

# KIC 009533045

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009533045-01	OBS	No	272.951438	140.573834	487.6	2.782	7.3	7.4	1.01	5795	2.66	1.54

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009533045-01	OBS	FP	0.06	1	0	0	0	INDIV_TRANS_MARSHALL—MOD_NONUNIQ_ALT

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

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

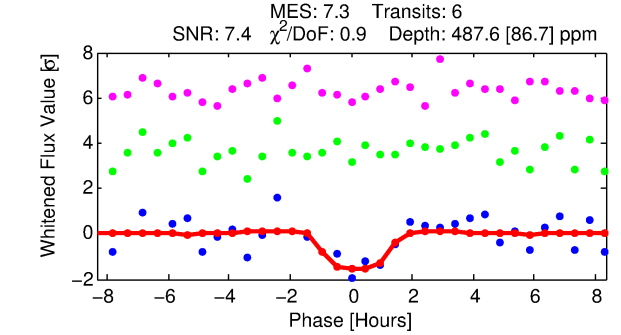
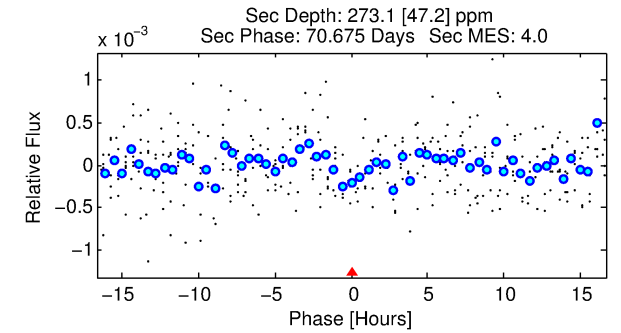
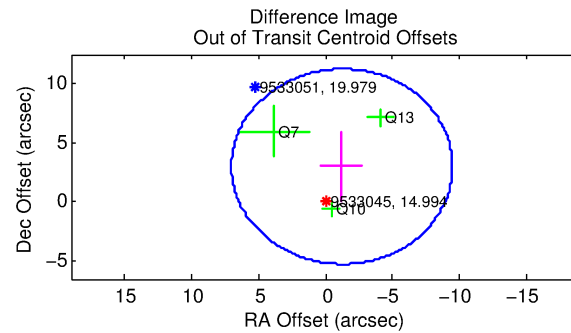
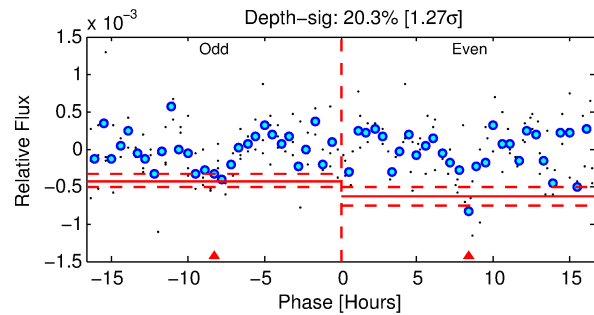
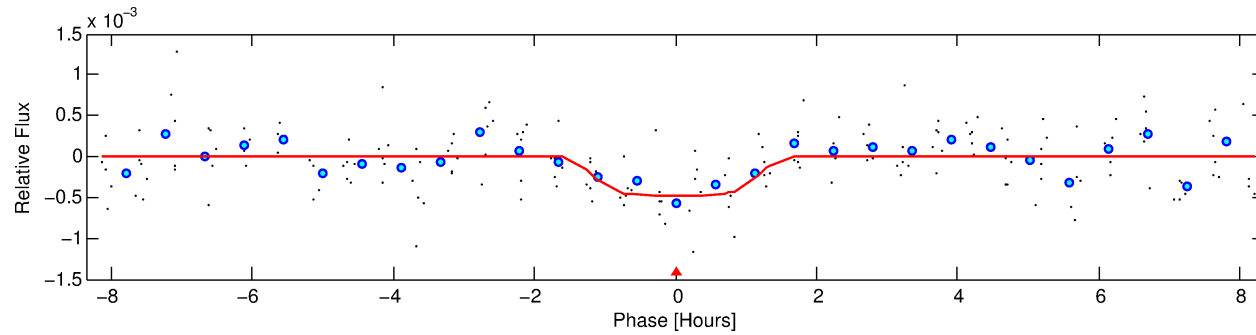
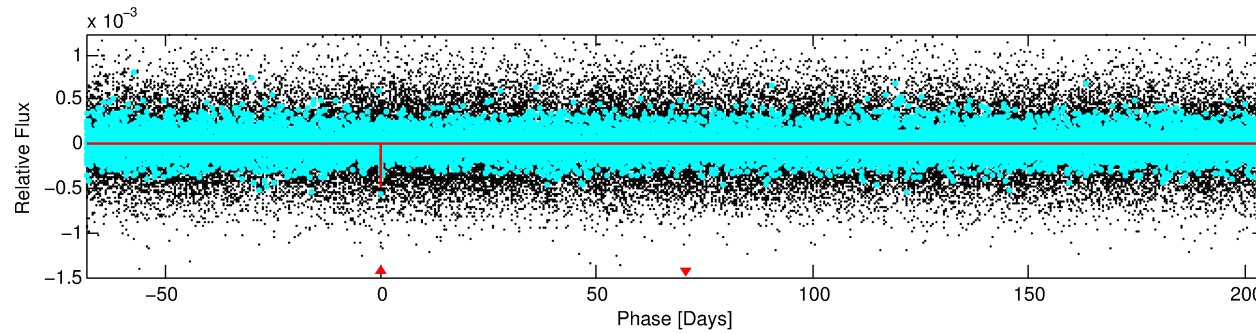
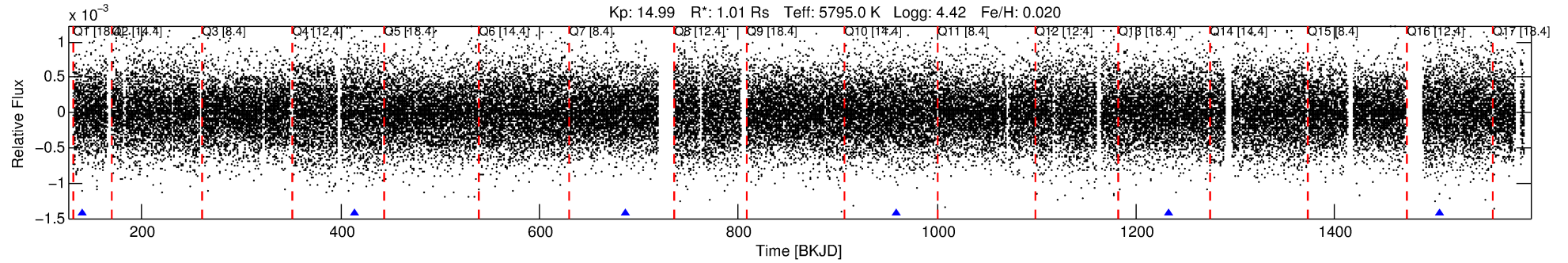
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009533045-01

No Significant Match Found

# DV One-Page Summary

KIC: 9533045 Candidate: 1 of 1 Period: 272.951 d



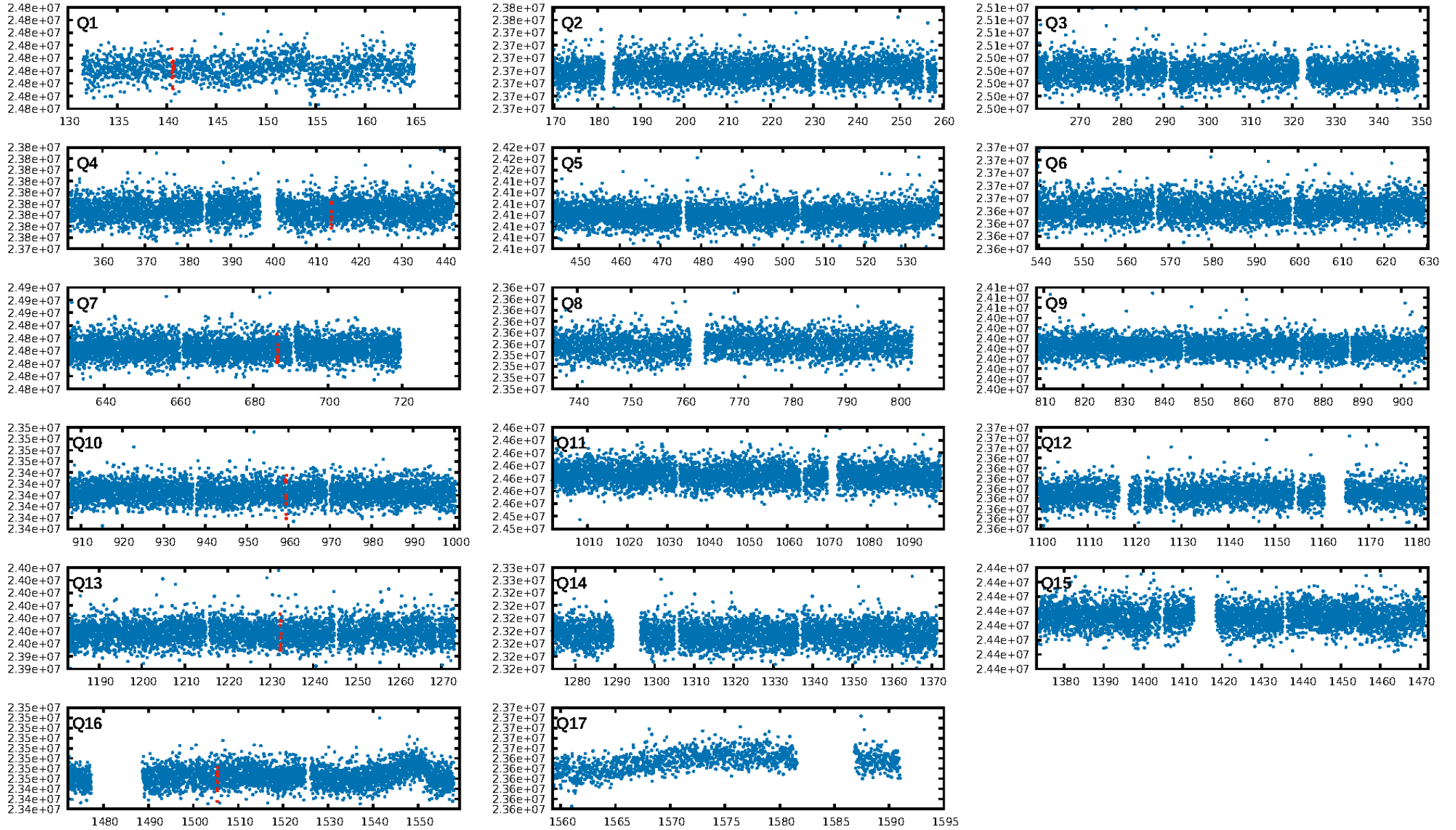
## DV Fit Results:

Period = 272.95144 [0.00292] d  
Epoch = 140.5738 [0.0082] BKJD  
Rp/R\* = 0.0242 [0.0637]  
a/R\* = 363.21 [4589.30]  
b = 0.90 [2.66]  
Seff = 1.54 [0.58]  
Teff = 284 [27] K  
Rp = 2.66 [7.06] Re  
a = 0.8190 [0.2015] AU  
Ag = 14204.02 [75081.94] [0.19 $\sigma$ ]  
Teffp = 4792 [6319] K [0.71 $\sigma$ ]

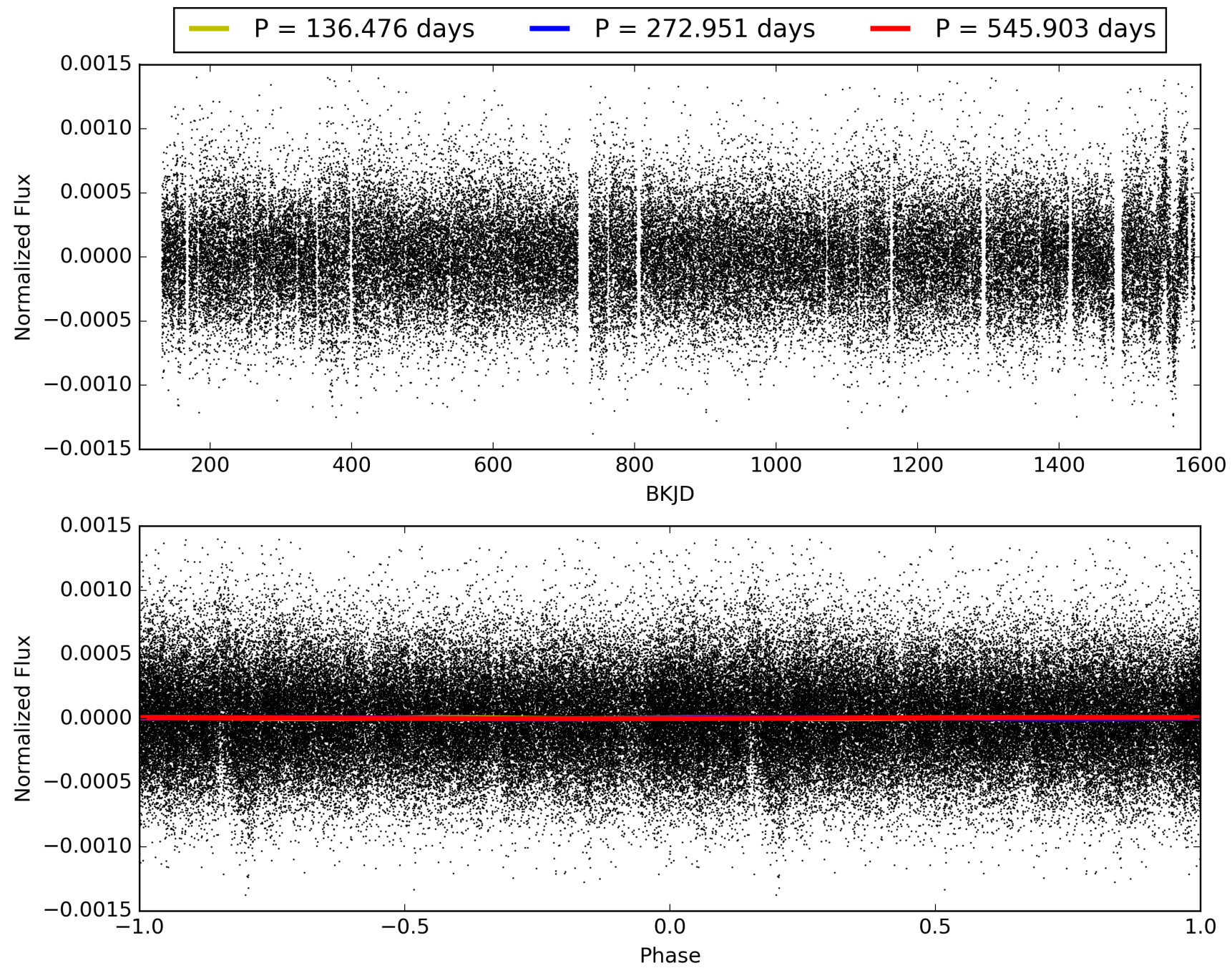
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 74.9%  
ModelChiSquareGof-sig: 99.6%  
**Bootstrap-pfa: 1.52e-12**  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: -6.669  
**Centroid-sig: 0.2%**  
Centroid-so: 4.608 arcsec [2.00 $\sigma$ ]  
OotOffset-rm: 3.256 arcsec [1.18 $\sigma$ ]  
KicOffset-rm: 3.085 arcsec [1.12 $\sigma$ ]  
OotOffset-st: 1/1/0/1 [3]  
KicOffset-st: 1/1/0/1 [3]  
DiffImageQuality-fgm: 0.00 [0/3]  
DiffImageOverlap-fno: 1.00 [5/5]

