

# KIC 009520694

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009520694-01	OBS	No	513.835098	490.221016	588.4	4.184	10.5	9.6	1.88	6413	4.58	2.72

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009520694-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—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.

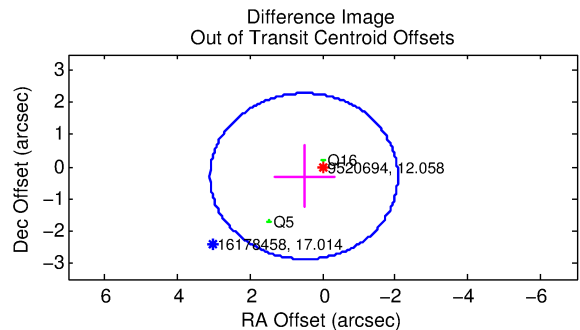
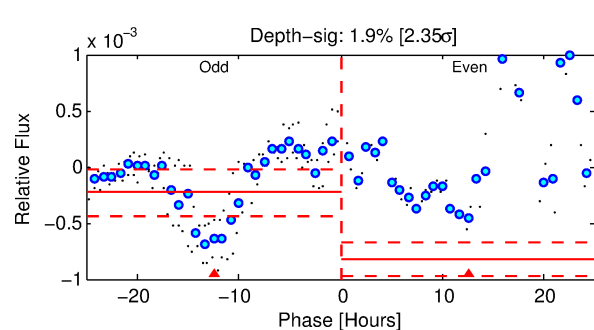
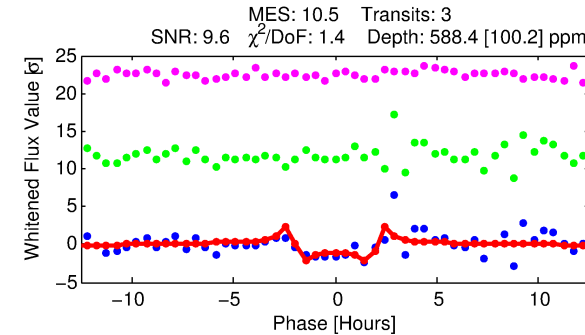
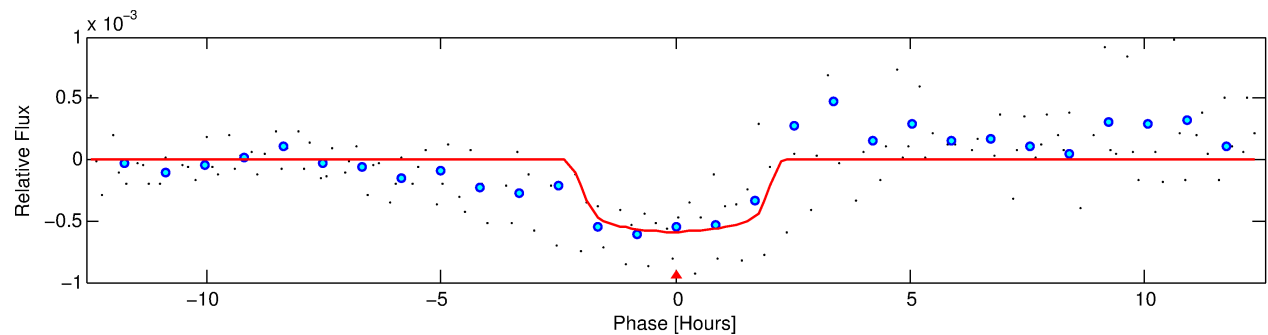
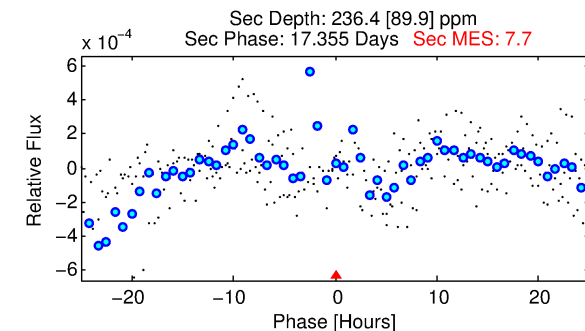
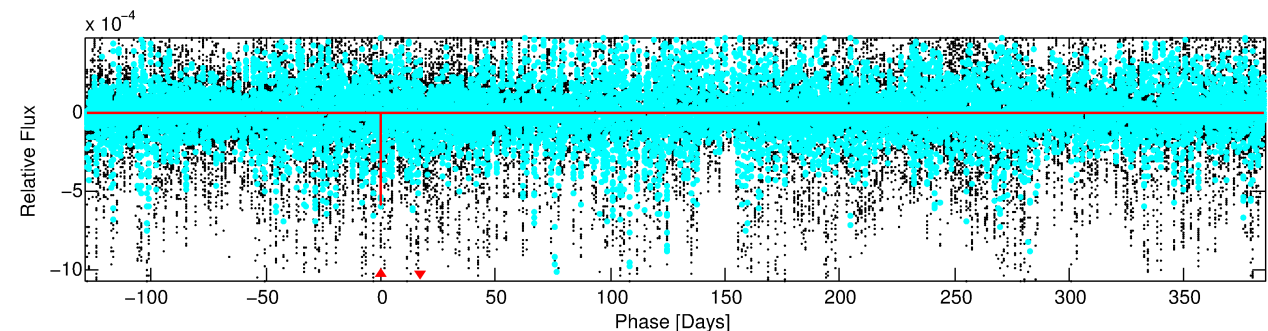
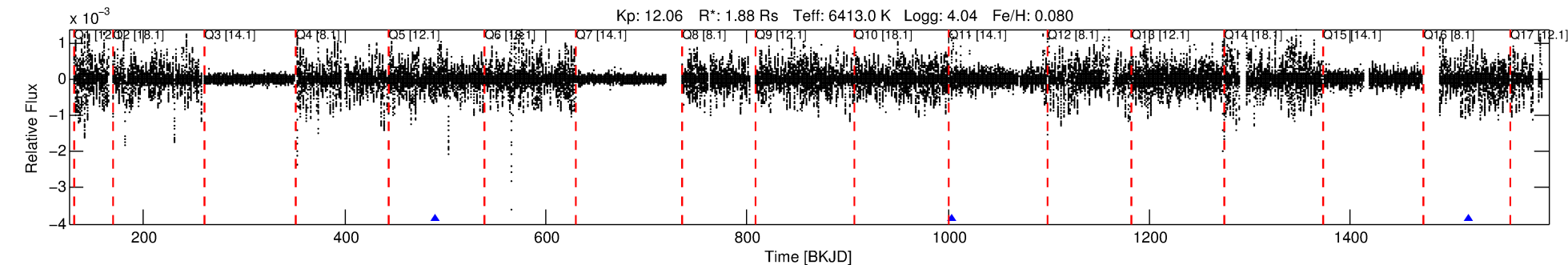
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009520694-01

