

# KIC 011823661

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011823661-01	OBS	No	285.729371	321.383635	22.6	6.890	32.7	1.2	2.56	8540	1.34	29.53
011823661-02	OBS	No	485.843469	254.756706	220.4	4.776	9.4	7.8	2.56	8540	4.62	14.55

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011823661-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
011823661-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED

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

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

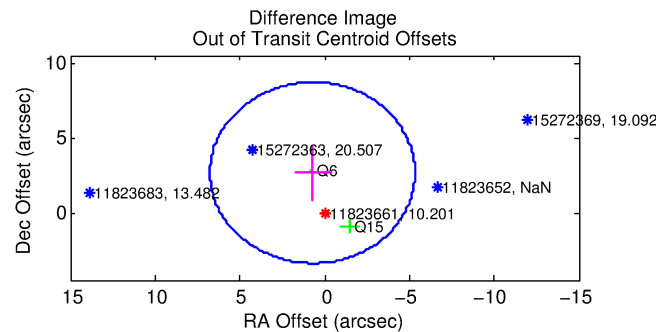
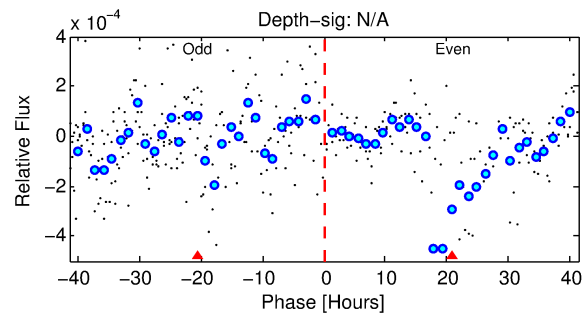
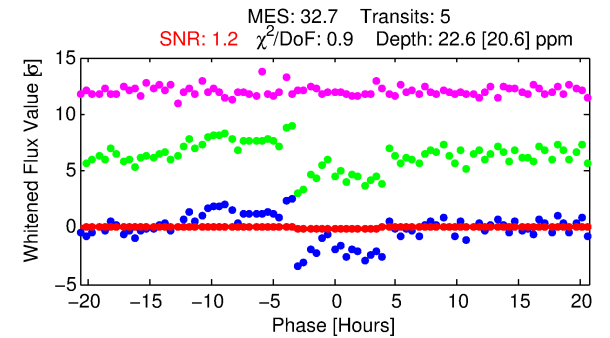
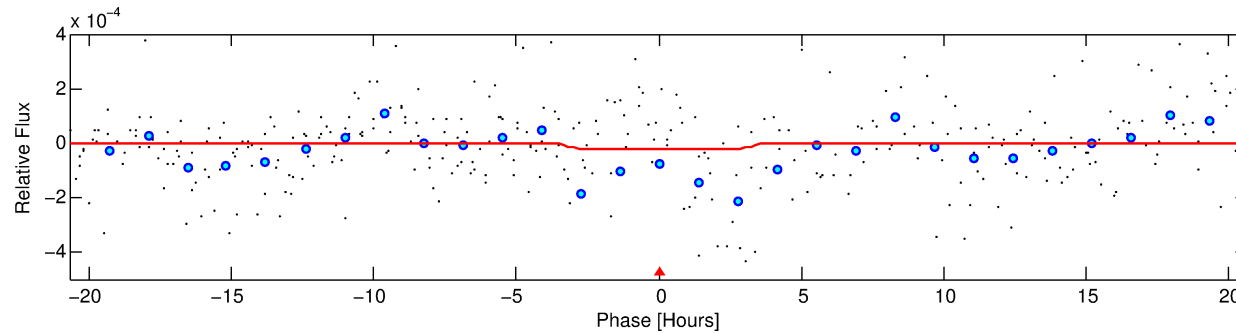
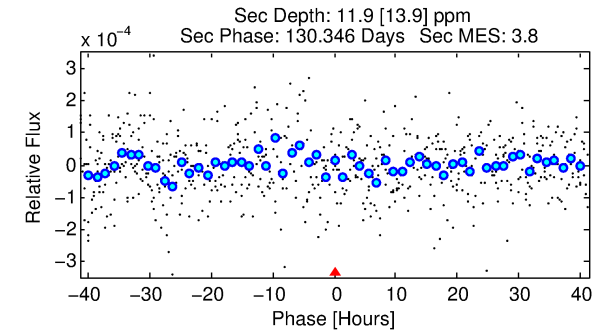
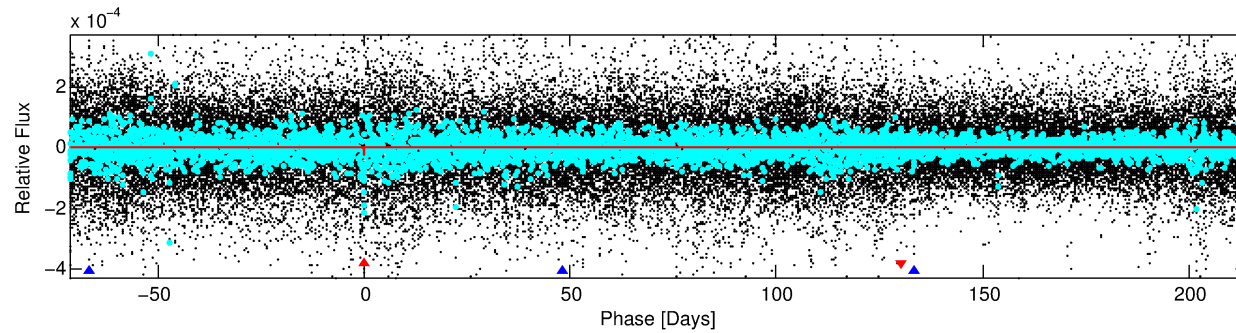
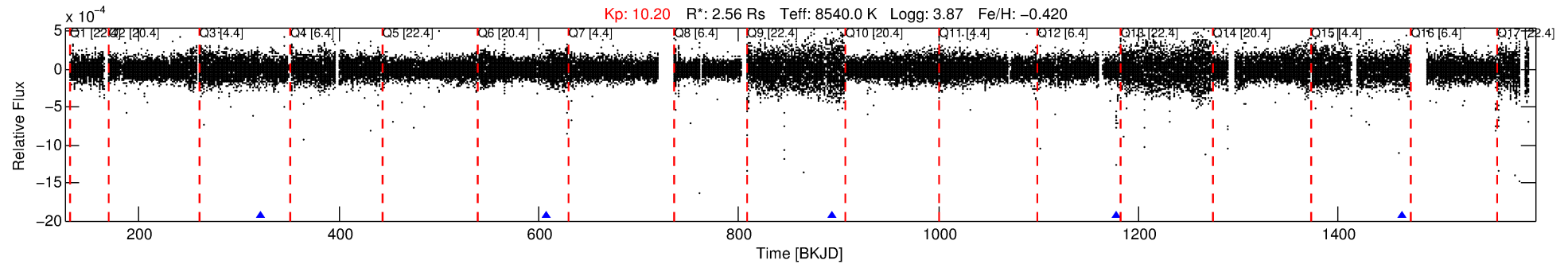
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 011823661-01

No Significant Match Found

# DV One-Page Summary

KIC: 11823661 Candidate: 1 of 2 Period: 285.729 d



## DV Fit Results:

Period = 285.72937 [0.03450] d  
Epoch = 321.3836 [0.1105] BKJD  
Rp/R\* = 0.0048 [0.0218]  
a/R\* = 190.93 [5419.24]  
b = 0.80 [12.77]  
Seff = 29.53 [10.94]  
Teq = 594 [55] K  
Rp = 1.34 [6.09] Re  
a = 1.0284 [0.2372] AU  
Ag = 3819.44 [34864.82] [0.11σ]  
Teffp = 7225 [16475] K [0.40σ]

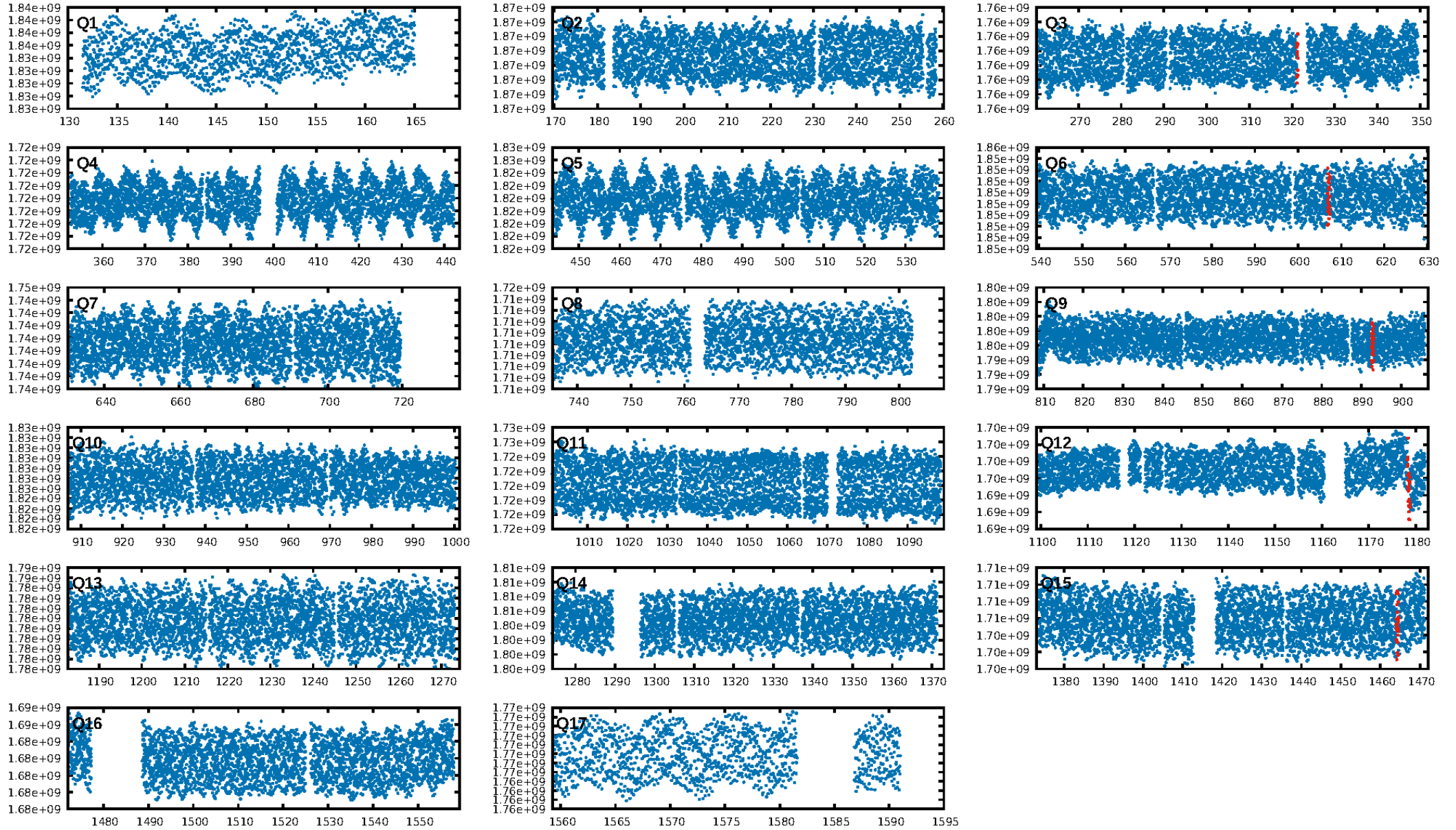
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [572.90σ]  
ModelChiSquare2-sig: 55.5%  
ModelChiSquareGof-sig: 99.9%  
Bootstrap-pfa: 7.06e-64  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: 0.8146  
Centroid-sig: 0.0%  
Centroid-so: 24.585 arcsec [2.54σ]  
OotOffset-rm: 2.751 arcsec [1.37σ]  
KicOffset-rm: 3.454 arcsec [1.10σ]  
OotOffset-st: 1/1/0/0 [2]  
KicOffset-st: 1/1/0/0 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 1.00 [3/3]

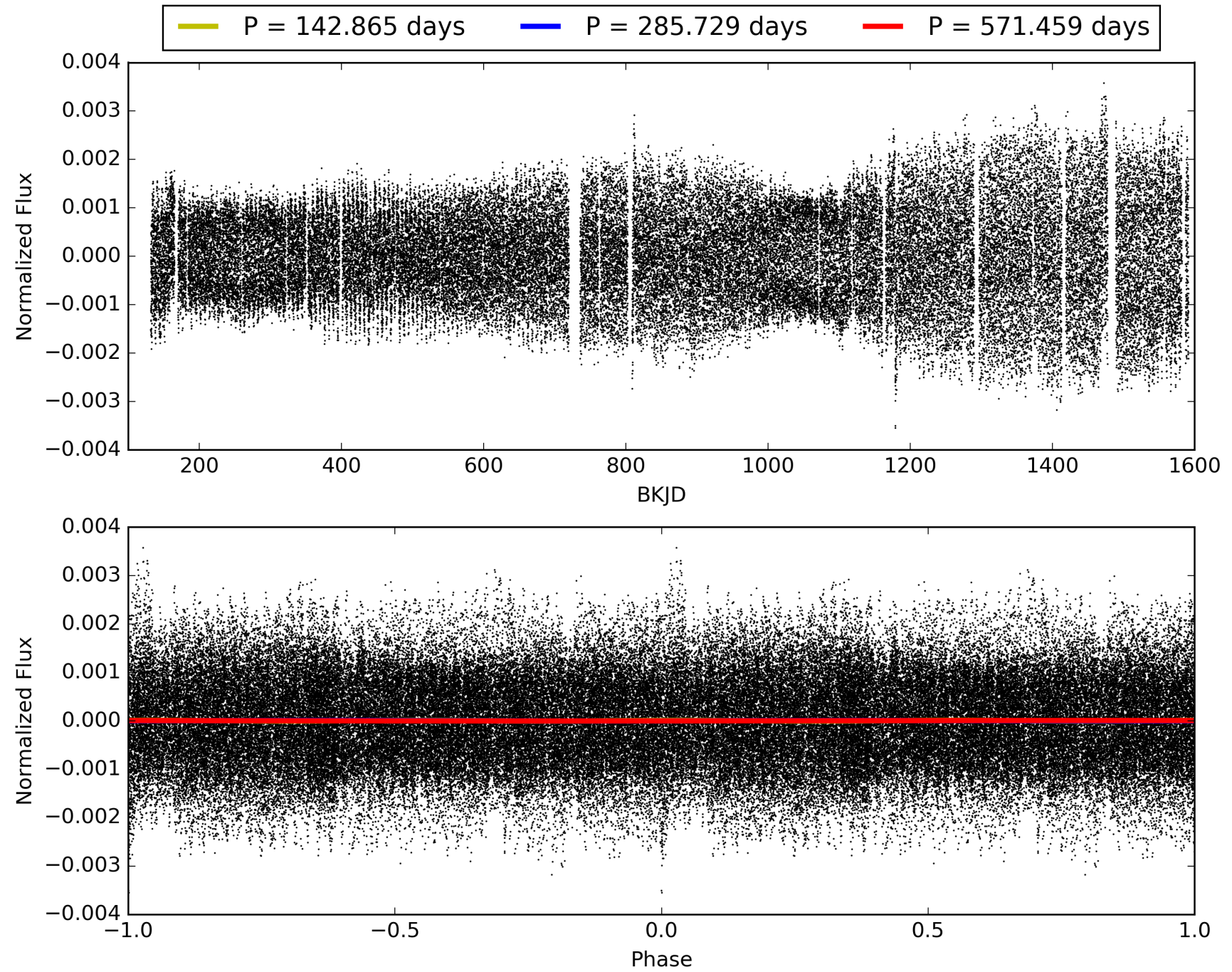
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 02:42:28 Z

