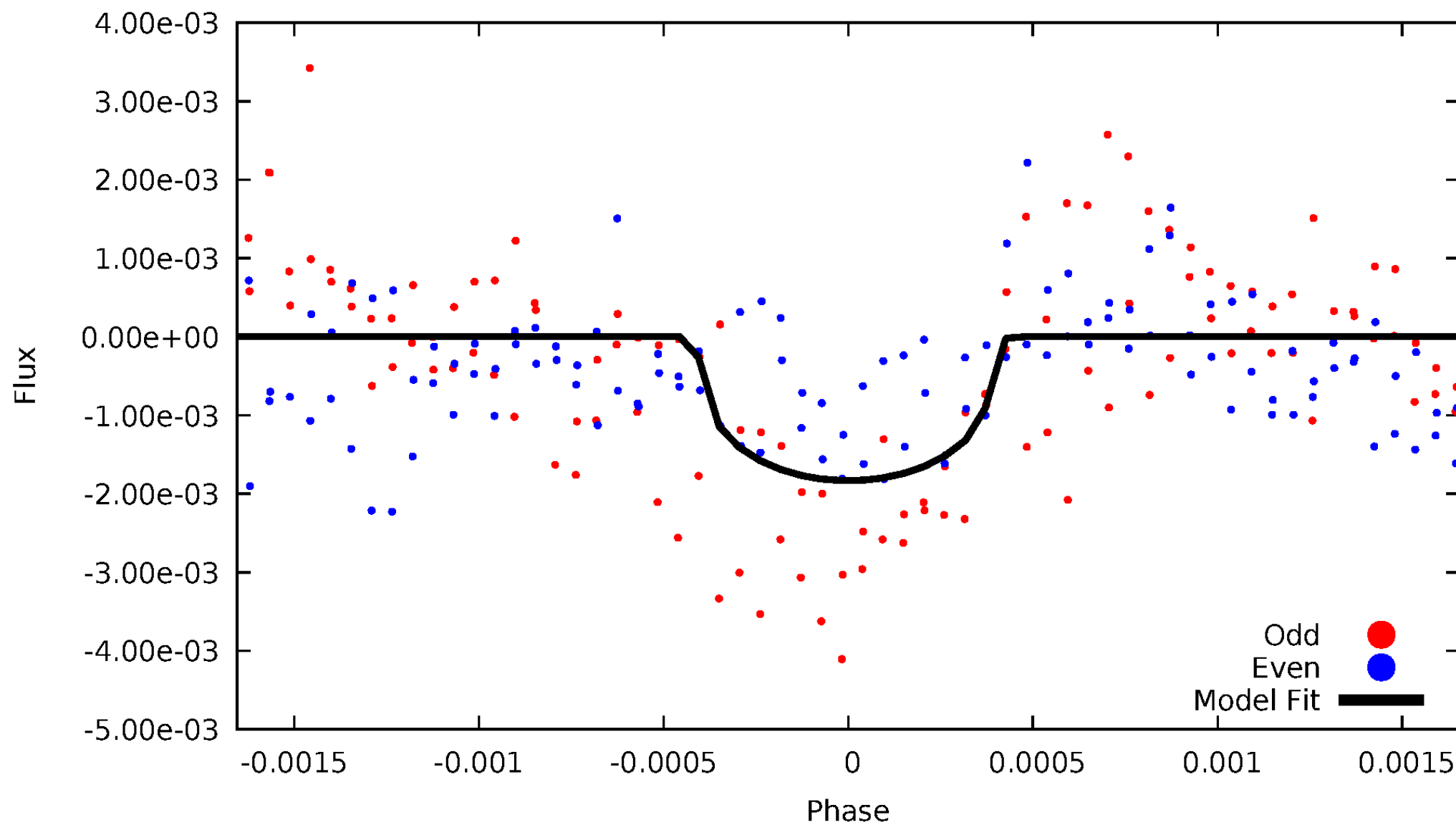
TCE 008374551-02





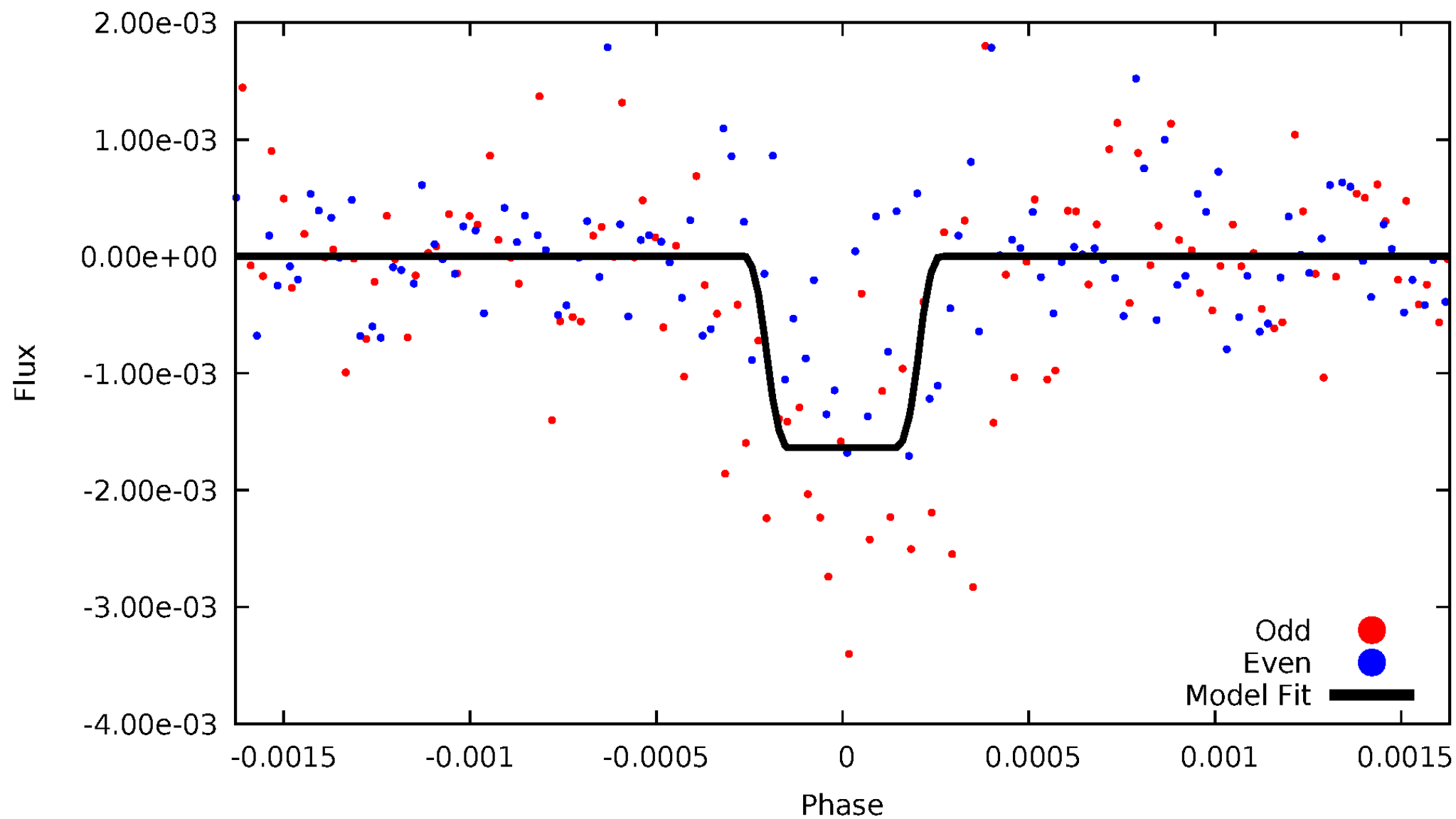
# DV Odd/Even

TCE 008374551-02



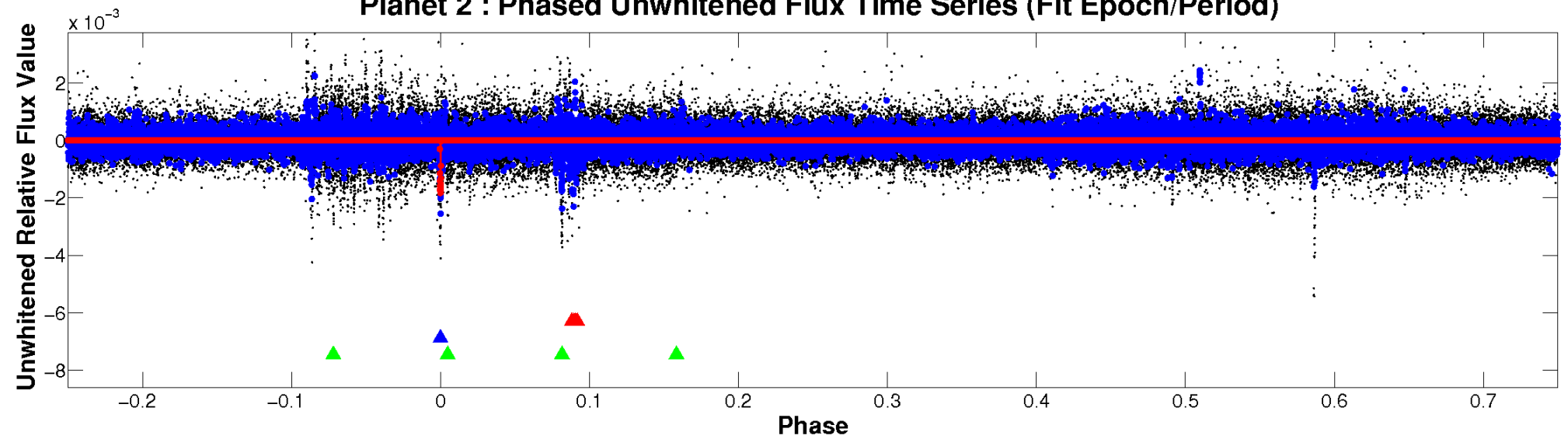
