

# KIC 009344623

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009344623-01	OBS	7163.01	14.759196	139.783180	363404.4	6.000	22832.9	-1.0	1.10	6522	60.29	130.99
009344623-02	OBS	No	14.759488	145.783900	335229.4	7.933	21115.2	8557.0	1.10	6522	72.22	130.99

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009344623-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_ALT—MOD_ODDEVEN_ALT—HAS_SEC_TCE—CENT_NOFITS
009344623-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

**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.

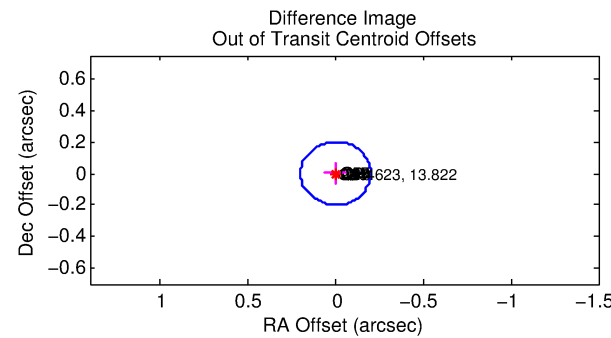
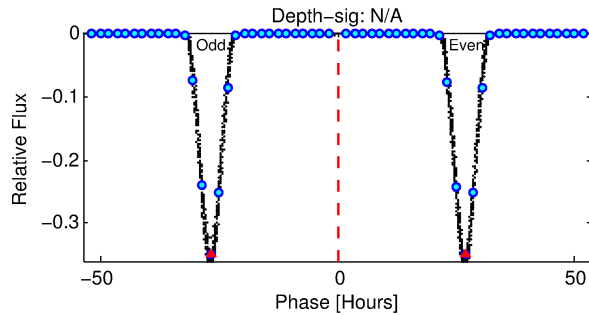
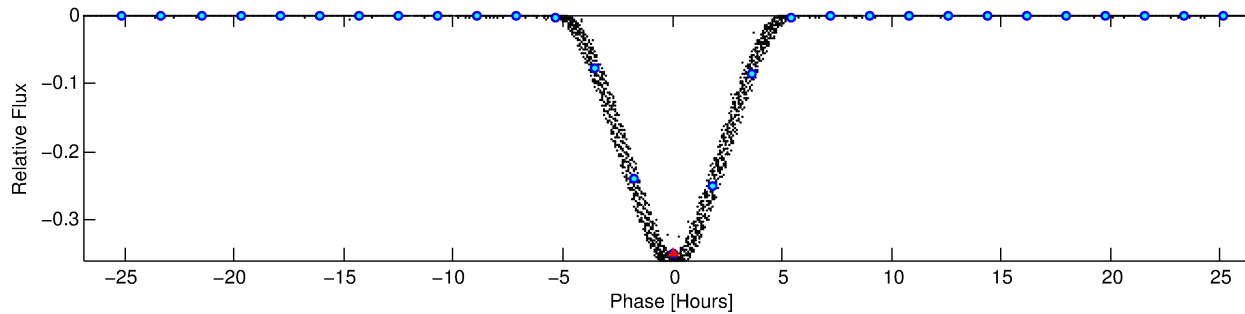
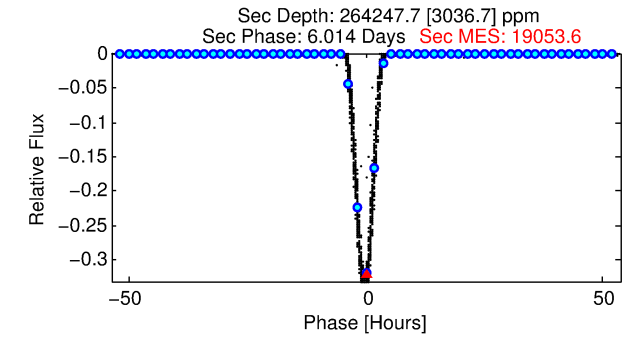
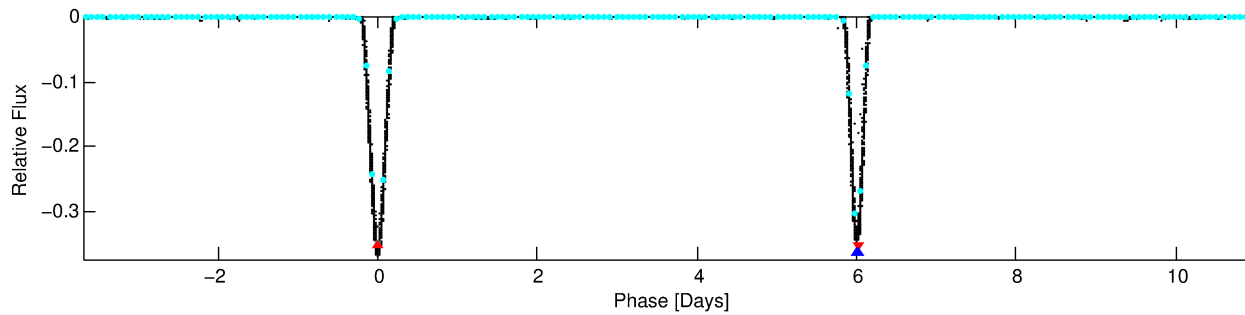
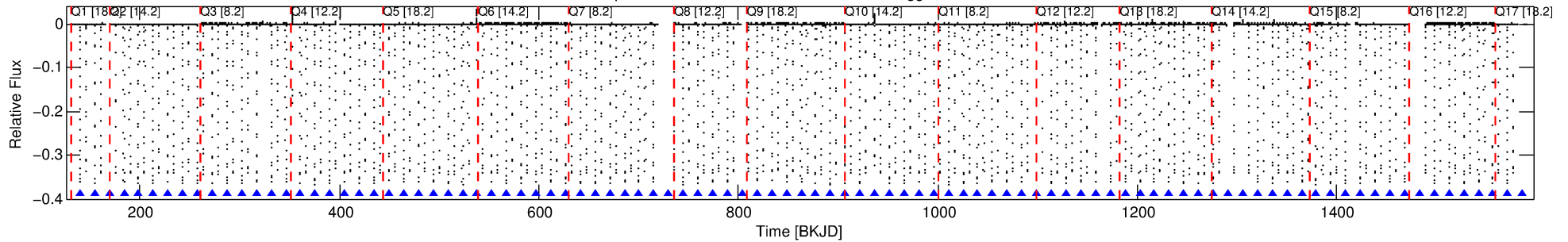
## Ephemeris Match Information For 009344623-01

No Significant Match Found

# DV One-Page Summary

KIC: 9344623 Candidate: 1 of 2 Period: 14.759 d  
KOI: K07163.01 Corr: 0.783

Kp: 13.82 R\*: 1.10 Rs Teff: 6522.0 K Logg: 4.41 Fe/H: -0.260



## TPS TCE Results:

Period = 14.75920 d  
Epoch = 139.7832 BKJD

DV fit results are unavailable

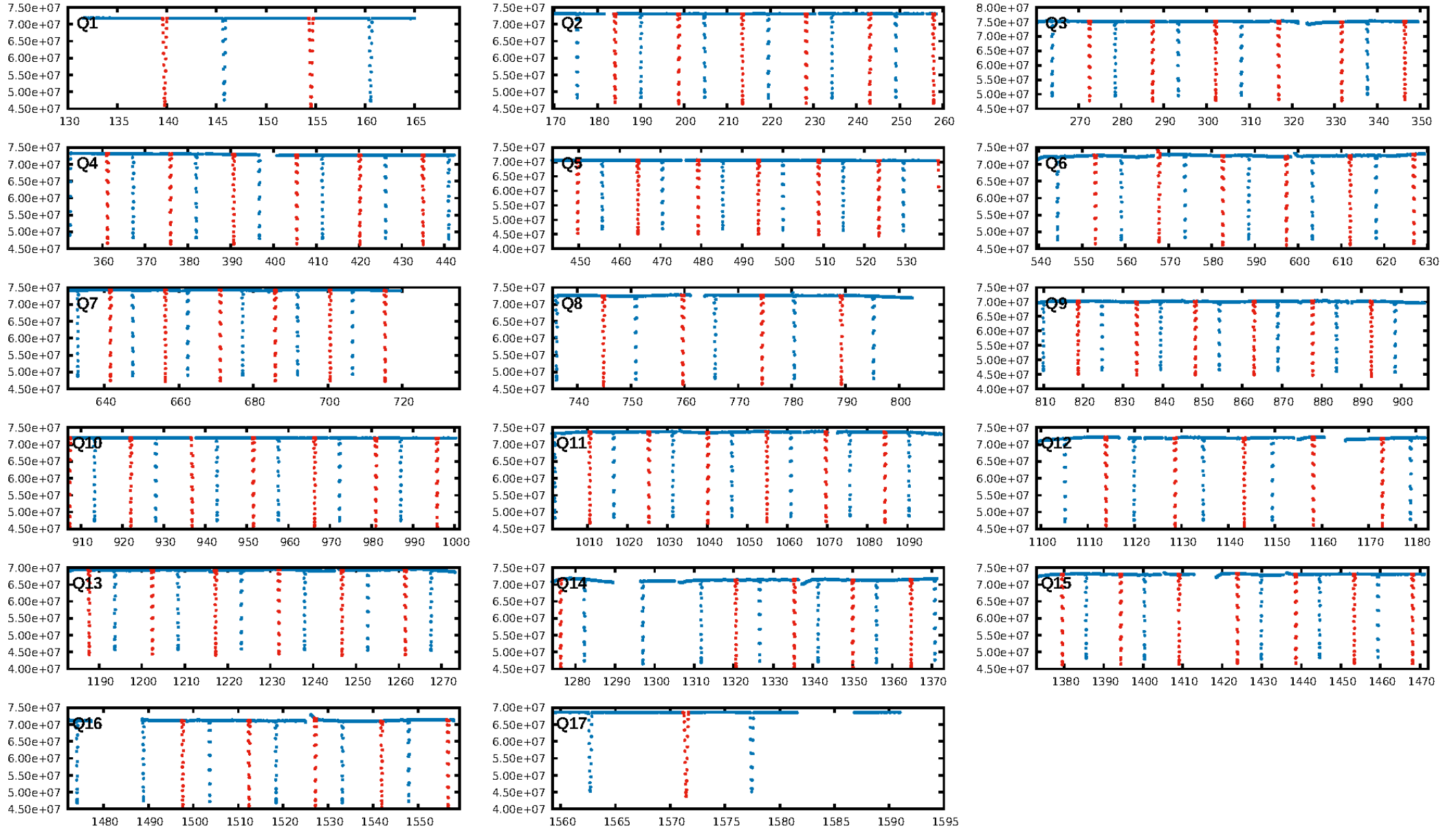
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.1% [0.00 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [88/88]  
GhostDiagnostic-chr: 4.775  
Centroid-sig: 0.0%  
Centroid-so: 0.057 arcsec [158.23 $\sigma$ ]  
OotOffset-rm: 0.002 arcsec [0.04 $\sigma$ ]  
KicOffset-rm: 0.082 arcsec [1.22 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

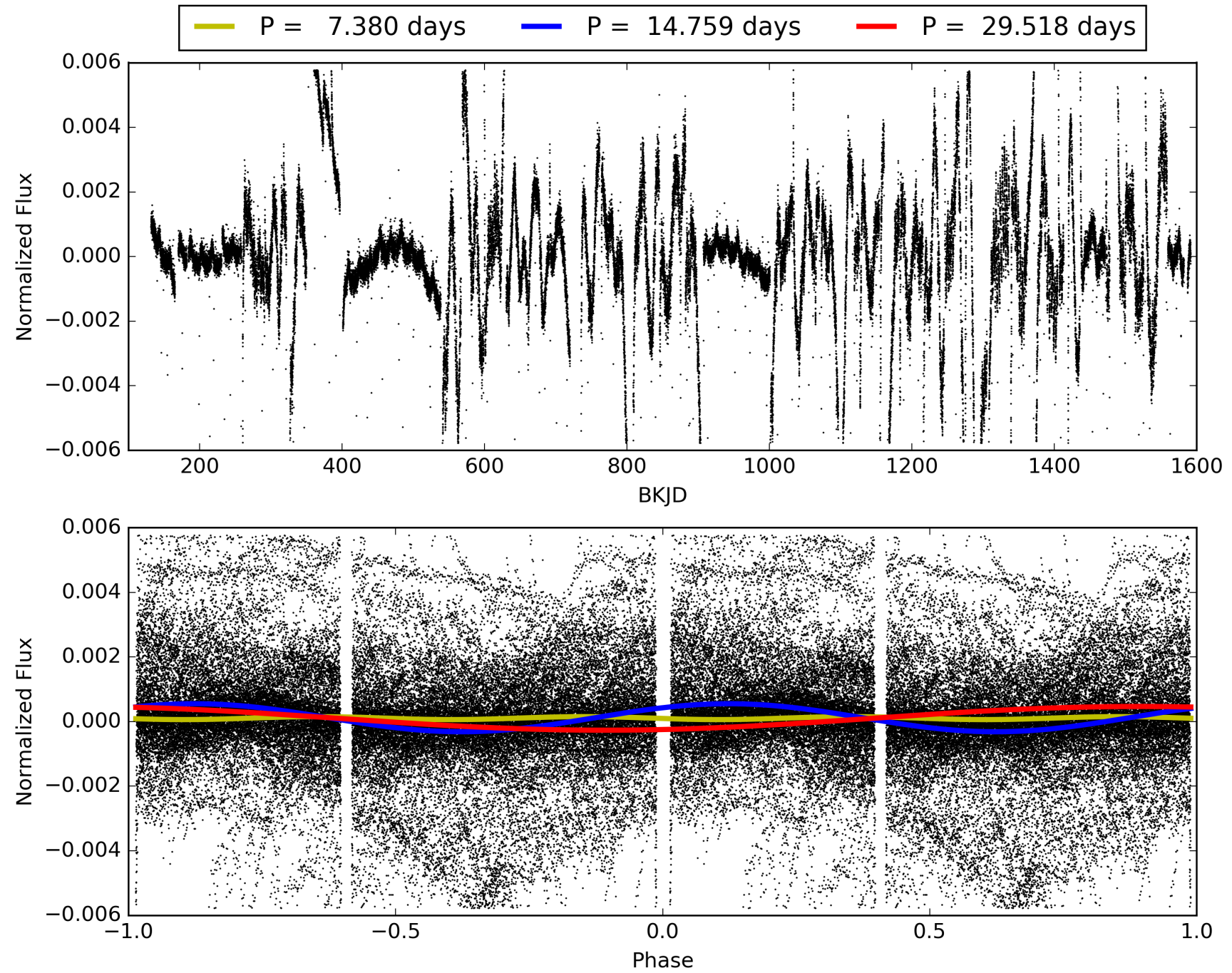
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 22:03:54 Z

