

# KIC 007812179

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007812179-01	OBS	0515.01	17.794168	134.018163	1566.7	4.001	103.9	87.7	0.81	5485	6.19	32.00
007812179-02	OBS	No	17.792822	141.455866	358.6	4.534	24.6	26.5	0.81	5485	2.50	32.00

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007812179-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_RESOLVED_OFFSET—EPHEM_MATCH
007812179-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH

**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 007812179-01

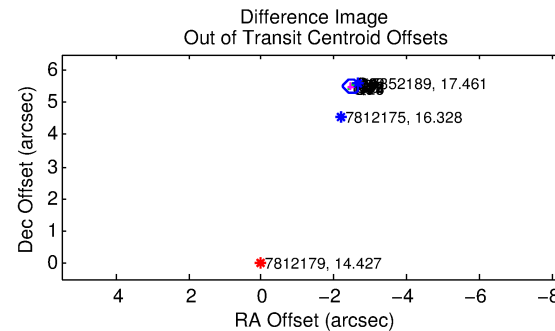
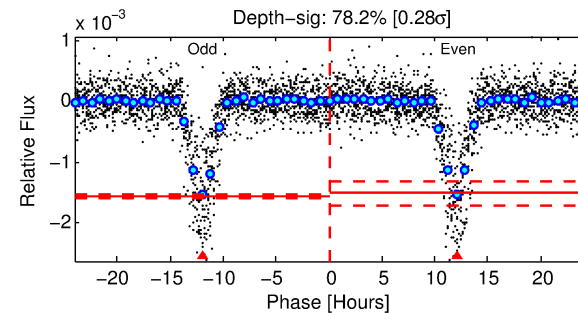
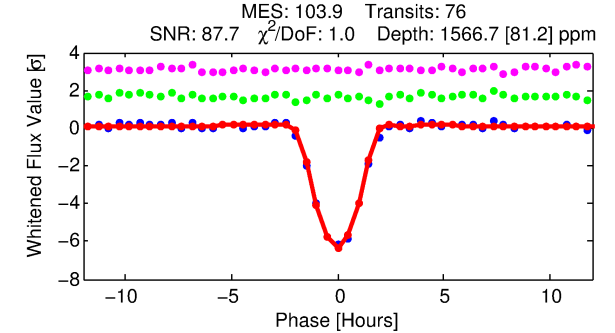
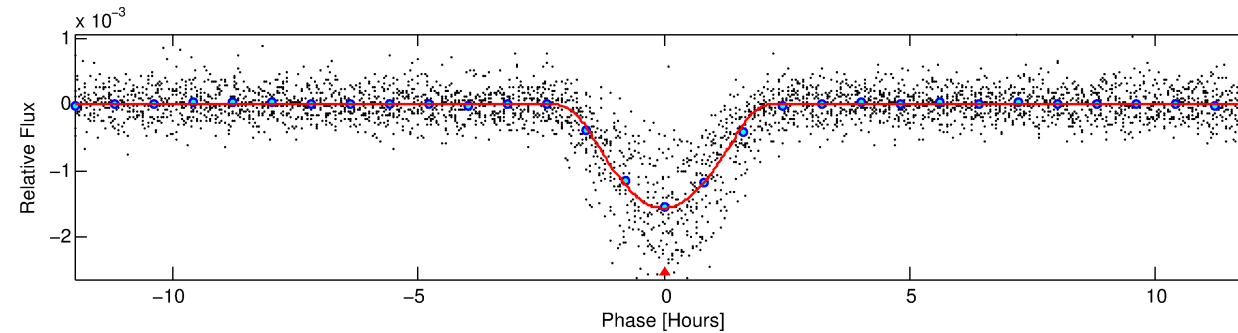
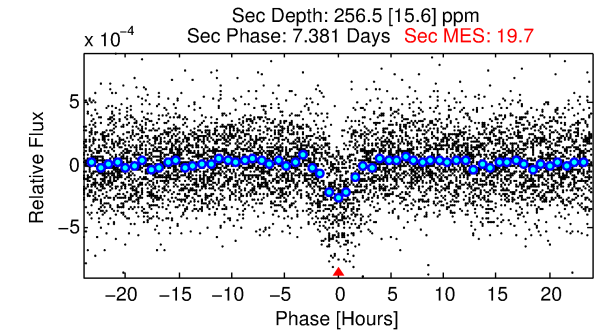
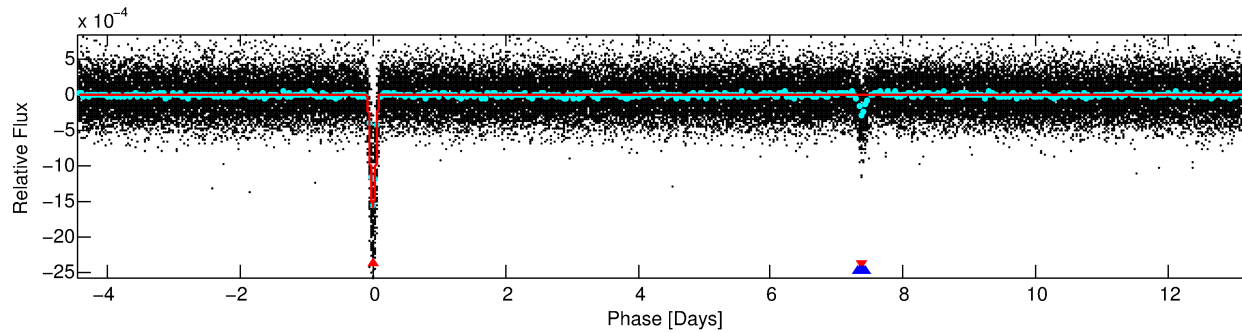
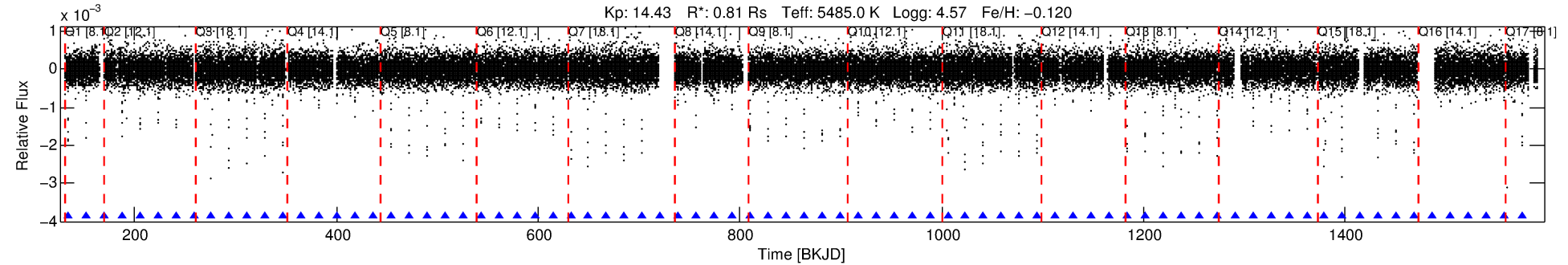
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
007812179-01	7812179	007812175-01	7812175	1:1	5.1	1	1	16.33	14.43	74.03	Direct-PRF	0	1.04	0.81

**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: 7812179 Candidate: 1 of 2 Period: 17.794 d  
KOI: K00515 Corr: No Ephemeris Match

Kp: 14.43 R<sup>\*</sup>: 0.81 R<sub>s</sub> Teff: 5485.0 K Logg: 4.57 Fe/H: -0.120



## DV Fit Results:

Period = 17.79417 [0.00002] d  
Epoch = 134.0182 [0.0011] BKJD  
Rp/R<sup>\*</sup> = 0.0705 [0.0372]  
a/R<sup>\*</sup> = 13.06 [1.52]  
b = 1.00 [0.06]  
Seff = 32.00 [9.13]  
Teq = 606 [43] K  
Rp = 6.19 [3.54] Re  
a = 0.1282 [0.0234] AU  
Ag = 60.42 [65.85] [0.90σ]  
Teffp = 2614 [695] K [2.89σ]

