

# KIC 009239670

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009239670-01	OBS	8282.01	456.551908	527.352474	123.2	4.535	7.5	7.5	1.30	5678	1.59	1.26

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009239670-01	OBS	FP	0.12	1	0	0	0	MOD_NONUNIQ_ALT—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.

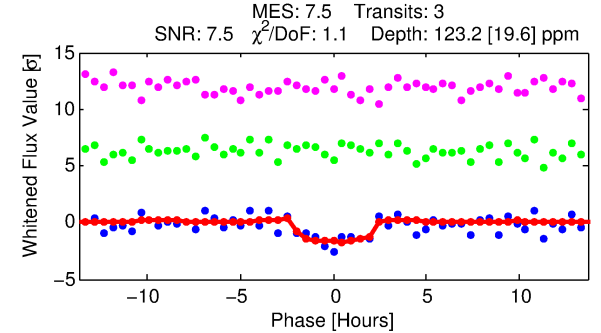
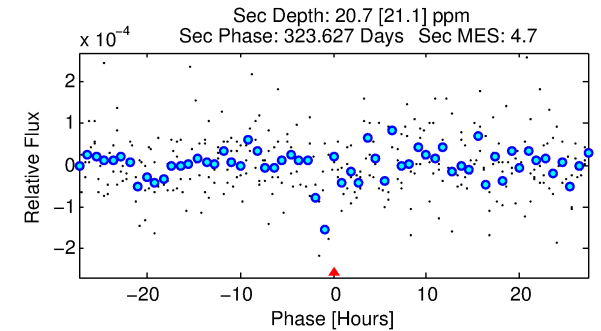
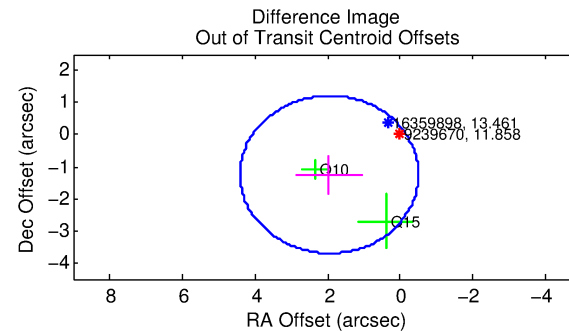
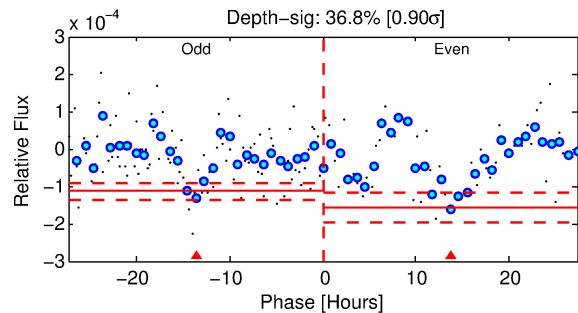
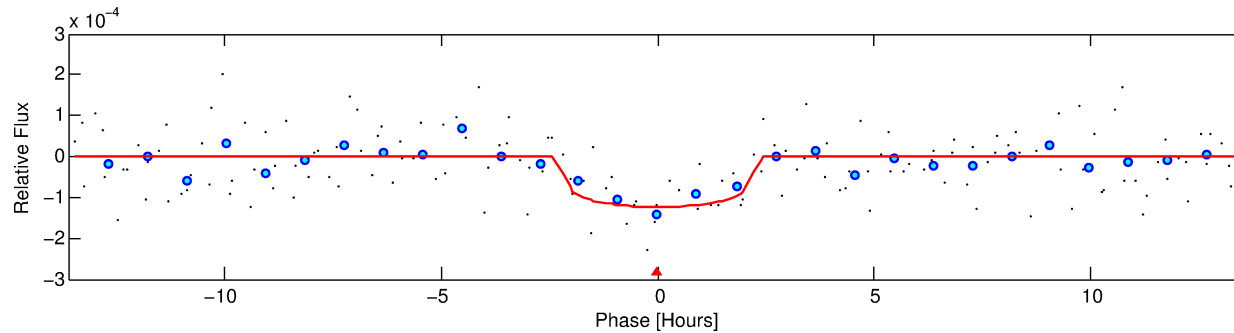
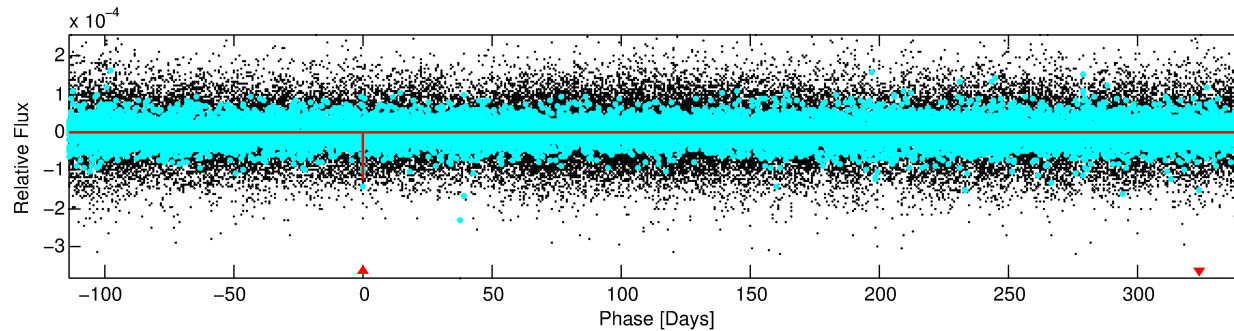
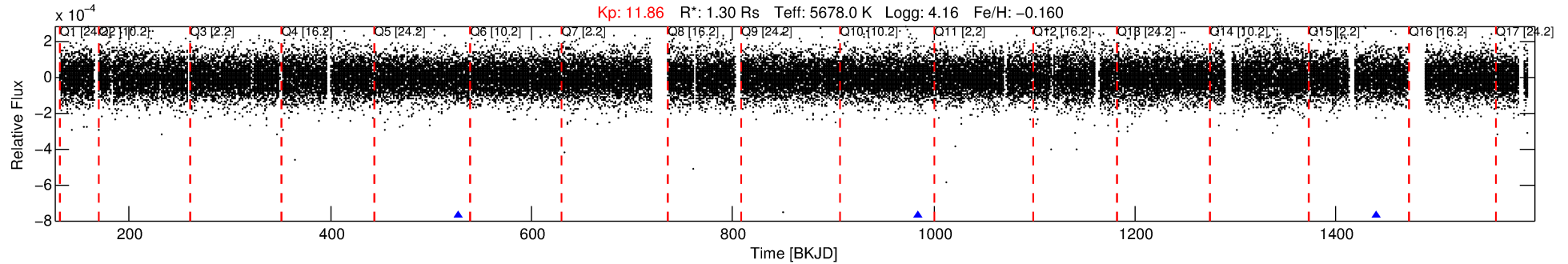
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009239670-01

No Significant Match Found

# DV One-Page Summary

KIC: 9239670 Candidate: 1 of 1 Period: 456.552 d



## DV Fit Results:

Period = 456.55191 [0.00873] d  
Epoch = 527.3525 [0.0108] BKJD  
 $R_p/R^* = 0.0112$  [0.0110]  
 $a/R^* = 486.15$  [2162.69]  
 $b = 0.79$  [2.14]  
 $\text{Seff} = 1.26$  [0.56]  
 $T_{\text{eq}} = 270$  [30] K  
 $R_p = 1.59$  [1.61]  $R_e$   
 $a = 1.1165$  [0.2961] AU  
 $A_g = 5613.47$  [12617.58] [0.44 $\sigma$ ]  
 $T_{\text{eff}} = 3614$  [1995] K [1.68 $\sigma$ ]