# ALT Odd/Even

TCE 008374551-02

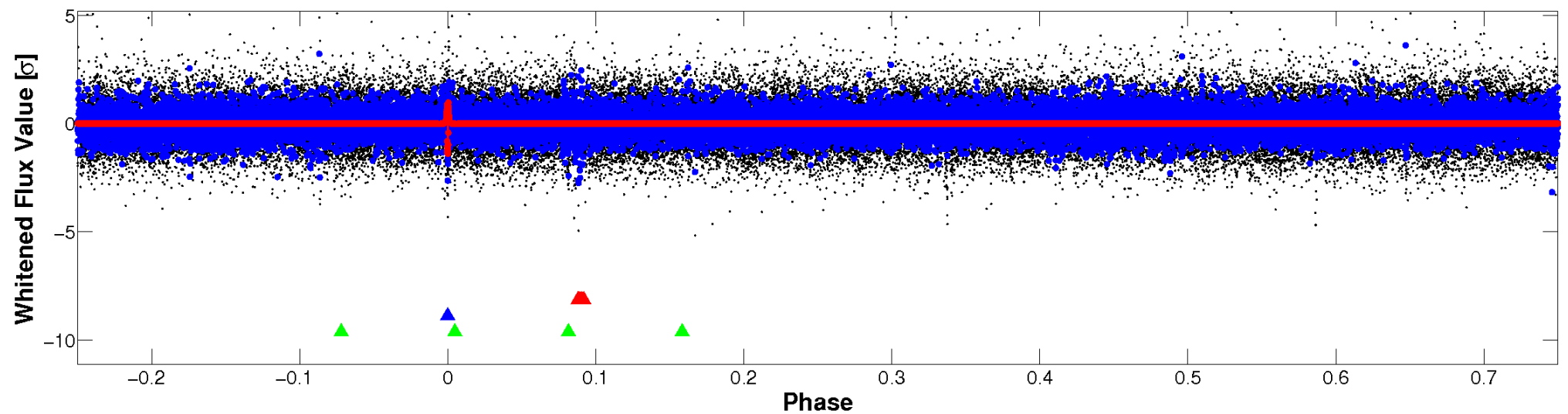


# Non-Whitened Vs. Whitened Light Curve

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

