

# KIC 010909974

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010909974-01	OBS	No	351.208661	288.126122	126.9	7.008	7.3	7.1	0.88	5667	1.11	0.87

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010909974-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS

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

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

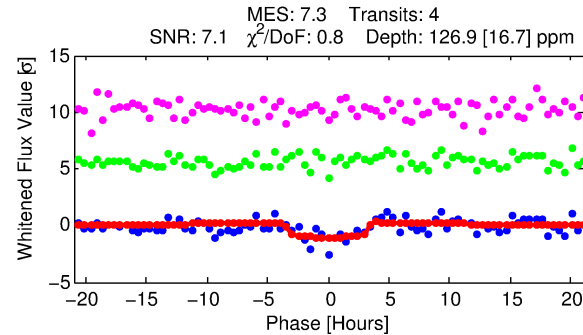
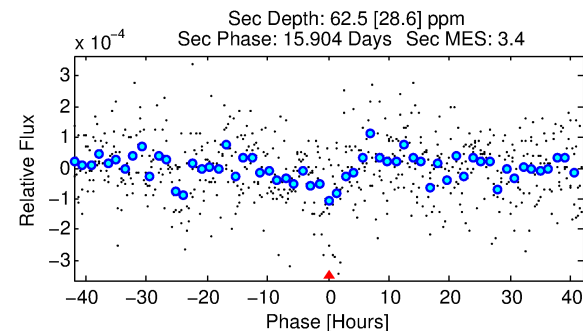
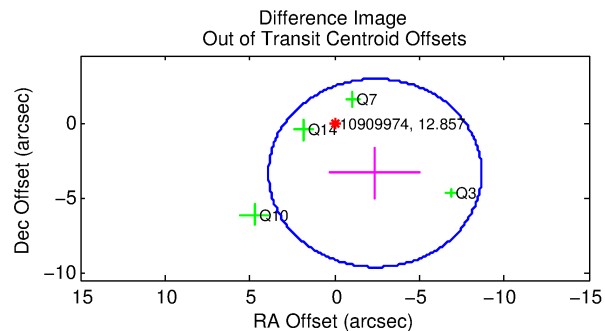
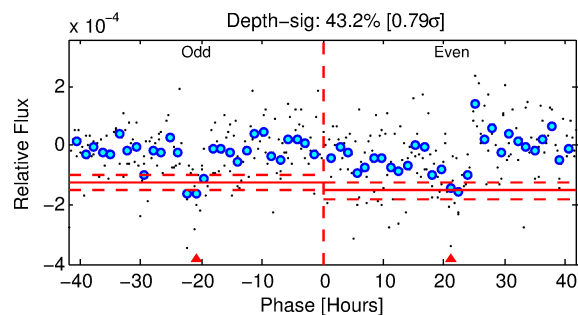
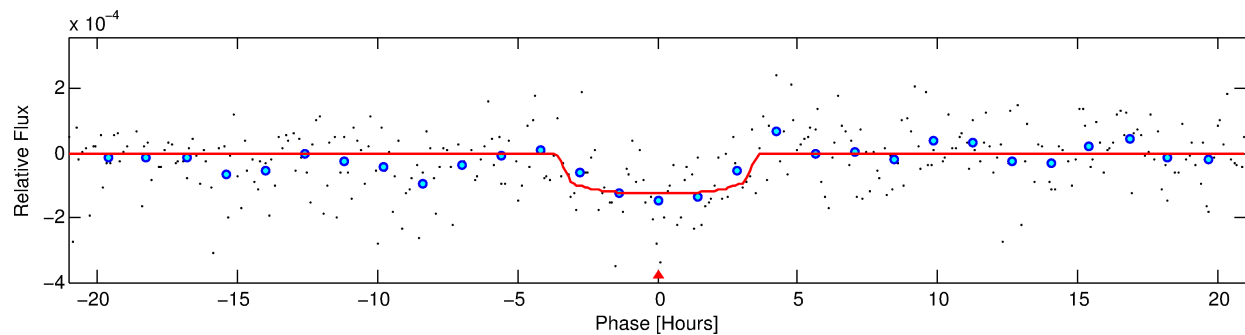
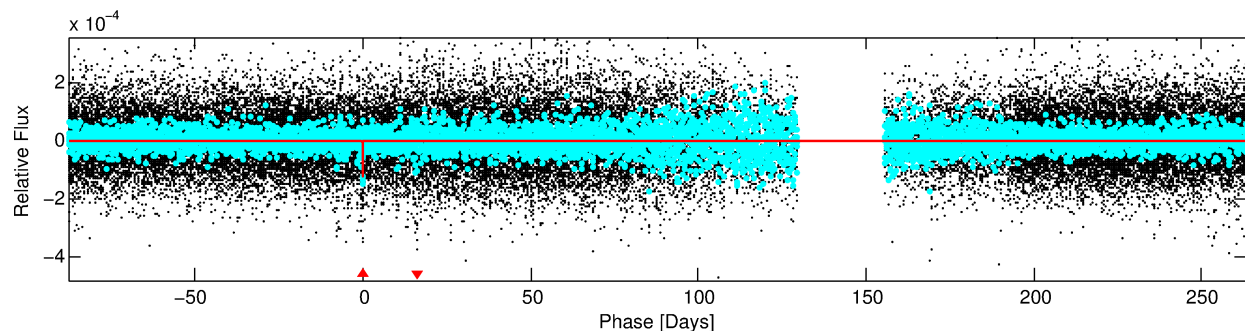
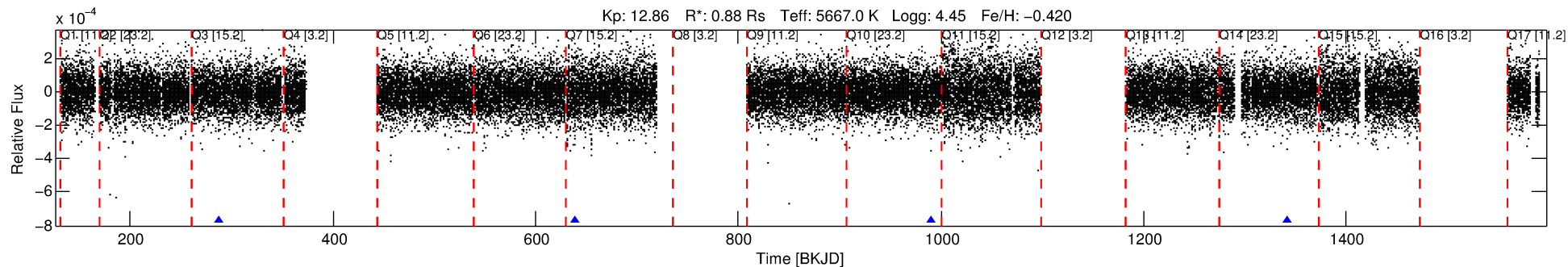
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010909974-01

No Significant Match Found

# DV One-Page Summary

KIC: 10909974 Candidate: 1 of 1 Period: 351.209 d



## DV Fit Results:

Period = 351.20866 [0.00664] d  
Epoch = 288.1261 [0.0129] BKJD  
Rp/R\* = 0.0116 [0.0081]  
a/R\* = 222.90 [734.49]  
b = 0.83 [1.27]  
Seff = 0.87 [0.29]  
Teq = 246 [20] K  
Rp = 1.11 [0.82] Re  
a = 0.9017 [0.1894] AU  
Ag = 22782.42 [34164.02] [0.67 $\sigma$ ]  
Teffp = 4678 [1724] K [2.57 $\sigma$ ]