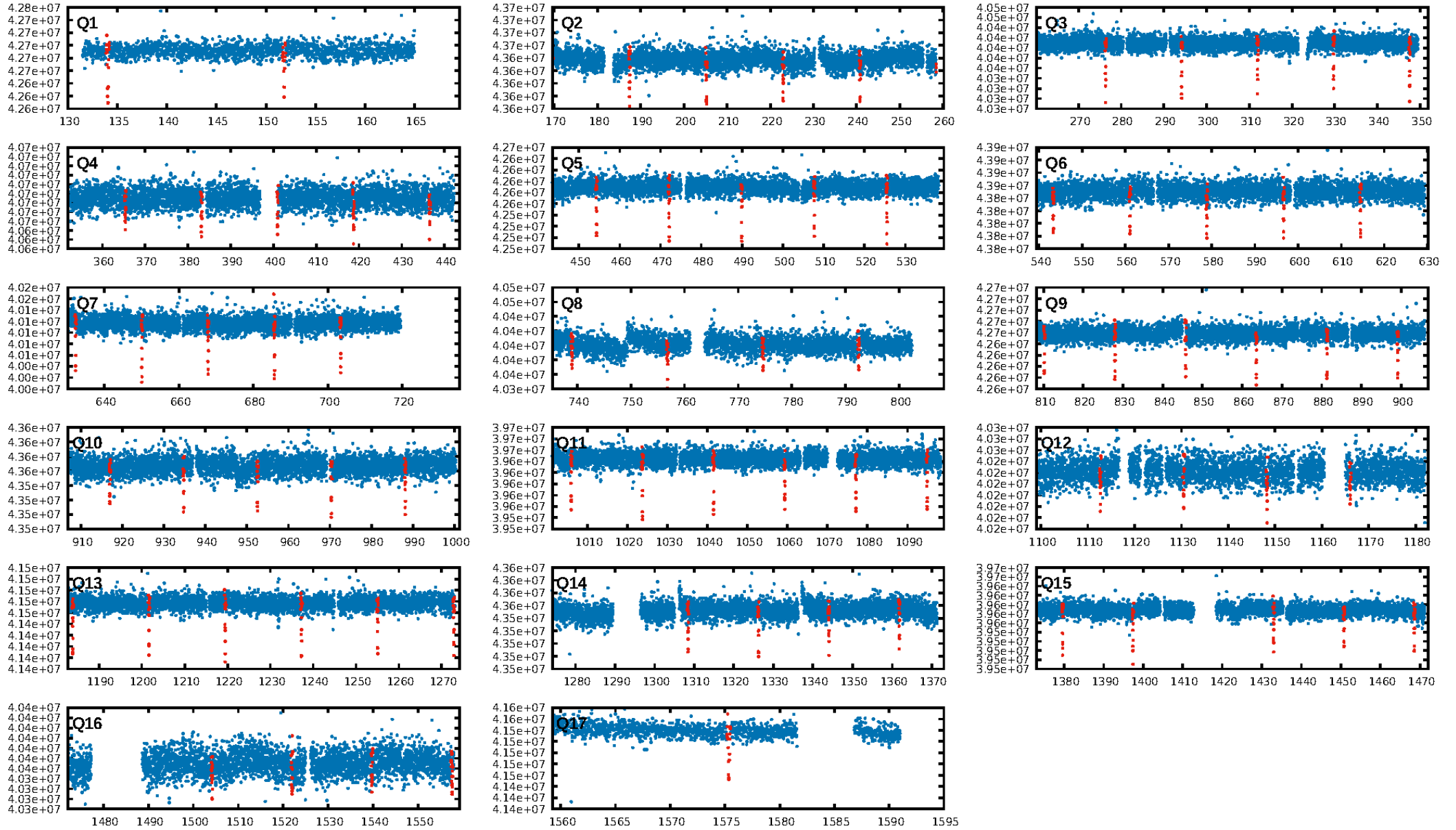
## DV Diagnostic Results:

ShortPeriod-sig: 0.4% [0.01σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 95.3%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [73/73]  
GhostDiagnostic-chr: -0.3152  
Centroid-sig: 0.0%  
Centroid-so: 25.223 arcsec [213.47σ]  
OotOffset-rm: 6.031 arcsec [87.41σ]  
KicOffset-rm: 6.082 arcsec [89.16σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

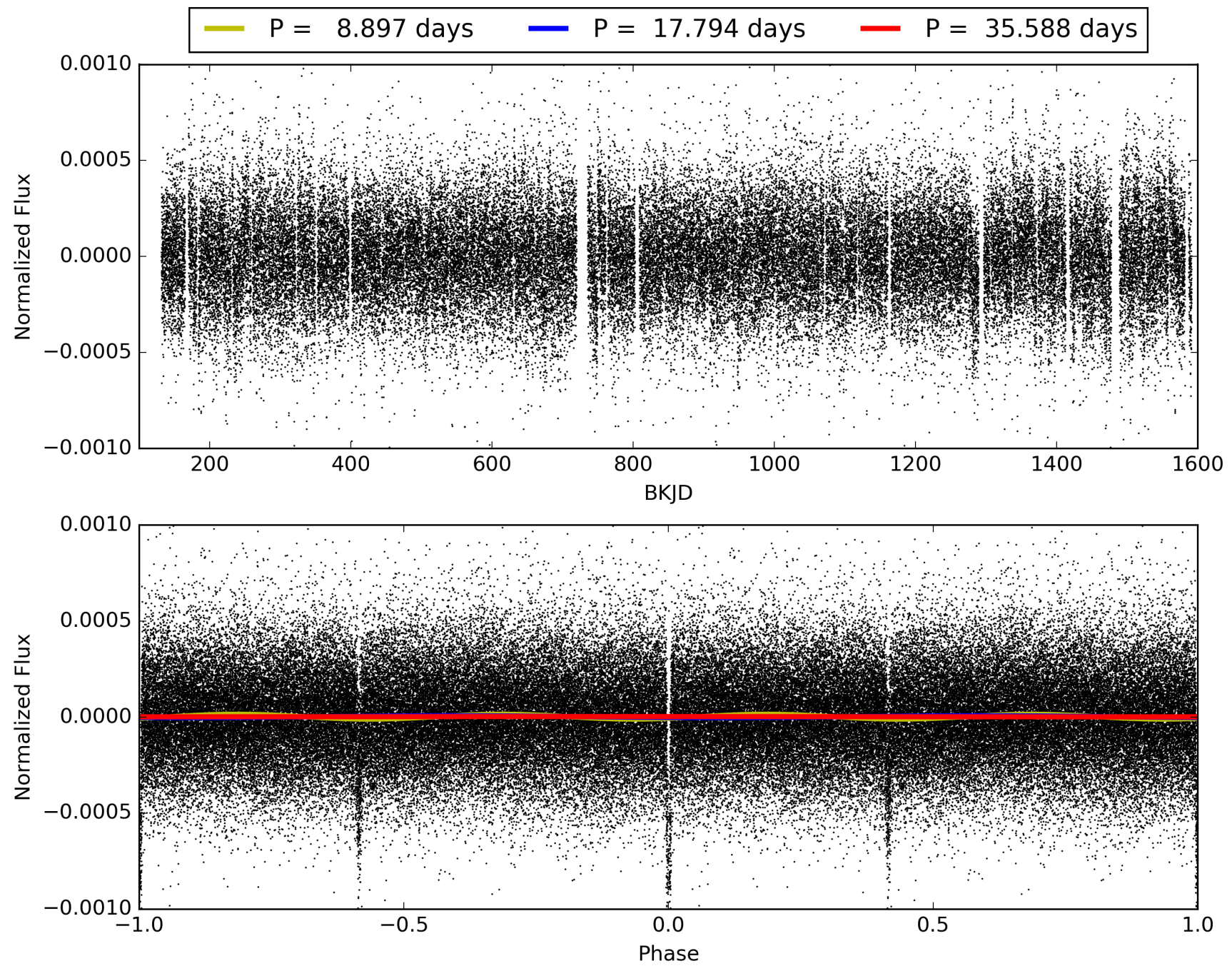
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 04:10:05 Z

