

# KIC 003124412

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003124412-01	OBS	1087.01	0.948929	131.533356	443.7	2.252	61.3	60.6	1.13	6307	2.83	4634.76

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003124412-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_ALT—CENT_RESOLVED_OFFSET—HALO_GHOST—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 003124412-01

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	$\sigma_P$	$\sigma_T$
003124412-01	3124412	3918.01	3124420	1:1	5.8	1	0	18.24	14.91	953.65	Direct-PRF	0	2.16	0.94

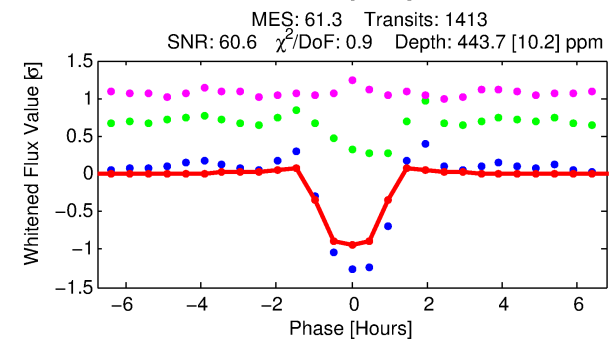
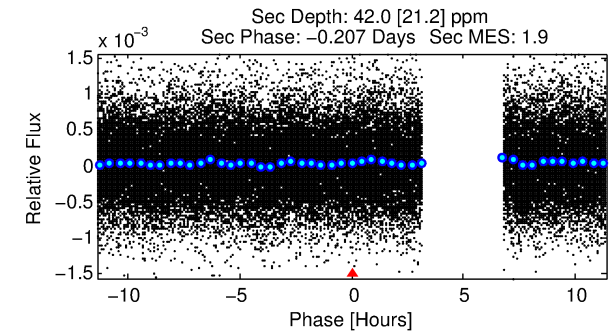
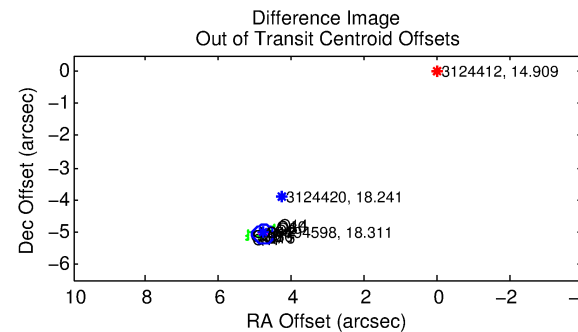
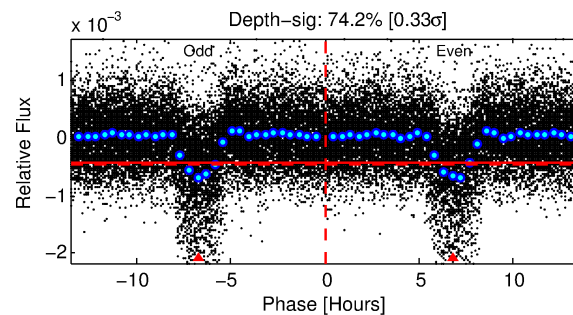
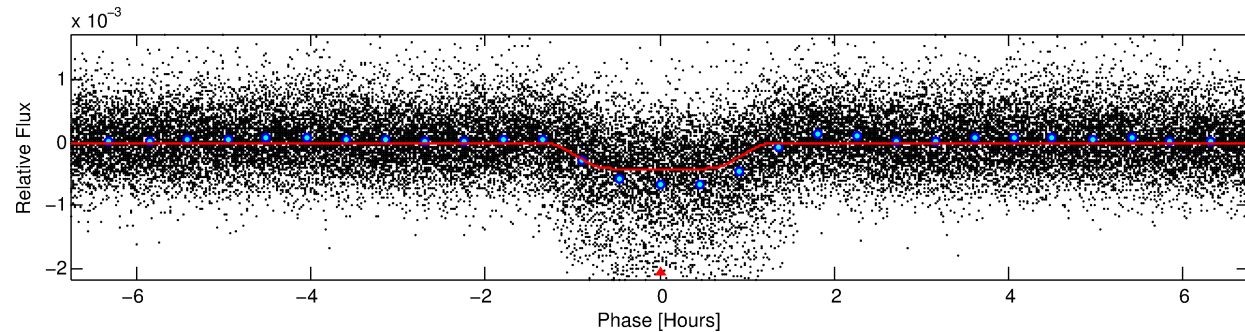
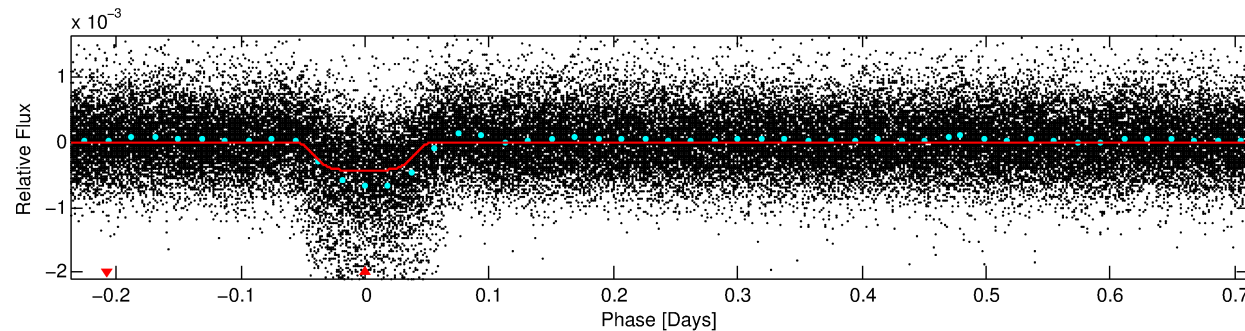
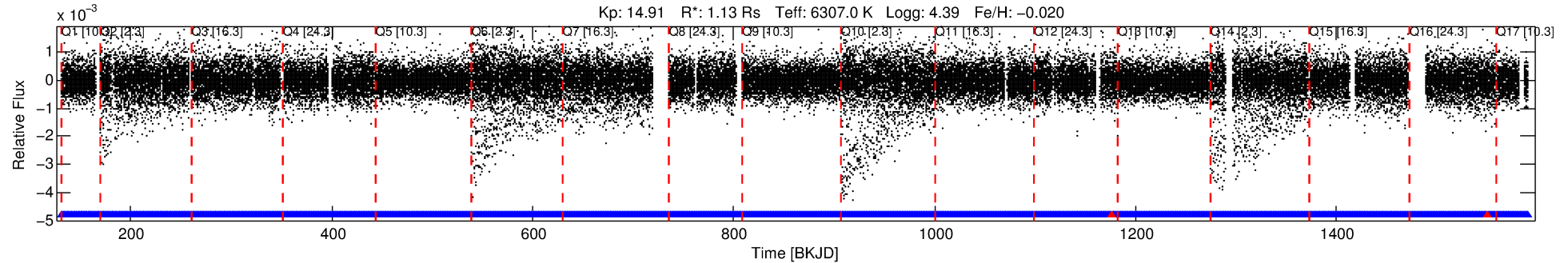
**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  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: 3124412 Candidate: 1 of 1 Period: 0.949 d

KOI: K01087 Corr: No Ephemeris Match

Kp: 14.91 R\*: 1.13 Rs Teff: 6307.0 K Logg: 4.39 Fe/H: -0.020



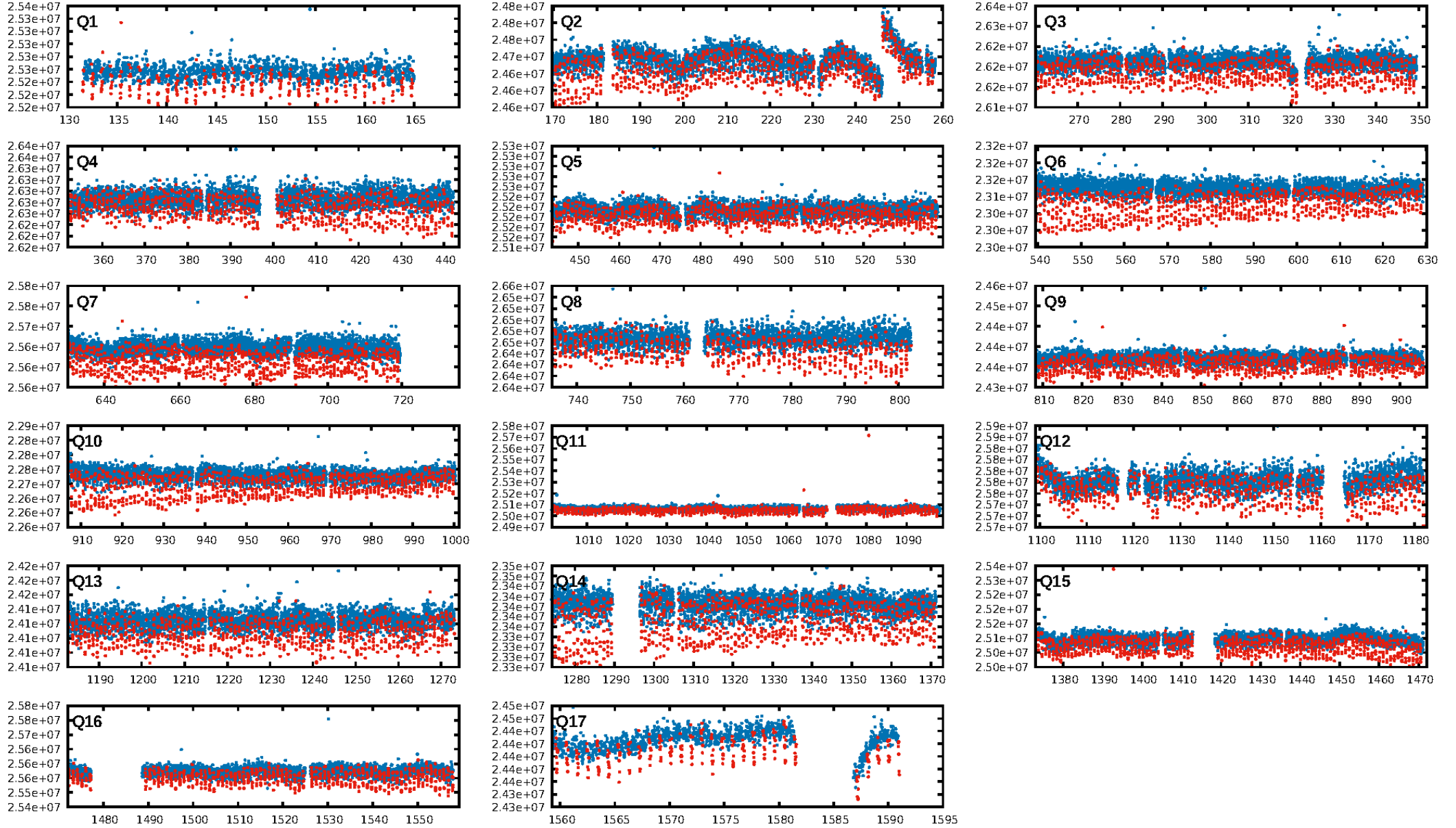
## DV Fit Results:

Period = 0.94893 [0.00000] d  
Epoch = 131.5334 [0.0005] BKJD  
Rp/R\* = 0.0229 [0.0012]  
a/R\* = 1.78 [0.33]  
b = 0.91 [0.05]  
Seff = 4634.76 [1985.06]  
Teq = 2104 [225] K  
Rp = 2.83 [0.98] Re  
a = 0.0198 [0.0055] AU  
Ag = 1.13 [0.74] [0.18σ]  
Teff = 3356 [454] K [2.47σ]

## DV Diagnostic Results:

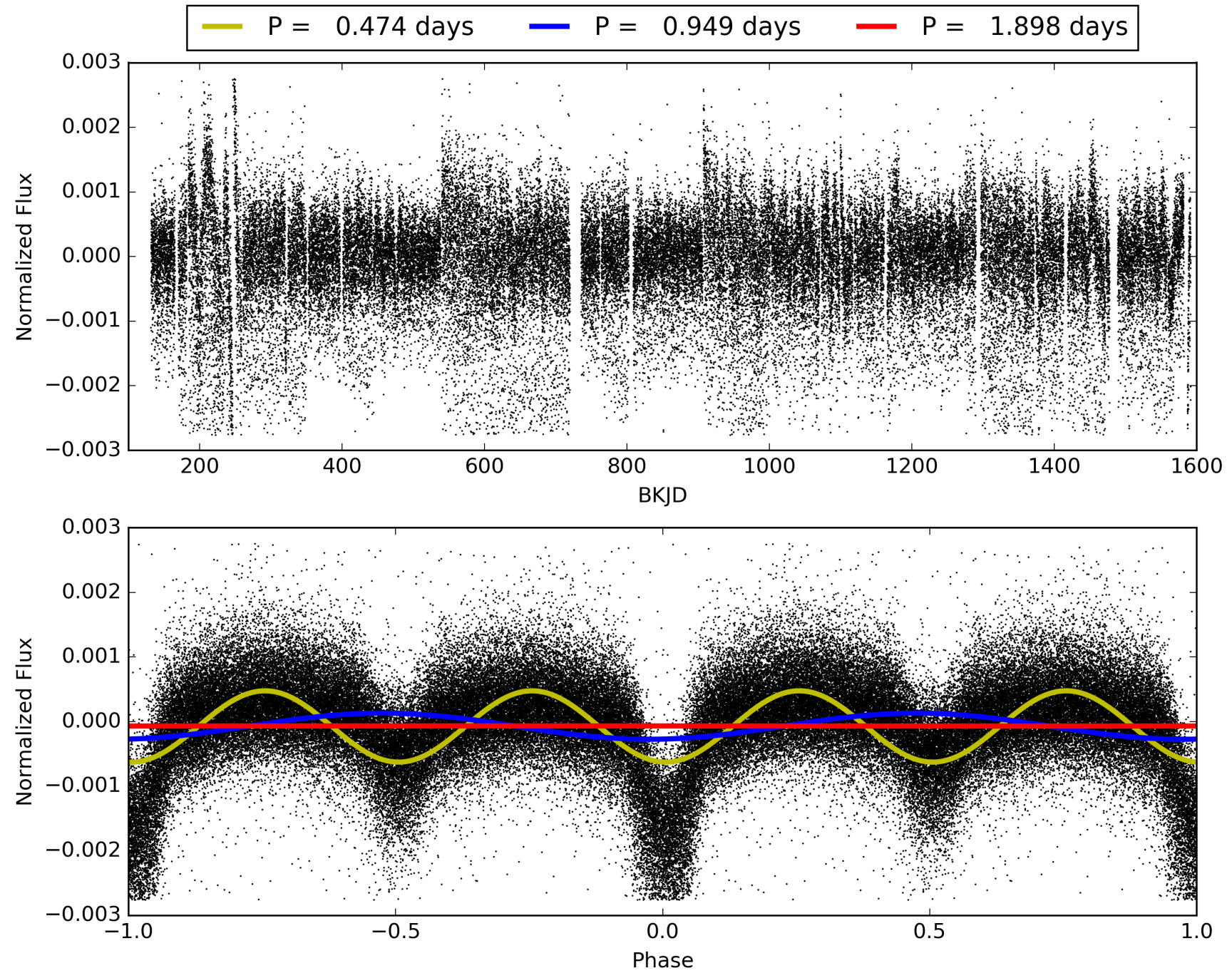
ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [1346/1348]  
GhostDiagnostic-chr: -0.1747  
Centroid-sig: 0.0%  
Centroid-so: 94.921 arcsec [437.76σ]  
OotOffset-rm: 6.972 arcsec [72.18σ]  
KicOffset-rm: 6.858 arcsec [91.45σ]  
OotOffset-st: 4/4/2/5 [15]  
KicOffset-st: 4/4/2/5 [15]  
DiffImageQuality-fgm: 1.00 [15/15]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 003124412-01, PDC Light Curves



