

# KIC 009873604

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009873604-01	OBS	8188.01	522.357297	344.655667	355.8	13.363	7.8	7.0	2.82	5103	5.83	2.70

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009873604-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE—ALL_TRANS_CHASES—INCONSISTENT_TRANS

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

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

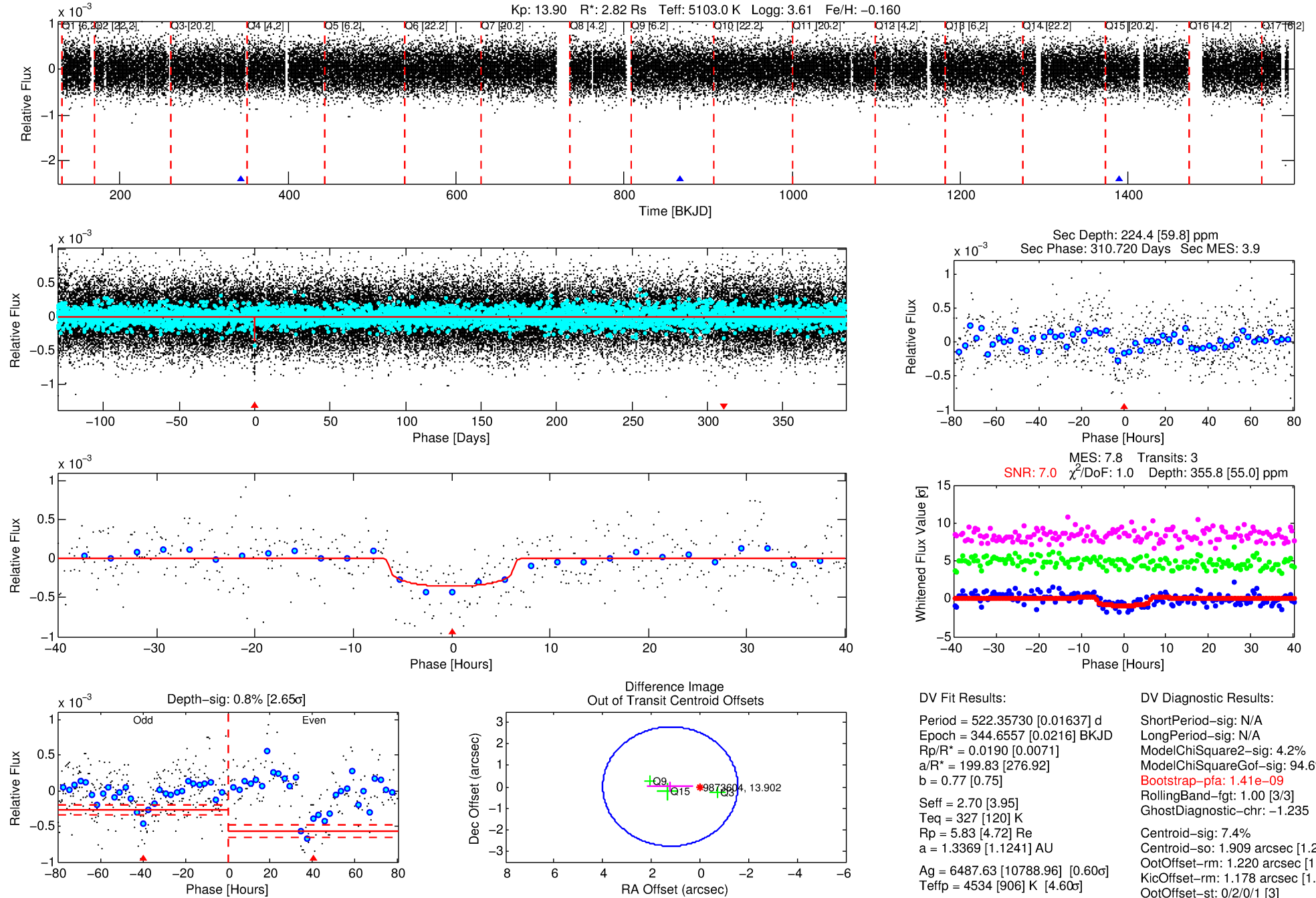
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009873604-01

No Significant Match Found

# DV One-Page Summary

KIC: 9873604 Candidate: 1 of 1 Period: 522.357 d



## DV Fit Results:

Period = 522.35730 [0.01637] d  
Epoch = 344.6557 [0.0216] BKJD  
Rp/R\* = 0.0190 [0.0071]  
a/R\* = 199.83 [276.92]  
b = 0.77 [0.75]  
Seff = 2.70 [3.95]  
Teq = 327 [120] K  
Rp = 5.83 [4.72] Re  
a = 1.3369 [1.1241] AU  
Ag = 6487.63 [10788.96] [0.60 $\sigma$ ]  
Teffp = 4534 [906] K [4.60 $\sigma$ ]

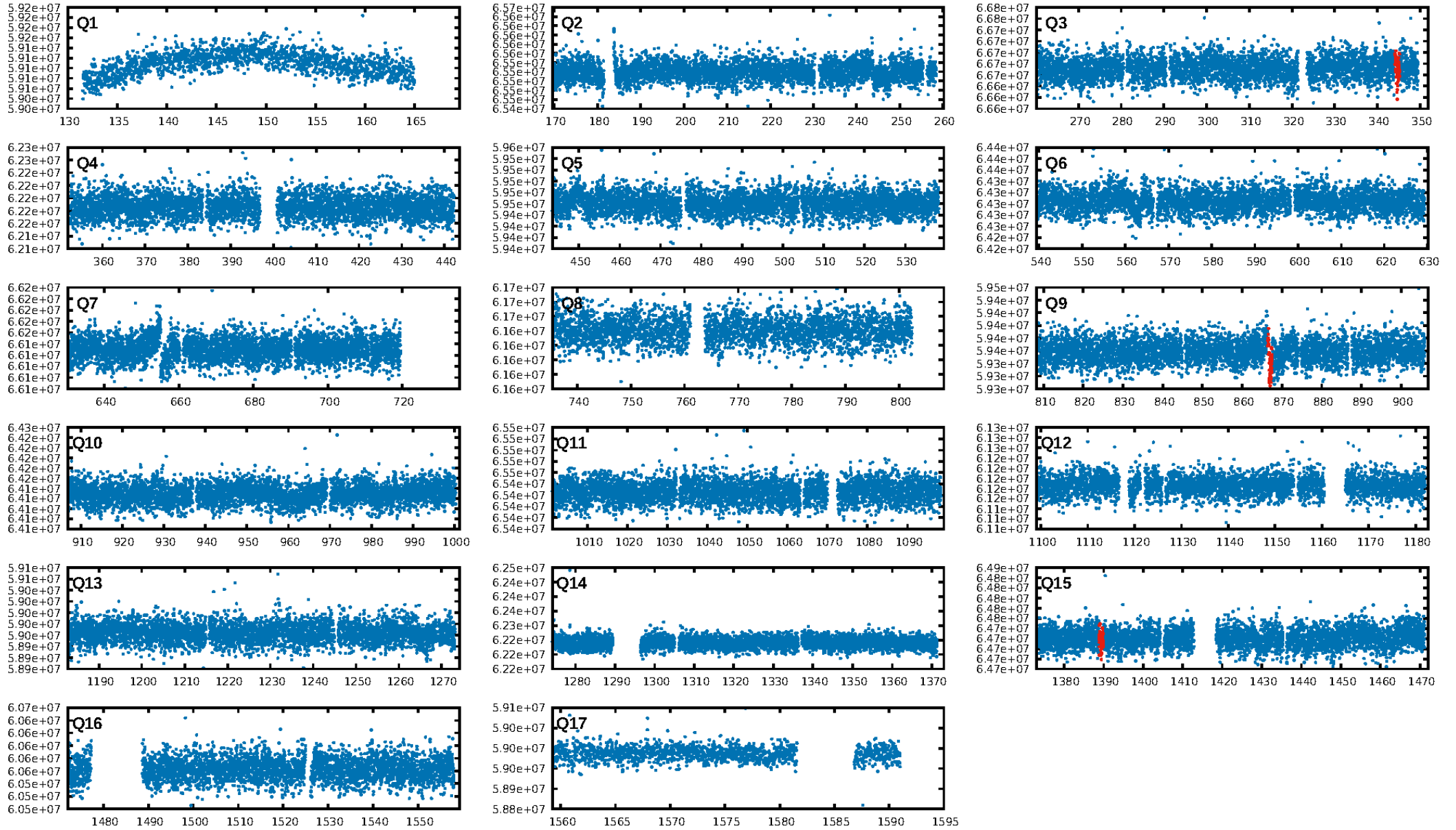
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 4.2%  
ModelChiSquareGof-sig: 94.6%  
**Bootstrap-pfa: 1.41e-09**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -1.235  
Centroid-sig: 7.4%  
Centroid-so: 1.909 arcsec [1.24 $\sigma$ ]  
OotOffset-rm: 1.220 arcsec [1.32 $\sigma$ ]  
KicOffset-rm: 1.178 arcsec [1.28 $\sigma$ ]  
OotOffset-st: 0/2/0/1 [3]  
KicOffset-st: 0/2/0/1 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [3/3]

