

# KIC 010467637

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010467637-01	OBS	No	362.998686	175.903612	594.9	34.231	8.7	10.9	0.93	6003	2.48	1.01
010467637-02	OBS	No	352.108108	185.942060	638.5	12.389	8.5	8.3	0.93	6003	2.43	1.05

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010467637-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—ALL_TRANS_CHASES—CENT_FEW_DIFFS
010467637-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS

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

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

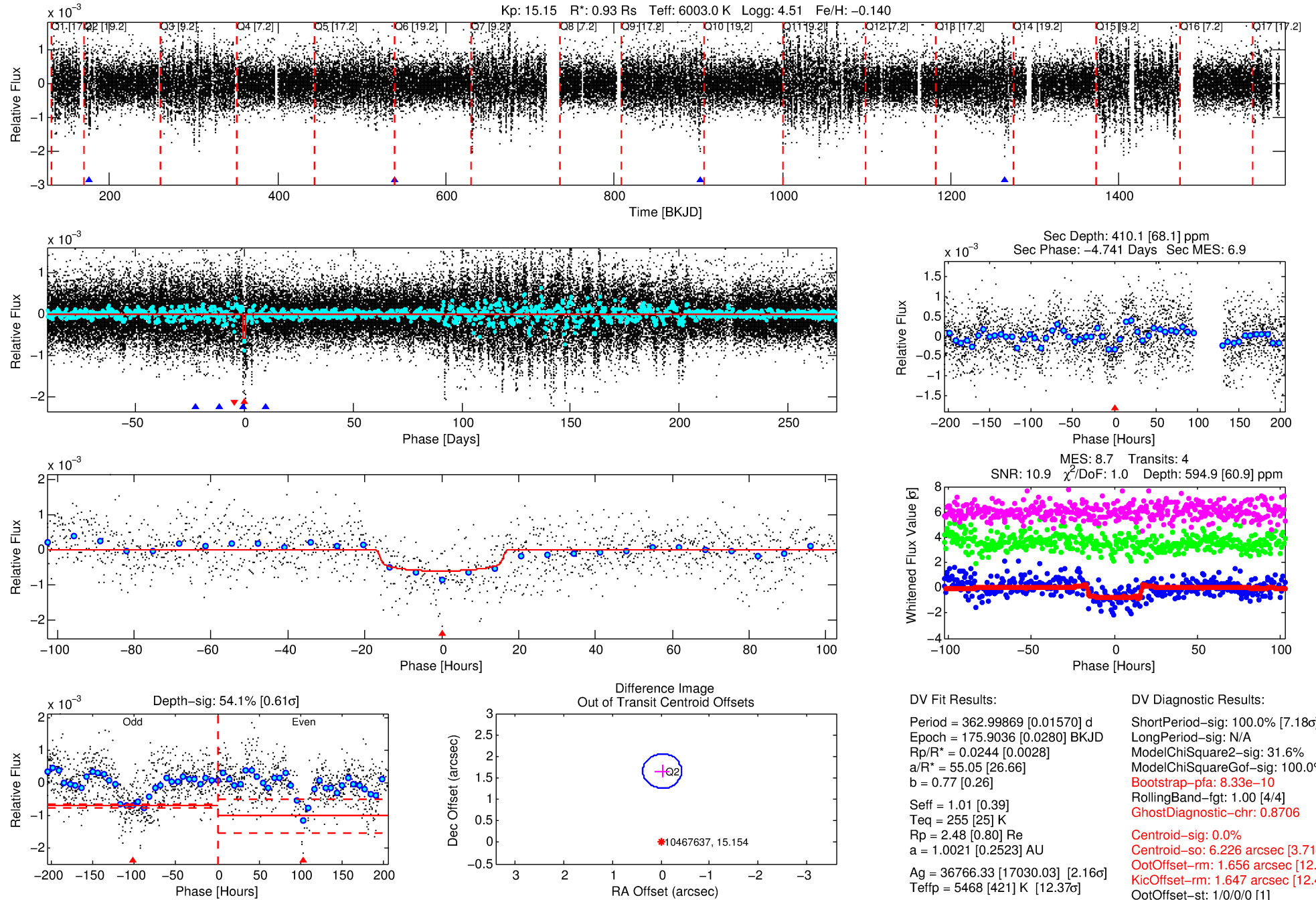
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010467637-01

No Significant Match Found

# DV One-Page Summary

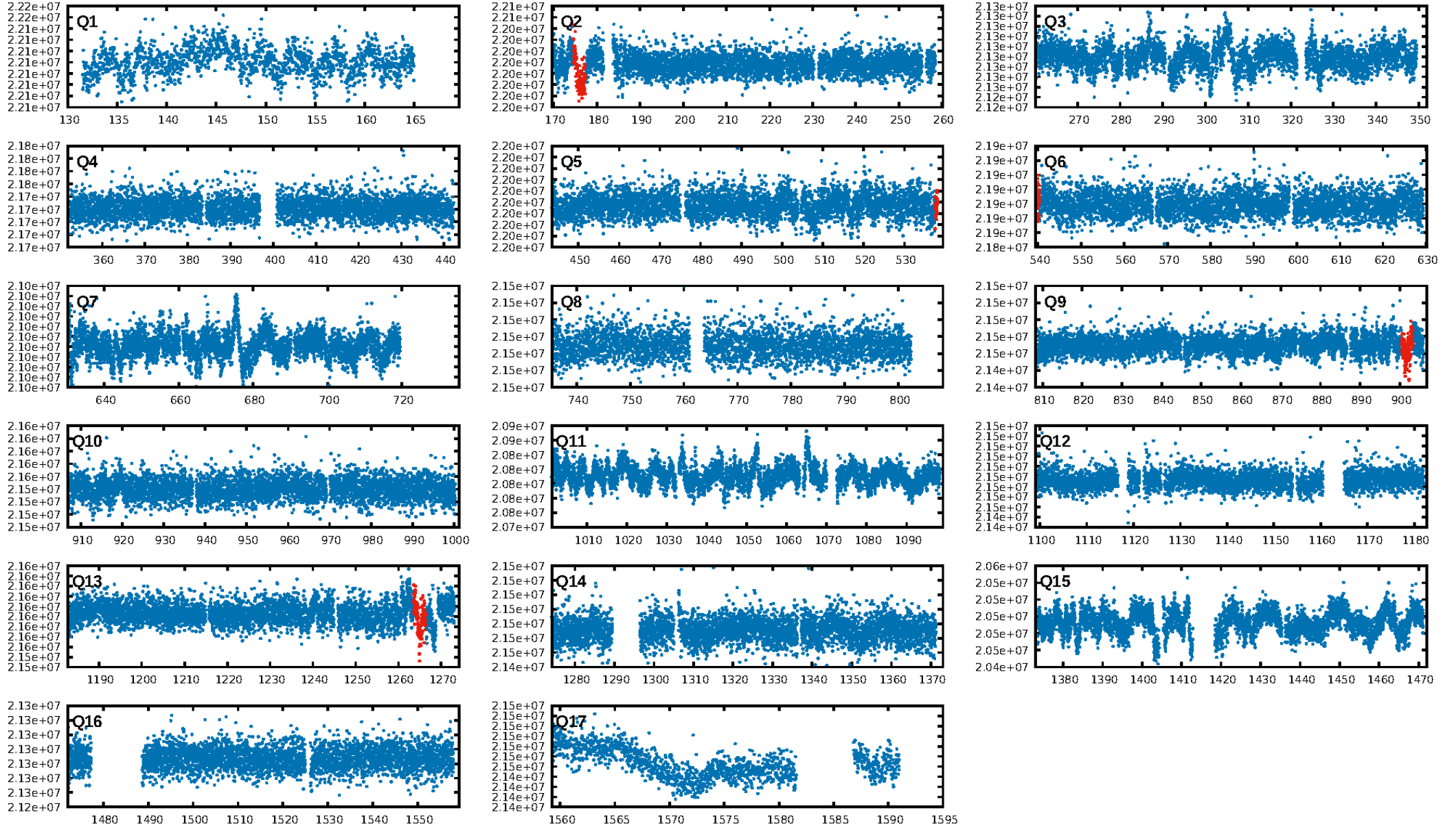
KIC: 10467637 Candidate: 1 of 2 Period: 362.999 d



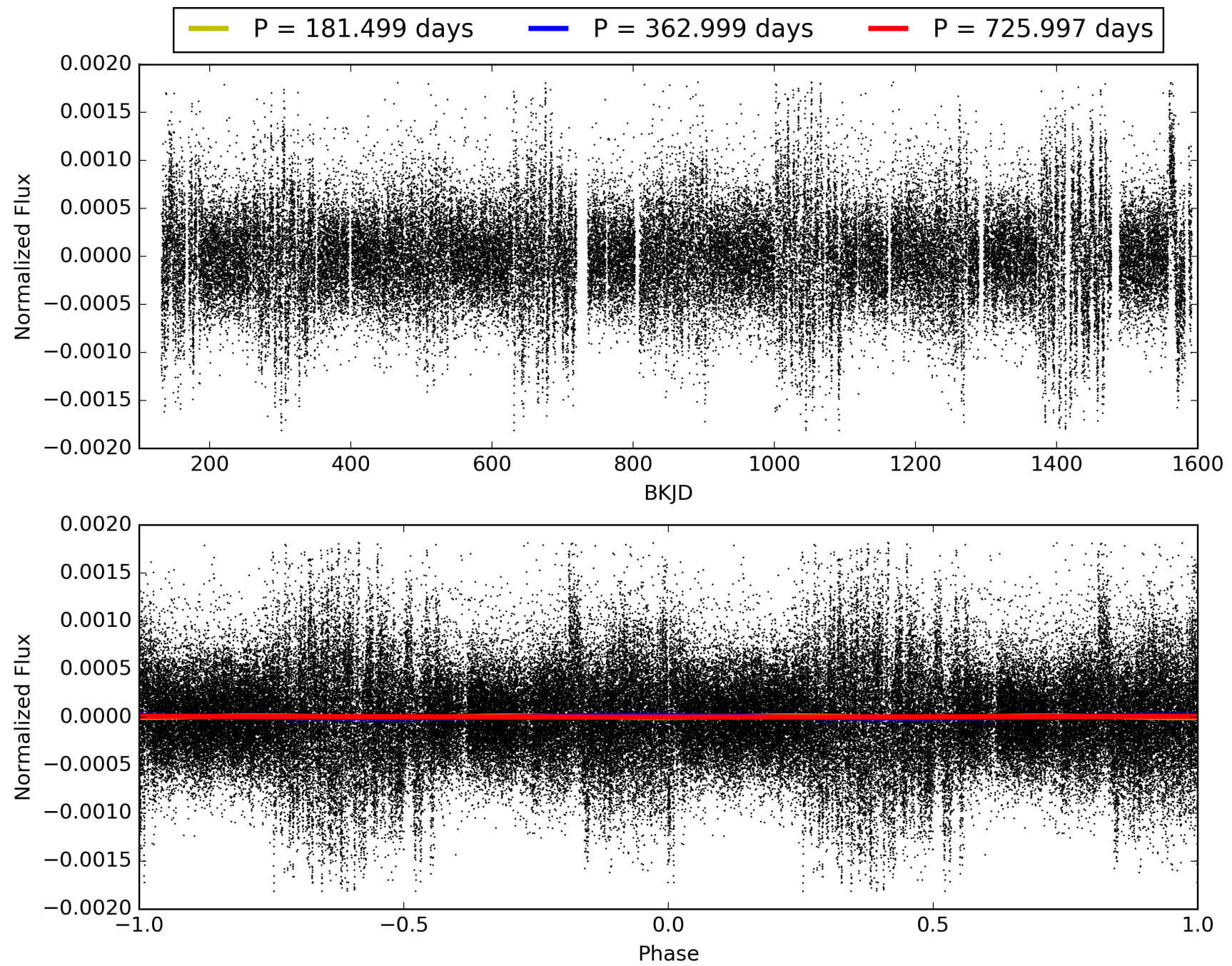
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 02:06:25 Z

