

# KIC 010518399

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010518399-01	OBS	2800.01	2.696388	132.988725	99.8	3.821	17.3	18.9	1.14	5653	1.38	926.08

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010518399-01	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.

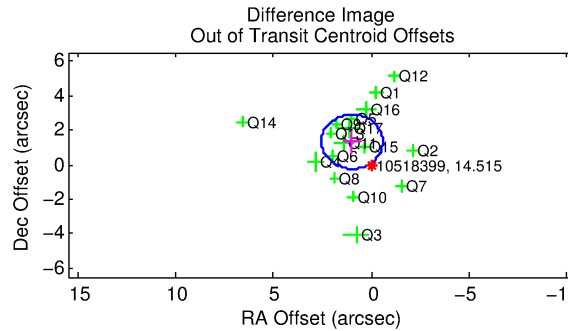
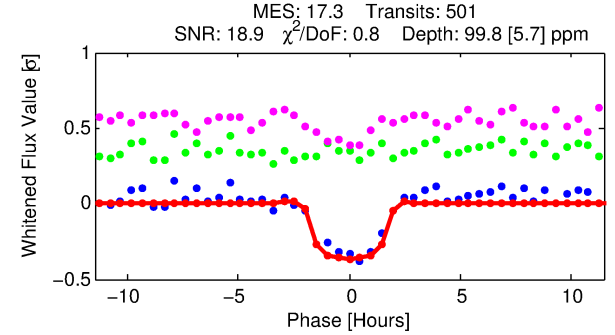
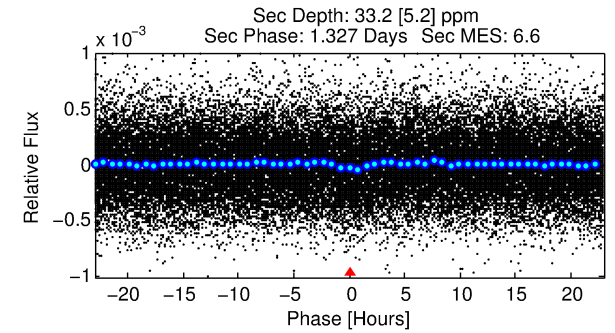
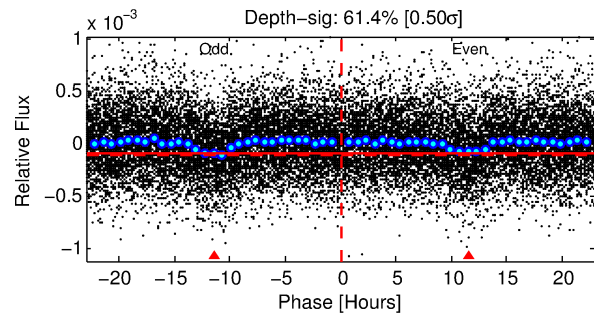
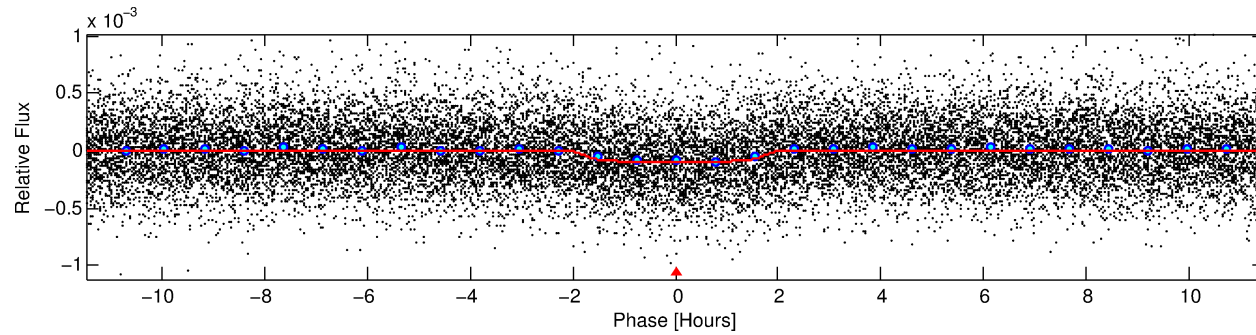
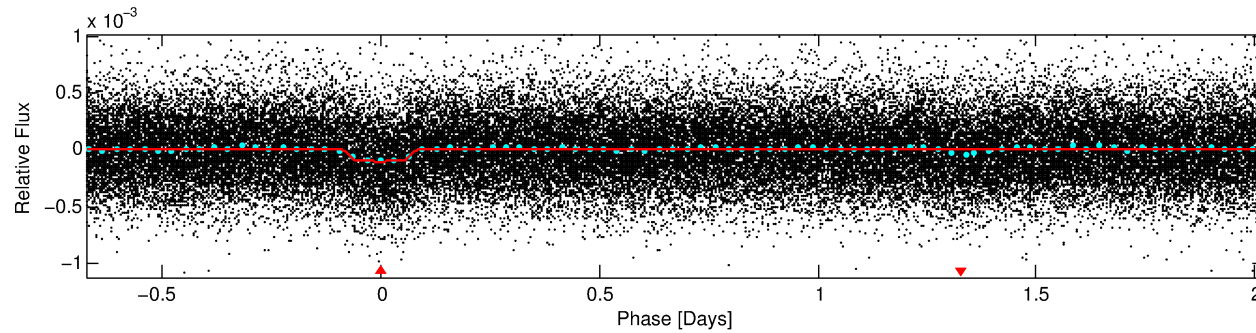
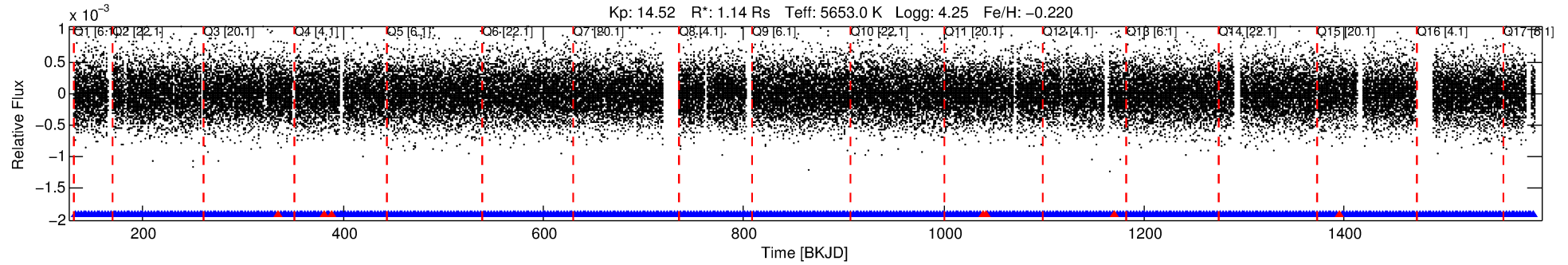
## Ephemeris Match Information For 010518399-01

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	$\sigma_P$	$\sigma_T$
010518399-01	10518399	010583181-pri	10583181	1:1	106.1	-4	26	11.01	14.52	2535.00	Direct-PRF	0	1.53	0.38

**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: 10518399 Candidate: 1 of 1 Period: 2.696 d  
KOI: K02800.01 Corr: 0.973



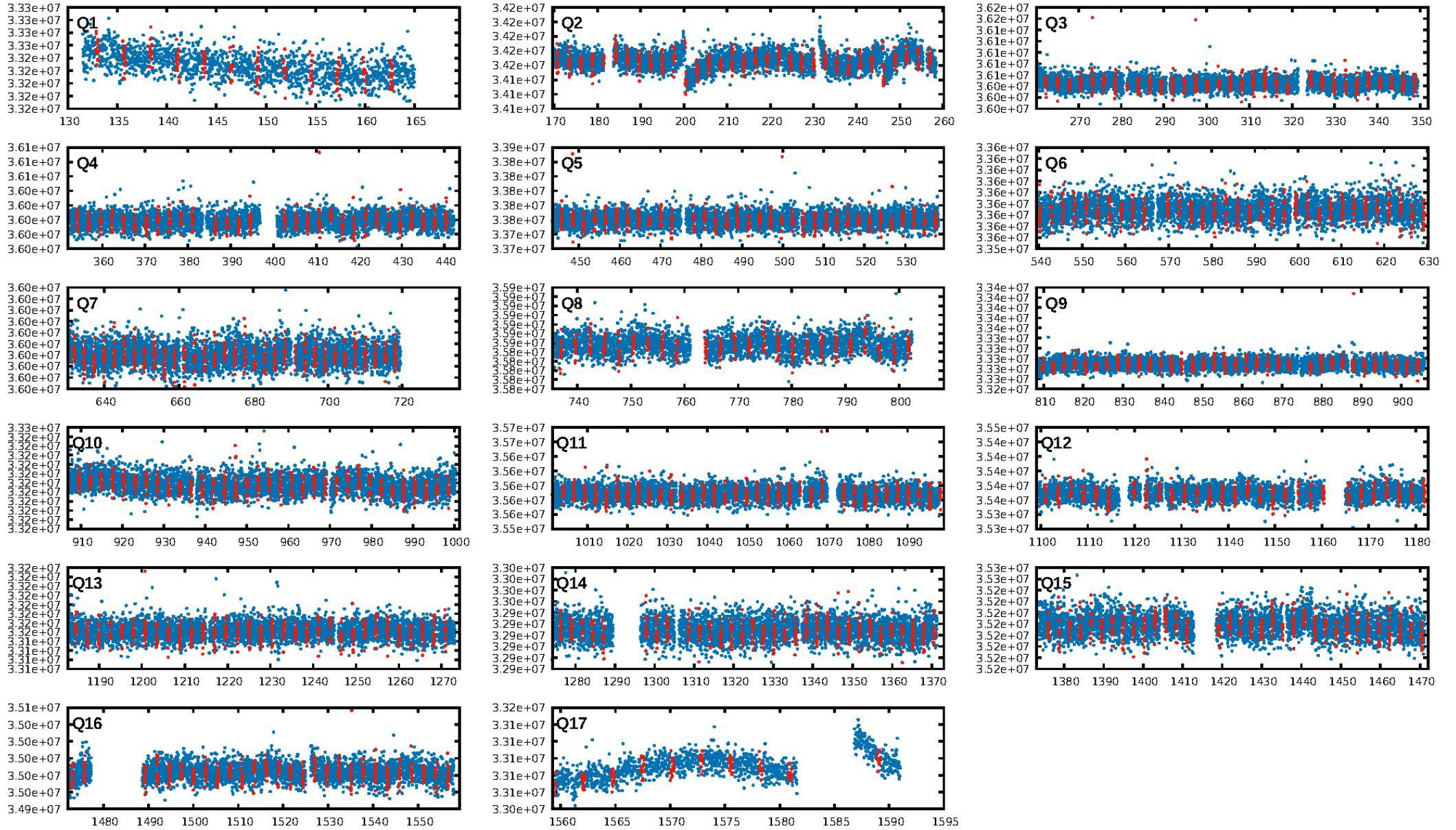
## DV Fit Results:

Period = 2.69639 [0.00001] d  
Epoch = 132.9887 [0.0029] BKJD  
Rp/R\* = 0.0111 [0.0026]  
a/R\* = 2.44 [2.34]  
b = 0.92 [0.19]  
Seff = 926.08 [457.55]  
Teq = 1407 [174] K  
Rp = 1.38 [0.55] Re  
a = 0.0358 [0.0109] AU  
Ag = 12.23 [8.44] [1.33 $\sigma$ ]  
Teffp = 4067 [514] K [4.90 $\sigma$ ]

