

# KIC 011098023

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011098023-01	OBS	No	343.906277	242.276280	3211.6	27.426	9.7	7.9	0.78	5112	8.59	0.44
011098023-02	OBS	No	366.369523	227.316011	4067.1	39.245	8.2	10.5	0.78	5112	9.47	0.41
011098023-03	OBS	No	355.234830	236.036061	2378.7	21.807	7.1	7.4	0.78	5112	7.34	0.42

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011098023-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
011098023-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA—MOD_NONUNIQ_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011098023-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—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.

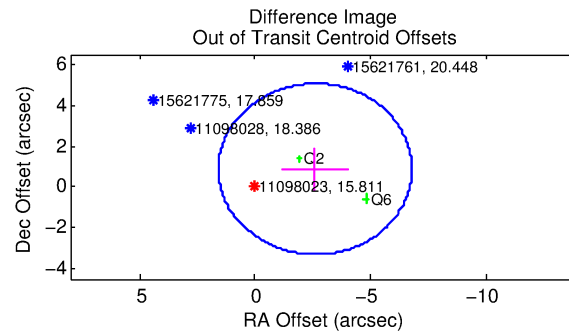
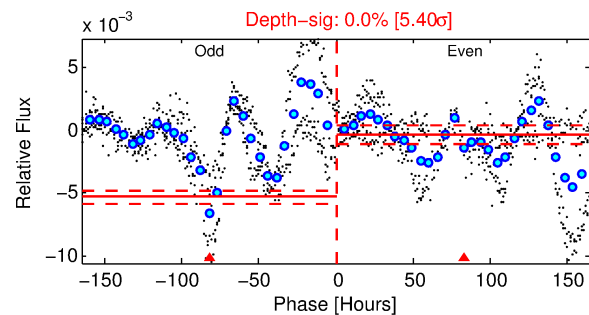
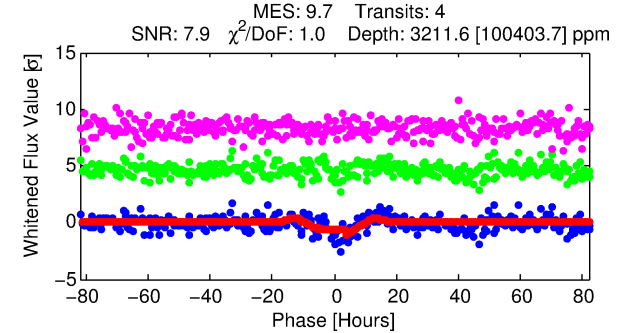
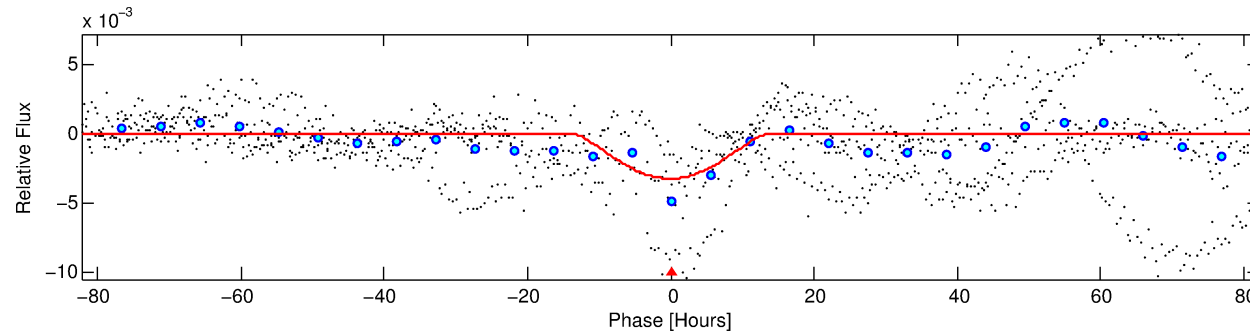
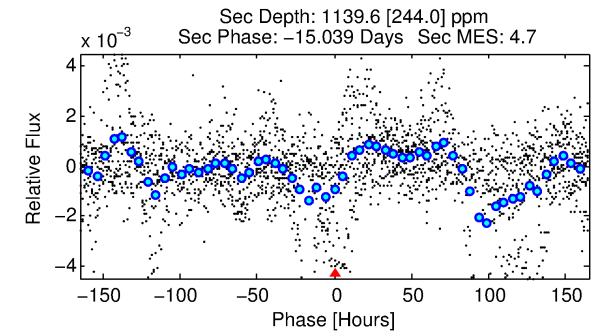
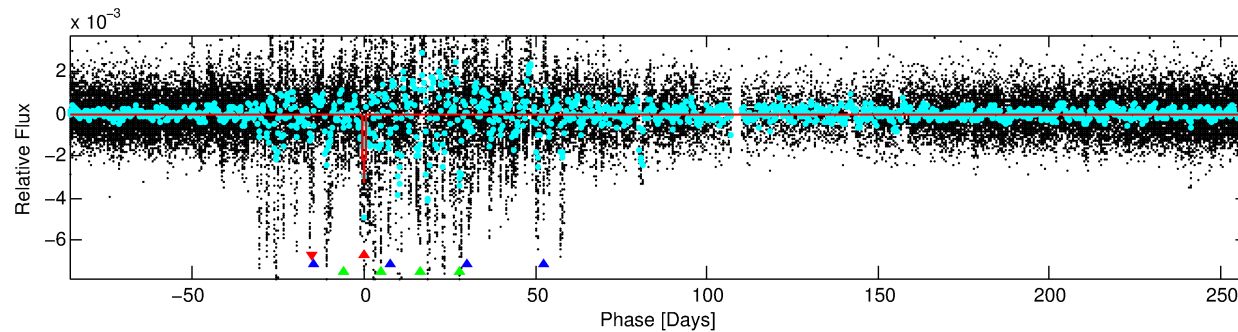
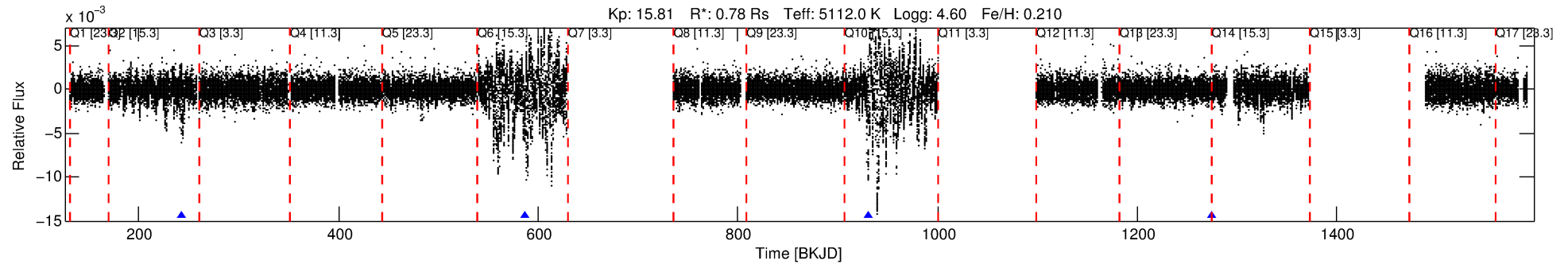
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 011098023-01

No Significant Match Found

# DV One-Page Summary

KIC: 11098023 Candidate: 1 of 3 Period: 343.906 d



## DV Fit Results:

Period = 343.90628 [0.02518] d  
Epoch = 242.2763 [0.0399] BKJD  
Rp/R\* = 0.1007 [0.2227]  
a/R\* = 44.08 [17.72]  
b = 1.00 [1.74]  
Seff = 0.44 [0.09]  
Teq = 208 [11] K  
Rp = 8.59 [19.01] Re  
a = 0.9206 [0.1006] AU  
Ag = 7209.09 [31933.34] [0.23σ]  
Teffp = 2959 [3276] K [0.84σ]

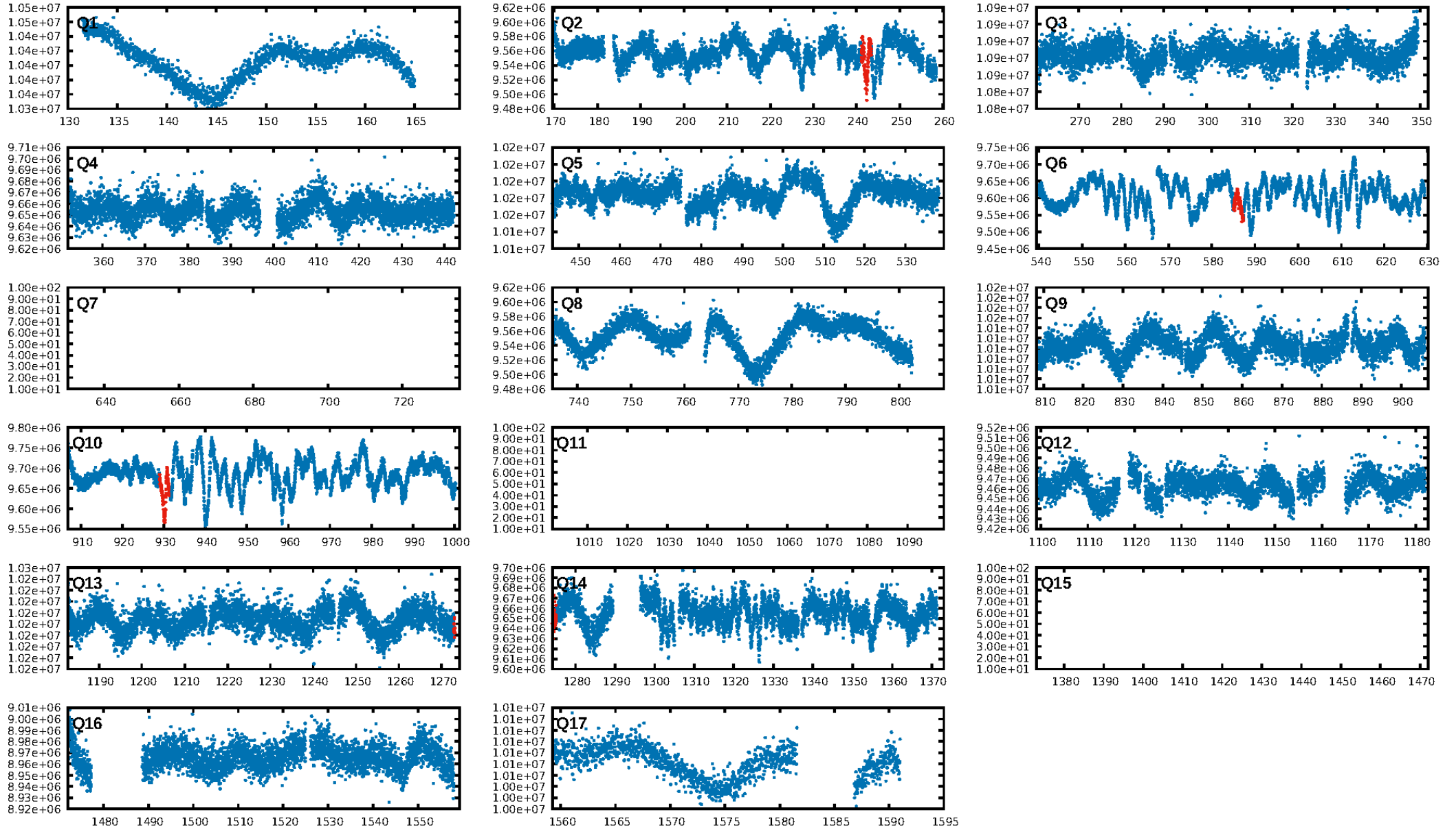
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [7.76σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.23e-15  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 0.4545  
Centroid-sig: 0.0%  
Centroid-so: 3.443 arcsec [3.94σ]  
OotOffset-rm: 2.735 arcsec [1.96σ]  
OotOffset-st: 2/0/0/0 [2]  
KicOffset-rm: 2.482 arcsec [1.82σ]  
KicOffset-st: 2/0/0/0 [2]  
DiffImageQuality-fgm: 0.00 [0/2]  
DiffImageOverlap-fno: 1.00 [2/2]

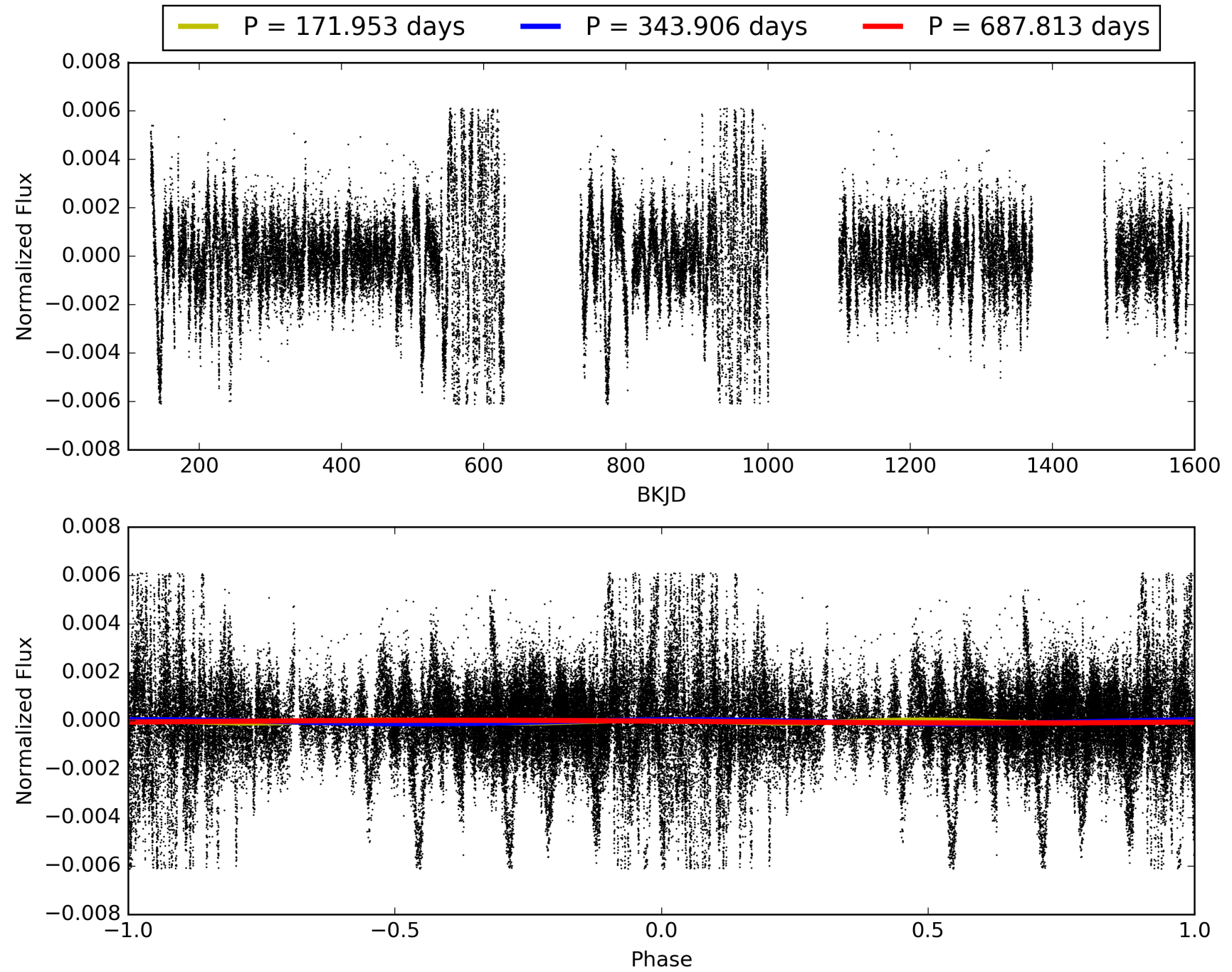
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:25:52 Z

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

# TCE 011098023-01, PDC Light Curves

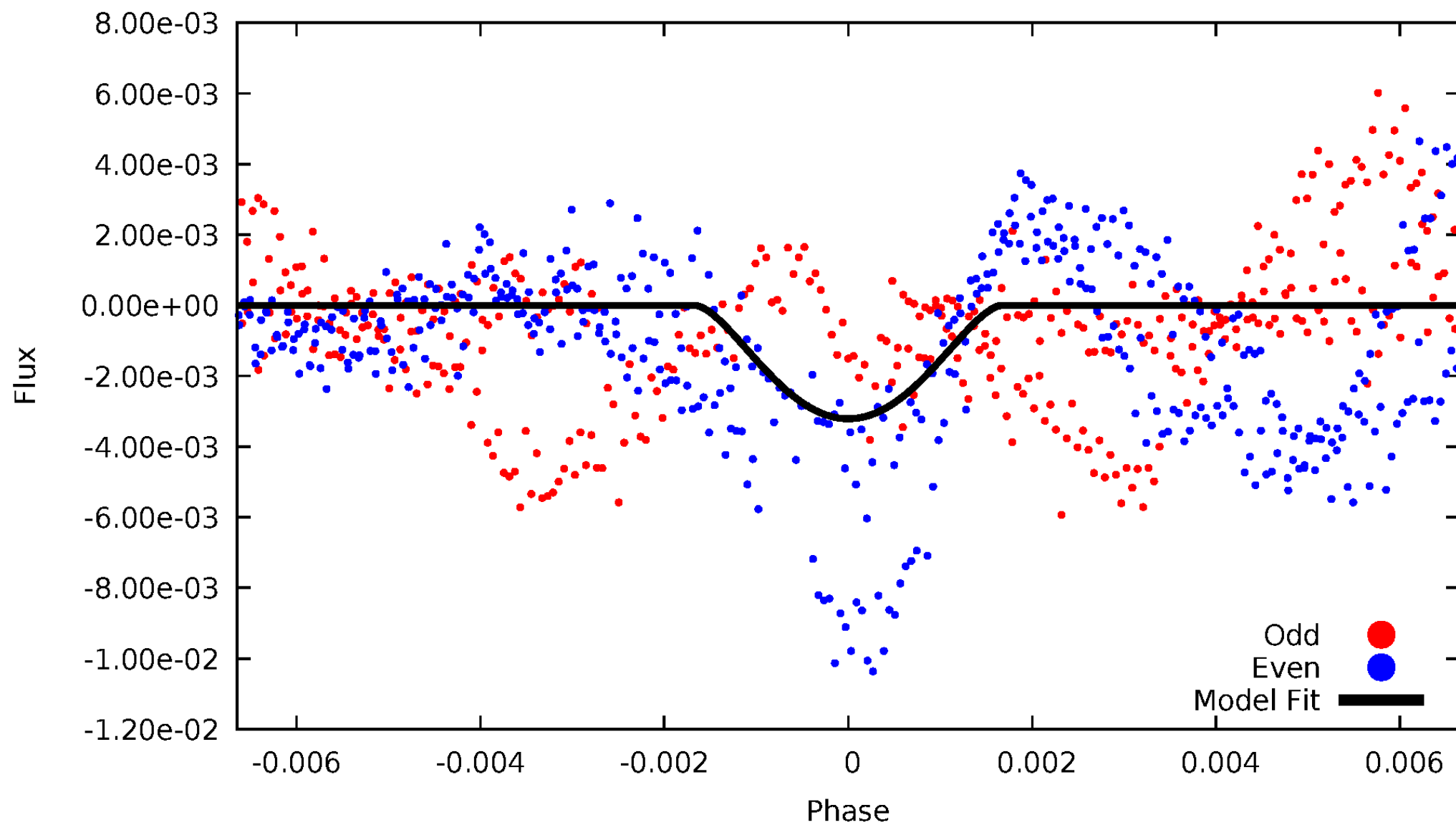


# TCE 011098023-01



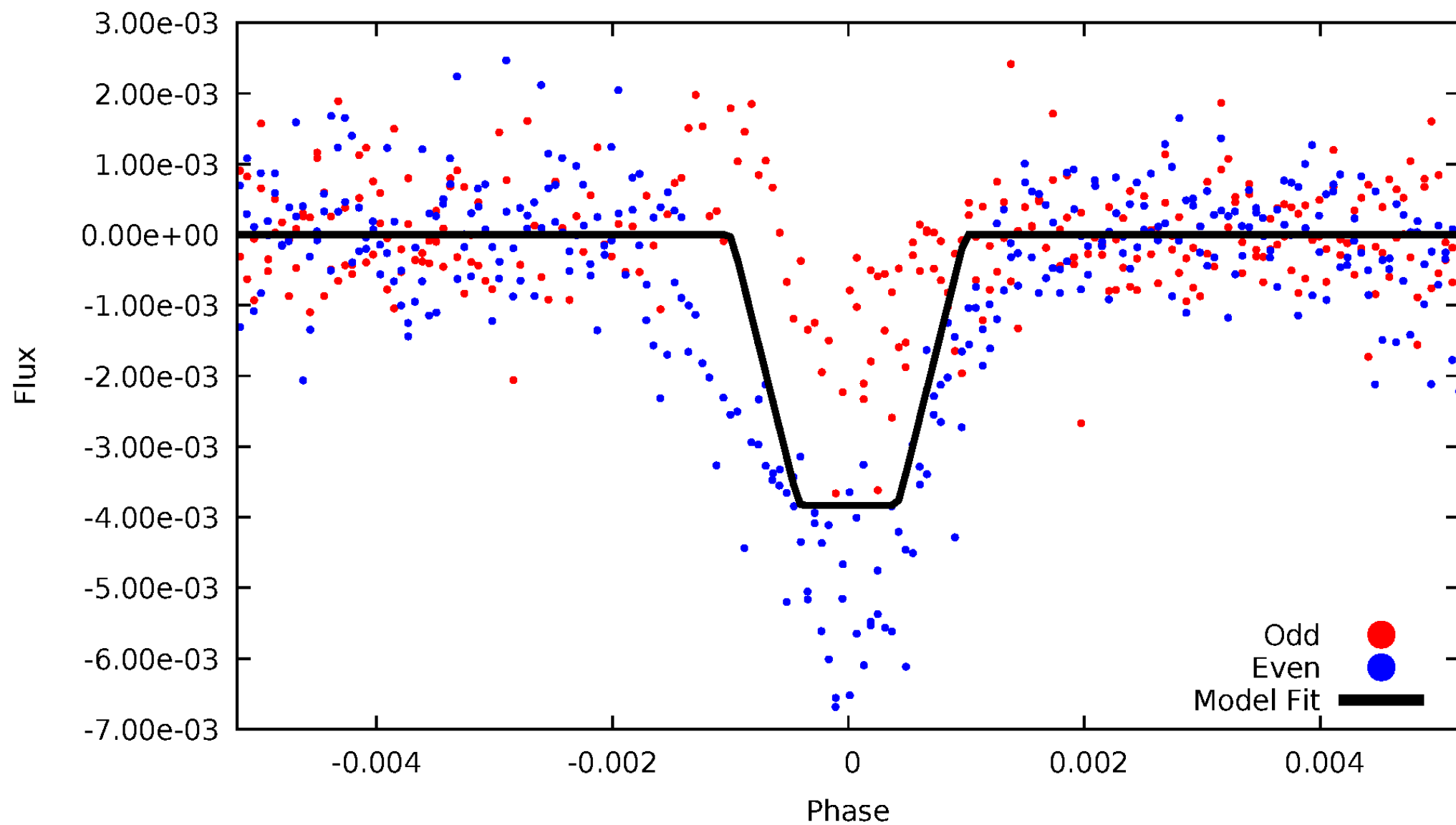
# DV Odd/Even

TCE 011098023-01



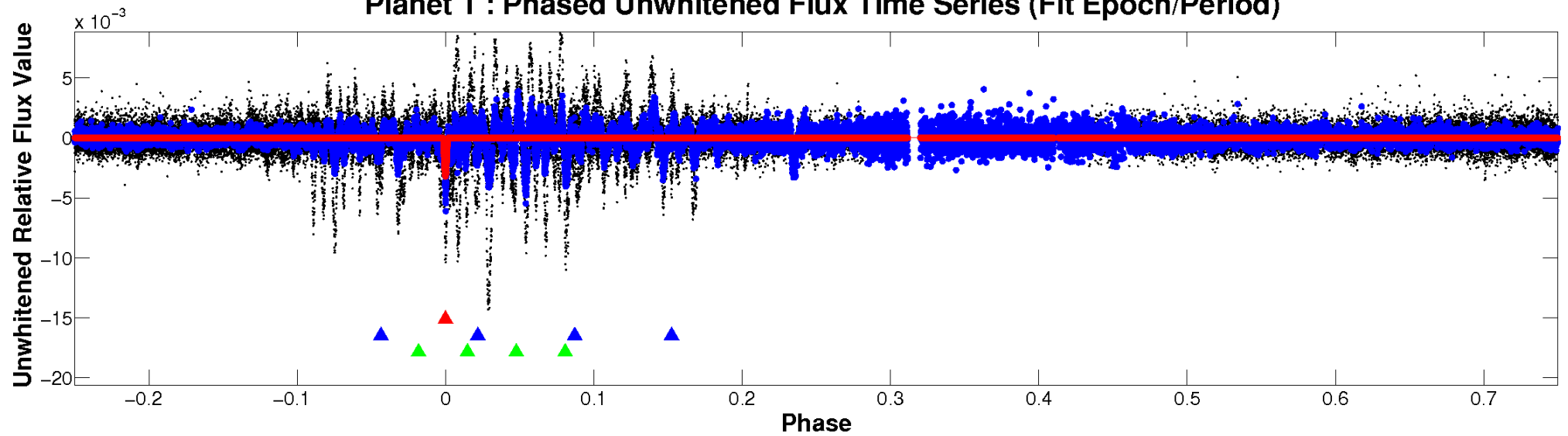
# ALT Odd/Even

TCE 011098023-01

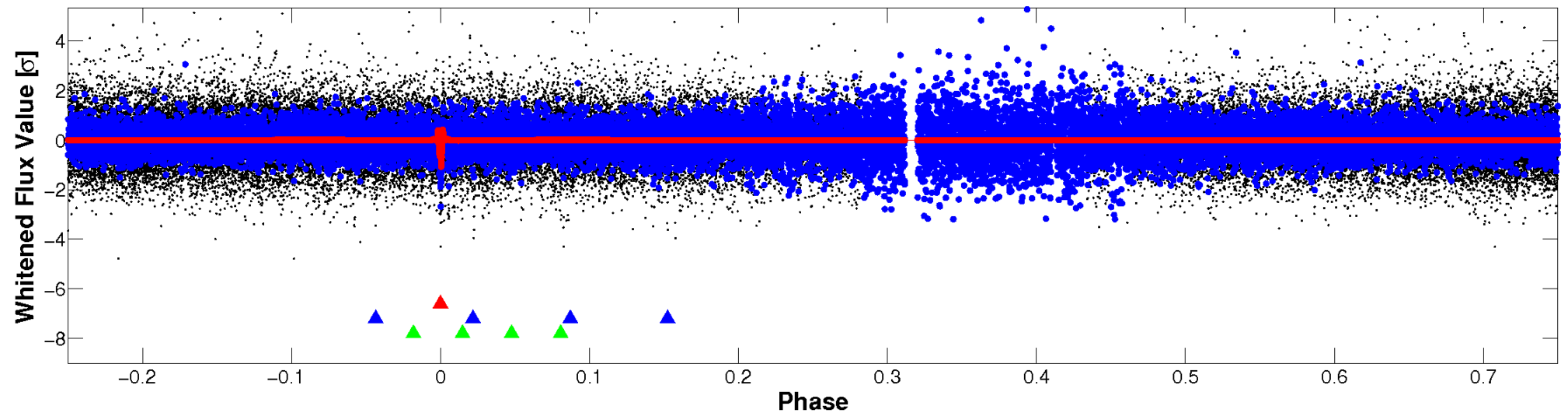


# Non-Whitened Vs. Whitened Light Curve

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



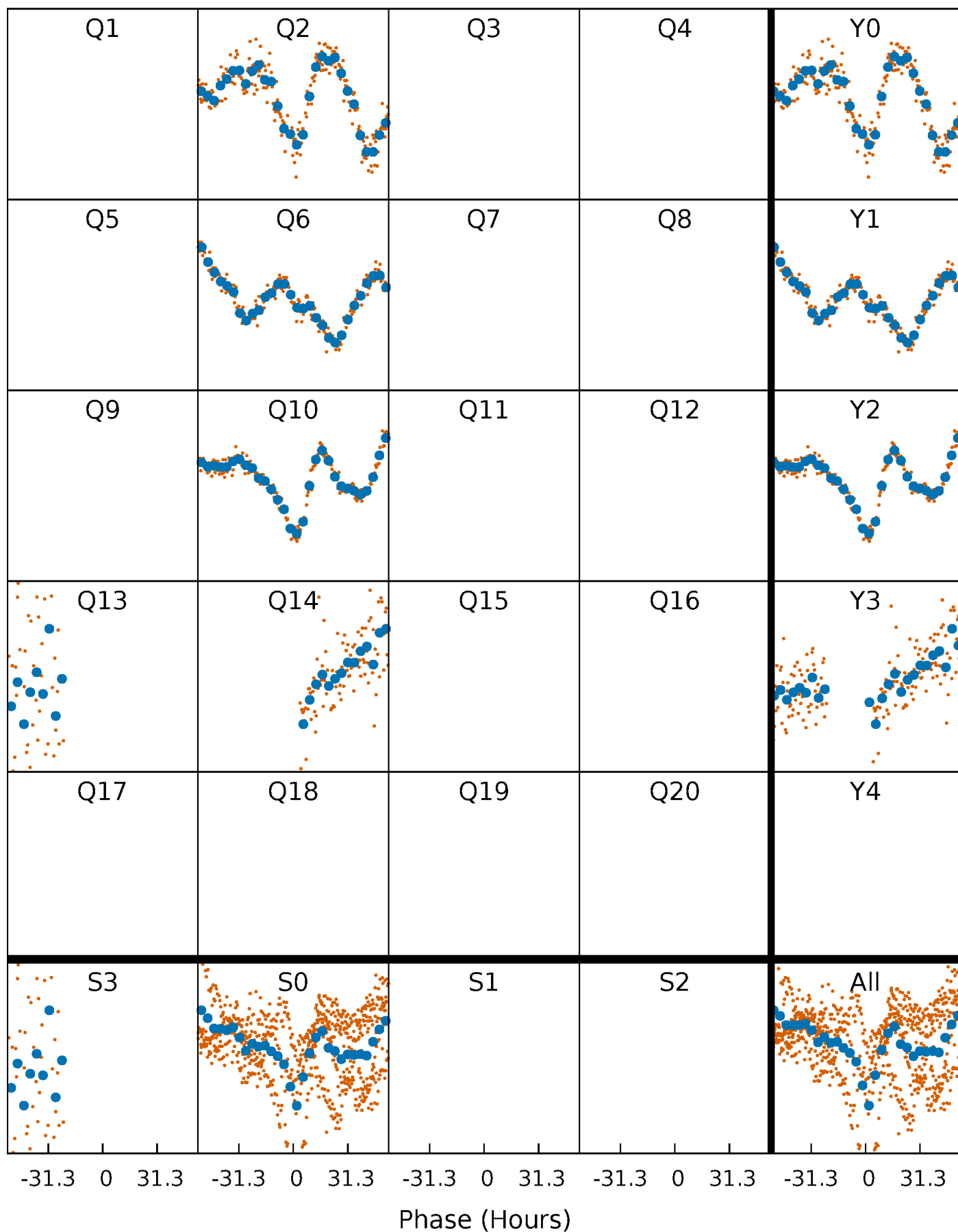
Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

