

# KIC 005984278

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005984278-01	OBS	No	2.251677	132.484588	31.6	6.012	10.3	10.3	3.72	6363	2.42	13003.24
005984278-02	OBS	No	532.526754	215.248019	252.8	7.355	9.9	6.5	3.72	6363	6.43	8.89

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005984278-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT
005984278-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS

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

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

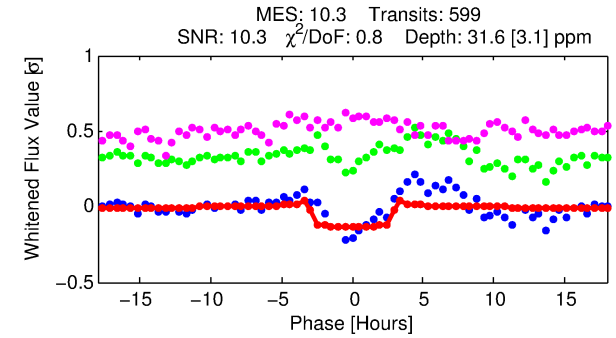
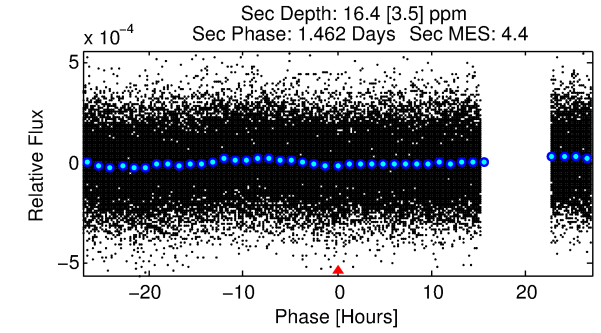
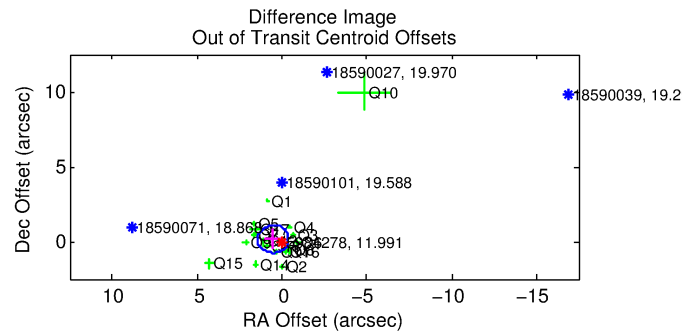
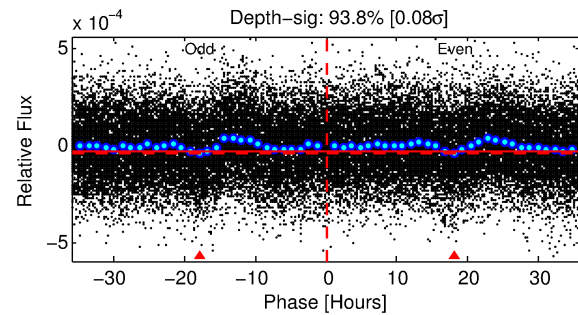
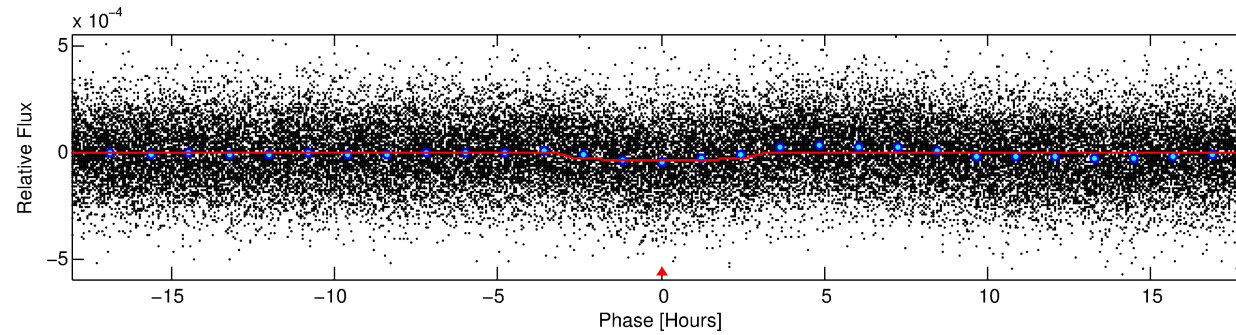
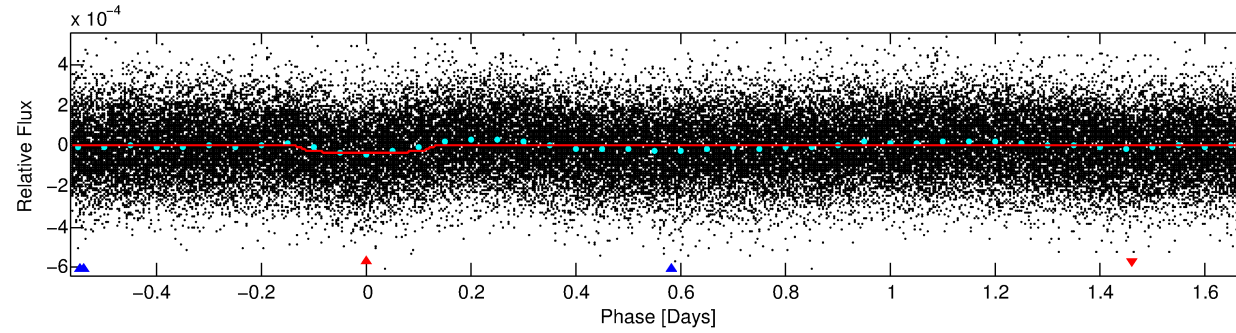
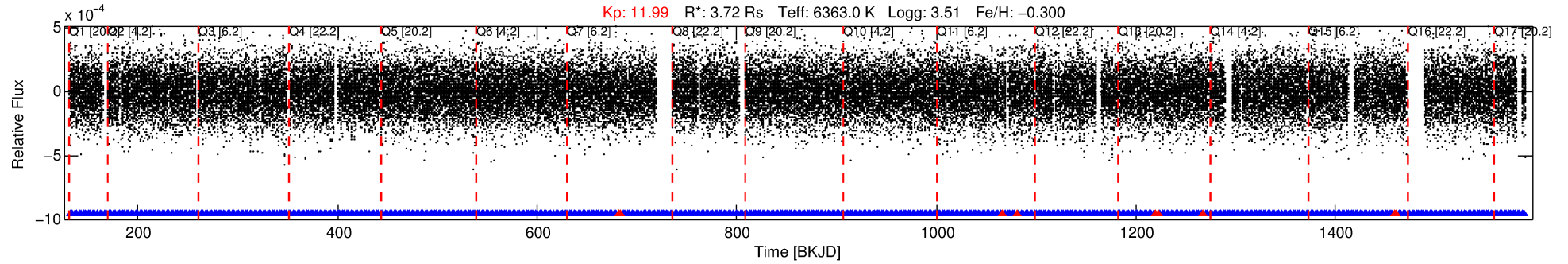
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005984278-01

No Significant Match Found

# DV One-Page Summary

KIC: 5984278 Candidate: 1 of 2 Period: 2.252 d



## DV Fit Results:

Period = 2.25168 [0.00002] d  
Epoch = 132.4846 [0.0040] BKJD  
Rp/R\* = 0.0060 [0.0013]  
a/R\* = 1.65 [1.26]  
b = 0.89 [0.29]  
Seff = 13003.24 [8565.41]  
Teq = 2723 [448] K  
Rp = 2.42 [1.12] Re  
a = 0.0396 [0.0159] AU  
Ag = 2.40 [1.95] [0.72 $\sigma$ ]  
Teffp = 5243 [648] K [3.20 $\sigma$ ]

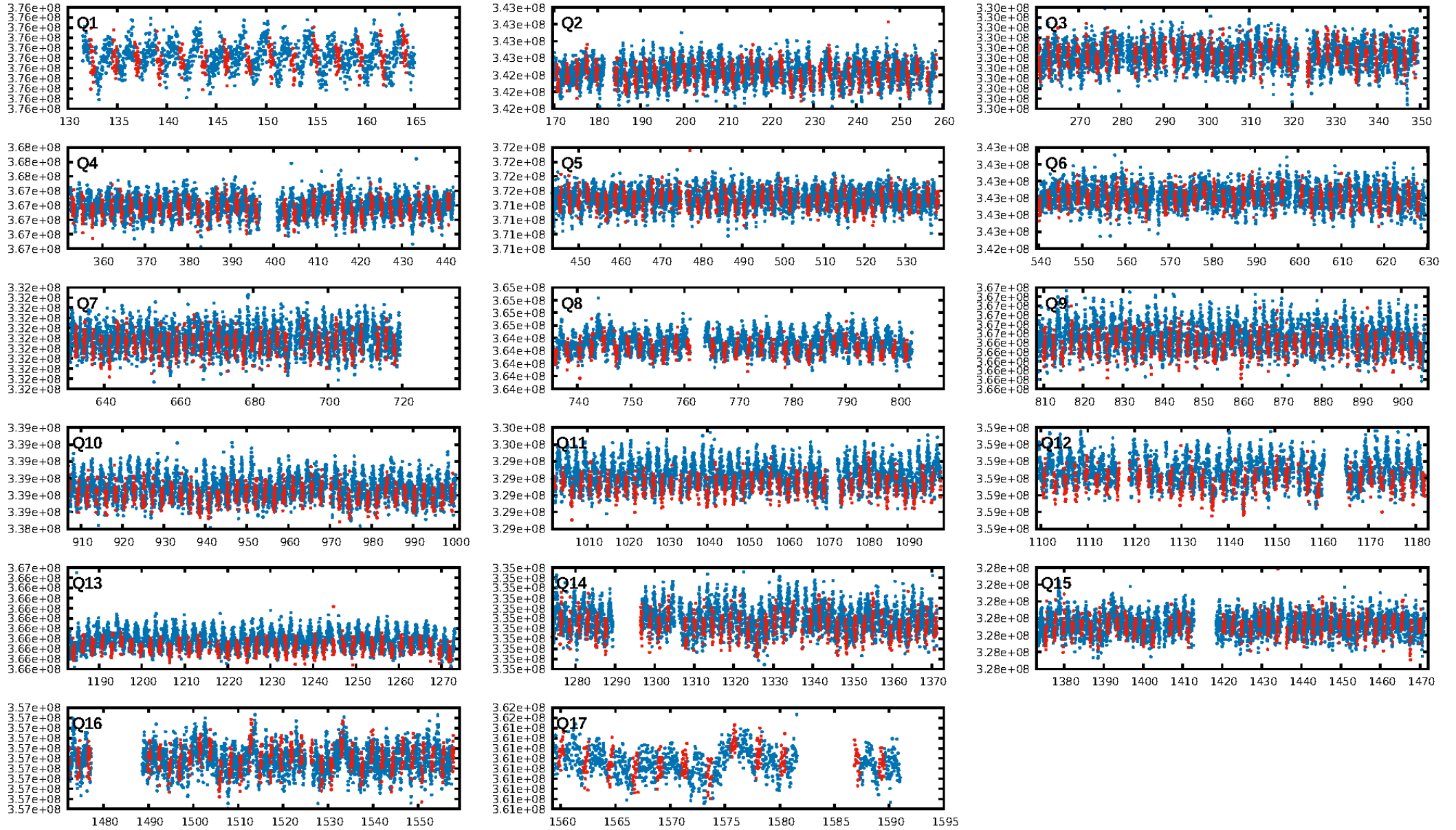
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [1339.74 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 7.94e-18  
RollingBand-fgt: 0.98 [563/572]  
GhostDiagnostic-chr: 0.551  
Centroid-sig: 0.3%  
Centroid-so: 0.781 arcsec [1.53 $\sigma$ ]  
OotOffset-rm: 0.549 arcsec [1.79 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-rm: 0.566 arcsec [1.89 $\sigma$ ]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.76 [13/17]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 04:02:41 Z

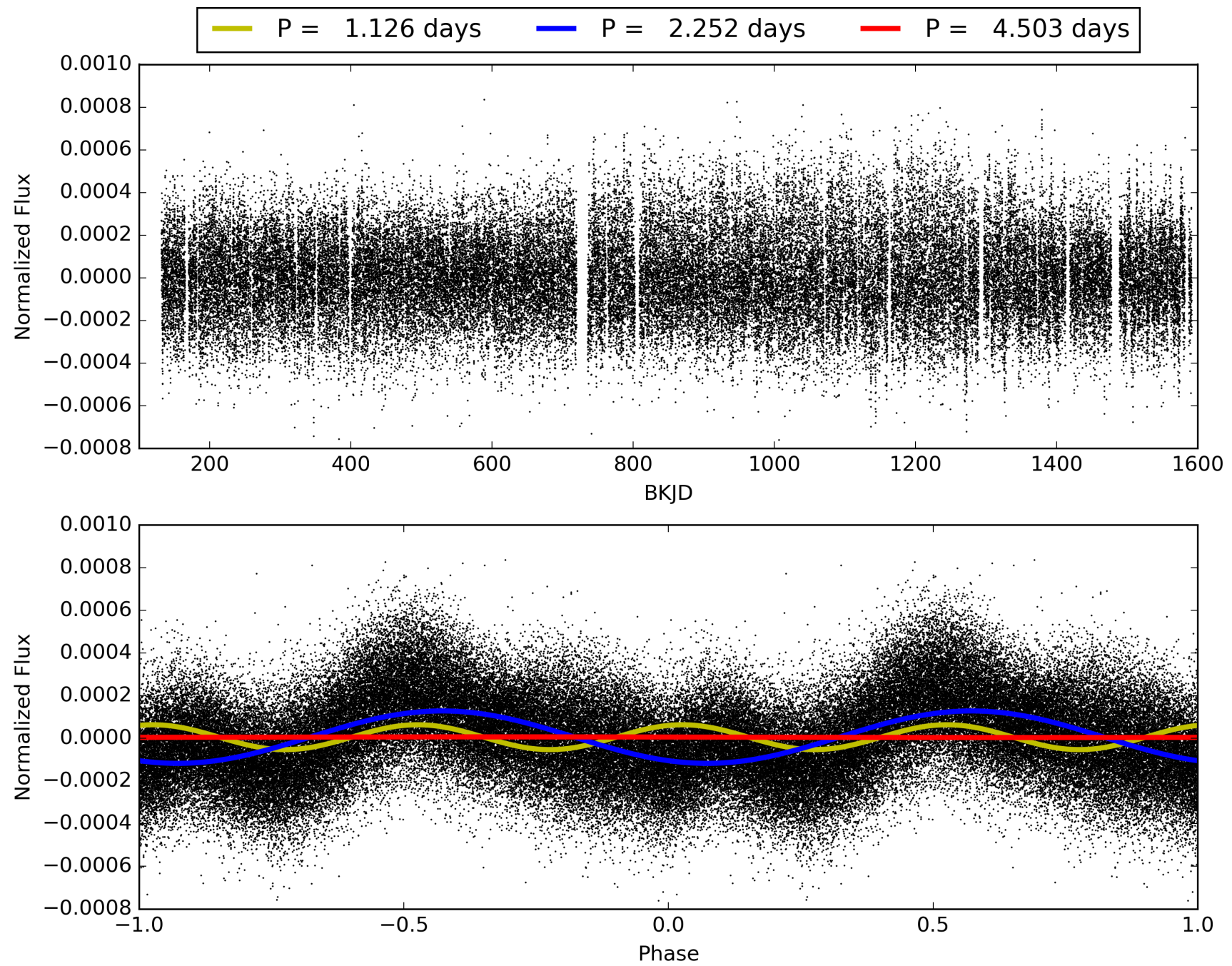
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005984278-01, PDC Light Curves



