

# KIC 009532052

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009532052-01	OBS	2115.01	15.725837	133.989272	1348.7	3.932	29.7	31.5	0.76	5332	2.92	31.16

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009532052-01	OBS	PC	1.00	0	0	0	0	CENT_KIC_POS

**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.

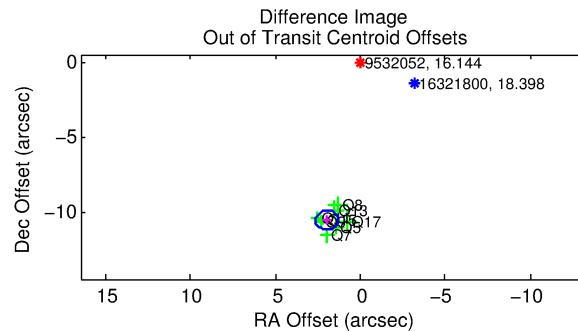
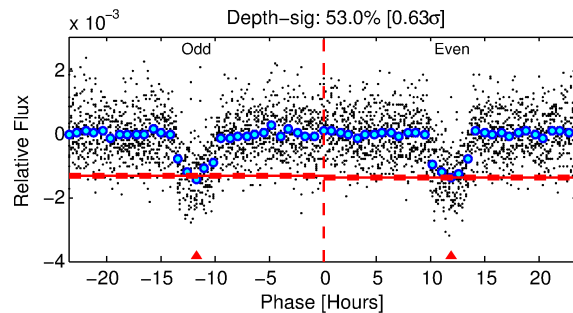
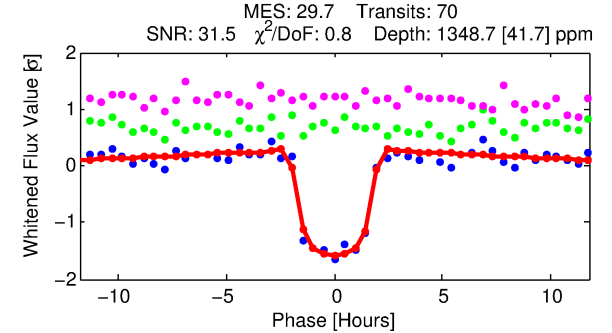
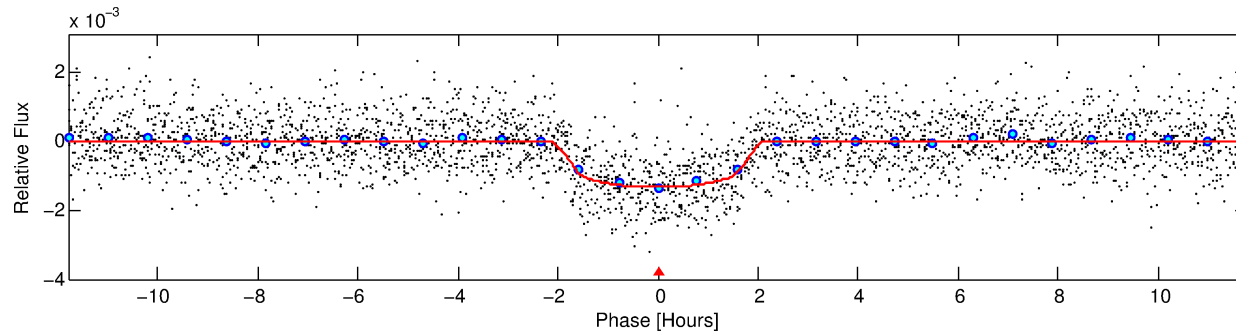
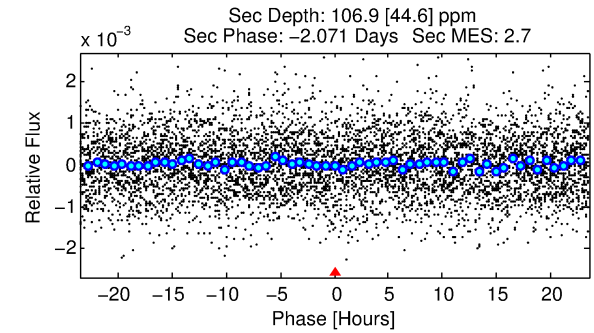
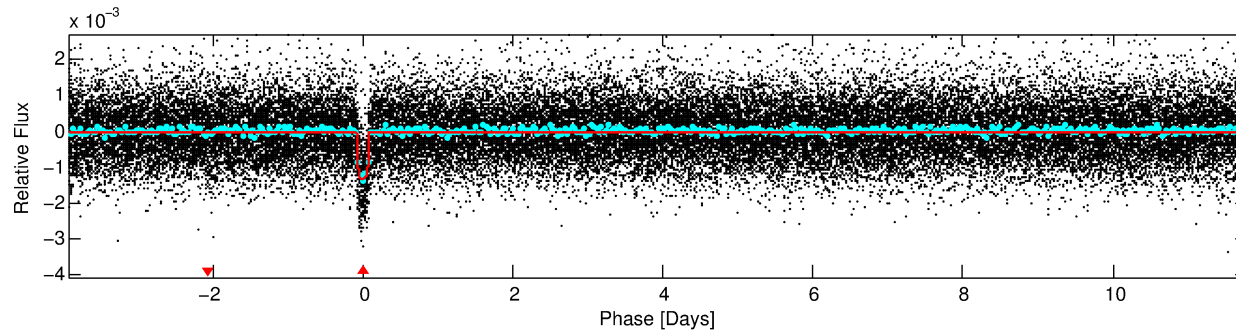
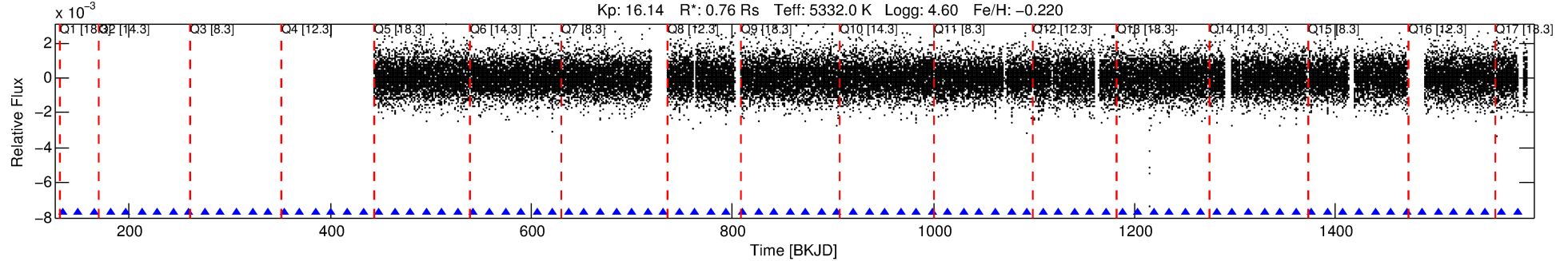
## Ephemeris Match Information For 009532052-01

No Significant Match Found

# DV One-Page Summary

KIC: 9532052 Candidate: 1 of 1 Period: 15.726 d  
KOI: K02115.01 Name: Kepler-67b Corr: 0.987

Kp: 16.14 R\*: 0.76 Rs Teff: 5332.0 K Logg: 4.60 Fe/H: -0.220



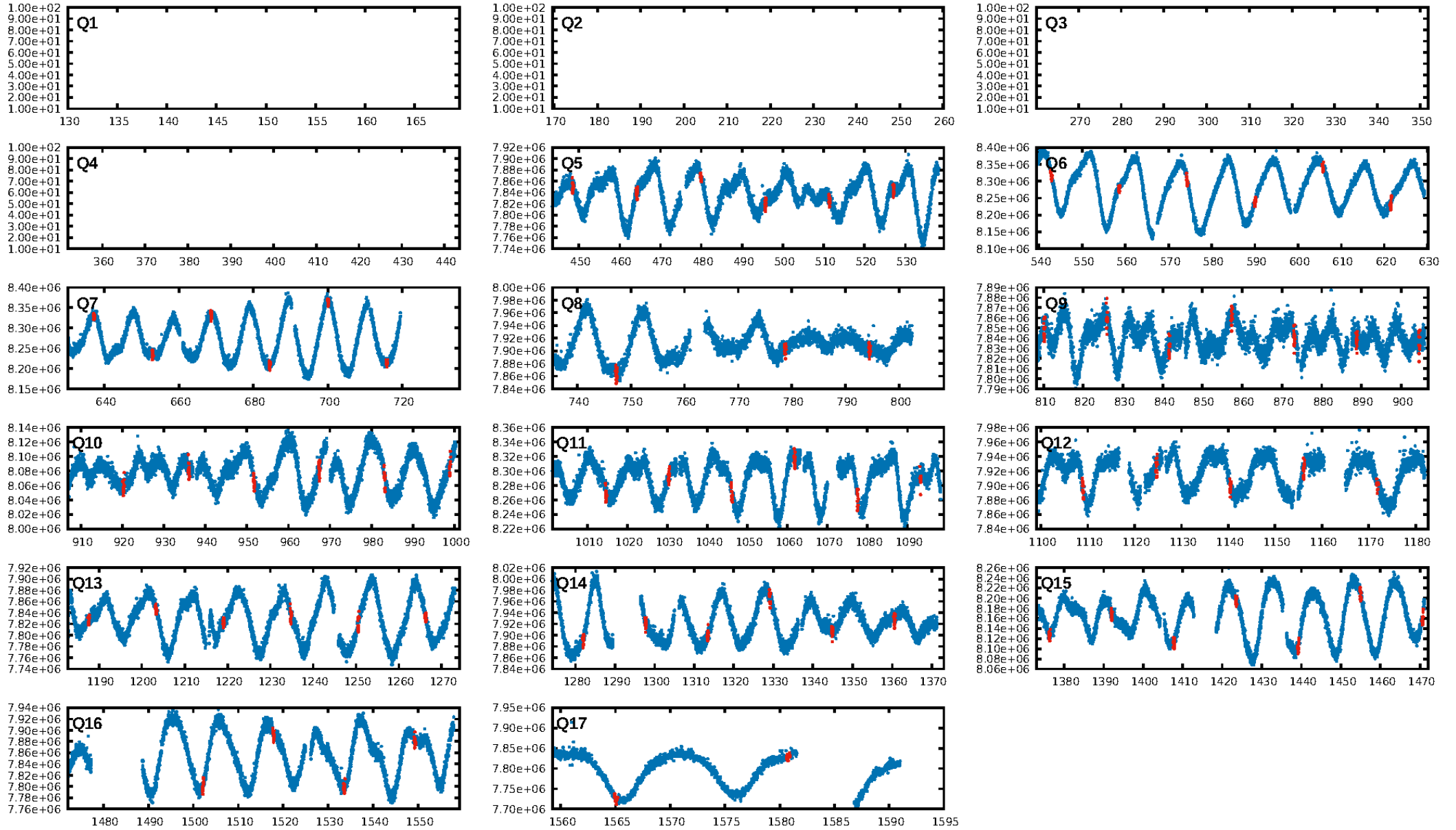
## DV Fit Results:

Period = 15.72584 [0.00006] d  
Epoch = 133.9893 [0.0034] BKJD  
Rp/R\* = 0.0354 [0.0105]  
a/R\* = 24.54 [28.28]  
b = 0.65 [1.03]  
Seff = 31.16 [4.83]  
Teff = 5332 [23] K  
Rp = 2.92 [0.91] Re  
a = 0.1151 [0.0098] AU  
Ag = 91.56 [67.70] [1.34σ]  
Teffp = 2881 [527] K [4.32σ]

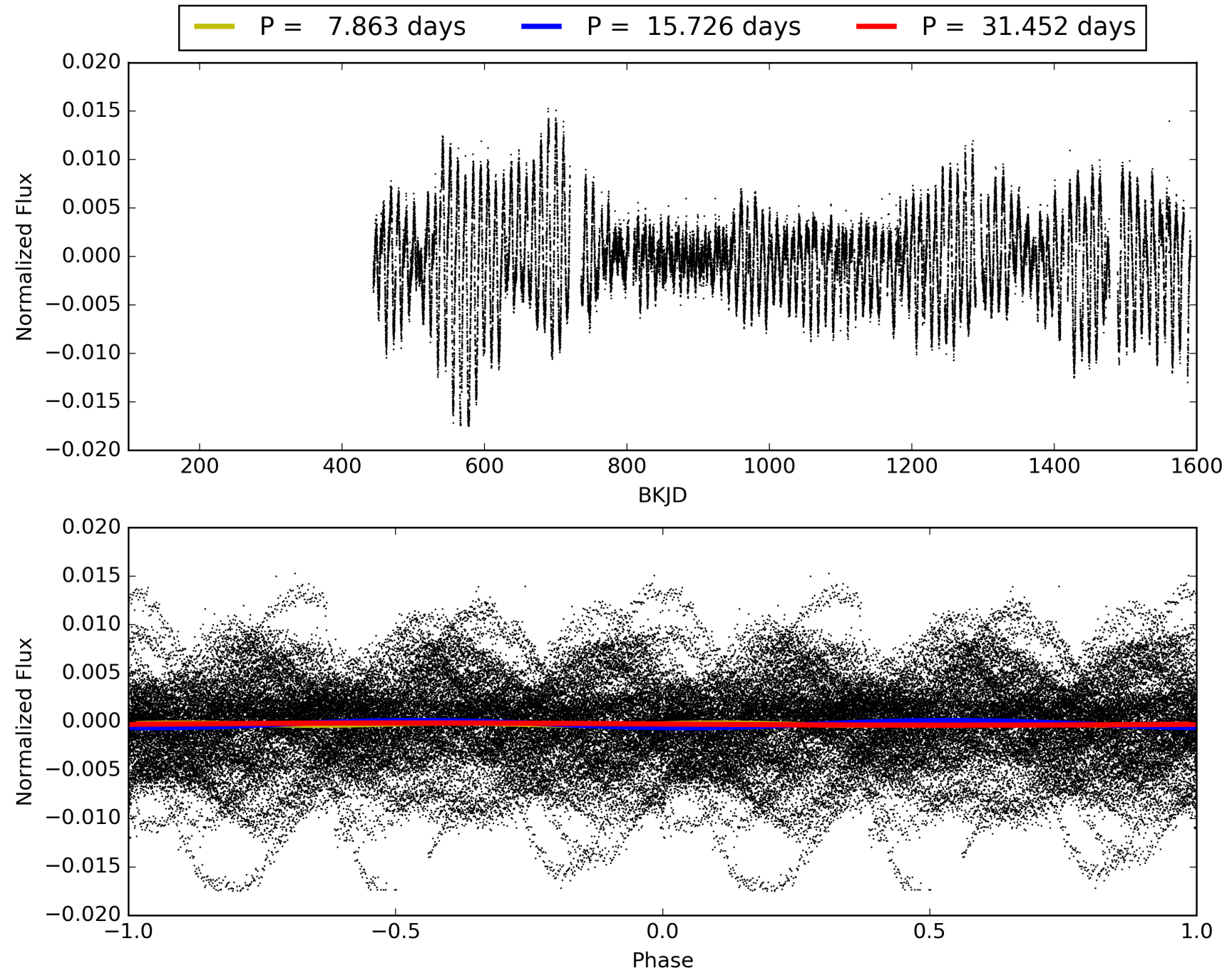
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 84.9%  
ModelChiSquareGoF-sig: 100.0%  
Bootstrap-pfa: 2.06e-191  
RollingBand-fgt: 1.00 [68/68]  
GhostDiagnostic-chr: 3.283  
Centroid-sig: 0.2%  
Centroid-so: 2.556 arcsec [8.56σ]  
OotOffset-rm: 10.766 arcsec [49.36σ]  
KicOffset-rm: 0.568 arcsec [4.12σ]  
OotOffset-st: 0/3/1/4 [8]  
KicOffset-st: 3/3/3/4 [13]  
DiffImageQuality-fgm: 1.00 [13/13]  
DiffImageOverlap-fno: 1.00 [13/13]