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

# TCE 009344623-01, PDC Light Curves

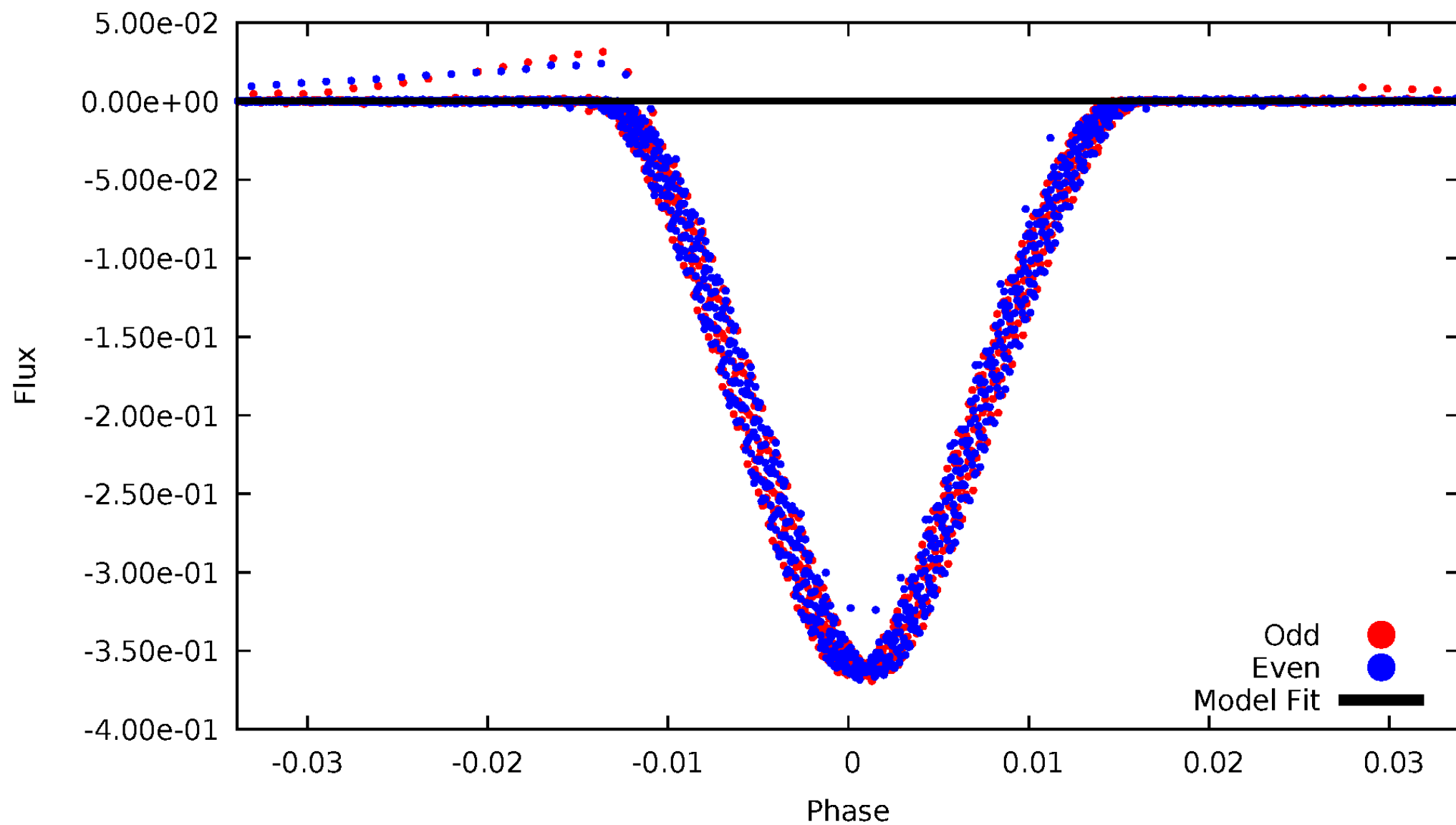


TCE 009344623-01



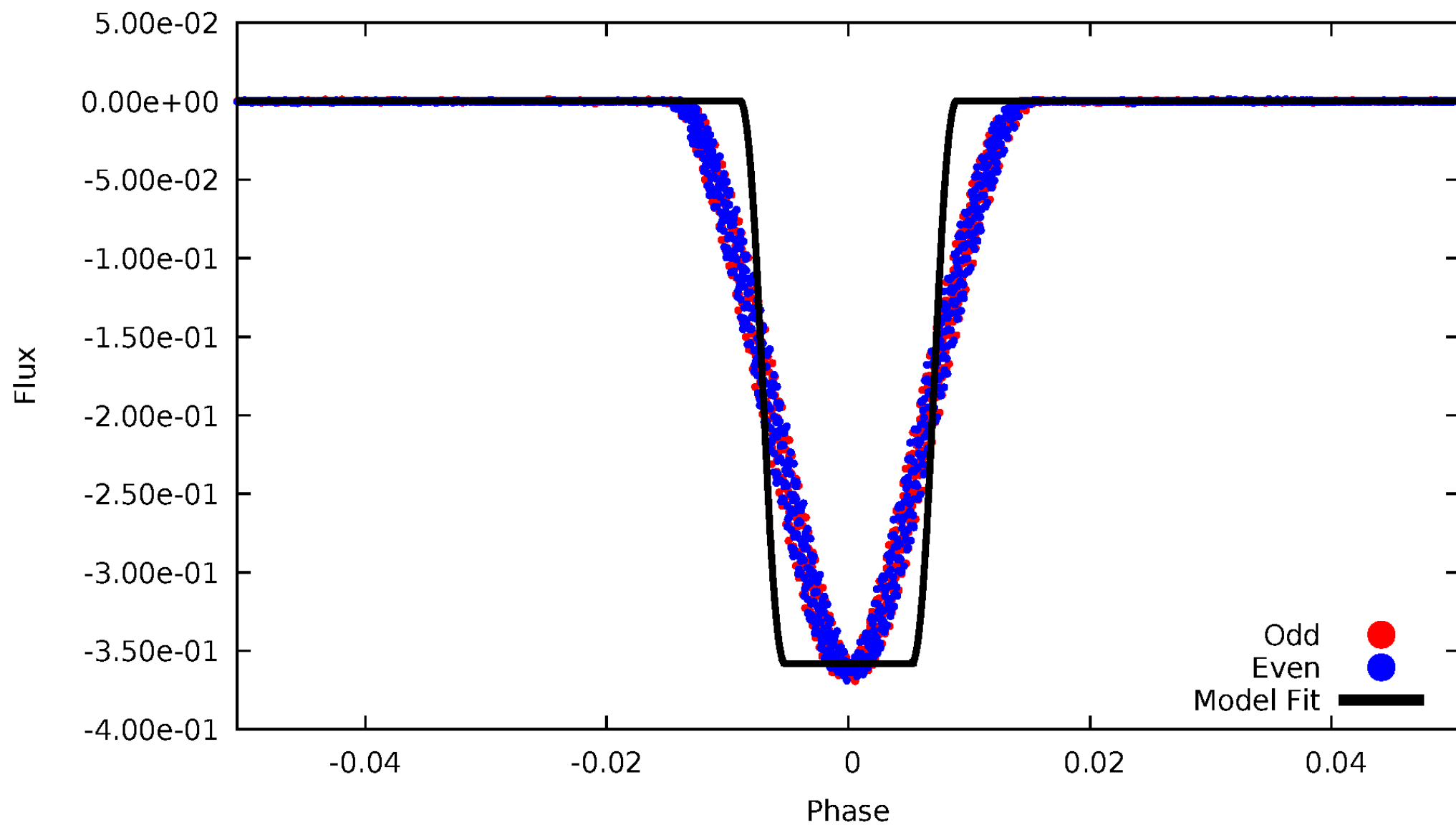
# DV Odd/Even

TCE 009344623-01



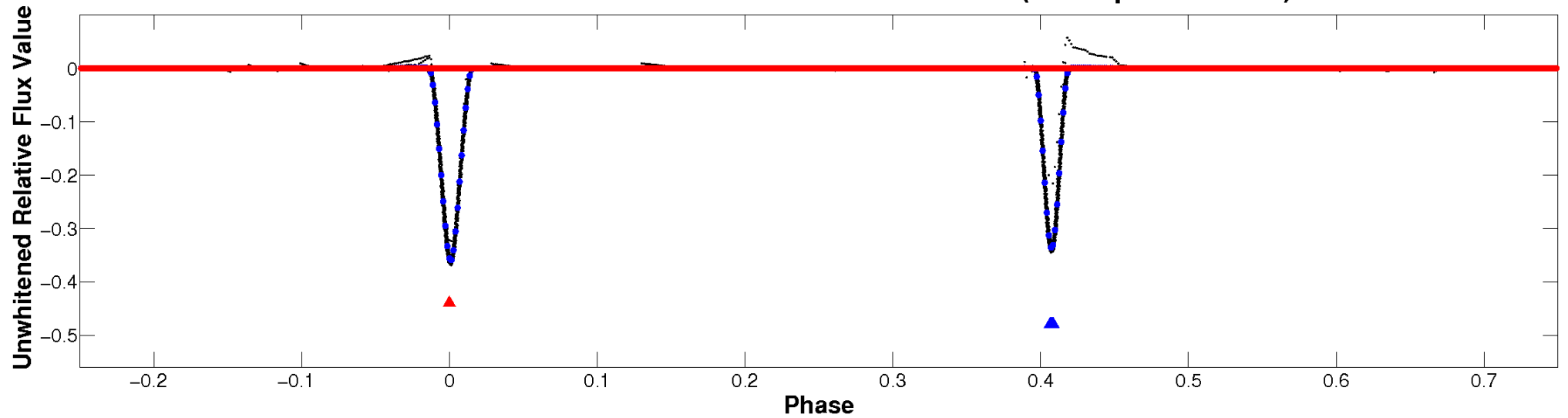
# ALT Odd/Even

TCE 009344623-01



# Non-Whitened Vs. Whitened Light Curve

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

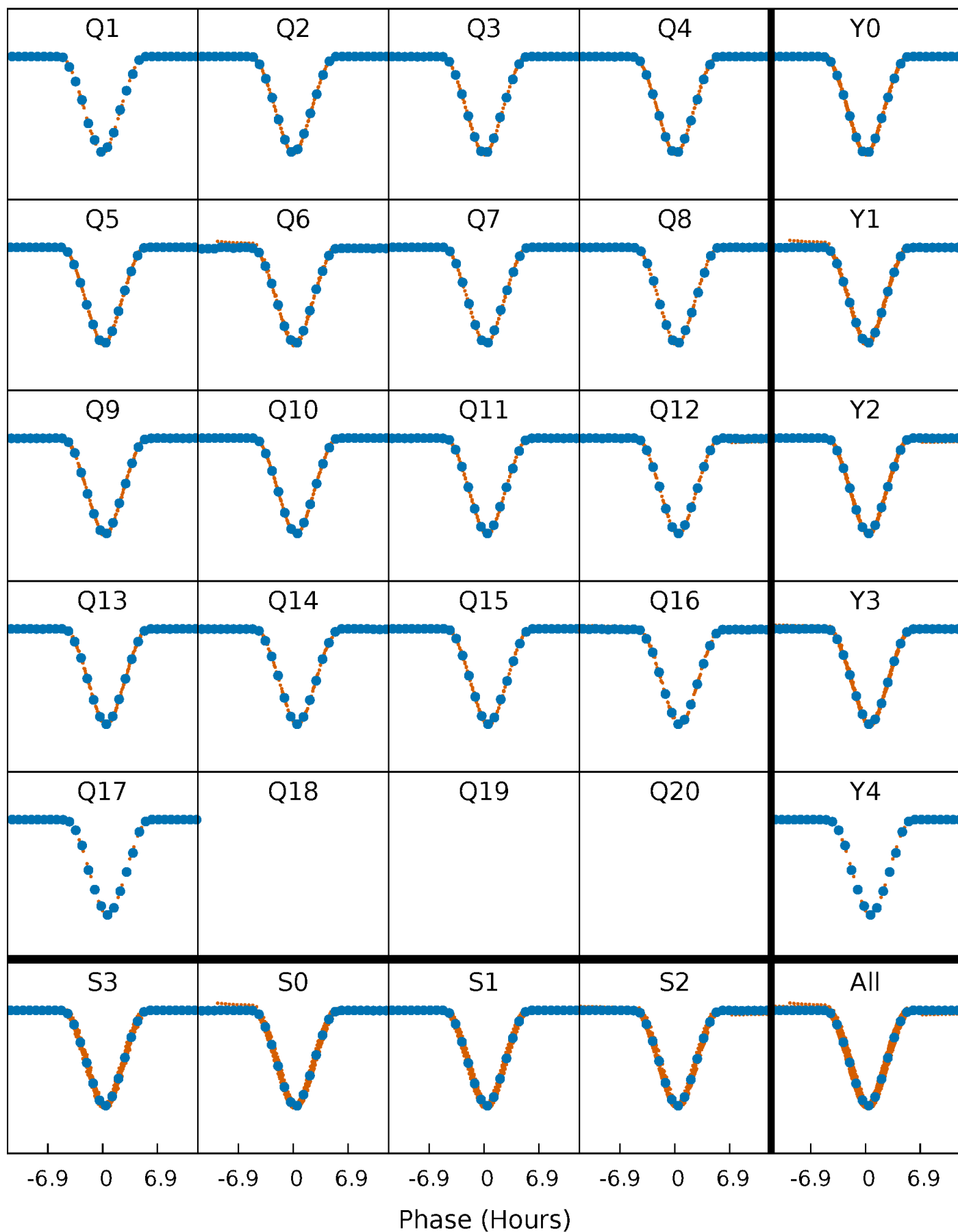


**Planet 1 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



# PDC Quarter-Phased Transit Curves

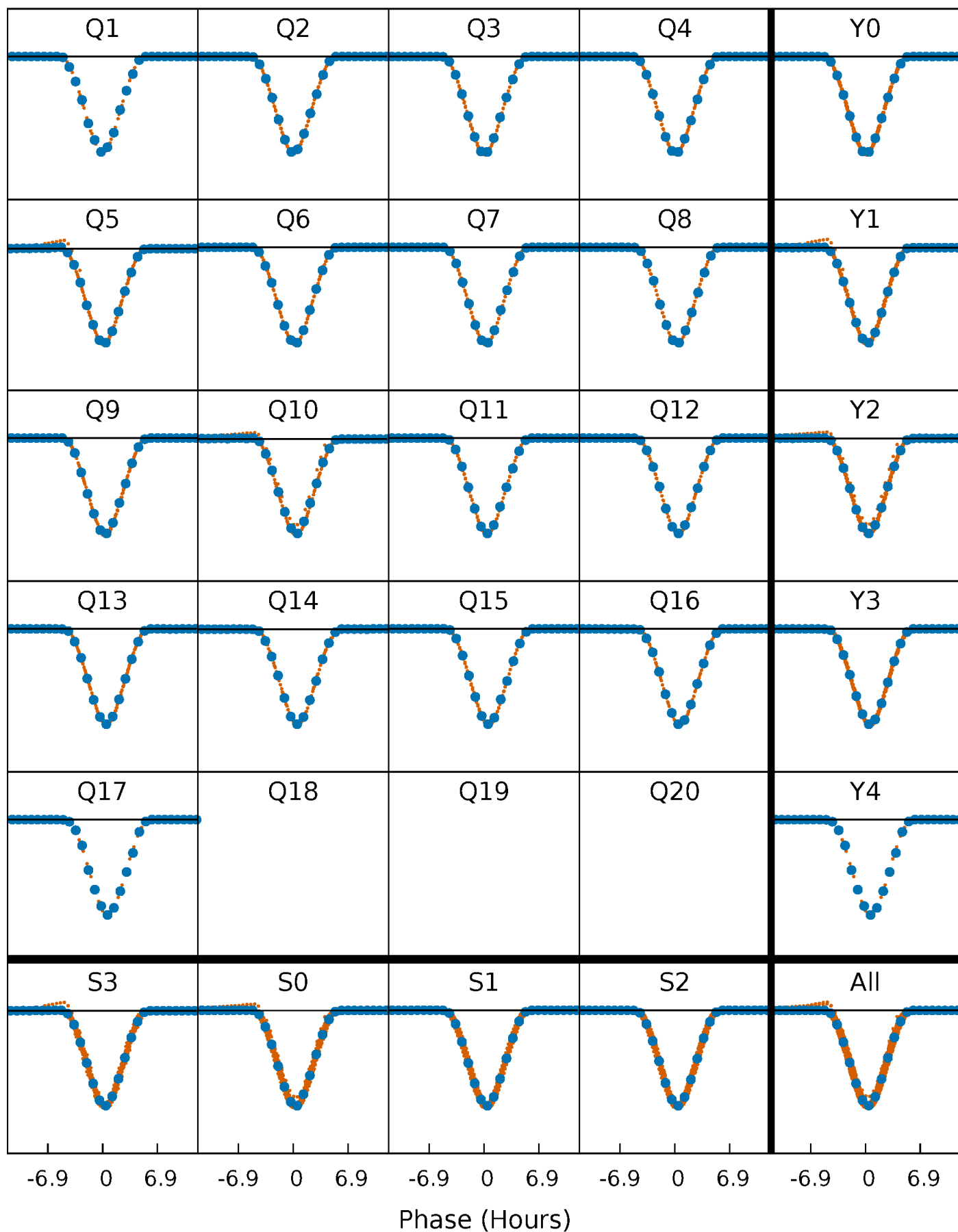
TCE 009344623-01 P= 14.759196 Days  $T_0=139.783180$  (BKJD)





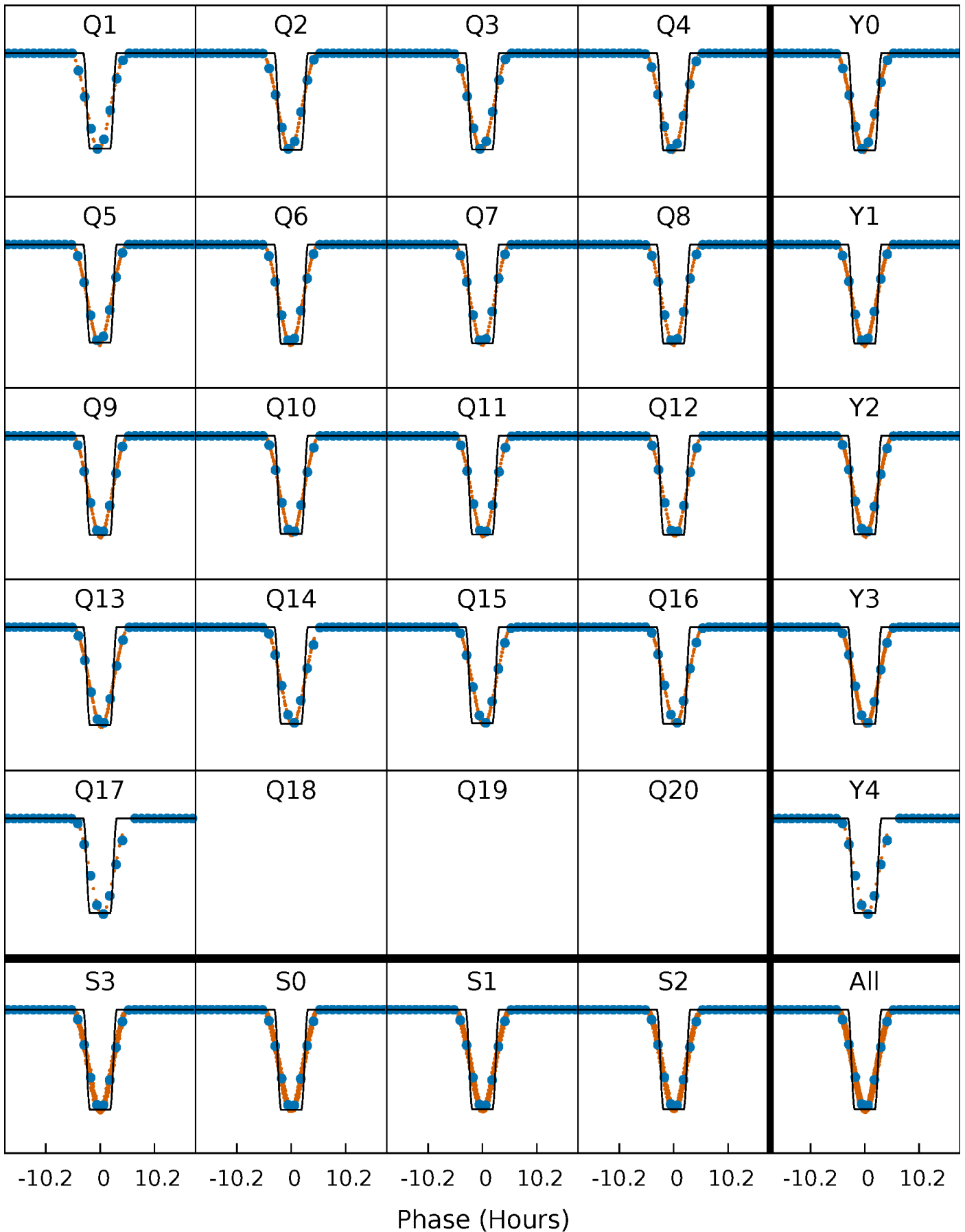
# DV Quarter-Phased Transit Curves

TCE 009344623-01 P= 14.759196 Days  $T_0=139.783180$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

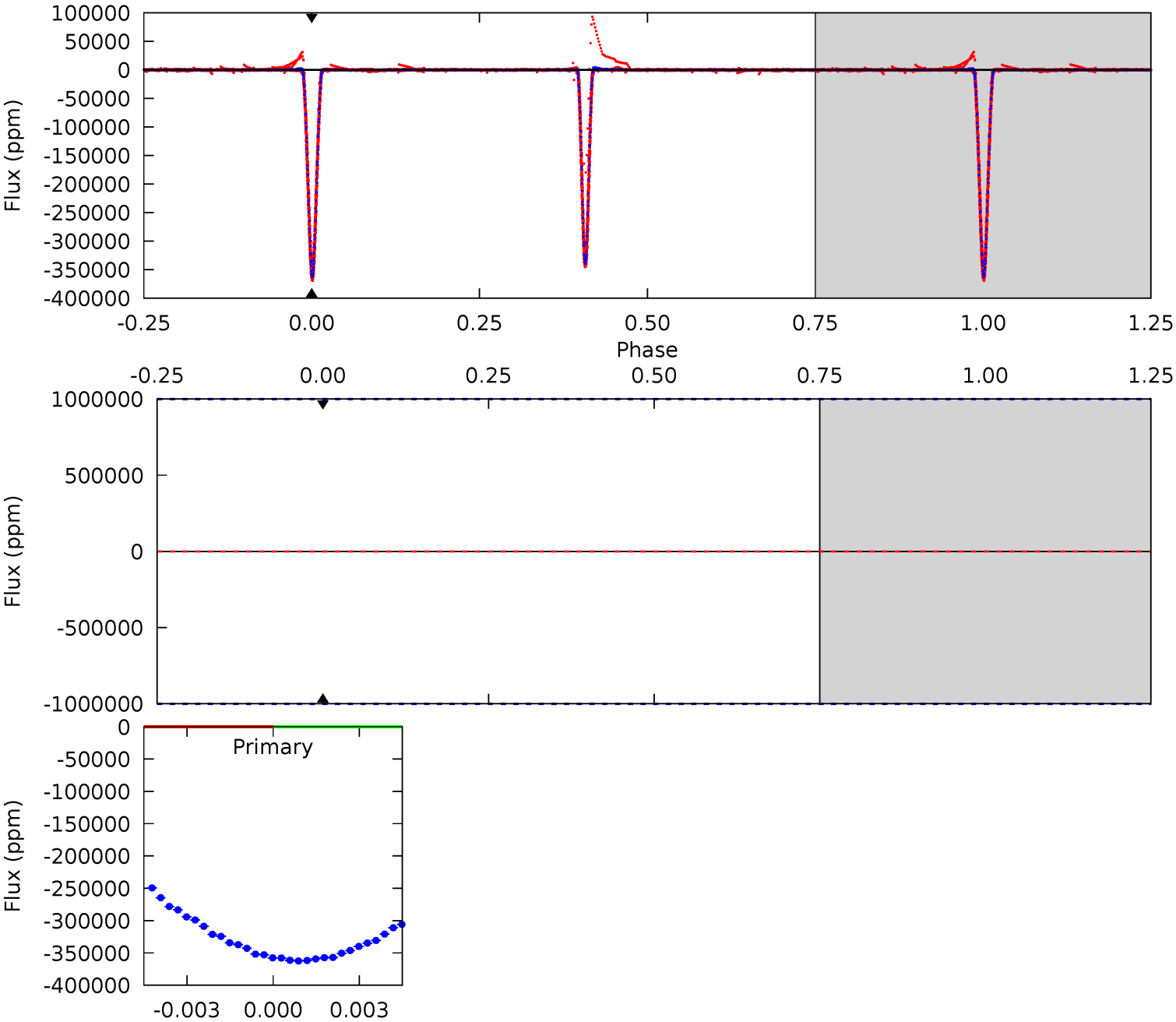
TCE 009344623-01 P= 14.759196 Days  $T_0=139.794226$  (BKJD)



