

# KIC 007117020

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007117020-01	OBS	No	0.566795	131.814458	43.3	3.494	10.4	11.4	0.99	6170	0.77	6820.38
007117020-02	OBS	No	93.730848	132.912310	585.1	7.085	8.0	9.2	0.99	6170	3.02	7.51

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007117020-01	OBS	FP	0.00	1	0	0	1	LPP_DV—MOD_NONUNIQ_ALT—EPHEM_MATCH
007117020-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT

**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.

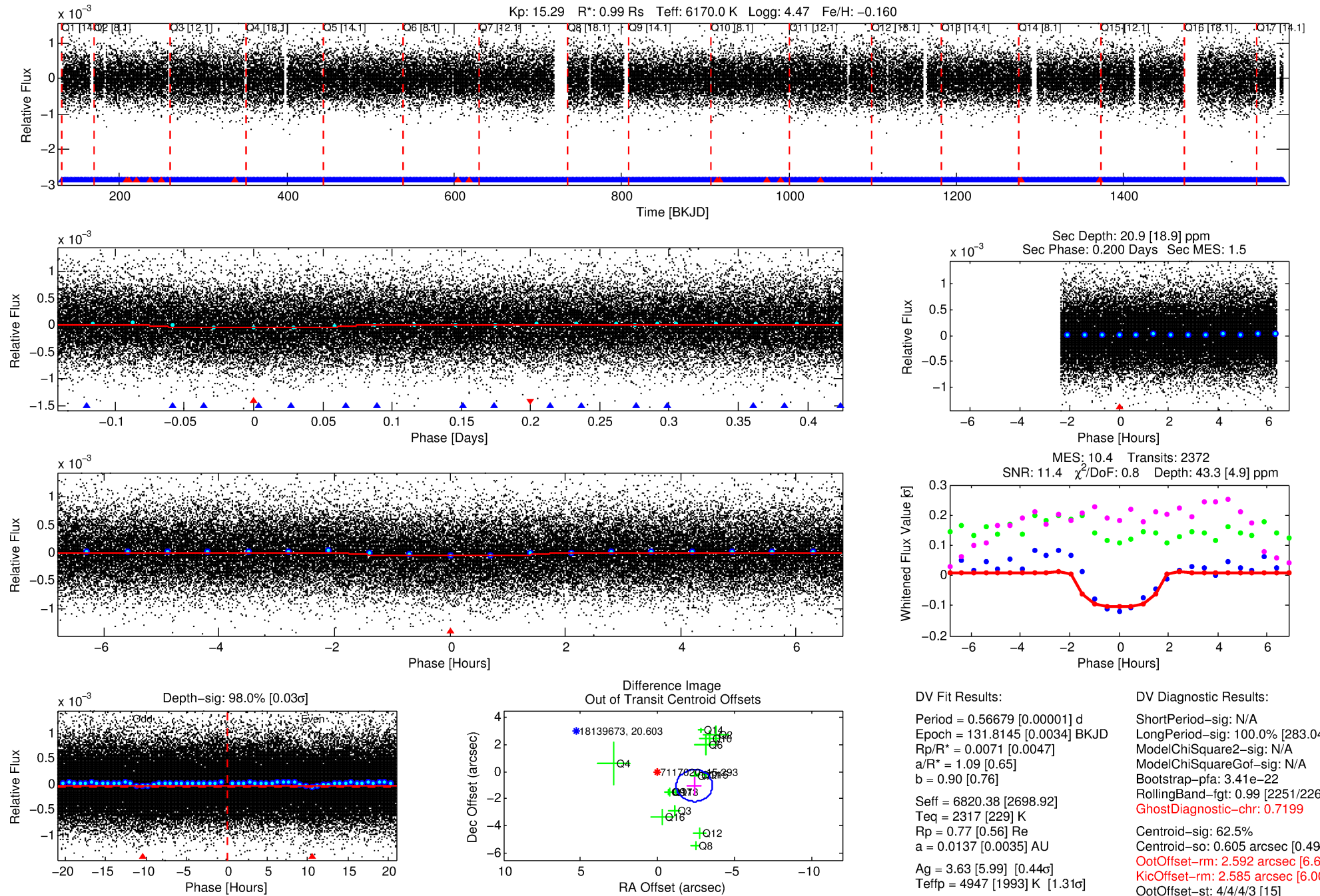
## Ephemeris Match Information For 007117020-01

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
007117020-01	7117020	RR-Lyr-pri	7198959	1:1	692.4	171	33	7.86	15.29	14495.00	Direct-PRF	0	0.63	20.04

**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

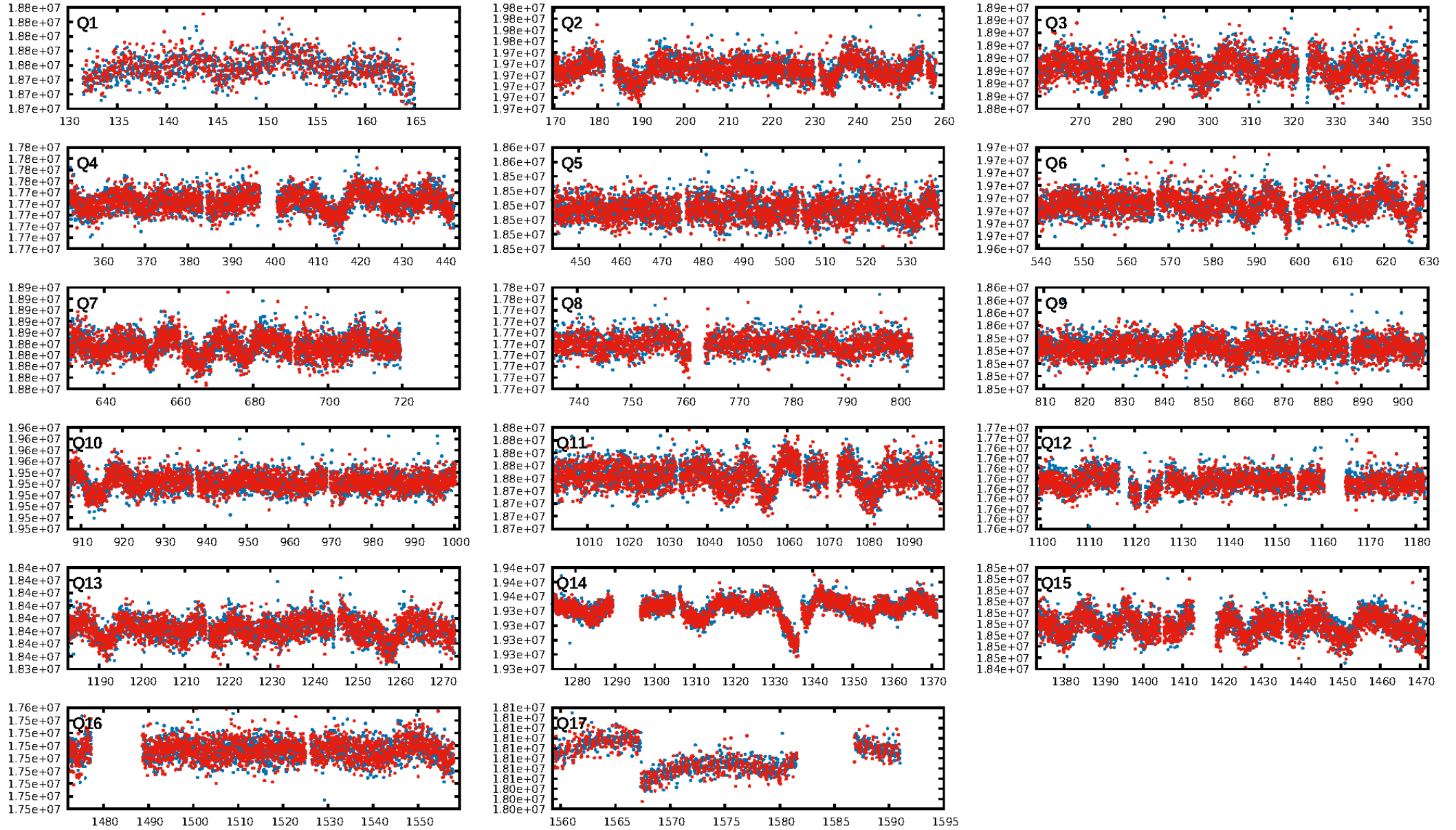
KIC: 7117020 Candidate: 1 of 2 Period: 0.567 d



Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 11:39:31 Z

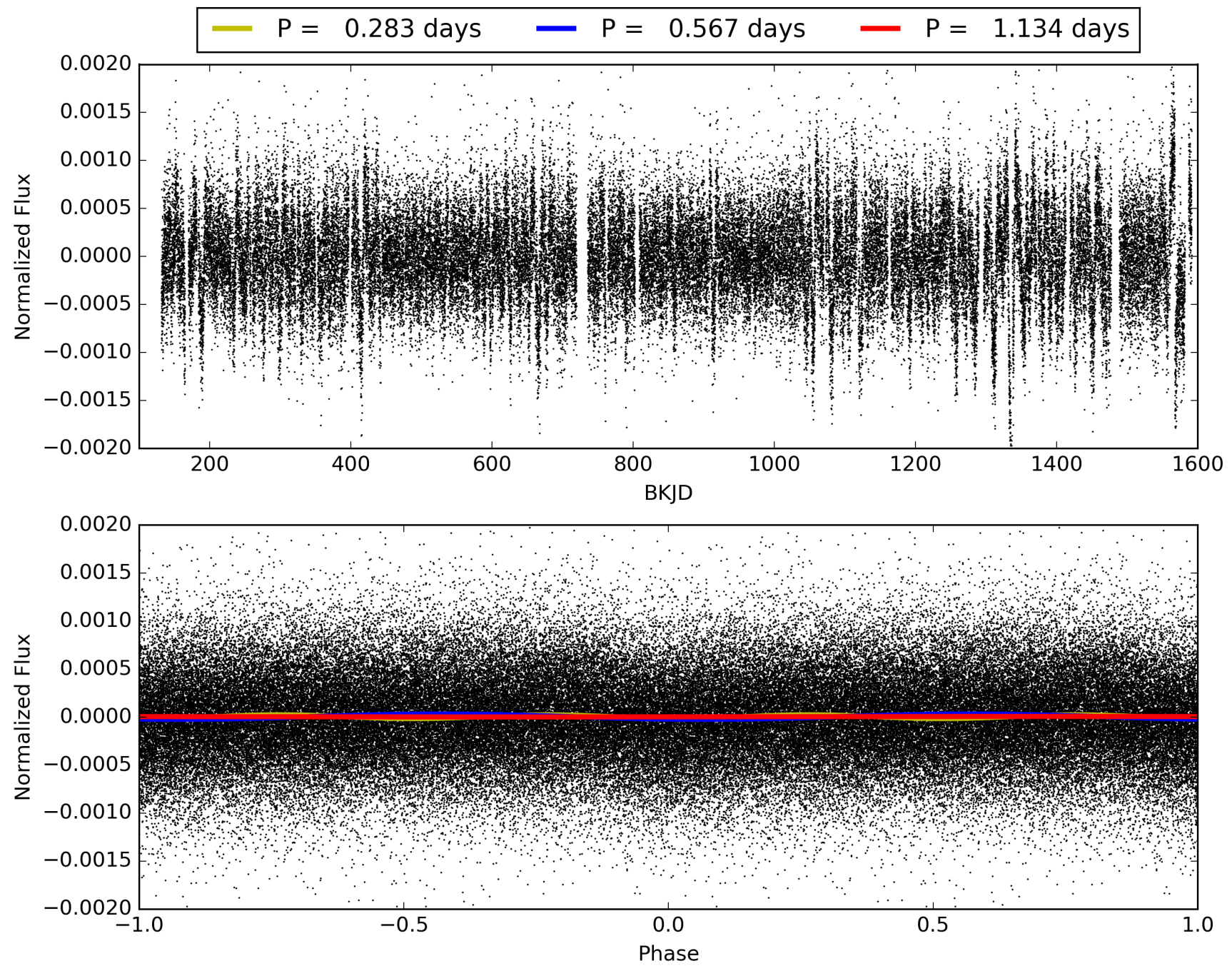
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 007117020-01, PDC Light Curves



