

# KIC 002309286

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002309286-01	OBS	No	157.273361	160.529312	975.9	3.141	7.8	6.6	14.94	4795	53.23	169.36

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002309286-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS

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

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

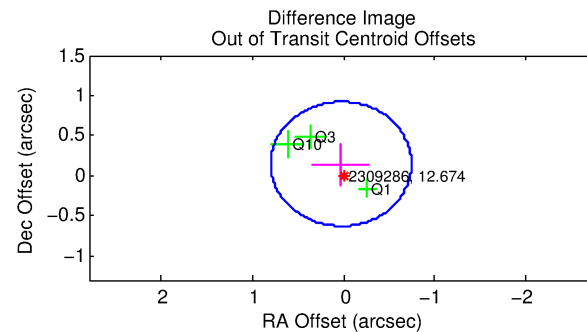
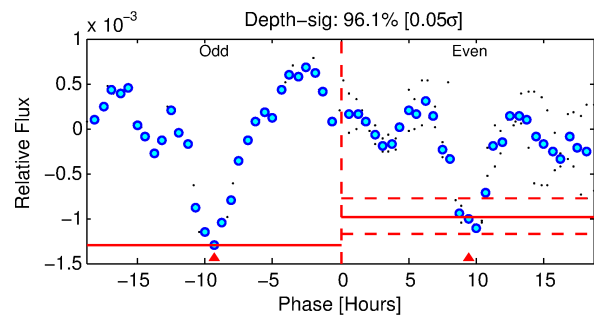
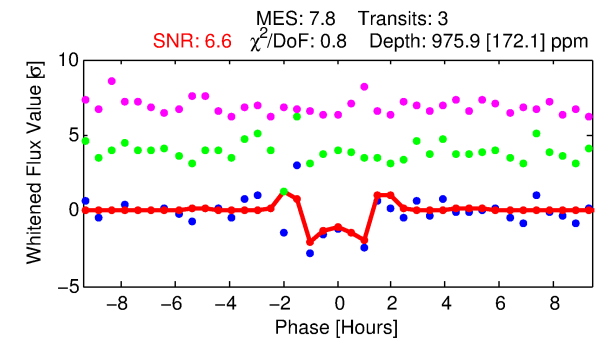
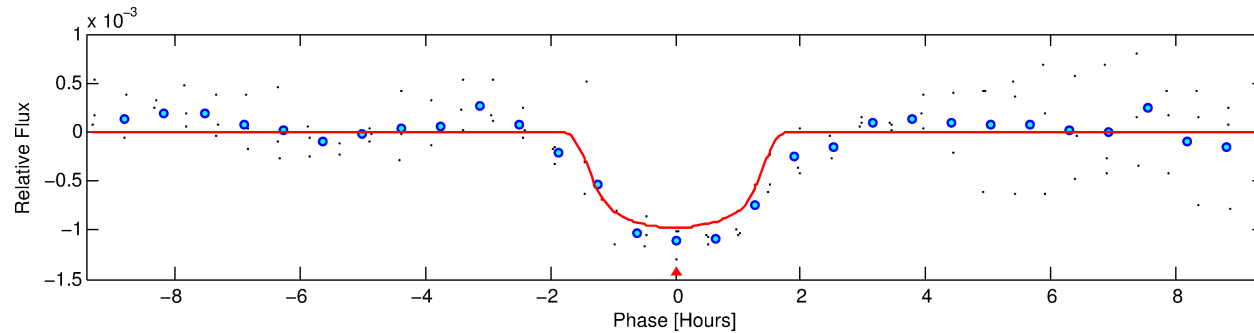
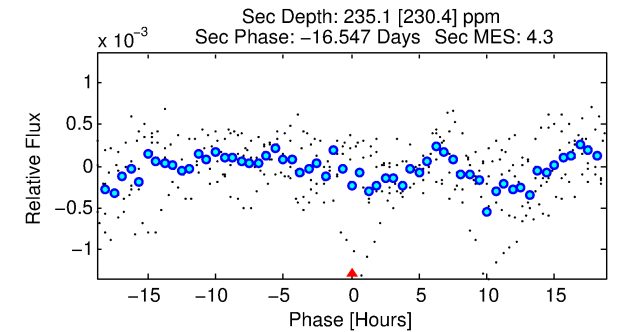
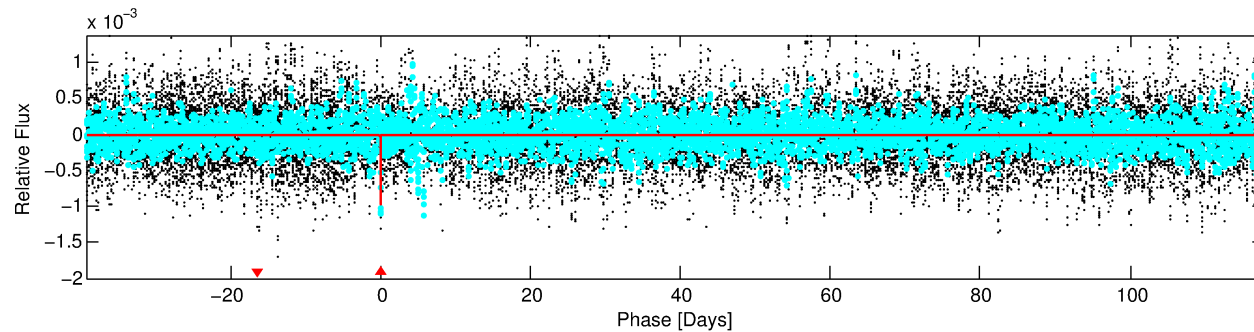
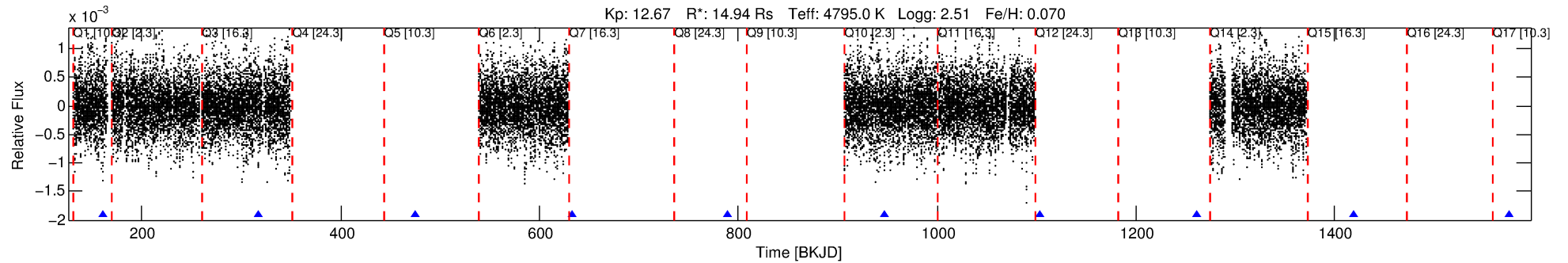
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 002309286-01

