

# KIC 009640985

## Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	R <sub>★</sub> (R <sub>☉</sub> )	T <sub>★</sub> (K)	R <sub>p</sub> (R <sub>⊕</sub> )	S <sub>p</sub> (S <sub>⊕</sub> )
009640985-01	OBS	0713.01	2.178111	132.037793	225.4	2.174	51.9	55.7	1.25	6820	2.20	2466.74

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009640985-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_ALT—CENT_RESOLVED_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 009640985-01

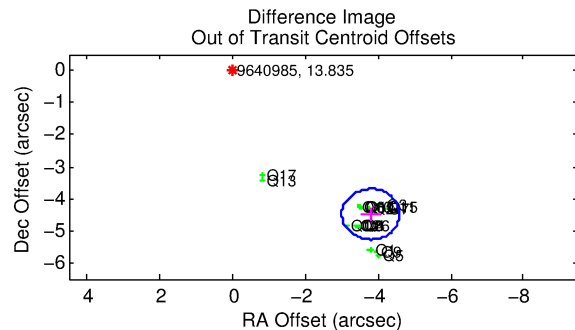
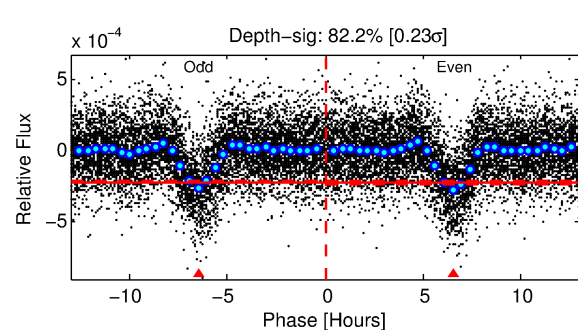
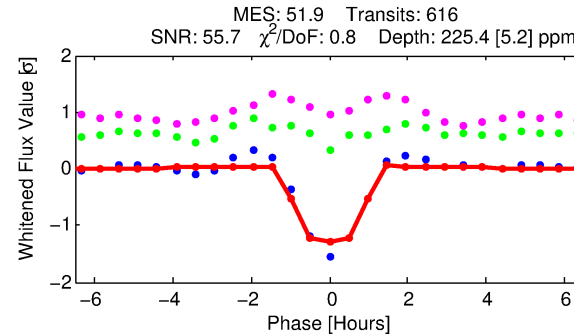
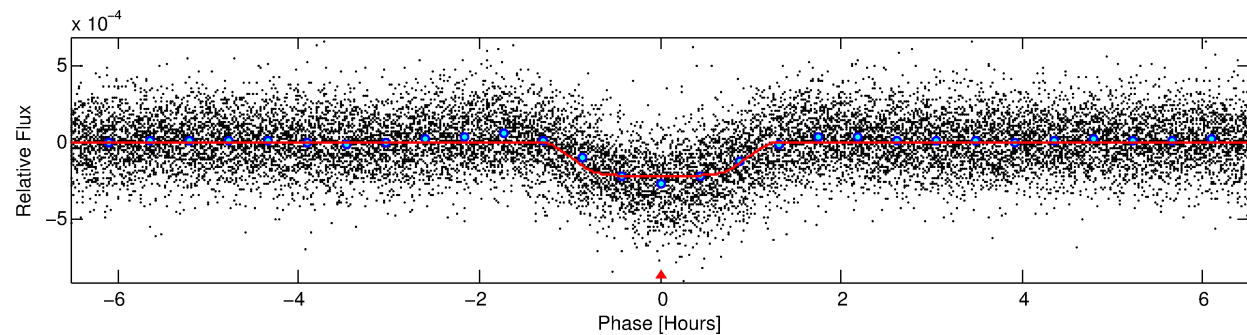
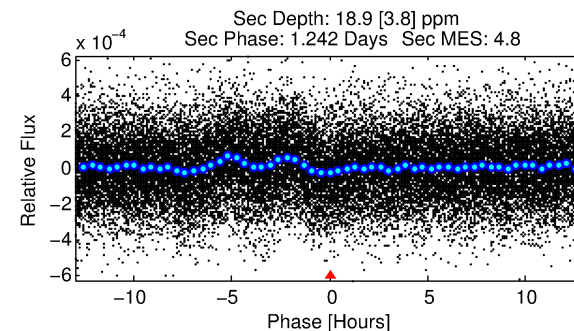
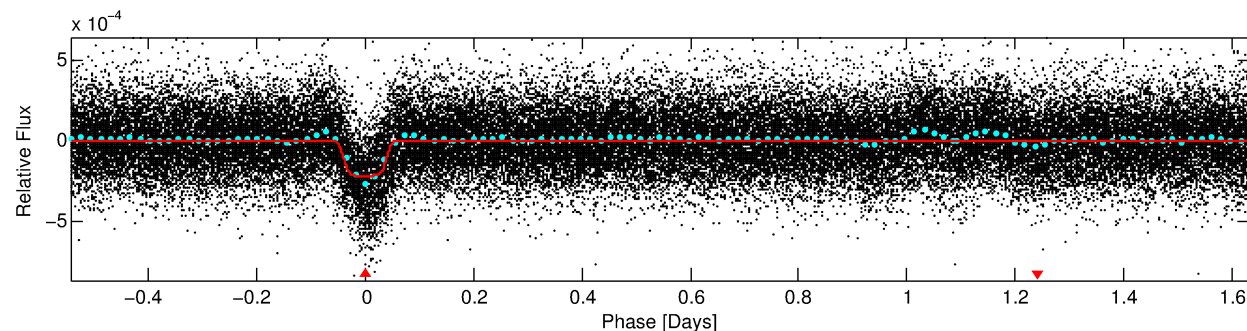
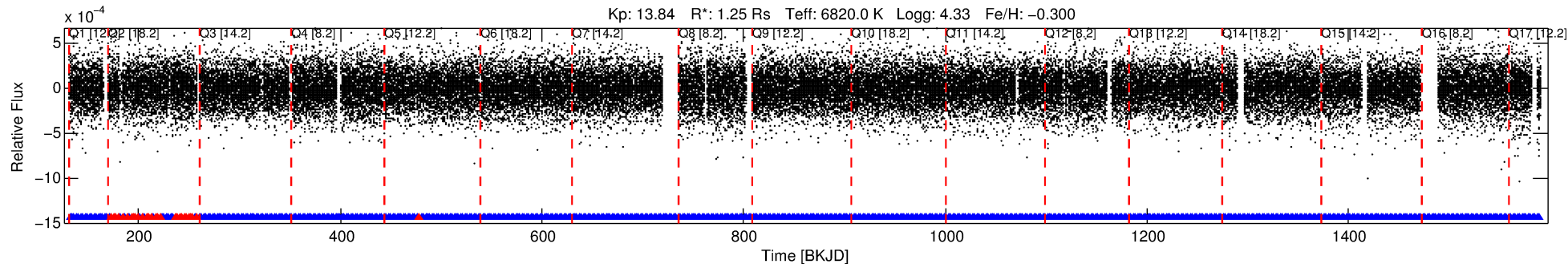
TCE (1)	KIC	Parent (2)	Parent KIC	P <sub>1</sub> :P <sub>2</sub>	Dist (″)	ΔRow	ΔCol	m <sub>2</sub>	m <sub>1</sub>	D <sub>2</sub> /D <sub>1</sub>	Mechanism	Flag	σ <sub>P</sub>	σ <sub>T</sub>
009640985-01	9640985	FL-Lyr-pri	9641031	1:1	63.1	13	-9	9.18	13.84	1933.60	Direct-PRF	0	1.37	0.89

**Notes:** P<sub>1</sub>:P<sub>2</sub> is the period ratio. Dist is the distance in arcseconds. ΔRow and ΔCol are the number of pixels apart in row and column. m<sub>2</sub> and m<sub>1</sub> are the magnitudes of the parent and child. D<sub>2</sub>/D<sub>1</sub> is the parent's transit depth divided by the child's. σ<sub>P</sub> and σ<sub>T</sub> are the significance of the match in period and epoch. For a match to be considered significant σ<sub>P</sub> < 5.0 and σ<sub>T</sub> < 5.0. Matches which have σ<sub>P</sub> and σ<sub>T</sub> very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

KIC: 9640985 Candidate: 1 of 1 Period: 2.178 d  
KOI: K00713.01 Corr: 0.789

Kp: 13.84 R\*: 1.25 Rs Teff: 6820.0 K Logg: 4.33 Fe/H: -0.300



## DV Fit Results:

Period = 2.17811 [0.00000] d  
Epoch = 132.0378 [0.0006] BKJD  
Rp/R\* = 0.0161 [0.0014]  
a/R\* = 3.70 [1.74]  
b = 0.90 [0.11]  
Seff = 2466.74 [996.39]  
Teq = 1797 [181] K  
Rp = 2.20 [0.76] Re  
a = 0.0352 [0.0094] AU  
Ag = 2.67 [1.22] [1.37σ]  
Teffp = 3550 [270] K [5.38σ]

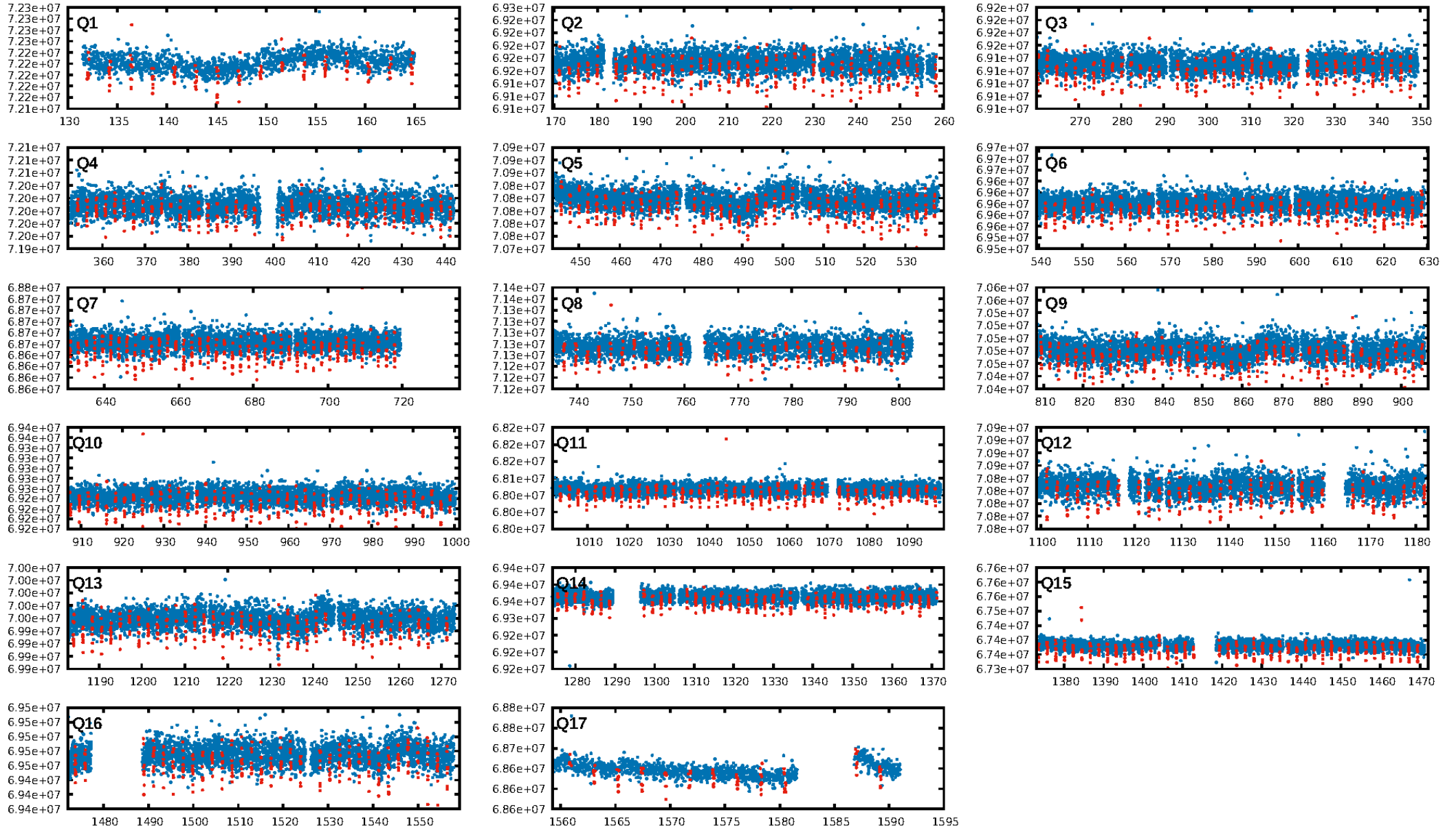
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.95 [560/588]  
GhostDiagnostic-chr: -0.03082  
Centroid-sig: 0.0%  
Centroid-so: 10.365 arcsec [45.70σ]  
OotOffset-rm: 5.874 arcsec [22.28σ]  
KicOffset-rm: 5.773 arcsec [22.36σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.00 [0/17]  
DiffImageOverlap-fno: 1.00 [17/17]