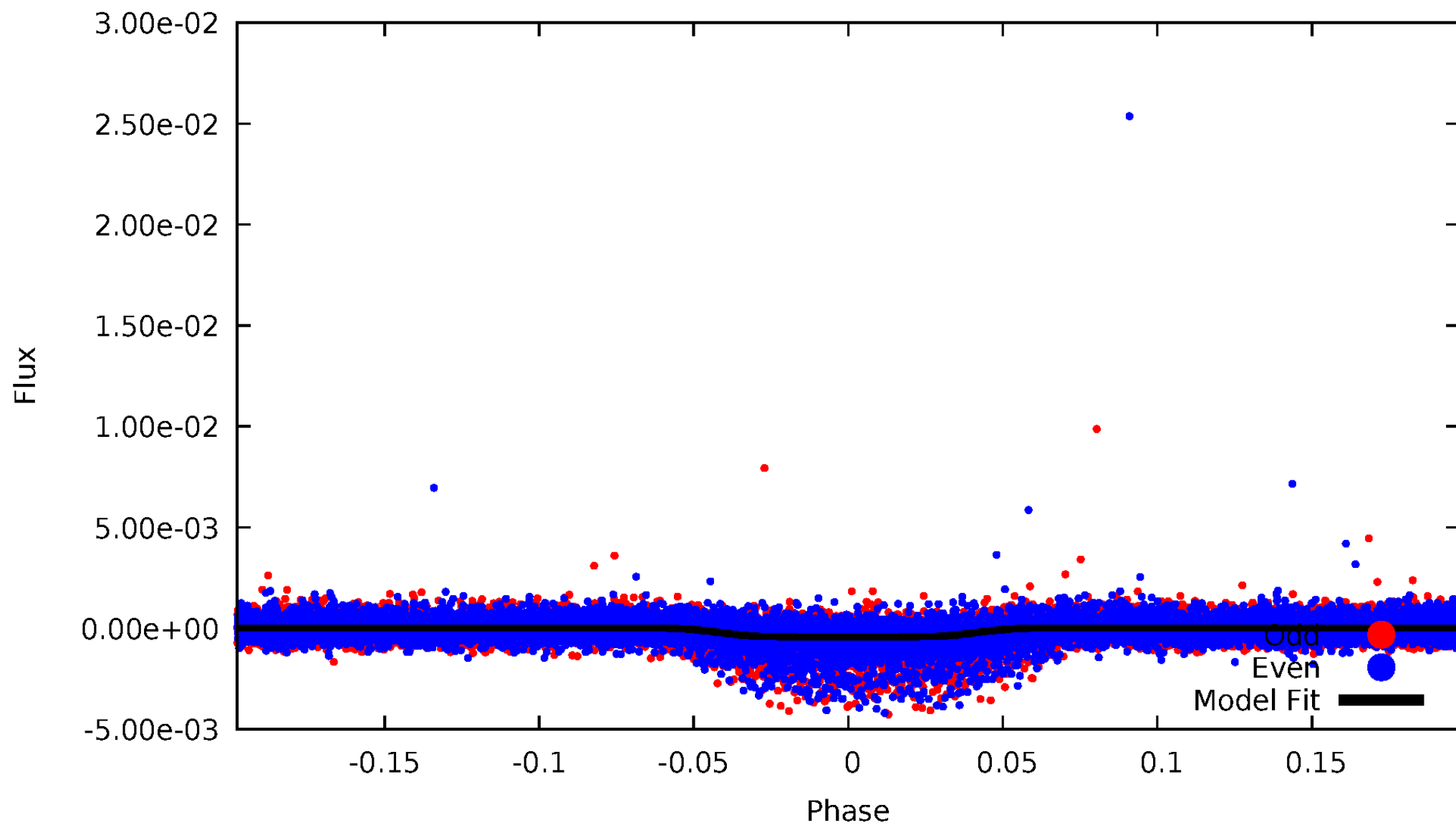


TCE 003124412-01



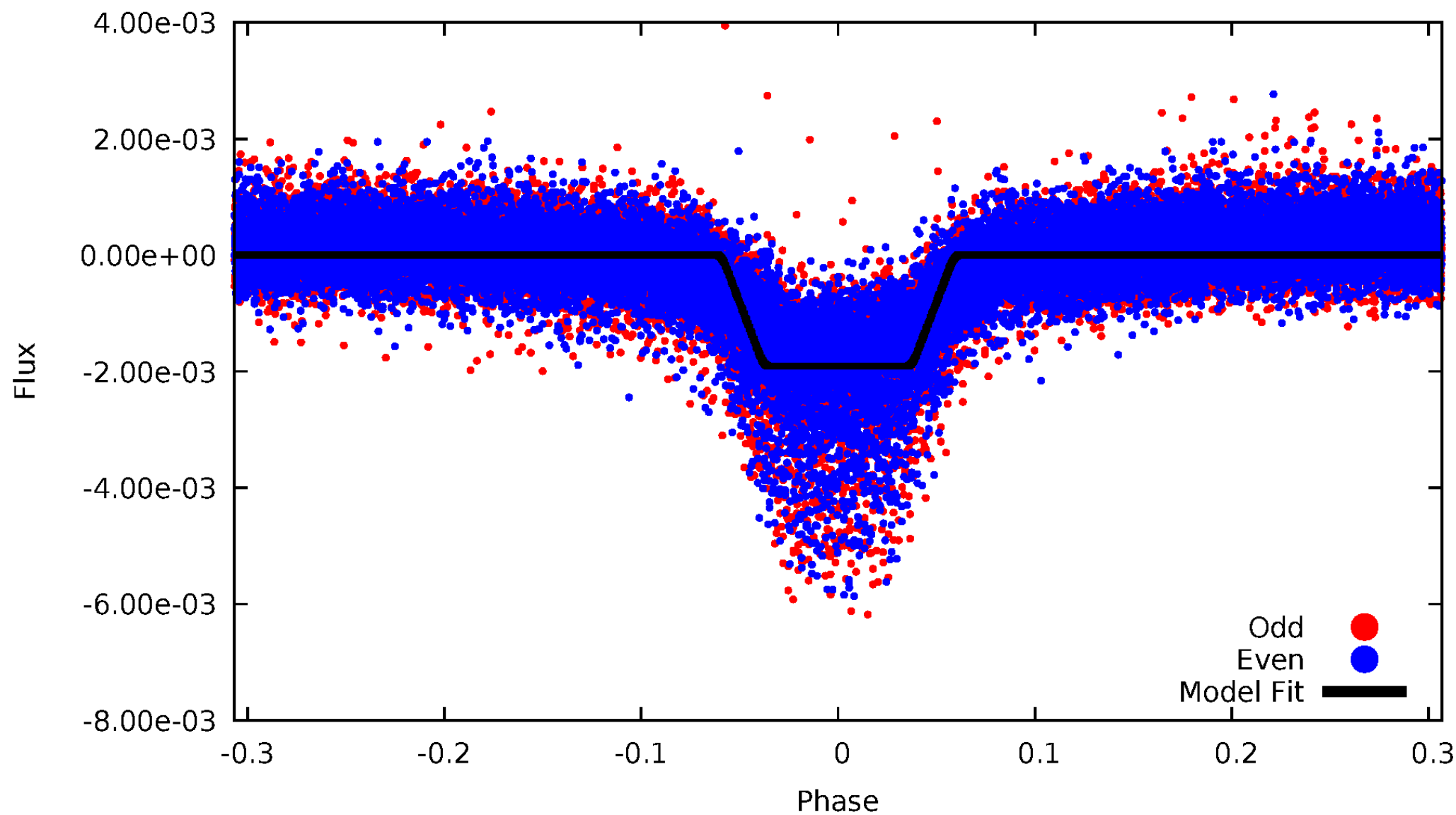
# DV Odd/Even

TCE 003124412-01



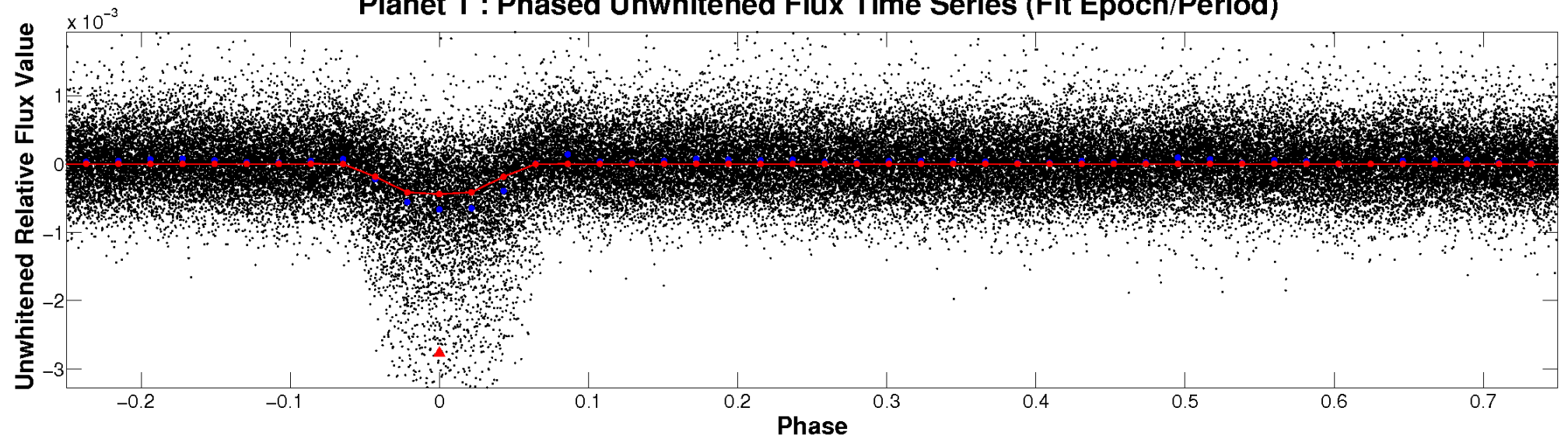
# ALT Odd/Even

TCE 003124412-01

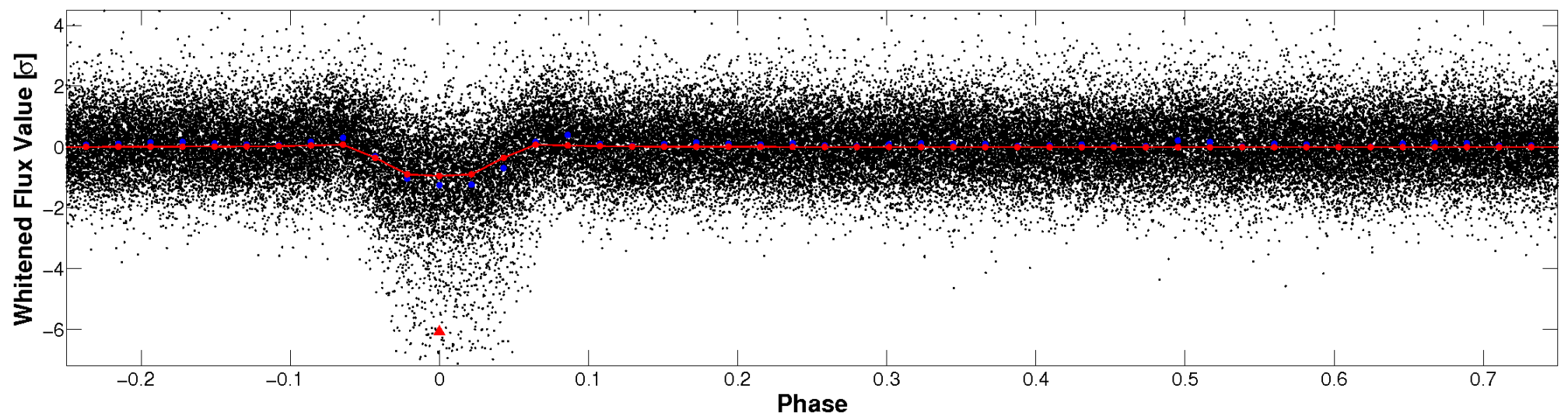


# Non-Whitened Vs. Whitened Light Curve

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



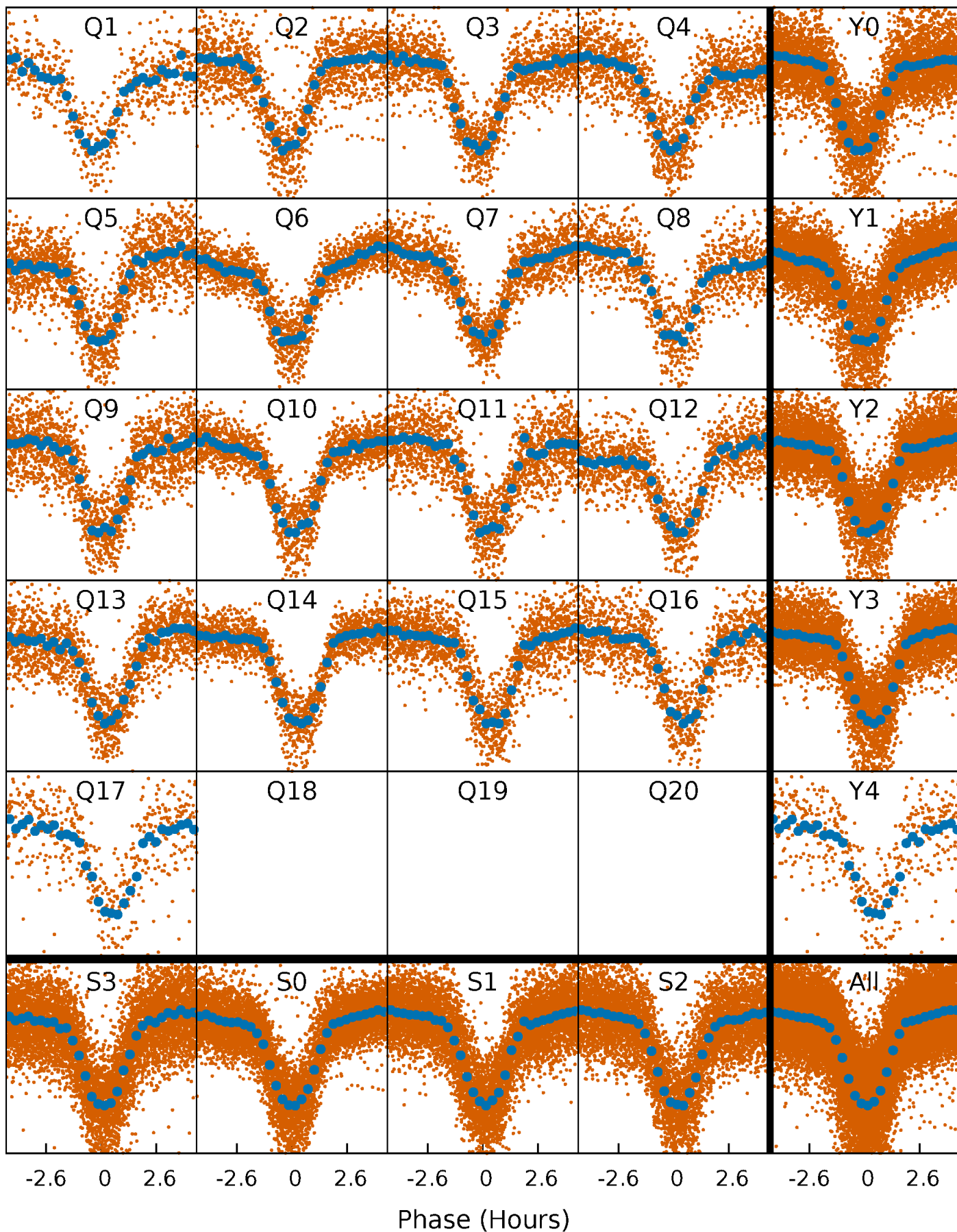
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