No Significant Match Found

# DV One-Page Summary

KIC: 2309286 Candidate: 1 of 1 Period: 157.273 d



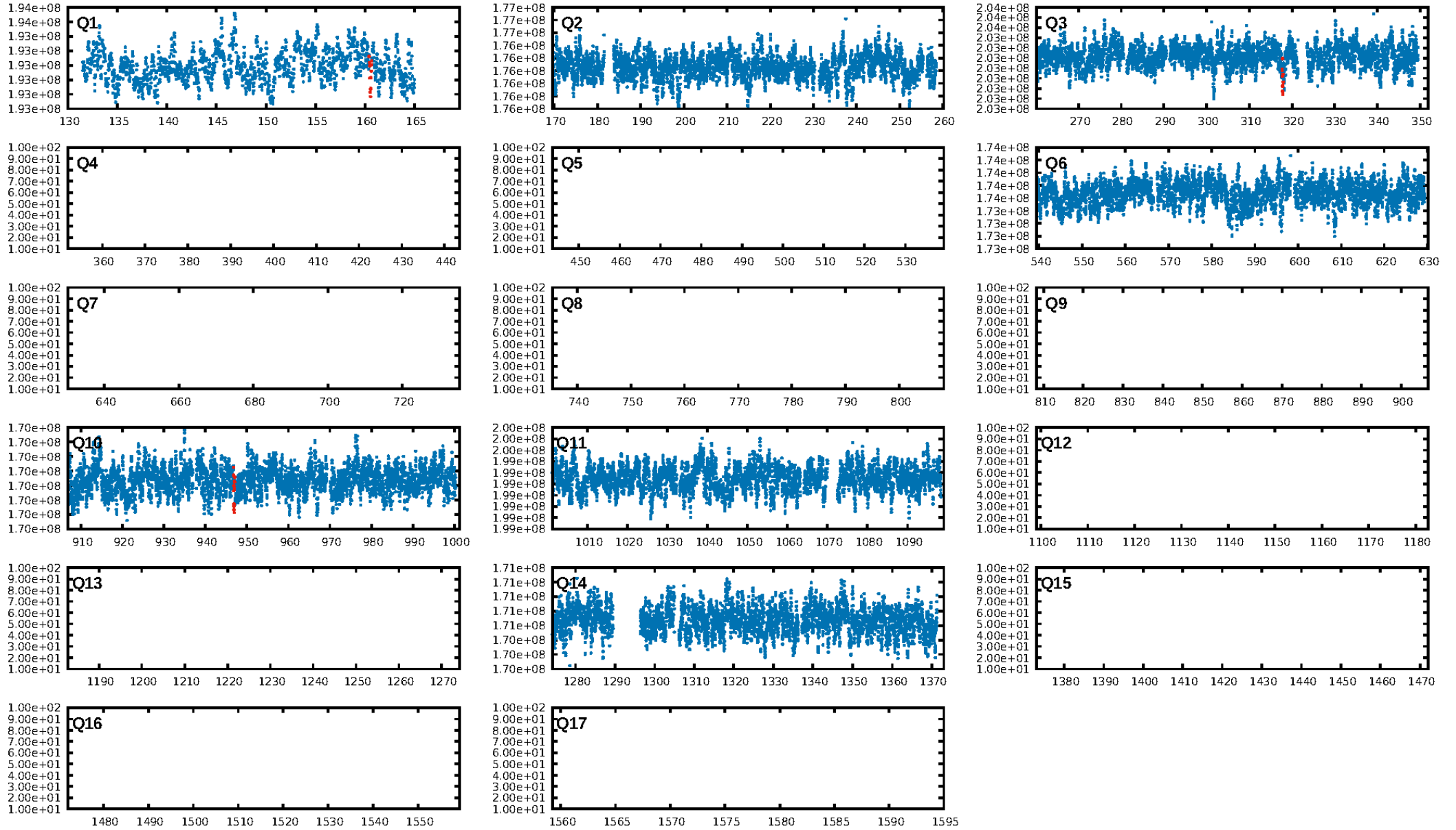
## DV Fit Results:

Period = 157.27336 [0.00097] d  
Epoch = 160.5293 [0.0027] BKJD  
Rp/R\* = 0.0326 [0.0248]  
a/R\* = 239.23 [663.06]  
b = 0.82 [1.13]  
Seff = 169.36 [47.01]  
Teff = 920 [64] K  
Rp = 53.23 [44.32] Re  
a = 0.7903 [0.1809] AU  
Ag = 28.51 [51.96] [0.53 $\sigma$ ]  
Teffp = 3286 [1490] K [1.59 $\sigma$ ]

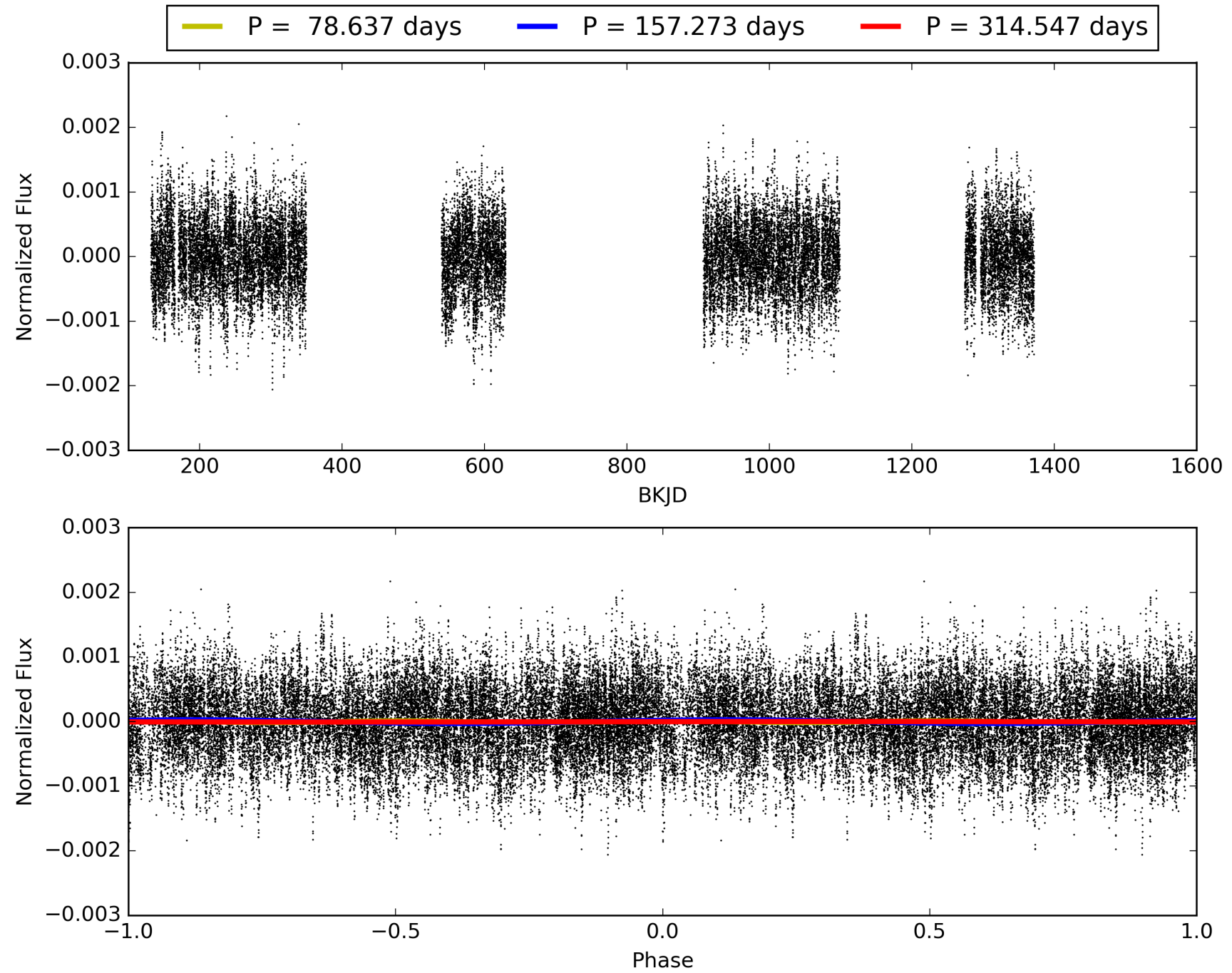
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 48.4%  
ModelChiSquareGof-sig: 98.2%  
Bootstrap-pfa: 1.17e-10  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: 0.9136  
Centroid-sig: 78.9%  
Centroid-so: 0.308 arcsec [0.54 $\sigma$ ]  
OotOffset-rm: 0.149 arcsec [0.58 $\sigma$ ]  
KicOffset-rm: 0.084 arcsec [0.31 $\sigma$ ]  
OotOffset-st: 1/1/0/1 [3]  
KicOffset-st: 1/1/0/1 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [3/3]