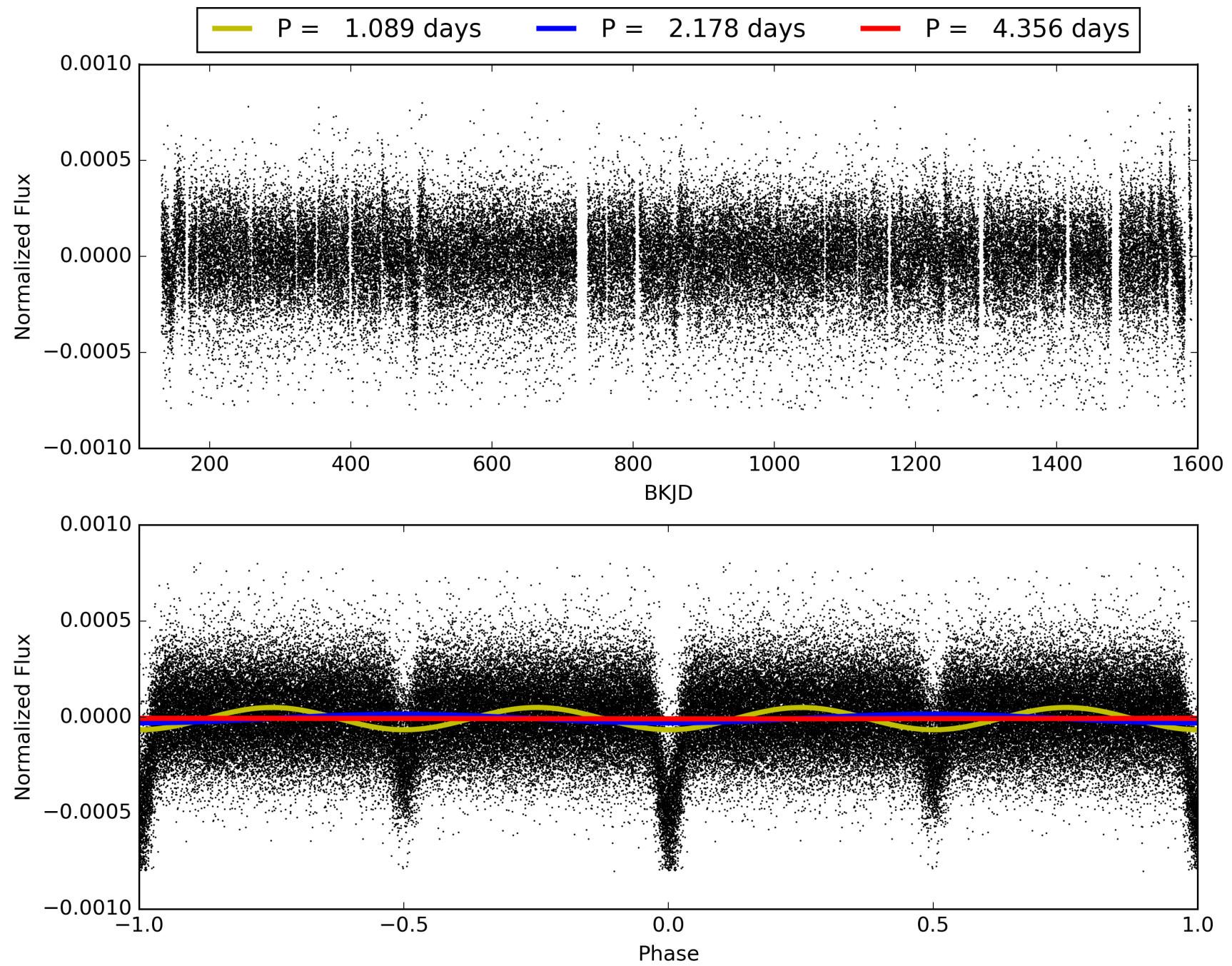
Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 00:42:43 Z

