

# KIC 008362546

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008362546-01	OBS	No	378.627942	253.639173	987.4	14.203	11.8	9.5	1.64	11430	5.33	23.06
008362546-02	OBS	No	0.937986	132.154356	59.2	2.361	7.6	7.1	1.64	11430	1.45	68794.97

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008362546-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008362546-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT

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

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

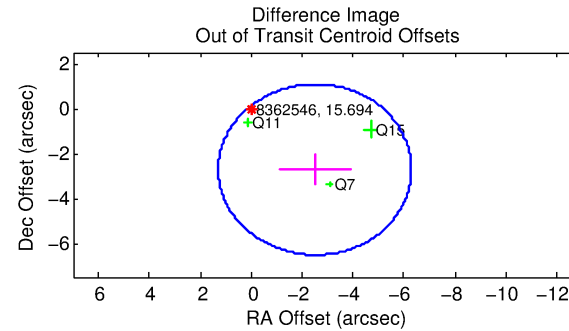
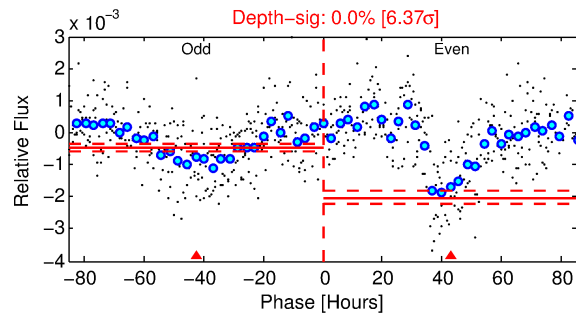
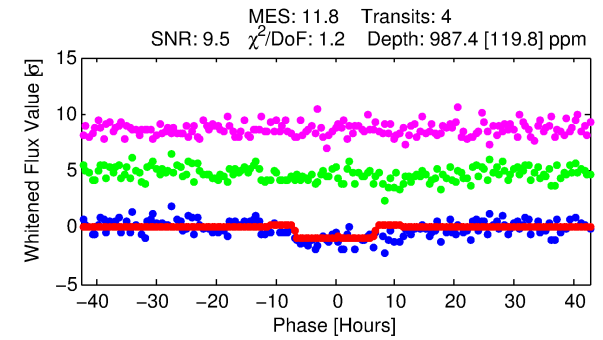
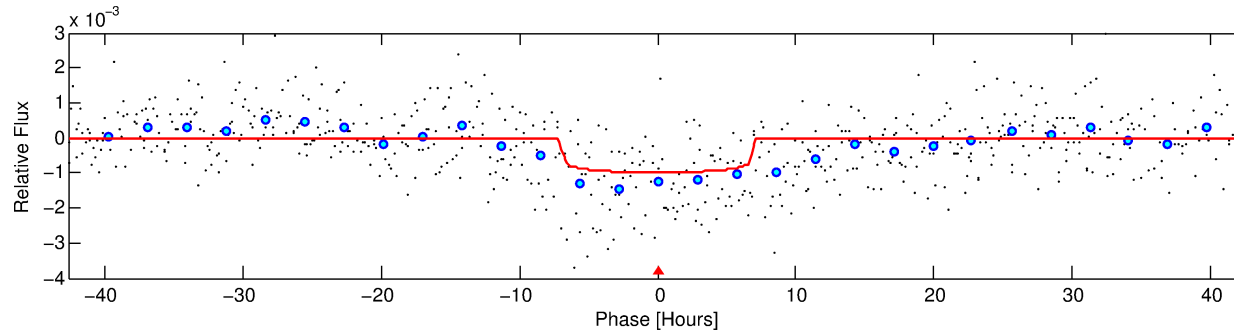
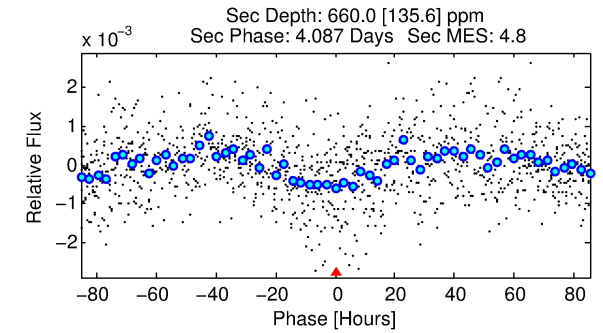
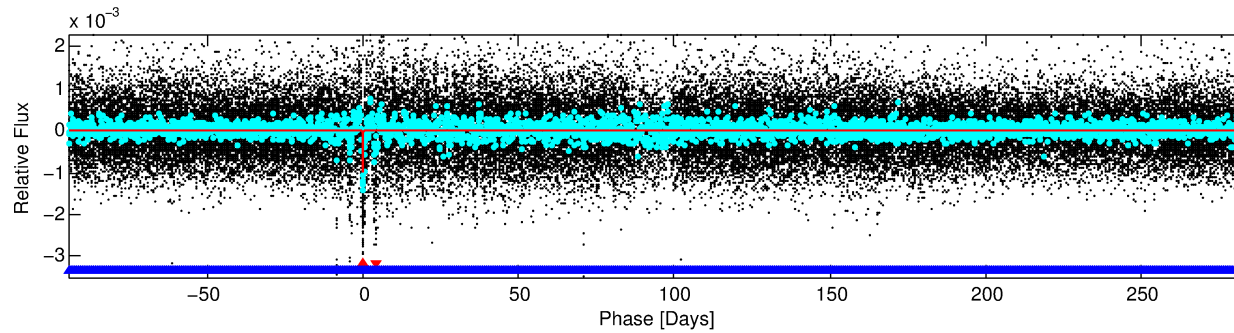
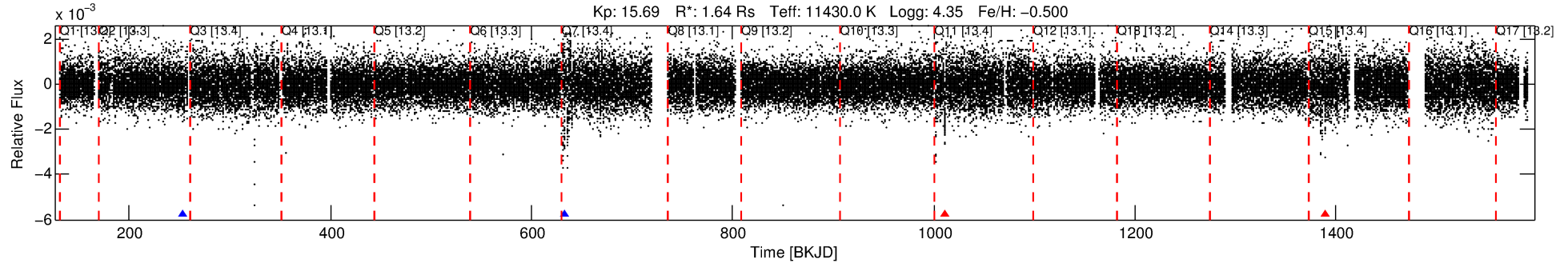
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008362546-01

No Significant Match Found

# DV One-Page Summary

KIC: 8362546 Candidate: 1 of 2 Period: 378.628 d



## DV Fit Results:

Period = 378.62794 [0.00770] d  
Epoch = 253.6392 [0.0148] BKJD  
Rp/R\* = 0.0298 [0.0098]  
a/R\* = 207.59 [529.27]  
b = 0.15 [17.09]  
Seff = 23.06 [7.28]  
Teq = 559 [44] K  
Rp = 5.33 [2.18] Re  
a = 1.3363 [0.2631] AU  
Ag = 22829.32 [16923.10] [1.35σ]  
Teffp = 10620 [1874] K [5.37σ]

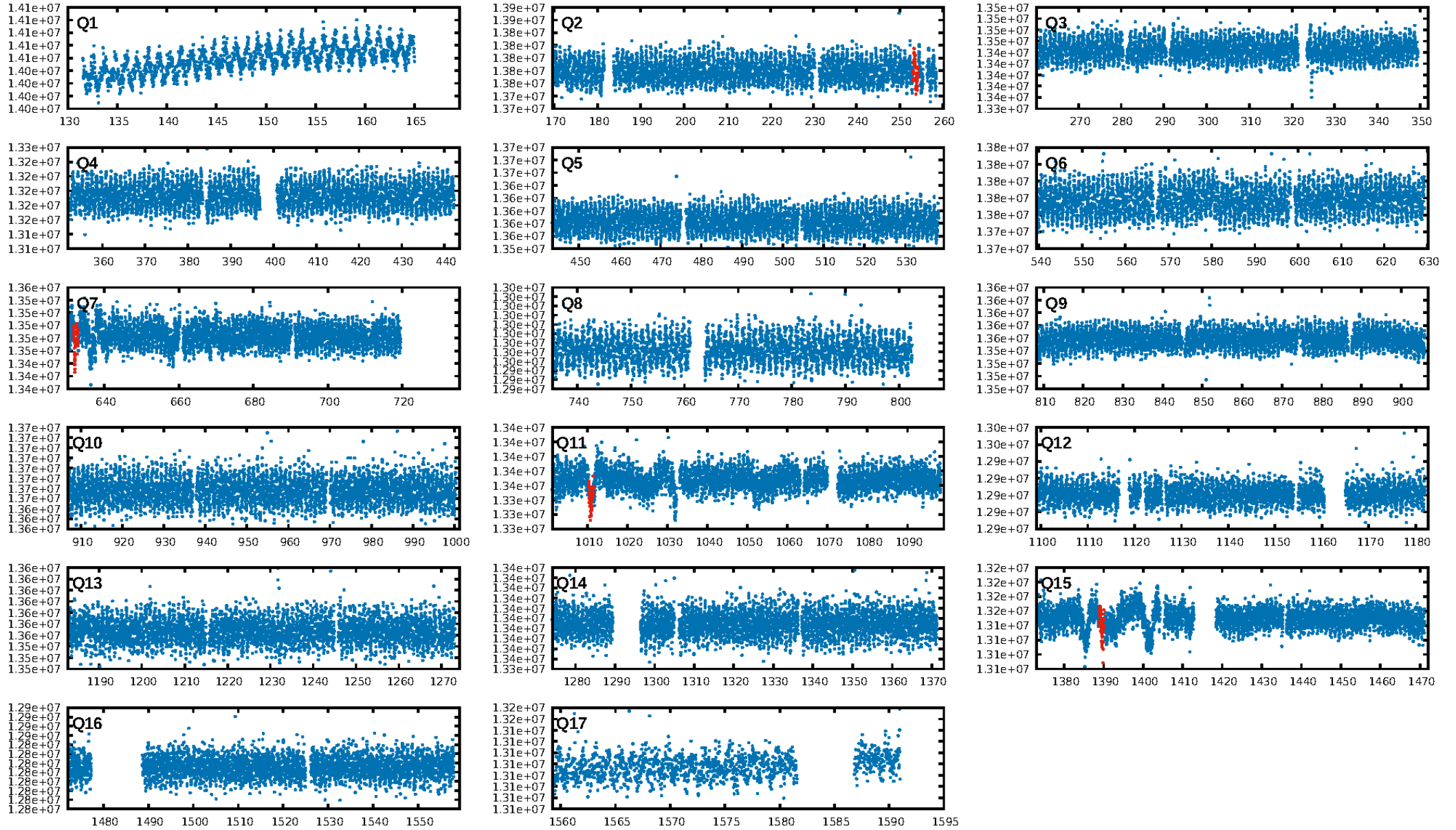
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [629.59σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 60.7%  
Bootstrap-pfa: 3.84e-17  
RollingBand-fgt: 0.50 [2/4]  
GhostDiagnostic-chr: 0.7177  
Centroid-sig: 75.0%  
Centroid-so: 0.957 arcsec [0.71σ]  
OotOffset-rm: 3.699 arcsec [2.92σ]  
KicOffset-rm: 3.492 arcsec [3.12σ]  
OotOffset-st: 0/3/0/0 [3]  
KicOffset-st: 0/3/0/0 [3]  
DiffImageQuality-fgm: 0.33 [1/3]  
DiffImageOverlap-fno: 0.00 [0/4]

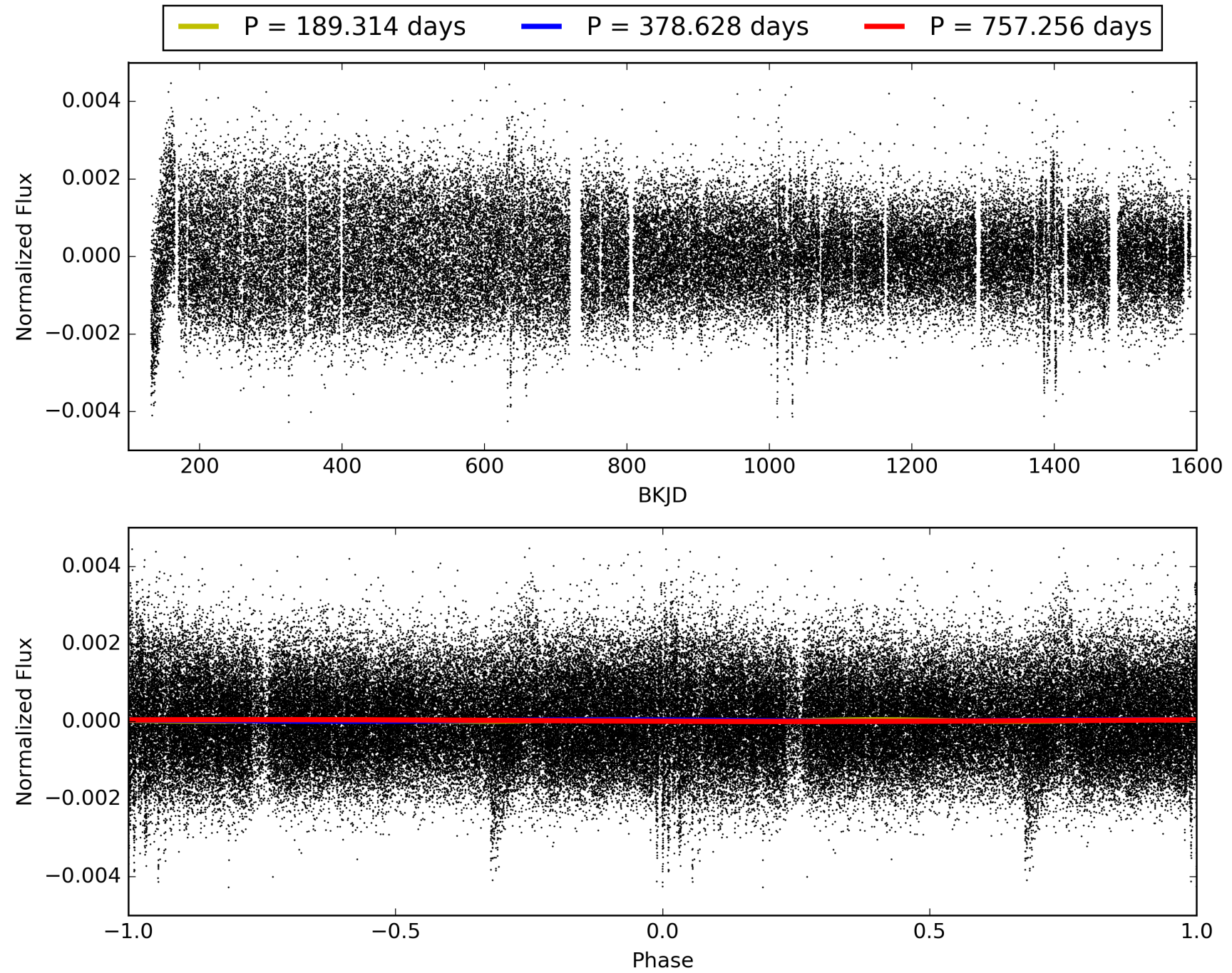
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 00:38:05 Z