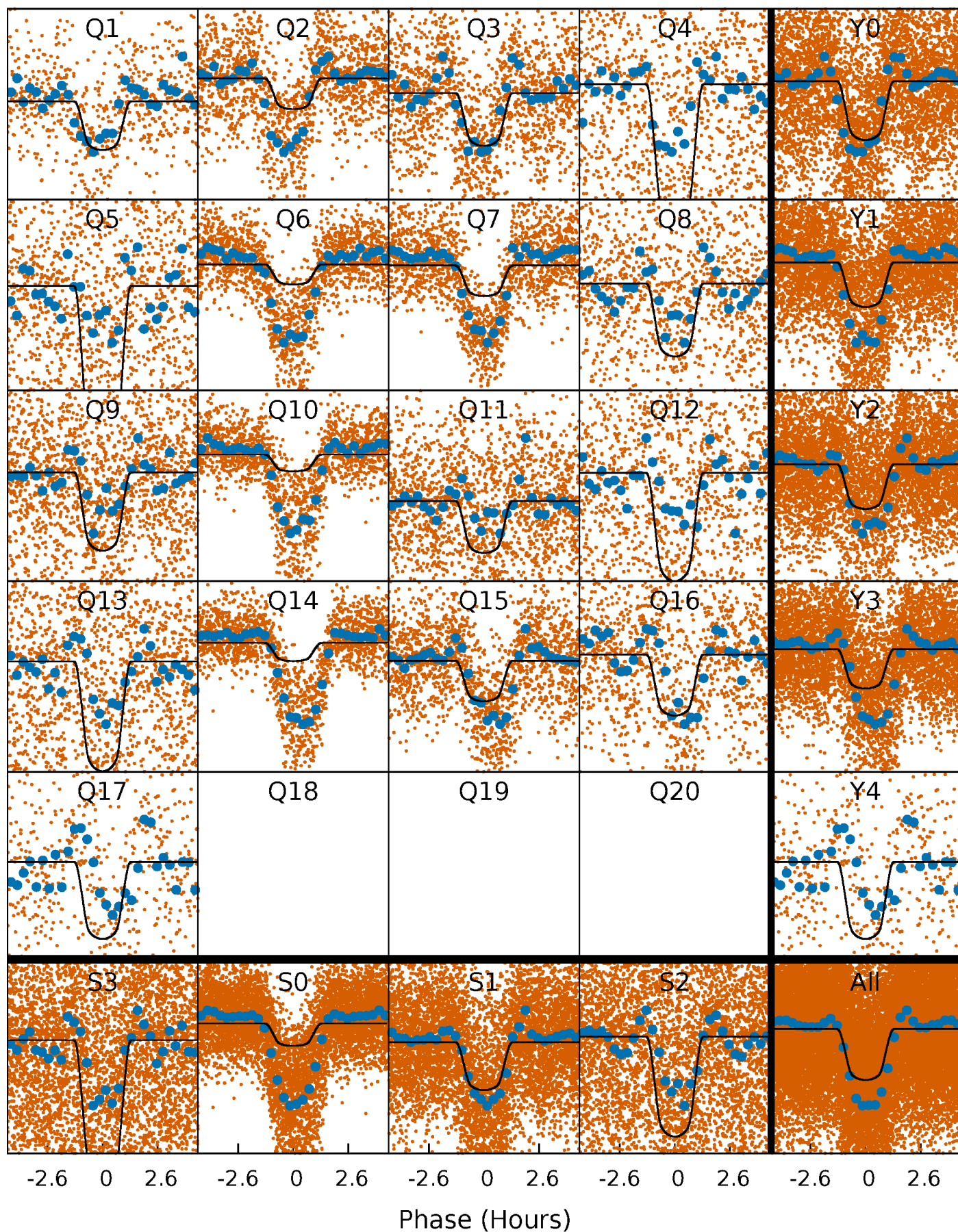
TCE 003124412-01 P= 0.948929 Days  $T_0=131.533356$  (BKJD)





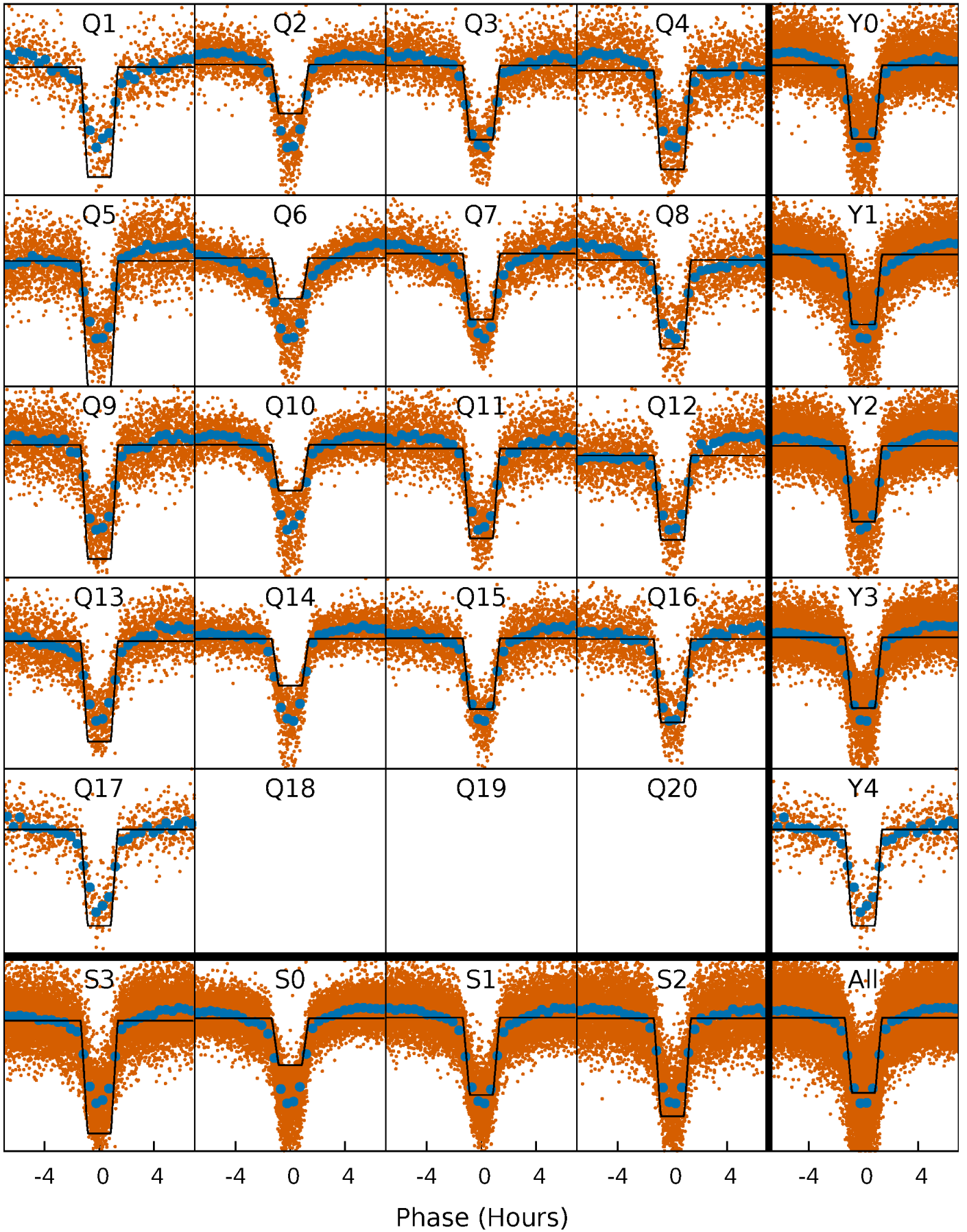
# DV Quarter-Phased Transit Curves

TCE 003124412-01 P= 0.948929 Days  $T_0=131.533356$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

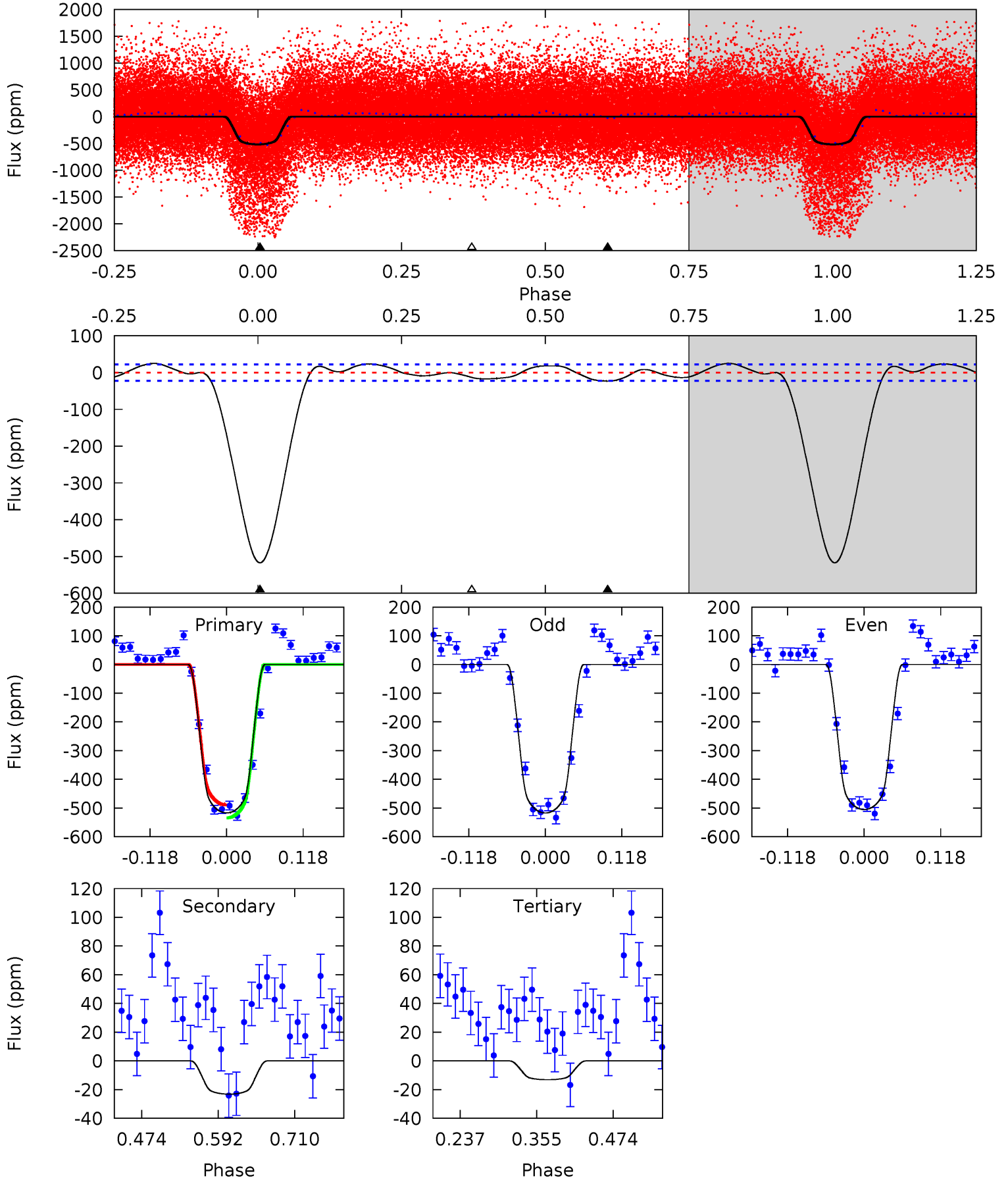
TCE 003124412-01 P= 0.948951 Days  $T_0=131.521359$  (BKJD)



