

# KIC 006960456

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006960456-01	OBS	0613.01	5.074441	136.034327	264.1	5.962	20.8	22.5	0.86	5448	2.91	176.19

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006960456-01	OBS	FP	0.00	0	0	1	1	CENT_RESOLVED_OFFSET—EPHEM_MATCH

**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 006960456-01

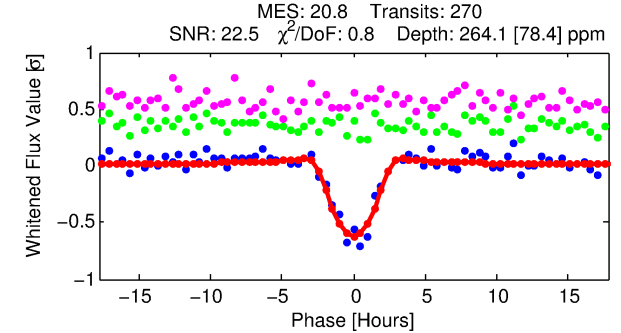
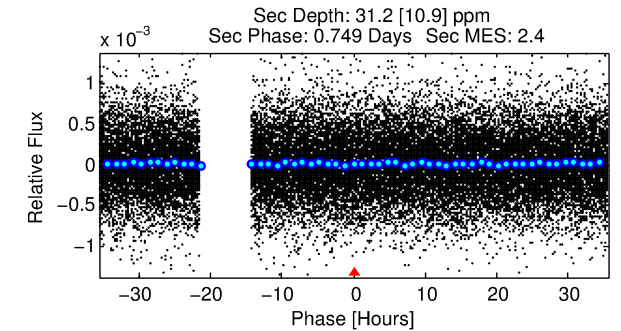
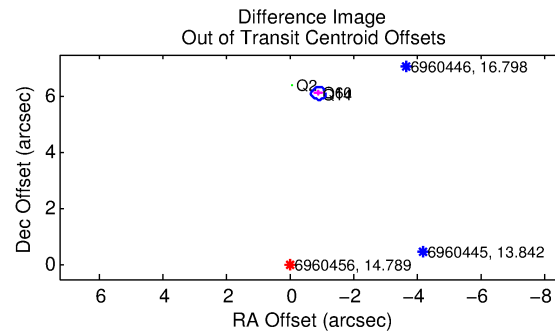
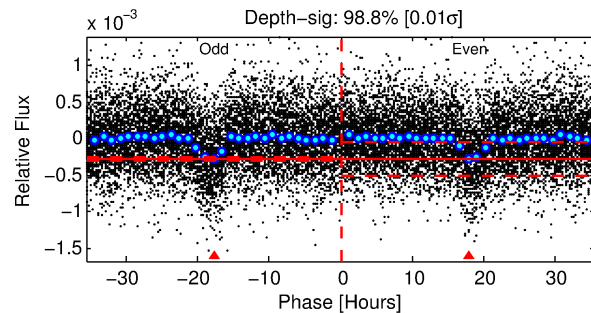
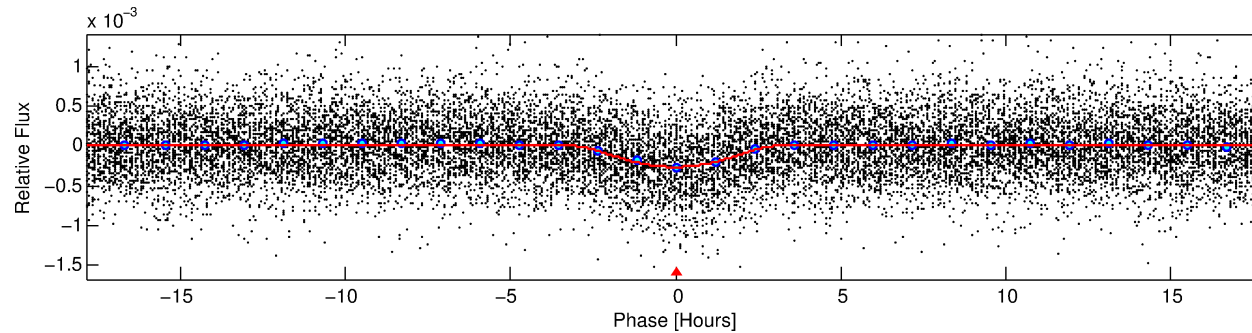
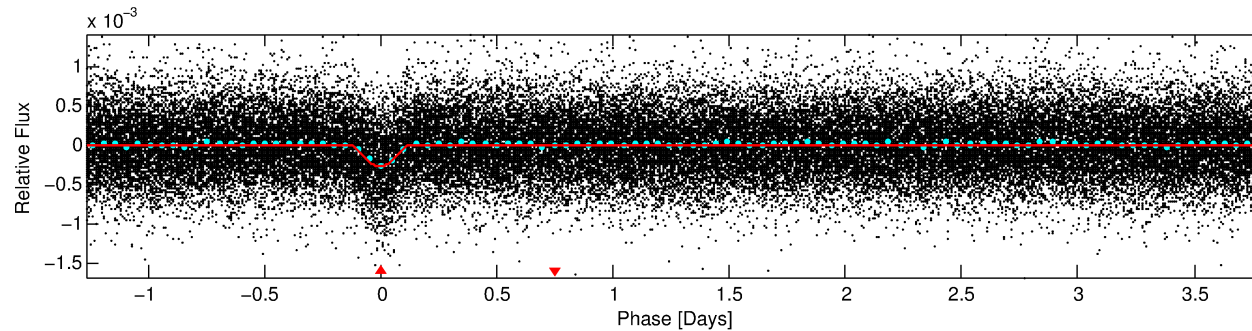
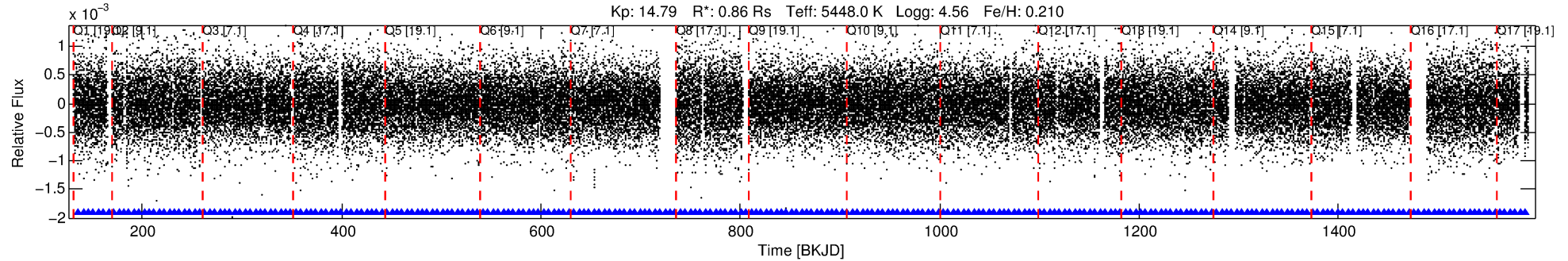
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
006960456-01	6960456	3654.01	6960446	1:2	8.0	0	-2	16.80	14.79	505.27	Direct-PRF	0	1.57	0.32

