

# KIC 009044228

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009044228-01	OBS	1988.01	0.934880	131.582737	239.5	1.438	45.3	51.3	1.79	4777	3.44	4431.50

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009044228-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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

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

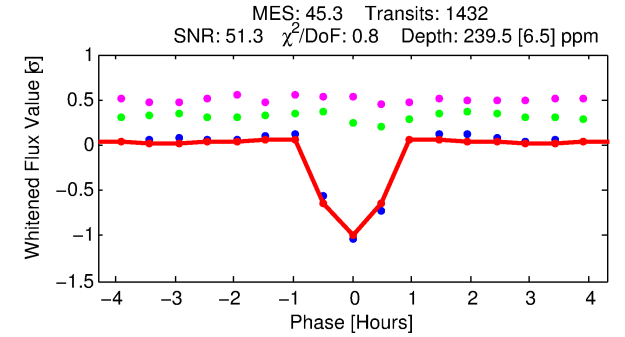
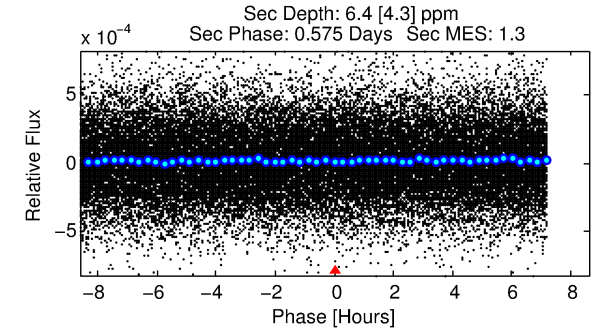
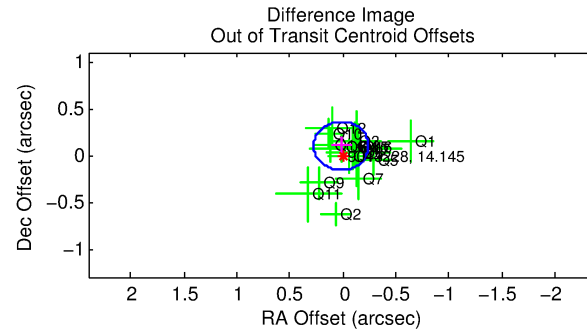
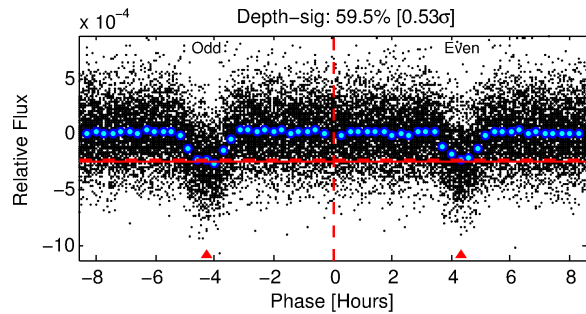
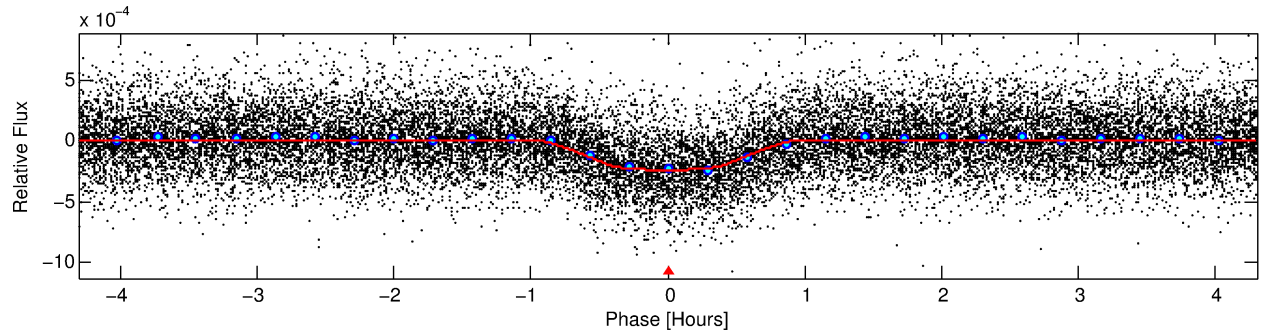
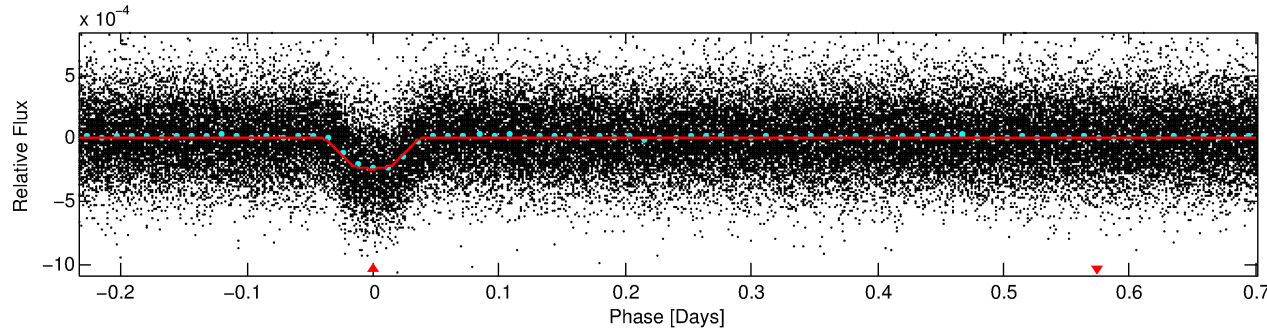
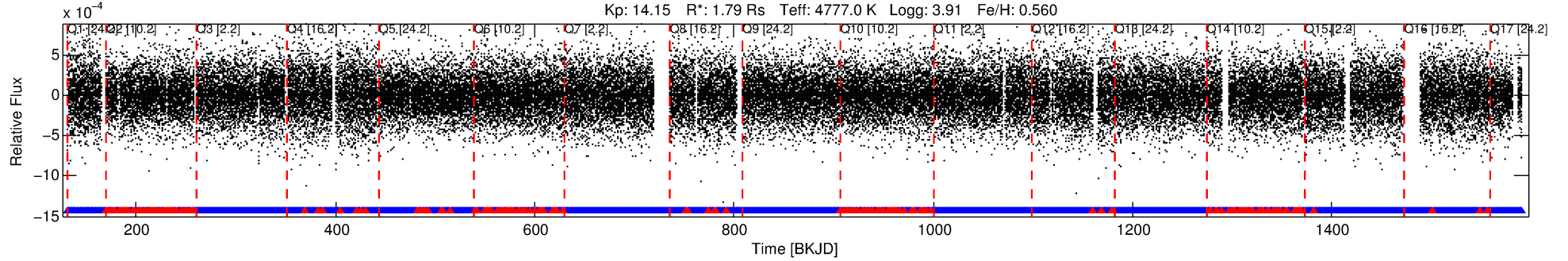
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009044228-01

No Significant Match Found

# DV One-Page Summary

KIC: 9044228 Candidate: 1 of 1 Period: 0.935 d  
KOI: K01988.01 Corr: 0.959



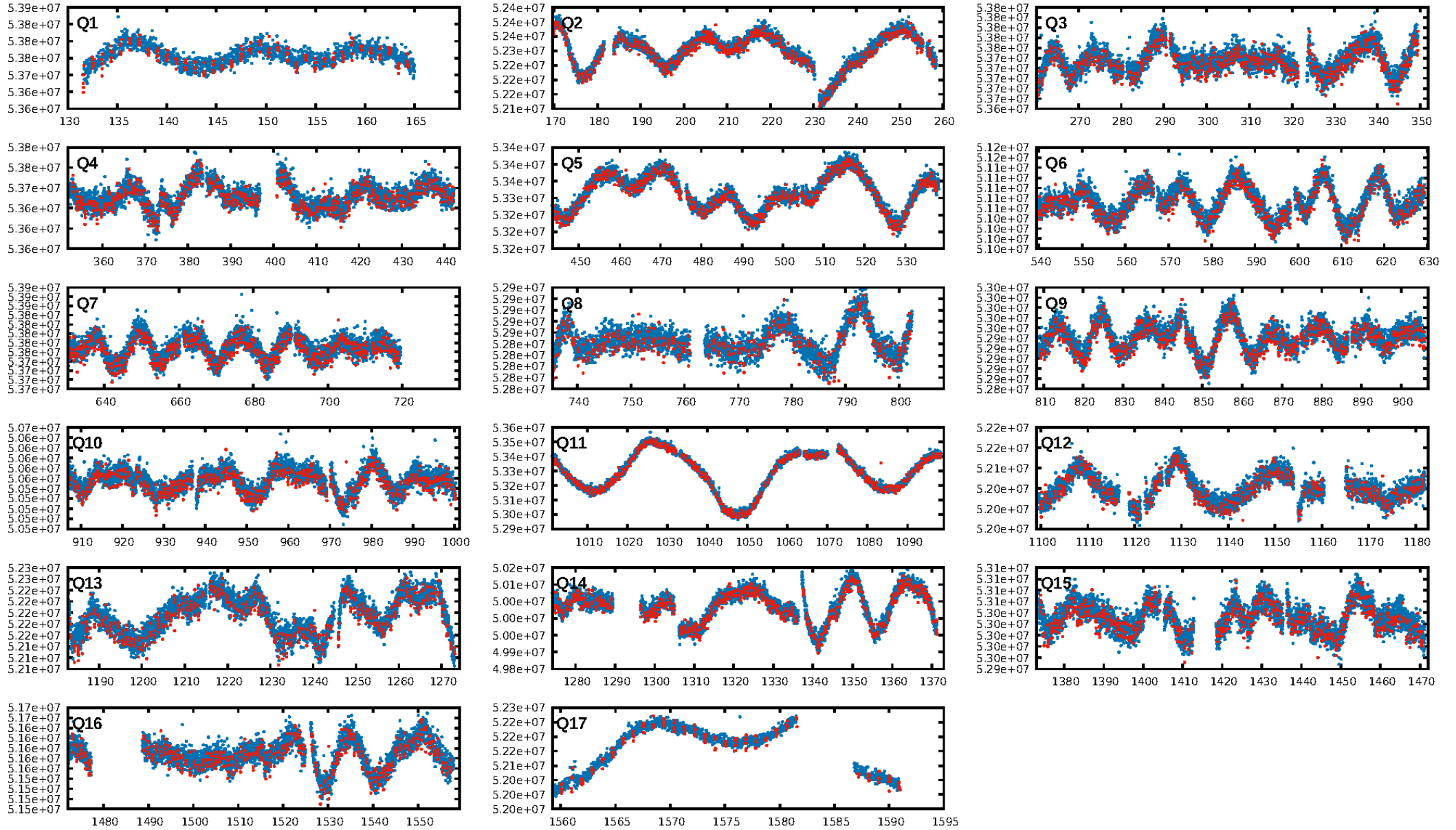
## DV Fit Results:

Period = 0.93488 [0.00000] d  
Epoch = 131.5827 [0.0004] BKJD  
Rp/R\* = 0.0176 [0.0039]  
a/R\* = 2.54 [1.72]  
b = 0.90 [0.18]  
Seff = 4431.50 [5147.45]  
Teff = 2080 [604] K  
Rp = 3.44 [2.18] Re  
a = 0.0184 [0.0124] AU  
Ag = 0.10 [0.14] [-6.37 $\sigma$ ]  
Teffp = 1811 [368] K [-0.38 $\sigma$ ]