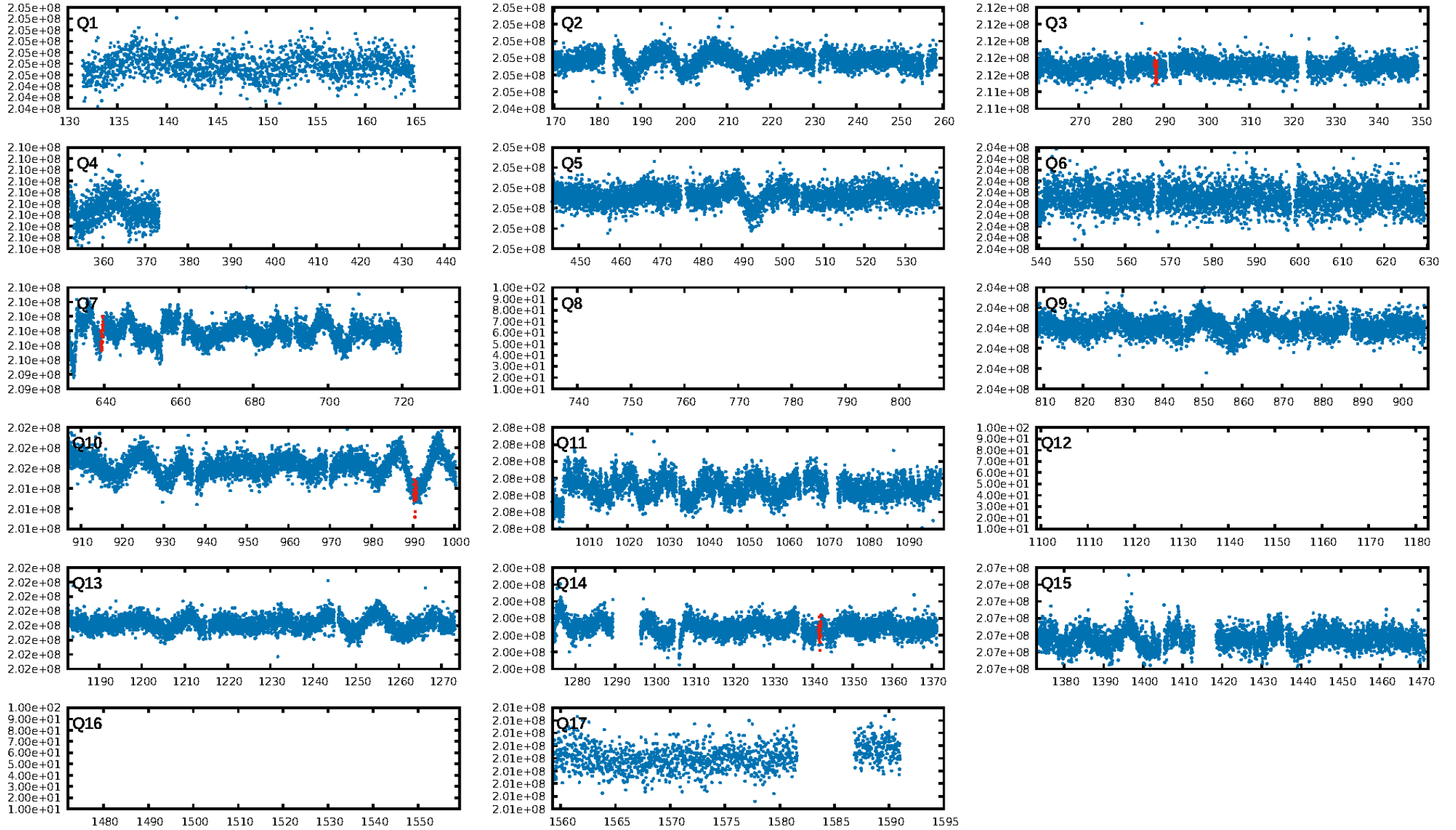
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 50.3%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 1.14e-10**  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 6.309  
Centroid-sig: 28.0%  
Centroid-so: 1.931 arcsec [1.12 $\sigma$ ]  
OotOffset-rm: 4.122 arcsec [1.97 $\sigma$ ]  
KicOffset-rm: 4.330 arcsec [2.04 $\sigma$ ]  
OotOffset-st: 2/2/0/0 [4]  
KicOffset-st: 2/2/0/0 [4]  
DiffImageQuality-fgm: 0.50 [2/4]  
DiffImageOverlap-fno: 1.00 [4/4]

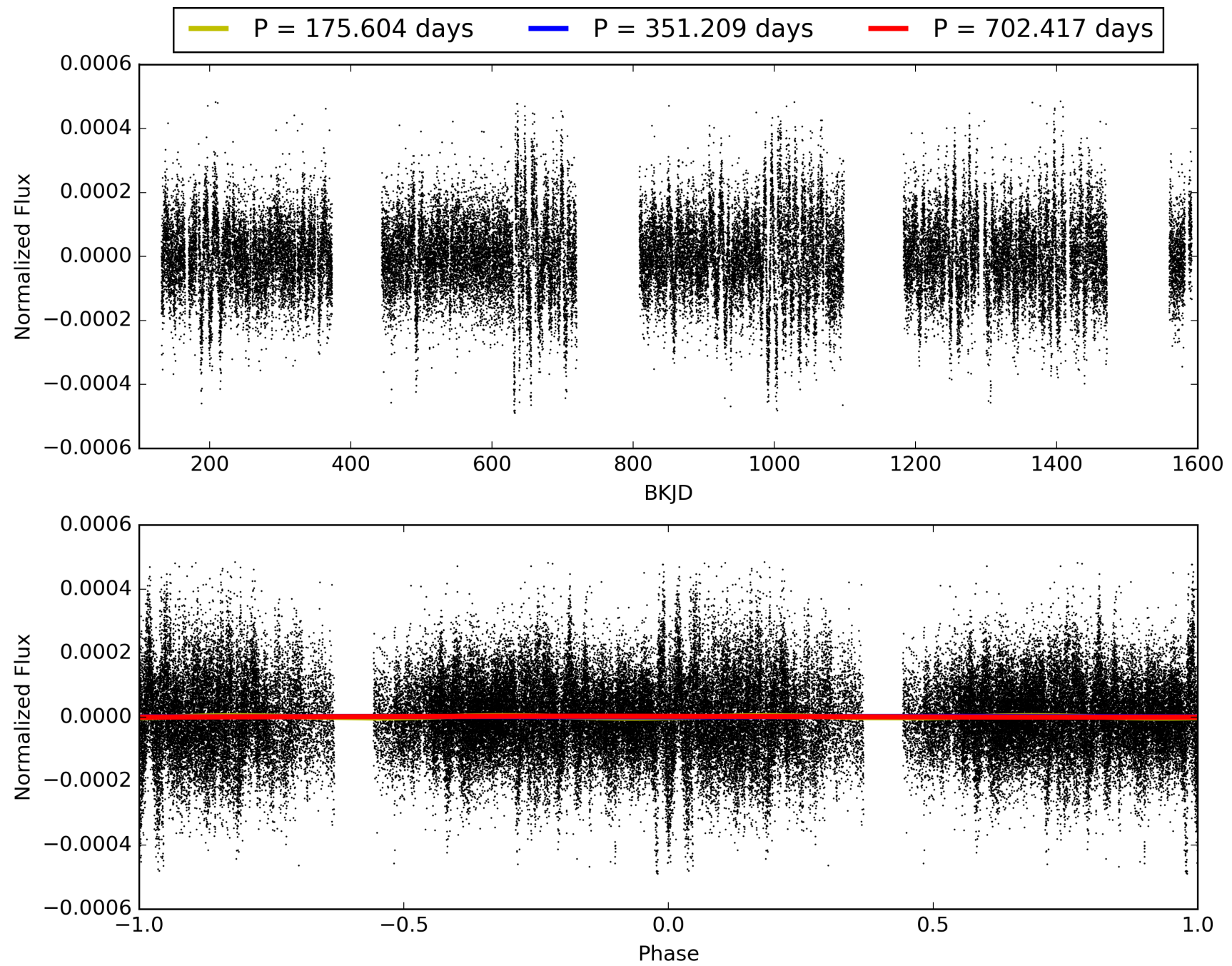
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 28-Jan-2016 18:47:29 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010909974-01, PDC Light Curves