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

# TCE 009640985-01, PDC Light Curves

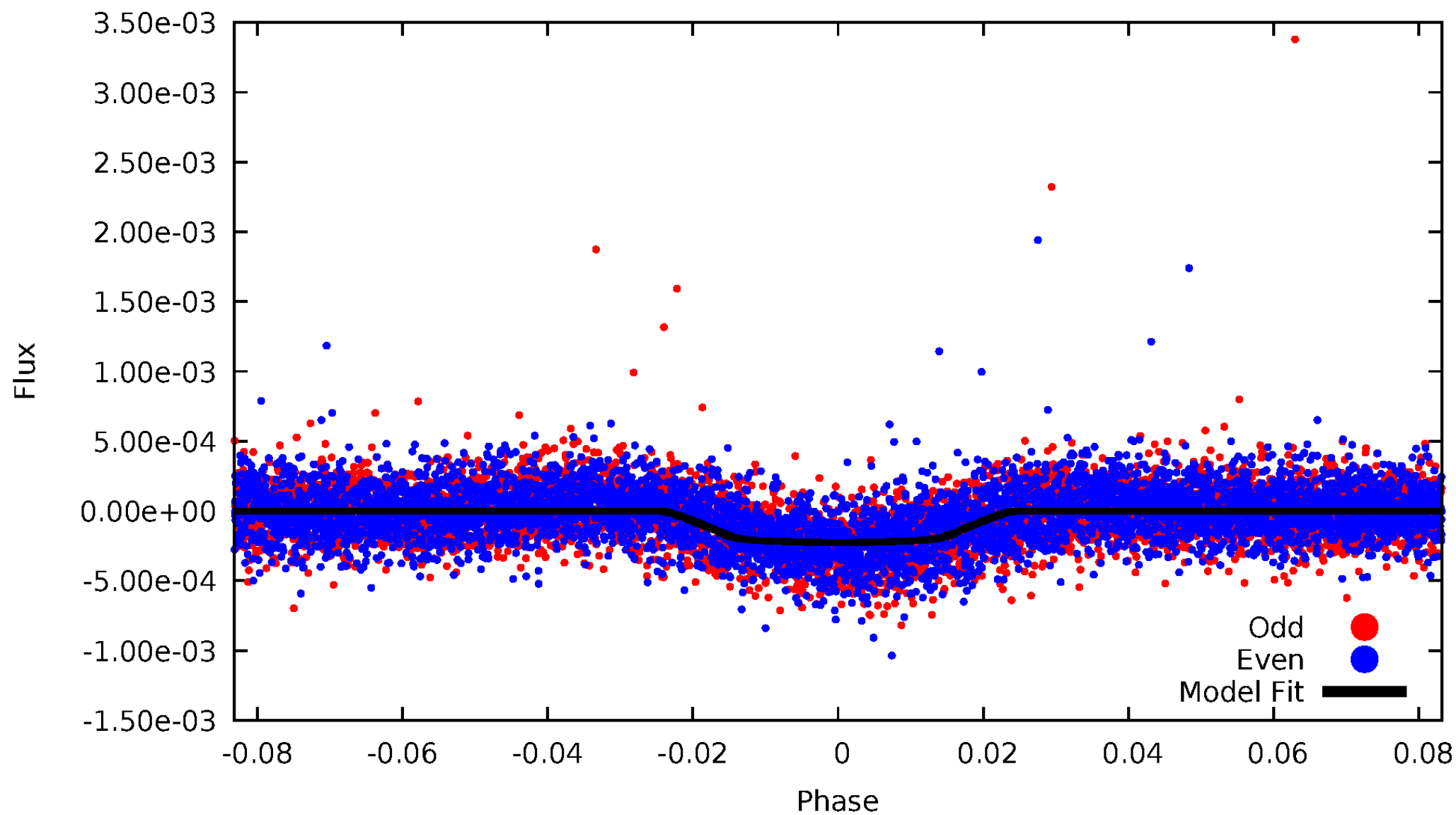


TCE 009640985-01



# DV Odd/Even

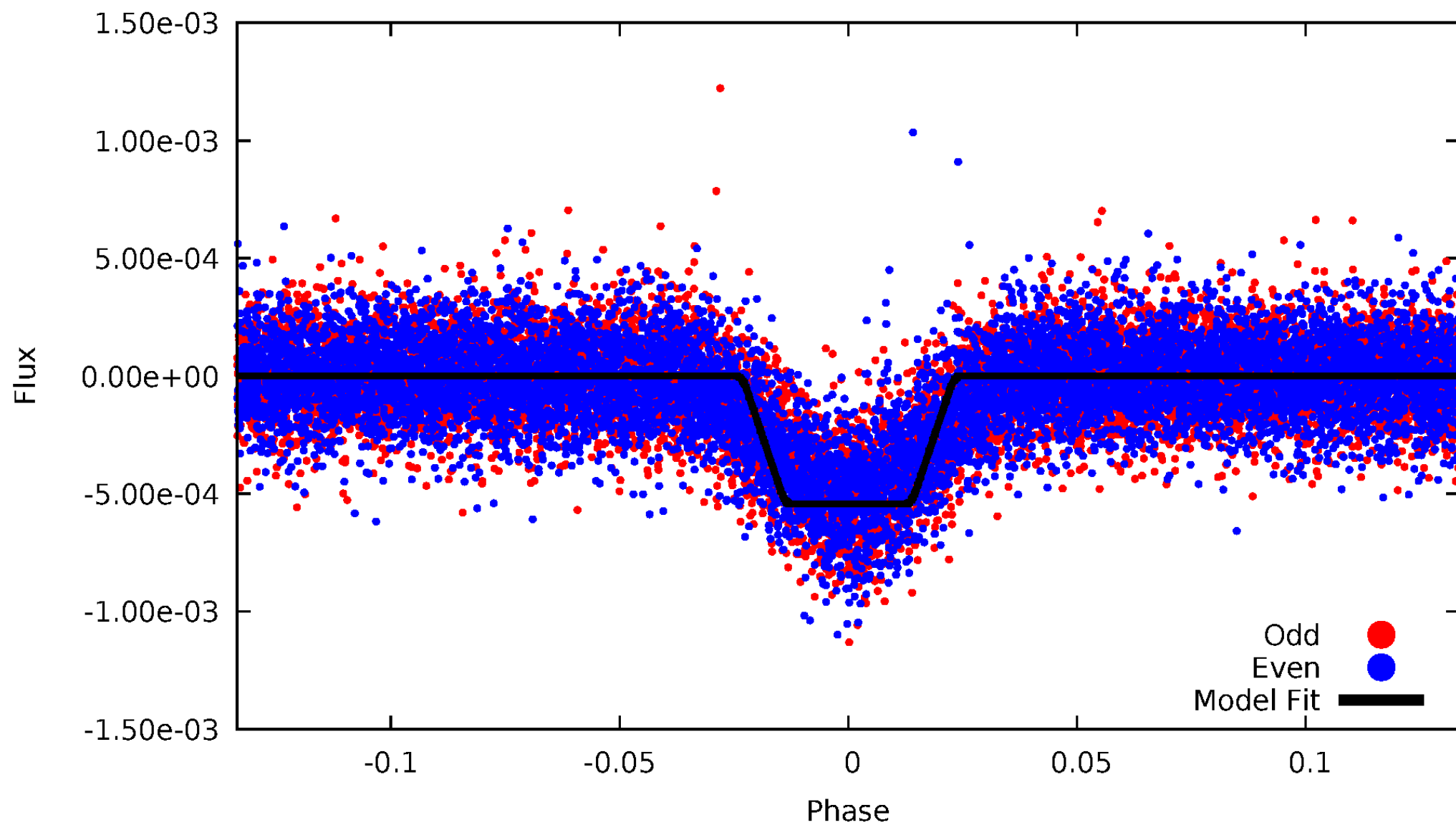
TCE 009640985-01





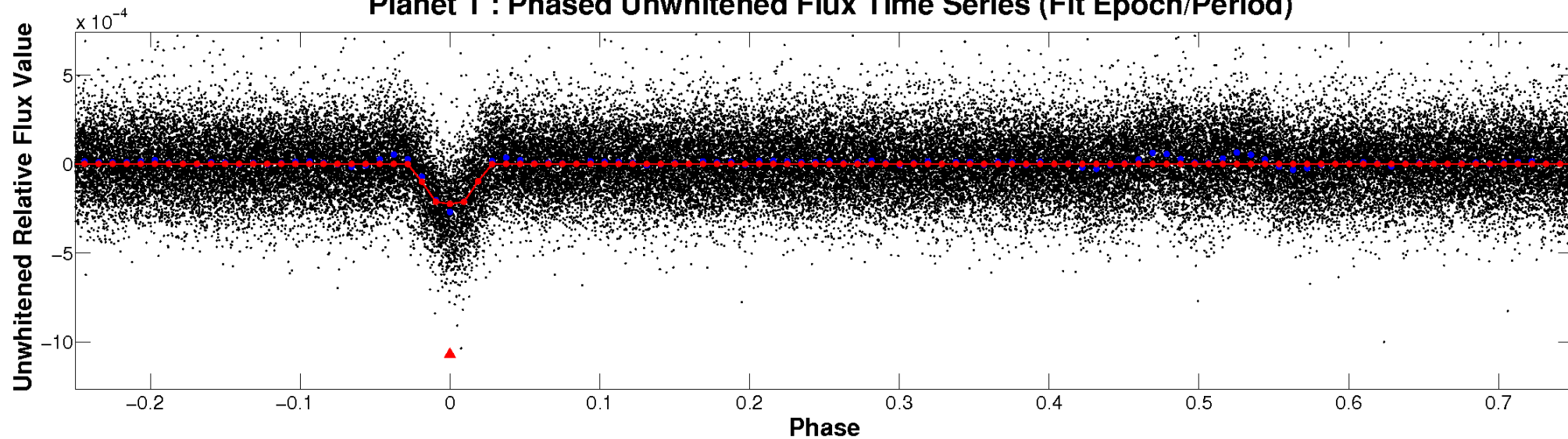
# ALT Odd/Even

TCE 009640985-01

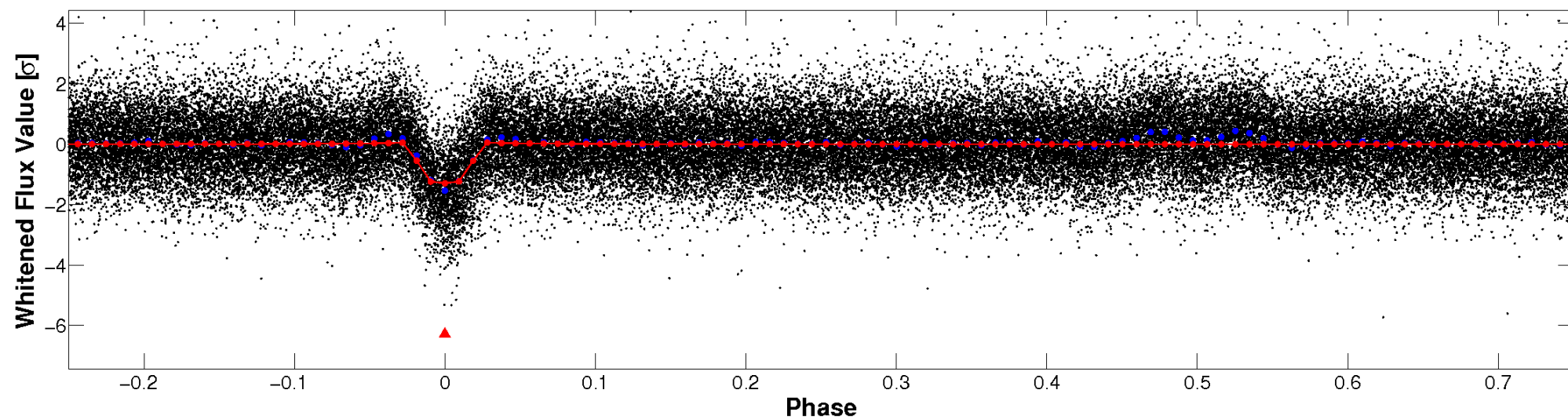


# Non-Whitened Vs. Whitened Light Curve

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

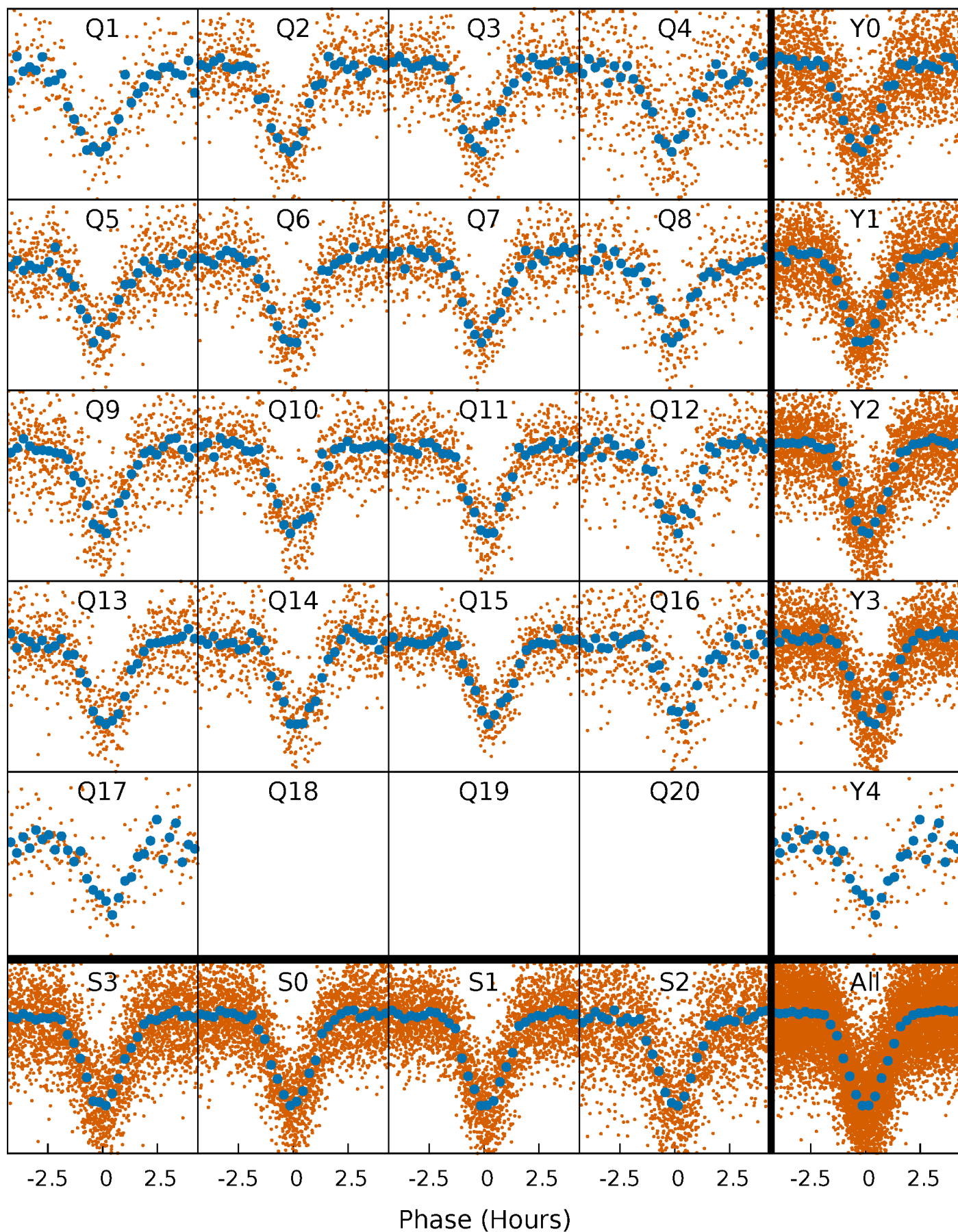


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

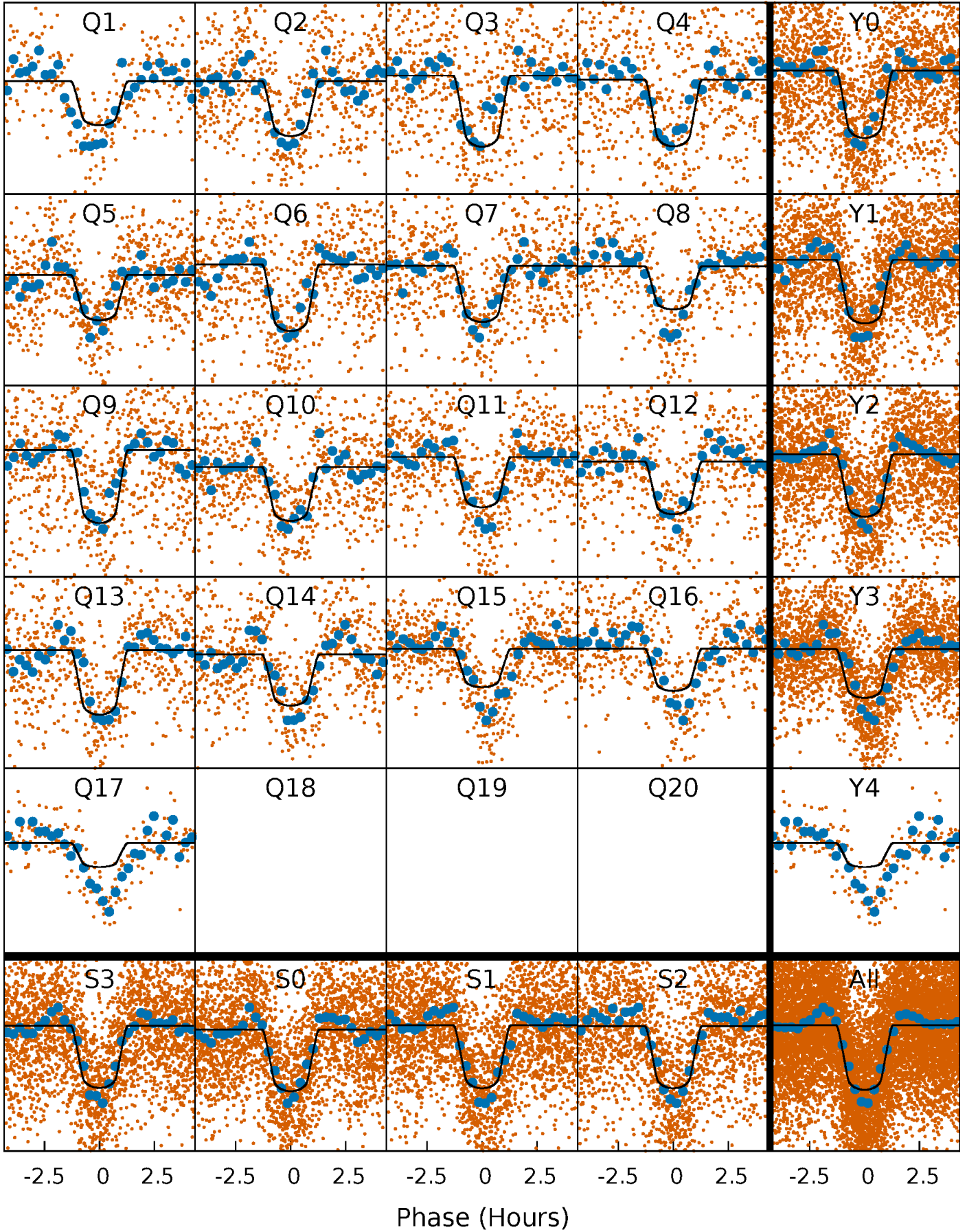
TCE 009640985-01 P= 2.178111 Days  $T_0=132.037793$  (BKJD)