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

# TCE 010467637-01, PDC Light Curves

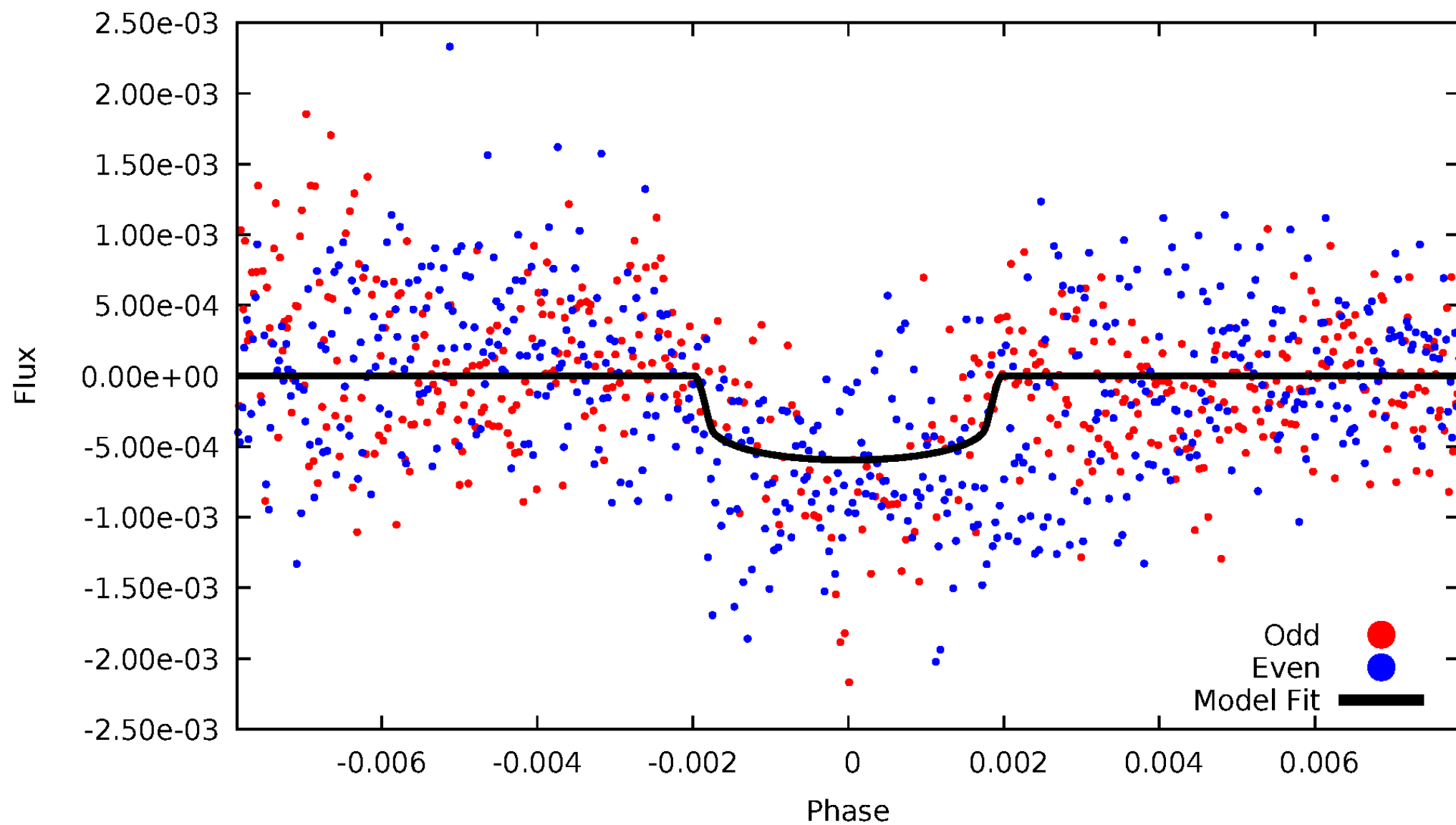


TCE 010467637-01



# DV Odd/Even

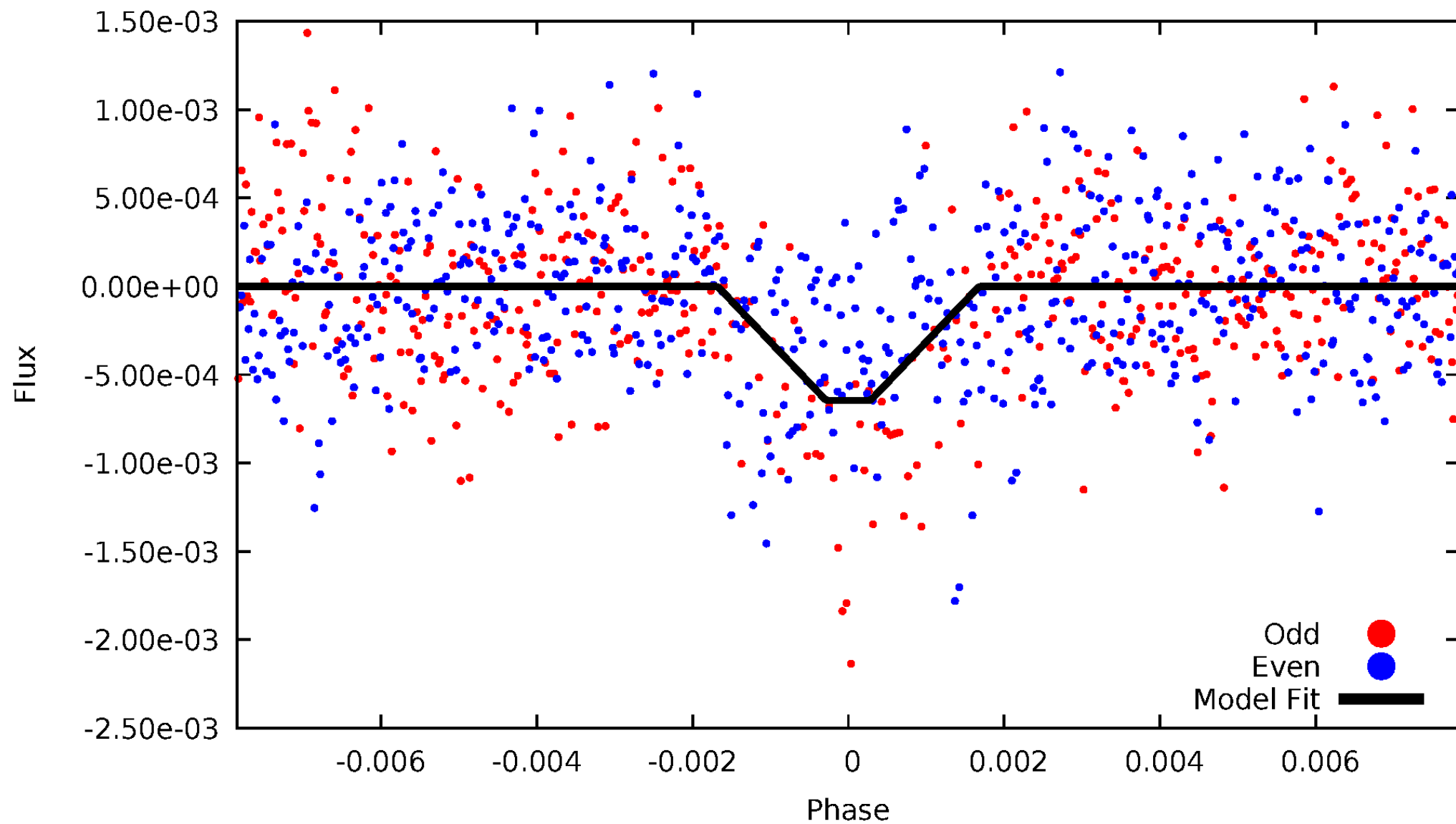
TCE 010467637-01





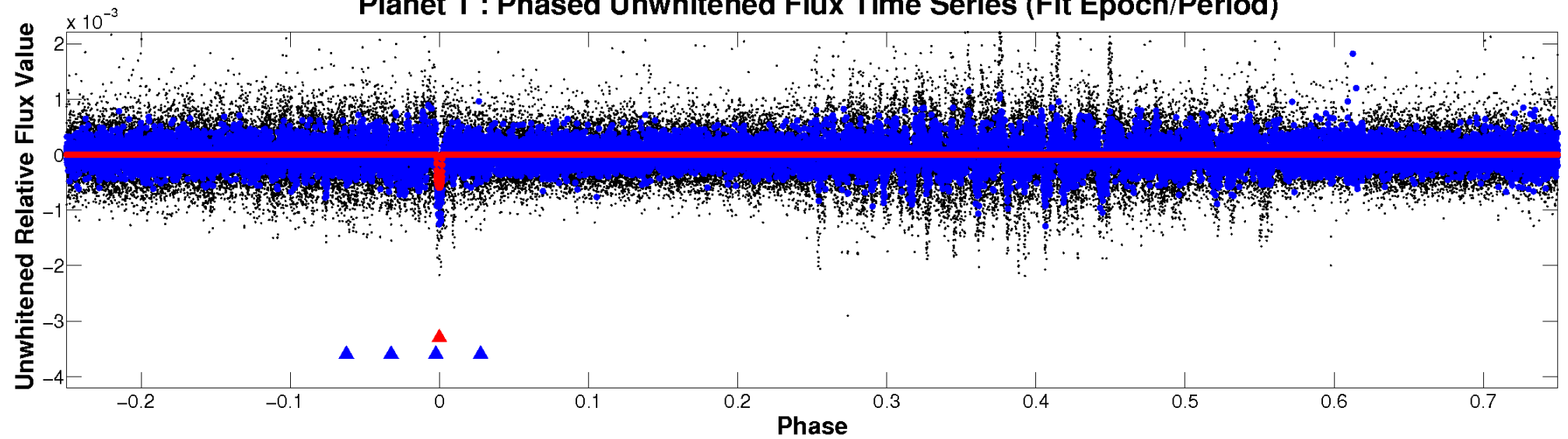
# ALT Odd/Even

TCE 010467637-01

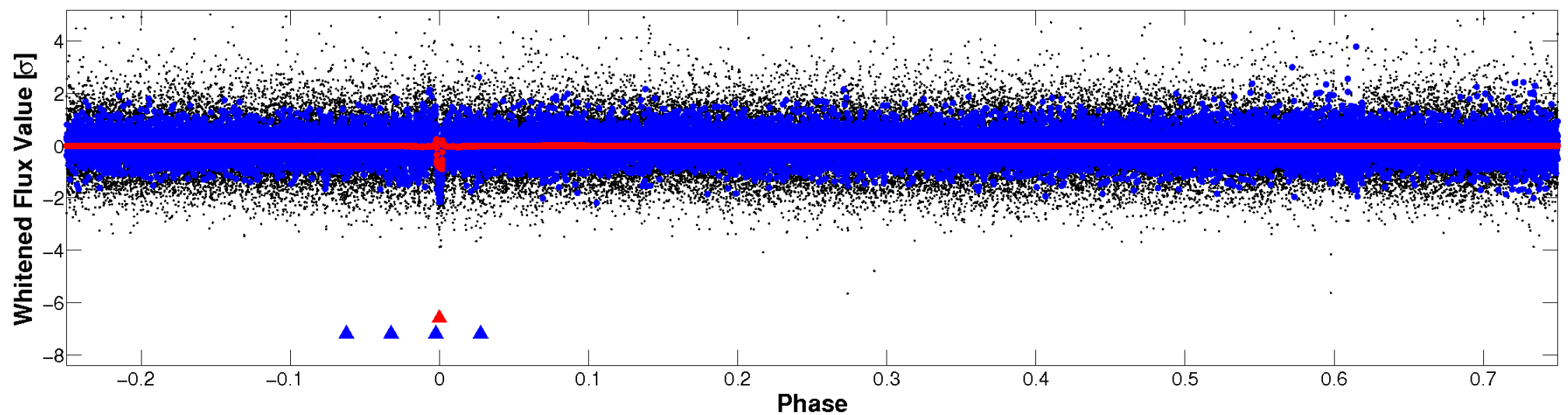


# Non-Whitened Vs. Whitened Light Curve

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

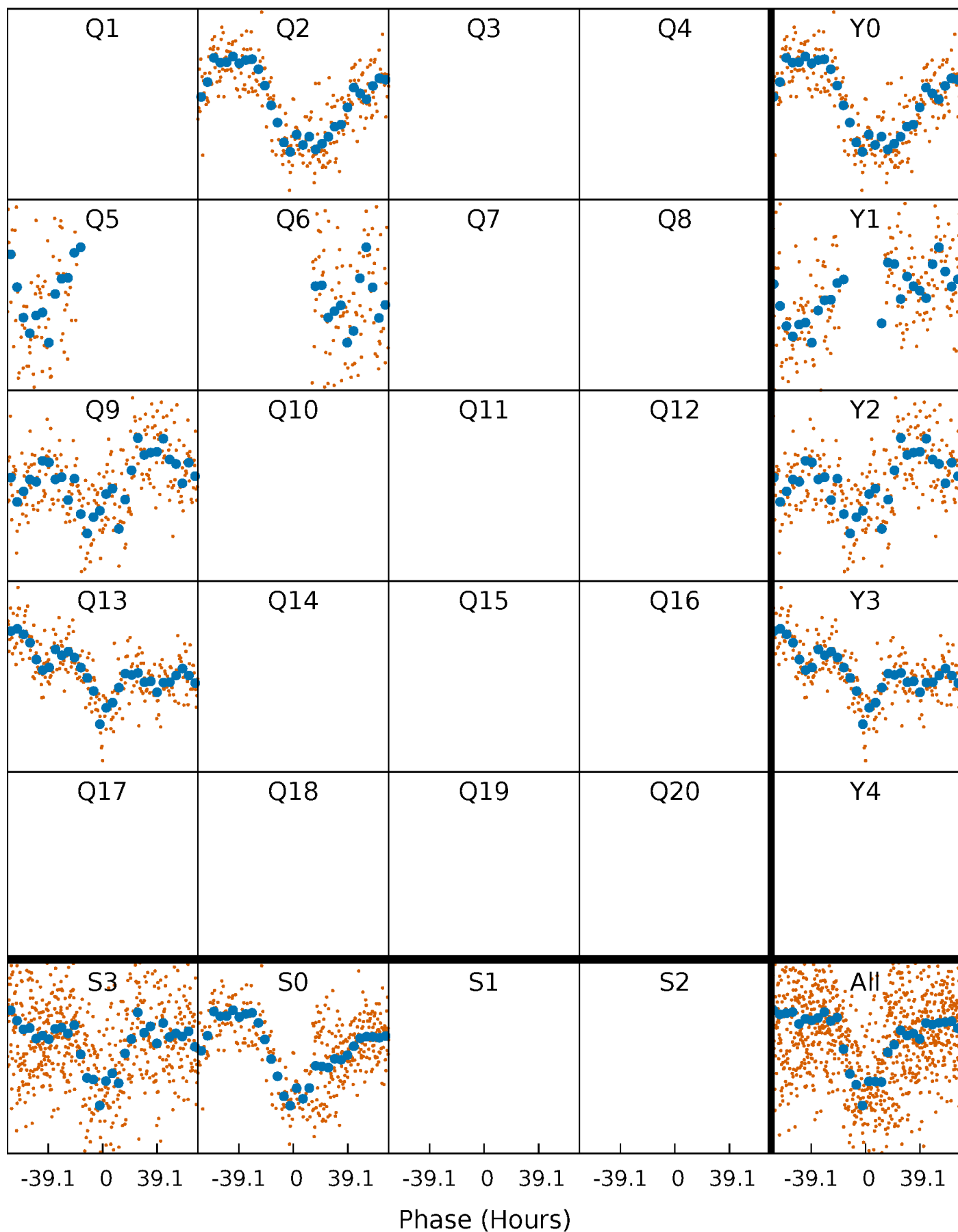


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

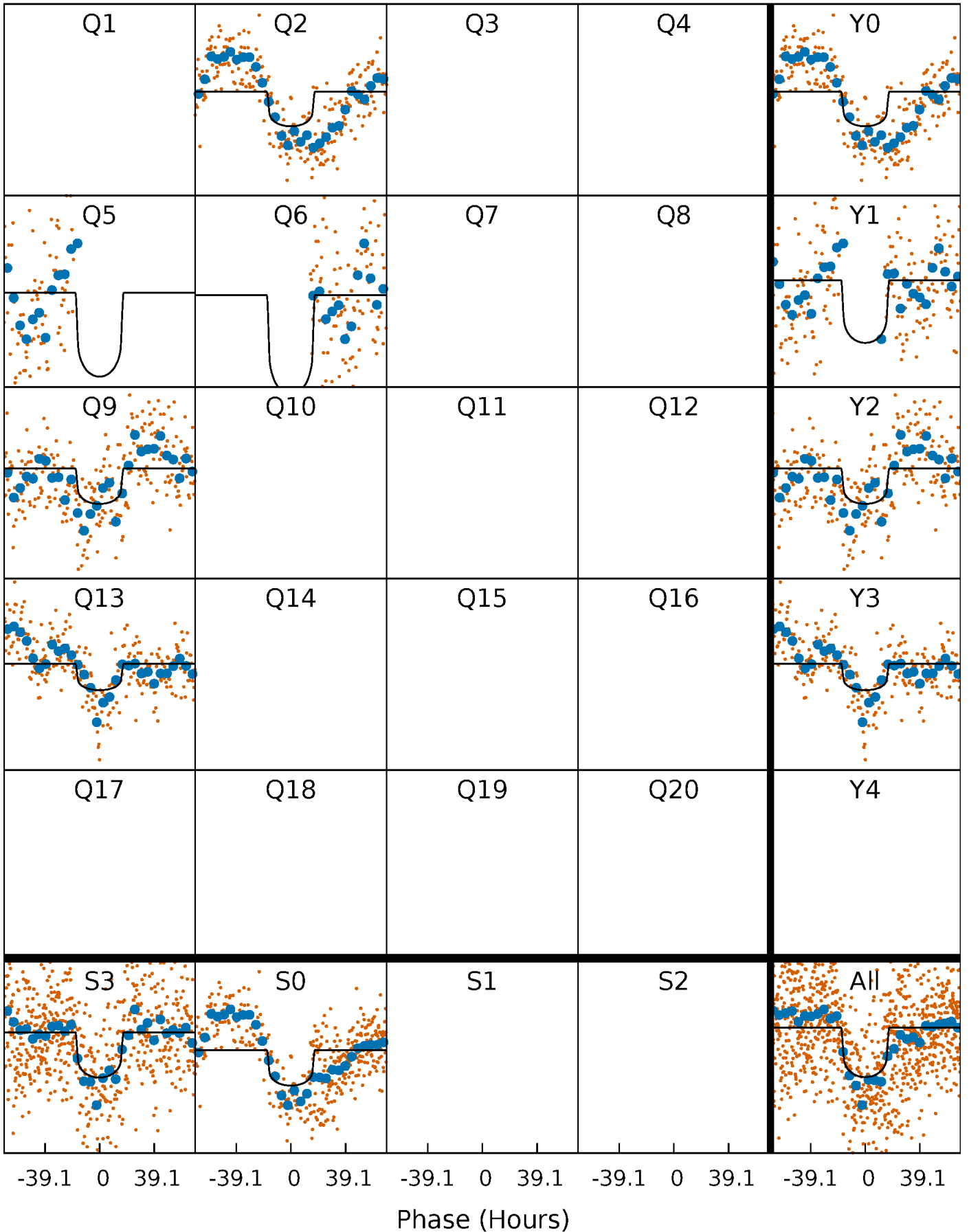
TCE 010467637-01 P=362.998686 Days  $T_0=175.903613$  (BKJD)





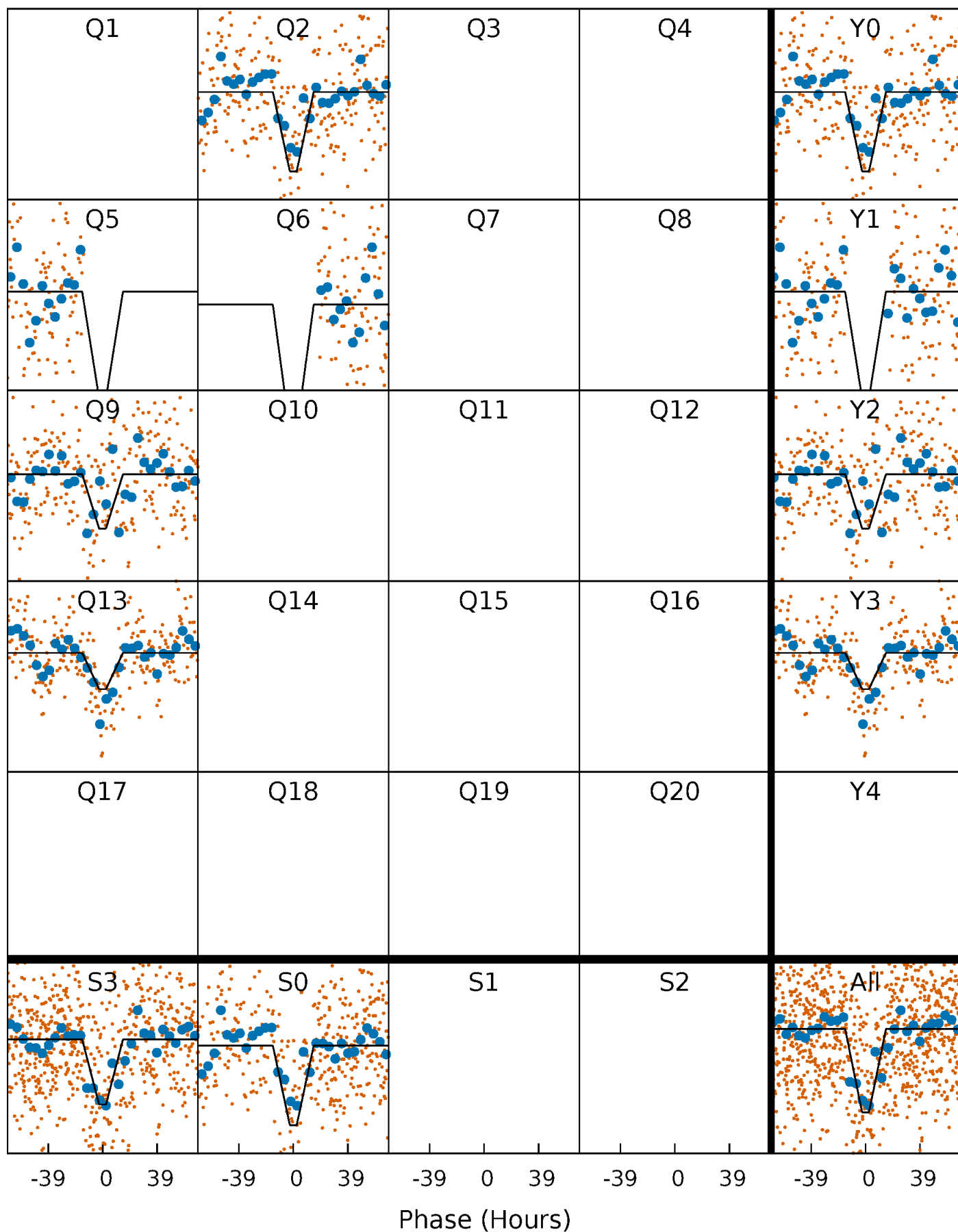
# DV Quarter-Phased Transit Curves

TCE 010467637-01 P=362.998686 Days  $T_0=175.903613$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

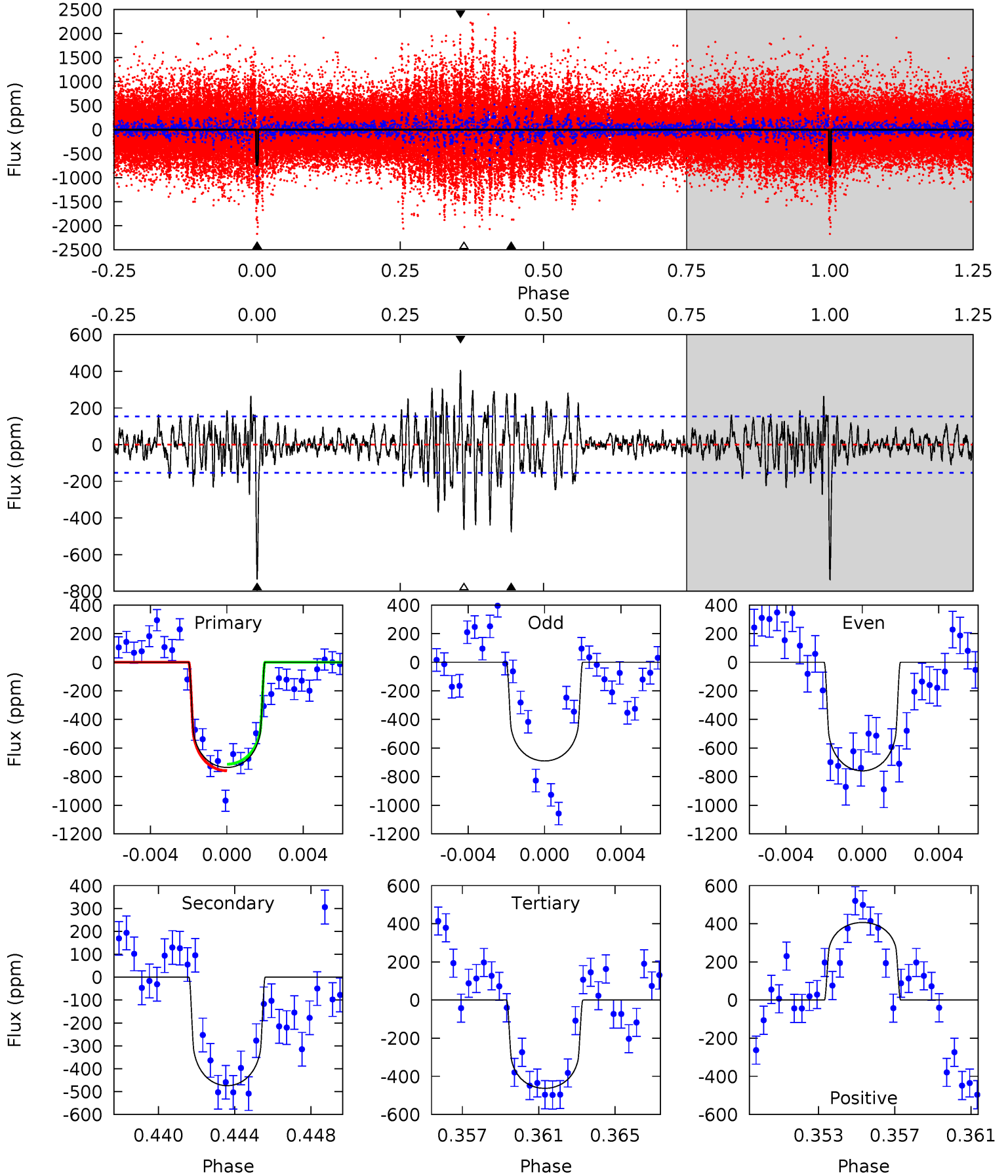
TCE 010467637-01 P=363.077116 Days  $T_0=175.658828$  (BKJD)