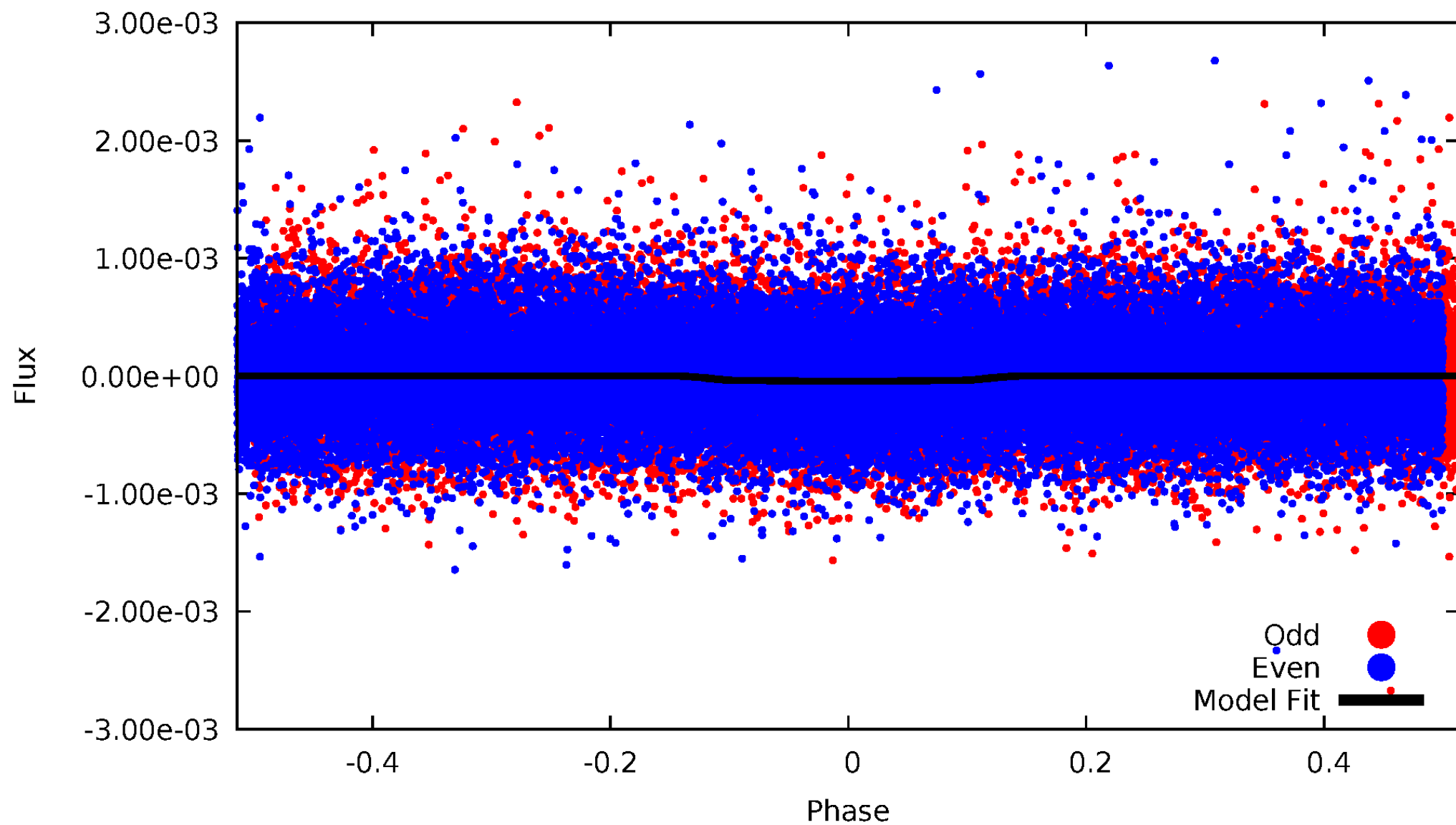


TCE 007117020-01



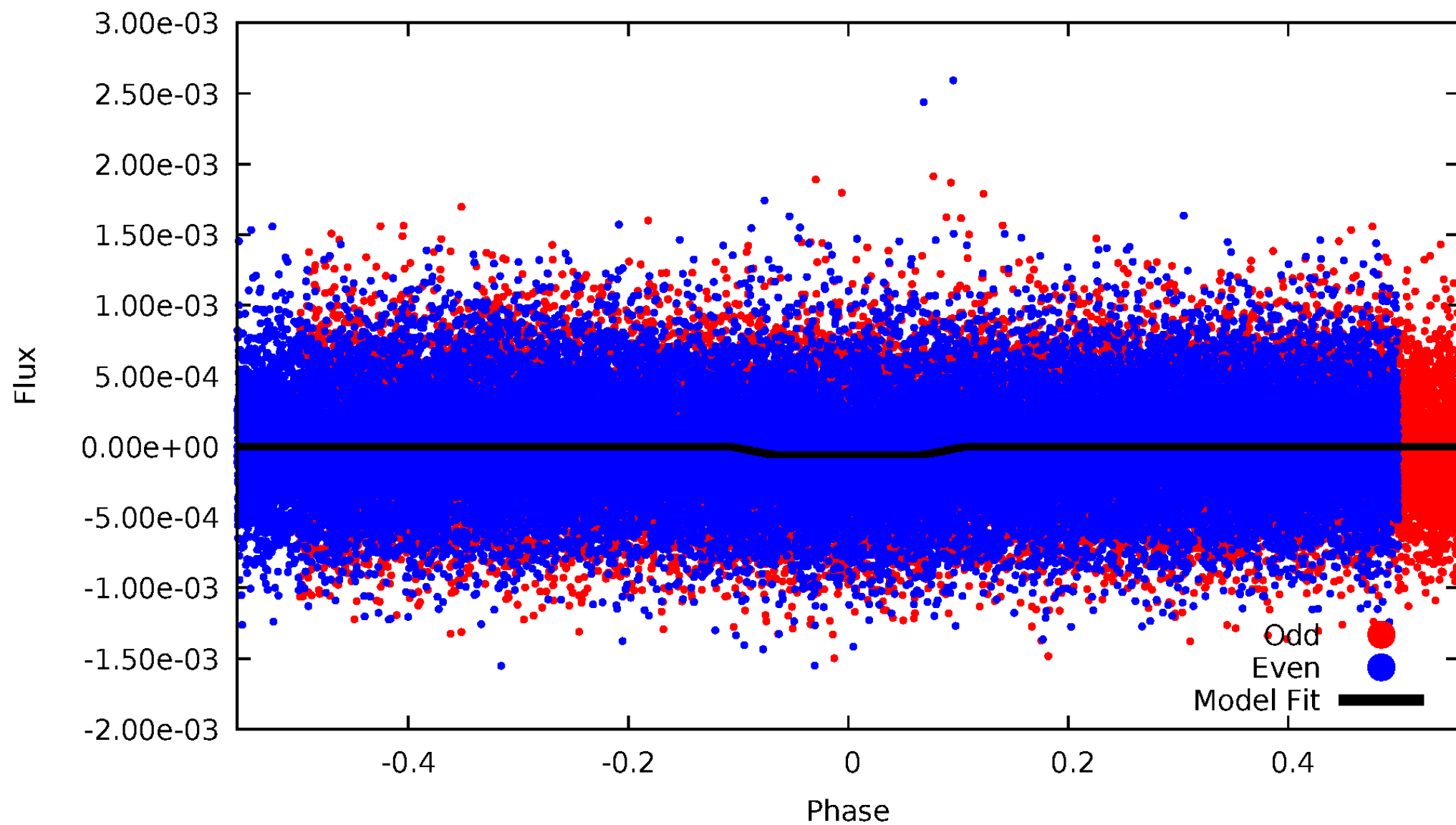
# DV Odd/Even

TCE 007117020-01



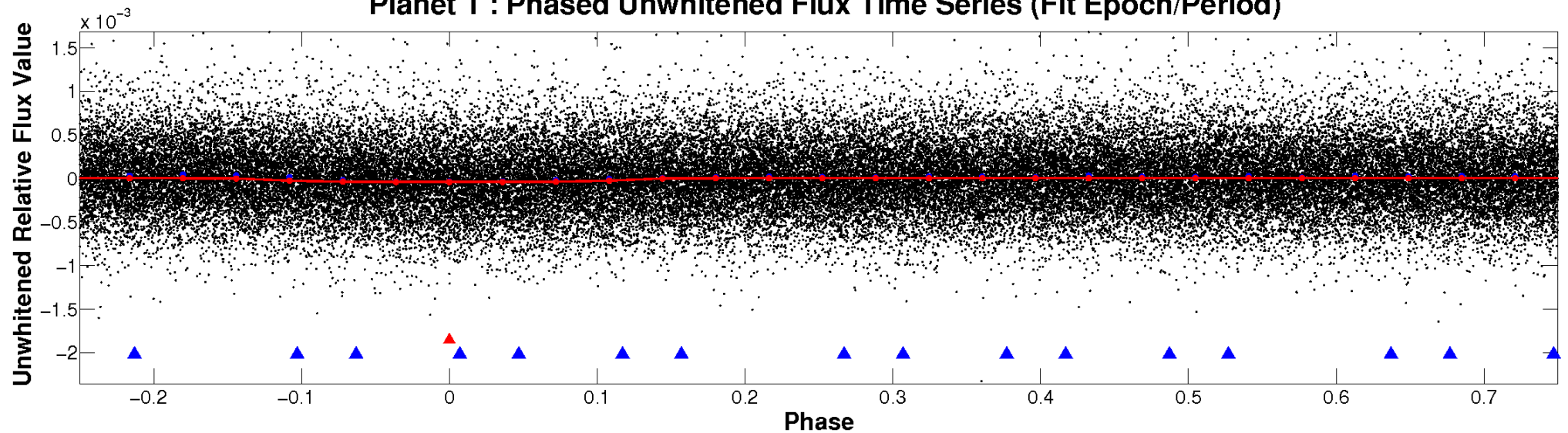
# ALT Odd/Even

TCE 007117020-01

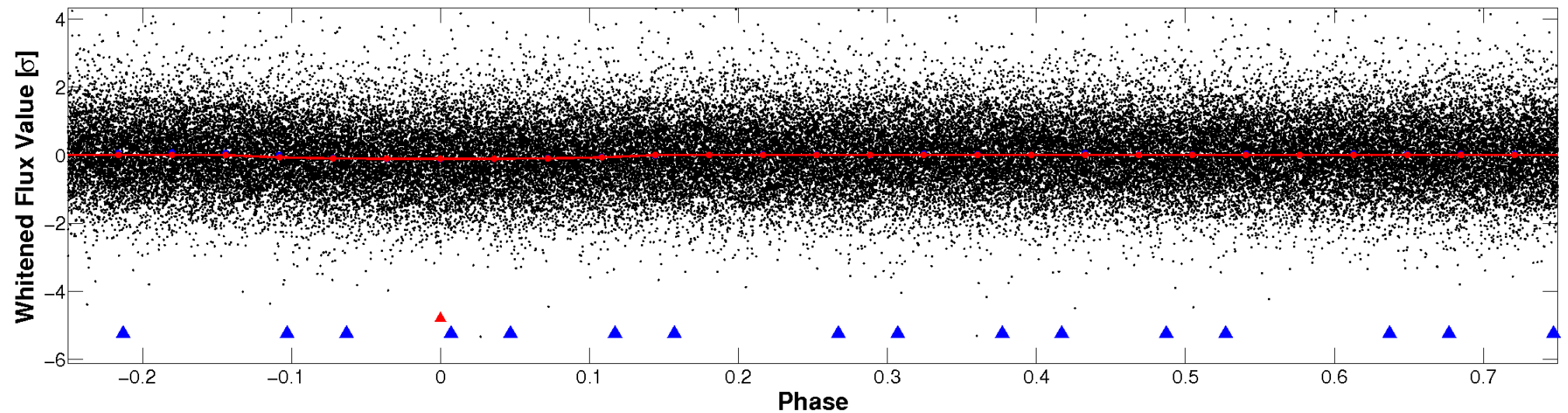


# Non-Whitened Vs. Whitened Light Curve

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



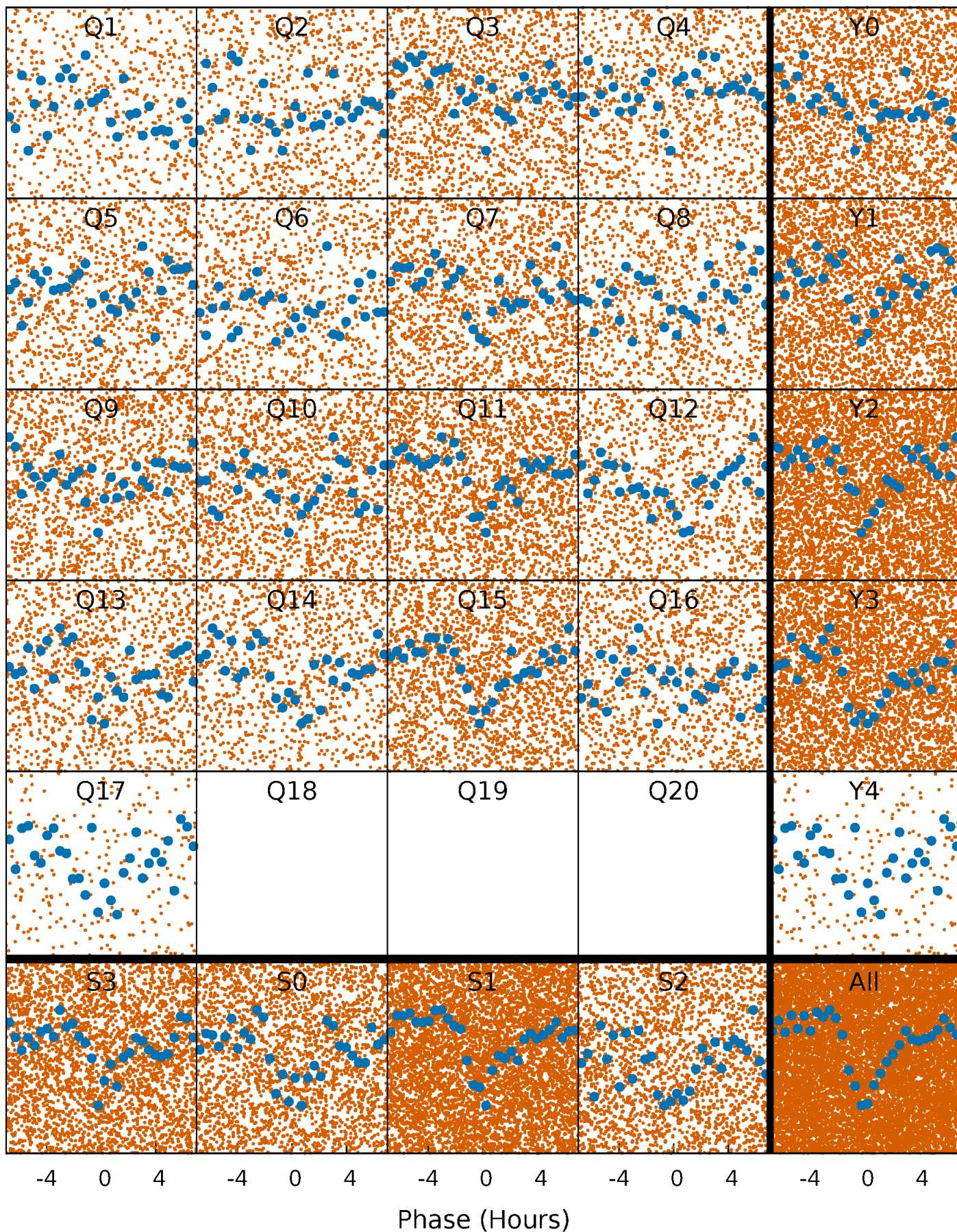
## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

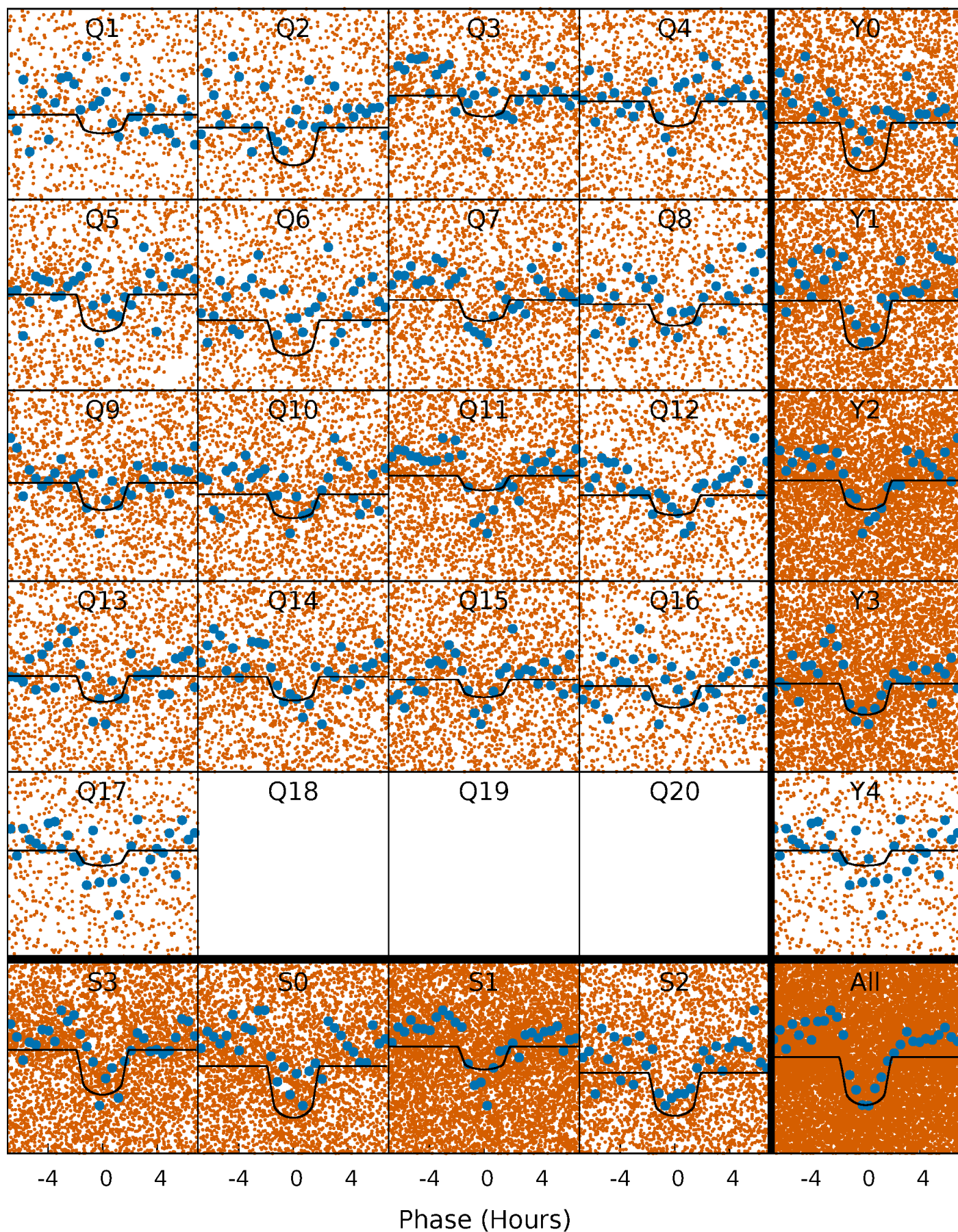
TCE 007117020-01 P= 0.566795 Days  $T_0=131.814458$  (BKJD)





# DV Quarter-Phased Transit Curves

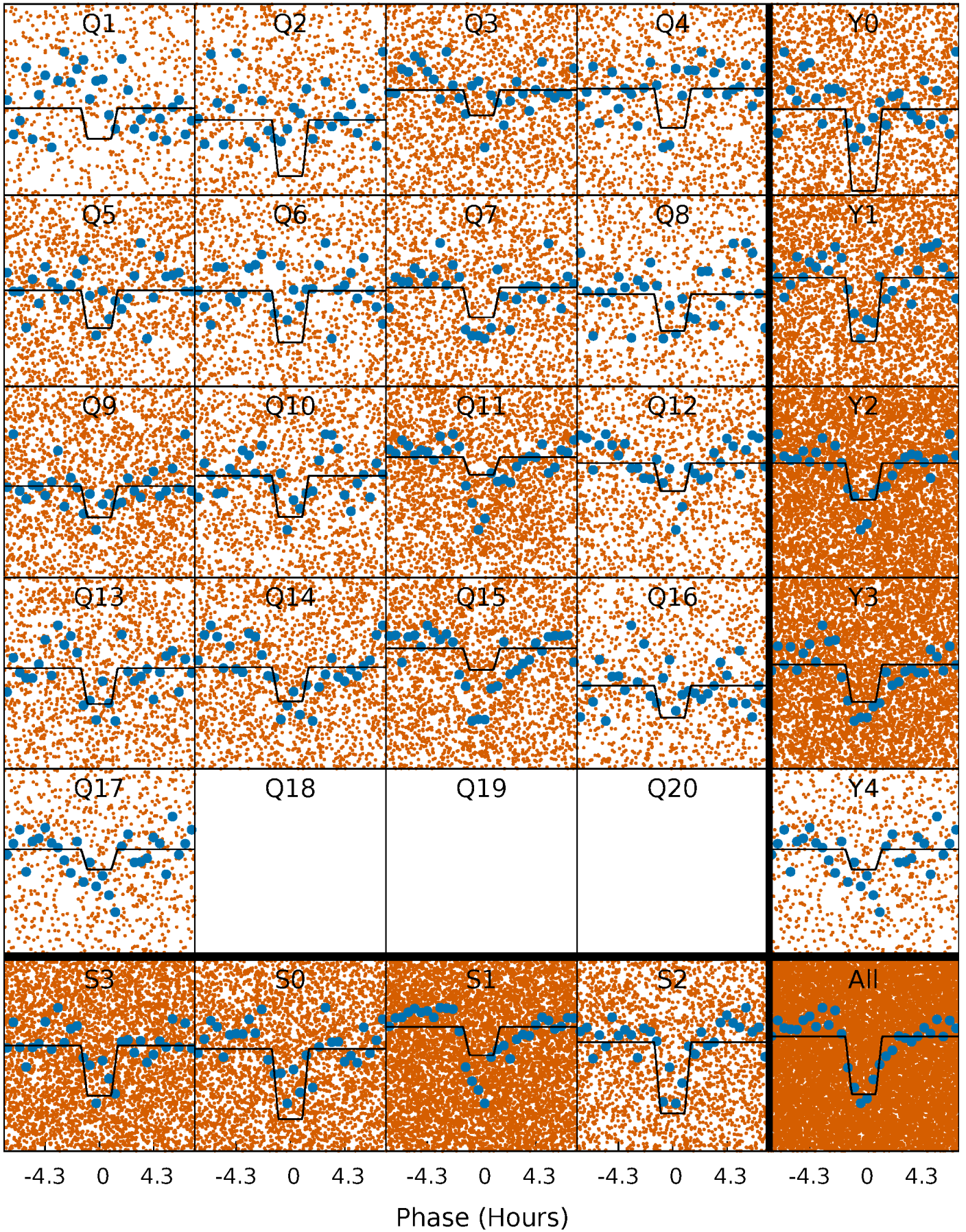
TCE 007117020-01 P= 0.566795 Days  $T_0=131.814458$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

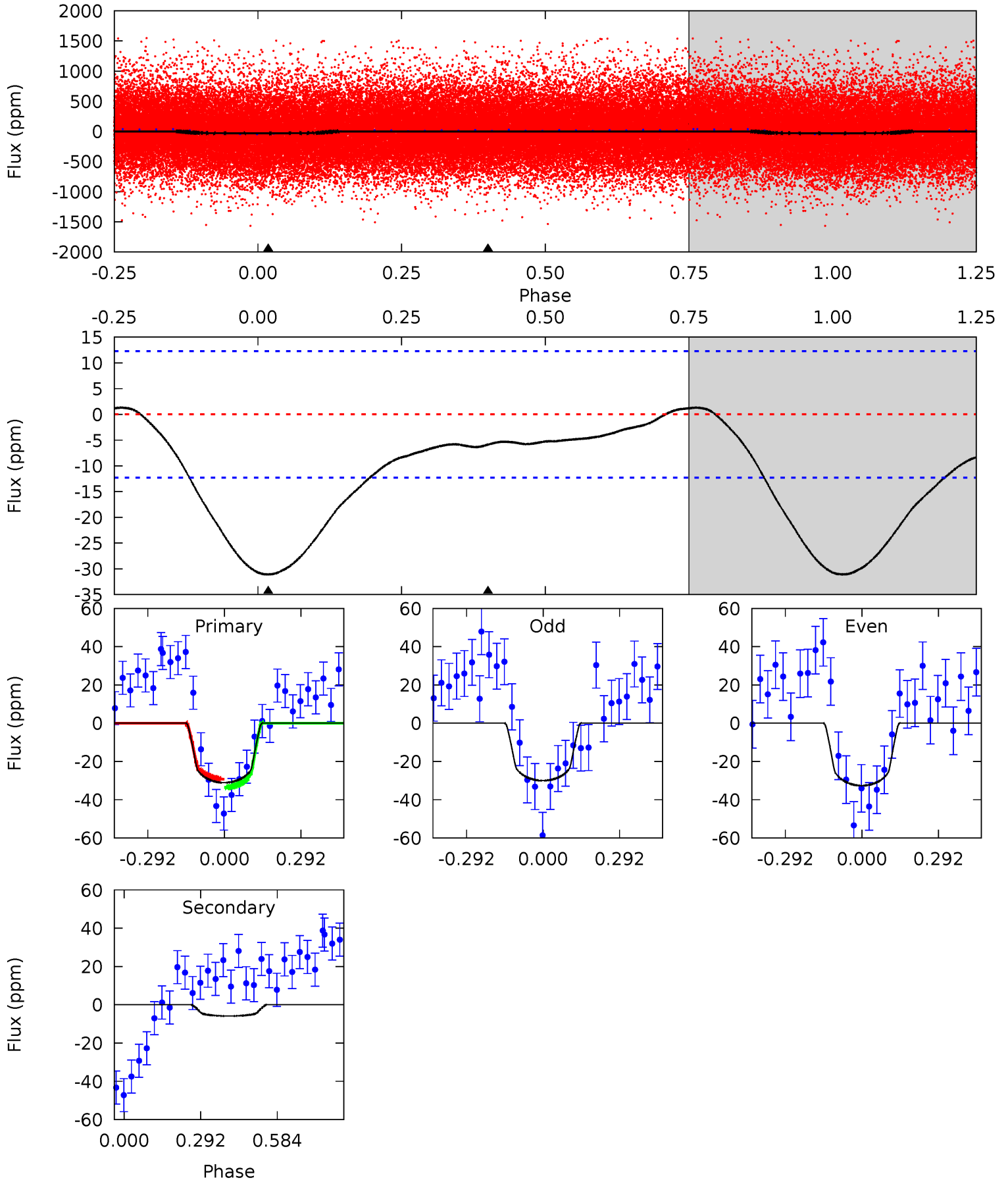
TCE 007117020-01 P= 0.566801 Days  $T_0=131.811347$  (BKJD)