# TCE 009533045-01, PDC Light Curves

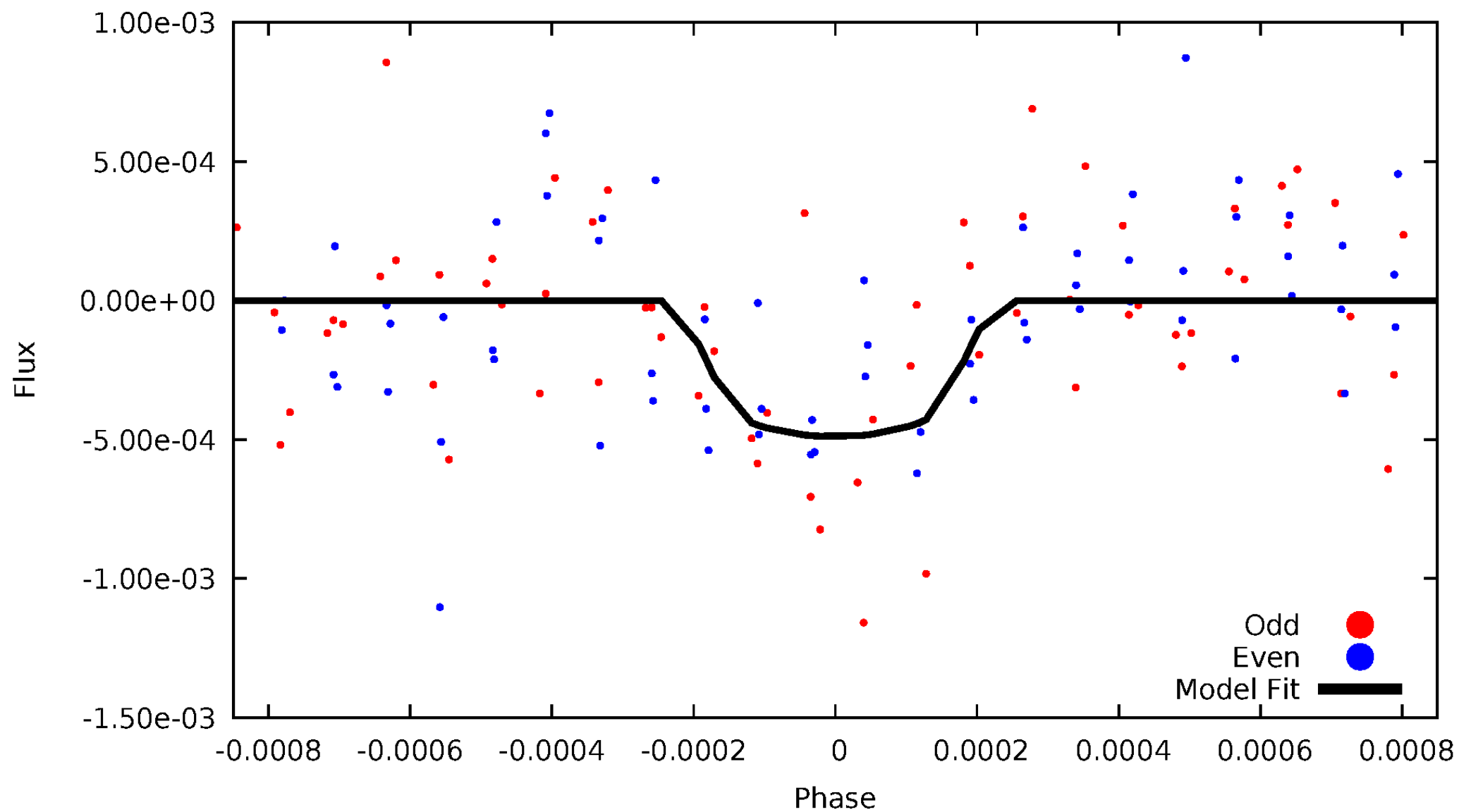


TCE 009533045-01



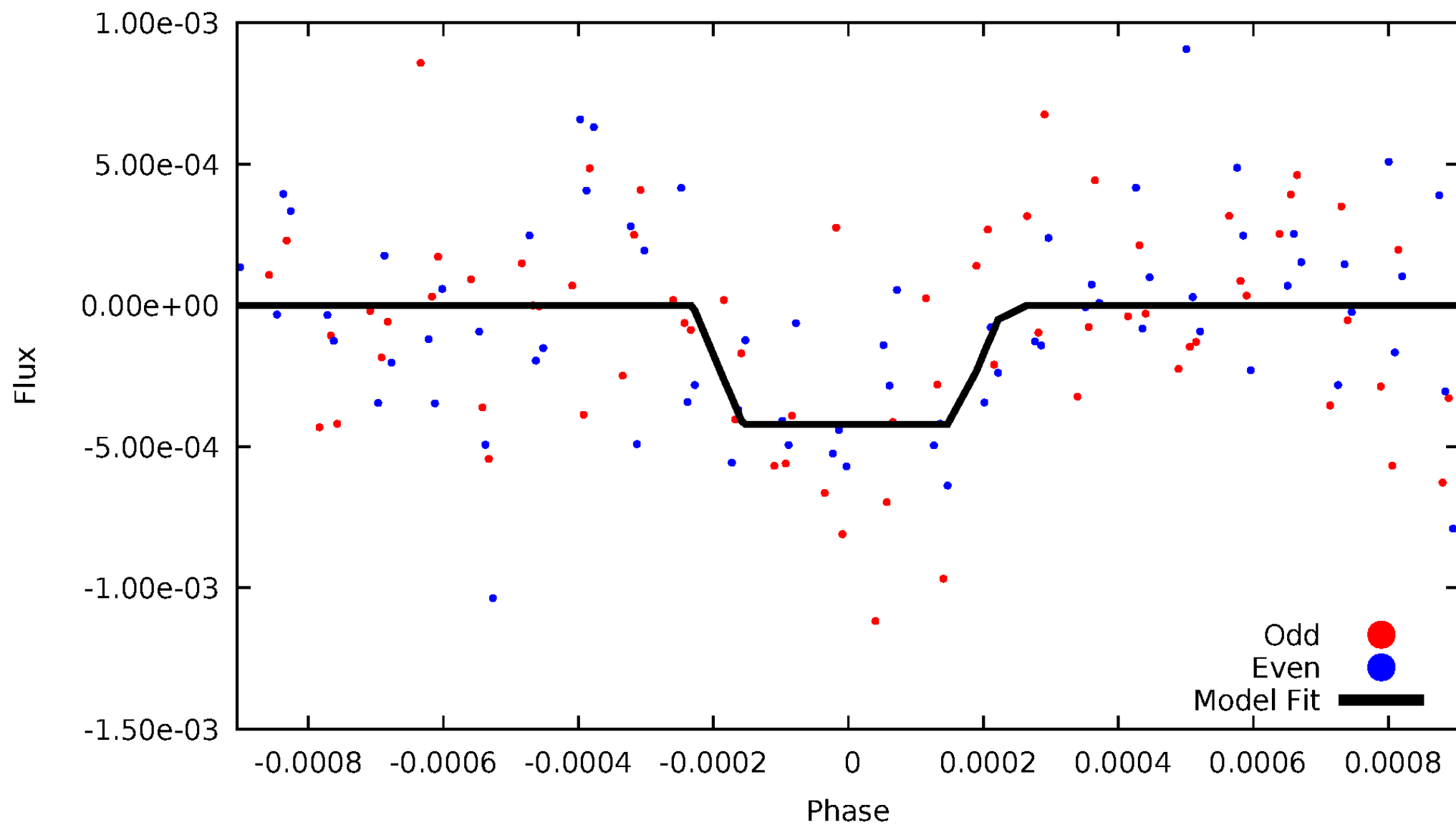
# DV Odd/Even

TCE 009533045-01



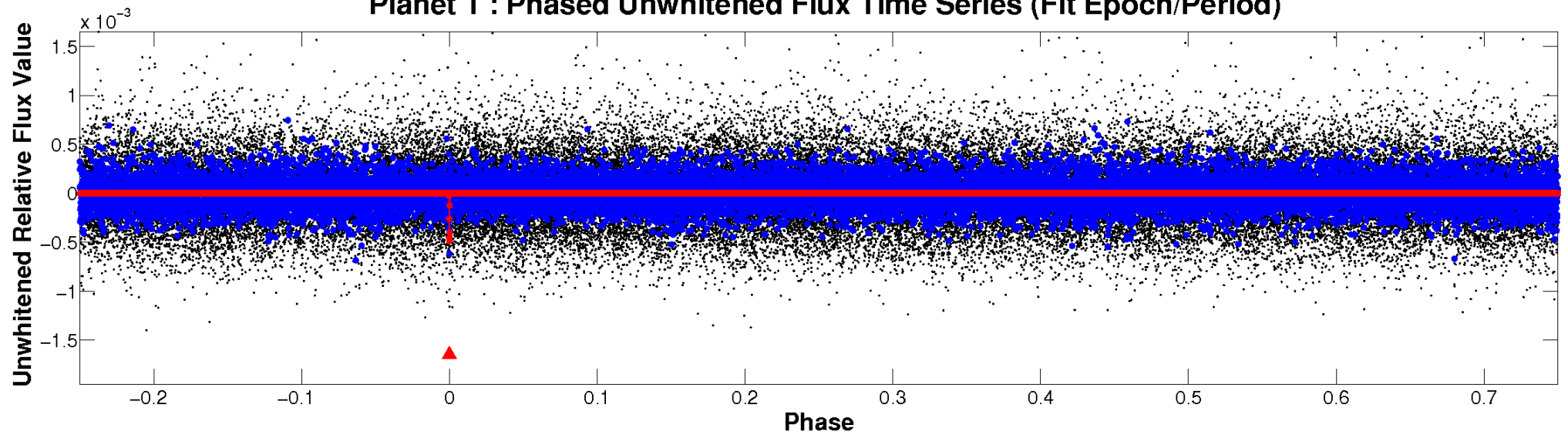
# ALT Odd/Even

TCE 009533045-01

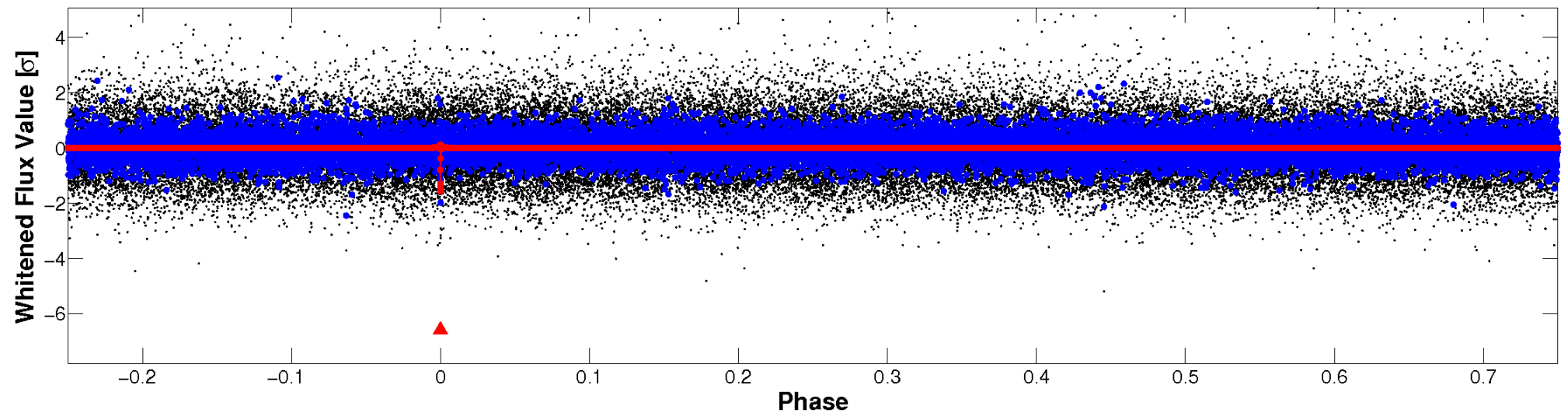


# Non-Whitened Vs. Whitened Light Curve

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

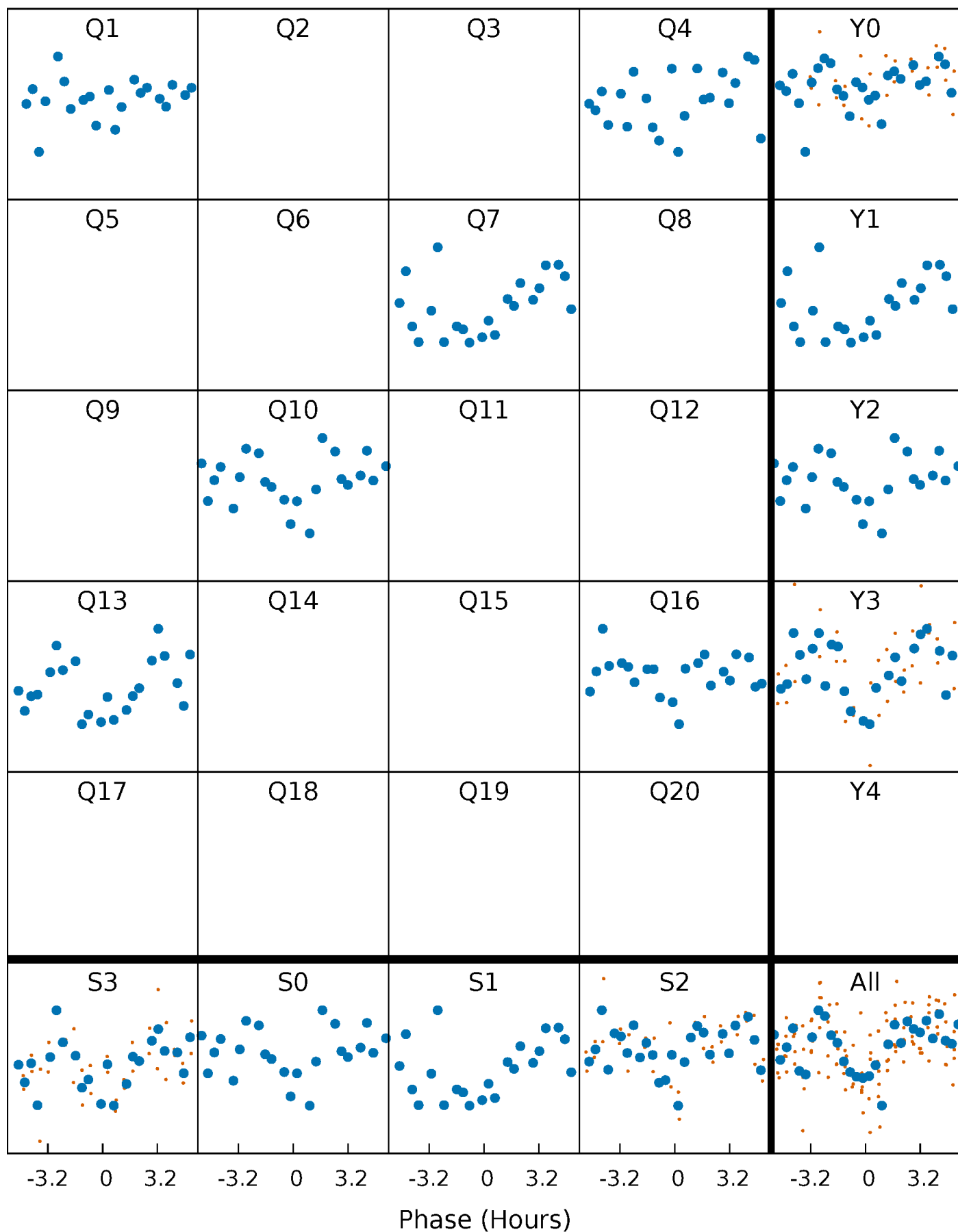


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