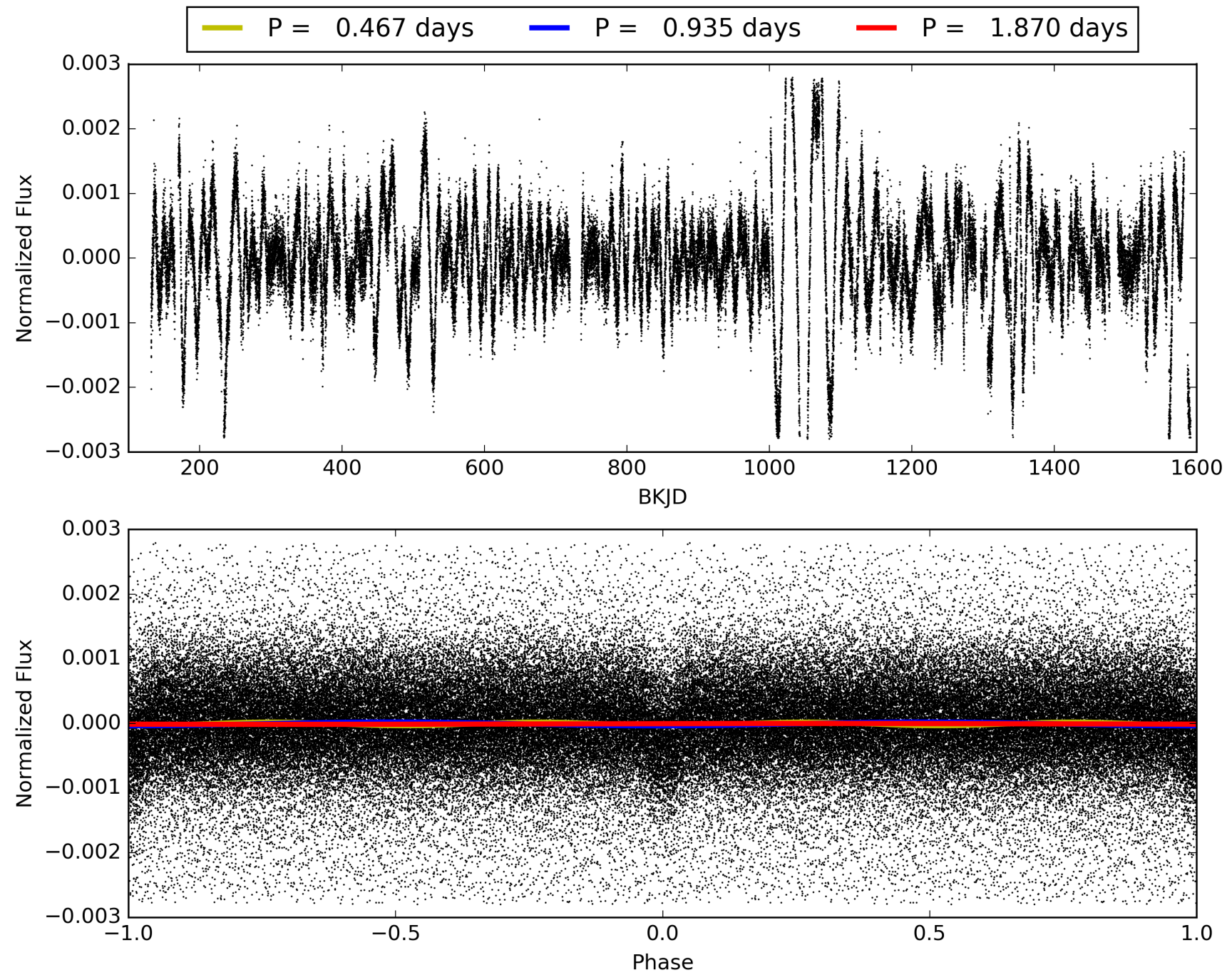
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.85 [1164/1367]  
GhostDiagnostic-chr: 6.482  
Centroid-sig: 15.8%  
Centroid-so: 0.365 arcsec [1.36 $\sigma$ ]  
OotOffset-rm: 0.101 arcsec [1.18 $\sigma$ ]  
KicOffset-rm: 0.274 arcsec [2.95 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 009044228-01, PDC Light Curves