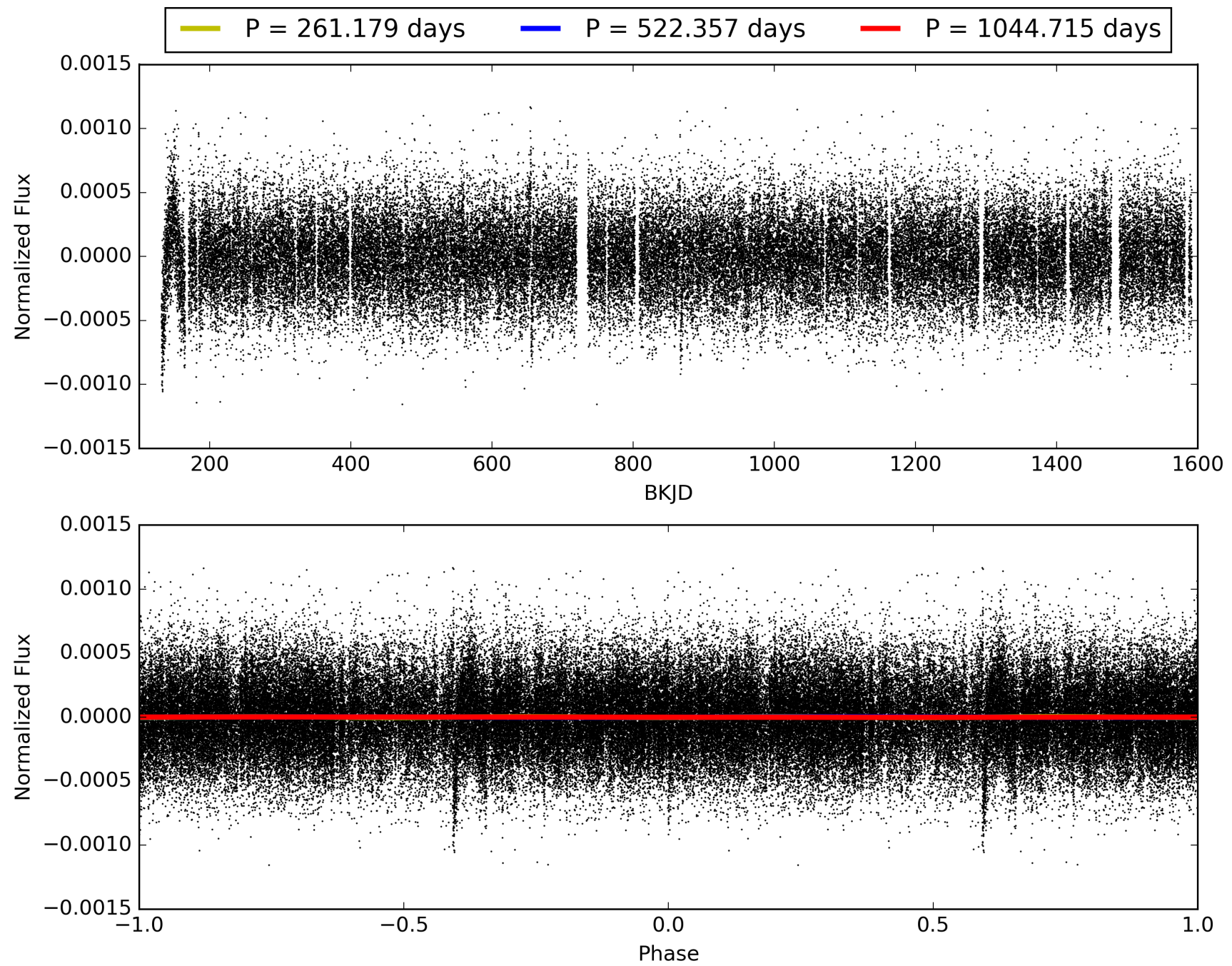
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 28-Jan-2016 19:57:21 Z

