

# KIC 009899217

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009899217-01	OBS	3979.01	1.332509	132.079974	119.7	4.548	24.2	24.5	1.00	6150	1.28	2387.76

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009899217-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—HALO_GHOST—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.

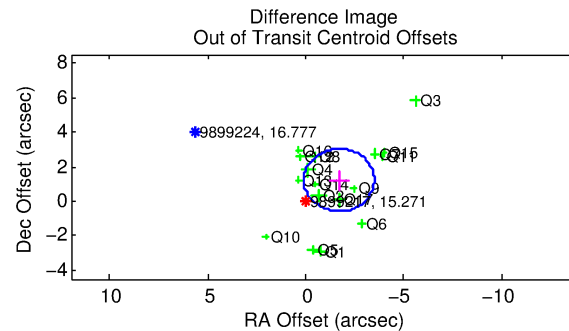
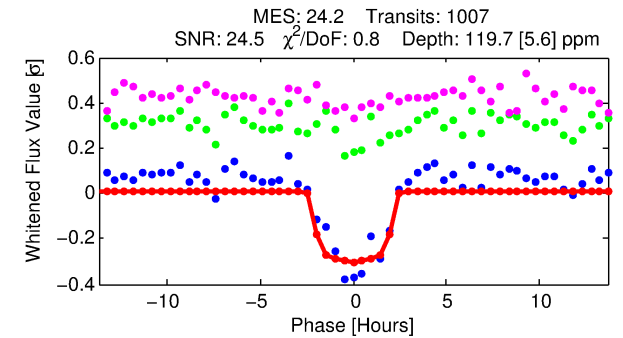
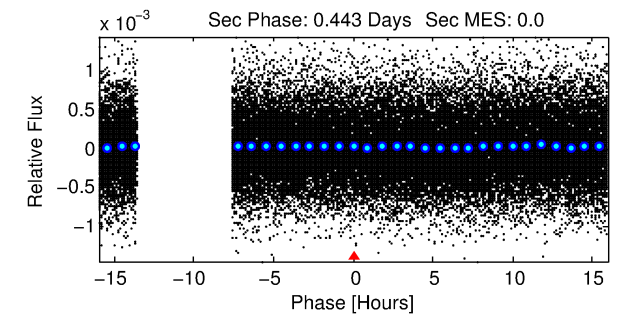
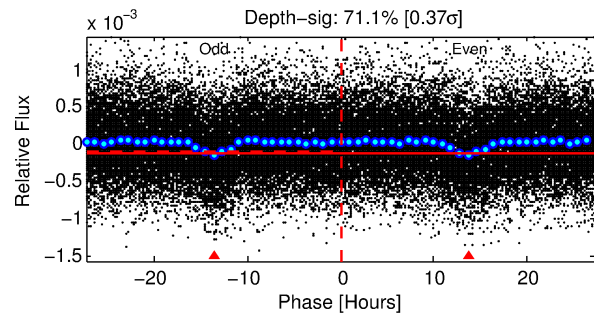
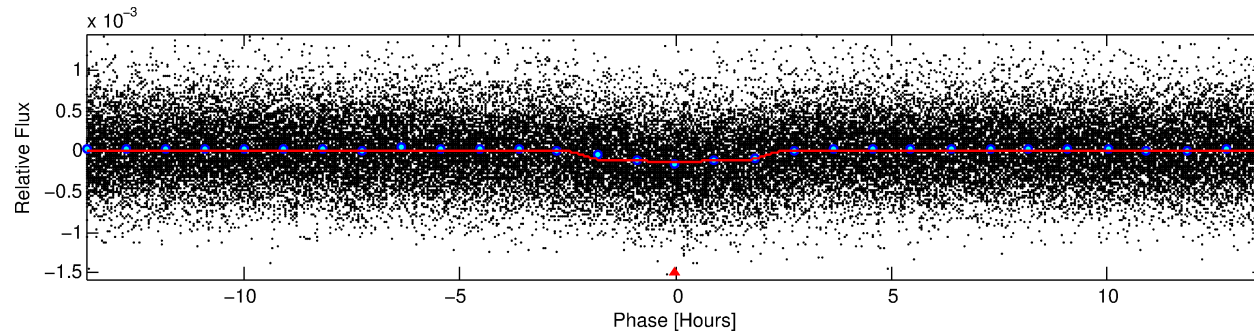
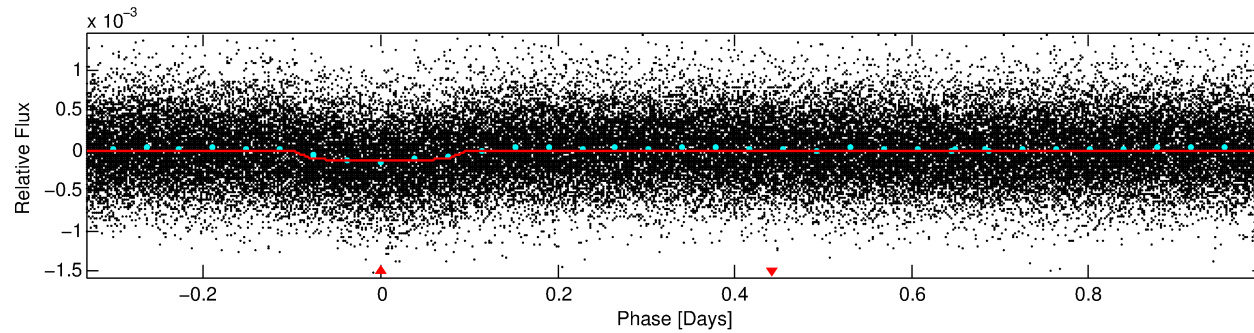
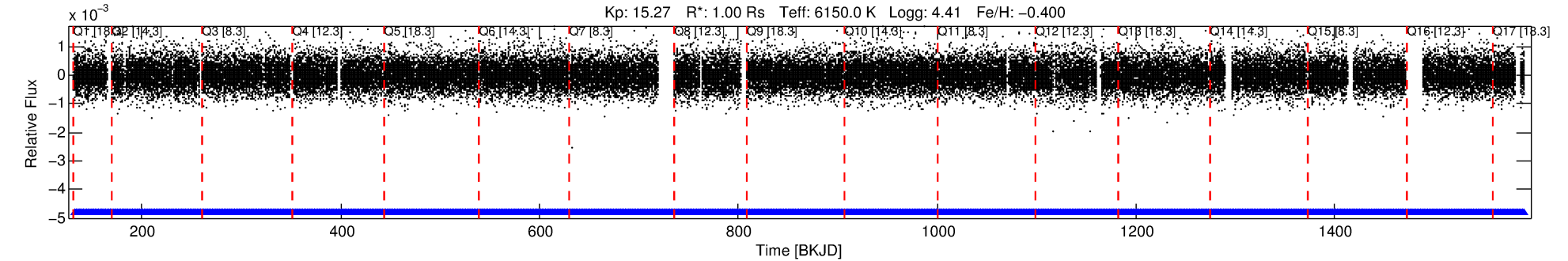
## Ephemeris Match Information For 009899217-01

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	$\sigma_P$	$\sigma_T$
009899217-01	9899217	BR-Cyg-pri	9899416	1:1	181.5	45	-3	10.03	15.27	5573.90	Direct-PRF	0	3.40	2.16

**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: 9899217 Candidate: 1 of 1 Period: 1.333 d  
KOI: K03979.01 Corr: 0.836



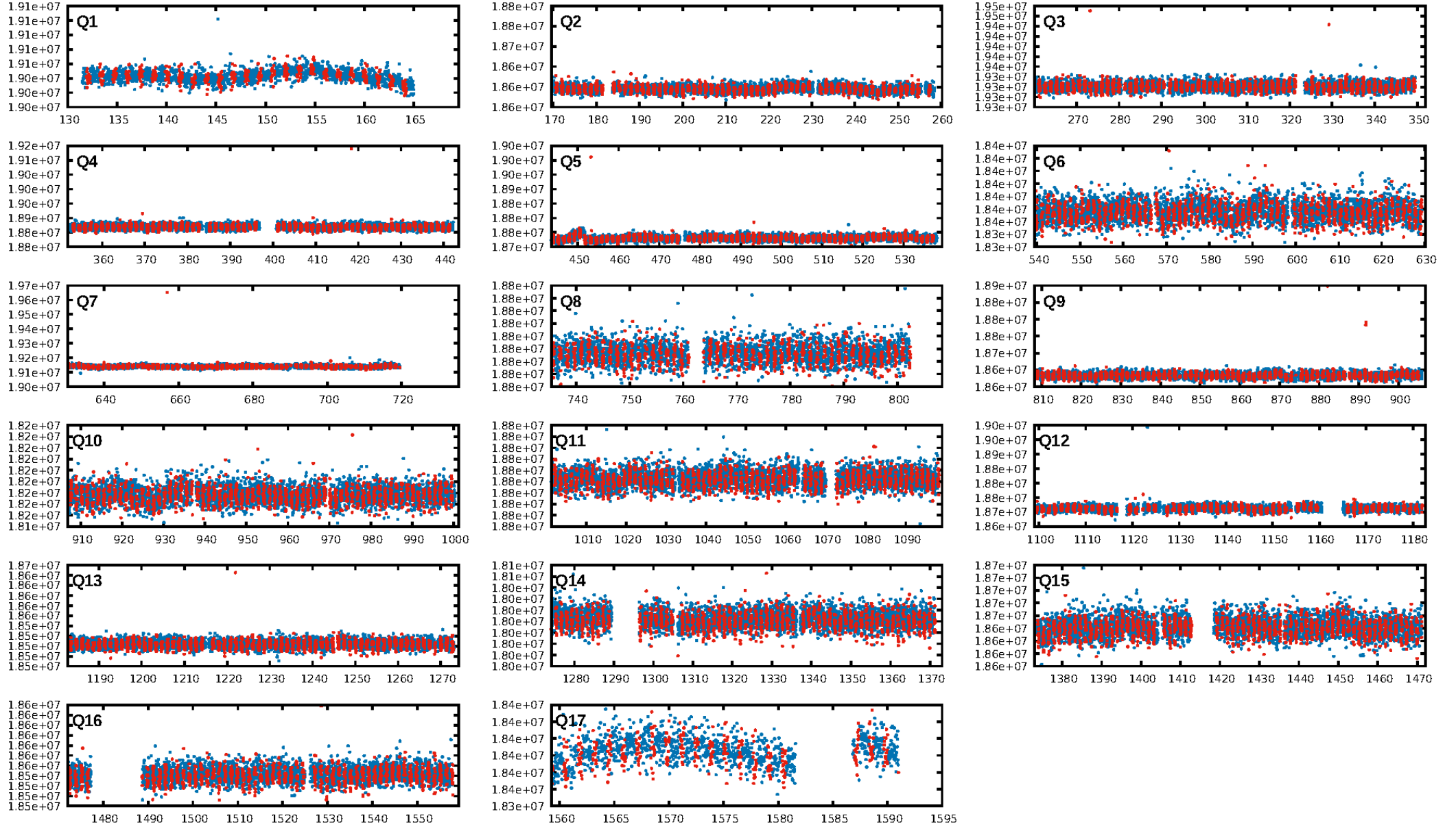
## DV Fit Results:

Period = 1.33251 [0.00001] d  
Epoch = 132.0800 [0.0022] BKJD  
Rp/R\* = 0.0117 [0.0021]  
a/R\* = 1.40 [0.67]  
b = 0.90 [0.21]  
Seff = 2387.76 [885.90]  
Teff = 1782 [165] K  
Rp = 1.29 [0.42] Re  
a = 0.0233 [0.0055] AU  
Ag = N/A  
Teffp = N/A

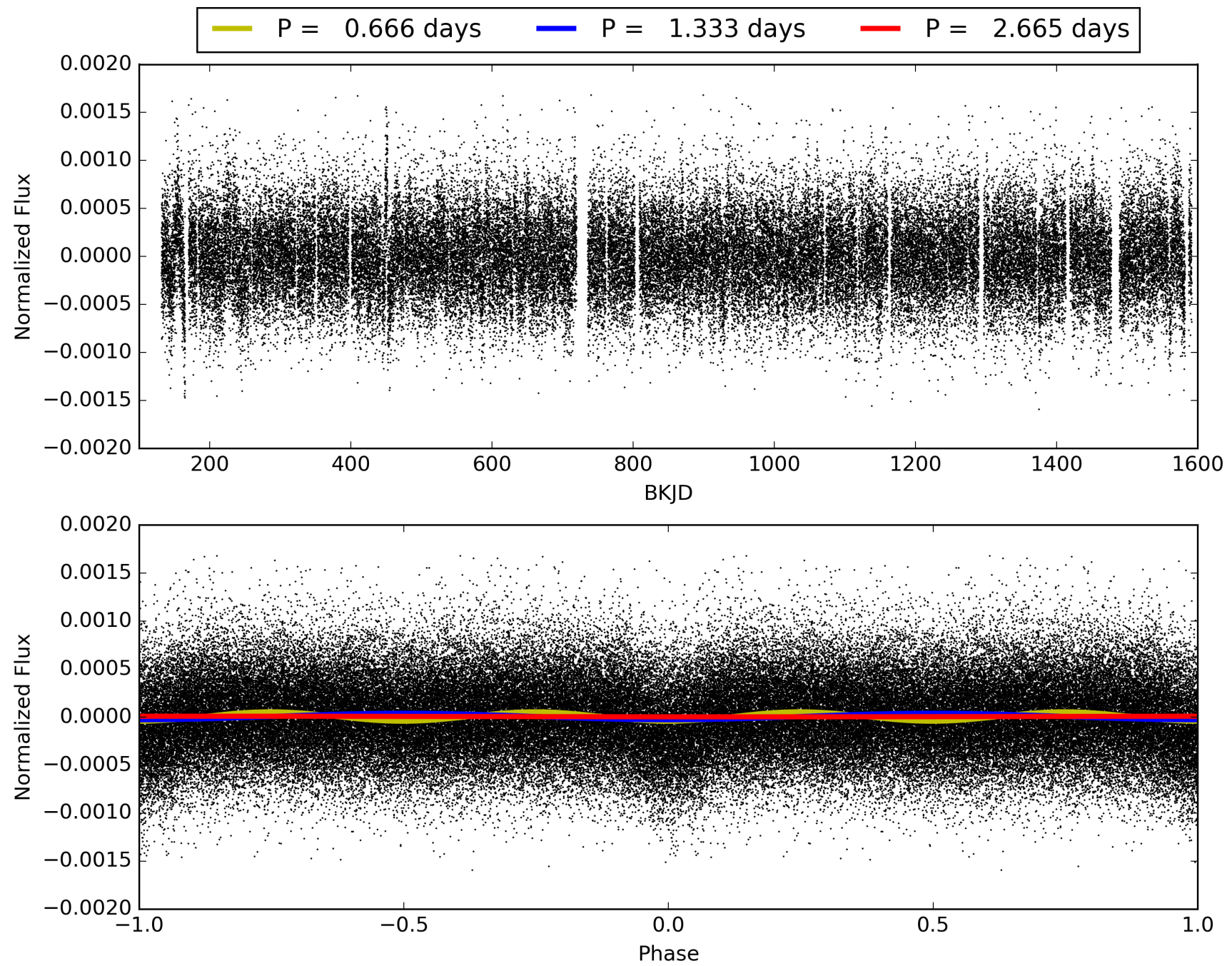
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 2.07e-119  
RollingBand-fgt: 1.00 [962/962]  
GhostDiagnostic-chr: -0.0572  
Centroid-sig: 0.0%  
Centroid-so: 3.626 arcsec [7.08 $\sigma$ ]  
OotOffset-rm: 2.087 arcsec [3.47 $\sigma$ ]  
KicOffset-rm: 1.972 arcsec [3.32 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.12 [2/17]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 009899217-01, PDC Light Curves