# TCE 002309286-01, PDC Light Curves

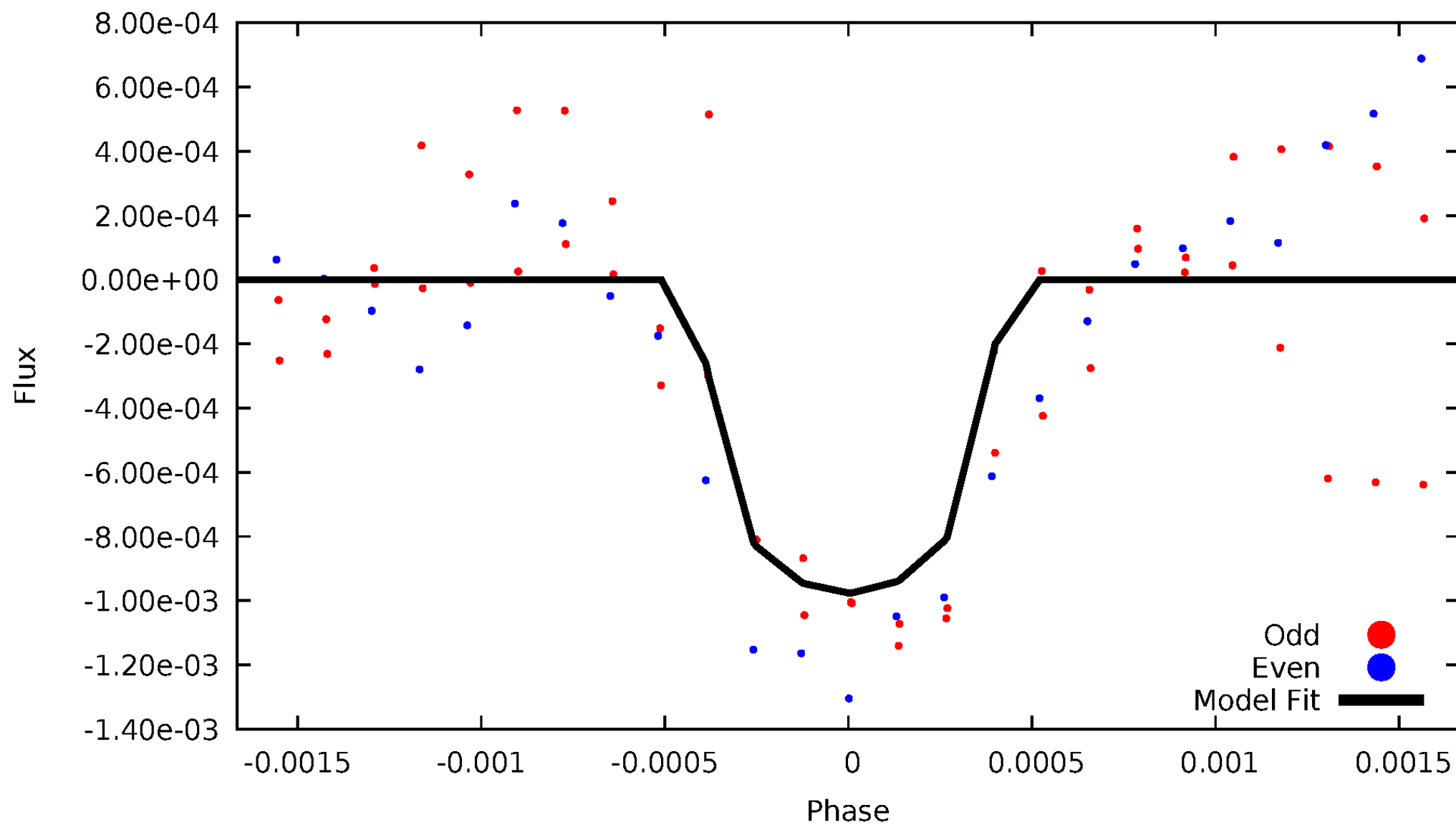


TCE 002309286-01



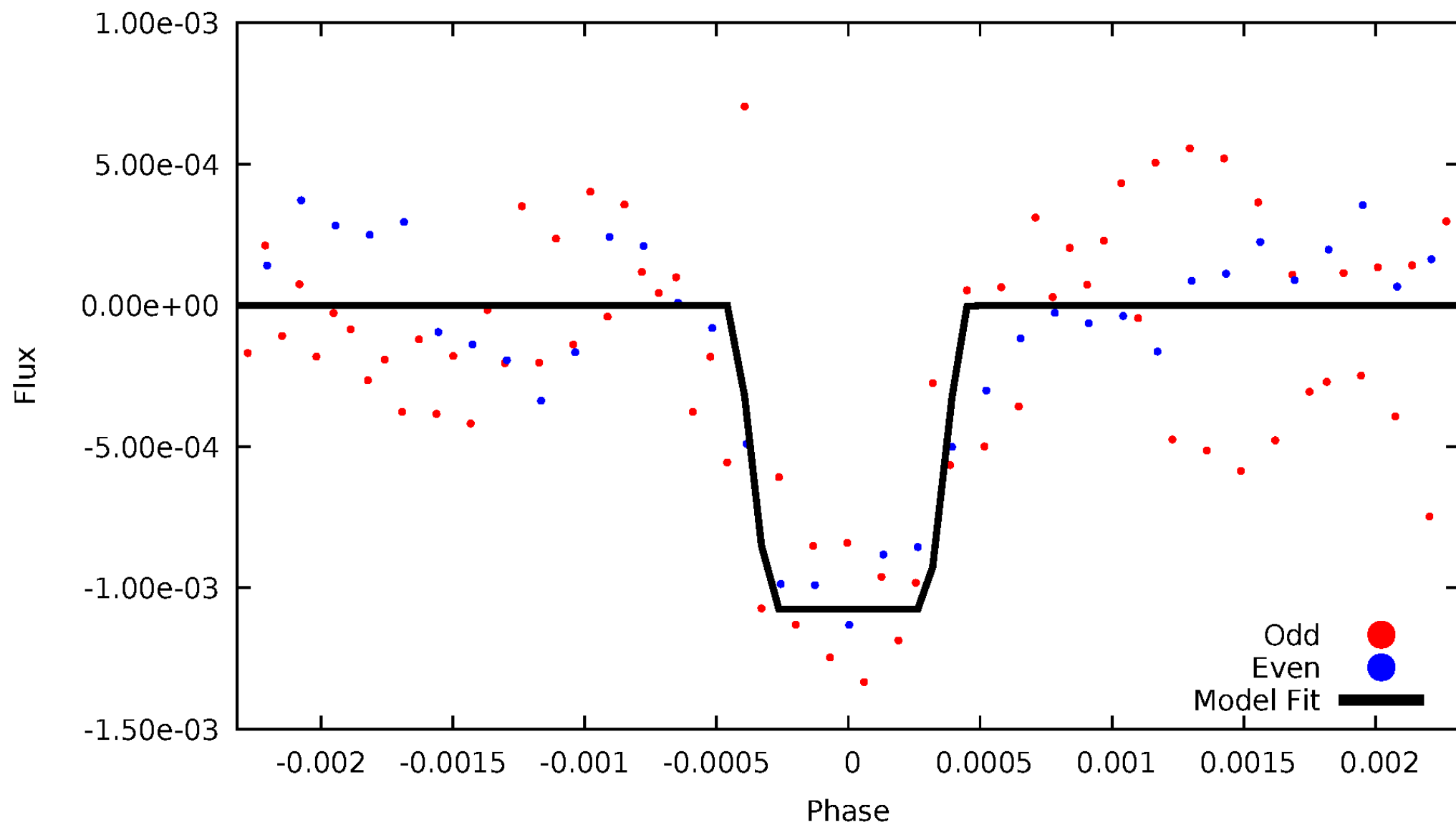
# DV Odd/Even

TCE 002309286-01



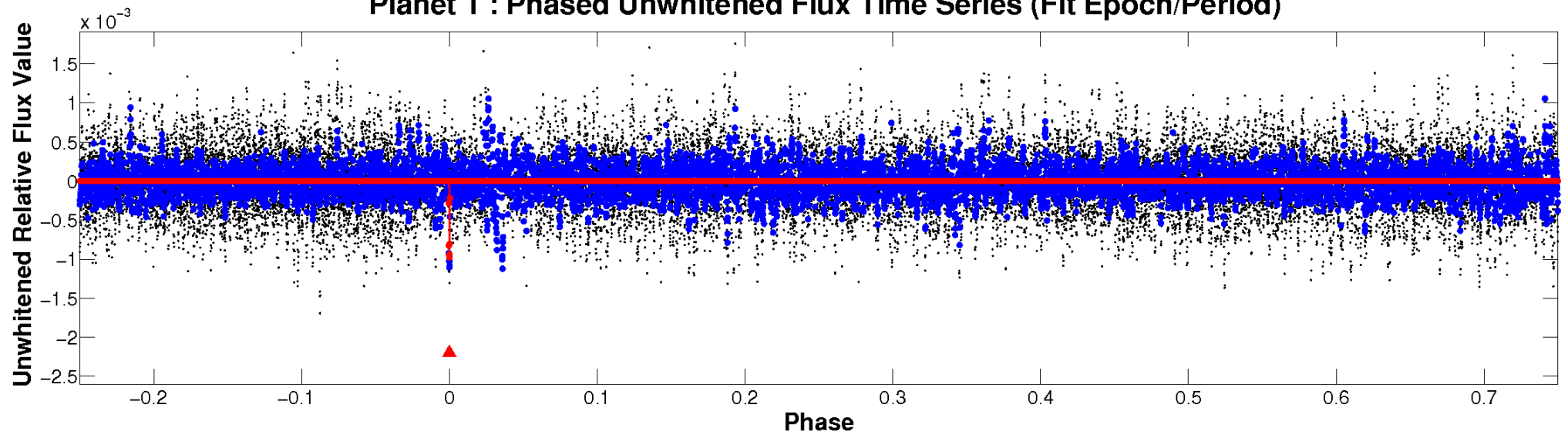
# ALT Odd/Even

TCE 002309286-01

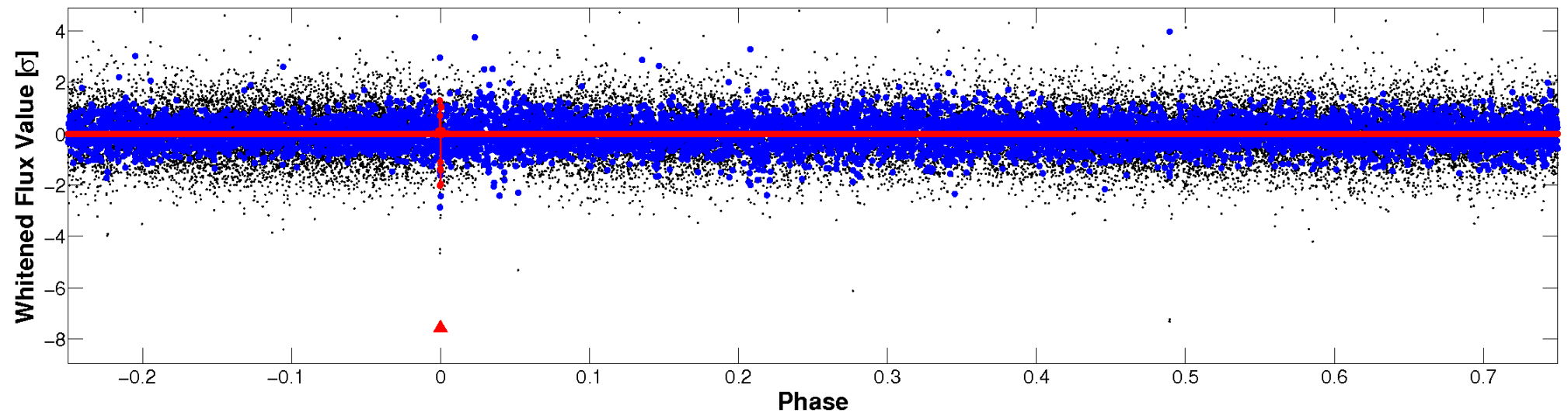


