

# KIC 002570659

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002570659-01	OBS	No	471.634808	458.423258	1711.4	7.569	8.3	6.9	3.44	5110	17.72	4.71

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002570659-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—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.

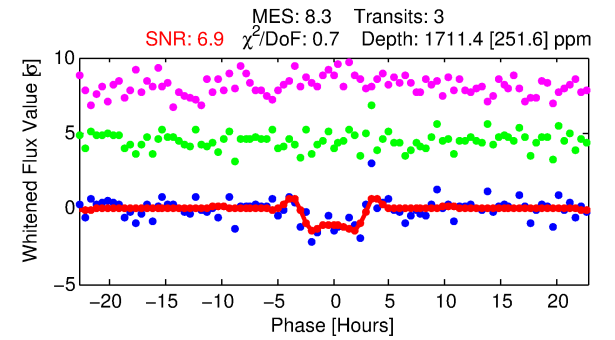
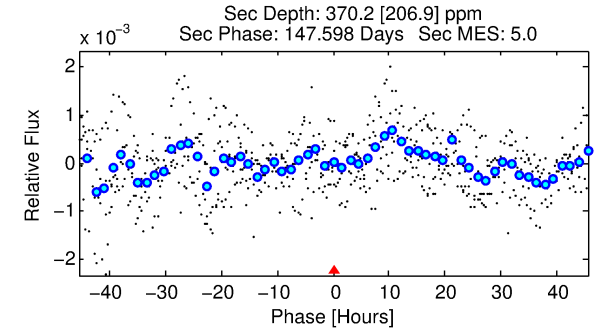
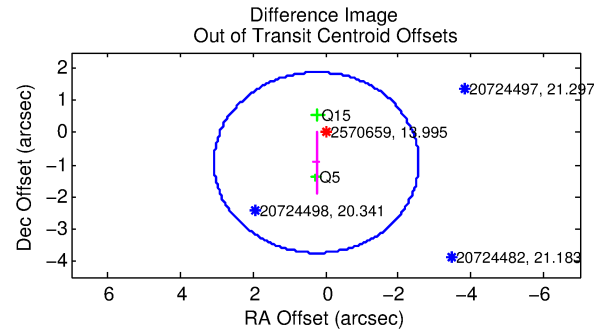
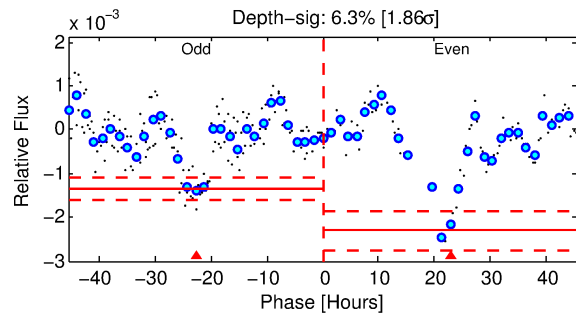
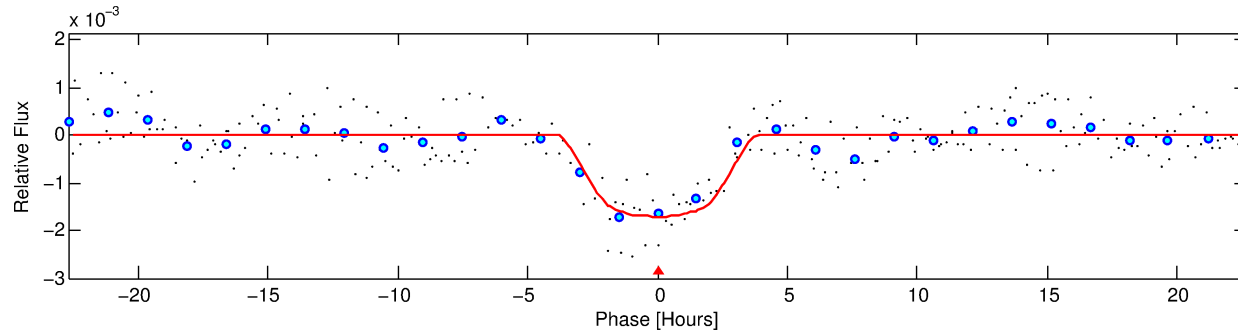
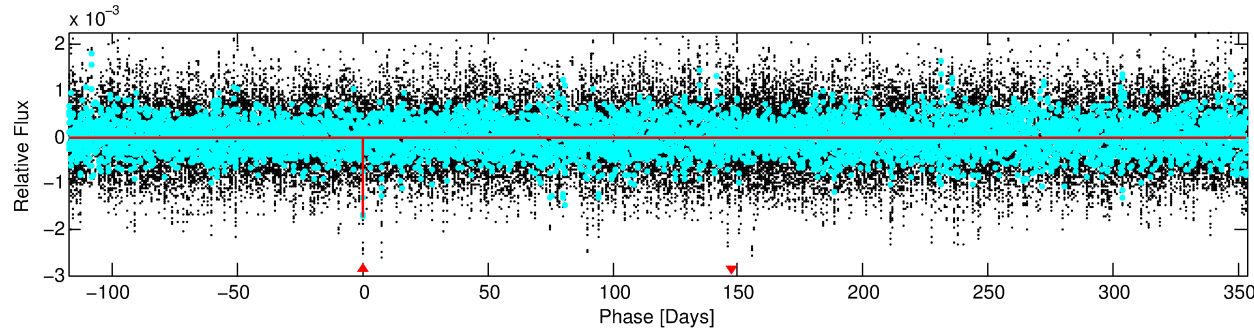
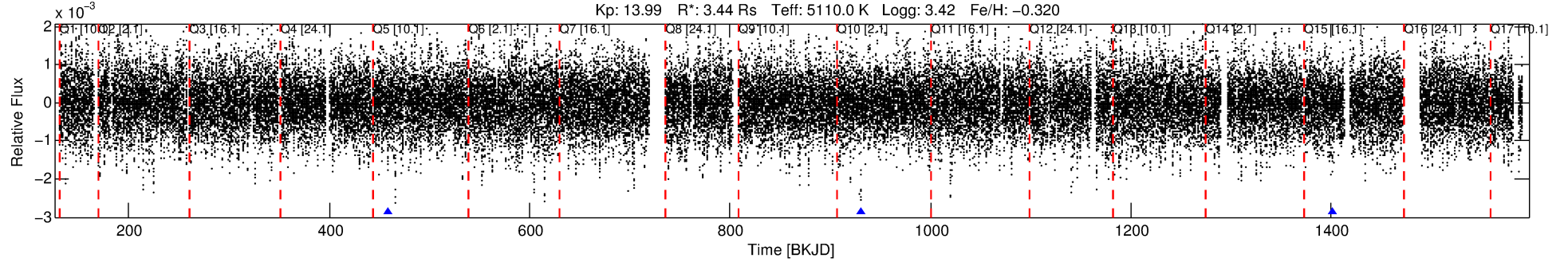
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 002570659-01

No Significant Match Found

# DV One-Page Summary

KIC: 2570659 Candidate: 1 of 1 Period: 471.635 d



## DV Fit Results:

Period = 471.63481 [0.00685] d  
Epoch = 458.4233 [0.0085] BKJD  
Rp/R\* = 0.0472 [0.0040]  
a/R\* = 235.66 [26.51]  
b = 0.92 [0.02]  
Seff = 4.71 [2.72]  
Teq = 376 [54] K  
Rp = 17.72 [7.42] Re  
a = 1.2392 [0.4585] AU  
Ag = 995.98 [811.77] [1.23 $\sigma$ ]  
Teffp = 3262 [483] K [5.94 $\sigma$ ]

