

# KIC 010288443

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010288443-01	OBS	No	1.729436	132.290255	16.6	3.032	11.2	4.1	1.66	7141	0.78	6550.48
010288443-02	OBS	No	1.729772	132.477497	25.8	0.726	9.8	4.0	1.66	7141	0.90	6548.78

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010288443-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
010288443-02	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD

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

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

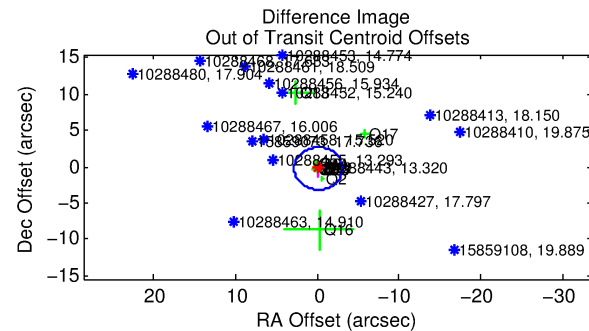
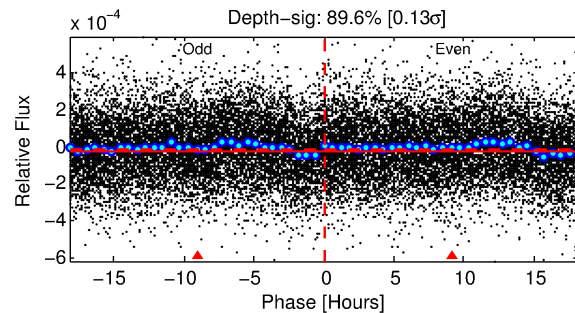
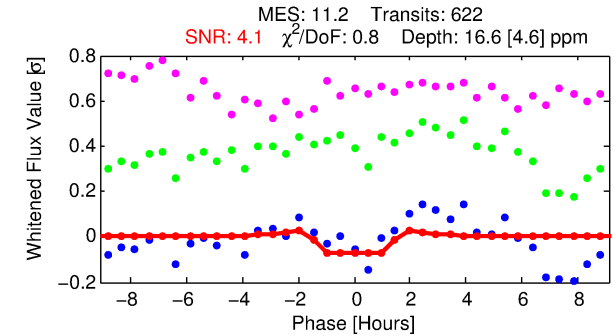
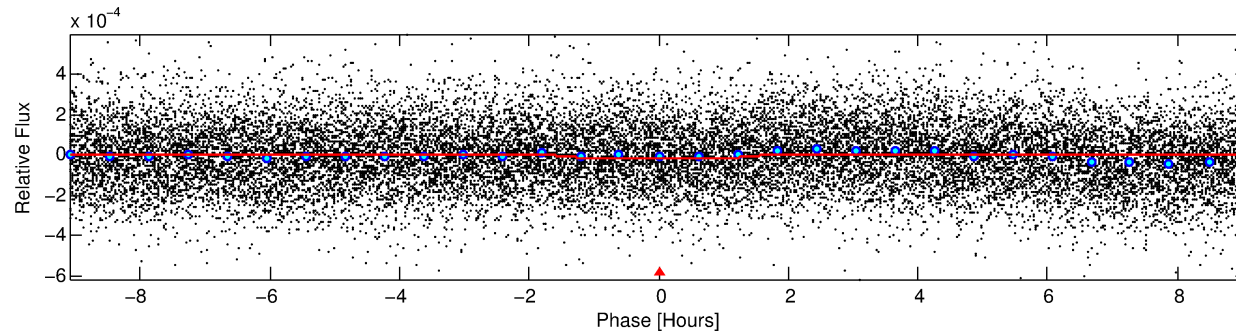
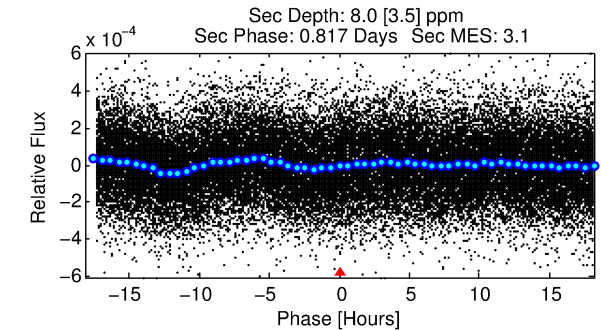
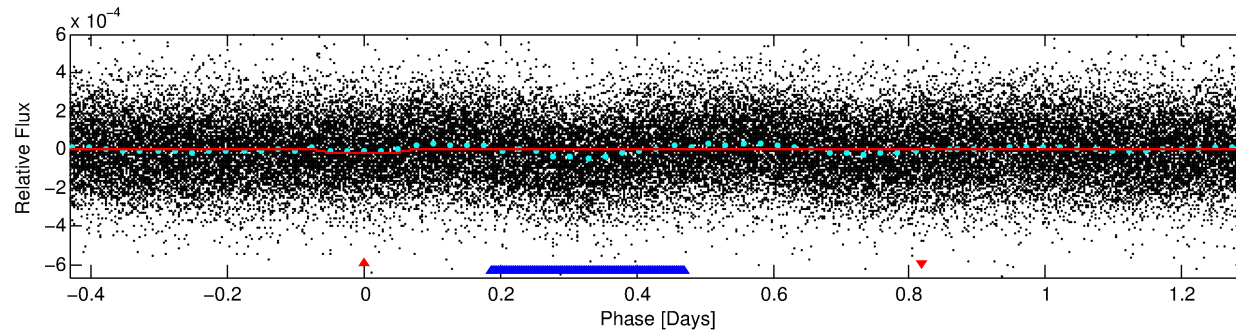
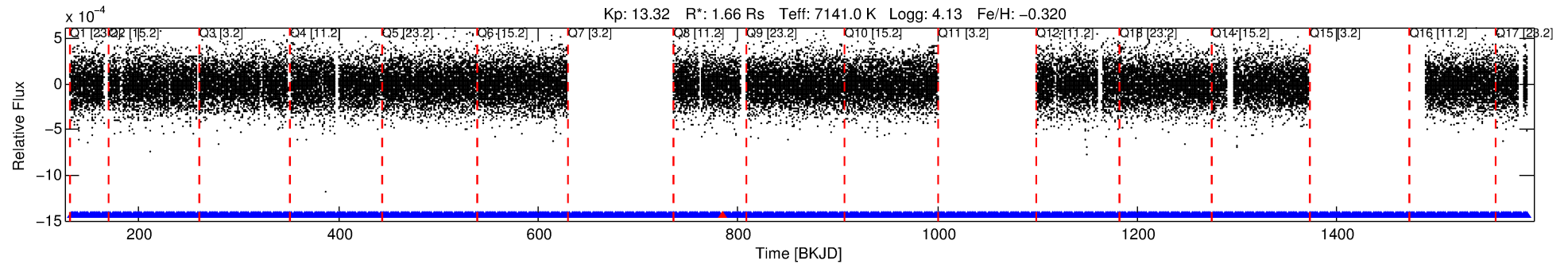
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010288443-01

No Significant Match Found

# DV One-Page Summary

KIC: 10288443 Candidate: 1 of 2 Period: 1.729 d



## DV Fit Results:

Period = 1.72944 [0.00003] d  
Epoch = 132.2903 [0.0072] BKJD  
Rp/R\* = 0.0043 [0.0021]  
a/R\* = 2.16 [4.97]  
b = 0.90 [0.63]  
Seff = 6550.48 [2429.07]  
Teq = 2294 [213] K  
Rp = 0.78 [0.44] Re  
a = 0.0312 [0.0074] AU  
Ag = 7.03 [7.81] [0.77σ]  
Teffp = 5776 [1544] K [2.23σ]

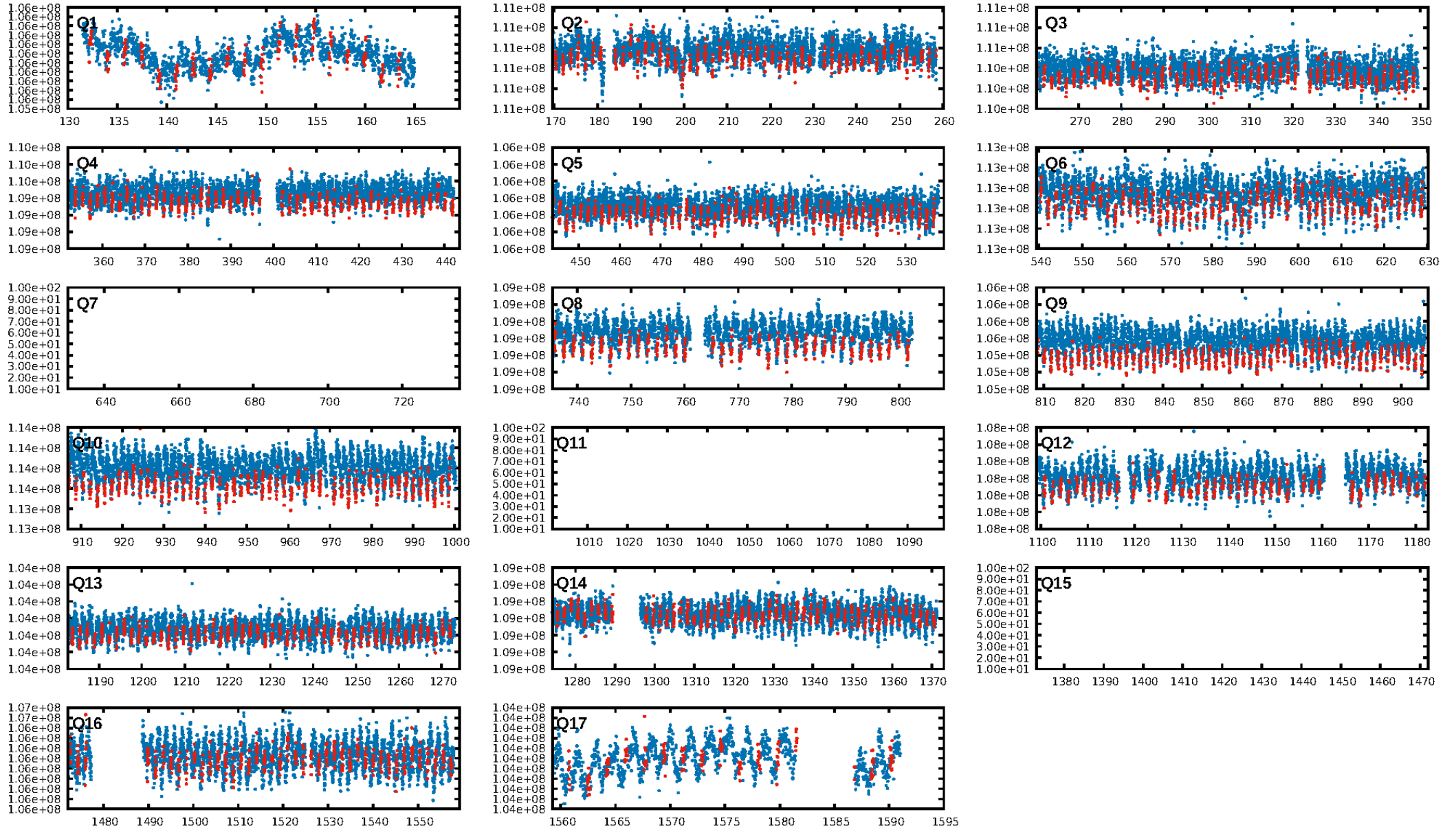
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.2% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 4.92e-24  
RollingBand-fgt: 1.00 [587/588]  
GhostDiagnostic-chr: -1.969  
Centroid-sig: 3.0%  
Centroid-so: 3.049 arcsec [1.82σ]  
OotOffset-rm: 0.266 arcsec [0.27σ]  
KicOffset-rm: 0.242 arcsec [0.22σ]  
OotOffset-st: 4/1/4/4 [13]  
KicOffset-st: 4/1/4/4 [13]  
DiffImageQuality-fgm: 0.69 [9/13]  
DiffImageOverlap-fno: 0.43 [6/14]

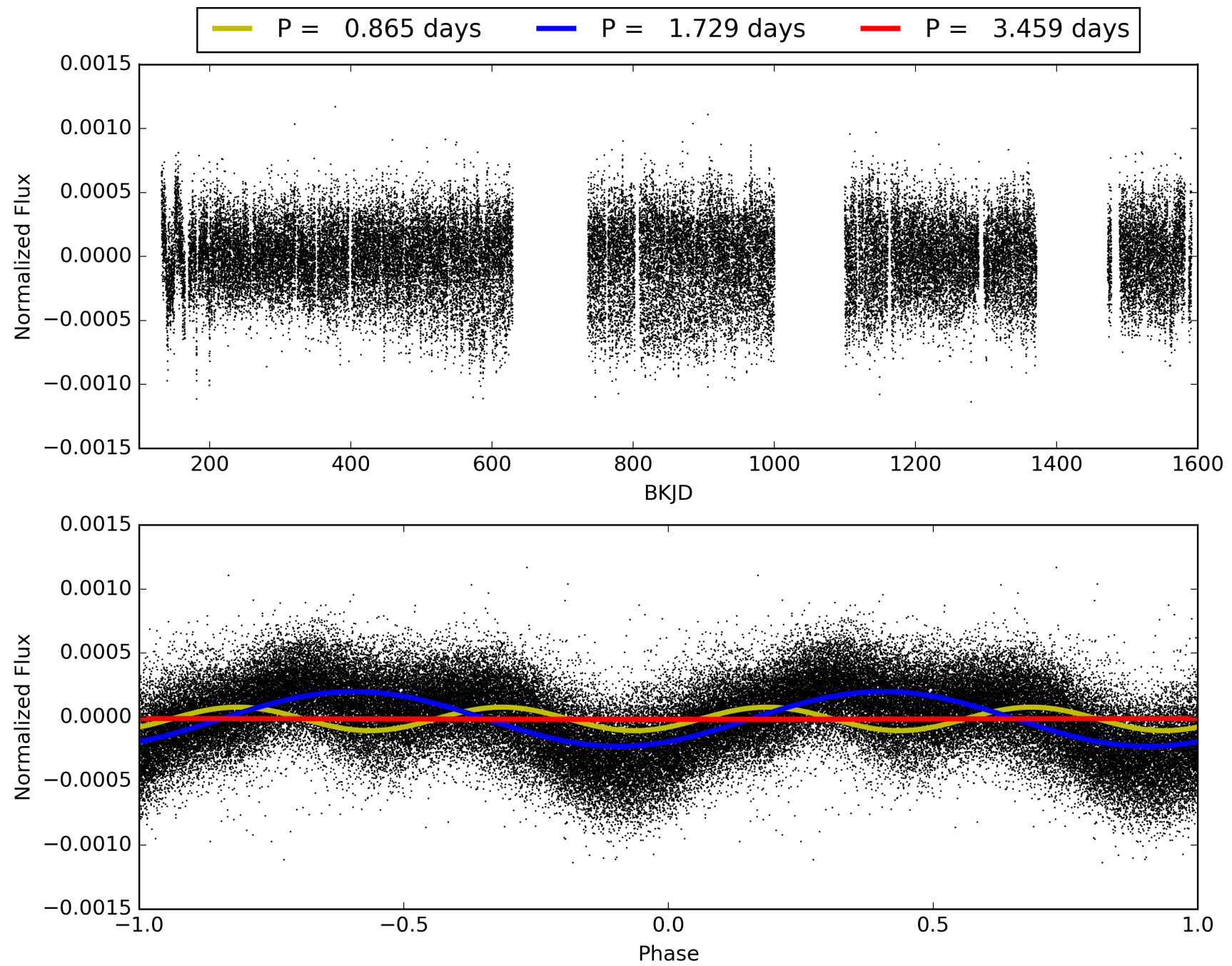
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 04:21:00 Z