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

# TCE 008362546-01, PDC Light Curves

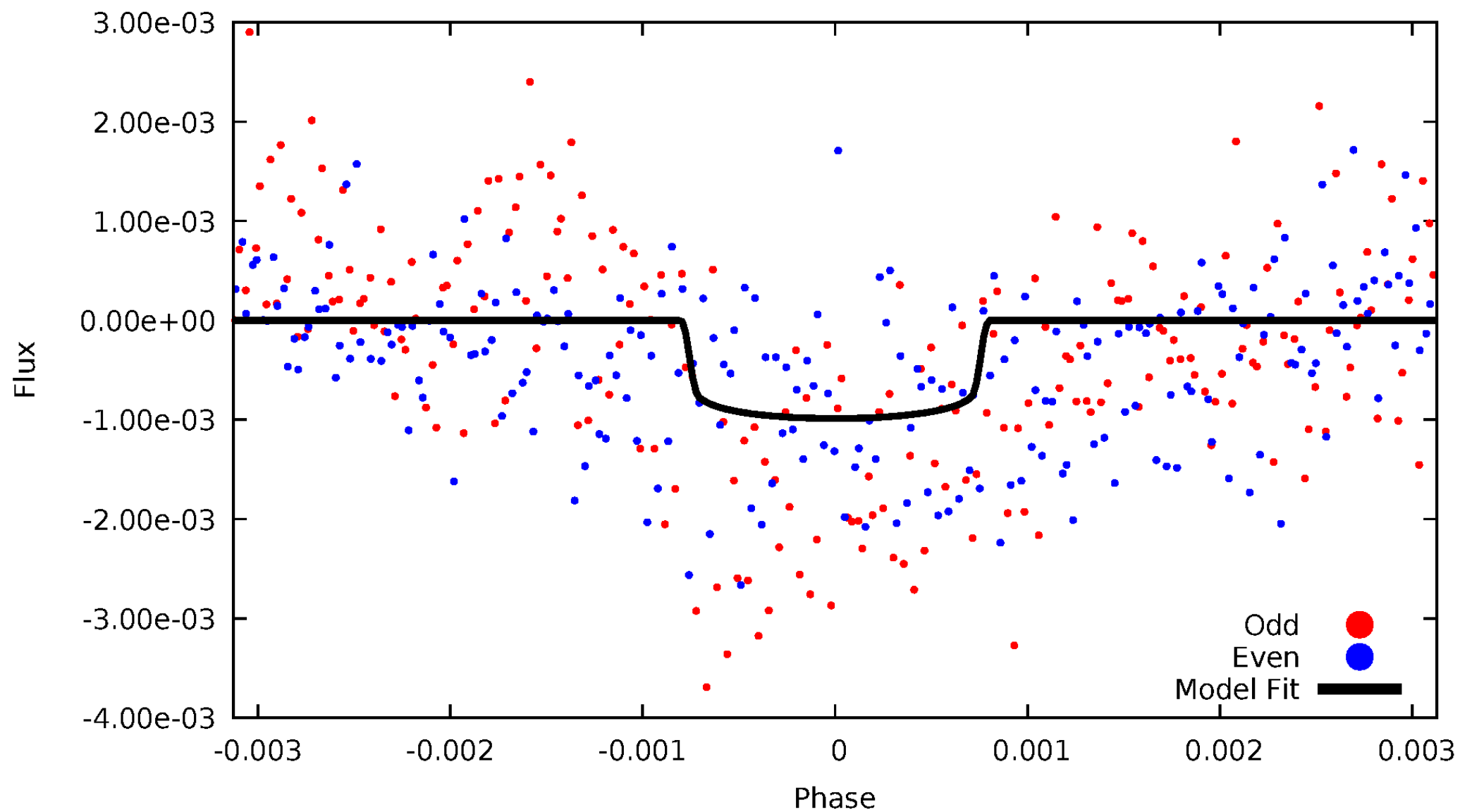


TCE 008362546-01



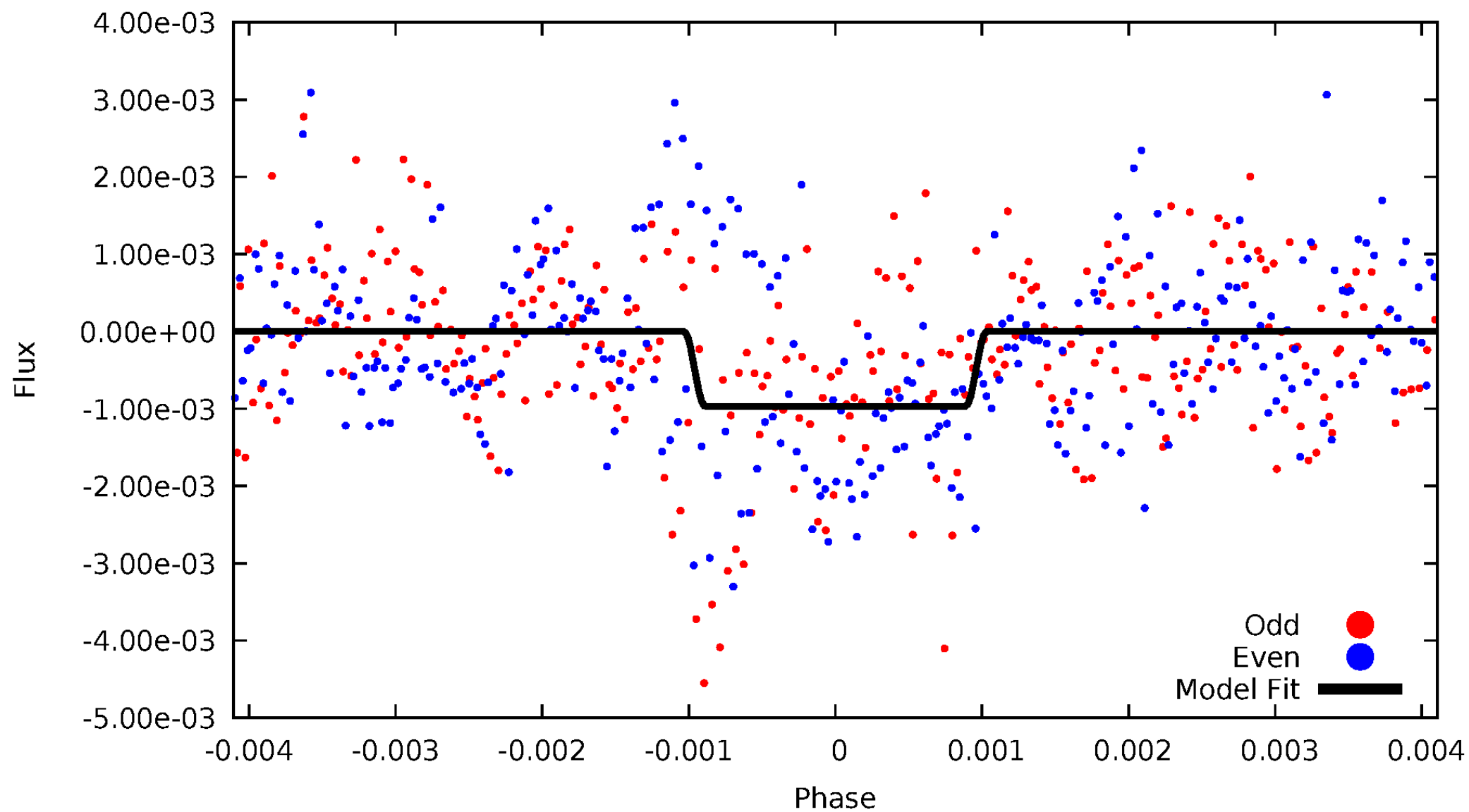
# DV Odd/Even

TCE 008362546-01



# ALT Odd/Even

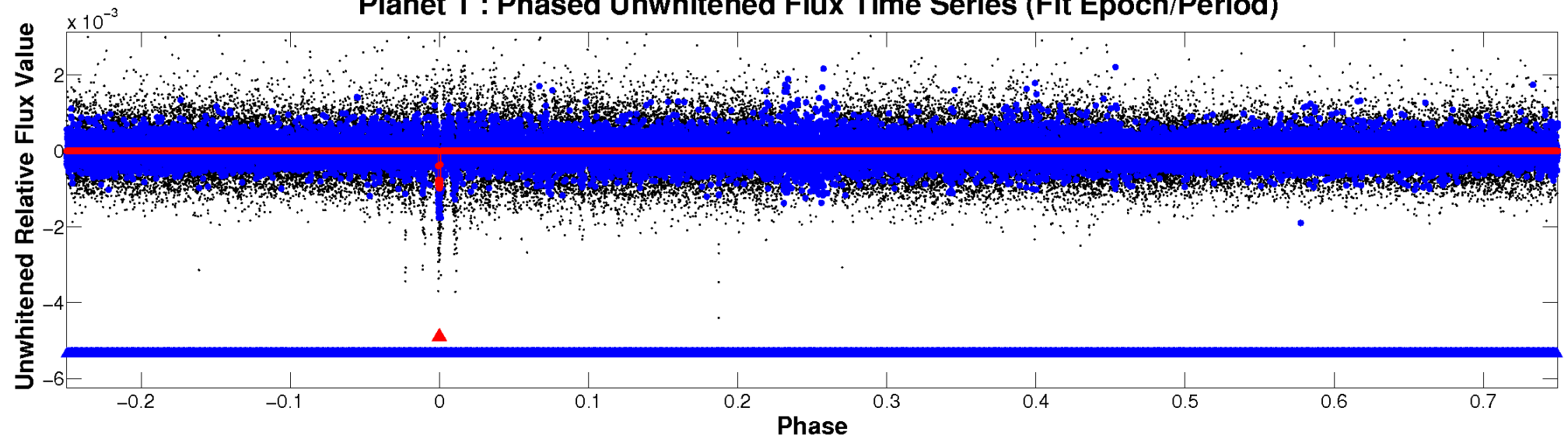
TCE 008362546-01



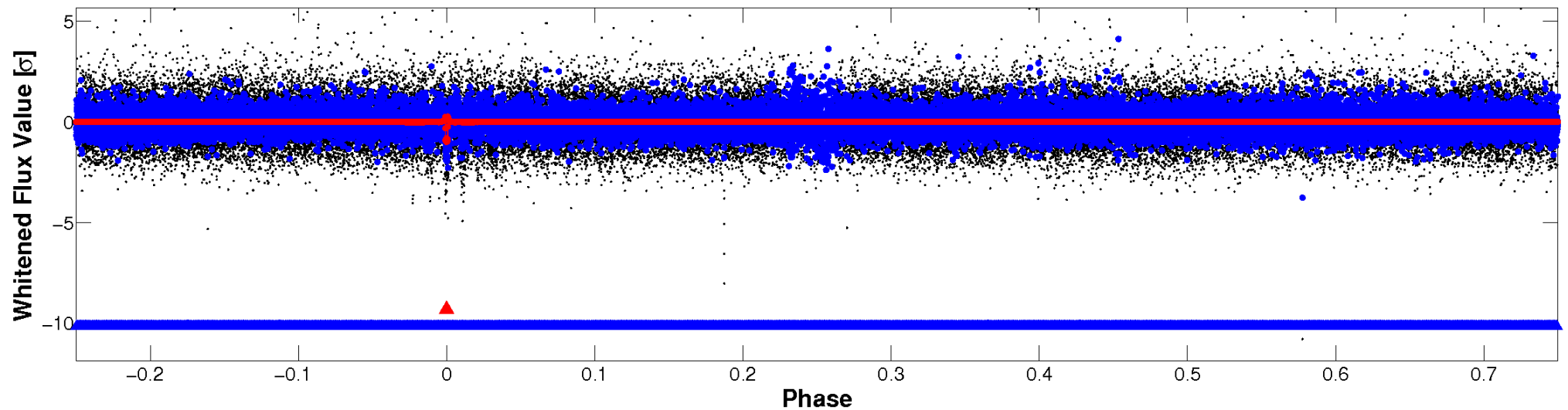


# Non-Whitened Vs. Whitened Light Curve

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

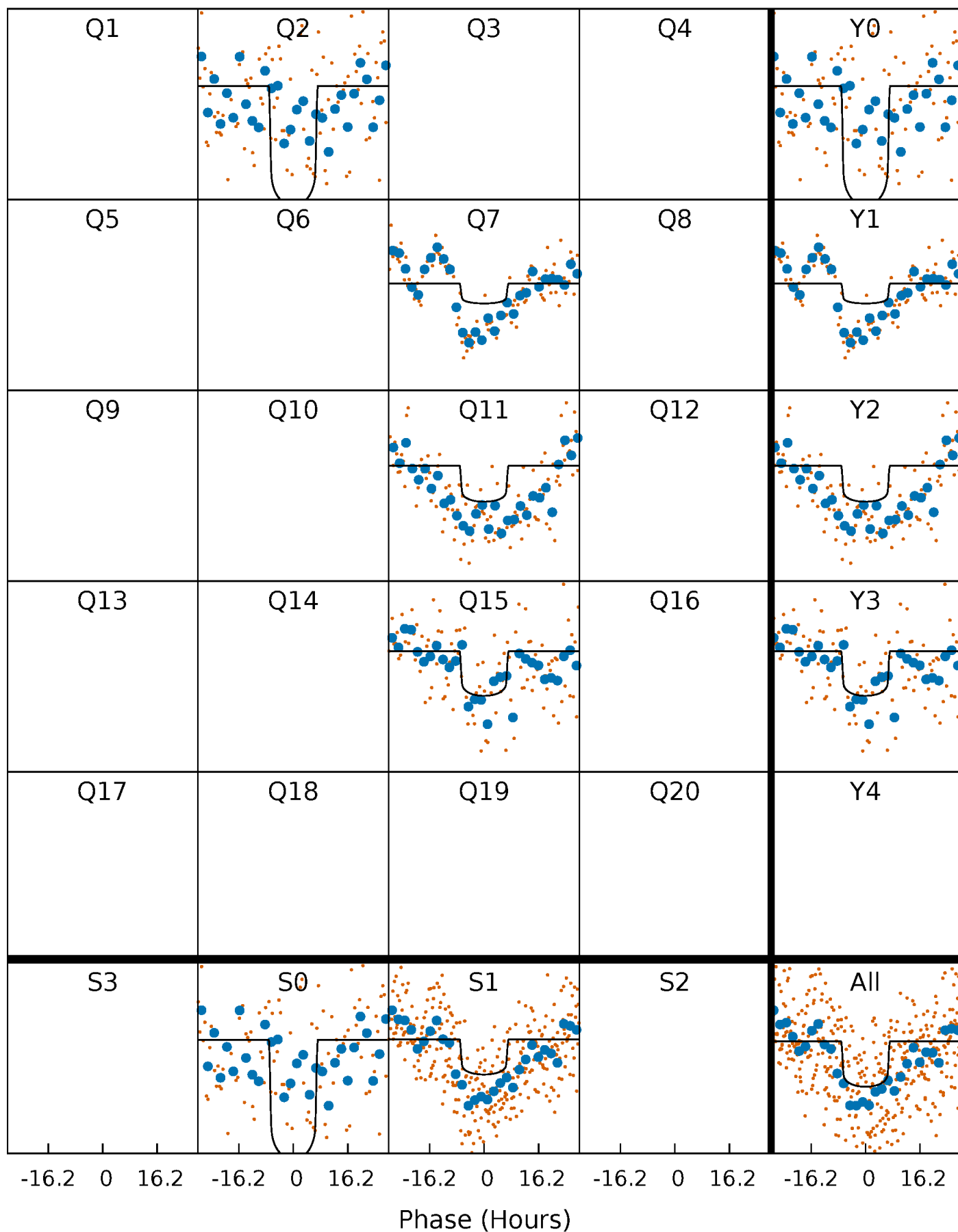
TCE 008362546-01     $P=378.627942$  Days     $T_0=253.639173$  (BKJD)





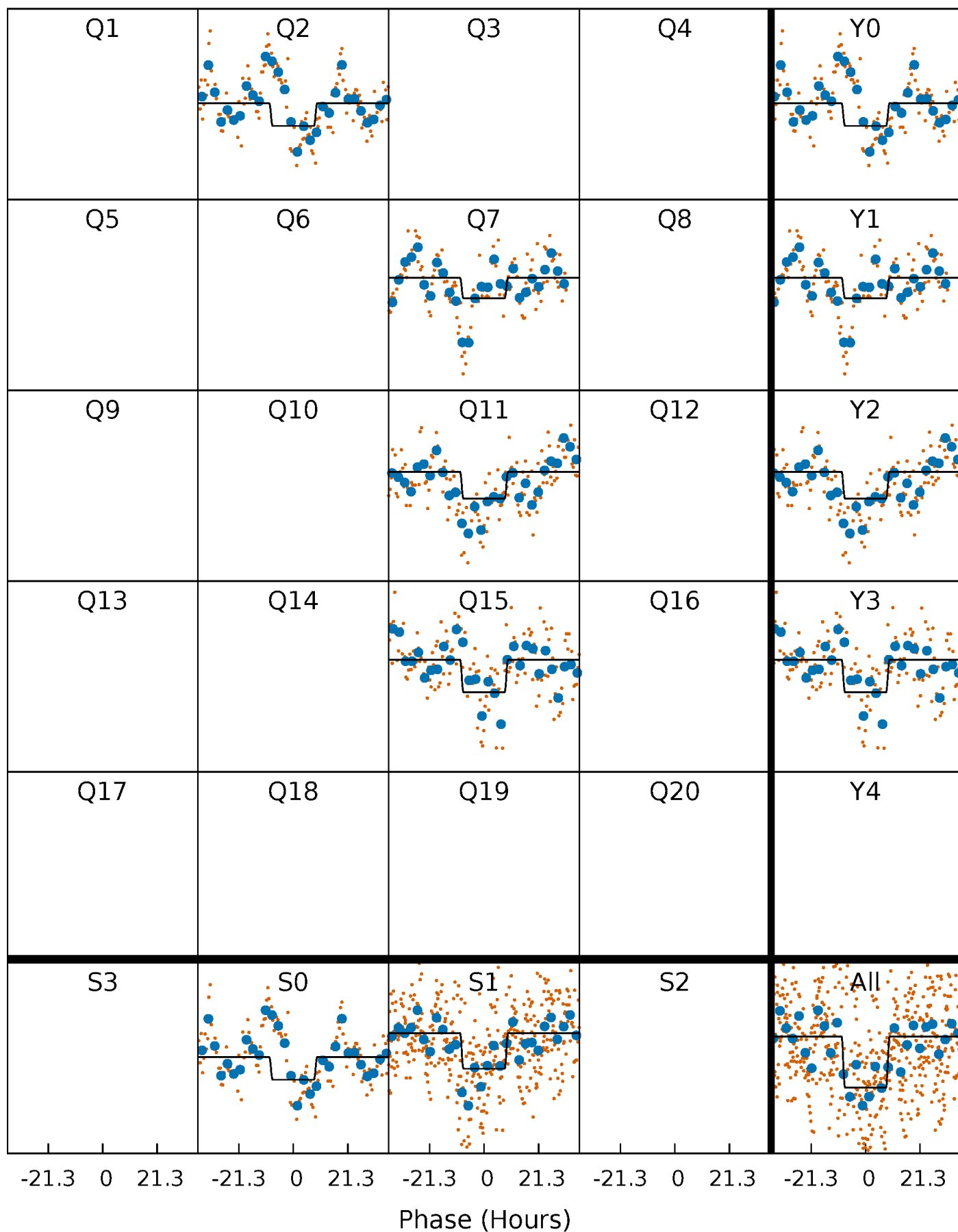
# DV Quarter-Phased Transit Curves

TCE 008362546-01 P=378.627942 Days  $T_0=253.639173$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

