

# KIC 009716645

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009716645-01	OBS	No	271.896623	397.232857	2601.5	11.444	10.0	4.2	0.92	5837	5.23	1.58

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009716645-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—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.

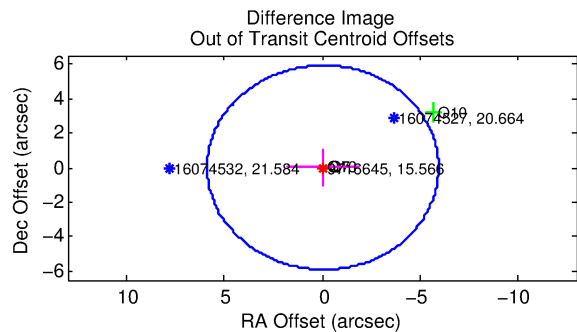
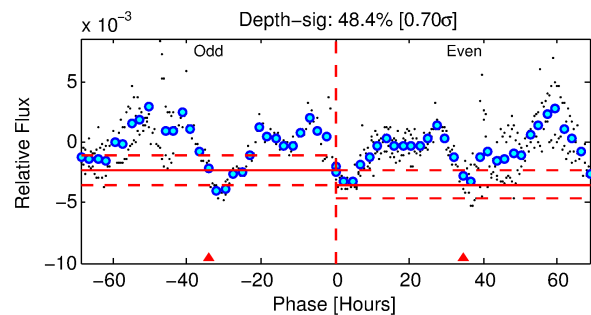
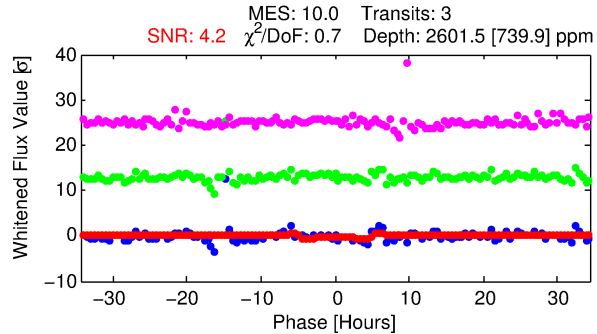
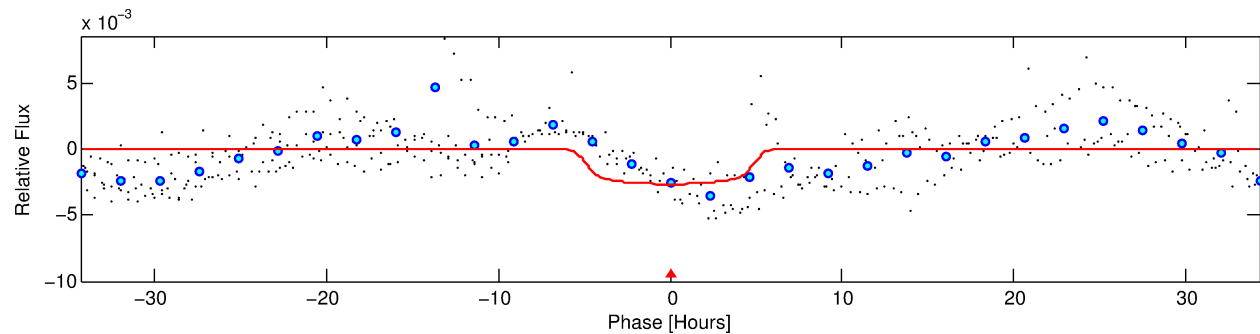
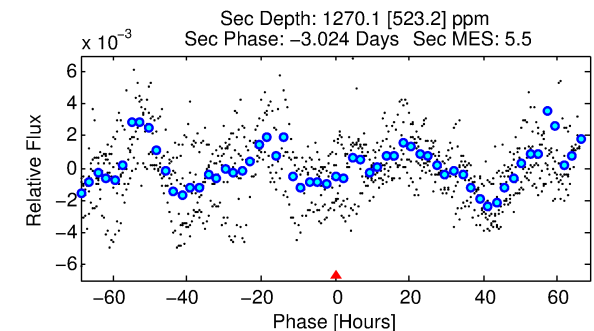
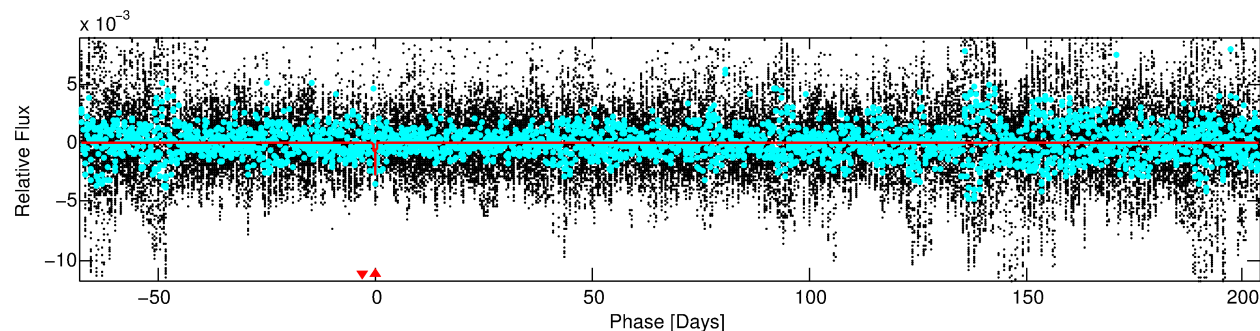
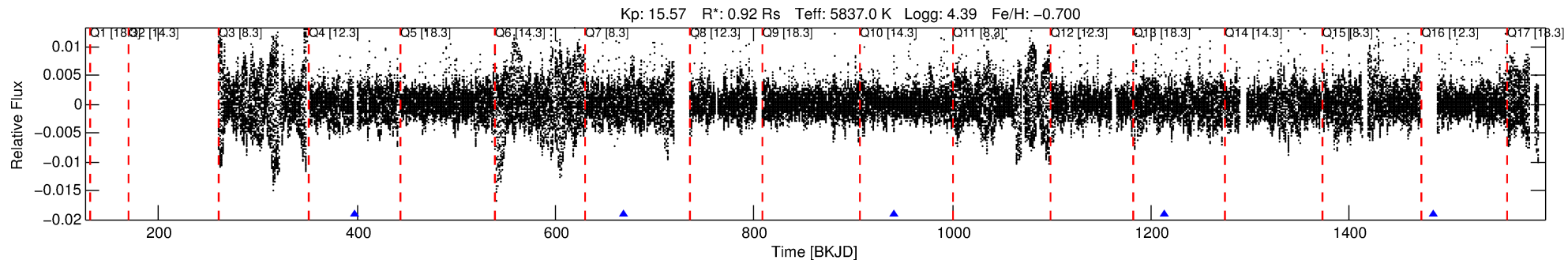
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009716645-01

No Significant Match Found

# DV One-Page Summary

KIC: 9716645 Candidate: 1 of 1 Period: 271.897 d



## DV Fit Results:

Period = 271.89662 [0.01213] d  
Epoch = 397.2329 [0.0259] BKJD  
Rp/R\* = 0.0520 [0.0085]  
a/R\* = 121.67 [32.24]  
b = 0.81 [0.11]  
Seff = 1.58 [0.58]  
Teq = 286 [26] K  
Rp = 5.23 [1.62] Re  
a = 0.7478 [0.1705] AU  
Ag = 14310.06 [8955.09] [1.60σ]  
Teffp = 4832 [655] K [6.94σ]