# Non-Whitened Vs. Whitened Light Curve

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

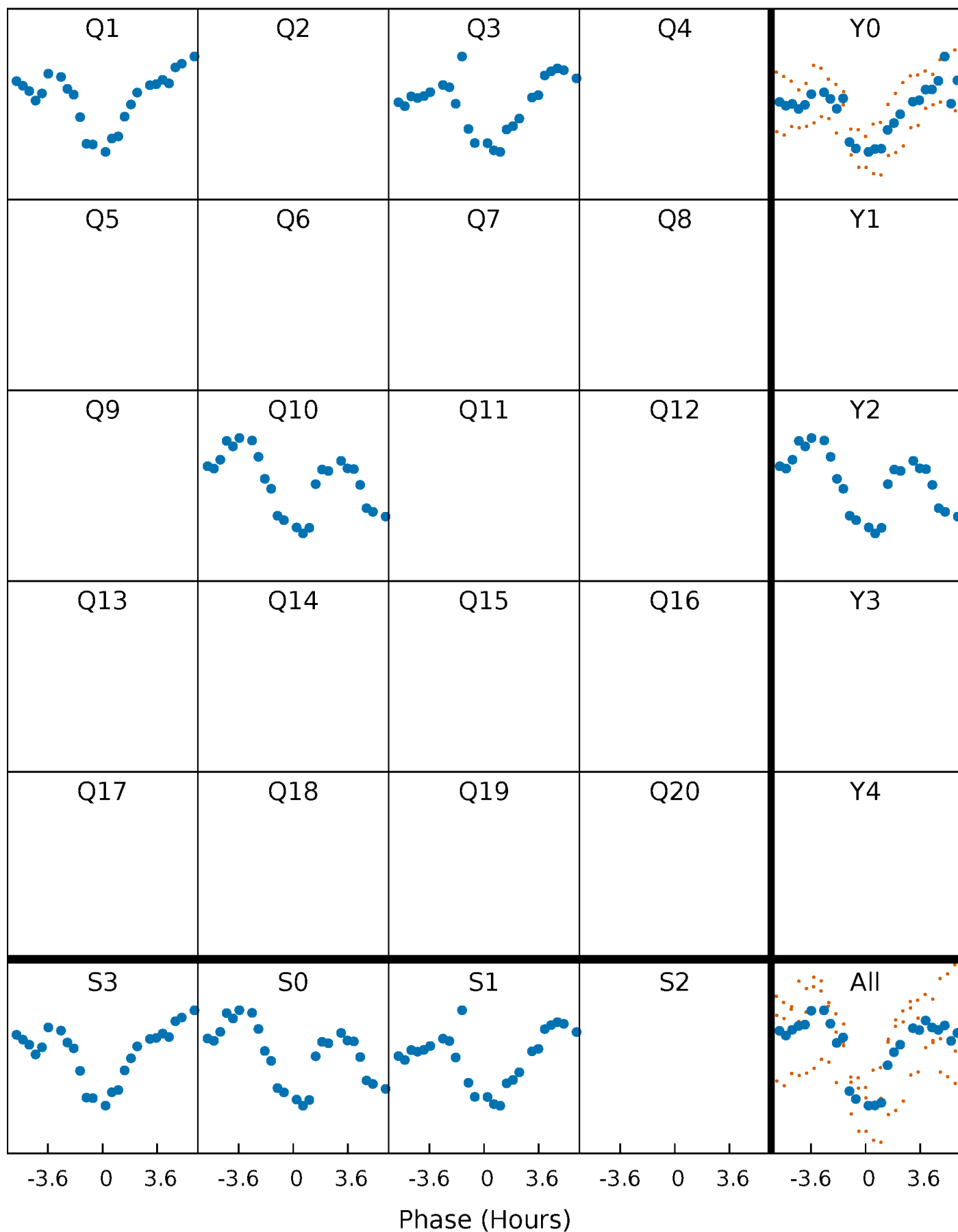


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

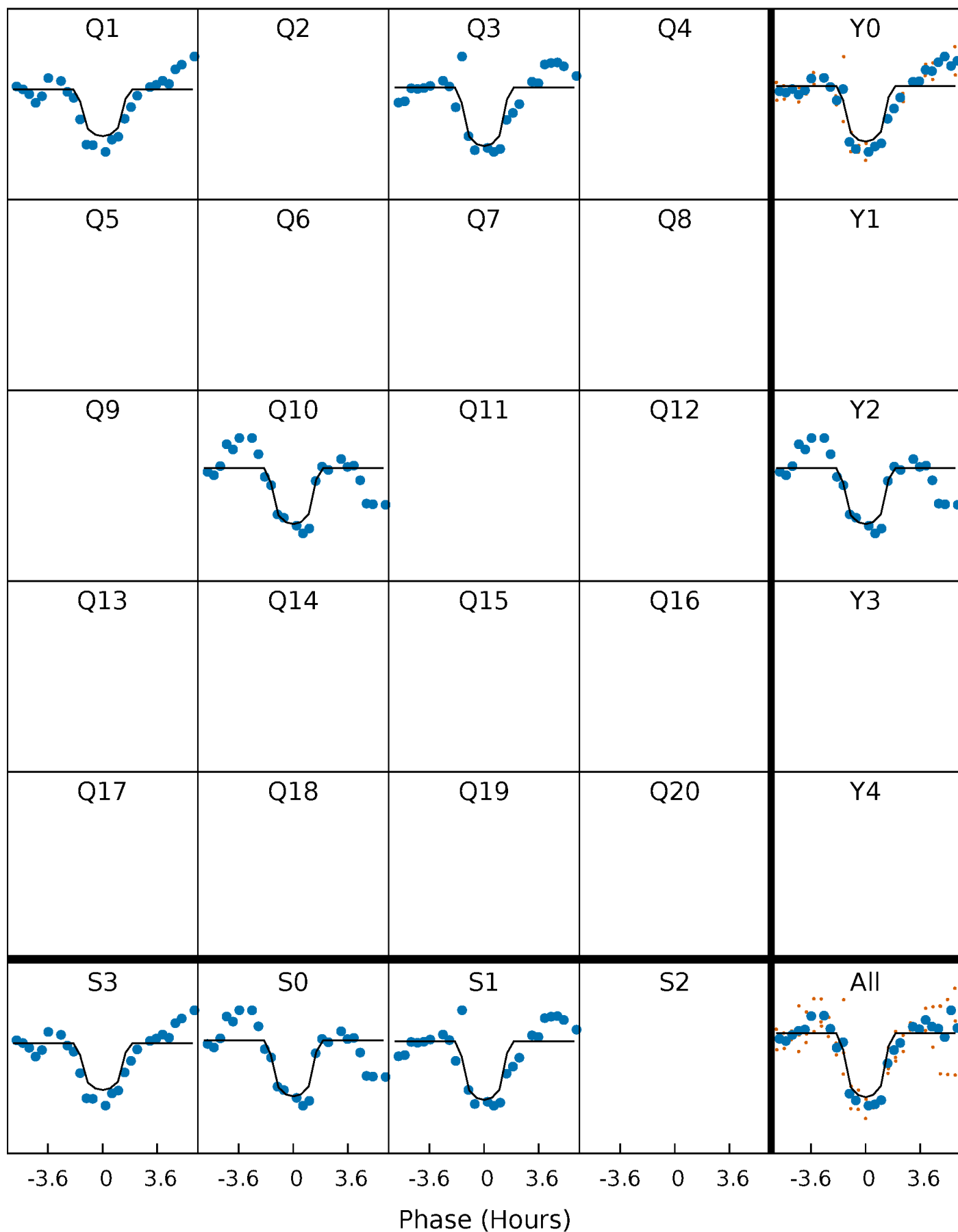
TCE 002309286-01   P=157.273361 Days    $T_0=160.529312$  (BKJD)