# TCE 009532052-01, PDC Light Curves

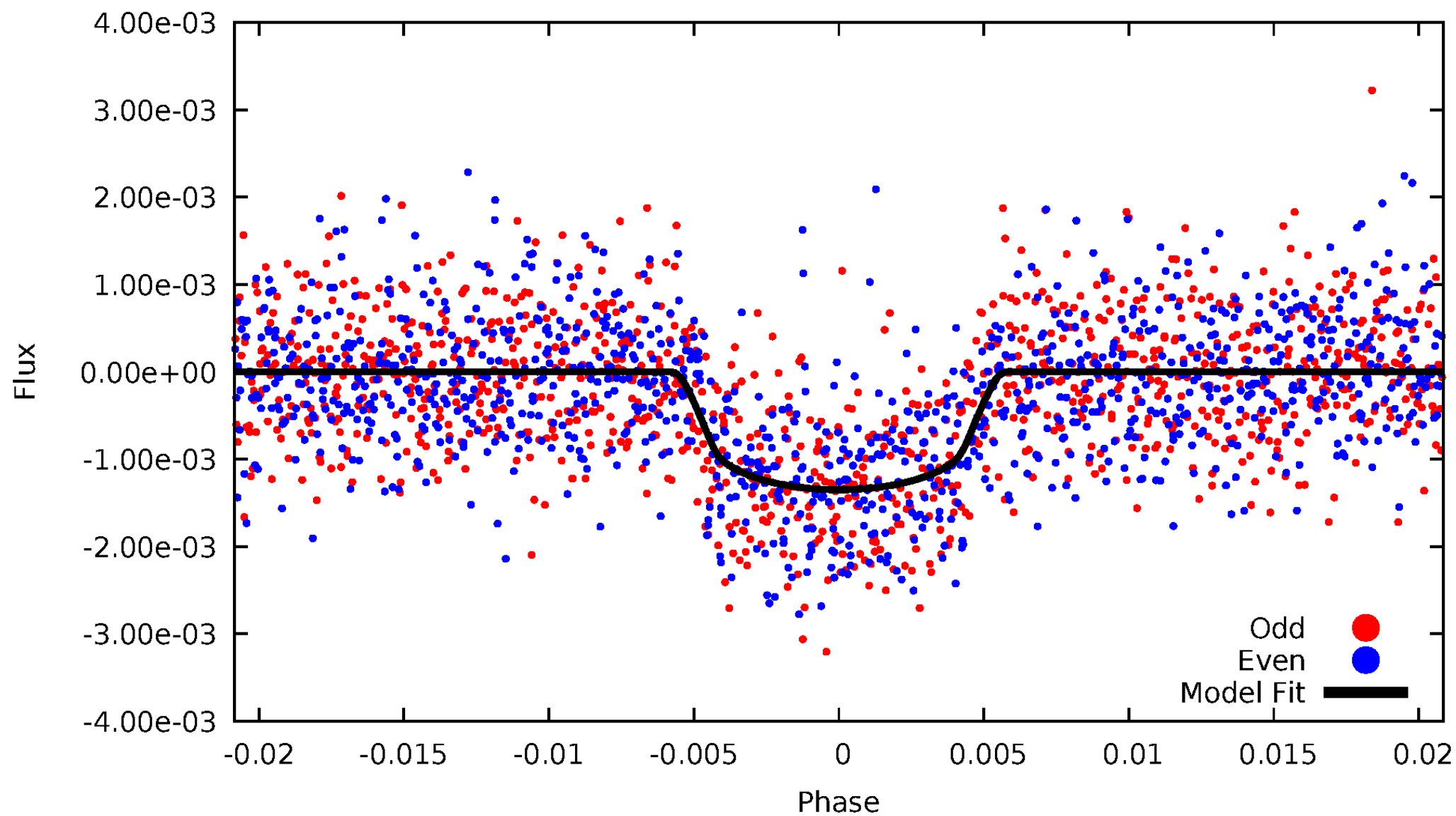


TCE 009532052-01



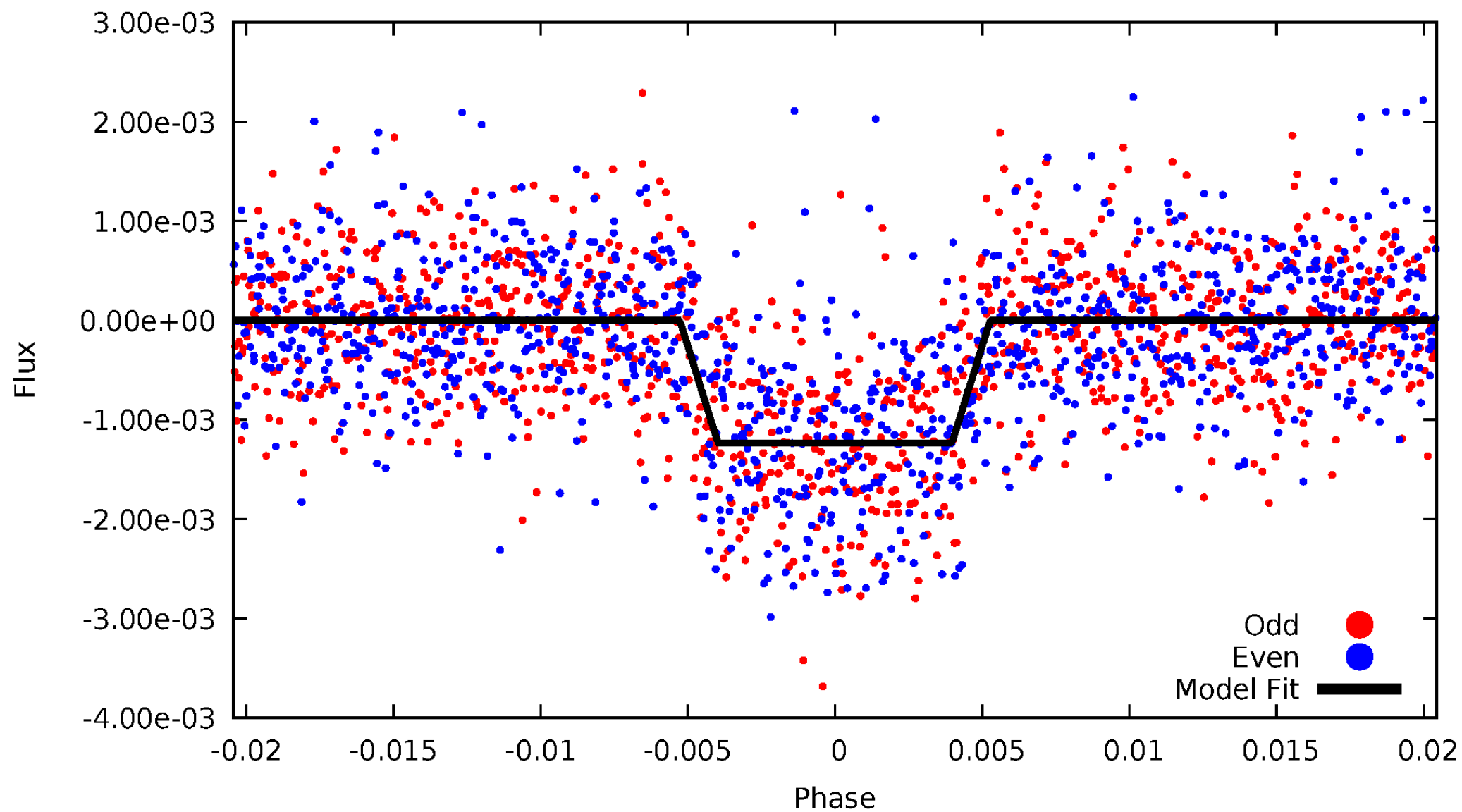
# DV Odd/Even

TCE 009532052-01



# ALT Odd/Even

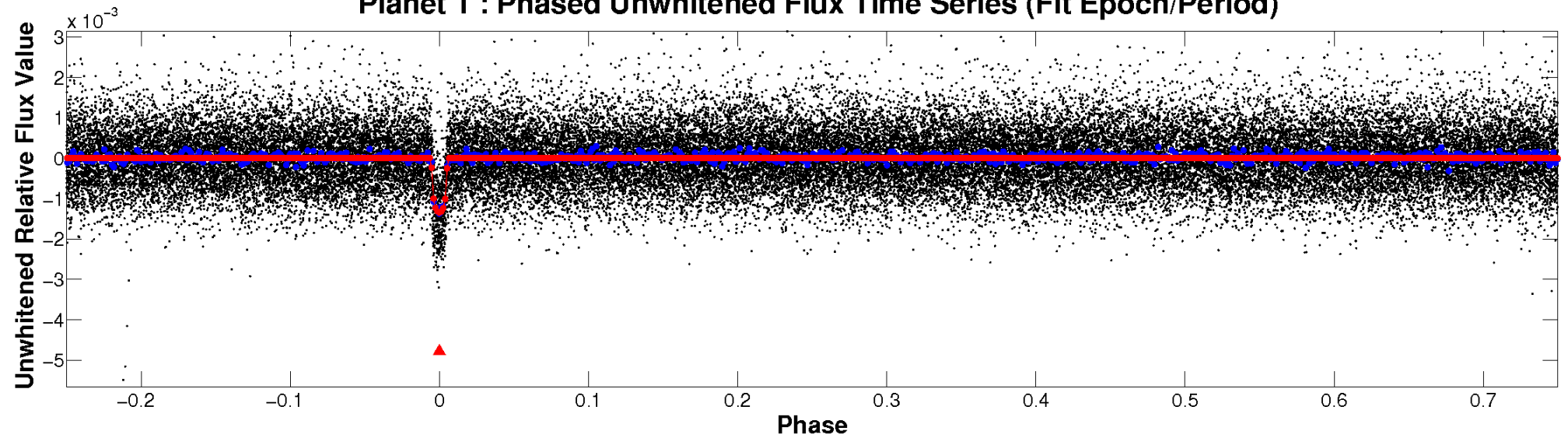
TCE 009532052-01



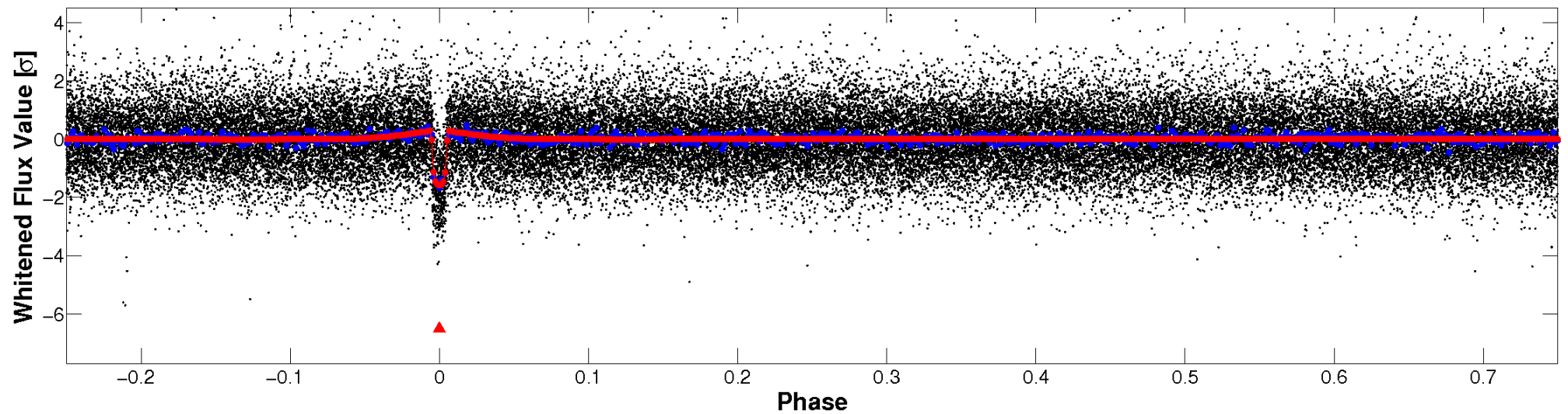


# Non-Whitened Vs. Whitened Light Curve

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