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

# TCE 009873604-01, PDC Light Curves

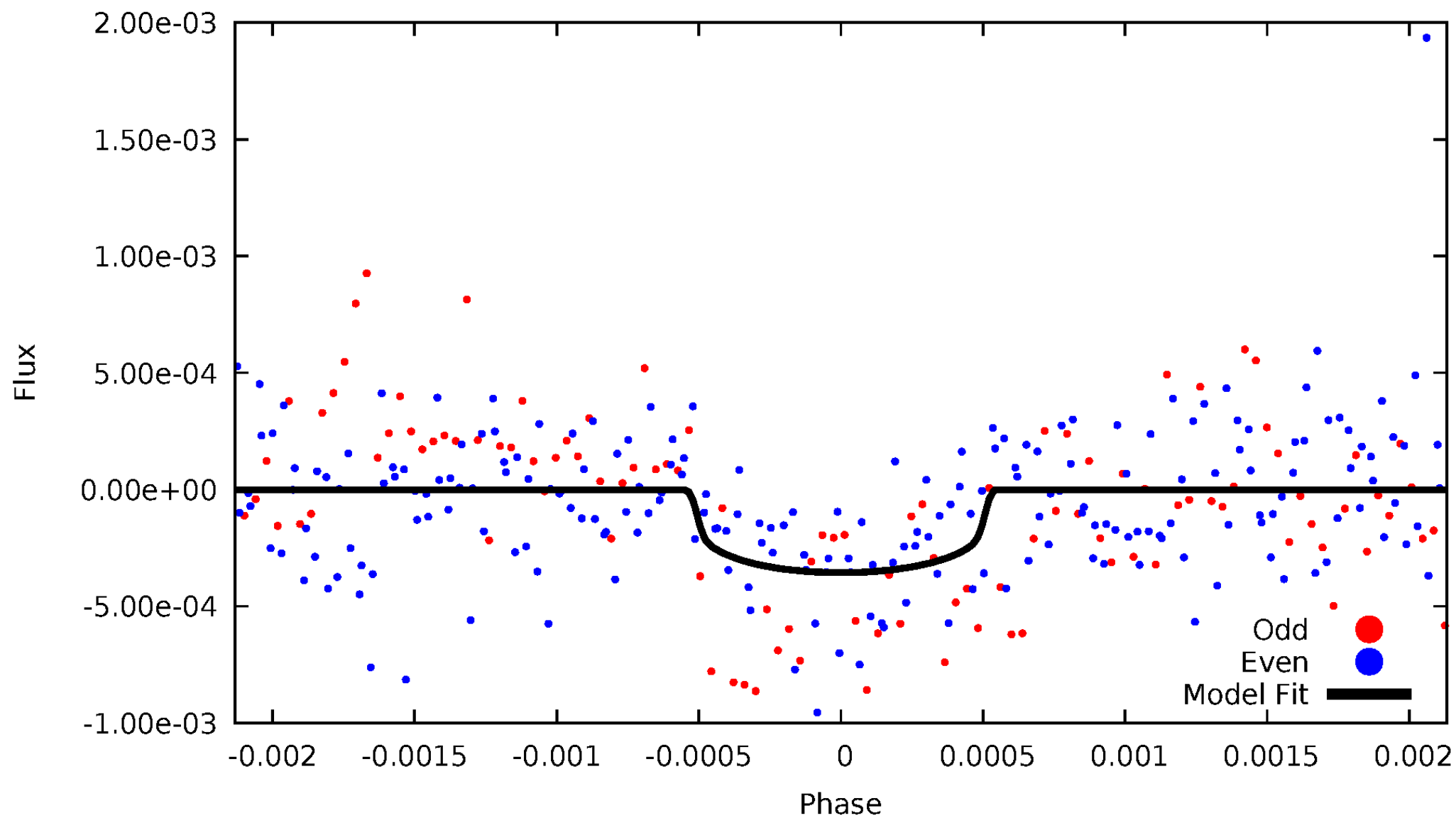


TCE 009873604-01



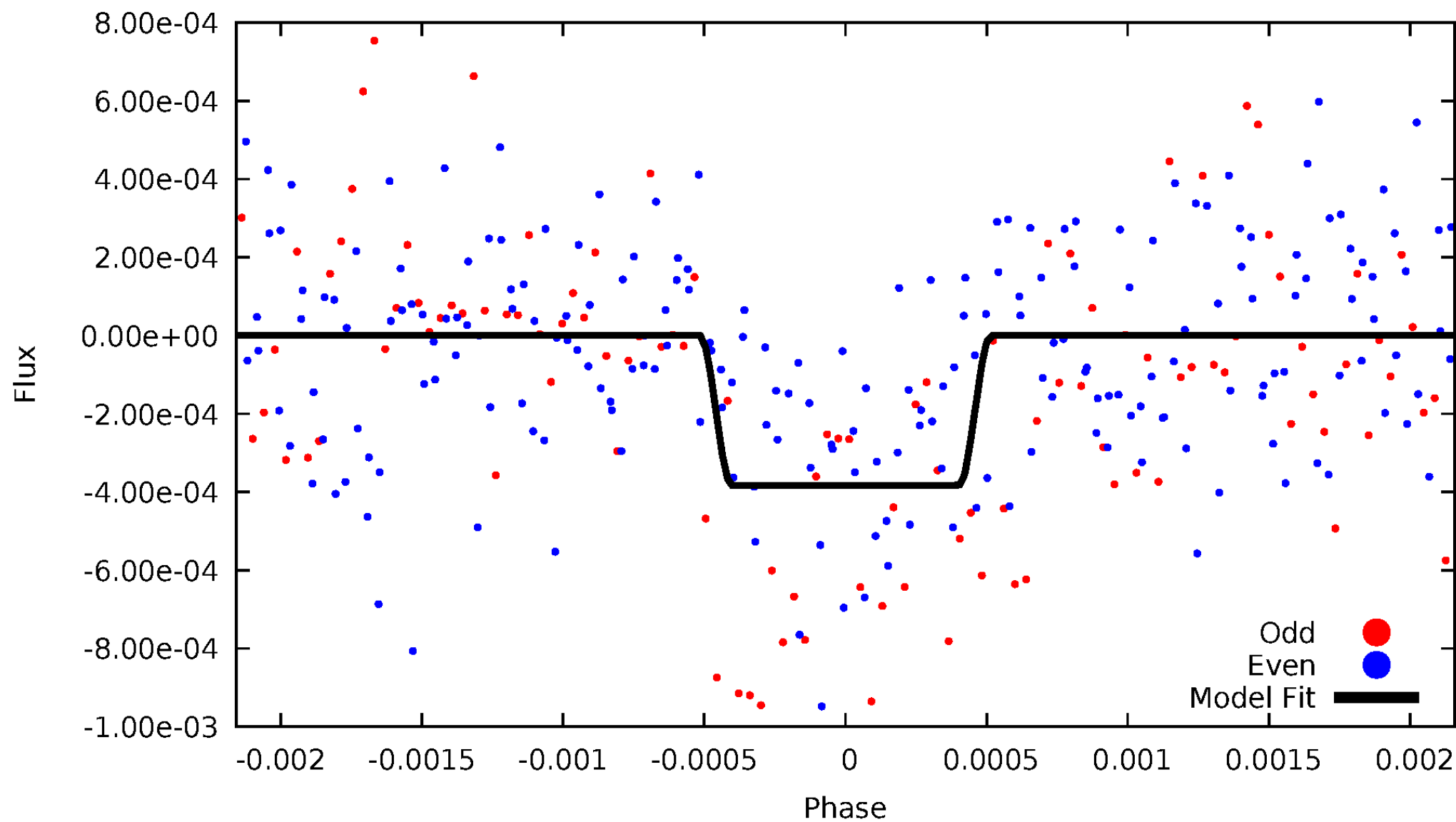
# DV Odd/Even

TCE 009873604-01



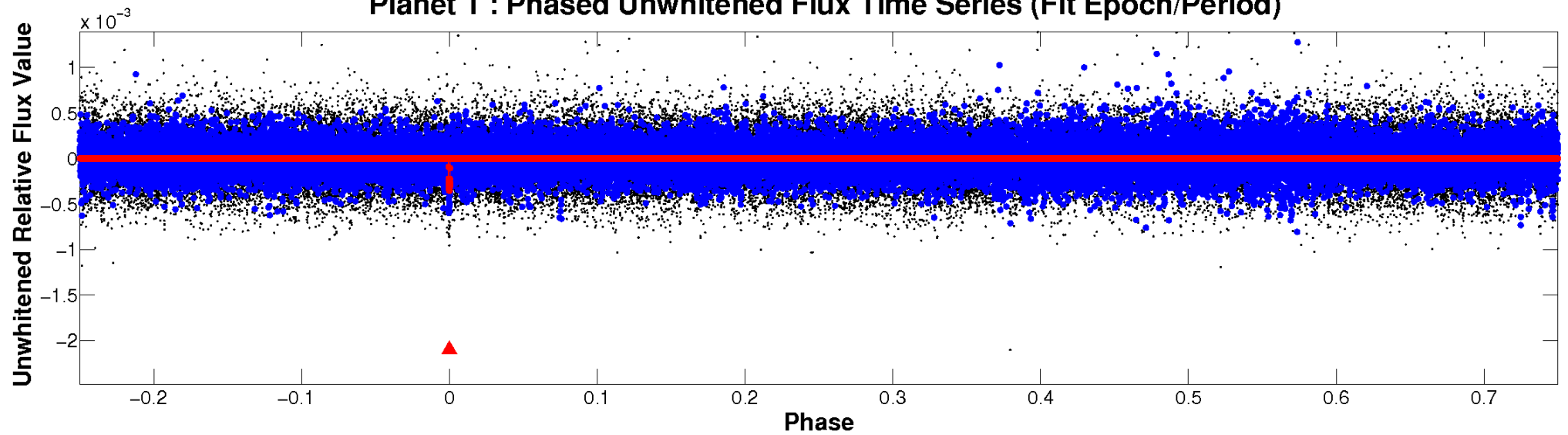