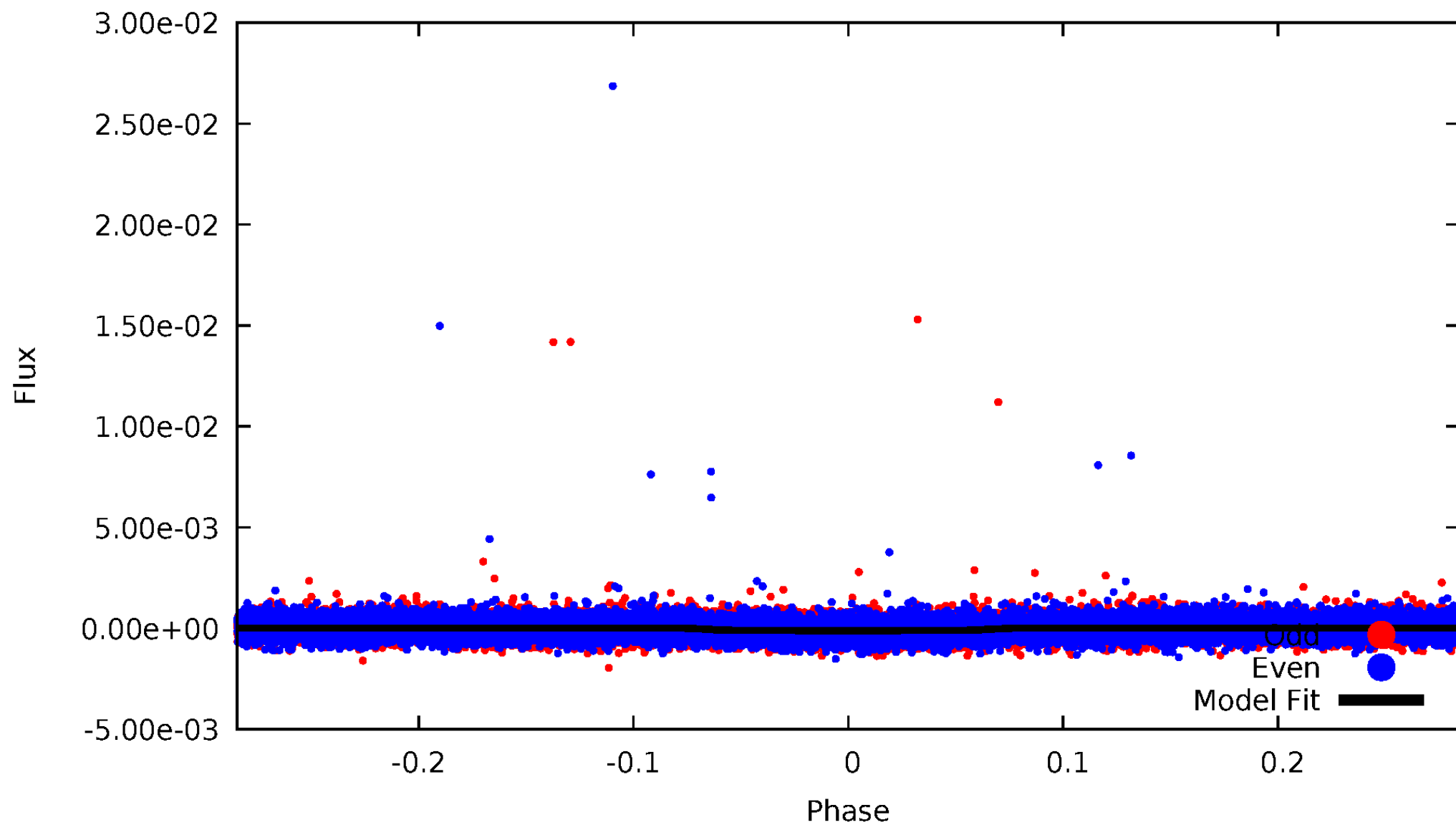


TCE 009899217-01



# DV Odd/Even

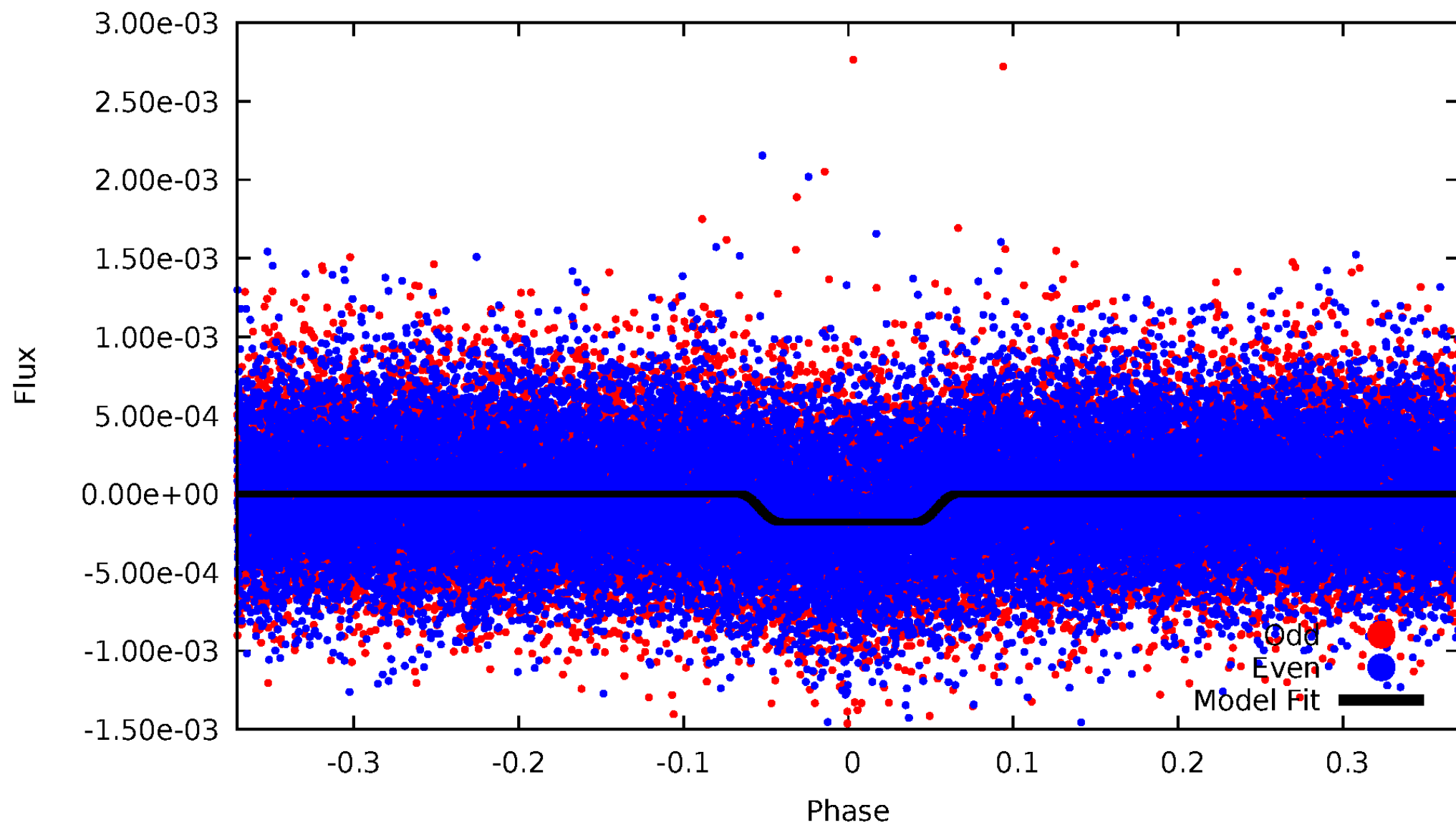
TCE 009899217-01





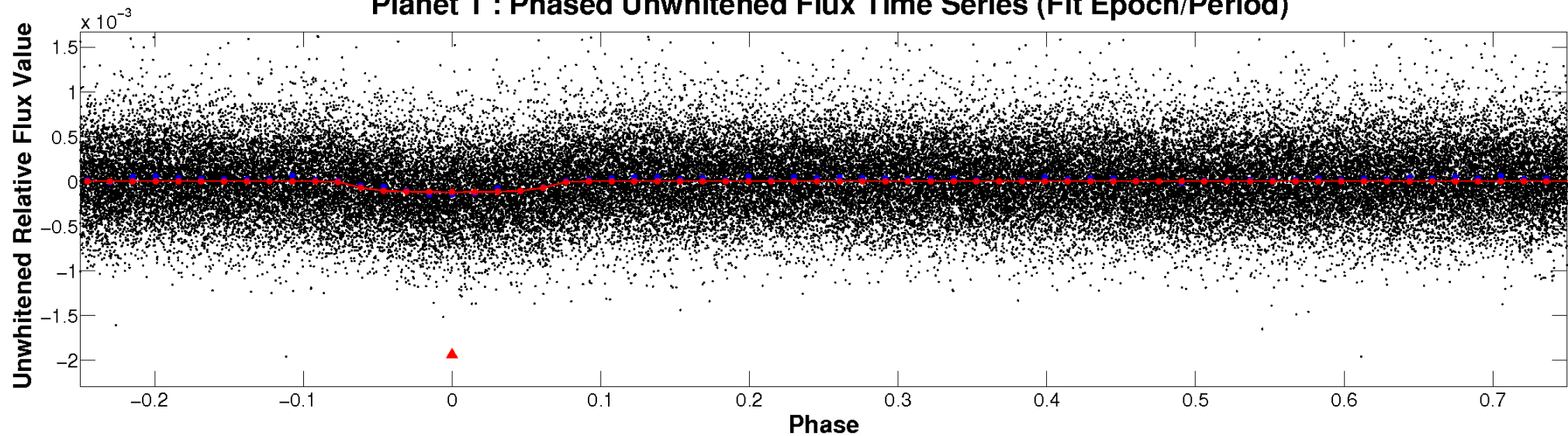
# ALT Odd/Even

TCE 009899217-01

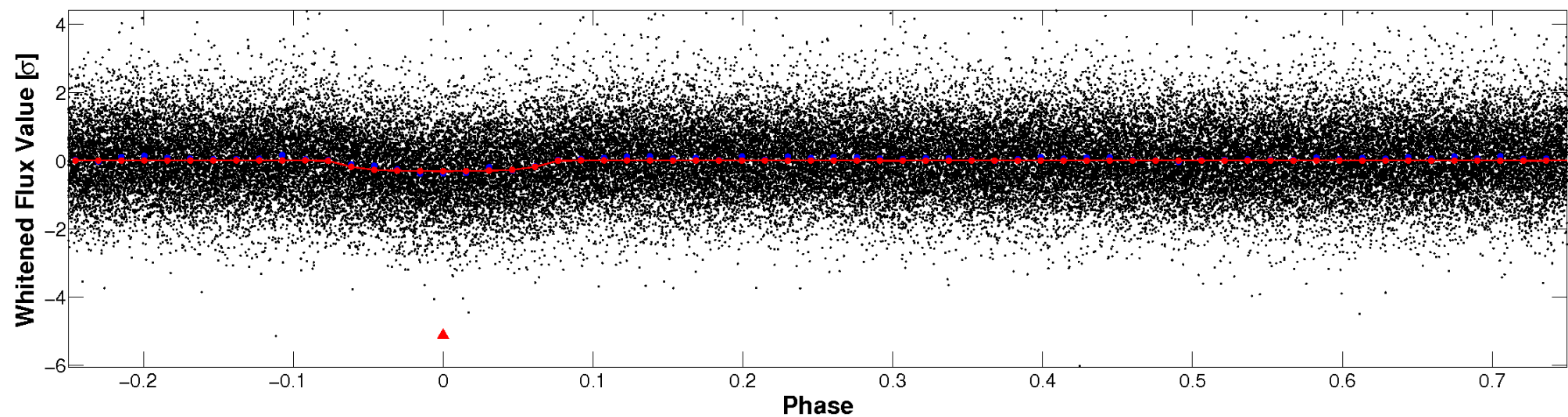


# Non-Whitened Vs. Whitened Light Curve

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

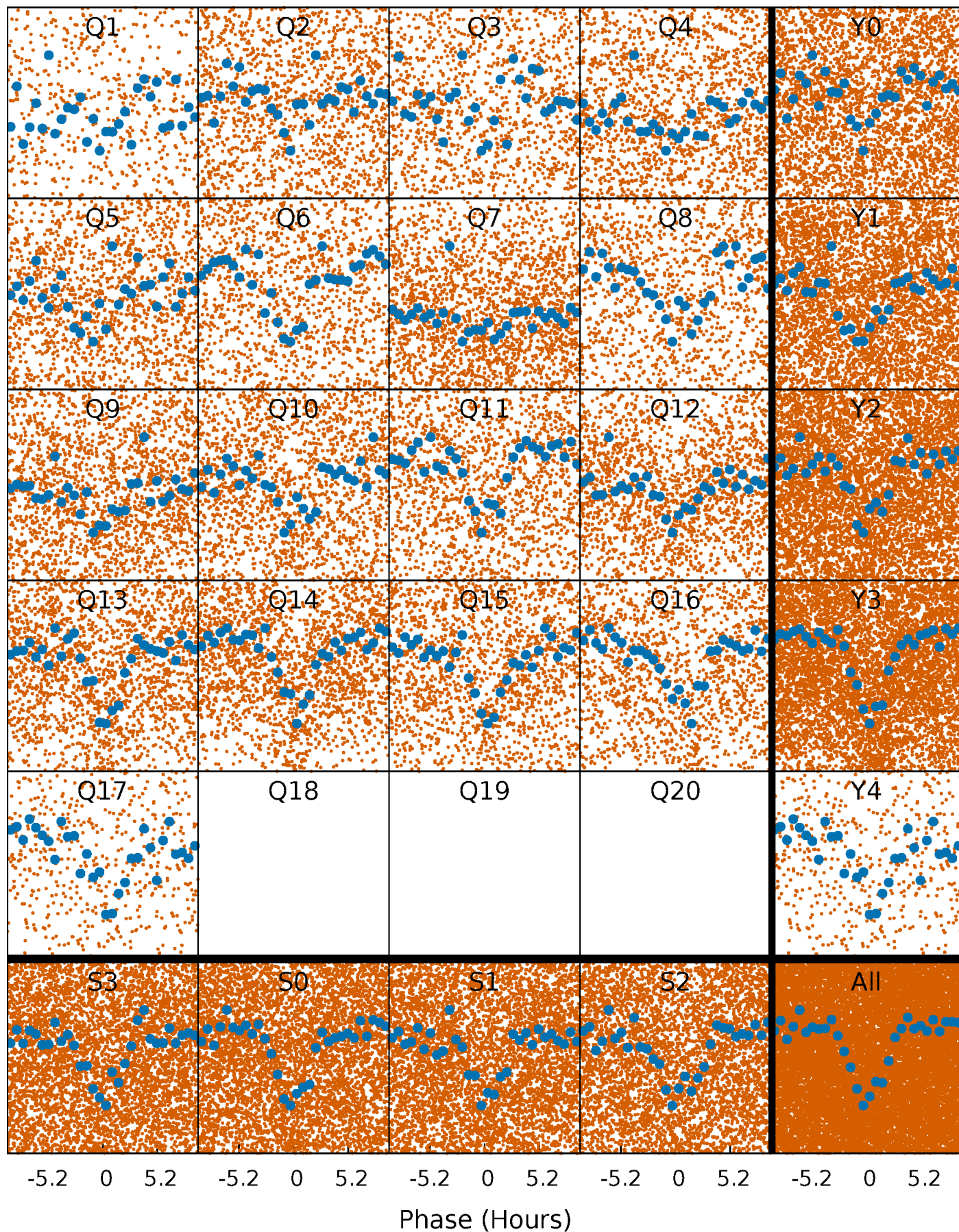