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

# TCE 011823661-01, PDC Light Curves

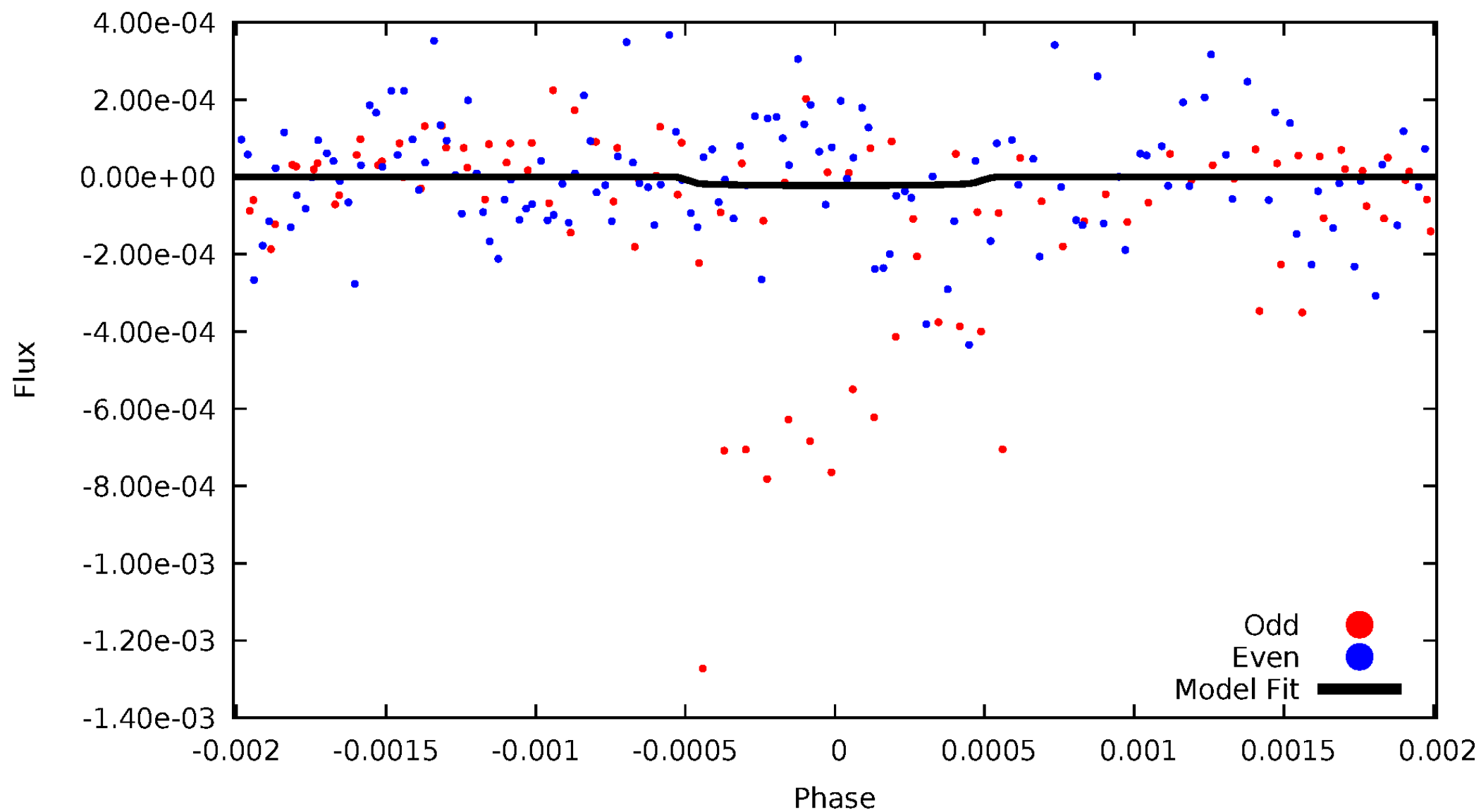


# TCE 011823661-01



# DV Odd/Even

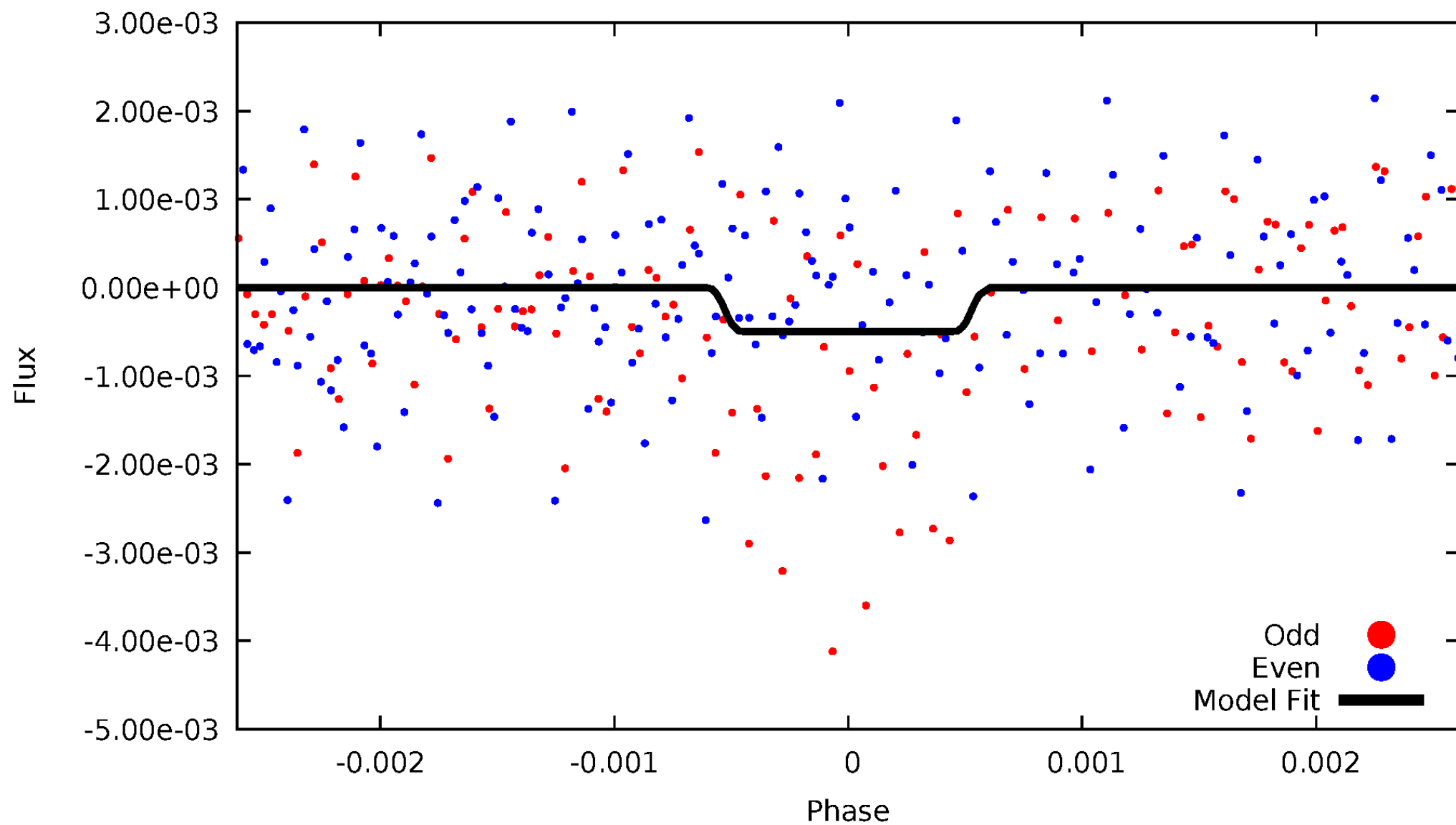
TCE 011823661-01





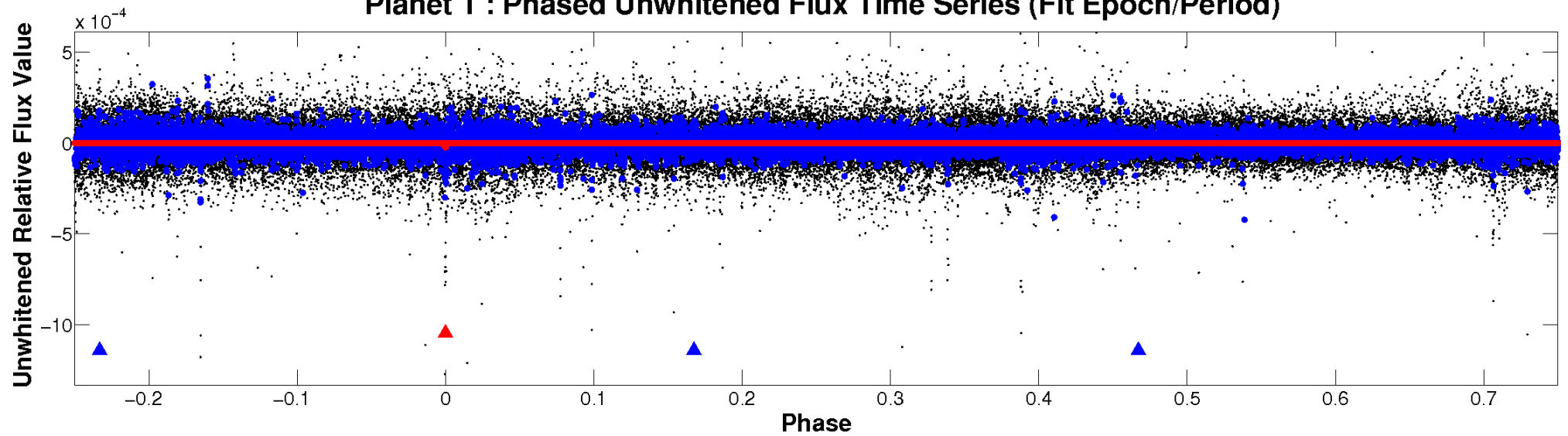
# ALT Odd/Even

TCE 011823661-01

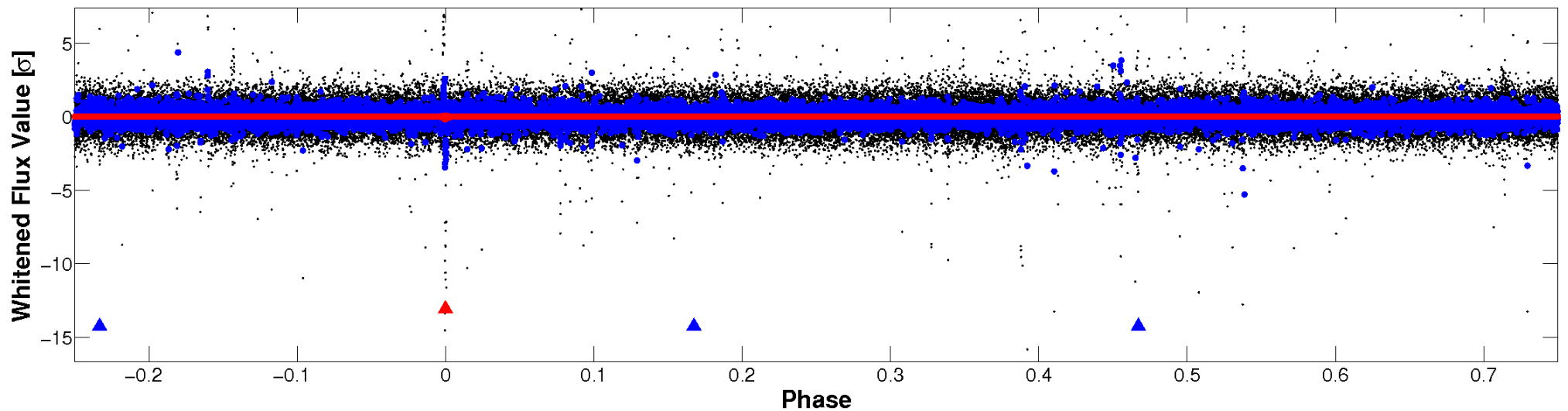


# Non-Whitened Vs. Whitened Light Curve

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

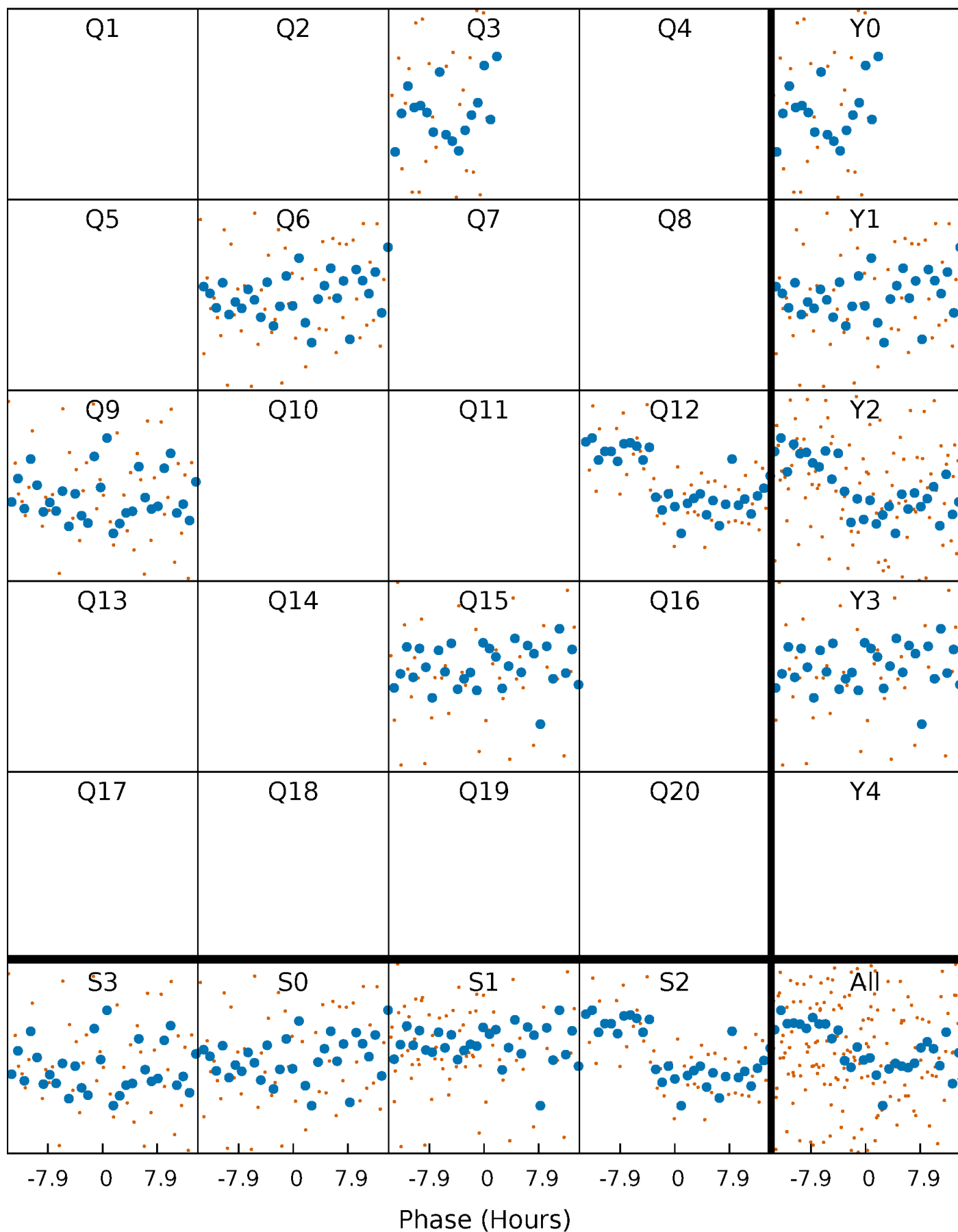


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

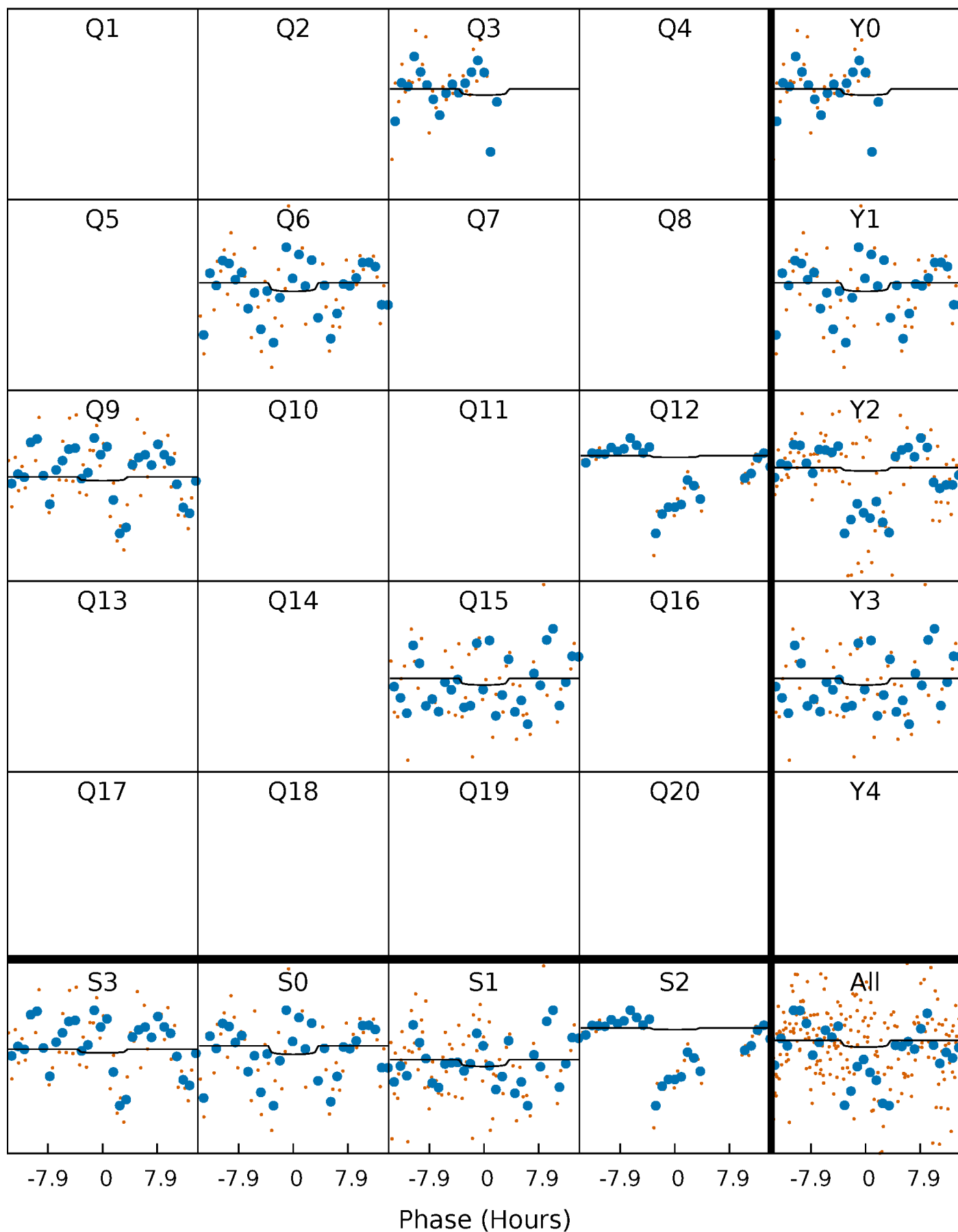
TCE 011823661-01 P=285.729371 Days  $T_0=321.383635$  (BKJD)