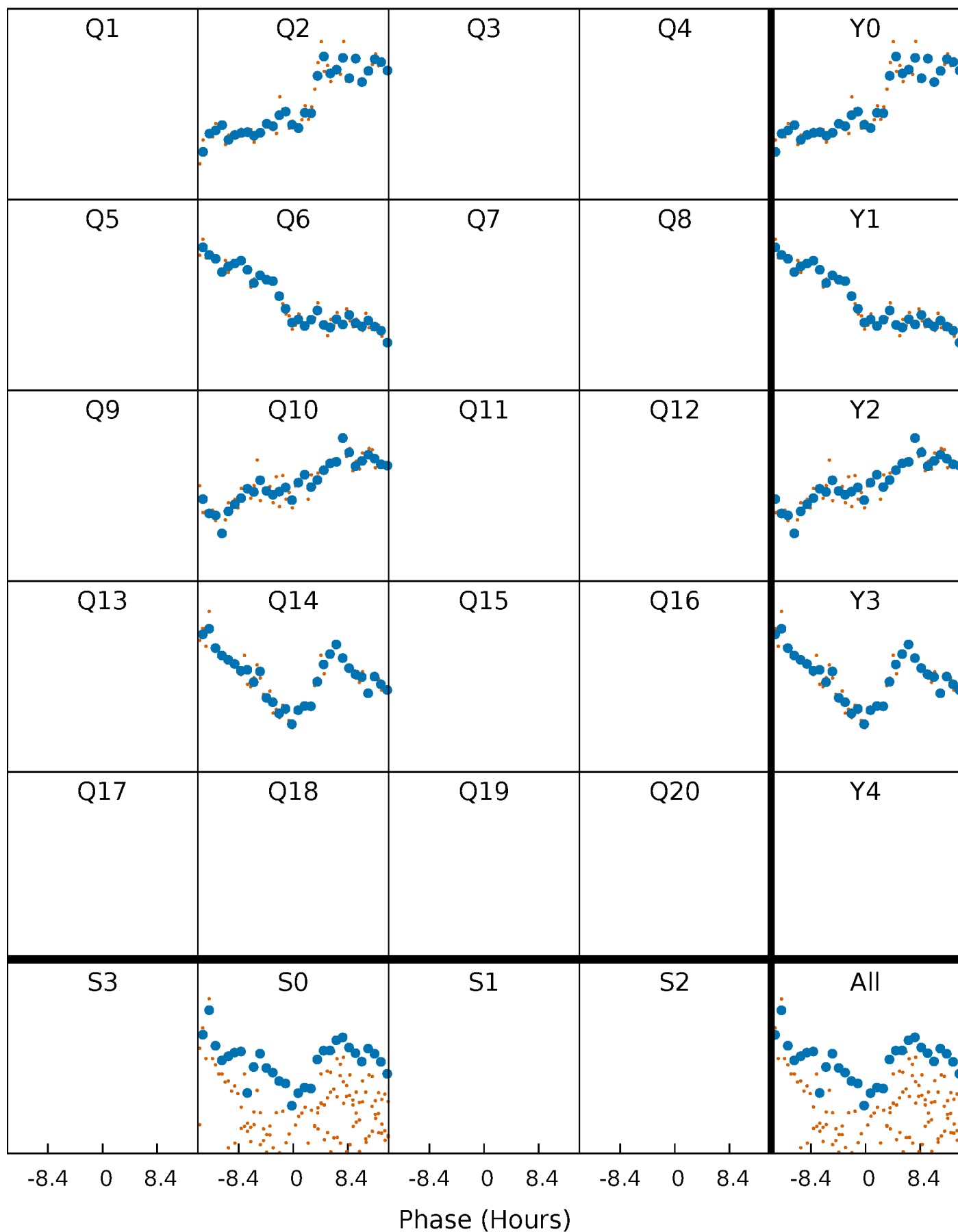


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

TCE 008374551-02     $P=368.888205$  Days     $T_0=200.870931$  (BKJD)



