

# KIC 003439096

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003439096-01	OBS	3509.01	2.976105	132.960650	210.7	4.635	19.0	18.8	7.75	5140	13.76	14541.22

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003439096-01	OBS	FP	0.00	0	0	1	1	CENT_UNRESOLVED_OFFSET—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.

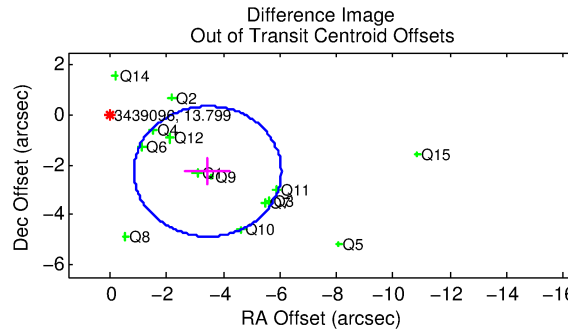
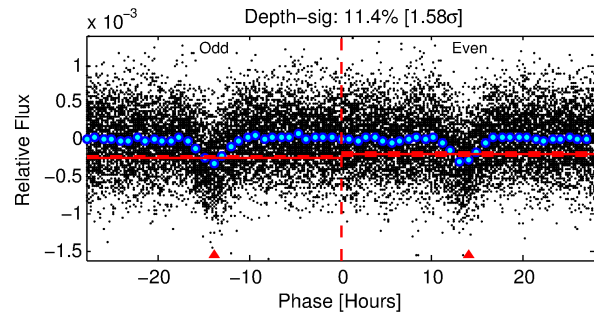
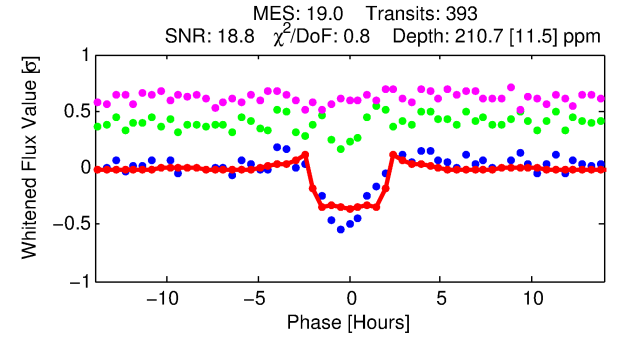
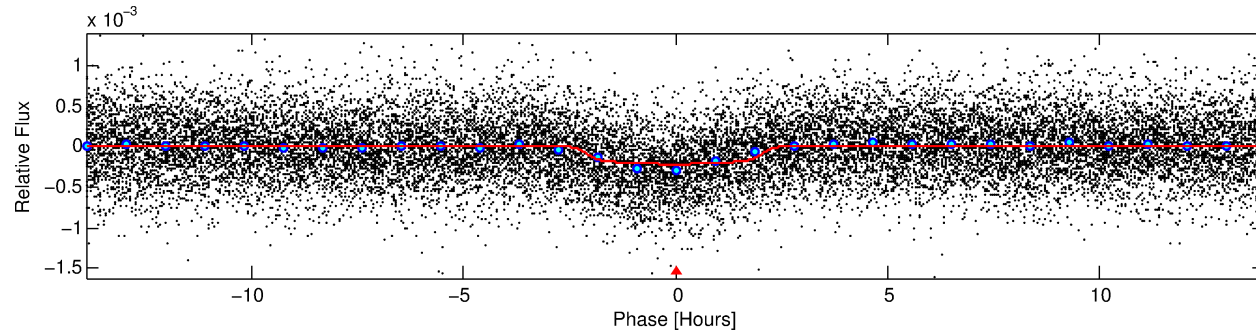
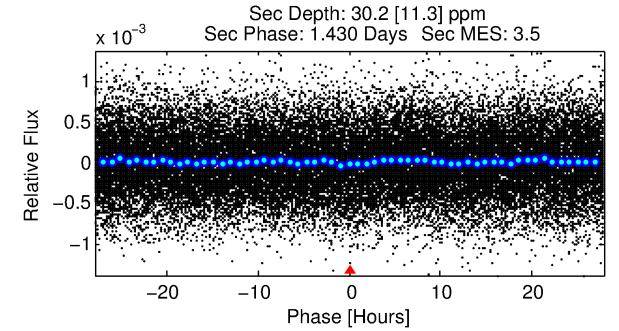
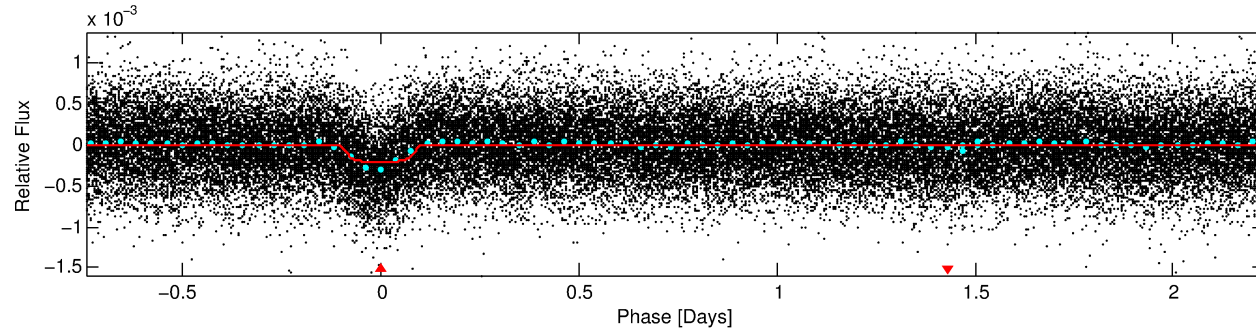
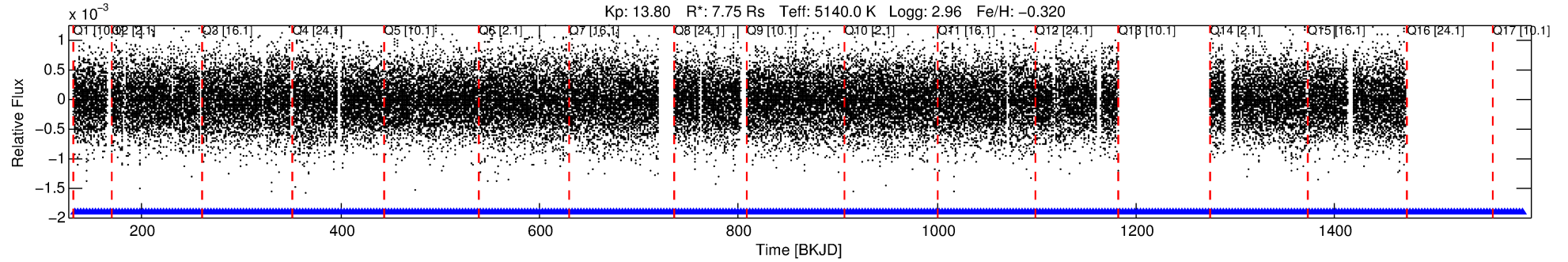
## Ephemeris Match Information For 003439096-01

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	$\sigma_P$	$\sigma_T$
003439096-01	3439096	4980.01	3439031	1:1	45.4	6	9	11.29	13.80	2115.40	Direct-PRF	0	1.91	0.49

**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: 3439096 Candidate: 1 of 1 Period: 2.976 d  
KOI: K03509.01 Corr: 0.907



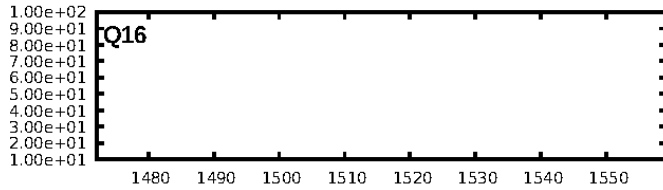
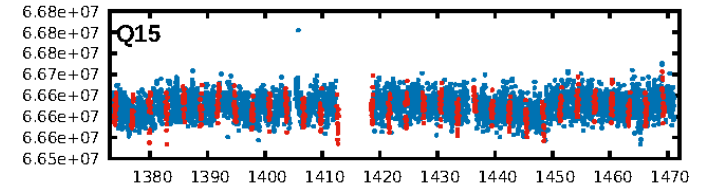
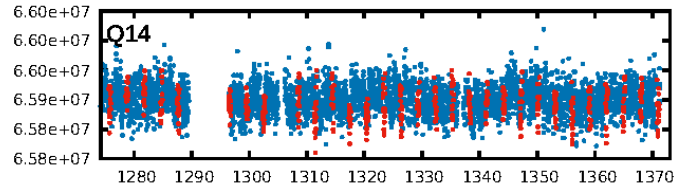
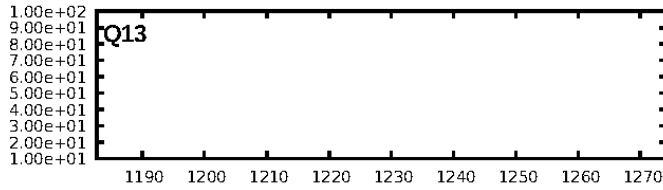
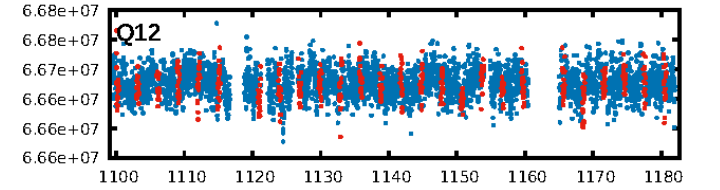
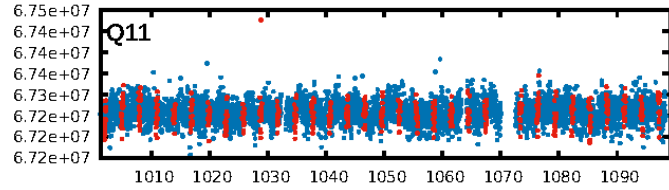
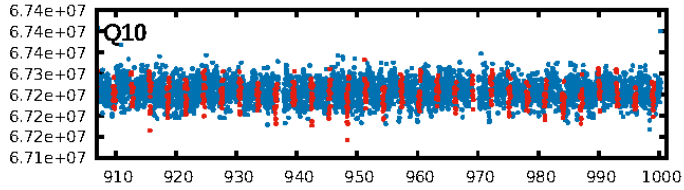
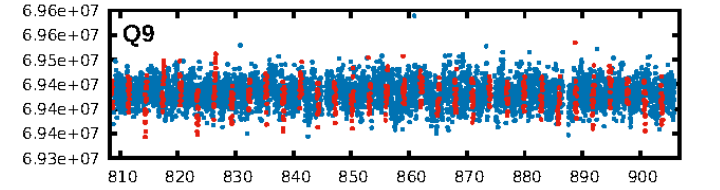
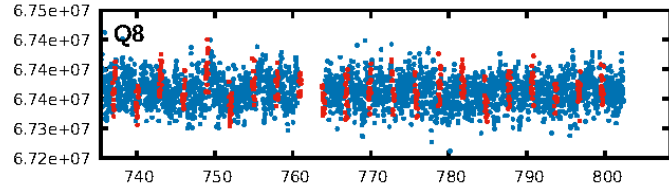
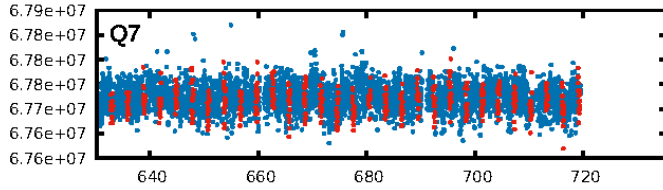
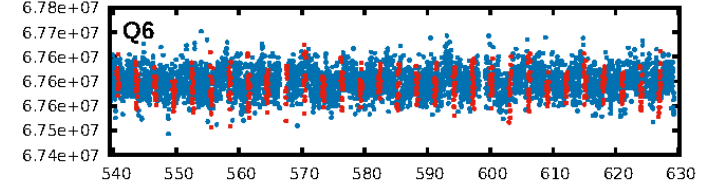
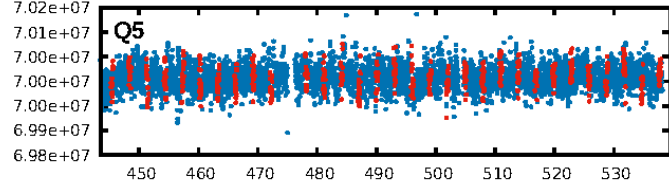
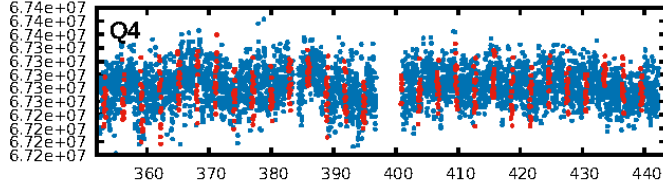
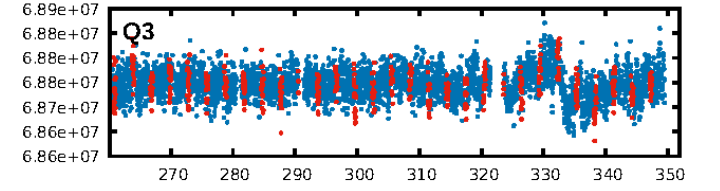
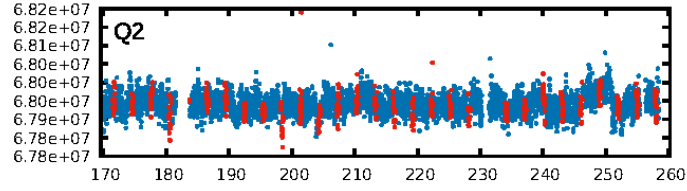
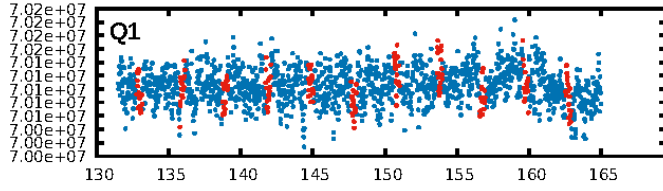
## DV Fit Results:

Period = 2.97610 [0.00001] d  
Epoch = 132.9607 [0.0019] BKJD  
Rp/R\* = 0.0163 [0.0014]  
a/R\* = 2.38 [0.68]  
b = 0.91 [0.06]  
Seff = 14541.22 [3338.62]  
Teff = 2800 [161] K  
Rp = 13.76 [3.88] Re  
a = 0.0508 [0.0092] AU  
Ag = 0.23 [0.10] [-7.59σ]  
Teffp = 2988 [322] K [0.52σ]

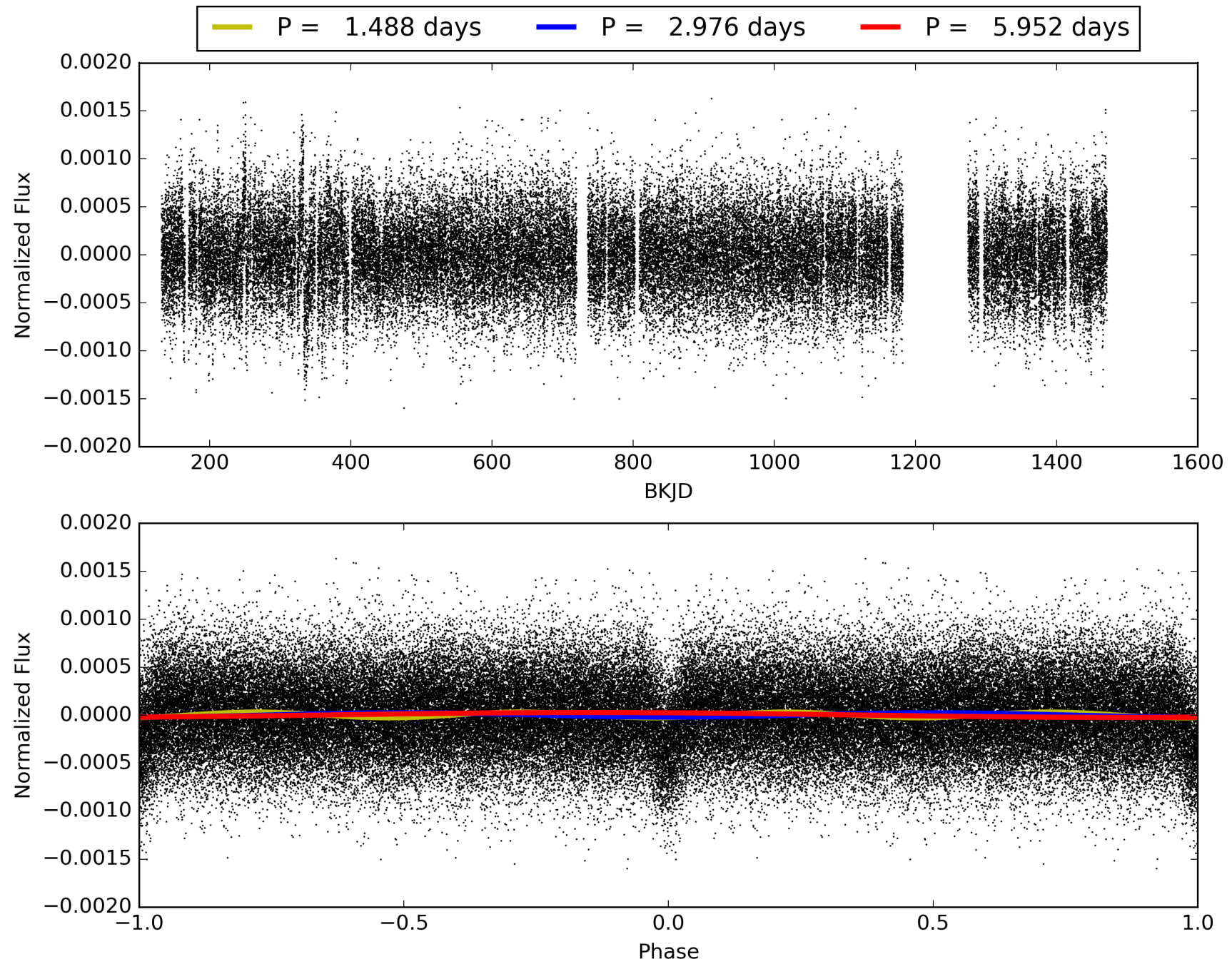
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 5.75e-65  
RollingBand-fgt: 1.00 [382/382]  
GhostDiagnostic-chr: -0.1357  
Centroid-sig: 0.0%  
Centroid-so: 2.425 arcsec [8.42σ]  
OotOffset-rm: 4.120 arcsec [4.74σ]  
KicOffset-rm: 4.359 arcsec [4.95σ]  
OotOffset-st: 4/4/3/3 [14]  
KicOffset-st: 4/4/3/3 [14]  
DiffImageQuality-fgm: 0.07 [1/14]  
DiffImageOverlap-fno: 1.00 [14/14]