# ALT Odd/Even

TCE 009873604-01

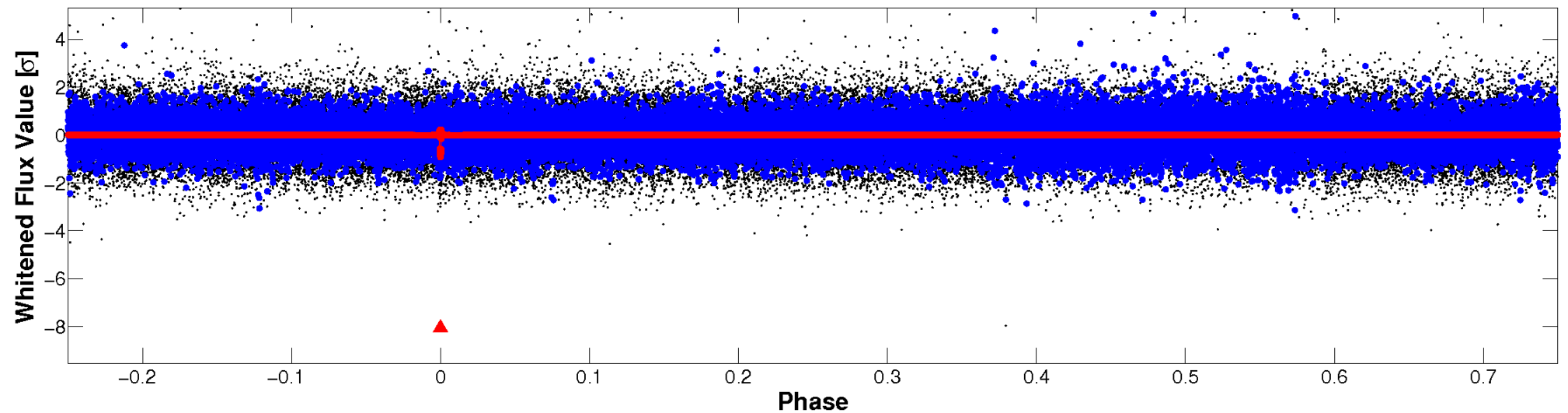


# Non-Whitened Vs. Whitened Light Curve

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



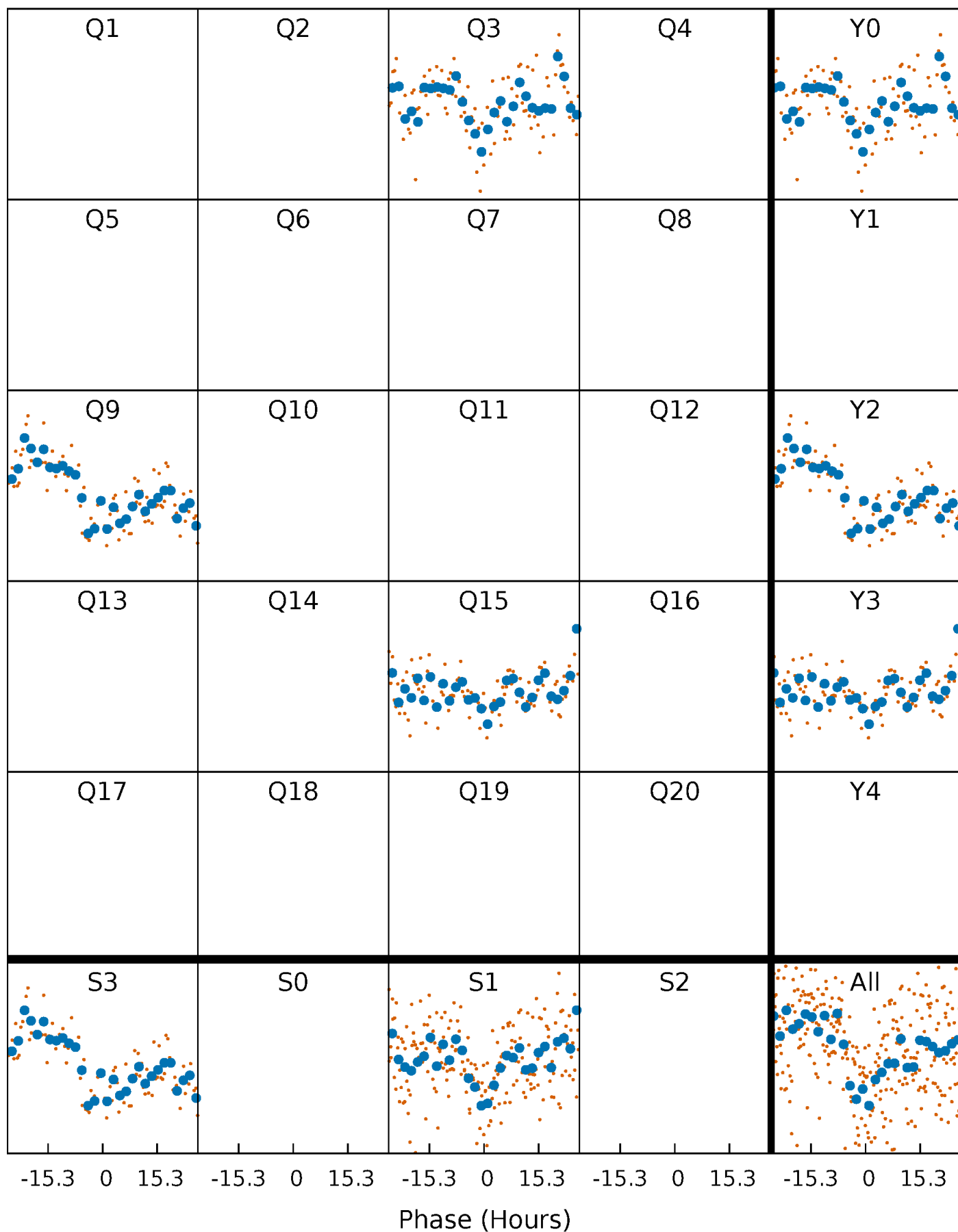
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

