

# KIC 008813698

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008813698-01	OBS	1268.01	268.941207	360.070945	9025.9	5.506	133.1	140.0	1.31	5798	13.72	2.53
008813698-02	OBS	No	318.415332	285.423102	533.8	15.498	18.9	12.7	1.31	5798	3.12	2.02

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008813698-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008813698-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—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.

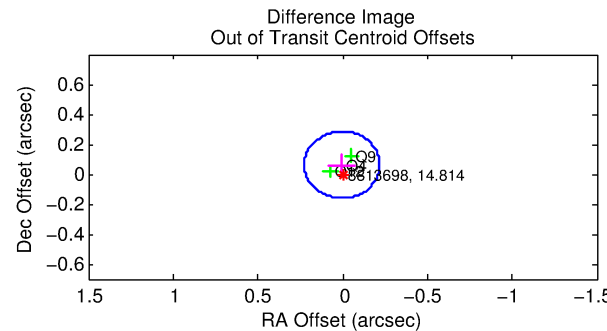
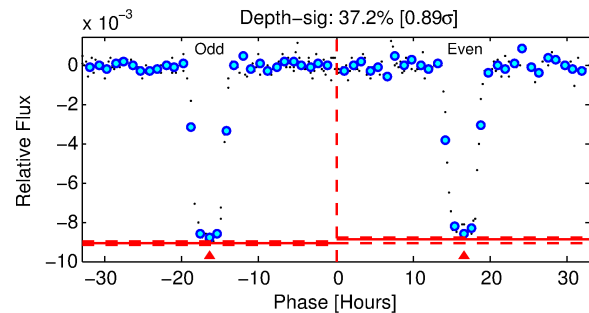
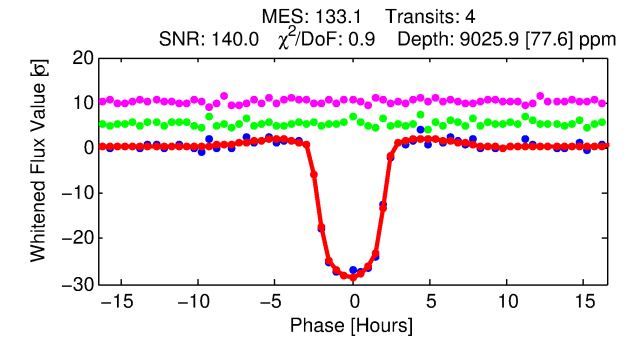
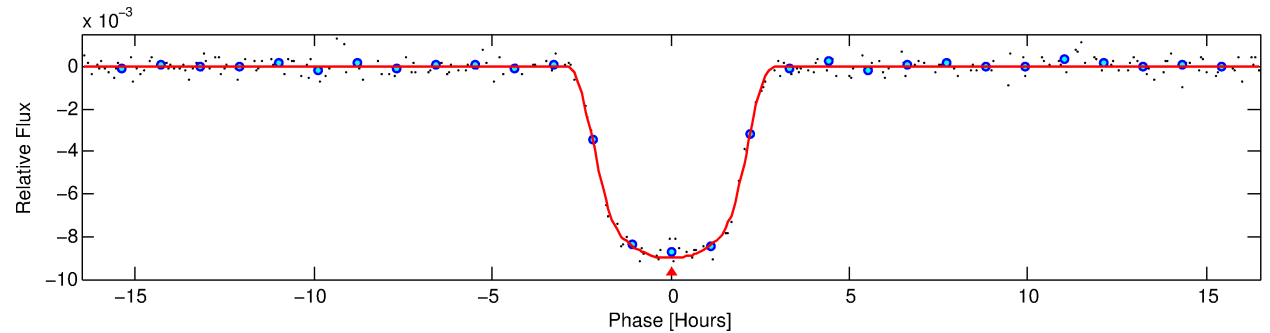
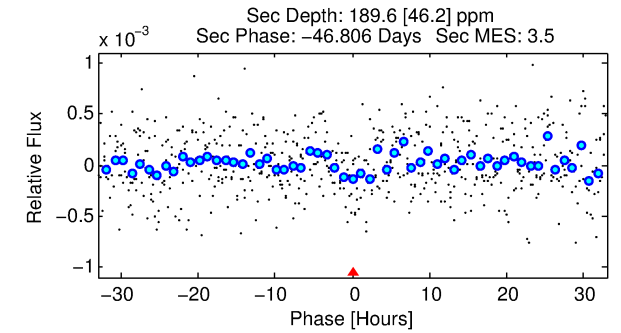
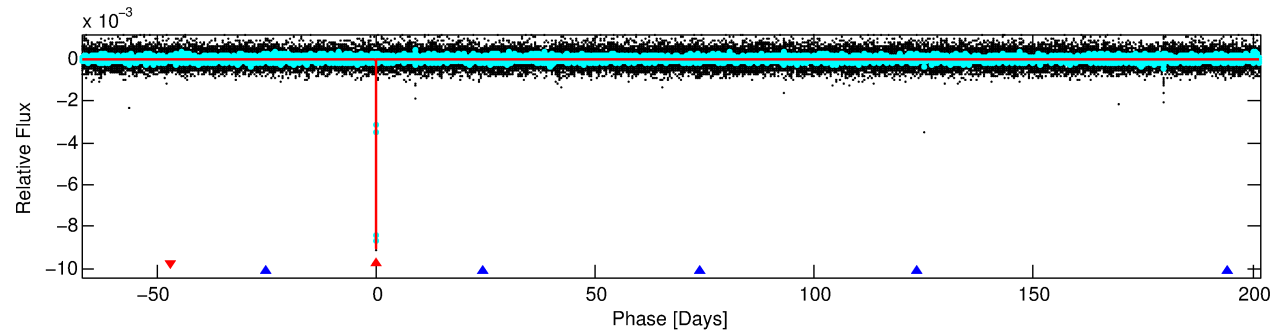
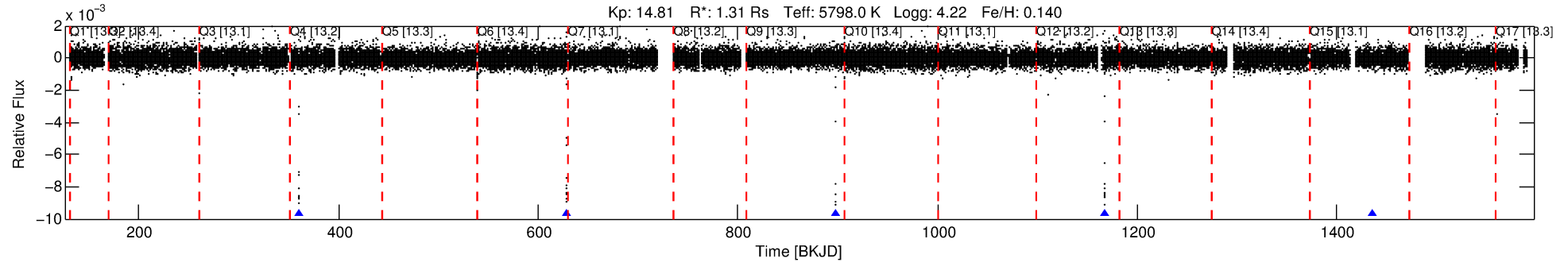
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008813698-01

No Significant Match Found

# DV One-Page Summary

KIC: 8813698 Candidate: 1 of 2 Period: 268.941 d  
KOI: K01268.01 Corr: 0.988



## DV Fit Results:

Period = 268.94121 [0.00048] d  
Epoch = 360.0709 [0.0008] BKJD  
Rp/R\* = 0.0963 [0.0010]  
a/R\* = 285.27 [9.10]  
b = 0.79 [0.02]  
Seff = 2.53 [0.68]  
Teff = 321 [22] K  
Rp = 13.73 [2.34] Re  
a = 0.8269 [0.1363] AU  
Ag = 378.53 [136.46] [2.77 $\sigma$ ]  
Teffp = 2192 [137] K [13.47 $\sigma$ ]

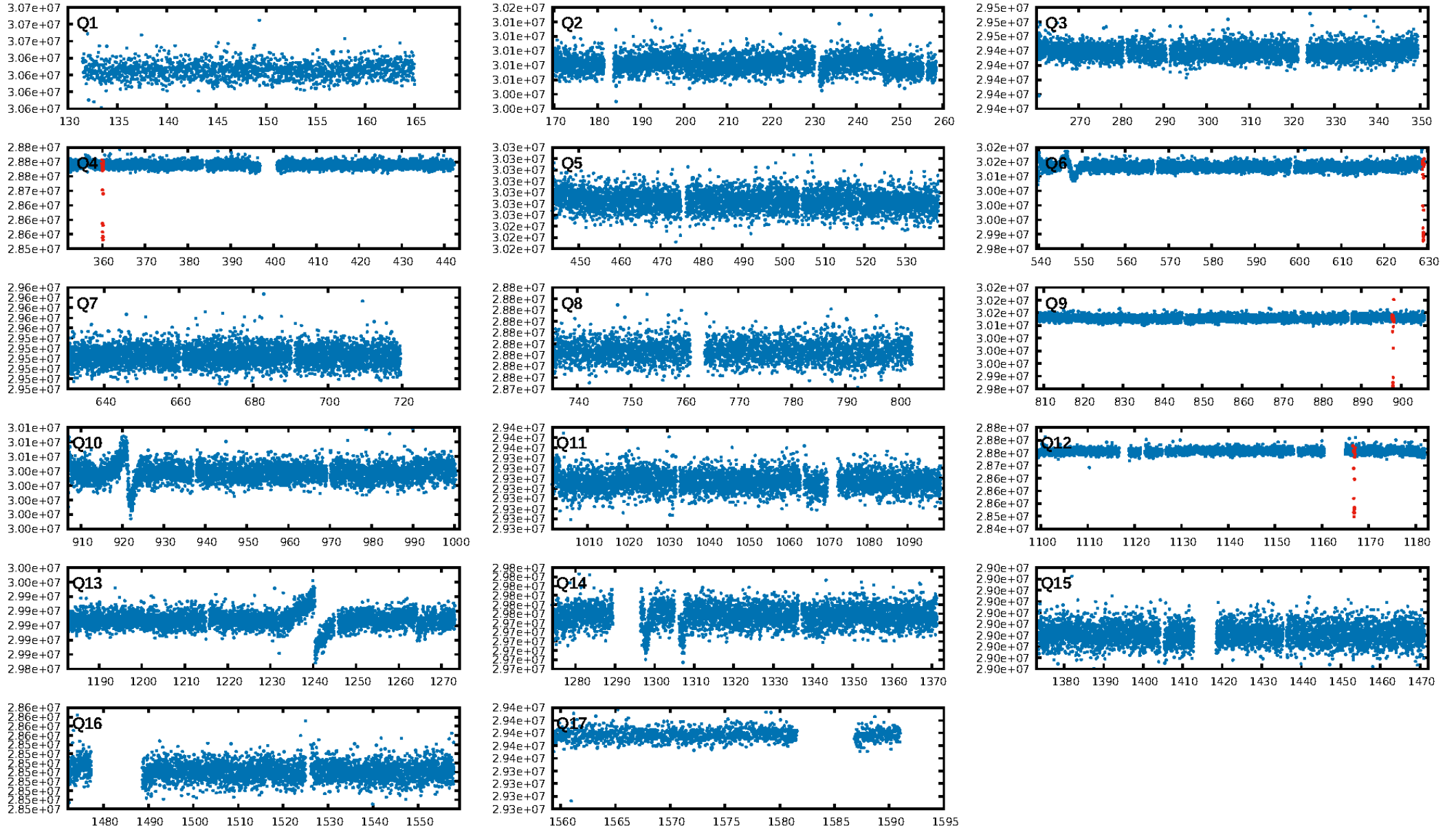
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [72.19 $\sigma$ ]  
ModelChiSquare2-sig: 5.6%  
ModelChiSquareGof-sig: 97.5%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 6.001  
Centroid-sig: 0.6%  
Centroid-so: 0.036 arcsec [0.33 $\sigma$ ]  
OotOffset-rm: 0.061 arcsec [0.83 $\sigma$ ]  
OotOffset-st: 0/0/2/1 [3]  
KicOffset-rm: 0.211 arcsec [2.23 $\sigma$ ]  
KicOffset-st: 0/0/2/1 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [3/3]

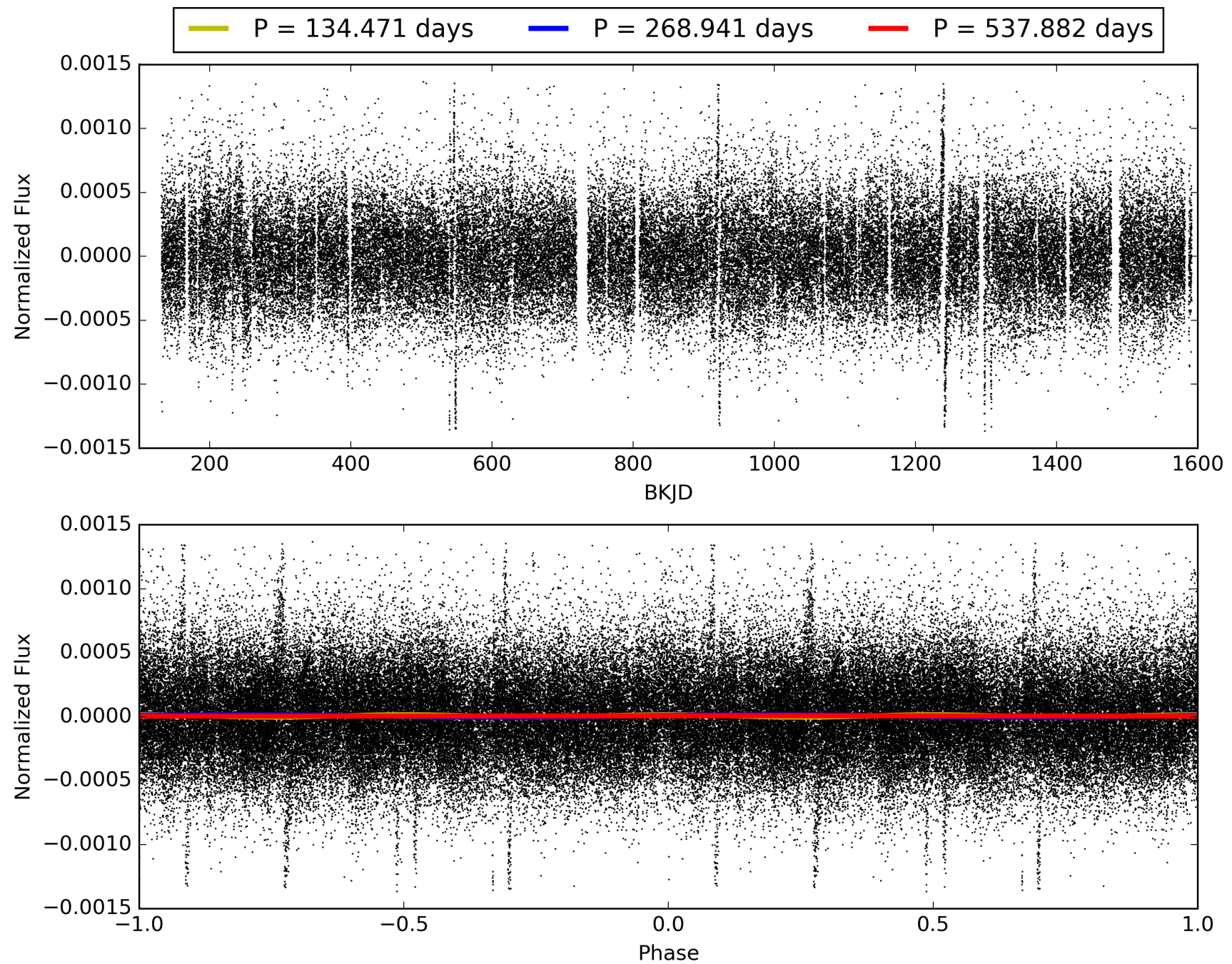
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 19:51:50 Z