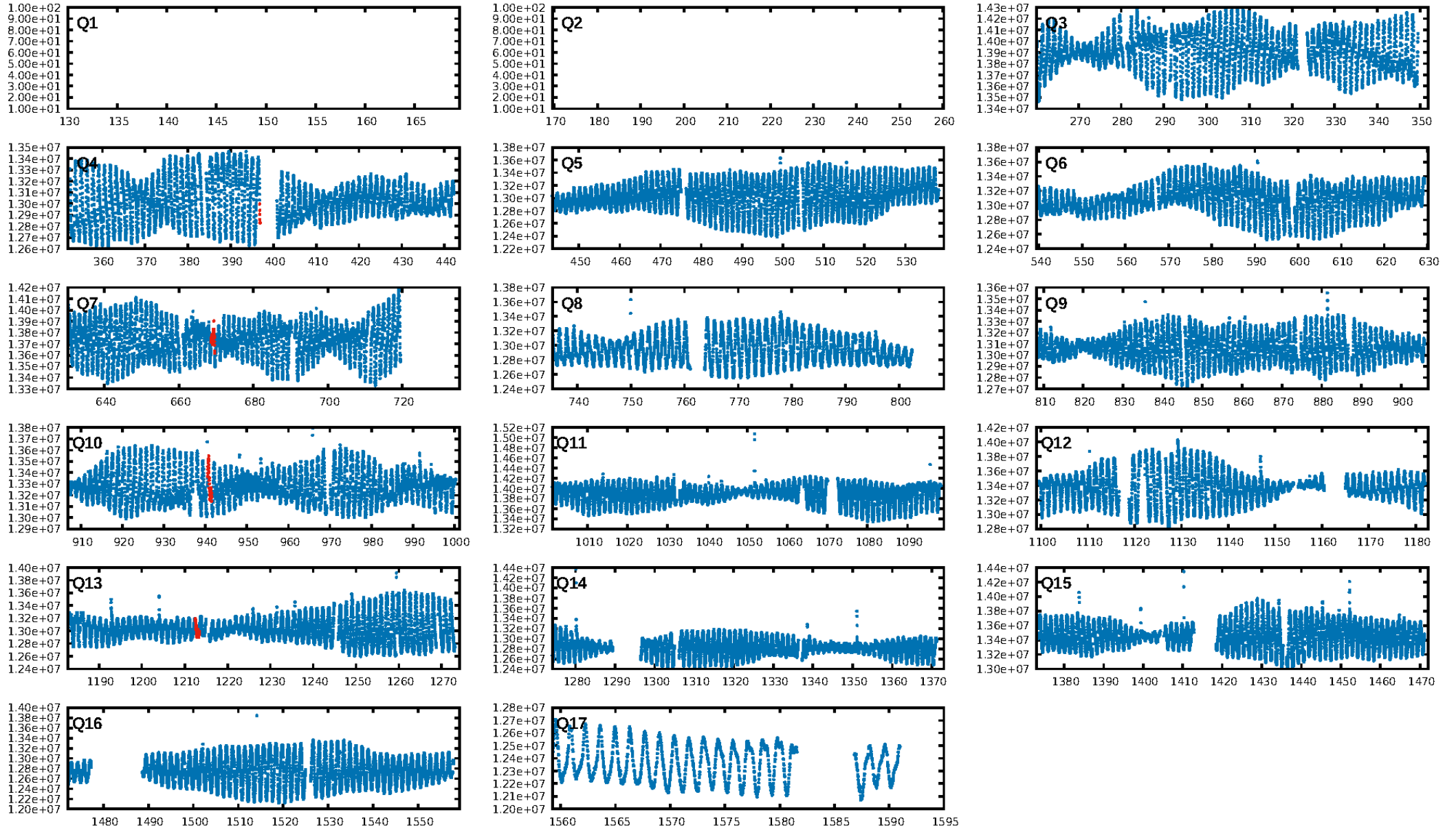
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 56.0%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 1.30e-09**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 2.177  
Centroid-sig: 64.4%  
Centroid-so: 0.265 arcsec [0.64σ]  
OotOffset-rm: 0.044 arcsec [0.02σ]  
KicOffset-rm: 0.087 arcsec [0.18σ]  
OotOffset-st: 1/1/0/1 [3]  
KicOffset-st: 1/1/0/1 [3]  
DiffImageQuality-fgm: 0.33 [1/3]  
DiffImageOverlap-fno: 1.00 [3/3]

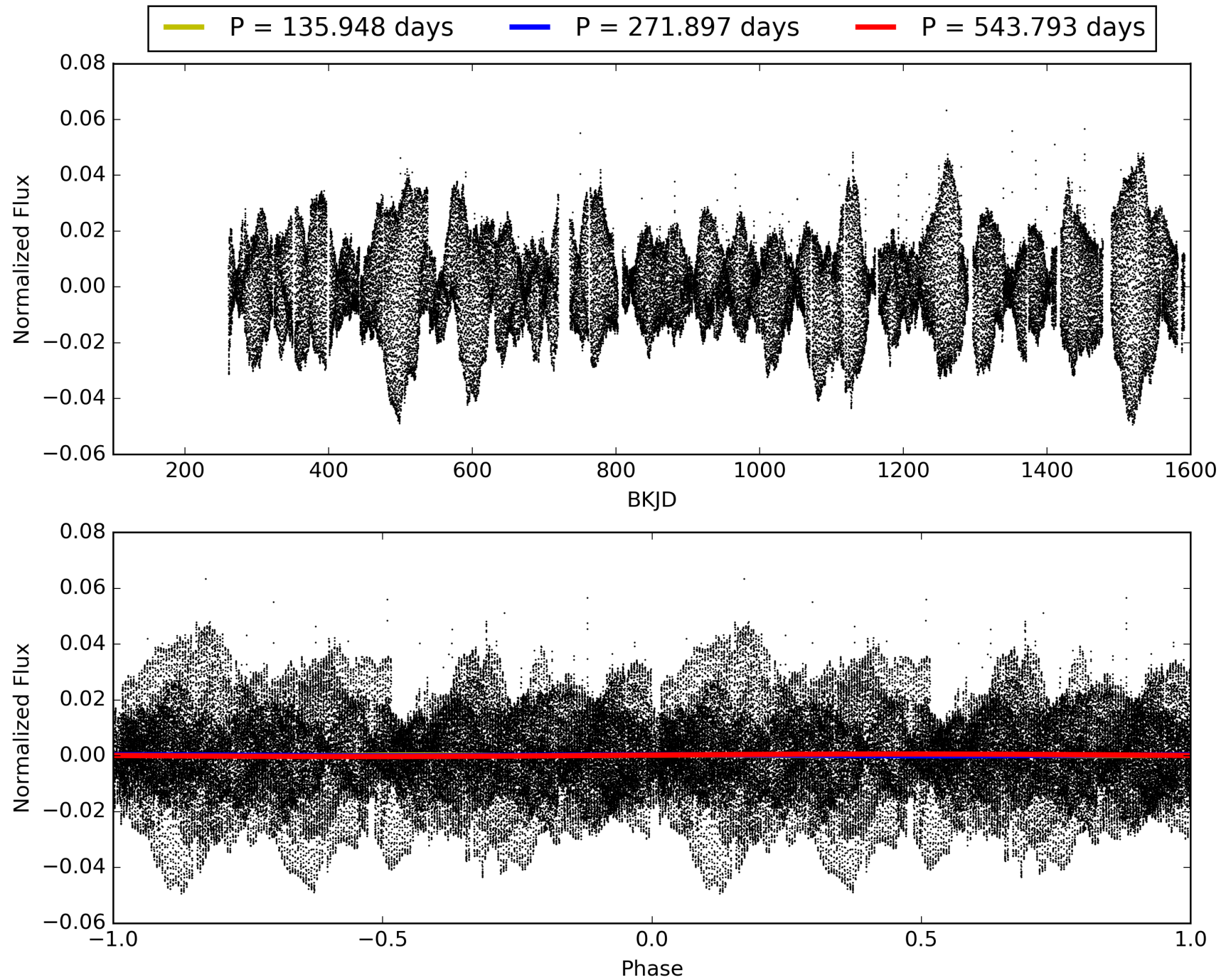
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 18:19:01 Z