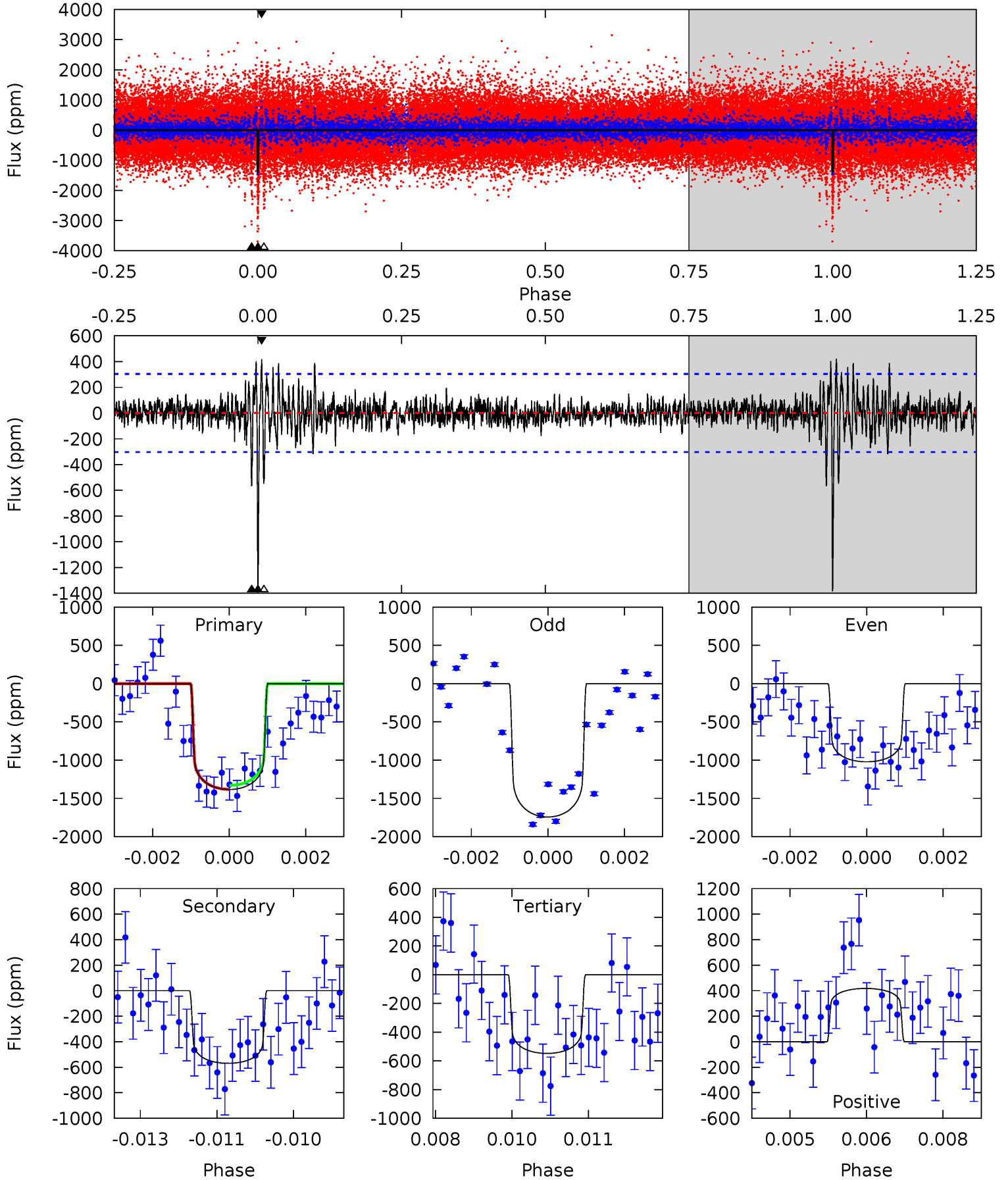
TCE 008362546-01 P=378.620244 Days  $T_0=253.732778$  (BKJD)



# DV Model-Shift Uniqueness Test

008362546-01, P = 378.627942 Days, E = 253.639173 Days

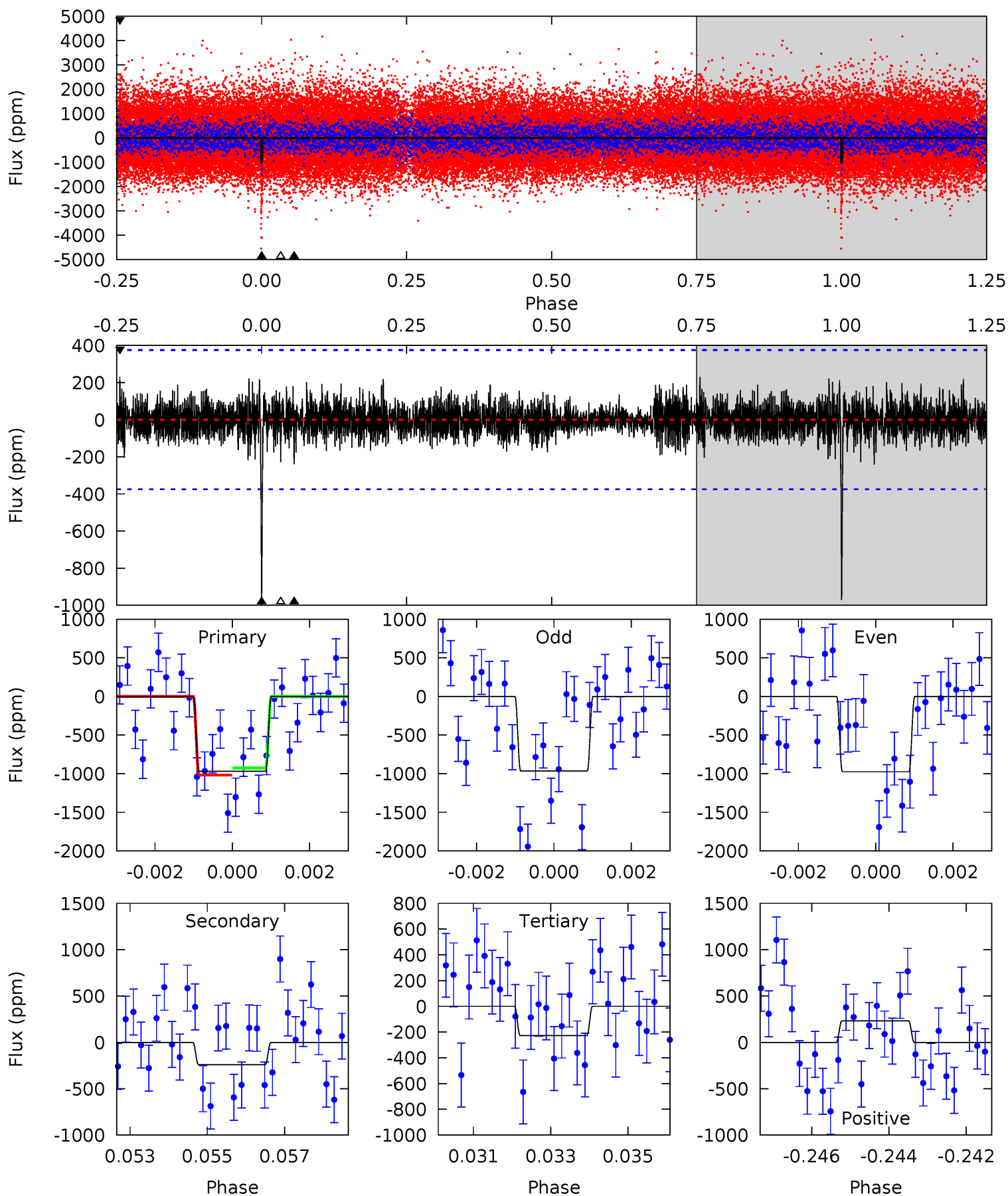
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
24.5	10.1	9.69	7.39	5.37	3.16	1.43	14.8	17.1	0.37	2.68	6.37	1.02	0.23	0.45



# Alt Model-Shift Uniqueness Test

008362546-01, P = 378.620244 Days, E = 253.732778 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
13.8	3.41	3.23	3.27	5.32	3.08	0.87	10.5	10.5	0.18	0.13	0.06	1.00	0.19	0.65



### Stellar Parameters For KIC 008362546

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$11430^{+364}_{-445}$	$4.354^{+0.072}_{-0.144}$	$-0.500^{+0.600}_{-0.250}$	$1.641^{+0.401}_{-0.216}$	$2.218^{+0.229}_{-0.187}$	$0.707^{+0.308}_{-0.297}$
	+3%/-4%	+2%/-3%	+120%/-50%	+24%/-13%	+10%/-8%	+44%/-42%
Source	KIC0	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 008362546-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-569 \pm 57$	$5.42^{+1.90}_{-1.86}$	$786^{+48}_{-38}$	$9630^{+3860}_{-1725}$	$18517^{+25812}_{-8277}$
Alt.	$-240 \pm 71$	$5.66^{+1.97}_{-1.83}$	$789^{+51}_{-41}$	$7197^{+1978}_{-1150}$	$7377^{+8373}_{-3577}$

$T_{\text{max}}$  = 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

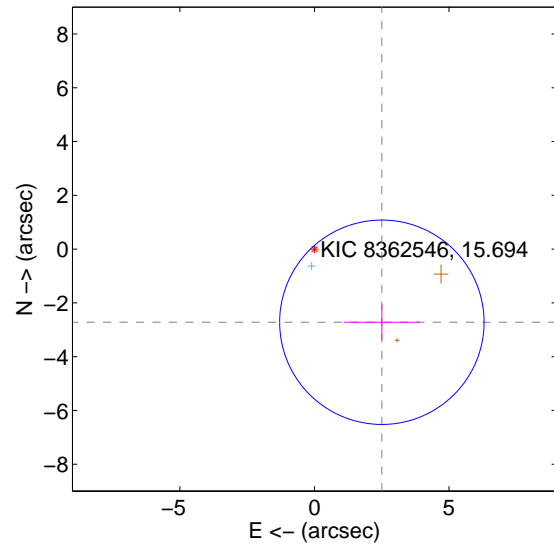
Supplemental centroid analysis for 008362546-01. Kepler magnitude: 15.69. Transit SNR 9.52

There are 1 quarters with good PRF difference image offsets

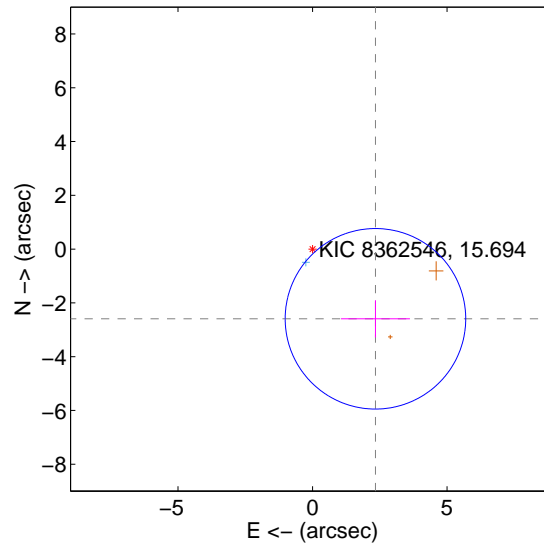
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.699 \pm 1.267$	2.92	$-2.507 \pm 1.417$	$-2.720 \pm 0.661$
PRF-fit source offset from KIC position	<b><math>3.492 \pm 1.119</math></b>	<b>3.12</b>	$-2.340 \pm 1.282$	$-2.592 \pm 0.692$
photometric centroid source offset	$0.96 \pm 1.35$	0.71	$0.83 \pm 1.36$	$0.48 \pm 1.34$

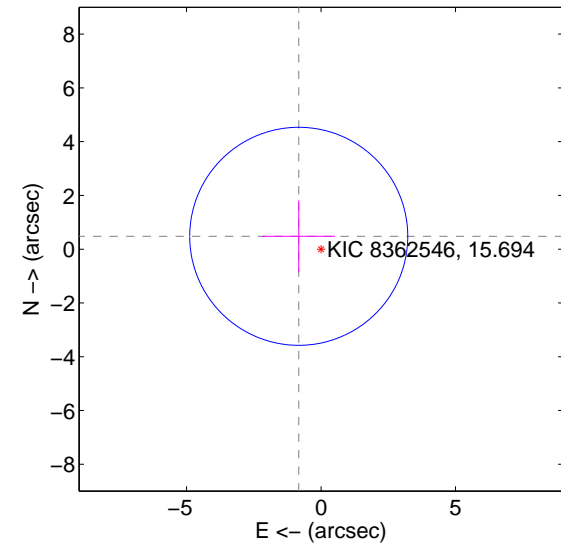
offset from difference PRF-fit to OOT PRF-fit



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.