# DV Model-Shift Uniqueness Test

010467637-01, P = 362.998686 Days, E = 175.903613 Days

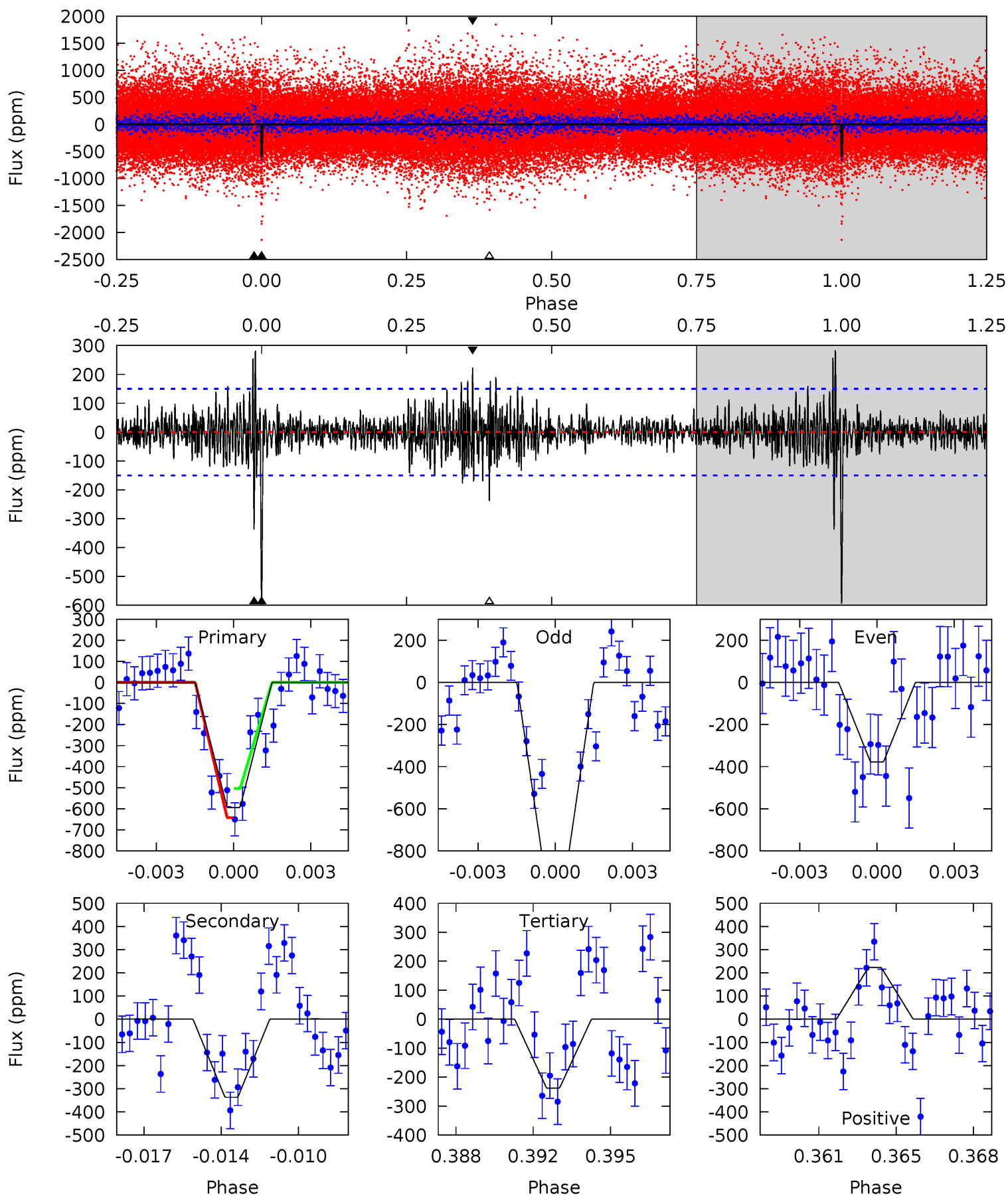
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
24.9	16.0	15.6	13.7	5.20	2.88	3.31	9.22	11.1	0.37	2.28	1.12	0.86	0.36	0.76



# Alt Model-Shift Uniqueness Test

010467637-01, P = 363.077116 Days, E = 175.658828 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
20.7	11.7	8.30	7.78	5.23	2.93	1.62	12.4	12.9	3.44	3.96	11.0	-0.97	0.32	2.41



### Stellar Parameters For KIC 010467637

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6003^{+179}_{-179}$	$4.507^{+0.050}_{-0.200}$	$-0.140^{+0.300}_{-0.300}$	$0.932^{+0.279}_{-0.093}$	$1.019^{+0.121}_{-0.133}$	$1.772^{+0.359}_{-0.886}$
	+3%/-3%	+1%/-4%	+214%/-214%	+30%/-10%	+12%/-13%	+20%/-50%
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 010467637-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-474 \pm 30$	$2.58^{+0.48}_{-0.39}$	$365^{+26}_{-17}$	$5700^{+368}_{-329}$	$38705^{+13244}_{-11096}$
Alt.	$-337 \pm 29$	$2.69^{+0.50}_{-0.35}$	$365^{+27}_{-18}$	$5154^{+340}_{-270}$	$25244^{+7939}_{-7107}$

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

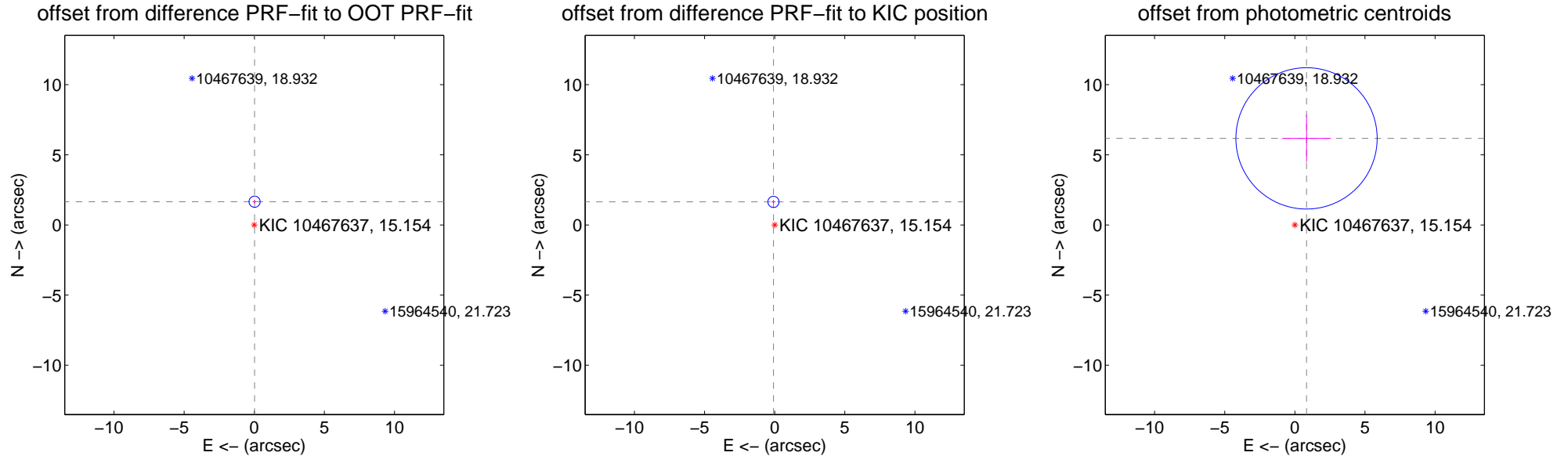
## DV Centroid Data

Supplemental centroid analysis for 010467637-01. Kepler magnitude: 15.15. Transit SNR 10.85

There are 0 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

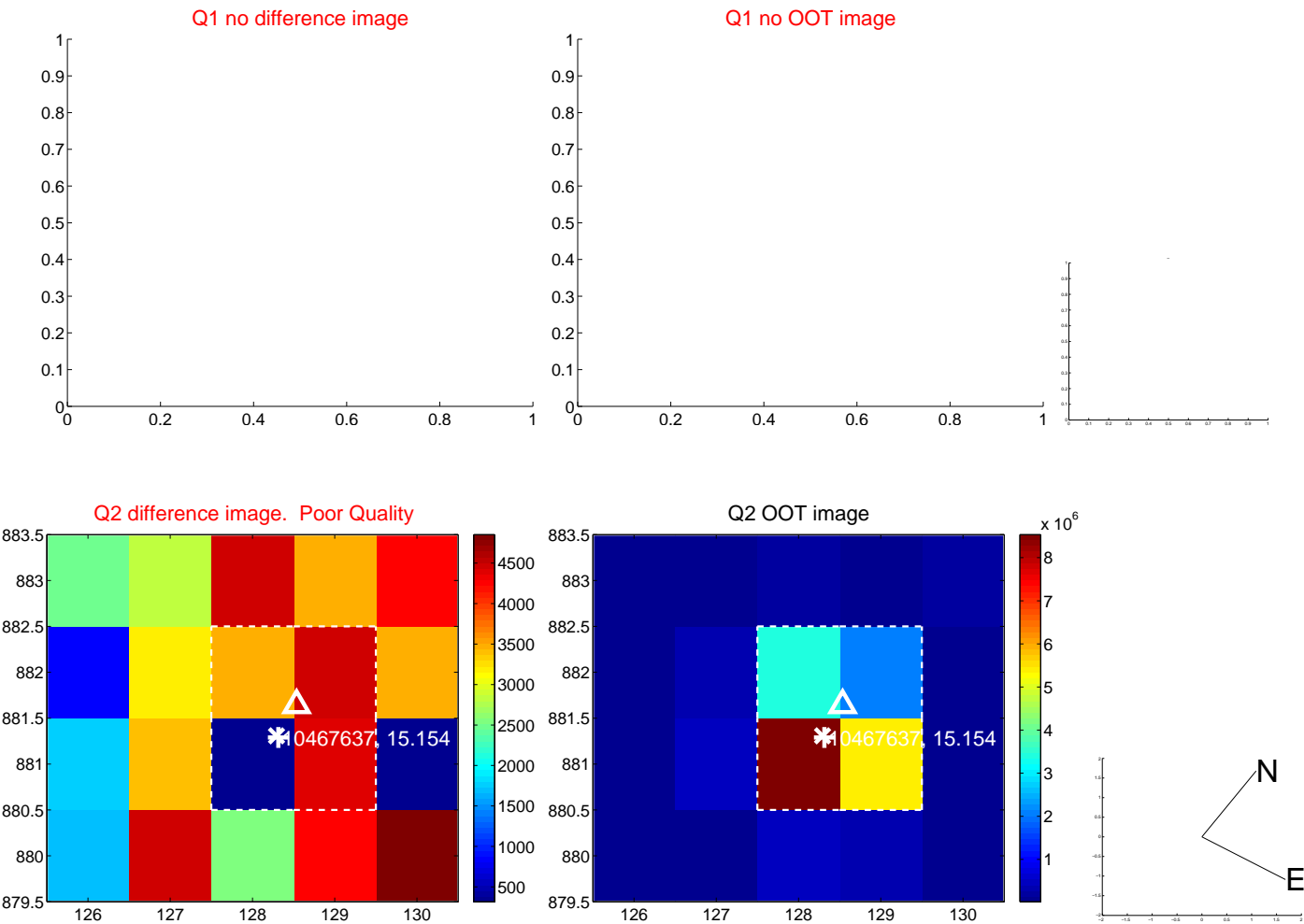
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.656 \pm 0.133$	12.48	$-0.024 \pm 0.133$	$1.656 \pm 0.133$
PRF-fit source offset from KIC position	$1.647 \pm 0.133$	12.41	$0.088 \pm 0.133$	$1.644 \pm 0.133$
photometric centroid source offset	$6.23 \pm 1.68$	3.71	$-0.83 \pm 1.74$	$6.17 \pm 1.68$



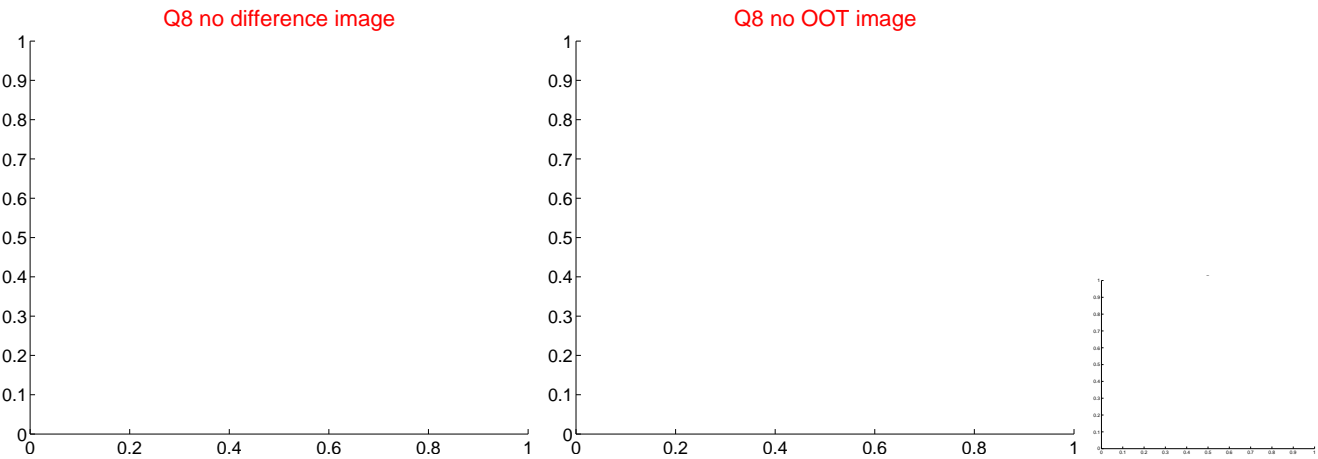
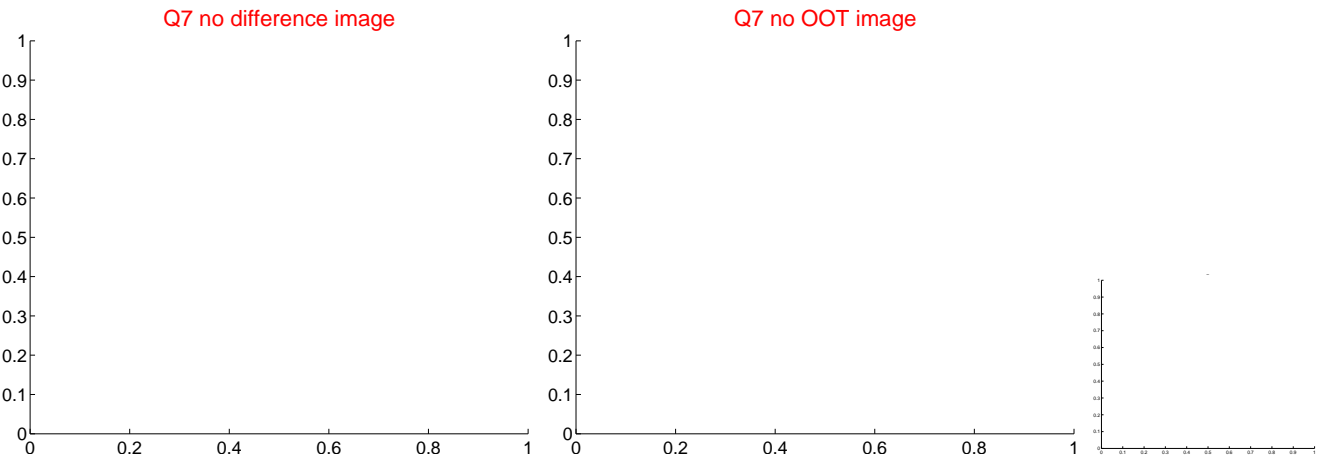
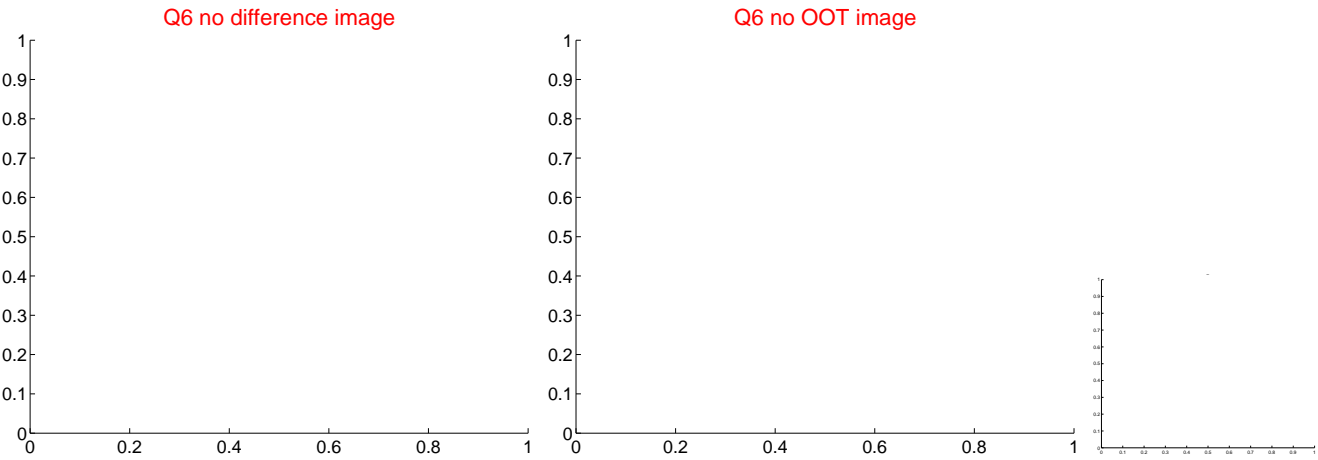
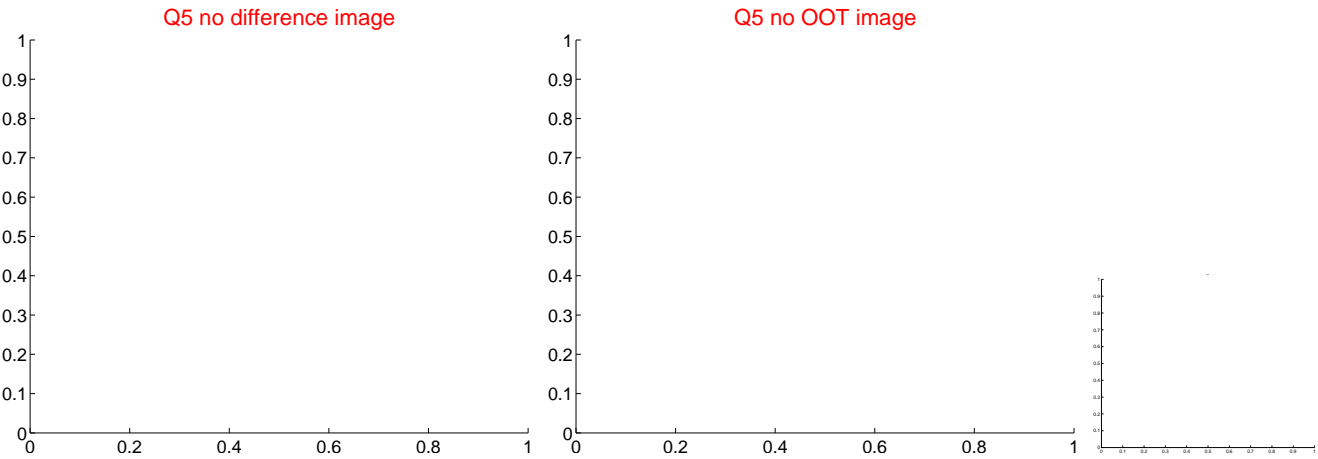
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