**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

KIC: 6960456 Candidate: 1 of 1 Period: 5.074 d  
KOI: K00613.01 Corr: 0.793

Kp: 14.79 R\*: 0.86 Rs Teff: 5448.0 K Logg: 4.56 Fe/H: 0.210



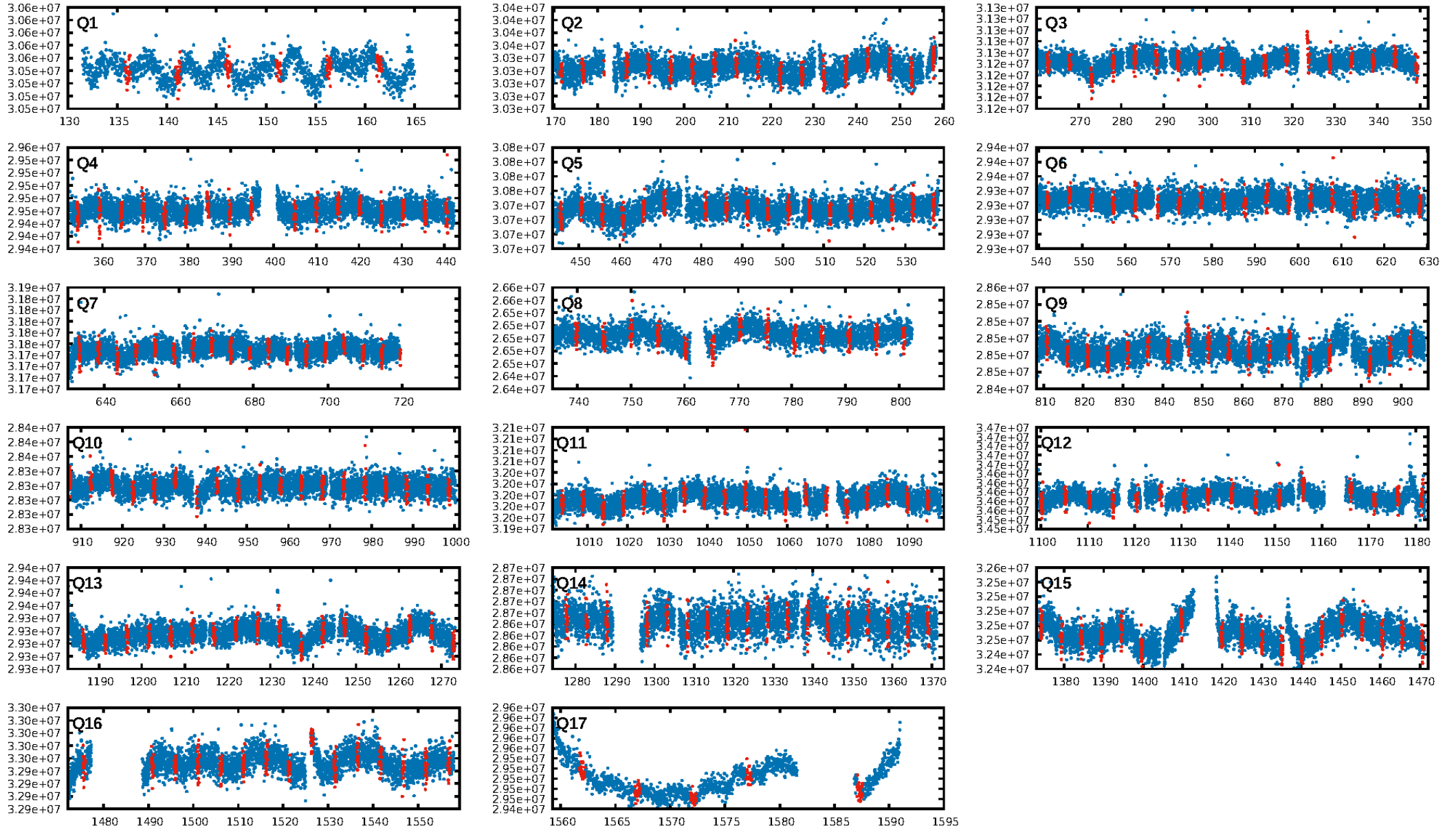
## DV Fit Results:

Period = 5.07444 [0.00004] d  
Epoch = 136.0343 [0.0056] BKJD  
Rp/R\* = 0.0311 [0.0470]  
a/R\* = 1.92 [0.52]  
b = 1.00 [0.07]  
Seff = 176.19 [57.45]  
Teq = 929 [76] K  
Rp = 2.91 [4.45] Re  
a = 0.0574 [0.0116] AU  
Ag = 6.67 [20.38] [0.28σ]  
Teffp = 2308 [1757] K [0.78σ]

## DV Diagnostic Results:

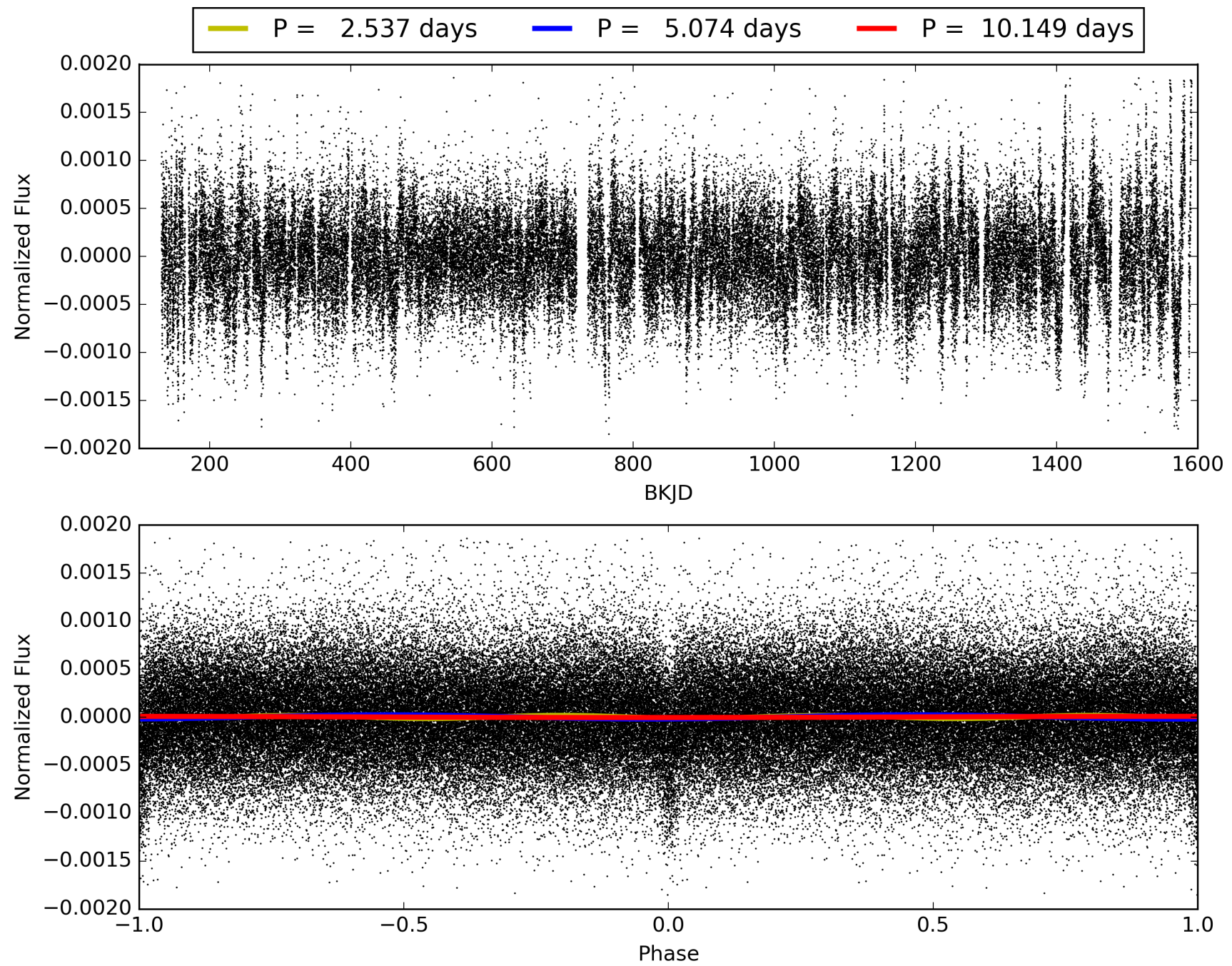
ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 8.29e-89  
RollingBand-fgt: 1.00 [259/259]  
GhostDiagnostic-chr: -0.6542  
Centroid-sig: 0.0%  
Centroid-so: 24.948 arcsec [133.72σ]  
OotOffset-rm: 6.179 arcsec [81.05σ]  
KicOffset-rm: 7.651 arcsec [108.53σ]  
OotOffset-st: 4/0/0/0 [4]  
KicOffset-st: 4/0/0/0 [4]  
DiffImageQuality-fgm: 1.00 [4/4]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 006960456-01, PDC Light Curves



