

# KIC 008868649

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008868649-01	OBS	3927.01	4.447370	133.830520	87.9	12.073	26.0	28.8	0.98	5472	1.10	308.40

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008868649-01	OBS	FP	0.00	1	0	1	1	LPP_DV—CENT_RESOLVED_OFFSET—EPHEM_MATCH

**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 008868649-01

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
008868649-01	8868649	008868650-pri	8868650	1:1	25.8	3	-6	11.94	14.02	2834.10	Direct-PRF	0	0.14	0.64

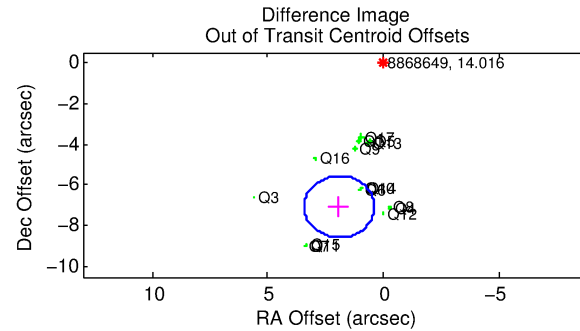
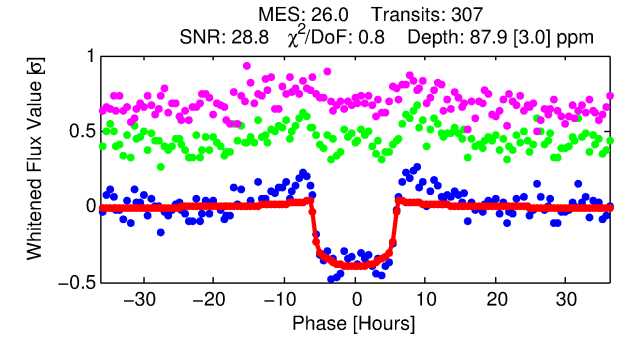
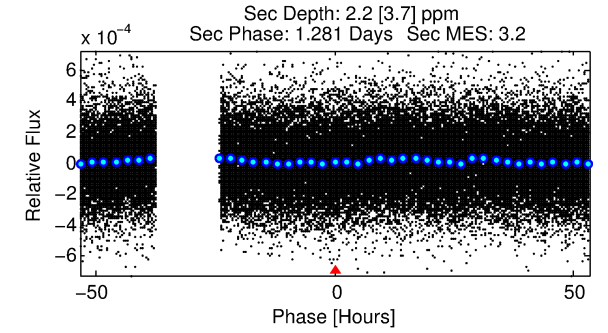
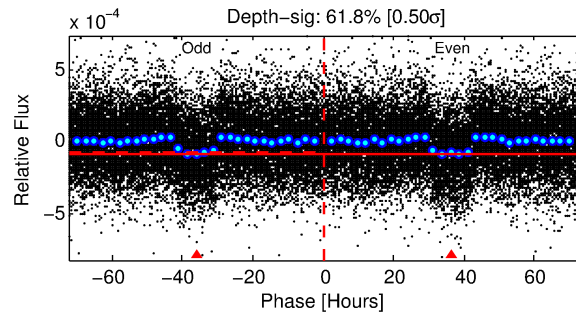
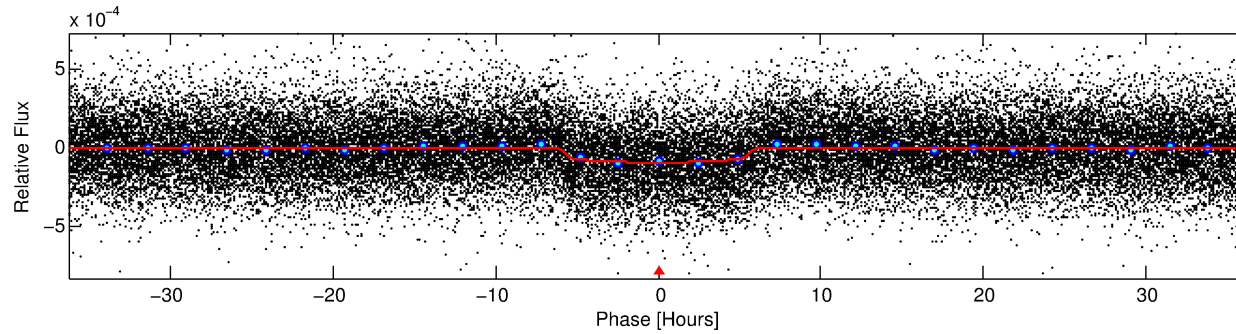
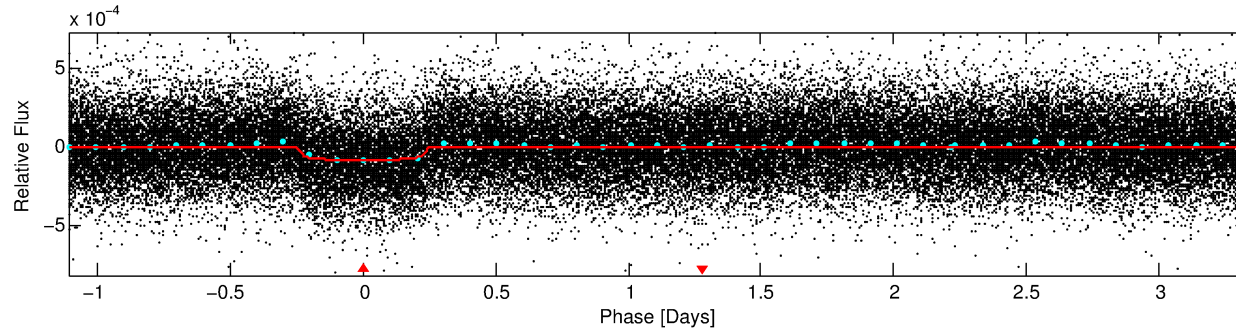
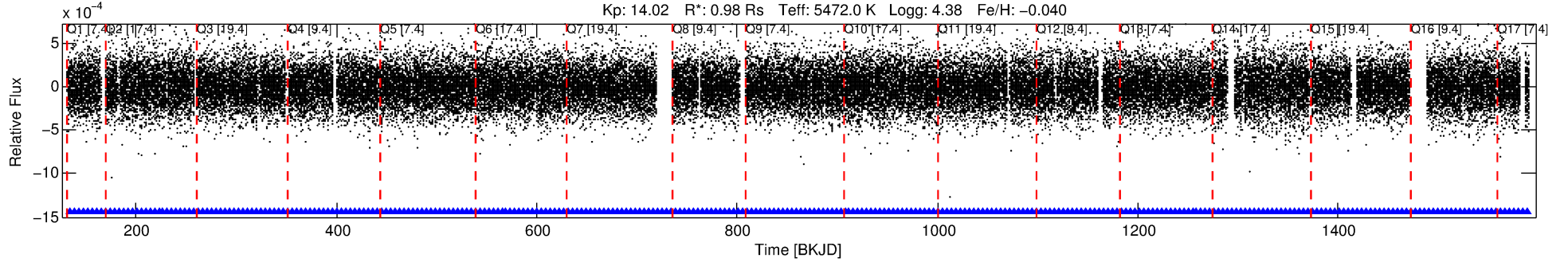
**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

KIC: 8868649 Candidate: 1 of 1 Period: 4.447 d

KOI: K03927.01 Corr: 0.983

Kp: 14.02 R\*: 0.98 Rs Teff: 5472.0 K Logg: 4.38 Fe/H: -0.040



## DV Fit Results:

Period = 4.44737 [0.00003] d  
Epoch = 133.8305 [0.0051] BKJD  
Rp/R\* = 0.0103 [0.0008]  
a/R\* = 1.61 [0.35]  
b = 0.90 [0.08]  
Seff = 308.40 [110.33]  
Teq = 1069 [96] K  
Rp = 1.10 [0.30] Re  
a = 0.0501 [0.0114] AU  
Ag = 2.52 [4.30] [0.35σ]  
Teffp = 2081 [873] K [1.15σ]