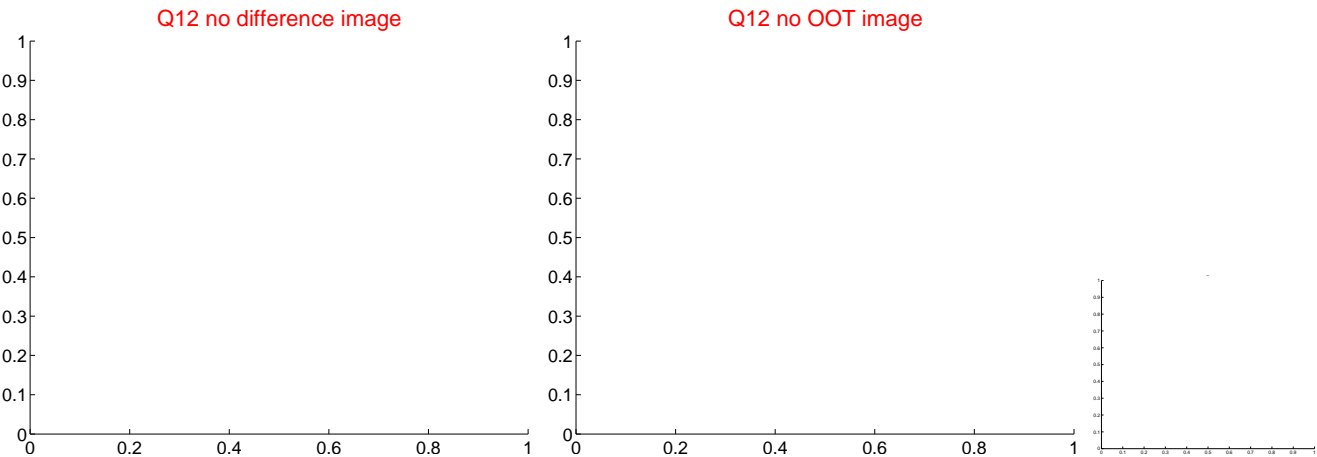
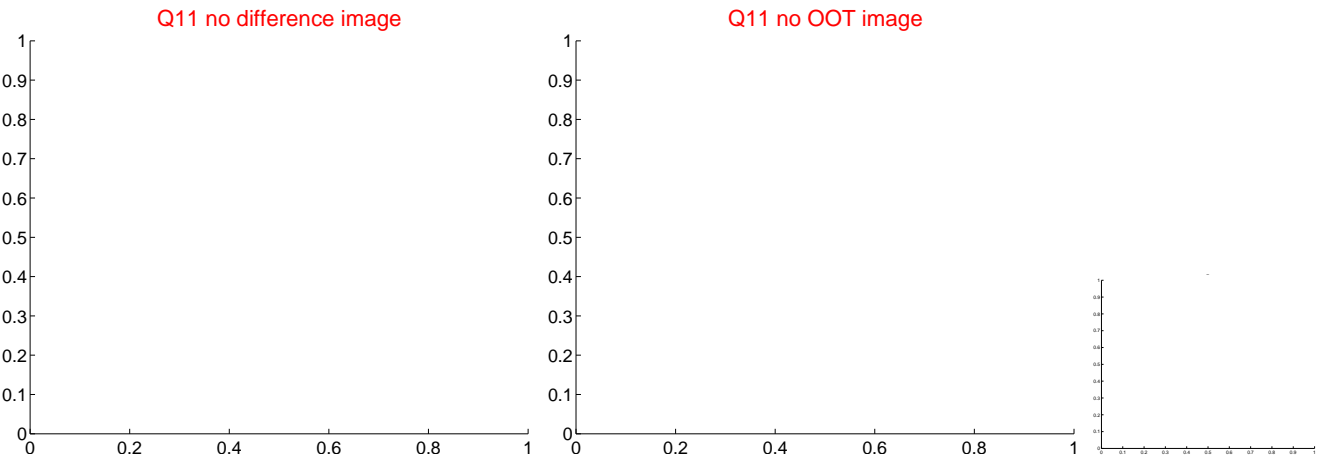
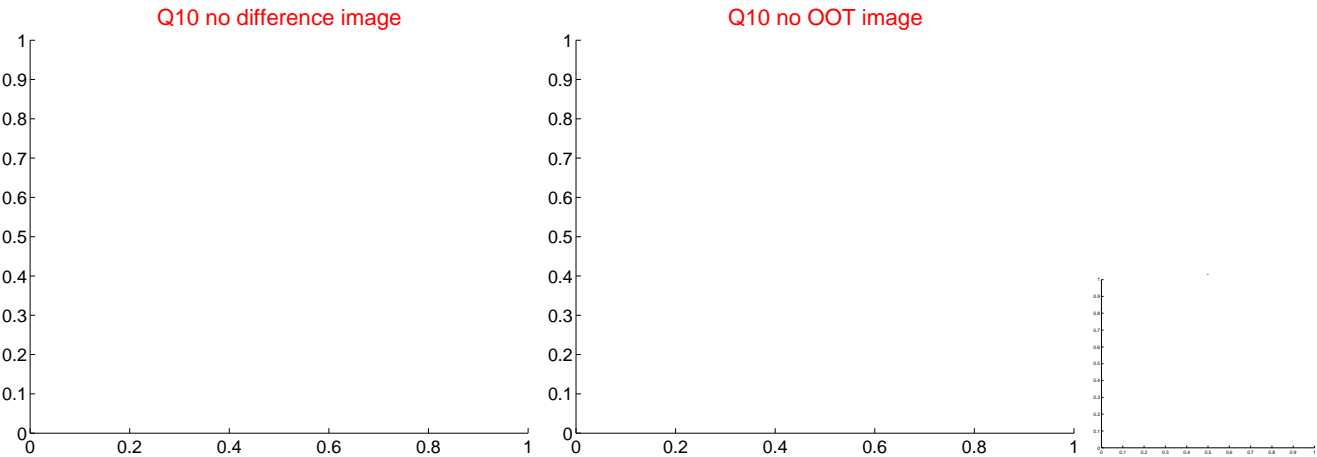
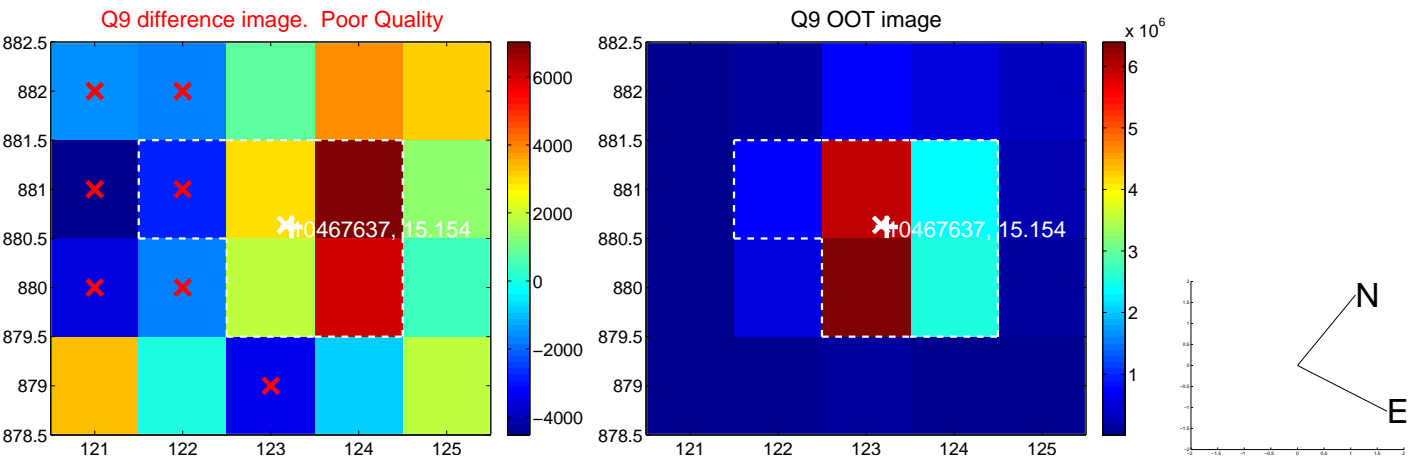
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



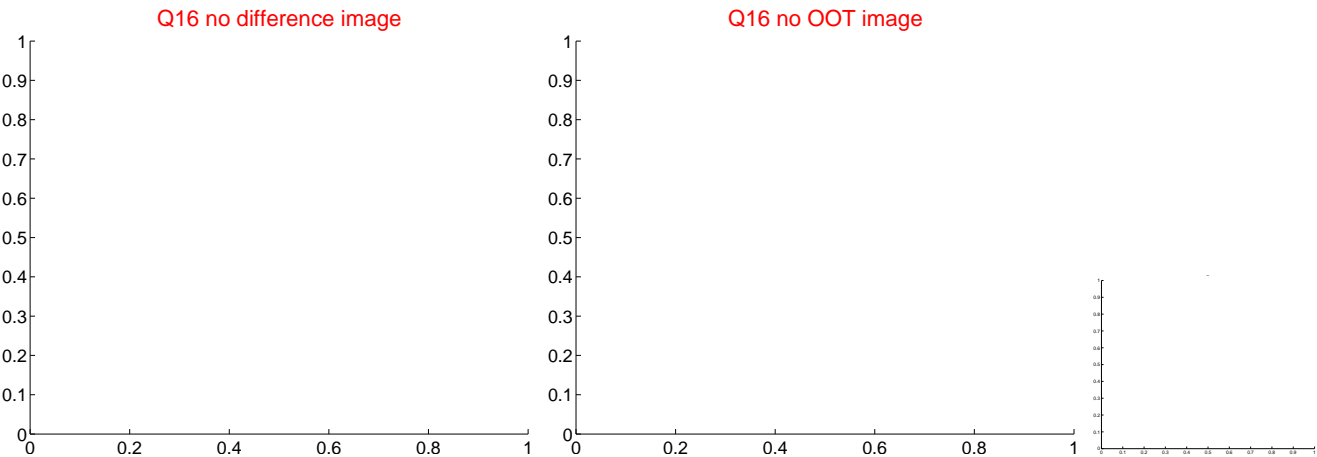
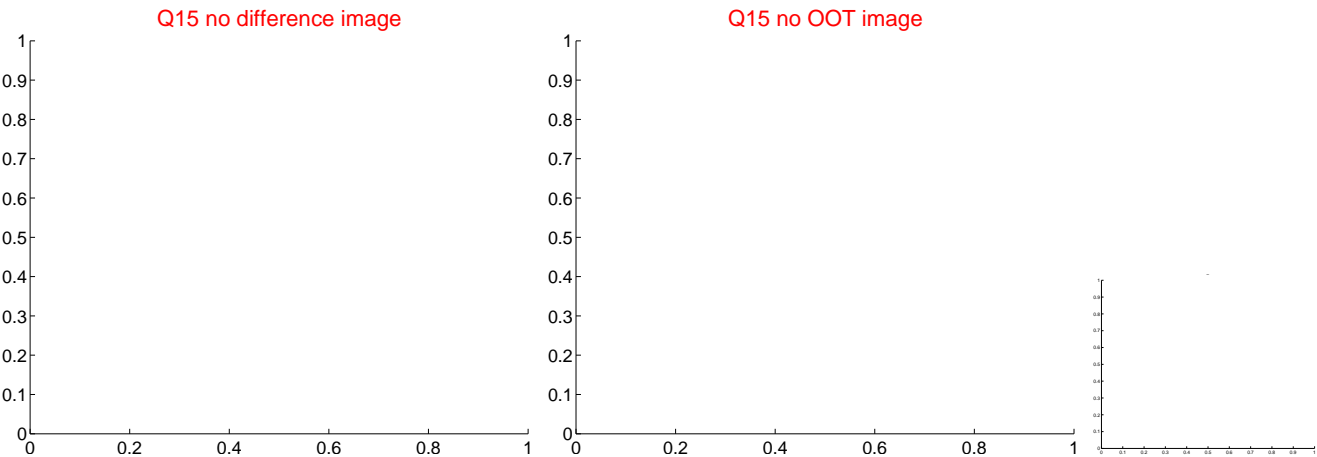
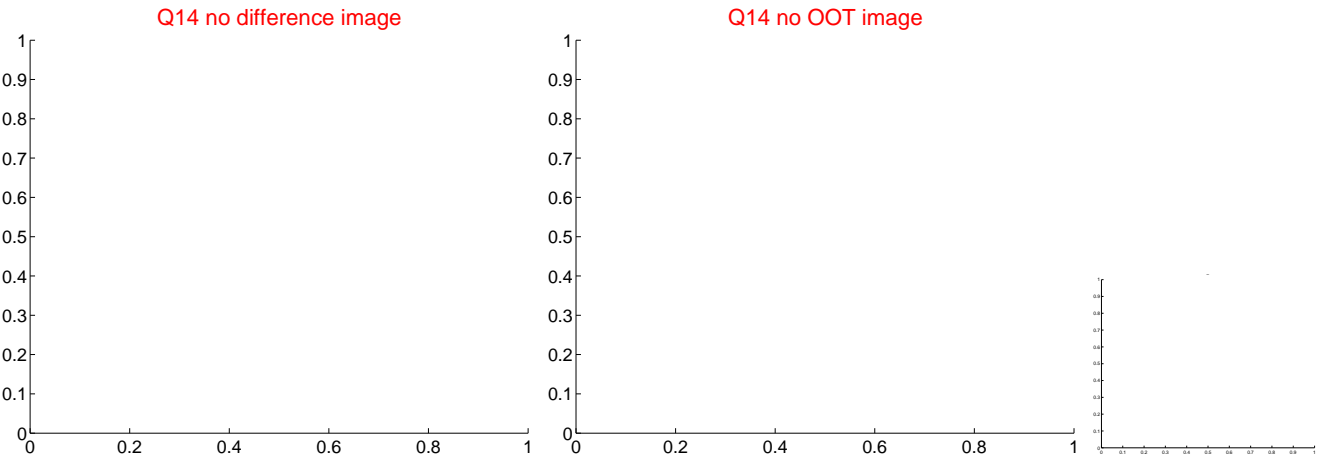
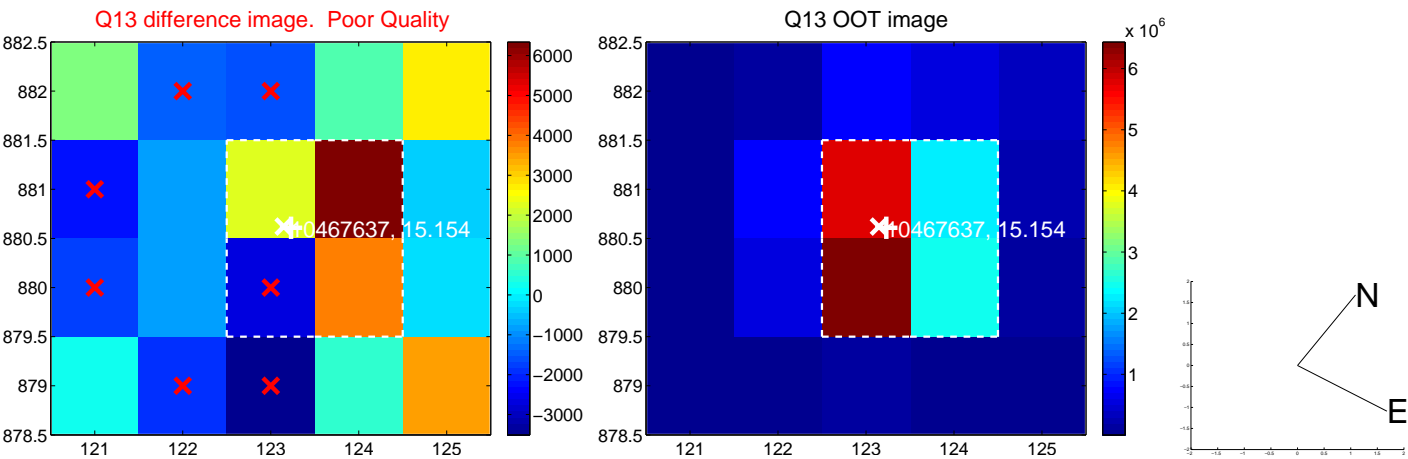
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



