

# KIC 010729958

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010729958-01	OBS	No	294.886398	135.500636	381.7	5.185	7.8	7.8	1.07	6171	2.20	2.03
010729958-02	OBS	No	464.471289	431.032484	275.2	17.211	7.7	7.7	1.07	6171	2.09	1.11

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010729958-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010729958-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—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.

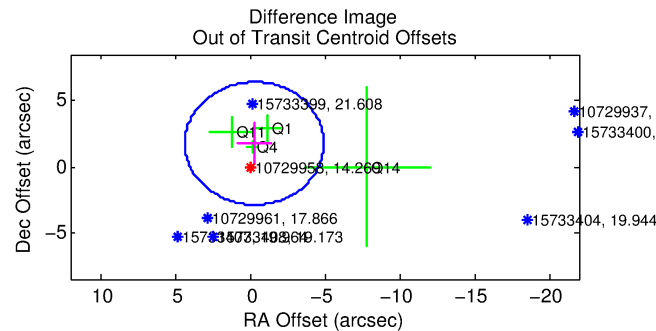
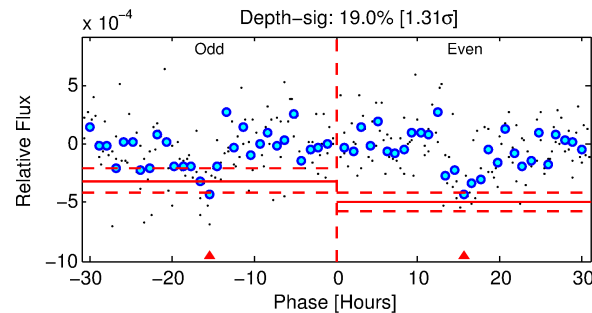
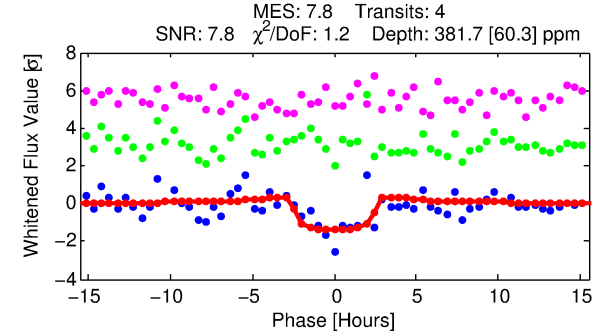
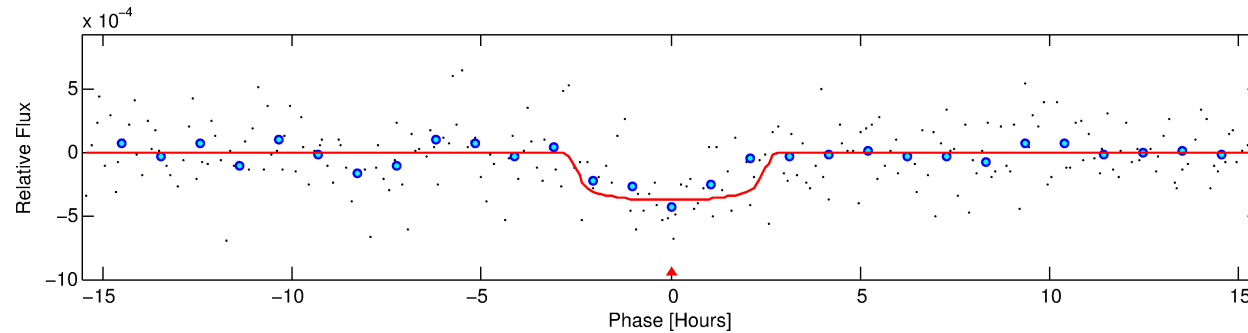
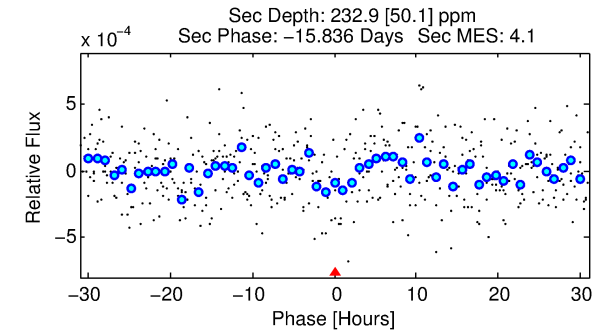
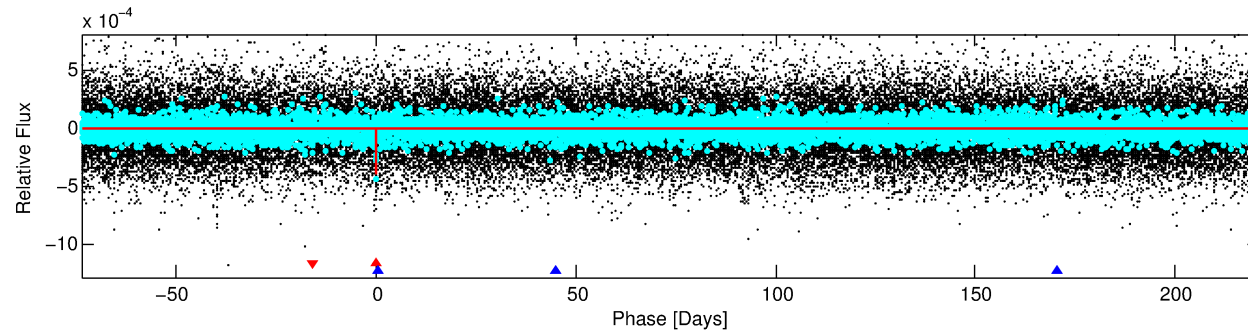
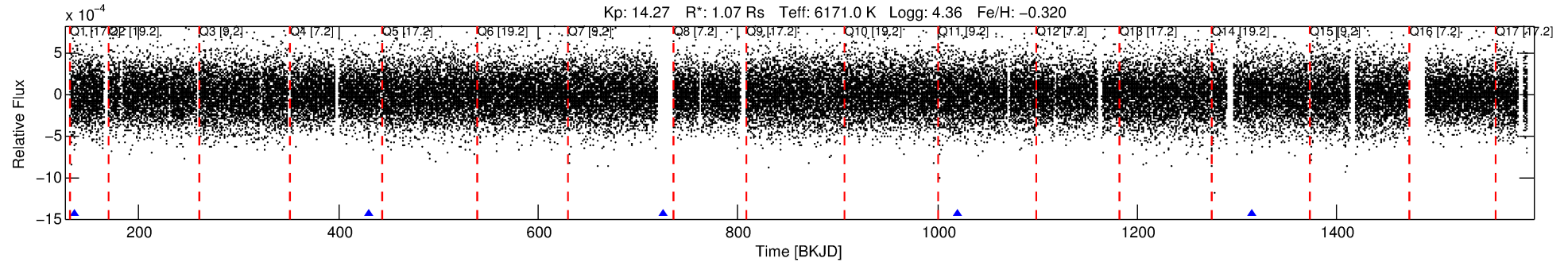
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010729958-01

No Significant Match Found

# DV One-Page Summary

KIC: 10729958 Candidate: 1 of 2 Period: 294.886 d



## DV Fit Results:

Period = 294.88640 [0.00448] d  
Epoch = 135.5006 [0.0103] BKJD  
Rp/R\* = 0.0188 [0.0472]  
Rp/R\* = 353.25 [4578.59]  
b = 0.61 [13.26]  
Seff = 2.03 [0.79]  
Teq = 305 [30] K  
Rp = 2.20 [5.57] Re  
a = 0.8592 [0.2139] AU  
Ag = 19487.92 [98238.32] [0.20σ]  
Teffp = 5563 [6995] K [0.75σ]

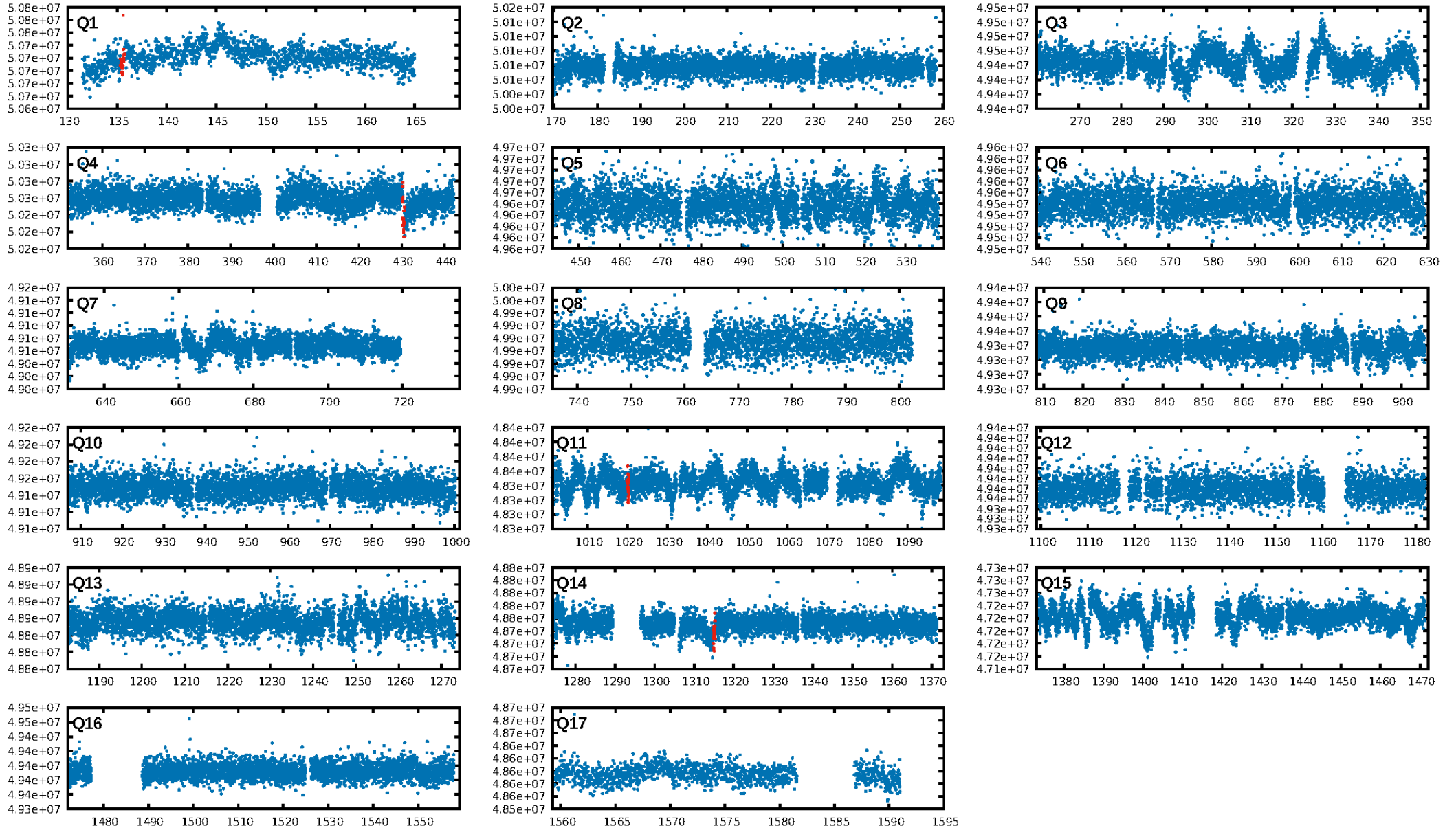
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [226.43σ]  
ModelChiSquare2-sig: 6.5%  
ModelChiSquareGof-sig: 94.9%  
**Bootstrap-pfa: 2.54e-12**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.741  
Centroid-sig: 14.2%  
Centroid-so: 2.217 arcsec [1.41σ]  
OotOffset-rm: 1.784 arcsec [1.15σ]  
KicOffset-rm: 1.988 arcsec [1.29σ]  
OotOffset-st: 1/1/1/1 [4]  
KicOffset-st: 1/1/1/1 [4]  
DiffImageQuality-fgm: 0.25 [1/4]  
DiffImageOverlap-fno: 0.75 [3/4]

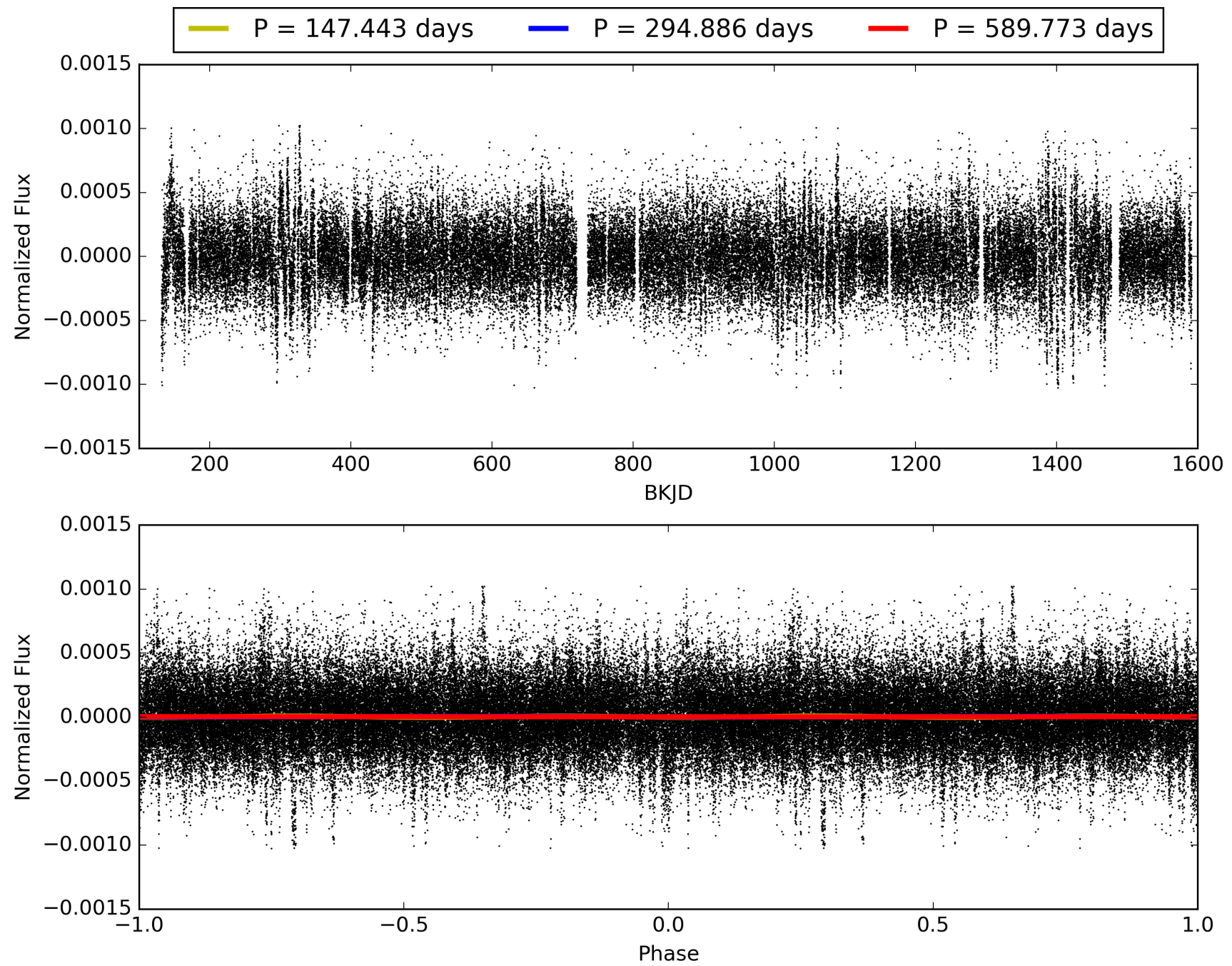
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 02:20:44 Z