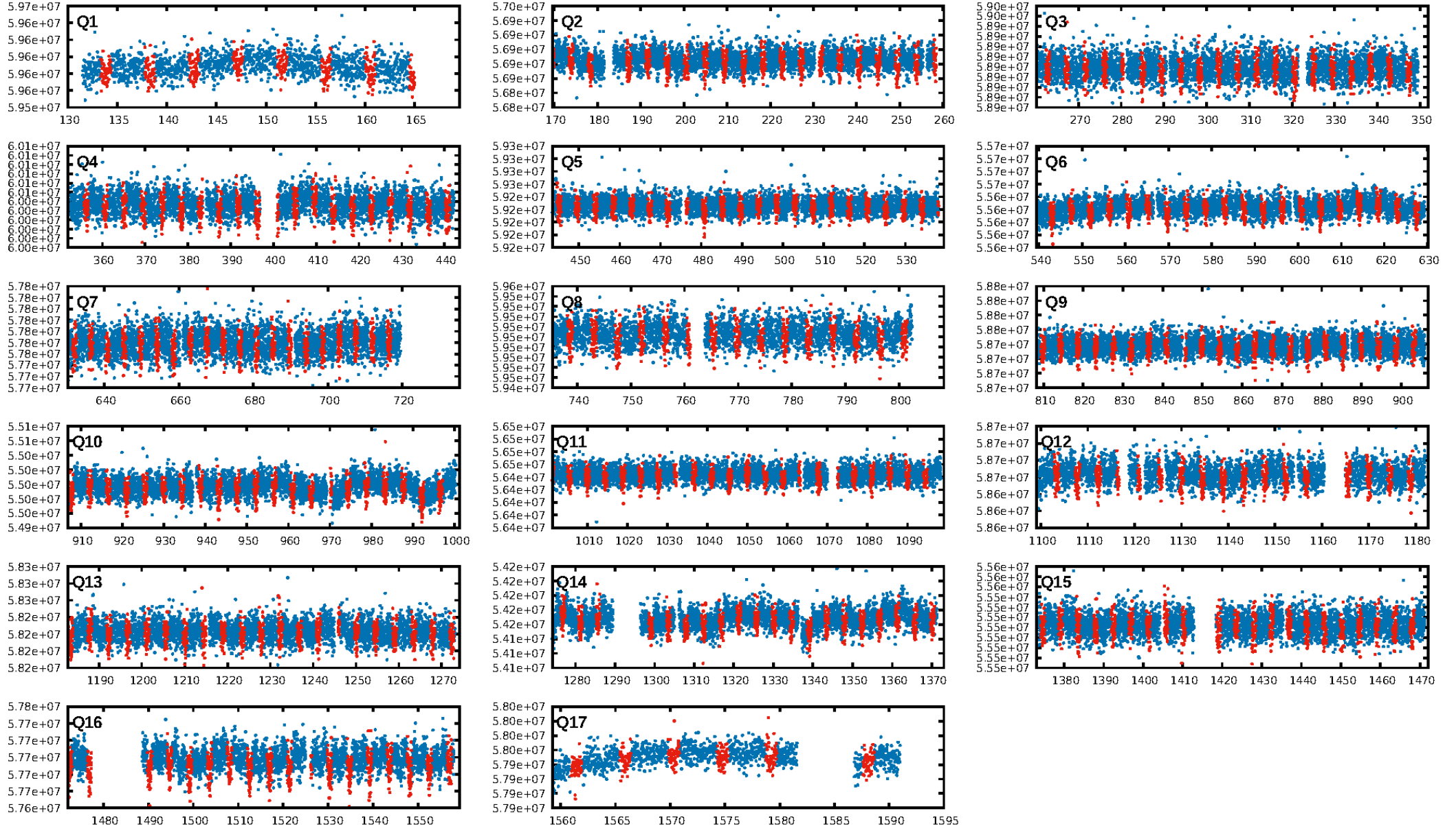
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 2.28e-138  
RollingBand-fgt: 1.00 [293/293]  
GhostDiagnostic-chr: -0.5299  
Centroid-sig: 0.0%  
Centroid-so: 8.072 arcsec [16.44σ]  
OotOffset-rm: 7.323 arcsec [14.57σ]  
KicOffset-rm: 7.132 arcsec [14.61σ]  
OotOffset-st: 3/4/4/5 [16]  
KicOffset-st: 3/4/4/5 [16]  
DiffImageQuality-fgm: 0.31 [5/16]  
DiffImageOverlap-fno: 1.00 [17/17]

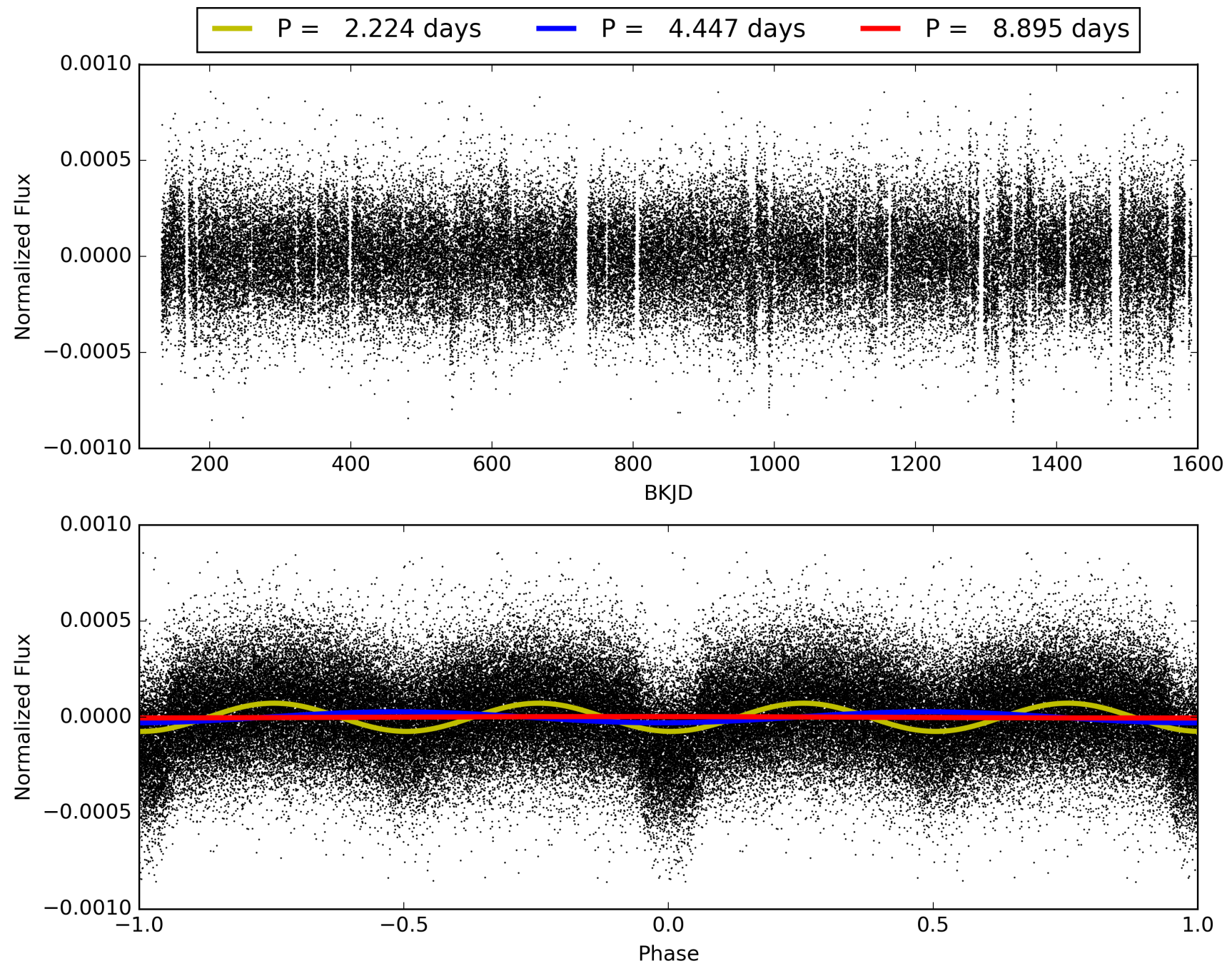
Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 01:17:22 Z