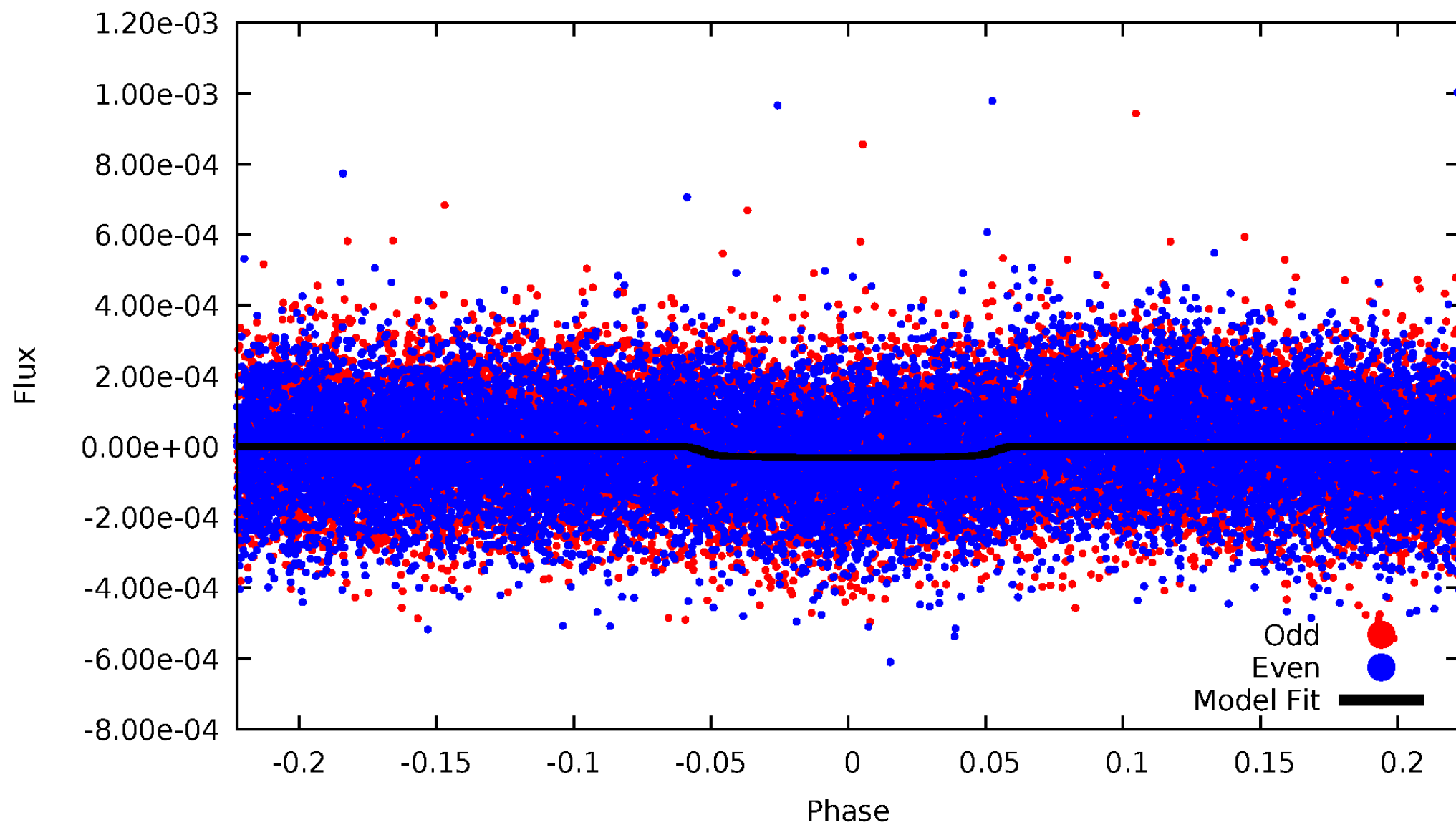


TCE 005984278-01



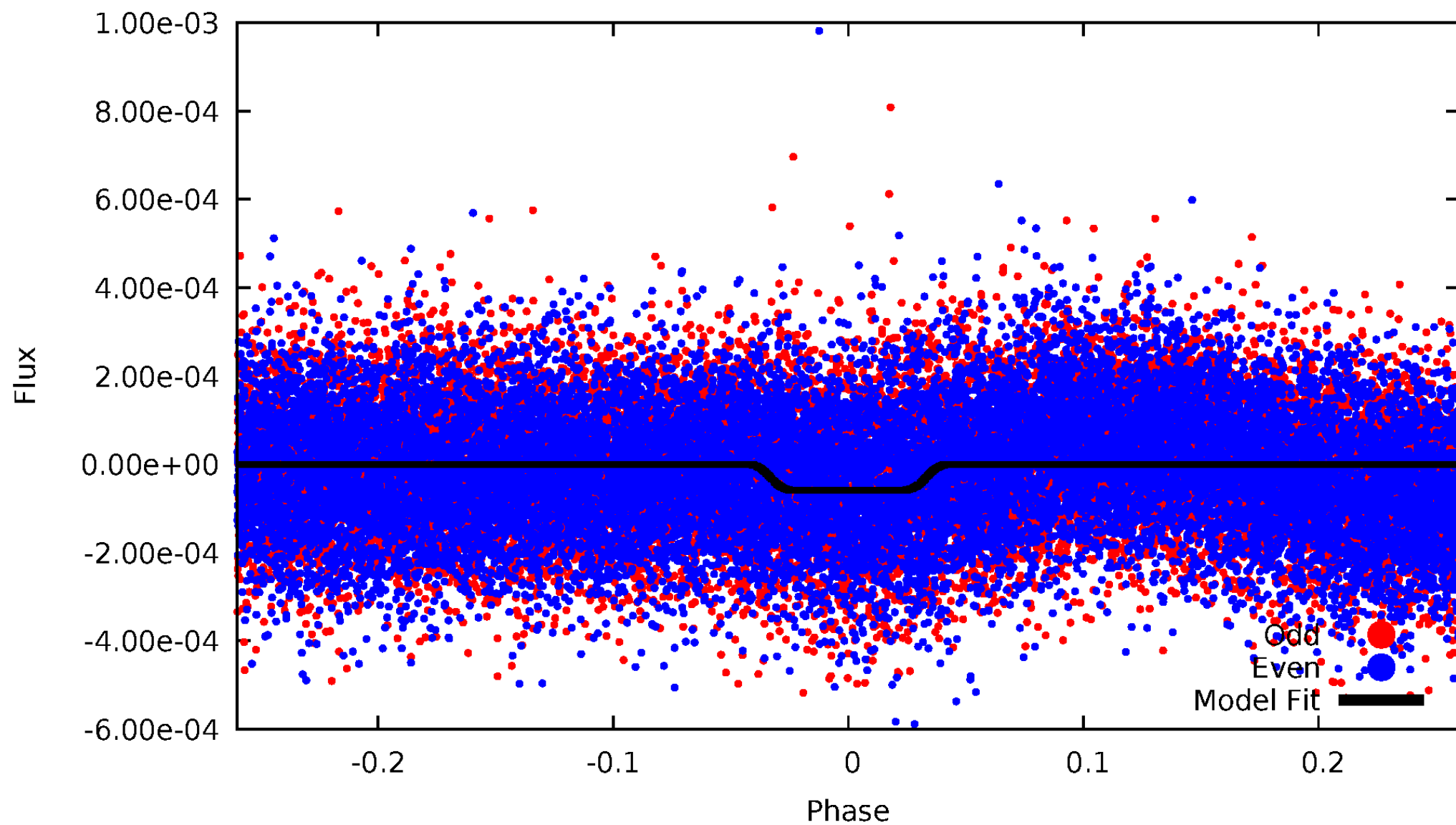
# DV Odd/Even

TCE 005984278-01



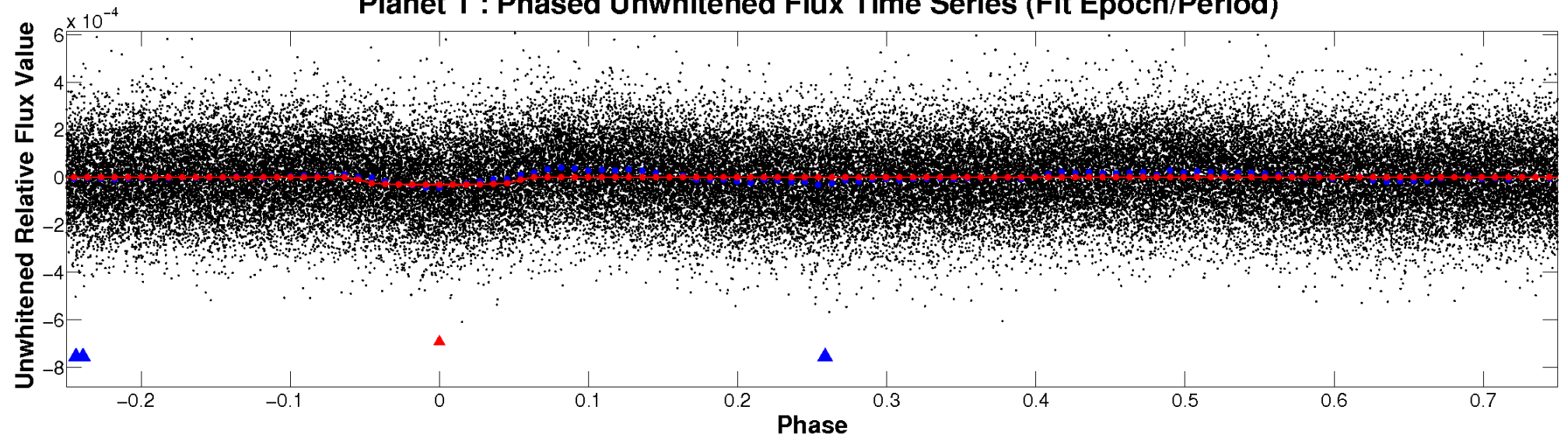
# ALT Odd/Even

TCE 005984278-01

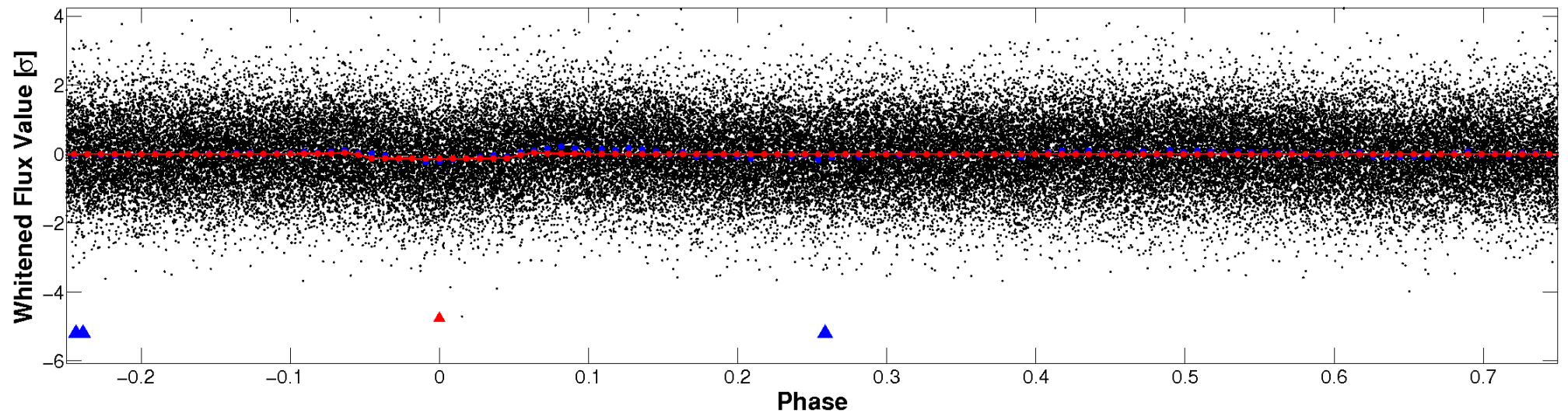


# Non-Whitened Vs. Whitened Light Curve

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



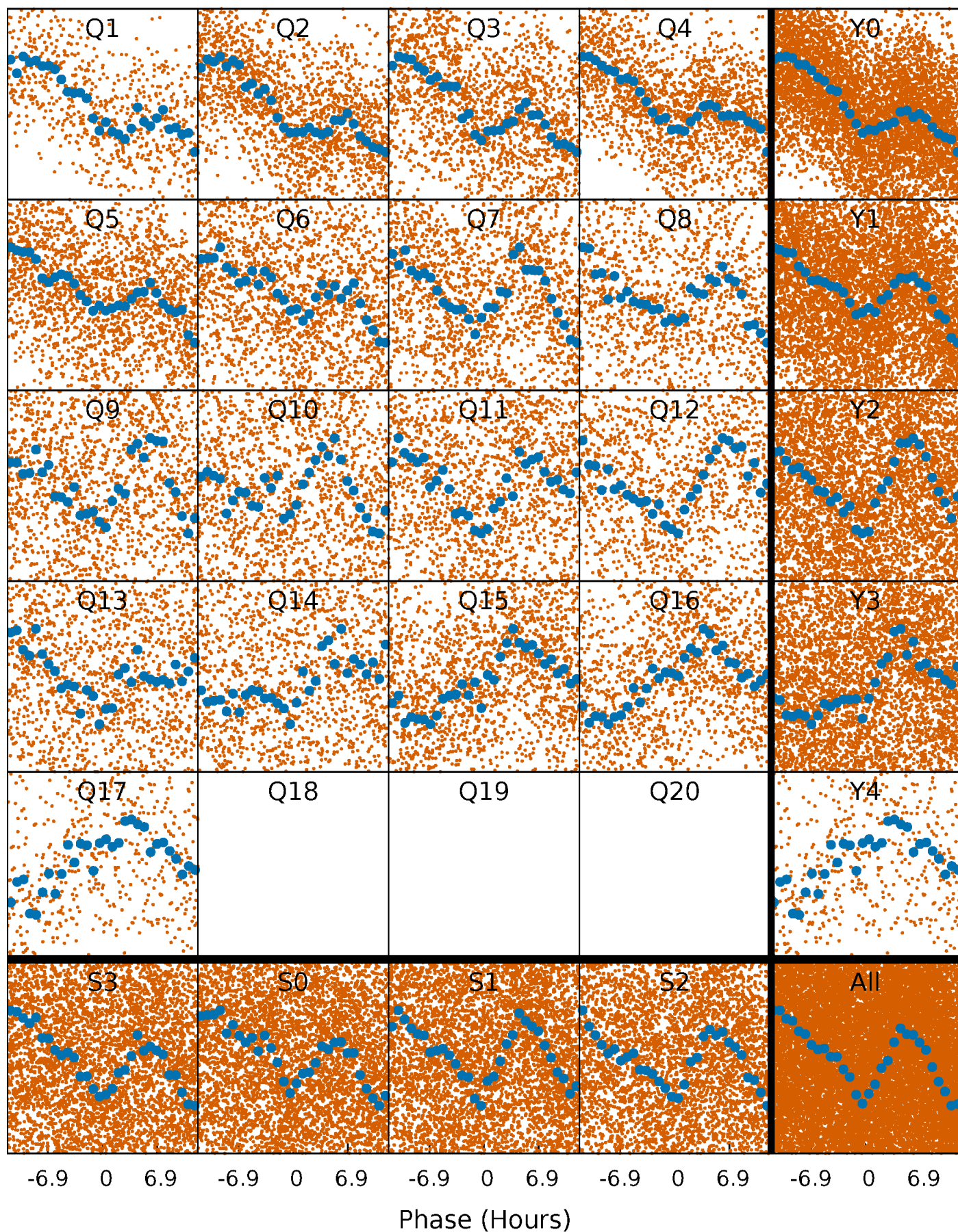
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

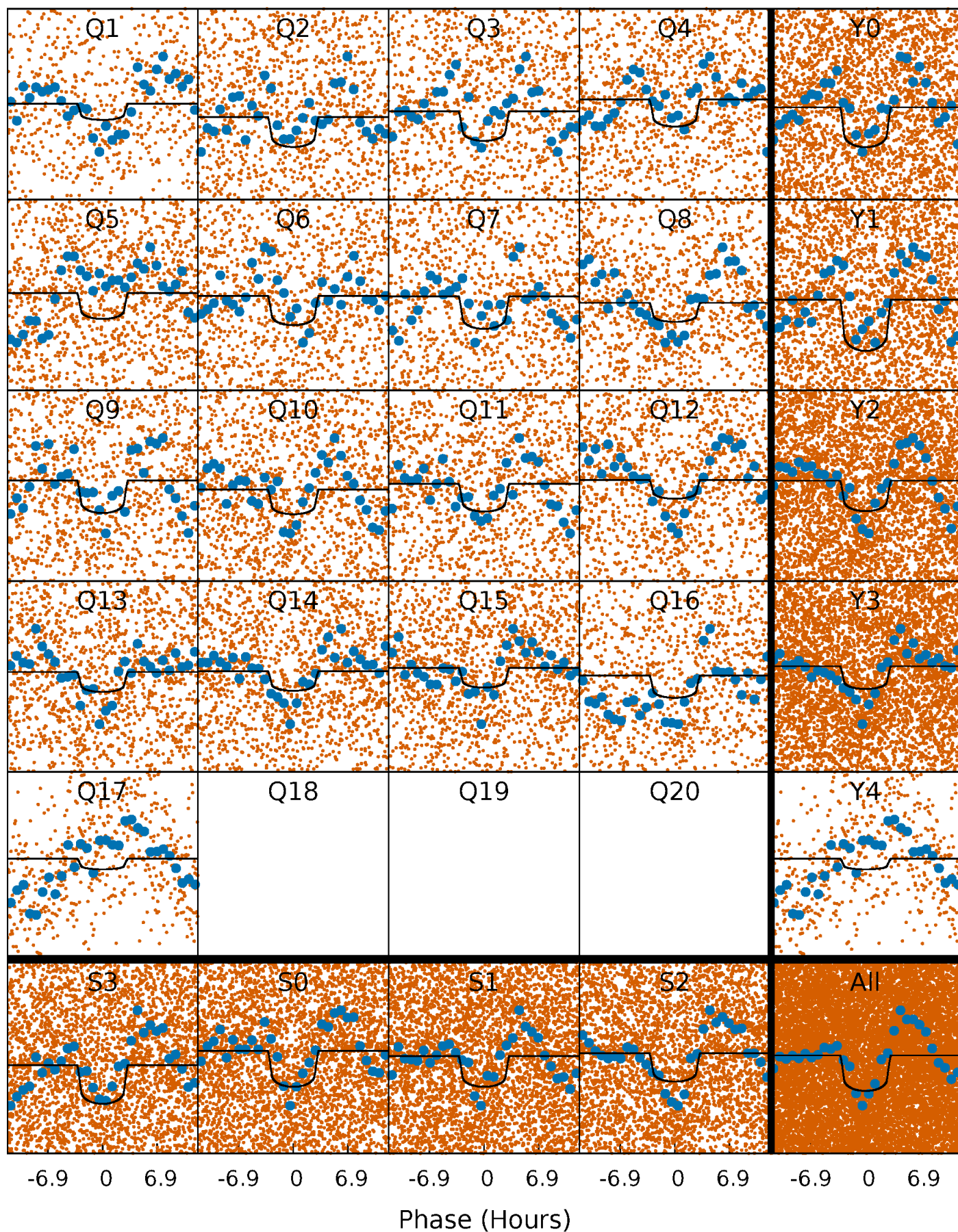
TCE 005984278-01 P= 2.251677 Days  $T_0=132.484588$  (BKJD)