No Significant Match Found

# DV One-Page Summary

KIC: 9520694 Candidate: 1 of 1 Period: 513.835 d



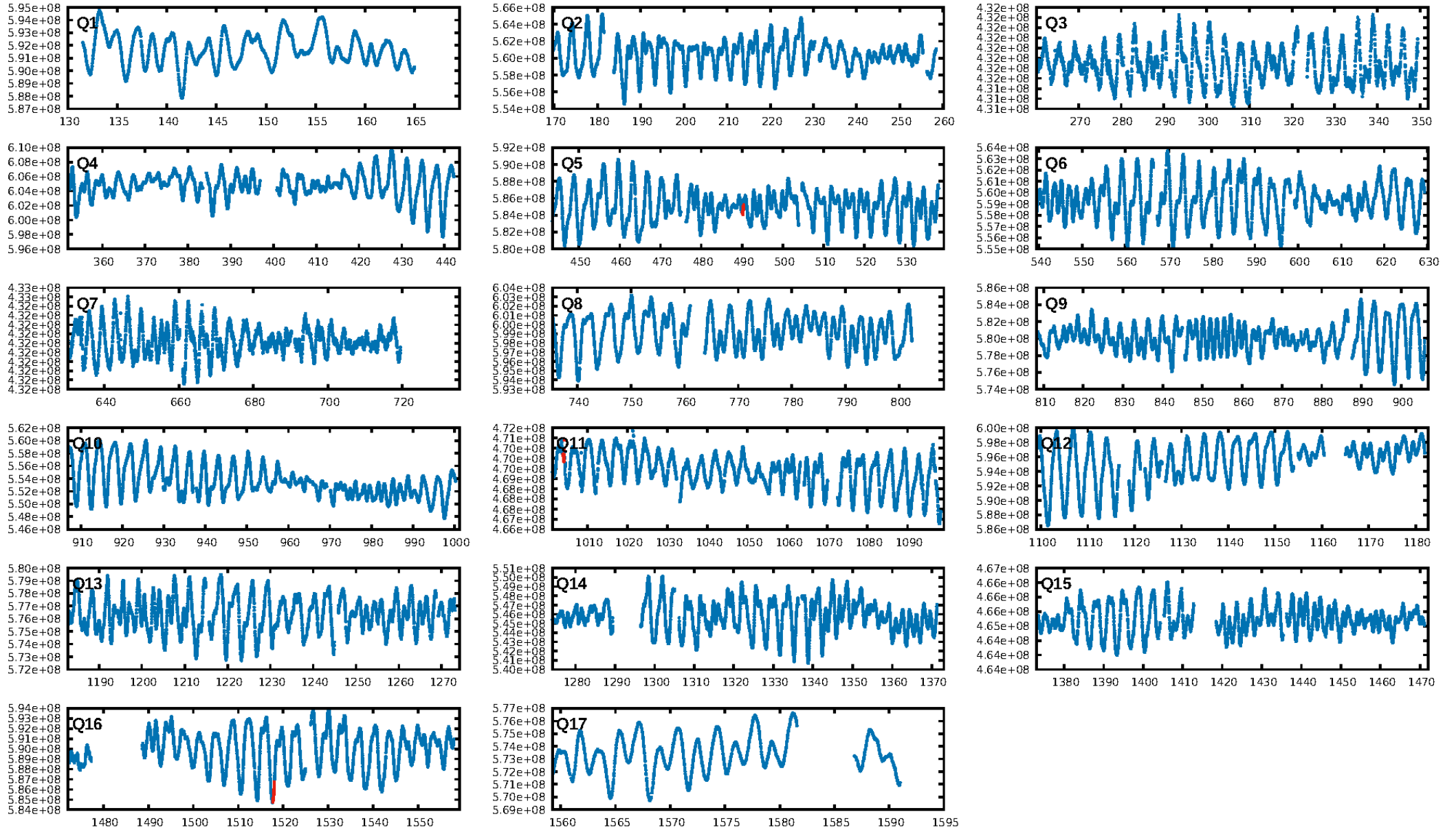
## DV Fit Results:

Period = 513.83510 [0.00237] d  
Epoch = 490.2210 [0.0028] BKJD  
Rp/R\* = 0.0223 [0.0283]  
a/R\* = 956.95 [6297.43]  
b = 0.07 [93.71]  
Seff = 2.72 [1.36]  
Teq = 327 [41] K  
Rp = 4.58 [6.03] Re  
a = 1.4044 [0.4374] AU  
Ag = 12250.72 [32032.79] [0.38σ]  
Teffp = 5326 [3430] K [1.46σ]

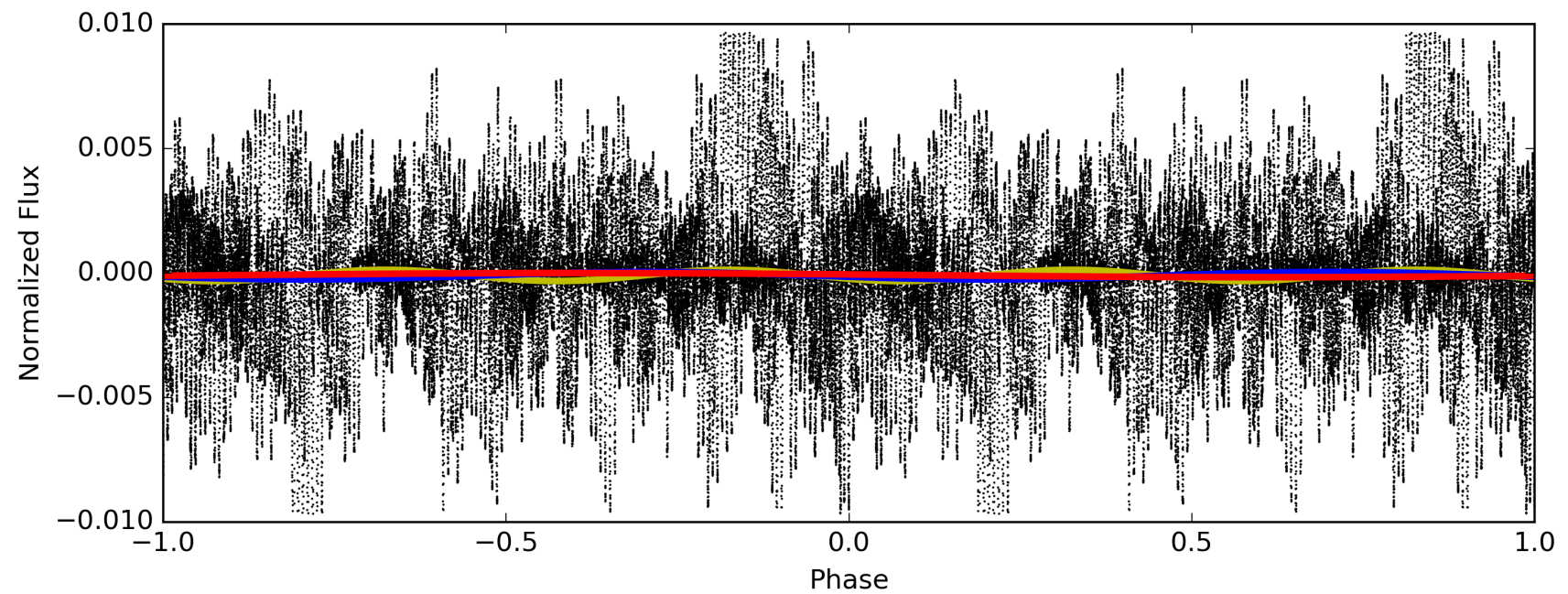
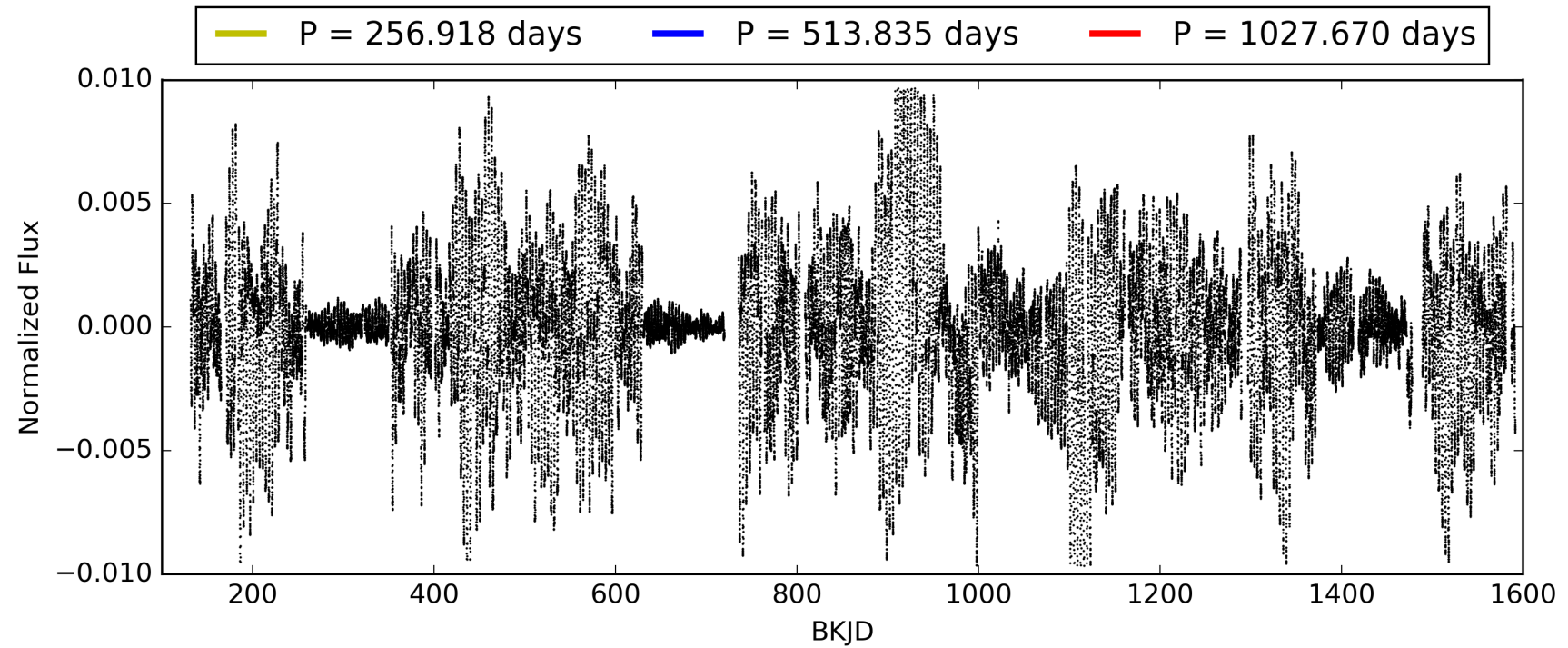
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 15.4%  
ModelChiSquareGof-sig: 56.7%  
**Bootstrap-pfa: 1.47e-08**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 6.397  
Centroid-sig: 36.0%  
Centroid-so: 0.529 arcsec [1.14σ]  
OotOffset-rm: 0.590 arcsec [0.68σ]  
KicOffset-rm: 0.541 arcsec [0.67σ]  
OotOffset-st: 0/0/1/1 [2]  
KicOffset-st: 0/0/1/1 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 1.00 [2/2]