# DV Model-Shift Uniqueness Test

009344623-01, P = 14.759196 Days, E = 125.023984 Days

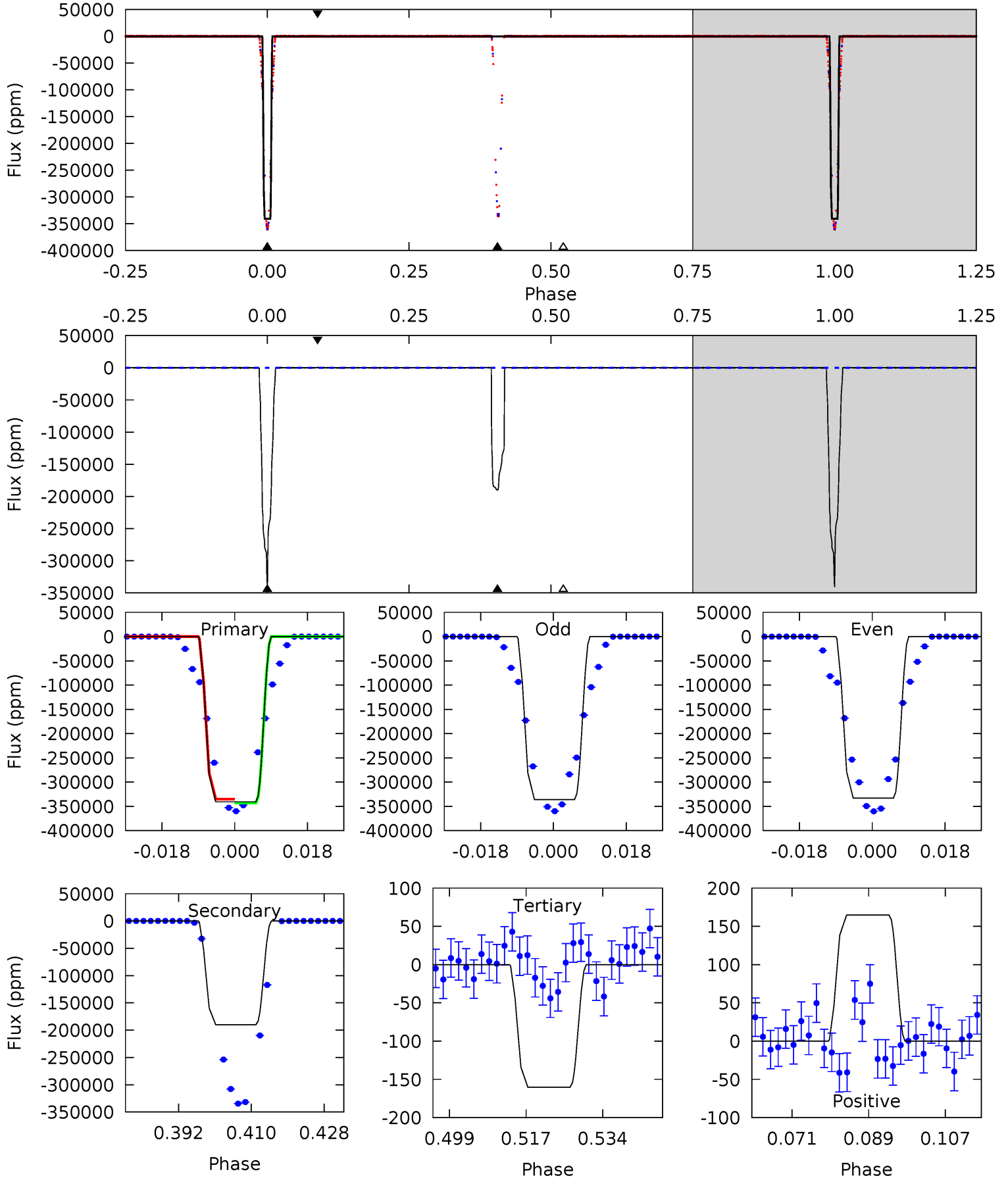
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

009344623-01, P = 14.759196 Days, E = 125.035030 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
8908	4972	4.19	4.31	4.91	2.37	1.18	8904	8904	4968	4968	40.9	1.00	0.00	0



### Stellar Parameters For KIC 009344623

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6522^{+158}_{-198}$	$4.407^{+0.065}_{-0.208}$	$-0.260^{+0.250}_{-0.300}$	$1.105^{+0.339}_{-0.136}$	$1.135^{+0.165}_{-0.150}$	$1.186^{+0.324}_{-0.611}$
	+2%/-3%	+1%/-5%	+96%/-115%	+31%/-12%	+15%/-13%	+27%/-52%
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 009344623-01 / KOI 7163.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$0 \pm 1000000$	$64.02^{+14.09}_{-14.38}$	$1227^{+102}_{-61}$	$3106^{+2307}_{-8221}$	$11^{+235}_{-200}$
Alt.	$-190138 \pm 38$	$75.11^{+18.67}_{-14.57}$	$1231^{+94}_{-62}$	$5859^{+582}_{-446}$	$345^{+165}_{-115}$

$T_{max}$  = 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  $A_{obs} \gg 1.0$

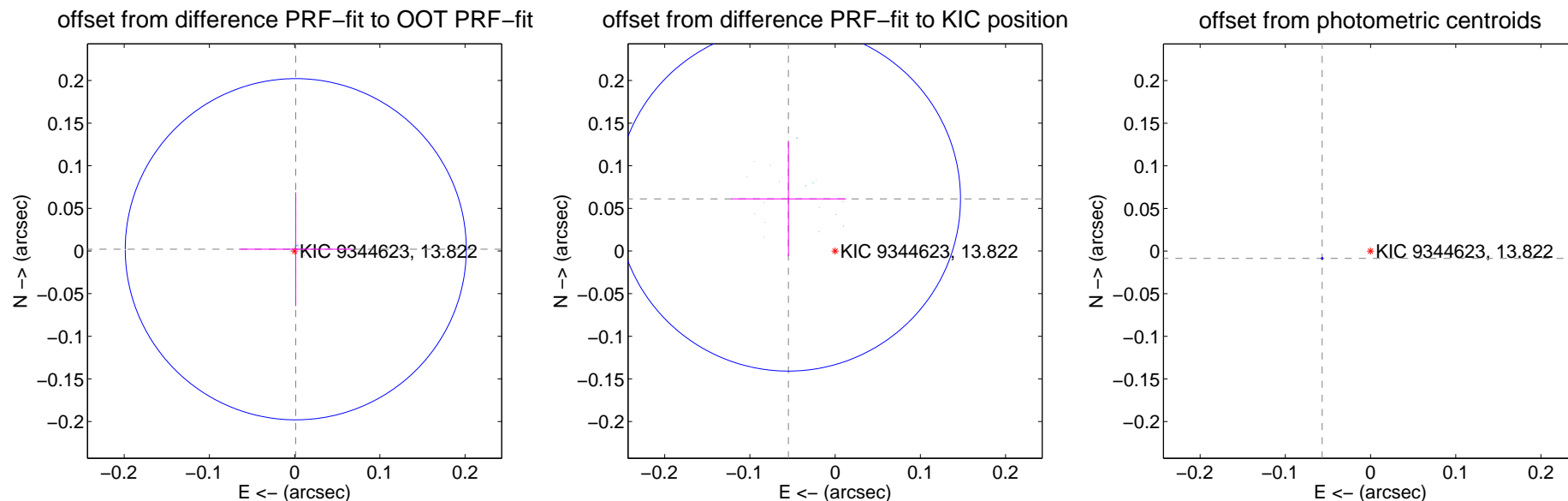
## DV Centroid Data

Supplemental centroid analysis for 009344623-01. Kepler magnitude: 13.82. Transit SNR -1.00

There are 17 quarters with good PRF difference image offsets

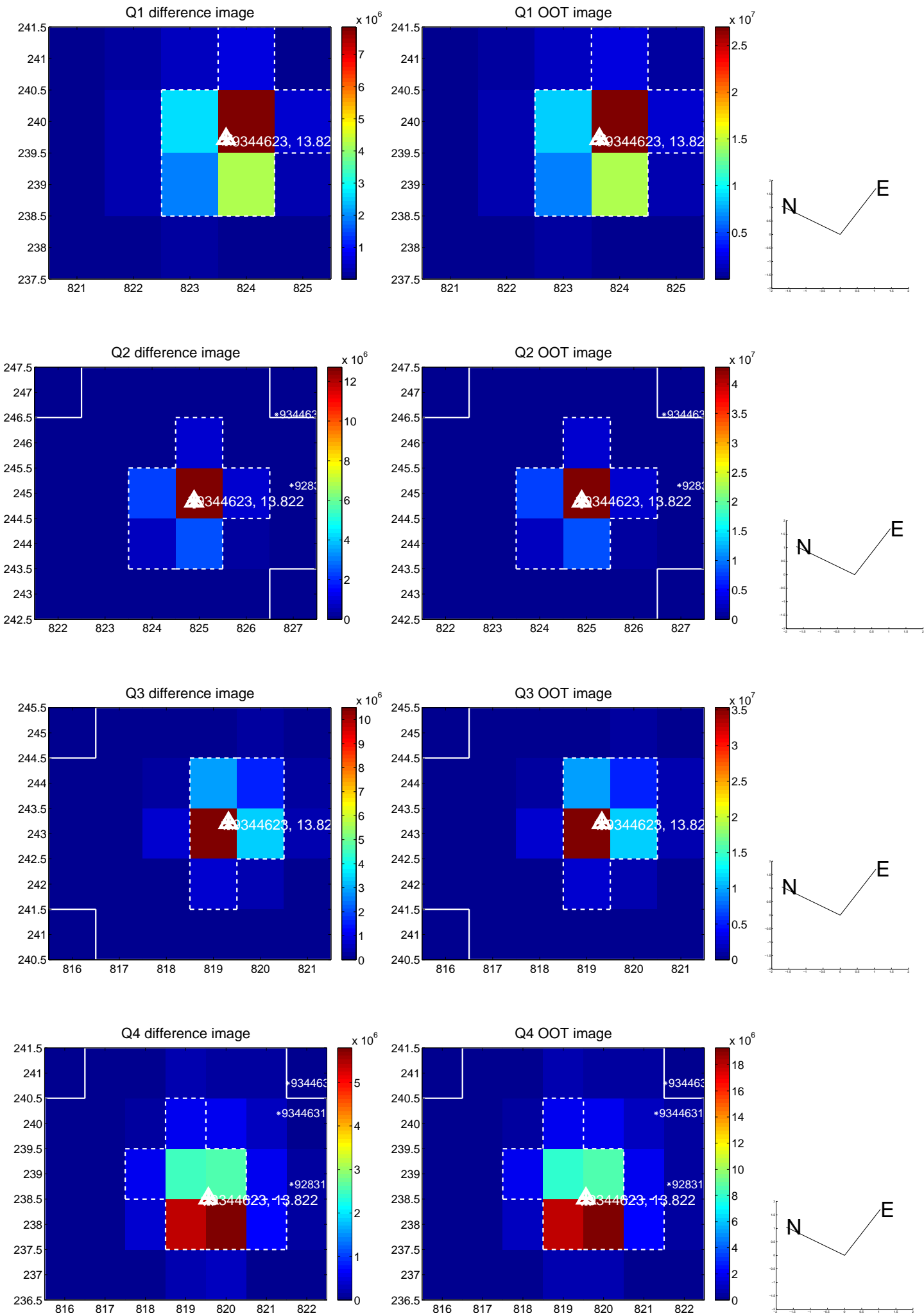
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.002 \pm 0.067$	0.04	$-0.001 \pm 0.067$	$0.002 \pm 0.067$
PRF-fit source offset from KIC position	$0.082 \pm 0.067$	1.22	$0.055 \pm 0.068$	$0.061 \pm 0.067$
photometric centroid source offset	$0.06 \pm 0.00$	<b>158.23</b>	$0.06 \pm 0.00$	$-0.01 \pm 0.00$

