

# KIC 012304728

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
012304728-01	OBS	7520.01	3.147373	133.385203	45.1	3.775	7.2	8.0	4.93	5189	3.84	5638.92

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012304728-01	OBS	PC	1.00	0	0	0	0	CENT_FEW_MEAS

**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

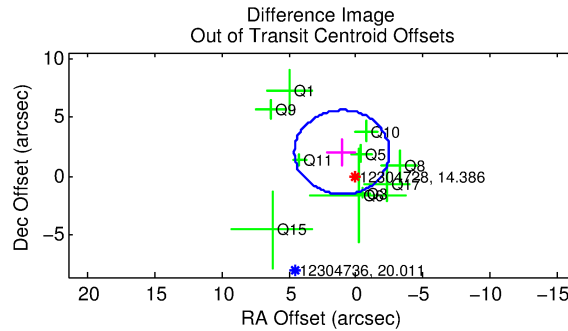
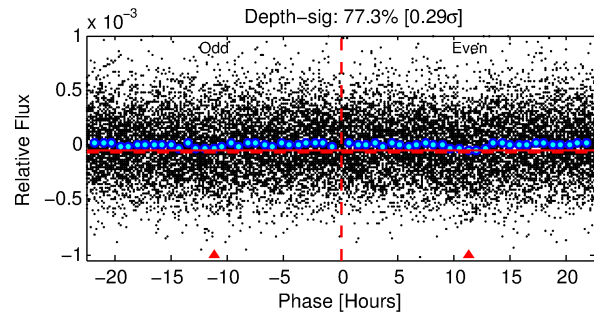
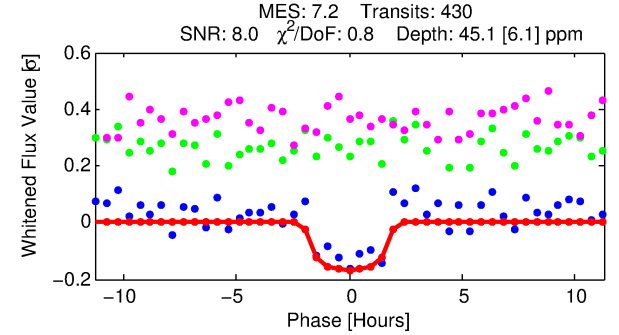
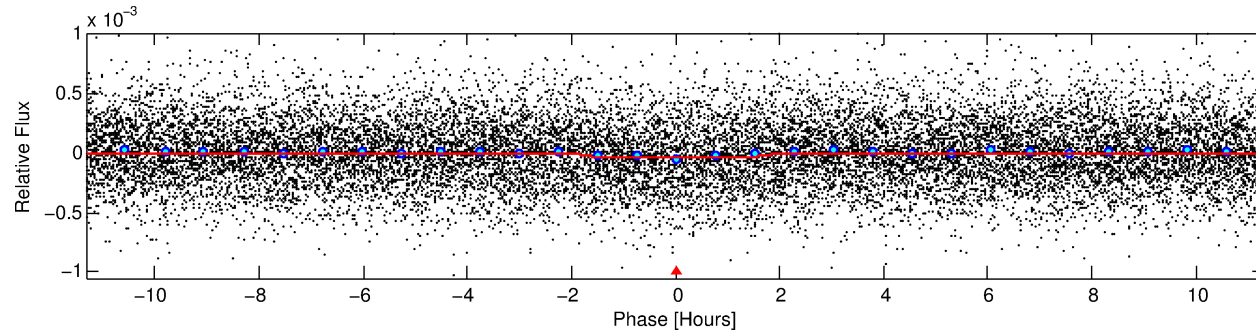
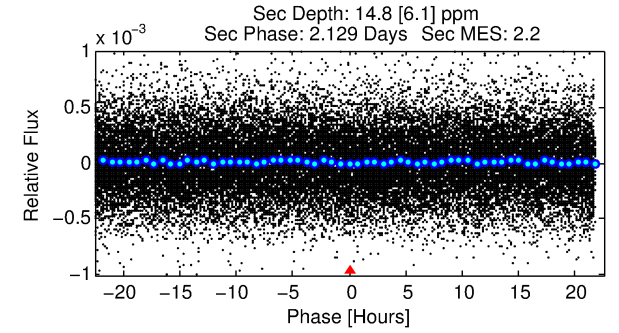
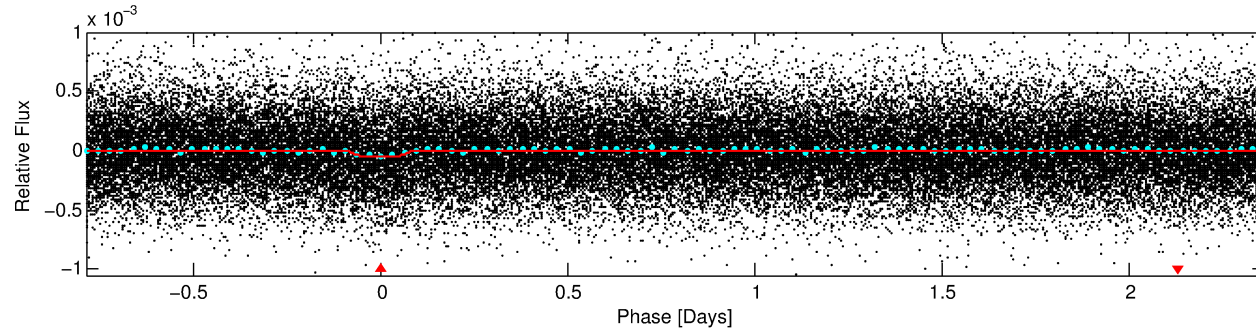
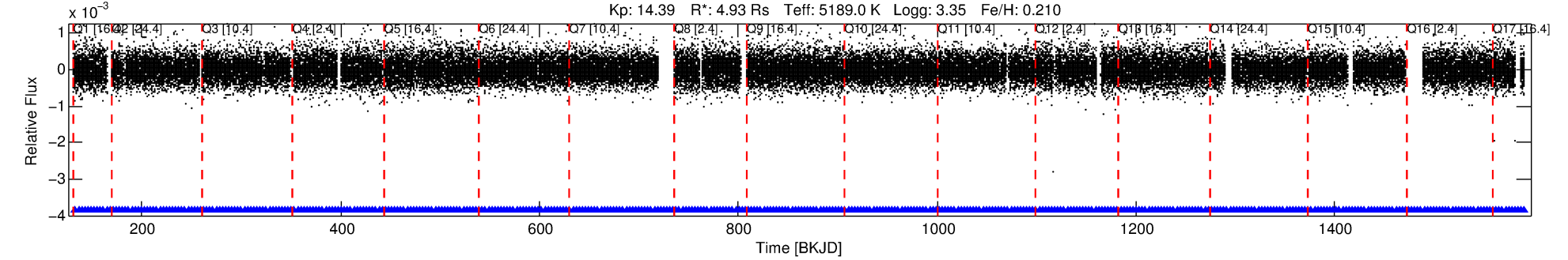
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 012304728-01

No Significant Match Found

# DV One-Page Summary

KIC: 12304728 Candidate: 1 of 1 Period: 3.147 d  
KOI: K07520.01 Corr: 0.975



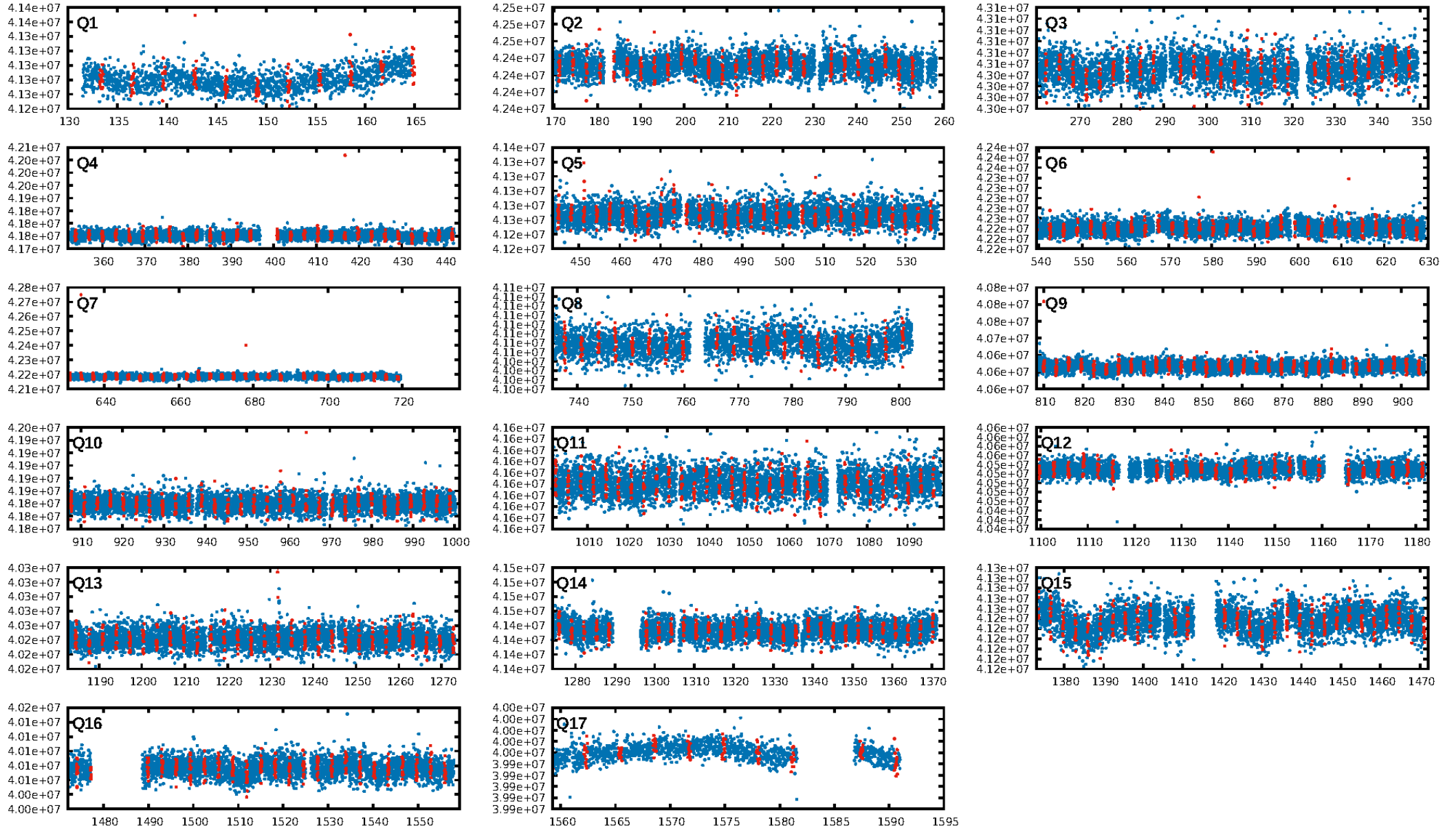
## DV Fit Results:

Period = 3.14737 [0.00004] d  
Epoch = 133.3852 [0.0073] BKJD  
Rp/R\* = 0.0071 [0.0061]  
a/R\* = 3.51 [10.97]  
b = 0.85 [1.10]  
Seff = 5638.92 [2740.19]  
Teq = 2210 [268] K  
Rp = 3.84 [3.59] Re  
a = 0.0529 [0.0172] AU  
Ag = 1.55 [2.81] [0.19σ]  
Teffp = 3810 [1674] K [0.94σ]

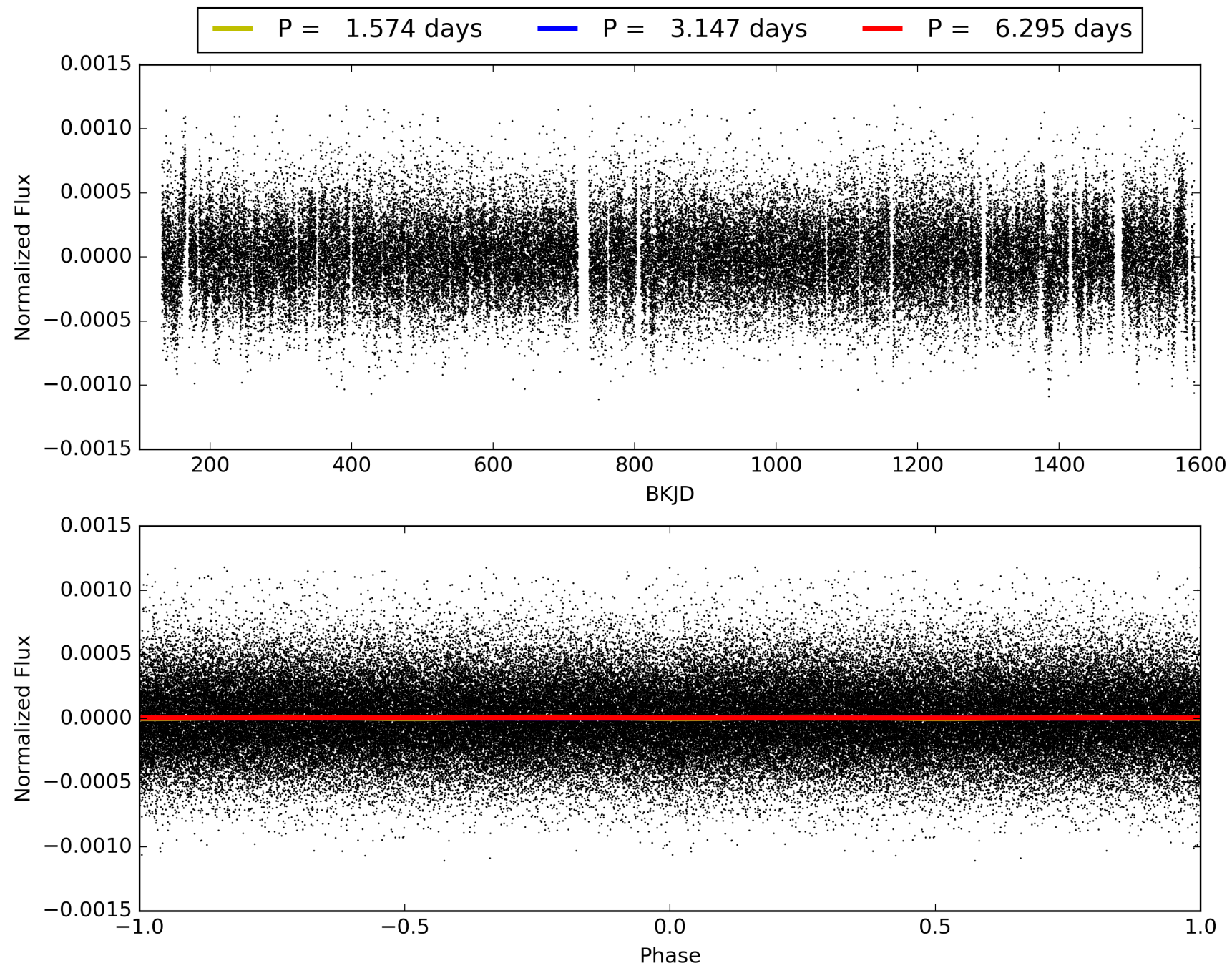
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
**Bootstrap-pfa: 1.99e-12**  
RollingBand-fgt: 1.00 [410/410]  
**GhostDiagnostic-chr: 0.911**  
Centroid-sig: 93.3%  
Centroid-so: 0.849 arcsec [0.46σ]  
OotOffset-rm: 2.300 arcsec [1.94σ]  
KicOffset-rm: 2.321 arcsec [1.93σ]  
OotOffset-st: 2/3/1/4 [10]  
KicOffset-st: 2/3/1/4 [10]  
DiffImageQuality-fgm: 0.10 [1/10]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 012304728-01, PDC Light Curves