# TCE 009520694-01, PDC Light Curves

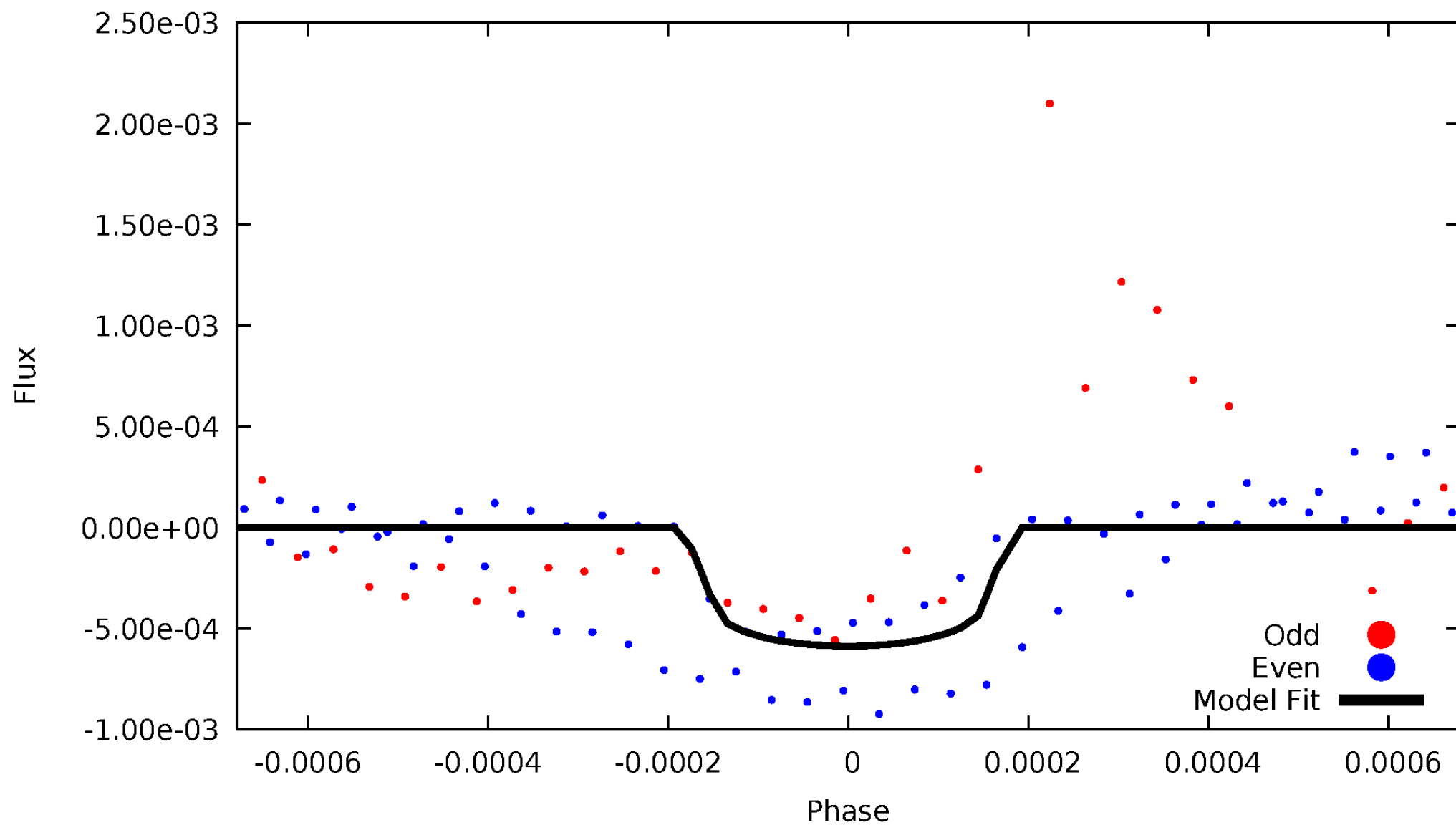


TCE 009520694-01



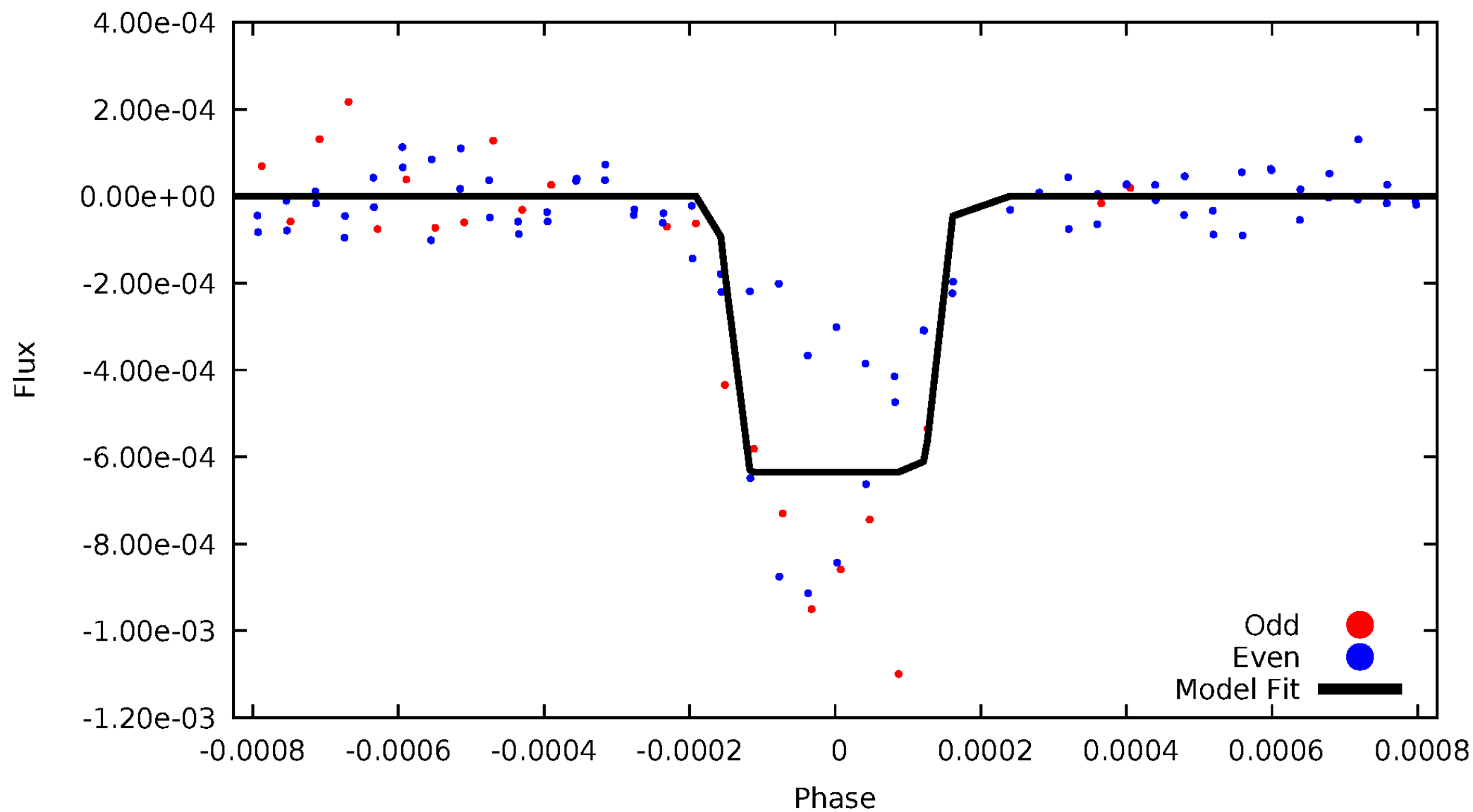
# DV Odd/Even

TCE 009520694-01



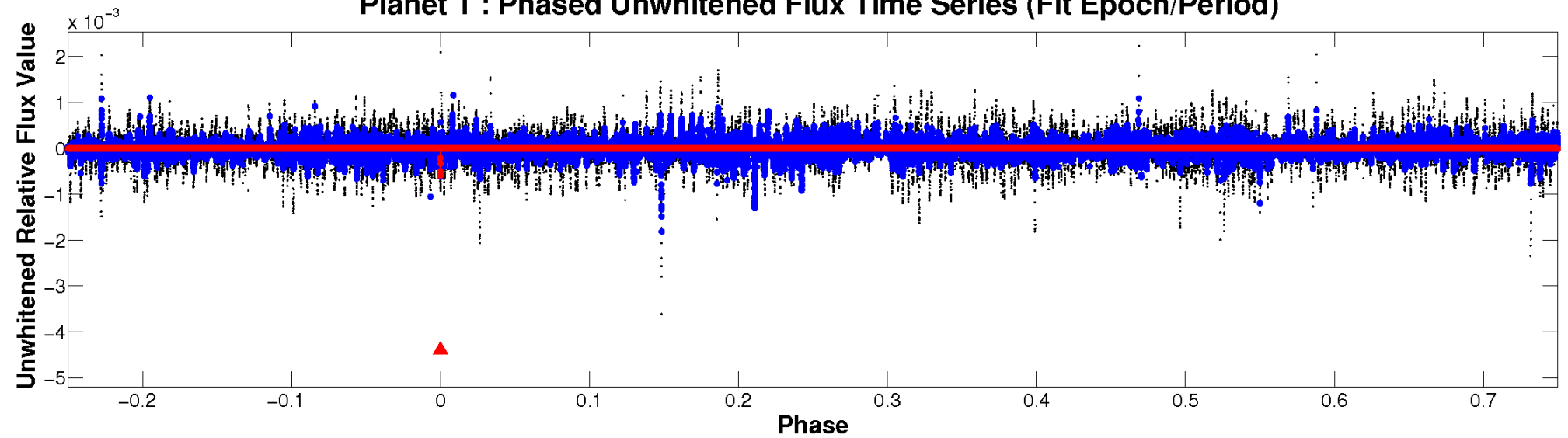
# ALT Odd/Even

TCE 009520694-01

