

# KIC 009823609

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009823609-01	OBS	No	623.341851	274.992859	348.3	31.296	41.3	18.3	0.85	5532	3.16	0.34

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009823609-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_MEAS

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

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

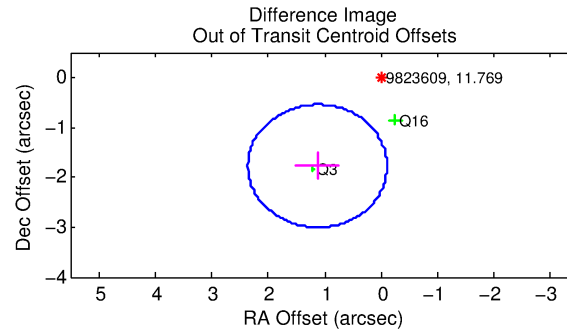
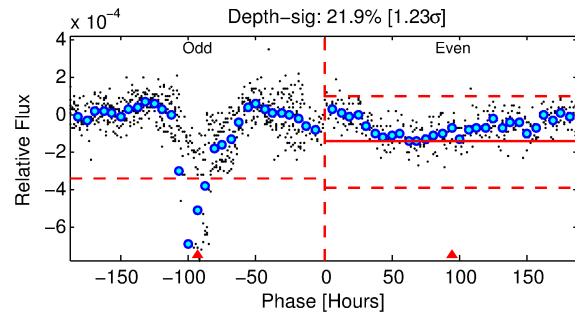
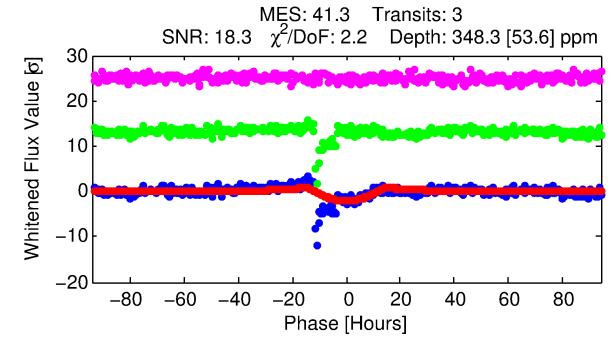
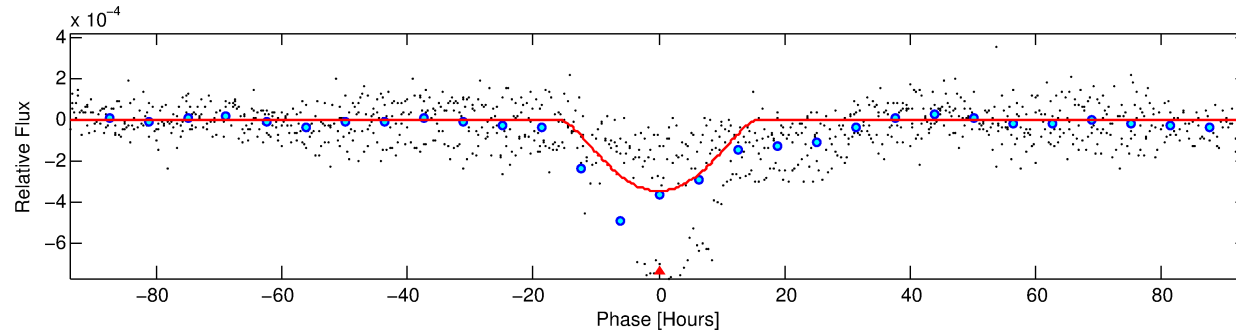
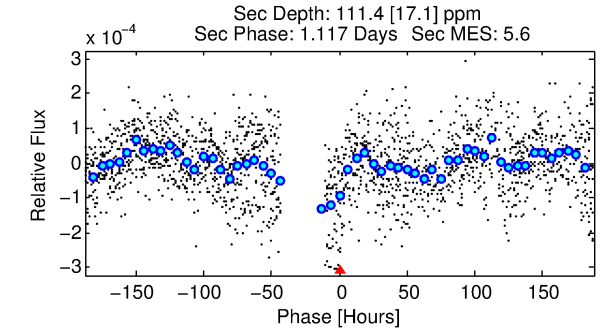
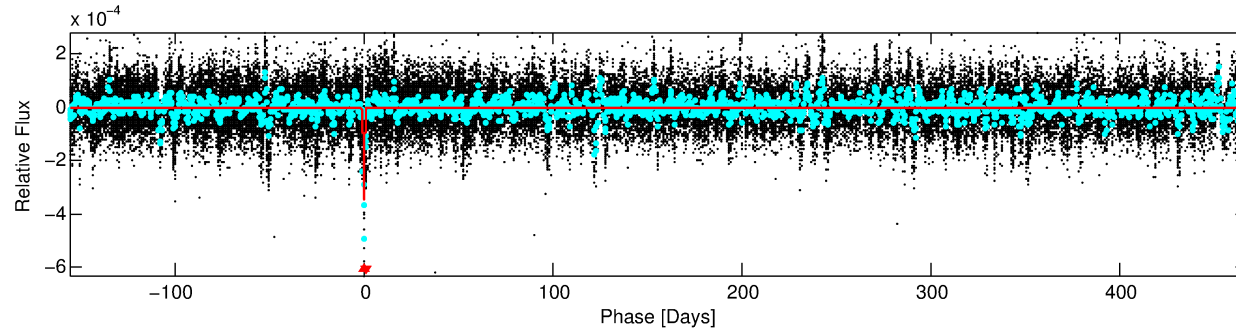
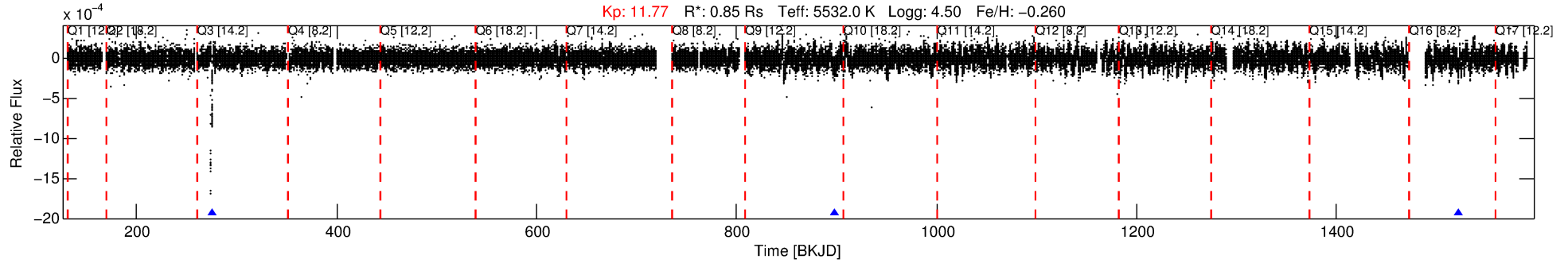
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009823609-01

No Significant Match Found

# DV One-Page Summary

KIC: 9823609 Candidate: 1 of 1 Period: 623.342 d



## DV Fit Results:

Period = 623.34185 [0.03160] d  
Epoch = 274.9929 [0.0317] BKJD  
Rp/R\* = 0.0343 [0.0610]  
a/R\* = 40.62 [18.58]  
b = 1.00 [0.09]  
Seff = 0.34 [0.07]  
Teq = 194 [10] K  
Rp = 3.16 [5.65] Re  
a = 1.3348 [0.1677] AU  
Ag = 10907.18 [38922.44] [0.28 $\sigma$ ]  
Teffp = 3070 [2736] K [1.05 $\sigma$ ]