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

# TCE 010288443-01, PDC Light Curves

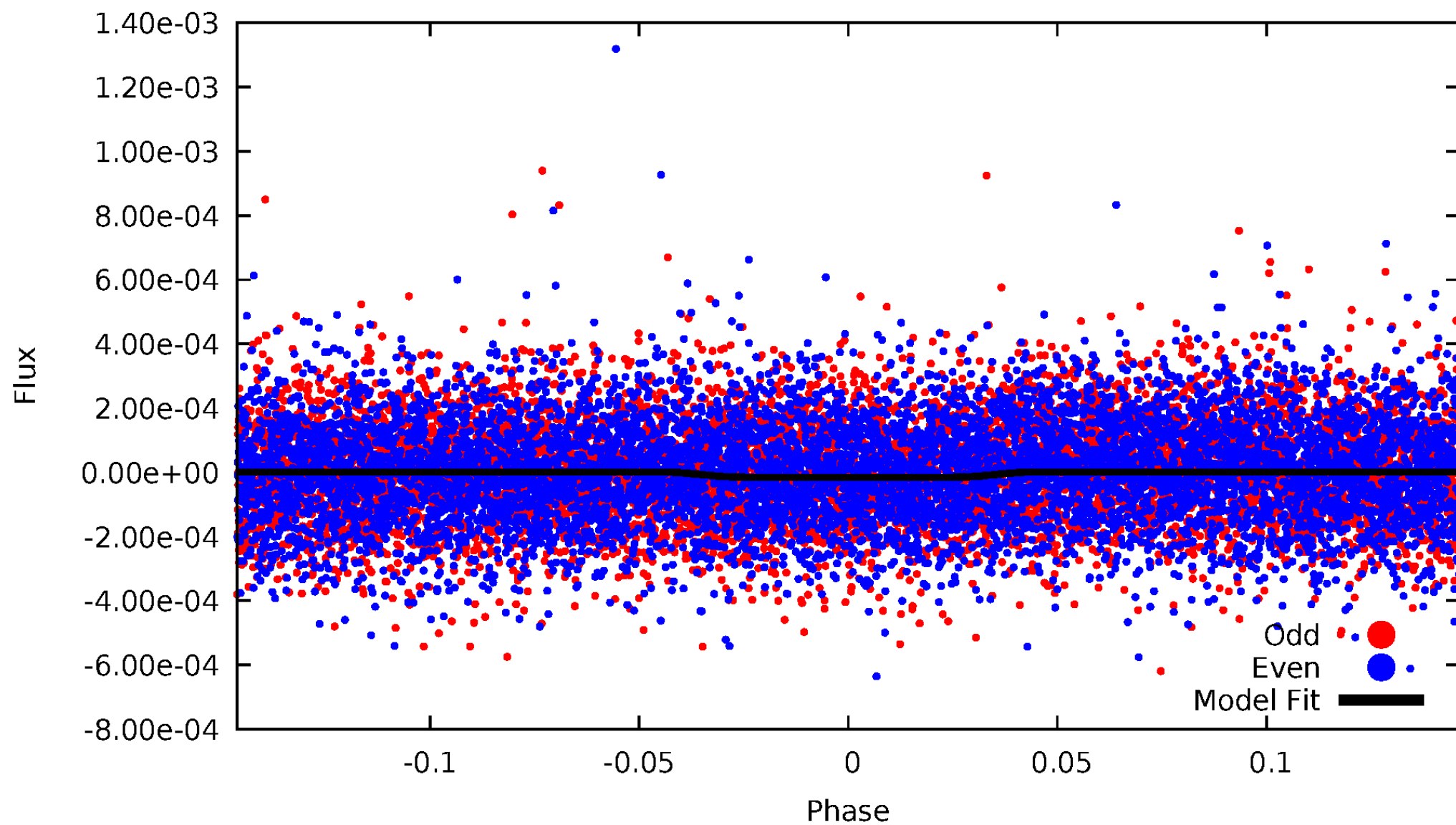


TCE 010288443-01



# DV Odd/Even

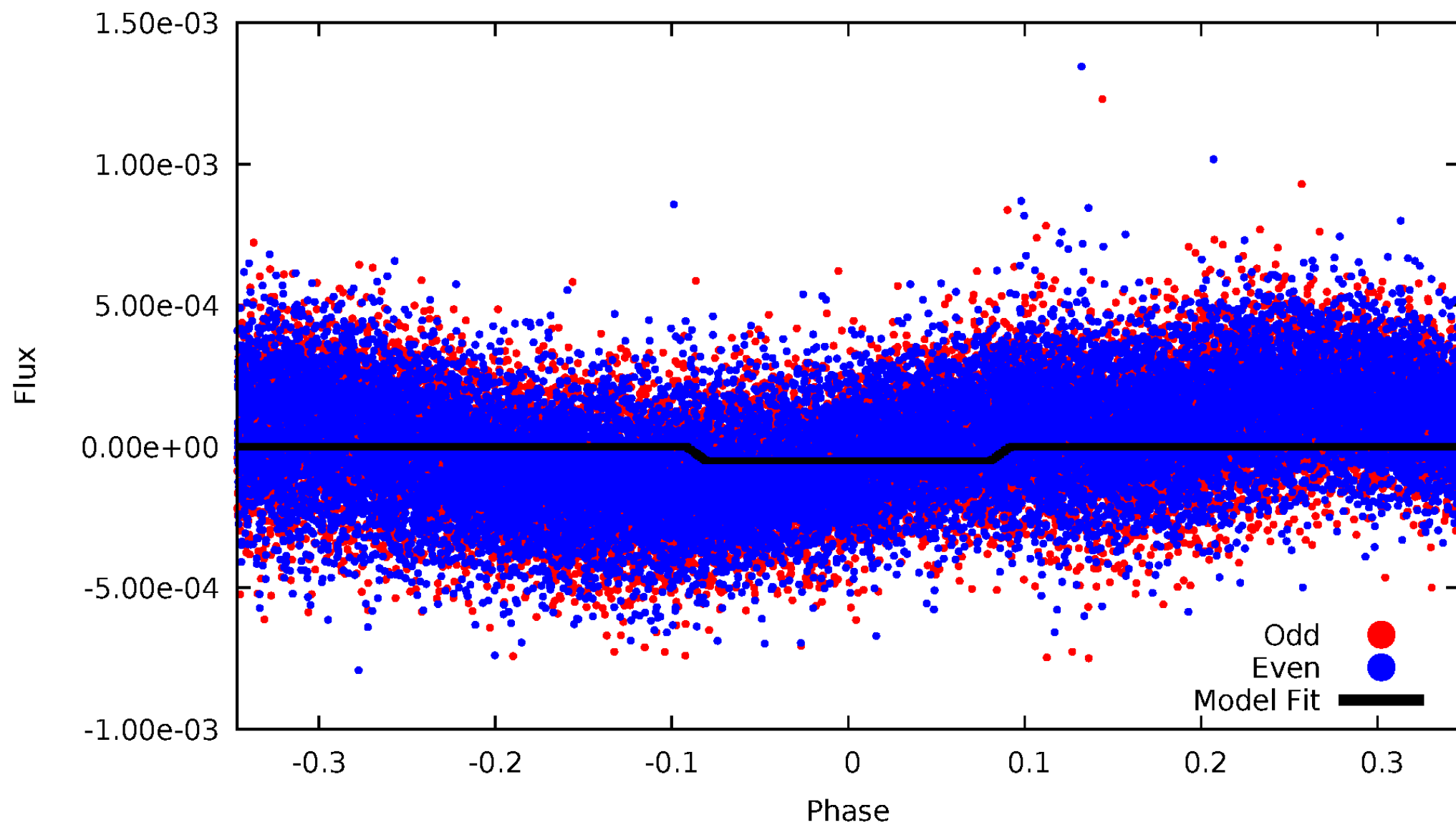
TCE 010288443-01





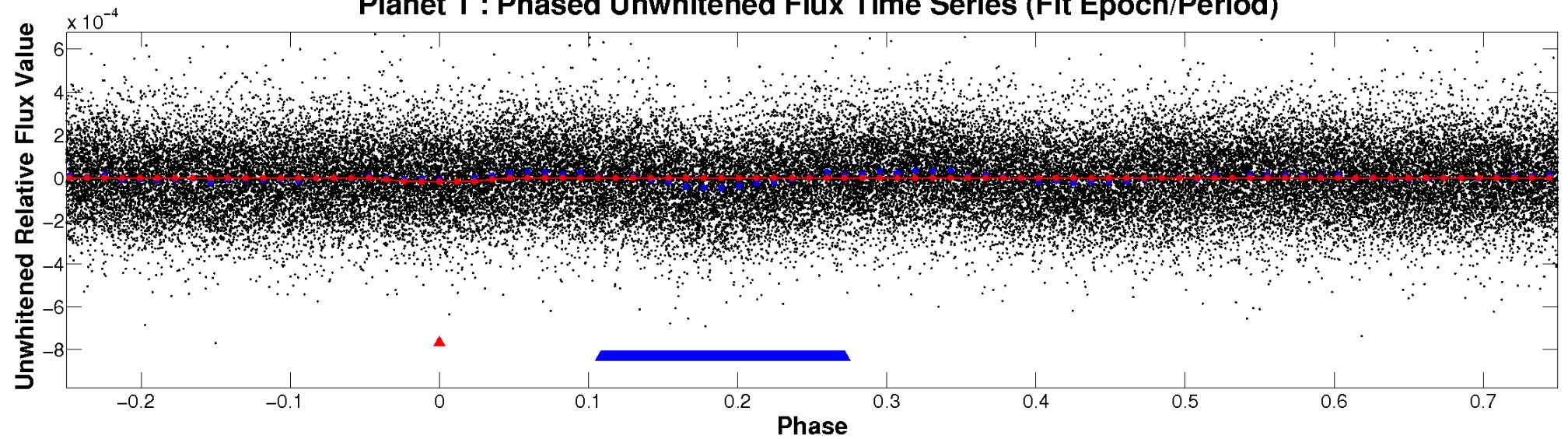
# ALT Odd/Even

TCE 010288443-01

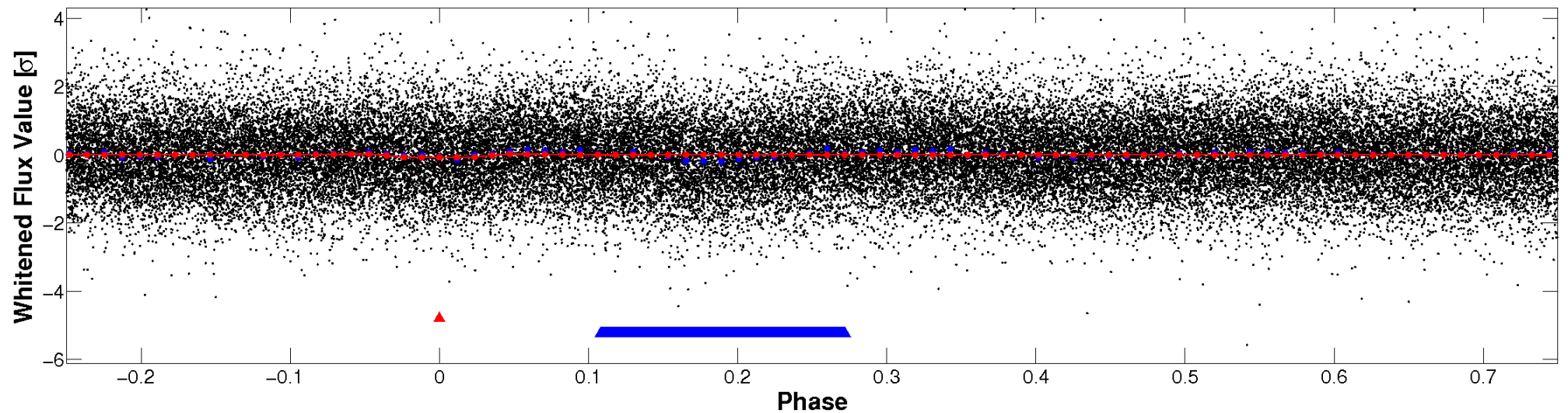


# Non-Whitened Vs. Whitened Light Curve

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

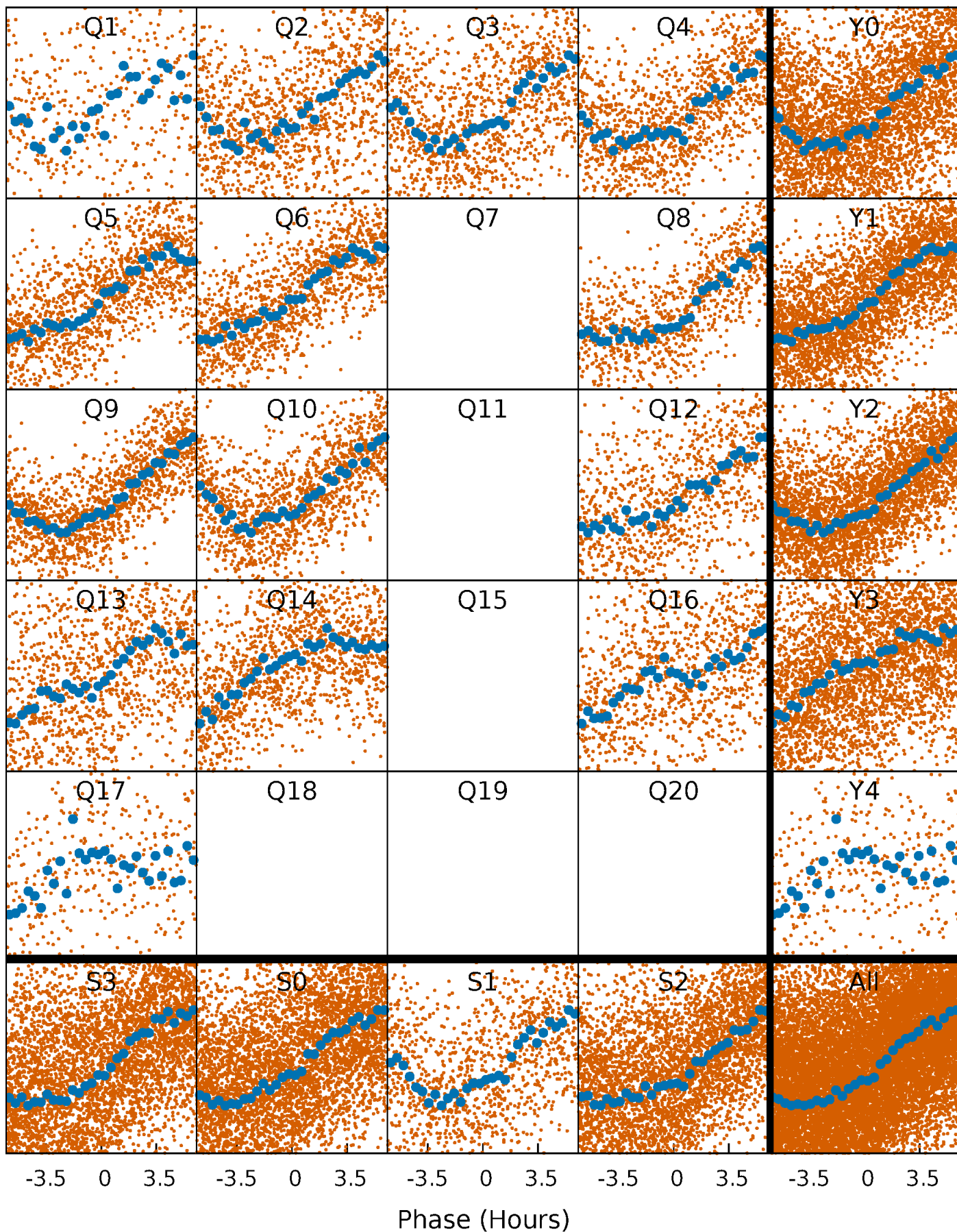


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

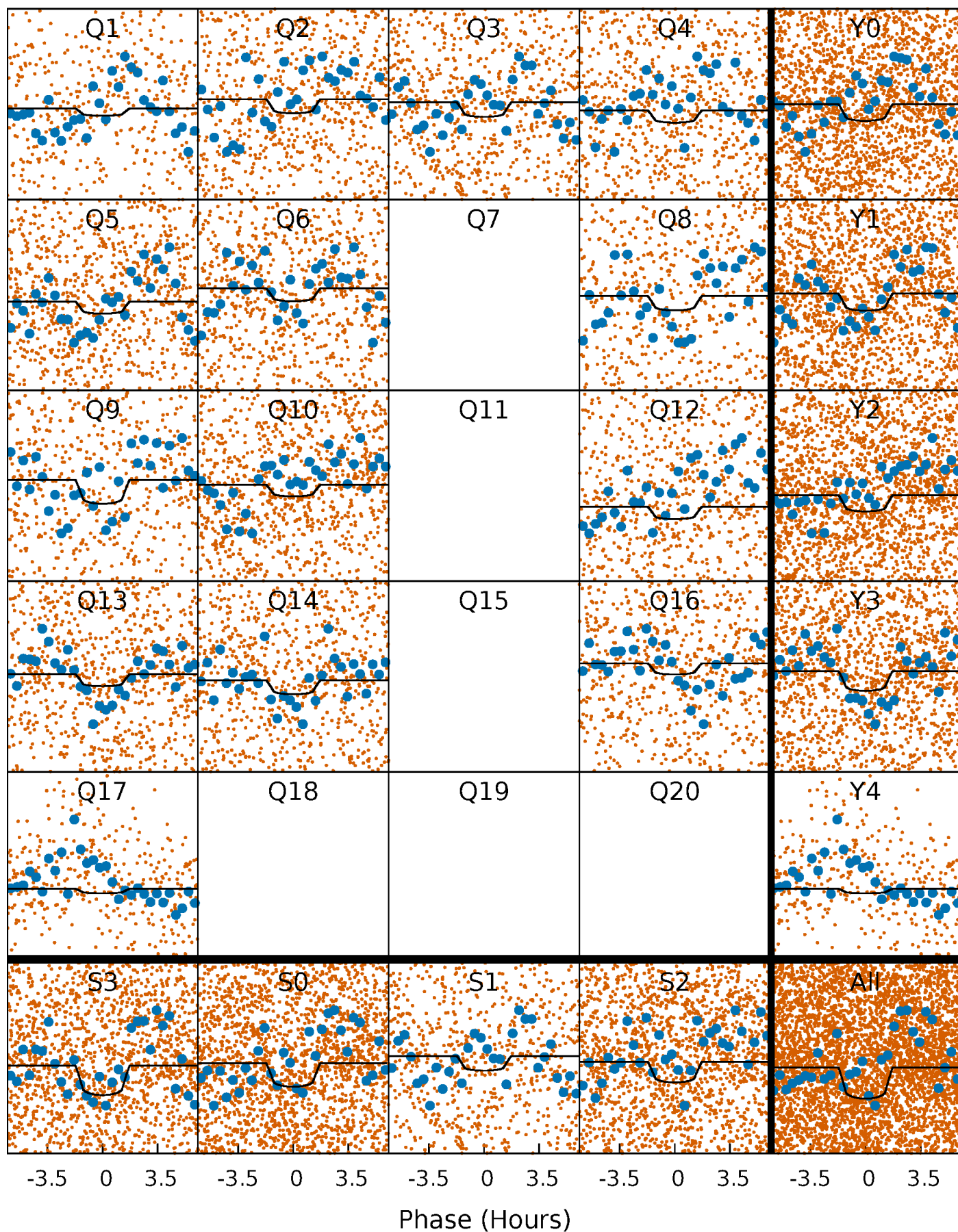
TCE 010288443-01 P= 1.729436 Days  $T_0=132.290255$  (BKJD)





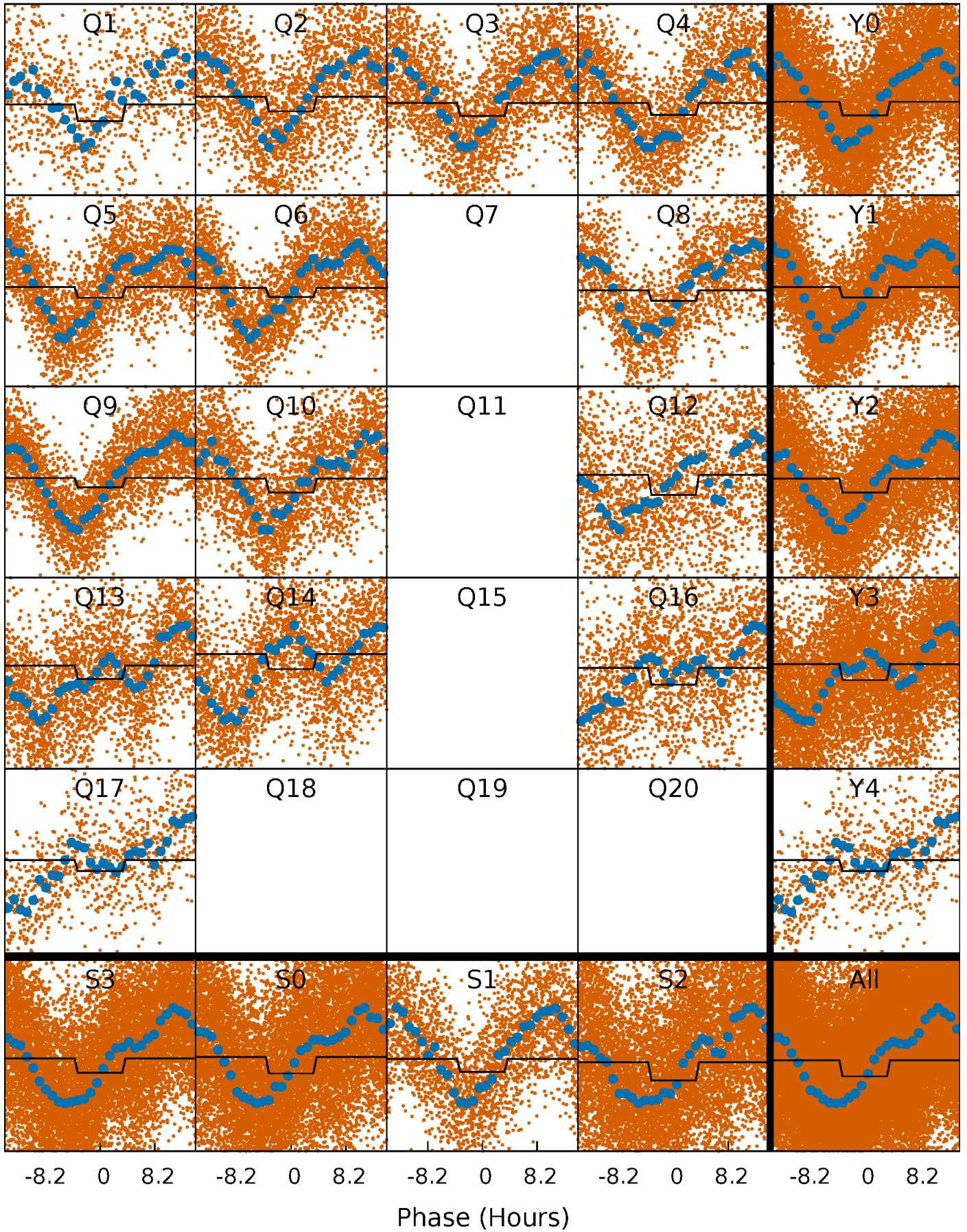
# DV Quarter-Phased Transit Curves

TCE 010288443-01 P= 1.729436 Days  $T_0=132.290255$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