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

# TCE 009716645-01, PDC Light Curves

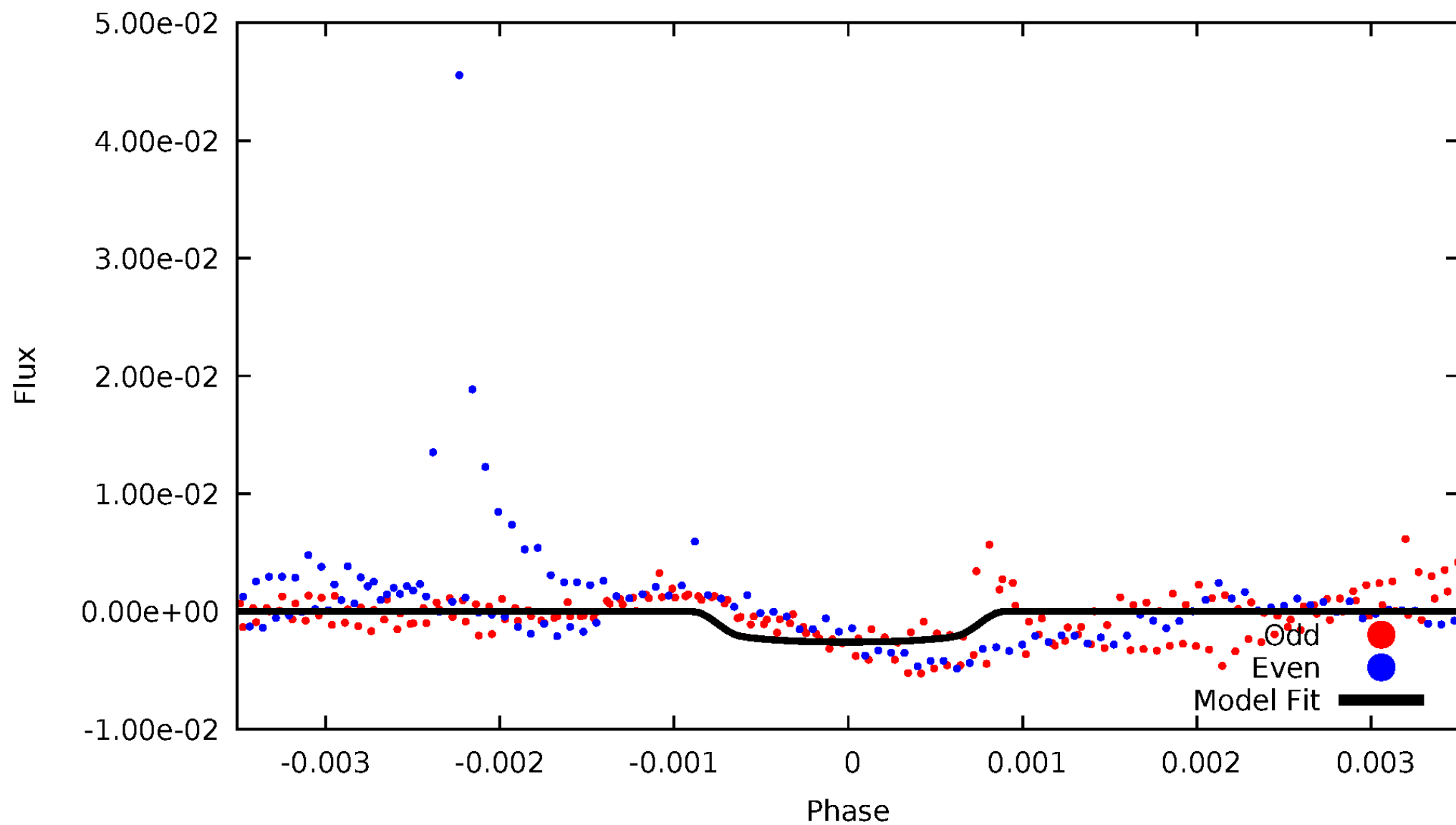


TCE 009716645-01



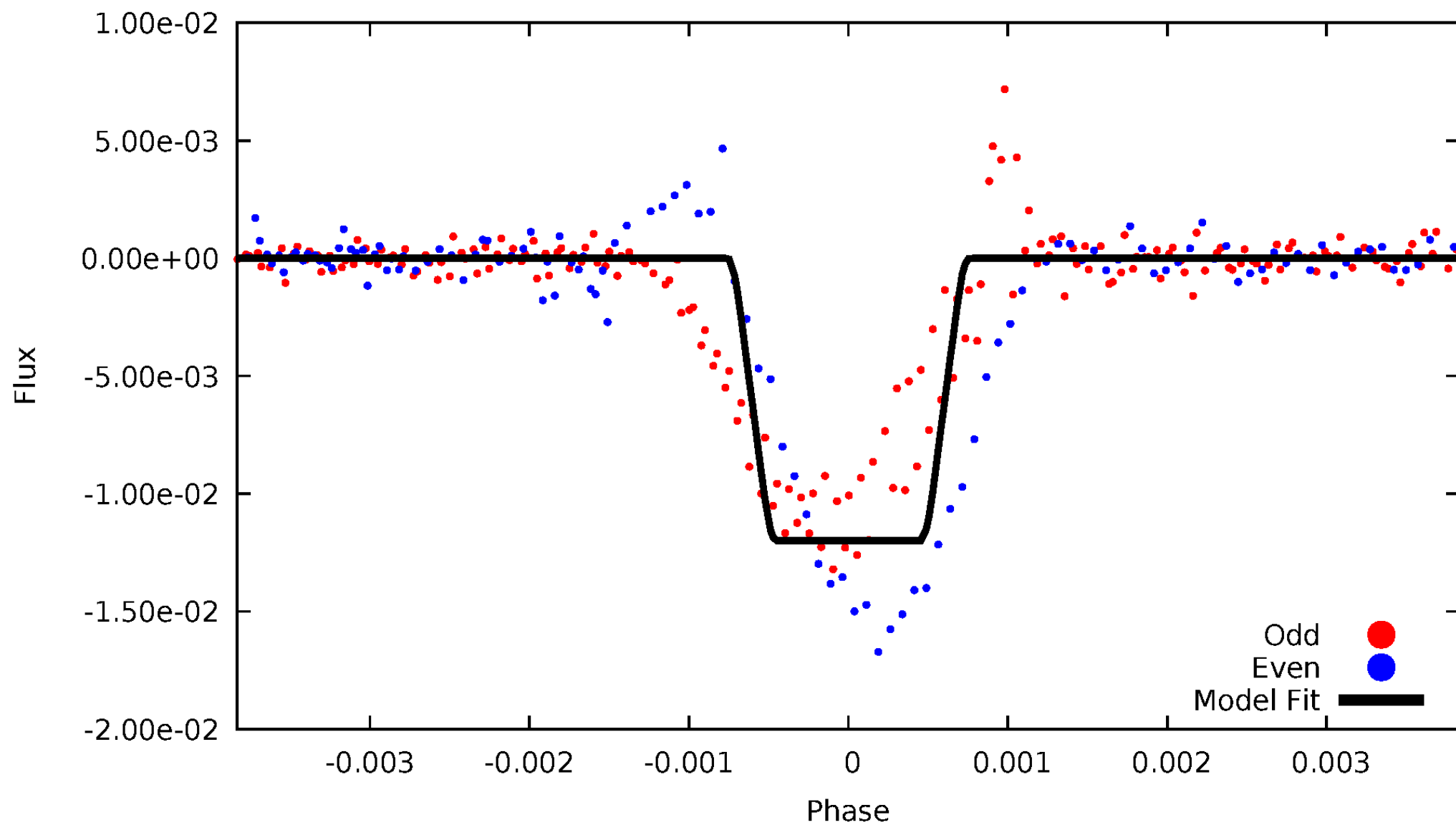
# DV Odd/Even

TCE 009716645-01



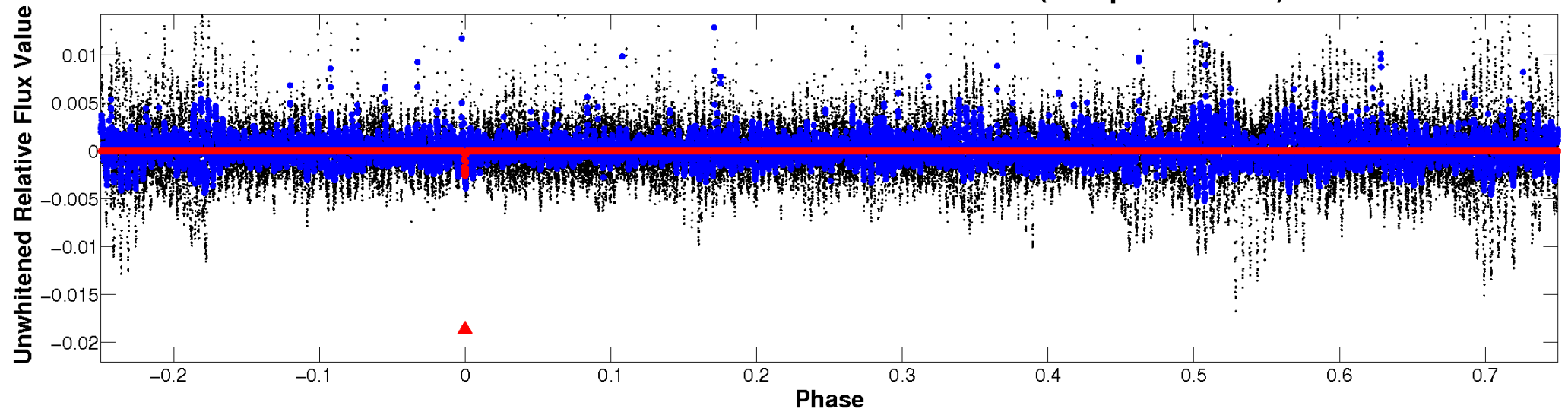
# ALT Odd/Even

TCE 009716645-01