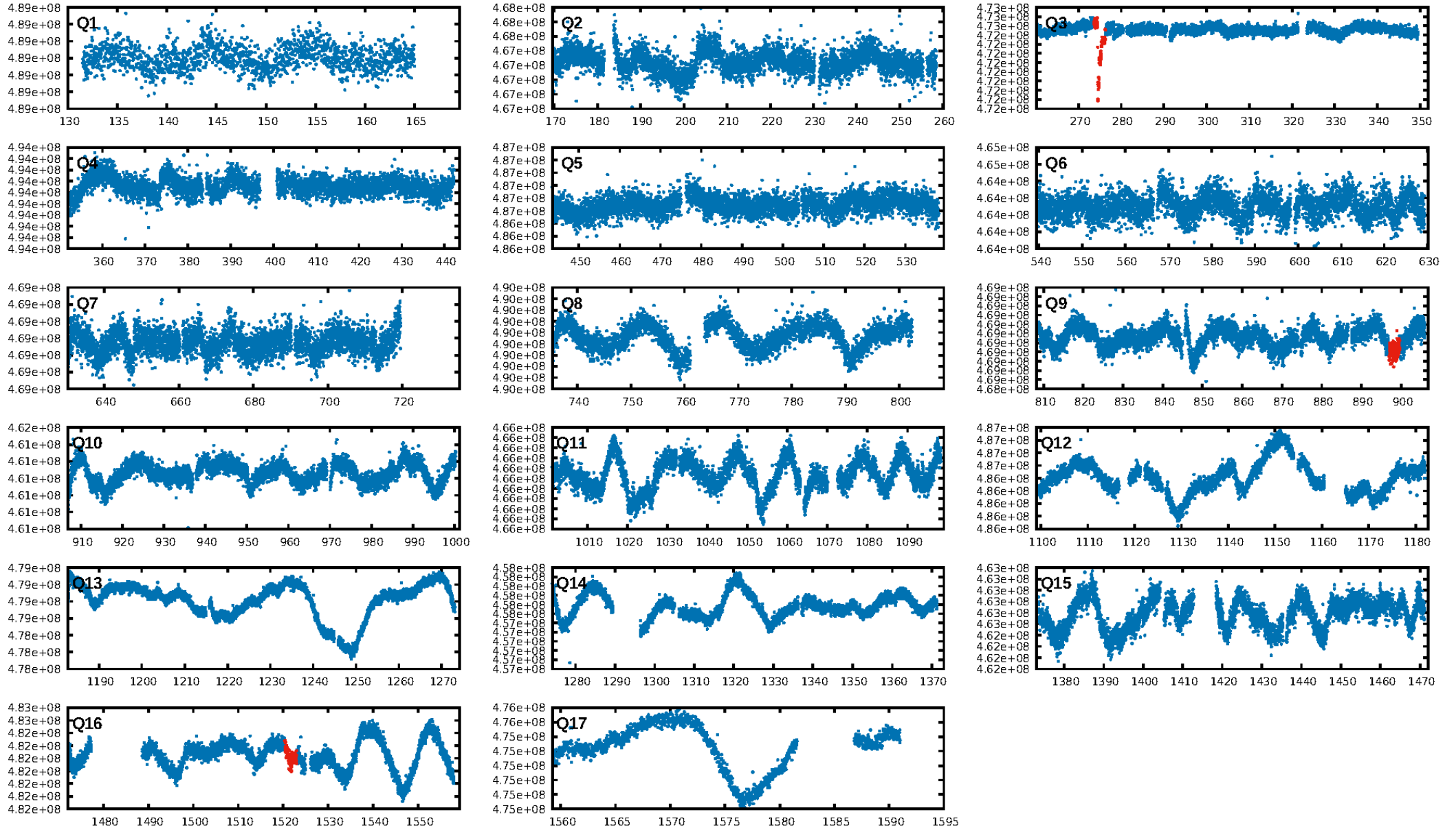
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 0.1%  
Bootstrap-pfa: 1.19e-155  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 8.549  
Centroid-sig: 0.1%  
Centroid-so: 0.691 arcsec [1.81 $\sigma$ ]  
OotOffset-rm: 2.105 arcsec [5.13 $\sigma$ ]  
KicOffset-rm: 1.934 arcsec [4.17 $\sigma$ ]  
OotOffset-st: 0/1/1/0 [2]  
KicOffset-st: 0/1/1/0 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 1.00 [3/3]

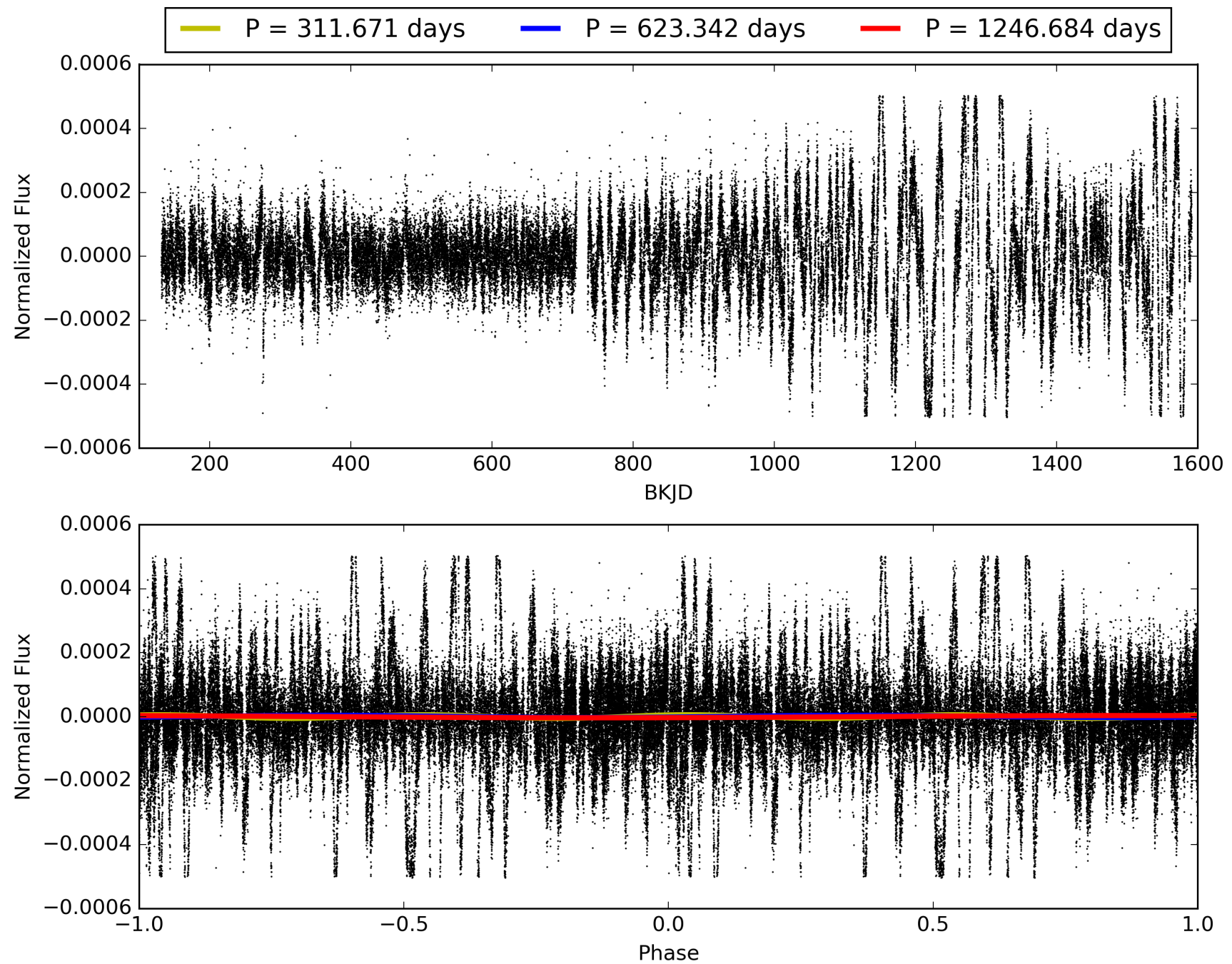
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 28-Jan-2016 23:06:40 Z