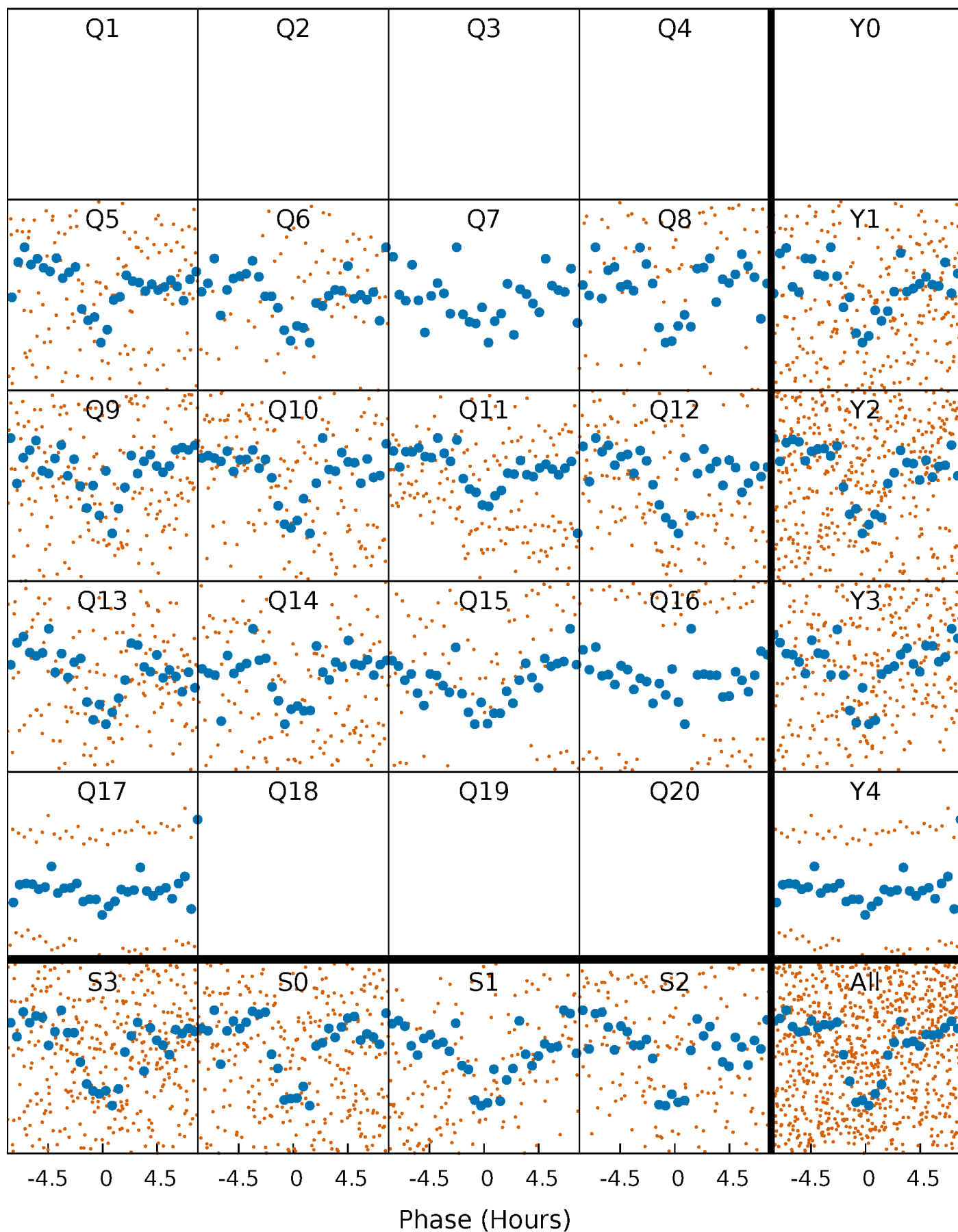


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

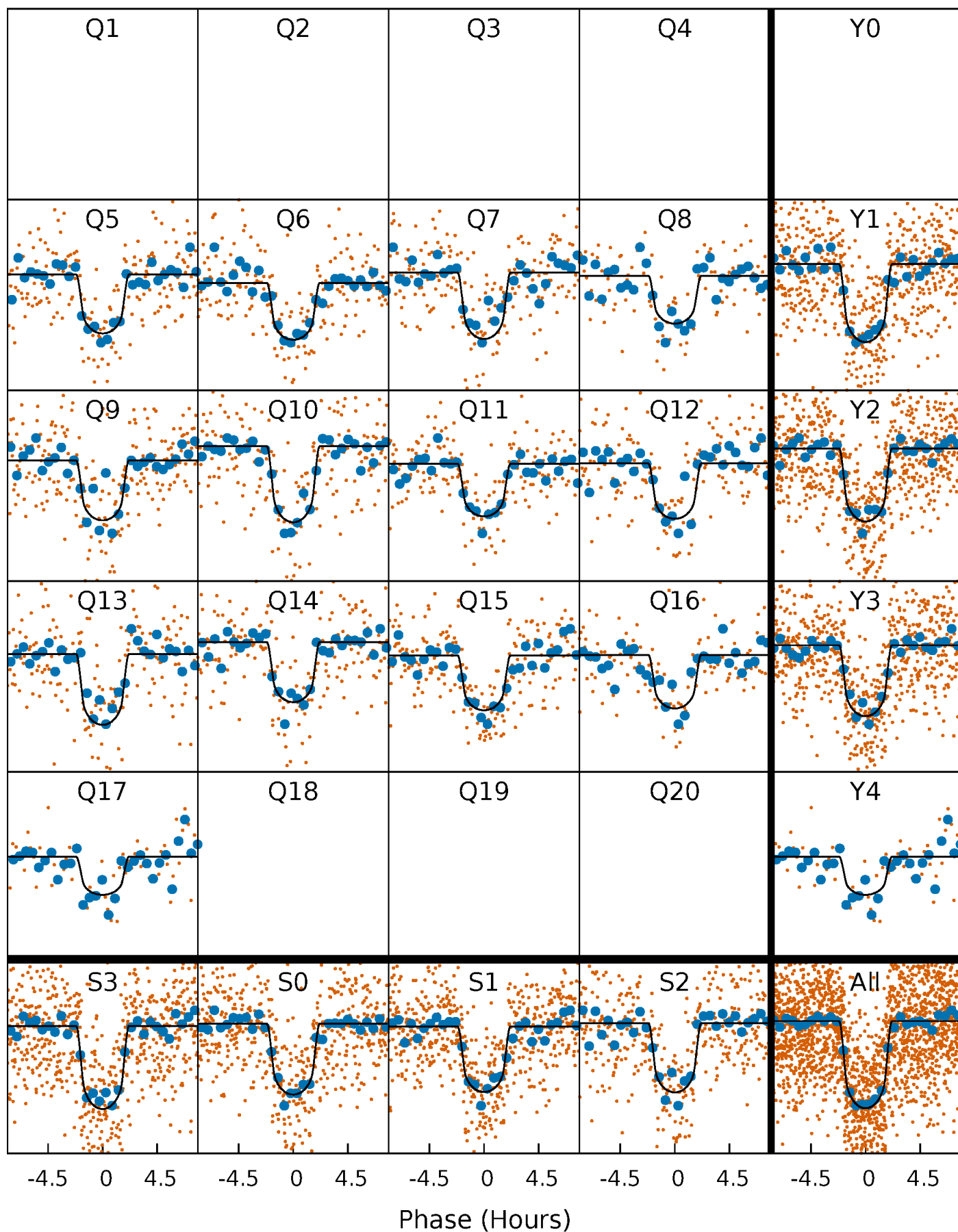
TCE 009532052-01 P= 15.725837 Days  $T_0=133.989272$  (BKJD)





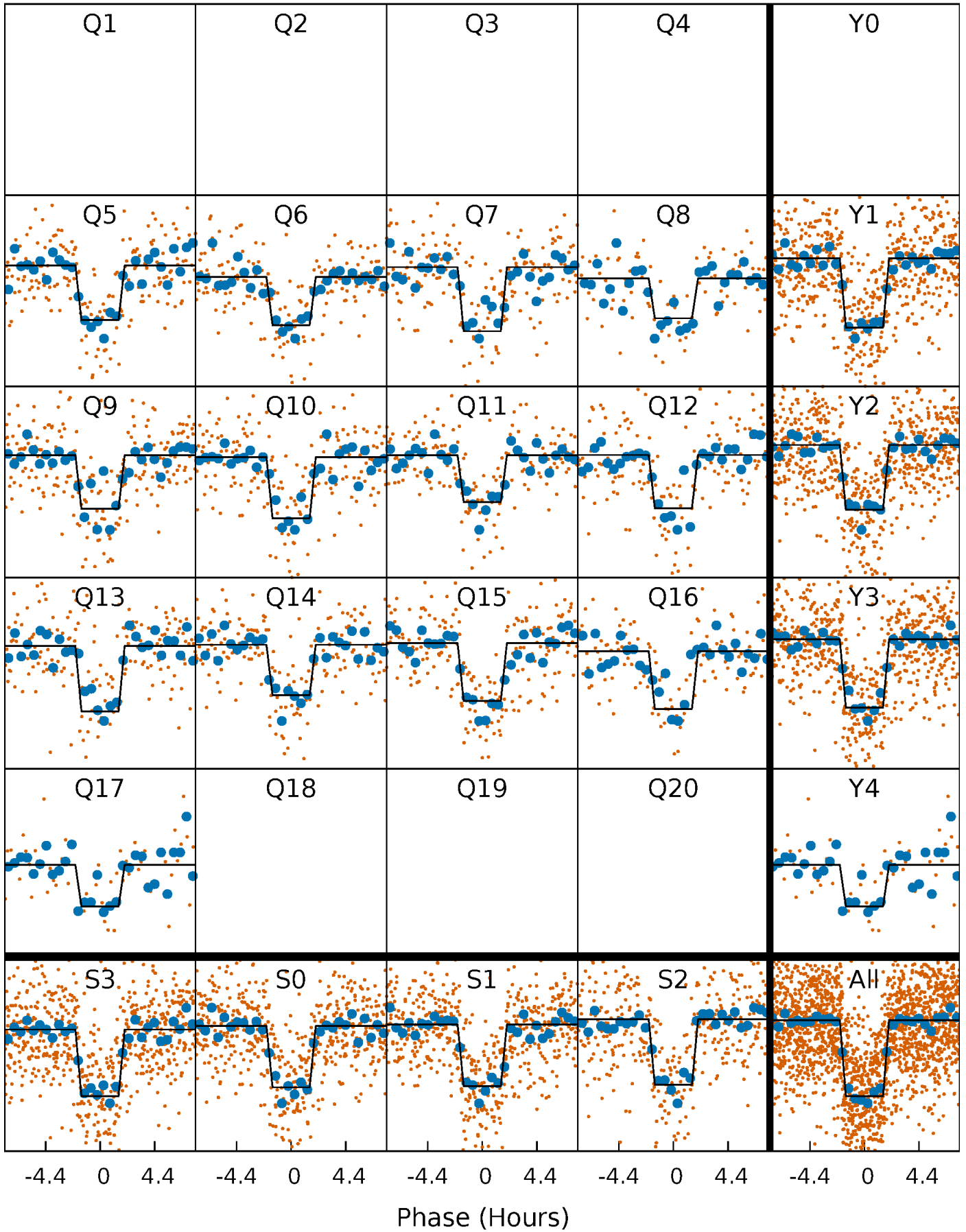
# DV Quarter-Phased Transit Curves

TCE 009532052-01 P= 15.725837 Days  $T_0=133.989272$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