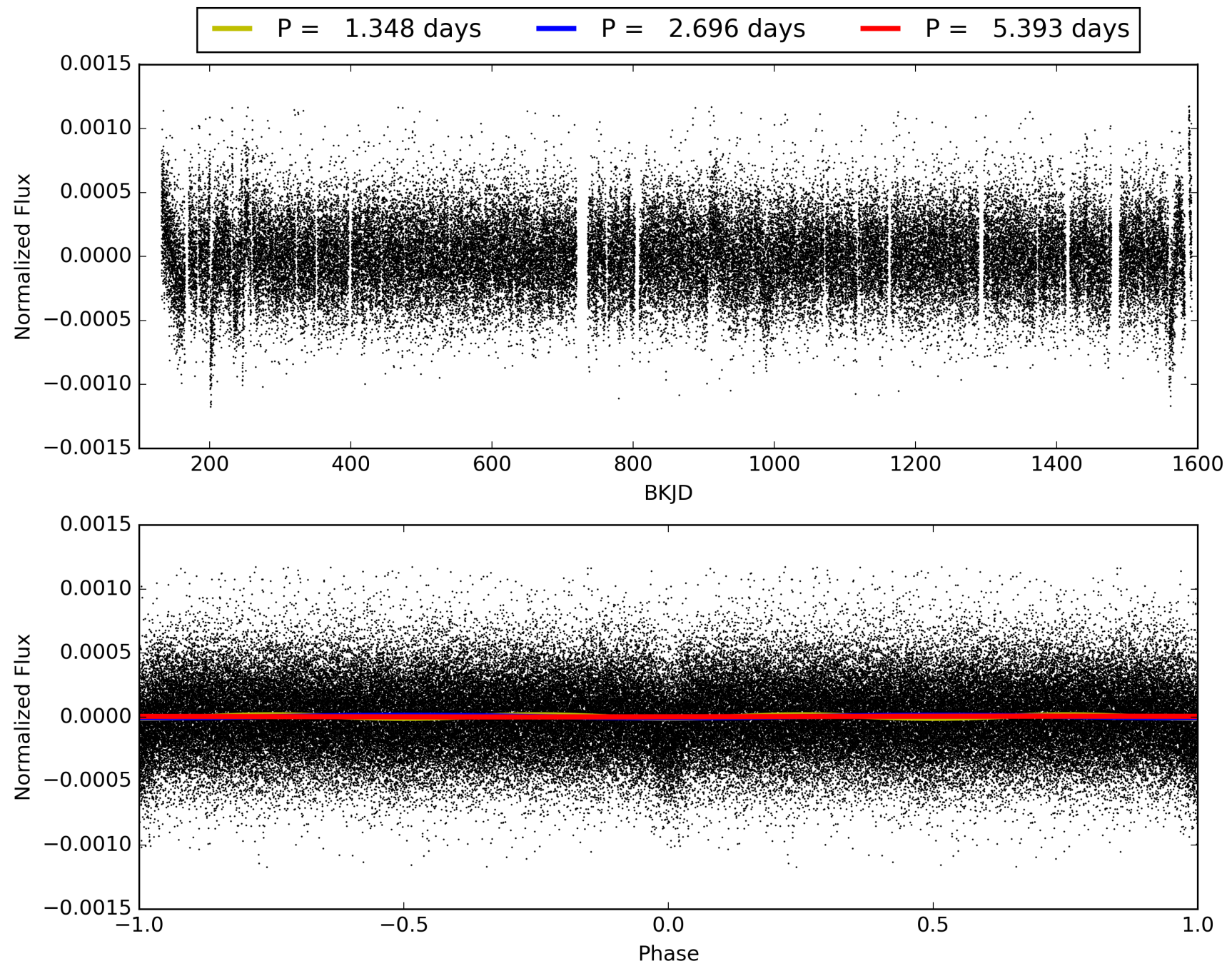
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 2.63e-64  
RollingBand-fgt: 0.99 [472/479]  
**GhostDiagnostic-chr: 0.1186**  
**Centroid-sig: 0.2%**  
Centroid-so: 1.267 arcsec [1.76 $\sigma$ ]  
**OotOffset-rm: 1.656 arcsec [3.17 $\sigma$ ]**  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-rm: 1.597 arcsec [2.94 $\sigma$ ]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.12 [2/17]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 010518399-01, PDC Light Curves