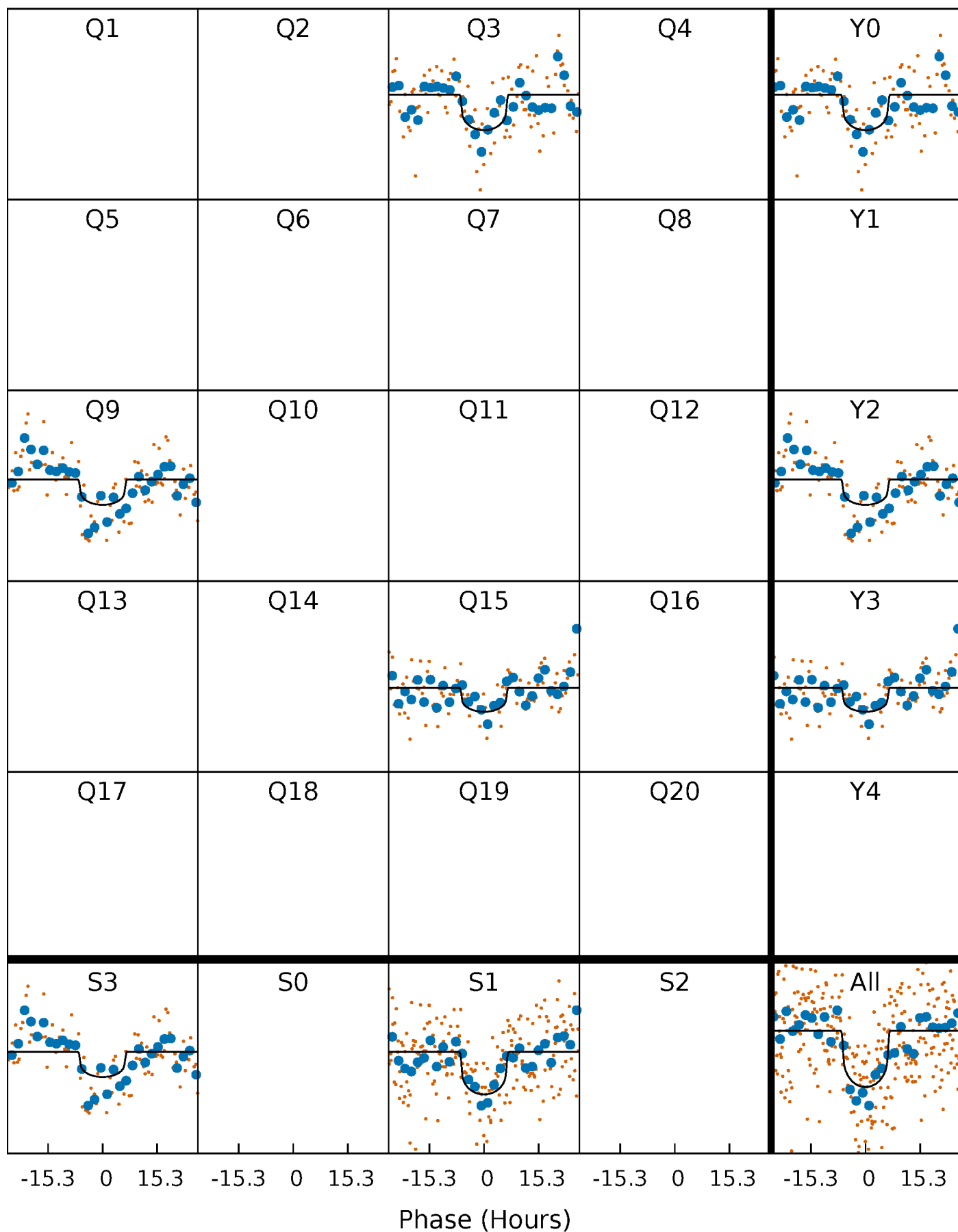
TCE 009873604-01 P=522.357296 Days  $T_0=344.655667$  (BKJD)





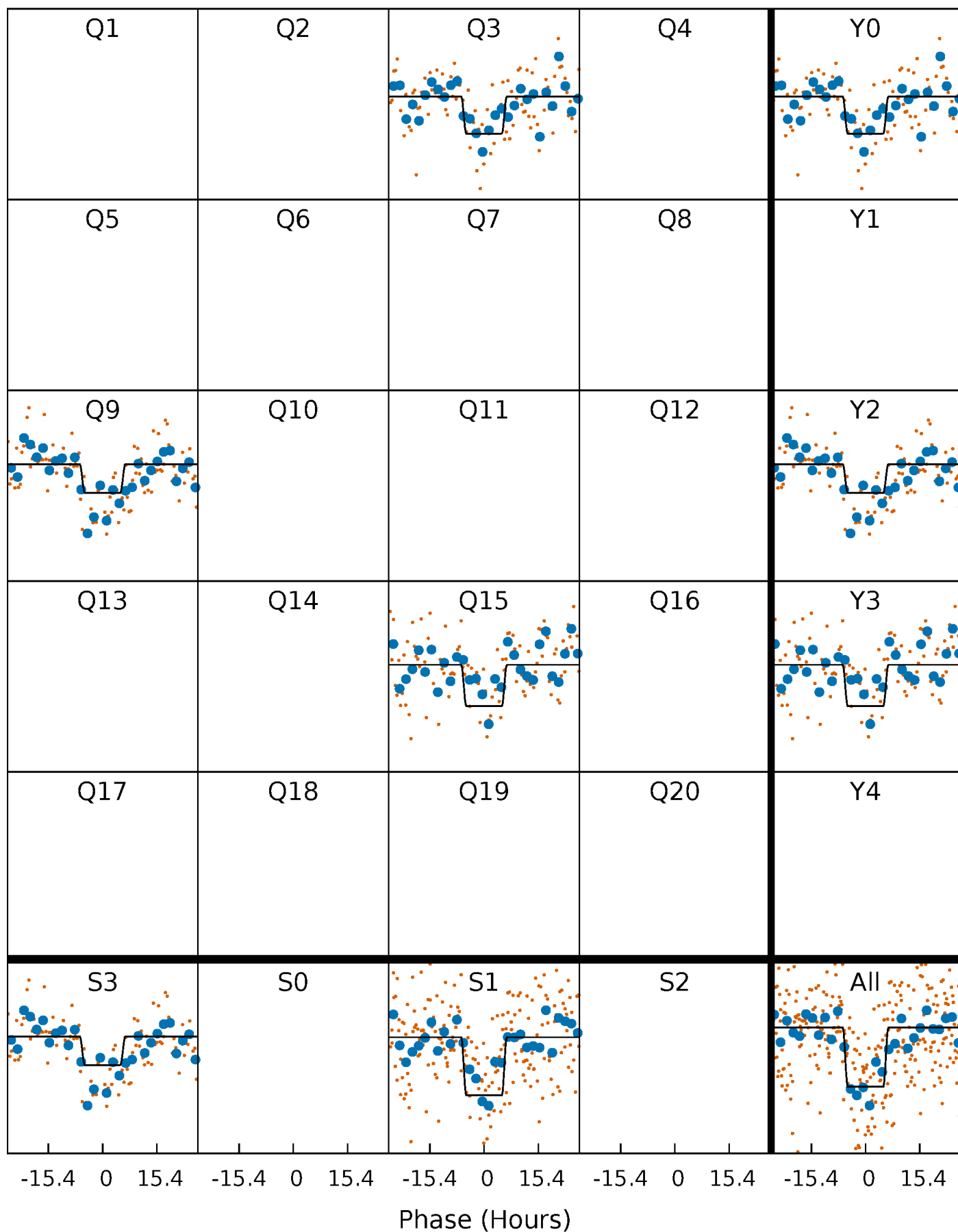
# DV Quarter-Phased Transit Curves

TCE 009873604-01     $P=522.357296$  Days     $T_0=344.655667$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

