

# KIC 006233573

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006233573-01	OBS	2725.01	1.174927	132.091347	102.3	1.491	15.0	21.3	2.67	5787	3.20	13062.99
006233573-02	OBS	No	1.174958	132.667985	101.7	1.532	20.6	22.3	2.67	5787	3.19	13062.53

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006233573-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE
006233573-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_UNRESOLVED_OFFSET

**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 006233573-01

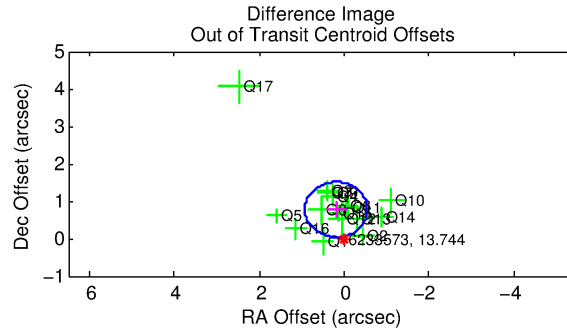
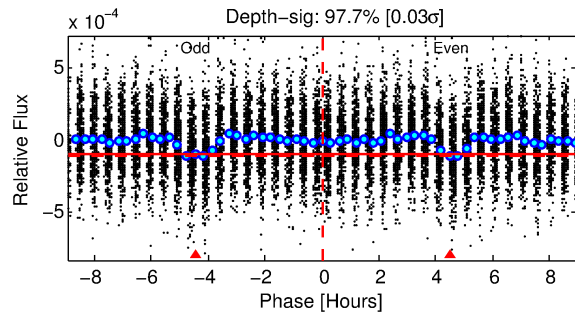
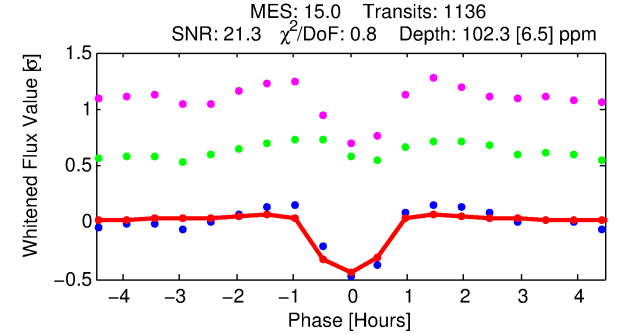
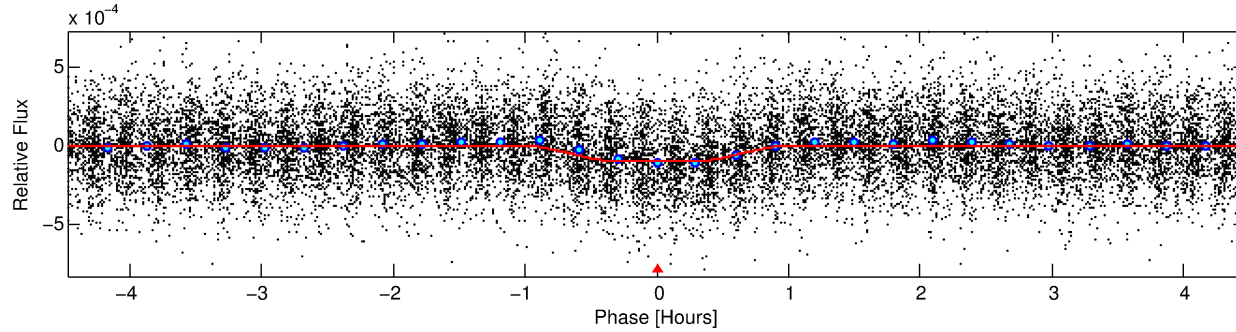
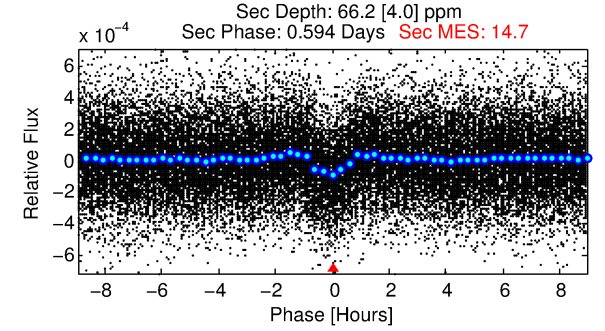
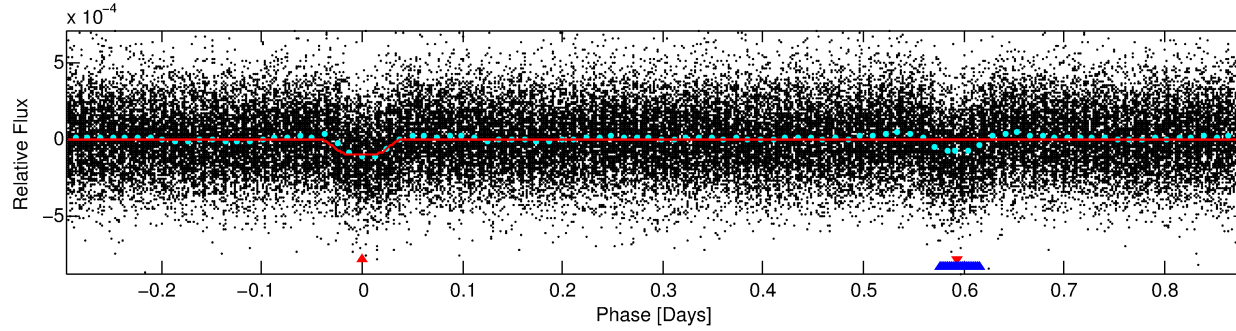
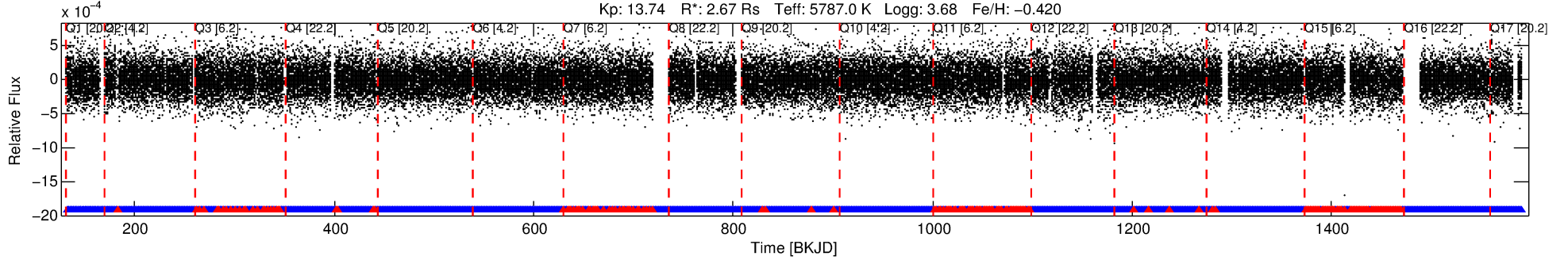
No Significant Match Found

# DV One-Page Summary

KIC: 6233573 Candidate: 1 of 2 Period: 1.175 d

KOI: K02725 Corr: No Ephemeris Match

Kp: 13.74 R\*: 2.67 Rs Teff: 5787.0 K Logg: 3.68 Fe/H: -0.420



## DV Fit Results:

Period = 1.17493 [0.00000] d  
Epoch = 132.0913 [0.0009] BKJD  
Rp/R\* = 0.0110 [0.0030]  
a/R\* = 2.91 [3.59]  
b = 0.90 [0.30]  
Seff = 13062.99 [16237.79]  
Teq = 2726 [847] K  
Rp = 3.20 [2.22] Re  
a = 0.0234 [0.0168] AU  
Ag = 1.95 [2.63] [0.36σ]  
Teffp = 4978 [702] K [2.05σ]

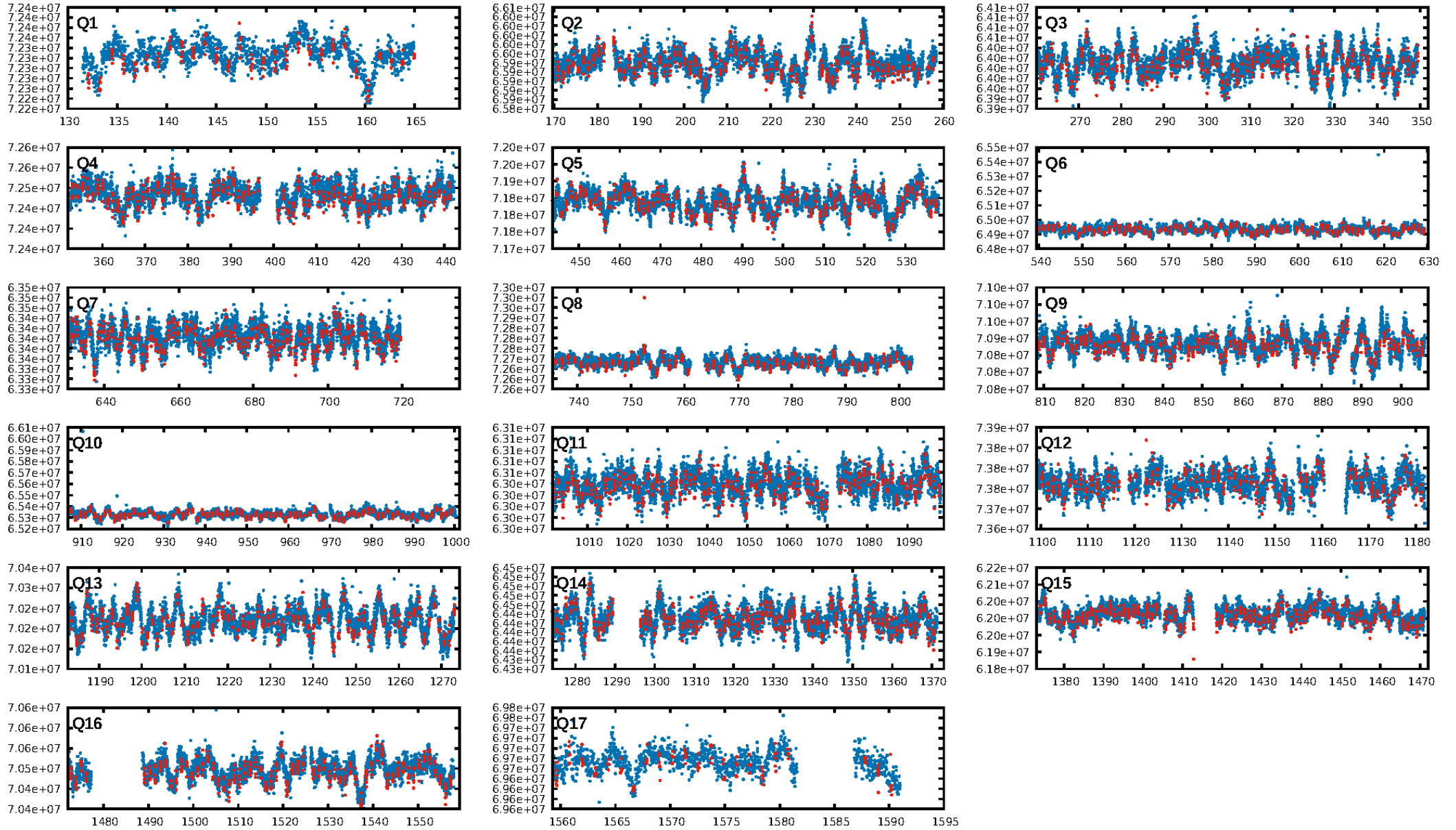
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.70e-50  
RollingBand-fgt: 0.82 [891/1085]  
GhostDiagnostic-chr: 1.462  
Centroid-sig: 0.0%  
Centroid-so: 2.044 arcsec [4.27σ]  
OotOffset-rm: 0.793 arcsec [3.23σ]  
KicOffset-rm: 0.795 arcsec [3.12σ]  
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]

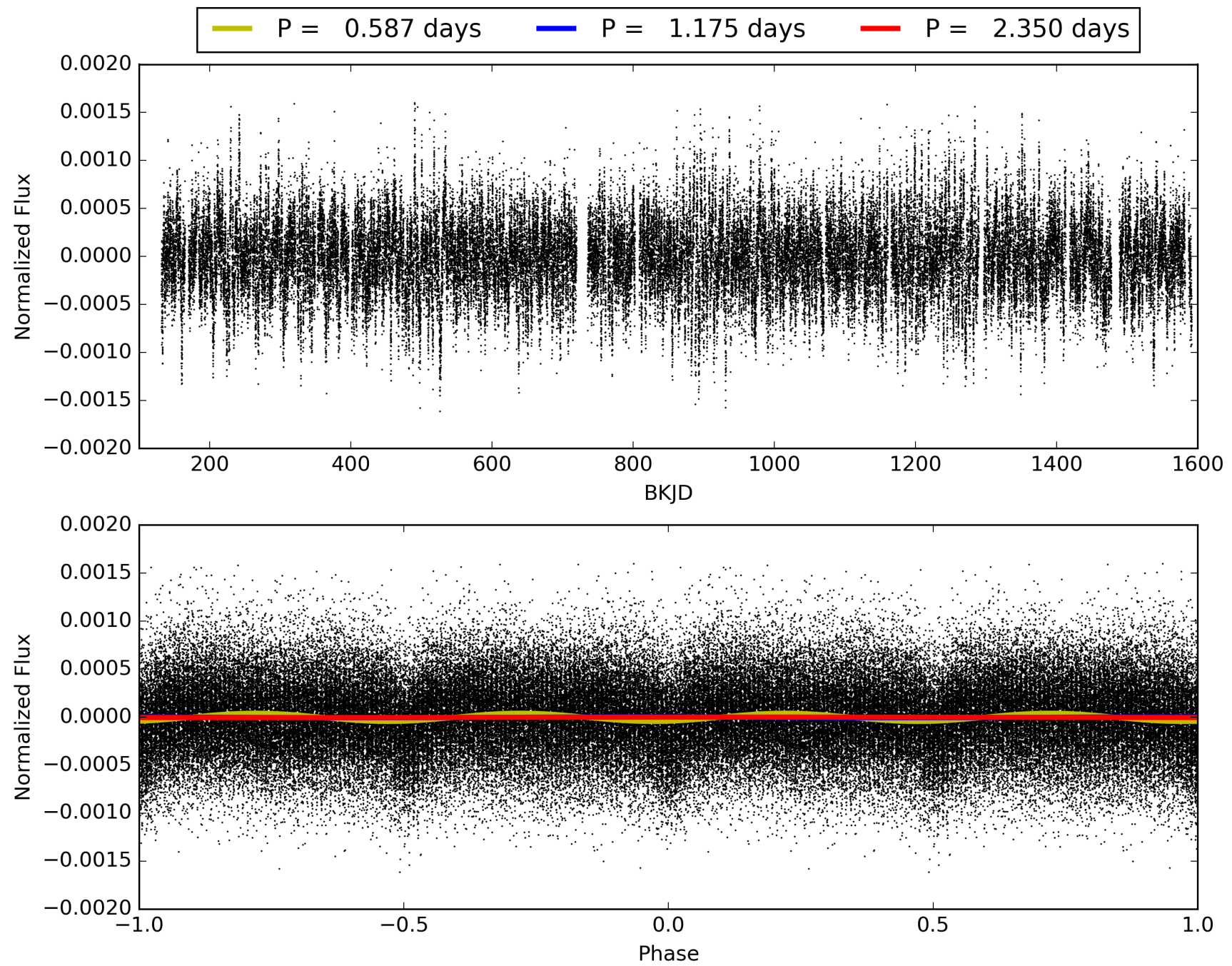
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 13:44:56 Z