# TCE 003439096-01, PDC Light Curves



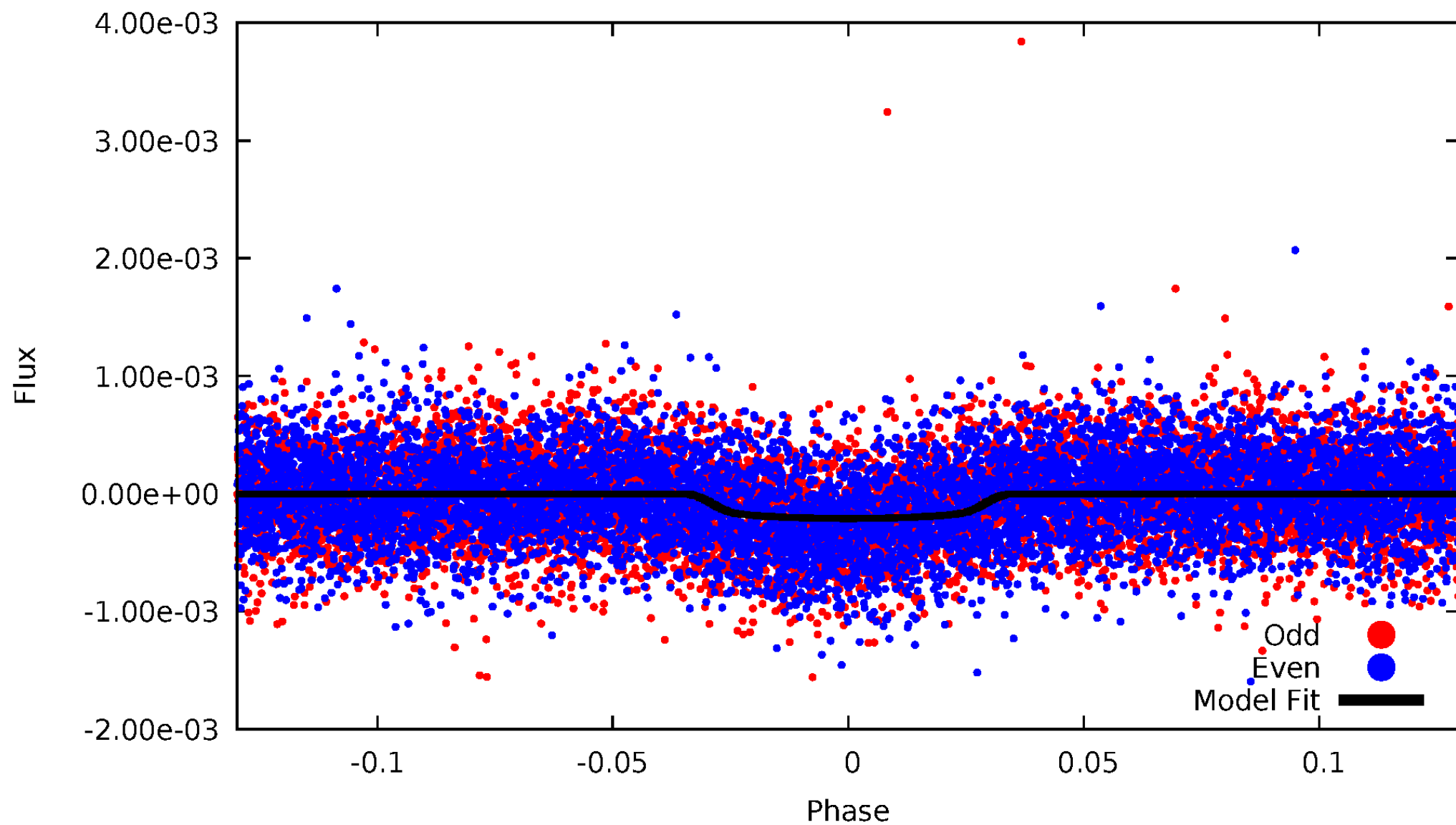
TCE 003439096-01





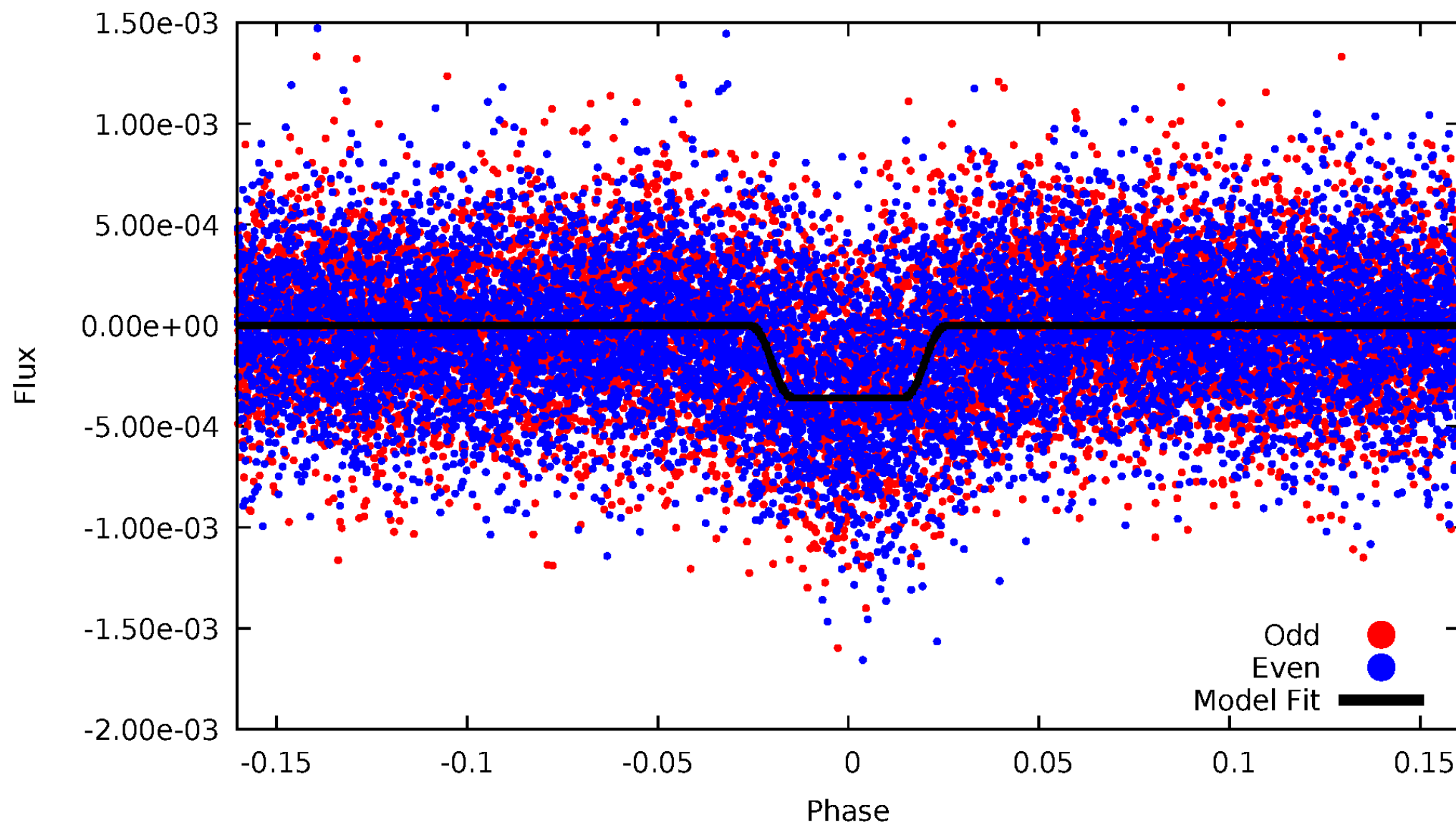
# DV Odd/Even

TCE 003439096-01



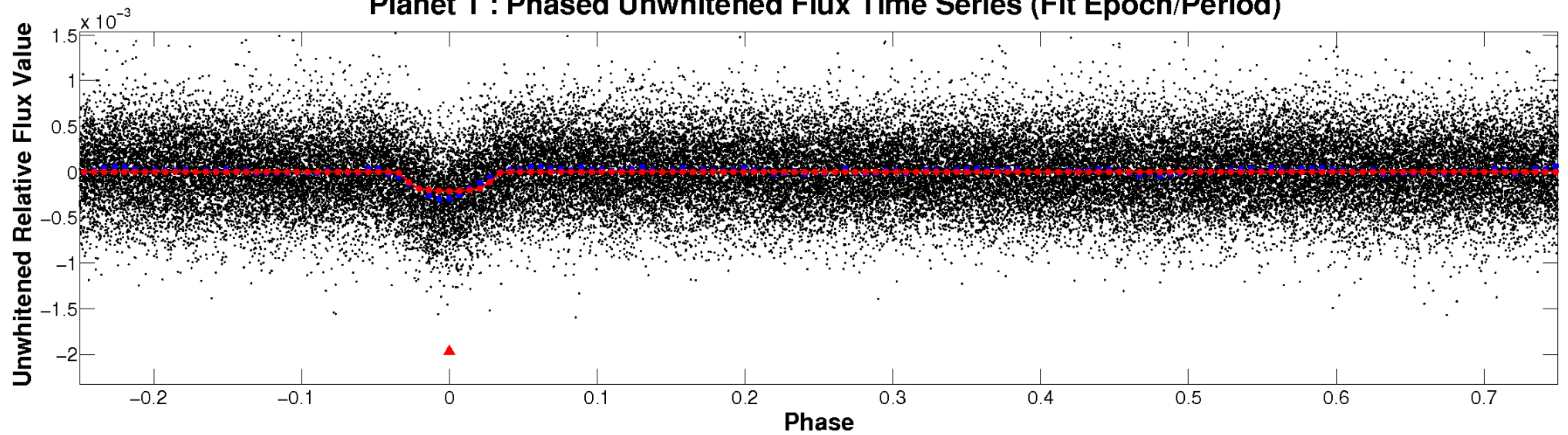
# ALT Odd/Even

TCE 003439096-01

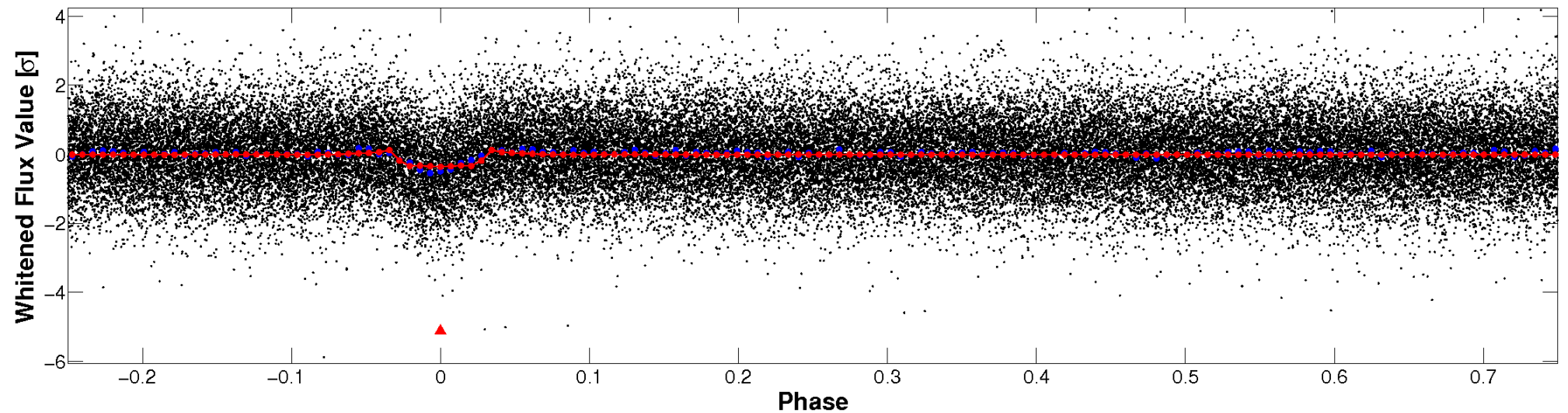


# Non-Whitened Vs. Whitened Light Curve

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

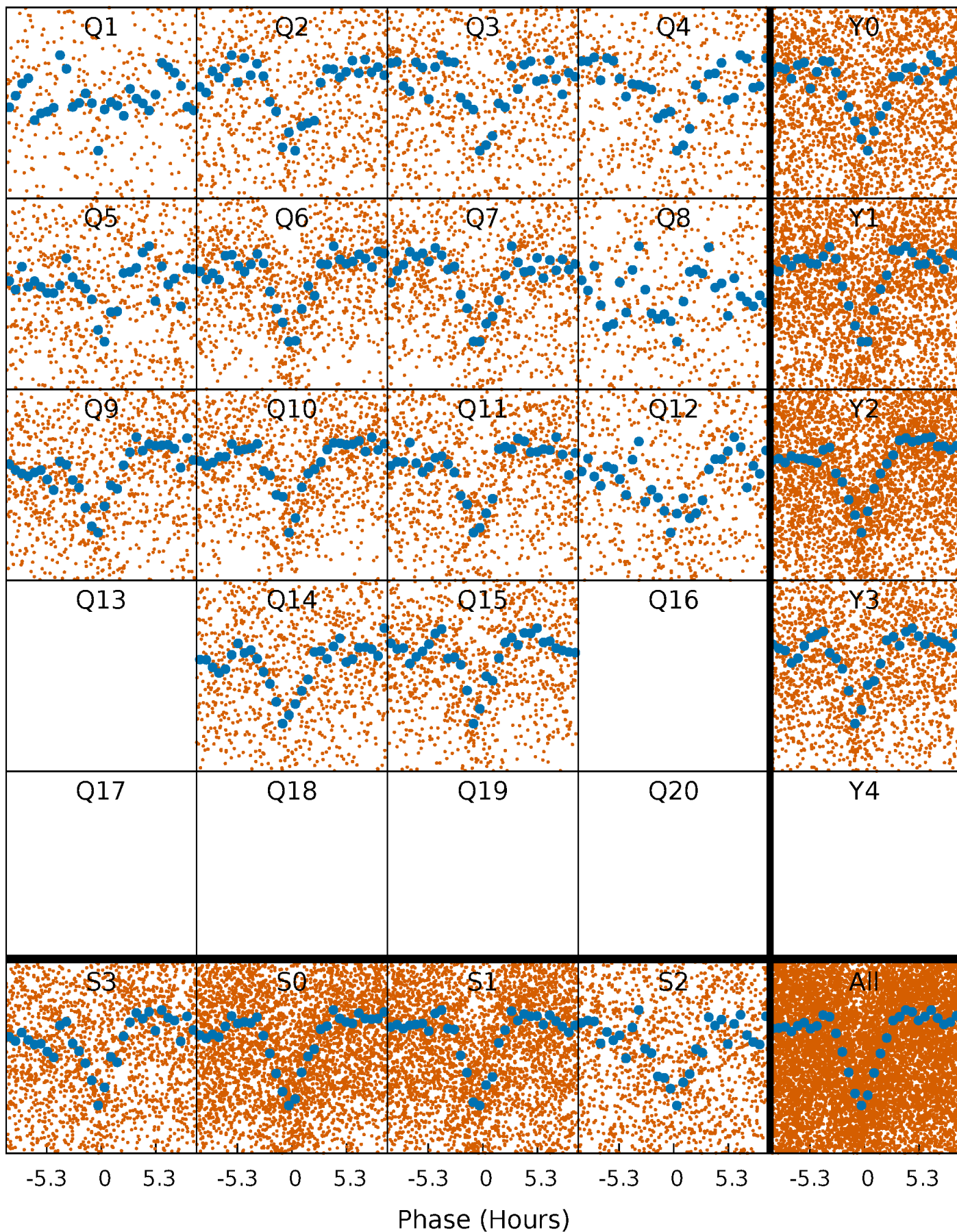