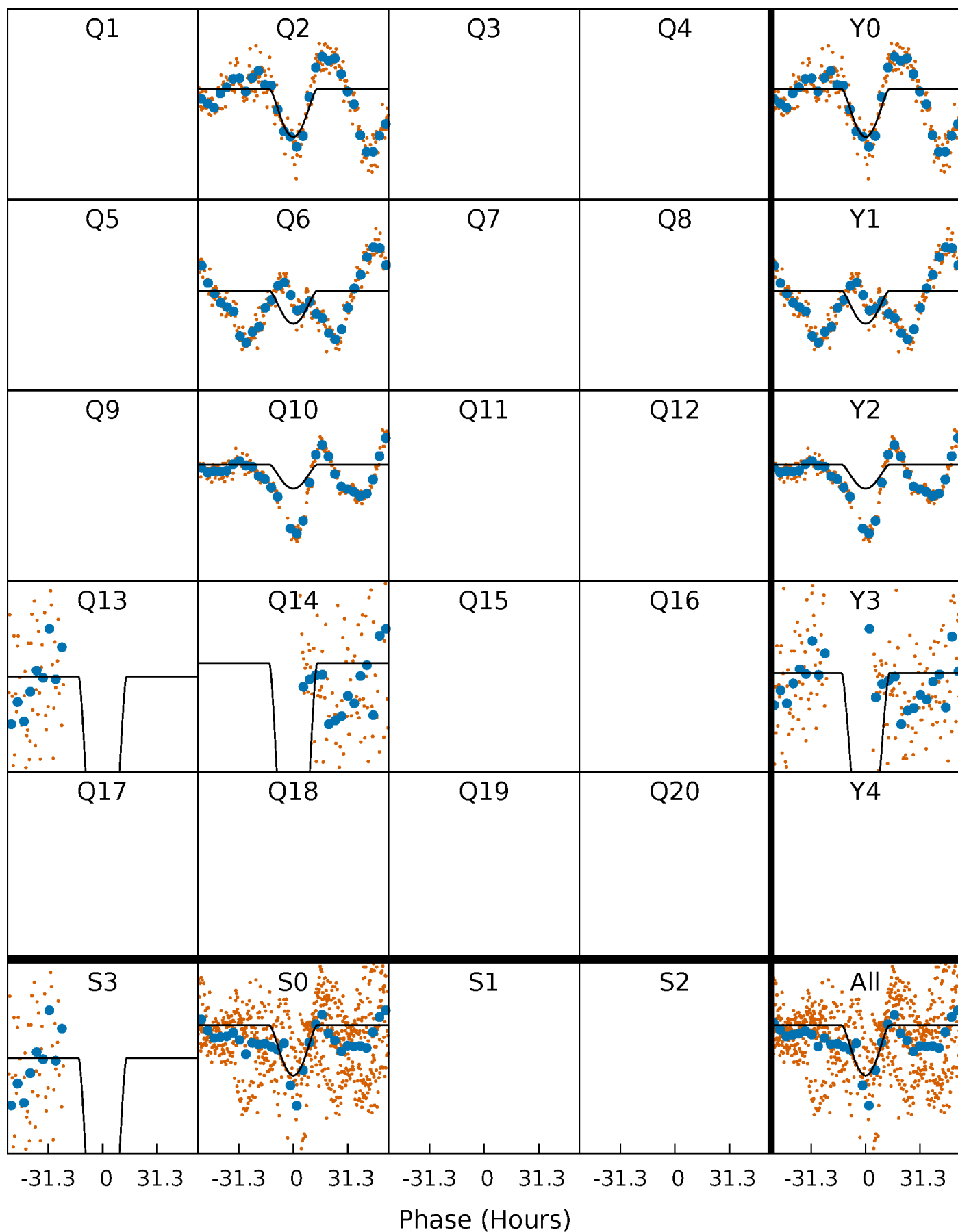
TCE 011098023-01 P=343.906277 Days  $T_0=242.276280$  (BKJD)





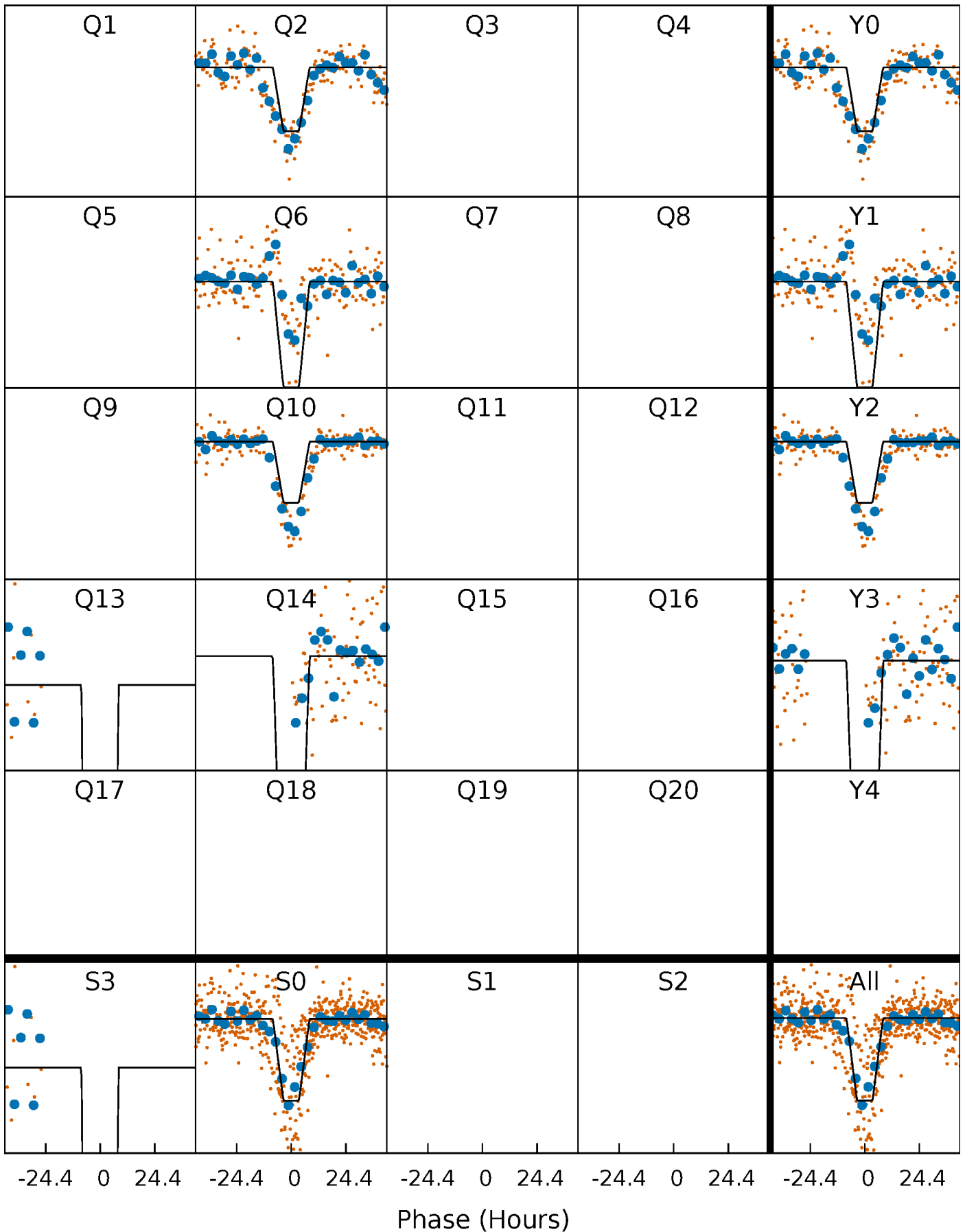
# DV Quarter-Phased Transit Curves

TCE 011098023-01   P=343.906277 Days    $T_0=242.276280$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

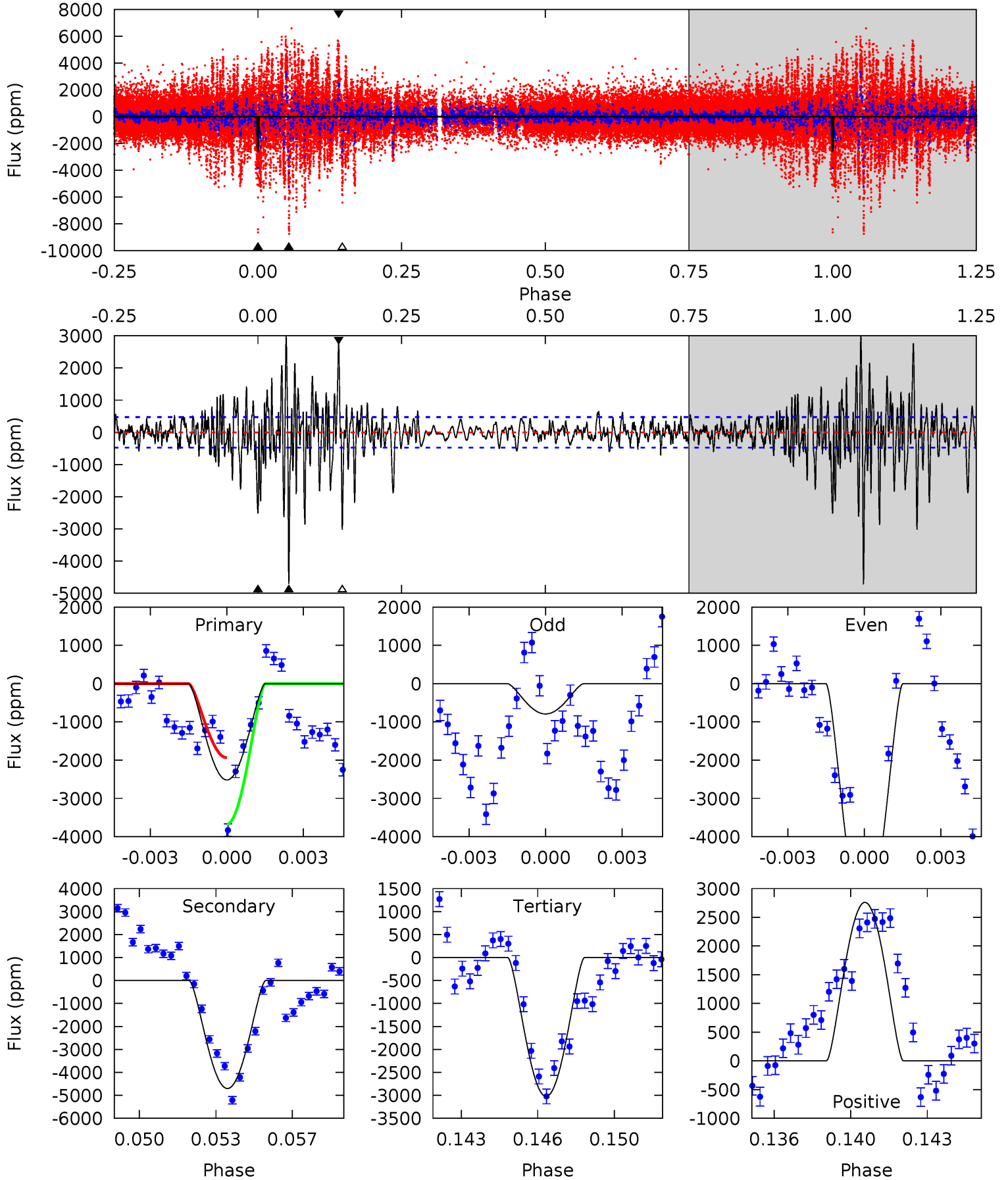
TCE 011098023-01 P=343.917248 Days  $T_0=242.383151$  (BKJD)



# DV Model-Shift Uniqueness Test

011098023-01, P = 343.906277 Days, E = 242.276280 Days

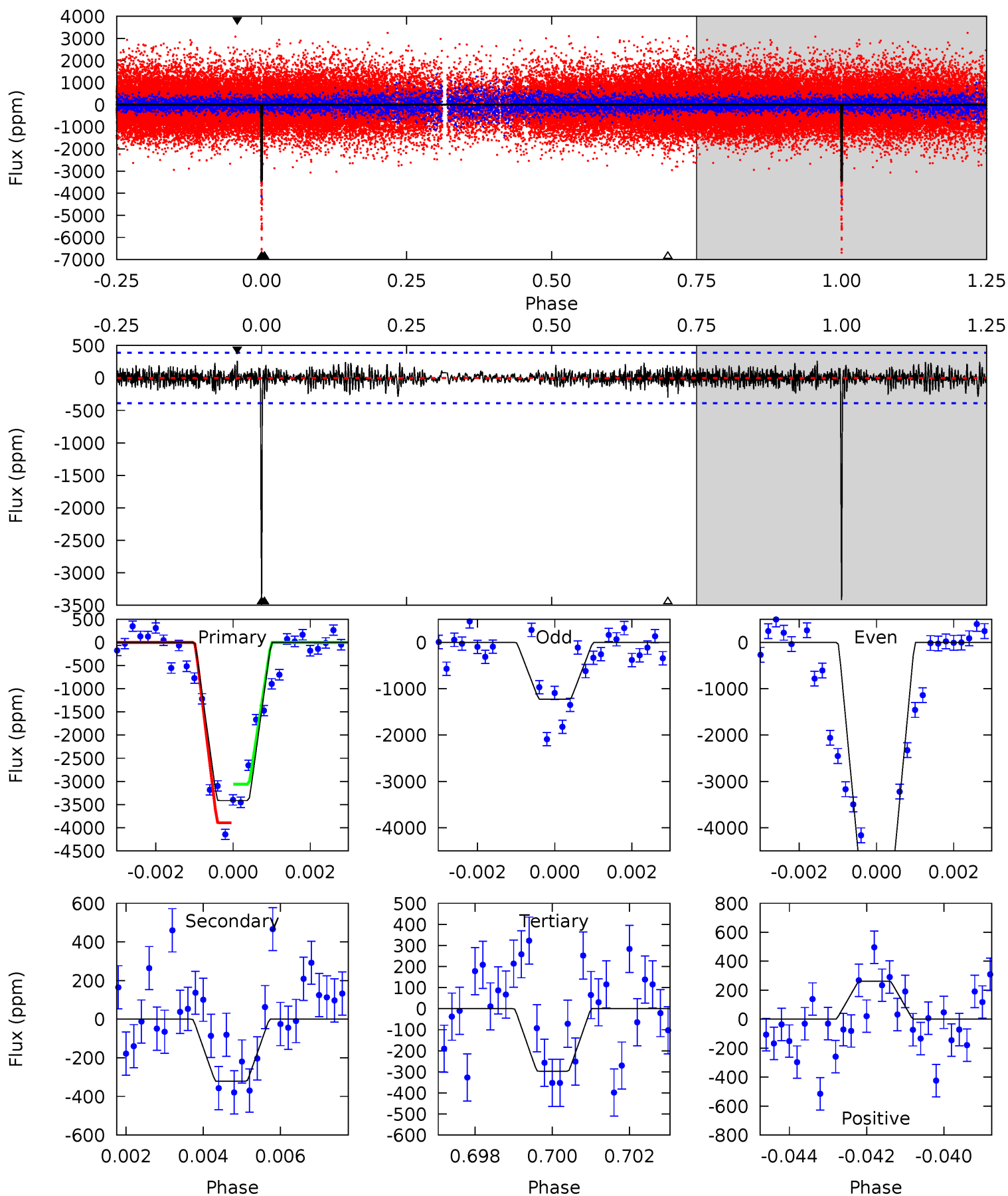
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
27.7	51.8	33.3	30.4	5.23	2.94	5.87	-5.55	-2.67	18.5	21.4	26.3	1.56	0.39	9.05



# Alt Model-Shift Uniqueness Test

011098023-01, P = 343.917248 Days, E = 242.383151 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
46.8	4.41	4.07	3.60	5.33	3.09	1.00	42.7	43.2	0.34	0.81	26.7	1.02	0.07	5.59



### Stellar Parameters For KIC 011098023

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5112^{+167}_{-167}$	$4.597^{+0.022}_{-0.093}$	$0.210^{+0.200}_{-0.300}$	$0.781^{+0.097}_{-0.052}$	$0.895^{+0.045}_{-0.097}$	$2.643^{+0.324}_{-0.775}$
	+3%/-3%	+0%/-2%	+95%/-143%	+12%/-7%	+5%/-11%	+12%/-29%
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 011098023-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-4704 \pm 91$	$17.56^{+15.97}_{-12.47}$	$294^{+12}_{-11}$	$3470^{+2016}_{-602}$	$7222^{+76705}_{-5249}$
Alt.	$-322 \pm 73$	$14.88^{+14.55}_{-10.44}$	$294^{+12}_{-11}$	$2481^{+991}_{-355}$	$636^{+6534}_{-470}$

$T_{max}$  = 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

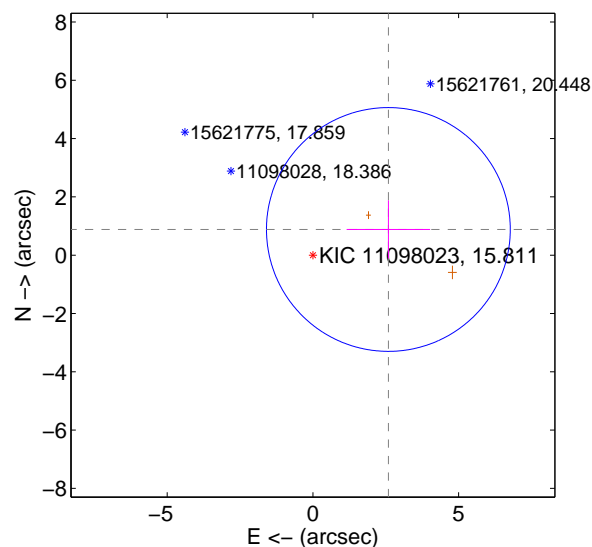
Supplemental centroid analysis for 011098023-01. Kepler magnitude: 15.81. Transit SNR 7.92

There are 0 quarters with good PRF difference image offsets

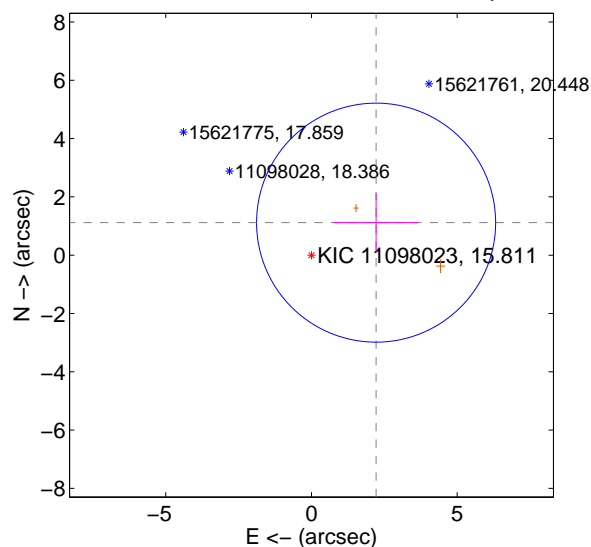
The direct PRF centroid is offset from the target star catalog position by about 0.42 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.735 \pm 1.394$	1.96	$-2.589 \pm 1.433$	$0.882 \pm 0.997$
PRF-fit source offset from KIC position	$2.482 \pm 1.367$	1.82	$-2.217 \pm 1.443$	$1.116 \pm 1.010$
photometric centroid source offset	$3.44 \pm 0.87$	3.94	$-2.49 \pm 0.84$	$2.38 \pm 0.91$

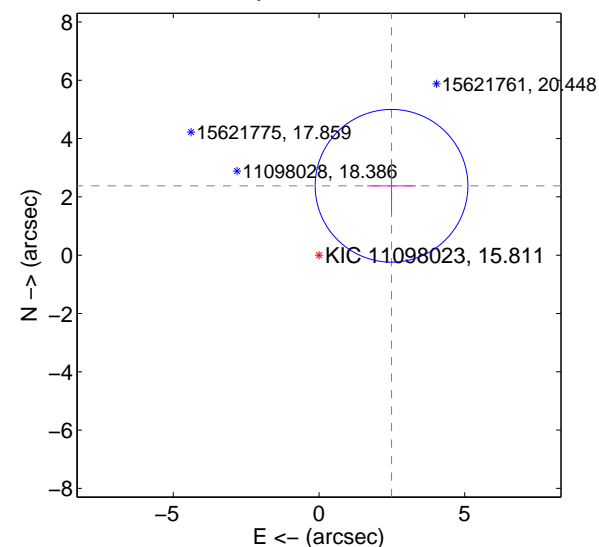
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