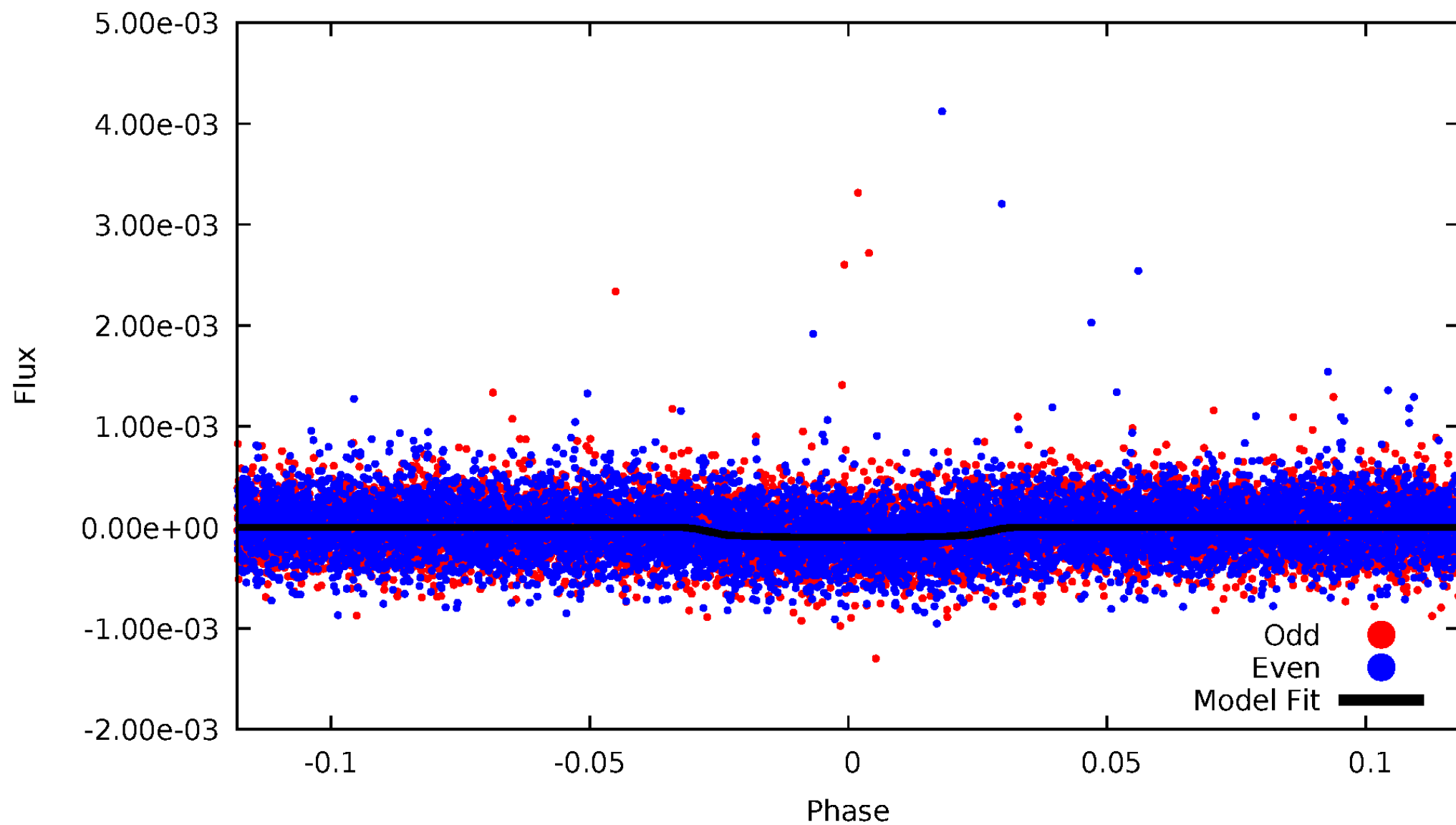
TCE 010518399-01





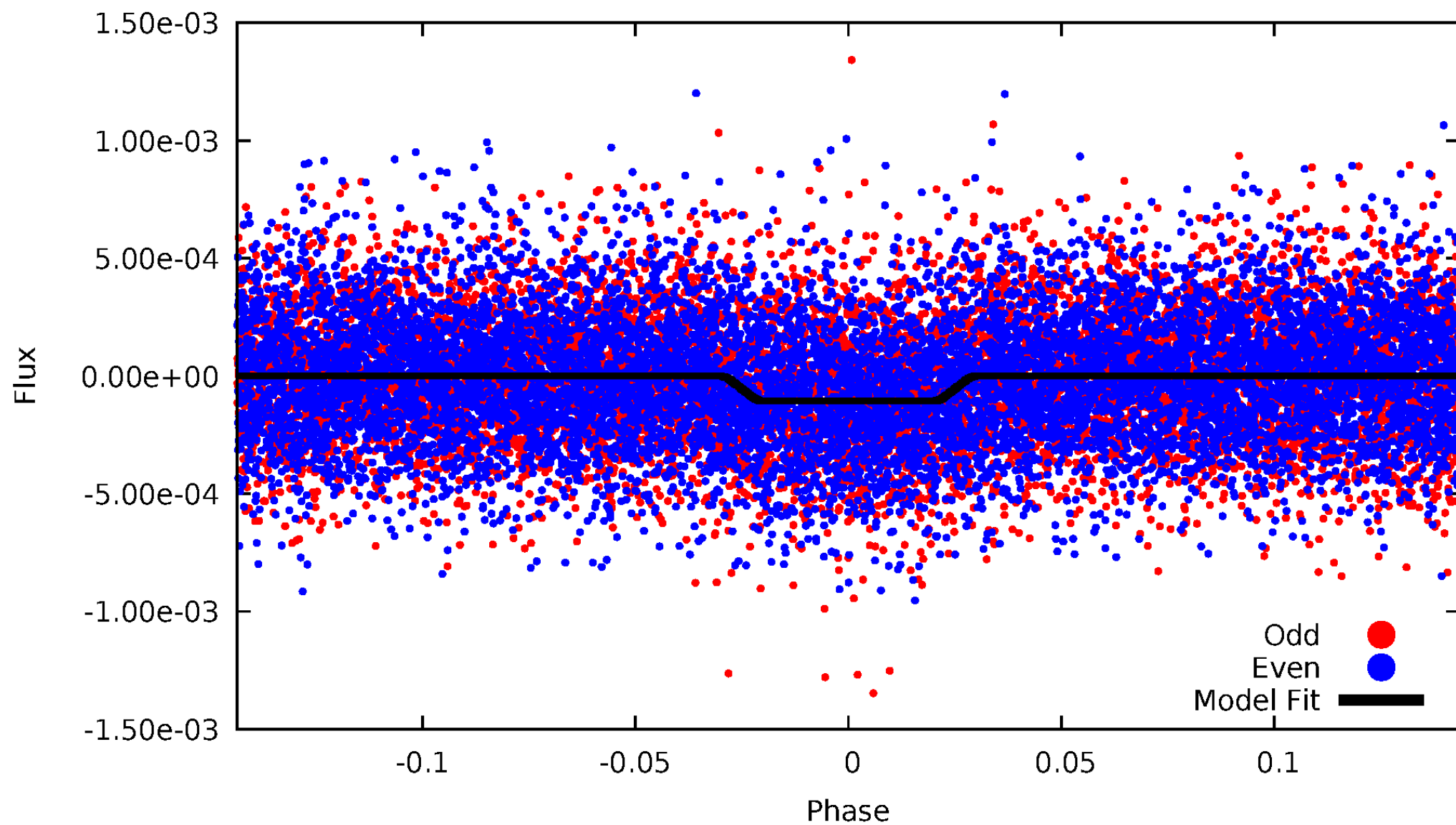
# DV Odd/Even

TCE 010518399-01



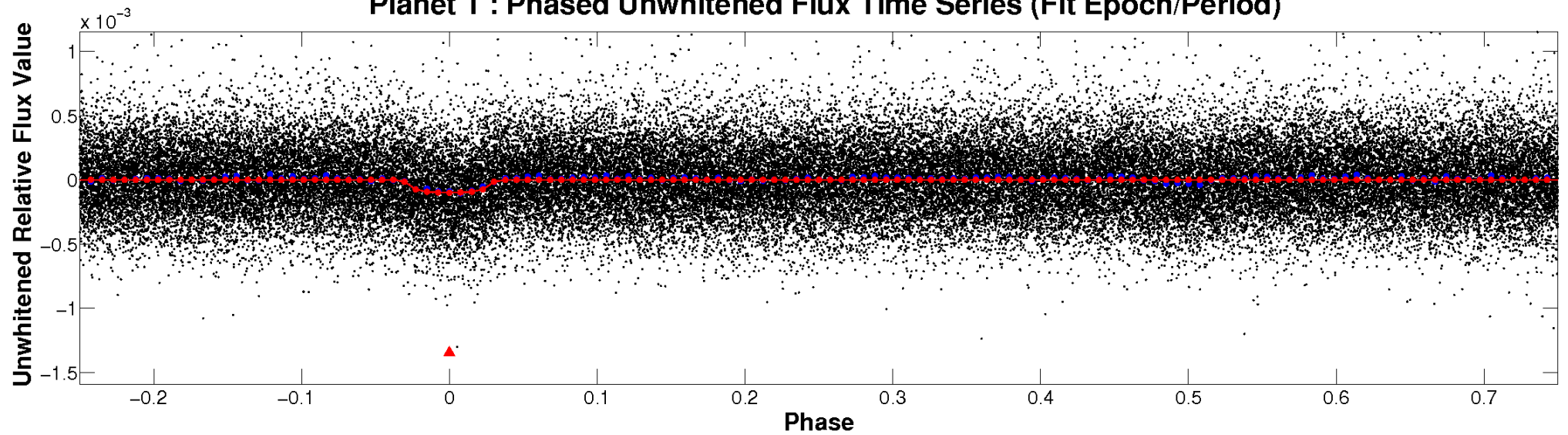
# ALT Odd/Even

TCE 010518399-01

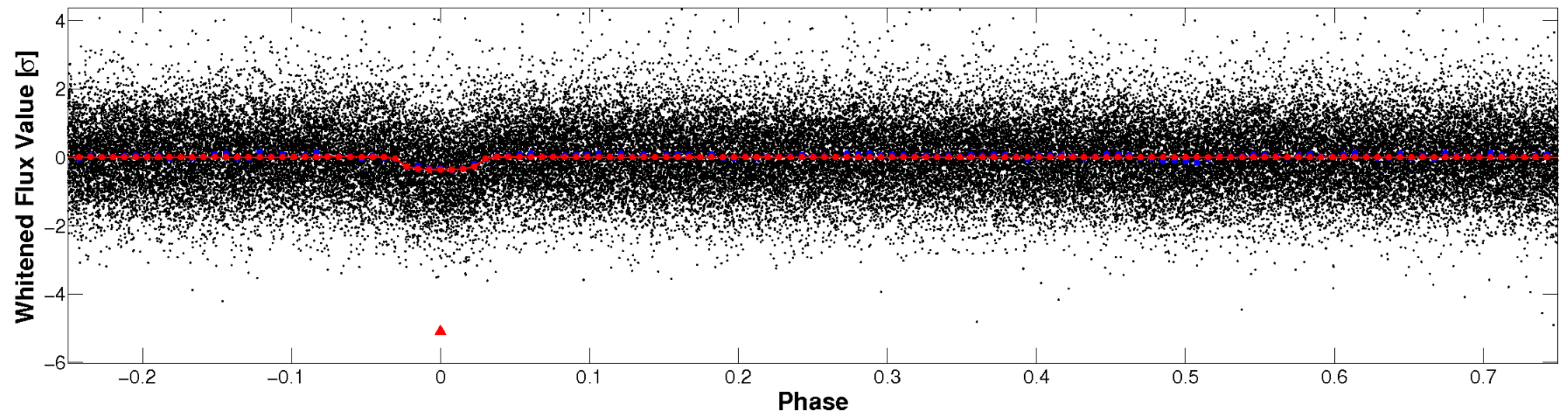


# Non-Whitened Vs. Whitened Light Curve

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

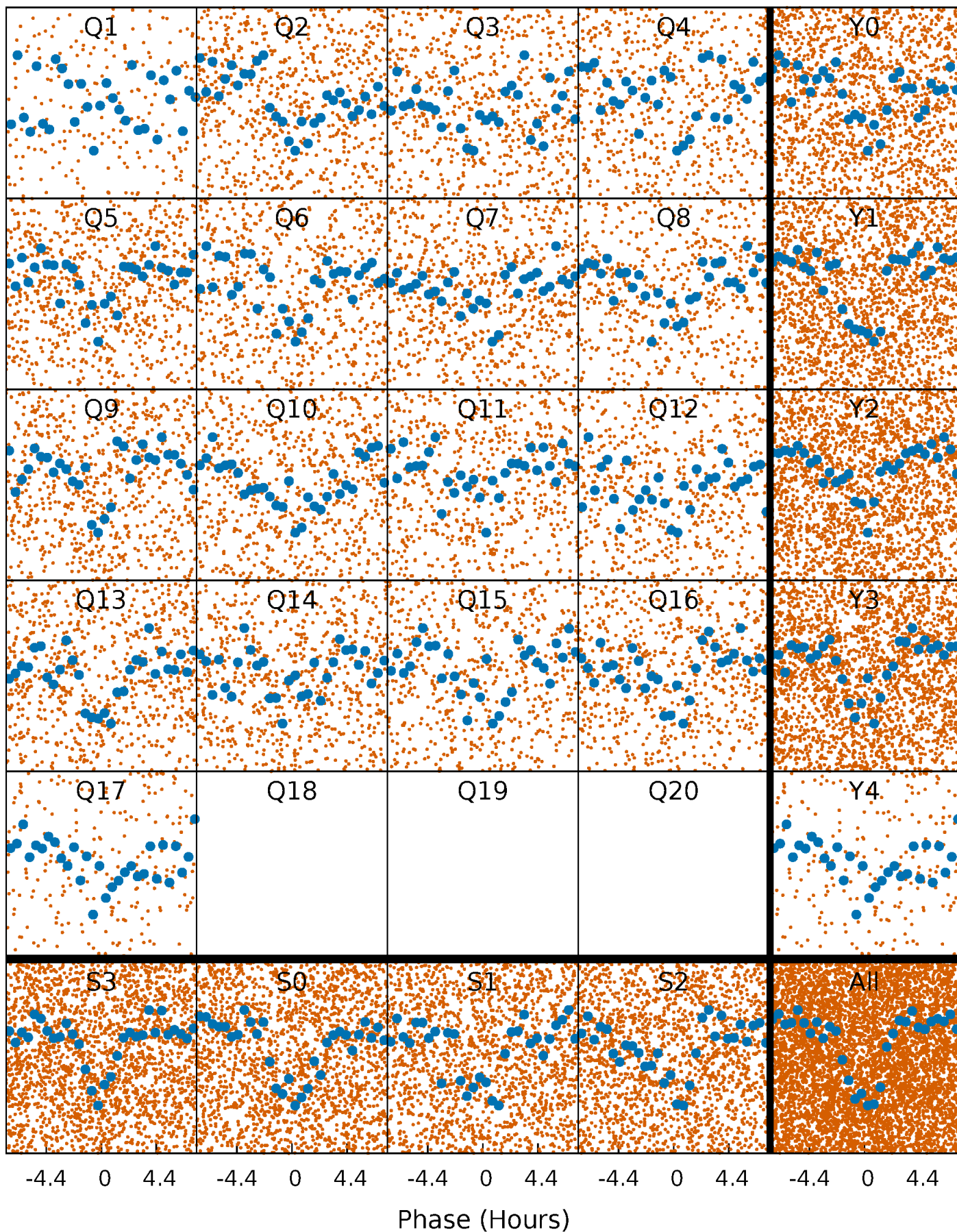


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

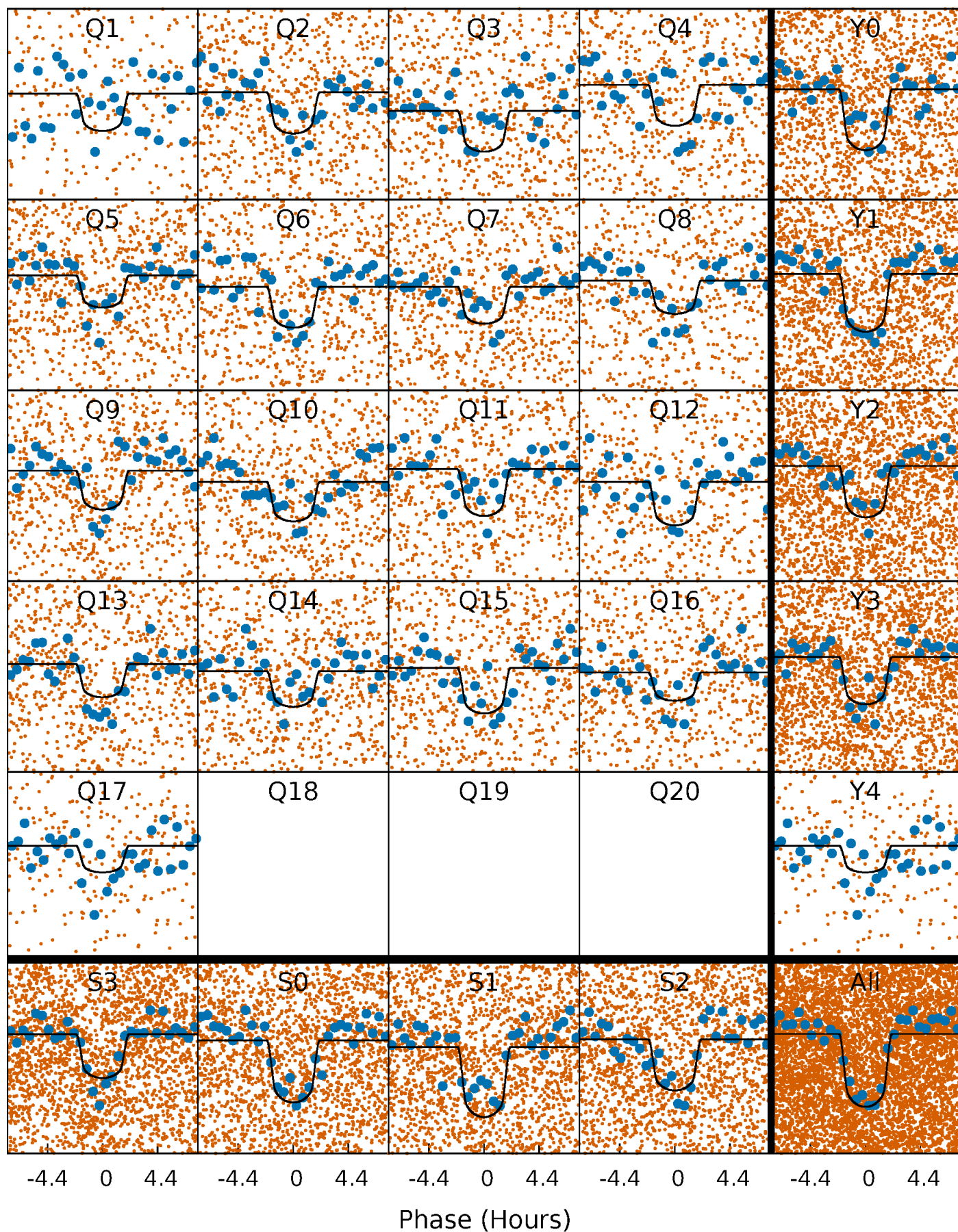
TCE 010518399-01 P= 2.696388 Days  $T_0=132.988725$  (BKJD)