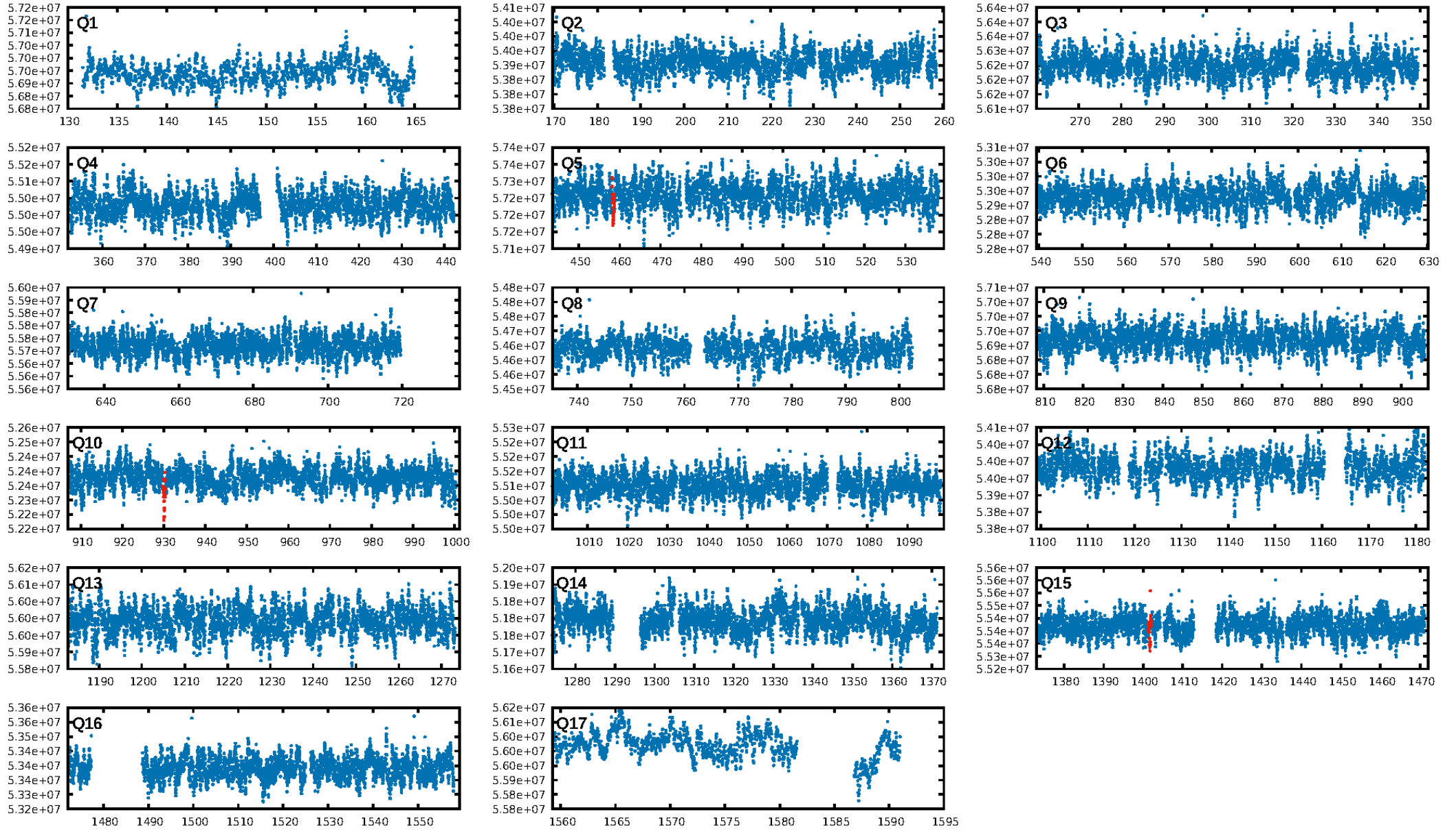
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 46.5%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 1.23e-10**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.855  
Centroid-sig: 5.9%  
Centroid-so: 0.551 arcsec [1.61 $\sigma$ ]  
OotOffset-rm: 0.968 arcsec [1.03 $\sigma$ ]  
KicOffset-rm: 1.000 arcsec [1.03 $\sigma$ ]  
OotOffset-st: 0/1/0/1 [2]  
KicOffset-st: 0/1/0/1 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 1.00 [2/2]

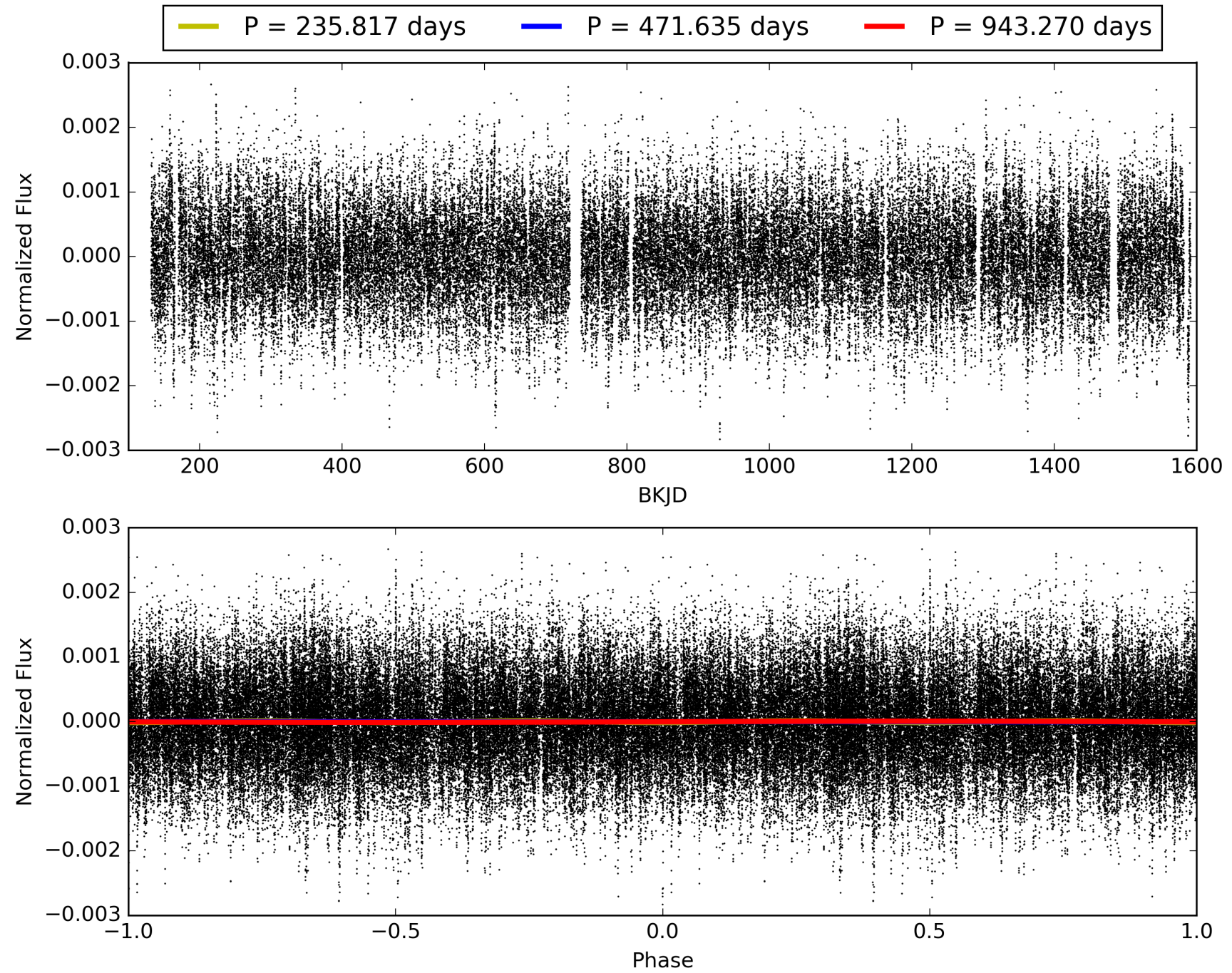
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 13:55:03 Z