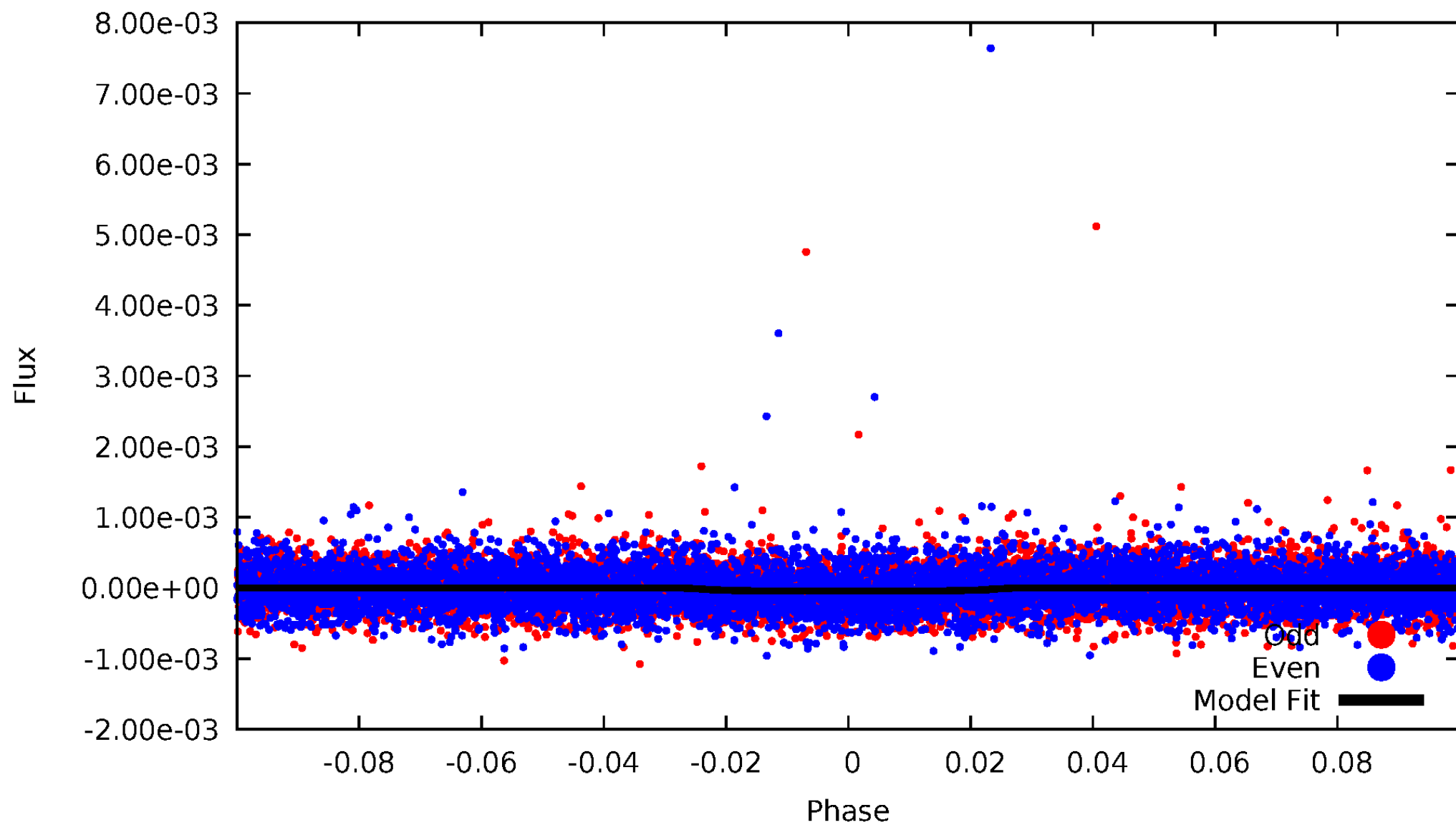


TCE 012304728-01



# DV Odd/Even

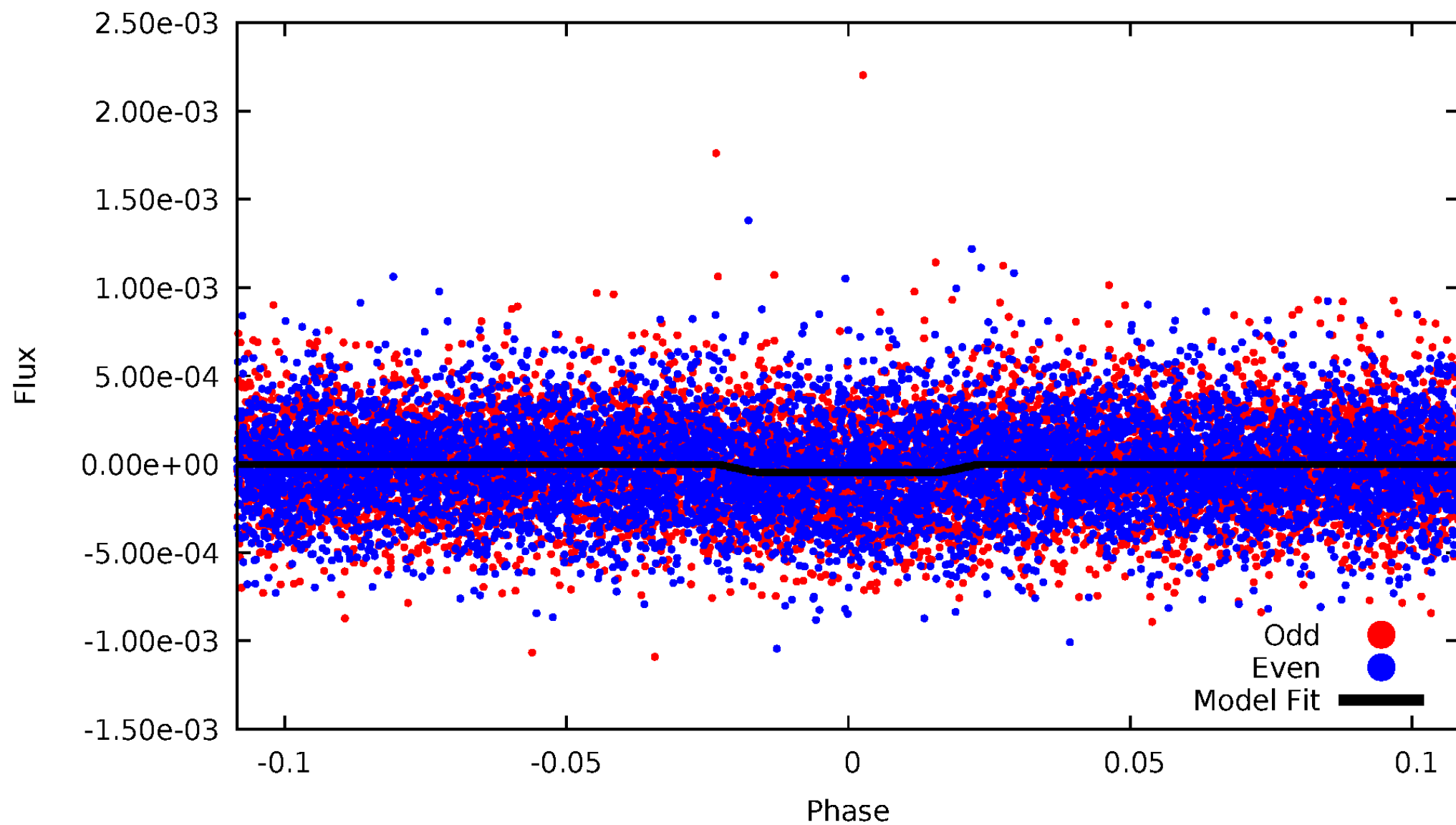
TCE 012304728-01



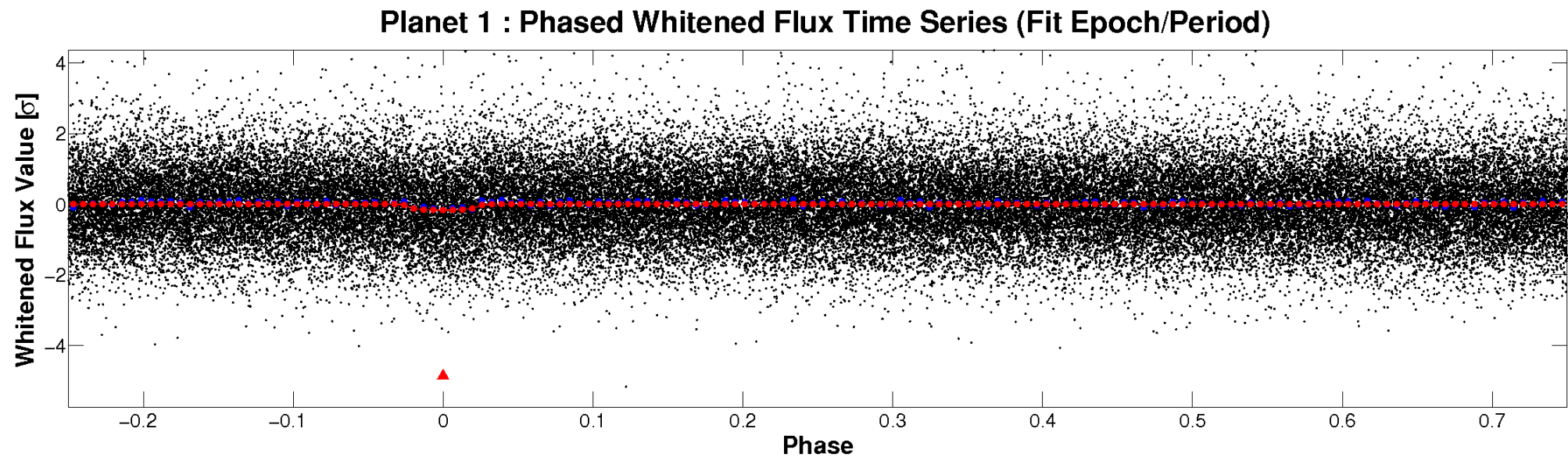
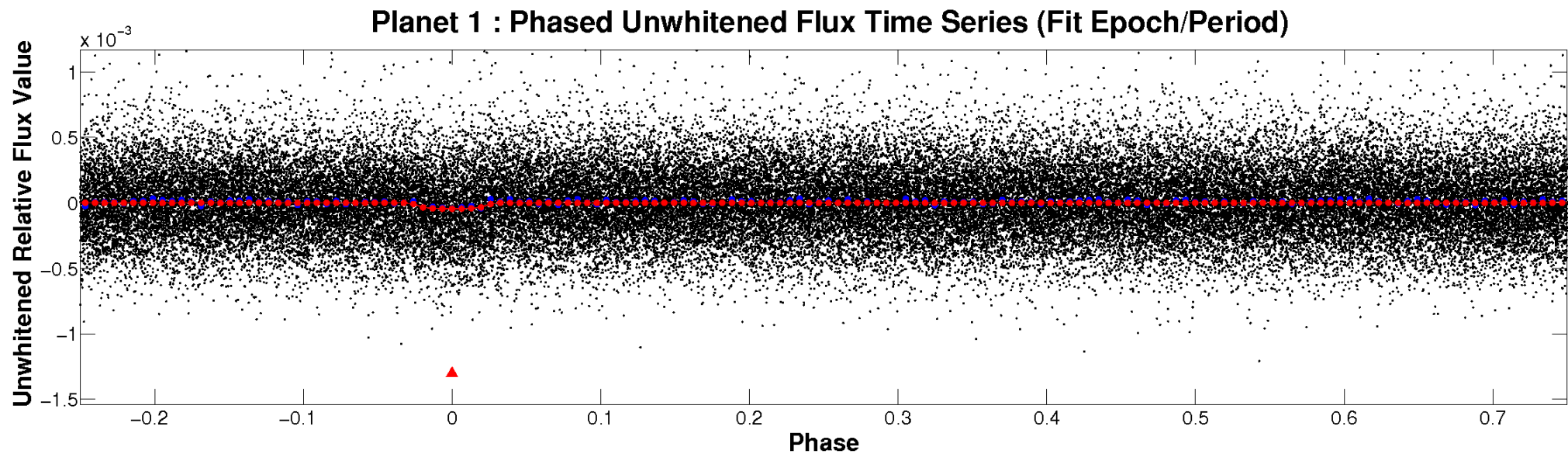