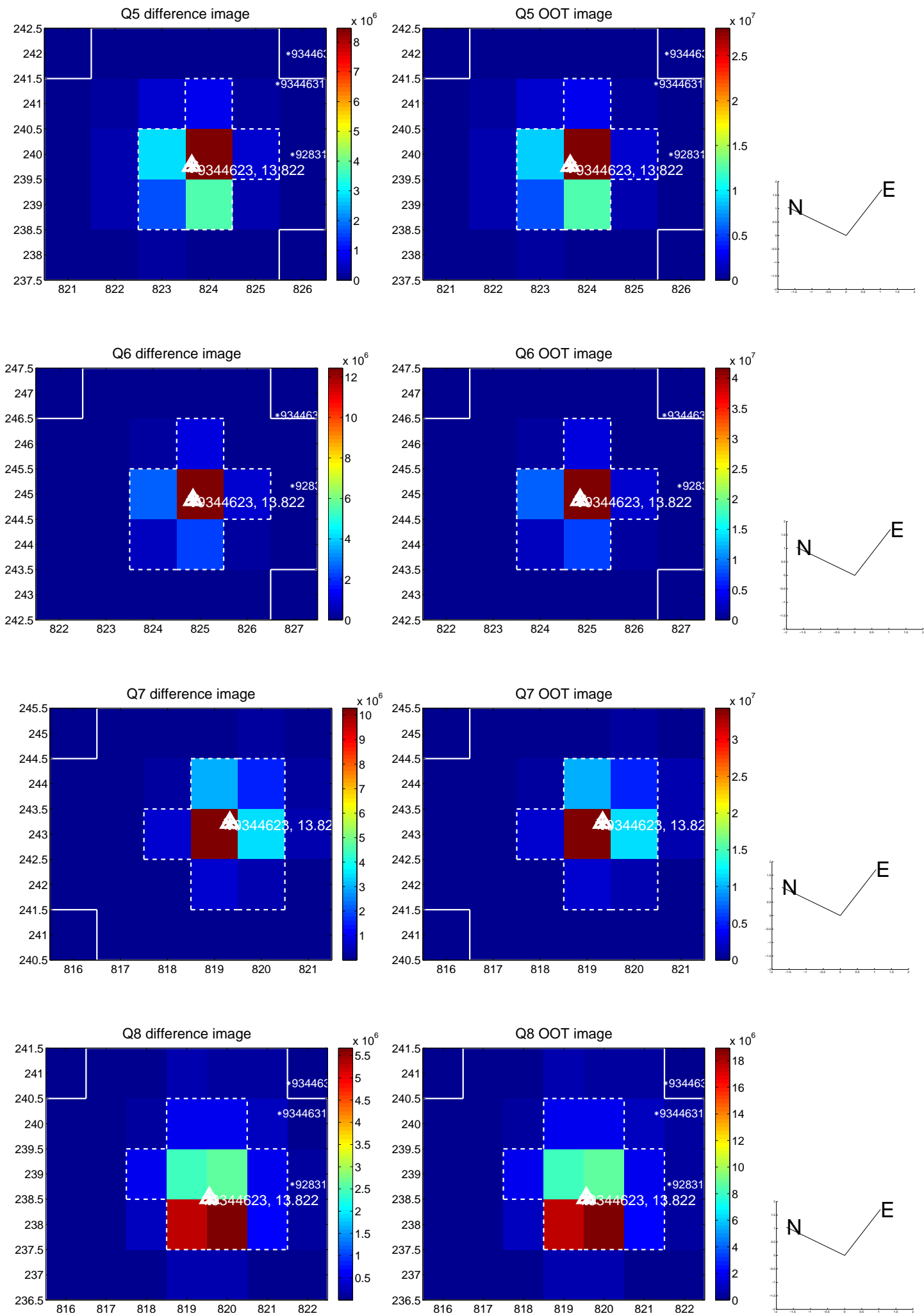


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

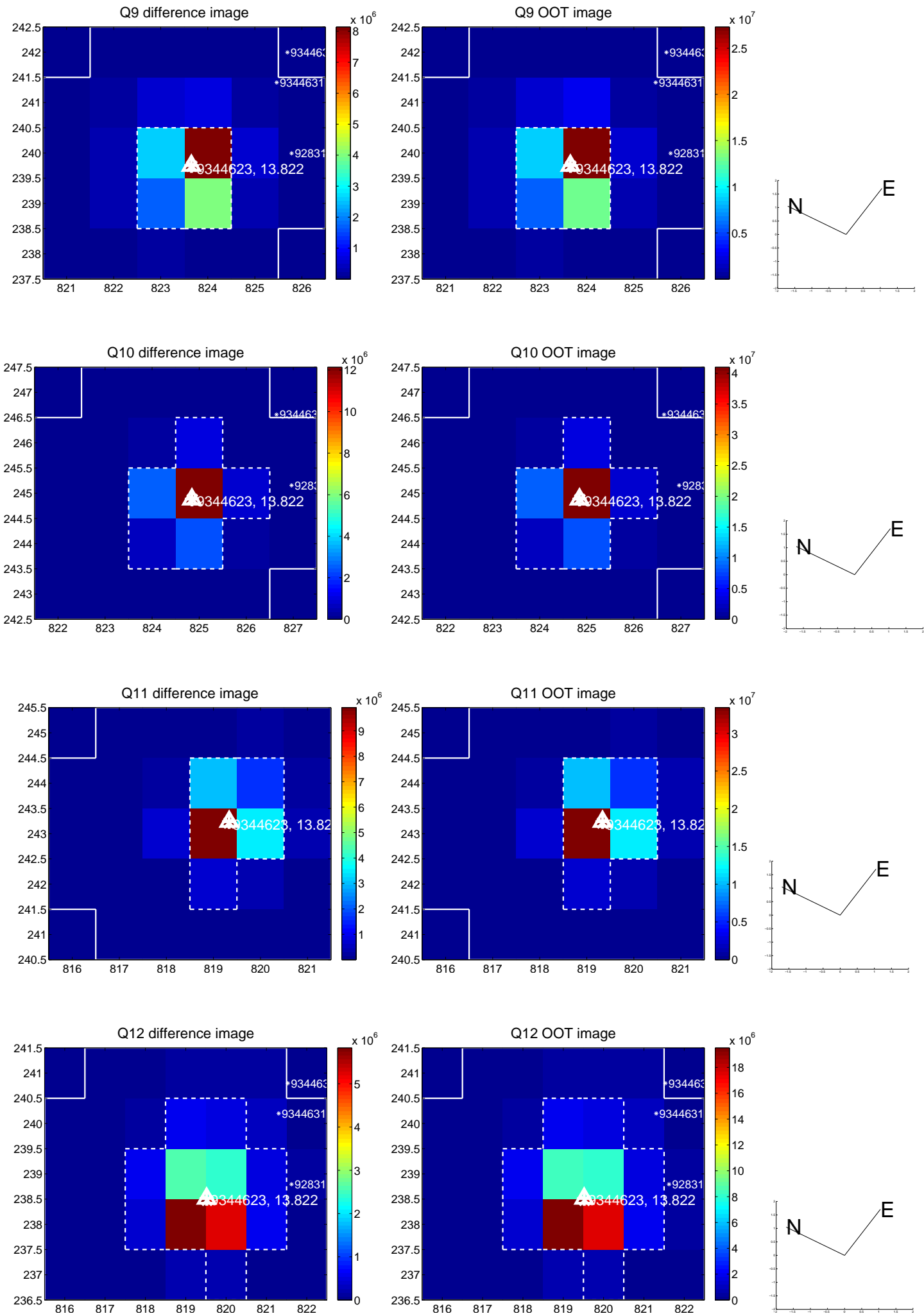


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

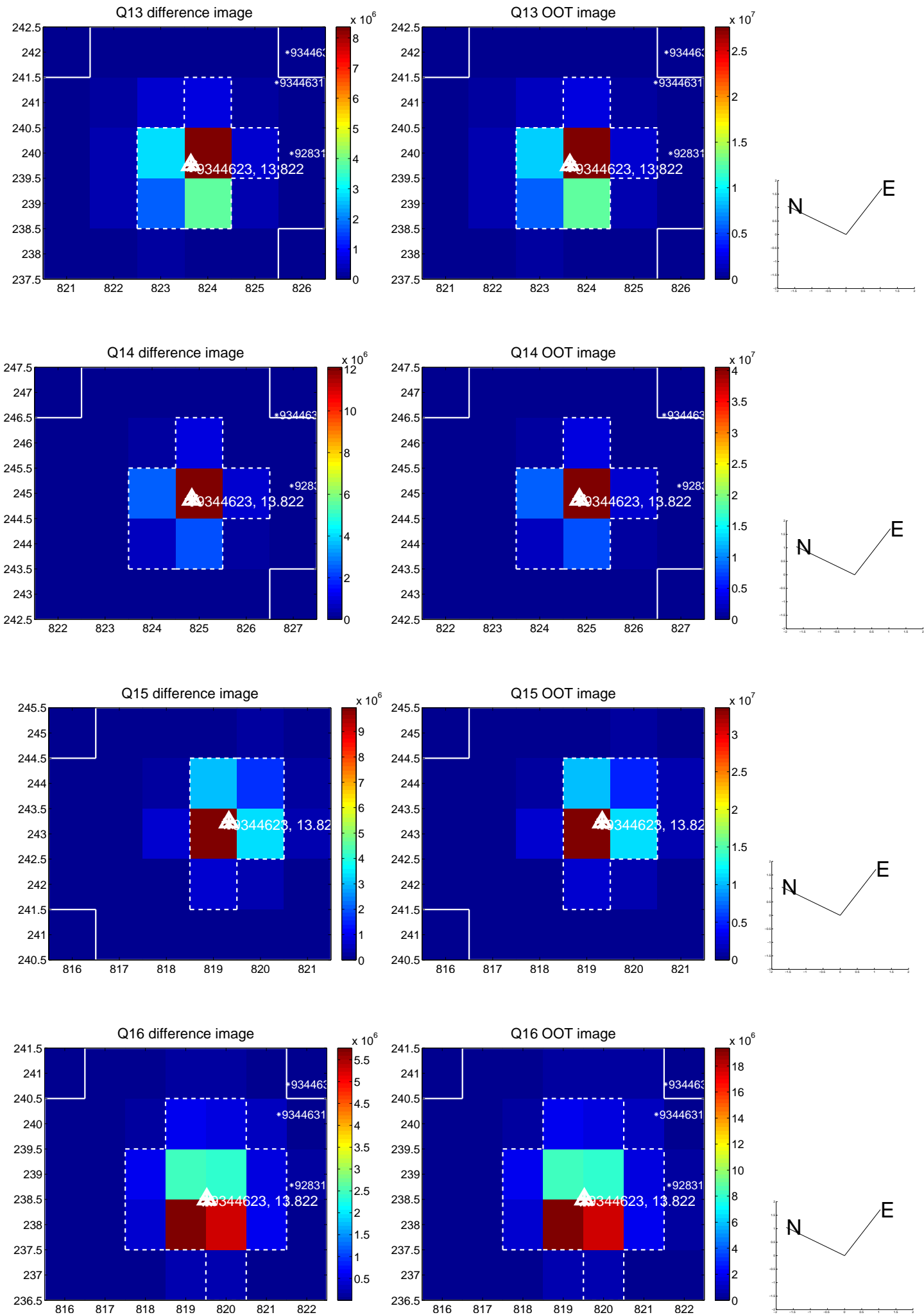




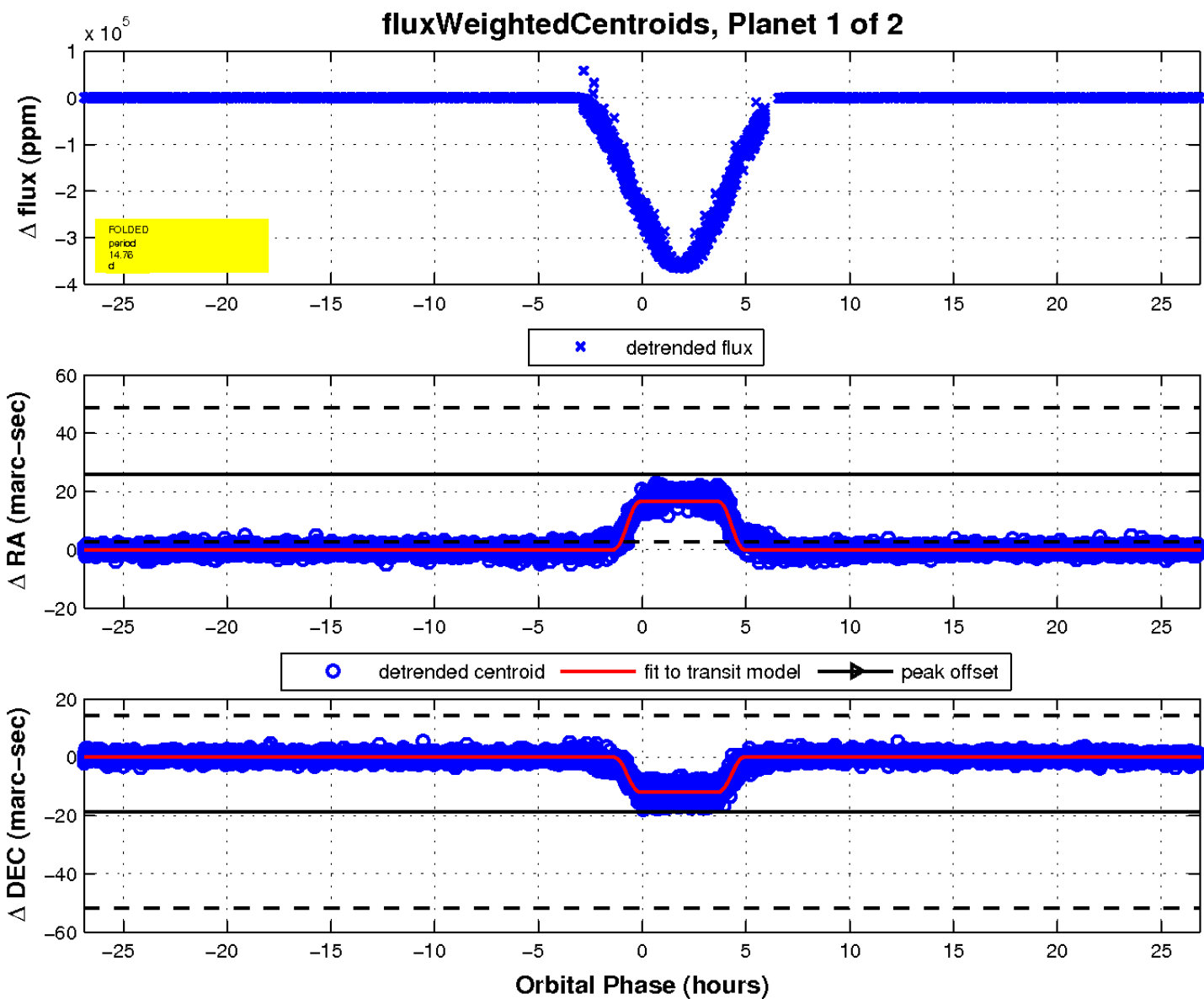
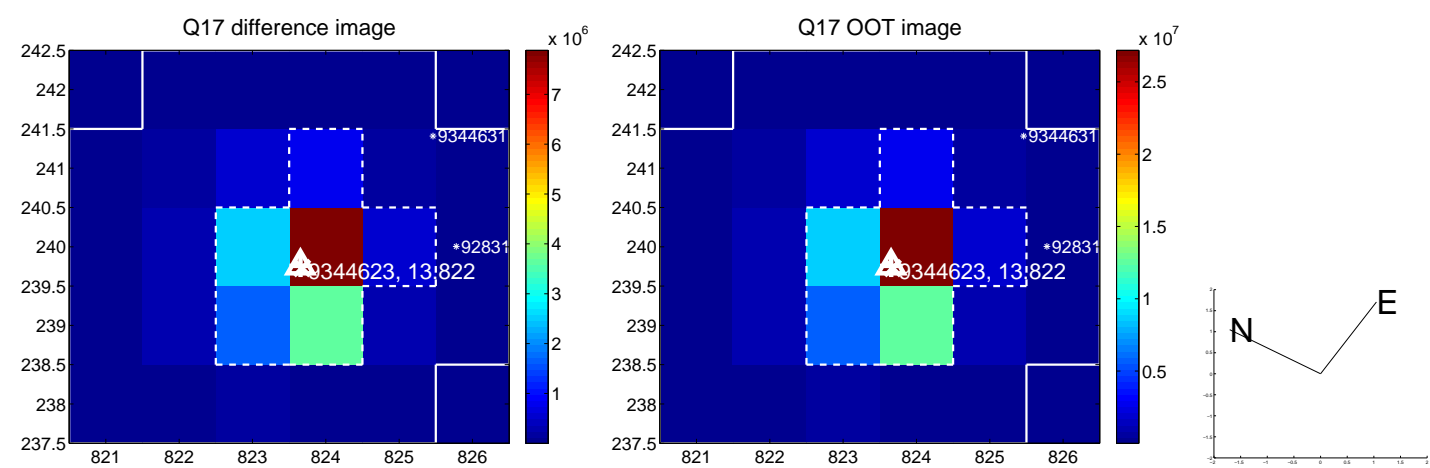
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

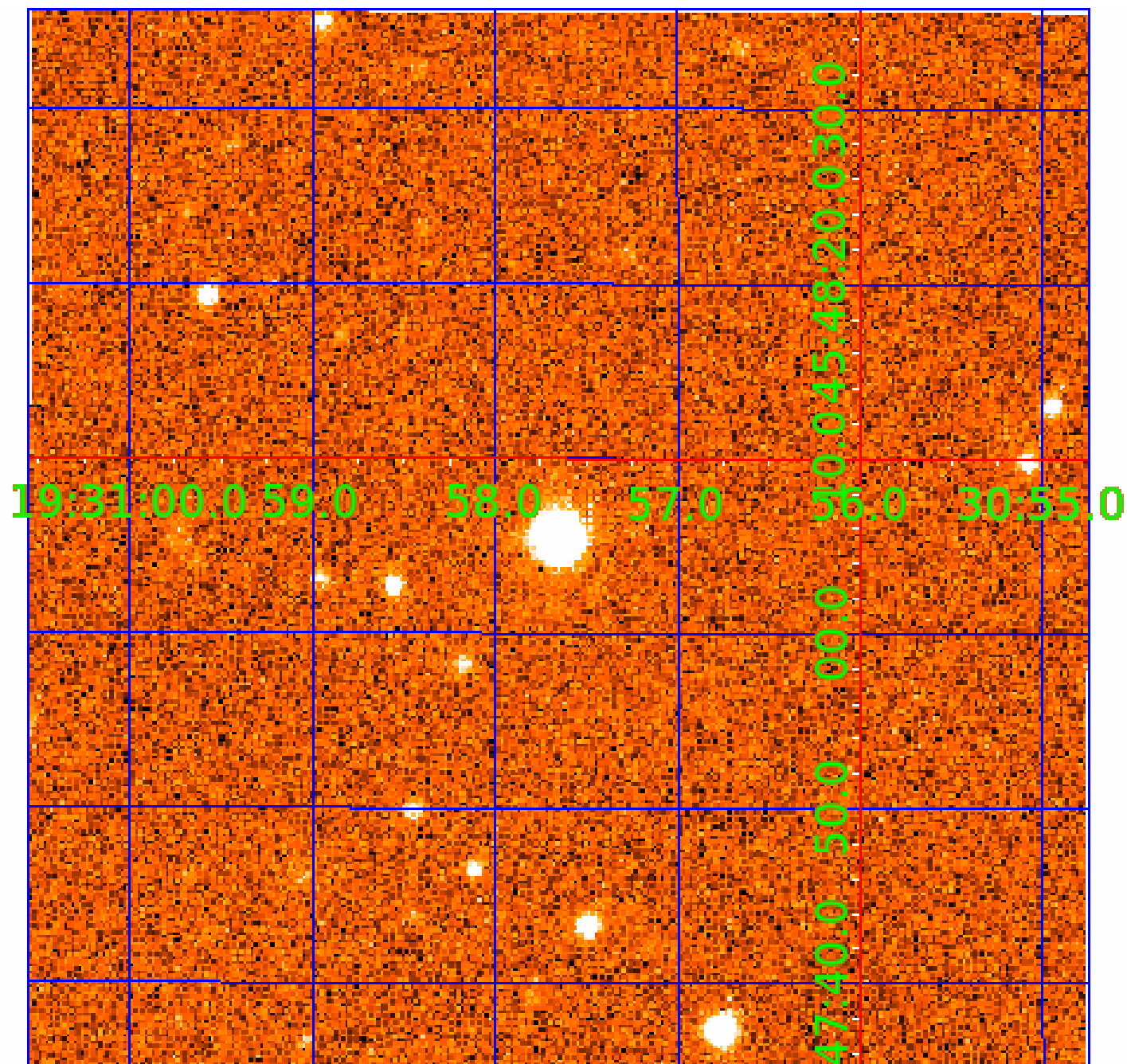


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination



# KIC 009344623

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009344623-01	OBS	7163.01	14.759196	139.783180	363404.4	6.000	22832.9	-1.0	1.10	6522	60.29	130.99
009344623-02	OBS	No	14.759488	145.783900	335229.4	7.933	21115.2	8557.0	1.10	6522	72.22	130.99

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009344623-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_ALT—MOD_ODDEVEN_ALT—HAS_SEC_TCE—CENT_NOFITS
009344623-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

**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 009344623-02

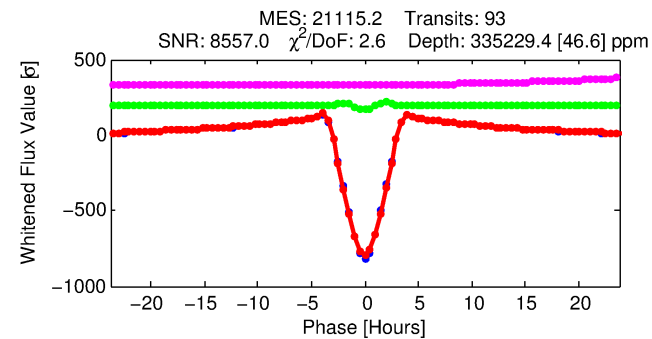
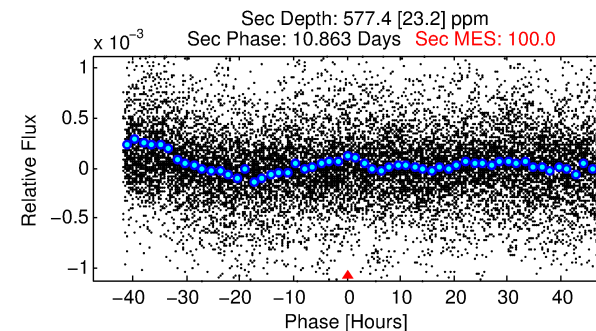
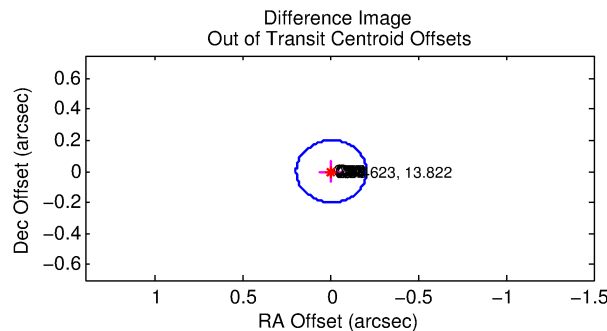
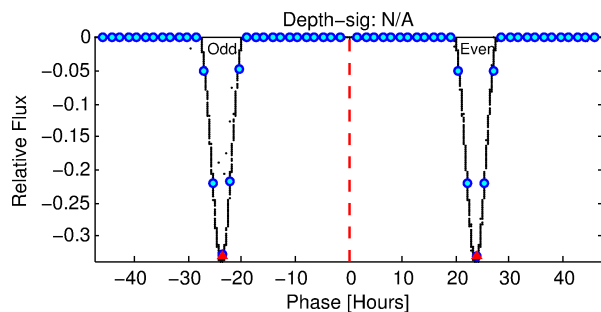
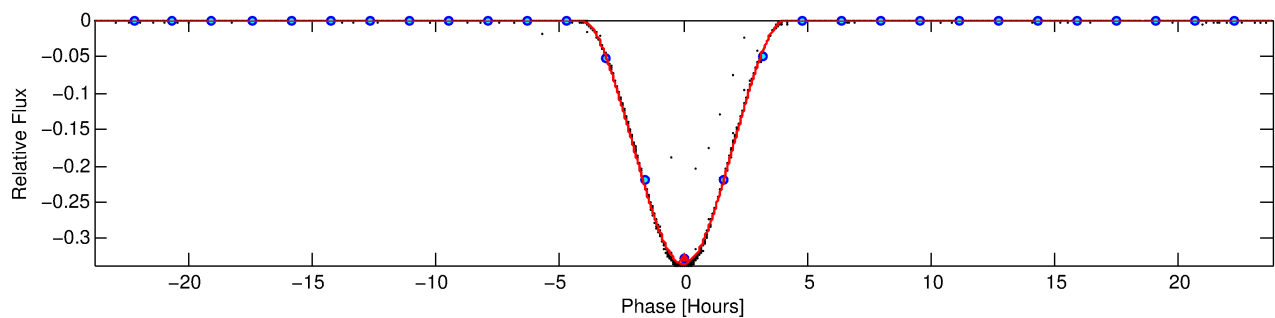
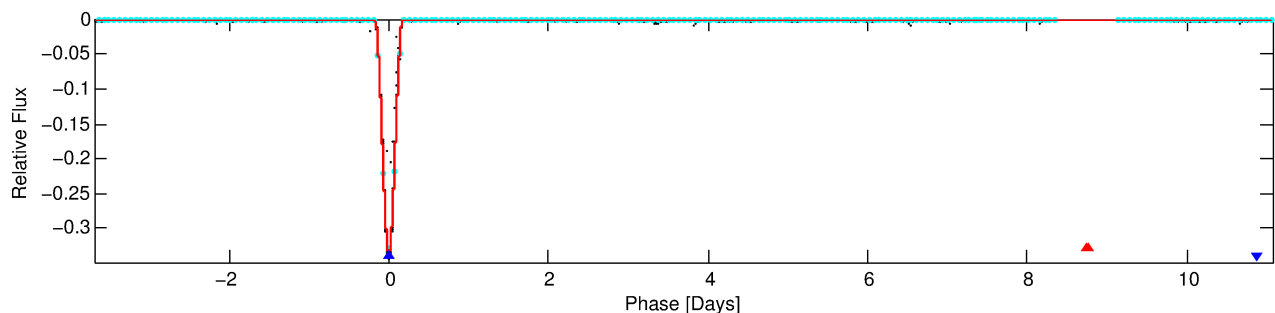
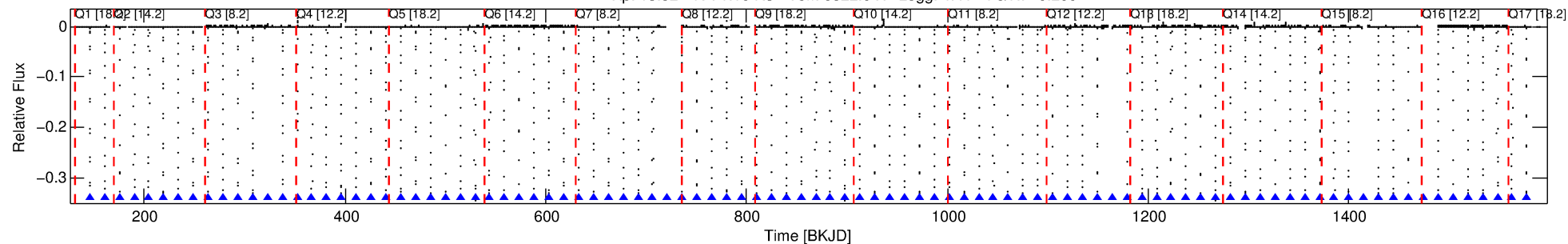
No Significant Match Found