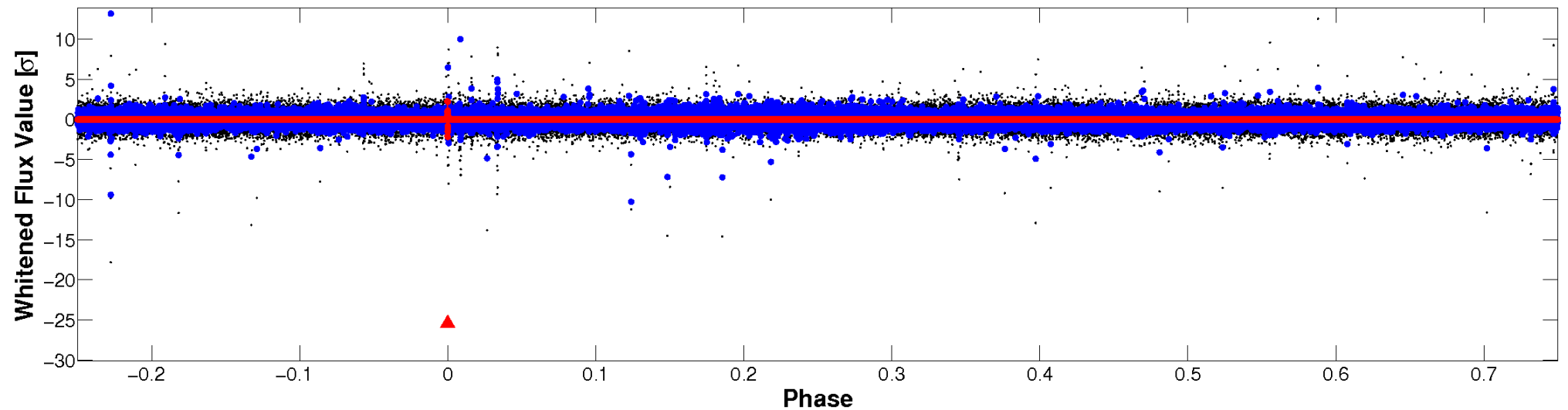


# Non-Whitened Vs. Whitened Light Curve

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



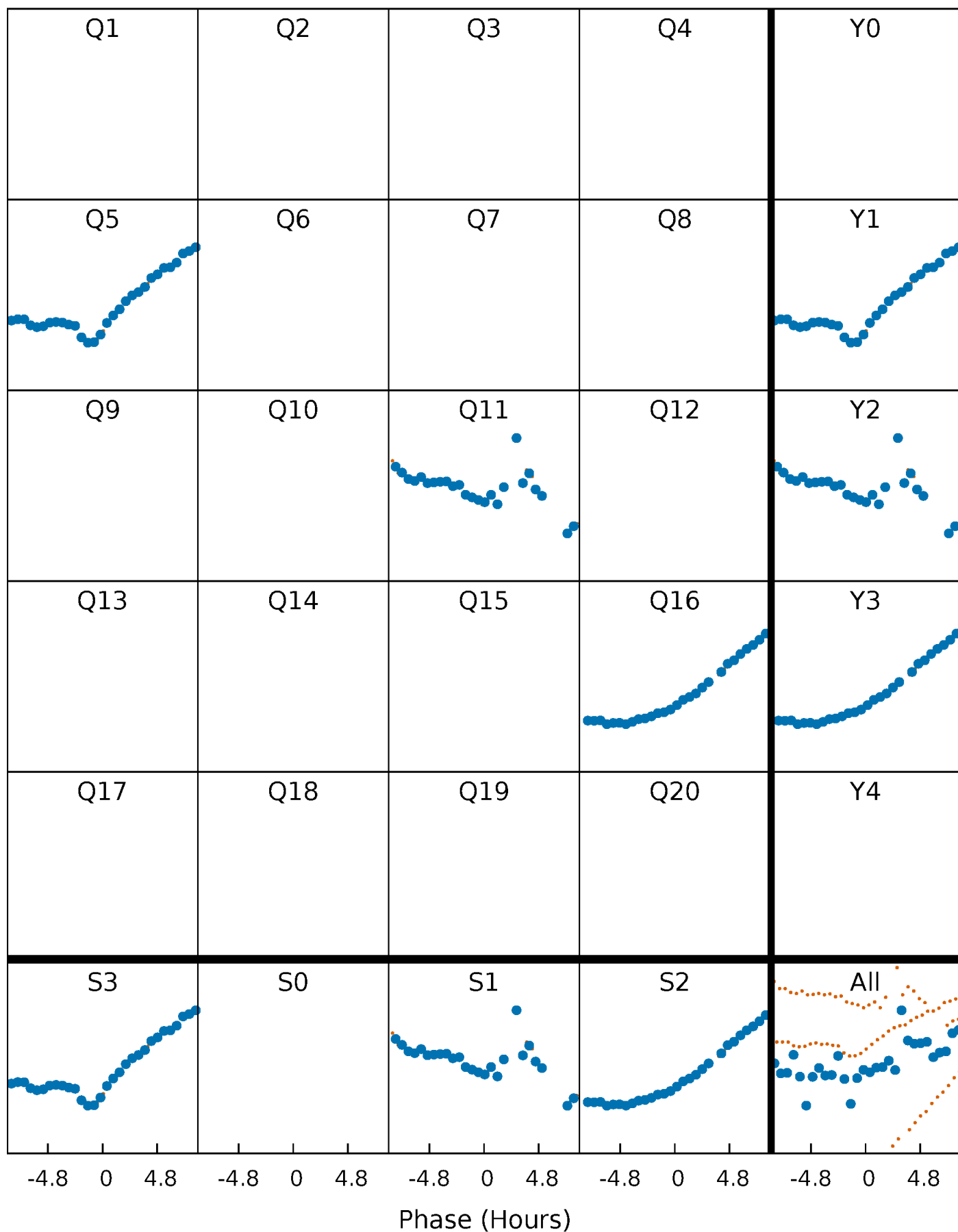
Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