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

# TCE 008868649-01, PDC Light Curves



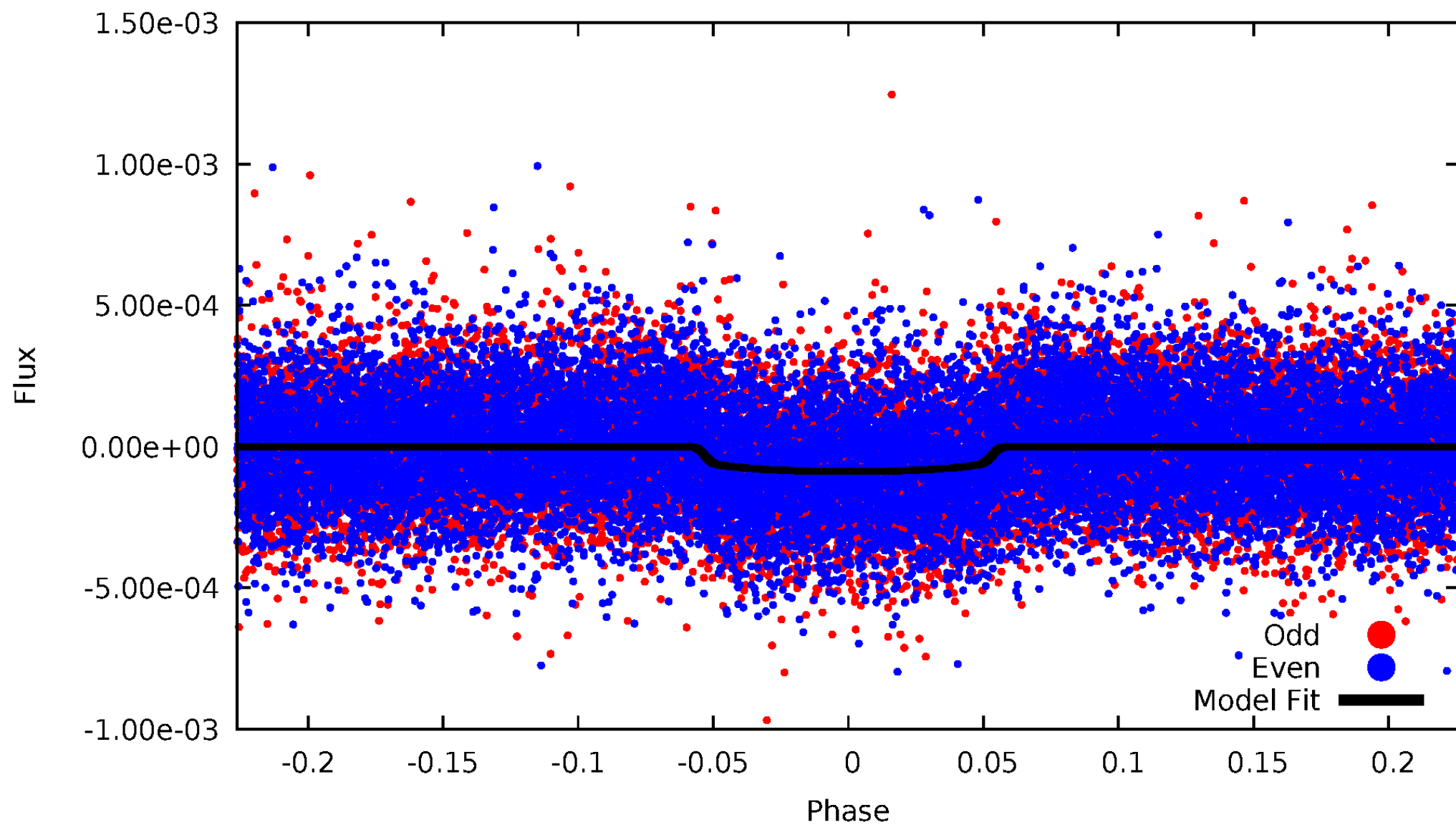
TCE 008868649-01





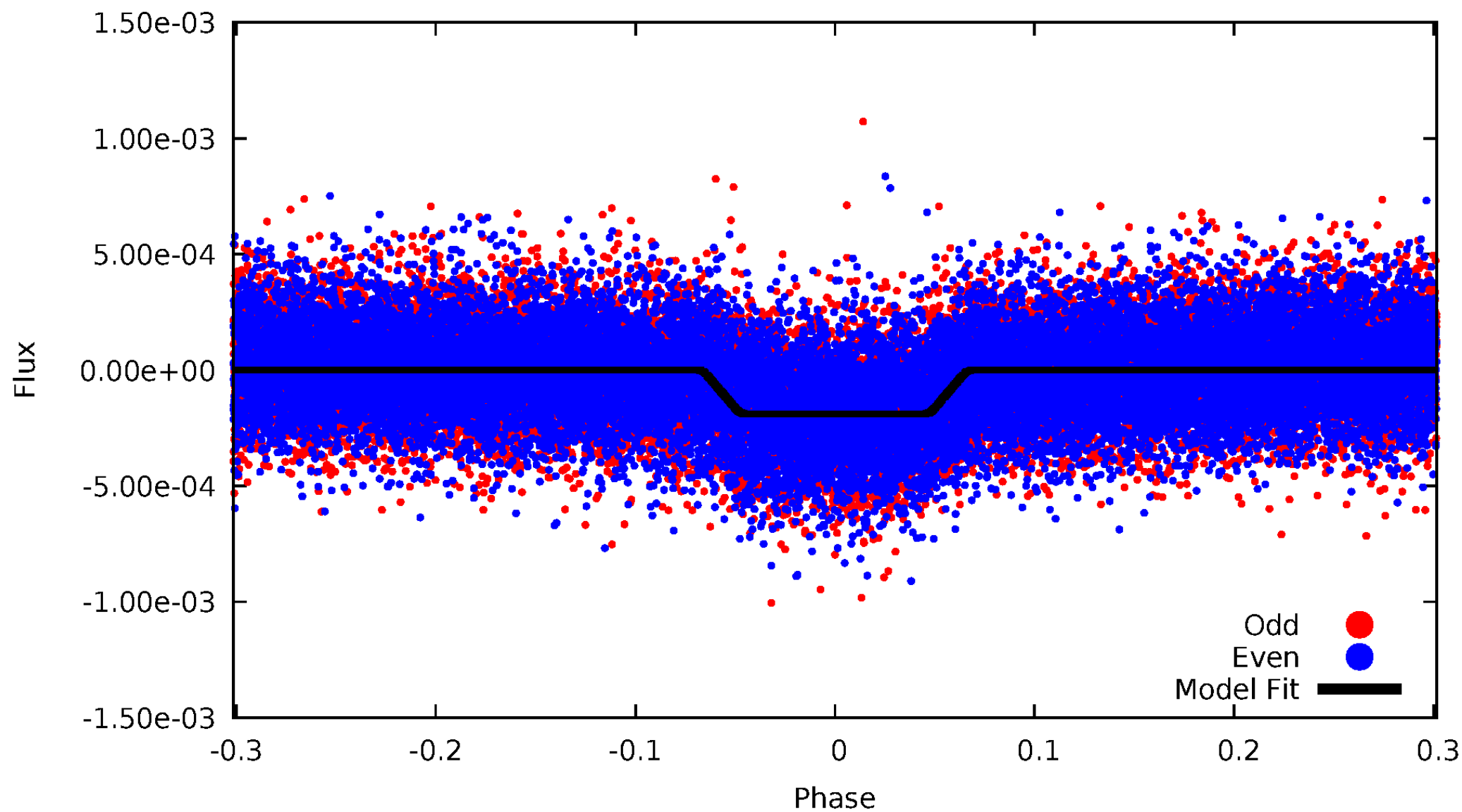
# DV Odd/Even

TCE 008868649-01



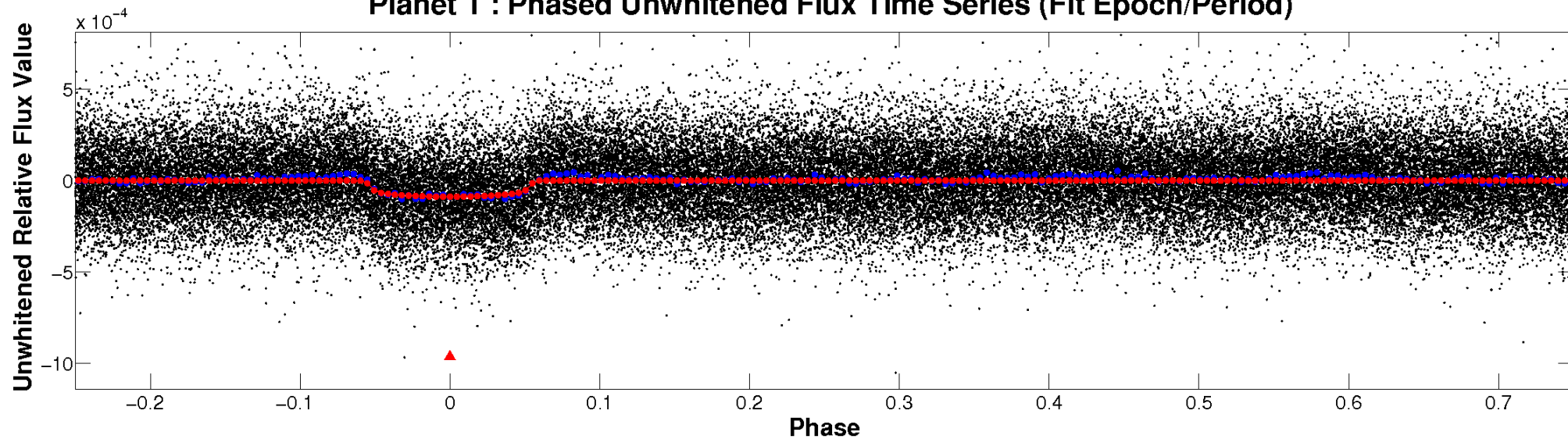
# ALT Odd/Even

TCE 008868649-01

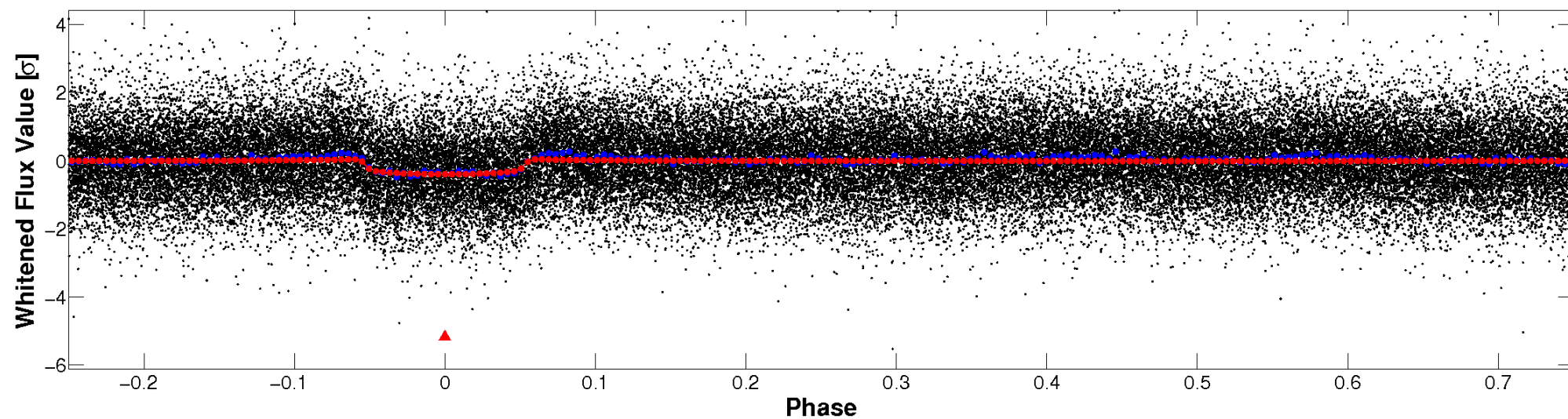


# Non-Whitened Vs. Whitened Light Curve

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

