

# KIC 009899065

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009899065-01	OBS	4108.01	1.332569	132.050370	136.2	3.416	13.9	14.1	0.62	5157	0.87	600.47

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009899065-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—CENT_FEW_DIFFS—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 009899065-01

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta\text{Row}$	$\Delta\text{Col}$	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
009899065-01	9899065	BR-Cyg-pri	9899416	1:1	361.9	91	2	10.03	15.86	4918.20	Direct-PRF	0	0.34	0.04

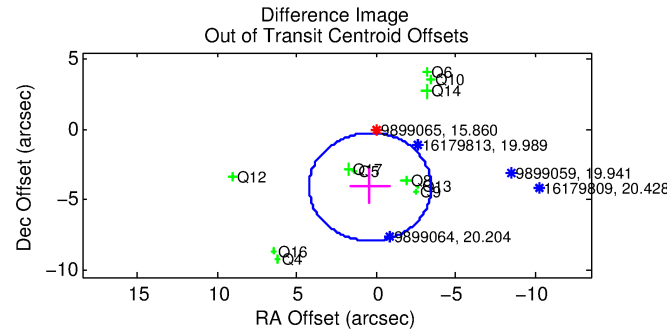
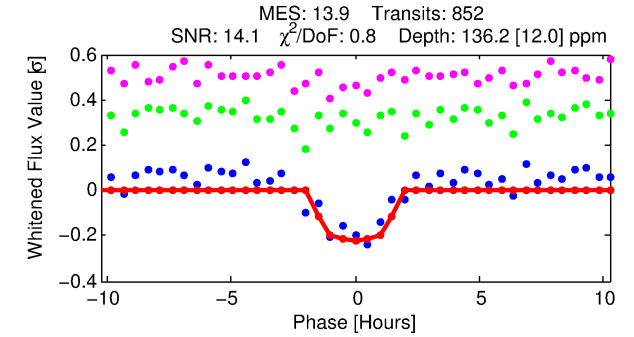
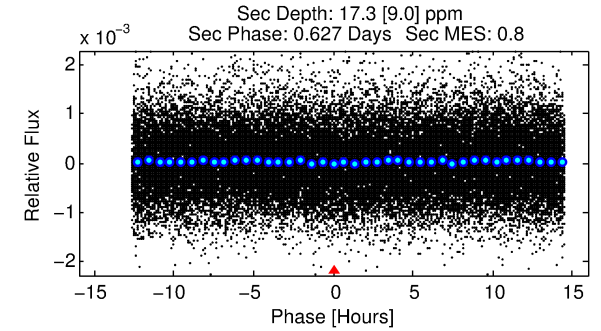
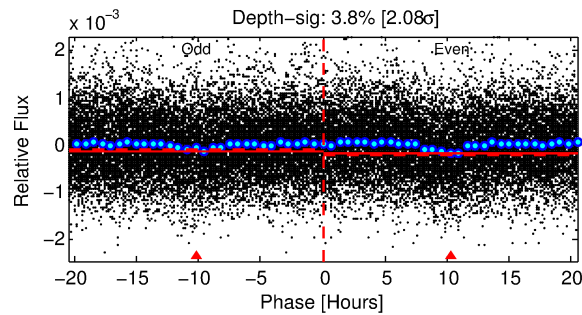
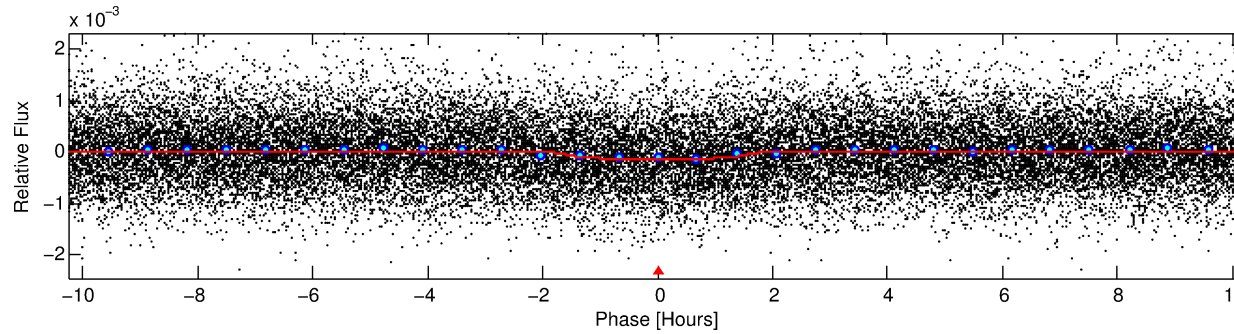
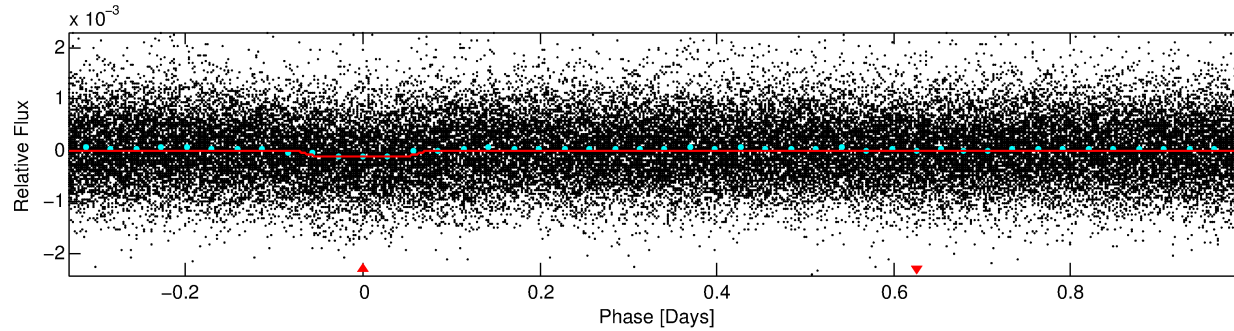
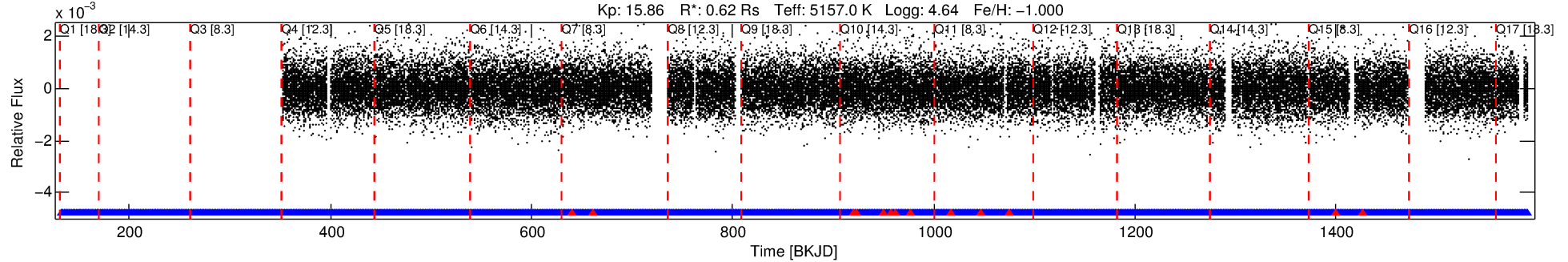
**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta\text{Row}$  and  $\Delta\text{Col}$  are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  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: 9899065 Candidate: 1 of 1 Period: 1.333 d

KOI: K04108.01 Corr: 0.910

Kp: 15.86 R\*: 0.62 Rs Teff: 5157.0 K Logg: 4.64 Fe/H: -1.000



## DV Fit Results:

Period = 1.33257 [0.00001] d  
Epoch = 132.0504 [0.0033] BKJD  
Rp/R\* = 0.0128 [0.0057]  
a/R\* = 1.66 [2.15]  
b = 0.90 [0.42]  
Seff = 600.47 [107.40]  
Teq = 1262 [56] K  
Rp = 0.87 [0.39] Re  
a = 0.0201 [0.0015] AU  
Ag = 5.14 [5.32] [0.78σ]  
Teffp = 2939 [763] K [2.19σ]

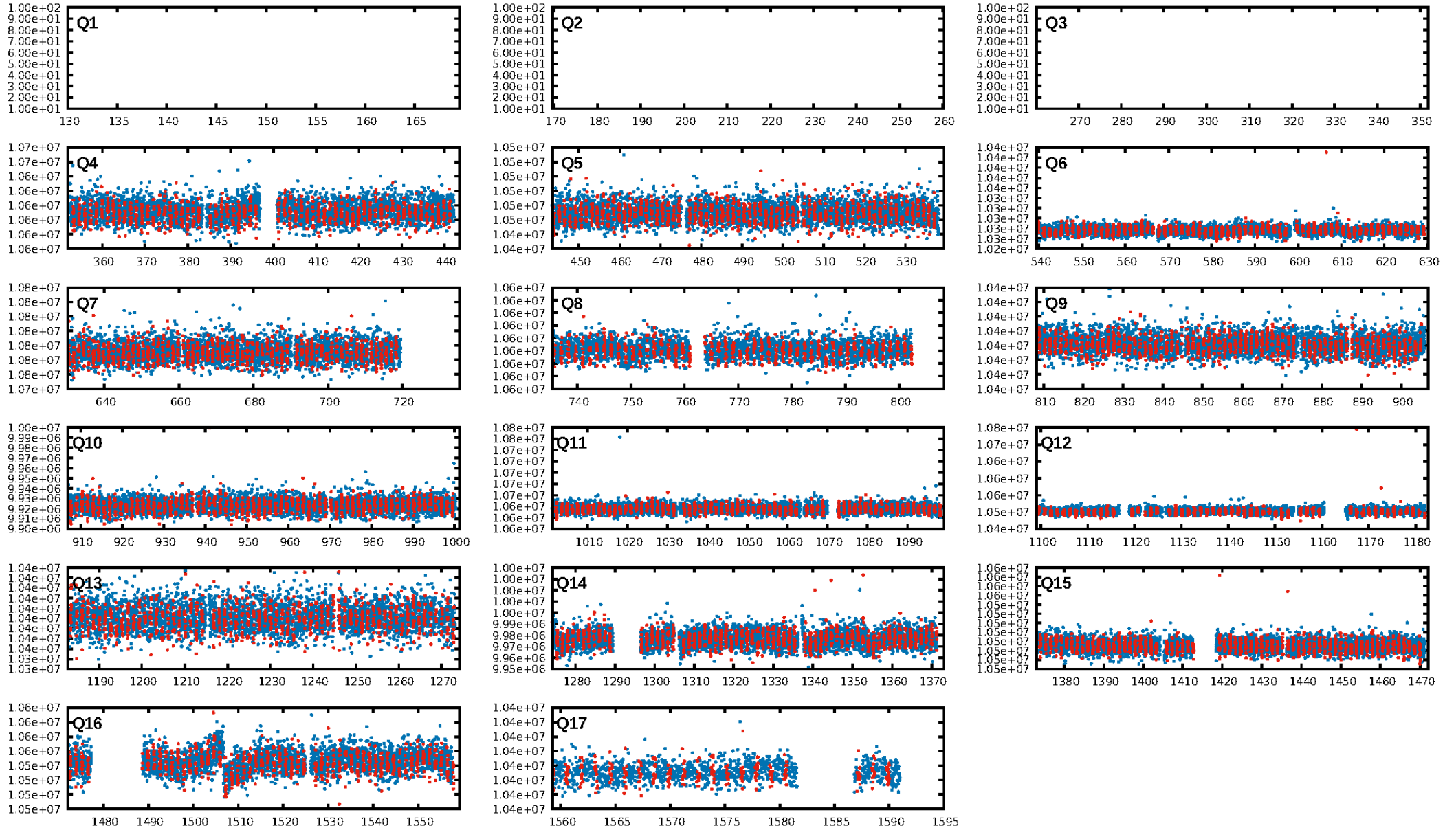
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.96e-44  
RollingBand-fgt: 0.98 [819/832]  
GhostDiagnostic-chr: -0.02169  
Centroid-sig: 0.0%  
Centroid-so: 2.533 arcsec [3.18σ]  
OotOffset-rm: 4.105 arcsec [3.20σ]  
KicOffset-rm: 2.477 arcsec [2.74σ]  
OotOffset-st: 3/0/4/4 [11]  
KicOffset-st: 3/0/4/4 [11]  
DiffImageQuality-fgm: 0.18 [2/11]  
DiffImageOverlap-fno: 1.00 [14/14]