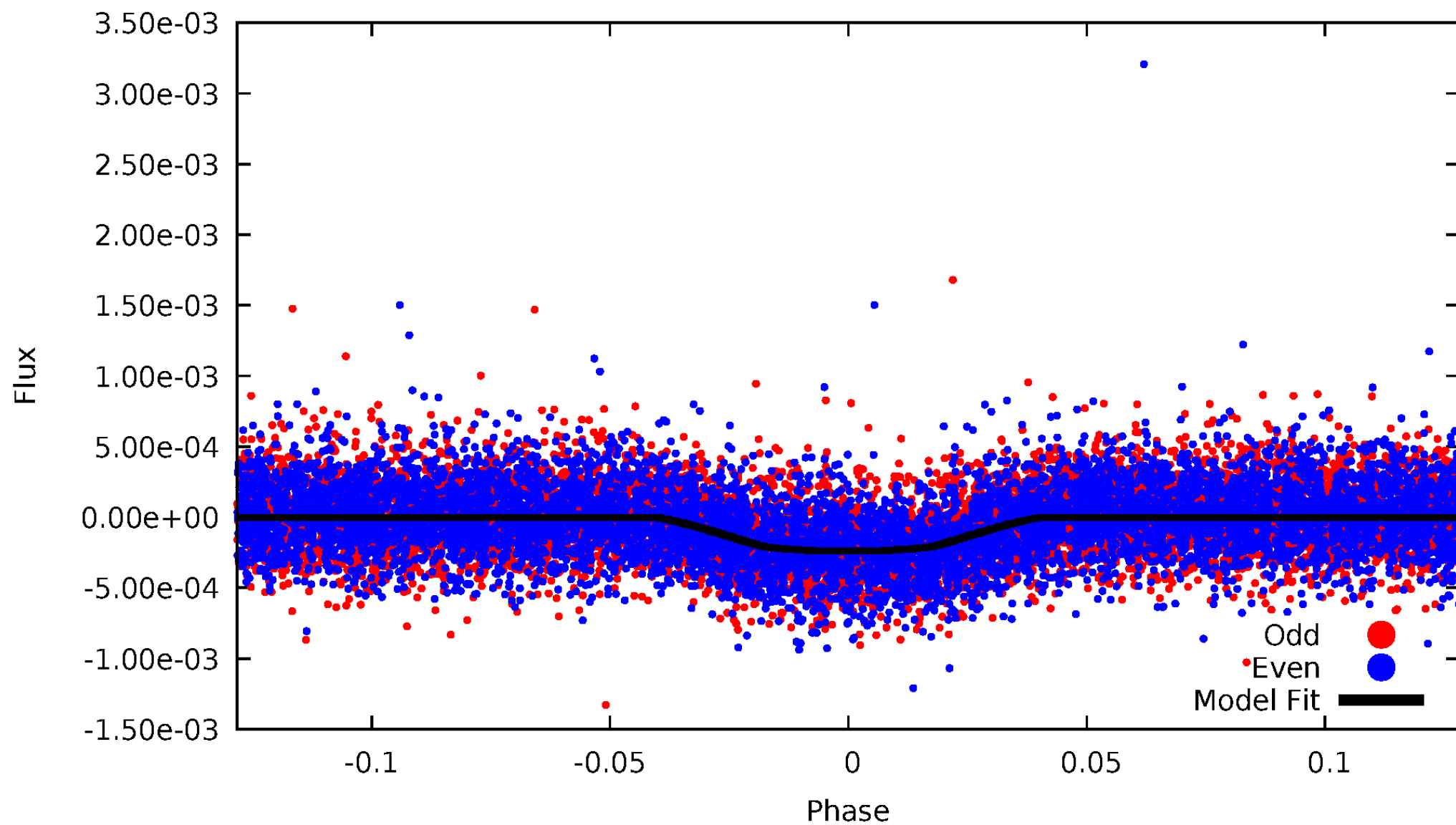
TCE 009044228-01





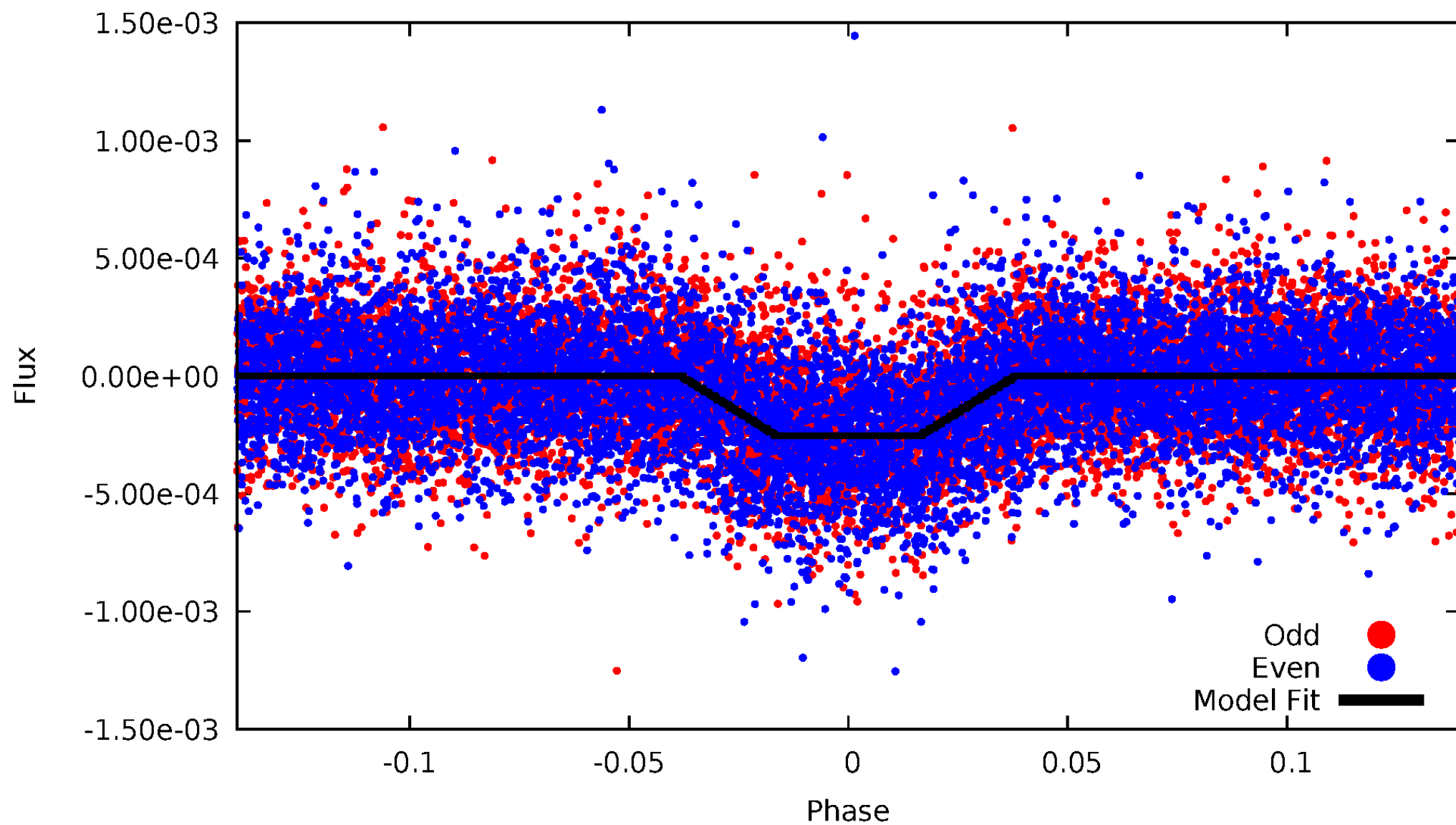
# DV Odd/Even

TCE 009044228-01



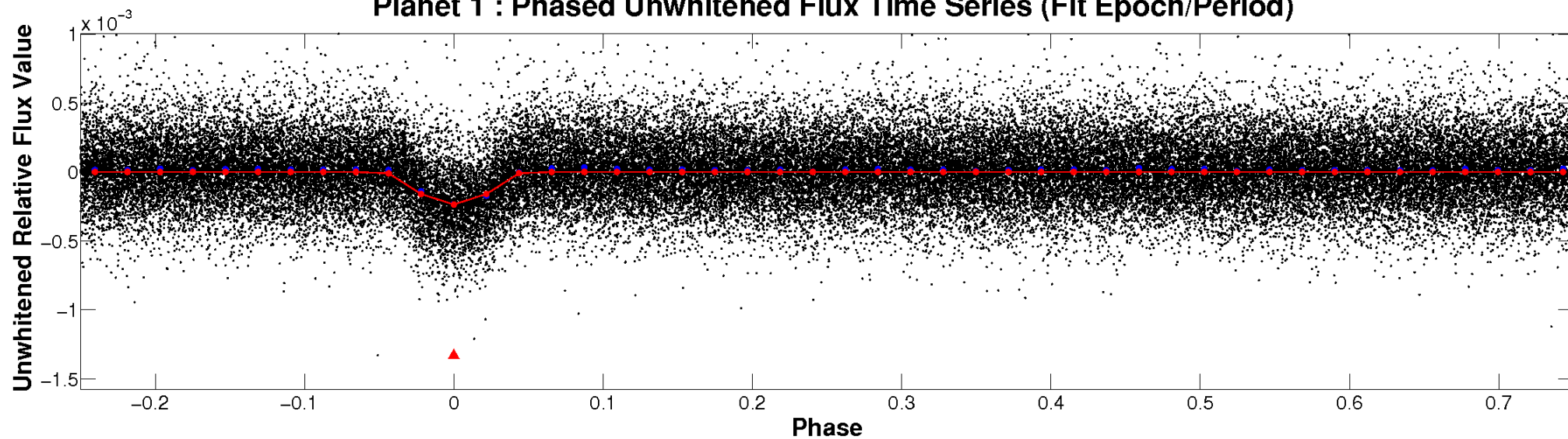
# ALT Odd/Even

TCE 009044228-01

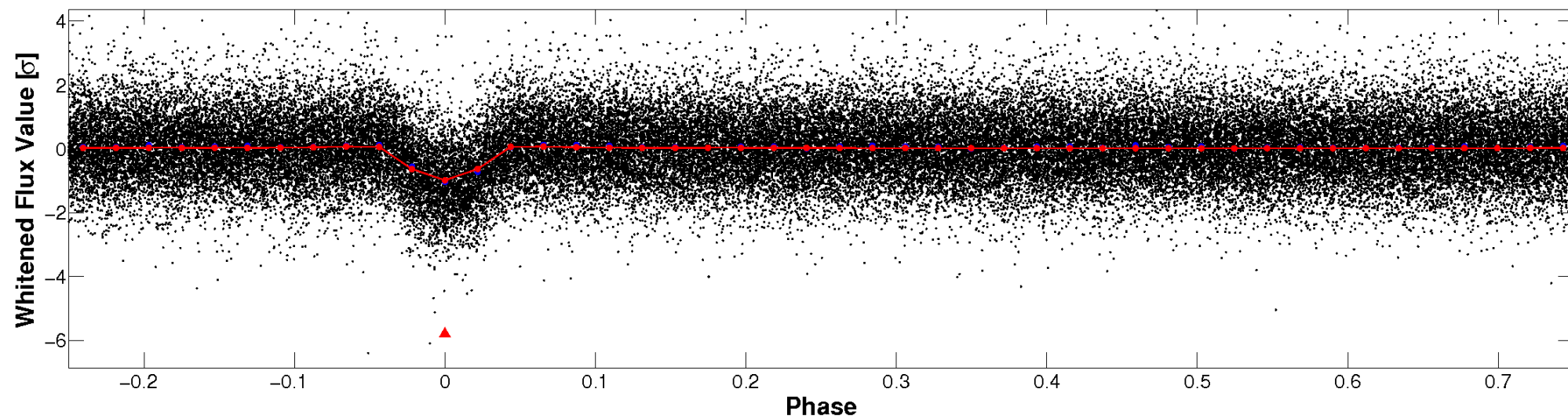


# Non-Whitened Vs. Whitened Light Curve

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

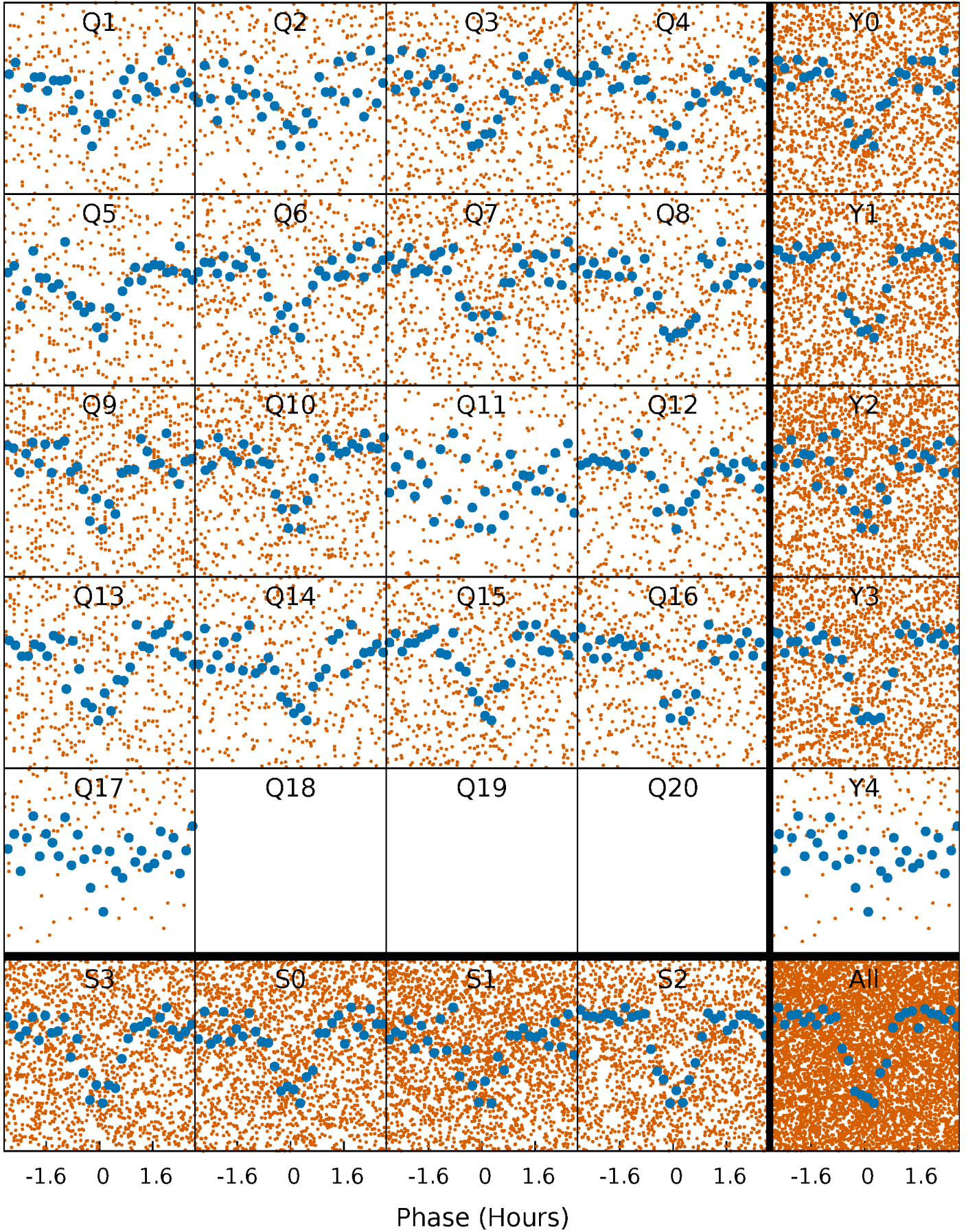


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

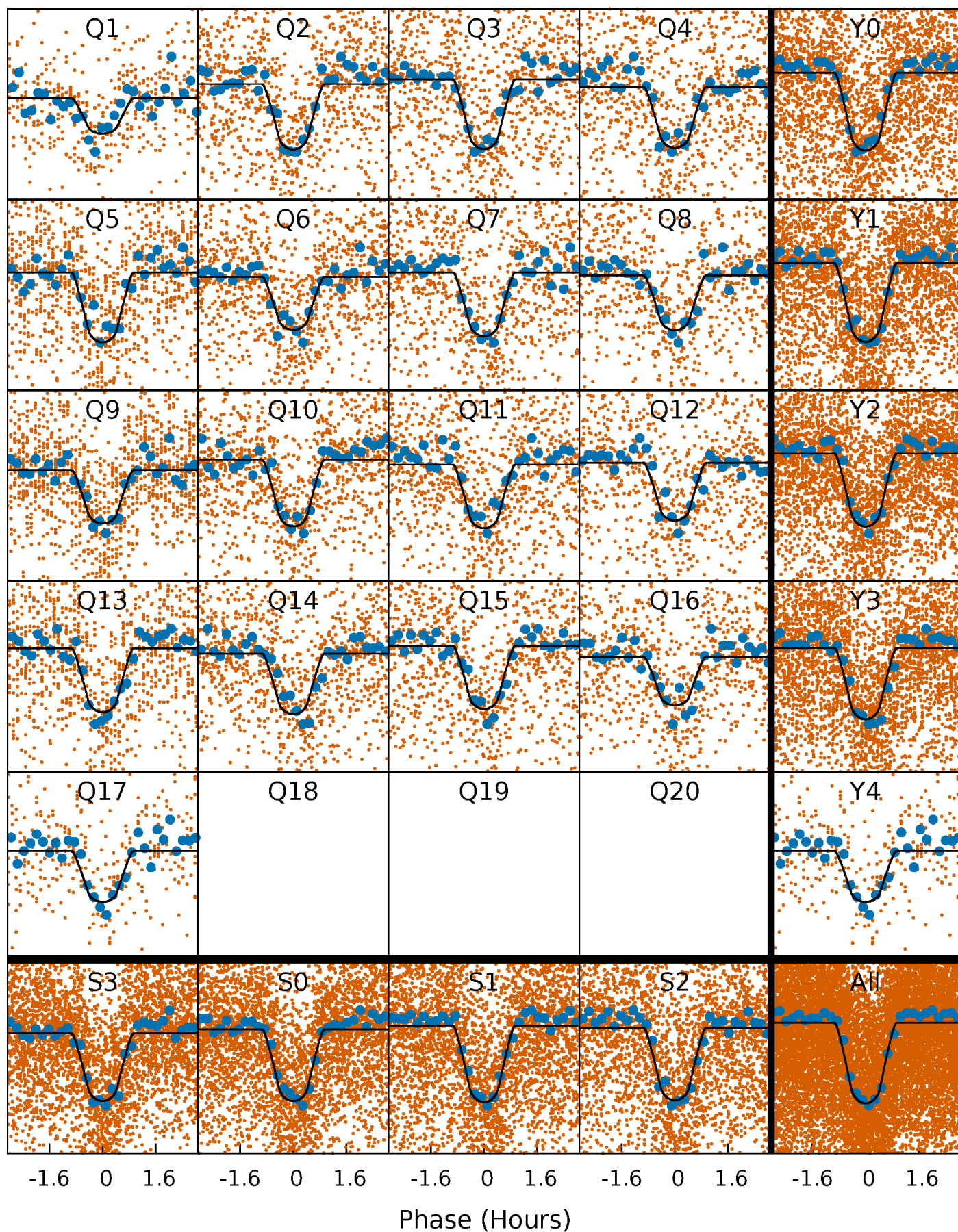
TCE 009044228-01 P= 0.934880 Days  $T_0=131.582737$  (BKJD)





