

# KIC 012470748

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
012470748-01	OBS	No	477.361973	314.469969	1459.7	9.041	7.9	7.0	2.23	5007	16.60	2.14

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012470748-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—MOD_NONUNIQ_ALT—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.

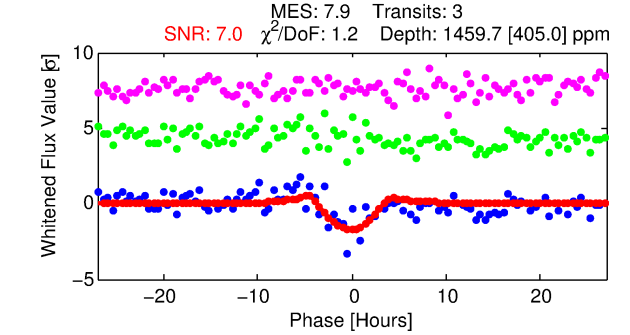
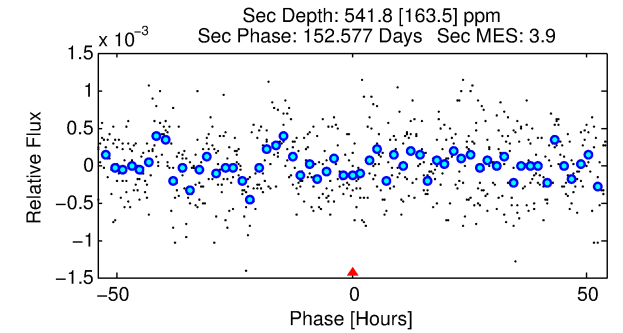
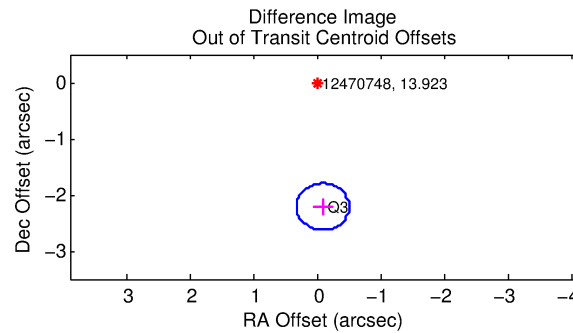
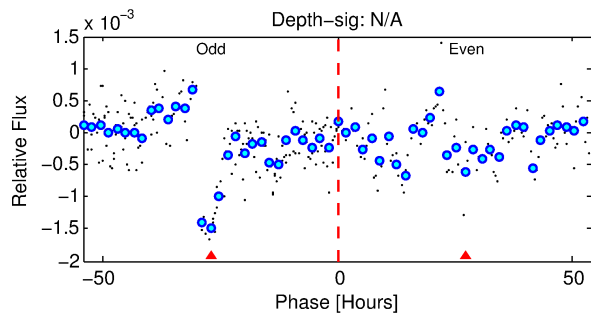
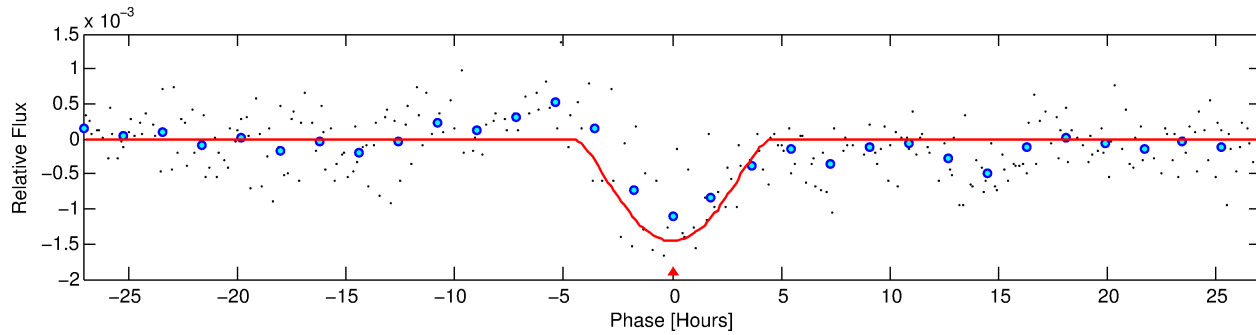
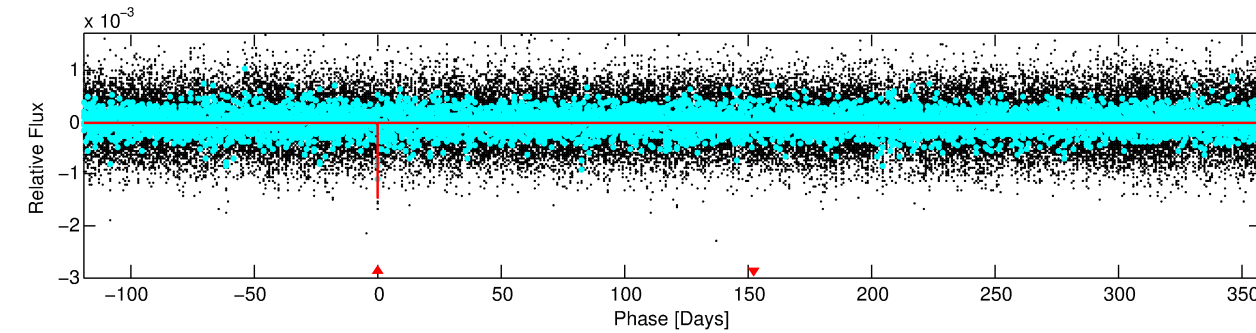
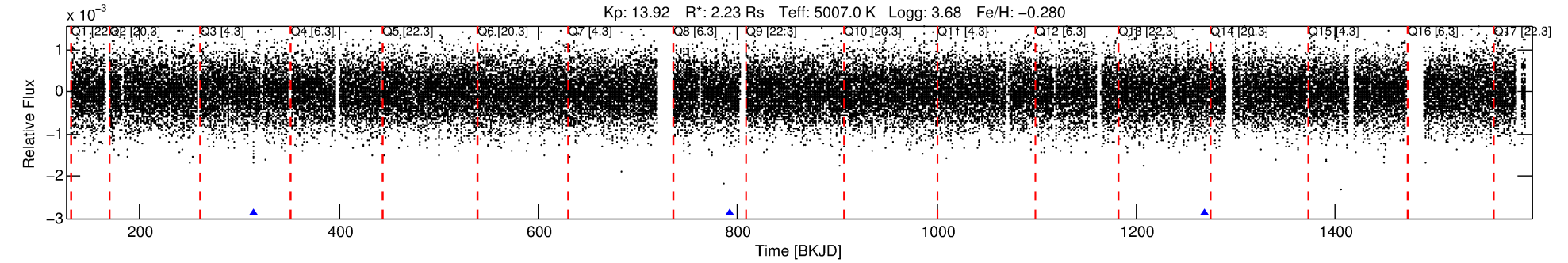
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 012470748-01