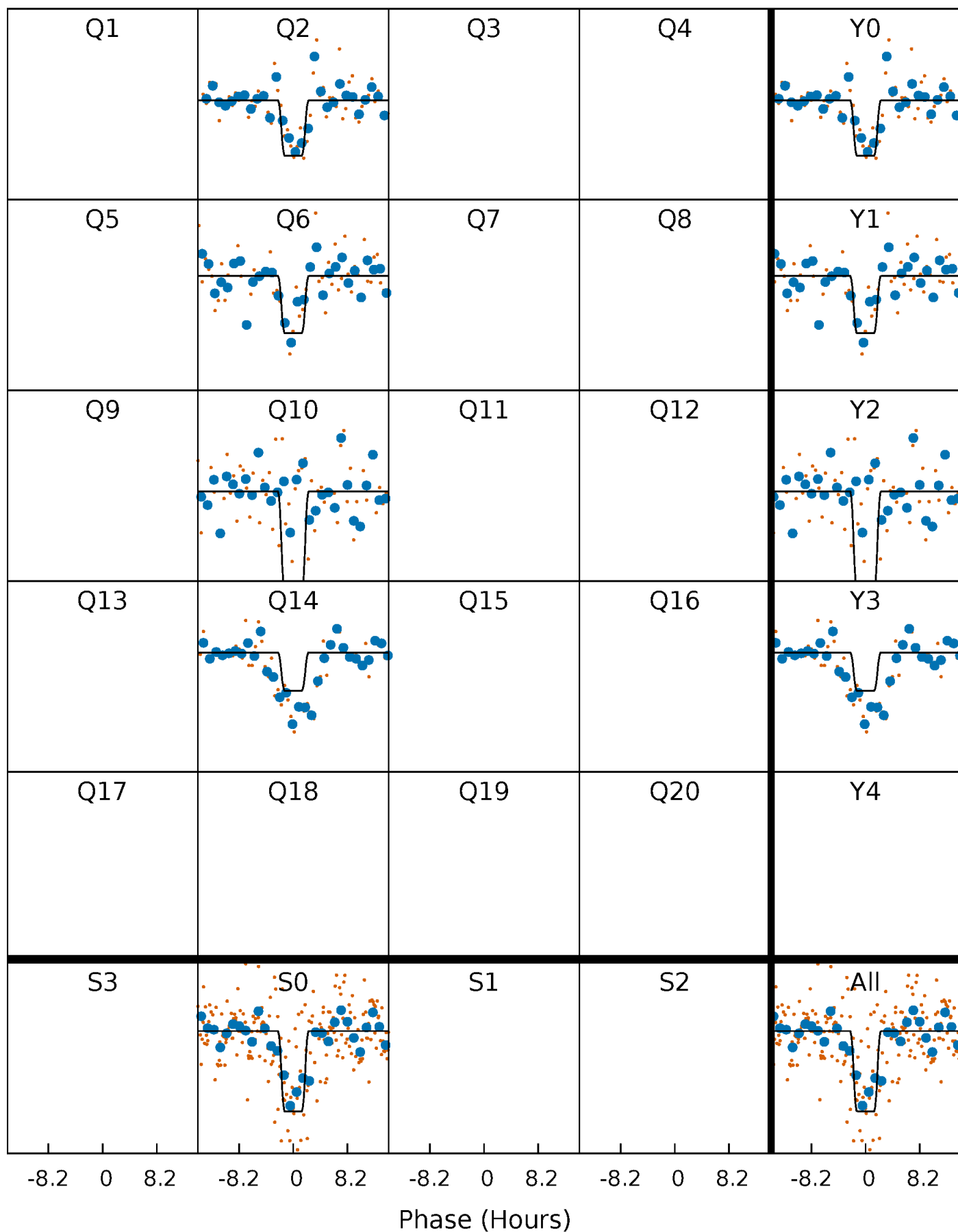
# DV Quarter-Phased Transit Curves

TCE 008374551-02 P=368.888205 Days  $T_0=200.870931$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

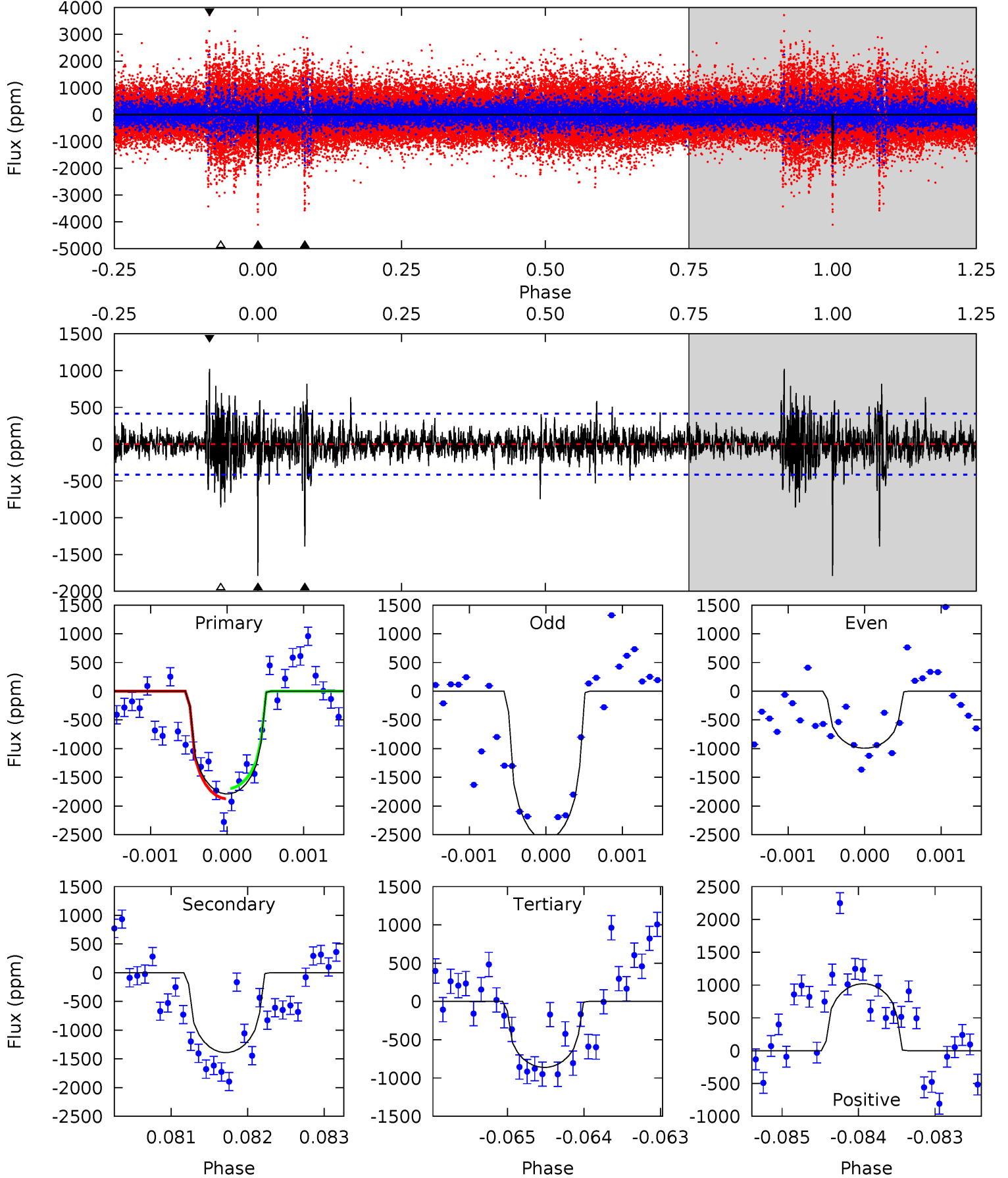
TCE 008374551-02 P=368.873436 Days  $T_0=200.902232$  (BKJD)