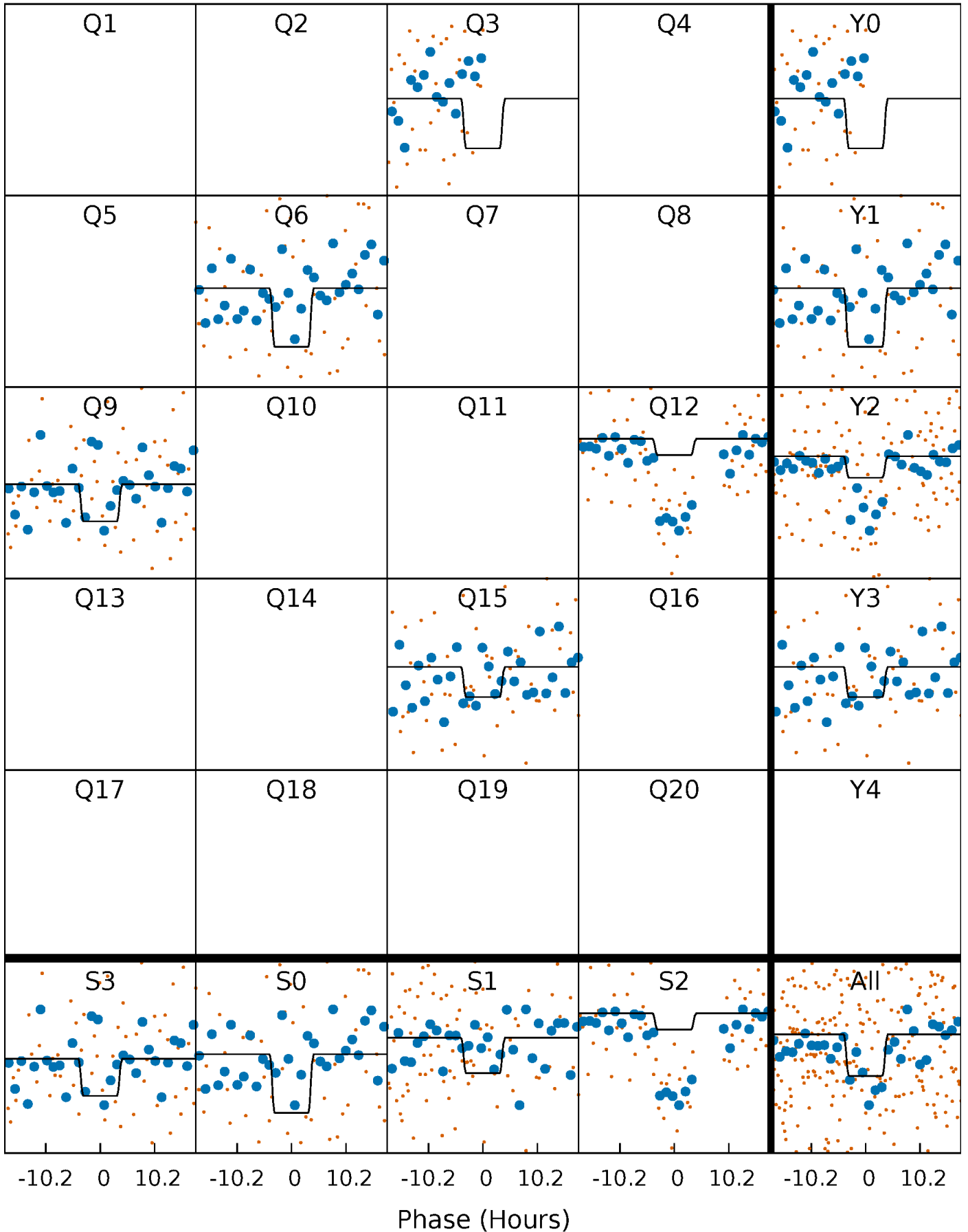
# DV Quarter-Phased Transit Curves

TCE 011823661-01 P=285.729371 Days  $T_0=321.383635$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

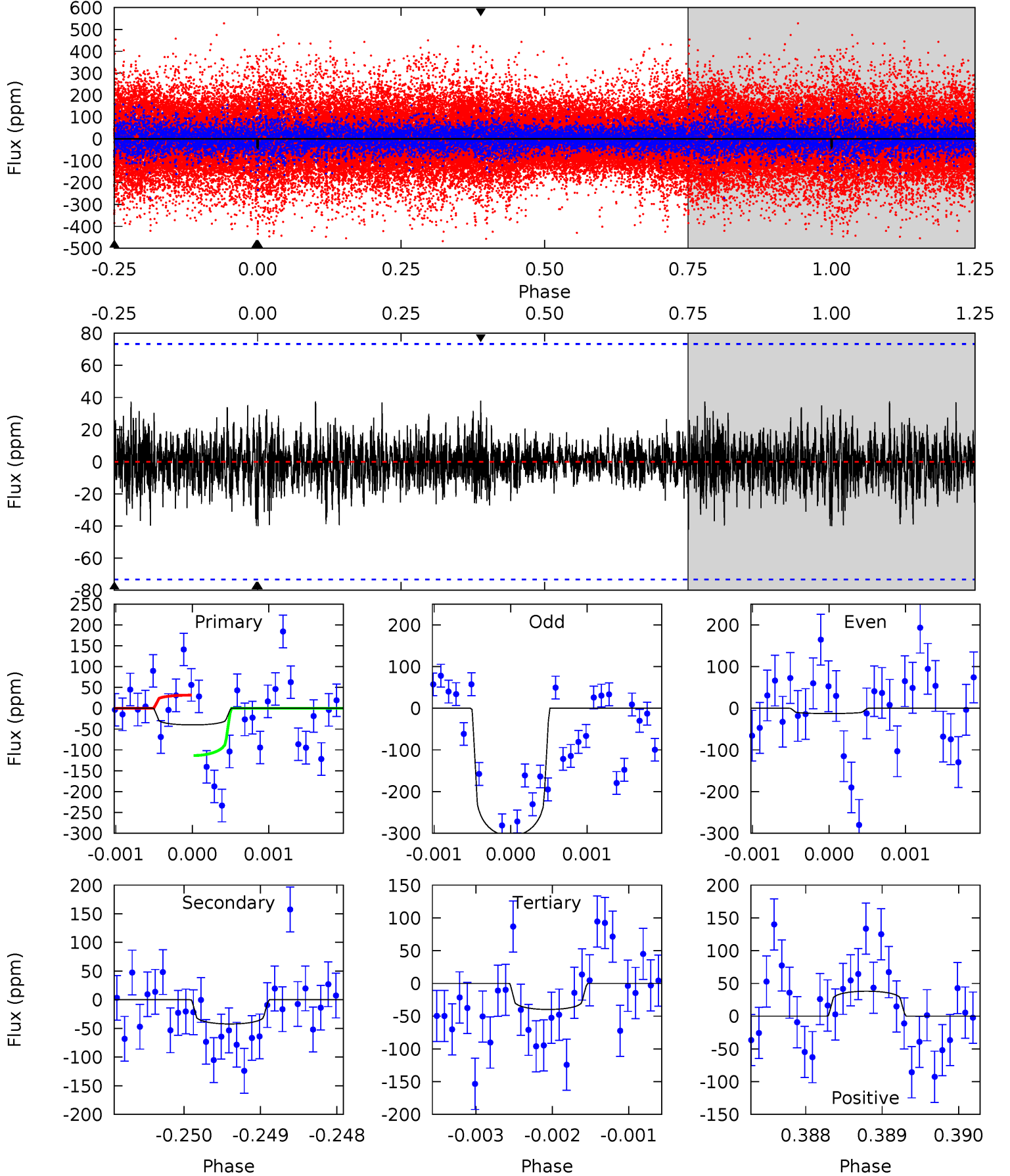
TCE 011823661-01 P=285.715658 Days  $T_0=321.440501$  (BKJD)



# DV Model-Shift Uniqueness Test

011823661-01, P = 285.729371 Days, E = 35.654264 Days

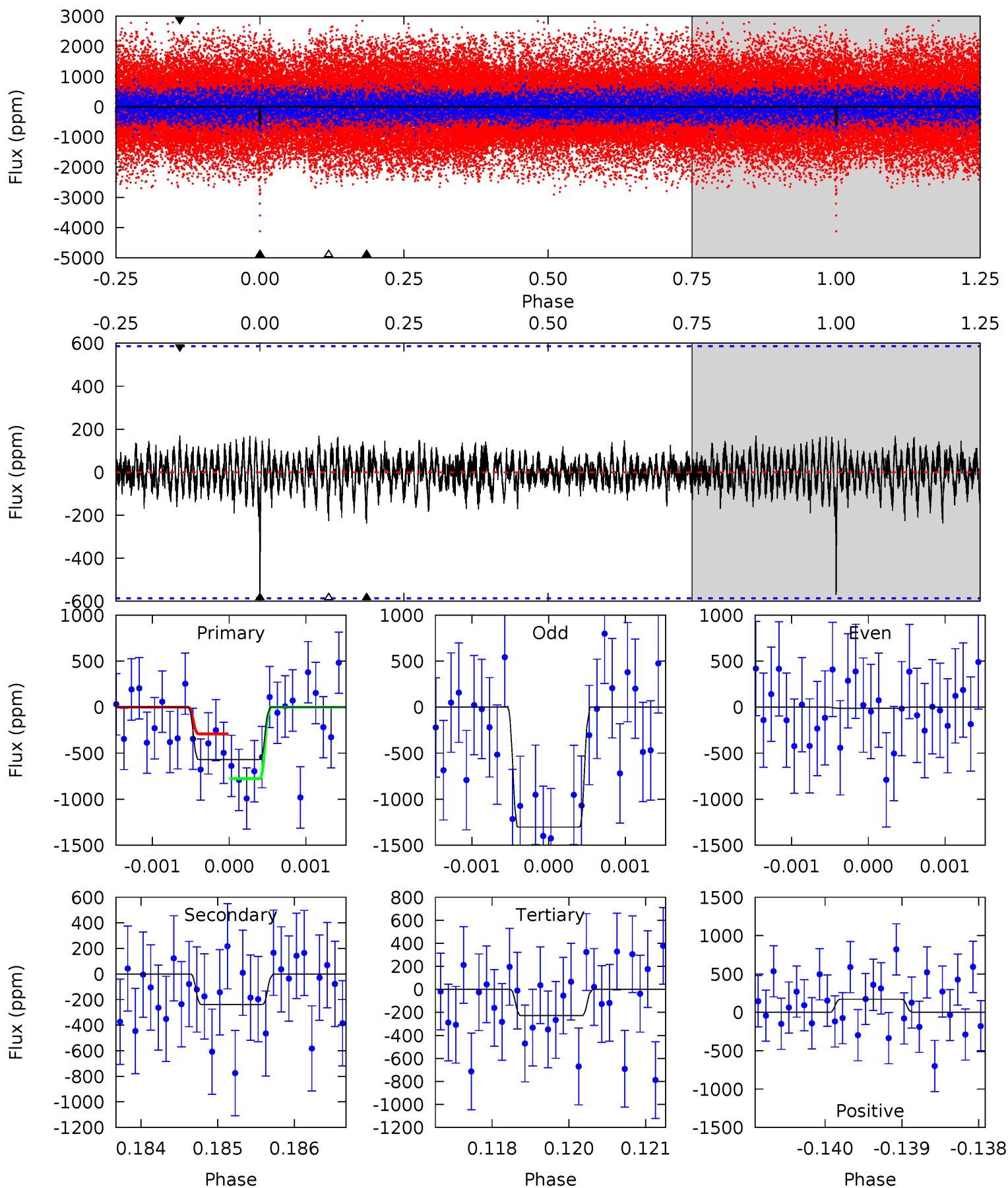
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.97	3.14	2.96	2.83	5.44	3.28	0.75	0.01	0.15	0.17	0.31	11.6	6.00	0.47	3.05



# Alt Model-Shift Uniqueness Test

011823661-01,  $P = 285.715658$  Days,  $E = 35.724843$  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
5.27	2.21	2.11	1.58	5.43	3.26	0.53	3.16	3.69	0.10	0.63	6.01	9.32	0.23	2.22



### Stellar Parameters For KIC 011823661

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$8540^{+76}_{-85}$	$3.871^{+0.216}_{-0.054}$	$-0.420^{+0.050}_{-0.200}$	$2.560^{+0.205}_{-0.616}$	$1.777^{+0.050}_{-0.176}$	$0.149^{+0.170}_{-0.031}$
	+1%/-1%	+6%/-1%	+12%/-48%	+8%/-24%	+3%/-10%	+114%/-21%
Source	SPE68	SPE68	SPE68	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 011823661-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-42 \pm 13$	$4.39^{+4.79}_{-3.12}$	$823^{+24}_{-54}$	$5176^{+5391}_{-1331}$	$1275^{+13662}_{-1016}$
Alt.	$-238 \pm 108$	$6.81^{+5.36}_{-4.39}$	$820^{+27}_{-53}$	$6238^{+6453}_{-1545}$	$2810^{+20966}_{-2062}$

$T_{max}$  = 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

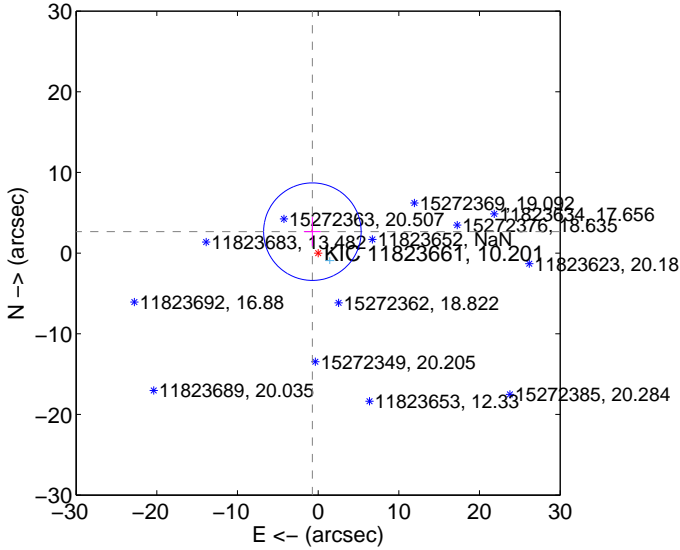
Supplemental centroid analysis for 011823661-01. **Kepler magnitude: 10.20.** Transit SNR 1.16

**There are 1 quarters with good PRF difference image offsets**

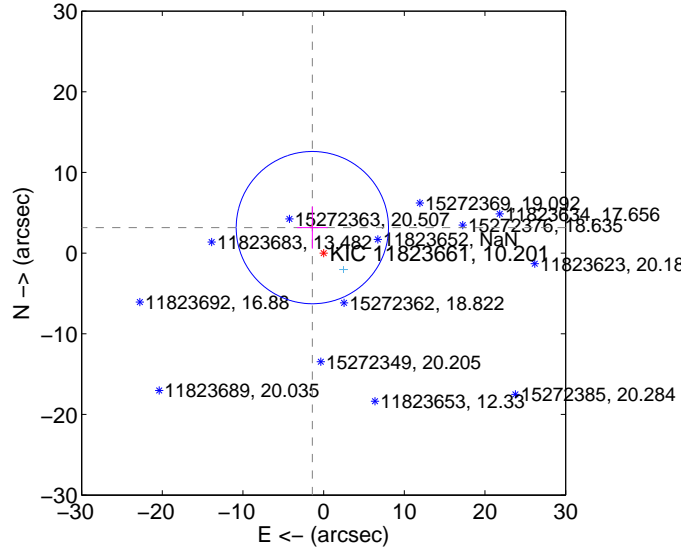
The direct PRF centroid is offset from the target star catalog position by about 1.51 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.751 \pm 2.015$	1.37	$0.715 \pm 1.049$	$2.657 \pm 1.805$
PRF-fit source offset from KIC position	$3.454 \pm 3.146$	1.10	$1.398 \pm 1.882$	$3.159 \pm 2.608$
photometric centroid source offset	$24.58 \pm 9.69$	2.54	$2.50 \pm 10.43$	$24.46 \pm 9.68$

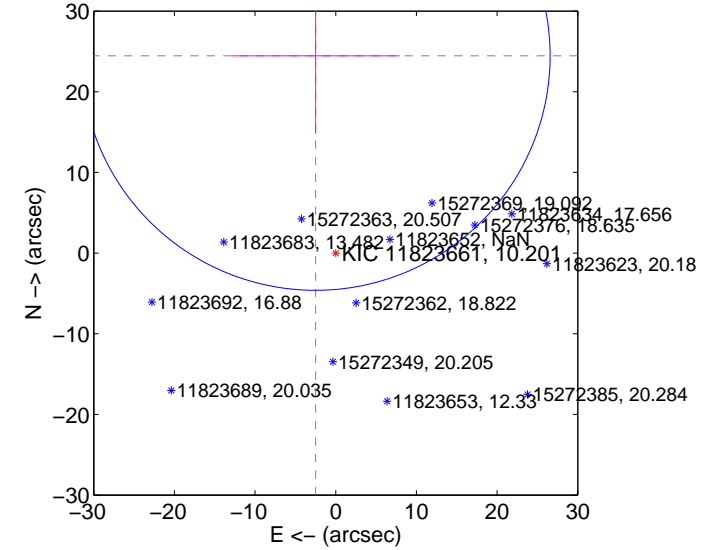
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids



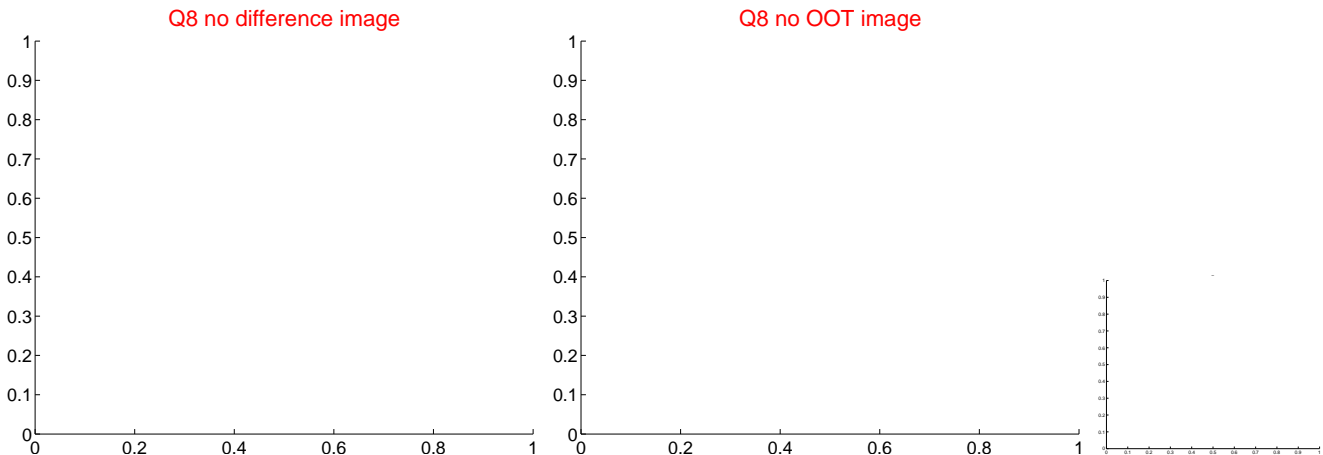
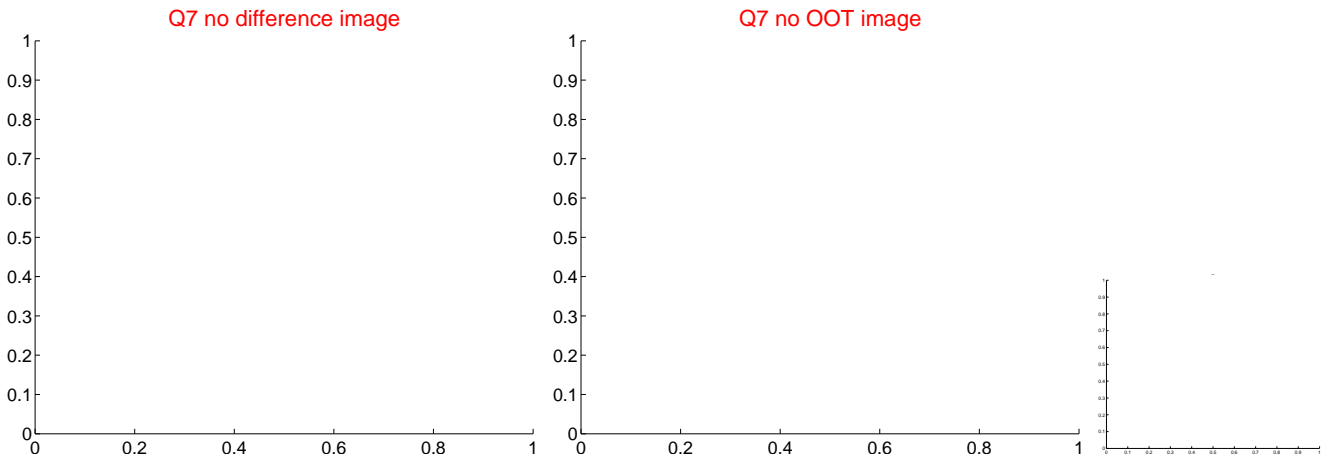
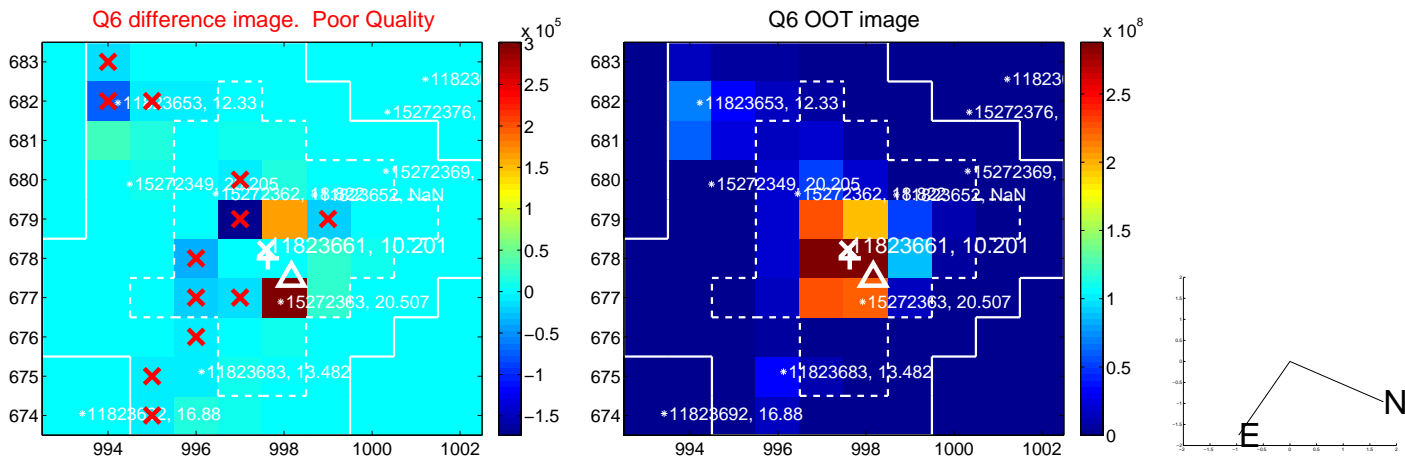
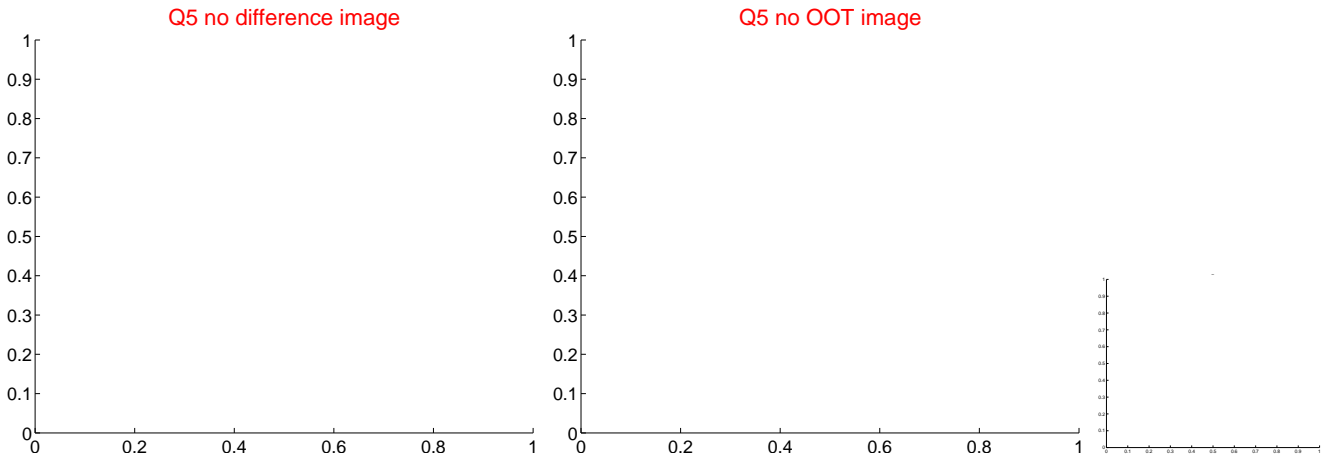
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



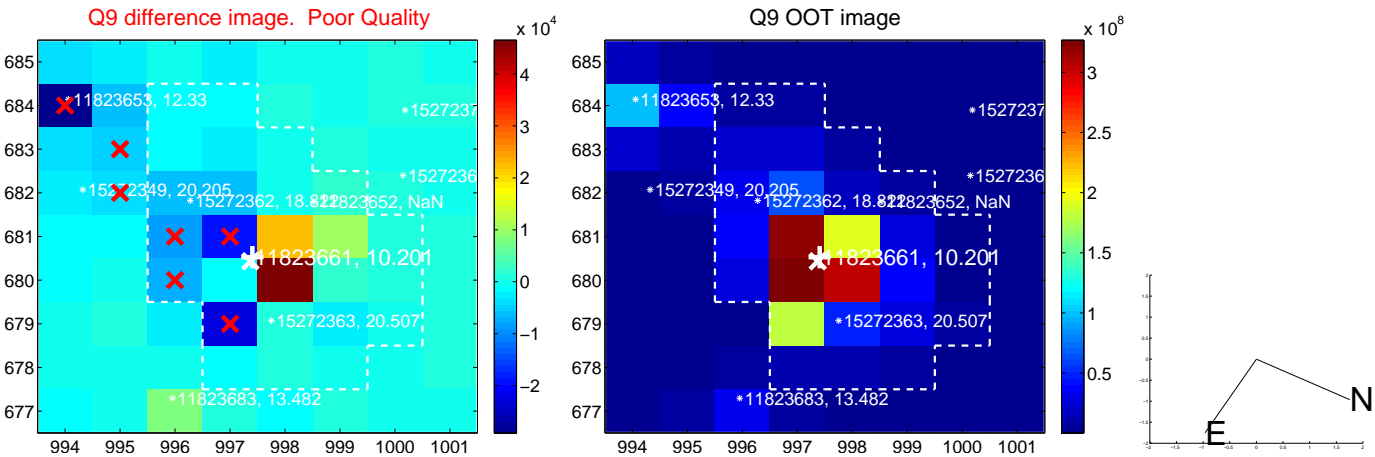
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



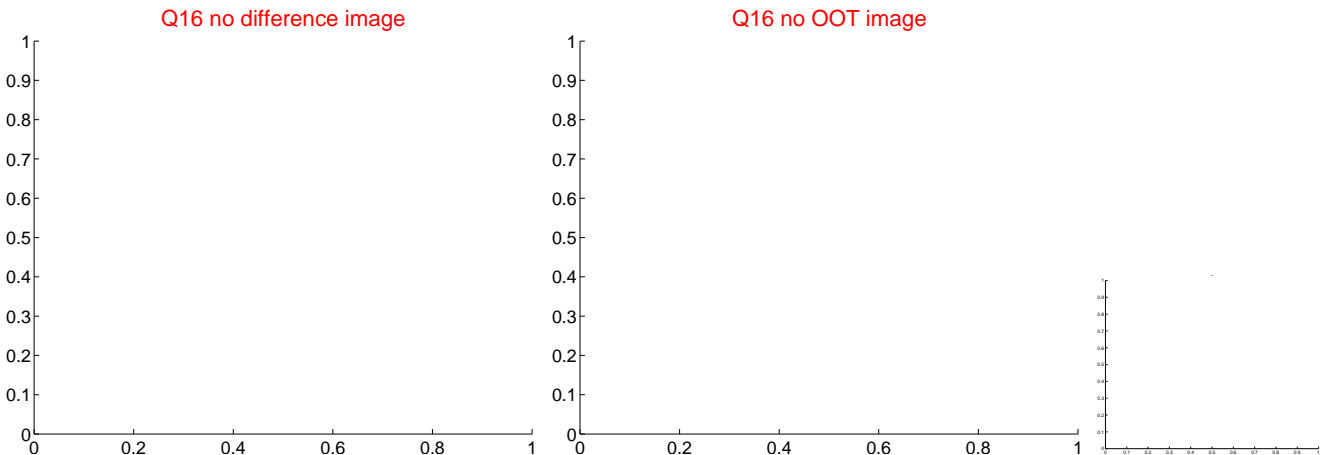
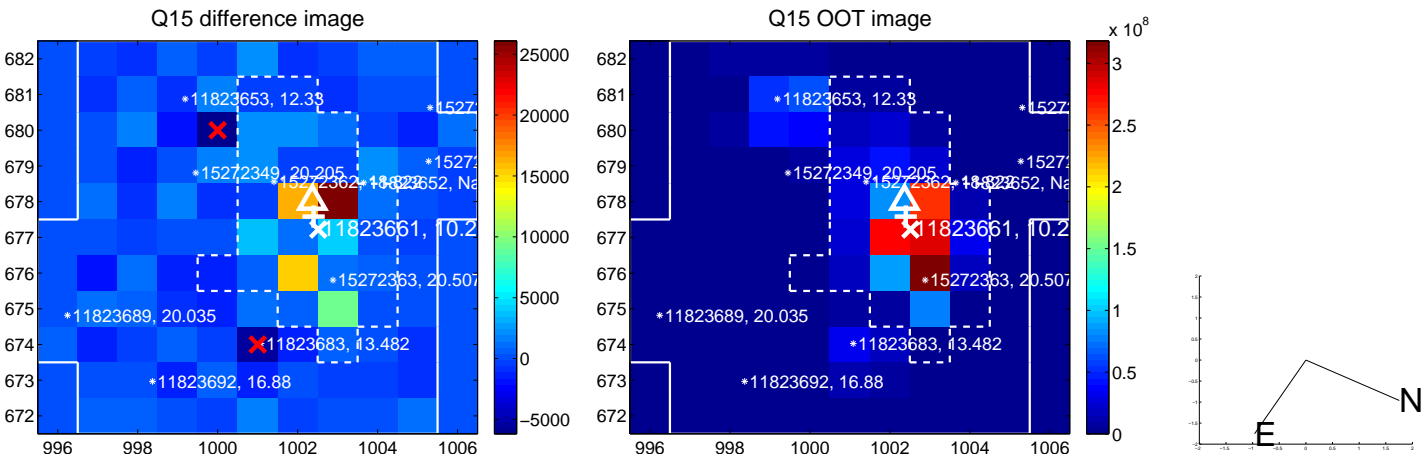
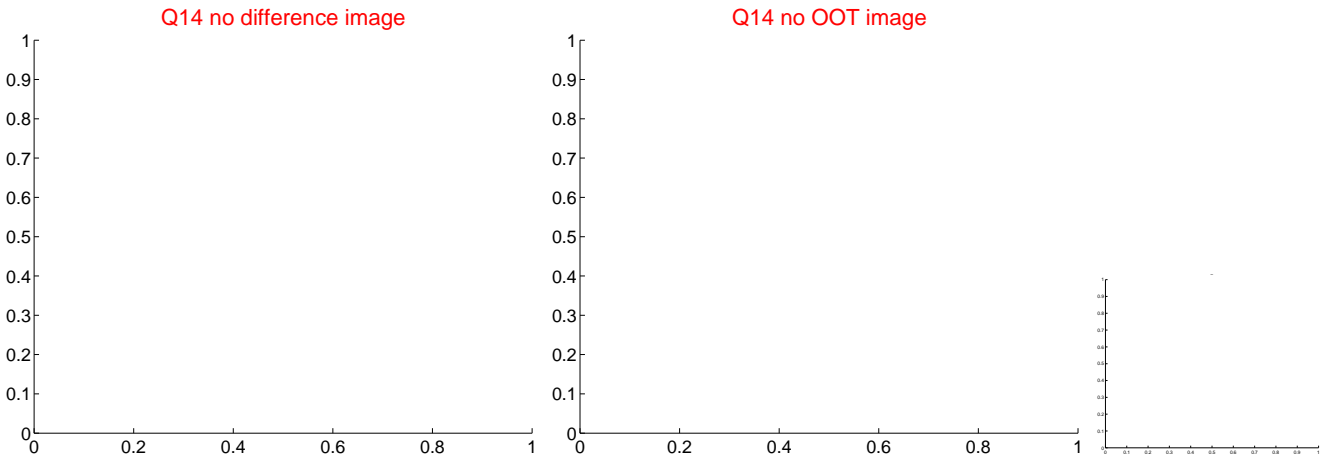
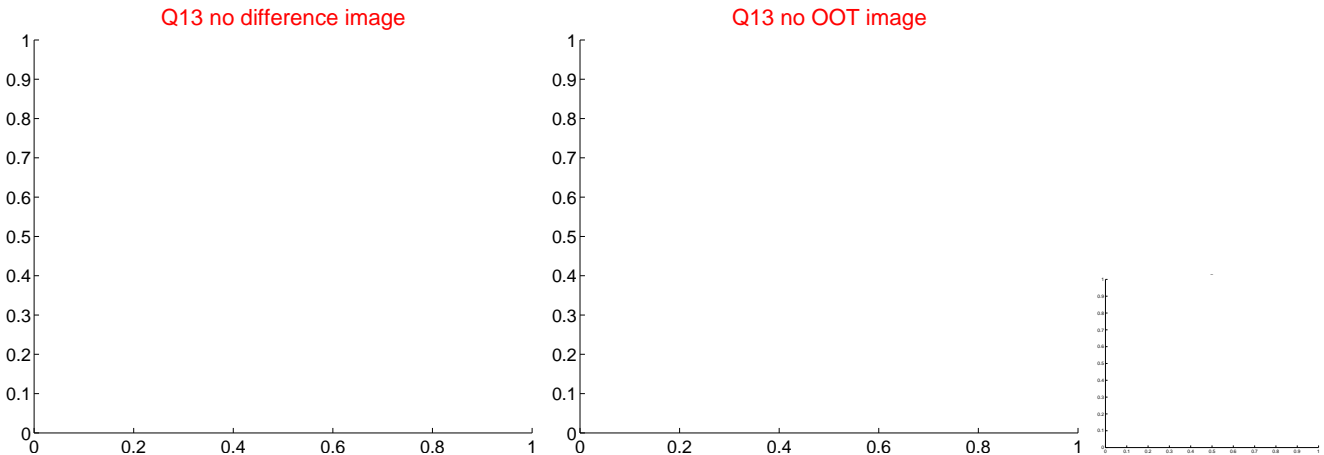
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