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

# TCE 006233573-01, PDC Light Curves

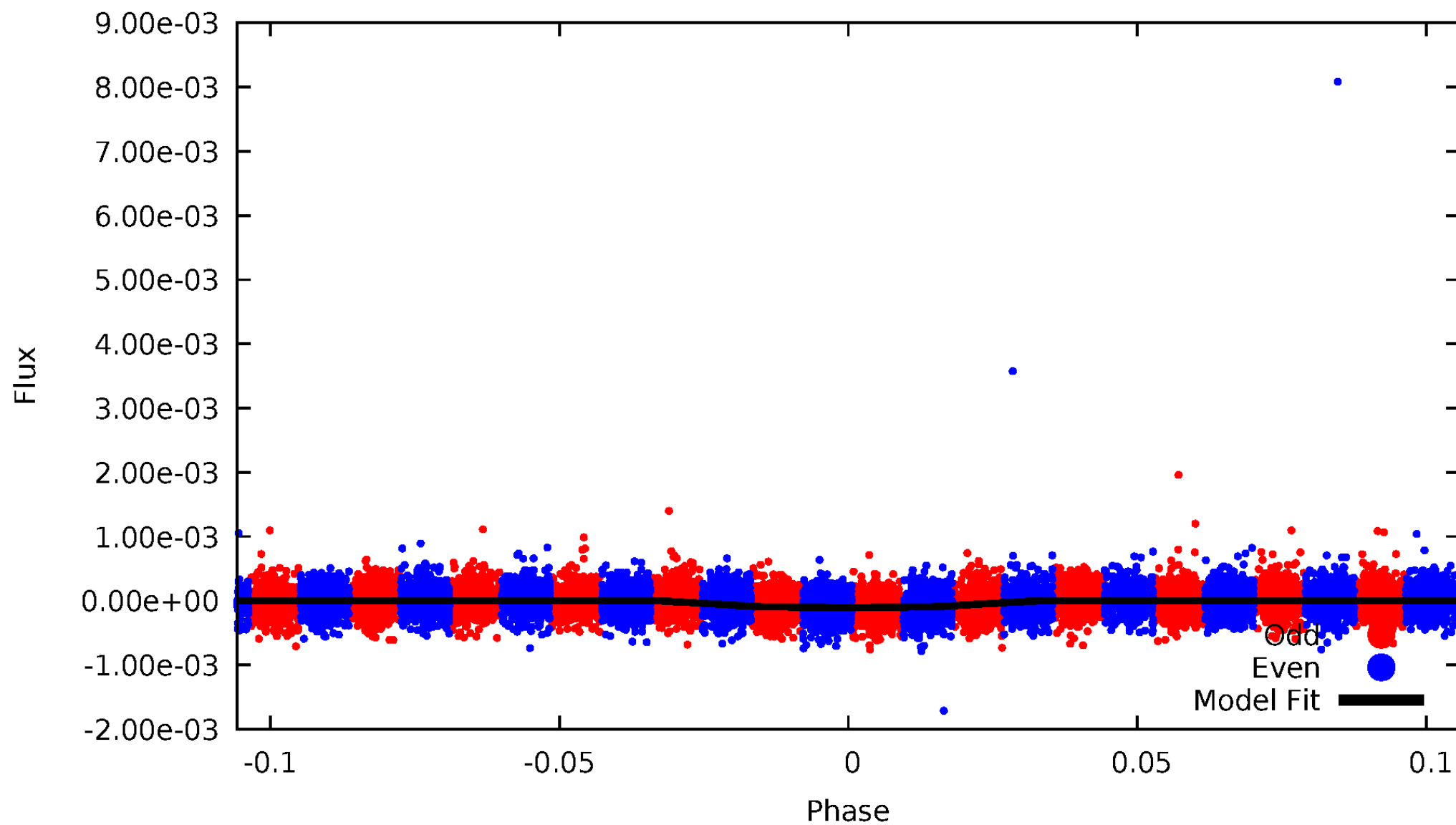


TCE 006233573-01



# DV Odd/Even

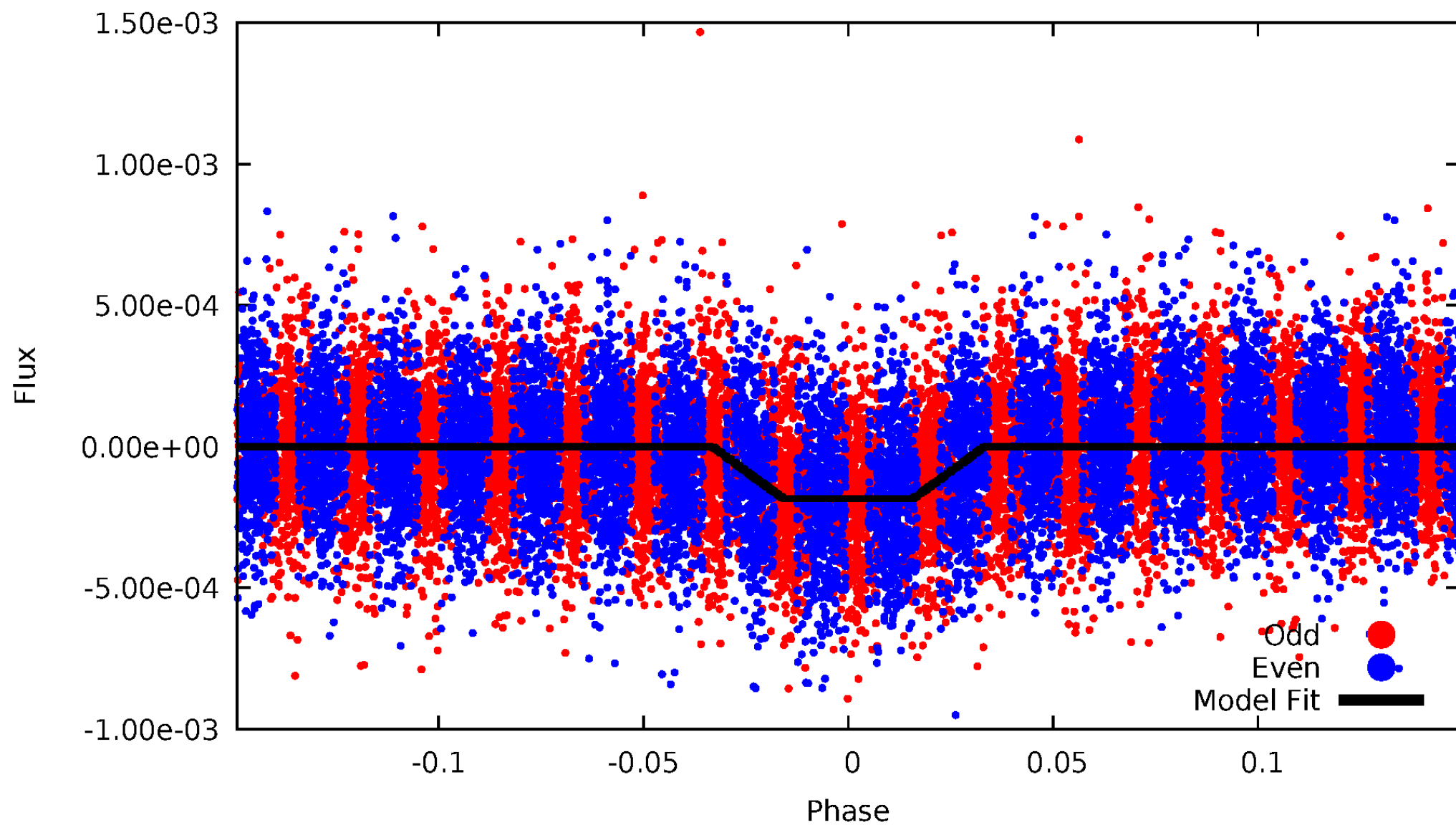
TCE 006233573-01





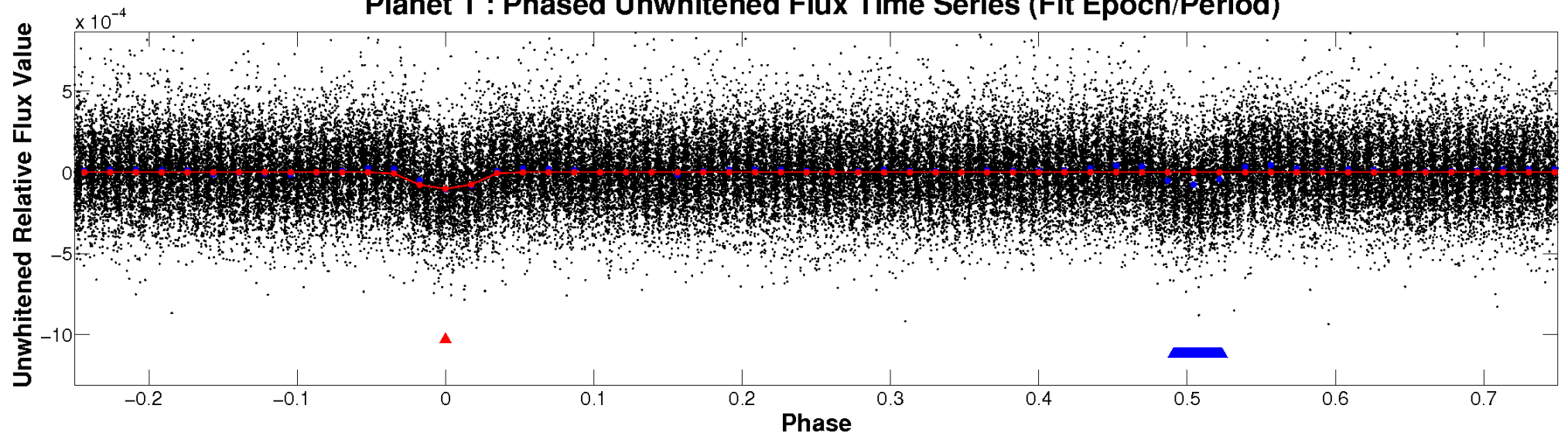
# ALT Odd/Even

TCE 006233573-01

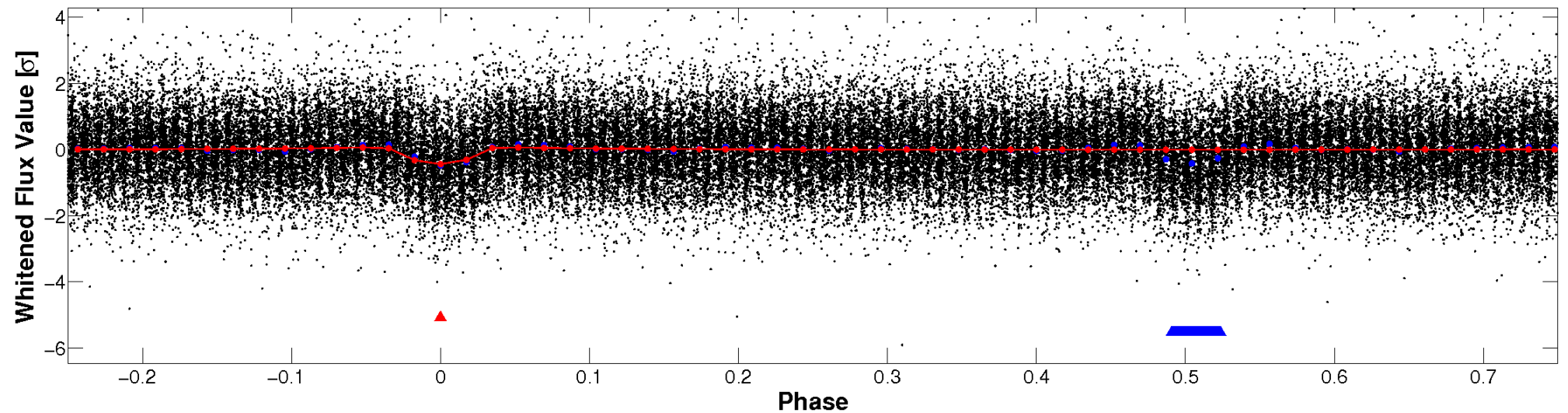


# Non-Whitened Vs. Whitened Light Curve

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

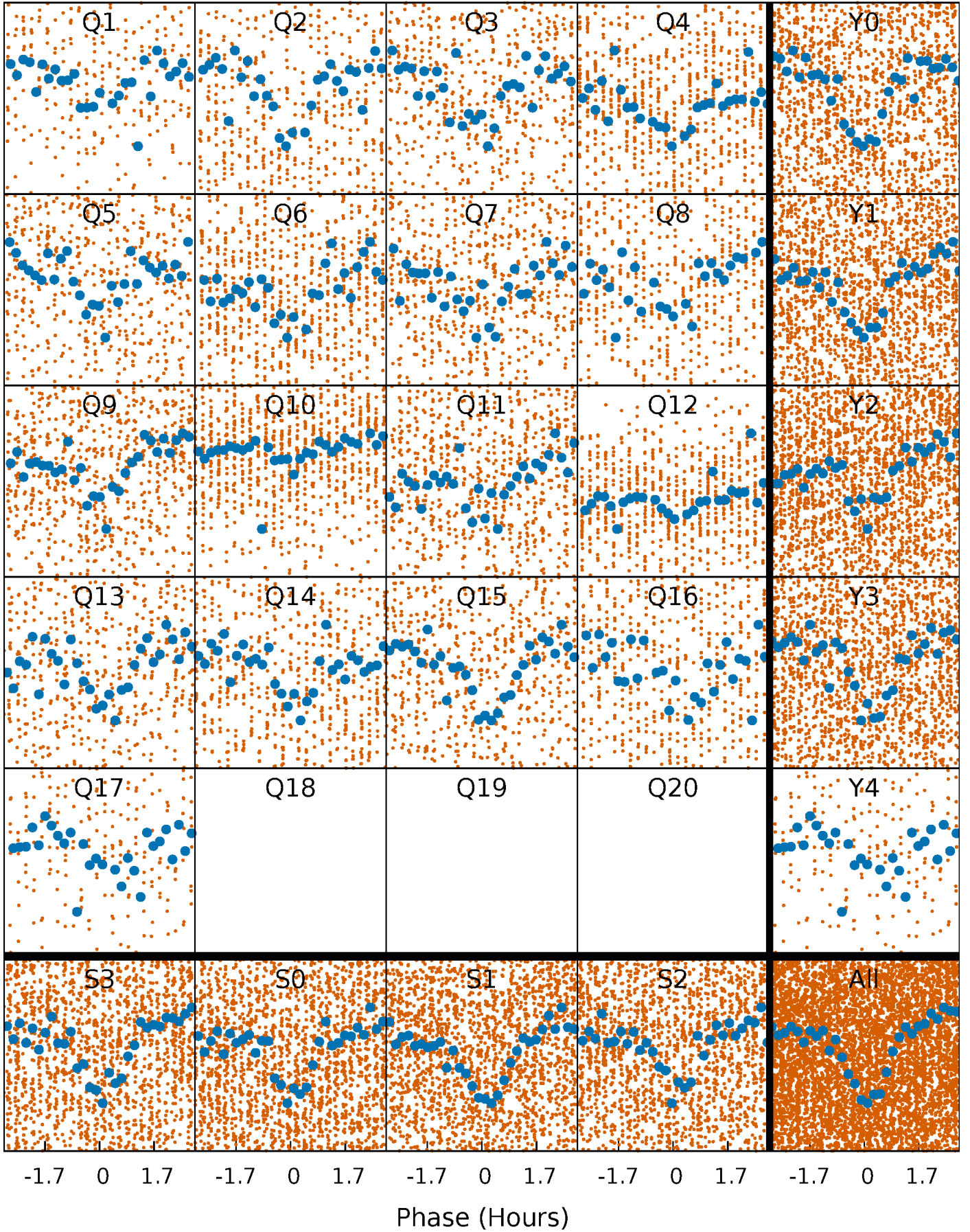


## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

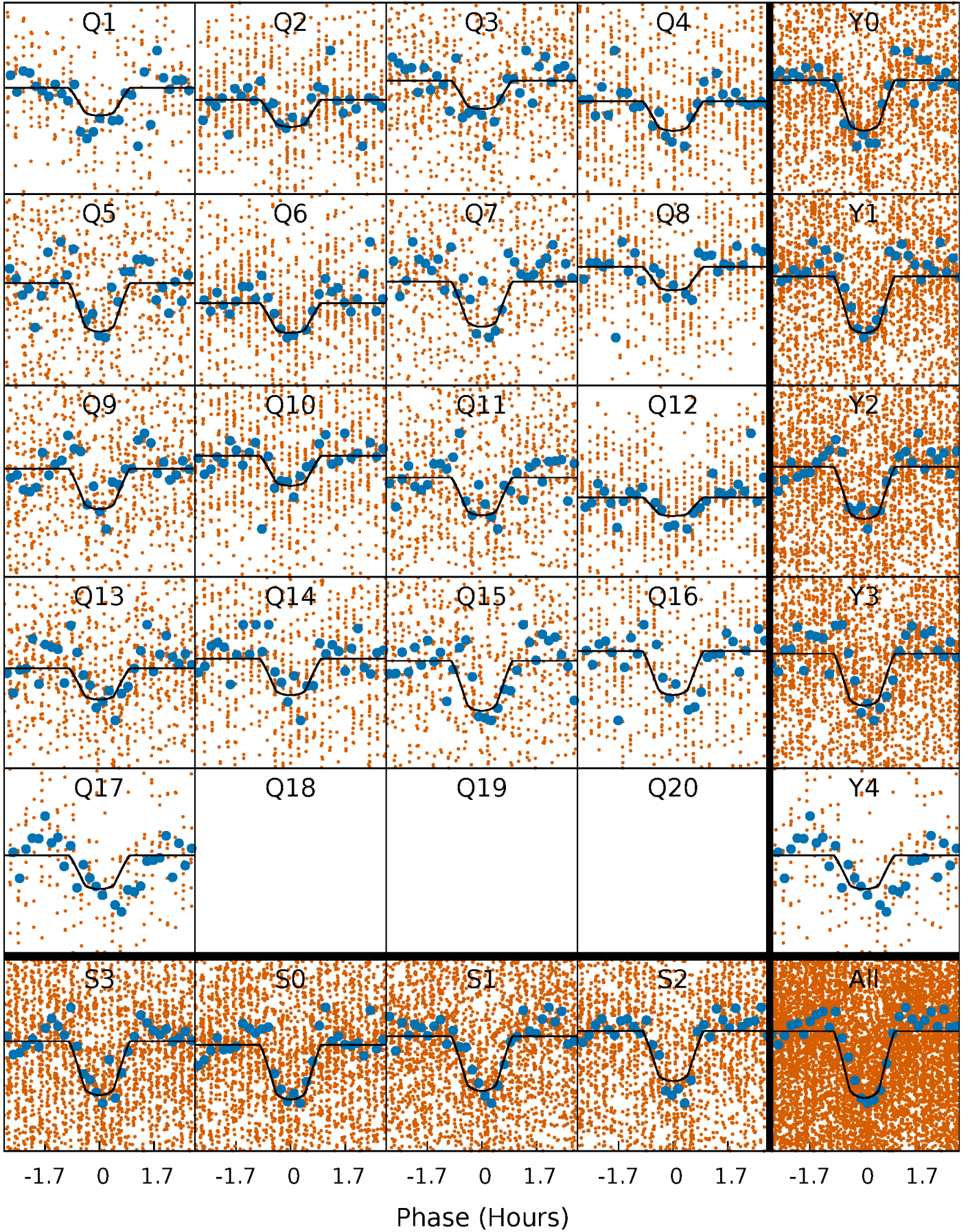
TCE 006233573-01 P= 1.174927 Days  $T_0=132.091347$  (BKJD)