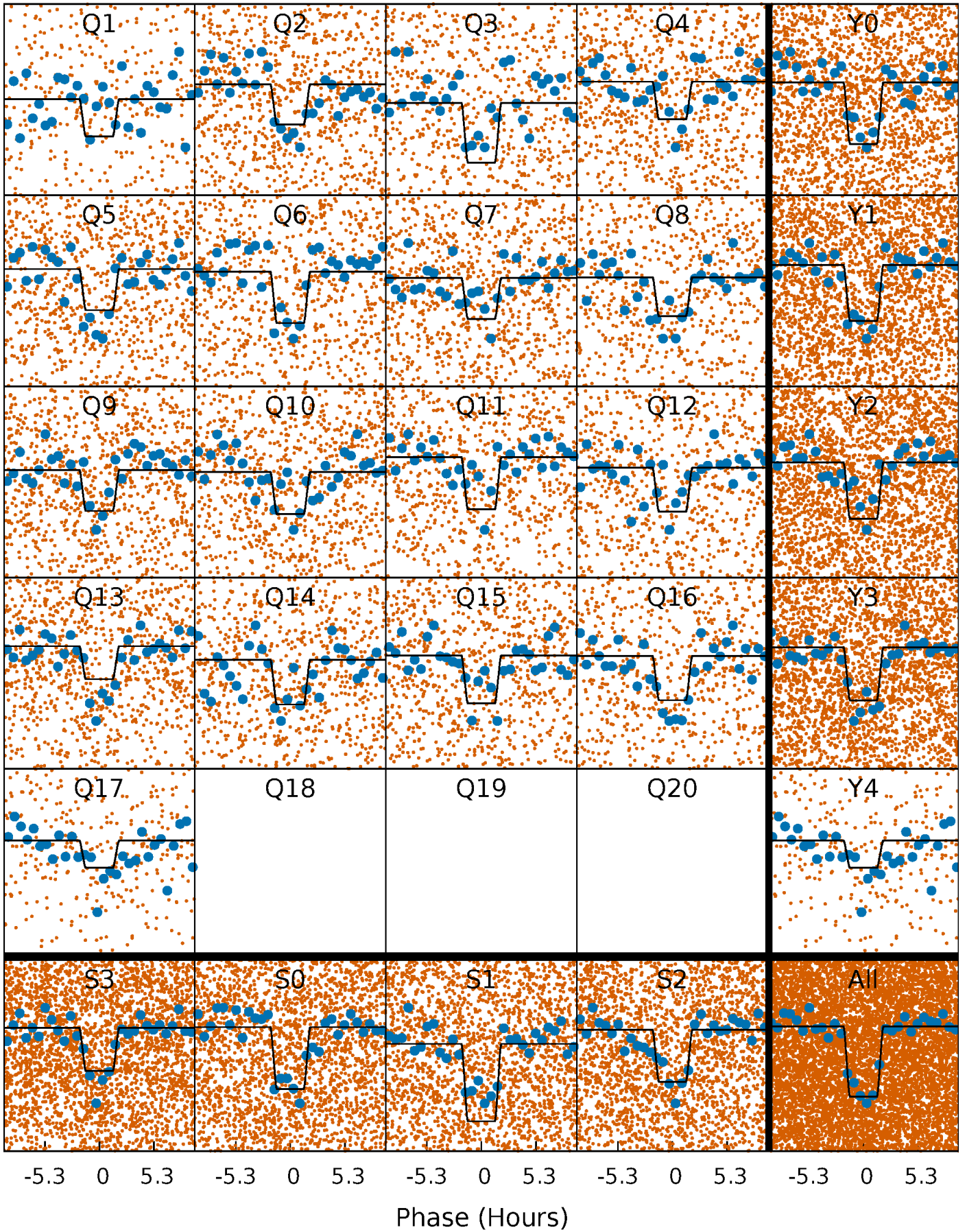
# DV Quarter-Phased Transit Curves

TCE 010518399-01 P= 2.696388 Days  $T_0=132.988725$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

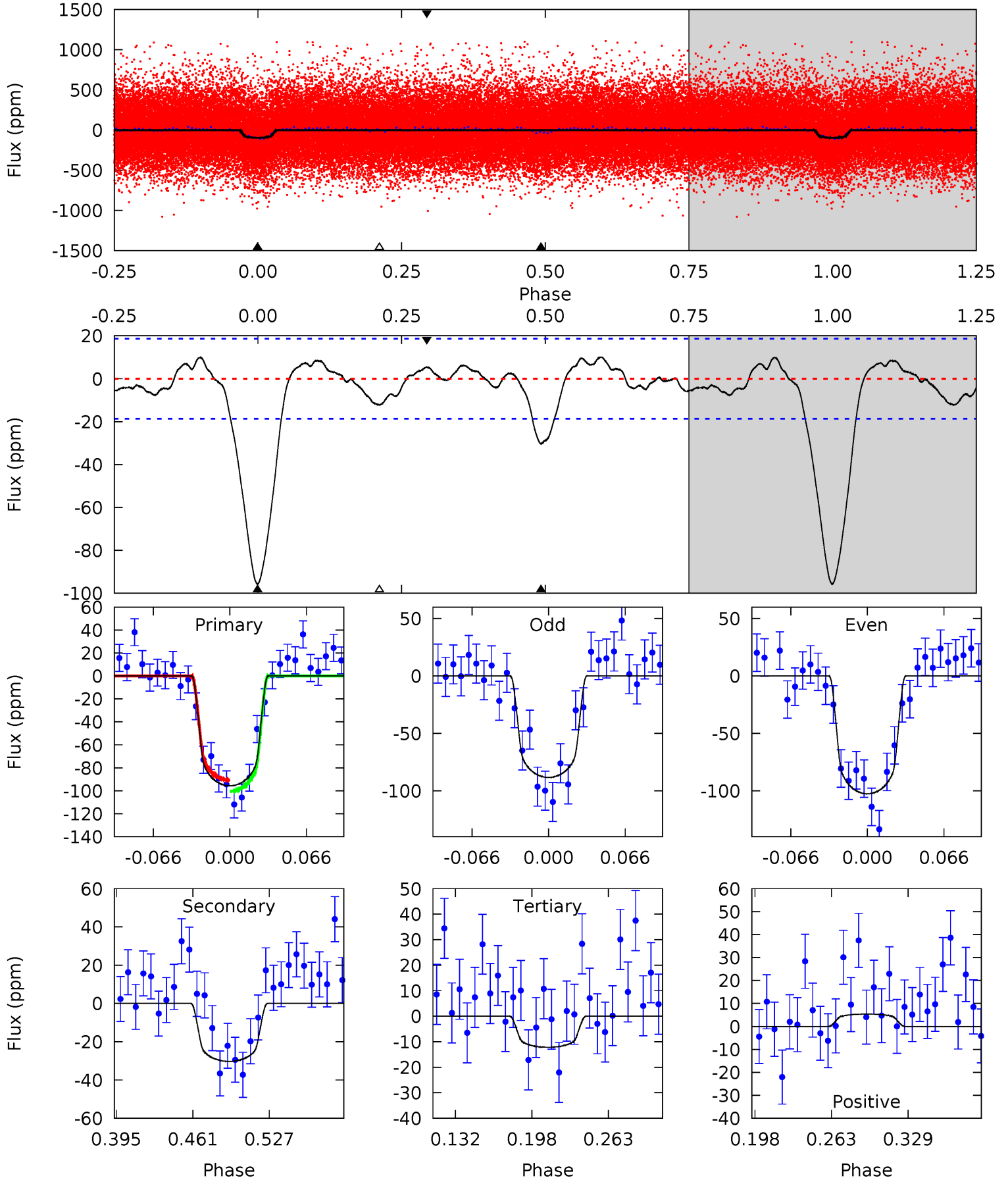
TCE 010518399-01 P= 2.696338 Days  $T_0=133.001614$  (BKJD)



# DV Model-Shift Uniqueness Test

010518399-01, P = 2.696388 Days, E = 130.292337 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
23.8	7.55	3.04	1.34	4.65	1.84	1.34	20.8	22.5	4.51	6.21	1.78	0.93	0.10	1.21