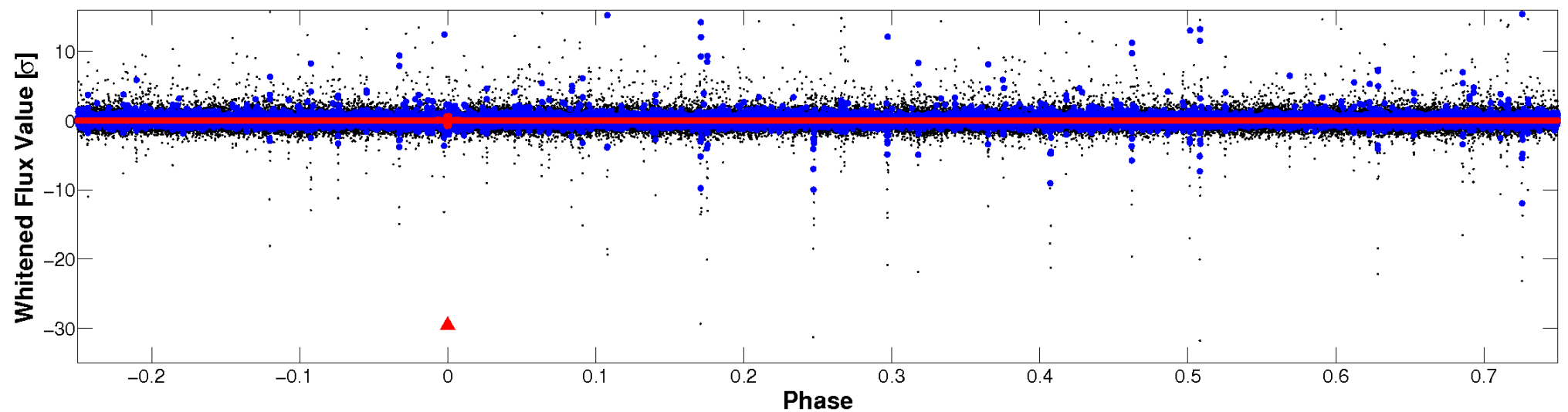


# Non-Whitened Vs. Whitened Light Curve

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



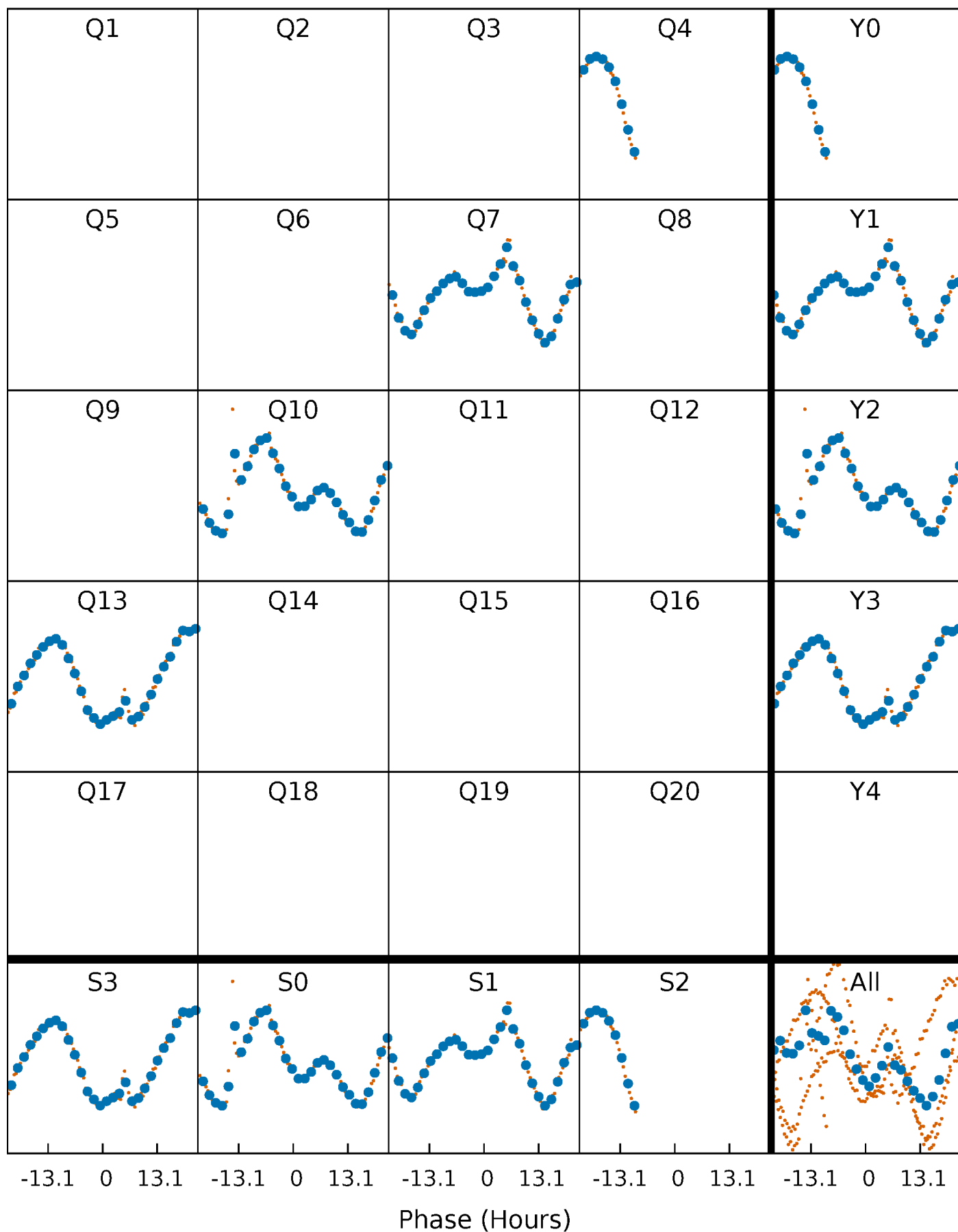
Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

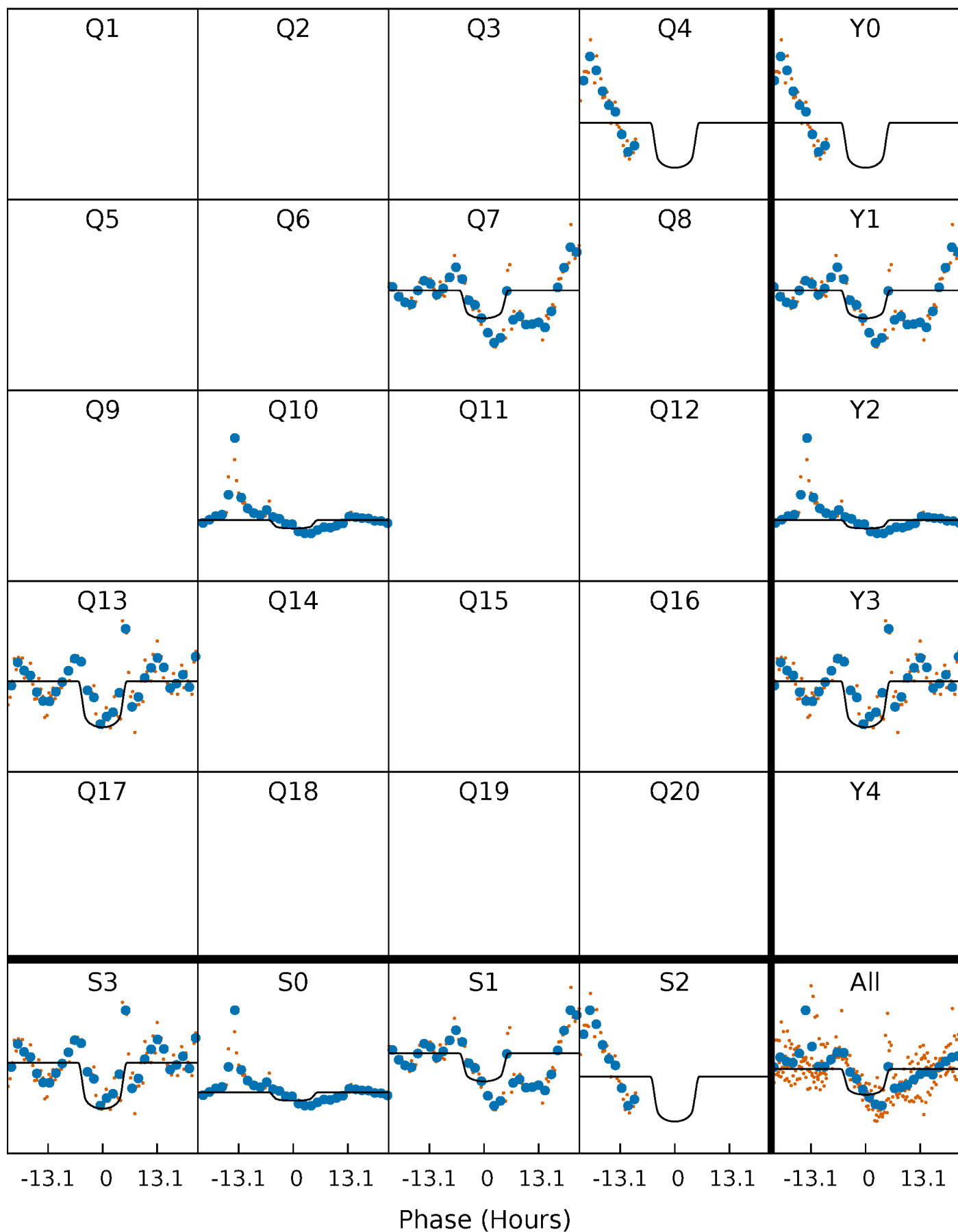
TCE 009716645-01 P=271.896623 Days  $T_0=397.232858$  (BKJD)