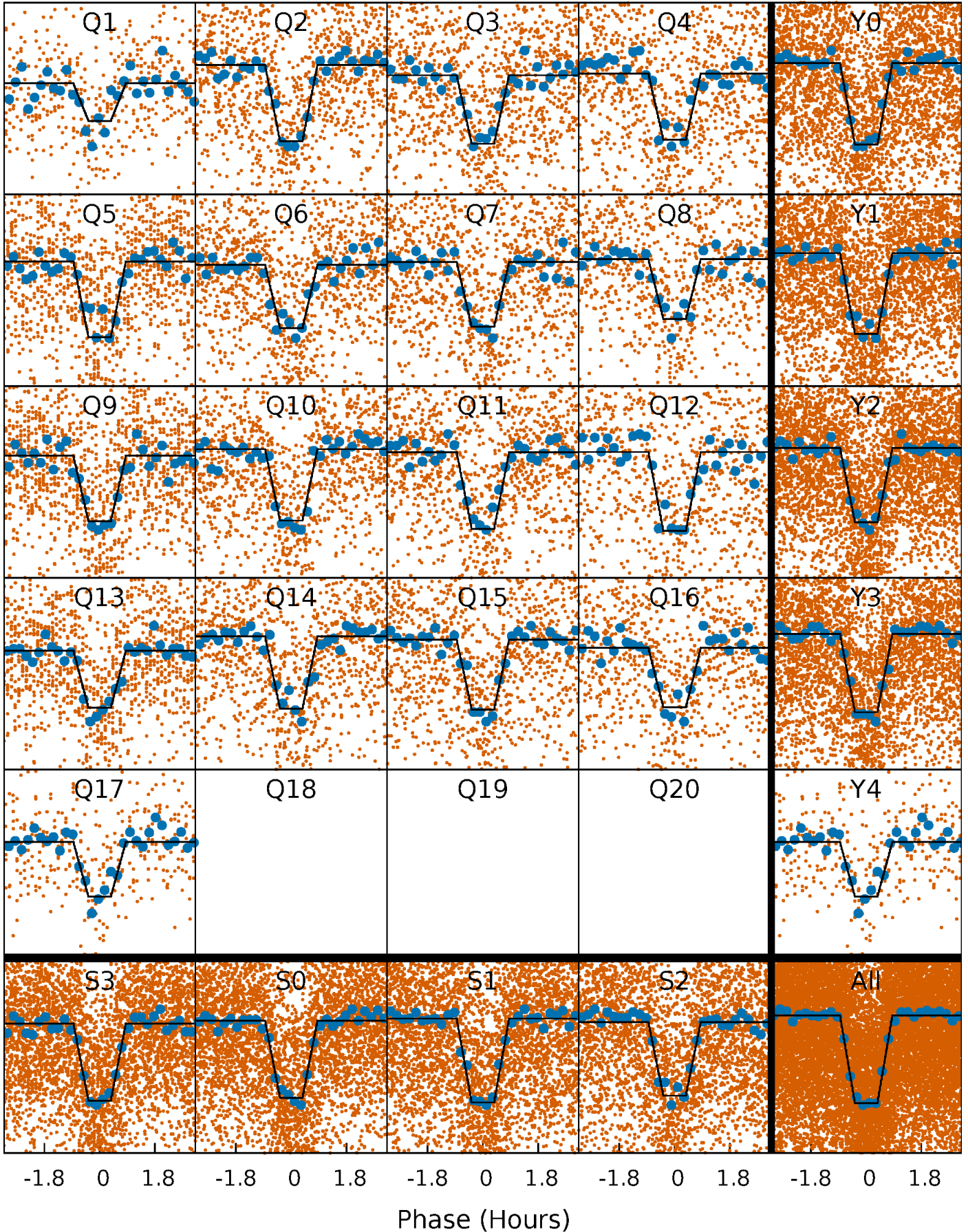
# DV Quarter-Phased Transit Curves

TCE 009044228-01 P= 0.934880 Days  $T_0=131.582737$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 009044228-01 P= 0.934883 Days  $T_0=131.582774$  (BKJD)

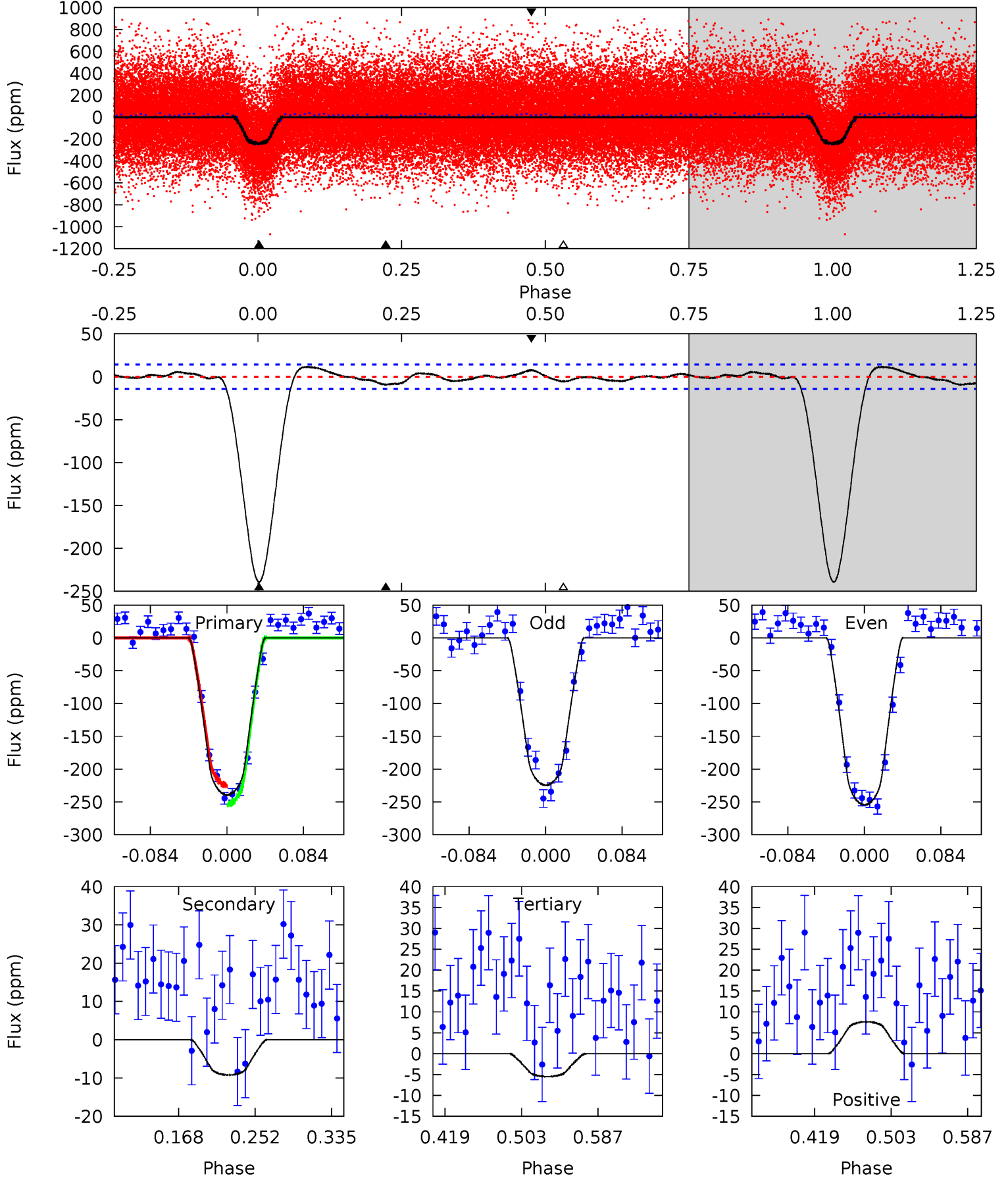




# DV Model-Shift Uniqueness Test

009044228-01, P = 0.934880 Days, E = 130.647857 Days

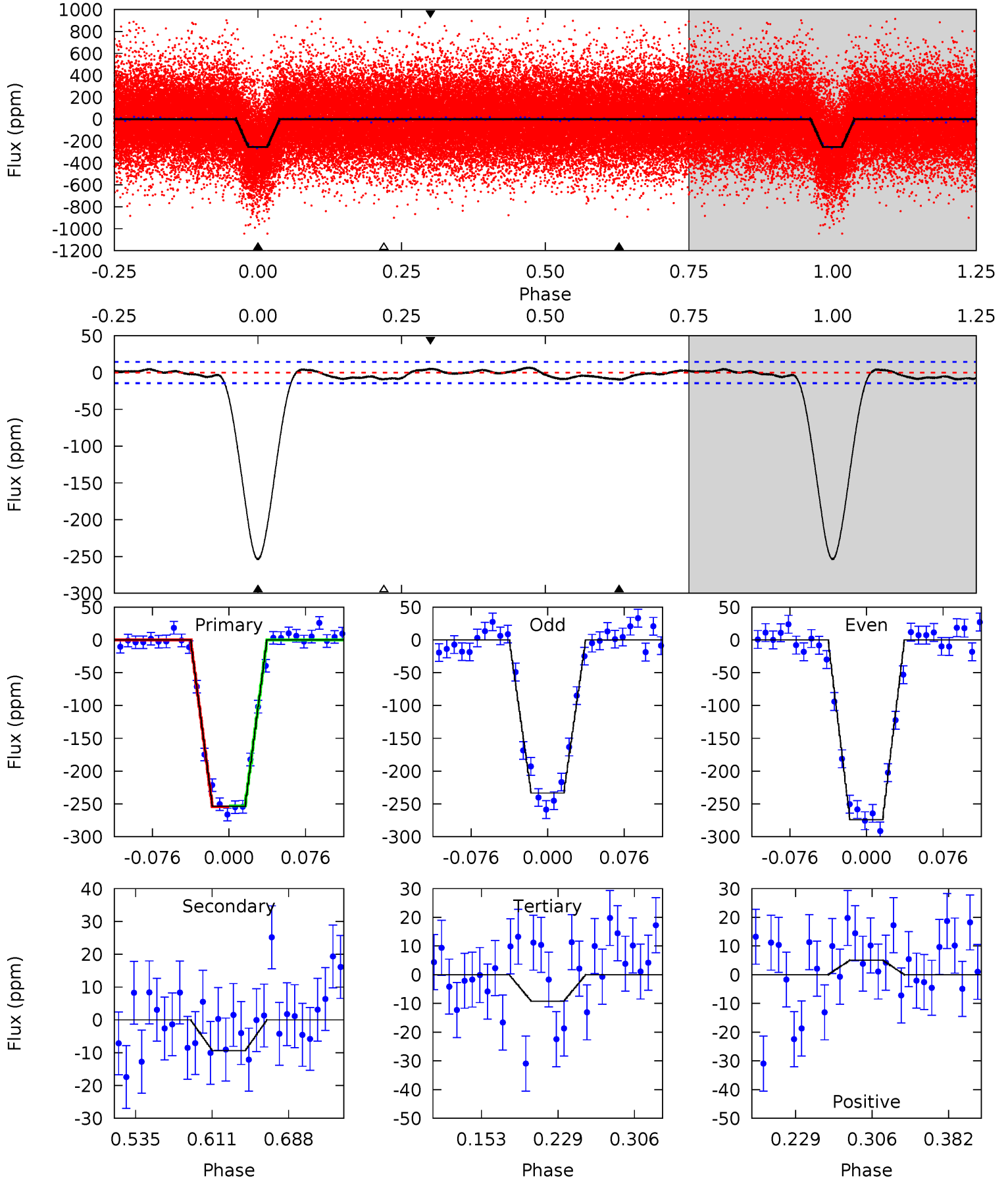
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
77.8	3.00	1.79	2.48	4.60	1.73	1.19	76.0	75.3	1.21	0.51	4.89	0.99	0.05	4.72