# DV Model-Shift Uniqueness Test

003124412-01, P = 0.948929 Days, E = 130.584427 Days

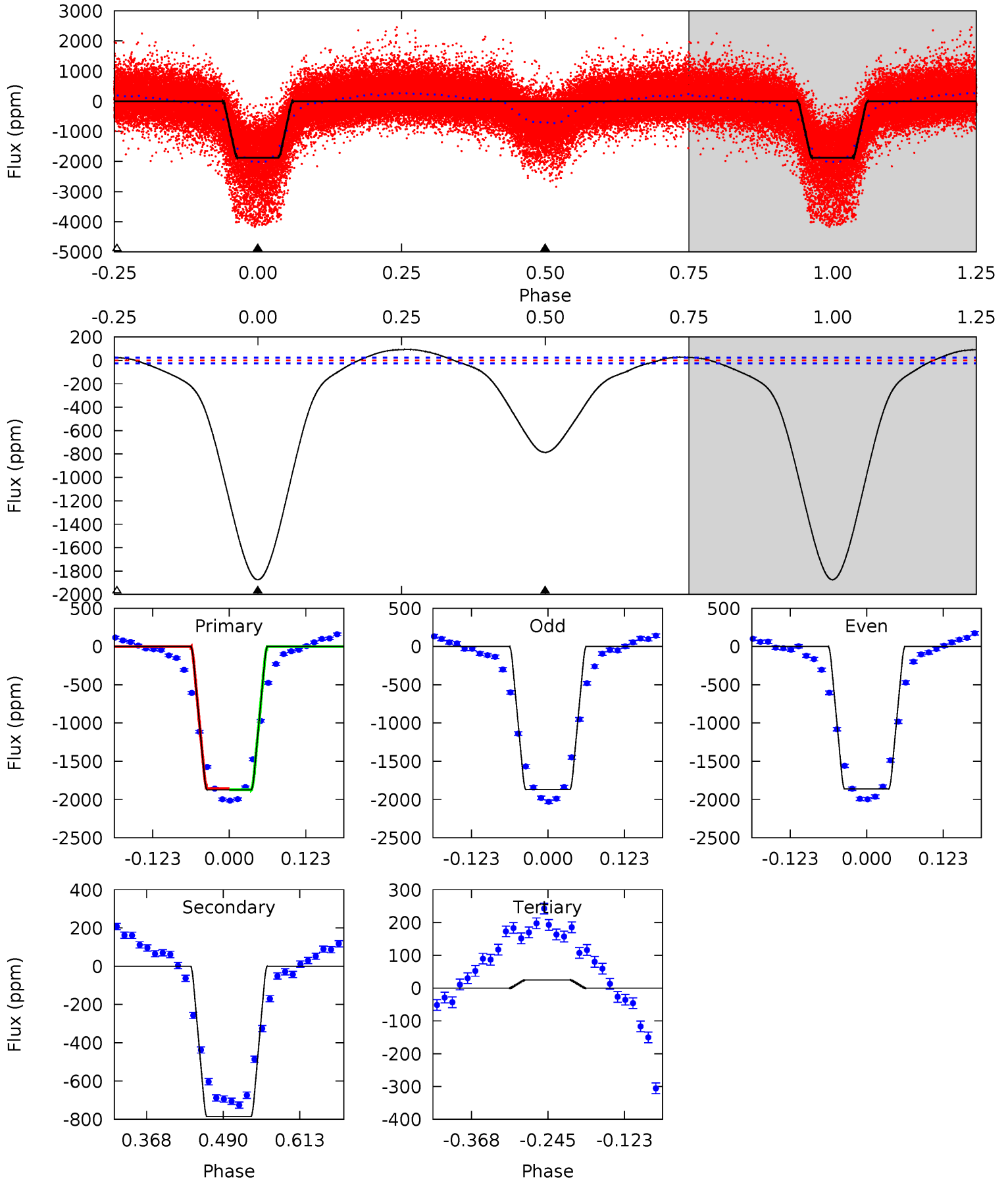
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
105.4	4.72	2.67	0	4.53	1.56	2.61	102.7	105.4	2.05	4.72	1.21	1.57	0.05	4.57



# Alt Model-Shift Uniqueness Test

003124412-01, P = 0.948951 Days, E = 130.572408 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
340.2	142.7	-4.50	0	4.52	1.54	12.8	344.7	340.2	147.2	142.7	0.57	1.15	0.05	1.45





### Stellar Parameters For KIC 003124412

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6307^{+174}_{-261}$	$4.391^{+0.070}_{-0.210}$	$-0.020^{+0.250}_{-0.300}$	$1.133^{+0.388}_{-0.155}$	$1.152^{+0.169}_{-0.169}$	$1.117^{+0.423}_{-0.586}$
	+3%/-4%	+2%/-5%	+1250%/-1500%	+34%/-14%	+15%/-15%	+38%/-52%
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 003124412-01 / KOI 1087.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-23 \pm 5$	$2.92^{+0.50}_{-0.33}$	$2981^{+227}_{-159}$	$3033^{+218}_{-330}$	$0.572^{+0.188}_{-0.167}$
Alt.	$-786 \pm 6$	$5.55^{+1.08}_{-0.53}$	$2986^{+240}_{-165}$	$5040^{+146}_{-172}$	$5.473^{+0.935}_{-1.477}$

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

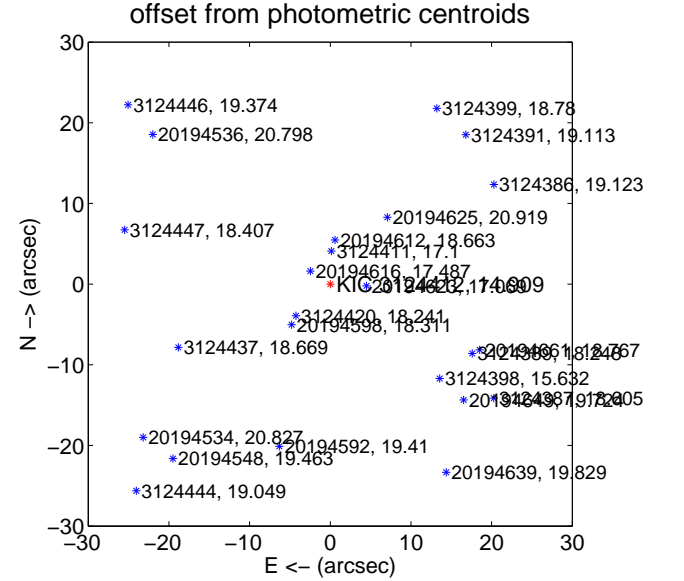
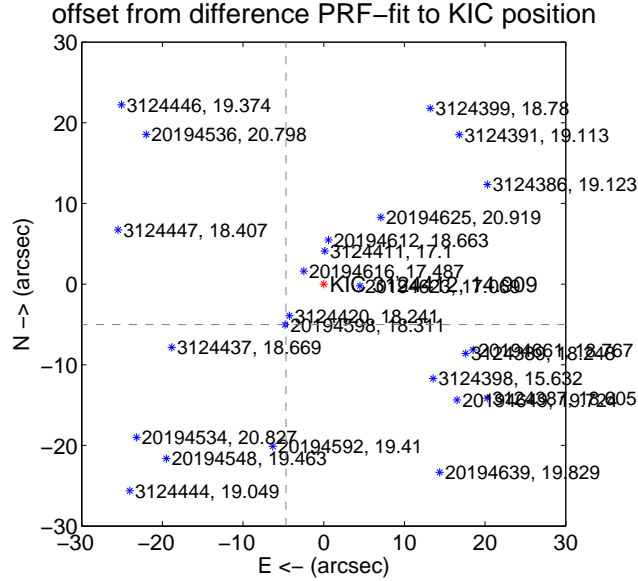
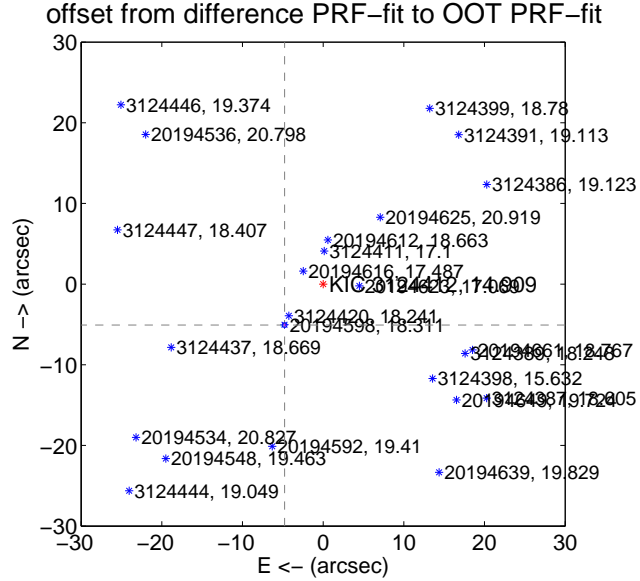
## DV Centroid Data

Supplemental centroid analysis for 003124412-01. Kepler magnitude: 14.91. Transit SNR 60.60