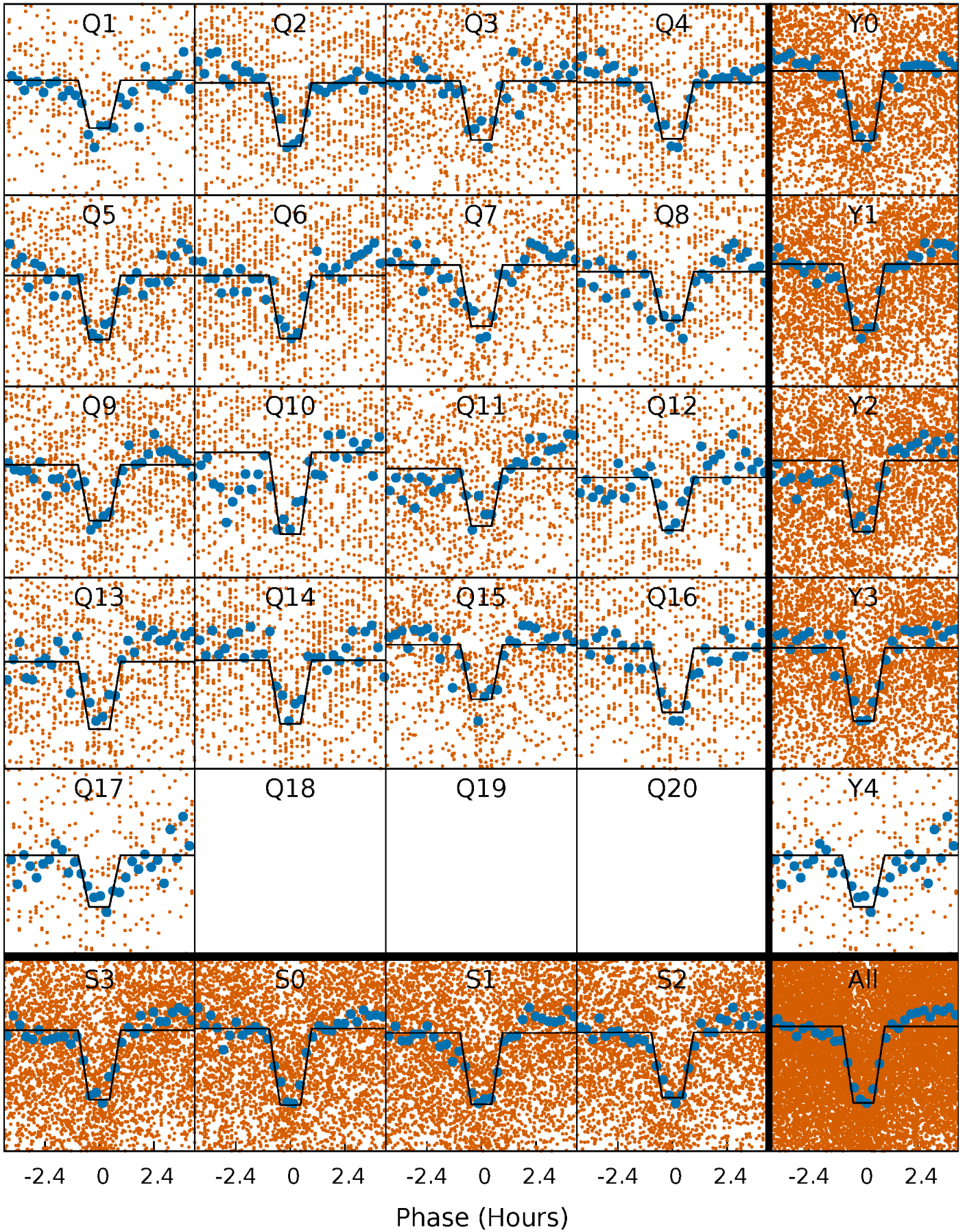
# DV Quarter-Phased Transit Curves

TCE 006233573-01 P= 1.174927 Days  $T_0=132.091347$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

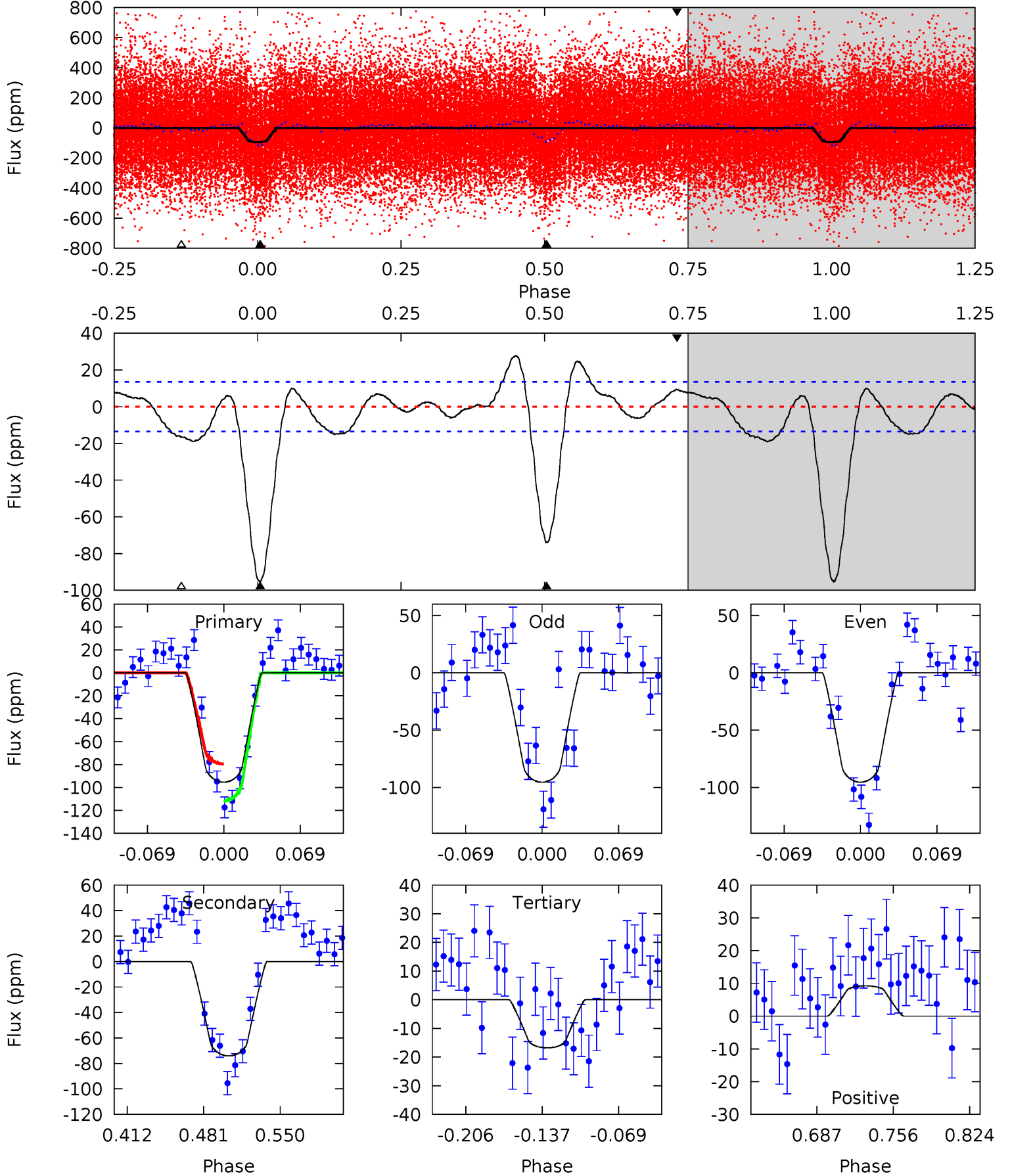
TCE 006233573-01 P= 1.174939 Days  $T_0=132.087103$  (BKJD)



# DV Model-Shift Uniqueness Test

006233573-01, P = 1.174927 Days, E = 130.916420 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
32.8	25.5	5.77	3.18	4.64	1.82	2.79	27.0	29.6	19.7	22.3	0.01	0.96	0.22	5.54

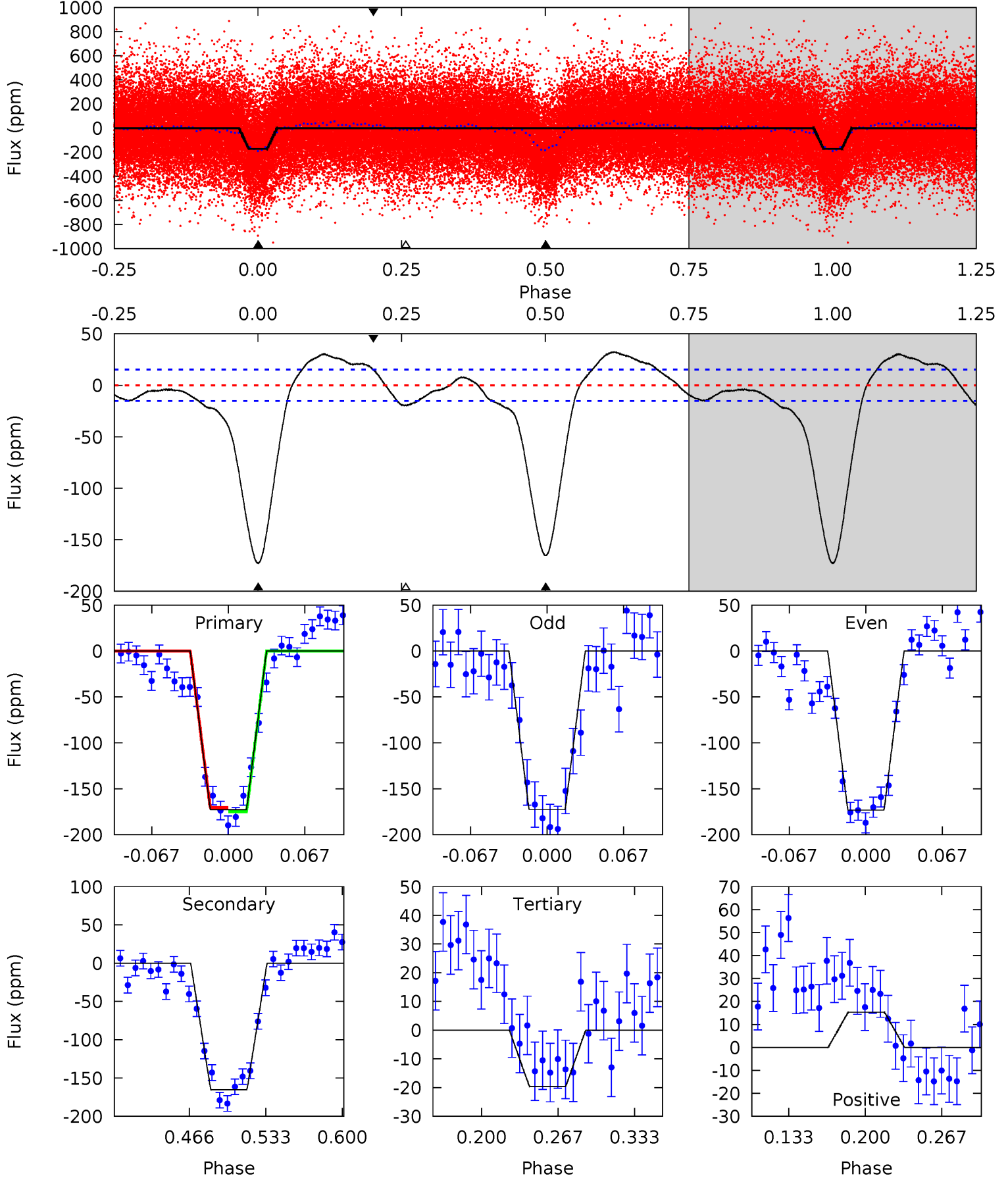




# Alt Model-Shift Uniqueness Test

006233573-01, P = 1.174939 Days, E = 130.912164 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
52.8	50.6	6.00	4.69	4.65	1.83	5.11	46.8	48.1	44.5	45.9	0.10	0.98	0.16	0.70





### Stellar Parameters For KIC 006233573

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5787^{+193}_{-176}$	$3.678^{+0.756}_{-0.178}$	$-0.420^{+0.350}_{-0.250}$	$2.667^{+0.729}_{-1.700}$	$1.236^{+0.166}_{-0.386}$	$0.092^{+1.142}_{-0.043}$
	+3%/-3%	+21%/-5%	+83%/-60%	+27%/-64%	+13%/-31%	+1244%/-47%
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 006233573-01 / KOI 2725.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-74 \pm 3$	$2.81^{+1.30}_{-1.00}$	$3705^{+389}_{-605}$	$5062^{+921}_{-603}$	$2.763^{+4.021}_{-1.438}$
Alt.	$-165 \pm 3$	$3.61^{+1.26}_{-1.28}$	$3733^{+349}_{-613}$	$5531^{+804}_{-552}$	$3.866^{+4.819}_{-1.732}$

$T_{\text{max}}$  = 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

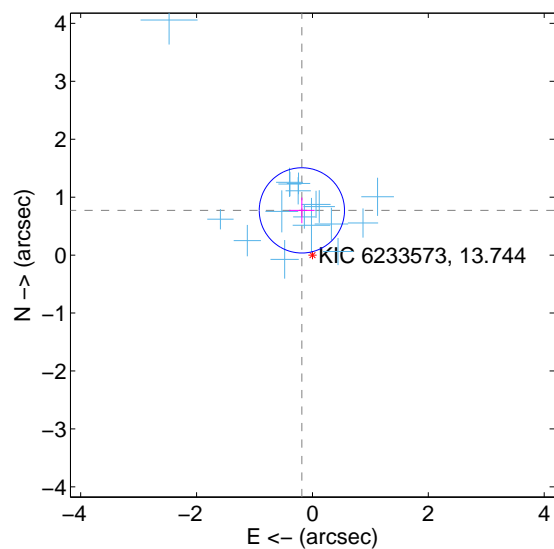
Supplemental centroid analysis for 006233573-01. Kepler magnitude: 13.74. Transit SNR 21.34

There are 17 quarters with good PRF difference image offsets

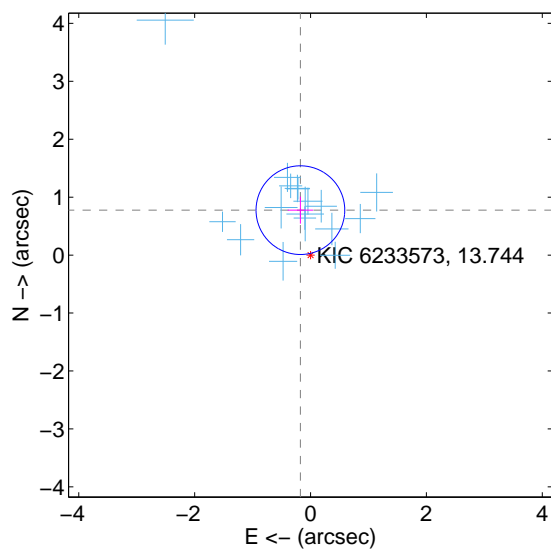
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.793 \pm 0.245$	3.23	$0.182 \pm 0.220$	$0.772 \pm 0.222$
PRF-fit source offset from KIC position	$0.795 \pm 0.255$	3.12	$0.175 \pm 0.219$	$0.776 \pm 0.233$
photometric centroid source offset	$2.04 \pm 0.48$	4.27	$0.46 \pm 0.47$	$1.99 \pm 0.48$

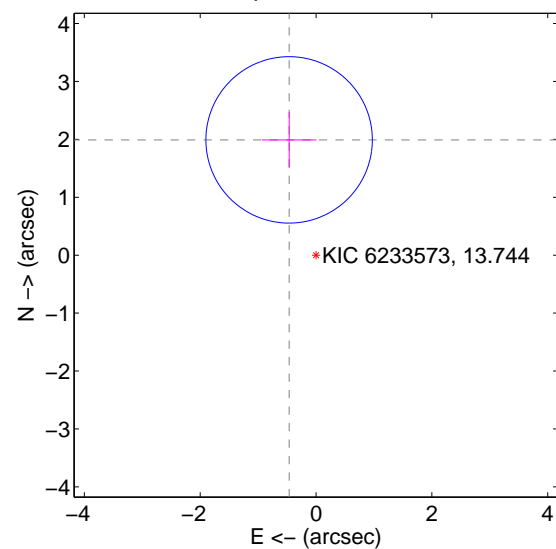
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