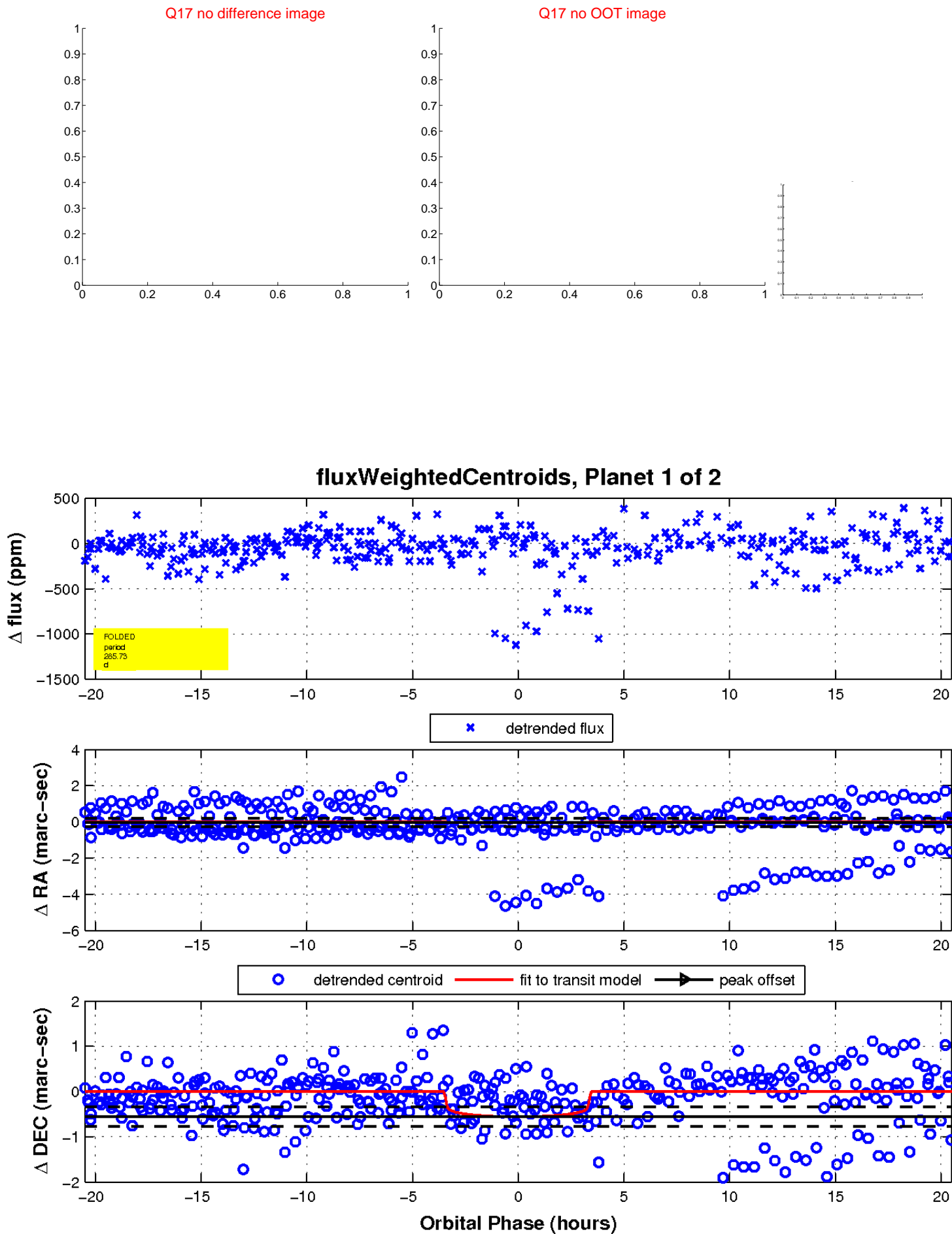
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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

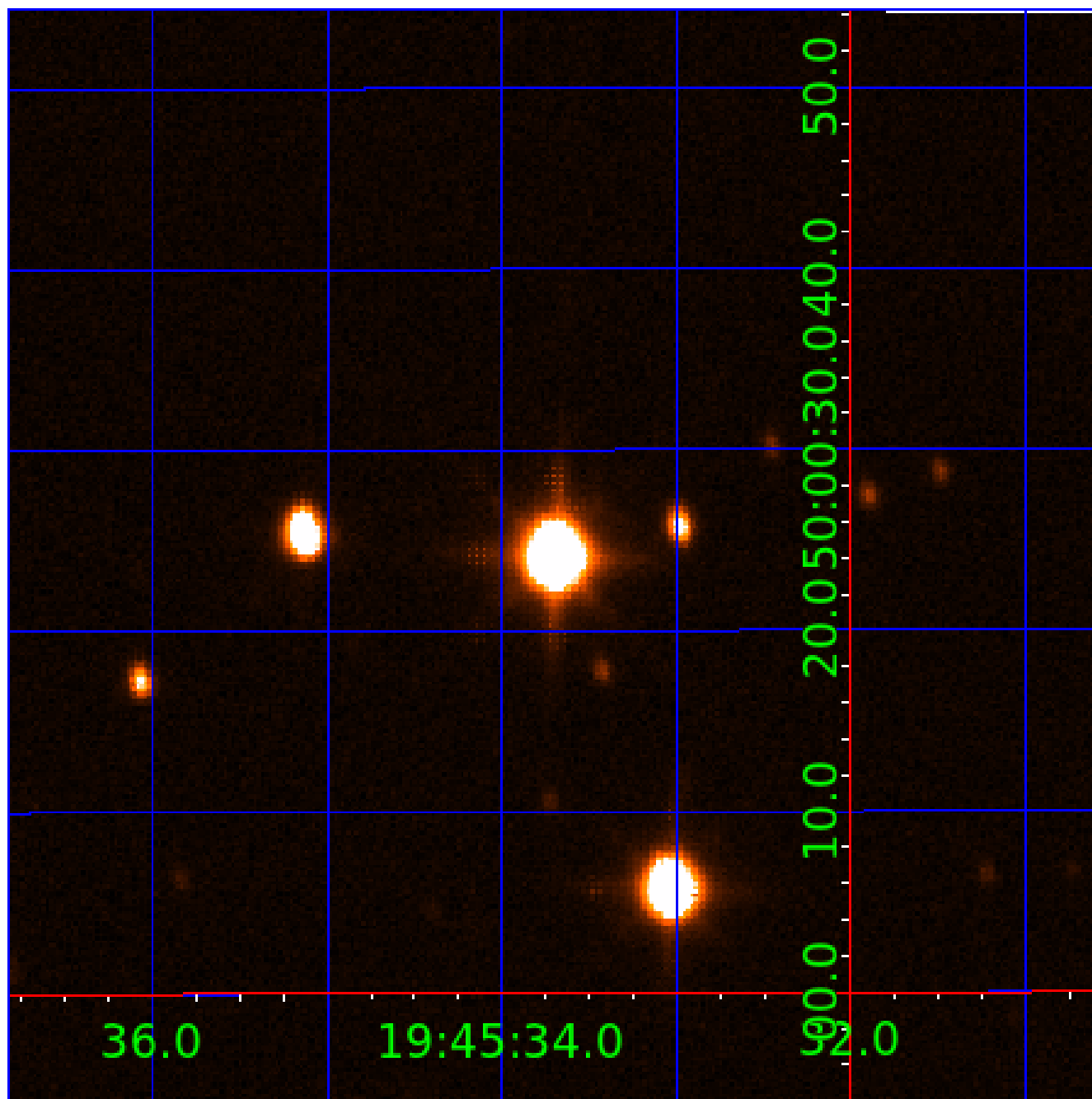


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 011823661

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011823661-01	OBS	No	285.729371	321.383635	22.6	6.890	32.7	1.2	2.56	8540	1.34	29.53
011823661-02	OBS	No	485.843469	254.756706	220.4	4.776	9.4	7.8	2.56	8540	4.62	14.55

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011823661-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
011823661-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED

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

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

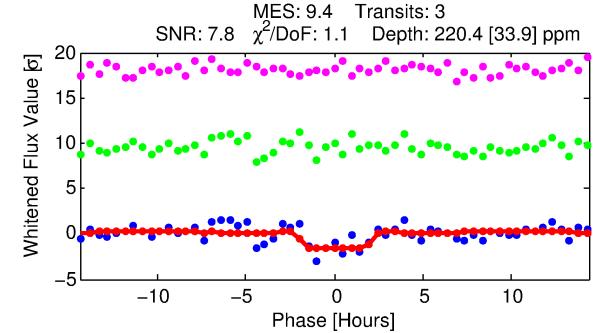
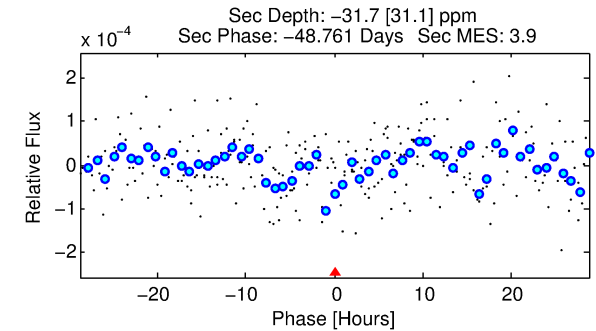
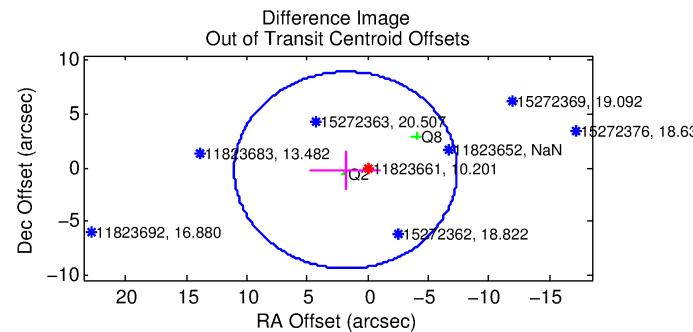
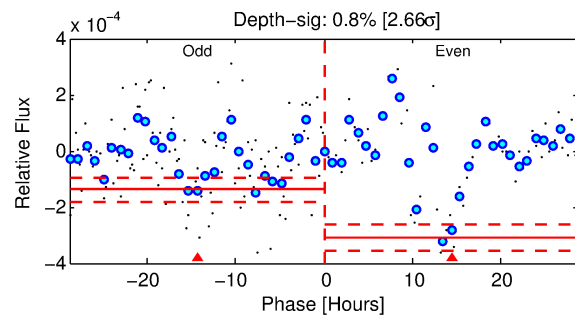
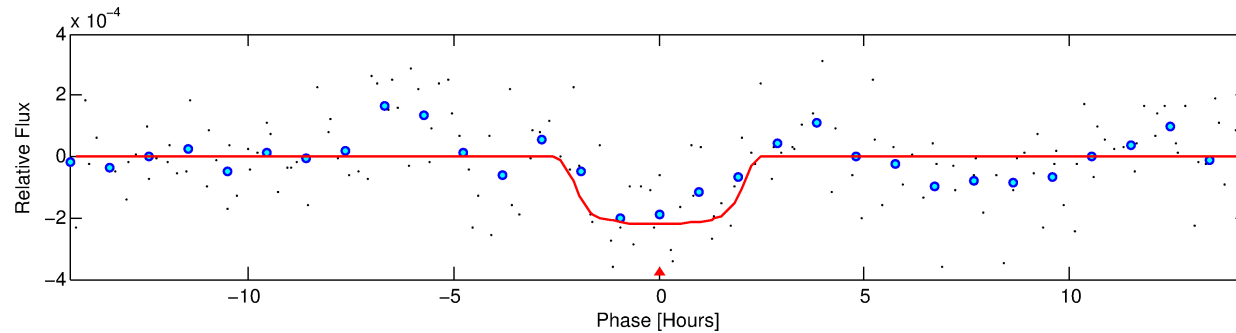
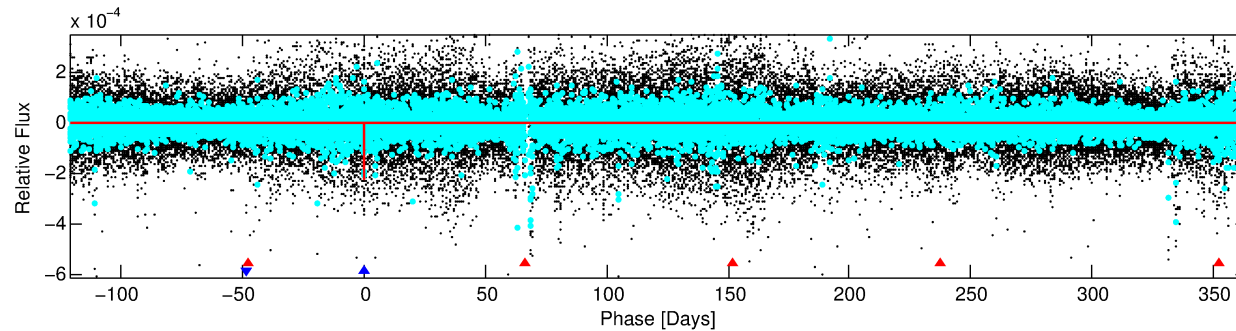
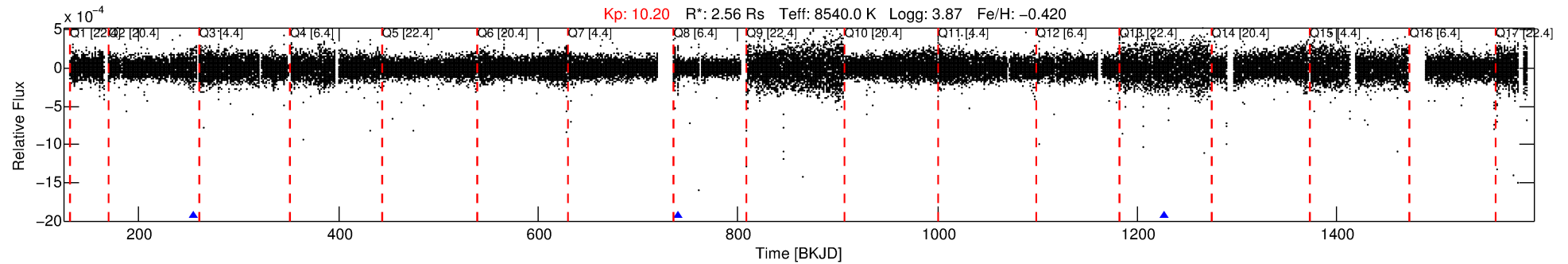
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 011823661-02

No Significant Match Found

# DV One-Page Summary

KIC: 11823661 Candidate: 2 of 2 Period: 485.843 d



## DV Fit Results:

Period = 485.84347 [0.00946] d  
Epoch = 254.7567 [0.0105] BKJD  
Rp/R\* = 0.0165 [0.0024]  
a/R\* = 282.06 [209.18]  
b = 0.95 [0.08]  
Seff = 14.55 [5.39]  
Teq = 498 [46] K  
Rp = 4.62 [1.29] Re  
a = 1.4651 [0.3380] AU  
Ag = N/A  
Teffp = N/A