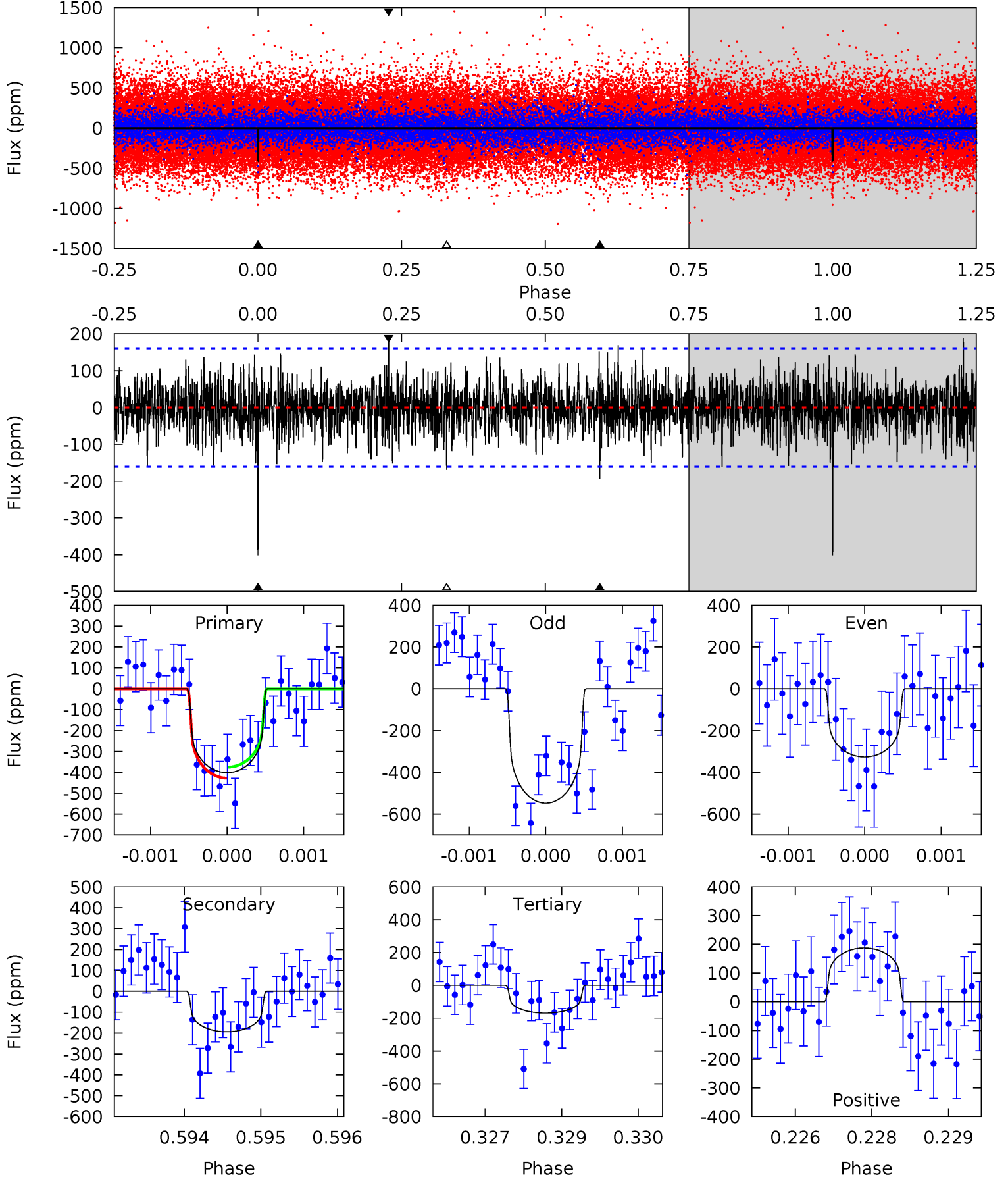
TCE 009873604-01 P=522.356717 Days  $T_0=344.656069$  (BKJD)



# DV Model-Shift Uniqueness Test

009873604-01,  $P = 522.357296$  Days,  $E = 344.655667$  Days

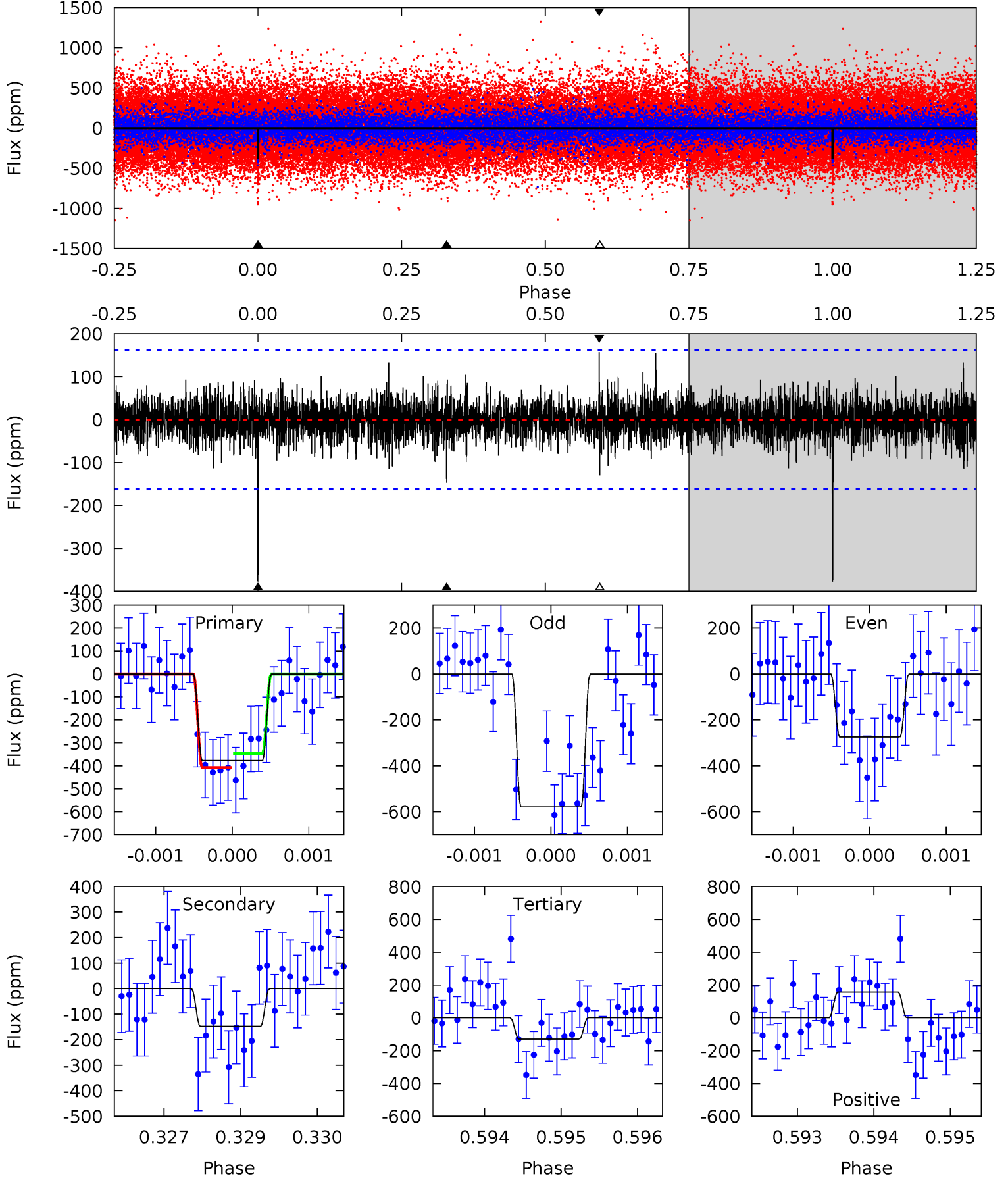
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.6	6.54	5.71	6.32	5.44	3.27	1.60	7.85	7.23	0.83	0.22	3.54	1.17	0.32	0.89



# Alt Model-Shift Uniqueness Test

009873604-01, P = 522.356717 Days, E = 344.656069 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
12.7	4.95	4.34	5.27	5.45	3.29	1.06	8.34	7.41	0.61	-0.32	4.88	1.20	0.29	1.03