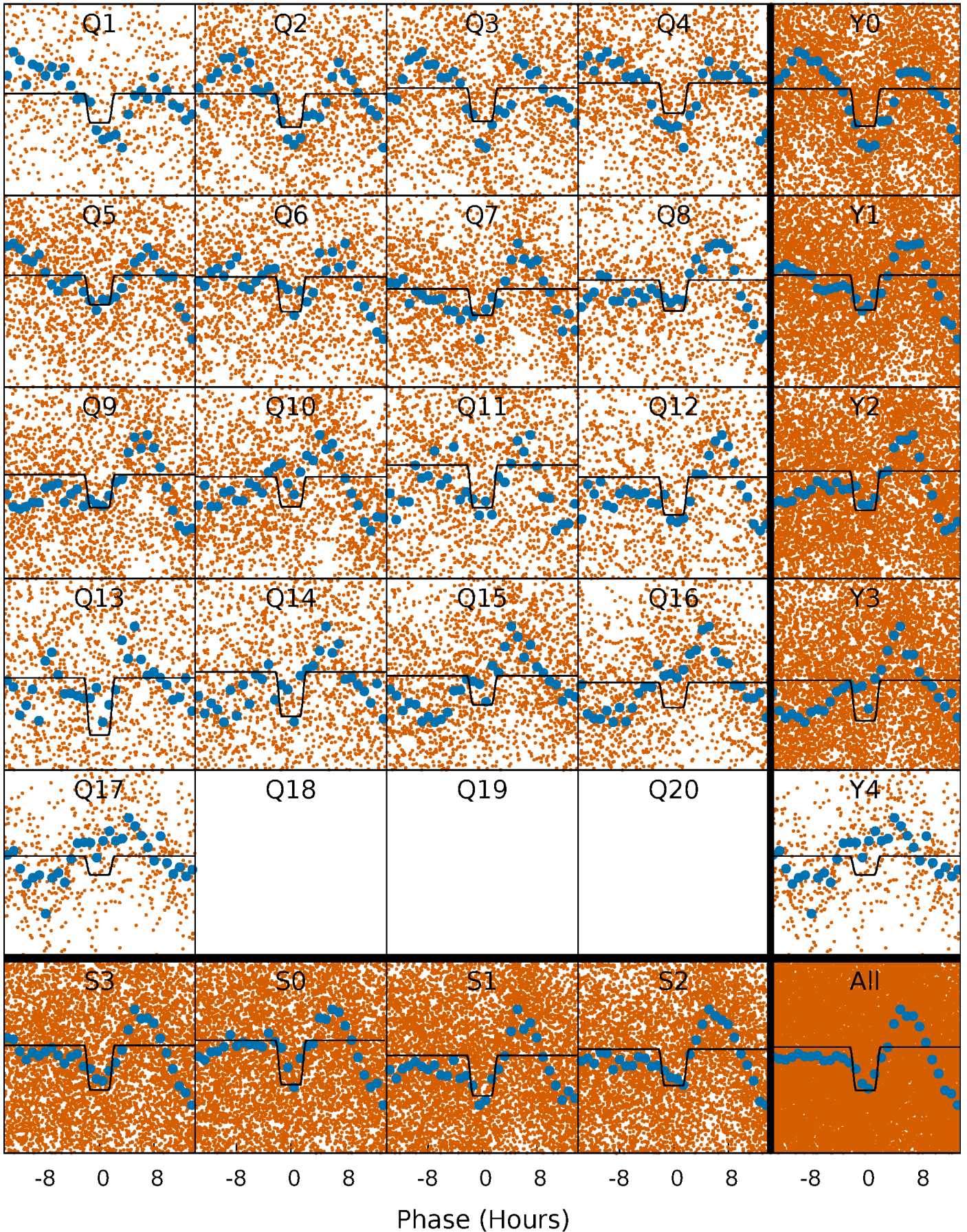
# DV Quarter-Phased Transit Curves

TCE 005984278-01 P= 2.251677 Days  $T_0=132.484588$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 005984278-01 P= 2.251673 Days  $T_0=132.456274$  (BKJD)

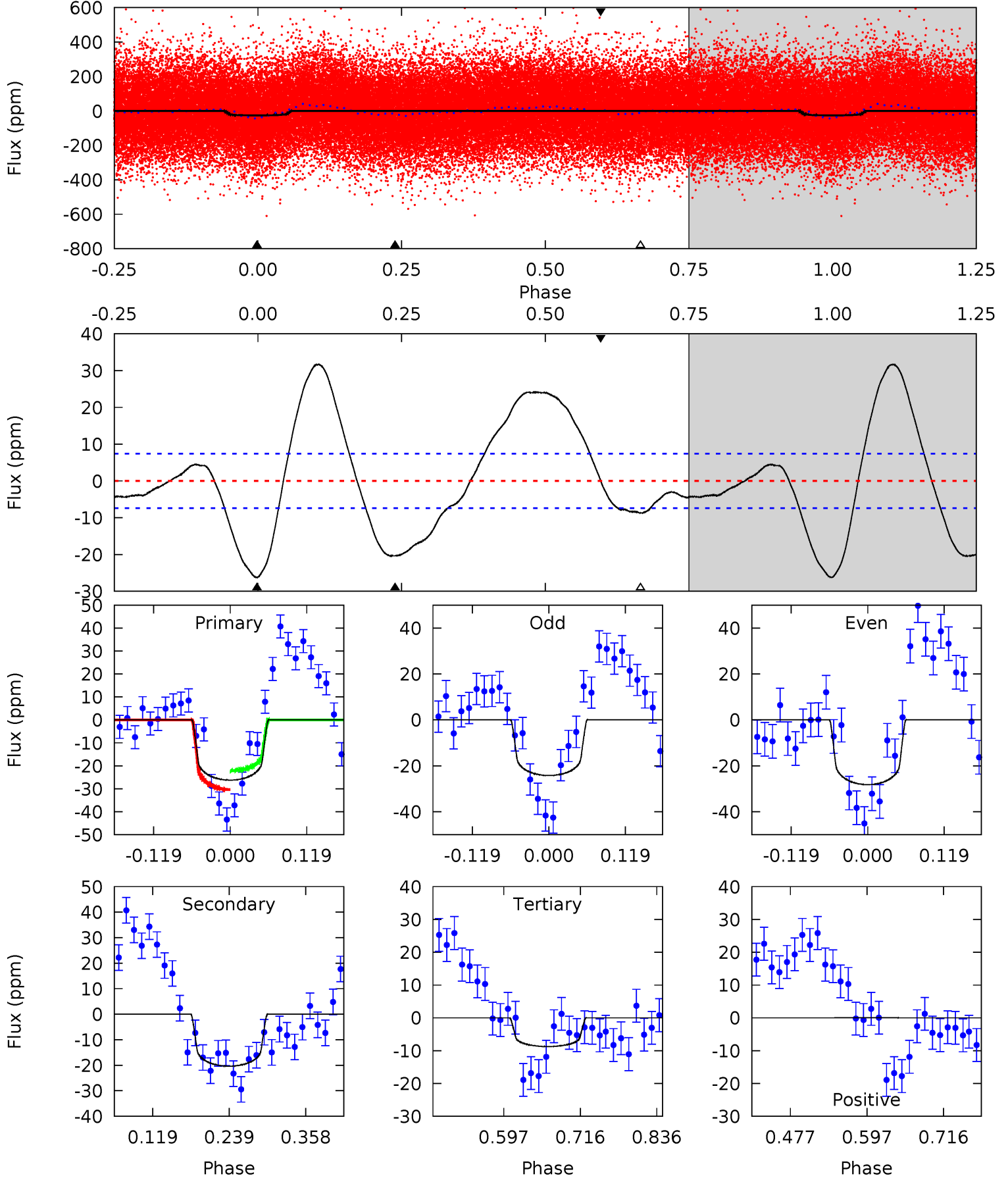




# DV Model-Shift Uniqueness Test

005984278-01, P = 2.251677 Days, E = 130.232911 Days

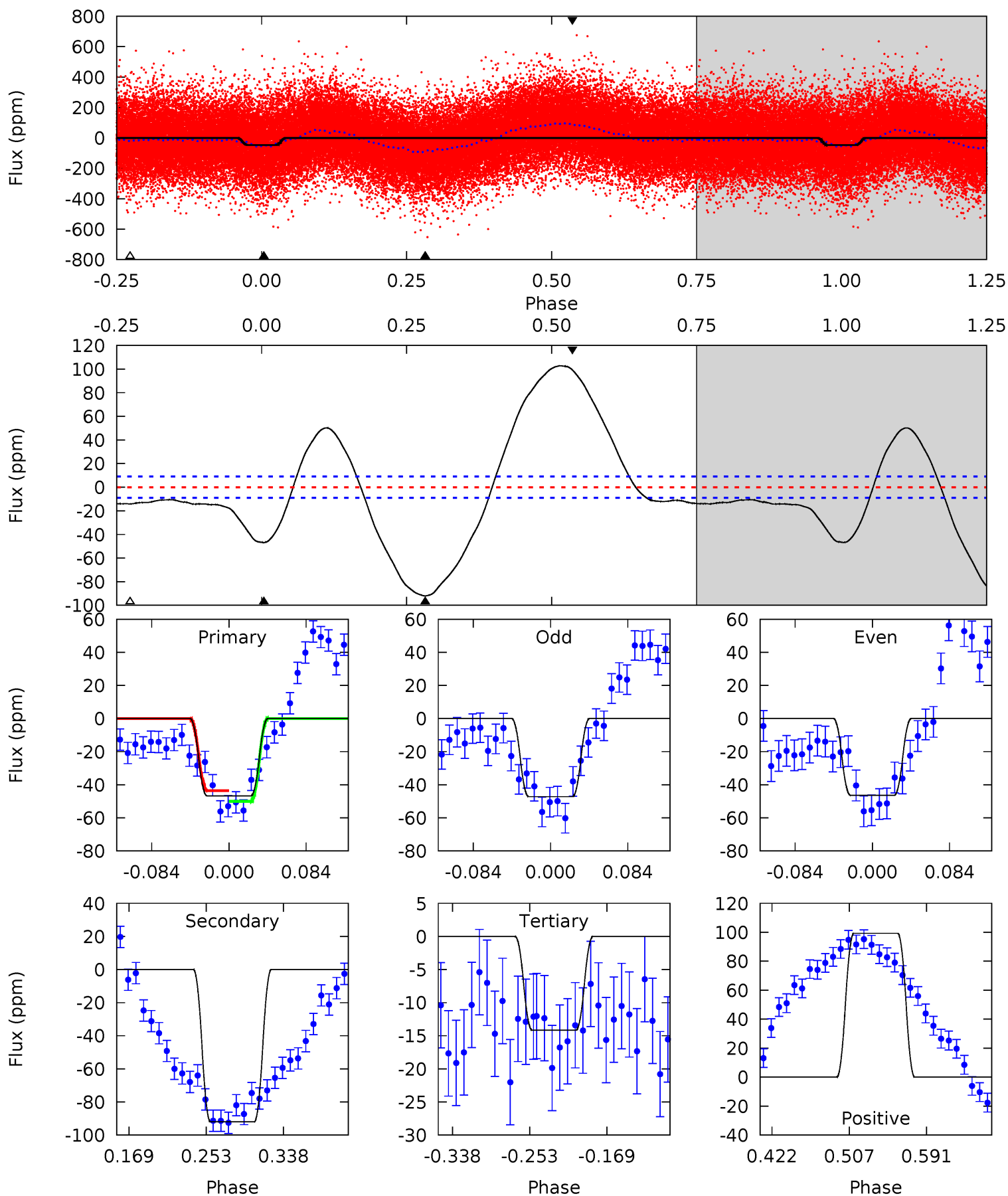
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.0	12.5	5.35	0.02	4.53	1.56	6.86	10.7	16.0	7.11	12.4	1.21	0.89	0.55	2.51



# Alt Model-Shift Uniqueness Test

005984278-01, P = 2.251673 Days, E = 130.204601 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
23.8	46.9	7.21	50.6	4.60	1.73	21.1	16.6	-26.8	39.7	-3.69	0.21	0.99	0.53	1.67





### Stellar Parameters For KIC 005984278

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6363^{+173}_{-173}$	$3.508^{+0.384}_{-0.096}$	$-0.300^{+0.350}_{-0.300}$	$3.722^{+0.545}_{-1.525}$	$1.628^{+0.193}_{-0.419}$	$0.044^{+0.146}_{-0.014}$
	+3%/-3%	+11%/-3%	+117%/-100%	+15%/-41%	+12%/-26%	+329%/-31%
Source	PHO1	FLK73	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 005984278-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-20 \pm 2$	$2.22^{+0.64}_{-0.63}$	$3731^{+217}_{-386}$	$5444^{+814}_{-519}$	$3.486^{+3.068}_{-1.294}$
Alt.	$-92 \pm 2$	$2.91^{+0.71}_{-0.72}$	$3730^{+236}_{-402}$	$7136^{+808}_{-656}$	$9.468^{+6.762}_{-3.351}$

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

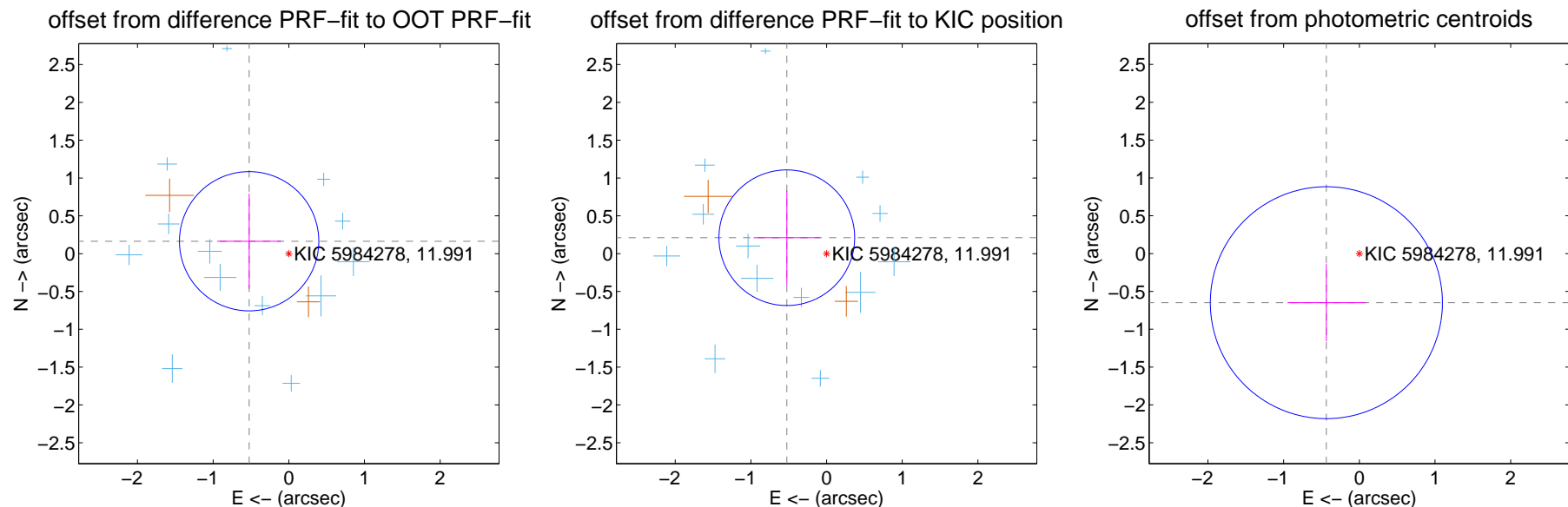
## DV Centroid Data

Supplemental centroid analysis for 005984278-01. **Kepler magnitude: 11.99.** Transit SNR 10.33

There are 13 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

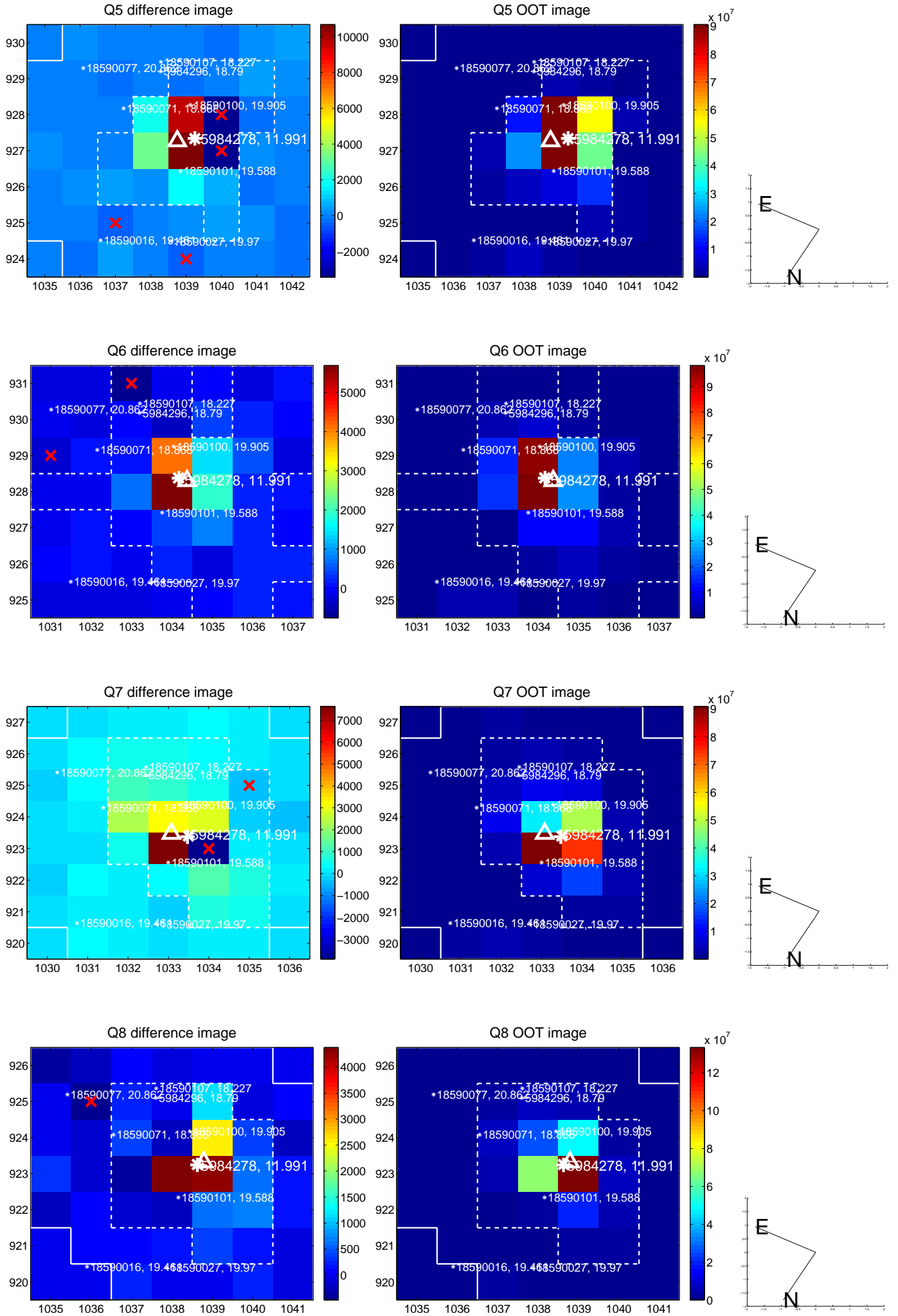
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.549 \pm 0.307$	1.79	$0.524 \pm 0.422$	$0.164 \pm 0.627$
PRF-fit source offset from KIC position	$0.566 \pm 0.299$	1.89	$0.526 \pm 0.438$	$0.211 \pm 0.622$
photometric centroid source offset	$0.78 \pm 0.51$	1.53	$0.44 \pm 0.51$	$-0.65 \pm 0.51$



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.