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

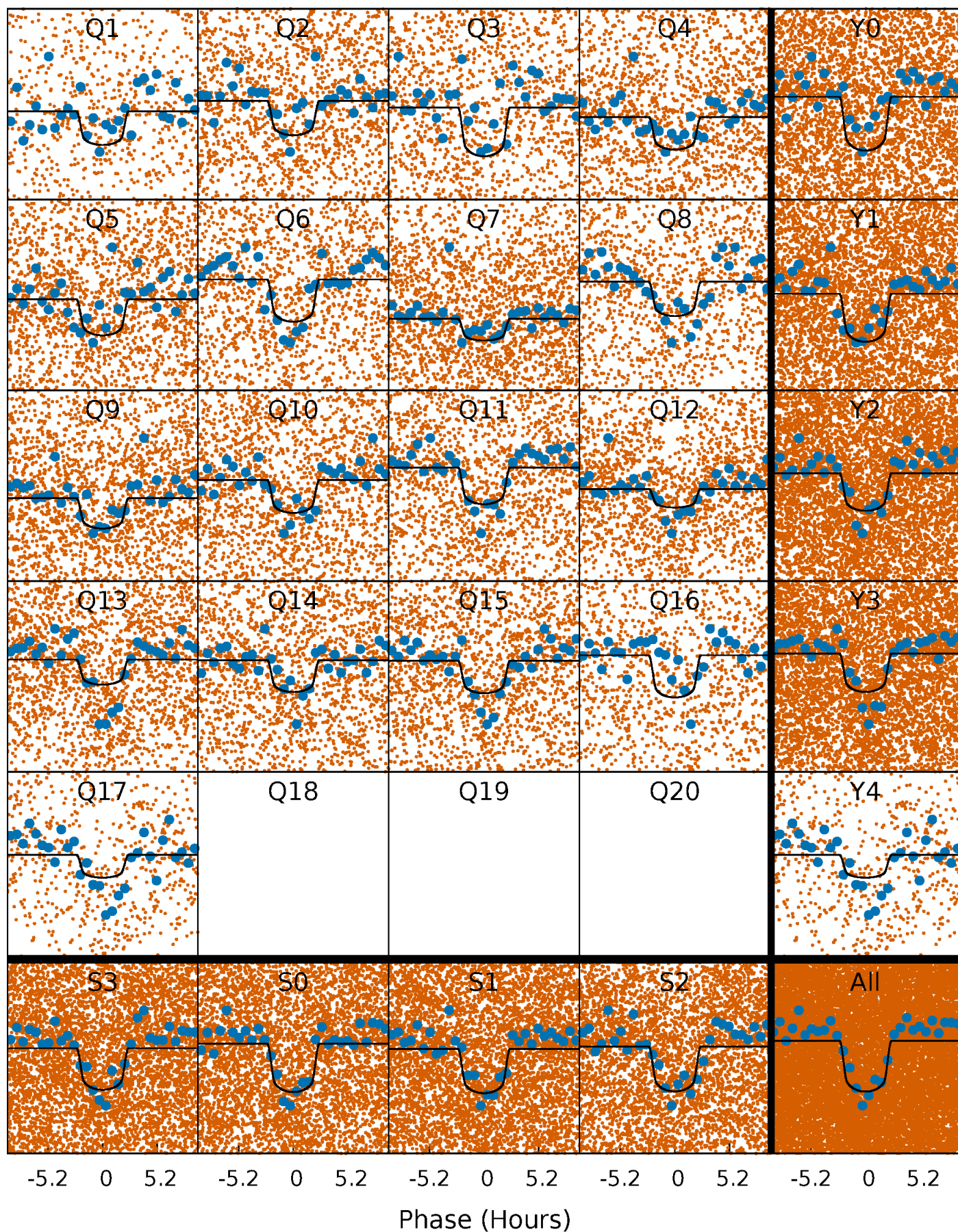
TCE 009899217-01 P= 1.332509 Days  $T_0=132.079974$  (BKJD)





# DV Quarter-Phased Transit Curves

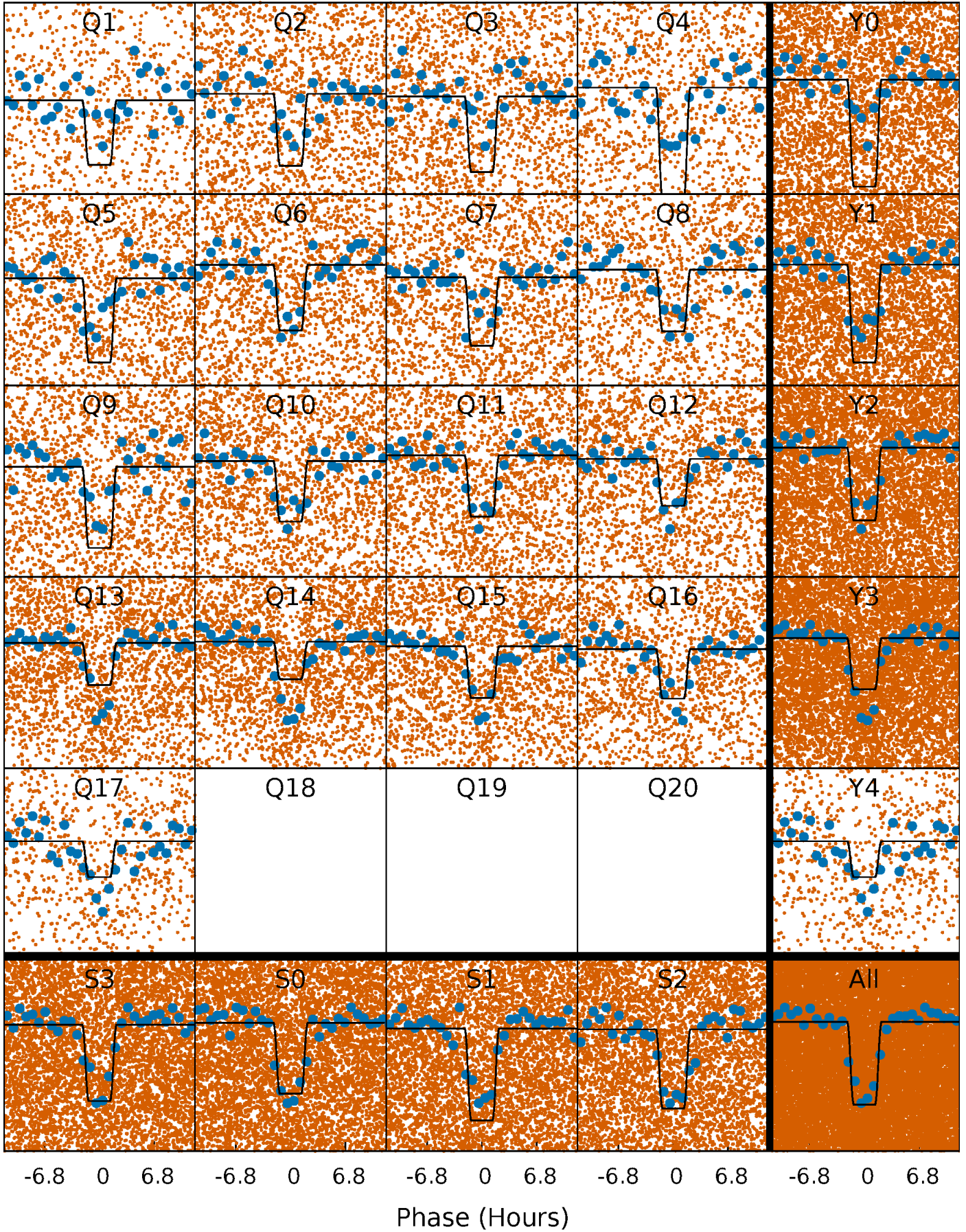
TCE 009899217-01 P= 1.332509 Days  $T_0=132.079974$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

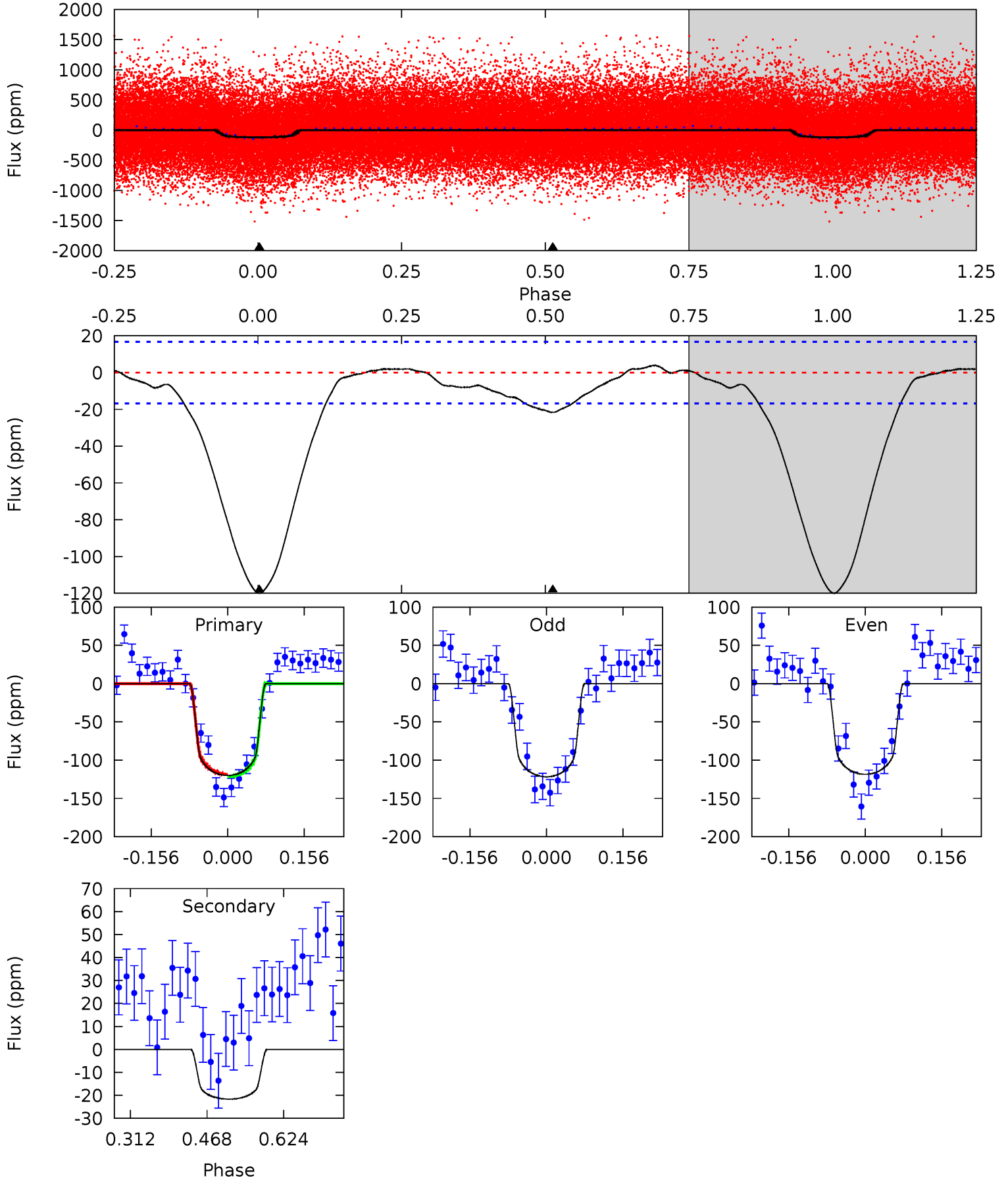
TCE 009899217-01 P= 1.332549 Days  $T_0=132.057304$  (BKJD)