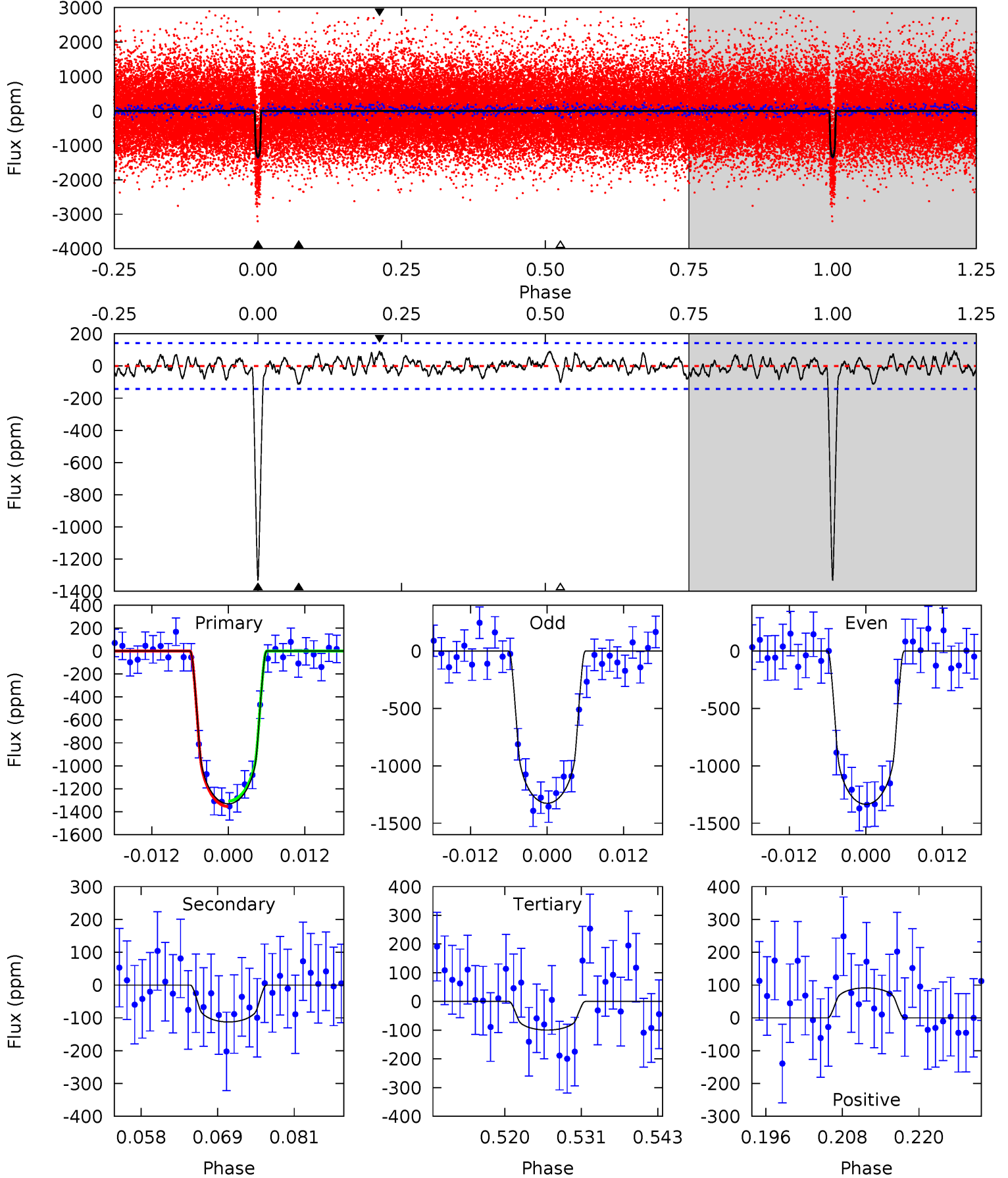
TCE 009532052-01 P= 15.725917 Days  $T_0=133.984055$  (BKJD)



# DV Model-Shift Uniqueness Test

009532052-01,  $P = 15.725837$  Days,  $E = 133.989272$  Days

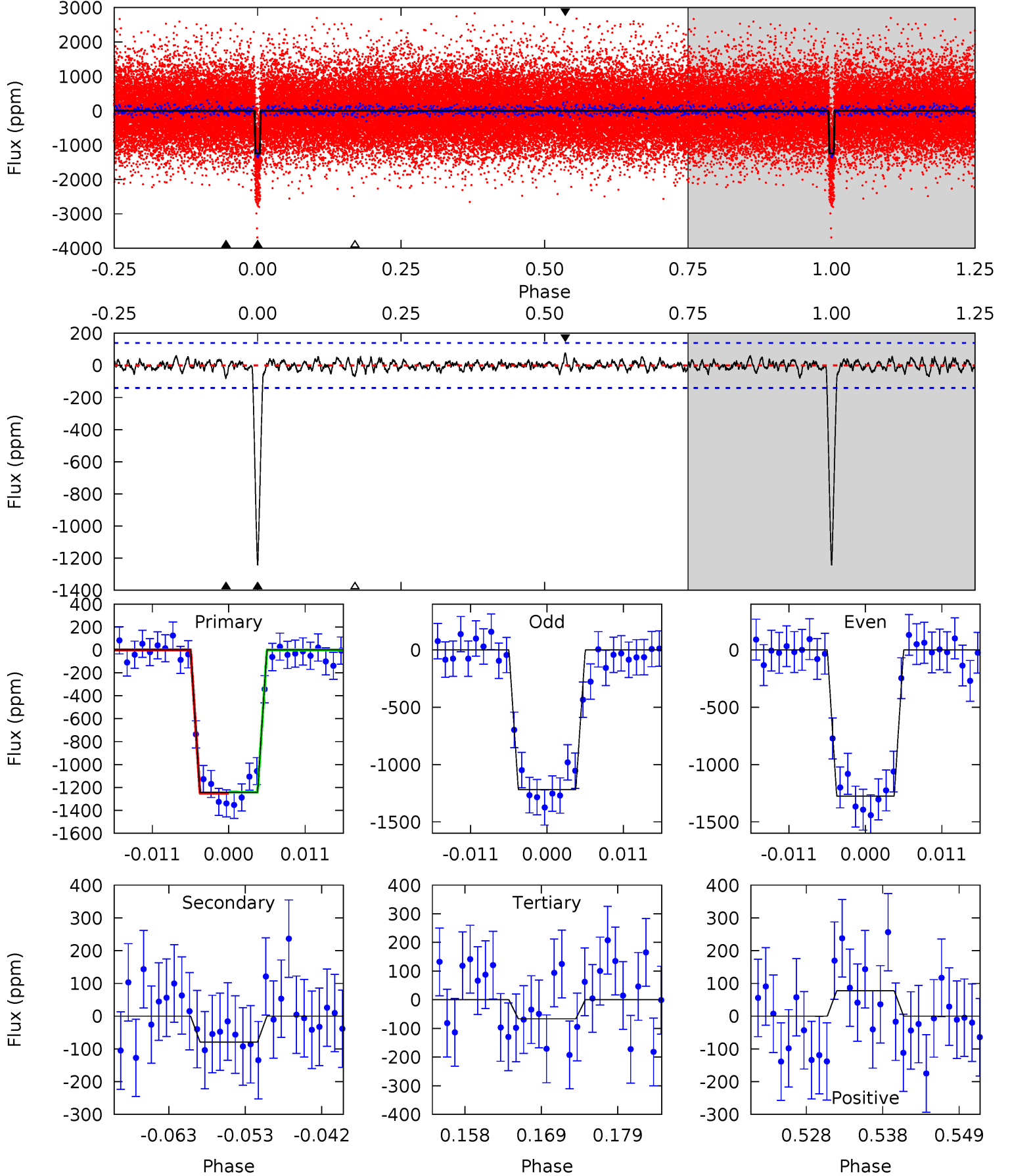
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
46.8	3.95	3.50	3.22	5.00	2.53	1.21	43.3	43.6	0.45	0.74	0.15	1.00	0.06	0.84



# Alt Model-Shift Uniqueness Test

009532052-01,  $P = 15.725917$  Days,  $E = 133.984055$  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
44.5	2.83	2.38	2.77	5.02	2.56	0.76	42.1	41.7	0.44	0.06	1.05	1.01	0.06	0.14



### Stellar Parameters For KIC 009532052

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5332^{+106}_{-106}$	$4.597^{+0.018}_{-0.077}$	$-0.220^{+0.150}_{-0.150}$	$0.755^{+0.069}_{-0.032}$	$0.824^{+0.043}_{-0.058}$	$2.699^{+0.245}_{-0.620}$
	+2%/-2%	+0%/-2%	+68%/-68%	+9%/-4%	+5%/-7%	+9%/-23%
Source	SPE47	SPE47	SPE47	DSEP		

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

### Secondary Eclipse Parameters for KIC 009532052-01 / KOI 2115.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-112 \pm 28$	$2.95^{+0.93}_{-0.82}$	$852^{+24}_{-23}$	$3409^{+391}_{-276}$	$91^{+93}_{-39}$
Alt.	$-79 \pm 28$	$2.92^{+0.92}_{-0.96}$	$852^{+23}_{-22}$	$3239^{+448}_{-329}$	$65^{+85}_{-33}$

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

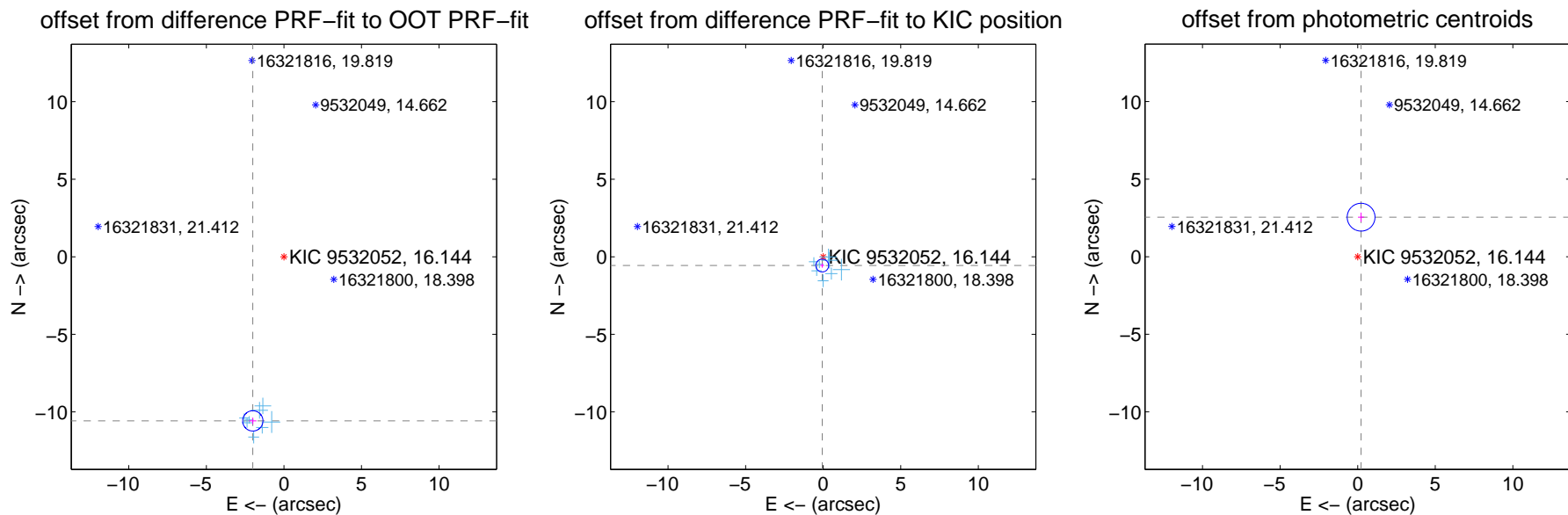
## DV Centroid Data

Supplemental centroid analysis for 009532052-01. Kepler magnitude: 16.14. Transit SNR 31.54

There are 13 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 10.02 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$10.766 \pm 0.218$	49.36	$2.005 \pm 0.236$	$-10.578 \pm 0.210$
PRF-fit source offset from KIC position	$0.568 \pm 0.138$	4.12	$0.062 \pm 0.128$	$-0.564 \pm 0.138$
photometric centroid source offset	$2.56 \pm 0.30$	8.56	$-0.22 \pm 0.20$	$2.55 \pm 0.30$