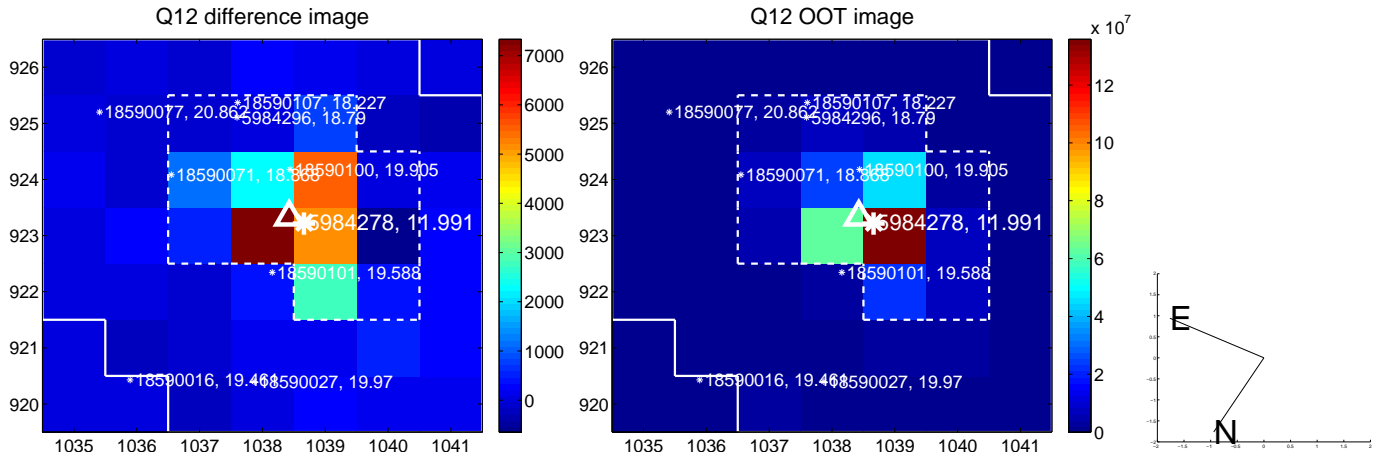
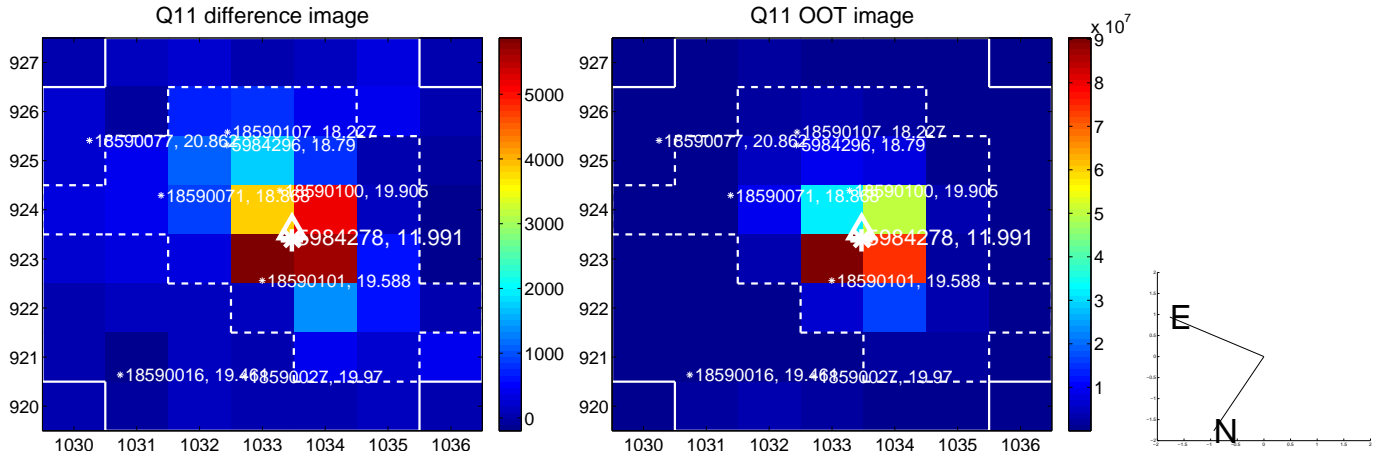
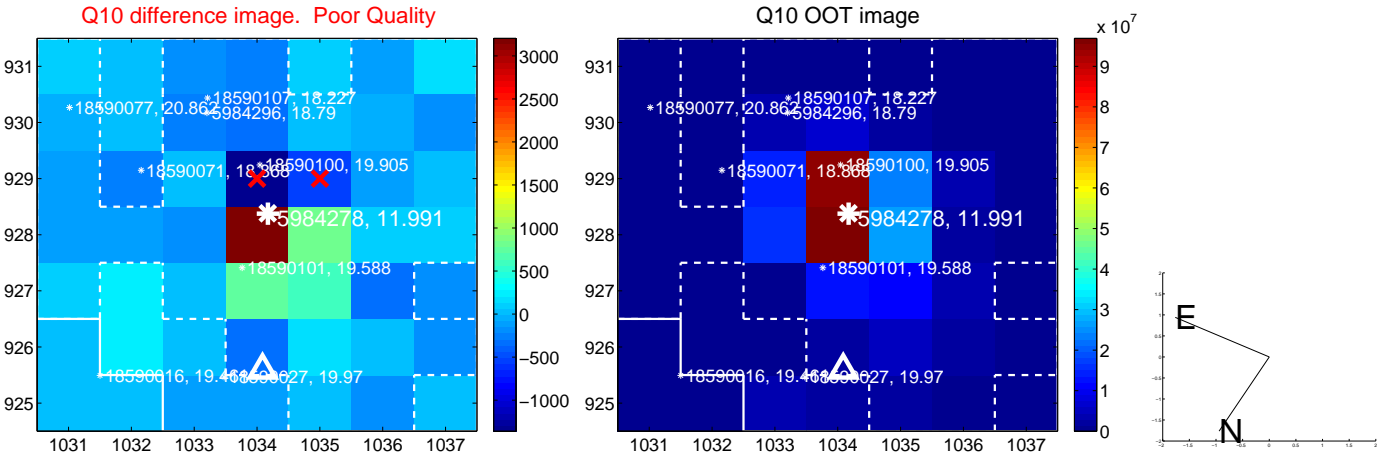
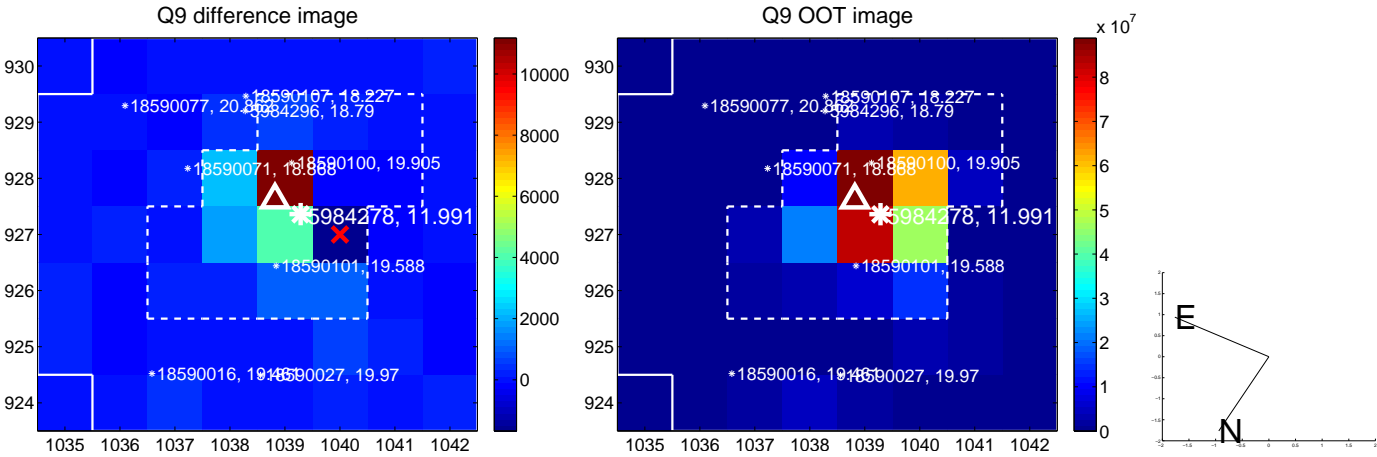


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

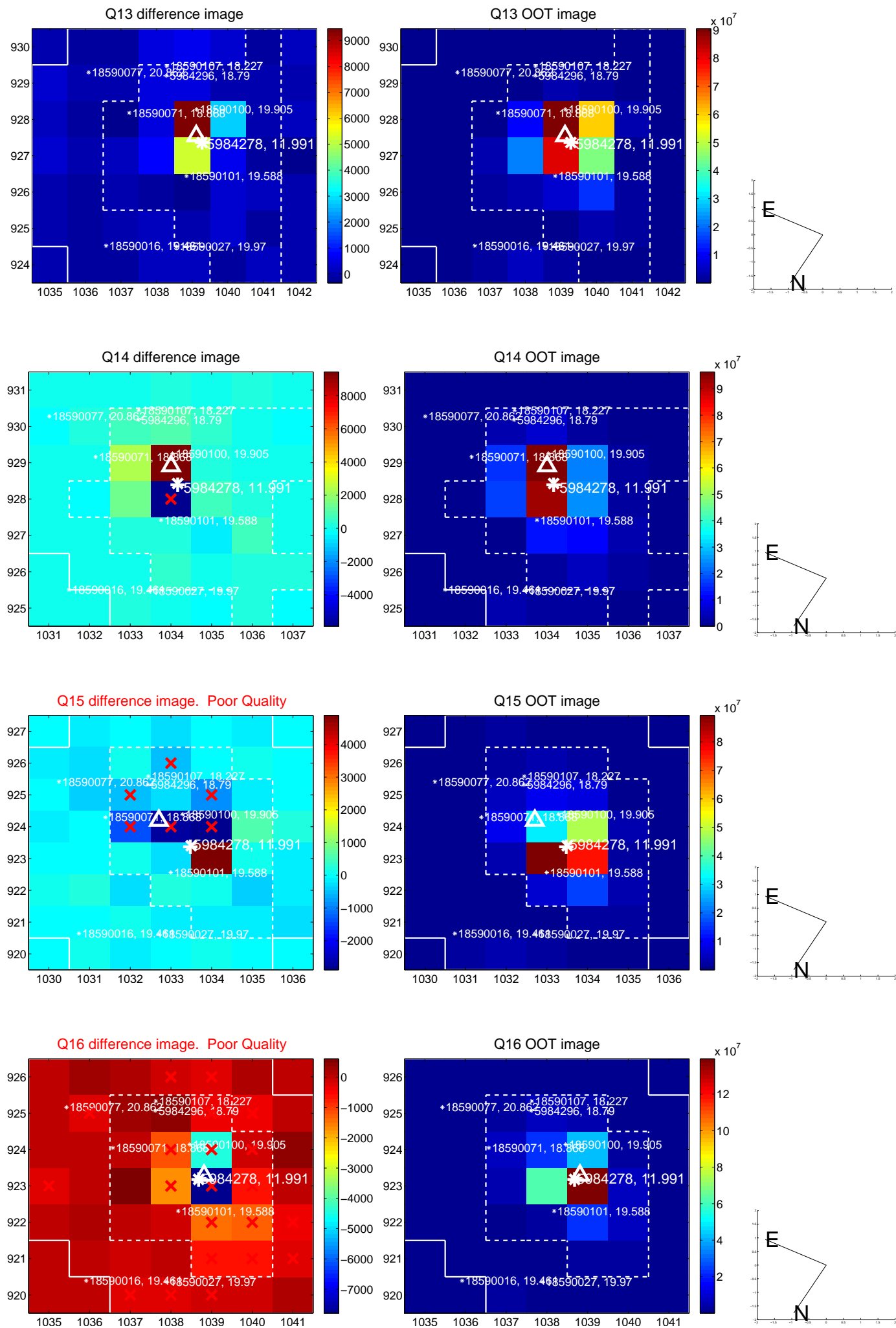




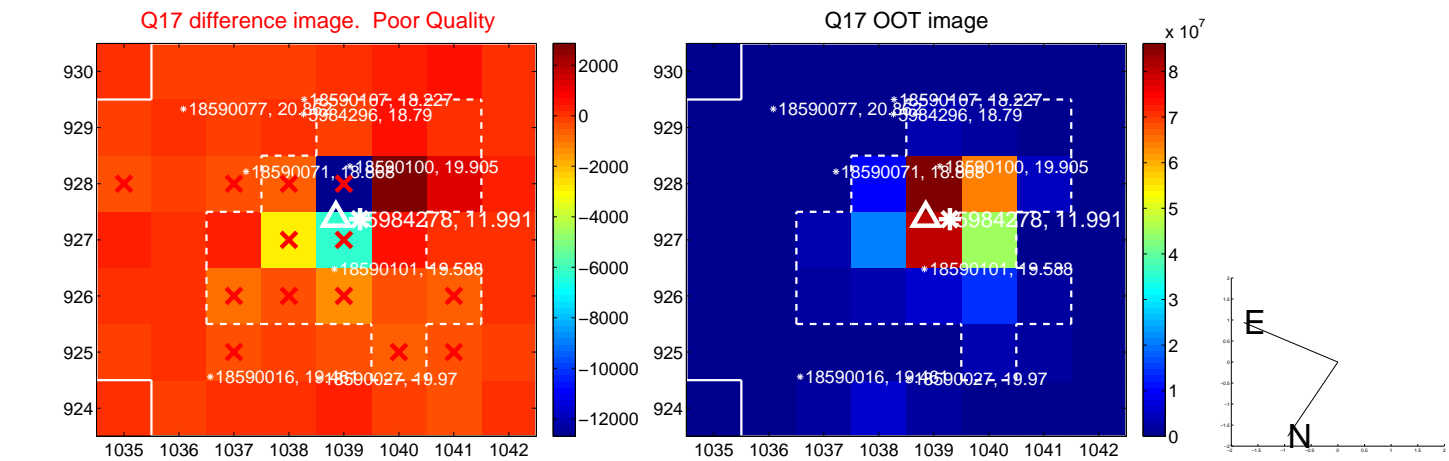
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