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

# TCE 002570659-01, PDC Light Curves

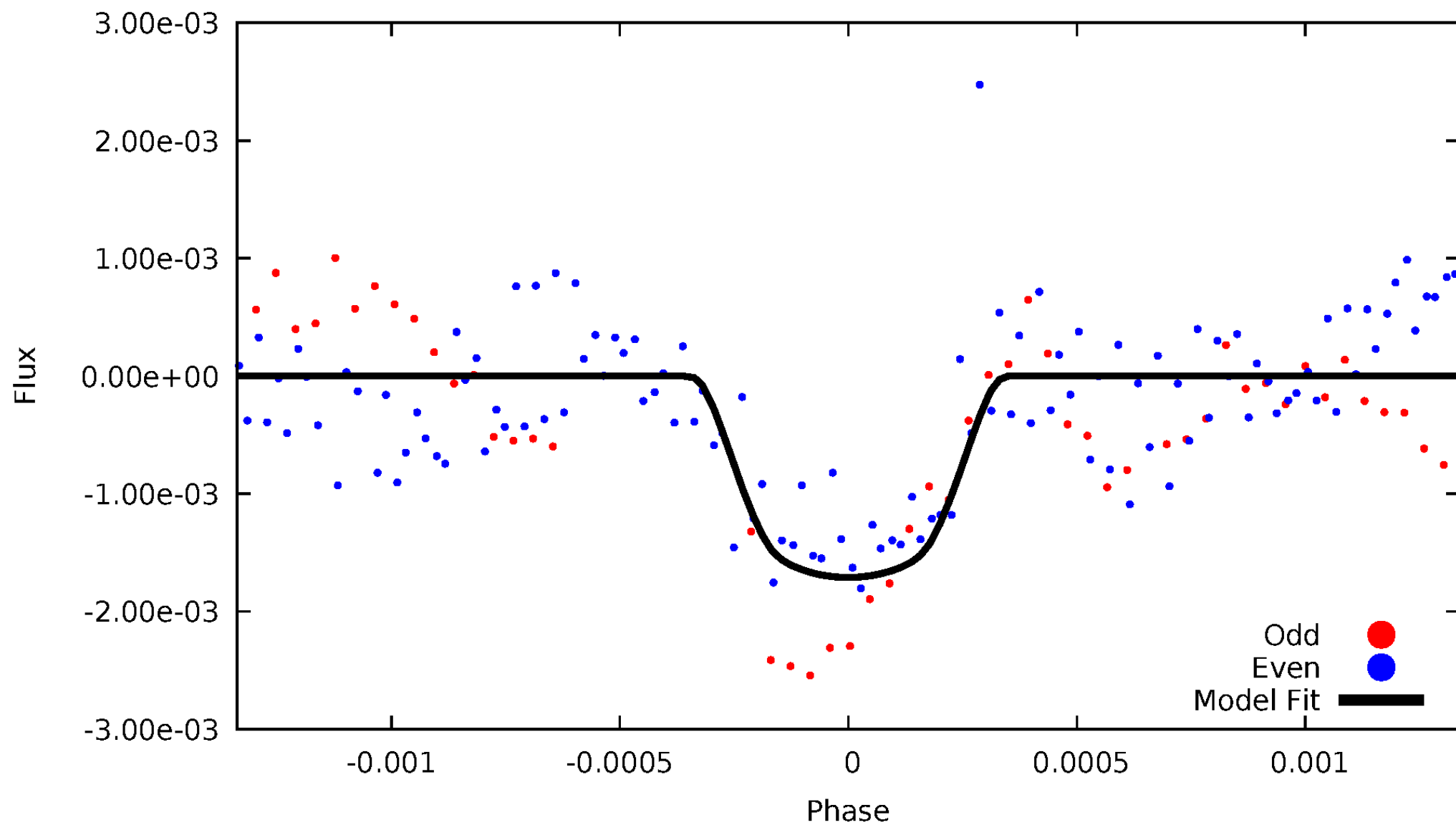


TCE 002570659-01



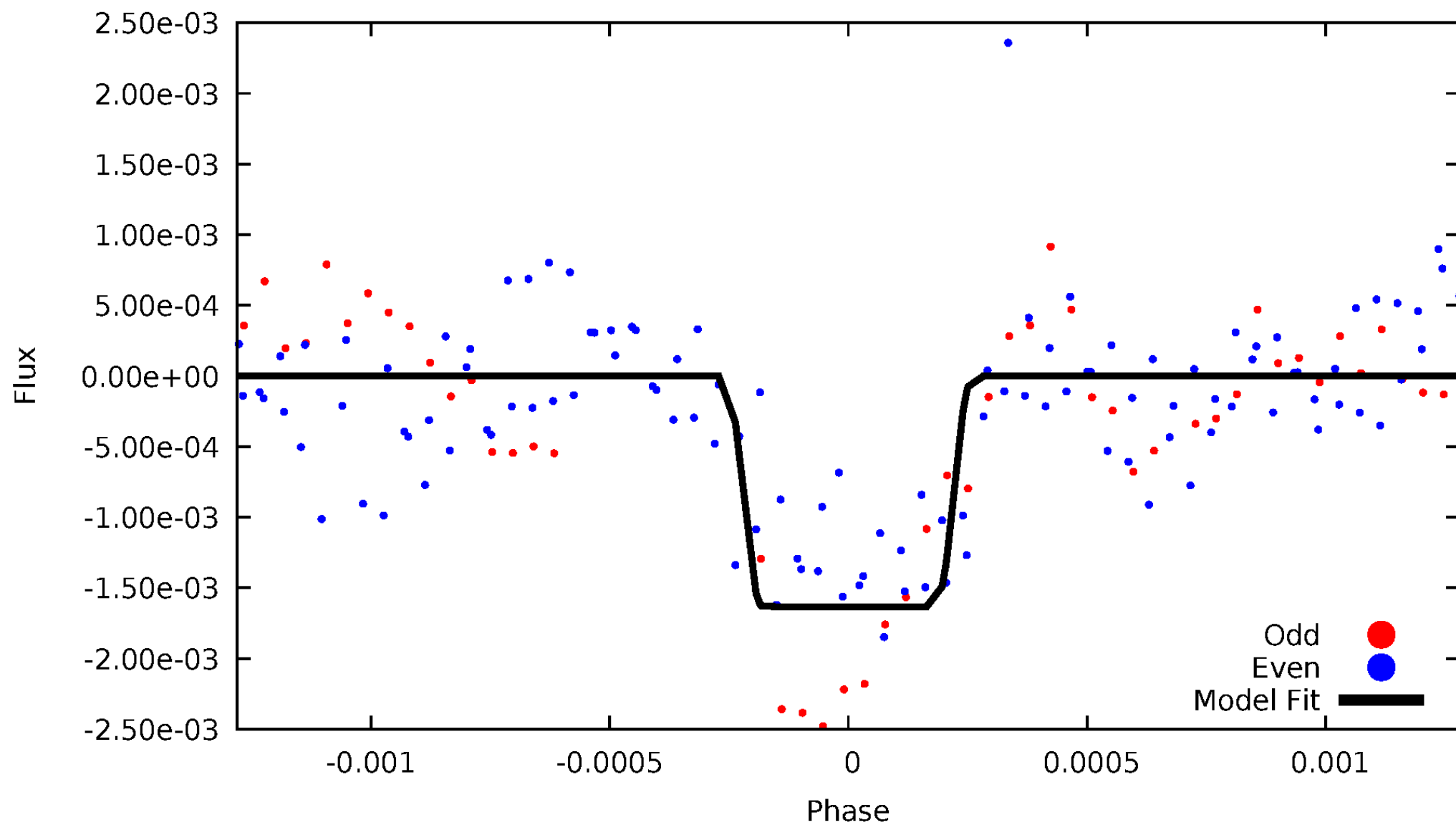
# DV Odd/Even

TCE 002570659-01



# ALT Odd/Even

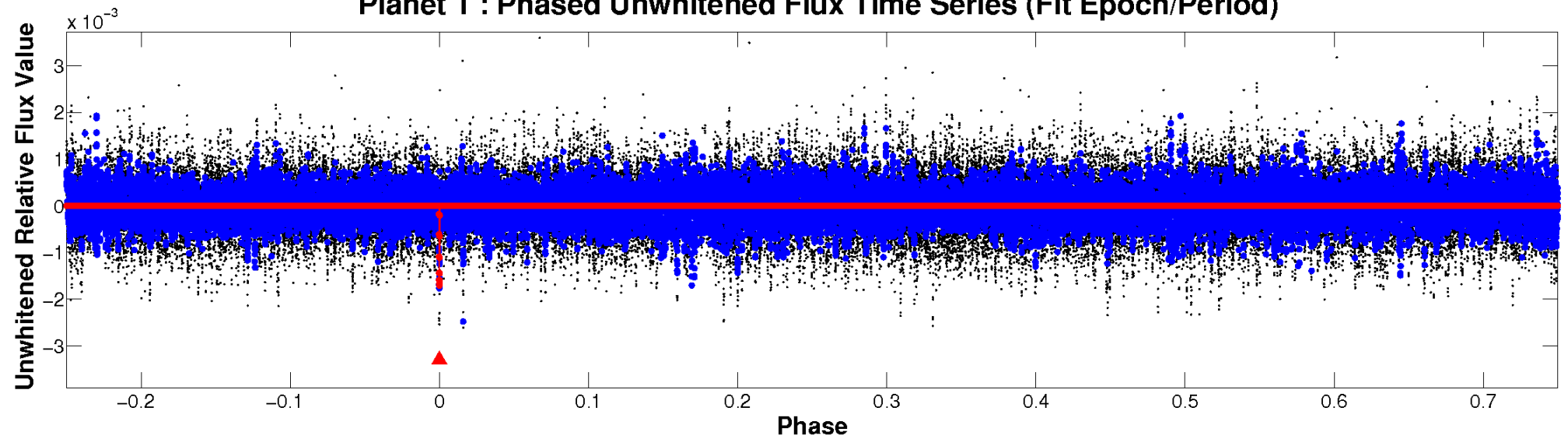