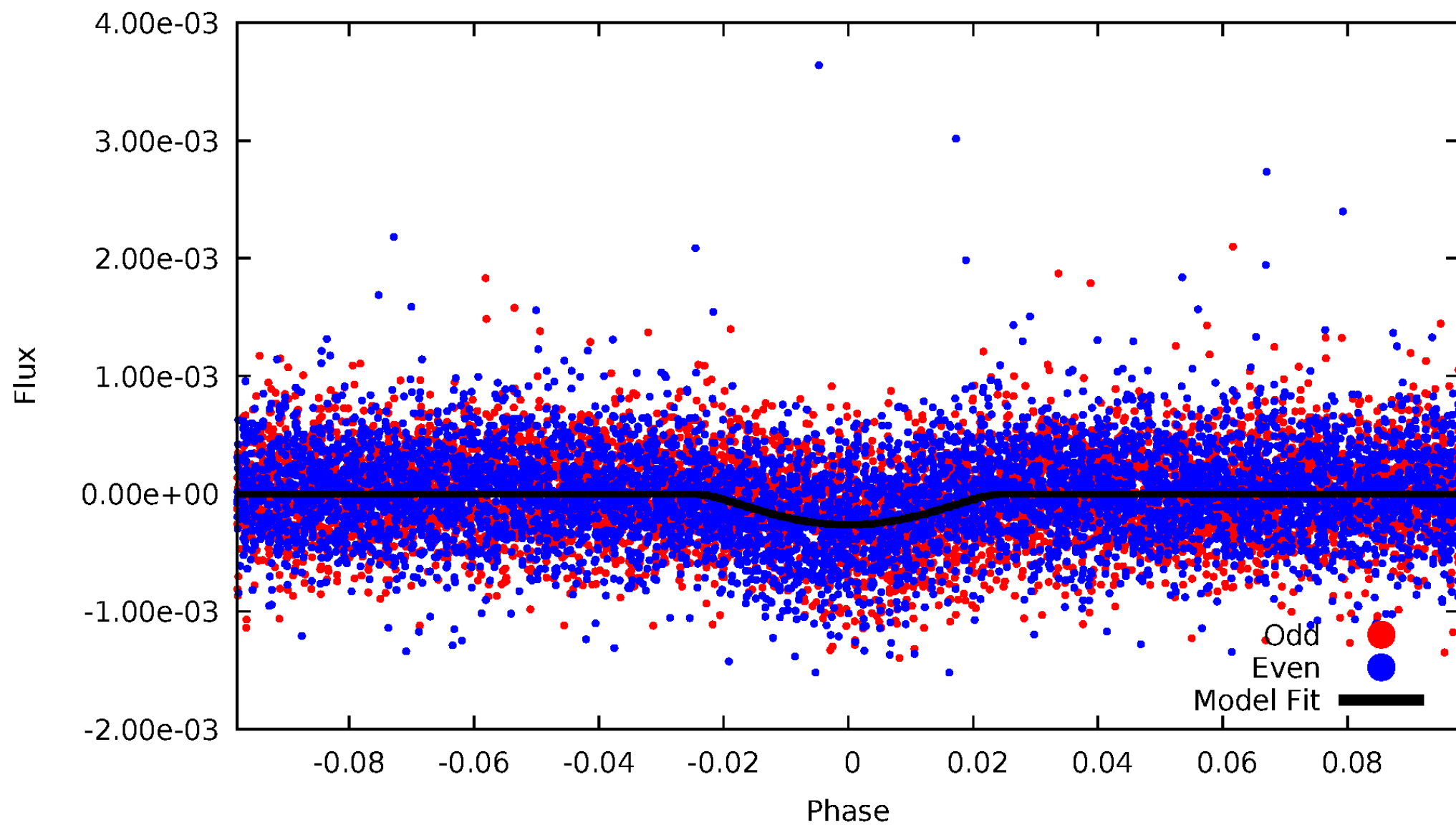


TCE 006960456-01



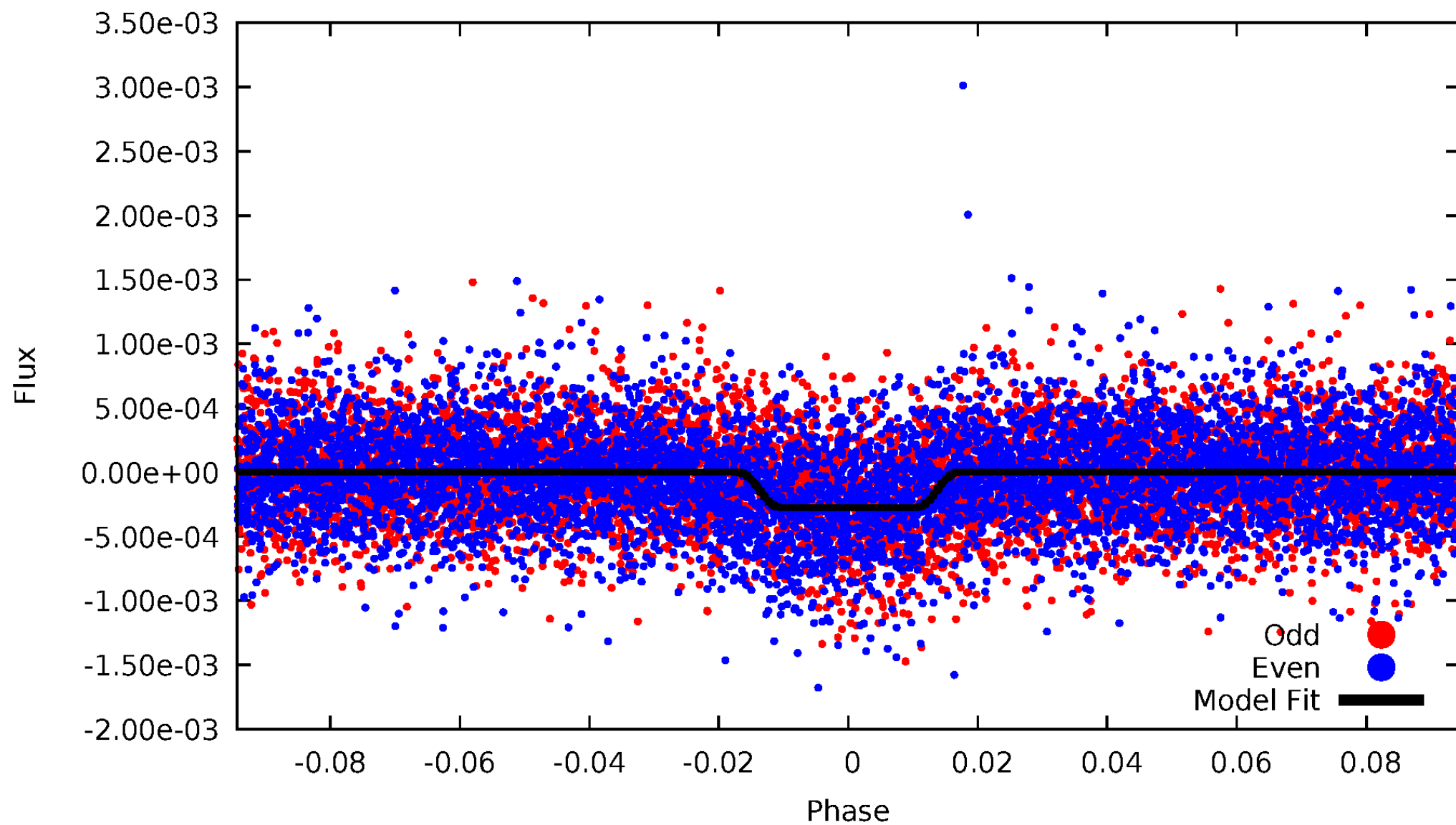
# DV Odd/Even

TCE 006960456-01



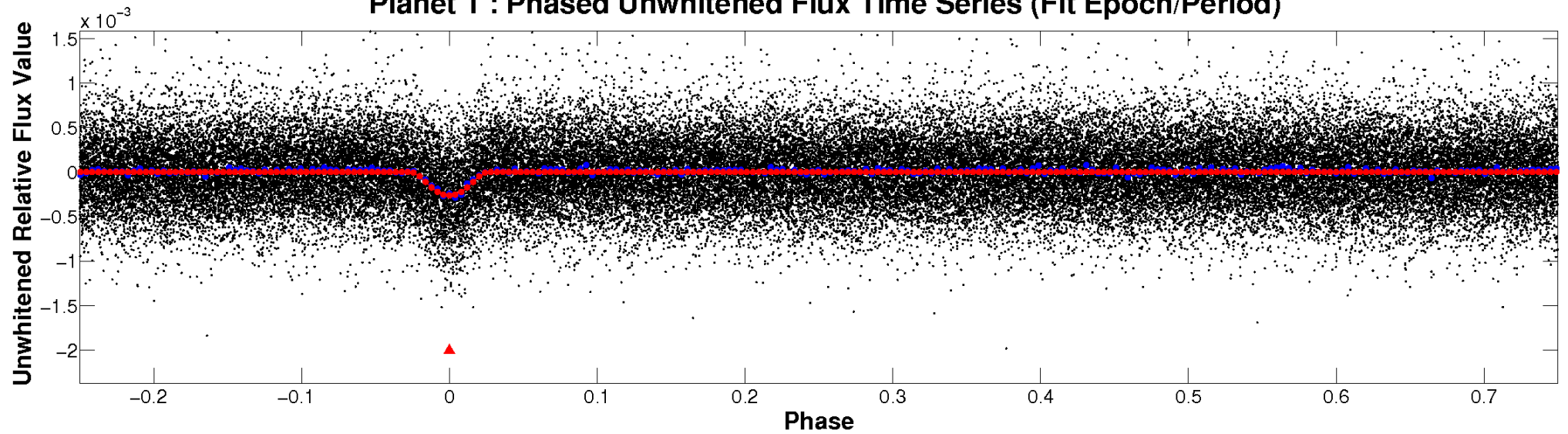
# ALT Odd/Even

TCE 006960456-01