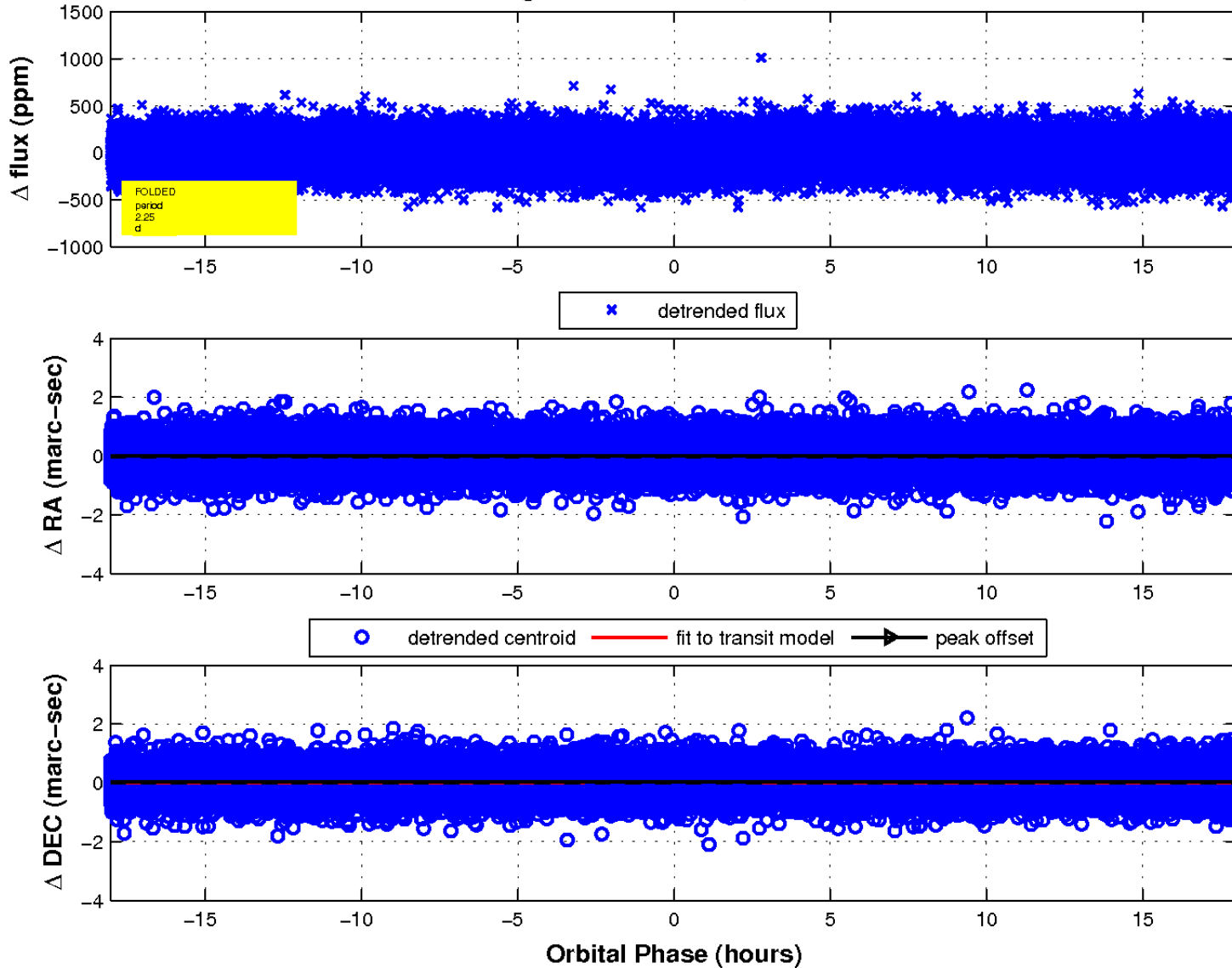
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

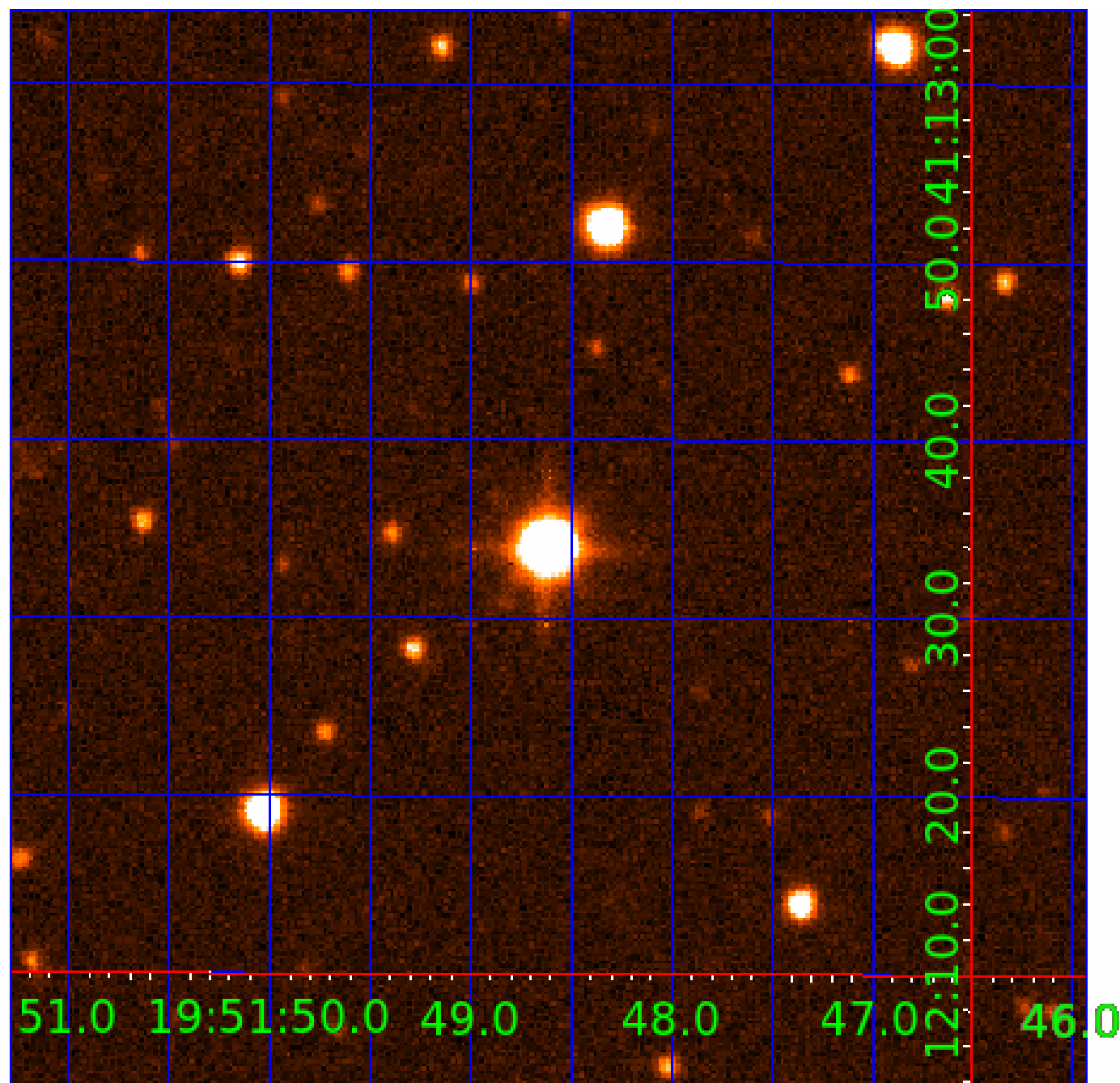


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 005984278

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005984278-01	OBS	No	2.251677	132.484588	31.6	6.012	10.3	10.3	3.72	6363	2.42	13003.24
005984278-02	OBS	No	532.526754	215.248019	252.8	7.355	9.9	6.5	3.72	6363	6.43	8.89

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005984278-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT
005984278-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS

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

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

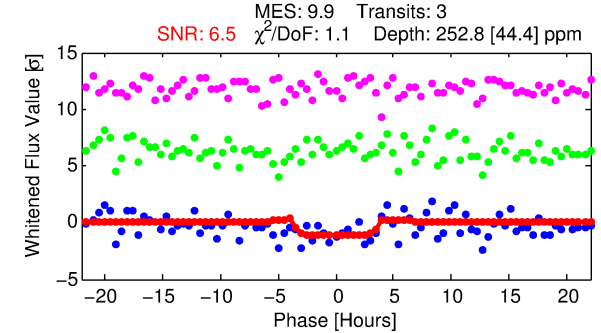
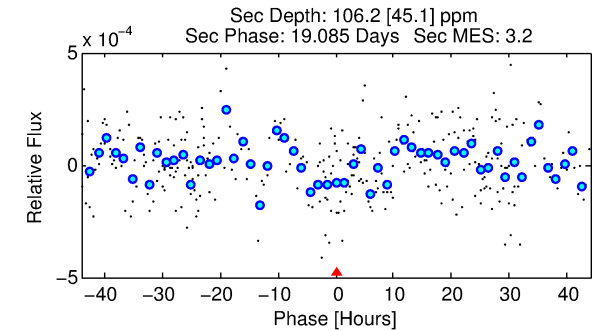
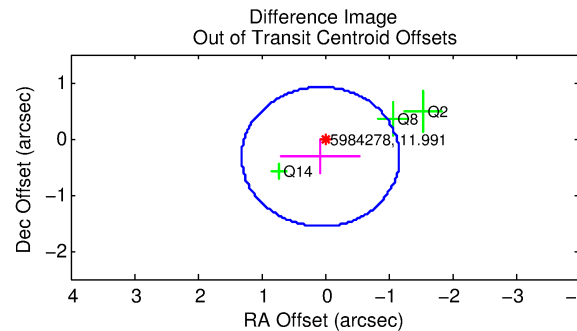
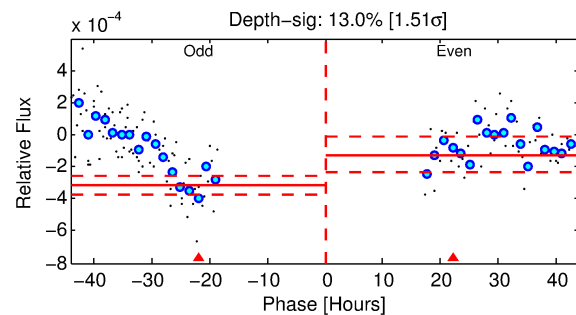
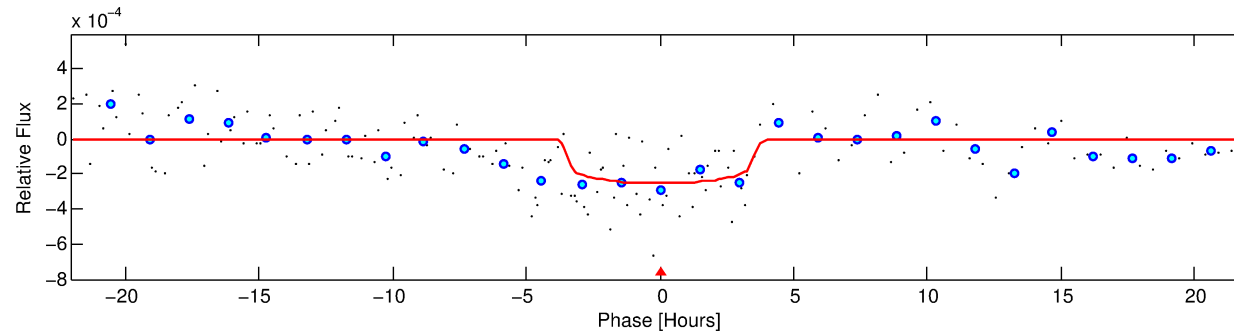
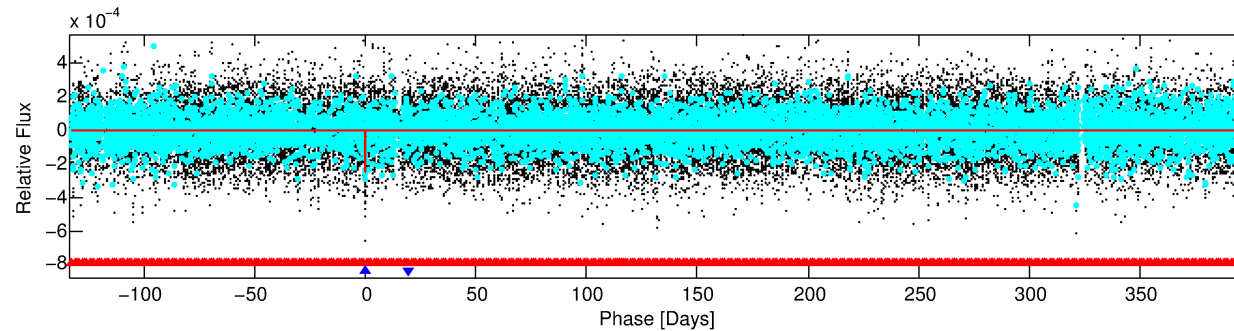
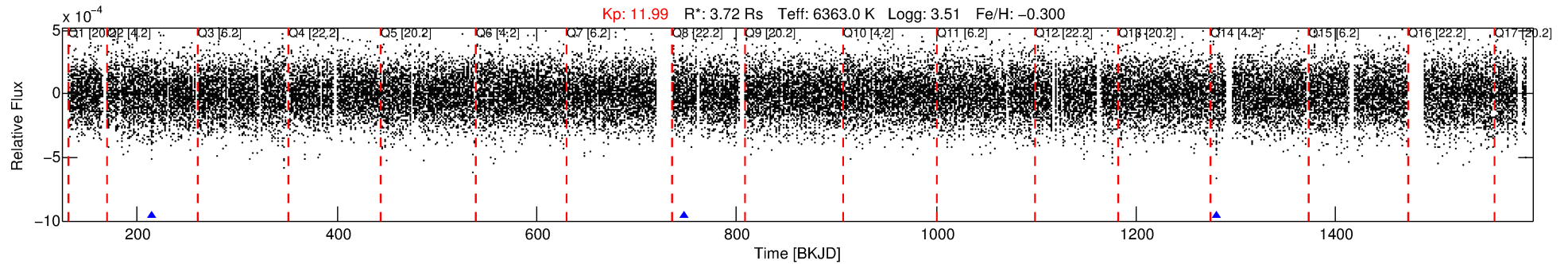
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005984278-02

No Significant Match Found

# DV One-Page Summary

KIC: 5984278 Candidate: 2 of 2 Period: 532.527 d



## DV Fit Results:

Period = 532.52675 [0.01278] d  
Epoch = 215.2480 [0.0138] BKJD  
 $R_p/R^* = 0.0158$  [0.0111]  
 $a/R^* = 375.87$  [1433.38]  
 $b = 0.76$  [2.18]  
 $\text{Seff} = 8.89$  [5.86]  
 $T_{\text{eq}} = 440$  [73] K  
 $R_p = 6.43$  [5.24]  $R_e$   
 $a = 1.5128$  [0.6079] AU  
 $A_g = 3229.31$  [5187.14] [0.62 $\sigma$ ]  
 $T_{\text{effp}} = 5132$  [1890] K [2.48 $\sigma$ ]

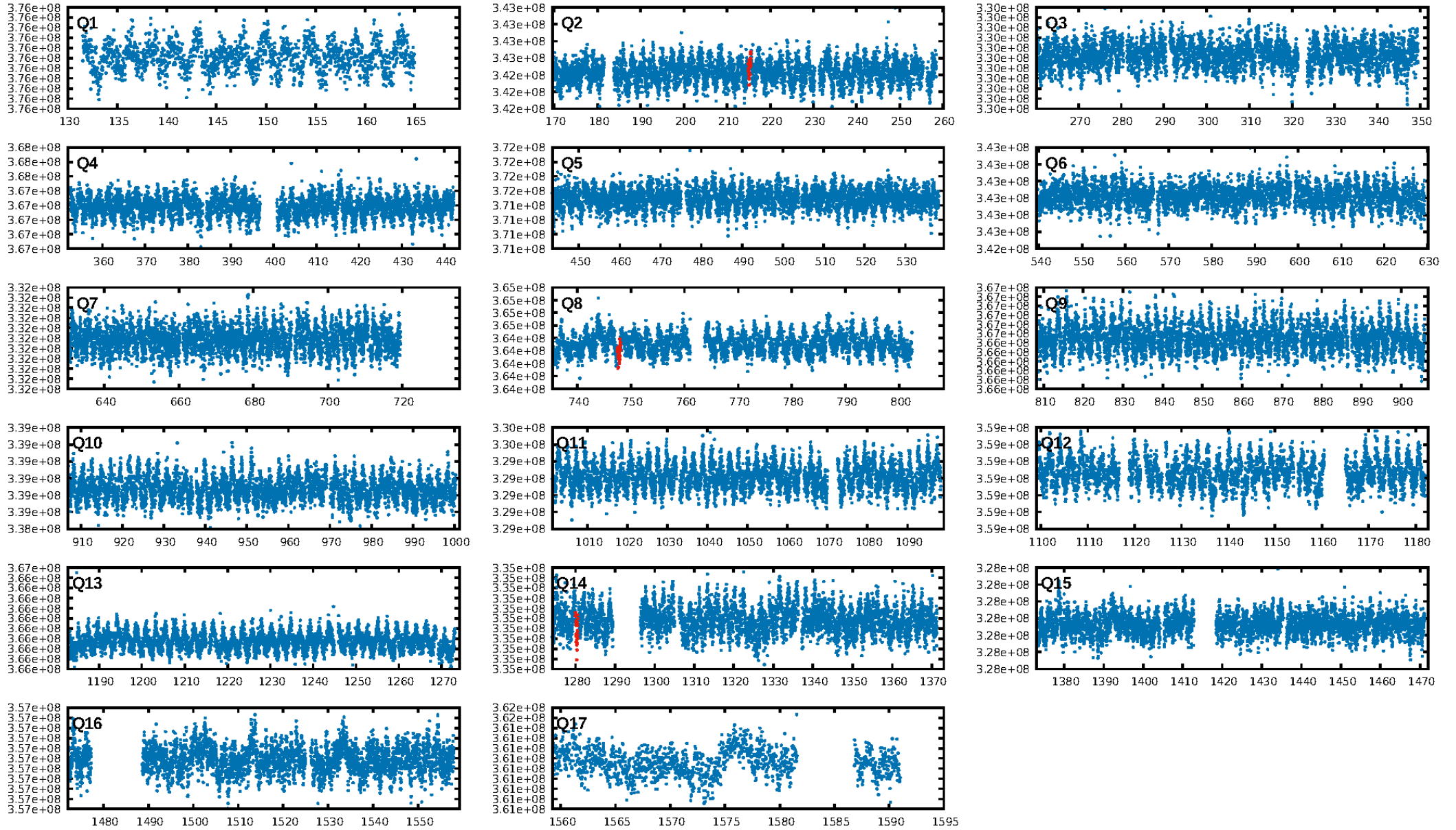
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [1339.74 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 1.9%  
ModelChiSquareGof-sig: 86.7%  
Bootstrap-pfa: 2.05e-16  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 0.8393  
Centroid-sig: 47.6%  
Centroid-so: 0.964 arcsec [0.99 $\sigma$ ]  
OotOffset-rm: 0.331 arcsec [0.80 $\sigma$ ]  
OotOffset-st: 2/0/1/0 [3]  
KicOffset-rm: 0.202 arcsec [0.60 $\sigma$ ]  
KicOffset-st: 2/0/1/0 [3]  
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DiffImageOverlap-fno: 0.00 [0/3]