# DV Model-Shift Uniqueness Test

007117020-01, P = 0.566795 Days, E = 131.247663 Days

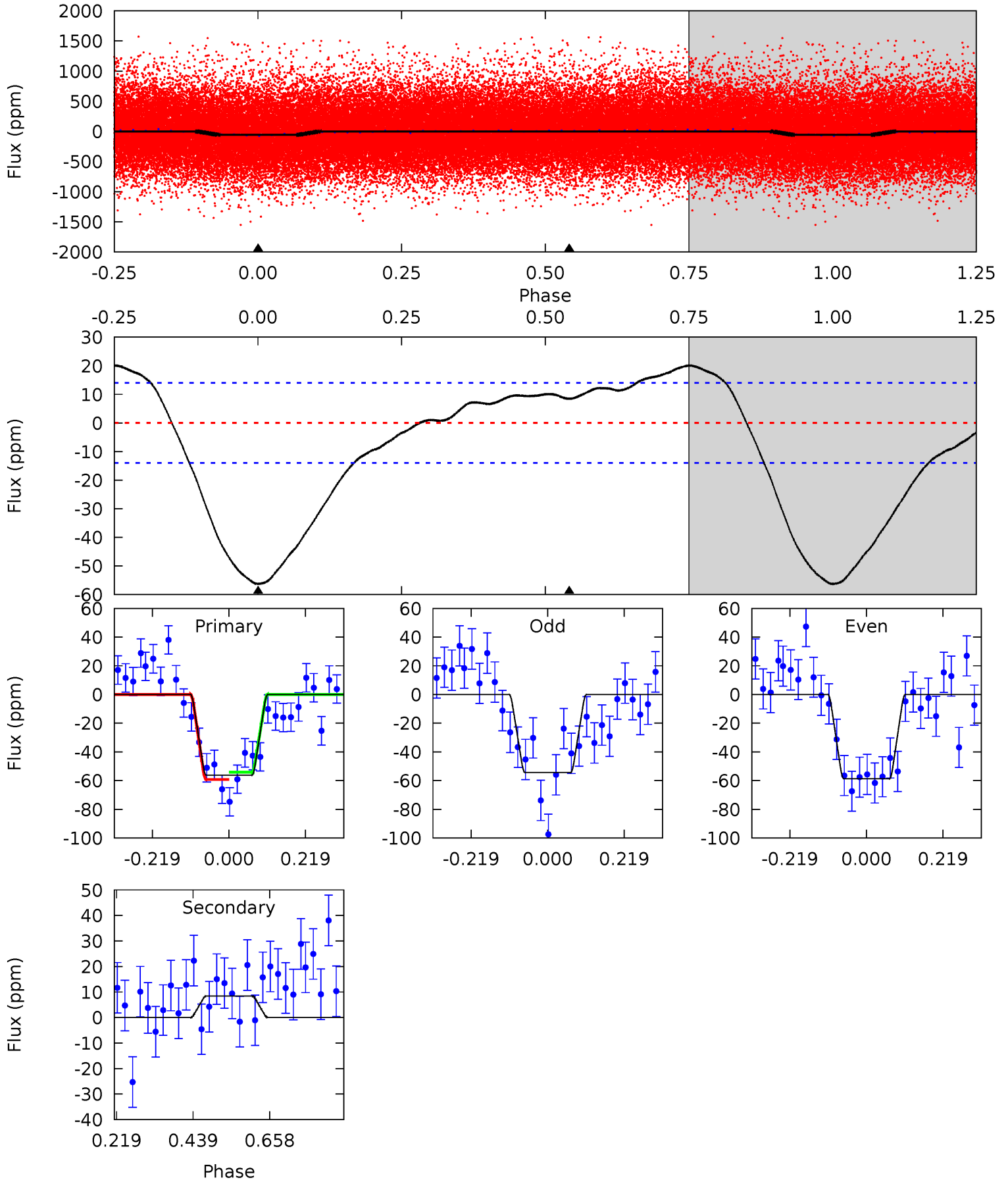
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.0	2.08	0	0	4.33	1.05	0.45	11.0	11.0	2.08	2.08	0.46	0.79	0.04	0.77



# Alt Model-Shift Uniqueness Test

007117020-01, P = 0.566801 Days, E = 131.244546 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
17.7	-2.65	0	0	4.40	1.23	2.55	17.7	17.7	-2.65	-2.65	0.69	0.94	0.26	0.81





### Stellar Parameters For KIC 007117020

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6170^{+174}_{-217}$	$4.472^{+0.054}_{-0.202}$	$-0.160^{+0.250}_{-0.350}$	$0.992^{+0.300}_{-0.107}$	$1.063^{+0.145}_{-0.145}$	$1.535^{+0.413}_{-0.778}$
	+3%/-4%	+1%/-5%	+156%/-219%	+30%/-11%	+14%/-14%	+27%/-51%
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 007117020-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-6 \pm 3$	$0.88^{+0.54}_{-0.48}$	$3302^{+245}_{-157}$	$3506^{+1592}_{-6187}$	$0.774^{+3.133}_{-0.535}$
Alt.	$8 \pm 3$	$0.91^{+0.52}_{-0.47}$	$3298^{+237}_{-169}$	$-4194^{+480}_{-1360}$	$-1.035^{+0.675}_{-3.484}$

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

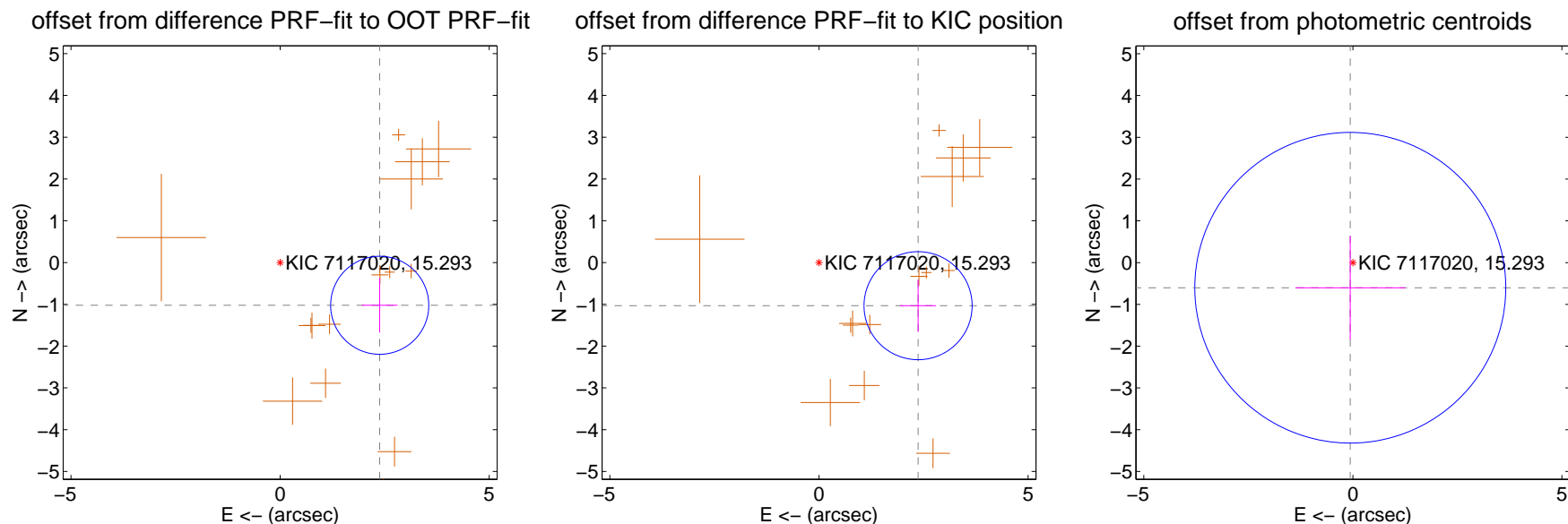
## DV Centroid Data

Supplemental centroid analysis for 007117020-01. Kepler magnitude: 15.29. Transit SNR 11.43

There are 0 quarters with good PRF difference image offsets

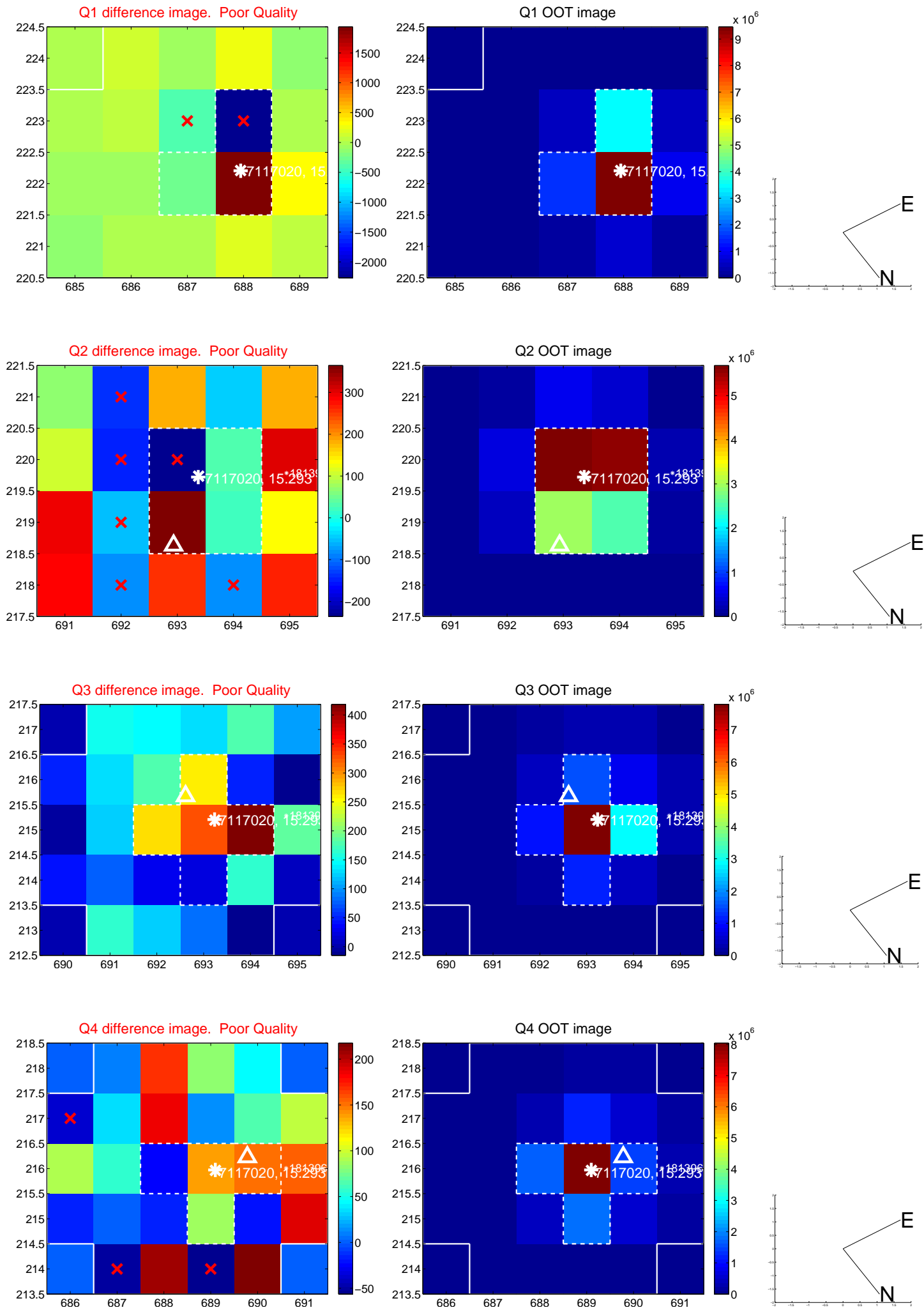
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.592 \pm 0.391$	6.63	$-2.382 \pm 0.426$	$-1.023 \pm 0.652$
PRF-fit source offset from KIC position	$2.585 \pm 0.431$	6.00	$-2.369 \pm 0.431$	$-1.033 \pm 0.622$
photometric centroid source offset	$0.60 \pm 1.24$	0.49	$0.06 \pm 1.31$	$-0.60 \pm 1.24$