# Alt Model-Shift Uniqueness Test

009044228-01, P = 0.934883 Days, E = 130.647891 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
80.7	3.00	2.92	1.61	4.62	1.77	1.37	77.7	79.0	0.07	1.39	6.49	0.99	0.03	0.20





### Stellar Parameters For KIC 009044228

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4777^{+143}_{-119}$	$3.909^{+0.707}_{-0.353}$	$0.560^{+0.050}_{-0.300}$	$1.795^{+1.067}_{-1.067}$	$0.953^{+0.187}_{-0.168}$	$0.232^{+2.587}_{-0.156}$
	+3%/-2%	+18%/-9%	+9%/-54%	+59%/-59%	+20%/-18%	+1115%/-67%
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 009044228-01 / KOI 1988.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-9 \pm 3$	$3.34^{+1.52}_{-1.11}$	$2902^{+468}_{-481}$	$-2700^{+4954}_{-404}$	$0.151^{+0.214}_{-0.087}$
Alt.	$-9 \pm 3$	$2.98^{+1.35}_{-1.11}$	$2883^{+432}_{-479}$	$-2579^{+5178}_{-470}$	$0.192^{+0.325}_{-0.109}$

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

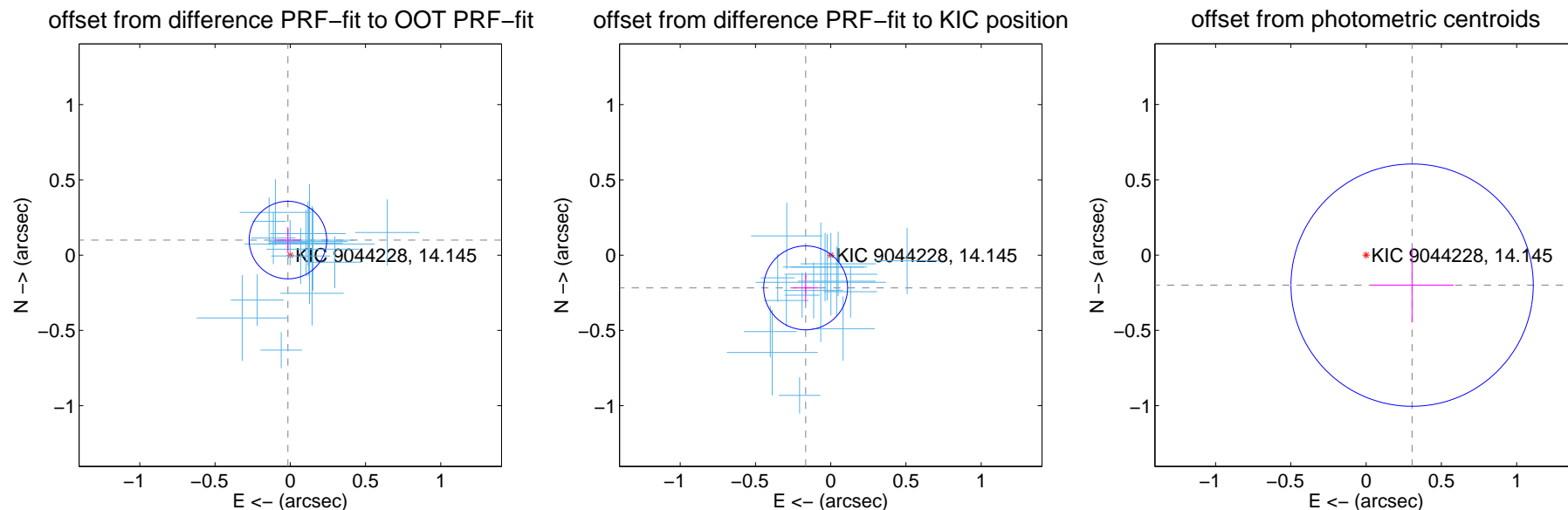
## DV Centroid Data

Supplemental centroid analysis for 009044228-01. Kepler magnitude: 14.14. Transit SNR 51.29

There are 17 quarters with good PRF difference image offsets

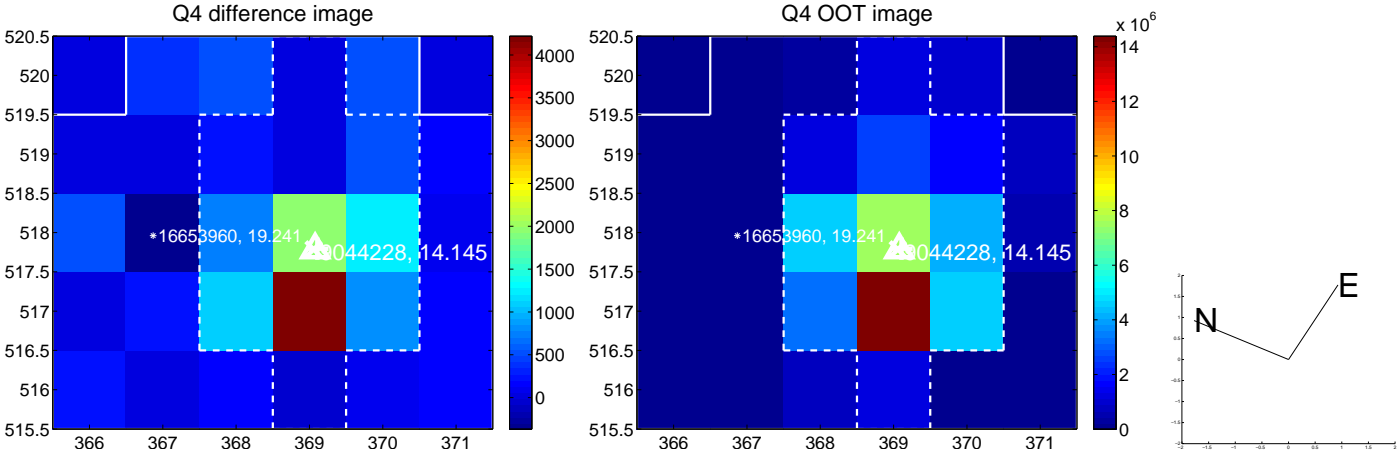
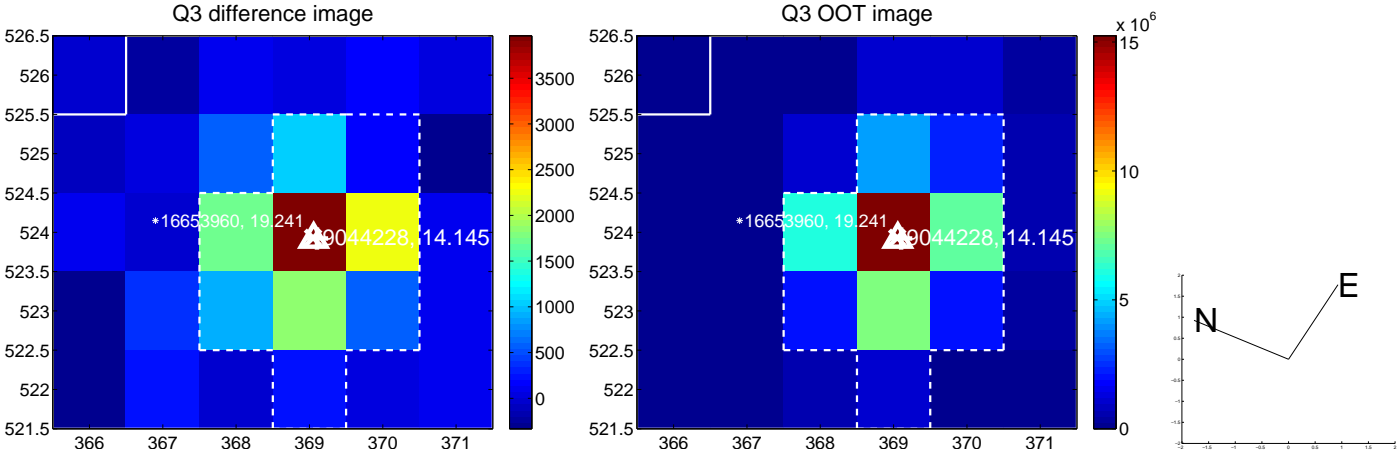
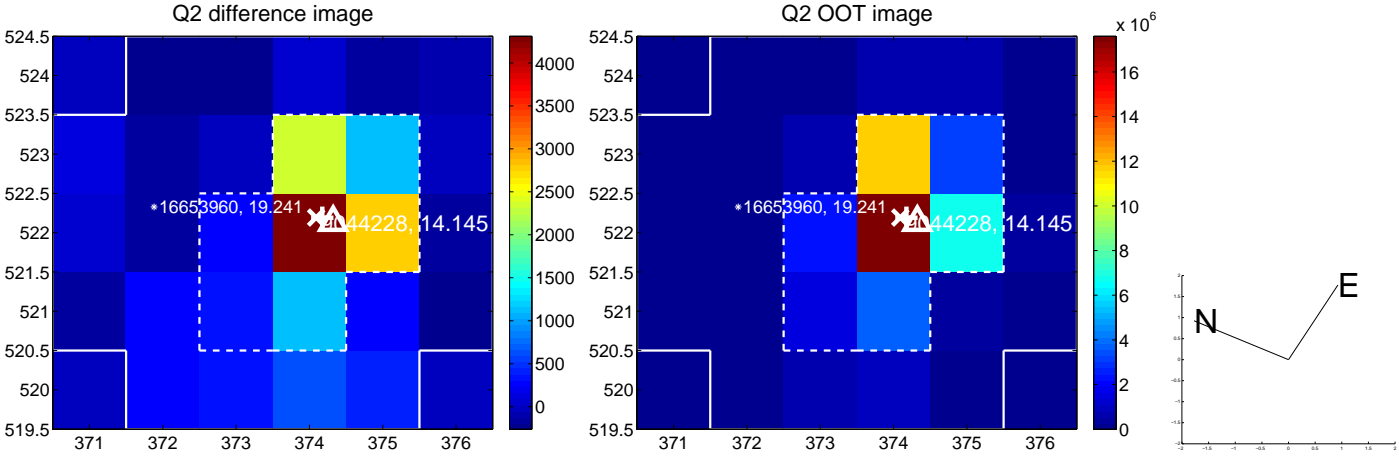
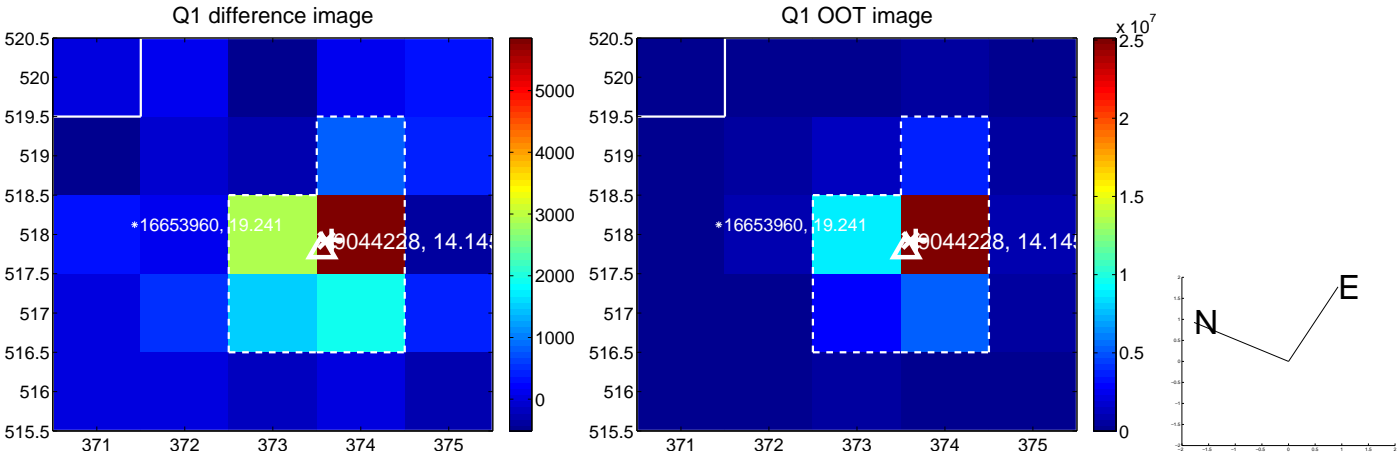
The direct PRF centroid is offset from the target star catalog position by about 0.32 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.101 \pm 0.086$	1.18	$0.016 \pm 0.088$	$0.100 \pm 0.086$
PRF-fit source offset from KIC position	$0.274 \pm 0.093$	2.95	$0.167 \pm 0.086$	$-0.217 \pm 0.088$
photometric centroid source offset	$0.36 \pm 0.27$	1.36	$-0.31 \pm 0.28$	$-0.20 \pm 0.25$