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

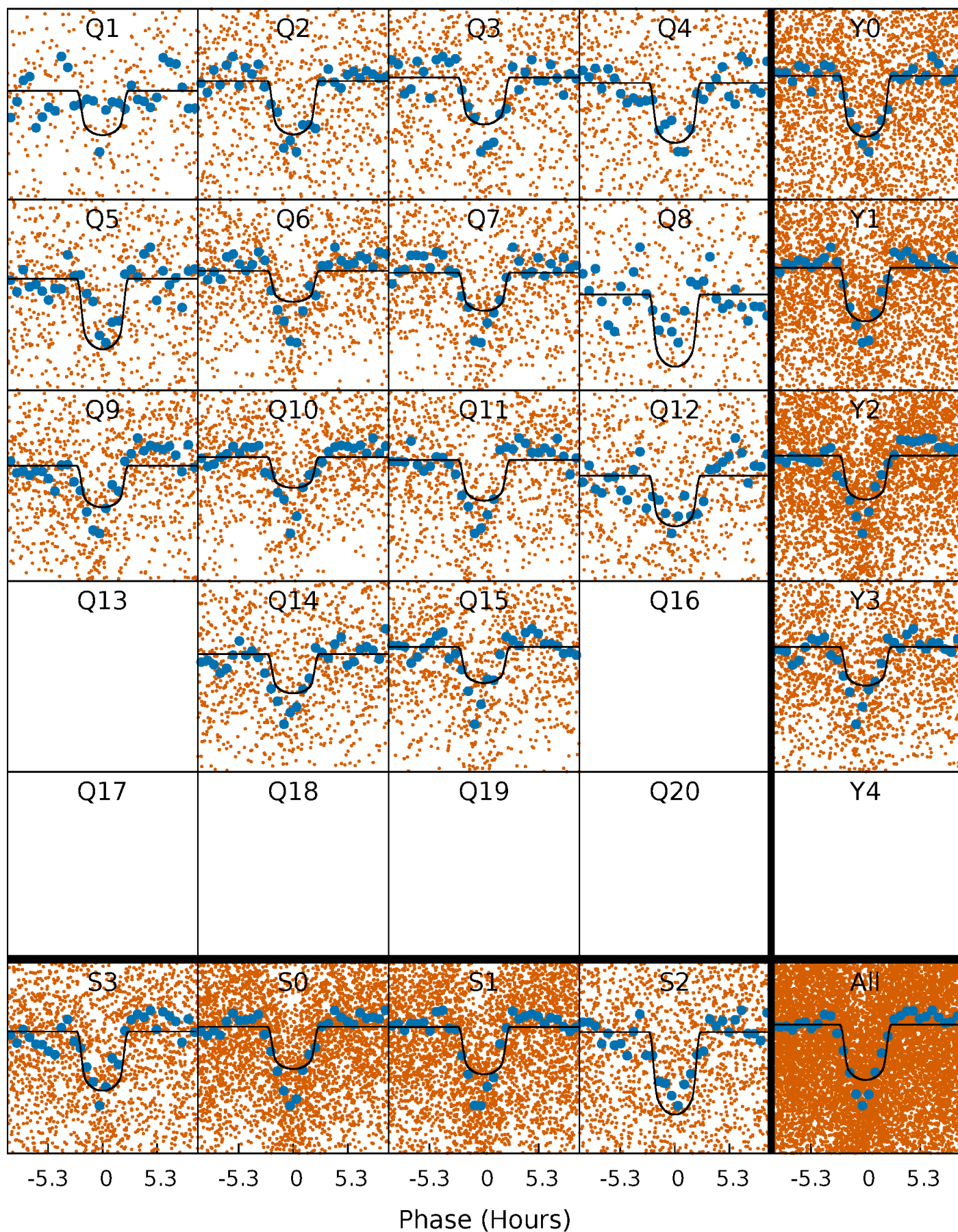
TCE 003439096-01 P= 2.976105 Days  $T_0=132.960651$  (BKJD)





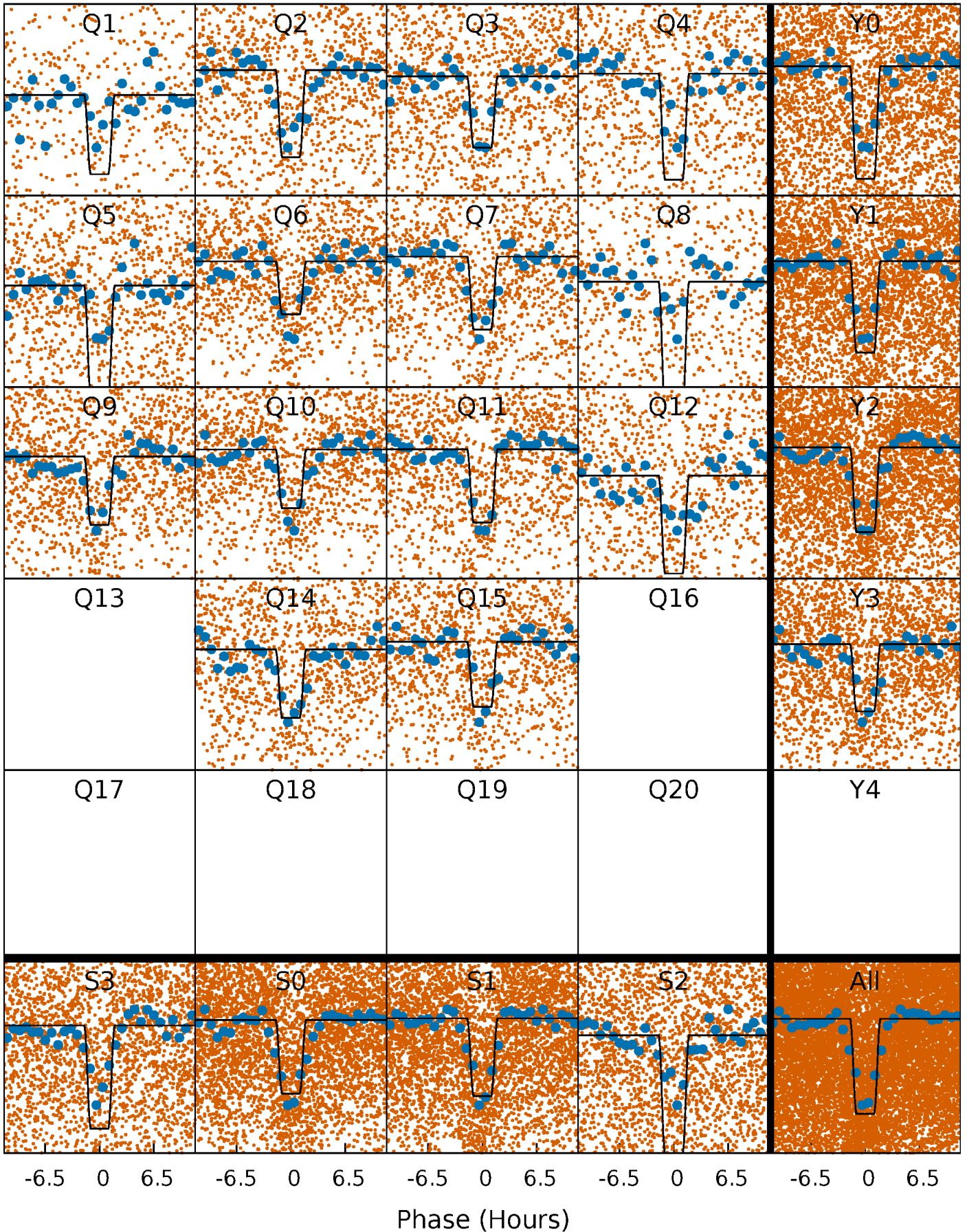
# DV Quarter-Phased Transit Curves

TCE 003439096-01 P= 2.976105 Days  $T_0=132.960651$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

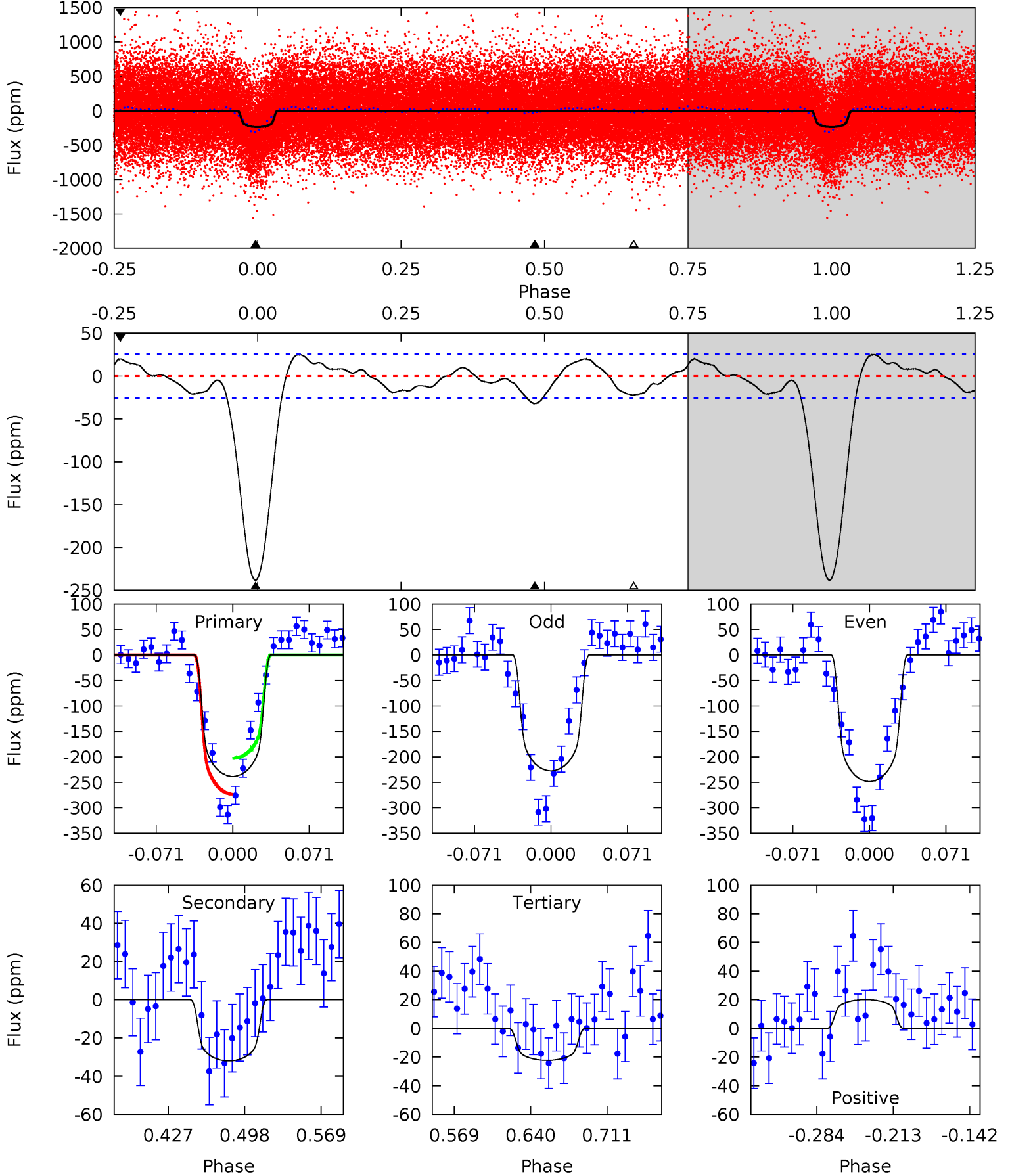
TCE 003439096-01 P= 2.975994 Days  $T_0=132.975392$  (BKJD)