# ALT Odd/Even

TCE 012304728-01

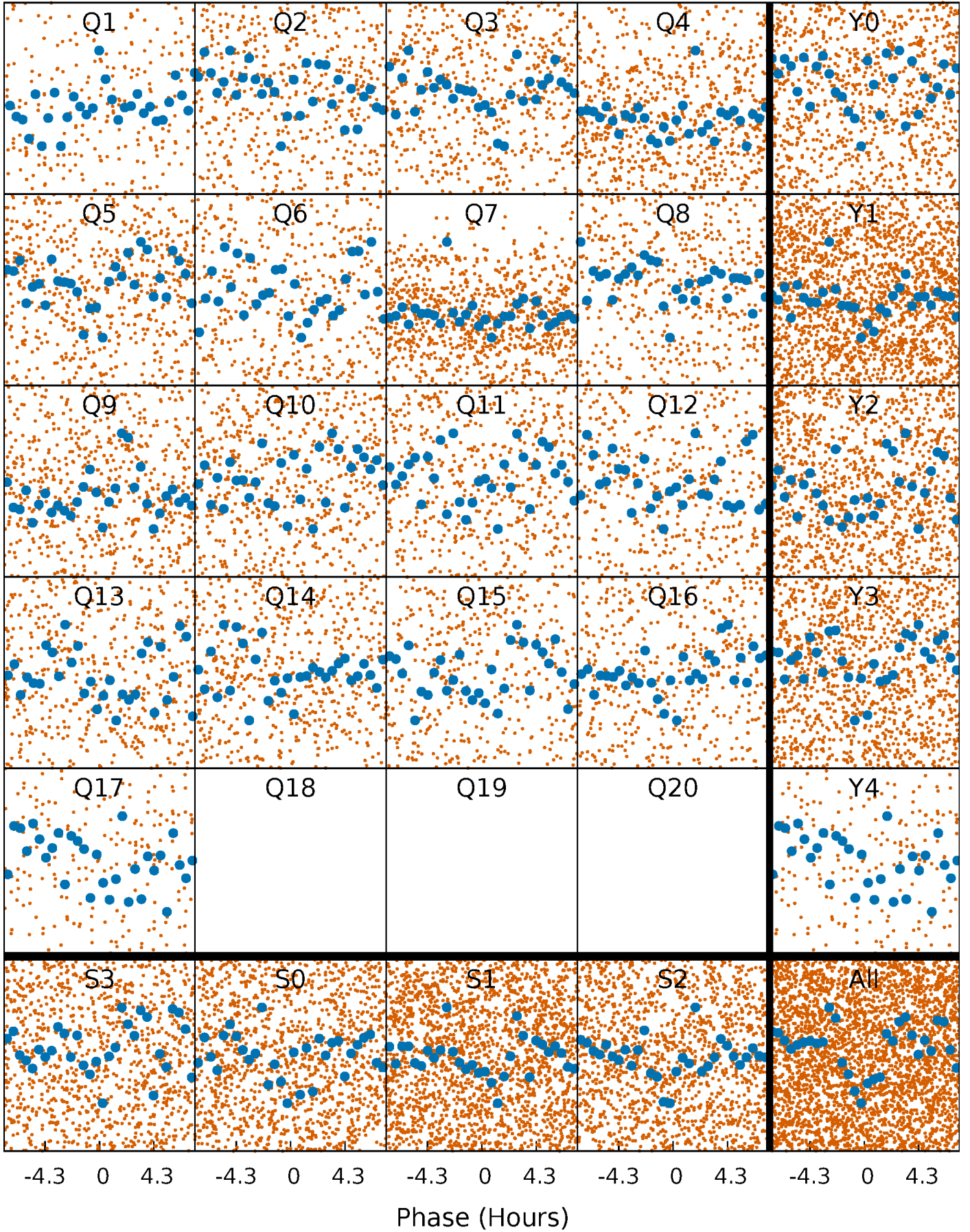


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

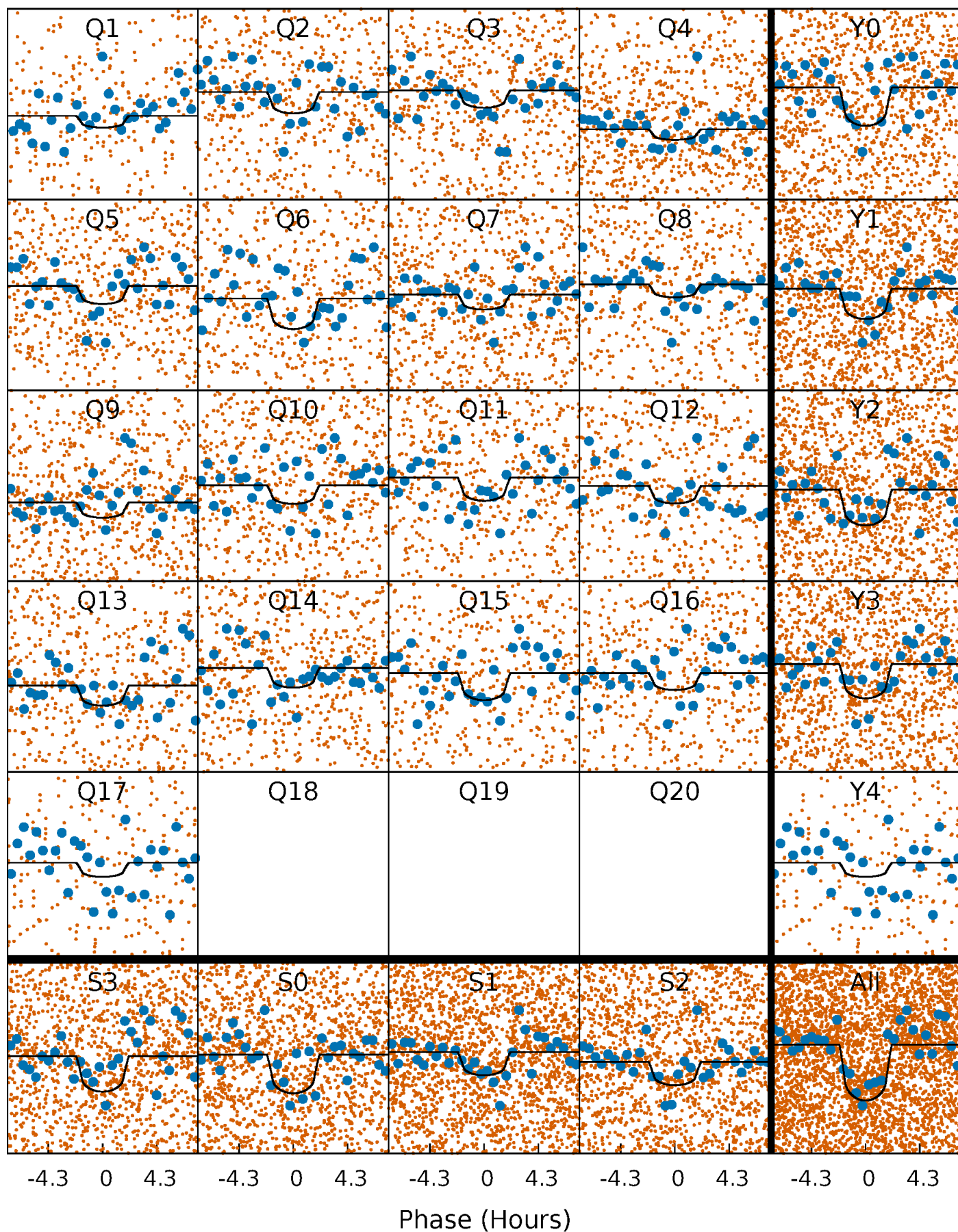
TCE 012304728-01 P= 3.147373 Days  $T_0=133.385203$  (BKJD)