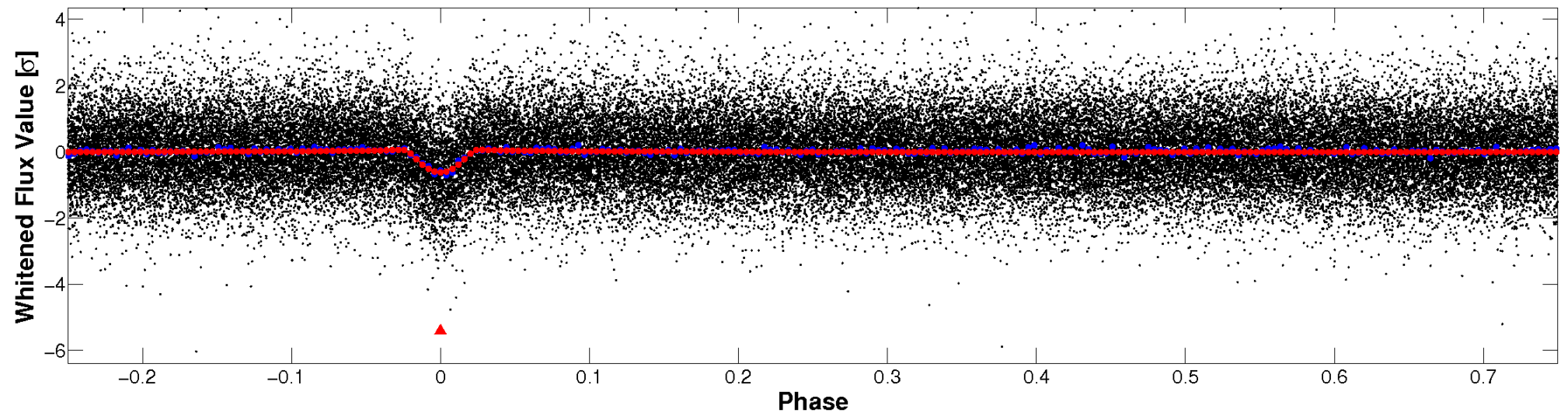


# Non-Whitened Vs. Whitened Light Curve

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



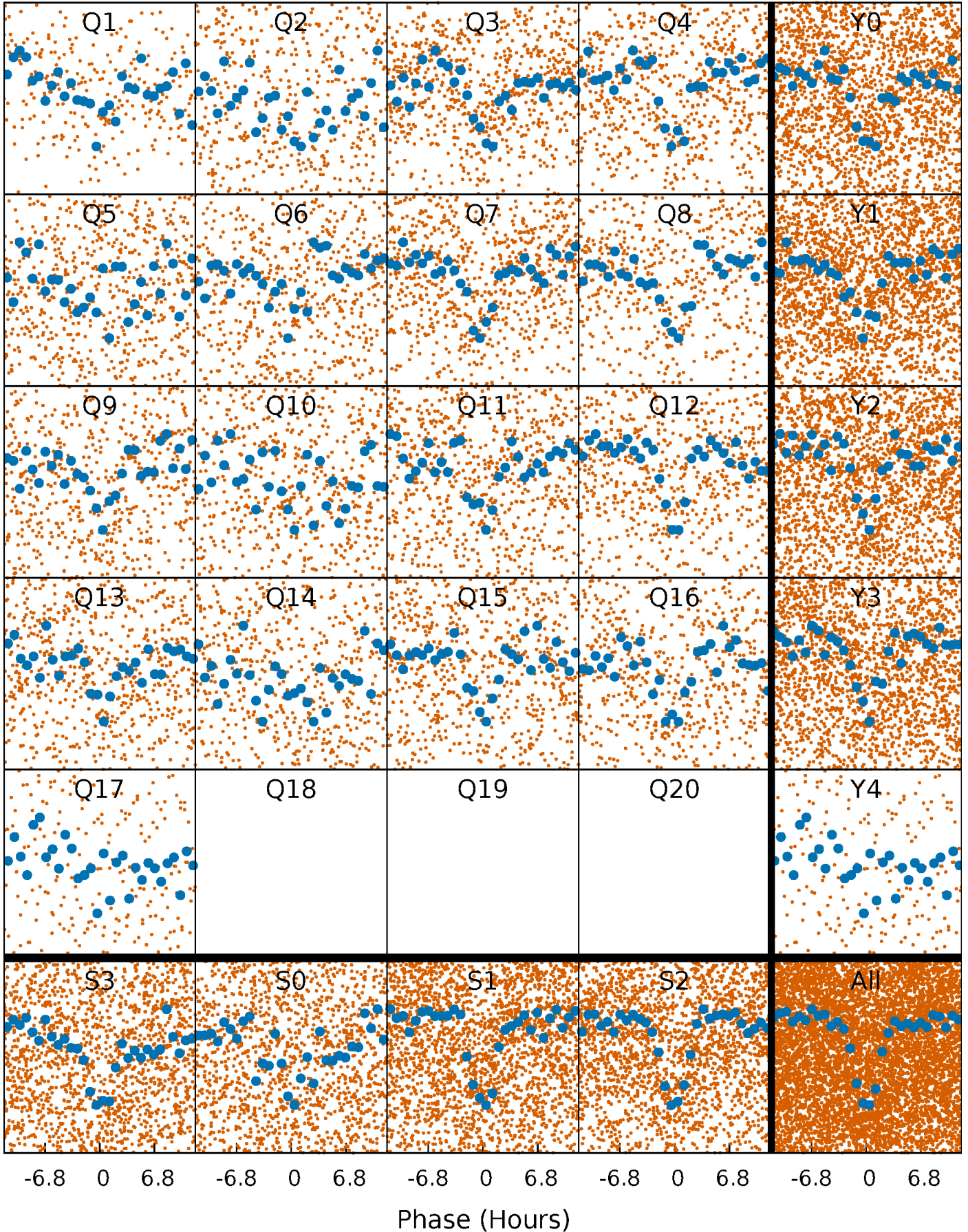
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