No Significant Match Found

# DV One-Page Summary

KIC: 12470748 Candidate: 1 of 1 Period: 477.362 d



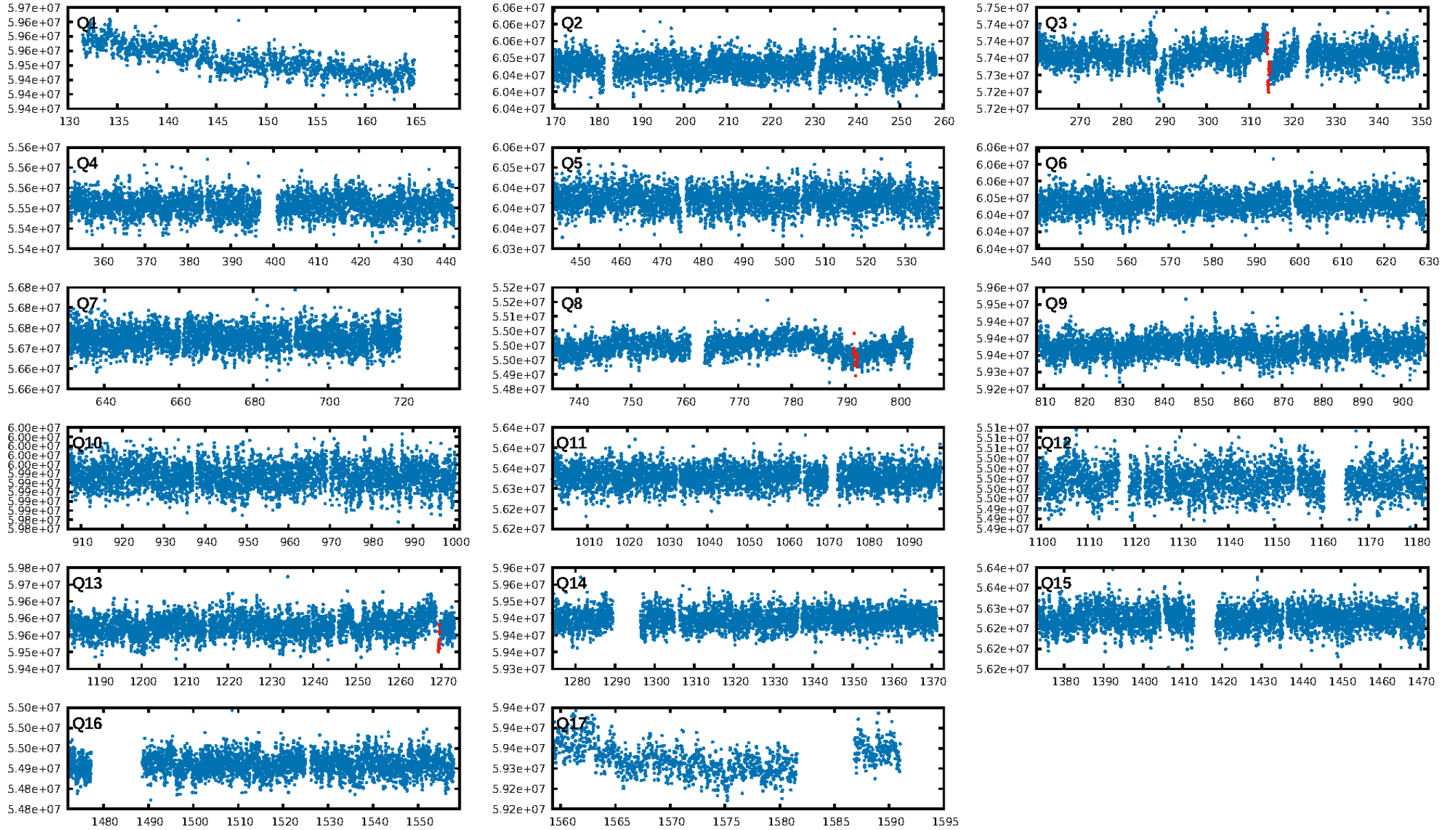
## DV Fit Results:

Period = 477.36197 [0.02229] d  
Epoch = 314.4700 [0.0199] BKJD  
Rp/R\* = 0.0684 [0.2743]  
a/R\* = 153.83 [136.40]  
b = 1.00 [0.41]  
Seff = 2.14 [3.25]  
Teq = 309 [117] K  
Rp = 16.60 [67.58] Re  
a = 1.1406 [0.9758] AU  
Ag = 1407.10 [11494.35] [0.12 $\sigma$ ]  
Teffp = 2921 [5863] K [0.45 $\sigma$ ]

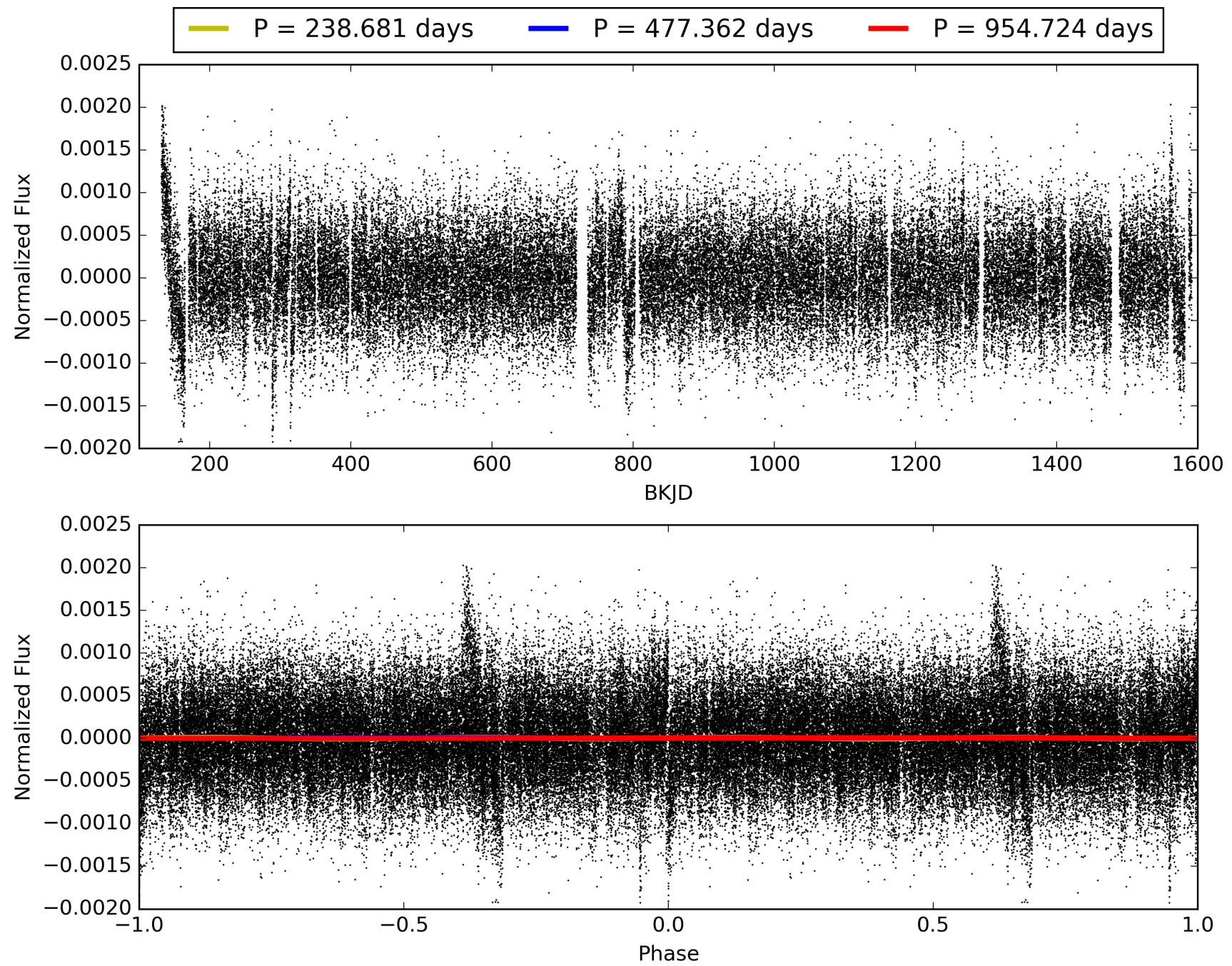
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 4.6%  
ModelChiSquareGof-sig: 99.8%  
**Bootstrap-pfa: 6.79e-11**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 38.64  
**Centroid-sig: 0.1%**  
Centroid-so: 0.388 arcsec [0.77 $\sigma$ ]  
**OotOffset-rm: 2.216 arcsec [15.94 $\sigma$ ]**  
**KicOffset-rm: 2.083 arcsec [14.98 $\sigma$ ]**  
OotOffset-st: 0/1/0/0 [1]  
KicOffset-st: 0/1/0/0 [1]  
DiffImageQuality-fgm: 1.00 [1/1]  
DiffImageOverlap-fno: 1.00 [2/2]