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

# TCE 007812179-01, PDC Light Curves

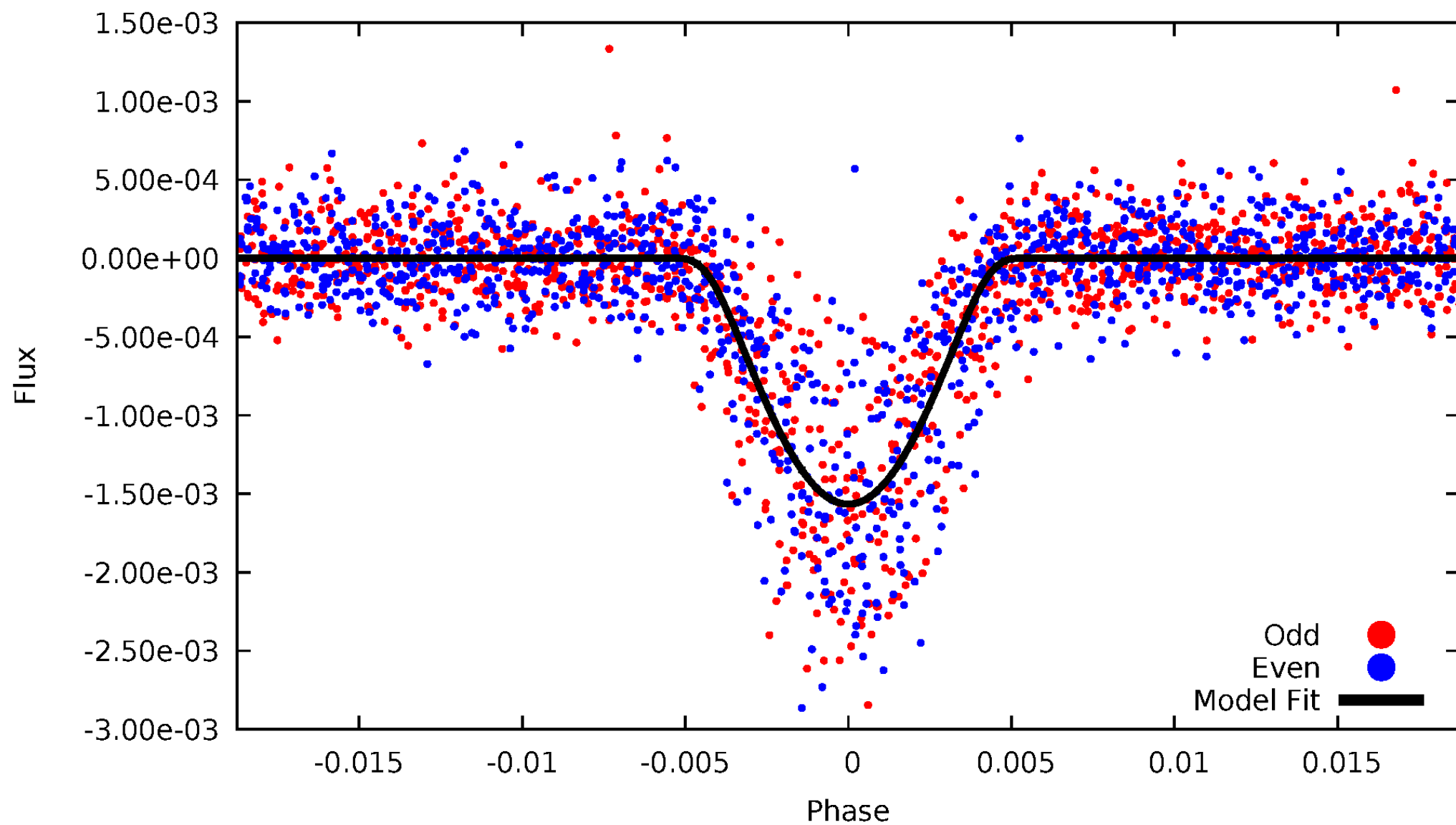


TCE 007812179-01



DV Odd/Even

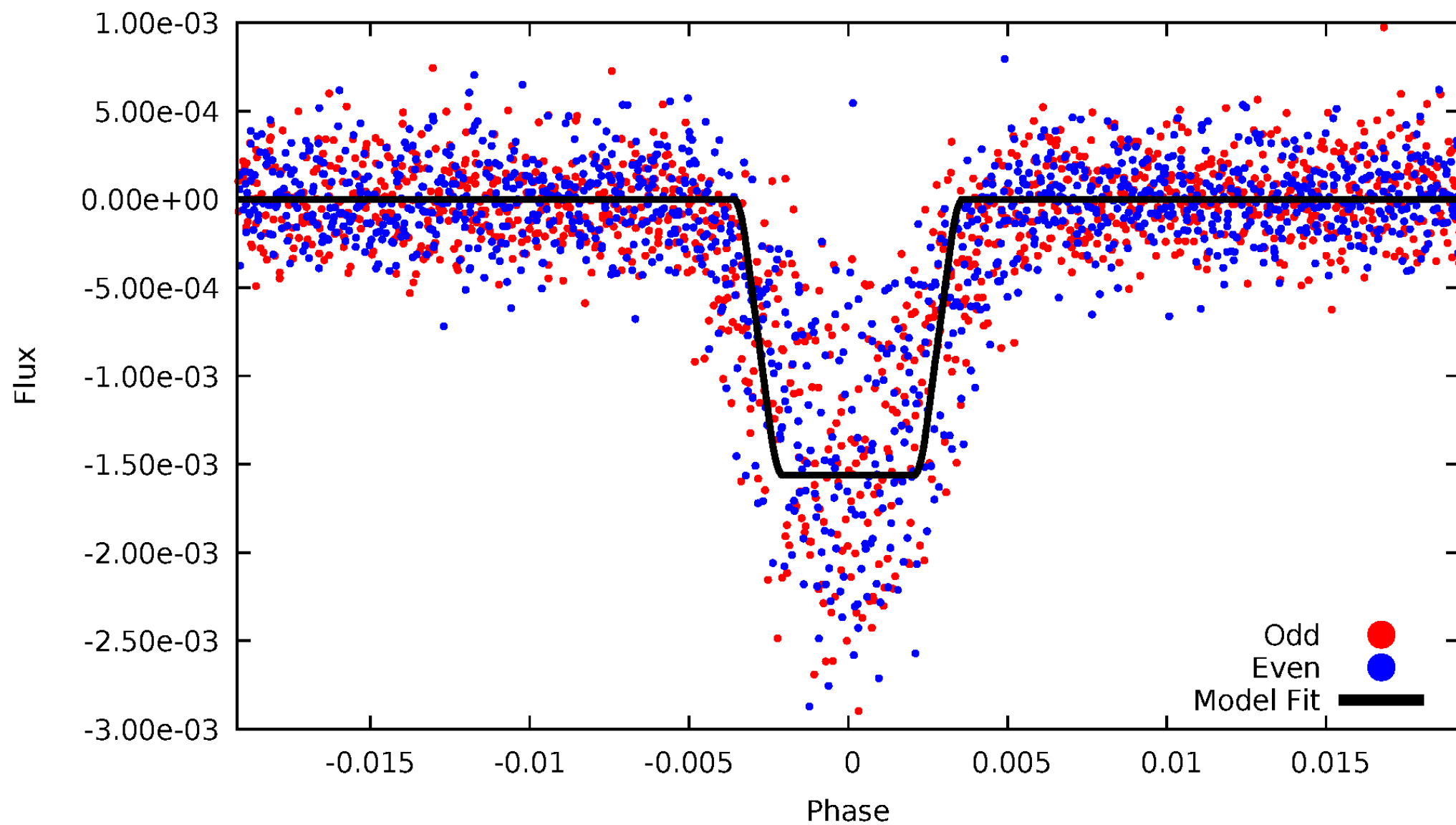
TCE 007812179-01





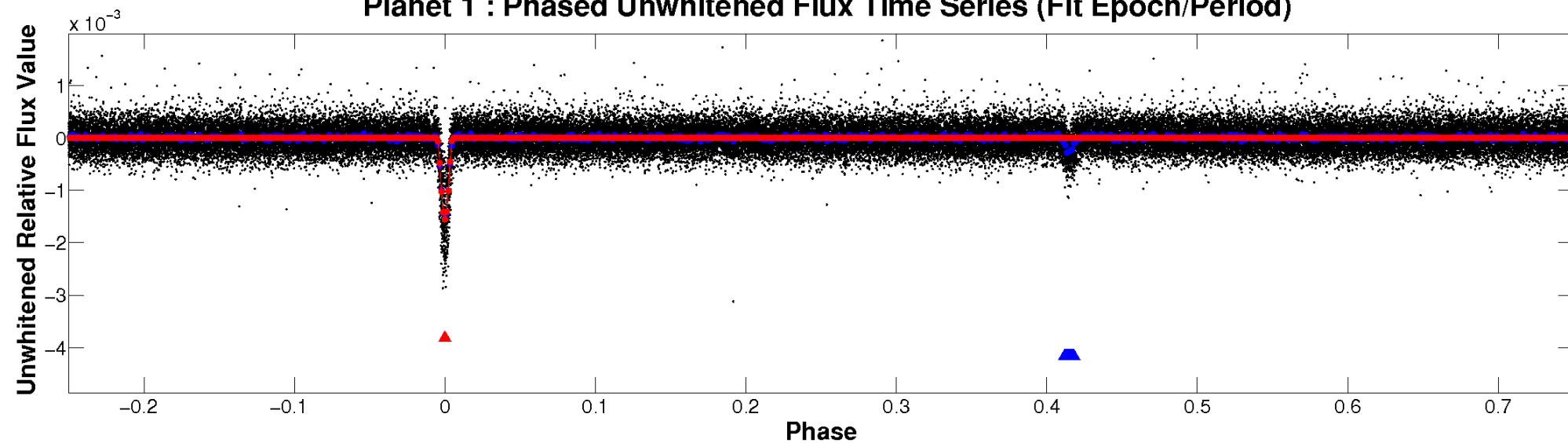