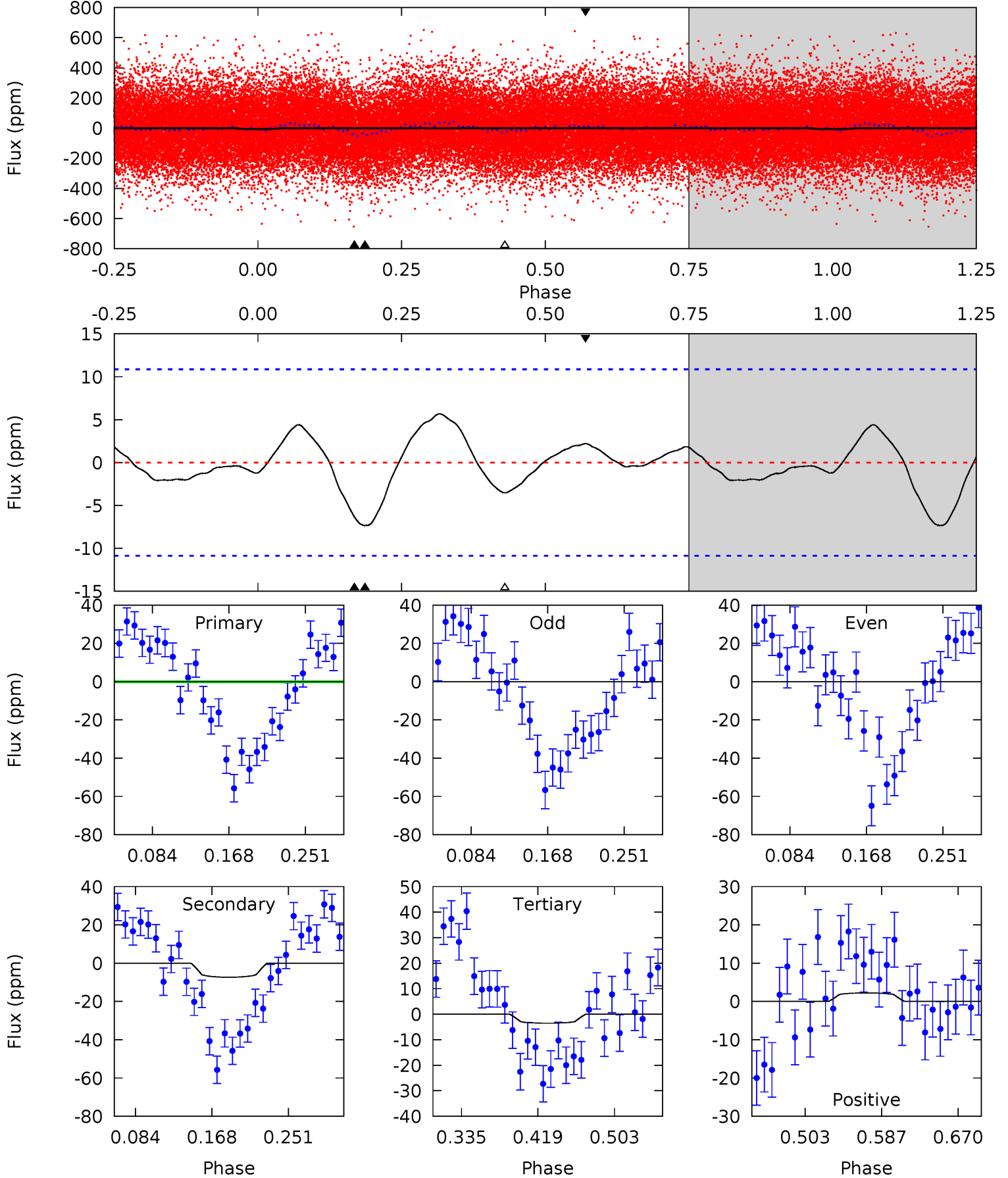
TCE 010288443-01 P= 1.729569 Days  $T_0=132.273202$  (BKJD)



# DV Model-Shift Uniqueness Test

010288443-01, P = 1.729436 Days, E = 130.560819 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.68	3.11	1.49	0.94	4.60	1.73	0.94	1.18	1.74	1.61	2.17	0.15	1.32	0.44	1.24

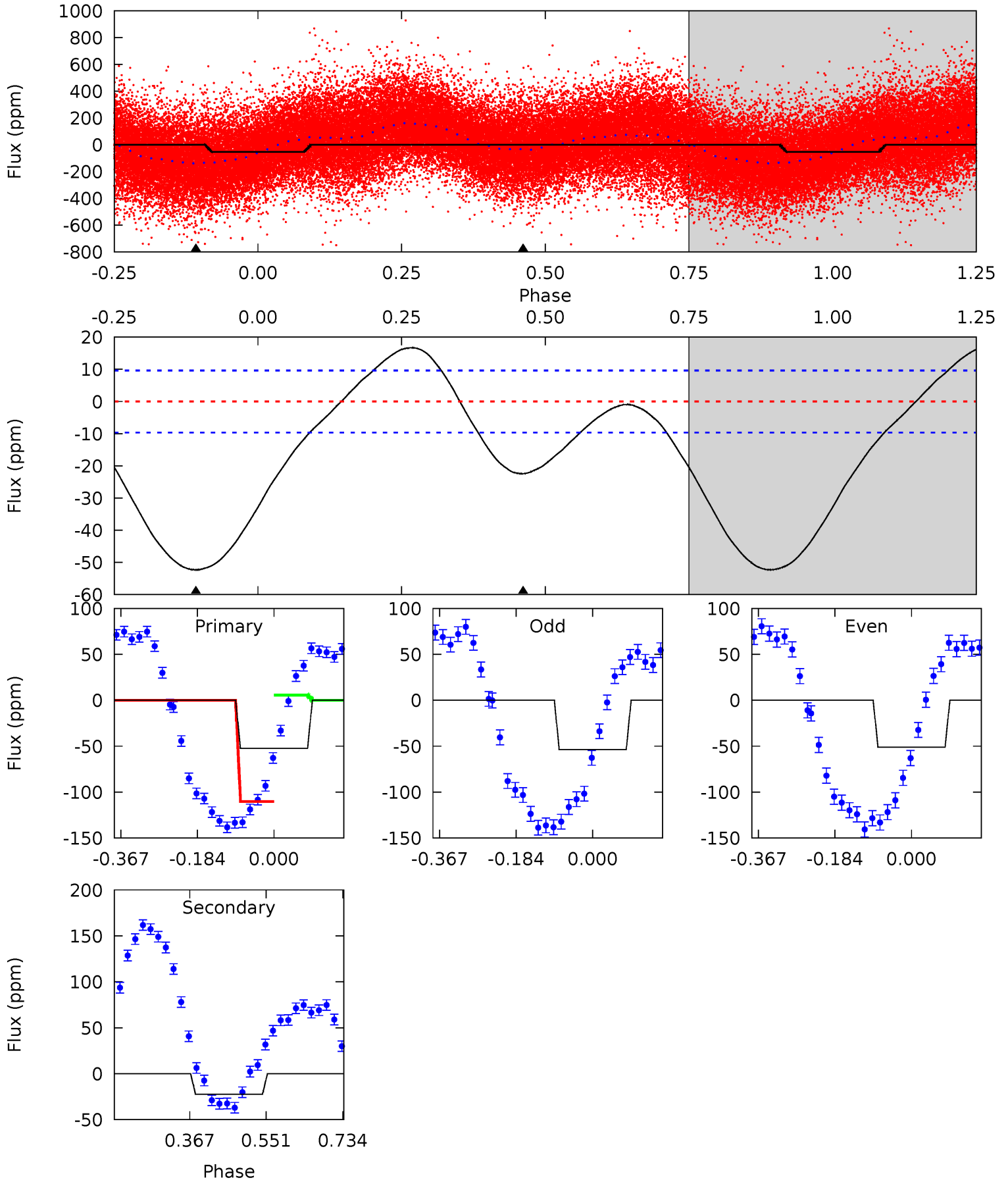




# Alt Model-Shift Uniqueness Test

010288443-01, P = 1.729569 Days, E = 130.543633 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
24.1	10.3	0	0	4.44	1.33	4.11	24.1	24.1	10.3	10.3	0.60	1.07	0.24	27.3





### Stellar Parameters For KIC 010288443

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	$7141^{+199}_{-274}$	$4.133^{+0.162}_{-0.180}$	$-0.320^{+0.250}_{-0.350}$	$1.657^{+0.482}_{-0.395}$	$1.364^{+0.214}_{-0.214}$	$0.422^{+0.408}_{-0.209}$
	+3%/-4%	+4%/-4%	+78%/-109%	+29%/-24%	+16%/-16%	+97%/-50%
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 010288443-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-7 \pm 2$	$0.81^{+0.38}_{-0.37}$	$3210^{+245}_{-239}$	$5391^{+1976}_{-900}$	$5.779^{+13.044}_{-3.374}$
Alt.	$-22 \pm 2$	$1.31^{+0.44}_{-0.42}$	$3222^{+238}_{-232}$	$5702^{+1095}_{-682}$	$6.945^{+7.738}_{-3.007}$

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

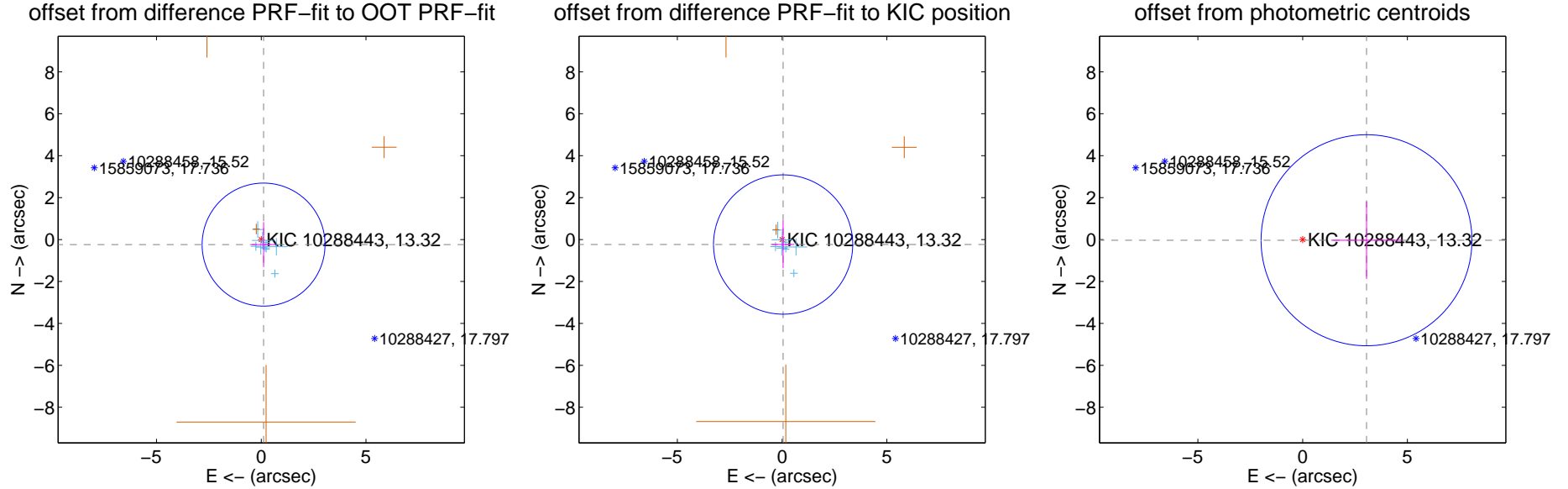
## DV Centroid Data

Supplemental centroid analysis for 010288443-01. Kepler magnitude: 13.32. Transit SNR 4.12

There are 9 quarters with good PRF difference image offsets

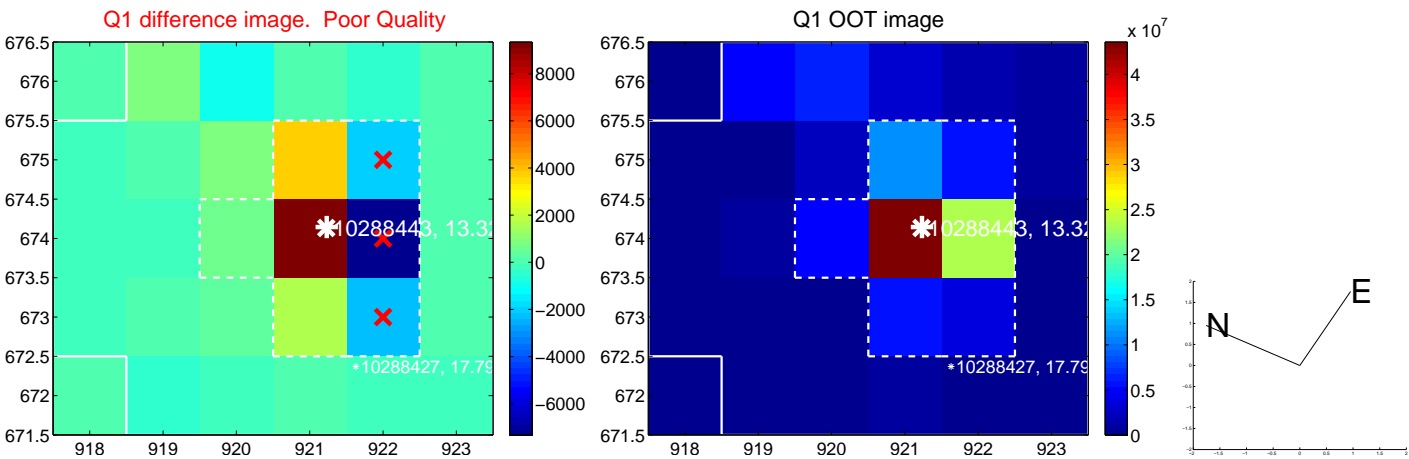
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.266 \pm 0.978$	0.27	$-0.111 \pm 0.569$	$-0.241 \pm 1.070$
PRF-fit source offset from KIC position	$0.242 \pm 1.108$	0.22	$-0.048 \pm 0.531$	$-0.237 \pm 1.123$
photometric centroid source offset	$3.05 \pm 1.68$	1.82	$-3.05 \pm 1.68$	$-0.03 \pm 1.85$

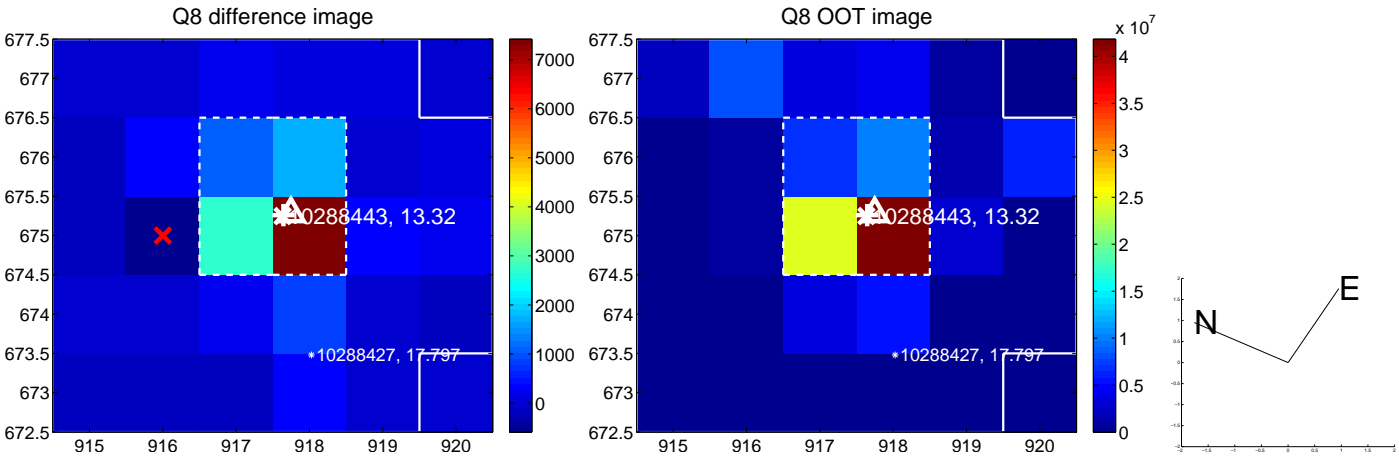
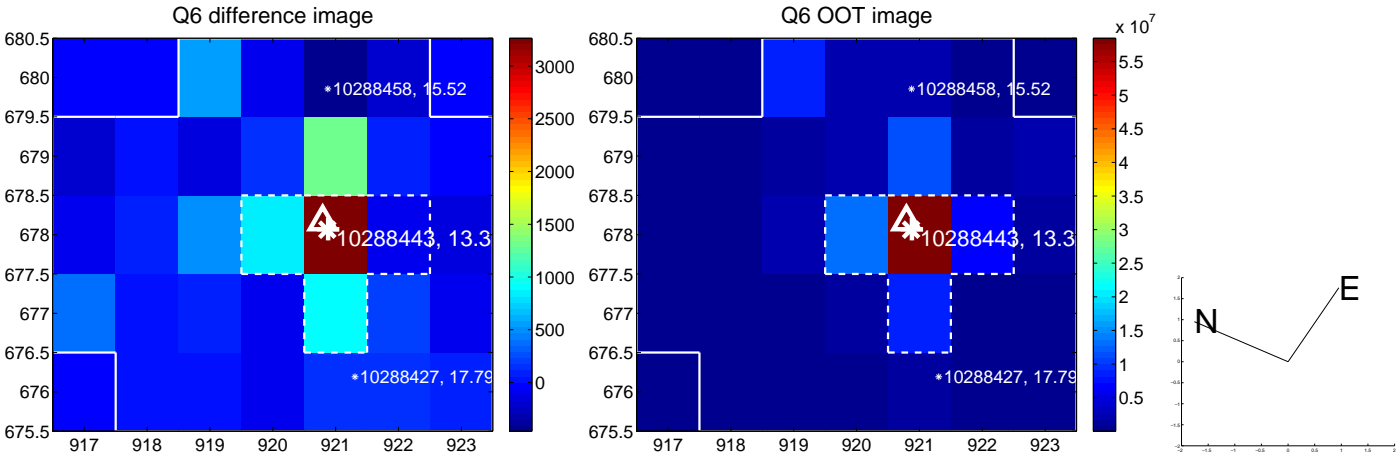
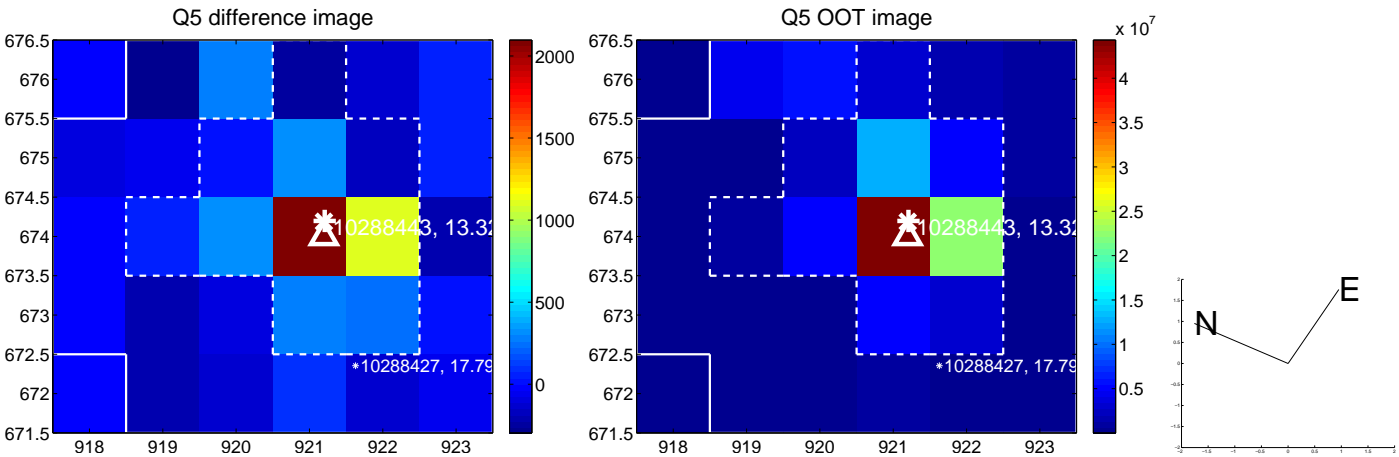