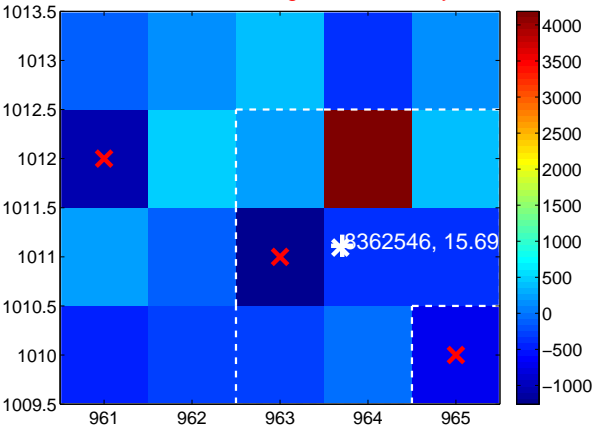
Q1 no difference image



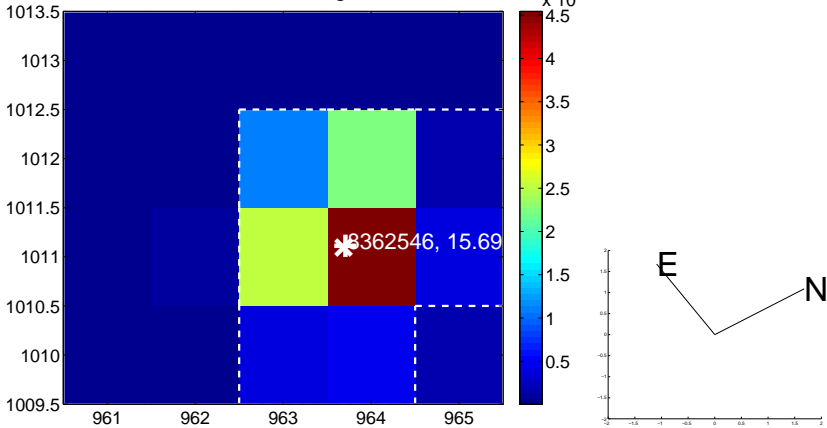
Q1 no OOT image



Q2 difference image. Poor Quality



Q2 OOT image



Q3 no difference image



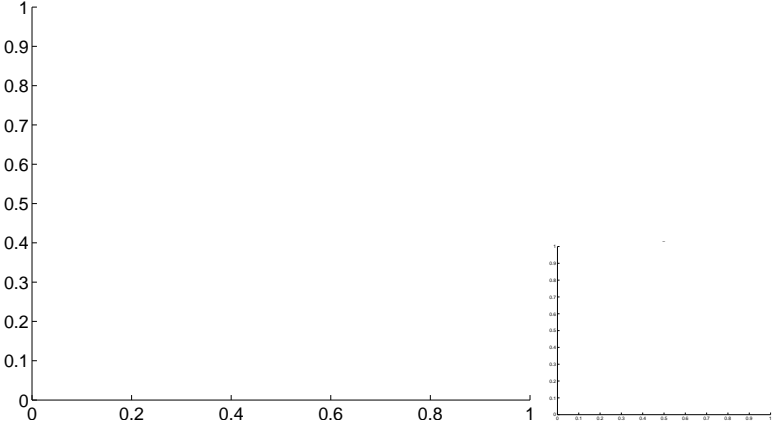
Q3 no OOT image



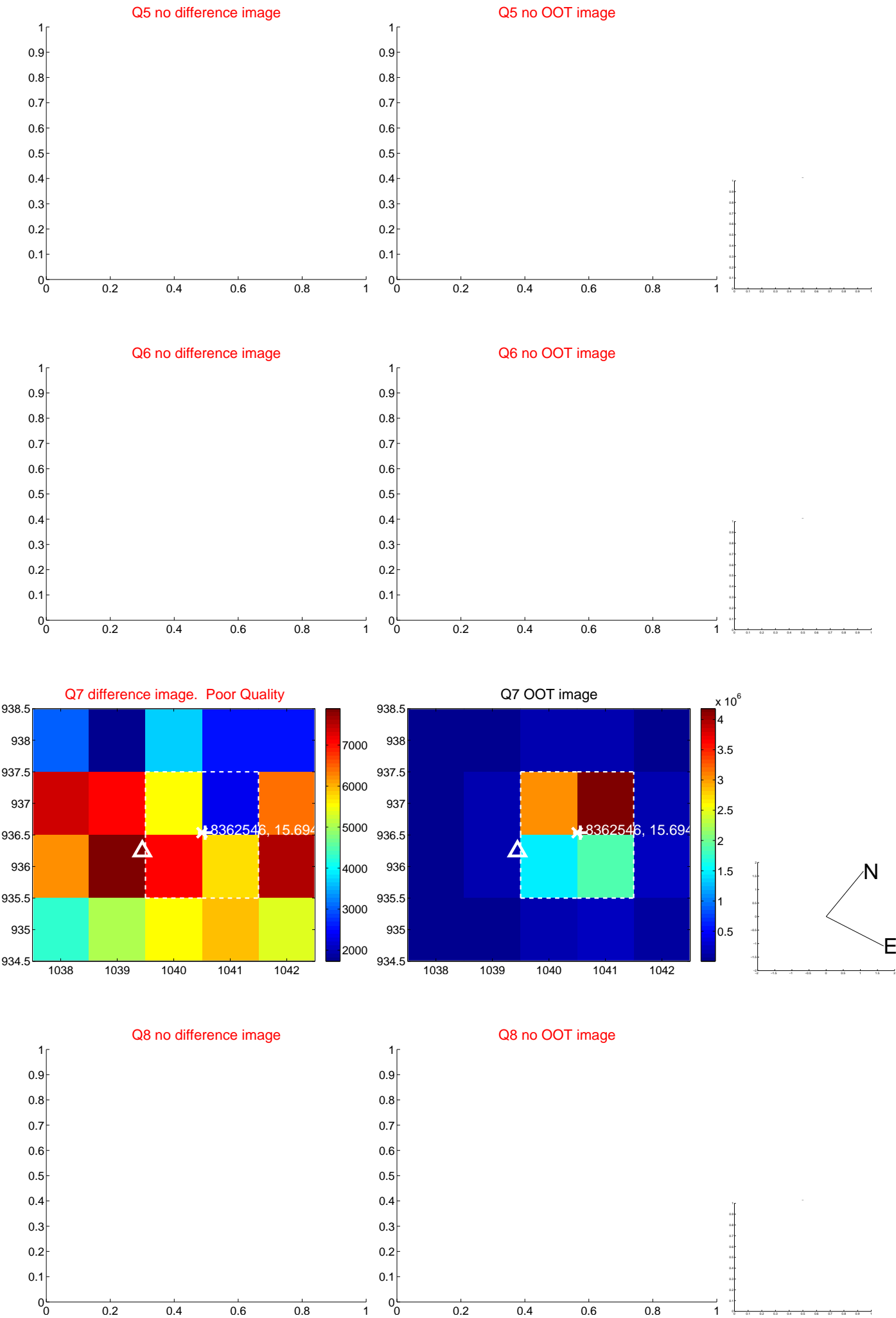
Q4 no difference image



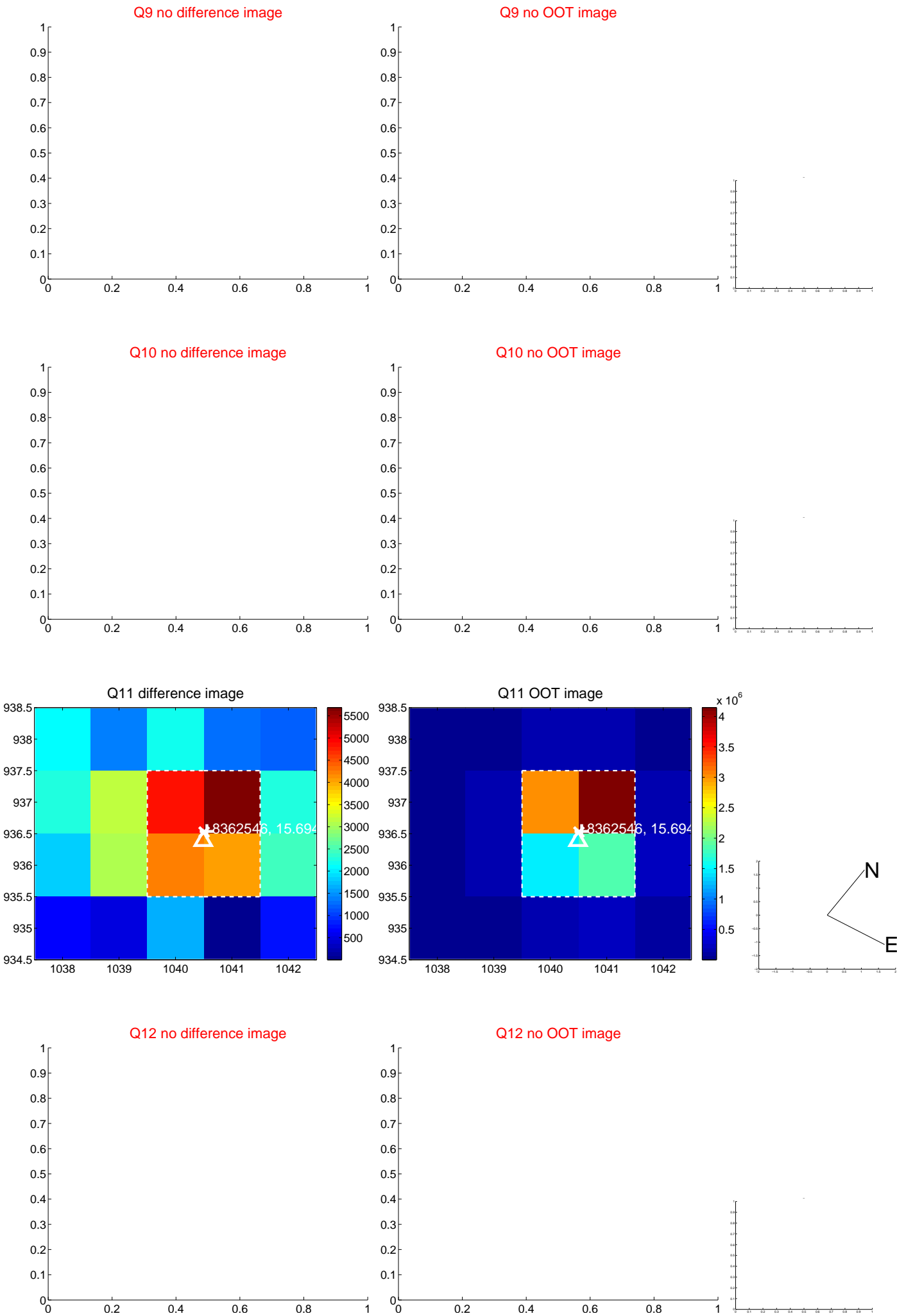
Q4 no OOT image



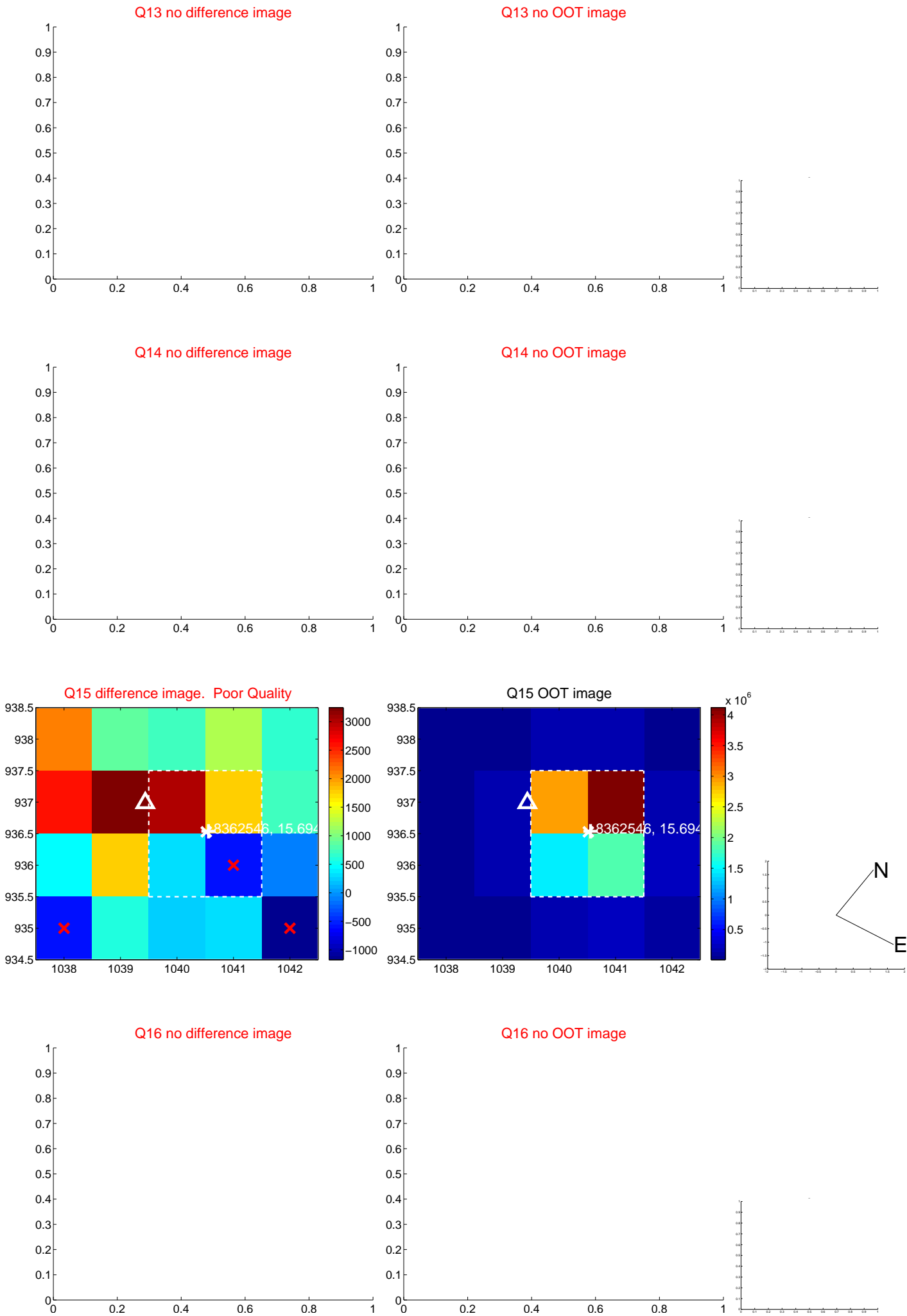
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



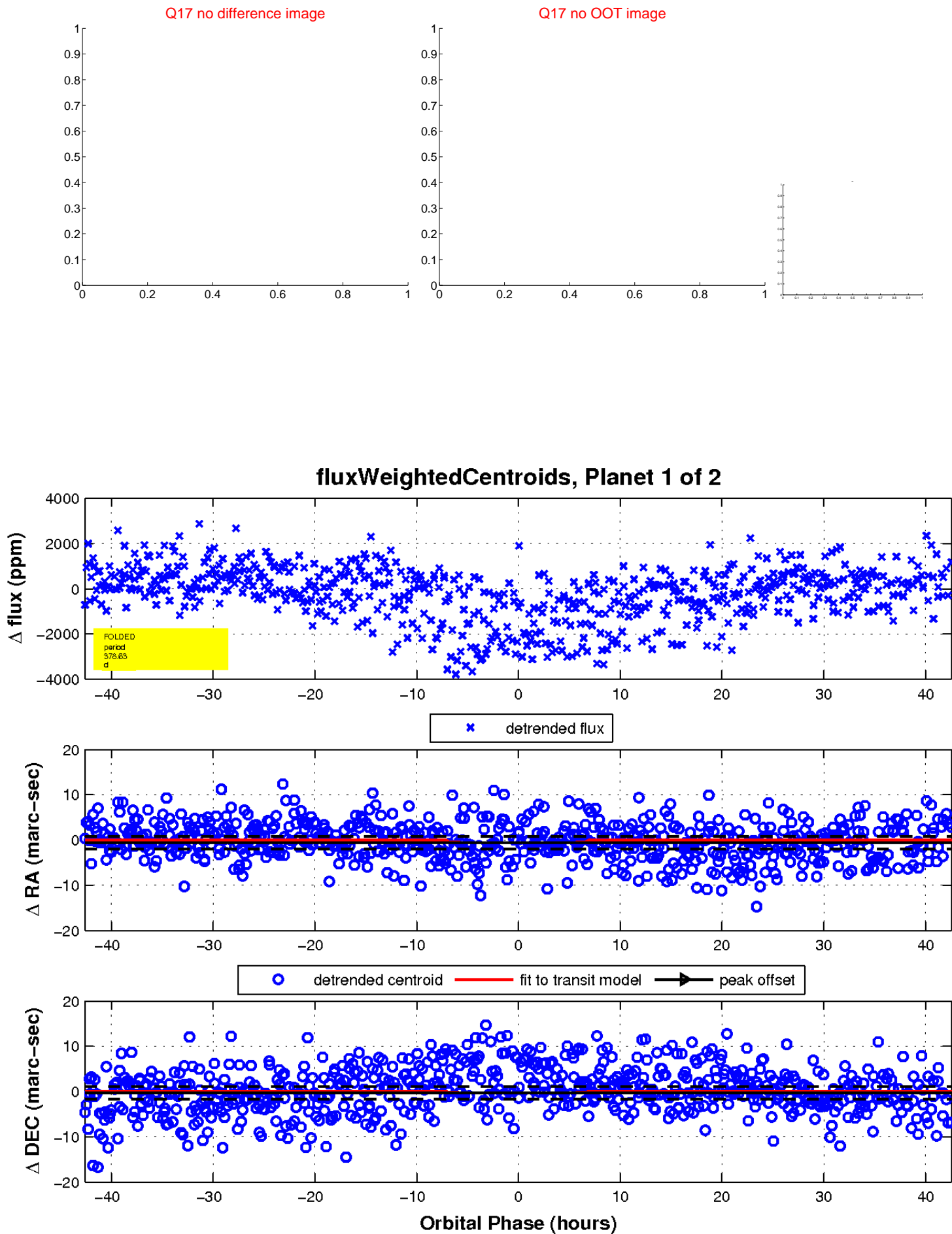
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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







# KIC 008362546

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008362546-01	OBS	No	378.627942	253.639173	987.4	14.203	11.8	9.5	1.64	11430	5.33	23.06
008362546-02	OBS	No	0.937986	132.154356	59.2	2.361	7.6	7.1	1.64	11430	1.45	68794.97

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008362546-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008362546-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT

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

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

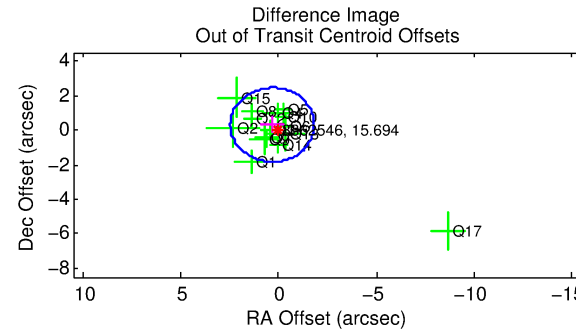
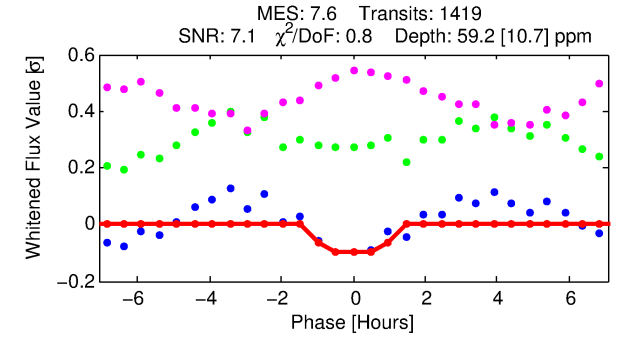
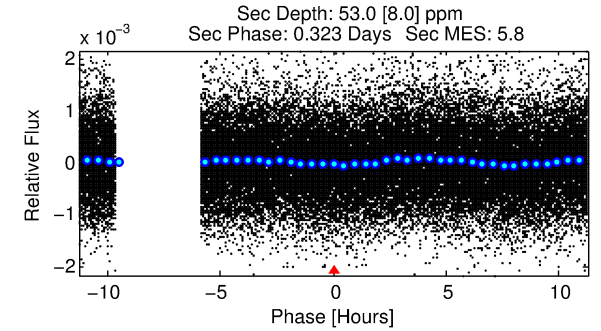
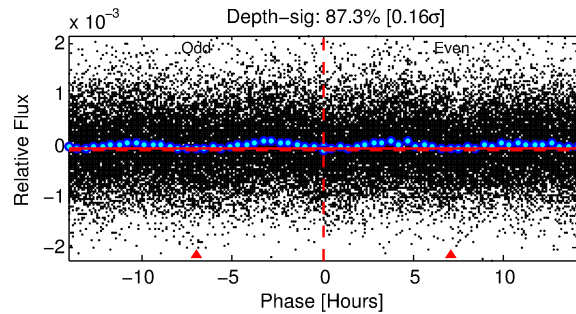
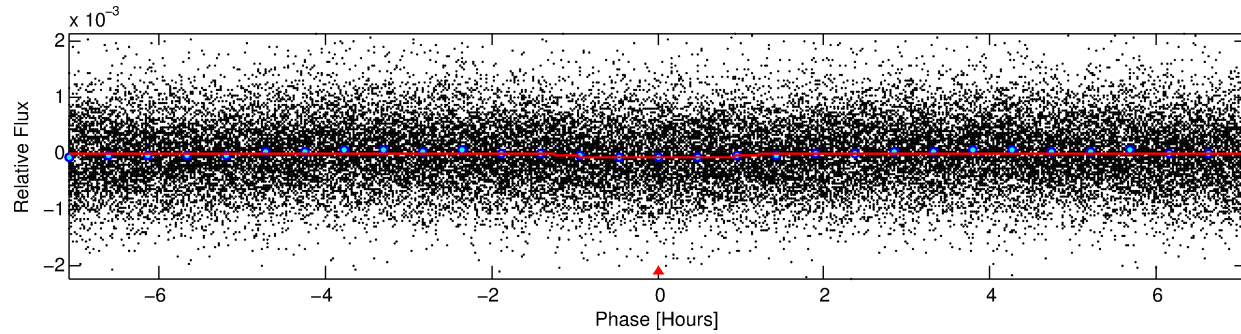
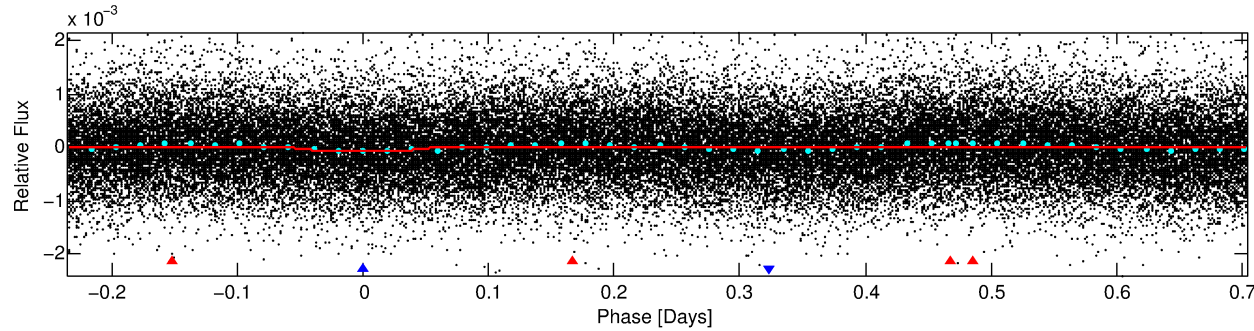
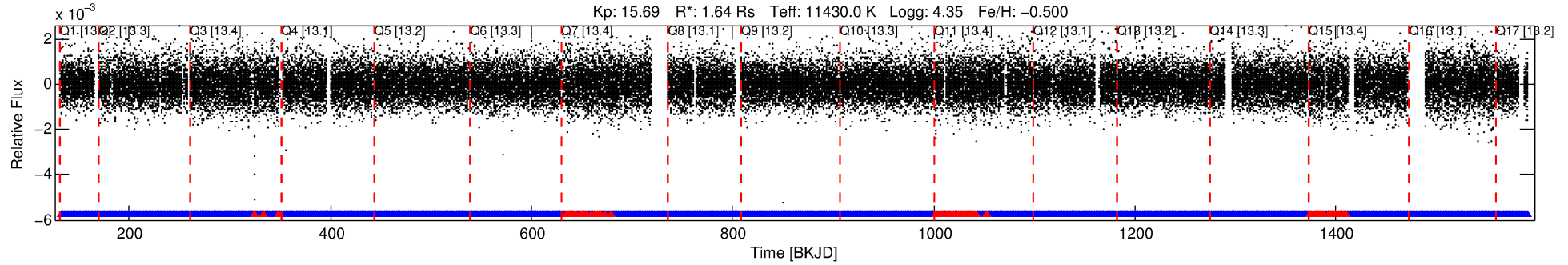
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008362546-02