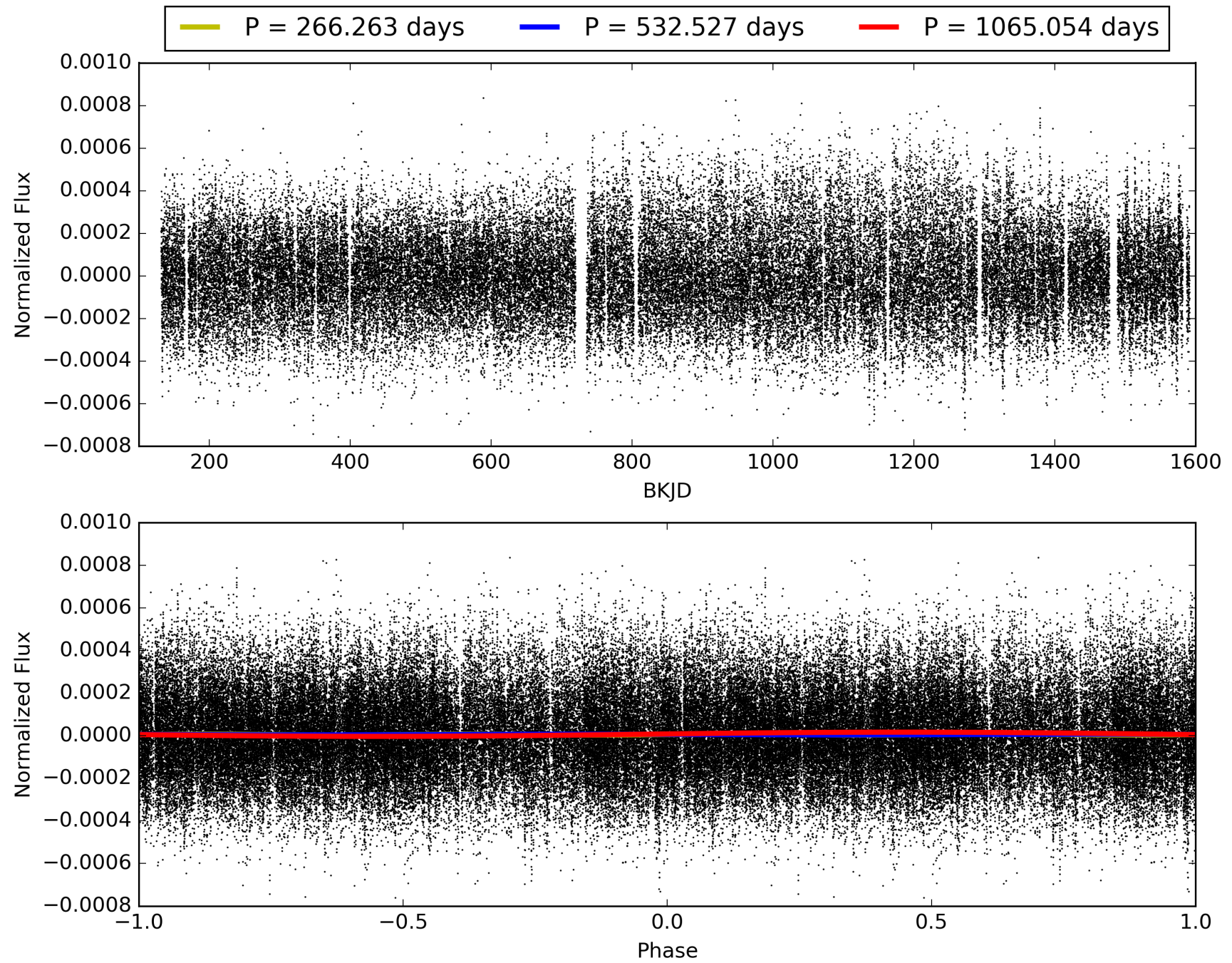
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 04:02:55 Z