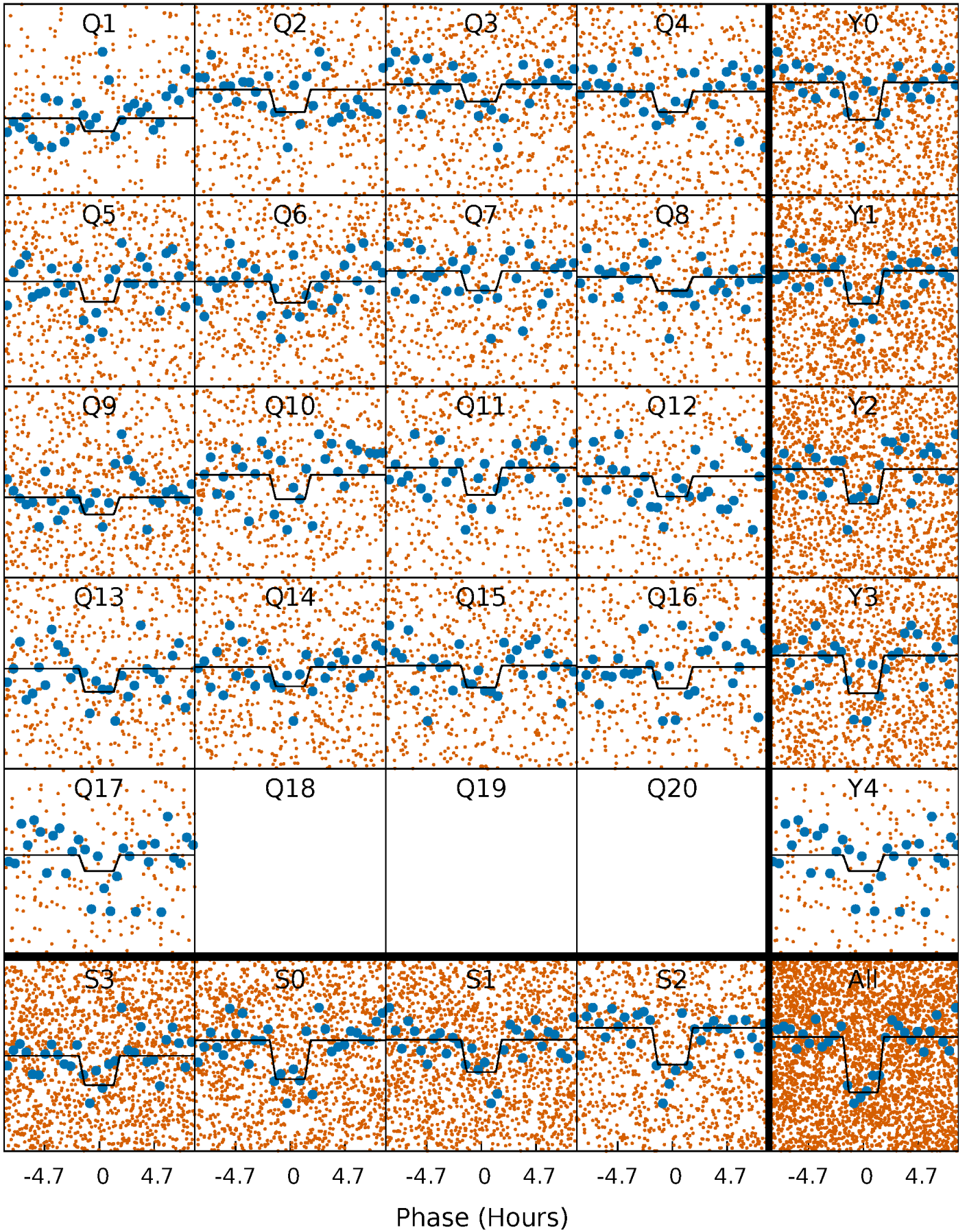
# DV Quarter-Phased Transit Curves

TCE 012304728-01   P= 3.147373 Days    $T_0=133.385203$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

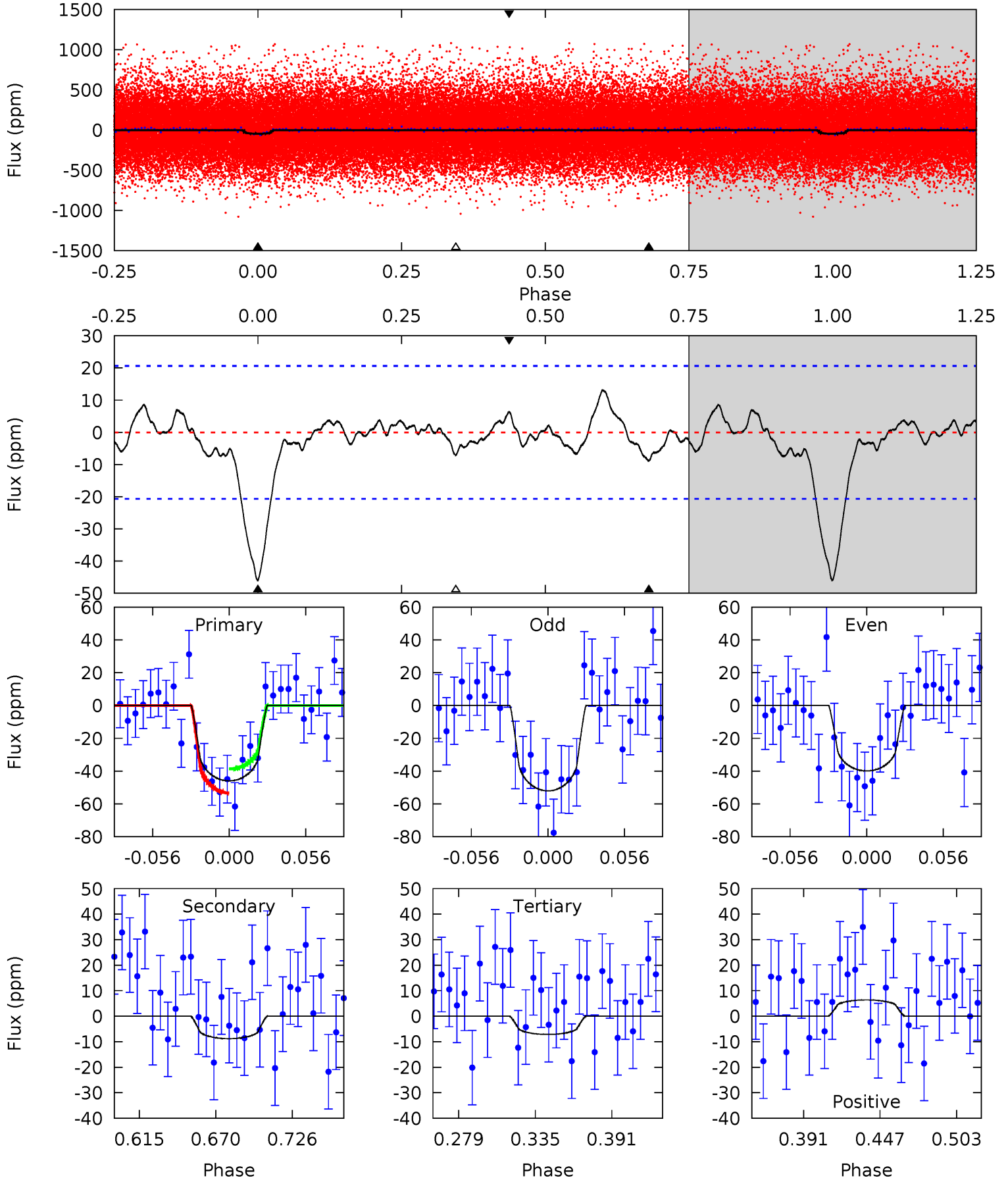
TCE 012304728-01 P= 3.147385 Days  $T_0=133.382212$  (BKJD)



# DV Model-Shift Uniqueness Test

012304728-01, P = 3.147373 Days, E = 130.237830 Days

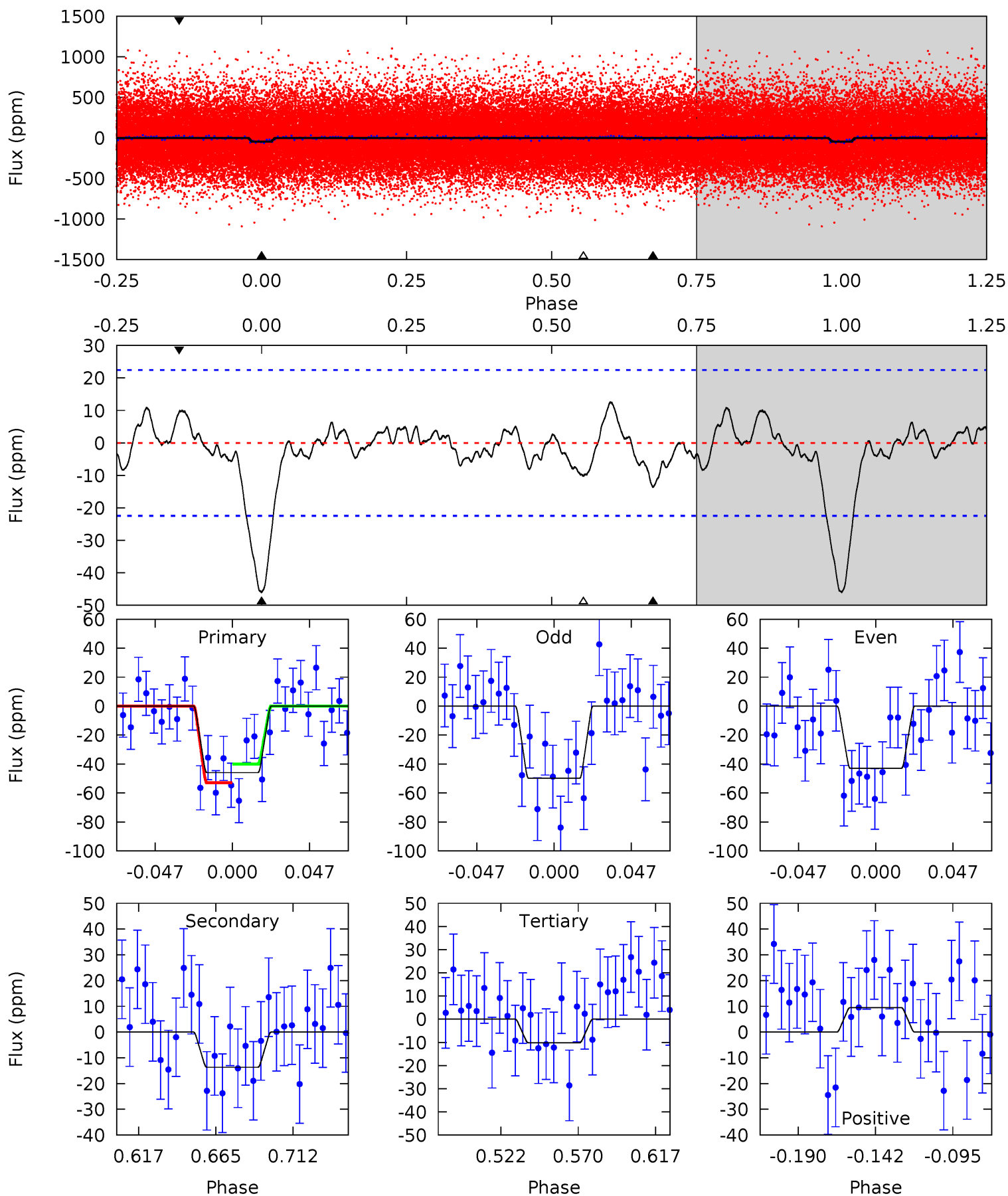
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.4	2.00	1.62	1.45	4.69	1.91	0.92	8.82	8.98	0.38	0.55	1.38	0.76	0.22	1.67



