

# KIC 009415108

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009415108-01	OBS	2121.01	4.510046	134.568963	286.5	2.231	19.1	22.0	1.03	5362	2.10	302.28

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009415108-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL

**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.

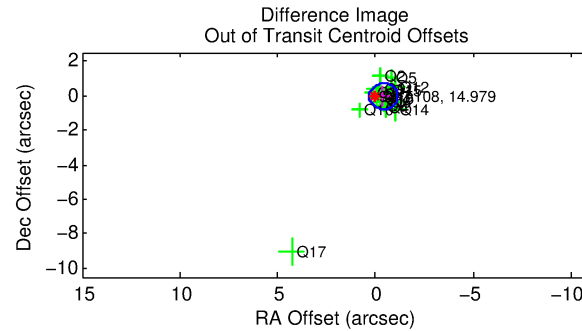
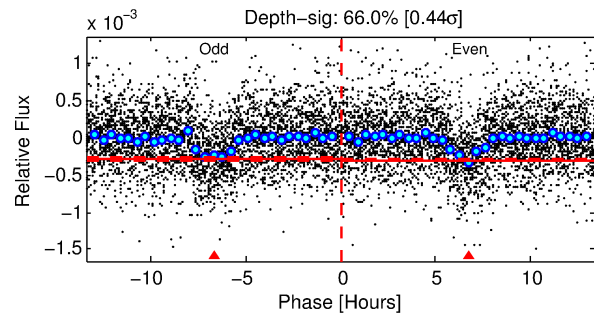
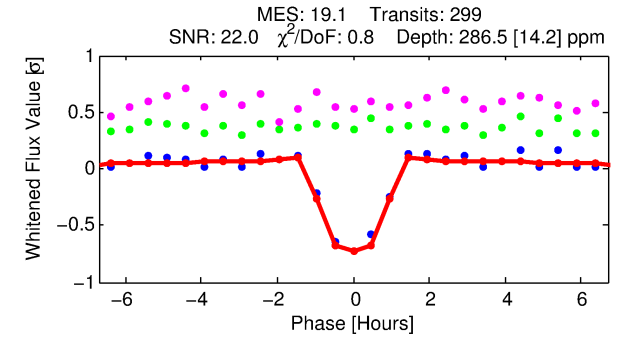
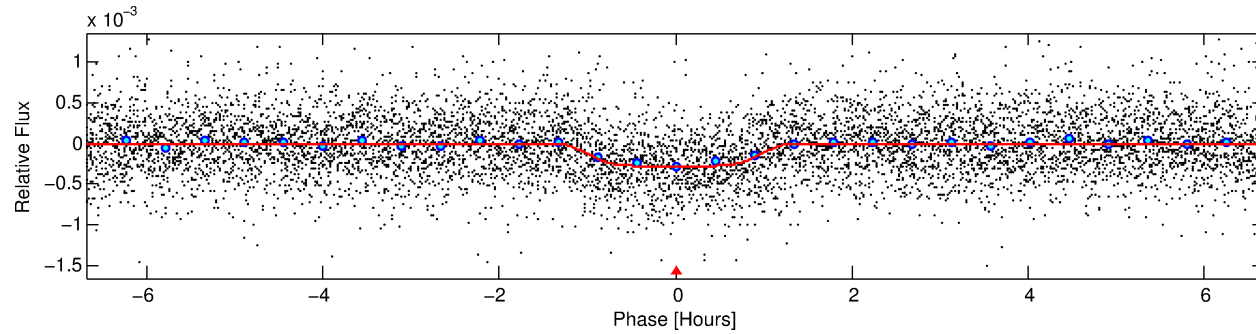
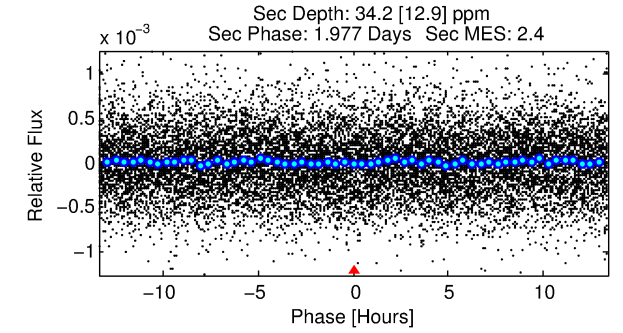
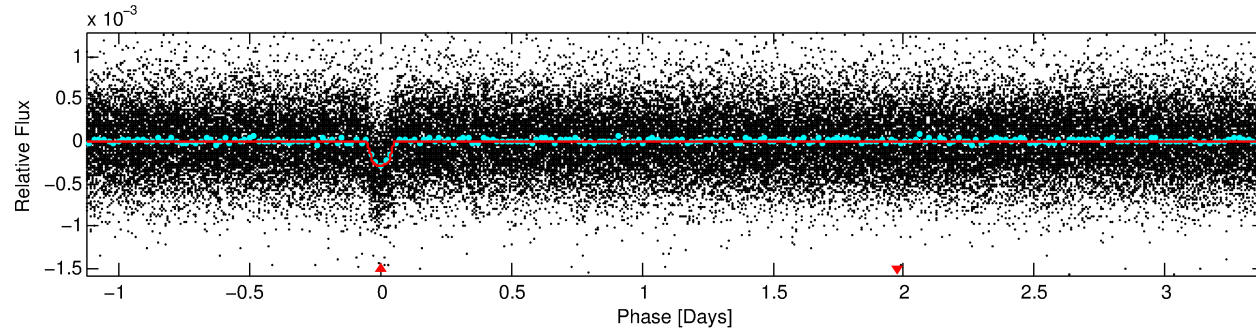
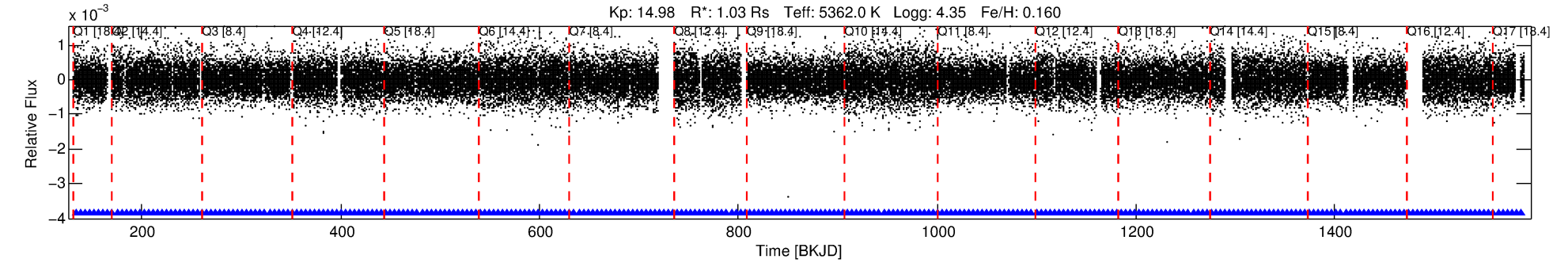
## Ephemeris Match Information For 009415108-01

No Significant Match Found

# DV One-Page Summary

KIC: 9415108 Candidate: 1 of 1 Period: 4.510 d

KOI: K02121.01 Corr: 0.984



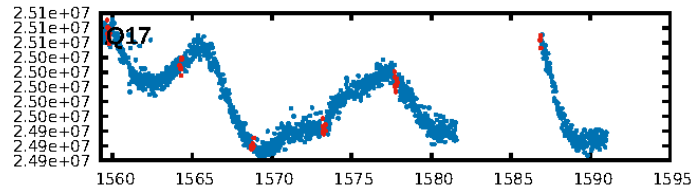
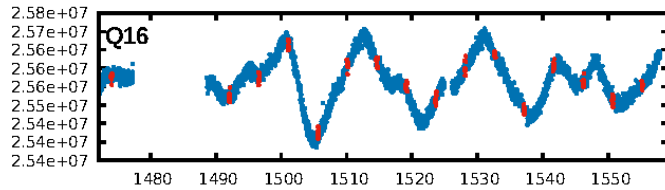
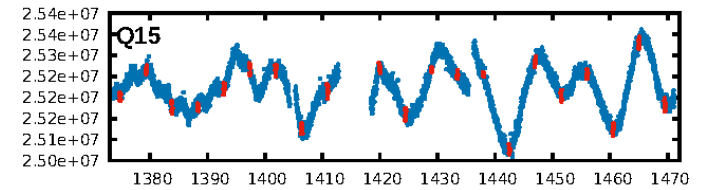
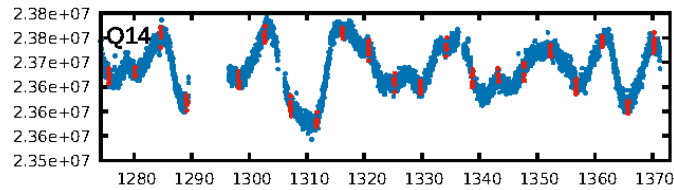
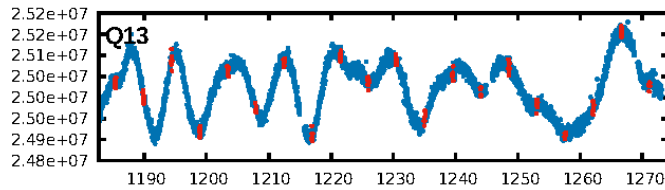
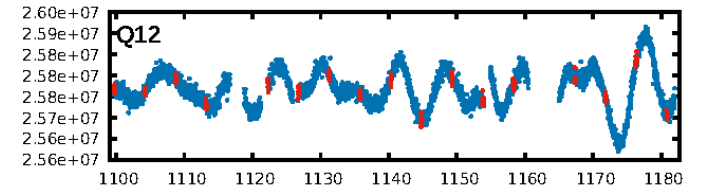
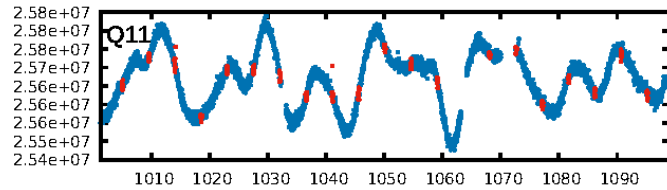
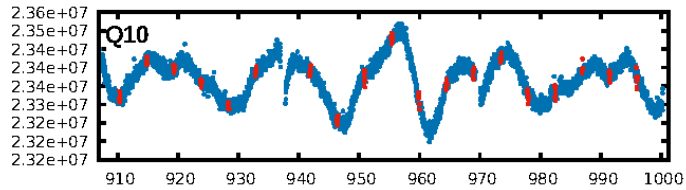
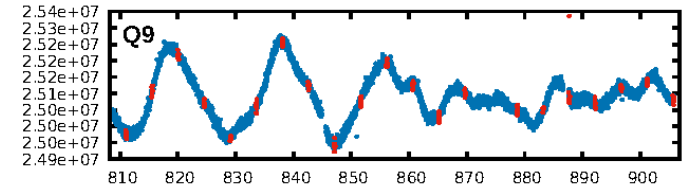
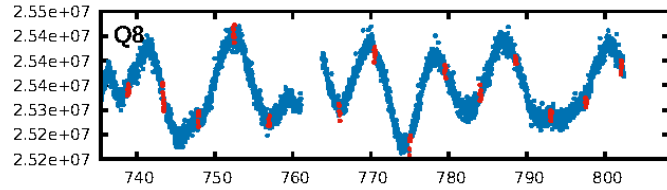
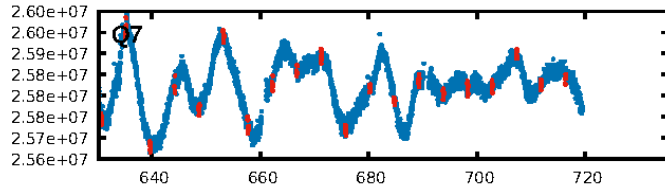
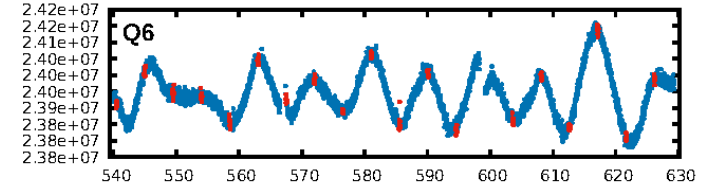
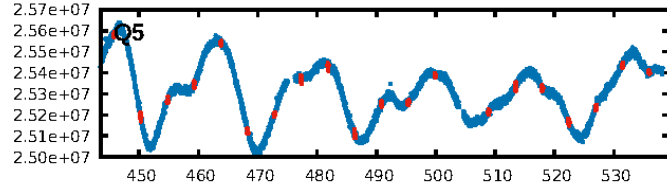
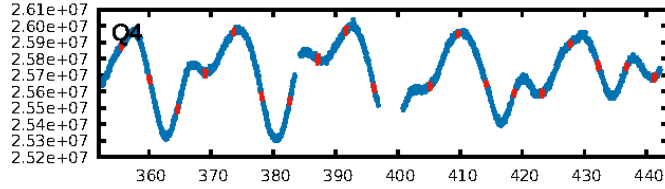
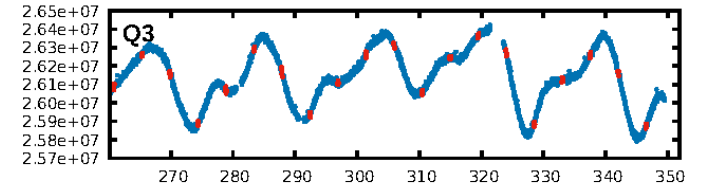
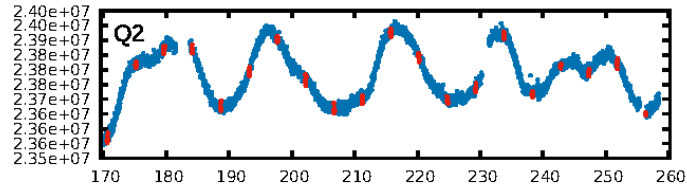
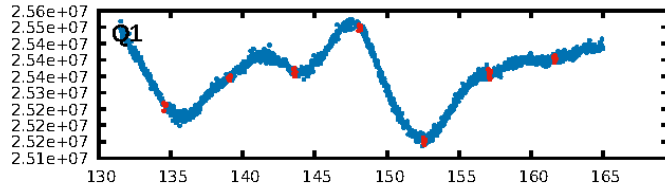
## DV Fit Results:

Period = 4.51005 [0.00001] d  
Epoch = 134.5690 [0.0017] BKJD  
Rp/R\* = 0.0186 [0.0057]  
a/R\* = 7.59 [9.52]  
b = 0.89 [0.29]  
Seff = 302.28 [74.56]  
Teff = 1063 [66] K  
Rp = 2.10 [0.70] Re  
a = 0.0511 [0.0073] AU  
Ag = 11.17 [8.43] [1.21σ]  
Teffp = 3005 [539] K [3.57σ]

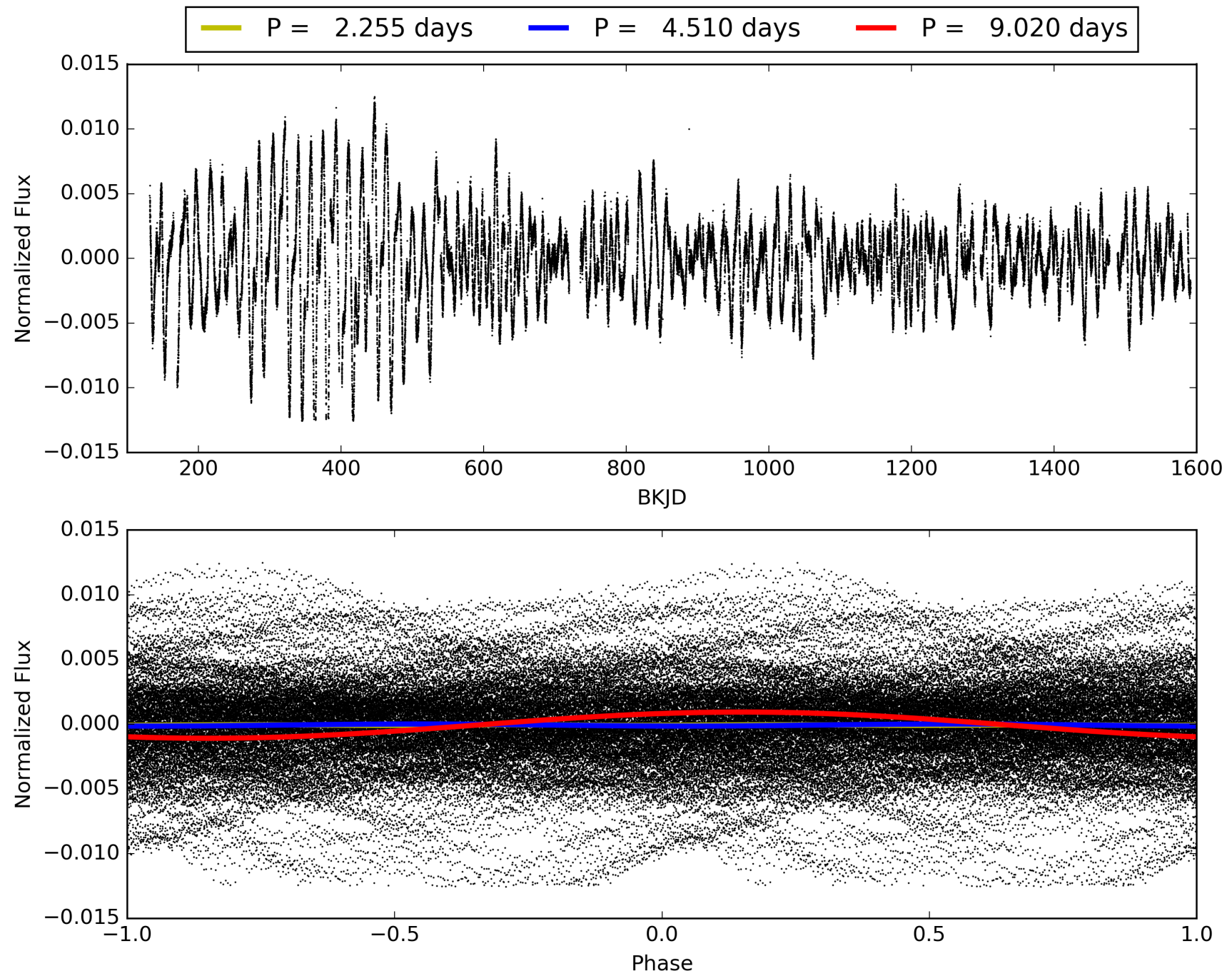
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 2.27e-79  
RollingBand-fgt: 1.00 [286/286]  
GhostDiagnostic-chr: 1.137  
Centroid-sig: 0.0%  
Centroid-so: 1.462 arcsec [2.63σ]  
OotOffset-rm: 0.391 arcsec [1.57σ]  
KicOffset-rm: 0.512 arcsec [1.98σ]  
OotOffset-st: 4/4/4/4 [16]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 0.94 [15/16]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 009415108-01, PDC Light Curves