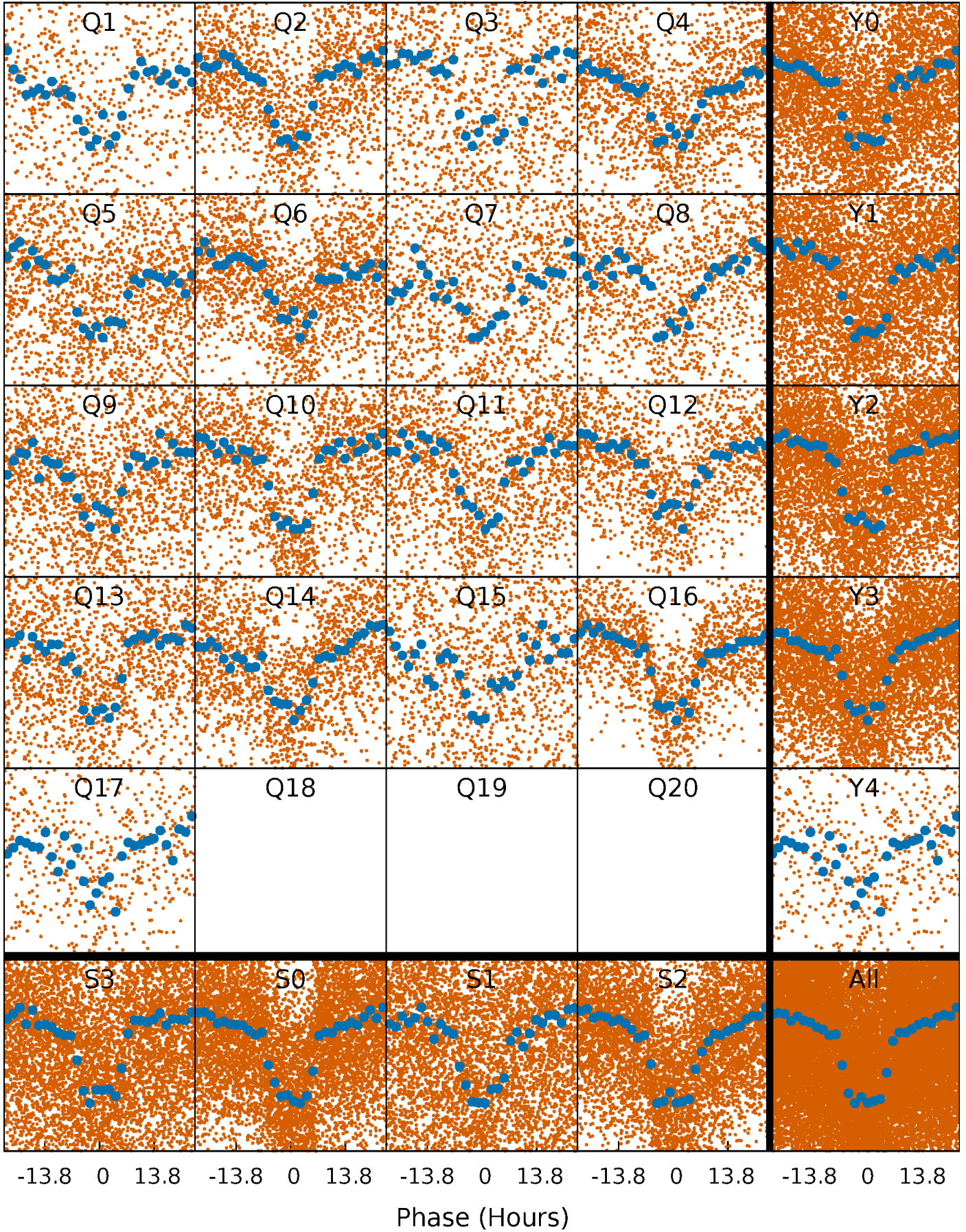


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

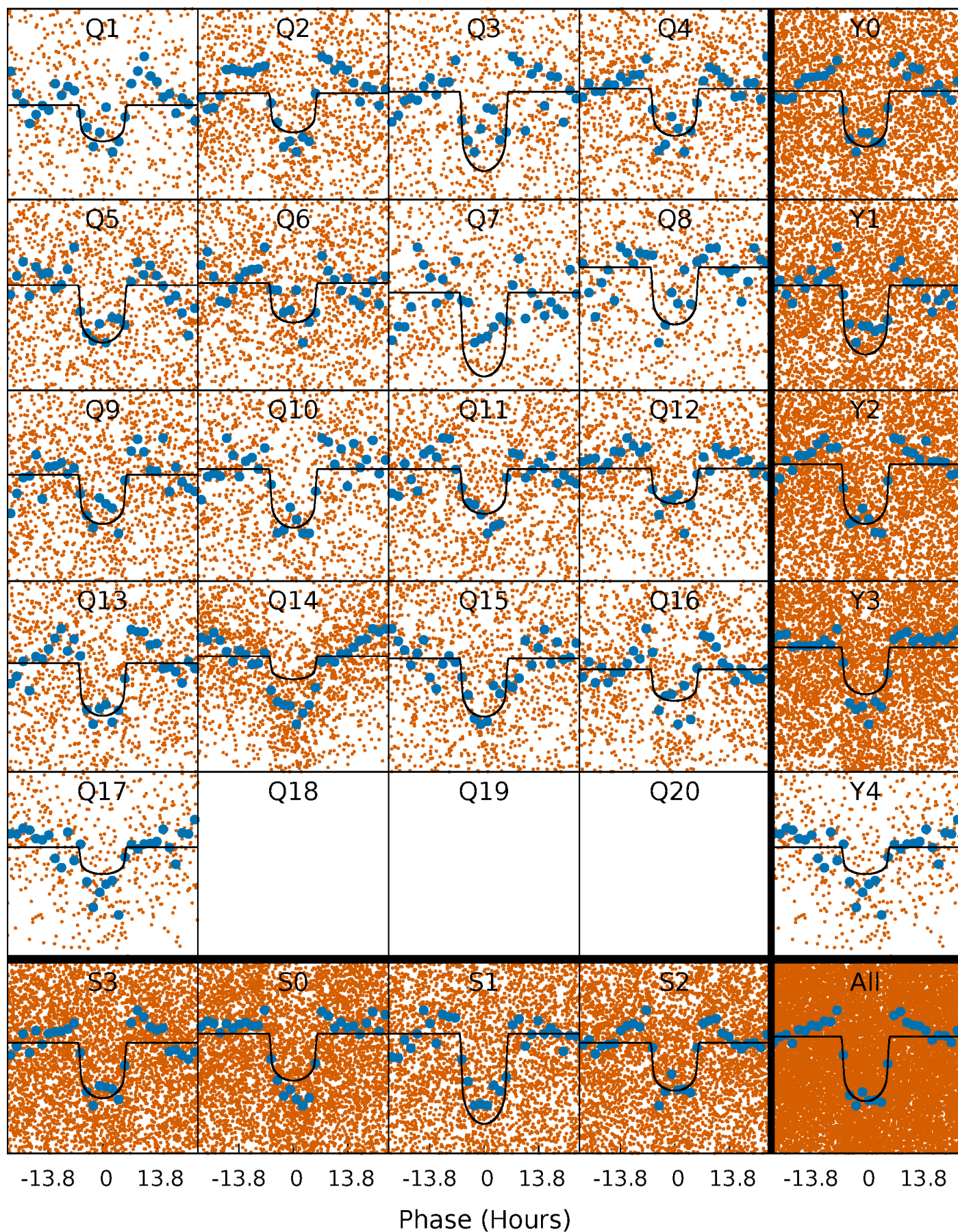
TCE 008868649-01 P= 4.447370 Days  $T_0=133.830521$  (BKJD)





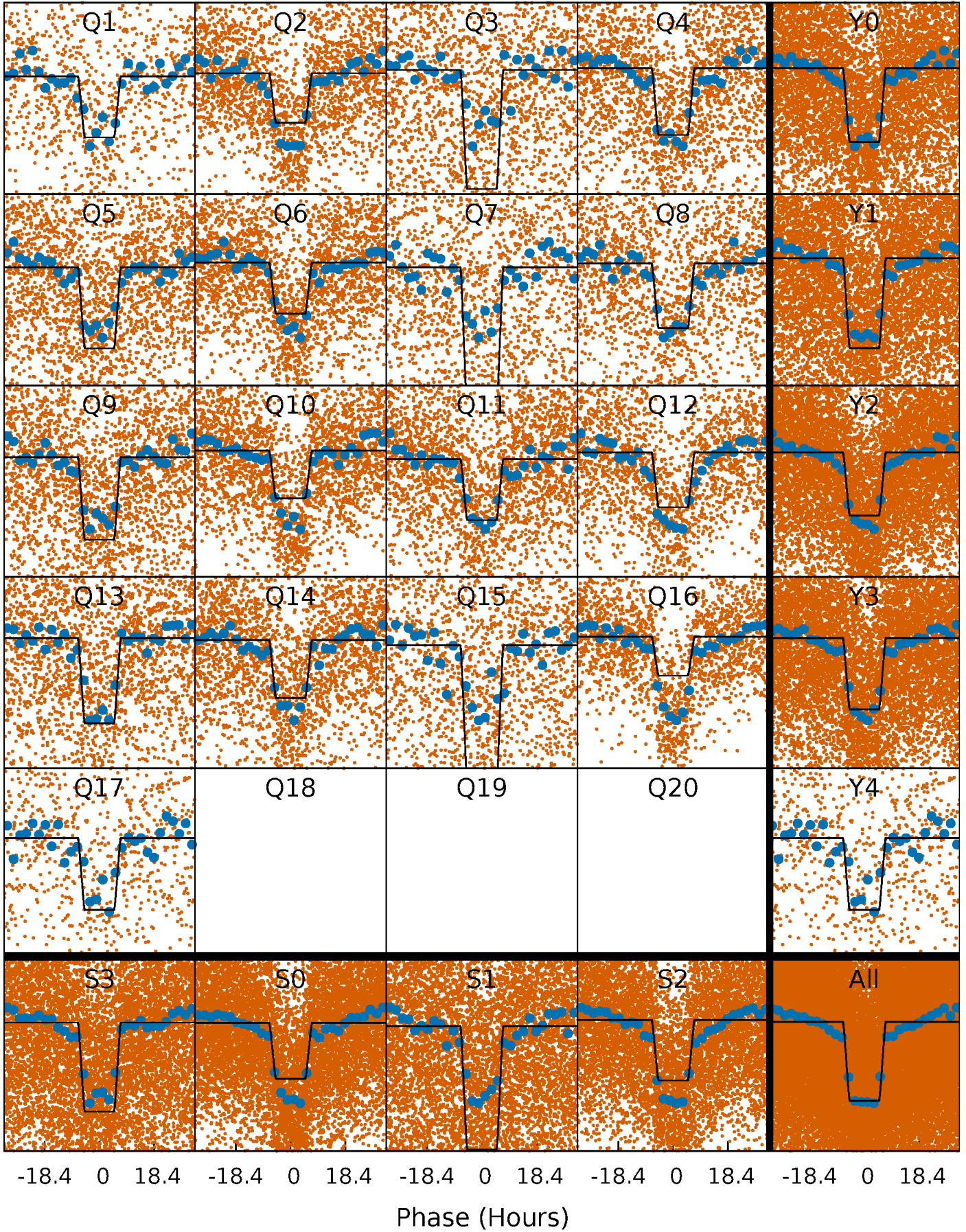
# DV Quarter-Phased Transit Curves

TCE 008868649-01   P= 4.447370 Days    $T_0=133.830521$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 008868649-01 P= 4.447349 Days  $T_0=133.843387$  (BKJD)