# Alt Model-Shift Uniqueness Test

012304728-01, P = 3.147385 Days, E = 130.234827 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
9.66	2.87	2.14	1.99	4.72	1.98	0.97	7.52	7.67	0.73	0.88	0.72	1.12	0.21	1.35





### Stellar Parameters For KIC 012304728

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5189^{+72}_{-124}$	$3.352^{+0.262}_{-0.087}$	$0.210^{+0.150}_{-0.250}$	$4.930^{+0.630}_{-1.889}$	$1.992^{+0.159}_{-0.634}$	$0.023^{+0.043}_{-0.007}$
	+1%/-2%	+8%/-3%	+71%/-119%	+13%/-38%	+8%/-32%	+183%/-29%
Source	SPE90	SPE90	SPE90	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 012304728-01 / KOI 7520.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-9 \pm 4$	$4.07^{+2.94}_{-2.54}$	$3058^{+135}_{-261}$	$3209^{+1790}_{-5890}$	$0.719^{+4.741}_{-0.517}$
Alt.	$-14 \pm 5$	$3.95^{+3.33}_{-2.47}$	$3046^{+131}_{-228}$	$3614^{+1965}_{-1205}$	$1.170^{+7.914}_{-0.822}$

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

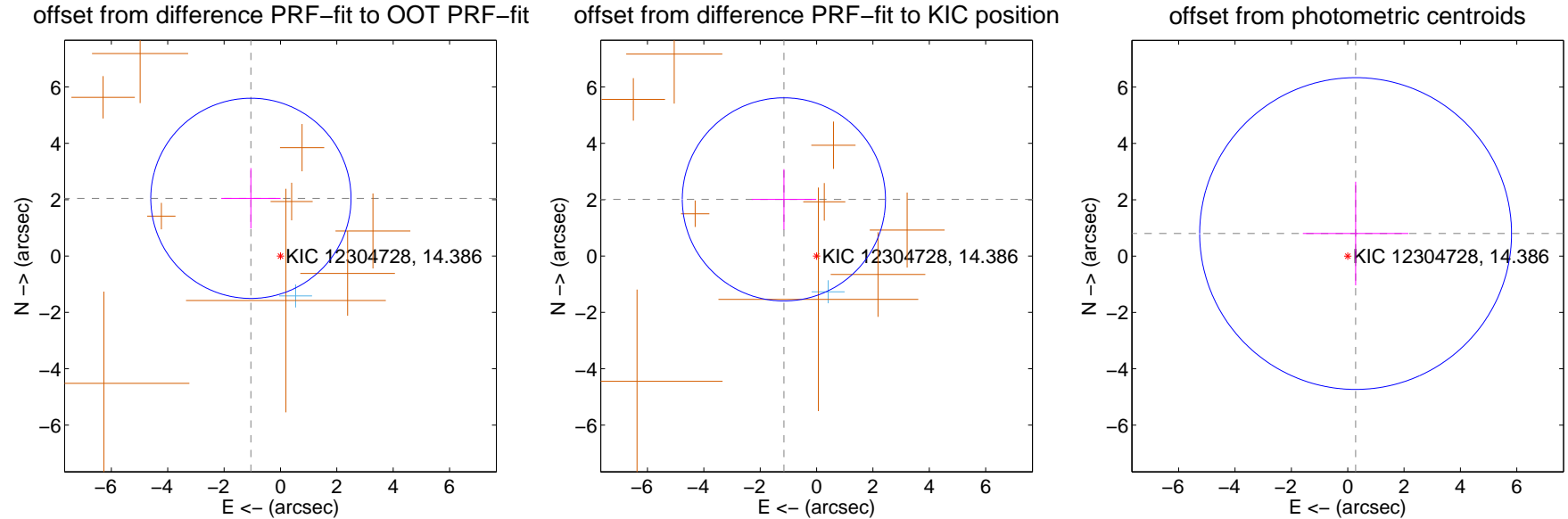
## DV Centroid Data

Supplemental centroid analysis for 012304728-01. Kepler magnitude: 14.39. Transit SNR 8.02

There are 1 quarters with good PRF difference image offsets

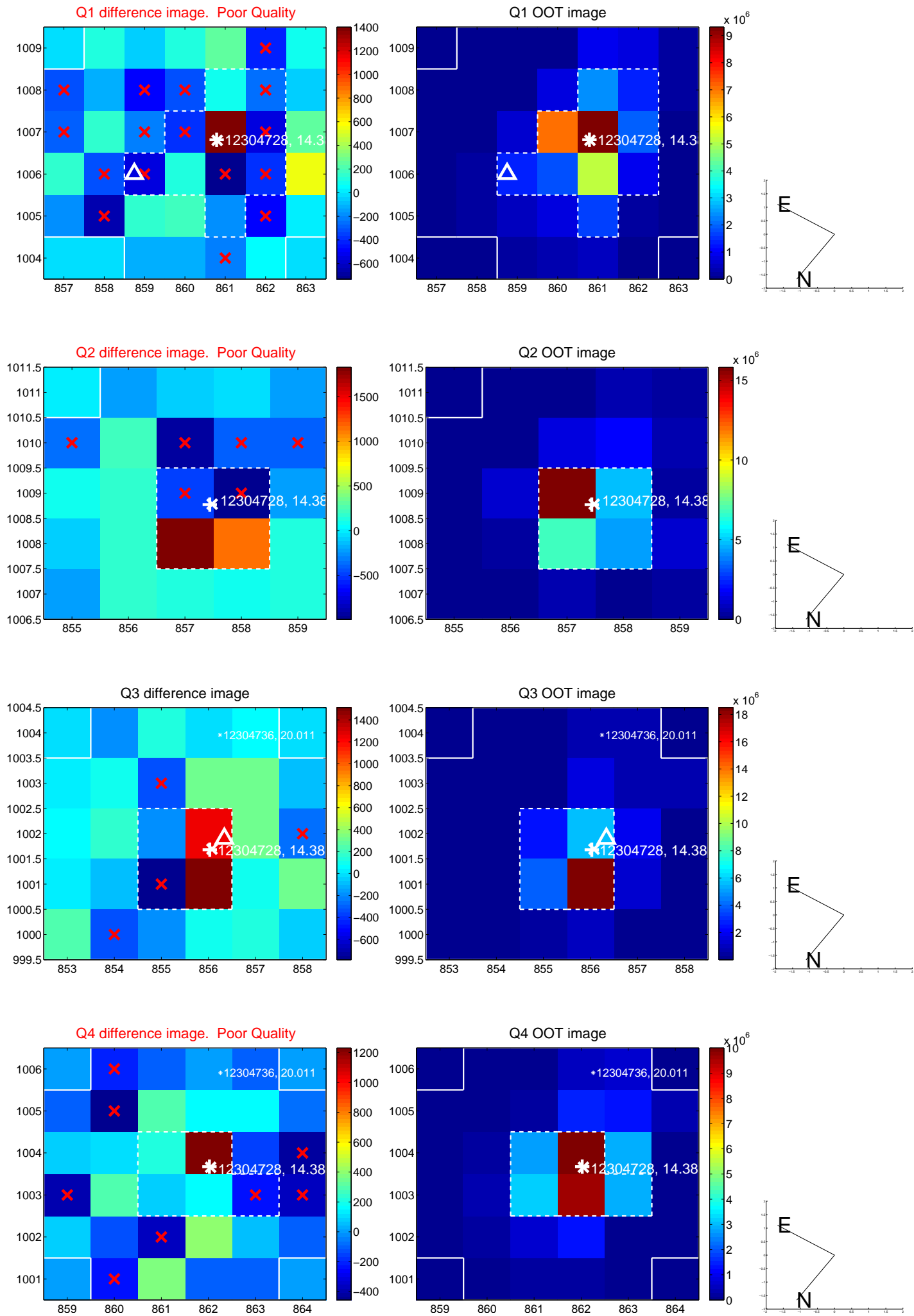
The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.300 \pm 1.184$	1.94	$1.048 \pm 1.053$	$2.047 \pm 1.070$
PRF-fit source offset from KIC position	$2.321 \pm 1.201$	1.93	$1.160 \pm 1.145$	$2.010 \pm 1.072$
photometric centroid source offset	$0.85 \pm 1.84$	0.46	$-0.28 \pm 1.87$	$0.80 \pm 1.84$