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

# TCE 009823609-01, PDC Light Curves

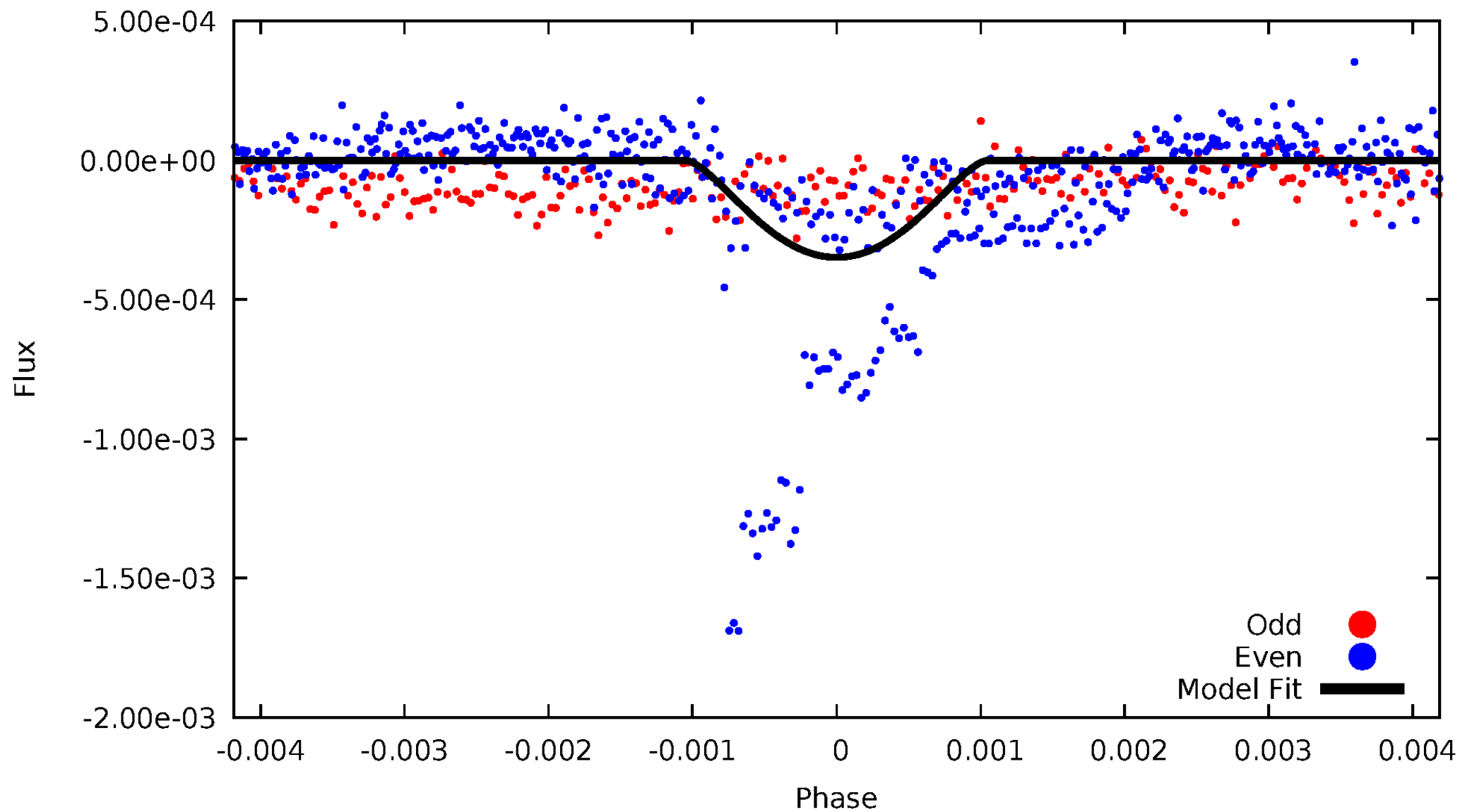