# DV One-Page Summary

KIC: 9344623 Candidate: 2 of 2 Period: 14.759 d

KOI: K07163 Corr: No Ephemeris Match

Kp: 13.82 R\*: 1.10 Rs Teff: 6522.0 K Logg: 4.41 Fe/H: -0.260



## DV Fit Results:

Period = 14.75949 [0.00000] d  
Epoch = 145.7839 [0.0000] BKJD  
Rp/R\* = 0.5990 [0.0014]  
a/R\* = 21.37 [0.01]  
b = 0.55 [0.00]  
Seff = 130.99 [52.15]  
Teq = 863 [86] K  
Rp = 72.22 [22.16] Re  
a = 0.1229 [0.0319] AU  
Ag = 0.92 [0.35] [-0.23σ]  
Teffp = 1306 [42] K [4.65σ]

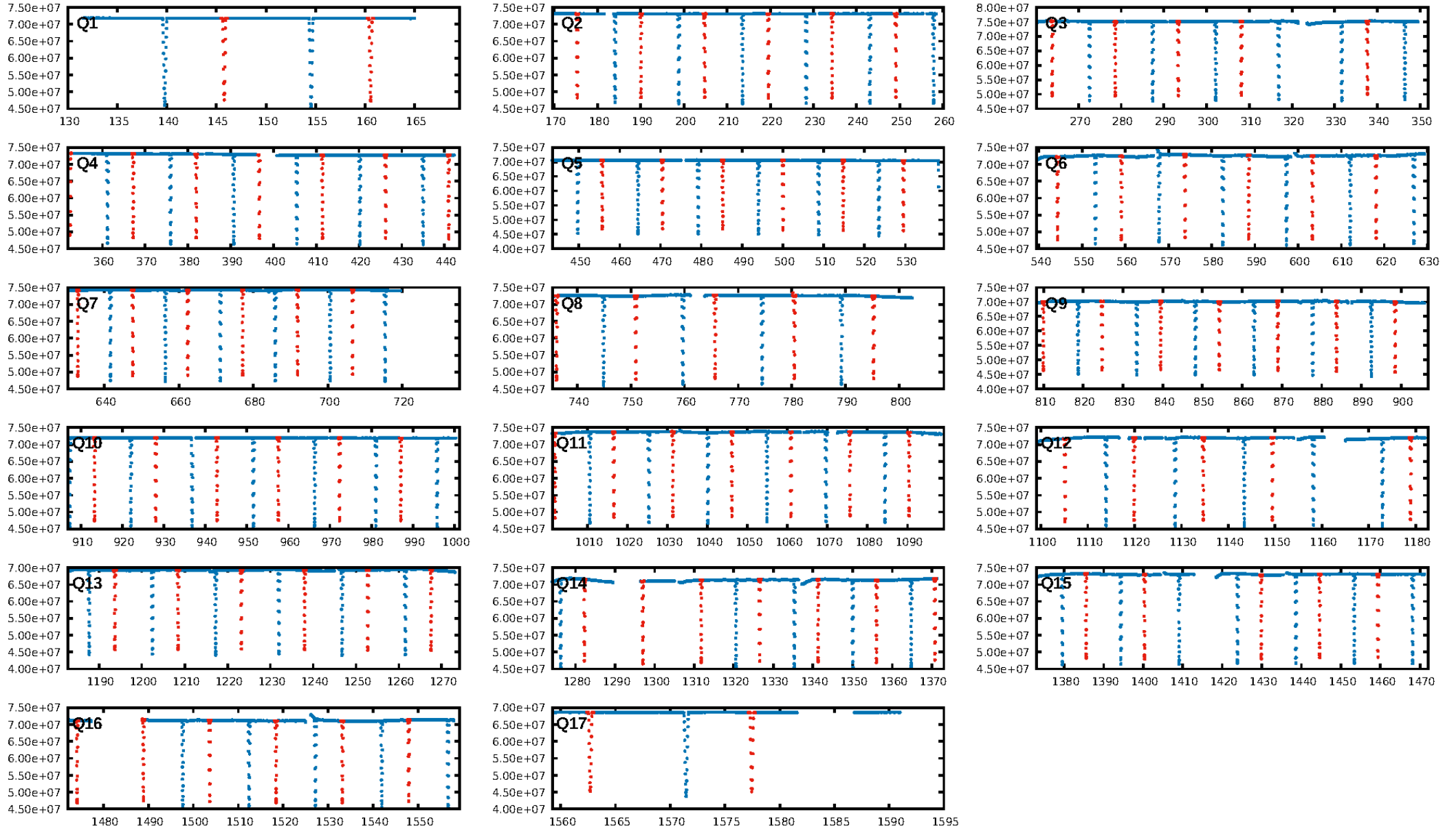
## DV Diagnostic Results:

ShortPeriod-sig: 0.1% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 0.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [89/89]  
GhostDiagnostic-chr: 5.851  
Centroid-sig: 0.0%  
Centroid-so: 0.054 arcsec [125.16σ]  
OotOffset-rm: 0.004 arcsec [0.06σ]  
KicOffset-rm: 0.074 arcsec [1.10σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 22:03:58 Z

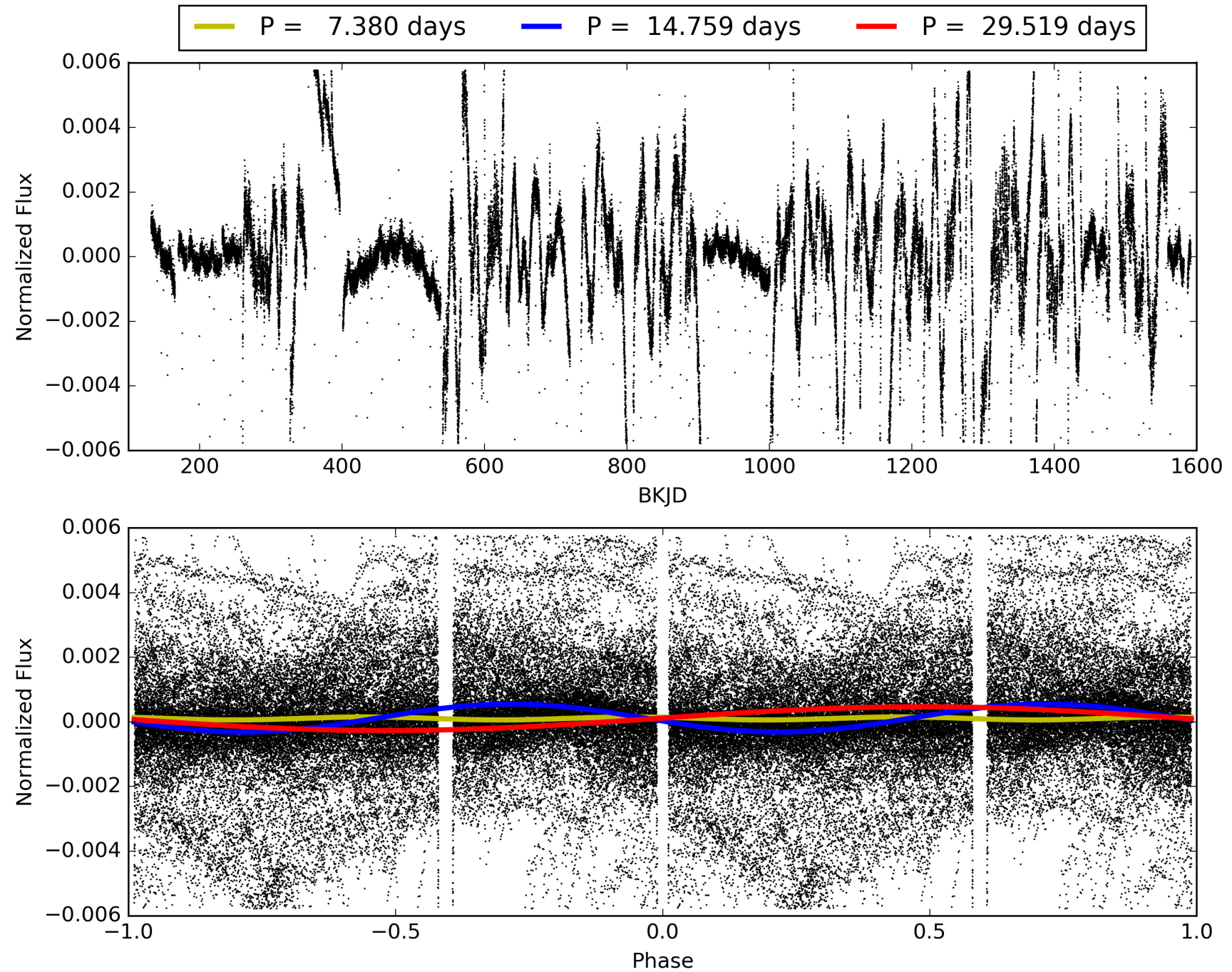
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009344623-02, PDC Light Curves