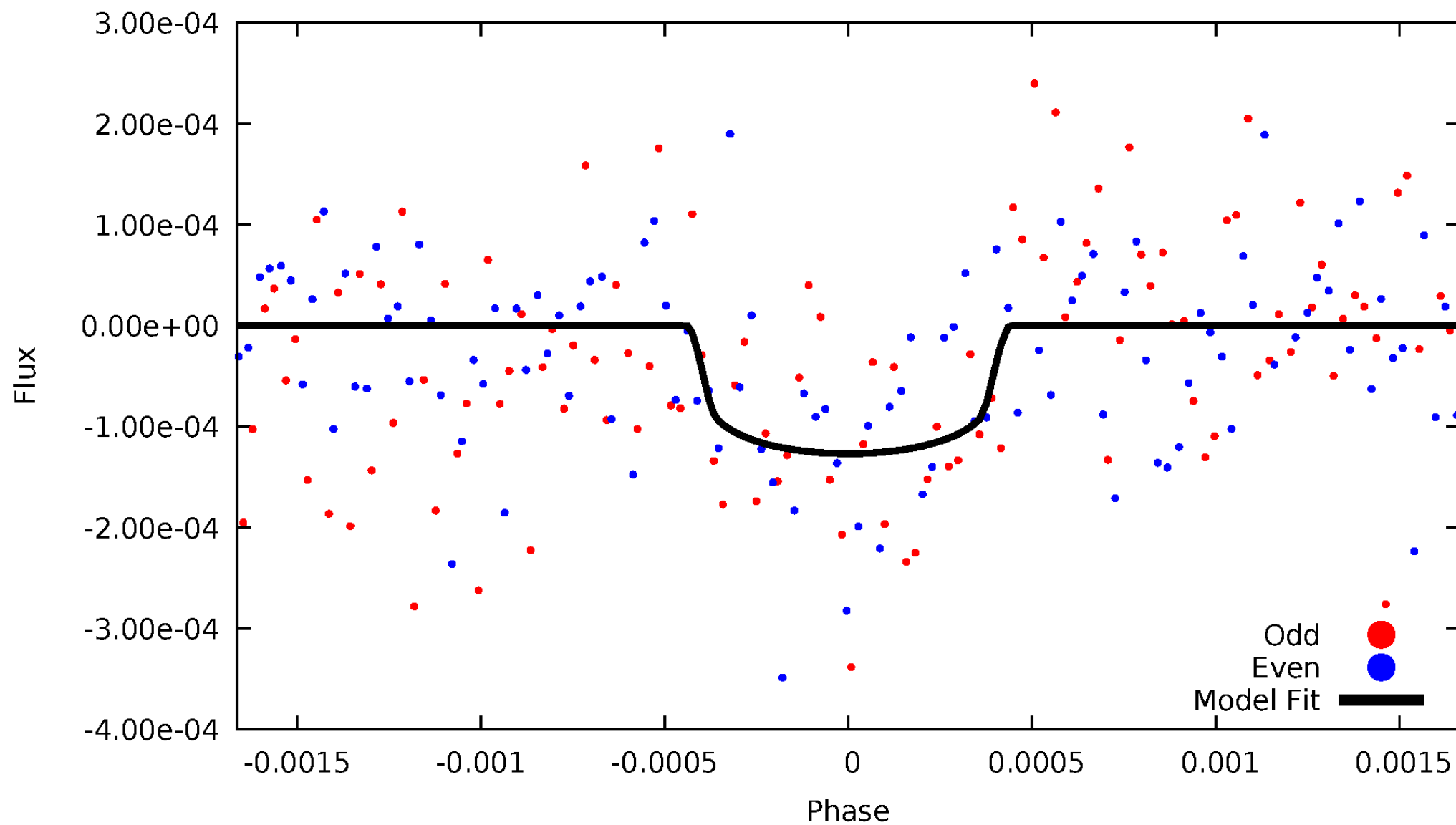


TCE 010909974-01



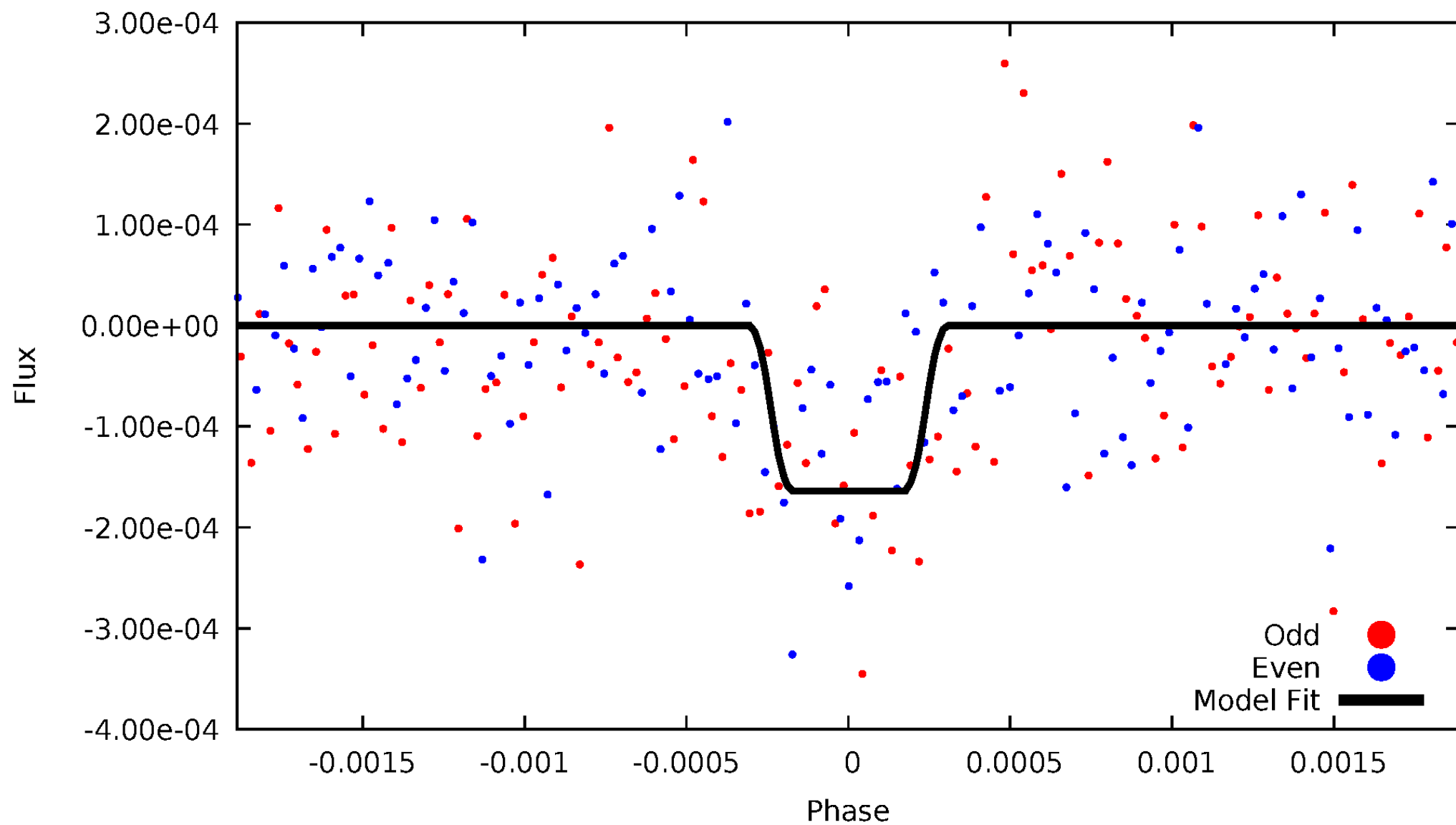
# DV Odd/Even

TCE 010909974-01



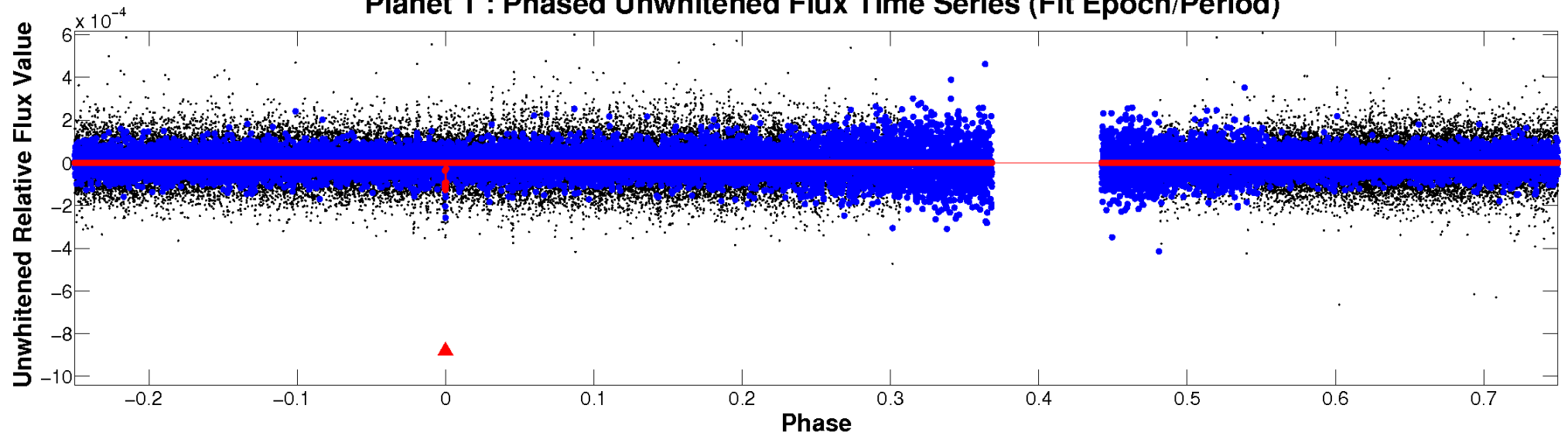
# ALT Odd/Even

TCE 010909974-01

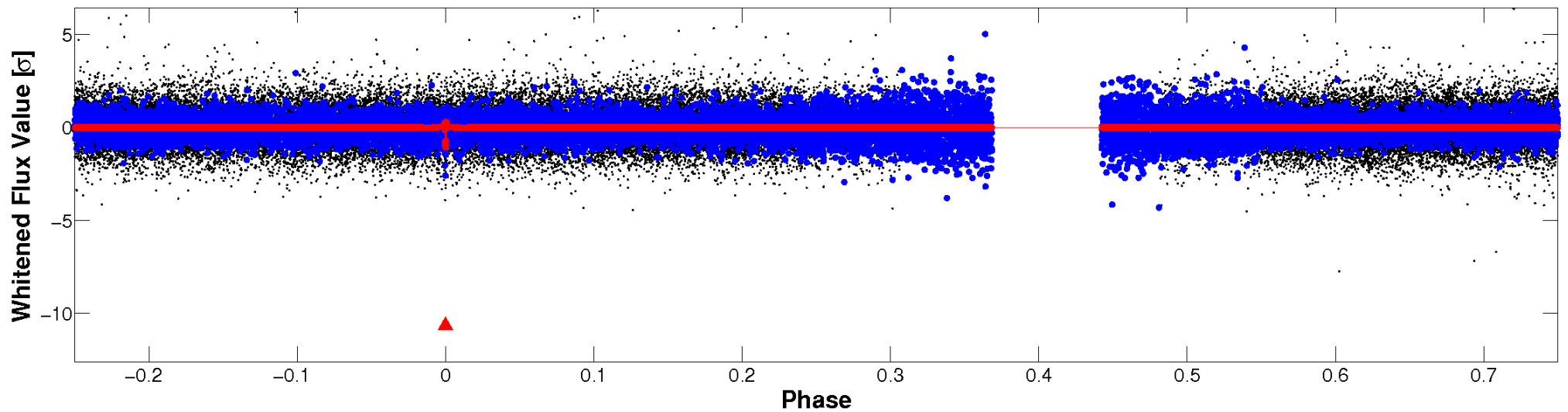