# TCE 009823609-01



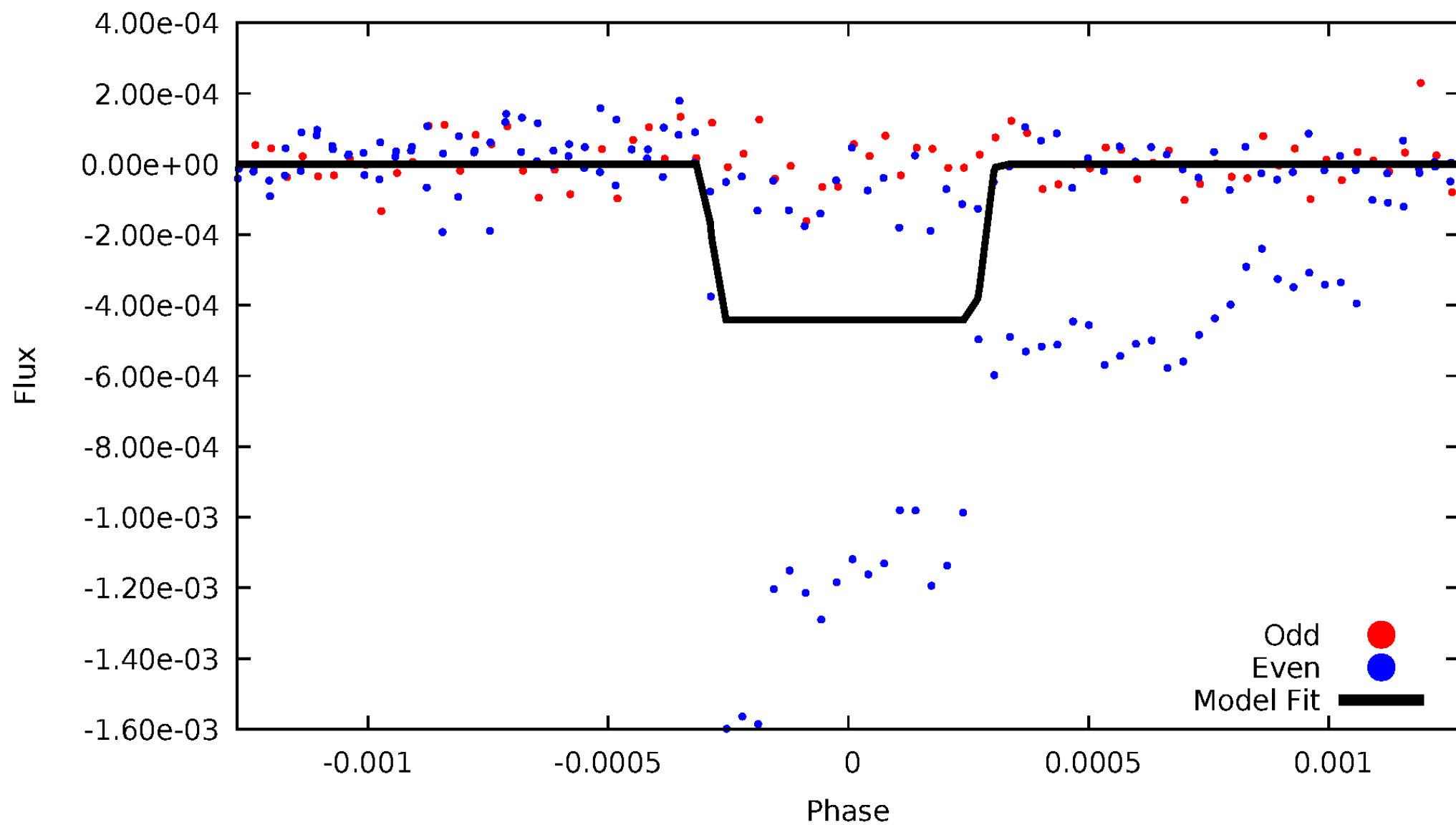
# DV Odd/Even

TCE 009823609-01

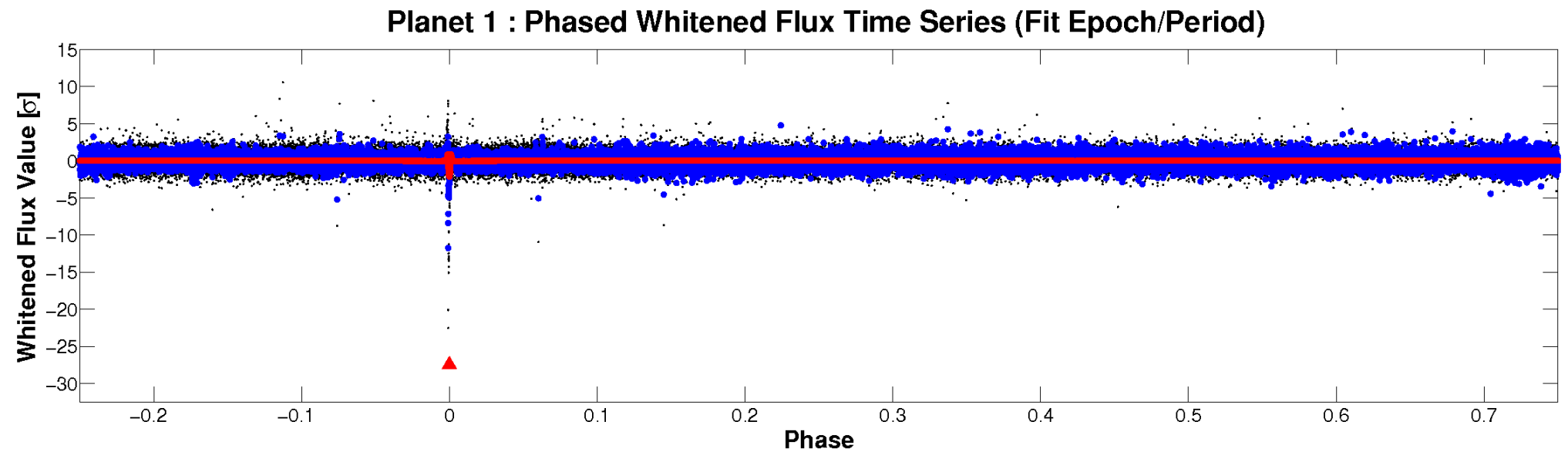
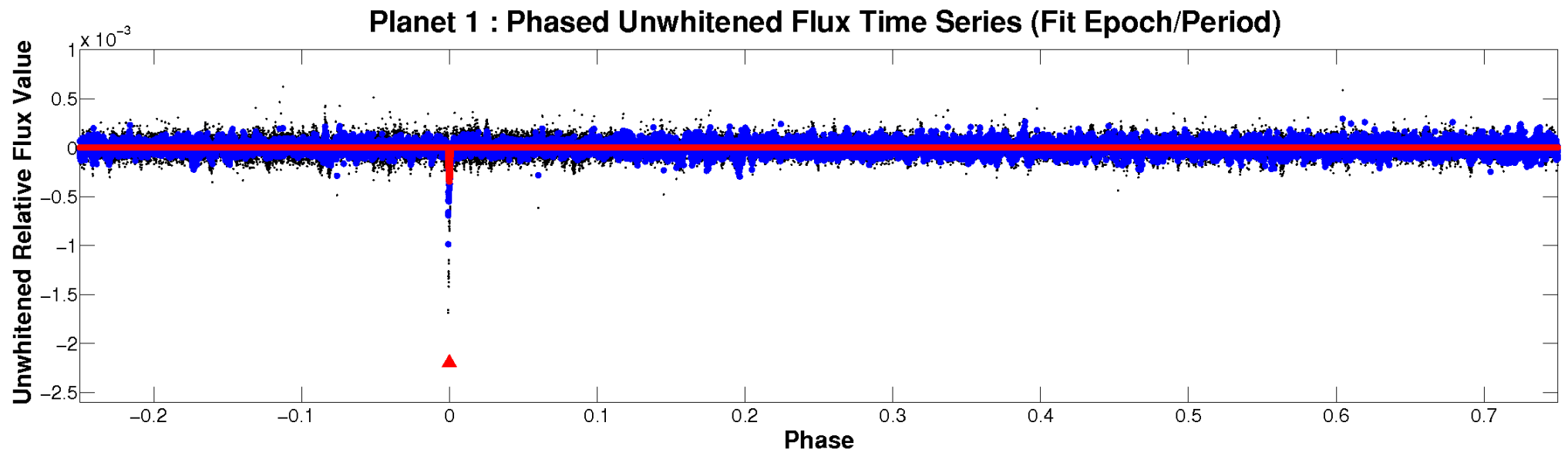