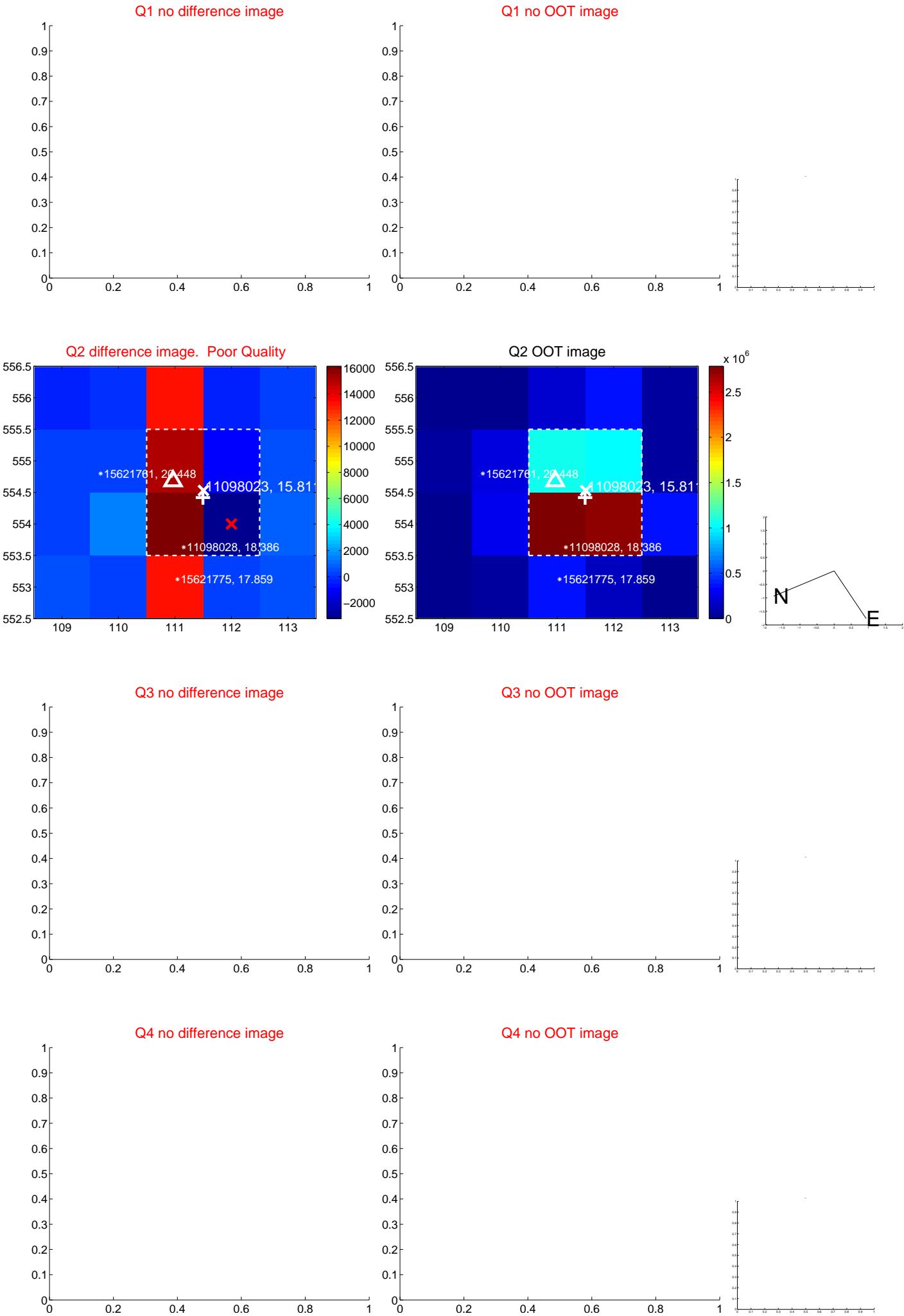


offset from photometric centroids



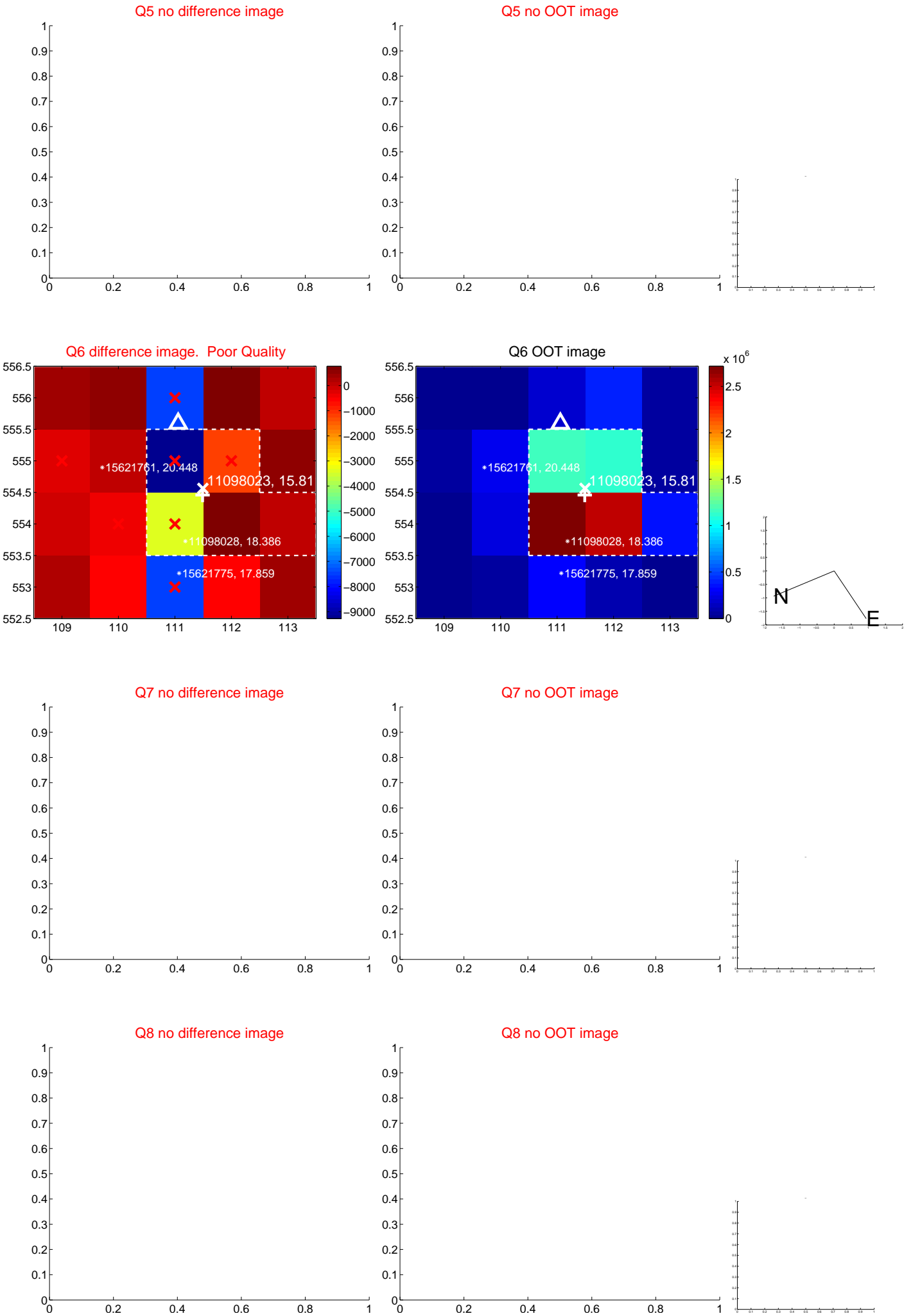
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

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





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



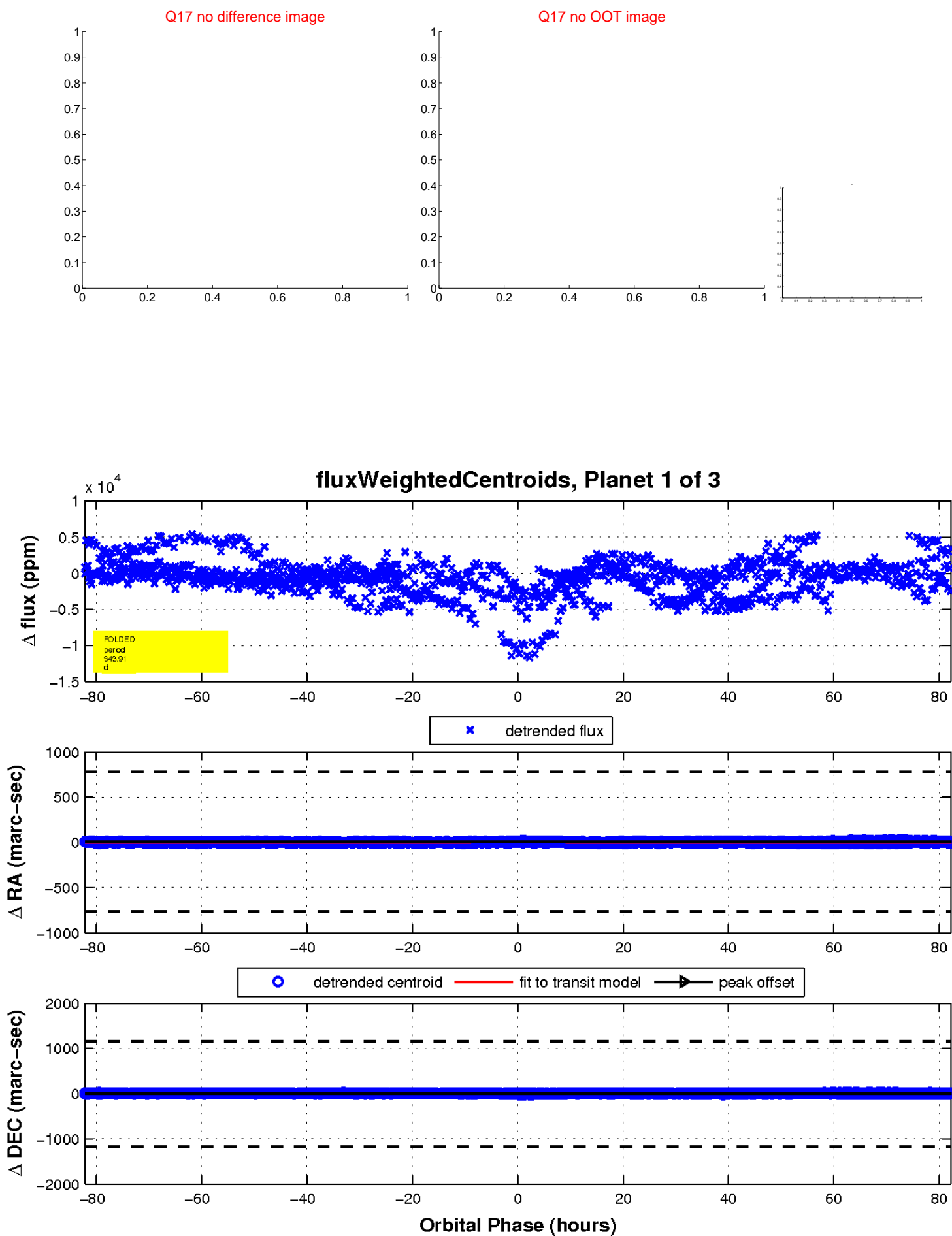
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

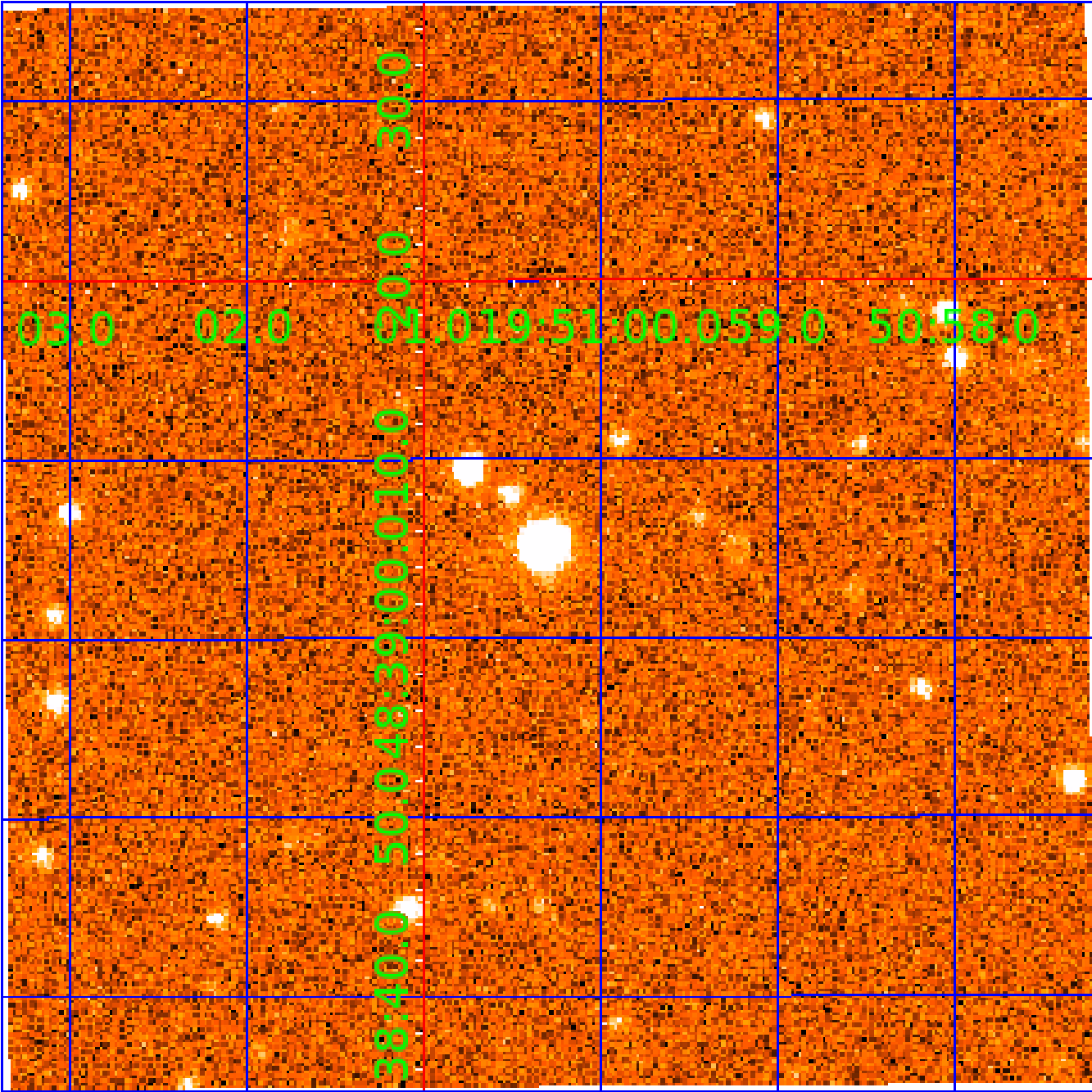


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 011098023

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011098023-01	OBS	No	343.906277	242.276280	3211.6	27.426	9.7	7.9	0.78	5112	8.59	0.44
011098023-02	OBS	No	366.369523	227.316011	4067.1	39.245	8.2	10.5	0.78	5112	9.47	0.41
011098023-03	OBS	No	355.234830	236.036061	2378.7	21.807	7.1	7.4	0.78	5112	7.34	0.42

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011098023-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
011098023-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA—MOD_NONUNIQ_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011098023-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—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.

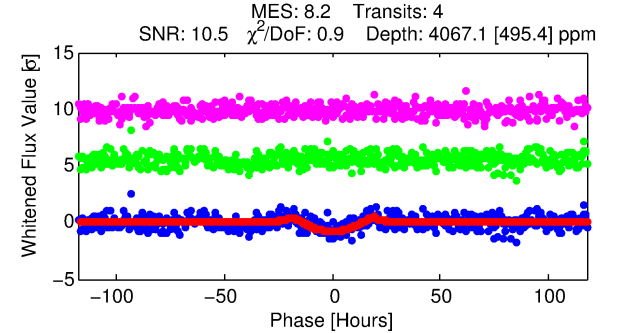
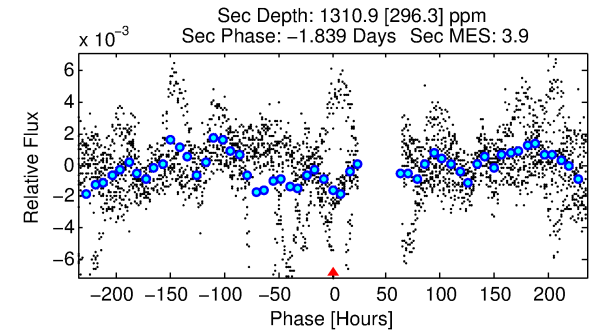
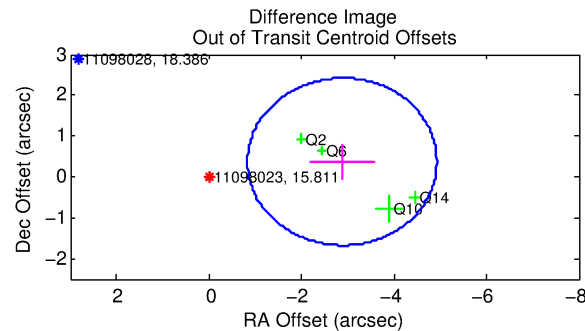
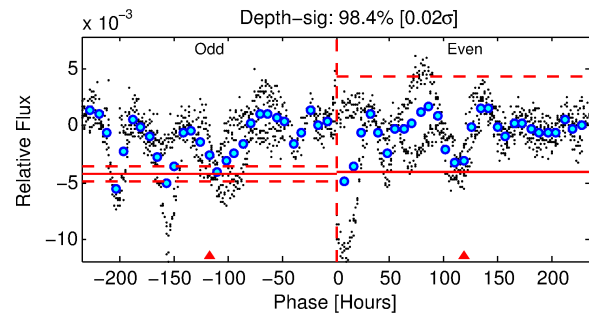
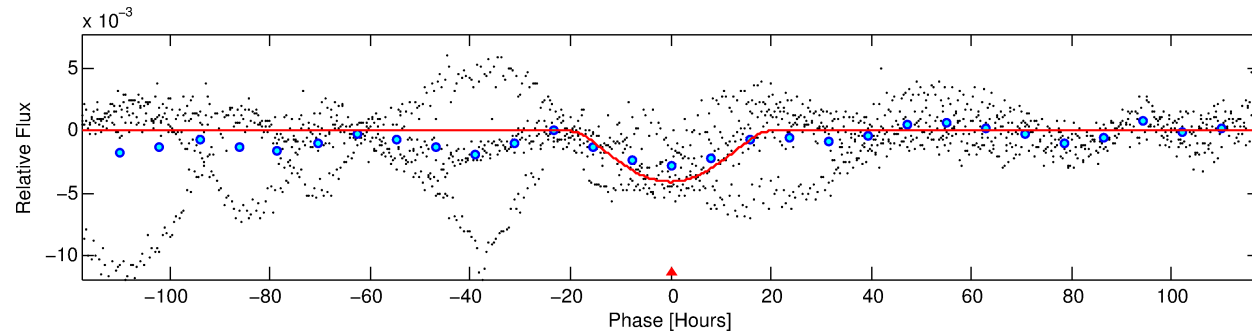
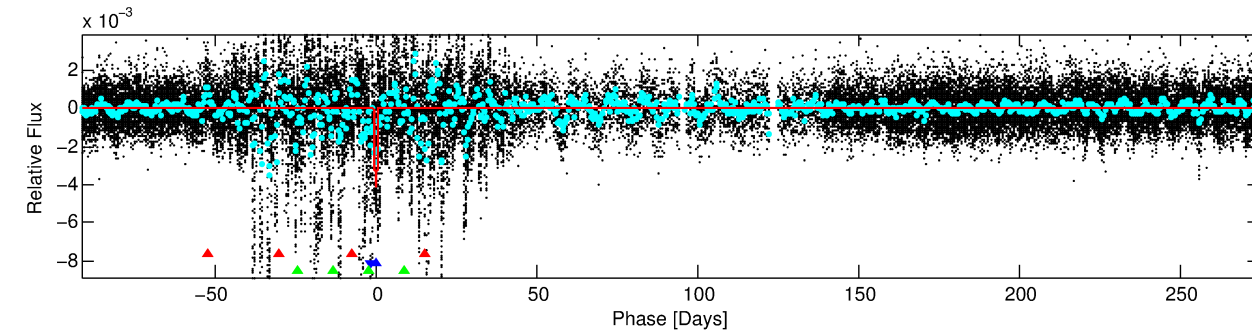
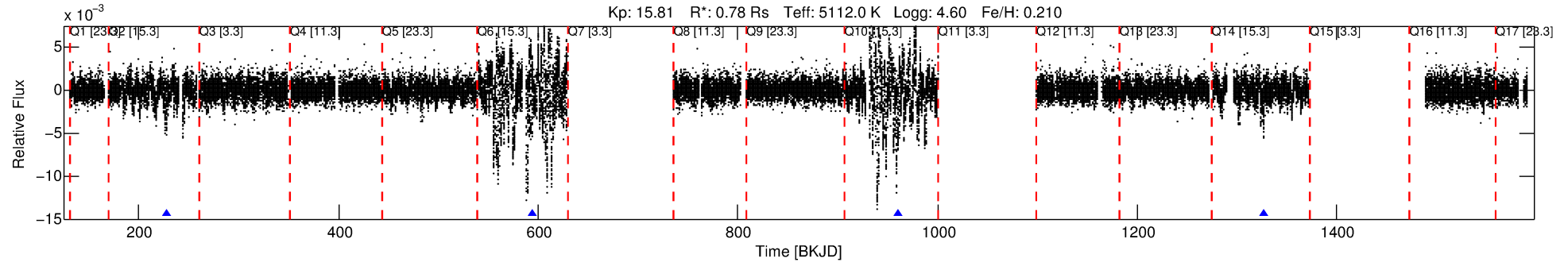
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 011098023-02

No Significant Match Found

# DV One-Page Summary

KIC: 11098023 Candidate: 2 of 3 Period: 366.370 d



## DV Fit Results:

Period = 366.36952 [0.02067] d  
Epoch = 227.3160 [0.0416] BKJD  
Rp/R\* = 0.1112 [0.1640]  
a/R\* = 34.80 [9.04]  
b = 1.00 [0.24]  
Seff = 0.40 [0.09]  
Teq = 203 [11] K  
Rp = 9.47 [14.03] Re  
a = 0.9603 [0.1050] AU  
Ag = 7410.52 [21966.30] [0.34 $\sigma$ ]  
Teffp = 2918 [2161] K [1.26 $\sigma$ ]

## DV Diagnostic Results:

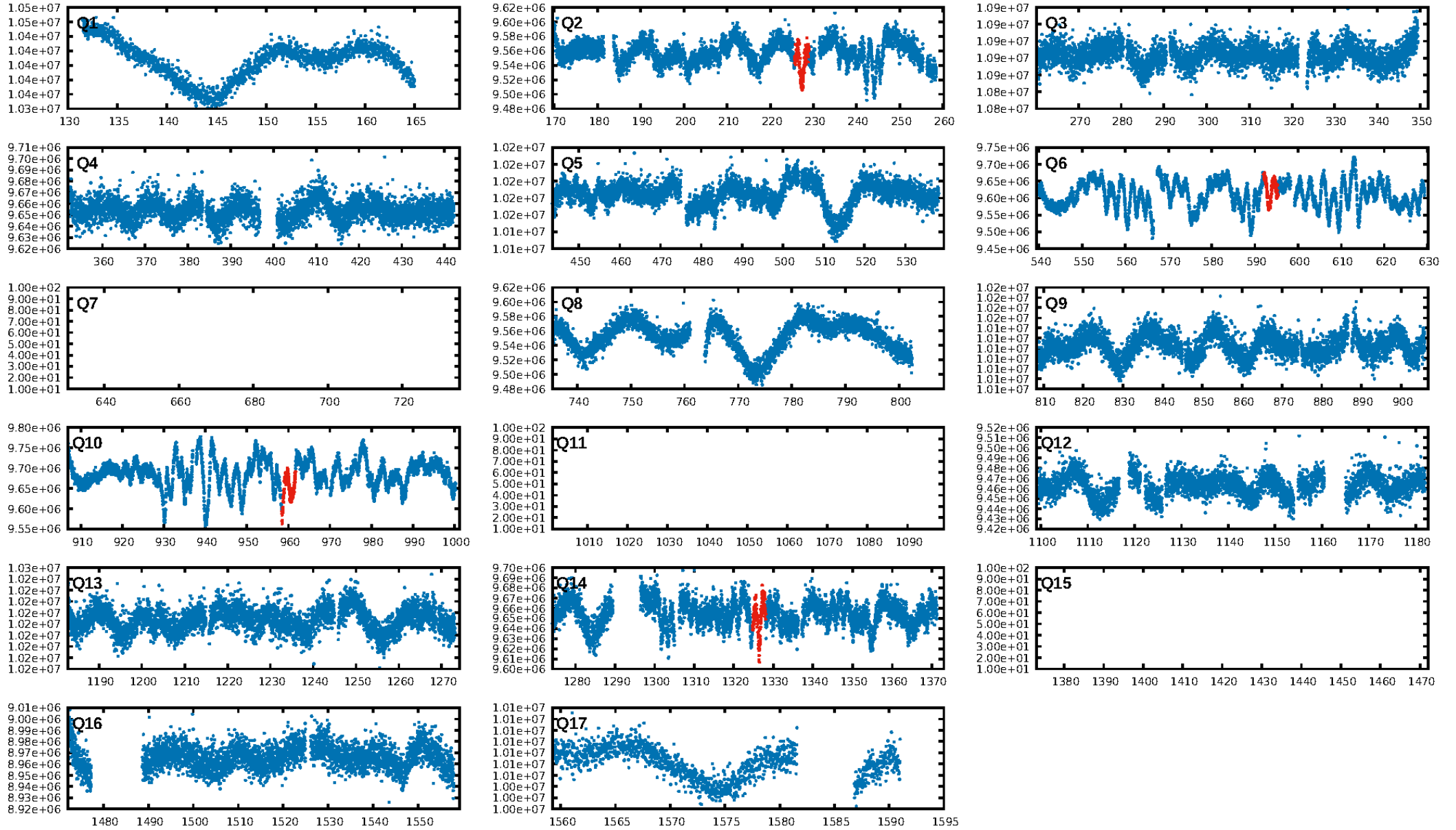
ShortPeriod-sig: 100.0% [5.95 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 52.4%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 3.82e-12**  
RollingBand-fgt: 1.00 [4/4]  
**GhostDiagnostic-chr: 0.4073**  
Centroid-sig: 0.0%  
Centroid-so: 1.647 arcsec [3.00 $\sigma$ ]  
OotOffset-rm: 2.905 arcsec [4.25 $\sigma$ ]  
KicOffset-rm: 2.595 arcsec [3.92 $\sigma$ ]  
OotOffset-st: 4/0/0/0 [4]  
KicOffset-st: 4/0/0/0 [4]  
DiffImageQuality-fgm: 0.50 [2/4]  
DiffImageOverlap-fno: 0.75 [3/4]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:25:59 Z

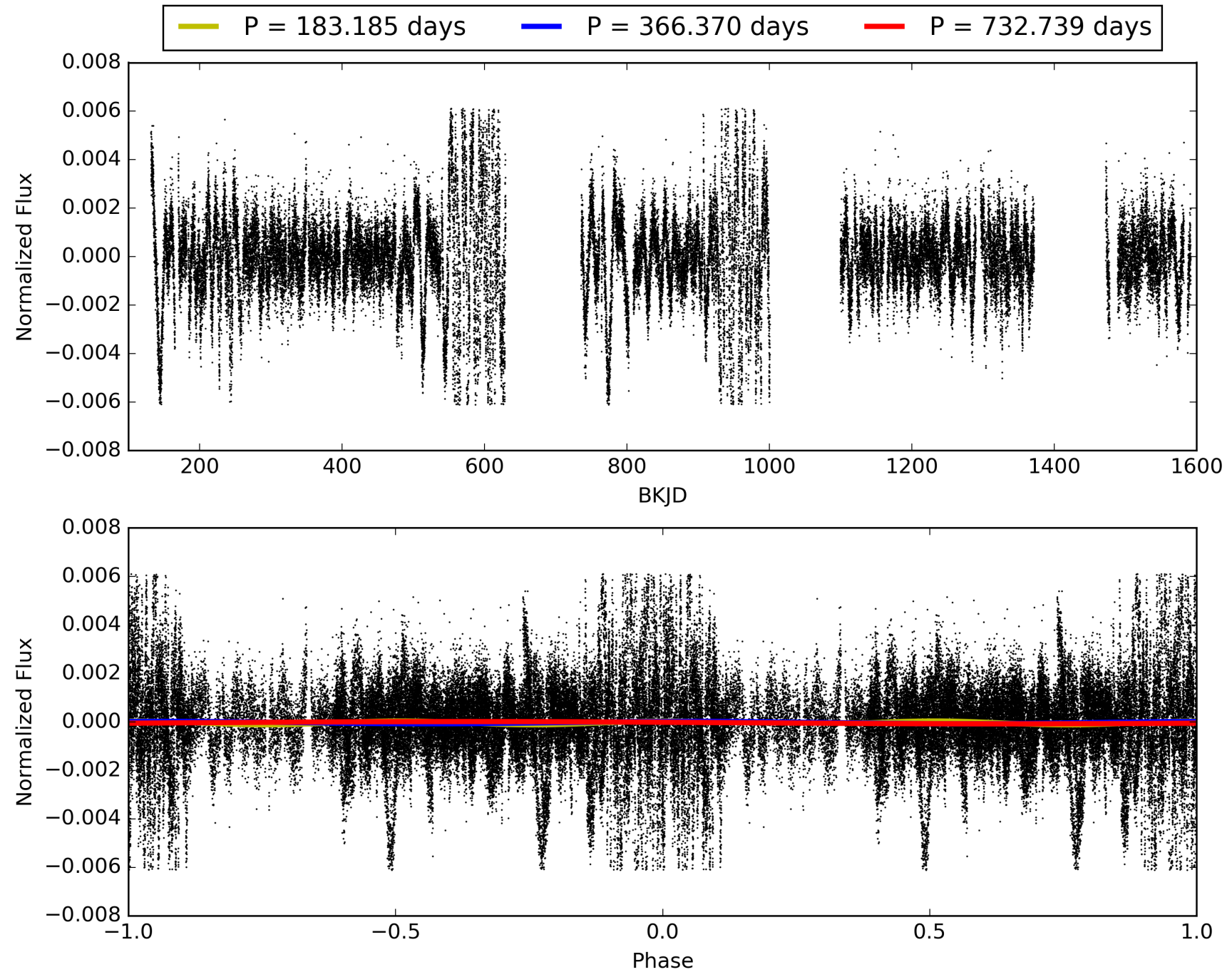
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 011098023-02, PDC Light Curves