# TCE 012470748-01, PDC Light Curves

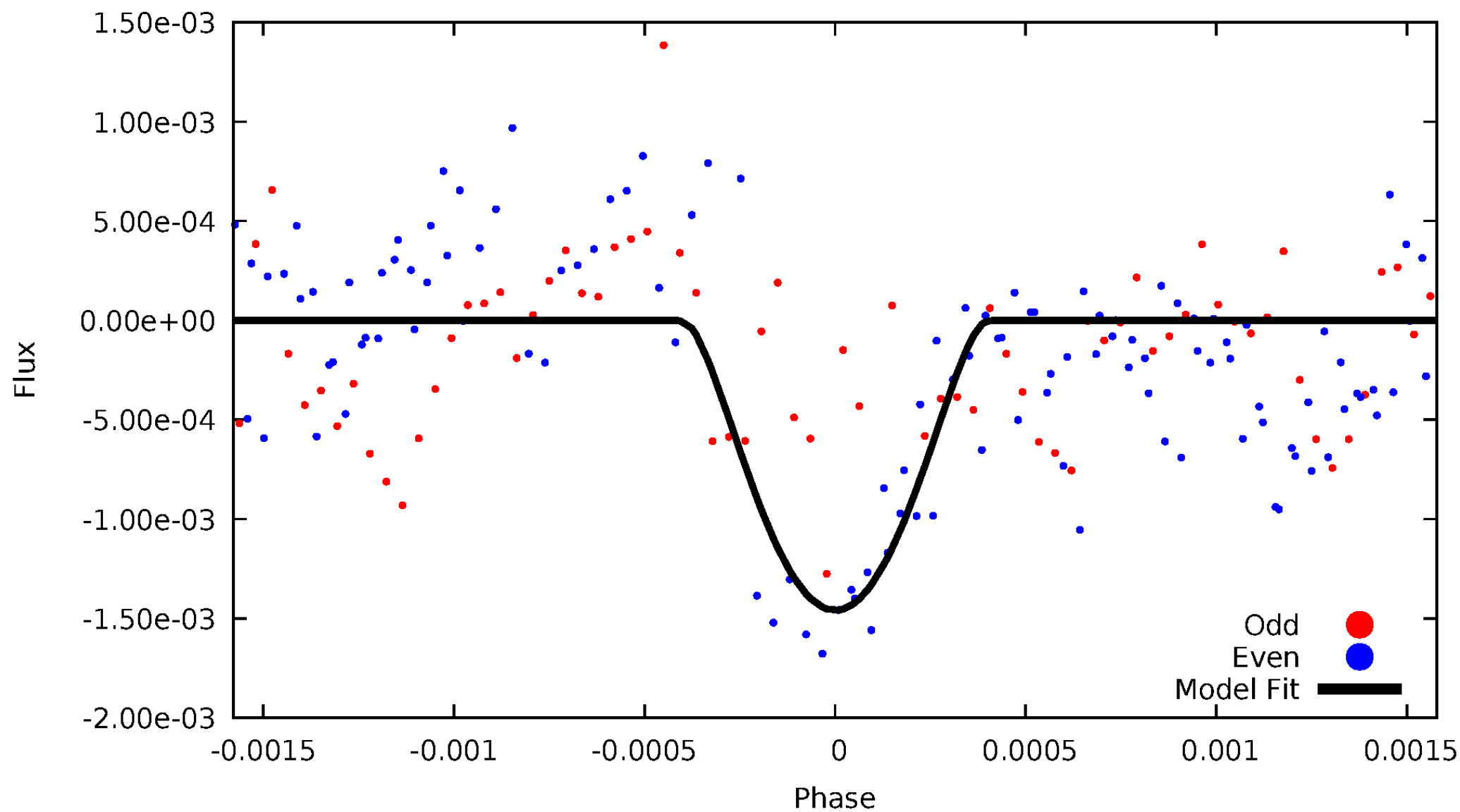


# TCE 012470748-01



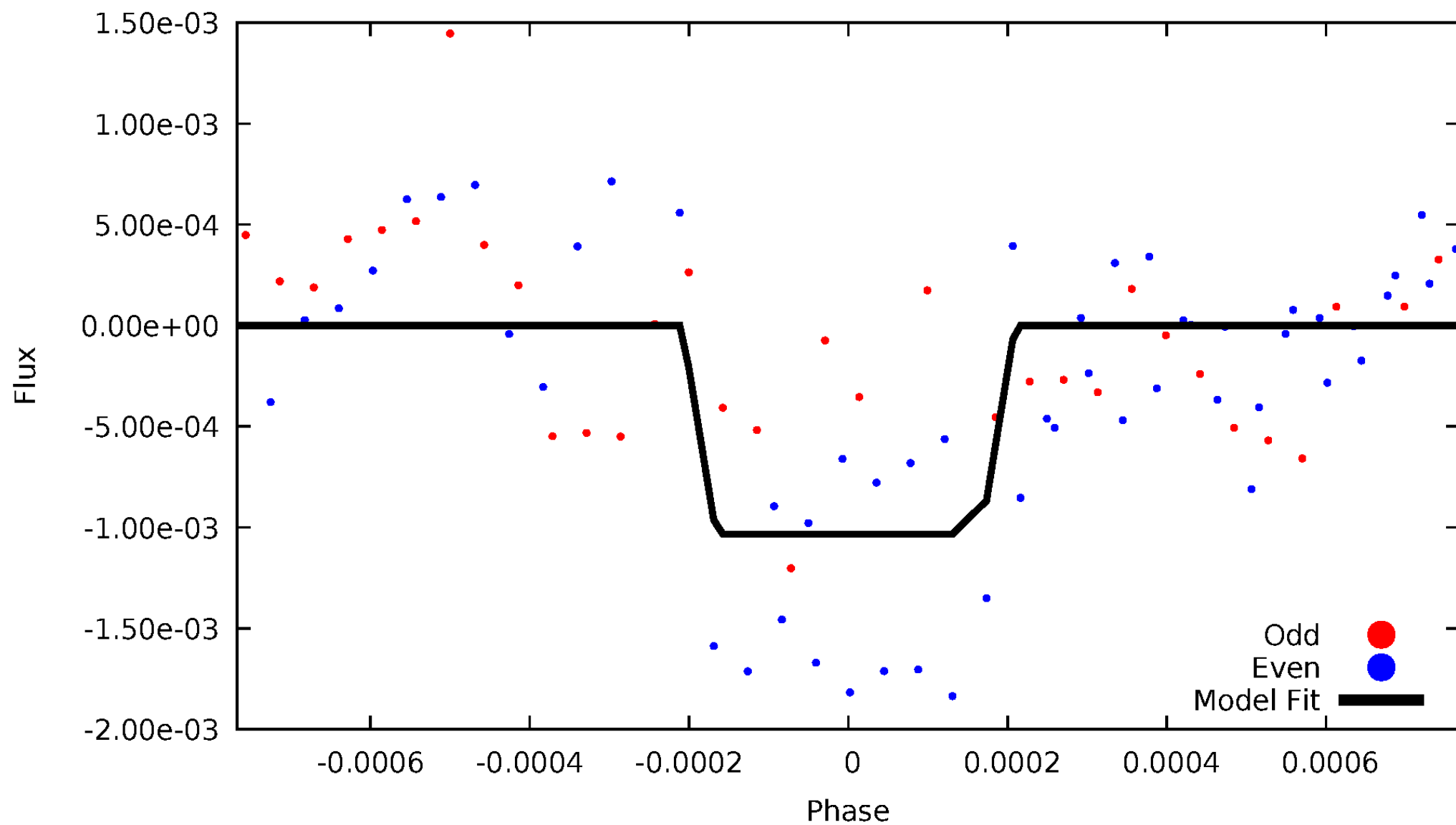
# DV Odd/Even

TCE 012470748-01



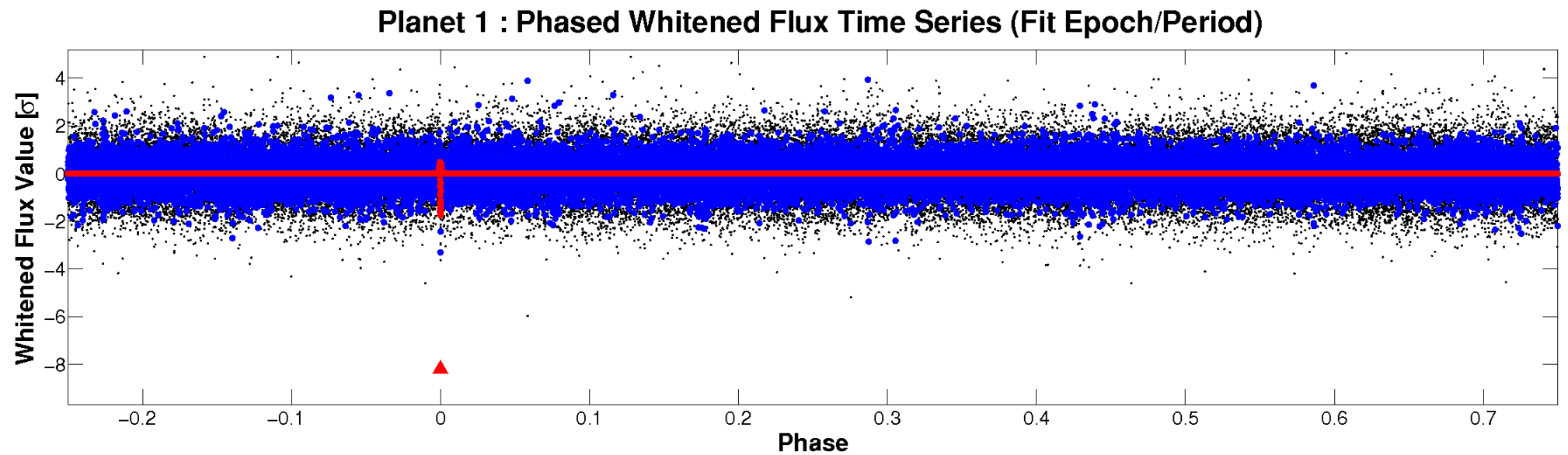
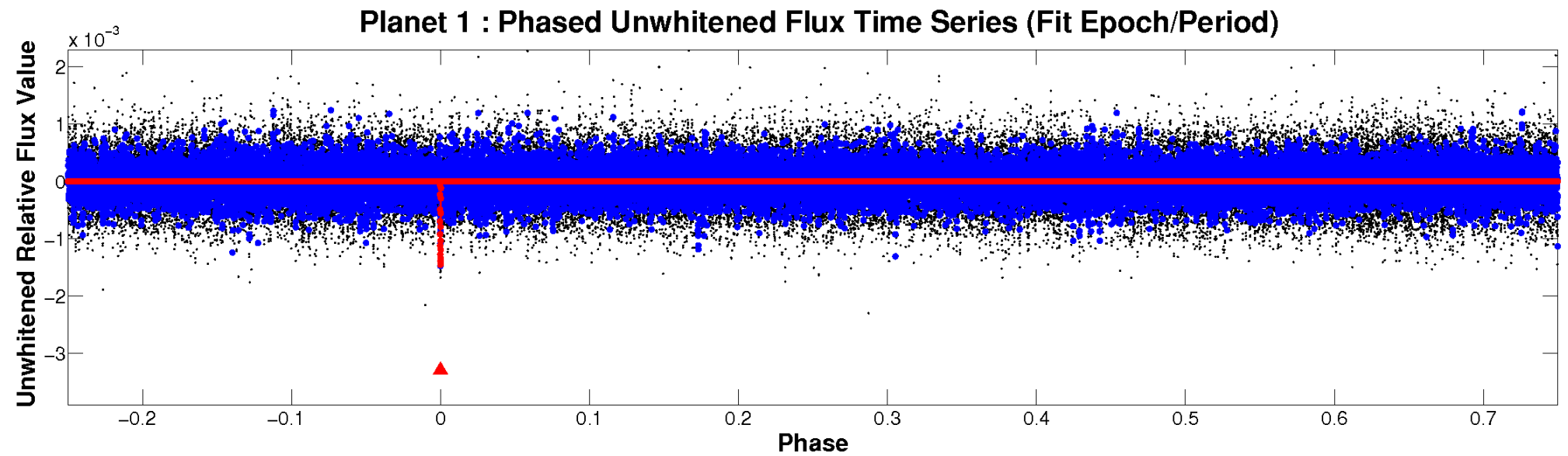
# ALT Odd/Even