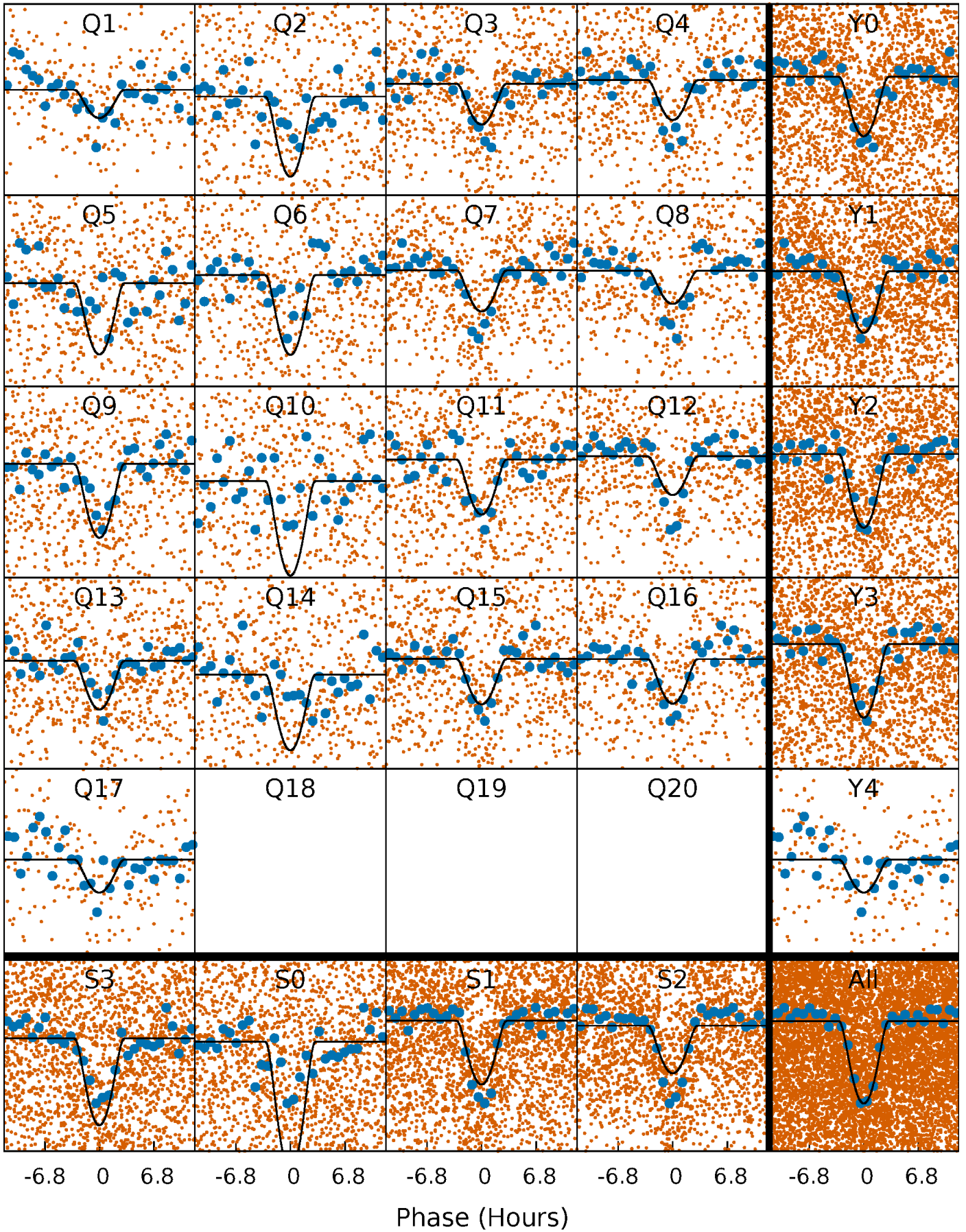
TCE 006960456-01 P= 5.074441 Days  $T_0=136.034327$  (BKJD)





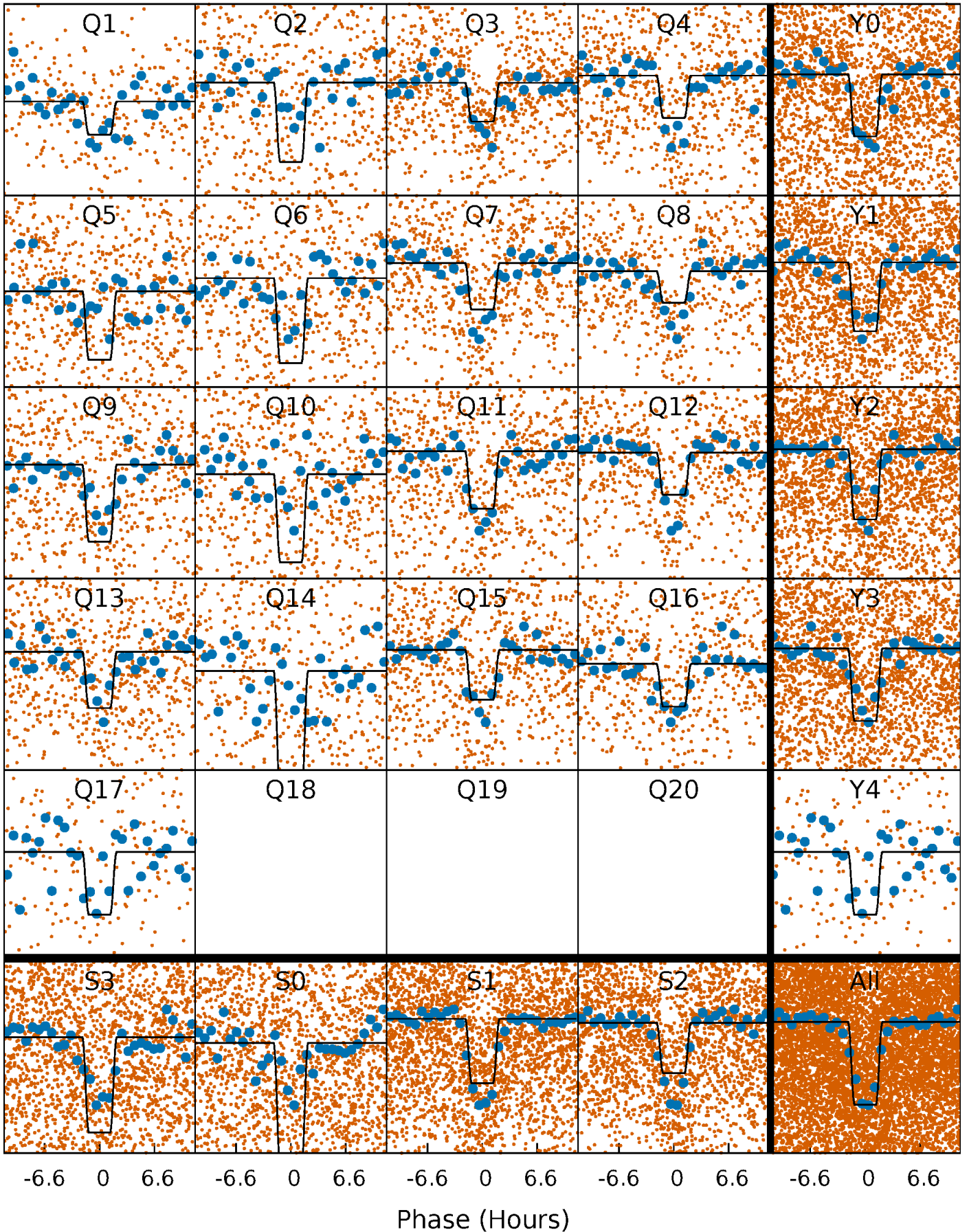
# DV Quarter-Phased Transit Curves

TCE 006960456-01 P= 5.074441 Days  $T_0=136.034327$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

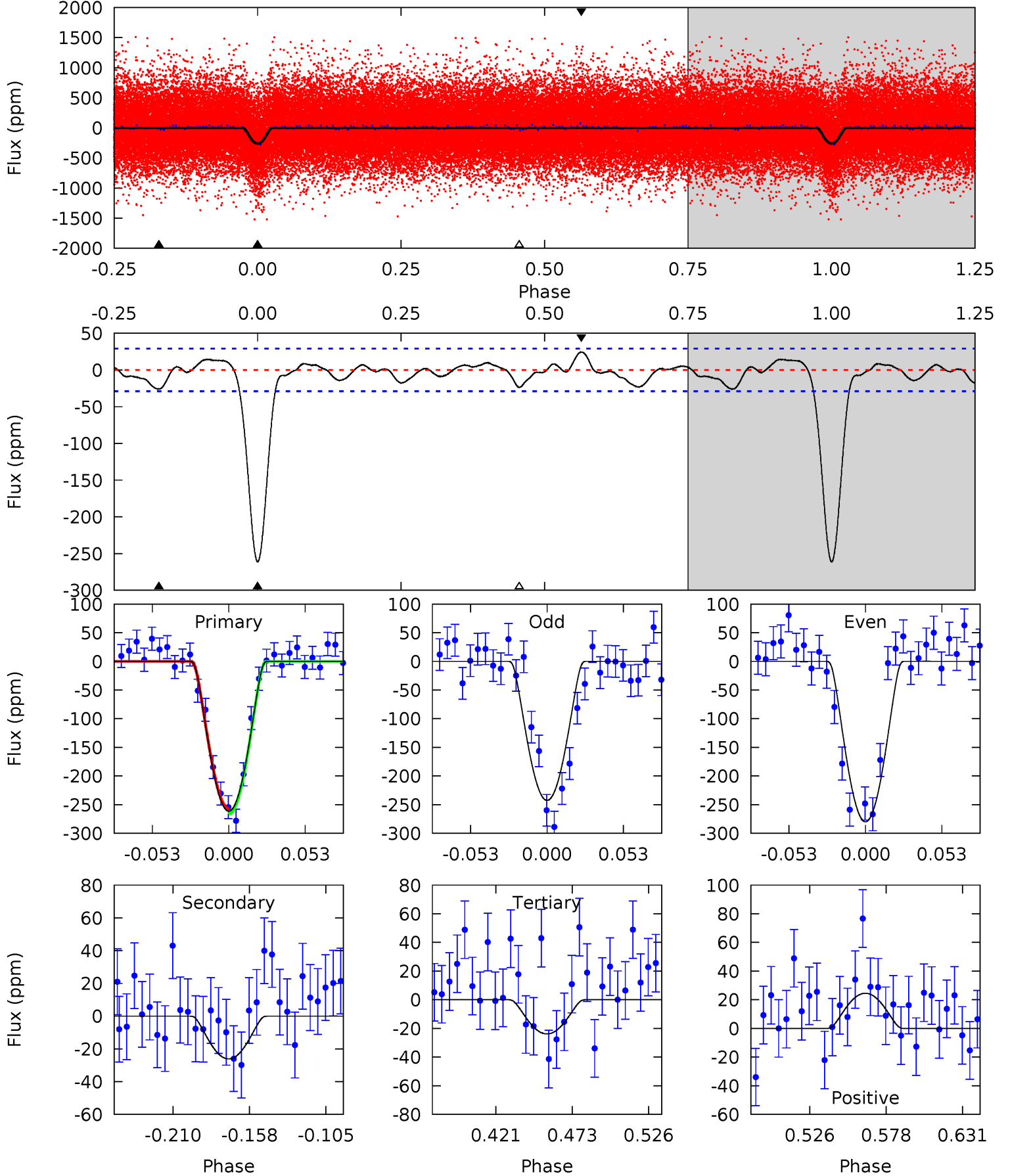
TCE 006960456-01 P= 5.074481 Days  $T_0=136.029497$  (BKJD)