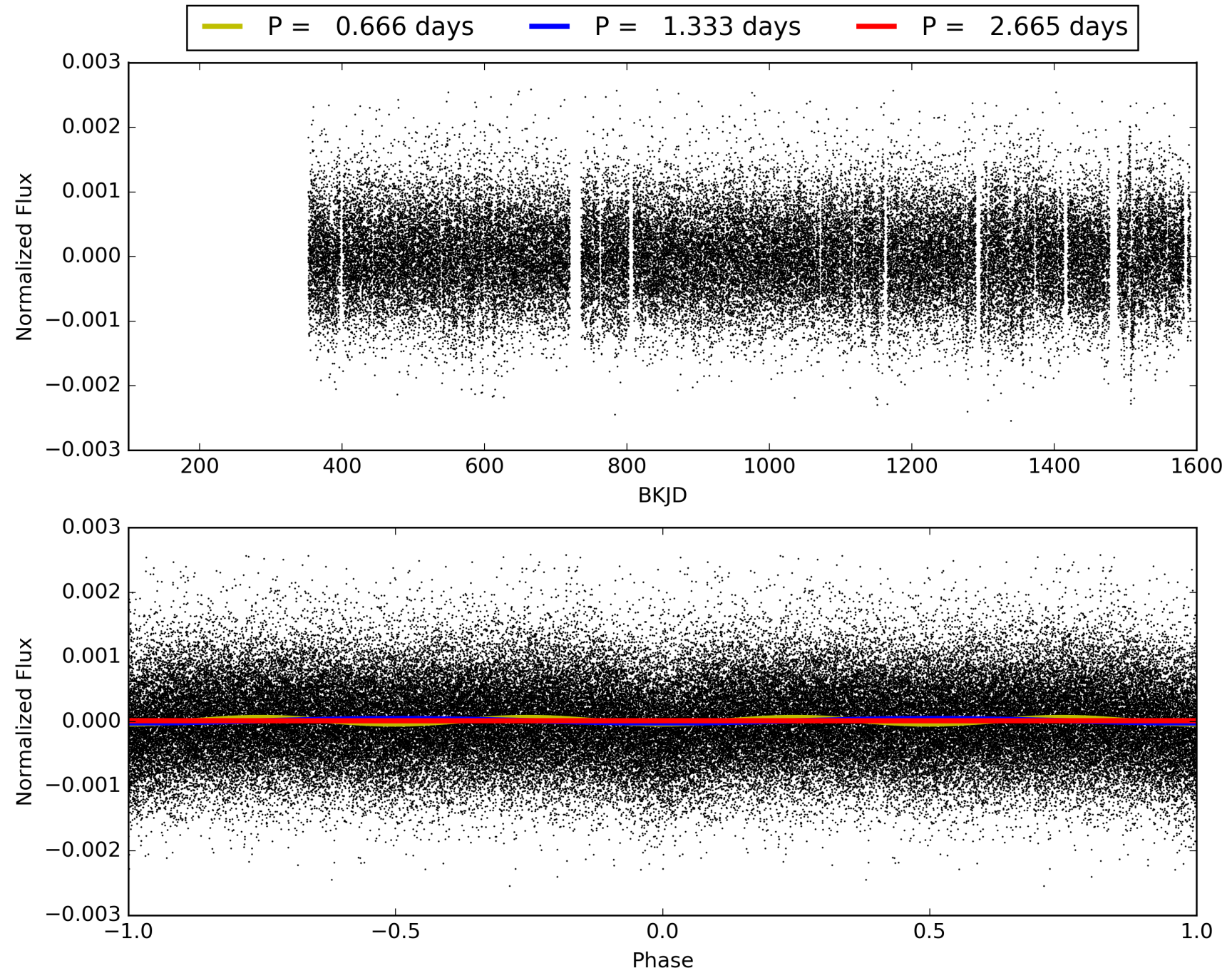
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 00:02:30 Z