# ALT Odd/Even

TCE 007812179-01

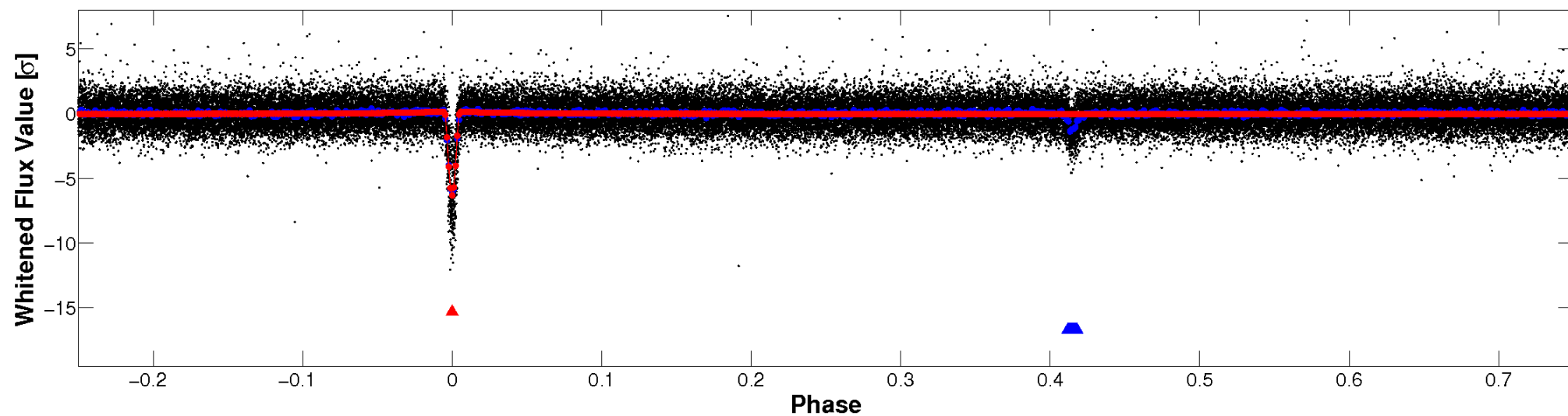


# Non-Whitened Vs. Whitened Light Curve

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

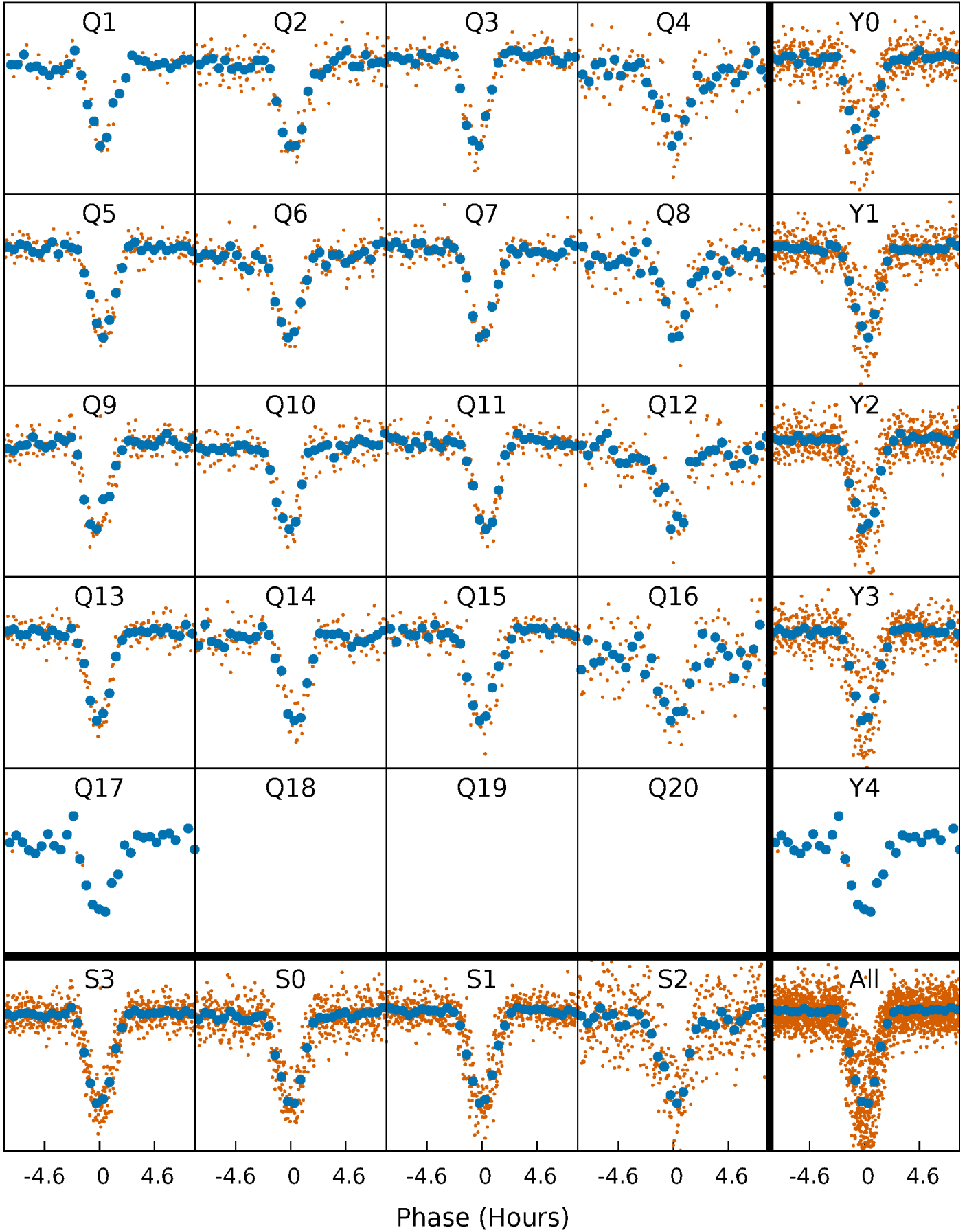


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