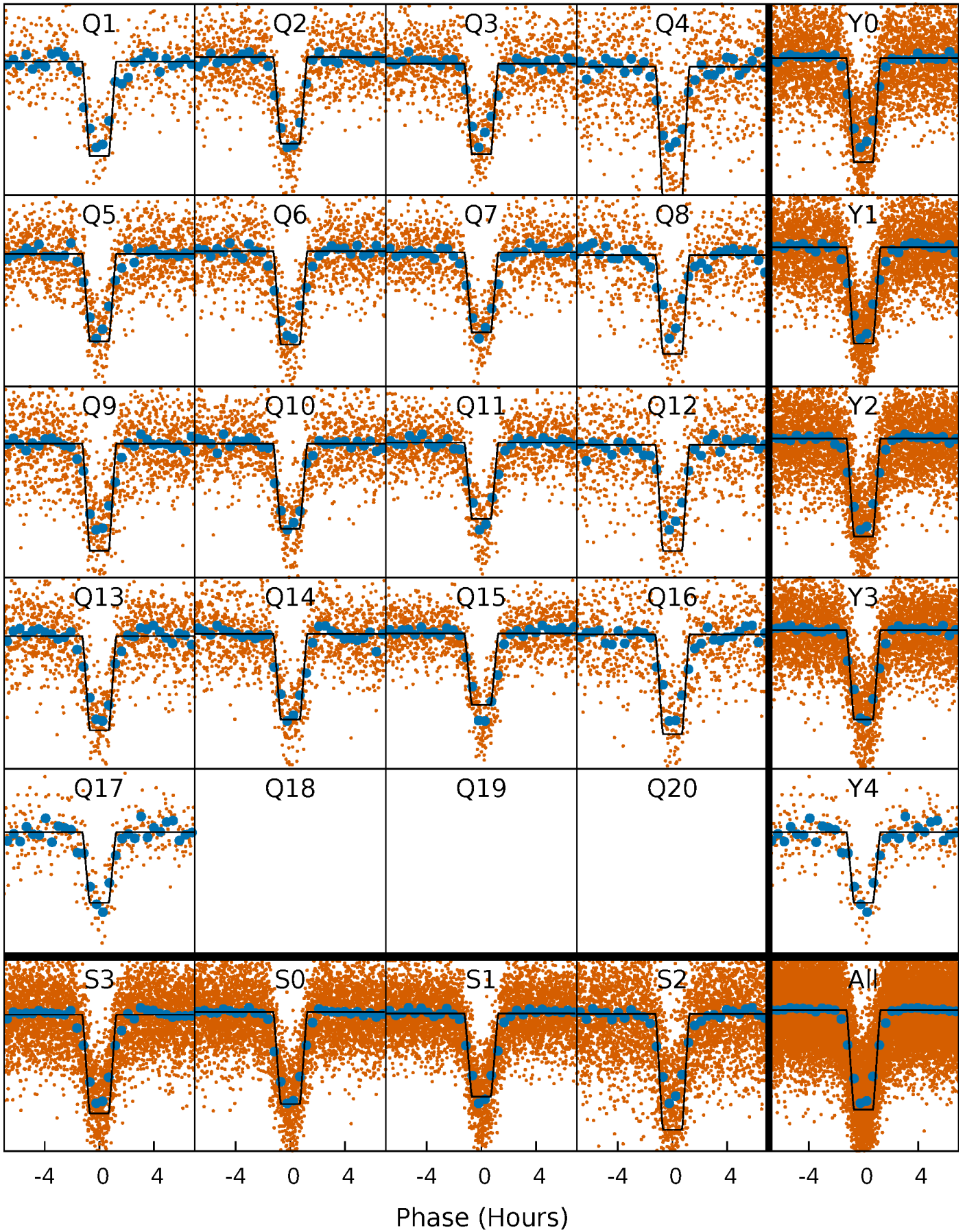
# DV Quarter-Phased Transit Curves

TCE 009640985-01 P= 2.178111 Days  $T_0=132.037793$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

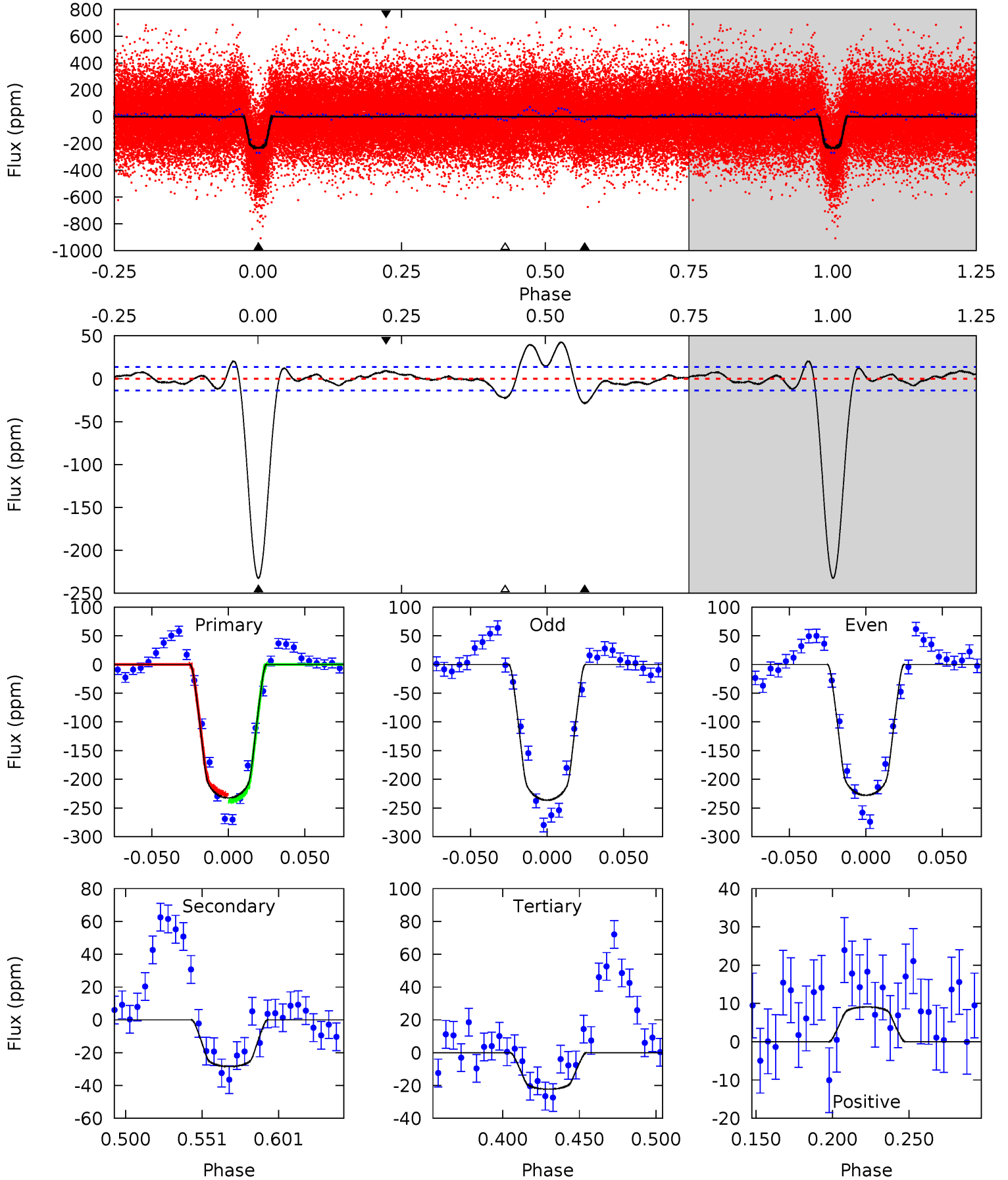
TCE 009640985-01   P= 2.178142 Days    $T_0=132.028538$  (BKJD)