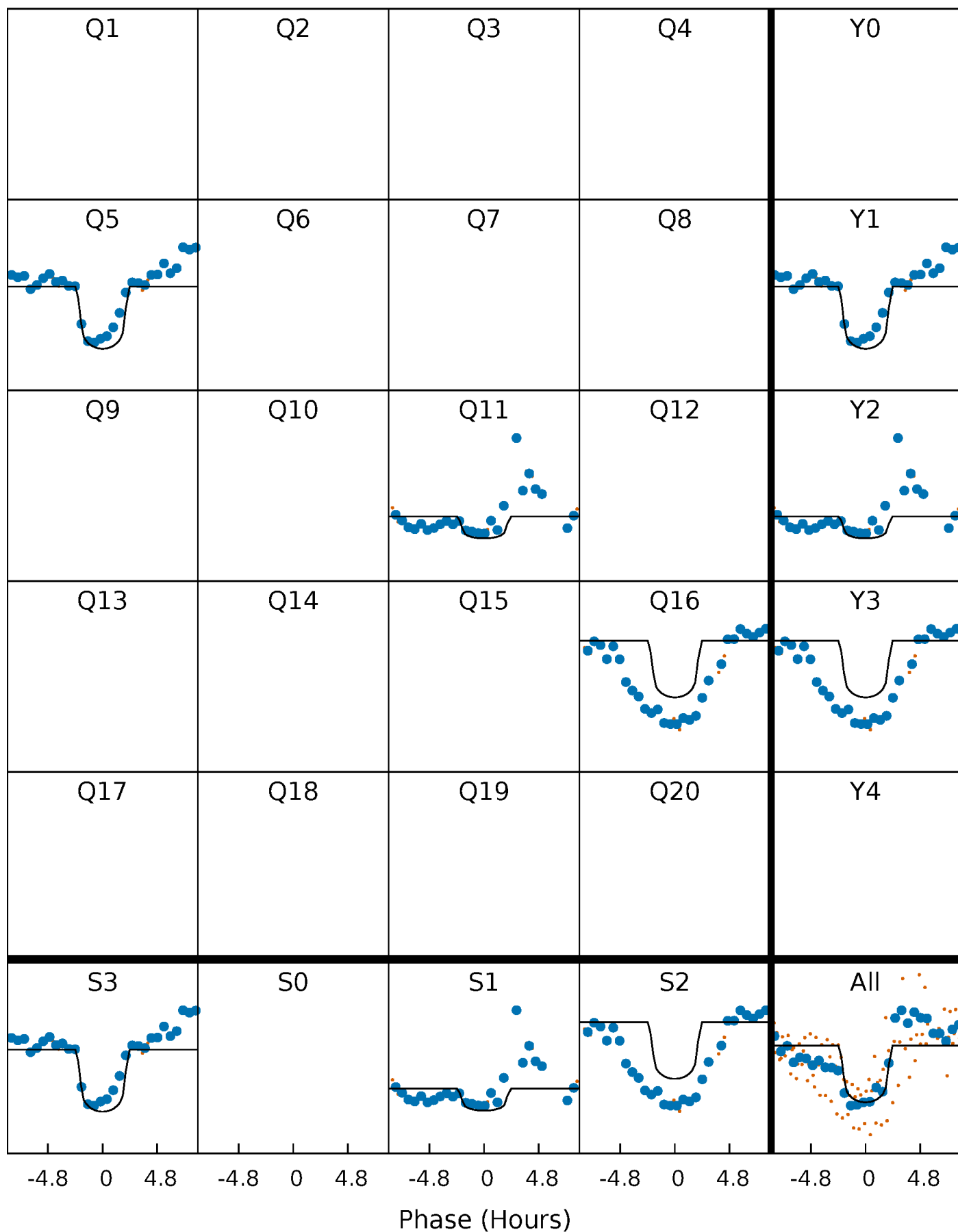
TCE 009520694-01 P=513.835098 Days  $T_0=490.221016$  (BKJD)