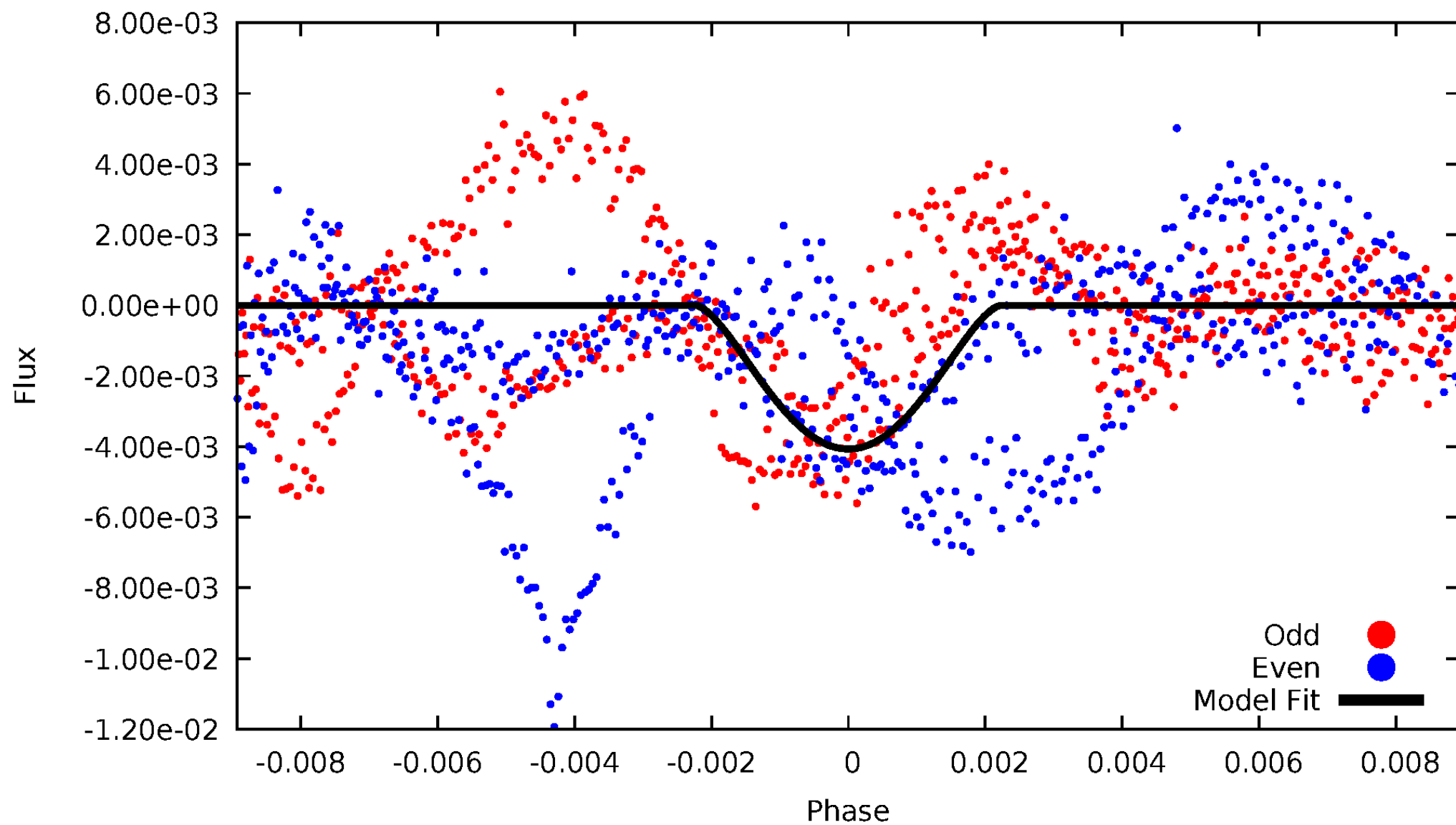


# TCE 011098023-02



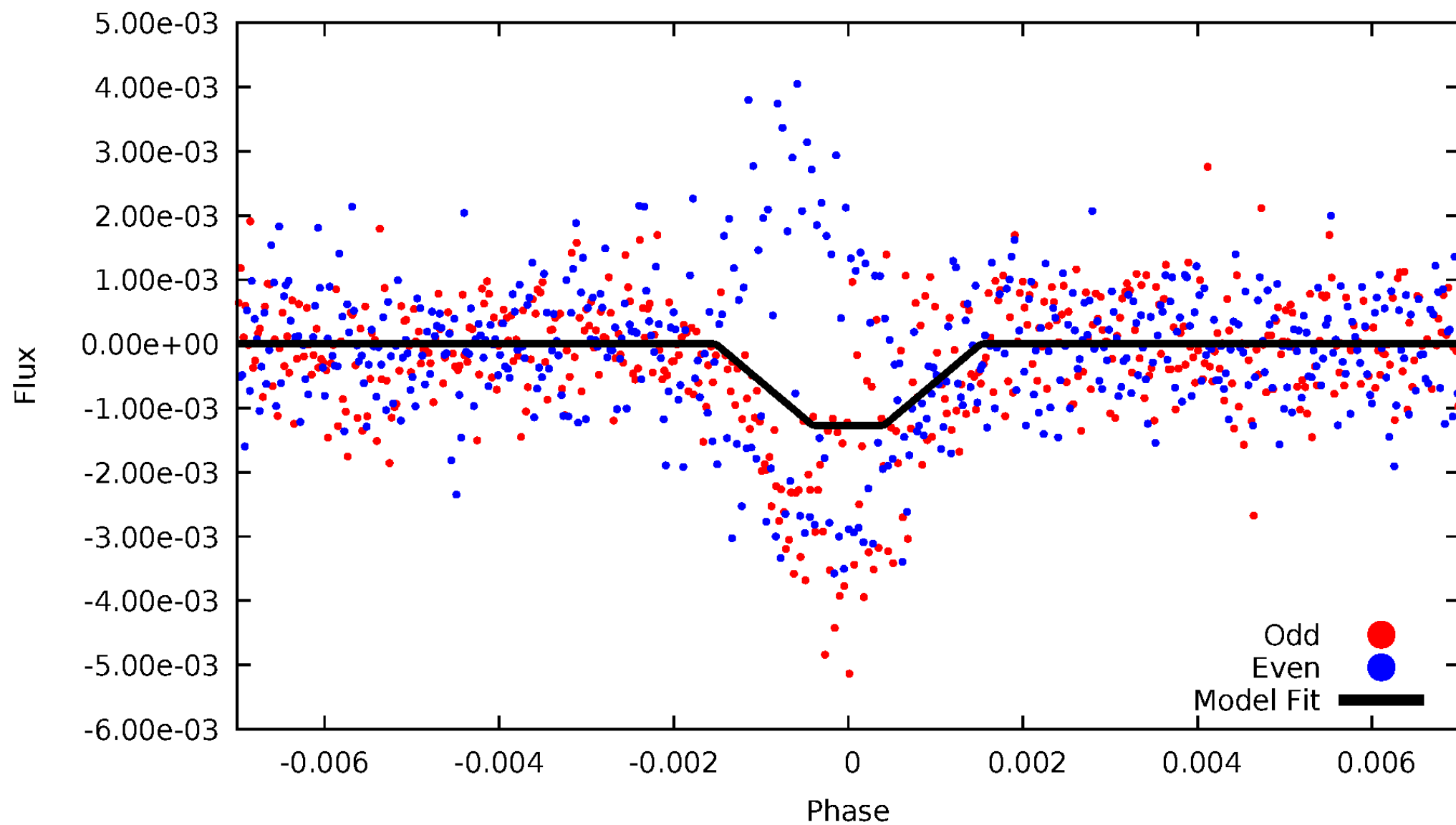
# DV Odd/Even

TCE 011098023-02



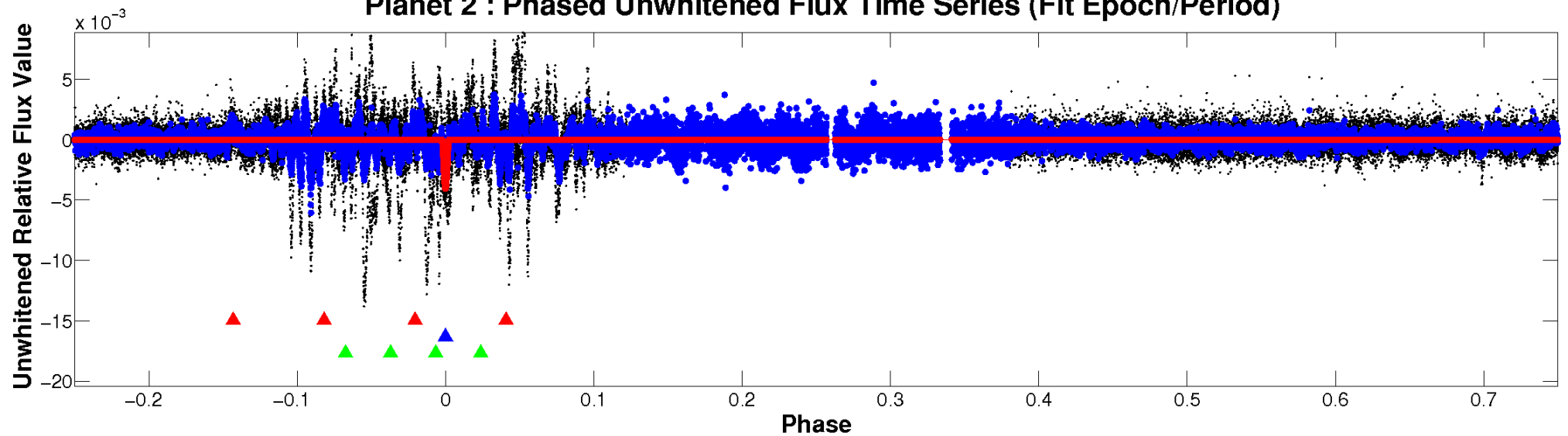
# ALT Odd/Even

TCE 011098023-02

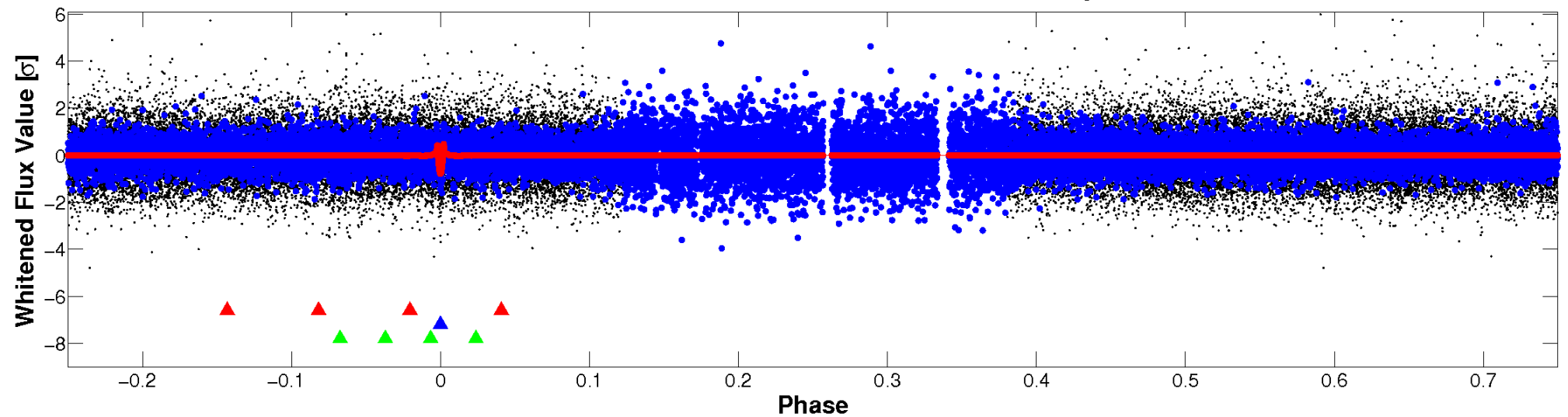


# Non-Whitened Vs. Whitened Light Curve

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

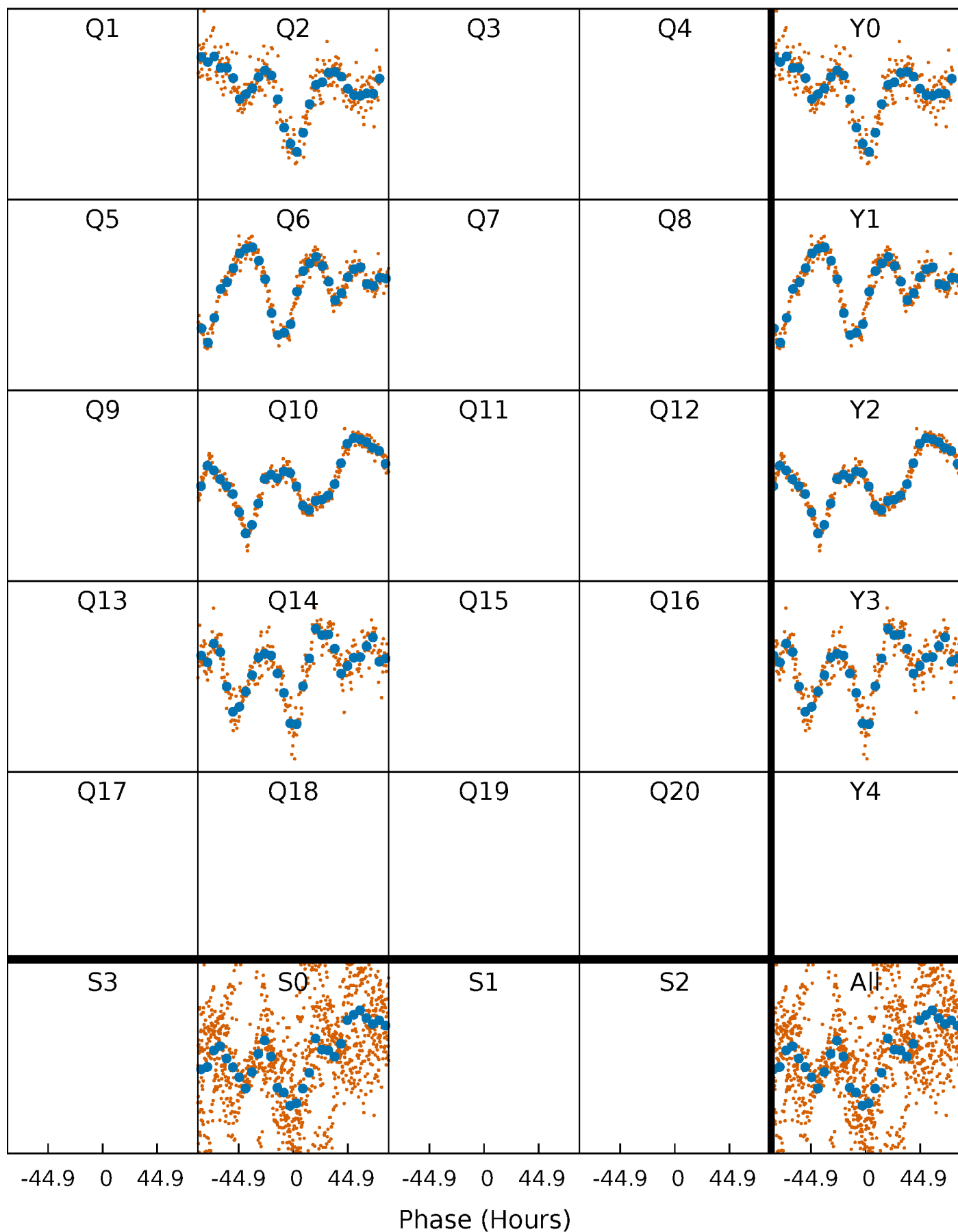


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



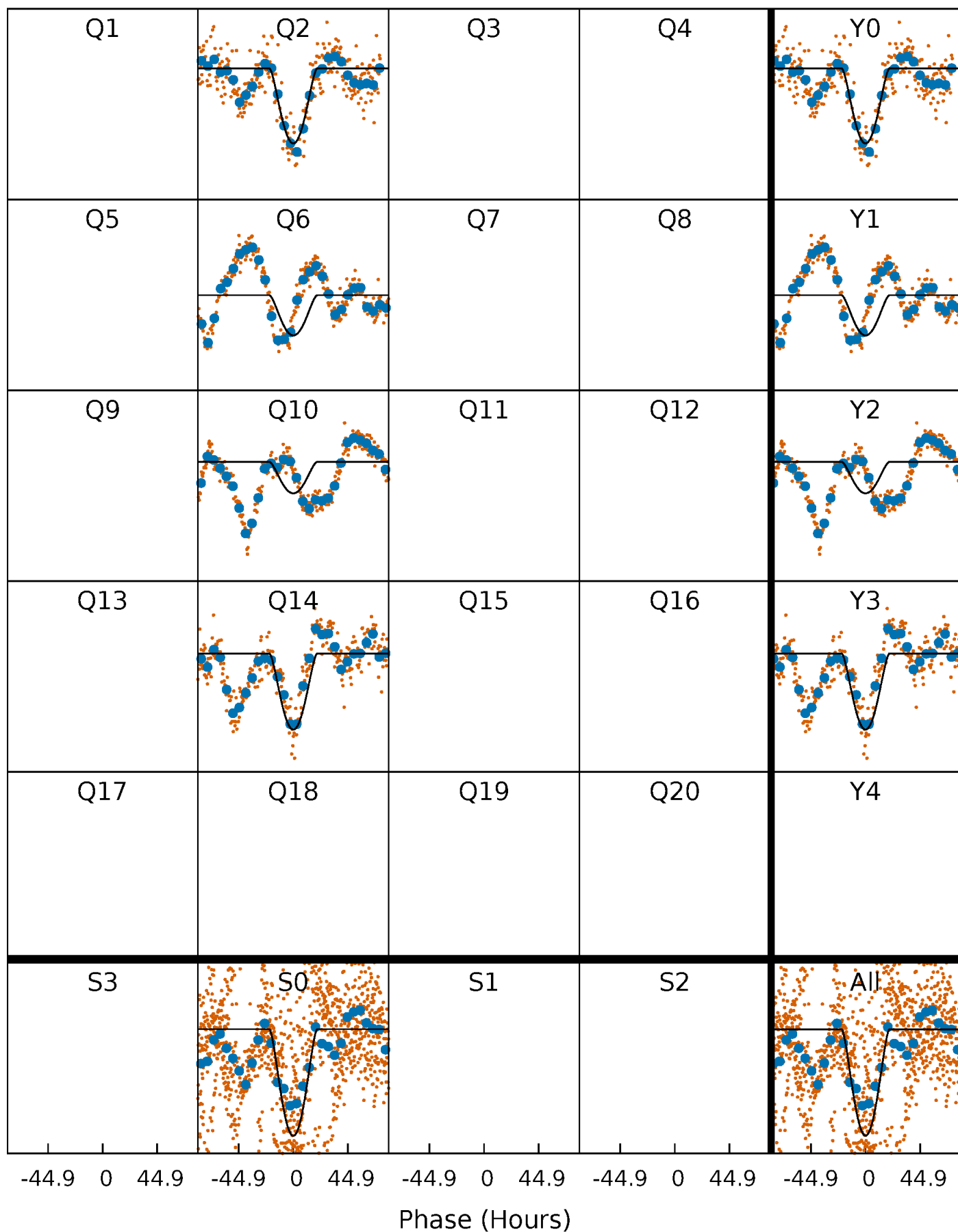
# PDC Quarter-Phased Transit Curves

TCE 011098023-02 P=366.369523 Days  $T_0=227.316011$  (BKJD)



# DV Quarter-Phased Transit Curves

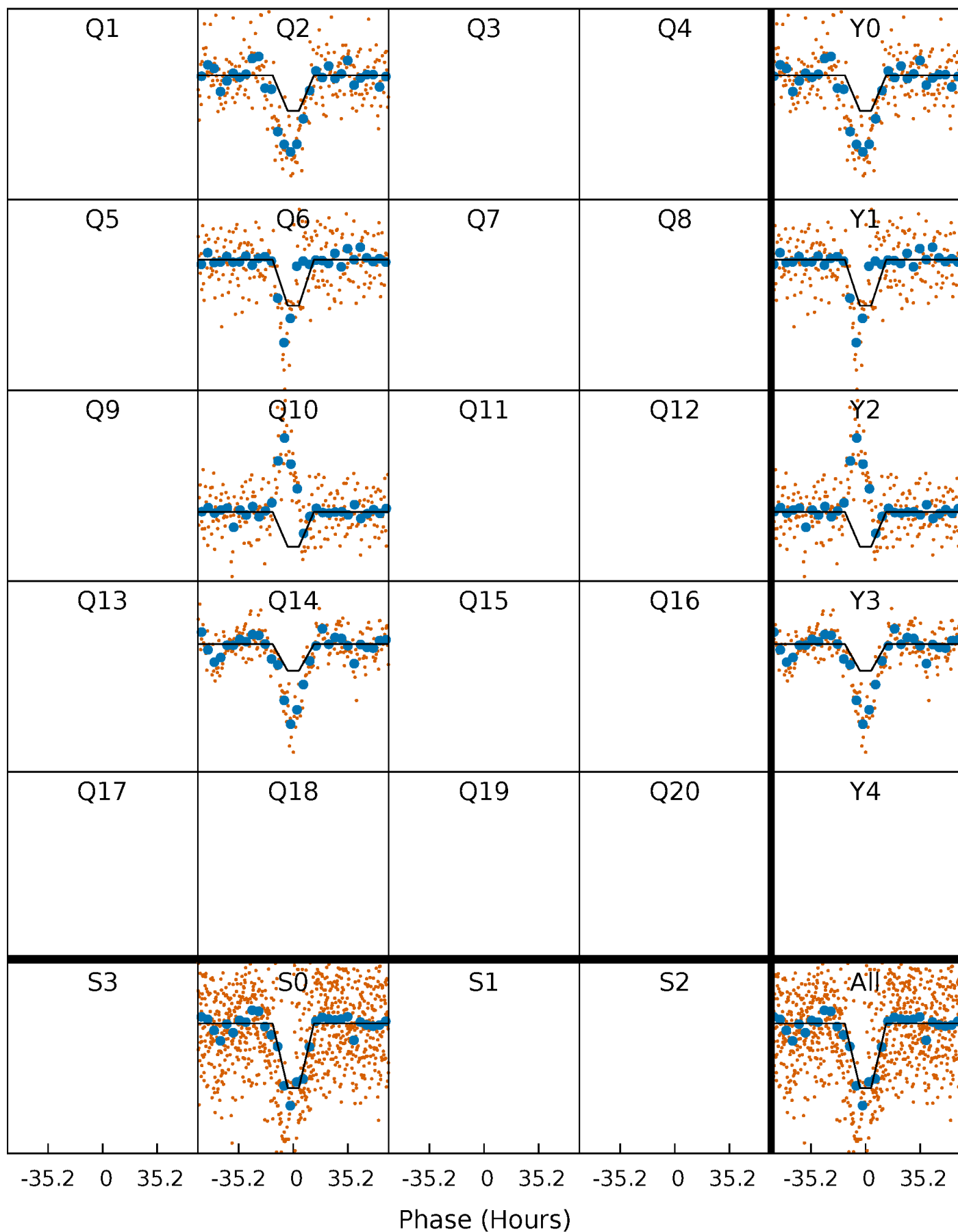
TCE 011098023-02 P=366.369523 Days  $T_0=227.316011$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

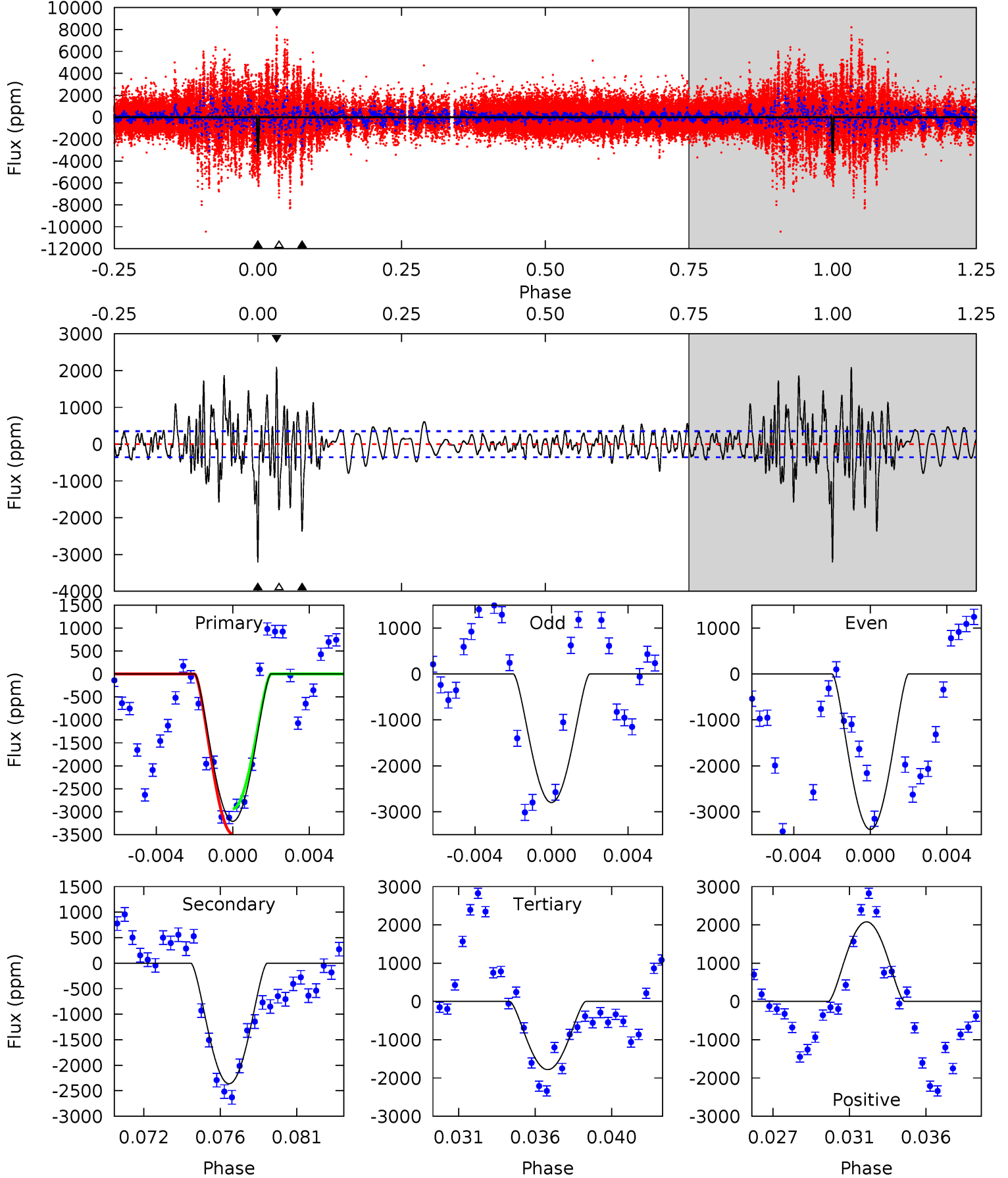
TCE 011098023-02 P=366.339675 Days  $T_0=227.447674$  (BKJD)