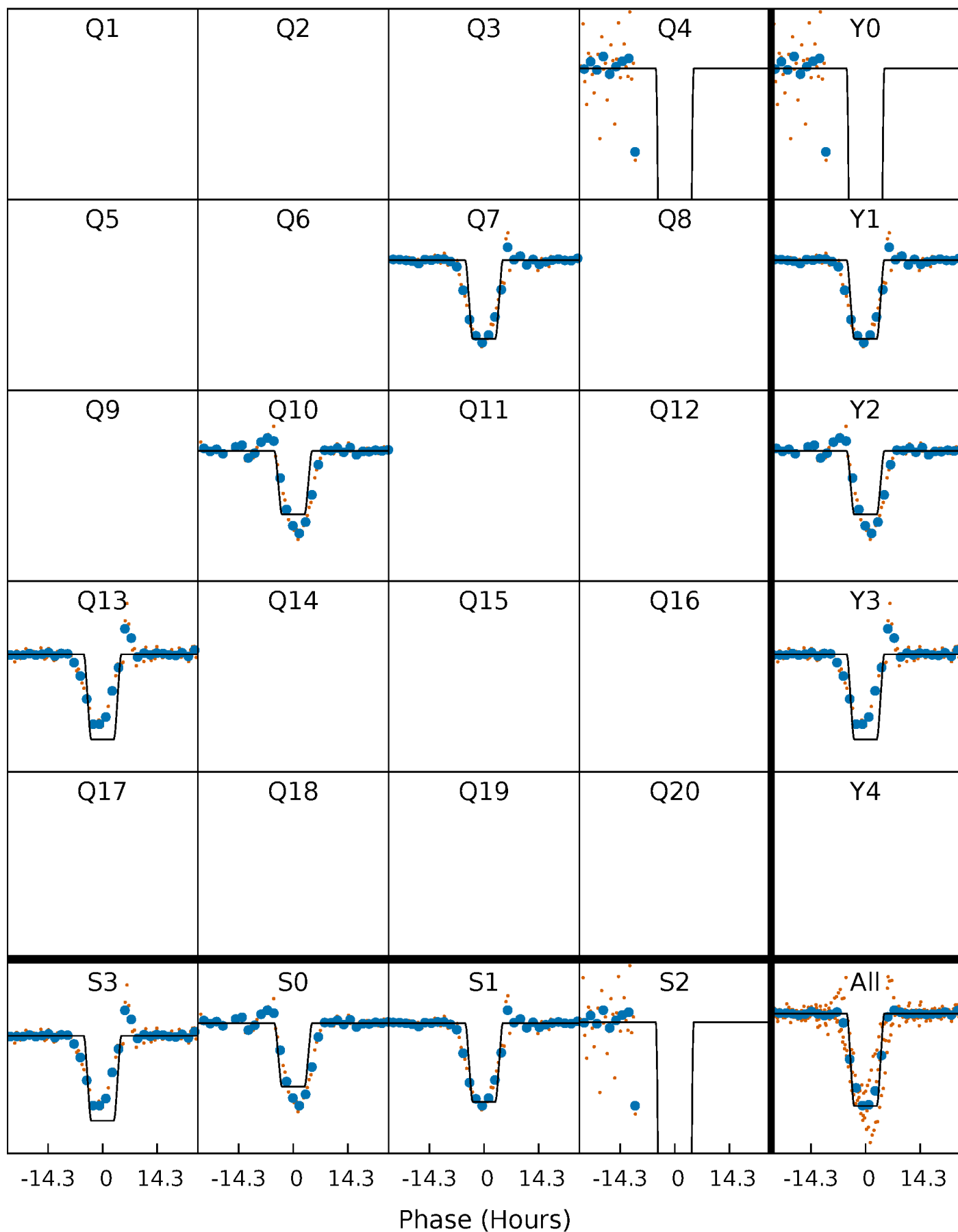
# DV Quarter-Phased Transit Curves

TCE 009716645-01 P=271.896623 Days  $T_0=397.232858$  (BKJD)



## Alt. Detrend Quarter-Phased Transit Curves

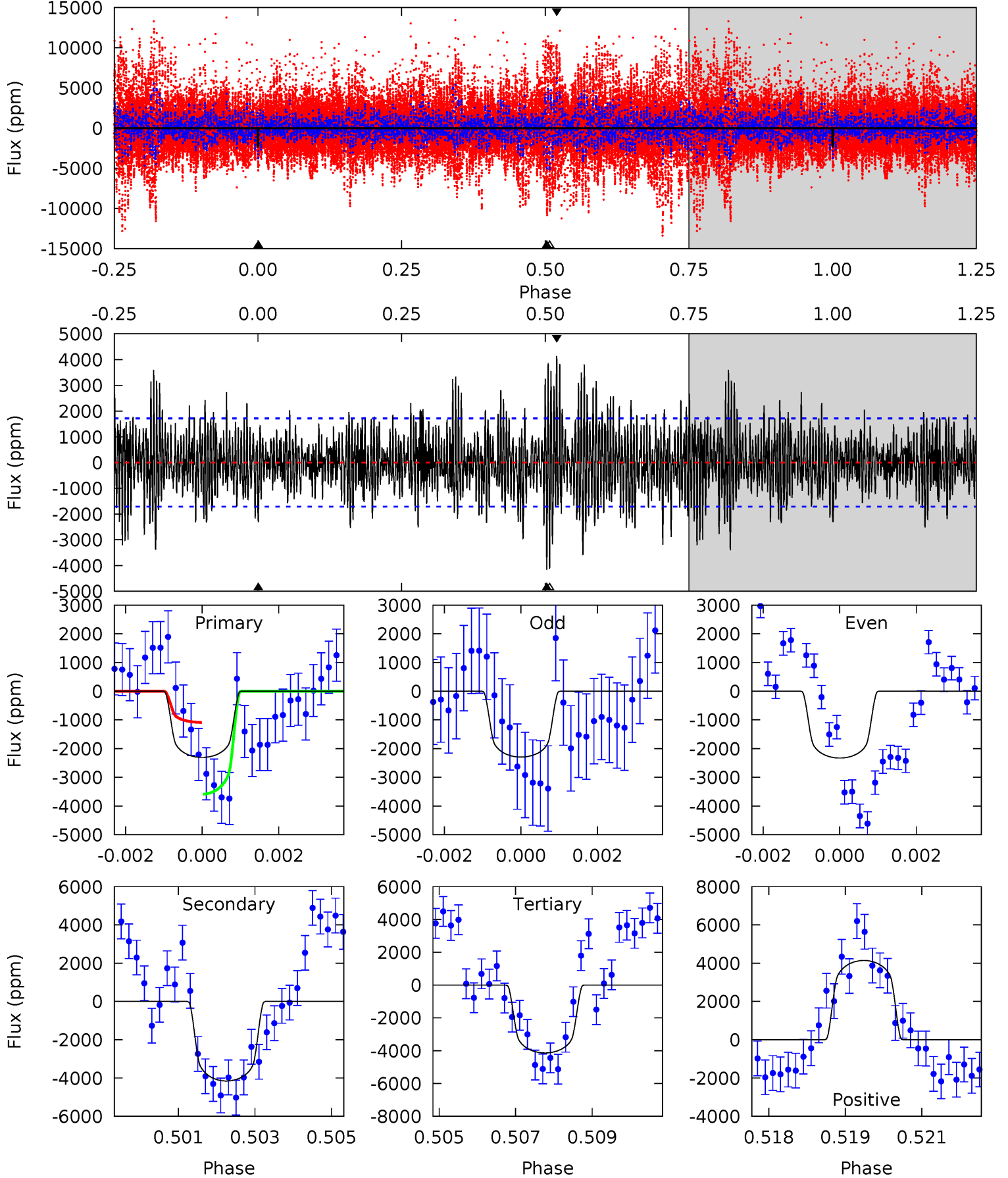
TCE 009716645-01 P=271.875327 Days  $T_0=397.250273$  (BKJD)