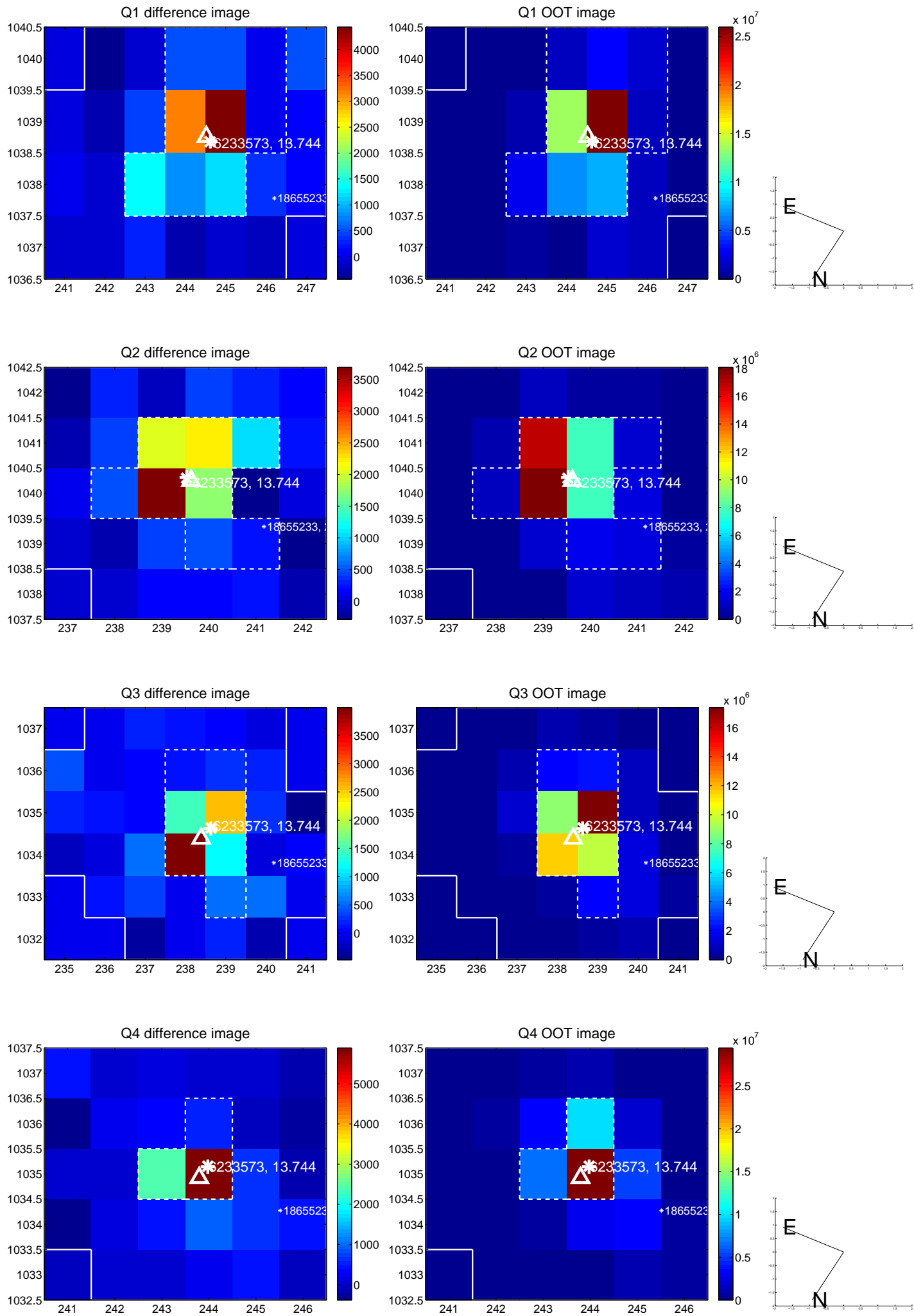


offset from photometric centroids

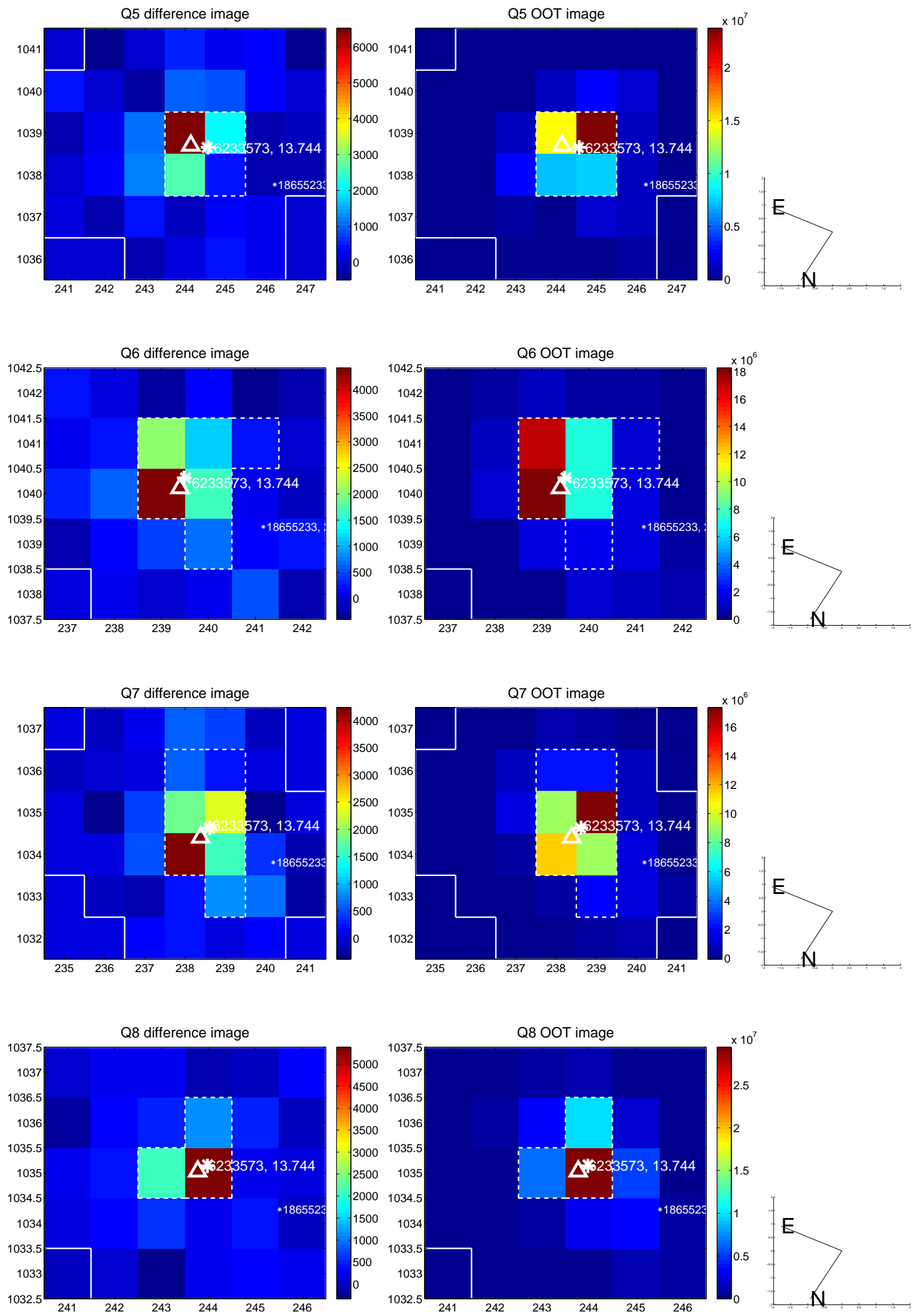


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

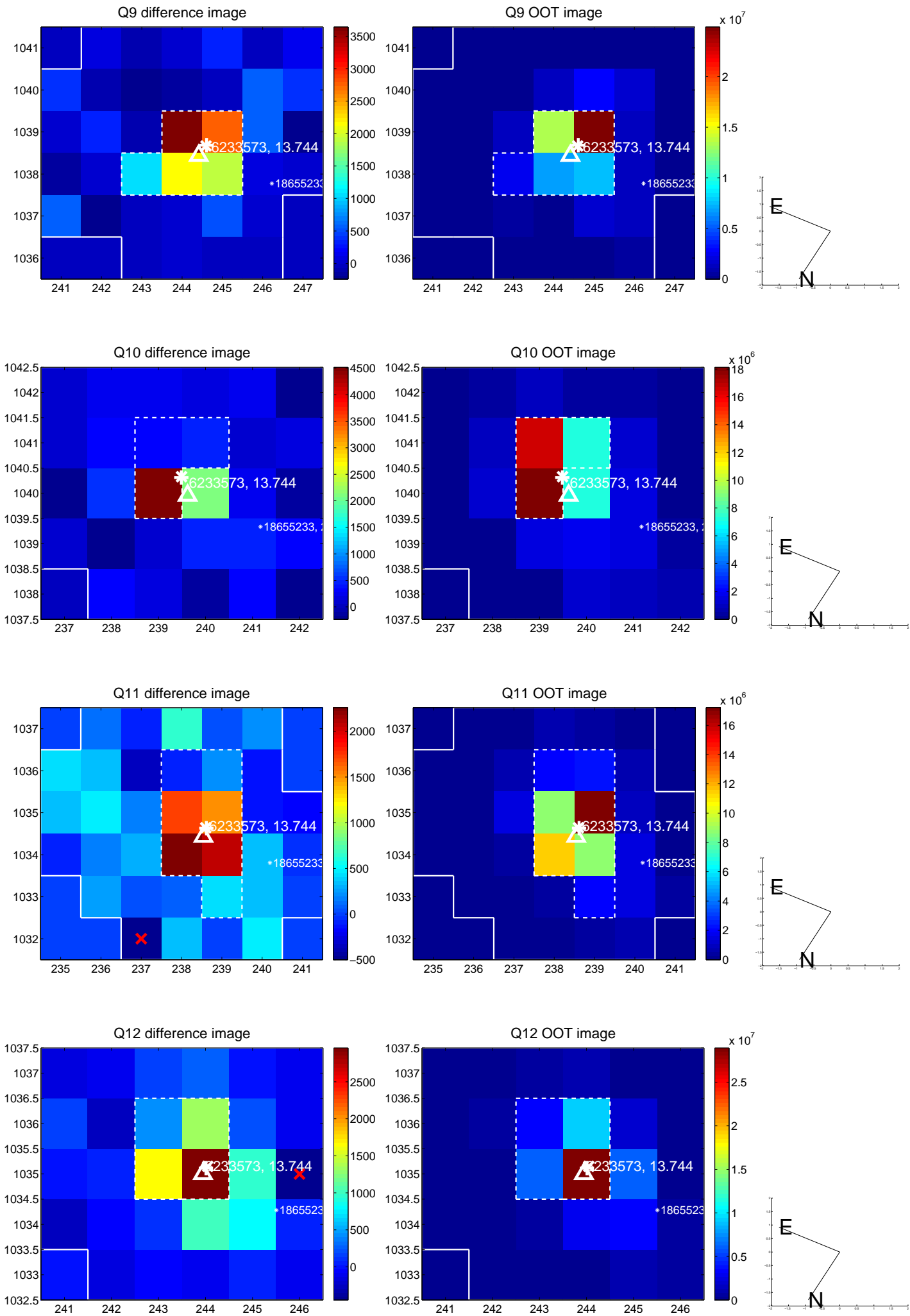


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

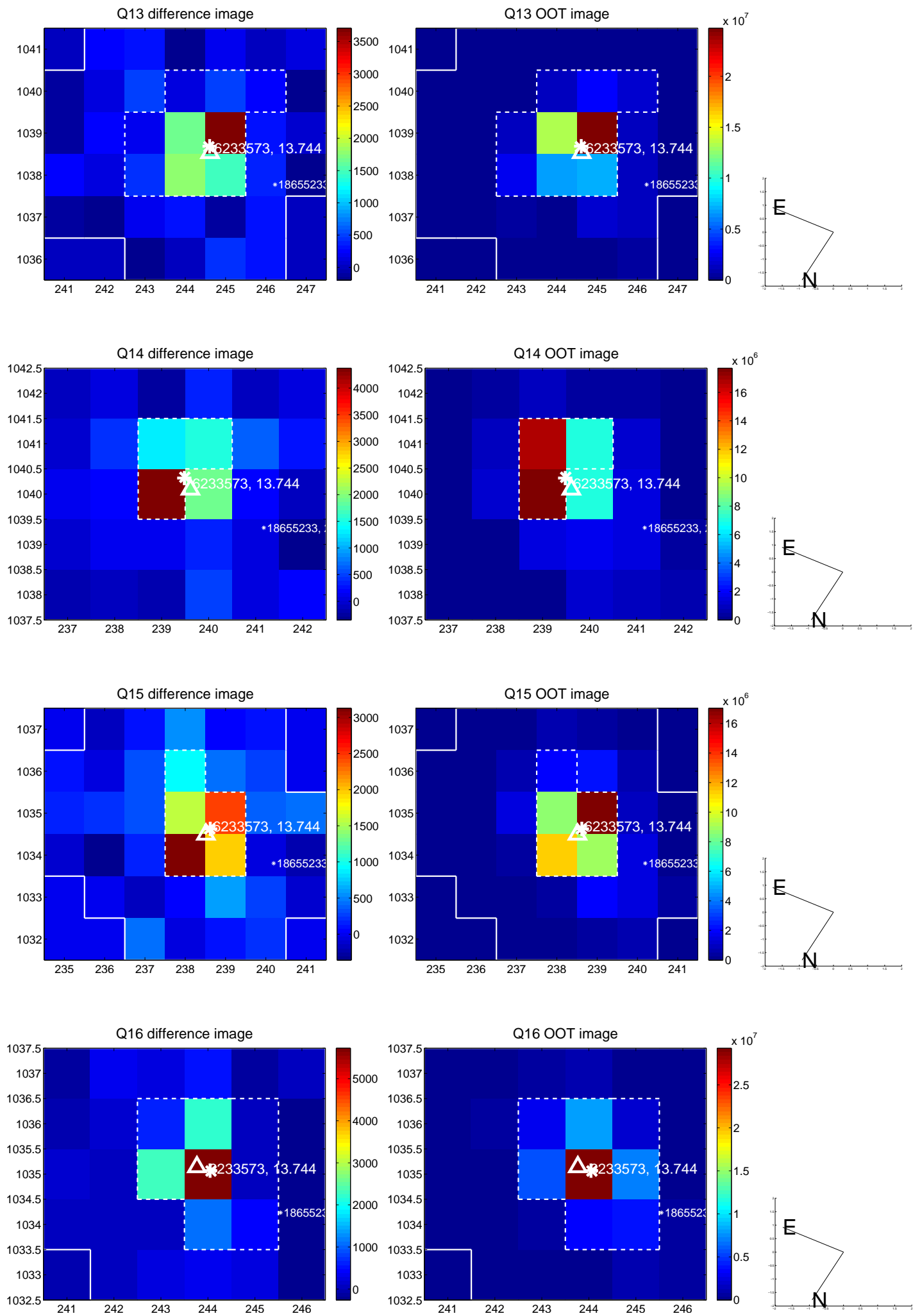




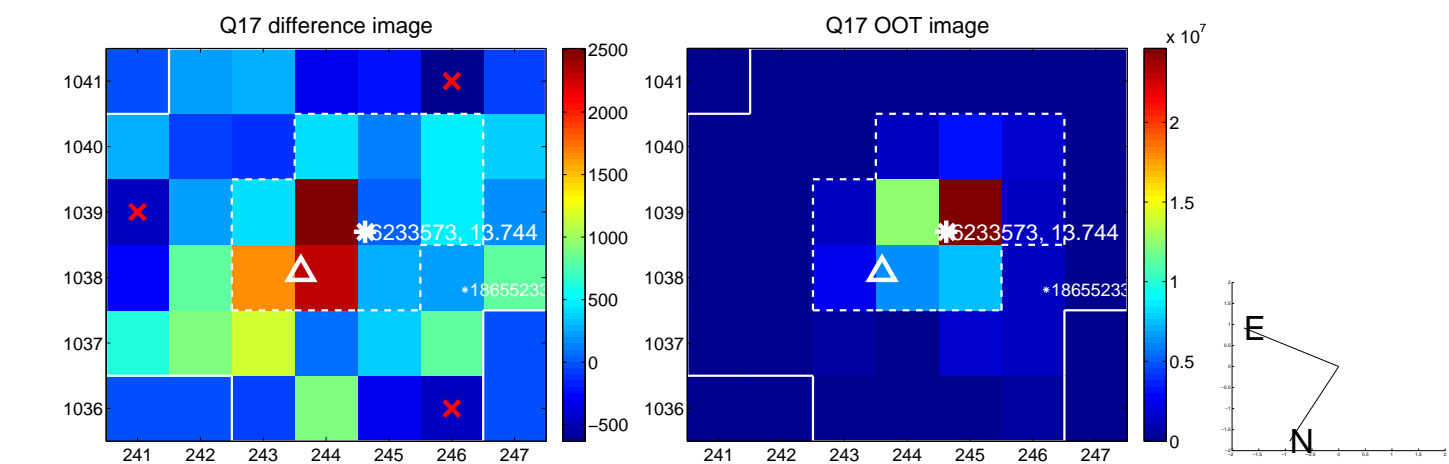
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



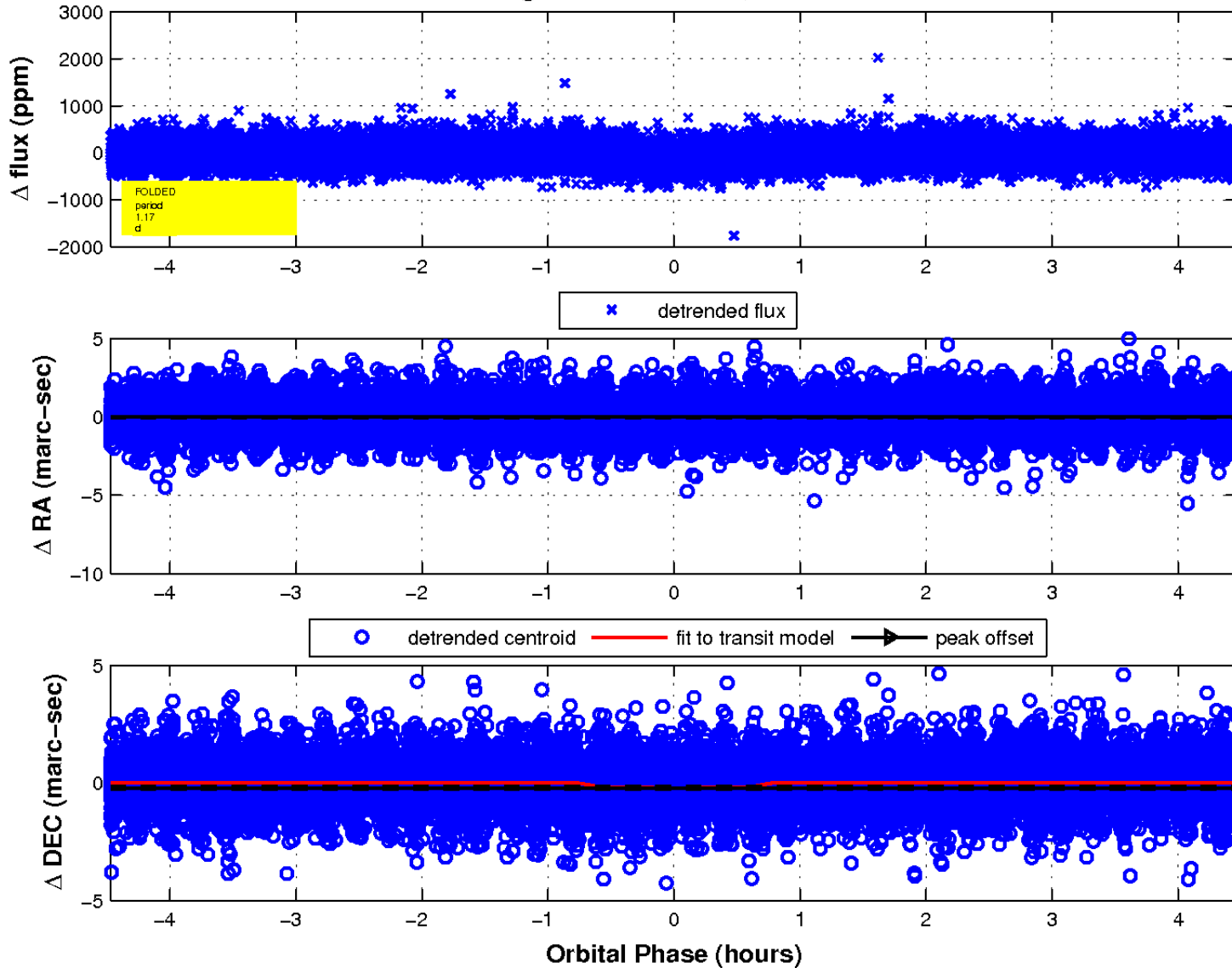
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

