

# KIC 007840044

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007840044-01	OBS	0516.01	13.542102	144.007632	316.1	4.638	25.2	22.9	1.01	5891	2.79	94.13

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007840044-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_ALT—CENT_UNRESOLVED_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 007840044-01

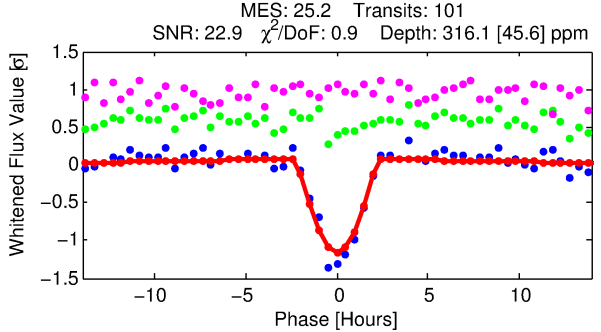
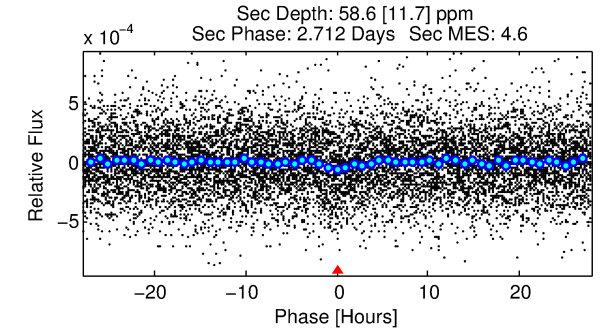
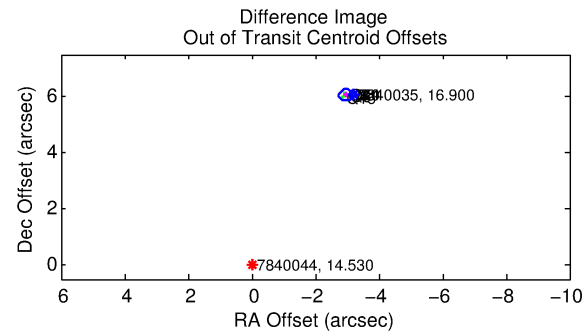
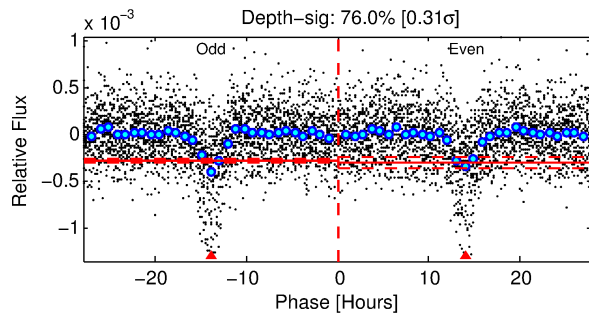
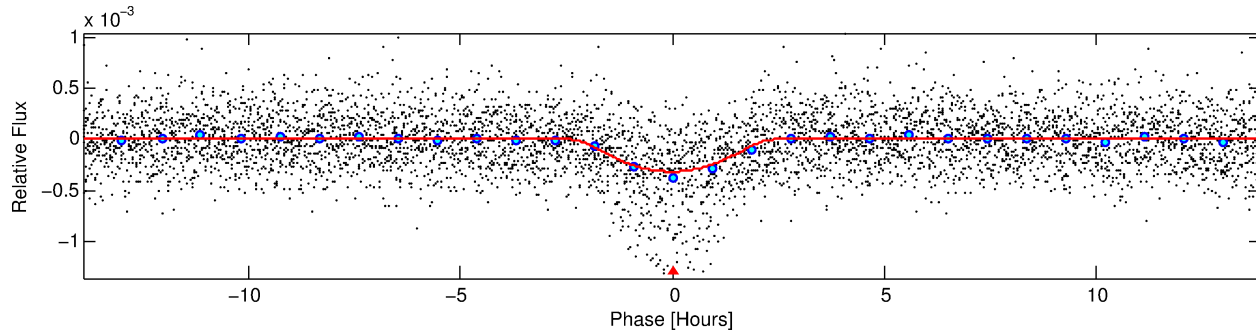
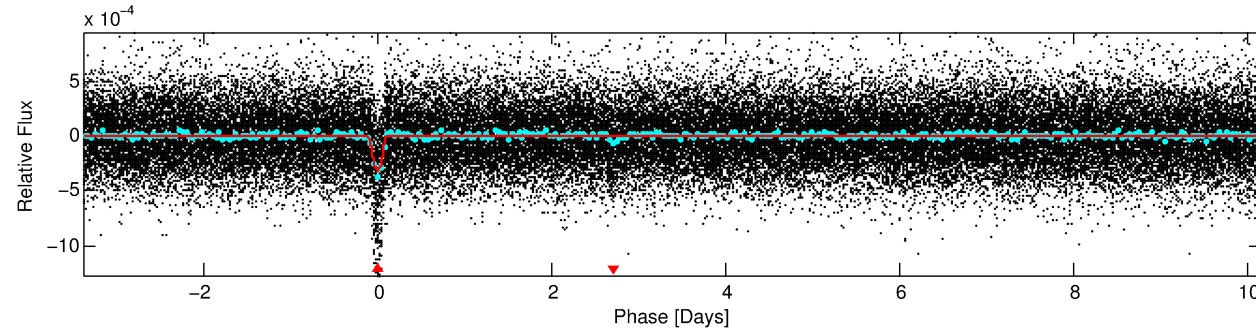
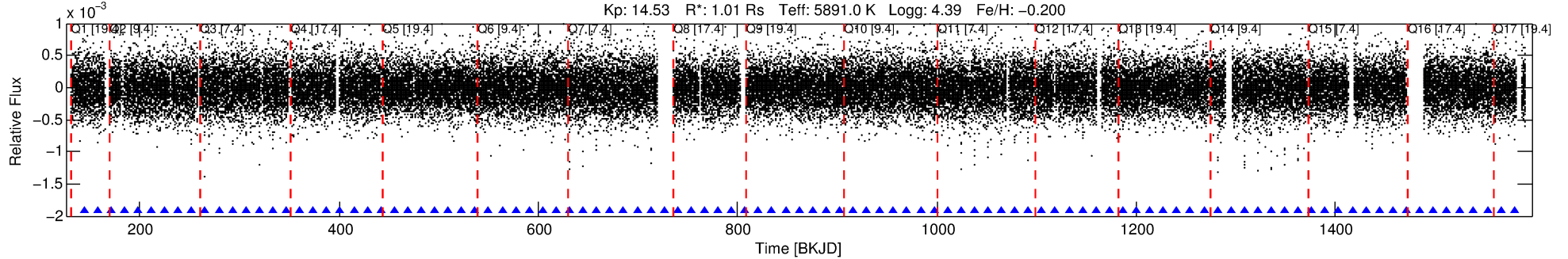
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
007840044-01	7840044	3758.01	7840035	1:1	6.8	0	-2	16.90	14.53	107.32	Direct-PRF	0	0.16	0.04

**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: 7840044 Candidate: 1 of 1 Period: 13.542 d  
KOI: K00516.01 Corr: 0.855

Kp: 14.53 R\*: 1.01 Rs Teff: 5891.0 K Logg: 4.39 Fe/H: -0.200



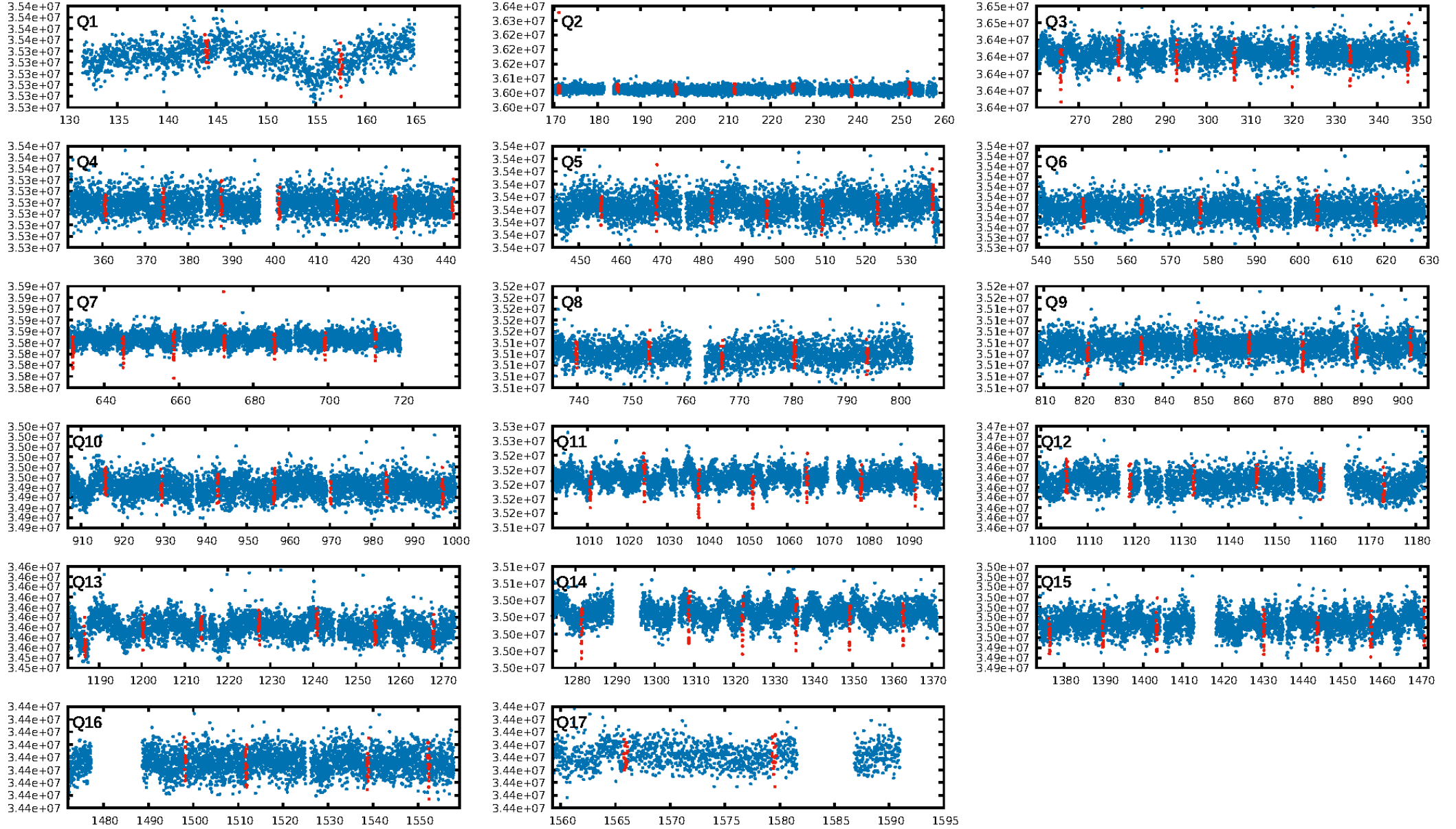
## DV Fit Results:

Period = 13.54210 [0.00008] d  
Epoch = 144.0076 [0.0048] BKJD  
Rp/R\* = 0.0252 [0.0130]  
a/R\* = 6.26 [1.43]  
b = 0.99 [0.03]  
Seff = 94.13 [34.07]  
Teq = 794 [72] K  
Rp = 2.79 [1.64] Re  
a = 0.1087 [0.0256] AU  
Ag = 48.95 [54.08] [0.89σ]  
Teffp = 3248 [859] K [2.85σ]

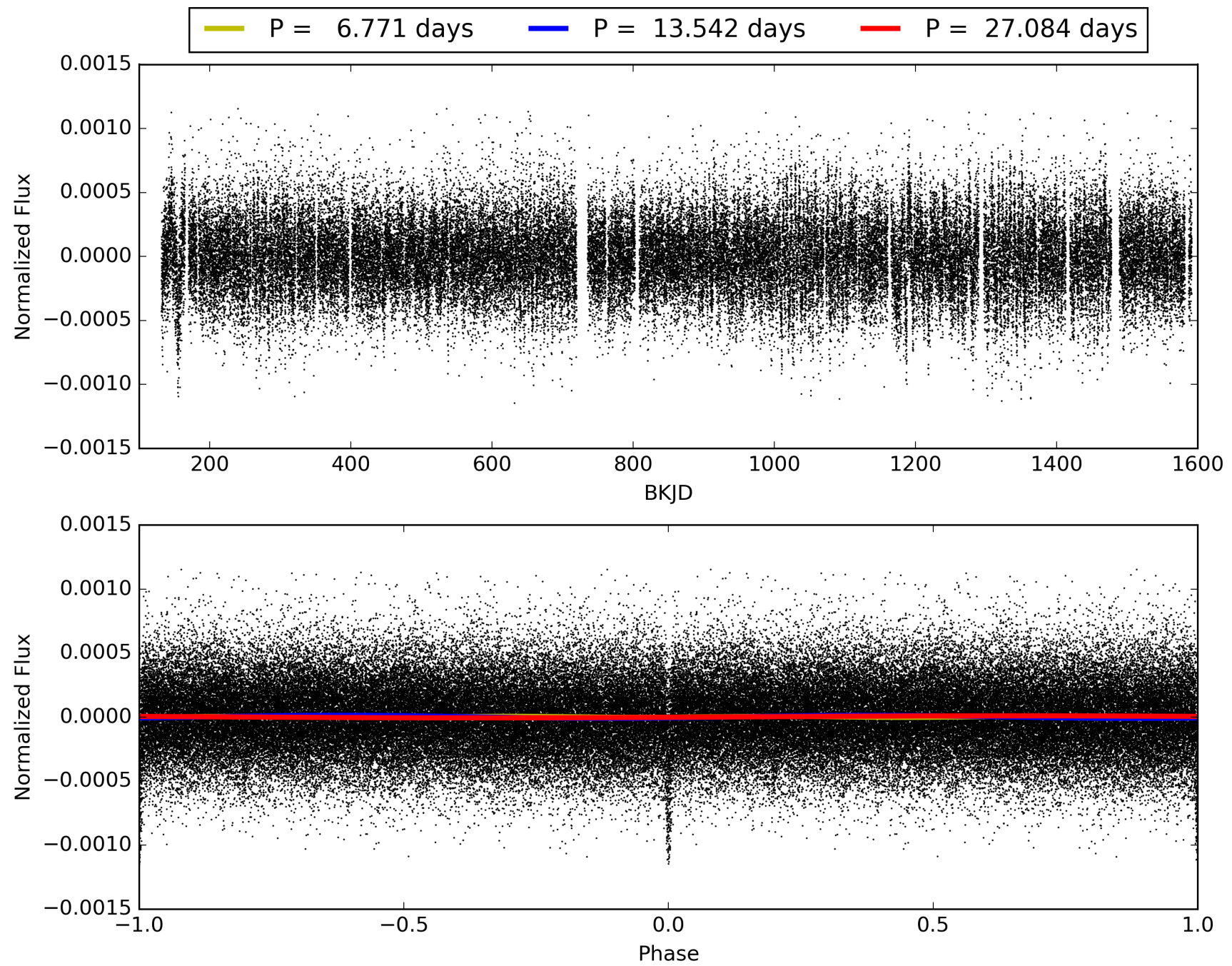
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 3.38e-137  
RollingBand-fgt: 1.00 [97/97]  
GhostDiagnostic-chr: -0.2999  
Centroid-sig: 0.0%  
Centroid-so: 38.660 arcsec [62.48σ]  
OotOffset-rm: 6.730 arcsec [97.07σ]  
KicOffset-rm: 6.736 arcsec [94.14σ]  
OotOffset-st: 4/4/0/0 [8]  
KicOffset-st: 4/4/0/0 [8]  
DiffImageQuality-fgm: 1.00 [8/8]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 007840044-01, PDC Light Curves