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

# TCE 009899065-01, PDC Light Curves



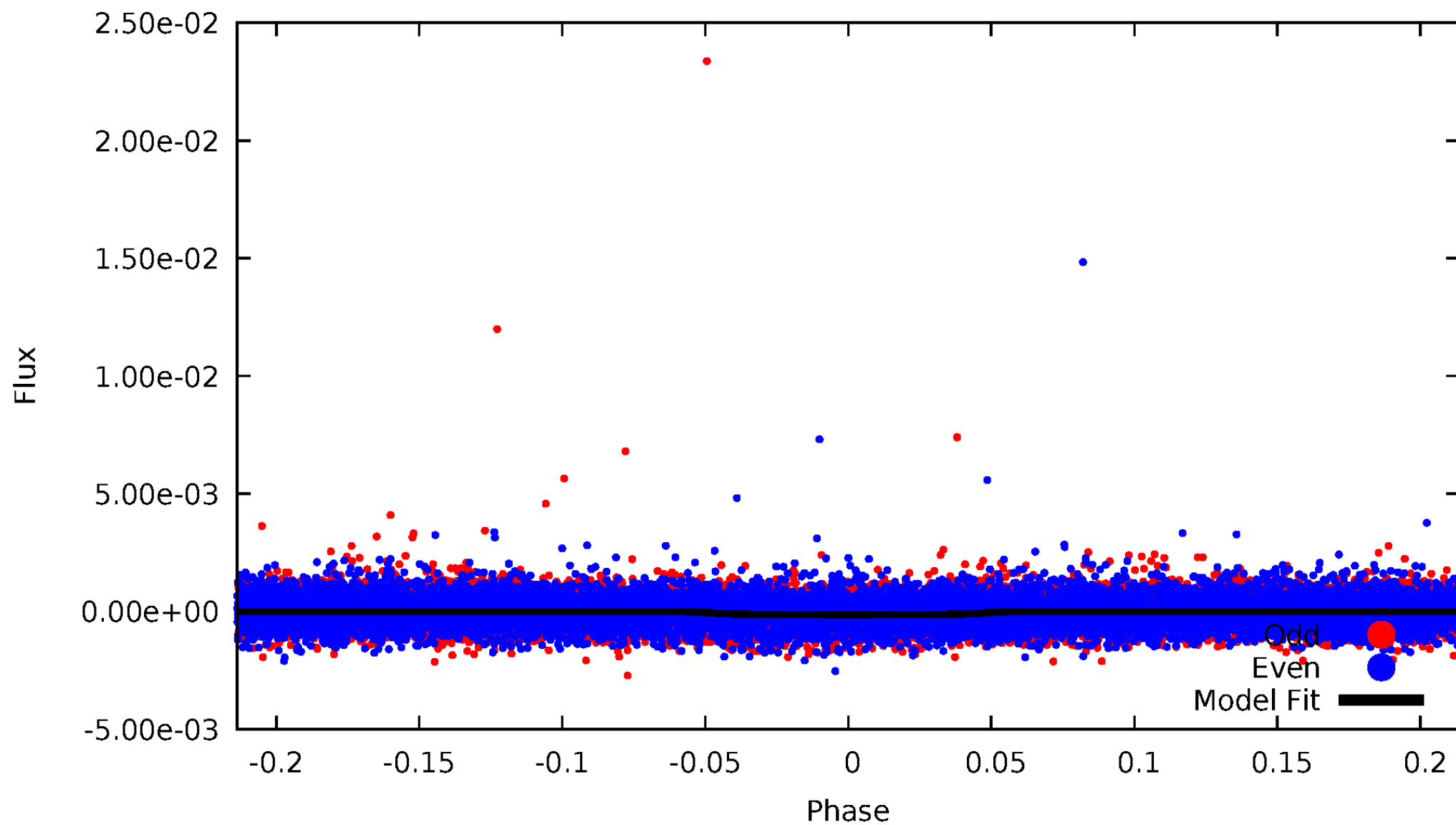
TCE 009899065-01





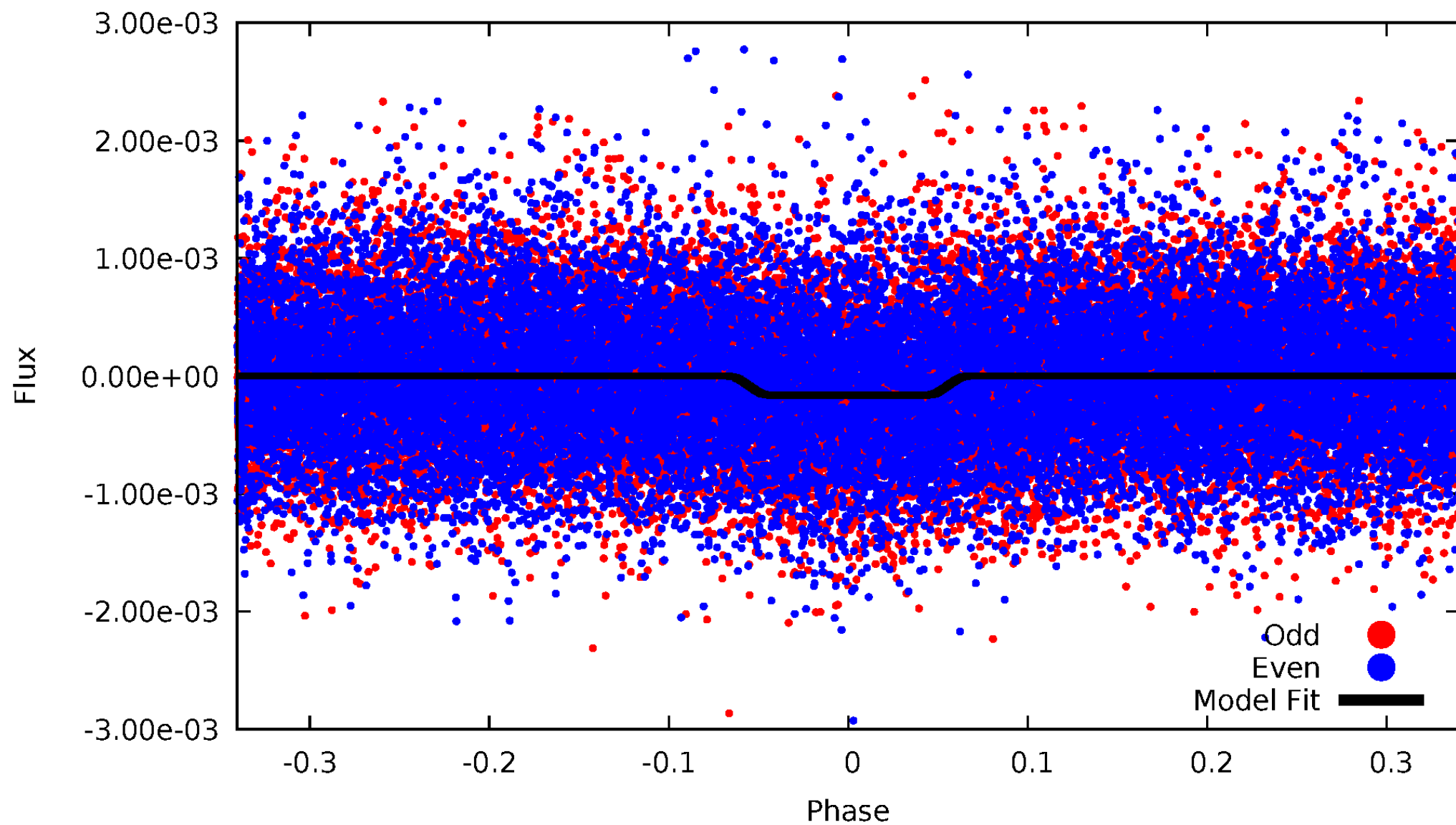
# DV Odd/Even

TCE 009899065-01



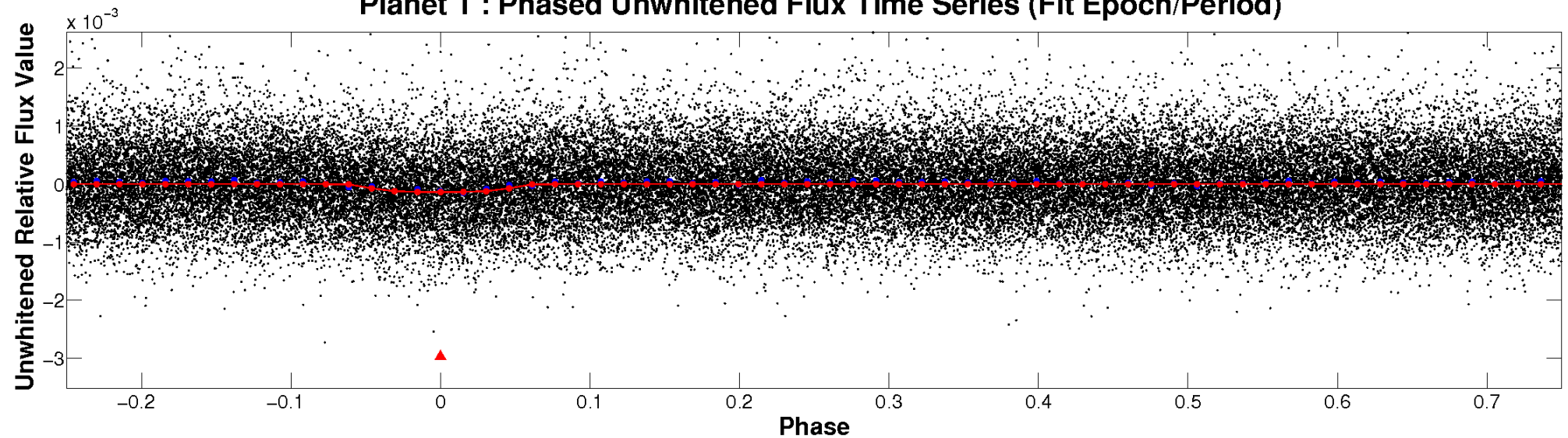
# ALT Odd/Even

TCE 009899065-01

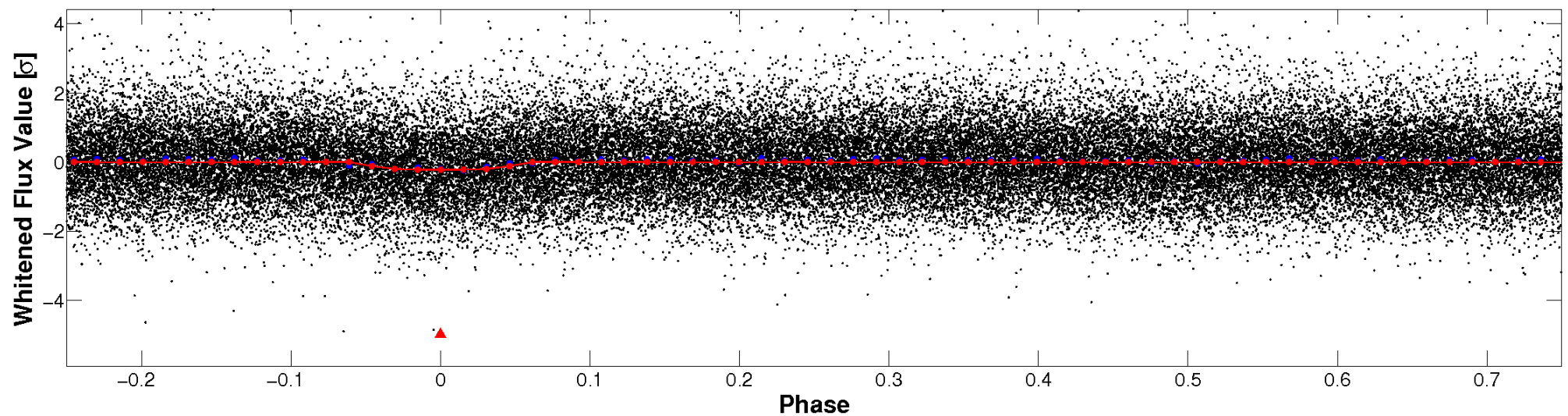


# Non-Whitened Vs. Whitened Light Curve

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