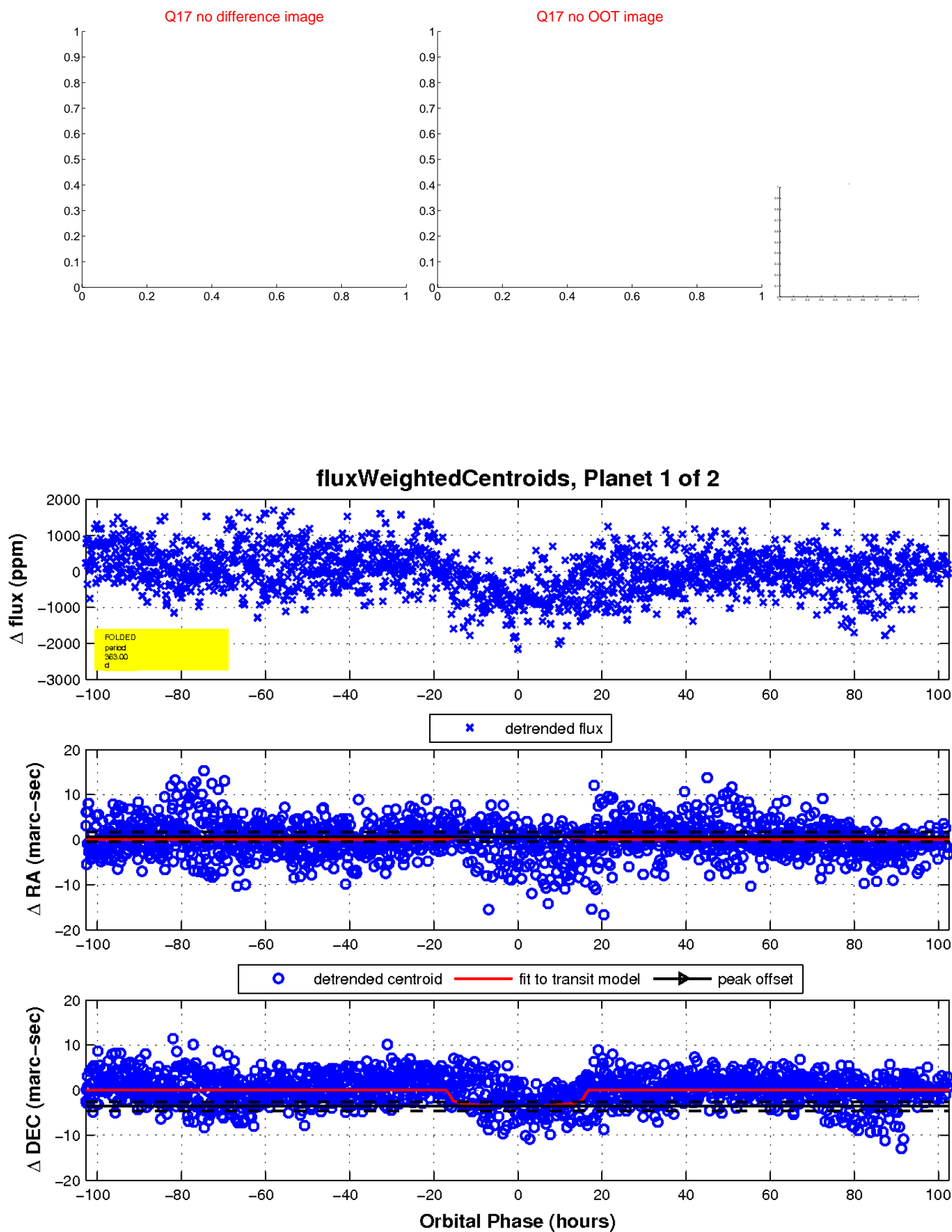
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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

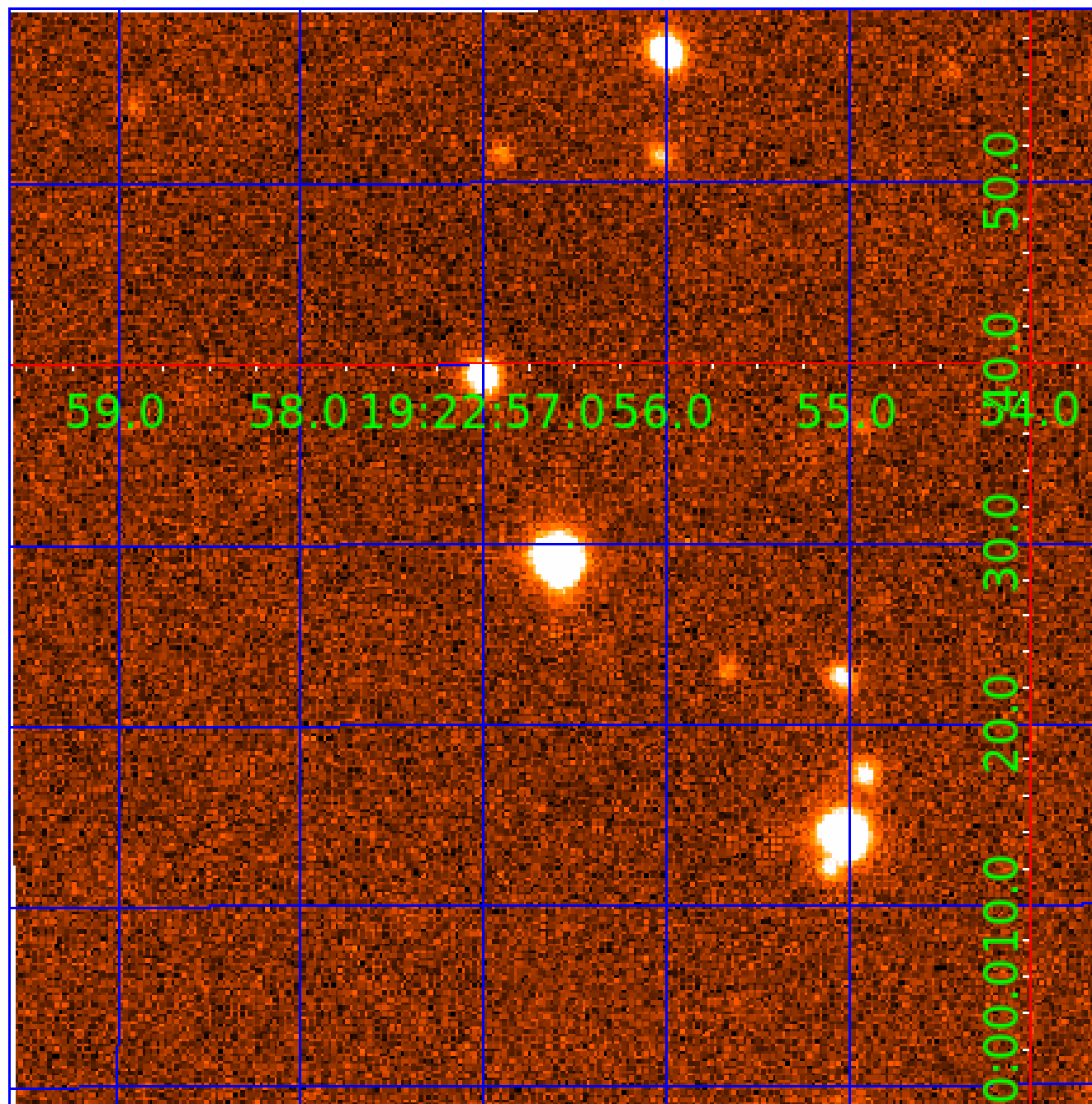


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 010467637

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010467637-01	OBS	No	362.998686	175.903612	594.9	34.231	8.7	10.9	0.93	6003	2.48	1.01
010467637-02	OBS	No	352.108108	185.942060	638.5	12.389	8.5	8.3	0.93	6003	2.43	1.05

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010467637-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—ALL_TRANS_CHASES—CENT_FEW_DIFFS
010467637-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS

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

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

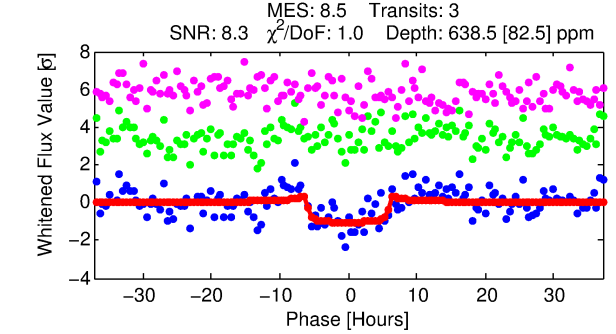
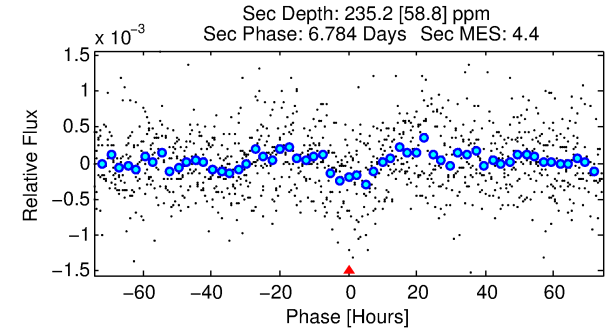
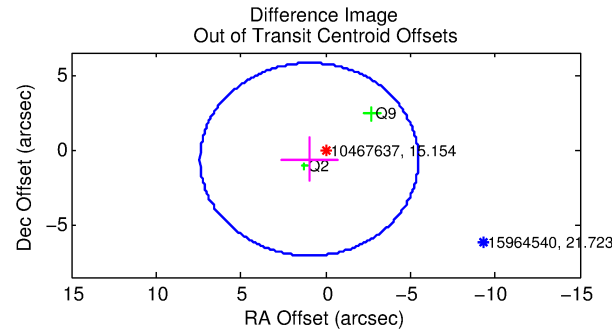
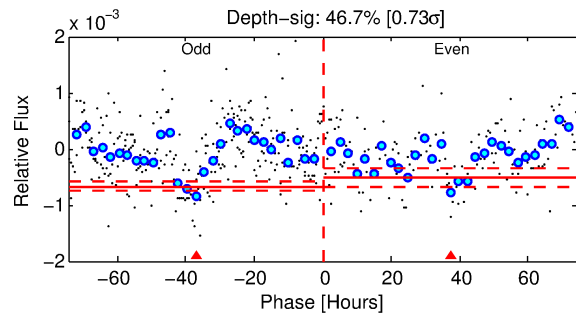
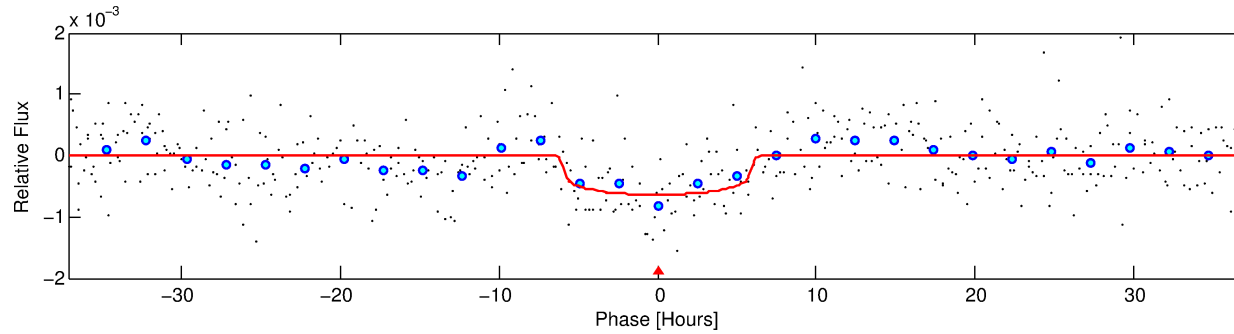
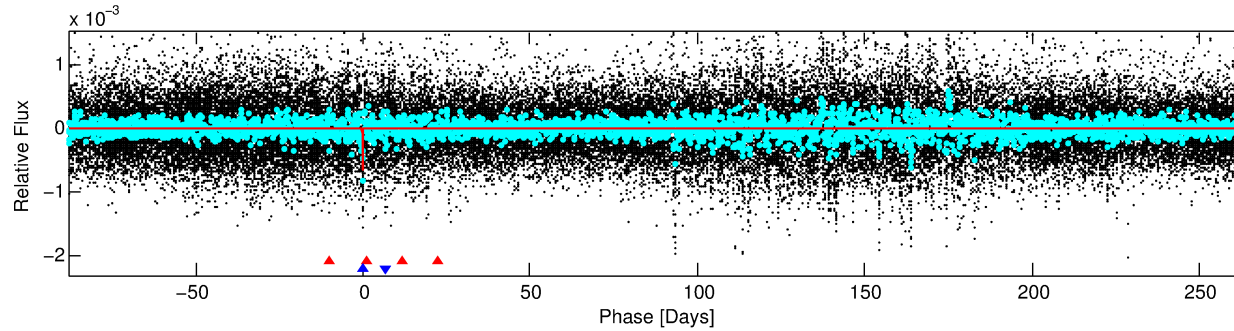
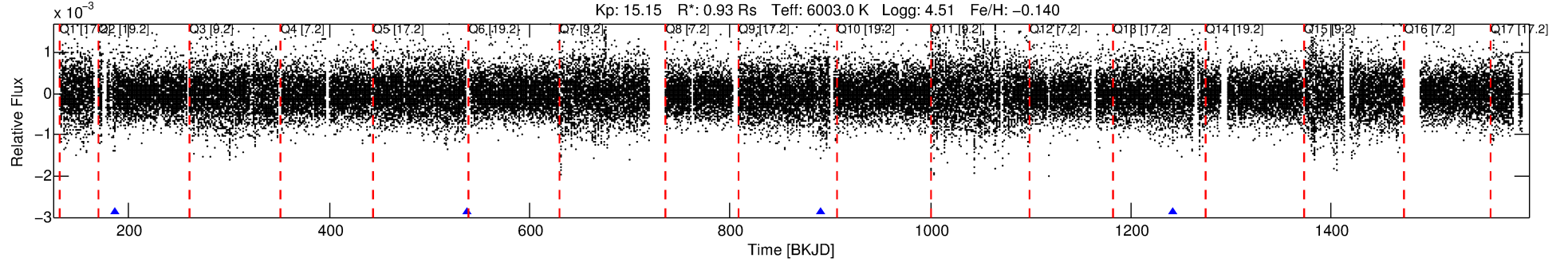
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010467637-02

No Significant Match Found

# DV One-Page Summary

KIC: 10467637 Candidate: 2 of 2 Period: 352.108 d



## DV Fit Results:

Period = 352.10811 [0.00792] d  
Epoch = 185.9421 [0.0163] BKJD  
Rp/R\* = 0.0239 [0.0136]  
a/R\* = 189.51 [513.15]  
b = 0.54 [3.63]  
Seff = 1.05 [0.40]  
Teq = 258 [25] K  
Rp = 2.43 [1.57] Re  
a = 0.9820 [0.2472] AU  
Ag = 21133.80 [25901.19] [0.82 $\sigma$ ]  
Teffp = 4810 [1414] K [3.22 $\sigma$ ]

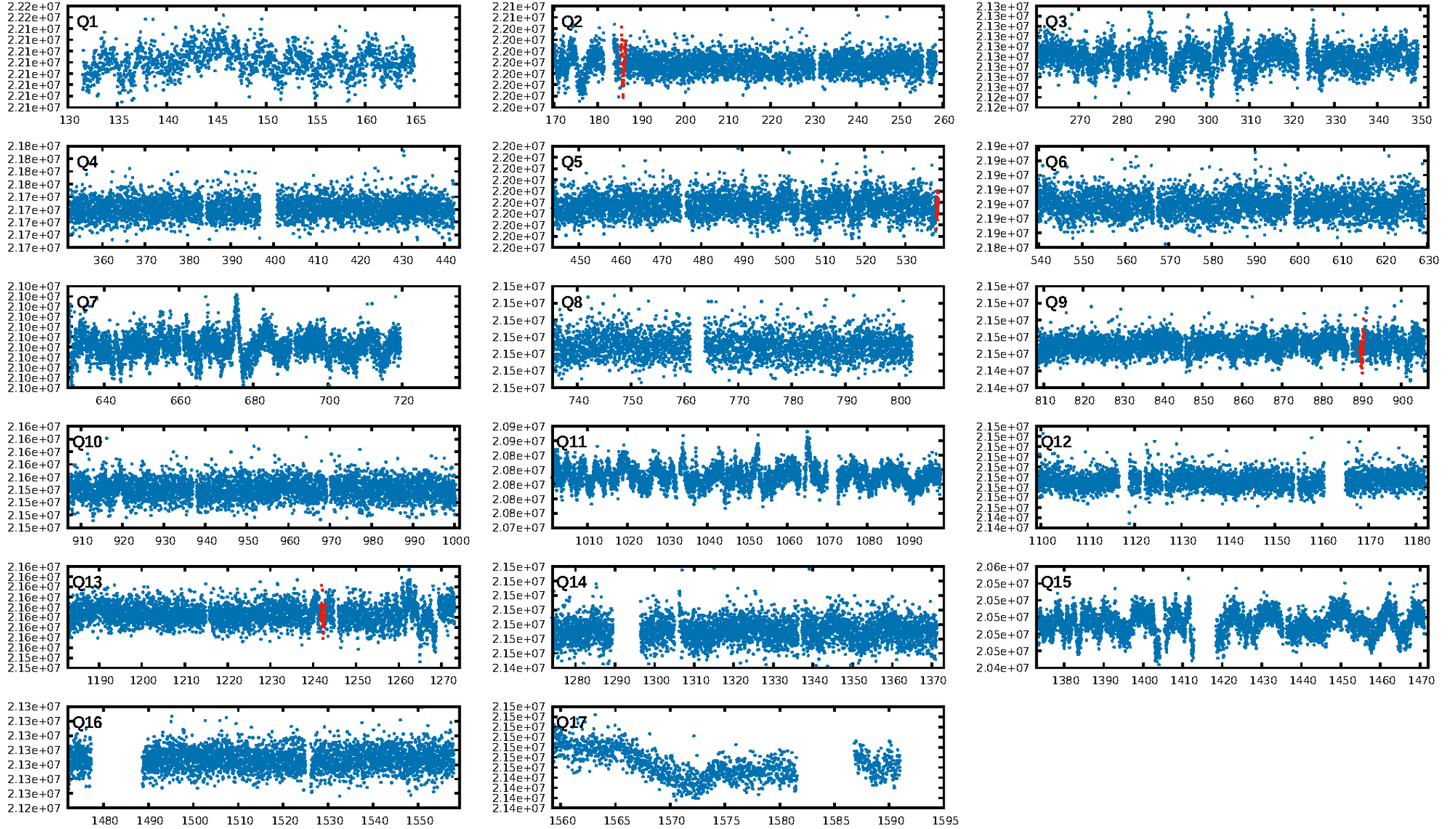
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [7.18 $\sigma$ ]  
ModelChiSquare2-sig: 88.6%  
ModelChiSquareGof-sig: 99.7%  
**Bootstrap-pfa: 1.20e-10**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.445  
Centroid-sig: 28.7%  
Centroid-so: 2.523 arcsec [1.26 $\sigma$ ]  
OotOffset-rm: 1.160 arcsec [0.54 $\sigma$ ]  
OotOffset-st: 1/0/0/1 [2]  
KicOffset-rm: 1.261 arcsec [0.98 $\sigma$ ]  
KicOffset-st: 1/0/0/1 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 1.00 [2/2]