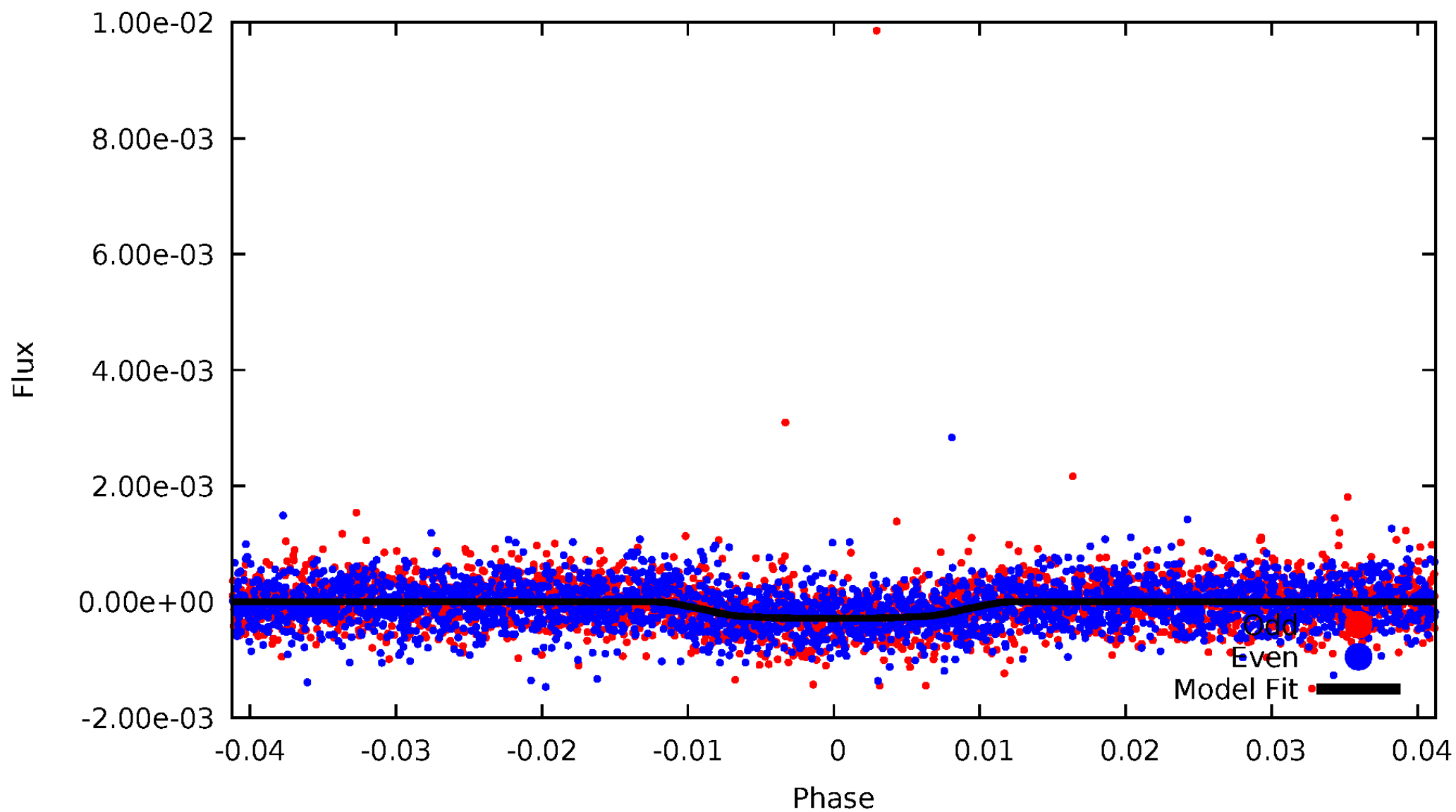


TCE 009415108-01



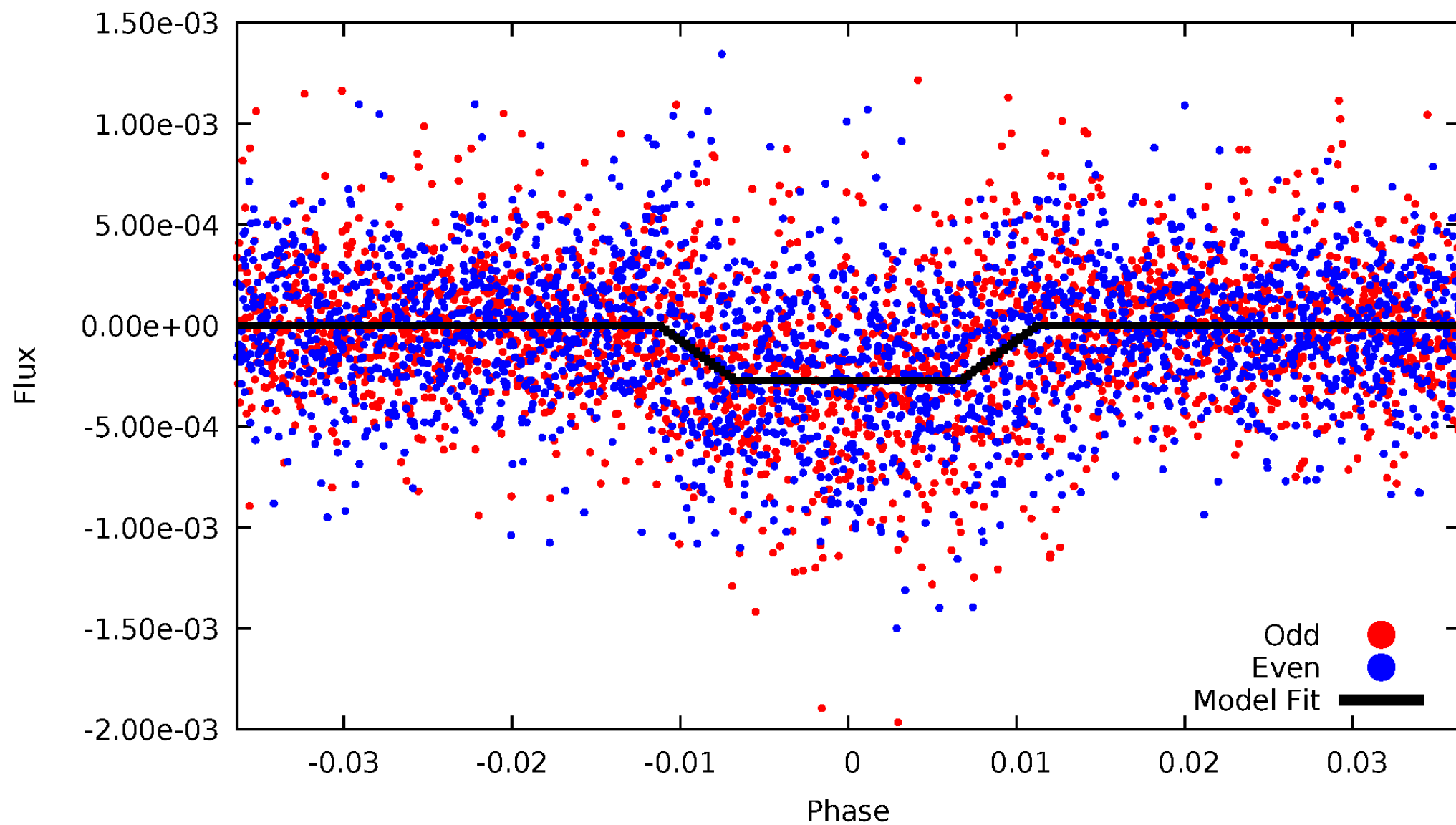
# DV Odd/Even

TCE 009415108-01



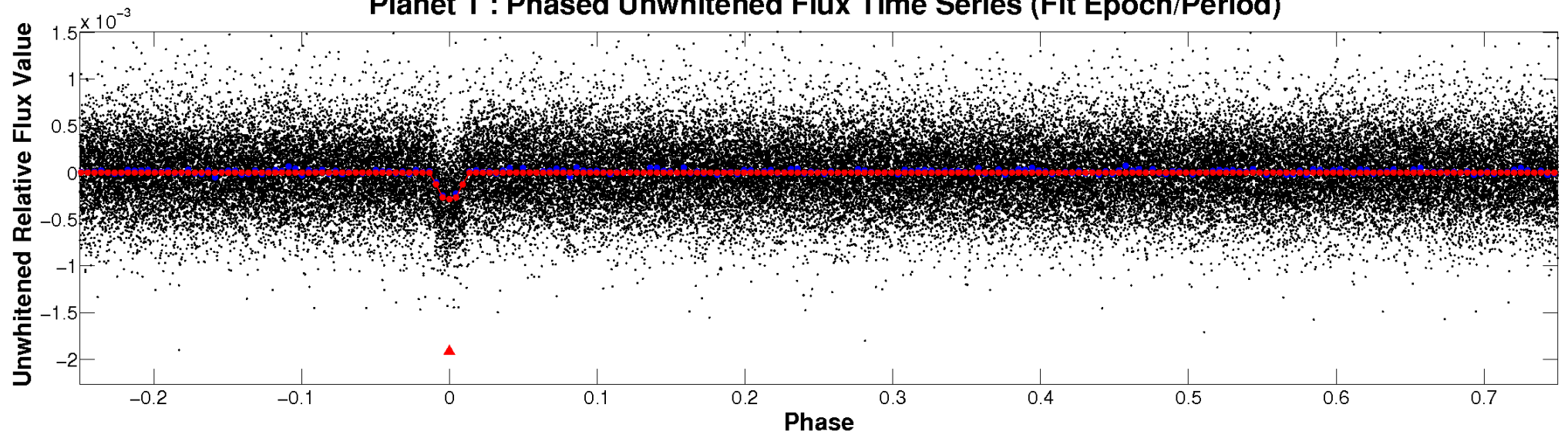
# ALT Odd/Even

TCE 009415108-01

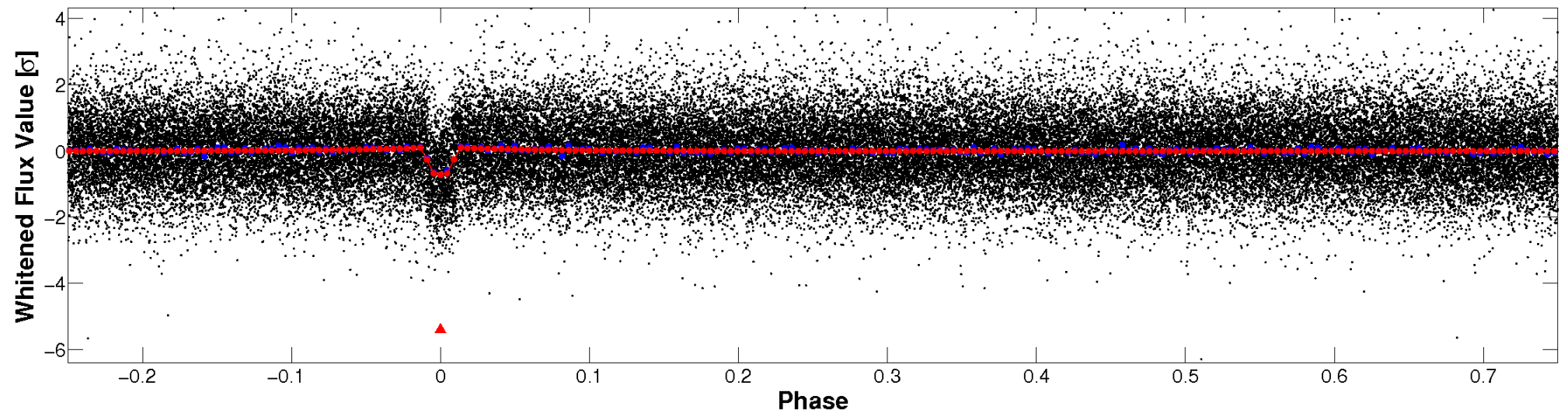


# Non-Whitened Vs. Whitened Light Curve

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

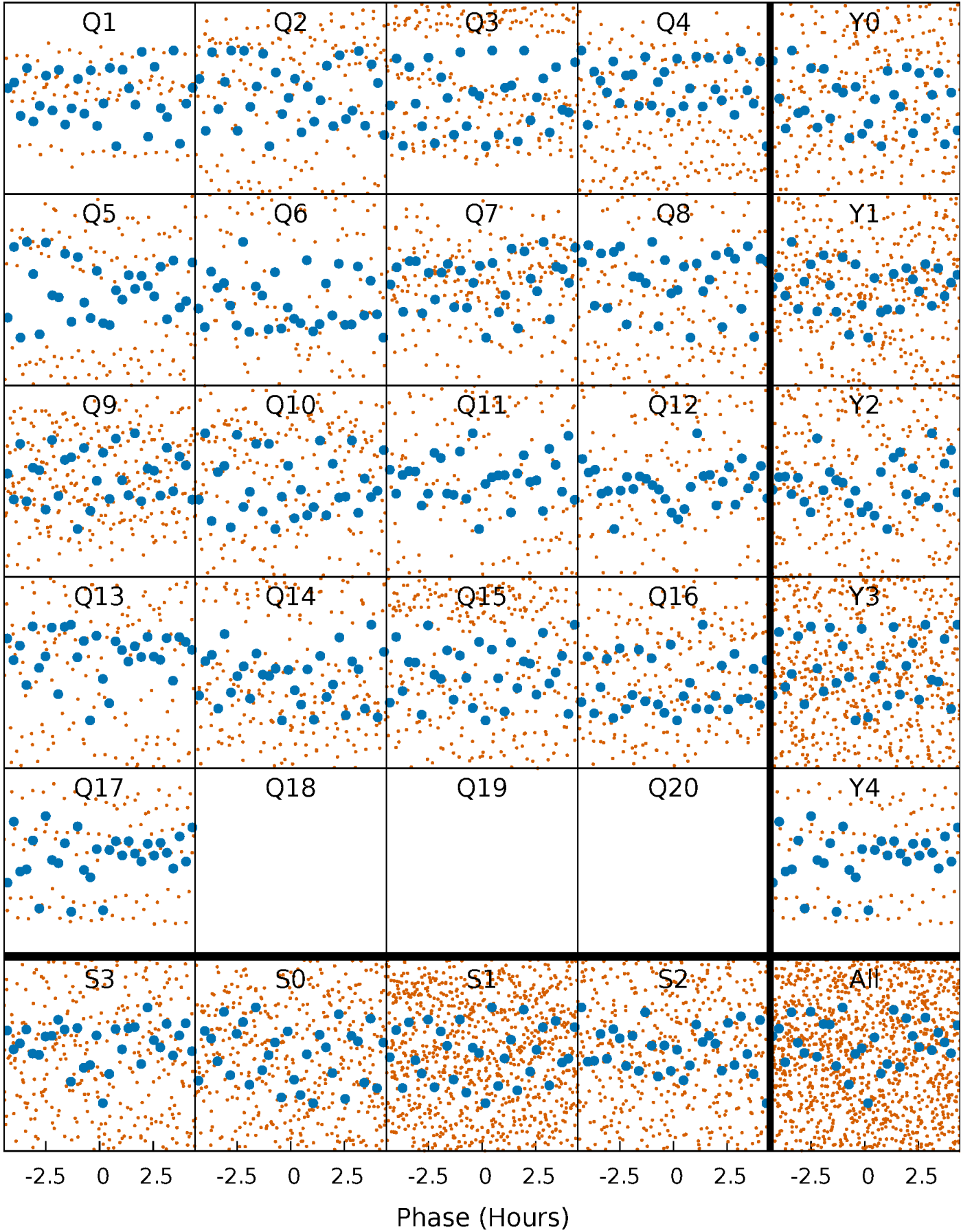


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