# DV Model-Shift Uniqueness Test

011098023-02, P = 366.369523 Days, E = 227.316011 Days

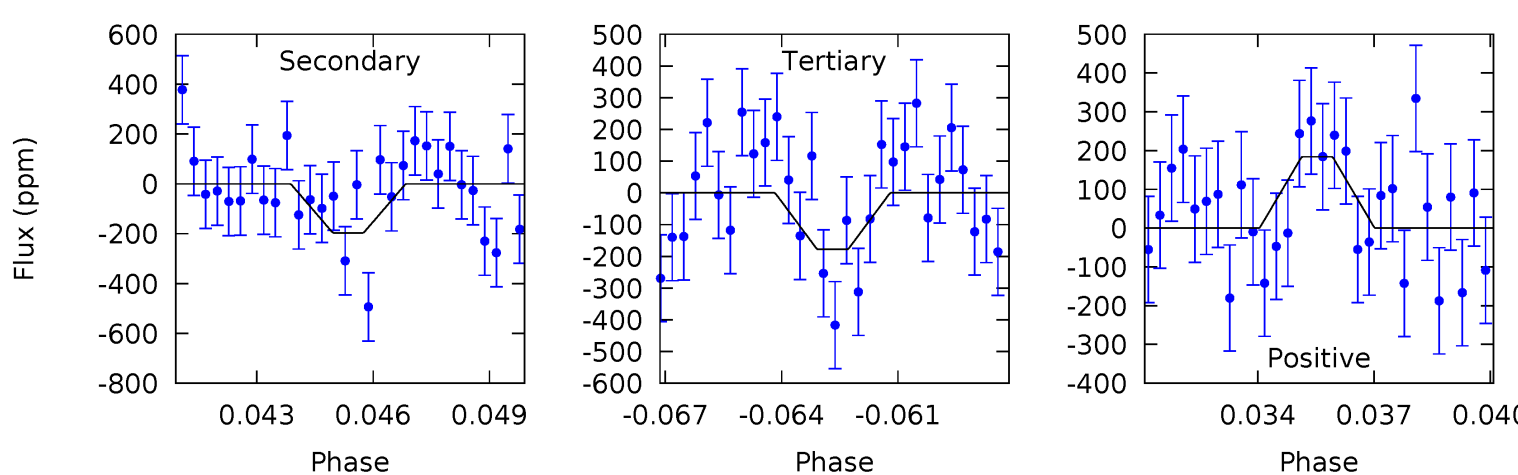
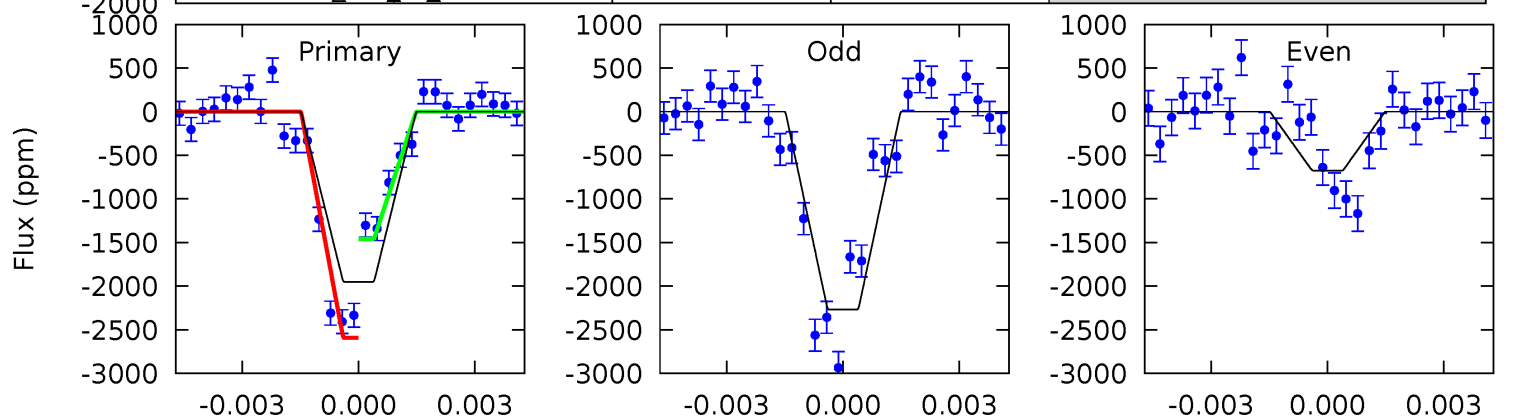
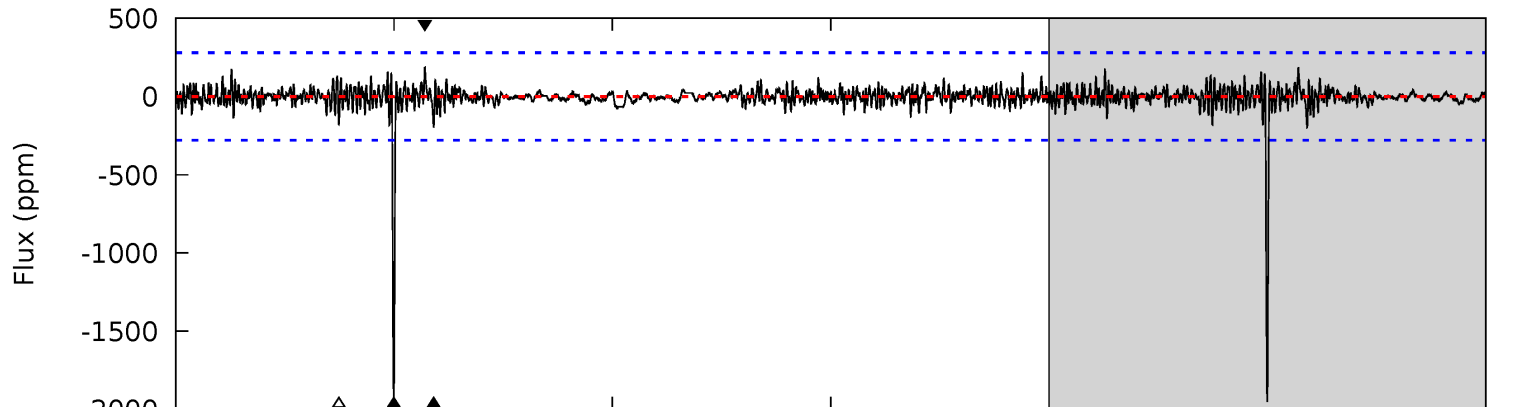
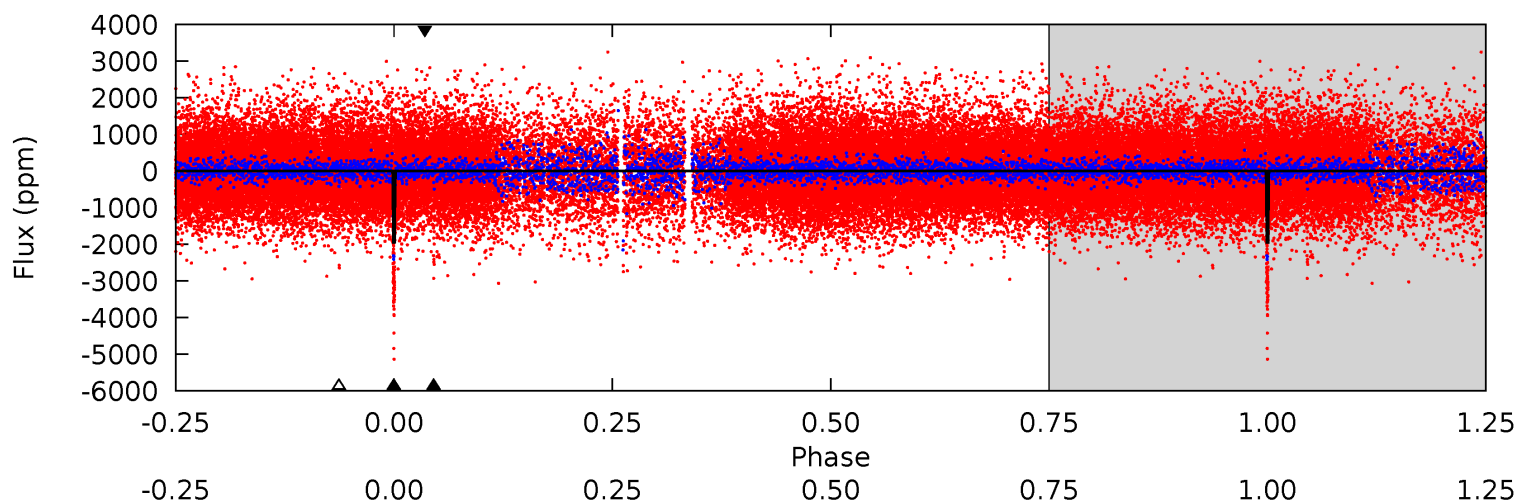
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
46.8	34.5	26.0	30.4	5.18	2.84	6.20	20.8	16.5	8.49	4.13	3.64	1.07	0.39	3.92



# Alt Model-Shift Uniqueness Test

011098023-02, P = 366.339675 Days, E = 227.447674 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
36.6	3.69	3.35	3.45	5.25	2.96	0.83	33.3	33.2	0.34	0.24	15.6	0.73	0.09	10.5



### Stellar Parameters For KIC 011098023

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5112^{+167}_{-167}$	$4.597^{+0.022}_{-0.093}$	$0.210^{+0.200}_{-0.300}$	$0.781^{+0.097}_{-0.052}$	$0.895^{+0.045}_{-0.097}$	$2.643^{+0.324}_{-0.775}$
	+3%/-3%	+0%/-2%	+95%/-143%	+12%/-7%	+5%/-11%	+12%/-29%
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 011098023-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-2362 \pm 68$	$14.94^{+12.27}_{-9.35}$	$289^{+12}_{-11}$	$3272^{+1316}_{-528}$	$5420^{+32773}_{-3863}$
Alt.	$-197 \pm 53$	$11.04^{+11.61}_{-7.36}$	$288^{+12}_{-11}$	$2529^{+875}_{-395}$	$814^{+6246}_{-634}$

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

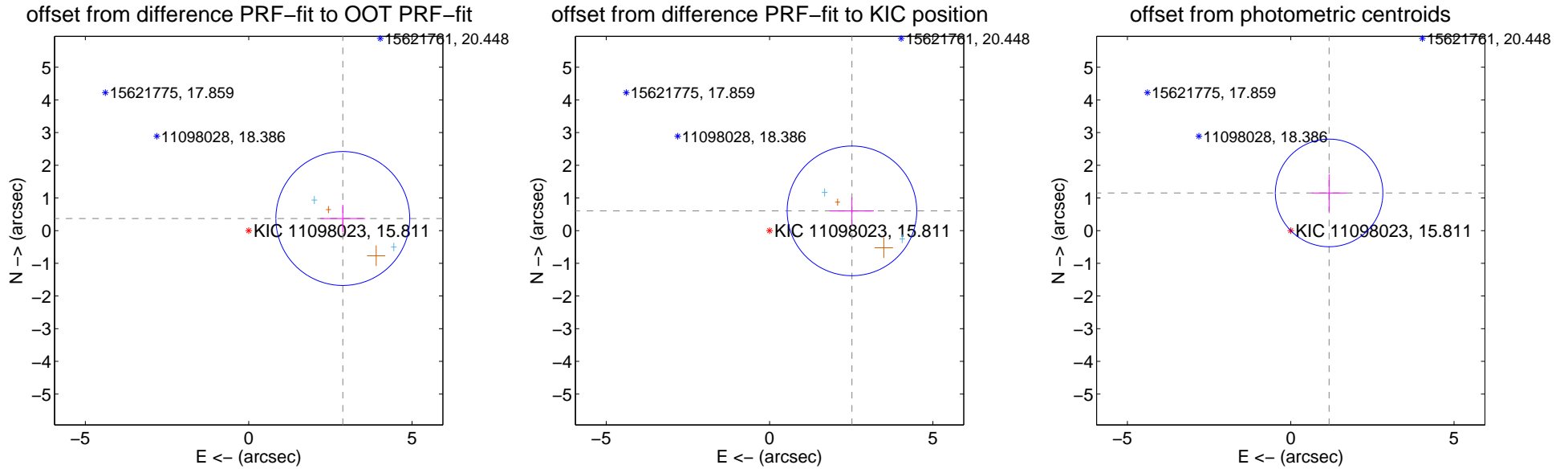
## DV Centroid Data

Supplemental centroid analysis for 011098023-02. Kepler magnitude: 15.81. Transit SNR 10.52

There are 2 quarters with good PRF difference image offsets

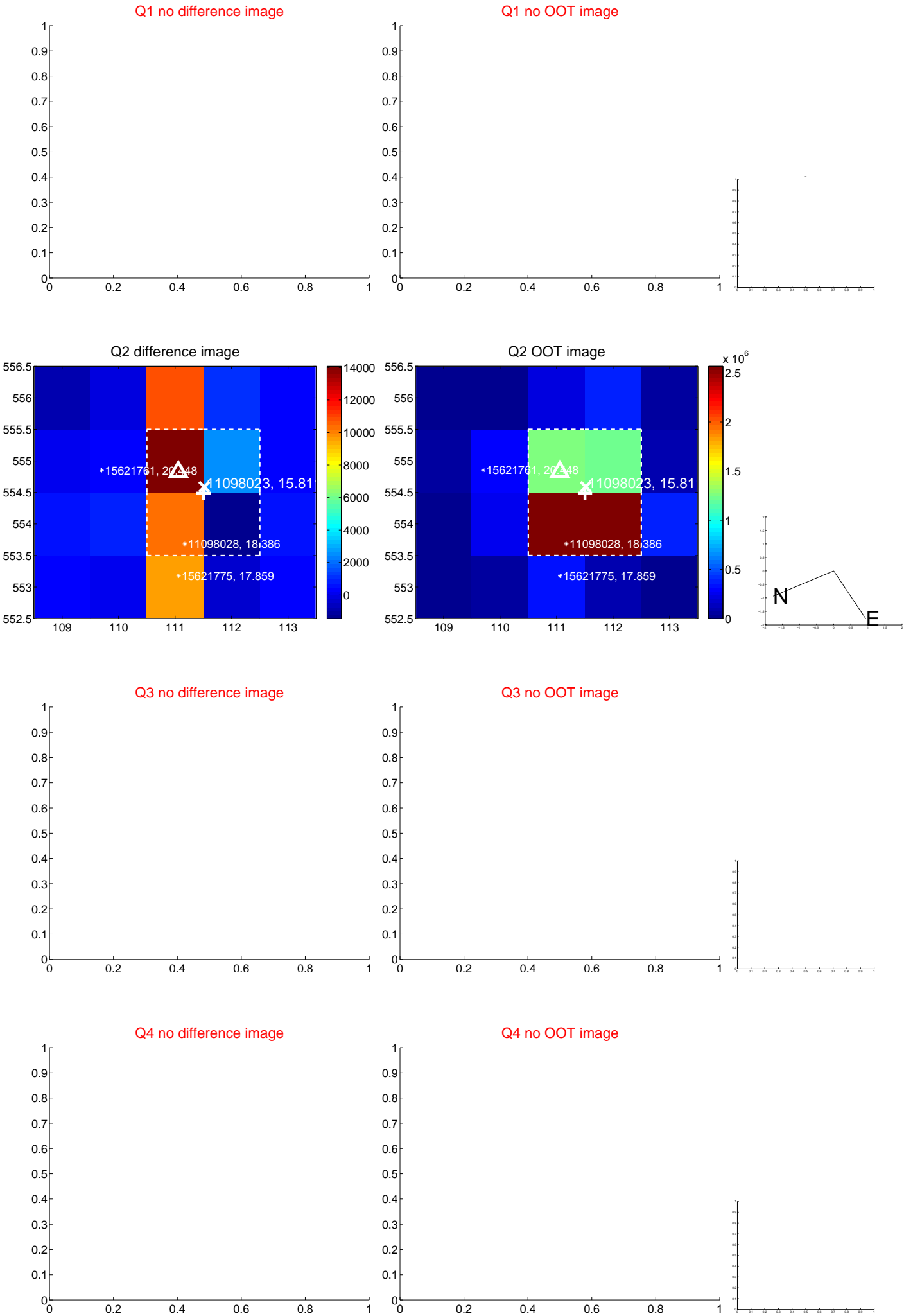
The direct PRF centroid is offset from the target star catalog position by about 0.45 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.905 \pm 0.683$	4.25	$-2.881 \pm 0.686$	$0.371 \pm 0.422$
PRF-fit source offset from KIC position	$2.595 \pm 0.661$	3.92	$-2.523 \pm 0.673$	$0.605 \pm 0.416$
photometric centroid source offset	$1.65 \pm 0.55$	3.00	$-1.18 \pm 0.53$	$1.15 \pm 0.57$



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.