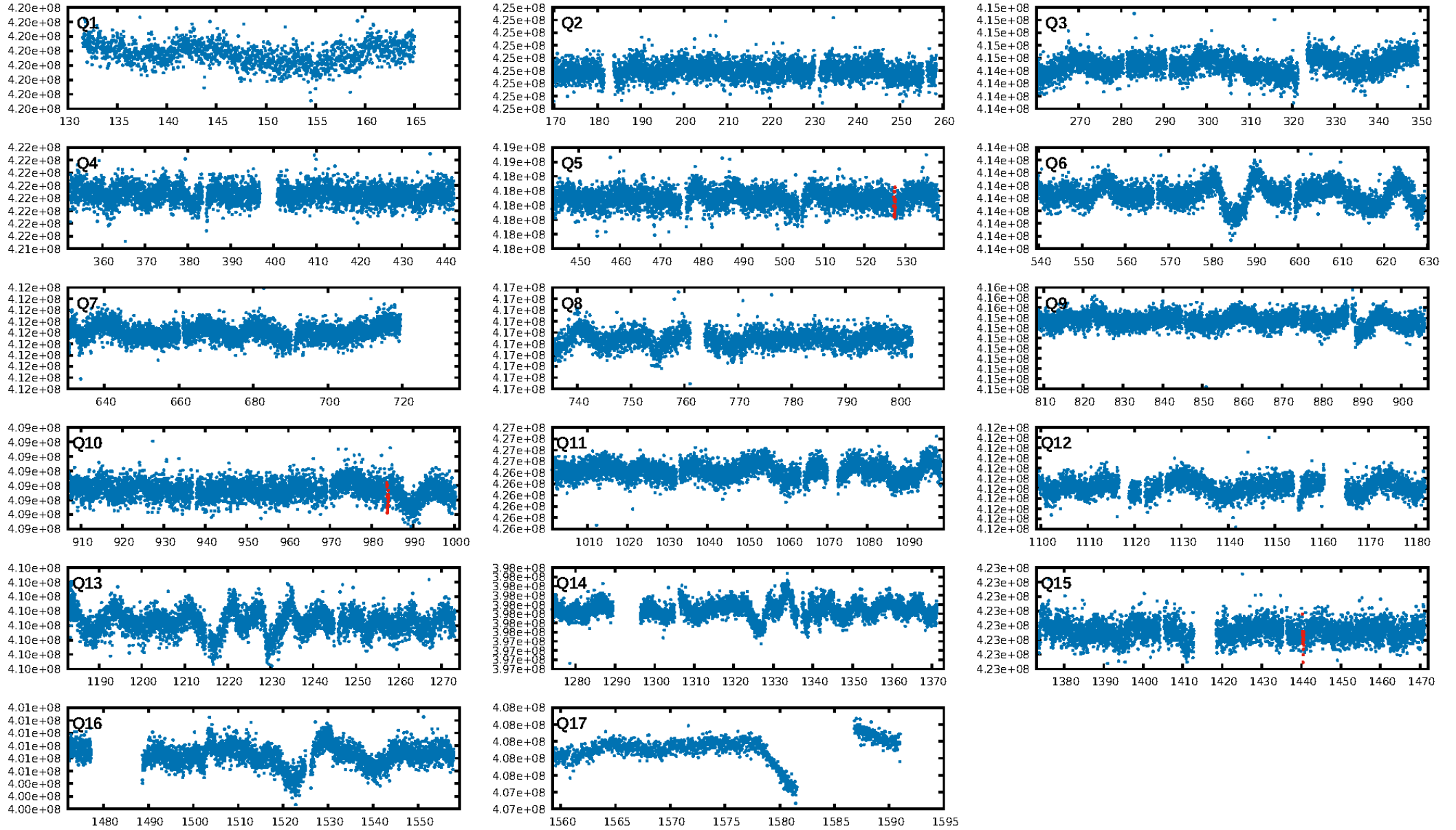
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 57.9%  
ModelChiSquareGof-sig: 99.0%  
**Bootstrap-pfa: 7.94e-10**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.085  
Centroid-sig: 0.3%  
Centroid-so: 3.948 arcsec [1.98 $\sigma$ ]  
OotOffset-rm: 2.316 arcsec [2.83 $\sigma$ ]  
KicOffset-rm: 2.066 arcsec [2.45 $\sigma$ ]  
OotOffset-st: 1/1/0/0 [2]  
KicOffset-st: 1/1/0/0 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 1.00 [3/3]

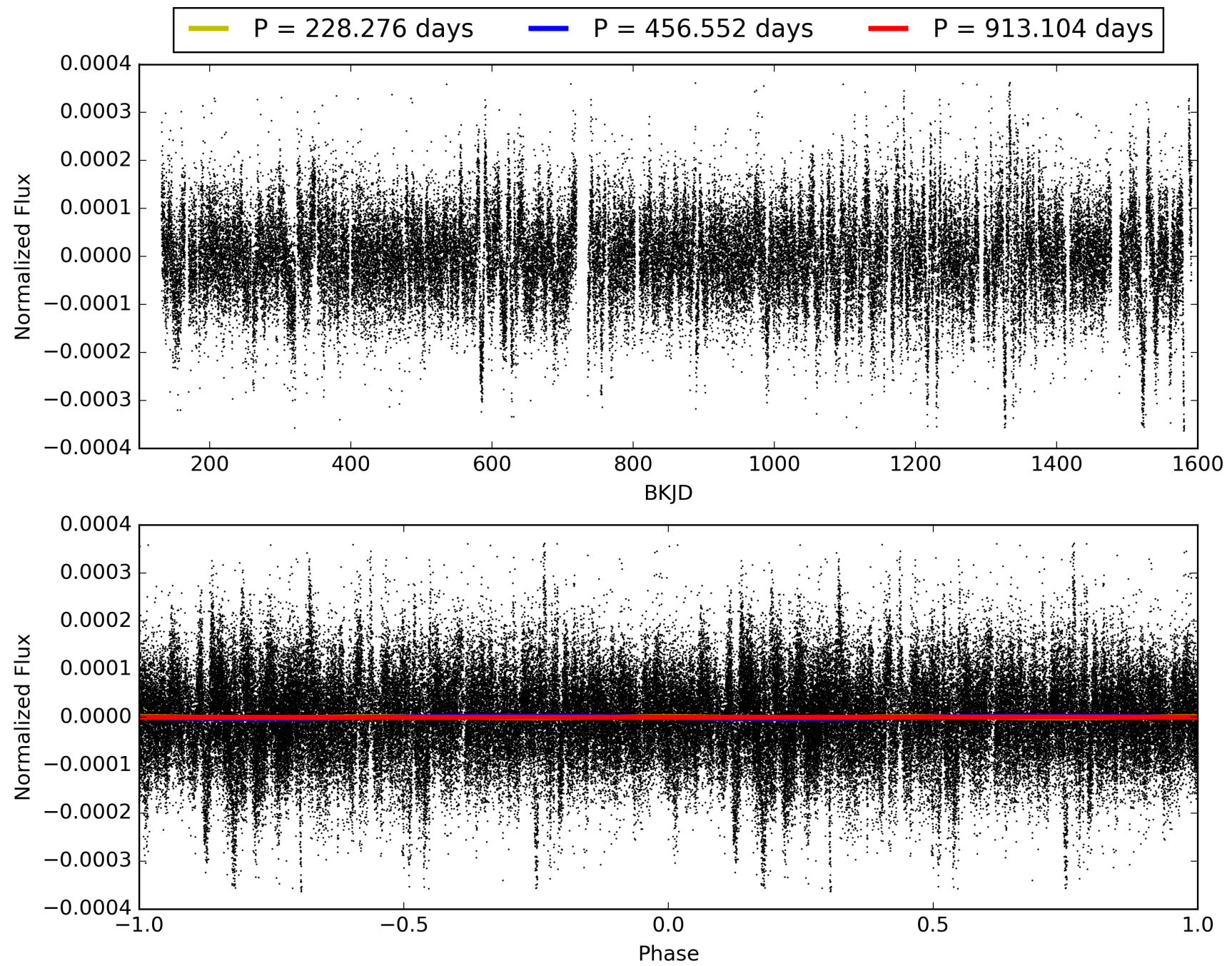
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 13:44:50 Z