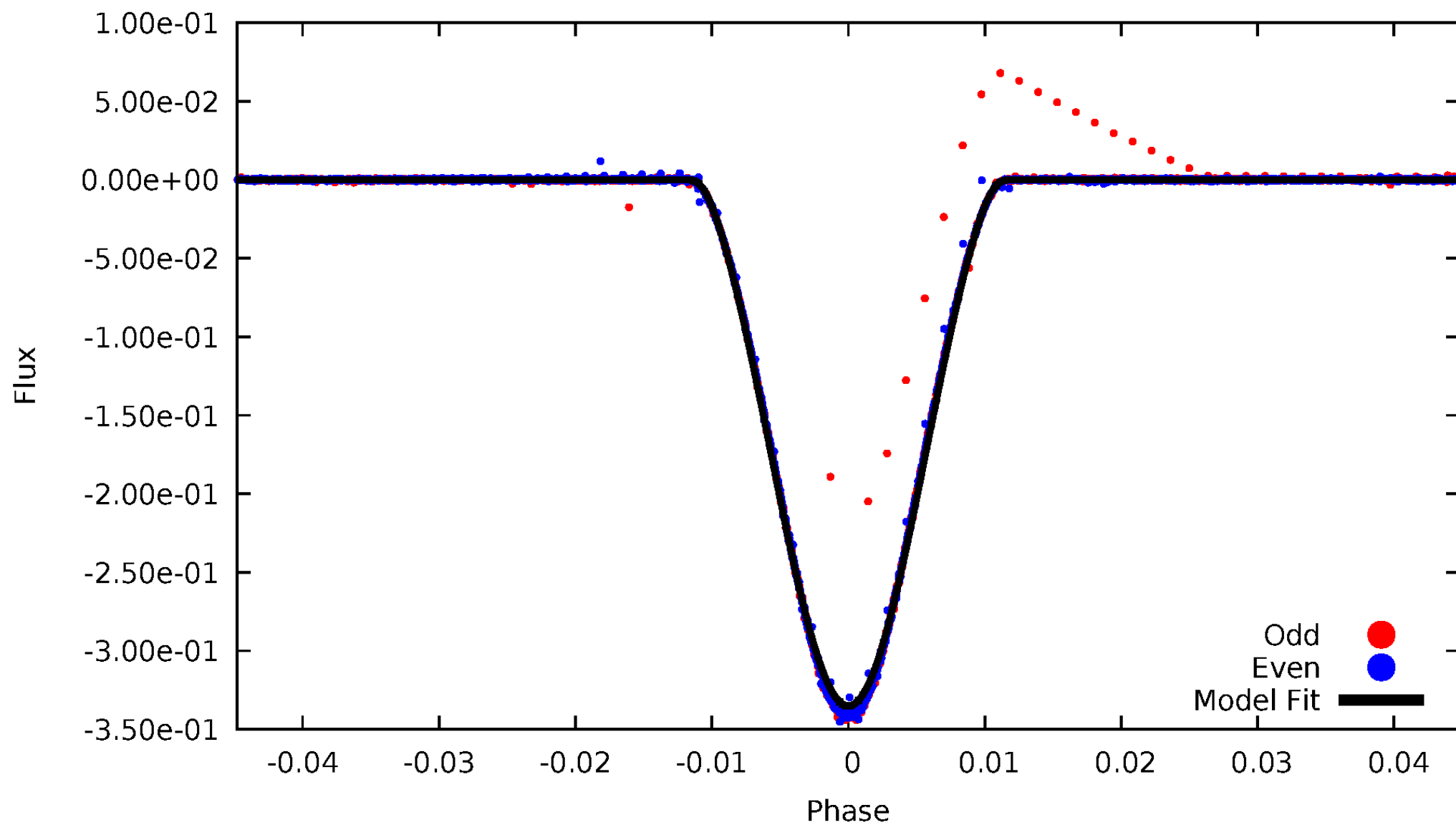
TCE 009344623-02





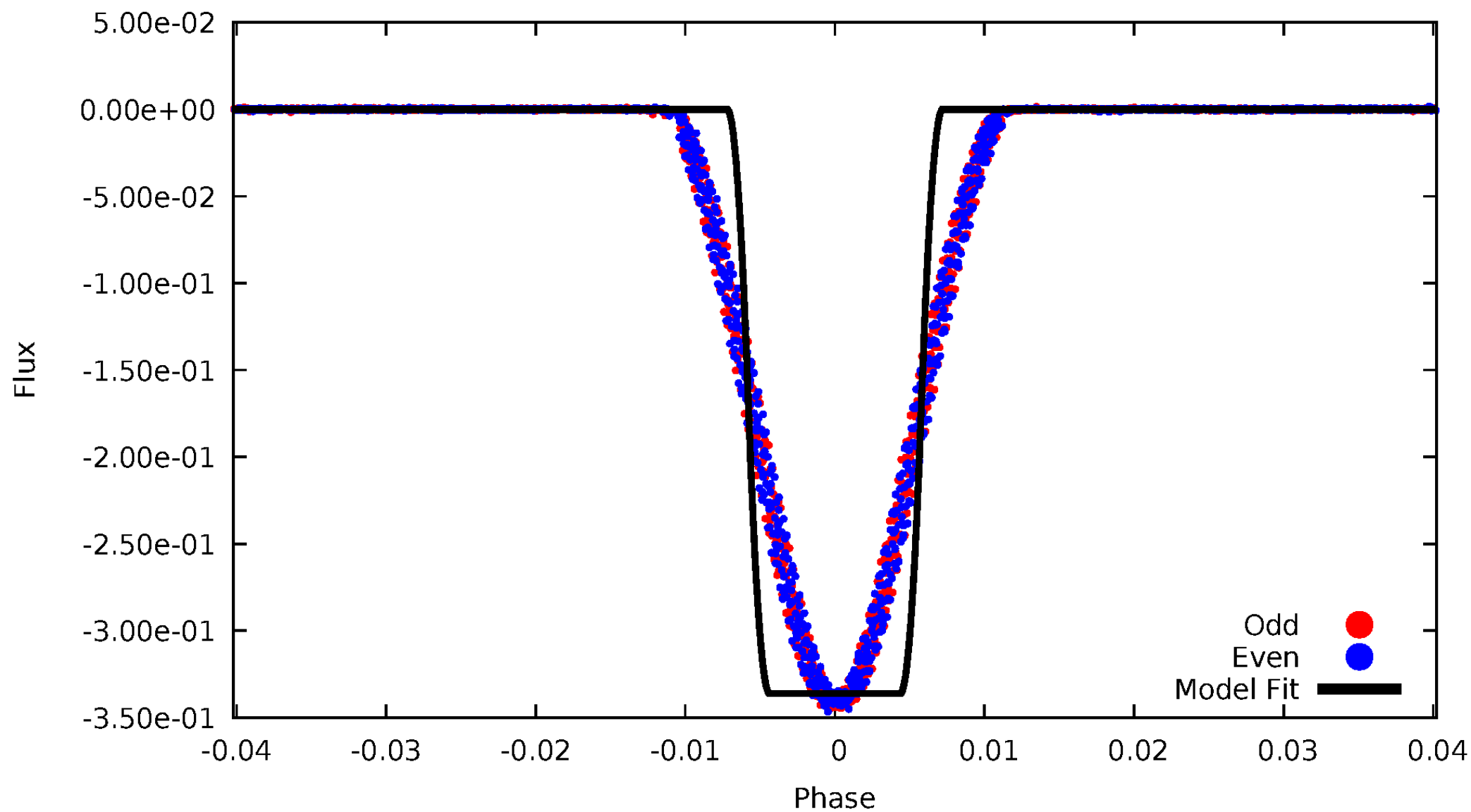
# DV Odd/Even

TCE 009344623-02



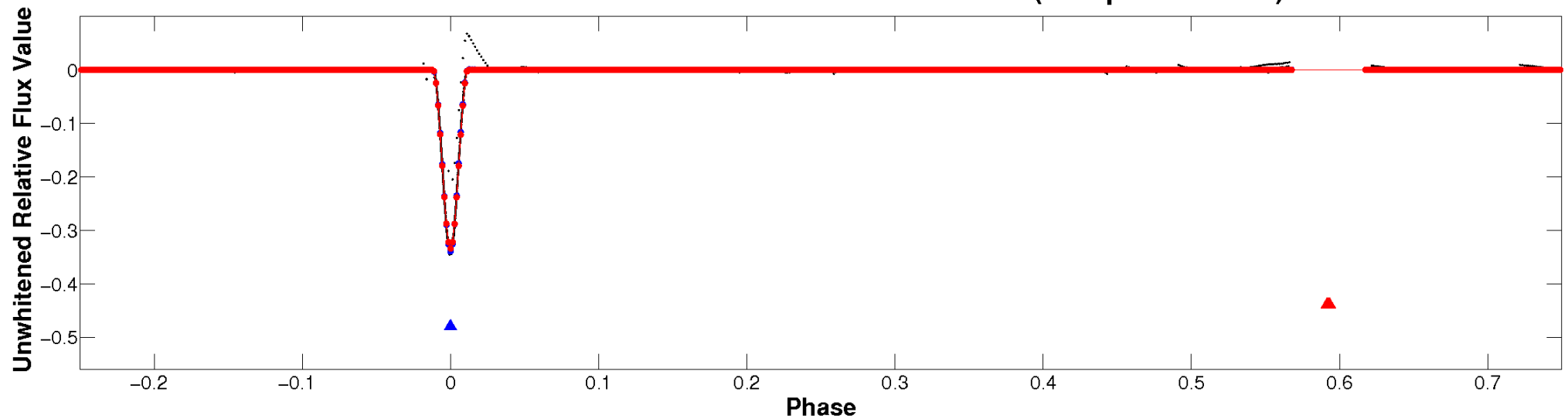
# ALT Odd/Even

TCE 009344623-02

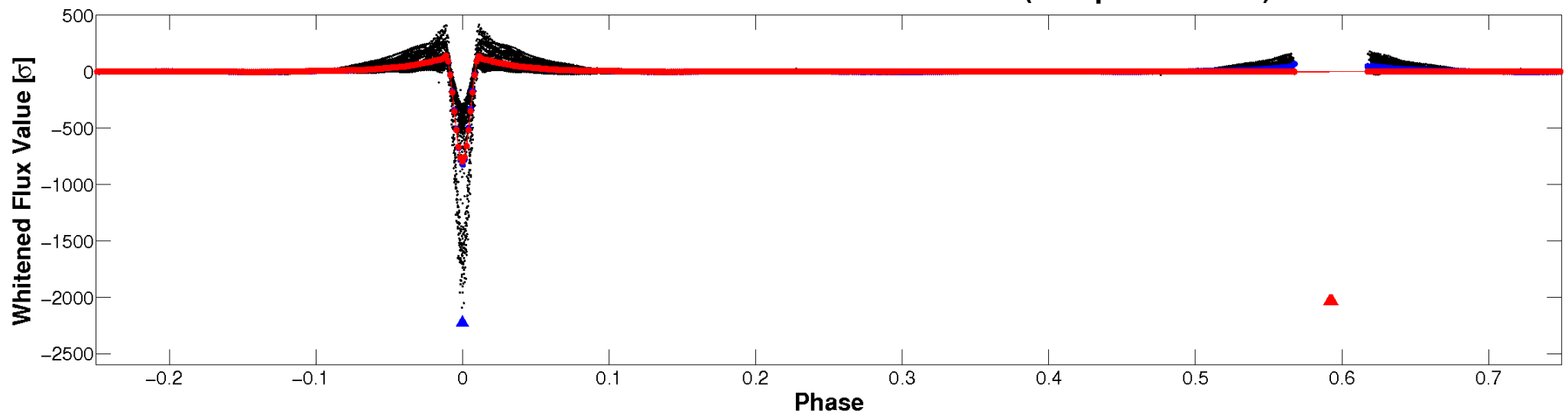


# Non-Whitened Vs. Whitened Light Curve

## Planet 2 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

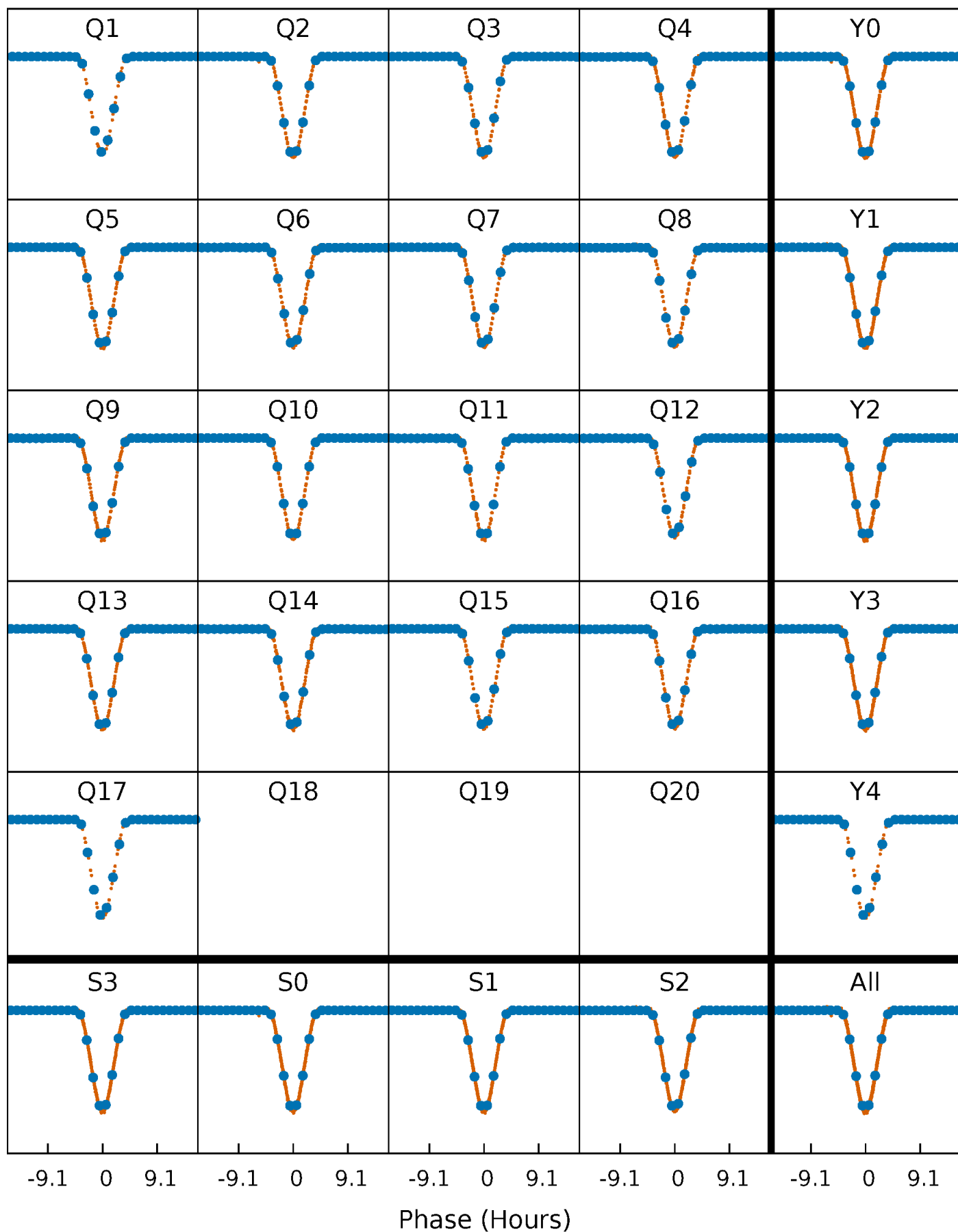


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



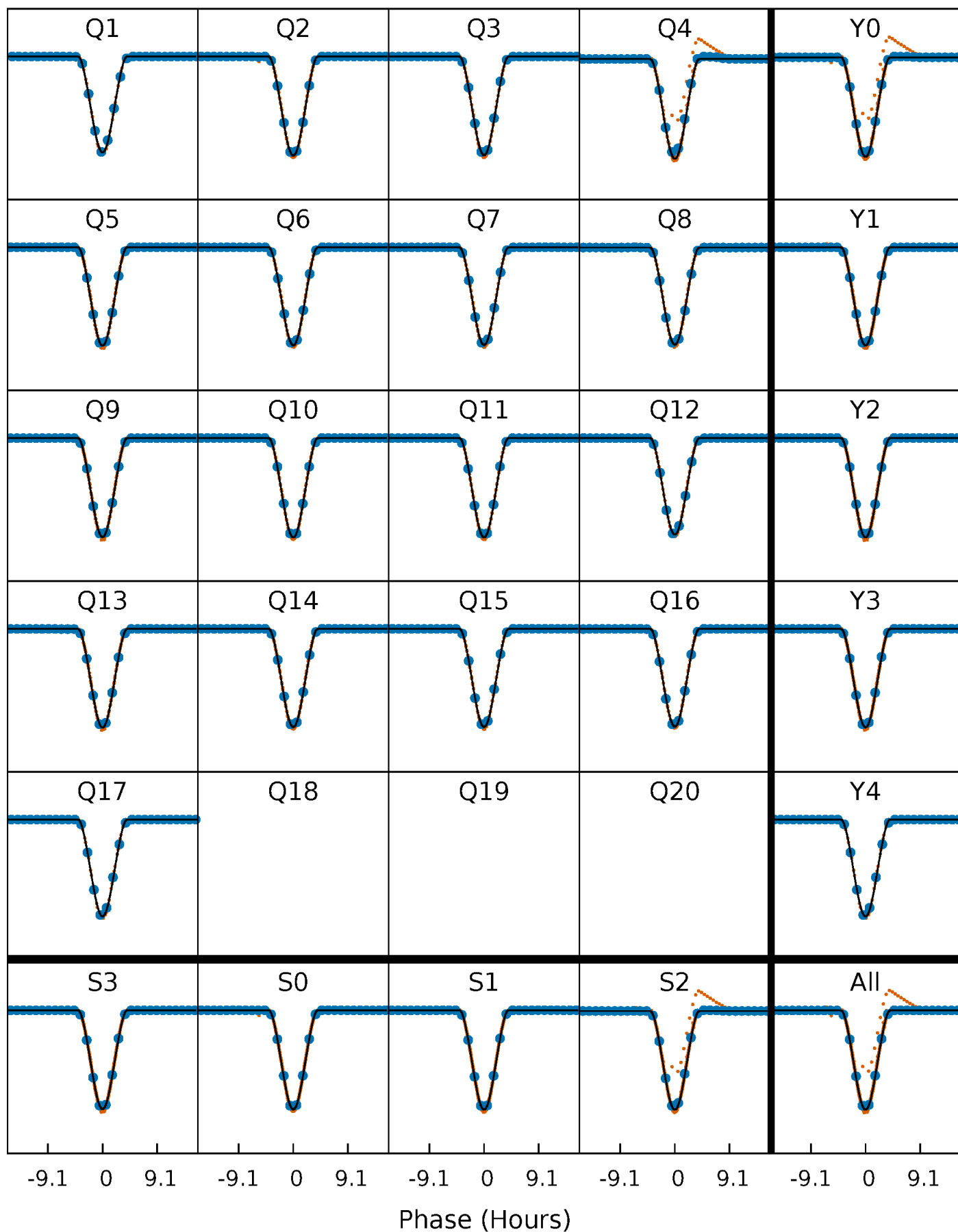
# PDC Quarter-Phased Transit Curves

TCE 009344623-02 P= 14.759488 Days  $T_0=145.783900$  (BKJD)



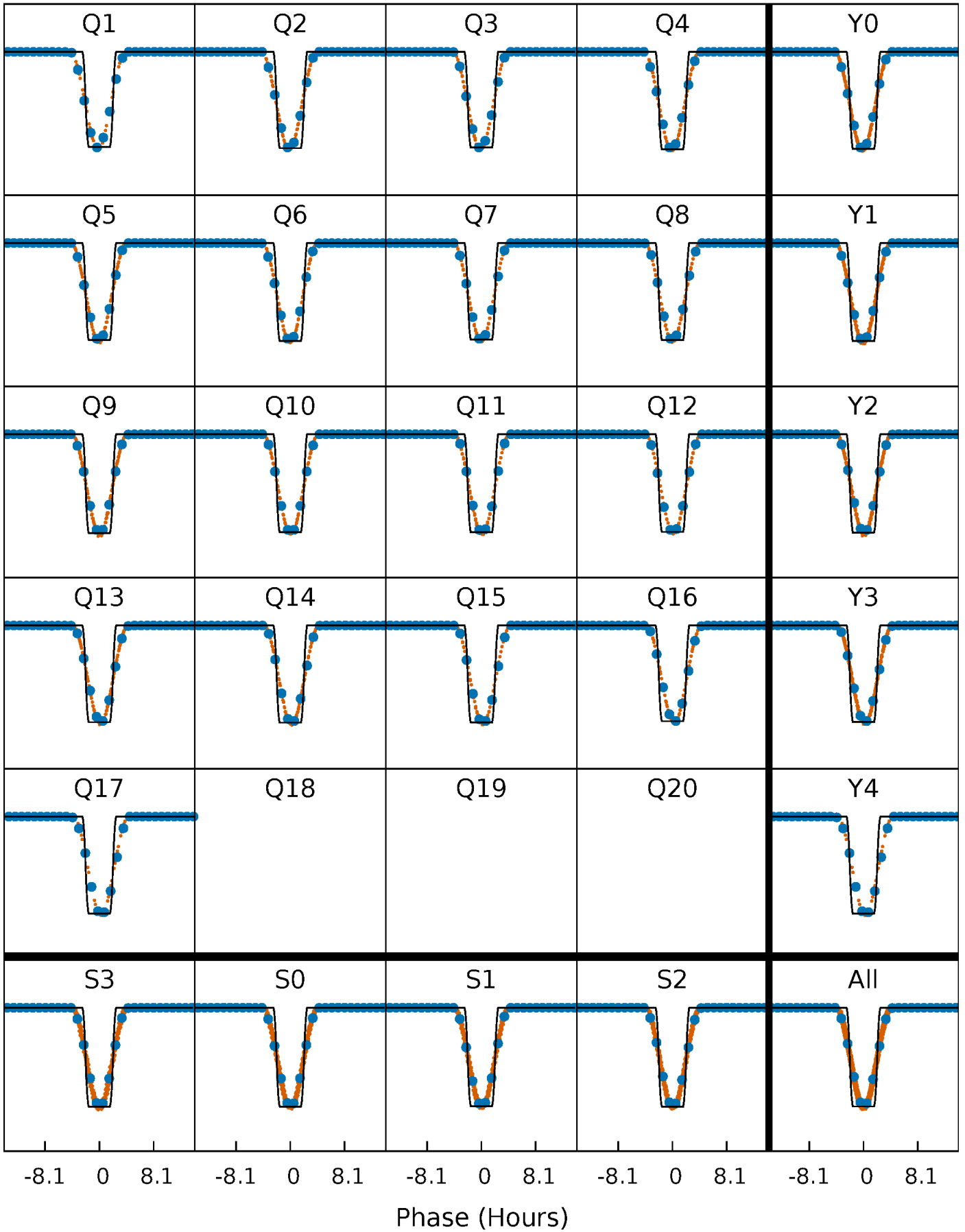
# DV Quarter-Phased Transit Curves

TCE 009344623-02 P= 14.759488 Days  $T_0=145.783900$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