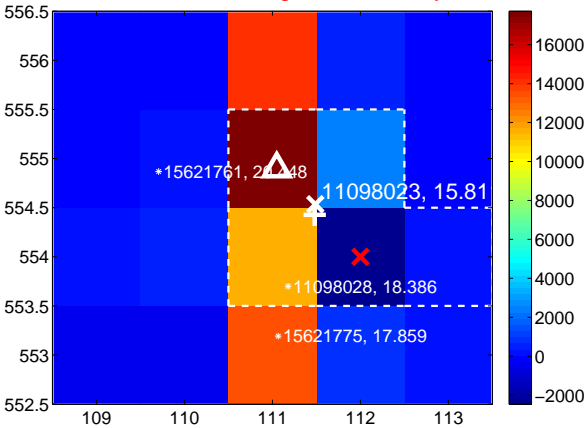
Q5 no difference image



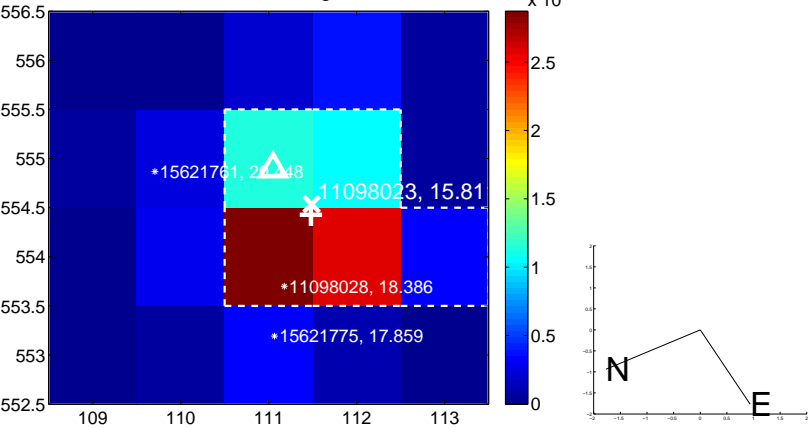
Q5 no OOT image



Q6 difference image. Poor Quality



Q6 OOT image



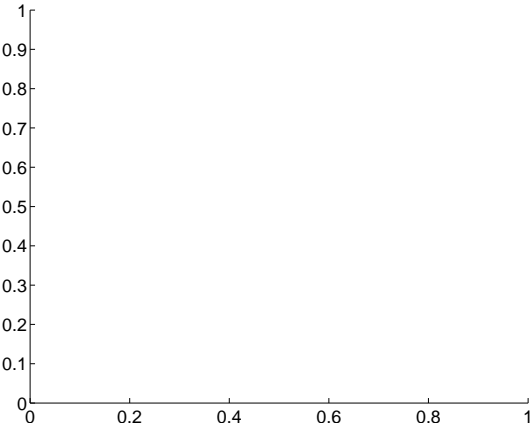
Q7 no difference image



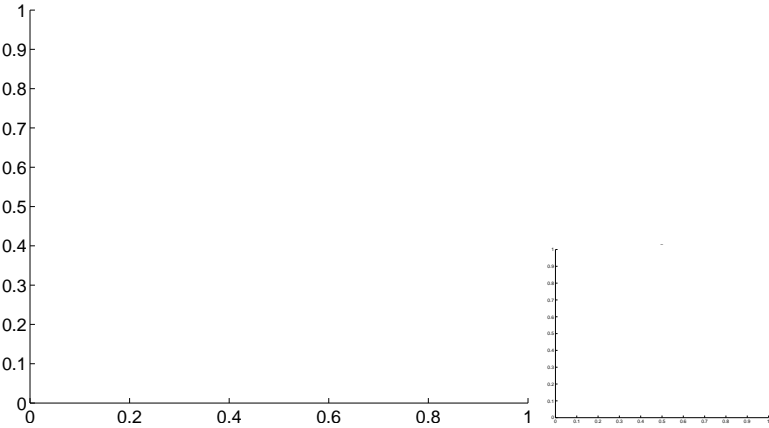
Q7 no OOT image



Q8 no difference image

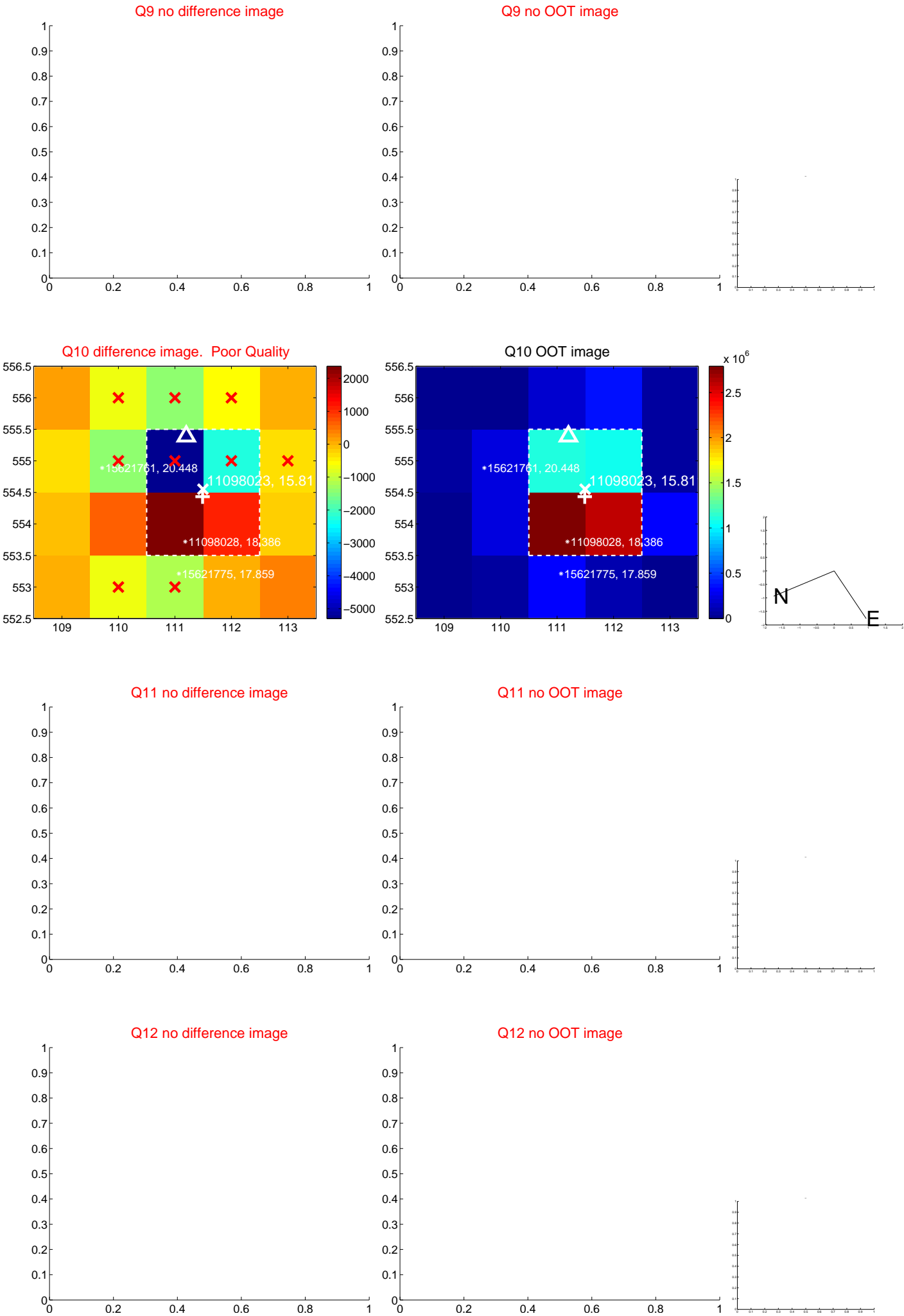


Q8 no OOT image

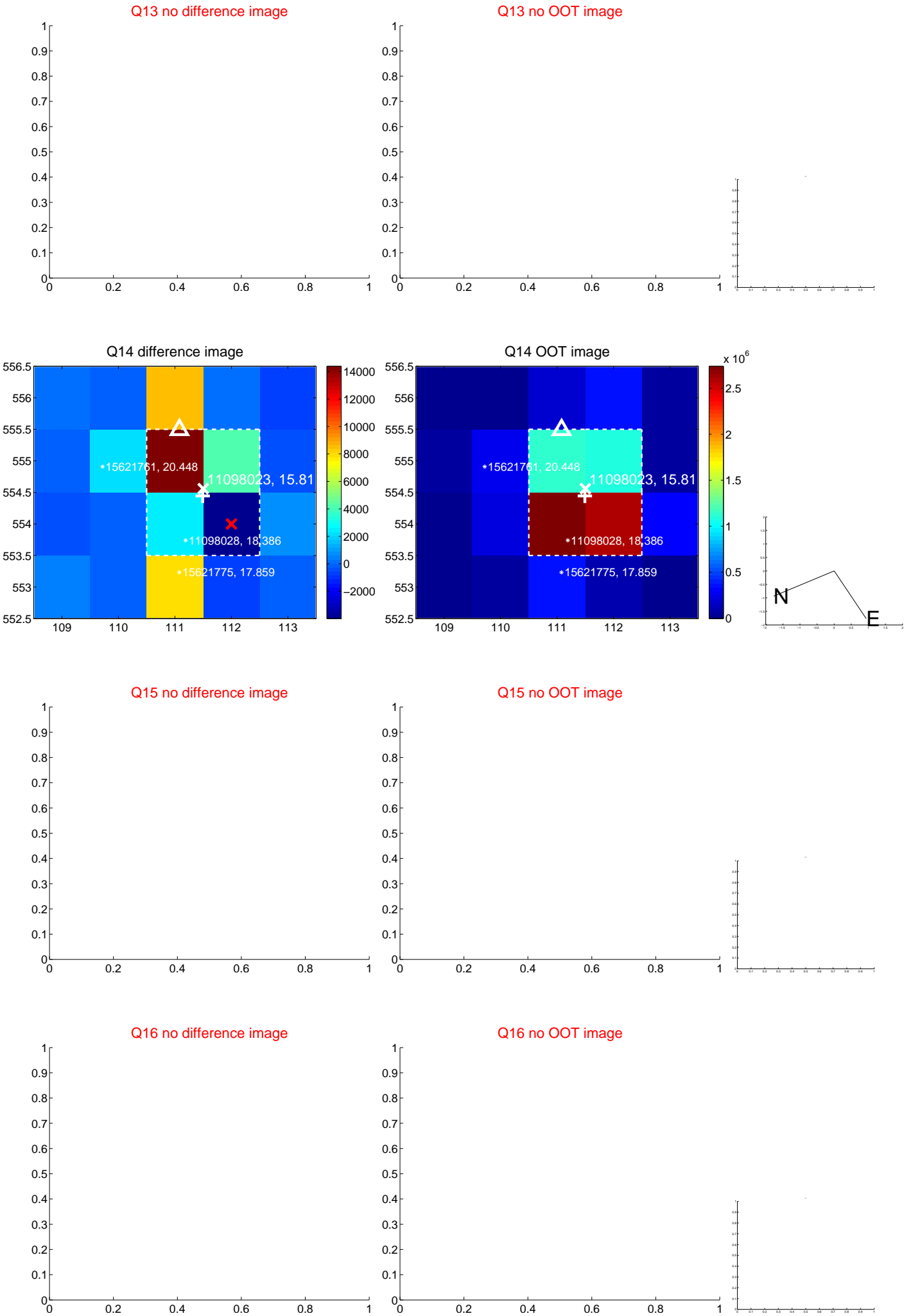




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



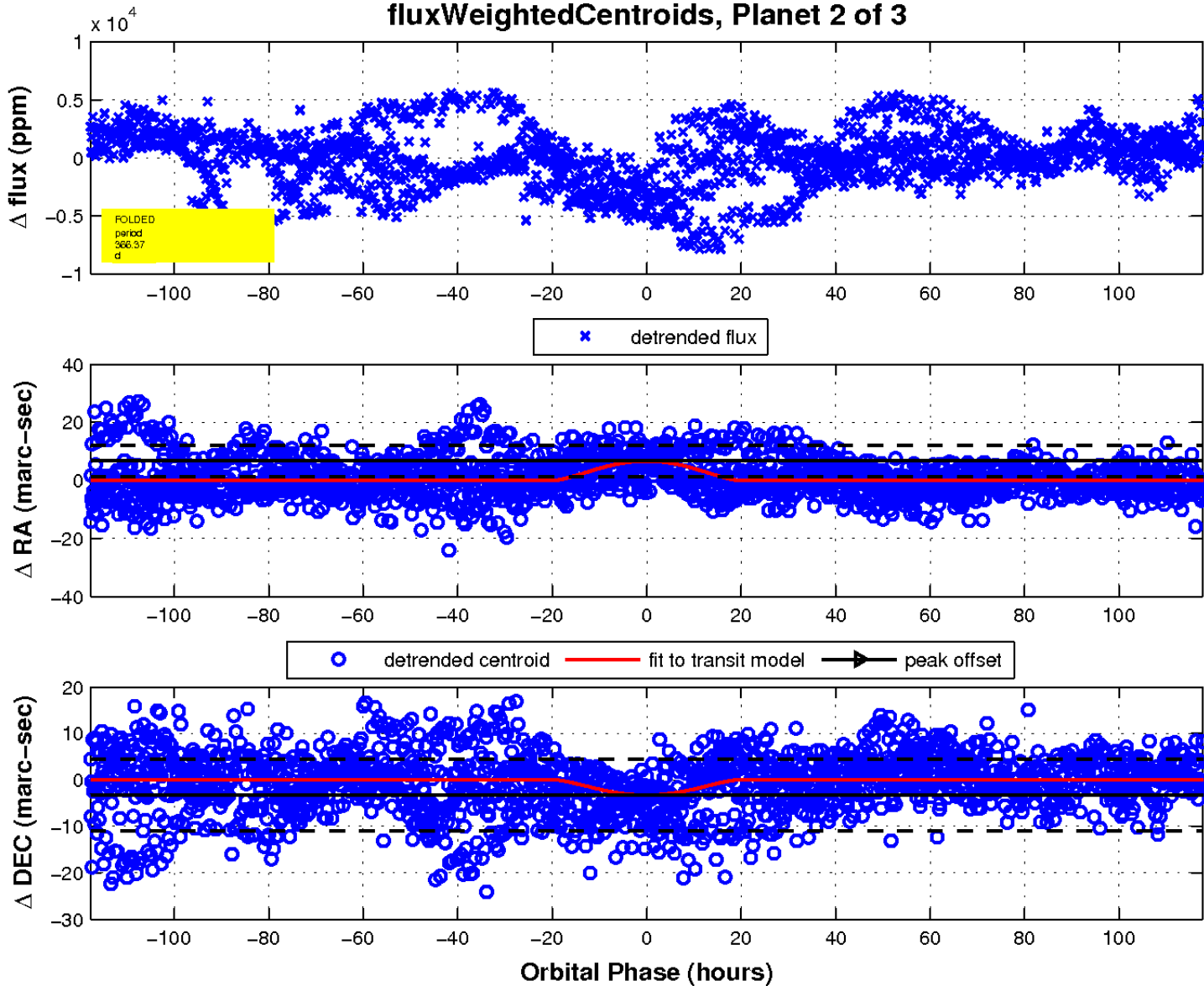
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

Q17 no difference image

Q17 no OOT image

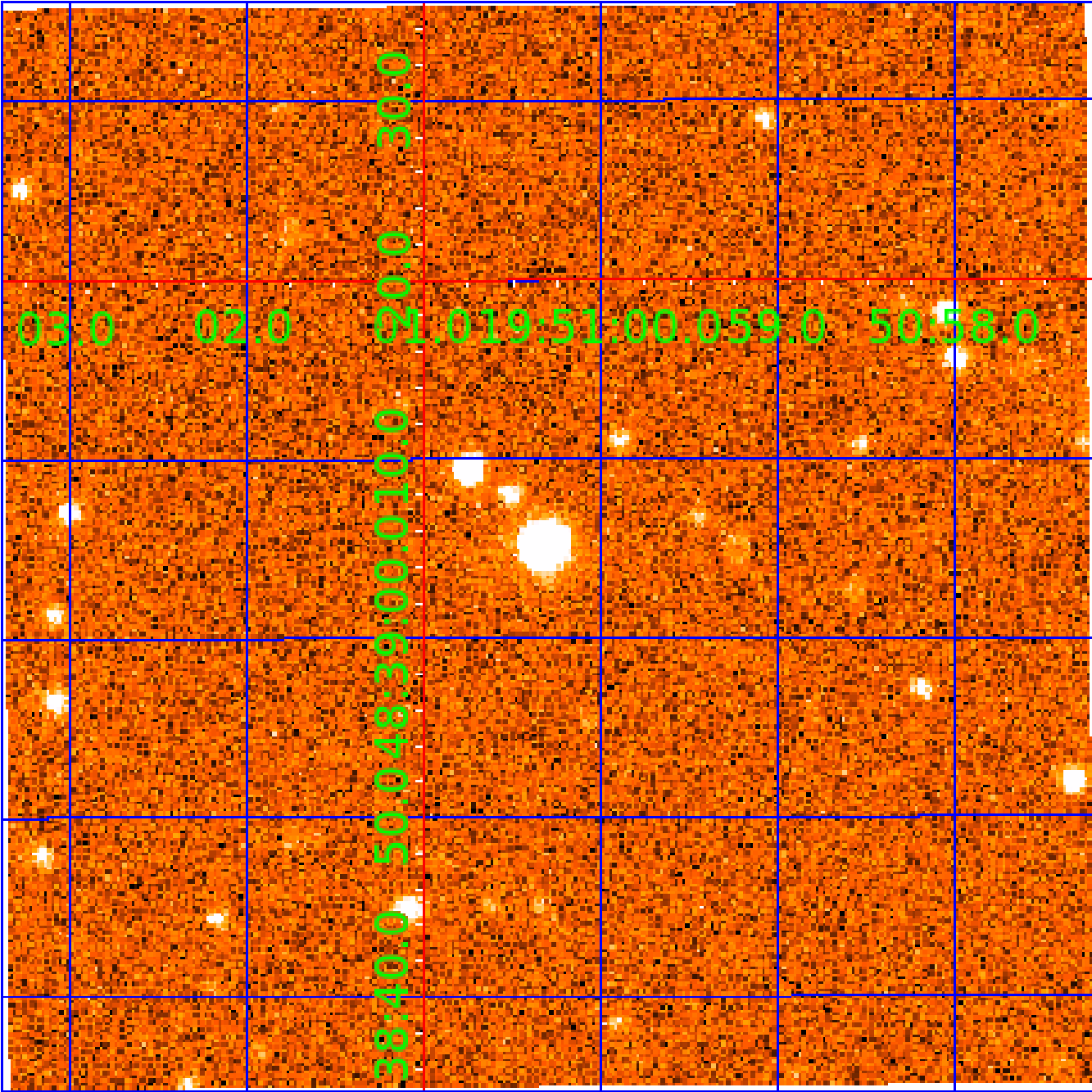


fluxWeightedCentroids, Planet 2 of 3



UKIRT Image

Declination



# KIC 011098023

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011098023-01	OBS	No	343.906277	242.276280	3211.6	27.426	9.7	7.9	0.78	5112	8.59	0.44
011098023-02	OBS	No	366.369523	227.316011	4067.1	39.245	8.2	10.5	0.78	5112	9.47	0.41
011098023-03	OBS	No	355.234830	236.036061	2378.7	21.807	7.1	7.4	0.78	5112	7.34	0.42

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011098023-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
011098023-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA—MOD_NONUNIQ_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011098023-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—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.

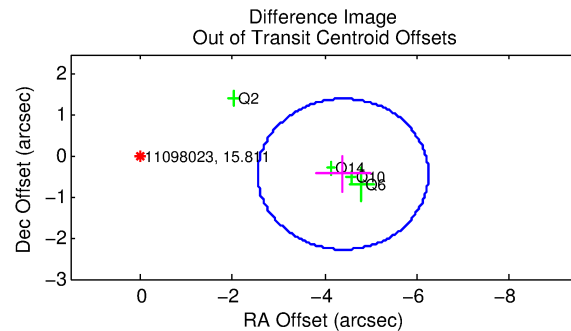
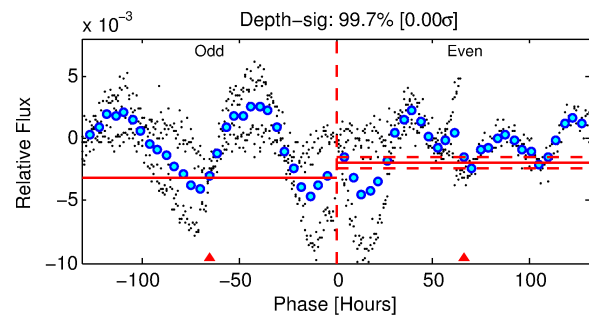
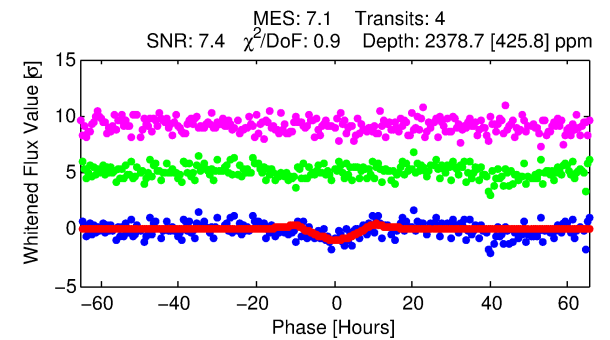
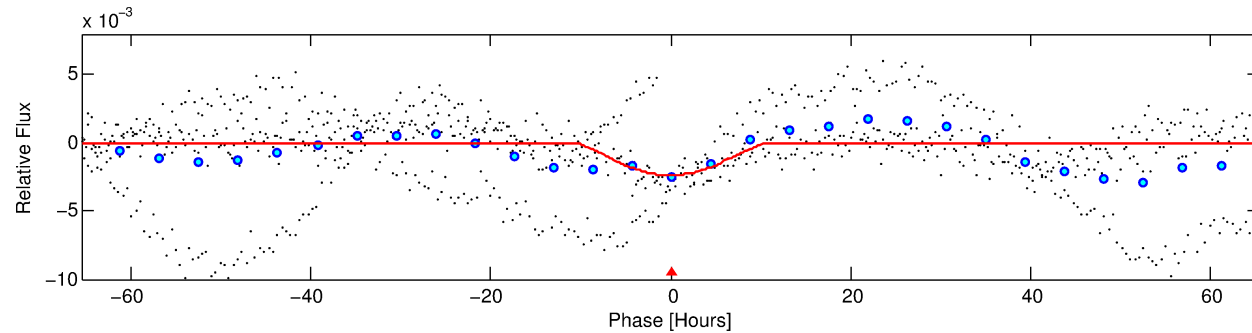
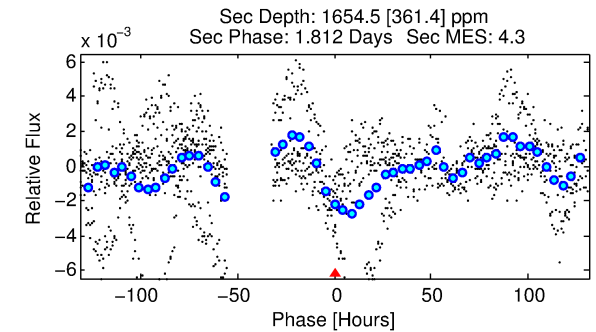
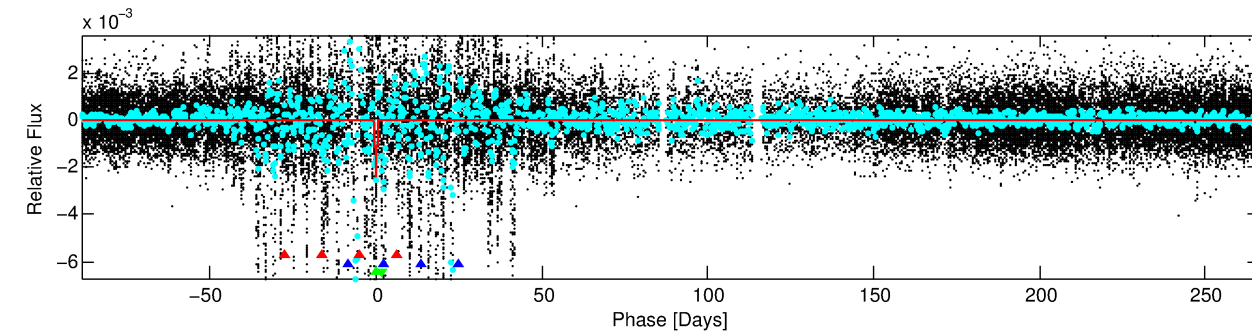
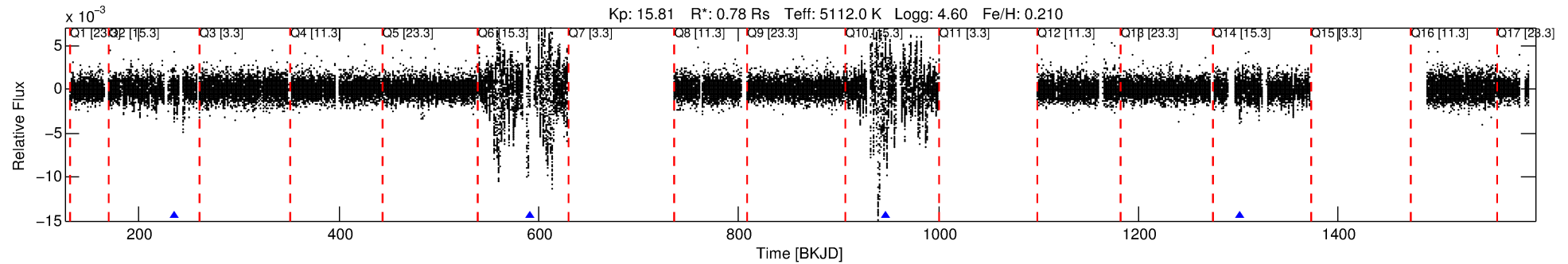
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 011098023-03

No Significant Match Found

# DV One-Page Summary

KIC: 11098023 Candidate: 3 of 3 Period: 355.235 d



## DV Fit Results:

Period = 355.23483 [0.01755] d  
Epoch = 236.0361 [0.0360] BKJD  
Rp/R\* = 0.0862 [0.2077]  
a/R\* = 53.43 [26.35]  
b = 1.00 [0.30]  
Seff = 0.42 [0.09]  
Teq = 205 [11] K  
Rp = 7.34 [17.73] Re  
a = 0.9408 [0.1028] AU  
Ag = 14942.87 [72172.74] [0.21 $\sigma$ ]  
Teffp = 3513 [4240] K [0.78 $\sigma$ ]

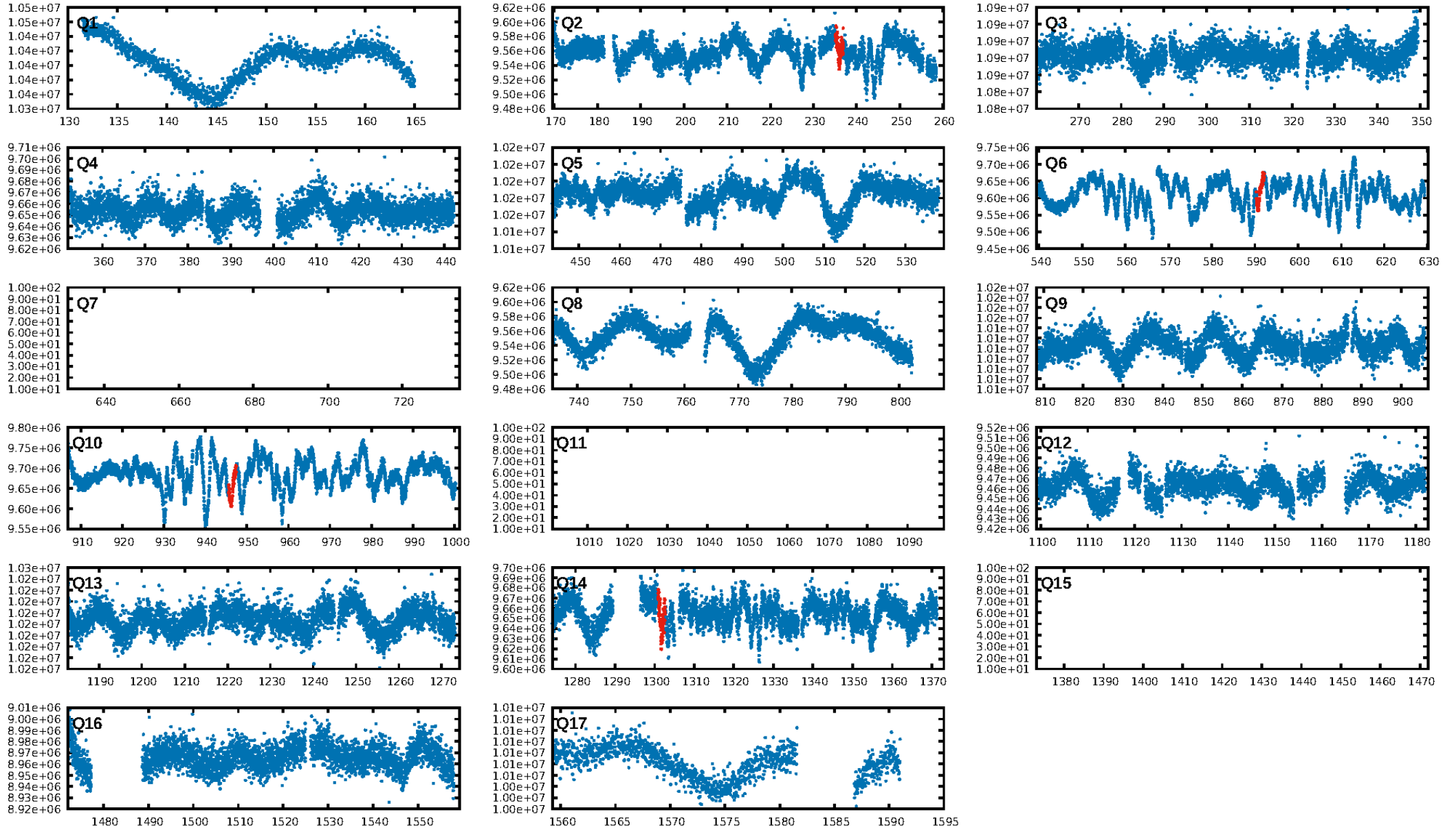
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [7.76 $\sigma$ ]  
LongPeriod-sig: 100.0% [5.95 $\sigma$ ]  
ModelChiSquare2-sig: 4.9%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 8.82e-10**  
RollingBand-fgt: 1.00 [4/4]  
**GhostDiagnostic-chr: 0.6068**  
Centroid-sig: 0.0%  
Centroid-so: 3.781 arcsec [3.53 $\sigma$ ]  
OotOffset-rm: 4.418 arcsec [7.19 $\sigma$ ]  
KicOffset-rm: 4.072 arcsec [7.63 $\sigma$ ]  
OotOffset-st: 4/0/0/0 [4]  
KicOffset-st: 4/0/0/0 [4]  
DiffImageQuality-fgm: 0.50 [2/4]  
DiffImageOverlap-fno: 1.00 [4/4]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:26:06 Z

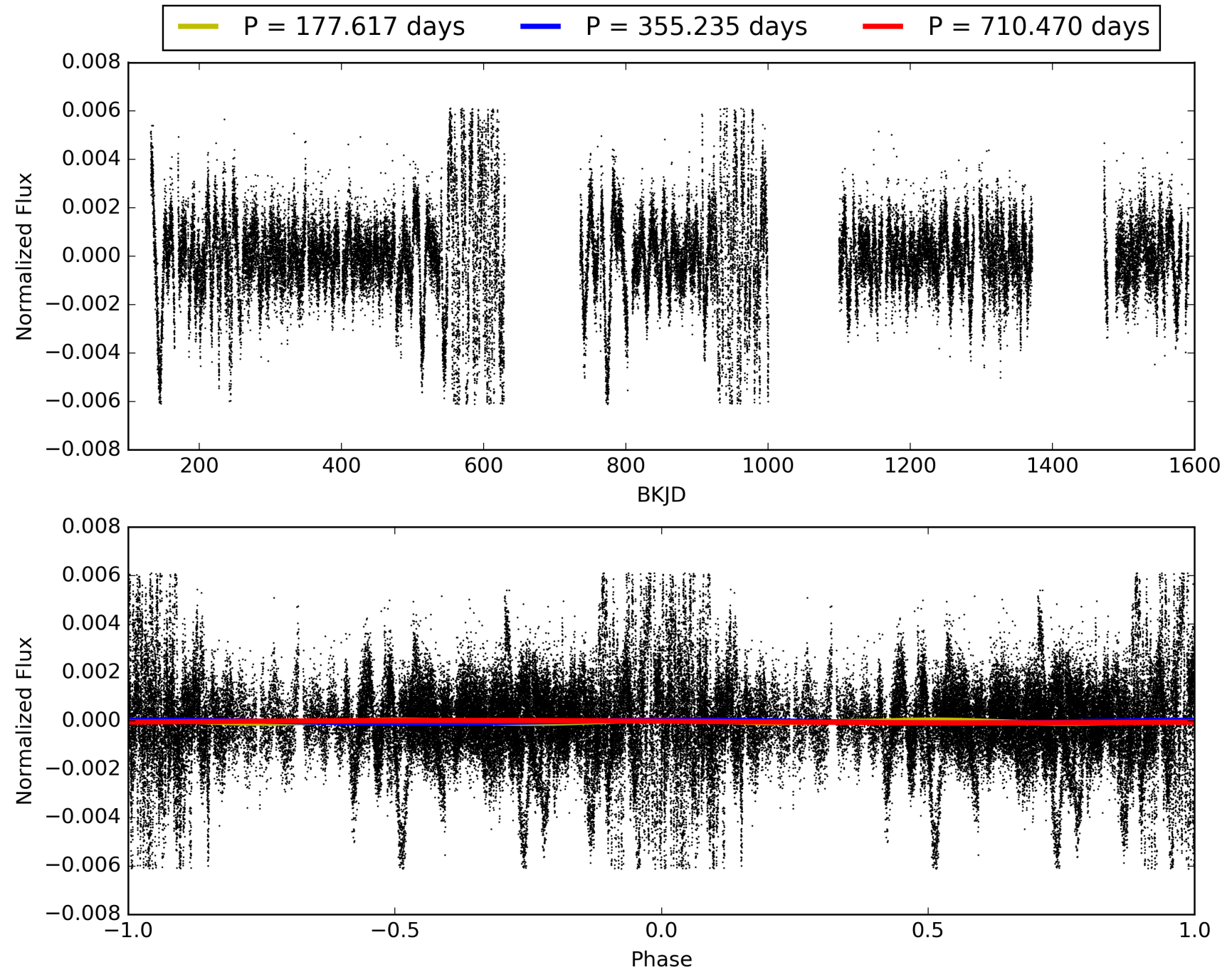
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 011098023-03, PDC Light Curves