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

# TCE 009239670-01, PDC Light Curves

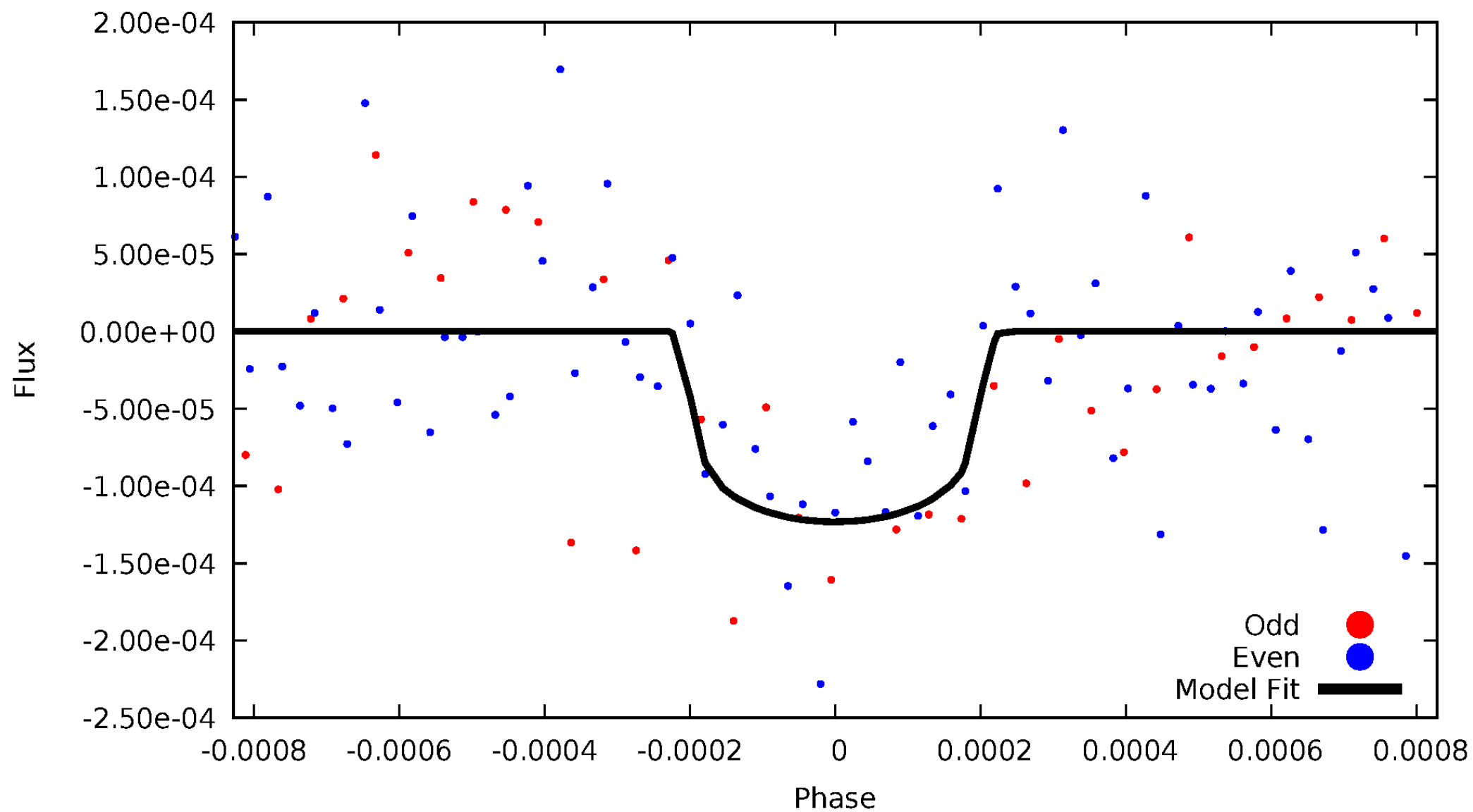


TCE 009239670-01



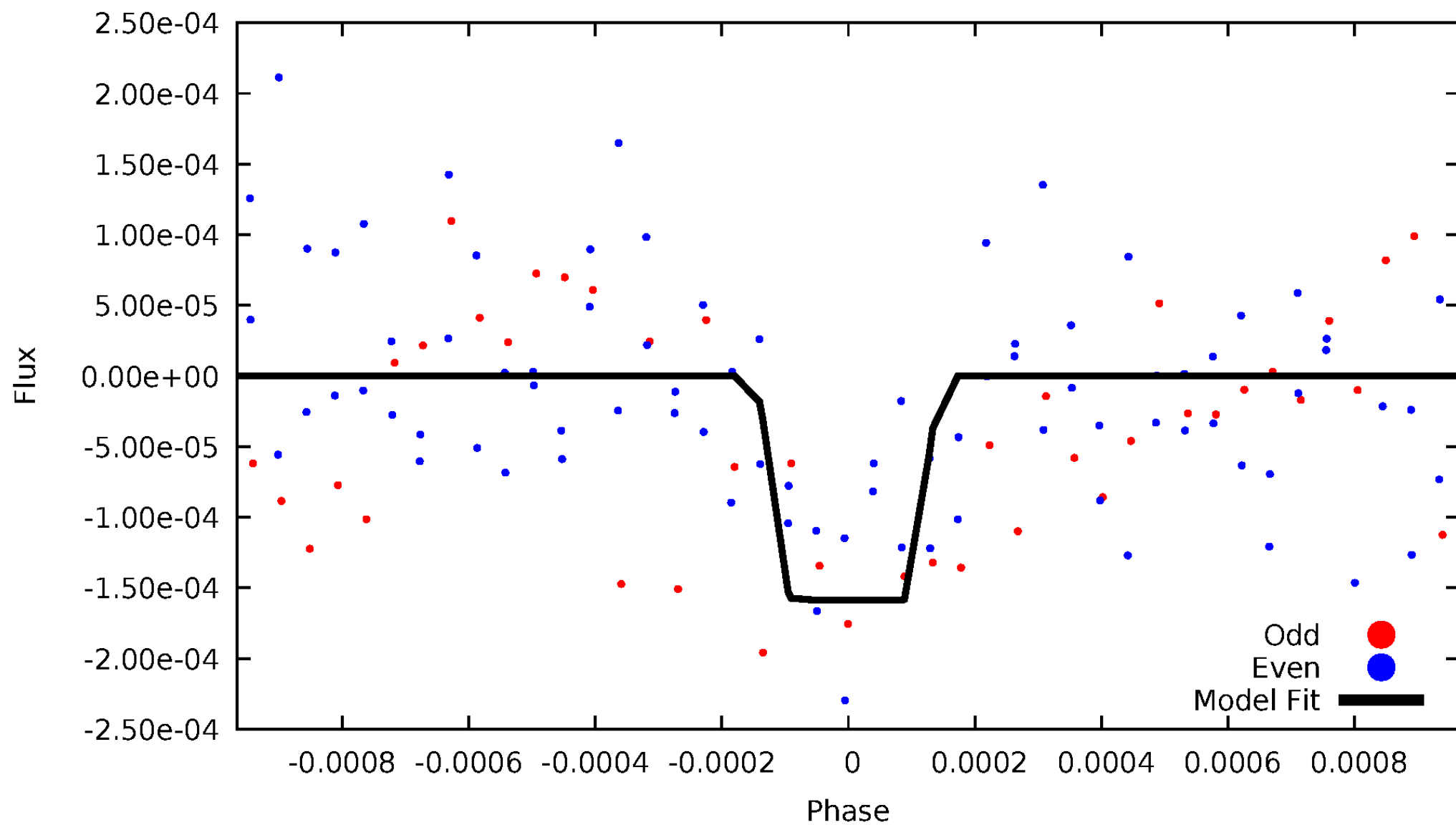
# DV Odd/Even

TCE 009239670-01



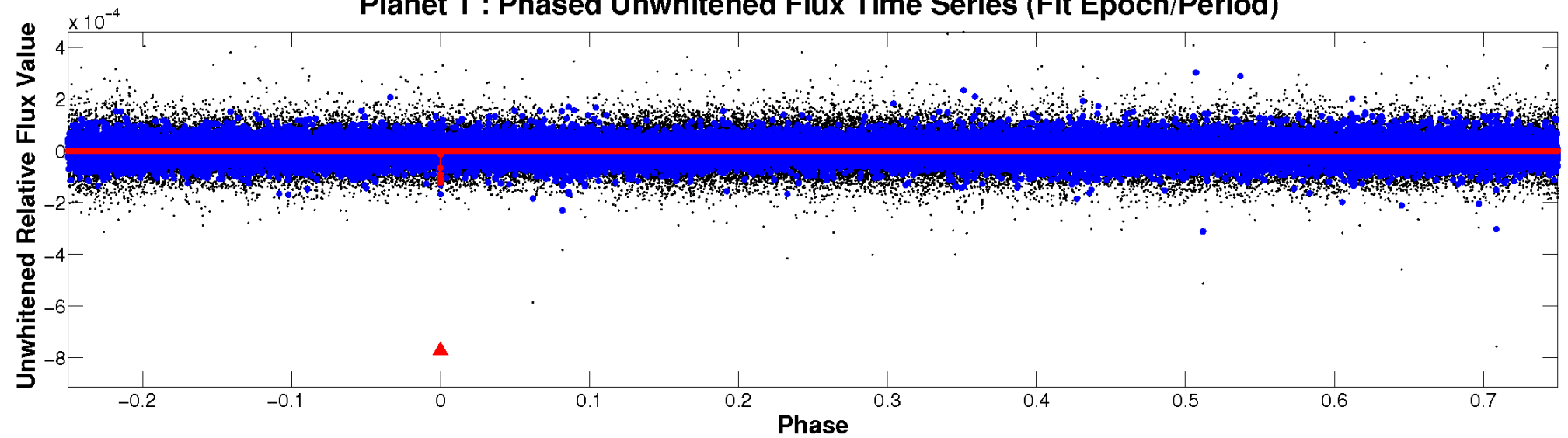
# ALT Odd/Even

TCE 009239670-01