# DV Model-Shift Uniqueness Test

009716645-01, P = 271.896623 Days, E = 125.336235 Days

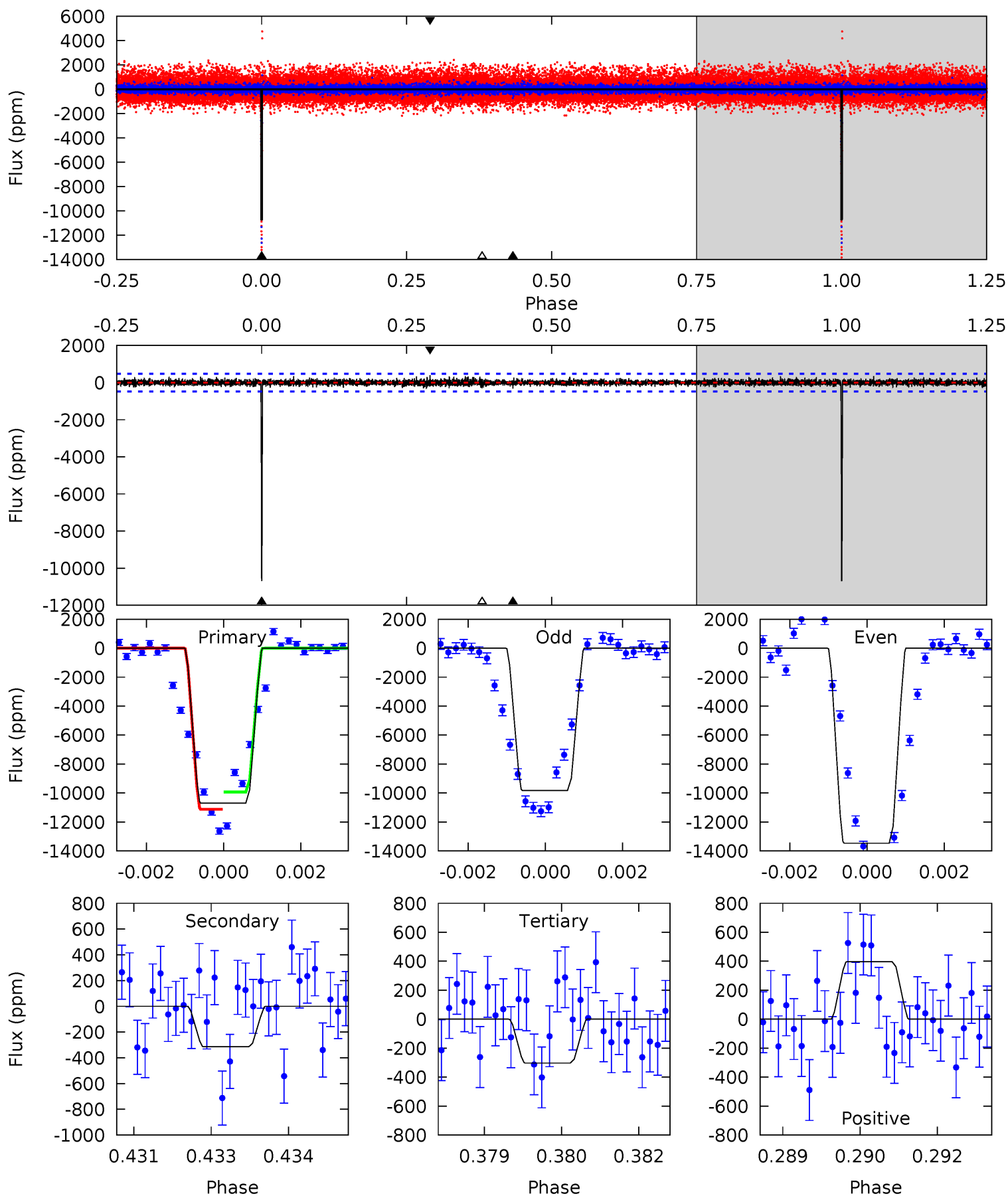
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.19	12.9	12.9	12.9	5.35	3.12	3.34	-5.70	-5.71	0.05	0.05	0.05	1.00	0.50	3.92



# Alt Model-Shift Uniqueness Test

009716645-01, P = 271.875327 Days, E = 125.374946 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
119.7	3.52	3.39	4.44	5.38	3.17	0.88	116.3	115.2	0.13	-0.93	24.4	0.96	0.04	6.26



### Stellar Parameters For KIC 009716645

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5837^{+195}_{-195}$	$4.387^{+0.190}_{-0.190}$	$-0.700^{+0.300}_{-0.300}$	$0.921^{+0.242}_{-0.182}$	$0.754^{+0.105}_{-0.042}$	$1.361^{+1.268}_{-0.658}$
	+3%/-3%	+4%/-4%	+43%/-43%	+26%/-20%	+14%/-6%	+93%/-48%
Source	KIC0	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 009716645-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-4155 \pm 321$	$5.20^{+1.20}_{-0.97}$	$400^{+29}_{-26}$	$6523^{+703}_{-549}$	$47896^{+24813}_{-16534}$
Alt.	$-314 \pm 89$	$11.18^{+1.85}_{-1.59}$	$400^{+30}_{-26}$	$3009^{+148}_{-169}$	$782^{+388}_{-296}$

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

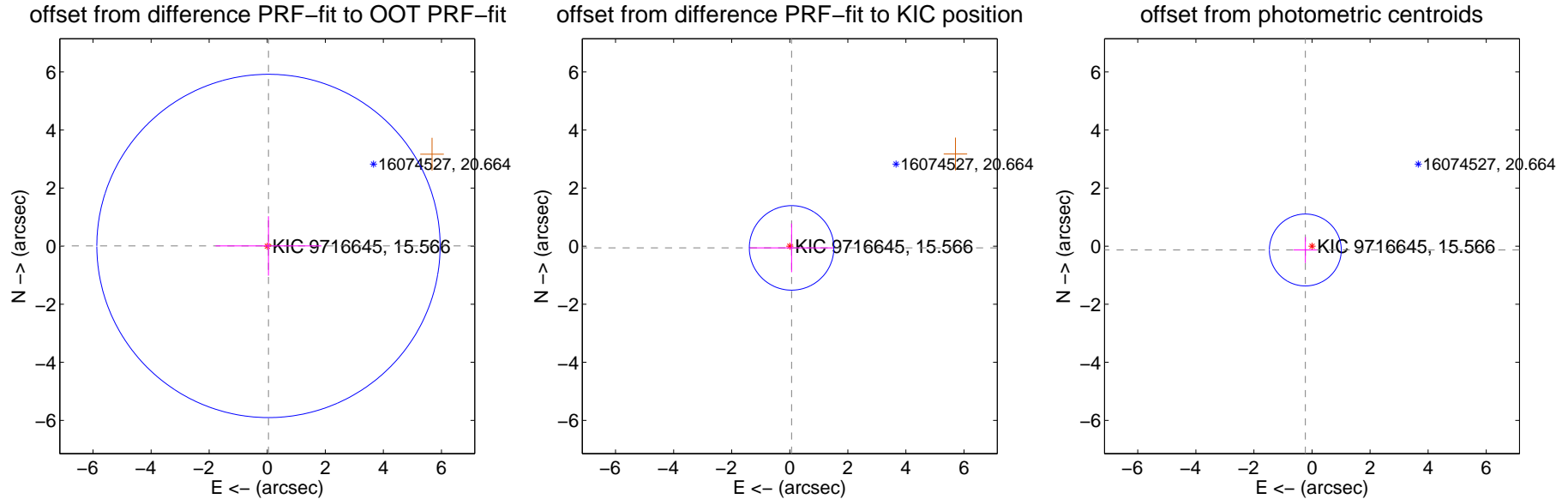
## DV Centroid Data

Supplemental centroid analysis for 009716645-01. Kepler magnitude: 15.57. Transit SNR 4.21