TCE 012470748-01



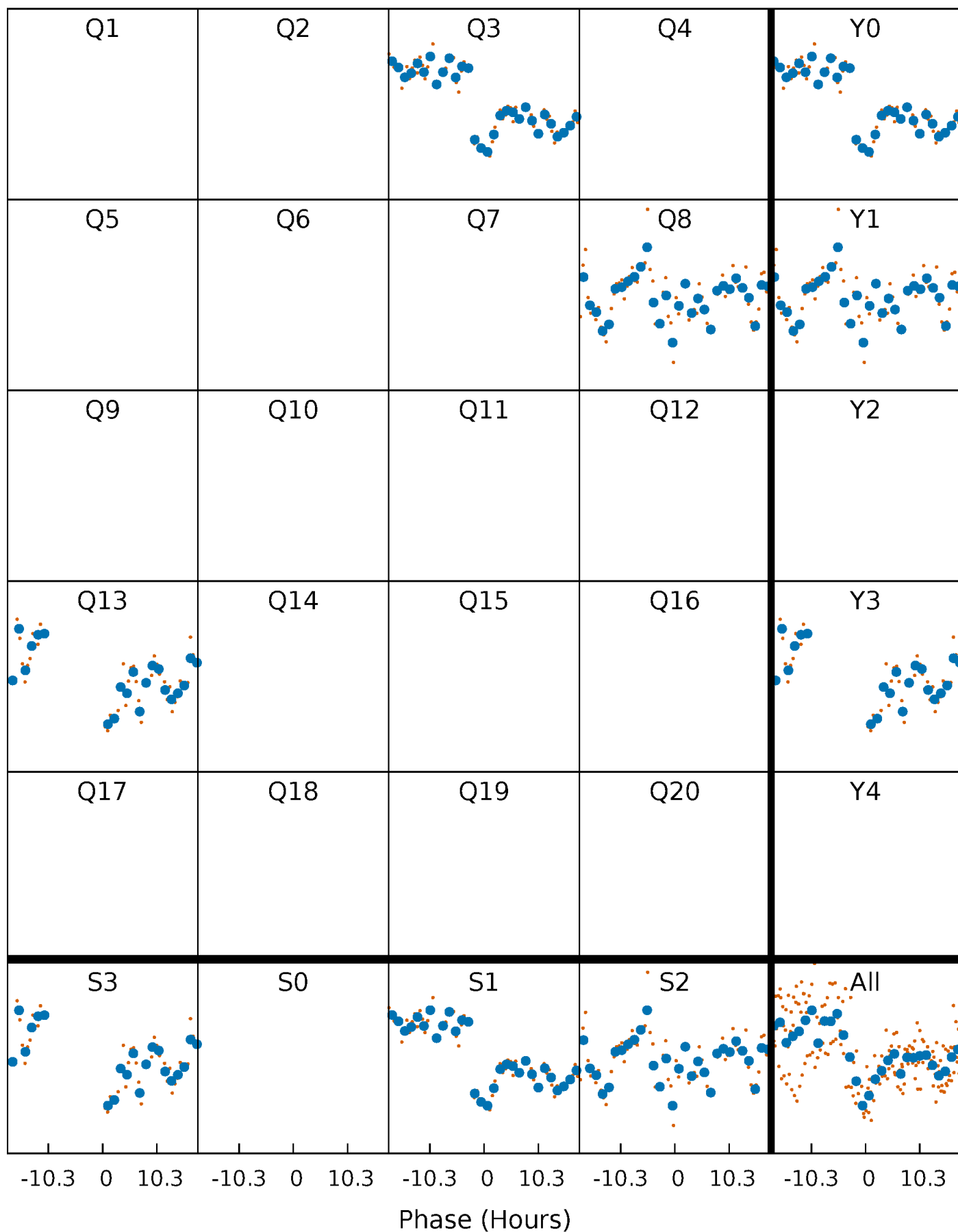


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

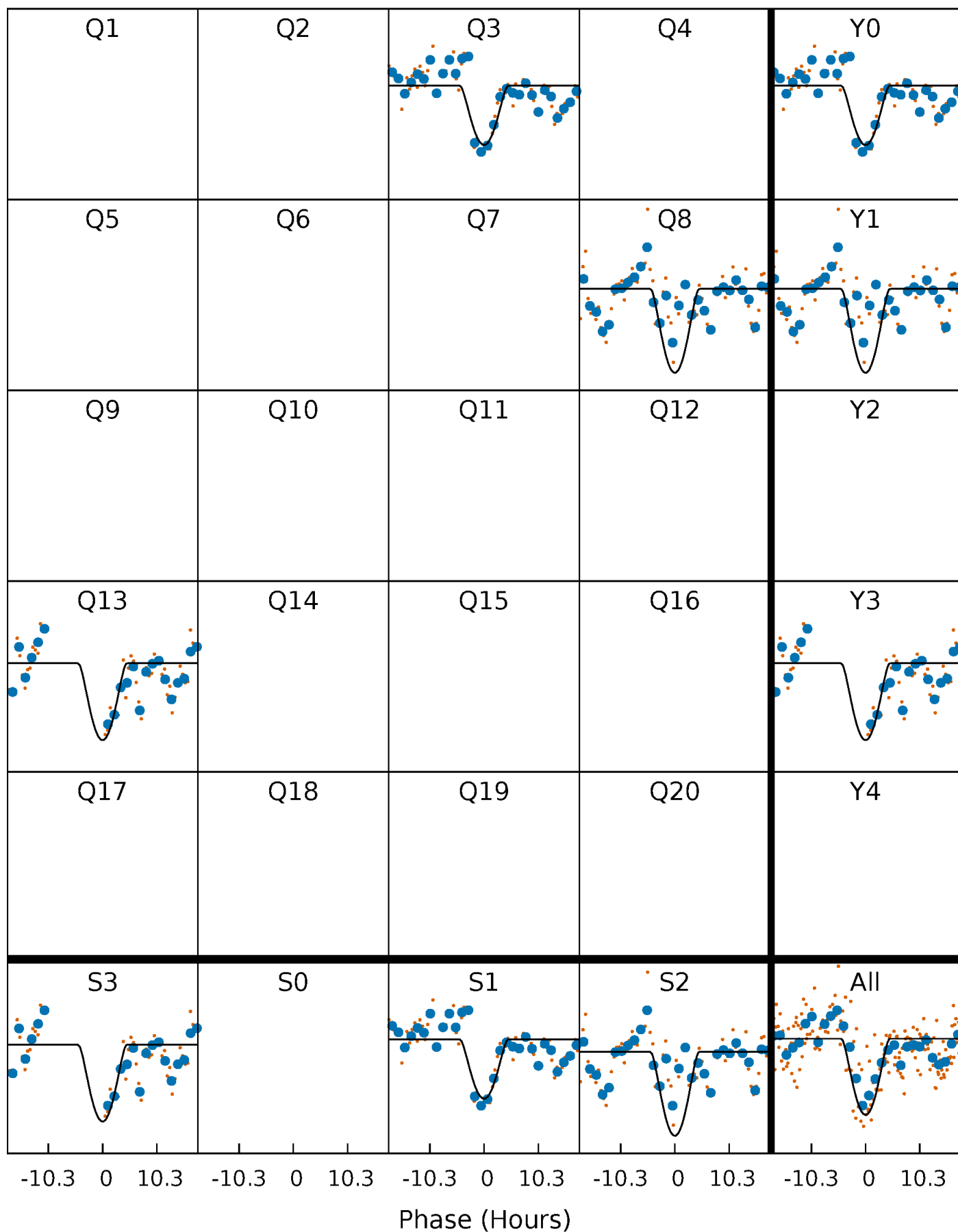
TCE 012470748-01 P=477.361973 Days  $T_0=314.469969$  (BKJD)