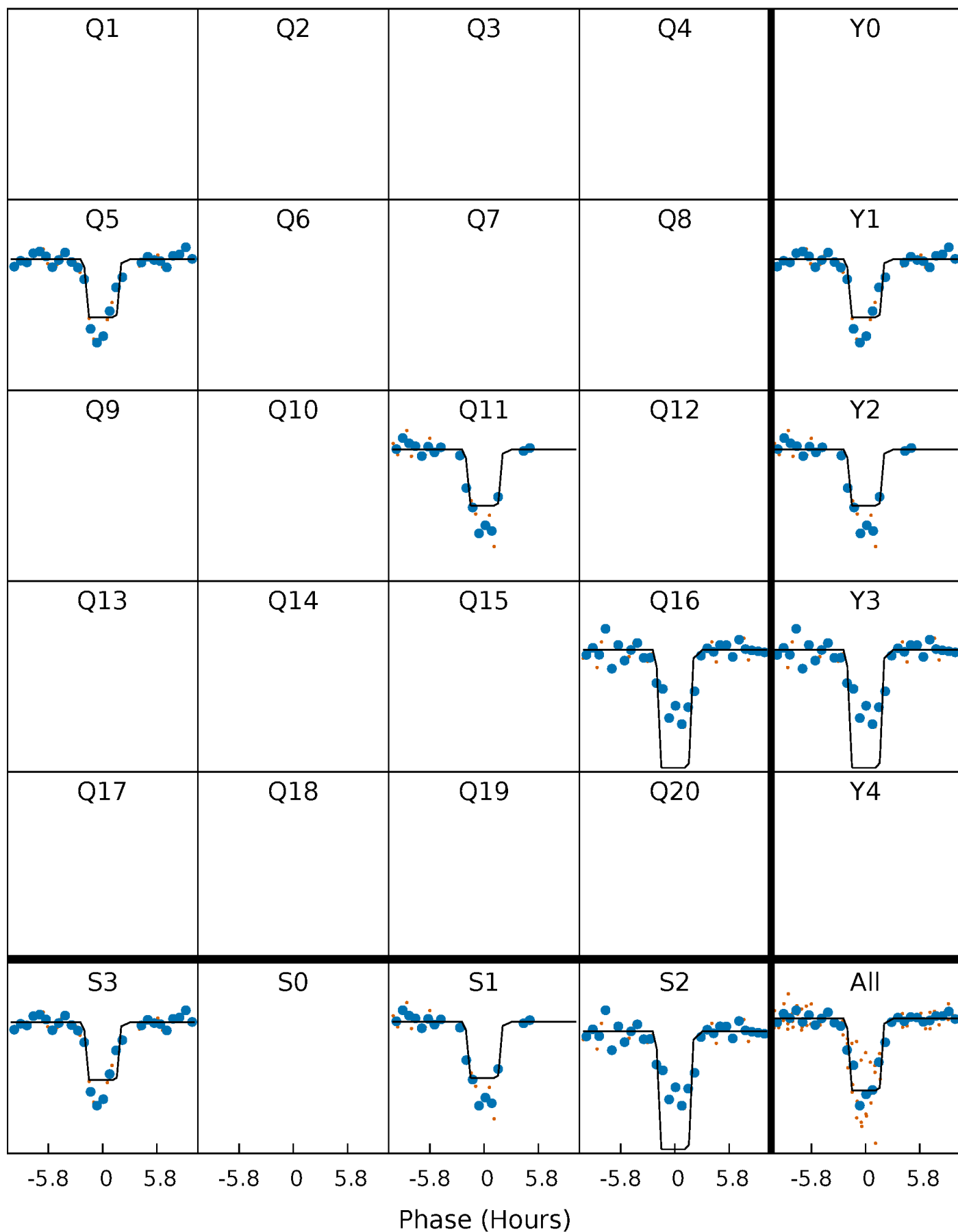
# DV Quarter-Phased Transit Curves

TCE 009520694-01 P=513.835098 Days  $T_0=490.221016$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

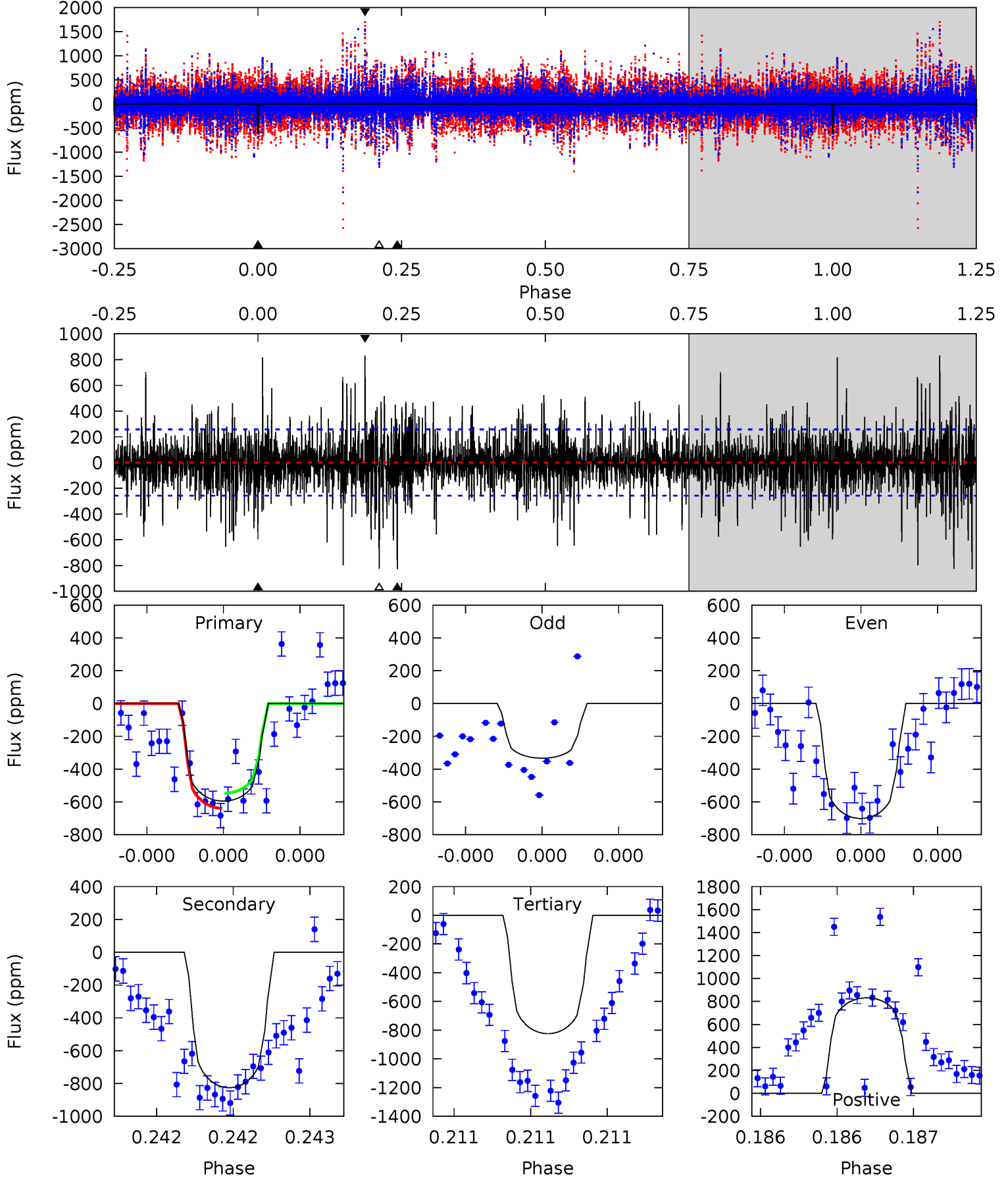
TCE 009520694-01 P=513.863167 Days  $T_0=490.201903$  (BKJD)



# DV Model-Shift Uniqueness Test

009520694-01, P = 513.835098 Days, E = 490.221016 Days

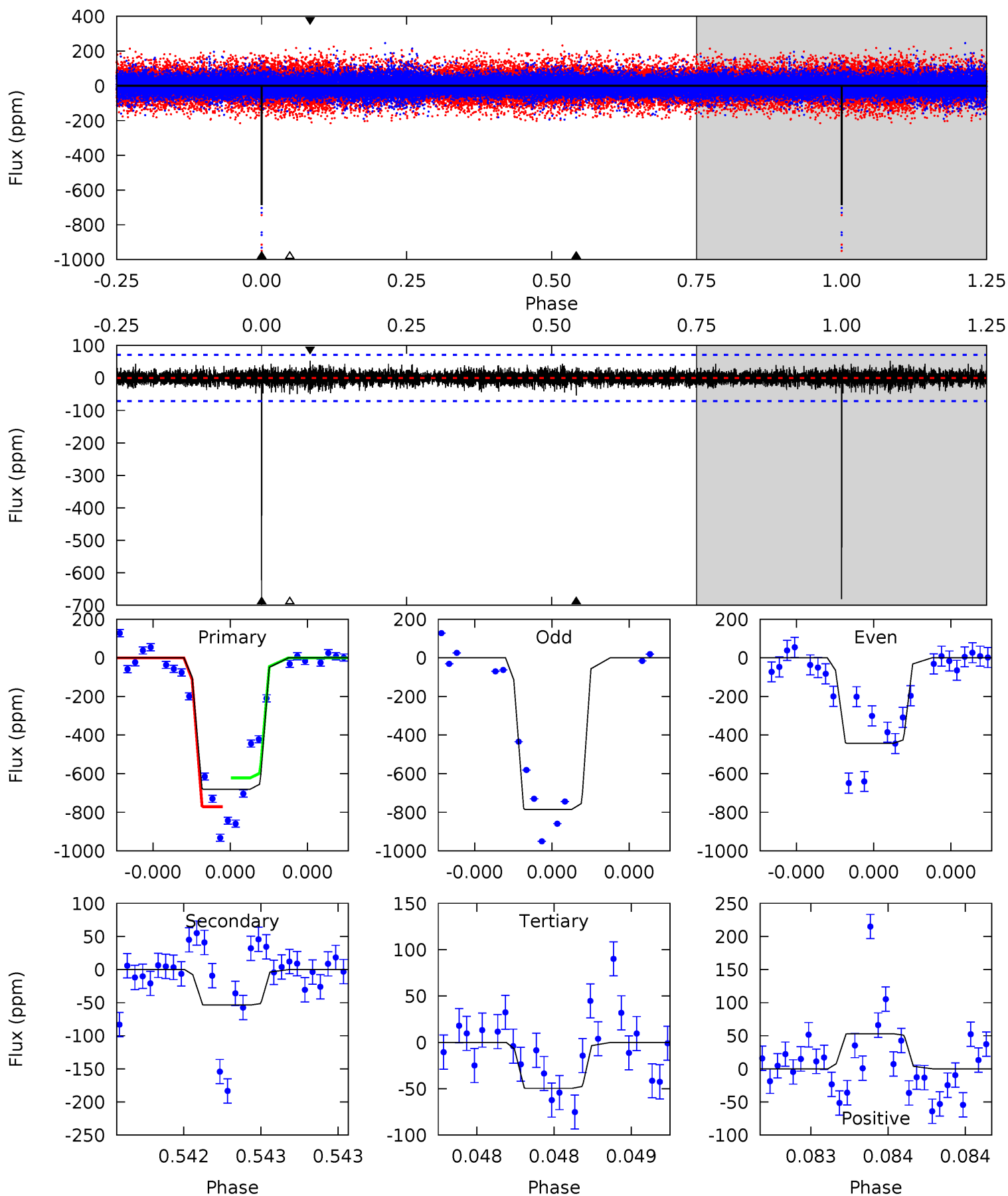
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.1	18.2	18.1	18.3	5.65	3.59	3.04	-5.03	-5.20	0.03	-0.13	3.30	1.21	0.50	1.02