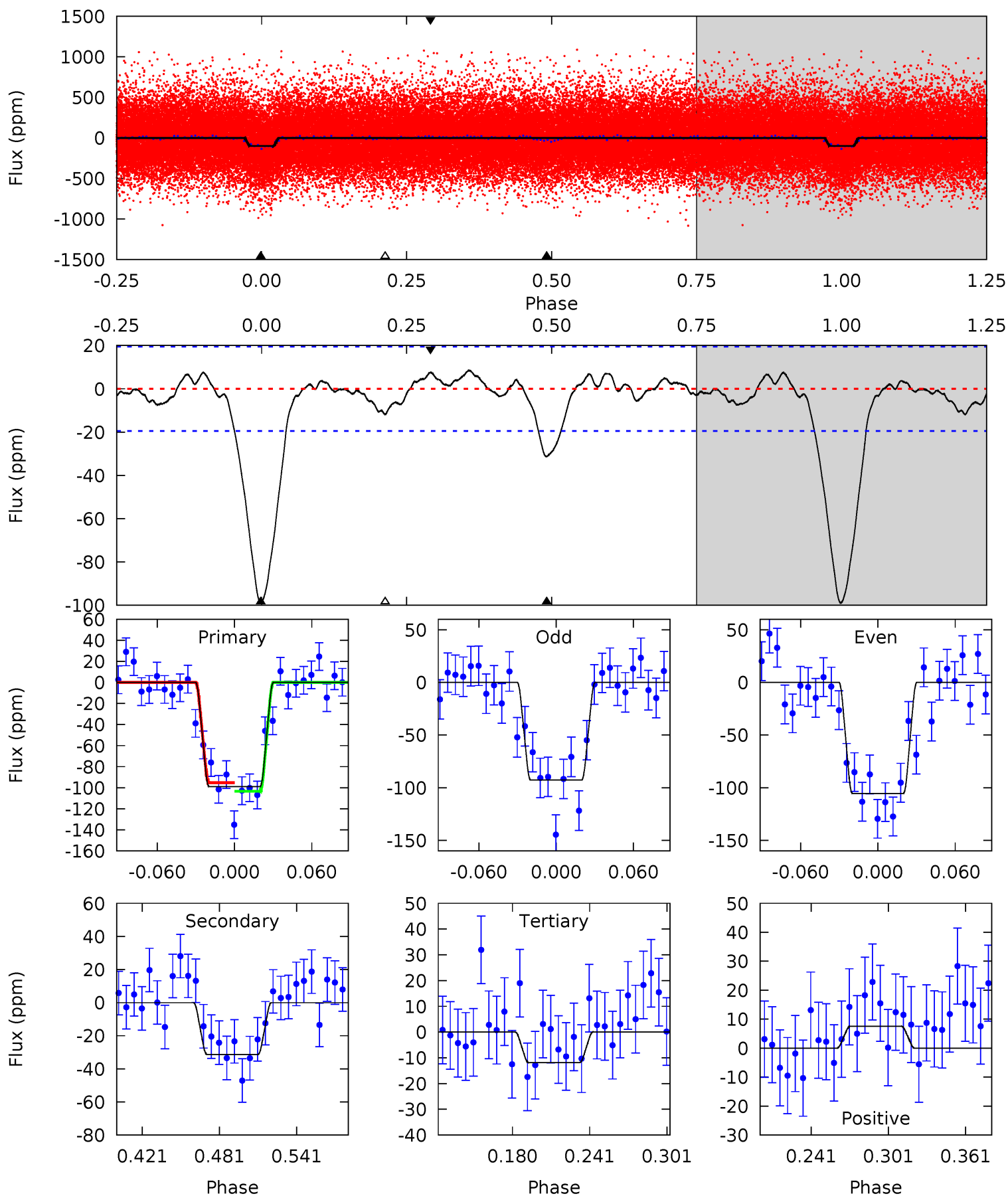




# Alt Model-Shift Uniqueness Test

010518399-01, P = 2.696338 Days, E = 130.305276 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
23.7	7.49	2.84	1.81	4.67	1.88	1.03	20.9	21.9	4.65	5.68	1.53	1.02	0.08	0.97





### Stellar Parameters For KIC 010518399

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5653^{+152}_{-152}$	$4.250^{+0.282}_{-0.212}$	$-0.220^{+0.300}_{-0.250}$	$1.139^{+0.363}_{-0.297}$	$0.842^{+0.122}_{-0.071}$	$0.803^{+1.313}_{-0.405}$
	+3%/-3%	+7%/-5%	+136%/-114%	+32%/-26%	+14%/-8%	+163%/-50%
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 010518399-01 / KOI 2800.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-30 \pm 4$	$1.37^{+0.40}_{-0.37}$	$1953^{+171}_{-155}$	$4219^{+449}_{-353}$	$12^{+11}_{-5}$
Alt.	$-31 \pm 4$	$1.26^{+0.43}_{-0.36}$	$1967^{+189}_{-166}$	$4375^{+584}_{-379}$	$14^{+13}_{-6}$

$T_{max}$  = 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

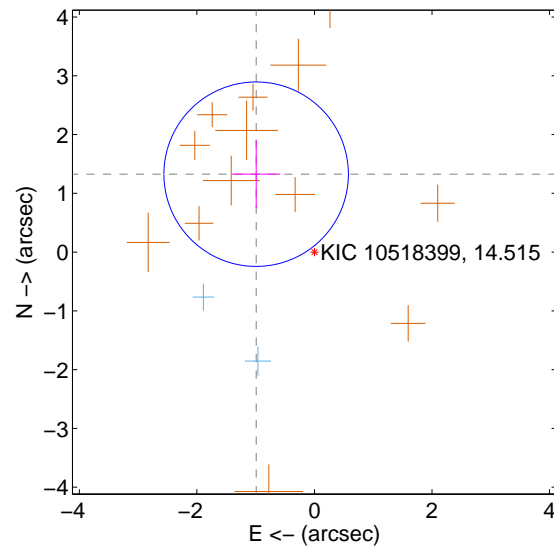
Supplemental centroid analysis for 010518399-01. Kepler magnitude: 14.52. Transit SNR 18.90

There are 2 quarters with good PRF difference image offsets

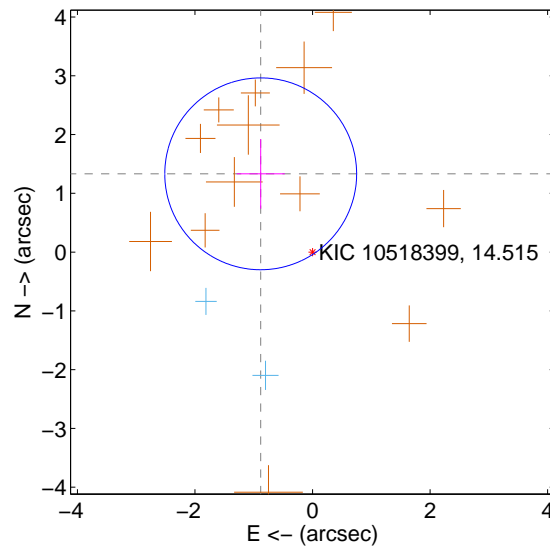
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>1.656 \pm 0.523</math></b>	<b>3.17</b>	$0.992 \pm 0.410$	$1.326 \pm 0.577$
PRF-fit source offset from KIC position	$1.597 \pm 0.544$	2.94	$0.882 \pm 0.410$	$1.332 \pm 0.593$
photometric centroid source offset	$1.27 \pm 0.72$	1.76	$0.41 \pm 0.73$	$1.20 \pm 0.72$

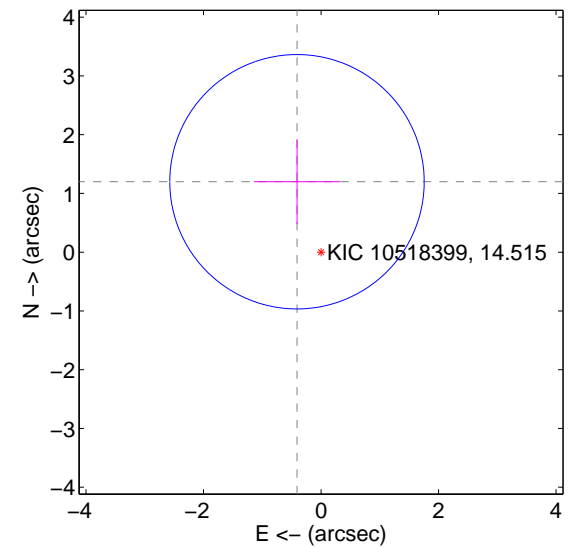
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

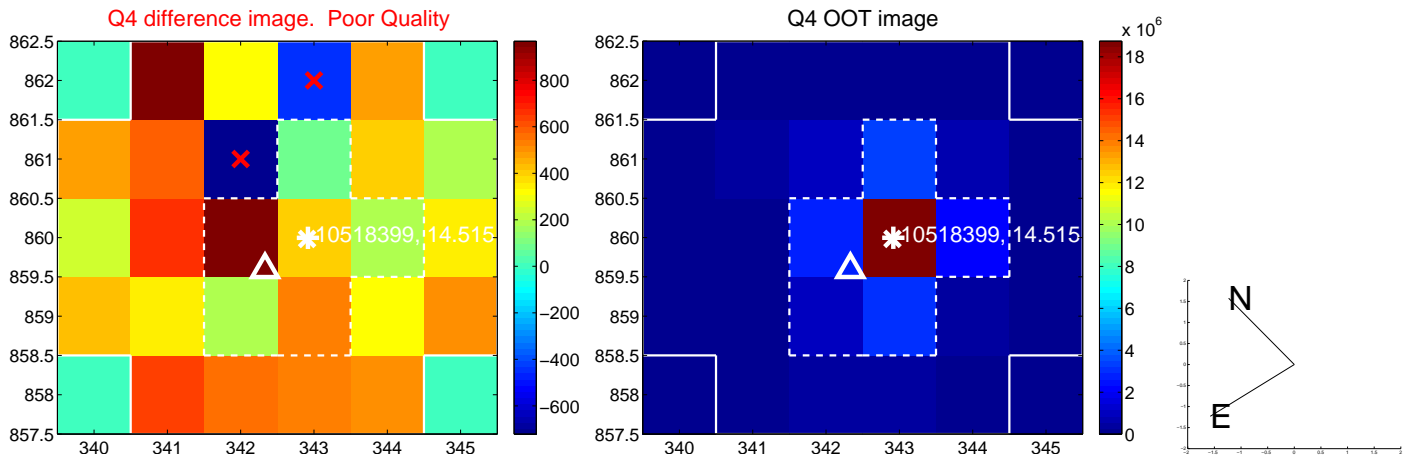
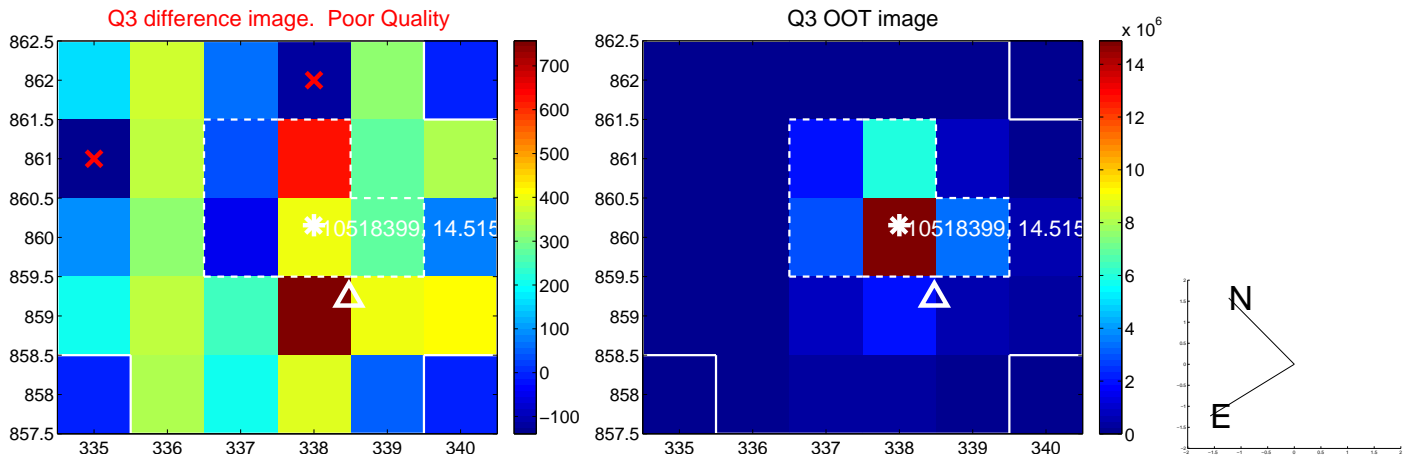
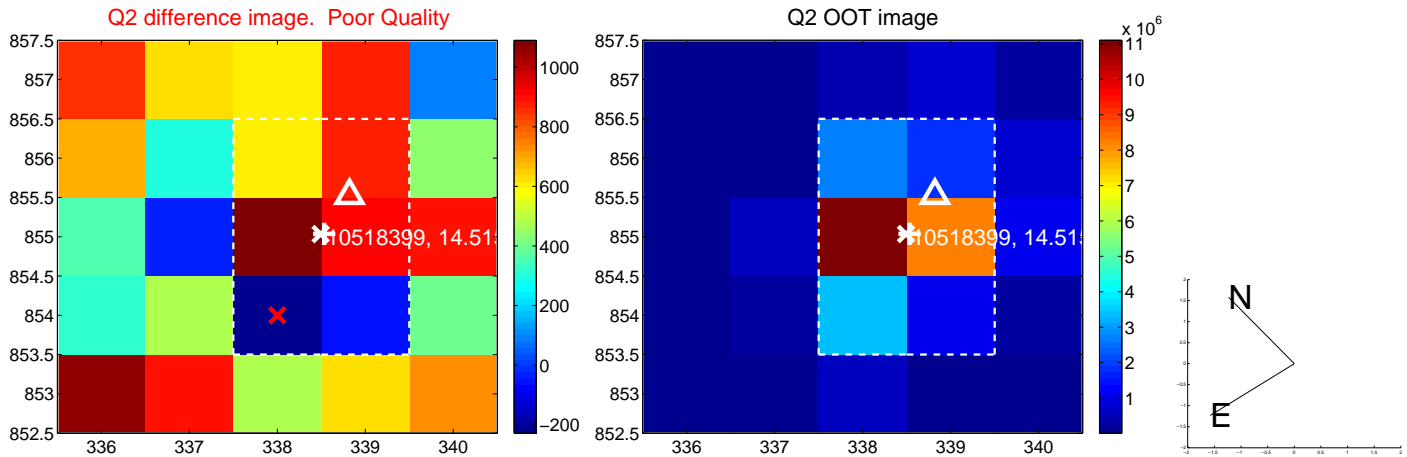
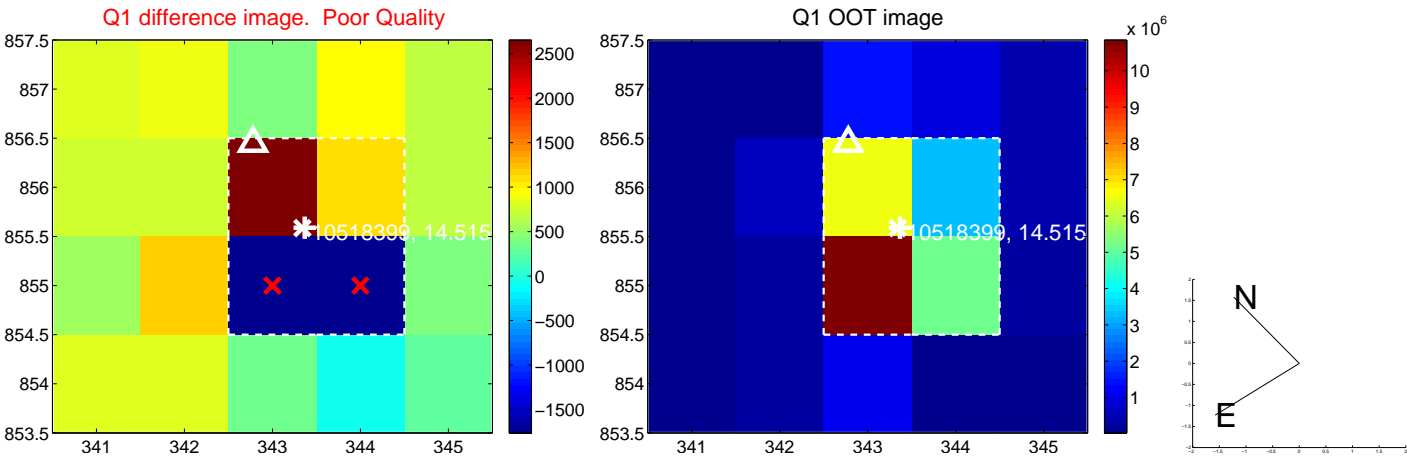