# DV Model-Shift Uniqueness Test

006960456-01, P = 5.074441 Days, E = 130.959886 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
42.2	4.22	3.86	3.96	4.70	1.94	1.53	38.4	38.3	0.37	0.26	3.01	0.96	0.09	0.69

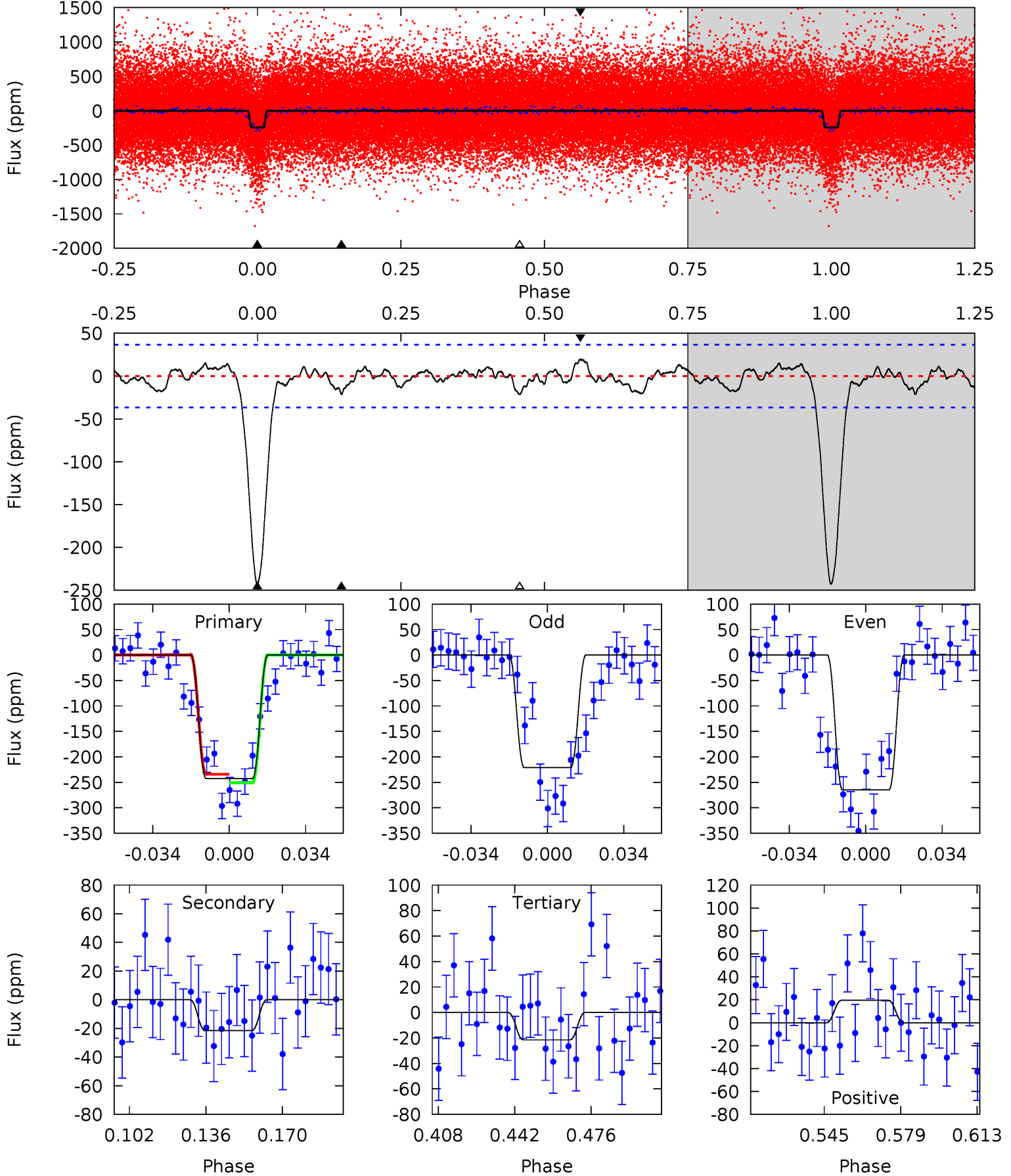




# Alt Model-Shift Uniqueness Test

006960456-01, P = 5.074481 Days, E = 130.955016 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
31.8	2.82	2.82	2.57	4.79	2.12	1.07	29.0	29.3	0.00	0.26	2.87	1.02	0.07	1.08





### Stellar Parameters For KIC 006960456

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5448^{+164}_{-164}$	$4.562^{+0.030}_{-0.170}$	$0.210^{+0.200}_{-0.300}$	$0.857^{+0.198}_{-0.062}$	$0.977^{+0.065}_{-0.106}$	$2.186^{+0.338}_{-1.001}$
	+3%/-3%	+1%/-4%	+95%/-143%	+23%/-7%	+7%/-11%	+15%/-46%
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 006960456-01 / KOI 0613.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-26 \pm 6$	$4.49^{+4.11}_{-2.94}$	$1325^{+78}_{-55}$	$2546^{+1001}_{-457}$	$2.210^{+17.299}_{-1.582}$
Alt.	$-22 \pm 8$	$3.88^{+3.47}_{-2.54}$	$1326^{+74}_{-56}$	$2596^{+977}_{-501}$	$2.427^{+17.119}_{-1.809}$

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

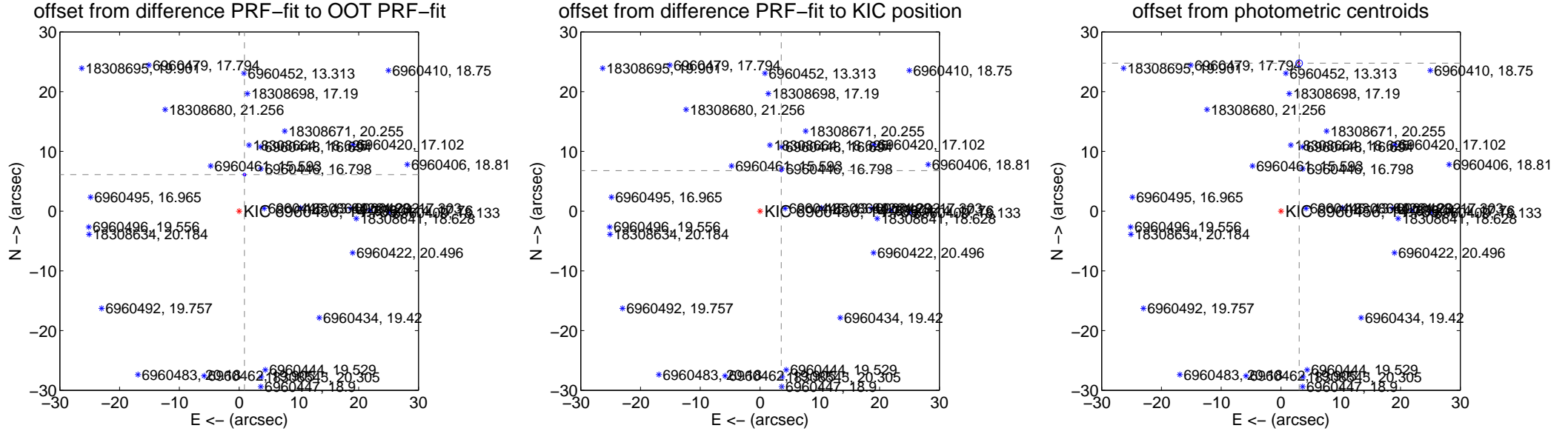
## DV Centroid Data

Supplemental centroid analysis for 006960456-01. Kepler magnitude: 14.79. Transit SNR 22.47