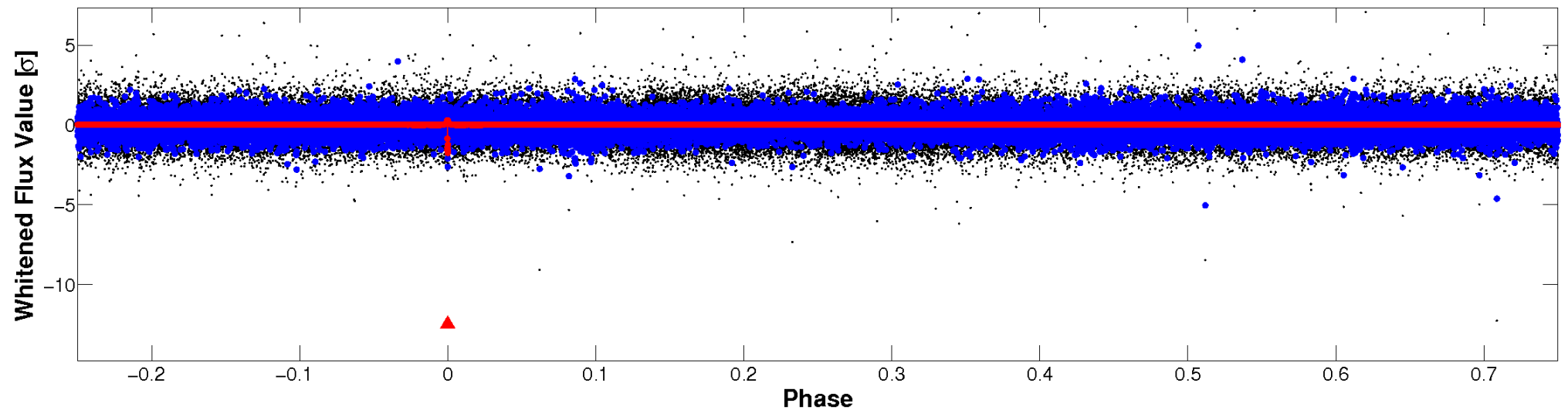


# Non-Whitened Vs. Whitened Light Curve

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



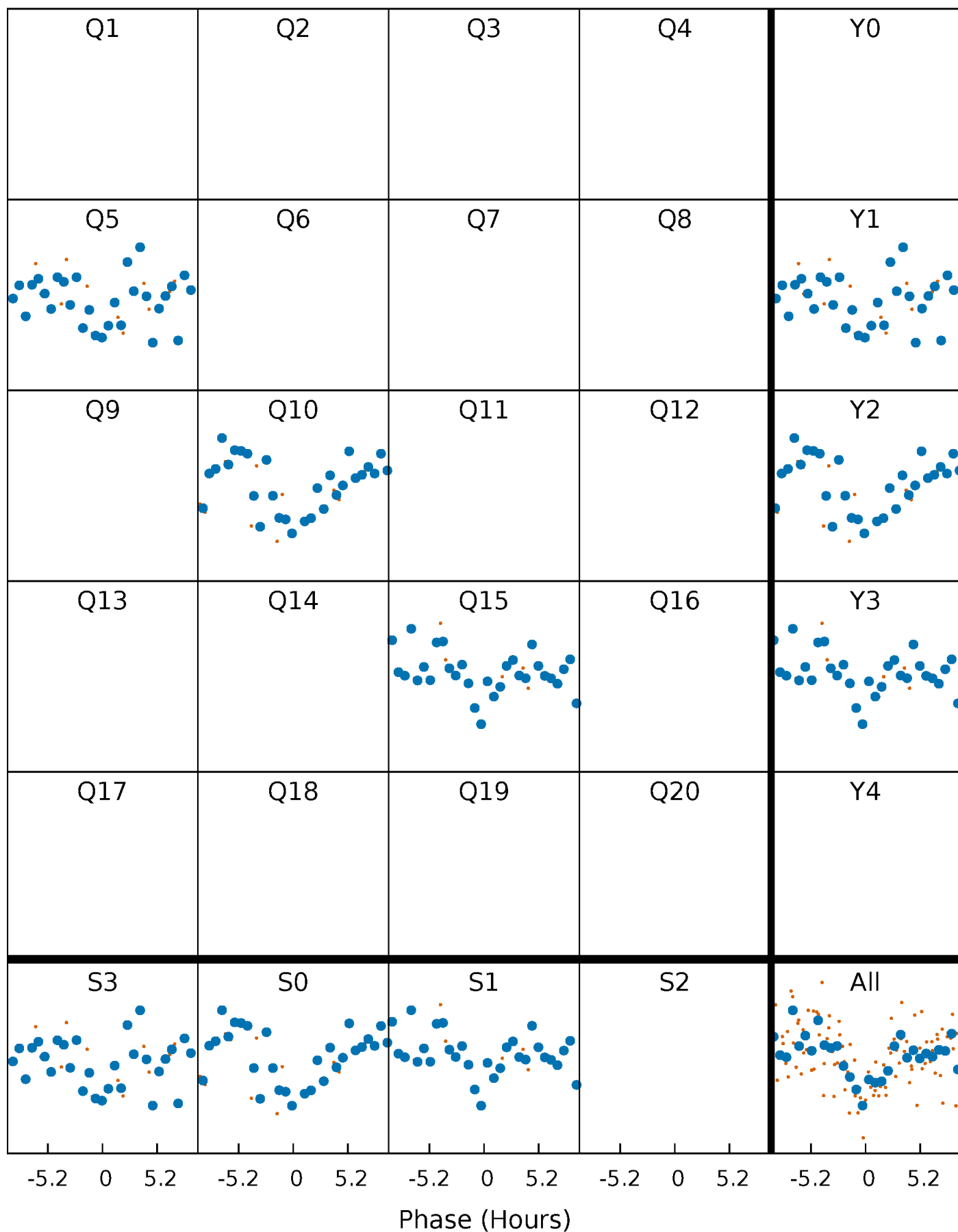
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

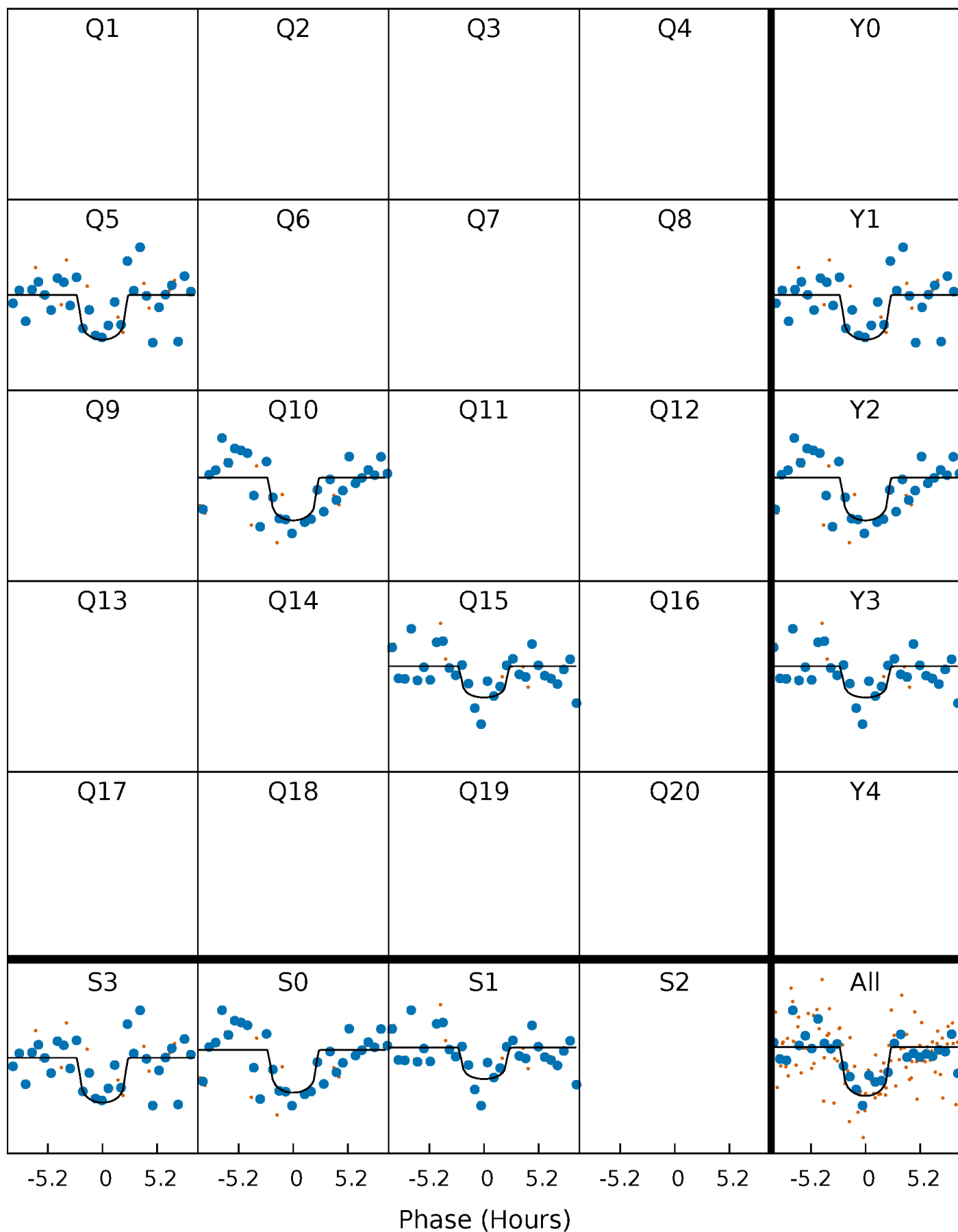
TCE 009239670-01 P=456.551908 Days  $T_0=527.352474$  (BKJD)