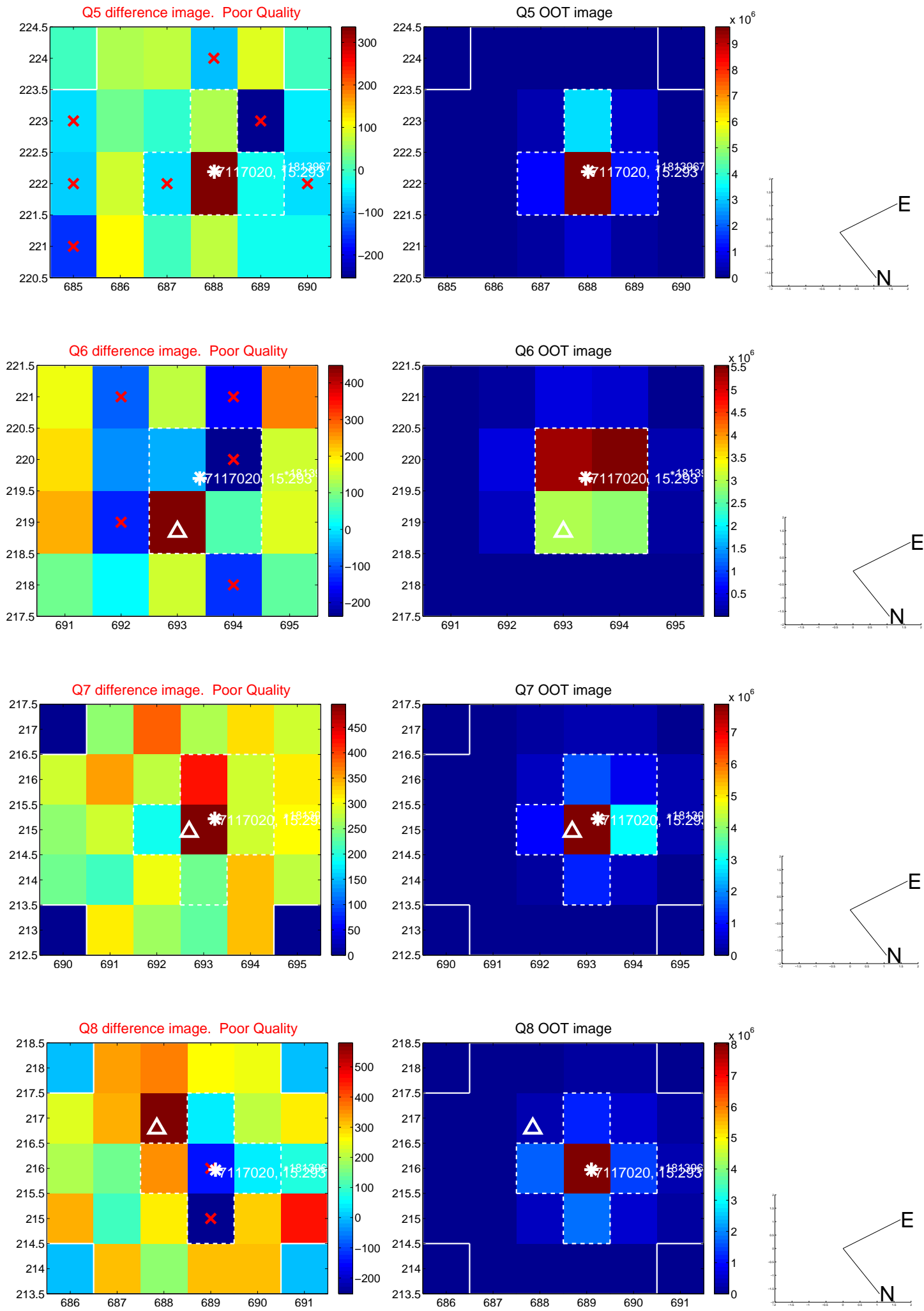


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

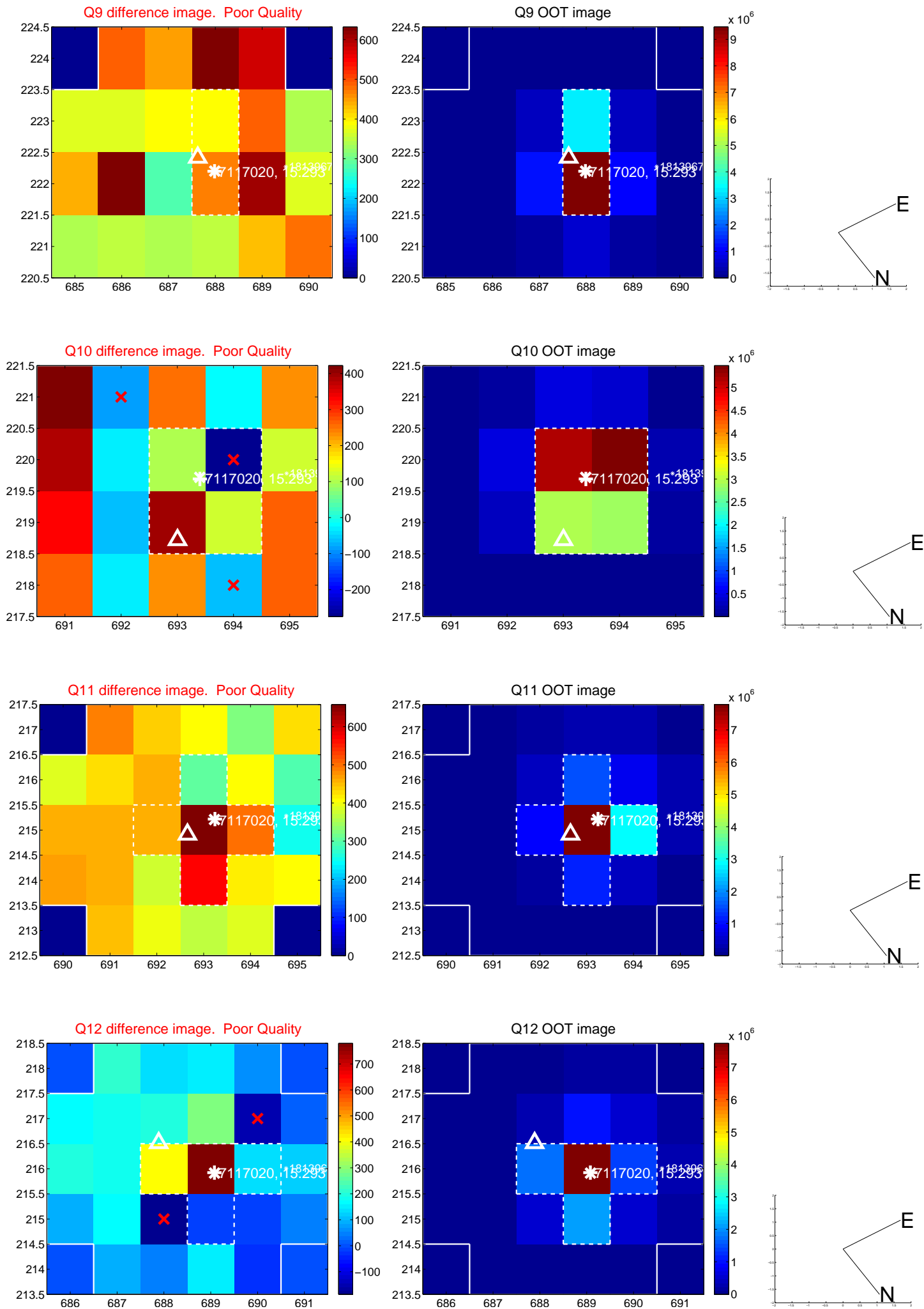


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

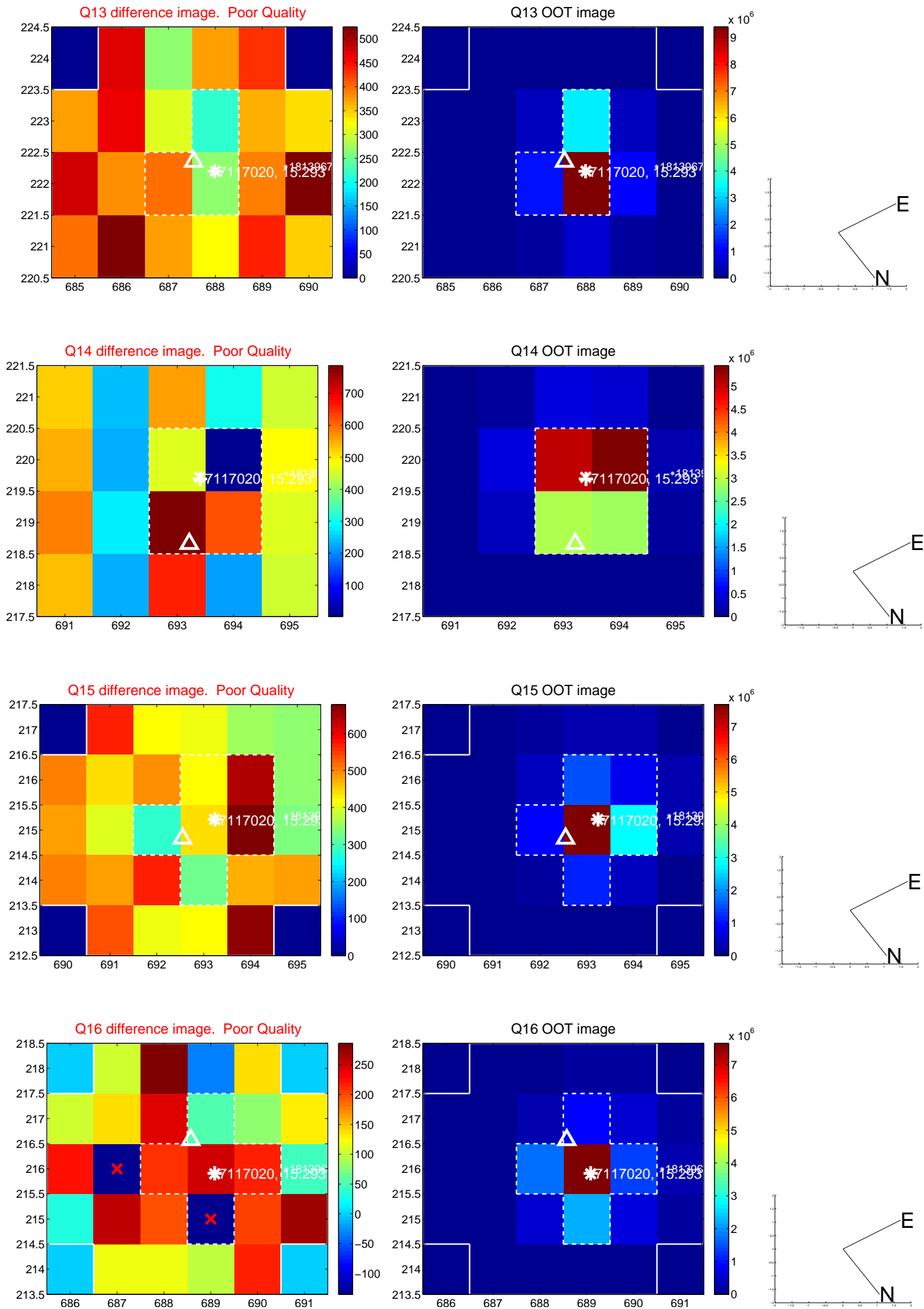




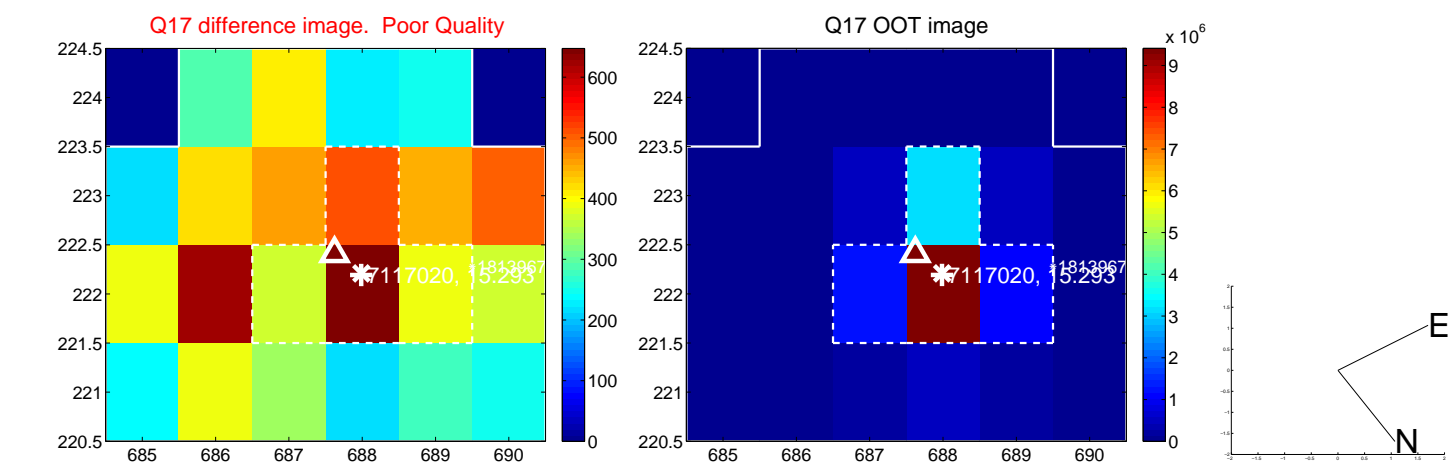
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



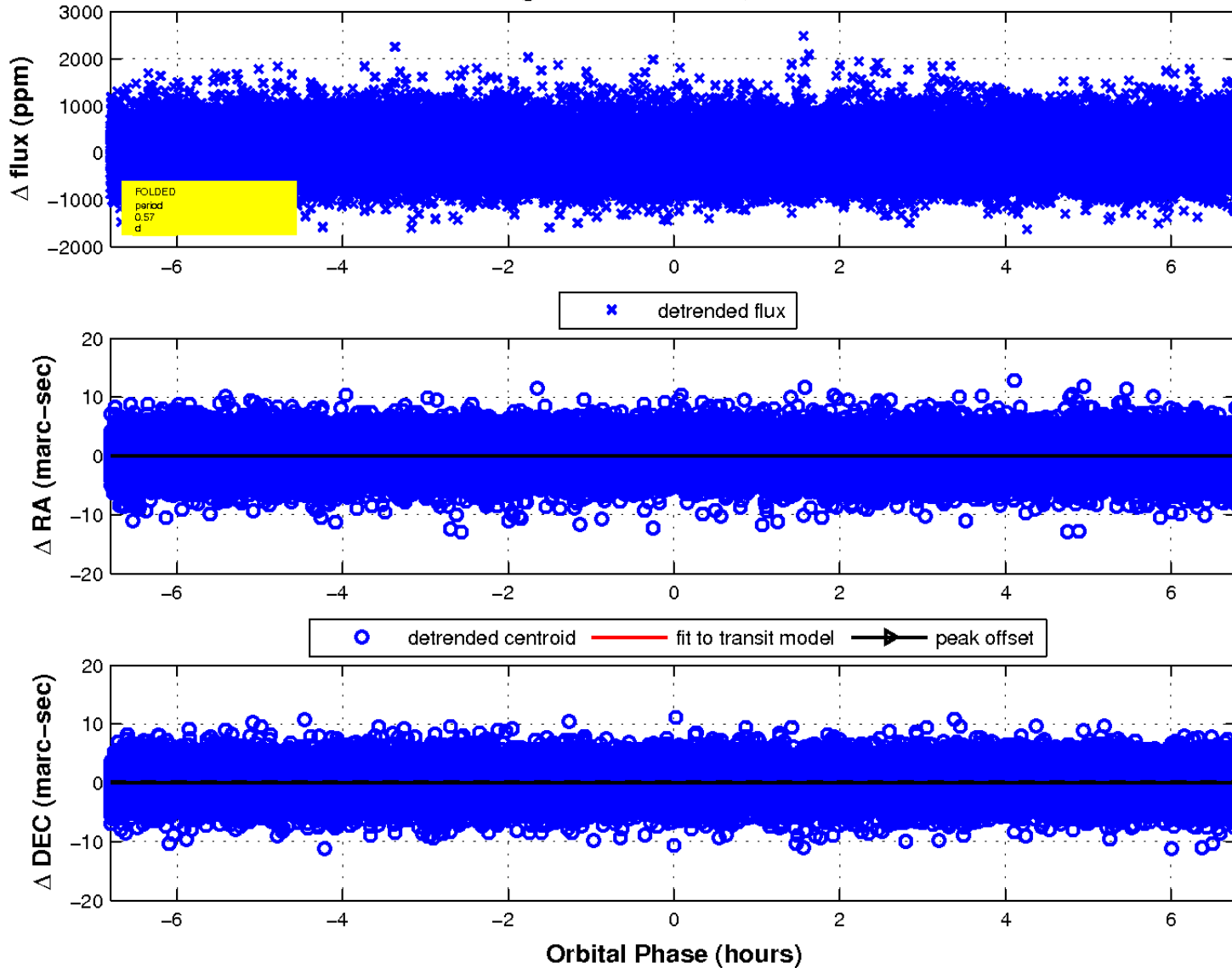
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



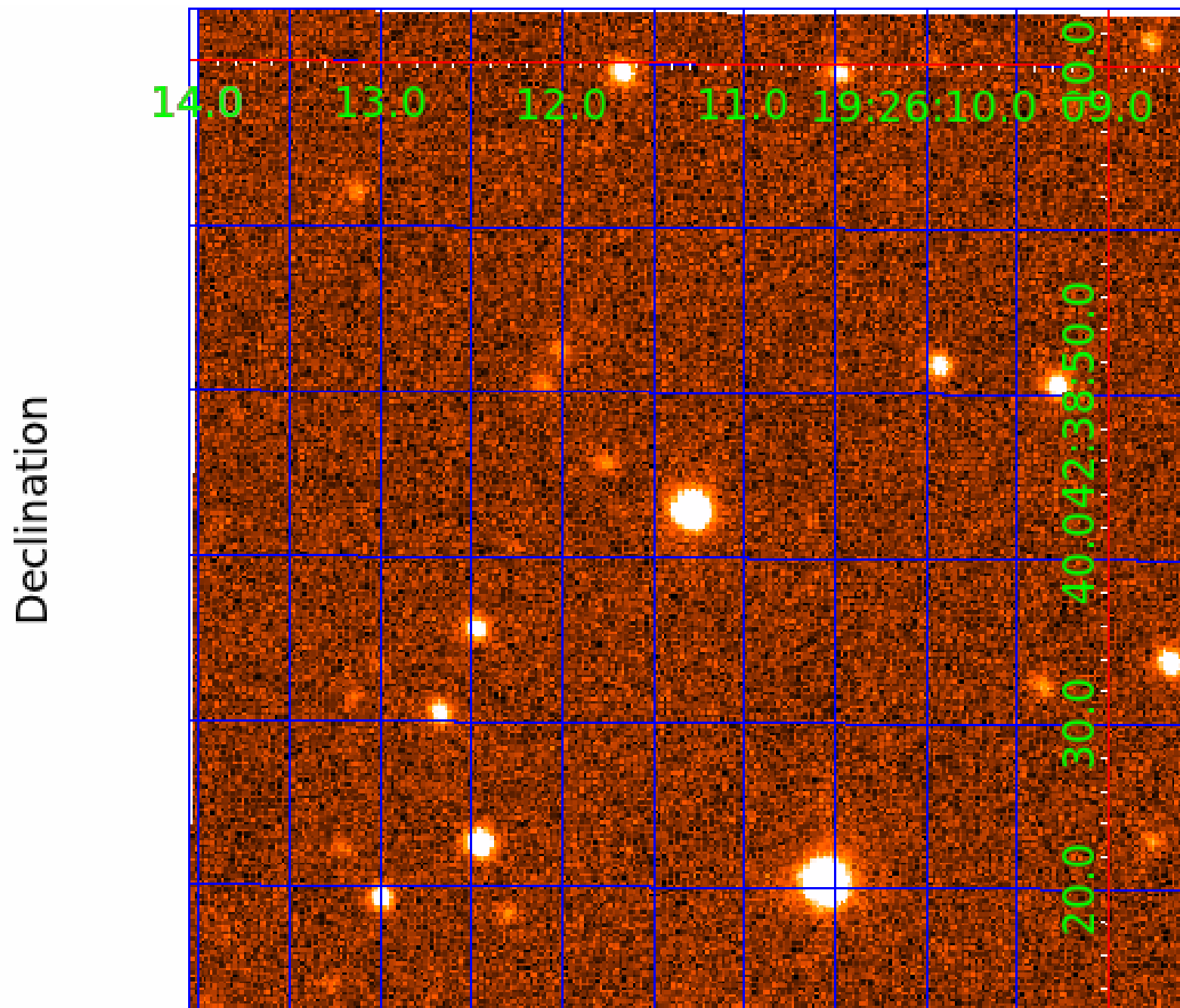
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 1 of 2



UKIRT Image





# KIC 007117020

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007117020-01	OBS	No	0.566795	131.814458	43.3	3.494	10.4	11.4	0.99	6170	0.77	6820.38
007117020-02	OBS	No	93.730848	132.912310	585.1	7.085	8.0	9.2	0.99	6170	3.02	7.51

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007117020-01	OBS	FP	0.00	1	0	0	1	LPP_DV—MOD_NONUNIQ_ALT—EPHEM_MATCH
007117020-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT

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

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

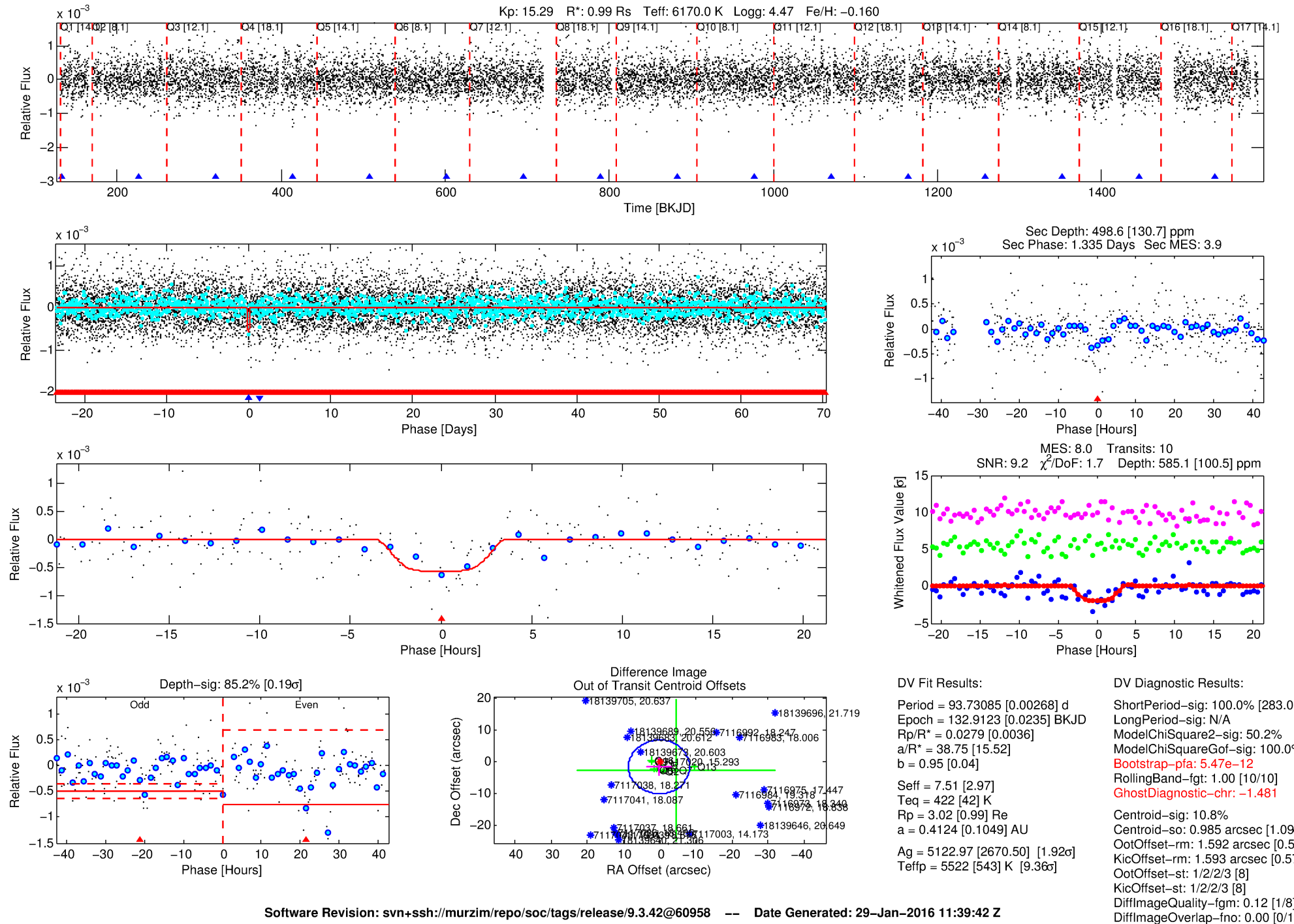
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 007117020-02