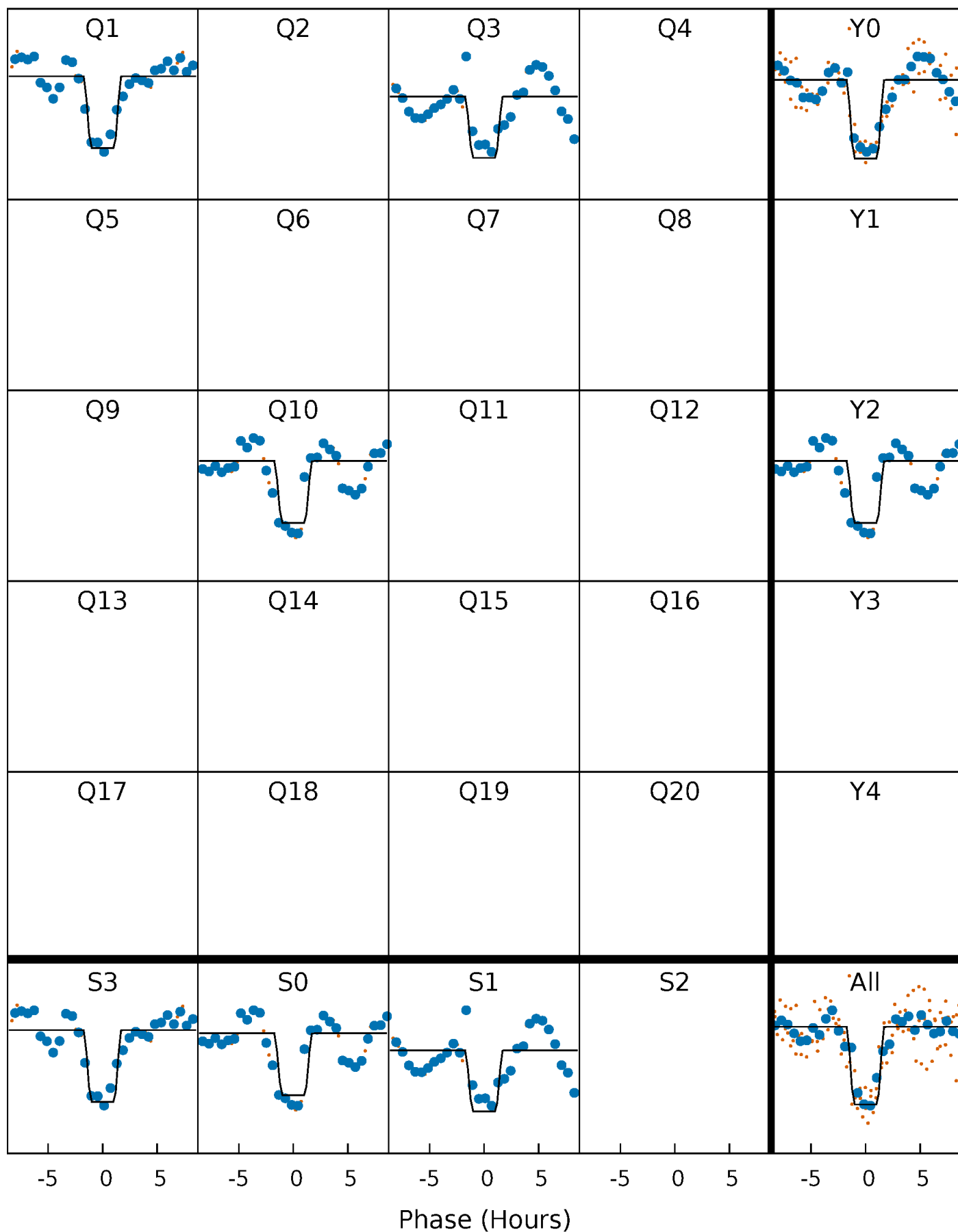
# DV Quarter-Phased Transit Curves

TCE 002309286-01 P=157.273361 Days  $T_0=160.529312$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

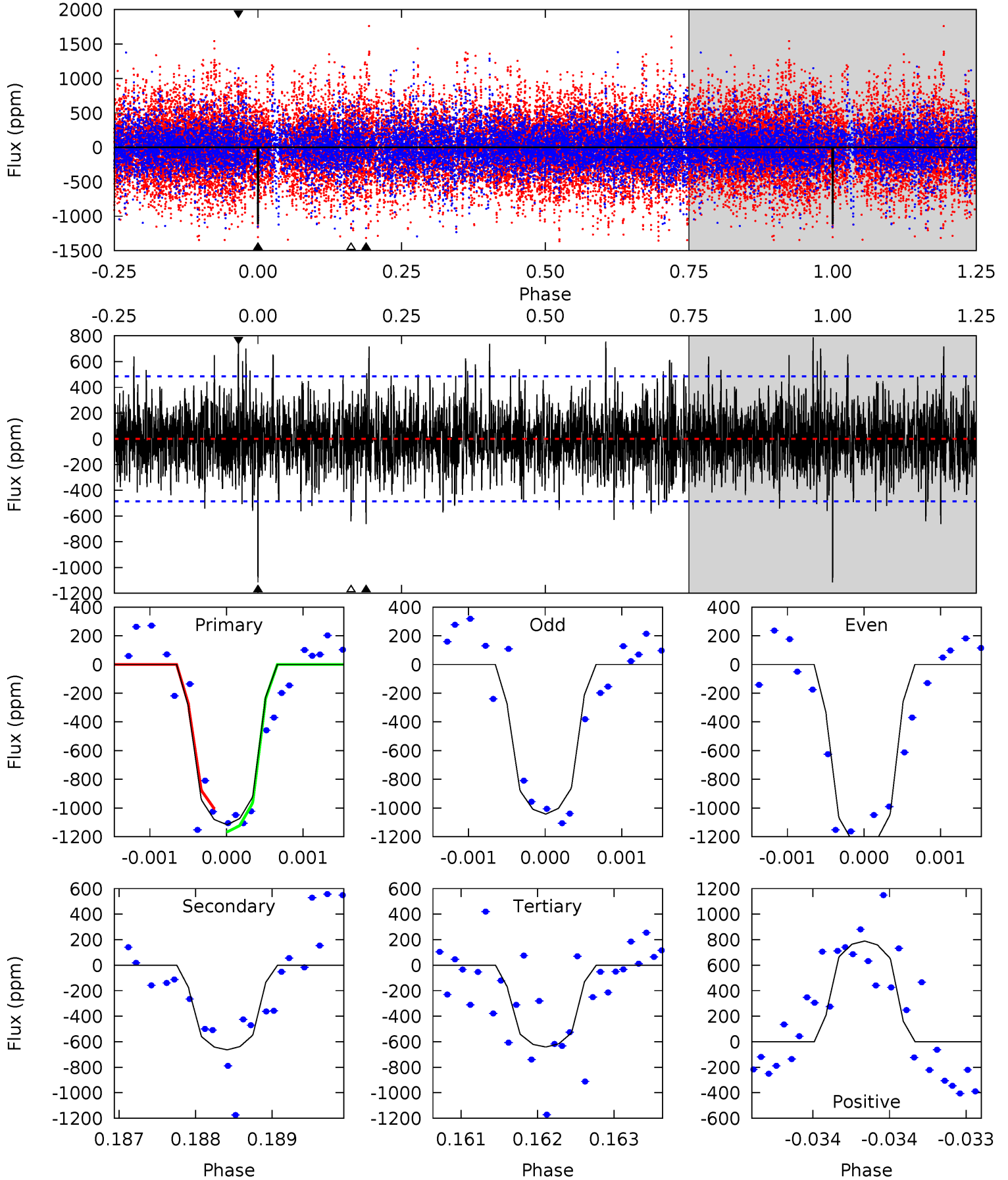
TCE 002309286-01 P=157.275835 Days  $T_0=160.528998$  (BKJD)