# DV Model-Shift Uniqueness Test

009640985-01, P = 2.178111 Days, E = 129.859682 Days

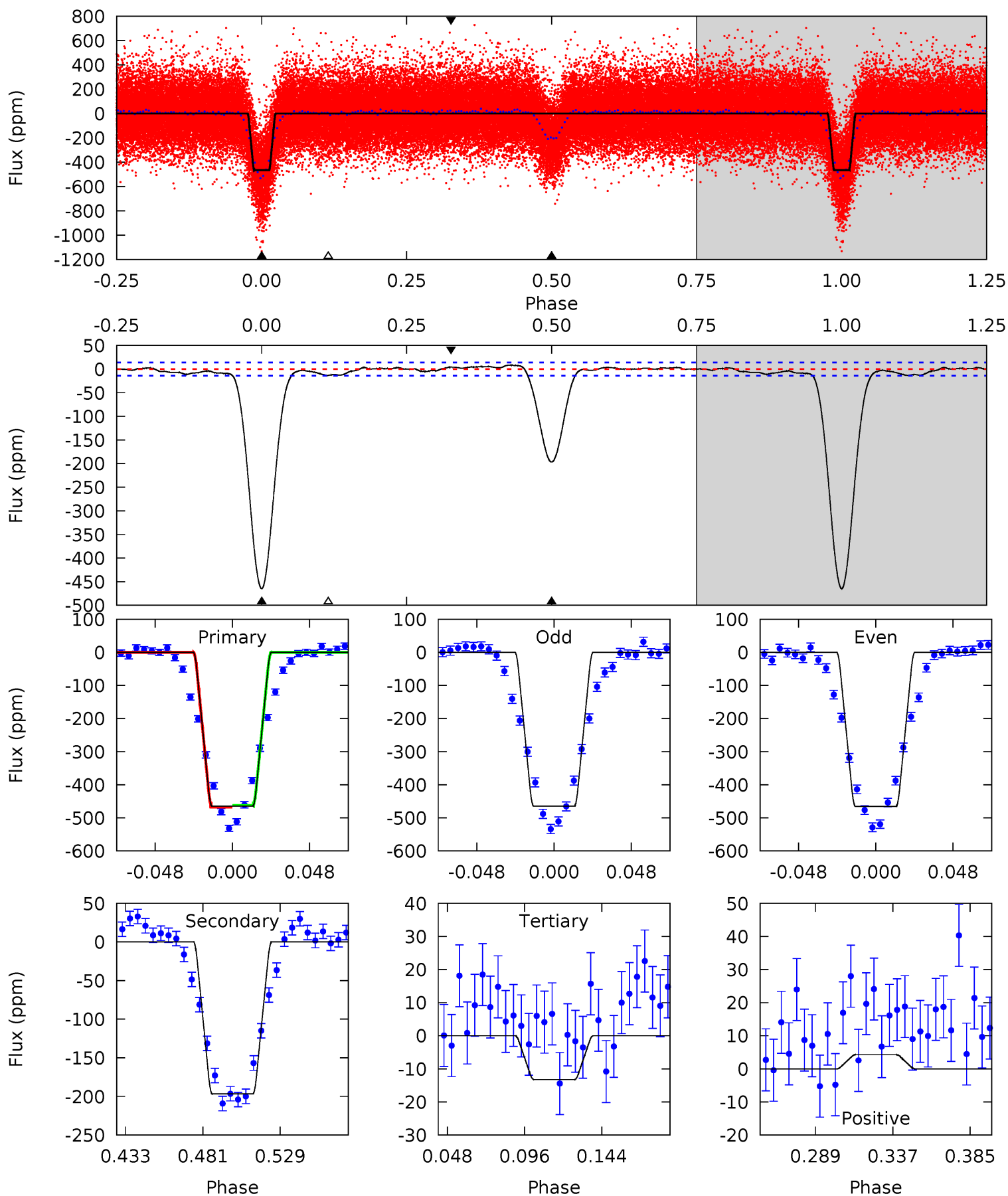
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
79.7	9.77	7.63	3.12	4.71	1.96	3.34	72.1	76.6	2.14	6.65	1.46	1.00	0.15	1.96



# Alt Model-Shift Uniqueness Test

009640985-01, P = 2.178142 Days, E = 129.850396 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
157.6	66.7	4.49	1.45	4.72	1.98	1.75	153.1	156.2	62.2	65.2	0.12	1.00	0.02	0.86



### Stellar Parameters For KIC 009640985

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6820^{+165}_{-260}$	$4.328^{+0.084}_{-0.196}$	$-0.300^{+0.250}_{-0.300}$	$1.254^{+0.418}_{-0.179}$	$1.227^{+0.189}_{-0.170}$	$0.876^{+0.322}_{-0.451}$
	+2%/-4%	+2%/-5%	+83%/-100%	+33%/-14%	+15%/-14%	+37%/-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 009640985-01 / KOI 0713.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-28 \pm 3$	$2.28^{+0.37}_{-0.32}$	$2535^{+172}_{-140}$	$4112^{+190}_{-188}$	$3.714^{+1.326}_{-0.978}$
Alt.	$-197 \pm 3$	$3.28^{+0.53}_{-0.37}$	$2539^{+179}_{-142}$	$5266^{+196}_{-185}$	$12^{+3}_{-3}$

$T_{\text{max}}$  = 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

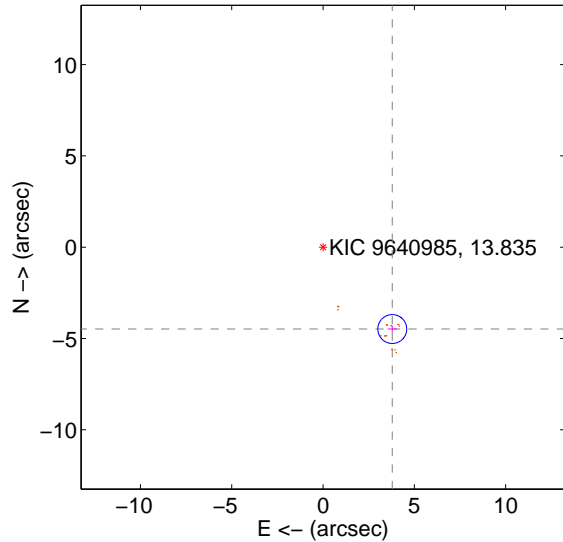
Supplemental centroid analysis for 009640985-01. Kepler magnitude: 13.84. Transit SNR 55.72

There are 0 quarters with good PRF difference image offsets

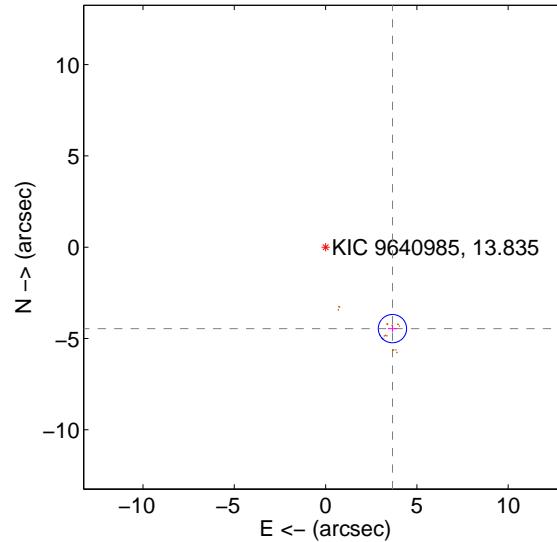
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$5.874 \pm 0.264$	22.28	$-3.794 \pm 0.253$	$-4.484 \pm 0.179$
PRF-fit source offset from KIC position	$5.773 \pm 0.258$	22.36	$-3.663 \pm 0.248$	$-4.462 \pm 0.178$
photometric centroid source offset	$10.36 \pm 0.23$	45.70	$-3.31 \pm 0.22$	$-9.82 \pm 0.23$

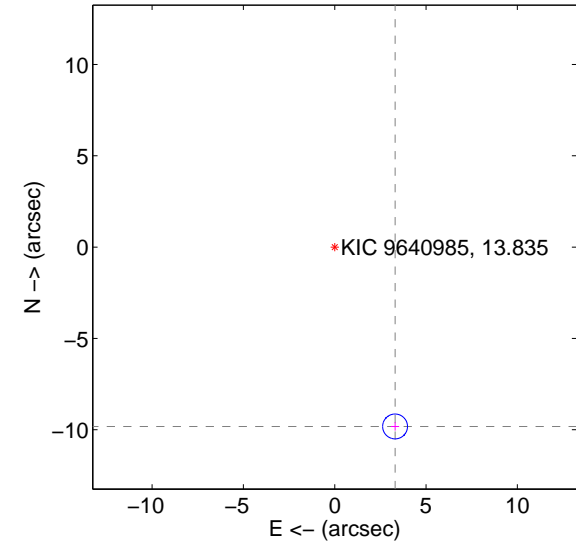
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

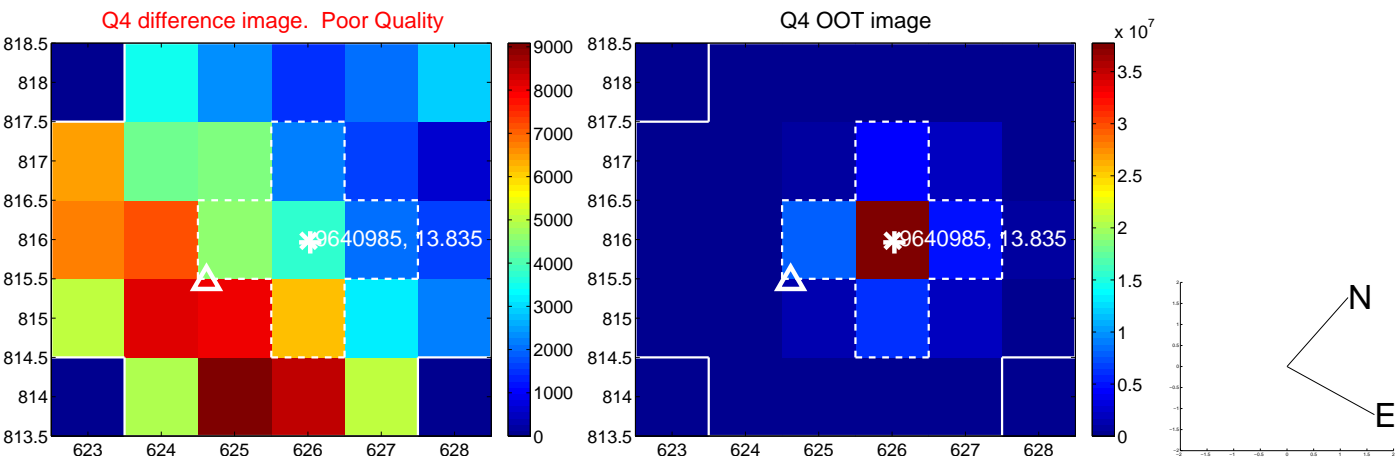
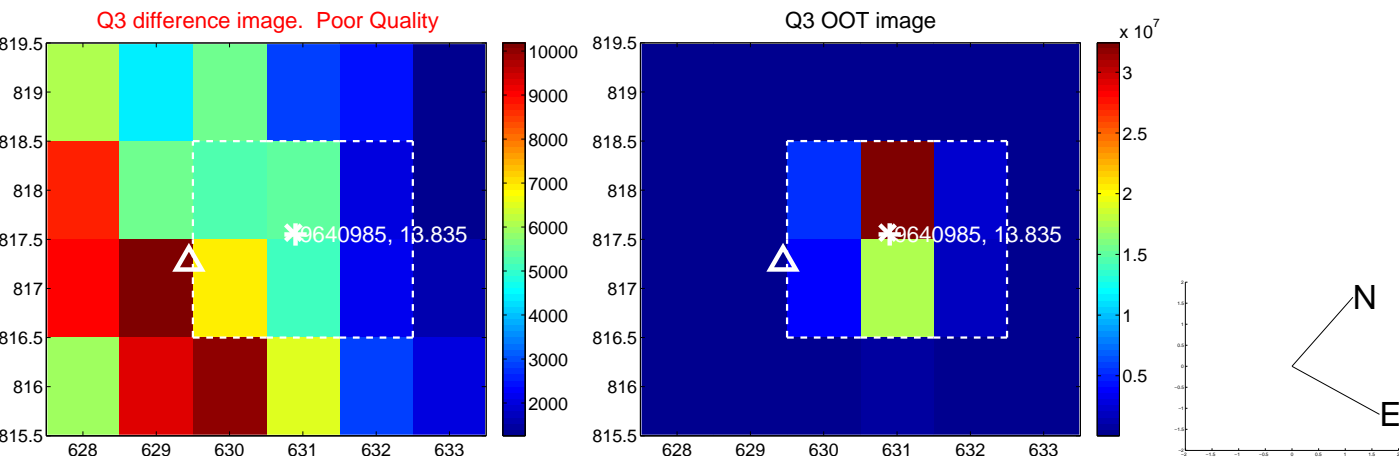
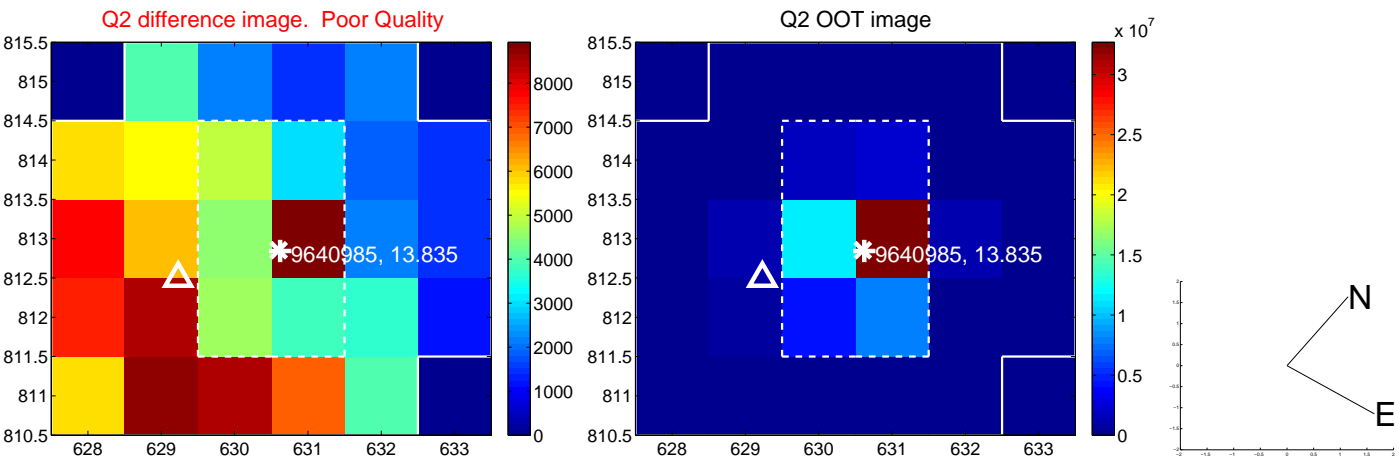
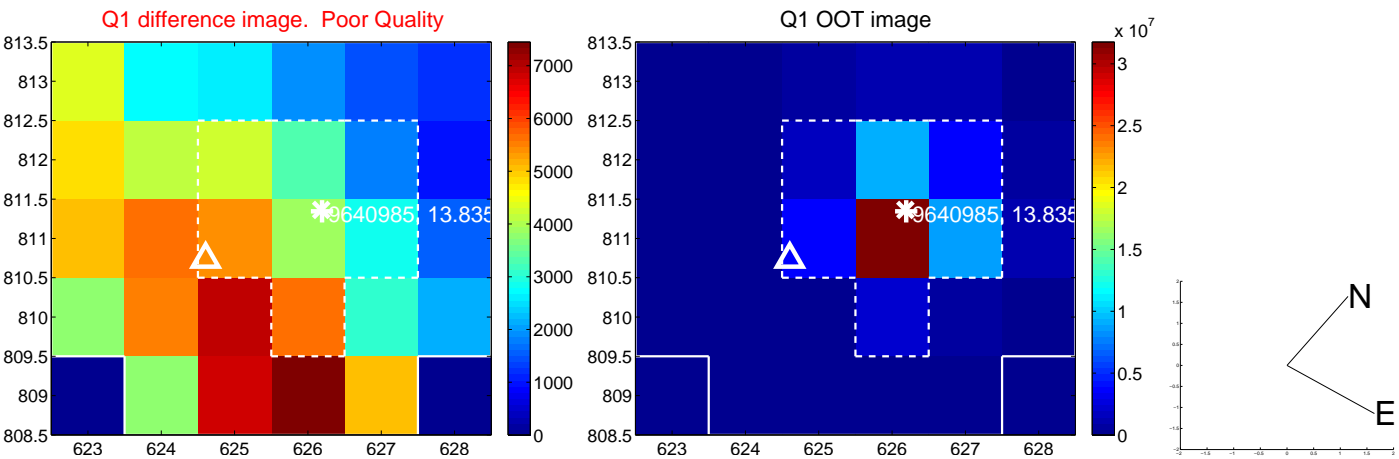