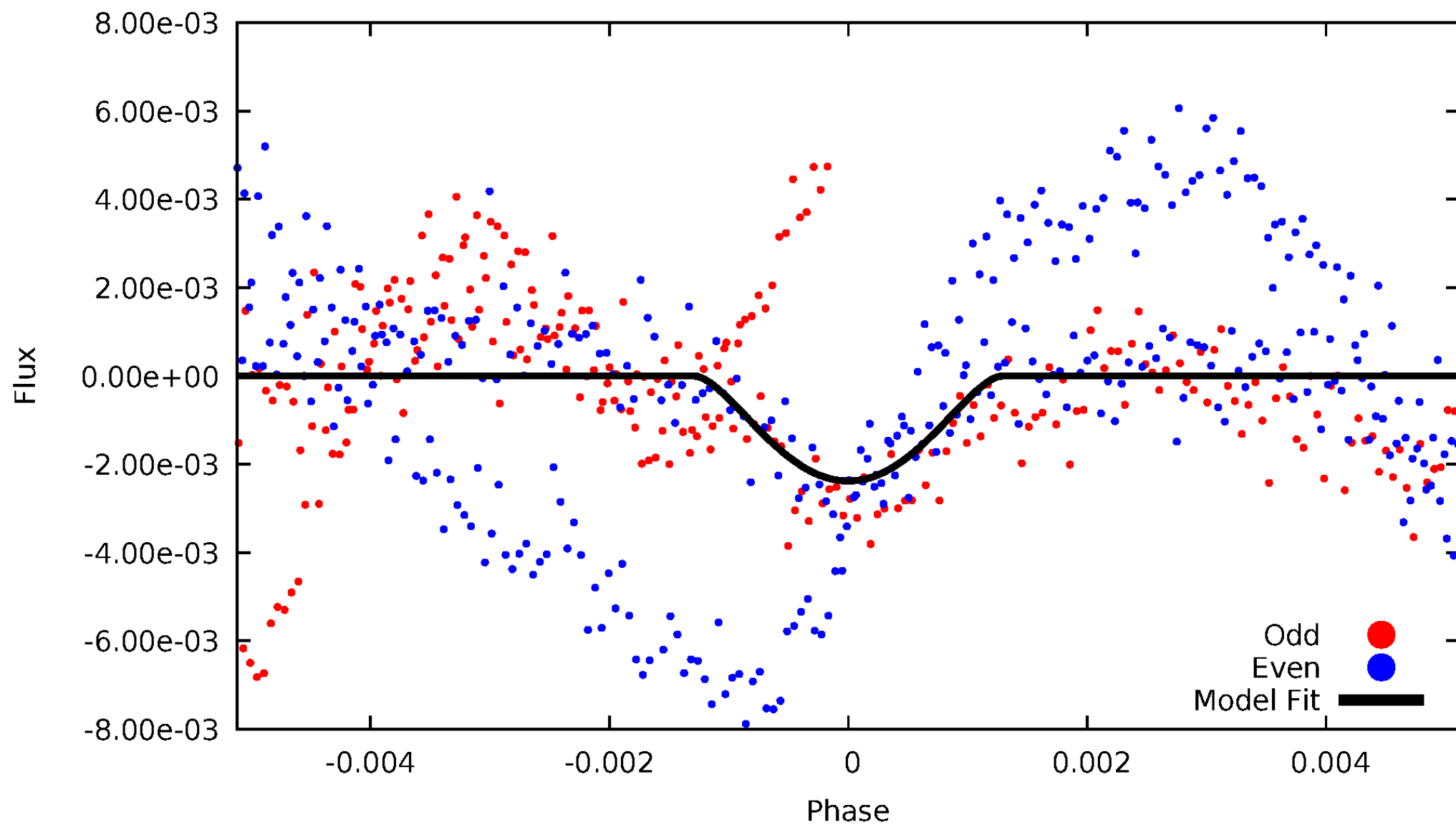
# TCE 011098023-03





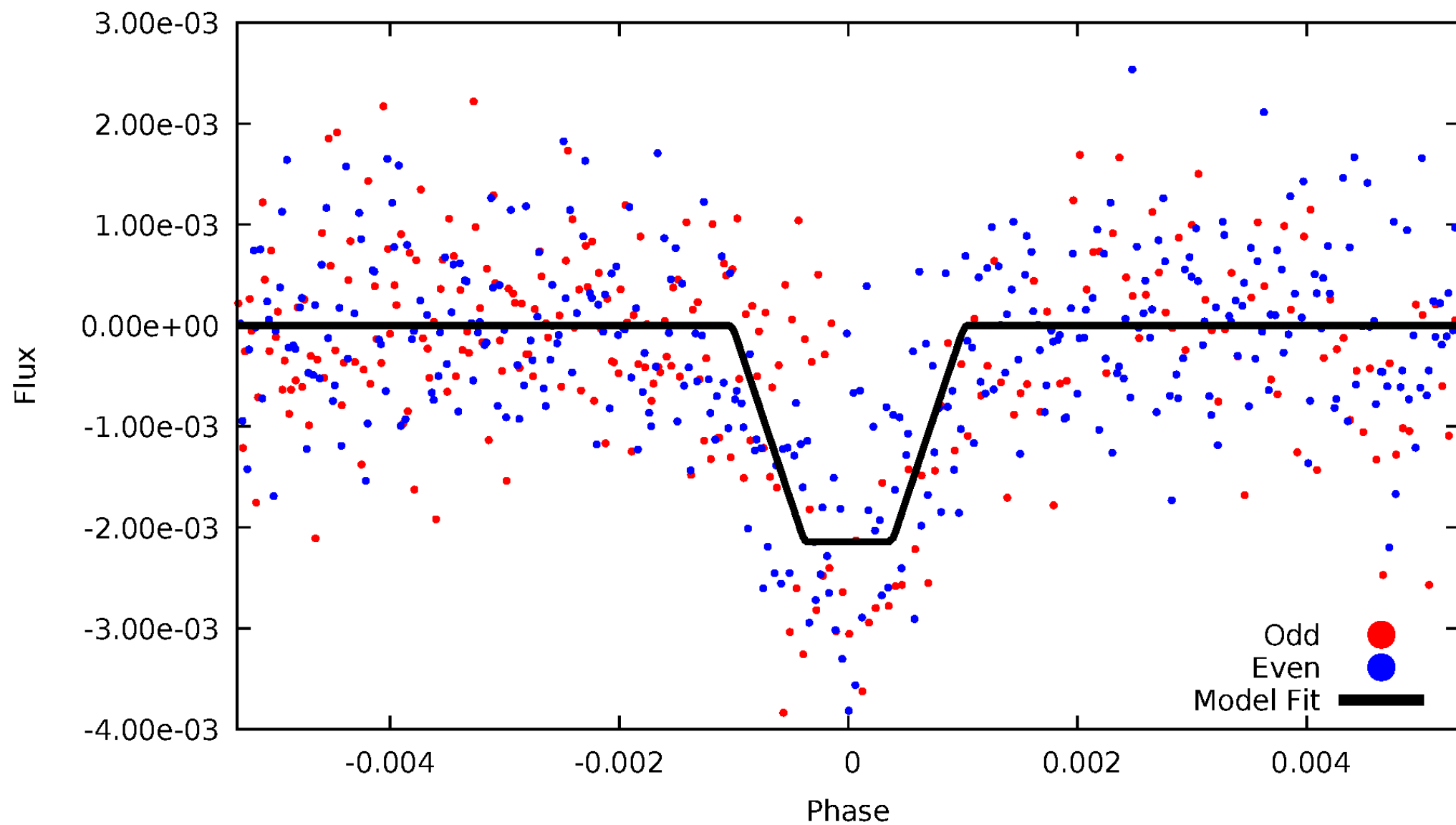
# DV Odd/Even

TCE 011098023-03



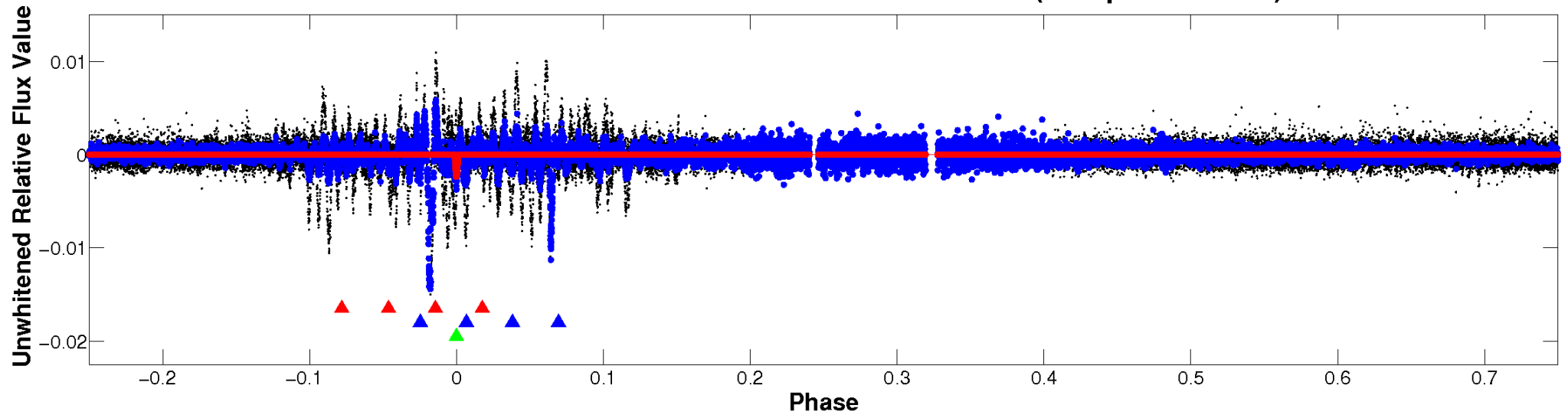
# ALT Odd/Even

TCE 011098023-03

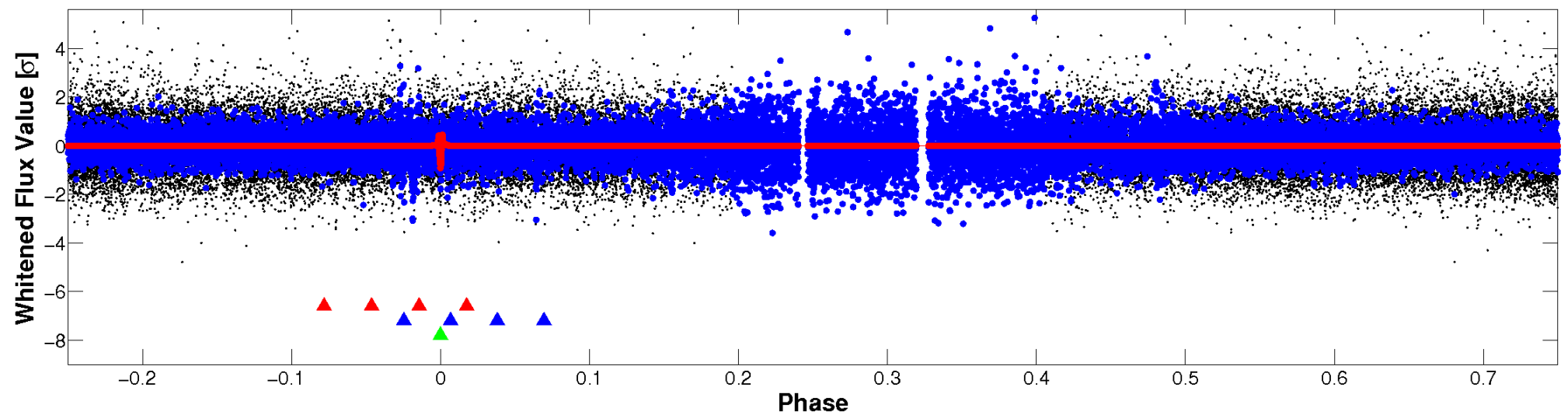


# Non-Whitened Vs. Whitened Light Curve

Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

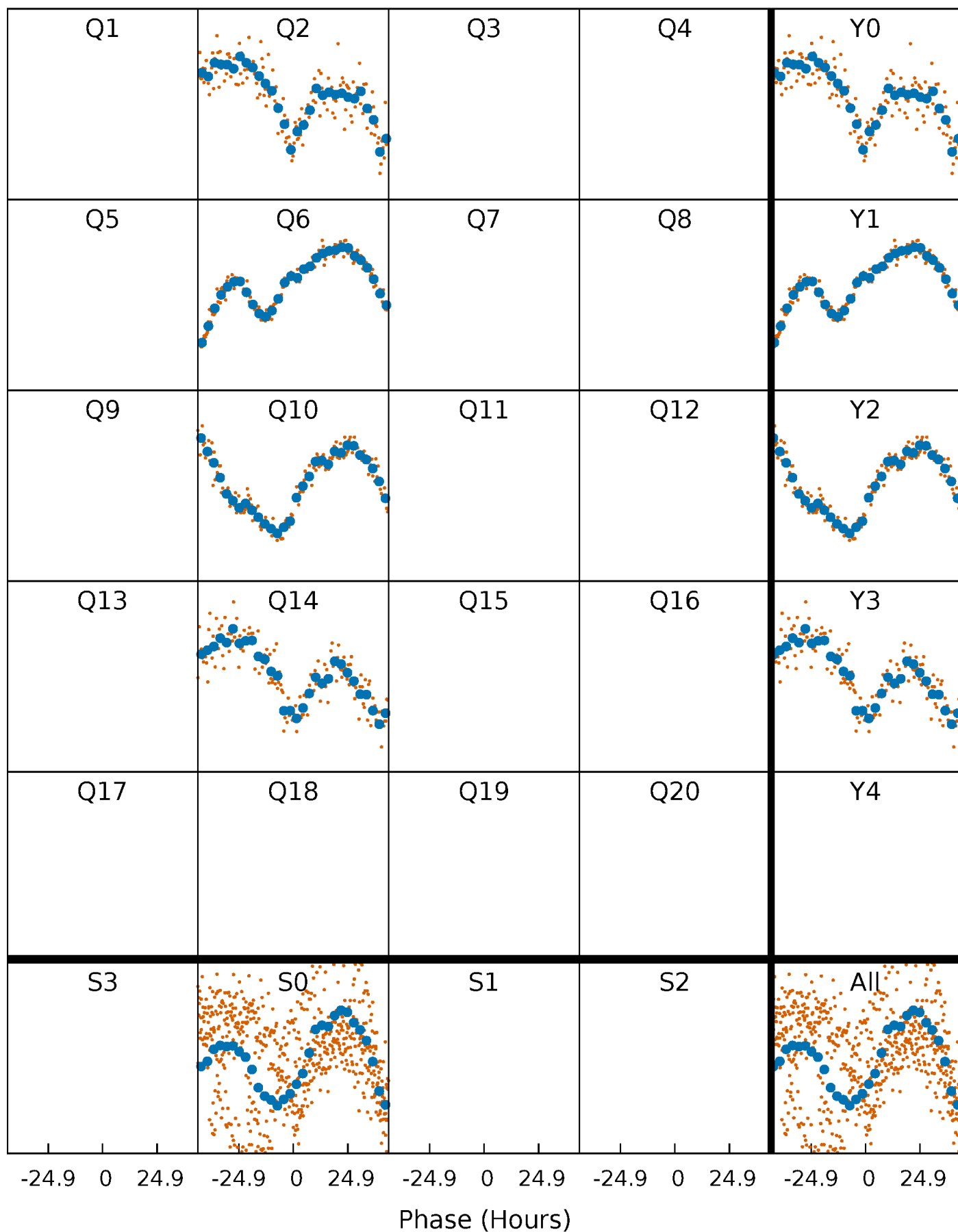


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



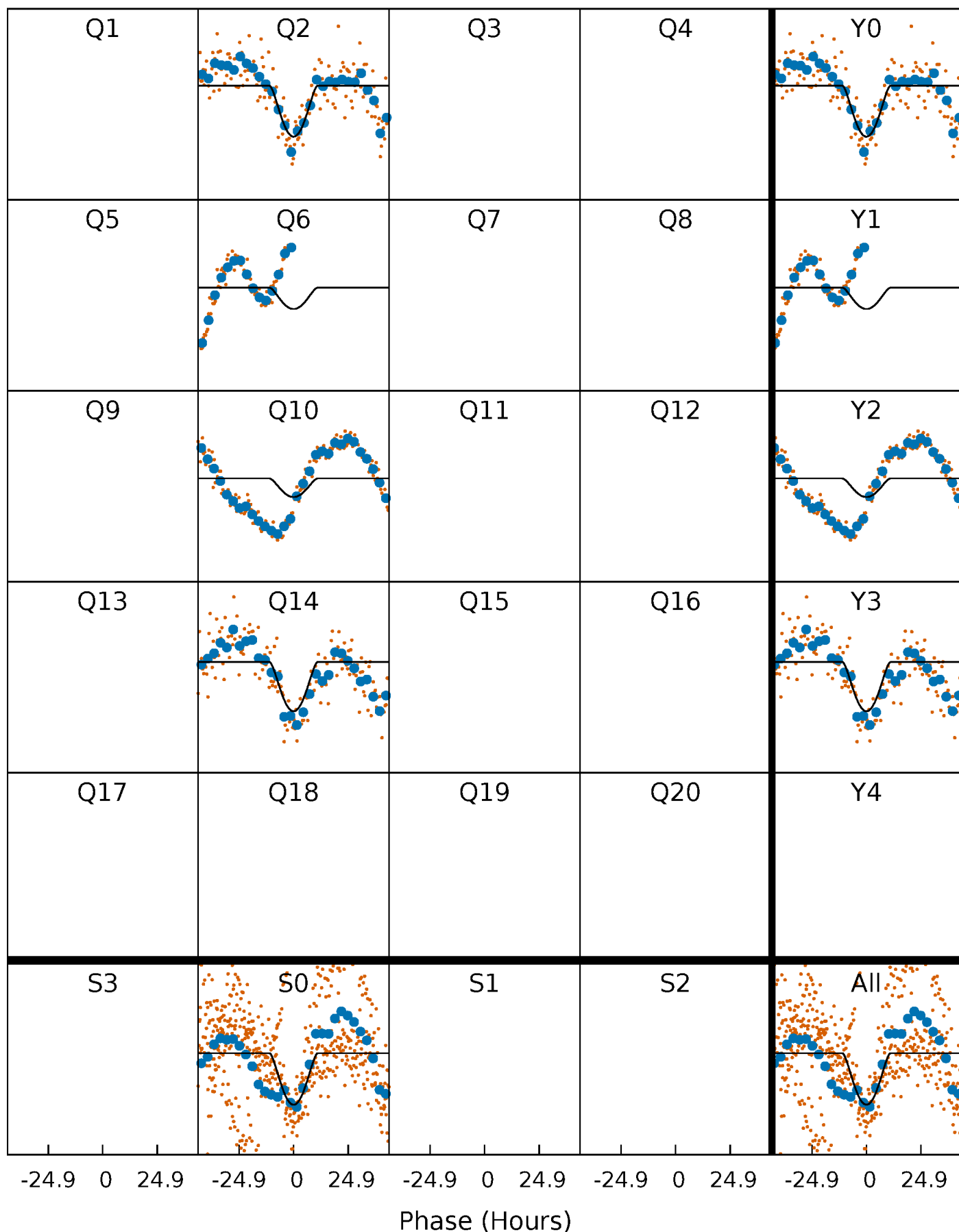
# PDC Quarter-Phased Transit Curves

TCE 011098023-03     $P=355.234830$  Days     $T_0=236.036061$  (BKJD)



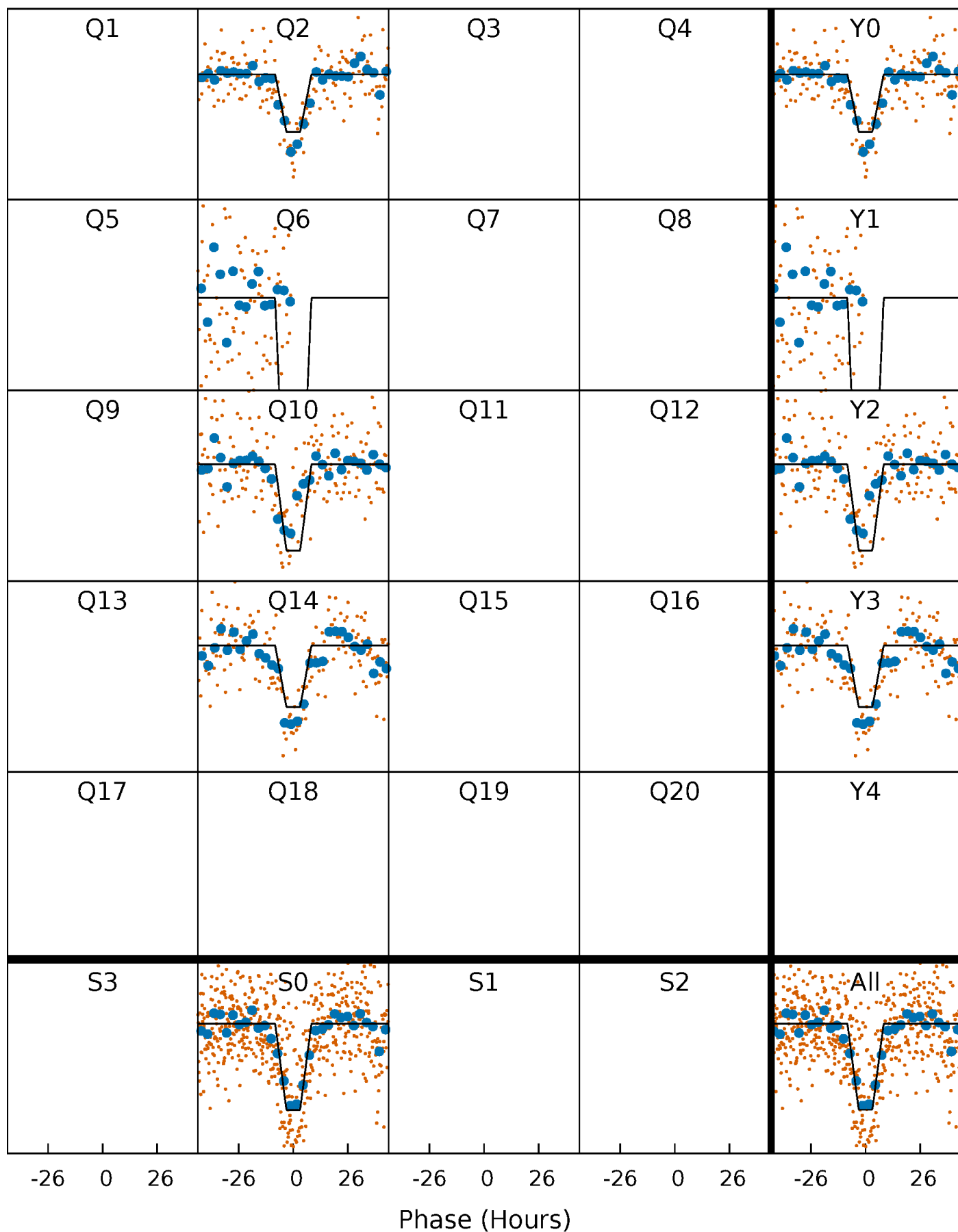
# DV Quarter-Phased Transit Curves

TCE 011098023-03 P=355.234830 Days  $T_0=236.036061$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

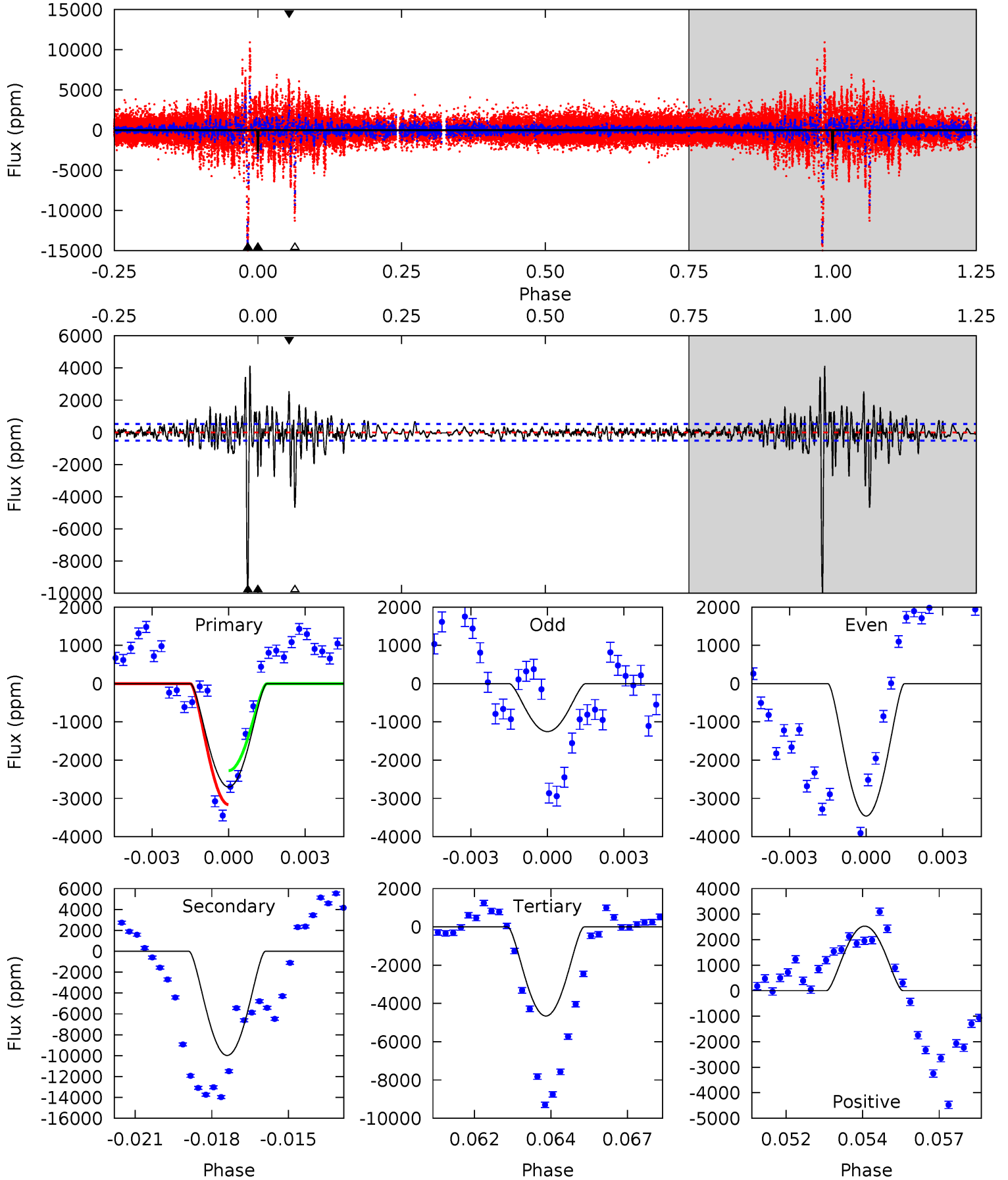
TCE 011098023-03 P=355.251063 Days  $T_0=236.010087$  (BKJD)



# DV Model-Shift Uniqueness Test

011098023-03, P = 355.234830 Days, E = 236.036061 Days

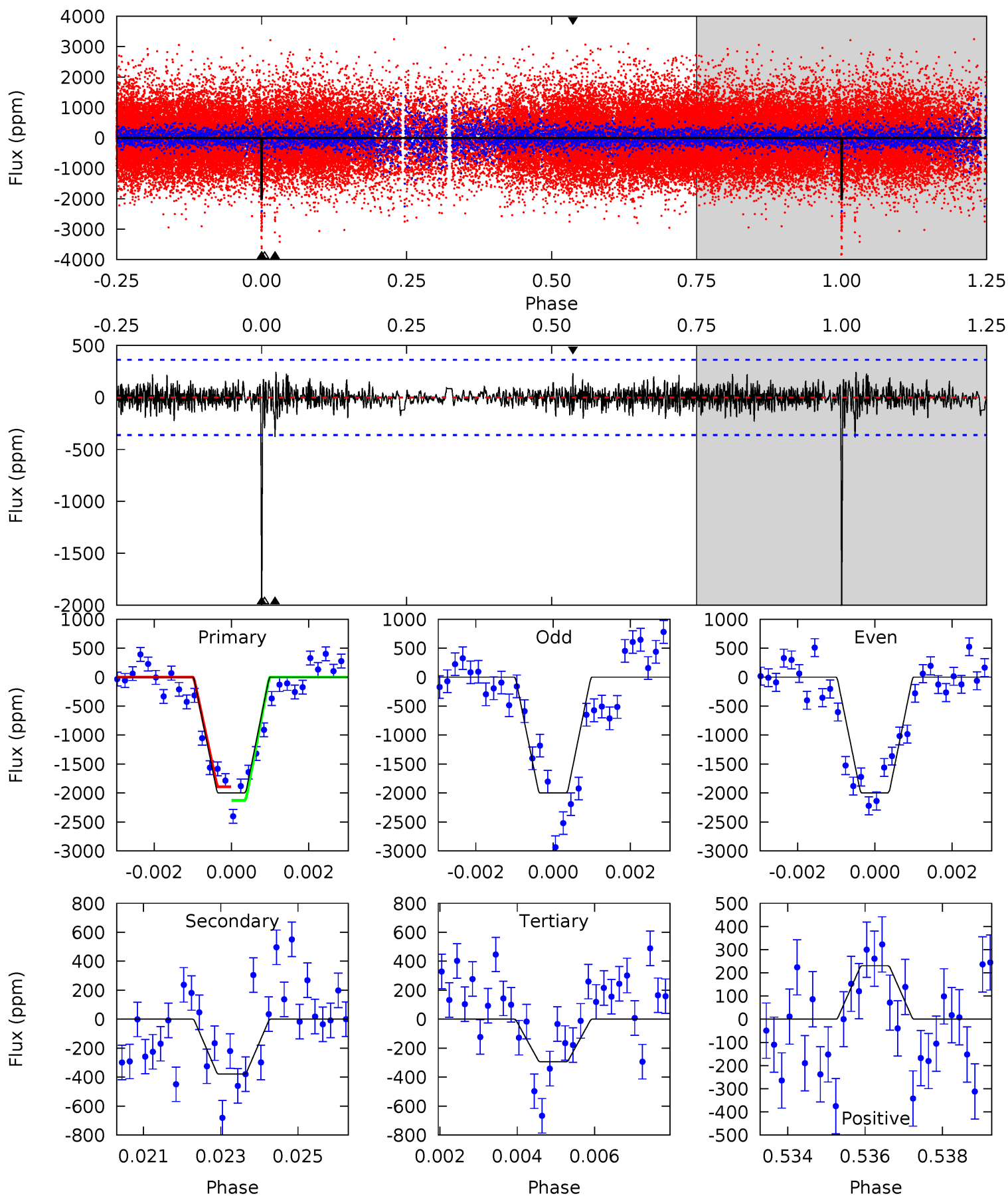
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
27.6	101.8	47.5	25.8	5.28	3.01	5.19	-19.9	1.76	54.3	76.0	10.0	0.51	0.29	4.49