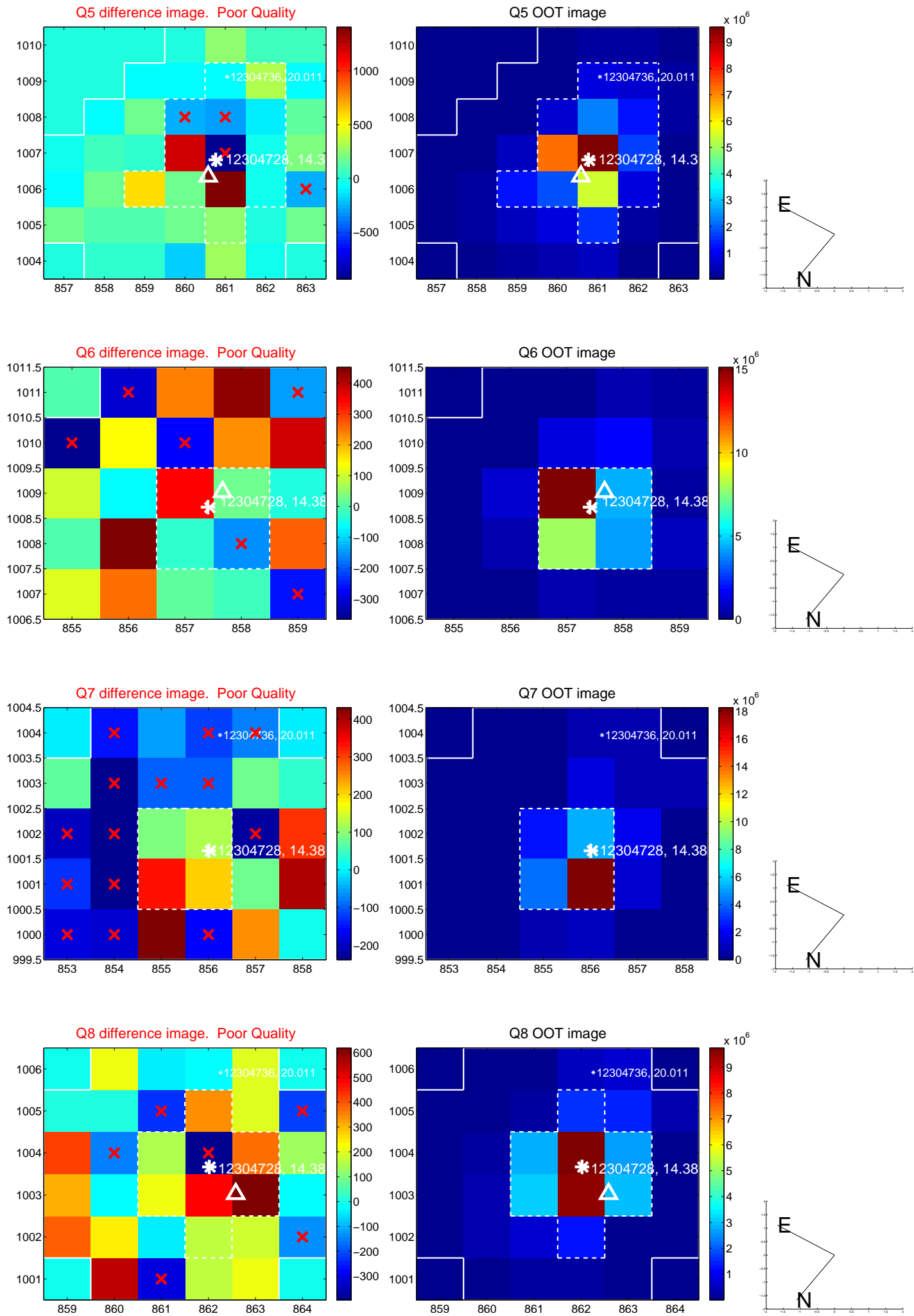


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

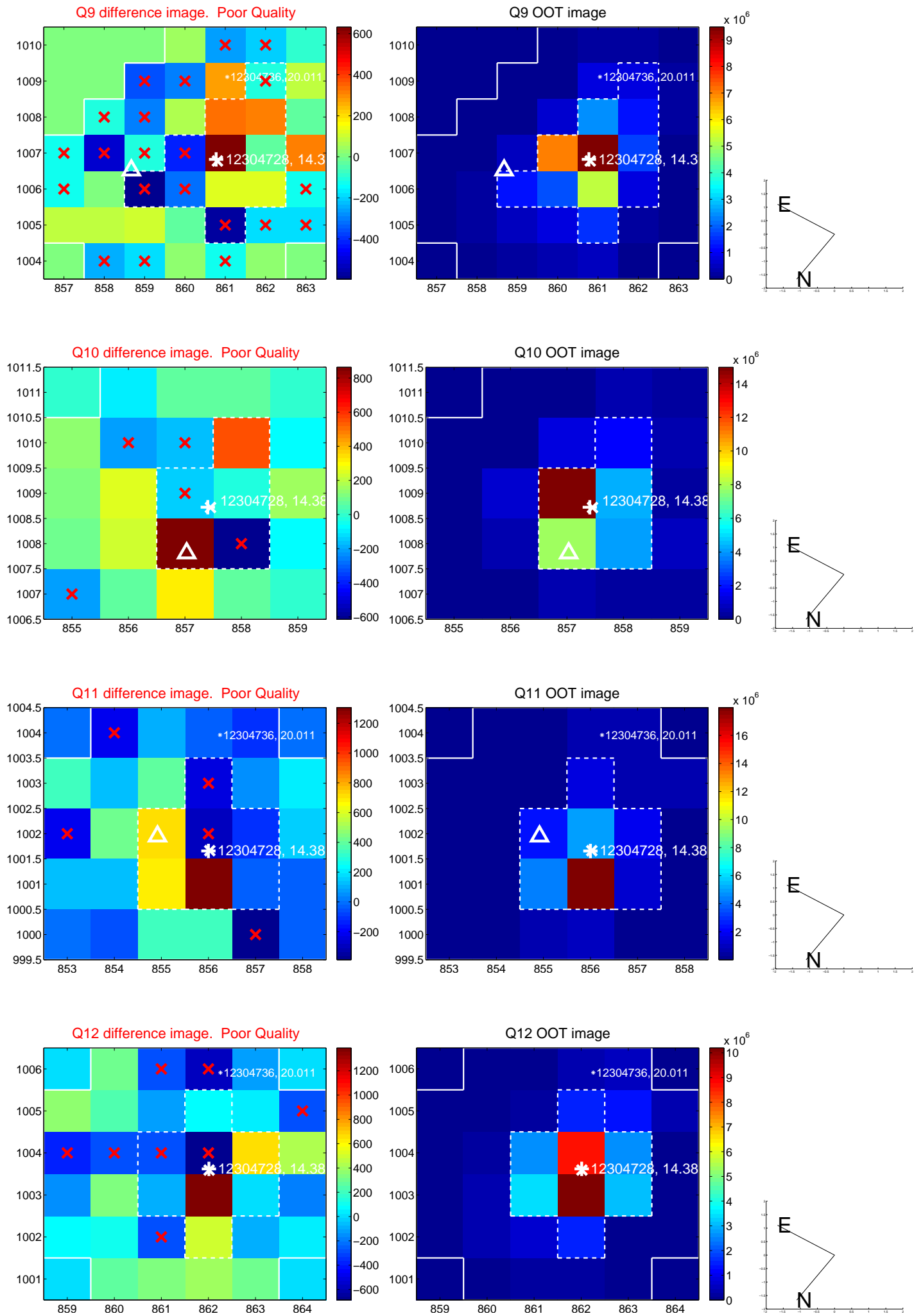


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

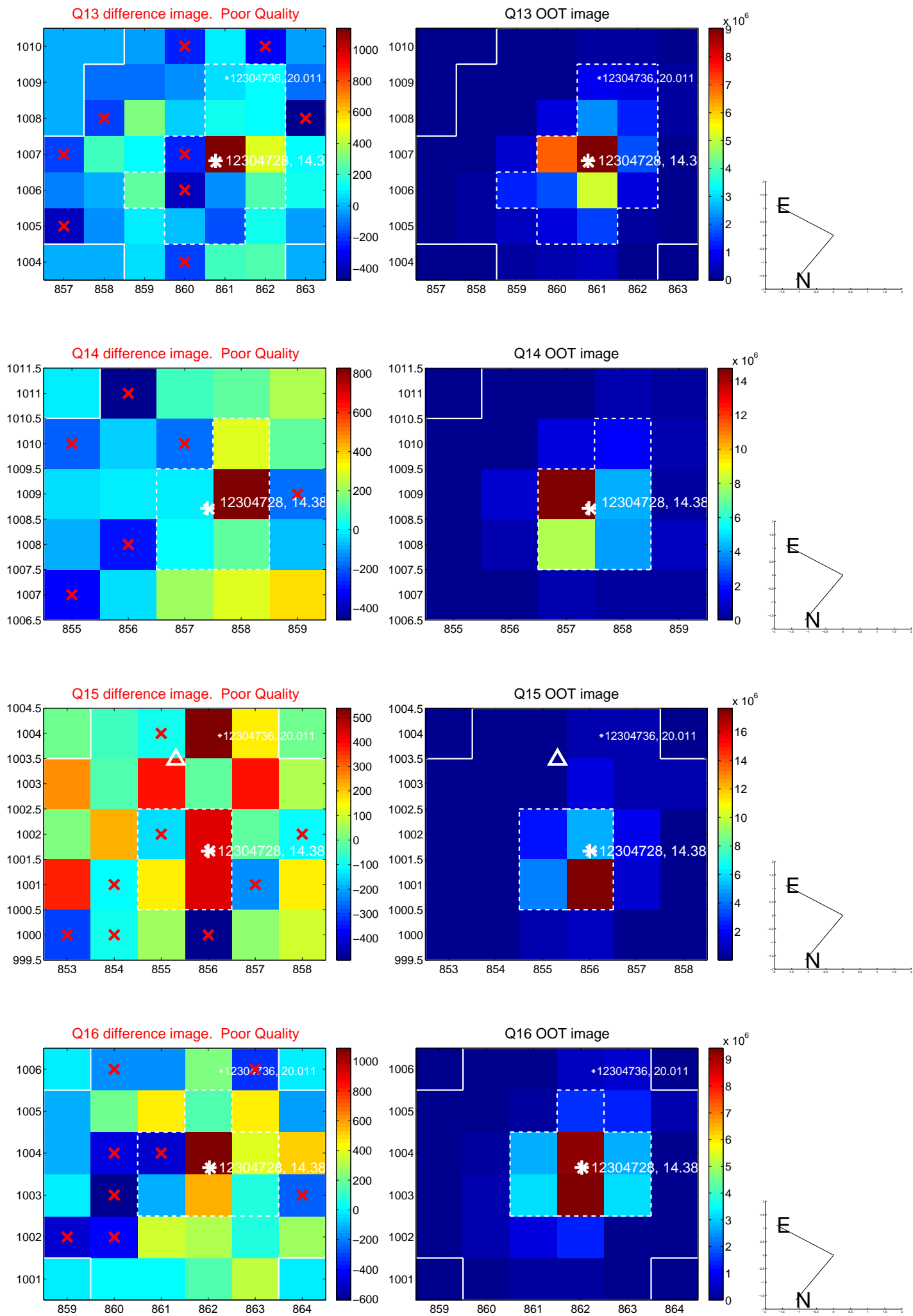