offset from photometric centroids

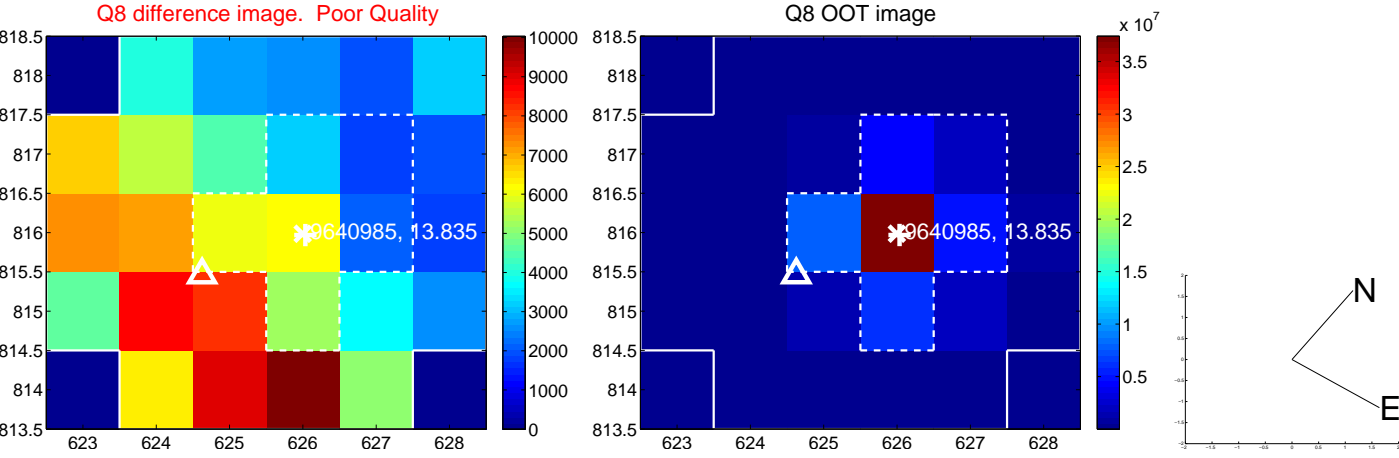
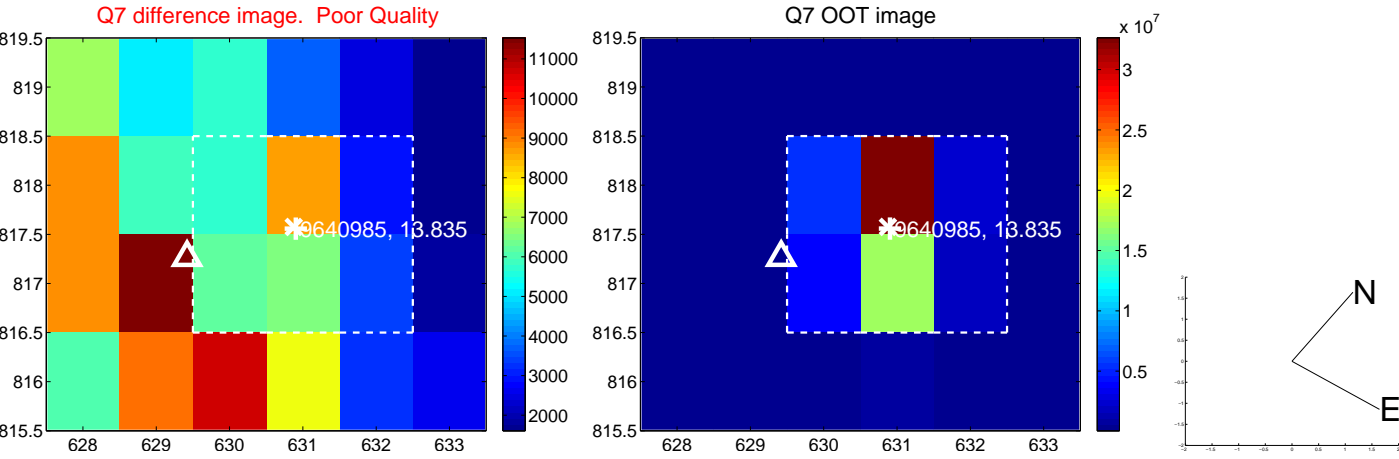
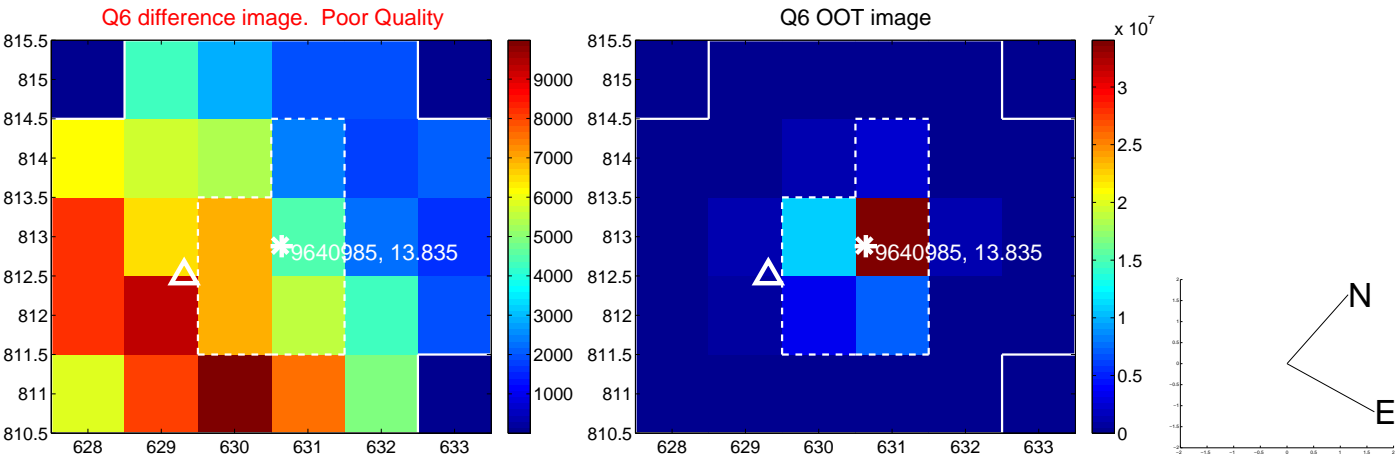
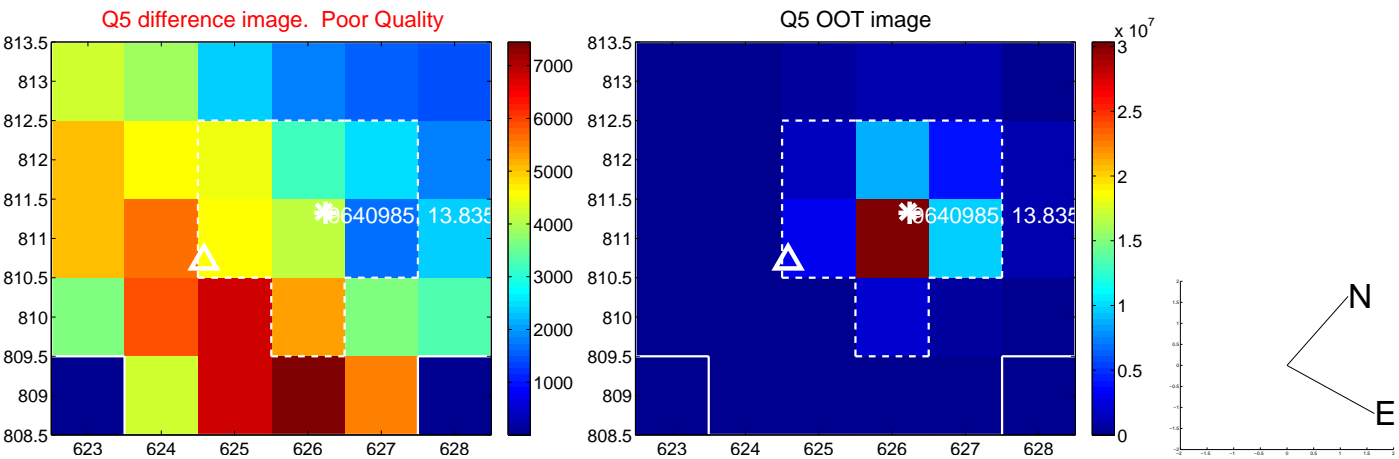