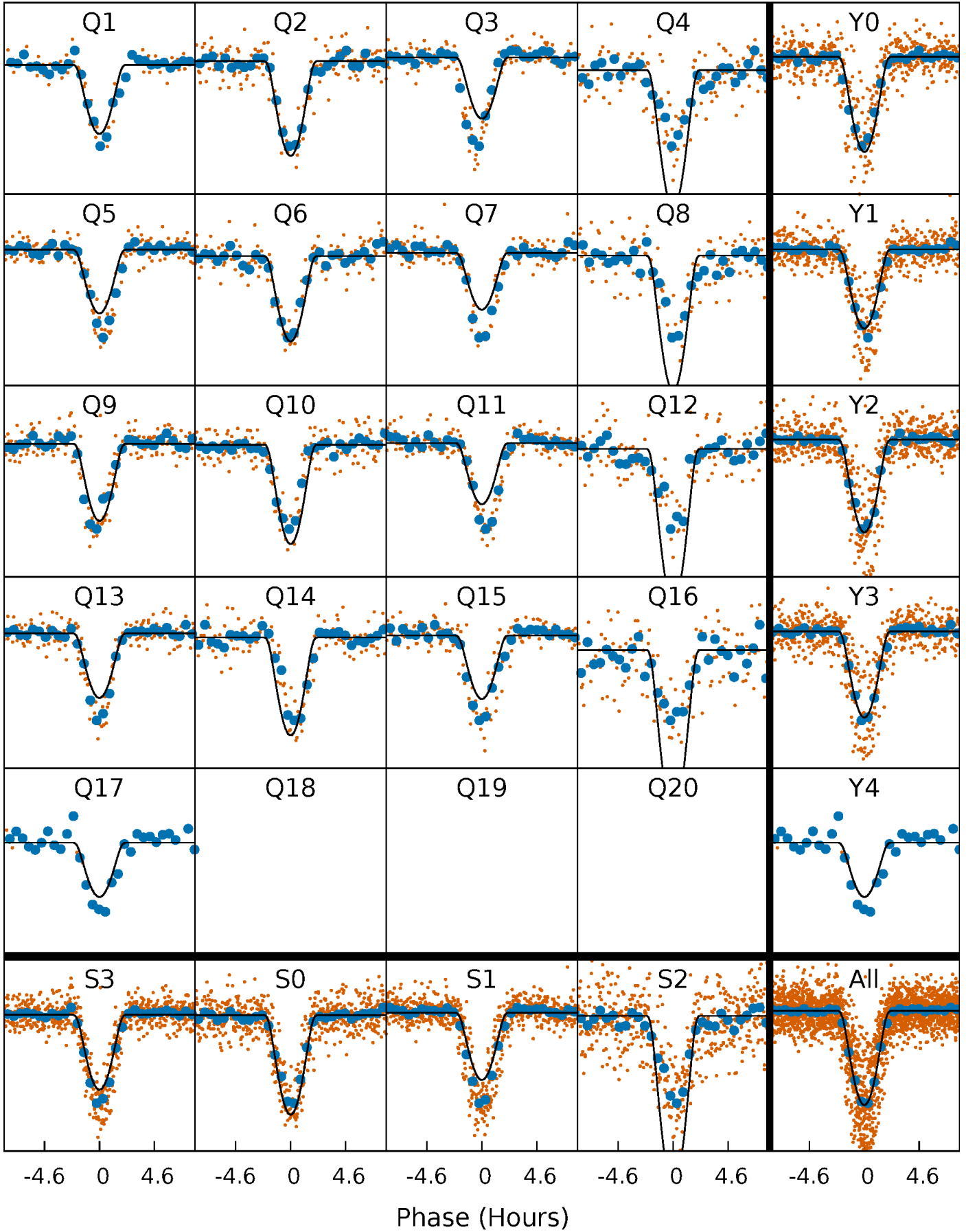
TCE 007812179-01 P= 17.794168 Days  $T_0=134.018162$  (BKJD)





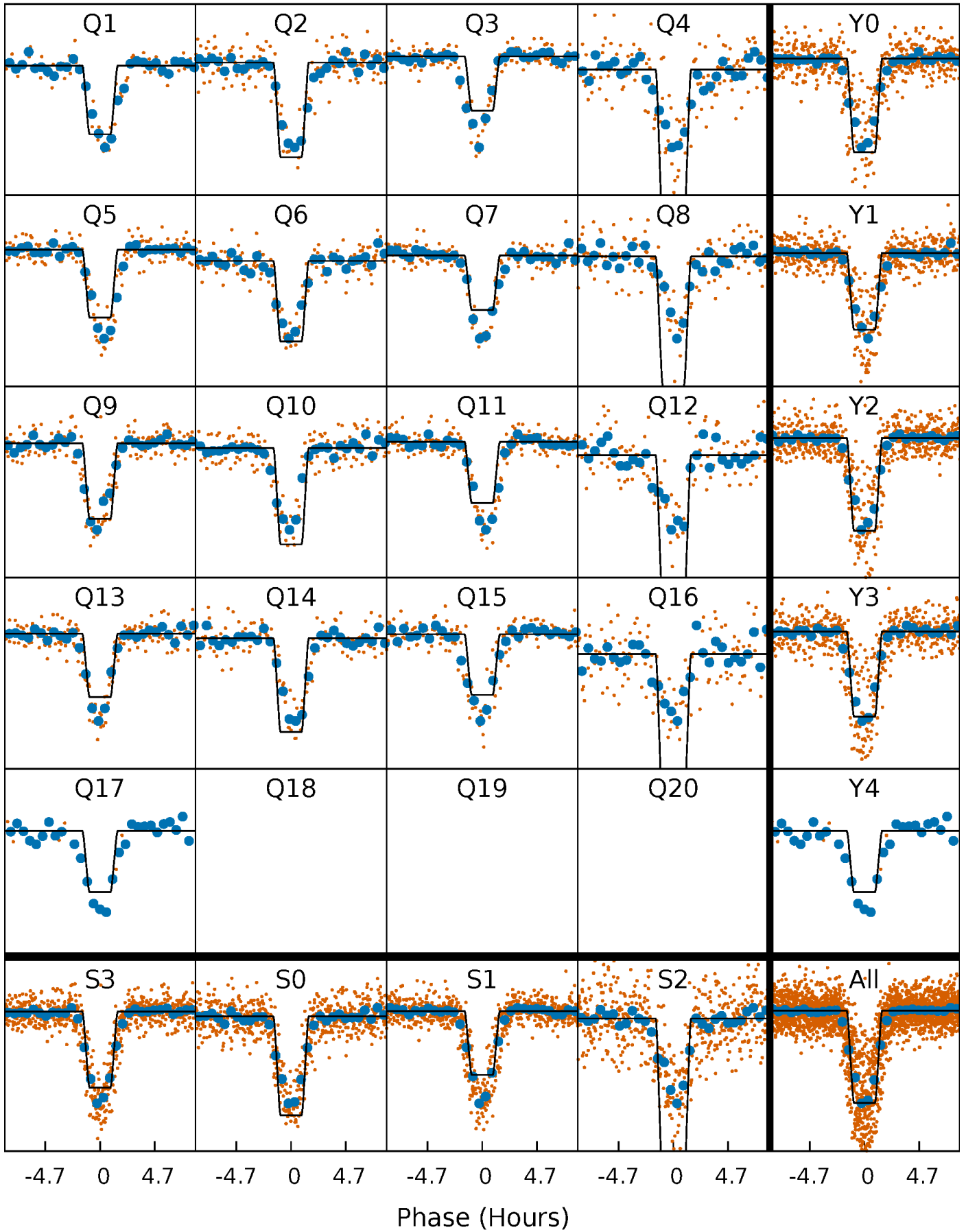
# DV Quarter-Phased Transit Curves

TCE 007812179-01 P= 17.794168 Days  $T_0=134.018162$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