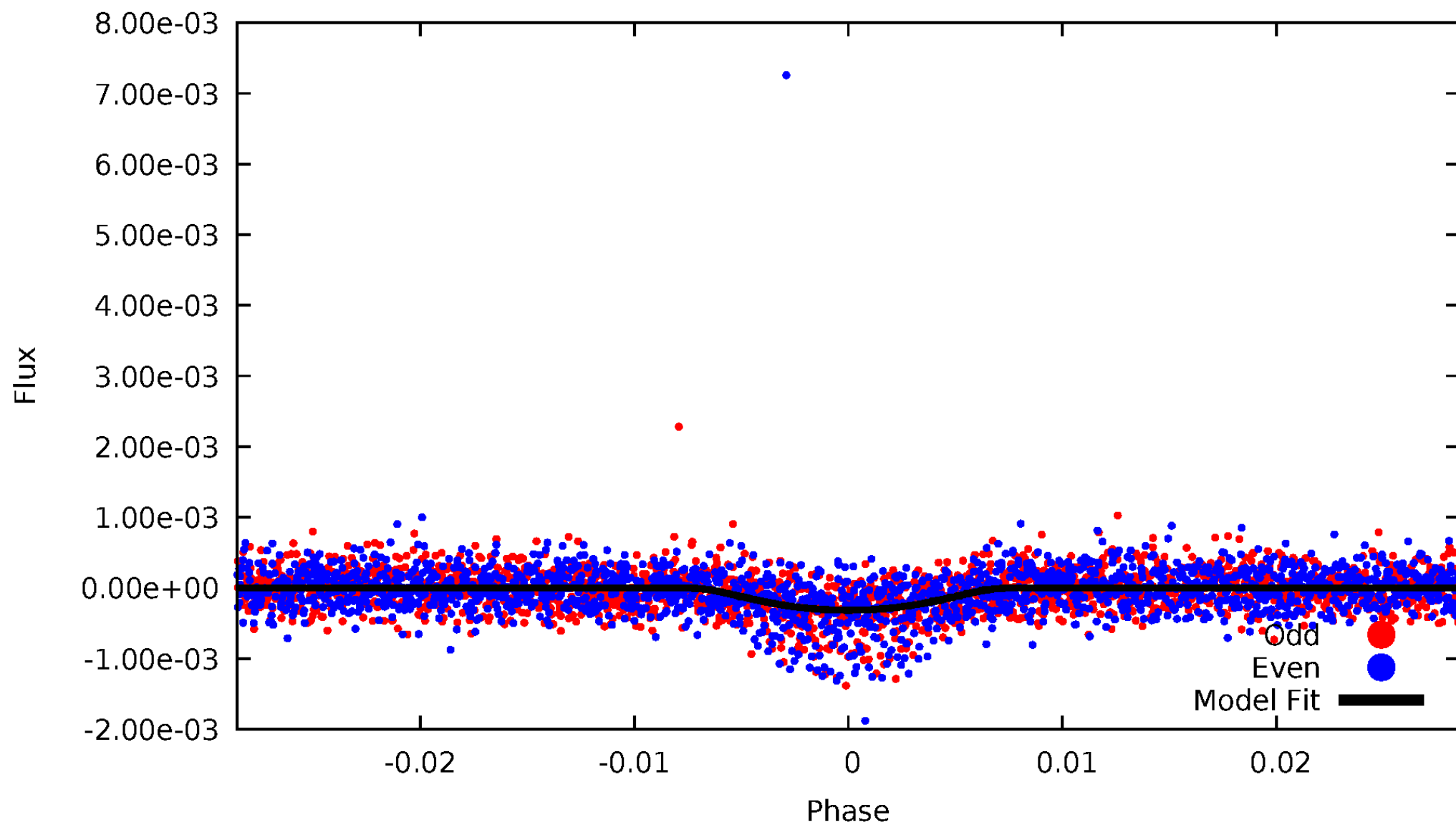


TCE 007840044-01



# DV Odd/Even

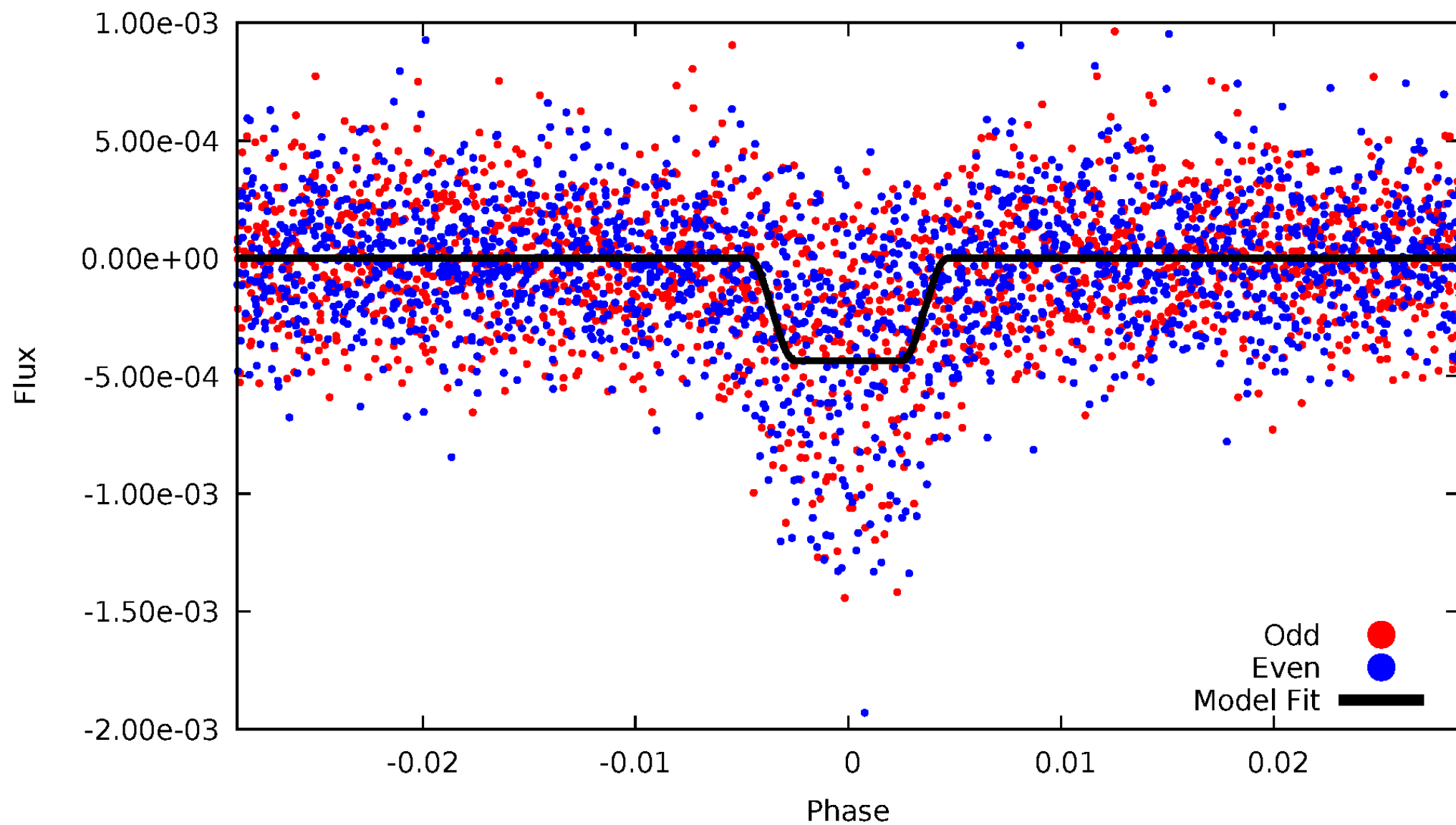
TCE 007840044-01



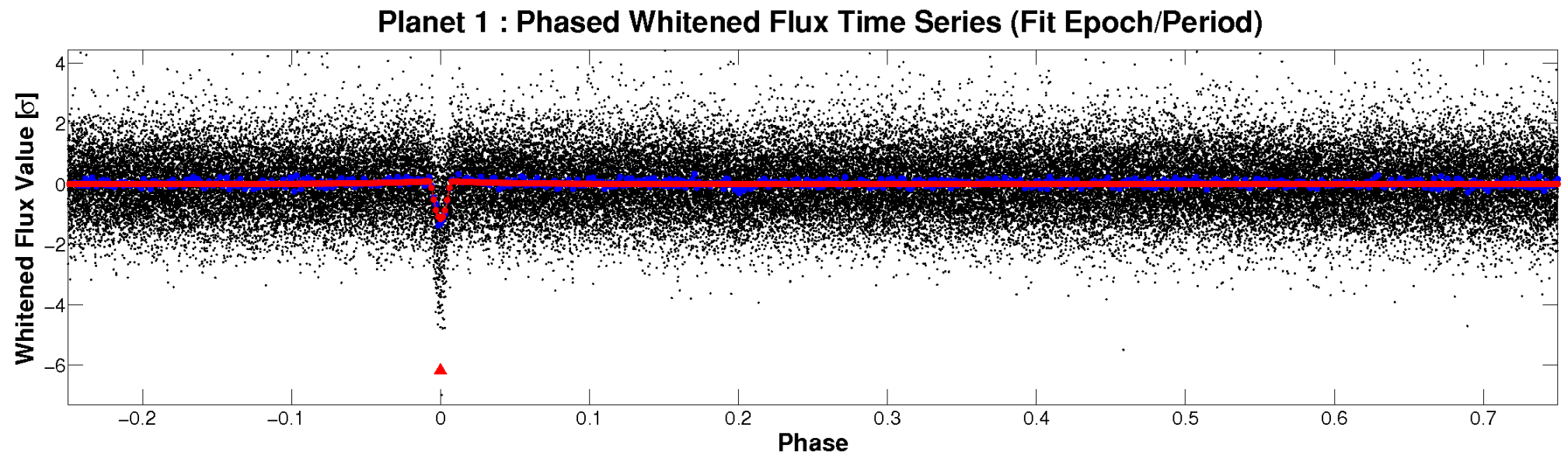
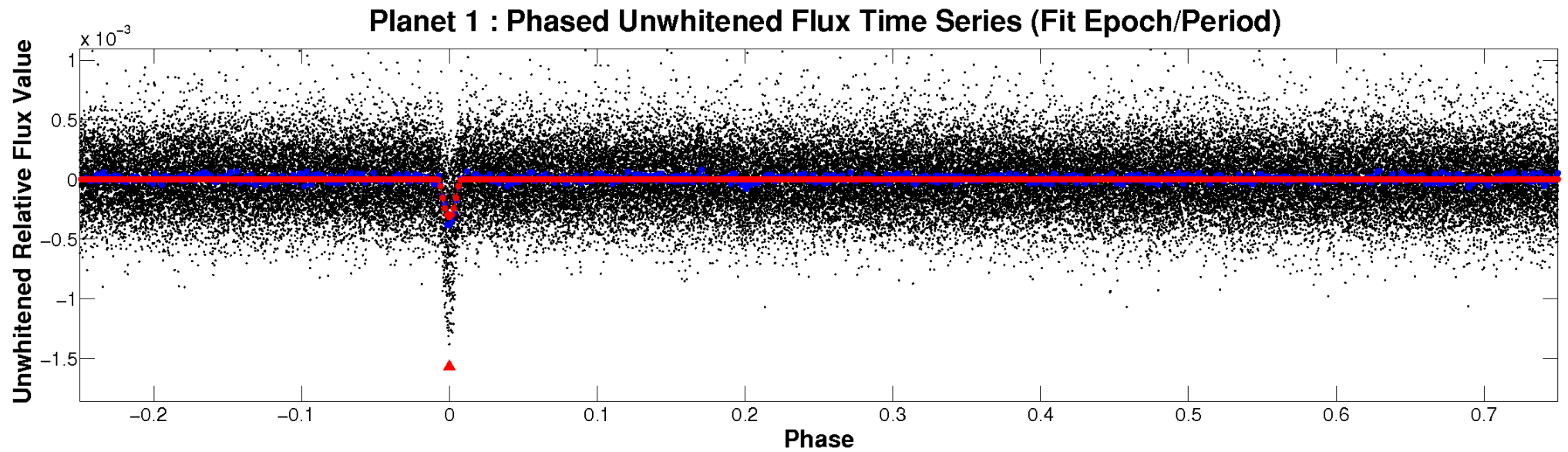