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

# TCE 010729958-01, PDC Light Curves

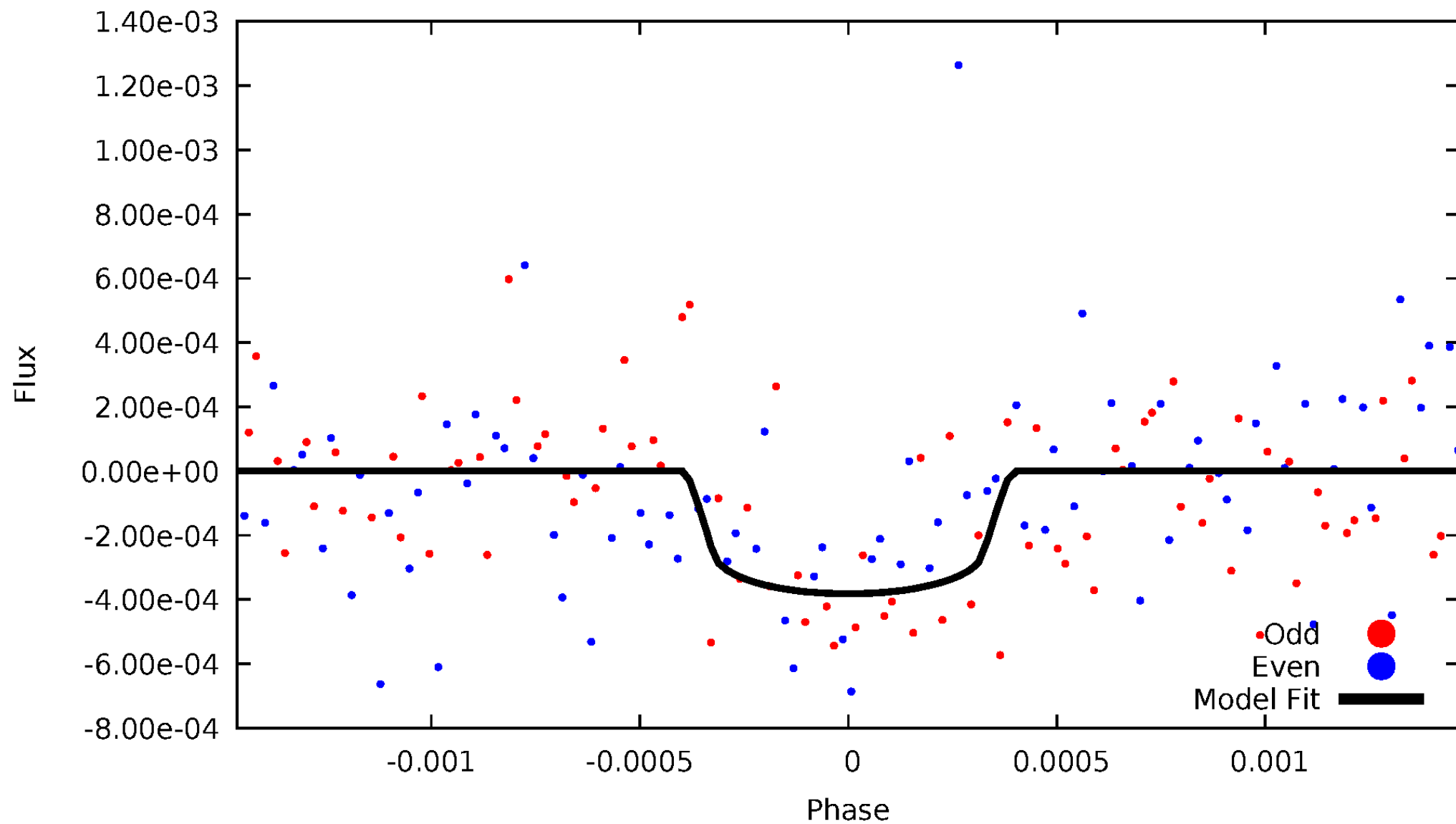


TCE 010729958-01



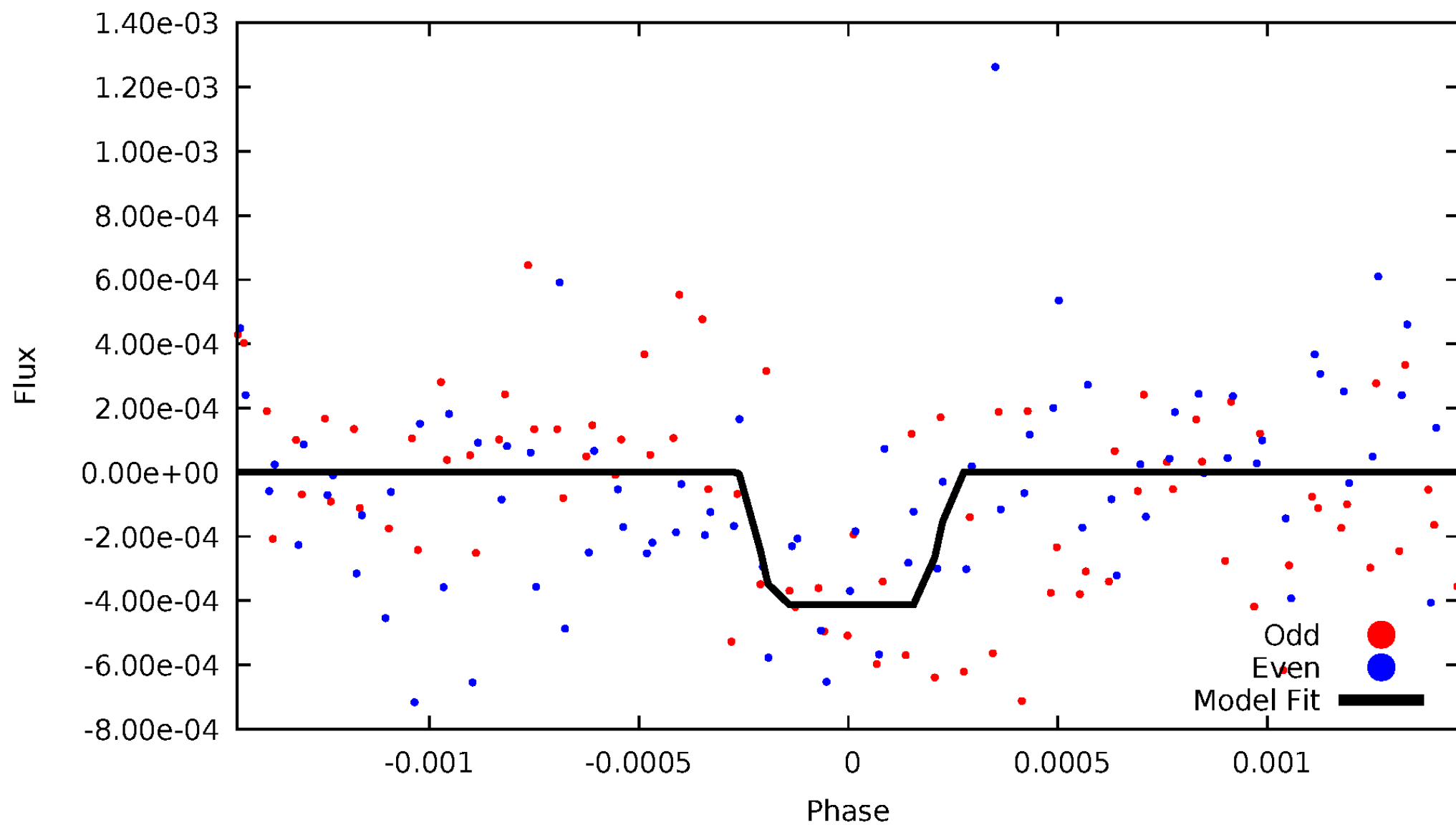
# DV Odd/Even

TCE 010729958-01

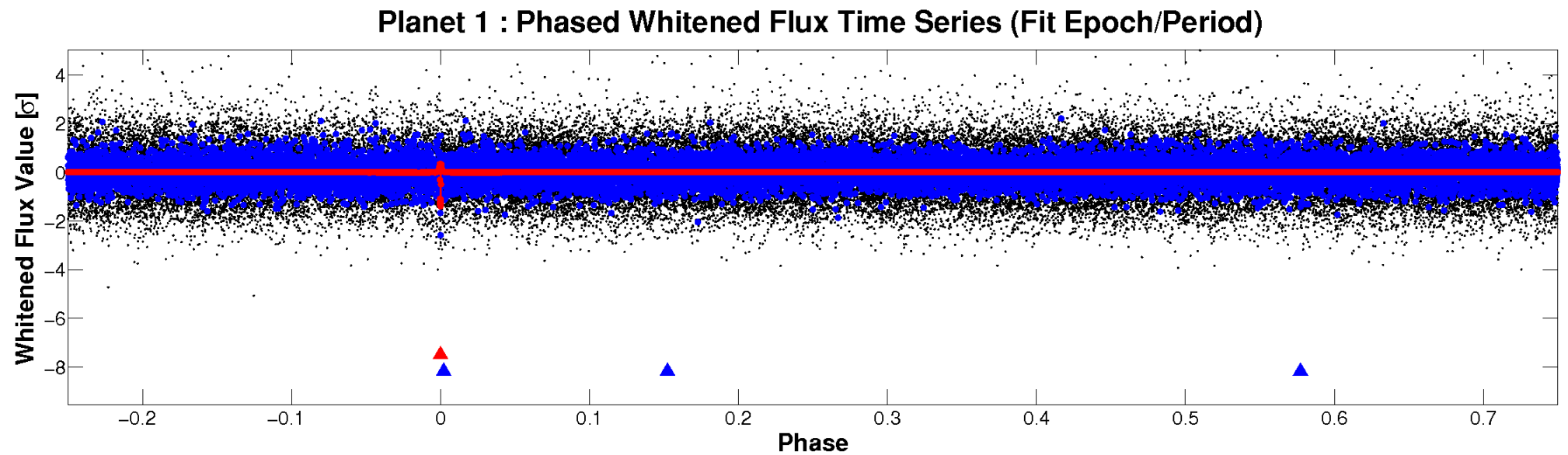
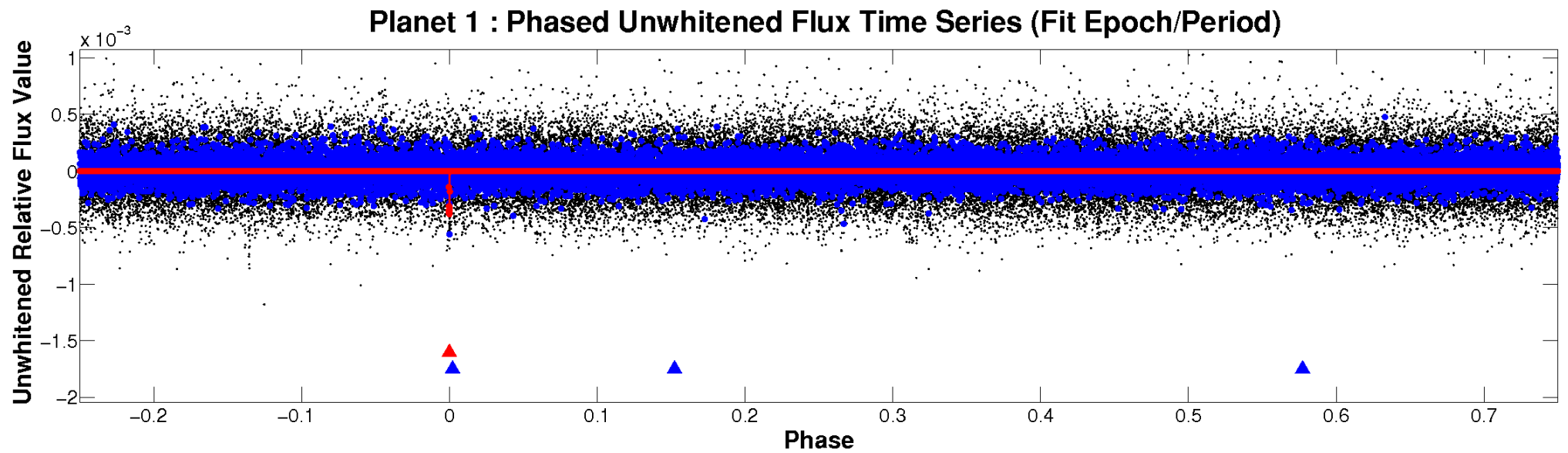


# ALT Odd/Even

TCE 010729958-01



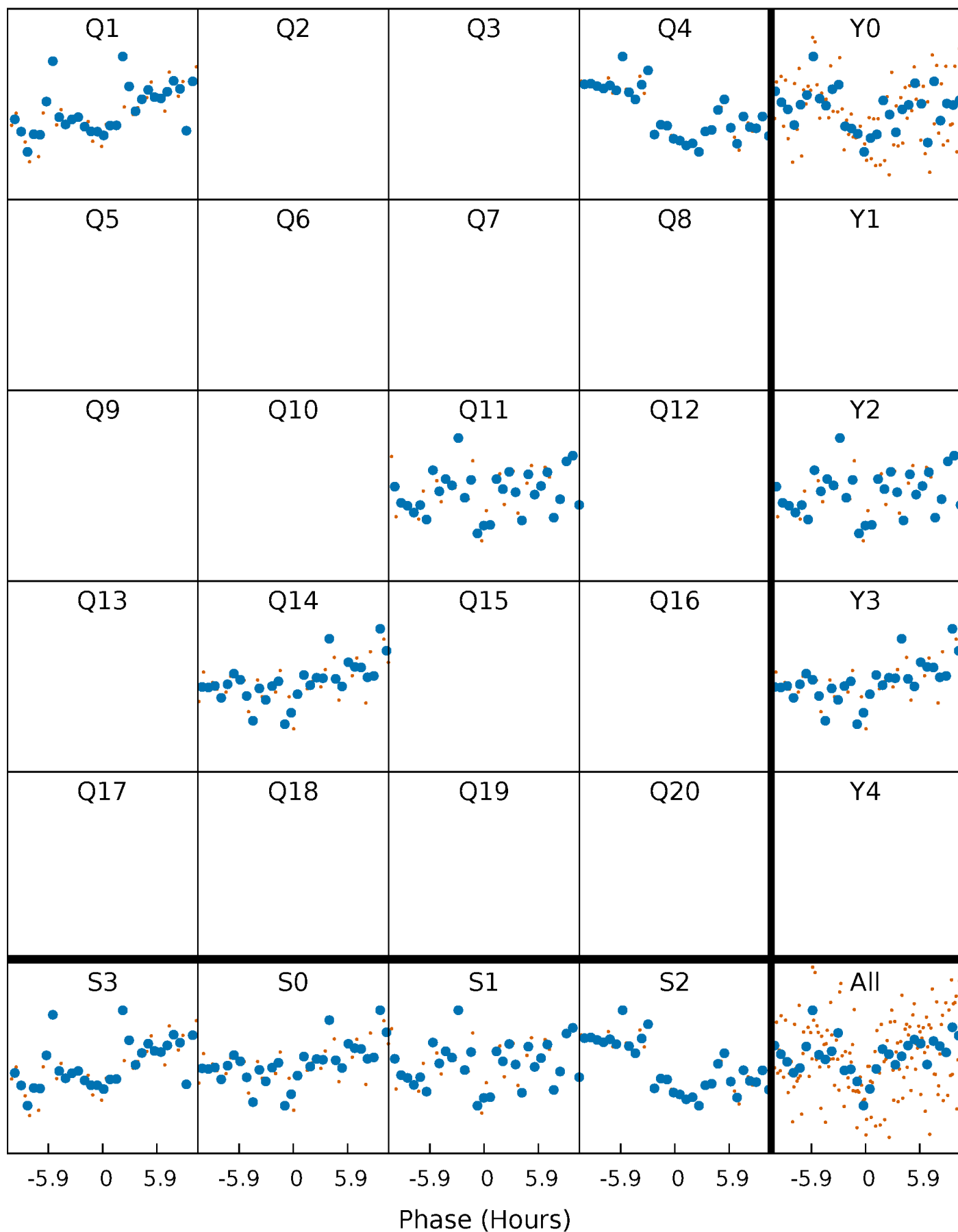
# Non-Whitened Vs. Whitened Light Curve





# PDC Quarter-Phased Transit Curves

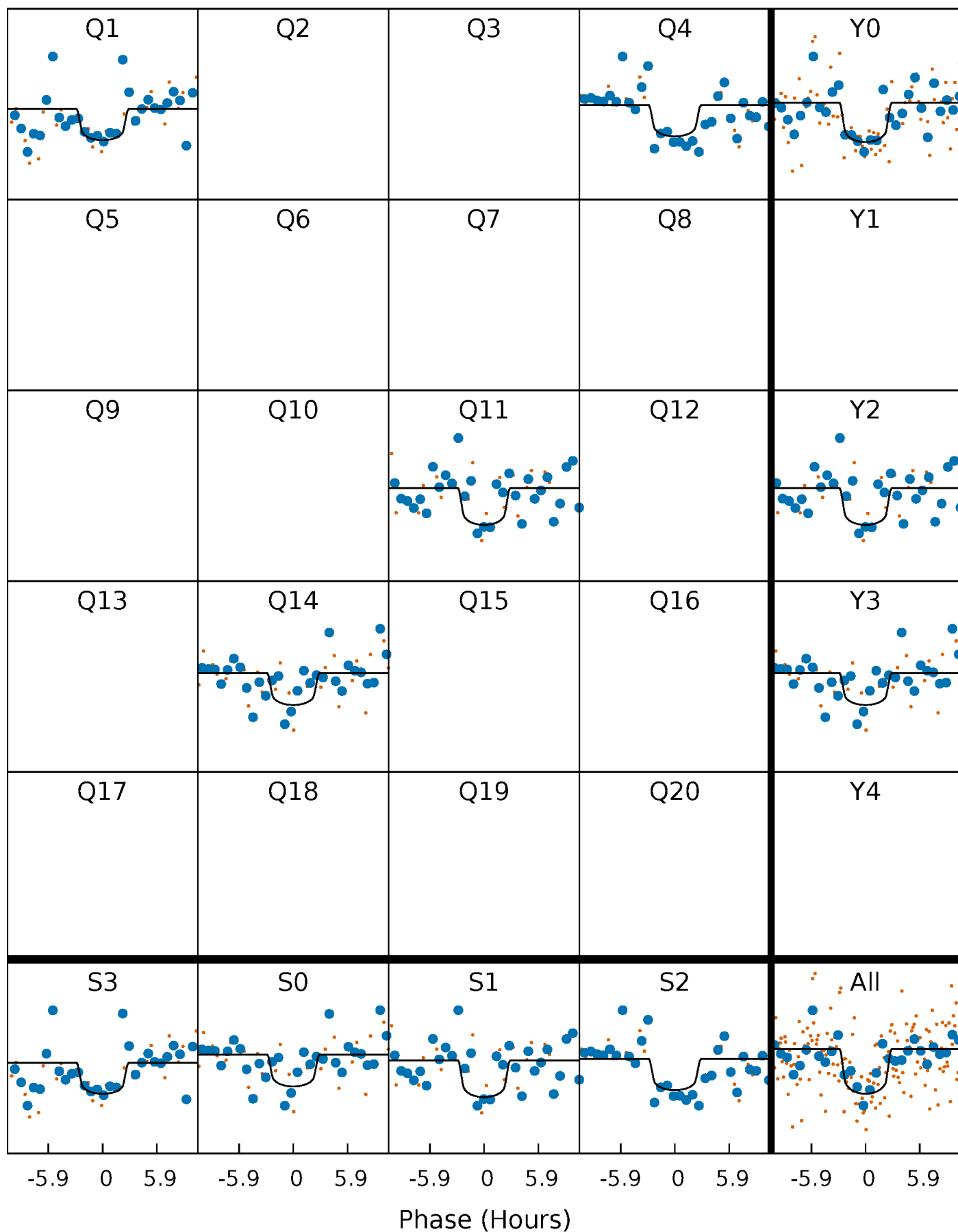
TCE 010729958-01 P=294.886398 Days  $T_0=135.500636$  (BKJD)





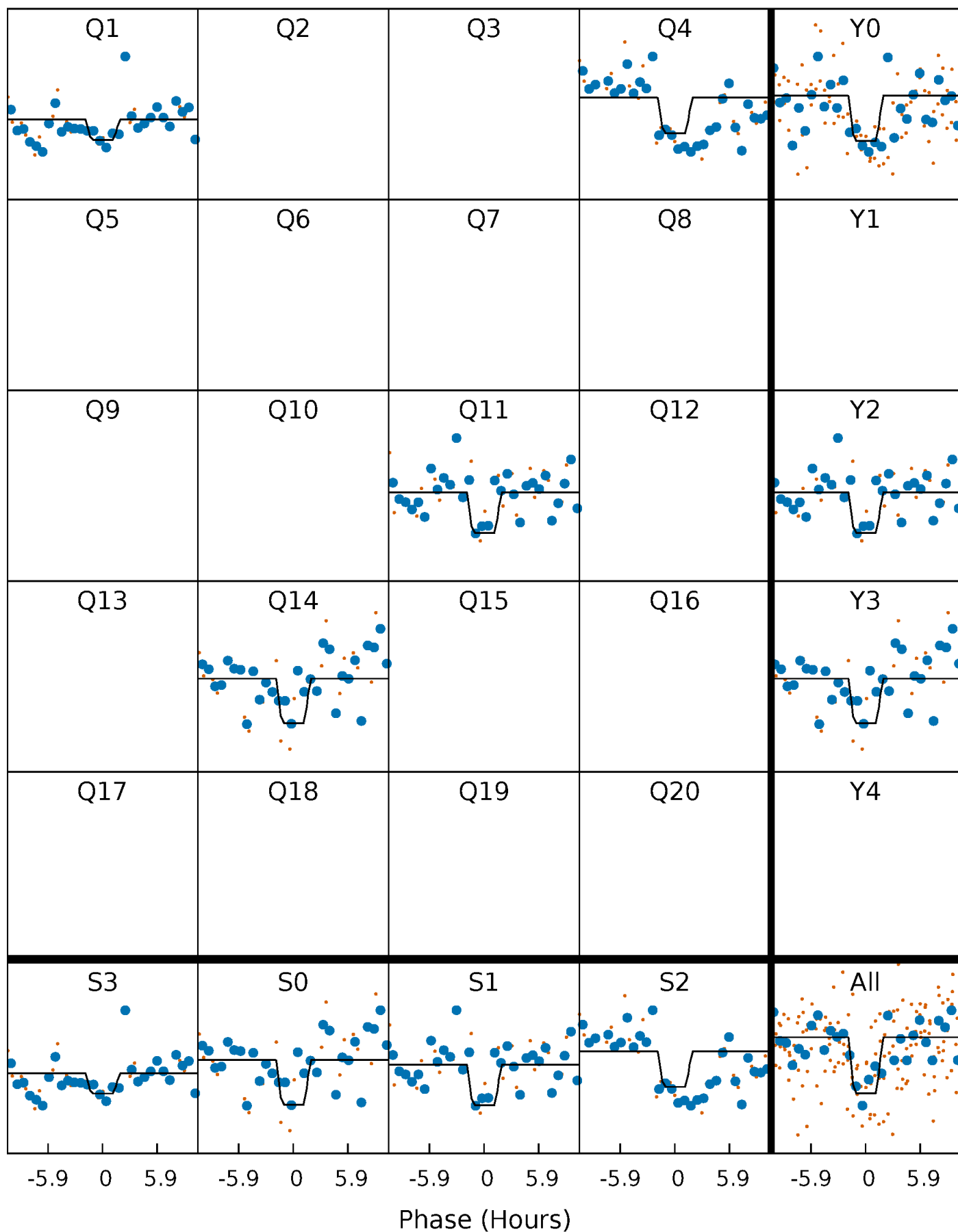
# DV Quarter-Phased Transit Curves

TCE 010729958-01     $P=294.886398$  Days     $T_0=135.500636$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