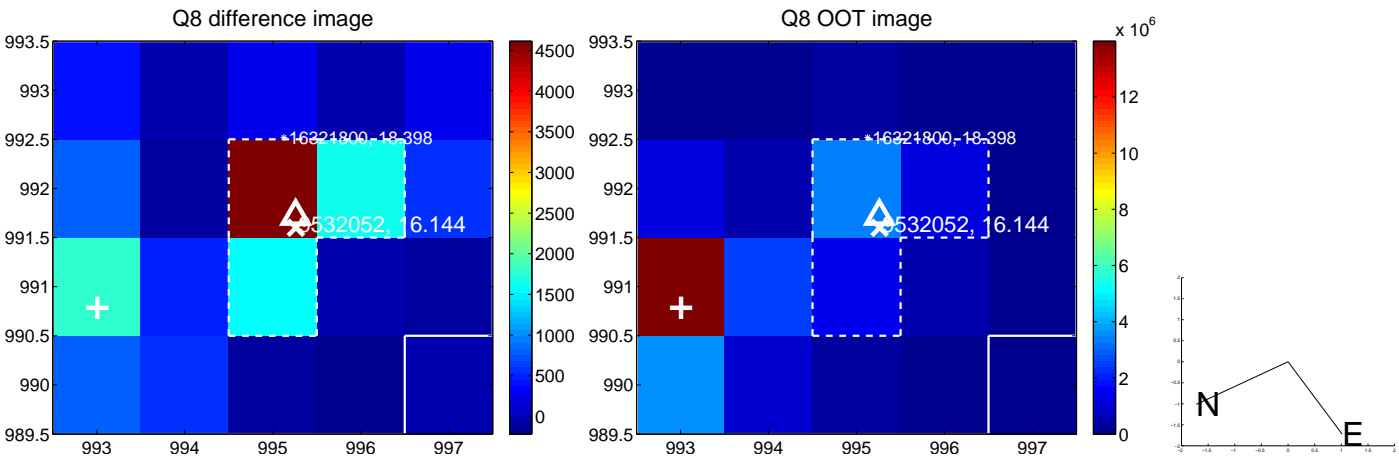
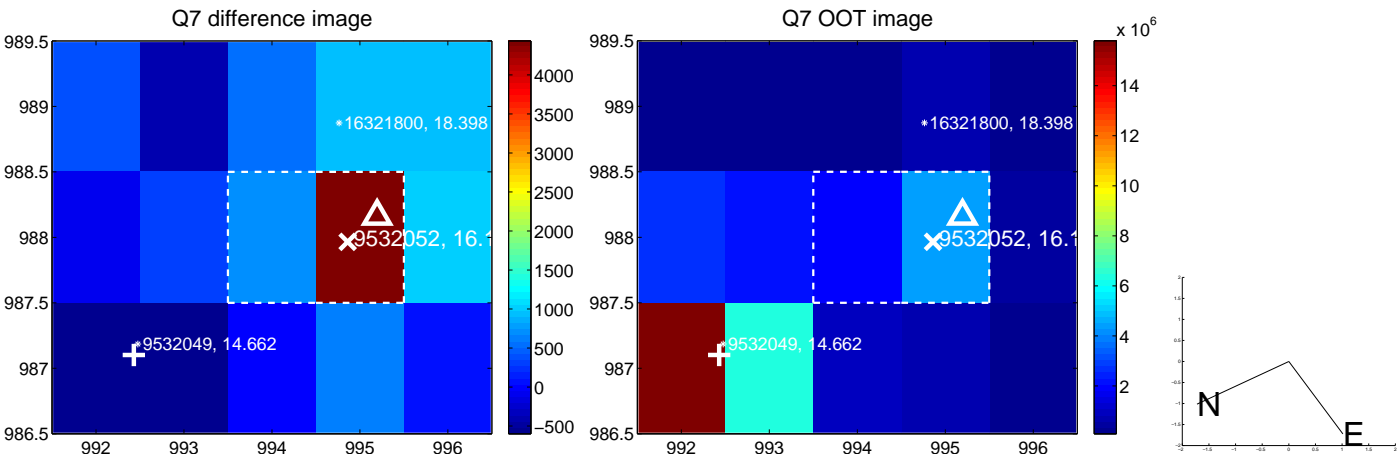
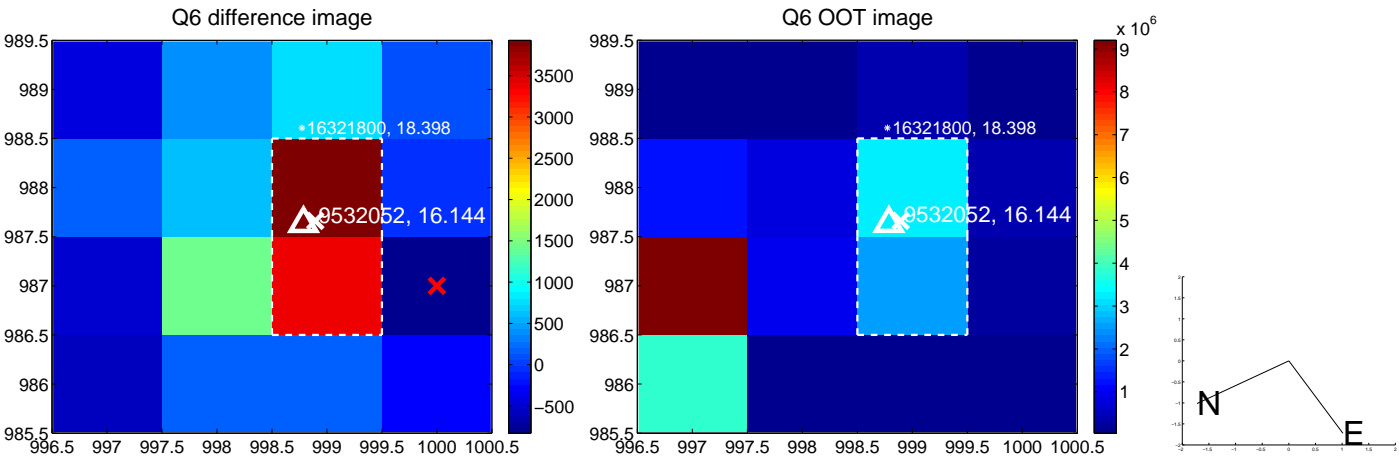
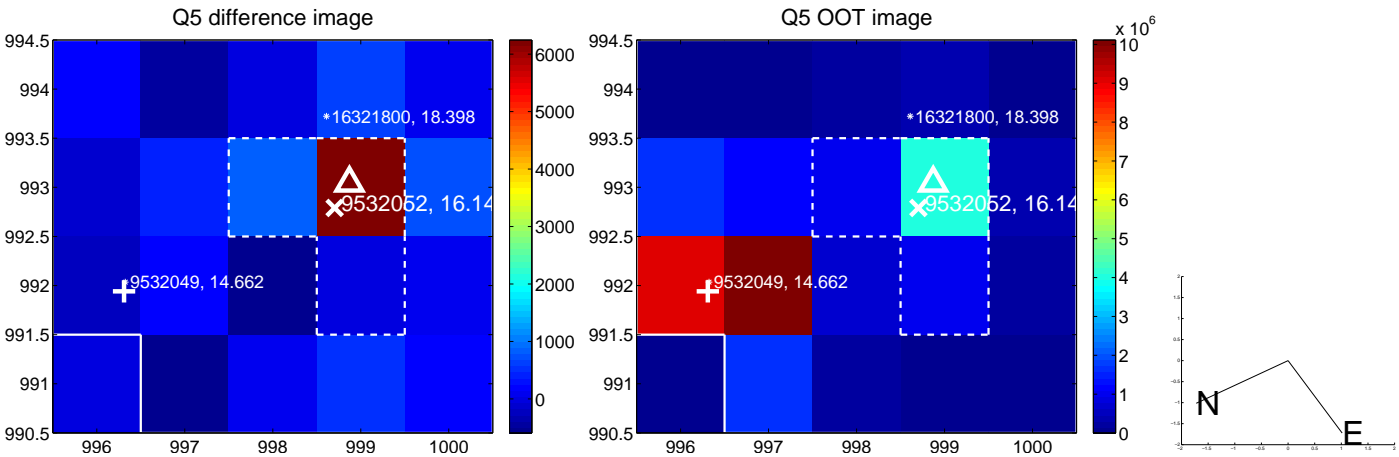
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