# ALT Odd/Even

TCE 007840044-01

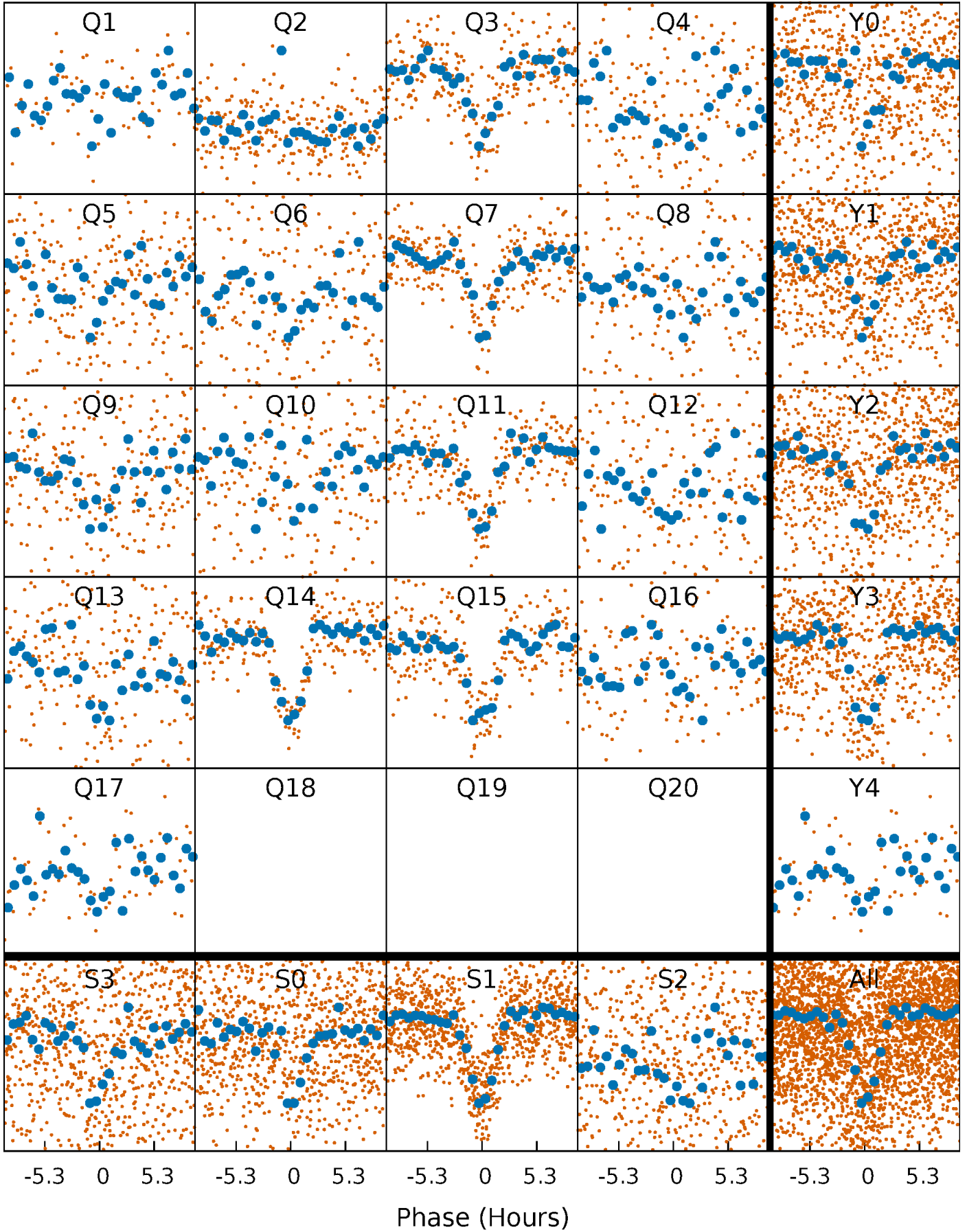


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

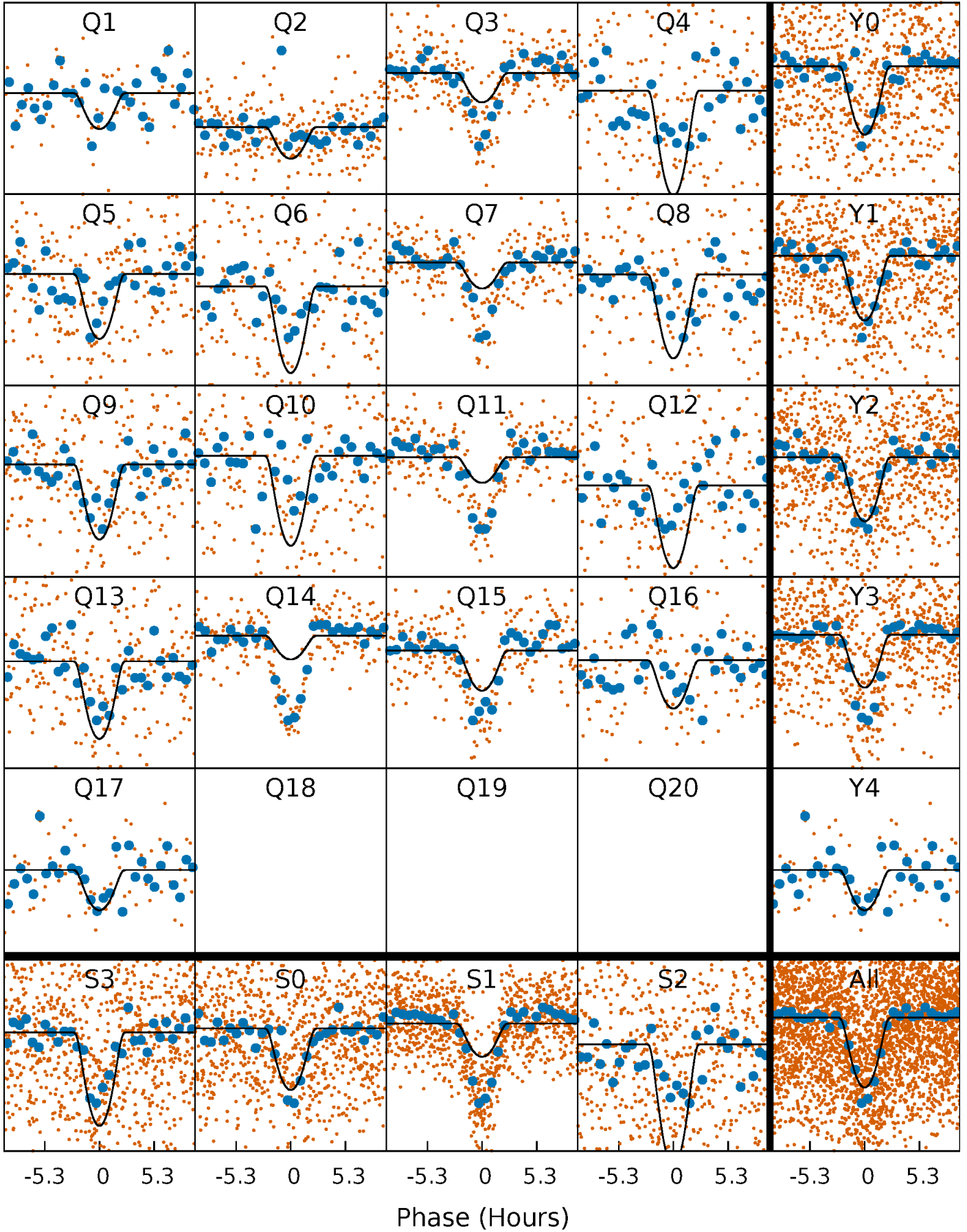
TCE 007840044-01 P= 13.542102 Days  $T_0=144.007632$  (BKJD)





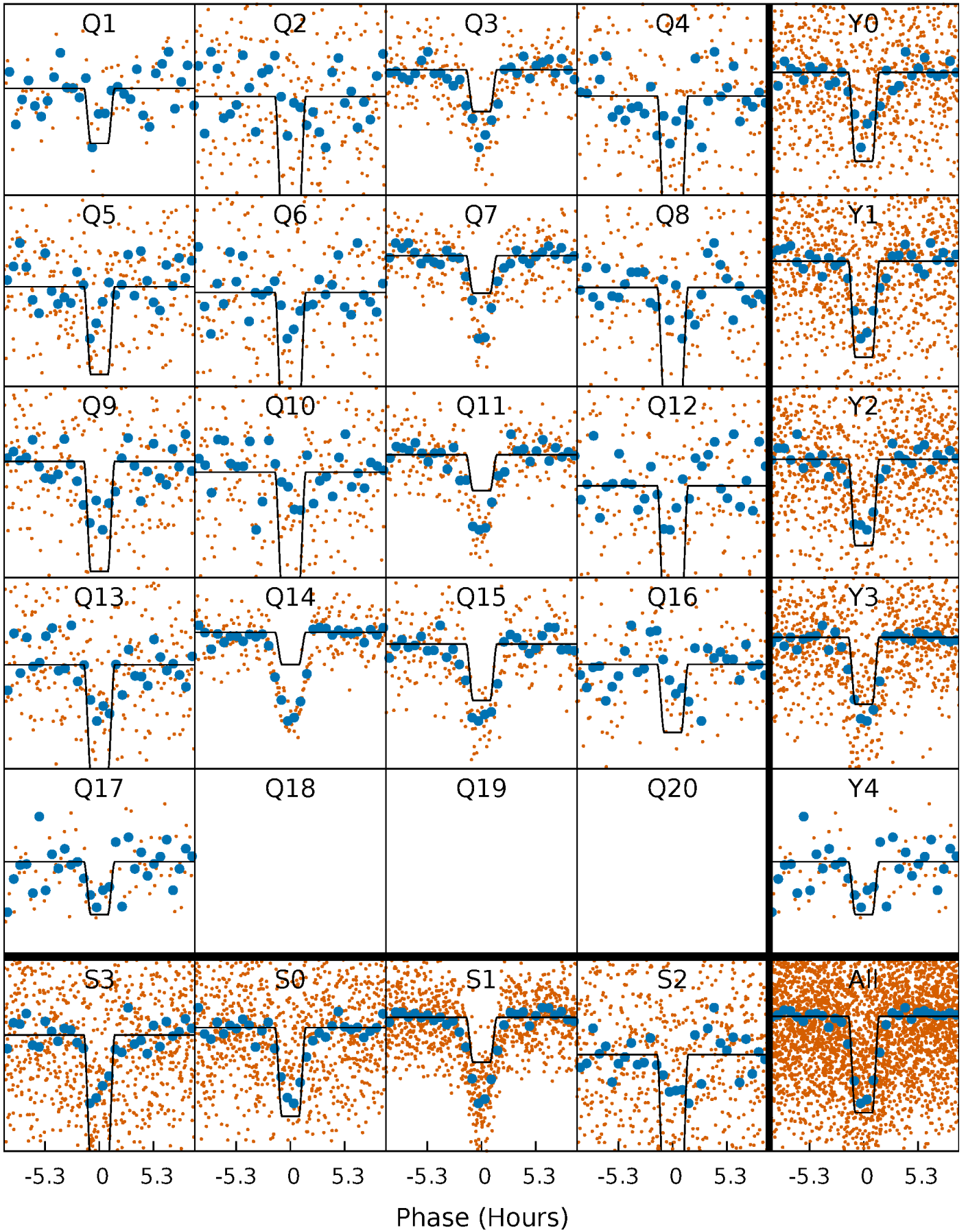
# DV Quarter-Phased Transit Curves

TCE 007840044-01 P= 13.542102 Days  $T_0=144.007632$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