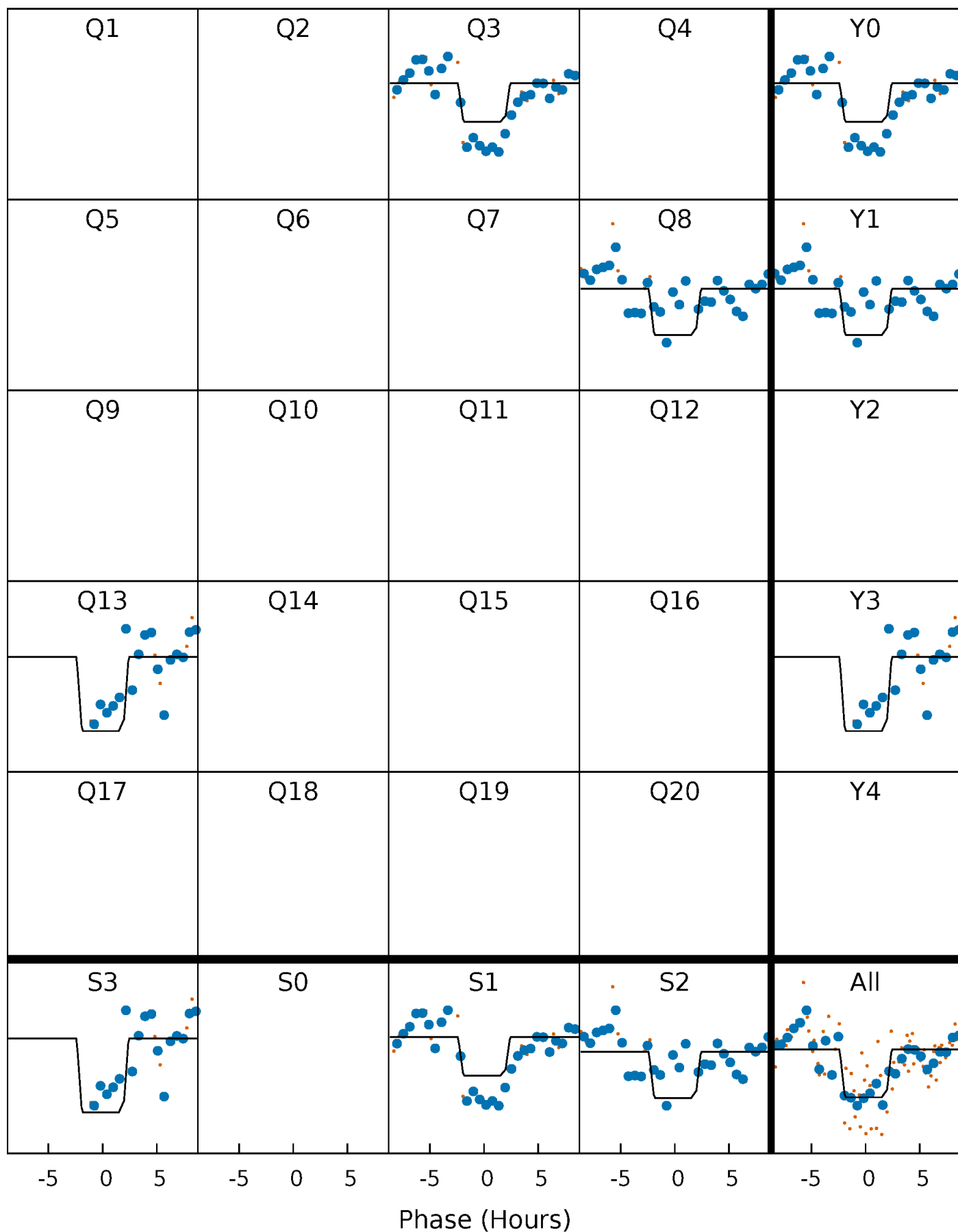
# DV Quarter-Phased Transit Curves

TCE 012470748-01 P=477.361973 Days  $T_0=314.469969$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

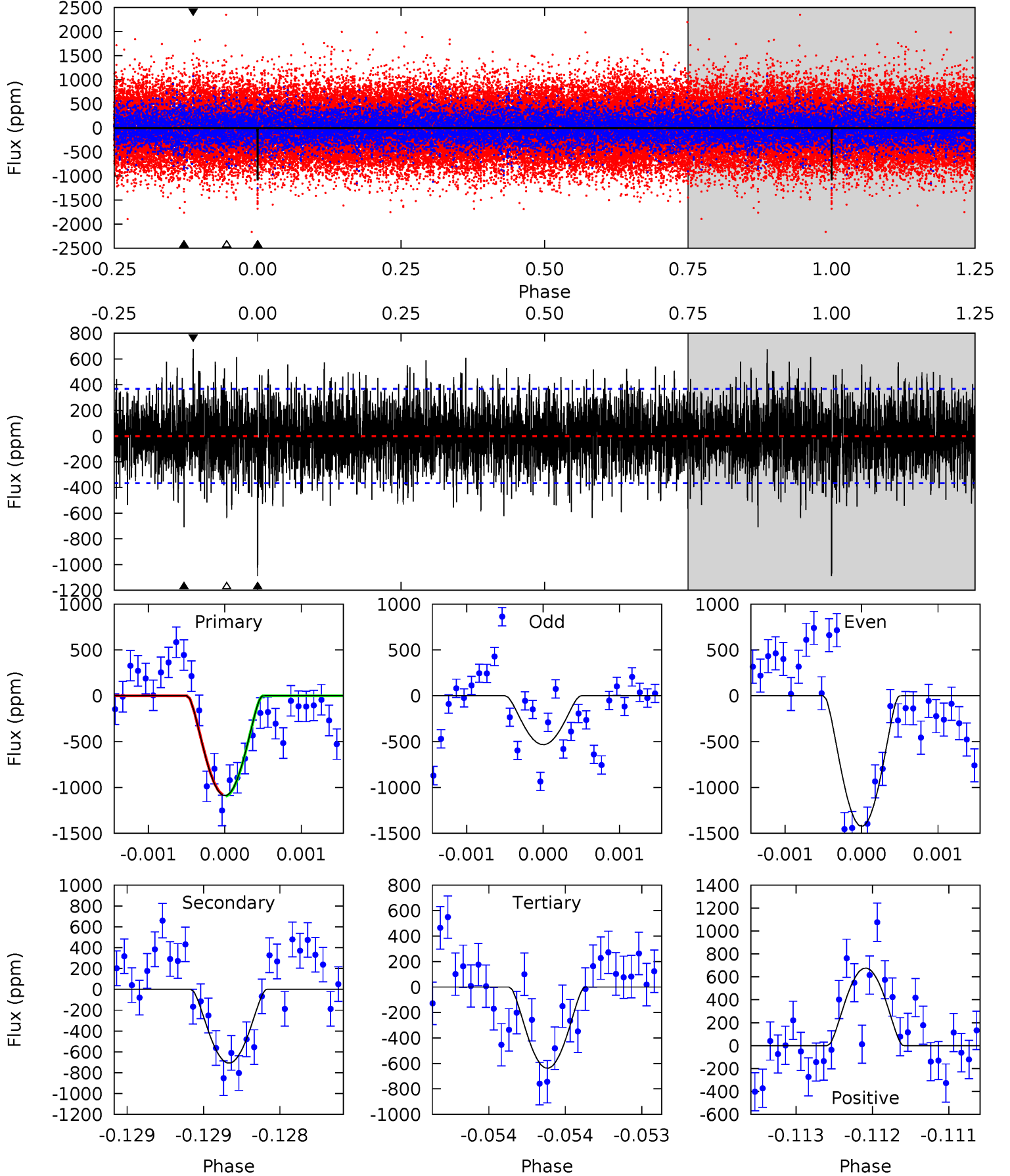
TCE 012470748-01 P=477.402885 Days  $T_0=314.452989$  (BKJD)