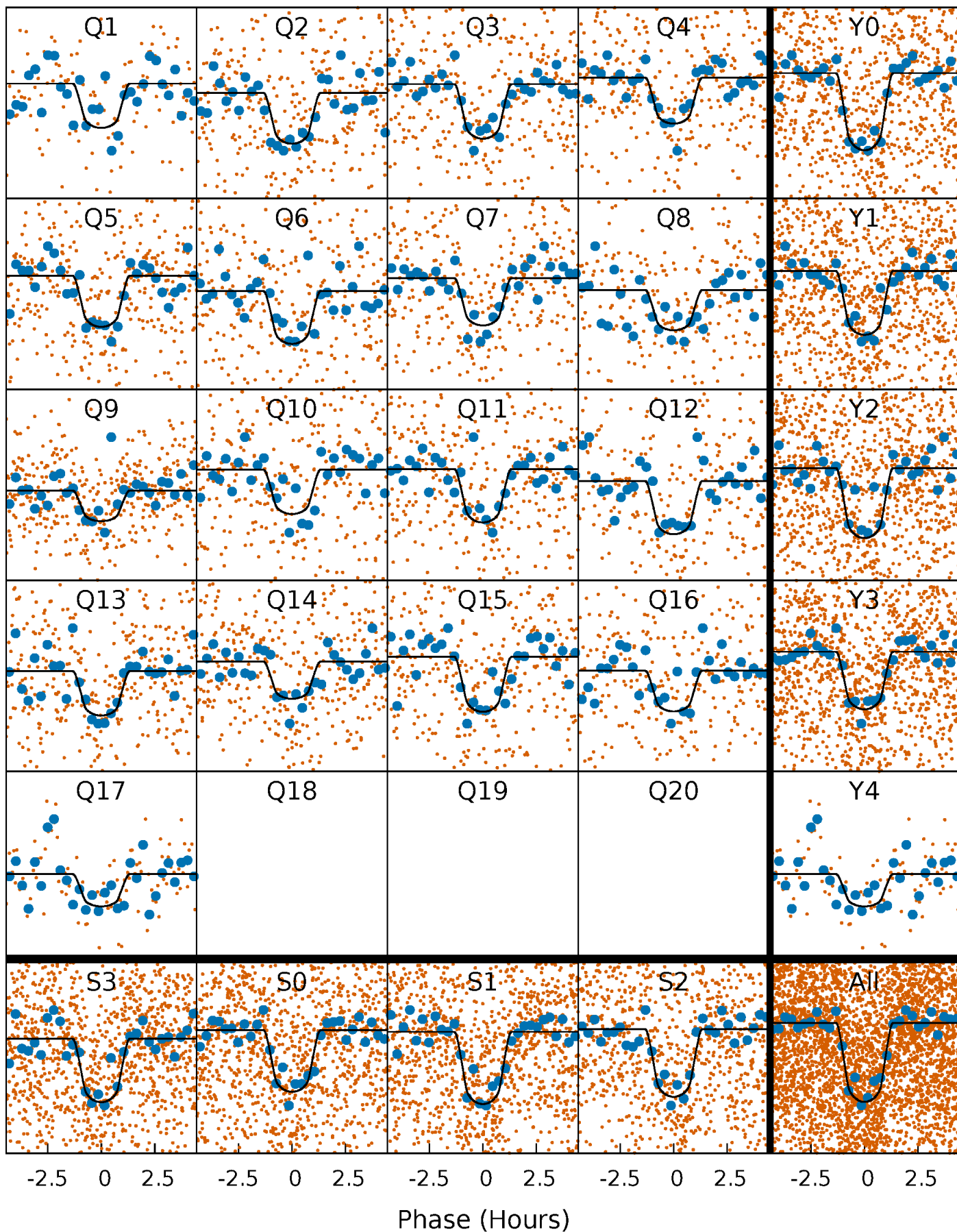
# PDC Quarter-Phased Transit Curves

TCE 009415108-01   P= 4.510046 Days    $T_0=134.568963$  (BKJD)



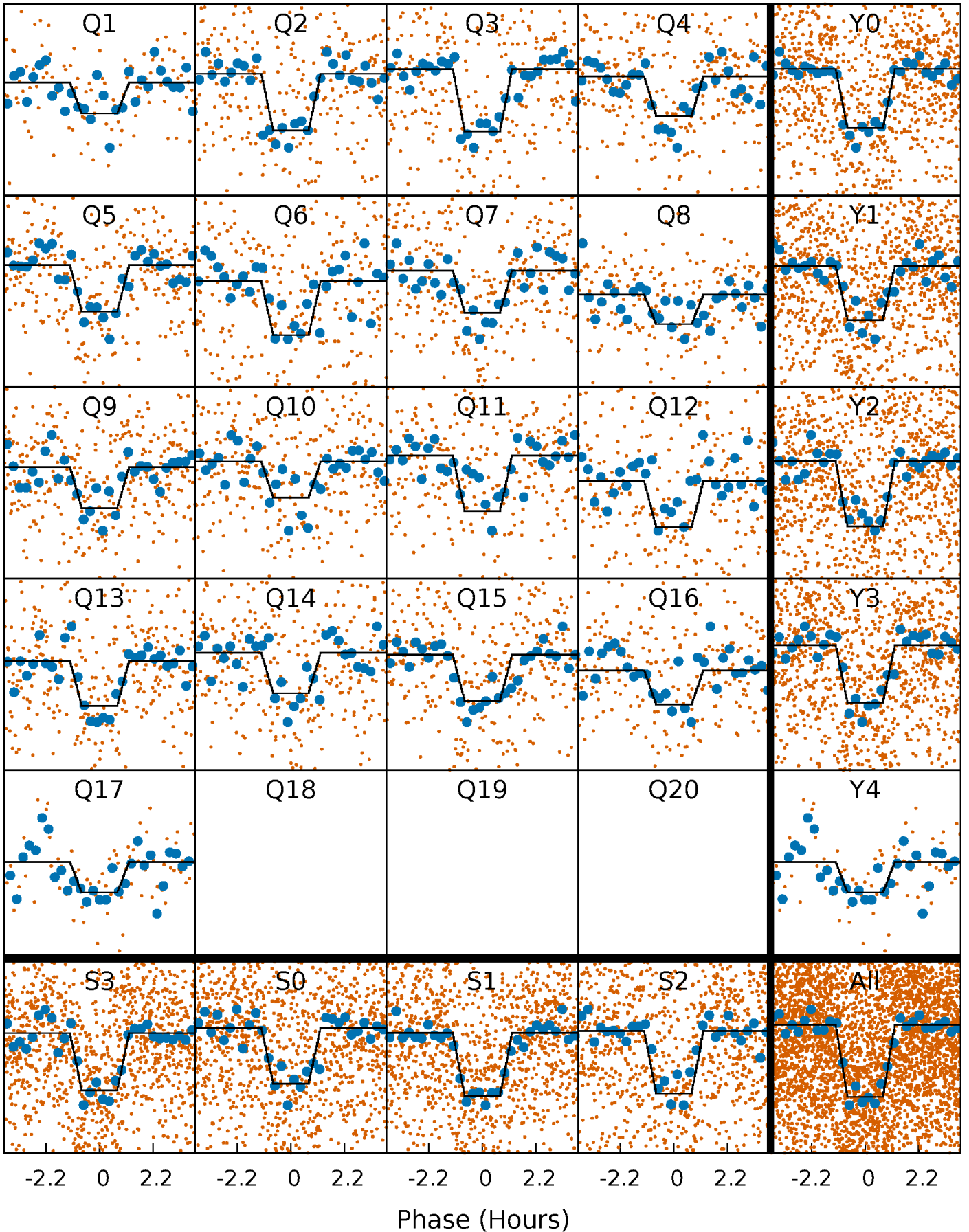
# DV Quarter-Phased Transit Curves

TCE 009415108-01 P= 4.510046 Days  $T_0=134.568963$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

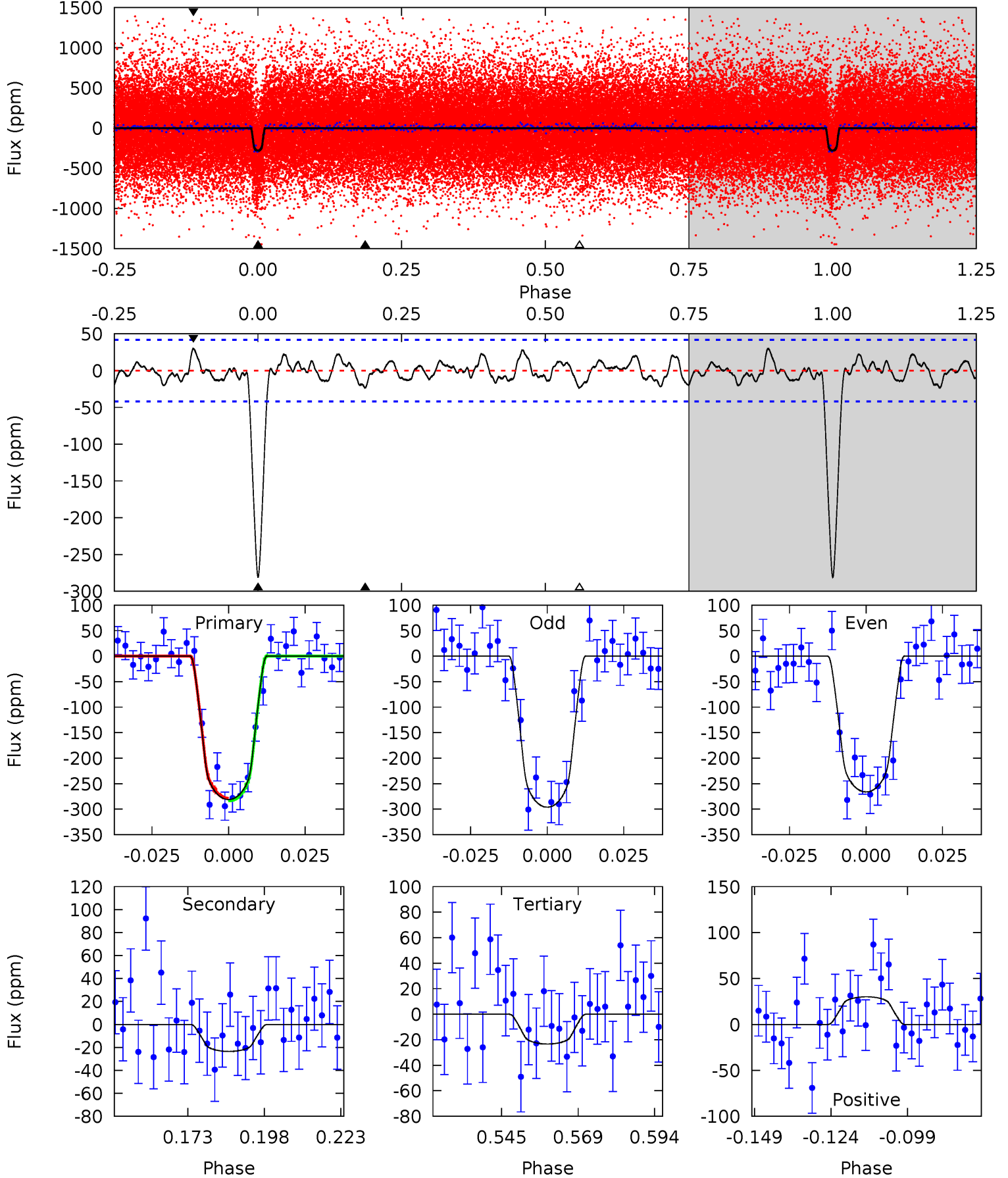
TCE 009415108-01 P= 4.510038 Days  $T_0=134.571214$  (BKJD)