# Non-Whitened Vs. Whitened Light Curve

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

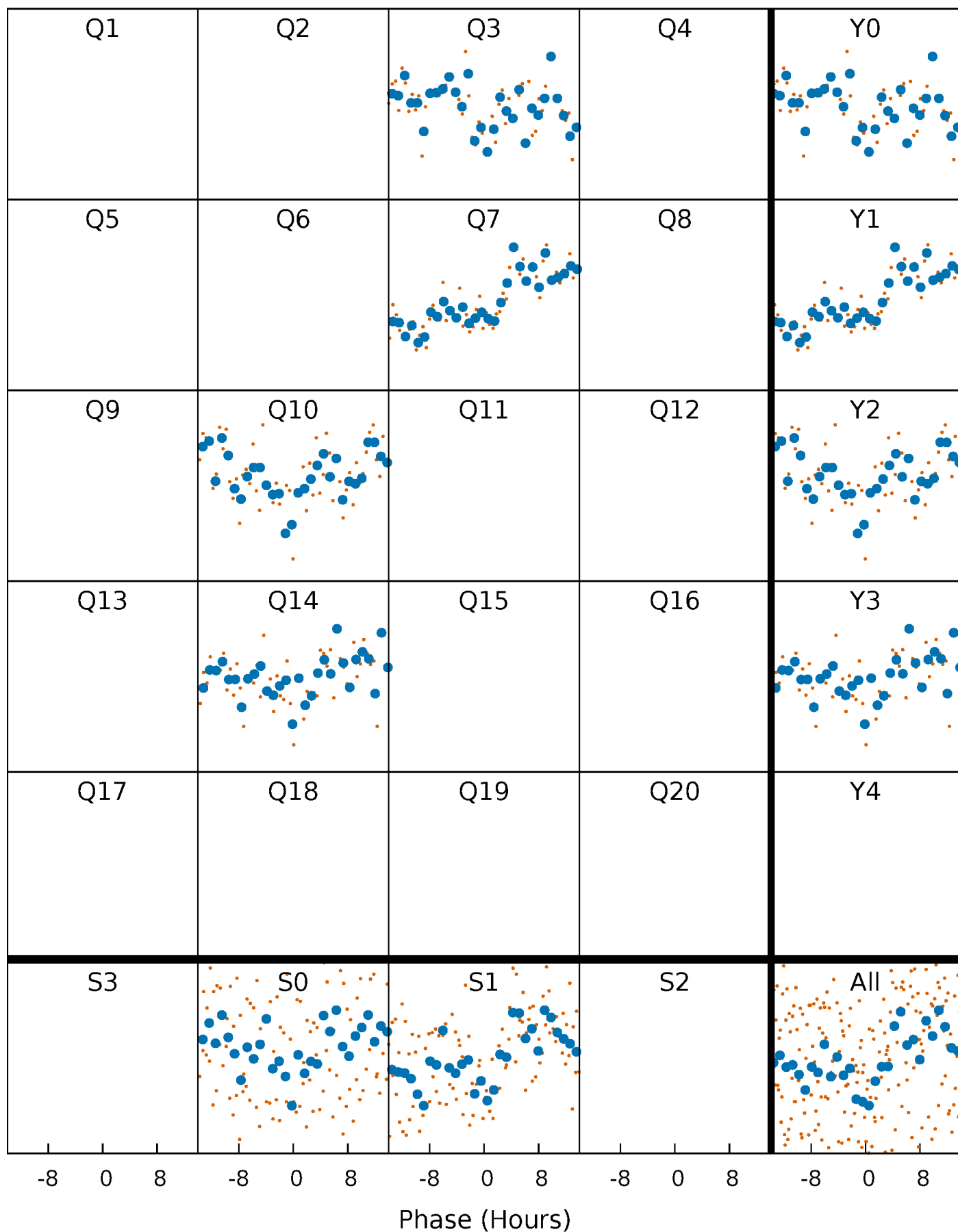


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

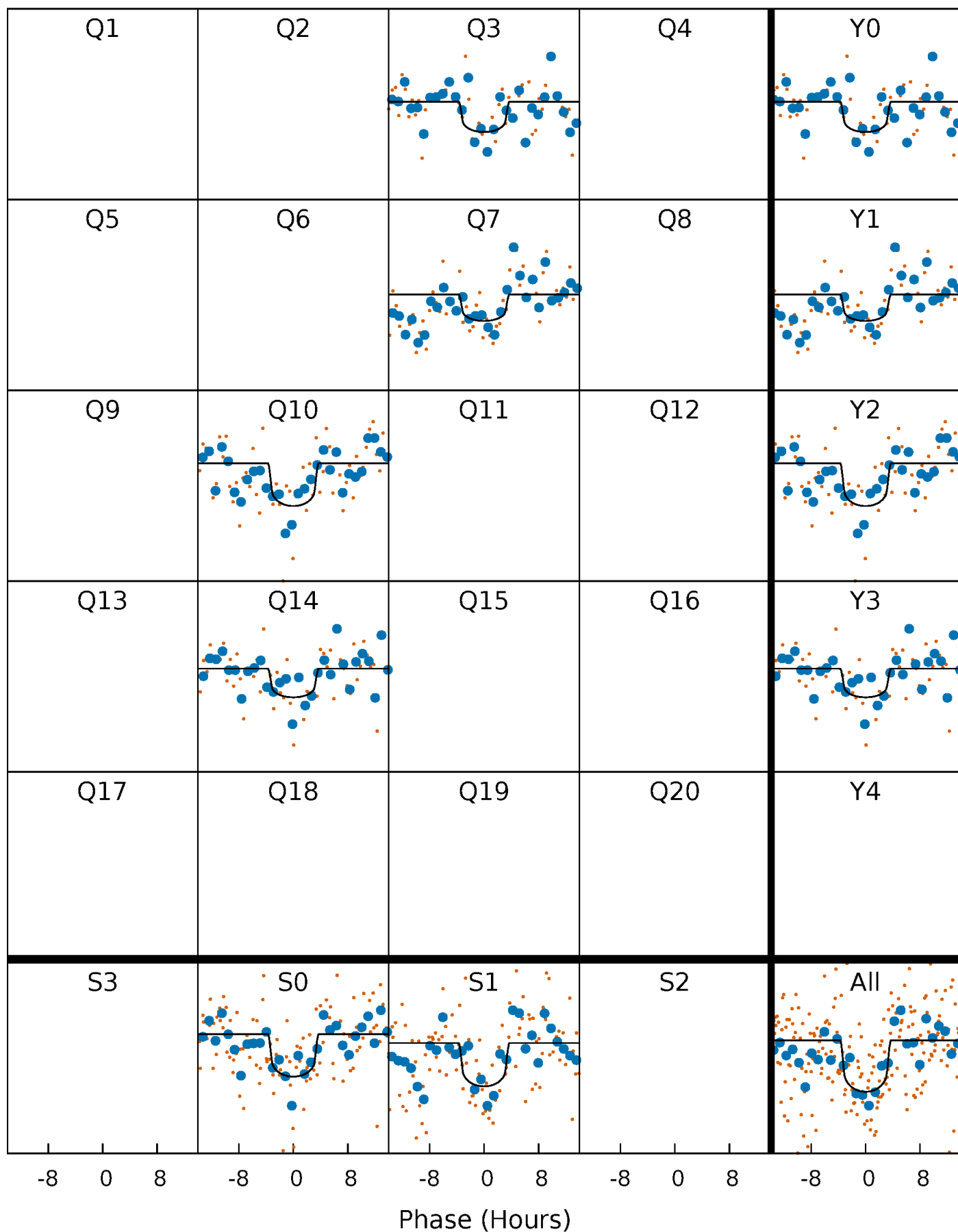
TCE 010909974-01 P=351.208662 Days  $T_0=288.126122$  (BKJD)