There are 15 quarters with good PRF difference image offsets

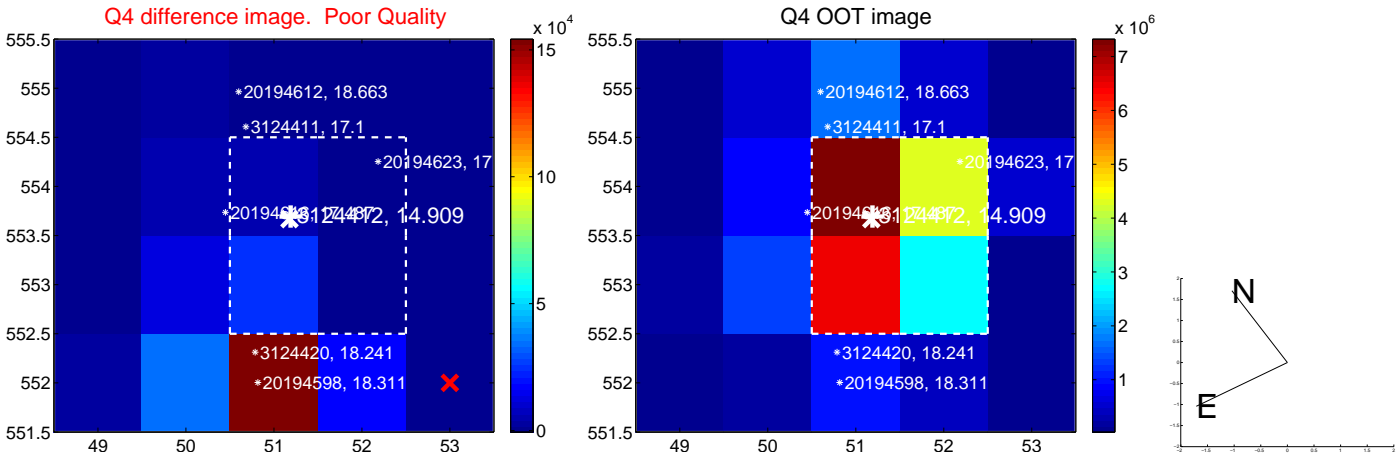
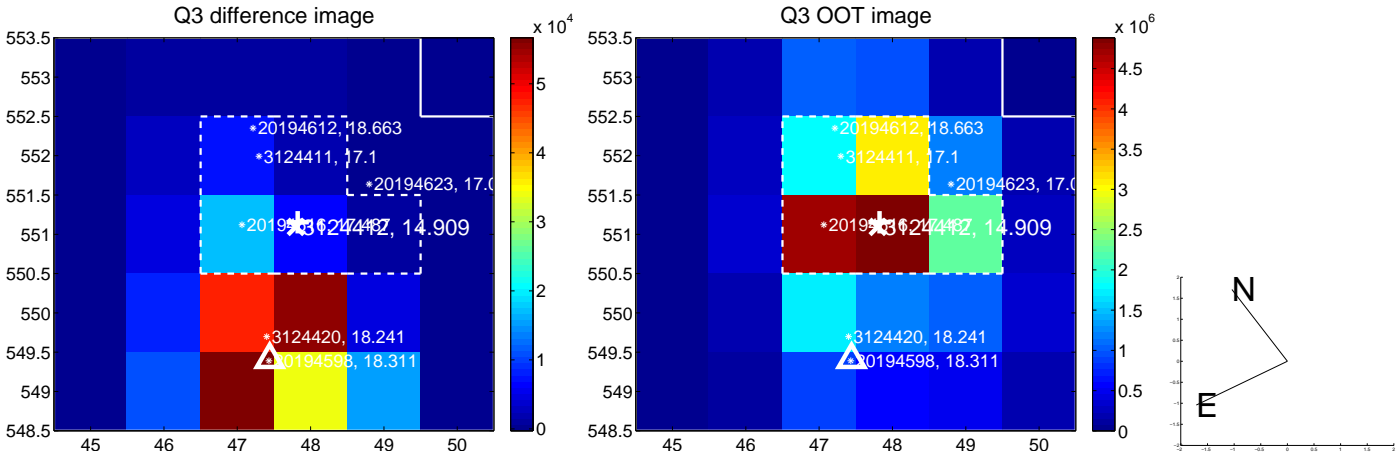
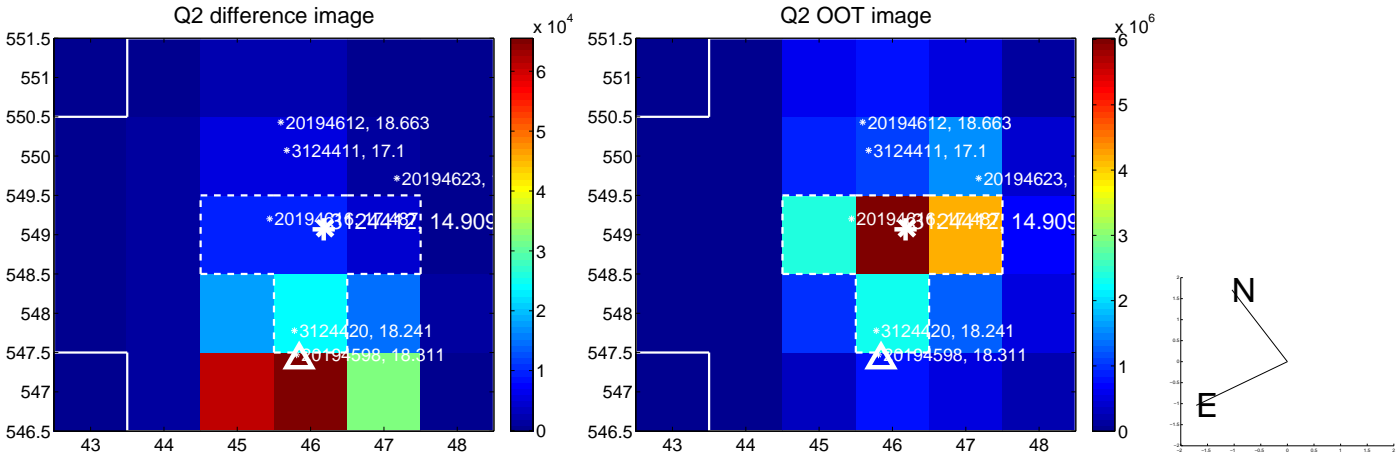
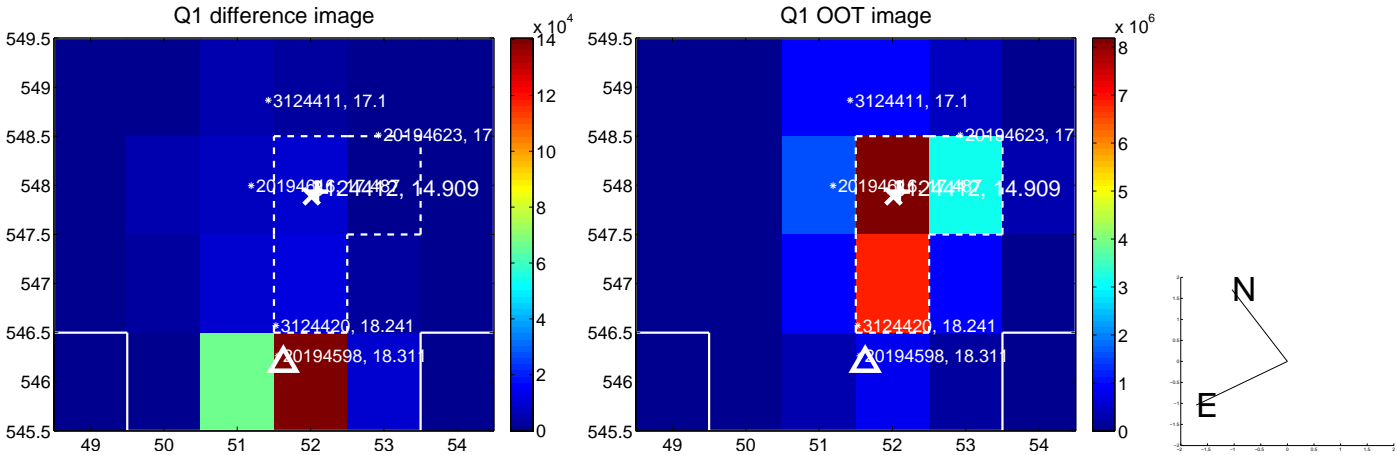
The direct PRF centroid is offset from the target star catalog position by about 0.32 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>6.972 <math>\pm</math> 0.097</b>	<b>72.18</b>	4.777 $\pm$ 0.098	-5.078 $\pm$ 0.075
PRF-fit source offset from KIC position	<b>6.858 <math>\pm</math> 0.075</b>	<b>91.45</b>	4.676 $\pm$ 0.074	-5.017 $\pm$ 0.071
photometric centroid source offset	<b>94.93 <math>\pm</math> 0.22</b>	<b>437.76</b>	75.02 $\pm$ 0.22	-58.18 $\pm$ 0.21

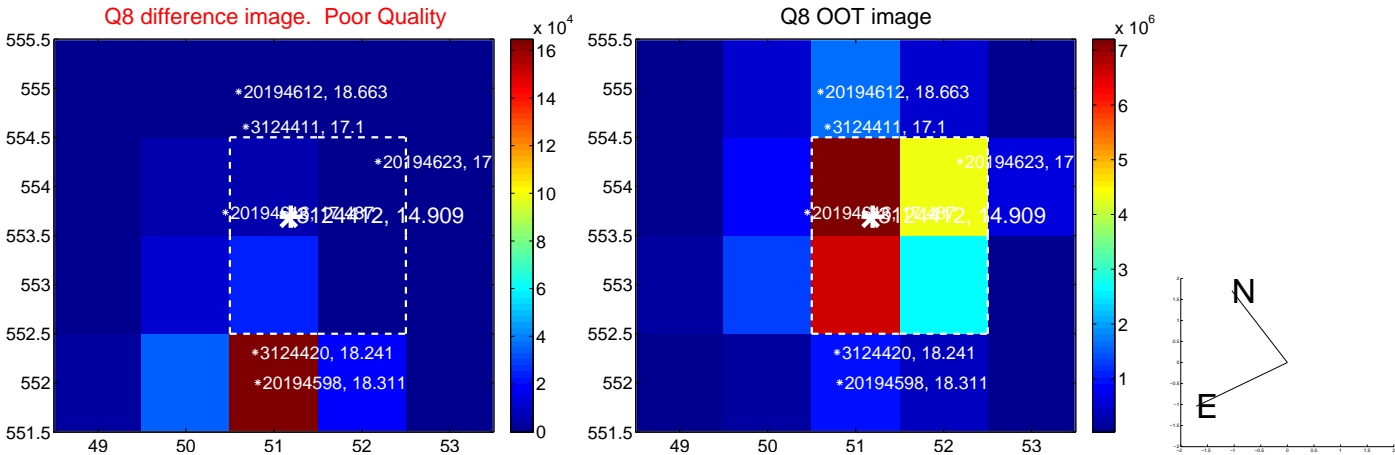
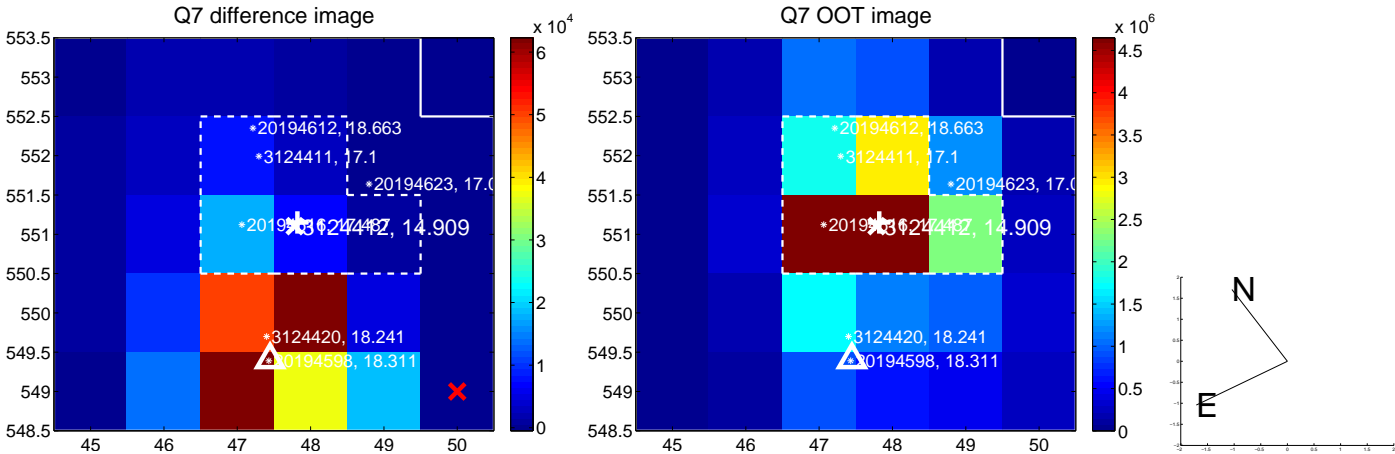
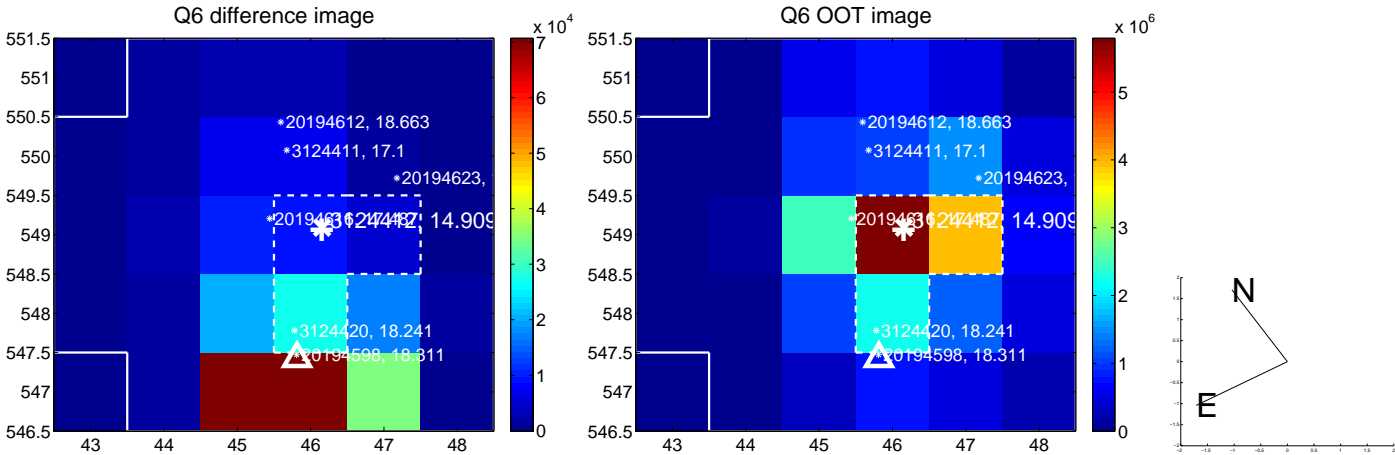
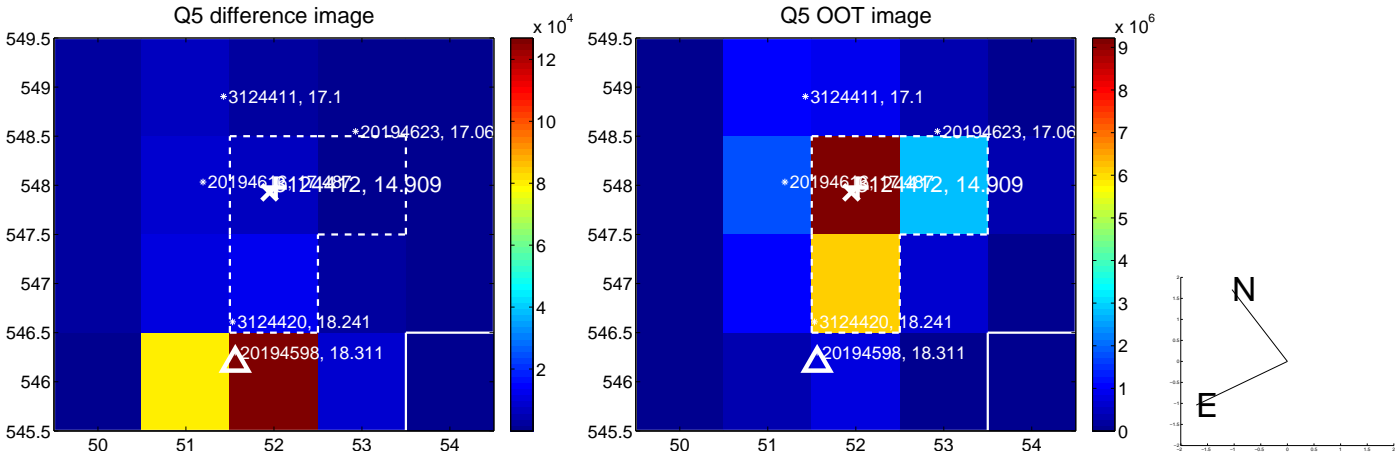