offset from photometric centroids

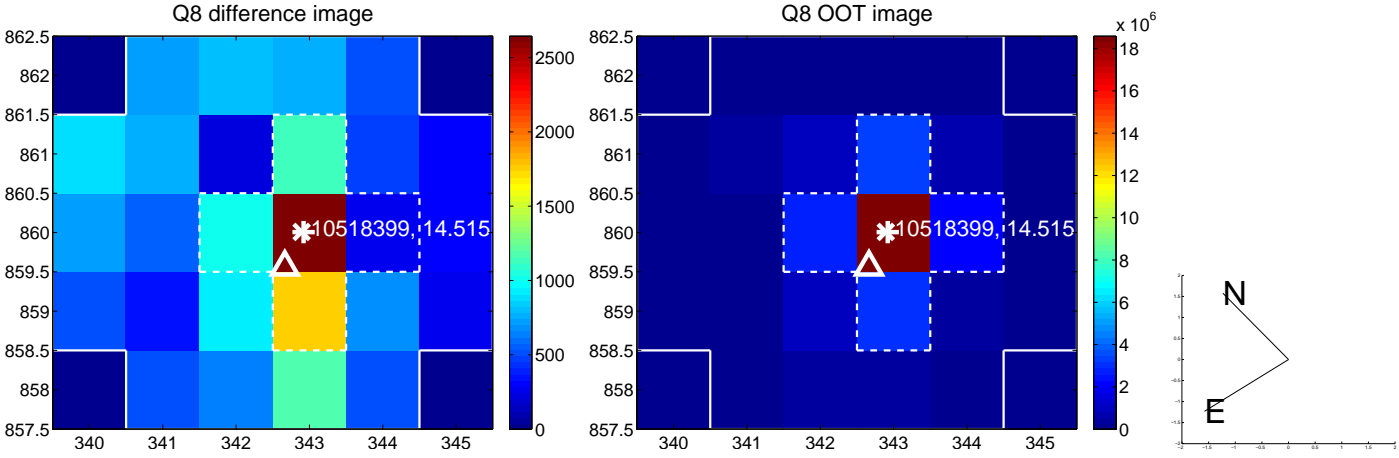
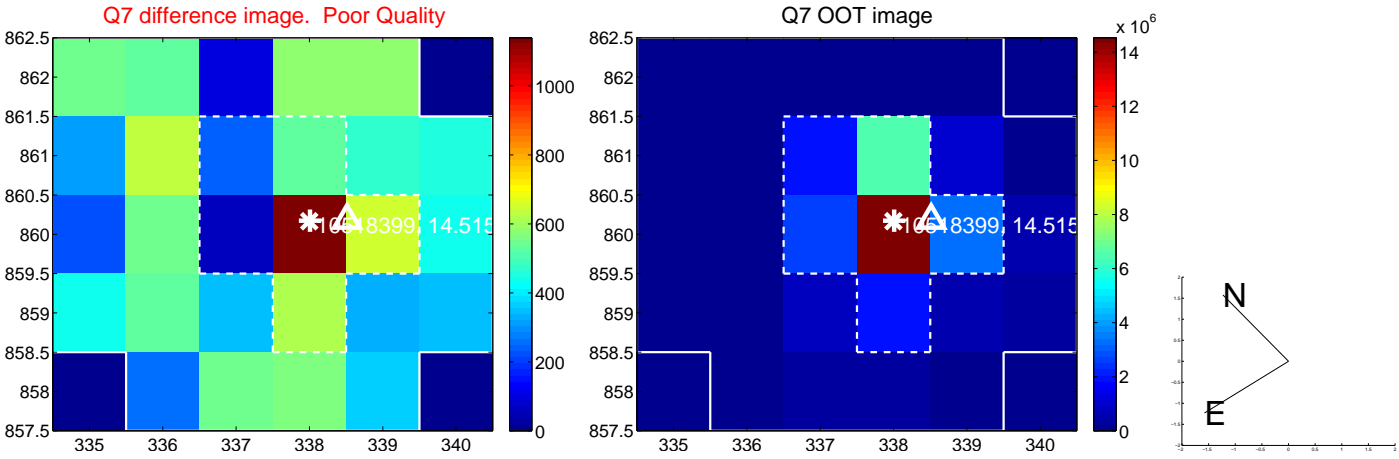
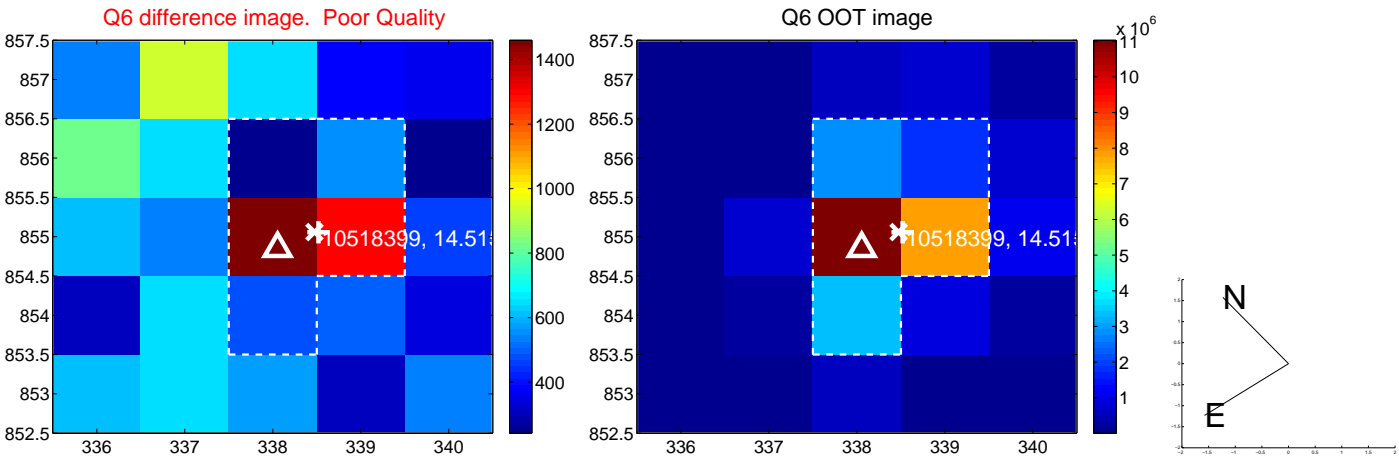
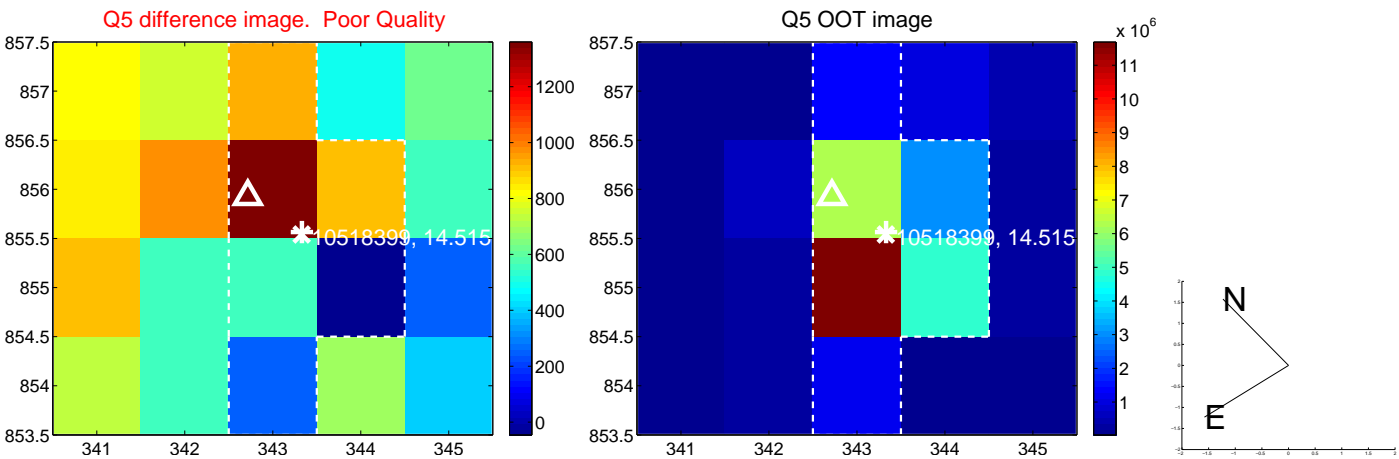