# DV Model-Shift Uniqueness Test

009415108-01, P = 4.510046 Days, E = 130.058917 Days

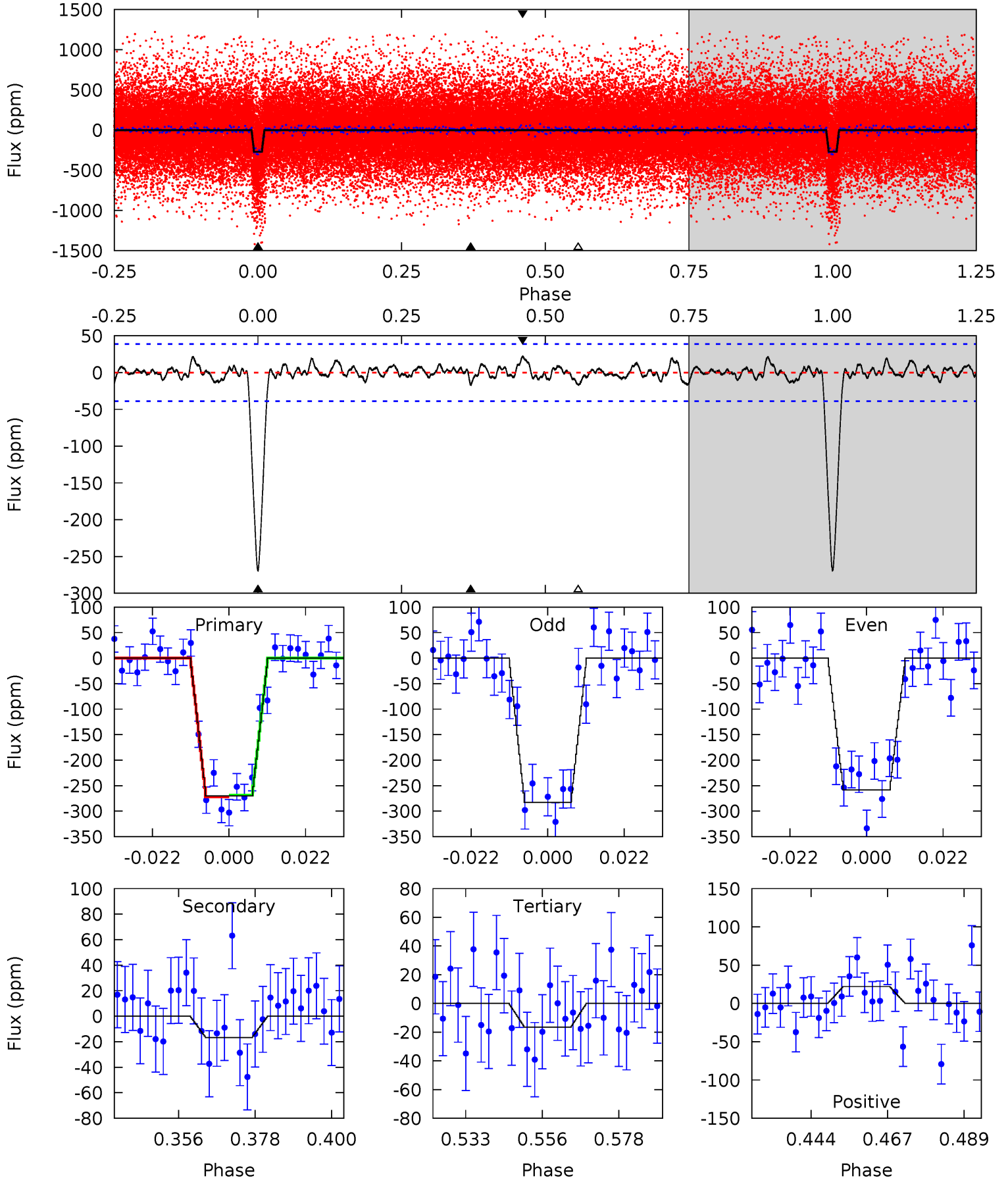
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
32.6	2.73	2.71	3.49	4.85	2.25	1.26	29.9	29.1	0.02	-0.76	1.73	0.92	0.10	0.30



# Alt Model-Shift Uniqueness Test

009415108-01, P = 4.510038 Days, E = 130.061176 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
33.8	2.09	2.07	2.77	4.87	2.29	0.88	31.7	31.0	0.03	-0.67	1.53	1.01	0.08	0.22



### Stellar Parameters For KIC 009415108

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5362^{+80}_{-72}$	$4.352^{+0.144}_{-0.108}$	$0.160^{+0.150}_{-0.100}$	$1.032^{+0.142}_{-0.142}$	$0.873^{+0.064}_{-0.032}$	$1.119^{+0.665}_{-0.354}$
	+1%/-1%	+3%/-2%	+94%/-62%	+14%/-14%	+7%/-4%	+59%/-32%
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 009415108-01 / KOI 2121.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-24 \pm 9$	$2.06^{+0.70}_{-0.62}$	$1482^{+66}_{-69}$	$3249^{+445}_{-327}$	$7.591^{+9.998}_{-3.820}$
Alt.	$-17 \pm 8$	$1.89^{+0.68}_{-0.66}$	$1480^{+68}_{-62}$	$3184^{+537}_{-372}$	$6.710^{+10.927}_{-3.797}$

$T_{max}$  = 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

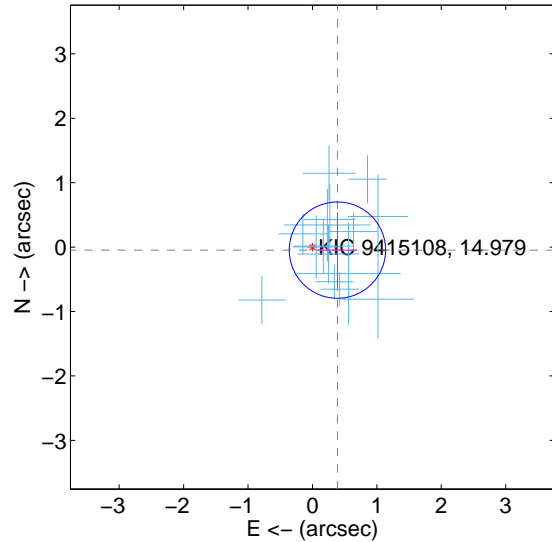
Supplemental centroid analysis for 009415108-01. Kepler magnitude: 14.98. Transit SNR 21.97

There are 15 quarters with good PRF difference image offsets

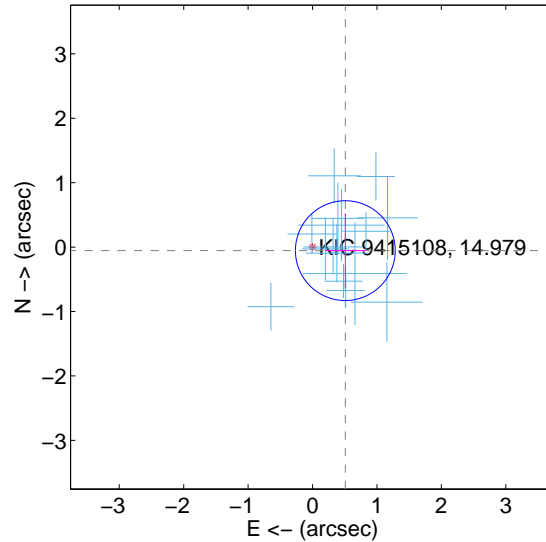
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.391 \pm 0.249$	1.57	$-0.388 \pm 0.313$	$-0.047 \pm 0.584$
PRF-fit source offset from KIC position	$0.512 \pm 0.258$	1.98	$-0.509 \pm 0.315$	$-0.055 \pm 0.582$
photometric centroid source offset	$1.46 \pm 0.56$	2.63	$-0.09 \pm 0.49$	$-1.46 \pm 0.56$

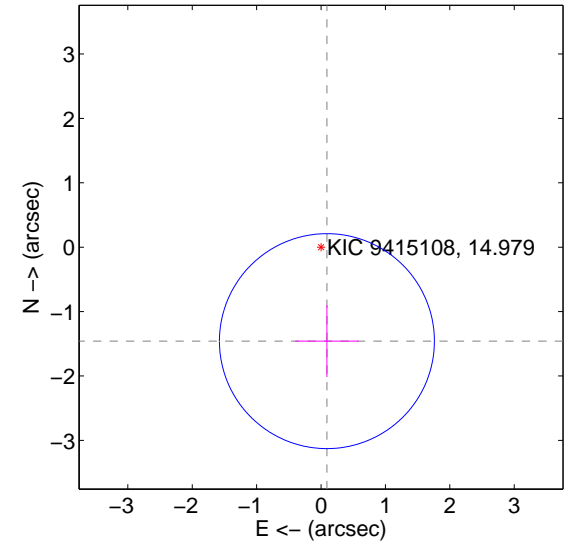
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