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

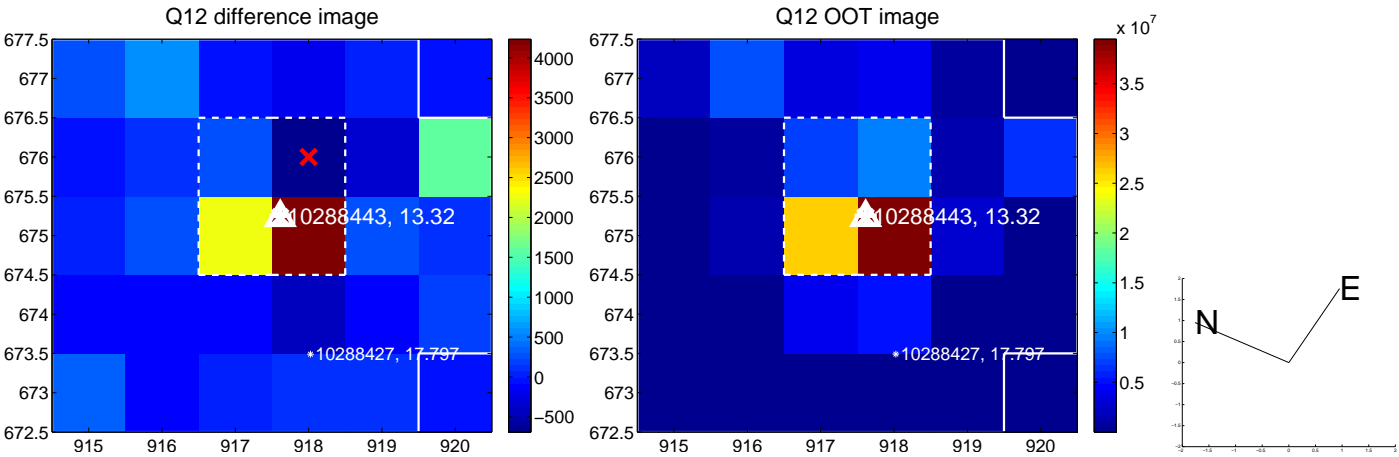
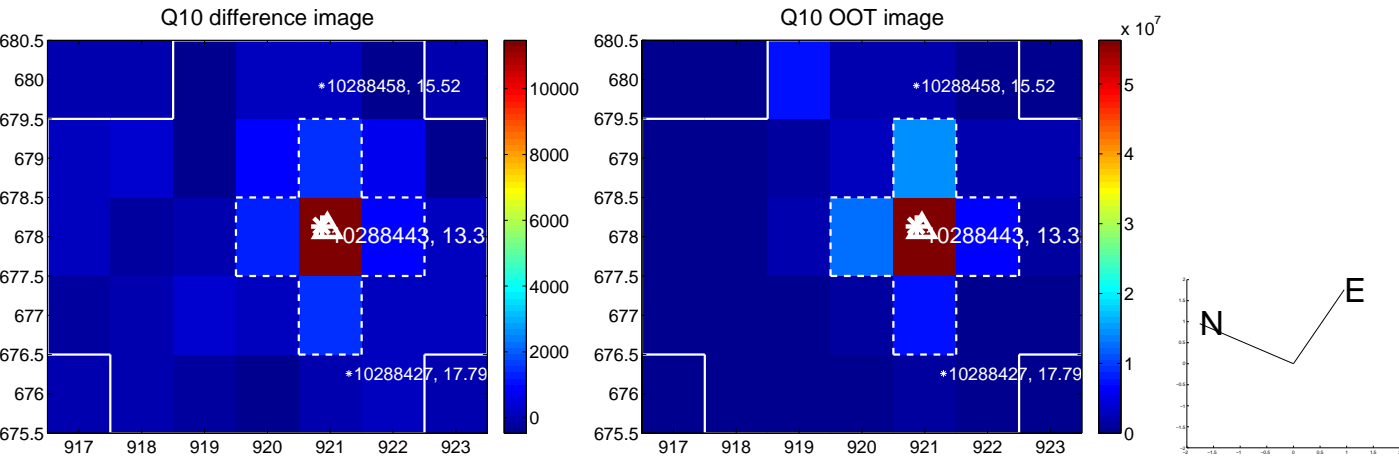
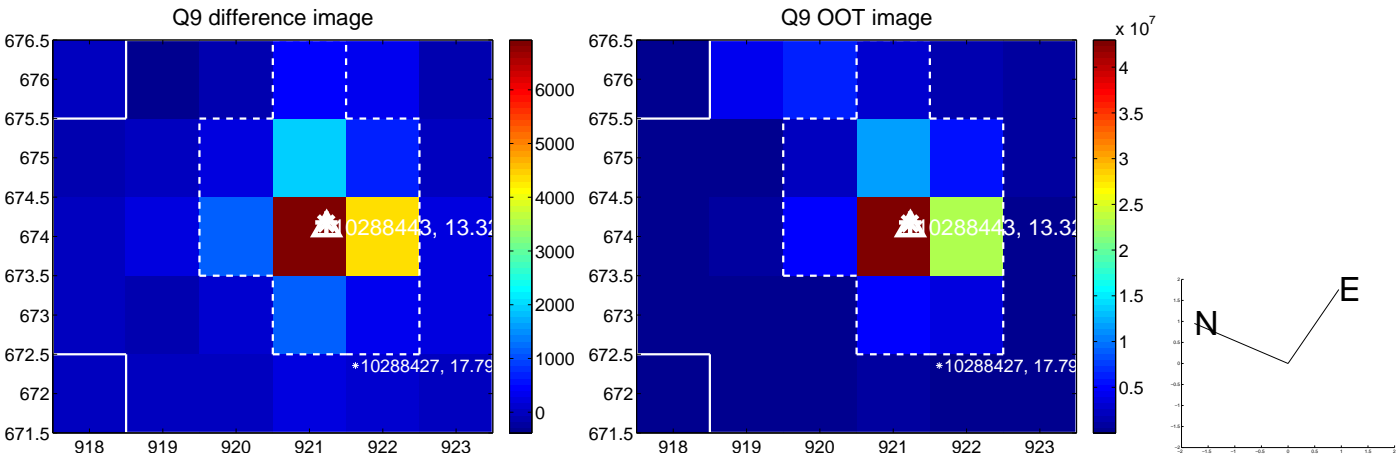


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

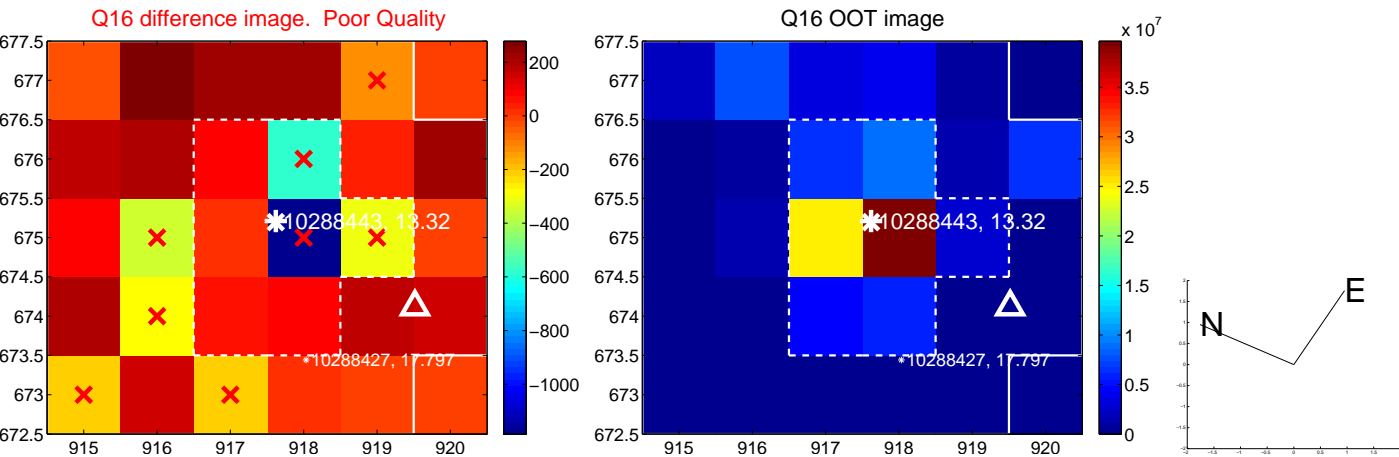
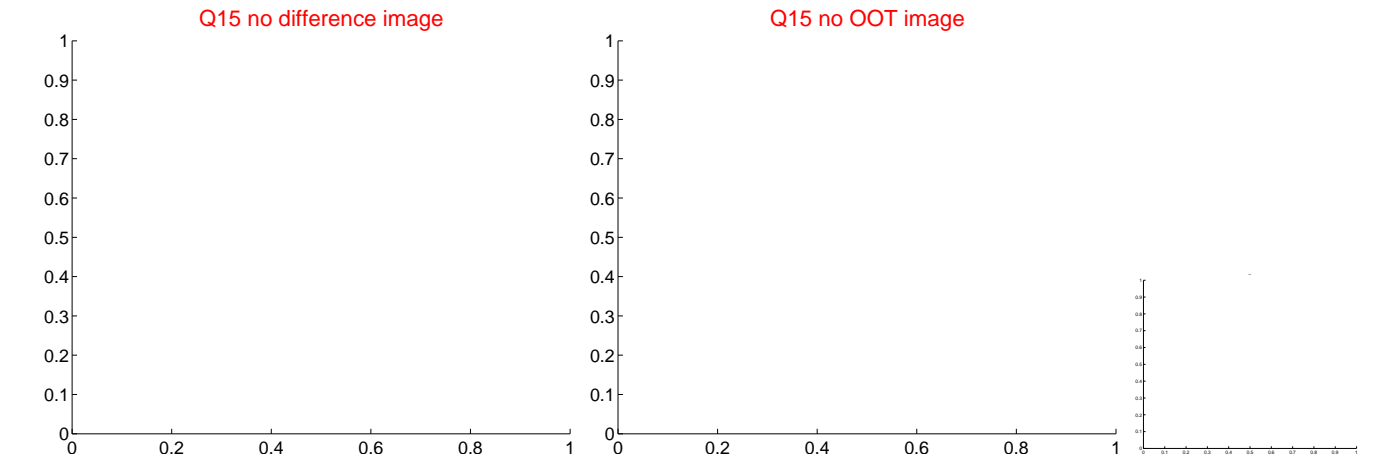
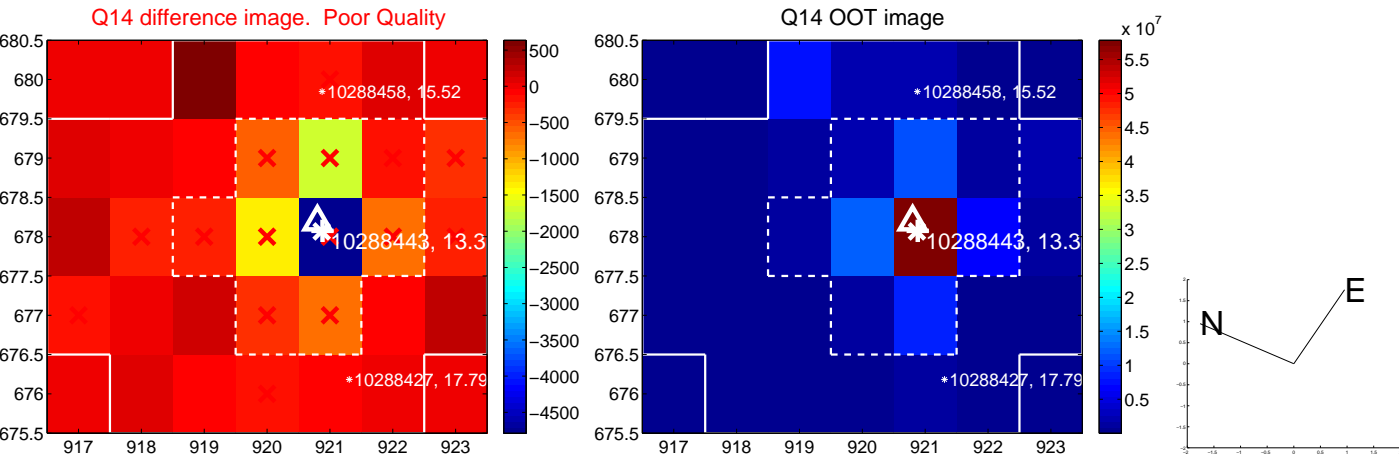
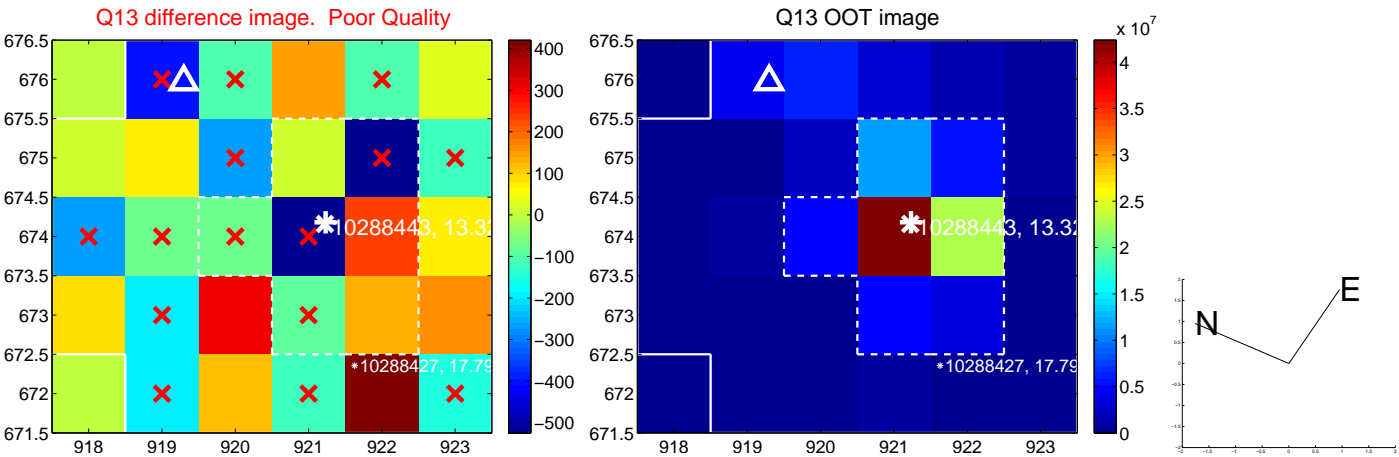




white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



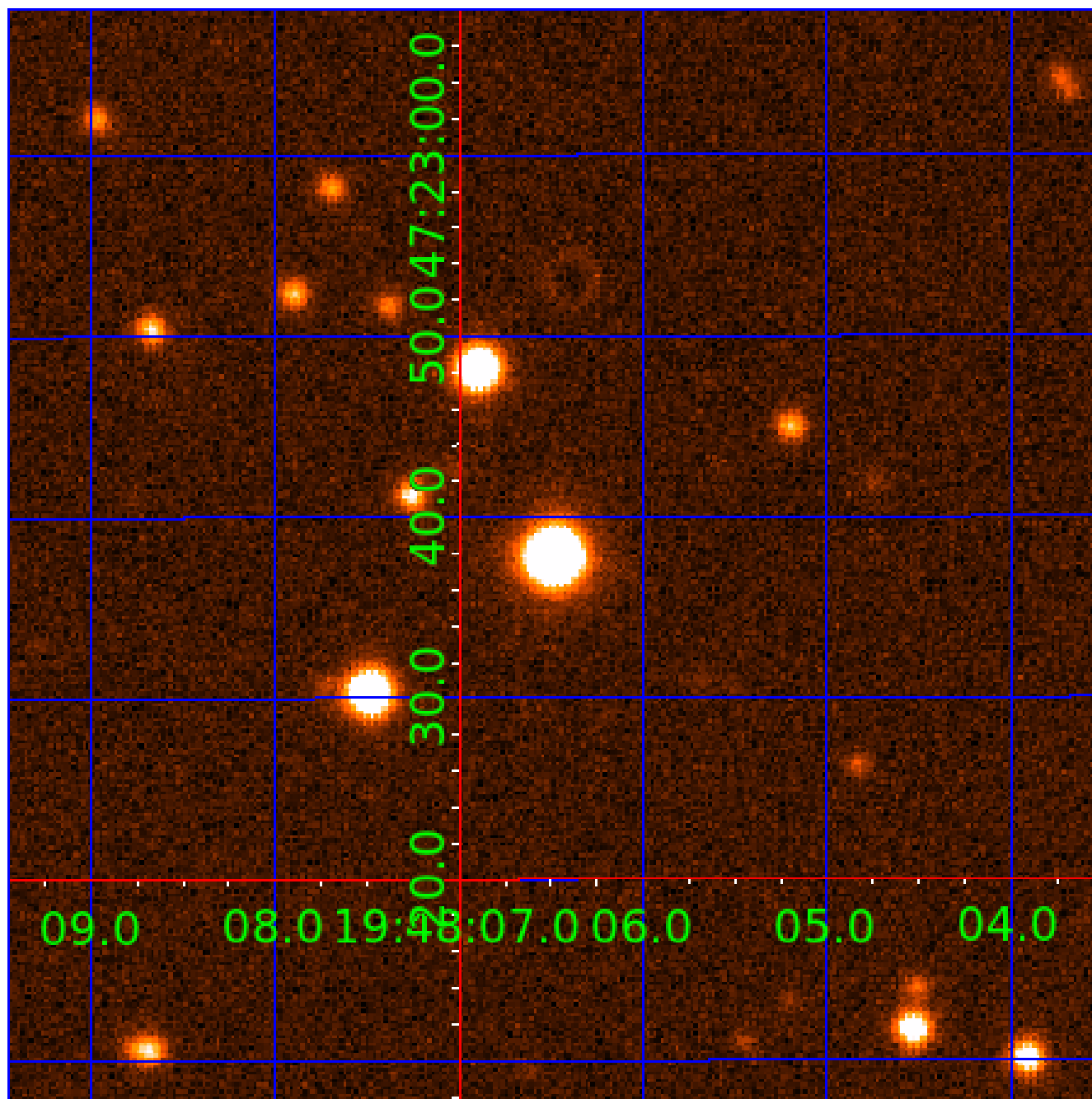
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination





# KIC 010288443

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010288443-01	OBS	No	1.729436	132.290255	16.6	3.032	11.2	4.1	1.66	7141	0.78	6550.48
010288443-02	OBS	No	1.729772	132.477497	25.8	0.726	9.8	4.0	1.66	7141	0.90	6548.78

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010288443-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
010288443-02	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD

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

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

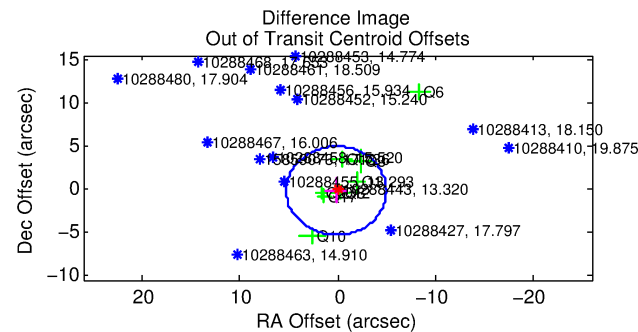
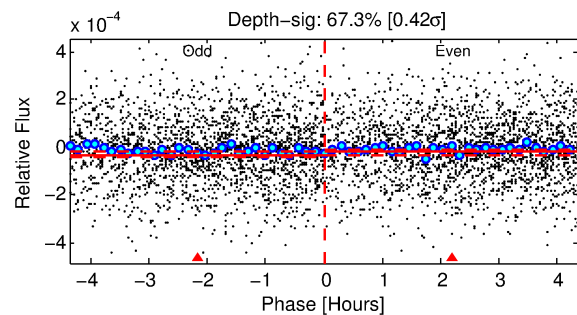
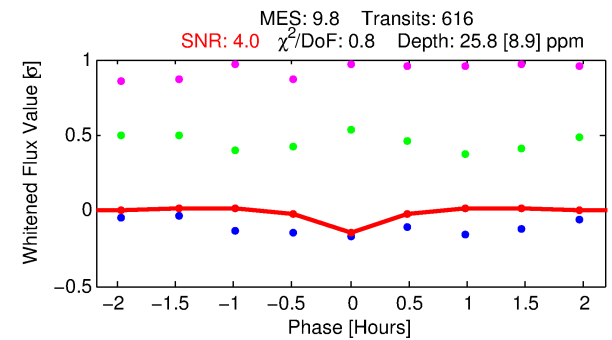
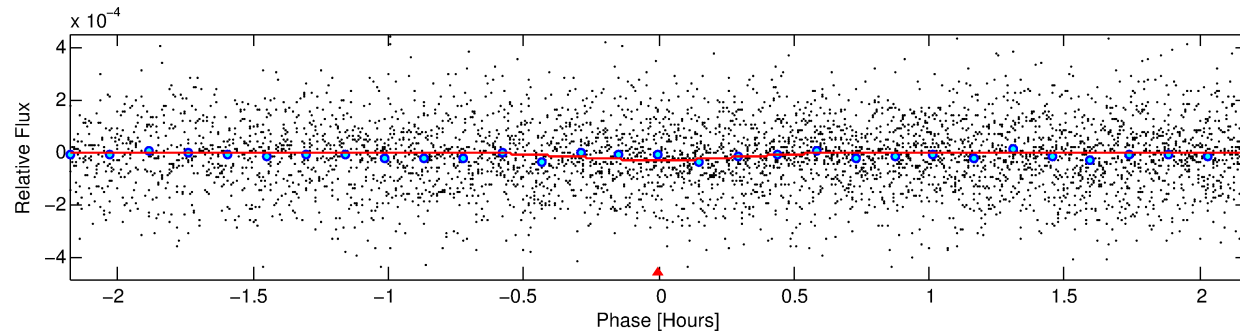
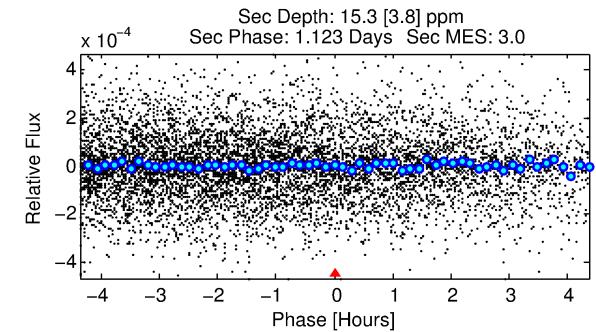
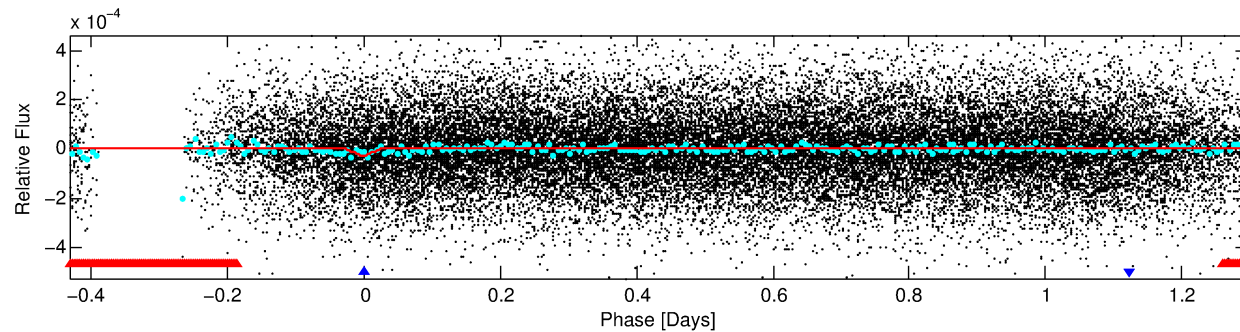
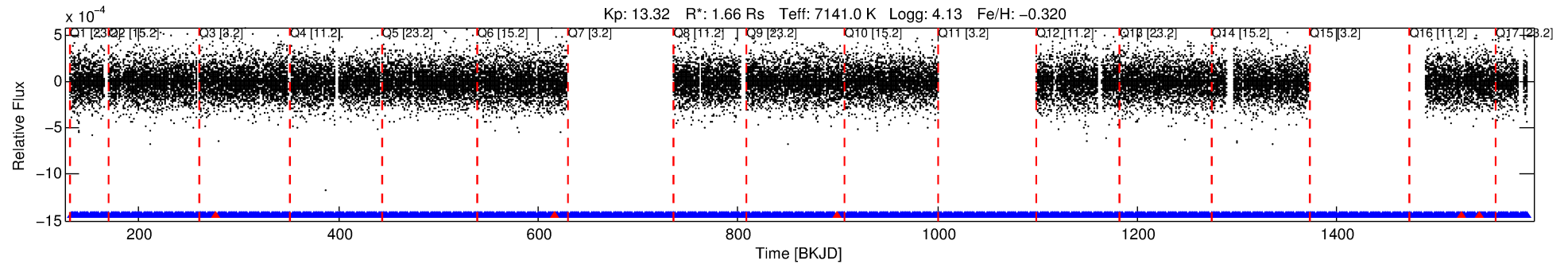
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010288443-02

No Significant Match Found

# DV One-Page Summary

KIC: 10288443 Candidate: 2 of 2 Period: 1.730 d



## DV Fit Results:

Period = 1.72977 [0.00003] d  
Epoch = 132.4775 [0.0035] BKJD  
Rp/R\* = 0.0050 [0.0024]  
a/R\* = 14.76 [39.69]  
b = 0.59 [2.94]  
Seff = 6548.78 [2428.44]  
Teq = 2294 [213] K  
Rp = 0.90 [0.50] Re  
a = 0.0313 [0.0074] AU  
Ag = 10.19 [10.62] [0.87σ]  
Teffp = 6337 [1581] K [2.53σ]

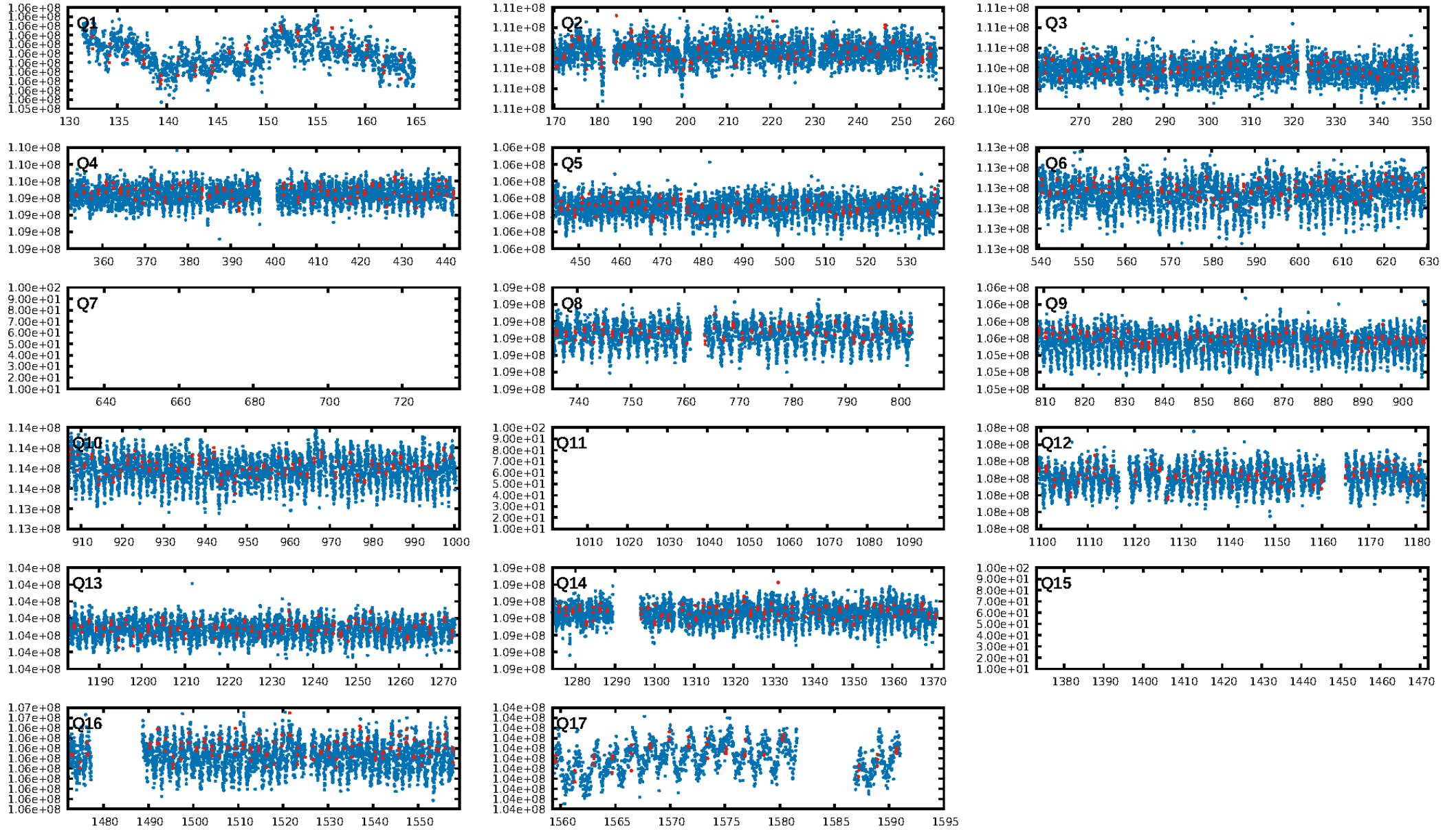
## DV Diagnostic Results:

ShortPeriod-sig: 0.2% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.04e-19  
RollingBand-fgt: 0.99 [576/581]  
GhostDiagnostic-chr: -0.4733  
Centroid-sig: 94.7%  
Centroid-so: 0.141 arcsec [0.06σ]  
OotOffset-rm: 0.217 arcsec [0.13σ]  
OotOffset-st: 3/1/2/3 [9]  
KicOffset-rm: 0.261 arcsec [0.15σ]  
KicOffset-st: 3/1/2/3 [9]  
DiffImageQuality-fgm: 0.33 [3/9]  
DiffImageOverlap-fno: 0.64 [9/14]

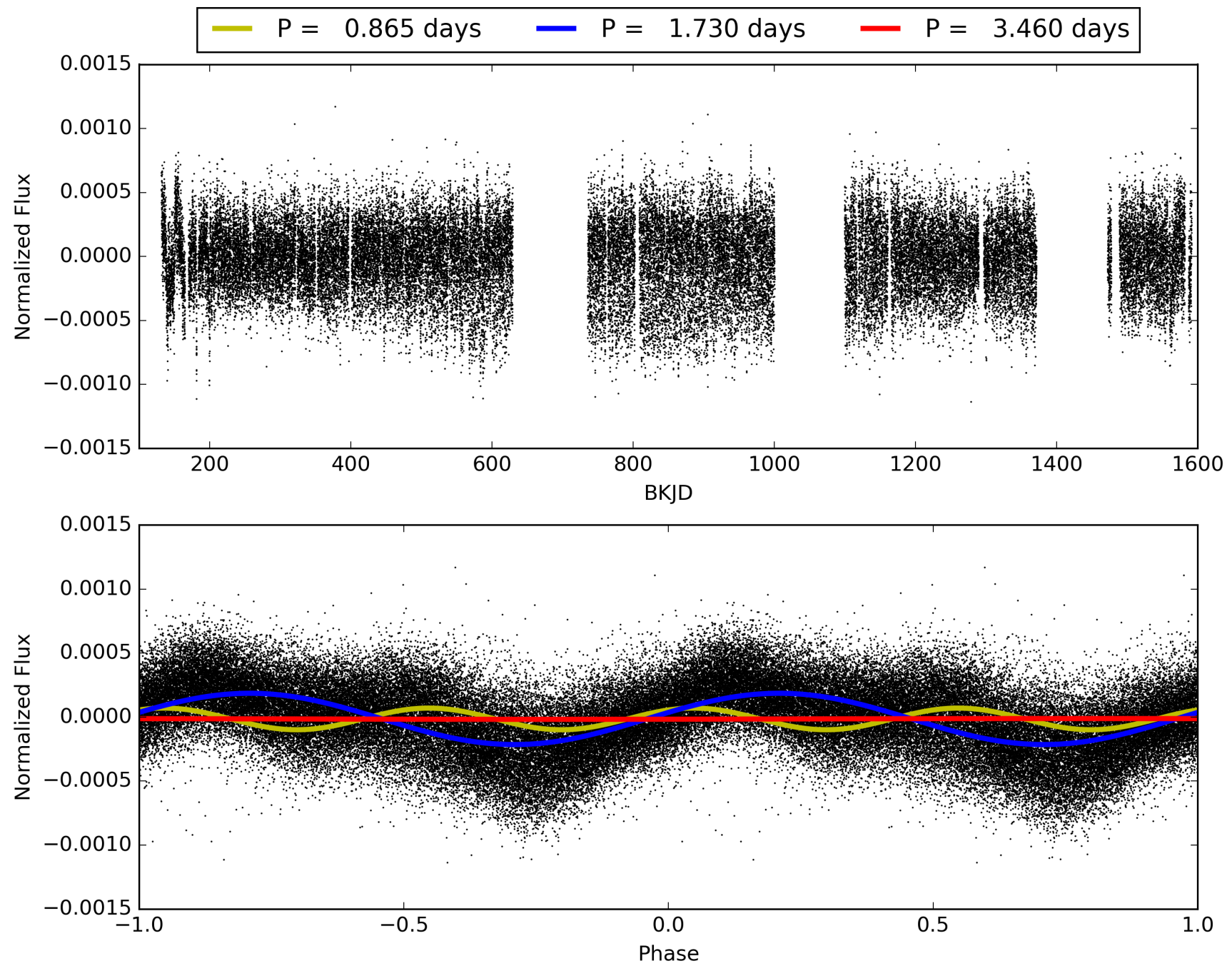
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 04:21:15 Z