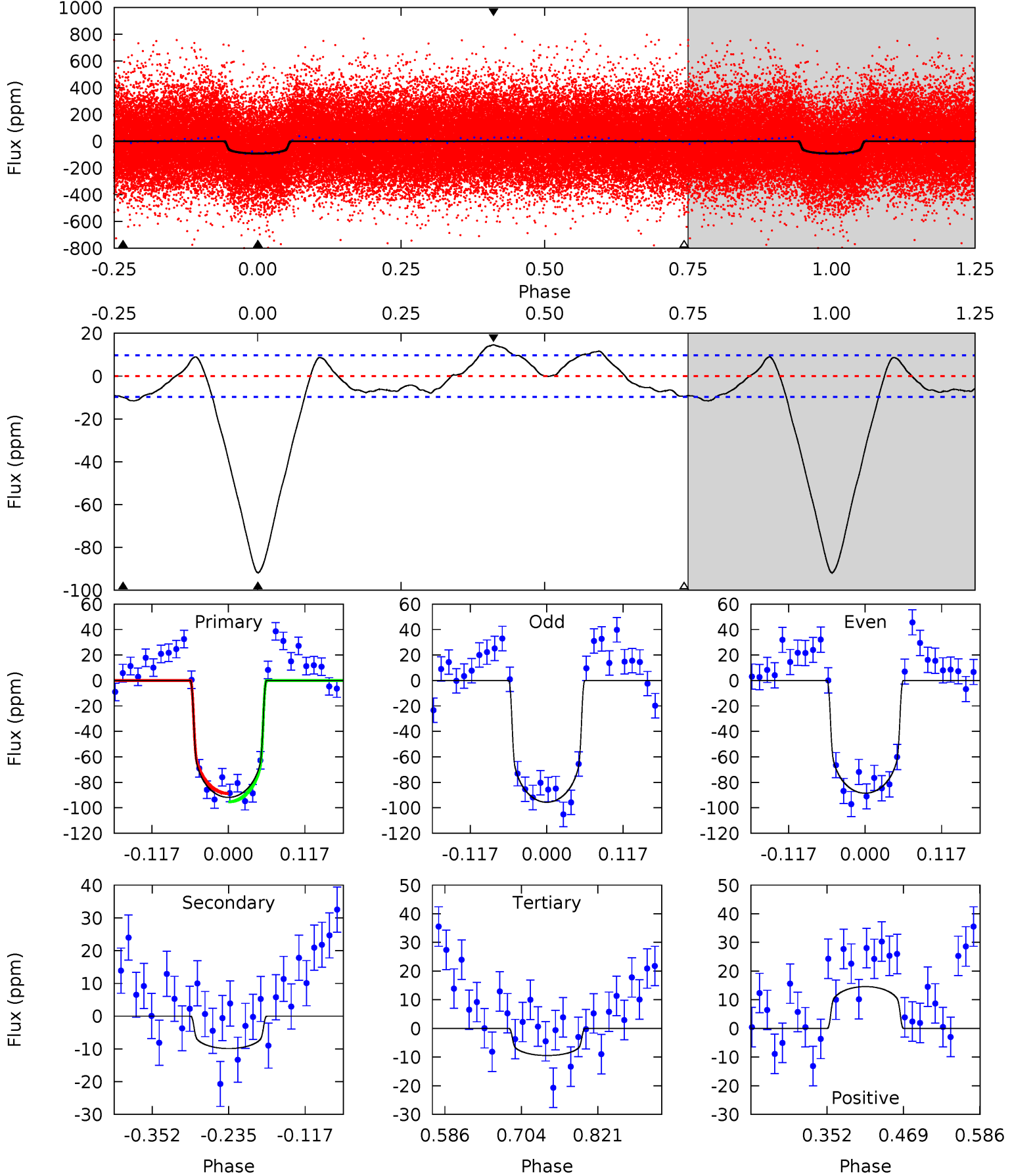




# DV Model-Shift Uniqueness Test

008868649-01, P = 4.447370 Days, E = 129.383151 Days

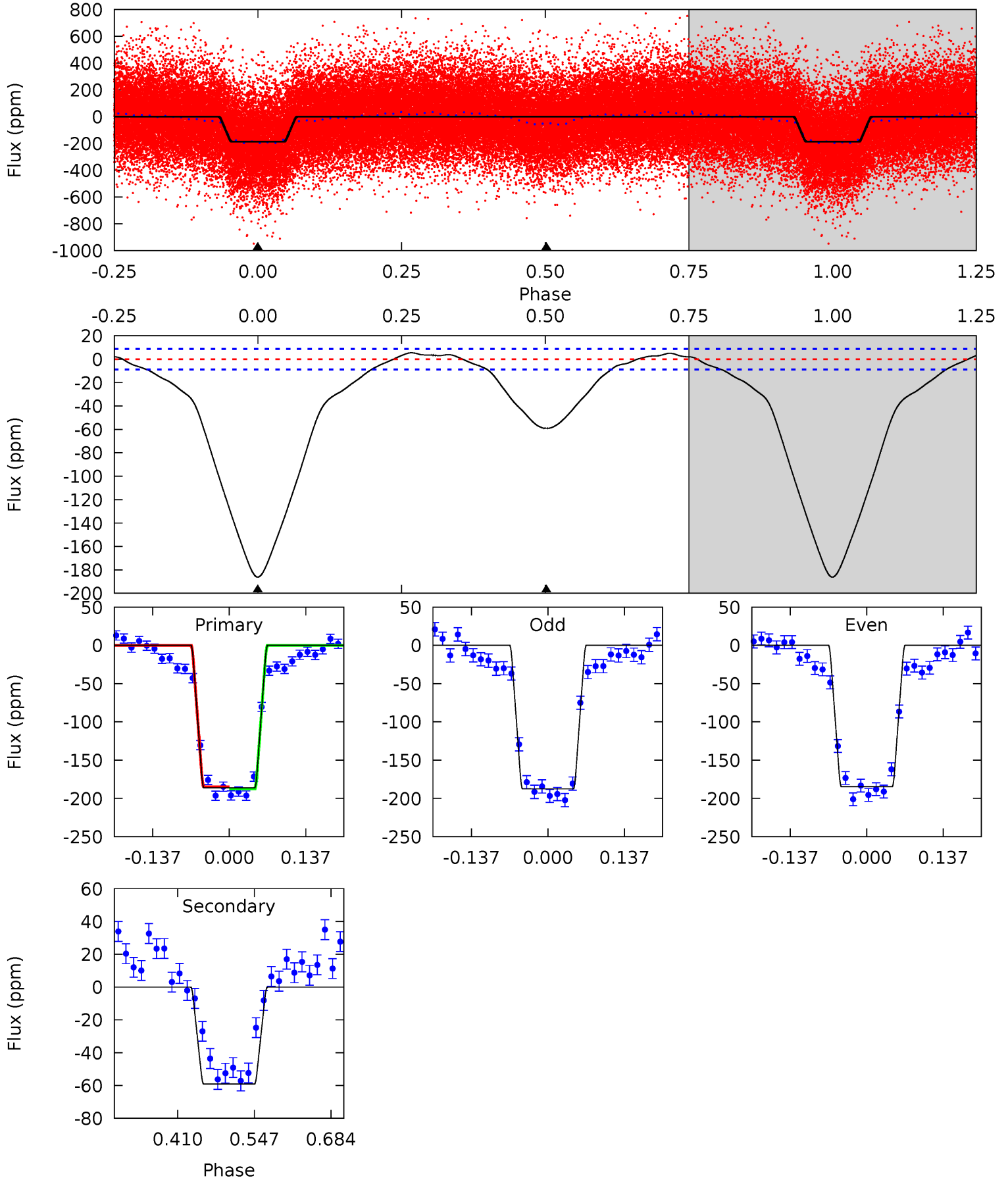
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
42.9	4.63	4.42	6.82	4.53	1.57	3.33	38.5	36.1	0.21	-2.19	1.67	1.01	0.14	1.54



# Alt Model-Shift Uniqueness Test

008868649-01, P = 4.447349 Days, E = 129.396038 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
95.1	30.2	0	0	4.50	1.49	4.77	95.1	95.1	30.2	30.2	0.76	1.02	0.03	0.66