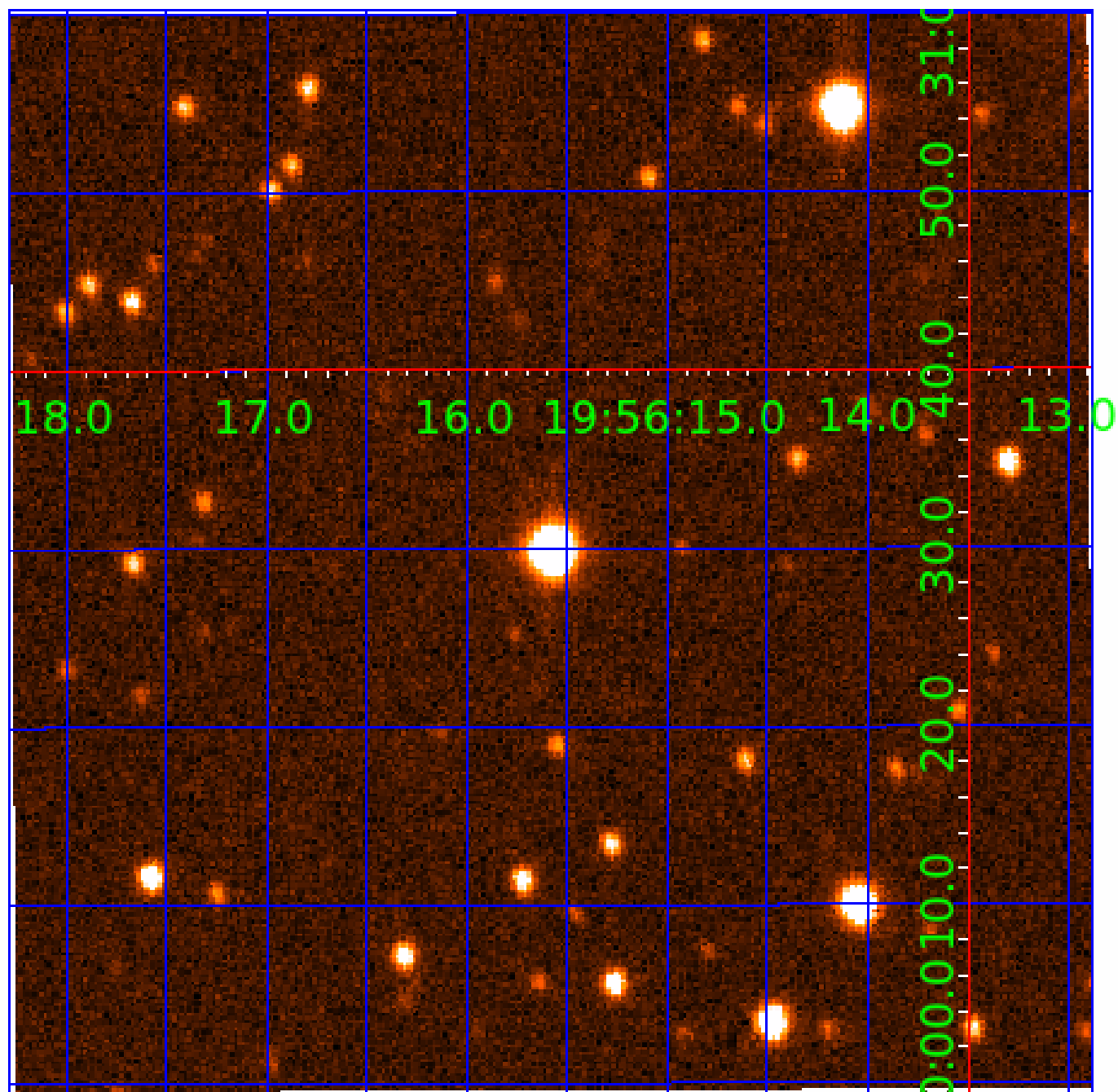


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 006233573

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006233573-01	OBS	2725.01	1.174927	132.091347	102.3	1.491	15.0	21.3	2.67	5787	3.20	13062.99
006233573-02	OBS	No	1.174958	132.667985	101.7	1.532	20.6	22.3	2.67	5787	3.19	13062.53

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006233573-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE
006233573-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_UNRESOLVED_OFFSET

**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

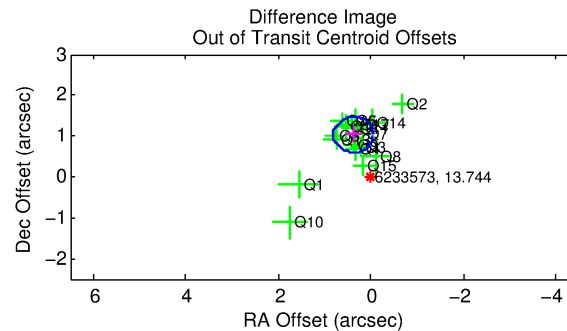
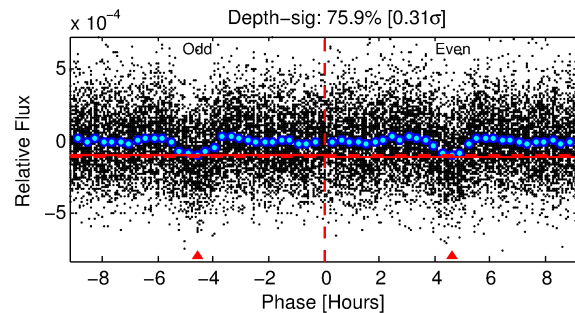
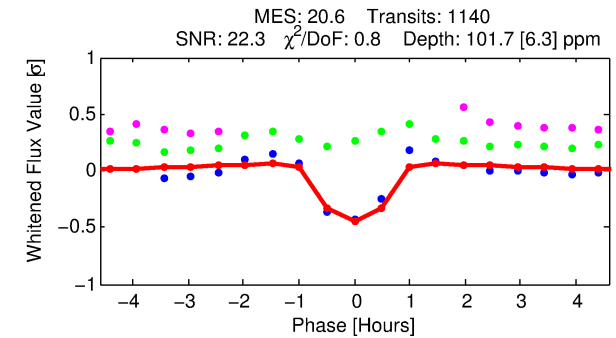
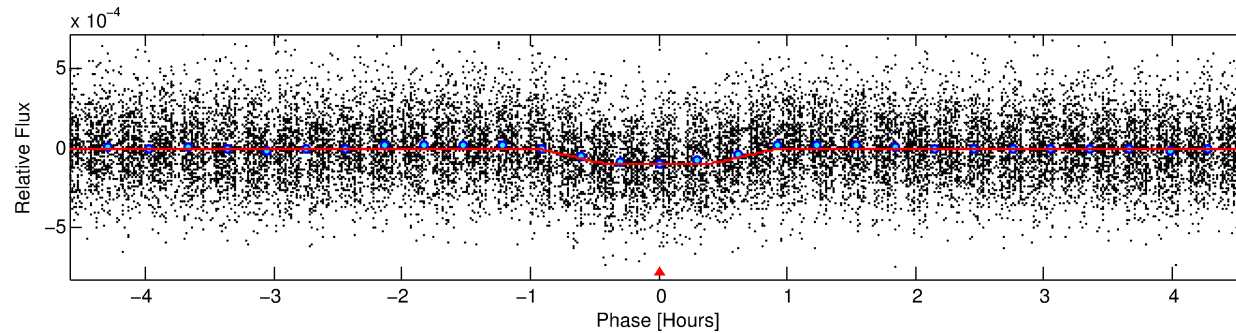
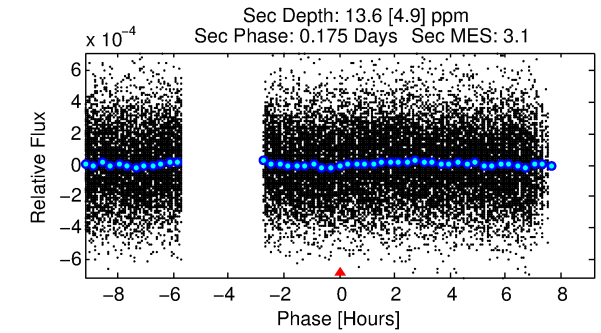
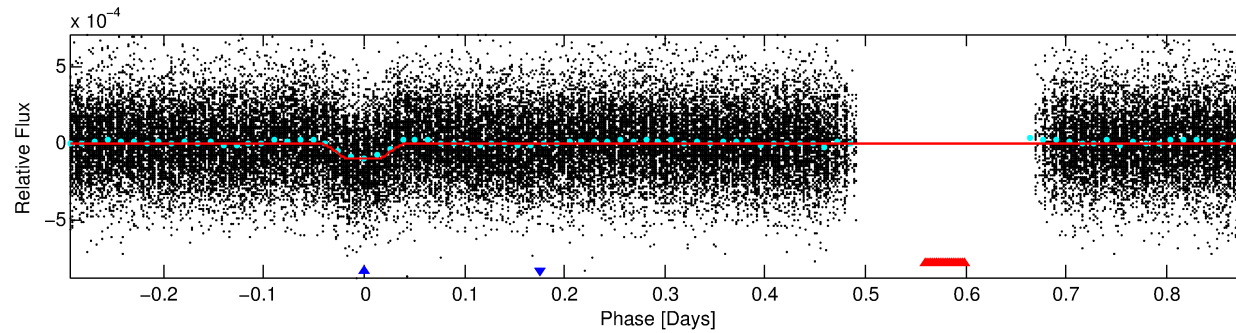
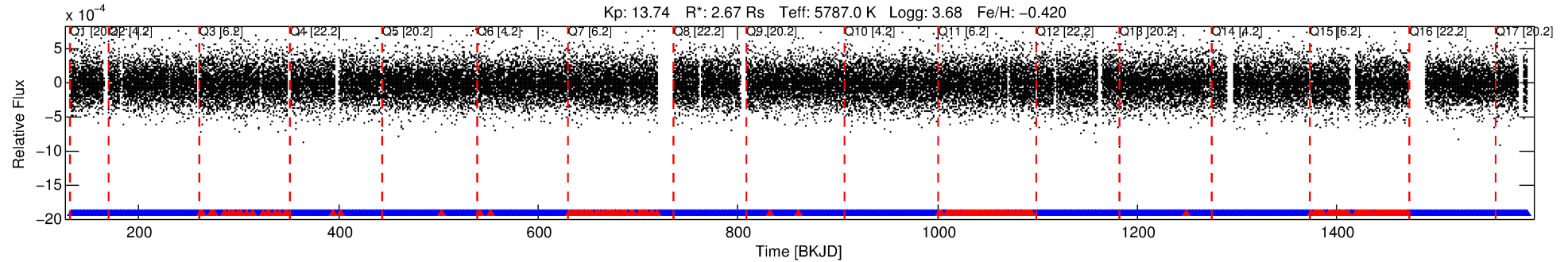
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 006233573-02

No Significant Match Found

# DV One-Page Summary

KIC: 6233573 Candidate: 2 of 2 Period: 1.175 d  
KOI: K02725 Corr: No Ephemeris Match



## DV Fit Results:

Period = 1.17496 [0.00000] d  
Epoch = 132.6680 [0.0009] BKJD  
Rp/R\* = 0.0110 [0.0025]  
a/R\* = 2.83 [2.88]  
b = 0.90 [0.24]  
Seff = 13062.53 [16237.21]  
Teq = 2726 [847] K  
Rp = 3.19 [2.16] Re  
a = 0.0234 [0.0168] AU  
Ag = 0.40 [0.55] [-1.09σ]  
Teffp = 3354 [503] K [0.64σ]

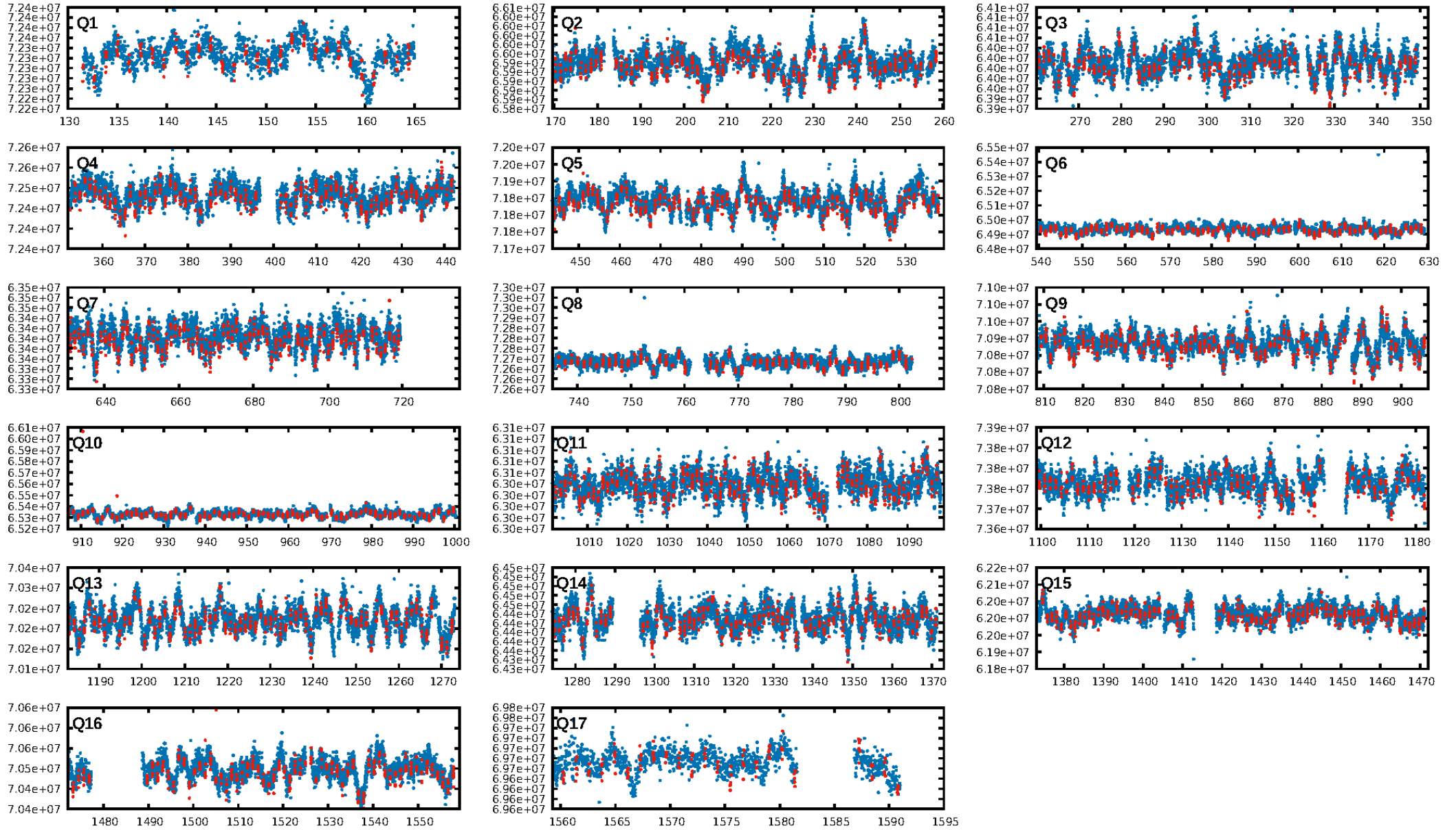
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.46e-88  
RollingBand-fgt: 0.82 [891/1088]  
GhostDiagnostic-chr: 1.479  
Centroid-sig: 0.0%  
Centroid-so: 1.809 arcsec [3.82σ]  
OotOffset-rm: 1.100 arcsec [7.64σ]  
KicOffset-rm: 1.098 arcsec [7.49σ]  
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]

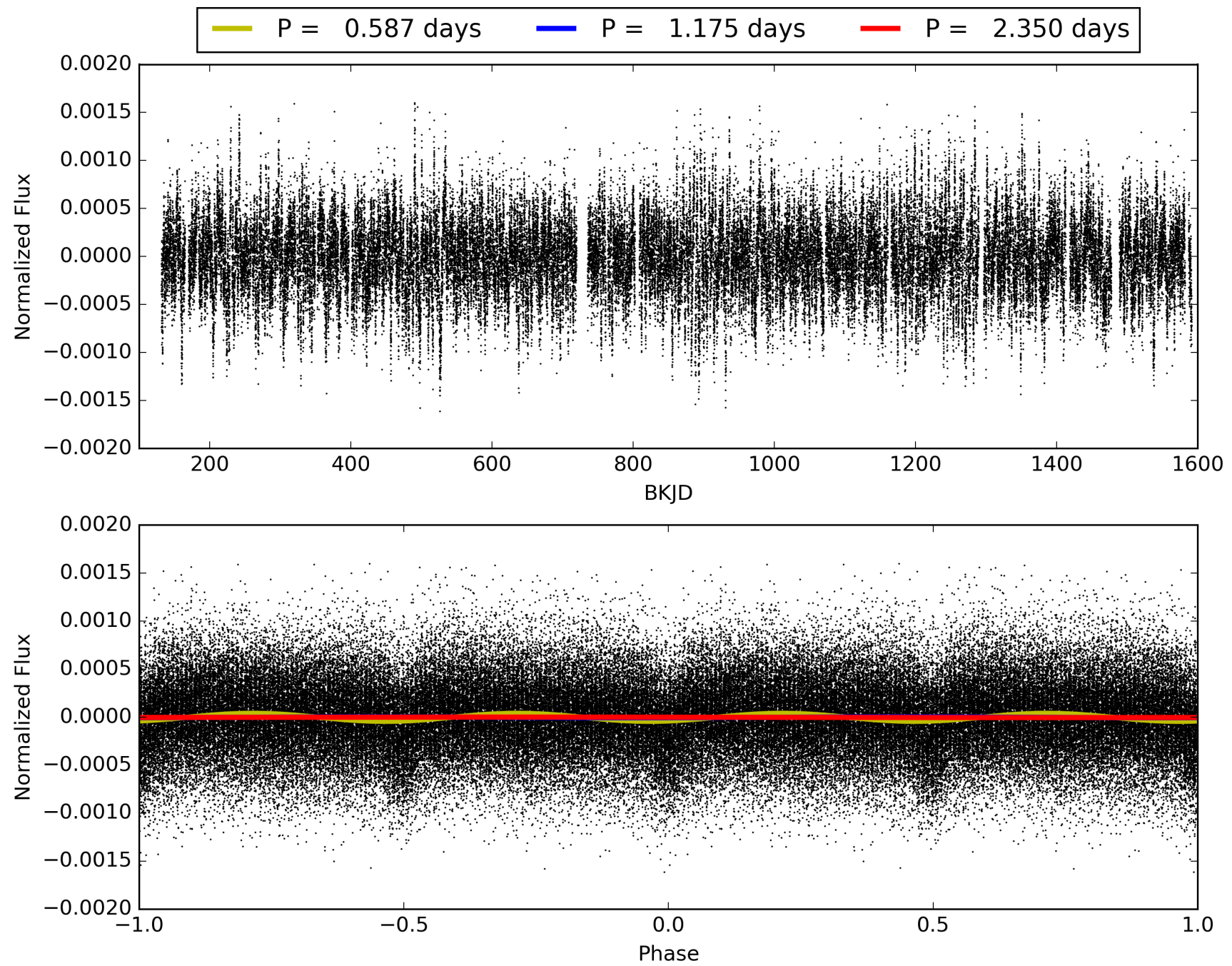
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 13:45:05 Z