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

# TCE 005984278-02, PDC Light Curves



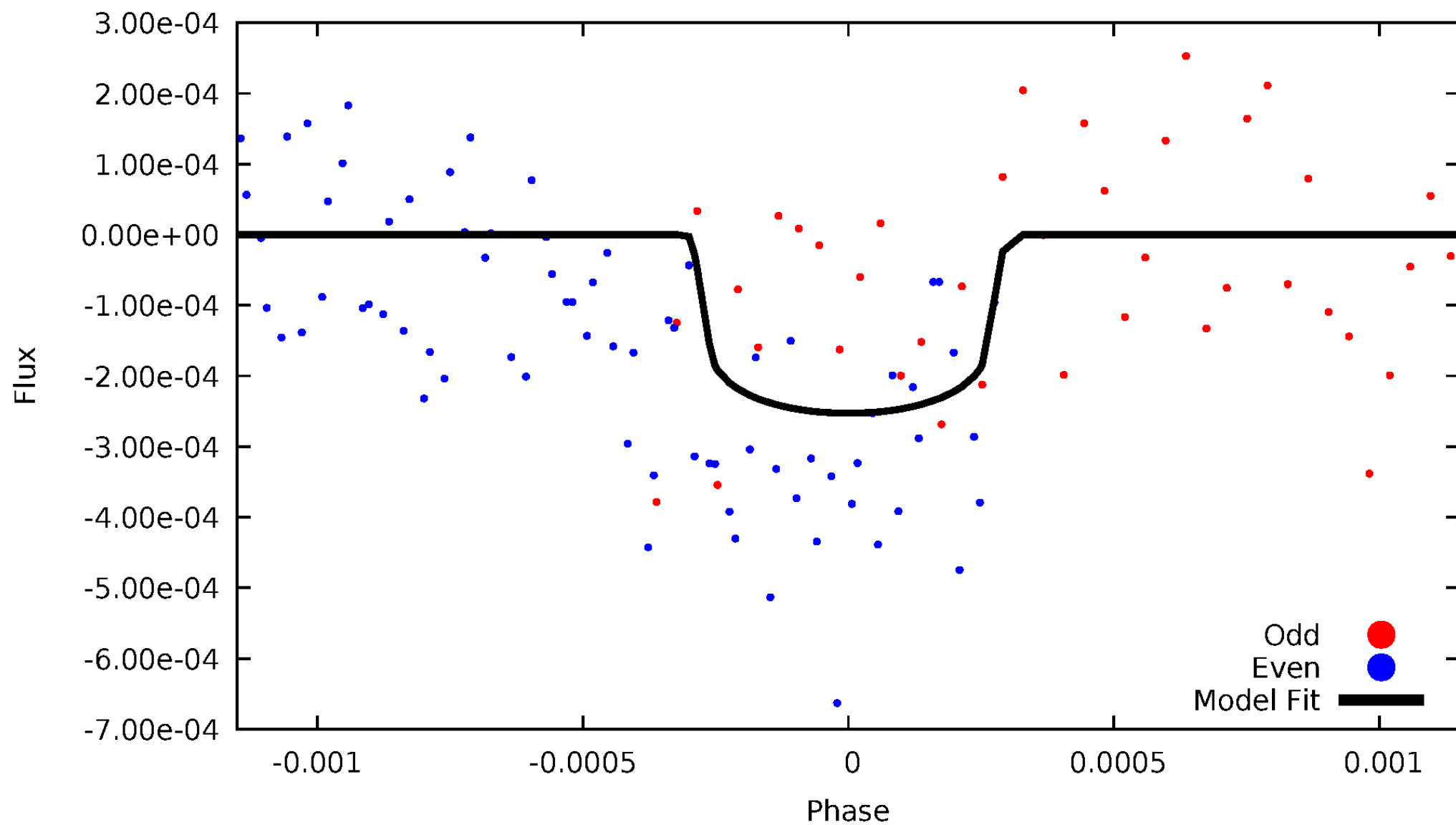
TCE 005984278-02





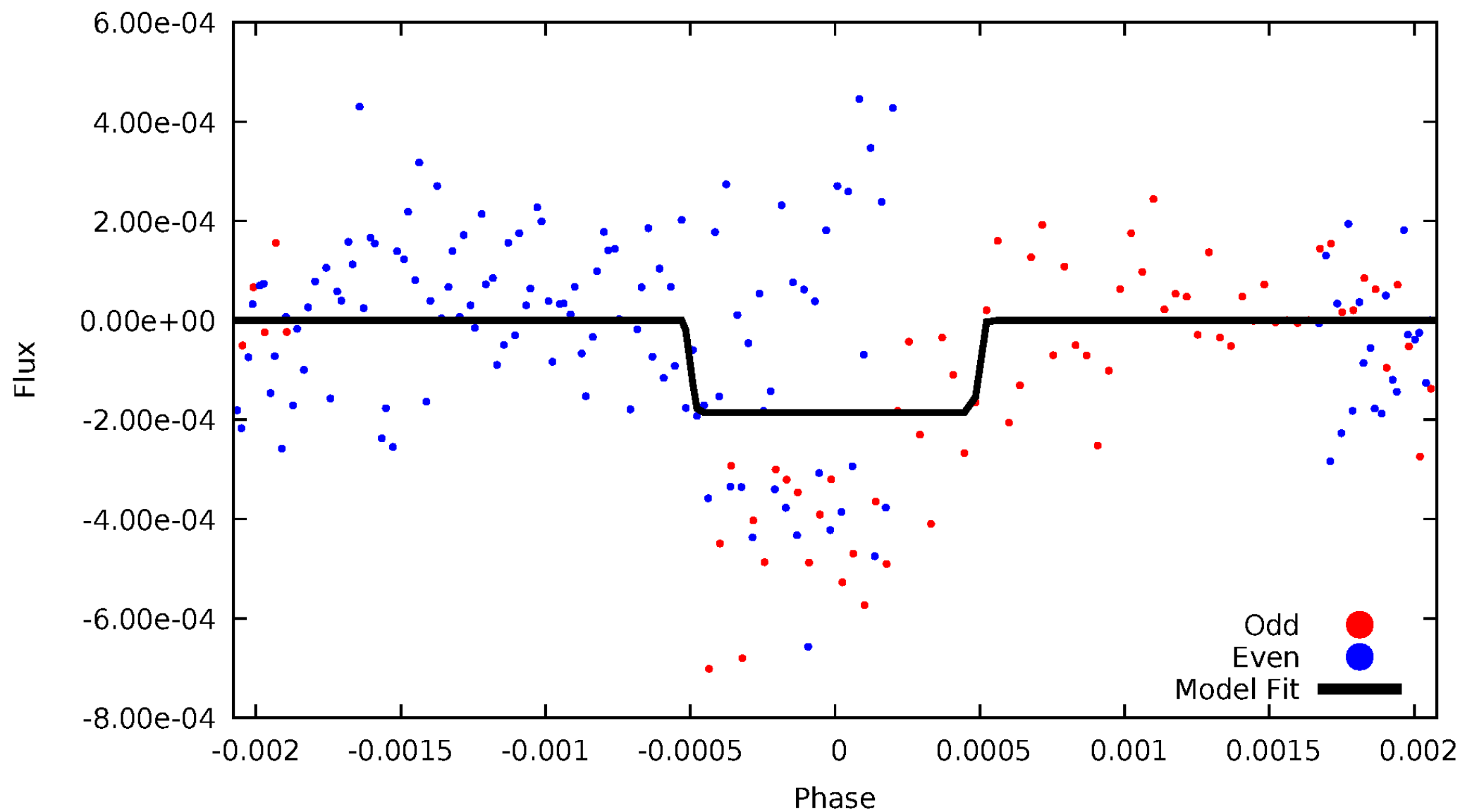
# DV Odd/Even

TCE 005984278-02



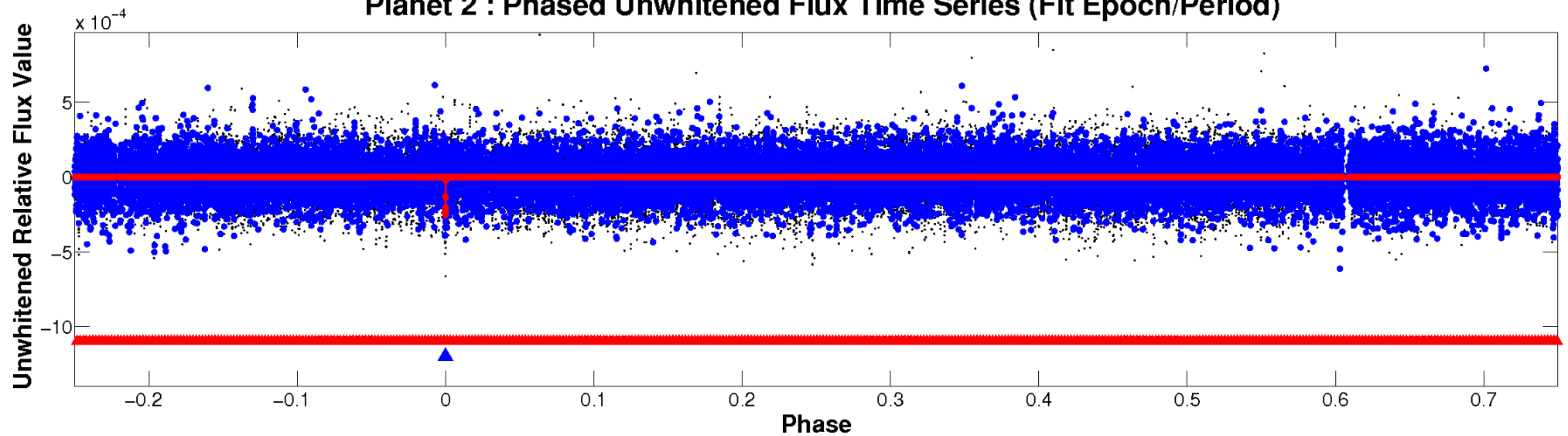
# ALT Odd/Even

TCE 005984278-02

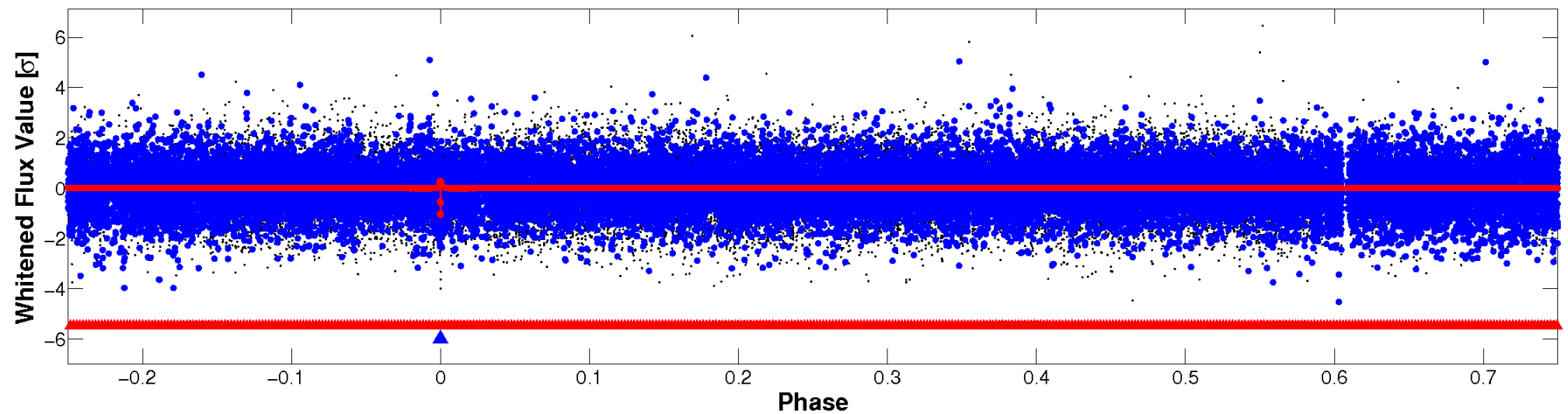


# Non-Whitened Vs. Whitened Light Curve

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

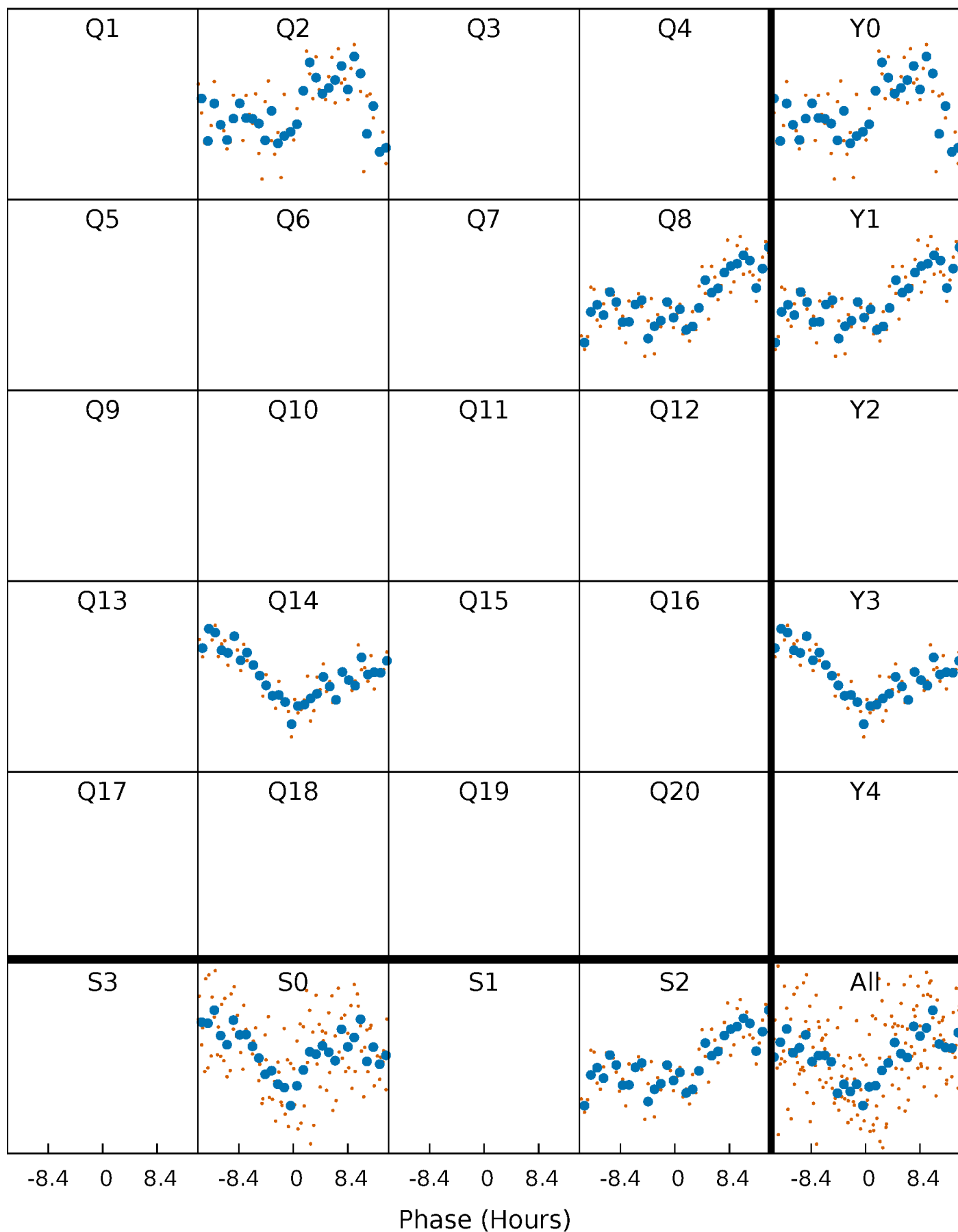


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

TCE 005984278-02     $P=532.526754$  Days     $T_0=215.248019$  (BKJD)



# DV Quarter-Phased Transit Curves

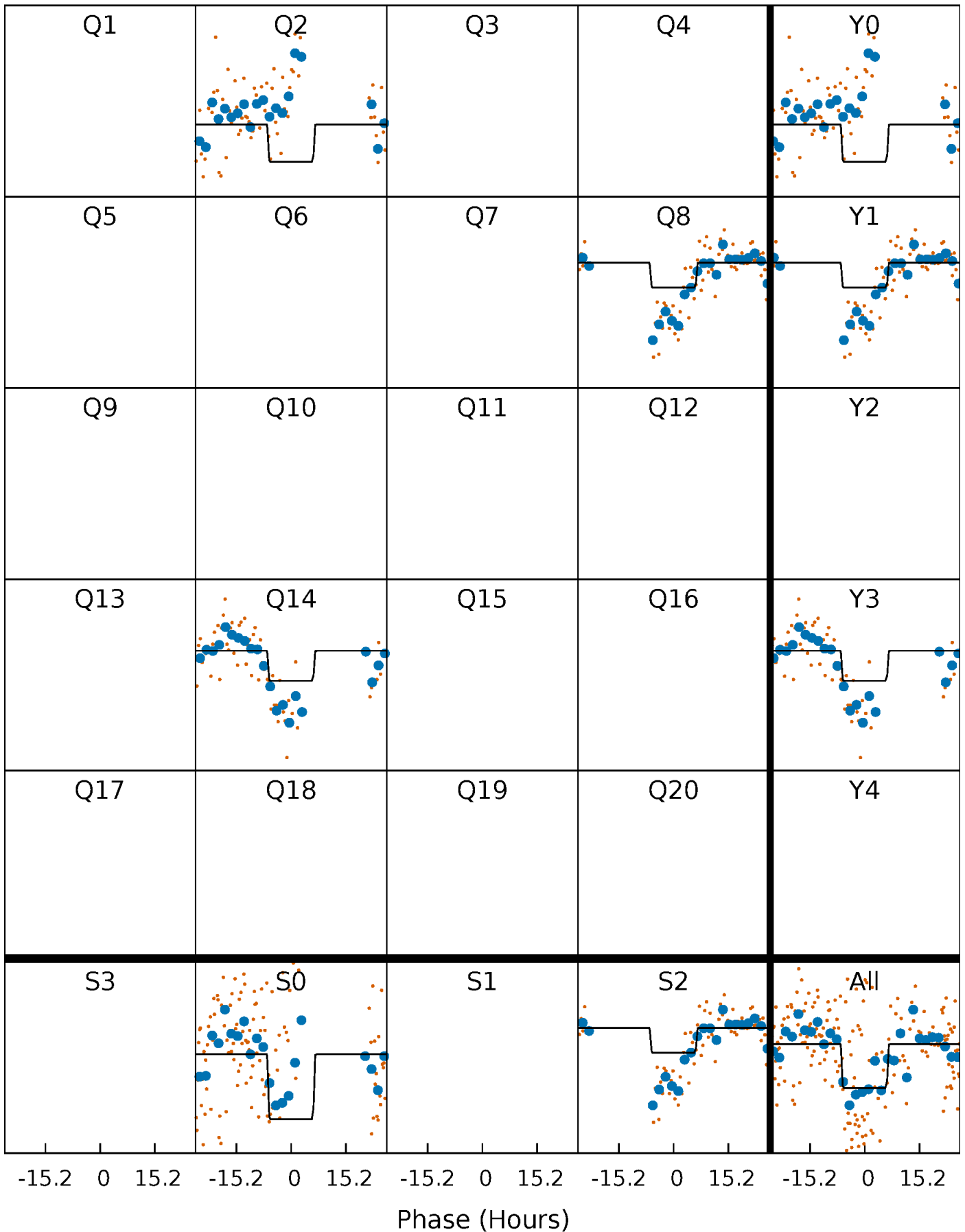
TCE 005984278-02 P=532.526754 Days  $T_0=215.248019$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

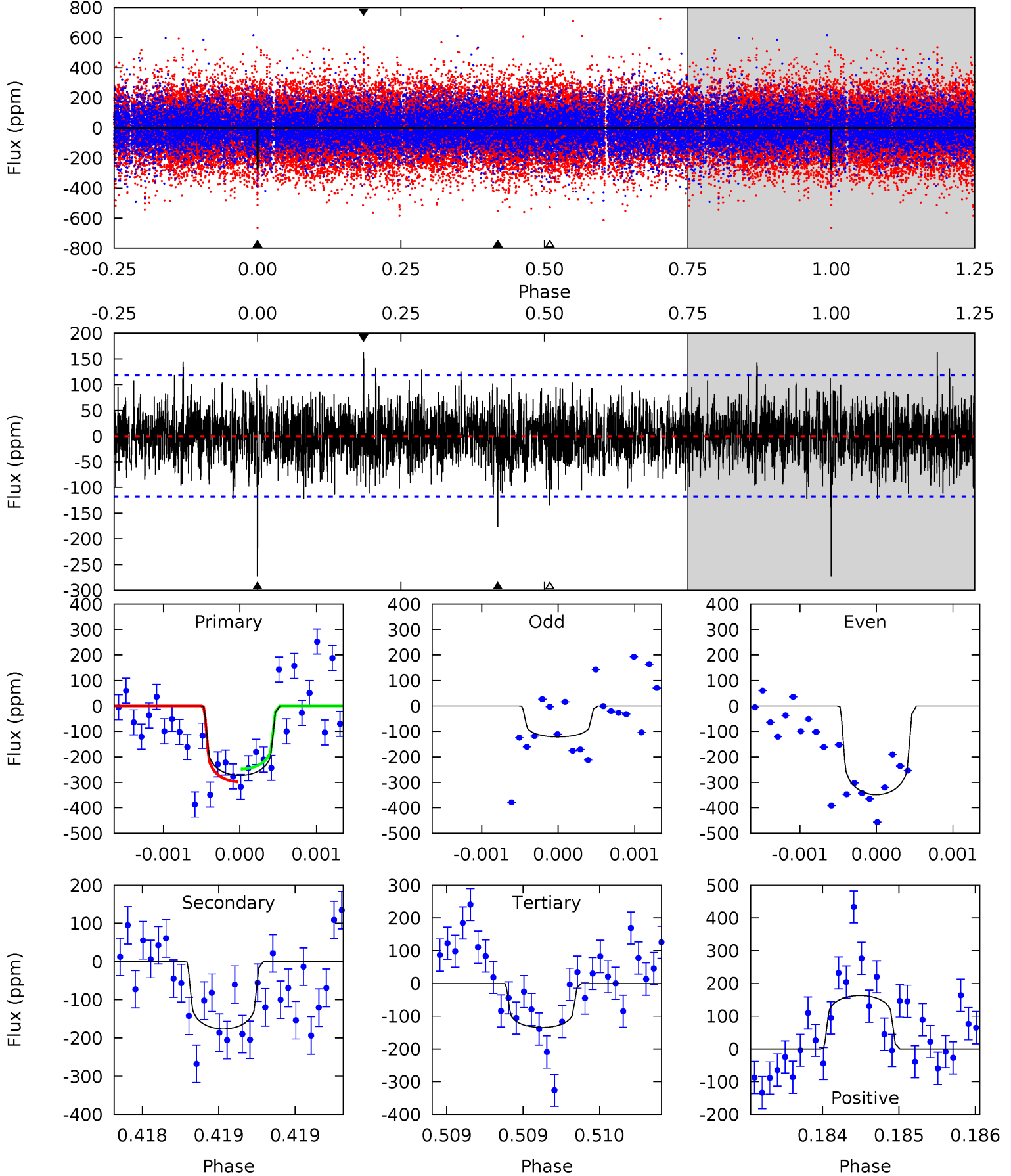
TCE 005984278-02 P=532.525818 Days  $T_0=215.288376$  (BKJD)



# DV Model-Shift Uniqueness Test

005984278-02, P = 532.526754 Days, E = 215.248019 Days

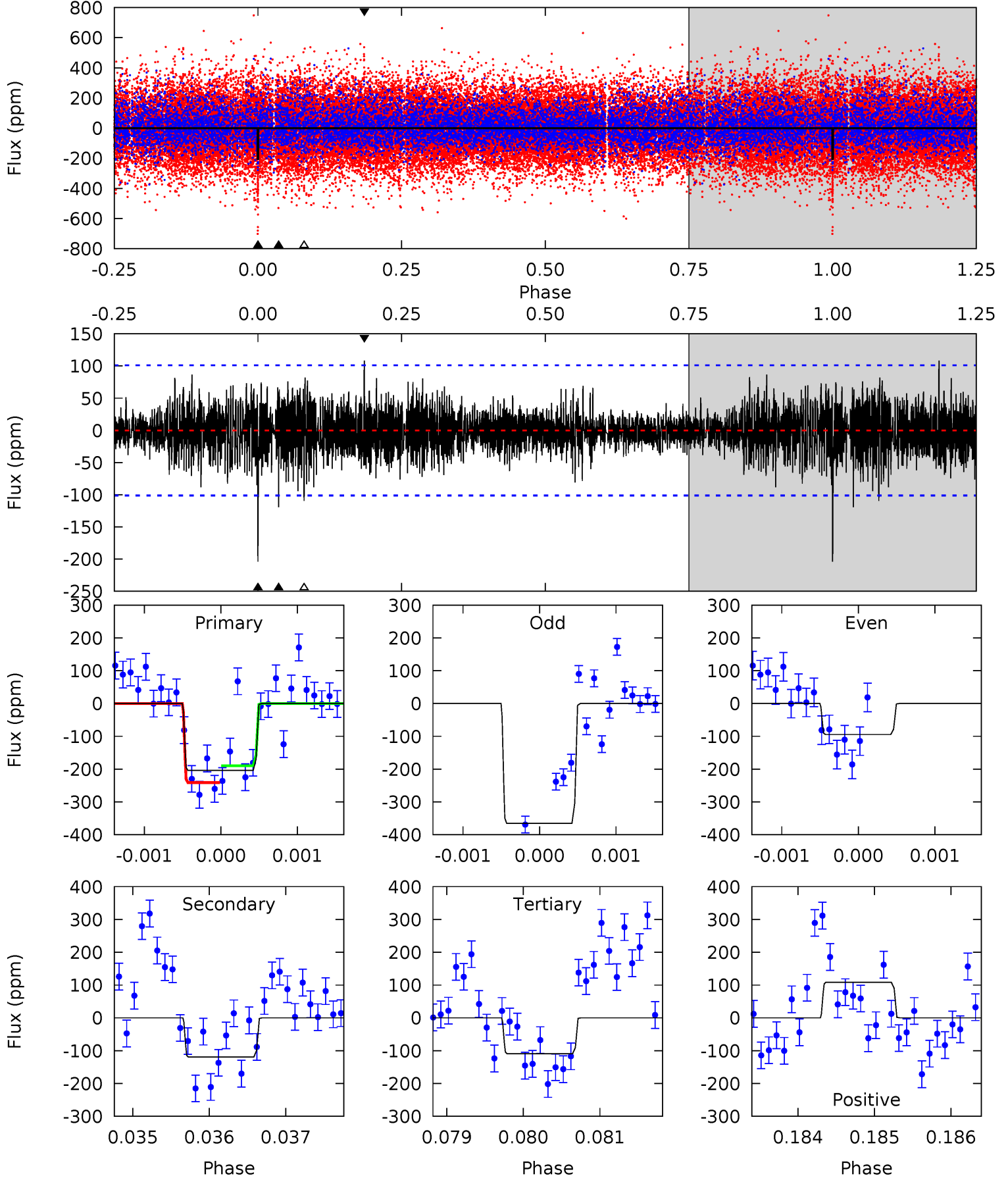
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.8	8.26	6.31	7.64	5.53	3.42	1.77	6.48	5.14	1.95	0.62	5.09	0.91	0.37	1.17



# Alt Model-Shift Uniqueness Test

005984278-02, P = 532.525818 Days, E = 215.288376 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
11.0	6.42	5.89	5.85	5.44	3.28	1.43	5.09	5.14	0.53	0.58	7.14	0.55	0.35	1.32



### Stellar Parameters For KIC 005984278

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6363^{+173}_{-173}$	$3.508^{+0.384}_{-0.096}$	$-0.300^{+0.350}_{-0.300}$	$3.722^{+0.545}_{-1.525}$	$1.628^{+0.193}_{-0.419}$	$0.044^{+0.146}_{-0.014}$
	+3%/-3%	+11%/-3%	+117%/-100%	+15%/-41%	+12%/-26%	+329%/-31%
Source	PHO1	FLK73	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 005984278-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-176 \pm 21$	$6.12^{+4.37}_{-3.42}$	$603^{+35}_{-62}$	$5674^{+3269}_{-1145}$	$5936^{+24605}_{-3992}$
Alt.	$-119 \pm 19$	$5.34^{+4.65}_{-3.25}$	$602^{+38}_{-63}$	$5513^{+4017}_{-1144}$	$5247^{+28178}_{-3785}$

$T_{max}$  = 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

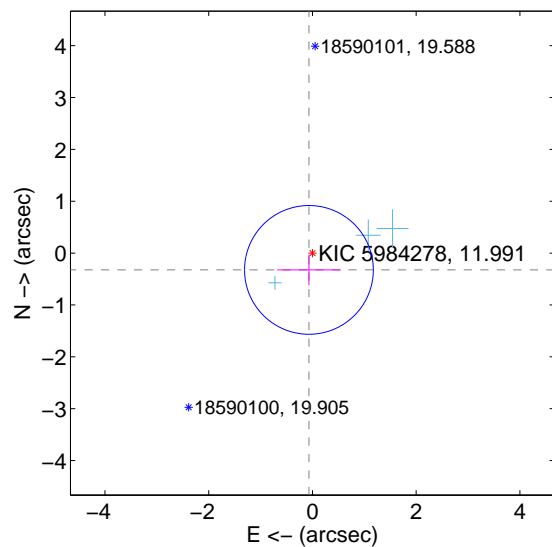
Supplemental centroid analysis for 005984278-02. **Kepler magnitude: 11.99.** Transit SNR 6.52

**There are 3 quarters with good PRF difference image offsets**

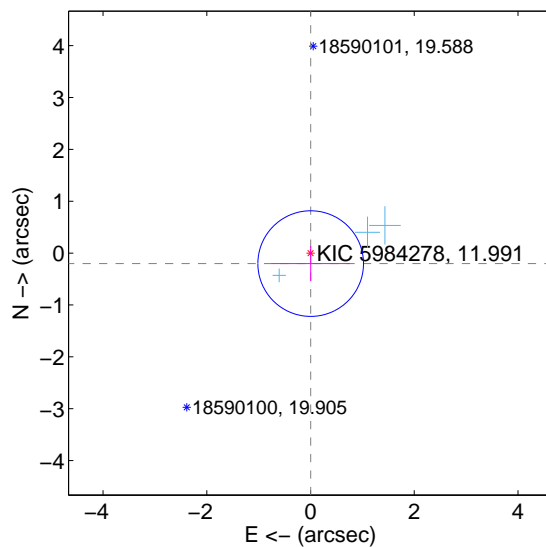
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.331 \pm 0.414$	0.80	$0.068 \pm 0.611$	$-0.324 \pm 0.298$
PRF-fit source offset from KIC position	$0.202 \pm 0.339$	0.60	$-0.003 \pm 0.757$	$-0.202 \pm 0.339$
photometric centroid source offset	$0.96 \pm 0.97$	0.99	$-0.91 \pm 0.98$	$0.31 \pm 0.93$