# DV Model-Shift Uniqueness Test

003439096-01, P = 2.976105 Days, E = 129.984546 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
42.7	5.74	3.99	3.61	4.64	1.80	2.28	38.8	39.1	1.75	2.14	1.89	1.03	0.10	6.31

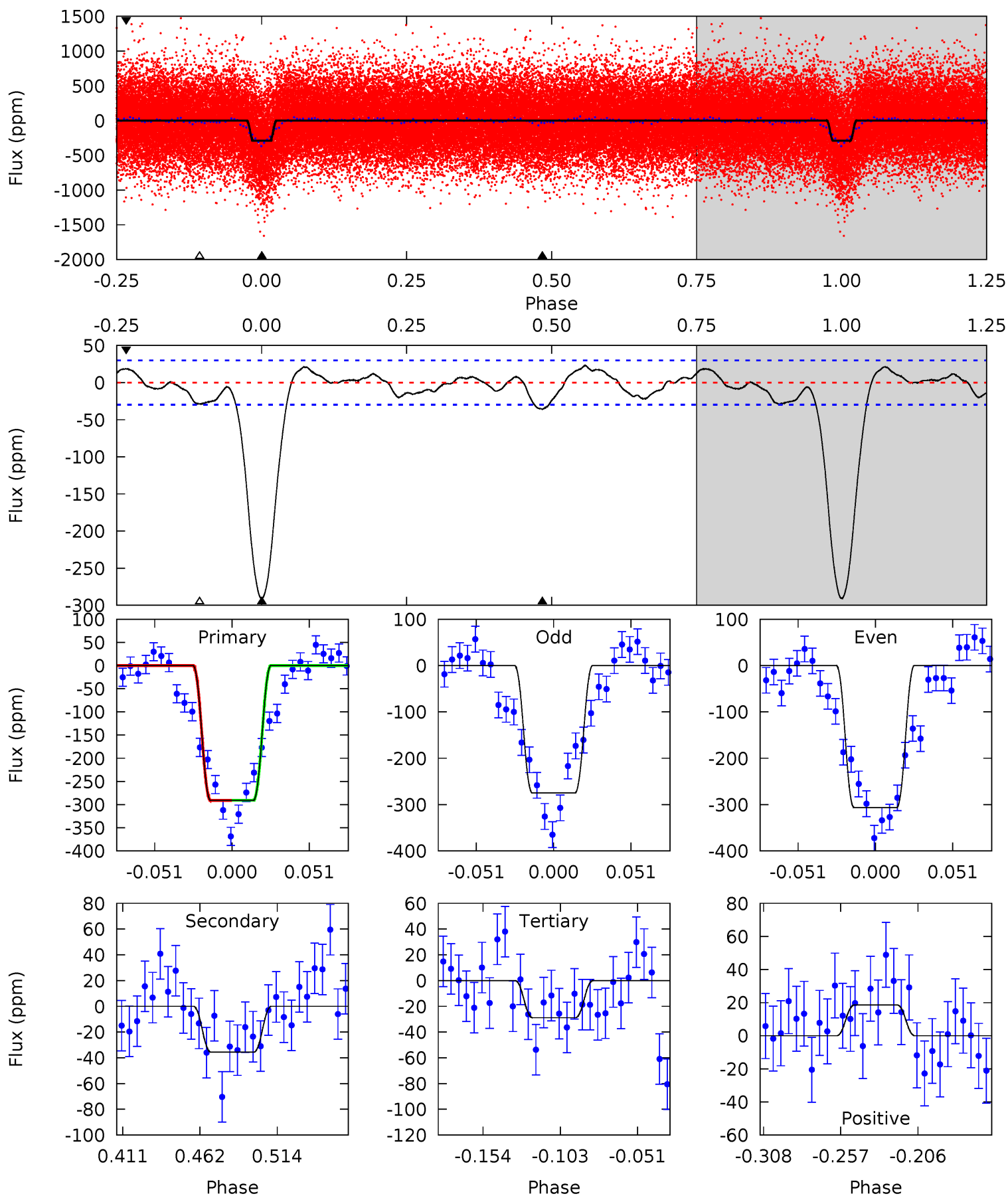




# Alt Model-Shift Uniqueness Test

003439096-01, P = 2.975994 Days, E = 129.999398 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
45.8	5.61	4.54	2.93	4.70	1.95	1.95	41.3	42.9	1.06	2.68	2.48	0.96	0.07	0.03





### Stellar Parameters For KIC 003439096

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5140^{+75}_{-175}$	$2.955^{+0.030}_{-0.030}$	$-0.320^{+0.200}_{-0.350}$	$7.746^{+0.231}_{-2.080}$	$1.975^{+0.099}_{-0.938}$	$0.006^{+0.002}_{-0.000}$
	+1%/-3%	+1%/-1%	+62%/-109%	+3%/-27%	+5%/-47%	+39%/-8%
Source	PHO1	AST9	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 003439096-01 / KOI 3509.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-32 \pm 6$	$13.84^{+1.26}_{-1.38}$	$3910^{+80}_{-151}$	$-2829^{+5029}_{-278}$	$0.240^{+0.068}_{-0.053}$
Alt.	$-36 \pm 6$	$16.13^{+1.29}_{-1.45}$	$3894^{+86}_{-121}$	$-3053^{+272}_{-174}$	$0.194^{+0.051}_{-0.040}$

$T_{max}$  = 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

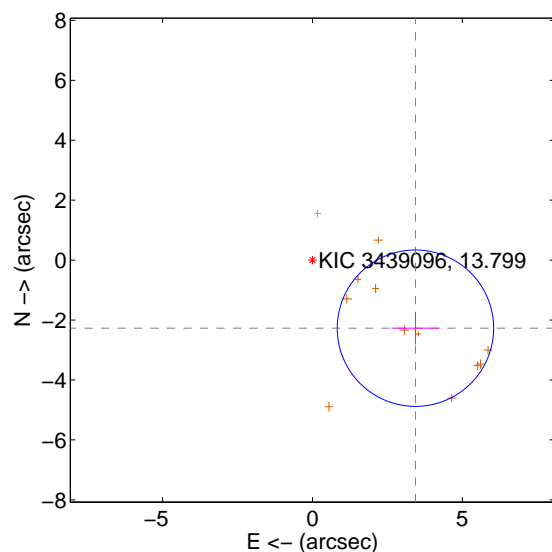
Supplemental centroid analysis for 003439096-01. Kepler magnitude: 13.80. Transit SNR 18.80

There are 1 quarters with good PRF difference image offsets

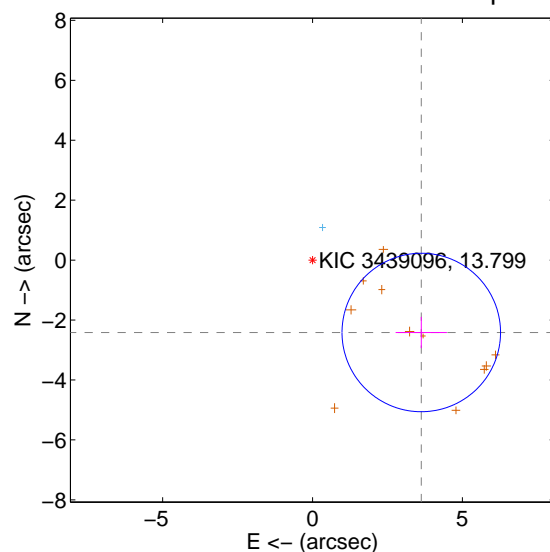
The direct PRF centroid is offset from the target star catalog position by about 0.29 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$4.120 \pm 0.870$	4.74	$-3.437 \pm 0.803$	$-2.272 \pm 0.545$
PRF-fit source offset from KIC position	$4.359 \pm 0.881$	4.95	$-3.629 \pm 0.857$	$-2.415 \pm 0.523$
photometric centroid source offset	$2.43 \pm 0.29$	8.42	$-1.84 \pm 0.28$	$-1.58 \pm 0.29$

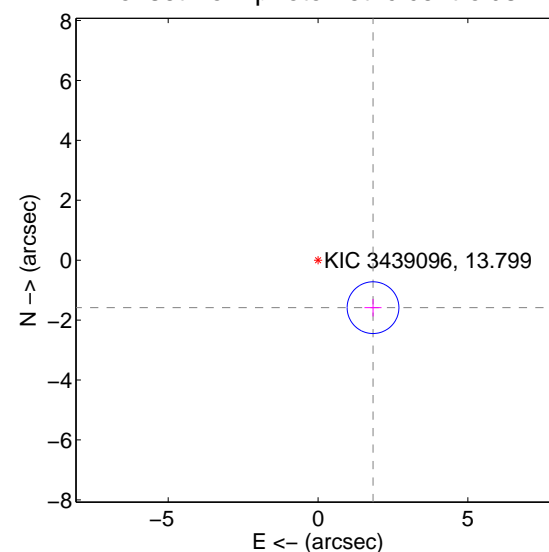
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