# DV Model-Shift Uniqueness Test

002309286-01, P = 157.273361 Days, E = 3.255951 Days

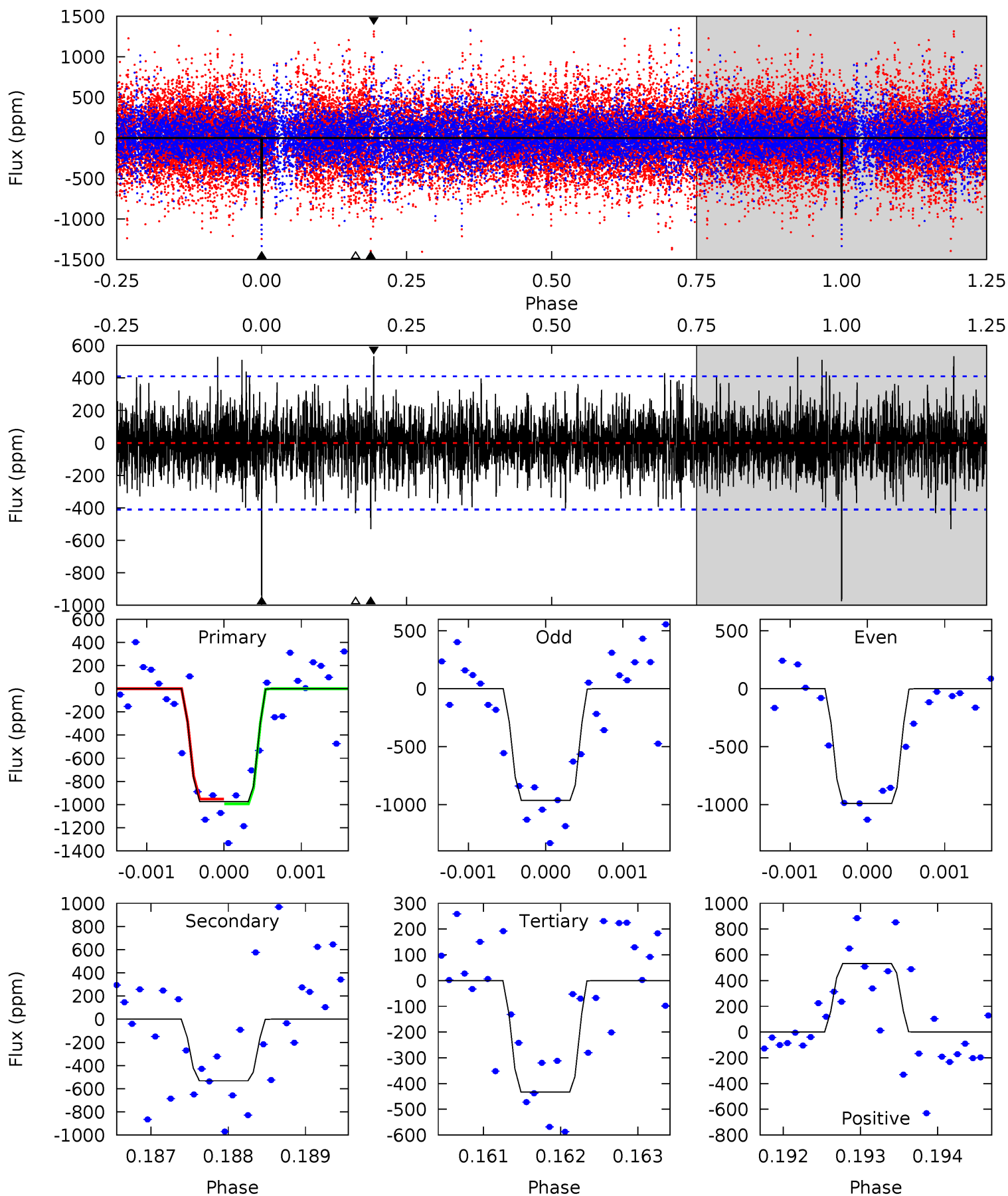
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.6	7.50	7.25	8.93	5.49	3.36	2.13	5.37	3.70	0.25	-1.43	1.18	1.06	0.41	0.88



# Alt Model-Shift Uniqueness Test

002309286-01, P = 157.275835 Days, E = 3.253163 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
13.0	7.10	5.79	7.12	5.48	3.34	1.73	7.23	5.90	1.31	-0.02	0.16	0.98	0.35	0.28



### Stellar Parameters For KIC 002309286

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4795^{+70}_{-182}$	$2.514^{+0.030}_{-0.027}$	$0.070^{+0.150}_{-0.300}$	$14.944^{+1.702}_{-5.105}$	$2.661^{+0.501}_{-1.502}$	$0.001^{+0.001}_{-0.000}$
	+1%/-4%	+1%/-1%	+214%/-429%	+11%/-34%	+19%/-56%	+53%/-14%
Source	PHO1	AST9	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 002309286-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-663 \pm 88$	$59.13^{+38.69}_{-32.53}$	$1281^{+34}_{-55}$	$4163^{+1629}_{-670}$	$65^{+269}_{-41}$
Alt.	$-531 \pm 75$	$60.49^{+40.16}_{-32.71}$	$1284^{+36}_{-54}$	$3969^{+1433}_{-597}$	$49^{+187}_{-30}$

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

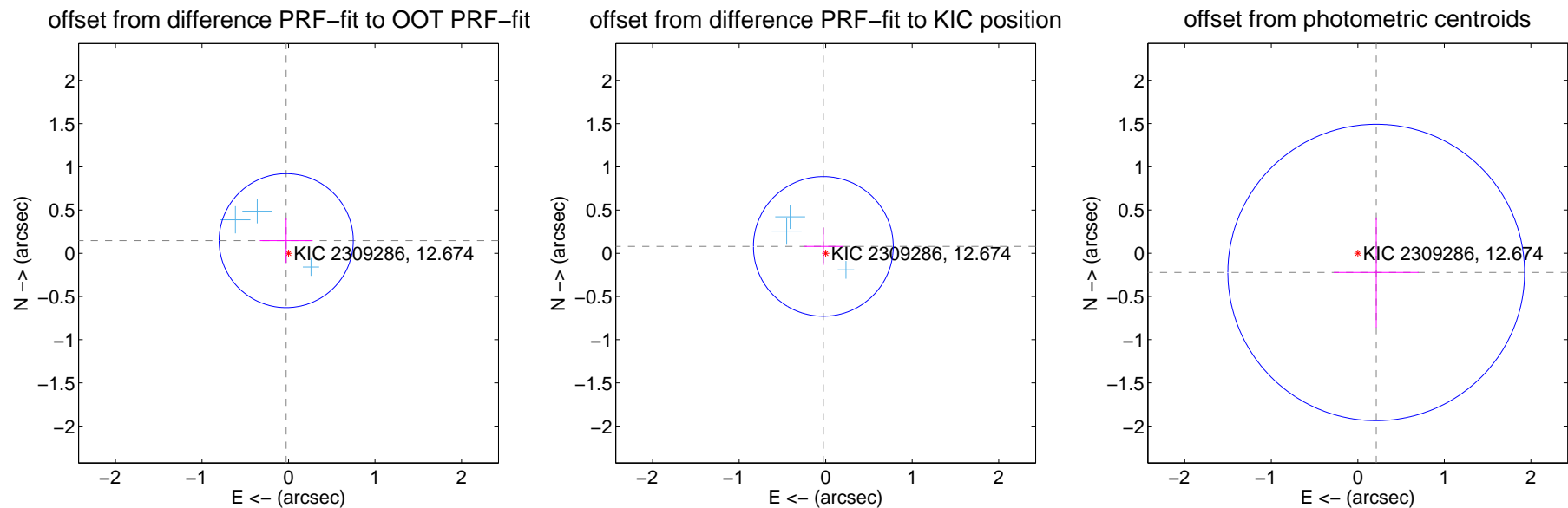
## DV Centroid Data

Supplemental centroid analysis for 002309286-01. Kepler magnitude: 12.67. Transit SNR 6.60