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

# TCE 008813698-01, PDC Light Curves

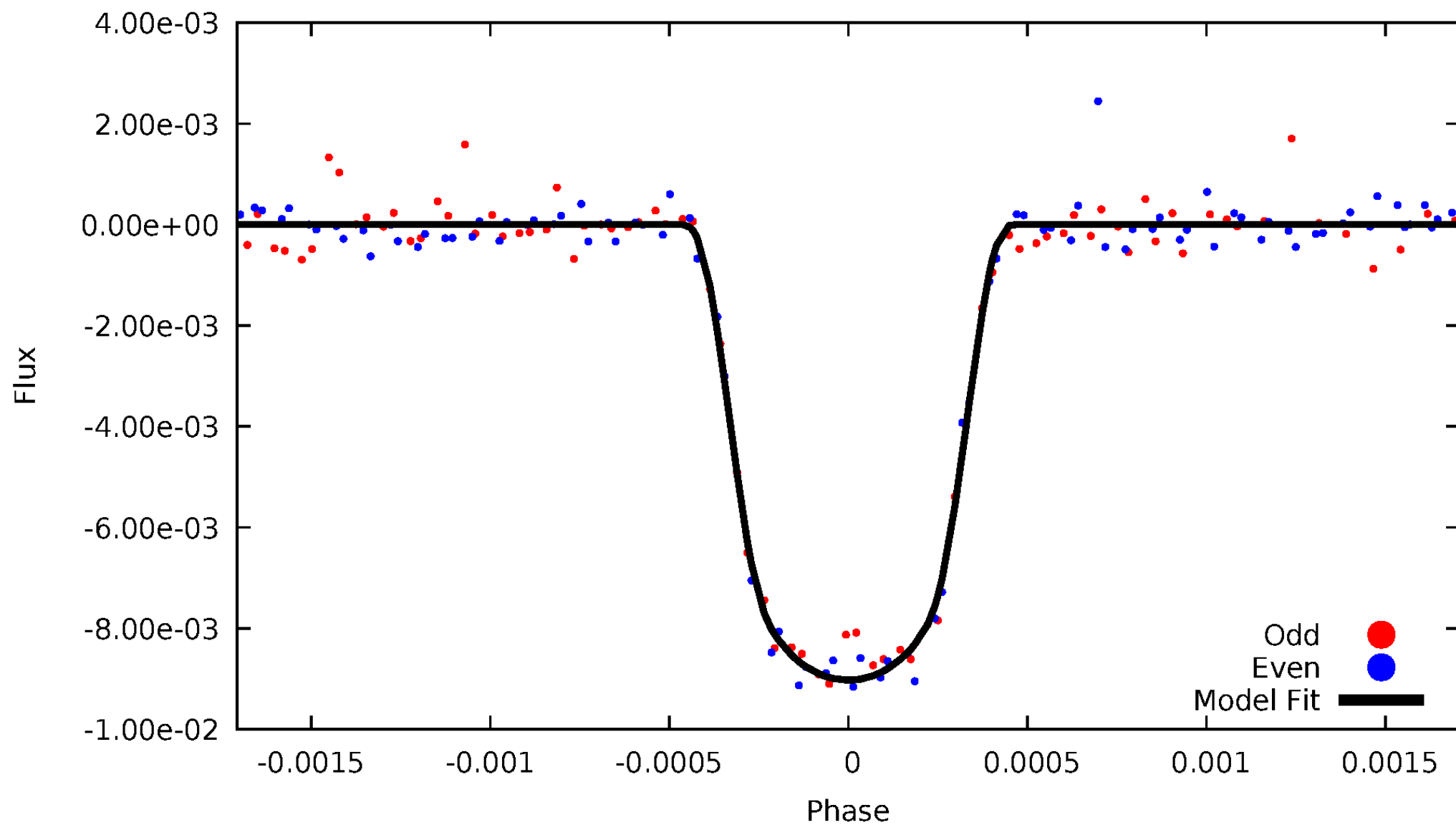


# TCE 008813698-01



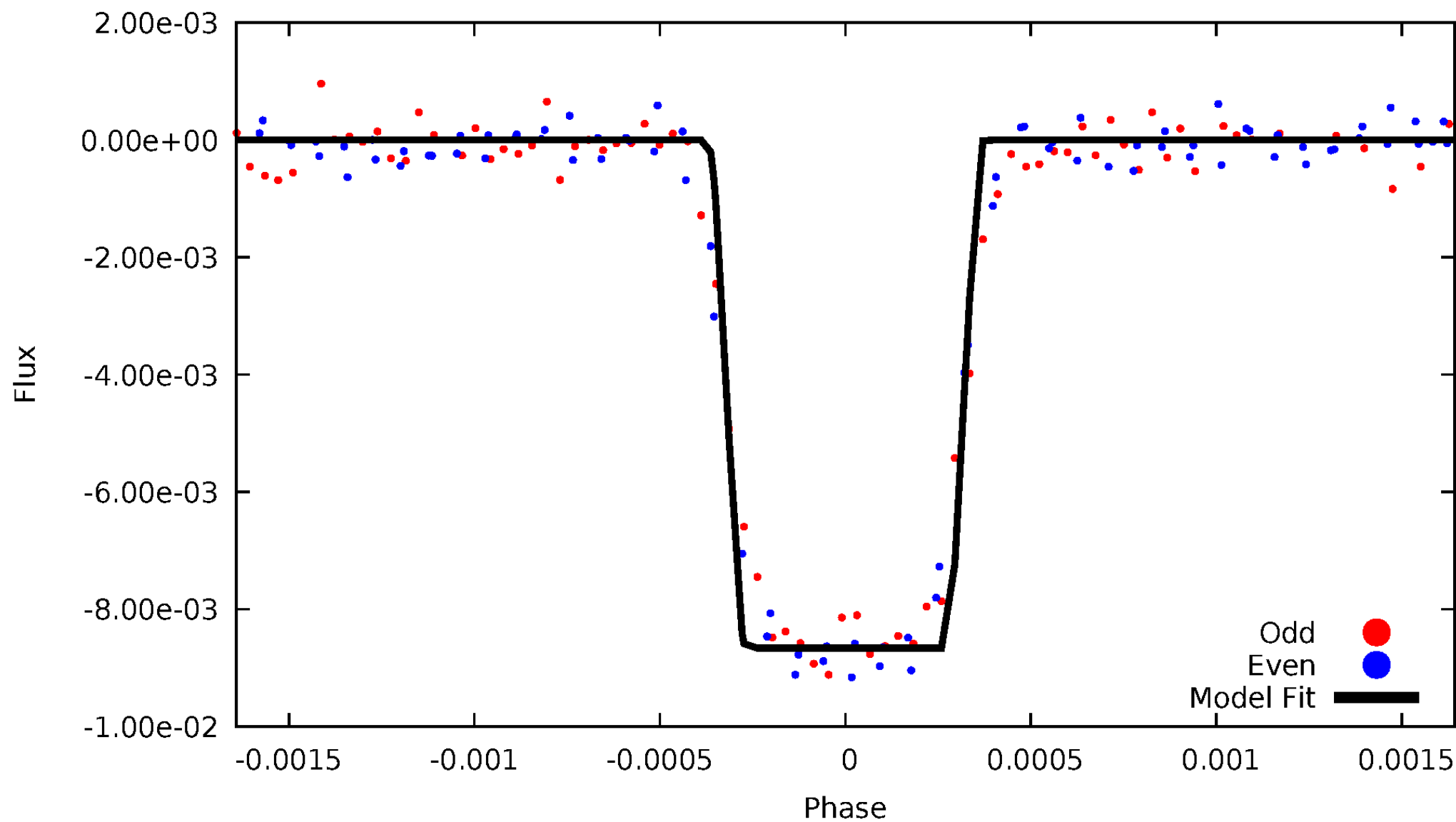
# DV Odd/Even

TCE 008813698-01



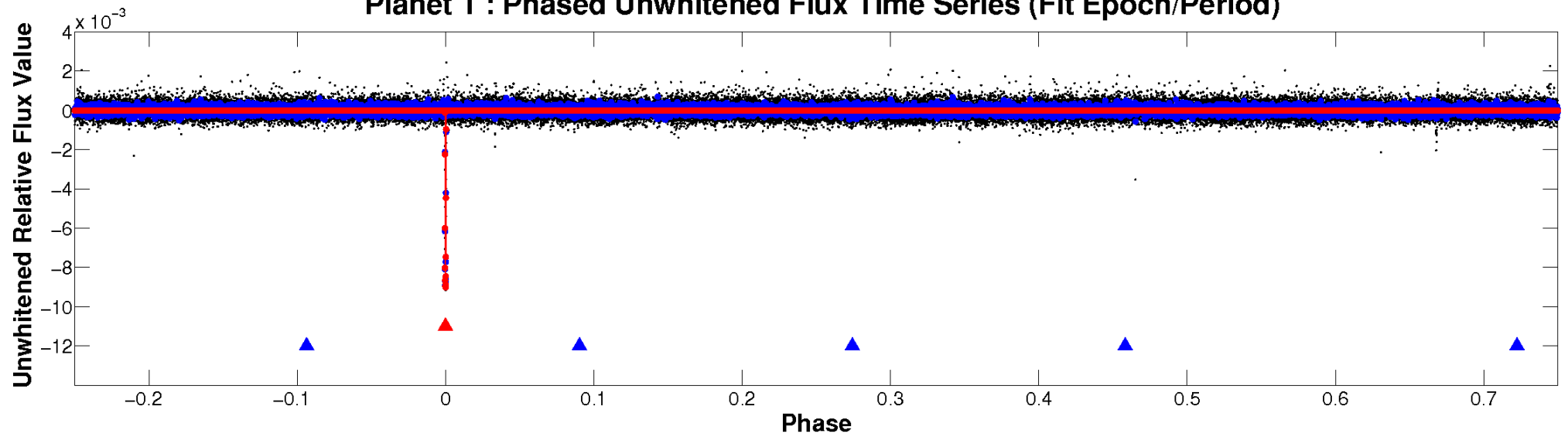
# ALT Odd/Even

TCE 008813698-01

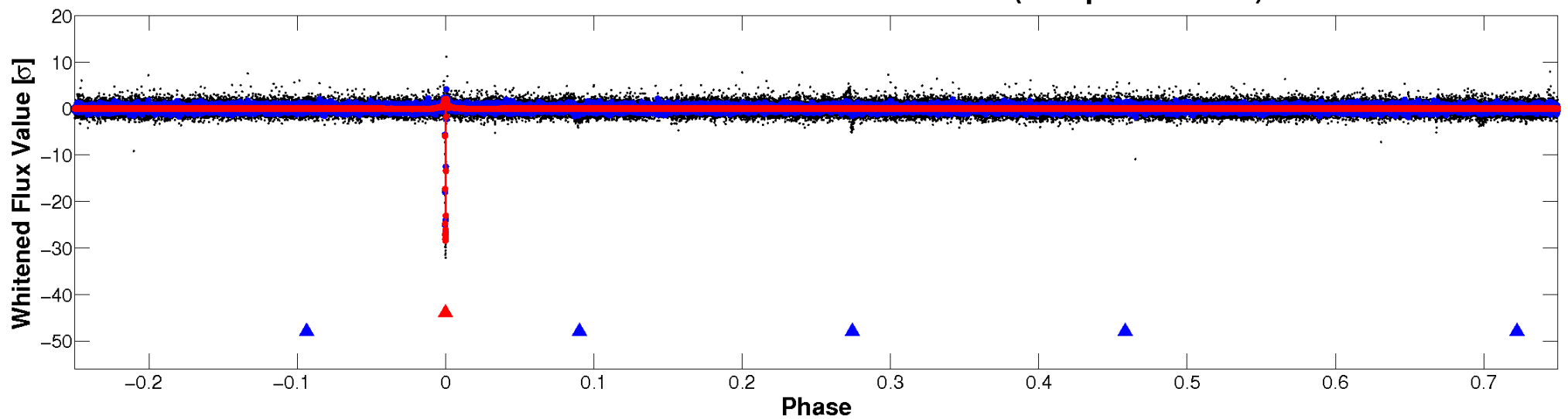


# Non-Whitened Vs. Whitened Light Curve

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

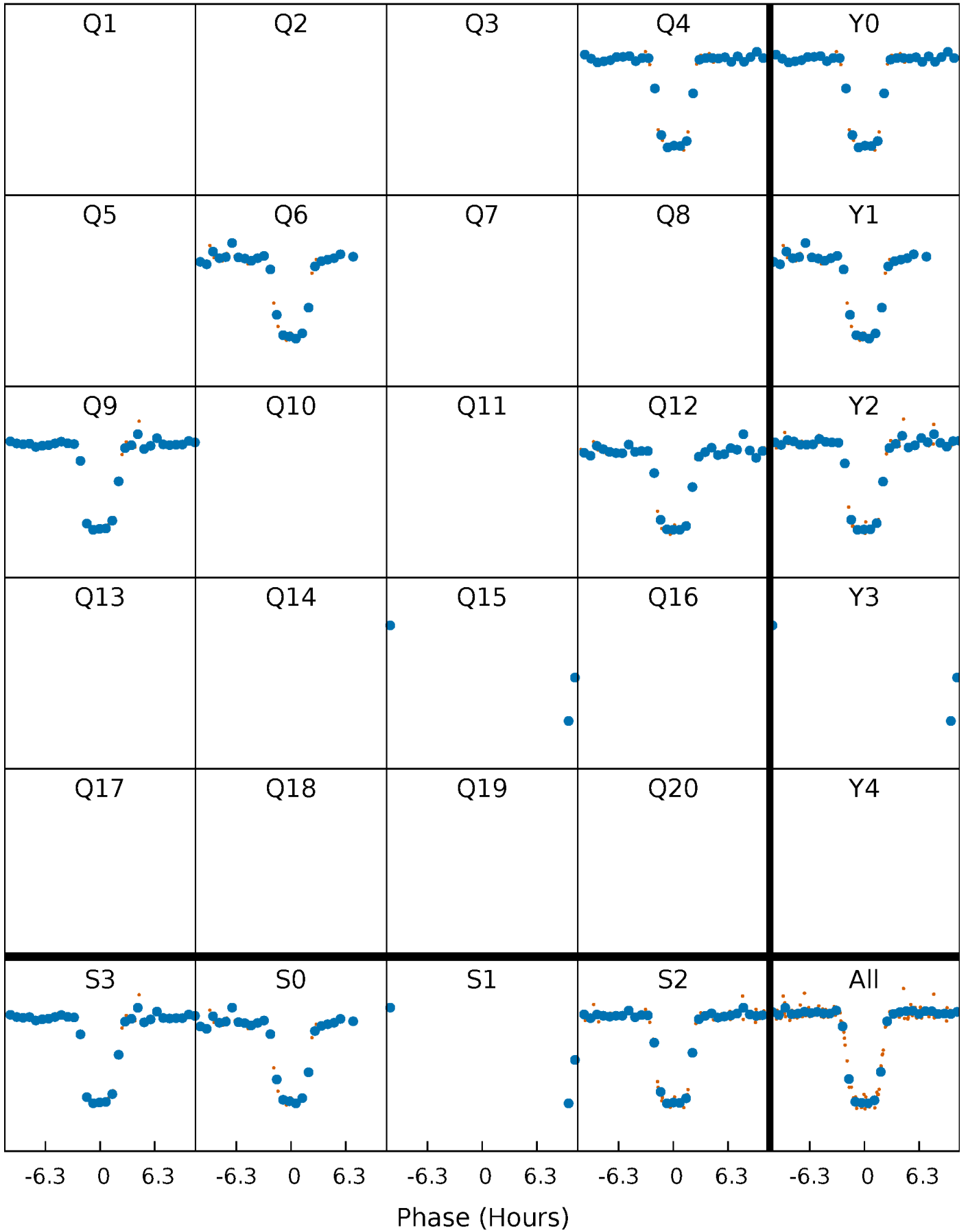


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

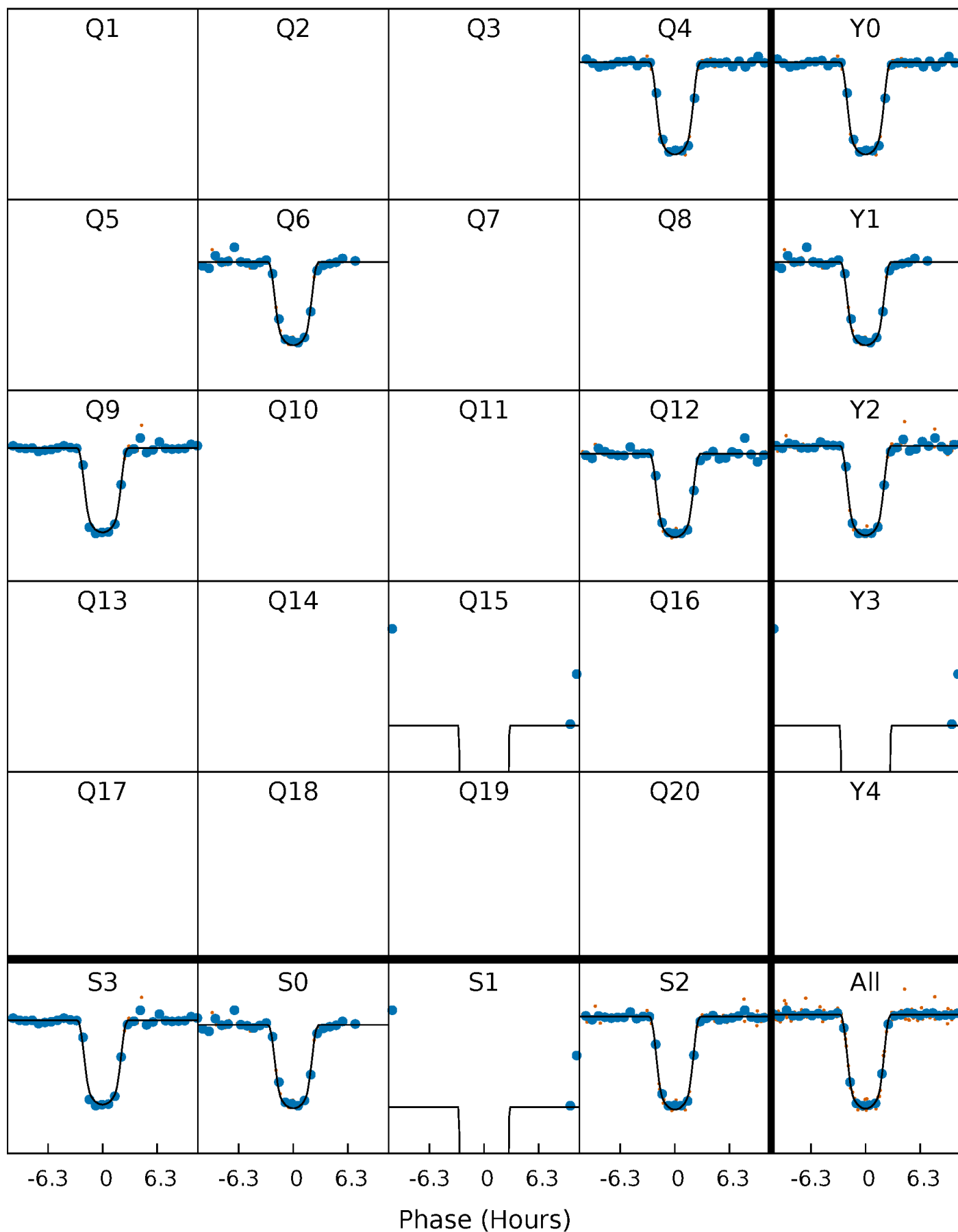
TCE 008813698-01 P=268.941207 Days  $T_0=360.070945$  (BKJD)