No Significant Match Found

# DV One-Page Summary

KIC: 8362546 Candidate: 2 of 2 Period: 0.938 d



## DV Fit Results:

Period = 0.93799 [0.00001] d  
Epoch = 132.1544 [0.0044] BKJD  
Rp/R\* = 0.0081 [0.0038]  
a/R\* = 1.59 [4.04]  
b = 0.92 [0.75]  
Seff = 68794.97 [21717.16]  
Teq = 4130 [326] K  
Rp = 1.45 [0.76] Re  
a = 0.0245 [0.0048] AU  
Ag = 8.28 [8.11] [0.90 $\sigma$ ]  
Teffp = 10831 [2581] K [2.58 $\sigma$ ]

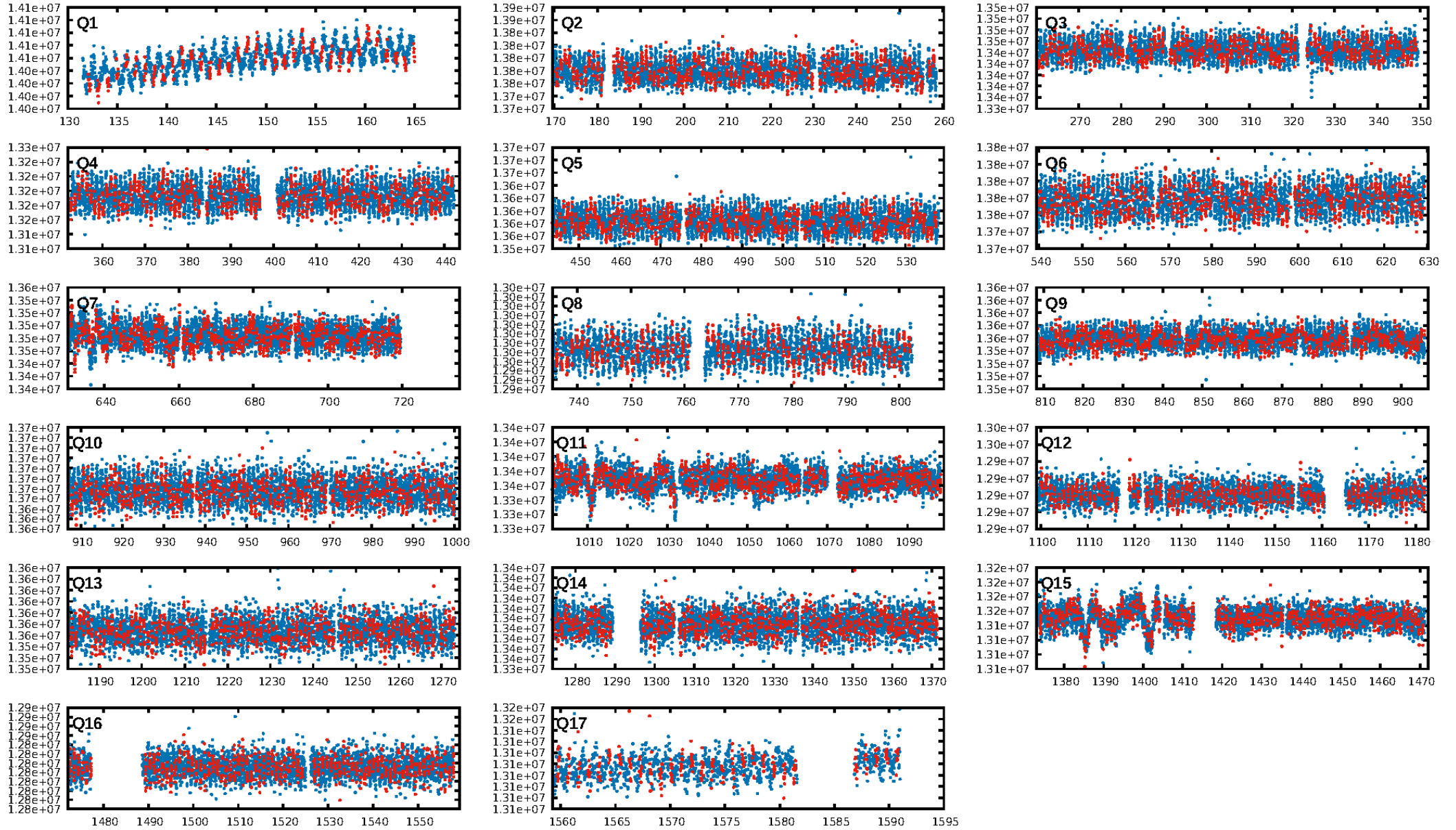
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [629.59 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 2.38e-14  
RollingBand-fgt: 0.94 [1267/1354]  
GhostDiagnostic-chr: 1.586  
Centroid-sig: 53.4%  
Centroid-so: 1.663 arcsec [0.74 $\sigma$ ]  
OotOffset-rm: 0.449 arcsec [0.63 $\sigma$ ]  
KicOffset-rm: 0.649 arcsec [0.97 $\sigma$ ]  
OotOffset-st: 4/3/3/5 [15]  
KicOffset-st: 4/3/3/5 [15]  
DiffImageQuality-fgm: 0.87 [13/15]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 00:38:13 Z

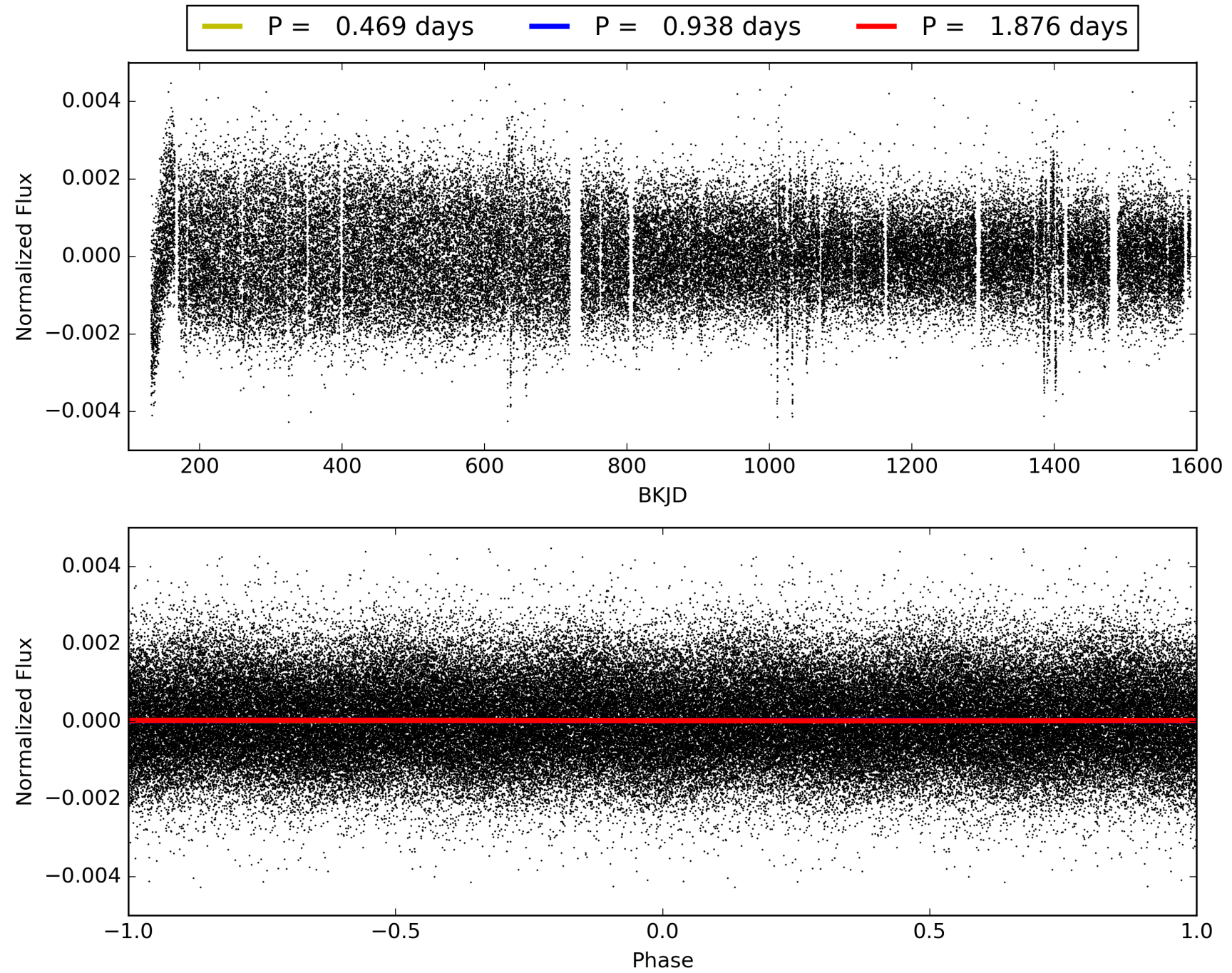
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008362546-02, PDC Light Curves