### Stellar Parameters For KIC 008868649

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5472^{+164}_{-147}$	$4.382^{+0.153}_{-0.187}$	$-0.040^{+0.300}_{-0.300}$	$0.981^{+0.260}_{-0.173}$	$0.846^{+0.119}_{-0.064}$	$1.263^{+0.929}_{-0.621}$
	+3%/-3%	+3%/-4%	+750%/-750%	+27%/-18%	+14%/-8%	+74%/-49%
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 008868649-01 / KOI 3927.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-10 \pm 2$	$1.13^{+0.17}_{-0.15}$	$1503^{+110}_{-83}$	$3479^{+179}_{-163}$	$11^{+4}_{-3}$
Alt.	$-59 \pm 2$	$1.48^{+0.23}_{-0.19}$	$1499^{+108}_{-92}$	$4310^{+141}_{-139}$	$37^{+12}_{-9}$

$T_{\text{max}}$  = 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

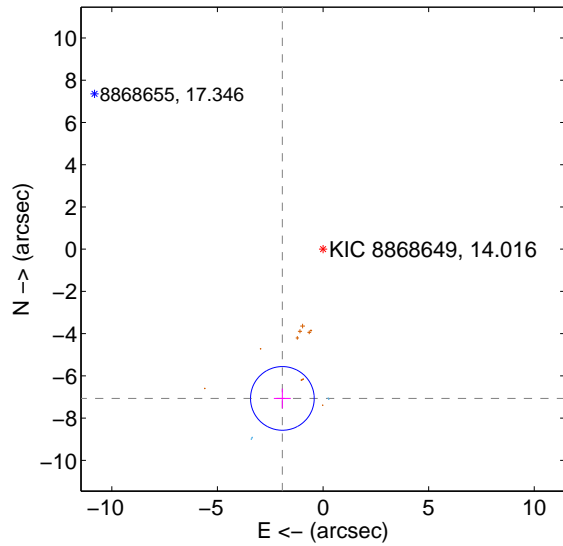
Supplemental centroid analysis for 008868649-01. Kepler magnitude: 14.02. Transit SNR 28.83

There are 5 quarters with good PRF difference image offsets

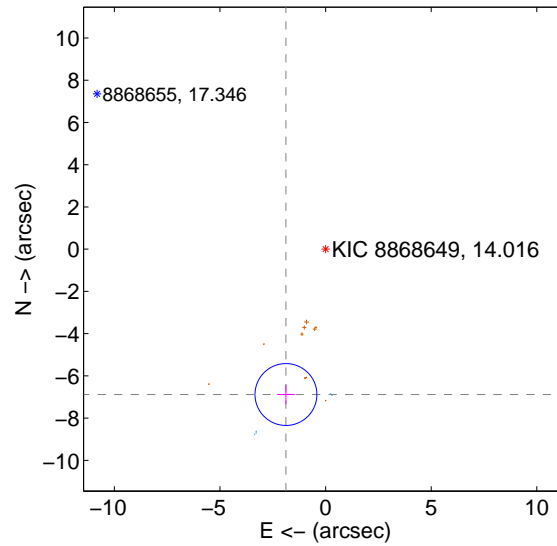
The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$7.323 \pm 0.502$	14.57	$1.925 \pm 0.401$	$-7.065 \pm 0.465$
PRF-fit source offset from KIC position	$7.132 \pm 0.488$	14.61	$1.877 \pm 0.421$	$-6.881 \pm 0.459$
photometric centroid source offset	$8.07 \pm 0.49$	16.44	$3.69 \pm 0.42$	$-7.18 \pm 0.51$

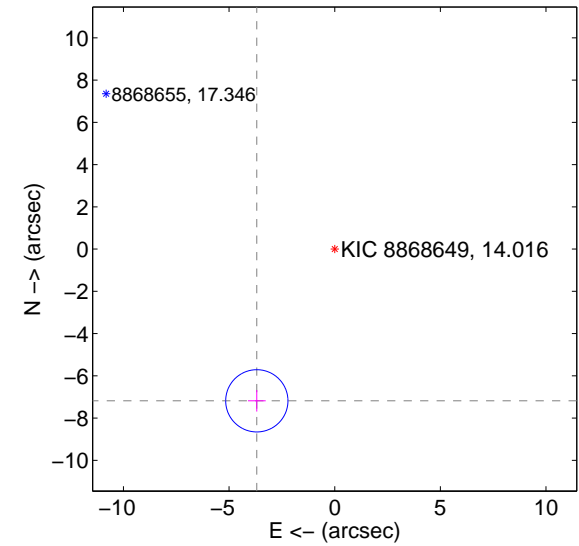
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

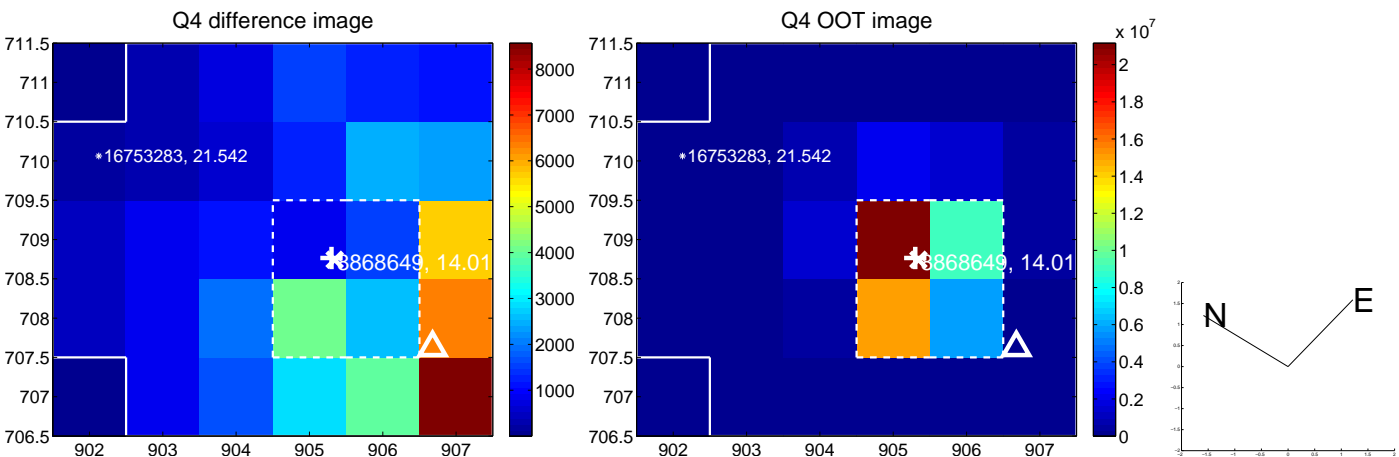
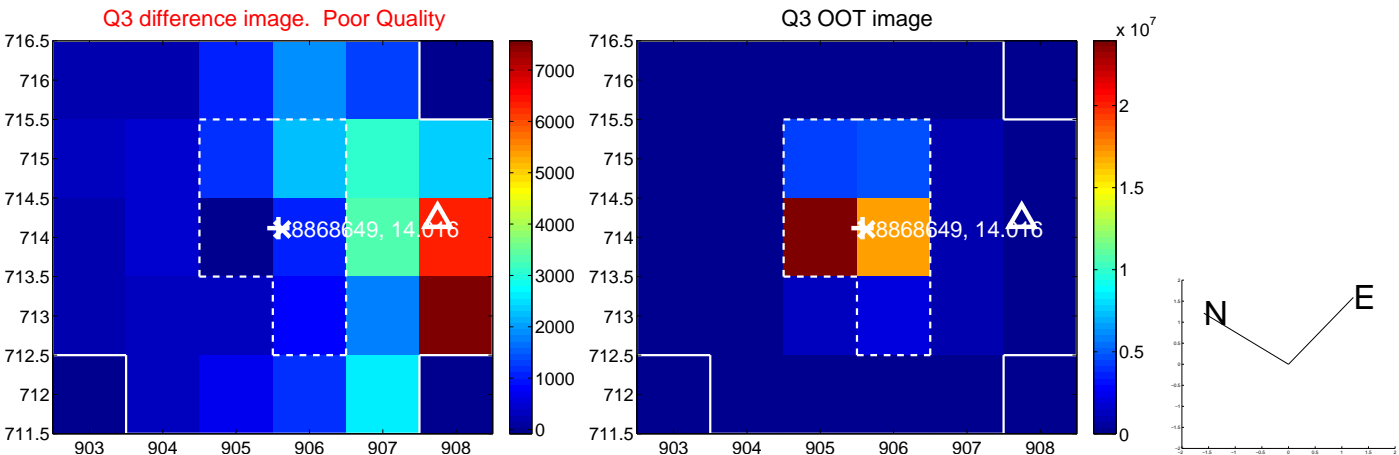
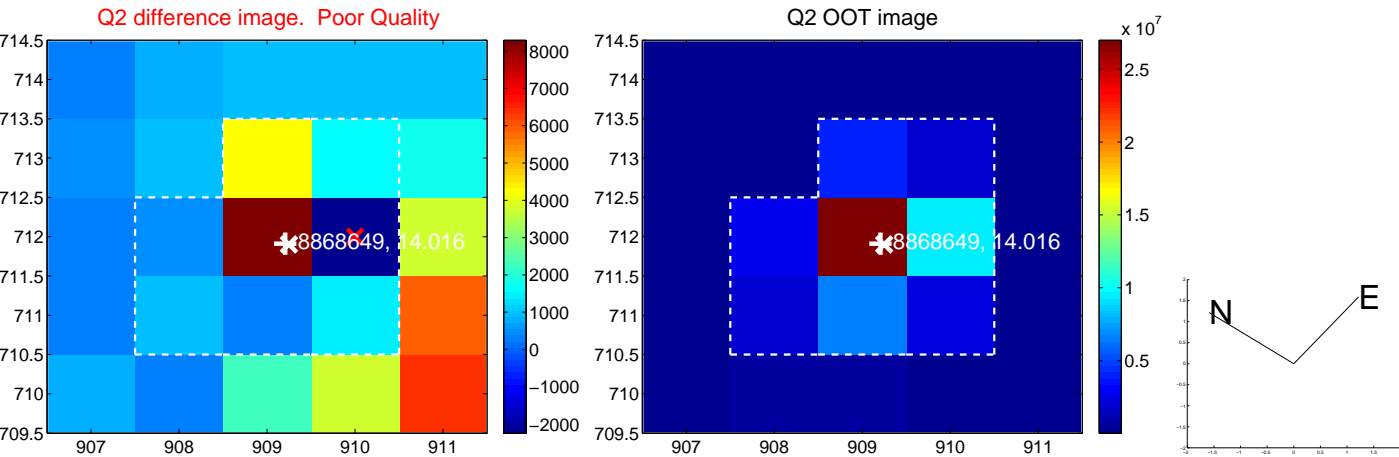
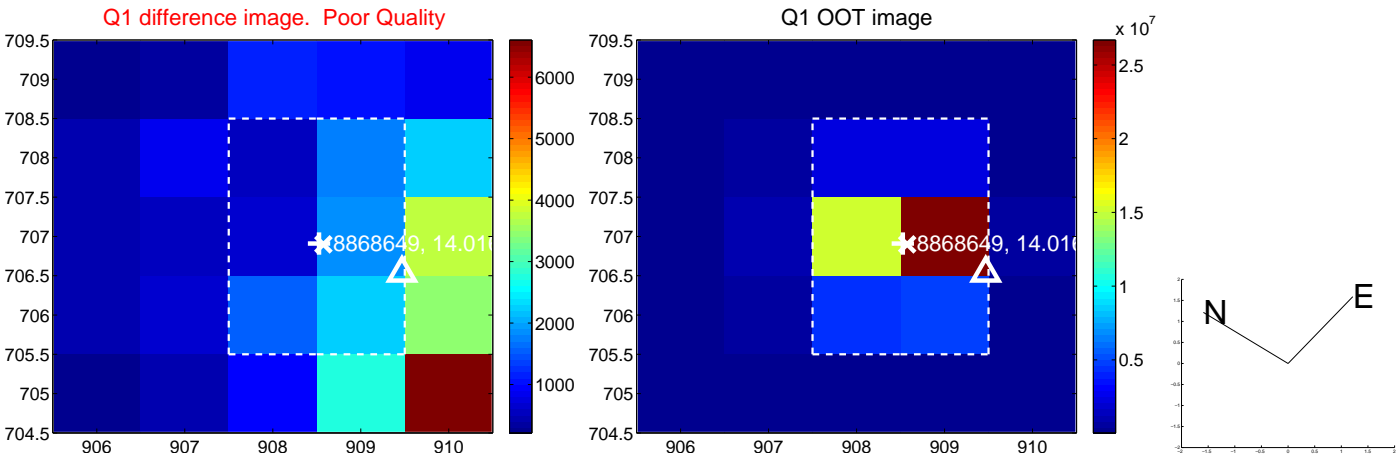