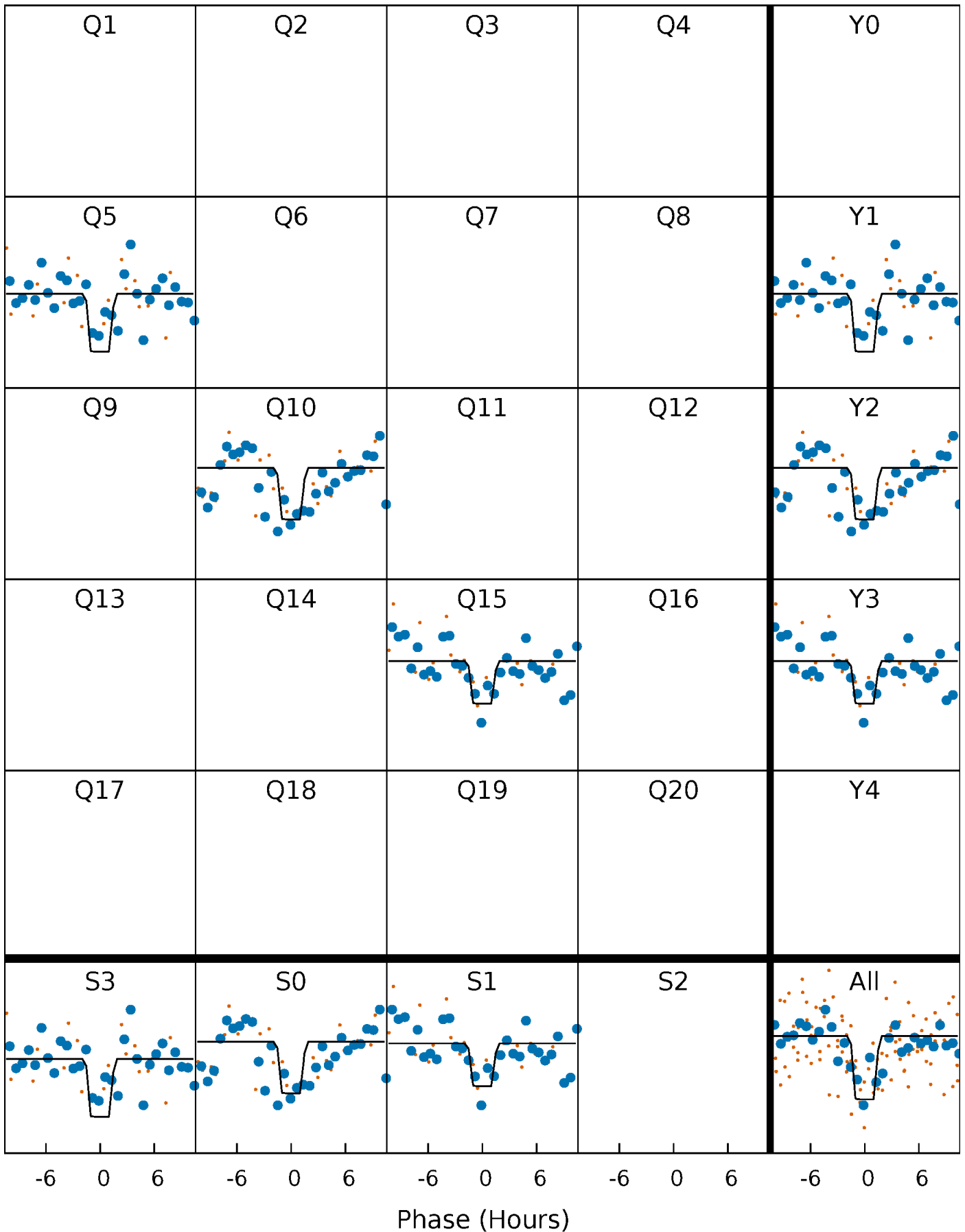
# DV Quarter-Phased Transit Curves

TCE 009239670-01 P=456.551908 Days  $T_0=527.352474$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

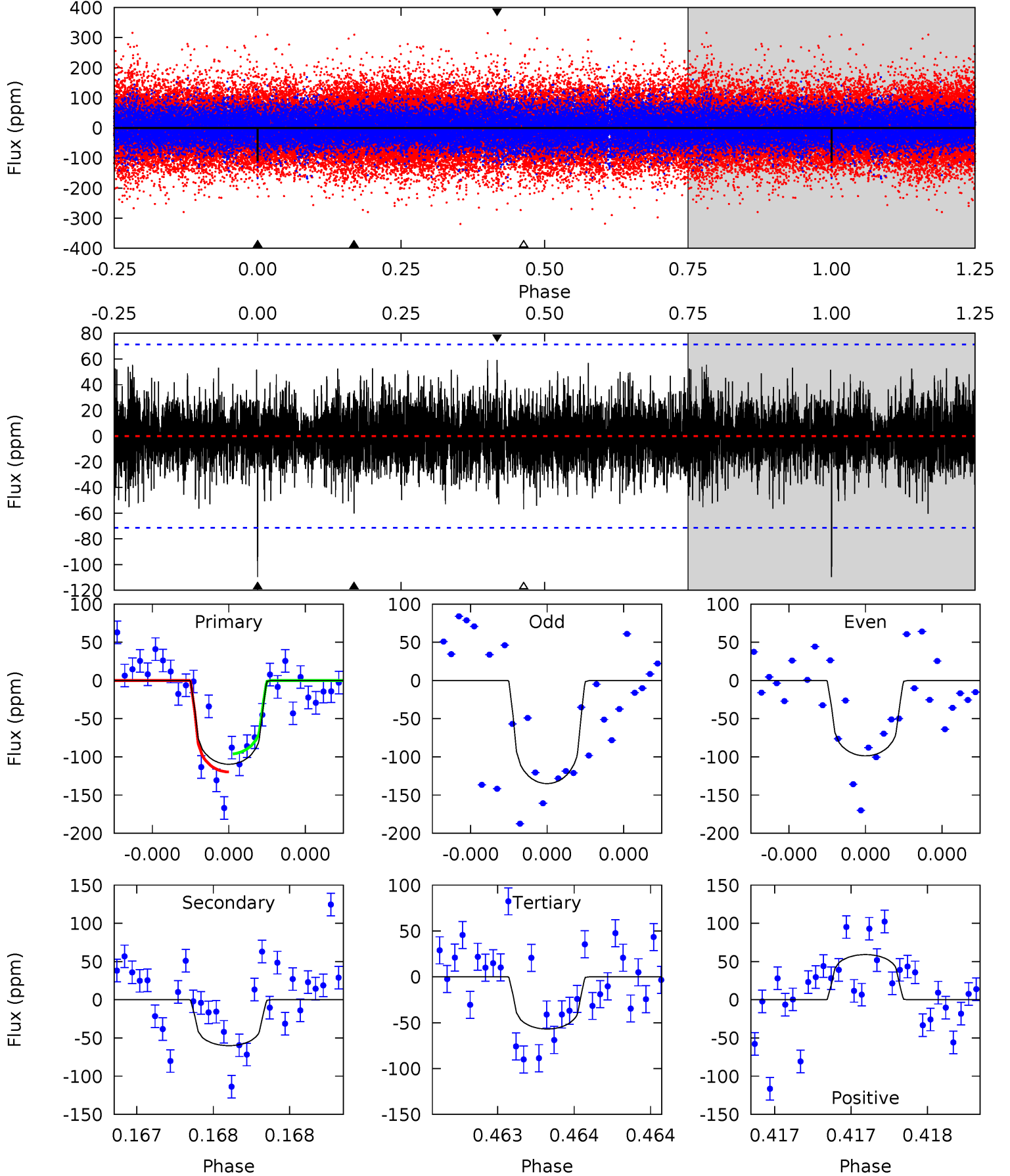
TCE 009239670-01 P=456.547031 Days  $T_0=527.355183$  (BKJD)