There are 4 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 2.73 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	6.179 $\pm$ 0.076	81.05	-0.893 $\pm$ 0.114	6.114 $\pm$ 0.075
PRF-fit source offset from KIC position	7.651 $\pm$ 0.070	108.53	-3.549 $\pm$ 0.067	6.778 $\pm$ 0.071
photometric centroid source offset	24.95 $\pm$ 0.19	133.72	-3.04 $\pm$ 0.18	24.76 $\pm$ 0.19



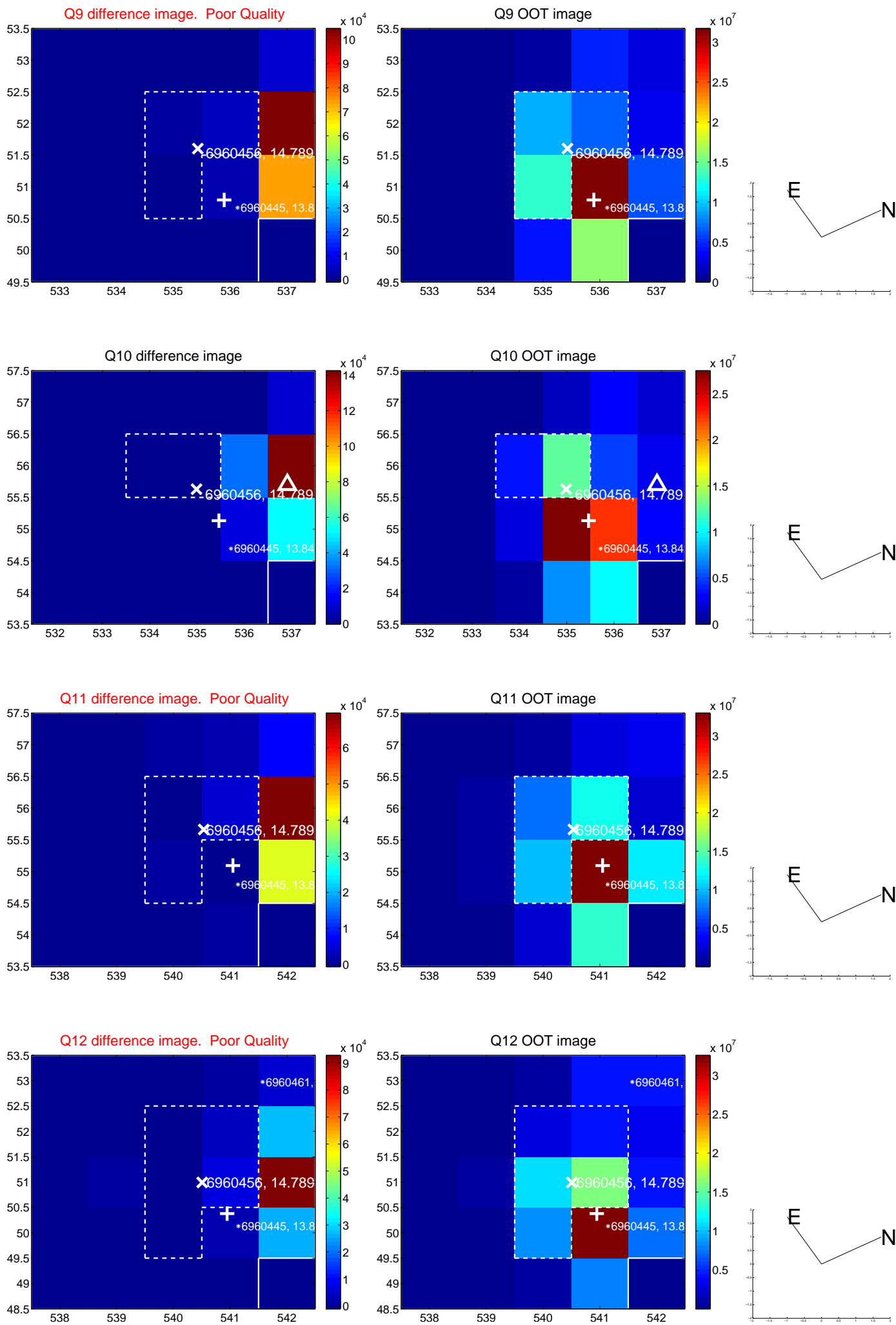
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