# DV Model-Shift Uniqueness Test

012470748-01, P = 477.361973 Days, E = 314.469969 Days

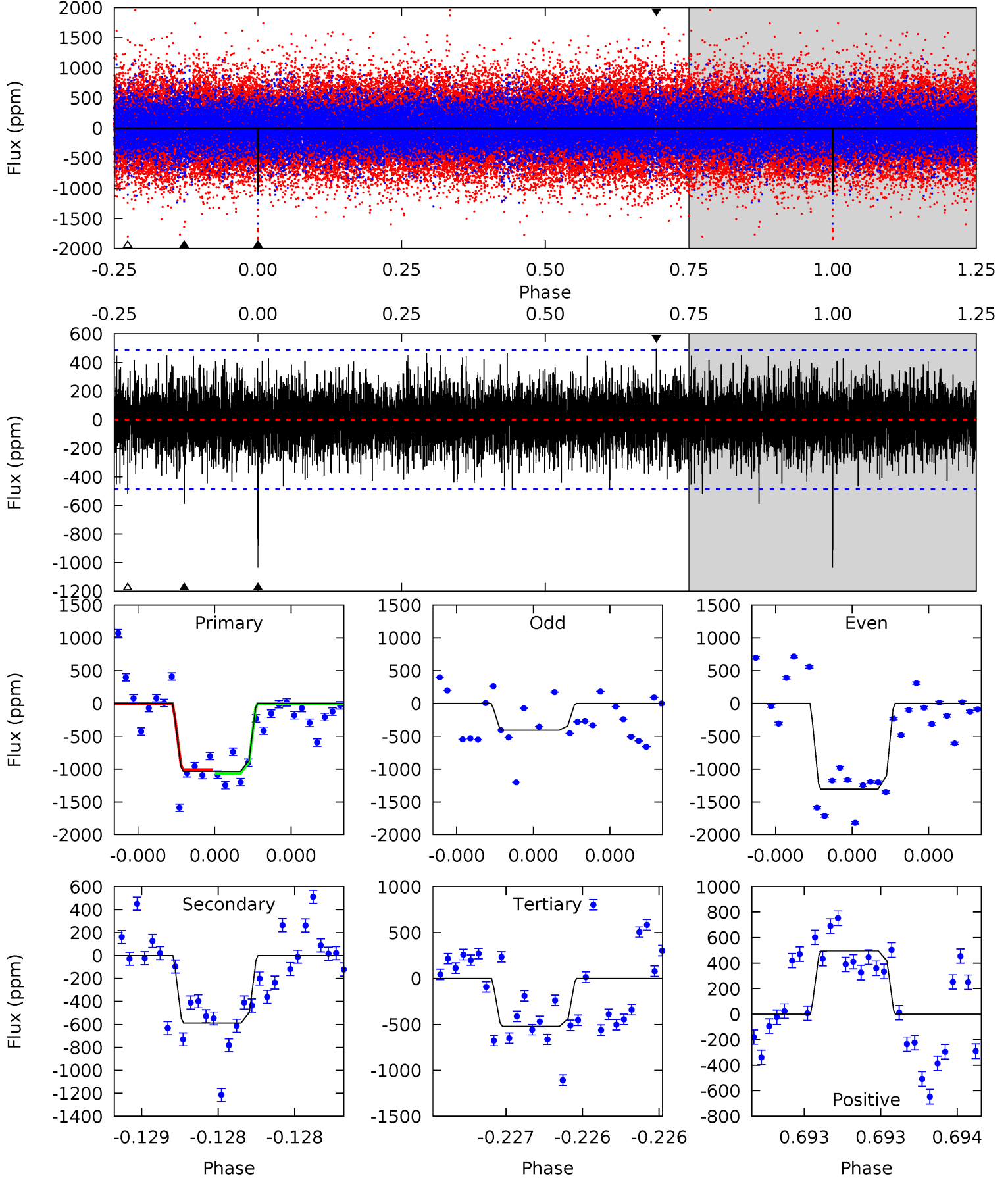
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.3	10.6	9.53	10.1	5.49	3.35	2.78	6.77	6.19	1.05	0.47	6.48	0.82	0.38	0.12



# Alt Model-Shift Uniqueness Test

012470748-01, P = 477.402885 Days, E = 314.452989 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
12.0	6.81	6.01	5.75	5.62	3.55	1.60	5.95	6.21	0.80	1.06	4.87	1.26	0.32	0.30



### Stellar Parameters For KIC 012470748

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5007^{+136}_{-121}$	$3.682^{+0.938}_{-0.313}$	$-0.280^{+0.350}_{-0.200}$	$2.225^{+1.262}_{-1.542}$	$0.869^{+0.247}_{-0.164}$	$0.111^{+2.709}_{-0.090}$
	+3%/-2%	+25%/-9%	+125%/-71%	+57%/-69%	+28%/-19%	+2438%/-81%
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 012470748-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-708 \pm 67$	$44.88^{+55.78}_{-30.71}$	$419^{+66}_{-82}$	$2558^{+1028}_{-372}$	$270^{+2405}_{-219}$
Alt.	$-589 \pm 86$	$41.11^{+54.18}_{-30.29}$	$424^{+64}_{-82}$	$2612^{+1037}_{-444}$	$274^{+3210}_{-227}$

$T_{\text{max}}$  = 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

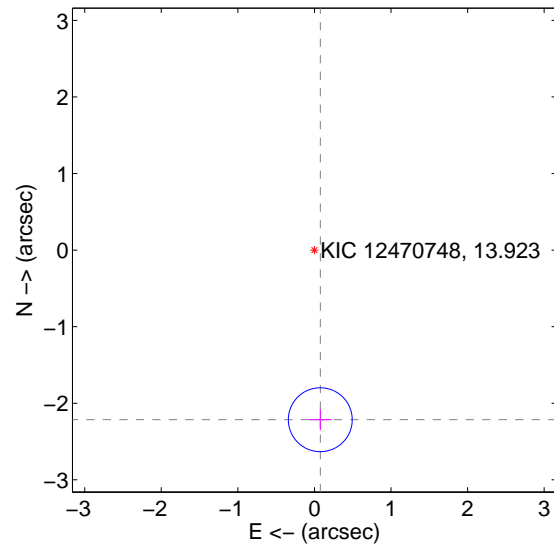
Supplemental centroid analysis for 012470748-01. Kepler magnitude: 13.92. Transit SNR 7.01

There are 1 quarters with good PRF difference image offsets

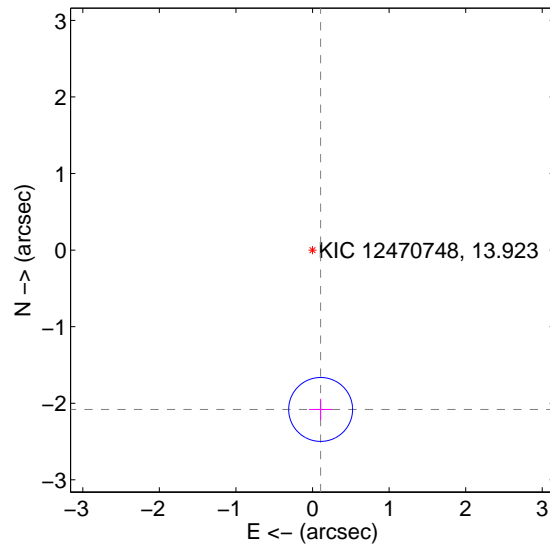
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.216 \pm 0.139$	15.94	$-0.076 \pm 0.151$	$-2.215 \pm 0.139$
PRF-fit source offset from KIC position	$2.083 \pm 0.139$	14.98	$-0.106 \pm 0.151$	$-2.081 \pm 0.139$
photometric centroid source offset	$0.39 \pm 0.50$	0.77	$-0.38 \pm 0.50$	$-0.06 \pm 0.54$

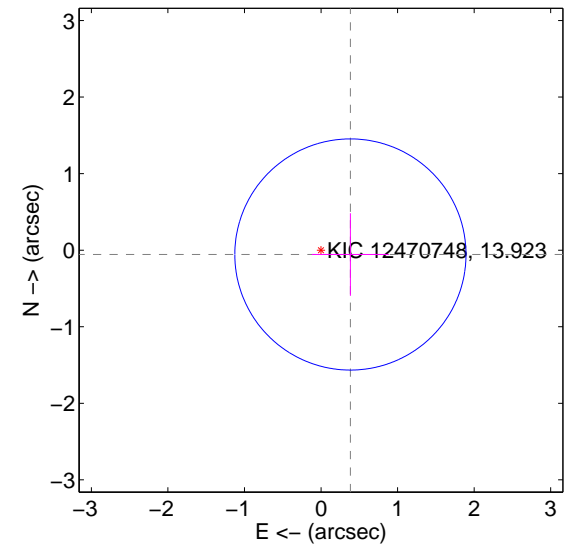
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