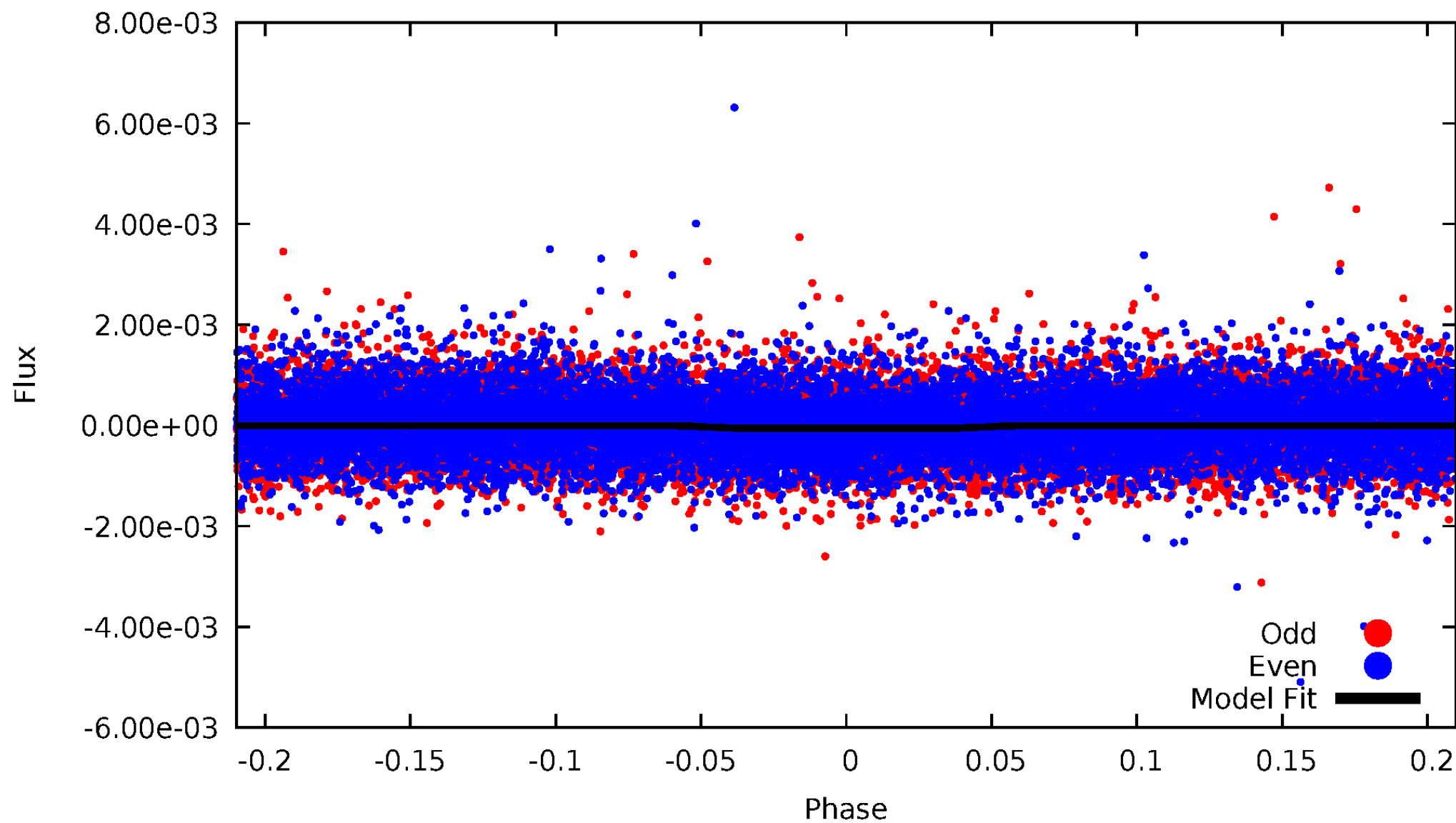


TCE 008362546-02



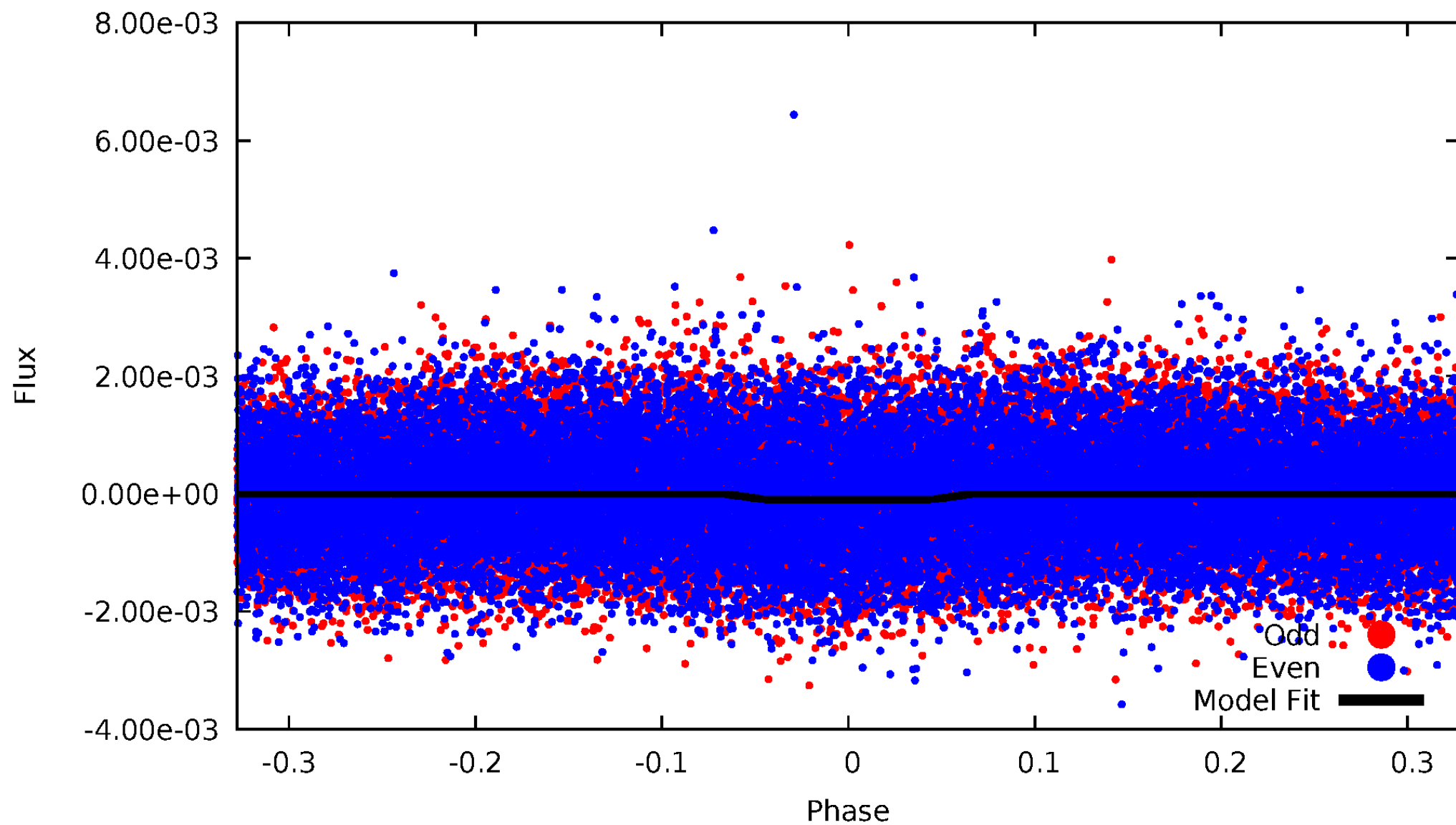
# DV Odd/Even

TCE 008362546-02



# ALT Odd/Even

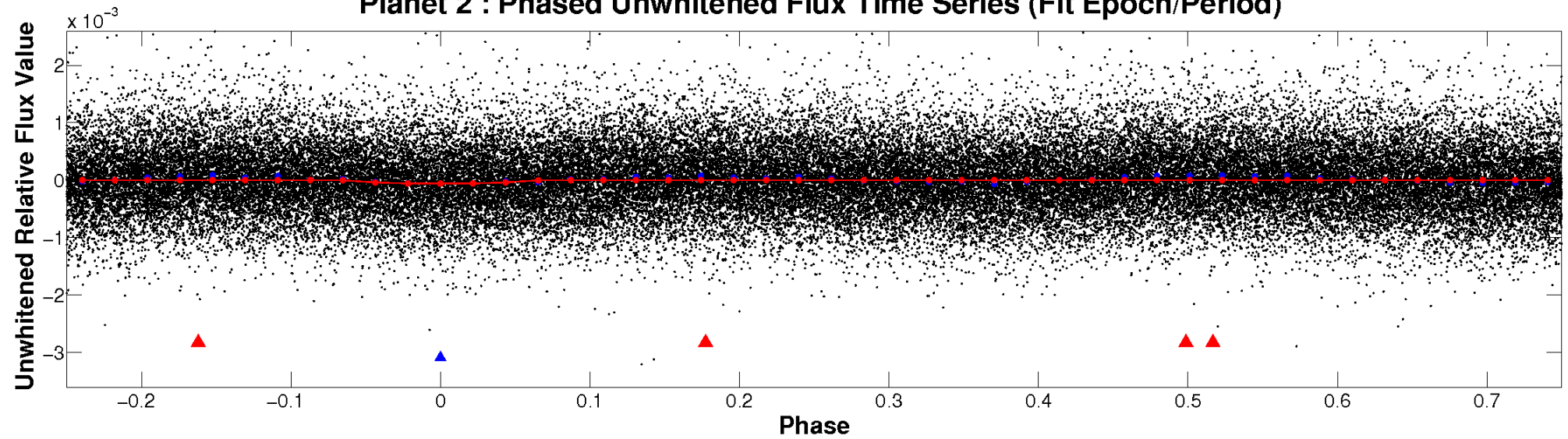
TCE 008362546-02



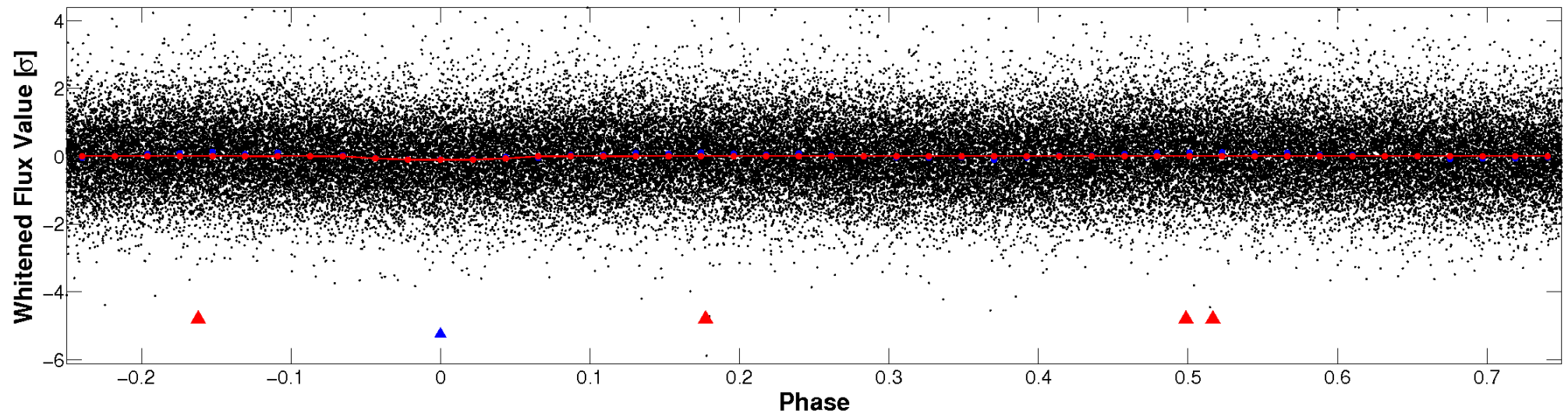


# Non-Whitened Vs. Whitened Light Curve

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

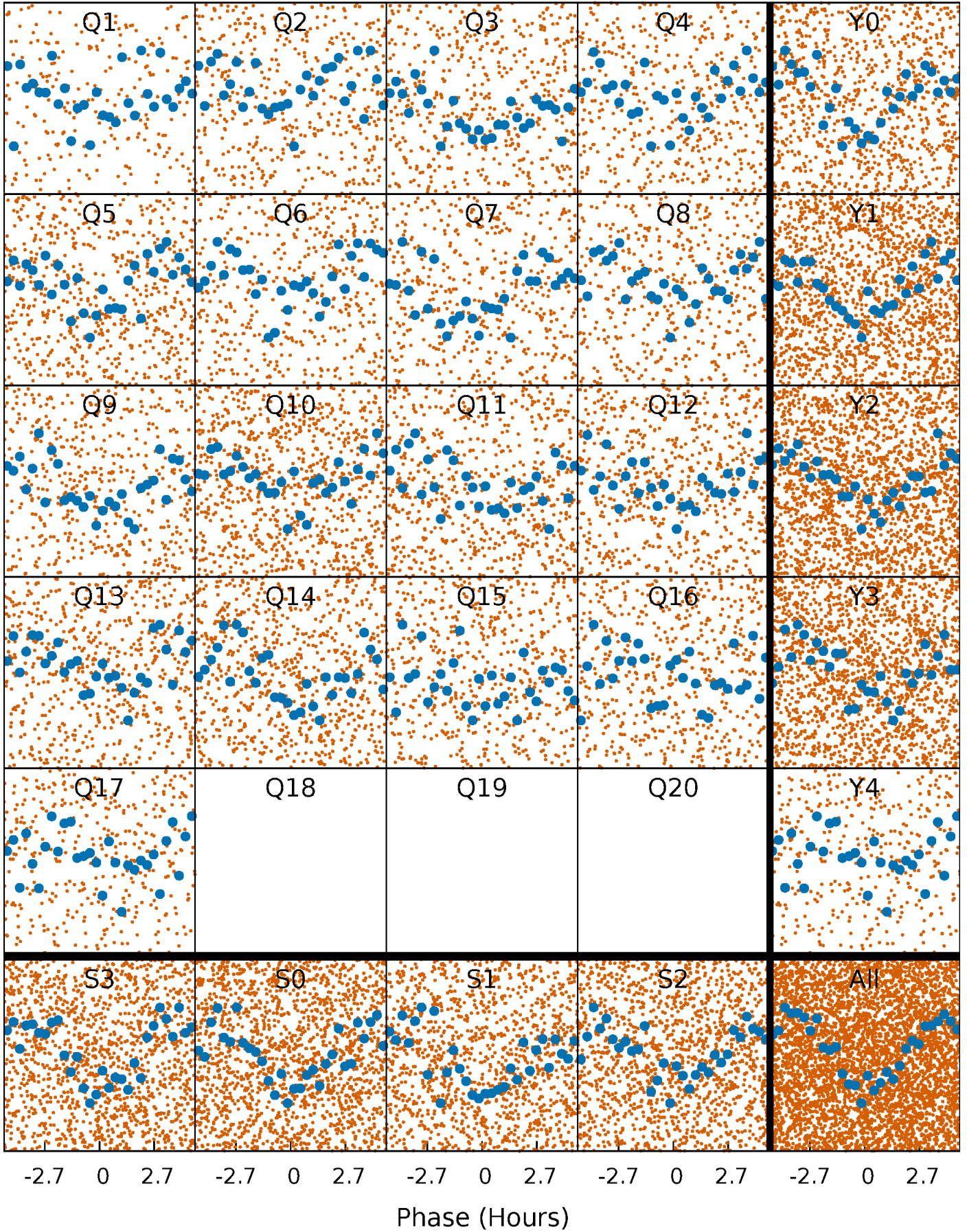


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

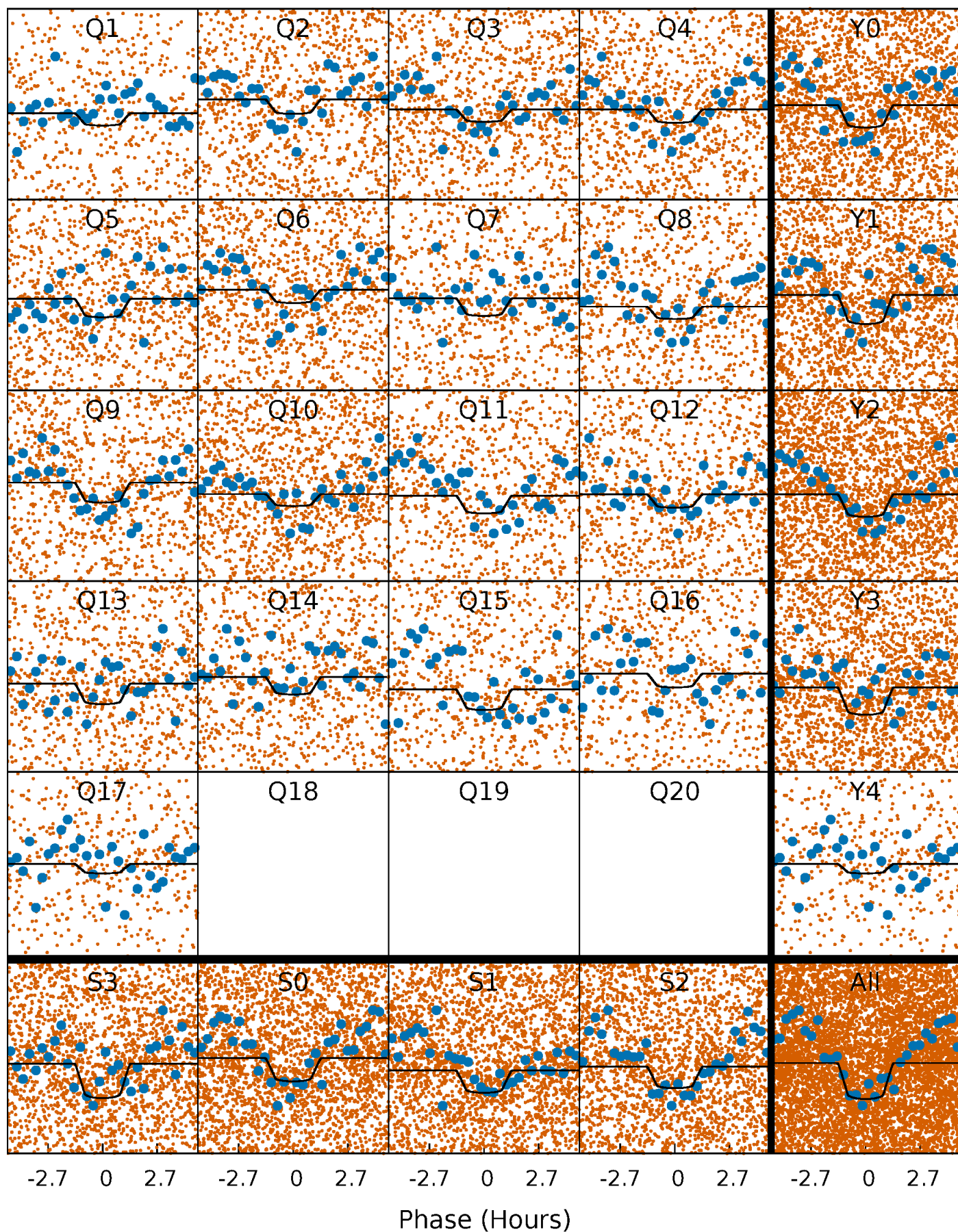
TCE 008362546-02   P= 0.937986 Days    $T_0=132.154356$  (BKJD)





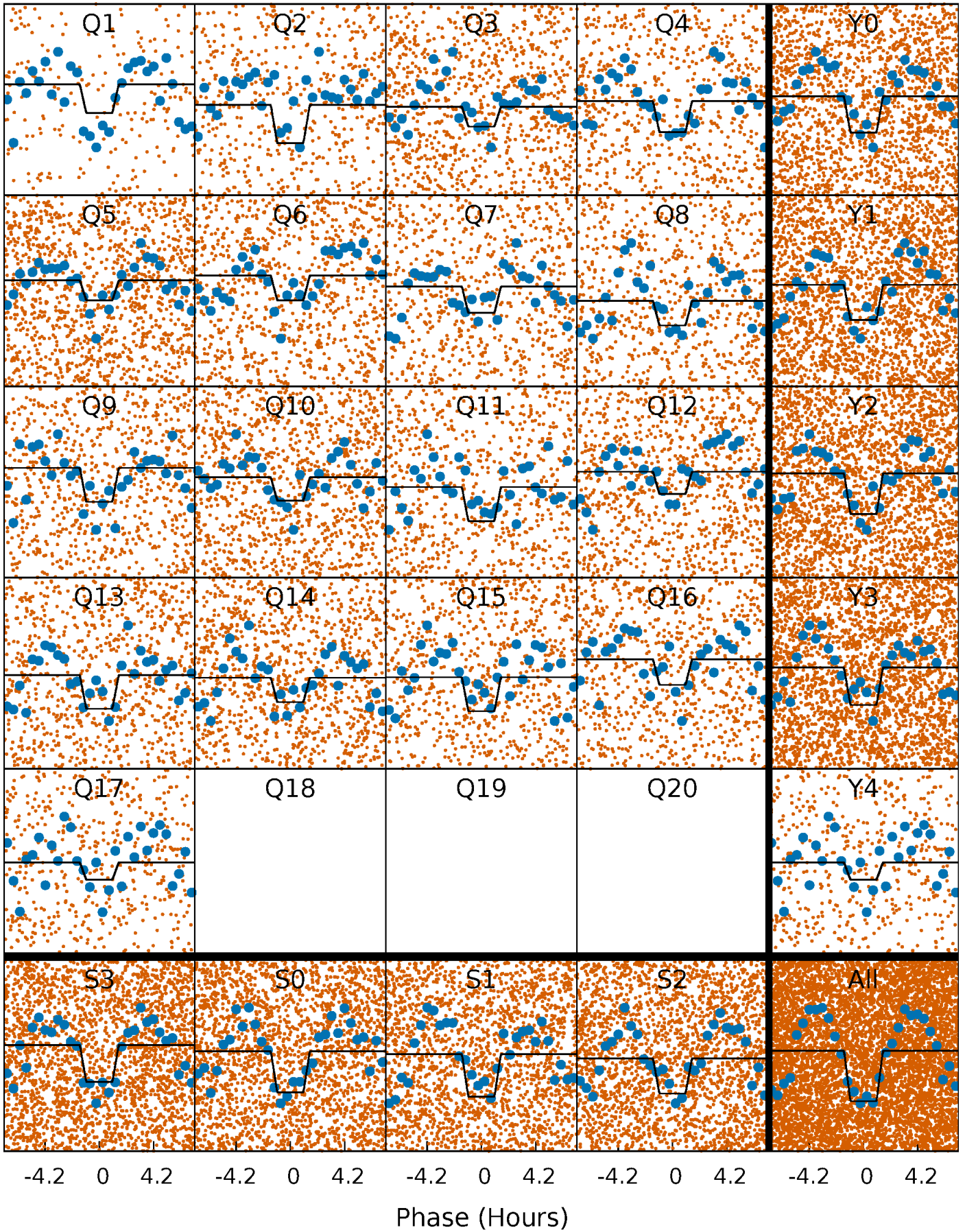
# DV Quarter-Phased Transit Curves

TCE 008362546-02 P= 0.937986 Days  $T_0=132.154356$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 008362546-02   P= 0.938027 Days    $T_0=132.134621$  (BKJD)