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

# TCE 006233573-02, PDC Light Curves



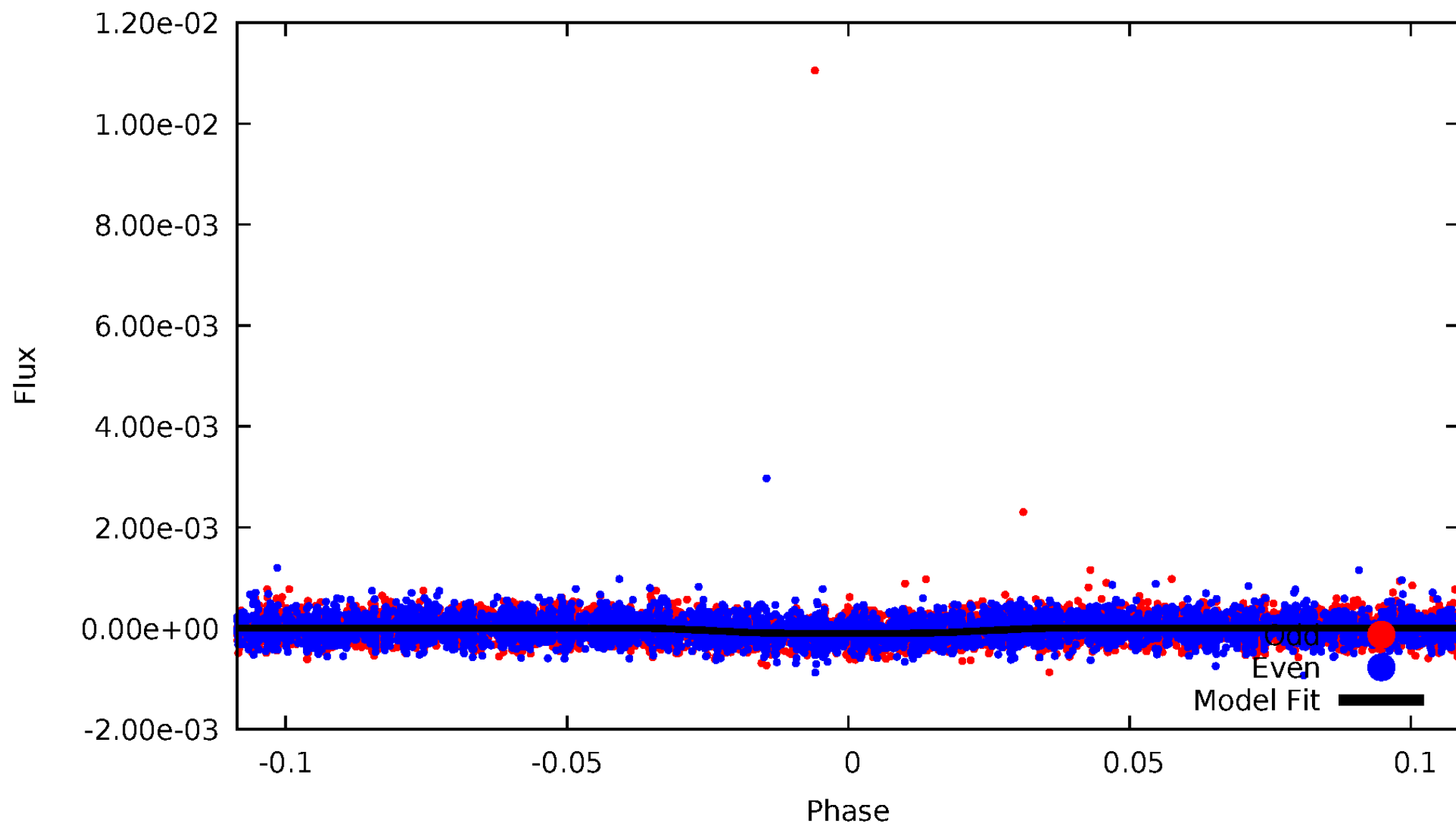
TCE 006233573-02





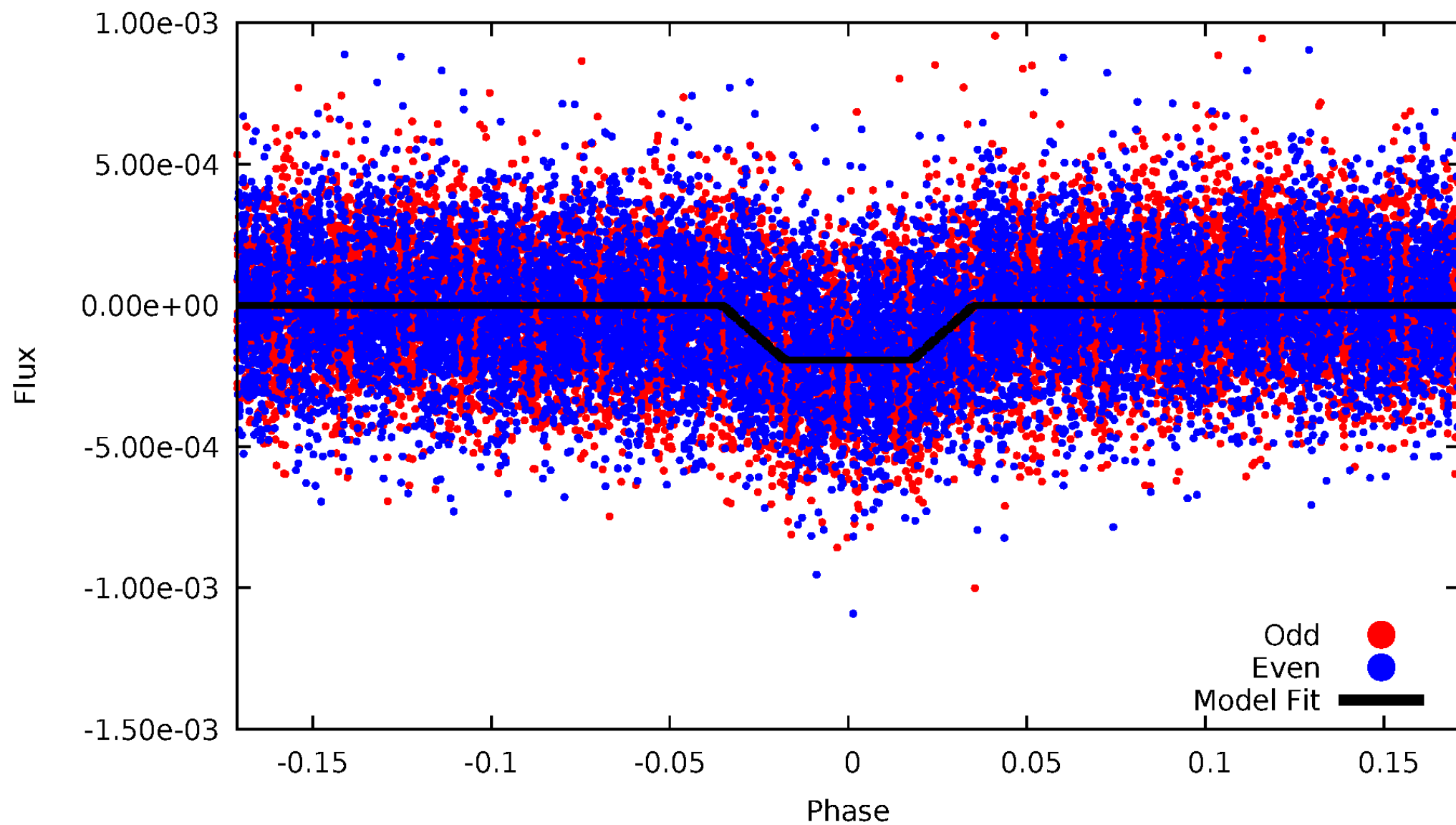
# DV Odd/Even

TCE 006233573-02



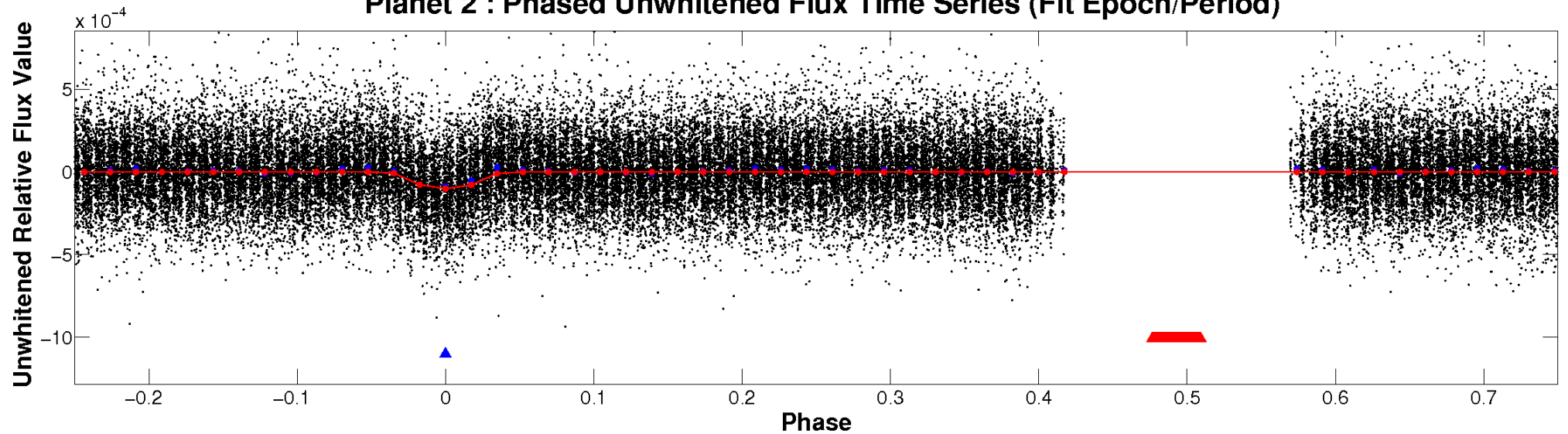
# ALT Odd/Even

TCE 006233573-02

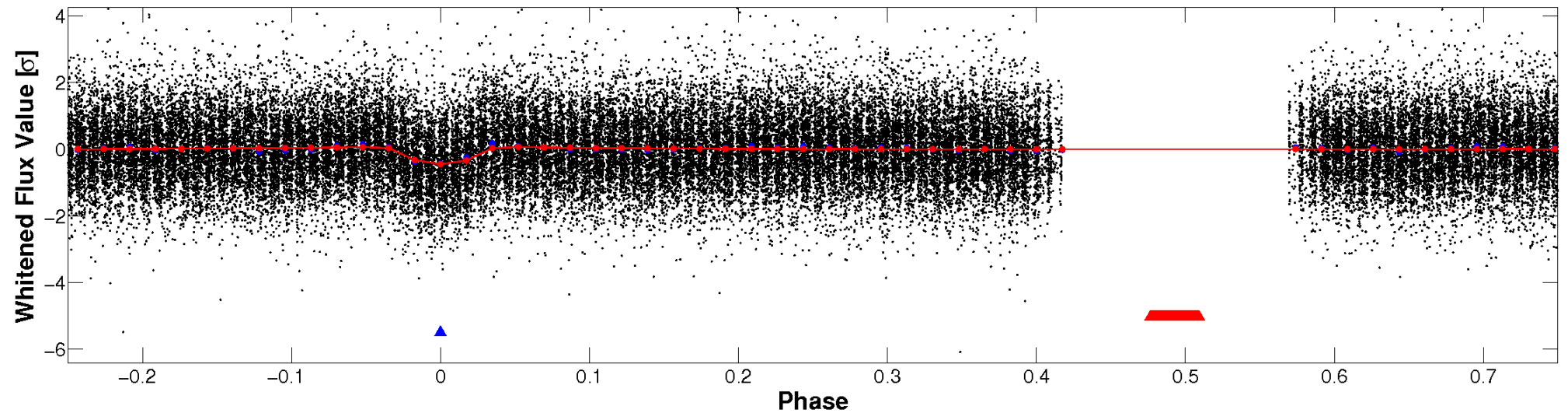


# Non-Whitened Vs. Whitened Light Curve

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

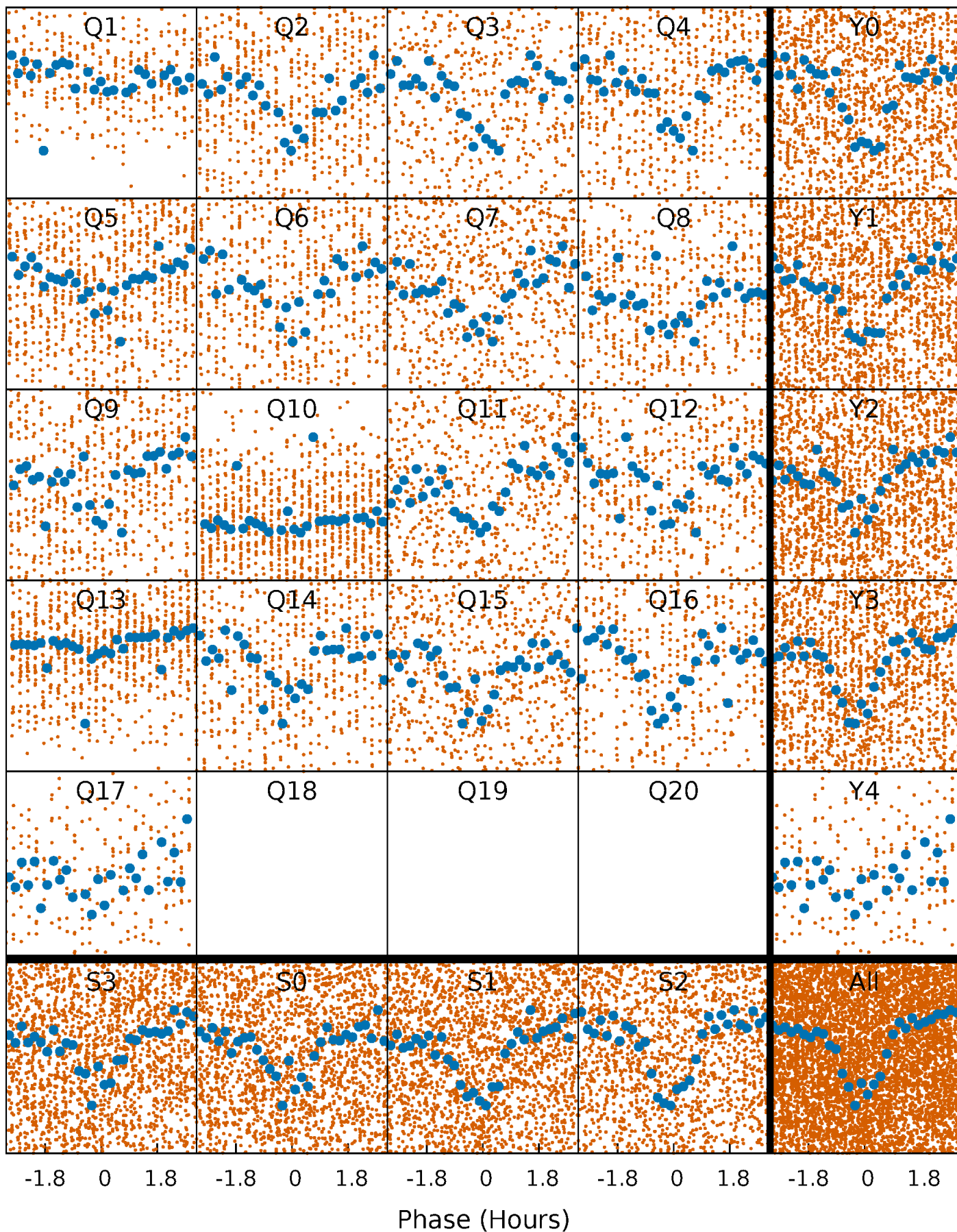


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

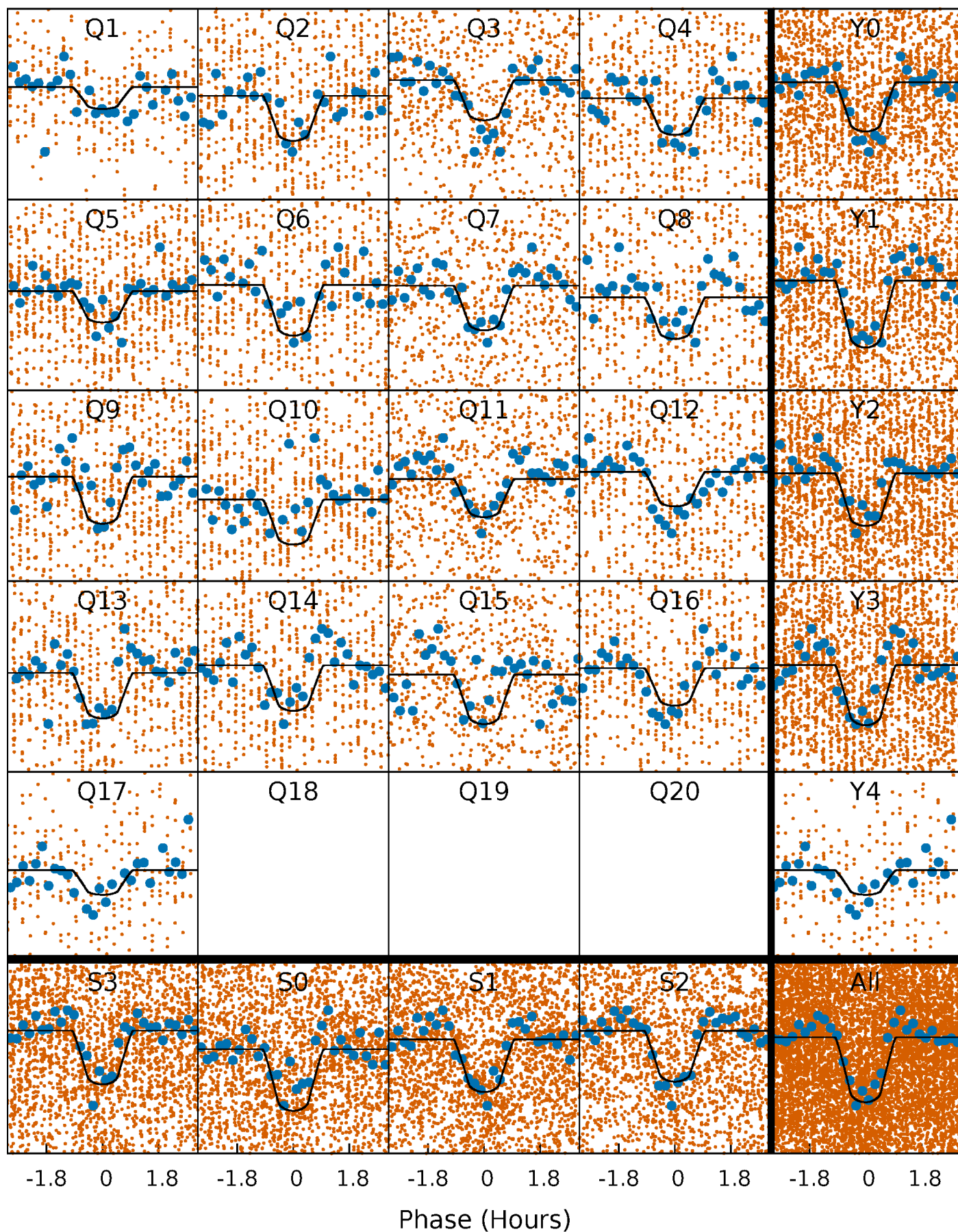
TCE 006233573-02 P= 1.174958 Days  $T_0=132.667985$  (BKJD)