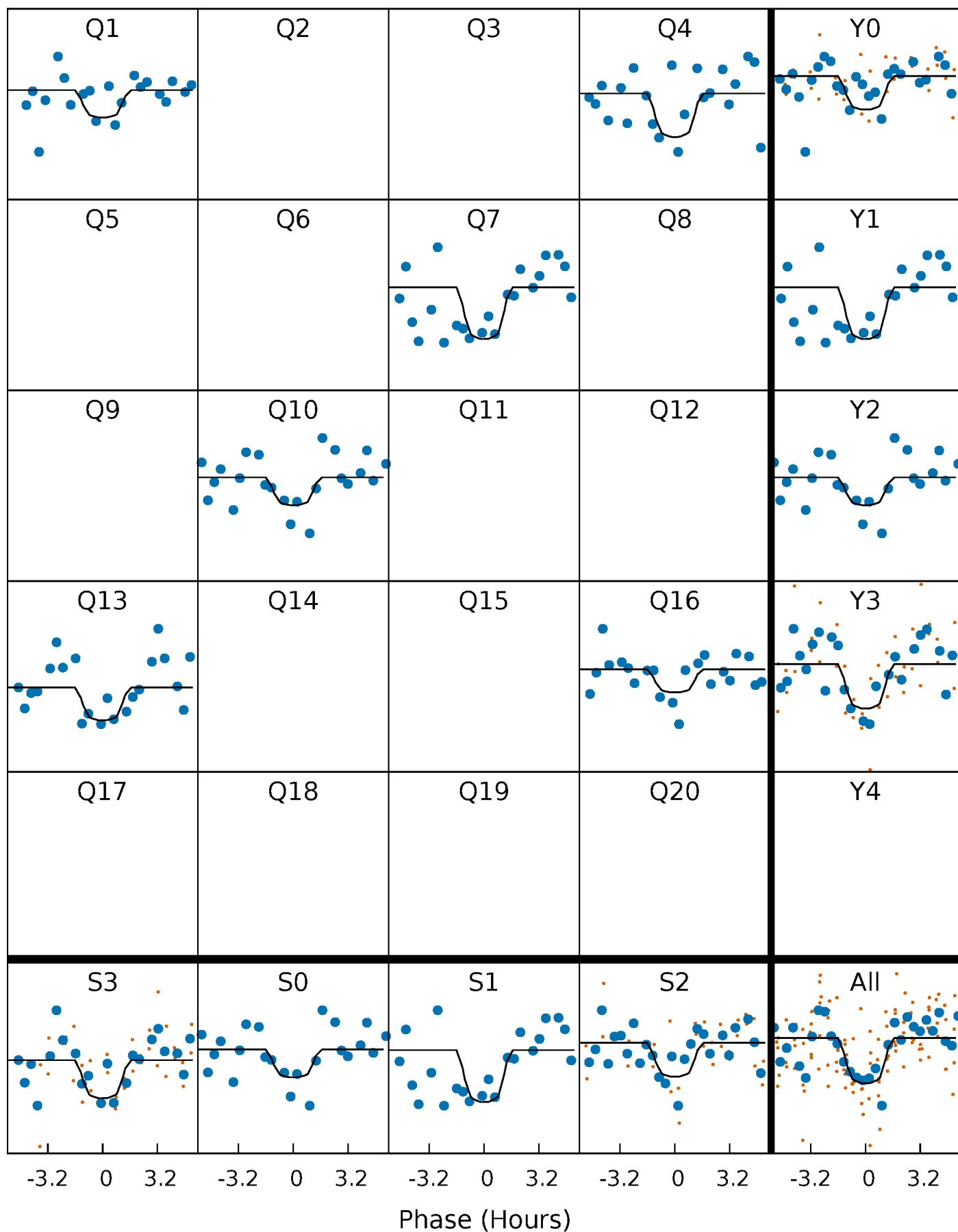
# PDC Quarter-Phased Transit Curves

TCE 009533045-01   P=272.951438 Days    $T_0=140.573834$  (BKJD)



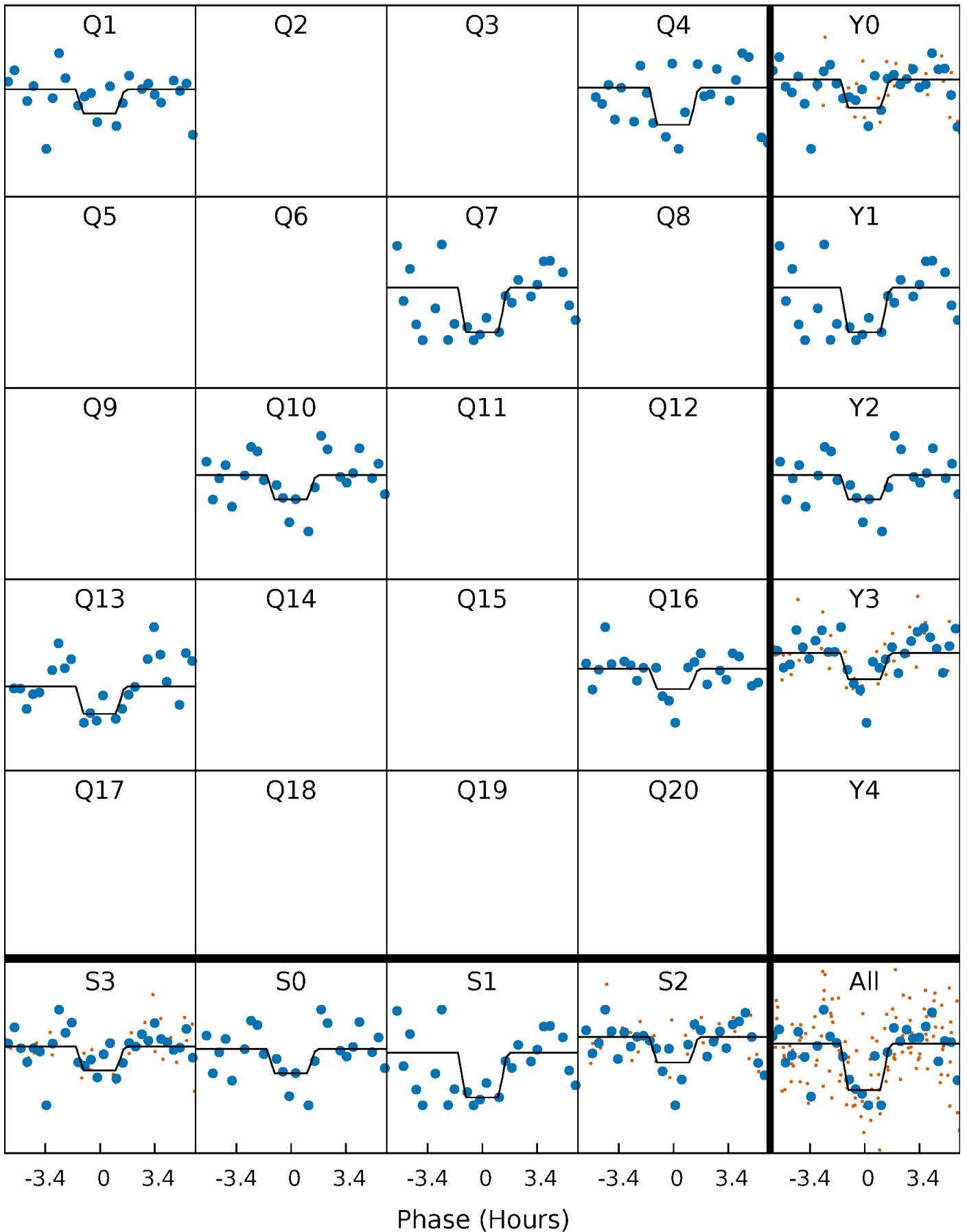
# DV Quarter-Phased Transit Curves

TCE 009533045-01 P=272.951438 Days  $T_0=140.573834$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

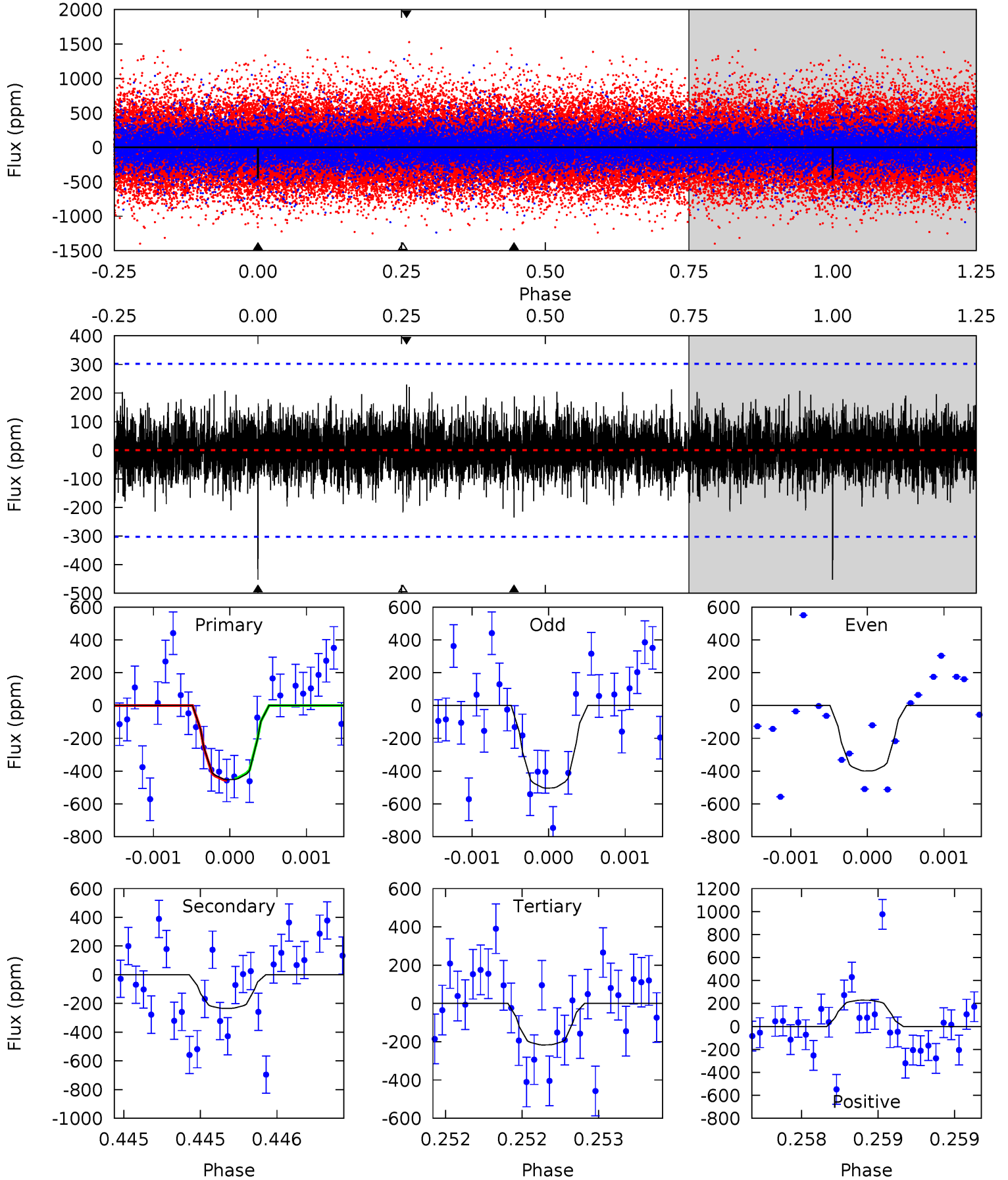
TCE 009533045-01 P=272.953165 Days  $T_0=140.565219$  (BKJD)