TCE 002570659-01



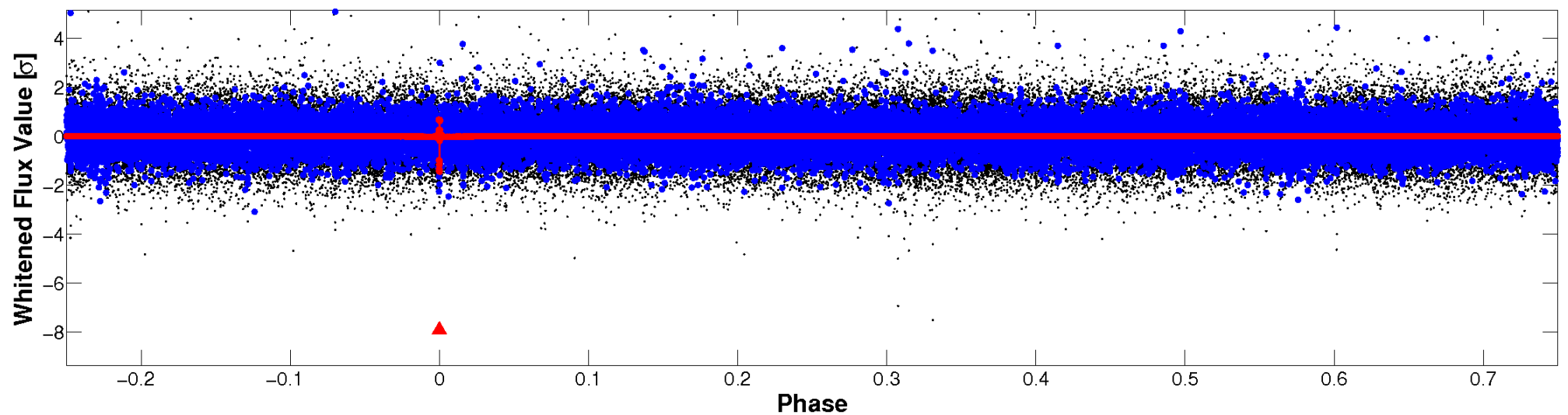


# Non-Whitened Vs. Whitened Light Curve

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

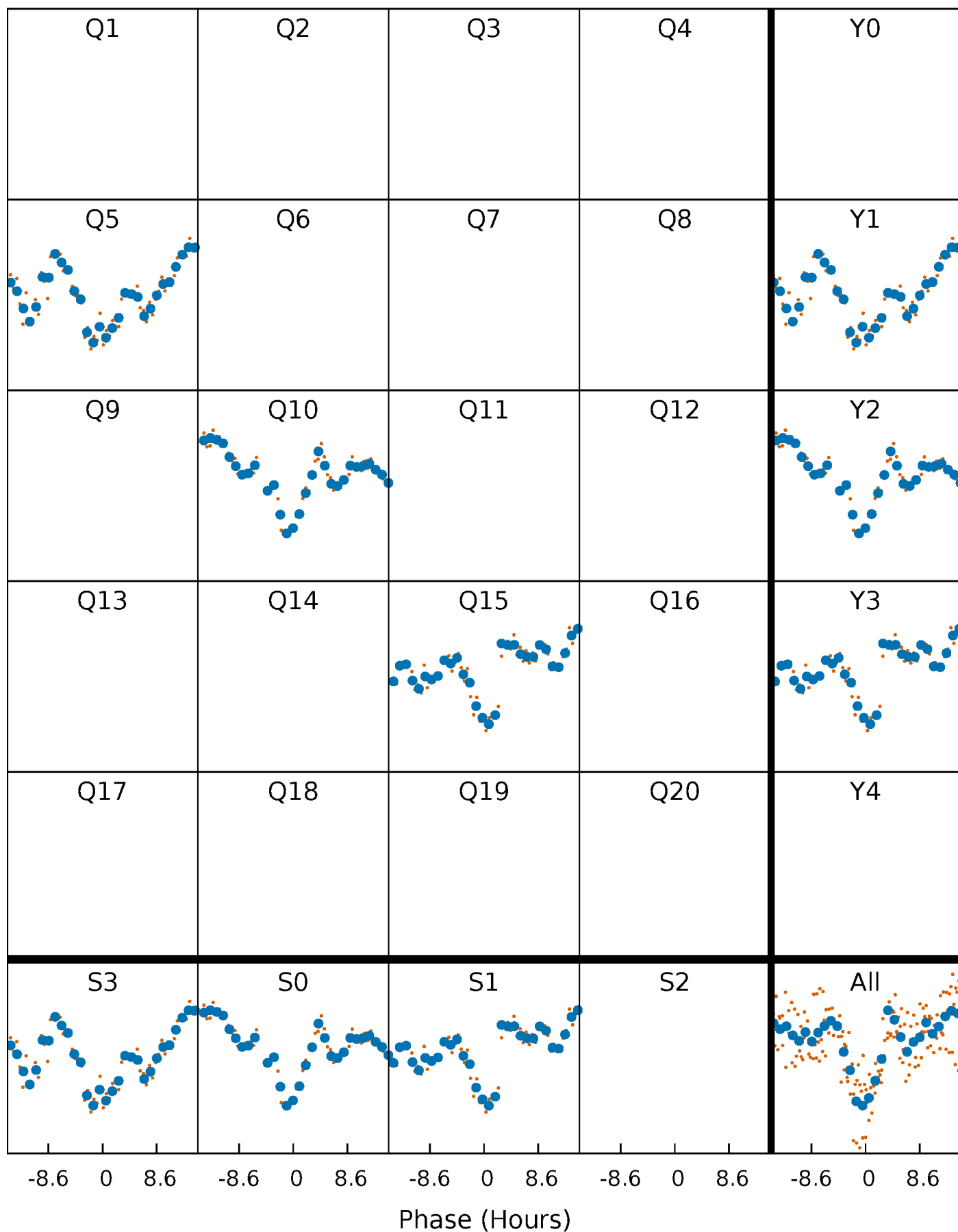


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