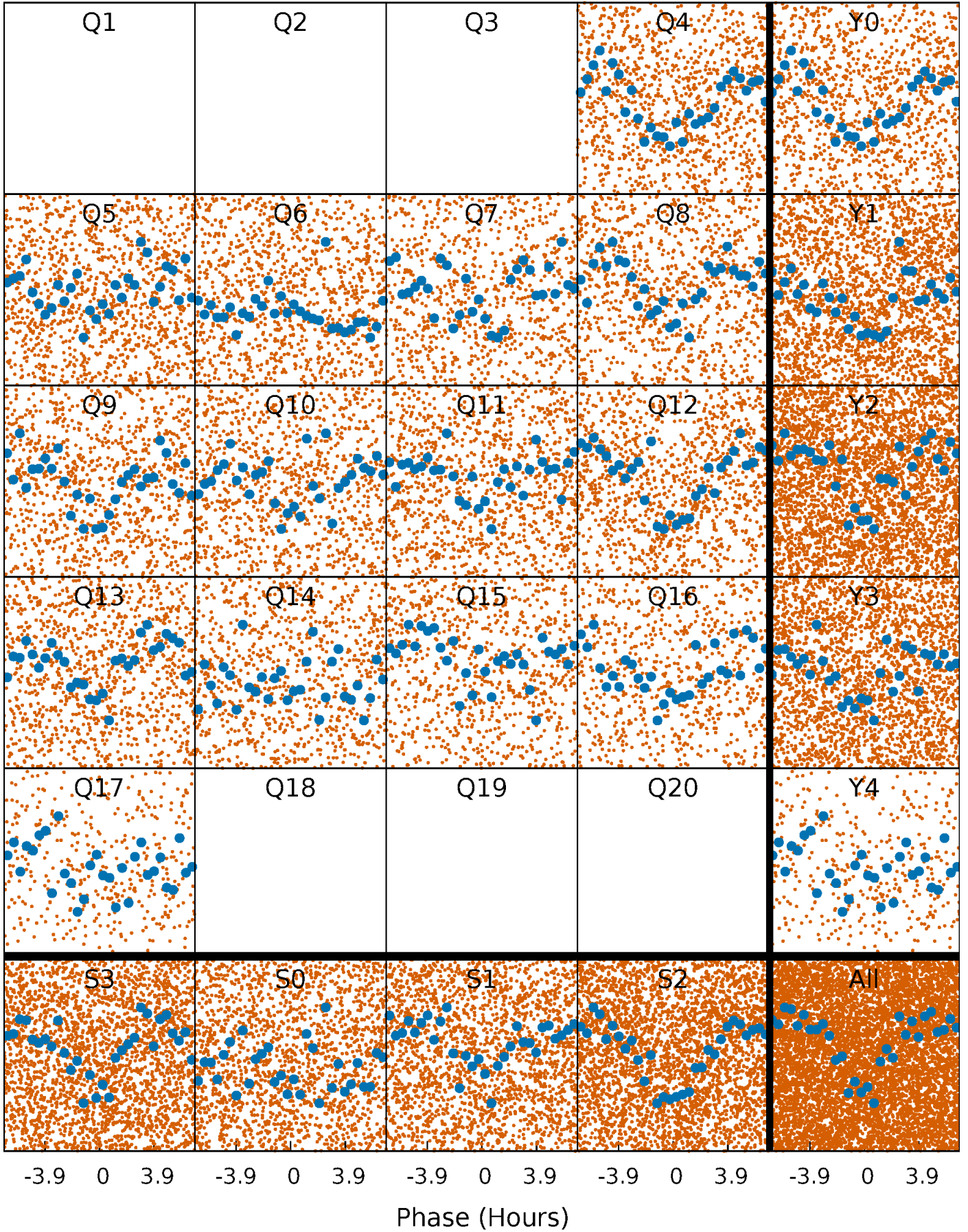


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

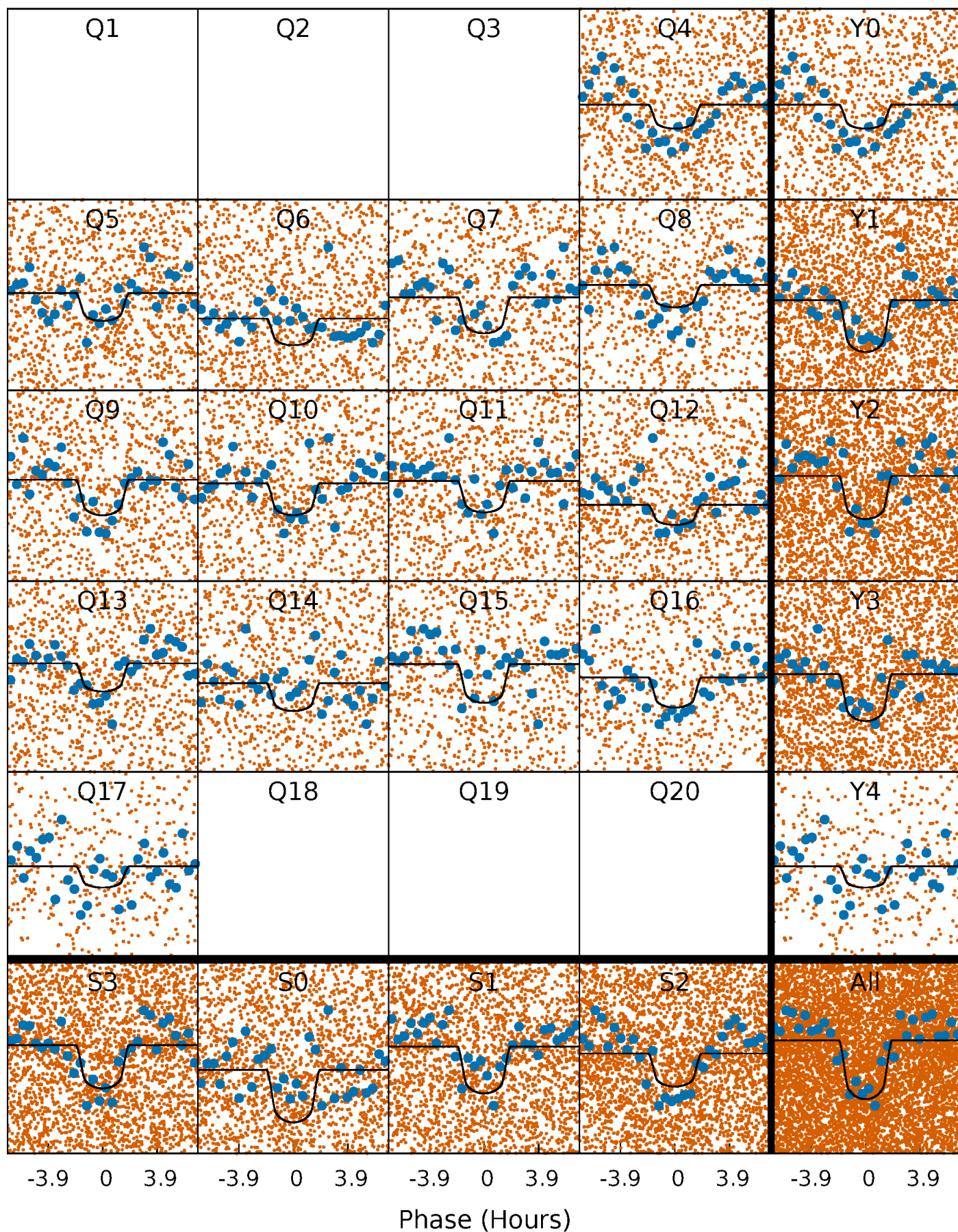
TCE 009899065-01 P= 1.332569 Days  $T_0=132.050371$  (BKJD)





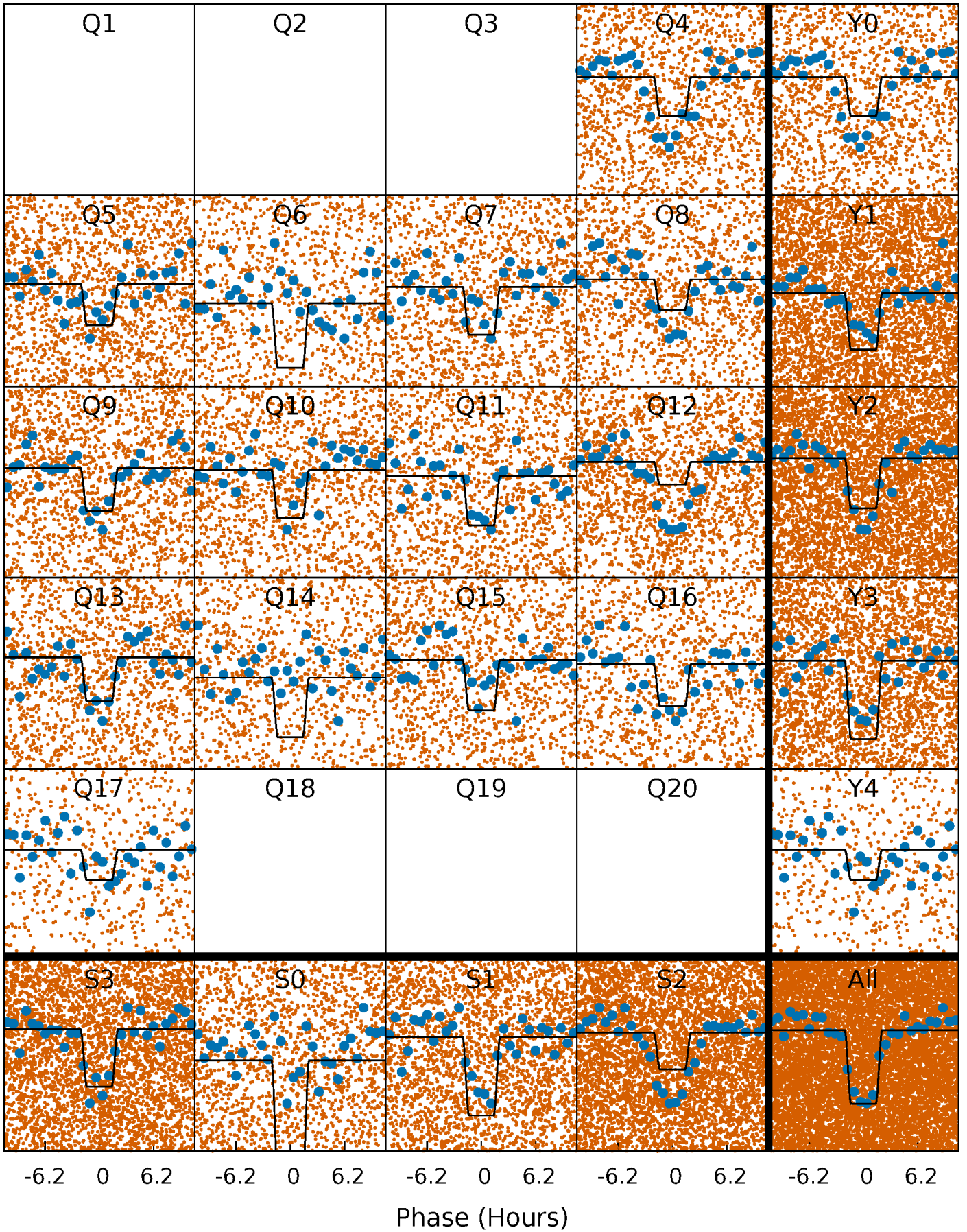
# DV Quarter-Phased Transit Curves

TCE 009899065-01 P= 1.332569 Days  $T_0=132.050371$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 009899065-01 P= 1.332553 Days  $T_0=132.053067$  (BKJD)