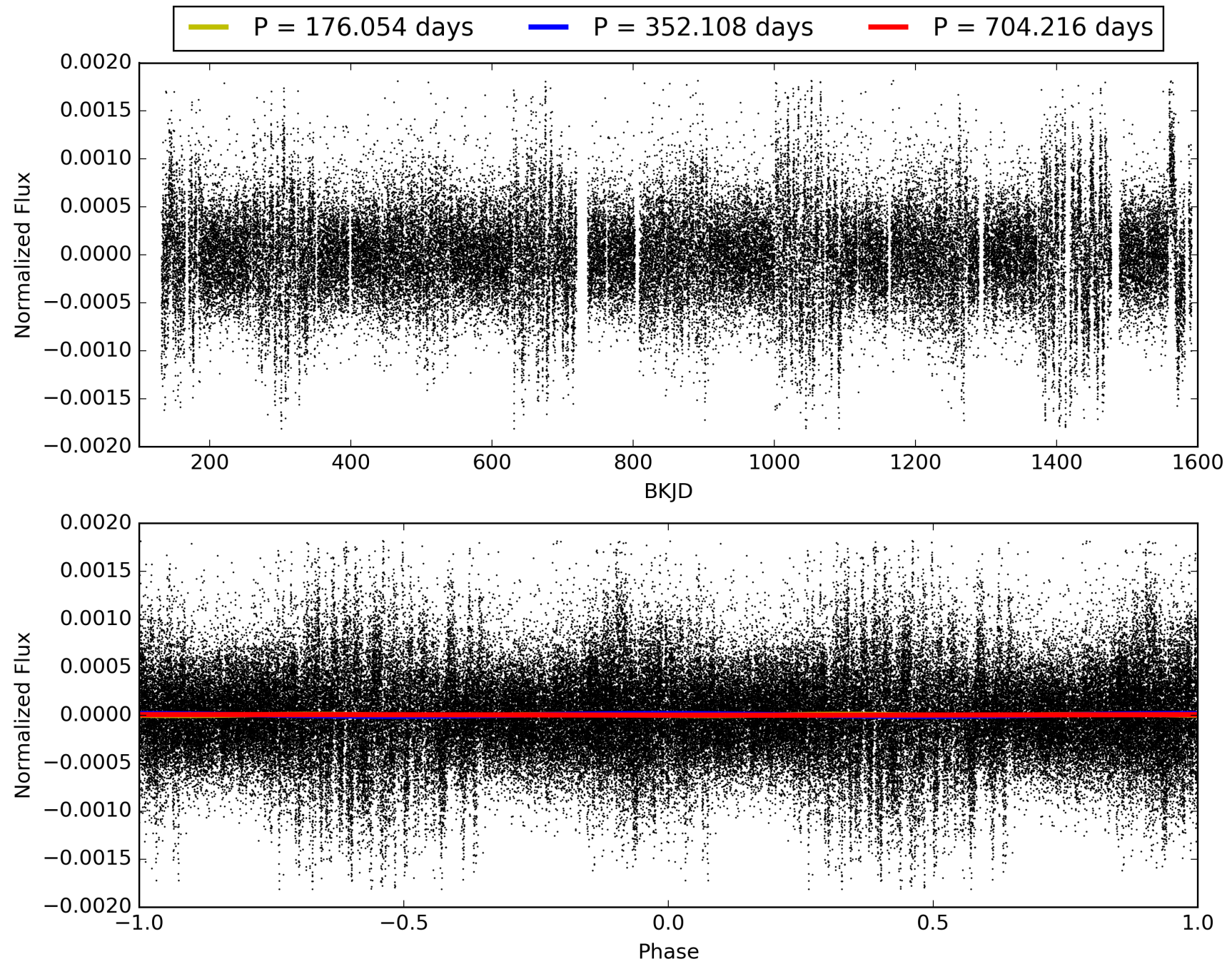
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 02:06:34 Z