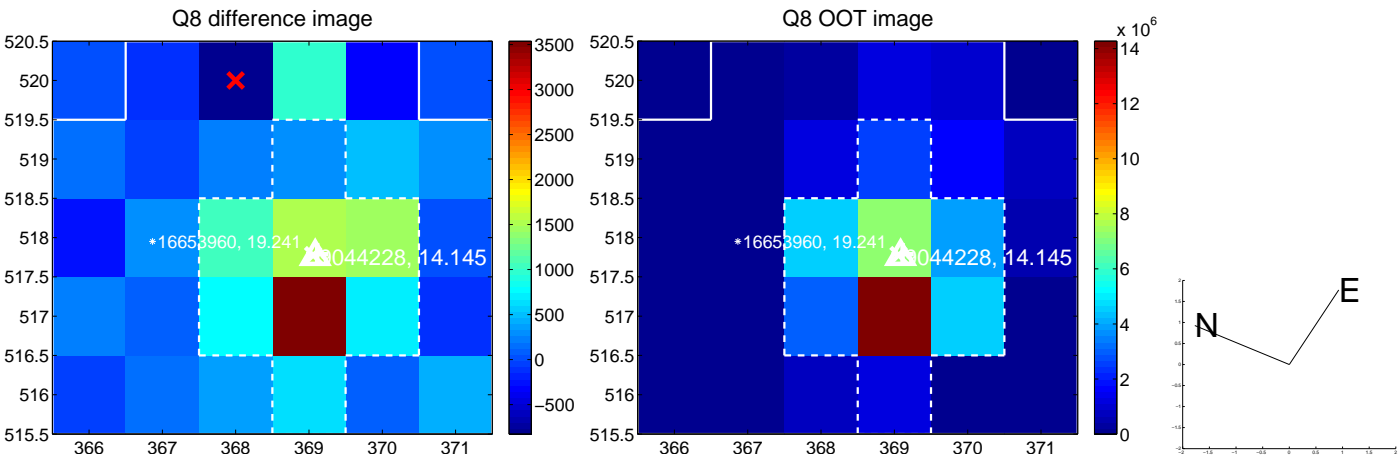
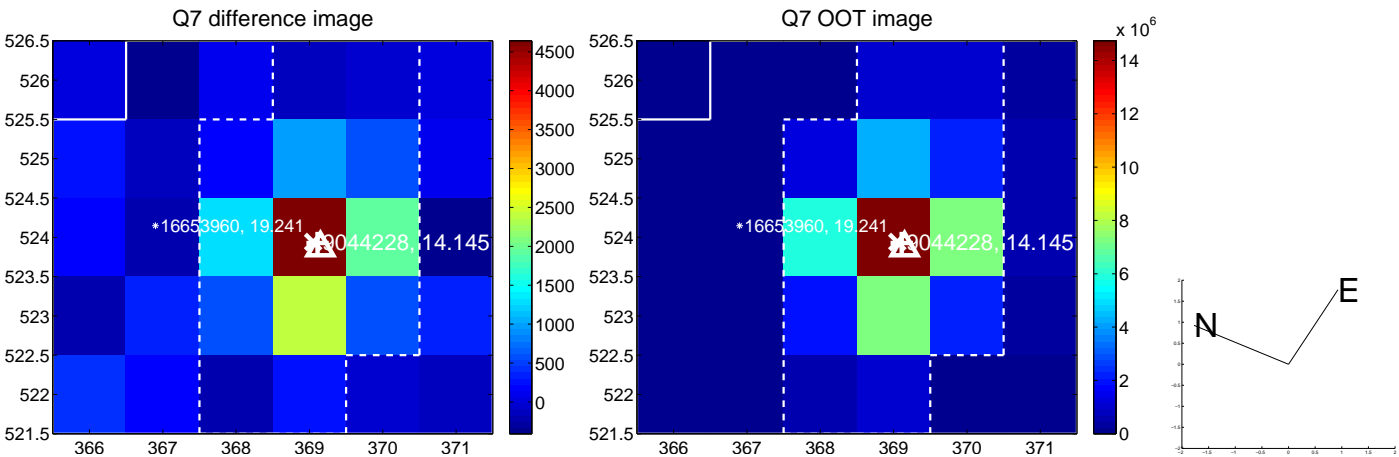
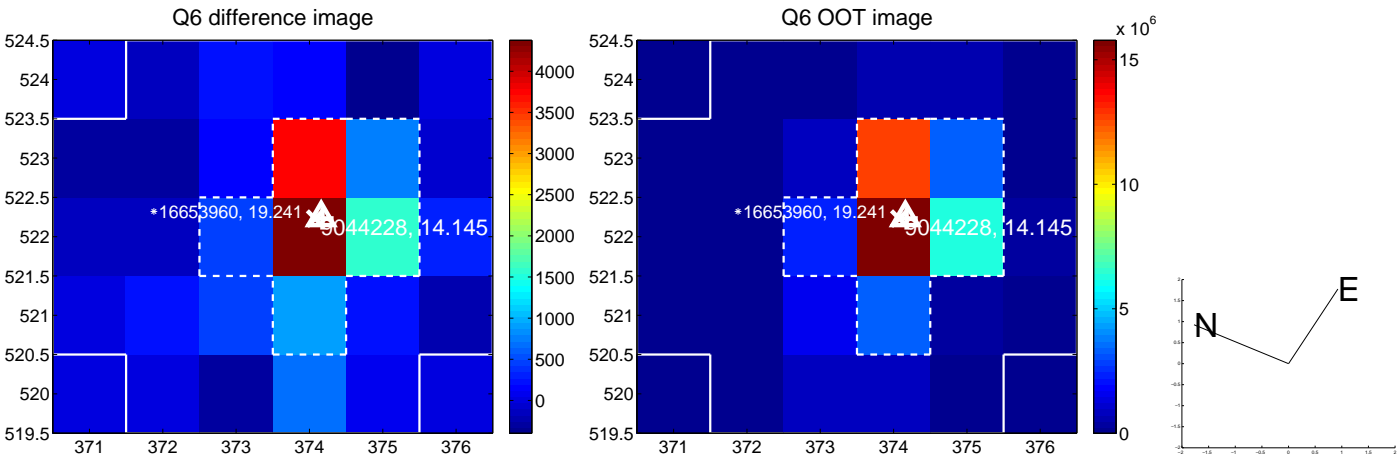
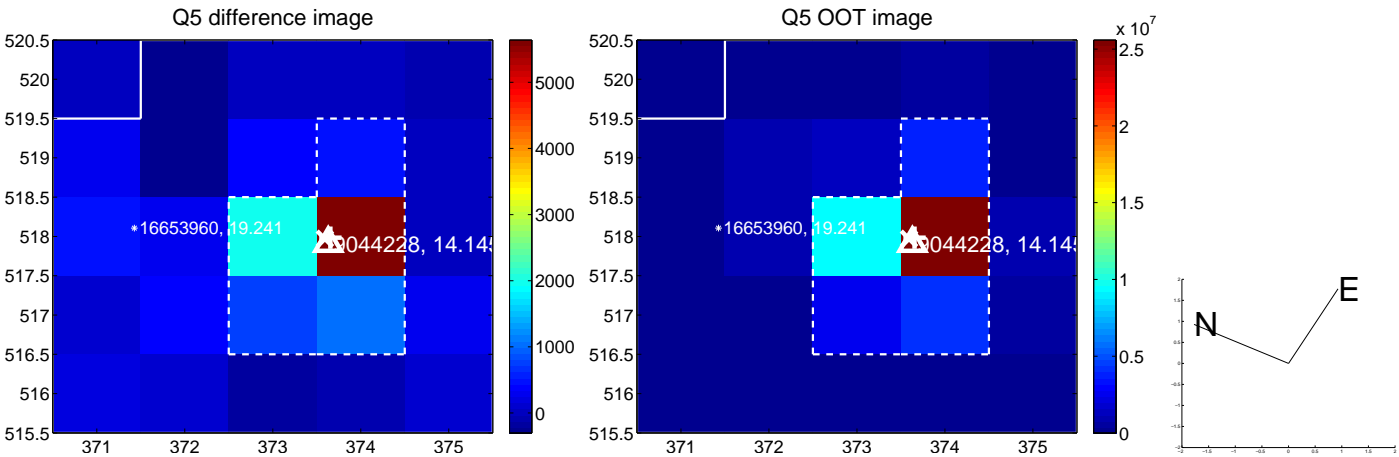