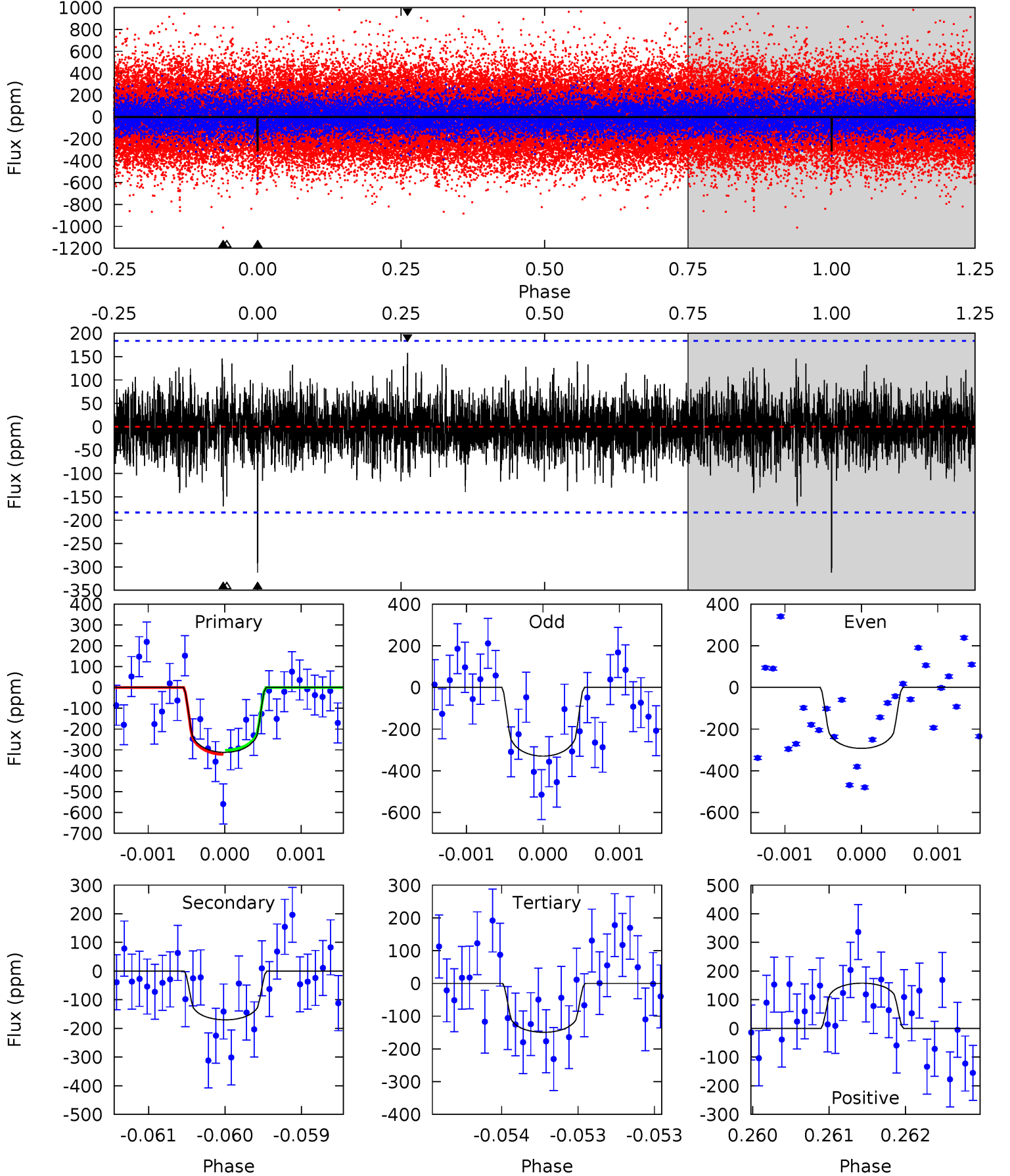
TCE 010729958-01 P=294.897138 Days  $T_0=135.475115$  (BKJD)



# DV Model-Shift Uniqueness Test

010729958-01, P = 294.886398 Days, E = 135.500636 Days

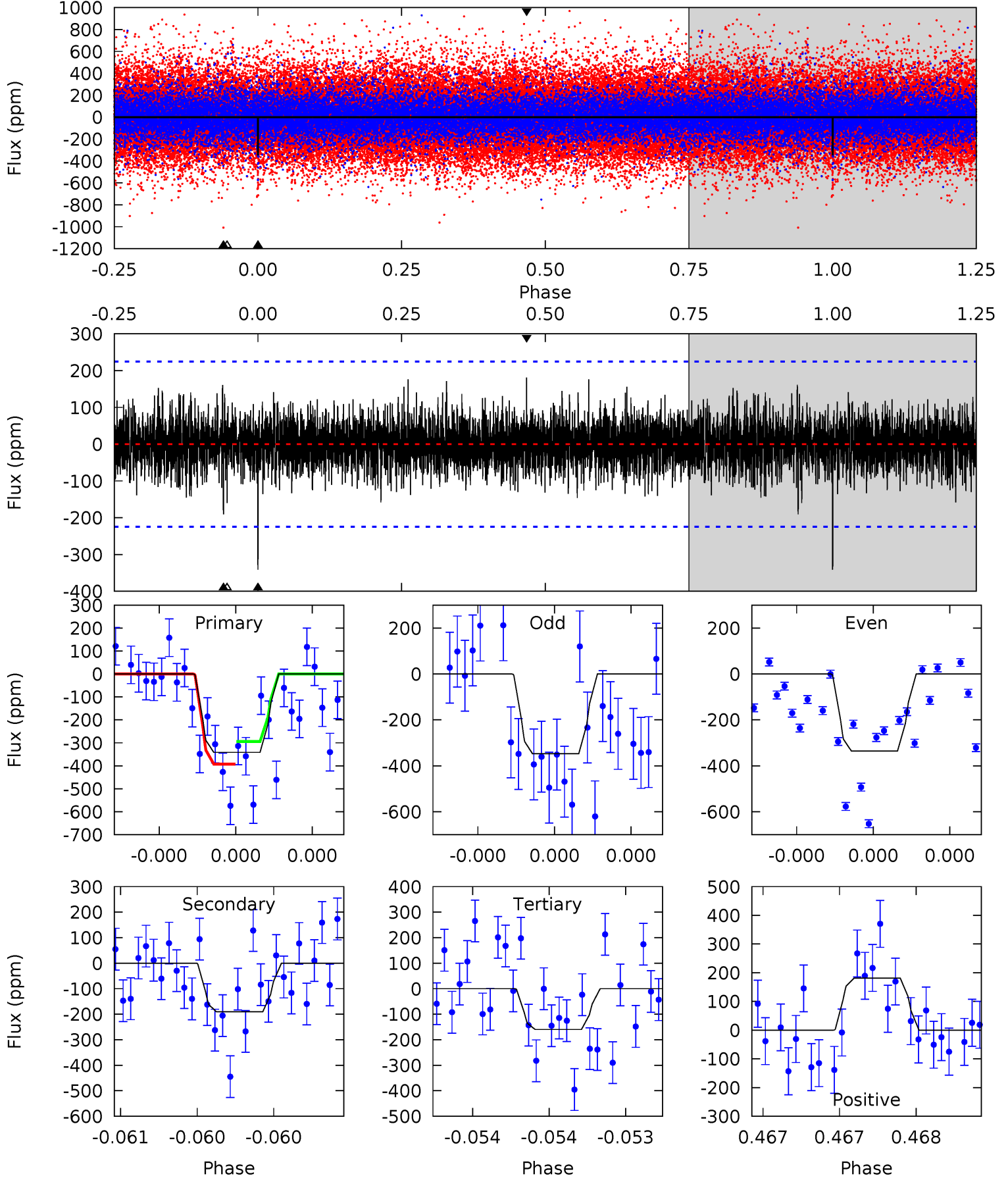
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.35	5.10	4.48	4.74	5.50	3.37	1.18	4.87	4.61	0.62	0.36	0.56	1.27	0.34	0.30



# Alt Model-Shift Uniqueness Test

010729958-01, P = 294.897138 Days, E = 135.475115 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.47	4.73	3.97	4.50	5.58	3.49	1.12	4.50	3.97	0.76	0.23	0.15	1.02	0.35	1.22



### Stellar Parameters For KIC 010729958

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6171^{+169}_{-206}$	$4.363^{+0.124}_{-0.201}$	$-0.320^{+0.300}_{-0.300}$	$1.075^{+0.315}_{-0.170}$	$0.972^{+0.148}_{-0.111}$	$1.101^{+0.626}_{-0.534}$
	+3%/-3%	+3%/-5%	+94%/-94%	+29%/-16%	+15%/-11%	+57%/-48%
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 010729958-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-170 \pm 33$	$4.94^{+4.79}_{-3.32}$	$427^{+35}_{-26}$	$3836^{+2261}_{-729}$	$2826^{+25021}_{-2086}$
Alt.	$-191 \pm 40$	$4.96^{+4.55}_{-3.49}$	$429^{+31}_{-24}$	$3892^{+2686}_{-743}$	$3164^{+33985}_{-2366}$

$T_{\text{max}}$  = 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

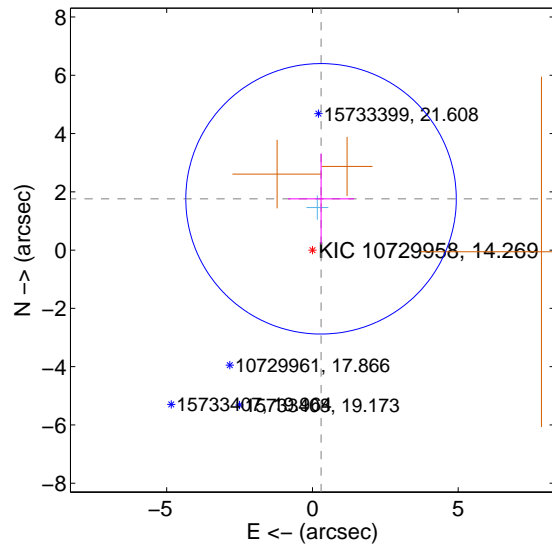
Supplemental centroid analysis for 010729958-01. Kepler magnitude: 14.27. Transit SNR 7.84

There are 1 quarters with good PRF difference image offsets

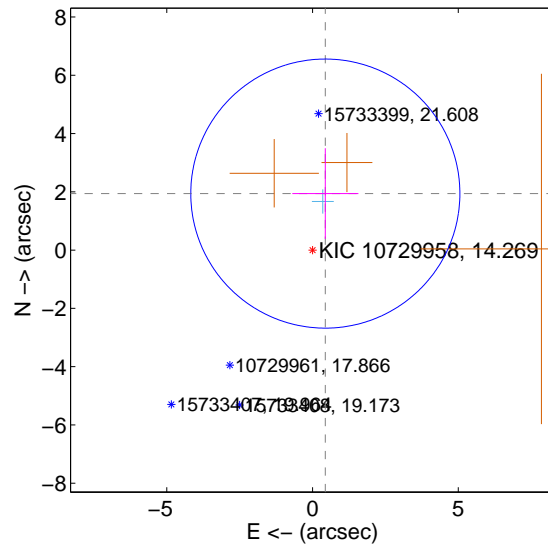
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.784 \pm 1.547$	1.15	$-0.295 \pm 1.133$	$1.760 \pm 1.557$
PRF-fit source offset from KIC position	$1.988 \pm 1.539$	1.29	$-0.439 \pm 1.133$	$1.939 \pm 1.557$
photometric centroid source offset	$2.22 \pm 1.57$	1.41	$-2.02 \pm 1.57$	$0.92 \pm 1.53$

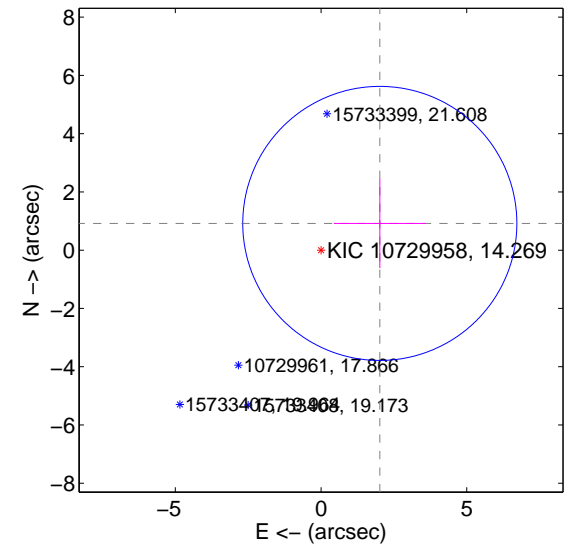
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

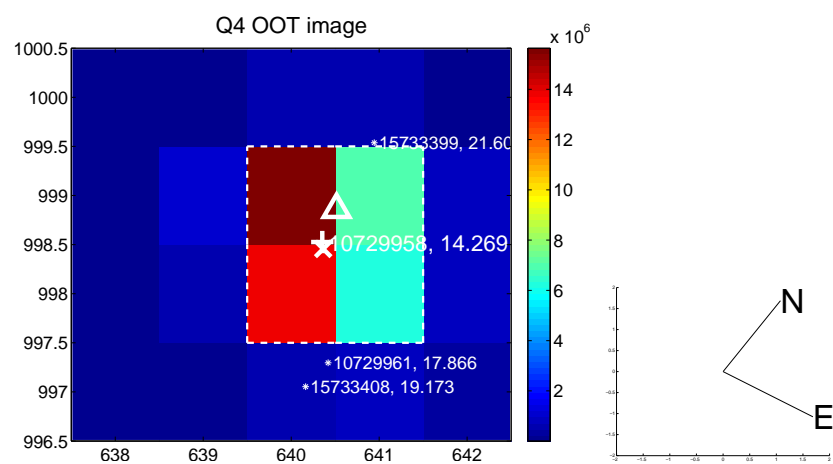
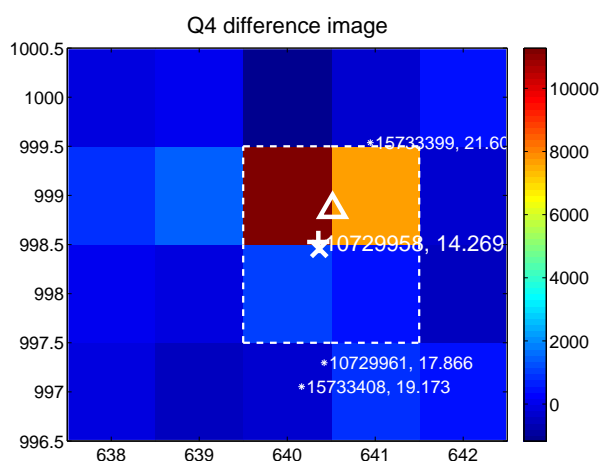
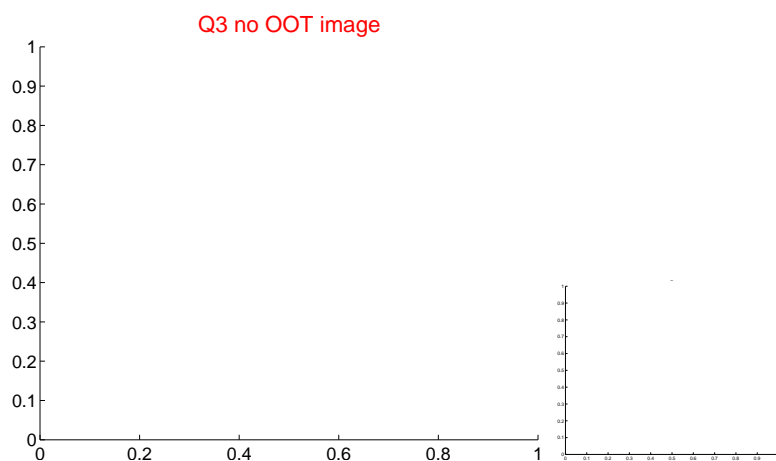
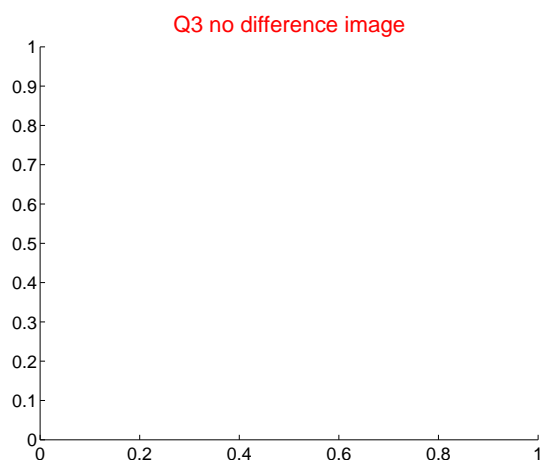
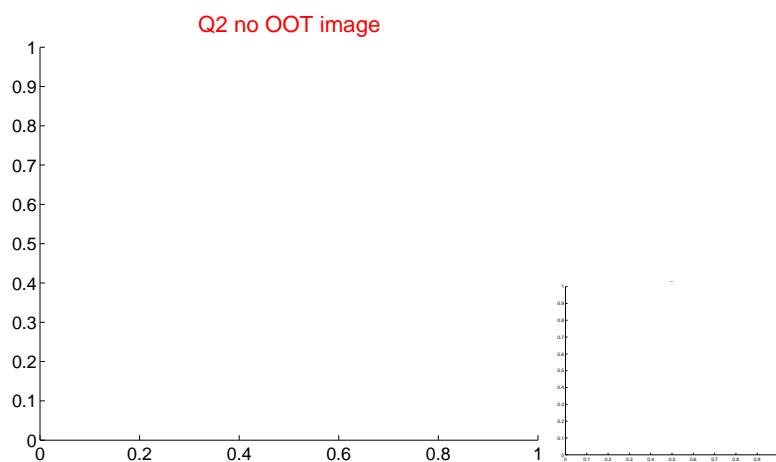
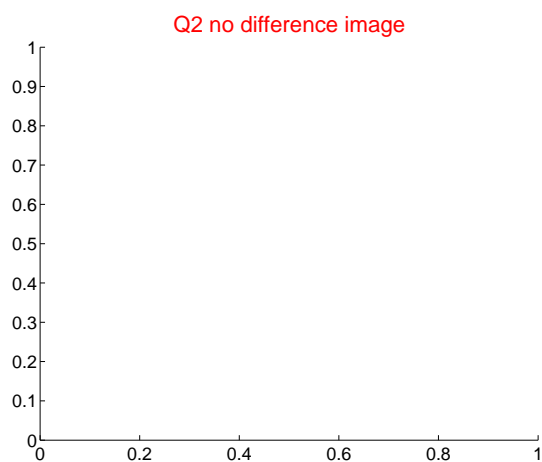
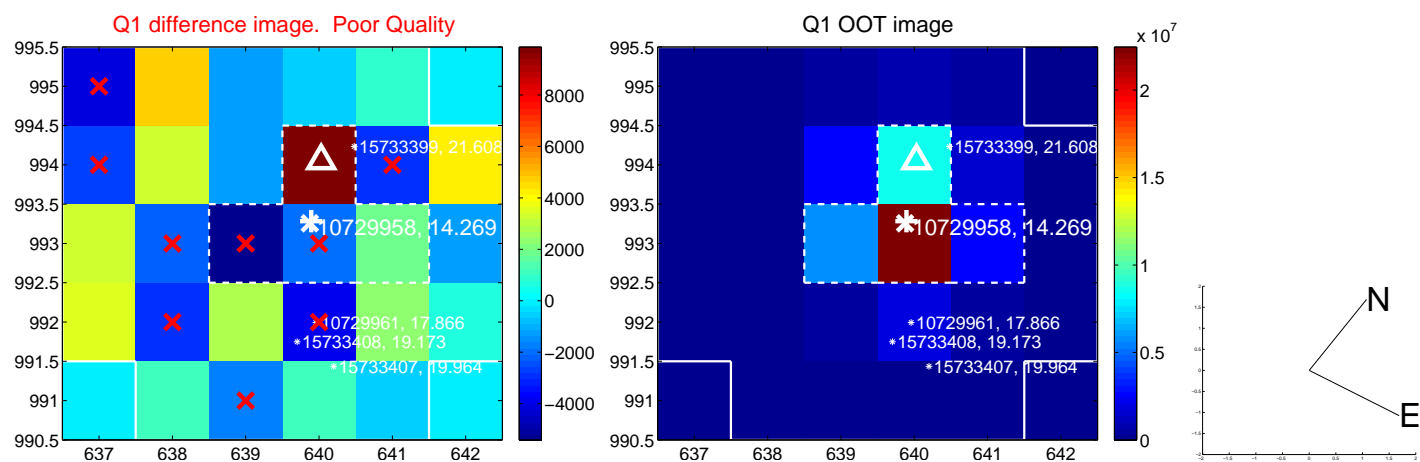