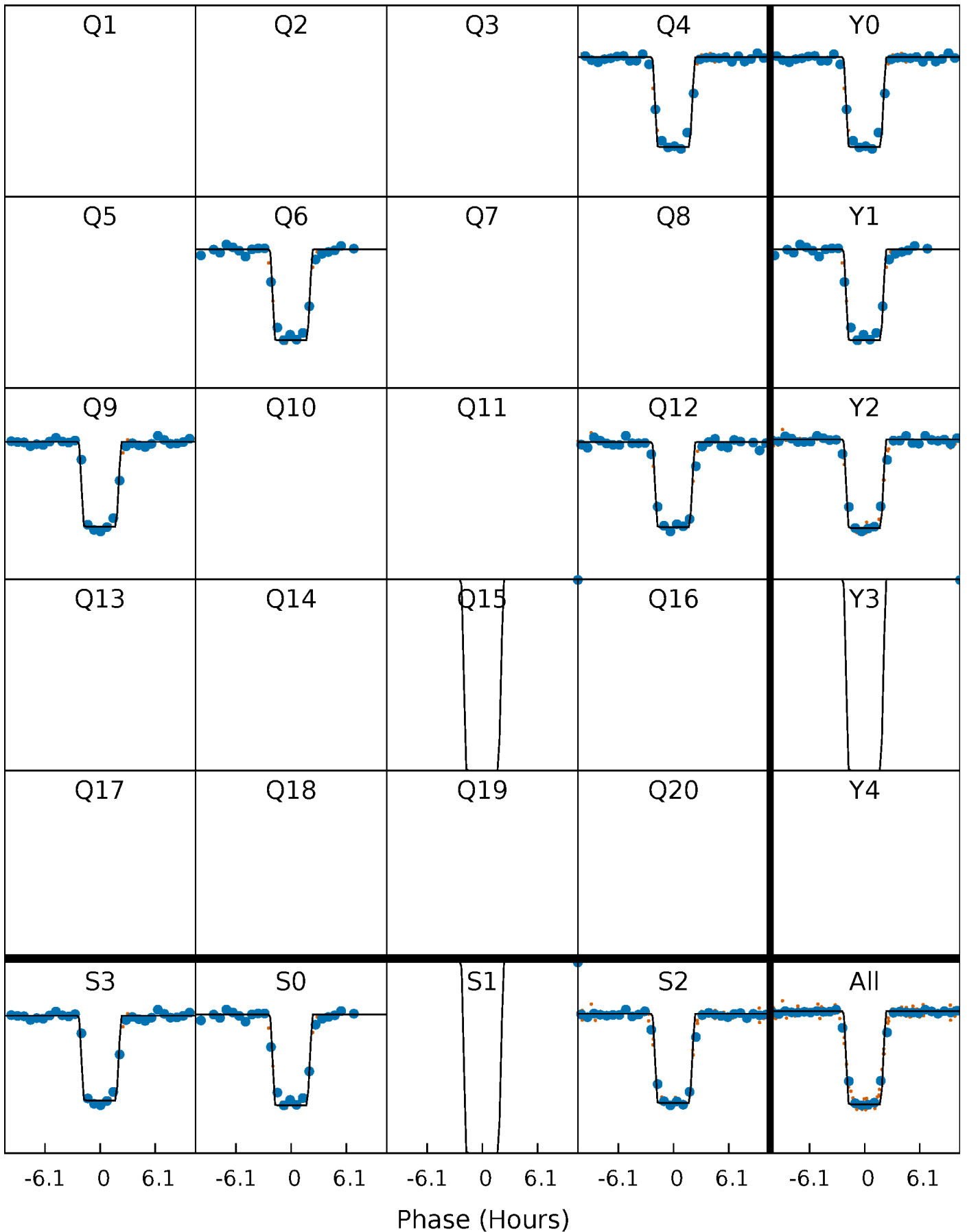
# DV Quarter-Phased Transit Curves

TCE 008813698-01 P=268.941207 Days  $T_0=360.070945$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

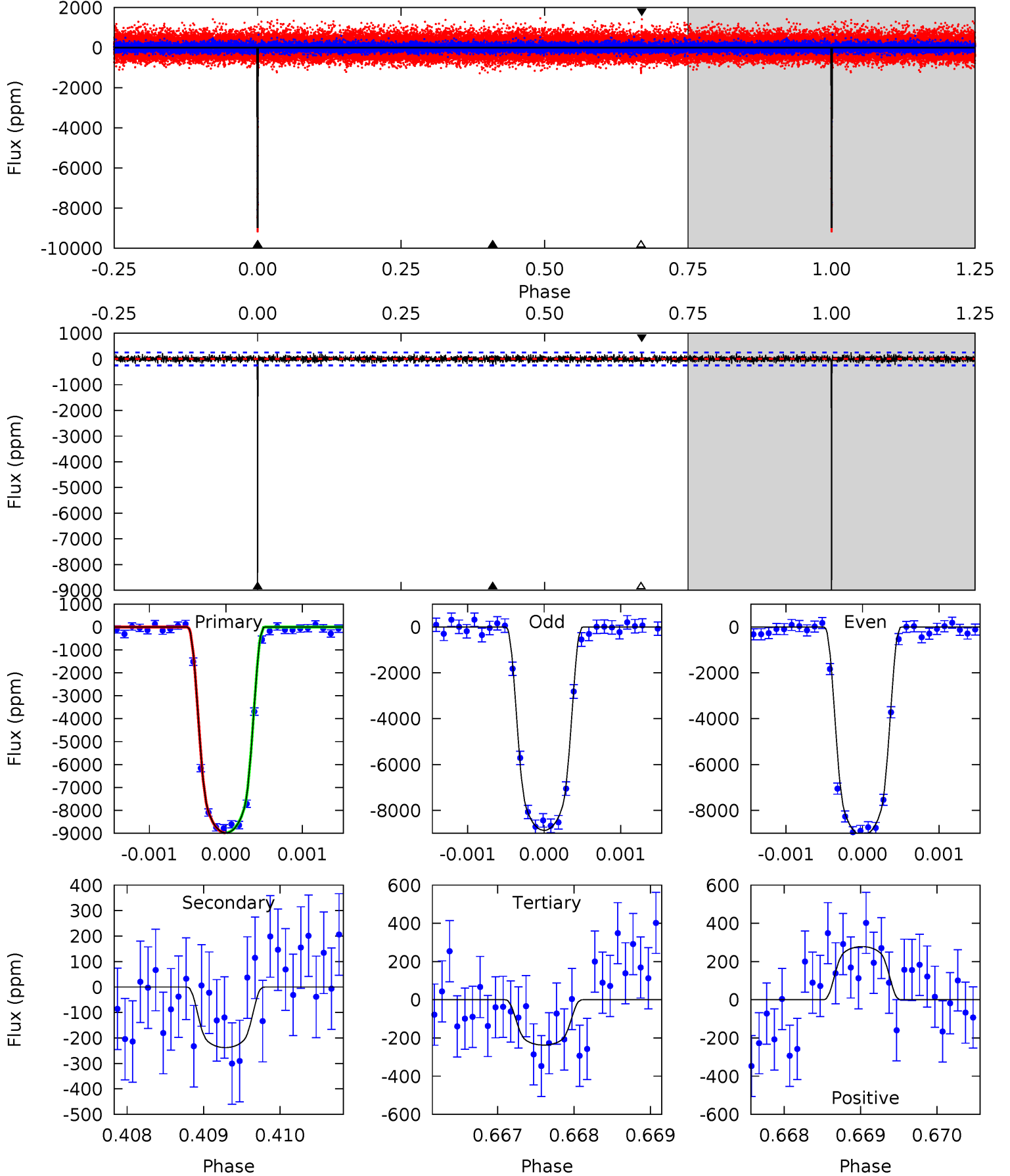
TCE 008813698-01 P=268.939706 Days  $T_0=360.073151$  (BKJD)



# DV Model-Shift Uniqueness Test

008813698-01,  $P = 268.941207$  Days,  $E = 91.129738$  Days

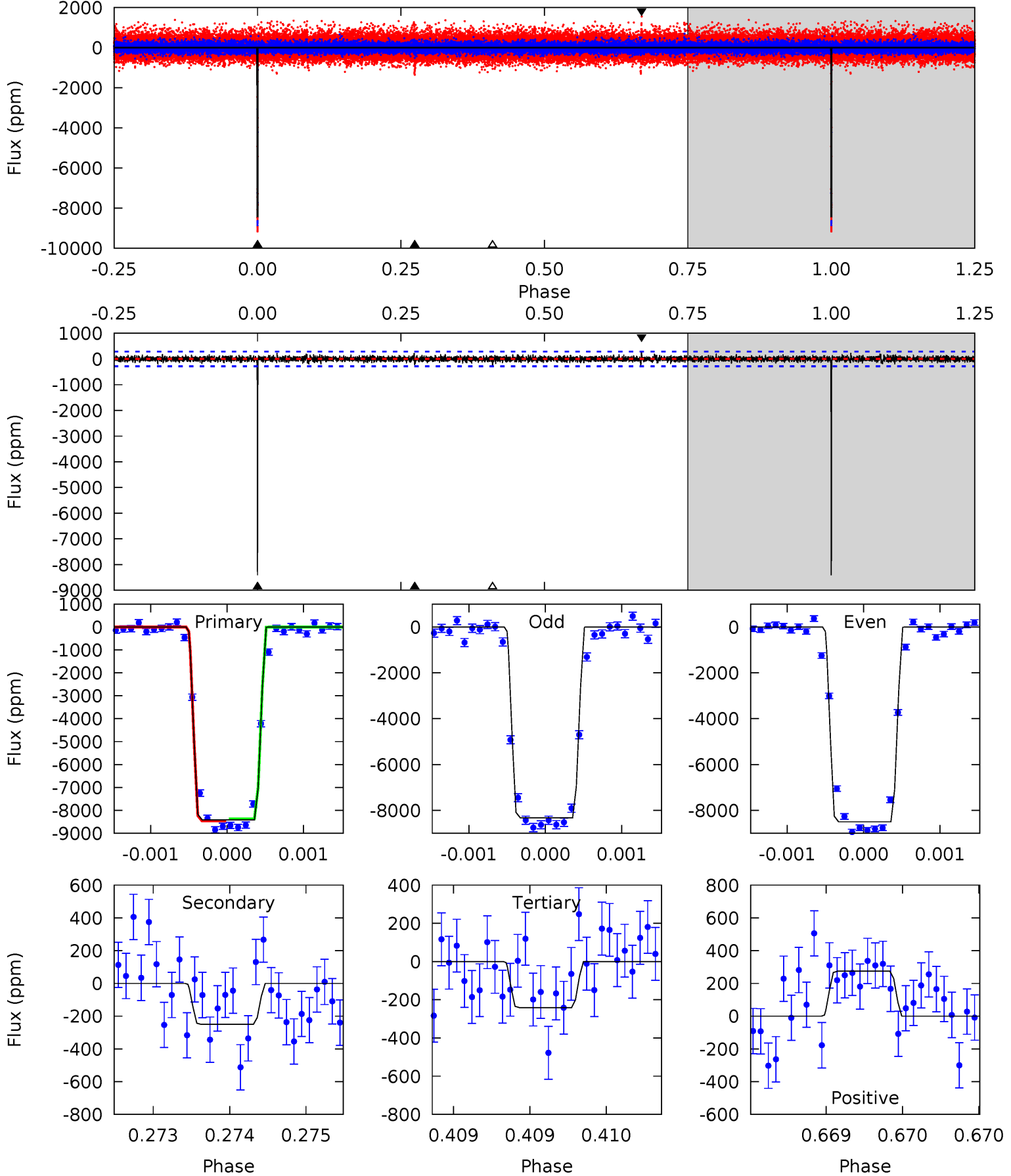
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
196.0	5.19	5.18	6.07	5.47	3.32	1.26	190.9	190.0	0.02	-0.88	2.35	1.00	0.03	0.15



# Alt Model-Shift Uniqueness Test

008813698-01,  $P = 268.939706$  Days,  $E = 91.133445$  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
160.6	4.77	4.60	5.24	5.51	3.38	1.05	156.0	155.4	0.17	-0.46	1.60	1.00	0.03	0.94



### Stellar Parameters For KIC 008813698

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5798^{+78}_{-78}$	$4.224^{+0.156}_{-0.104}$	$0.140^{+0.150}_{-0.150}$	$1.306^{+0.222}_{-0.222}$	$1.041^{+0.087}_{-0.063}$	$0.658^{+0.511}_{-0.211}$
	+1%/-1%	+4%/-2%	+107%/-107%	+17%/-17%	+8%/-6%	+78%/-32%
Source	SPE90	SPE90	SPE90	DSEP		

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

### Secondary Eclipse Parameters for KIC 008813698-01 / KOI 1268.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-238 \pm 46$	$13.65^{+1.37}_{-1.47}$	$447^{+22}_{-22}$	$2997^{+76}_{-101}$	$481^{+147}_{-118}$
Alt.	$-250 \pm 52$	$13.24^{+1.09}_{-1.29}$	$448^{+19}_{-22}$	$3046^{+89}_{-101}$	$548^{+151}_{-139}$

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

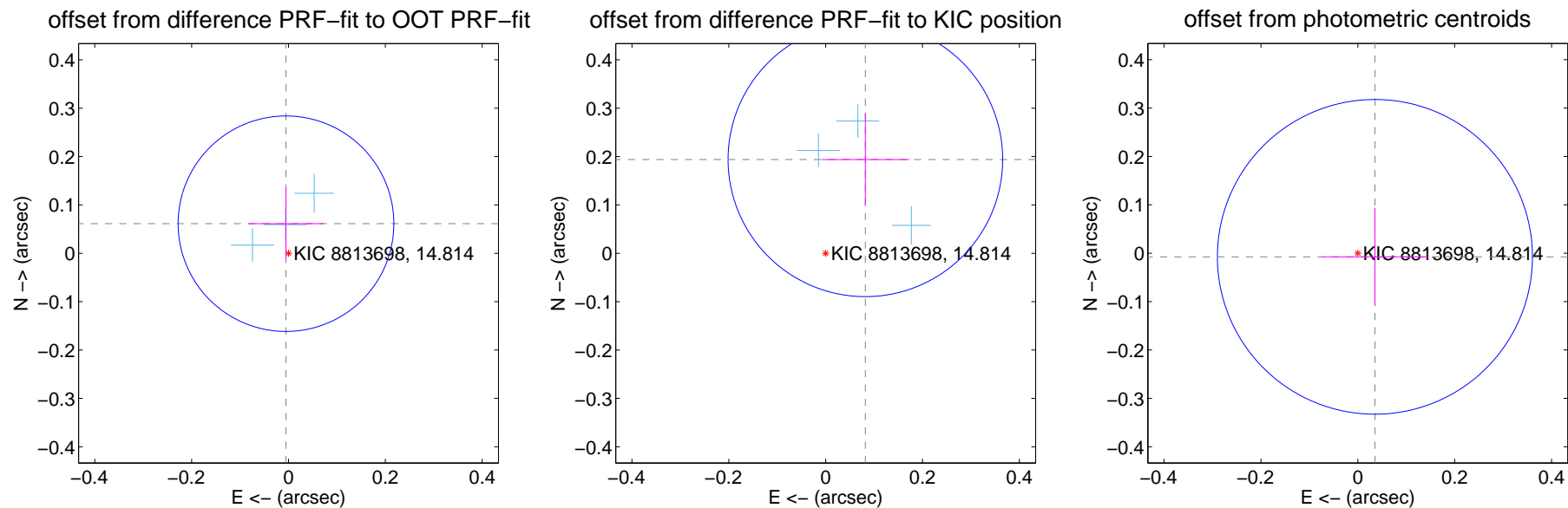
## DV Centroid Data

Supplemental centroid analysis for 008813698-01. Kepler magnitude: 14.81. Transit SNR 140.01