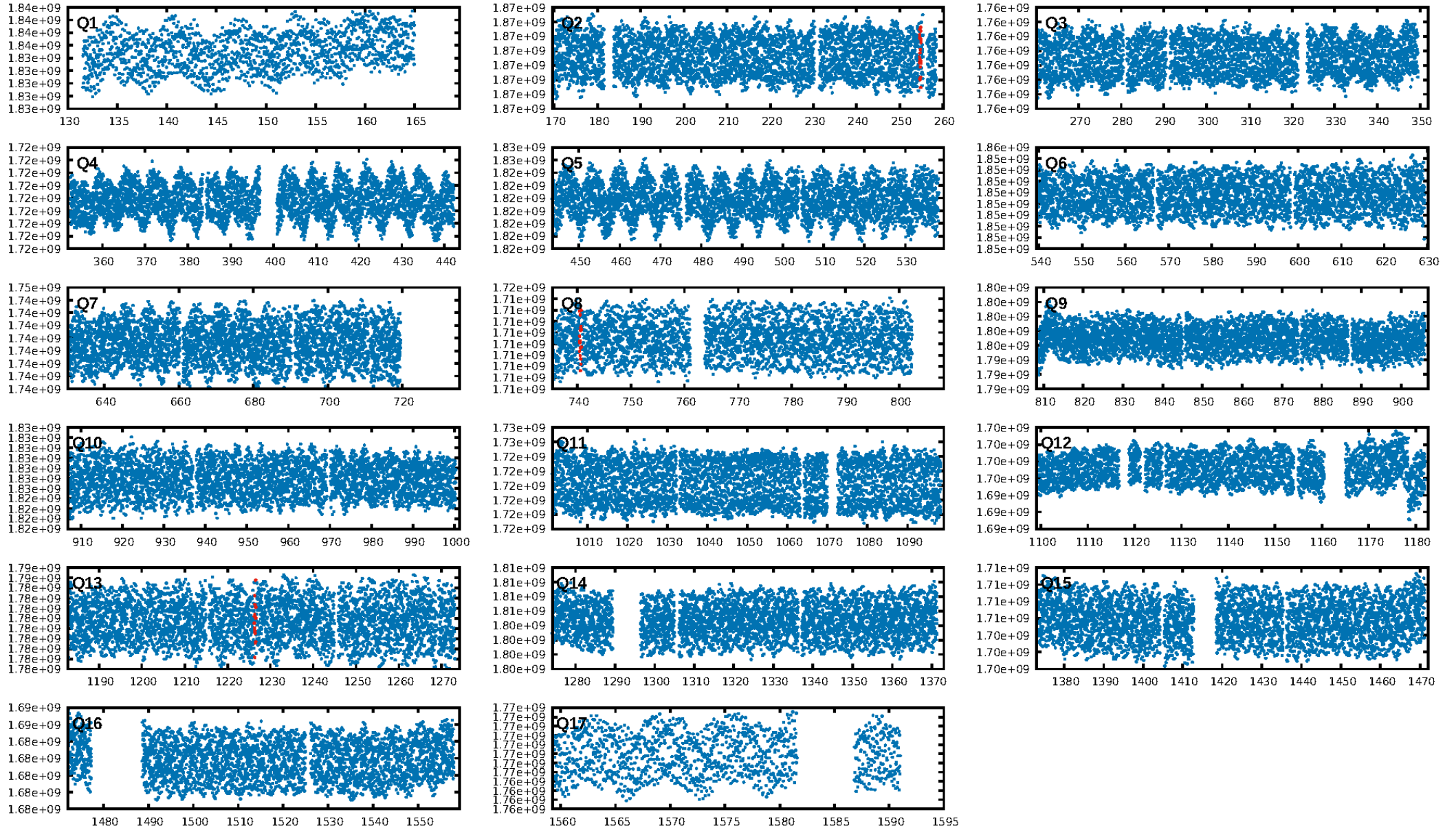
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [572.90 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 21.7%  
ModelChiSquareGof-sig: 98.0%  
**Bootstrap-pfa: 2.16e-09**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 15.42  
Centroid-sig: 93.1%  
Centroid-so: 0.734 arcsec [0.57 $\sigma$ ]  
OotOffset-rm: 1.847 arcsec [0.60 $\sigma$ ]  
KicOffset-rm: 2.586 arcsec [1.68 $\sigma$ ]  
OotOffset-st: 1/0/1/0 [2]  
KicOffset-st: 1/0/1/0 [2]  
DiffImageQuality-fgm: 0.00 [0/2]  
DiffImageOverlap-fno: 1.00 [2/2]

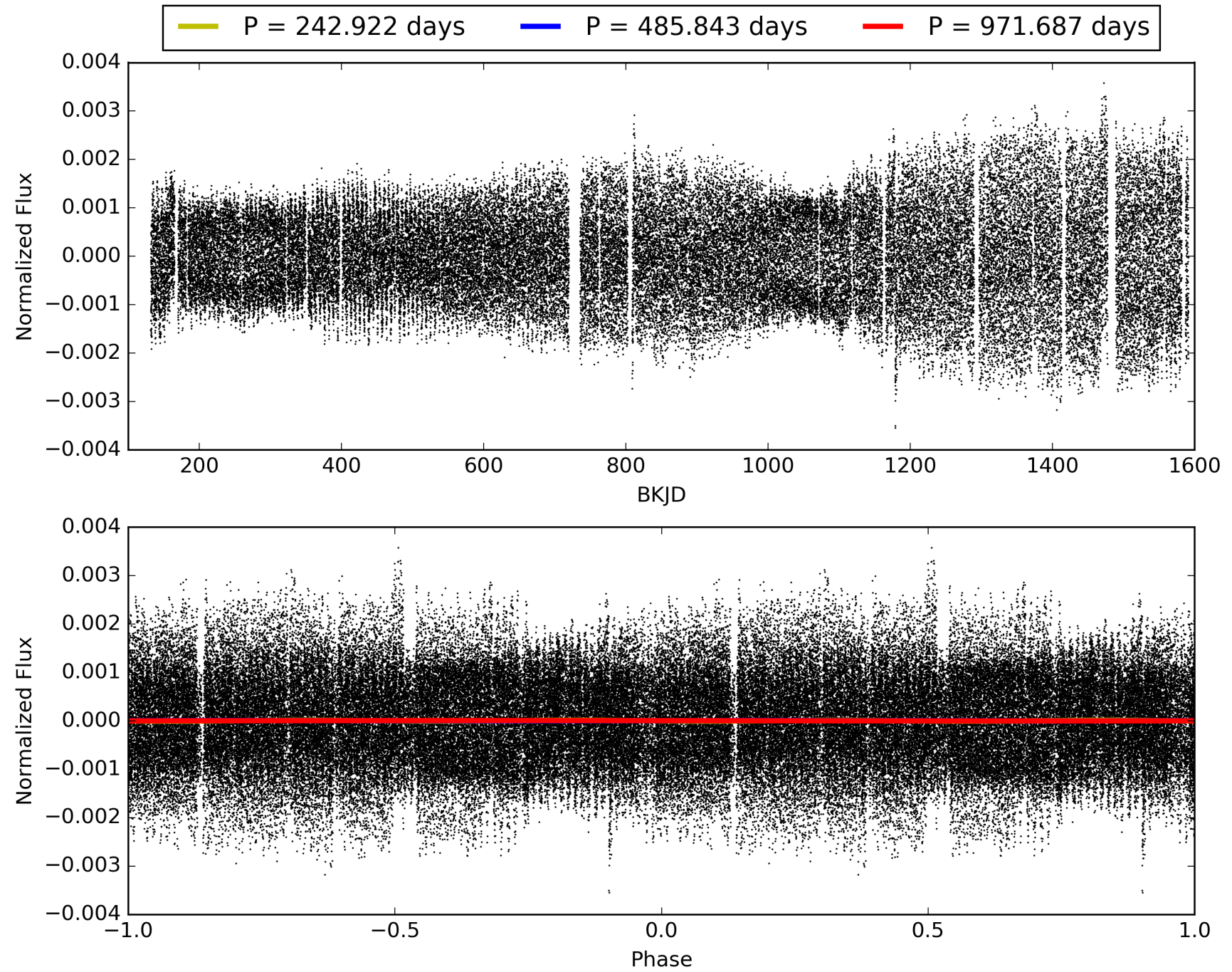
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 02:42:43 Z