offset from photometric centroids



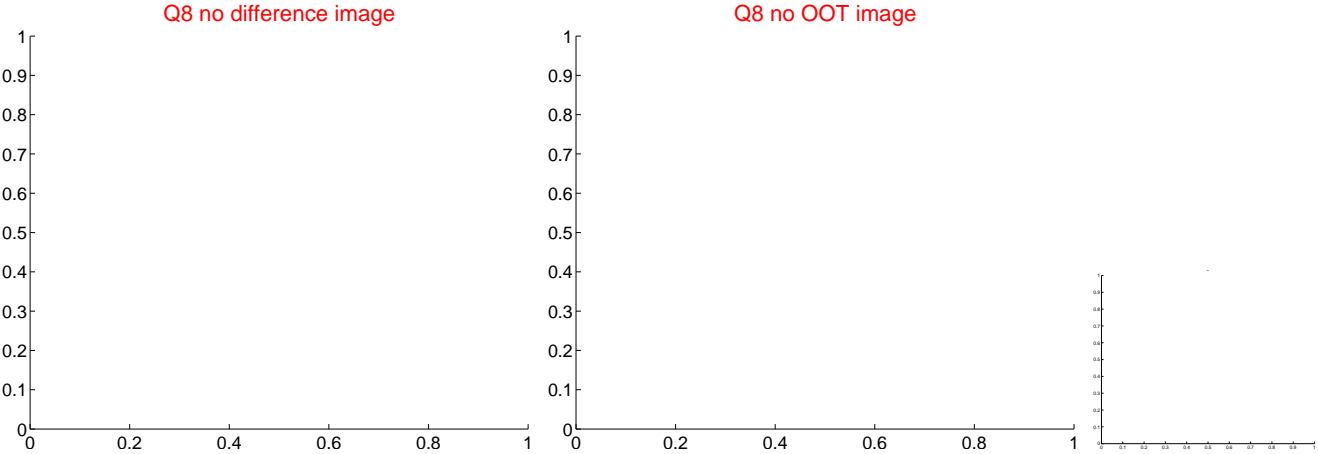
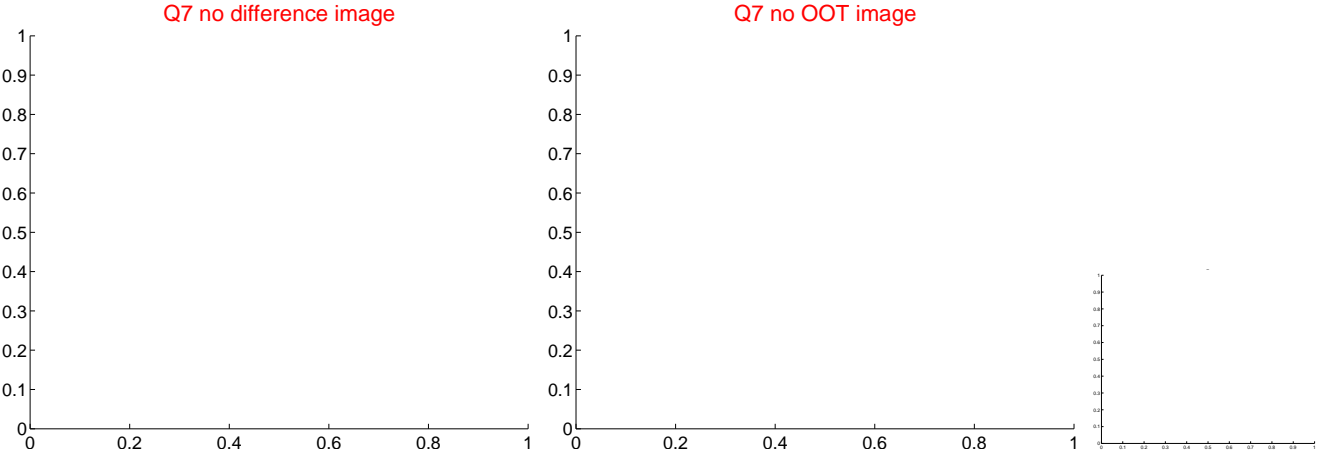
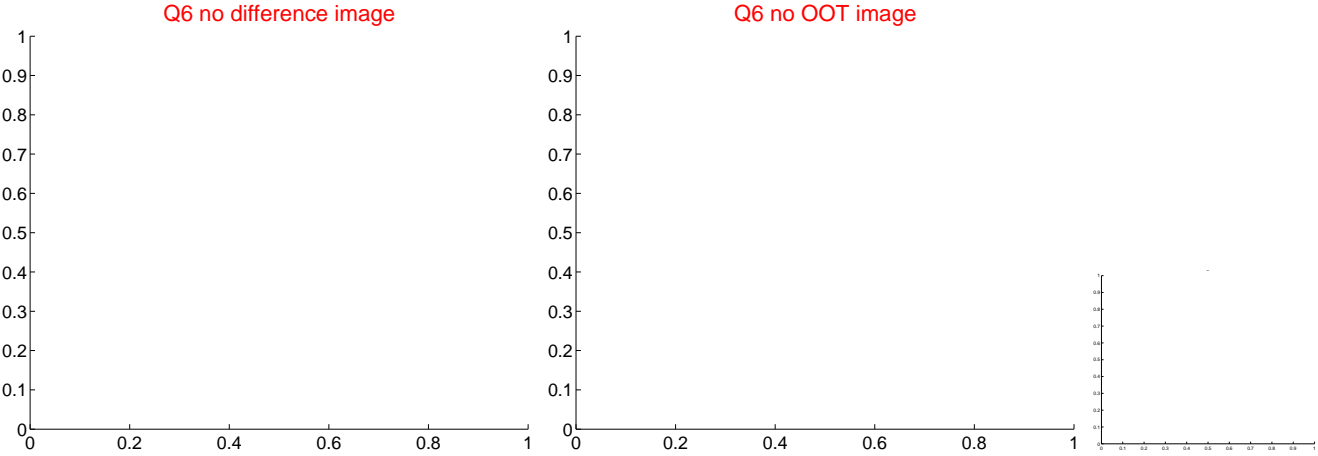
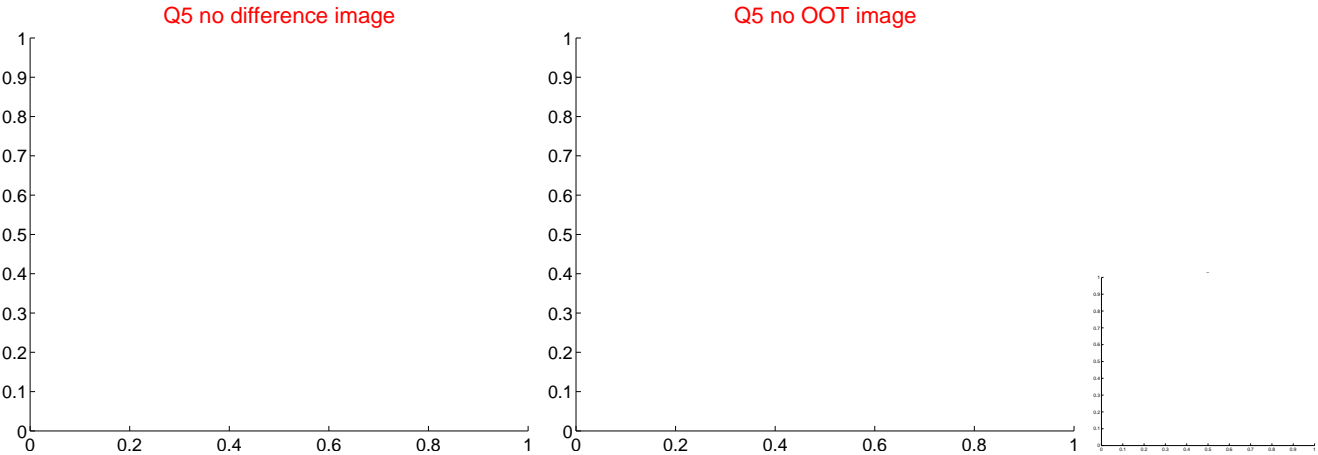
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

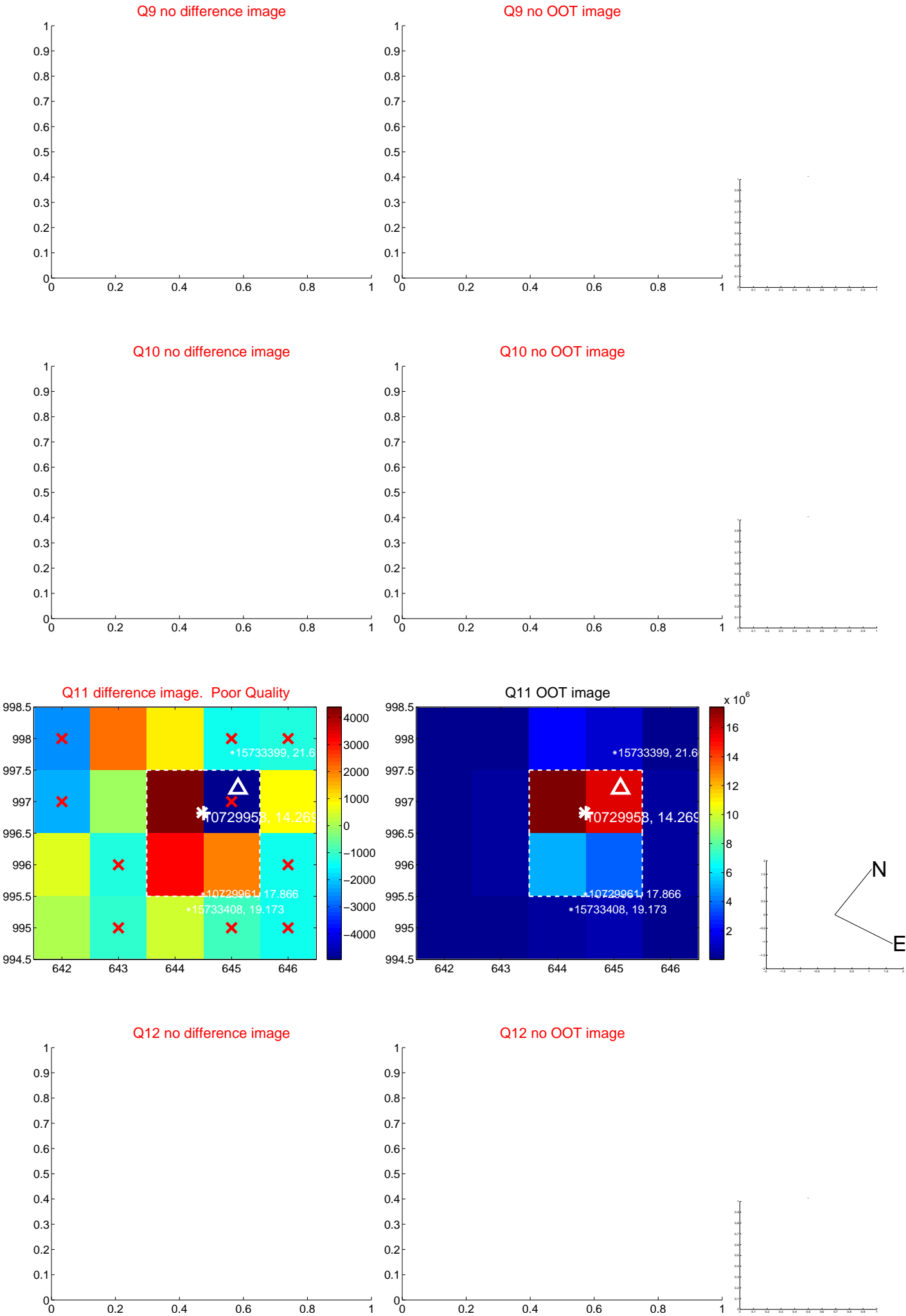




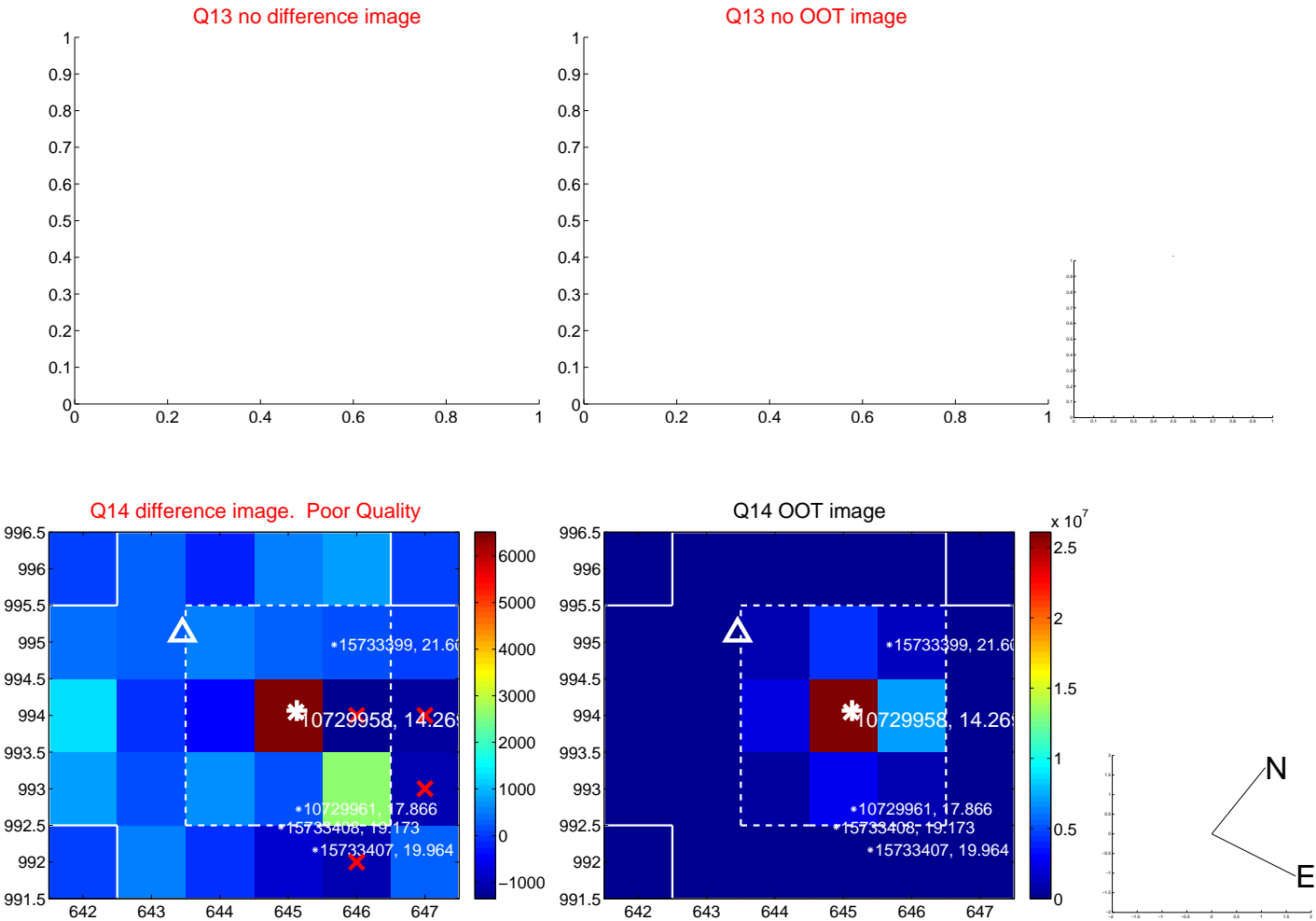
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



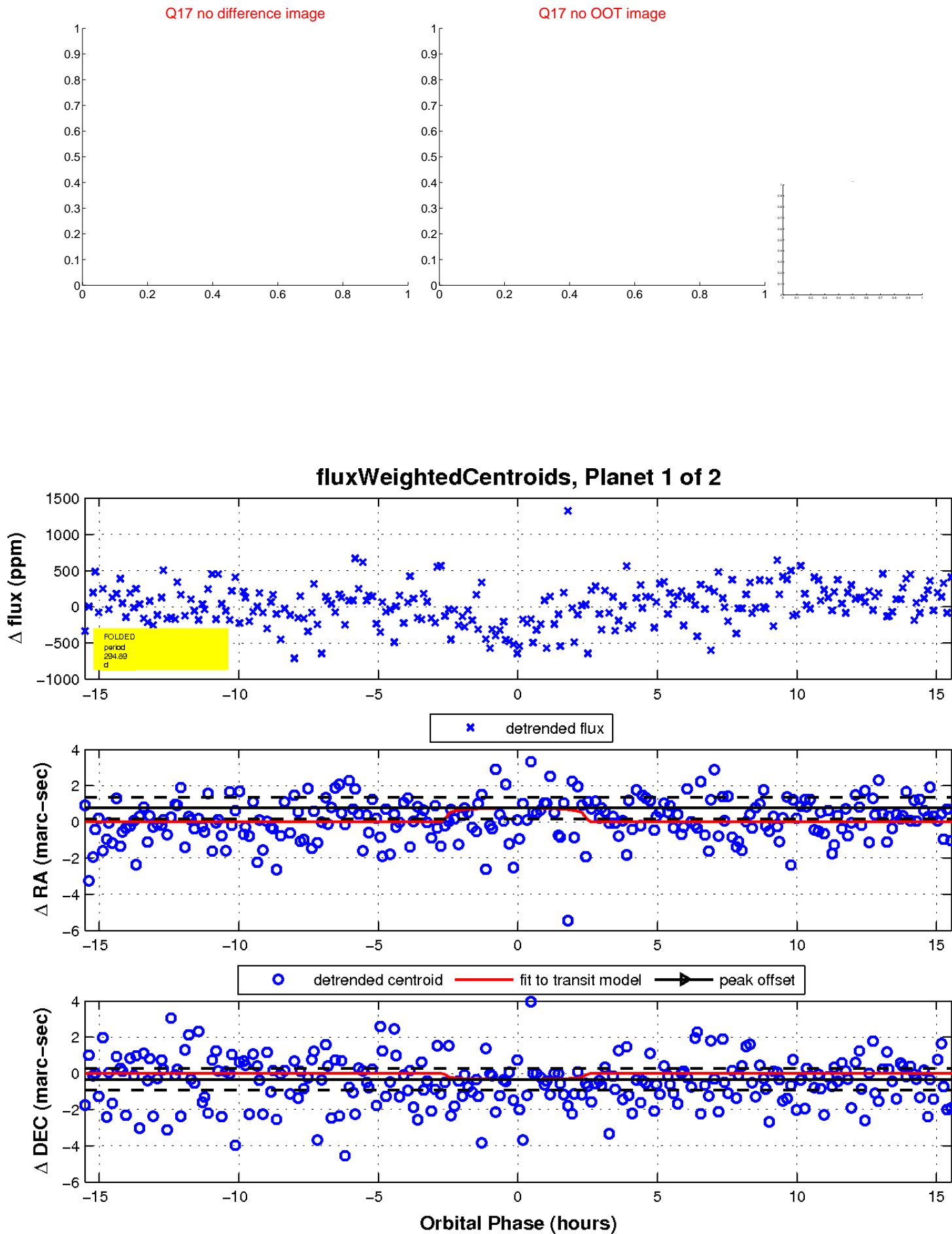
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

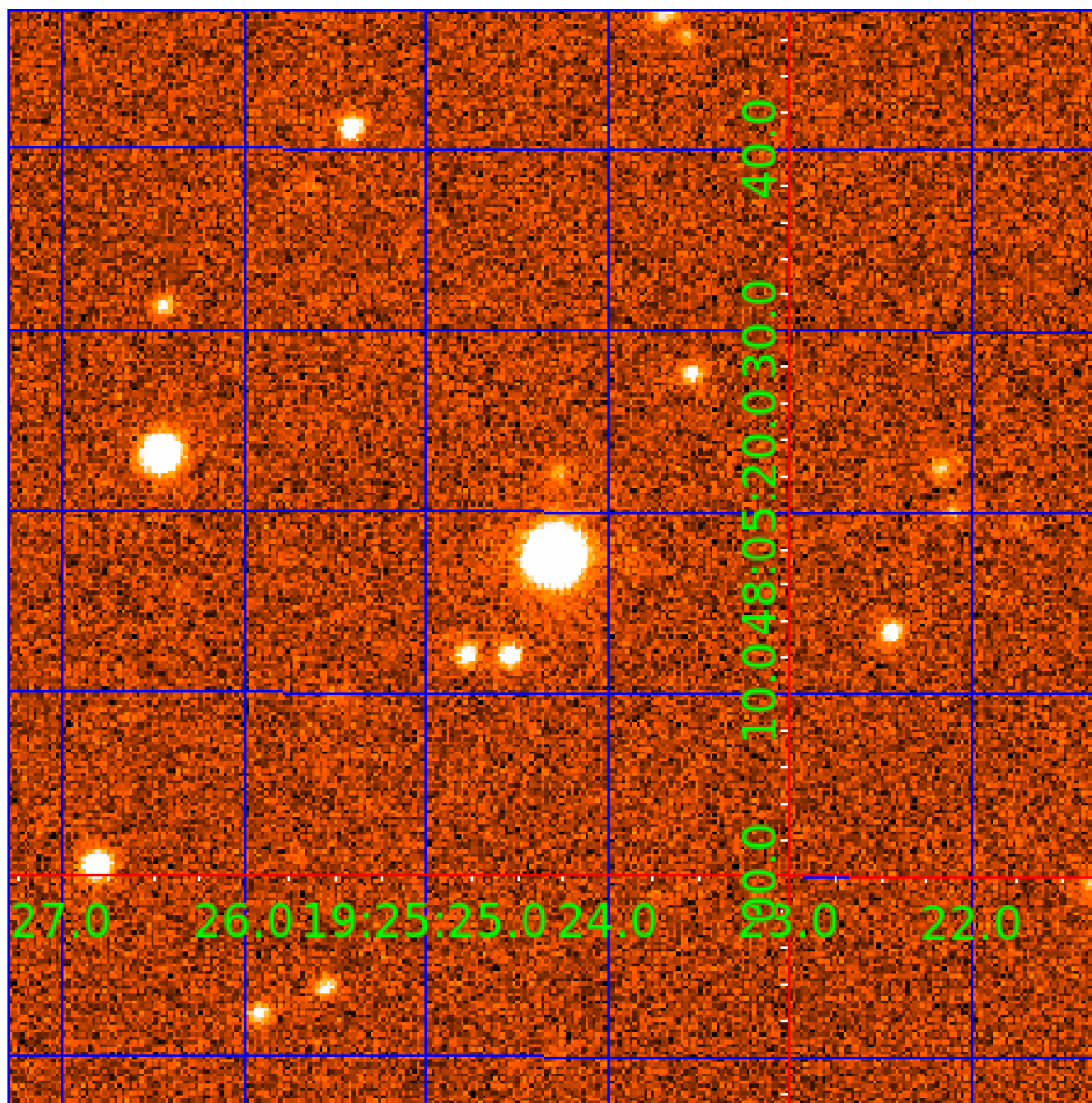


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 010729958

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010729958-01	OBS	No	294.886398	135.500636	381.7	5.185	7.8	7.8	1.07	6171	2.20	2.03
010729958-02	OBS	No	464.471289	431.032484	275.2	17.211	7.7	7.7	1.07	6171	2.09	1.11

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010729958-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010729958-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—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.