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

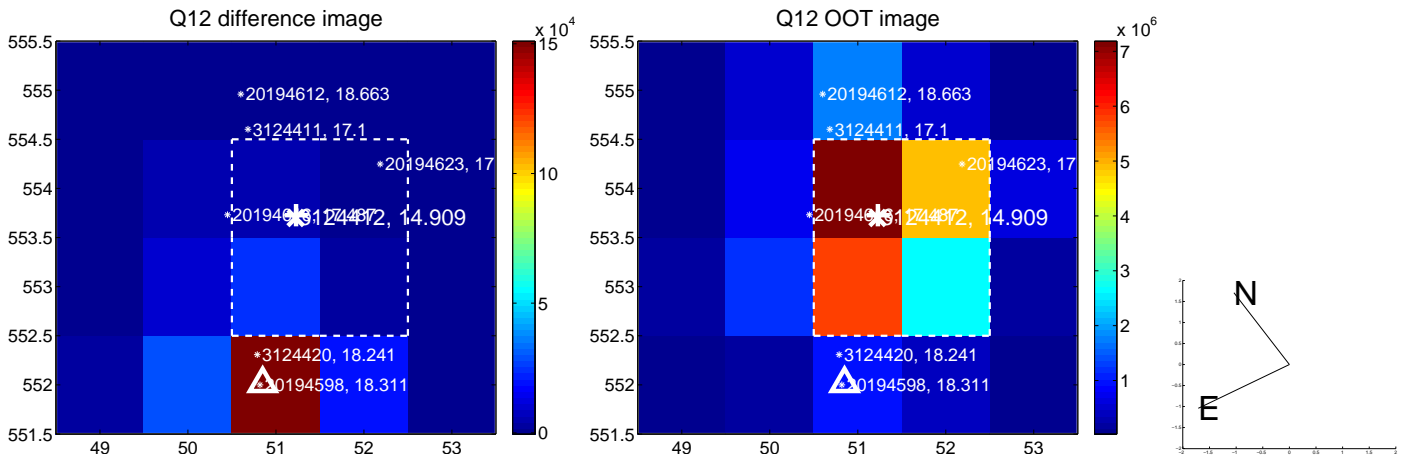
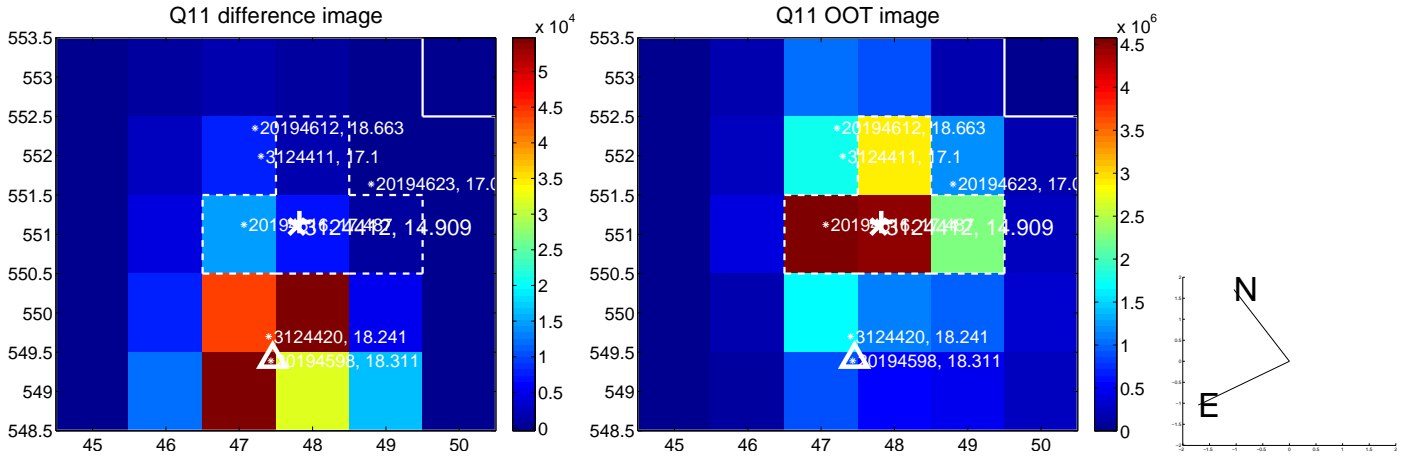
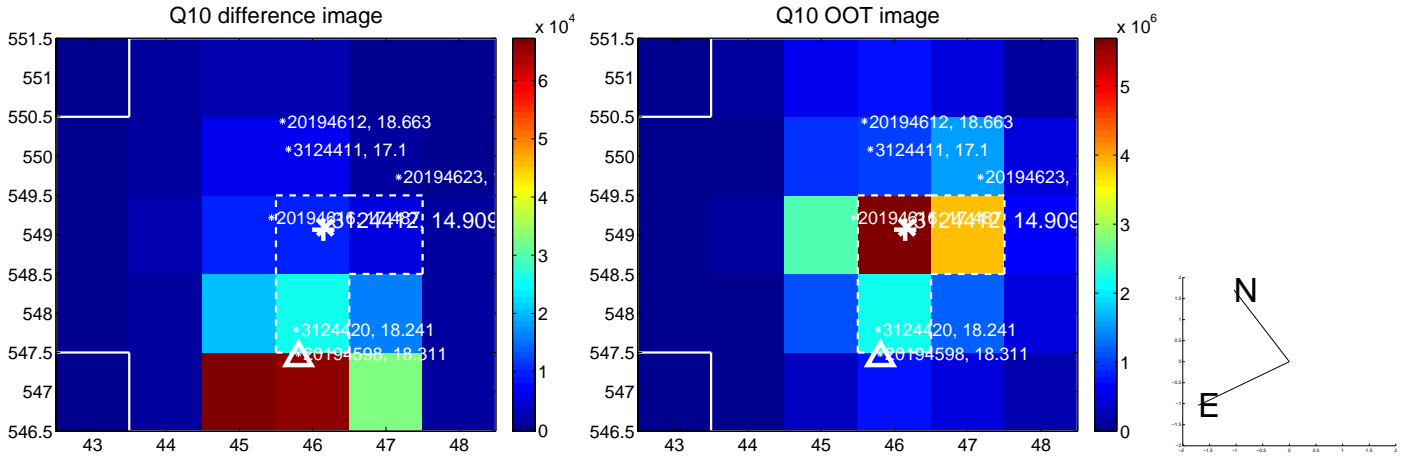
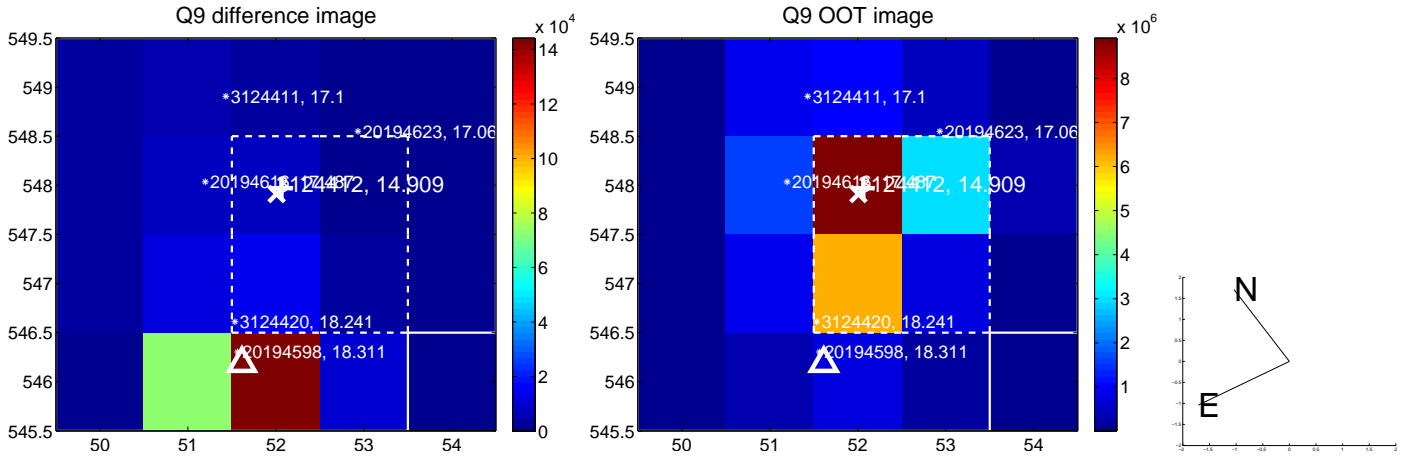