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

# TCE 010288443-02, PDC Light Curves



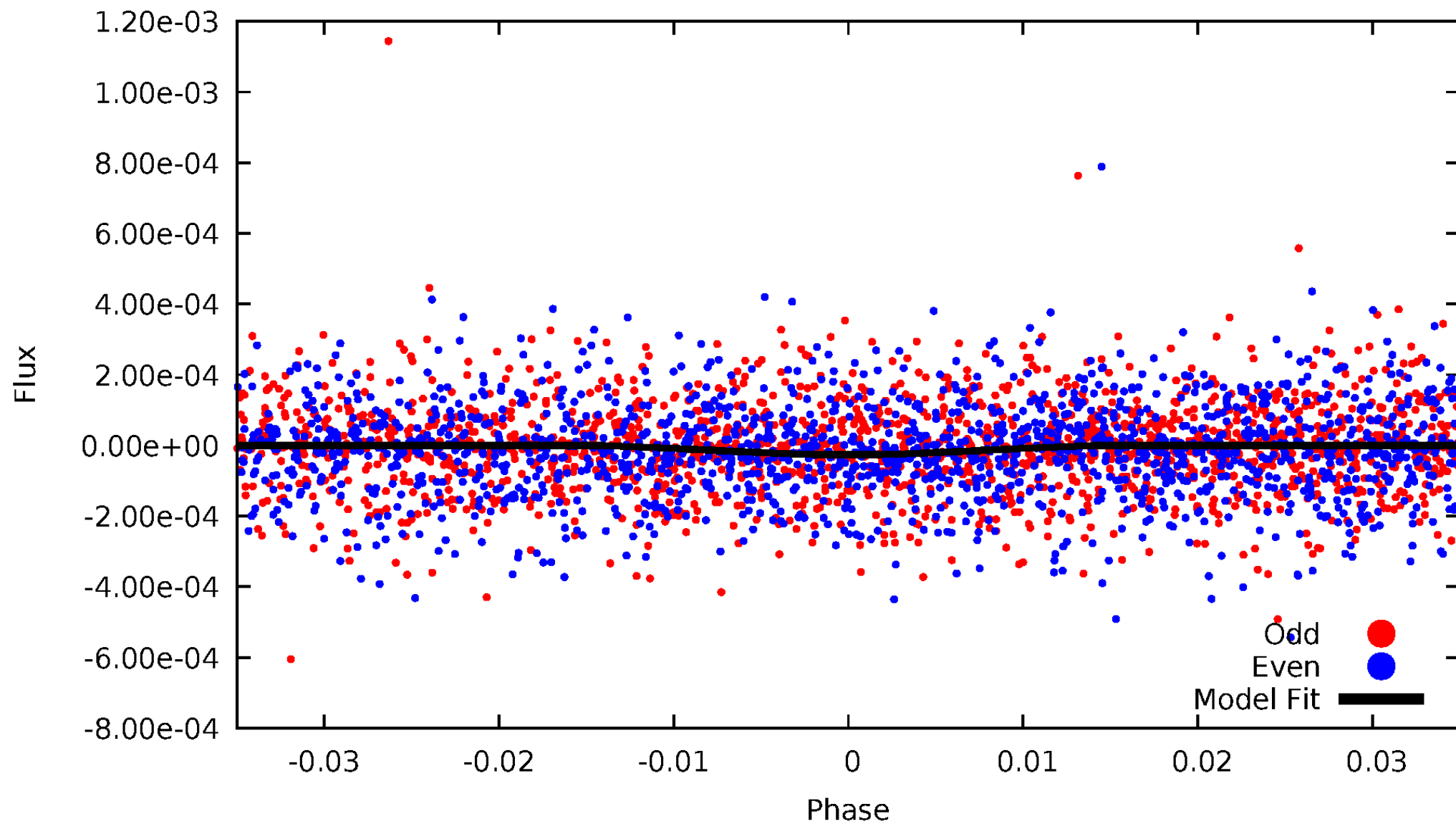
TCE 010288443-02





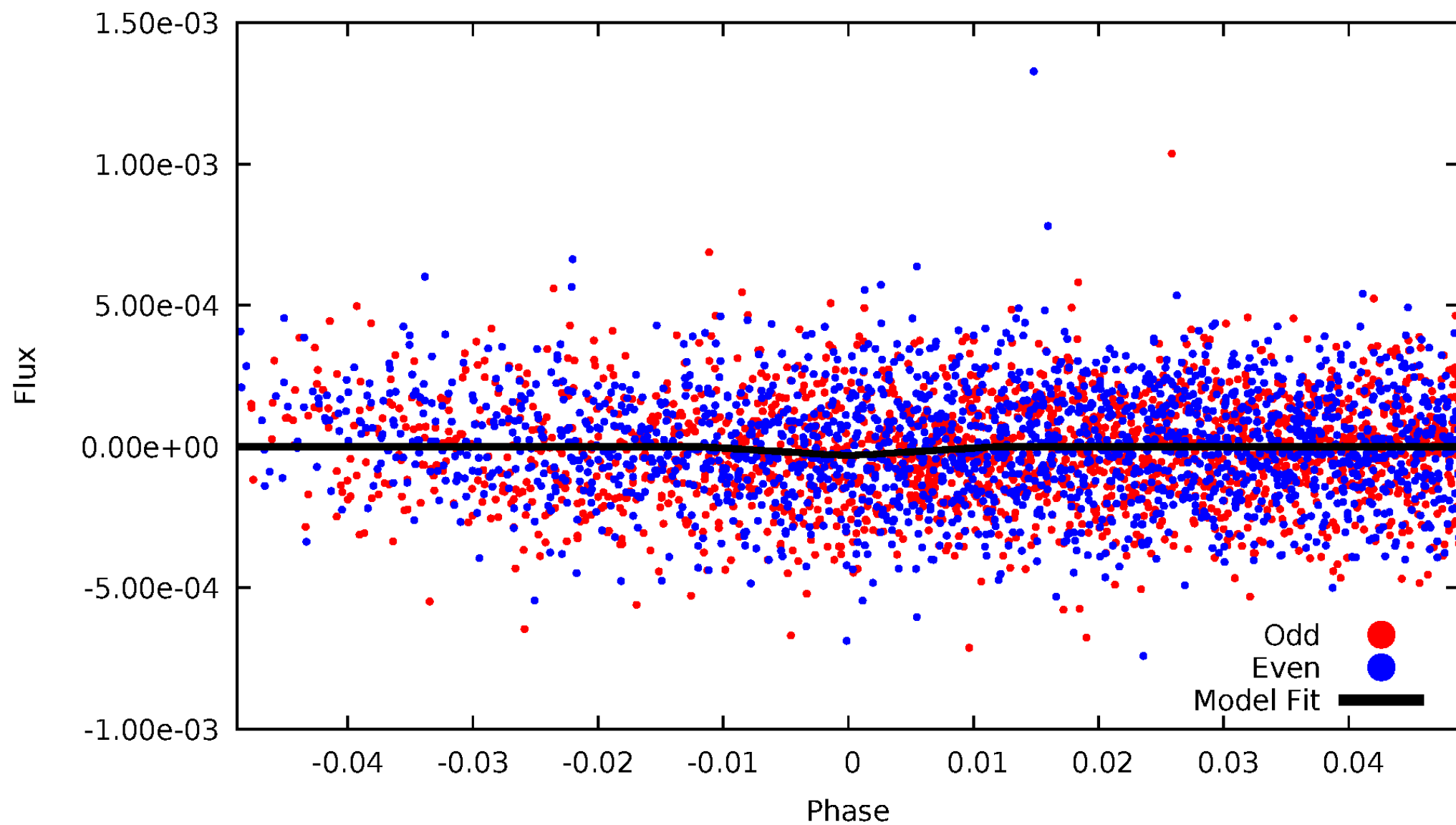
# DV Odd/Even

TCE 010288443-02



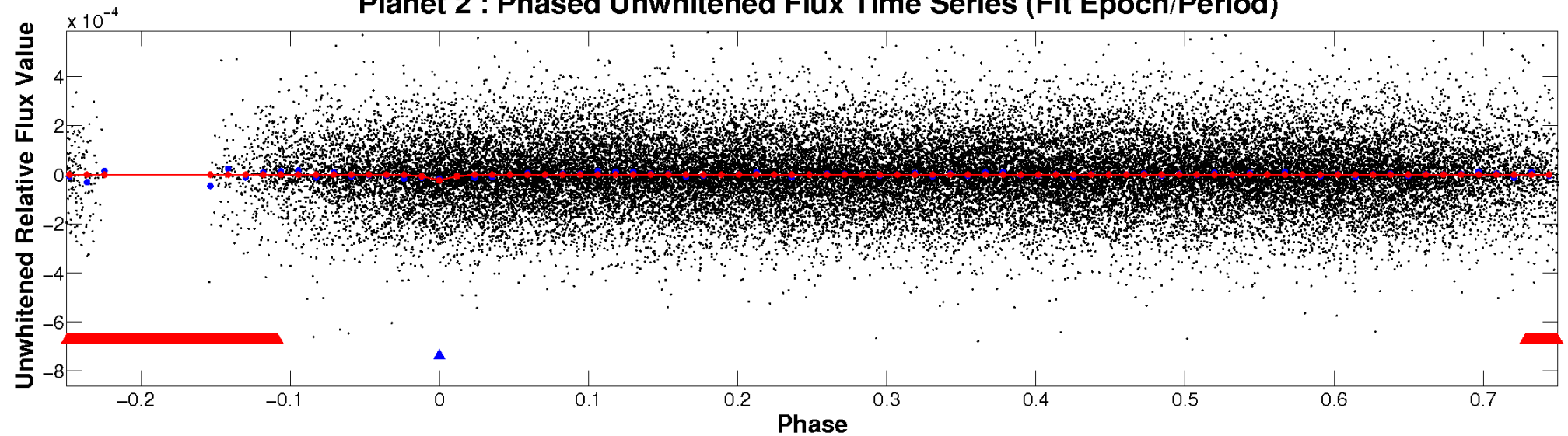
# ALT Odd/Even

TCE 010288443-02

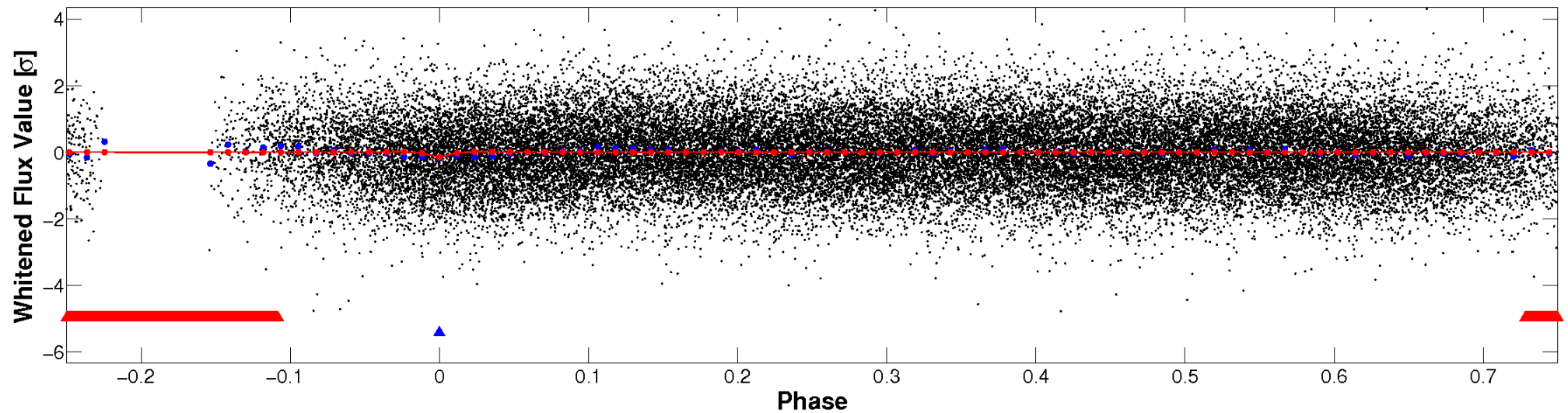


# Non-Whitened Vs. Whitened Light Curve

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

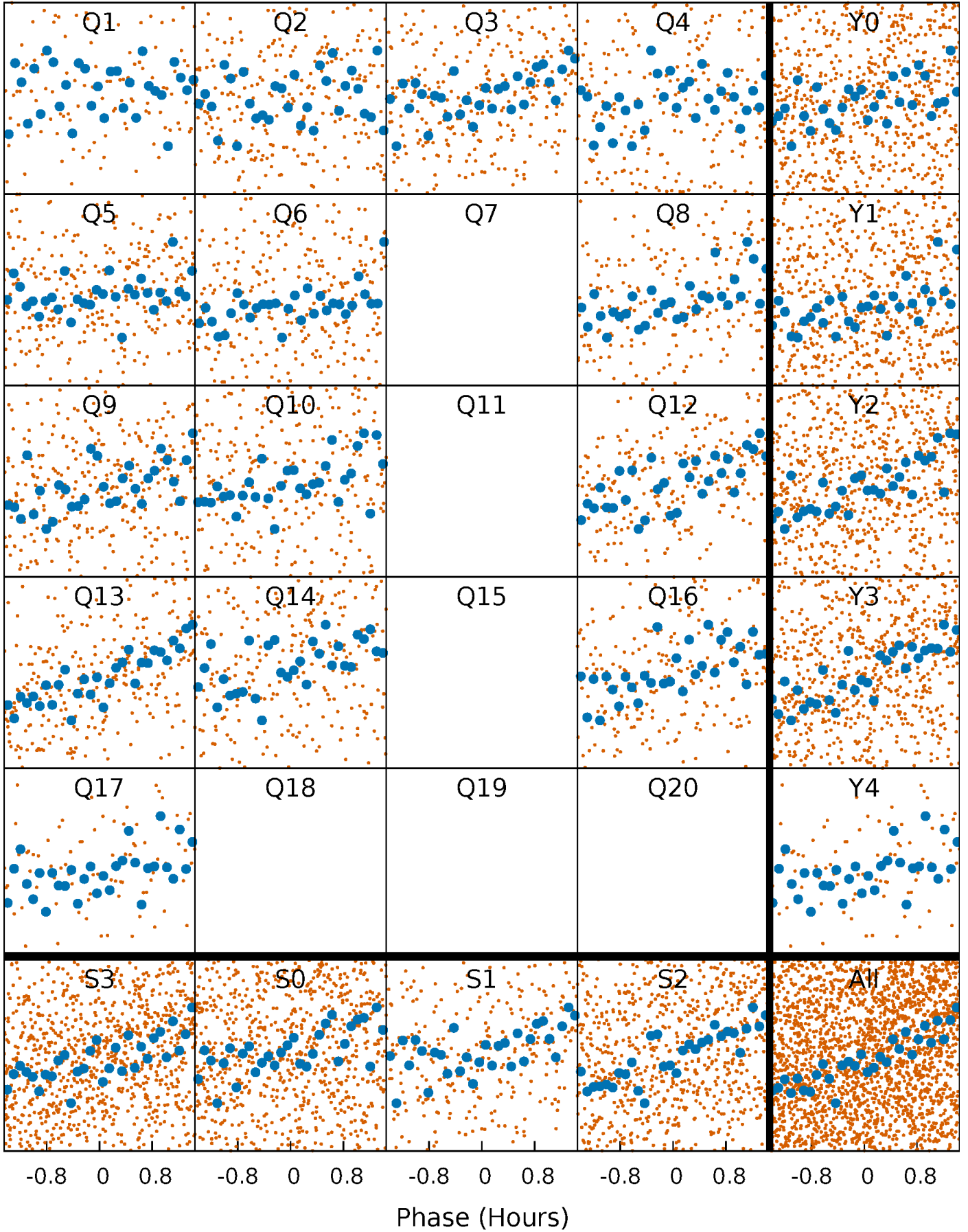


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



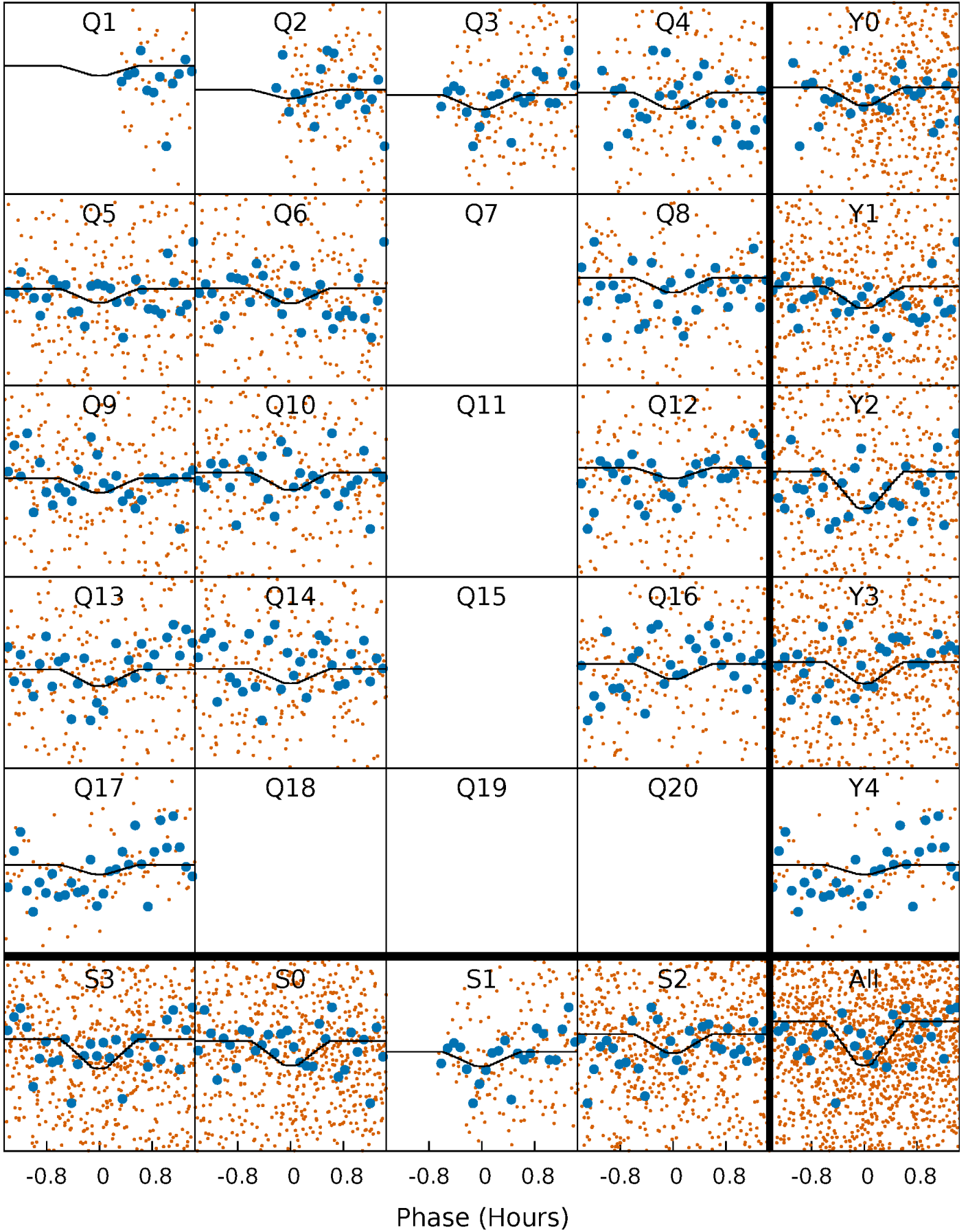
# PDC Quarter-Phased Transit Curves

TCE 010288443-02   P= 1.729772 Days    $T_0=132.477497$  (BKJD)



# DV Quarter-Phased Transit Curves

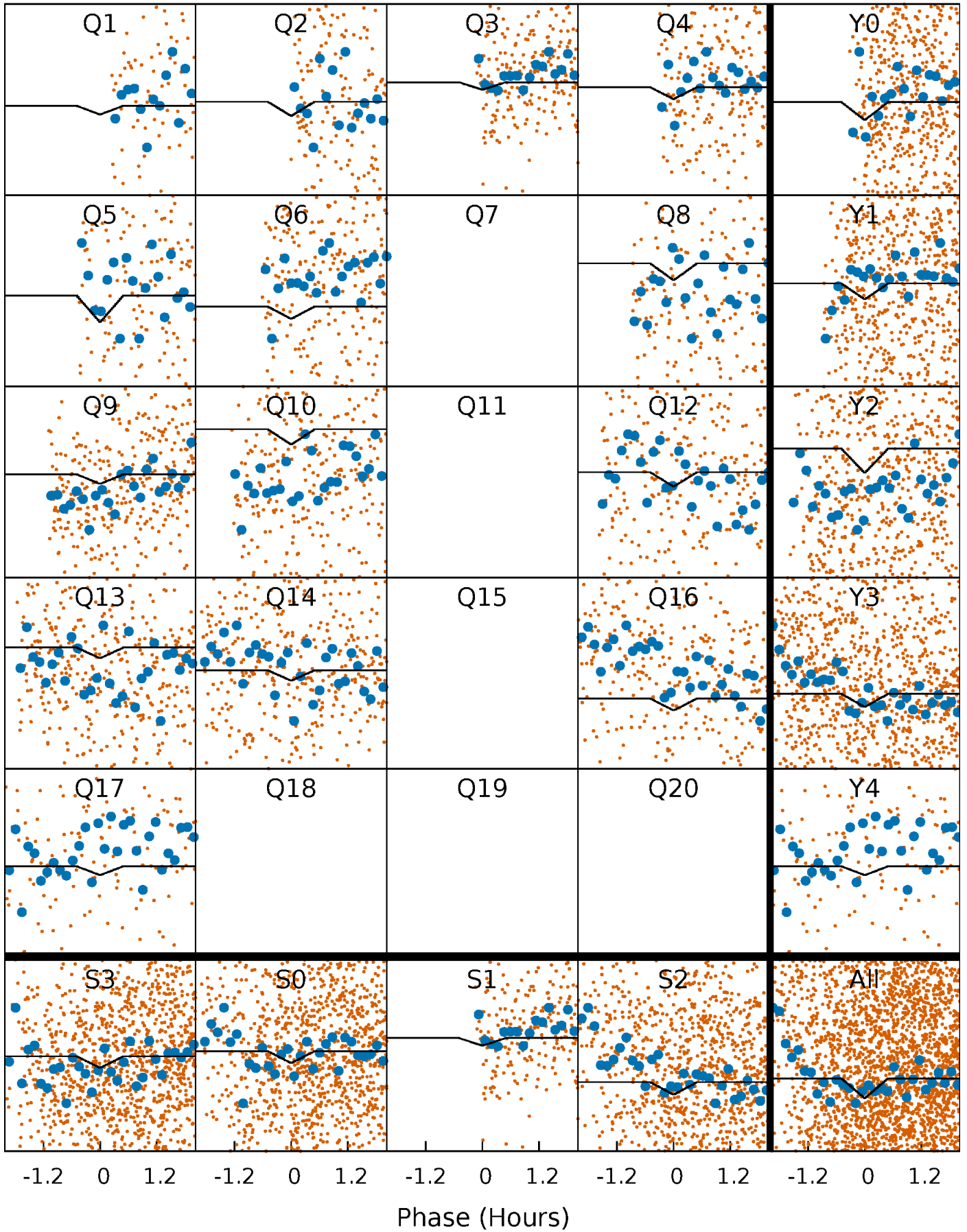
TCE 010288443-02   P= 1.729772 Days    $T_0=132.477497$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 010288443-02   P= 1.729561 Days    $T_0=132.481322$  (BKJD)