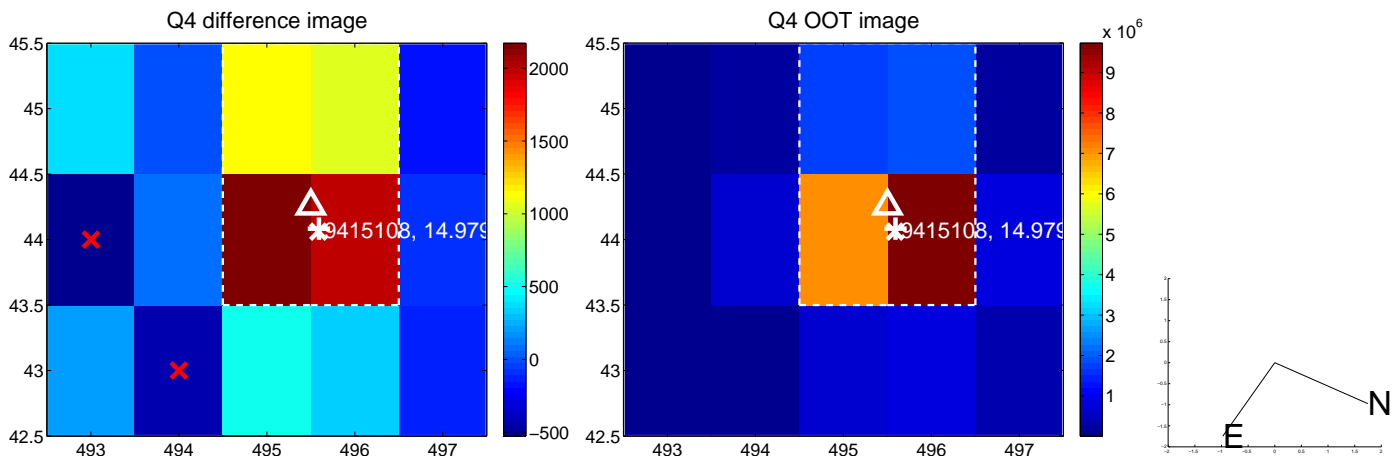
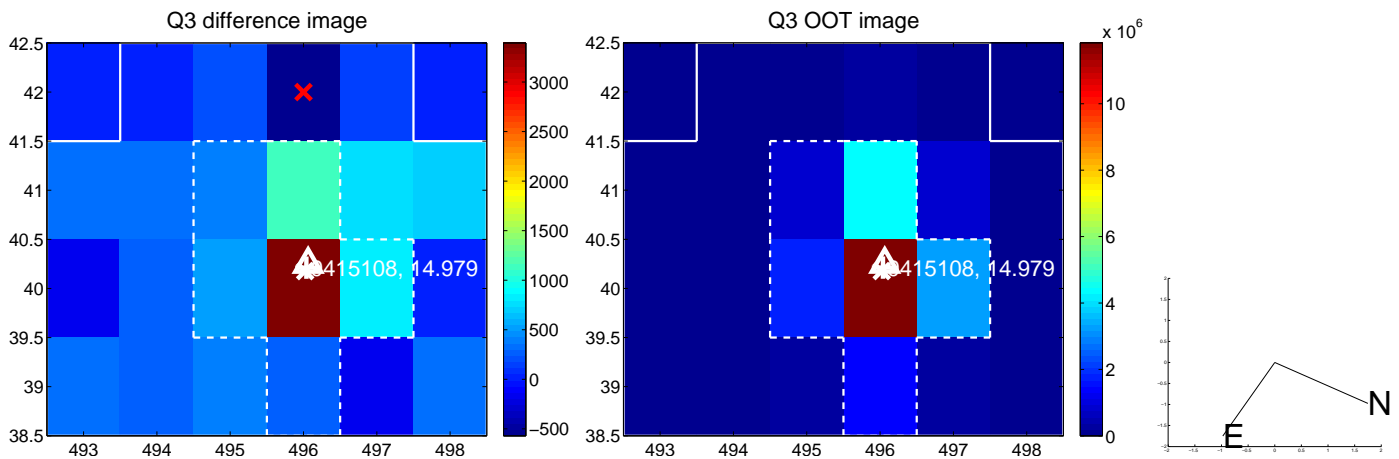
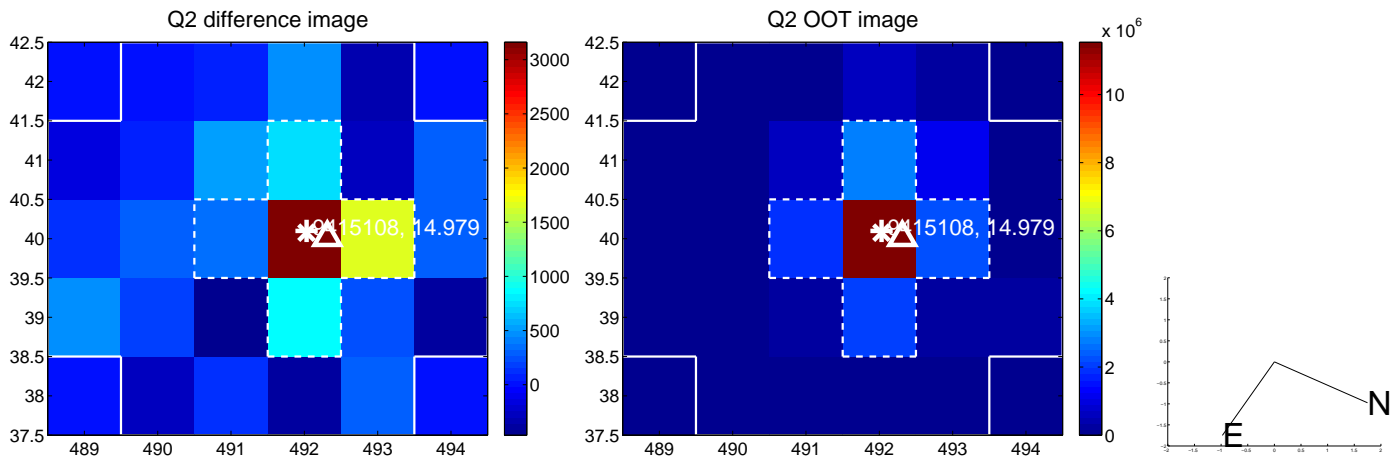
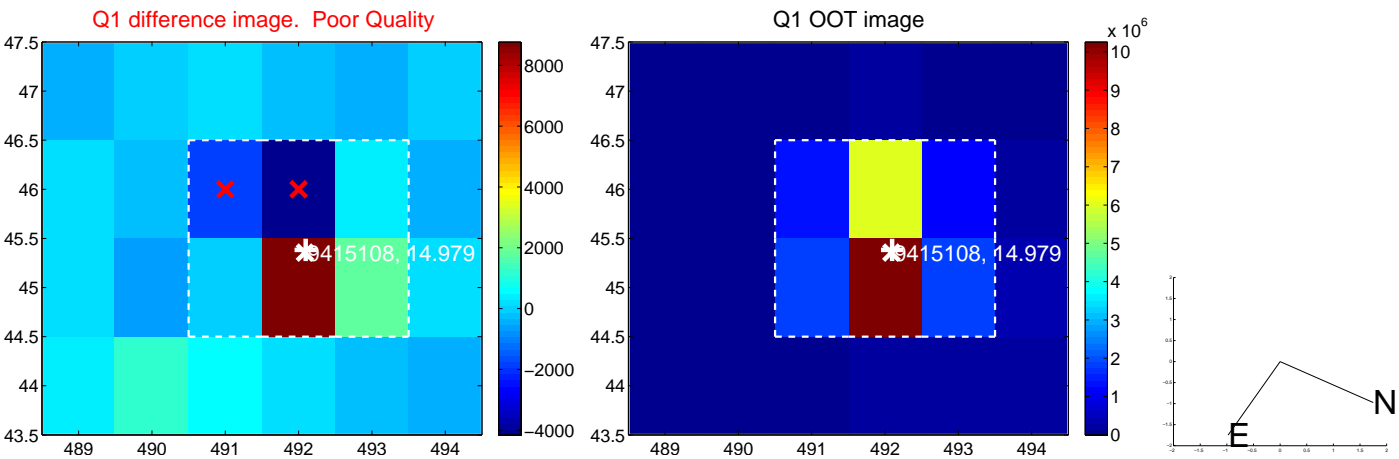


offset from photometric centroids

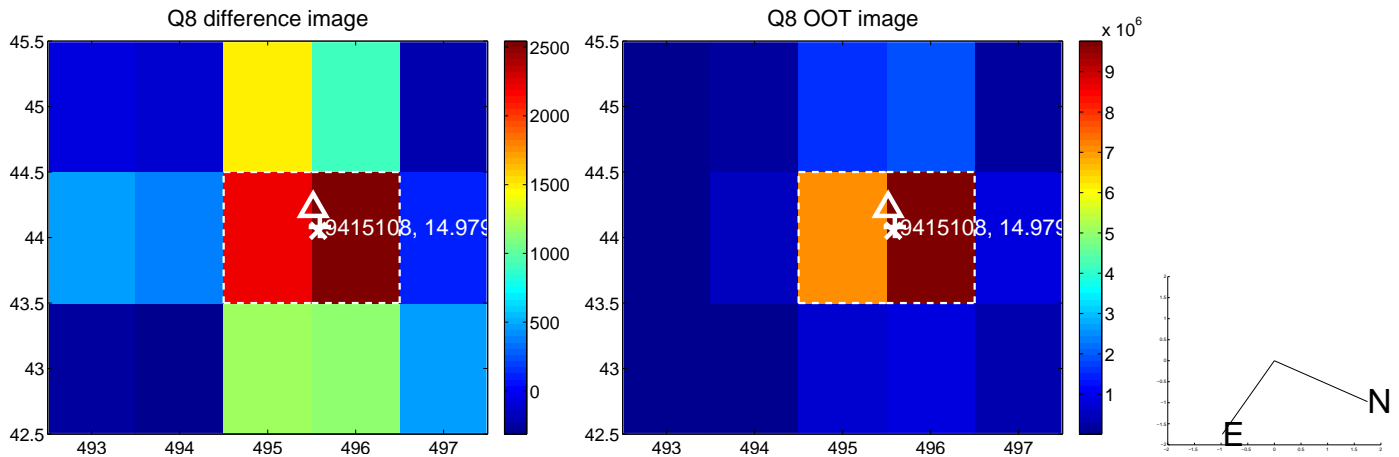
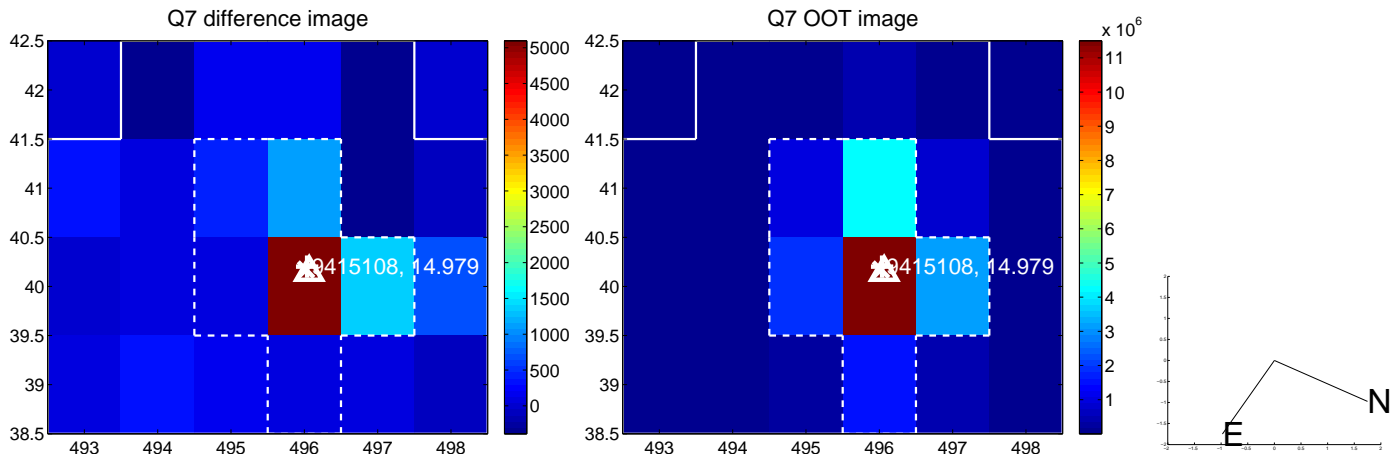
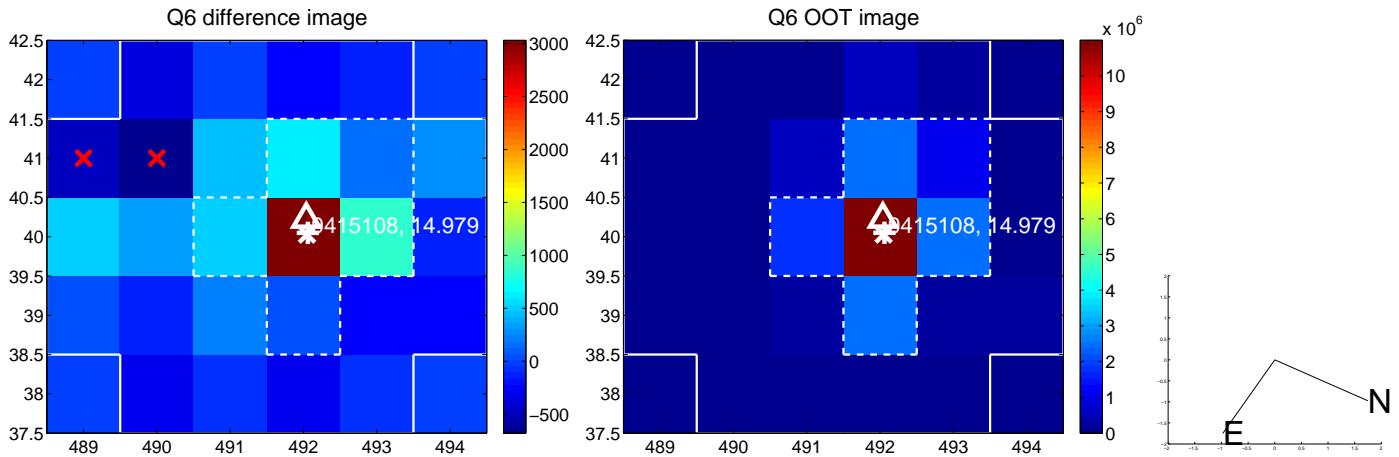
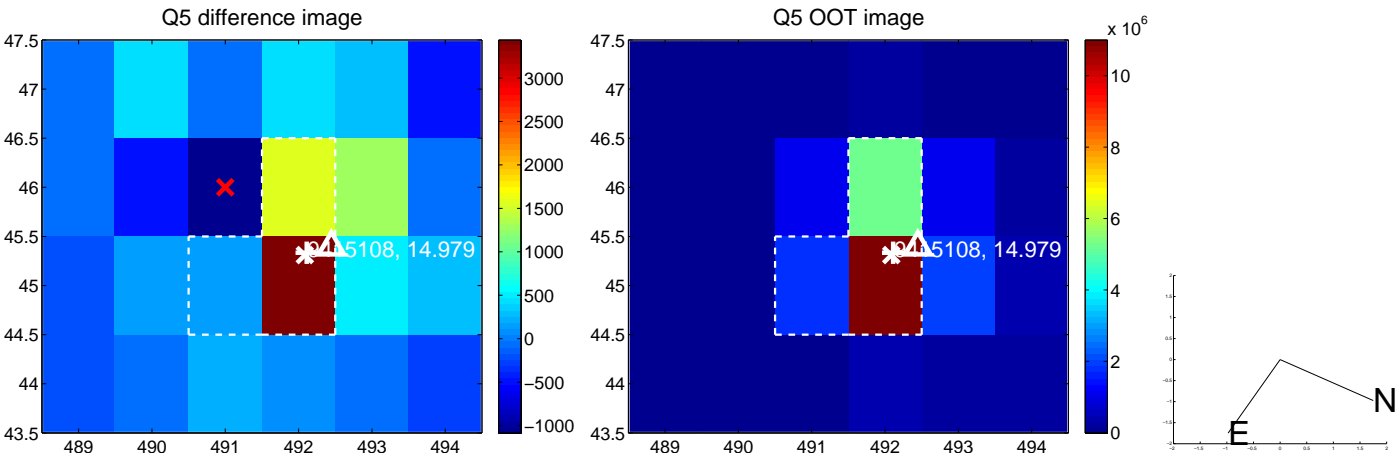