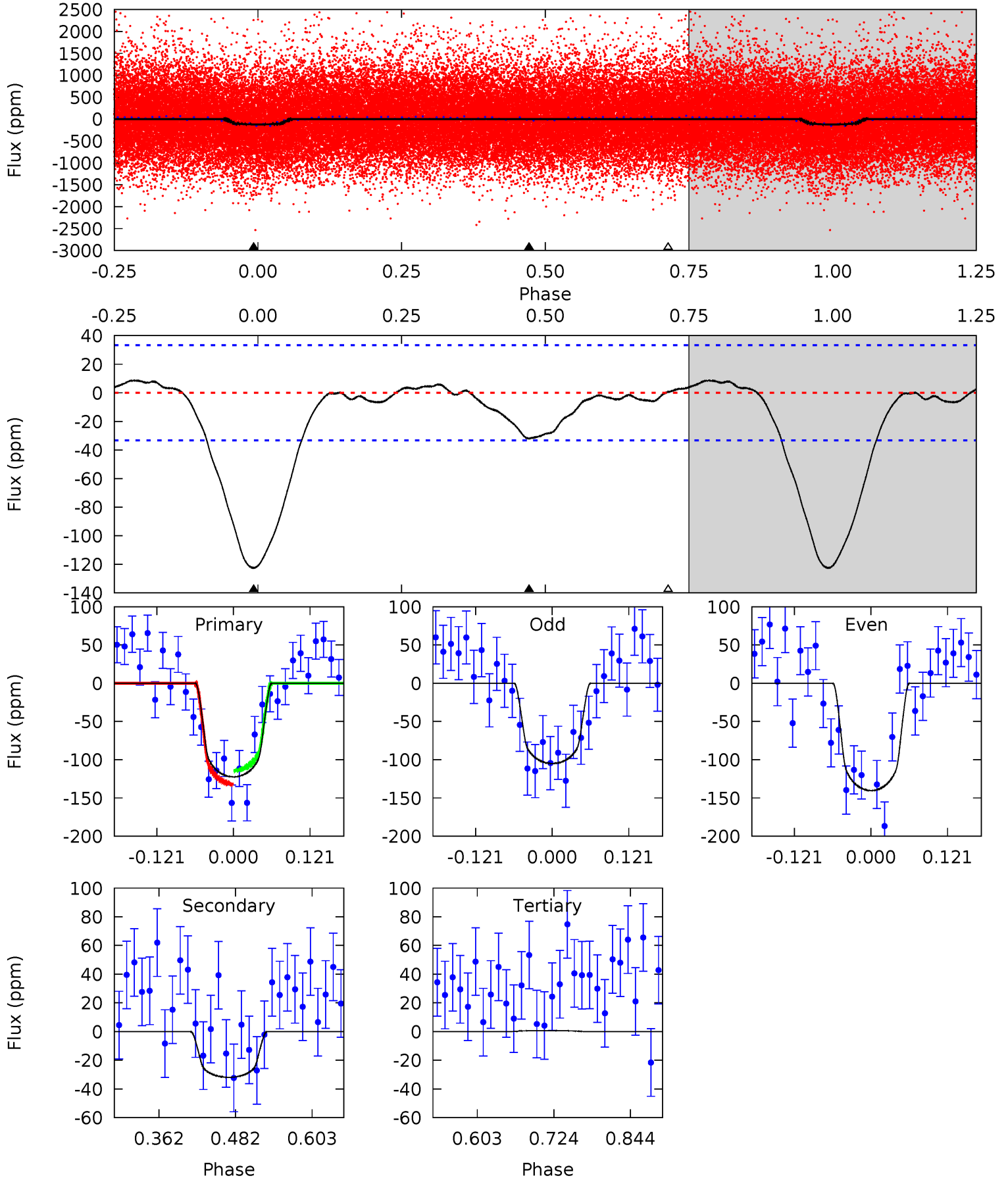




# DV Model-Shift Uniqueness Test

009899065-01, P = 1.332569 Days, E = 132.050371 Days

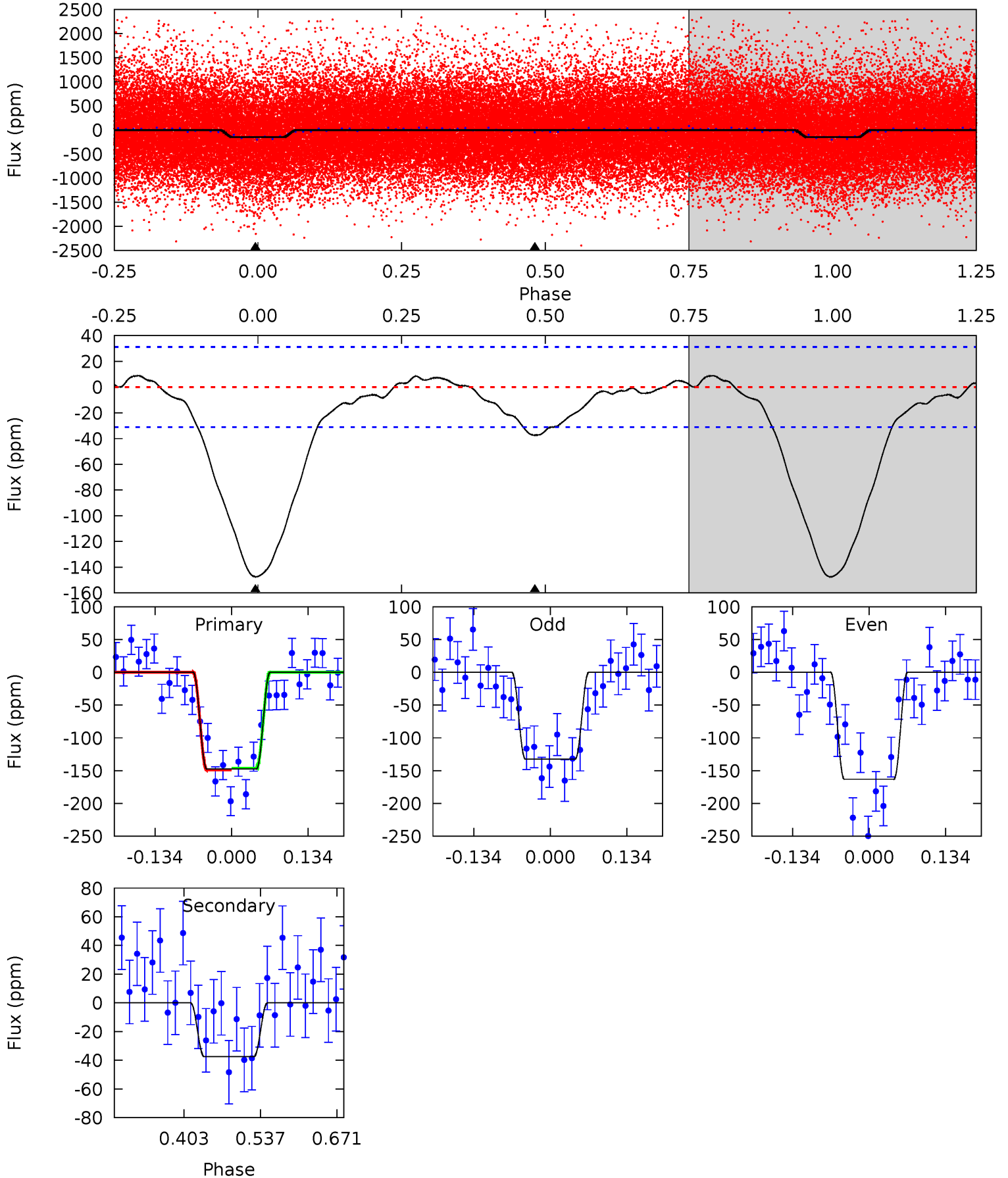
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.6	4.34	-0.08	0	4.53	1.55	0.59	16.7	16.6	4.42	4.34	2.41	0.96	0.07	1.20



# Alt Model-Shift Uniqueness Test

009899065-01, P = 1.332553 Days, E = 132.053067 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
21.3	5.41	0	0	4.50	1.50	0.93	21.3	21.3	5.41	5.41	2.21	1.08	0.06	0.20





### Stellar Parameters For KIC 009899065

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5157^{+178}_{-178}$	$4.641^{+0.066}_{-0.039}$	$-1.000^{+0.300}_{-0.300}$	$0.620^{+0.048}_{-0.048}$	$0.614^{+0.057}_{-0.026}$	$3.621^{+0.877}_{-0.529}$
	+3%/-3%	+1%/-1%	+30%/-30%	+8%/-8%	+9%/-4%	+24%/-15%
Source	KIC0	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 009899065-01 / KOI 4108.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-32 \pm 7$	$0.86^{+0.38}_{-0.36}$	$1757^{+68}_{-73}$	$3766^{+940}_{-481}$	$10^{+21}_{-5}$
Alt.	$-37 \pm 7$	$0.84^{+0.36}_{-0.35}$	$1754^{+67}_{-72}$	$3894^{+898}_{-487}$	$12^{+24}_{-6}$

$T_{max}$  = 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

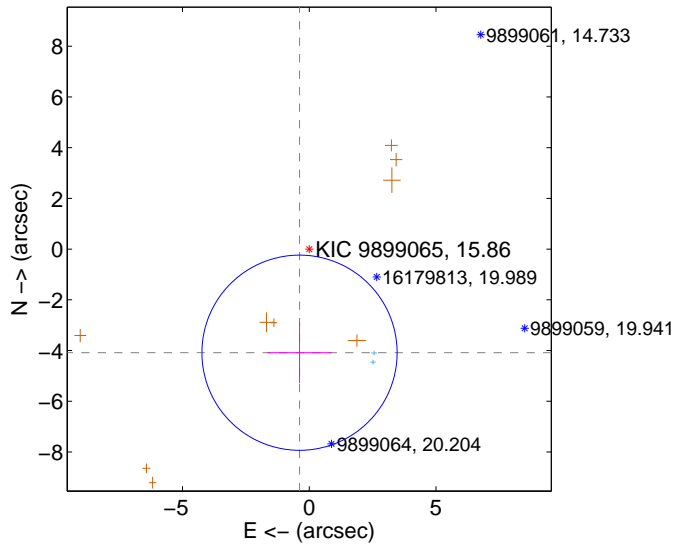
Supplemental centroid analysis for 009899065-01. Kepler magnitude: 15.86. Transit SNR 14.08

There are 2 quarters with good PRF difference image offsets

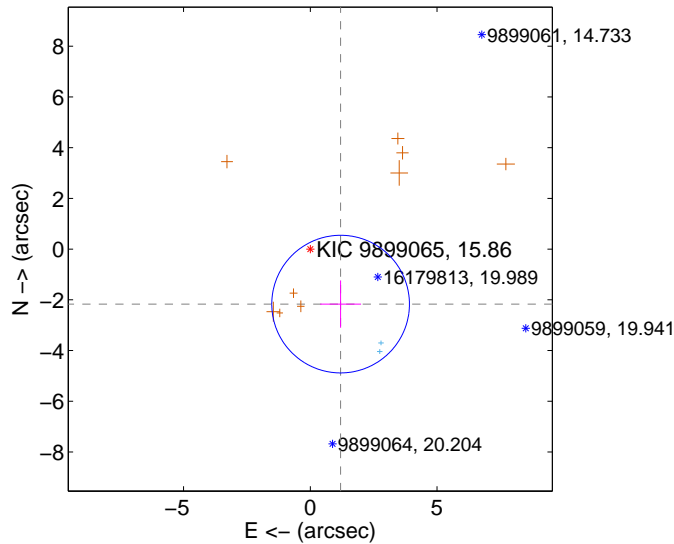
The direct PRF centroid is offset from the target star catalog position by about 0.48 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$4.105 \pm 1.283$	3.20	$0.383 \pm 1.265$	$-4.087 \pm 1.204$
PRF-fit source offset from KIC position	$2.477 \pm 0.905$	2.74	$-1.196 \pm 0.807$	$-2.169 \pm 0.933$
photometric centroid source offset	$2.53 \pm 0.80$	3.18	$-0.86 \pm 0.78$	$-2.38 \pm 0.80$

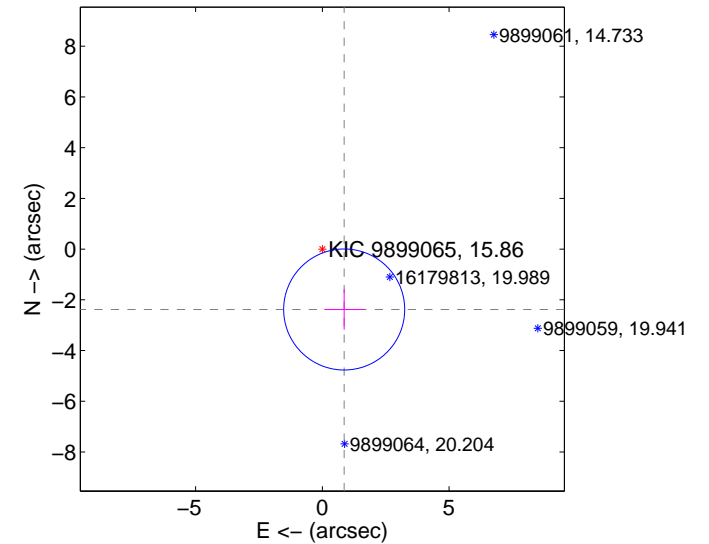
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