# DV Model-Shift Uniqueness Test

009533045-01, P = 272.951438 Days, E = 140.573834 Days

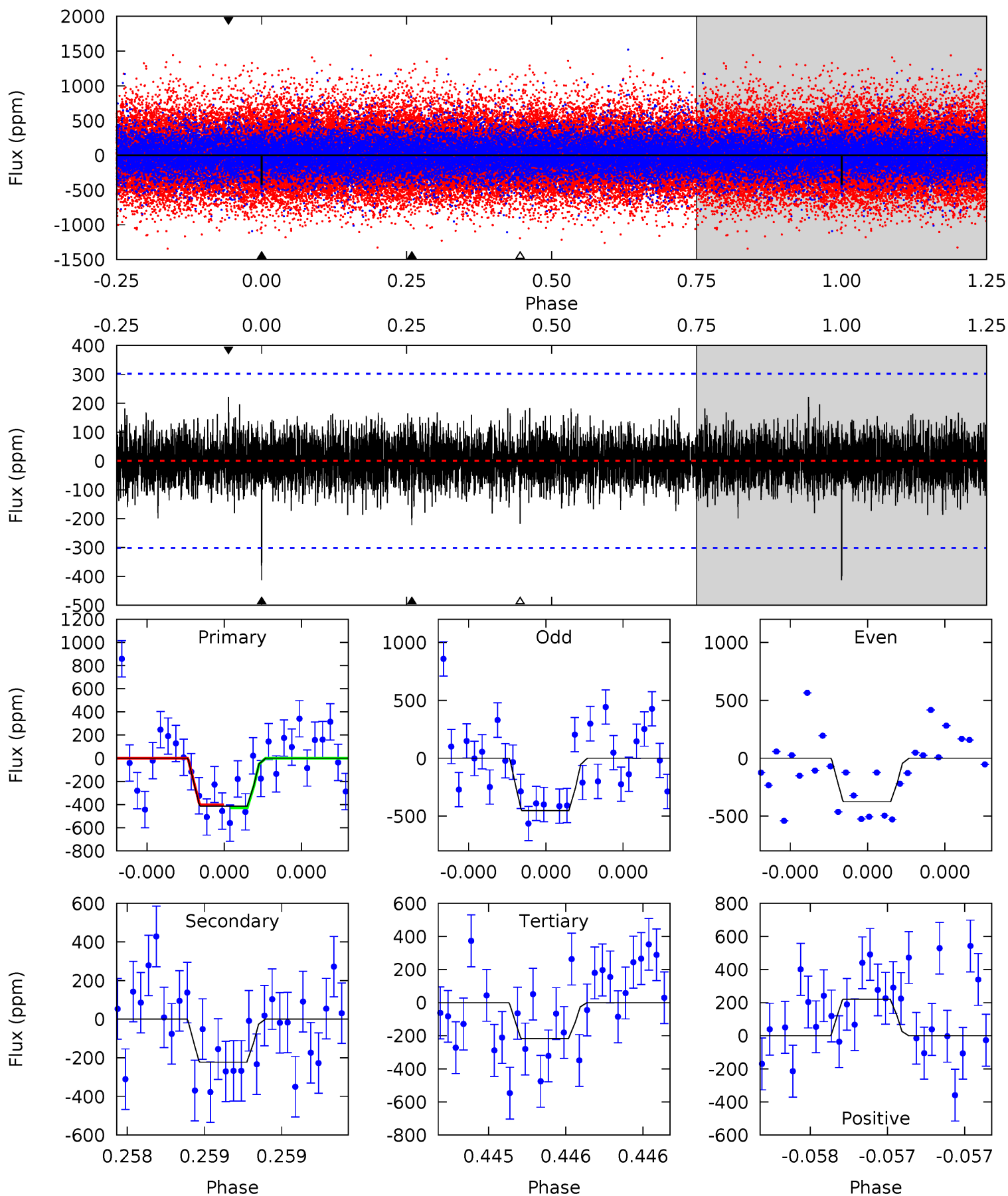
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.34	4.33	4.00	4.22	5.57	3.48	1.11	4.35	4.12	0.33	0.11	0.96	1.00	0.34	0.10



# Alt Model-Shift Uniqueness Test

009533045-01, P = 272.953165 Days, E = 140.565219 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
7.63	4.11	4.01	4.08	5.58	3.49	1.01	3.62	3.55	0.10	0.03	0.70	0.97	0.35	0.24



### Stellar Parameters For KIC 009533045

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5795^{+156}_{-173}$	$4.422^{+0.084}_{-0.196}$	$0.020^{+0.250}_{-0.300}$	$1.010^{+0.295}_{-0.126}$	$0.983^{+0.125}_{-0.102}$	$1.342^{+0.593}_{-0.665}$
	+3%/-3%	+2%/-4%	+1250%/-1500%	+29%/-12%	+13%/-10%	+44%/-50%
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 009533045-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-235 \pm 54$	$6.47^{+6.26}_{-4.16}$	$402^{+27}_{-22}$	$3484^{+1733}_{-630}$	$1993^{+14325}_{-1480}$
Alt.	$-223 \pm 54$	$5.75^{+6.02}_{-3.83}$	$400^{+26}_{-19}$	$3582^{+1907}_{-696}$	$2346^{+18322}_{-1785}$

$T_{\text{max}}$  = 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

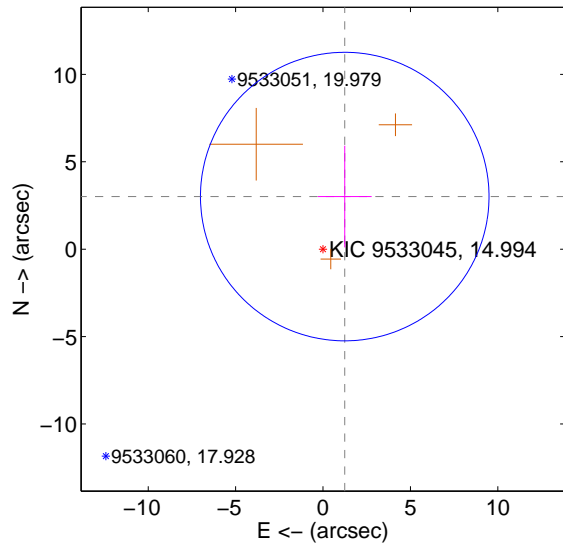
Supplemental centroid analysis for 009533045-01. Kepler magnitude: 14.99. Transit SNR 7.38

There are 0 quarters with good PRF difference image offsets

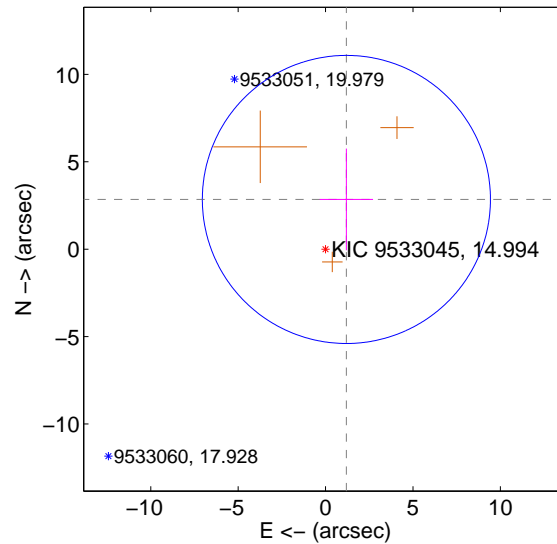
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.256 \pm 2.752$	1.18	$-1.242 \pm 1.542$	$3.010 \pm 2.908$
PRF-fit source offset from KIC position	$3.085 \pm 2.748$	1.12	$-1.191 \pm 1.526$	$2.845 \pm 2.909$
photometric centroid source offset	$4.61 \pm 2.31$	2.00	$3.34 \pm 2.27$	$3.18 \pm 2.35$

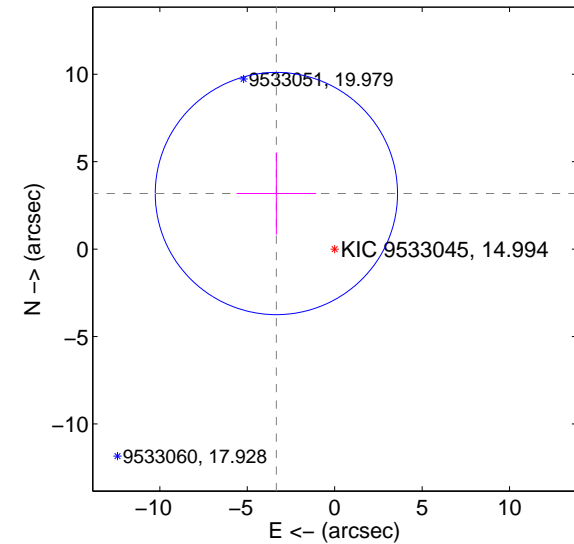
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