There are 3 quarters with good PRF difference image offsets

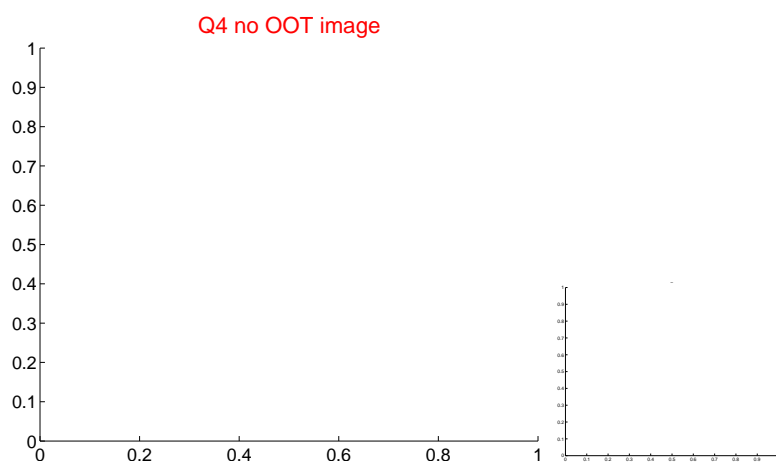
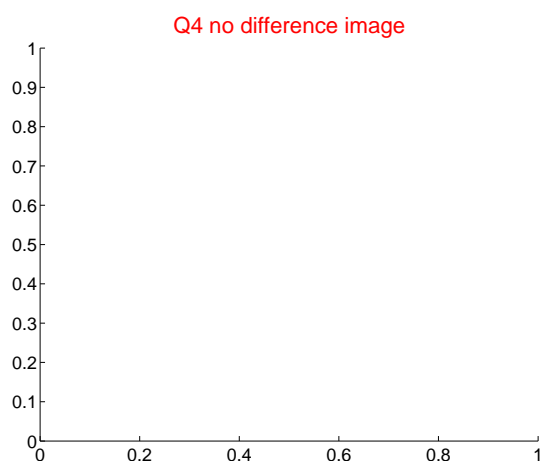
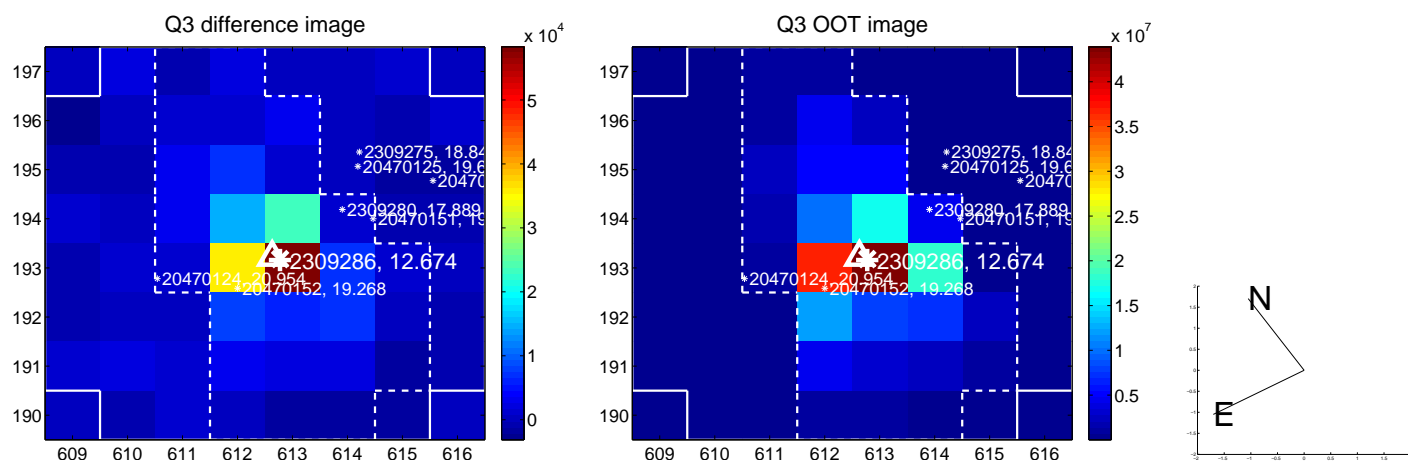
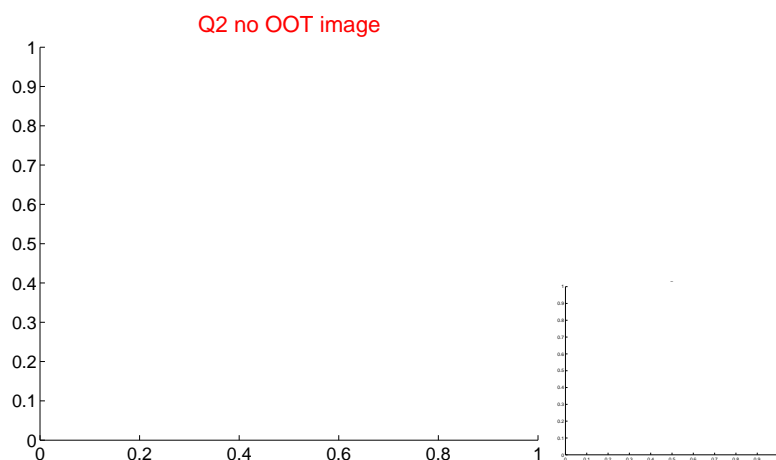
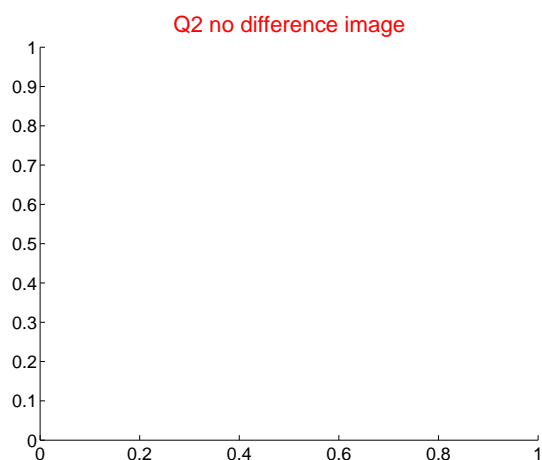
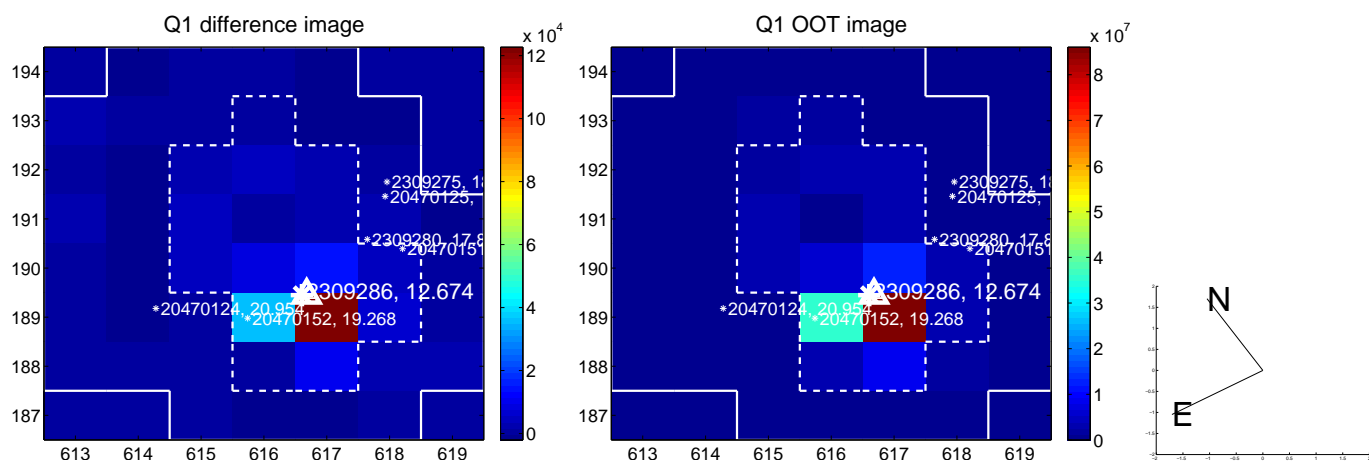
The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.149 \pm 0.258$	0.58	$0.027 \pm 0.305$	$0.146 \pm 0.257$
PRF-fit source offset from KIC position	$0.084 \pm 0.269$	0.31	$0.027 \pm 0.227$	$0.080 \pm 0.216$
photometric centroid source offset	$0.31 \pm 0.57$	0.54	$-0.21 \pm 0.49$	$-0.22 \pm 0.64$



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.