# DV Model-Shift Uniqueness Test

009899217-01, P = 1.332509 Days, E = 130.747465 Days

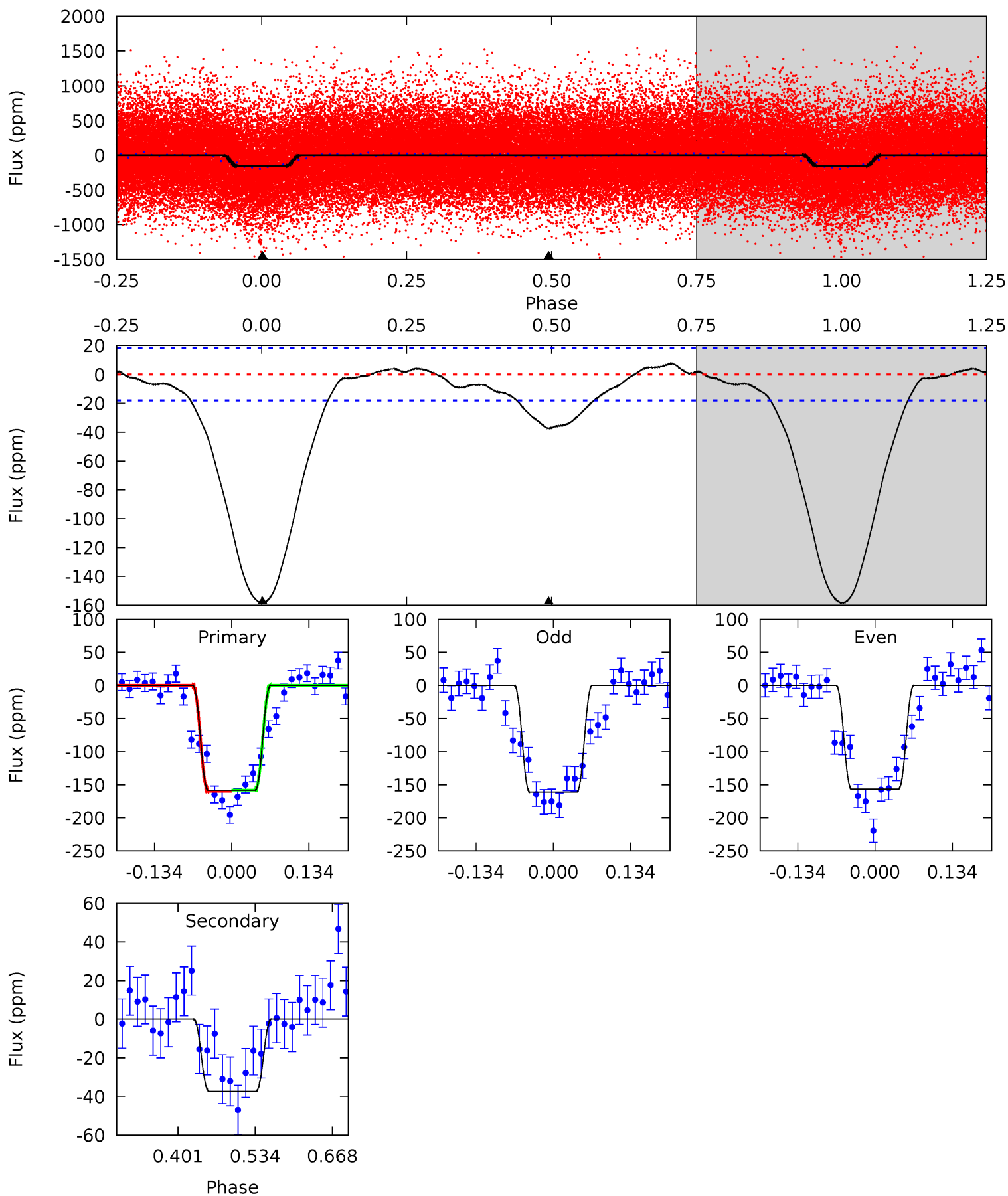
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
32.1	5.79	0	0	4.47	1.42	0.99	32.1	32.1	5.79	5.79	0.44	0.98	0.03	0.40



# Alt Model-Shift Uniqueness Test

009899217-01, P = 1.332549 Days, E = 130.724755 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
39.4	9.30	0	0	4.50	1.50	1.22	39.4	39.4	9.30	9.30	0.59	0.99	0.05	0.19





### Stellar Parameters For KIC 009899217

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6150^{+193}_{-215}$	$4.410^{+0.101}_{-0.188}$	$-0.400^{+0.300}_{-0.300}$	$1.004^{+0.281}_{-0.151}$	$0.946^{+0.126}_{-0.101}$	$1.315^{+0.610}_{-0.669}$
	+3%/-3%	+2%/-4%	+75%/-75%	+28%/-15%	+13%/-11%	+46%/-51%
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 009899217-01 / KOI 3979.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-22 \pm 4$	$1.31^{+0.30}_{-0.27}$	$2521^{+173}_{-147}$	$4099^{+387}_{-328}$	$3.742^{+2.369}_{-1.322}$
Alt.	$-37 \pm 4$	$1.51^{+0.32}_{-0.28}$	$2528^{+167}_{-144}$	$4331^{+335}_{-284}$	$4.962^{+2.578}_{-1.684}$

$T_{\text{max}}$  = 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

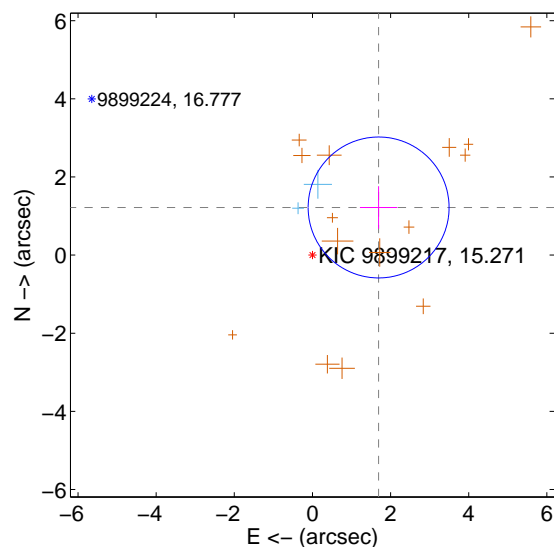
Supplemental centroid analysis for 009899217-01. Kepler magnitude: 15.27. Transit SNR 24.50

There are 2 quarters with good PRF difference image offsets

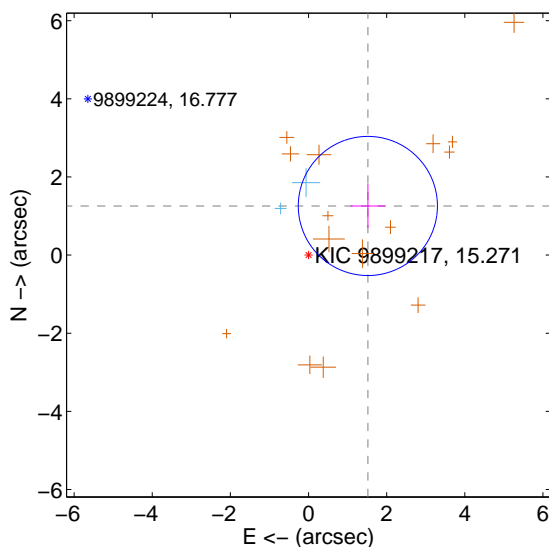
The direct PRF centroid is offset from the target star catalog position by about 0.34 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.087 \pm 0.601$	3.47	$-1.694 \pm 0.479$	$1.219 \pm 0.543$
PRF-fit source offset from KIC position	$1.972 \pm 0.594$	3.32	$-1.519 \pm 0.446$	$1.258 \pm 0.562$
photometric centroid source offset	$3.63 \pm 0.51$	7.08	$-3.27 \pm 0.51$	$-1.56 \pm 0.51$

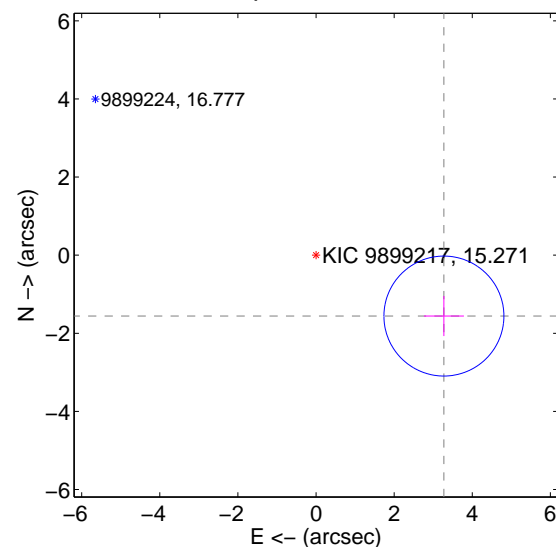
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