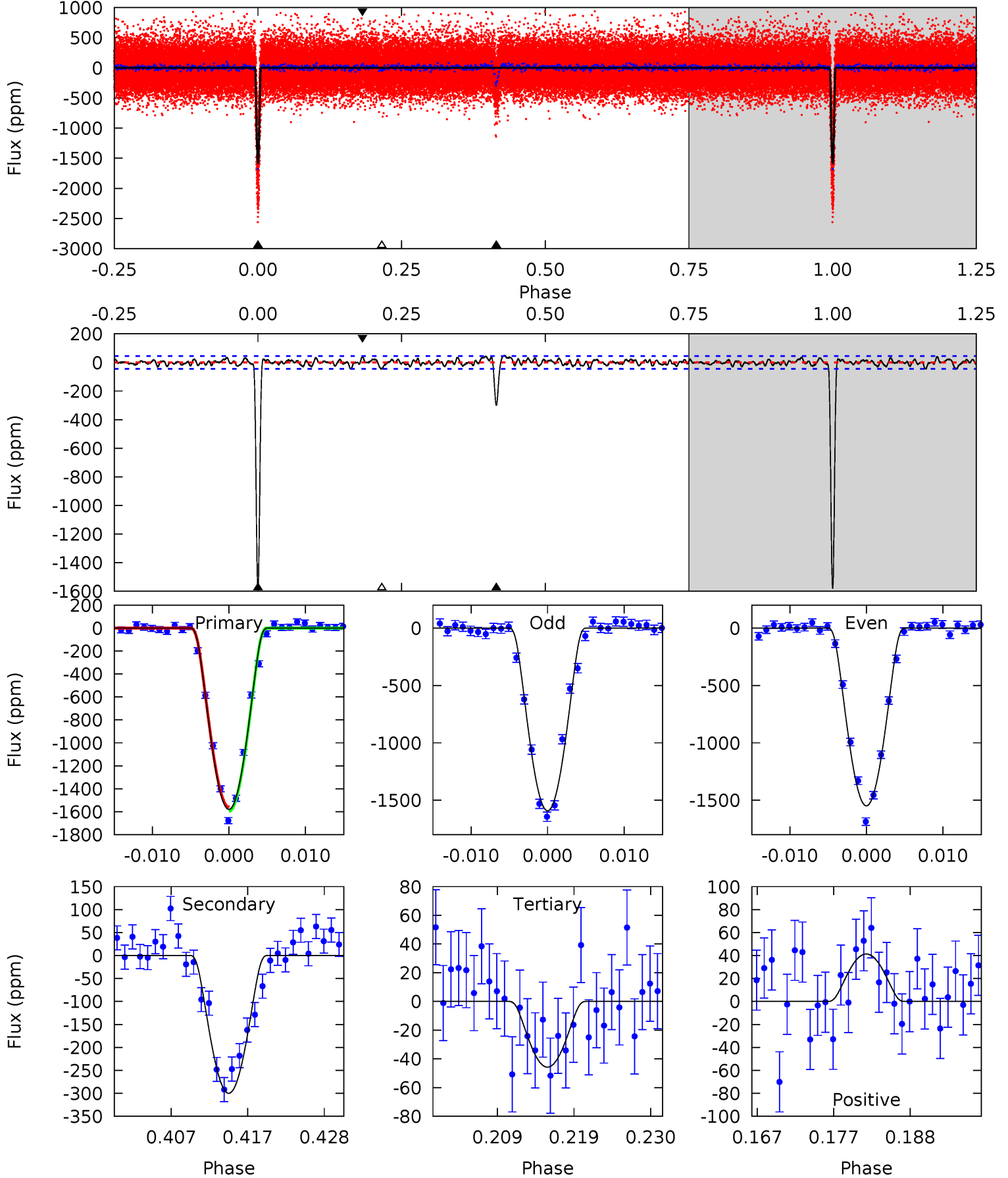
TCE 007812179-01 P= 17.794307 Days  $T_0=134.013390$  (BKJD)



# DV Model-Shift Uniqueness Test

007812179-01, P = 17.794168 Days, E = 116.223994 Days

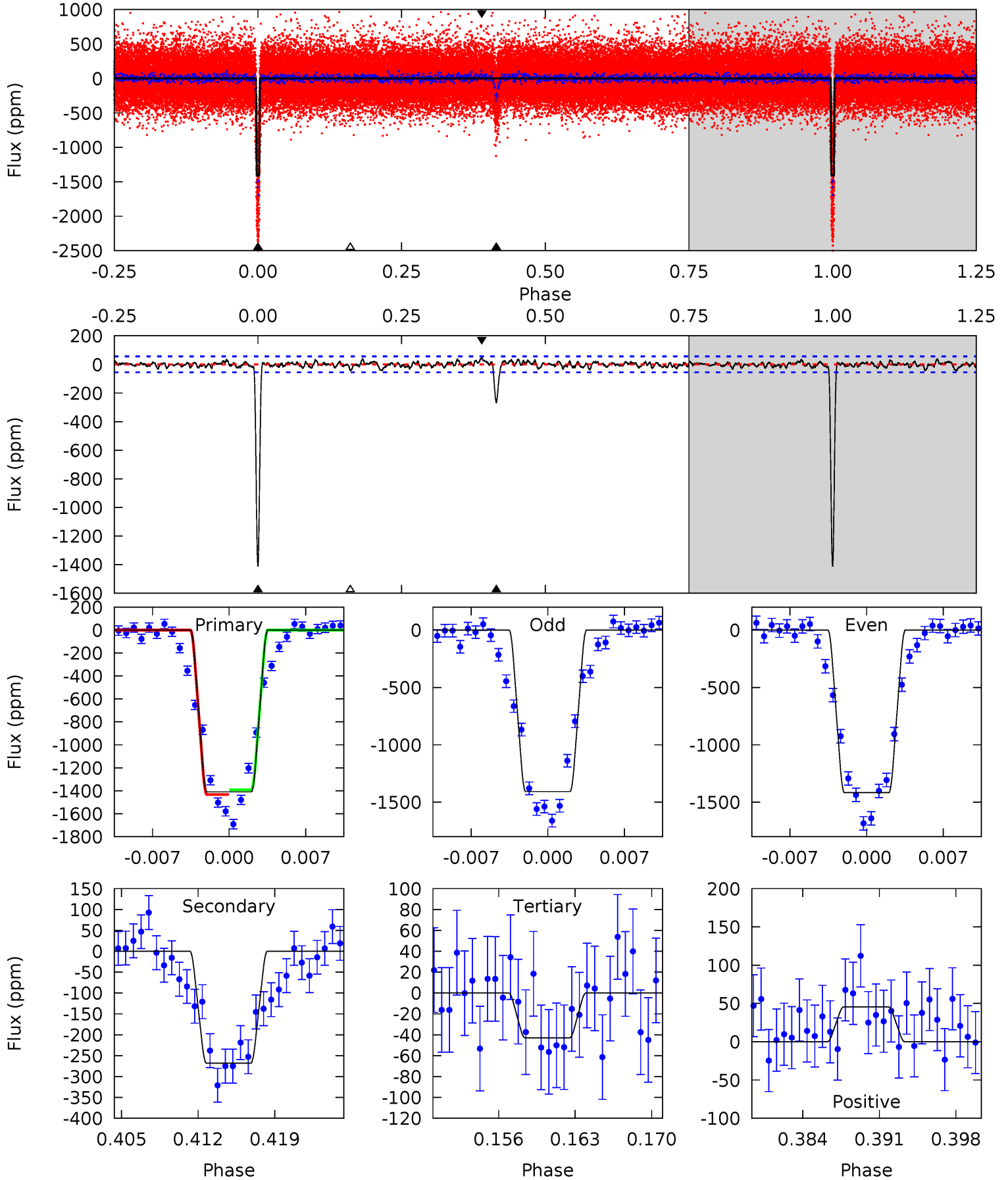
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
177.9	33.8	5.15	4.65	5.02	2.56	1.74	172.7	173.2	28.6	29.1	2.44	0.93	0.03	2.08