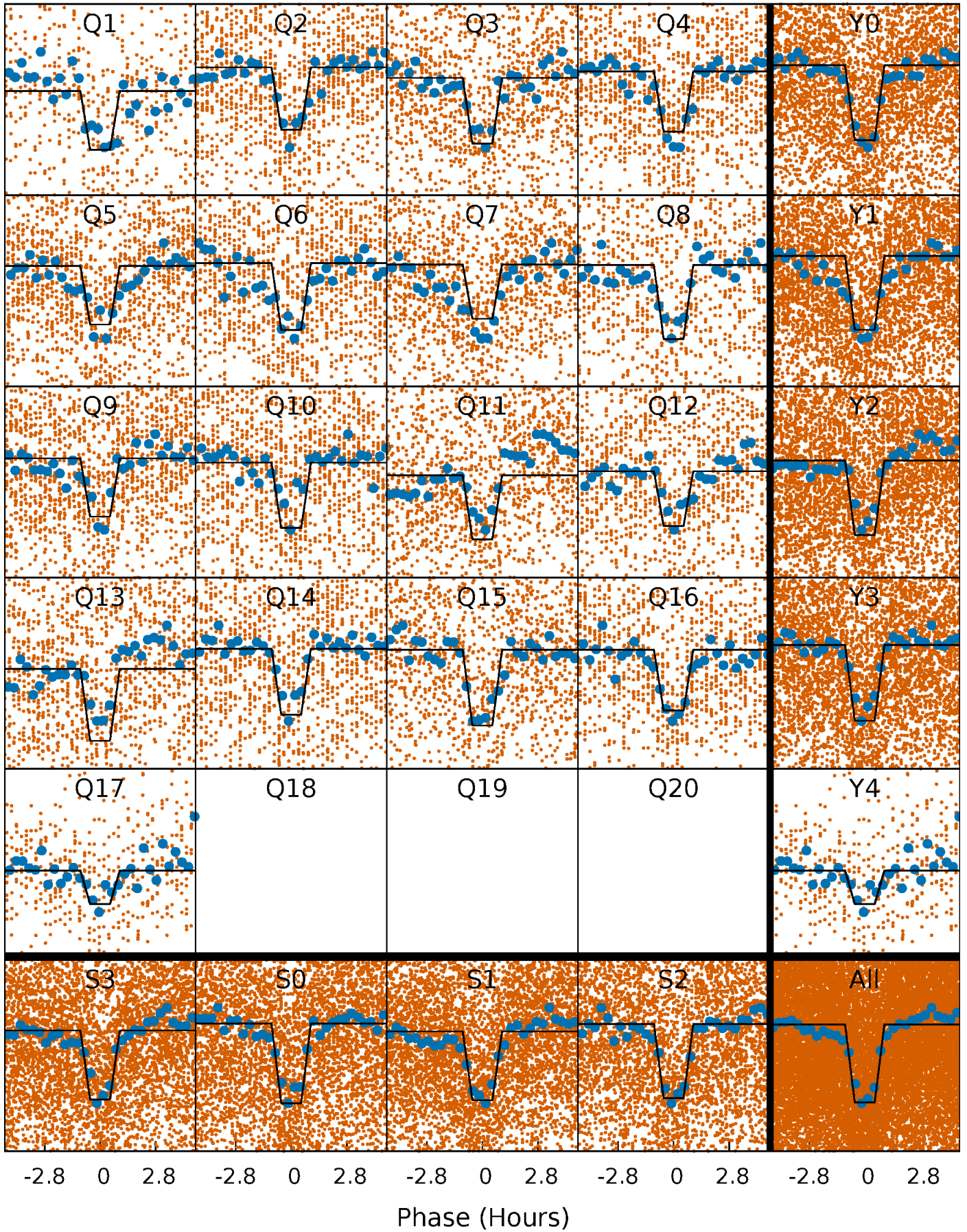
# DV Quarter-Phased Transit Curves

TCE 006233573-02 P= 1.174958 Days  $T_0=132.667985$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 006233573-02 P= 1.174945 Days  $T_0=132.670946$  (BKJD)

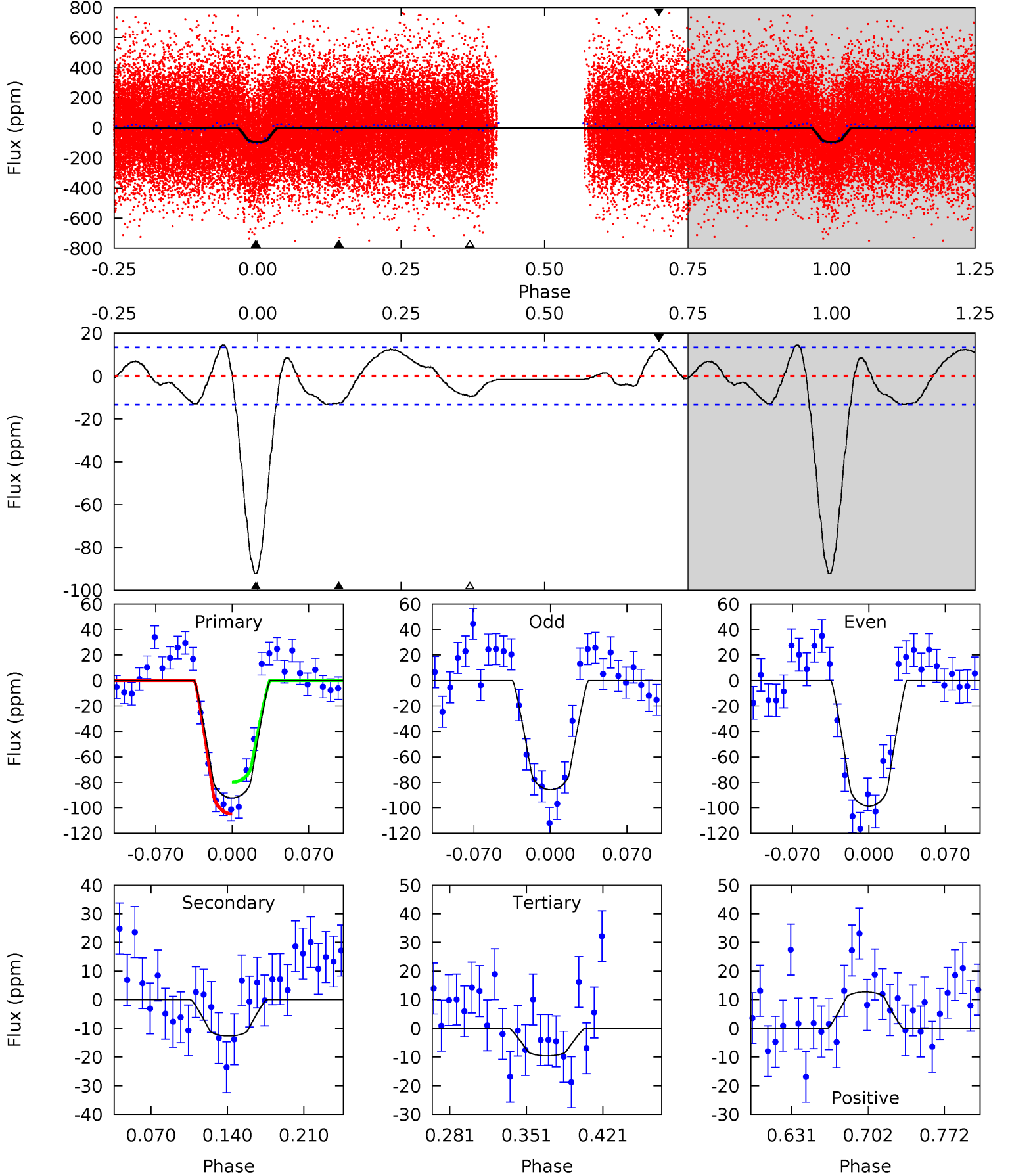




# DV Model-Shift Uniqueness Test

006233573-02, P = 1.174958 Days, E = 131.493027 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
31.9	4.37	3.30	4.40	4.64	1.81	2.33	28.6	27.5	1.07	-0.03	2.24	0.96	0.14	4.31

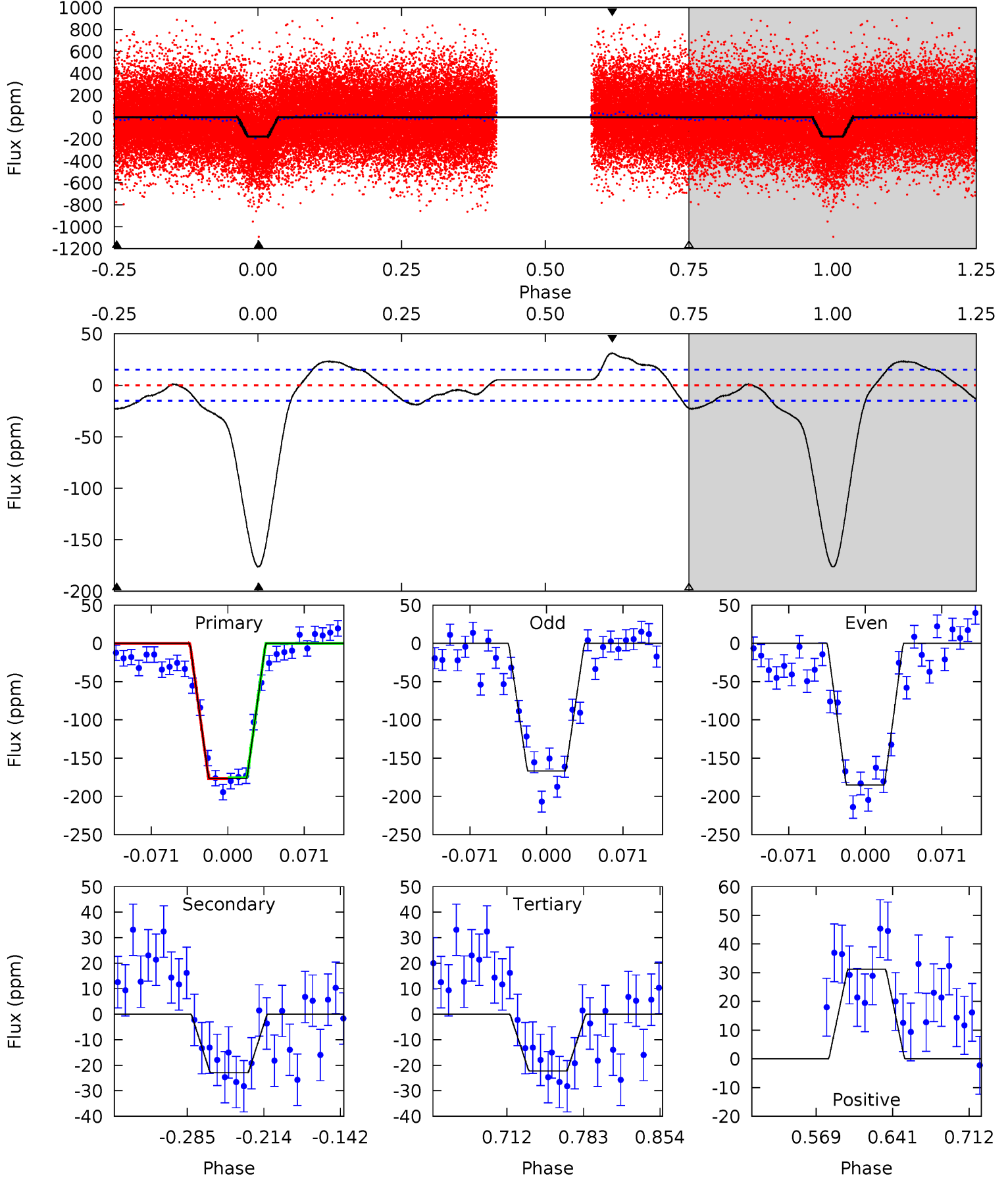




# Alt Model-Shift Uniqueness Test

006233573-02, P = 1.174945 Days, E = 131.496001 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
54.0	7.02	6.81	9.55	4.64	1.80	4.76	47.2	44.4	0.20	-2.54	2.82	0.99	0.15	0.16



### Stellar Parameters For KIC 006233573

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5787^{+193}_{-176}$	$3.678^{+0.756}_{-0.178}$	$-0.420^{+0.350}_{-0.250}$	$2.667^{+0.729}_{-1.700}$	$1.236^{+0.166}_{-0.386}$	$0.092^{+1.142}_{-0.043}$
	+3%/-3%	+21%/-5%	+83%/-60%	+27%/-64%	+13%/-31%	+1244%/-47%
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 006233573-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-13 \pm 3$	$2.82^{+1.14}_{-1.00}$	$3726^{+359}_{-614}$	$3140^{+633}_{-6068}$	$0.460^{+0.649}_{-0.234}$
Alt.	$-23 \pm 3$	$3.67^{+1.29}_{-1.30}$	$3720^{+376}_{-661}$	$3283^{+457}_{-5813}$	$0.506^{+0.620}_{-0.228}$

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

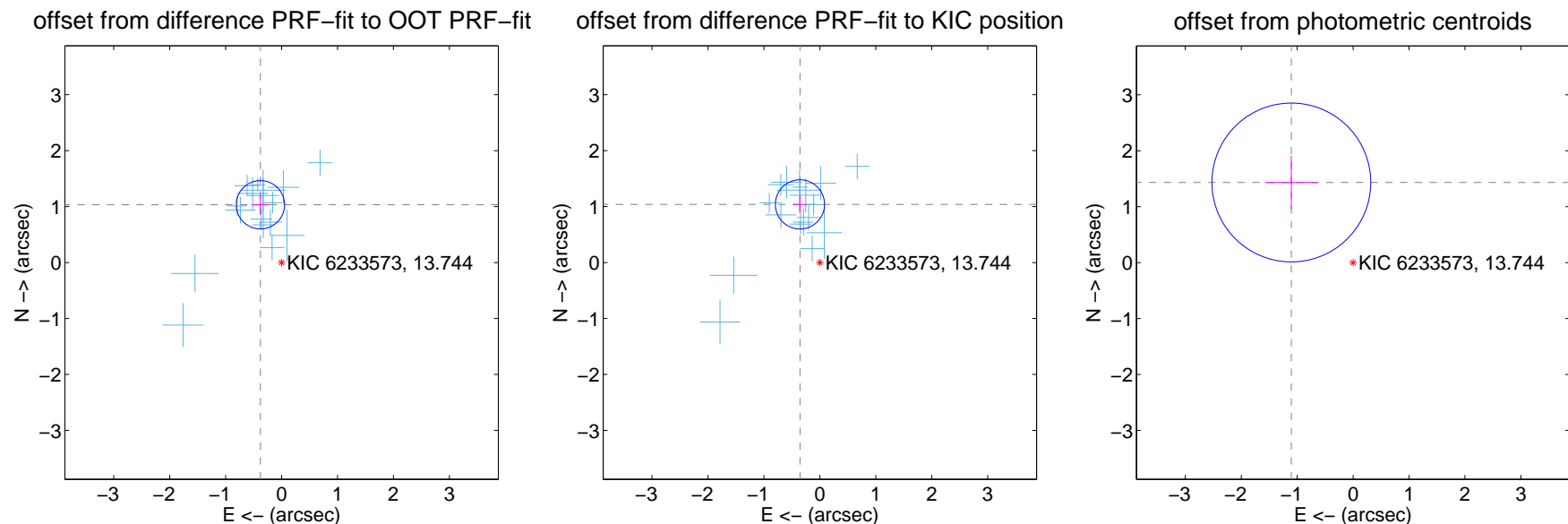
## DV Centroid Data

Supplemental centroid analysis for 006233573-02. Kepler magnitude: 13.74. Transit SNR 22.34

There are 17 quarters with good PRF difference image offsets

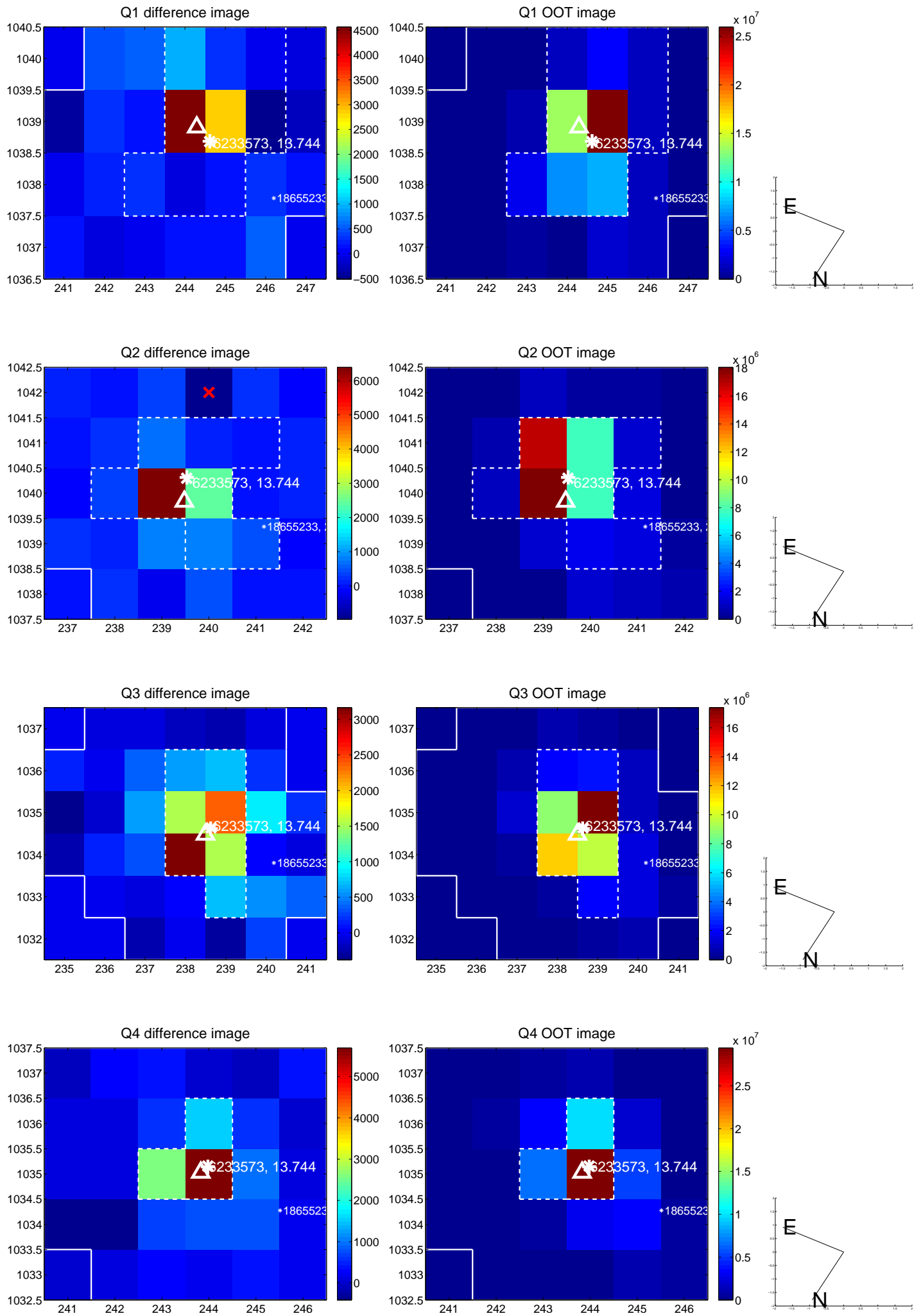
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.100 \pm 0.144$	7.64	$0.378 \pm 0.156$	$1.033 \pm 0.181$
PRF-fit source offset from KIC position	$1.098 \pm 0.147$	7.49	$0.355 \pm 0.128$	$1.039 \pm 0.149$
photometric centroid source offset	$1.81 \pm 0.47$	3.82	$1.10 \pm 0.47$	$1.43 \pm 0.48$