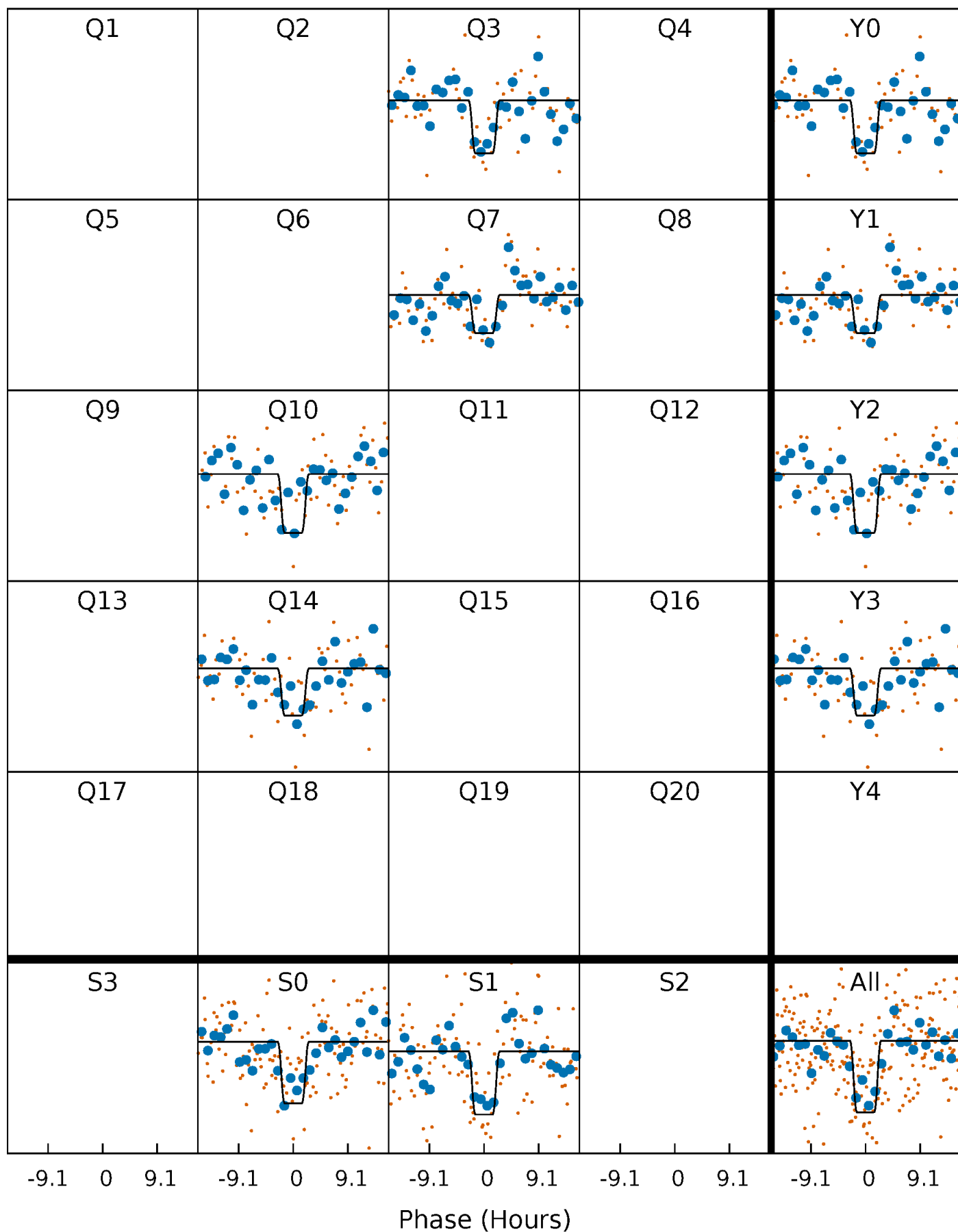
# DV Quarter-Phased Transit Curves

TCE 010909974-01 P=351.208662 Days  $T_0=288.126122$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

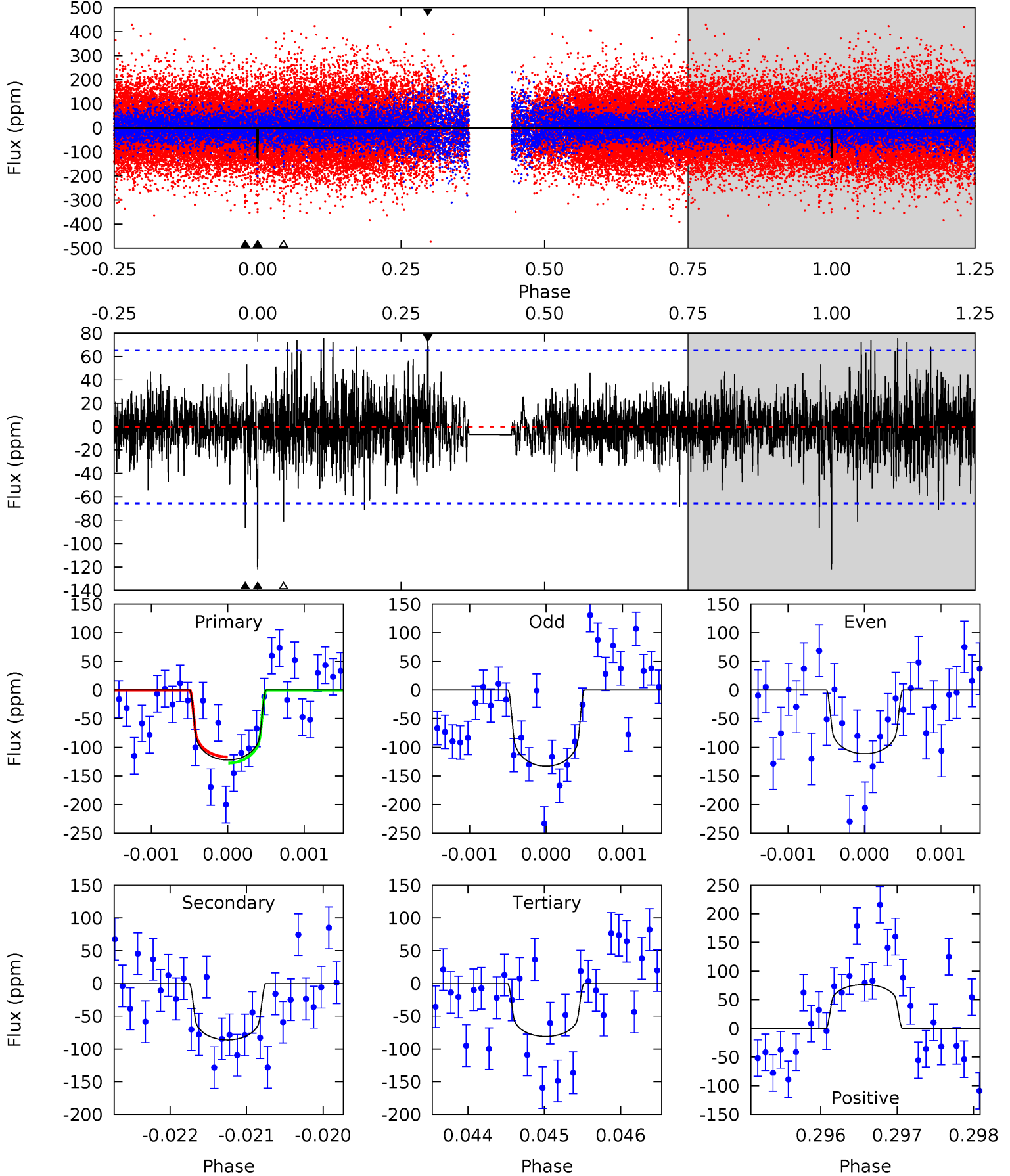
TCE 010909974-01 P=351.198407 Days  $T_0=288.144368$  (BKJD)



# DV Model-Shift Uniqueness Test

010909974-01, P = 351.208662 Days, E = 288.126122 Days

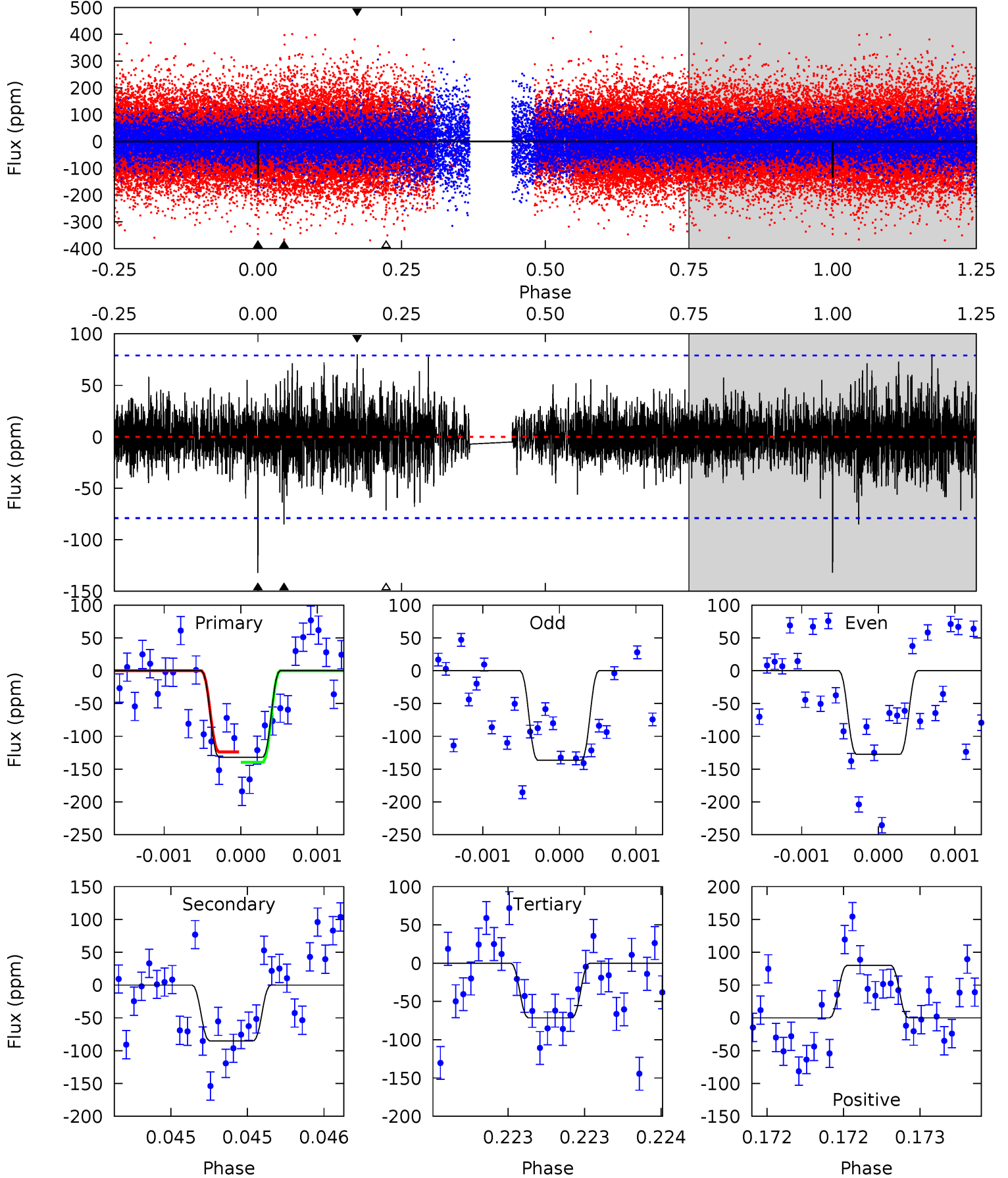
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.2	7.22	6.77	6.40	5.47	3.32	1.46	3.43	3.81	0.44	0.81	0.91	0.96	0.39	0.44