# DV Model-Shift Uniqueness Test

009239670-01,  $P = 456.551908$  Days,  $E = 70.800566$  Days

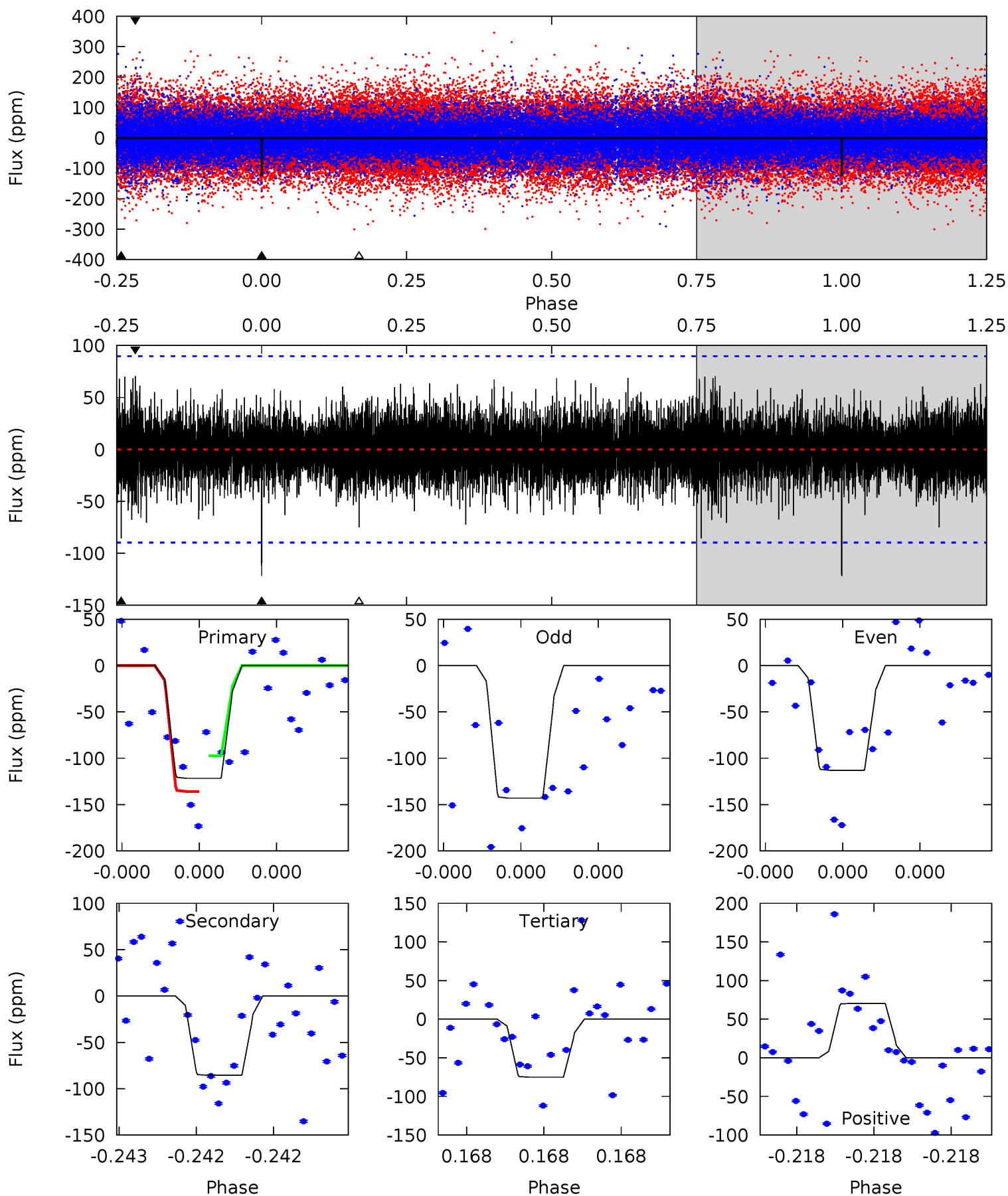
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.60	4.71	4.47	4.64	5.59	3.51	1.26	4.14	3.97	0.25	0.07	1.34	0.96	0.35	0.92



# Alt Model-Shift Uniqueness Test

009239670-01, P = 456.547031 Days, E = 70.808152 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
7.67	5.39	4.73	4.44	5.65	3.60	1.16	2.94	3.23	0.66	0.95	0.91	0.89	0.37	1.21



### Stellar Parameters For KIC 009239670

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5678^{+142}_{-128}$	$4.161^{+0.260}_{-0.140}$	$-0.160^{+0.350}_{-0.200}$	$1.298^{+0.278}_{-0.340}$	$0.891^{+0.135}_{-0.073}$	$0.573^{+0.860}_{-0.221}$
	+3%/-2%	+6%/-3%	+219%/-125%	+21%/-26%	+15%/-8%	+150%/-39%
Source	PHO1	FLK73	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 009239670-01 / KOI 8282.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-60 \pm 13$	$1.82^{+1.47}_{-1.19}$	$375^{+24}_{-27}$	$4545^{+2898}_{-842}$	$12101^{+89569}_{-8317}$
Alt.	$-86 \pm 16$	$2.01^{+1.38}_{-1.23}$	$375^{+22}_{-27}$	$4674^{+2677}_{-811}$	$15112^{+77317}_{-10109}$

$T_{\text{max}}$  = 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

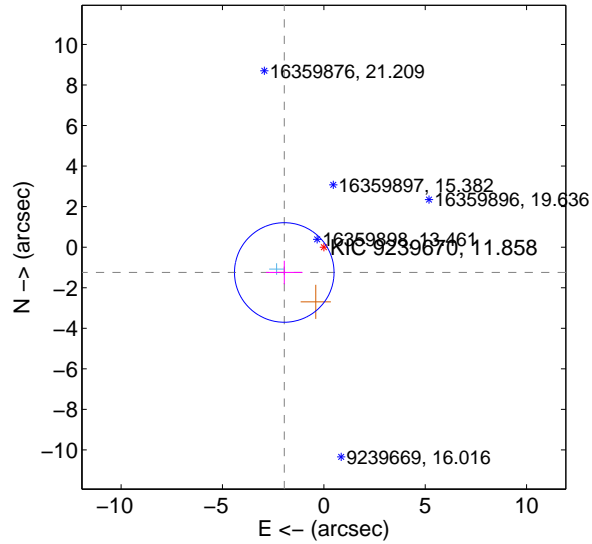
Supplemental centroid analysis for 009239670-01. **Kepler magnitude: 11.86.** Transit SNR 7.55

**There are 1 quarters with good PRF difference image offsets**

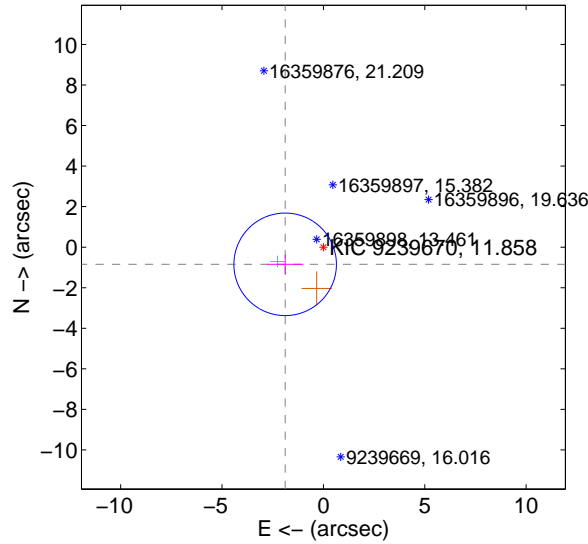
The direct PRF centroid is offset from the target star catalog position by about 0.66 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.316 \pm 0.818$	2.83	$1.952 \pm 0.898$	$-1.248 \pm 0.580$
PRF-fit source offset from KIC position	$2.066 \pm 0.843$	2.45	$1.885 \pm 0.898$	$-0.846 \pm 0.478$
photometric centroid source offset	$3.95 \pm 2.00$	1.98	$-0.74 \pm 1.91$	$3.88 \pm 2.00$

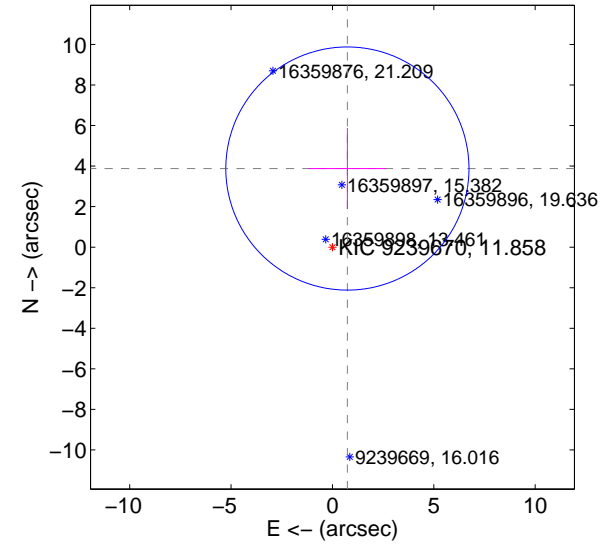
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids



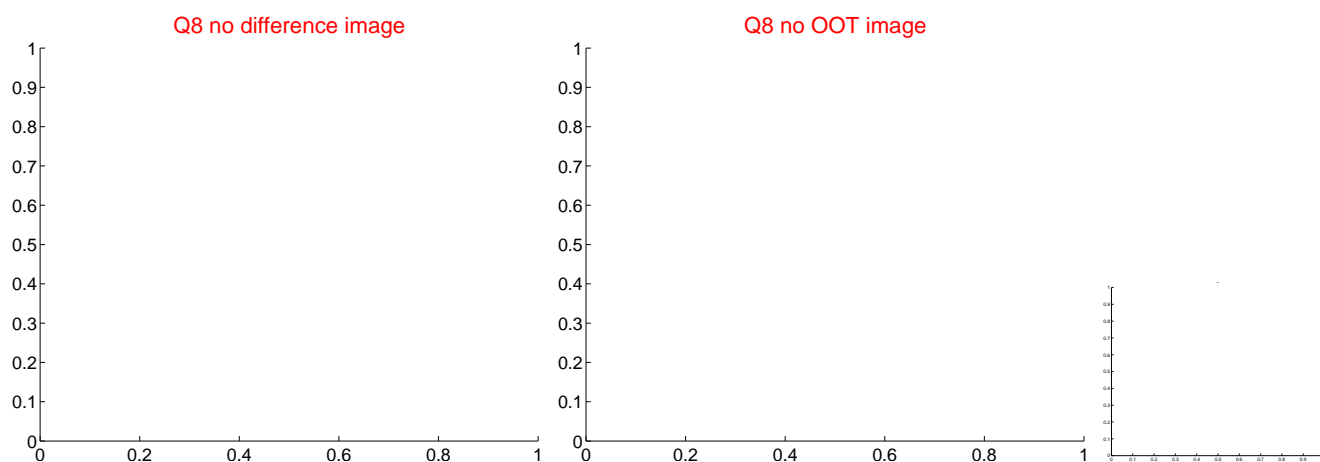
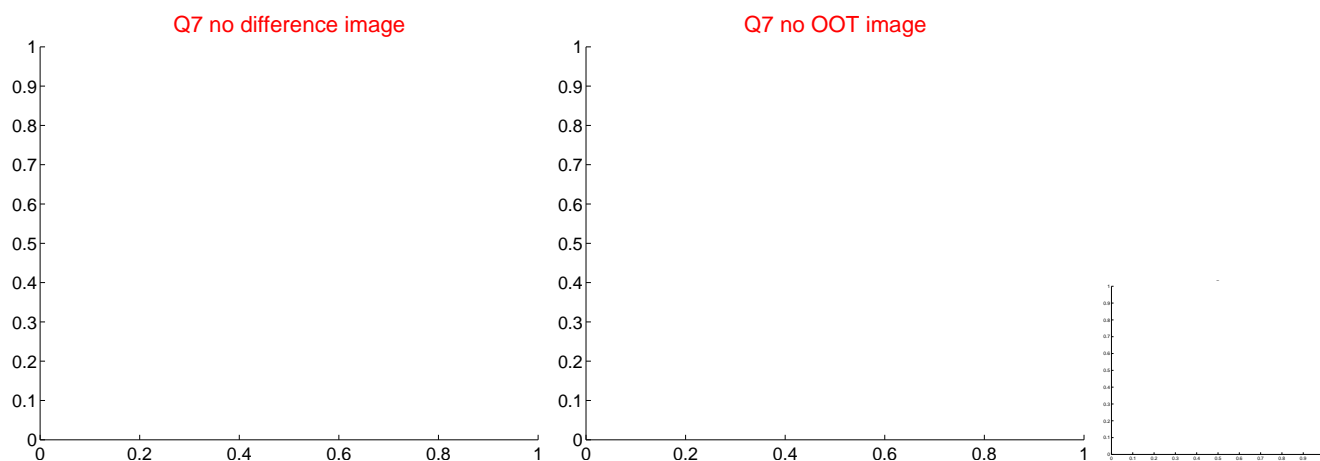
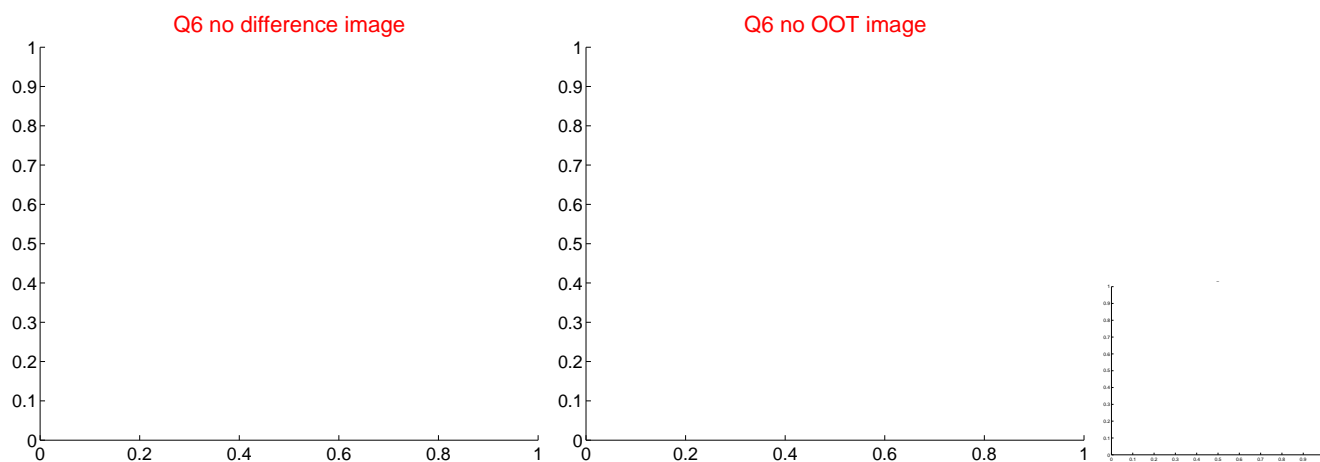
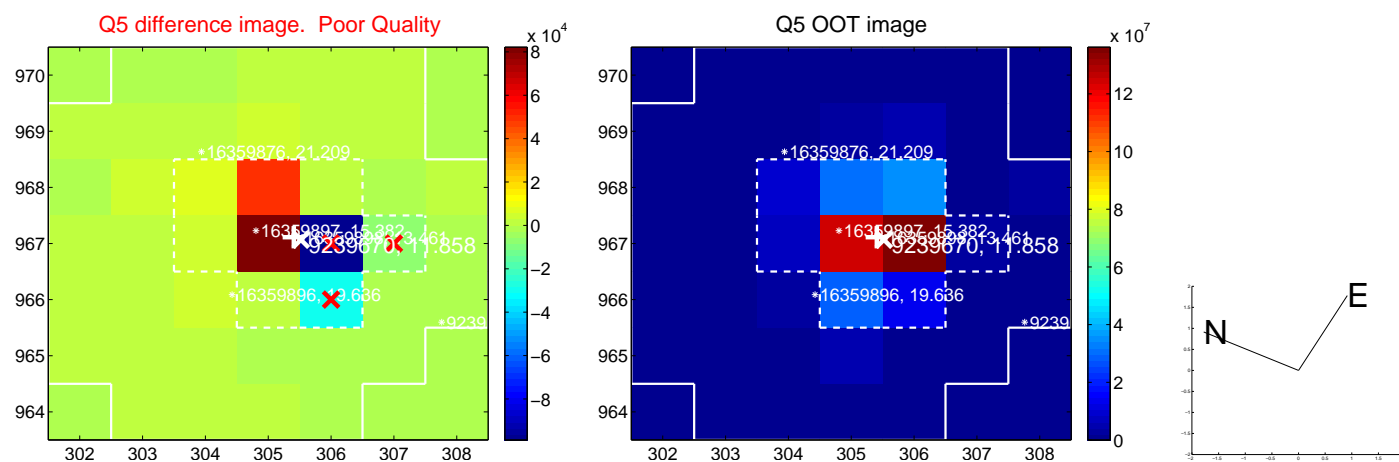
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