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

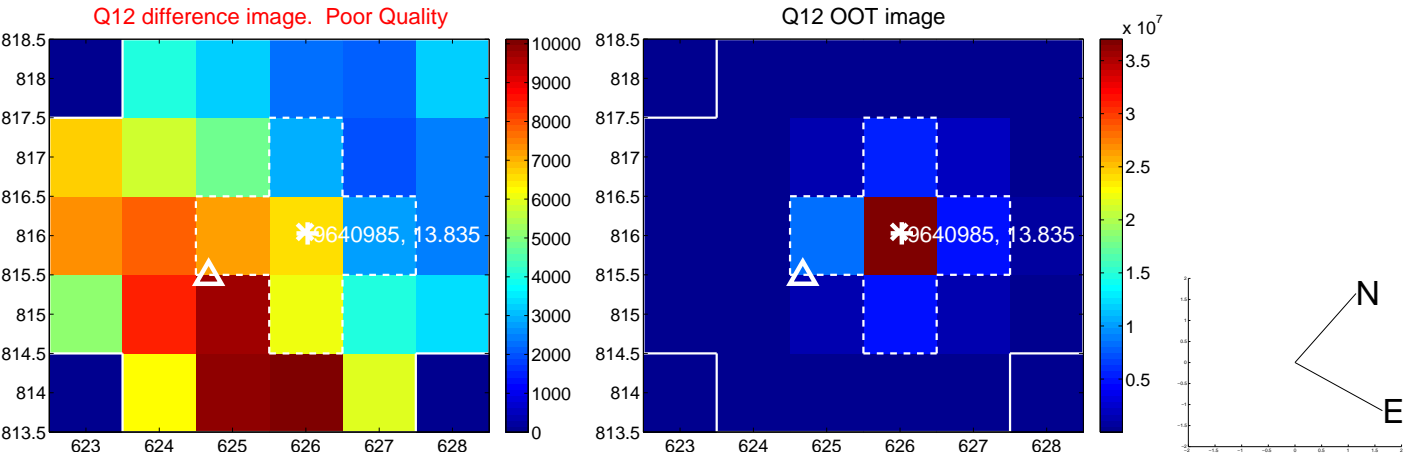
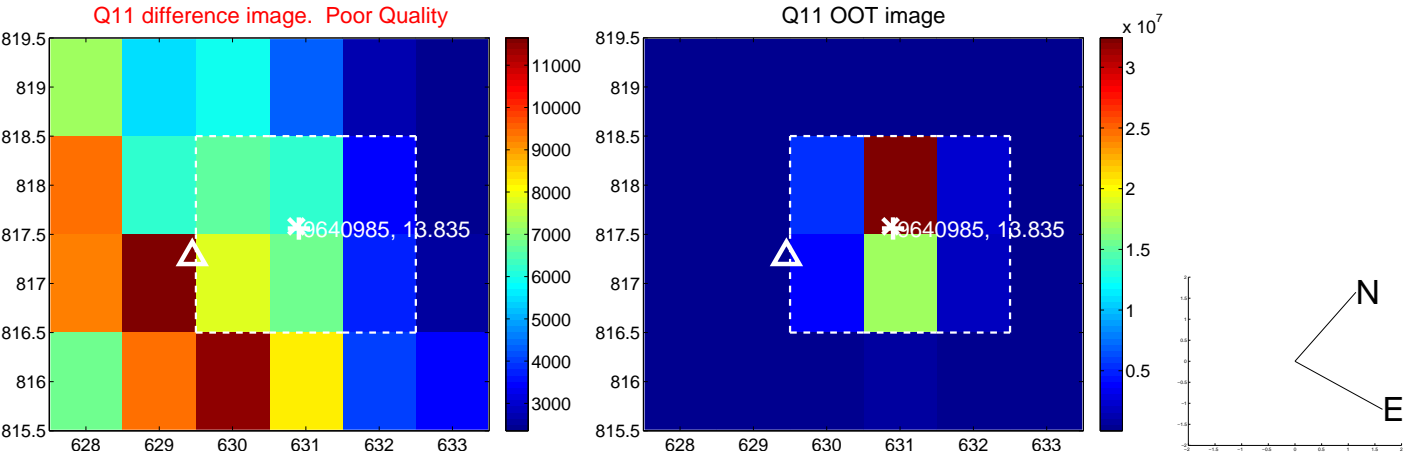
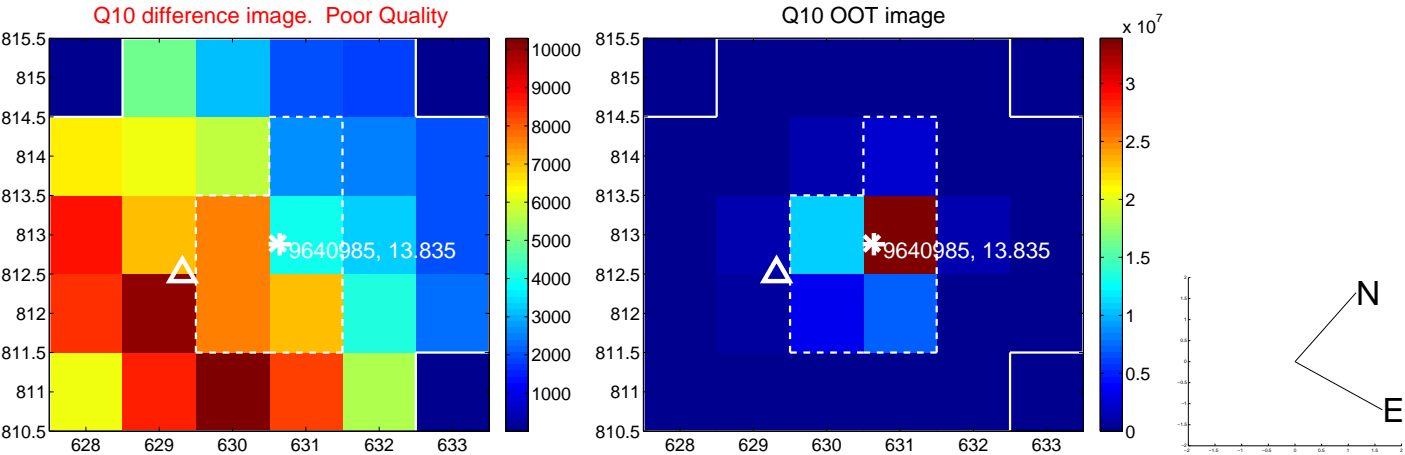
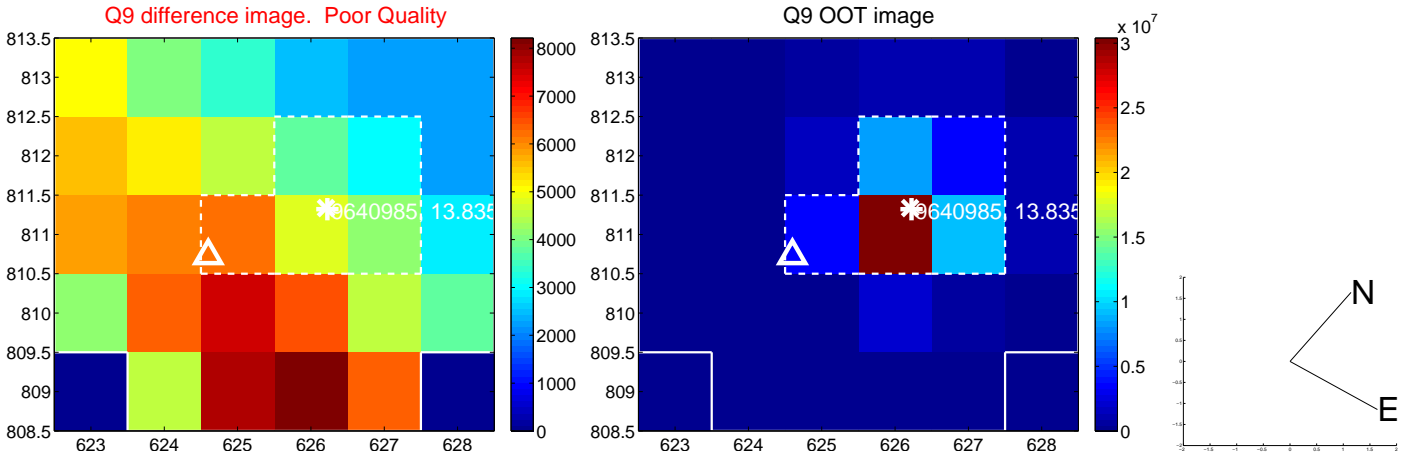
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