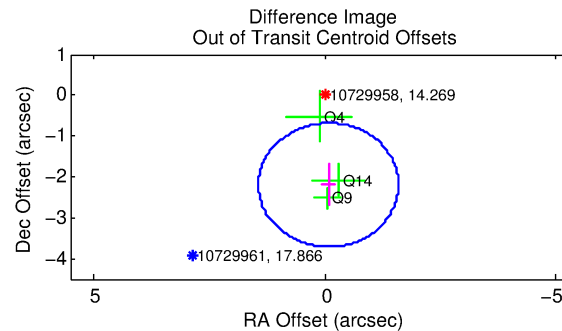
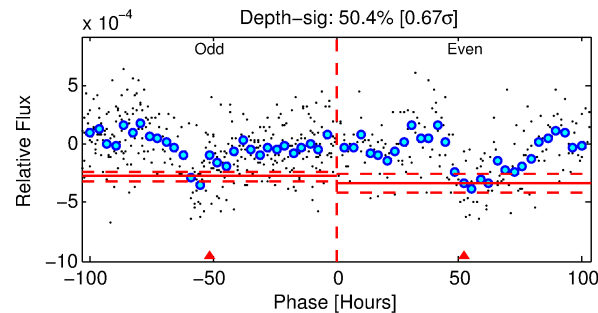
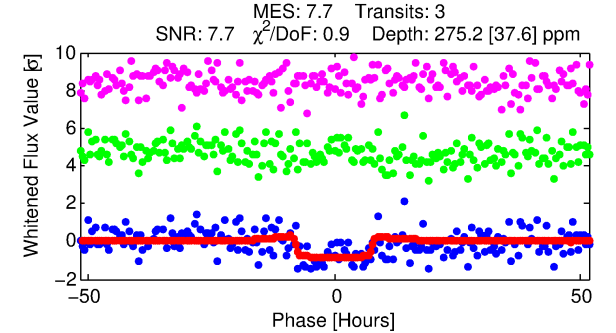
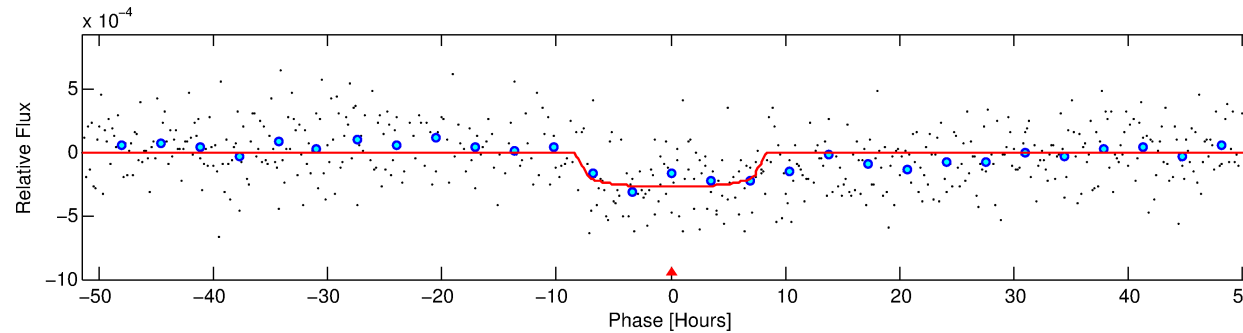
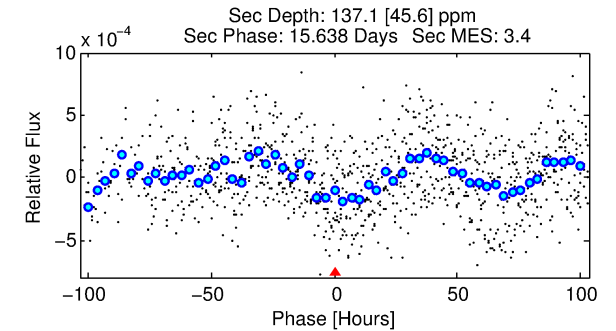
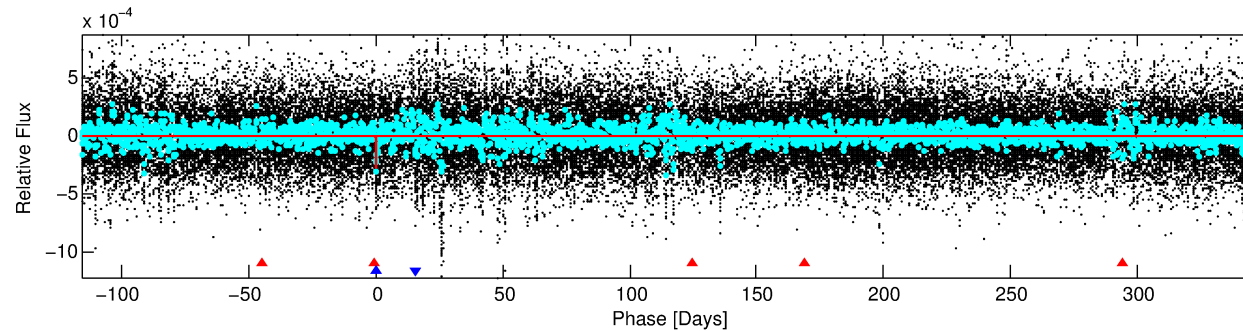
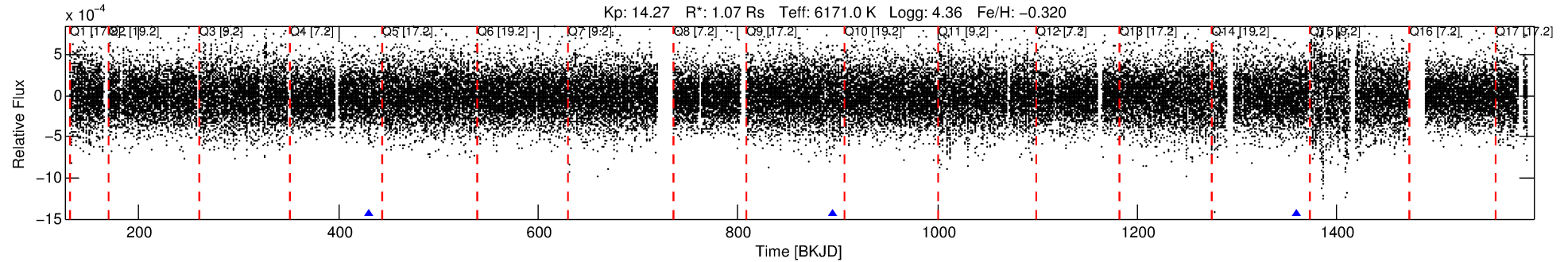
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010729958-02

No Significant Match Found

# DV One-Page Summary

KIC: 10729958 Candidate: 2 of 2 Period: 464.471 d



## DV Fit Results:

Period = 464.47129 [0.02419] d  
Epoch = 431.0325 [0.0335] BKJD  
Rp/R\* = 0.0178 [0.0025]  
a/R\* = 97.86 [64.20]  
b = 0.90 [0.14]  
Seff = 1.11 [0.43]  
Teq = 262 [25] K  
Rp = 2.09 [0.68] Re  
a = 1.1631 [0.2895] AU  
Ag = 23326.34 [13304.83] [1.75 $\sigma$ ]  
Teffp = 5001 [573] K [8.27 $\sigma$ ]

## DV Diagnostic Results:

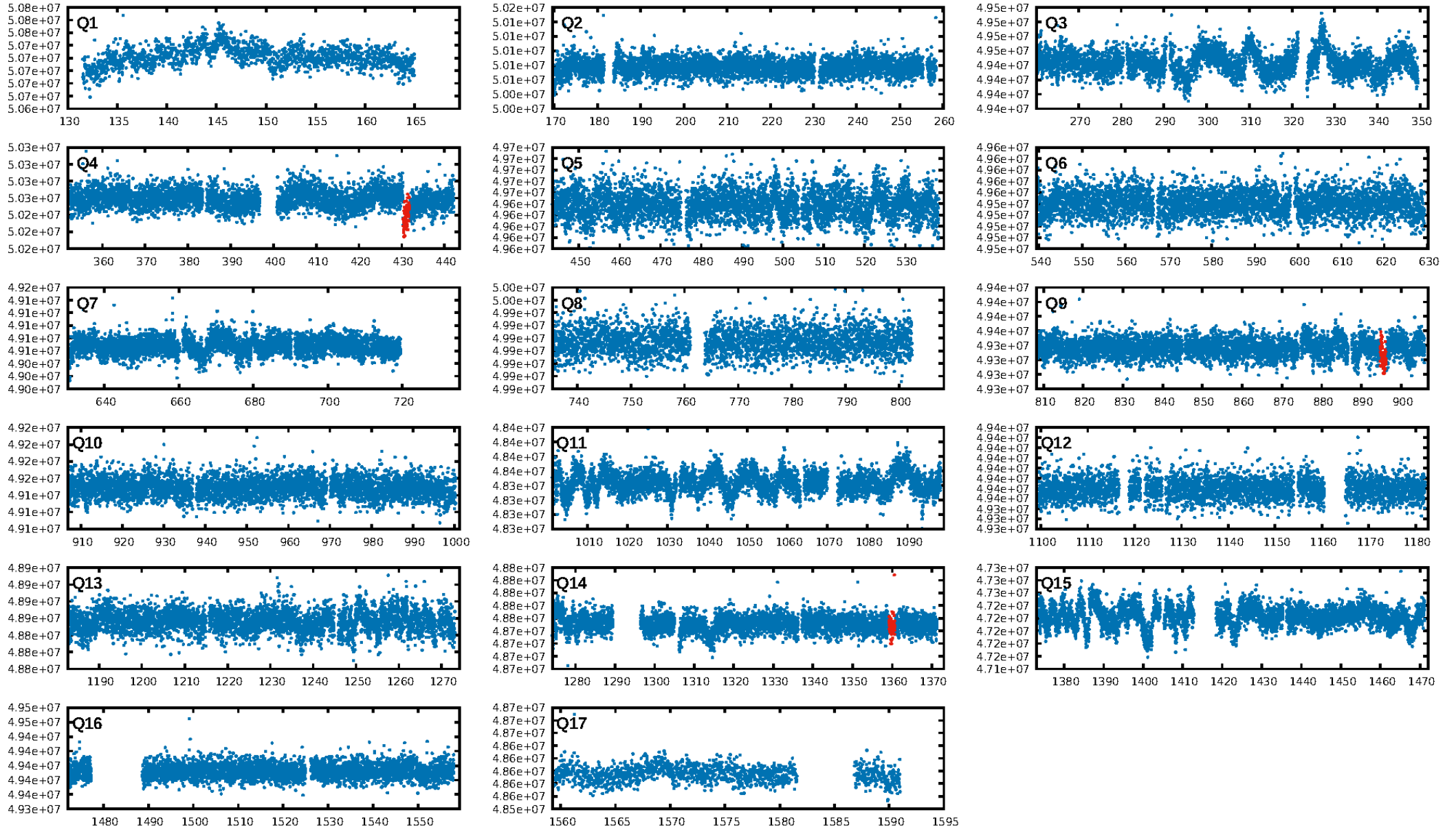
ShortPeriod-sig: 100.0% [226.43 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 14.2%  
ModelChiSquareGof-sig: 99.9%  
**Bootstrap-pfa: 1.29e-09**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 31.42  
Centroid-sig: 36.3%  
Centroid-so: 1.802 arcsec [1.16 $\sigma$ ]  
**OotOffset-rm: 2.199 arcsec [4.36 $\sigma$ ]**  
KicOffset-rm: 2.042 arcsec [2.53 $\sigma$ ]  
OotOffset-st: 1/0/1/1 [3]  
KicOffset-st: 1/0/1/1 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 0.67 [2/3]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 02:20:53 Z

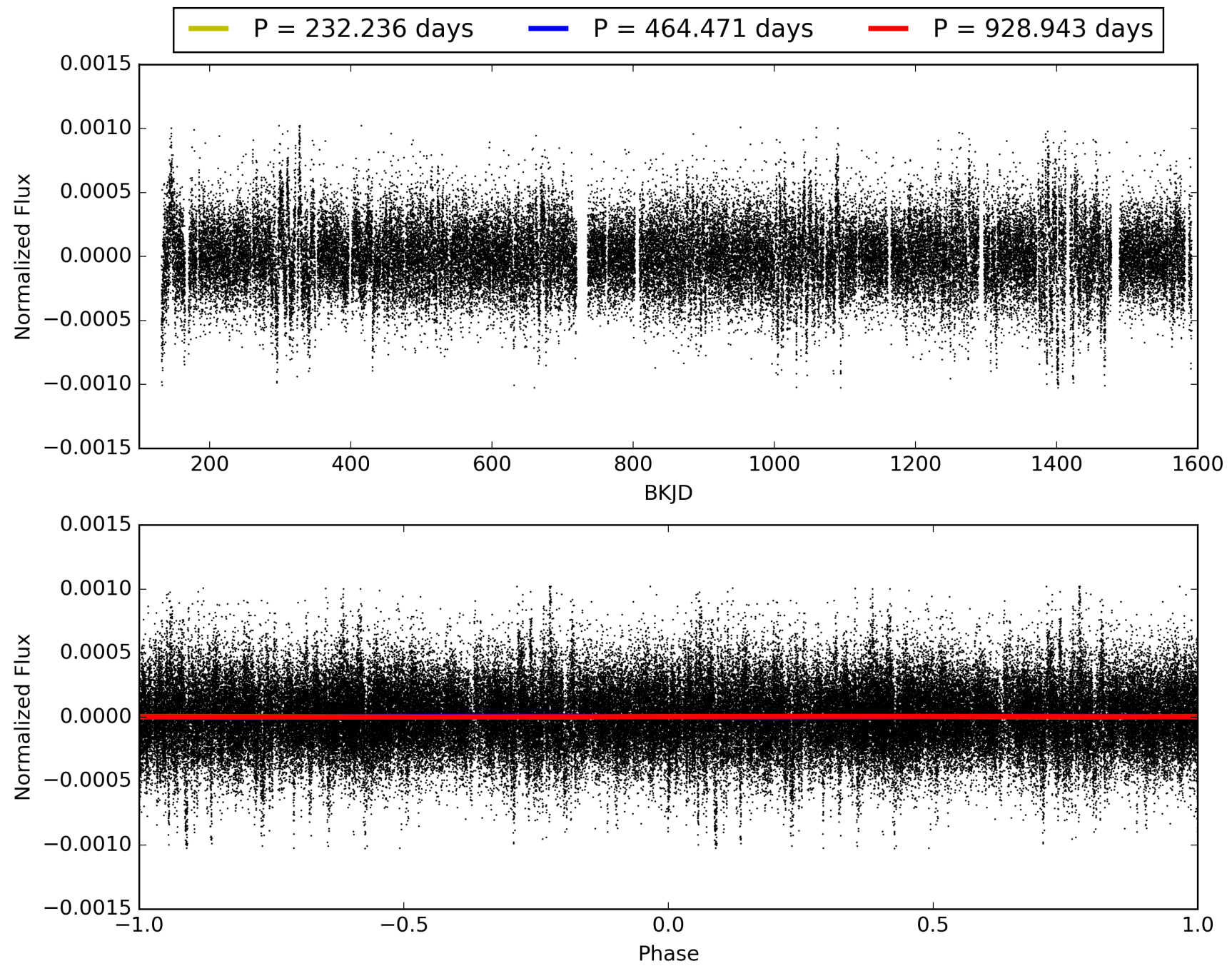
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 010729958-02, PDC Light Curves