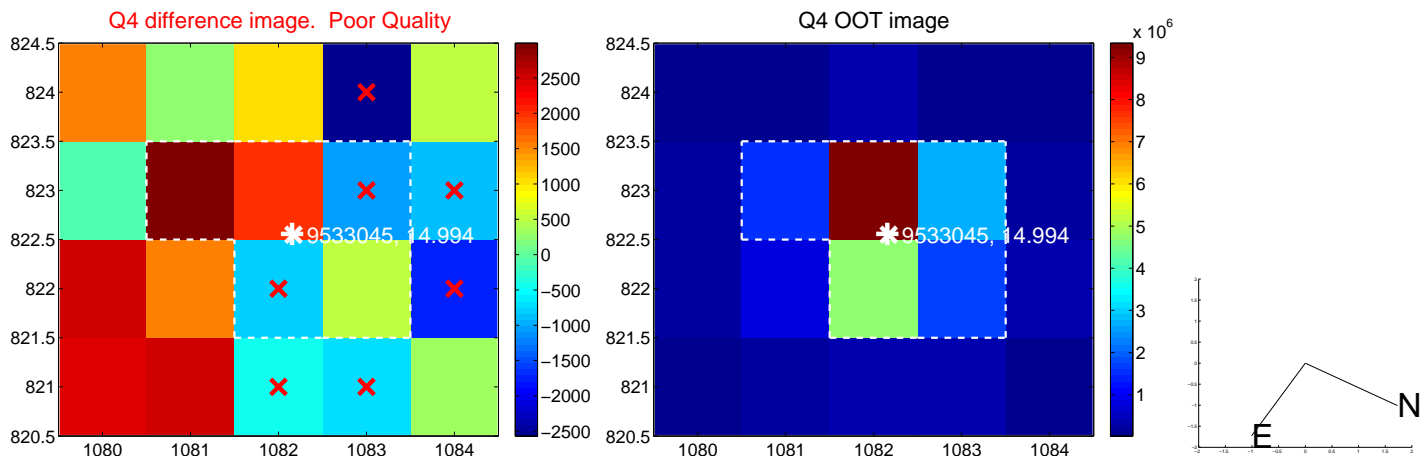
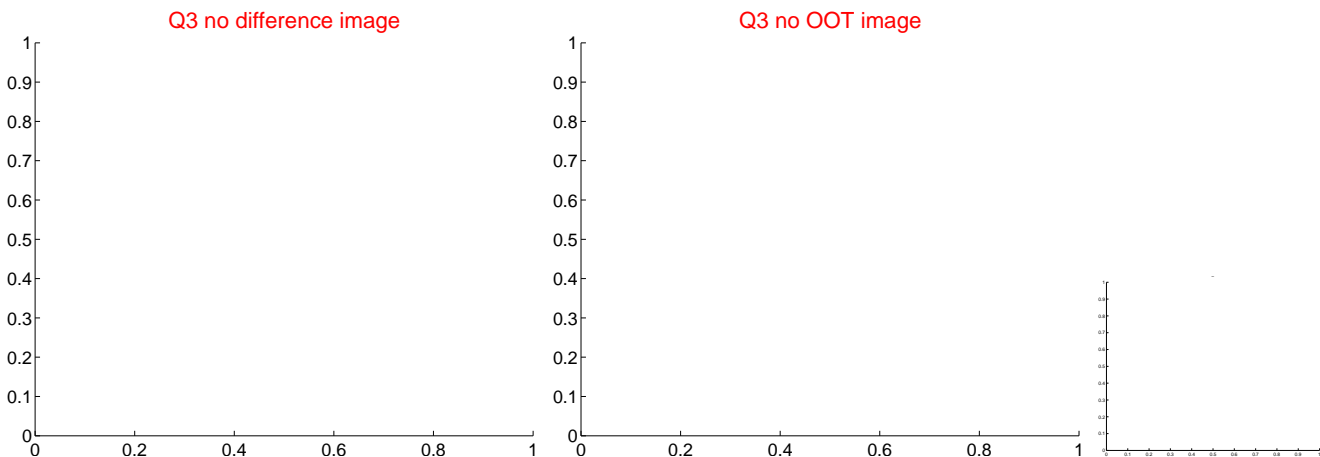
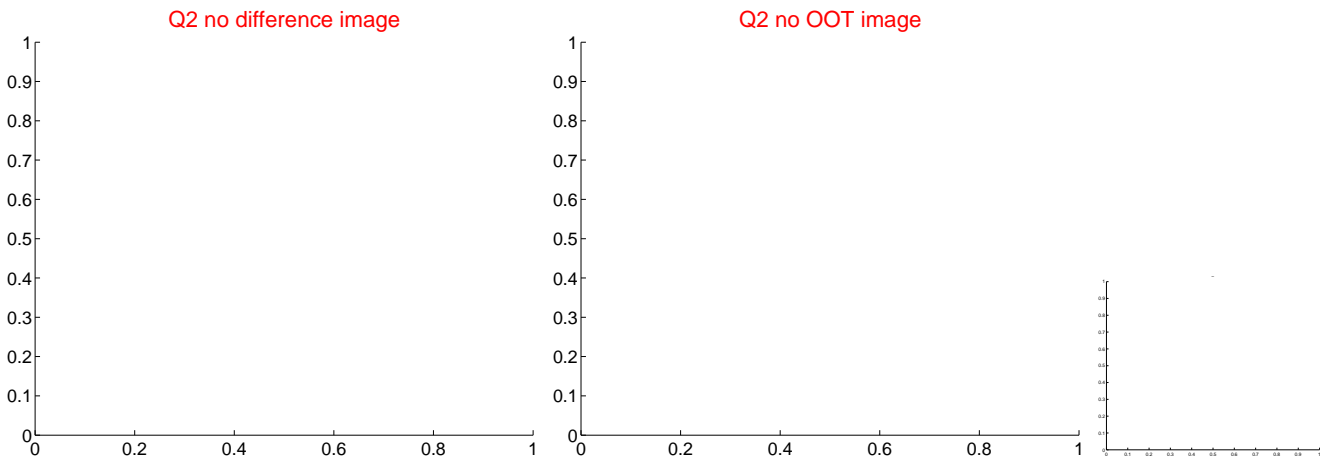
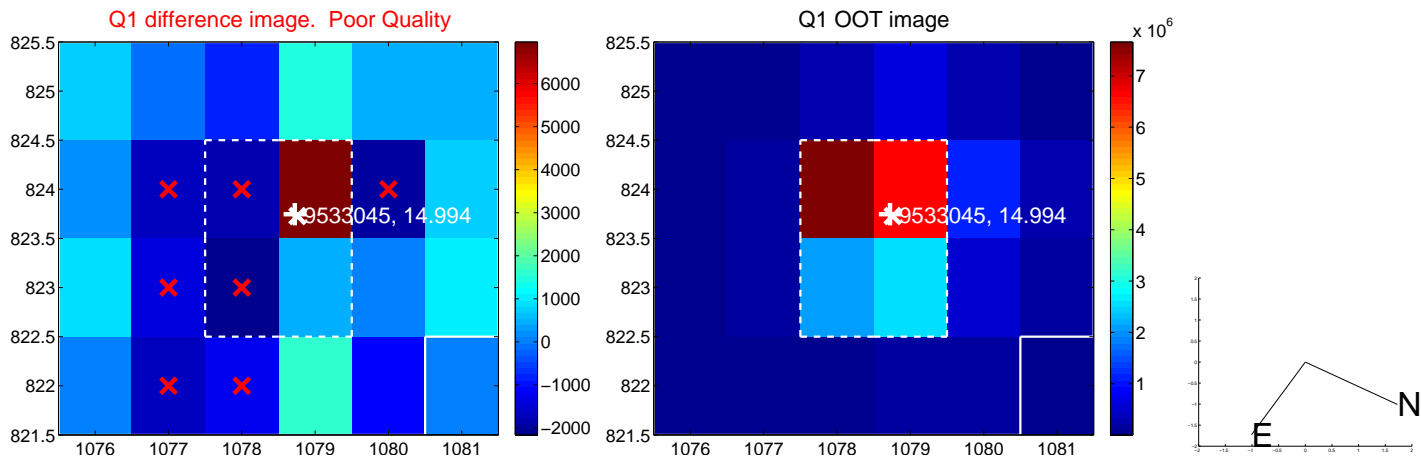


offset from photometric centroids



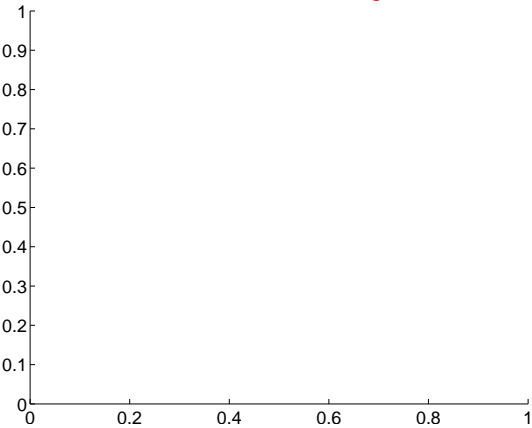
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