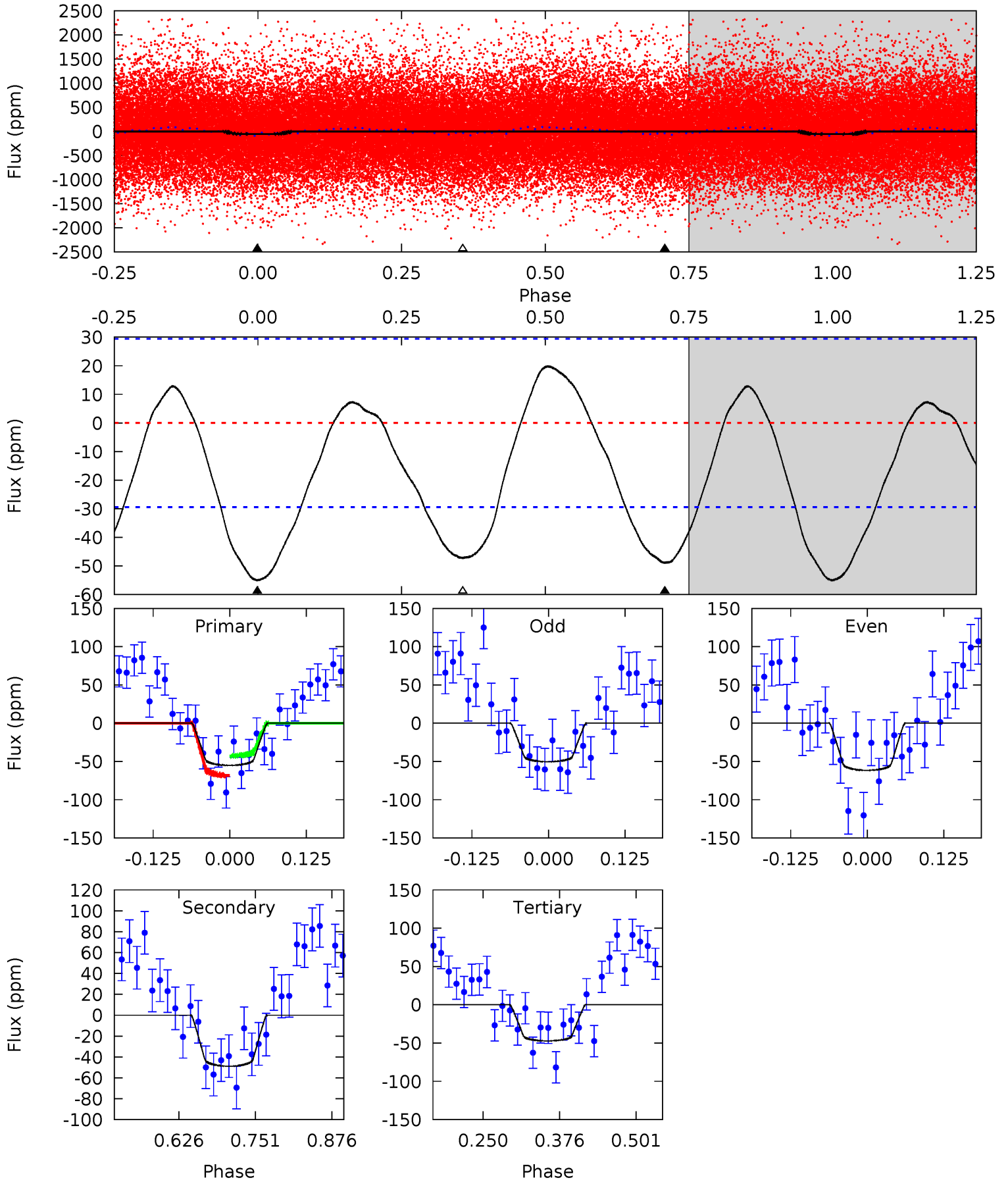




# DV Model-Shift Uniqueness Test

008362546-02, P = 0.937986 Days, E = 131.216370 Days

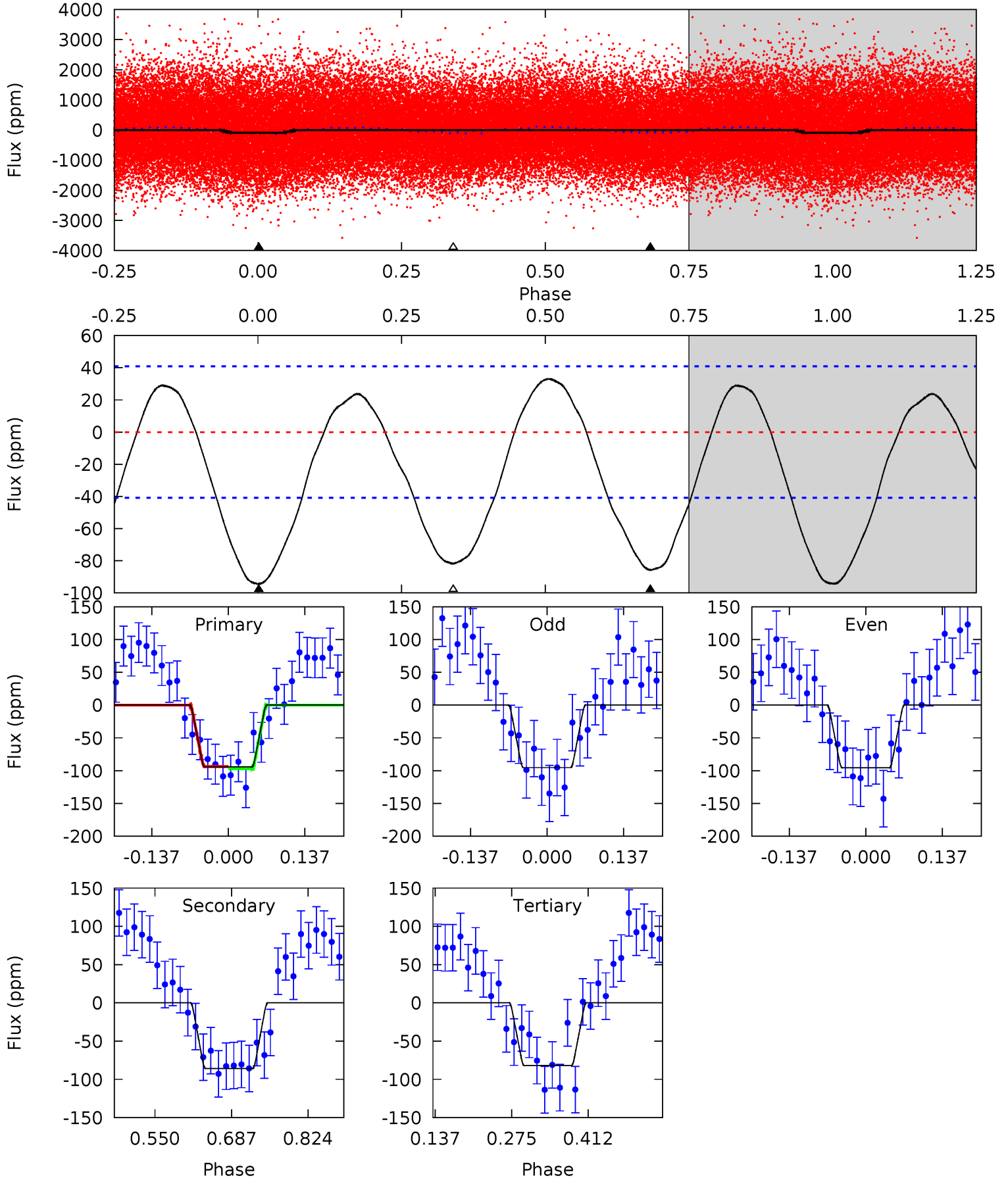
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.45	7.50	7.25	0	4.52	1.53	3.39	1.20	8.45	0.25	7.50	0.87	1.13	0.26	1.98



# Alt Model-Shift Uniqueness Test

008362546-02, P = 0.938027 Days, E = 131.196594 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
10.4	9.43	9.00	0	4.50	1.49	4.49	1.36	10.4	0.43	9.43	0.01	0.70	0.26	0.18





### Stellar Parameters For KIC 008362546

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$11430^{+364}_{-445}$	$4.354^{+0.072}_{-0.144}$	$-0.500^{+0.600}_{-0.250}$	$1.641^{+0.401}_{-0.216}$	$2.218^{+0.229}_{-0.187}$	$0.707^{+0.308}_{-0.297}$
	+3%/-4%	+2%/-3%	+120%/-50%	+24%/-13%	+10%/-8%	+44%/-42%
Source	KIC0	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 008362546-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-49 \pm 7$	$1.53^{+0.70}_{-0.71}$	$5808^{+317}_{-320}$	$9804^{+6327}_{-2287}$	$6.881^{+16.204}_{-3.718}$
Alt.	$-86 \pm 9$	$1.83^{+0.67}_{-0.65}$	$5819^{+368}_{-291}$	$10550^{+5239}_{-2096}$	$8.398^{+11.475}_{-3.942}$

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

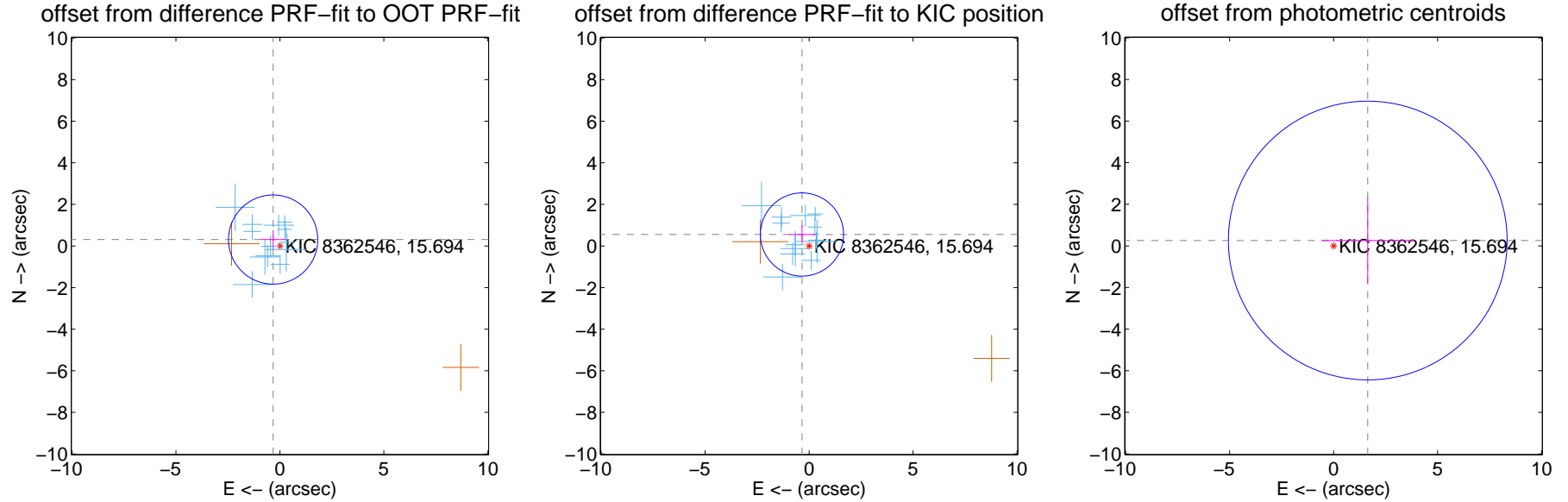
## DV Centroid Data

Supplemental centroid analysis for 008362546-02. Kepler magnitude: 15.69. Transit SNR 7.10

There are 13 quarters with good PRF difference image offsets

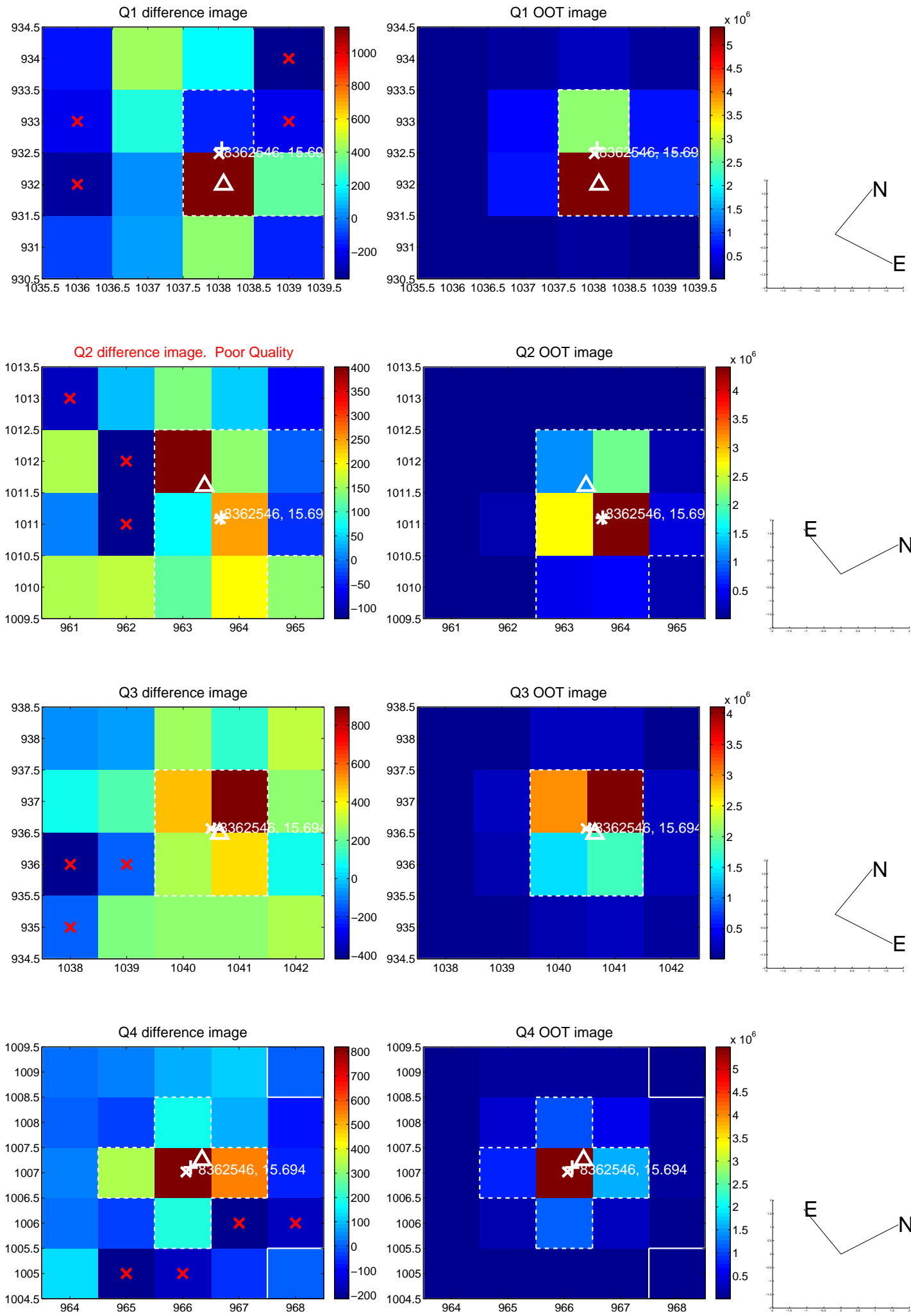
The direct PRF centroid is offset from the target star catalog position by about 0.44 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.449 \pm 0.715$	0.63	$0.326 \pm 0.599$	$0.309 \pm 0.456$
PRF-fit source offset from KIC position	$0.649 \pm 0.667$	0.97	$0.342 \pm 0.625$	$0.551 \pm 0.446$
photometric centroid source offset	$1.66 \pm 2.23$	0.74	$-1.64 \pm 2.24$	$0.26 \pm 2.07$