# Alt Model-Shift Uniqueness Test

010909974-01, P = 351.198407 Days, E = 288.144368 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
9.26	5.97	5.00	5.61	5.54	3.43	1.26	4.25	3.64	0.97	0.36	0.31	0.99	0.38	0.55



### Stellar Parameters For KIC 010909974

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5667^{+186}_{-186}$	$4.453^{+0.120}_{-0.165}$	$-0.420^{+0.300}_{-0.300}$	$0.875^{+0.220}_{-0.136}$	$0.793^{+0.115}_{-0.062}$	$1.665^{+0.867}_{-0.781}$
	+3%/-3%	+3%/-4%	+71%/-71%	+25%/-16%	+15%/-8%	+52%/-47%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 010909974-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-86 \pm 12$	$1.17^{+0.77}_{-0.66}$	$346^{+23}_{-19}$	$5041^{+2704}_{-921}$	$28038^{+117260}_{-17623}$
Alt.	$-85 \pm 14$	$1.31^{+0.80}_{-0.67}$	$346^{+23}_{-19}$	$4783^{+1876}_{-783}$	$23168^{+70125}_{-14395}$

$T_{max}$  = 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

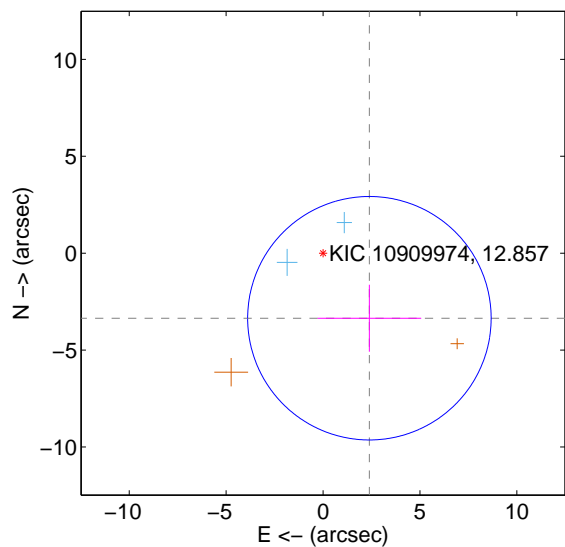
Supplemental centroid analysis for 010909974-01. Kepler magnitude: 12.86. Transit SNR 7.15

There are 2 quarters with good PRF difference image offsets

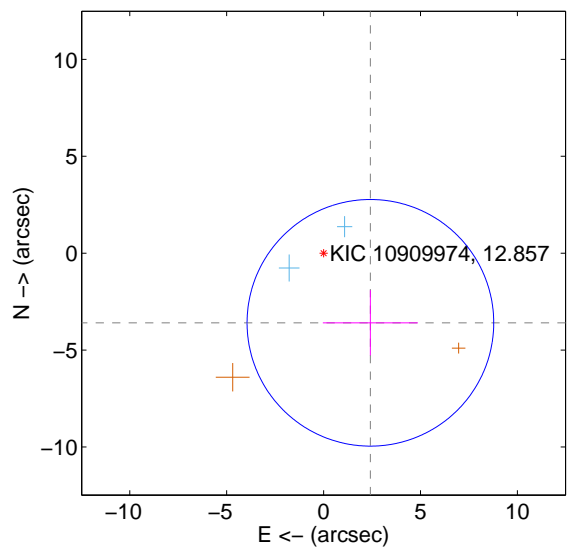
The direct PRF centroid is offset from the target star catalog position by about 0.30 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$4.122 \pm 2.094$	1.97	$-2.392 \pm 2.673$	$-3.357 \pm 1.727$
PRF-fit source offset from KIC position	$4.330 \pm 2.121$	2.04	$-2.416 \pm 2.451$	$-3.593 \pm 1.681$
photometric centroid source offset	$1.93 \pm 1.72$	1.12	$-1.84 \pm 1.72$	$-0.60 \pm 1.76$

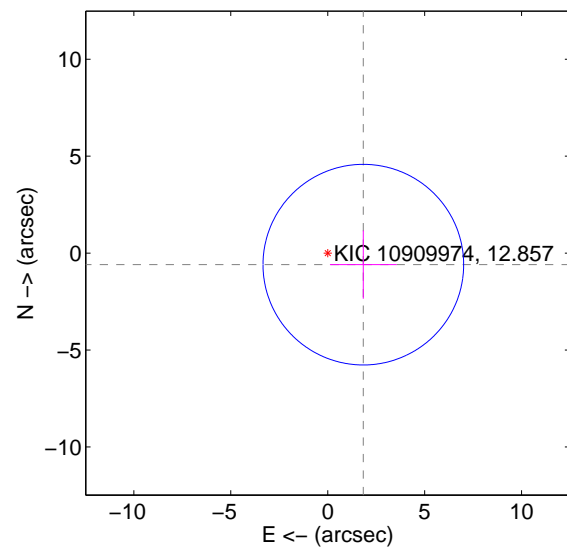
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