# Alt Model-Shift Uniqueness Test

009520694-01, P = 513.863167 Days, E = 490.201903 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
54.0	4.25	3.93	4.19	5.65	3.60	0.83	50.1	49.8	0.32	0.06	13.7	0.88	0.07	5.85



### Stellar Parameters For KIC 009520694

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6413^{+179}_{-247}$	$4.035^{+0.270}_{-0.180}$	$0.080^{+0.250}_{-0.300}$	$1.881^{+0.536}_{-0.656}$	$1.398^{+0.186}_{-0.280}$	$0.296^{+0.569}_{-0.141}$
	+3%/-4%	+7%/-4%	+312%/-375%	+28%/-35%	+13%/-20%	+192%/-48%
Source	PHO54	PHO54	PHO54	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 009520694-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-826 \pm 45$	$5.82^{+5.26}_{-3.83}$	$456^{+37}_{-43}$	$6450^{+6249}_{-1658}$	$26048^{+189073}_{-18723}$
Alt.	$-54 \pm 13$	$6.53^{+5.38}_{-4.29}$	$454^{+38}_{-39}$	$3491^{+1595}_{-547}$	$1291^{+9945}_{-907}$

$T_{\text{max}}$  = 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

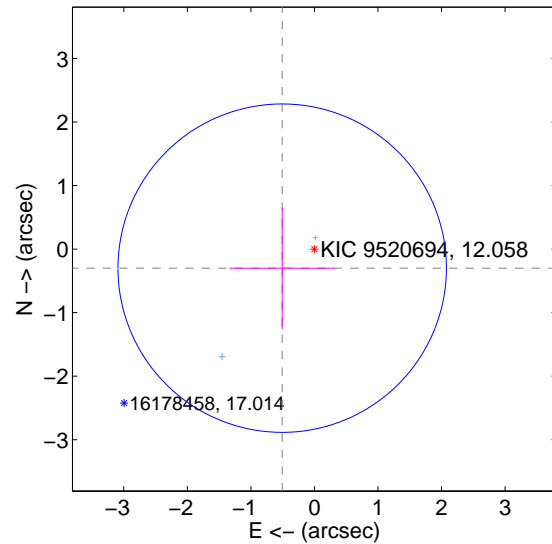
Supplemental centroid analysis for 009520694-01. Kepler magnitude: 12.06. Transit SNR 9.60

There are 2 quarters with good PRF difference image offsets

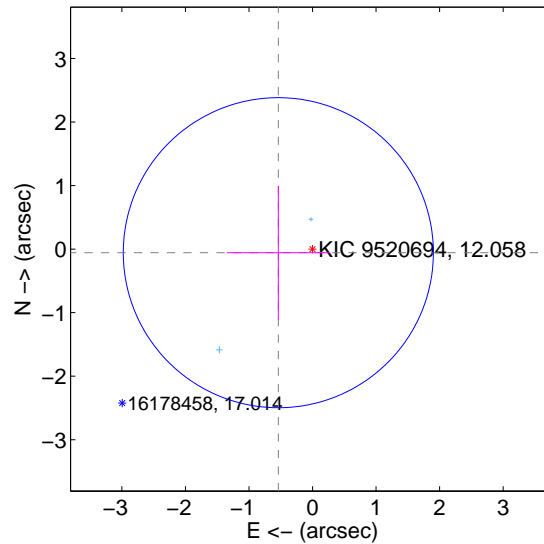
The direct PRF centroid is offset from the target star catalog position by about 0.29 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.590 \pm 0.861$	0.68	$0.508 \pm 0.825$	$-0.300 \pm 0.958$
PRF-fit source offset from KIC position	$0.541 \pm 0.813$	0.67	$0.538 \pm 0.810$	$-0.057 \pm 1.050$
photometric centroid source offset	$0.53 \pm 0.46$	1.14	$-0.15 \pm 0.40$	$0.51 \pm 0.47$

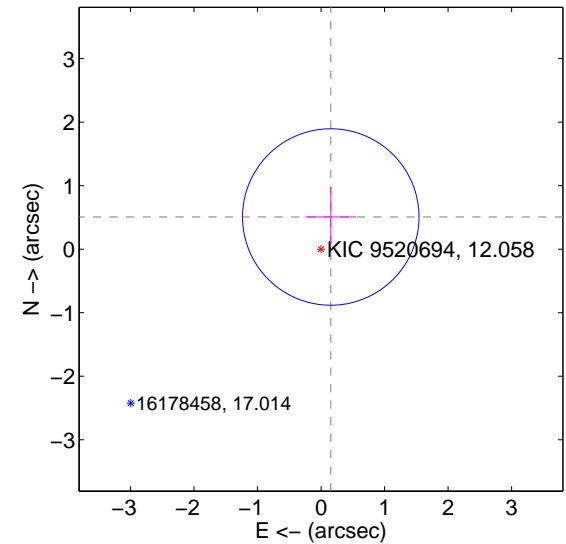
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids



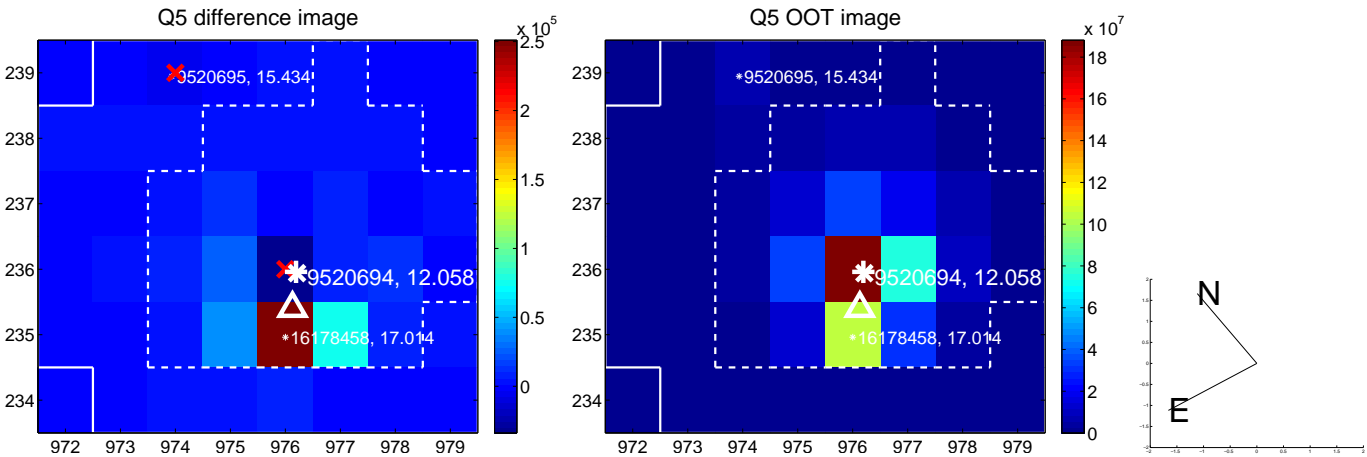
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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