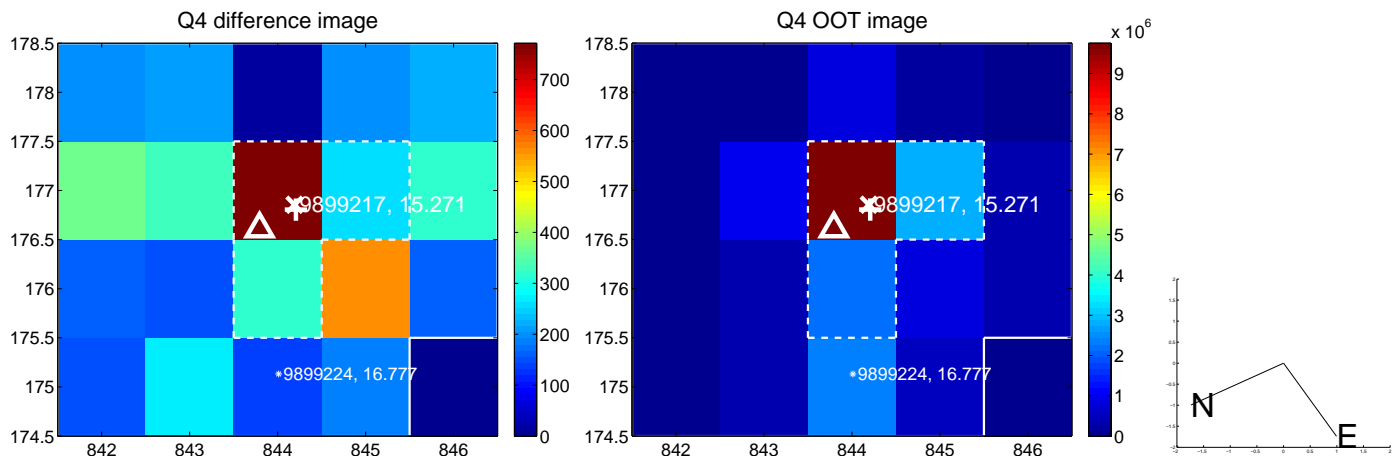
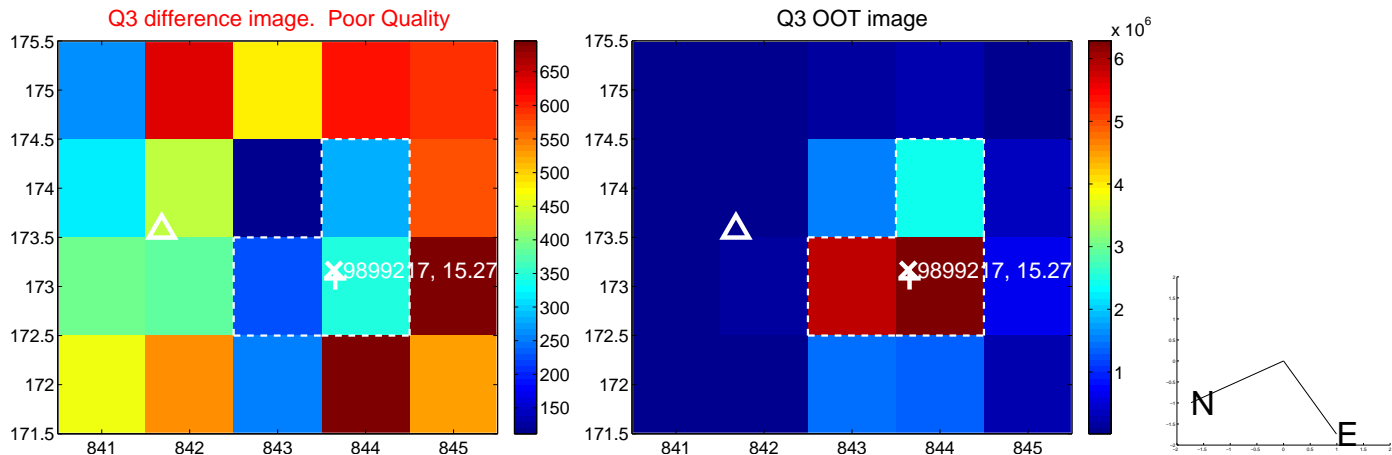
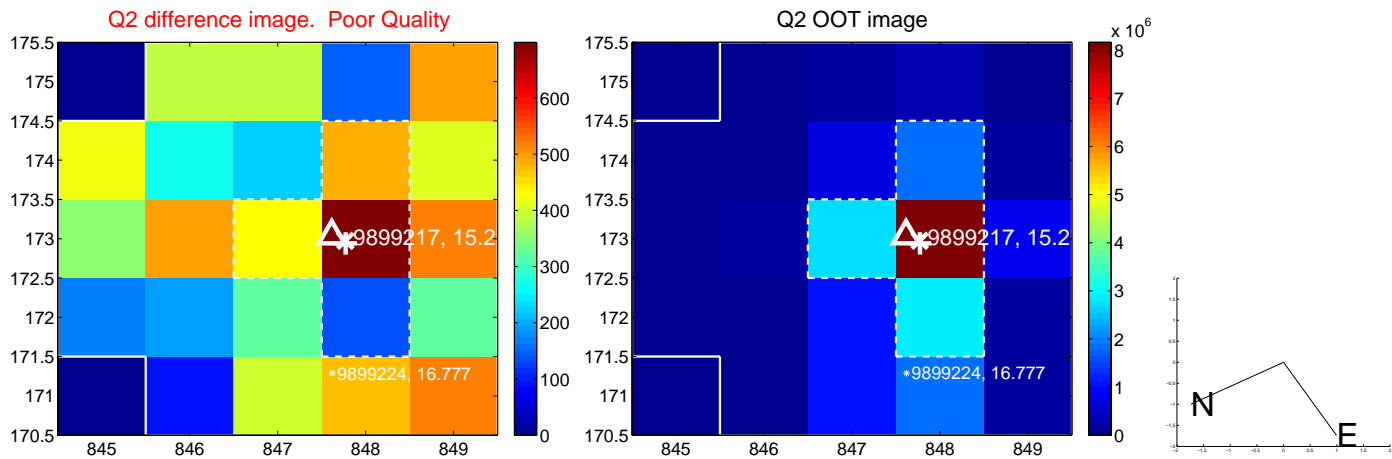
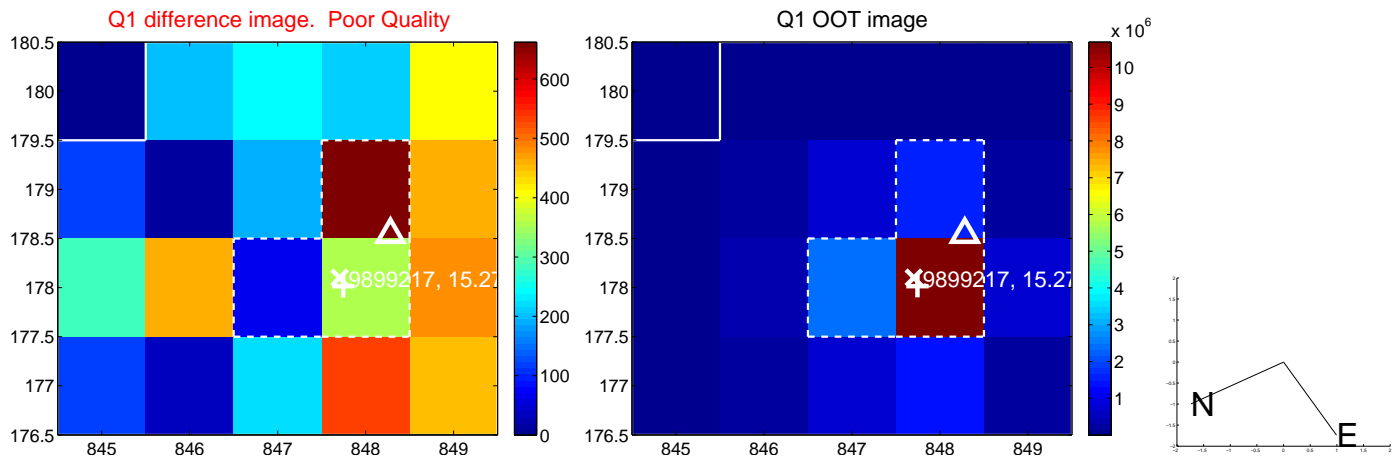


offset from photometric centroids



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.