offset from photometric centroids



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.

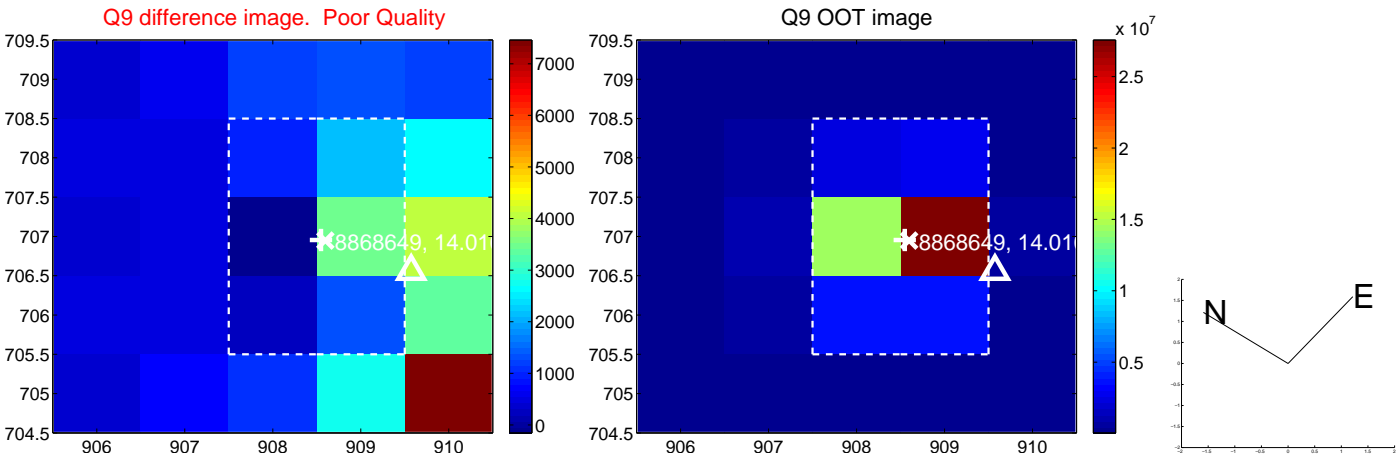
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



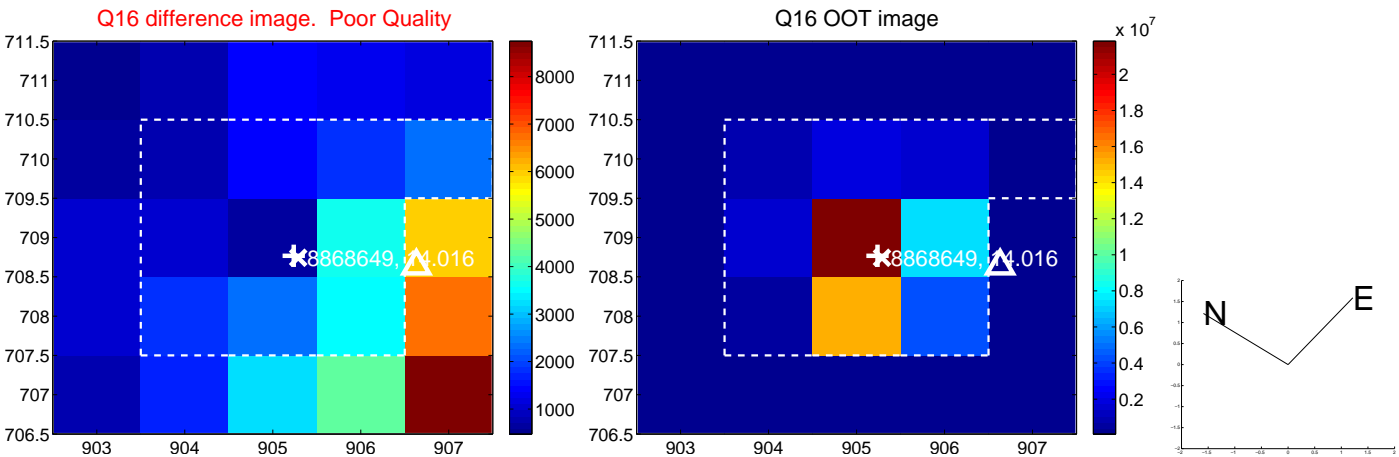
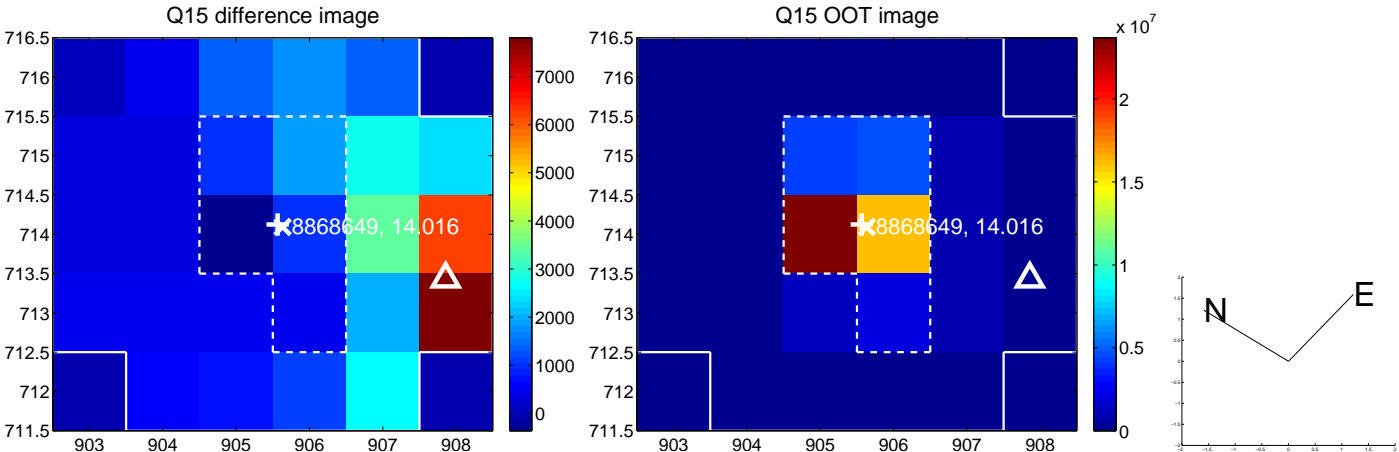
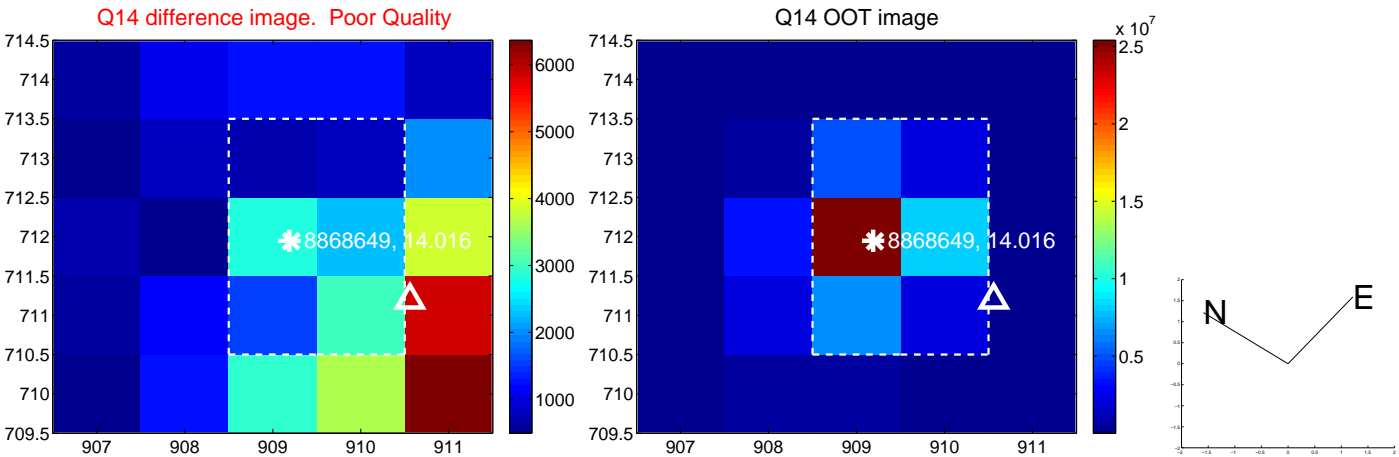
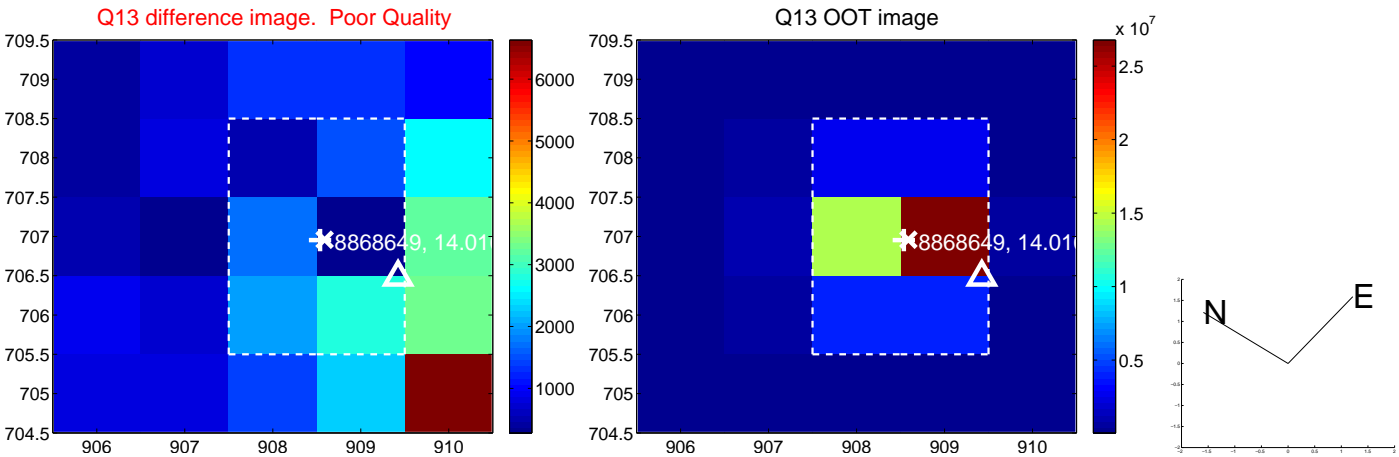