There are 1 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.044 \pm 1.970$	0.02	$-0.043 \pm 1.822$	$0.008 \pm 1.024$
PRF-fit source offset from KIC position	$0.087 \pm 0.485$	0.18	$-0.062 \pm 1.472$	$-0.060 \pm 0.838$
photometric centroid source offset	$0.26 \pm 0.41$	0.64	$0.23 \pm 0.40$	$-0.13 \pm 0.44$



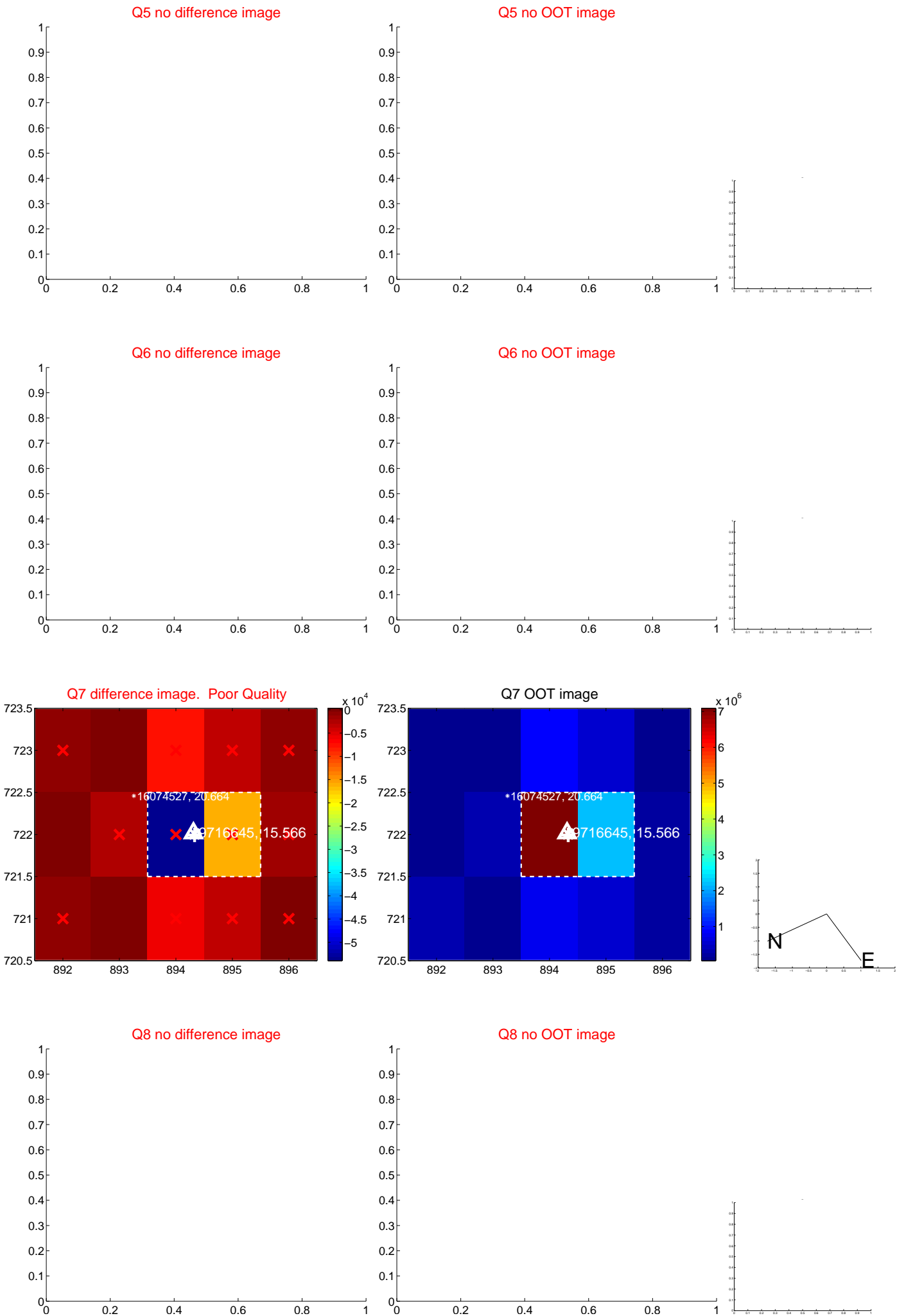
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