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

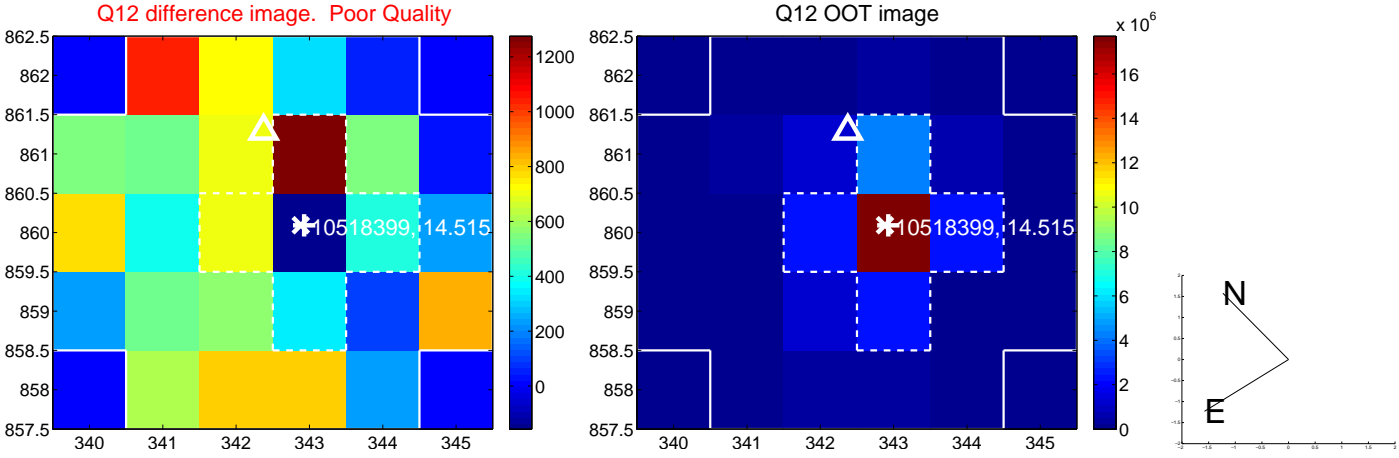
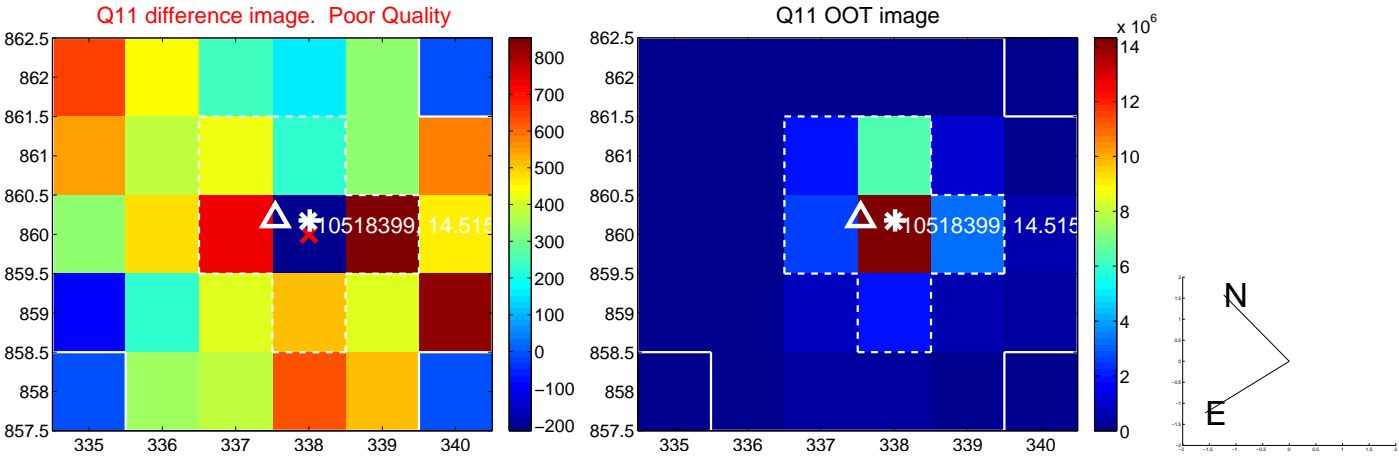
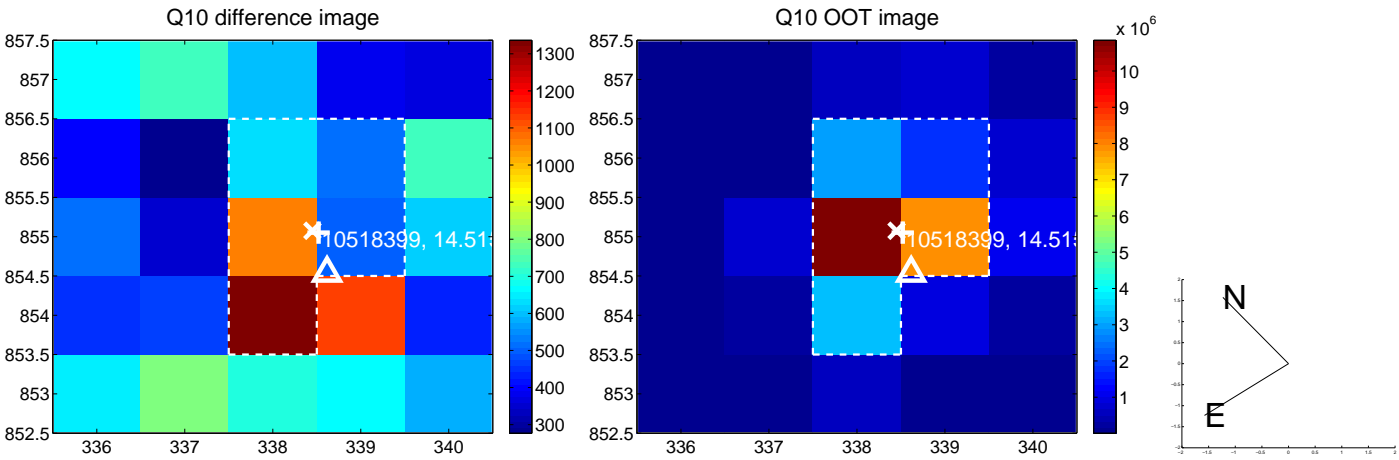
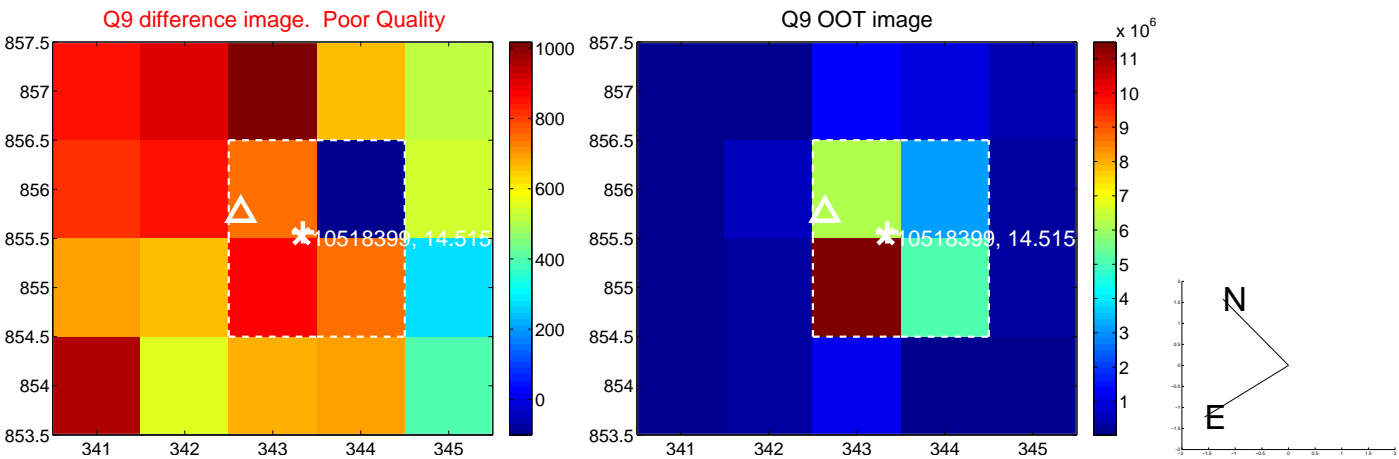