# ALT Odd/Even

TCE 009823609-01

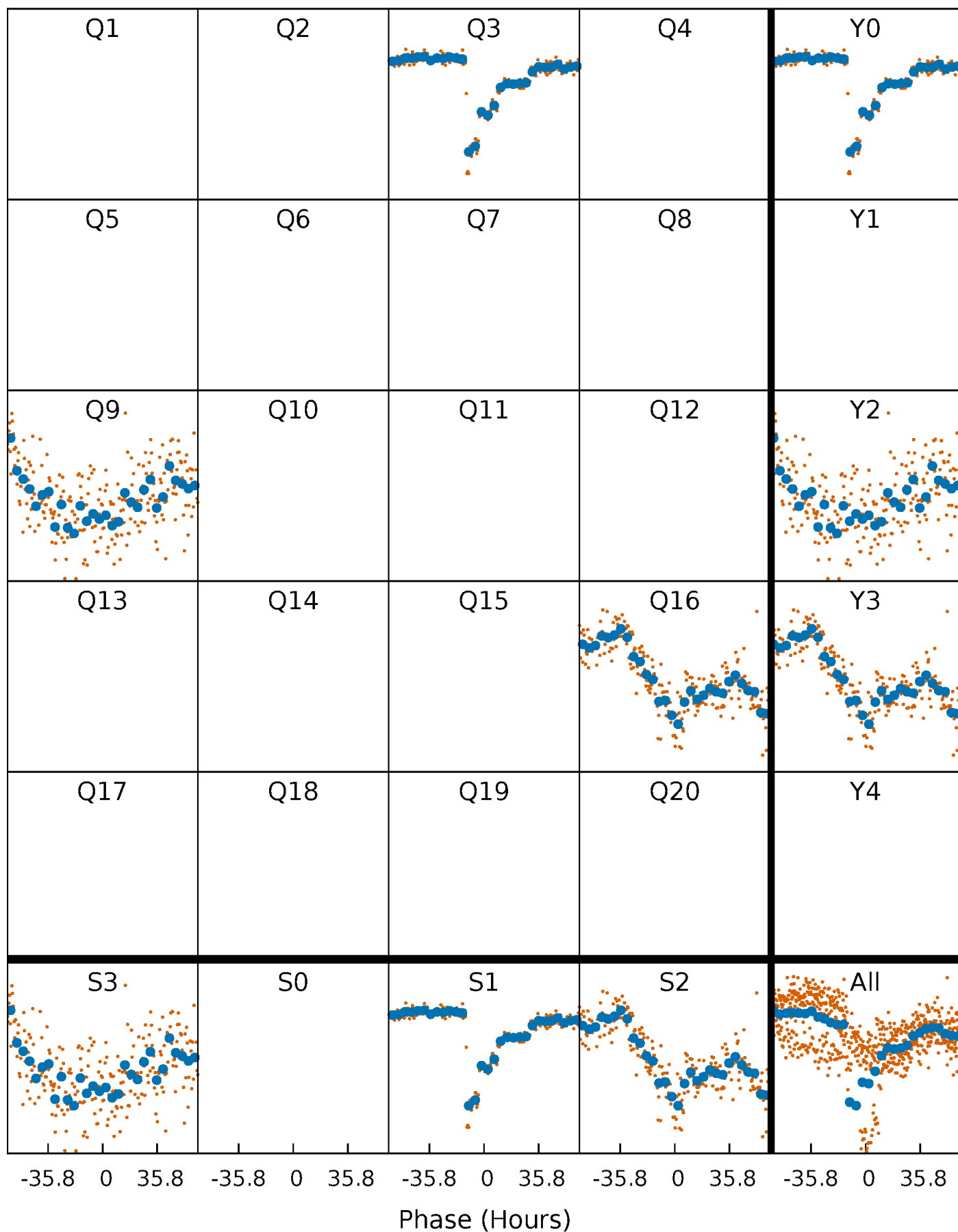


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

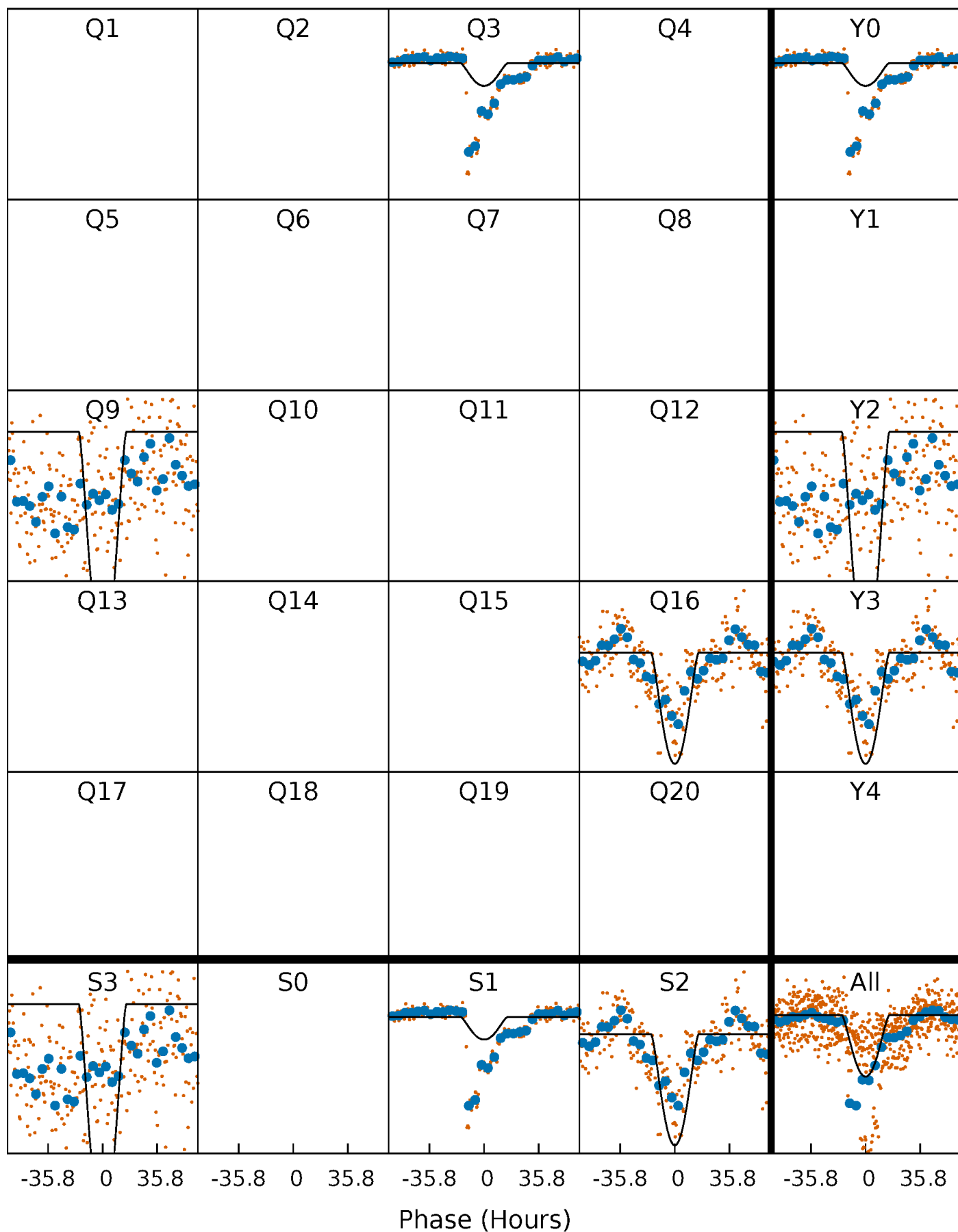
TCE 009823609-01 P=623.341851 Days  $T_0=274.992859$  (BKJD)





# DV Quarter-Phased Transit Curves

TCE 009823609-01 P=623.341851 Days  $T_0=274.992859$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

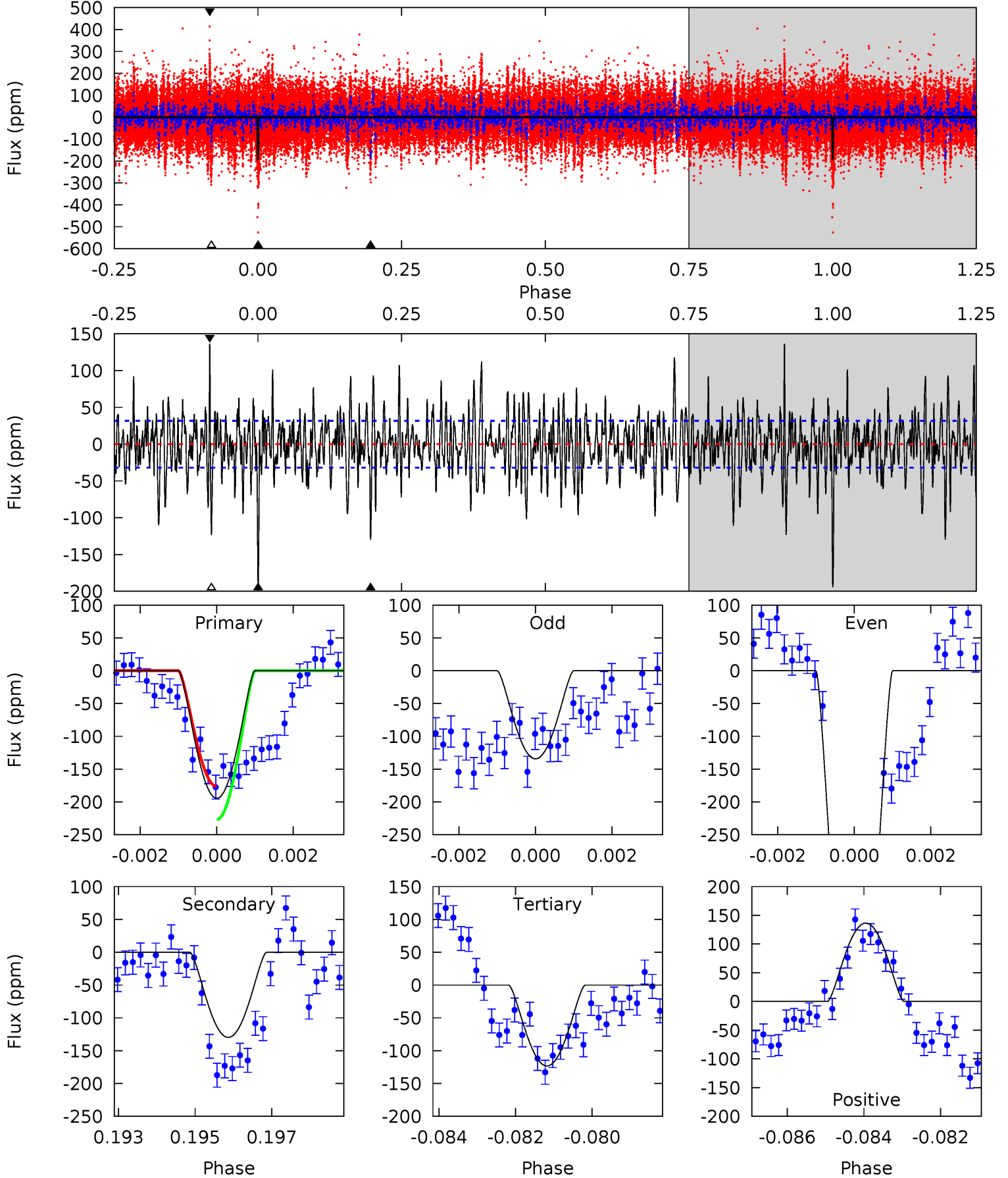
TCE 009823609-01 P=623.530083 Days  $T_0=274.685530$  (BKJD)