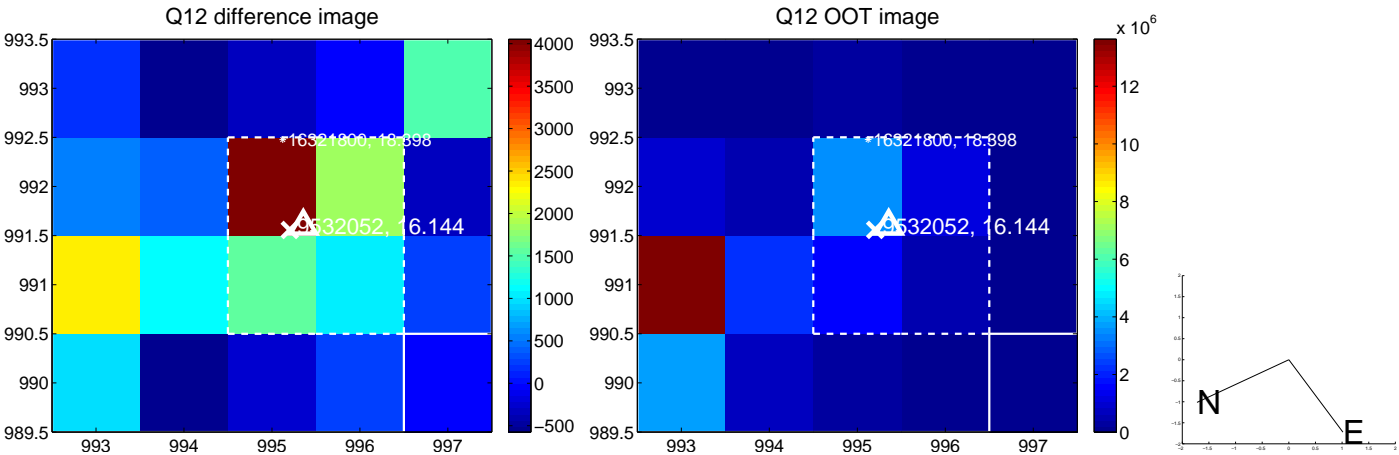
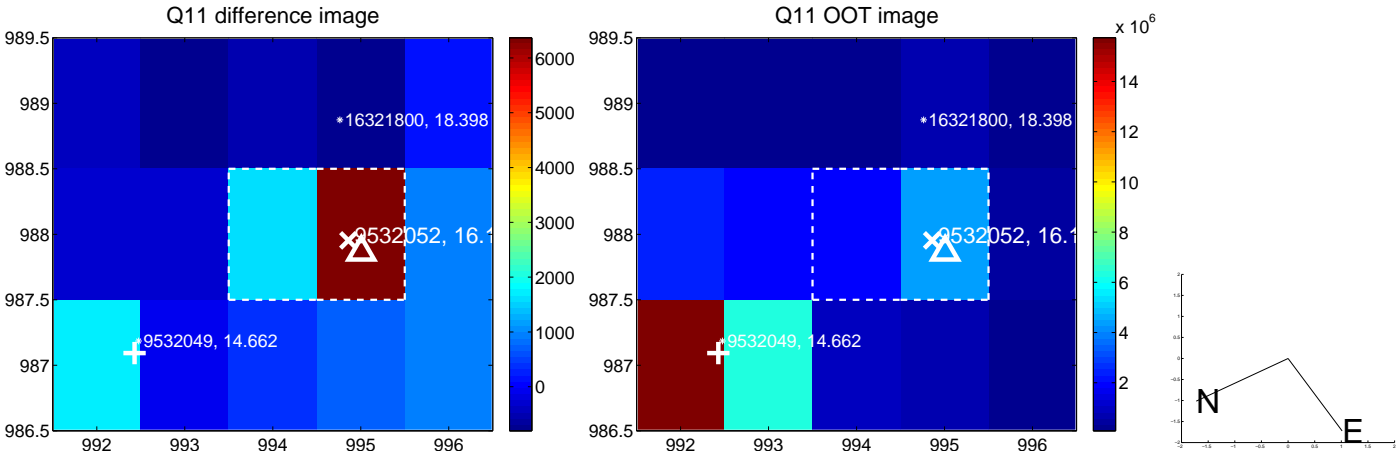
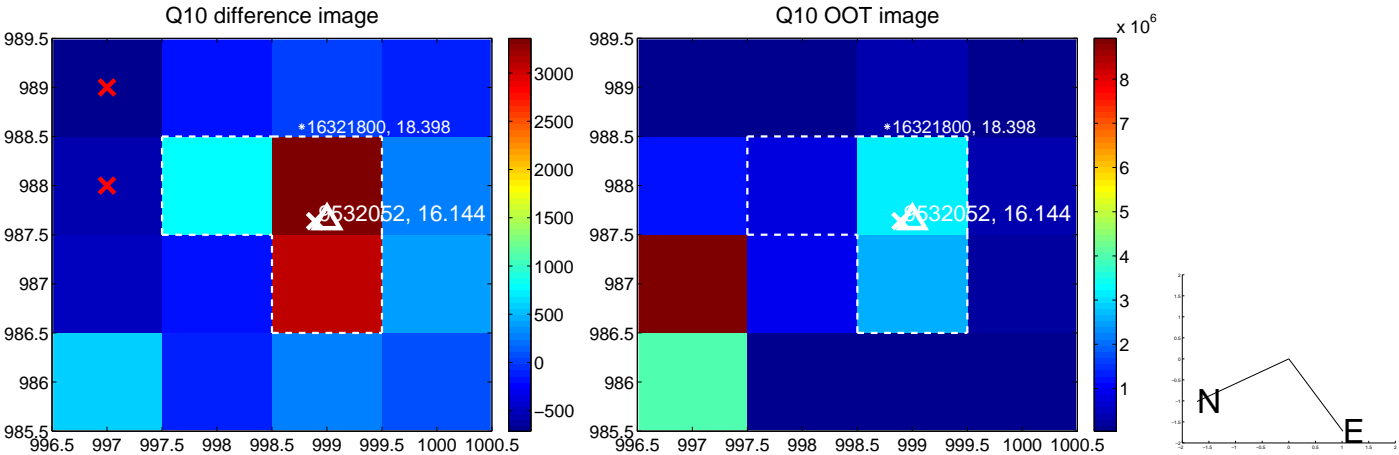
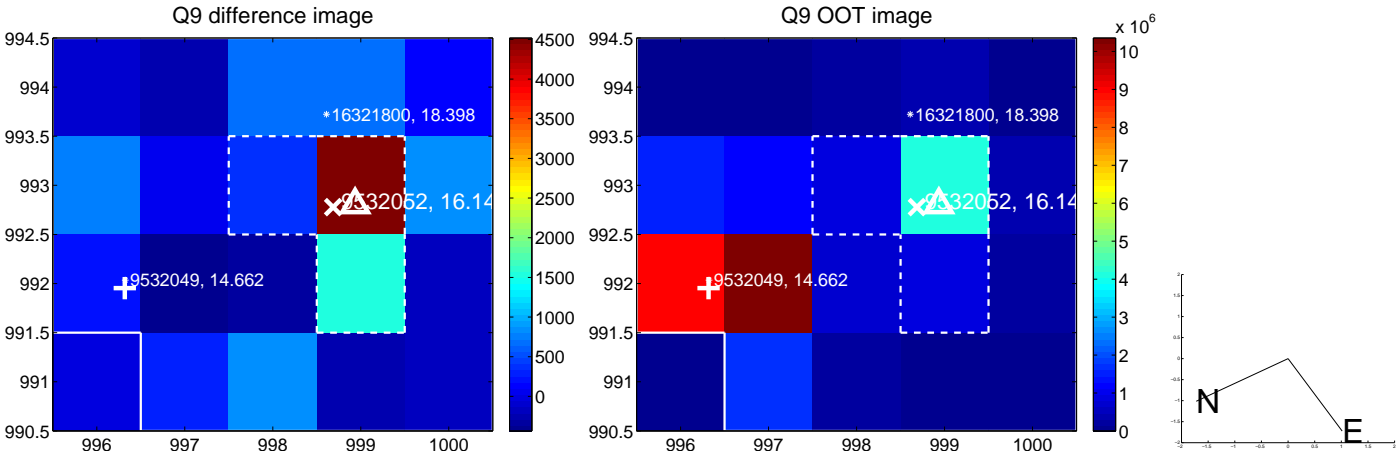
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