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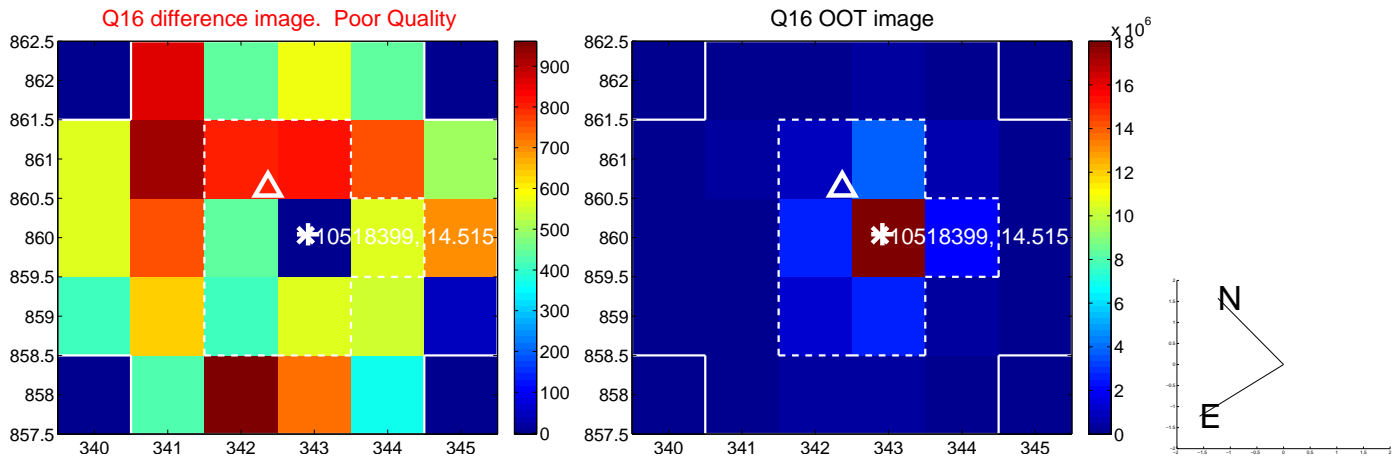
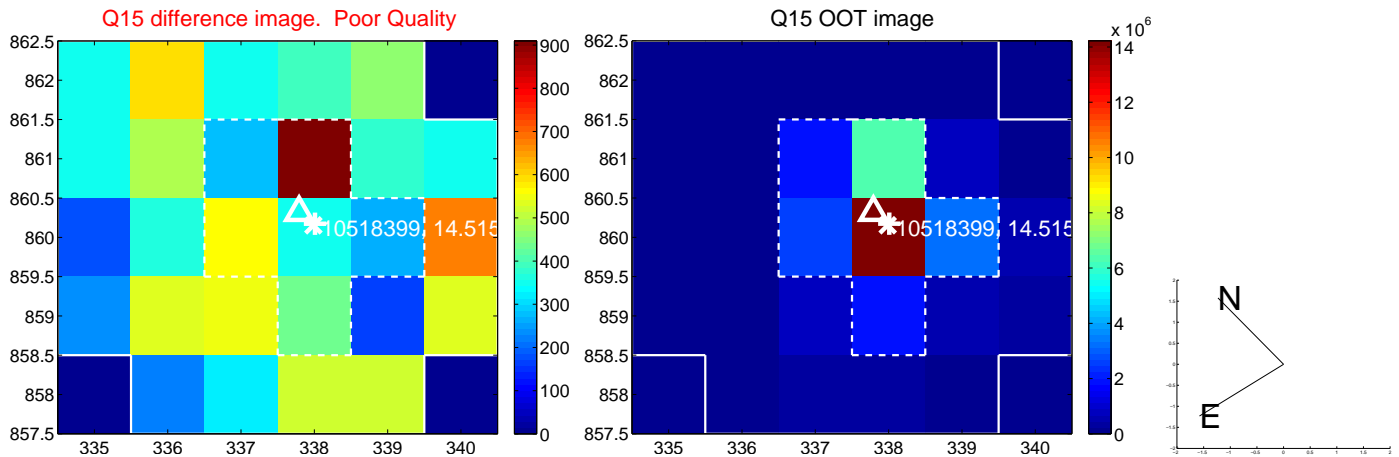
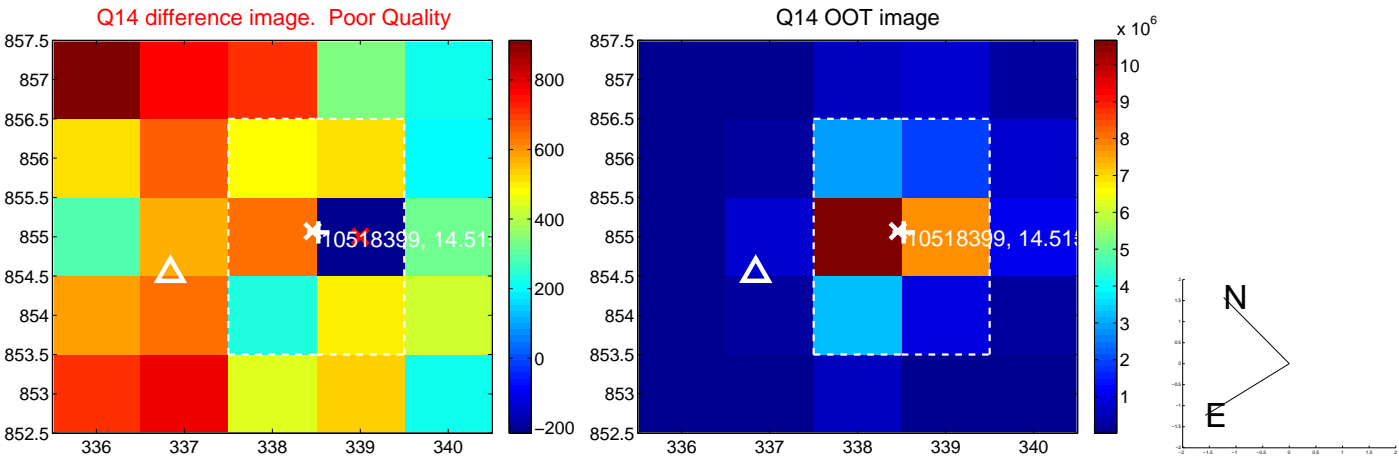
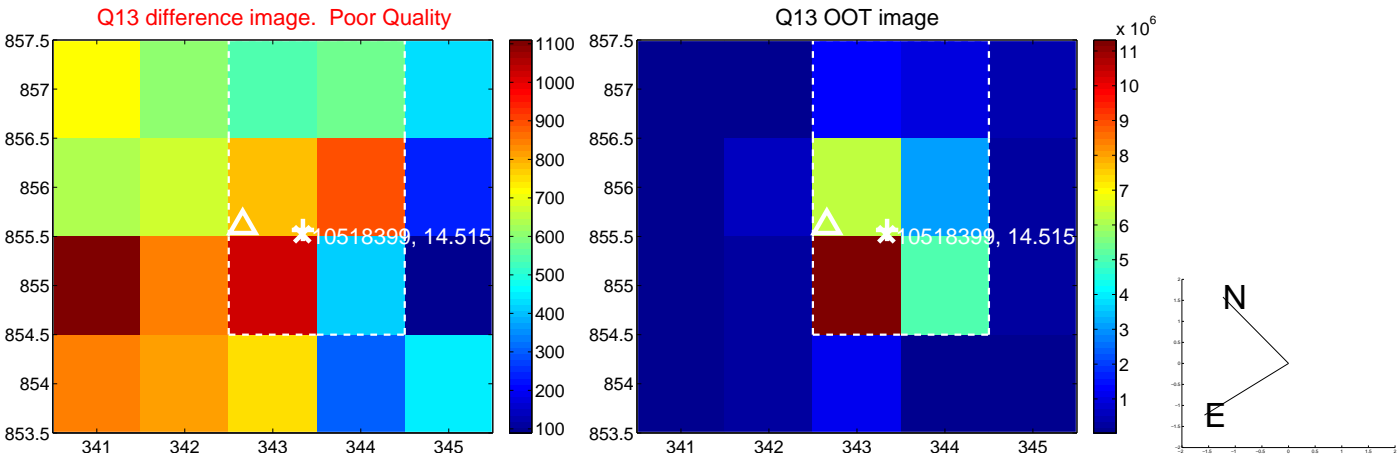




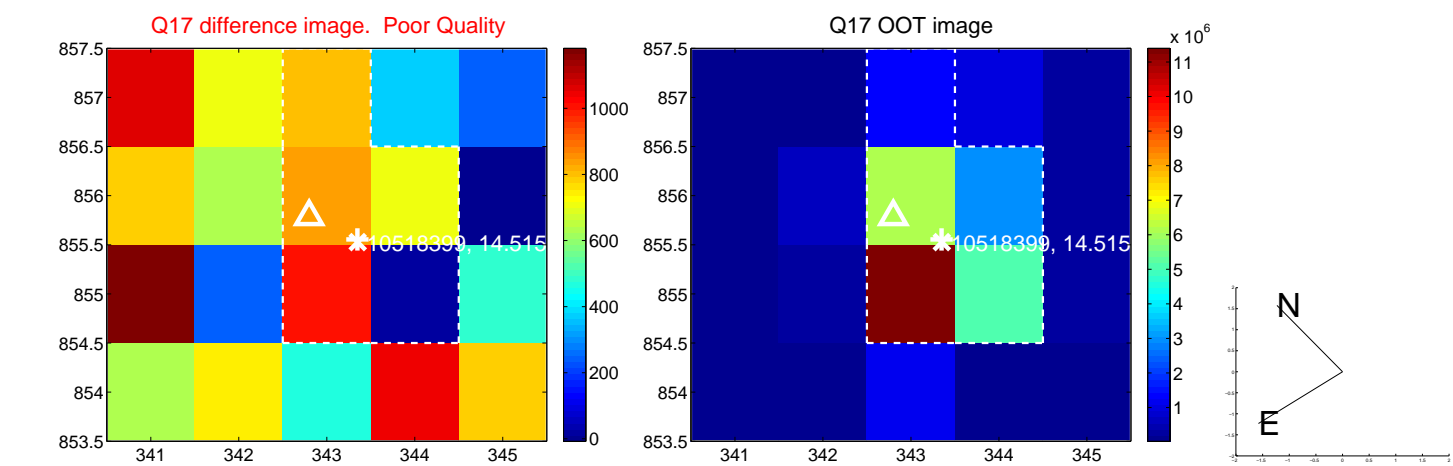
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



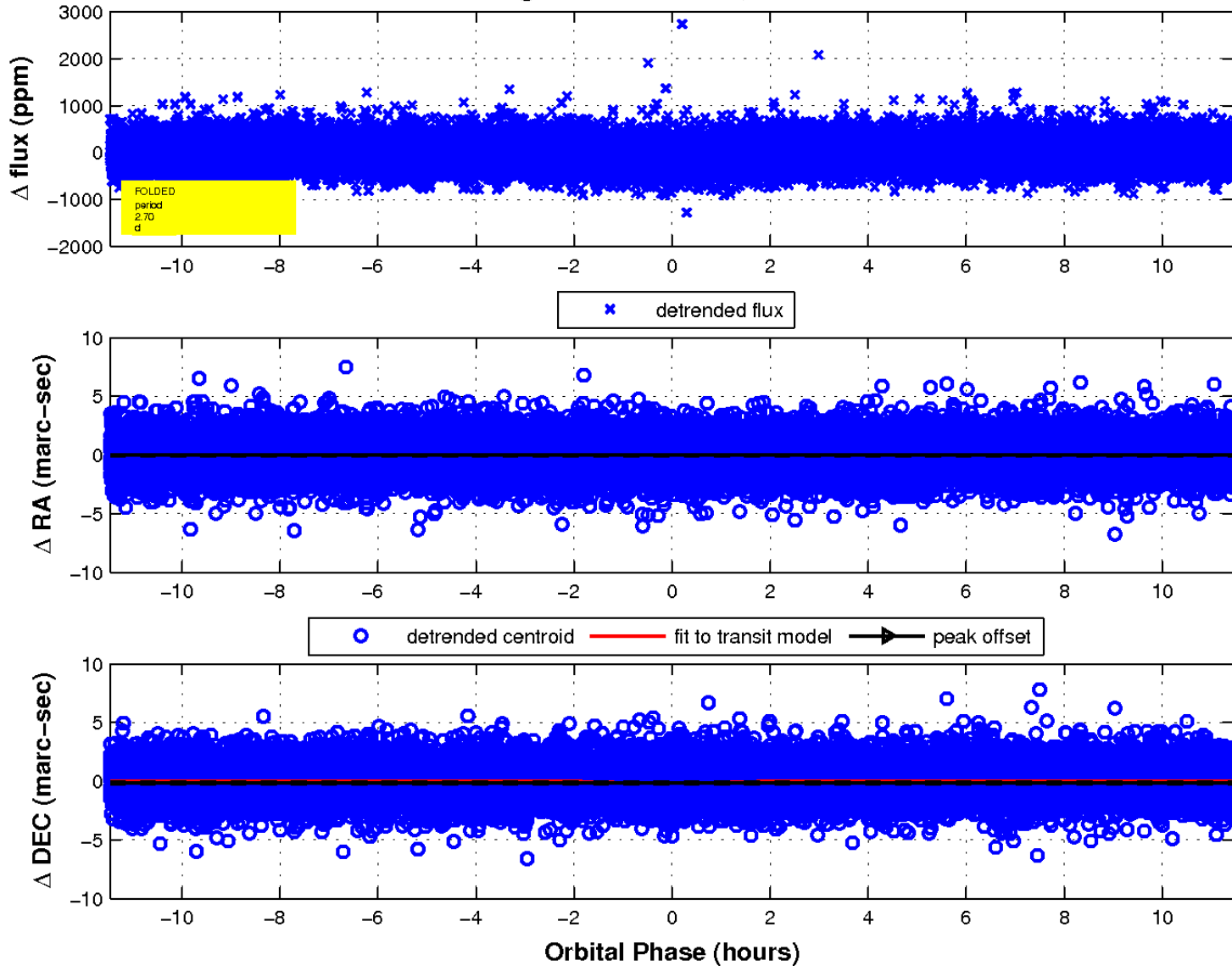
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 1 of 1



UKIRT Image

Declination