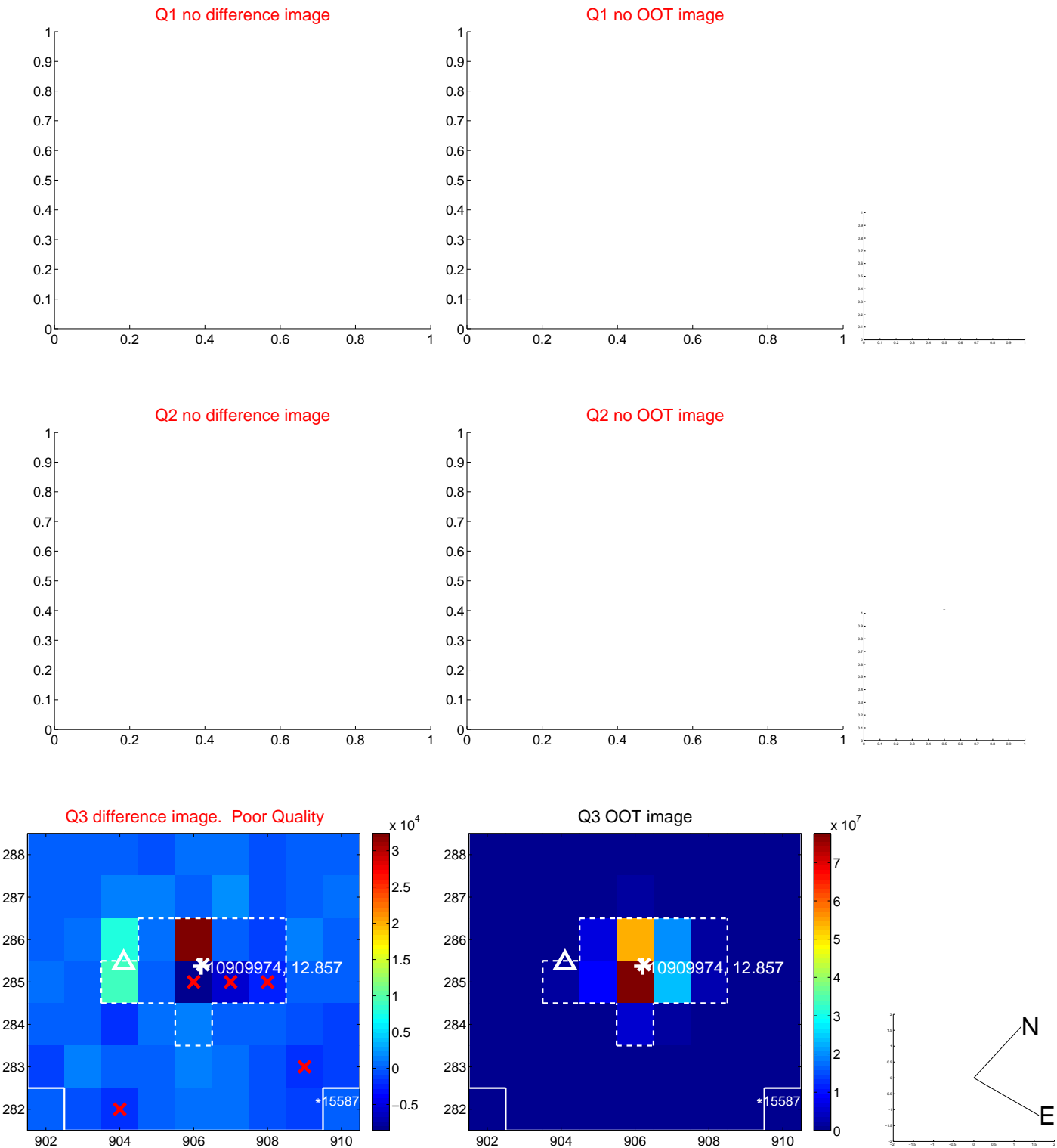


offset from photometric centroids



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



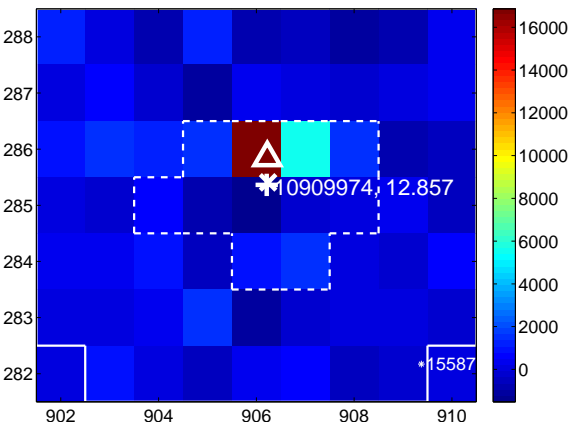
Q6 no difference image



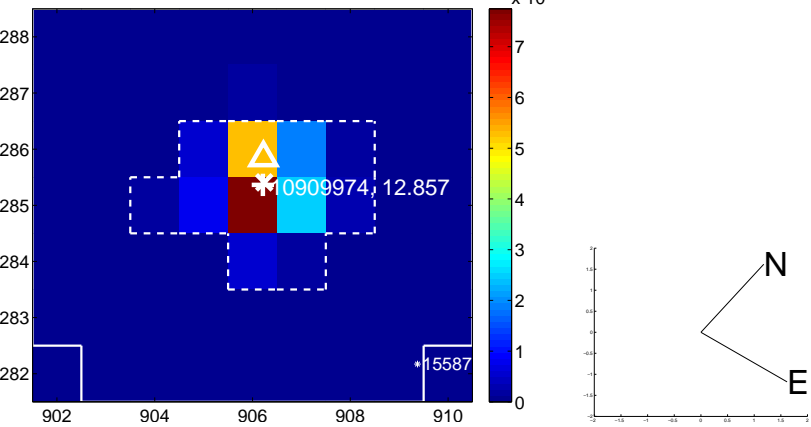
Q6 no OOT image



Q7 difference image



Q7 OOT image



Q8 no difference image

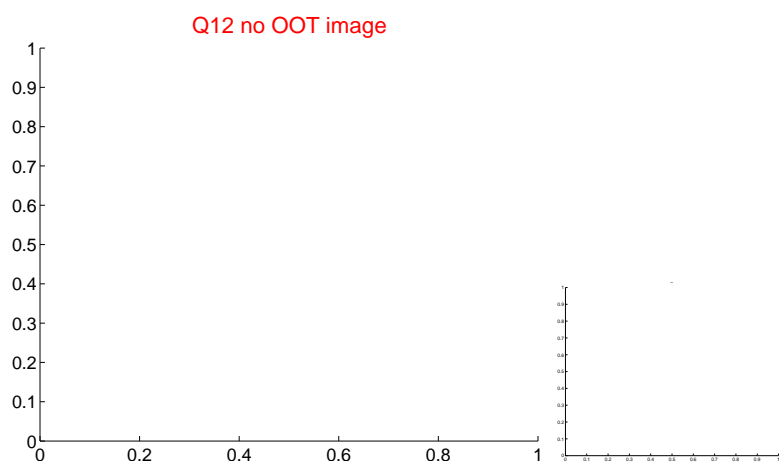
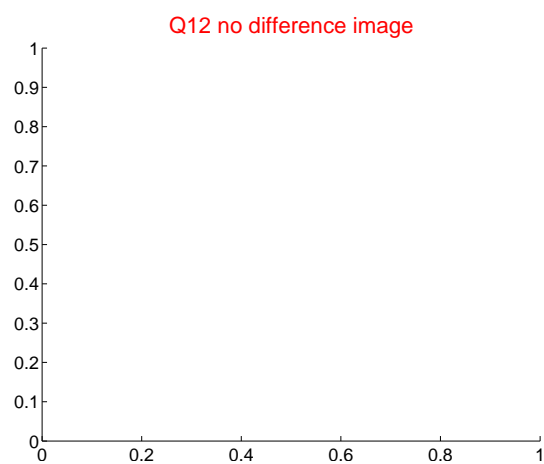
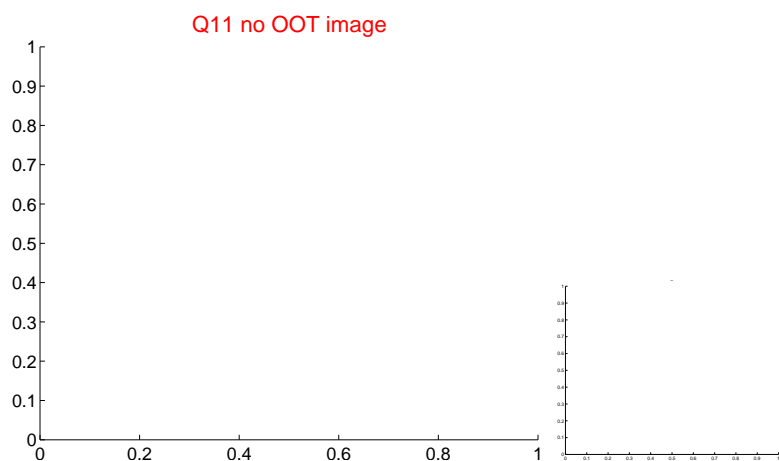
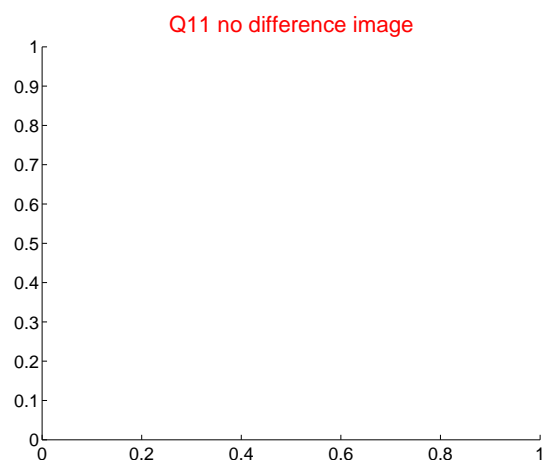
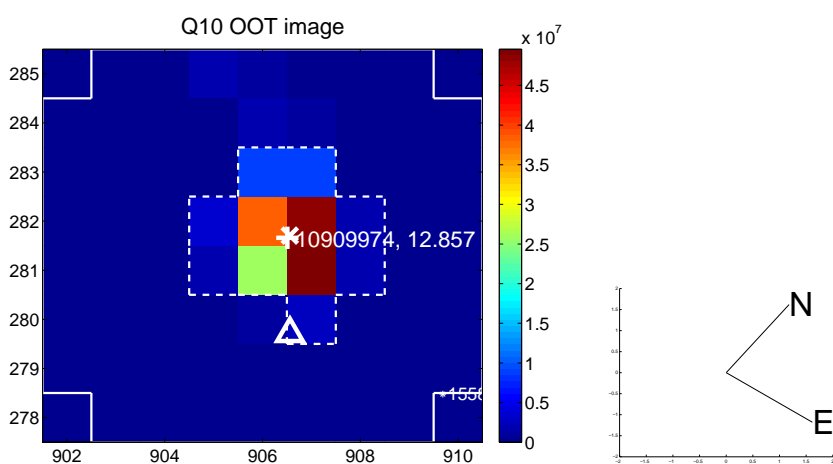
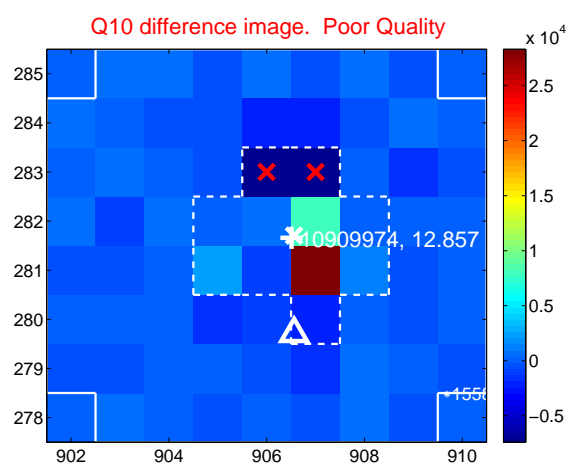
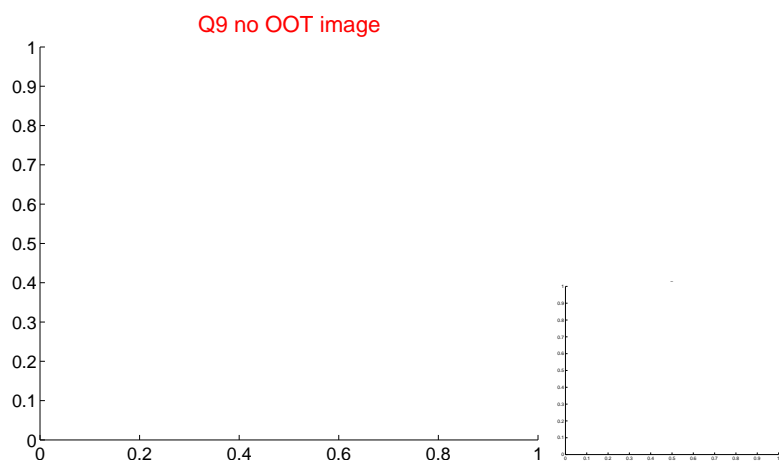
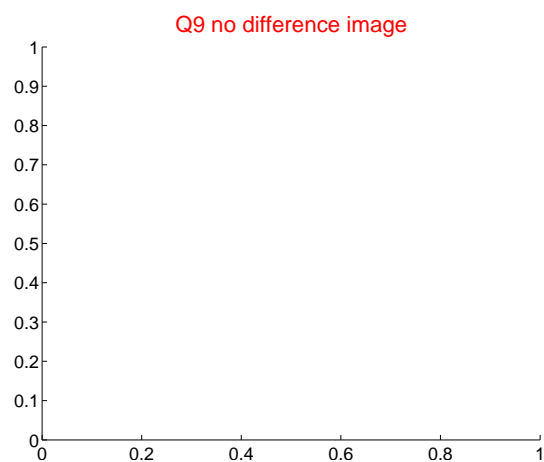