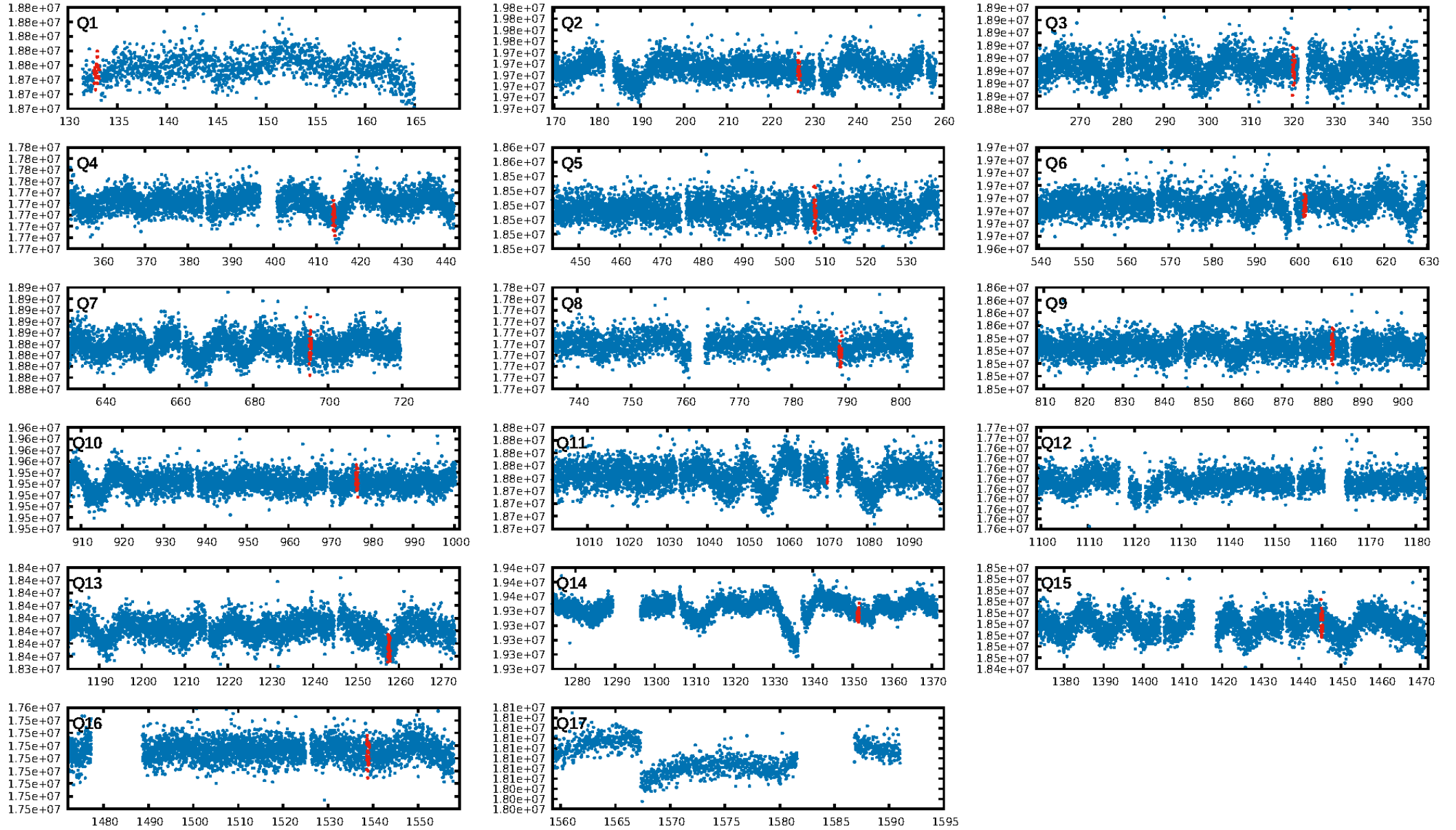
No Significant Match Found

# DV One-Page Summary

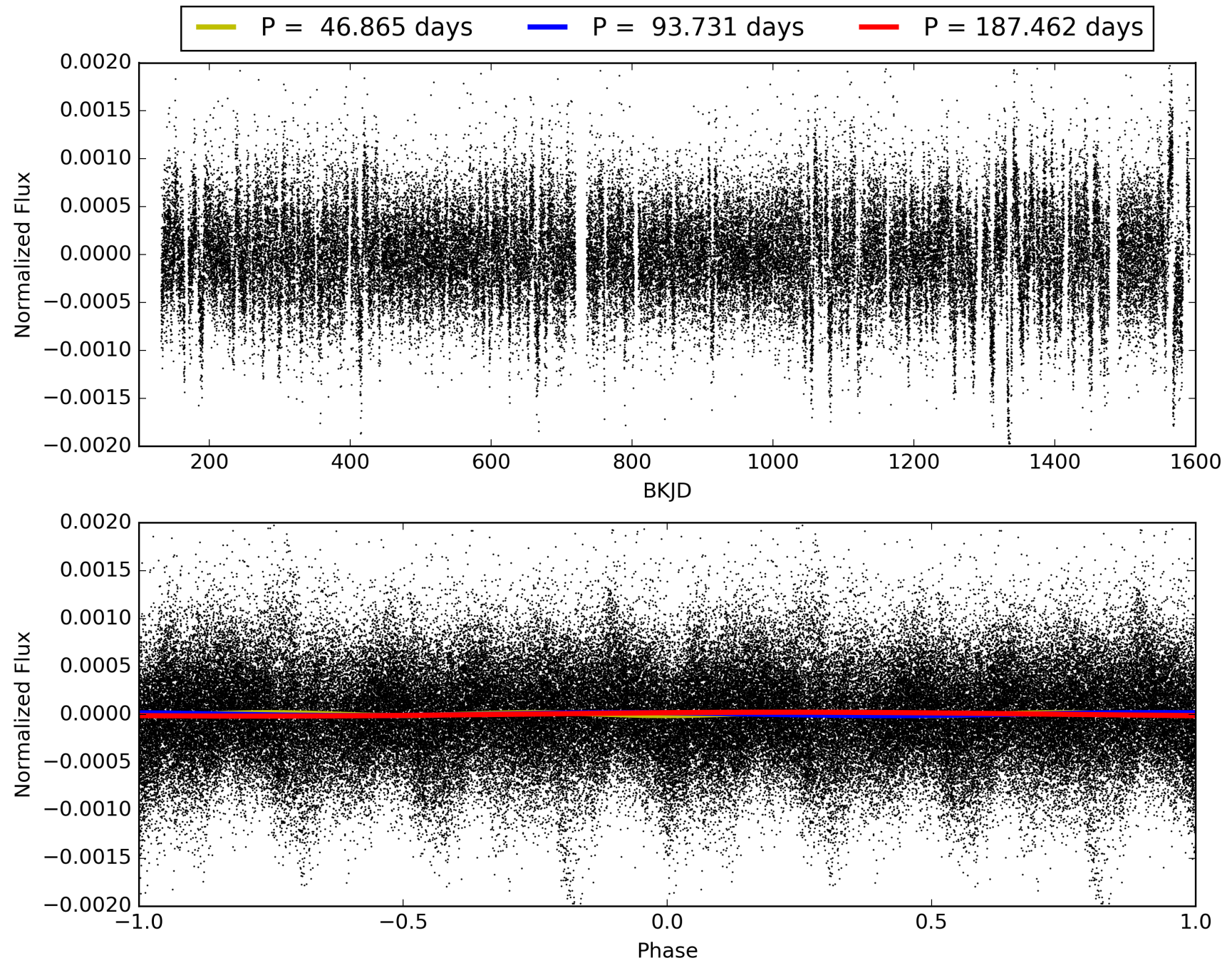
KIC: 7117020 Candidate: 2 of 2 Period: 93.731 d