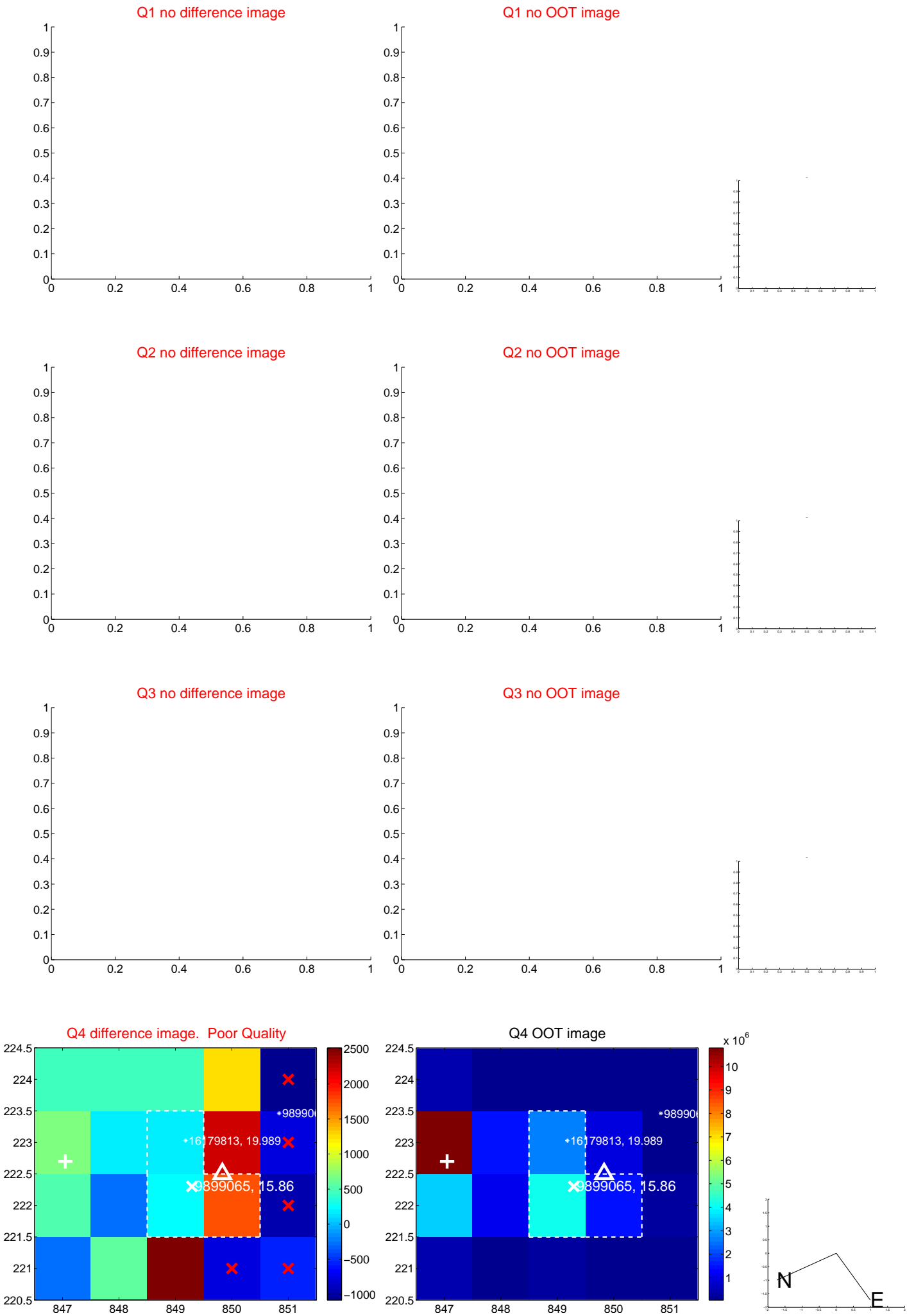


offset from photometric centroids

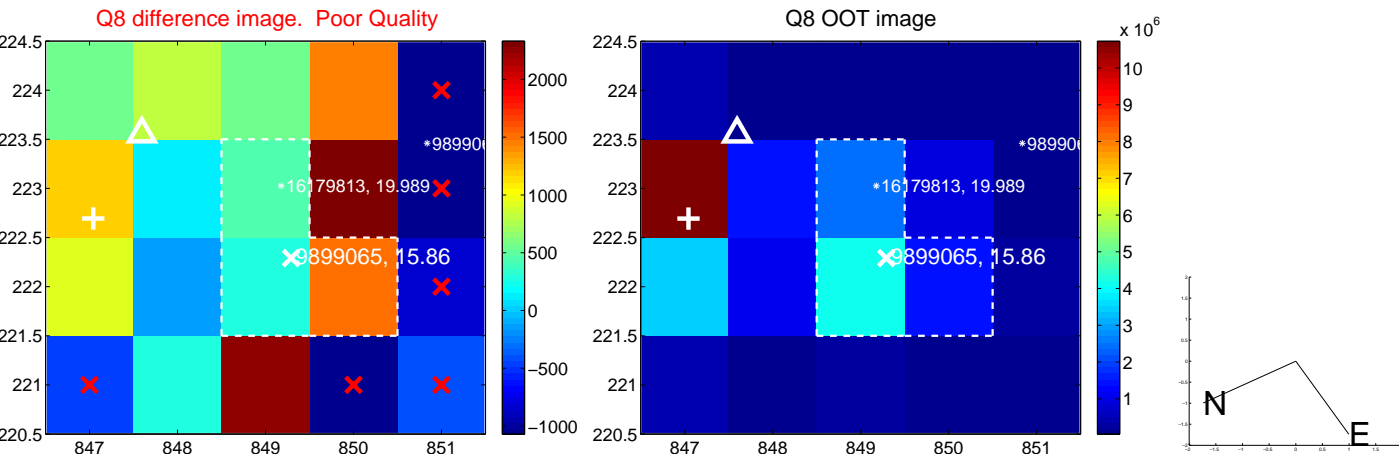
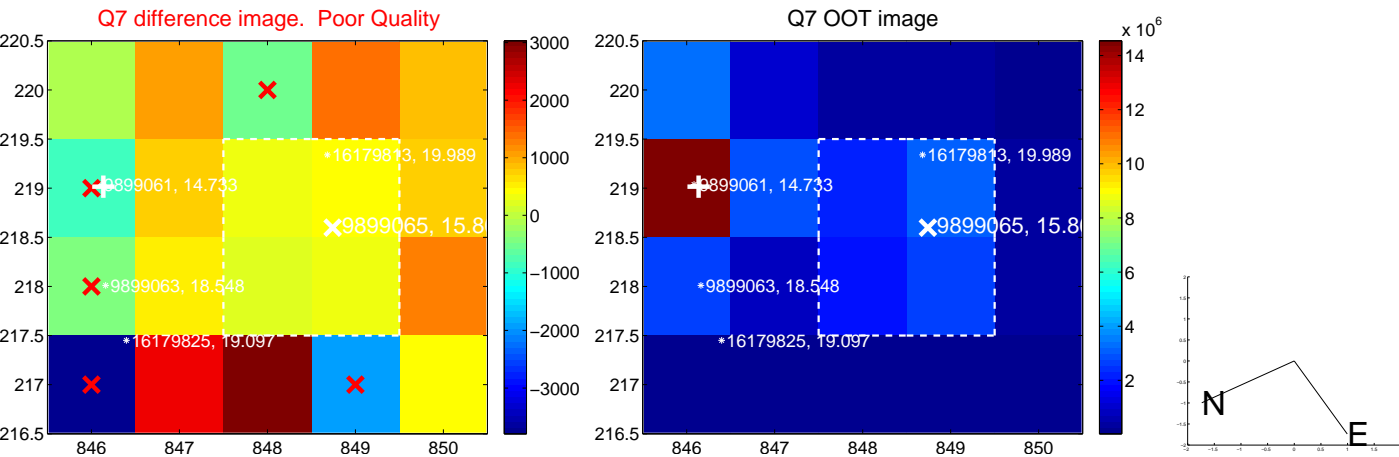
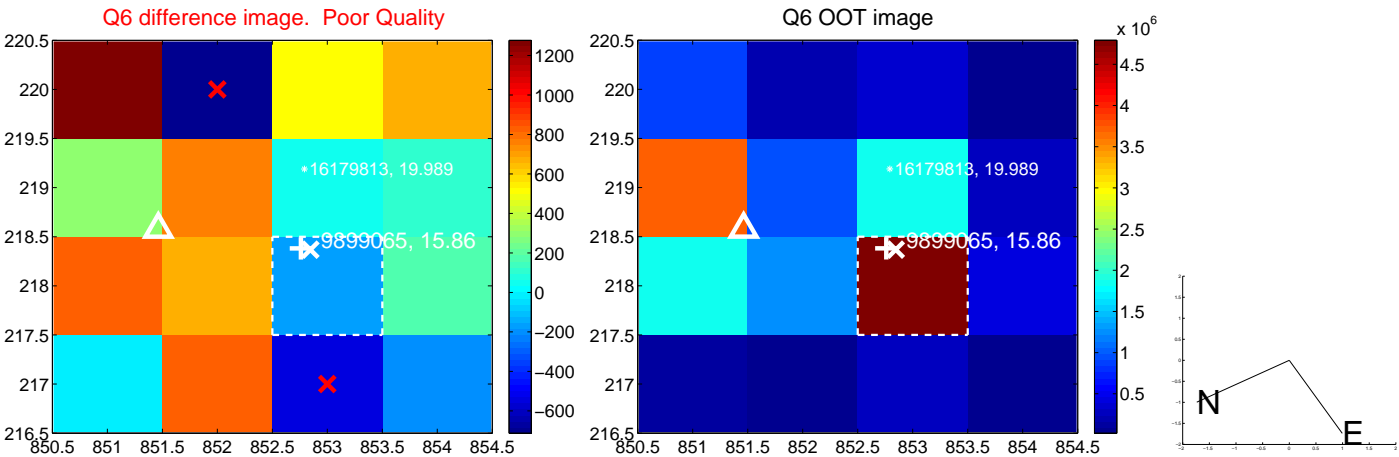
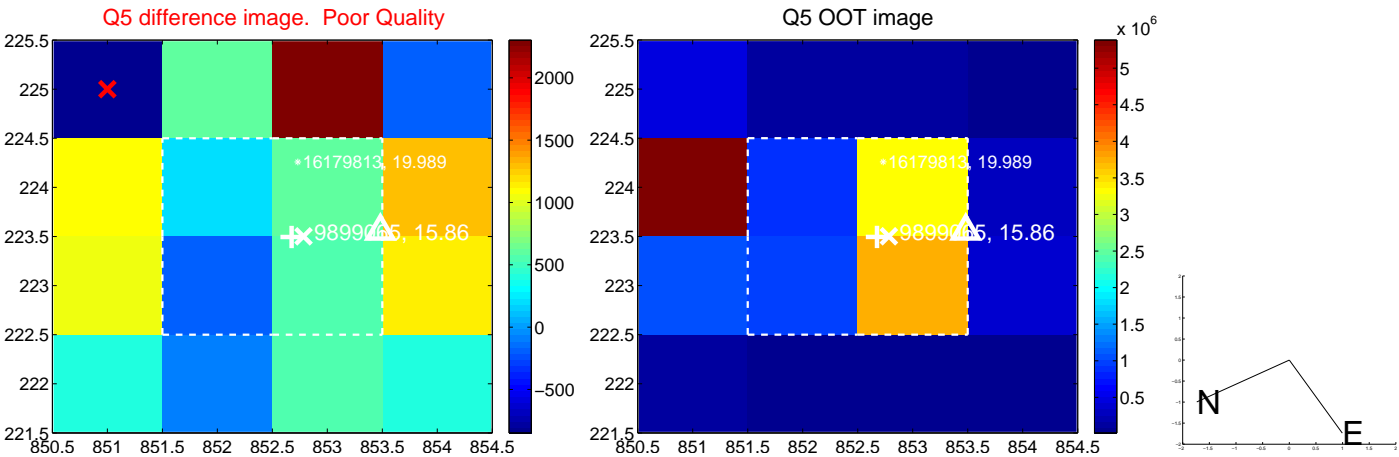