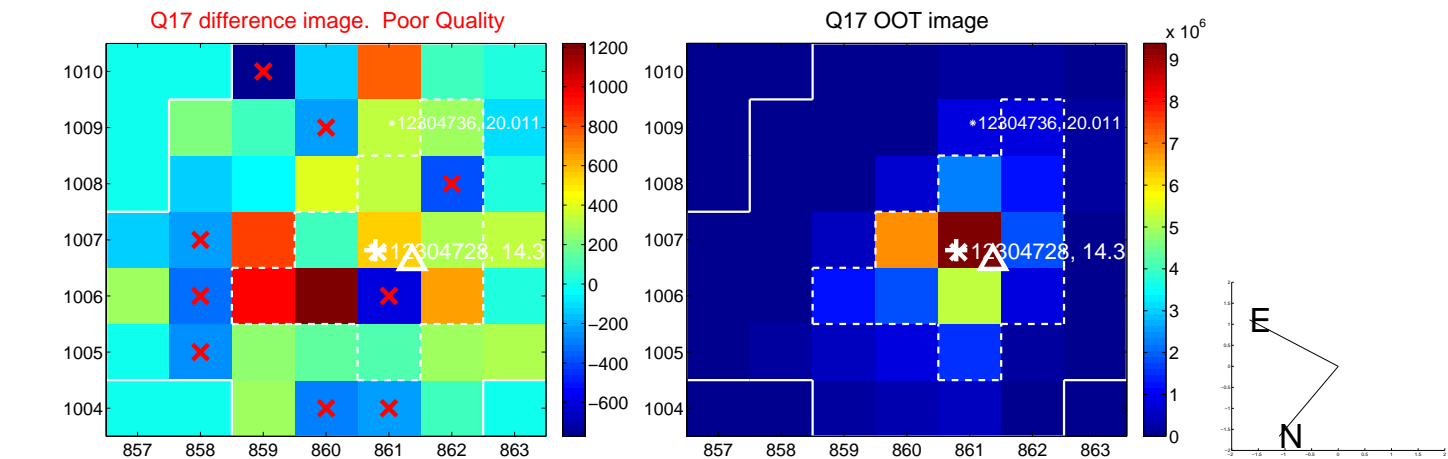
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



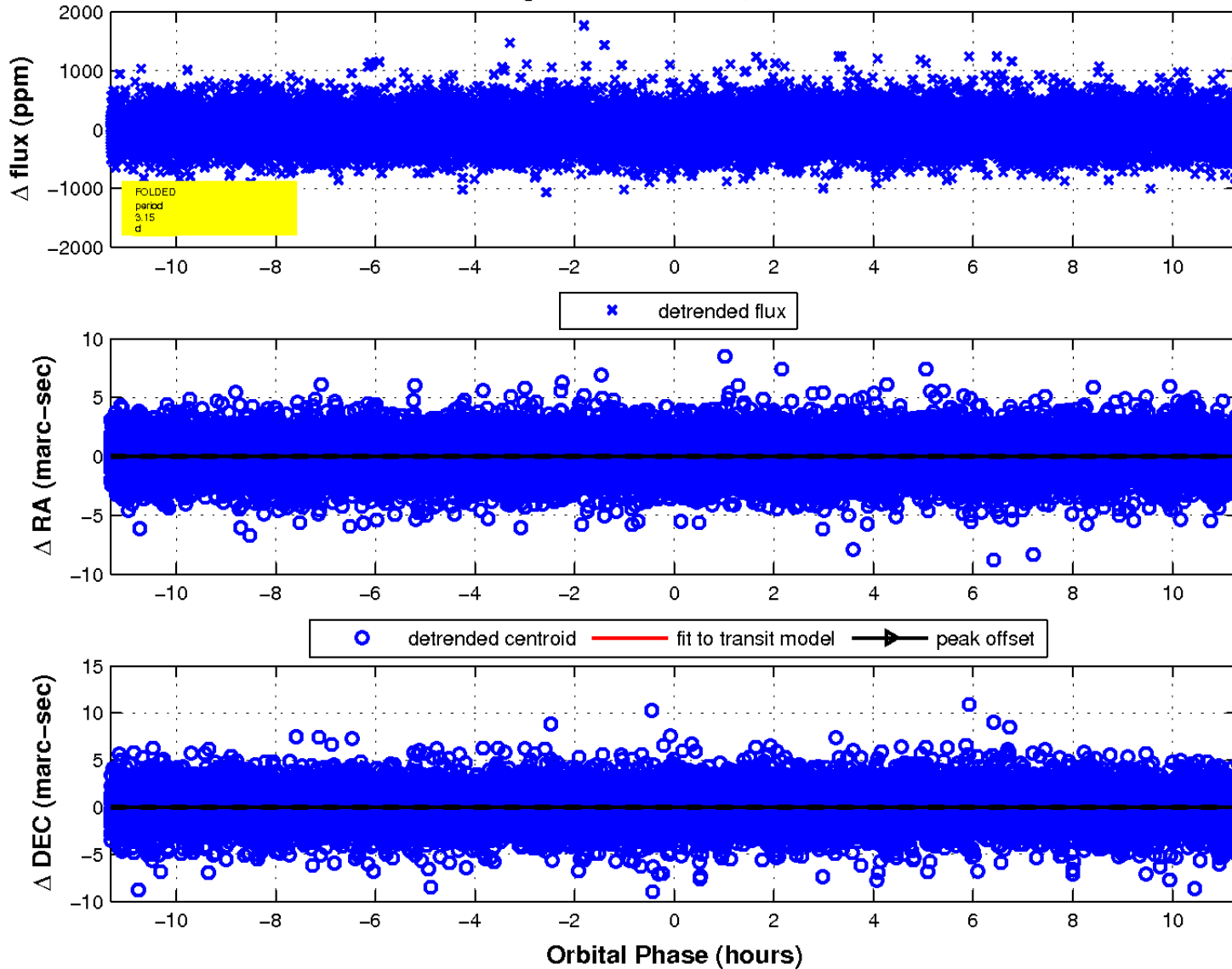
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 1 of 1



UKIRT Image