### Stellar Parameters For KIC 009873604

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5103^{+139}_{-123}$	$3.606^{+0.900}_{-0.300}$	$-0.160^{+0.300}_{-0.250}$	$2.816^{+1.090}_{-2.025}$	$1.168^{+0.172}_{-0.319}$	$0.074^{+2.110}_{-0.040}$
	+3%/-2%	+25%/-8%	+188%/-156%	+39%/-72%	+15%/-27%	+2863%/-54%
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 009873604-01 / KOI 8188.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-194 \pm 30$	$5.36^{+3.18}_{-2.48}$	$457^{+56}_{-90}$	$4486^{+915}_{-503}$	$6203^{+15917}_{-3691}$
Alt.	$-147 \pm 30$	$5.49^{+3.18}_{-2.60}$	$451^{+63}_{-83}$	$4194^{+879}_{-446}$	$4743^{+12095}_{-2848}$

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

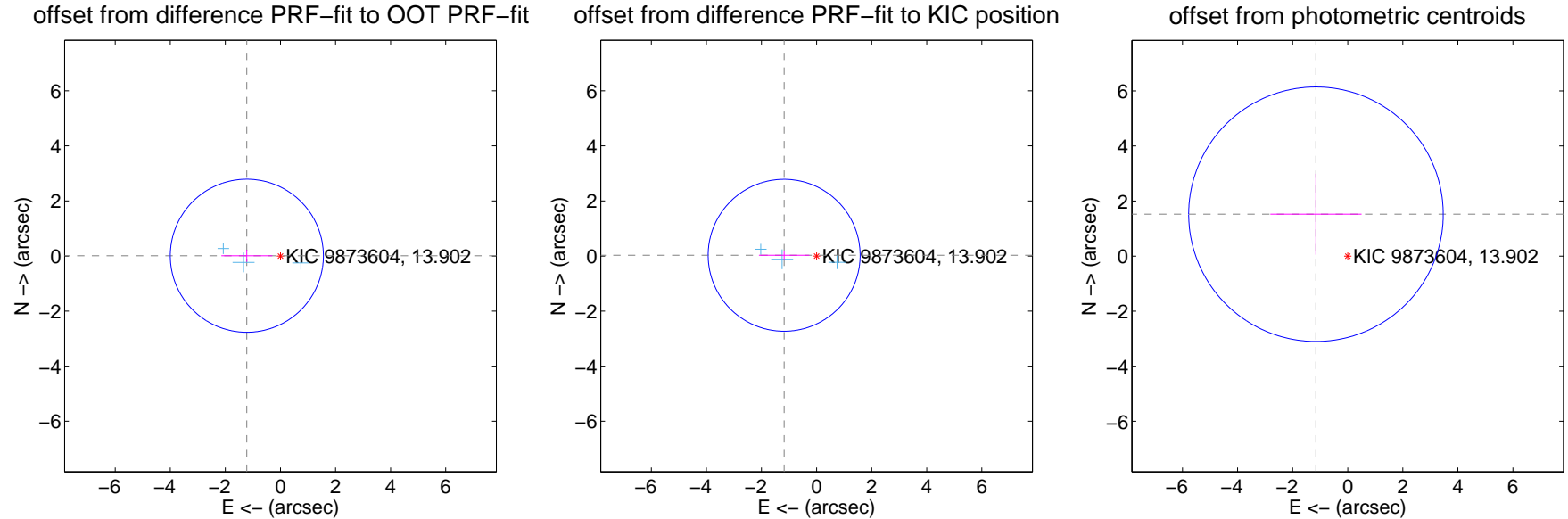
## DV Centroid Data

Supplemental centroid analysis for 009873604-01. Kepler magnitude: 13.90. Transit SNR 7.02

There are 3 quarters with good PRF difference image offsets

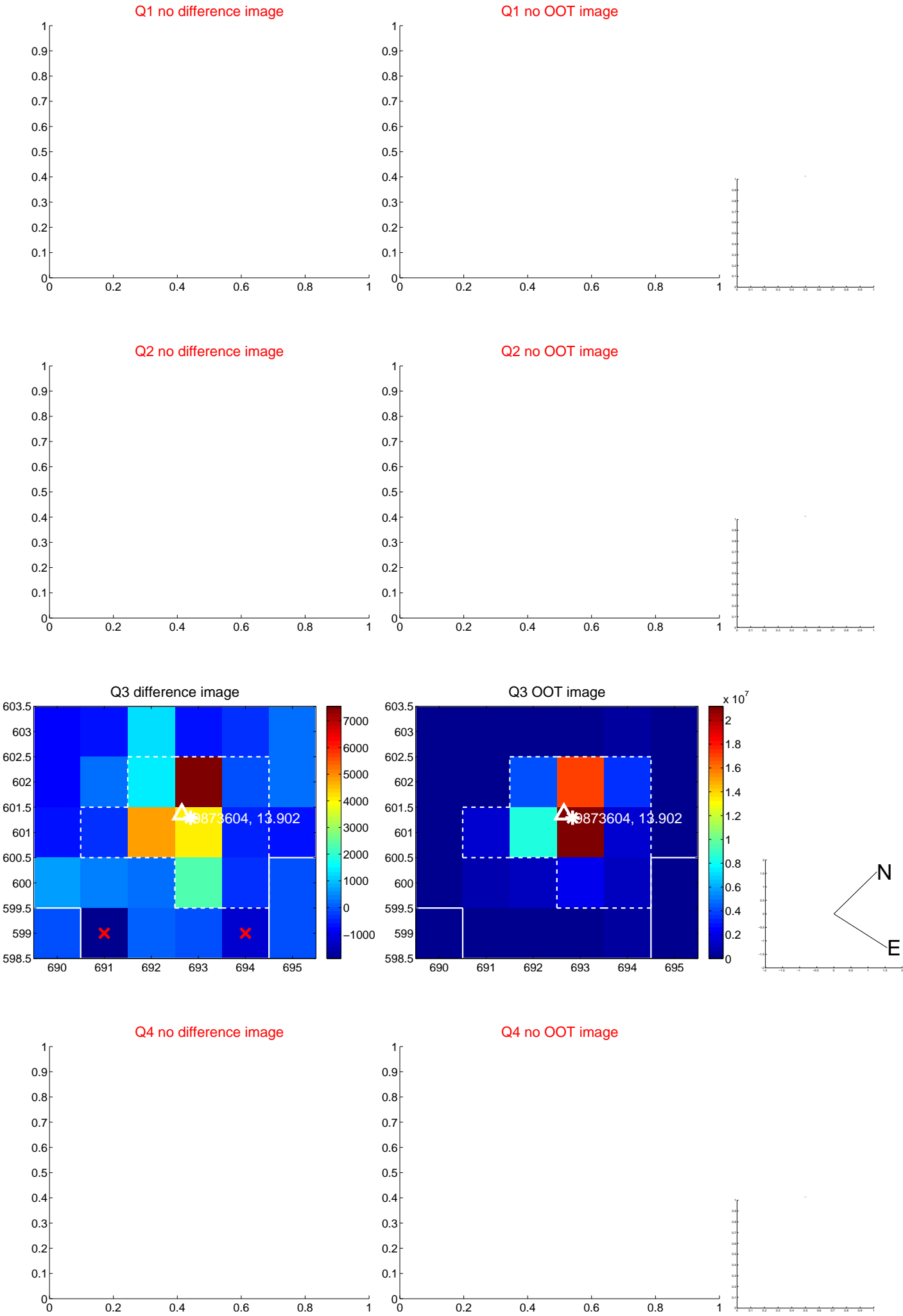
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.220 \pm 0.927$	1.32	$1.220 \pm 0.927$	$0.010 \pm 0.220$
PRF-fit source offset from KIC position	$1.178 \pm 0.920$	1.28	$1.178 \pm 0.917$	$0.027 \pm 0.147$
photometric centroid source offset	$1.91 \pm 1.54$	1.24	$1.15 \pm 1.66$	$1.52 \pm 1.47$