There are 3 quarters with good PRF difference image offsets

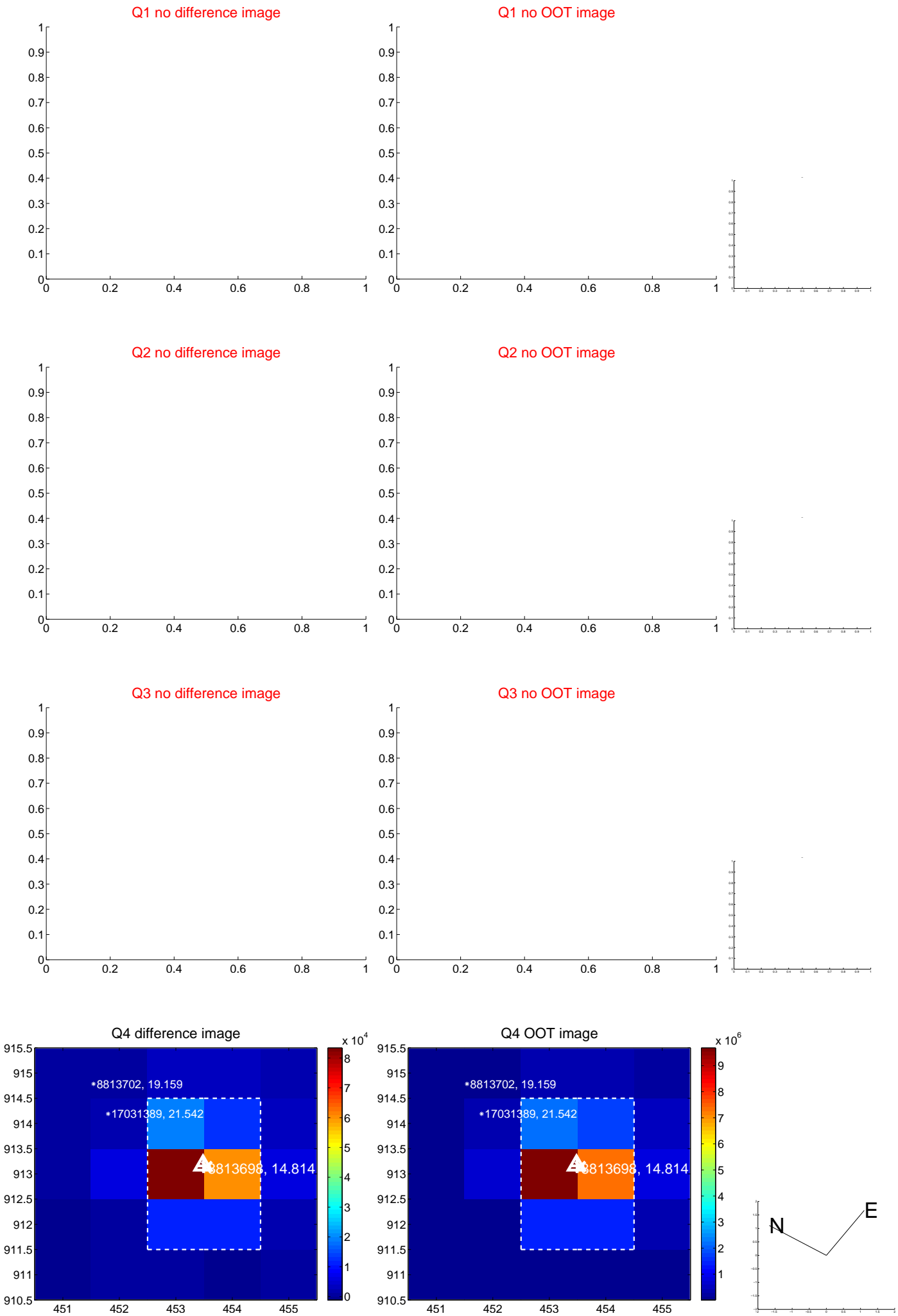
The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.061 \pm 0.074$	0.83	$0.005 \pm 0.078$	$0.061 \pm 0.074$
PRF-fit source offset from KIC position	$0.211 \pm 0.095$	2.23	$-0.082 \pm 0.091$	$0.194 \pm 0.095$
photometric centroid source offset	$0.04 \pm 0.11$	0.33	$-0.04 \pm 0.11$	$-0.01 \pm 0.10$



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.

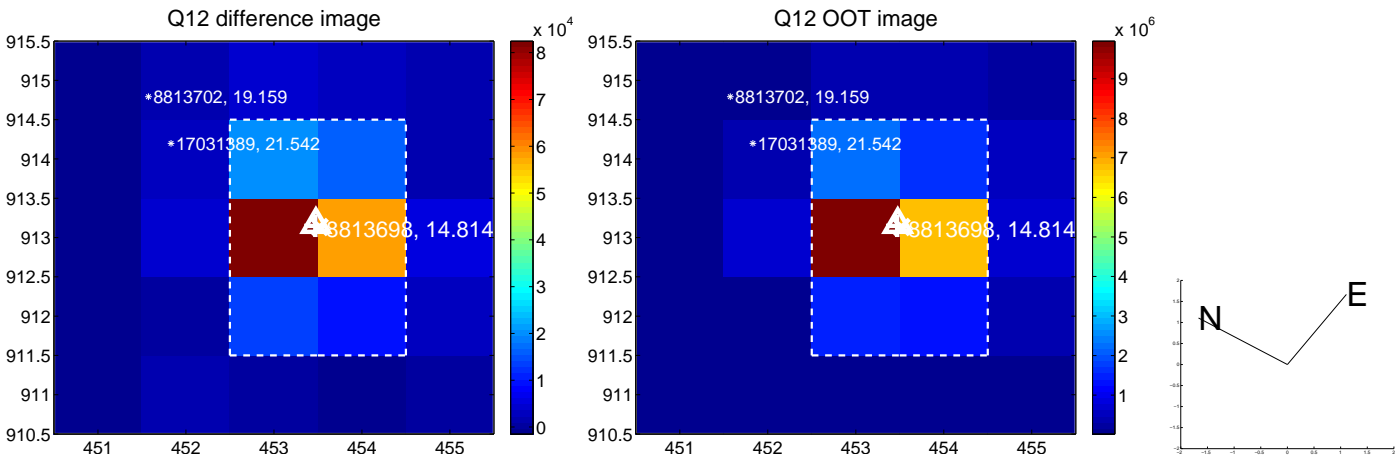
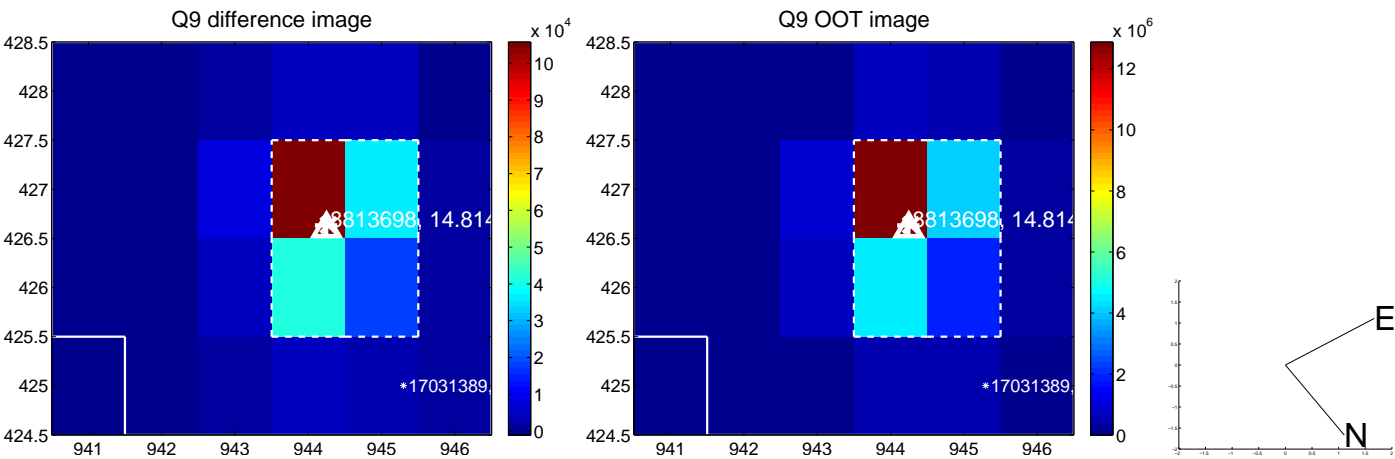


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





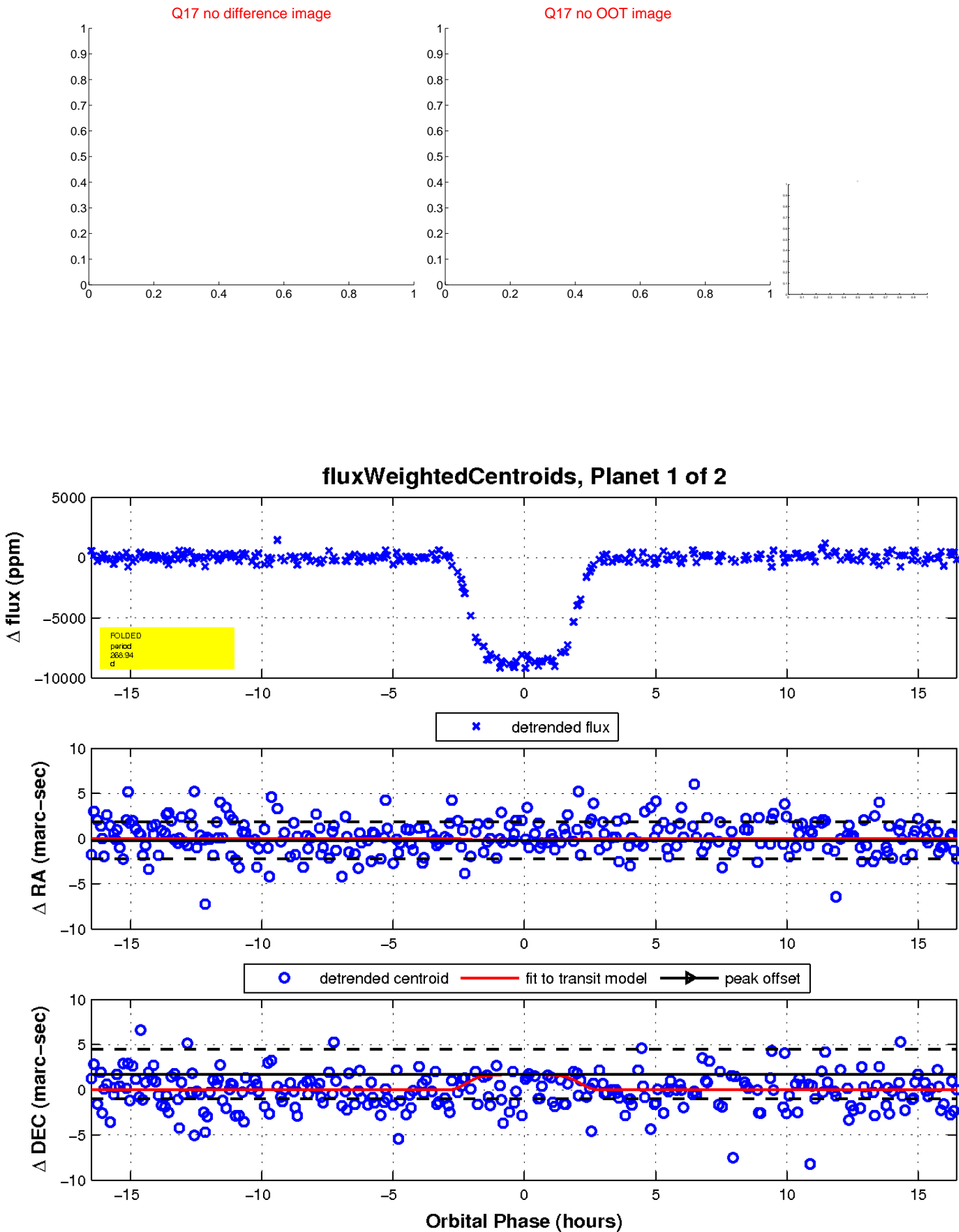
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

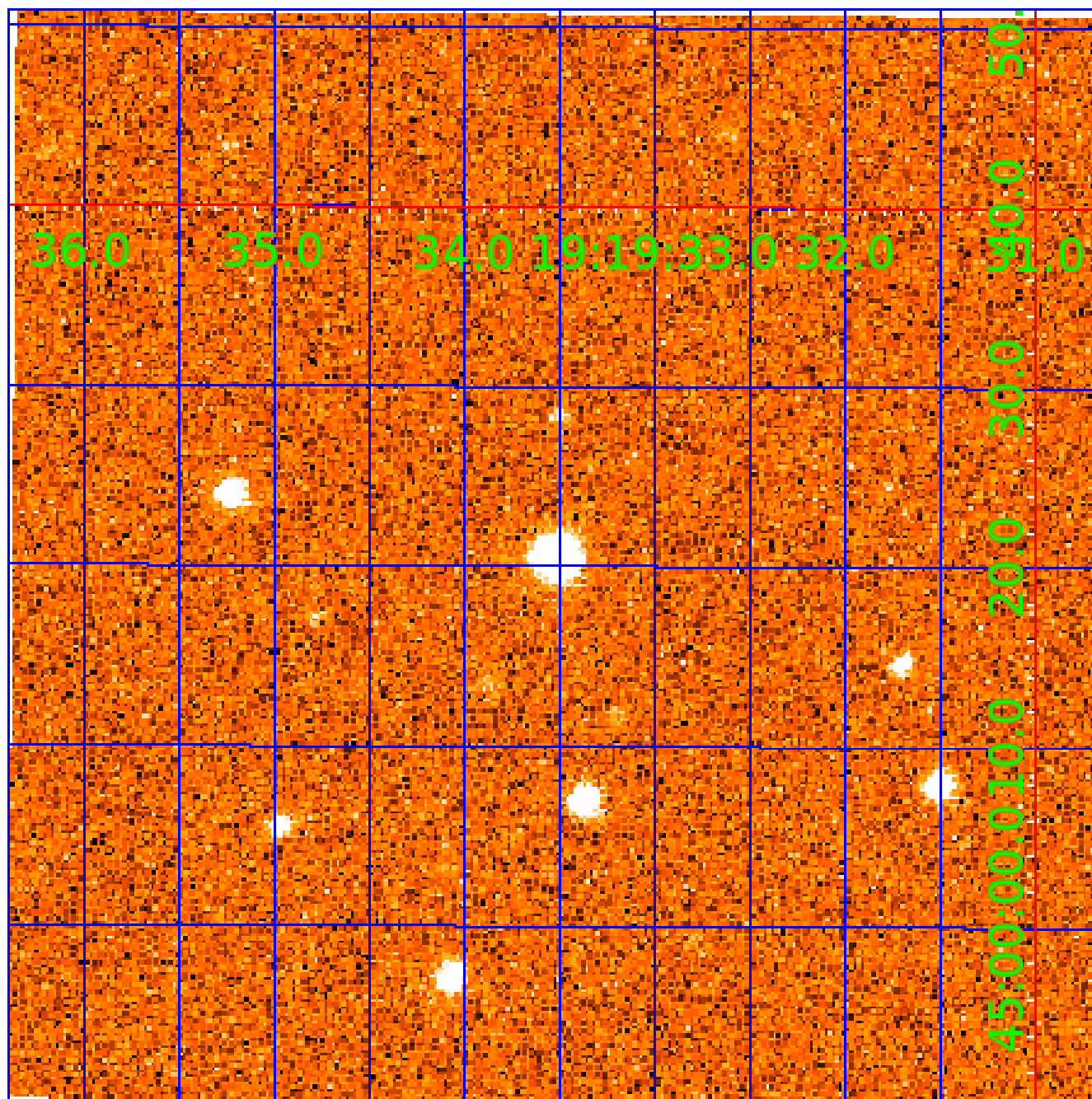


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination



# KIC 008813698

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008813698-01	OBS	1268.01	268.941207	360.070945	9025.9	5.506	133.1	140.0	1.31	5798	13.72	2.53
008813698-02	OBS	No	318.415332	285.423102	533.8	15.498	18.9	12.7	1.31	5798	3.12	2.02

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008813698-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008813698-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—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 008813698-02