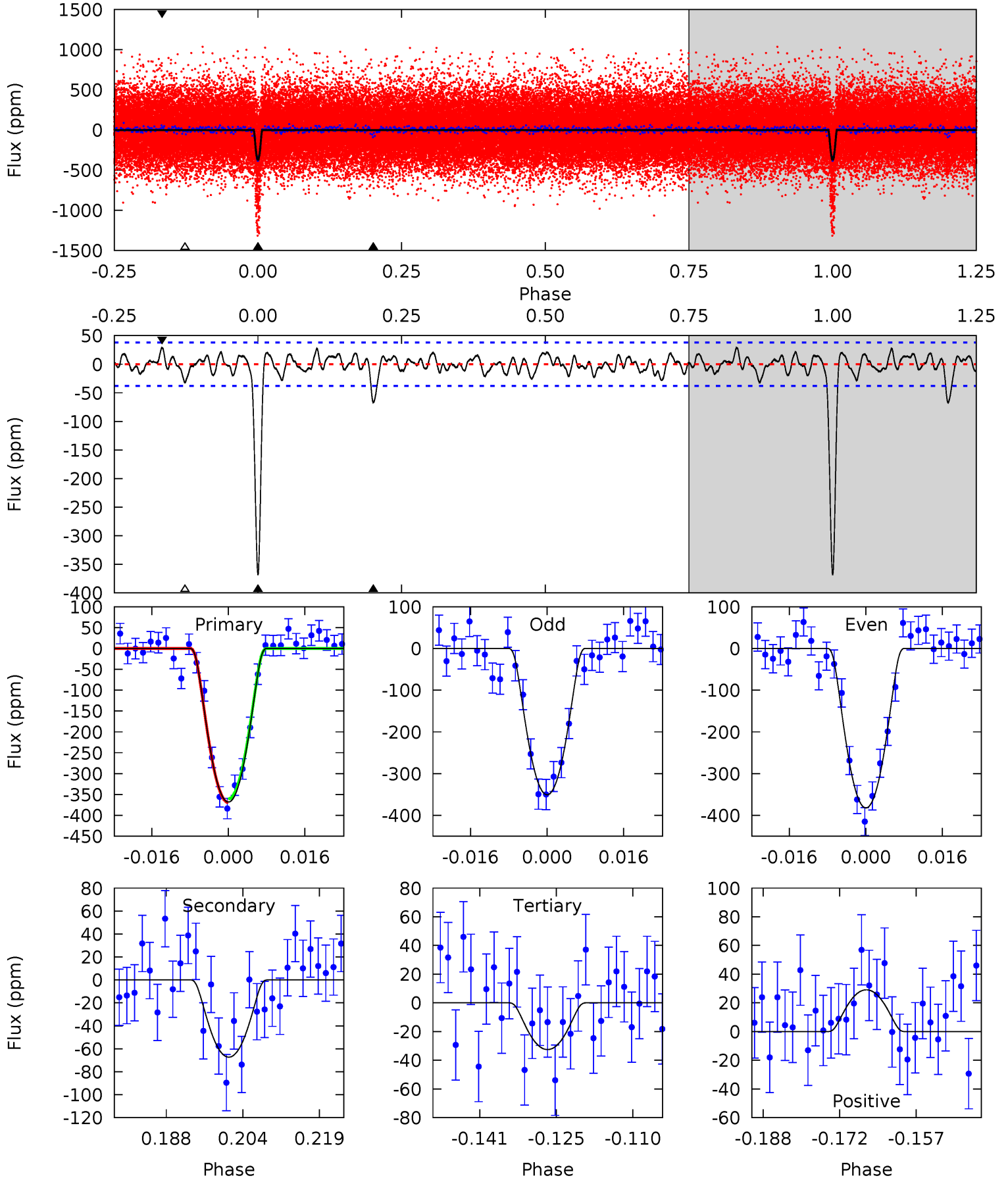
TCE 007840044-01 P= 13.542077 Days  $T_0=144.008797$  (BKJD)



# DV Model-Shift Uniqueness Test

007840044-01, P = 13.542102 Days, E = 130.465530 Days

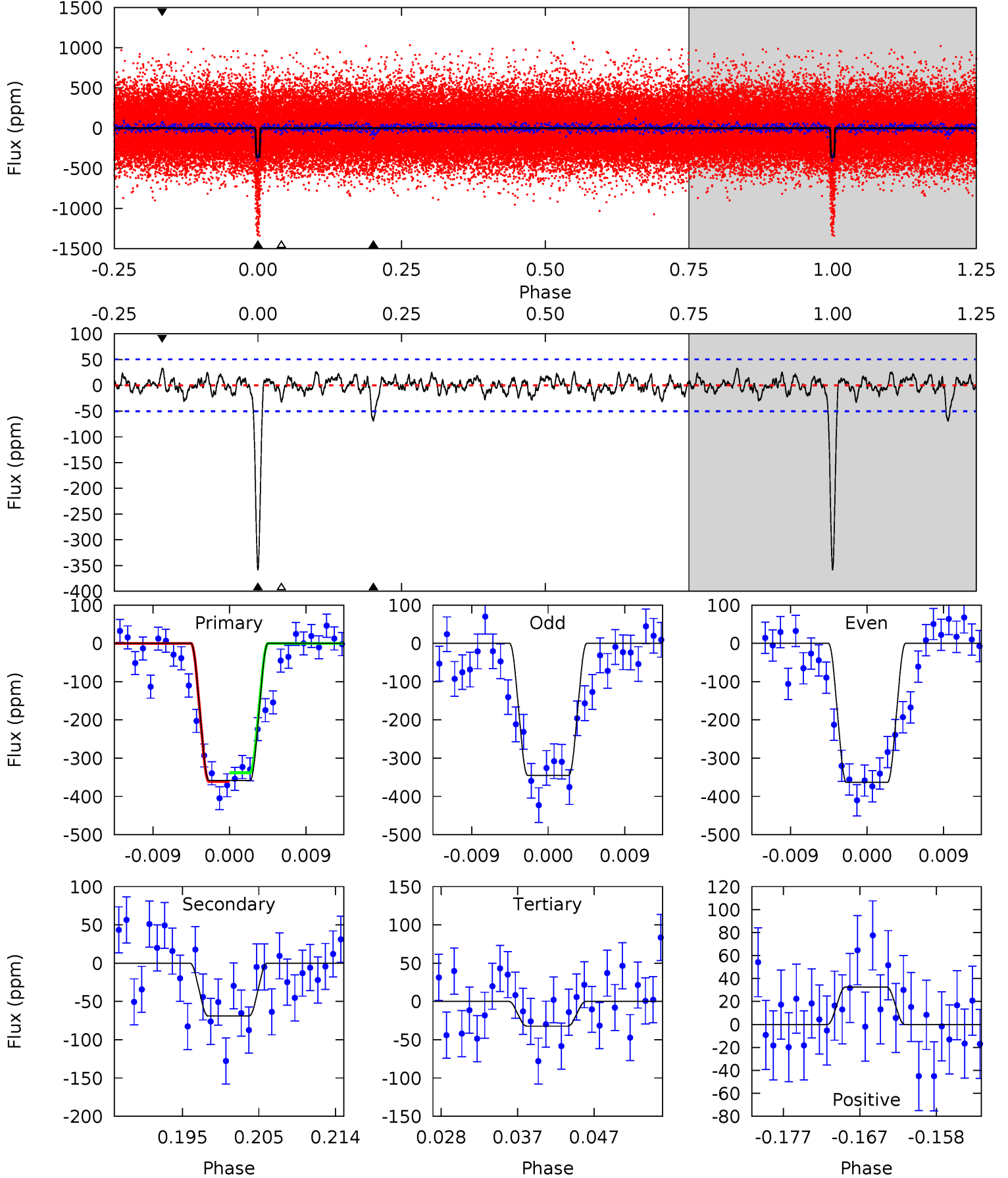
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
47.8	8.74	4.22	3.78	4.94	2.42	1.47	43.6	44.0	4.51	4.96	2.05	1.50	0.07	0.56



# Alt Model-Shift Uniqueness Test

007840044-01, P = 13.542077 Days, E = 130.466720 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
35.9	6.90	3.23	3.27	5.04	2.60	1.13	32.7	32.6	3.67	3.63	0.90	1.70	0.08	1.14



### Stellar Parameters For KIC 007840044

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5891^{+159}_{-177}$	$4.395^{+0.108}_{-0.186}$	$-0.200^{+0.300}_{-0.300}$	$1.015^{+0.285}_{-0.153}$	$0.934^{+0.132}_{-0.096}$	$1.258^{+0.716}_{-0.624}$
	+3%/-3%	+2%/-4%	+150%/-150%	+28%/-15%	+14%/-10%	+57%/-50%
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 007840044-01 / KOI 0516.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-67 \pm 8$	$2.86^{+1.52}_{-1.23}$	$1116^{+78}_{-55}$	$3732^{+886}_{-449}$	$54^{+110}_{-32}$
Alt.	$-69 \pm 10$	$2.46^{+1.47}_{-1.37}$	$1118^{+70}_{-64}$	$3964^{+1514}_{-569}$	$76^{+313}_{-47}$

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



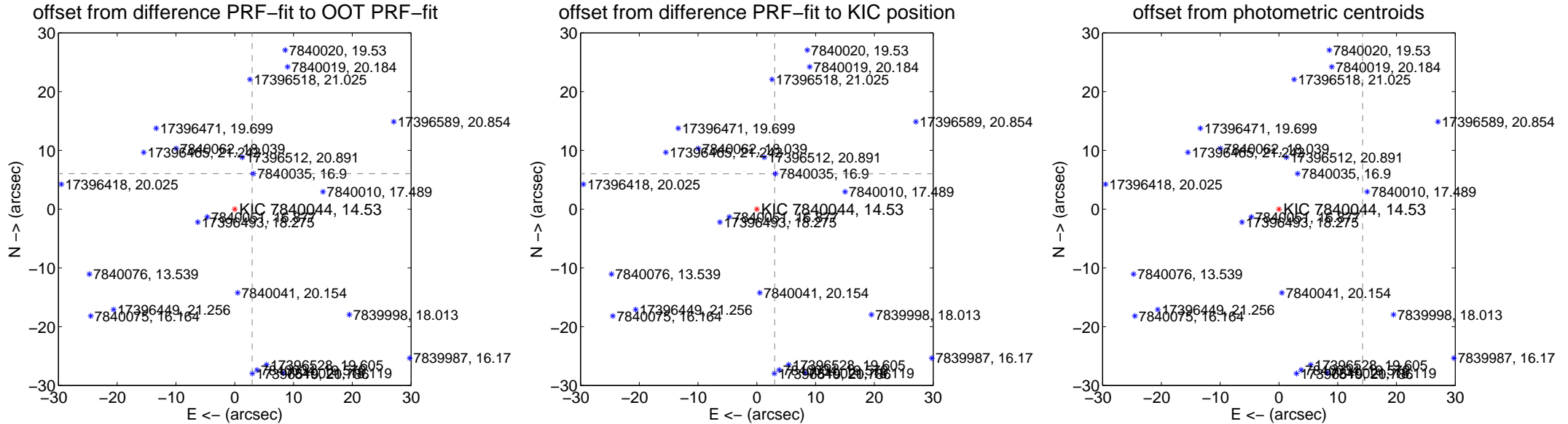
## DV Centroid Data

Supplemental centroid analysis for 007840044-01. Kepler magnitude: 14.53. Transit SNR 22.87