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

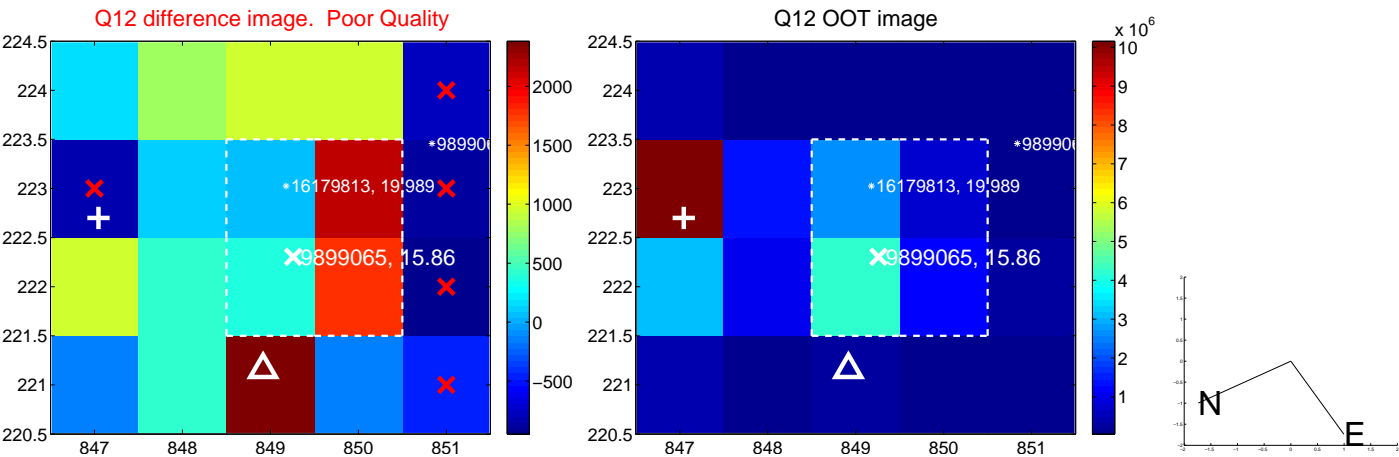
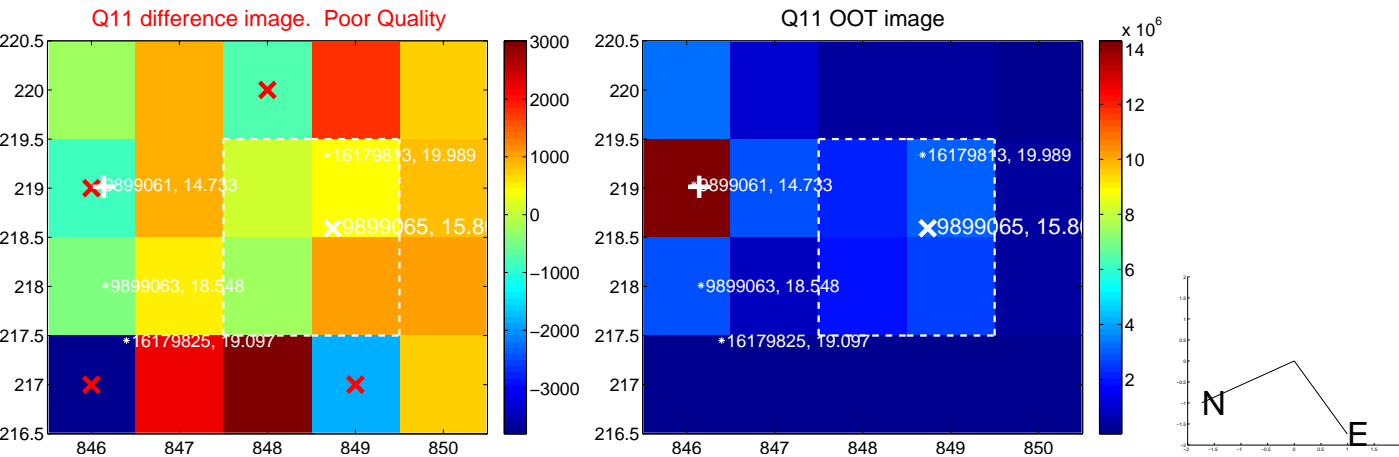
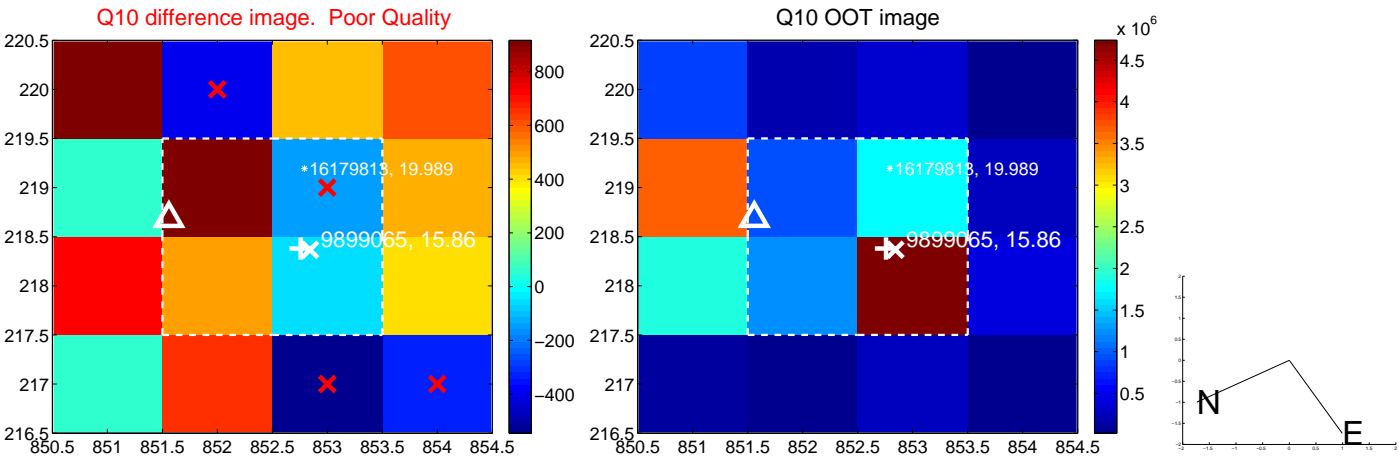
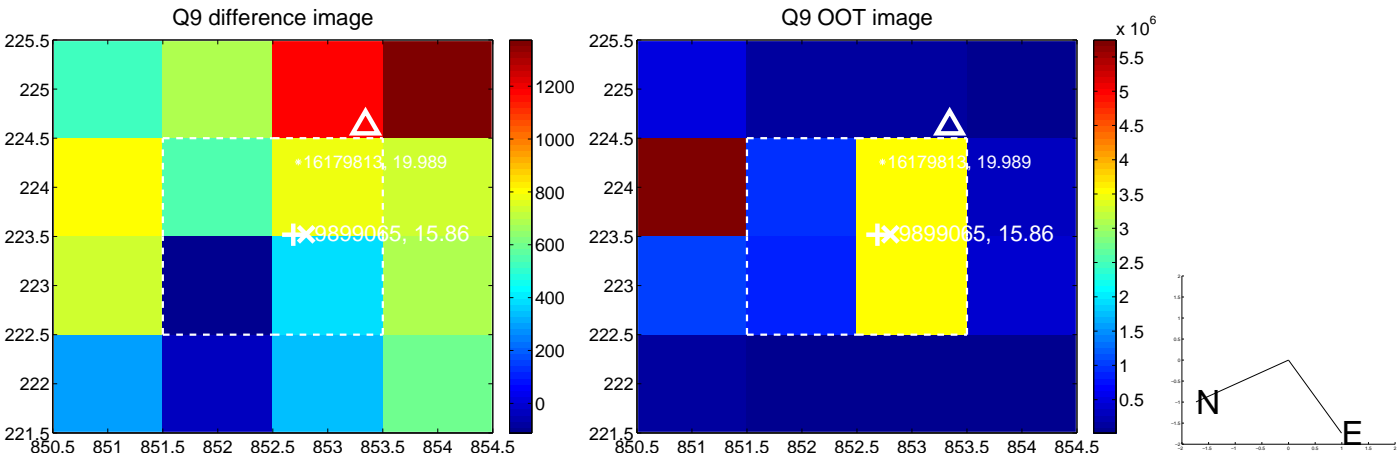