# Alt Model-Shift Uniqueness Test

007812179-01, P = 17.794307 Days, E = 116.219083 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
129.3	24.6	3.93	4.18	5.09	2.69	1.25	125.3	125.1	20.6	20.4	0.47	0.96	0.03	1.84



### Stellar Parameters For KIC 007812179

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5485^{+147}_{-147}$	$4.574^{+0.034}_{-0.144}$	$-0.120^{+0.300}_{-0.300}$	$0.805^{+0.175}_{-0.070}$	$0.891^{+0.082}_{-0.101}$	$2.406^{+0.446}_{-0.958}$
	+3%/-3%	+1%/-3%	+250%/-250%	+22%/-9%	+9%/-11%	+19%/-40%
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 007812179-01 / KOI 0515.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-300 \pm 9$	$6.68^{+3.65}_{-3.56}$	$866^{+44}_{-35}$	$3248^{+903}_{-370}$	$61^{+212}_{-35}$
Alt.	$-268 \pm 11$	$4.27^{+2.97}_{-2.77}$	$863^{+47}_{-33}$	$3657^{+1776}_{-550}$	$135^{+928}_{-88}$

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

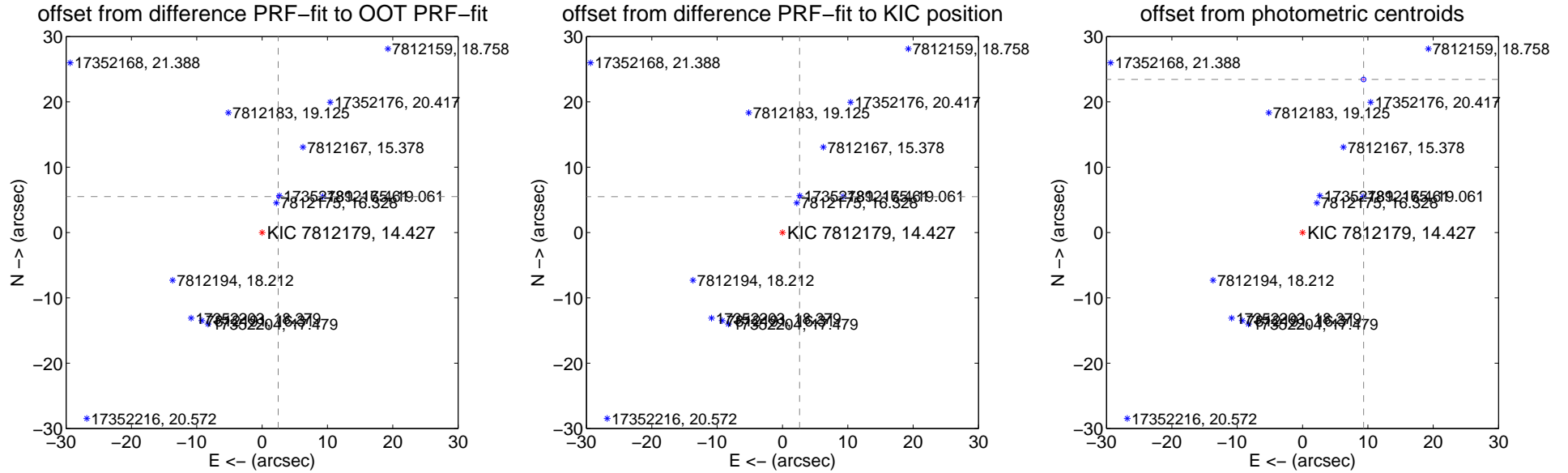
## DV Centroid Data

Supplemental centroid analysis for 007812179-01. Kepler magnitude: 14.43. Transit SNR 87.70