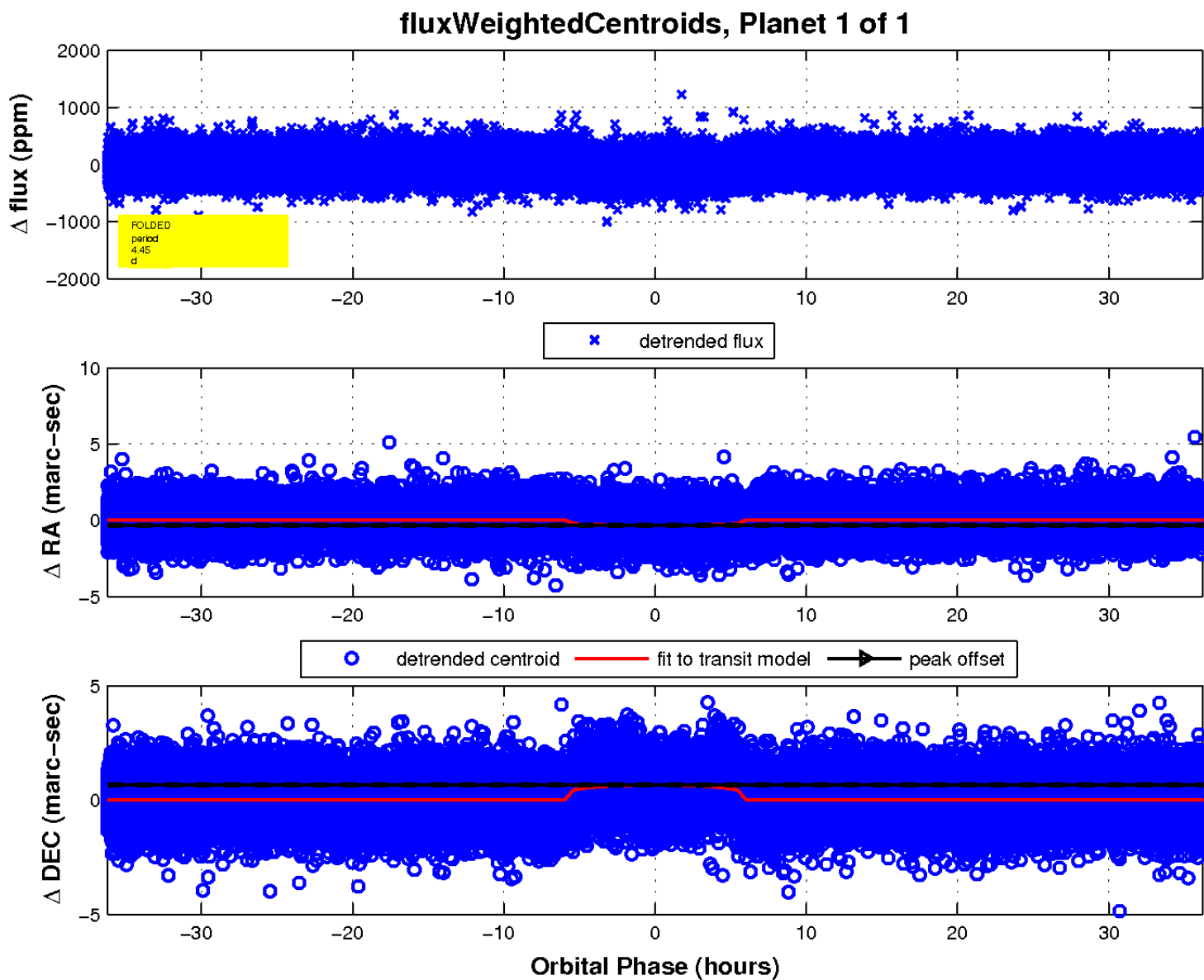
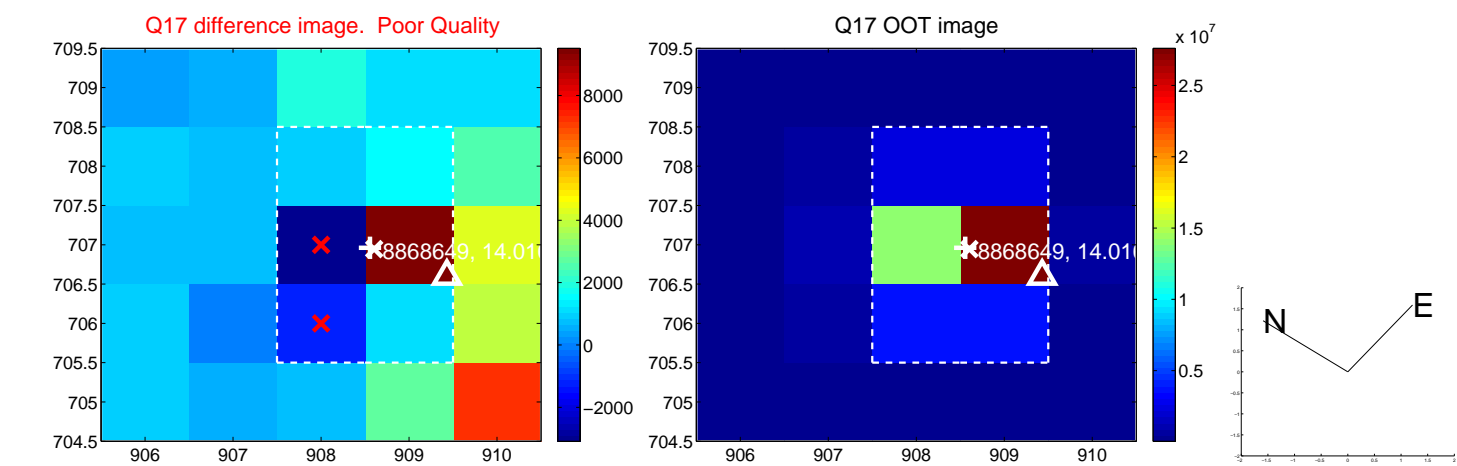
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white ×: 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