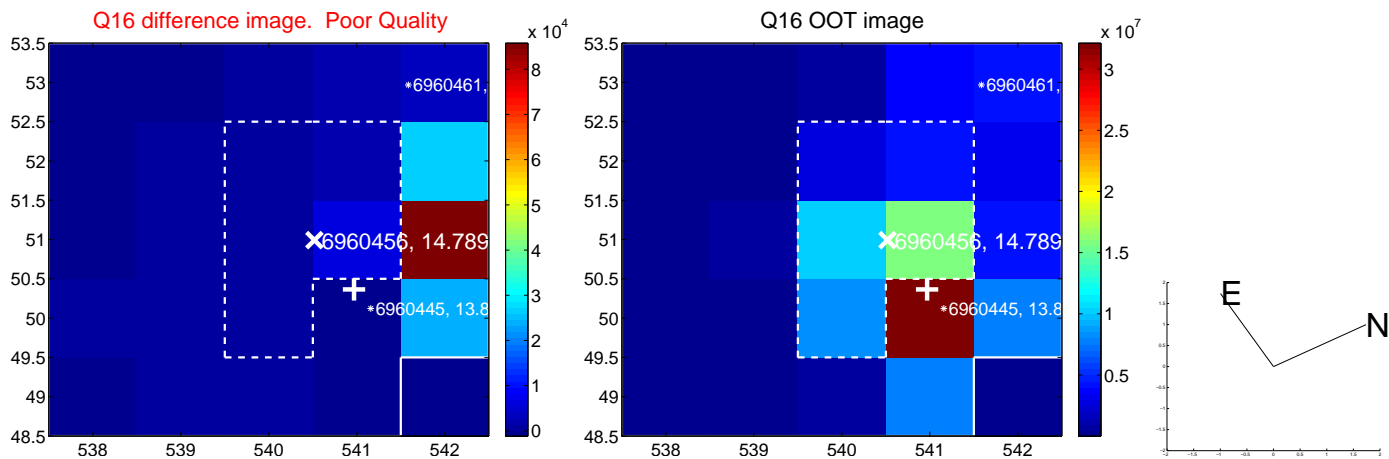
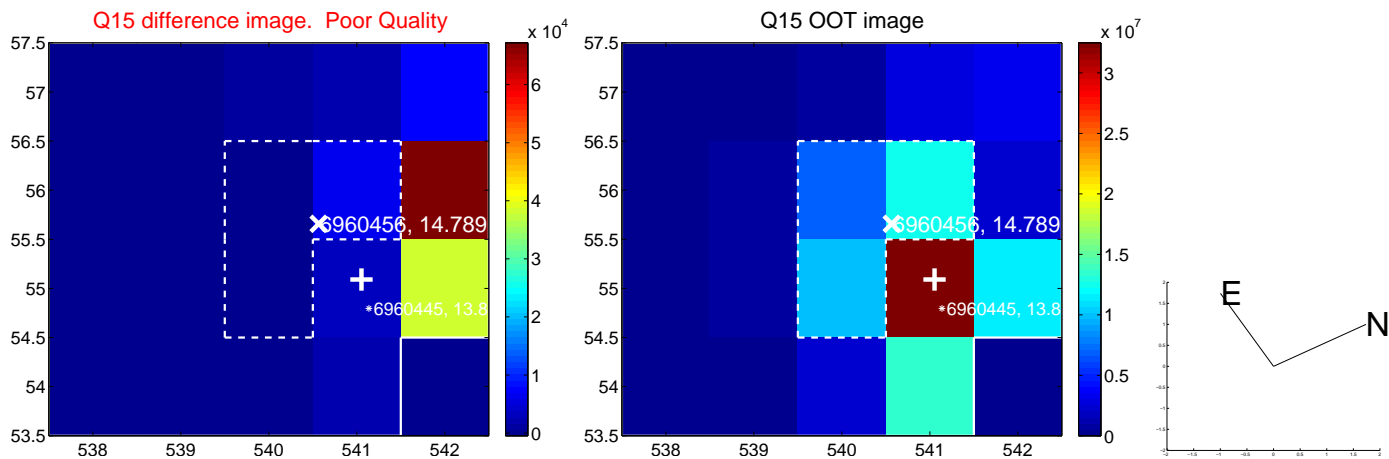
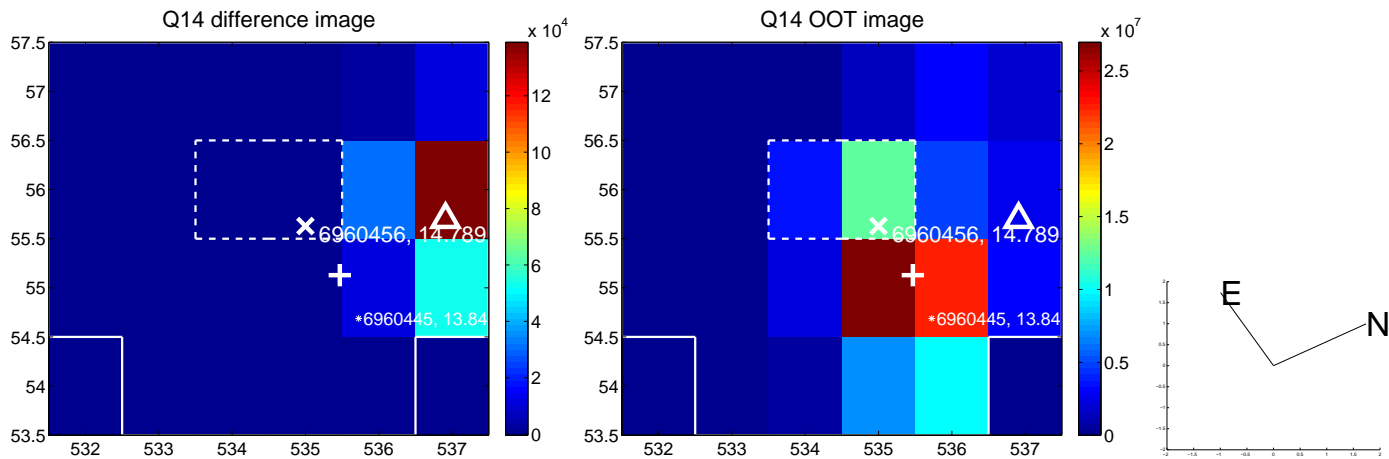
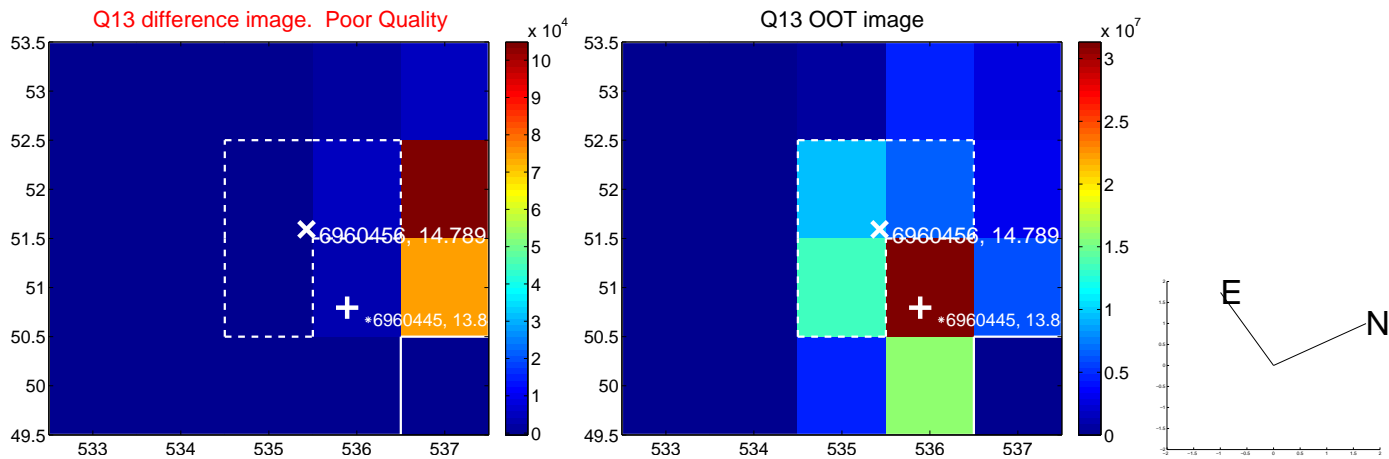




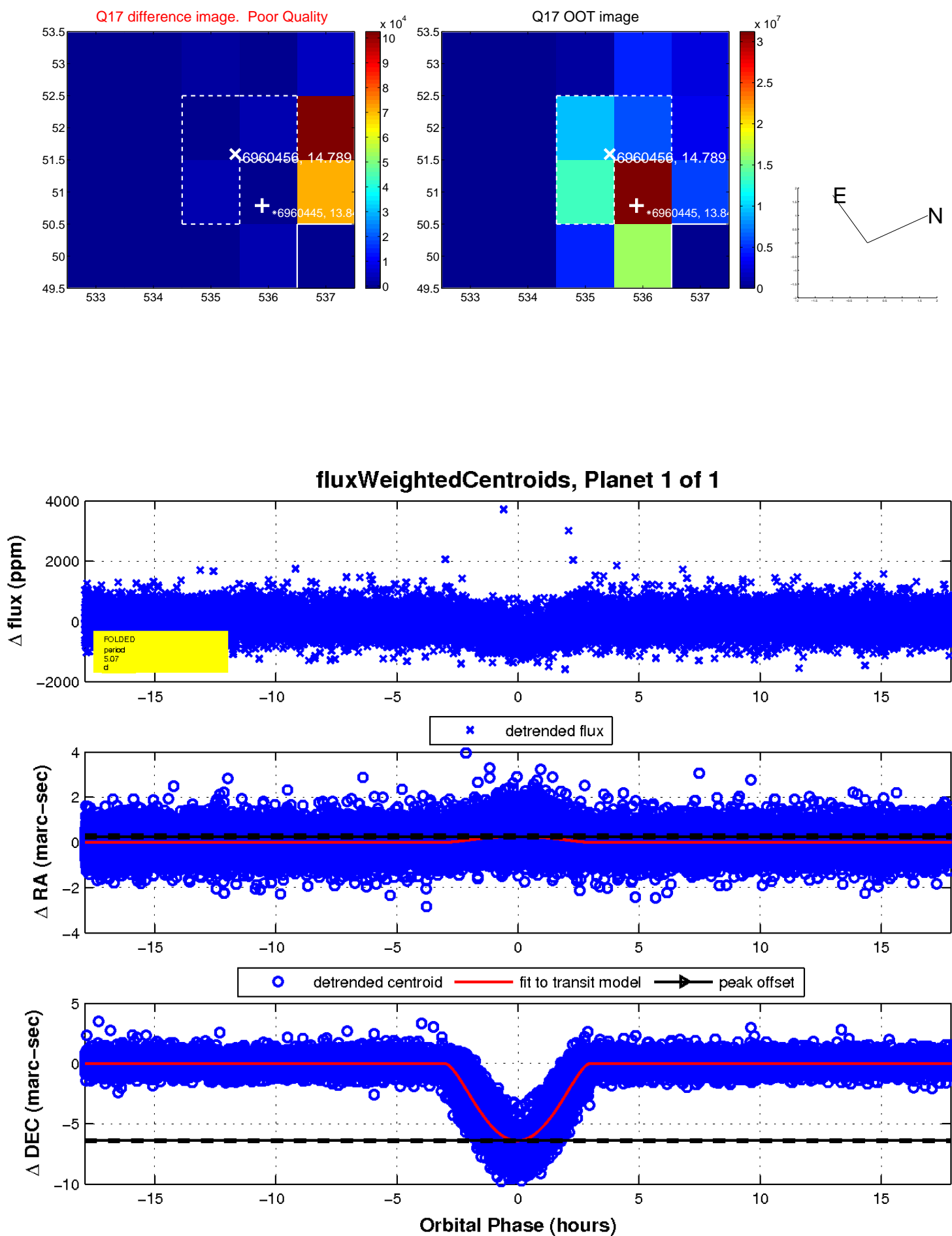
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.



UKIRT Image