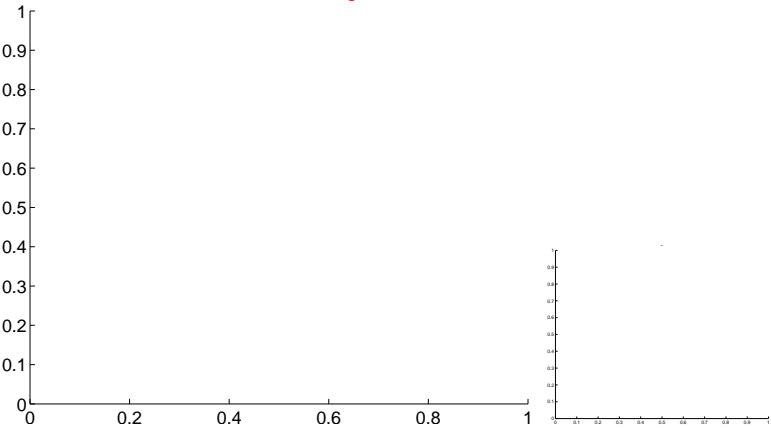


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

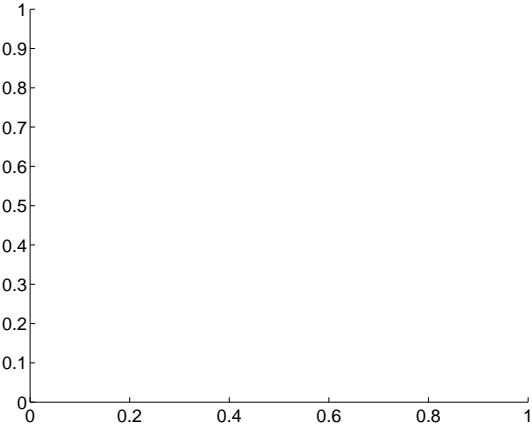
Q5 no difference image



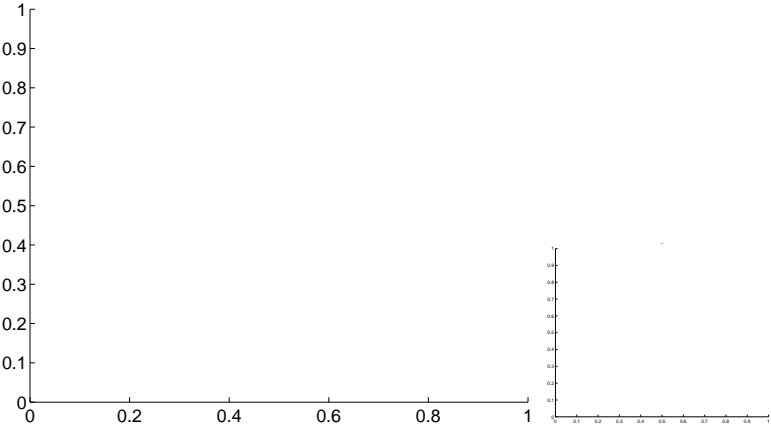
Q5 no OOT image



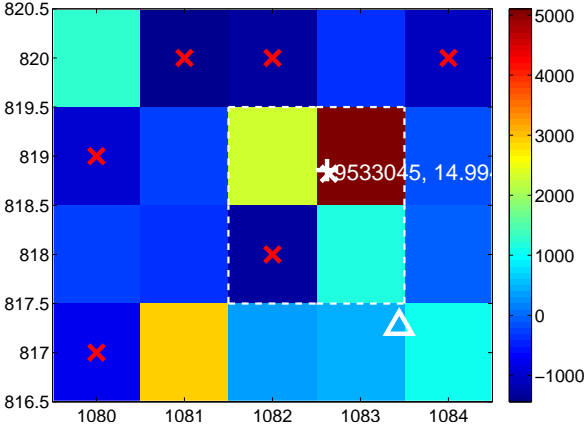
Q6 no difference image



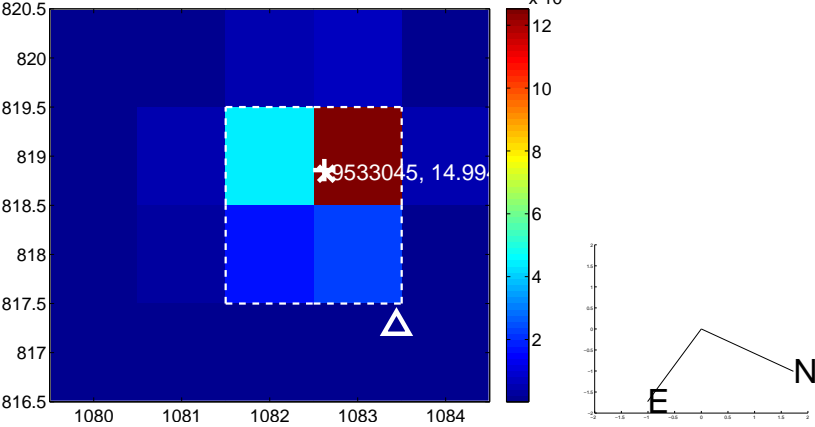
Q6 no OOT image



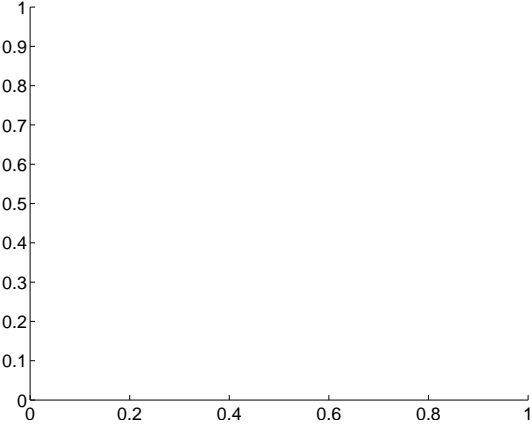
Q7 difference image. Poor Quality



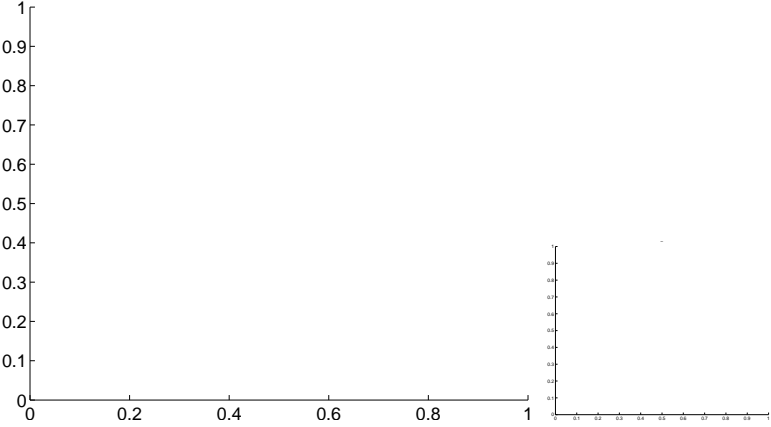
Q7 OOT image



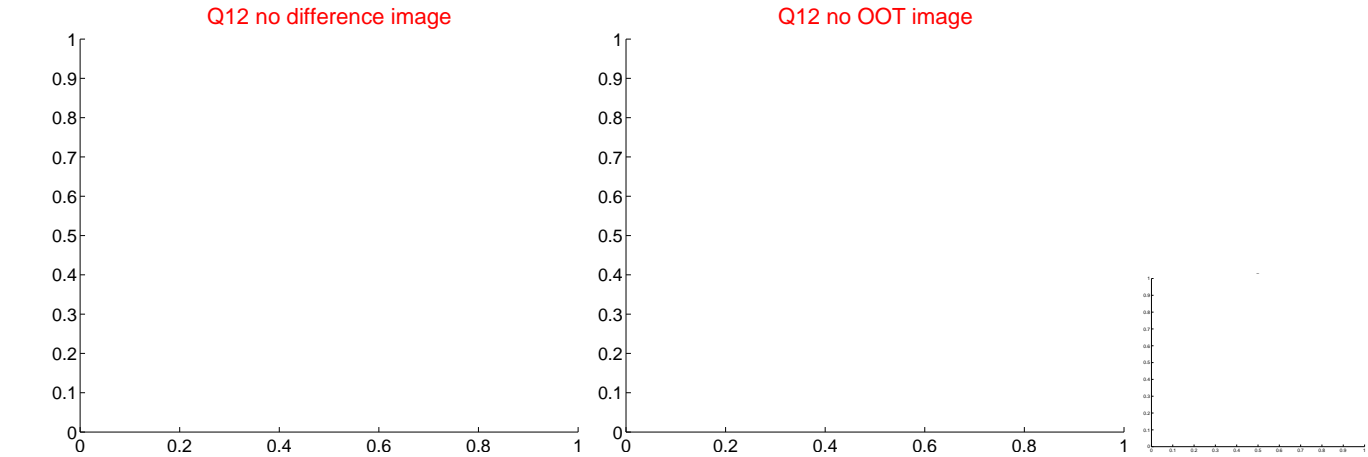
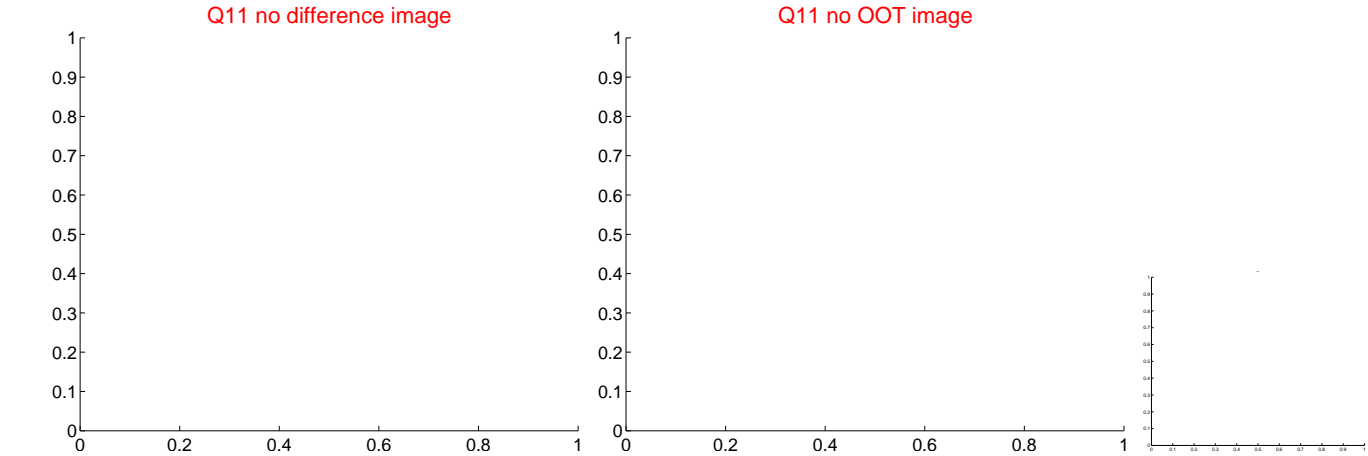
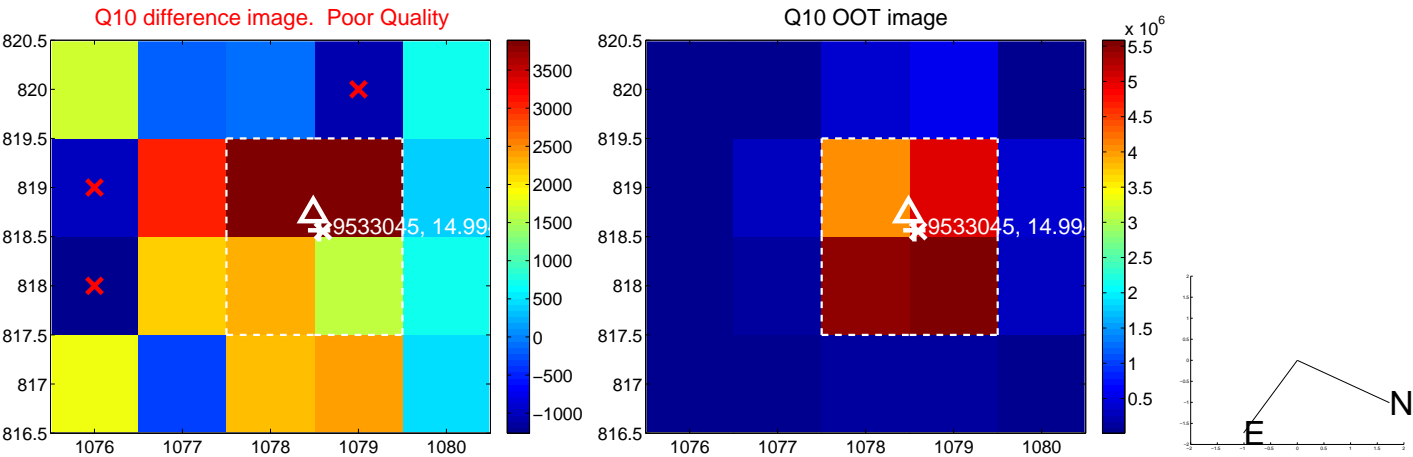
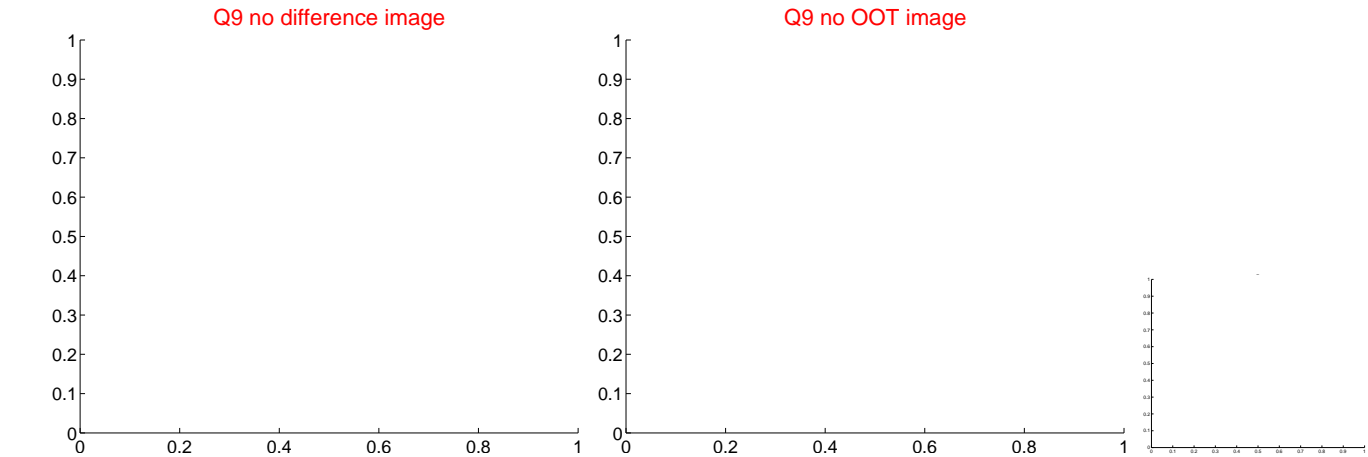
Q8 no difference image