# DV Model-Shift Uniqueness Test

009823609-01, P = 623.341851 Days, E = 274.992859 Days

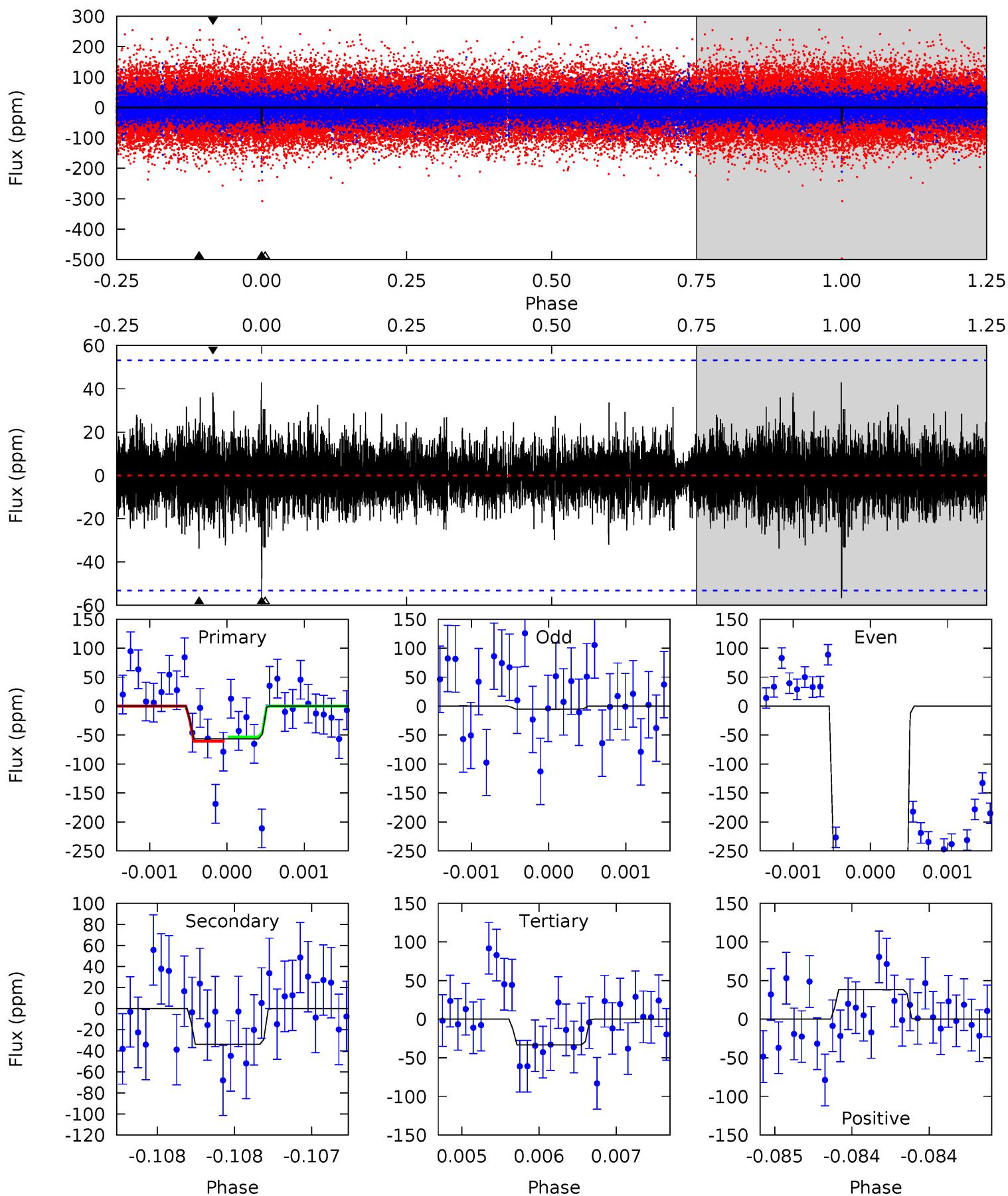
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
32.5	21.7	20.6	22.8	5.32	3.08	5.53	11.9	9.69	1.09	-1.12	41.9	2.24	0.41	4.24



# Alt Model-Shift Uniqueness Test

009823609-01, P = 623.530083 Days, E = 274.685530 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
5.92	3.53	3.47	3.99	5.54	3.44	0.88	2.45	1.94	0.06	-0.45	34.8	4.79	0.43	0.38



### Stellar Parameters For KIC 009823609

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5532^{+150}_{-150}$	$4.495^{+0.081}_{-0.099}$	$-0.260^{+0.300}_{-0.300}$	$0.846^{+0.127}_{-0.092}$	$0.818^{+0.100}_{-0.072}$	$1.900^{+0.656}_{-0.576}$
	+3%/-3%	+2%/-2%	+115%/-115%	+15%/-11%	+12%/-9%	+35%/-30%
Source	PHO1	FLK73	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 009823609-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-130 \pm 6$	$5.29^{+4.98}_{-3.66}$	$273^{+12}_{-11}$	$3109^{+1549}_{-504}$	$4602^{+42631}_{-3384}$
Alt.	$-34 \pm 10$	$4.59^{+4.43}_{-3.15}$	$272^{+11}_{-12}$	$2653^{+1128}_{-399}$	$1486^{+14259}_{-1116}$

$T_{max}$  = 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

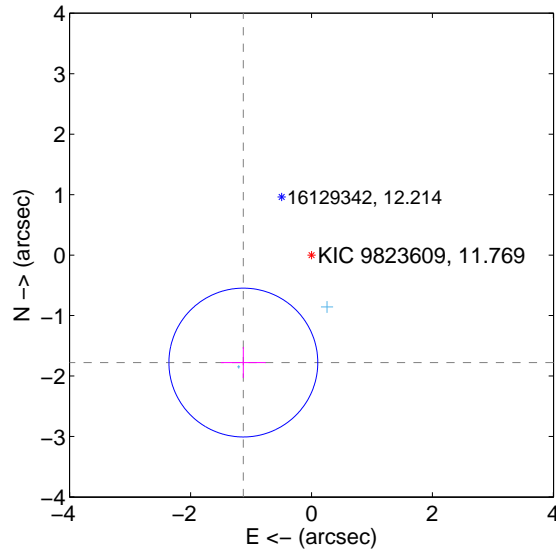
Supplemental centroid analysis for 009823609-01. **Kepler magnitude: 11.77.** Transit SNR 18.33