There are 8 quarters with good PRF difference image offsets

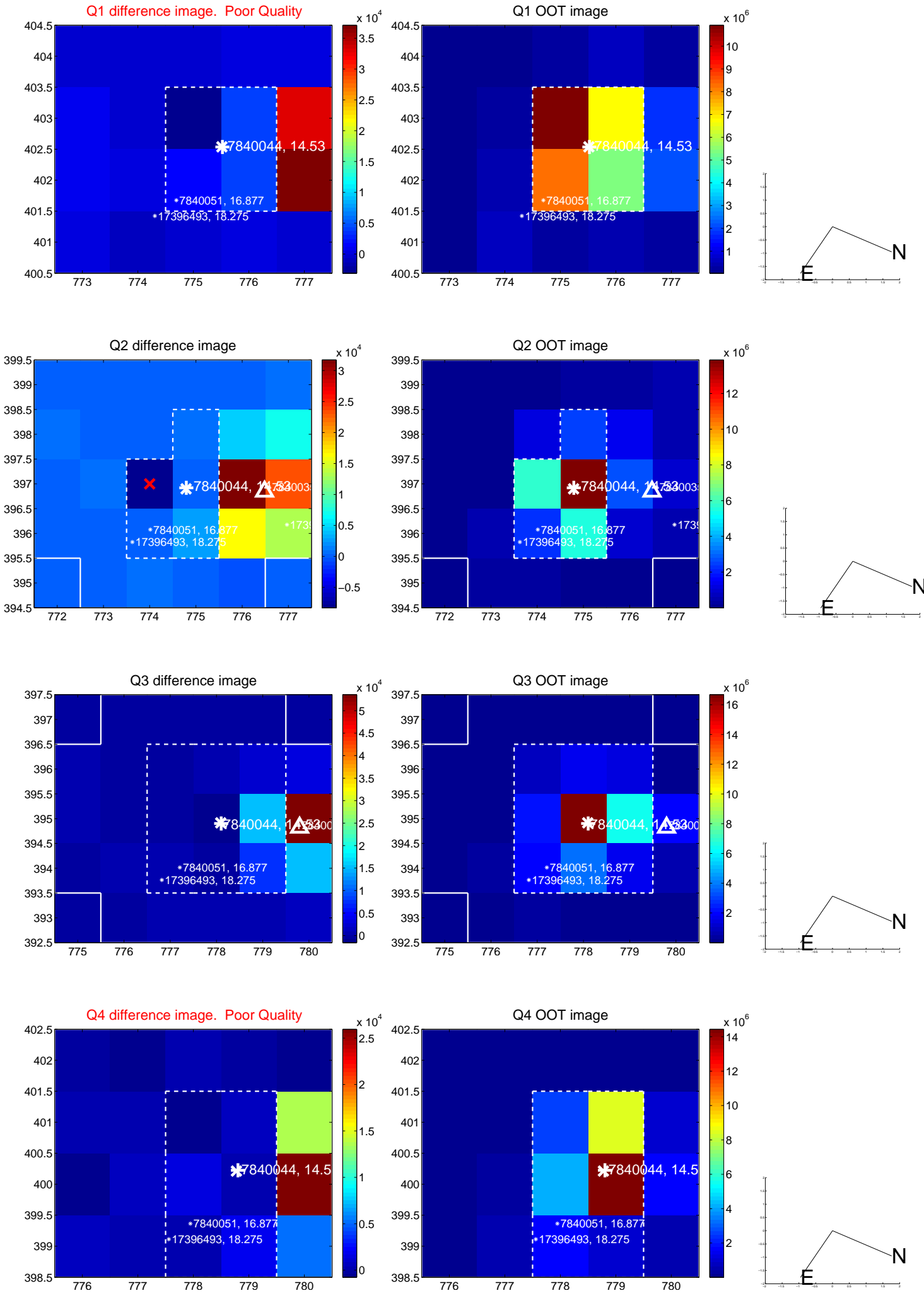
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>6.730 <math>\pm</math> 0.069</b>	<b>97.07</b>	-2.956 $\pm$ 0.068	6.046 $\pm$ 0.069
PRF-fit source offset from KIC position	<b>6.736 <math>\pm</math> 0.072</b>	<b>94.14</b>	-3.028 $\pm$ 0.077	6.016 $\pm$ 0.070
photometric centroid source offset	<b>38.66 <math>\pm</math> 0.62</b>	<b>62.48</b>	-14.23 $\pm$ 0.53	35.94 $\pm$ 0.63