# TCE 007117020-02, PDC Light Curves

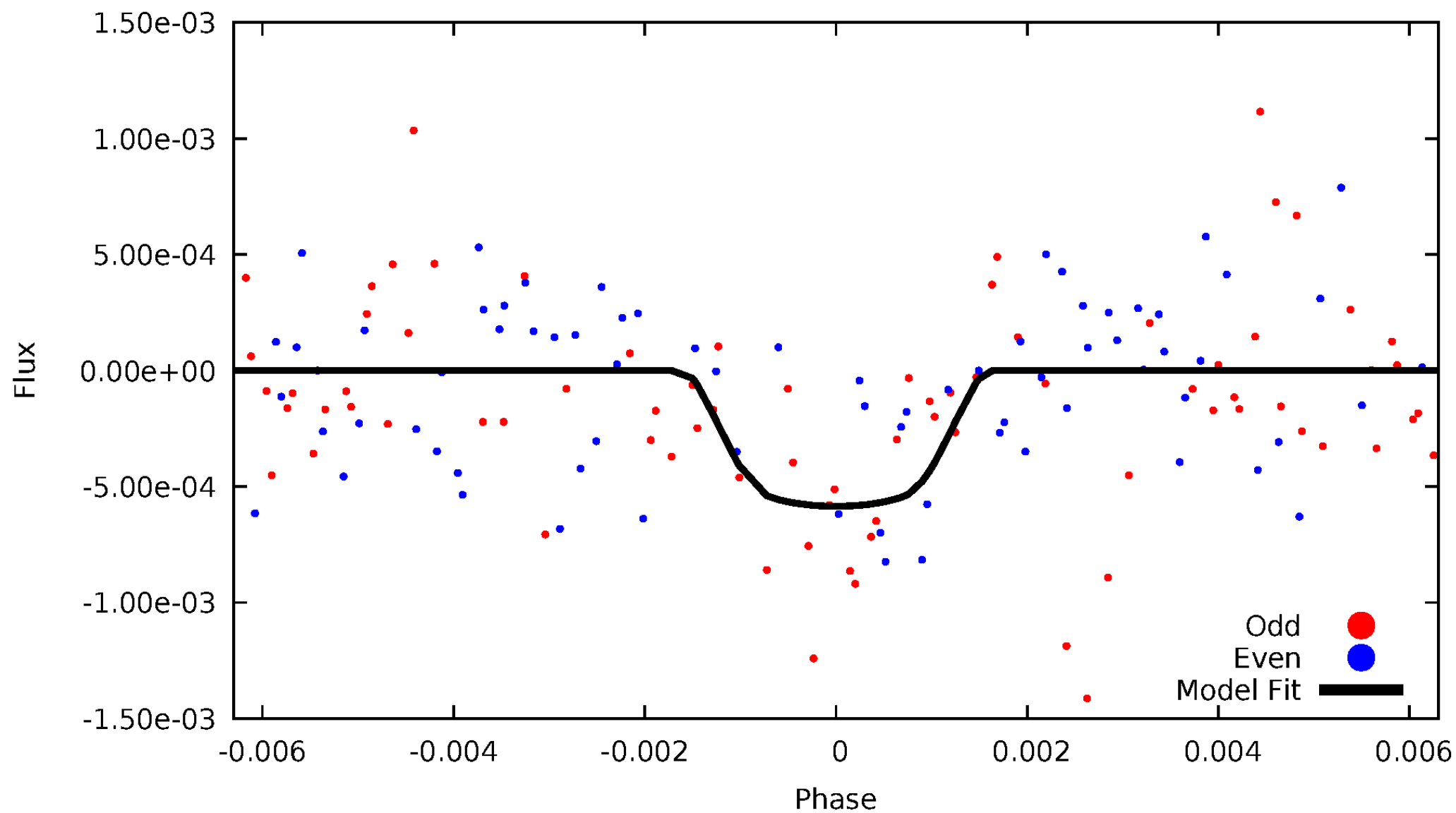


# TCE 007117020-02



# DV Odd/Even

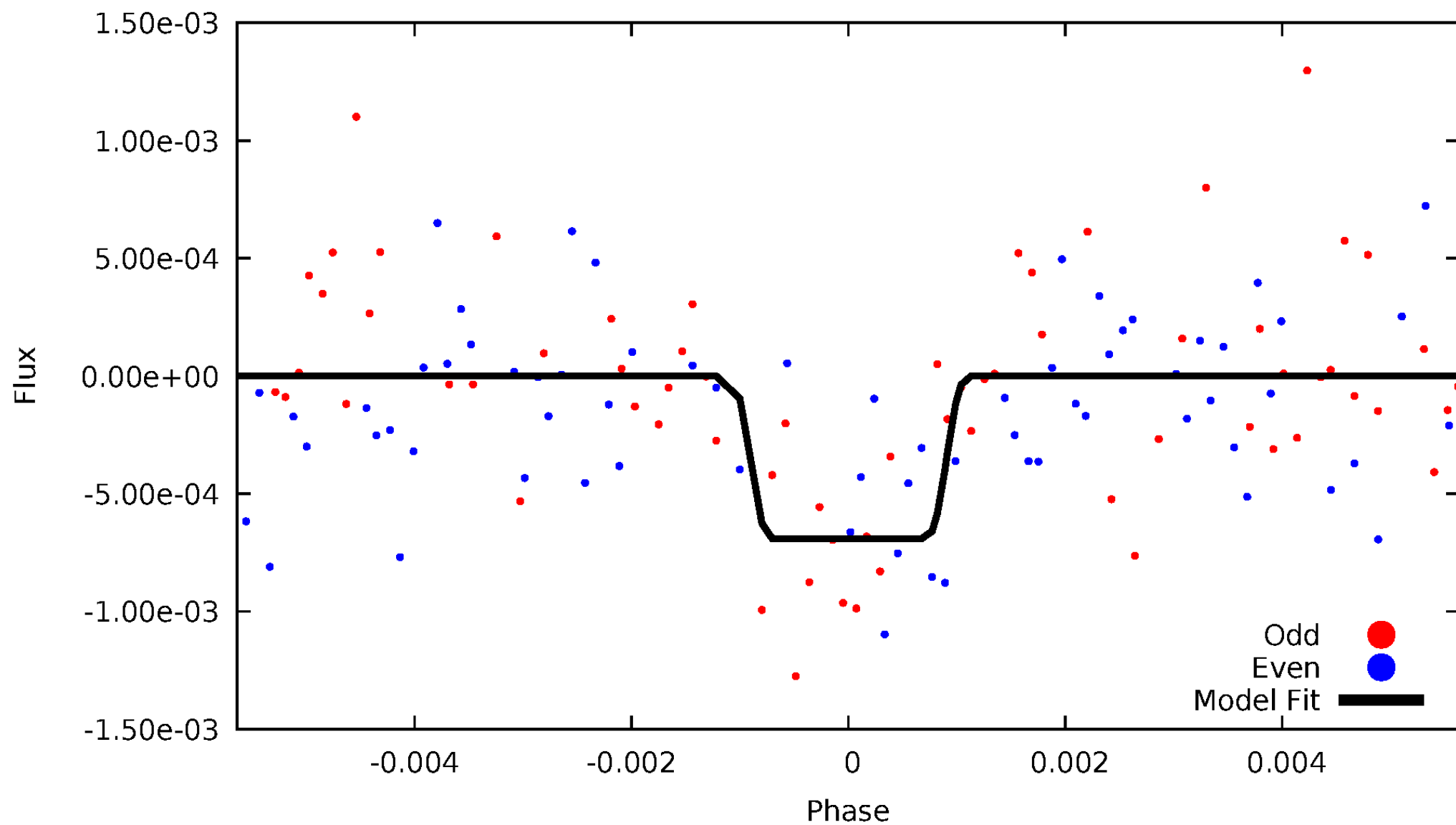
TCE 007117020-02





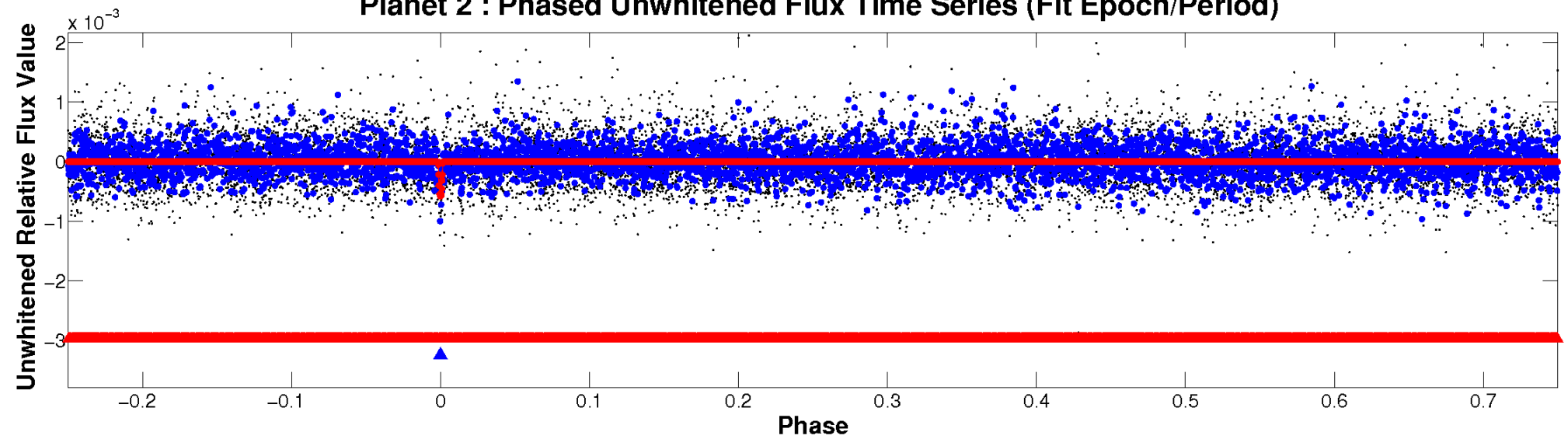
# ALT Odd/Even

TCE 007117020-02

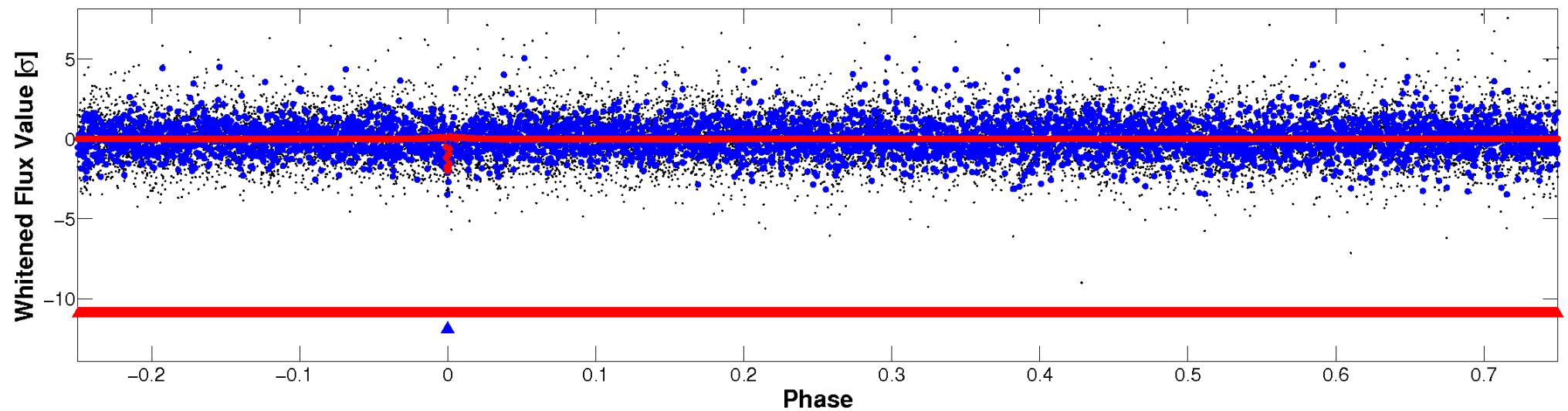


# Non-Whitened Vs. Whitened Light Curve

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

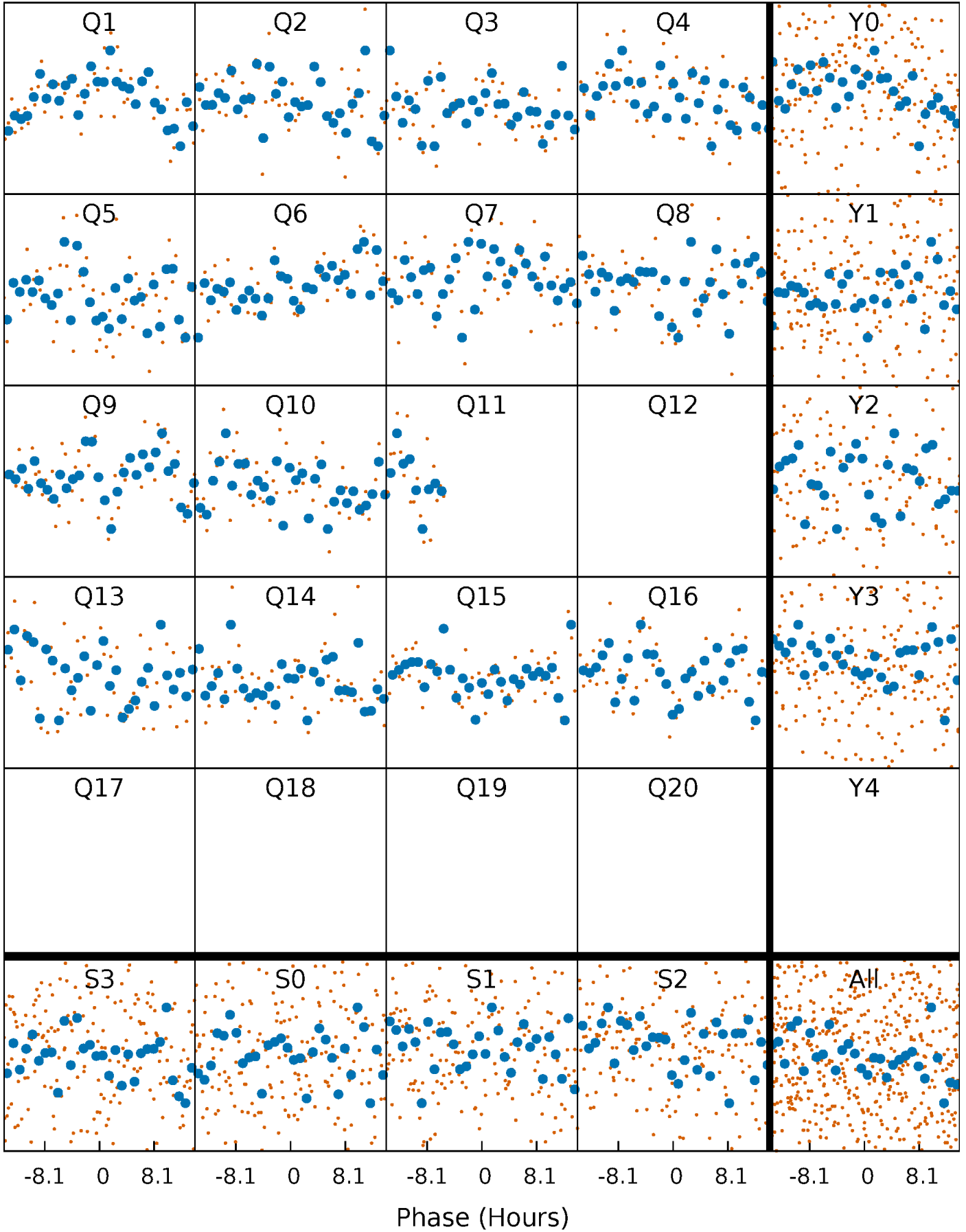


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



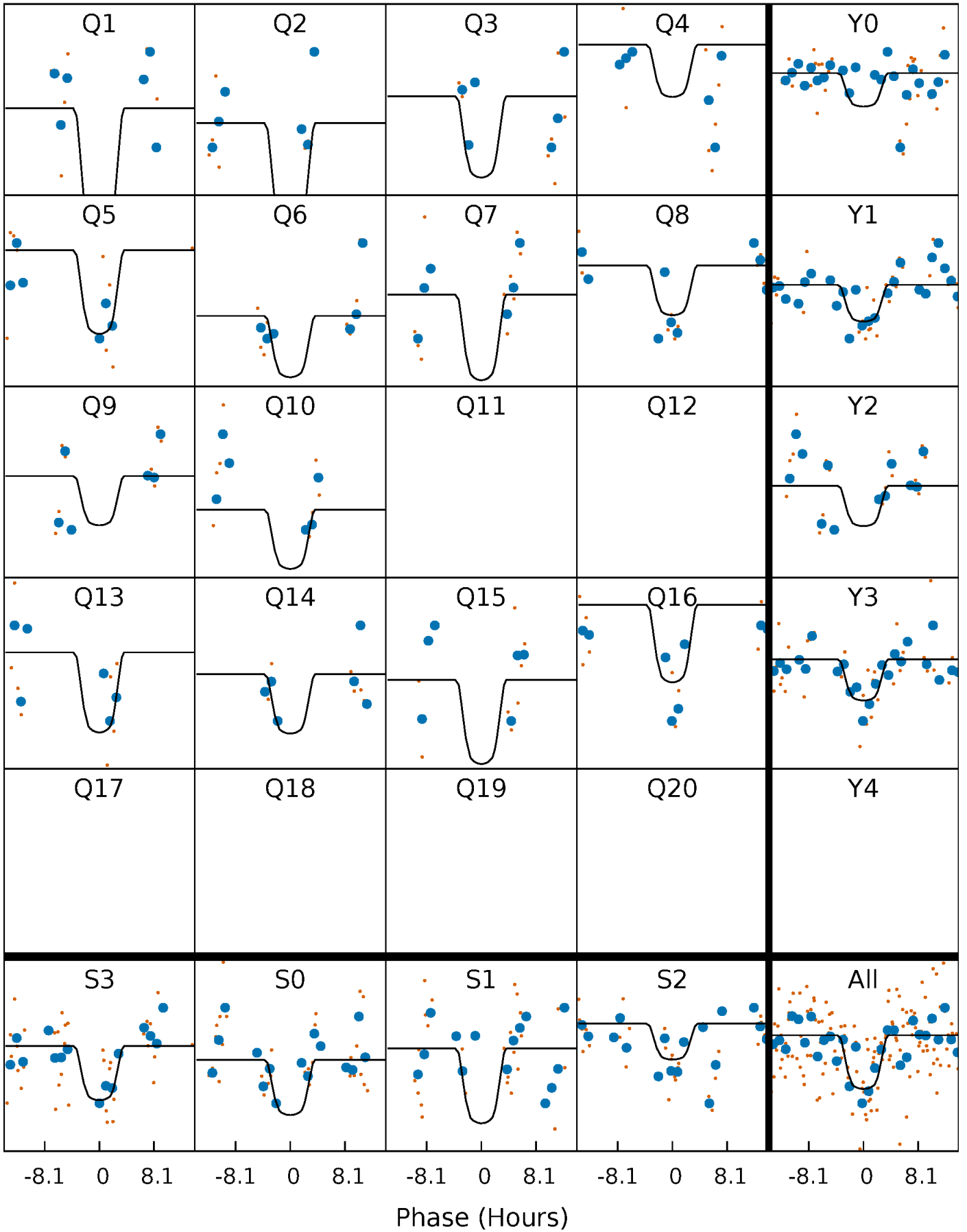
# PDC Quarter-Phased Transit Curves

TCE 007117020-02   P= 93.730848 Days    $T_0=132.912310$  (BKJD)



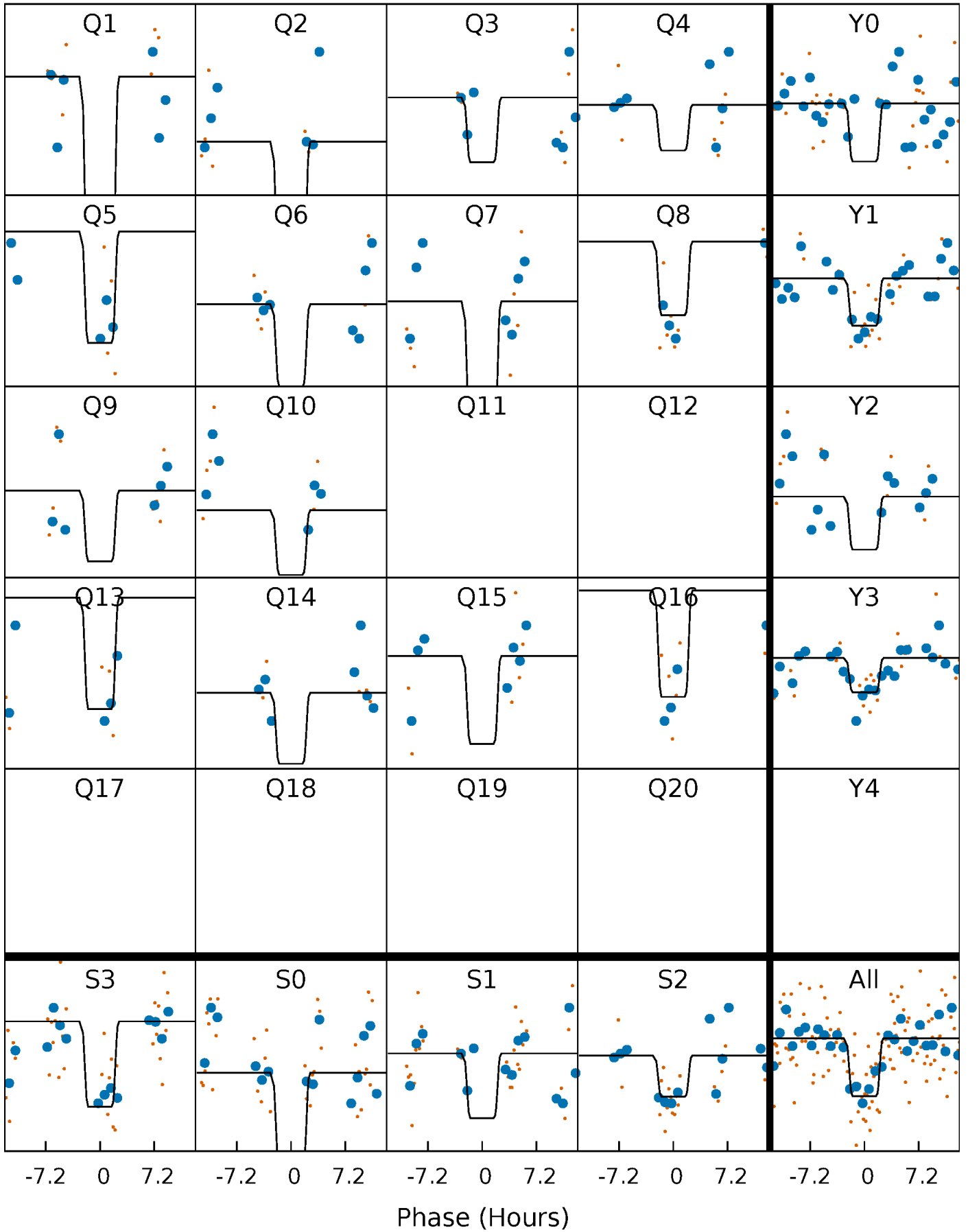
# DV Quarter-Phased Transit Curves

TCE 007117020-02 P= 93.730848 Days  $T_0=132.912310$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

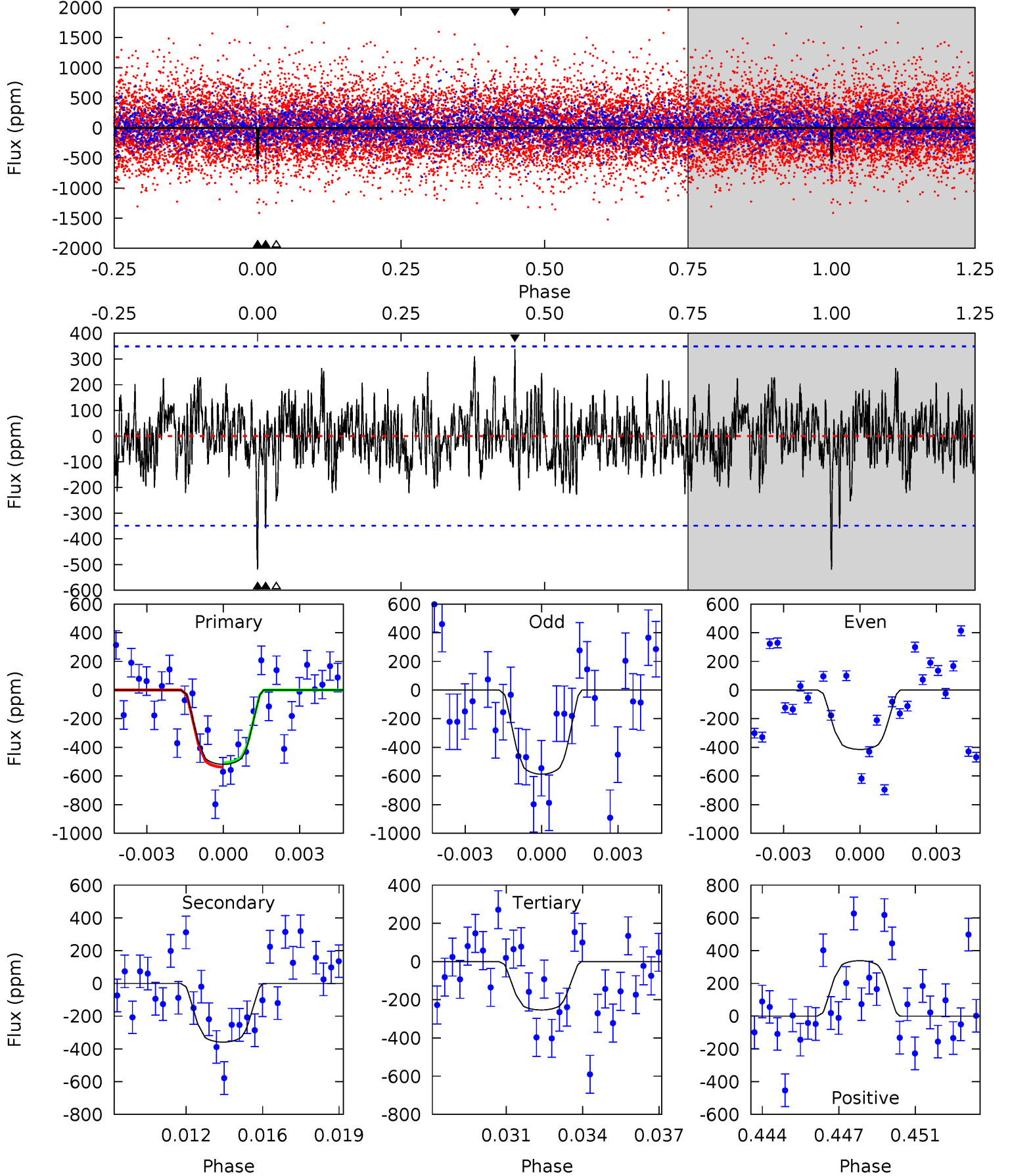
TCE 007117020-02 P= 93.732923 Days  $T_0=132.904662$  (BKJD)



# DV Model-Shift Uniqueness Test

007117020-02, P = 93.730848 Days, E = 39.181462 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
7.81	5.40	3.81	5.10	5.25	2.96	1.34	4.00	2.71	1.58	0.30	1.29	0.93	0.39	0.23

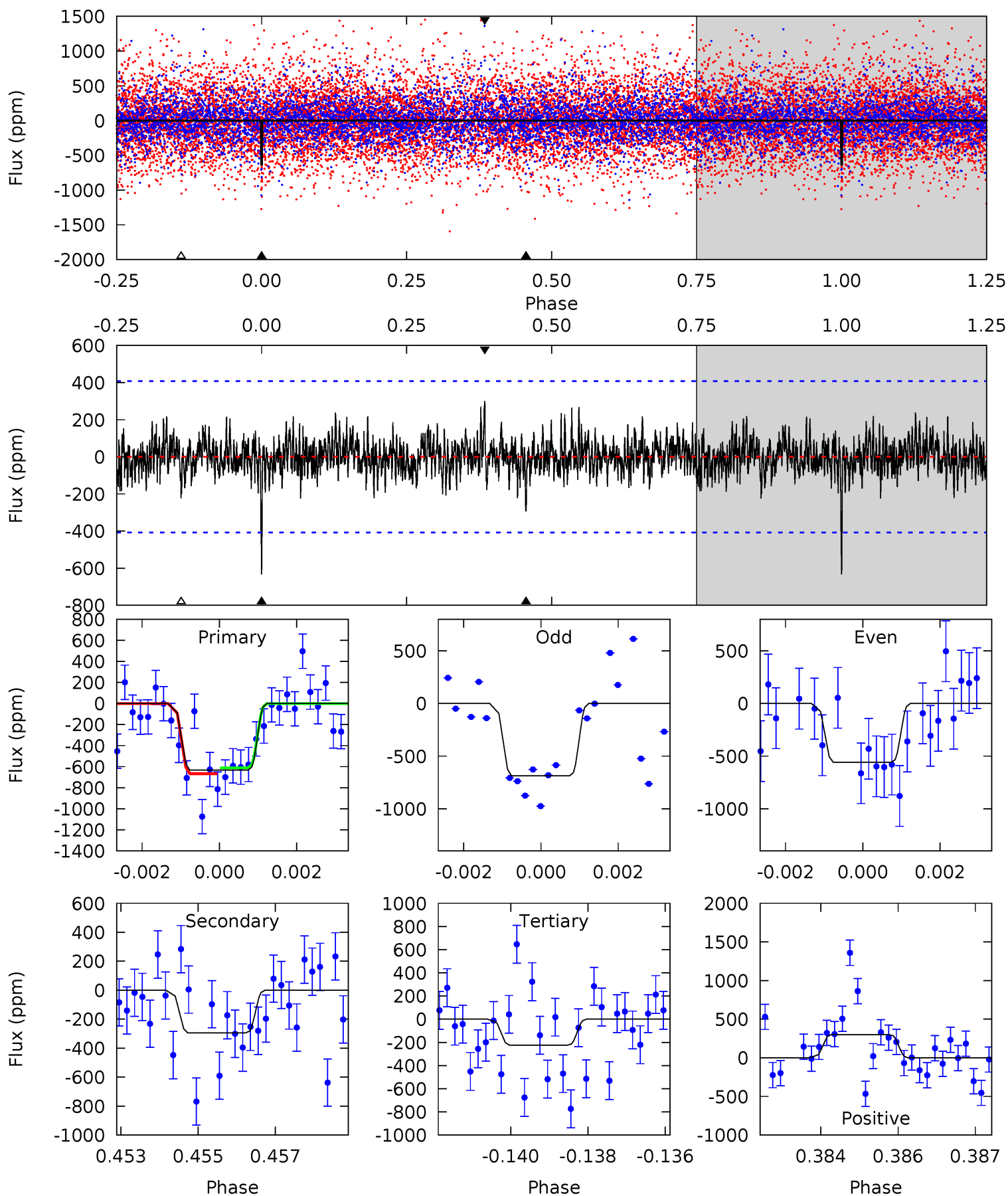




# Alt Model-Shift Uniqueness Test

007117020-02, P = 93.732923 Days, E = 39.171739 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
8.29	3.86	2.94	3.93	5.34	3.12	0.97	5.35	4.36	0.92	-0.07	0.85	0.72	0.32	0.35