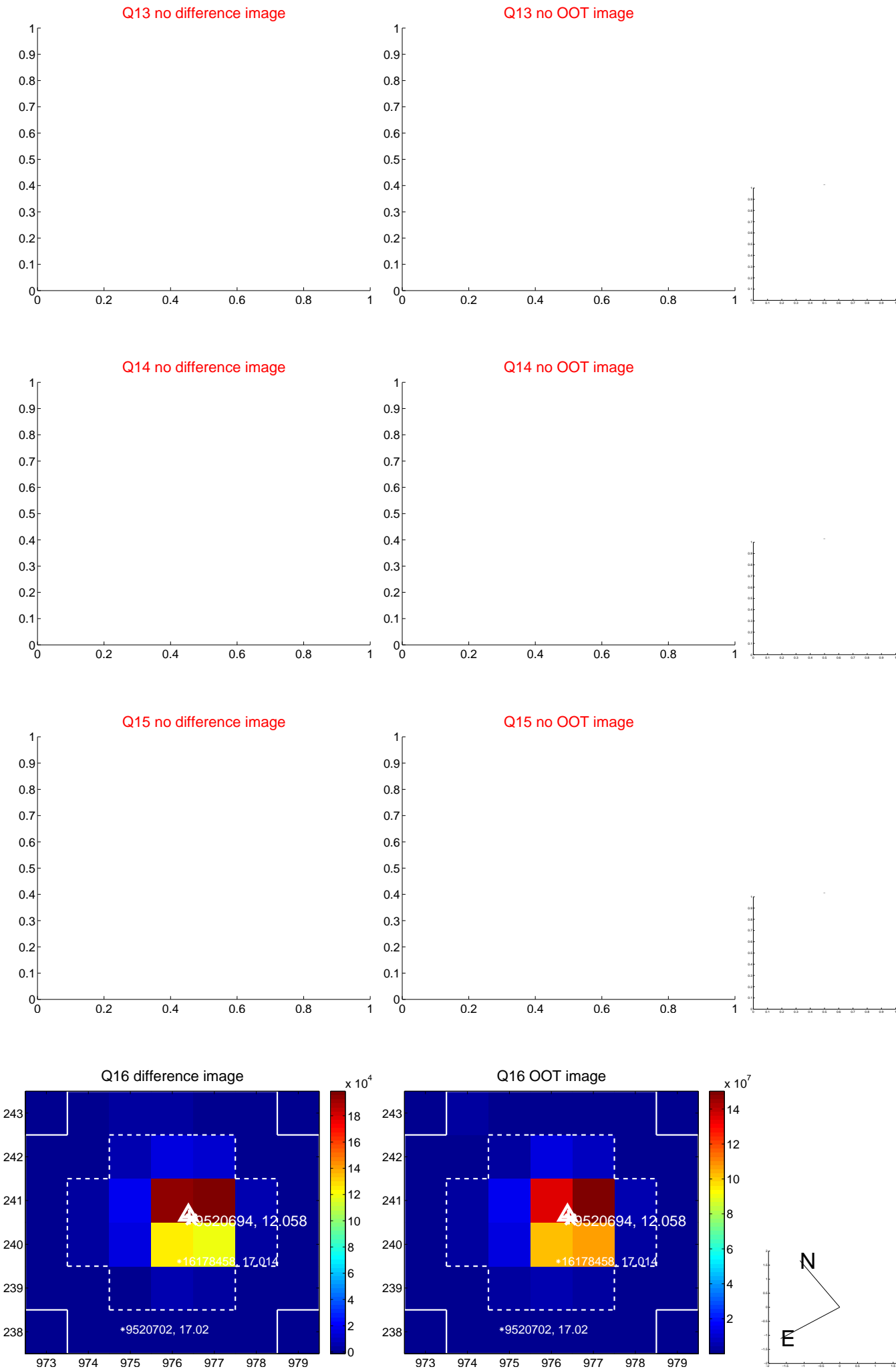
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



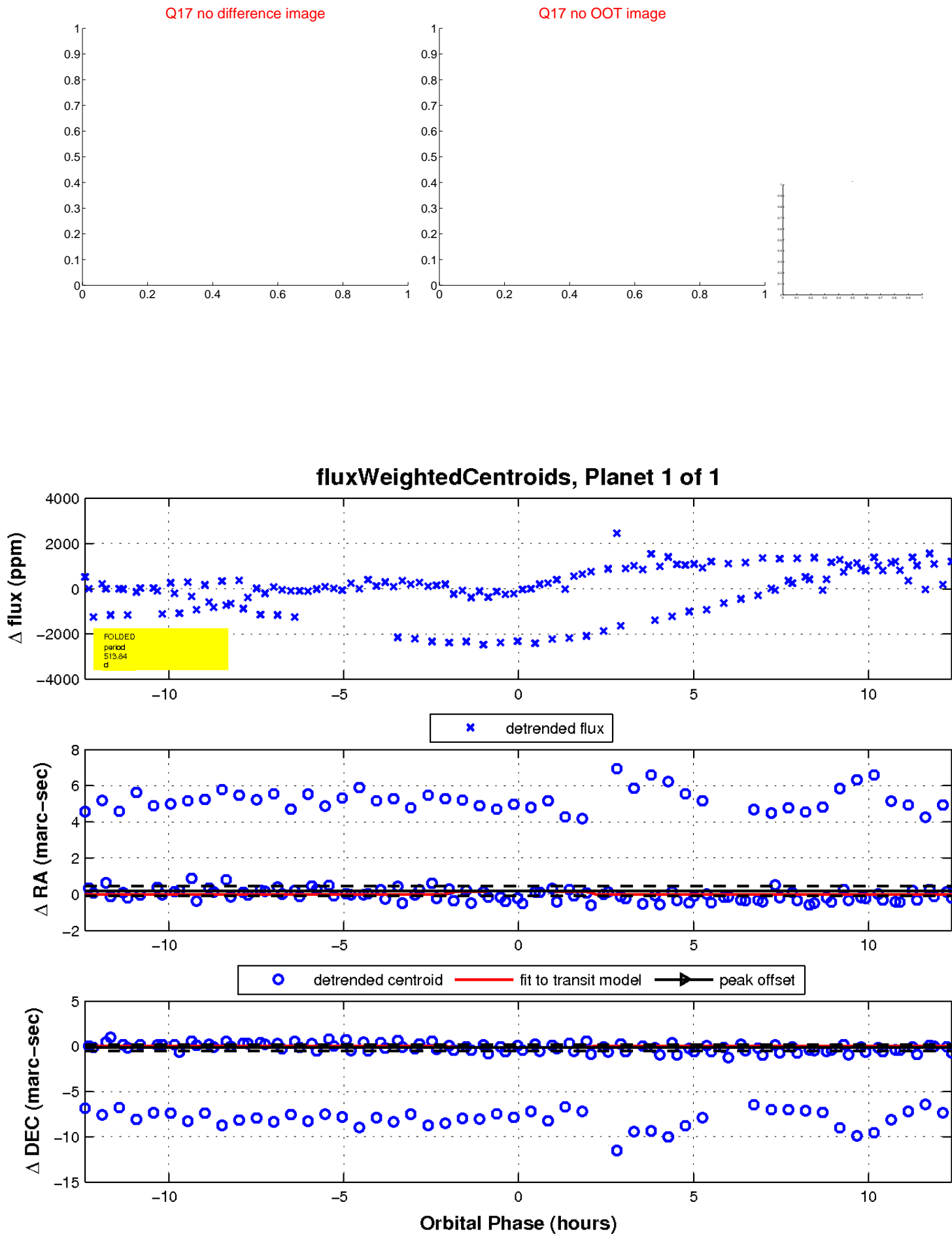
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



UKIRT Image

Declination