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

# TCE 011823661-02, PDC Light Curves

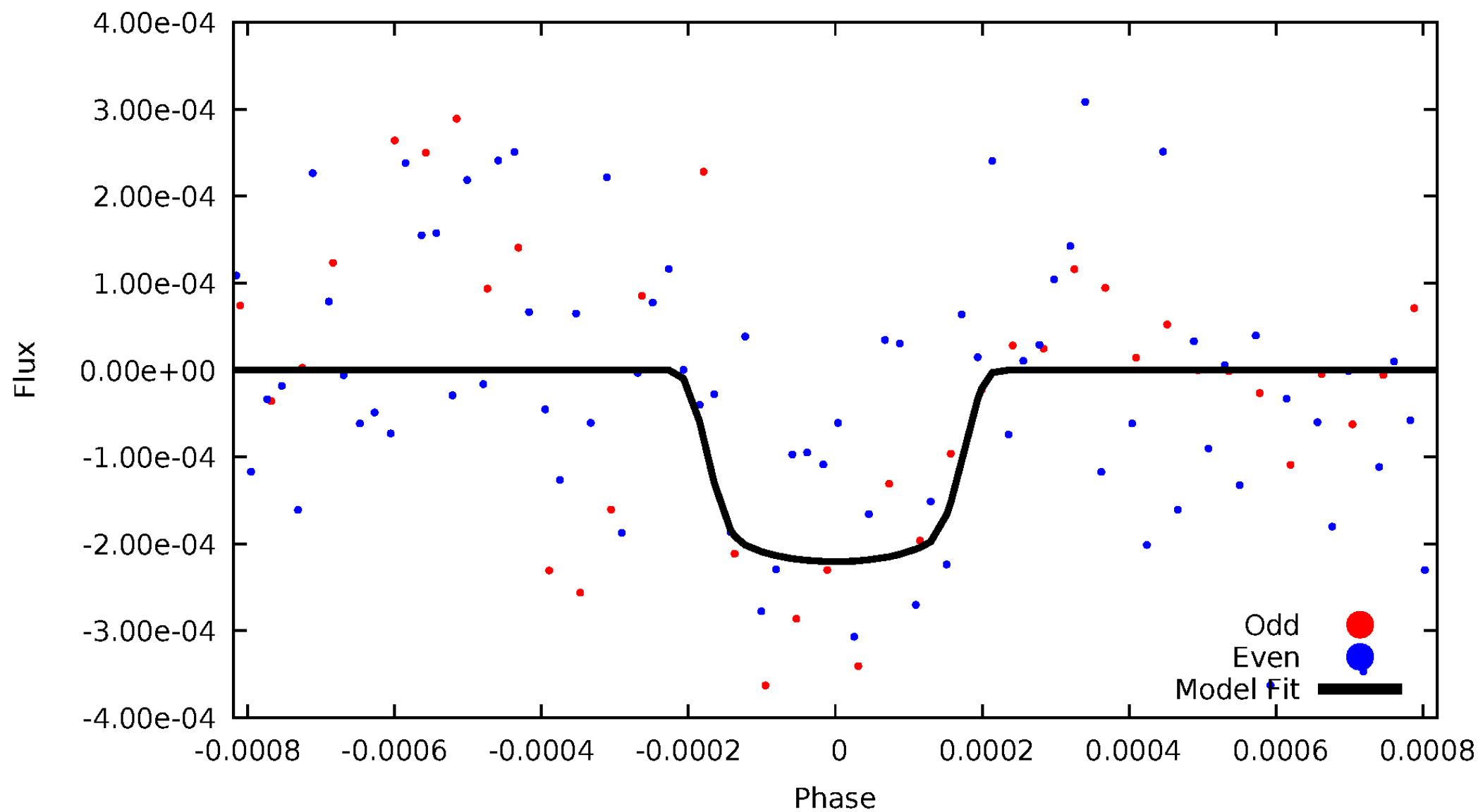


# TCE 011823661-02



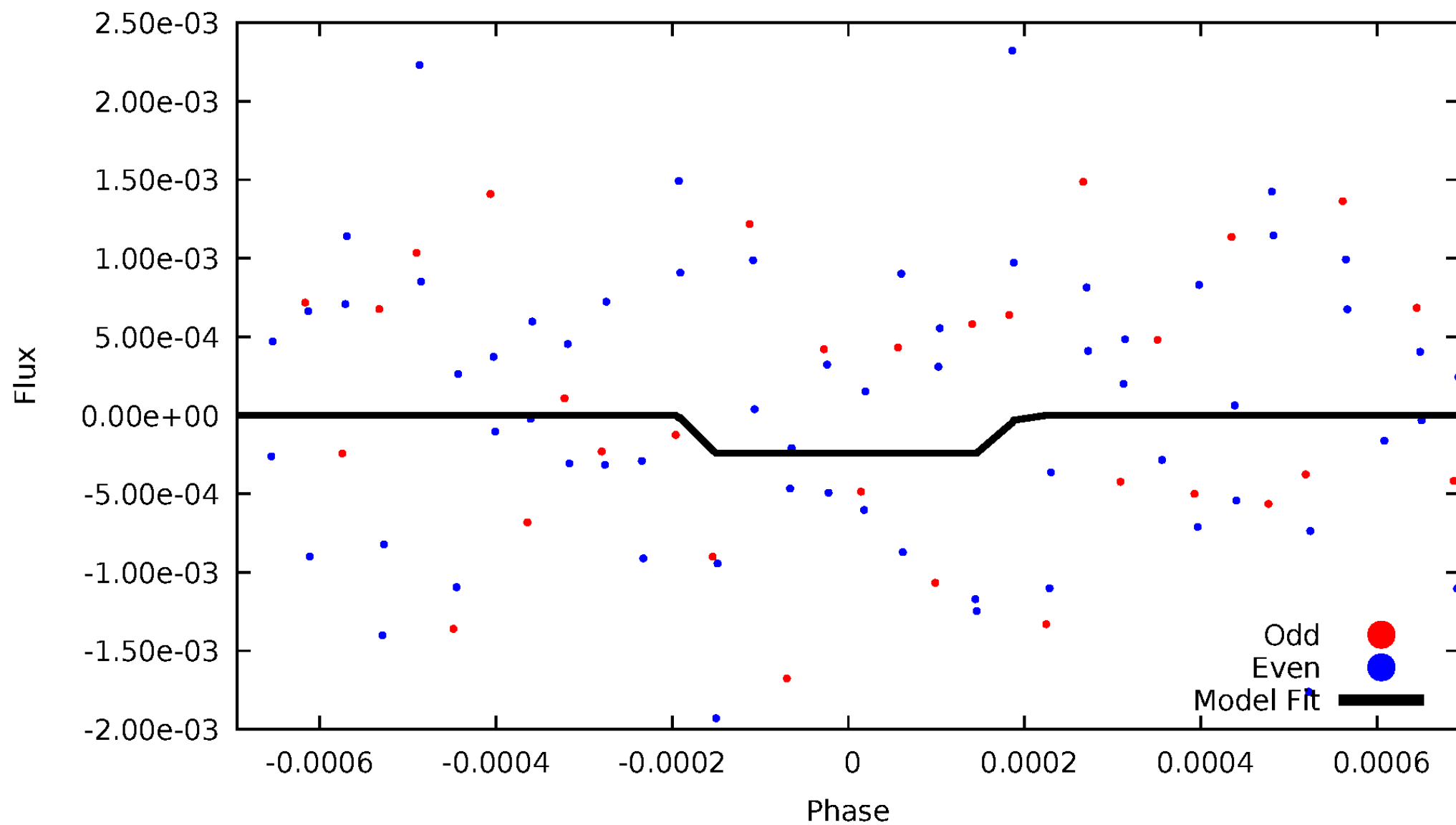
# DV Odd/Even

TCE 011823661-02



# ALT Odd/Even

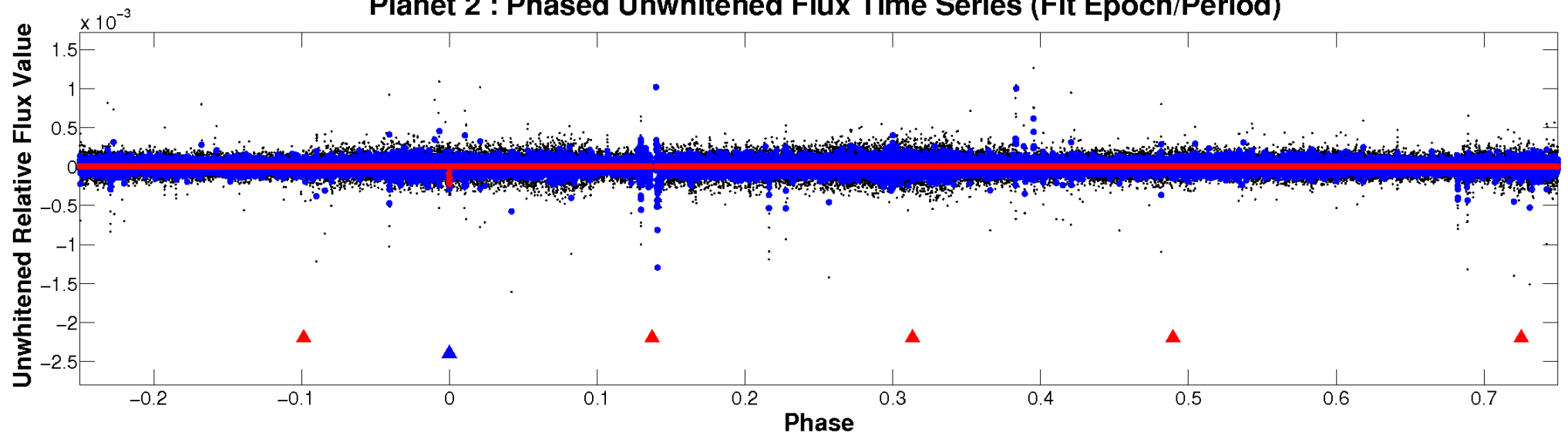
TCE 011823661-02



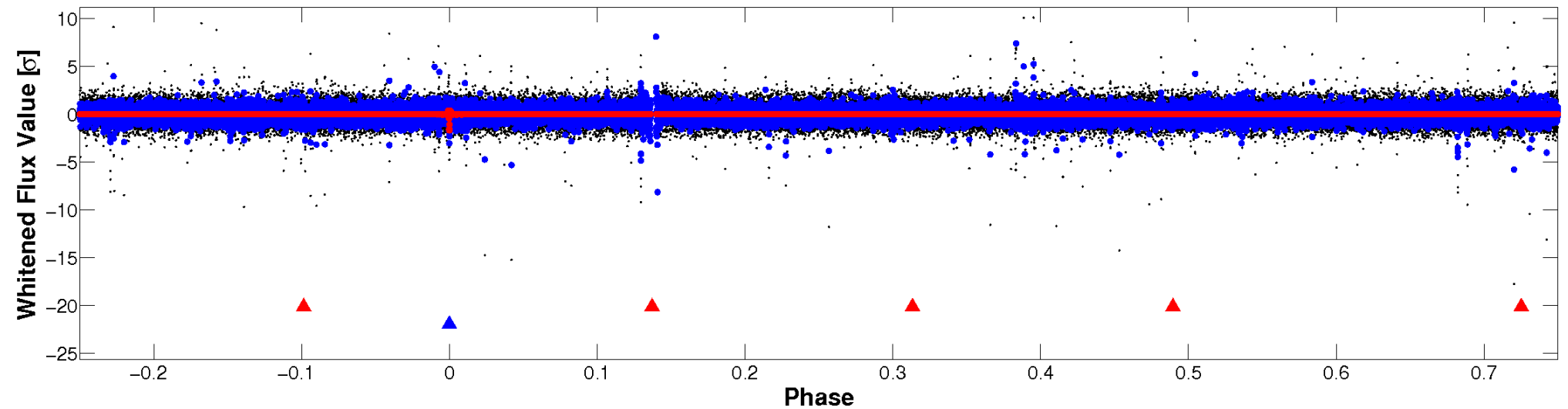


# Non-Whitened Vs. Whitened Light Curve

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

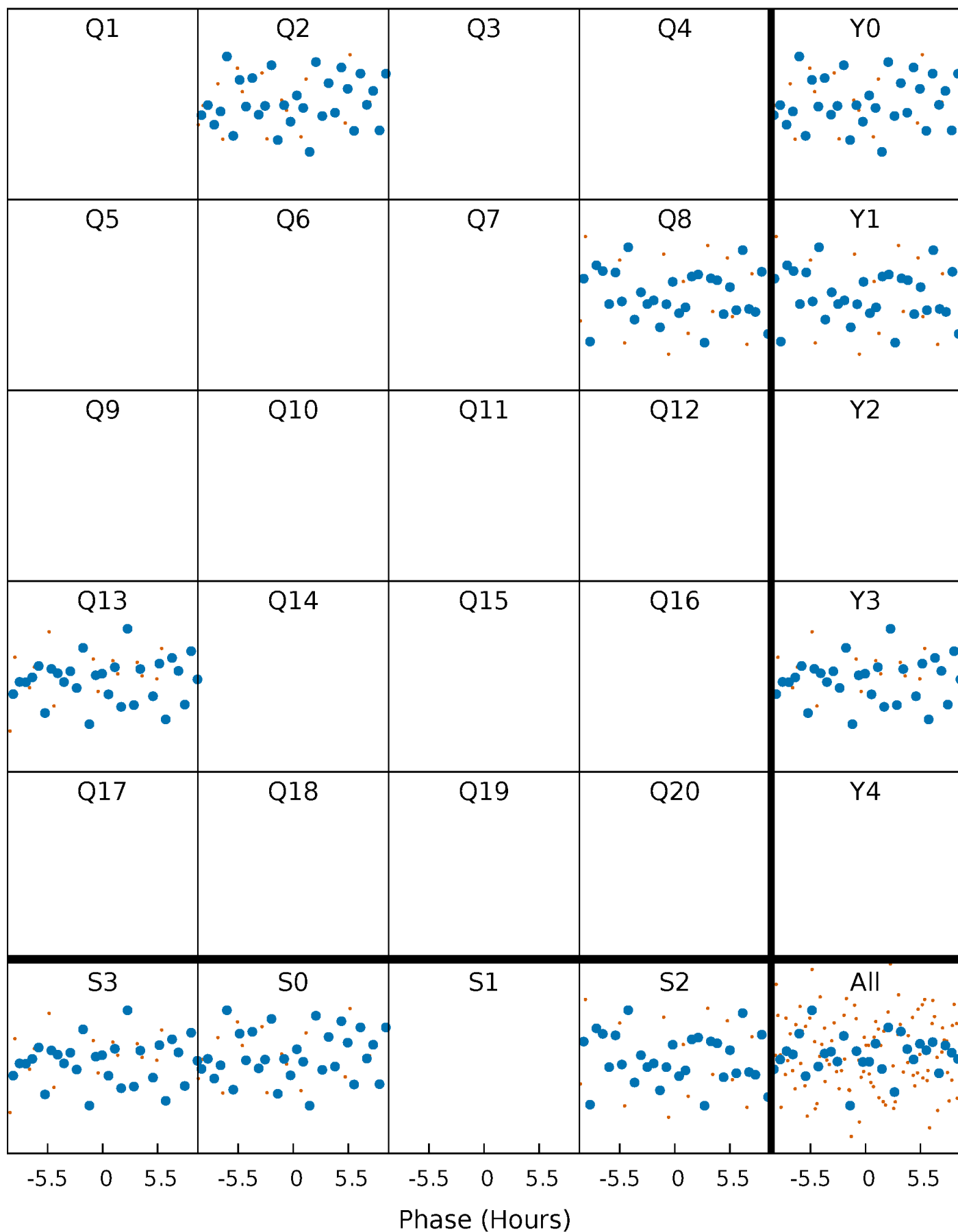


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



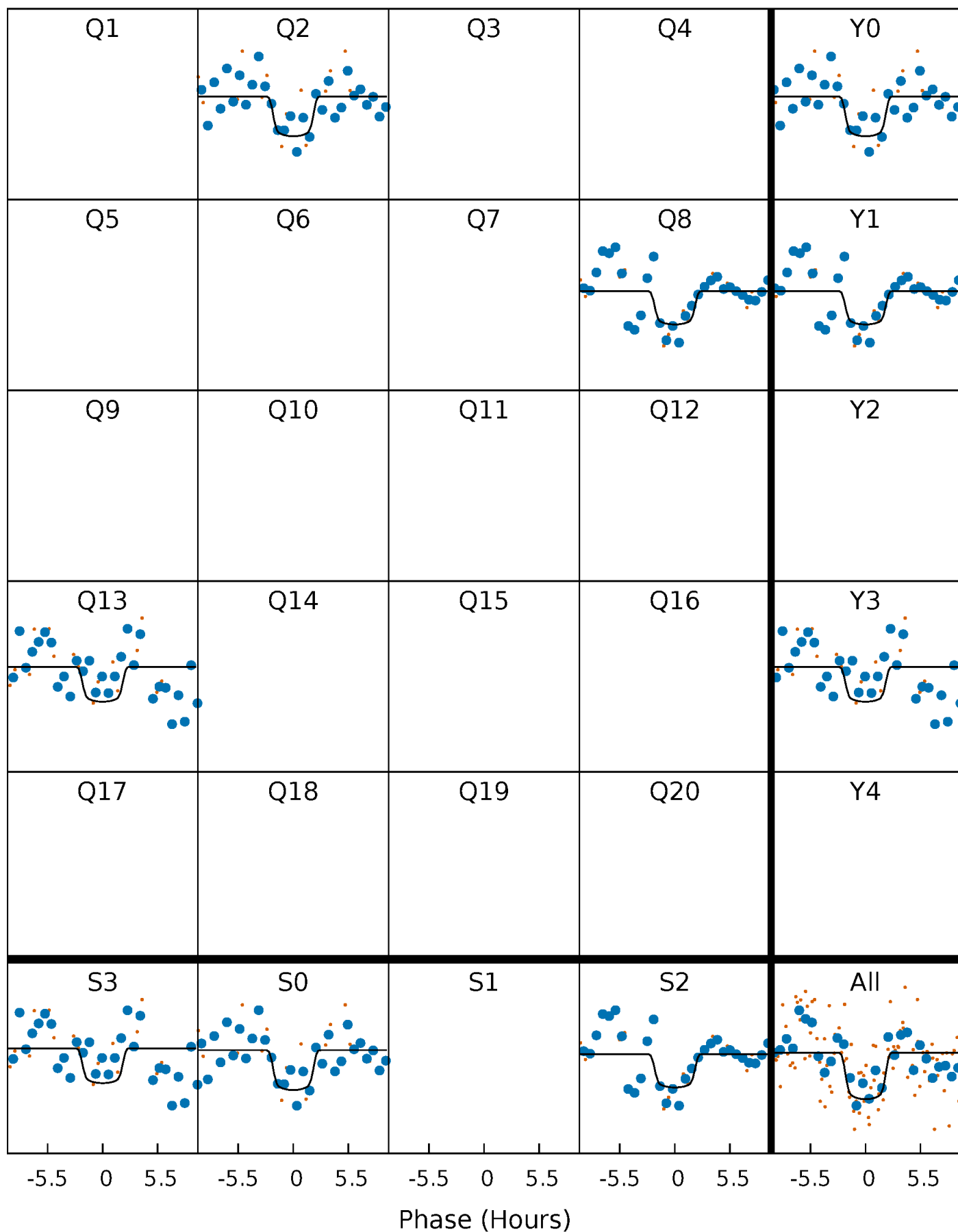
# PDC Quarter-Phased Transit Curves

TCE 011823661-02 P=485.843469 Days  $T_0=254.756706$  (BKJD)



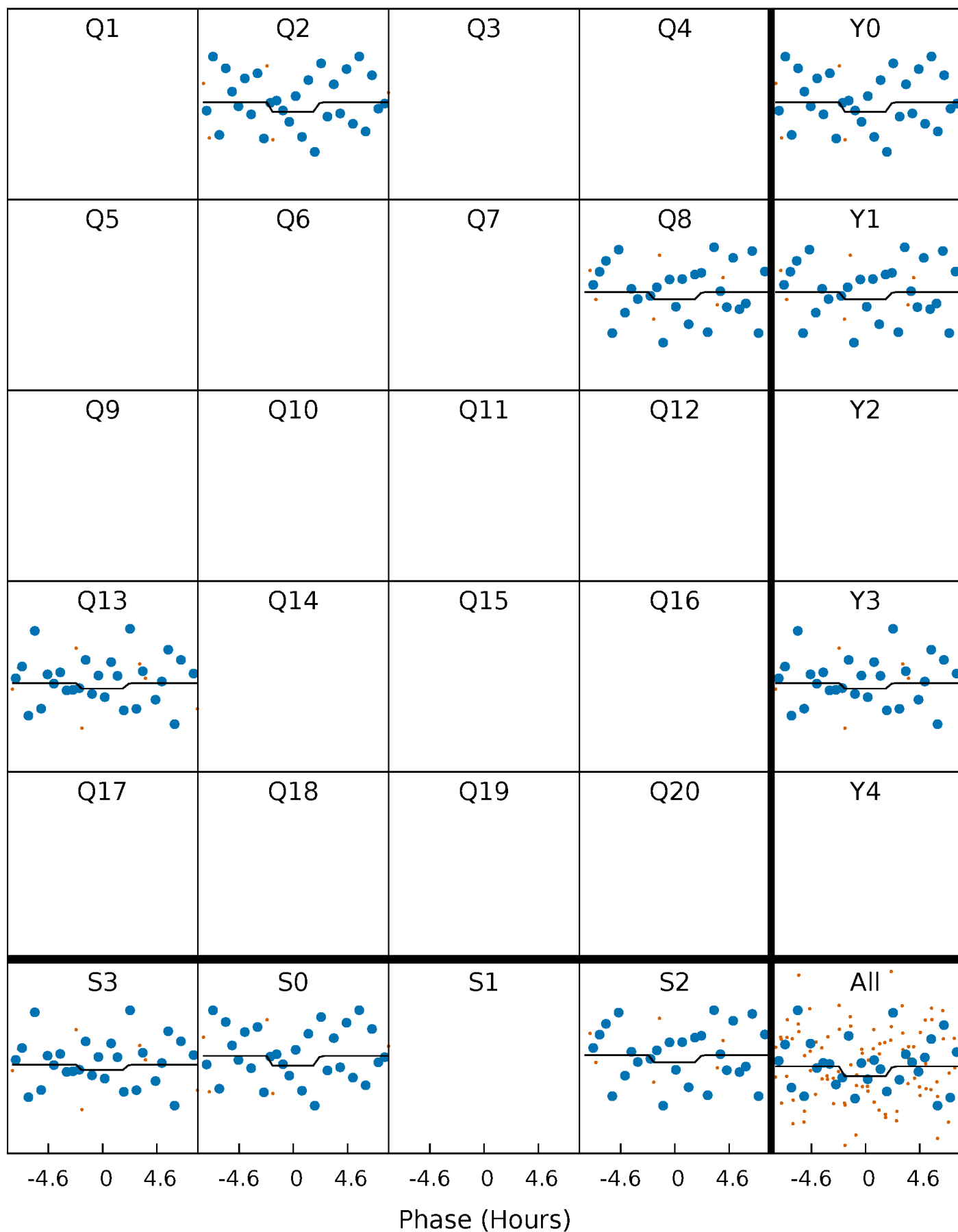
# DV Quarter-Phased Transit Curves

TCE 011823661-02     $P=485.843469$  Days     $T_0=254.756706$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

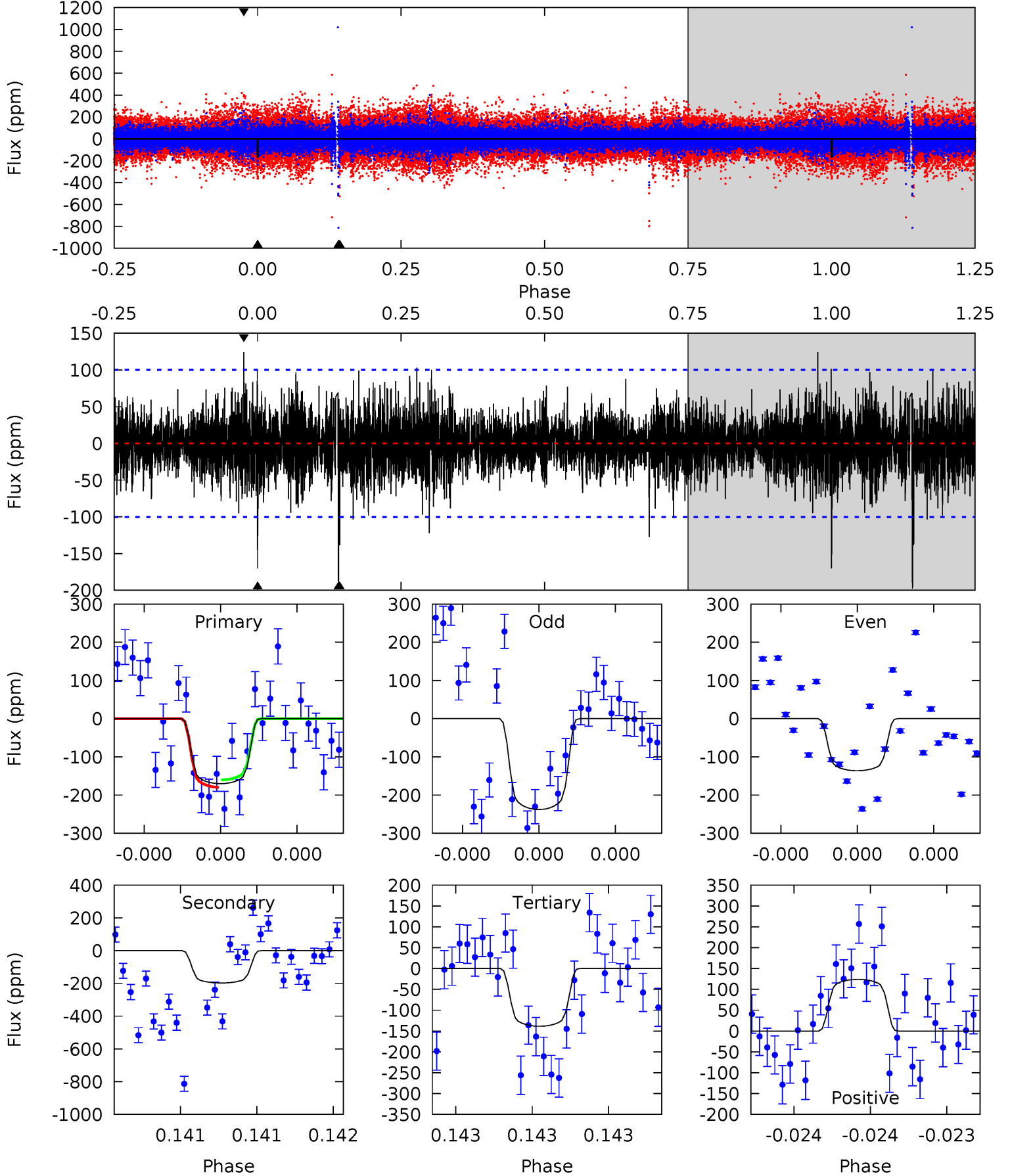
TCE 011823661-02   P=485.848756 Days    $T_0=254.759583$  (BKJD)