**There are 2 quarters with good PRF difference image offsets**

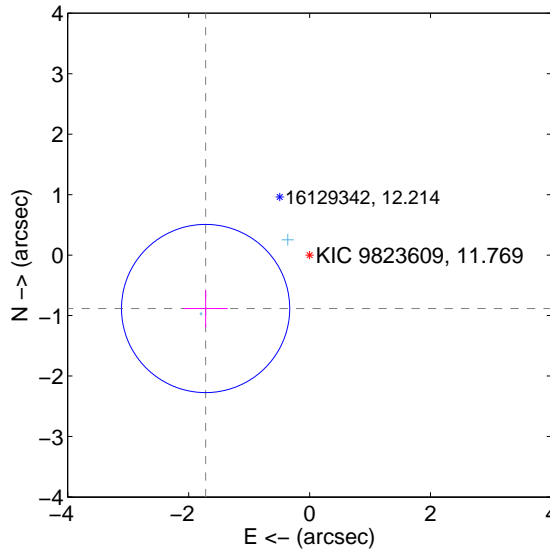
The direct PRF centroid is offset from the target star catalog position by about 1.27 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>2.105 \pm 0.410</math></b>	<b>5.13</b>	$1.127 \pm 0.371$	$-1.777 \pm 0.257$
PRF-fit source offset from KIC position	<b><math>1.934 \pm 0.464</math></b>	<b>4.17</b>	$1.720 \pm 0.365$	$-0.883 \pm 0.313$
photometric centroid source offset	$0.69 \pm 0.38$	1.81	$0.69 \pm 0.38$	$0.05 \pm 0.43$

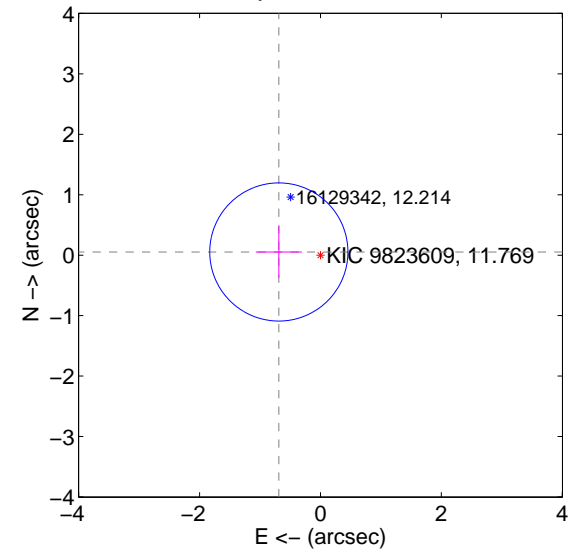
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

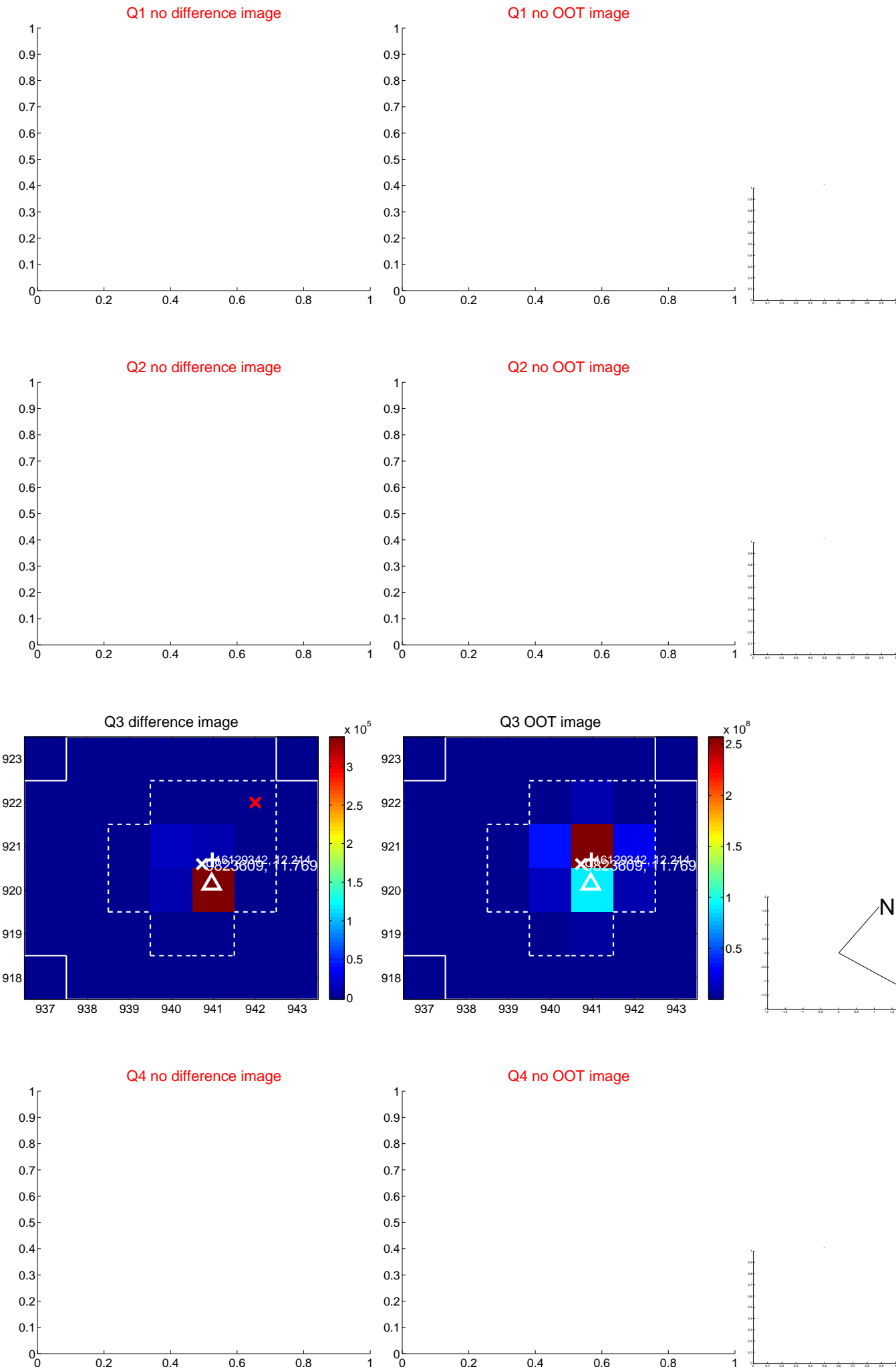


offset from photometric centroids



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.