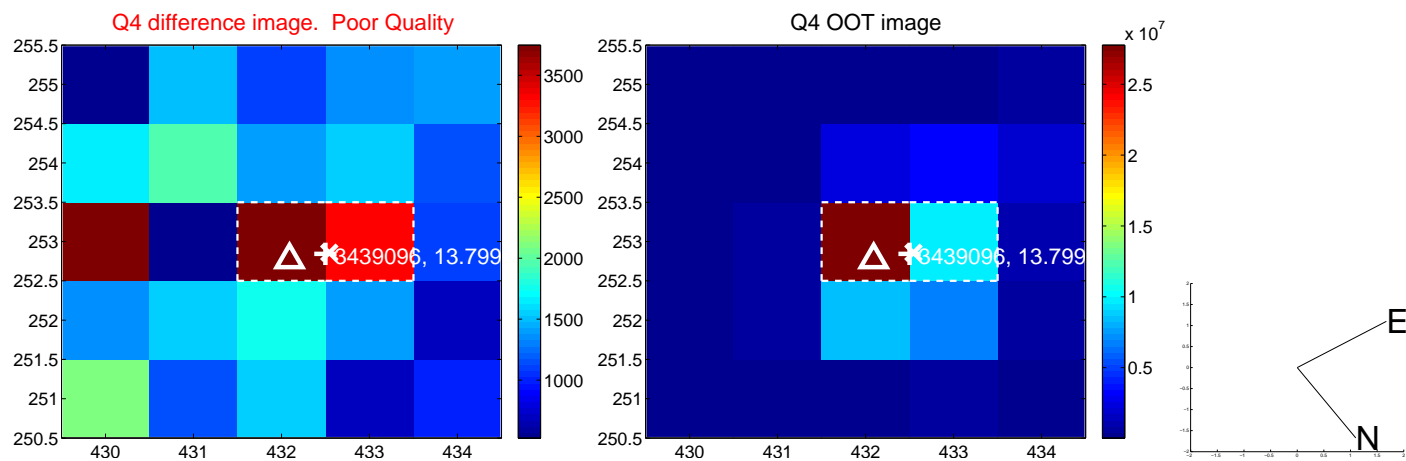
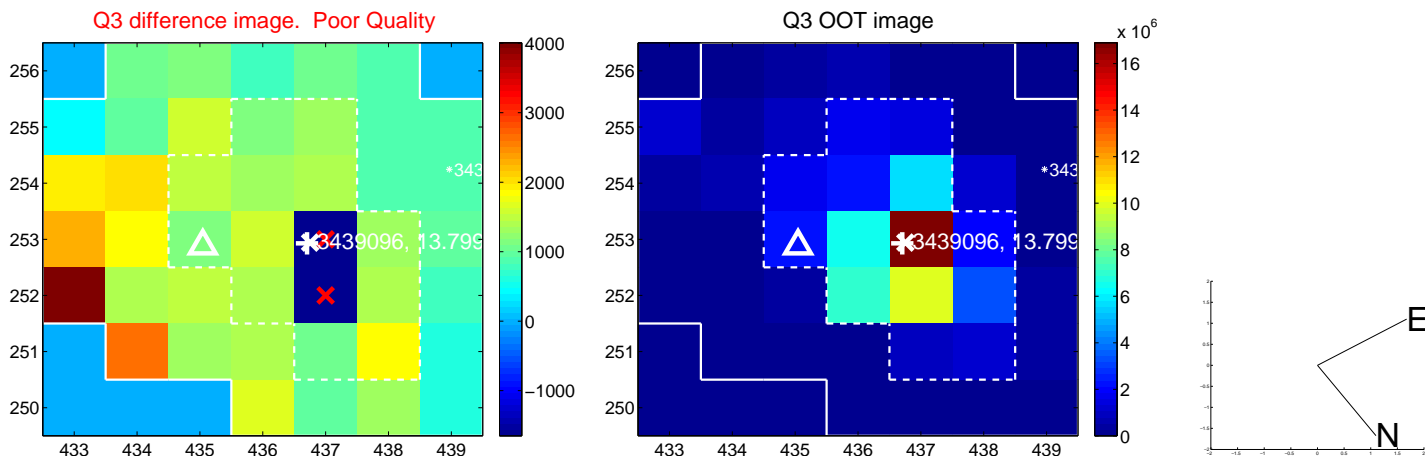
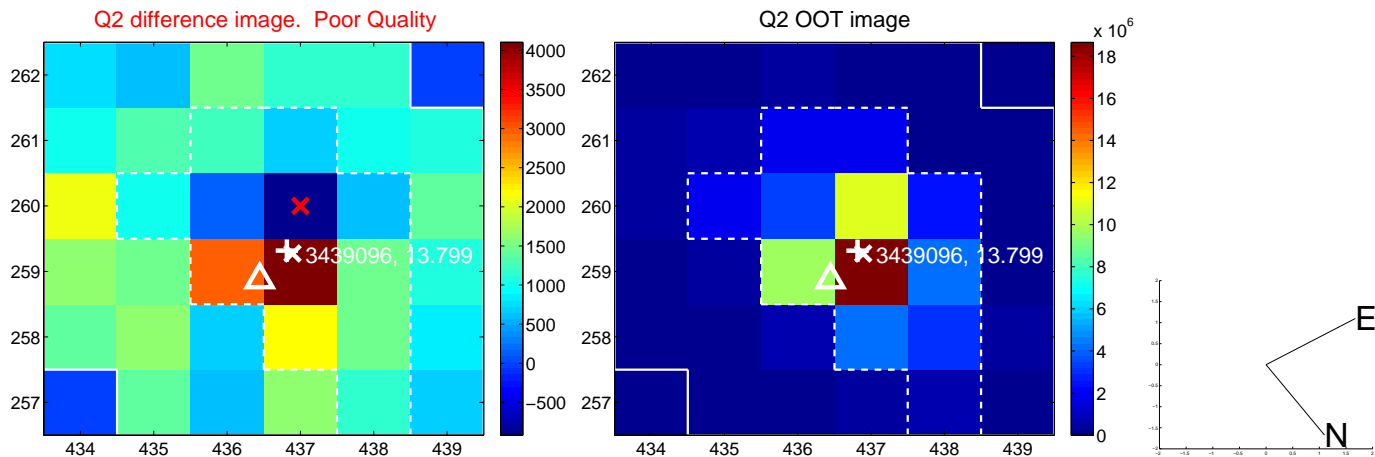
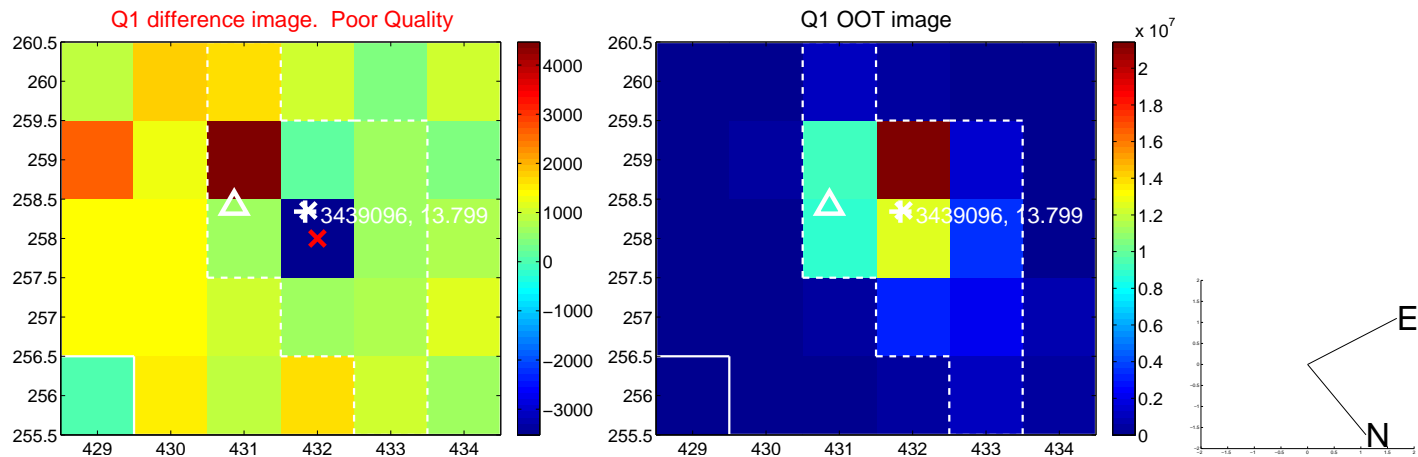


offset from photometric centroids

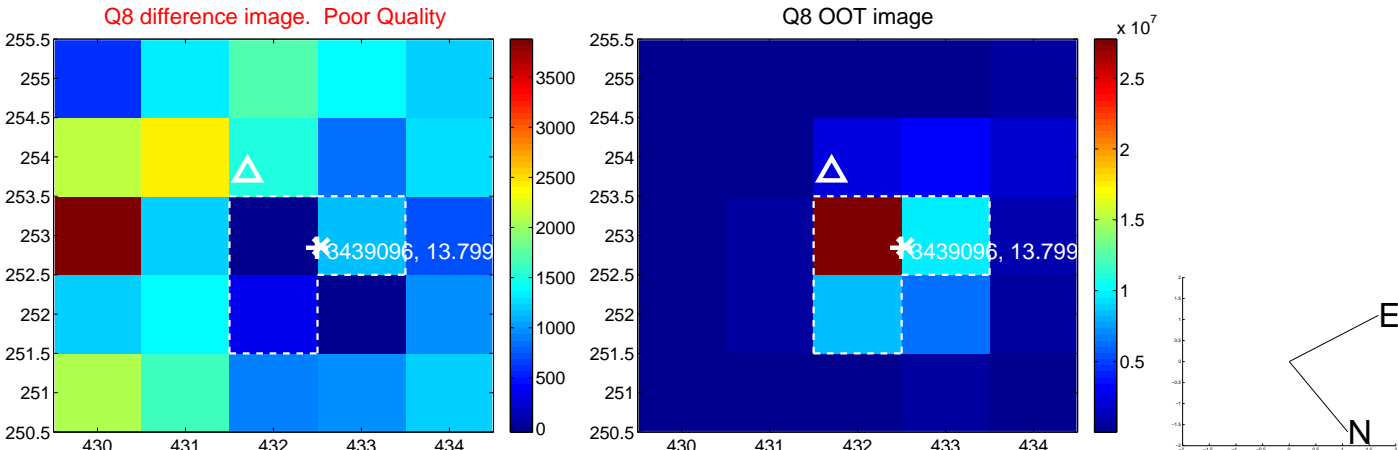
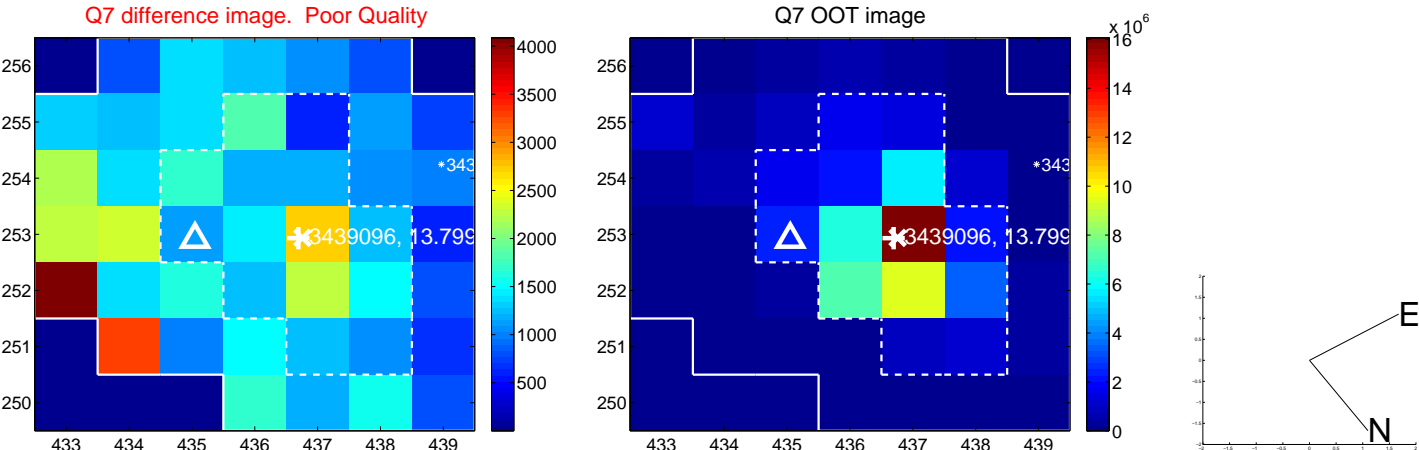
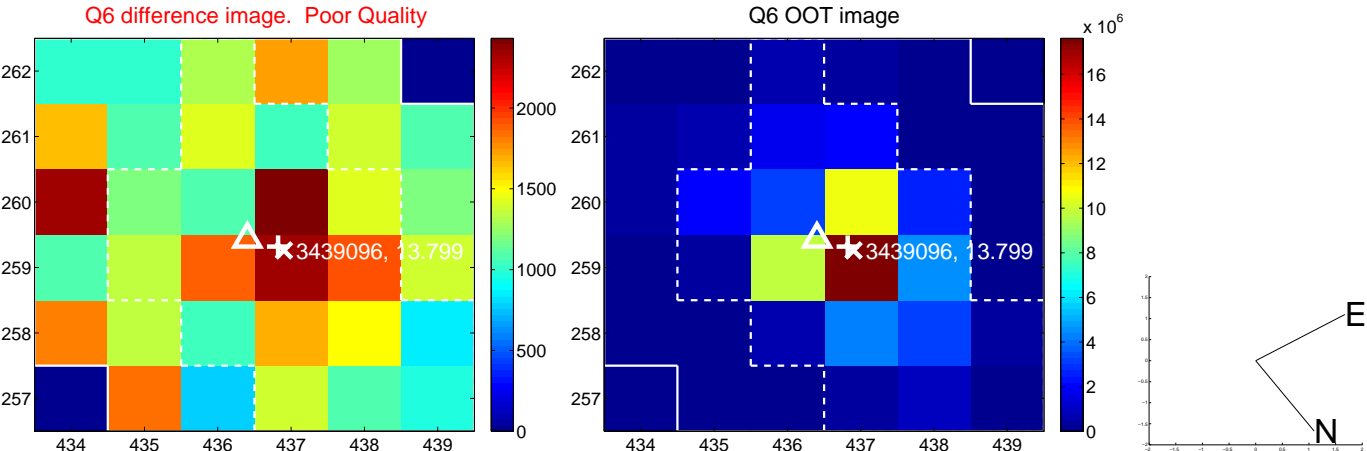
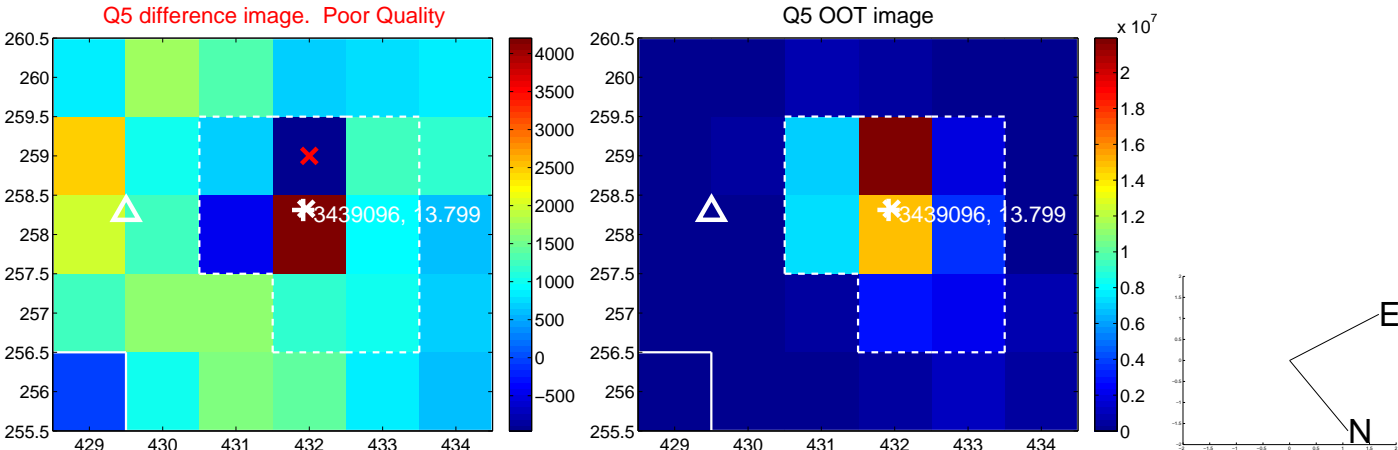