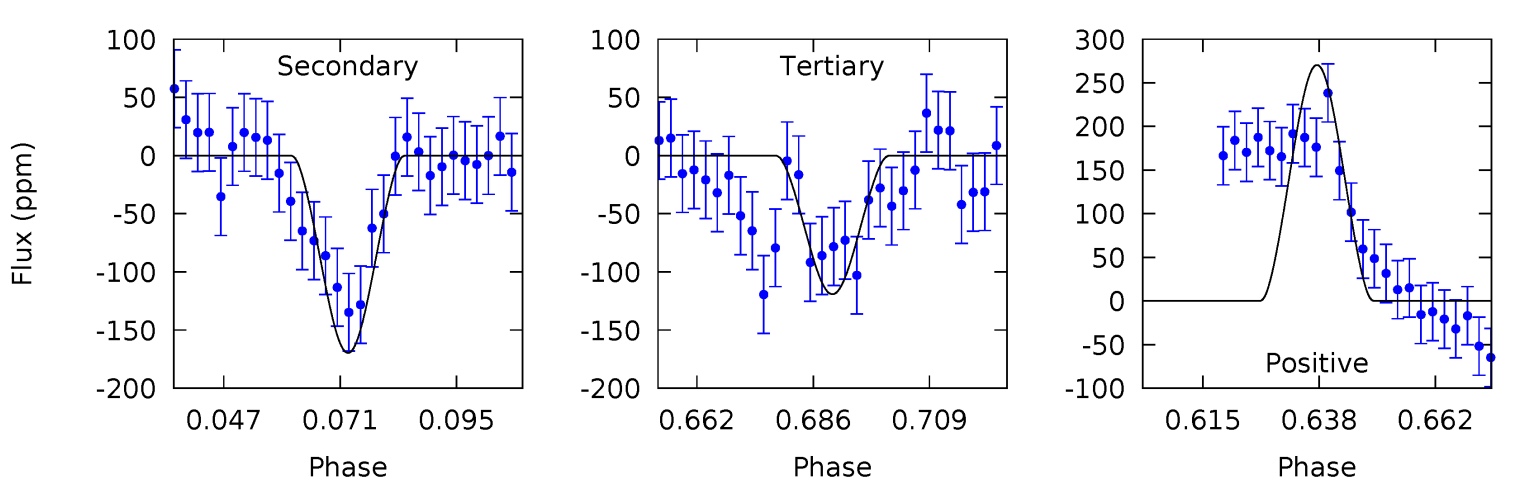
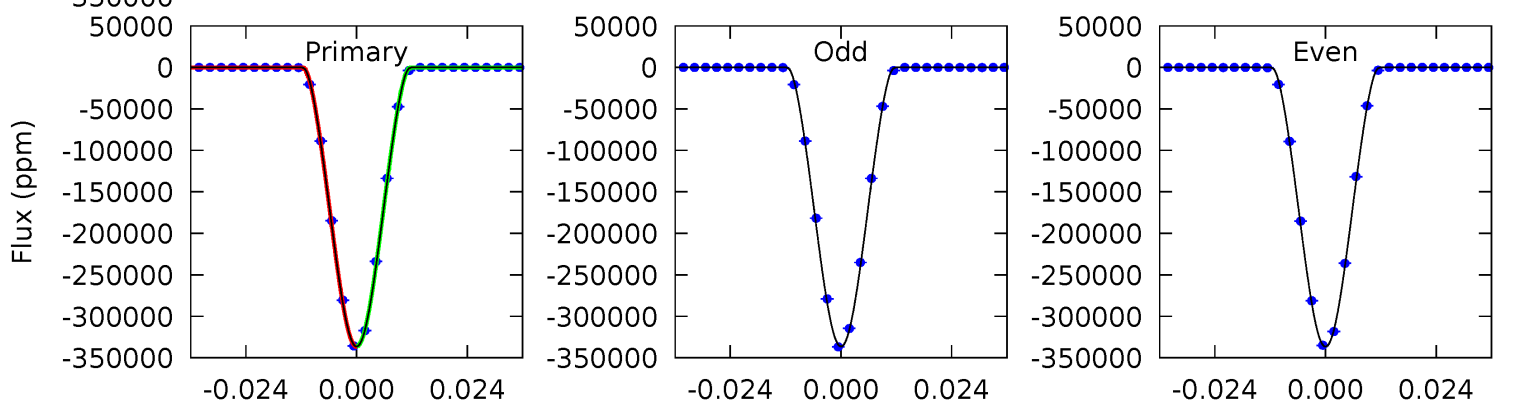
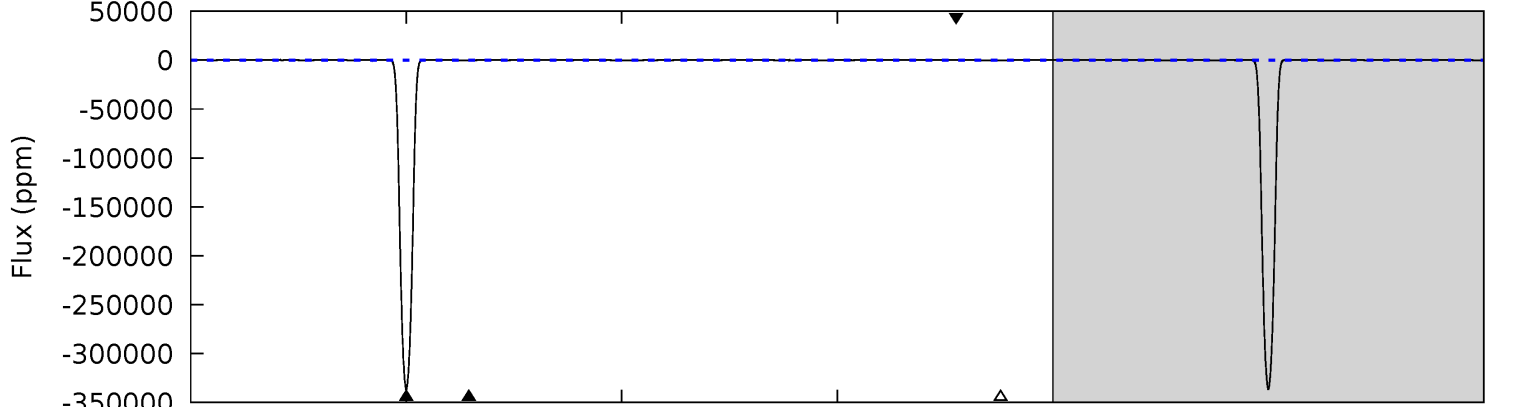
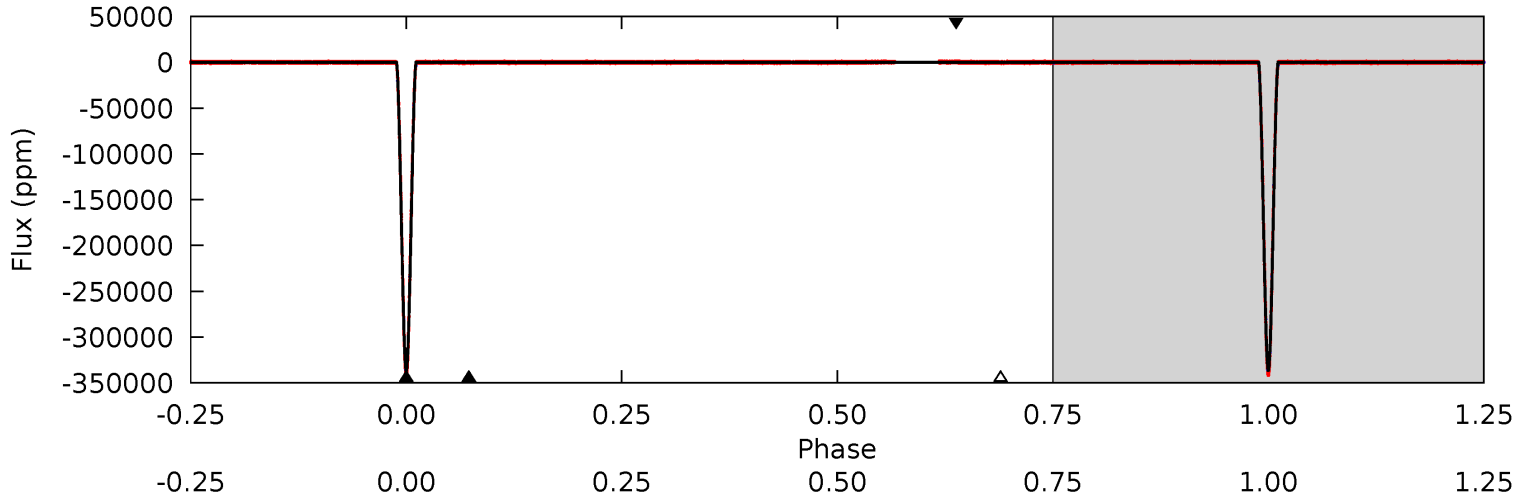
TCE 009344623-02 P= 14.759291 Days  $T_0=145.791473$  (BKJD)



# DV Model-Shift Uniqueness Test

009344623-02, P = 14.759488 Days, E = 131.024412 Days

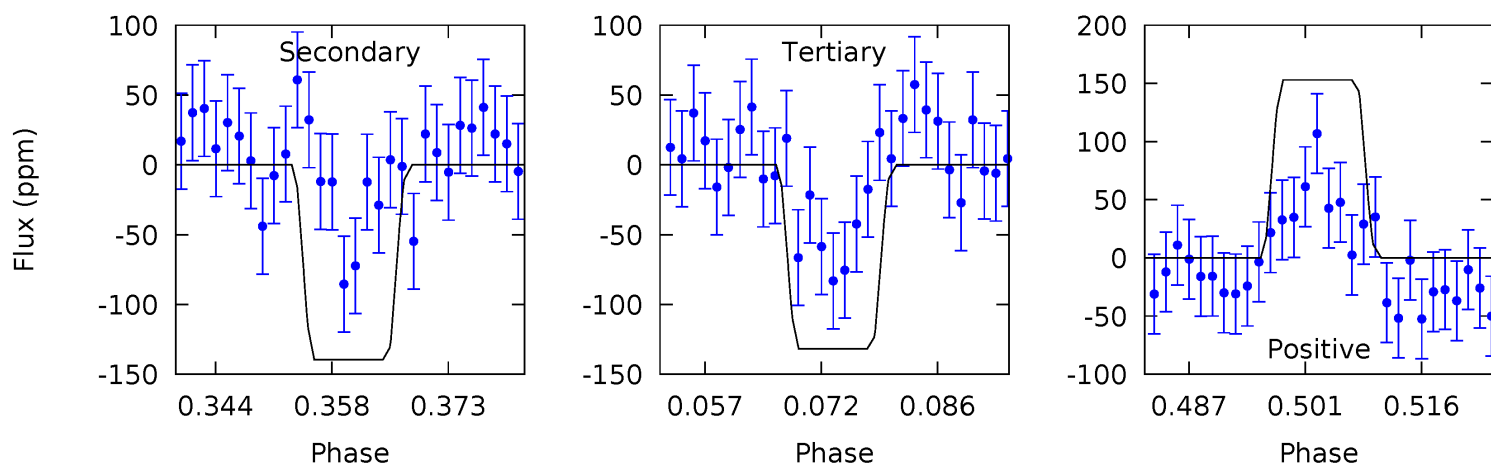
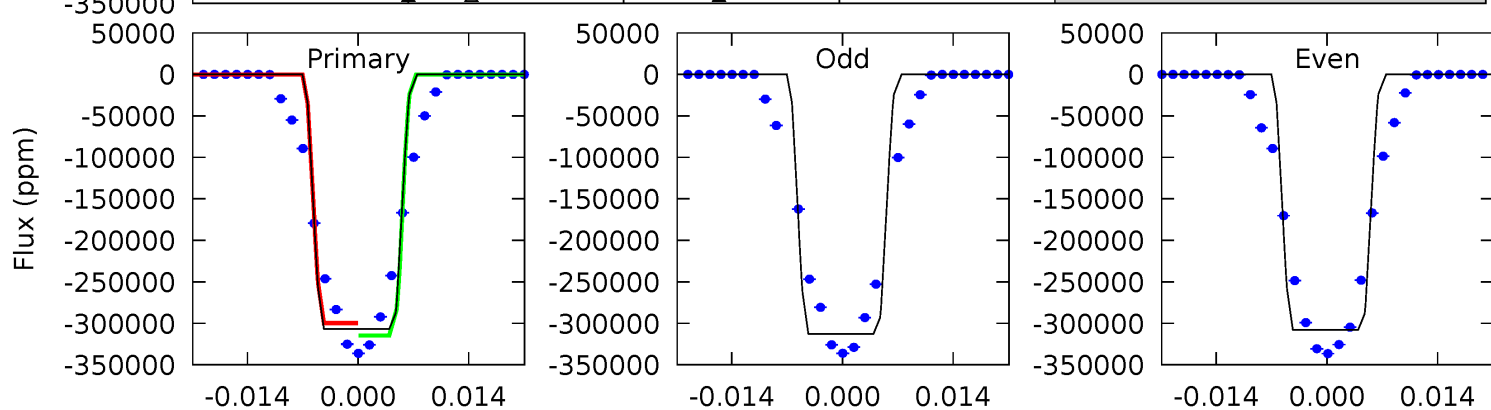
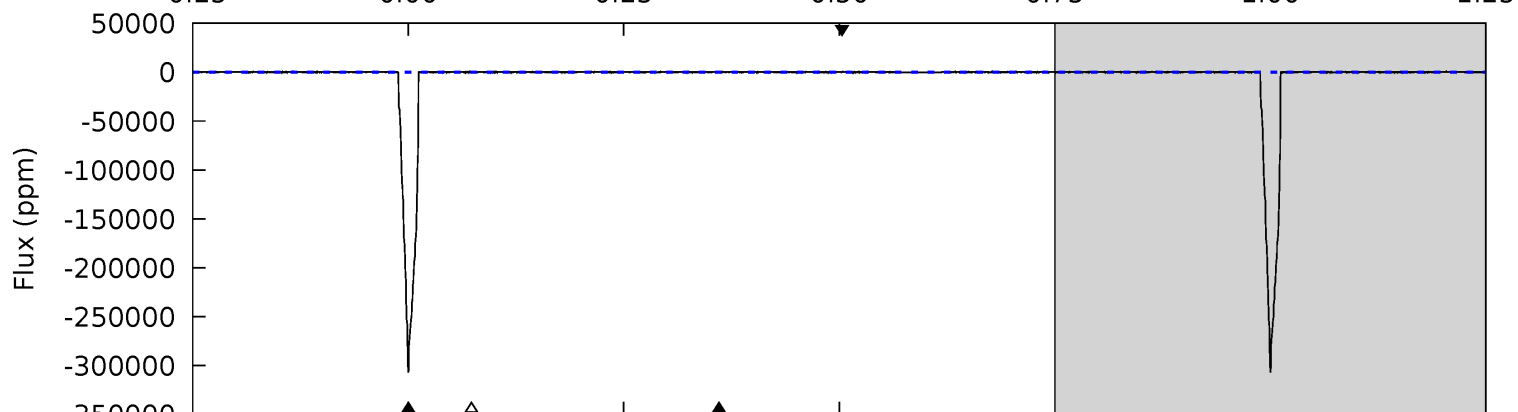
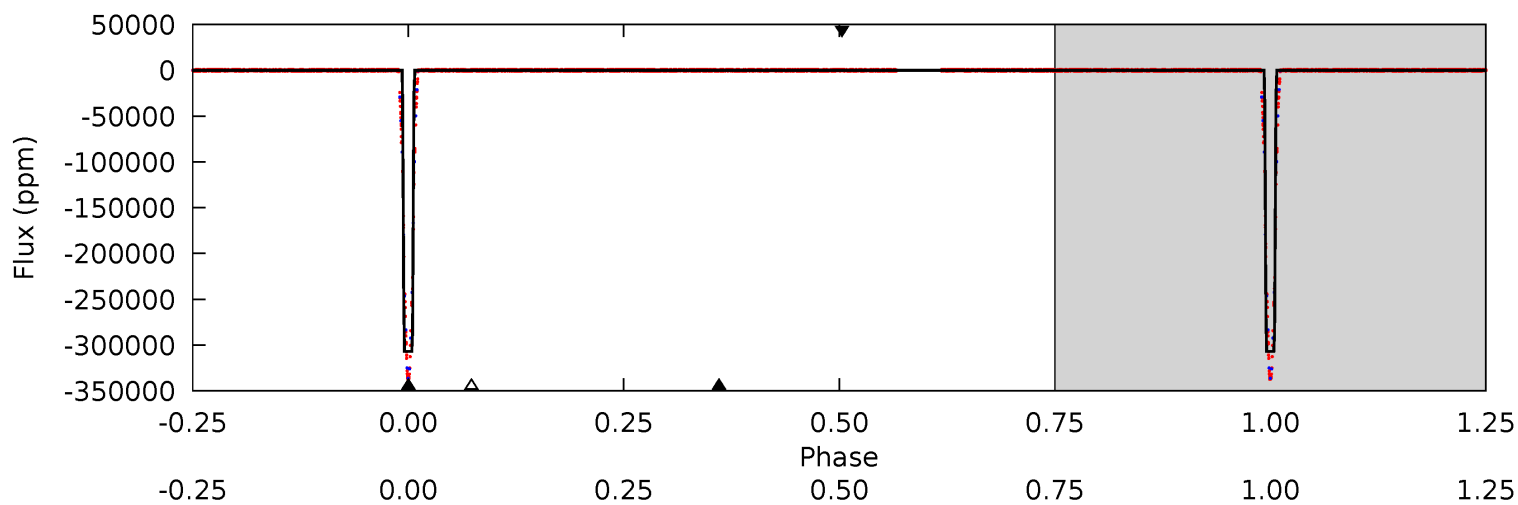
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
31935	16.1	11.3	25.7	4.86	2.26	6.85	31924	31910	4.79	-9.58	13.9	0.99	0.00	35.2



# Alt Model-Shift Uniqueness Test

009344623-02, P = 14.759291 Days, E = 131.032182 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
8666	3.94	3.72	4.32	4.96	2.45	1.08	8662	8662	0.22	-0.38	70.1	1.00	0.00	0





### Stellar Parameters For KIC 009344623

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6522^{+158}_{-198}$	$4.407^{+0.065}_{-0.208}$	$-0.260^{+0.250}_{-0.300}$	$1.105^{+0.339}_{-0.136}$	$1.135^{+0.165}_{-0.150}$	$1.186^{+0.324}_{-0.611}$
	+2%/-3%	+1%/-5%	+96%/-115%	+31%/-12%	+15%/-13%	+27%/-52%
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 009344623-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-170 \pm 11$	$73.34^{+13.21}_{-6.02}$	$1223^{+91}_{-63}$	$-1669^{+355}_{-190}$	$0.255^{+0.043}_{-0.062}$
Alt.	$-140 \pm 35$	$71.08^{+12.25}_{-5.64}$	$1227^{+91}_{-63}$	$-1774^{+362}_{-146}$	$0.215^{+0.080}_{-0.070}$

$T_{max}$  = 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  $A_{obs} \gg 1.0$

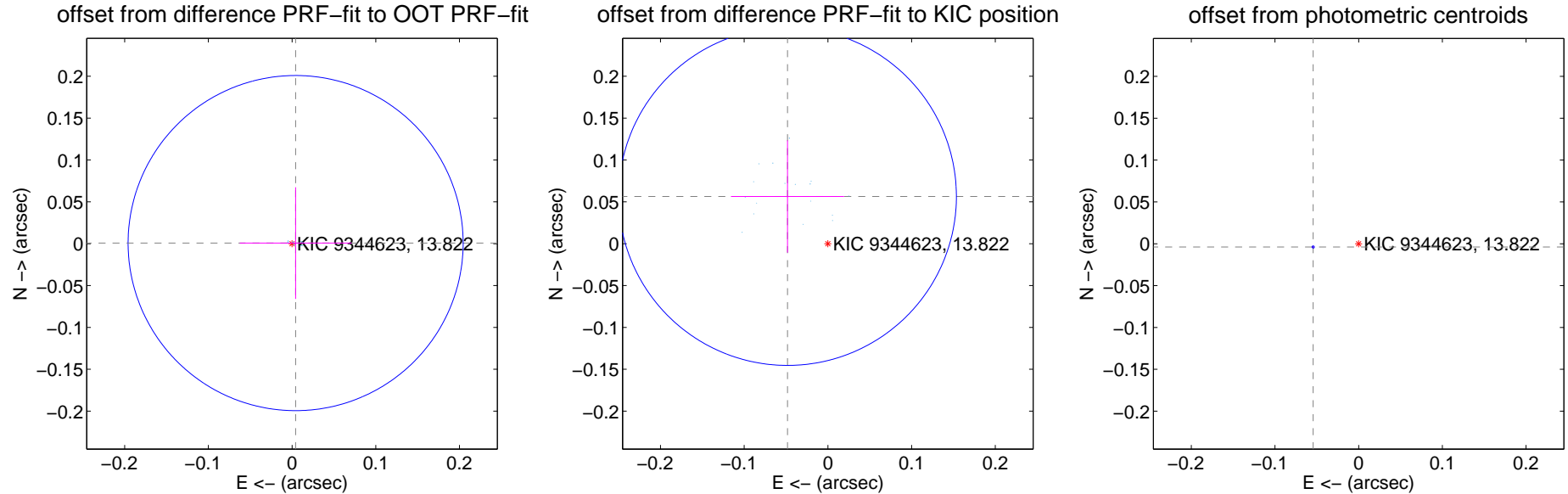
## DV Centroid Data

Supplemental centroid analysis for 009344623-02. Kepler magnitude: 13.82. Transit SNR 8556.95