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

# TCE 010467637-02, PDC Light Curves

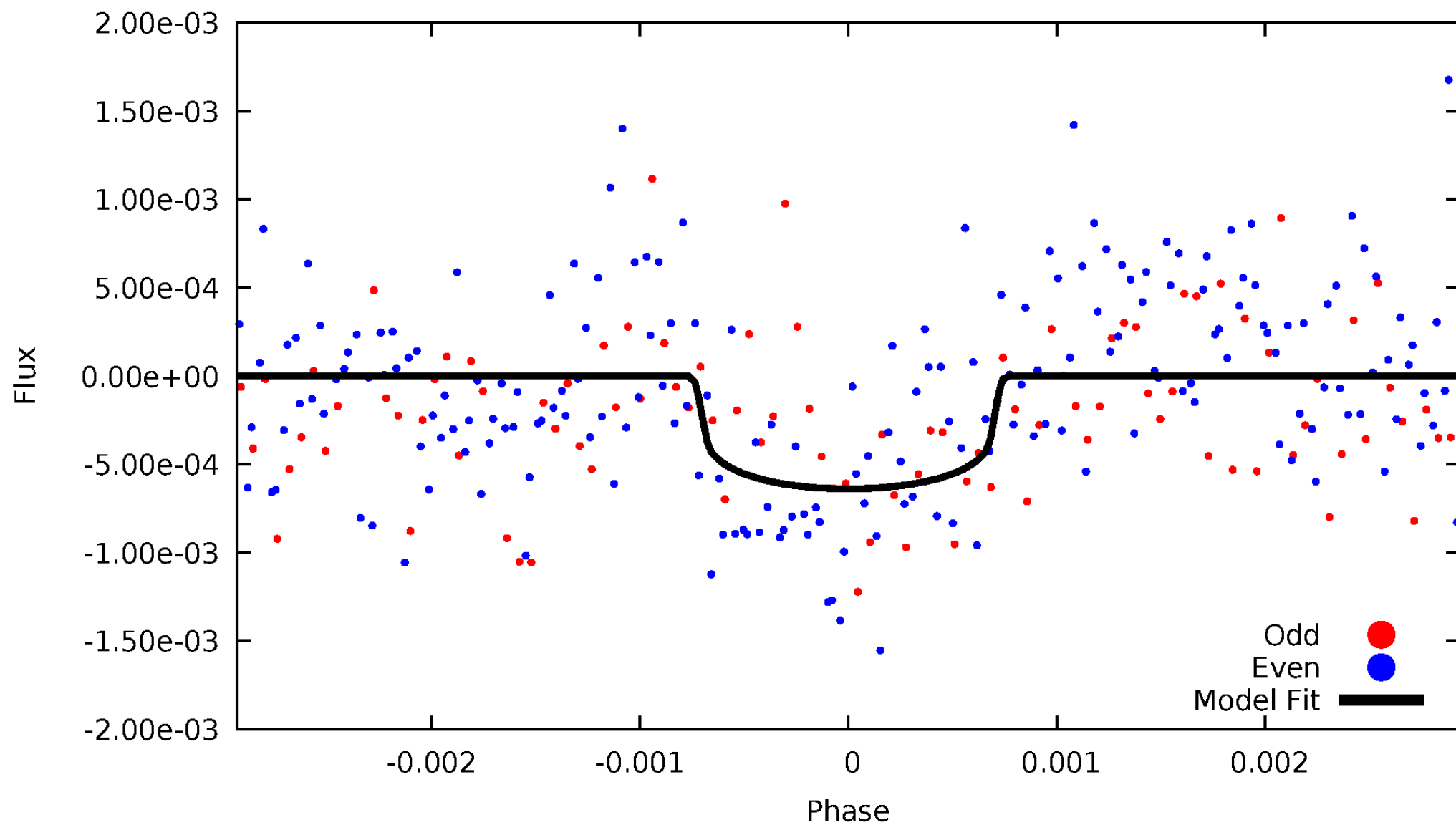


TCE 010467637-02



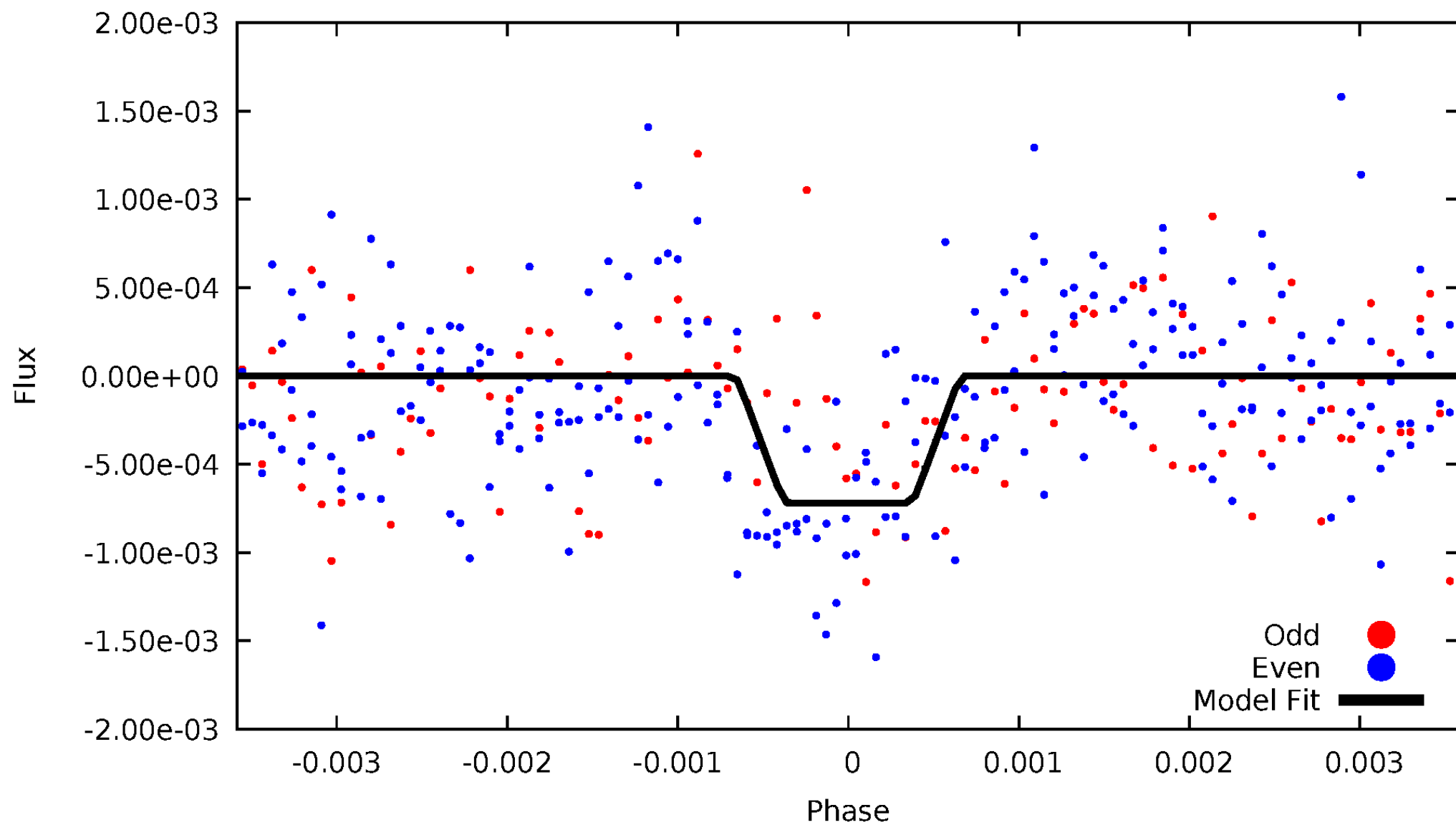
# DV Odd/Even

TCE 010467637-02



# ALT Odd/Even

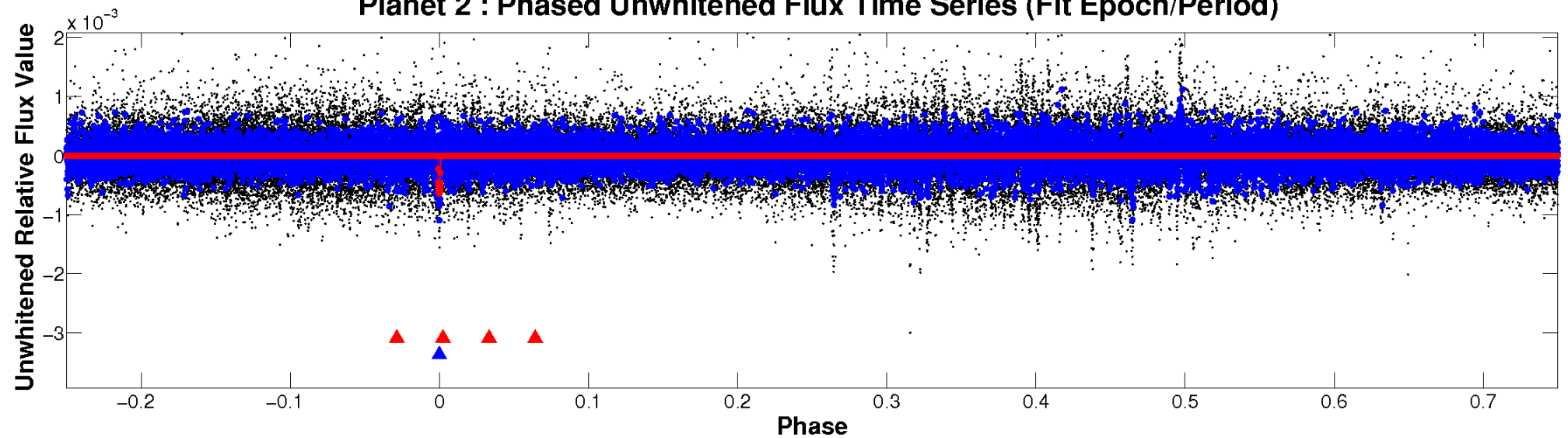
TCE 010467637-02



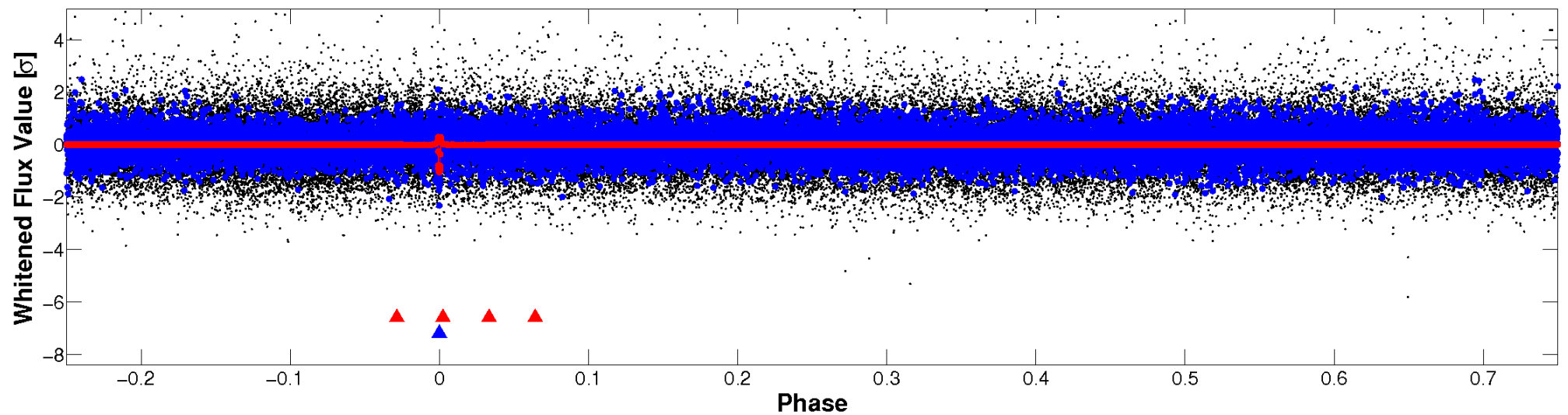


# Non-Whitened Vs. Whitened Light Curve

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

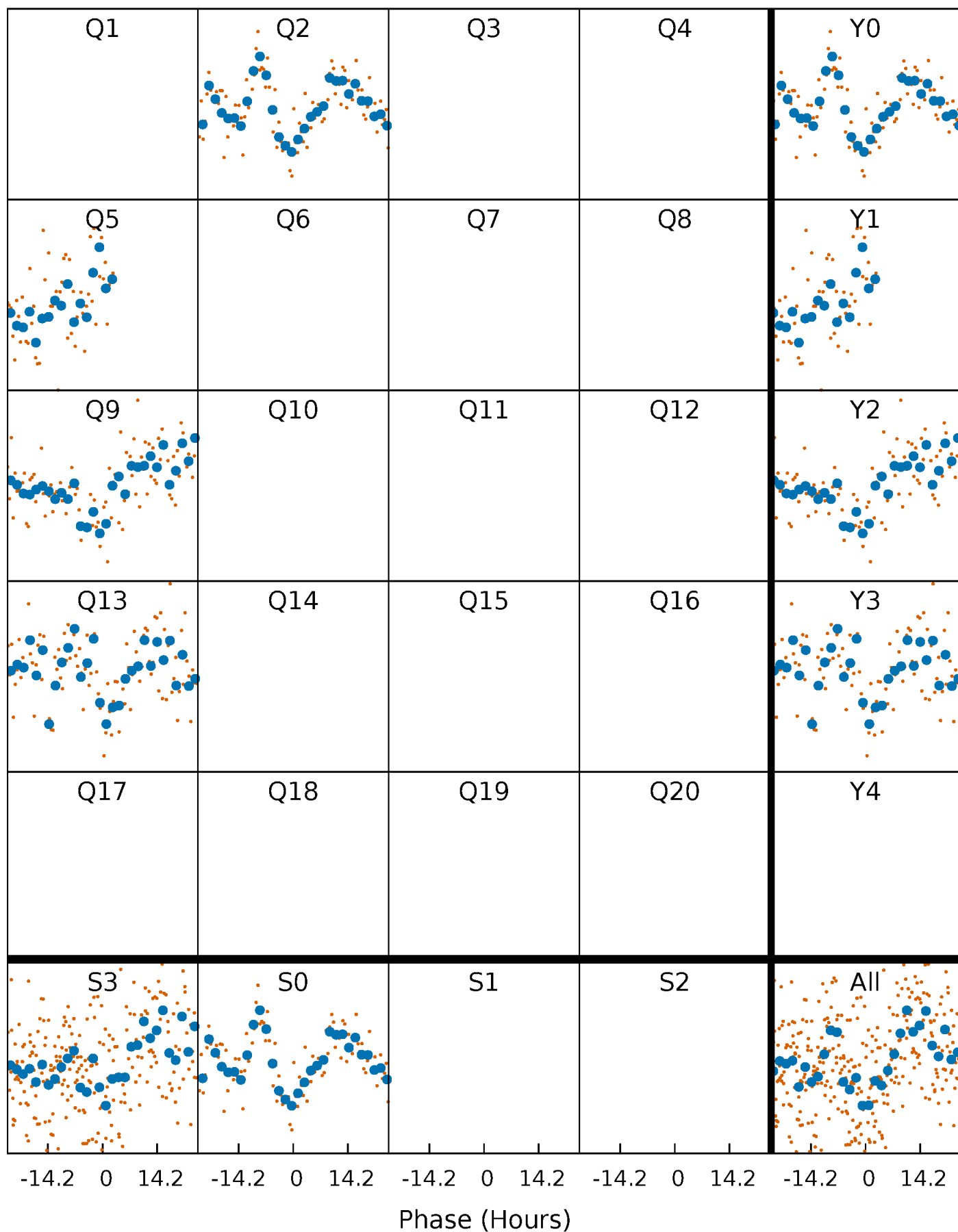


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



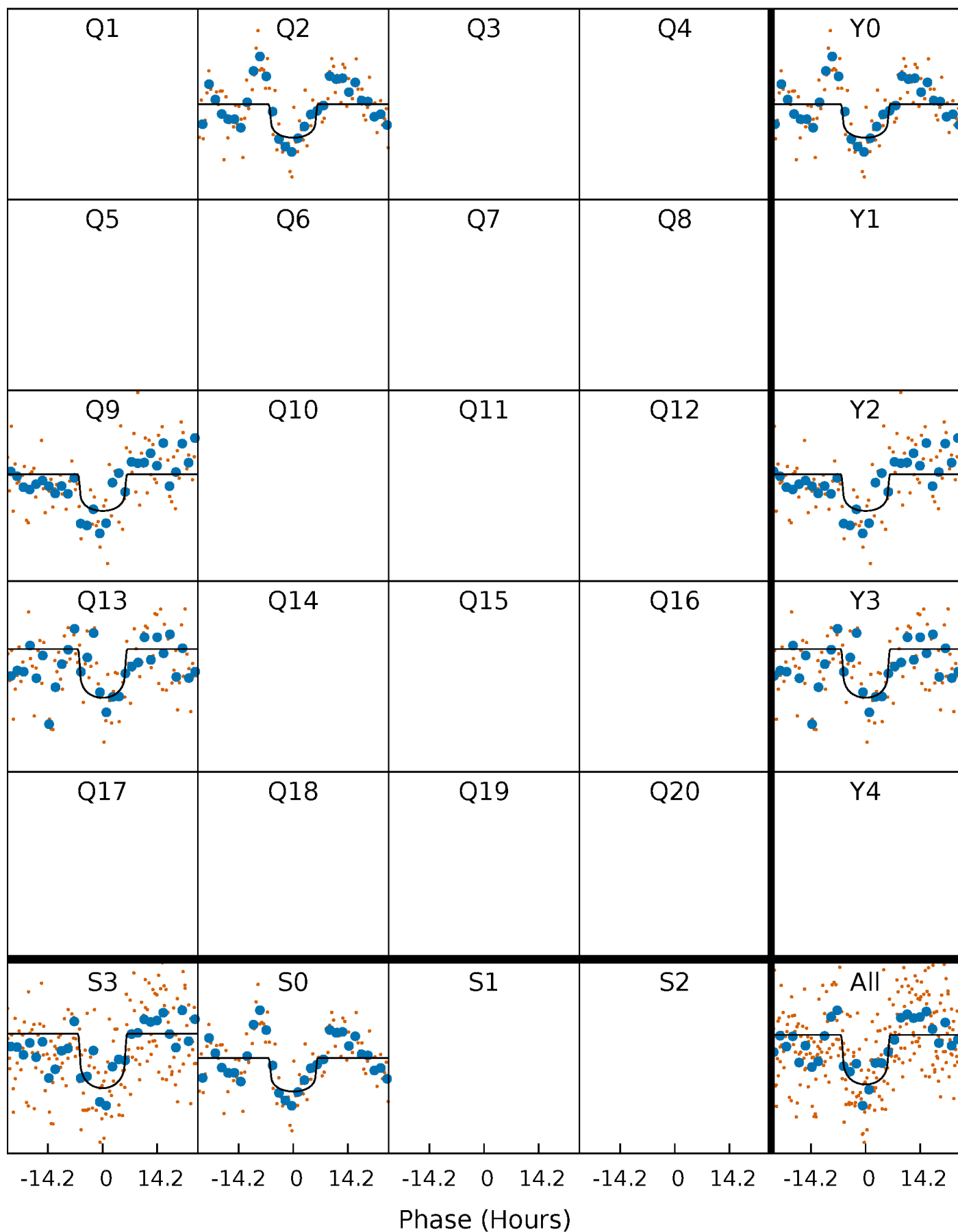
# PDC Quarter-Phased Transit Curves

TCE 010467637-02     $P=352.108108$  Days     $T_0=185.942060$  (BKJD)



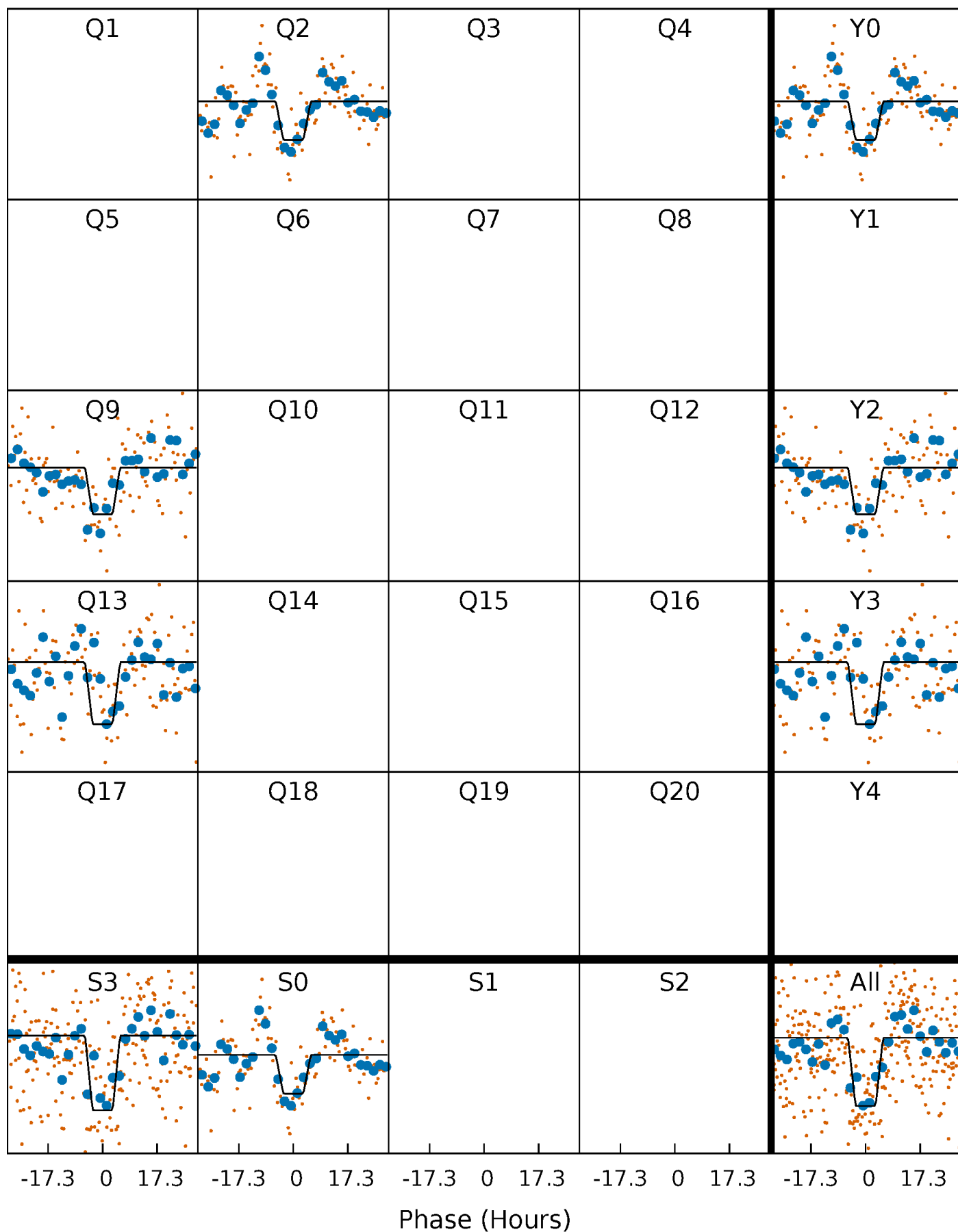
# DV Quarter-Phased Transit Curves

TCE 010467637-02     $P=352.108108$  Days     $T_0=185.942060$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

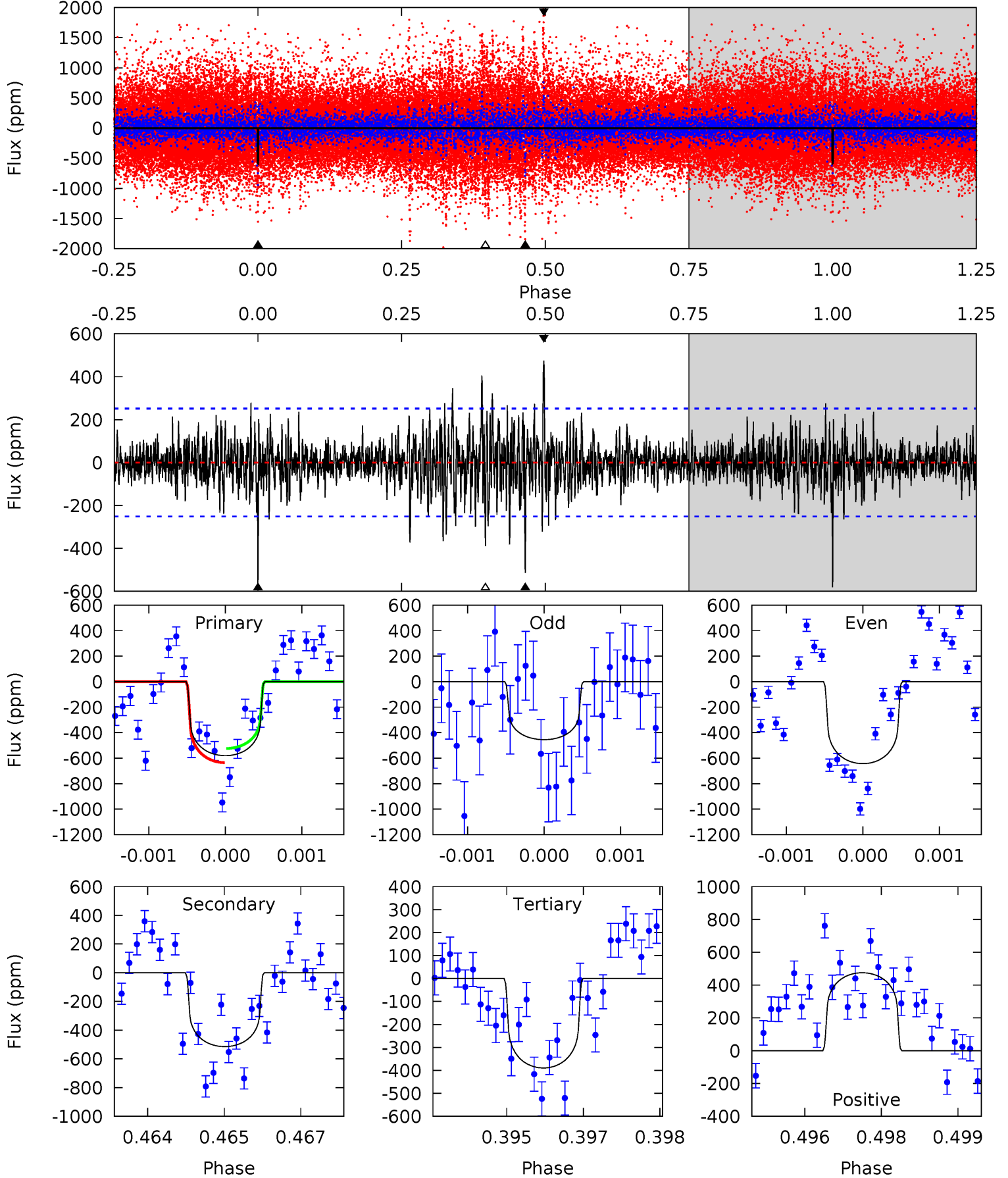
TCE 010467637-02 P=352.090672 Days  $T_0=185.973979$  (BKJD)



# DV Model-Shift Uniqueness Test

010467637-02, P = 352.108108 Days, E = 185.942060 Days

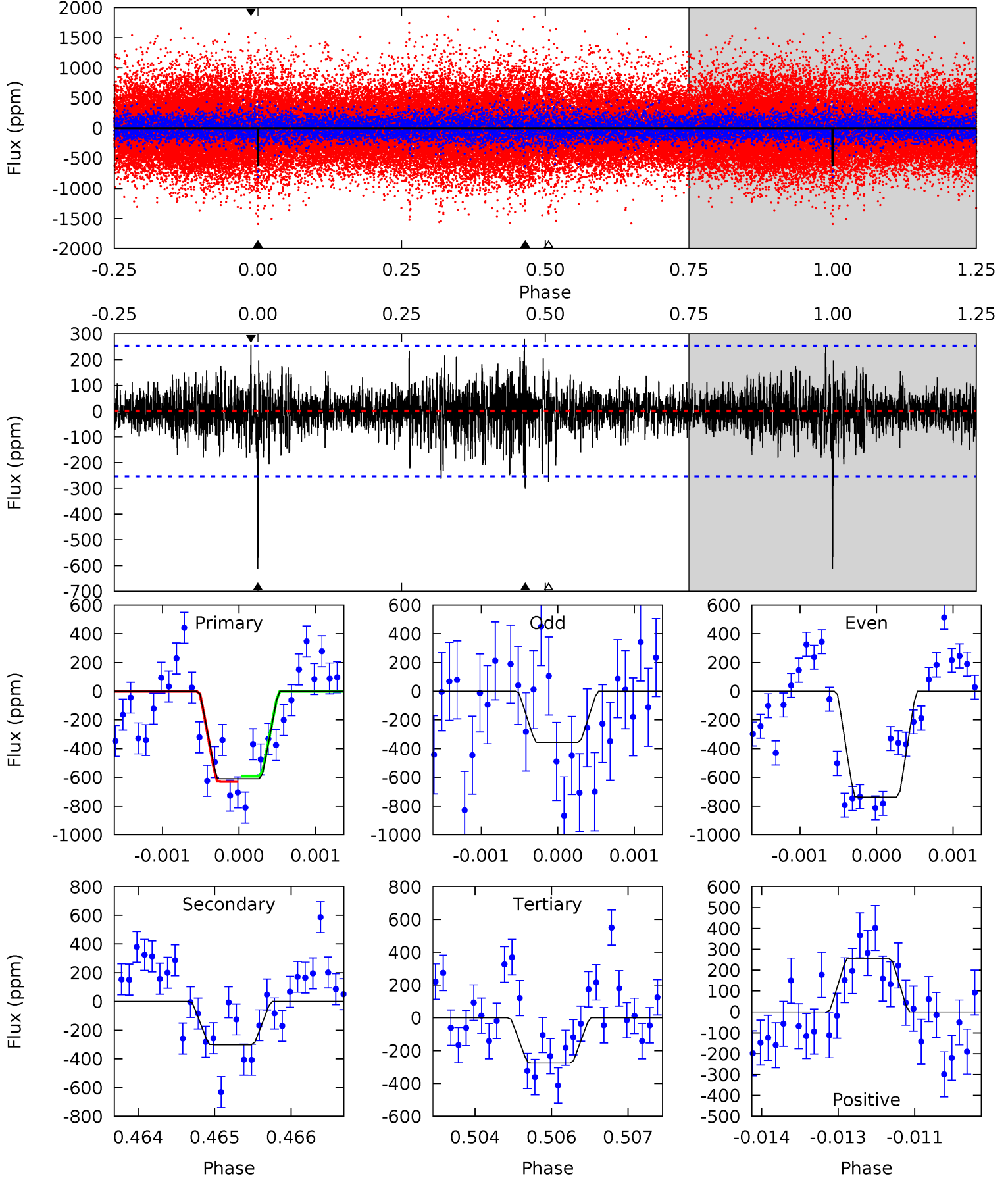
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.4	11.0	8.33	10.2	5.38	3.18	1.92	4.08	2.25	2.67	0.84	1.92	0.95	0.45	1.19



# Alt Model-Shift Uniqueness Test

010467637-02,  $P = 352.090672$  Days,  $E = 185.973979$  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
13.0	6.42	5.88	5.49	5.41	3.22	1.31	7.14	7.53	0.54	0.93	3.86	0.86	0.31	0.40





### Stellar Parameters For KIC 010467637

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6003^{+179}_{-179}$	$4.507^{+0.050}_{-0.200}$	$-0.140^{+0.300}_{-0.300}$	$0.932^{+0.279}_{-0.093}$	$1.019^{+0.121}_{-0.133}$	$1.772^{+0.359}_{-0.886}$
	+3%/-3%	+1%/-4%	+214%/-214%	+30%/-10%	+12%/-13%	+20%/-50%
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 010467637-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-514 \pm 47$	$2.64^{+1.55}_{-1.45}$	$369^{+24}_{-18}$	$5743^{+3210}_{-1004}$	$38085^{+145320}_{-22947}$
Alt.	$-301 \pm 47$	$2.91^{+1.53}_{-1.45}$	$370^{+25}_{-17}$	$4933^{+1783}_{-790}$	$18970^{+50959}_{-11194}$

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

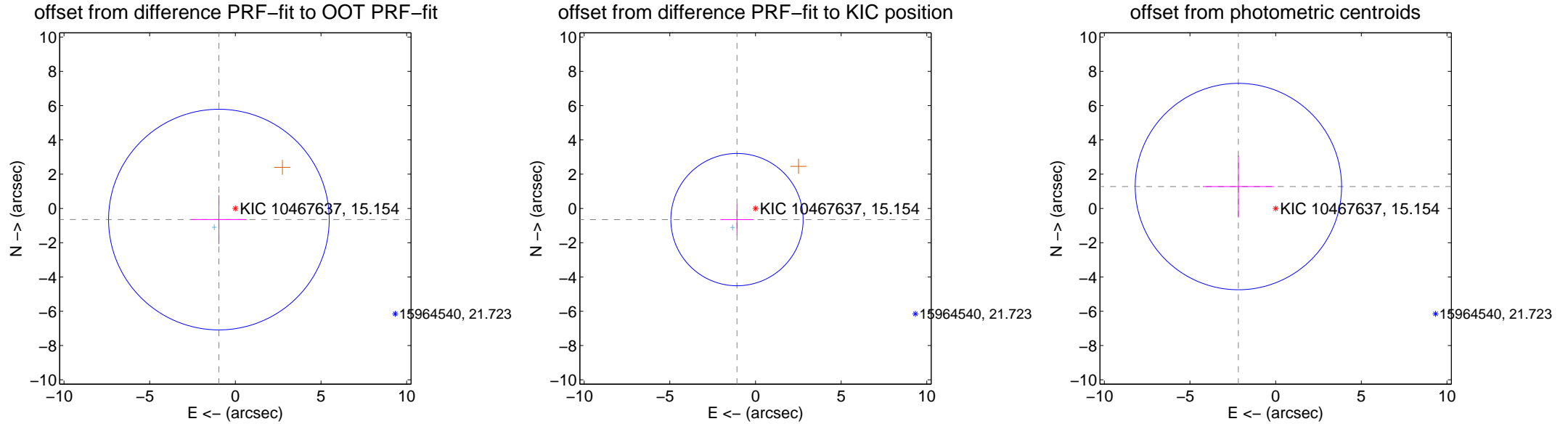
## DV Centroid Data

Supplemental centroid analysis for 010467637-02. Kepler magnitude: 15.15. Transit SNR 8.26