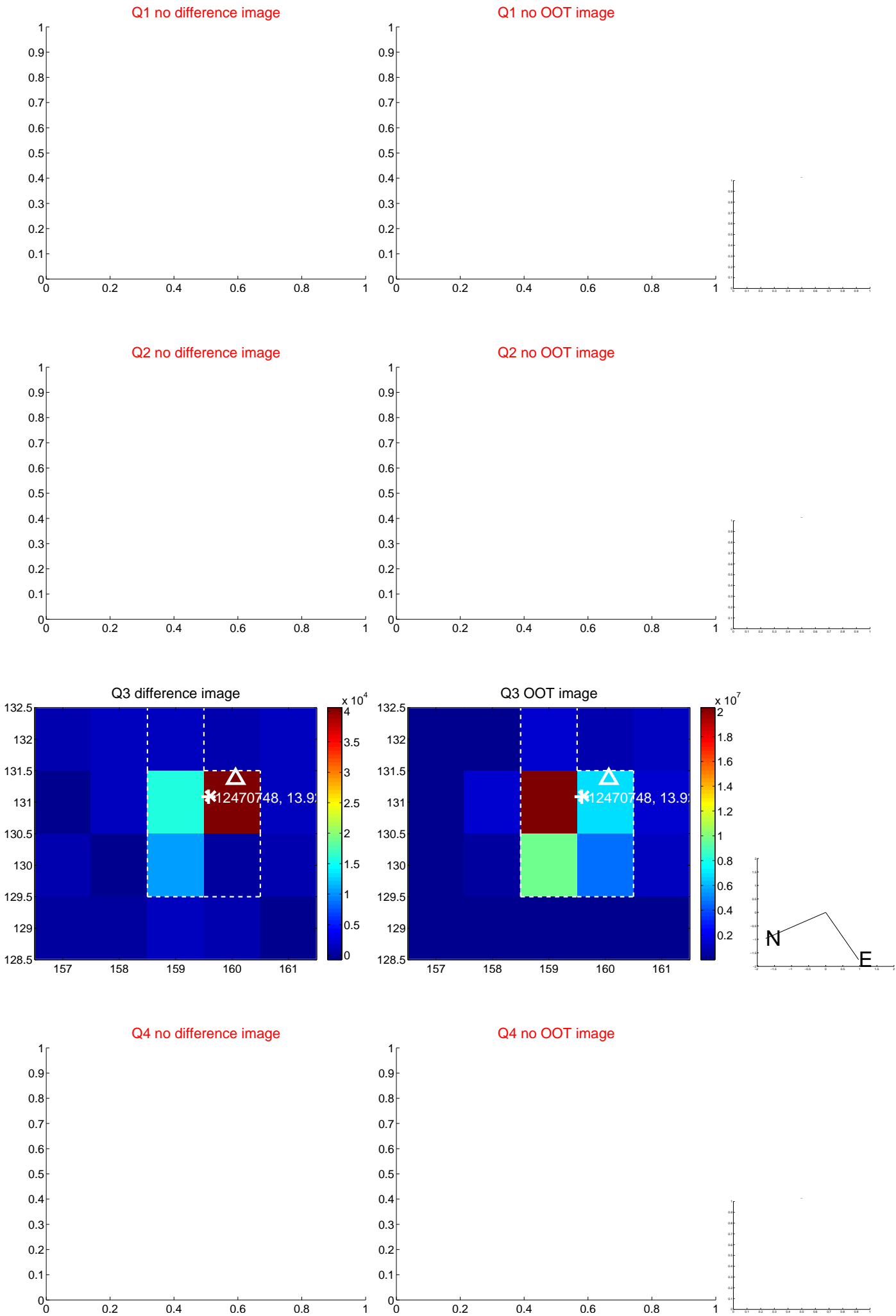


offset from photometric centroids



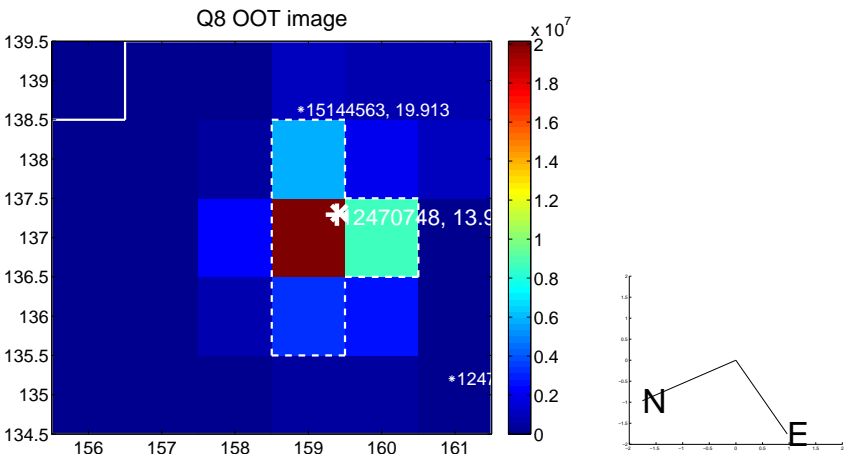
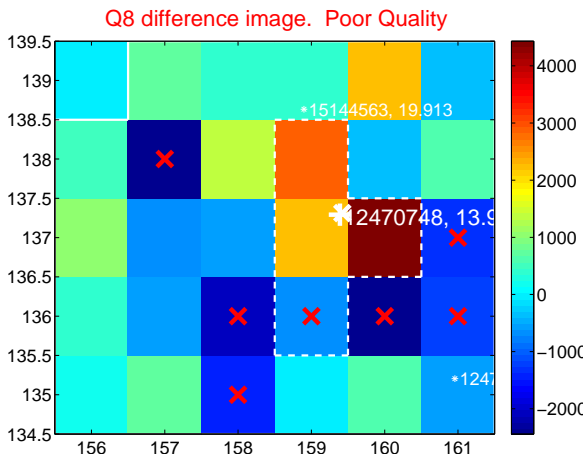
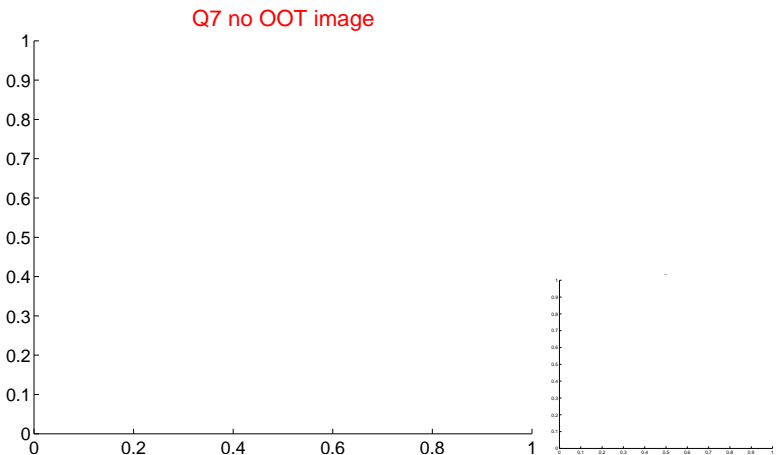
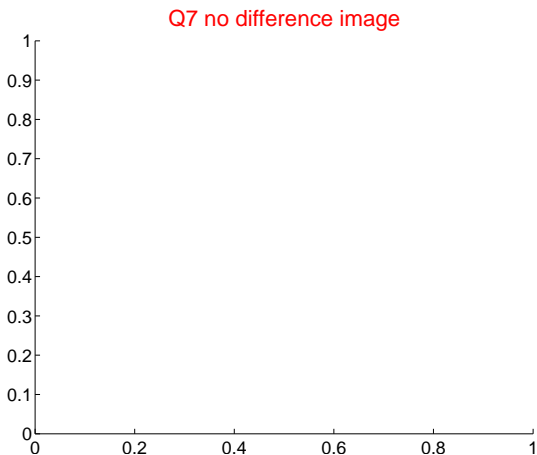
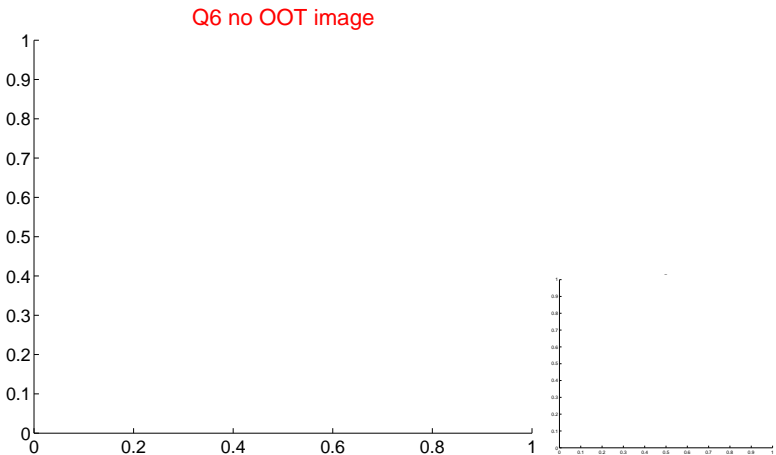
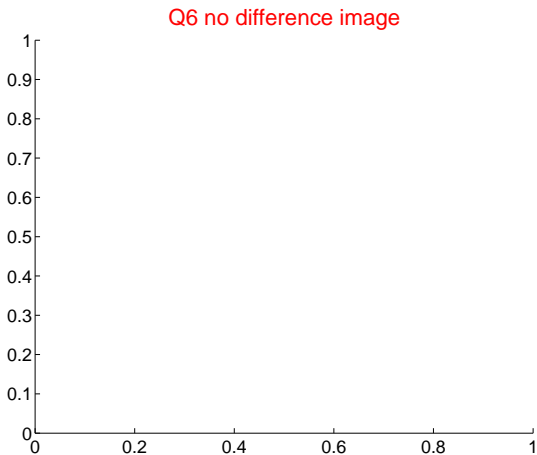
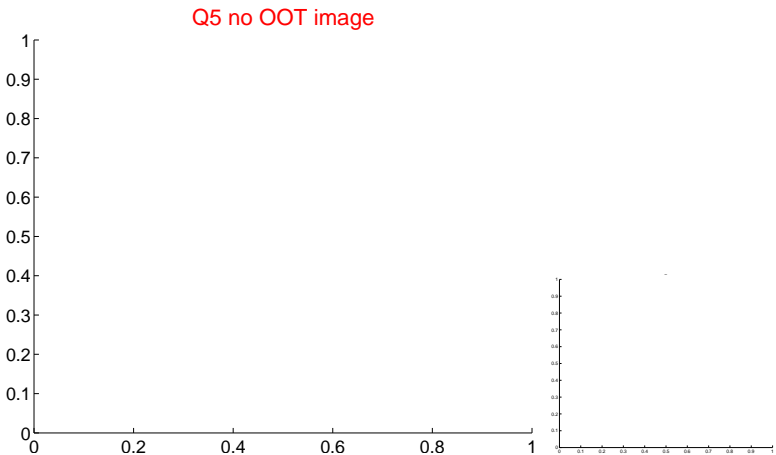
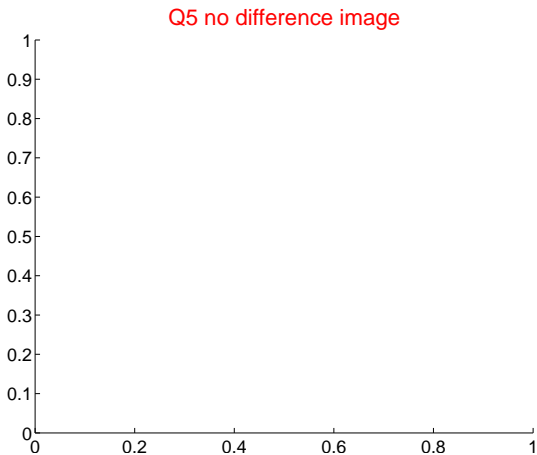
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