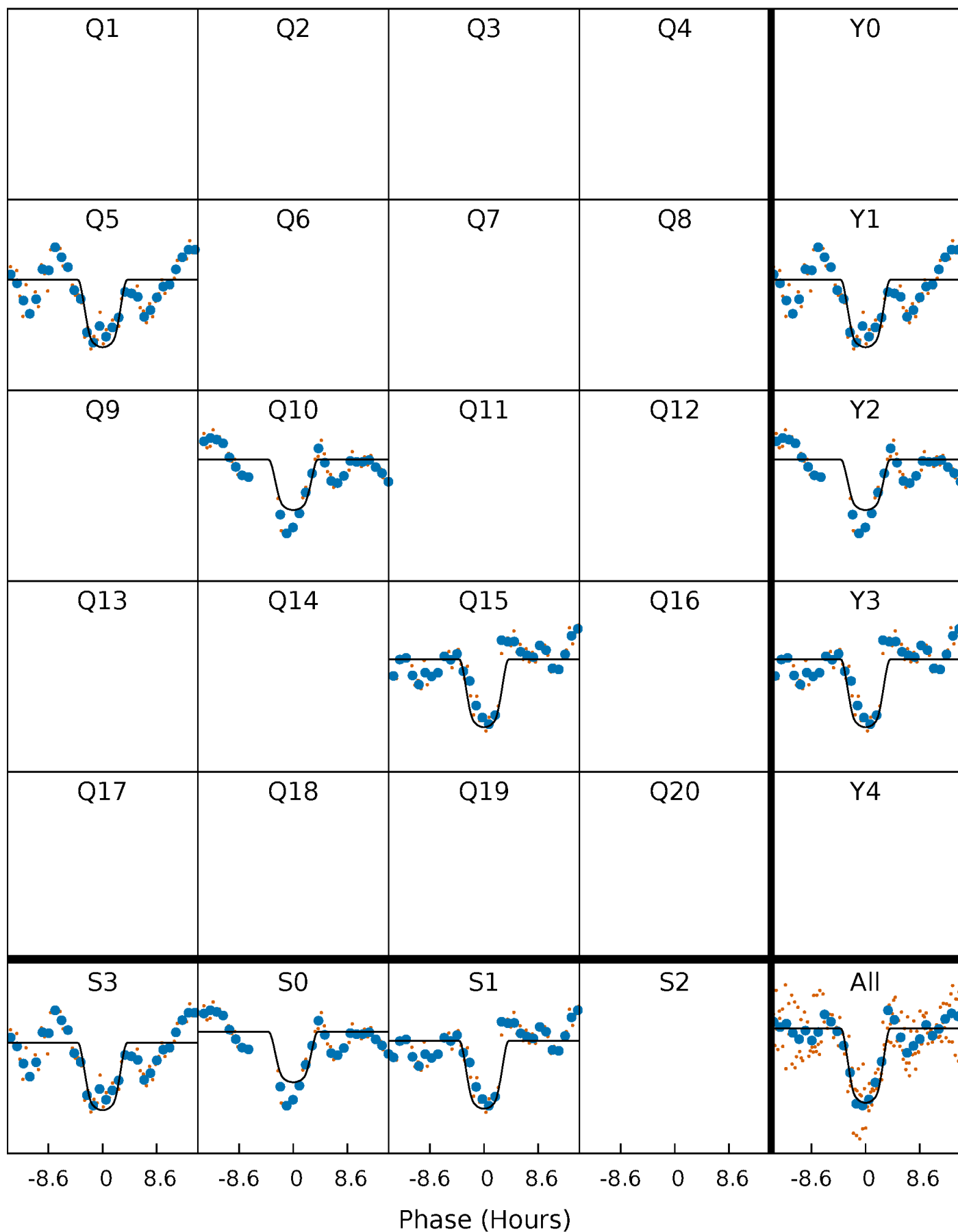
TCE 002570659-01 P=471.634808 Days  $T_0=458.423258$  (BKJD)





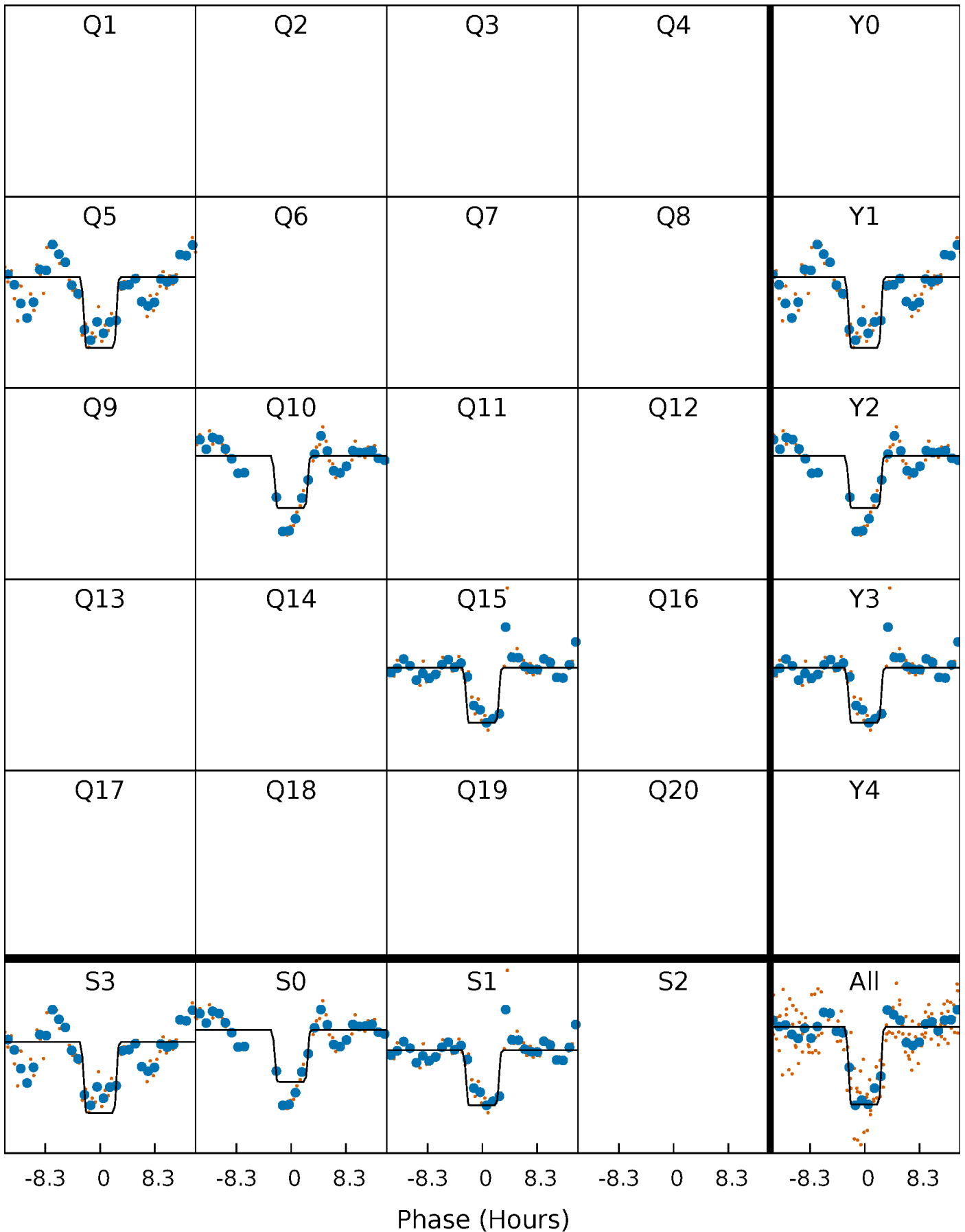
# DV Quarter-Phased Transit Curves

TCE 002570659-01 P=471.634808 Days  $T_0=458.423258$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