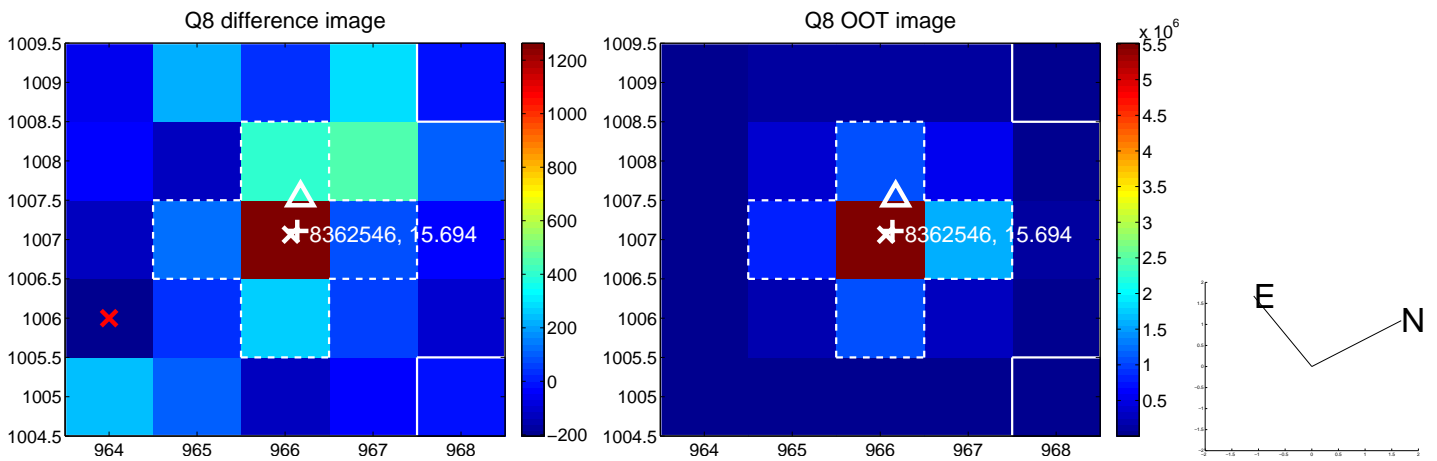
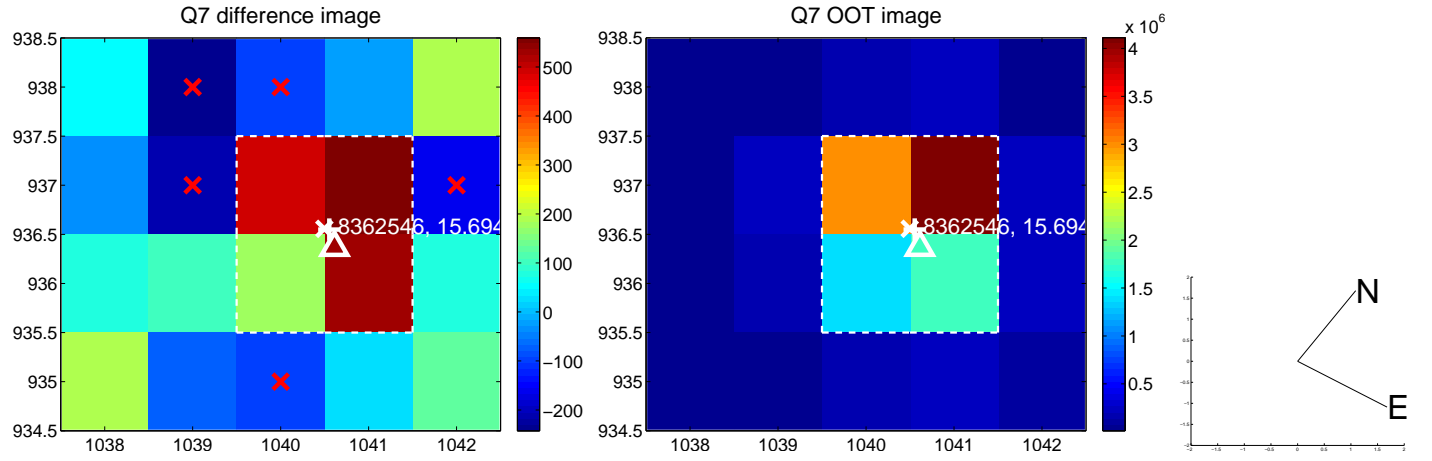
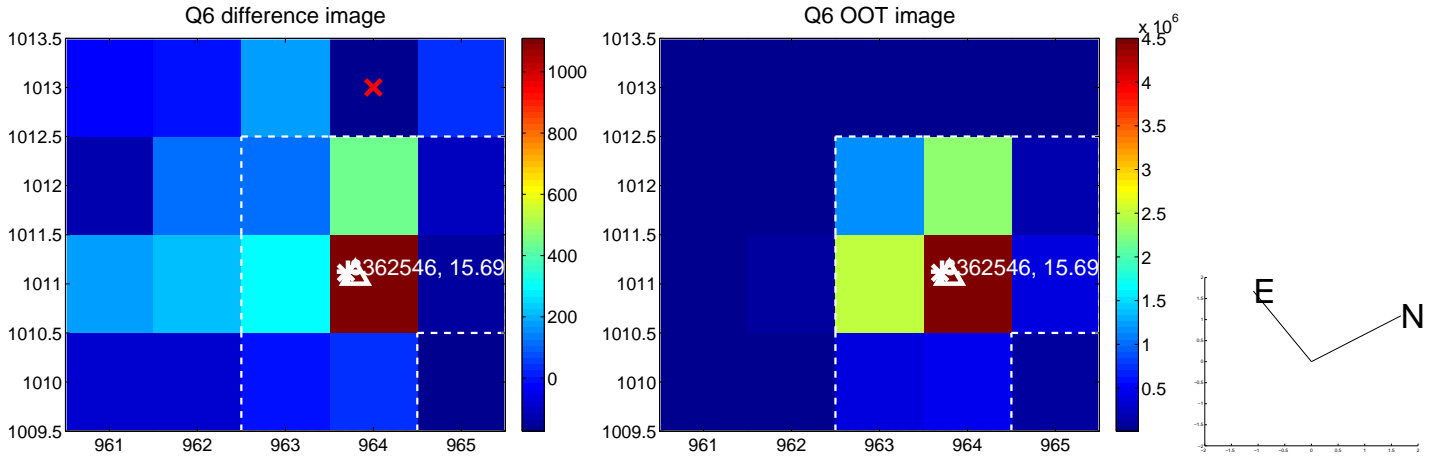
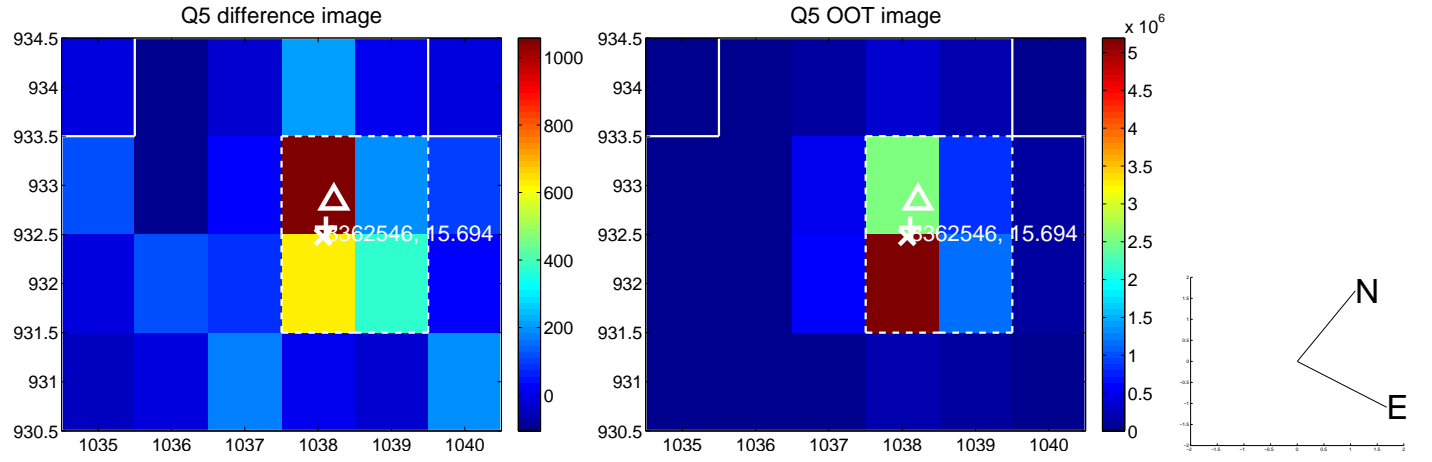


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

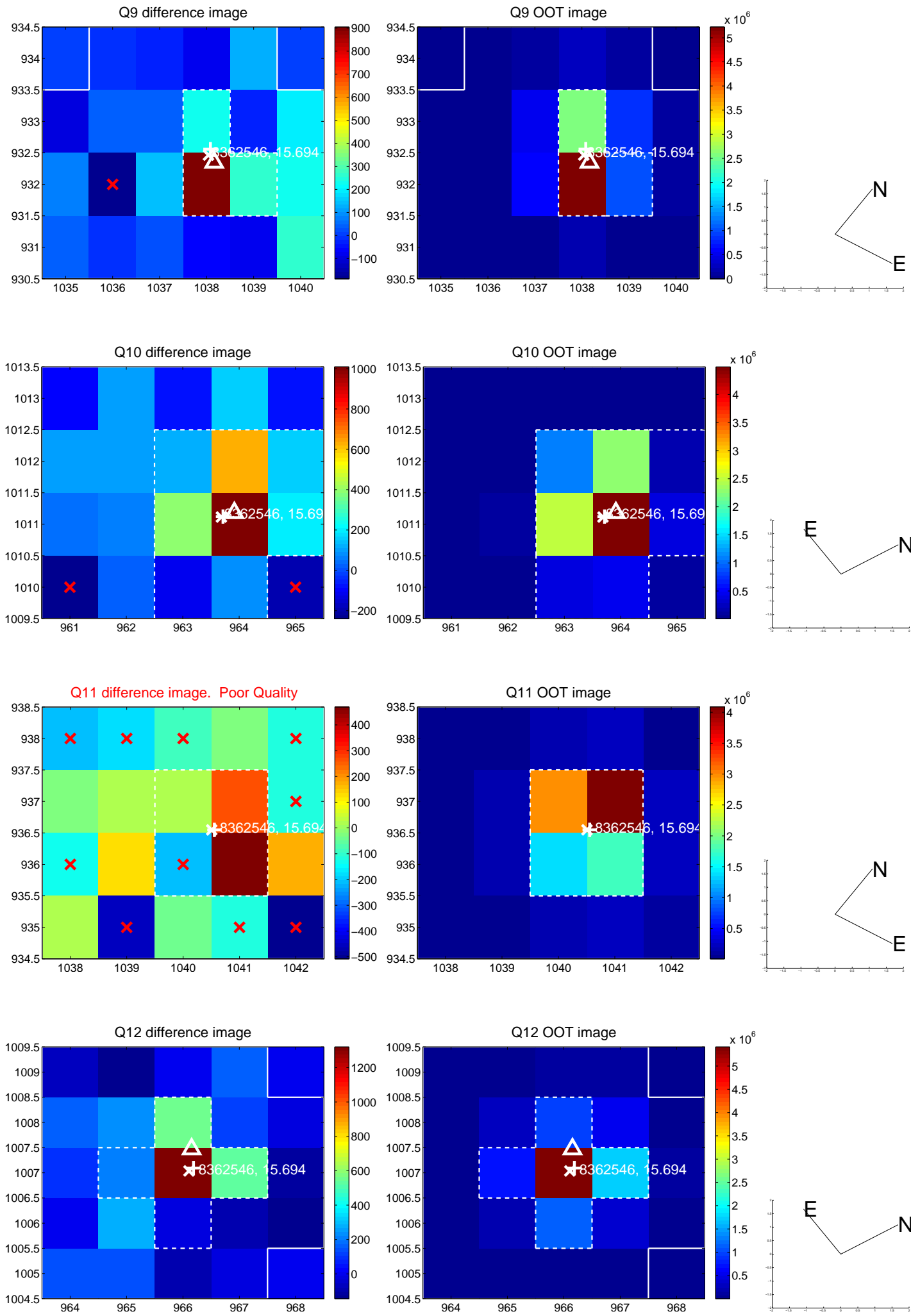
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



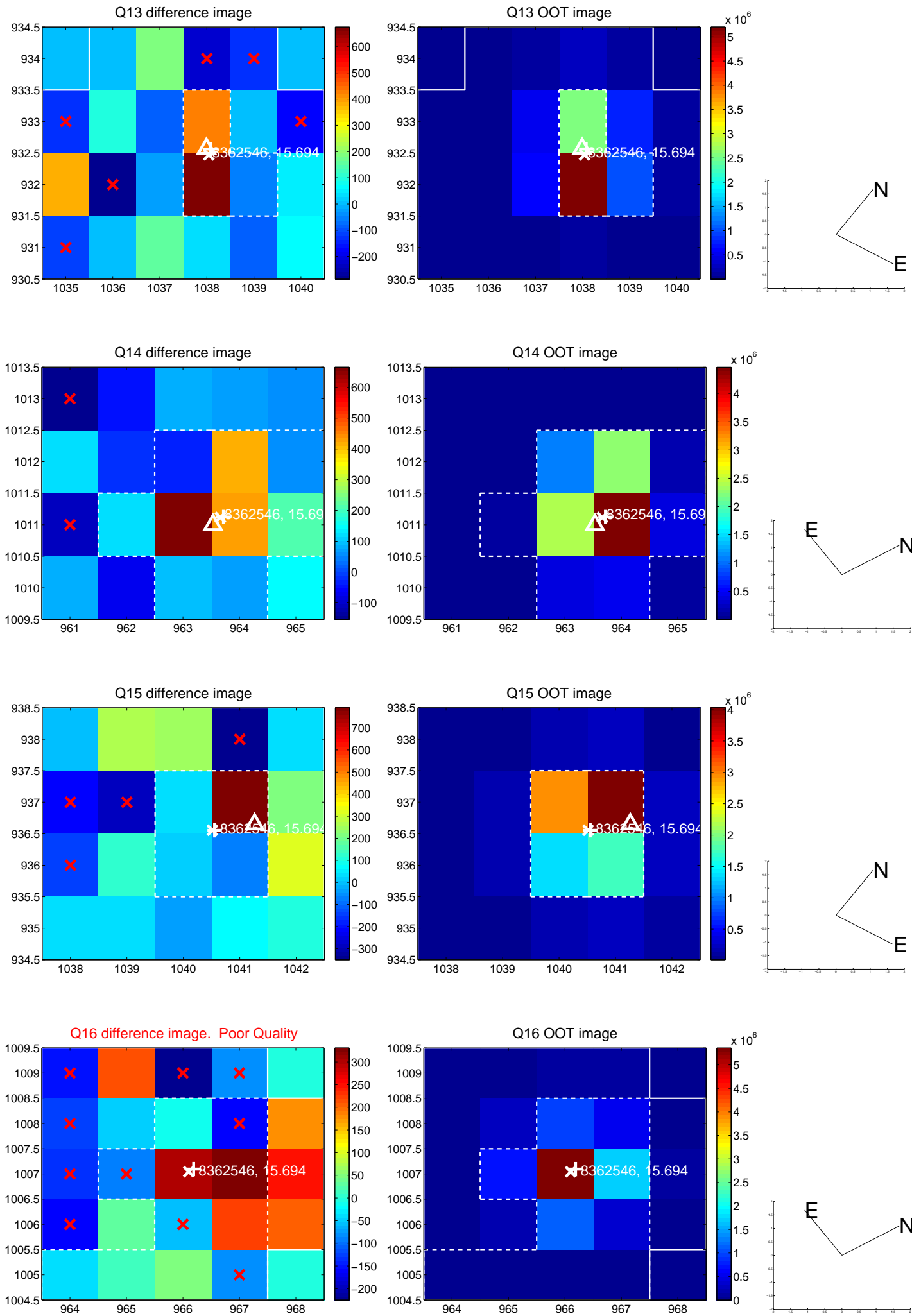
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



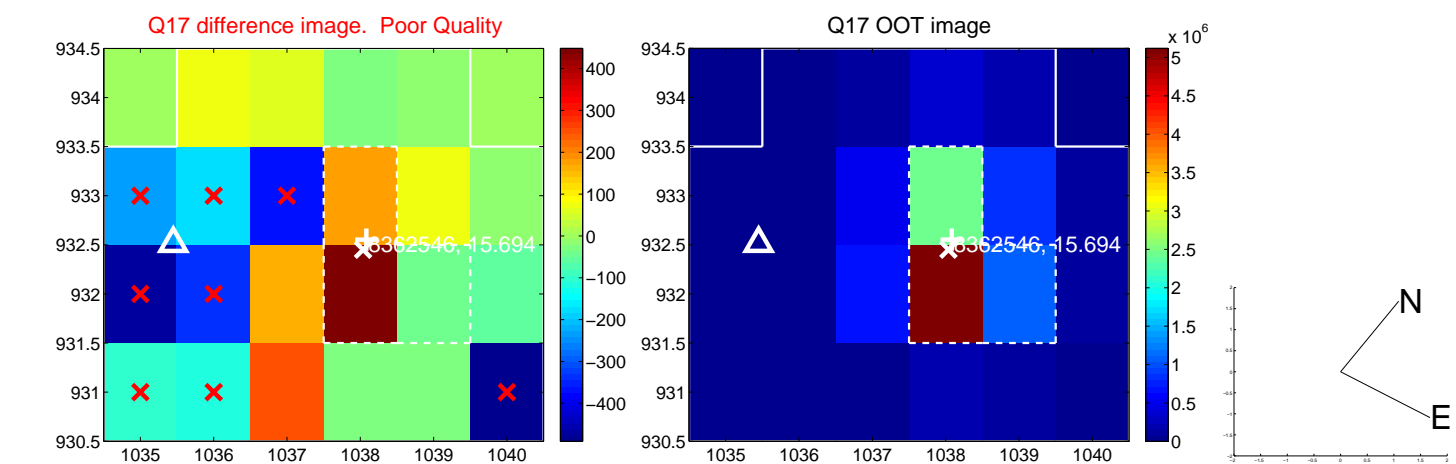
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



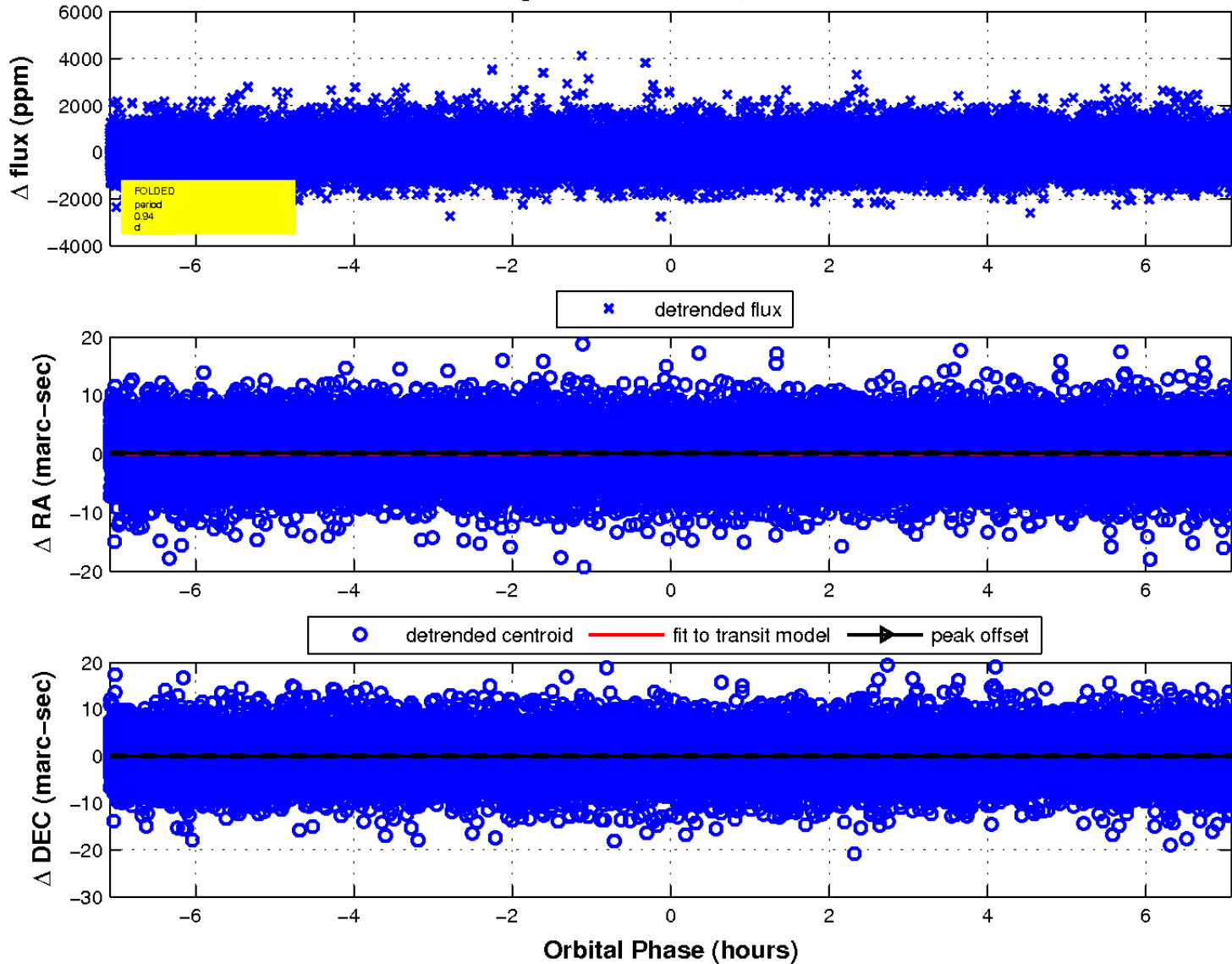
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