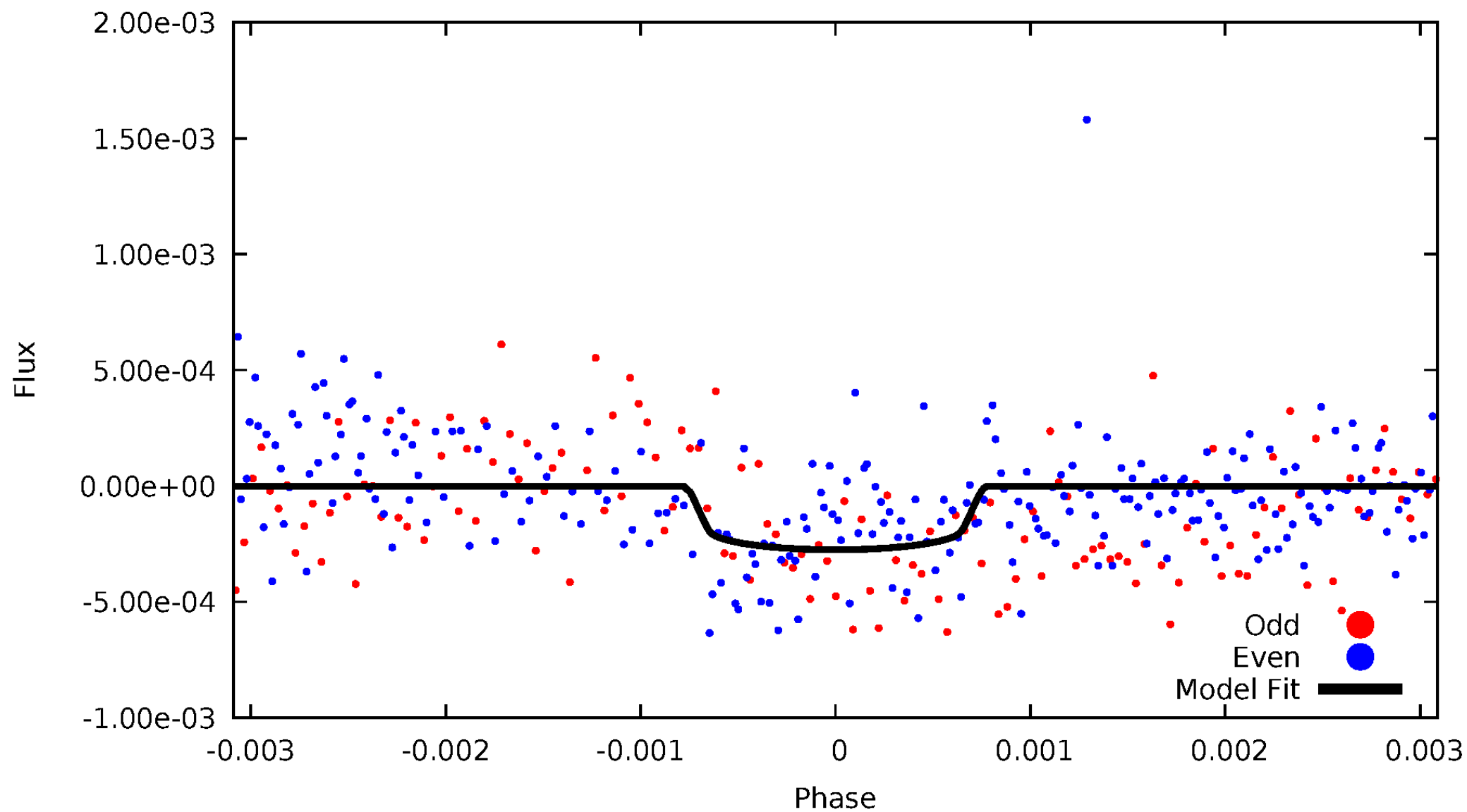


TCE 010729958-02



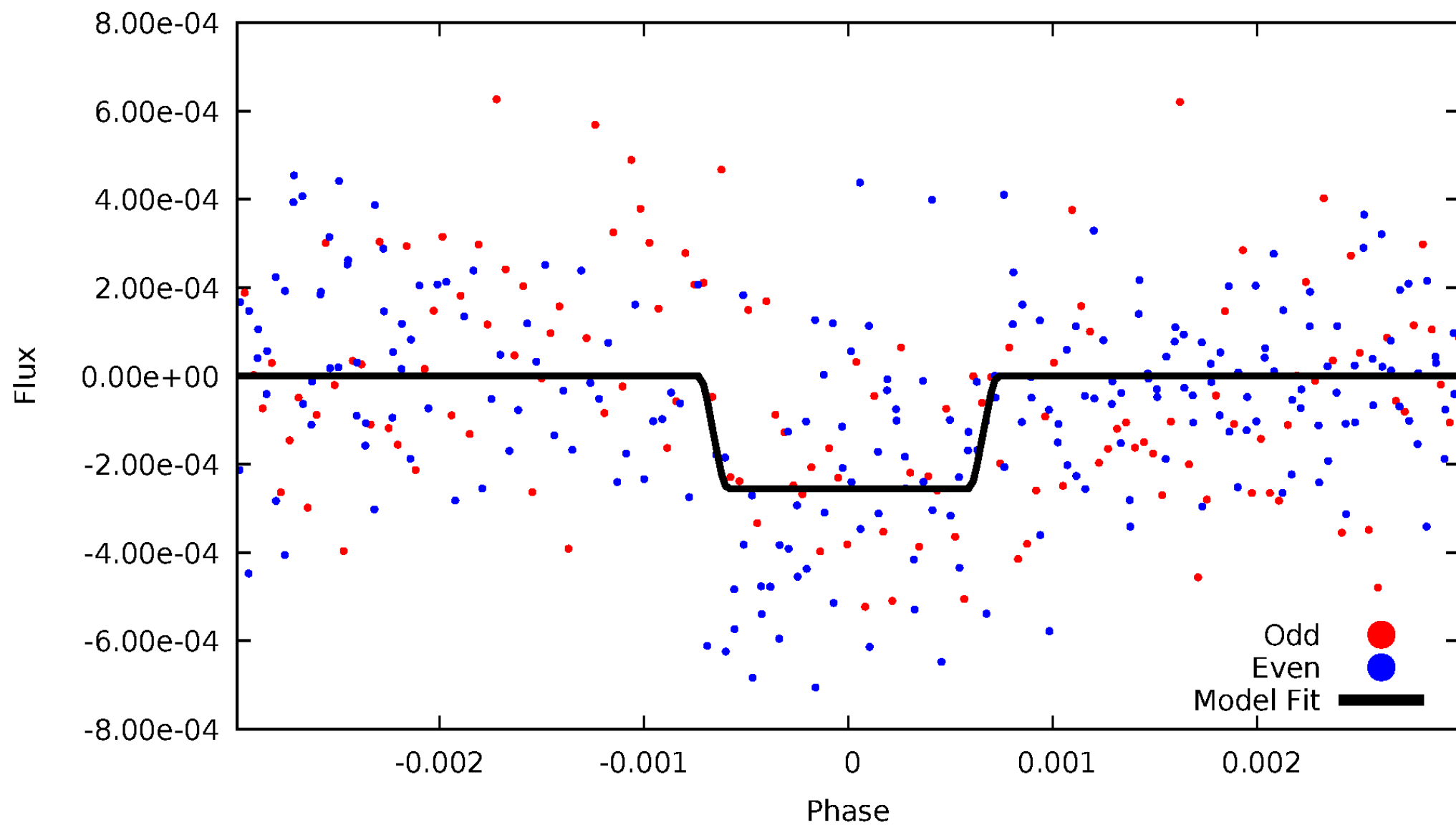
# DV Odd/Even

TCE 010729958-02



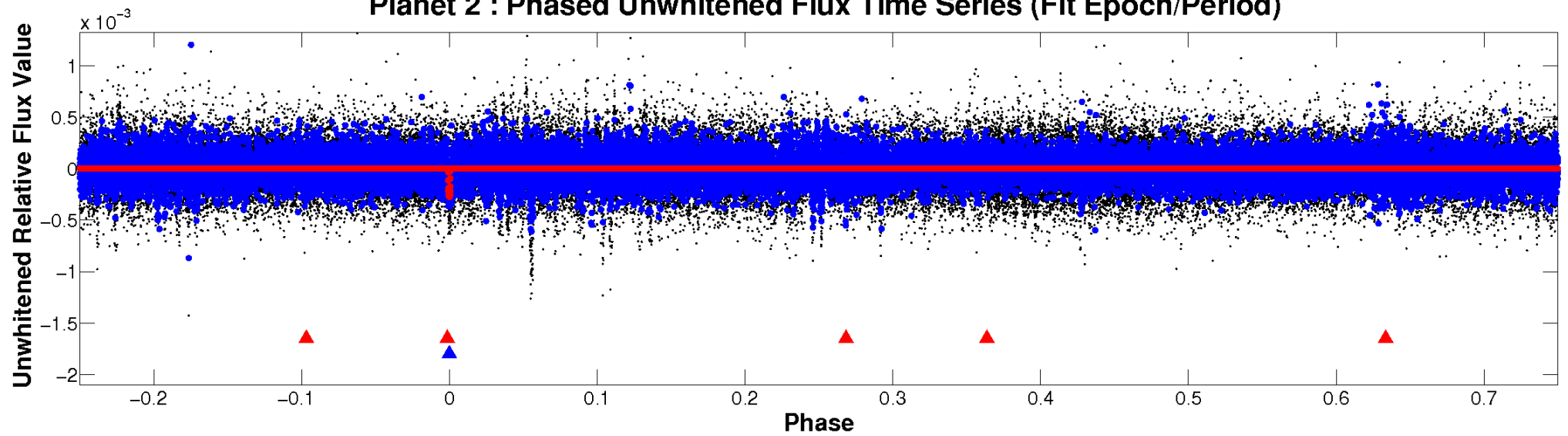
# ALT Odd/Even

TCE 010729958-02

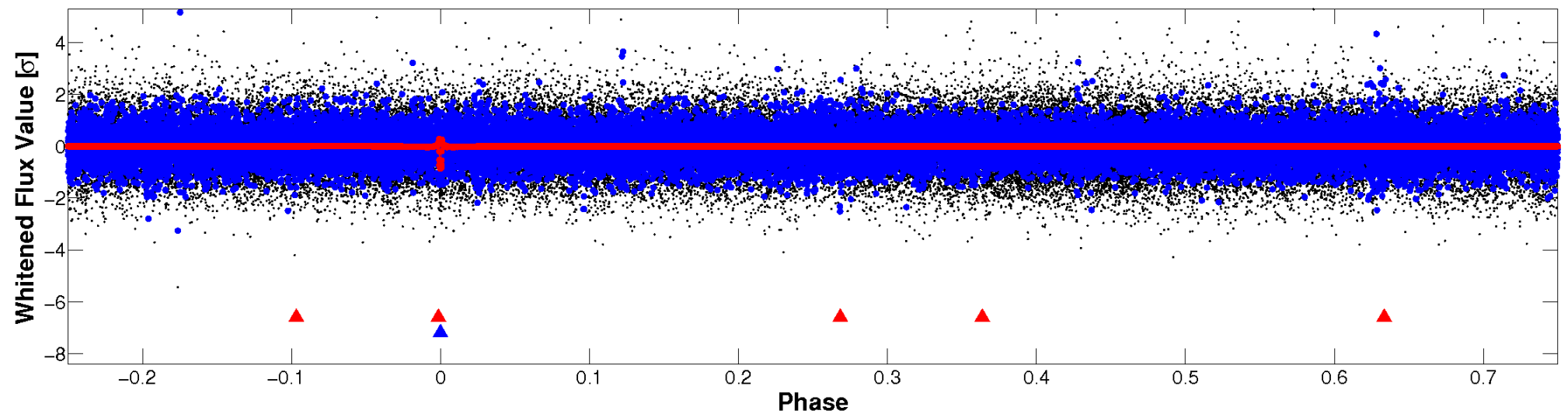


# Non-Whitened Vs. Whitened Light Curve

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

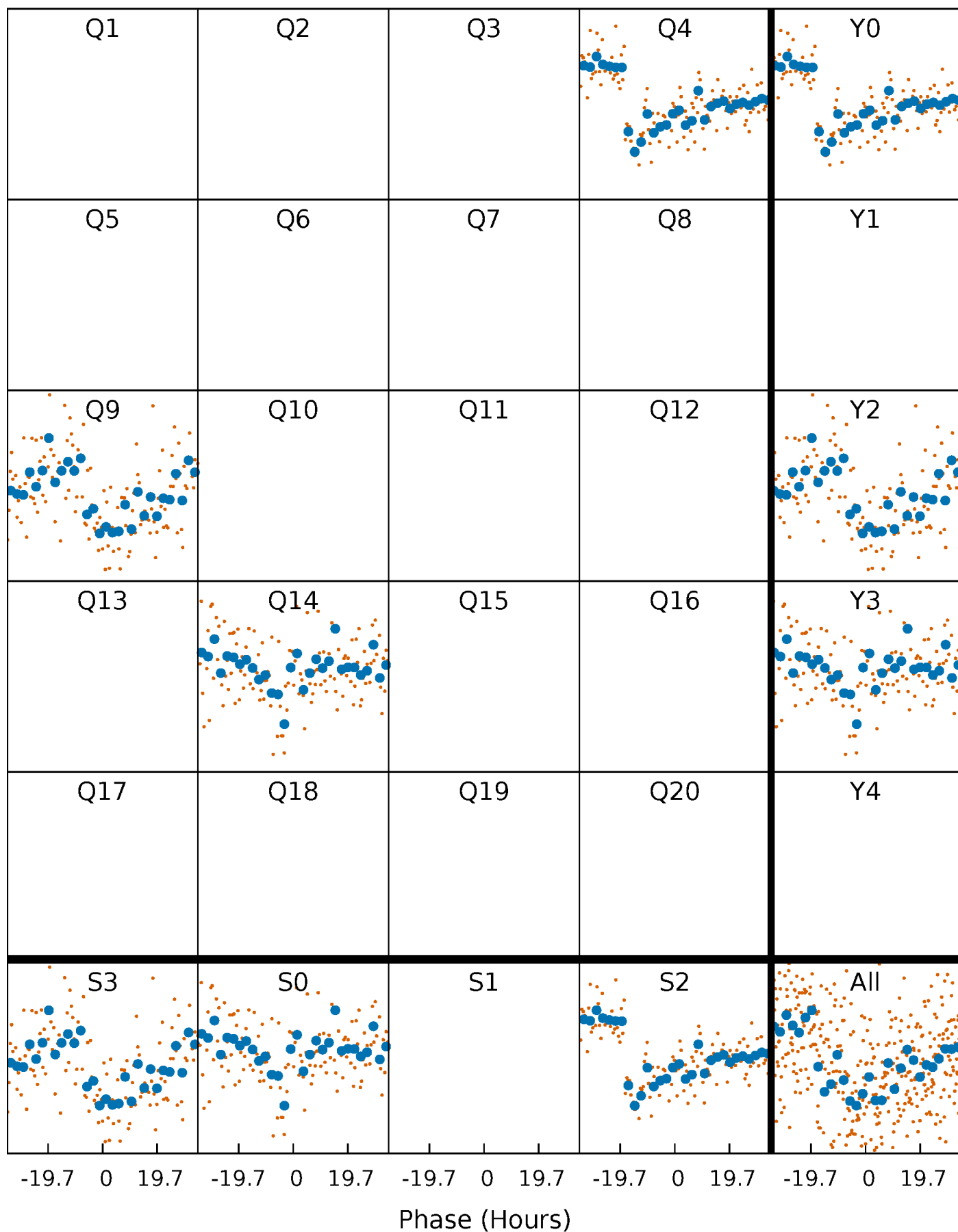


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



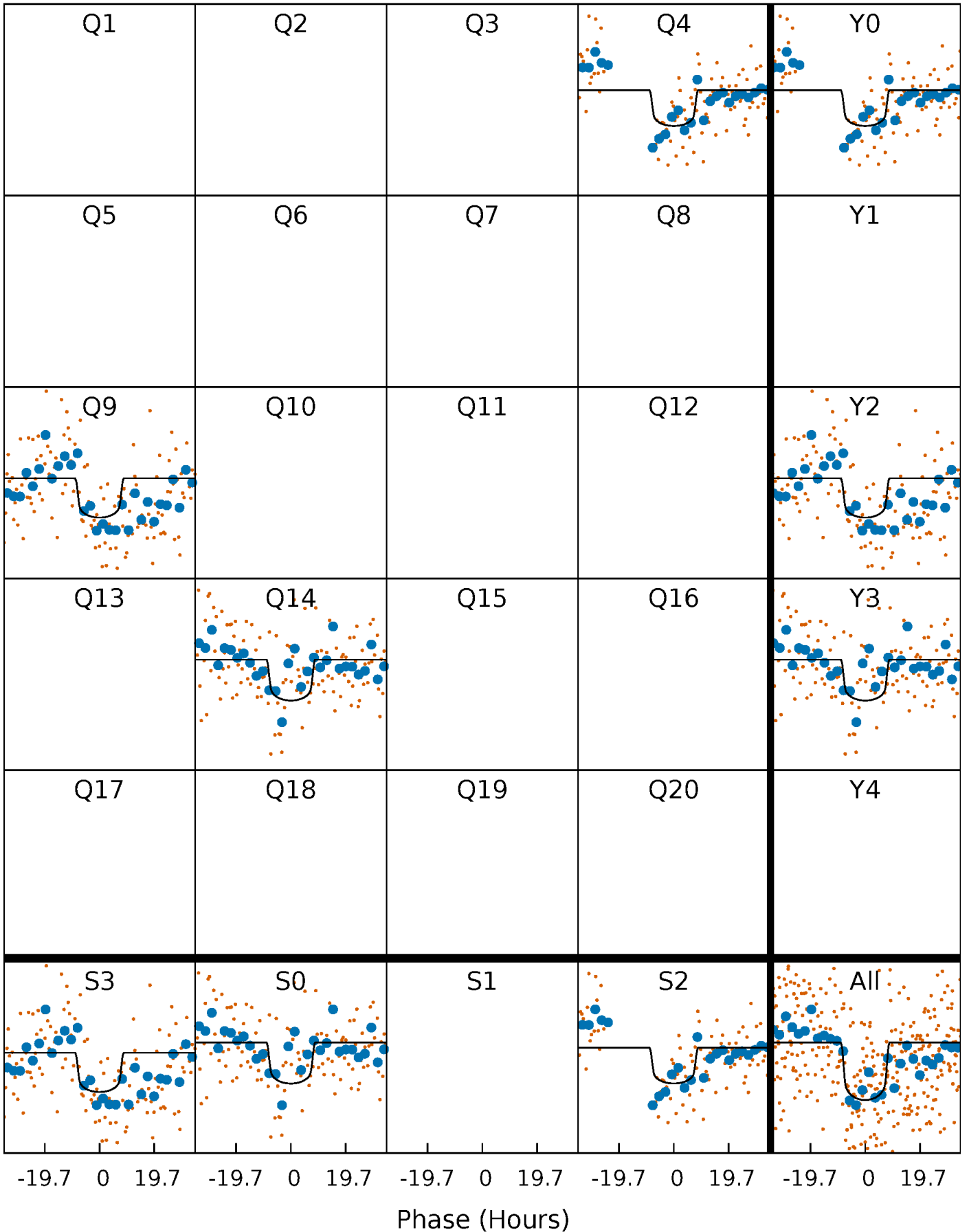
# PDC Quarter-Phased Transit Curves

TCE 010729958-02     $P=464.471289$  Days     $T_0=431.032484$  (BKJD)



# DV Quarter-Phased Transit Curves

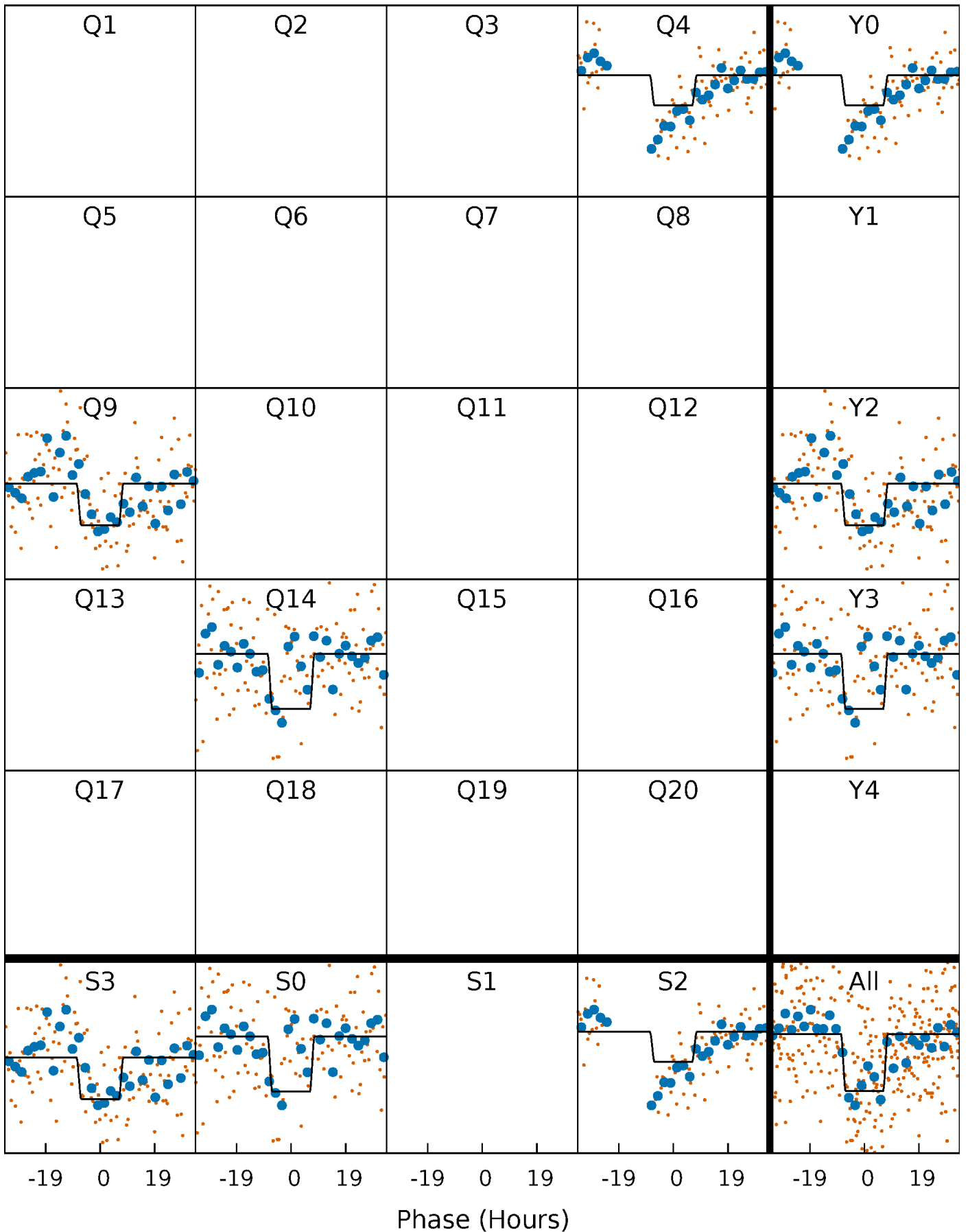
TCE 010729958-02     $P=464.471289$  Days     $T_0=431.032484$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