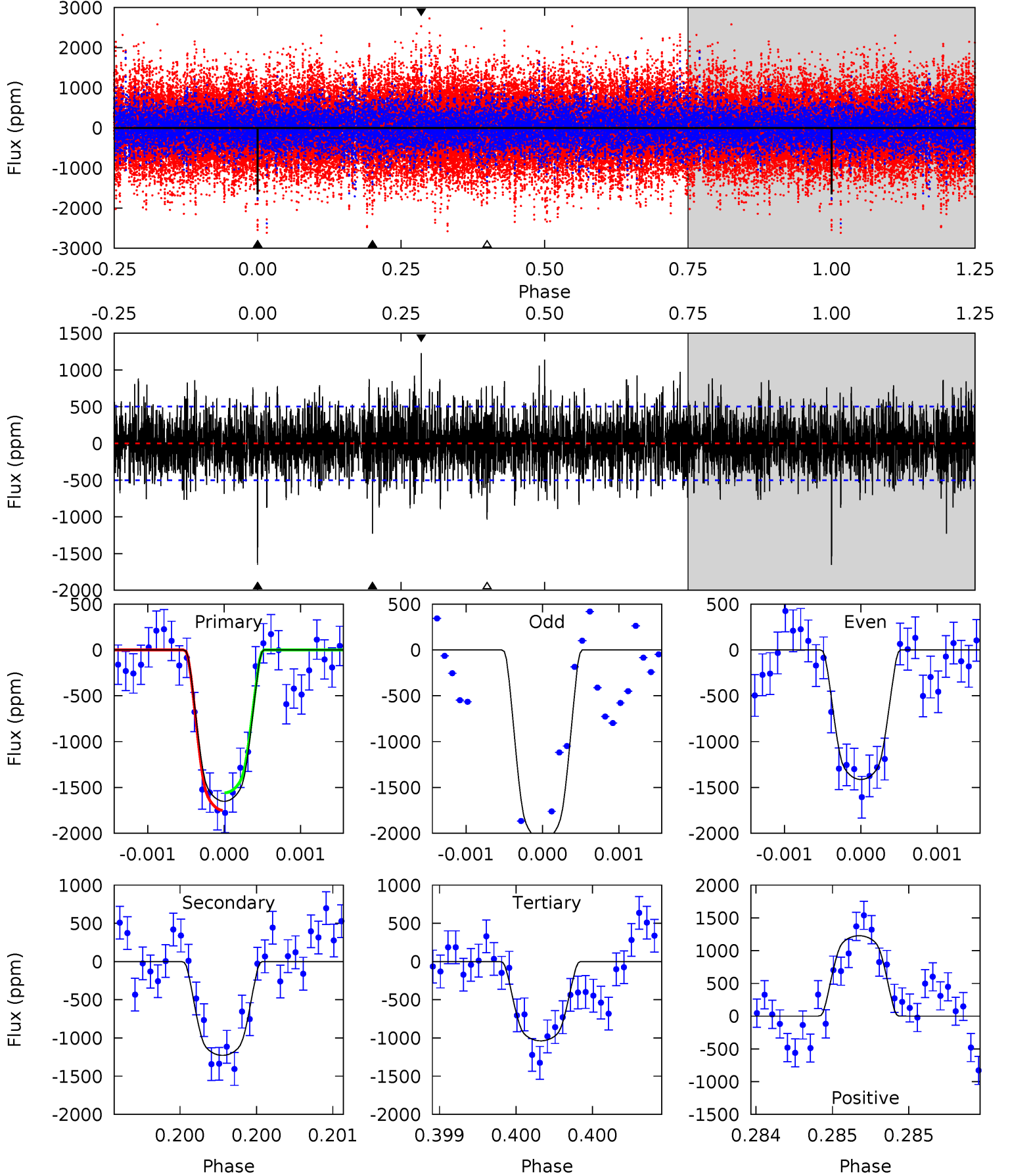
TCE 002570659-01 P=471.626998 Days  $T_0=458.416714$  (BKJD)



# DV Model-Shift Uniqueness Test

002570659-01, P = 471.634808 Days, E = 458.423258 Days

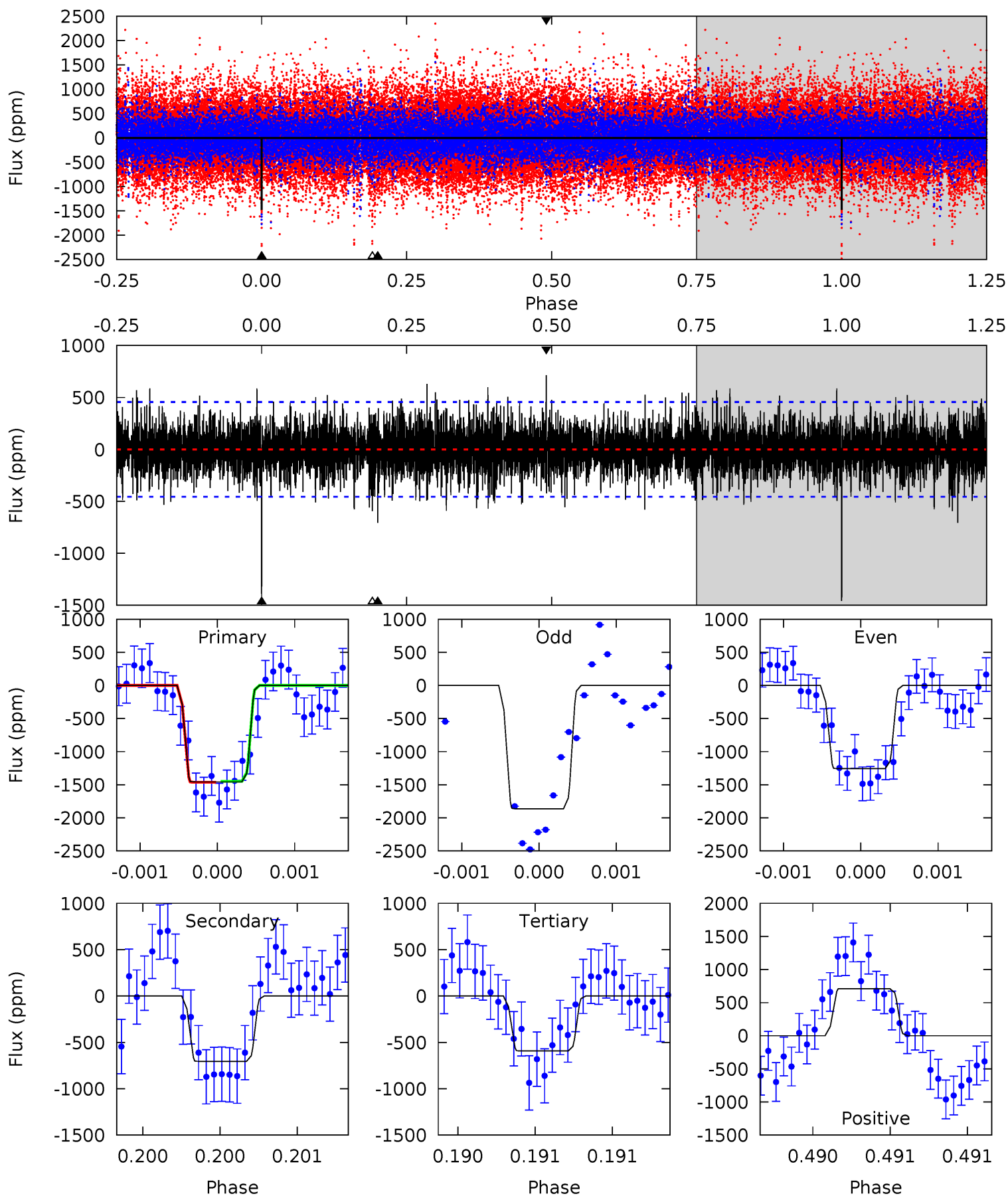
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.2	13.5	11.4	13.5	5.52	3.40	3.08	6.76	4.67	2.09	0.00	3.43	1.09	0.43	1.05