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

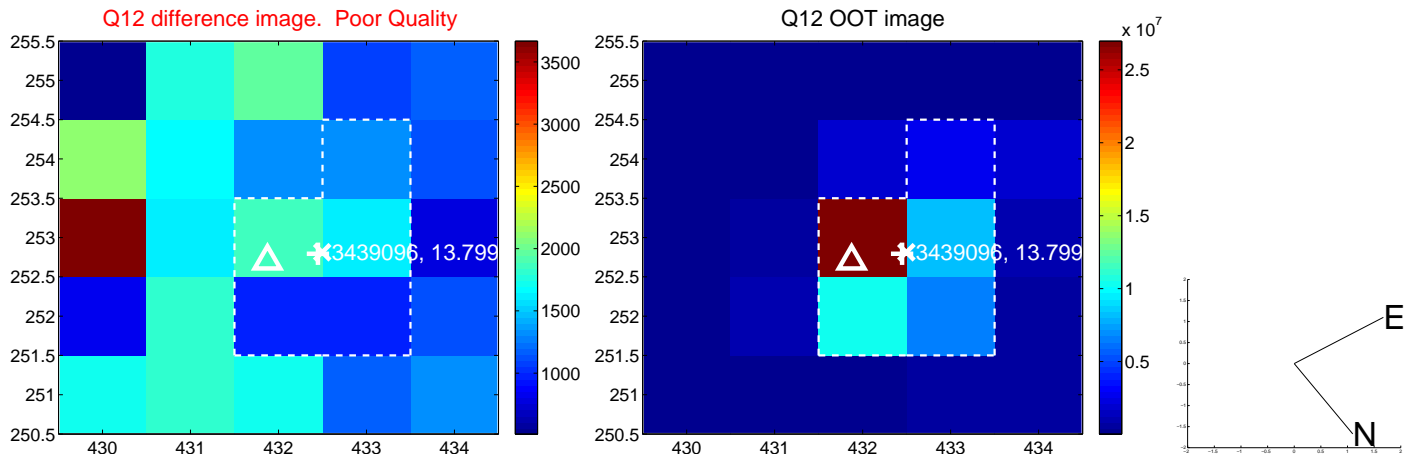
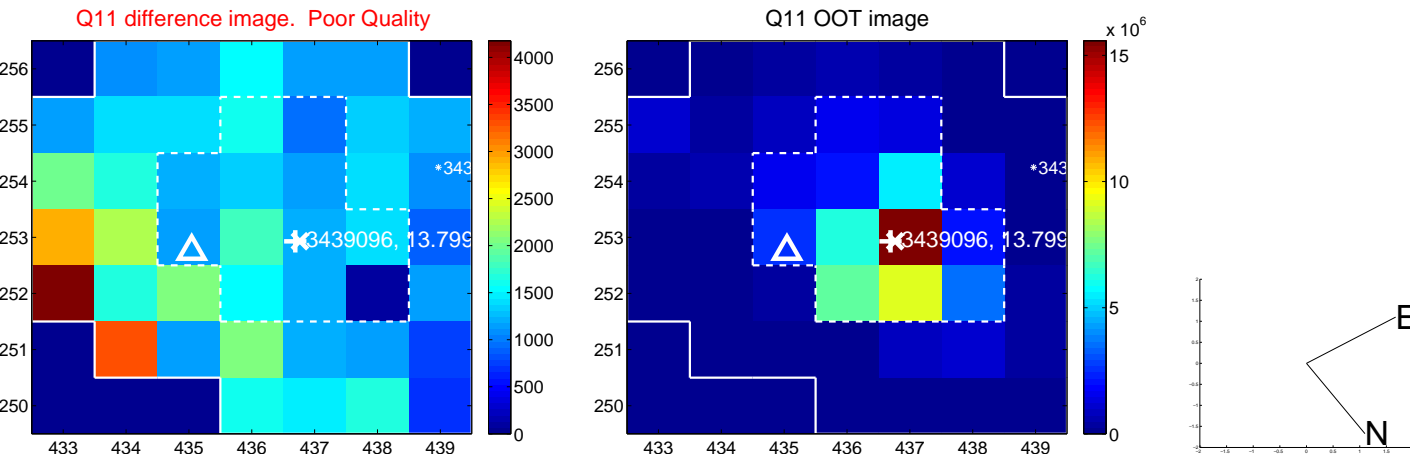
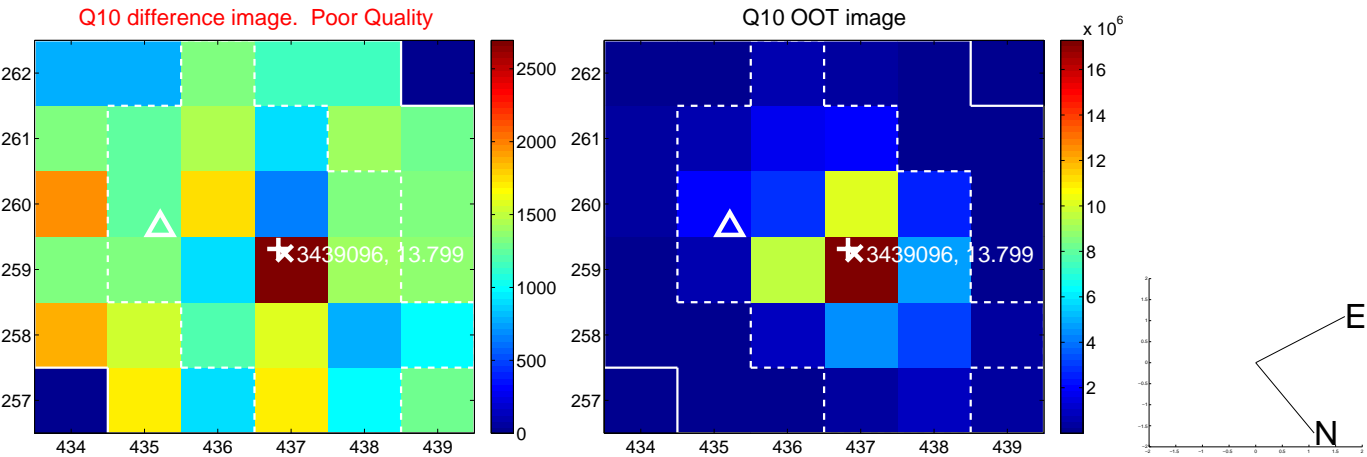
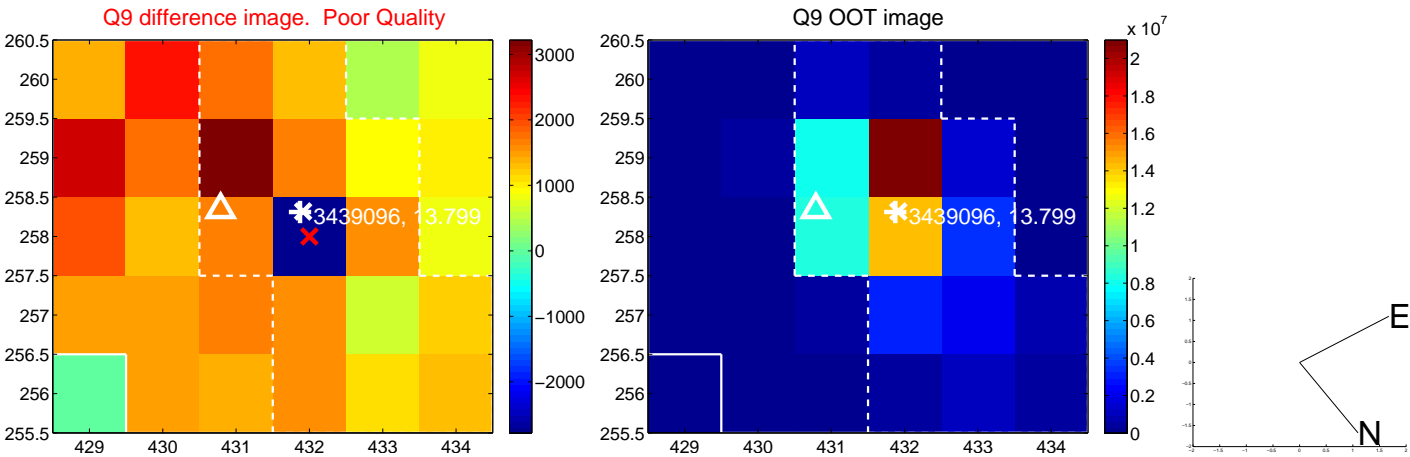