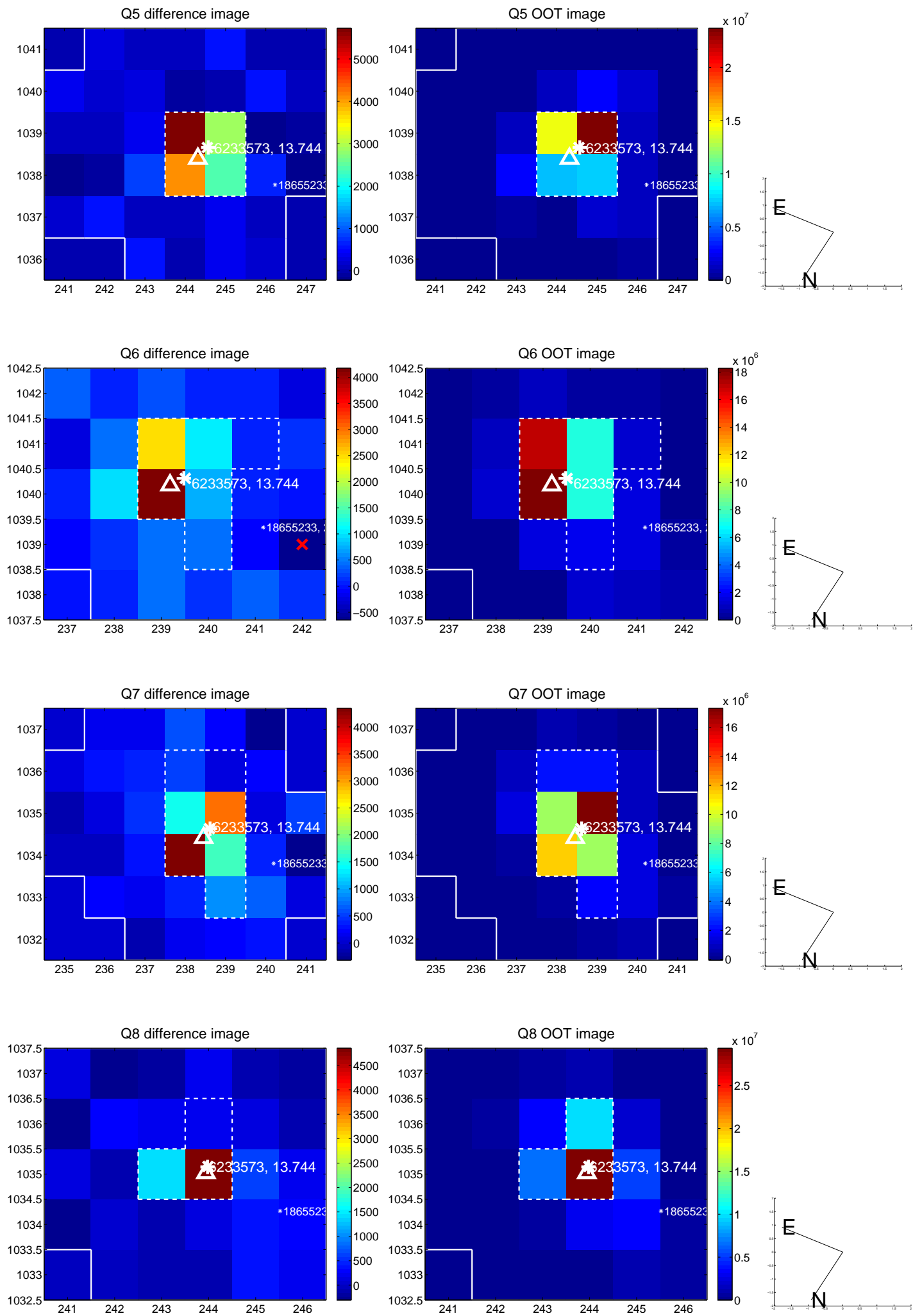


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

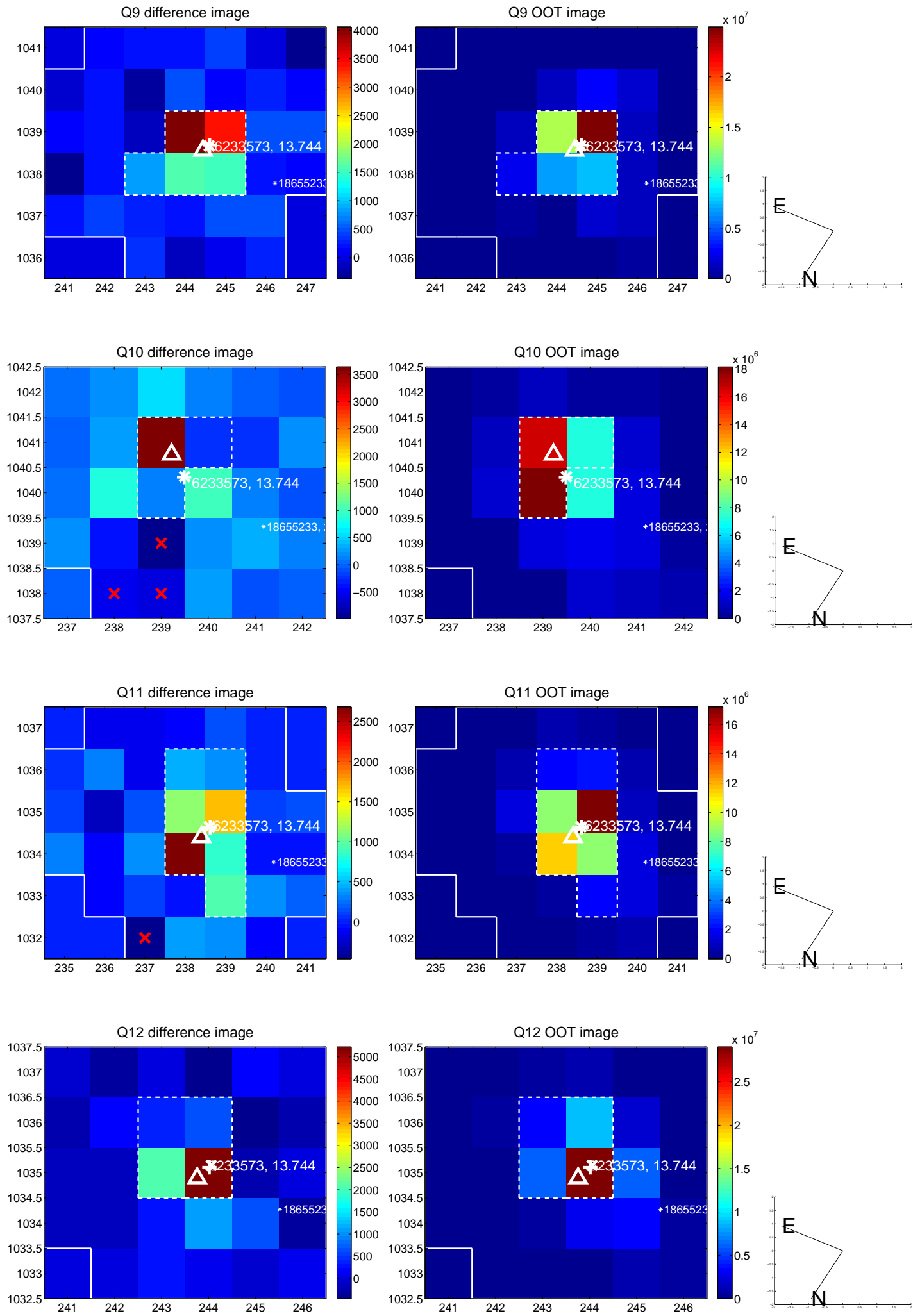
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



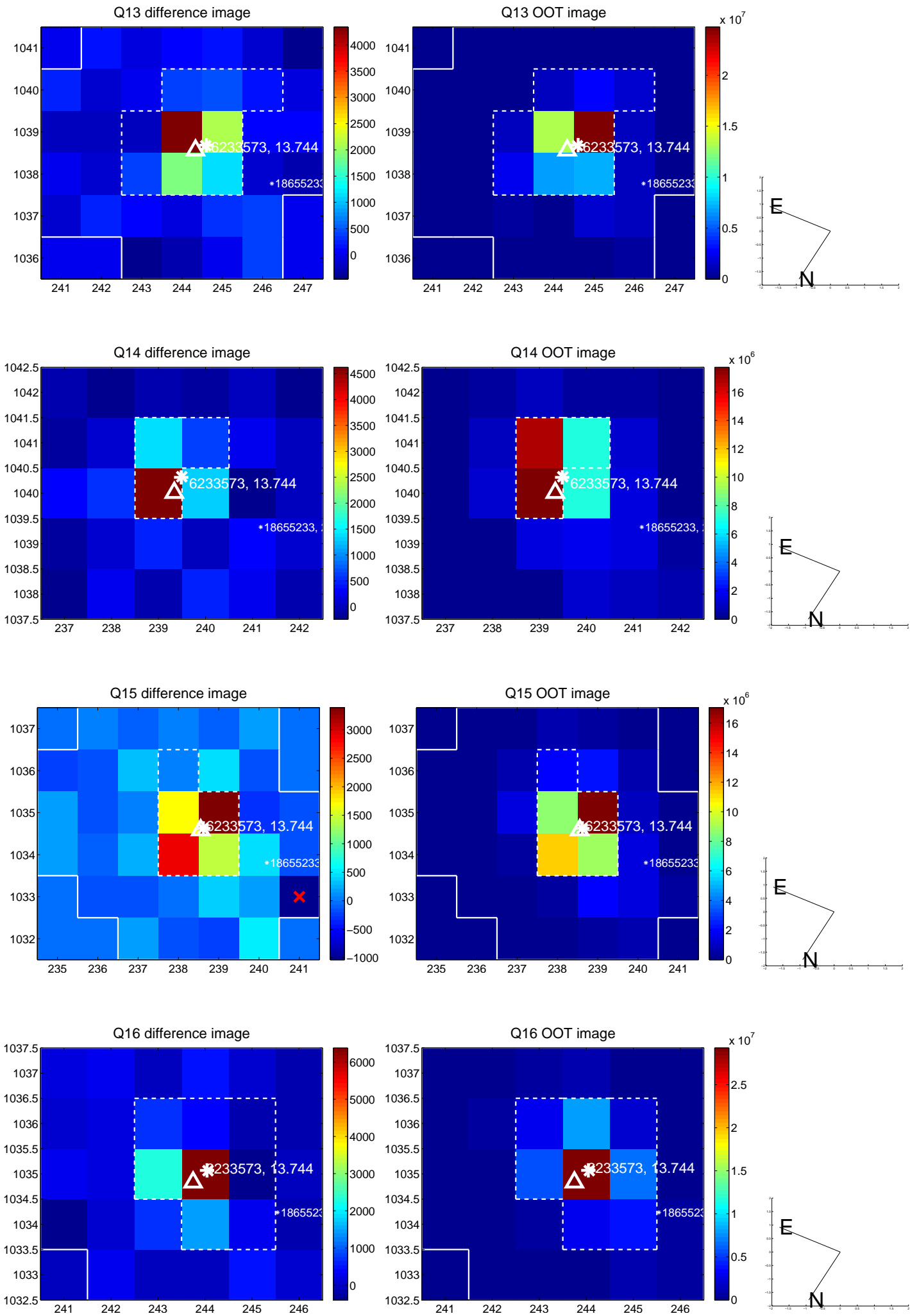
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

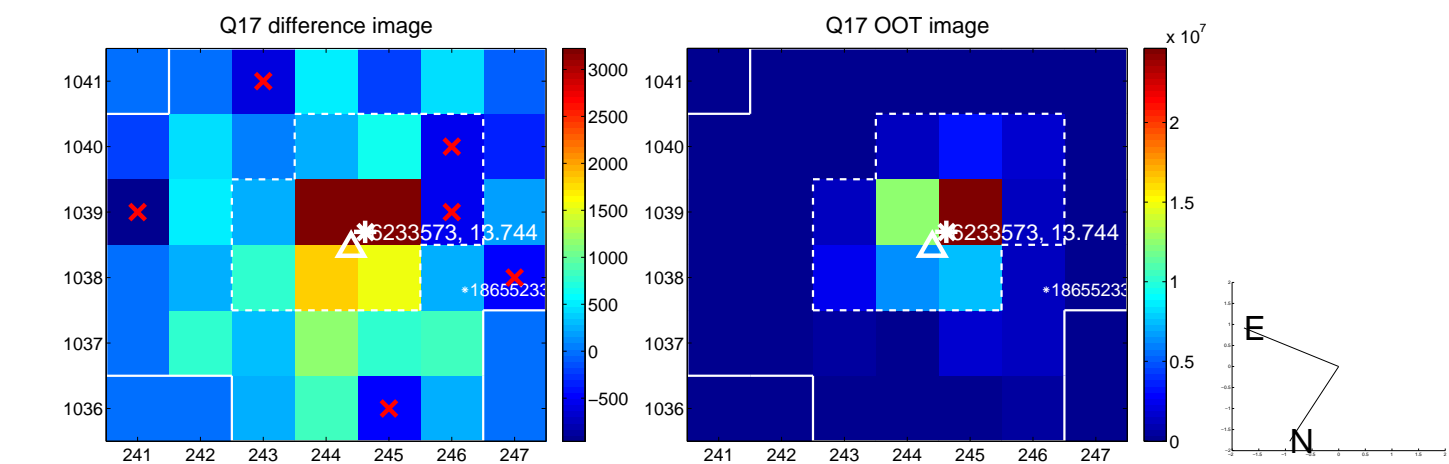


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

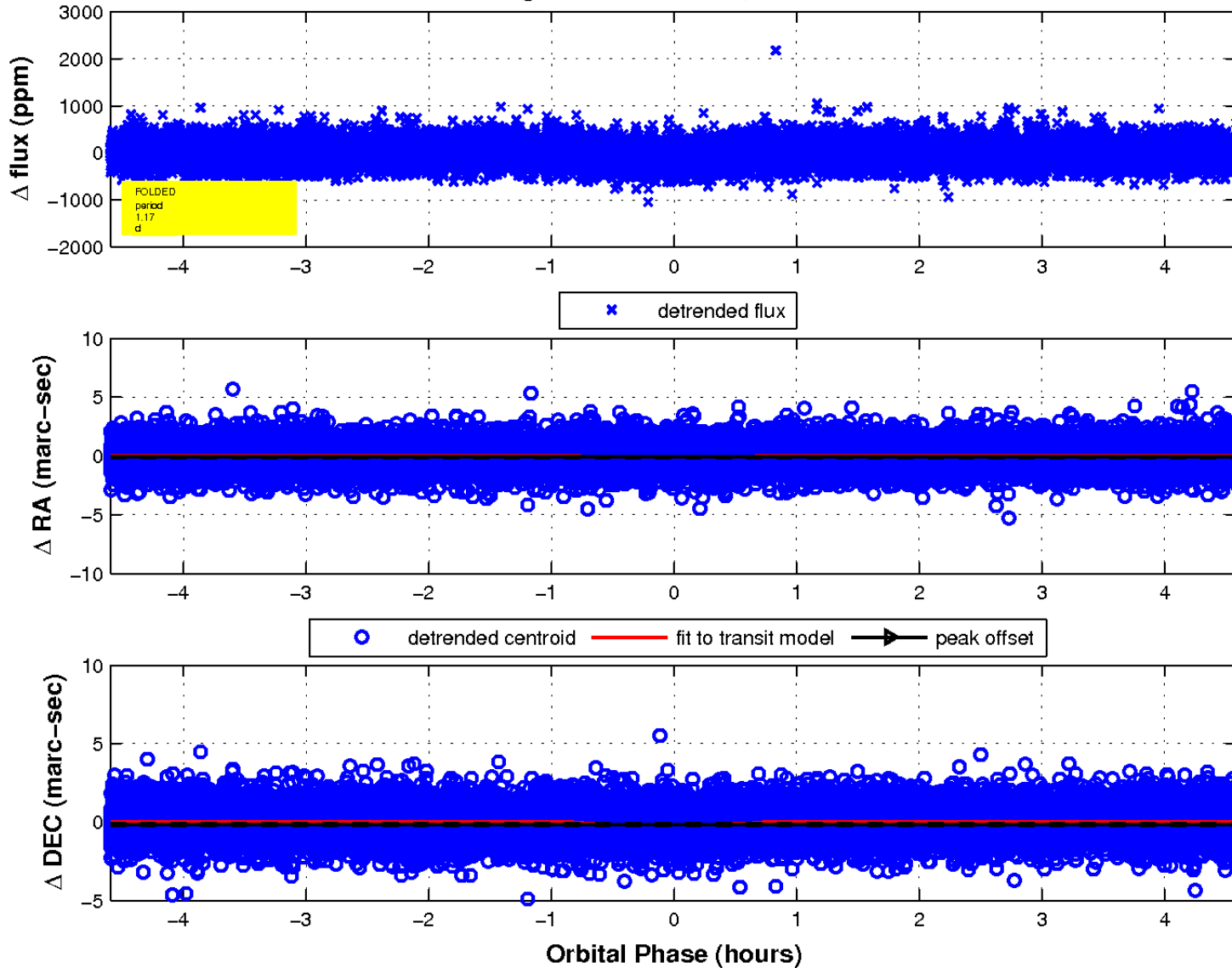




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