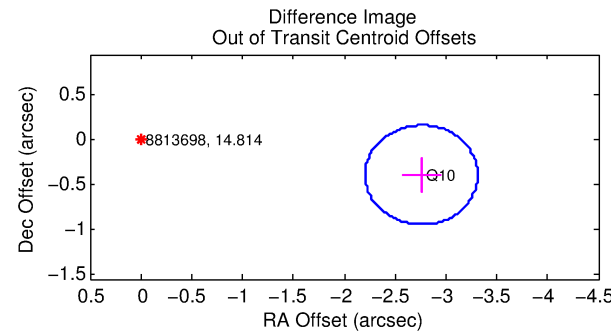
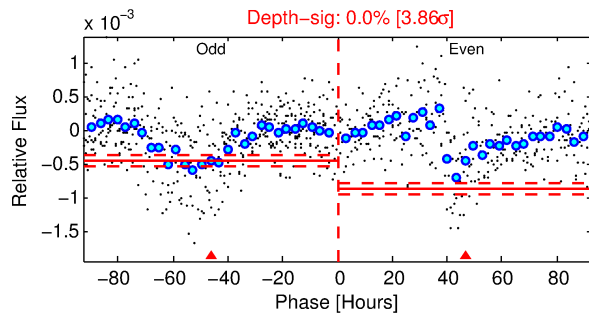
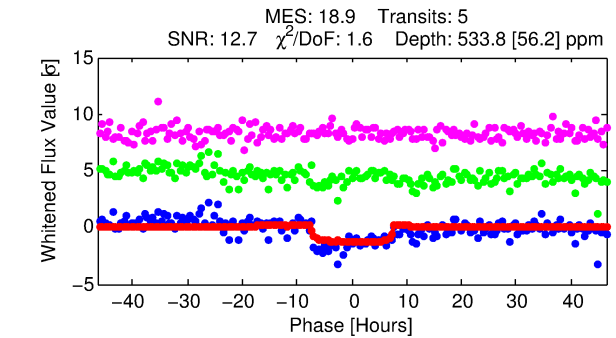
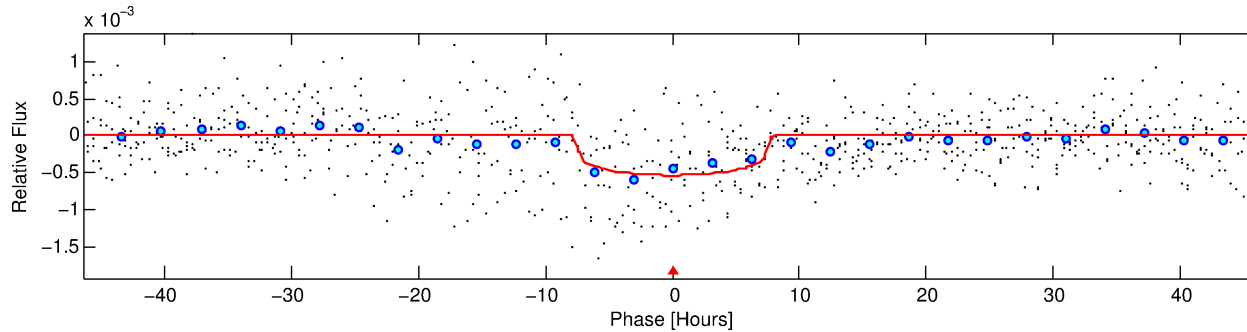
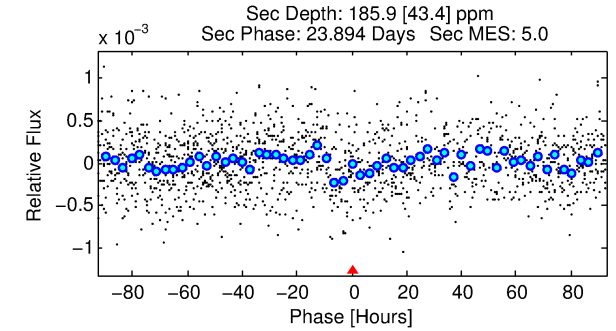
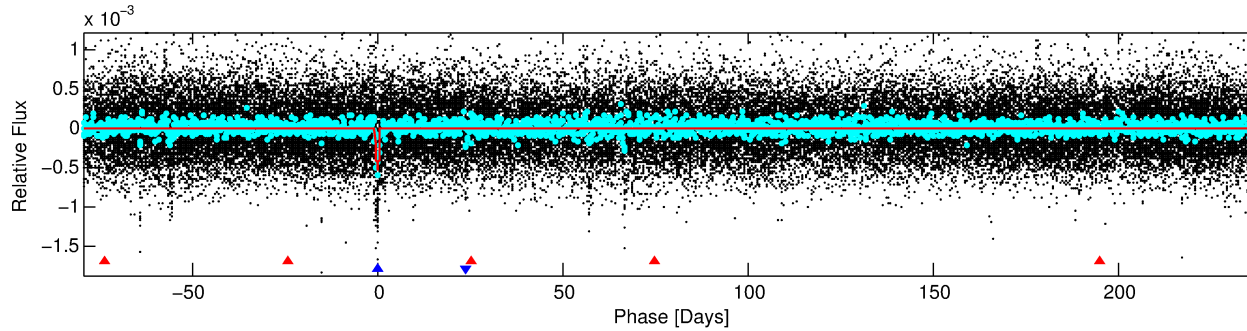
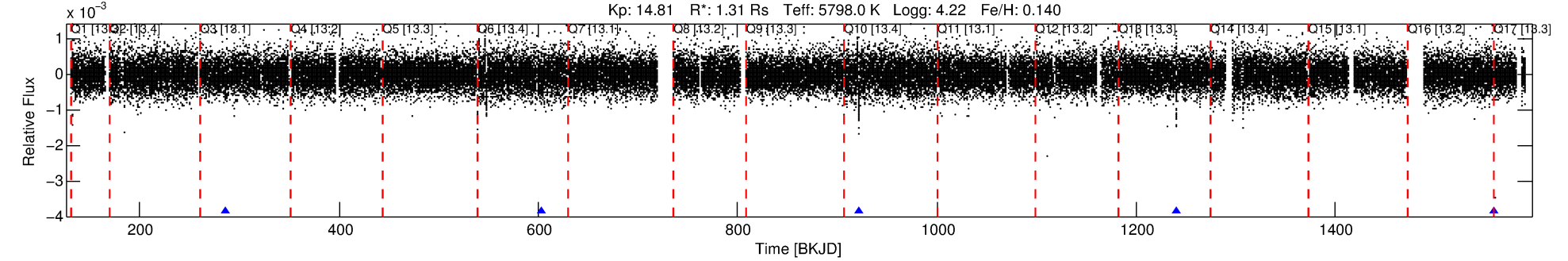
No Significant Match Found

# DV One-Page Summary

KIC: 8813698 Candidate: 2 of 2 Period: 318.415 d

KOI: K01268 Corr: No Ephemeris Match

Kp: 14.81 R\*: 1.31 Rs Teff: 5798.0 K Logg: 4.22 Fe/H: 0.140



## DV Fit Results:

Period = 318.41533 [0.00803] d  
Epoch = 285.4231 [0.0181] BKJD  
Rp/R\* = 0.0219 [0.0103]  
a/R\* = 132.20 [269.34]  
b = 0.58 [2.35]  
Seff = 2.02 [0.55]  
Teq = 304 [21] K  
Rp = 3.12 [1.55] Re  
a = 0.9254 [0.1526] AU  
Ag = 8973.40 [8972.04] [1.00σ]  
Teffp = 4573 [1104] K [3.87σ]

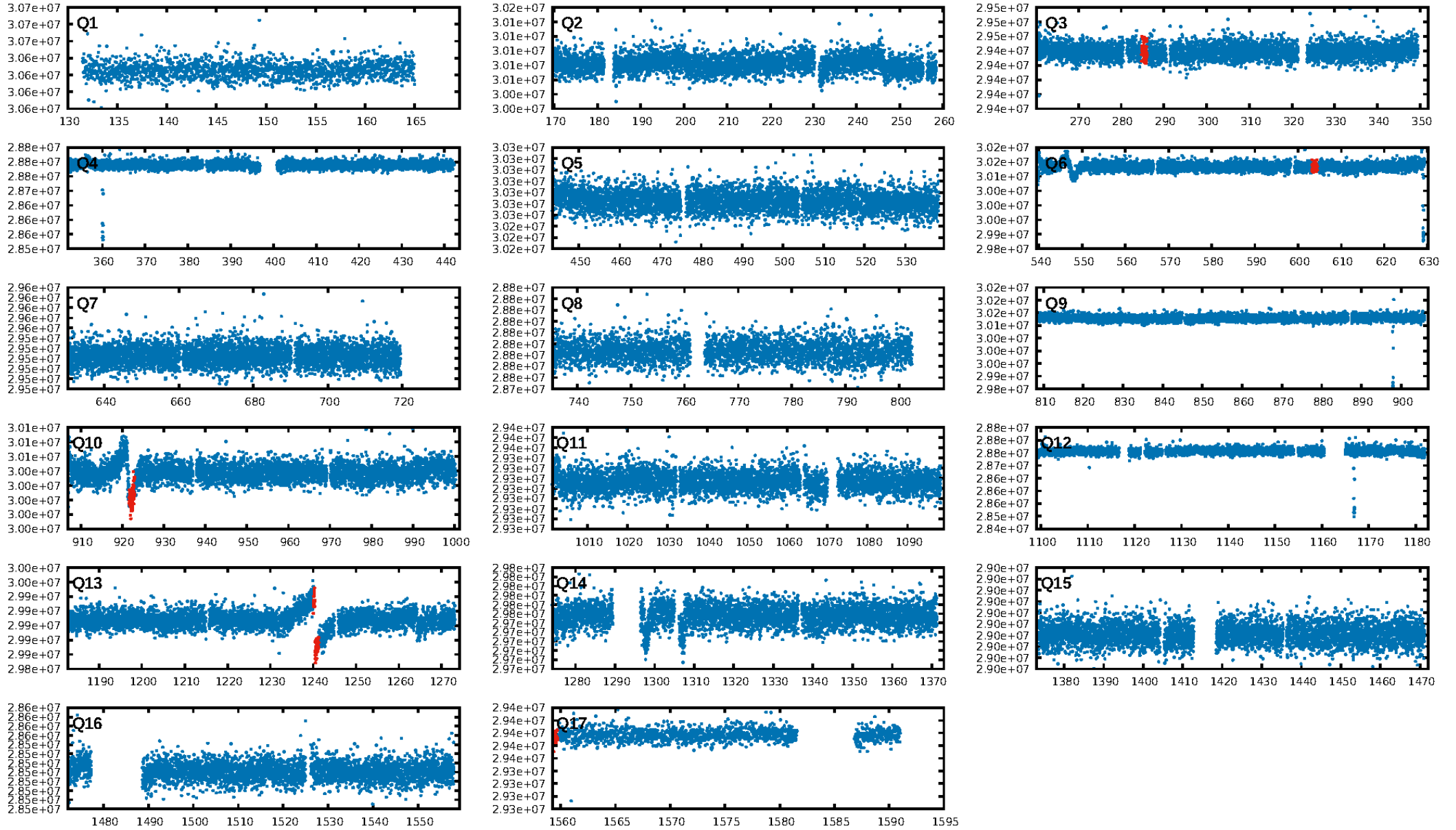
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [72.19σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 24.5%  
Bootstrap-pfa: 1.18e-29  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 3.558  
Centroid-sig: 0.0%  
Centroid-so: 2.534 arcsec [2.37σ]  
OotOffset-rm: 2.786 arcsec [15.10σ]  
KicOffset-rm: 2.904 arcsec [15.74σ]  
OotOffset-st: 1/0/0/0 [1]  
KicOffset-st: 1/0/0/0 [1]  
DiffImageQuality-fgm: 0.00 [0/1]  
DiffImageOverlap-fno: 1.00 [3/3]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 19:51:58 Z

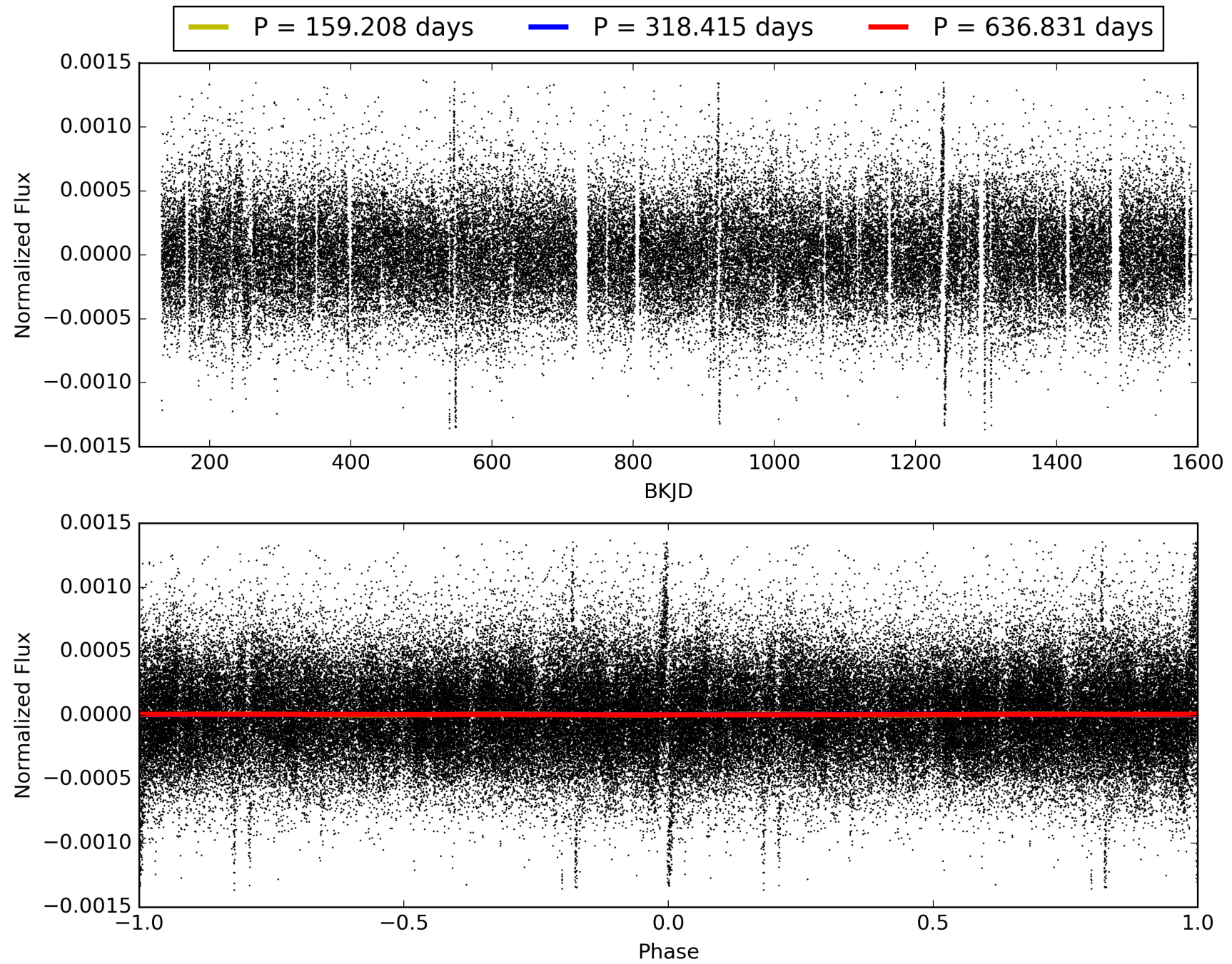
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008813698-02, PDC Light Curves