# Alt Model-Shift Uniqueness Test

011098023-03, P = 355.251063 Days, E = 236.010087 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
29.3	5.55	4.32	3.38	5.32	3.08	0.98	25.0	26.0	1.23	2.17	0.02	0.84	0.11	1.70





### Stellar Parameters For KIC 011098023

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5112^{+167}_{-167}$	$4.597^{+0.022}_{-0.093}$	$0.210^{+0.200}_{-0.300}$	$0.781^{+0.097}_{-0.052}$	$0.895^{+0.045}_{-0.097}$	$2.643^{+0.324}_{-0.775}$
	+3%/-3%	+0%/-2%	+95%/-143%	+12%/-7%	+5%/-11%	+12%/-29%
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 011098023-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-9980 \pm 98$	$16.92^{+14.31}_{-11.32}$	$291^{+12}_{-11}$	$3987^{+2316}_{-736}$	$17139^{+140544}_{-12224}$
Alt.	$-378 \pm 68$	$13.88^{+13.98}_{-9.47}$	$292^{+12}_{-12}$	$2600^{+1021}_{-411}$	$946^{+8641}_{-727}$

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

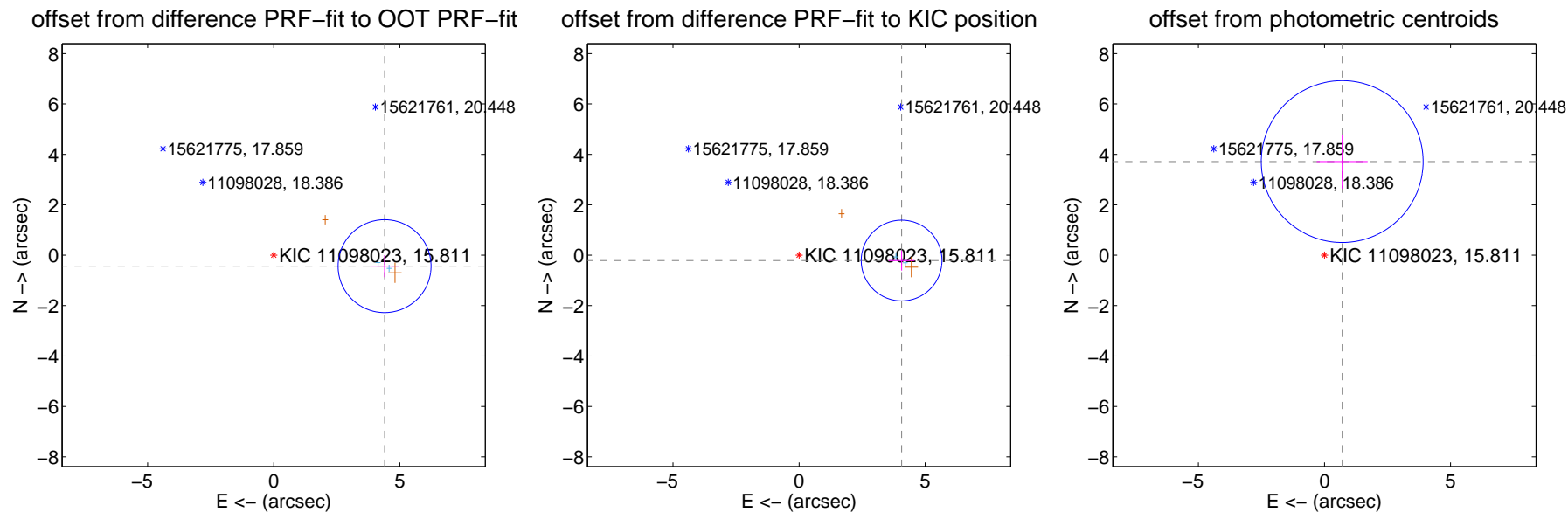
## DV Centroid Data

Supplemental centroid analysis for 011098023-03. Kepler magnitude: 15.81. Transit SNR 7.41

There are 2 quarters with good PRF difference image offsets

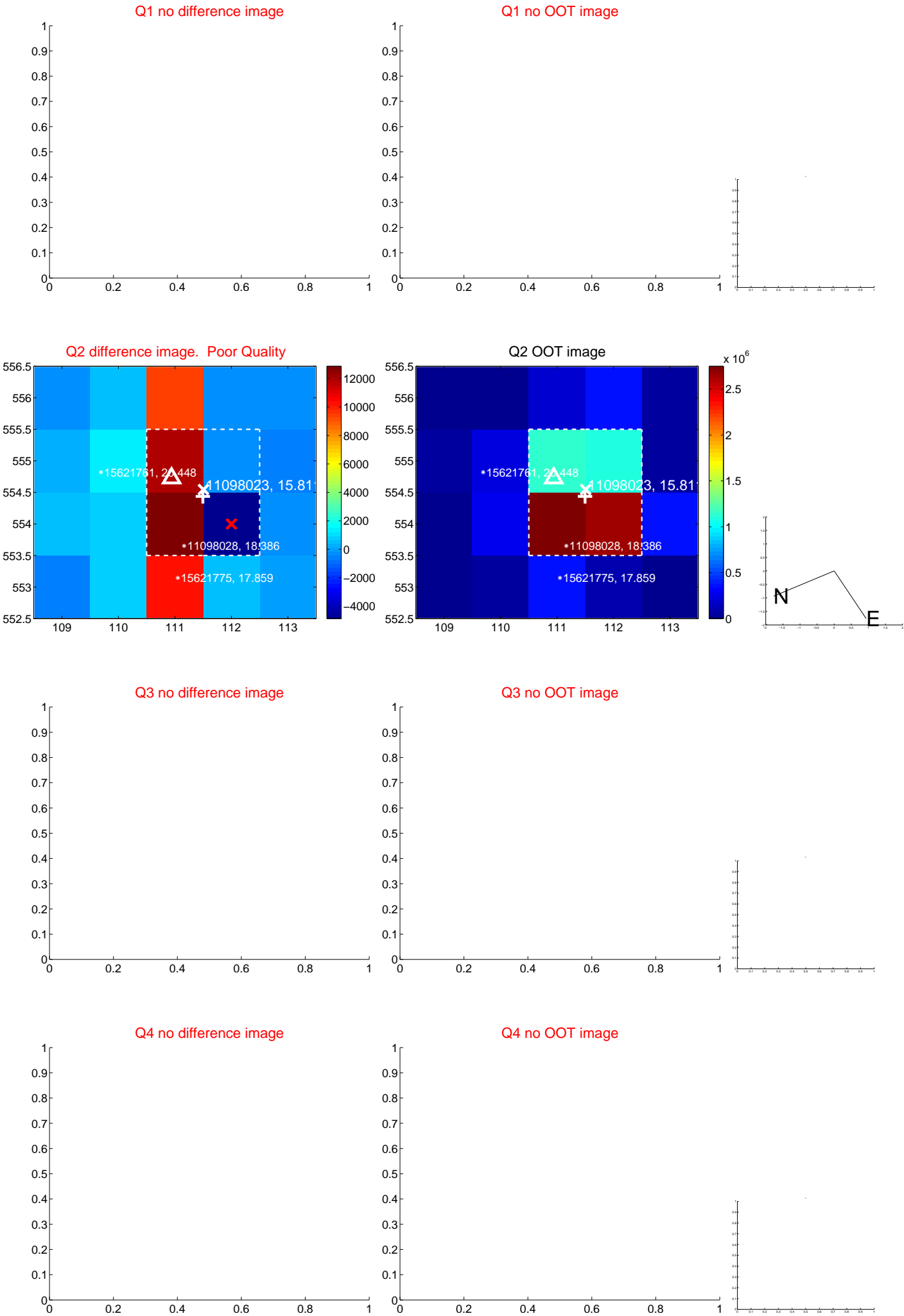
The direct PRF centroid is offset from the target star catalog position by about 0.37 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$4.418 \pm 0.614$	7.19	$-4.396 \pm 0.575$	$-0.433 \pm 0.439$
PRF-fit source offset from KIC position	$4.072 \pm 0.534$	7.63	$-4.067 \pm 0.514$	$-0.211 \pm 0.399$
photometric centroid source offset	$3.78 \pm 1.07$	3.53	$-0.70 \pm 1.01$	$3.72 \pm 1.07$

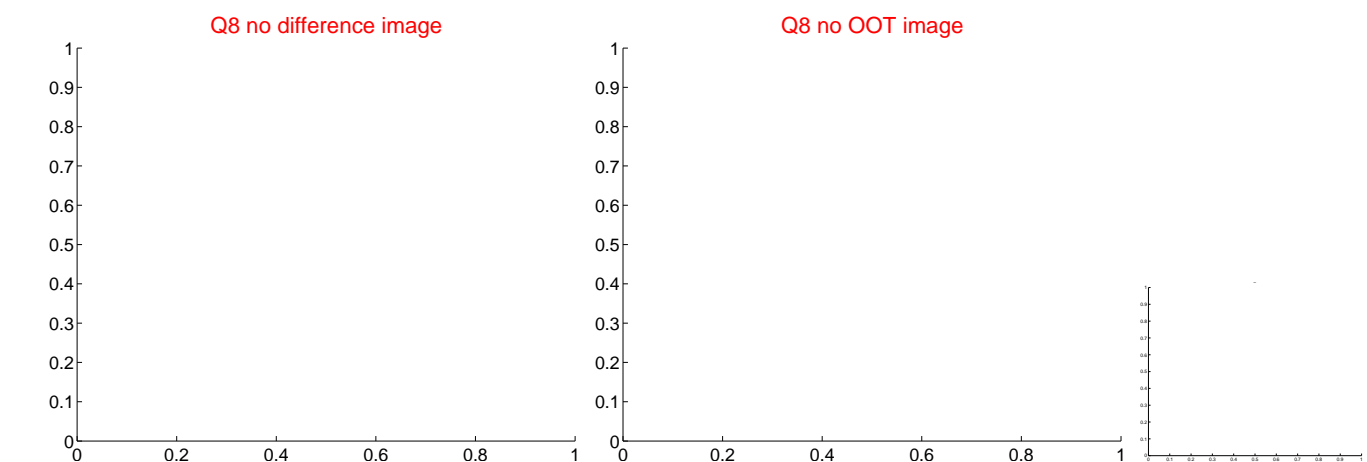
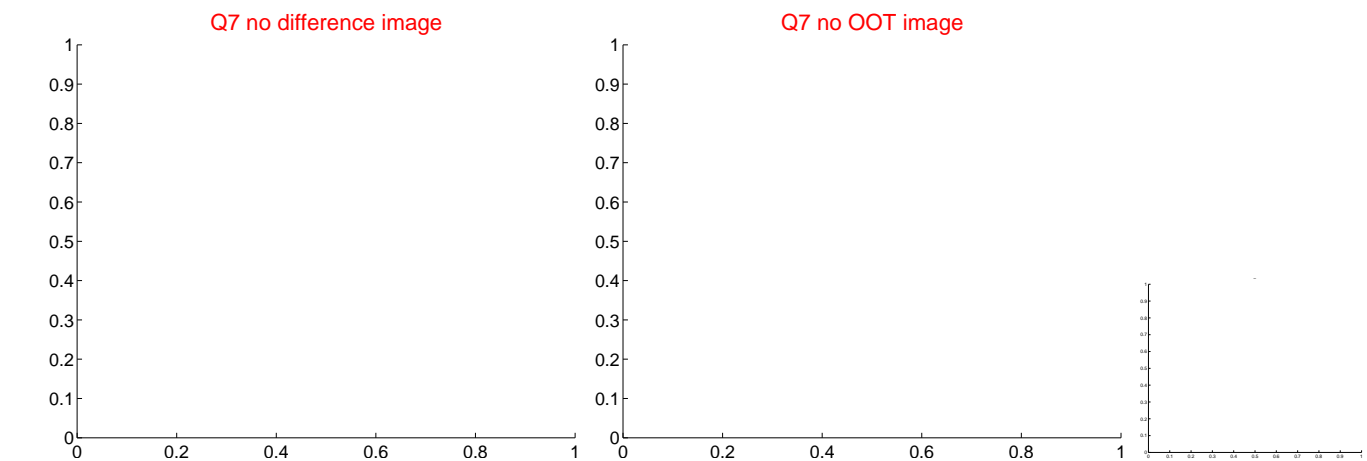
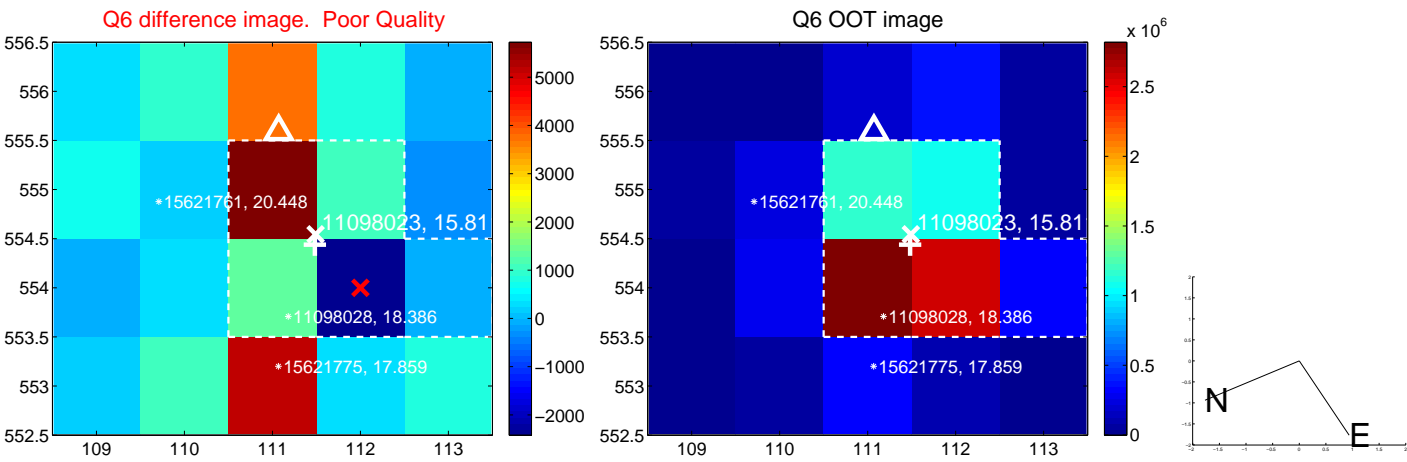
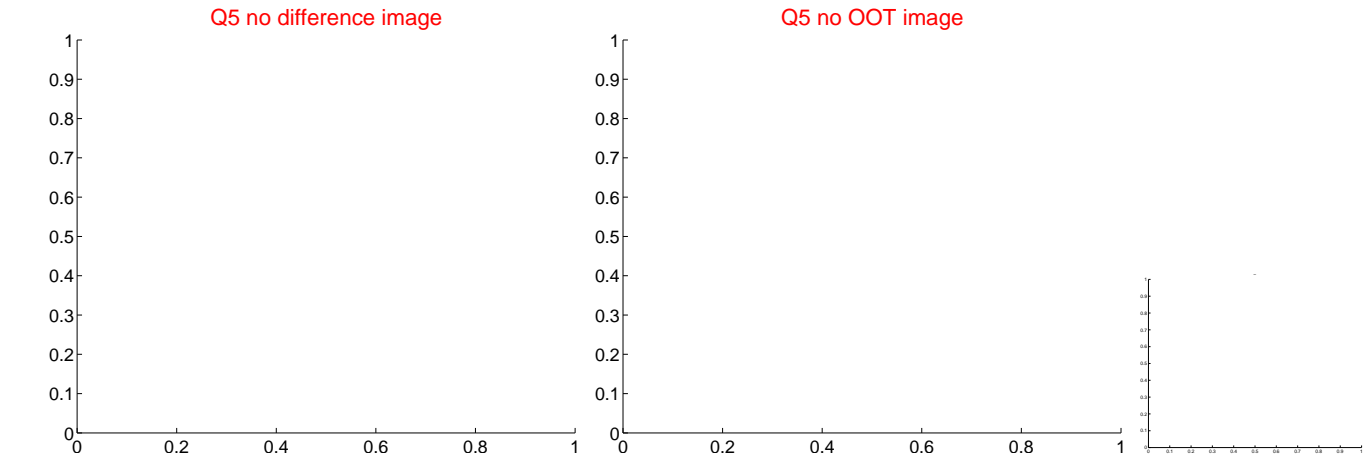


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

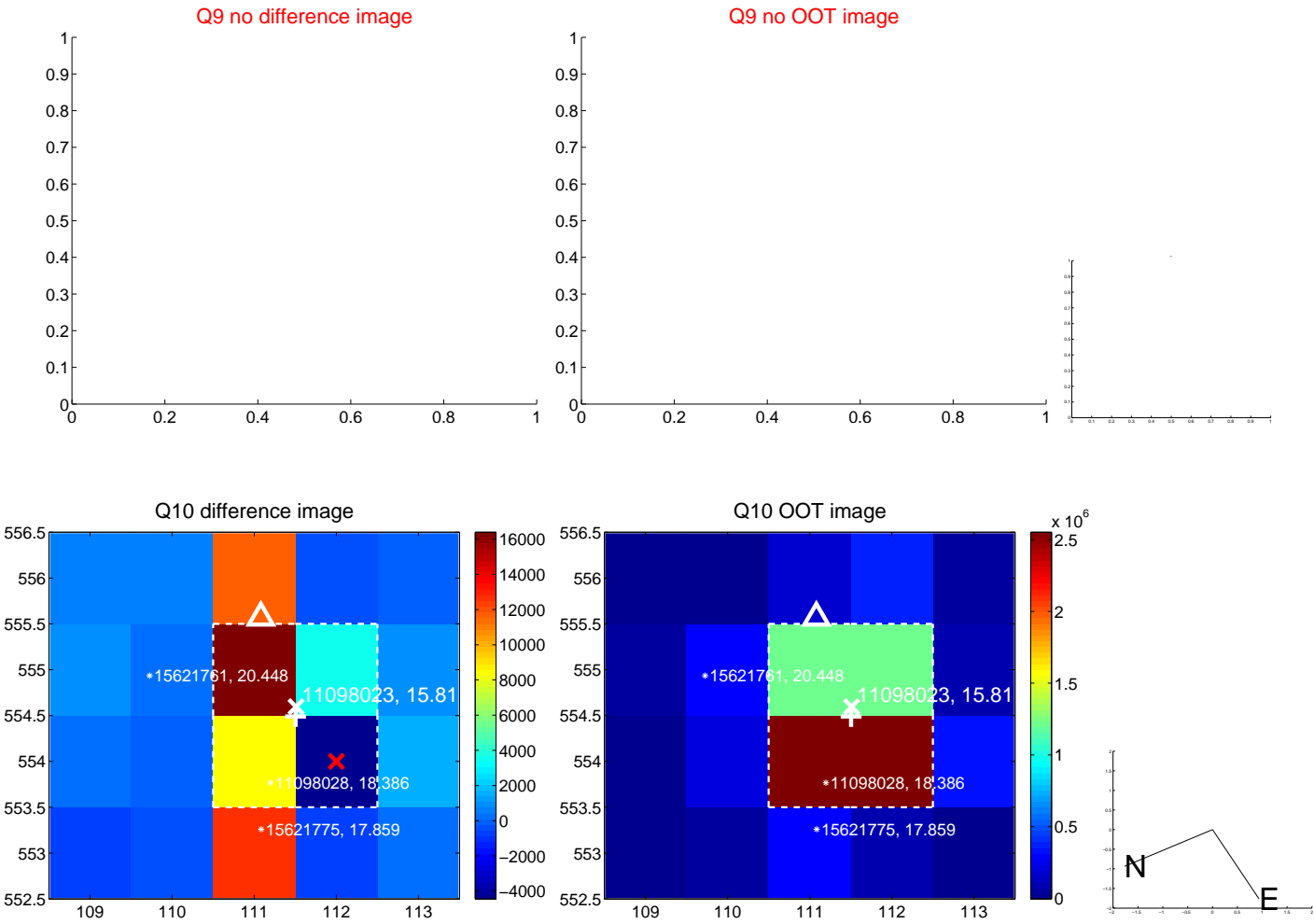
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



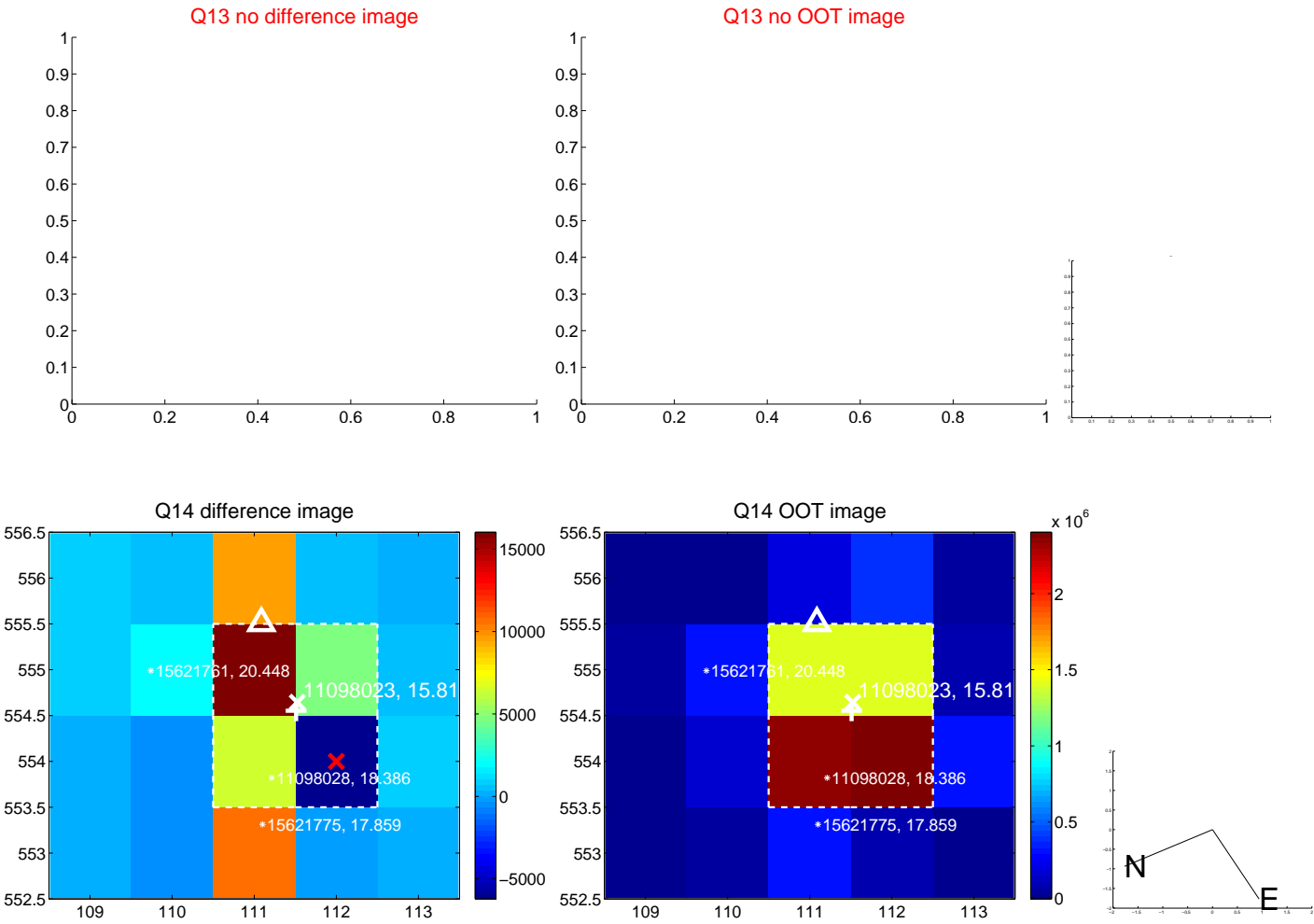
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



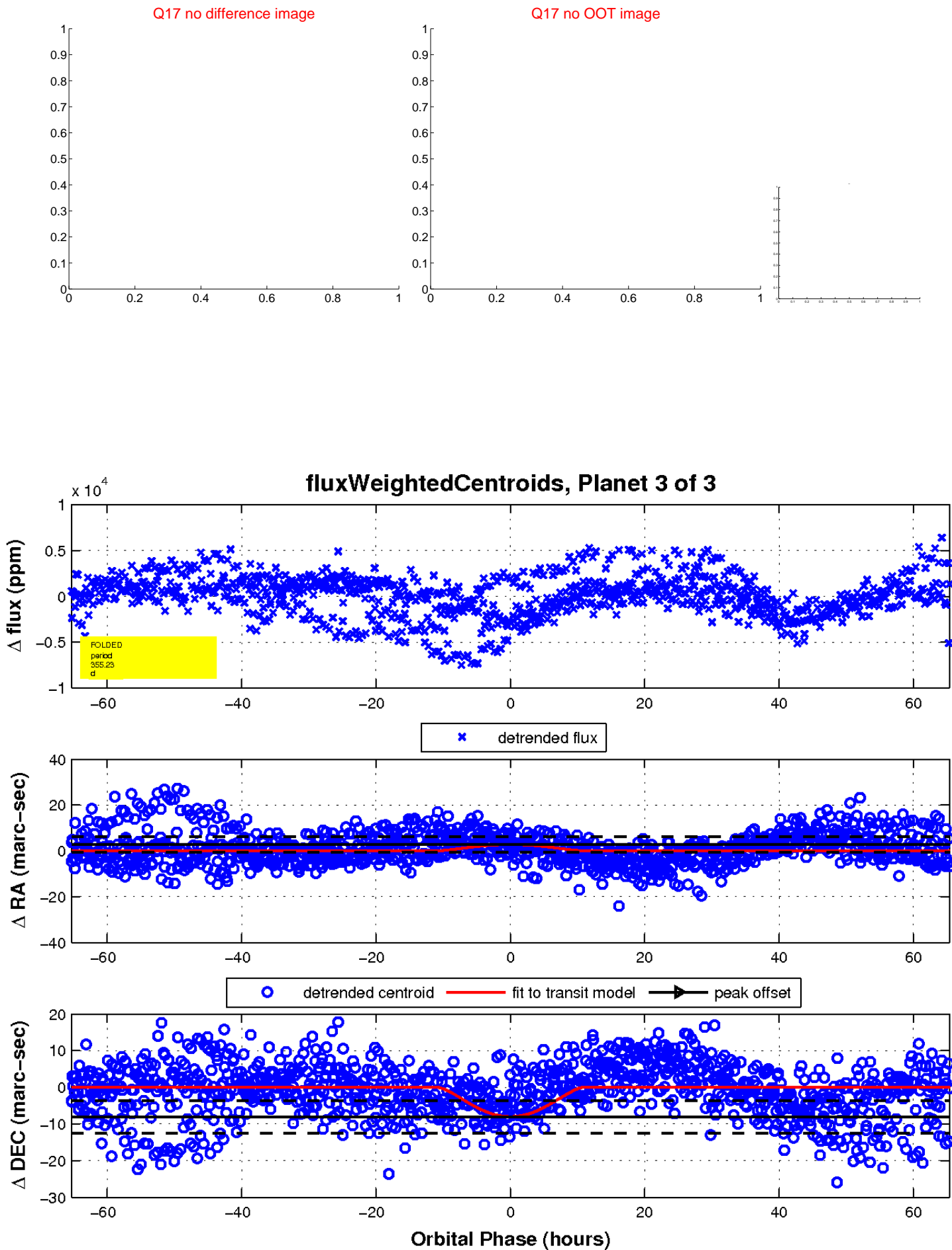
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white ×: 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