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

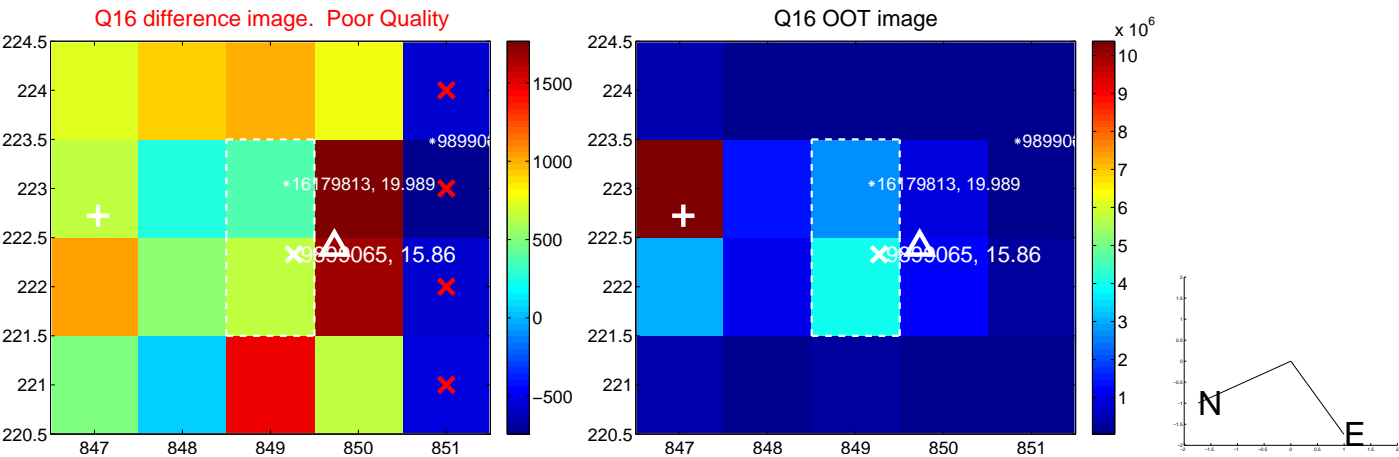
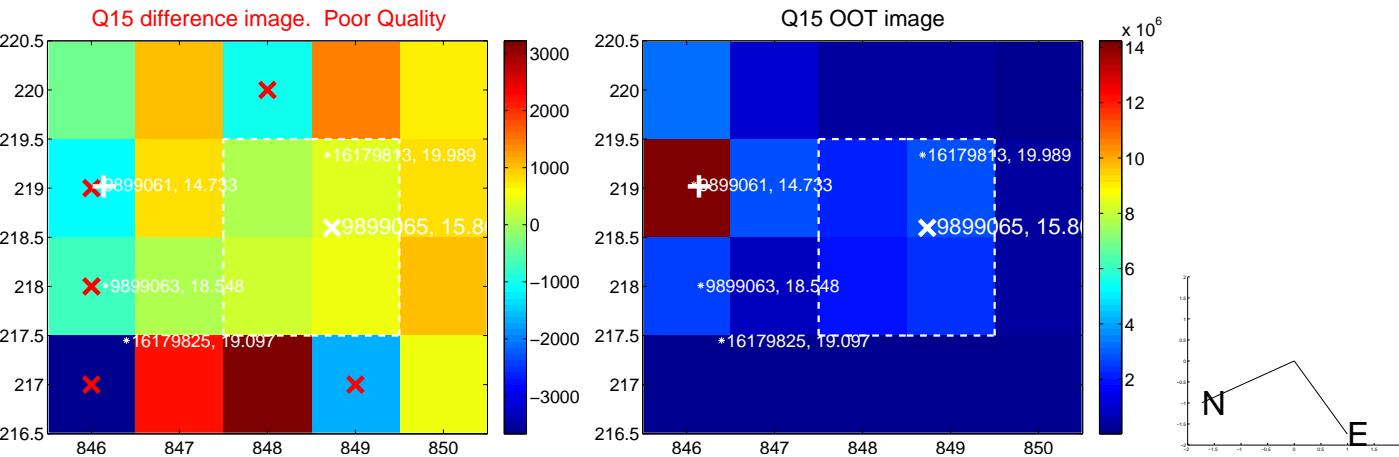
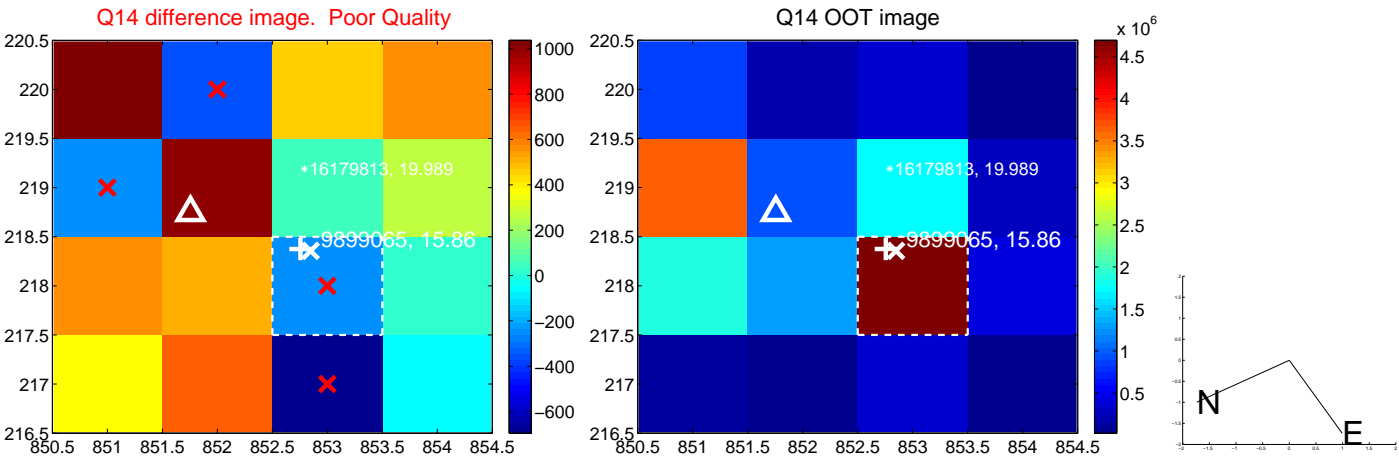
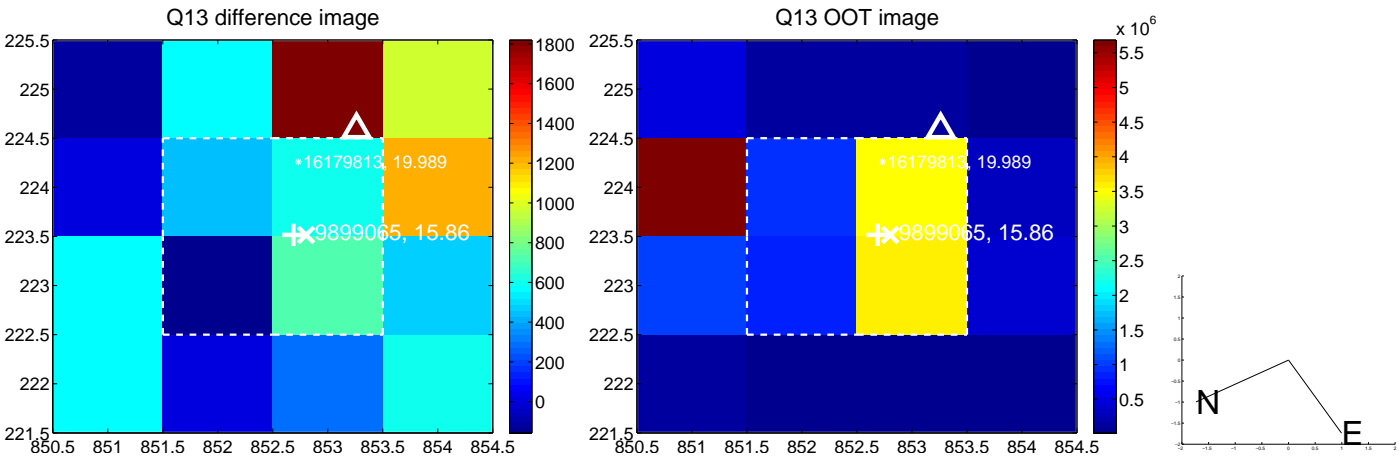




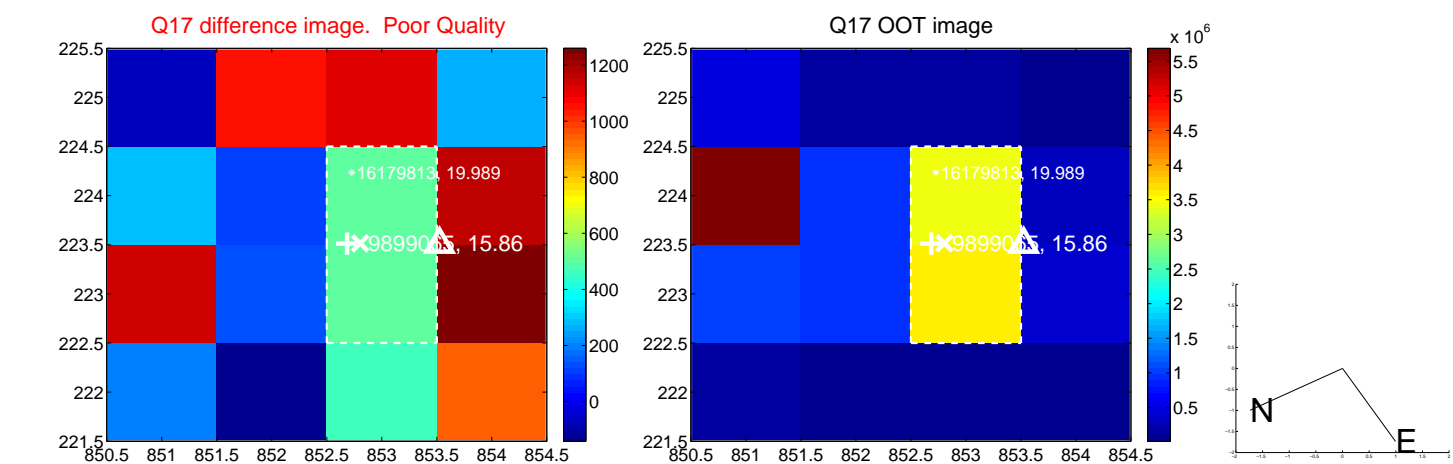
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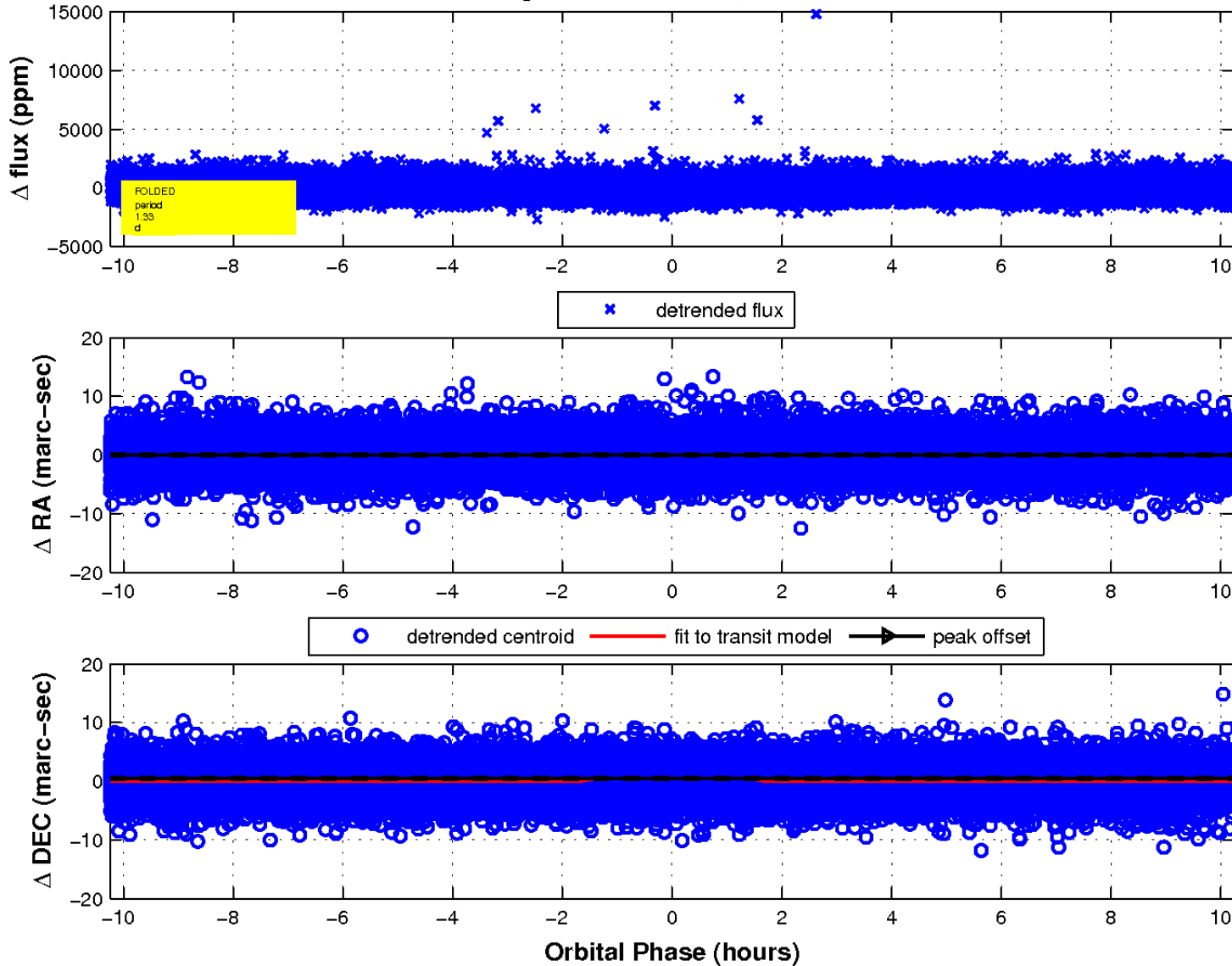
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 1 of 1



UKIRT Image

Declination