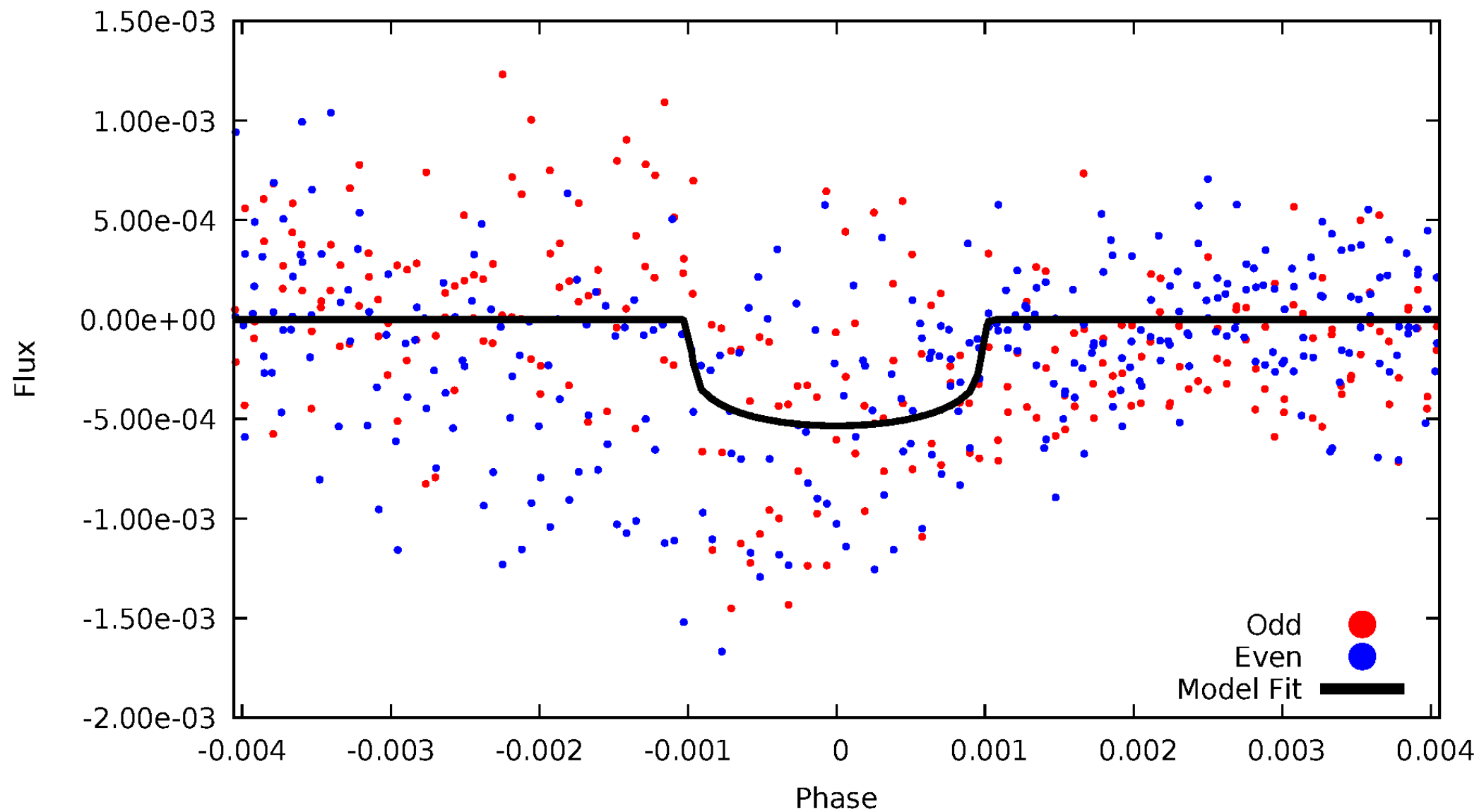
TCE 008813698-02





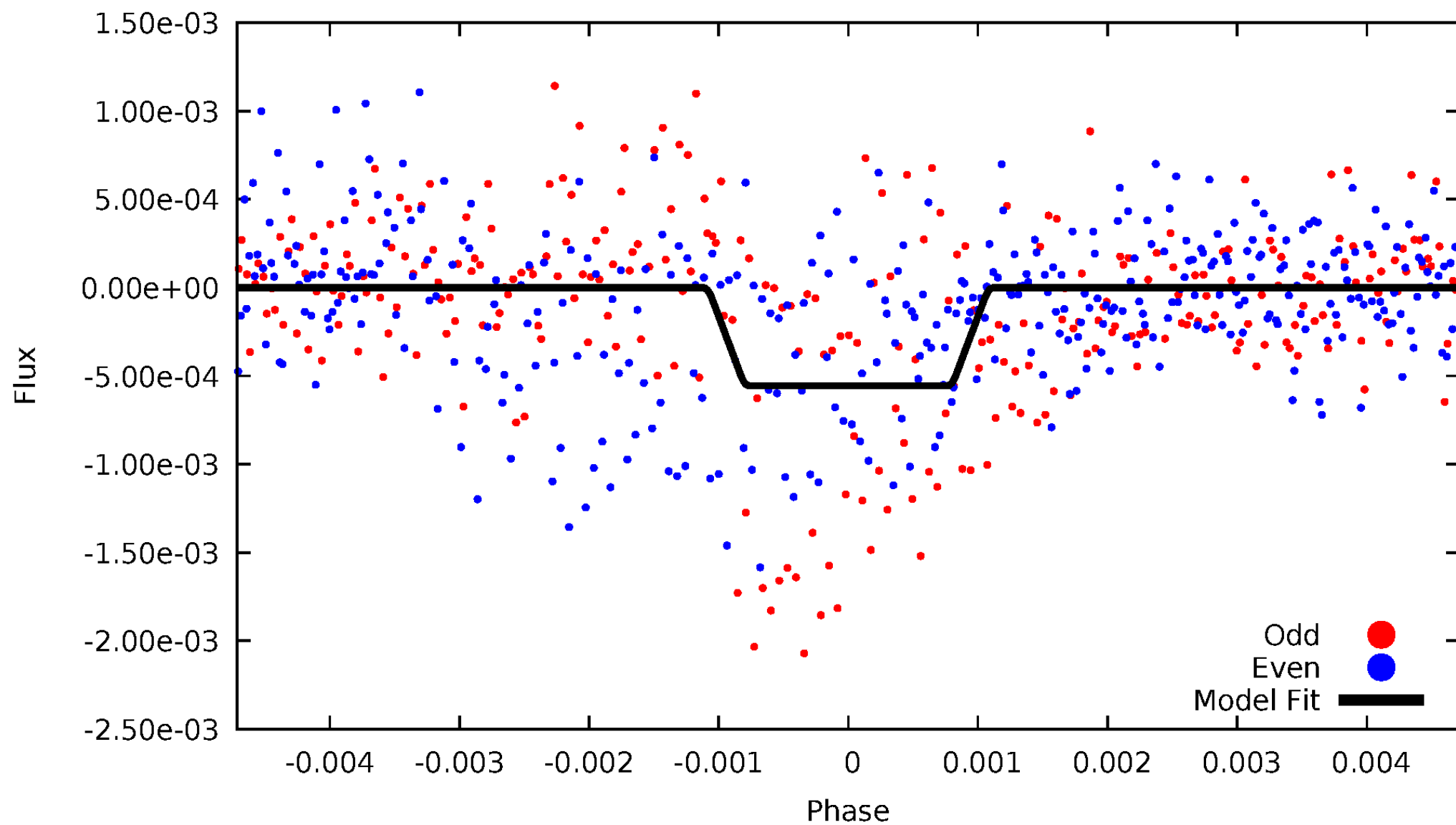
# DV Odd/Even

TCE 008813698-02



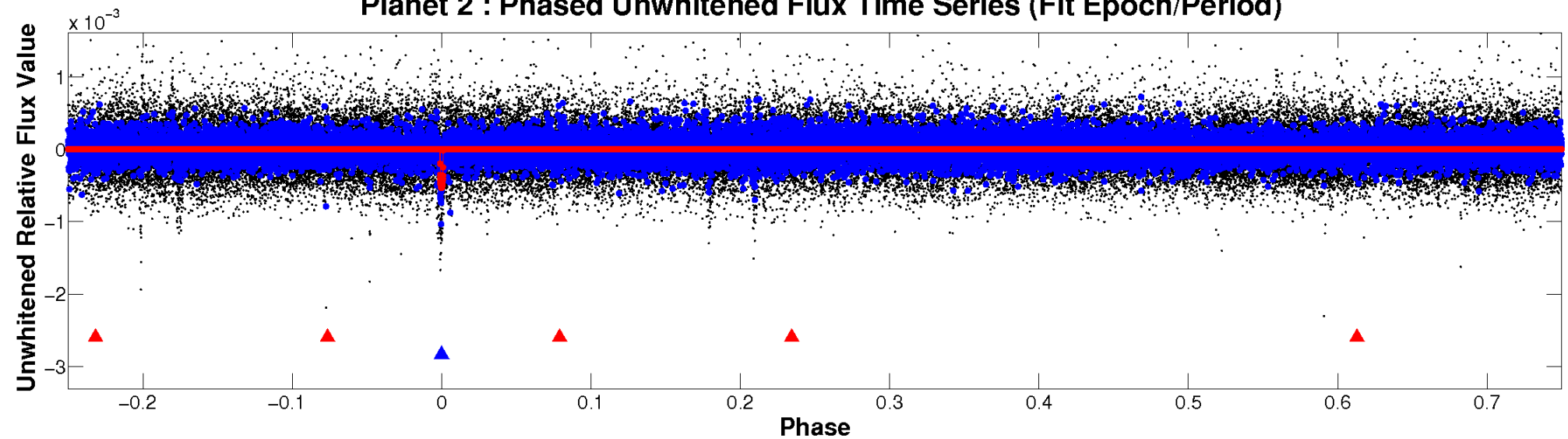
# ALT Odd/Even

TCE 008813698-02

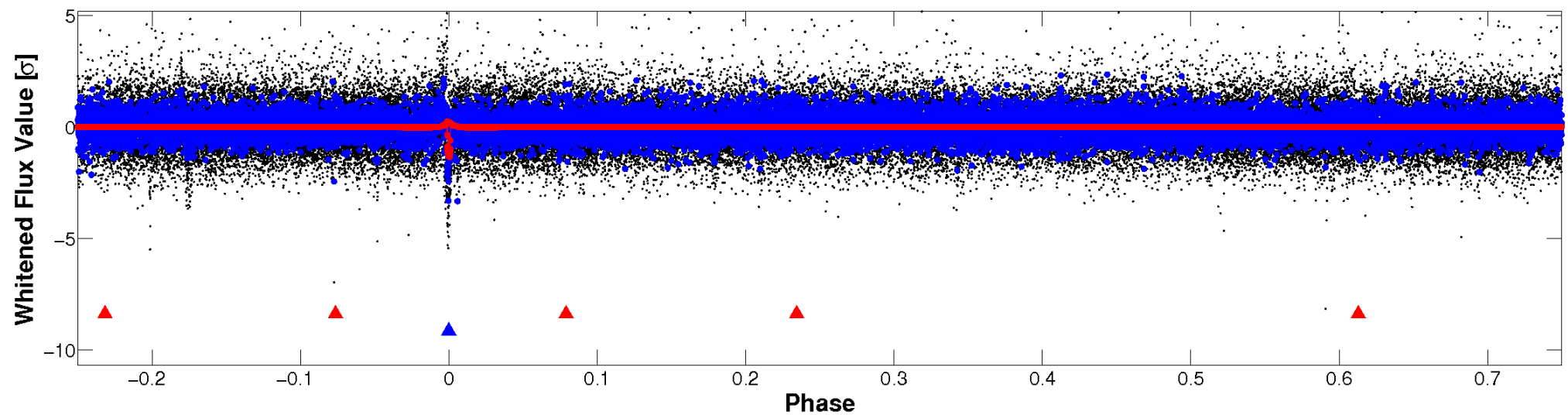


# Non-Whitened Vs. Whitened Light Curve

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

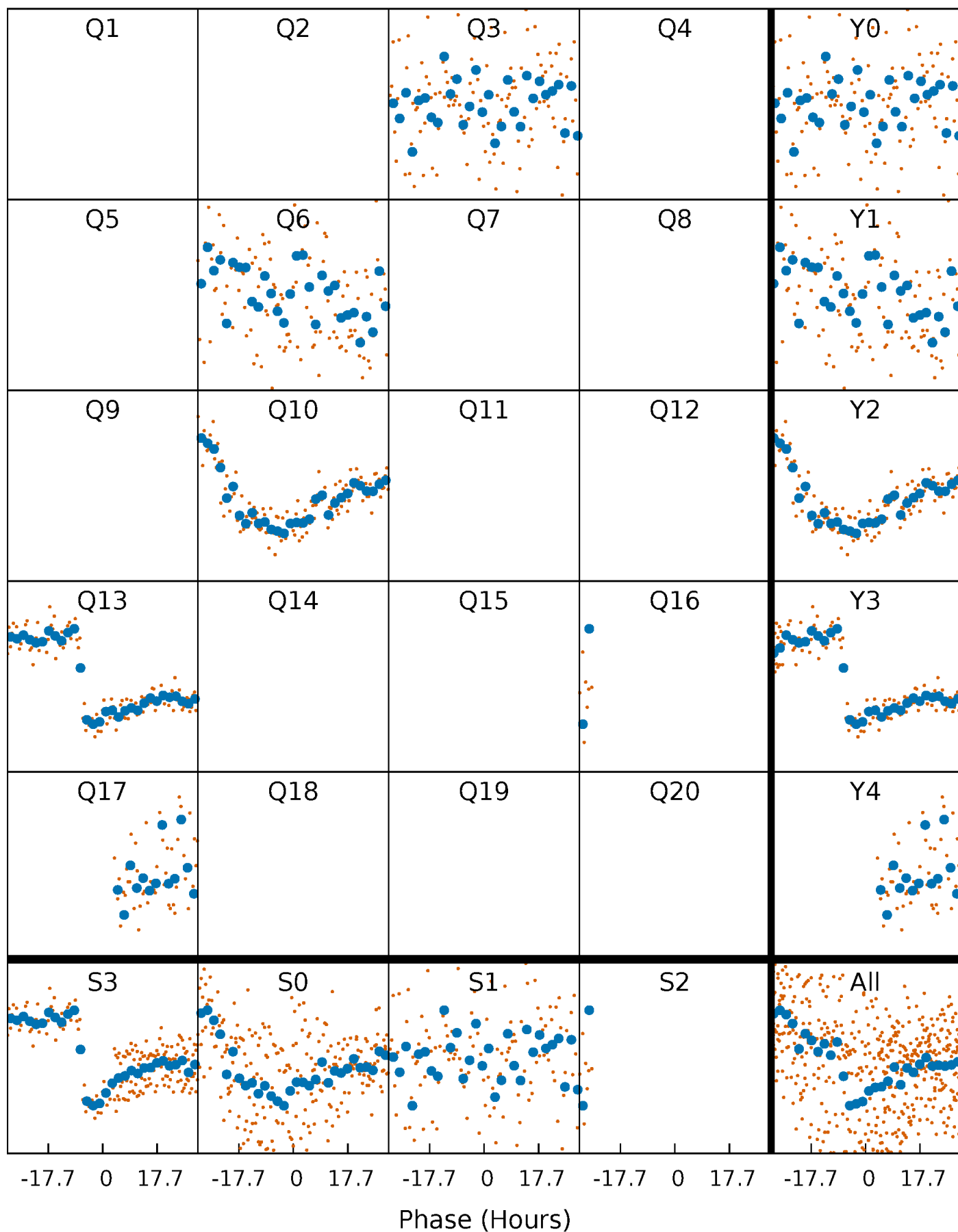


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



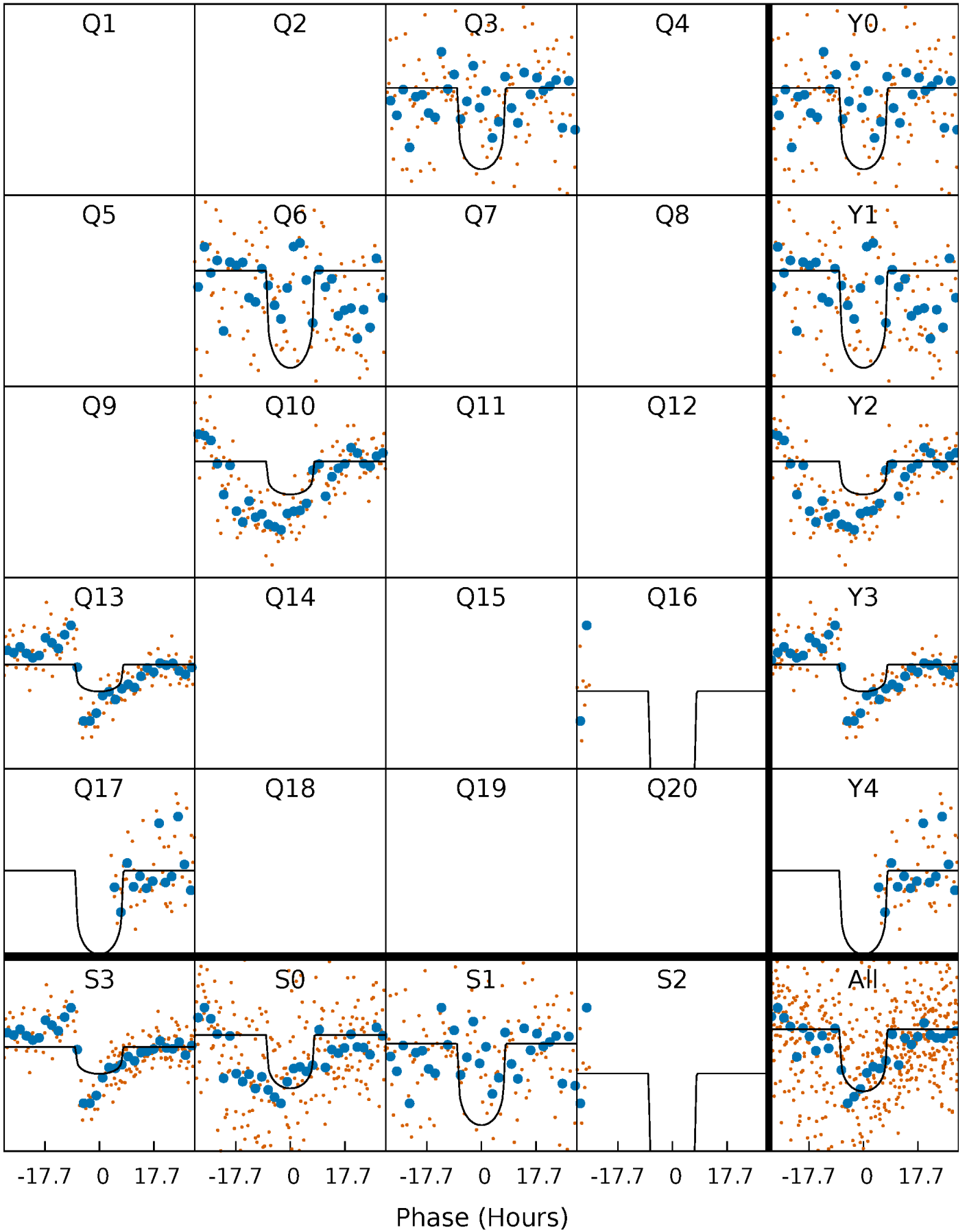
# PDC Quarter-Phased Transit Curves

TCE 008813698-02     $P=318.415332$  Days     $T_0=285.423102$  (BKJD)