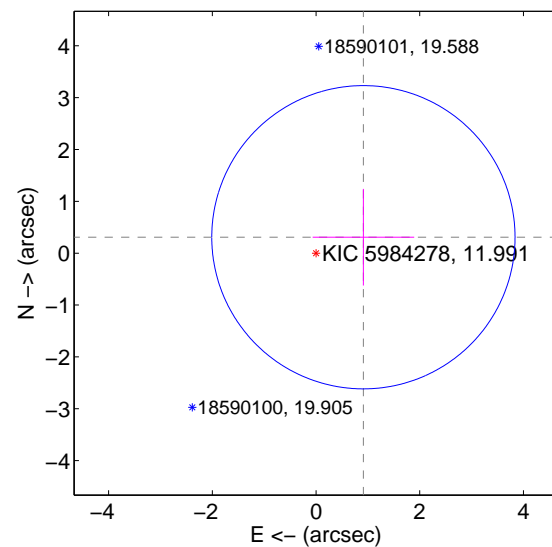
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



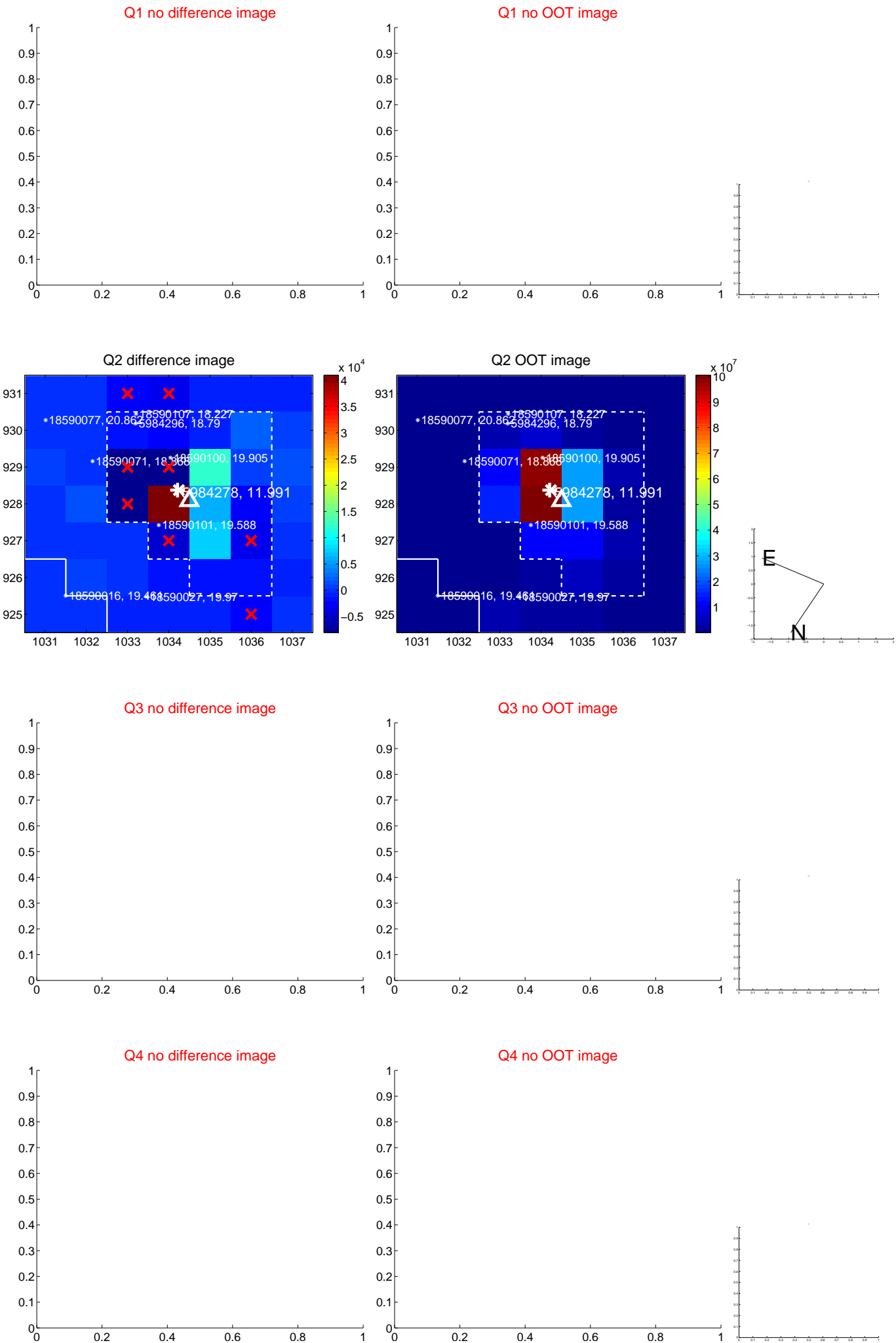
offset from photometric centroids



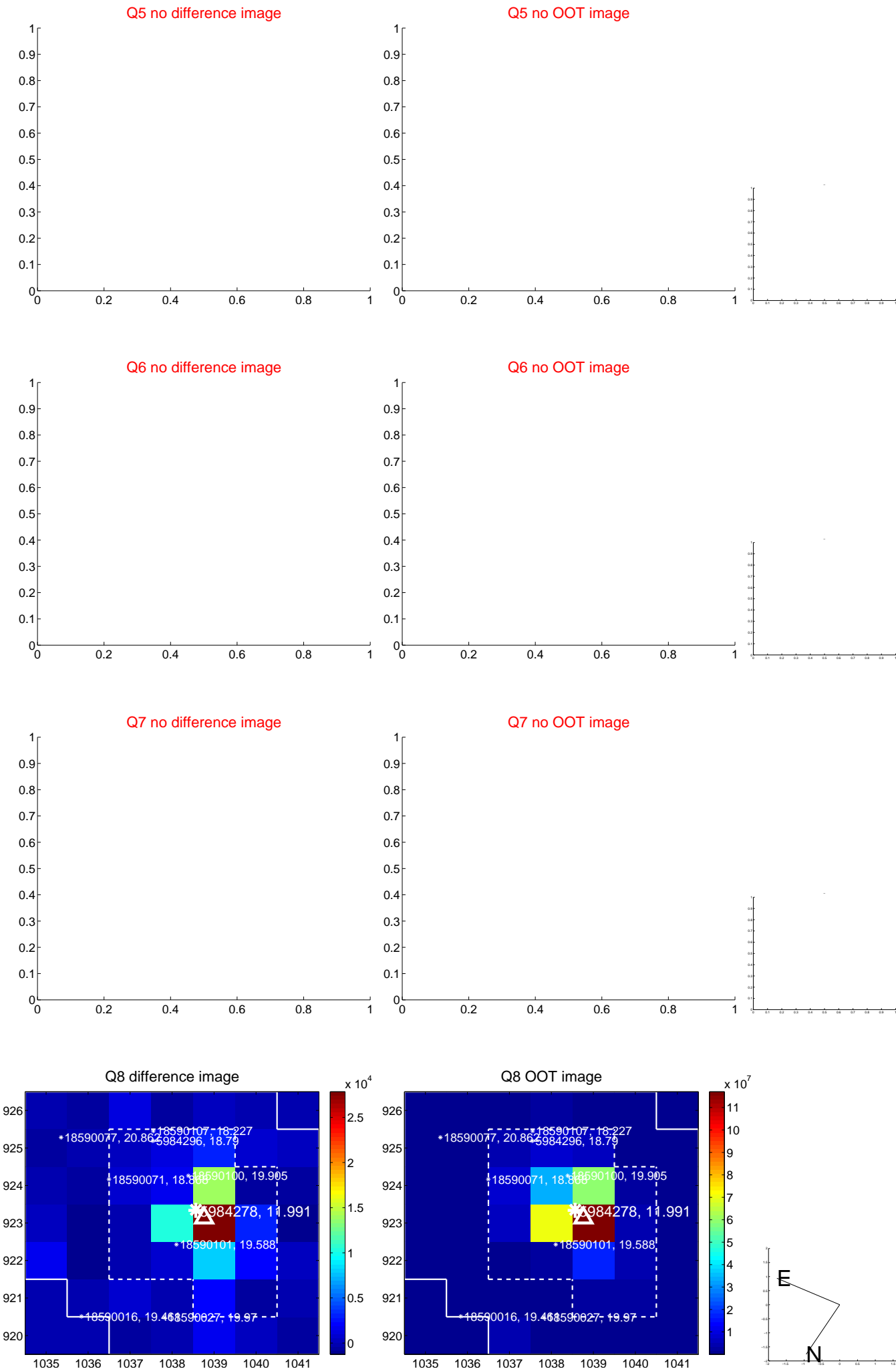
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

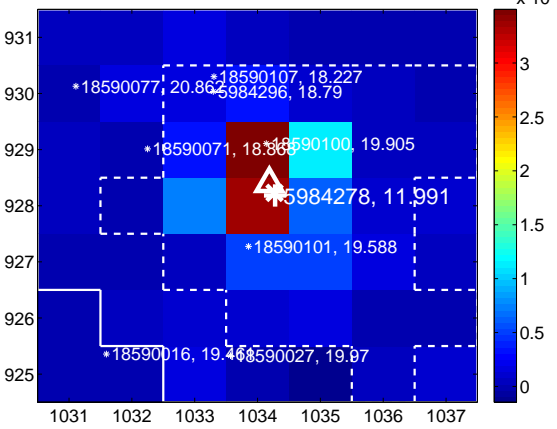
Q13 no difference image



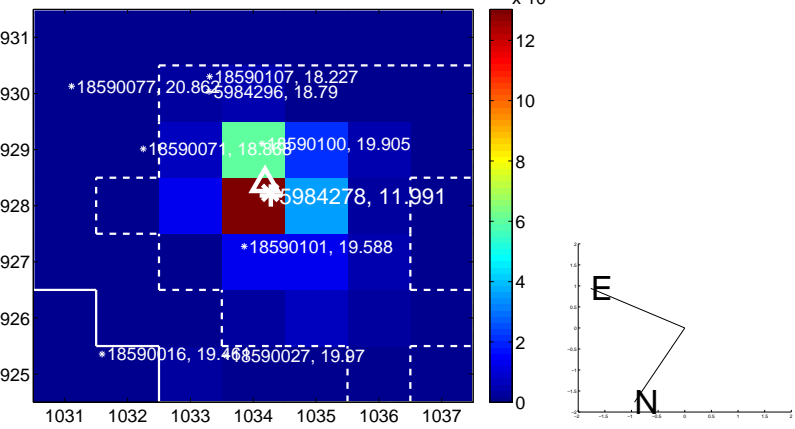
Q13 no OOT image



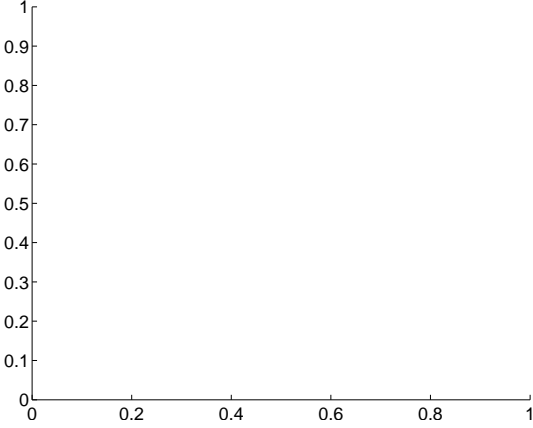
Q14 difference image



Q14 OOT image



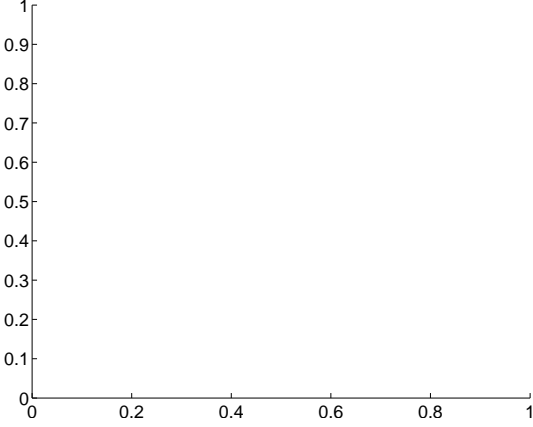
Q15 no difference image



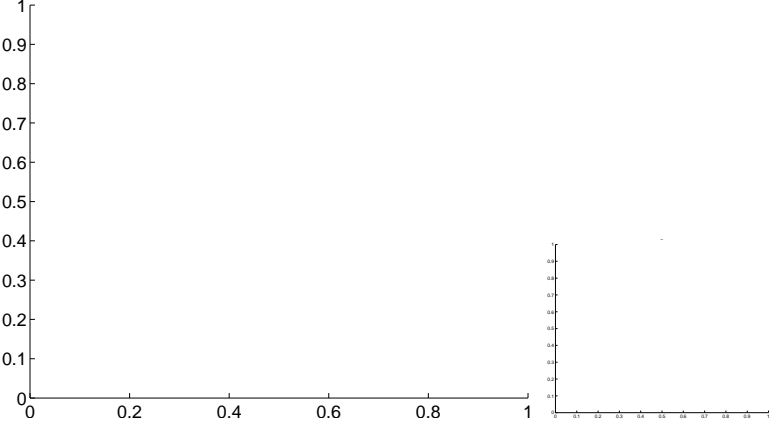
Q15 no OOT image



Q16 no difference image

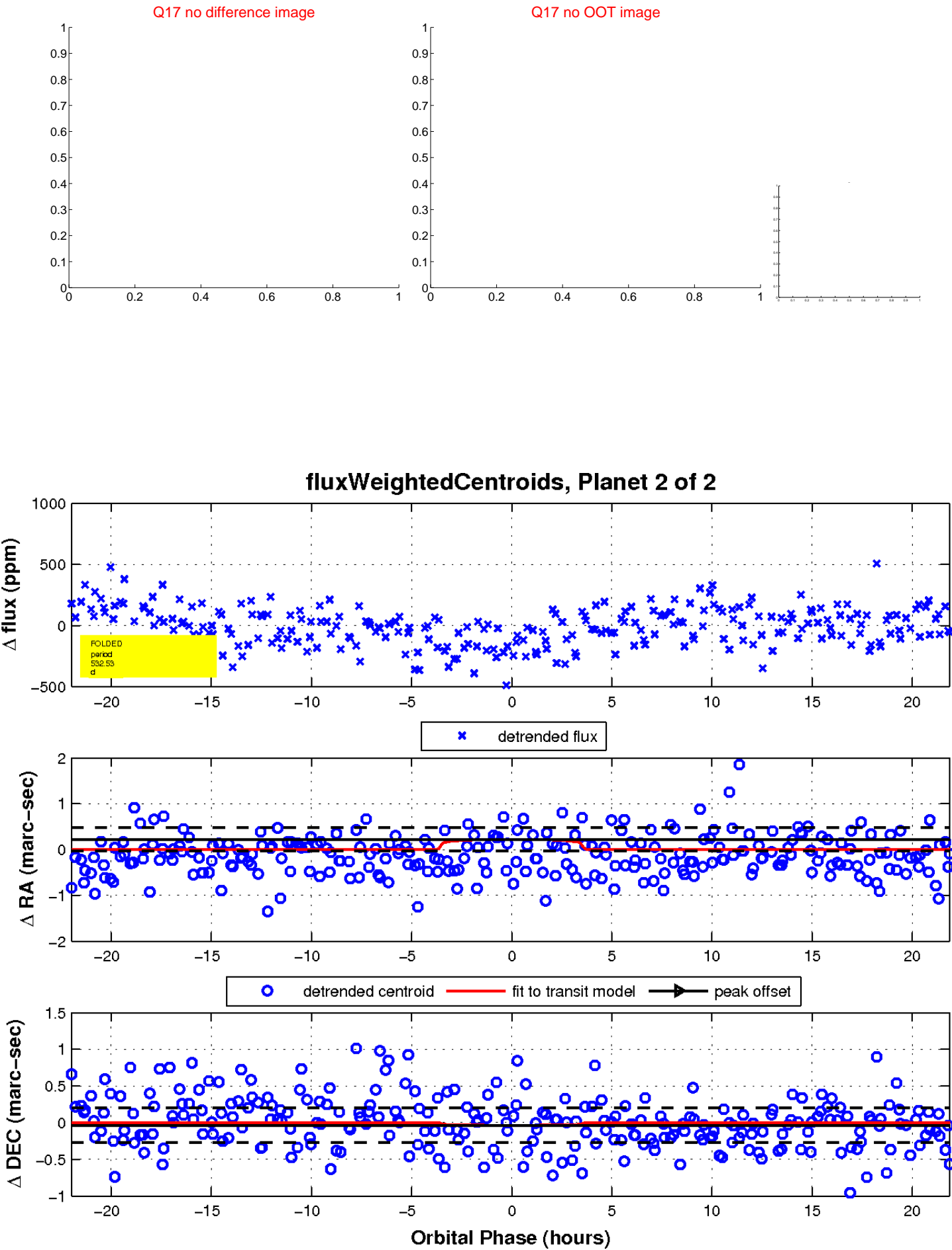


Q16 no OOT image





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



UKIRT Image

Declination