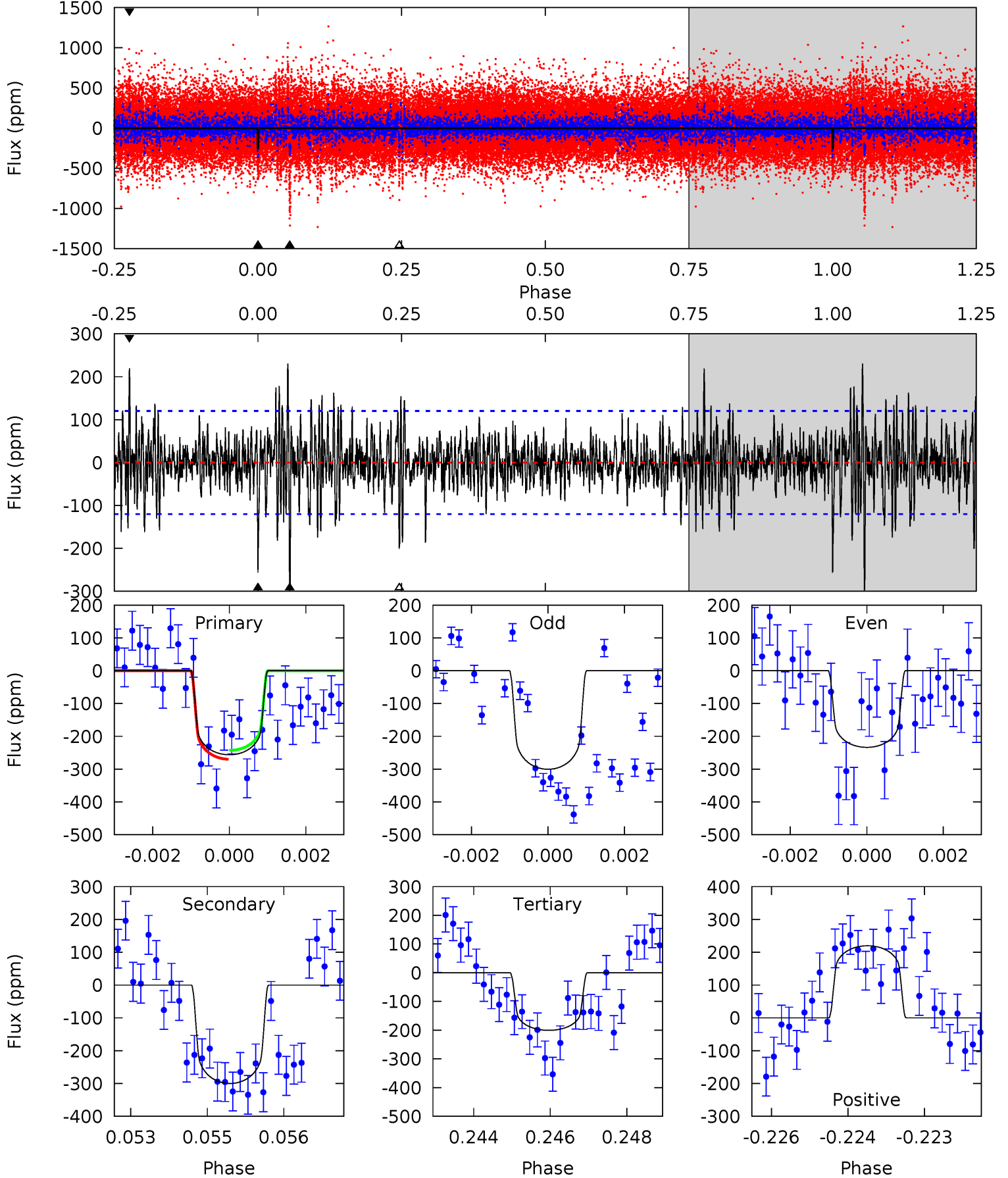
TCE 010729958-02 P=464.488875 Days  $T_0=431.018270$  (BKJD)



# DV Model-Shift Uniqueness Test

010729958-02, P = 464.471289 Days, E = 431.032484 Days

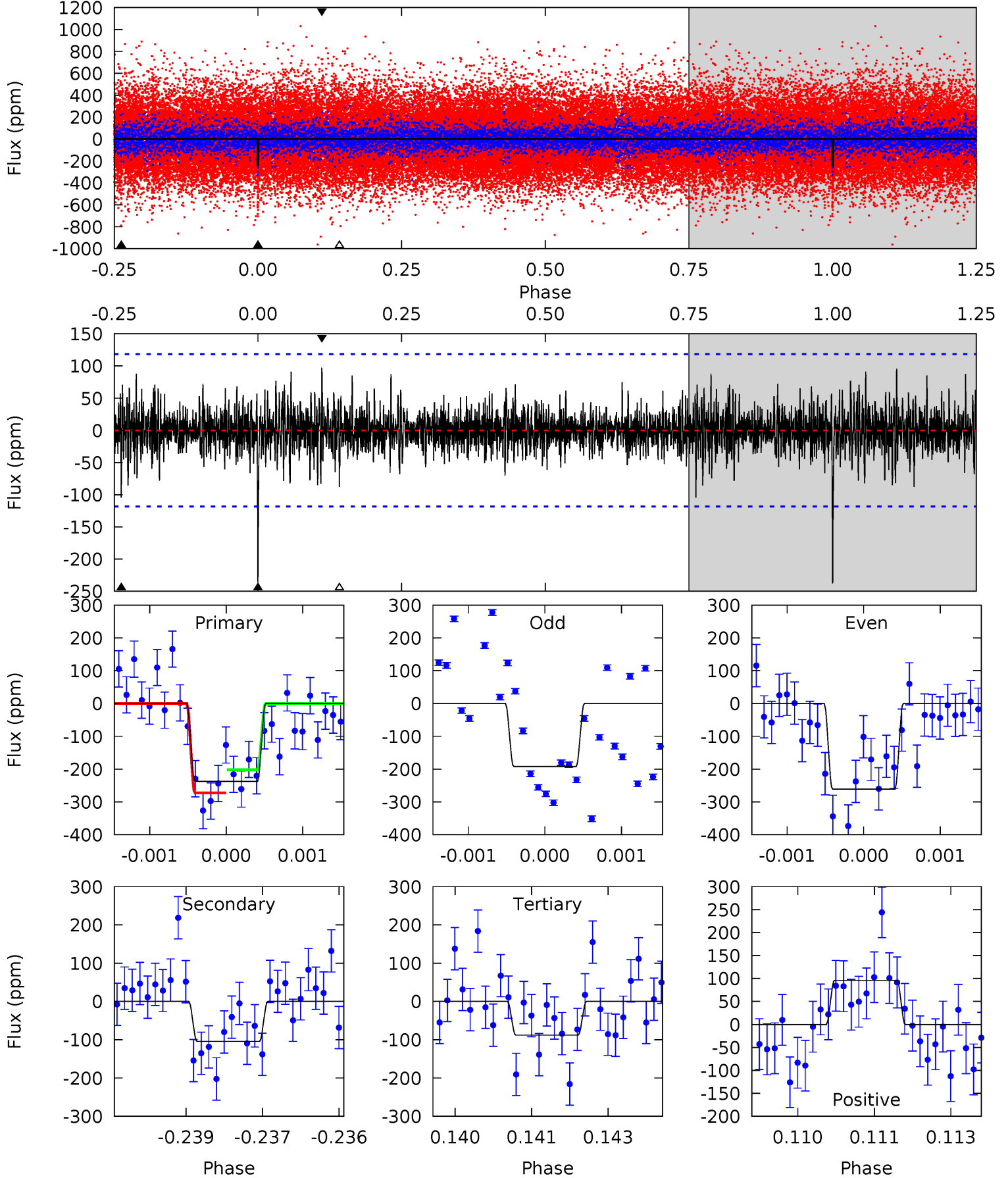
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.5	13.4	8.97	9.83	5.37	3.16	2.19	2.49	1.64	4.45	3.59	1.43	0.86	0.43	0.60



# Alt Model-Shift Uniqueness Test

010729958-02, P = 464.488875 Days, E = 431.018270 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.8	4.75	4.00	4.37	5.39	3.19	1.04	6.82	6.45	0.75	0.38	1.49	1.23	0.29	1.60



### Stellar Parameters For KIC 010729958

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6171^{+169}_{-206}$	$4.363^{+0.124}_{-0.201}$	$-0.320^{+0.300}_{-0.300}$	$1.075^{+0.315}_{-0.170}$	$0.972^{+0.148}_{-0.111}$	$1.101^{+0.626}_{-0.534}$
	+3%/-3%	+3%/-5%	+94%/-94%	+29%/-16%	+15%/-11%	+57%/-48%
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 010729958-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-300 \pm 22$	$2.15^{+0.45}_{-0.41}$	$368^{+27}_{-23}$	$6093^{+491}_{-476}$	$48949^{+23970}_{-15549}$
Alt.	$-104 \pm 22$	$1.90^{+0.43}_{-0.34}$	$368^{+30}_{-21}$	$5005^{+521}_{-383}$	$21128^{+11746}_{-7572}$

$T_{\text{max}}$  = 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

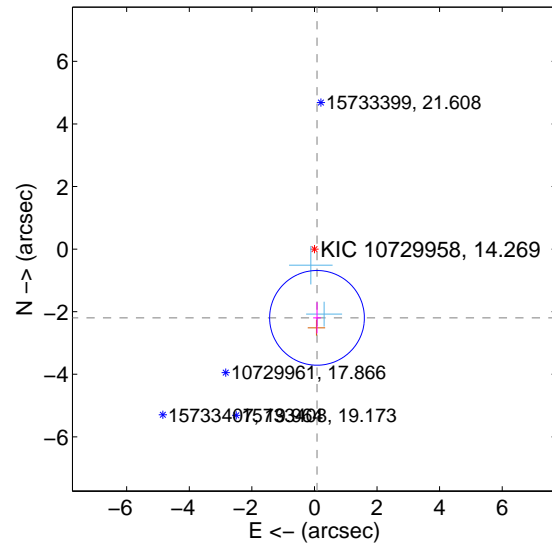
Supplemental centroid analysis for 010729958-02. Kepler magnitude: 14.27. Transit SNR 7.71

There are 2 quarters with good PRF difference image offsets

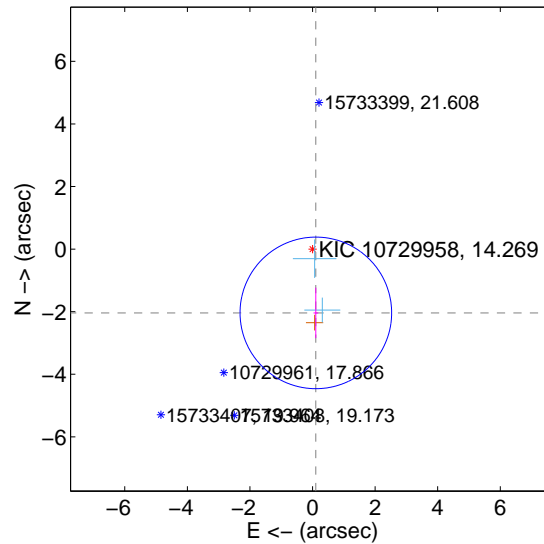
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	2.199 $\pm$ 0.505	4.36	-0.082 $\pm$ 0.124	-2.198 $\pm$ 0.501
PRF-fit source offset from KIC position	2.042 $\pm$ 0.807	2.53	-0.106 $\pm$ 0.076	-2.039 $\pm$ 0.807
photometric centroid source offset	1.80 $\pm$ 1.55	1.16	-1.79 $\pm$ 1.55	-0.19 $\pm$ 1.51

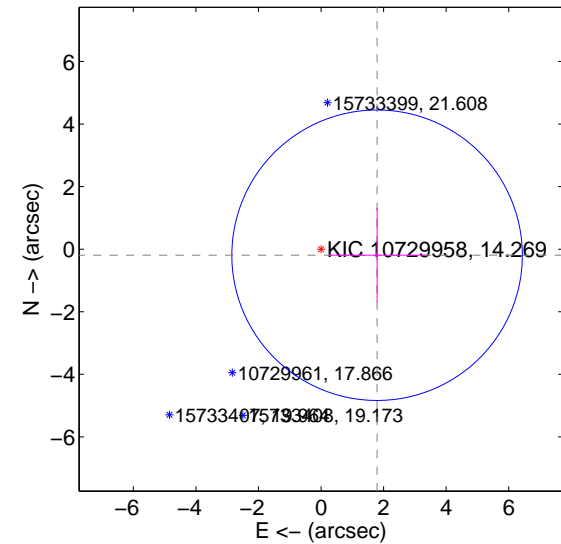
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