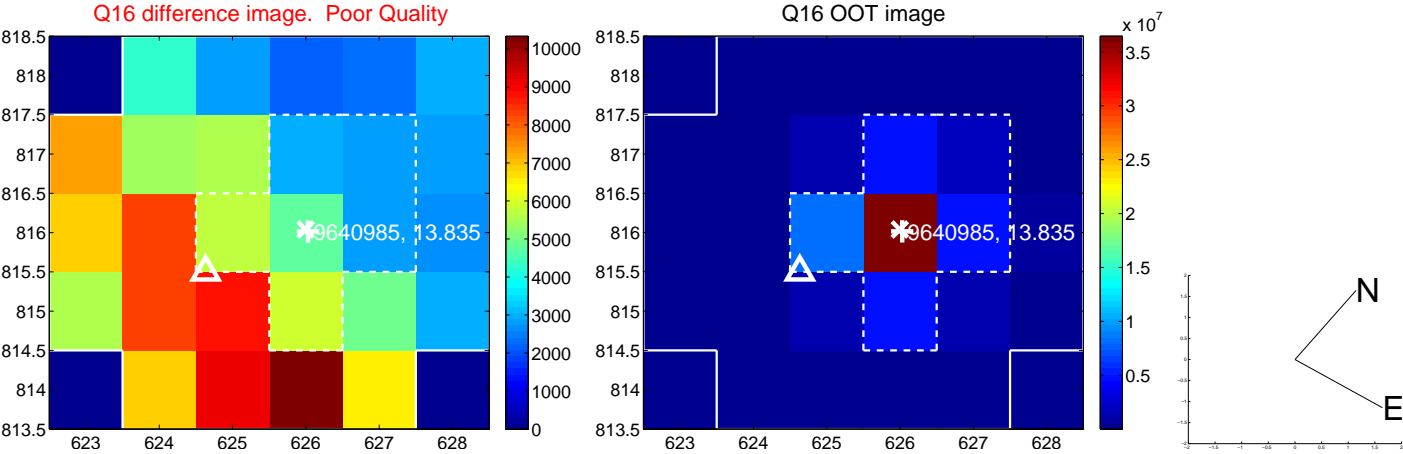
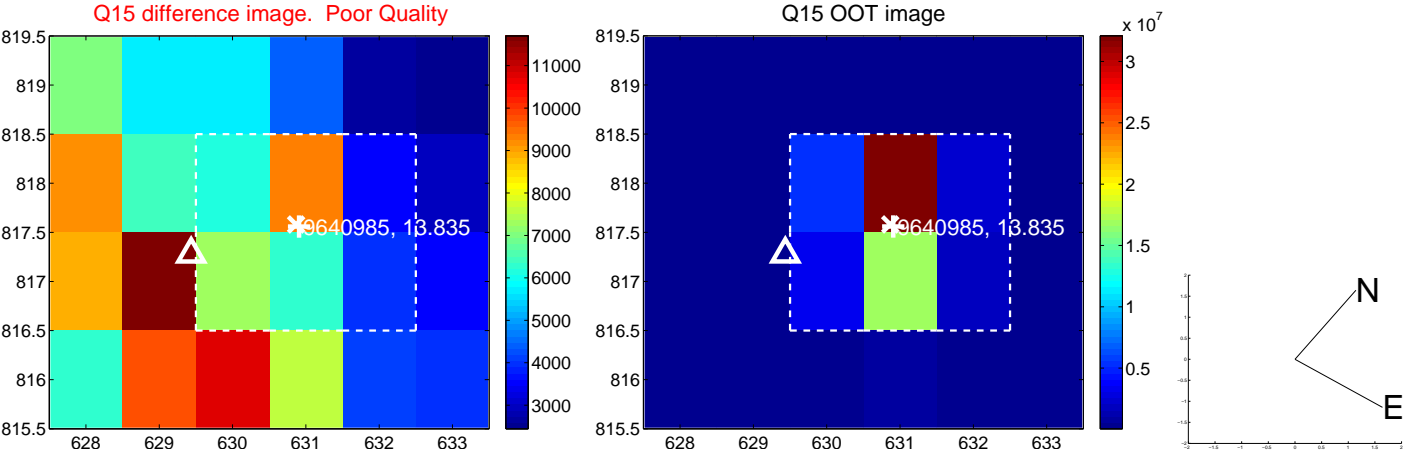
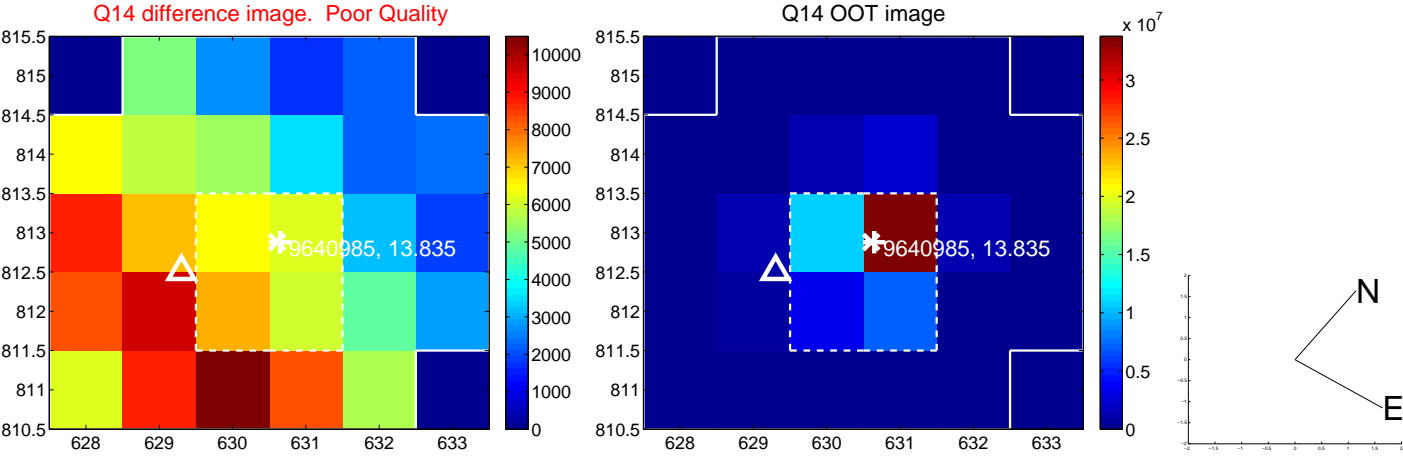
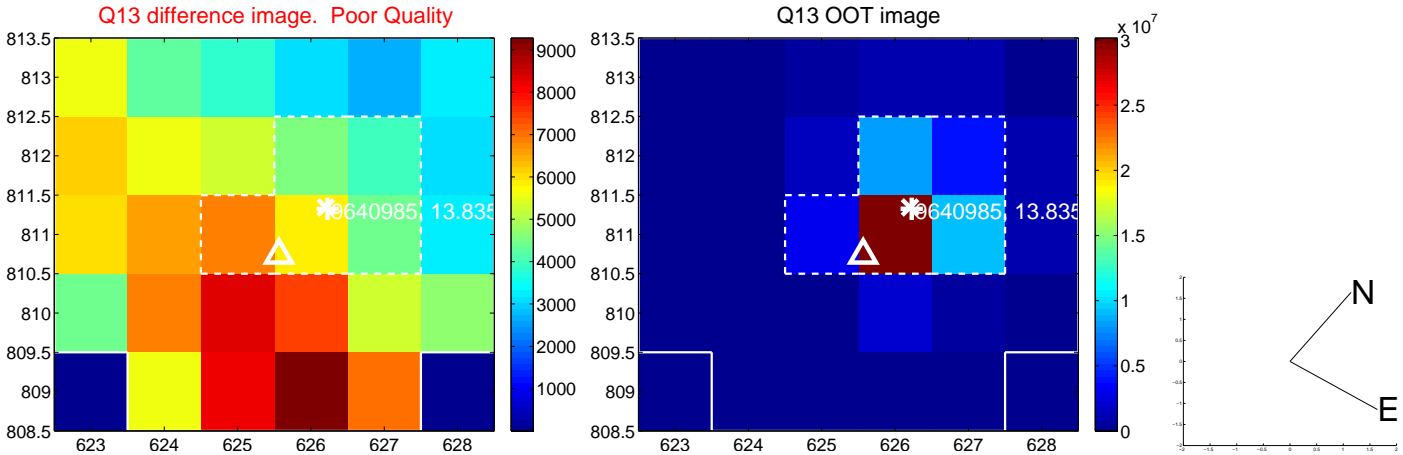
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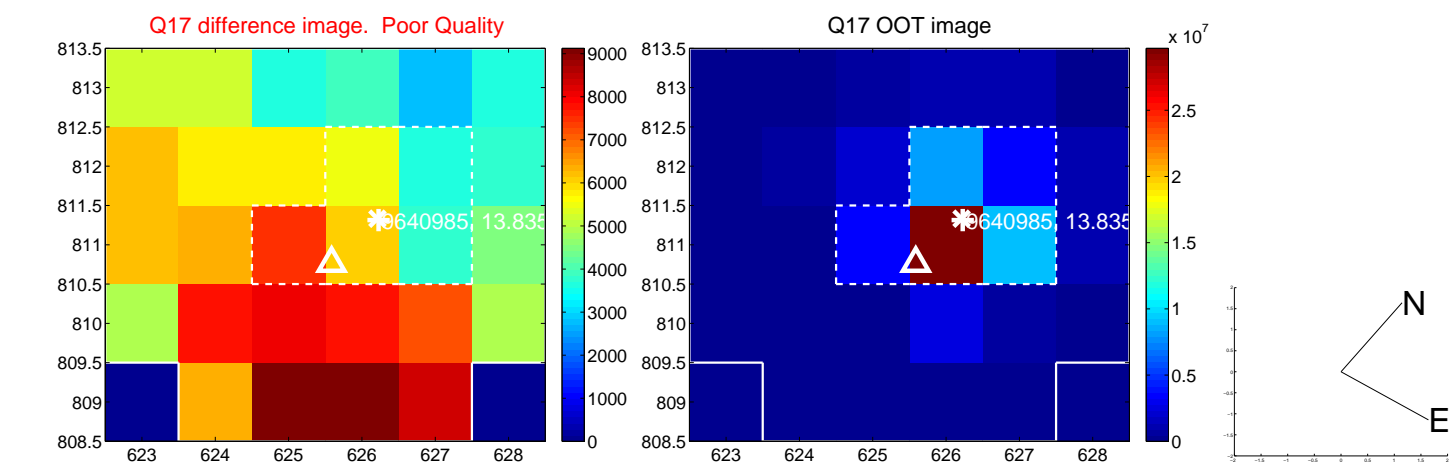


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

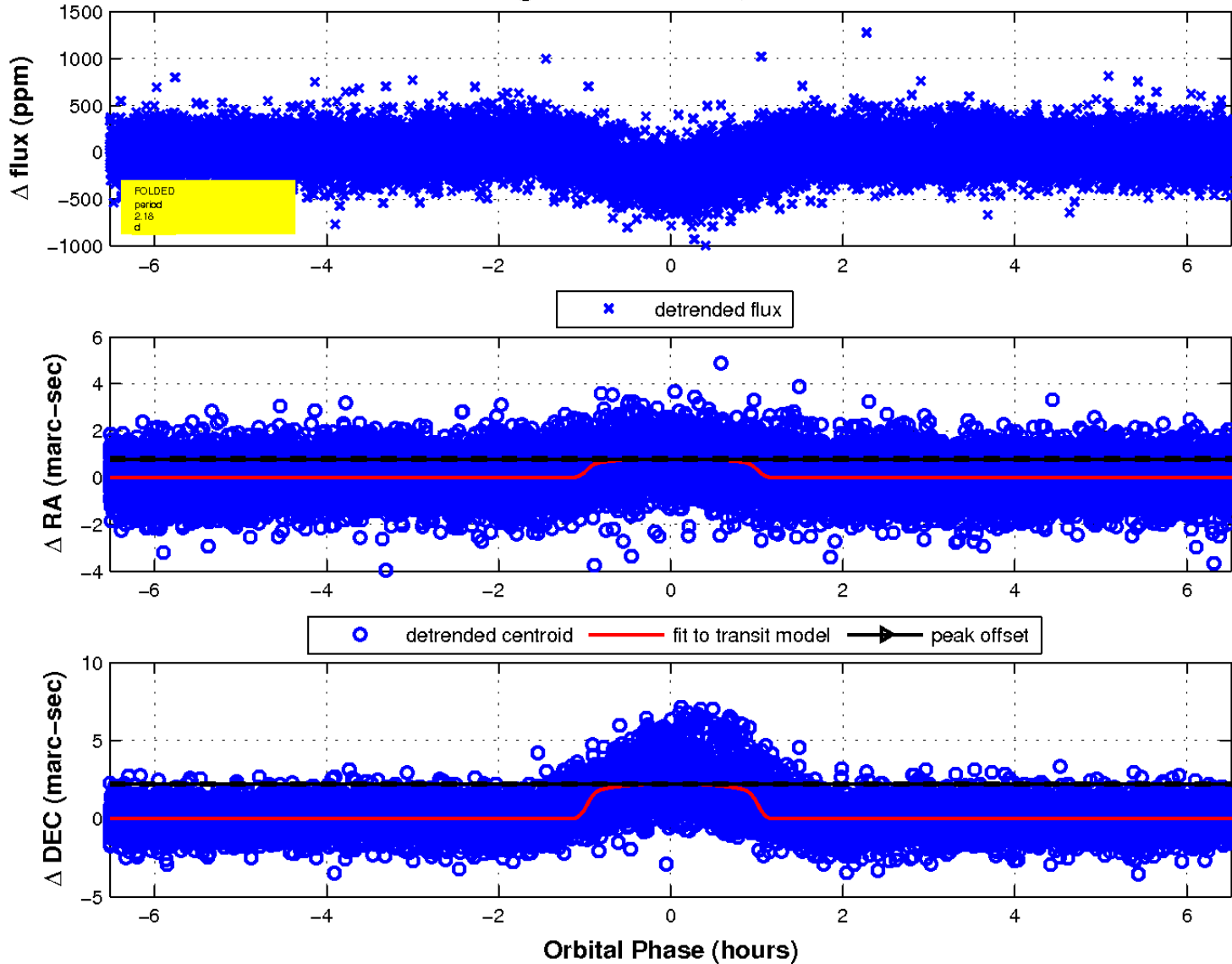




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 1 of 1



# UKIRT Image

Declination