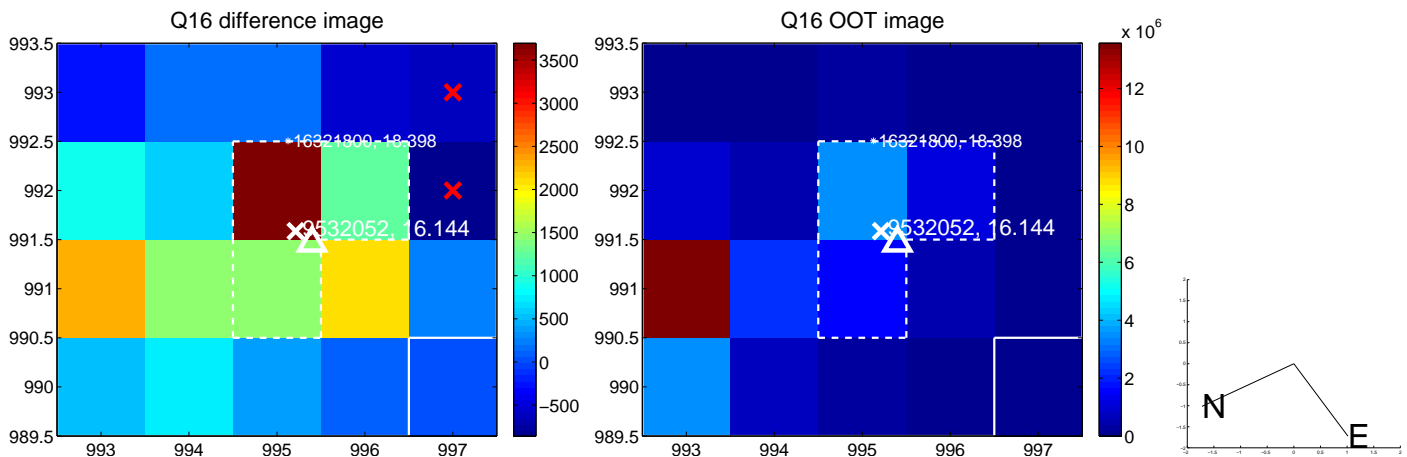
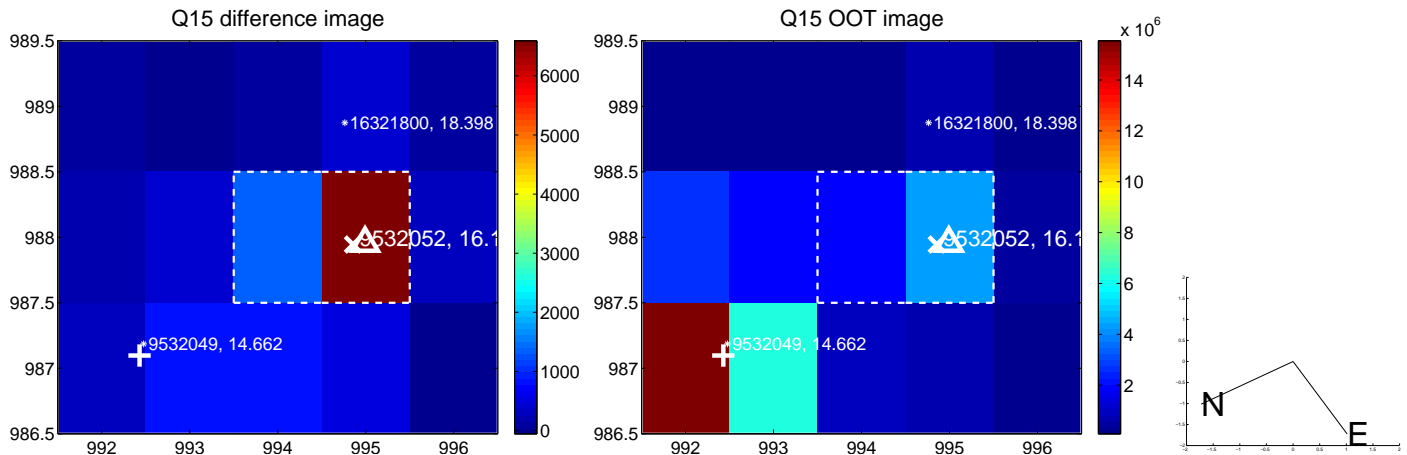
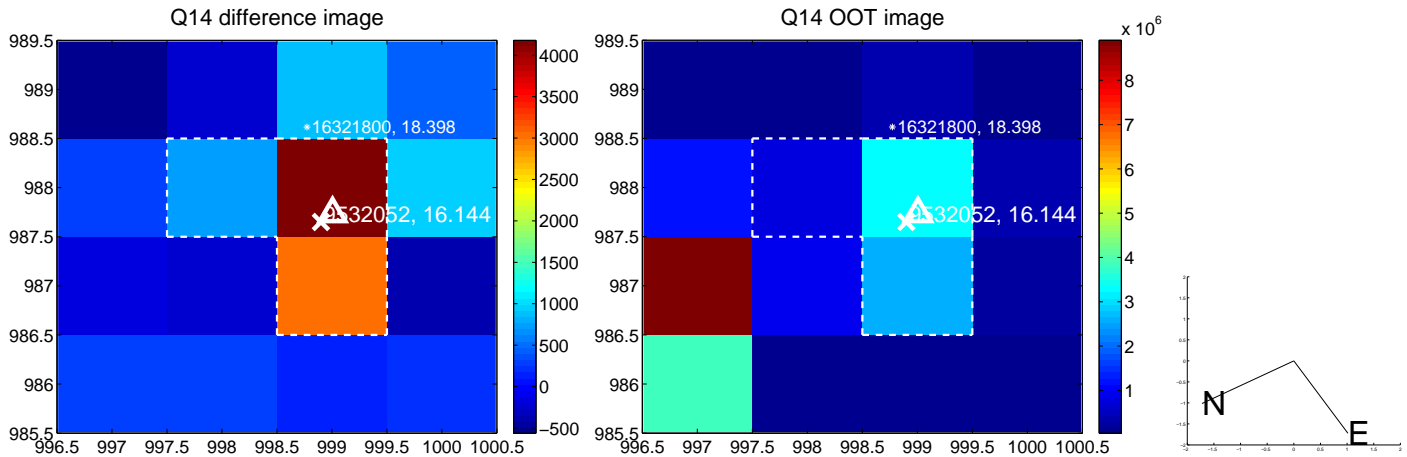
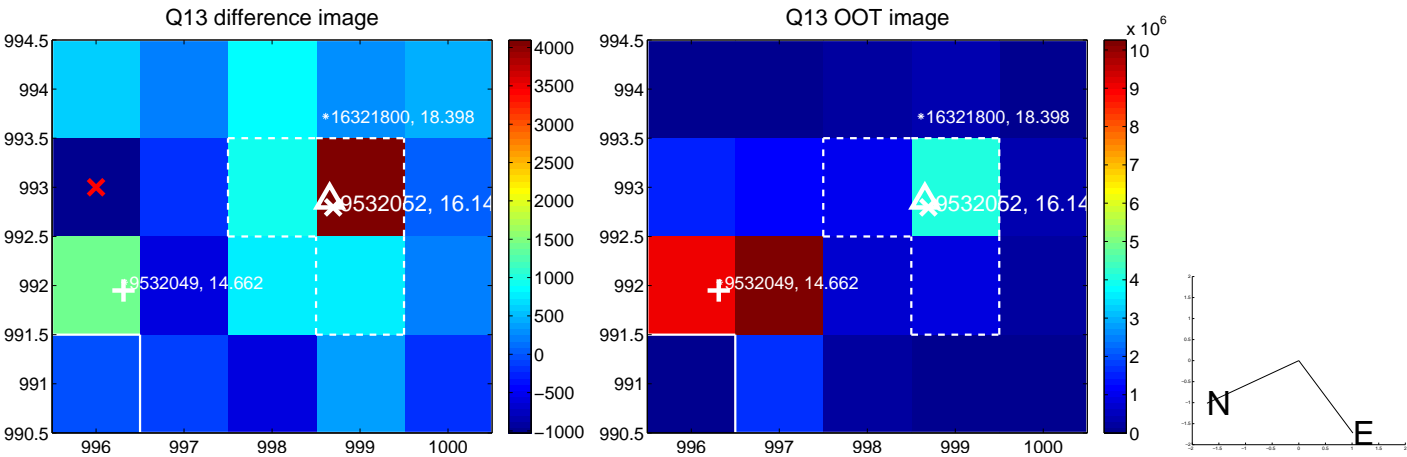
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



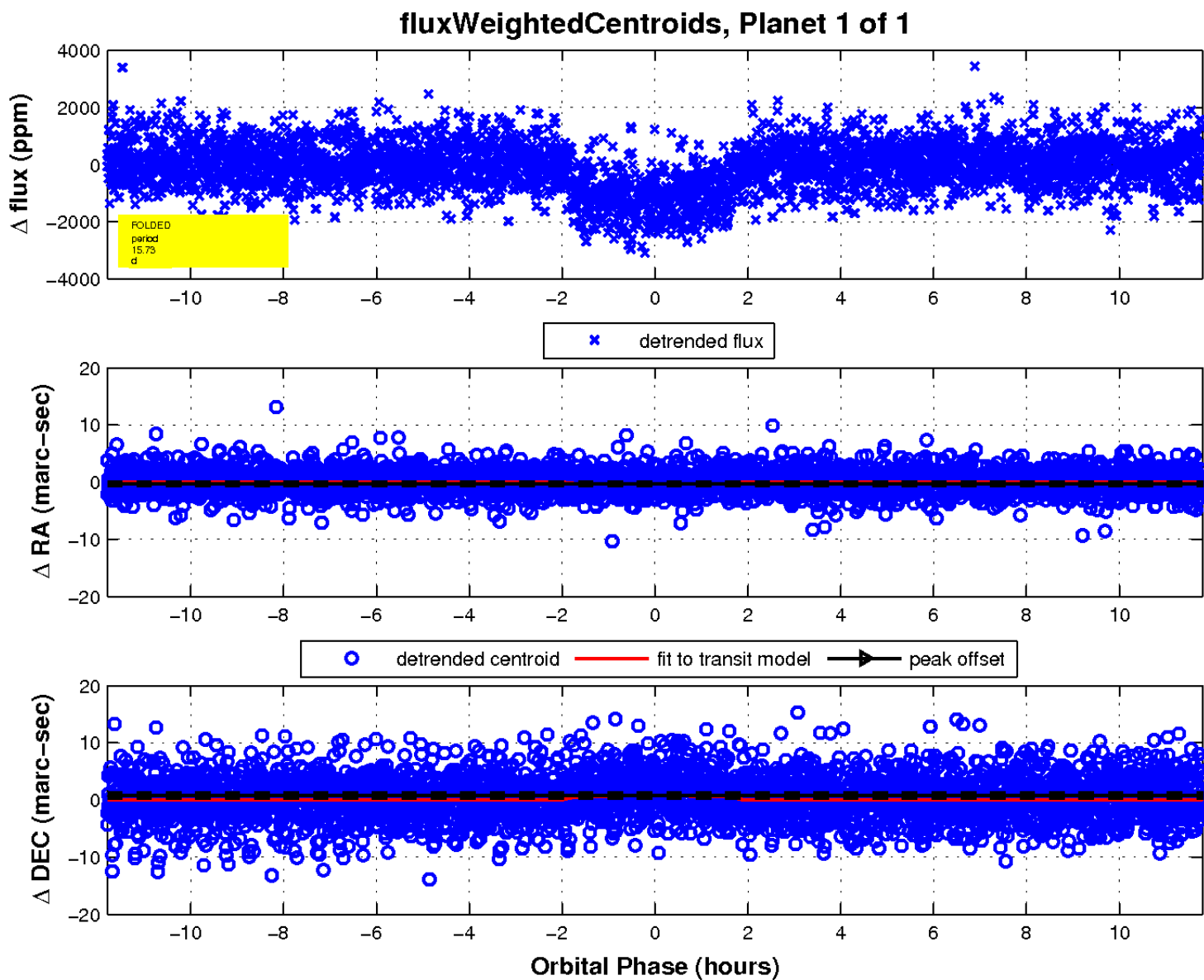
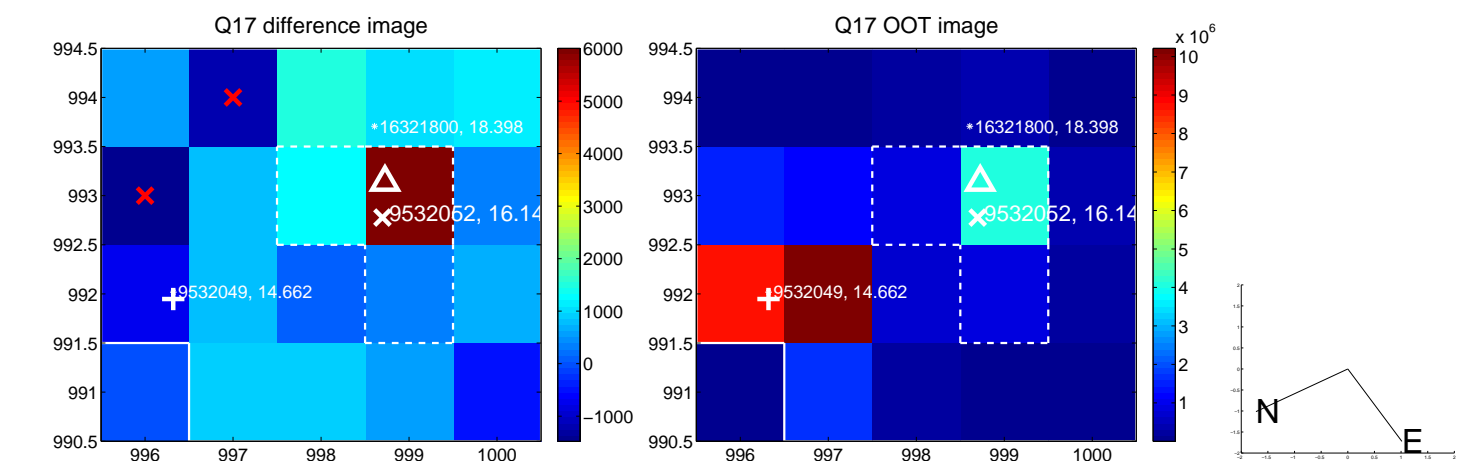
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image

Declination