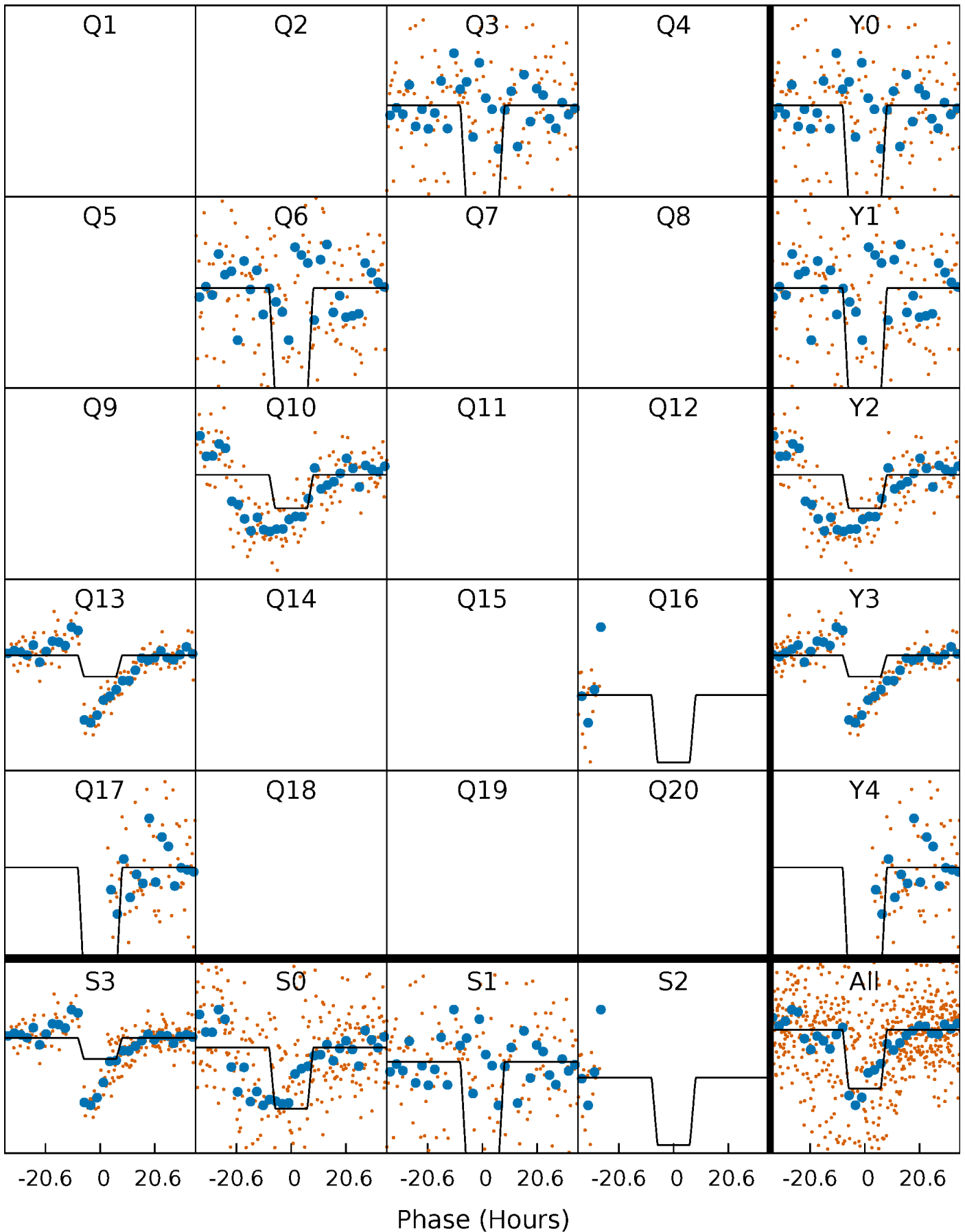
# DV Quarter-Phased Transit Curves

TCE 008813698-02     $P=318.415332$  Days     $T_0=285.423102$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

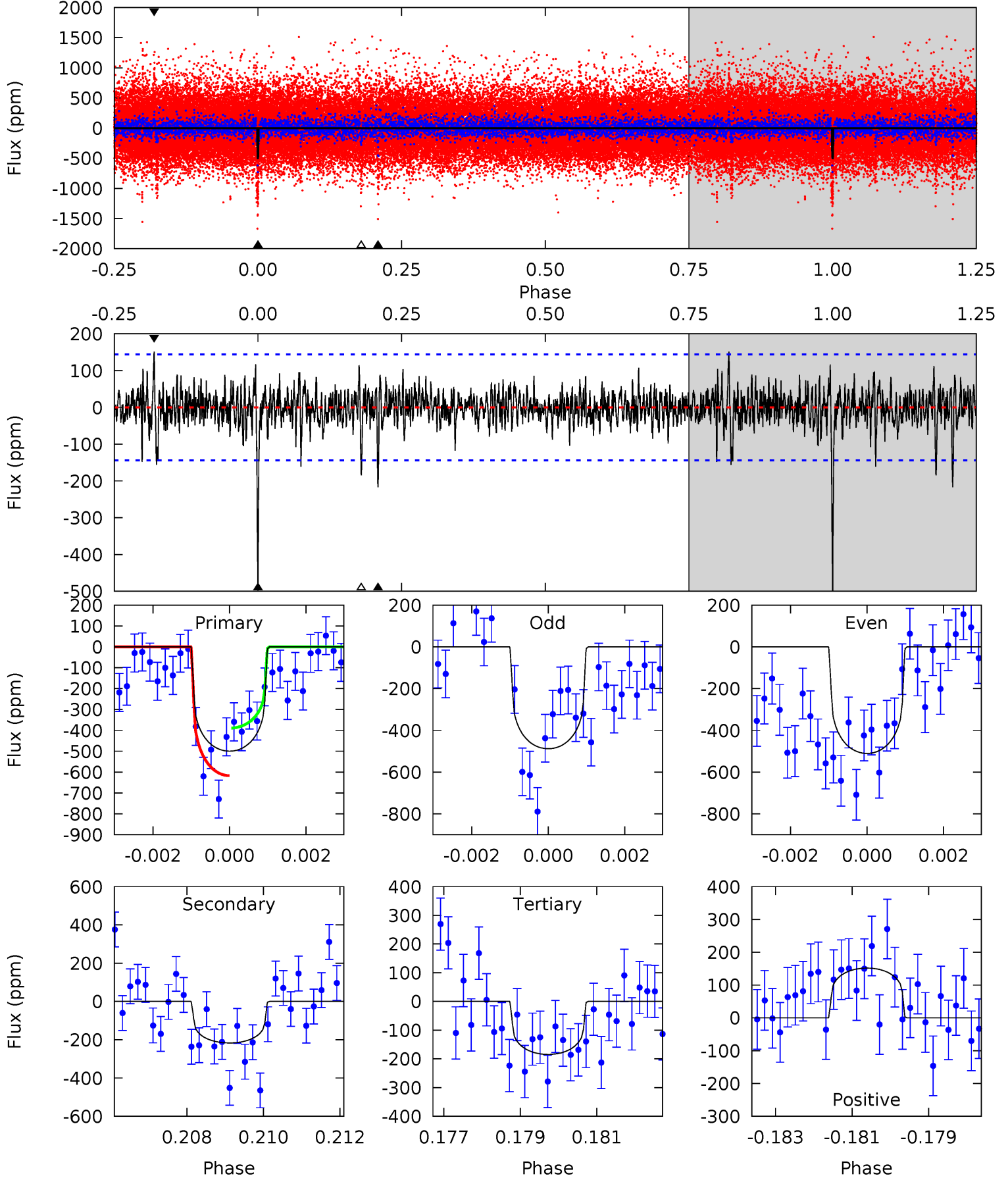
TCE 008813698-02     $P=318.450221$  Days     $T_0=285.323816$  (BKJD)



# DV Model-Shift Uniqueness Test

008813698-02, P = 318.415332 Days, E = 285.423102 Days

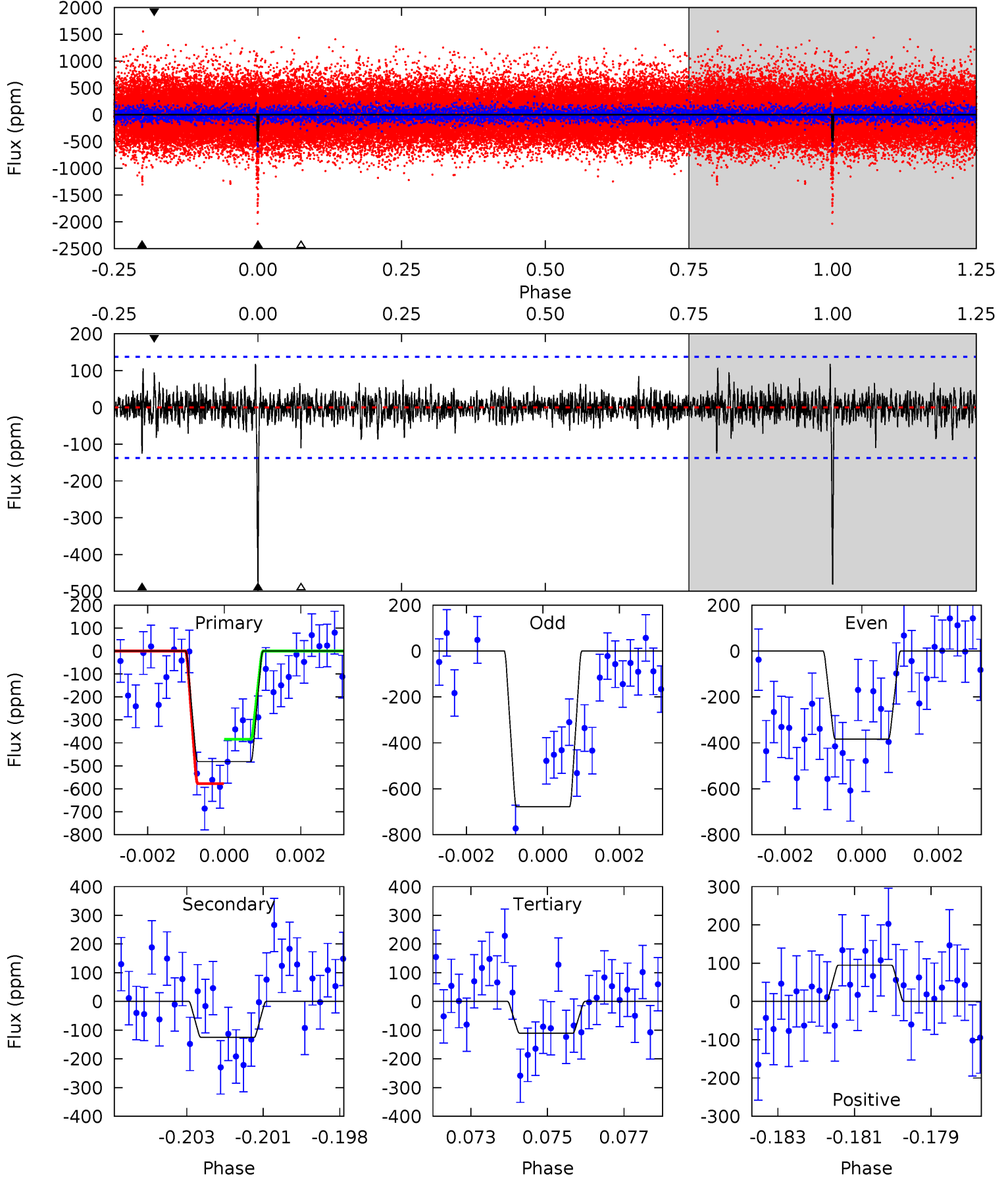
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.5	8.01	6.82	5.60	5.32	3.08	1.34	11.6	12.9	1.19	2.40	0.42	1.93	0.23	4.20



# Alt Model-Shift Uniqueness Test

008813698-02, P = 318.450221 Days, E = 285.323816 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
18.6	4.83	4.26	3.66	5.31	3.06	0.92	14.3	14.9	0.57	1.17	5.76	2.42	0.20	3.65





### Stellar Parameters For KIC 008813698

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5798^{+78}_{-78}$	$4.224^{+0.156}_{-0.104}$	$0.140^{+0.150}_{-0.150}$	$1.306^{+0.222}_{-0.222}$	$1.041^{+0.087}_{-0.063}$	$0.658^{+0.511}_{-0.211}$
	+1%/-1%	+4%/-2%	+107%/-107%	+17%/-17%	+8%/-6%	+78%/-32%
Source	SPE90	SPE90	SPE90	DSEP		

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

### Secondary Eclipse Parameters for KIC 008813698-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-217 \pm 27$	$3.06^{+1.49}_{-1.46}$	$422^{+20}_{-20}$	$4869^{+1686}_{-688}$	$11385^{+29329}_{-6518}$
Alt.	$-125 \pm 26$	$3.39^{+1.60}_{-1.41}$	$422^{+17}_{-19}$	$4202^{+1054}_{-522}$	$5264^{+10844}_{-2908}$

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

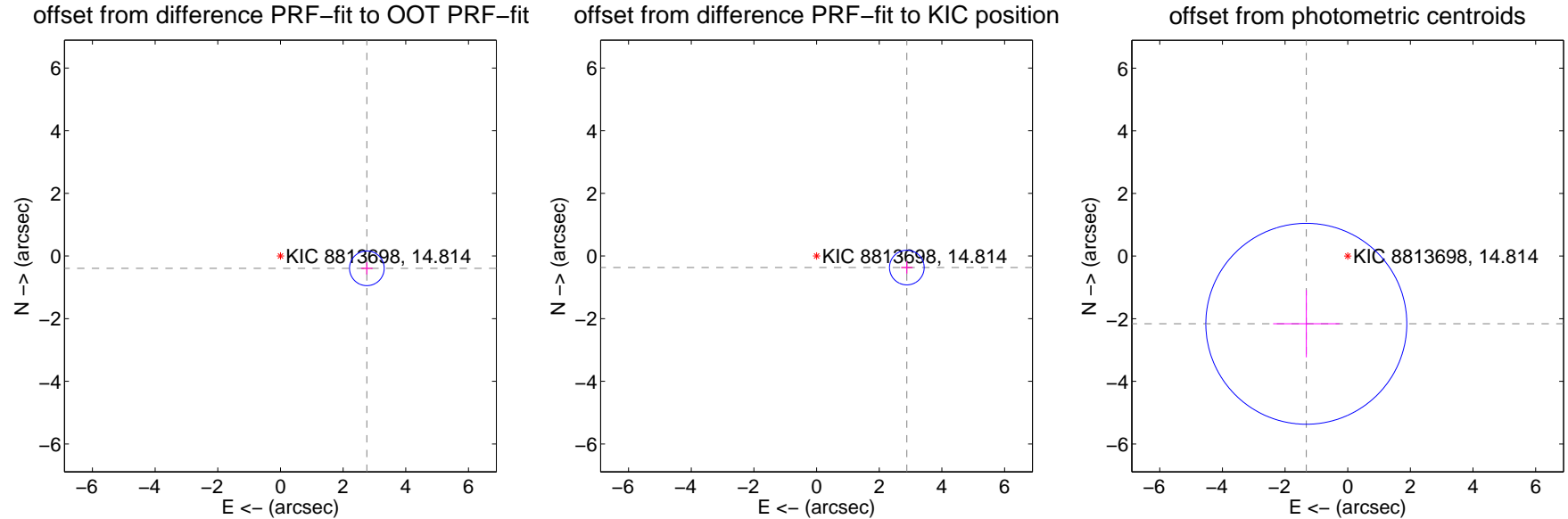
## DV Centroid Data

Supplemental centroid analysis for 008813698-02. Kepler magnitude: 14.81. Transit SNR 12.67