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

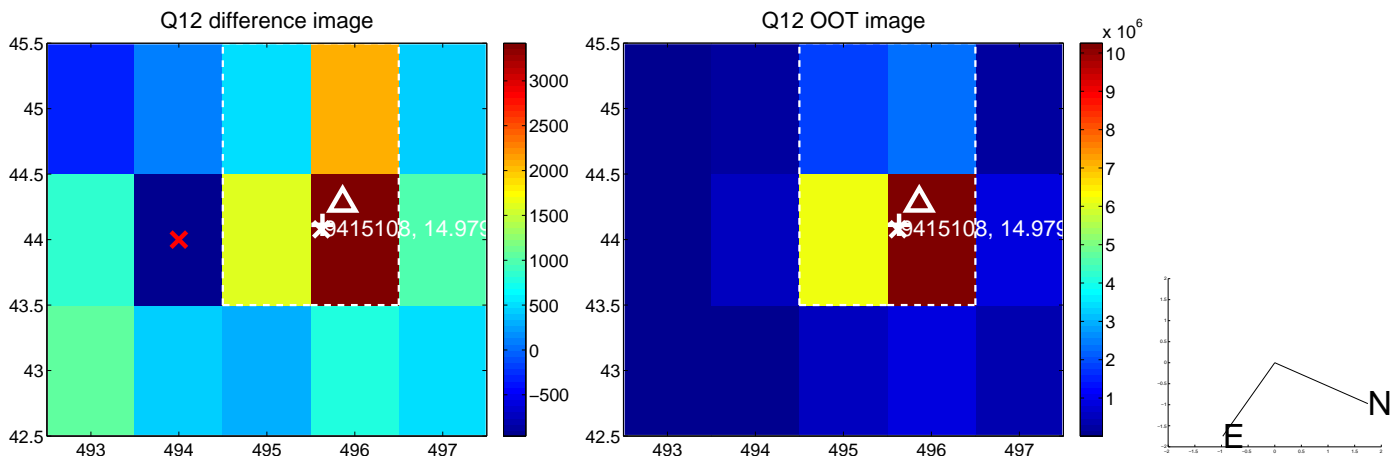
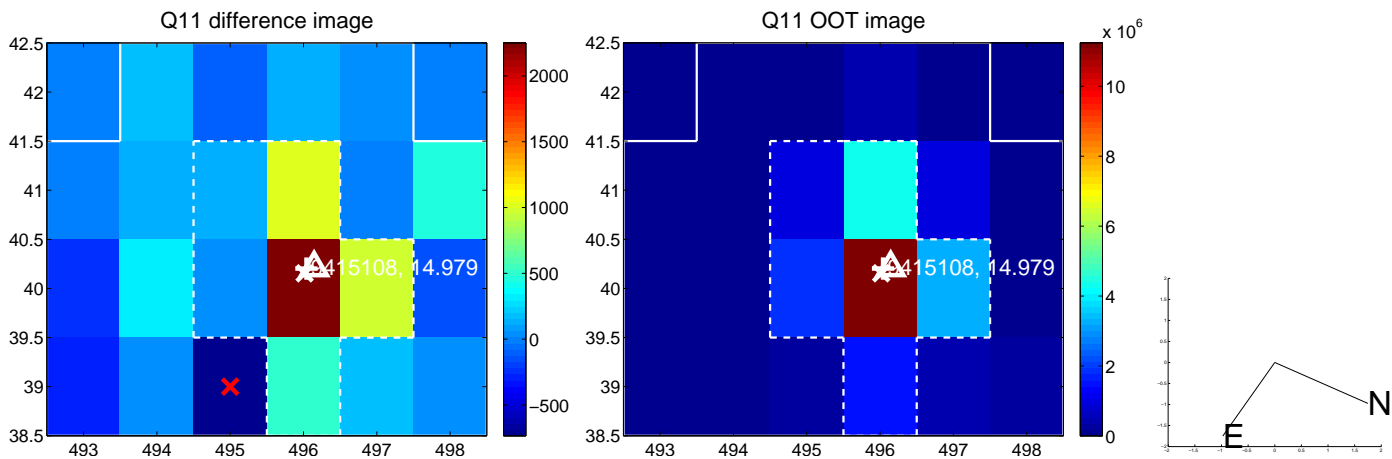
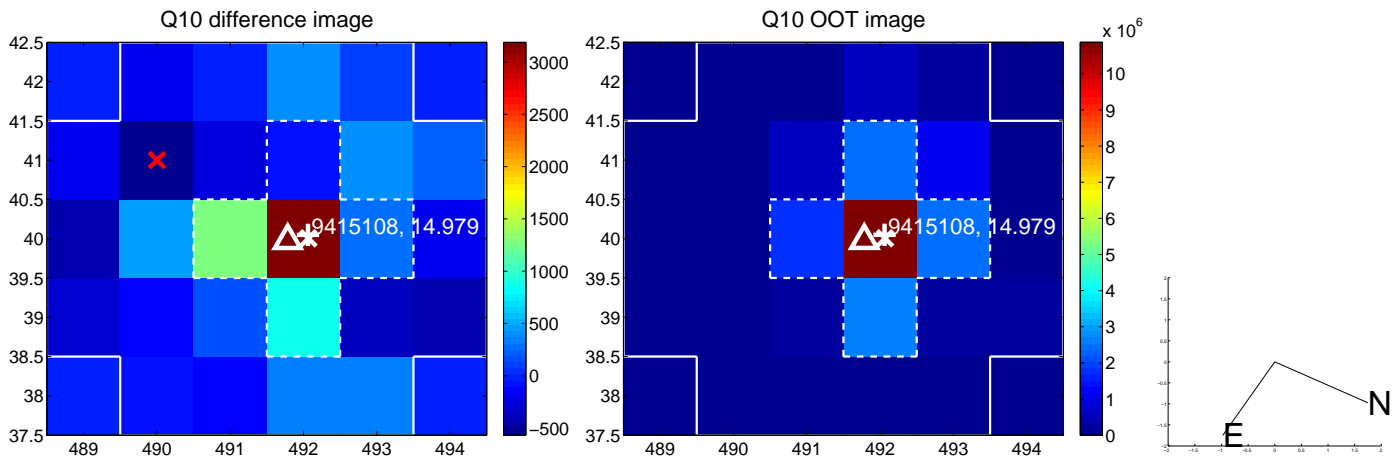
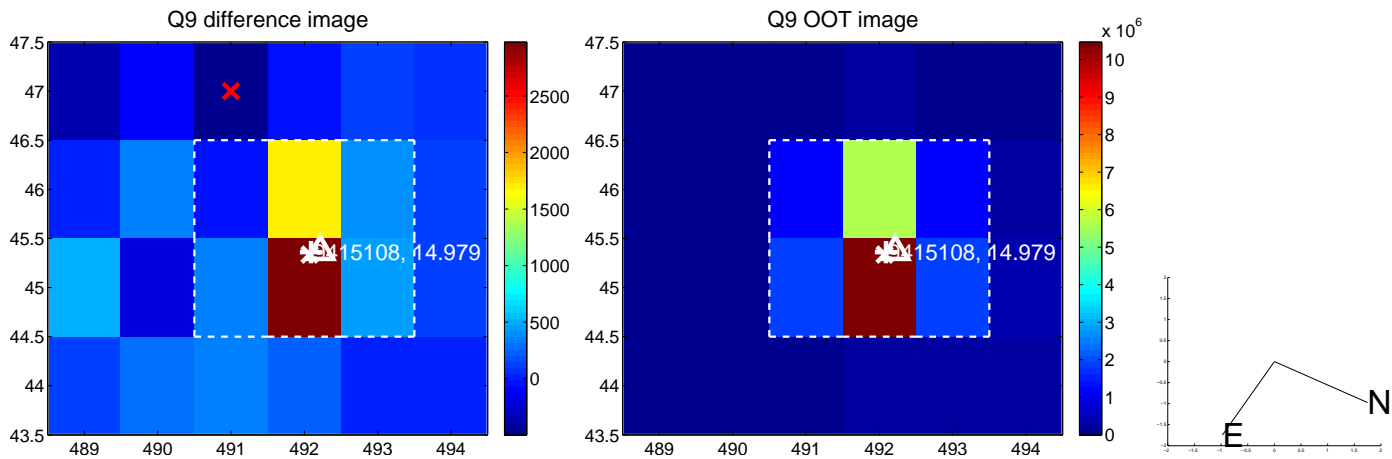
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