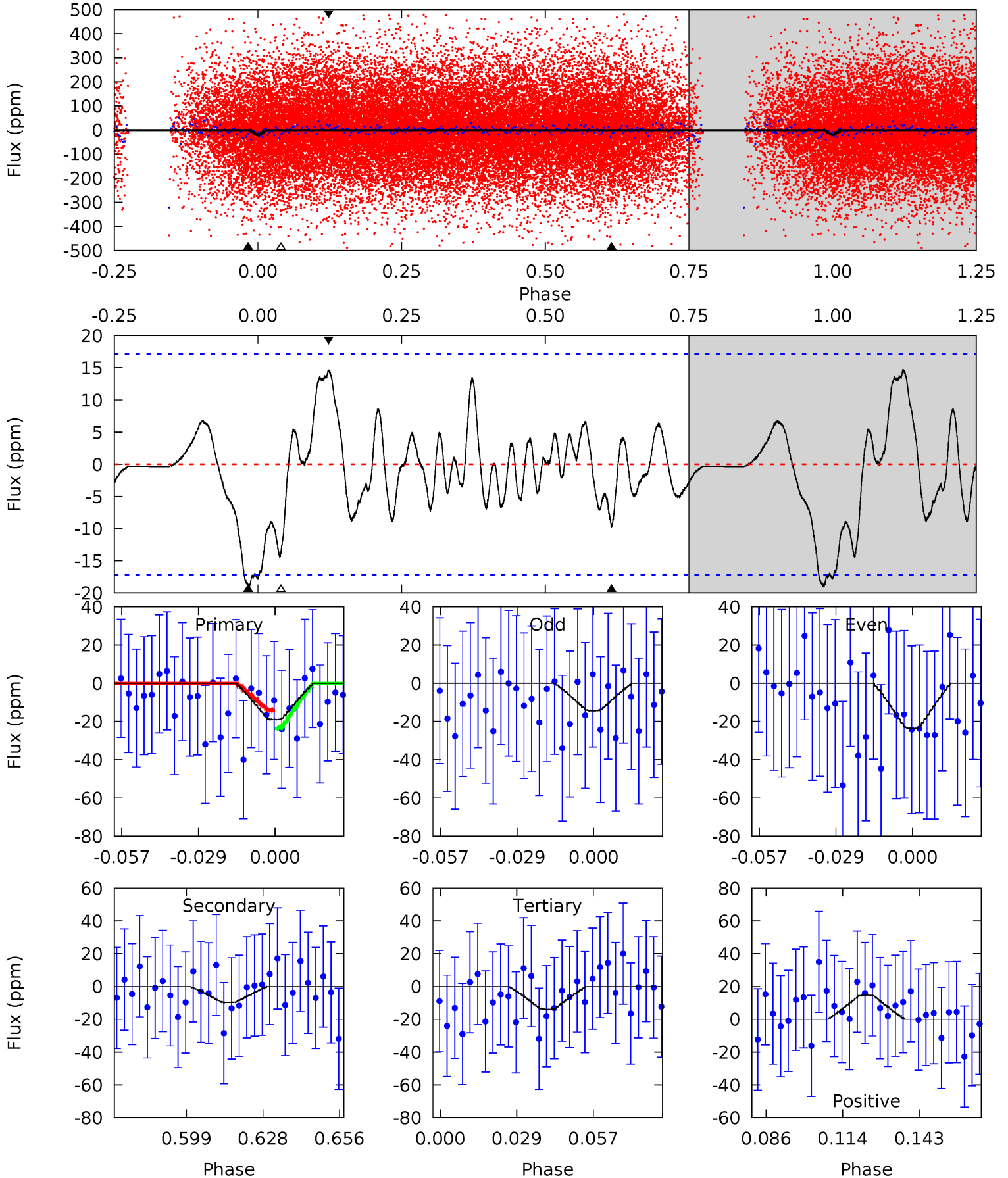




# DV Model-Shift Uniqueness Test

010288443-02, P = 1.729772 Days, E = 130.747725 Days

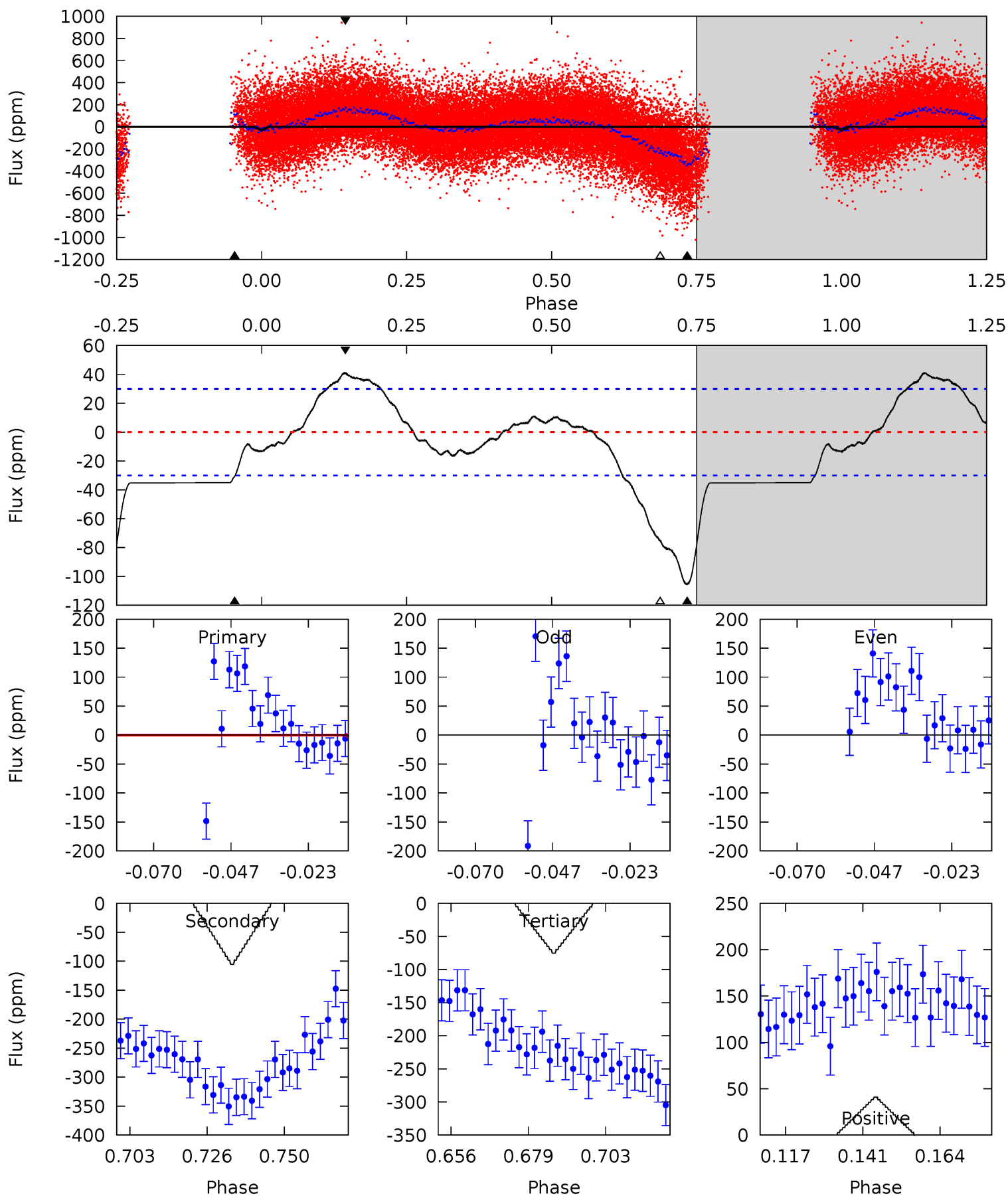
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.34	2.74	3.91	4.13	4.82	2.19	1.60	1.44	1.21	-1.17	-1.39	1.30	0.97	0.44	1.32



# Alt Model-Shift Uniqueness Test

010288443-02, P = 1.729561 Days, E = 130.751761 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
4.97	17.1	12.2	6.63	4.86	2.27	4.38	-7.21	-1.66	4.88	10.4	1.84	0.74	0.28	0.82



### Stellar Parameters For KIC 010288443

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7141^{+199}_{-274}$	$4.133^{+0.162}_{-0.180}$	$-0.320^{+0.250}_{-0.350}$	$1.657^{+0.482}_{-0.395}$	$1.364^{+0.214}_{-0.214}$	$0.422^{+0.408}_{-0.209}$
	+3%/-4%	+4%/-4%	+78%/-109%	+29%/-24%	+16%/-16%	+97%/-50%
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 010288443-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-10 \pm 4$	$0.90^{+0.47}_{-0.43}$	$3192^{+238}_{-198}$	$5563^{+2424}_{-1102}$	$6.722^{+18.339}_{-4.357}$
Alt.	$-105 \pm 6$	$1.07^{+0.46}_{-0.48}$	$3213^{+245}_{-218}$	$10338^{+6053}_{-2175}$	$50^{+104}_{-26}$

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

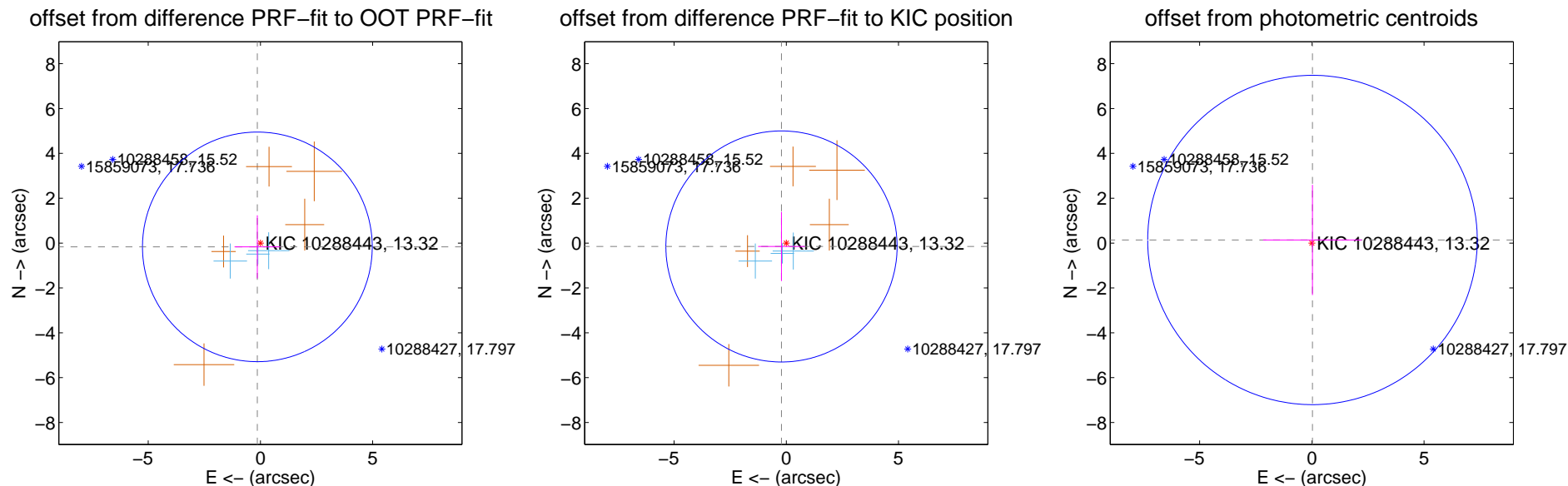
## DV Centroid Data

Supplemental centroid analysis for 010288443-02. Kepler magnitude: 13.32. Transit SNR 3.96

There are 3 quarters with good PRF difference image offsets

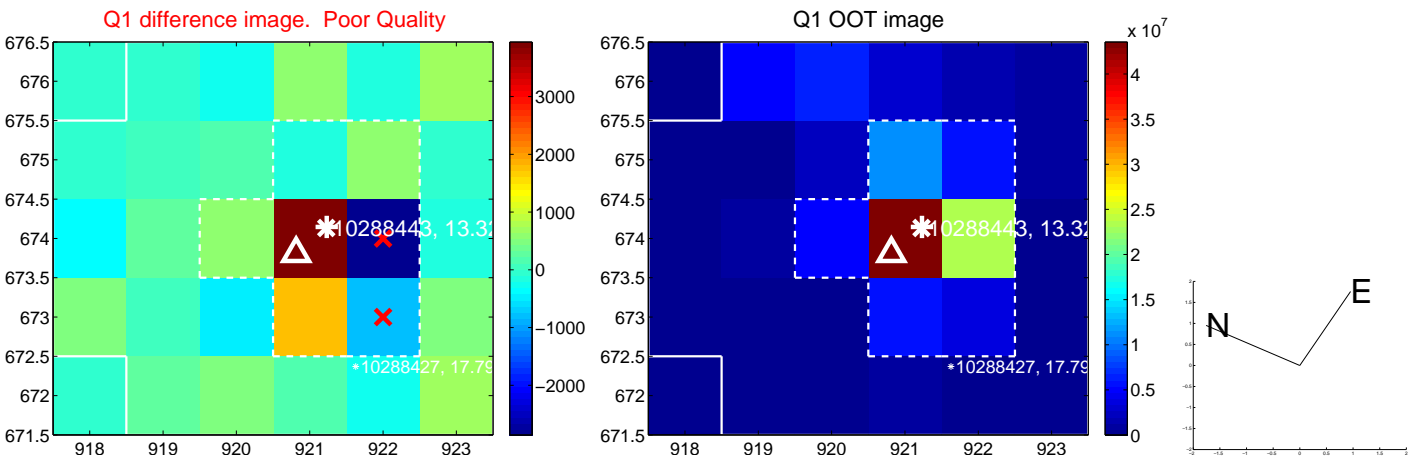
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.217 \pm 1.706$	0.13	$0.136 \pm 1.019$	$-0.169 \pm 1.407$
PRF-fit source offset from KIC position	$0.261 \pm 1.717$	0.15	$0.213 \pm 1.041$	$-0.150 \pm 1.544$
photometric centroid source offset	$0.14 \pm 2.45$	0.06	$-0.03 \pm 2.20$	$0.14 \pm 2.46$

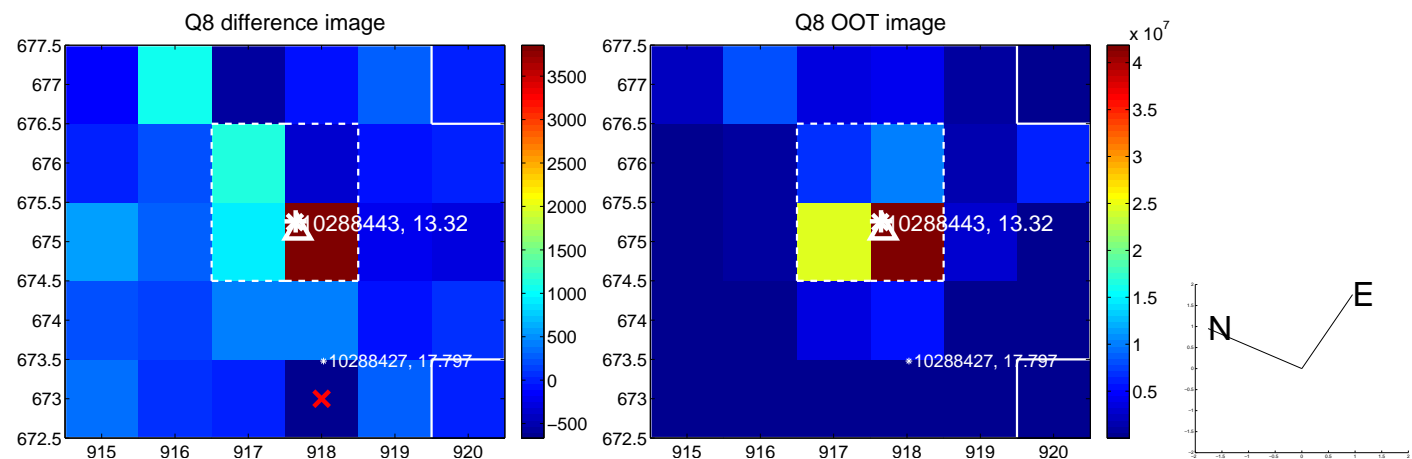
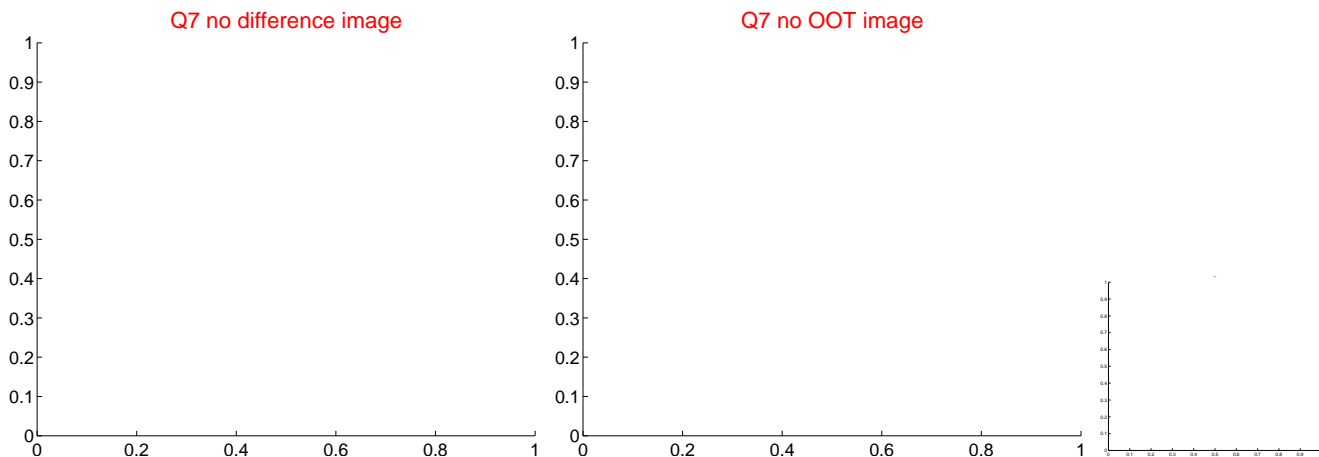
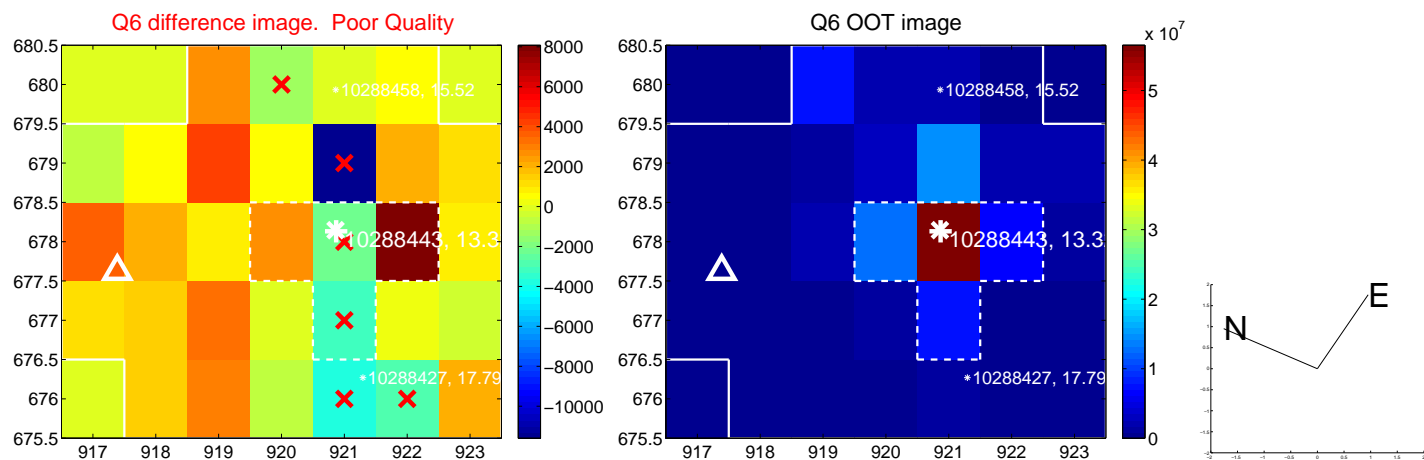
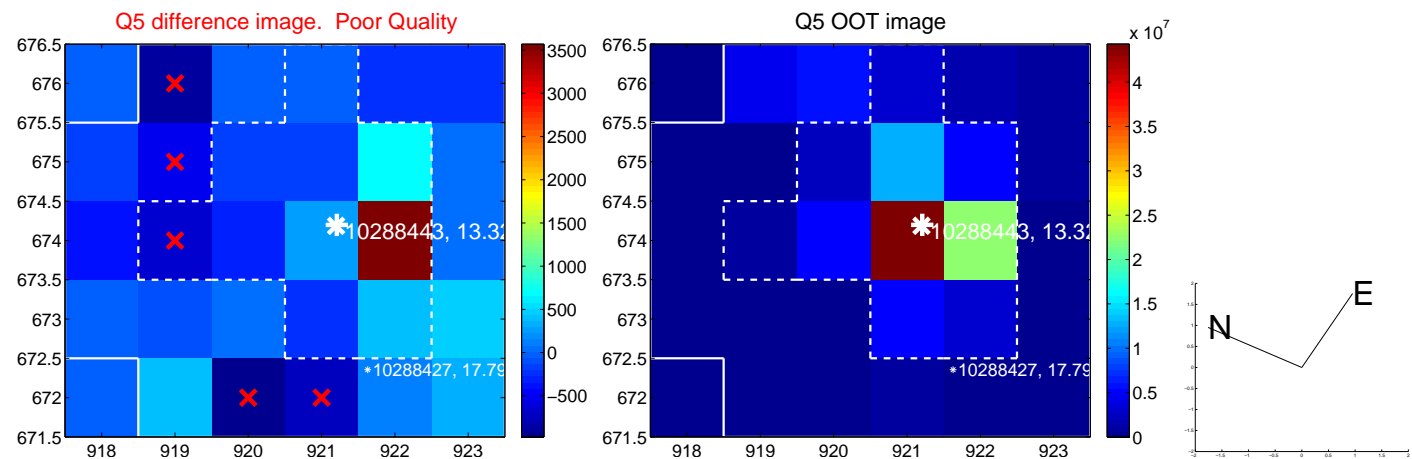