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

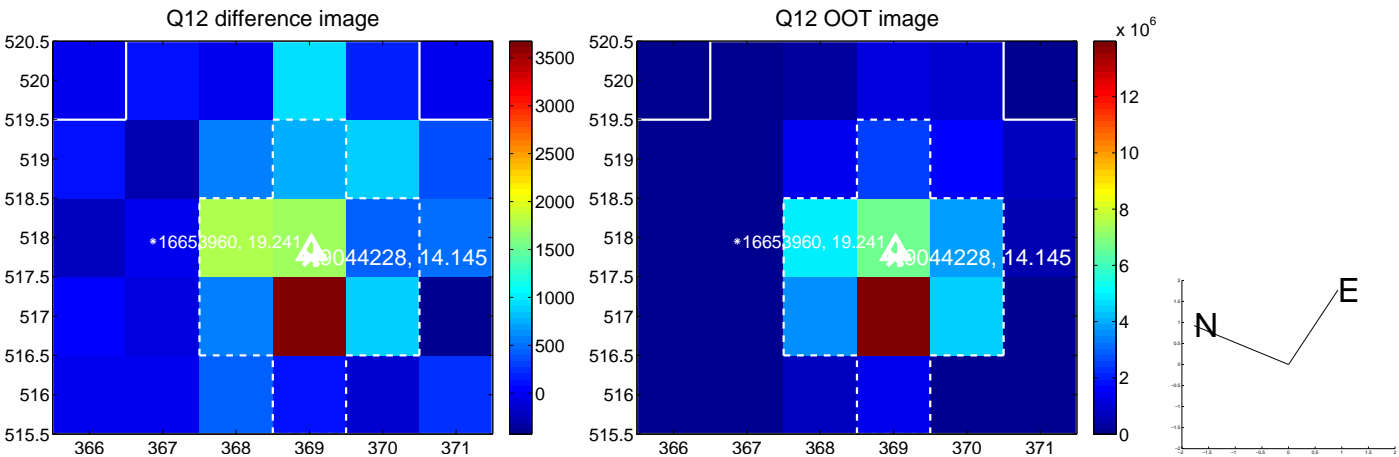
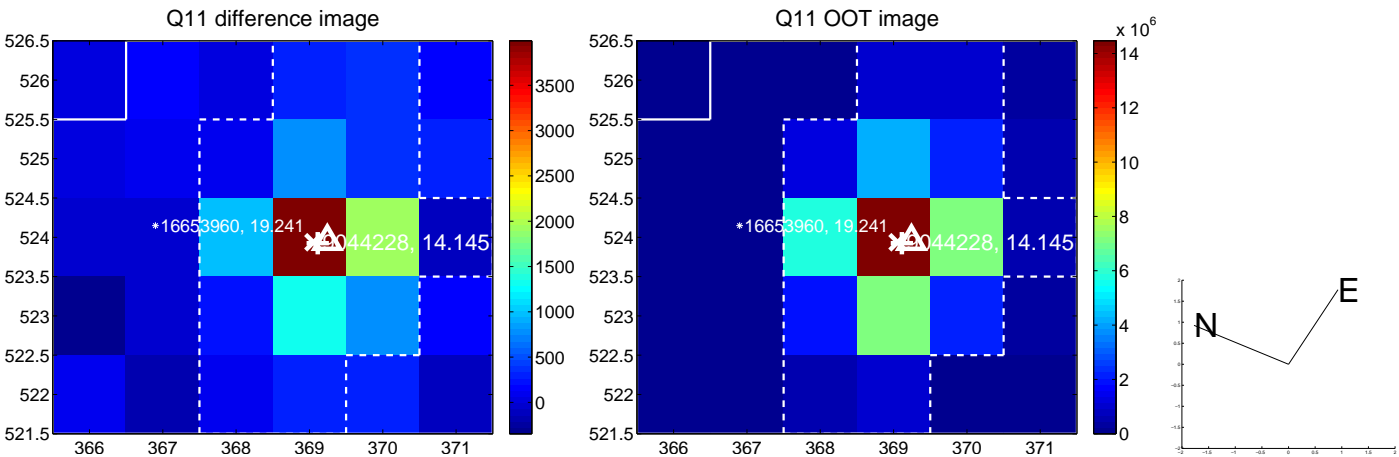
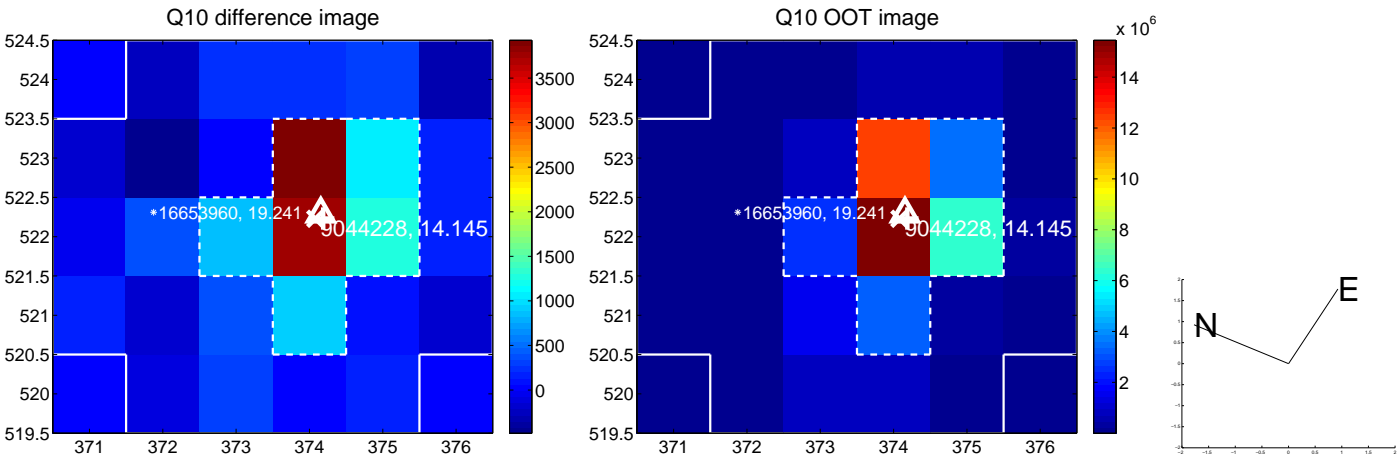
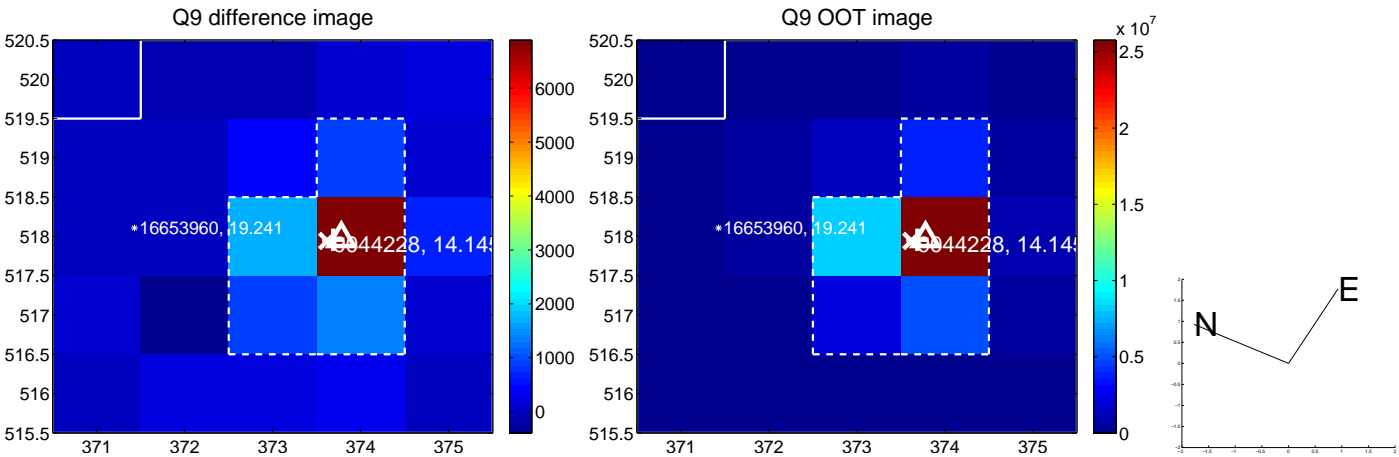