### Stellar Parameters For KIC 007117020

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6170^{+174}_{-217}$	$4.472^{+0.054}_{-0.202}$	$-0.160^{+0.250}_{-0.350}$	$0.992^{+0.300}_{-0.107}$	$1.063^{+0.145}_{-0.145}$	$1.535^{+0.413}_{-0.778}$
	+3%/-4%	+1%/-5%	+156%/-219%	+30%/-11%	+14%/-14%	+27%/-51%
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 007117020-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-359 \pm 66$	$3.16^{+0.58}_{-0.48}$	$604^{+41}_{-30}$	$5142^{+440}_{-358}$	$3267^{+1469}_{-996}$
Alt.	$-295 \pm 76$	$2.98^{+0.53}_{-0.46}$	$603^{+40}_{-30}$	$5068^{+442}_{-407}$	$3042^{+1517}_{-1062}$

$T_{max}$  = 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

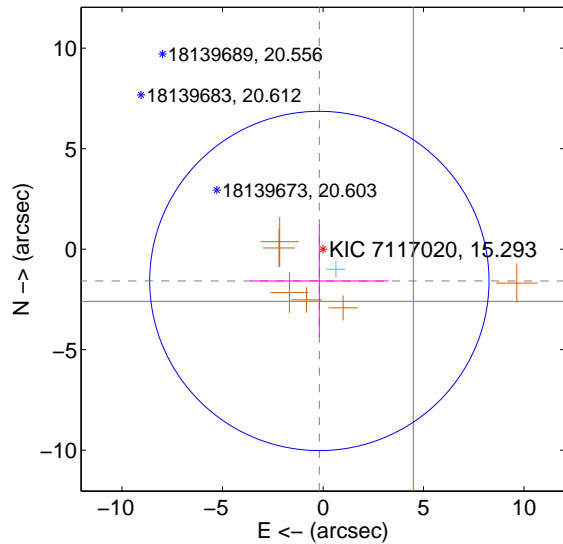
Supplemental centroid analysis for 007117020-02. Kepler magnitude: 15.29. Transit SNR 9.22

There are 1 quarters with good PRF difference image offsets

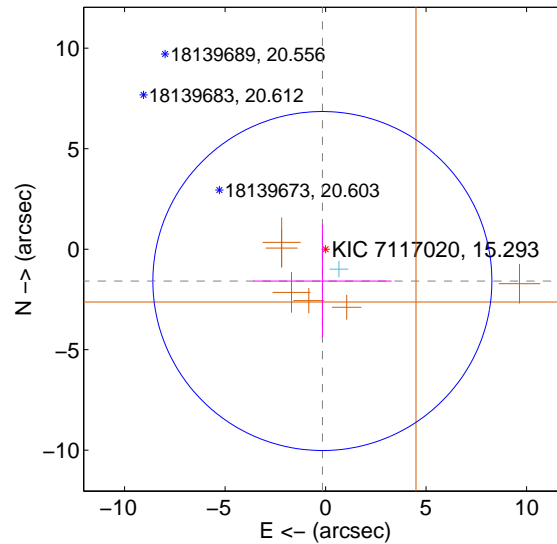
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.592 \pm 2.813$	0.57	$0.183 \pm 3.443$	$-1.581 \pm 2.804$
PRF-fit source offset from KIC position	$1.593 \pm 2.811$	0.57	$0.160 \pm 3.443$	$-1.585 \pm 2.804$
photometric centroid source offset	$0.99 \pm 0.91$	1.09	$0.08 \pm 0.94$	$-0.98 \pm 0.91$

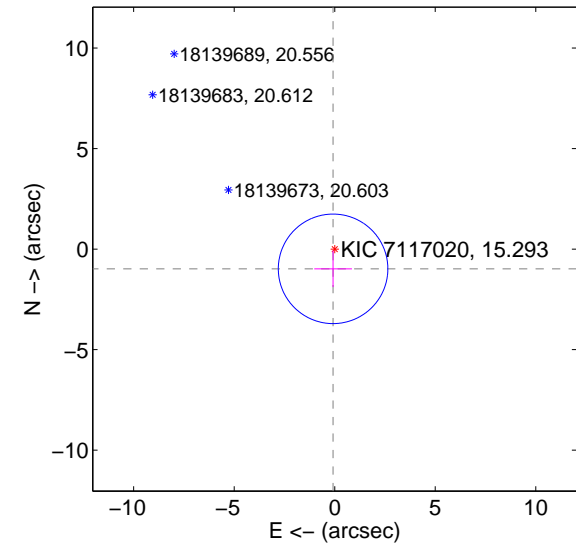
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

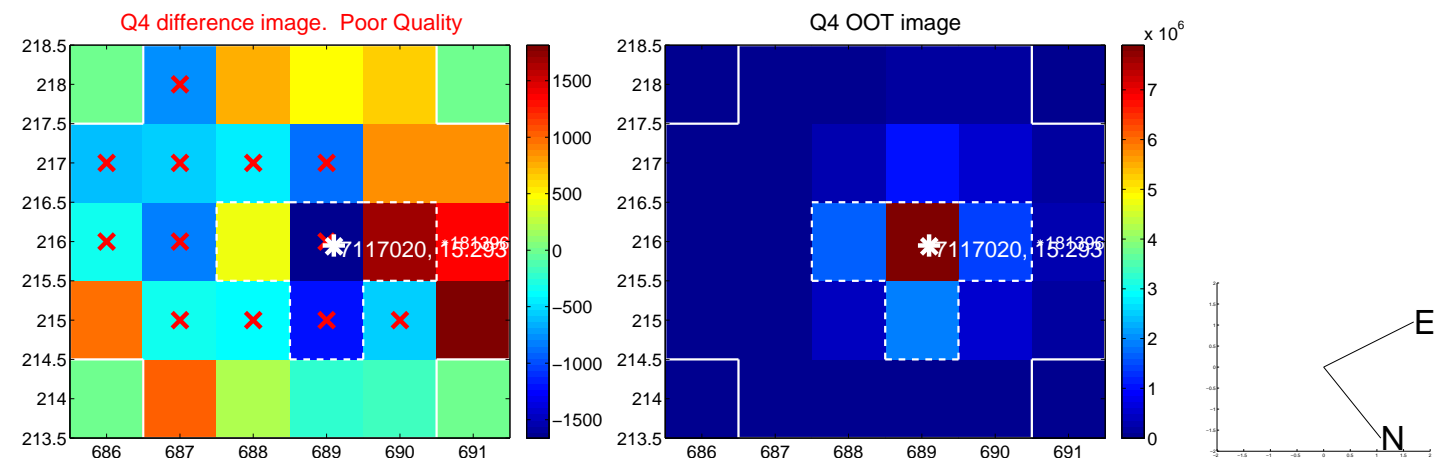
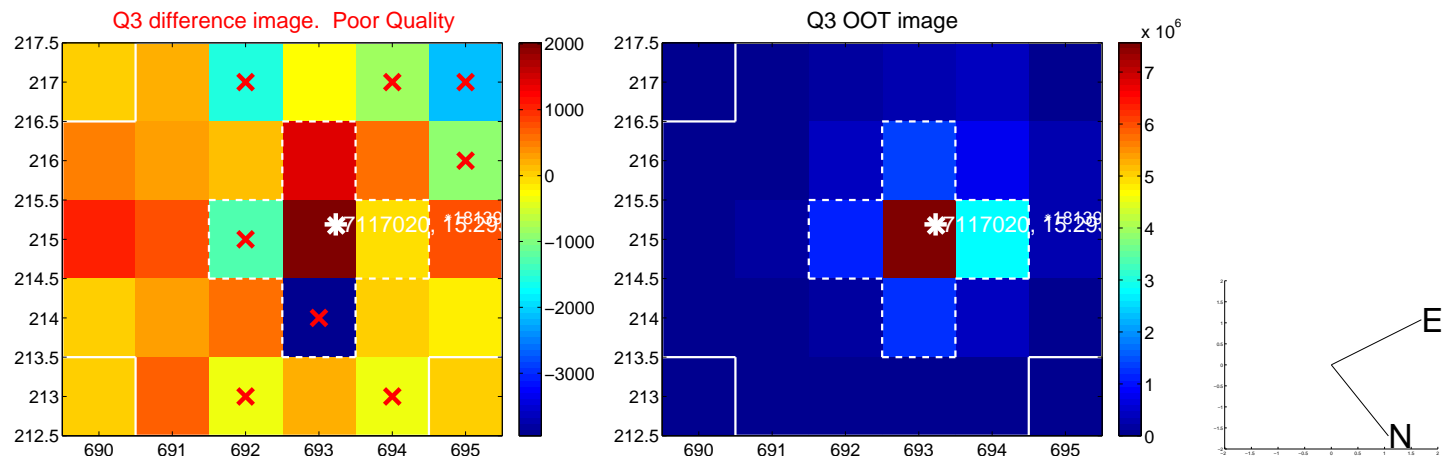
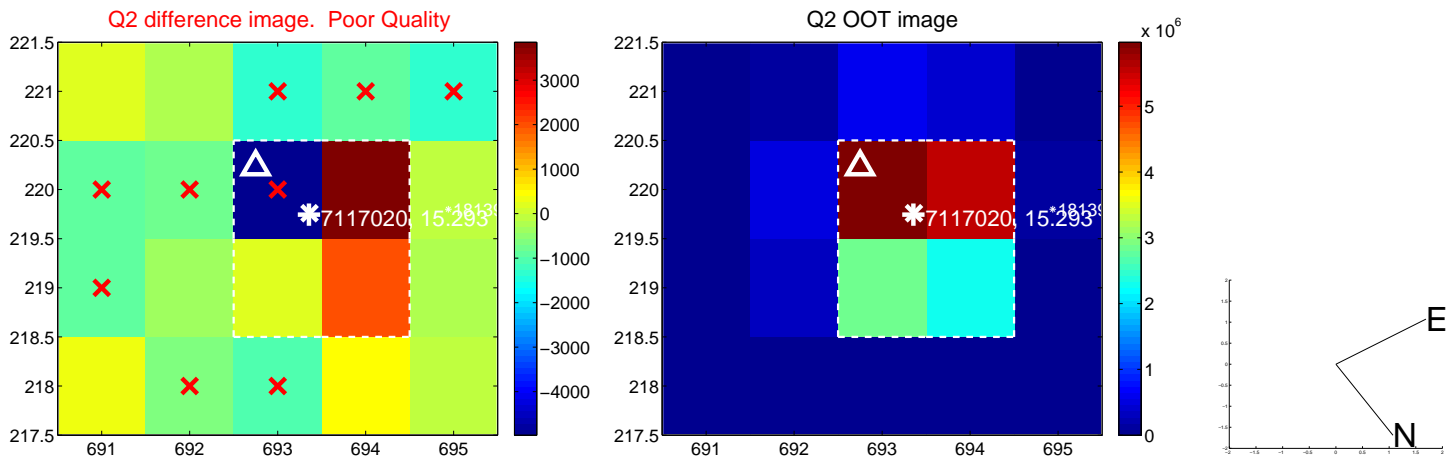
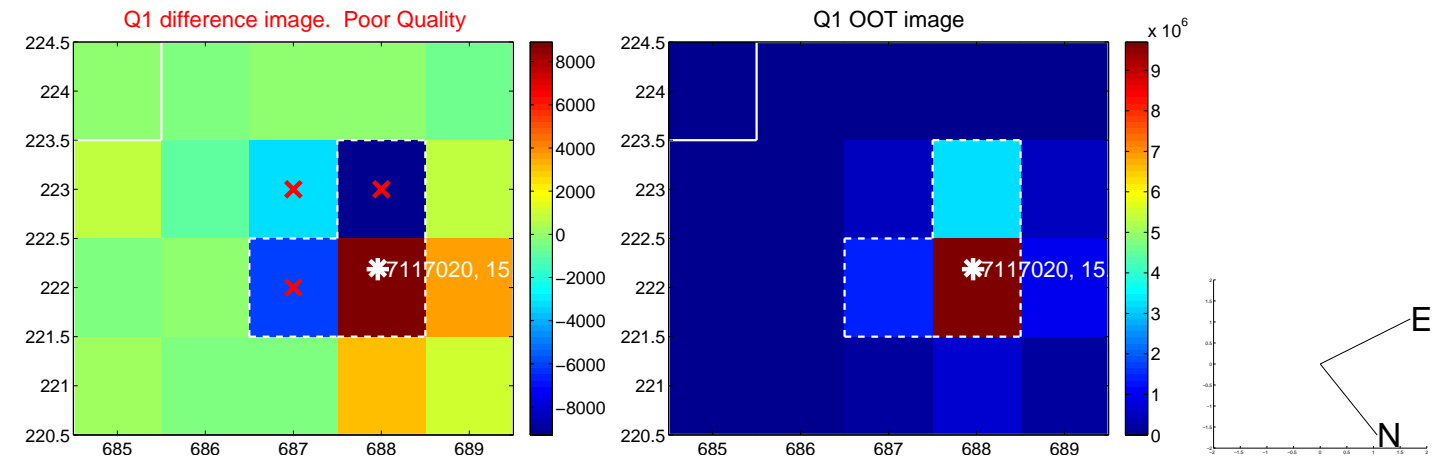


offset from photometric centroids

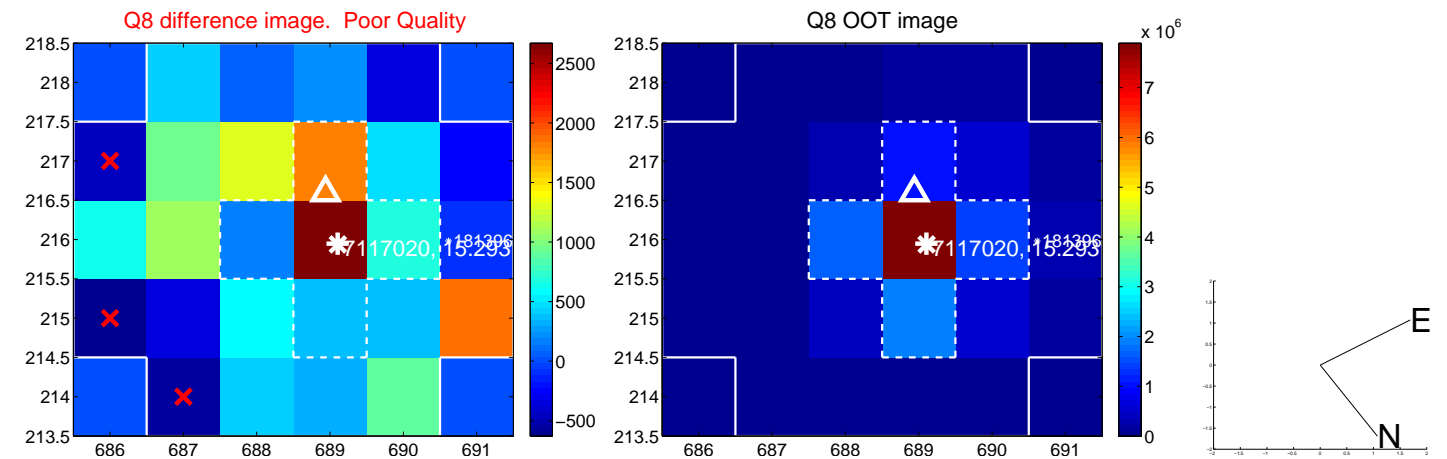
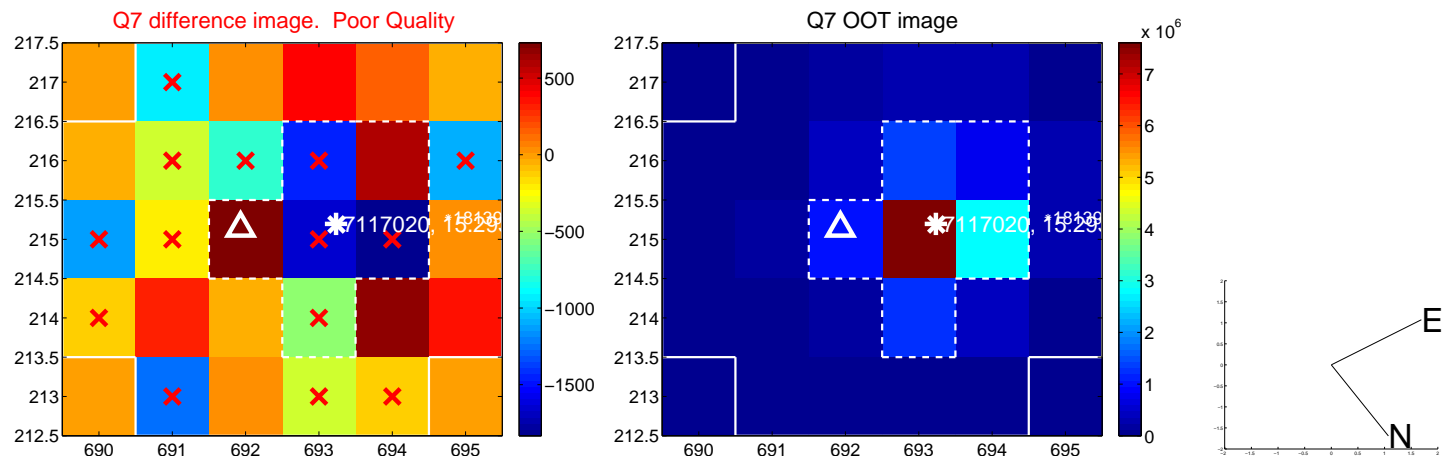
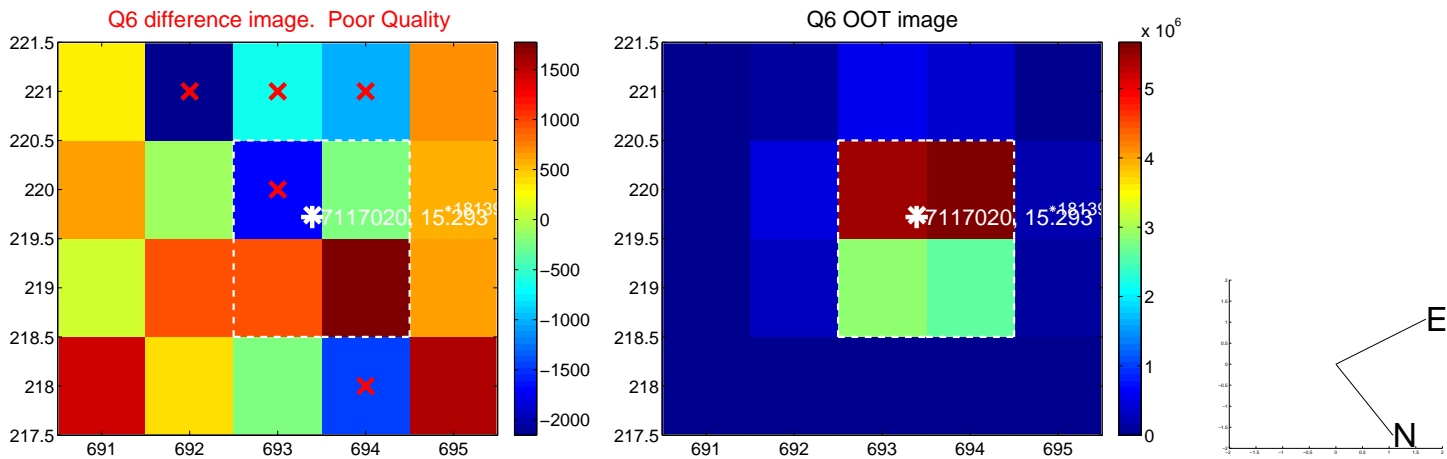
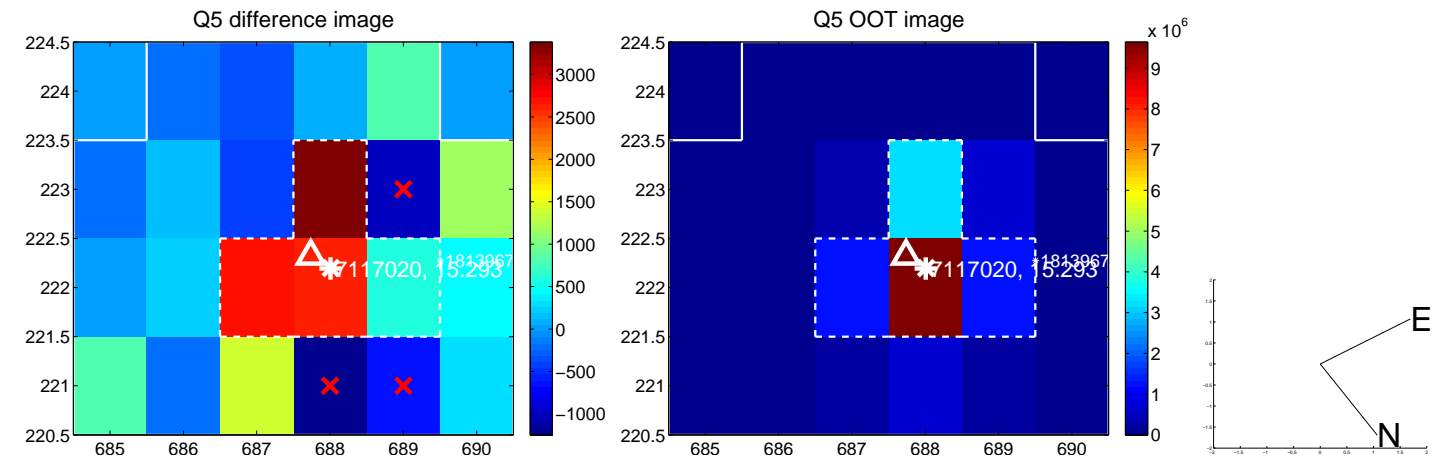