# DV Model-Shift Uniqueness Test

008374551-02, P = 368.888205 Days, E = 200.870931 Days

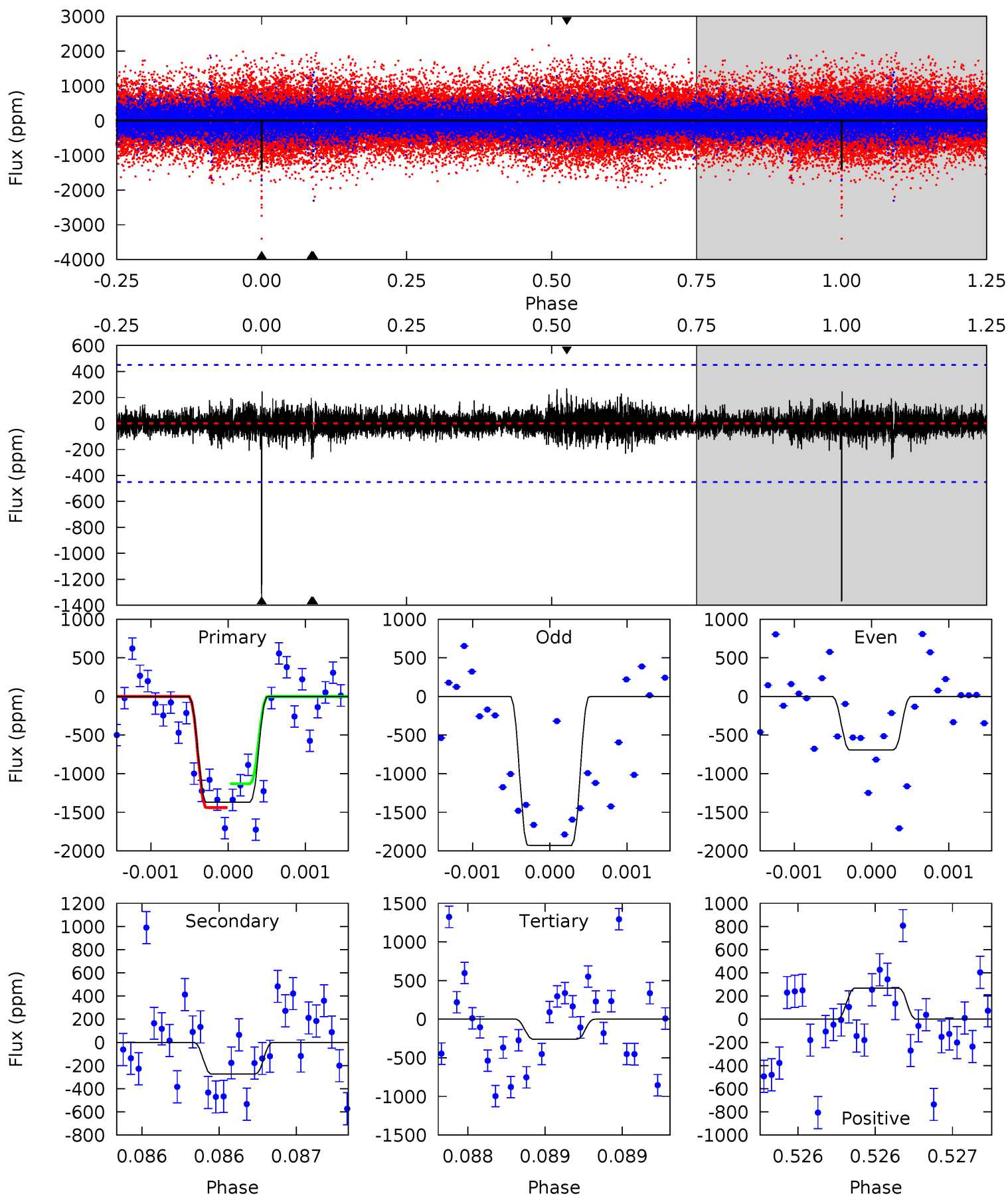
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.7	18.4	11.4	13.5	5.48	3.34	2.08	12.3	10.2	7.01	4.91	10.3	1.15	0.36	1.19



# Alt Model-Shift Uniqueness Test

008374551-02, P = 368.873436 Days, E = 200.902232 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
16.9	3.38	3.20	3.32	5.57	3.47	0.66	13.7	13.6	0.18	0.07	7.76	1.00	0.16	1.87





### Stellar Parameters For KIC 008374551

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4616^{+124}_{-138}$	$4.562^{+0.064}_{-0.024}$	$0.140^{+0.250}_{-0.300}$	$0.738^{+0.036}_{-0.067}$	$0.726^{+0.058}_{-0.053}$	$2.541^{+0.641}_{-0.234}$
	+3%/-3%	+1%/-1%	+179%/-214%	+5%/-9%	+8%/-7%	+25%/-9%
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 008374551-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-1391 \pm 75$	$3.24^{+2.03}_{-1.87}$	$255^{+8}_{-9}$	$4481^{+1959}_{-726}$	$61777^{+265419}_{-38918}$
Alt.	$-274 \pm 81$	$3.39^{+2.23}_{-1.91}$	$255^{+8}_{-8}$	$3338^{+1052}_{-512}$	$11303^{+45278}_{-7731}$

$T_{max}$  = 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

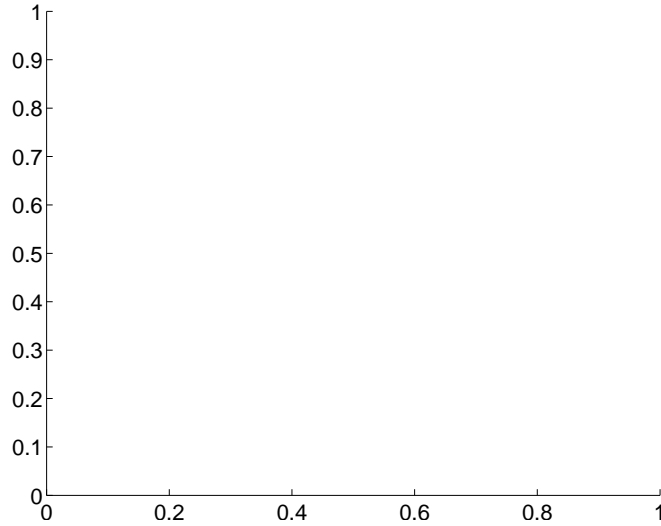
Supplemental centroid analysis for 008374551-02. Kepler magnitude: 15.64. Transit SNR 9.96