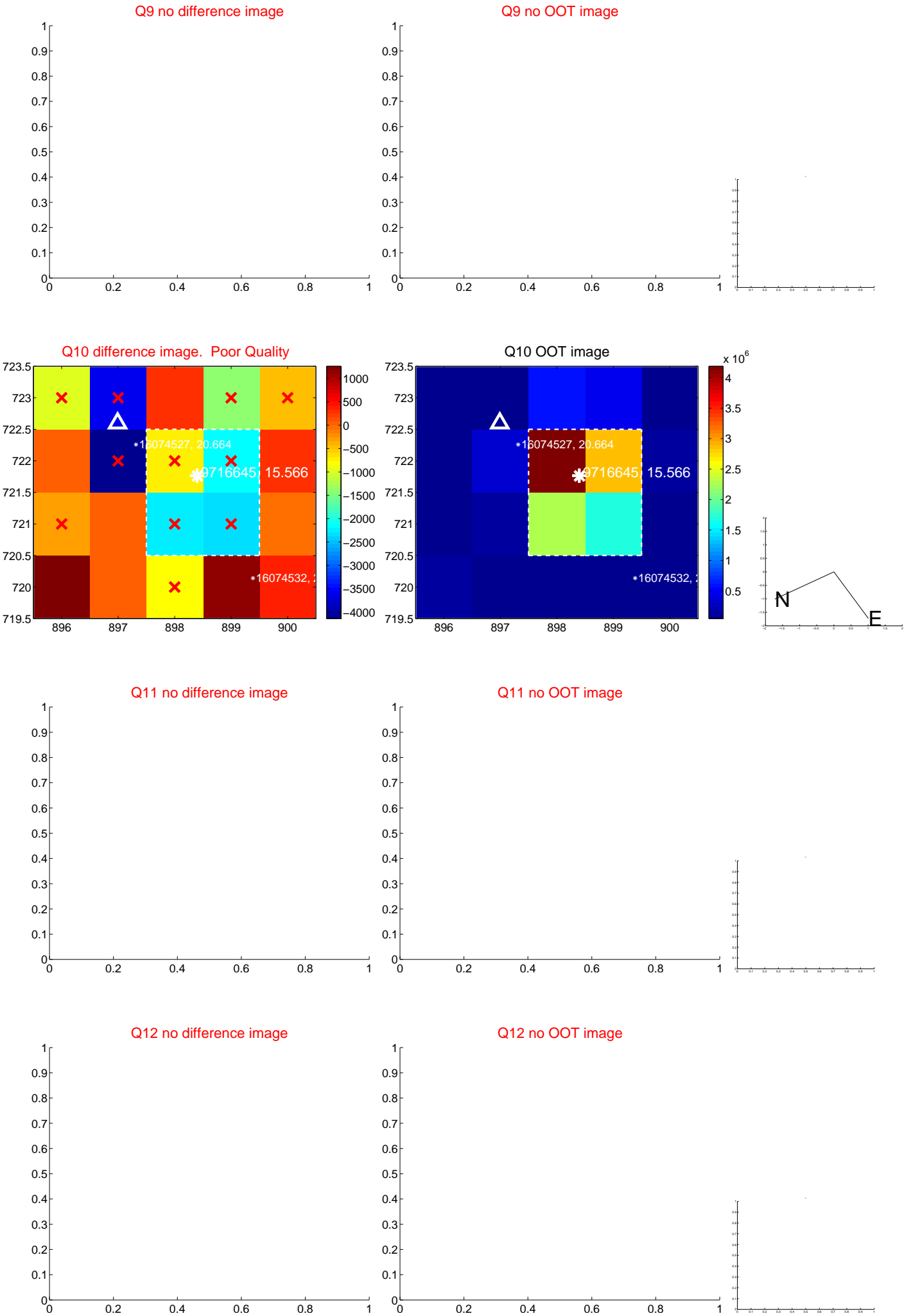




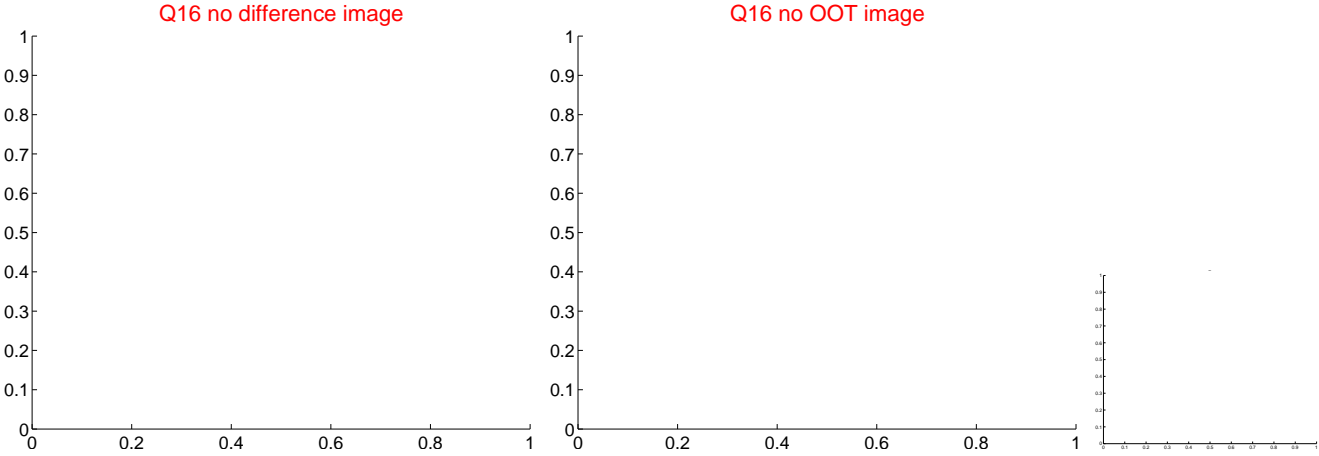
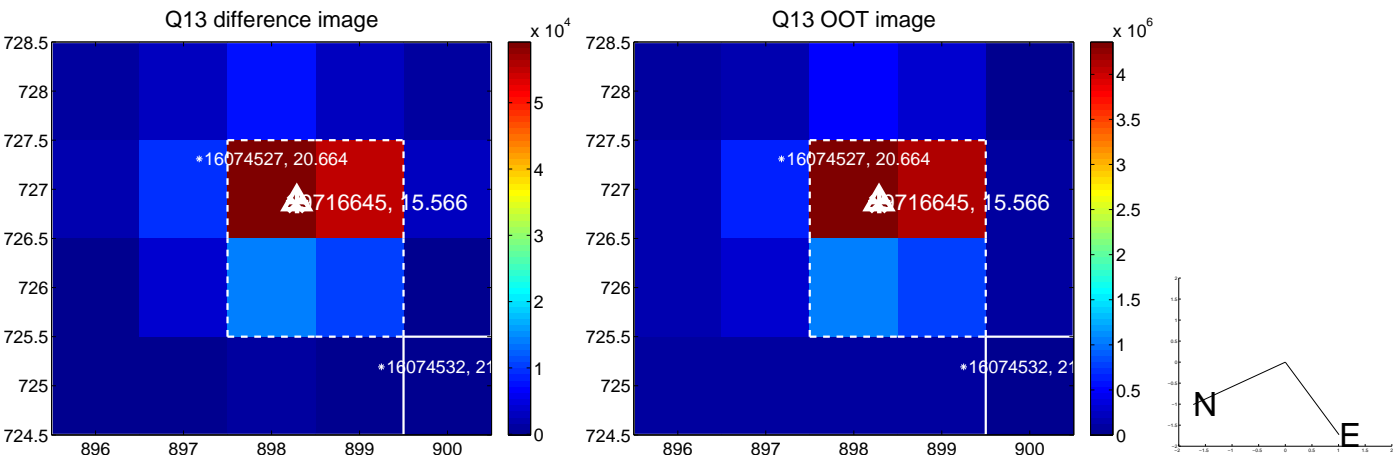
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



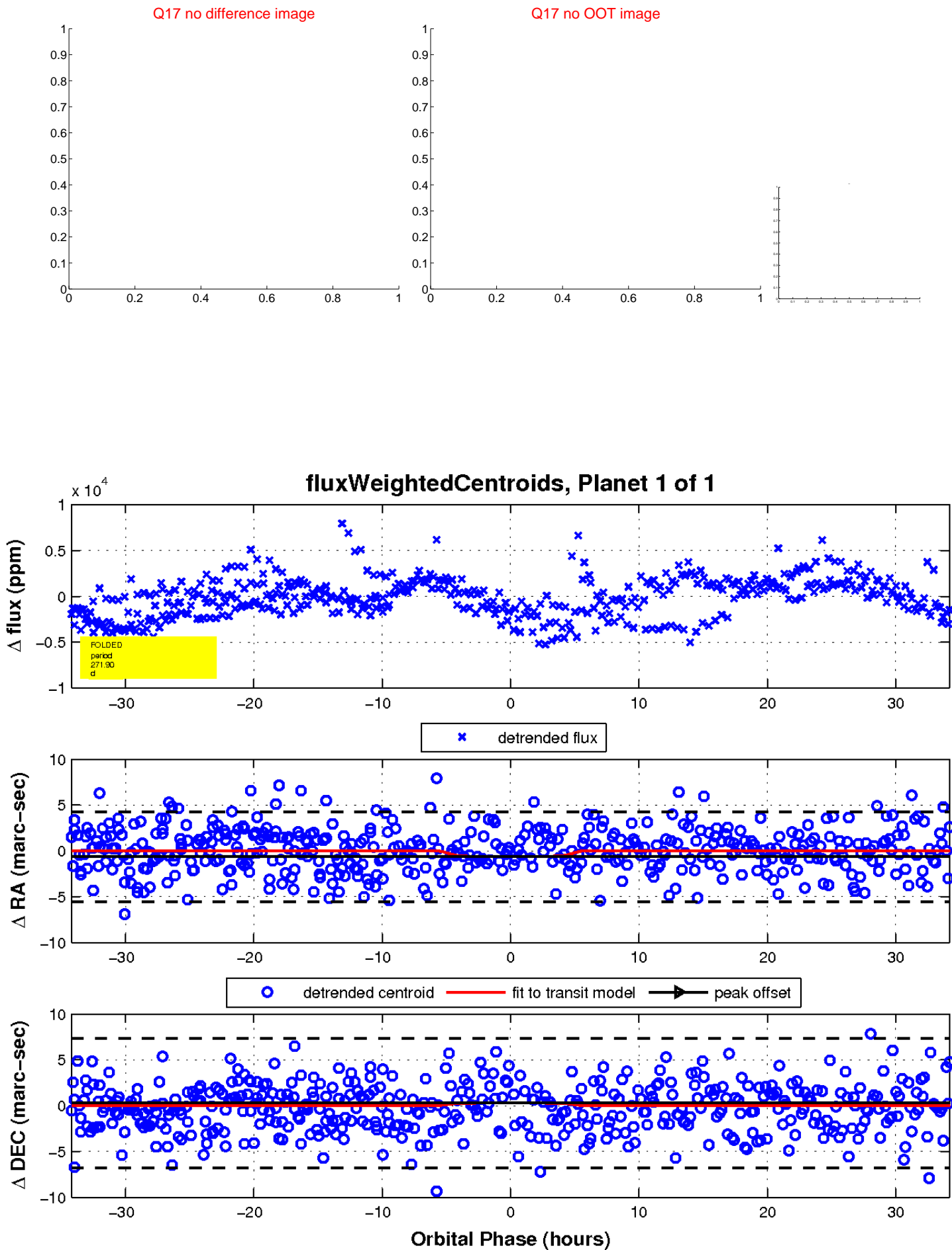
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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



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



UKIRT Image

Declination