# Alt Model-Shift Uniqueness Test

002570659-01, P = 471.626998 Days, E = 458.416714 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
17.8	8.61	7.23	8.69	5.57	3.47	2.00	10.6	9.11	1.38	-0.08	3.48	1.14	0.33	0.09



### Stellar Parameters For KIC 002570659

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5110^{+129}_{-129}$	$3.422^{+0.325}_{-0.266}$	$-0.320^{+0.250}_{-0.250}$	$3.440^{+1.410}_{-1.153}$	$1.140^{+0.199}_{-0.243}$	$0.039^{+0.085}_{-0.024}$
	+3%/-3%	+9%/-8%	+78%/-78%	+41%/-34%	+17%/-21%	+214%/-60%
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 002570659-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-1228 \pm 91$	$17.09^{+4.35}_{-3.63}$	$518^{+58}_{-49}$	$4534^{+211}_{-183}$	$3446^{+2038}_{-1174}$
Alt.	$-705 \pm 82$	$14.96^{+3.86}_{-3.32}$	$521^{+58}_{-48}$	$4307^{+232}_{-186}$	$2669^{+1633}_{-1007}$

$T_{max}$  = 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

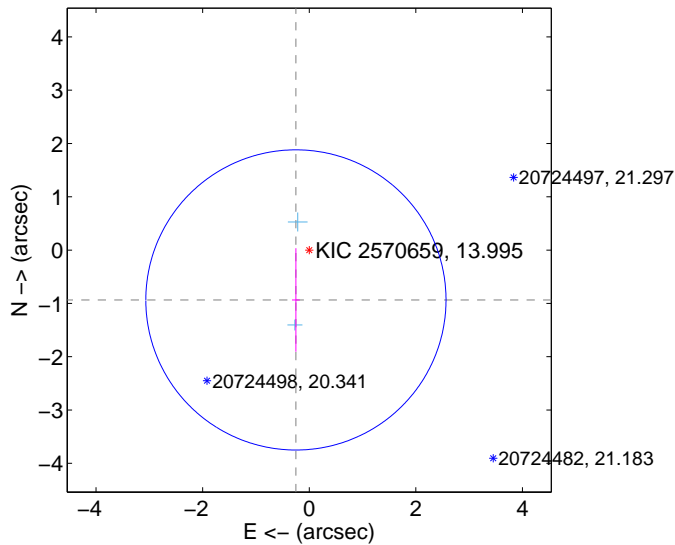
Supplemental centroid analysis for 002570659-01. Kepler magnitude: 13.99. Transit SNR 6.94

There are 2 quarters with good PRF difference image offsets

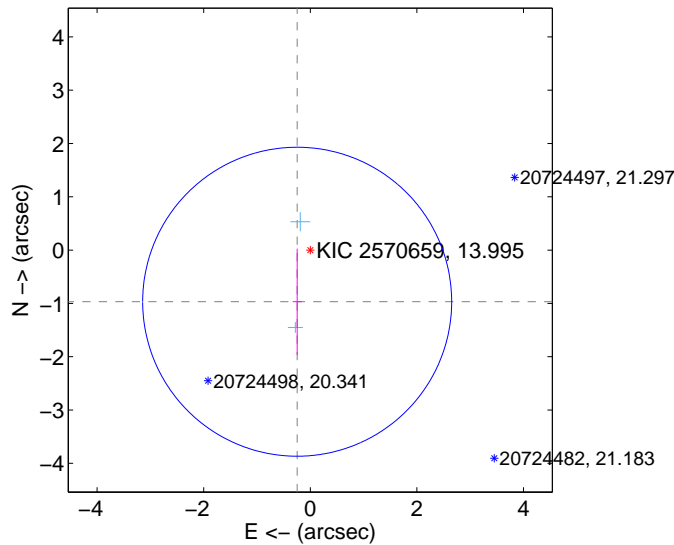
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.968 \pm 0.939$	1.03	$0.250 \pm 0.073$	$-0.935 \pm 0.971$
PRF-fit source offset from KIC position	$1.000 \pm 0.966$	1.03	$0.246 \pm 0.084$	$-0.969 \pm 0.997$
photometric centroid source offset	$0.55 \pm 0.34$	1.61	$-0.53 \pm 0.34$	$0.13 \pm 0.43$

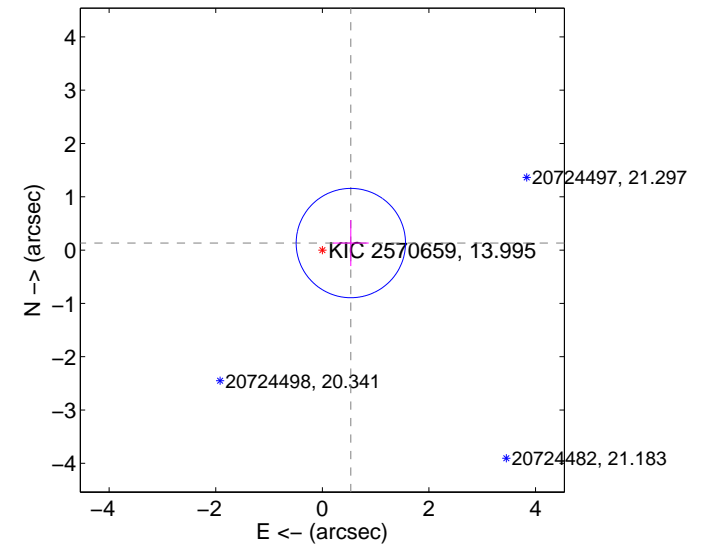
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids



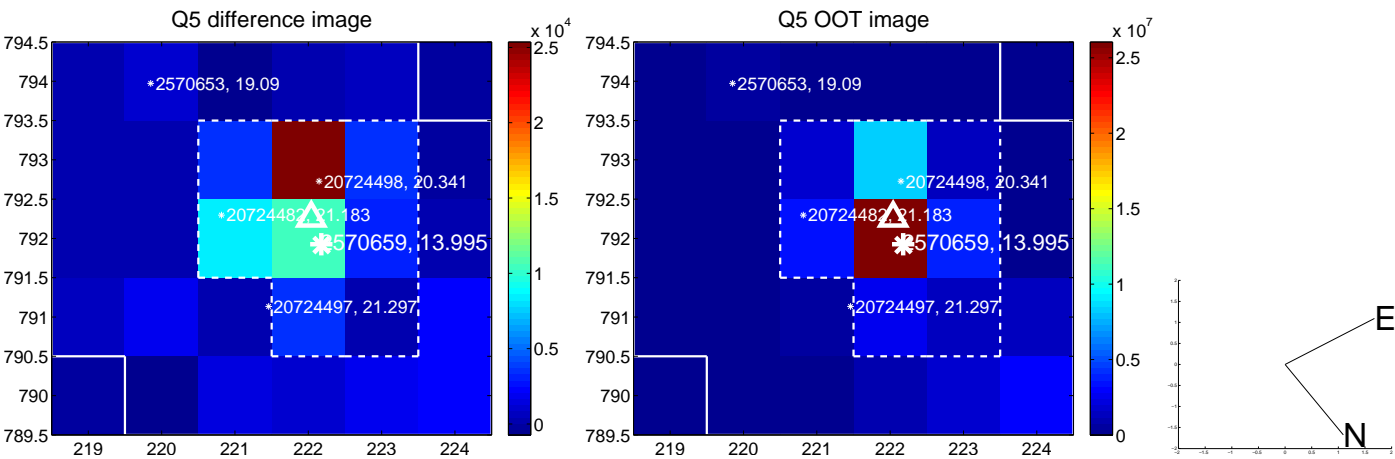
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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