There are 0 quarters with good PRF difference image offsets

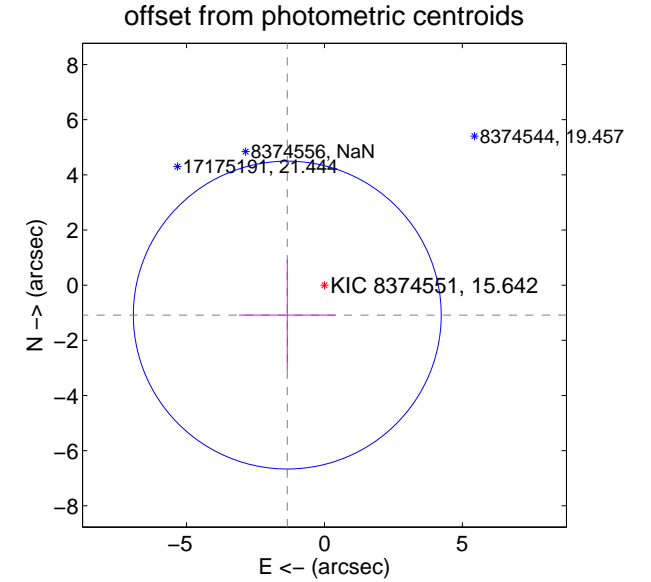
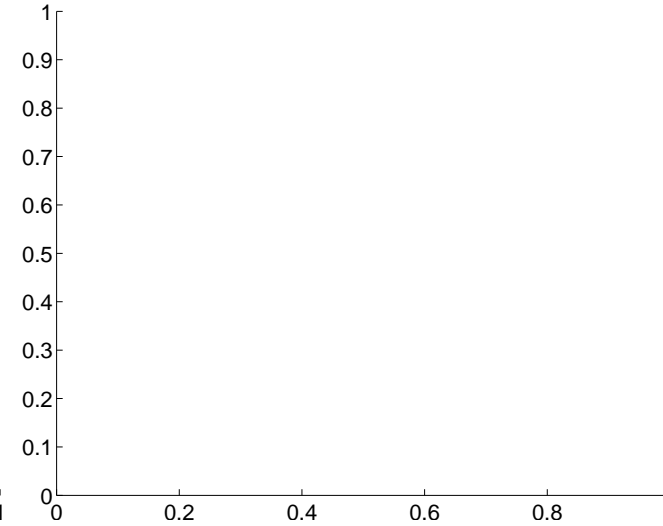
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	—	—	—	—
photometric centroid source offset	$1.73 \pm 1.86$	0.93	$1.35 \pm 1.76$	$-1.08 \pm 2.01$