Q8 no OOT image





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.

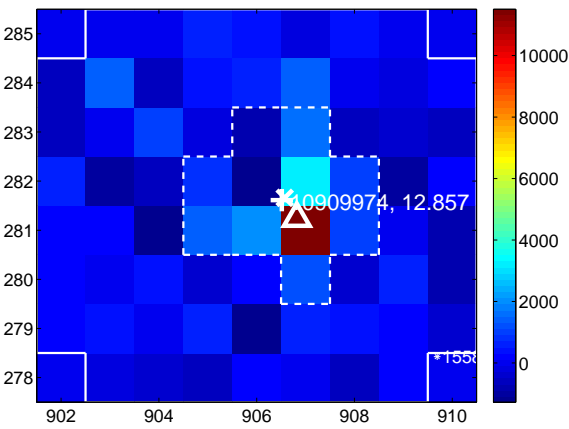
Q13 no difference image



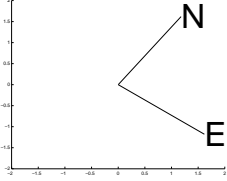
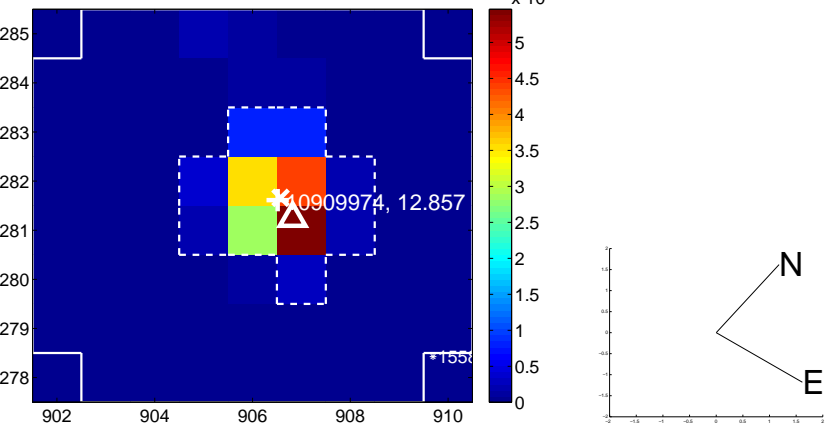
Q13 no OOT image



Q14 difference image



Q14 OOT image



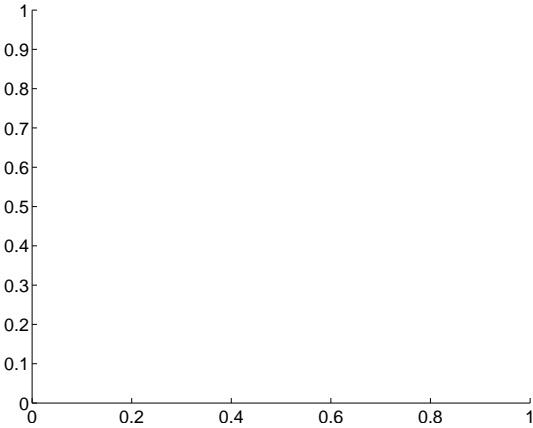
Q15 no difference image



Q15 no OOT image



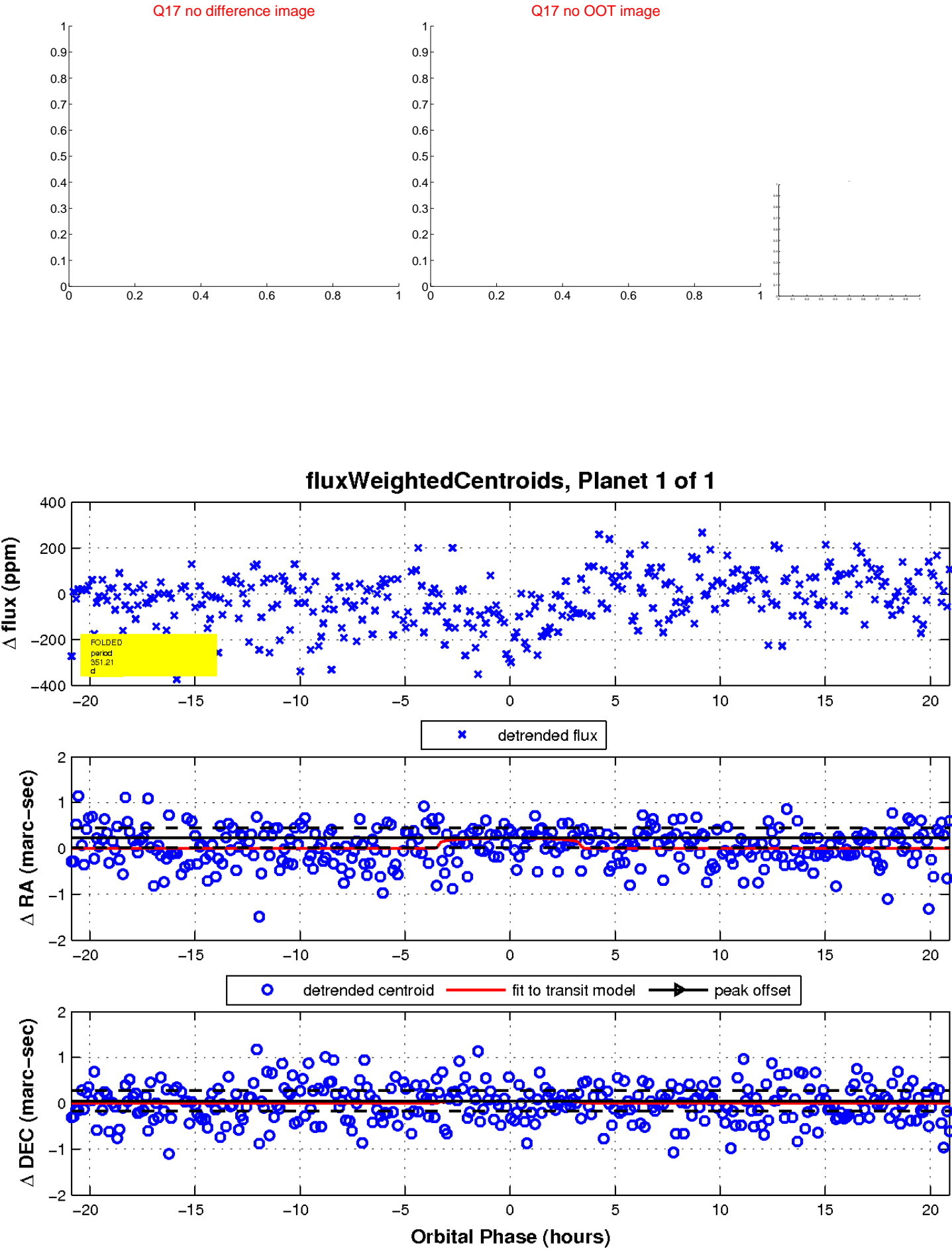
Q16 no difference image



Q16 no OOT image



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



UKIRT Image