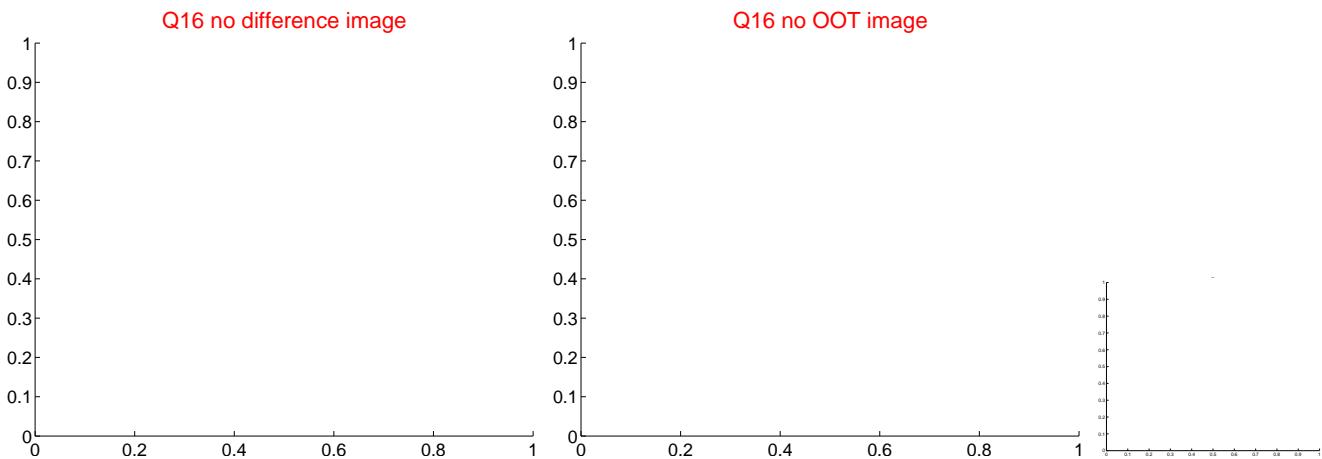
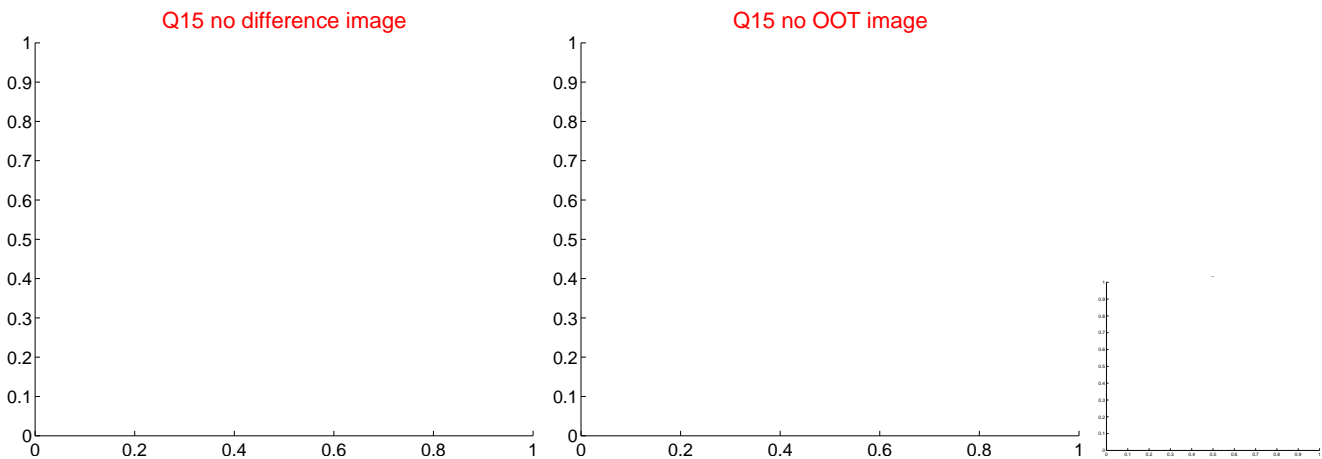
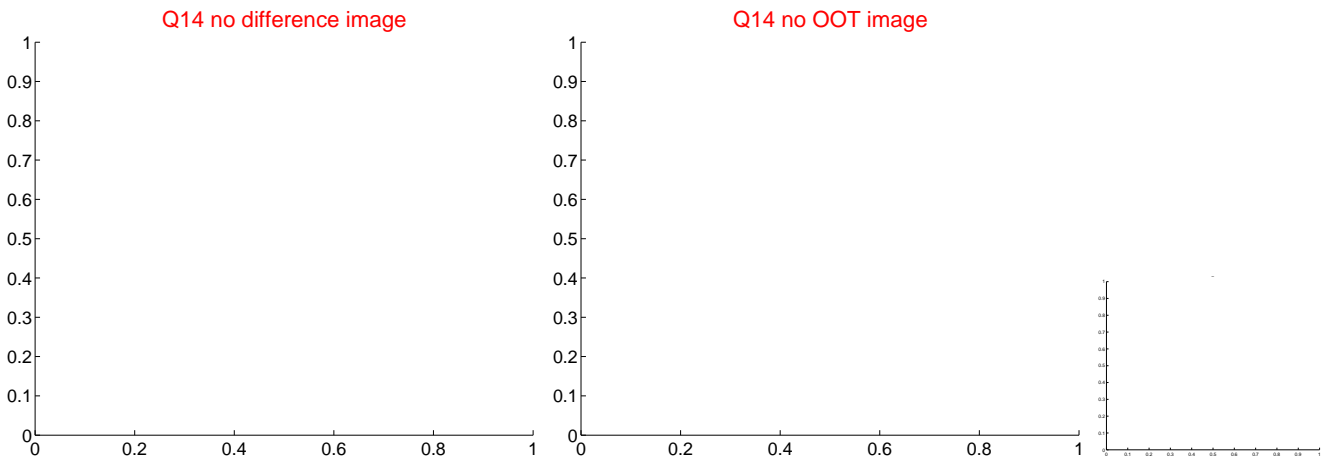
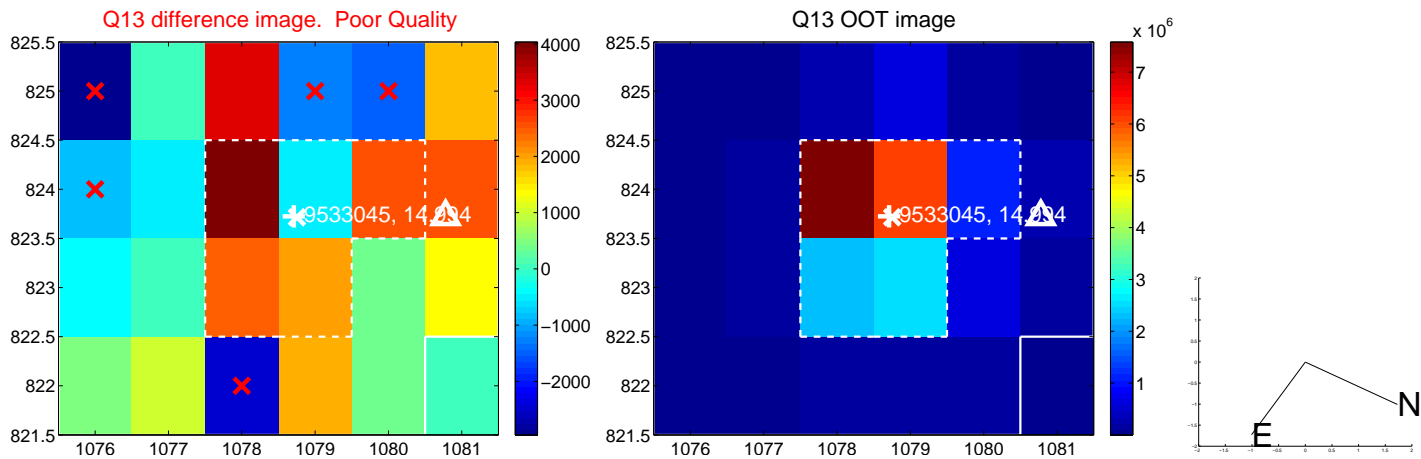
Q8 no OOT image



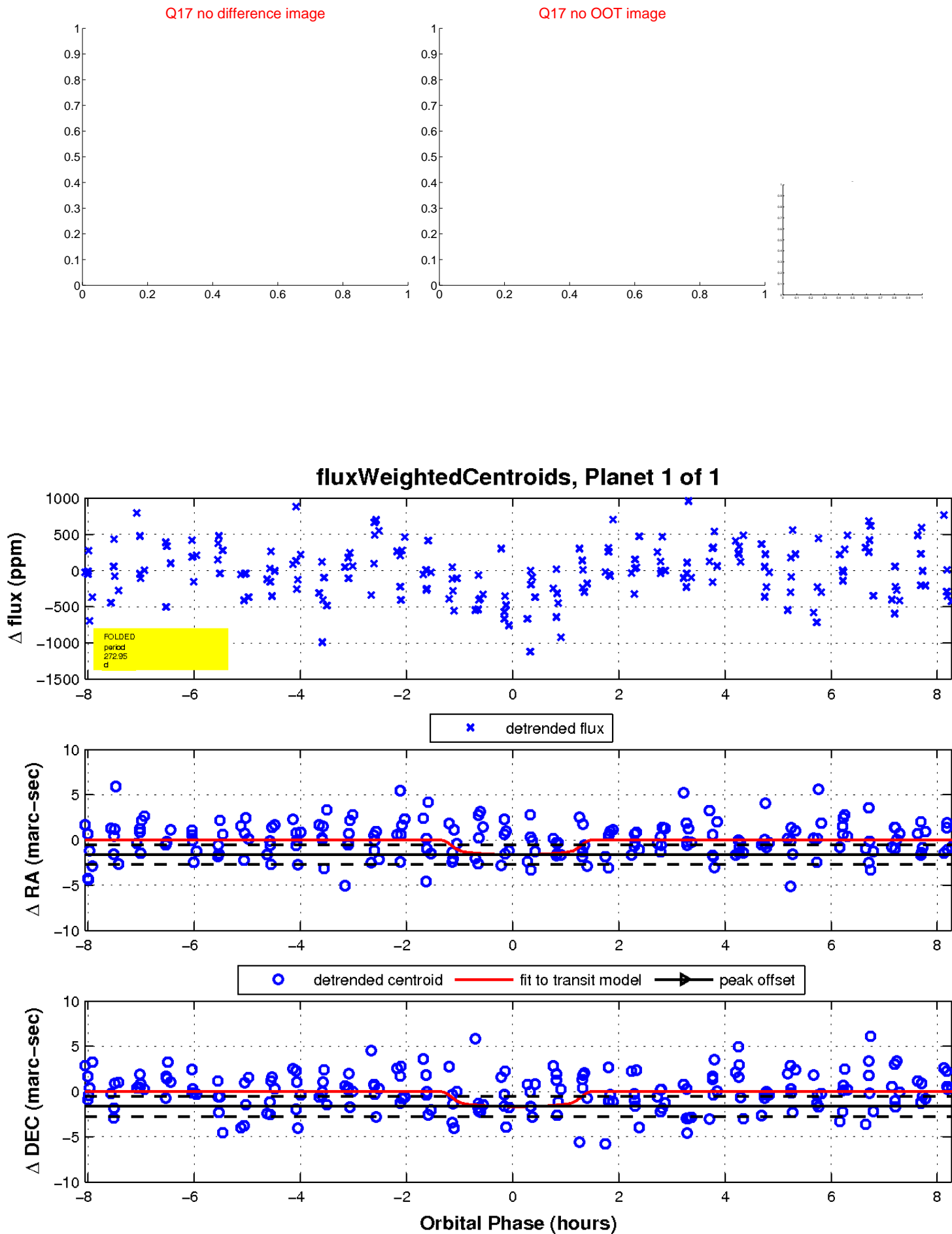
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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