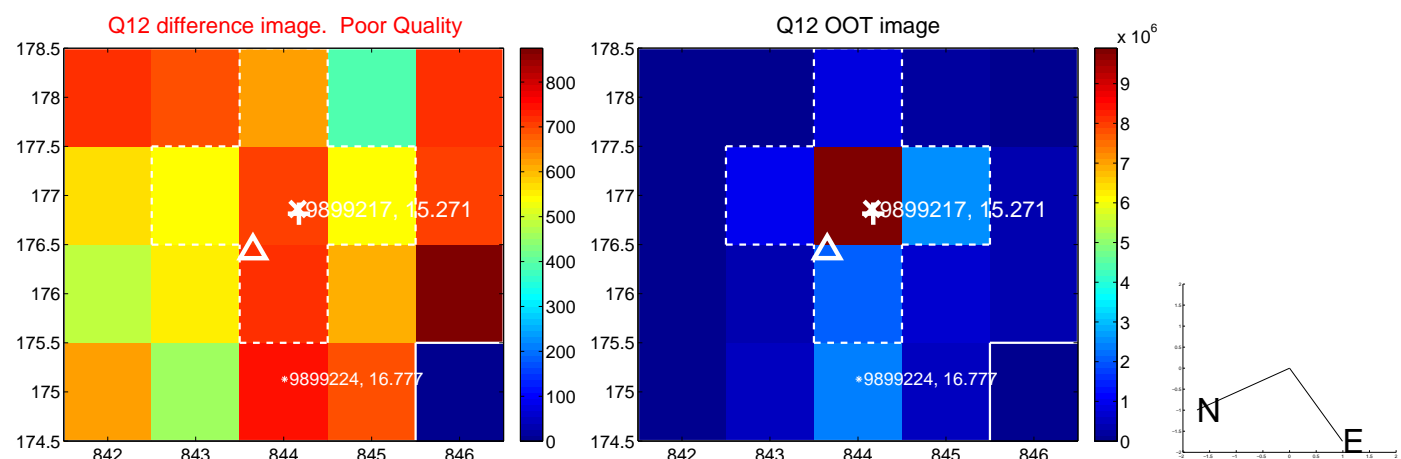
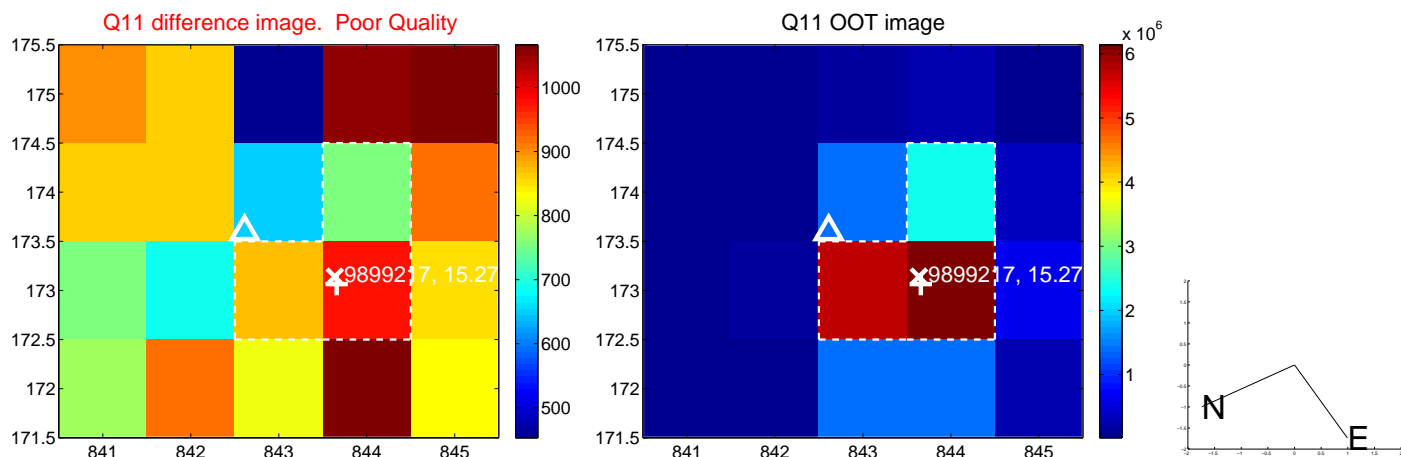
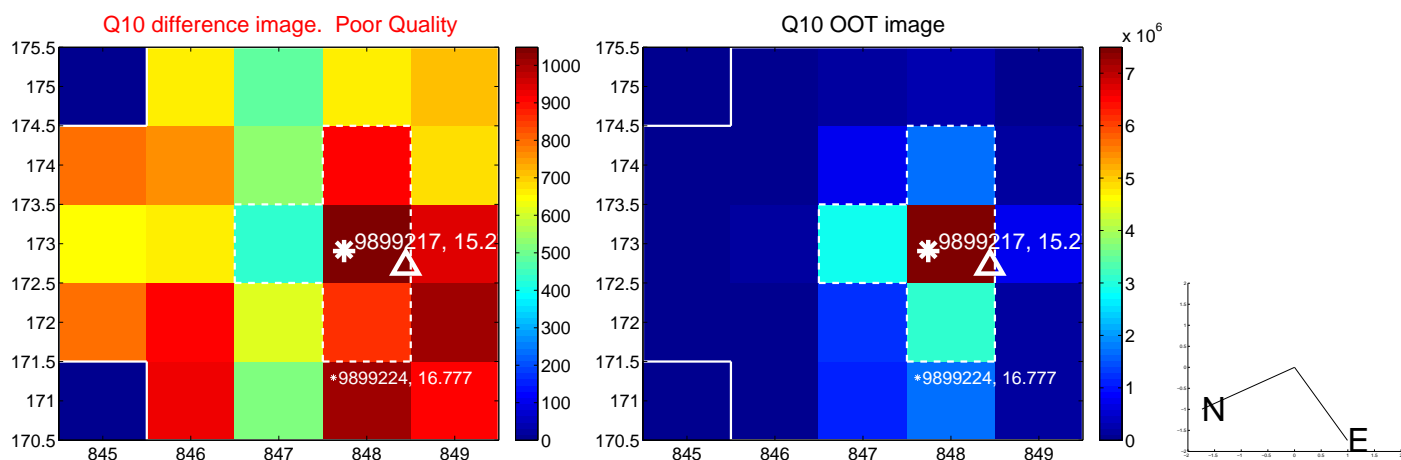
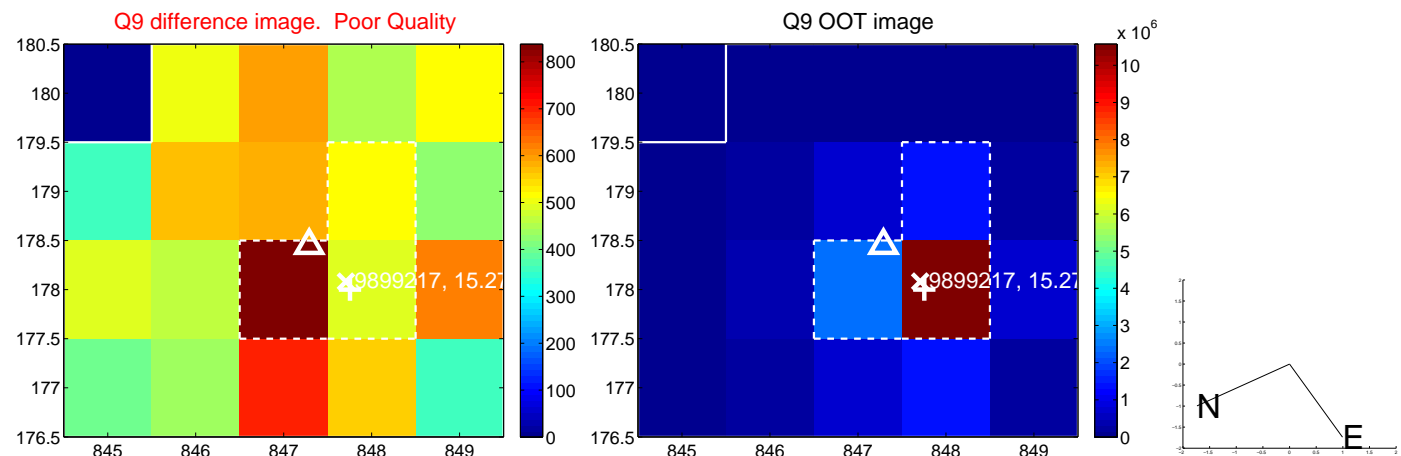
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