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

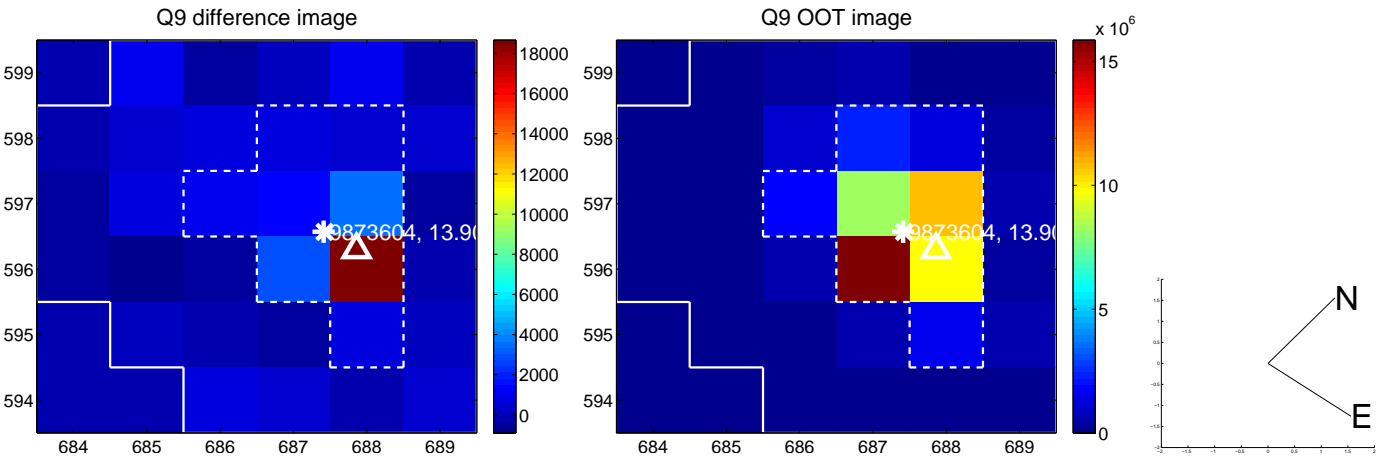




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.

Q13 no difference image



Q13 no OOT image



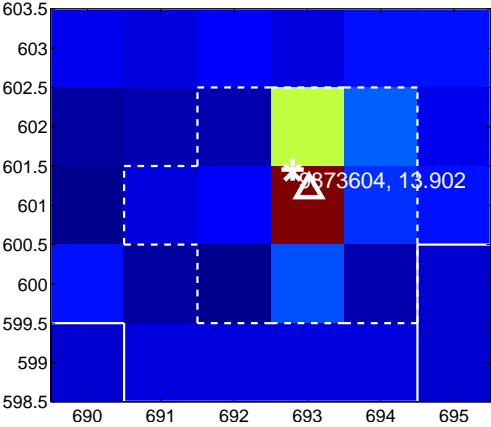
Q14 no difference image



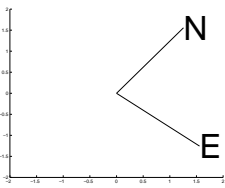
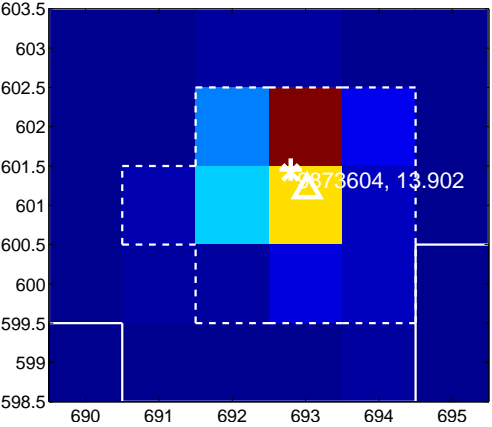
Q14 no OOT image



Q15 difference image



Q15 OOT image



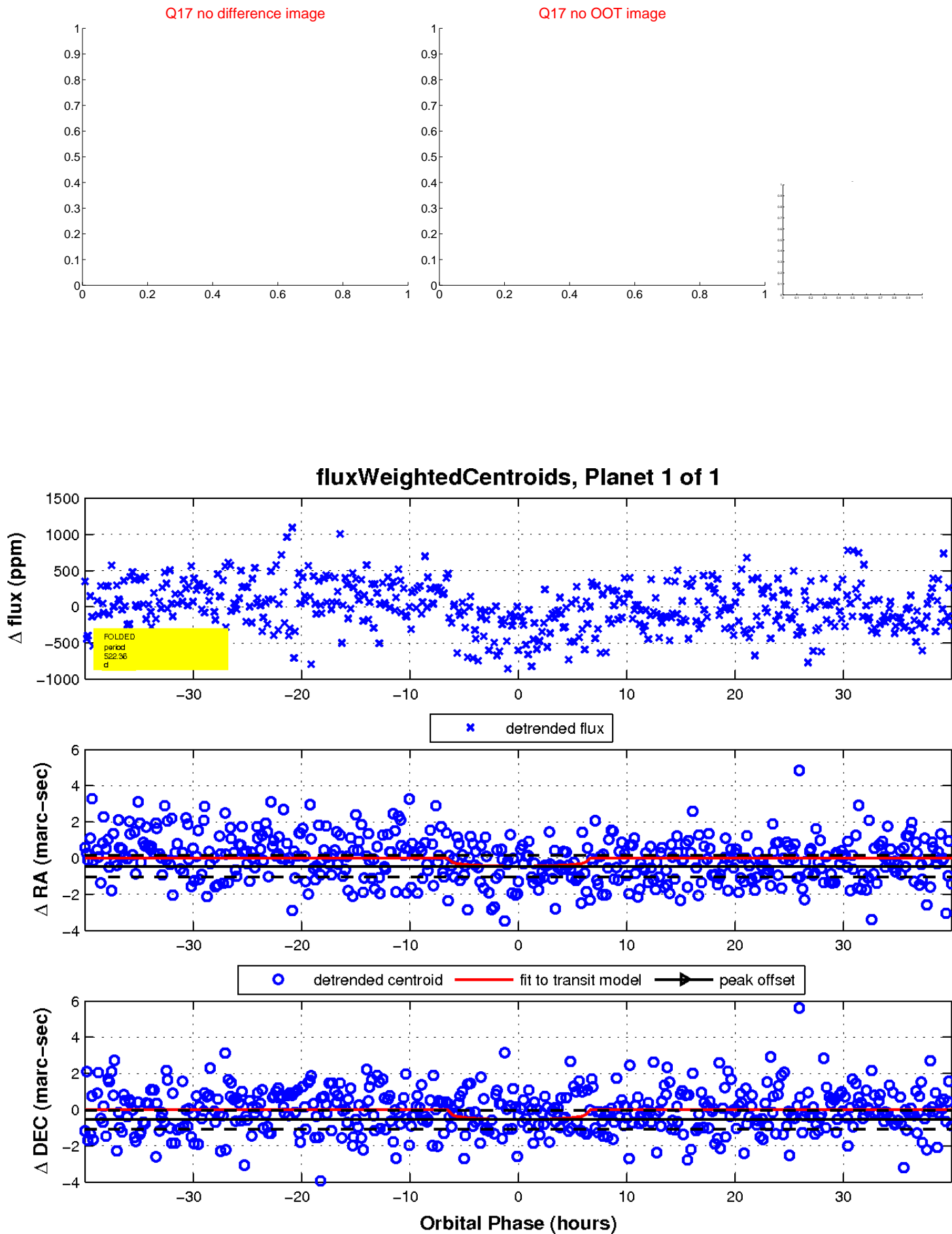
Q16 no difference image



Q16 no OOT image



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



UKIRT Image

Declination