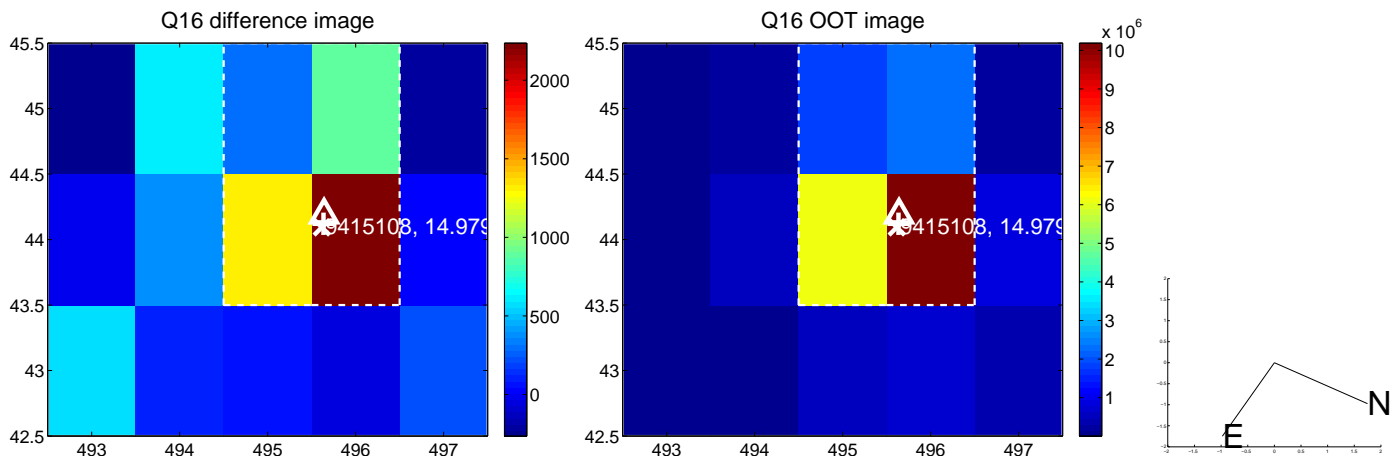
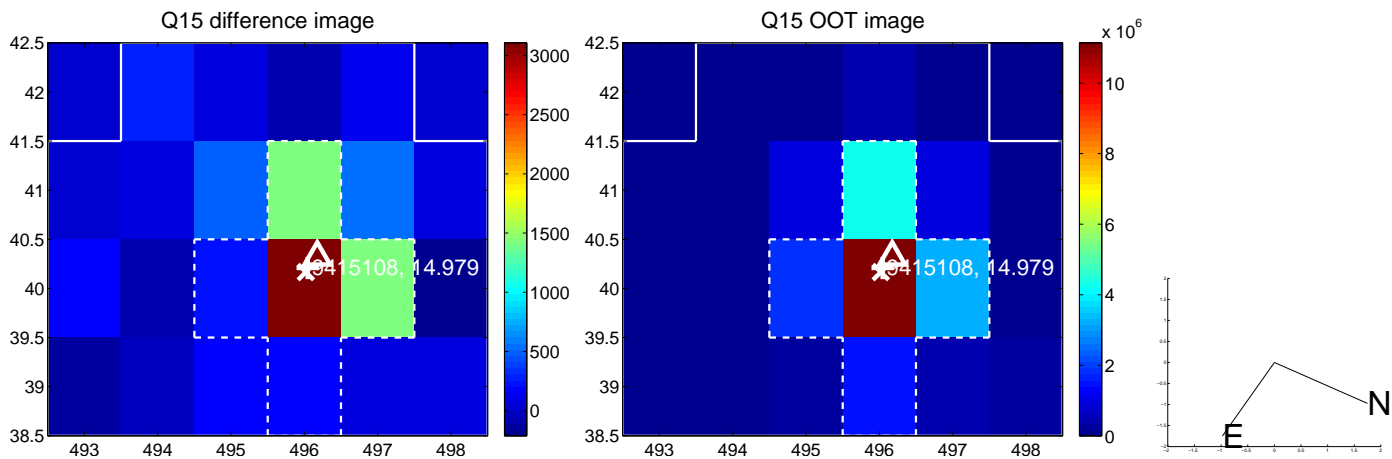
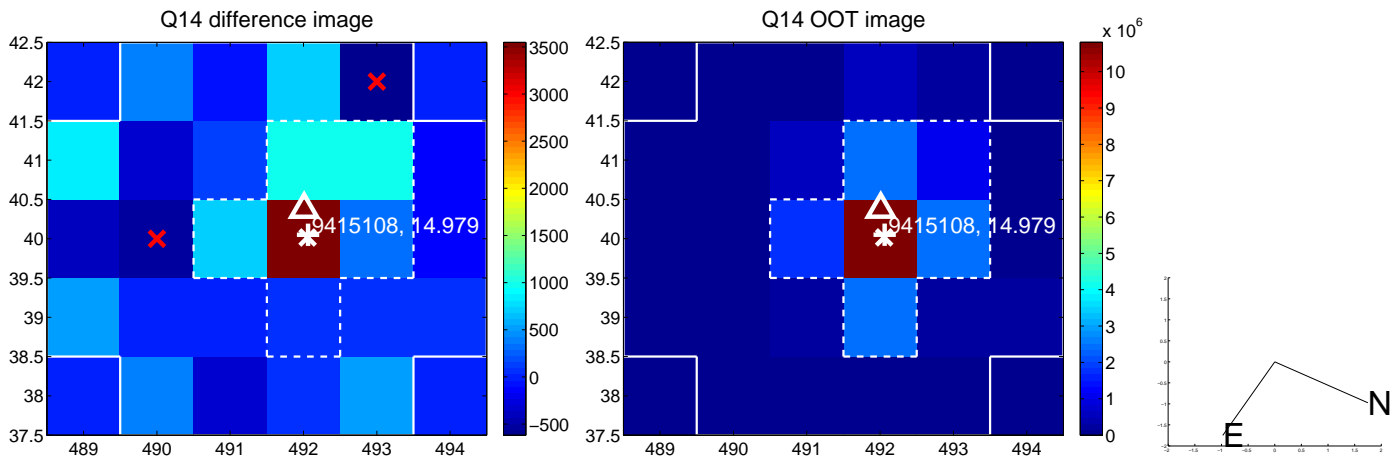
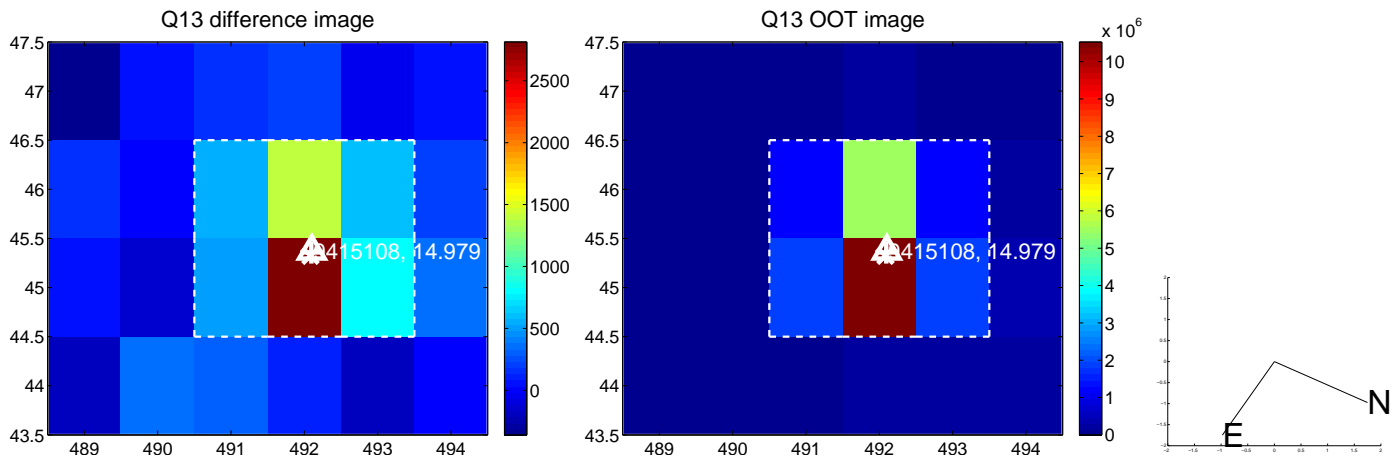
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



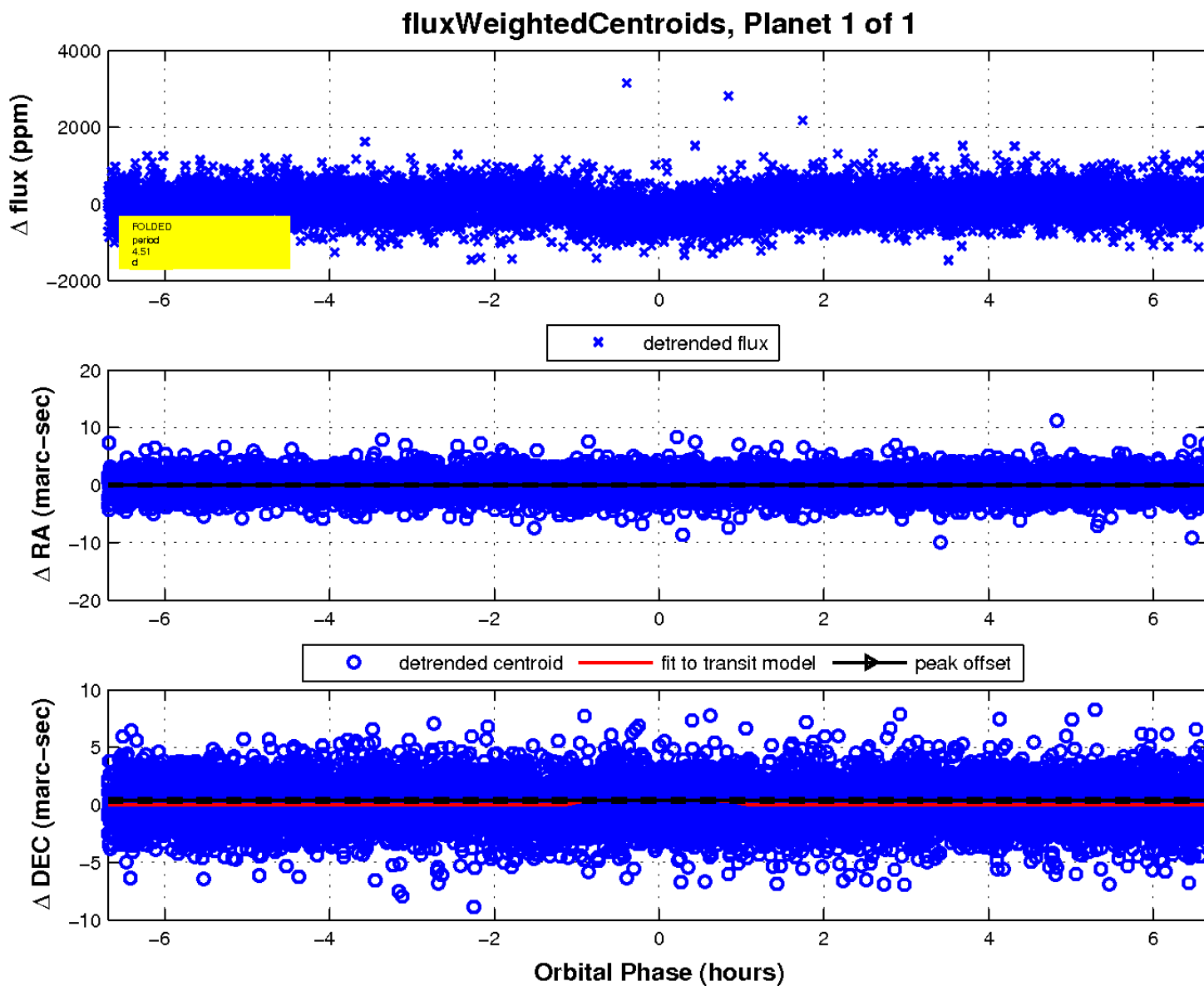
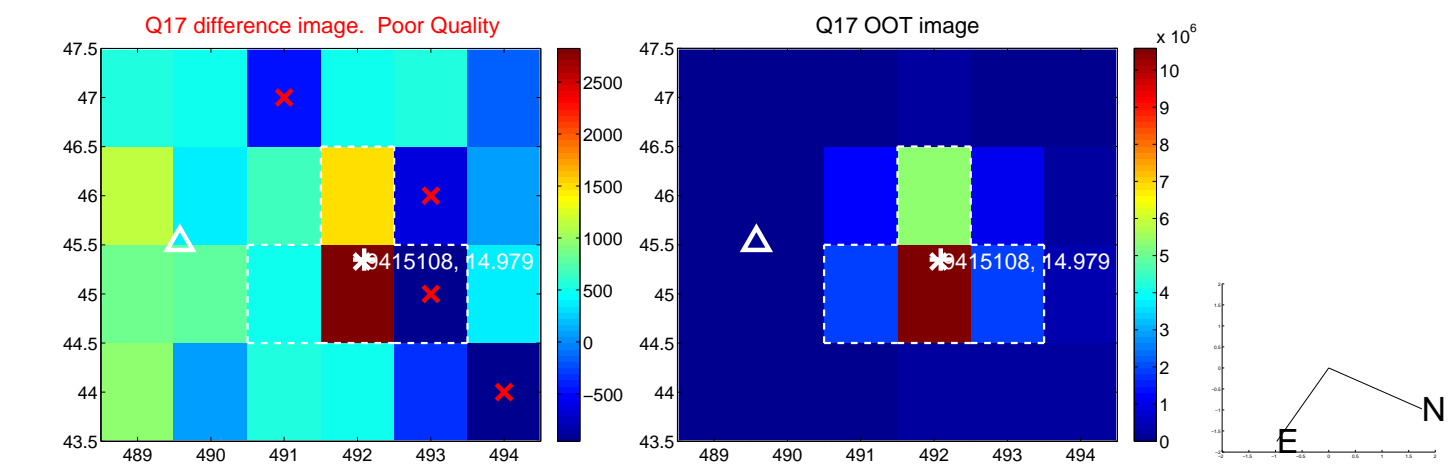
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.



UKIRT Image

Declination