There are 17 quarters with good PRF difference image offsets

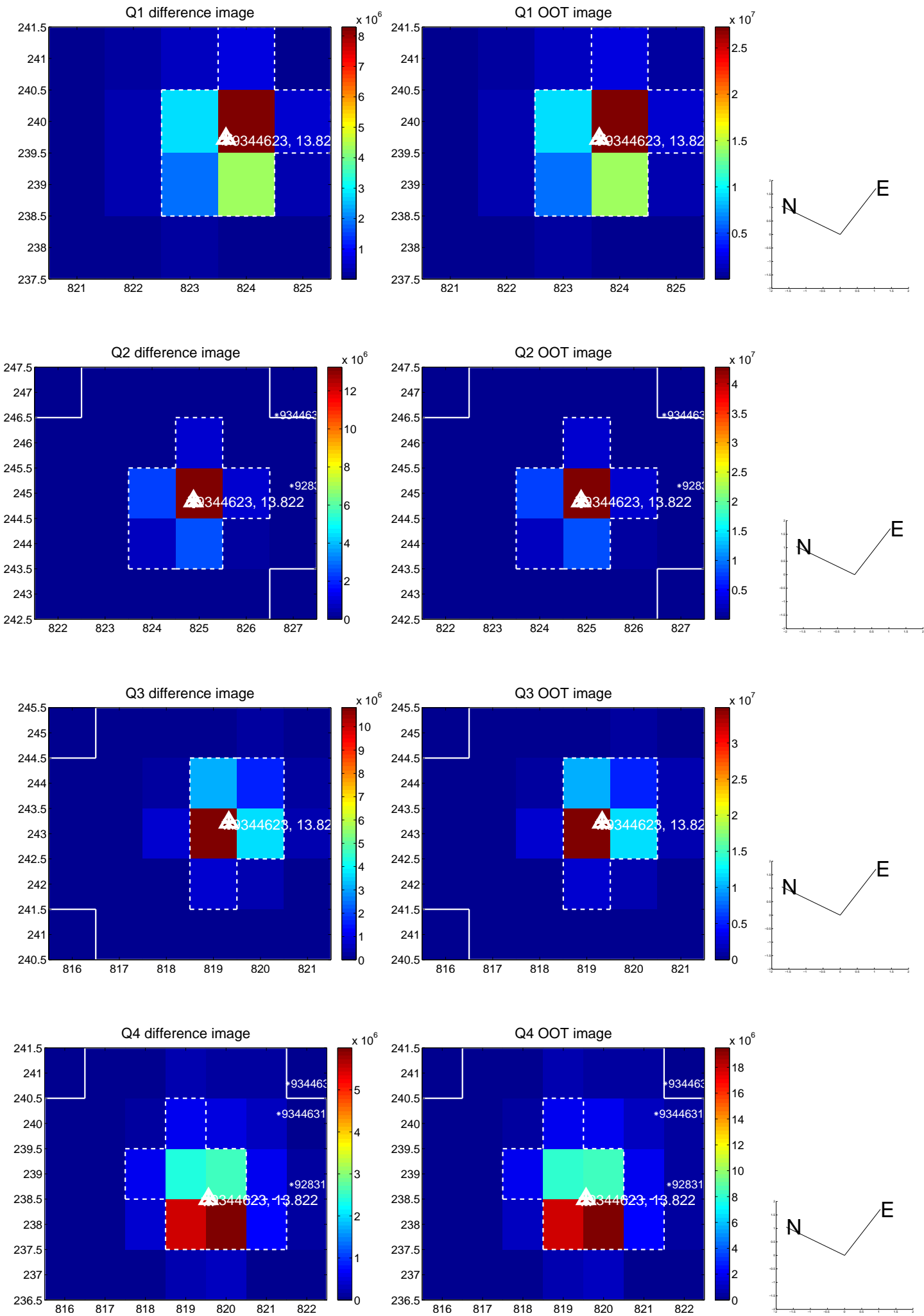
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.004 \pm 0.067$	0.06	$-0.004 \pm 0.067$	$0.001 \pm 0.067$
PRF-fit source offset from KIC position	$0.074 \pm 0.067$	1.10	$0.048 \pm 0.068$	$0.056 \pm 0.067$
photometric centroid source offset	$0.05 \pm 0.00$	125.16	$0.05 \pm 0.00$	$-0.00 \pm 0.00$

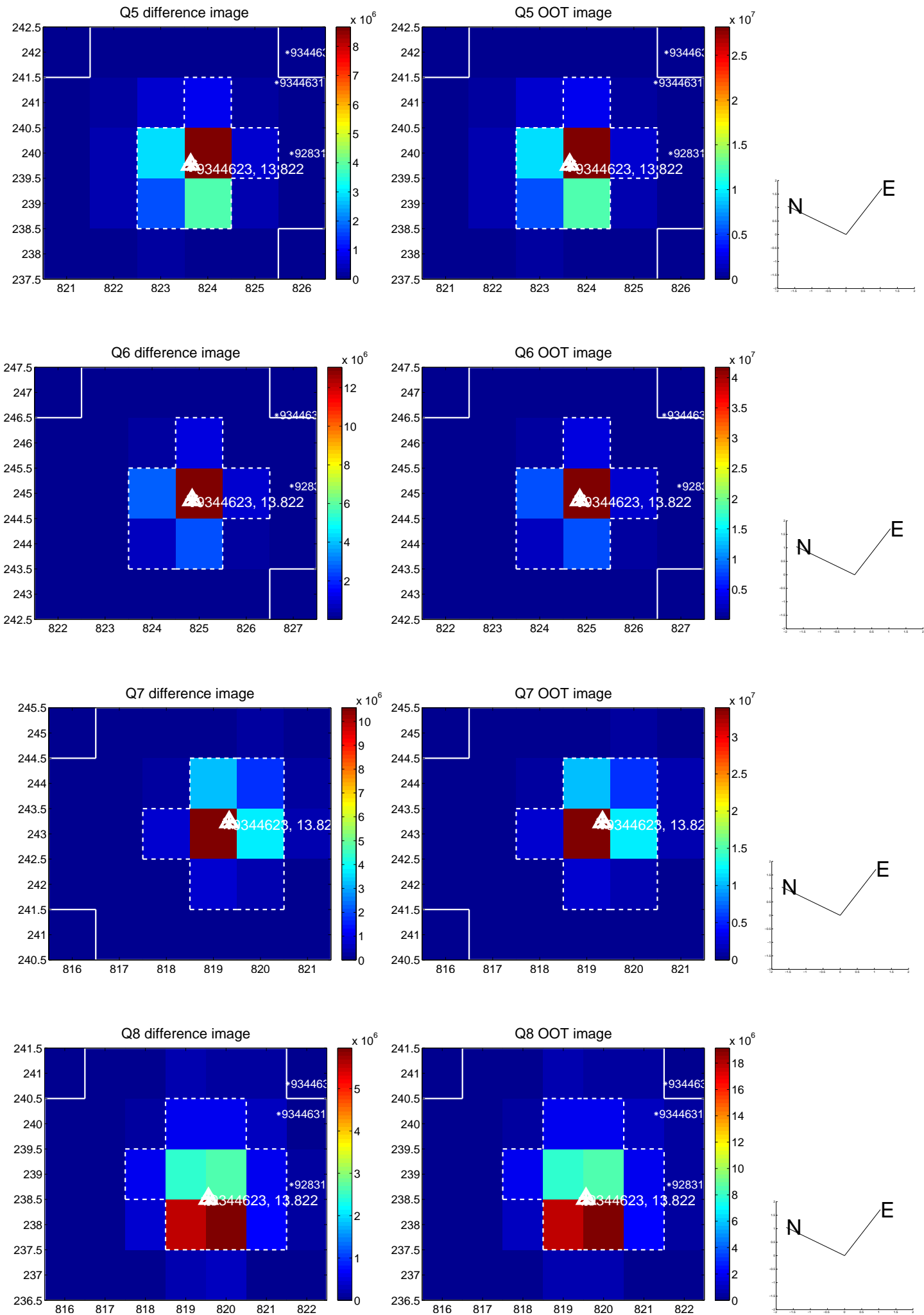


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

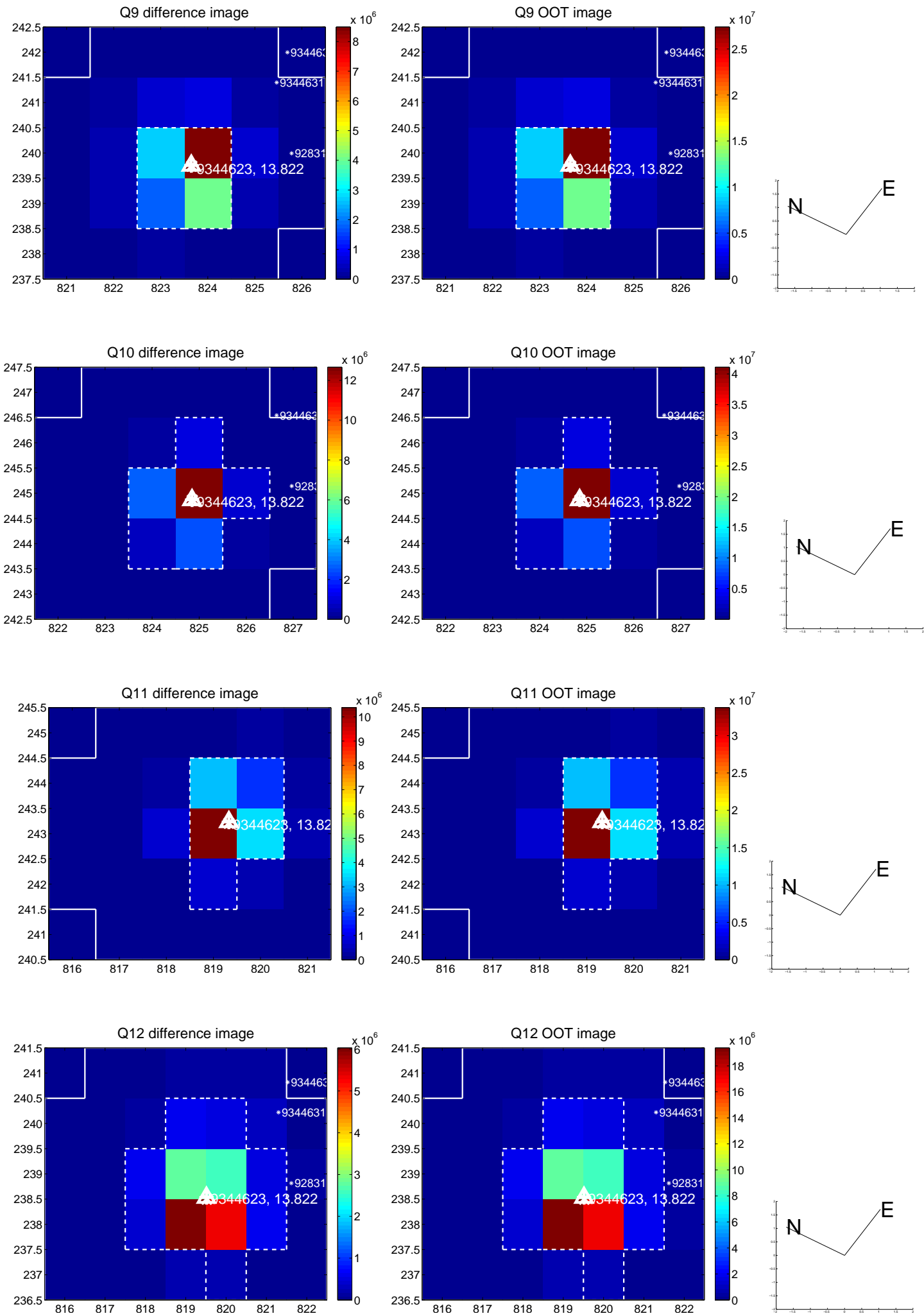
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



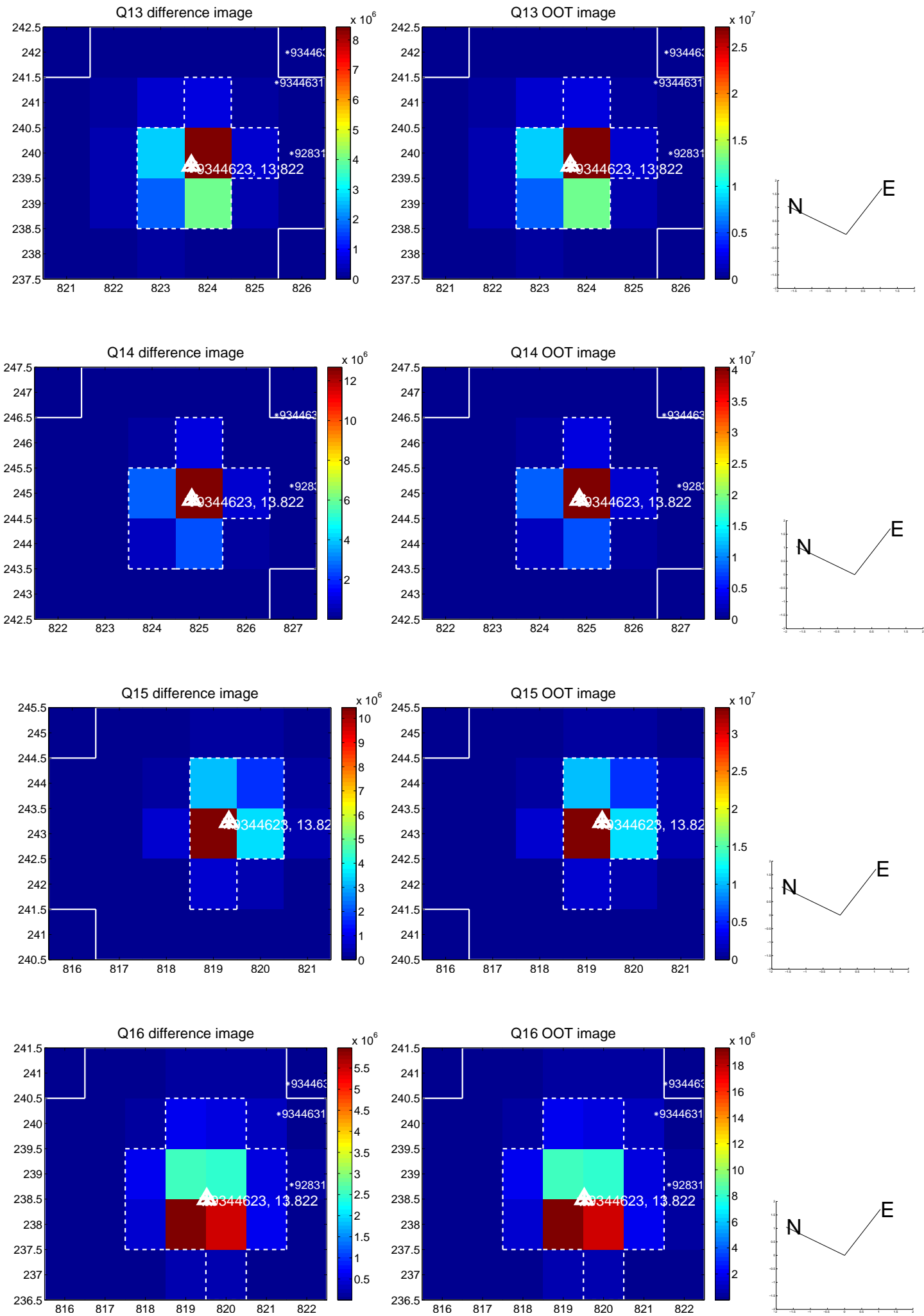
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



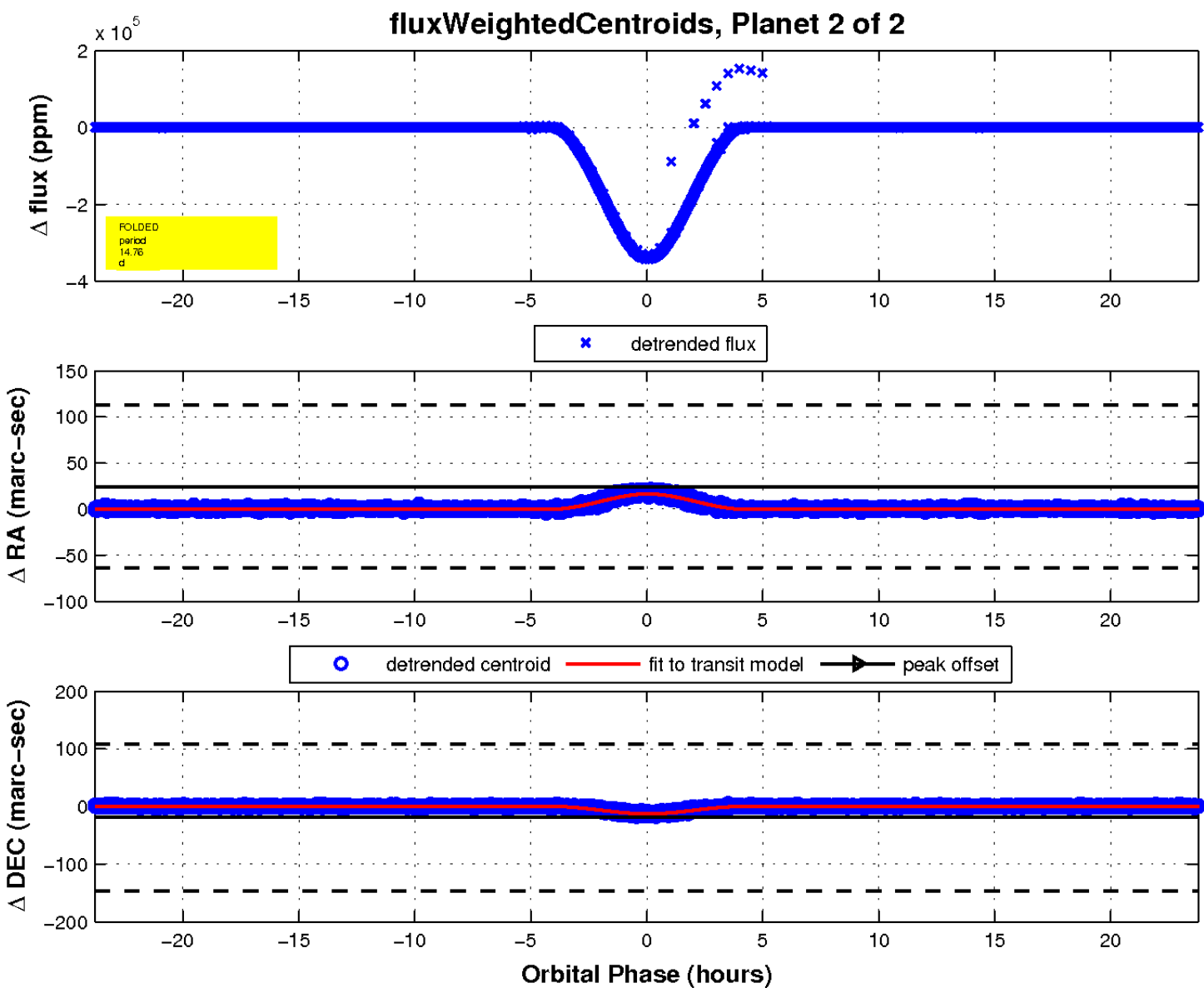
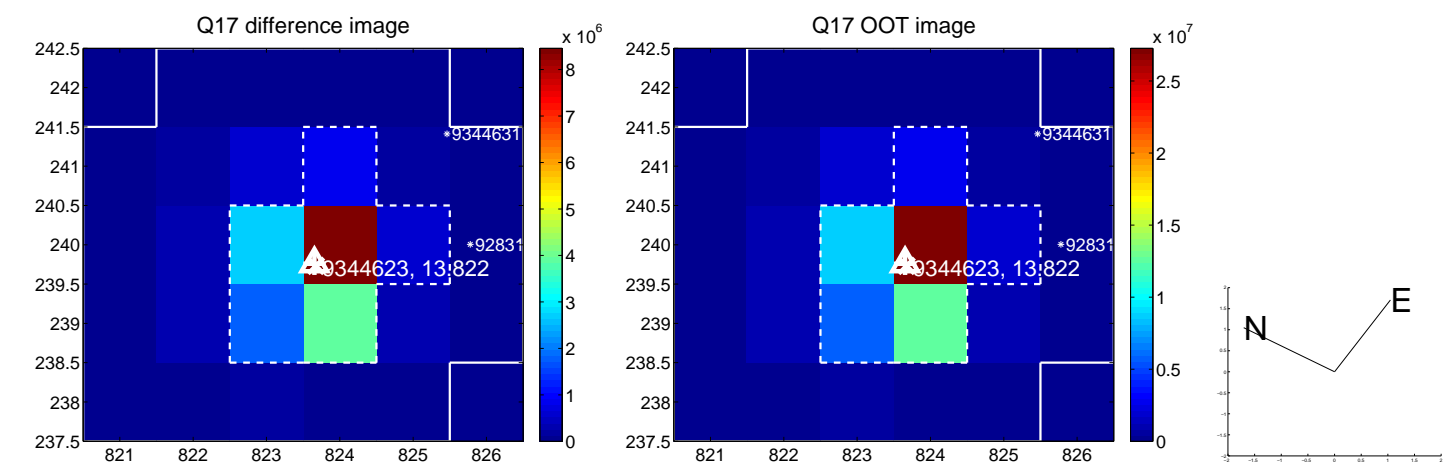
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



# UKIRT Image

Declination