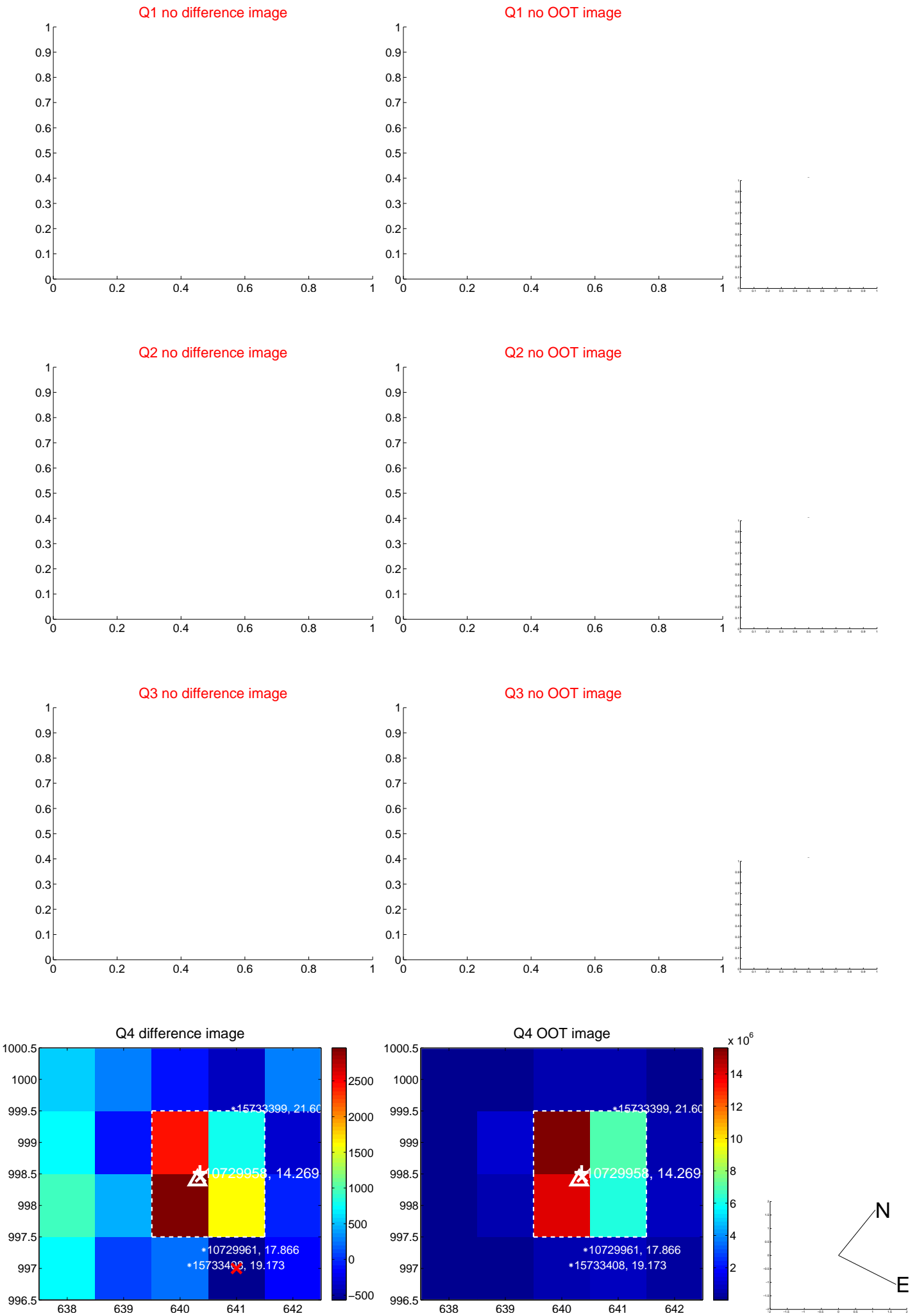


offset from photometric centroids

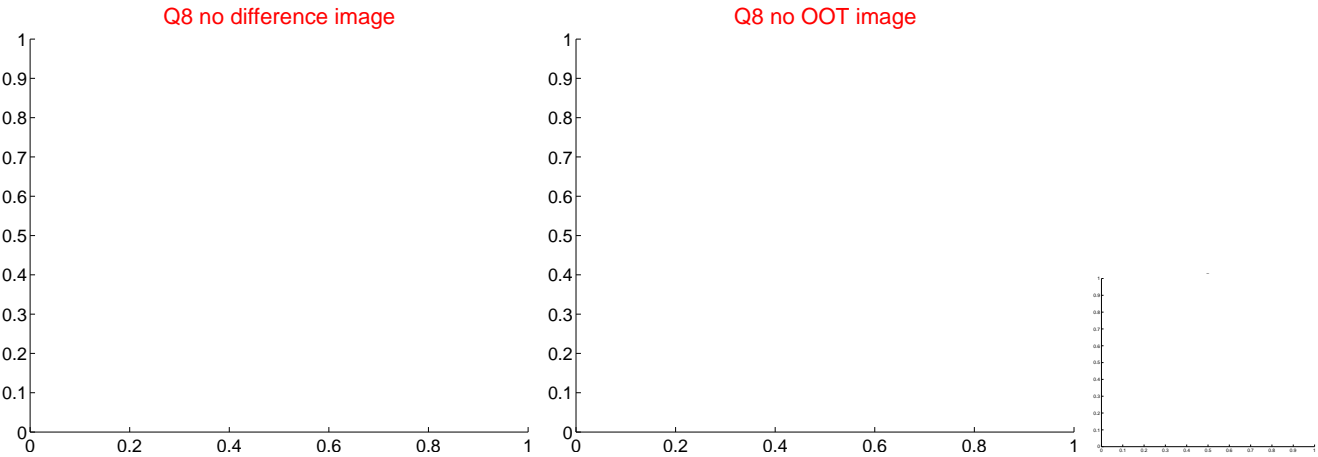
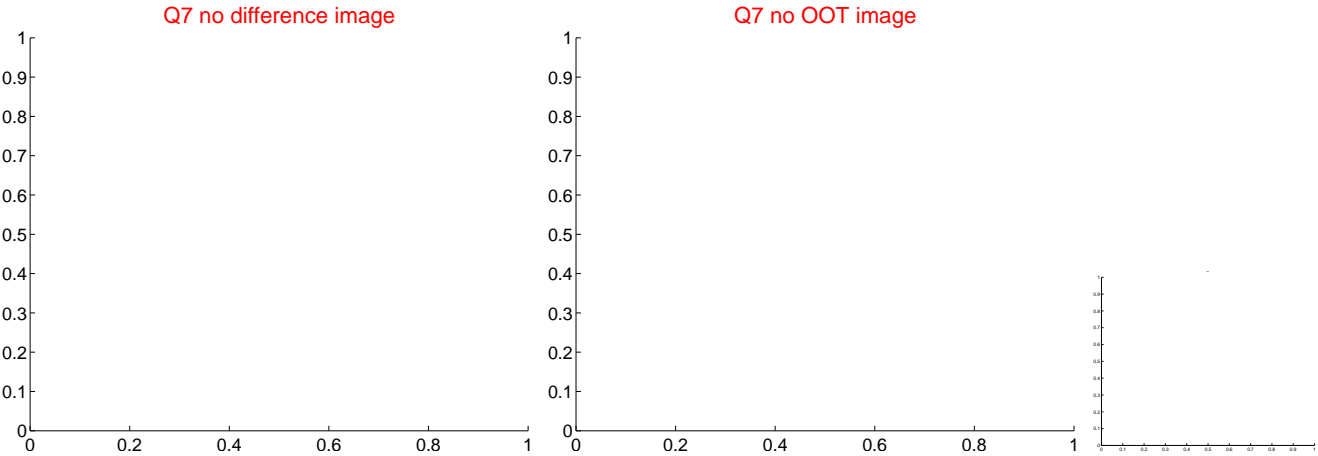
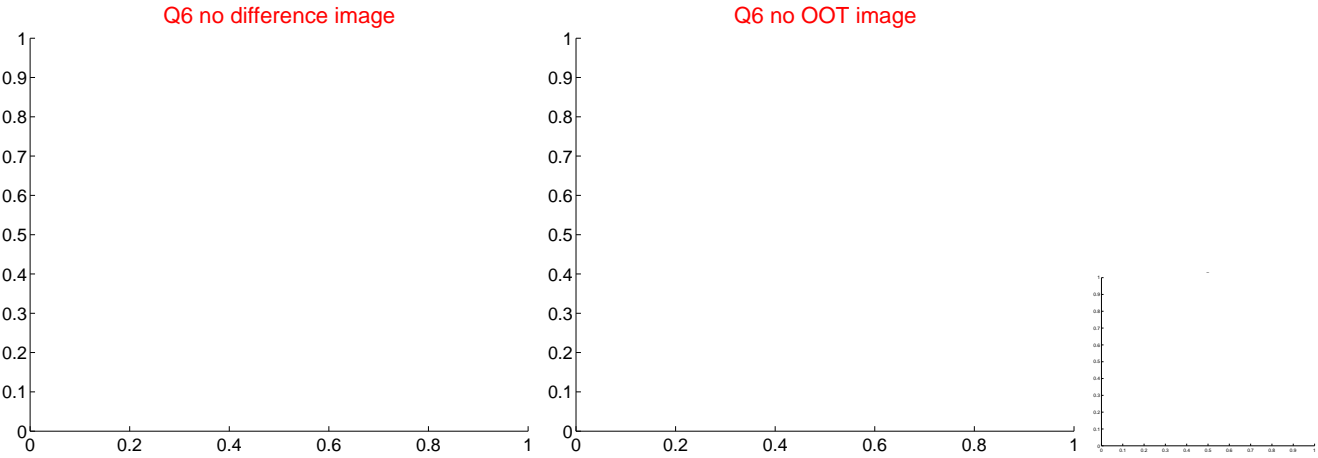
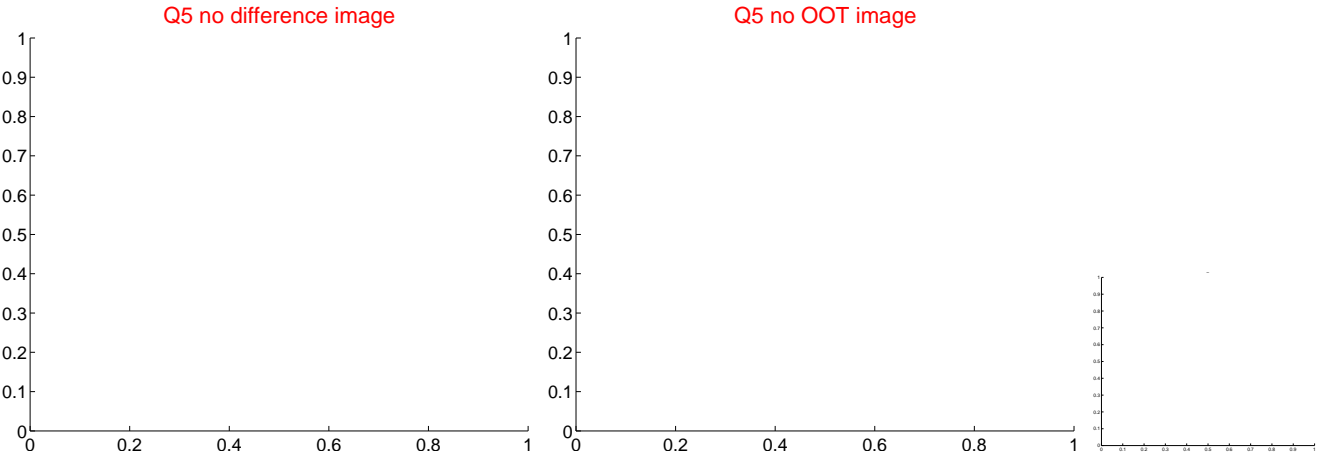


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

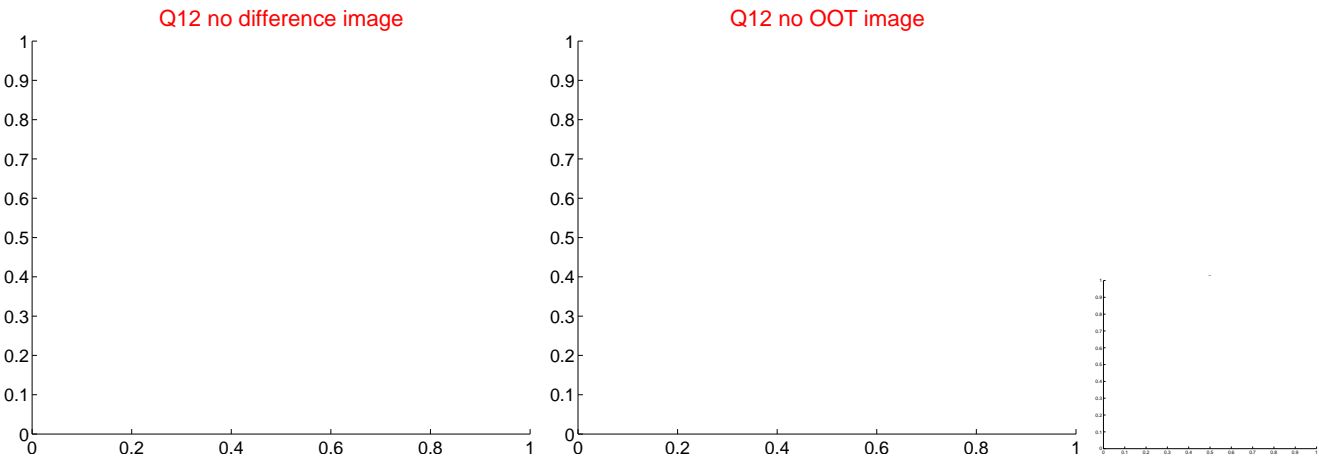
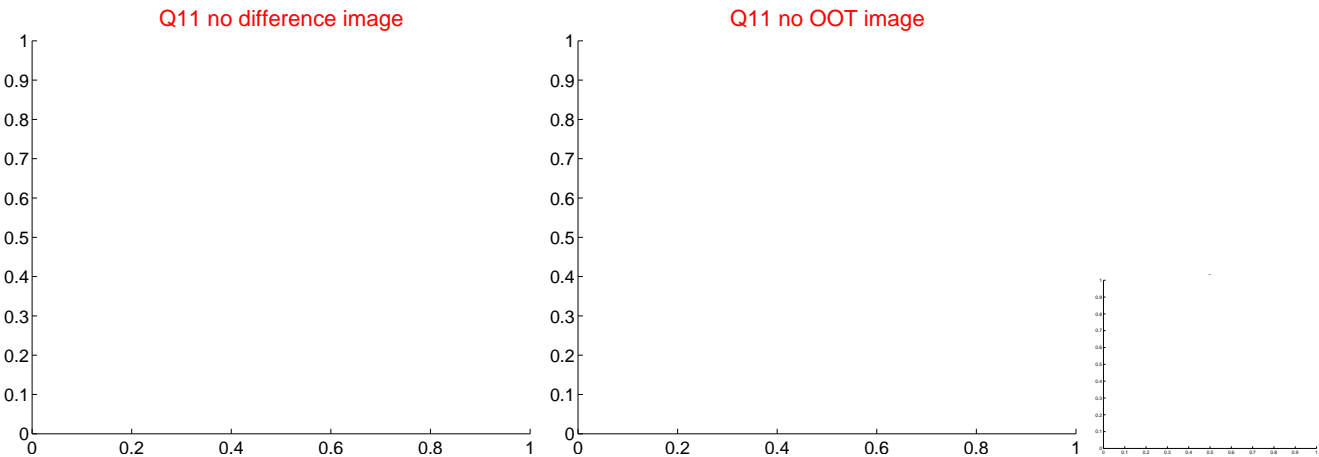
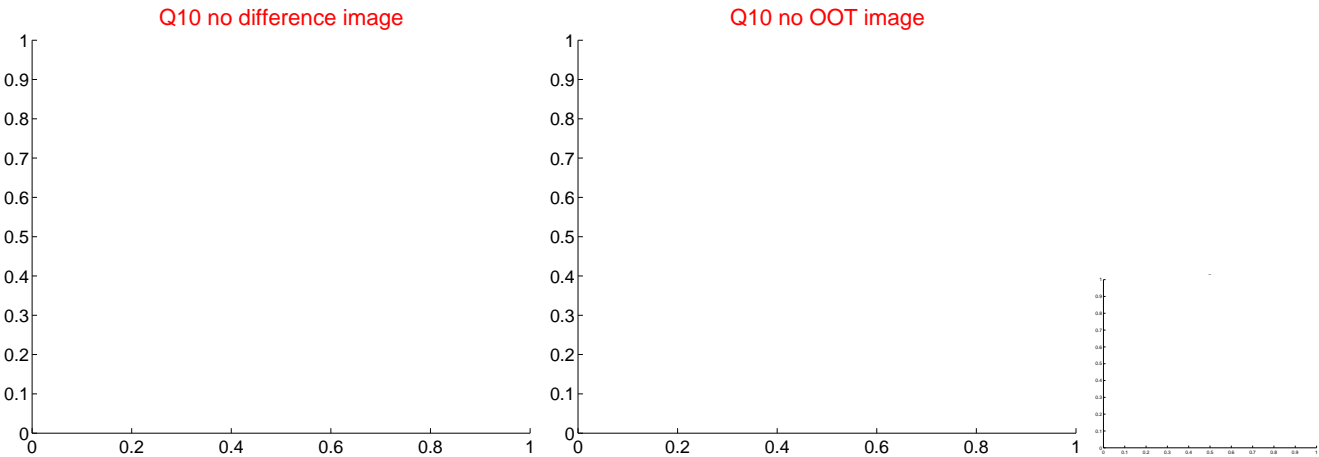
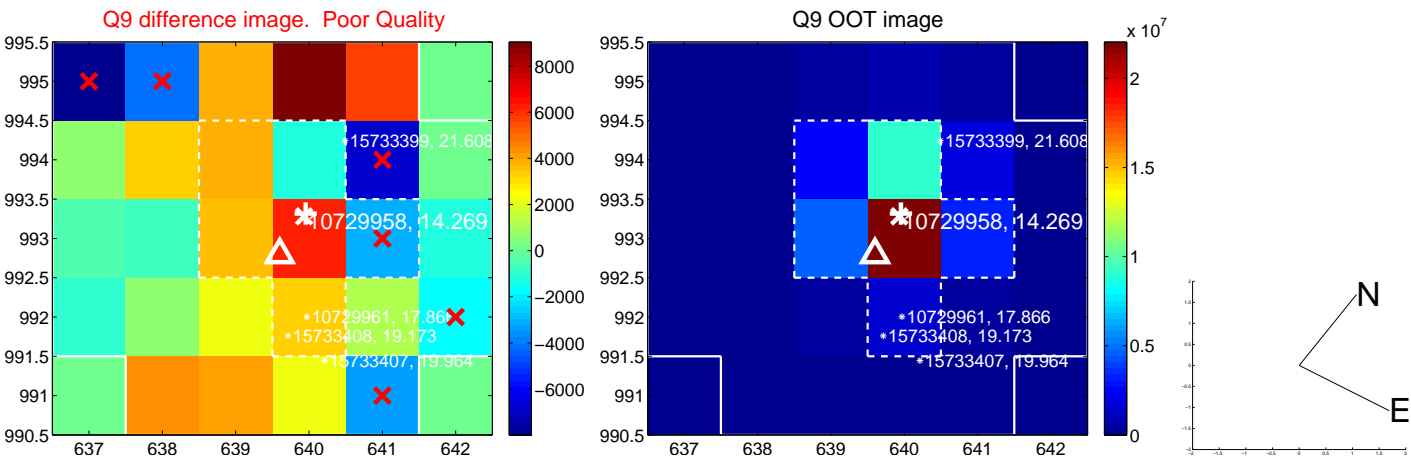


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

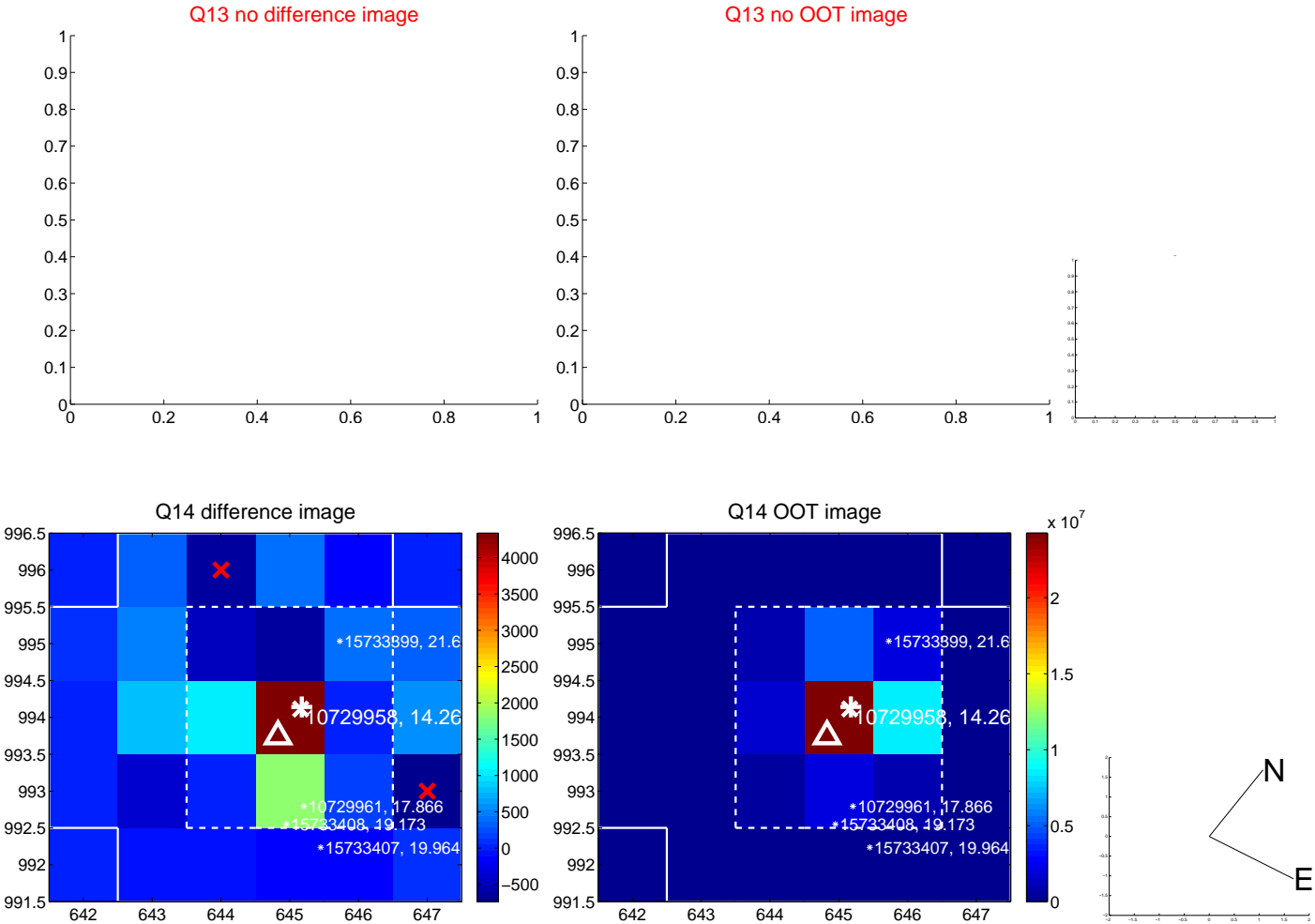




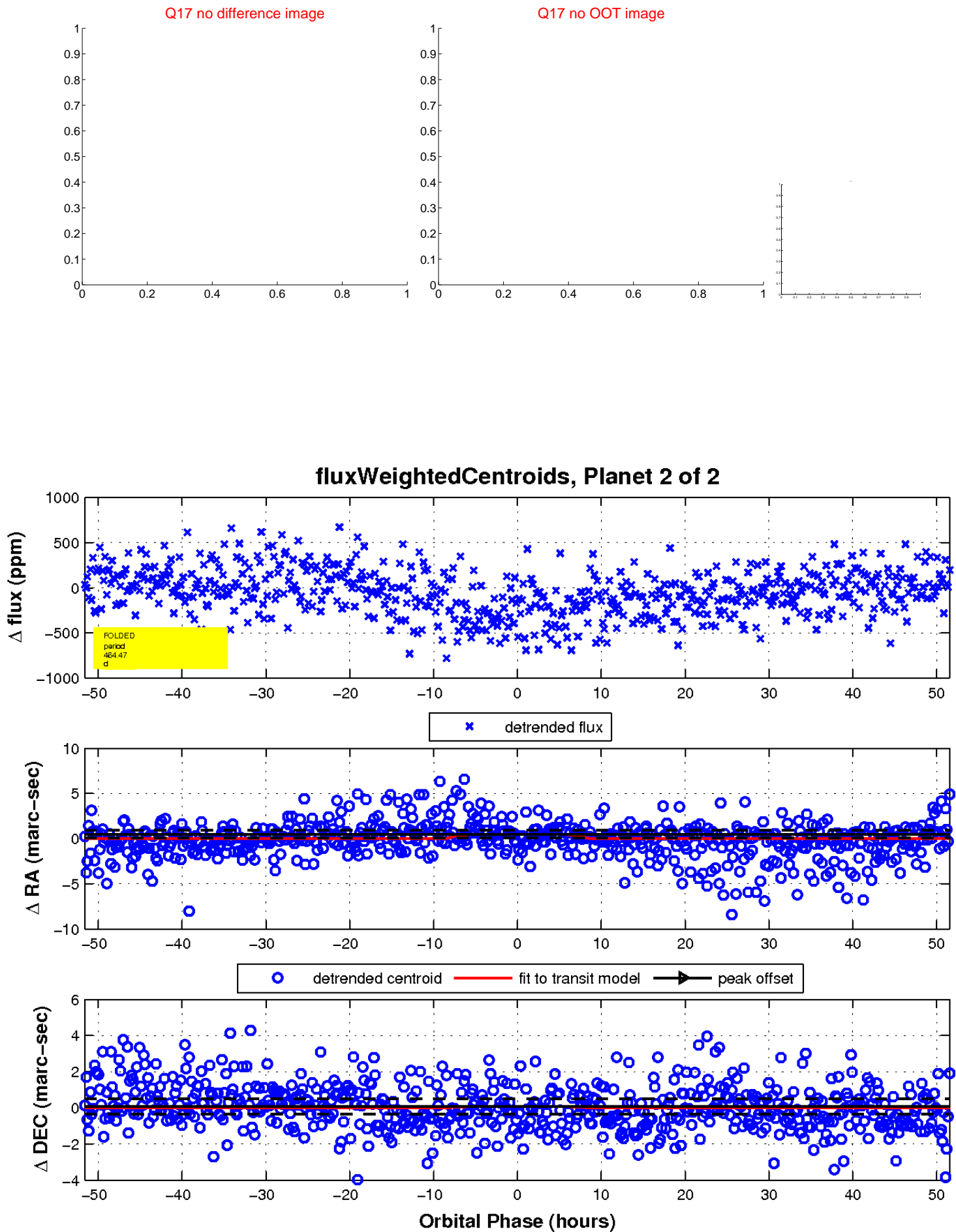
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