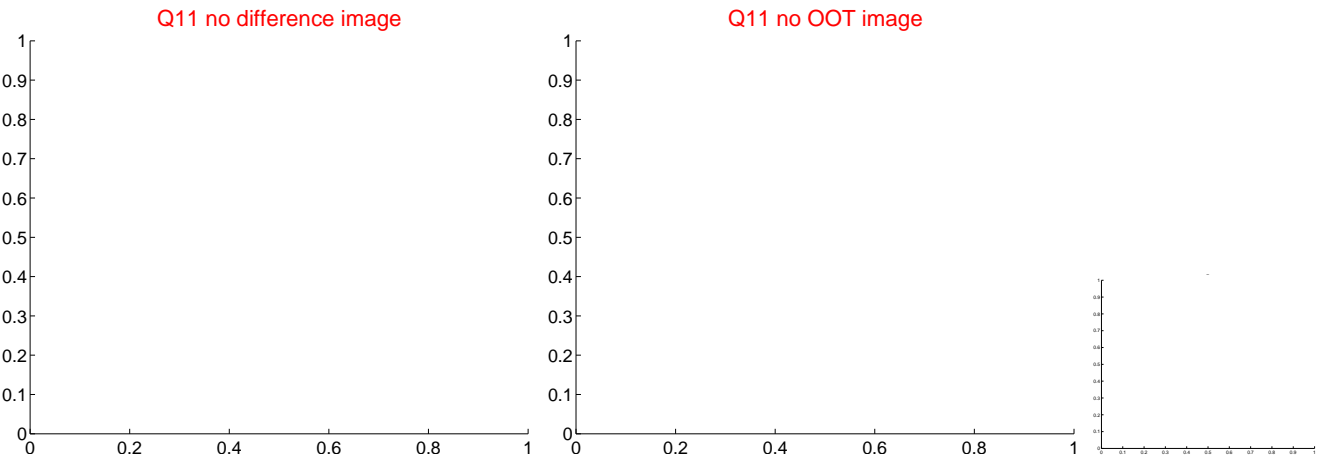




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



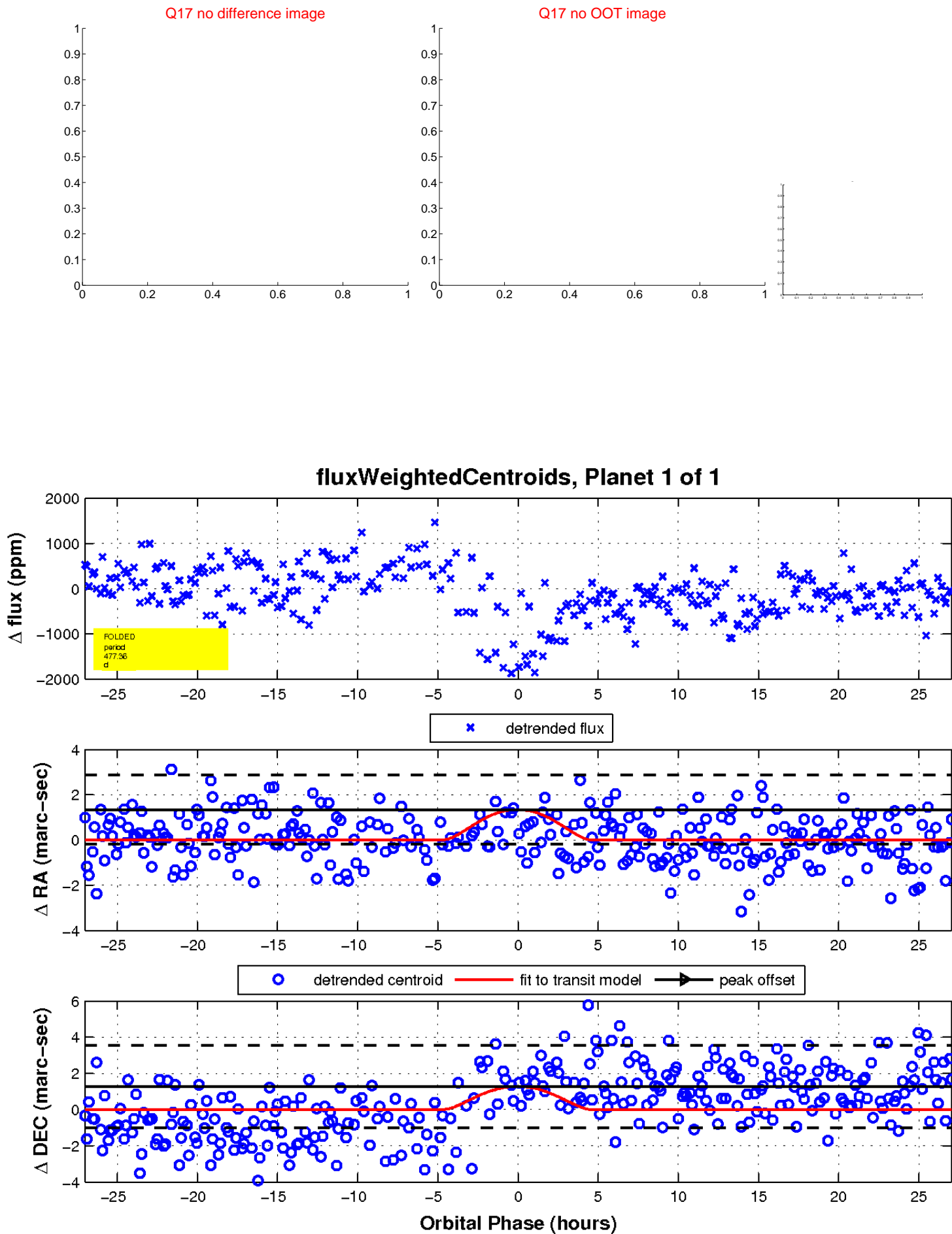
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image

Declination