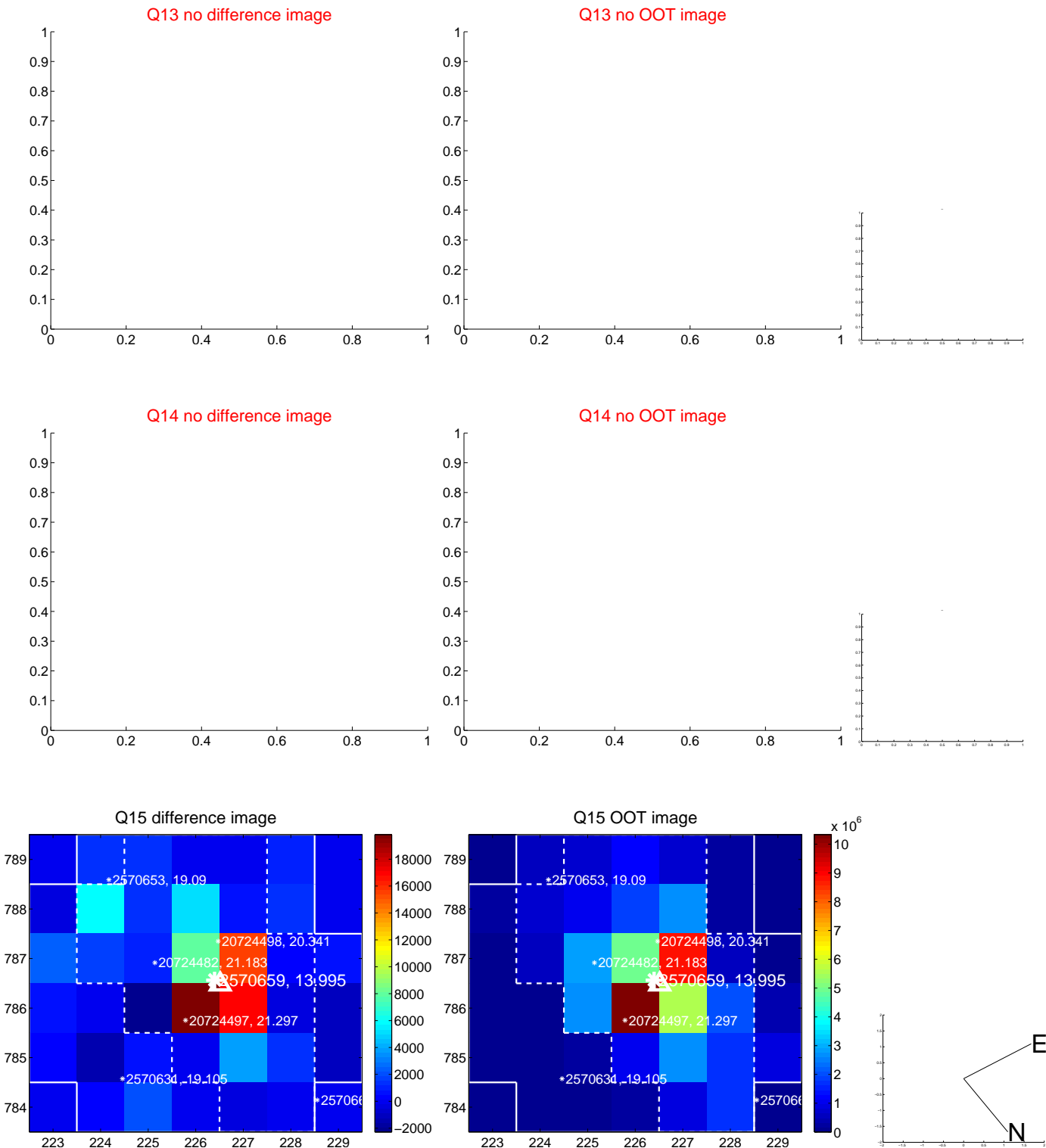
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



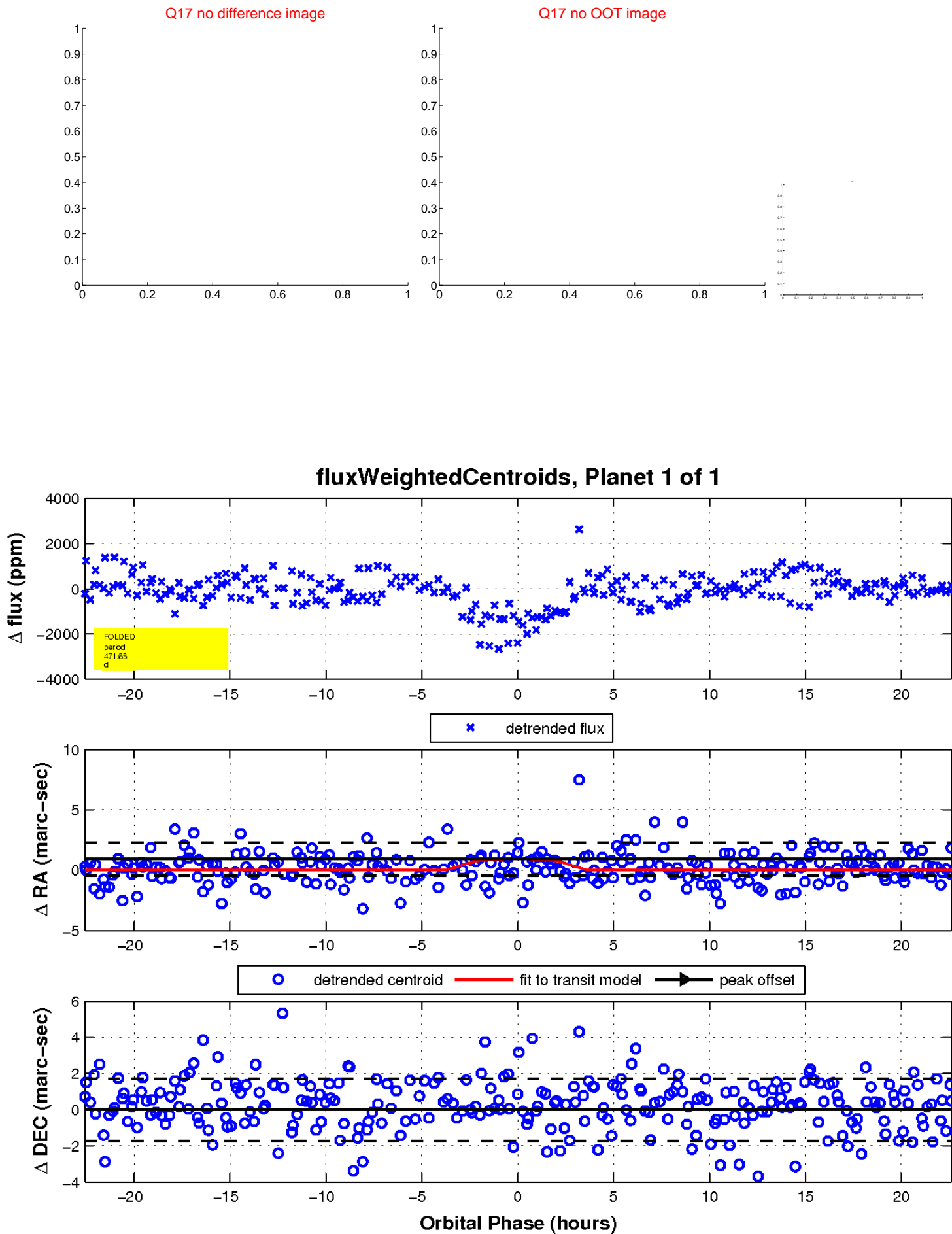
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white ×: 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.



UKIRT Image

Declination