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

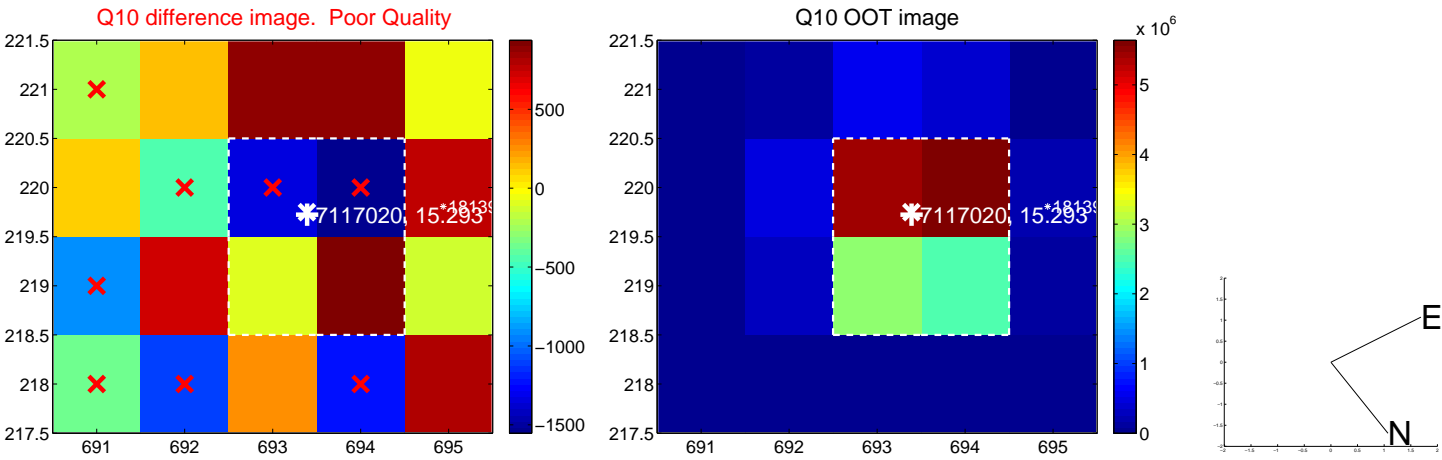
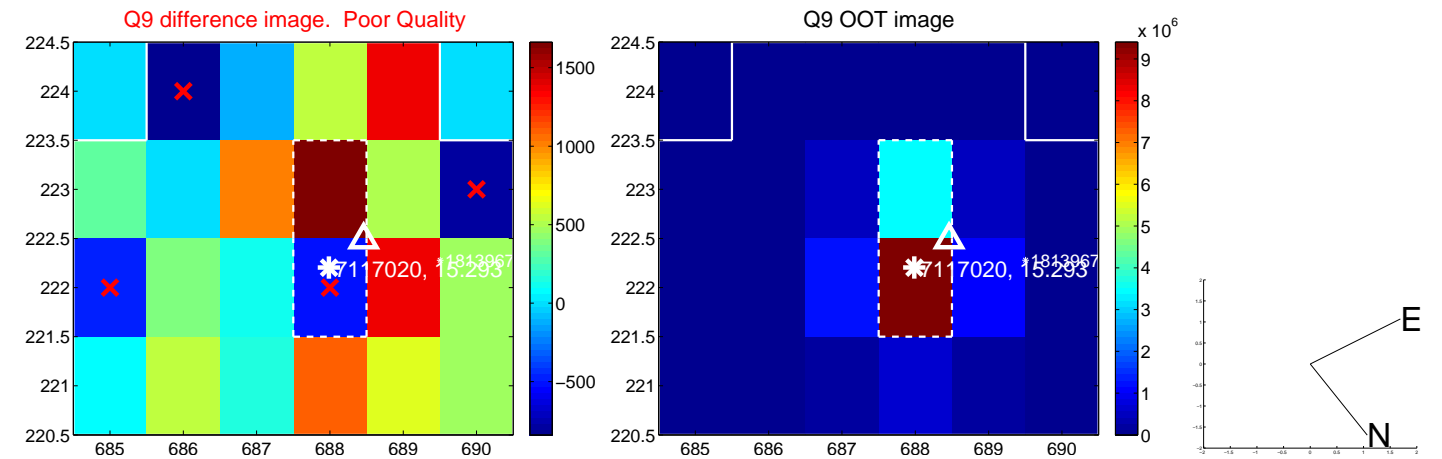


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

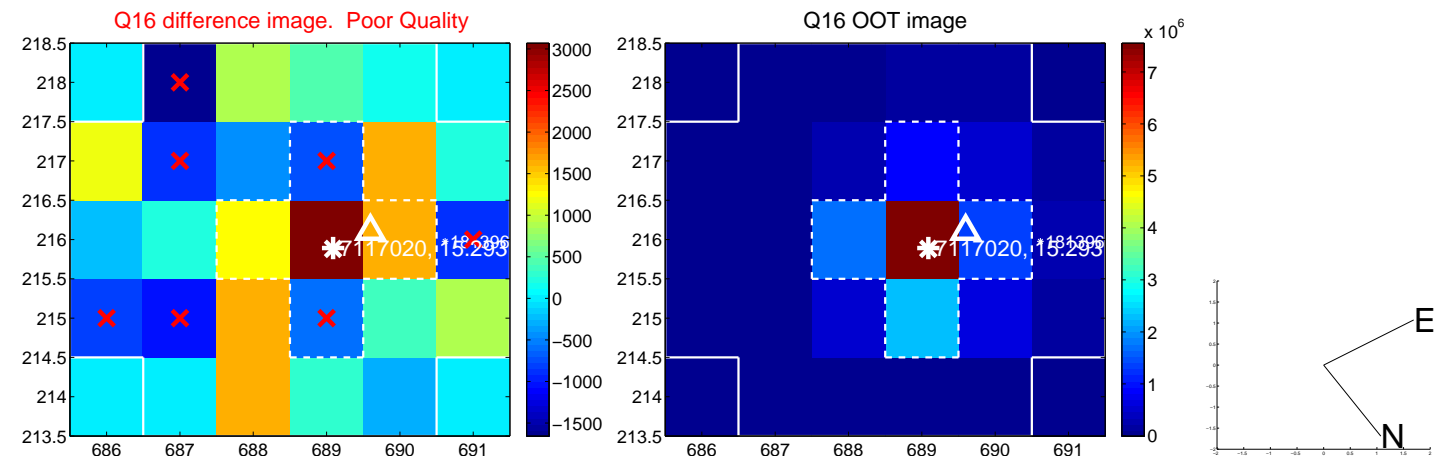
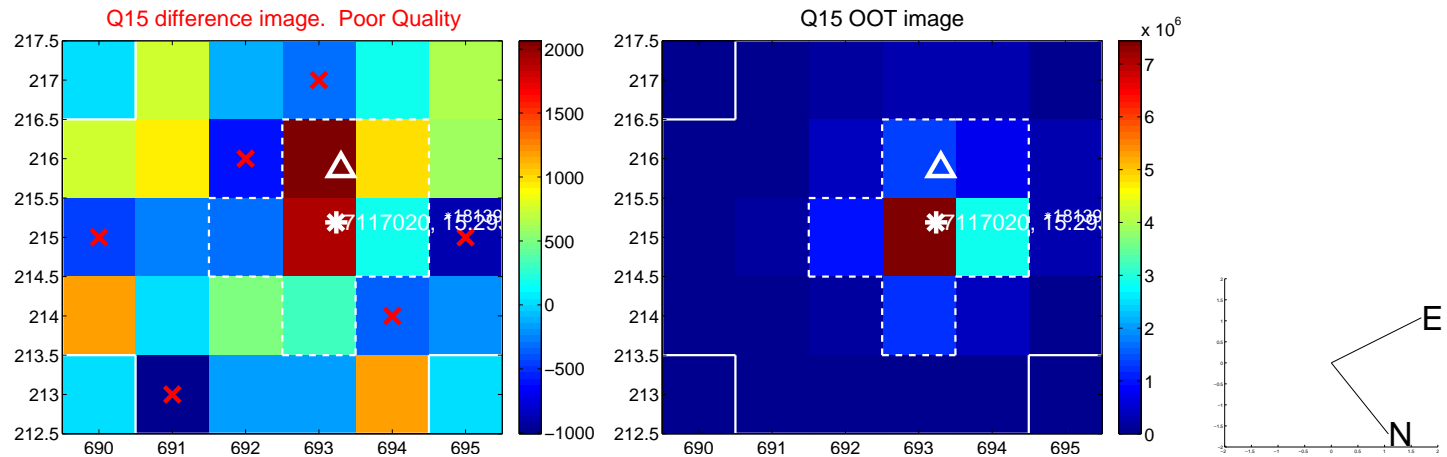
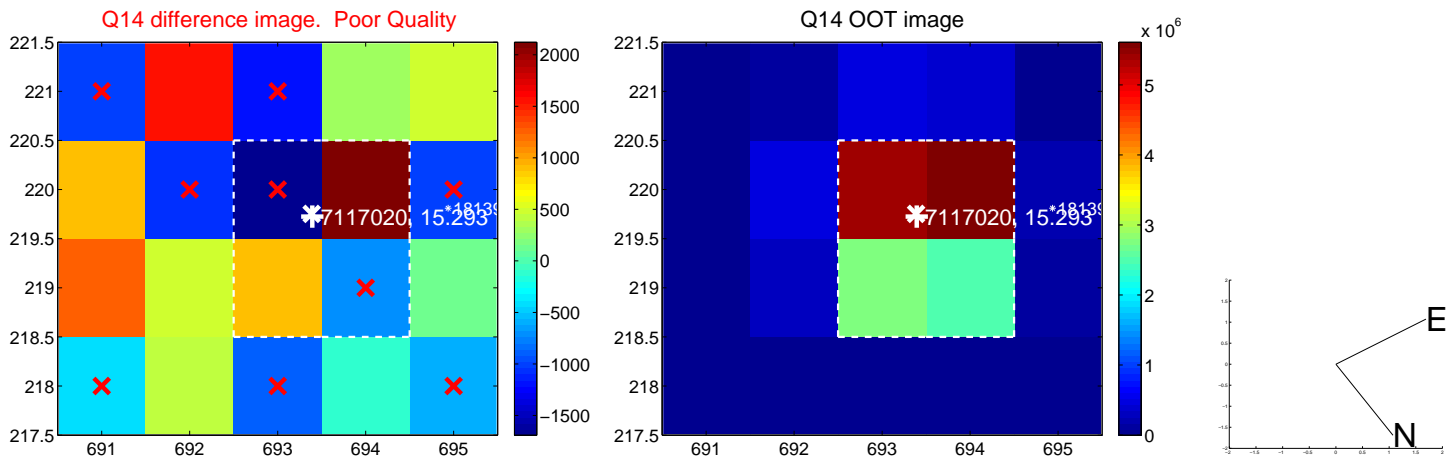
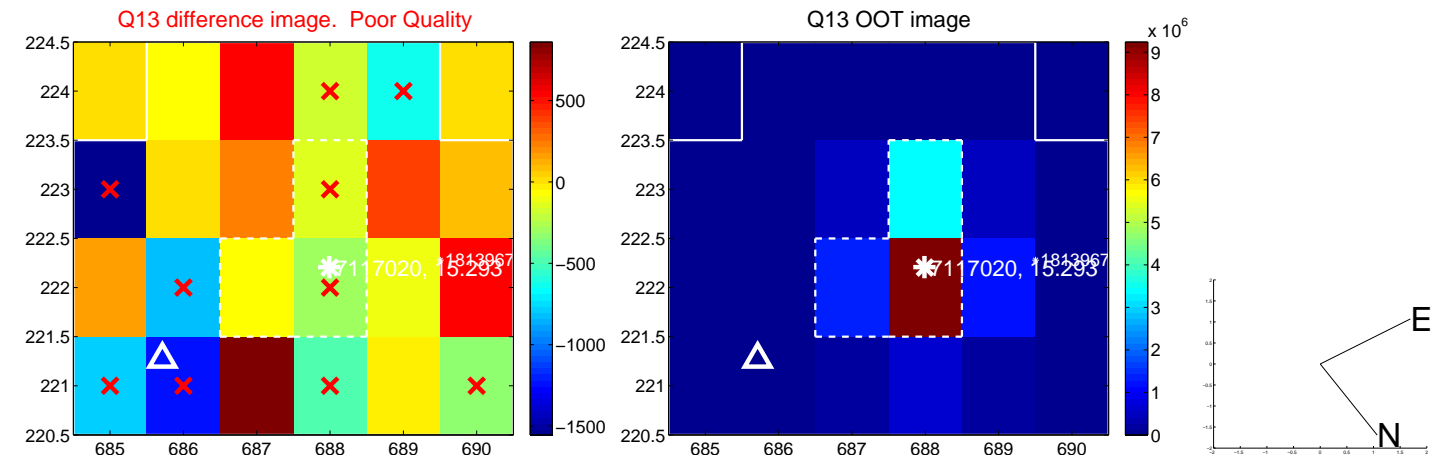




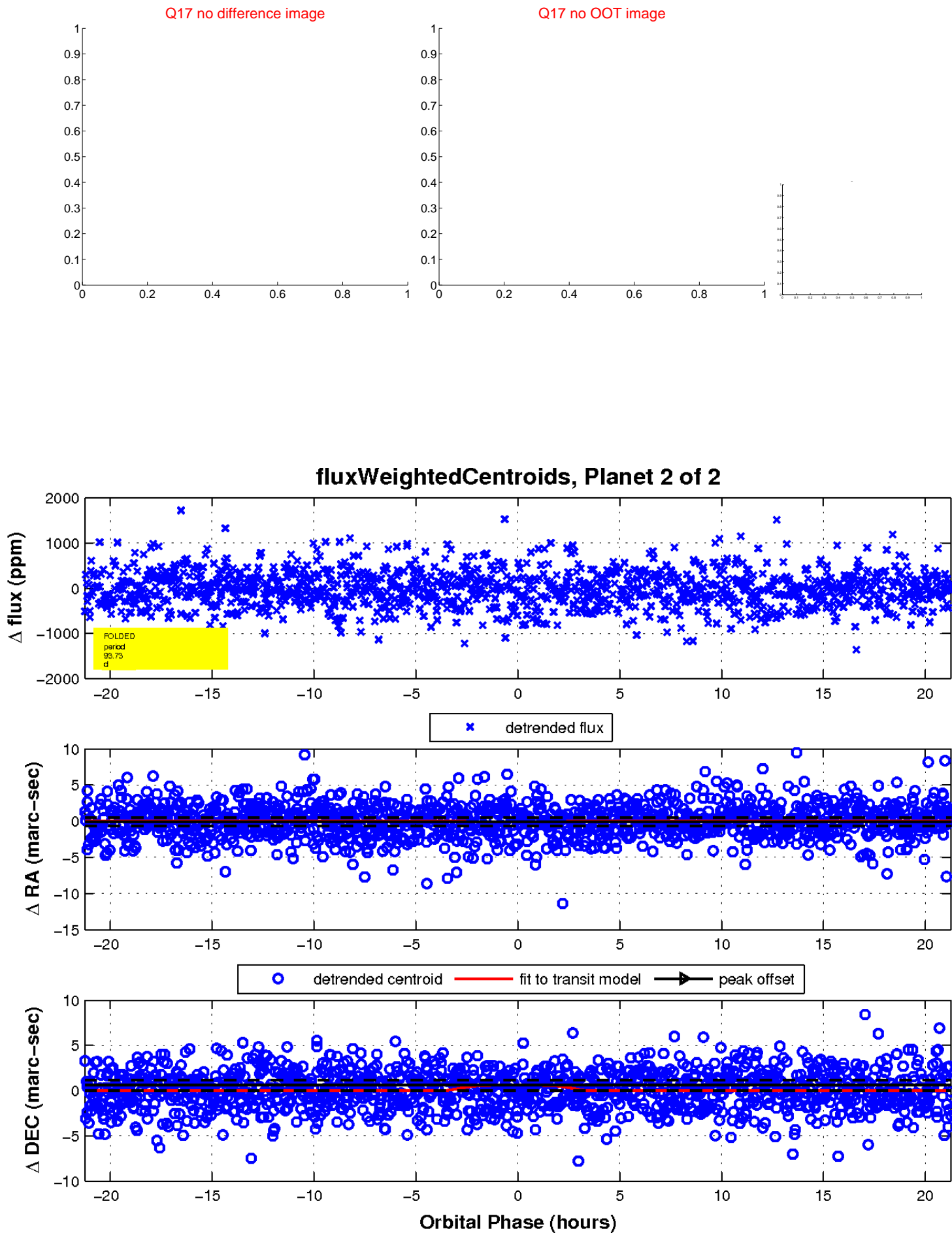
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