There are 1 quarters with good PRF difference image offsets

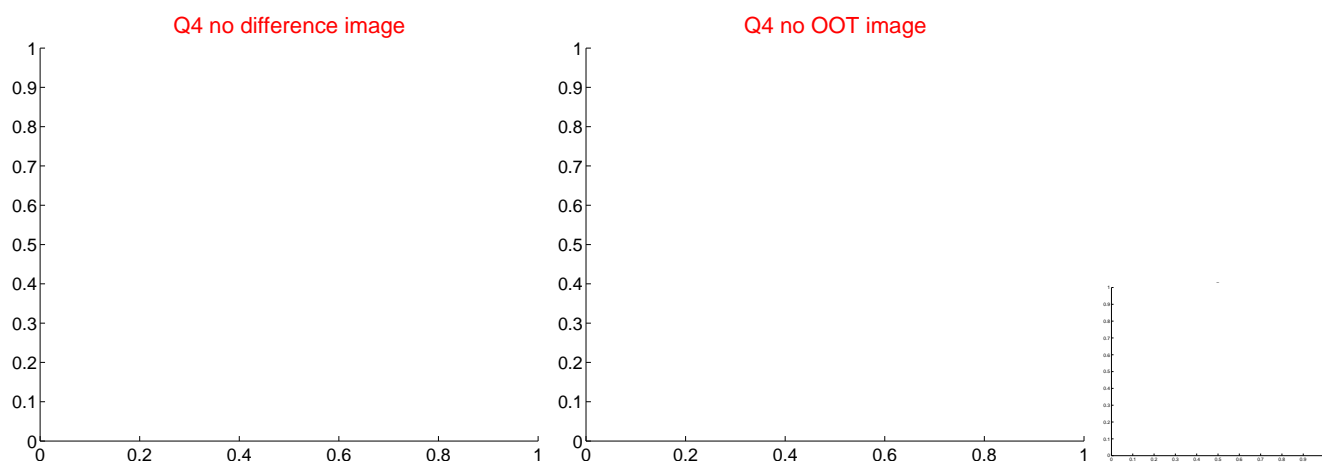
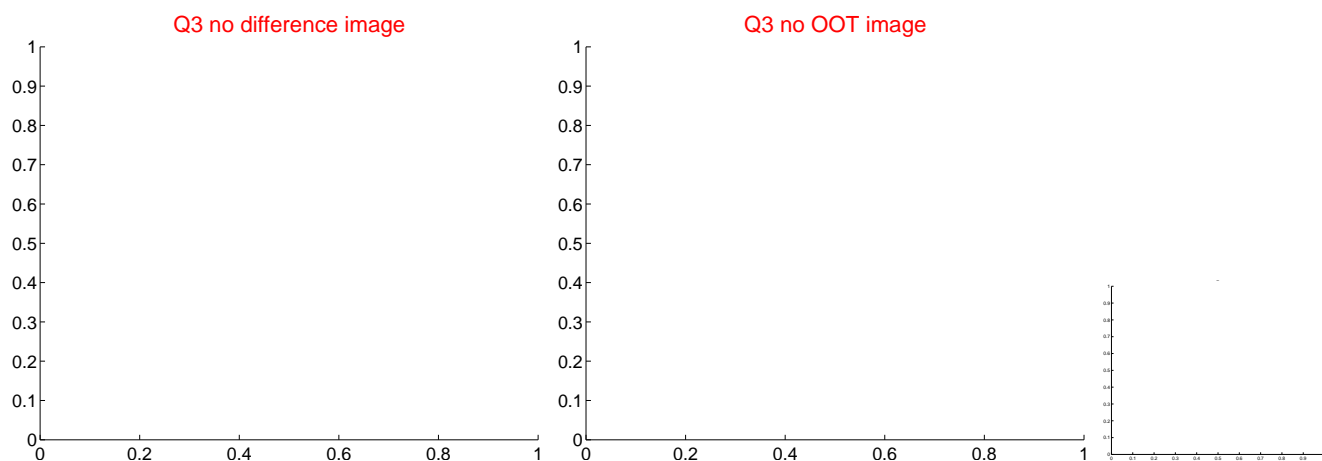
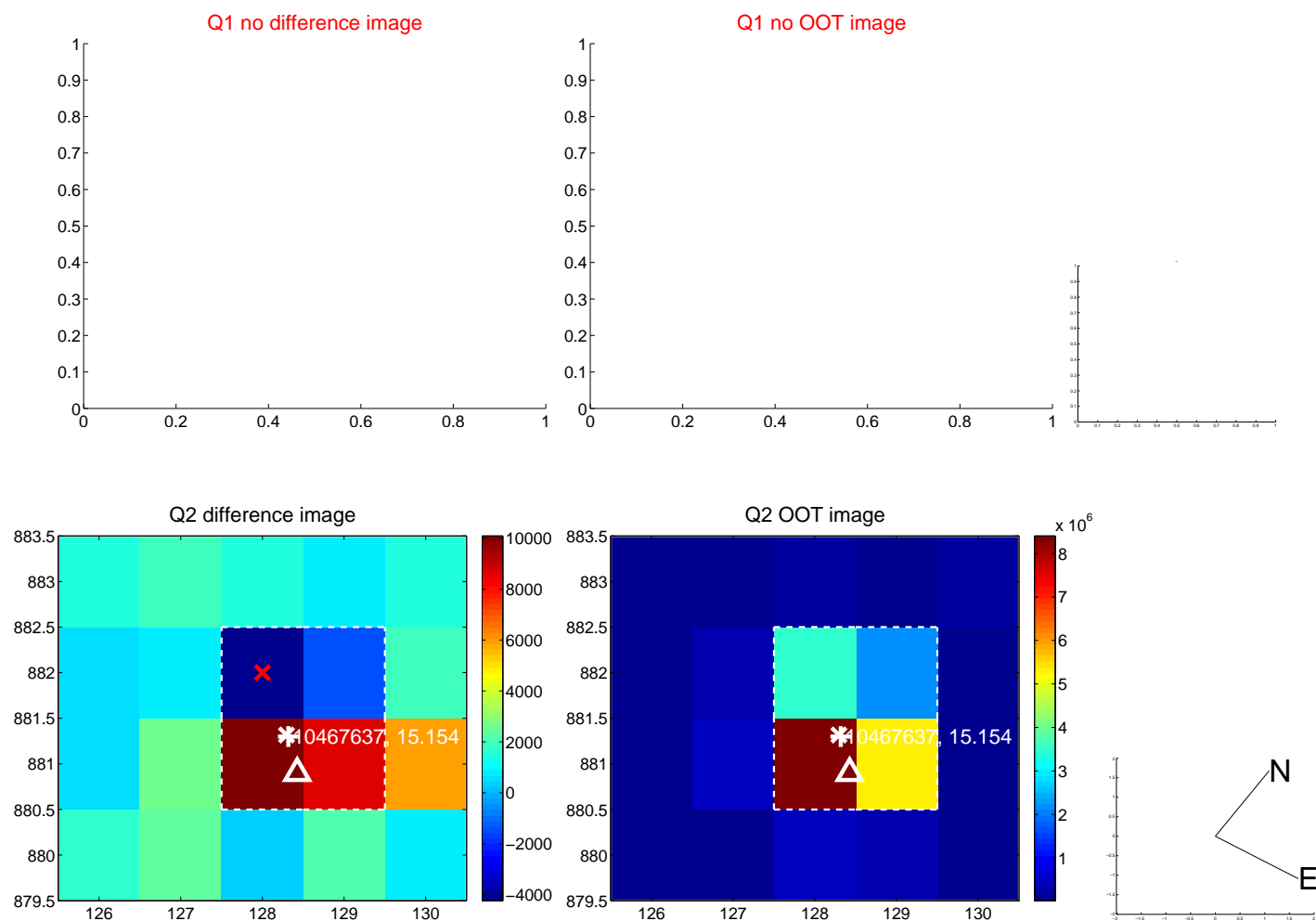
The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.160 \pm 2.146$	0.54	$0.961 \pm 1.625$	$-0.650 \pm 1.429$
PRF-fit source offset from KIC position	$1.261 \pm 1.287$	0.98	$1.080 \pm 0.965$	$-0.652 \pm 0.895$
photometric centroid source offset	$2.52 \pm 2.01$	1.26	$2.18 \pm 2.07$	$1.28 \pm 1.81$



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.

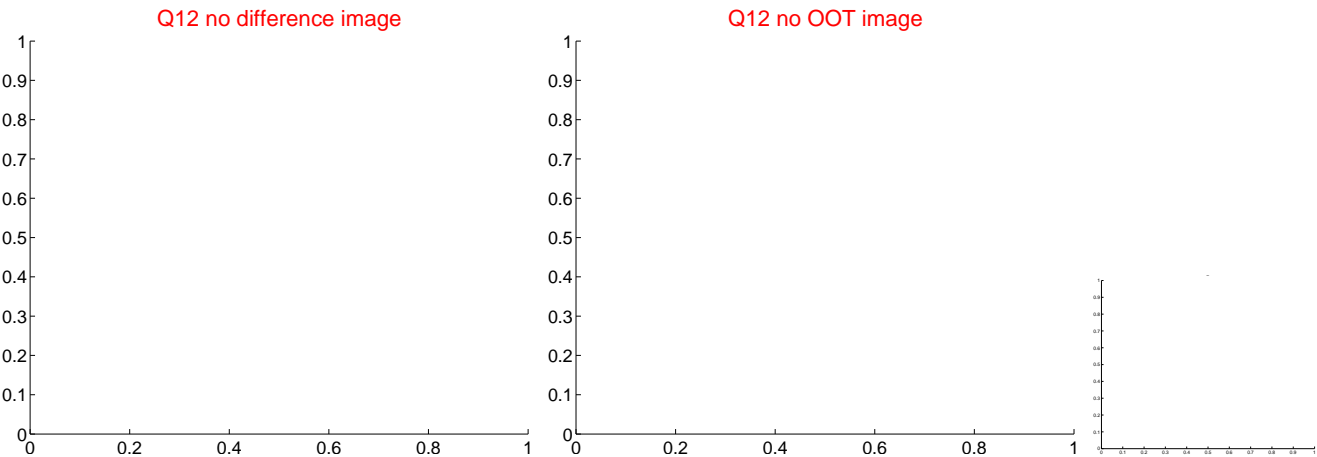
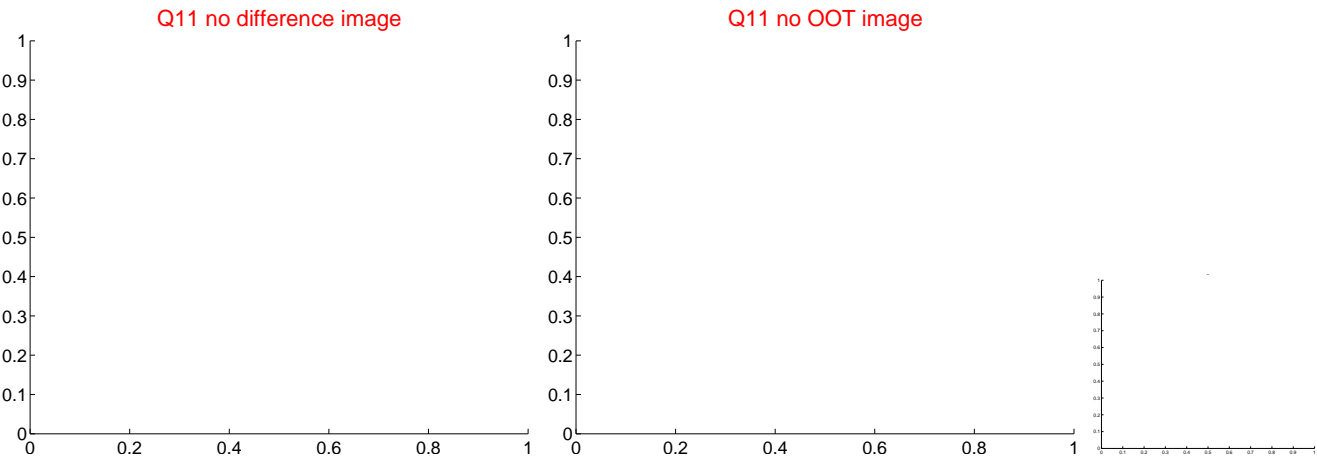
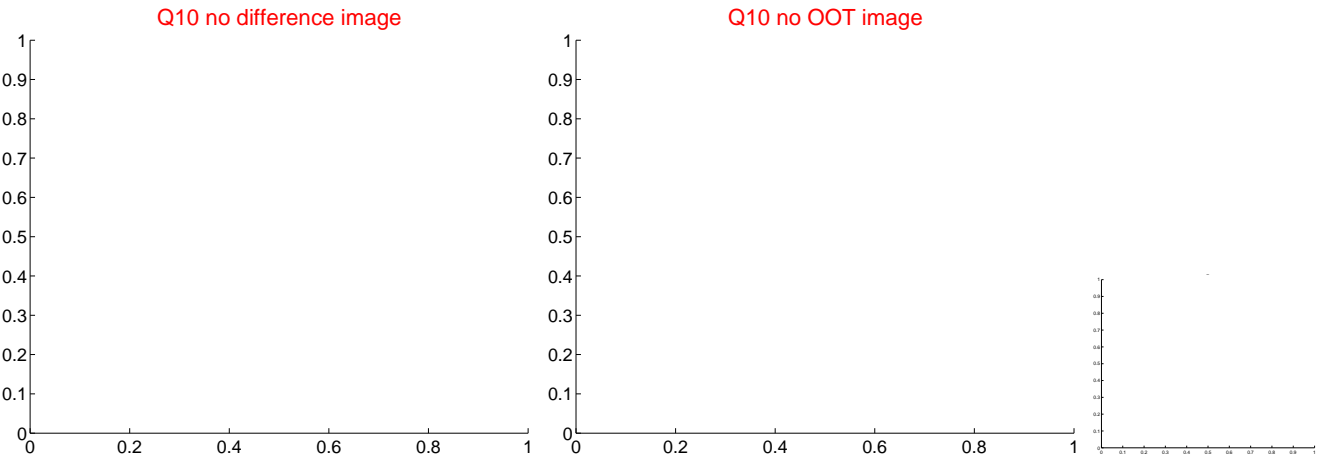
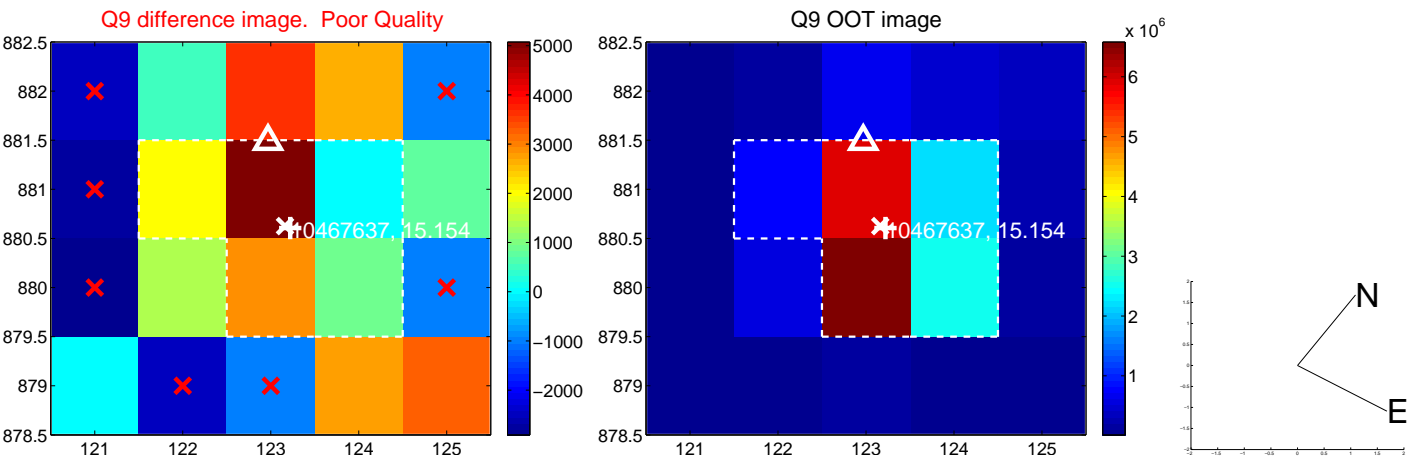
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



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



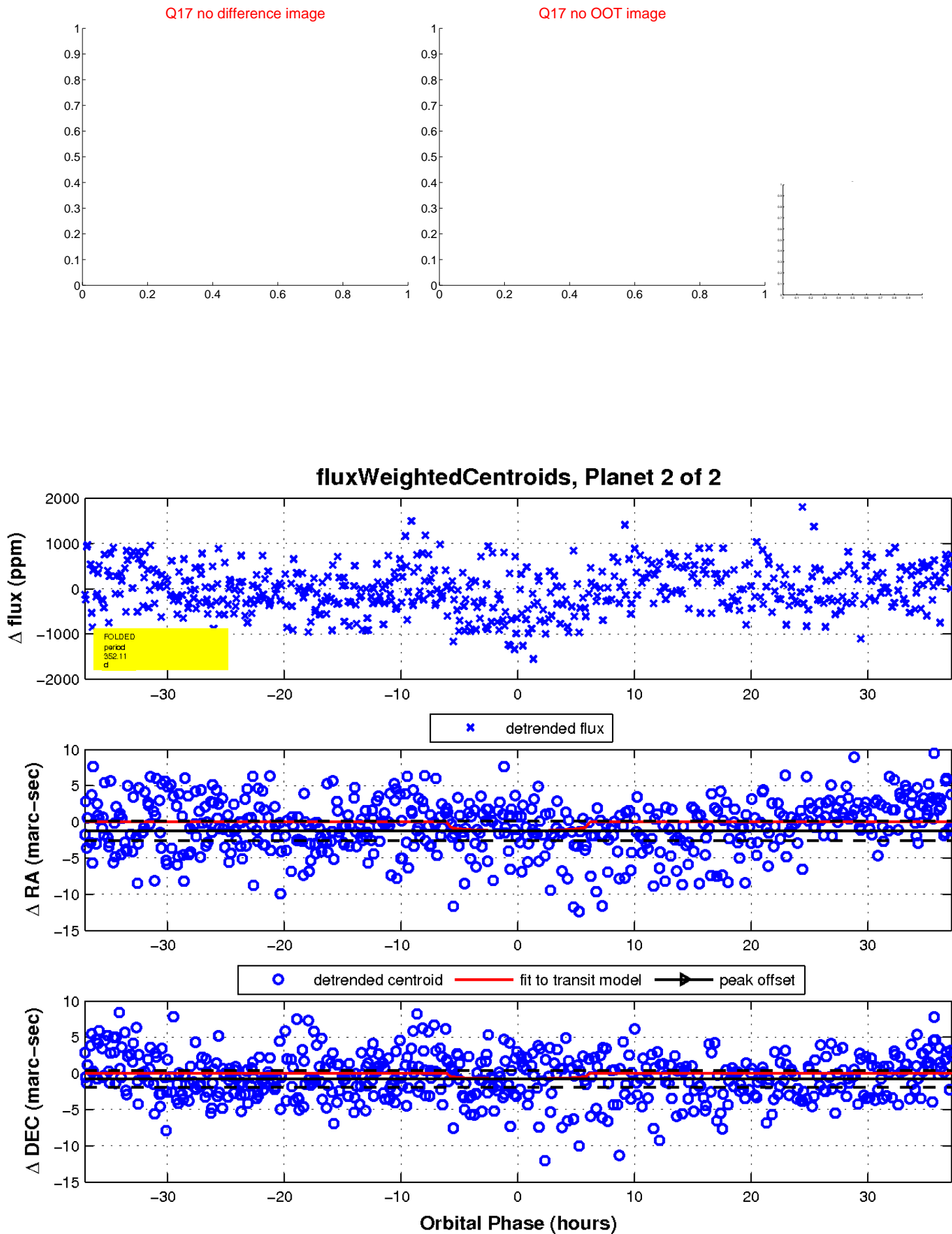
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