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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

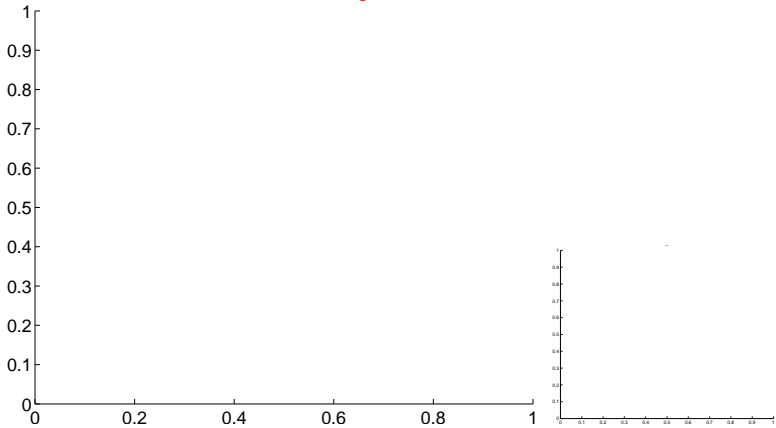


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

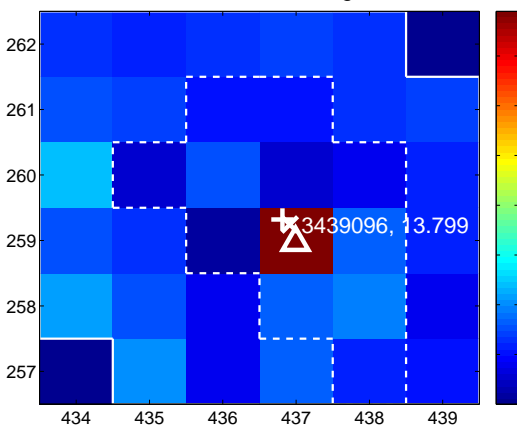
Q13 no difference image



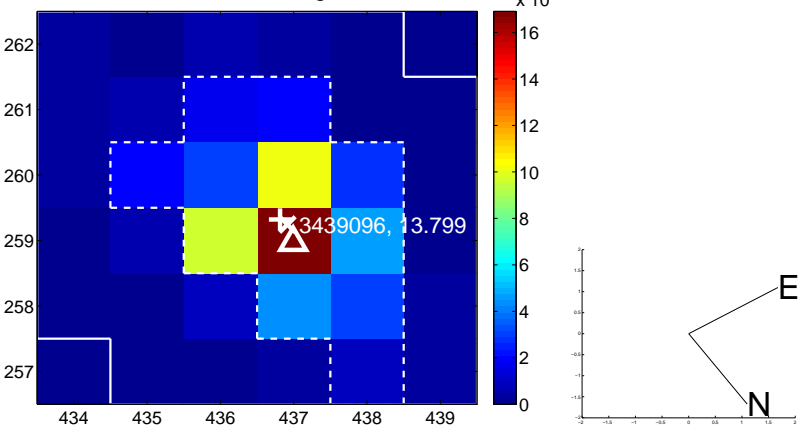
Q13 no OOT image



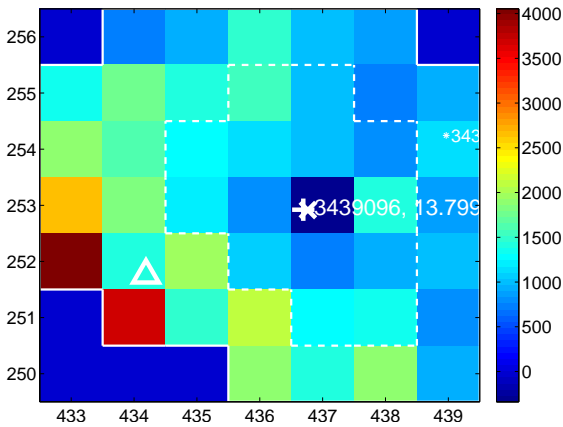
Q14 difference image



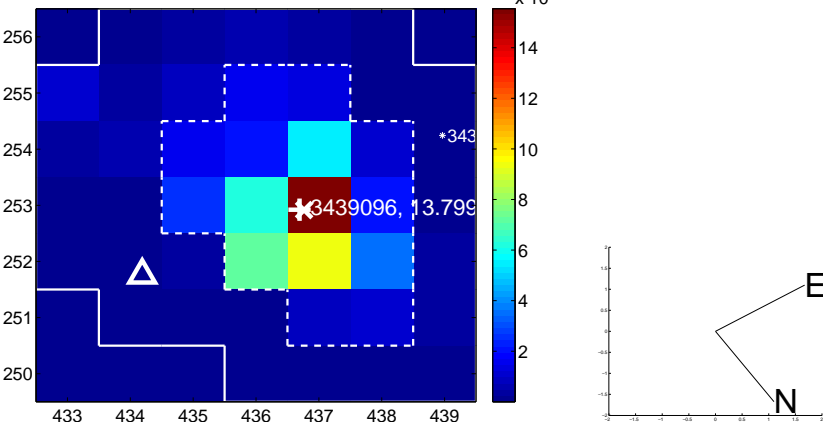
Q14 OOT image



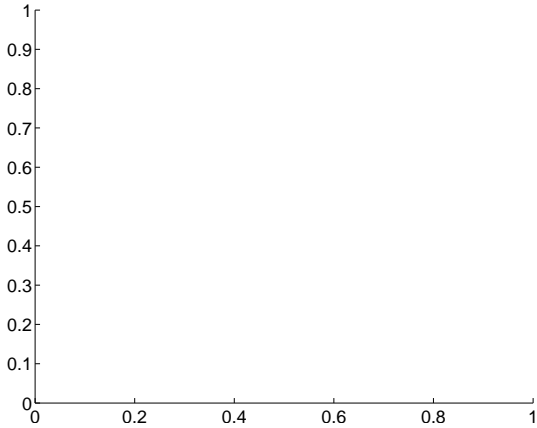
Q15 difference image. Poor Quality



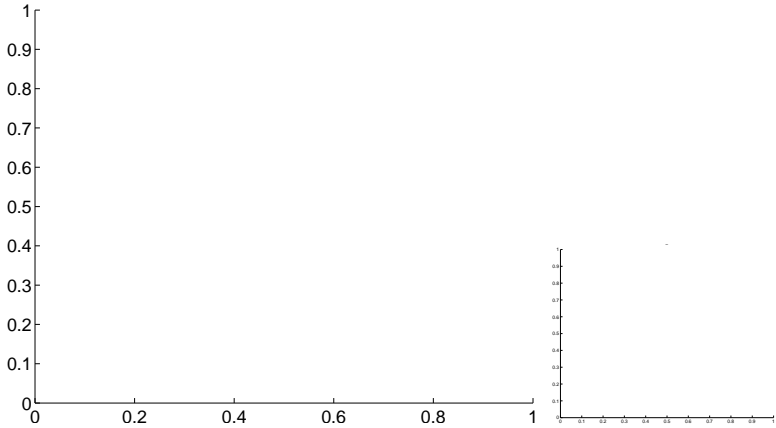
Q15 OOT image



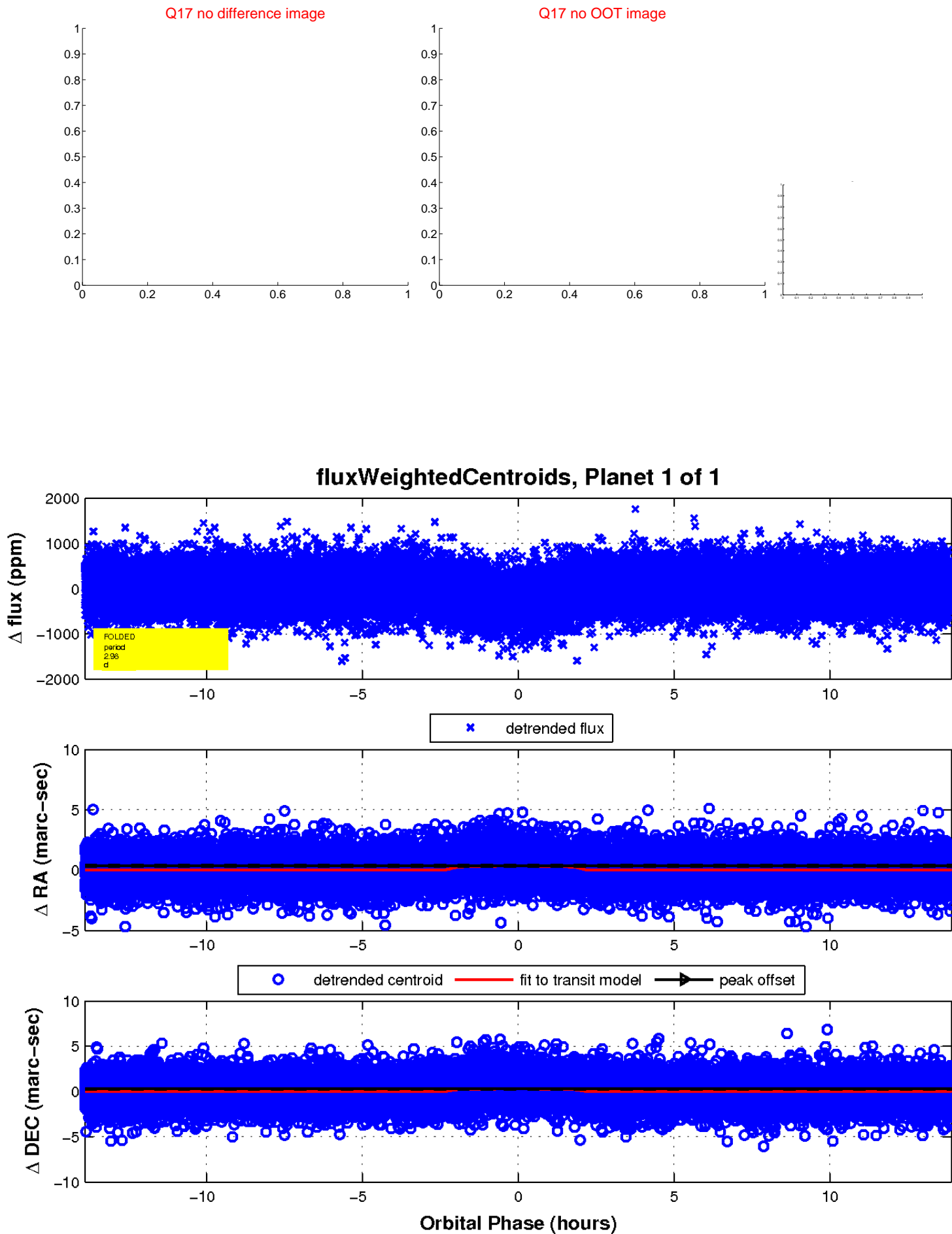
Q16 no difference image



Q16 no OOT image



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



UKIRT Image

Declination