There are 0 quarters with good PRF difference image offsets

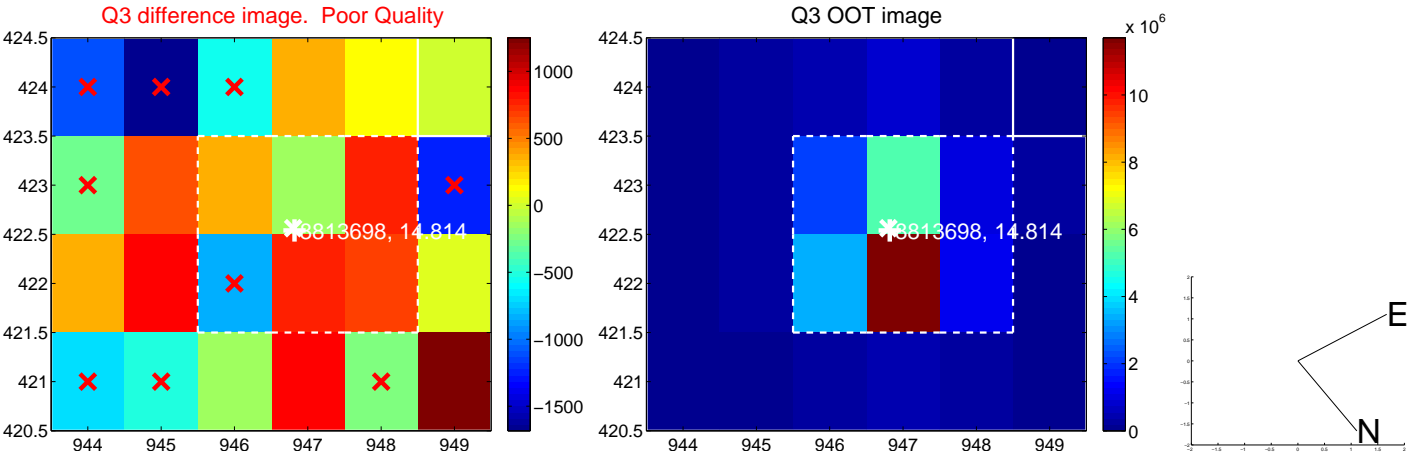
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.786 \pm 0.185$	15.10	$-2.758 \pm 0.184$	$-0.392 \pm 0.195$
PRF-fit source offset from KIC position	$2.904 \pm 0.184$	15.74	$-2.881 \pm 0.184$	$-0.368 \pm 0.195$
photometric centroid source offset	$2.53 \pm 1.07$	2.37	$1.32 \pm 1.06$	$-2.16 \pm 1.07$

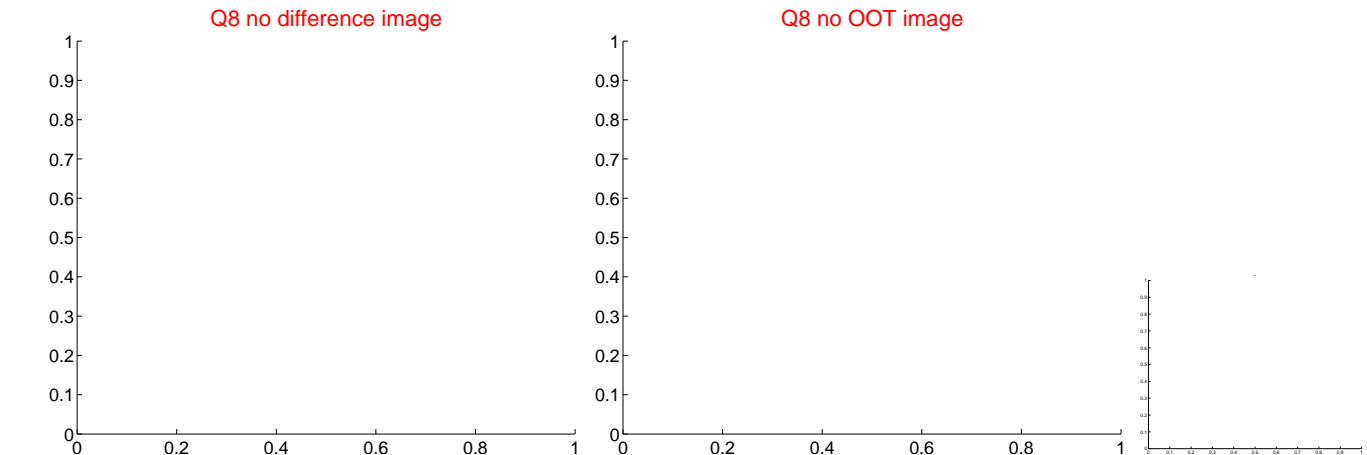
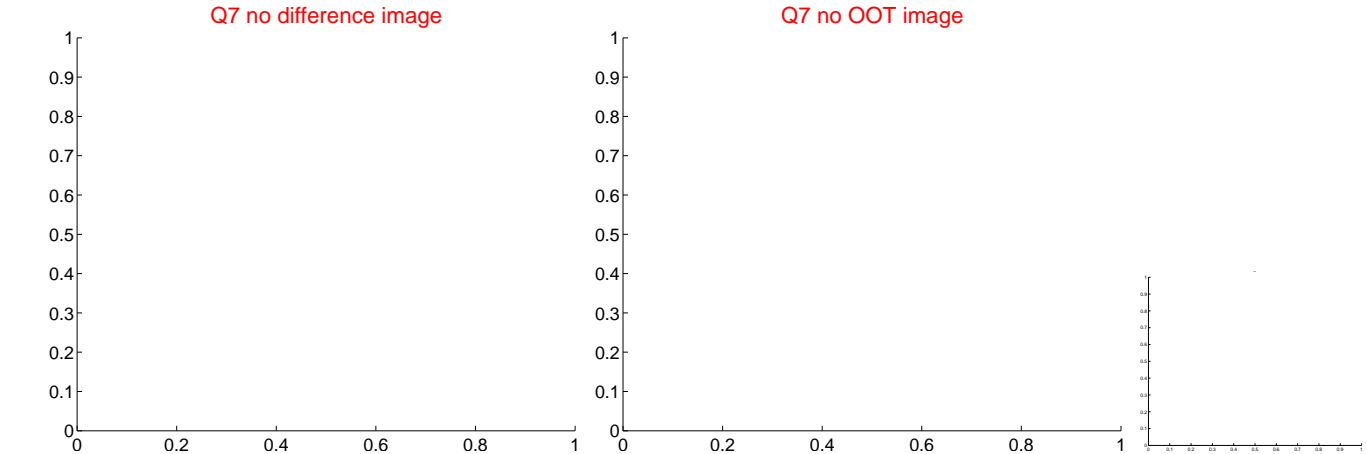
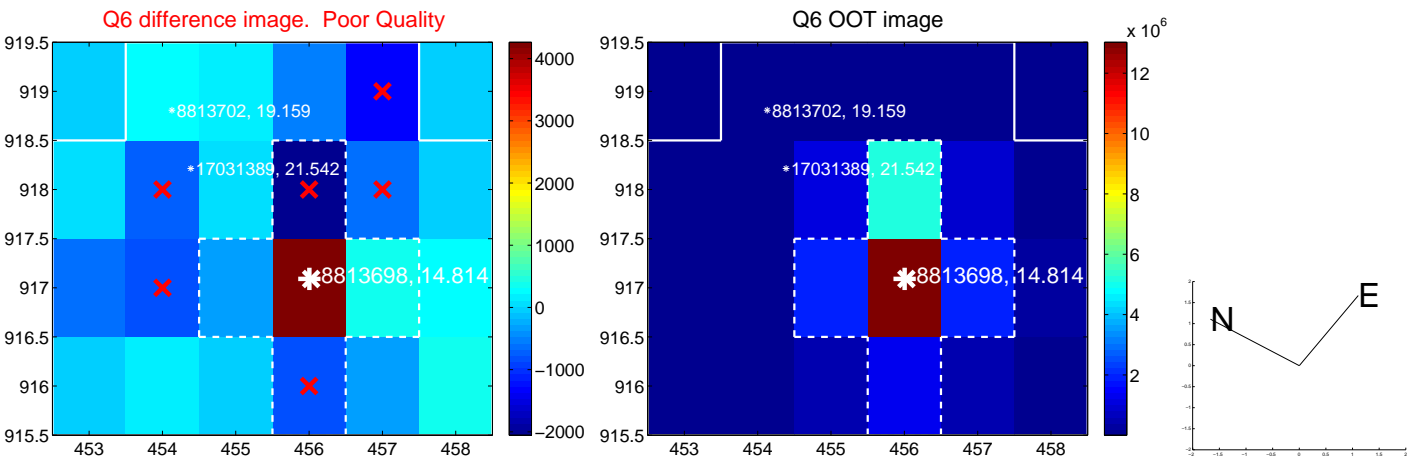
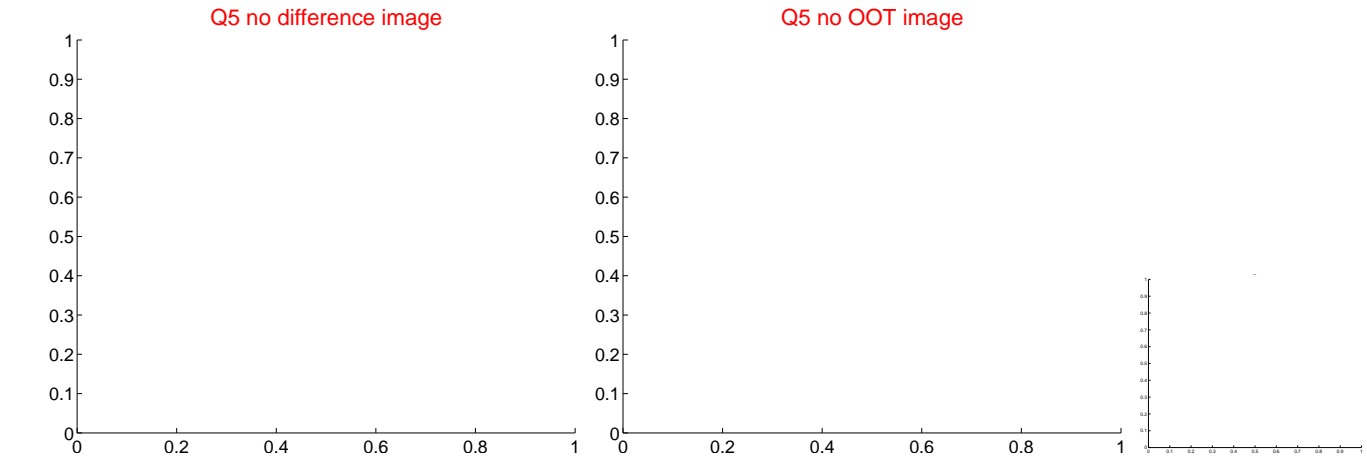


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

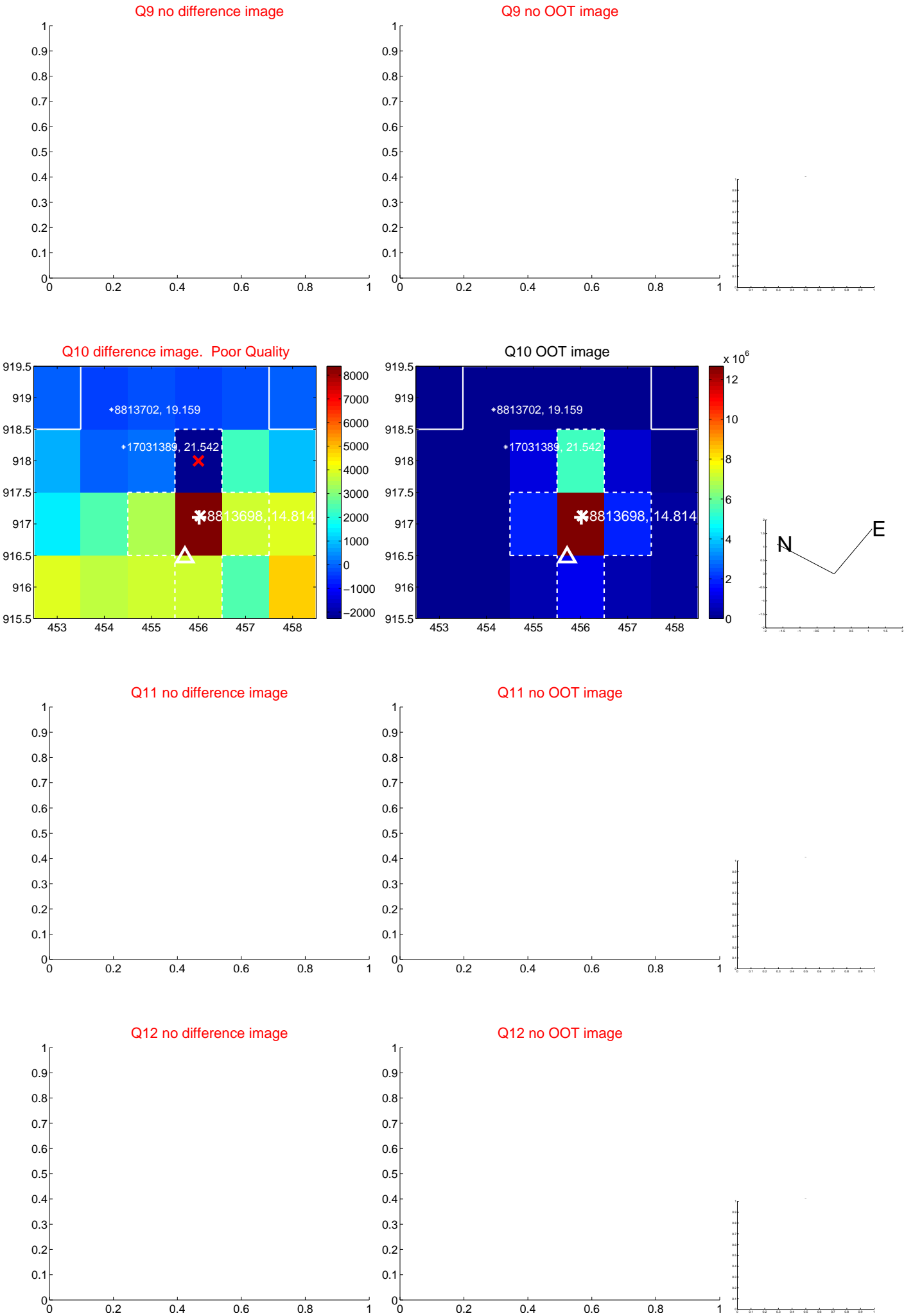
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



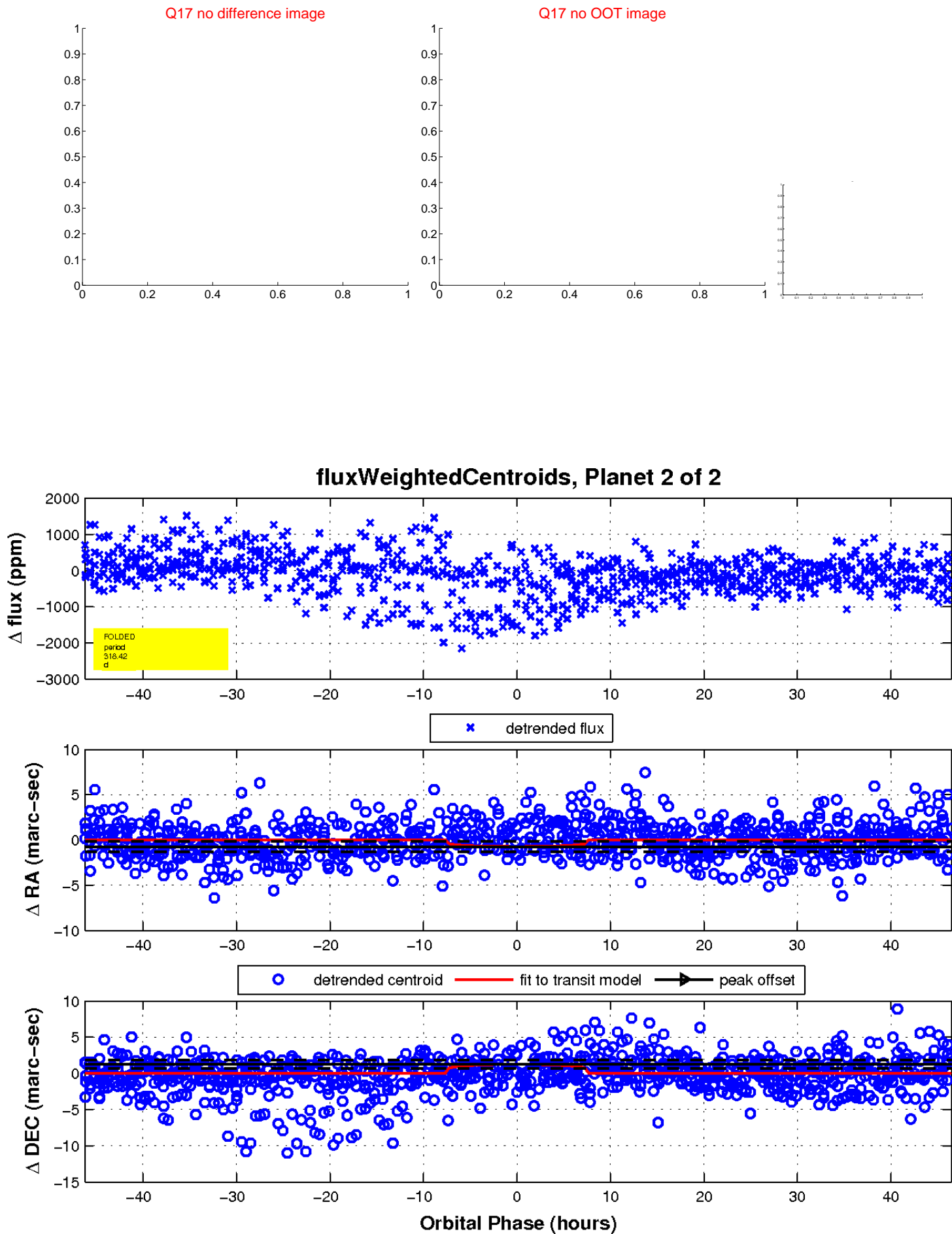
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.



# UKIRT Image

Declination