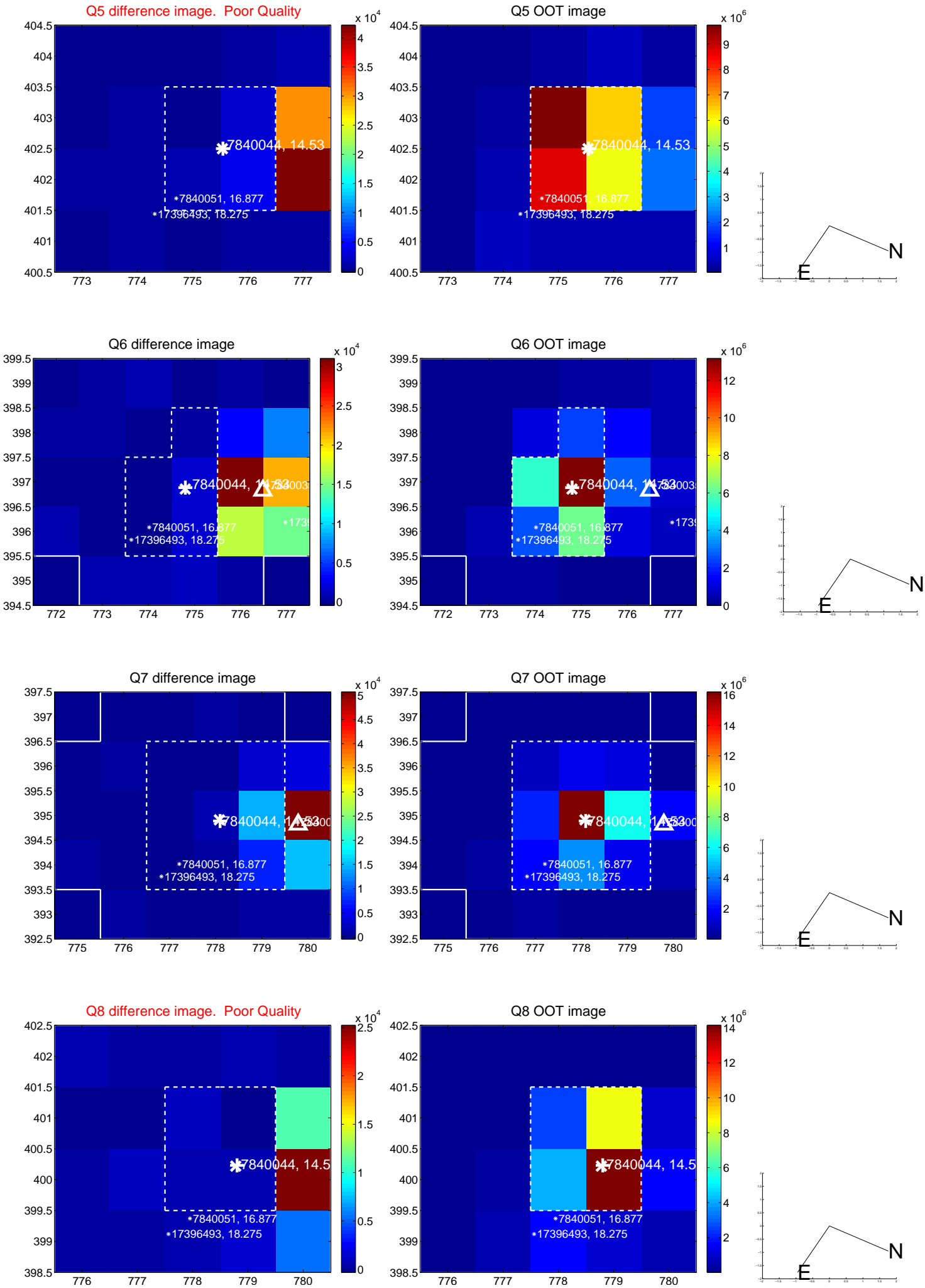


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

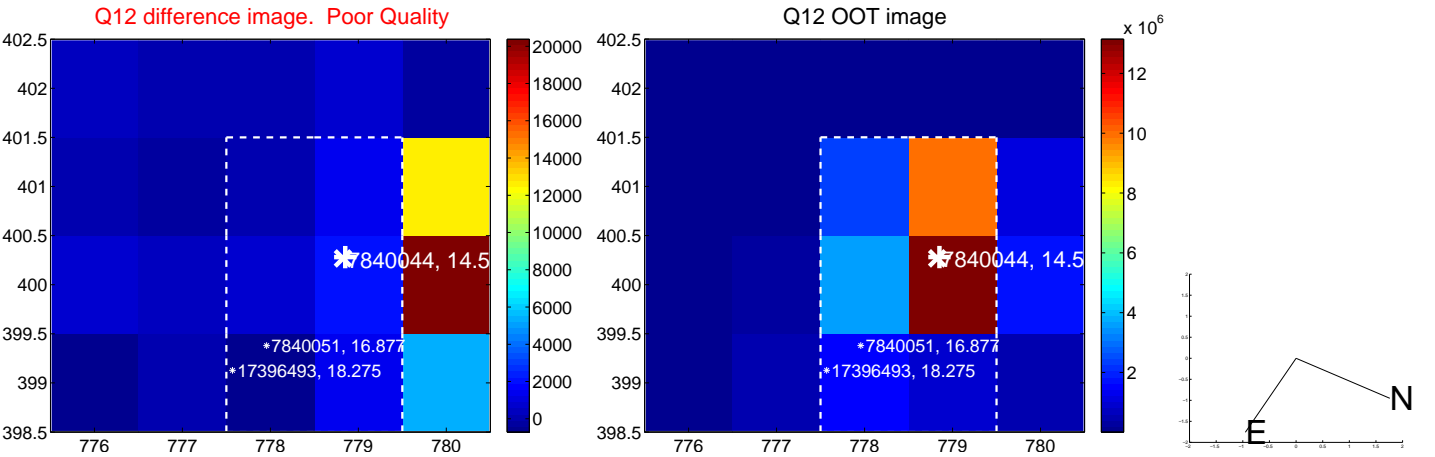
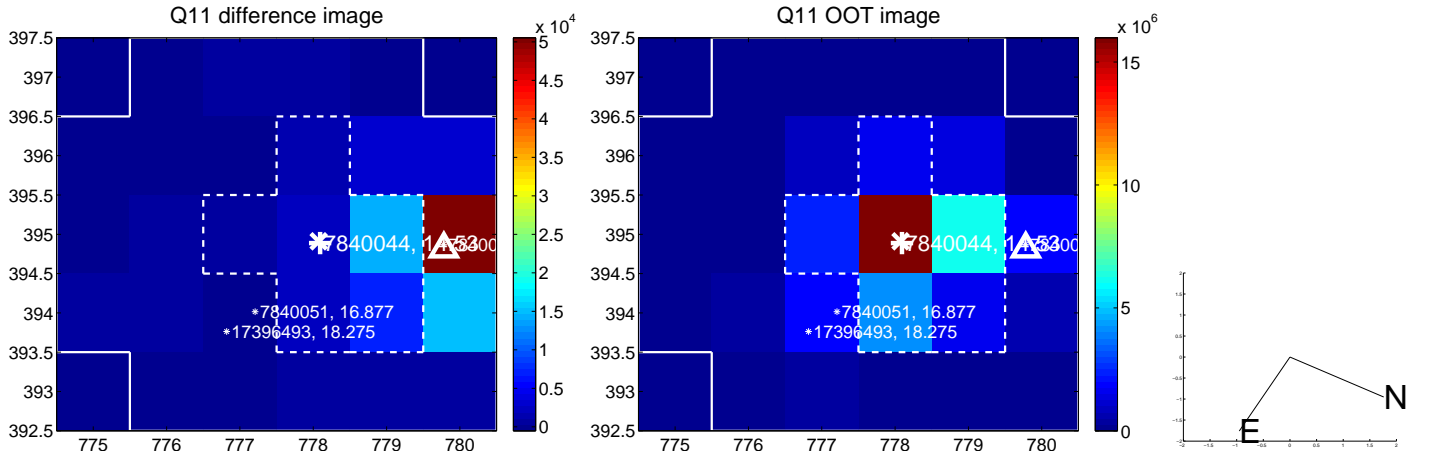
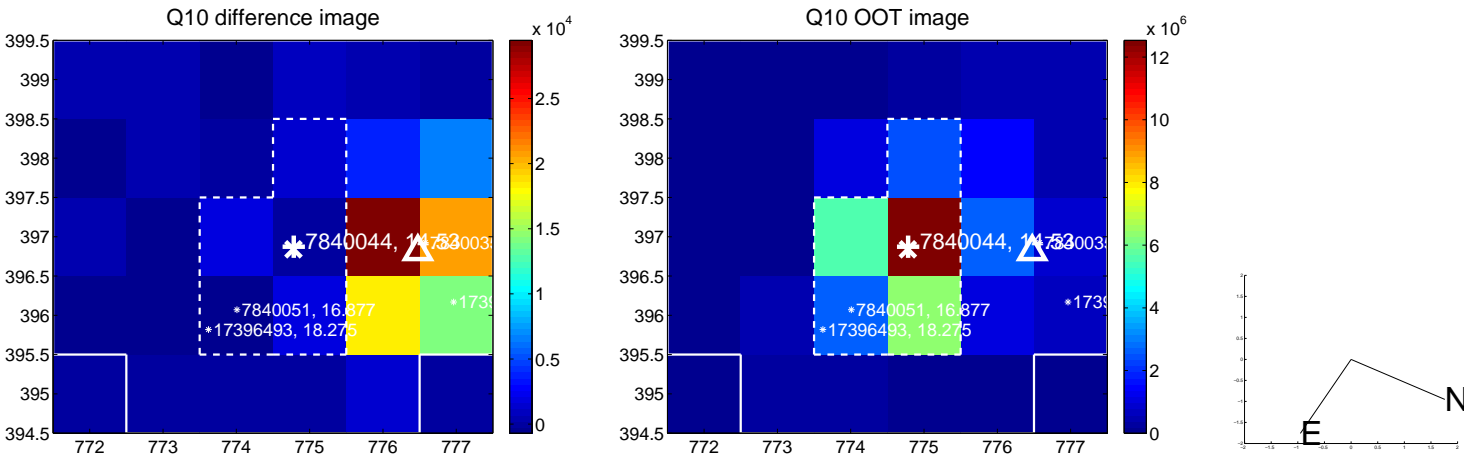
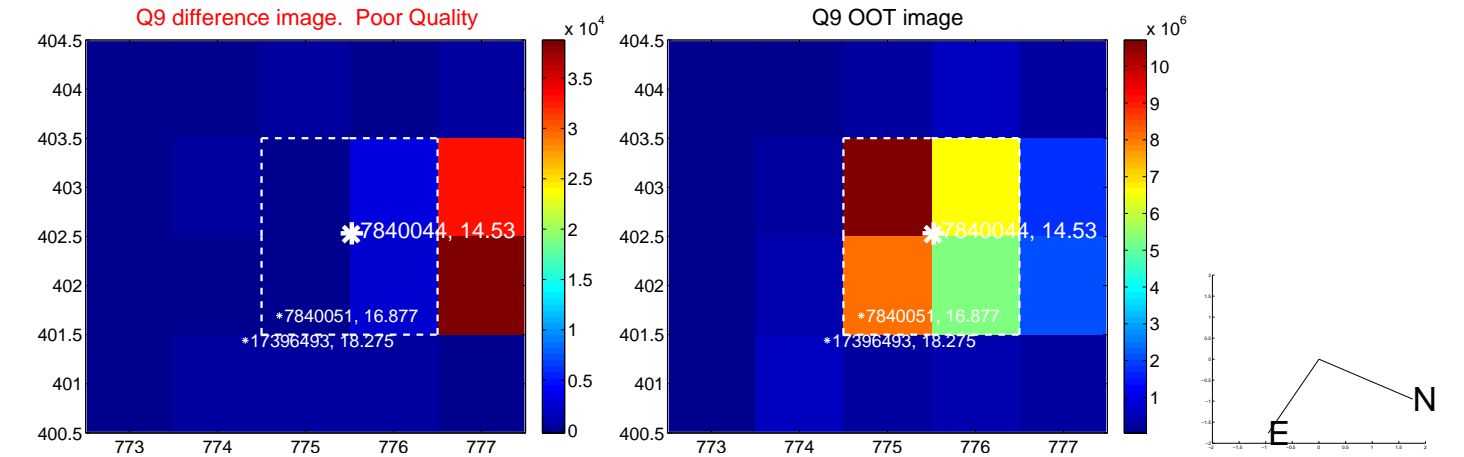
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