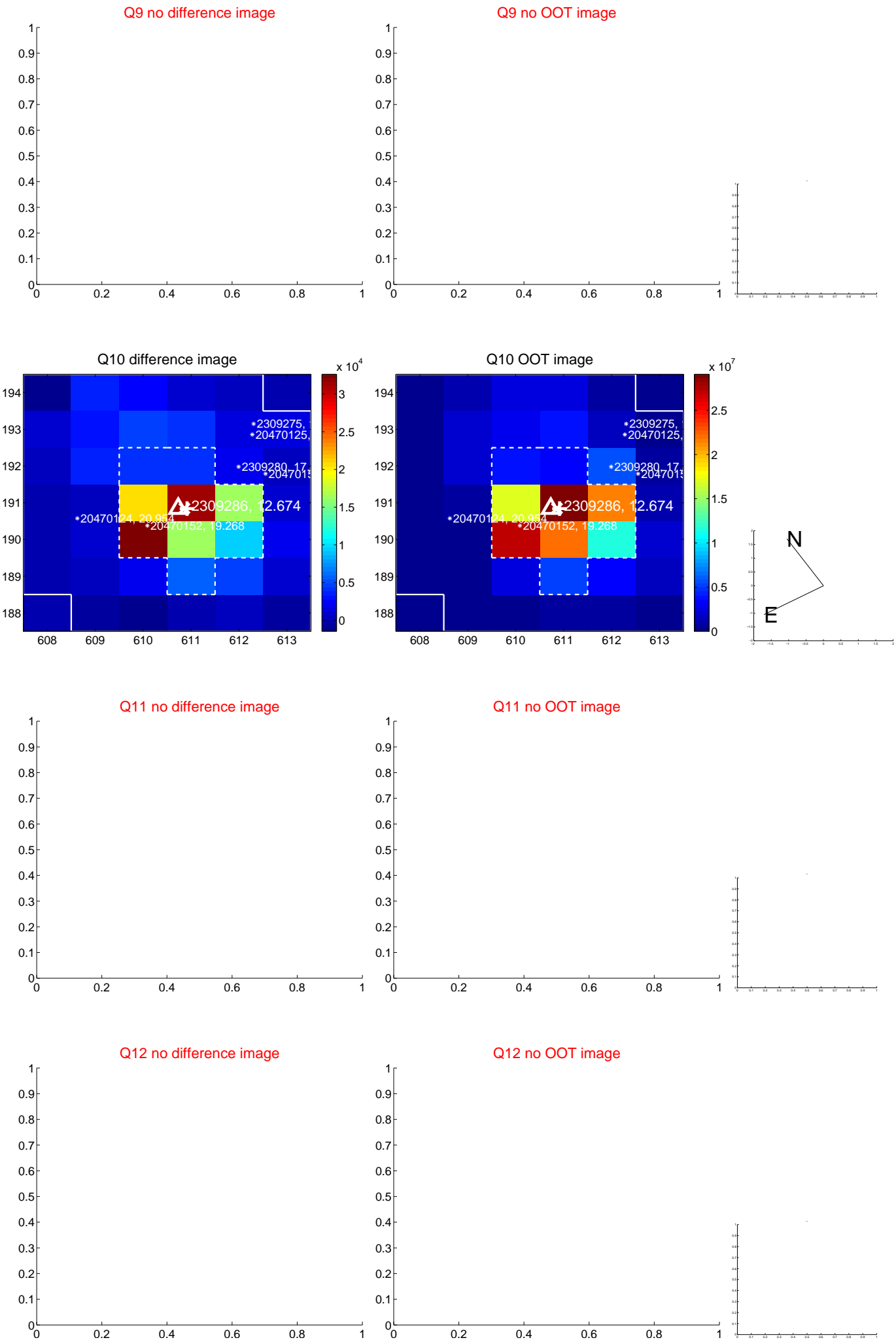


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





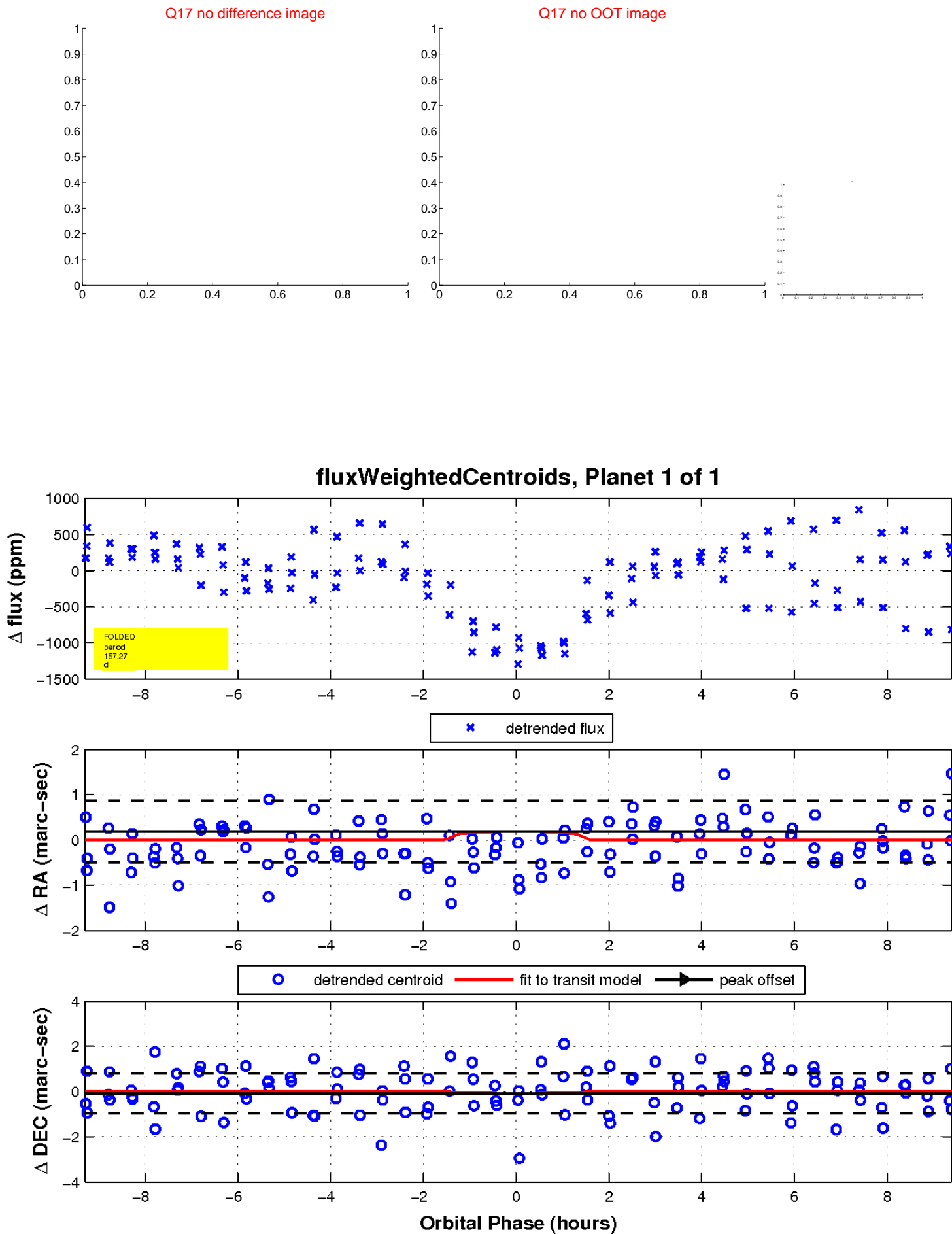
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