There is no PRF-fit offset from OOT-fit

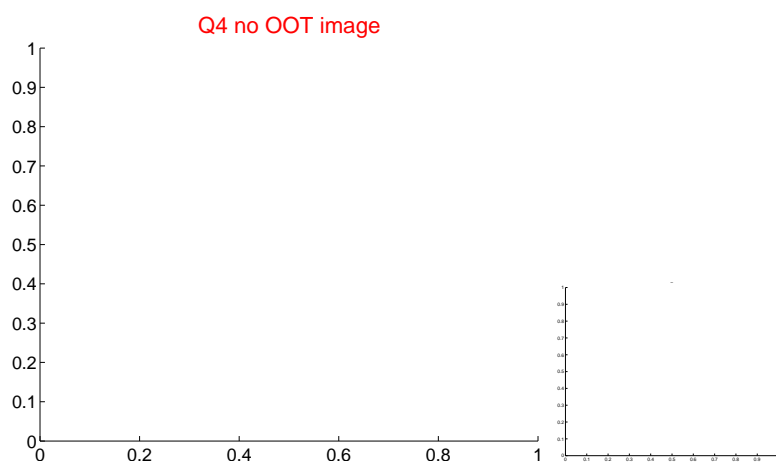
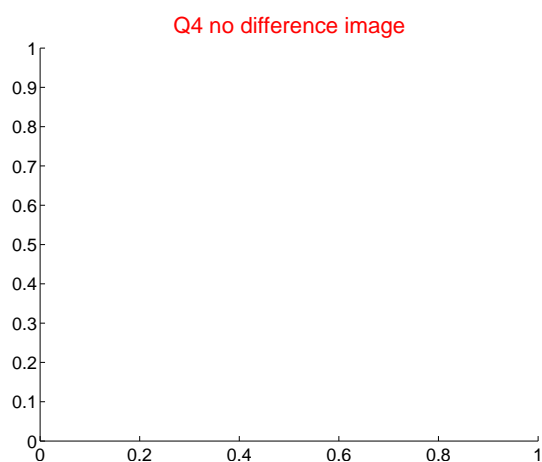
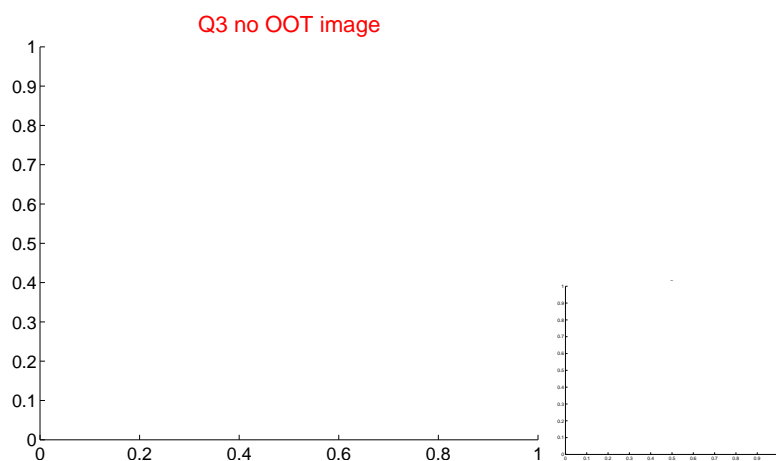
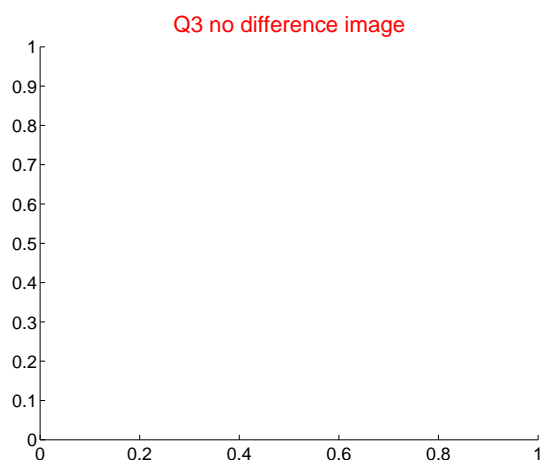
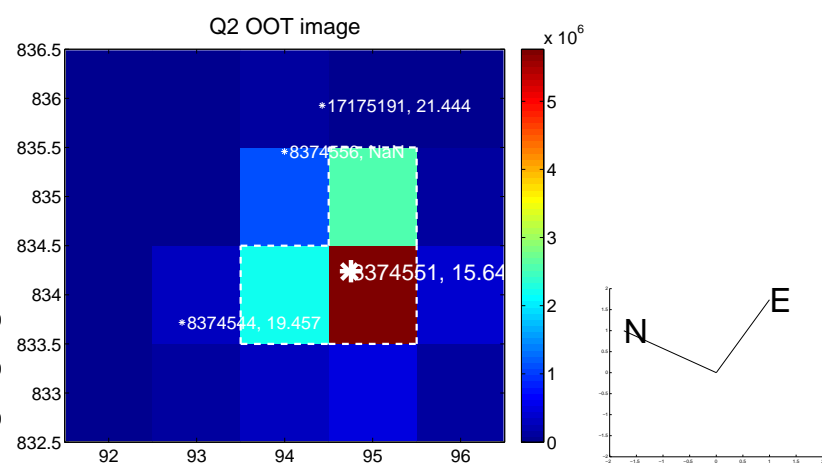
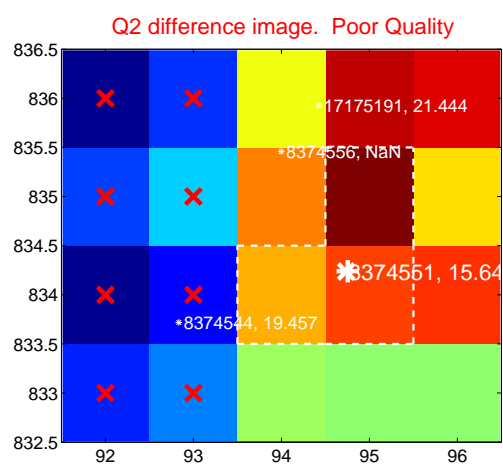
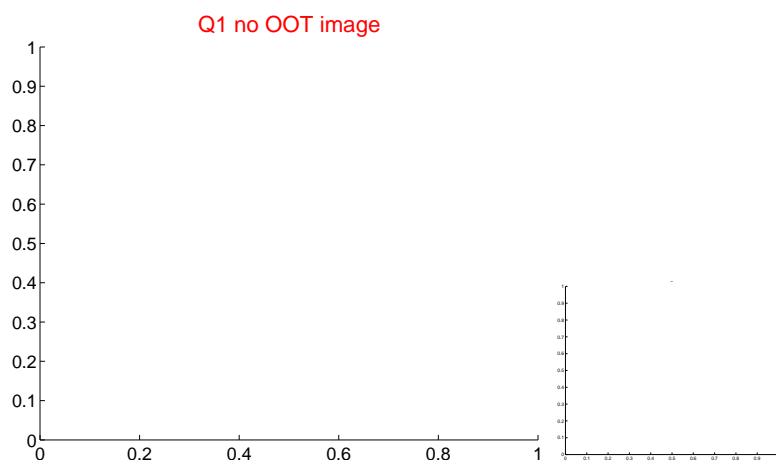
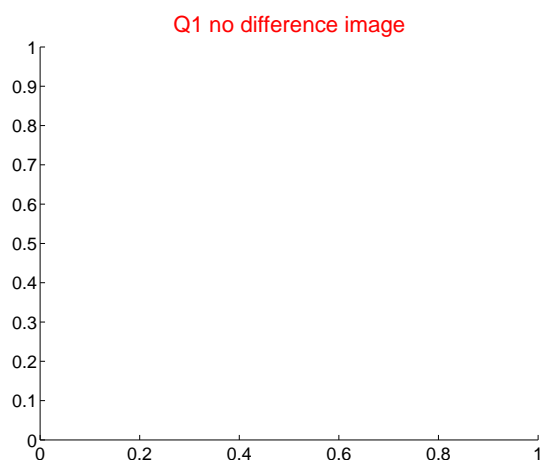