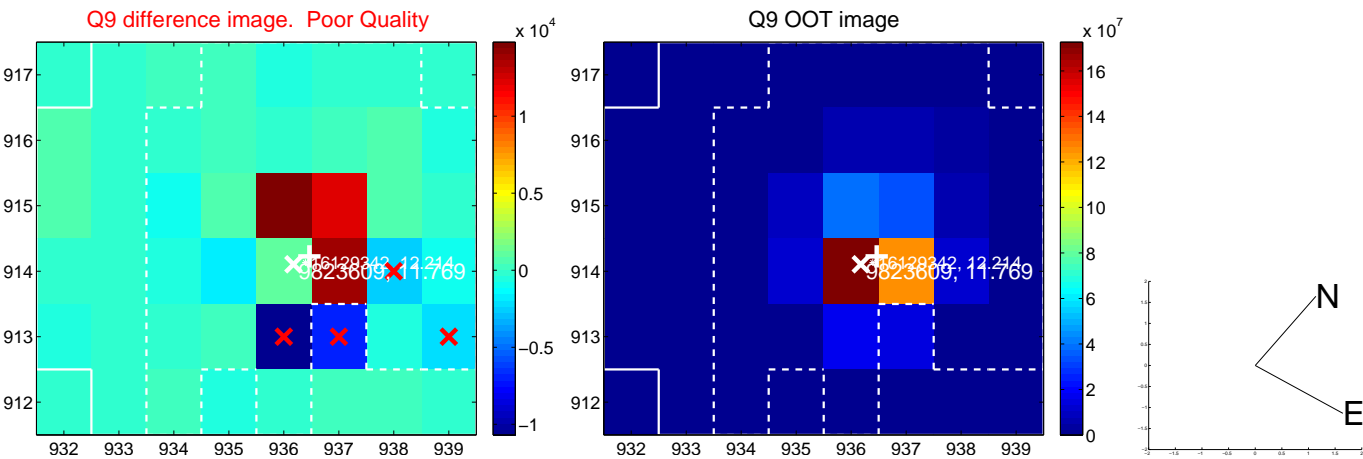


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

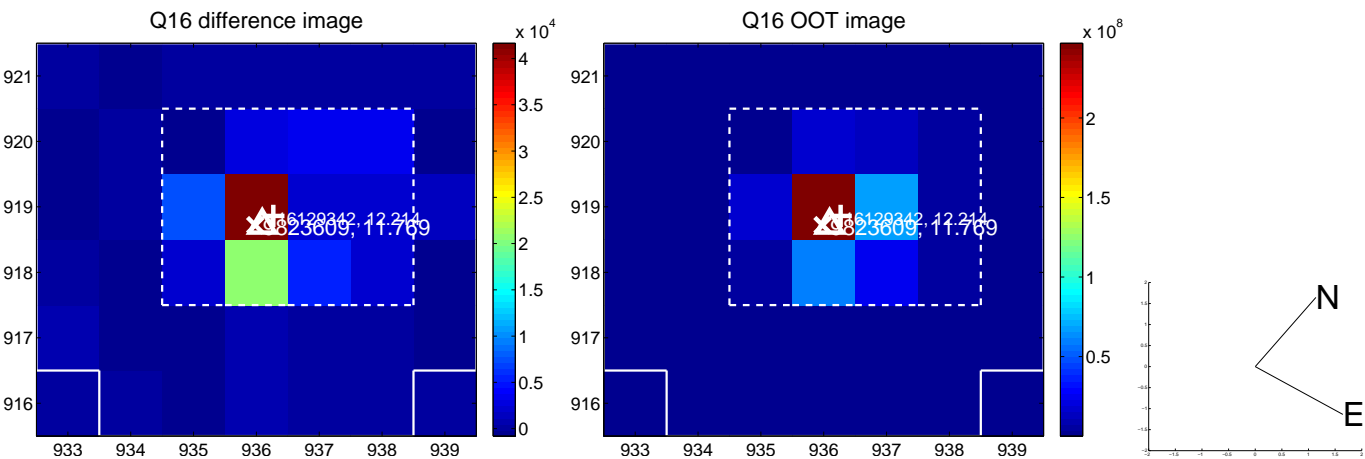
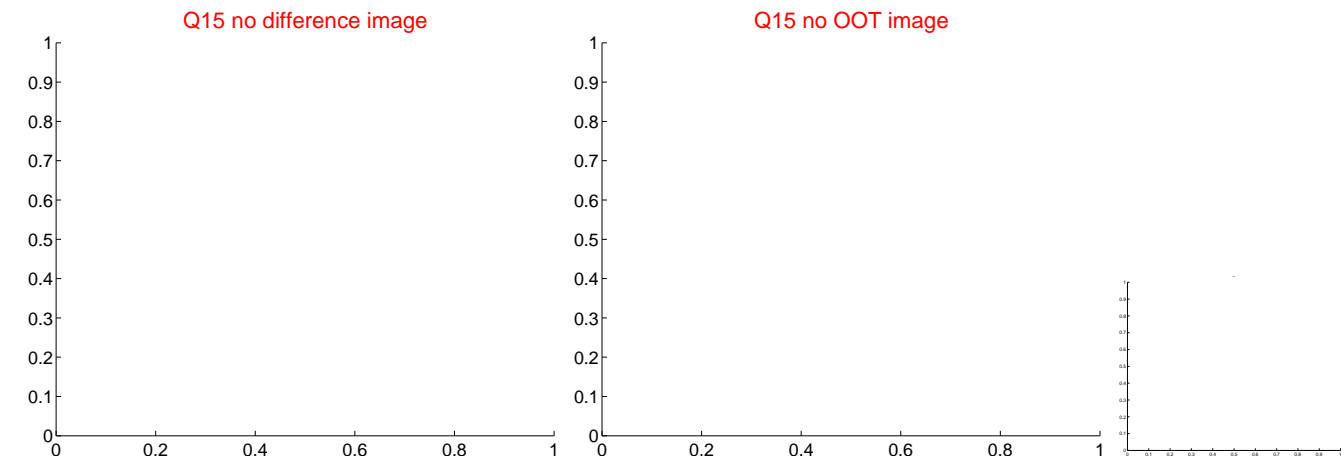




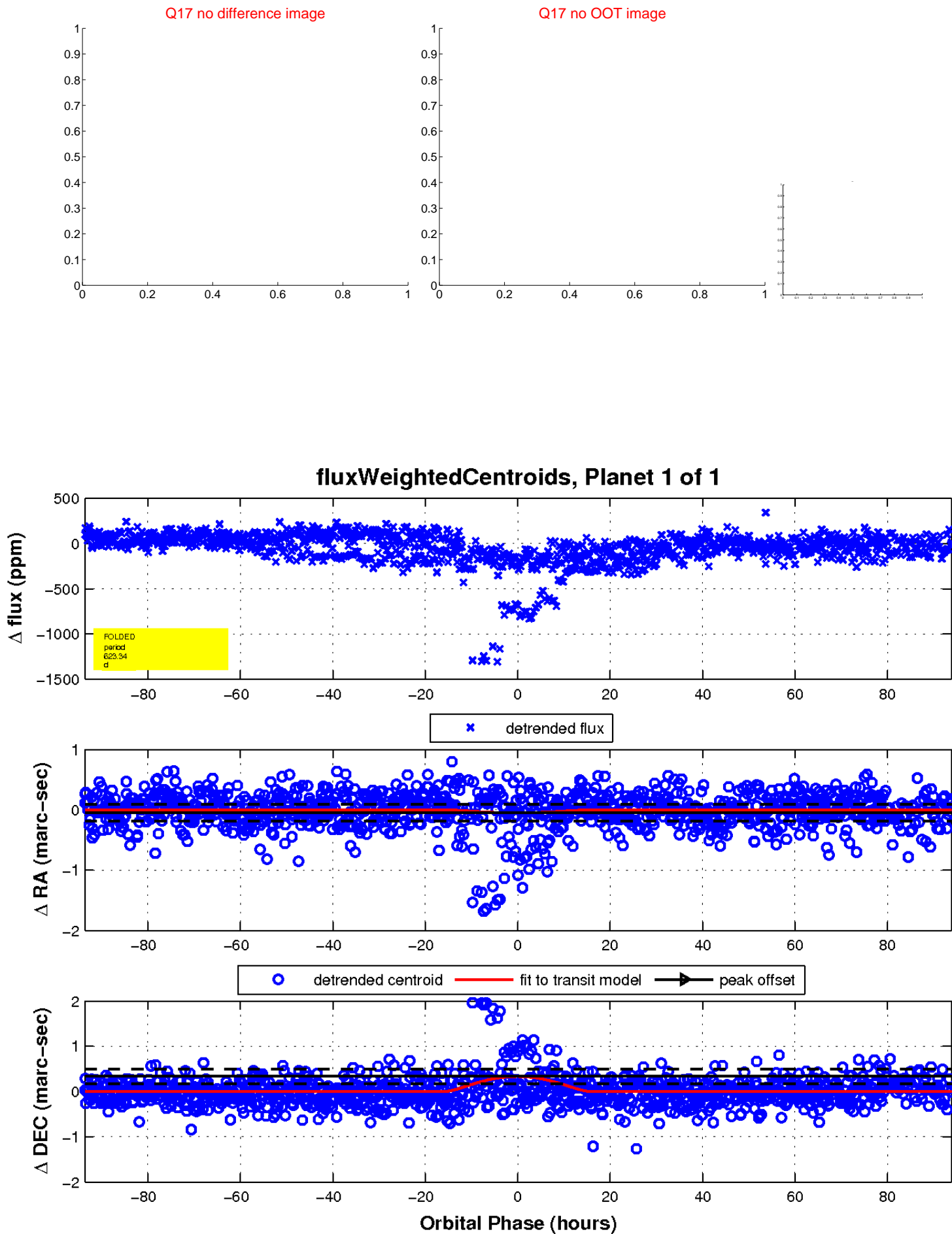
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white ×: 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.



UKIRT Image

Declination