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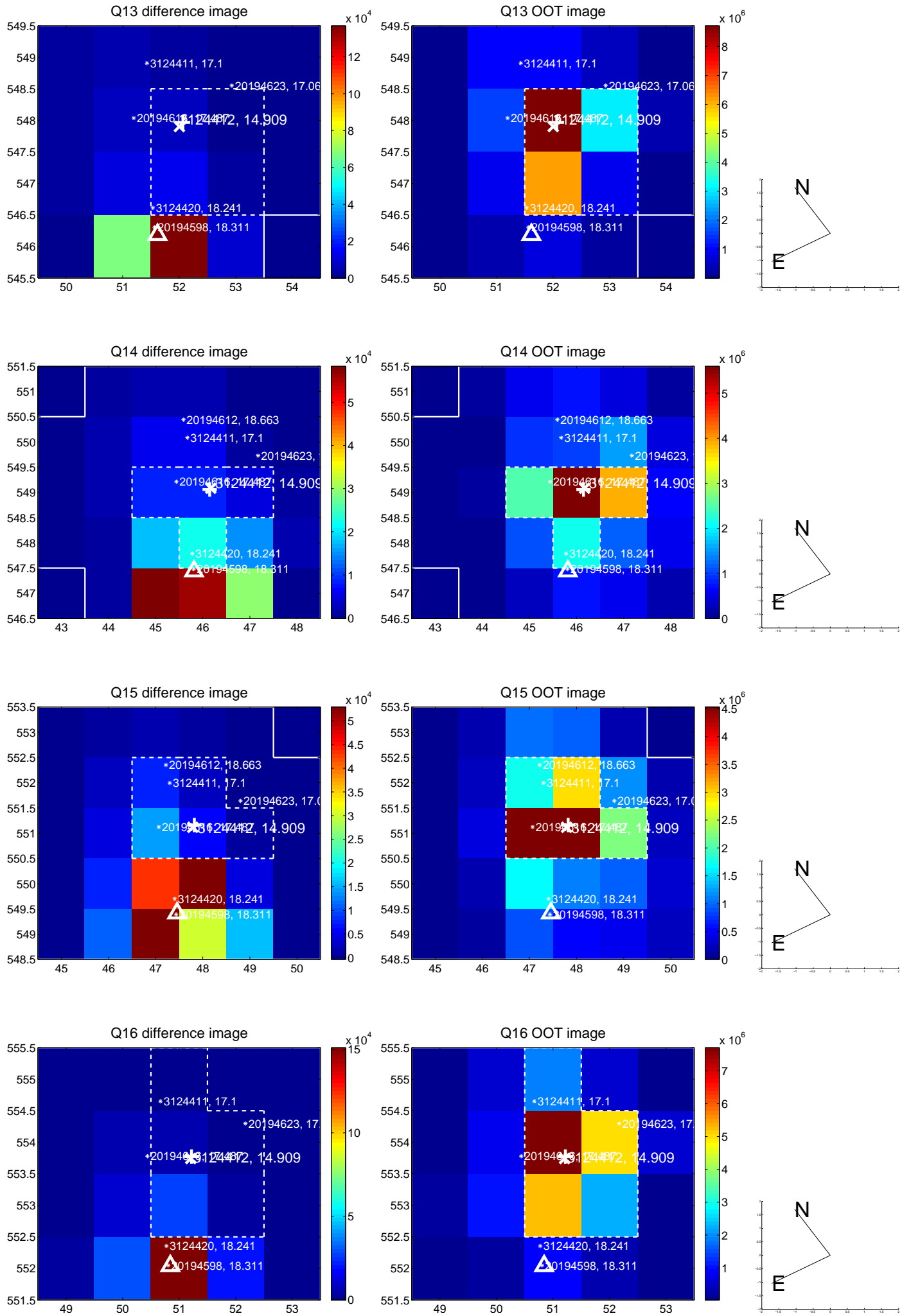




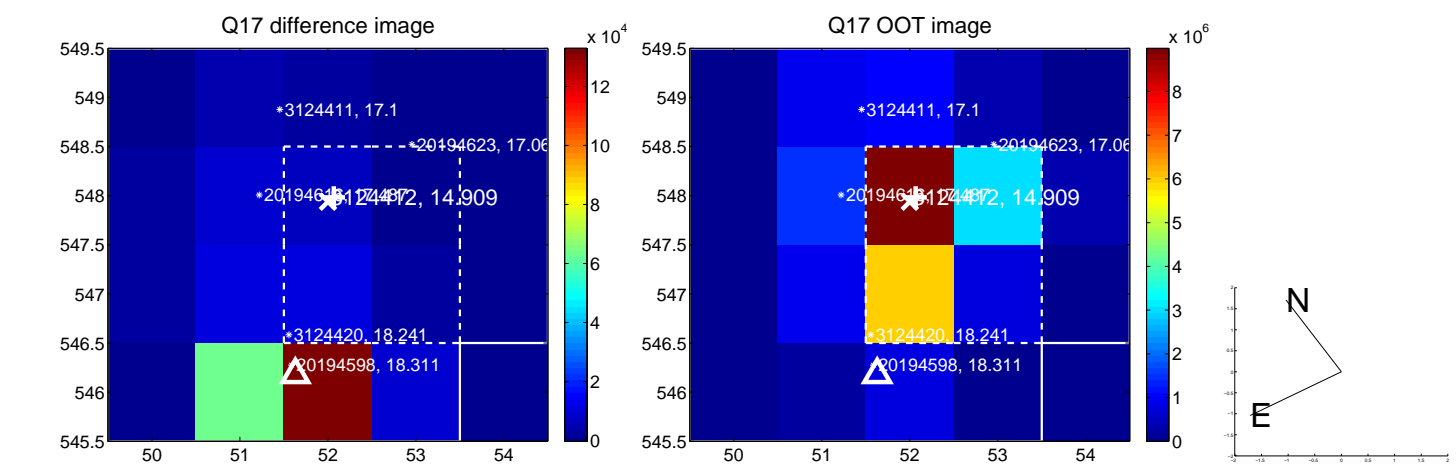
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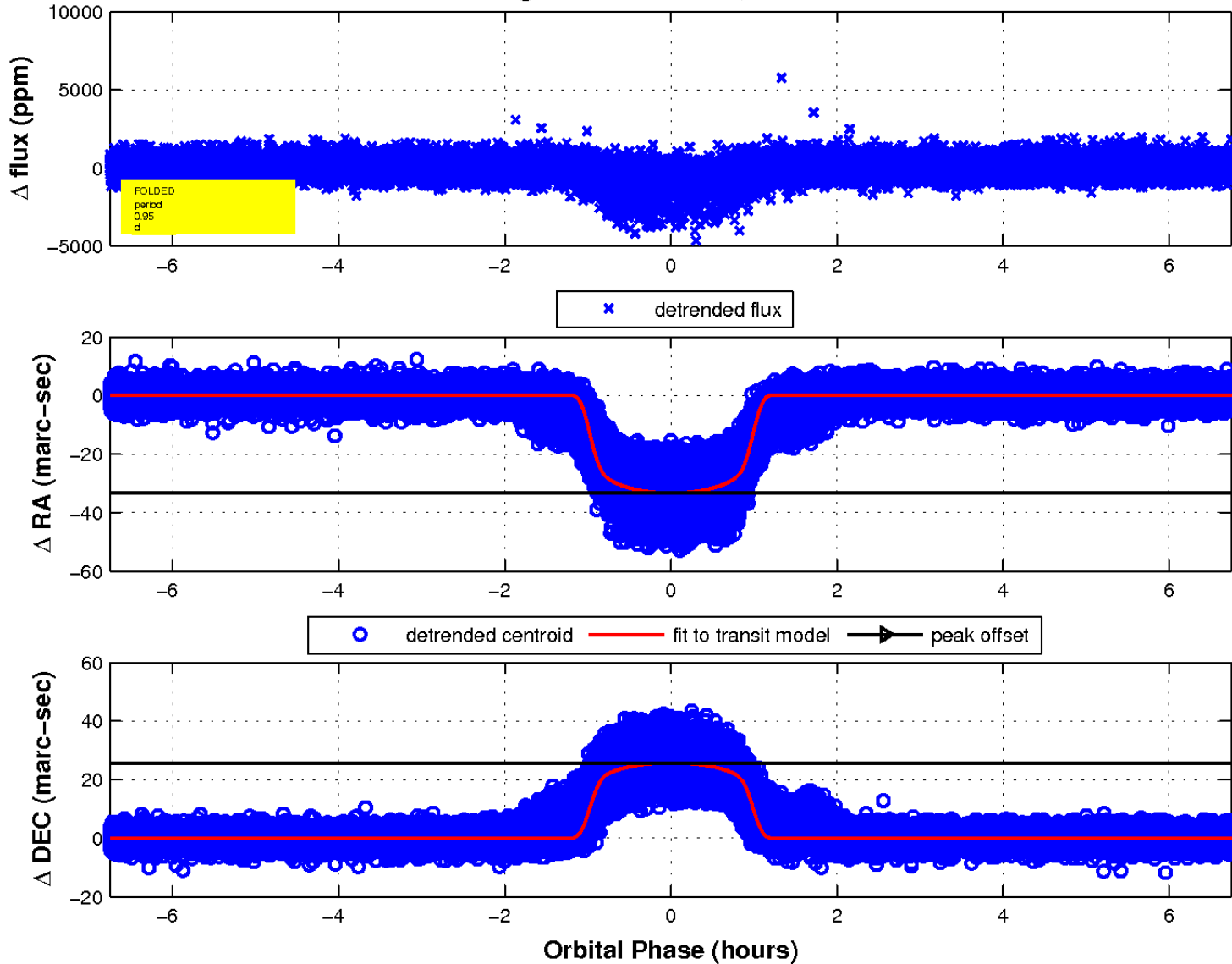
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 1 of 1



UKIRT Image

Declination