There is no PRF-fit offset from KIC

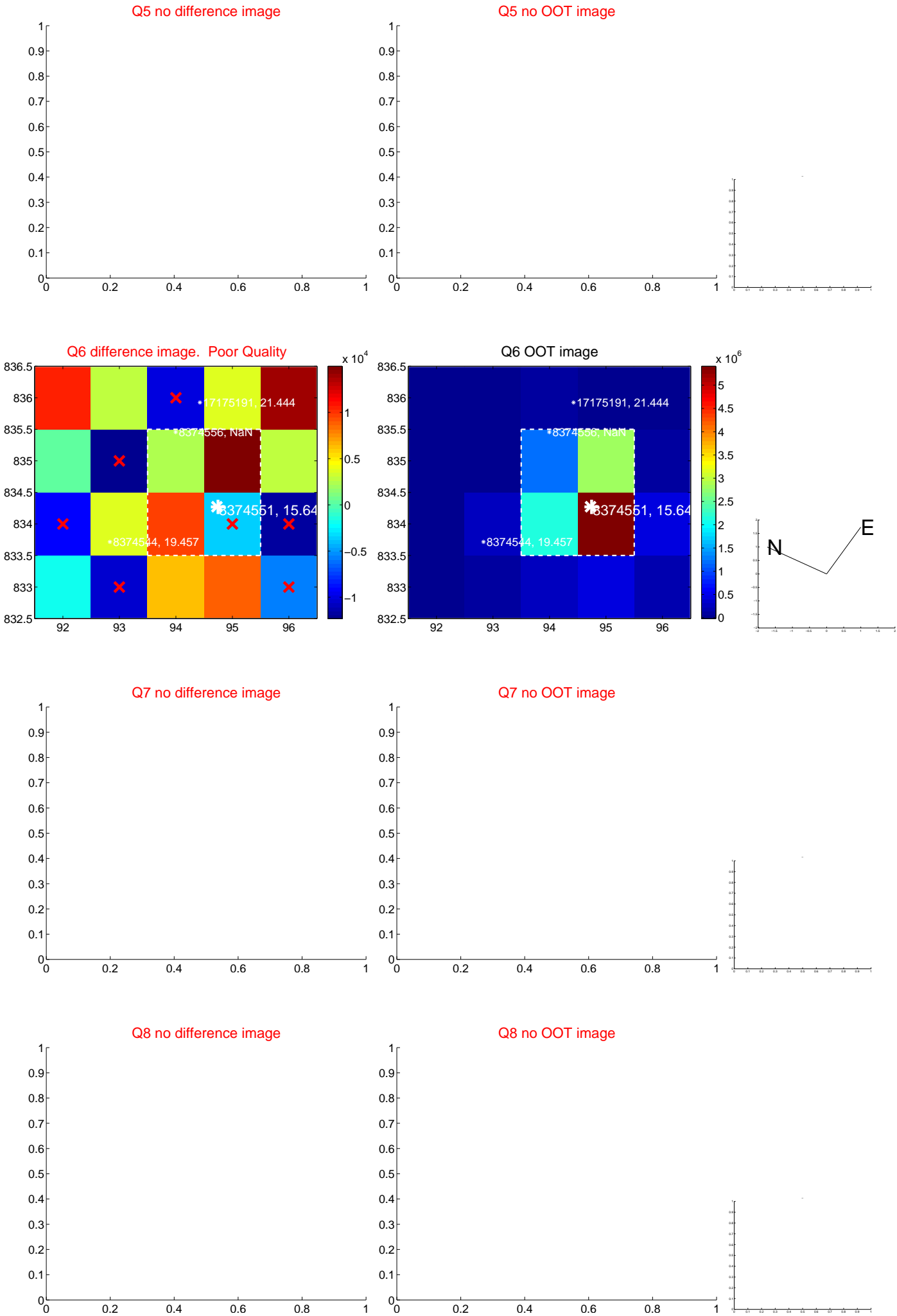


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



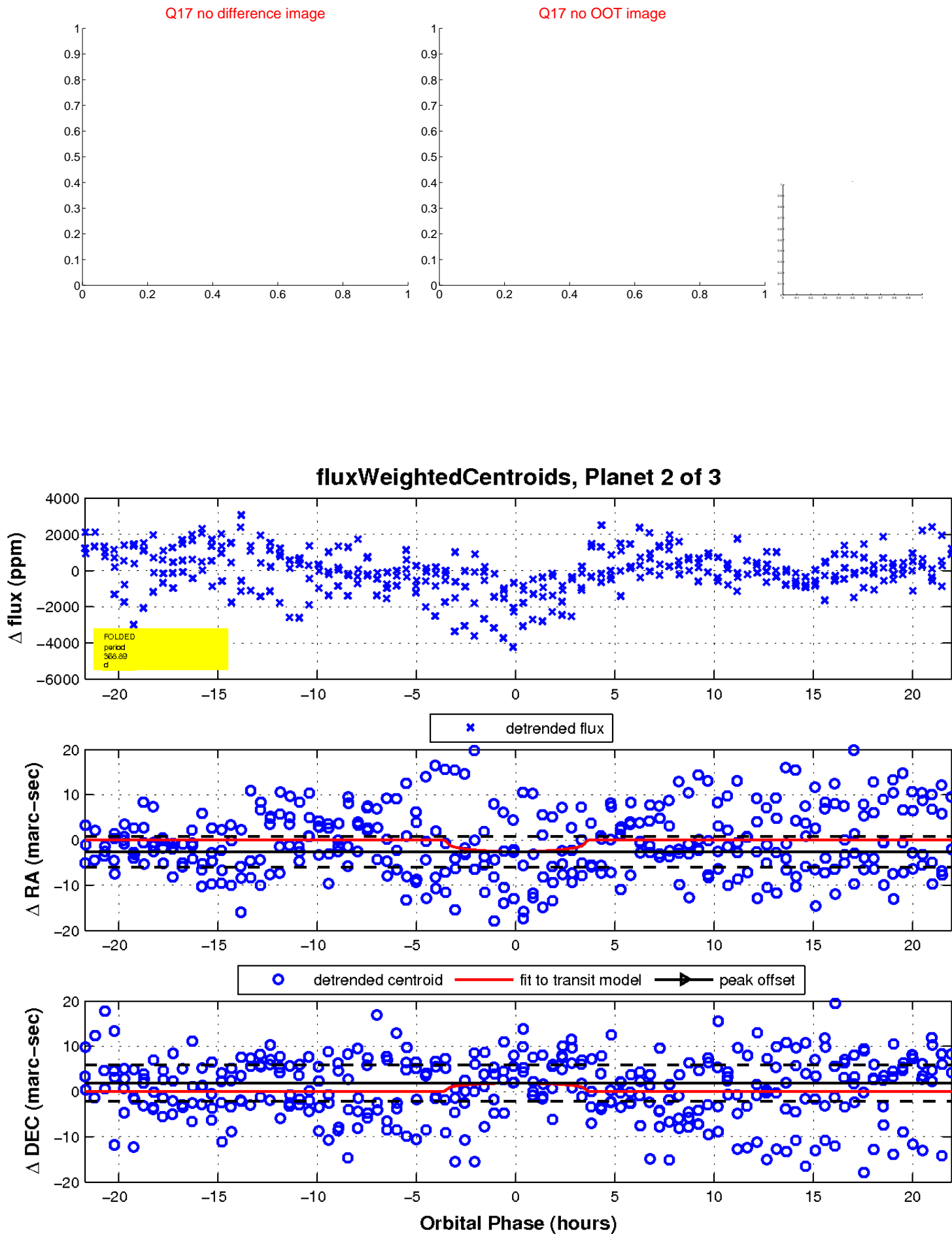
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