# DV Model-Shift Uniqueness Test

011823661-02, P = 485.843469 Days, E = 254.756706 Days

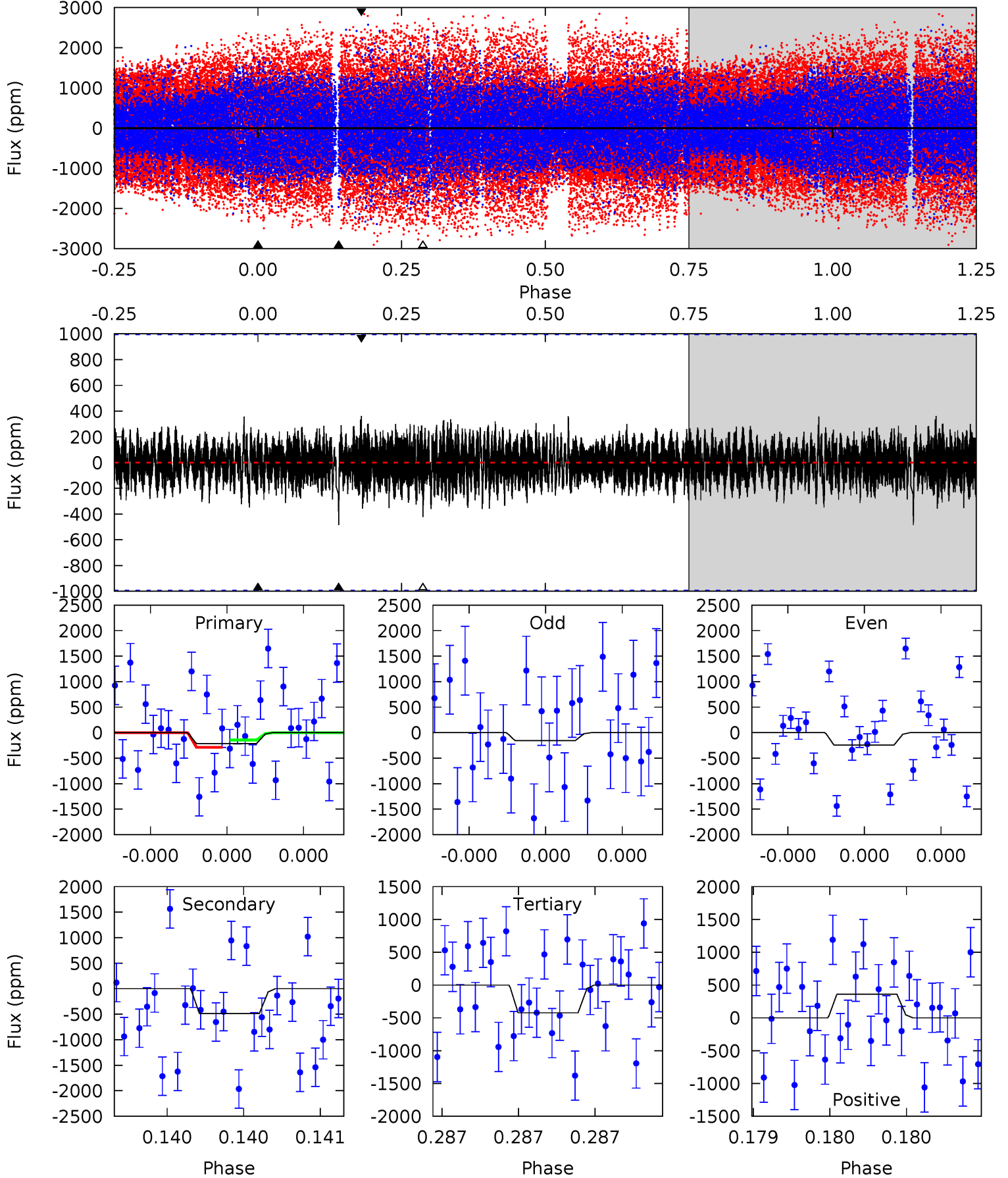
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.50	11.0	7.74	6.93	5.59	3.51	1.47	1.76	2.58	3.29	4.11	2.71	0.91	0.39	0.55



# Alt Model-Shift Uniqueness Test

011823661-02, P = 485.848756 Days, E = 254.759583 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
1.22	2.73	2.38	2.04	5.62	3.55	0.54	-1.17	-0.82	0.35	0.70	0.23	1.37	0.43	0.40





### Stellar Parameters For KIC 011823661

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$8540^{+76}_{-85}$	$3.871^{+0.216}_{-0.054}$	$-0.420^{+0.050}_{-0.200}$	$2.560^{+0.205}_{-0.616}$	$1.777^{+0.050}_{-0.176}$	$0.149^{+0.170}_{-0.031}$
	+1%/-1%	+6%/-1%	+12%/-48%	+8%/-24%	+3%/-10%	+114%/-21%
Source	SPE68	SPE68	SPE68	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 011823661-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-198 \pm 18$	$4.37^{+0.81}_{-0.76}$	$689^{+22}_{-46}$	$7740^{+835}_{-632}$	$12330^{+5612}_{-3824}$
Alt.	$-484 \pm 177$	$4.16^{+0.78}_{-0.78}$	$691^{+20}_{-44}$	$10850^{+2253}_{-1972}$	$31142^{+21732}_{-13974}$

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

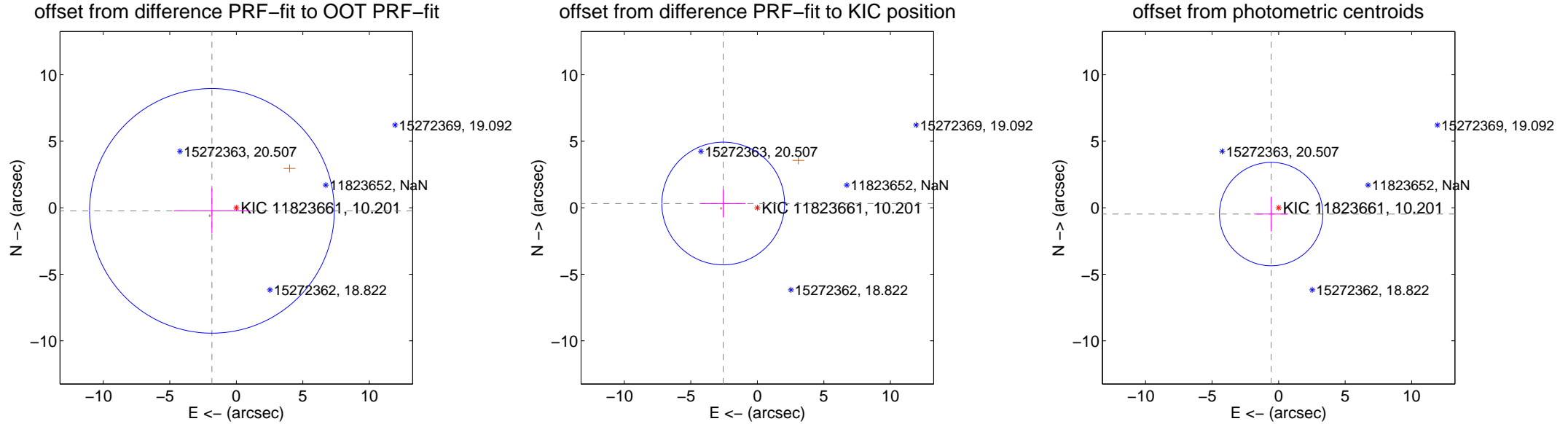
## DV Centroid Data

Supplemental centroid analysis for 011823661-02. **Kepler magnitude: 10.20.** Transit SNR 7.80

**There are 0 quarters with good PRF difference image offsets**

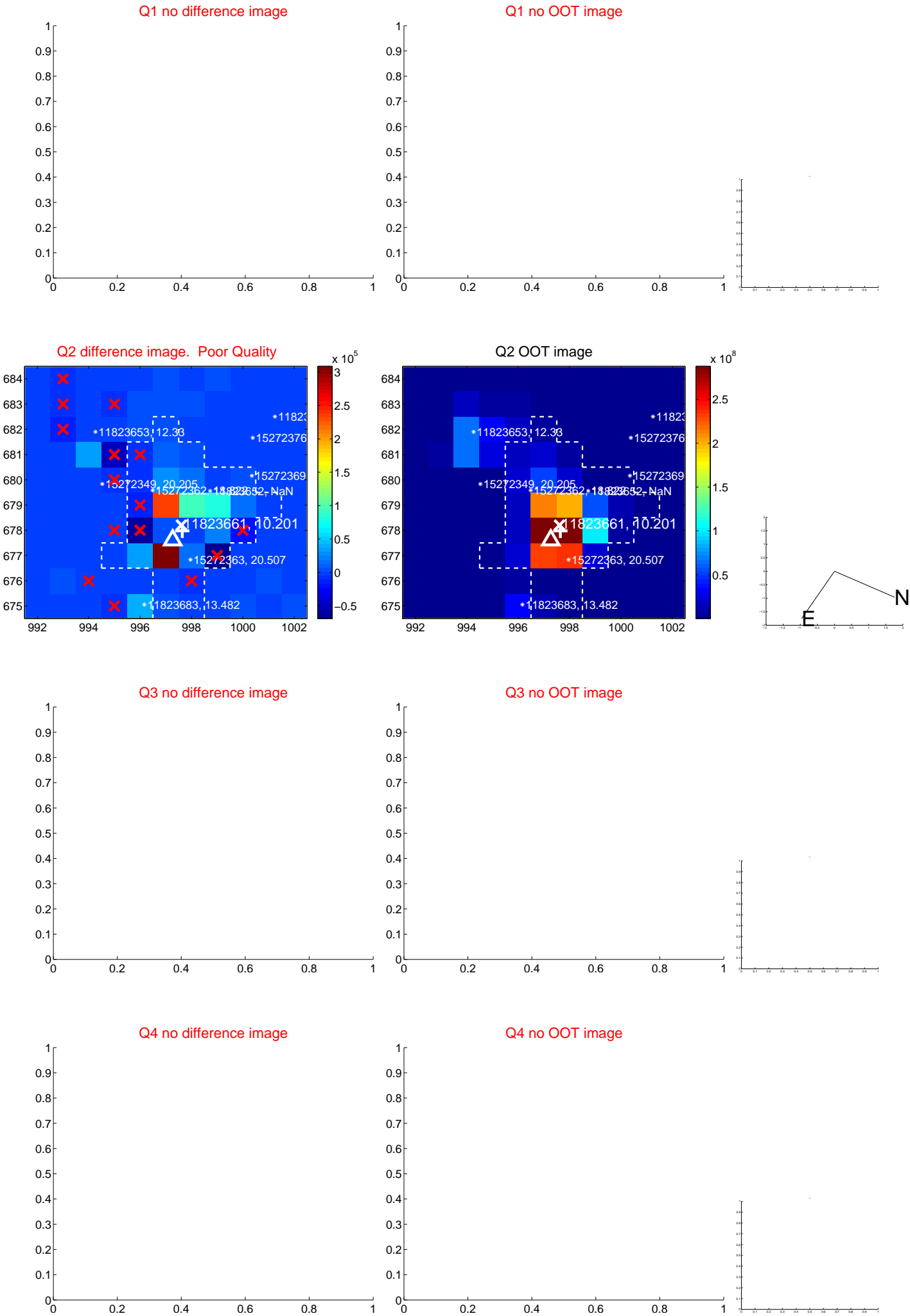
The direct PRF centroid is offset from the target star catalog position by about 1.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.847 \pm 3.066$	0.60	$1.832 \pm 2.874$	$-0.234 \pm 1.702$
PRF-fit source offset from KIC position	$2.586 \pm 1.538$	1.68	$2.566 \pm 1.679$	$0.319 \pm 1.044$
photometric centroid source offset	$0.73 \pm 1.30$	0.57	$0.56 \pm 1.29$	$-0.48 \pm 1.30$



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 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.

Q5 no difference image



Q5 no OOT image



Q6 no difference image



Q6 no OOT image



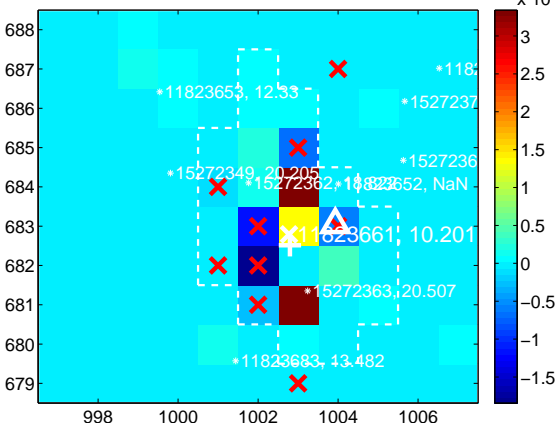
Q7 no difference image



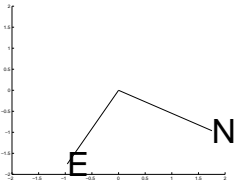
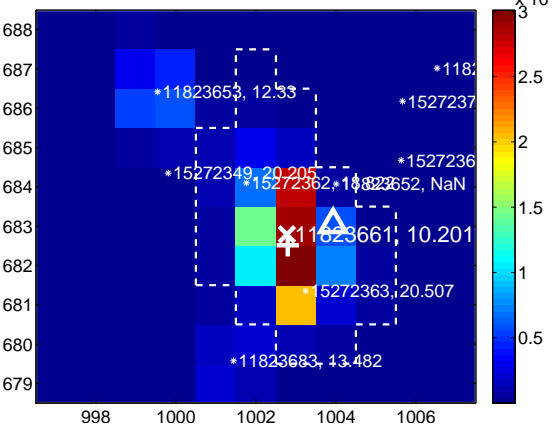
Q7 no OOT image



Q8 difference image. Poor Quality



Q8 OOT image



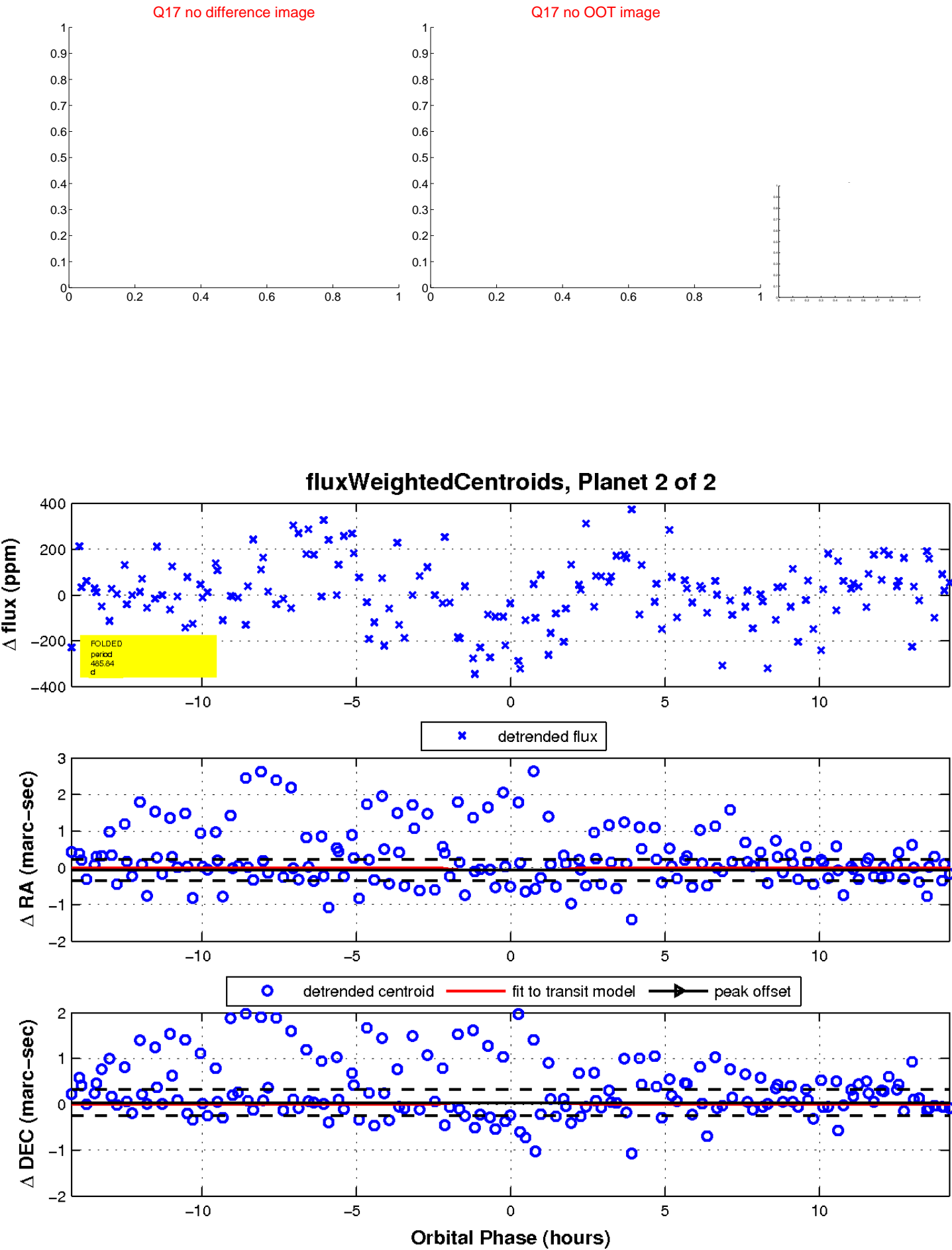
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