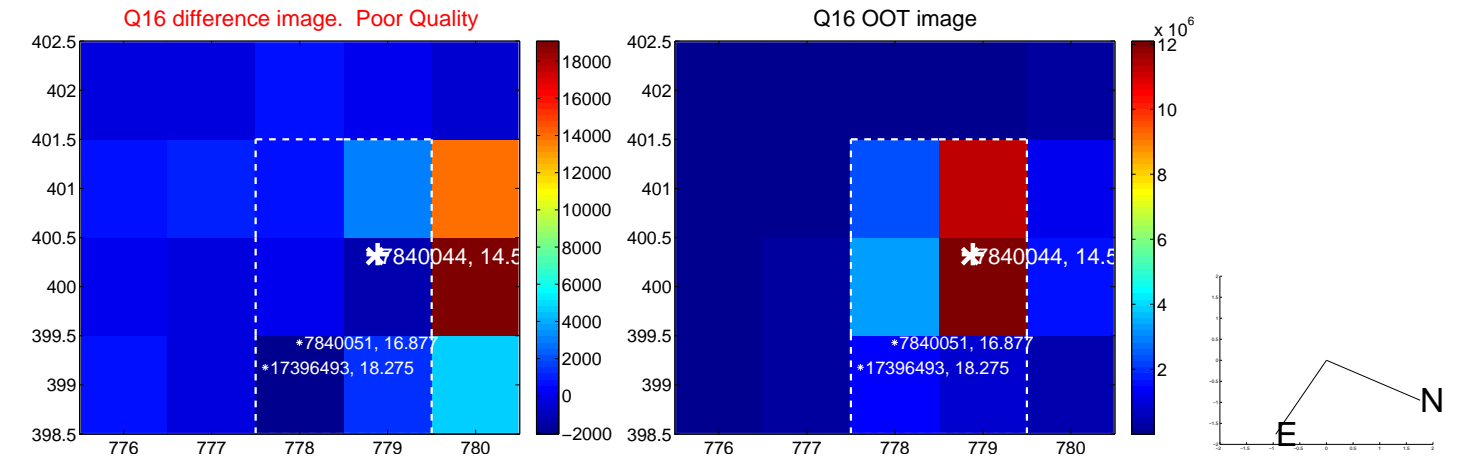
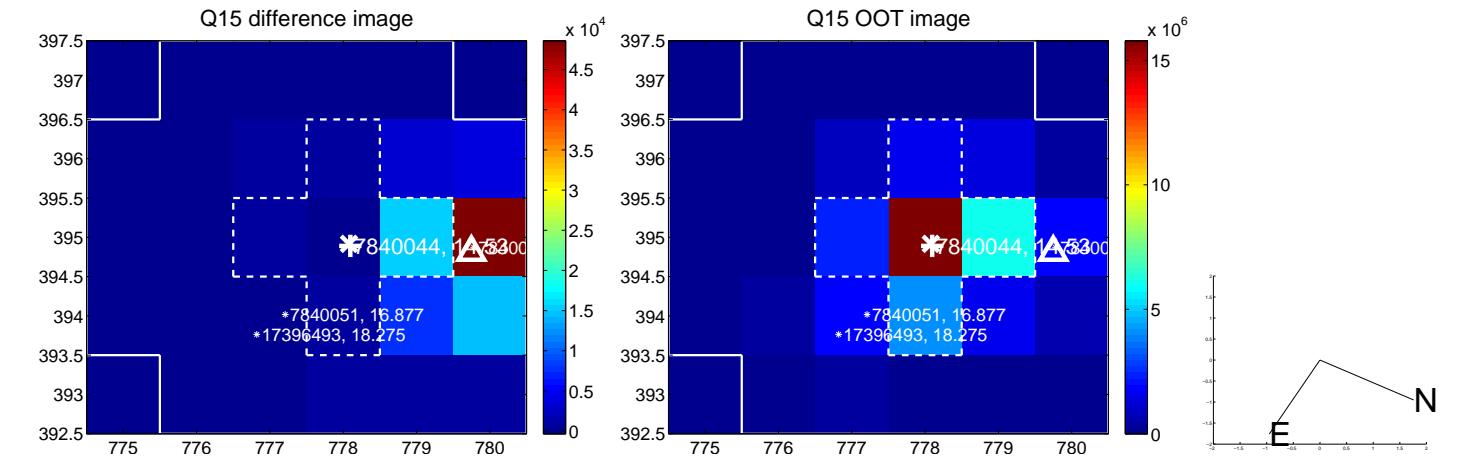
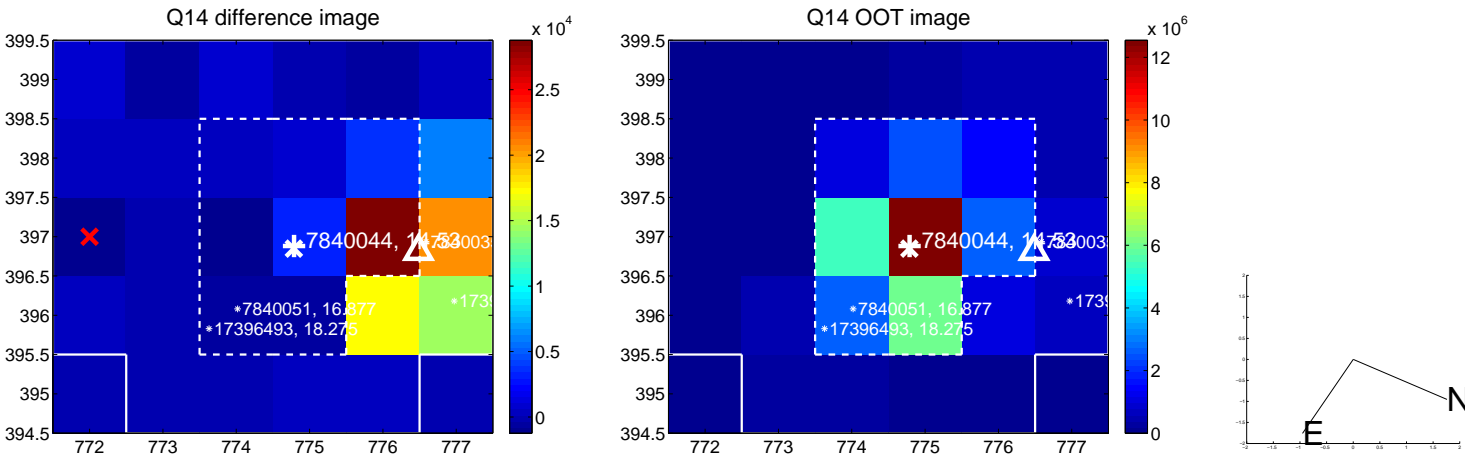
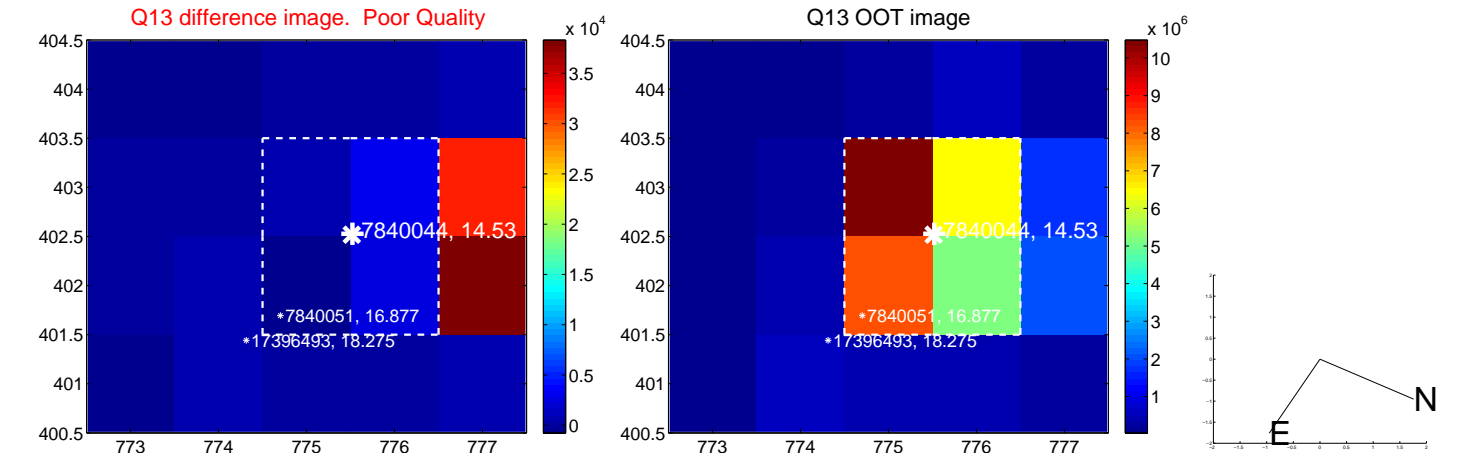
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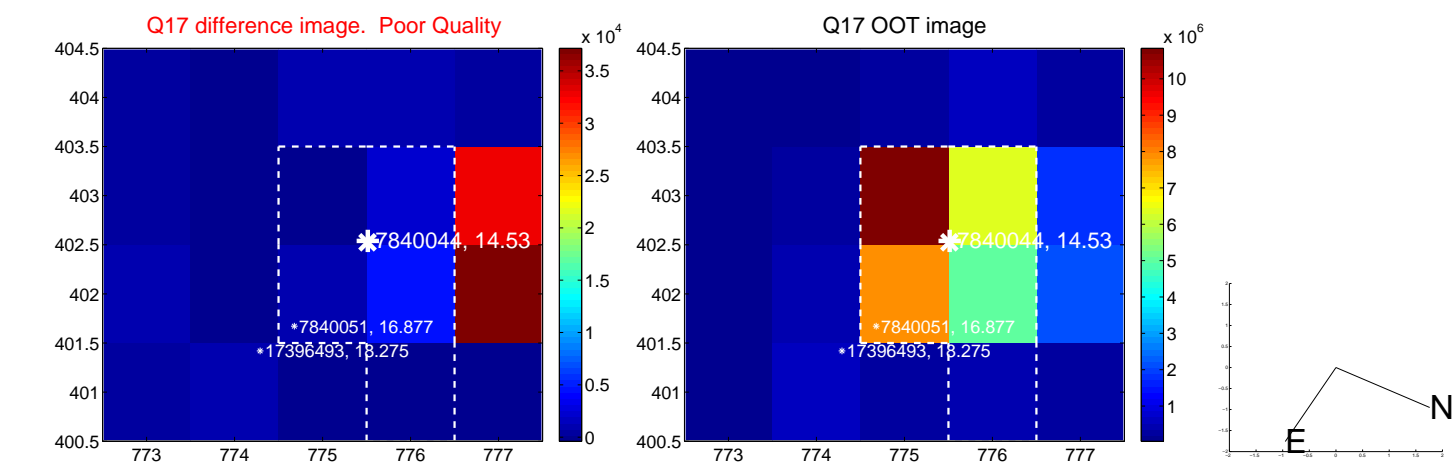


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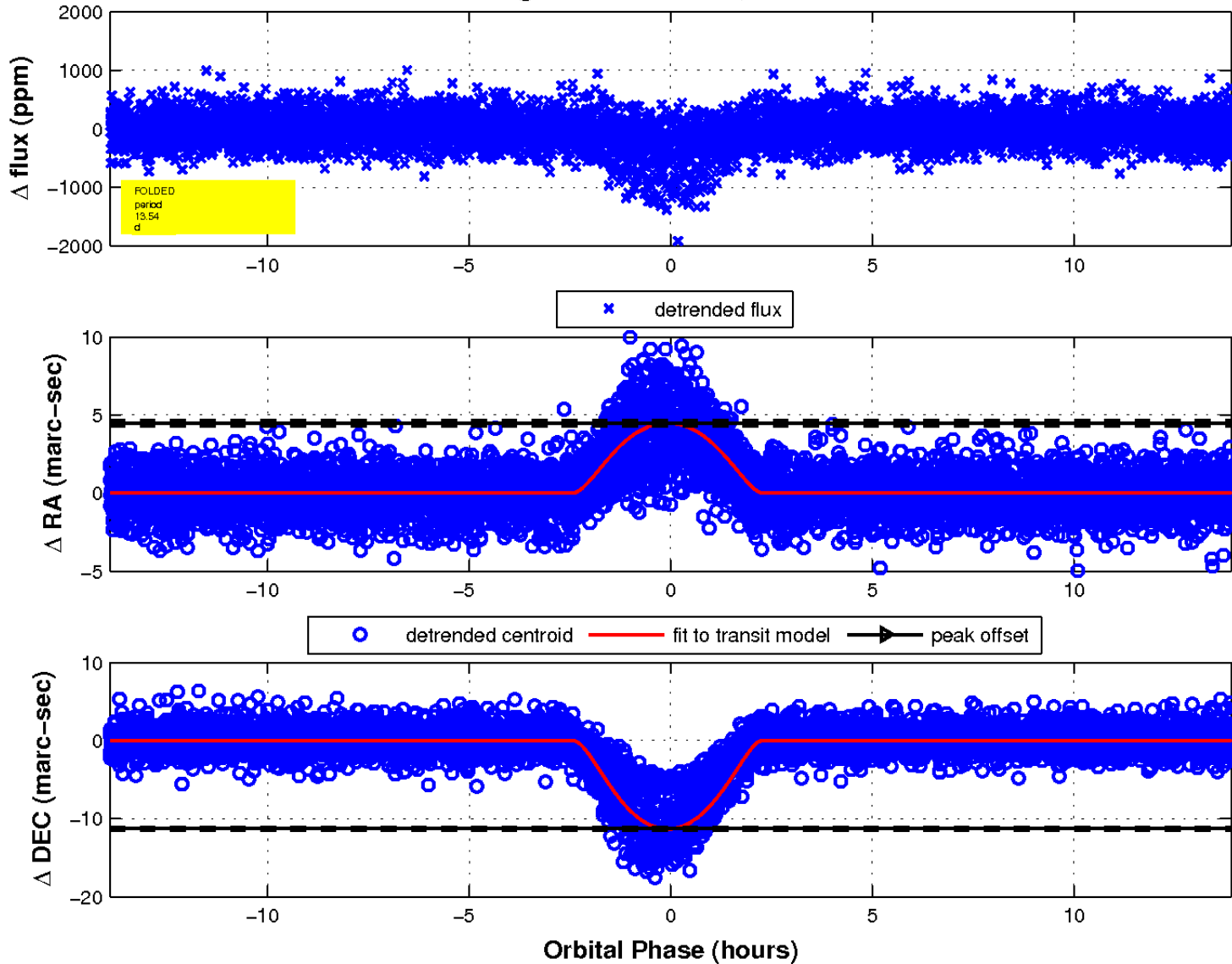




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 1 of 1



UKIRT Image

Declination