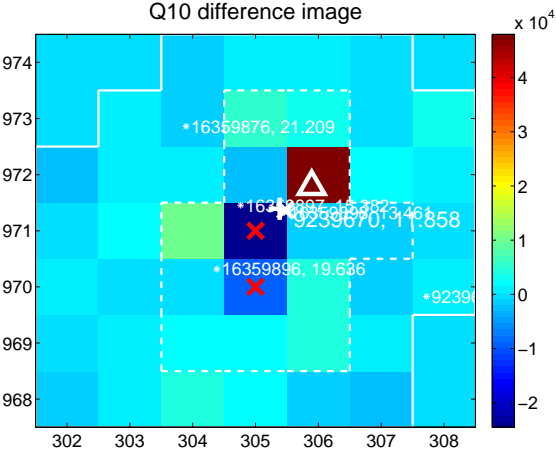
Q9 no difference image



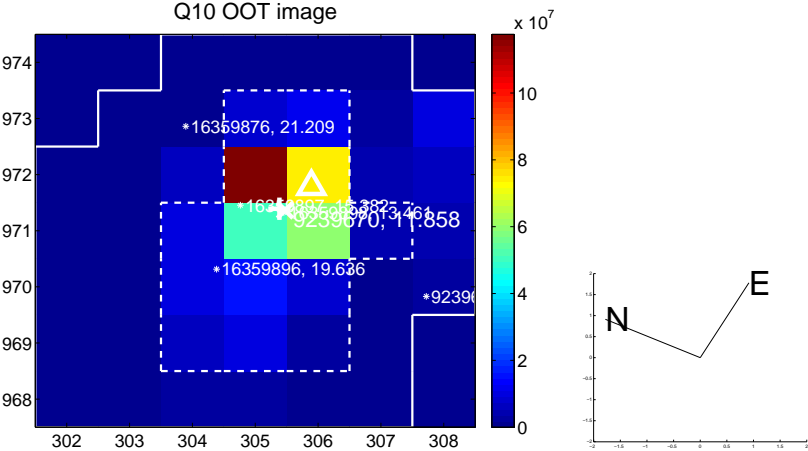
Q9 no OOT image



Q10 difference image



Q10 OOT image



Q11 no difference image



Q11 no OOT image



Q12 no difference image



Q12 no OOT image



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

Q13 no difference image



Q13 no OOT image



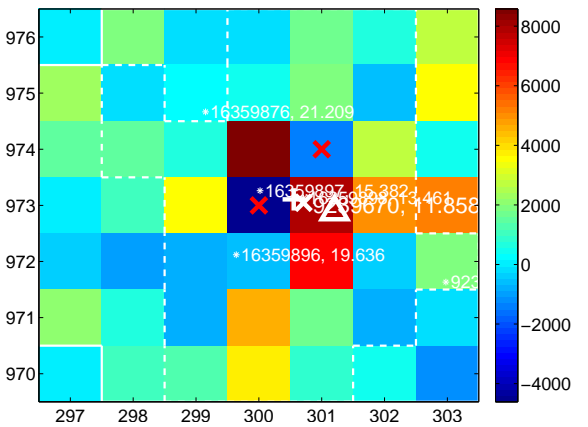
Q14 no difference image



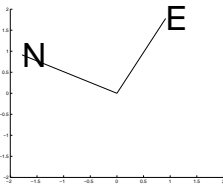
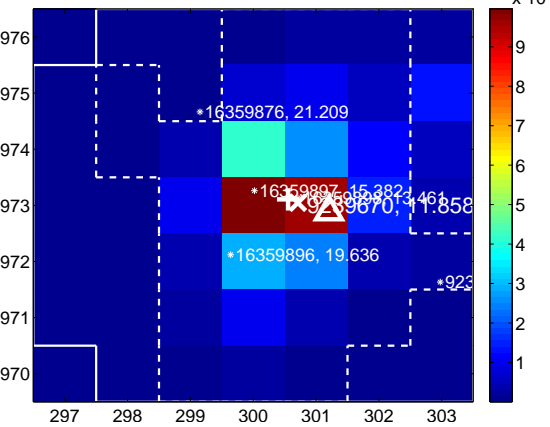
Q14 no OOT image



Q15 difference image. Poor Quality



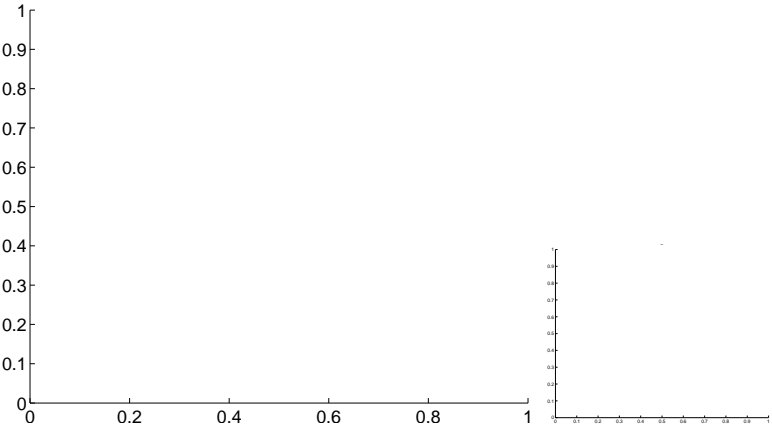
Q15 OOT image



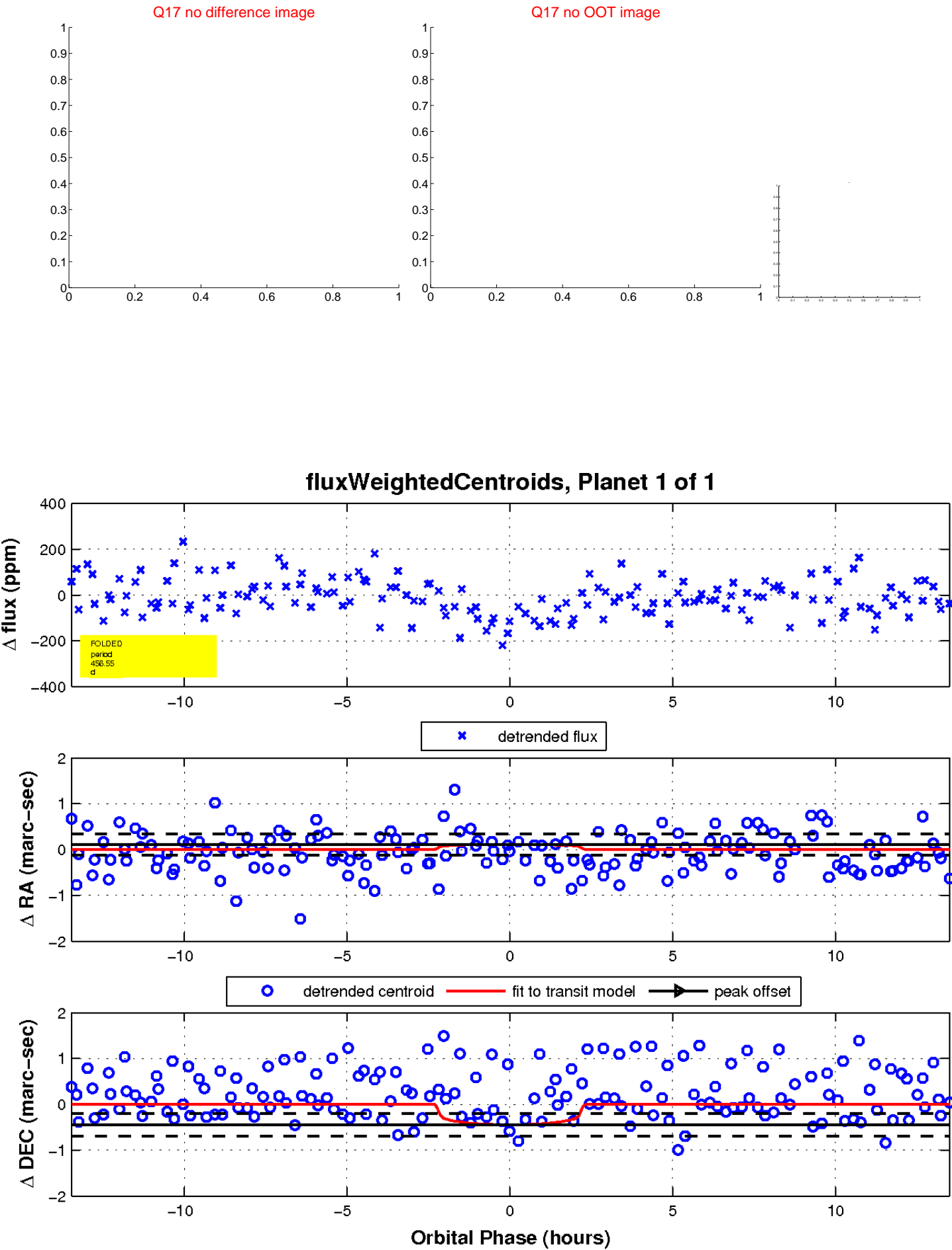
Q16 no difference image



Q16 no OOT image



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



UKIRT Image