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

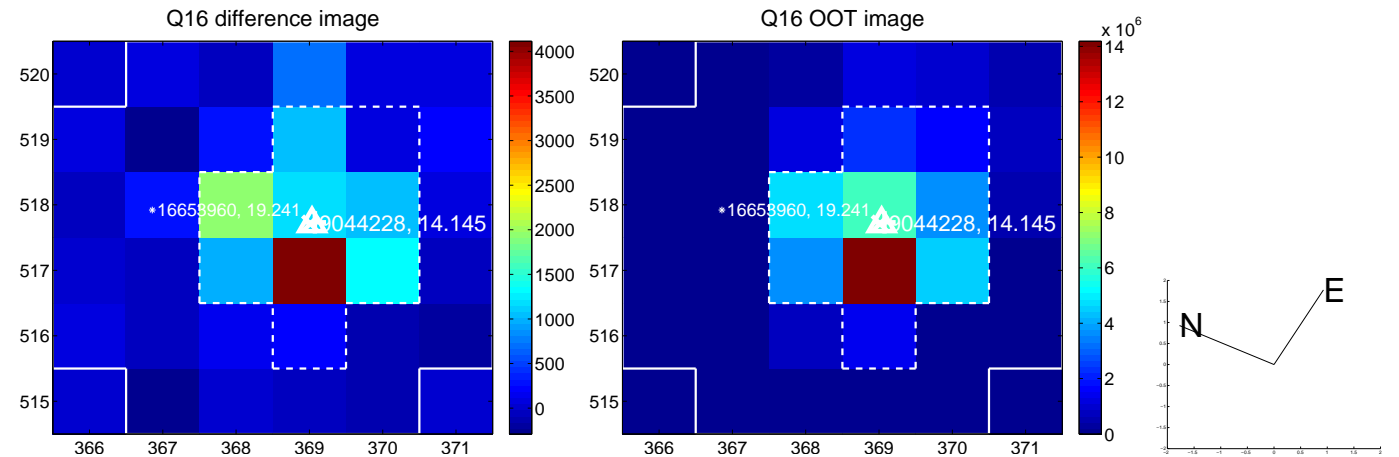
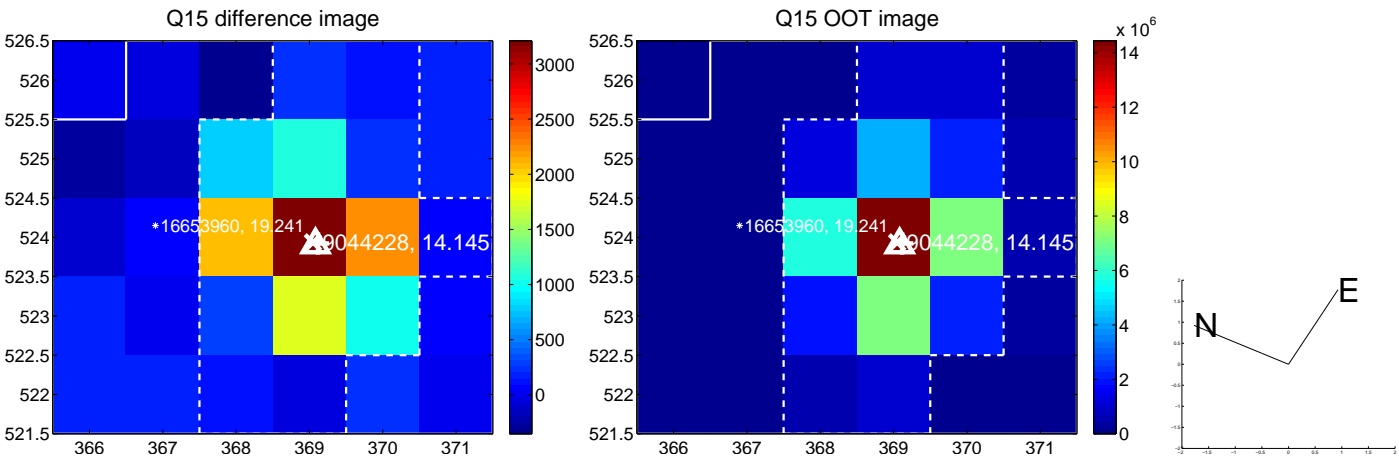
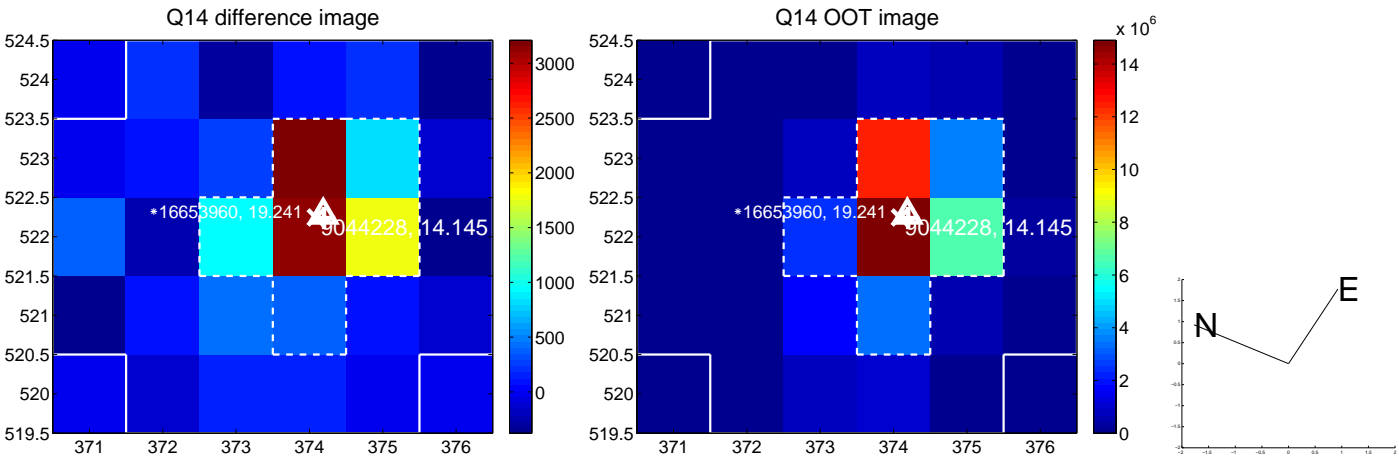
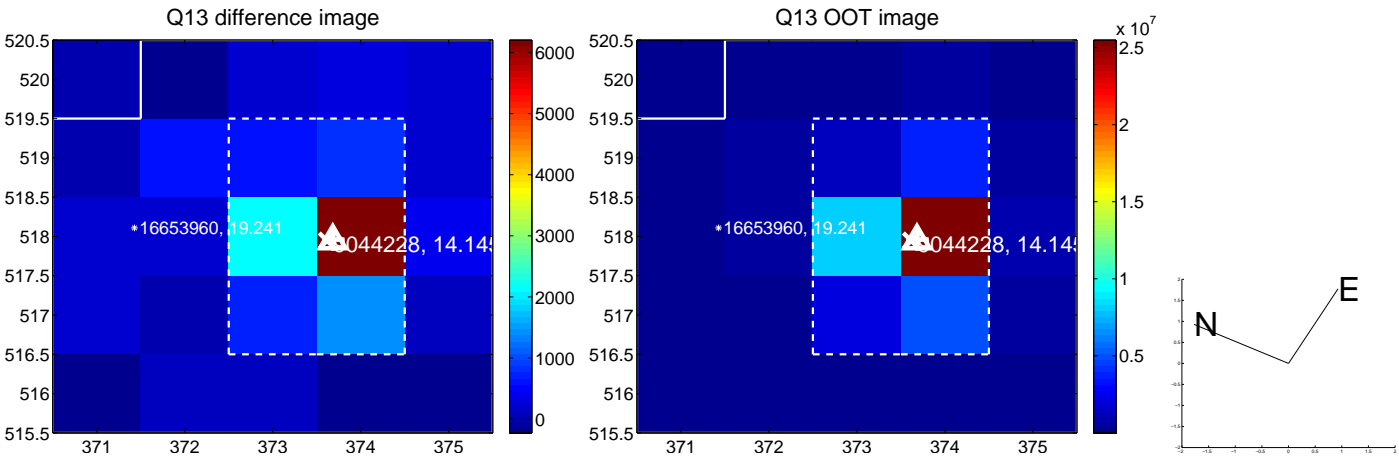




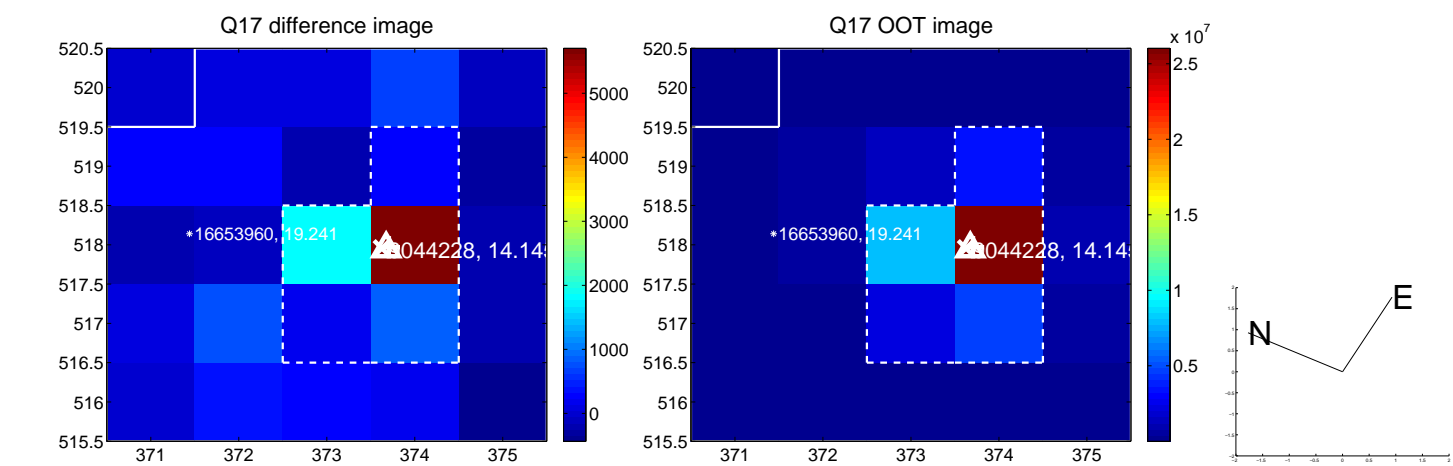
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



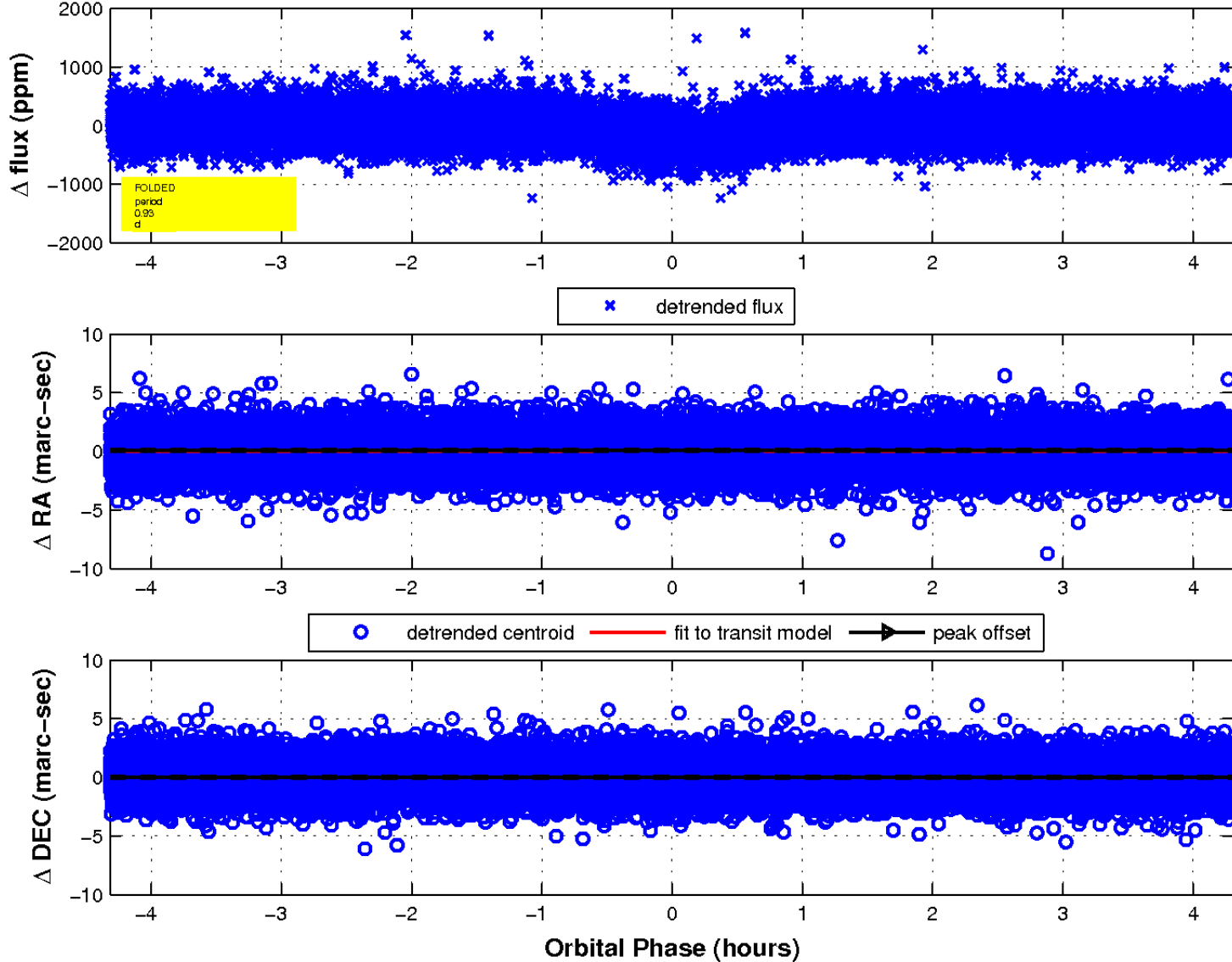
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 1 of 1



UKIRT Image

Declination