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

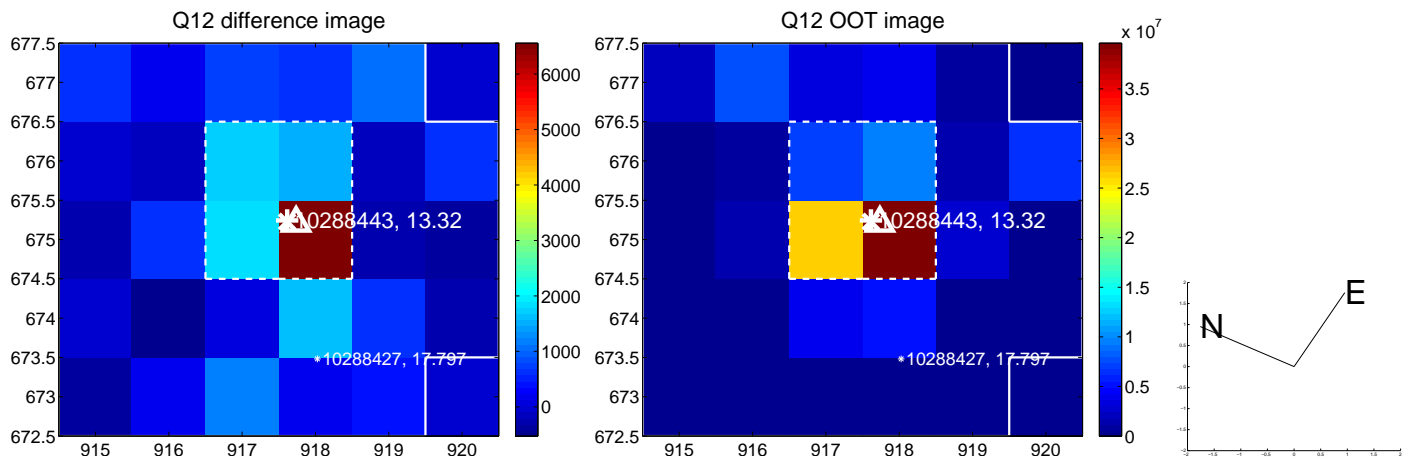
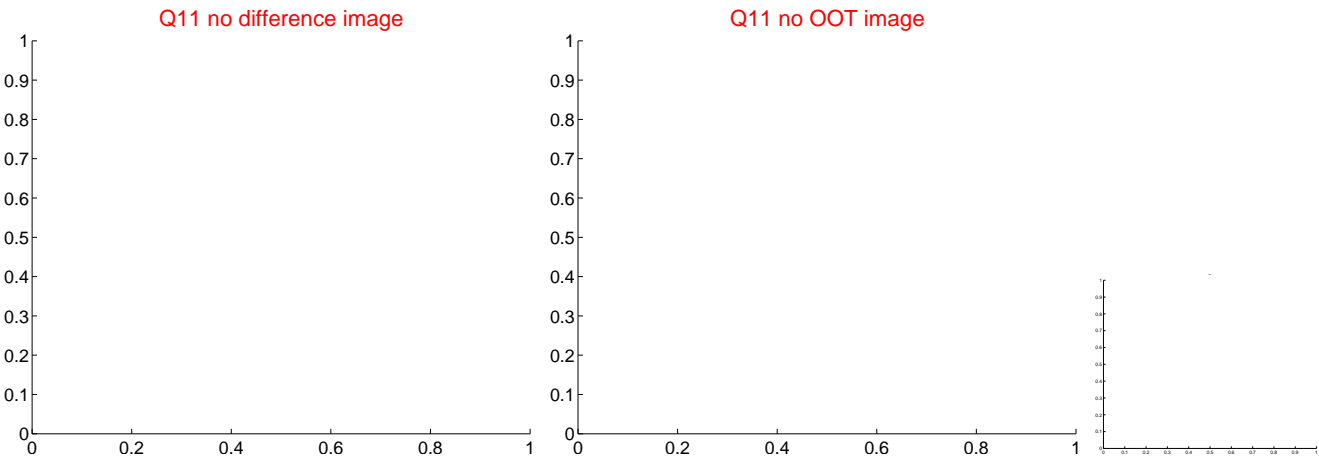
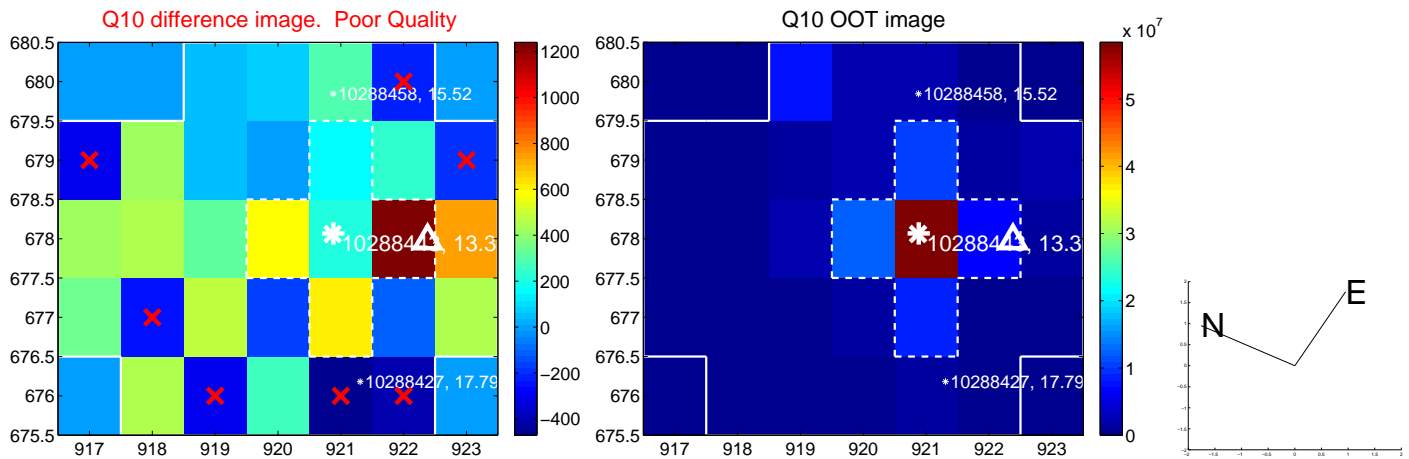
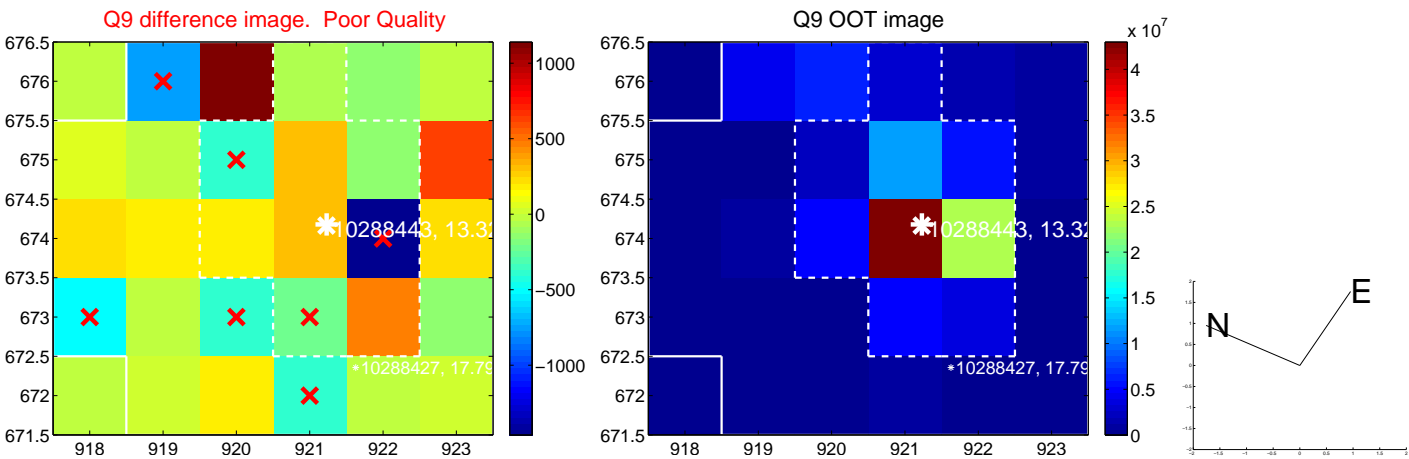


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

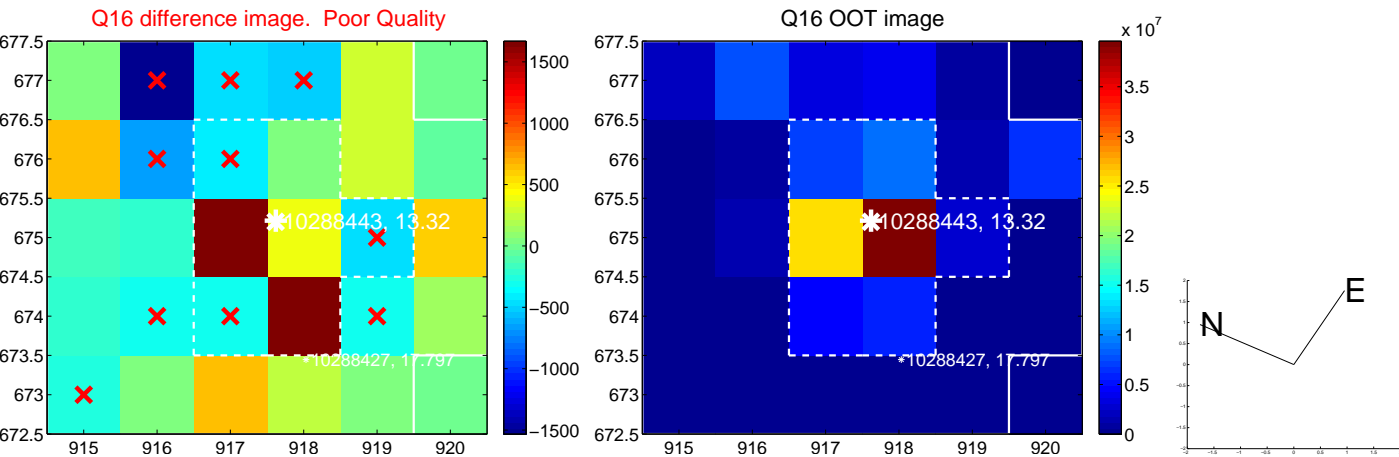
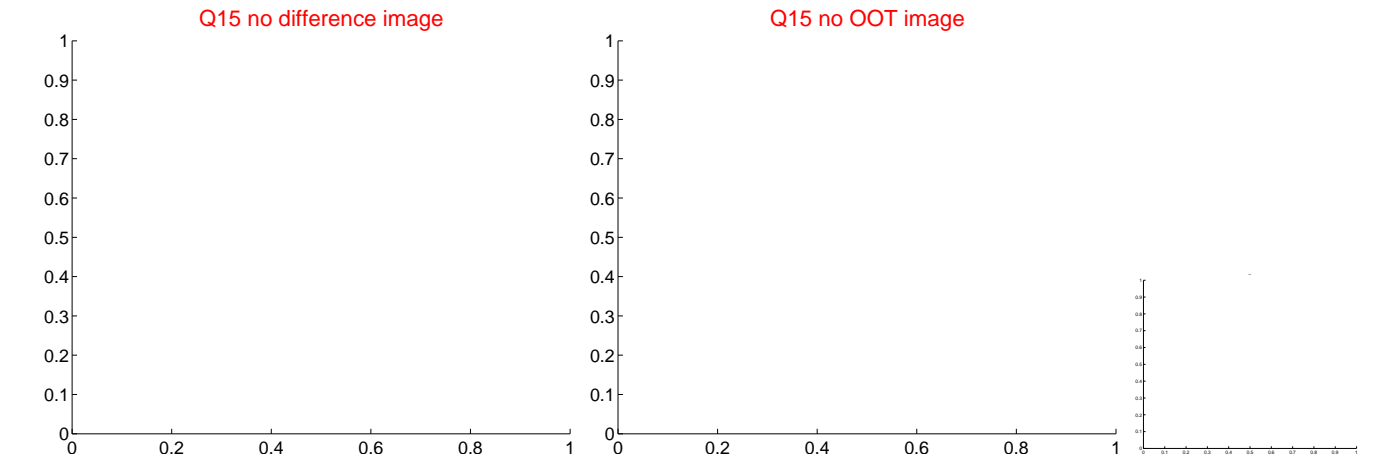
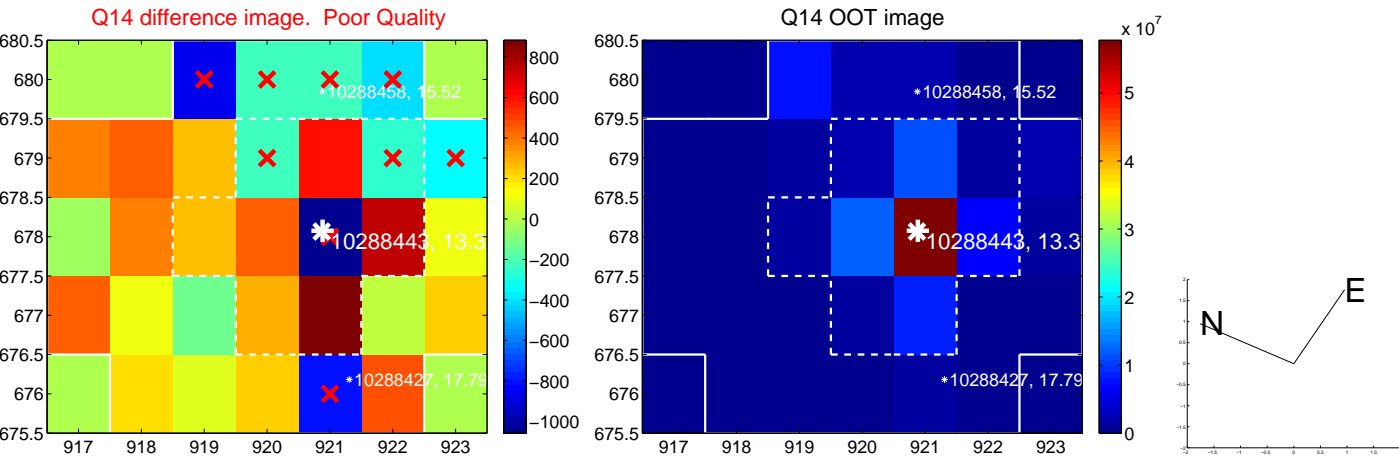
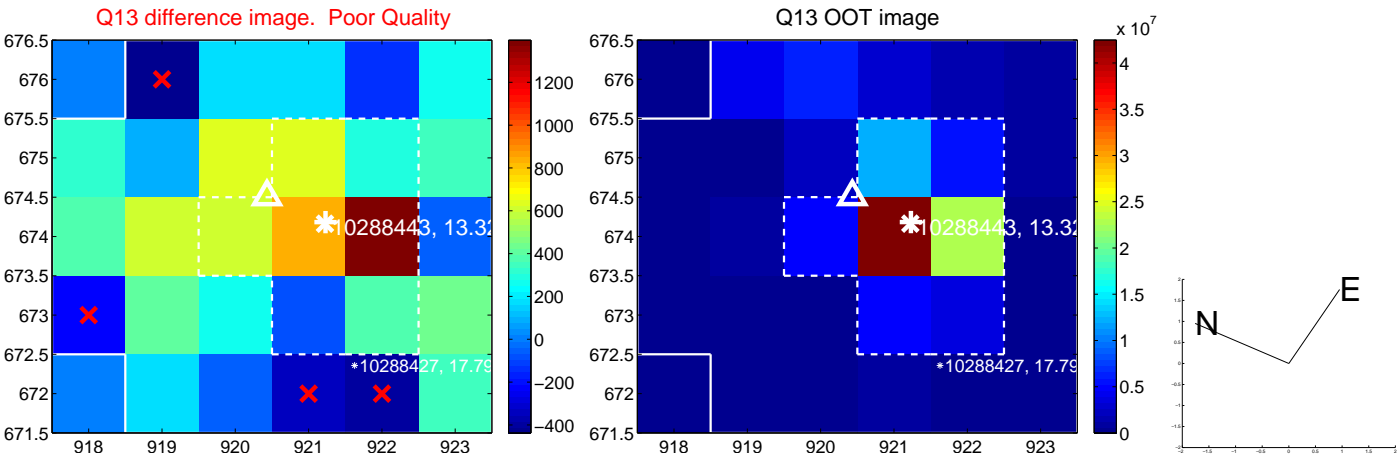




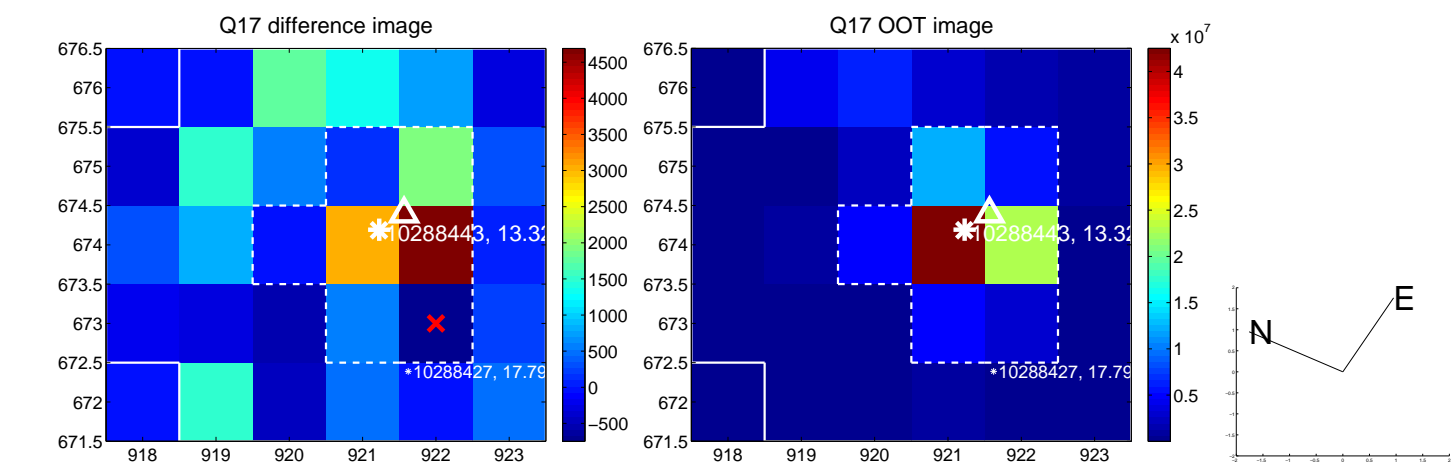
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



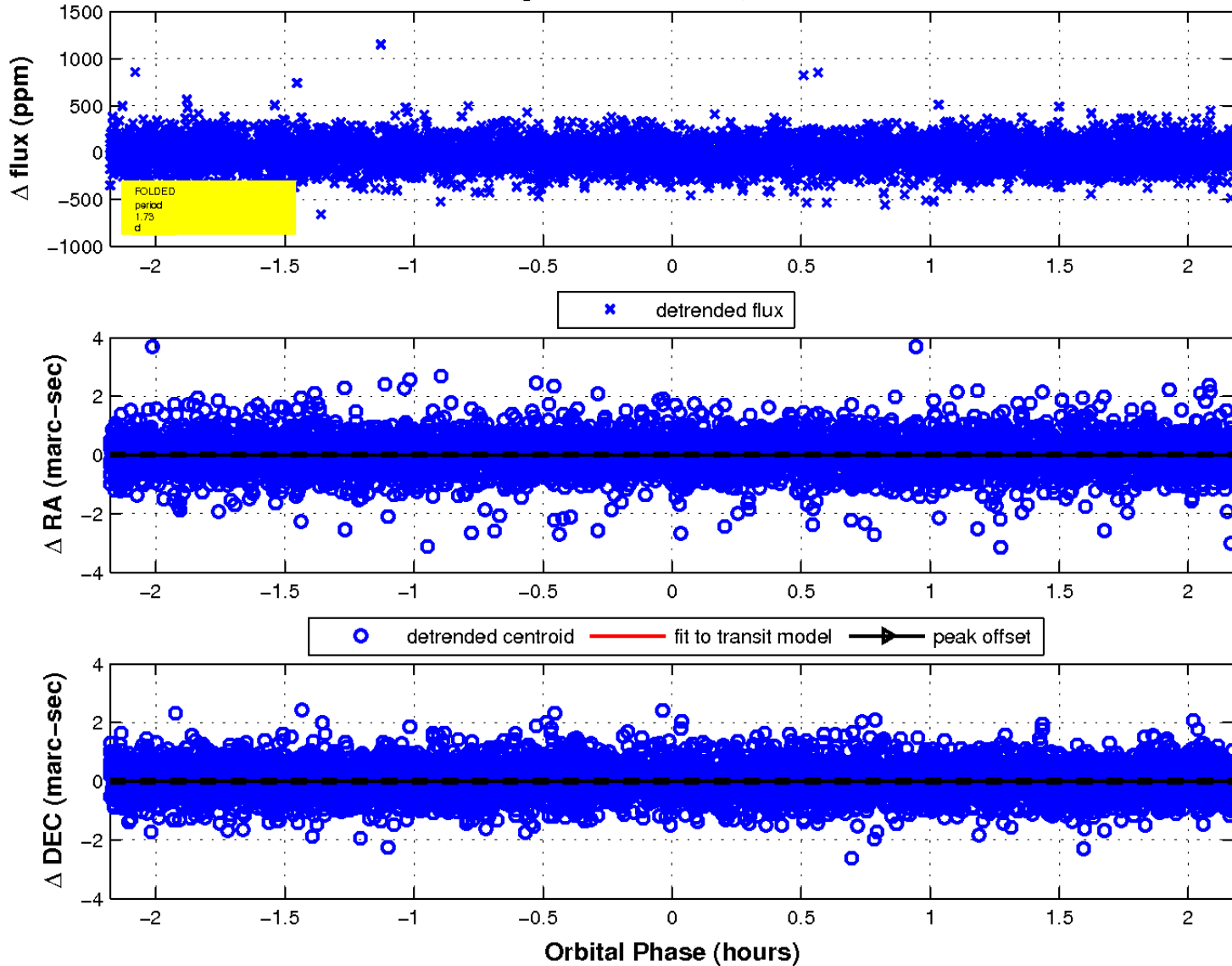
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