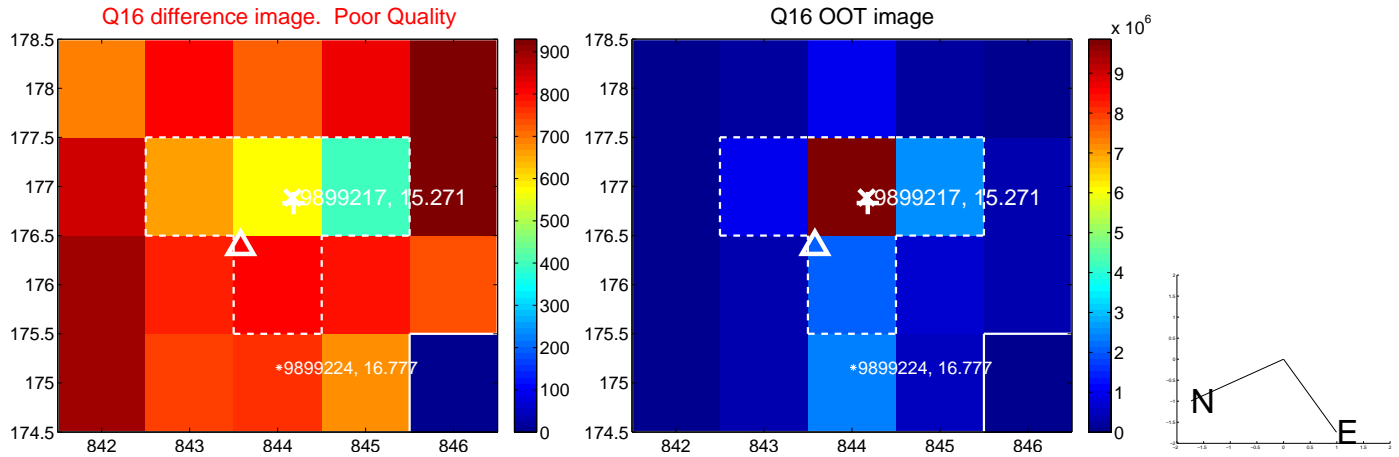
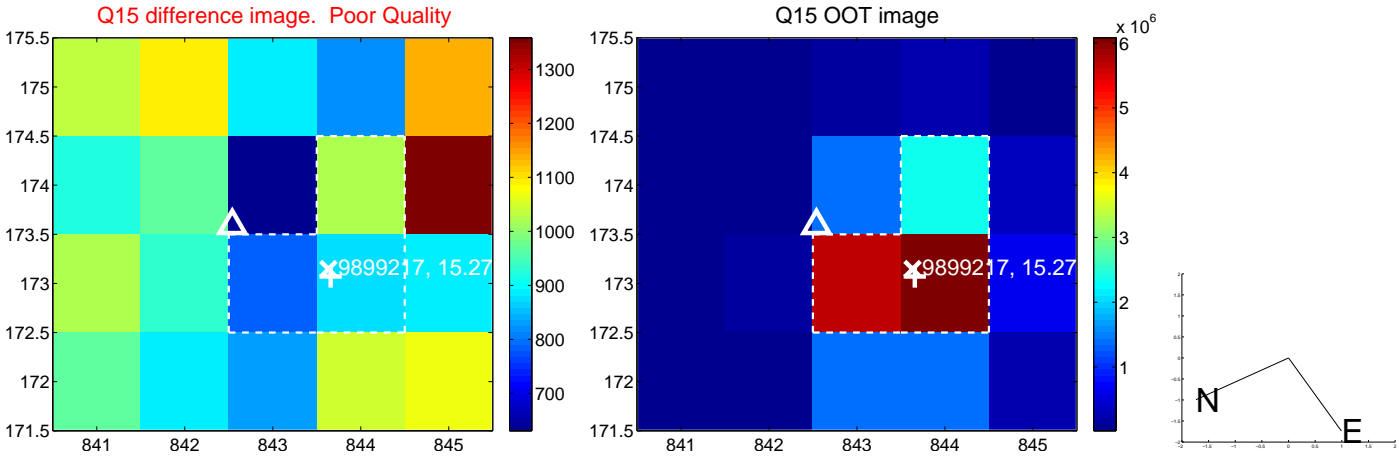
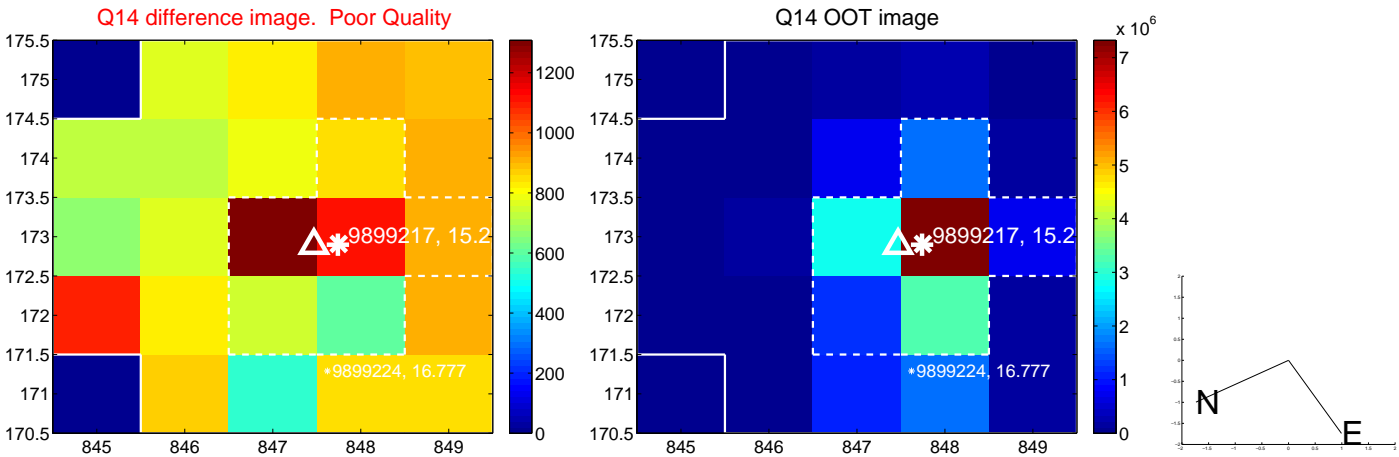
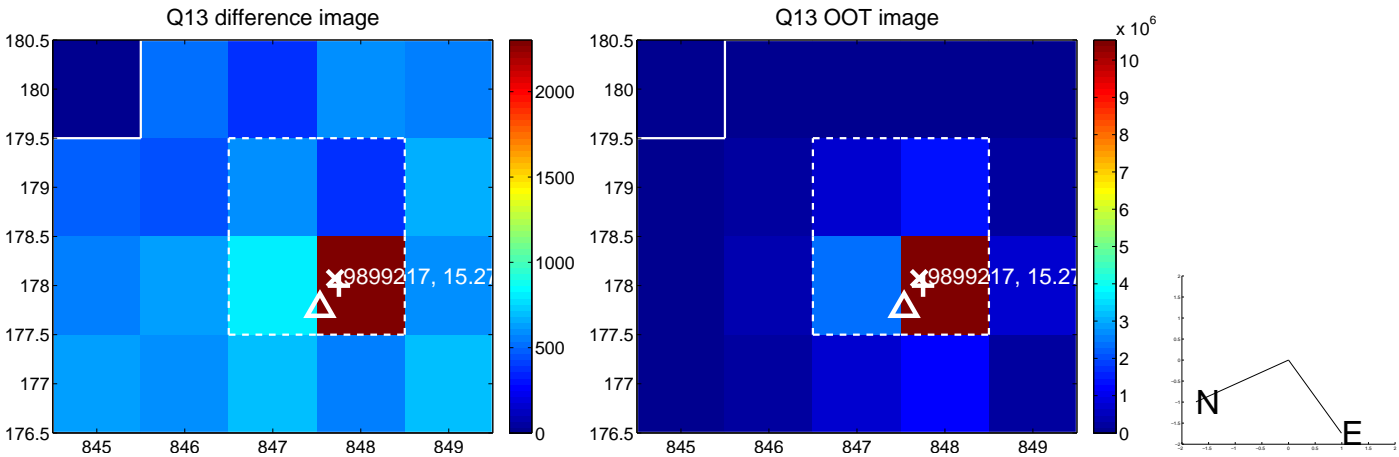




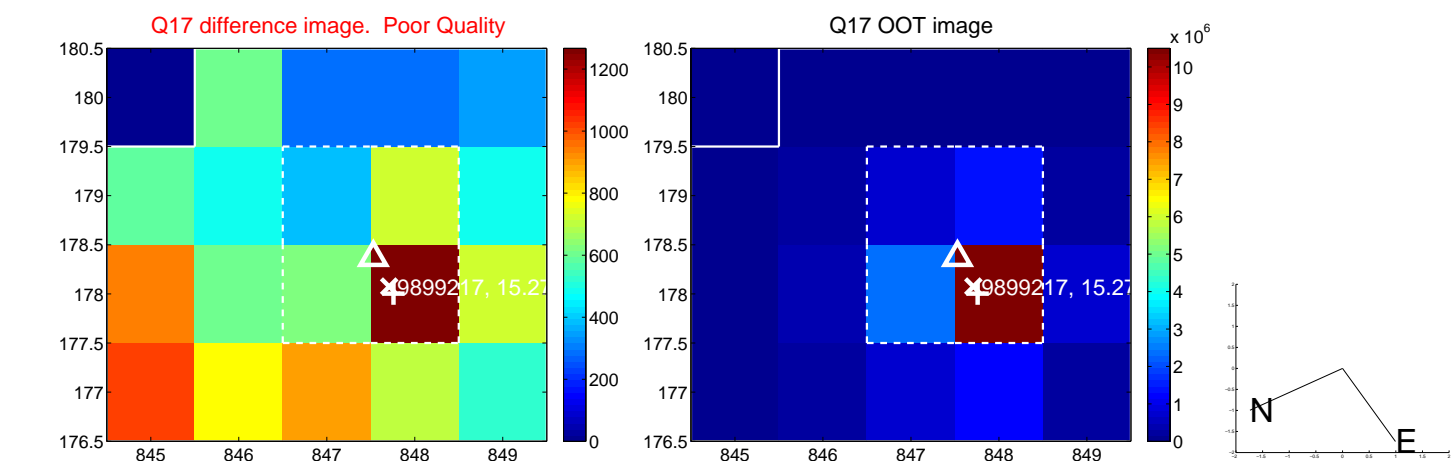
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



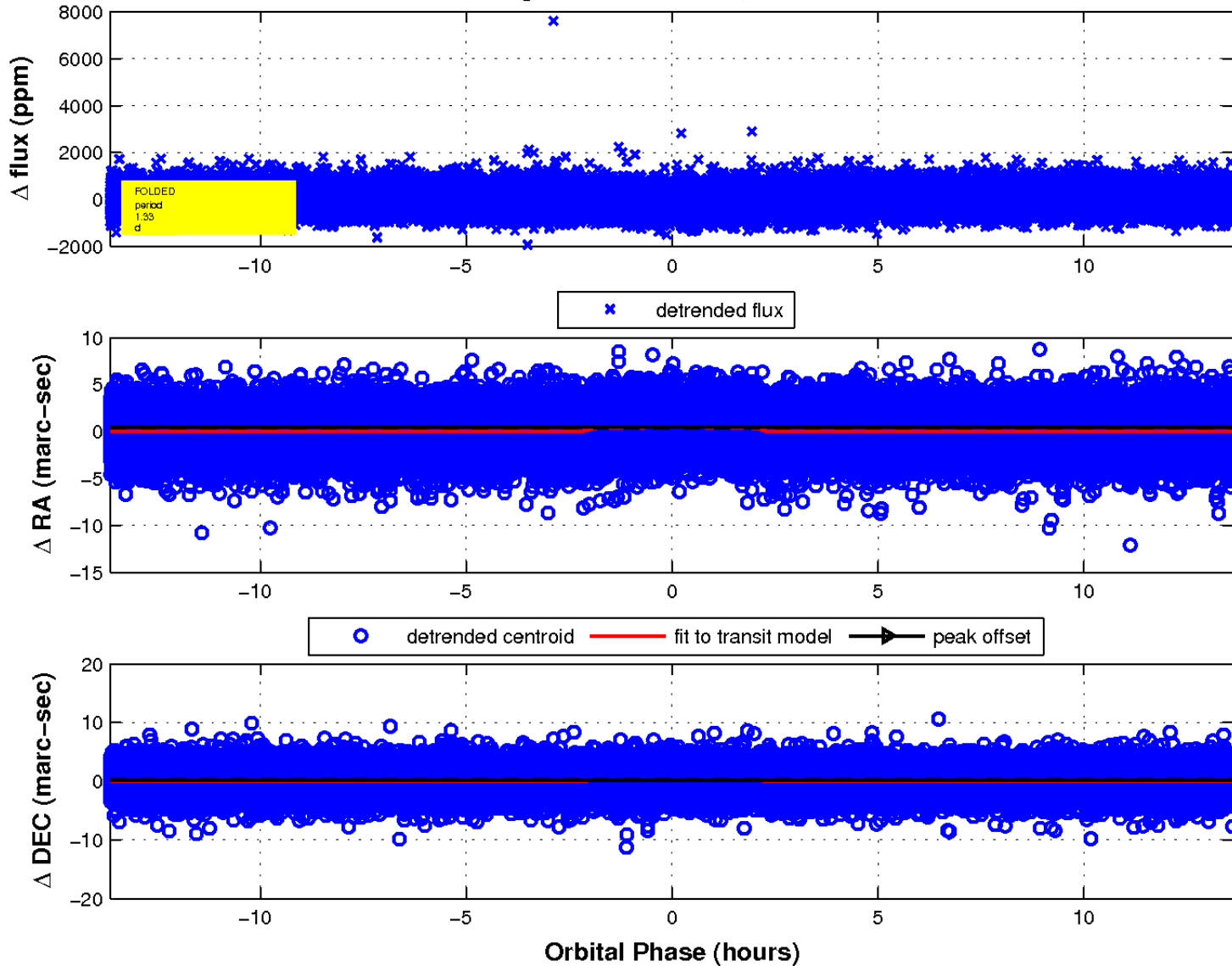
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 1 of 1



UKIRT Image

Declination