There are 17 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

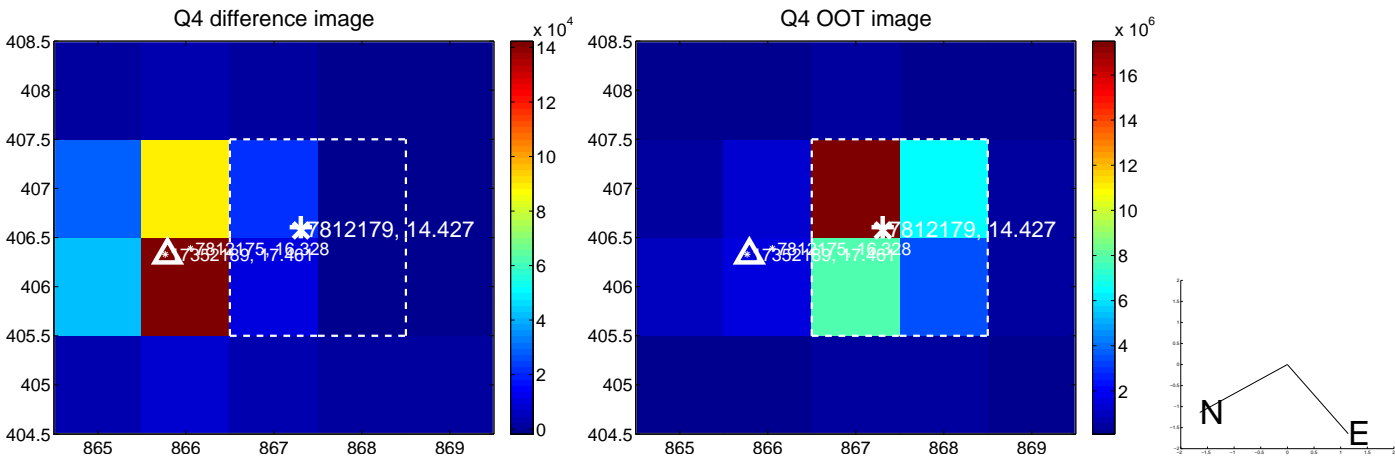
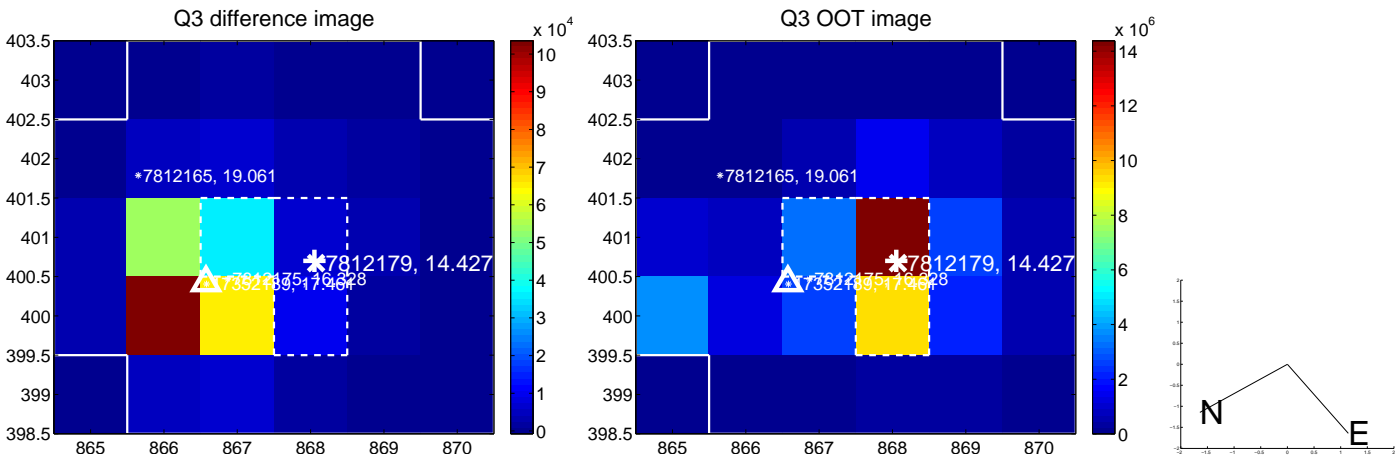
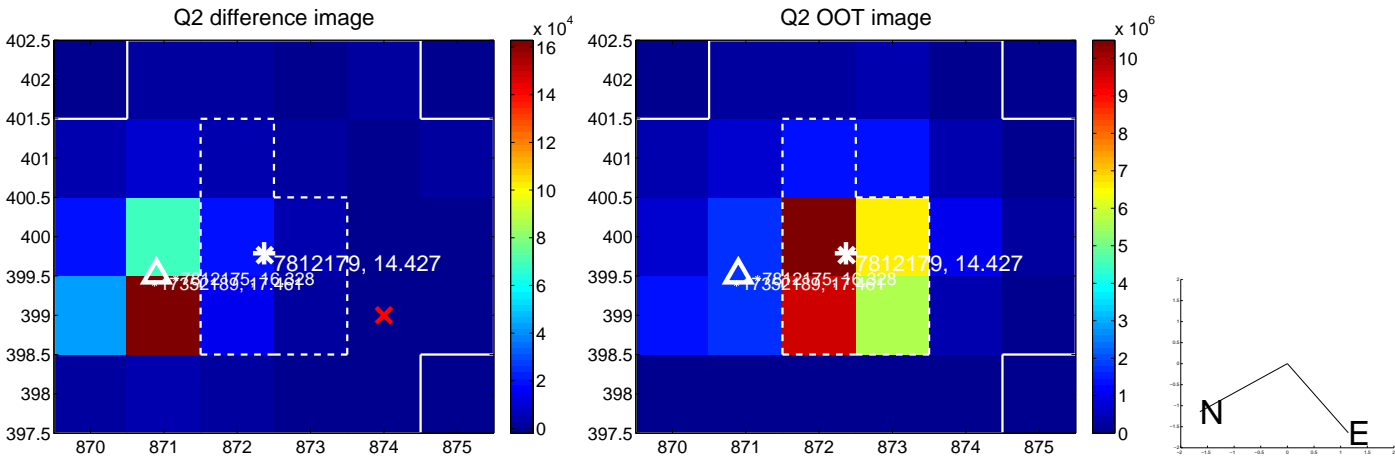
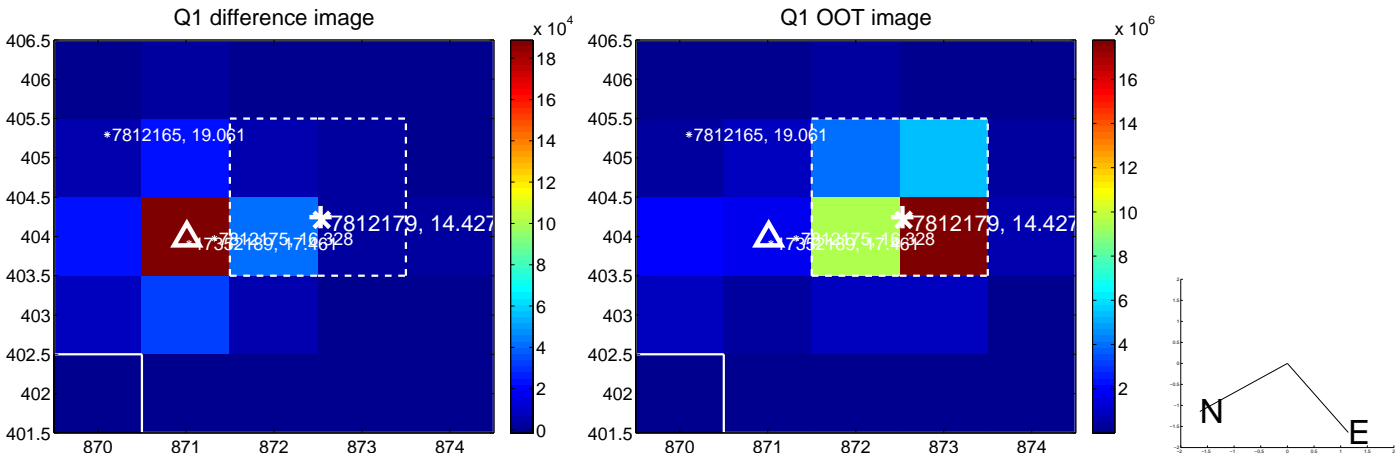
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$6.031 \pm 0.069$	87.41	$-2.469 \pm 0.067$	$5.502 \pm 0.069$
PRF-fit source offset from KIC position	$6.082 \pm 0.068$	89.16	$-2.619 \pm 0.067$	$5.489 \pm 0.068$
photometric centroid source offset	$25.22 \pm 0.12$	213.47	$-9.34 \pm 0.12$	$23.43 \pm 0.12$



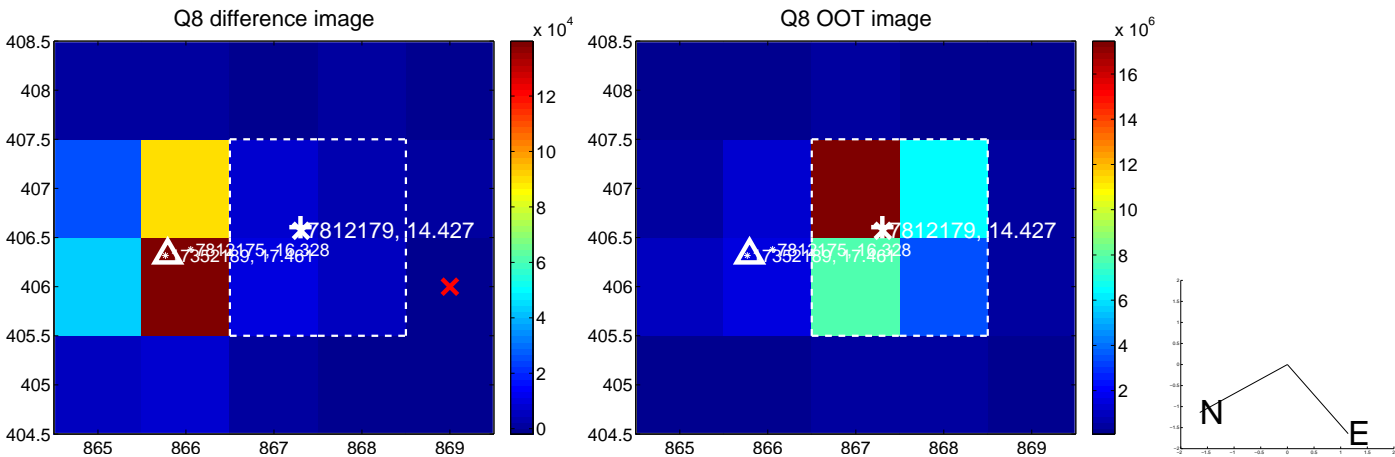
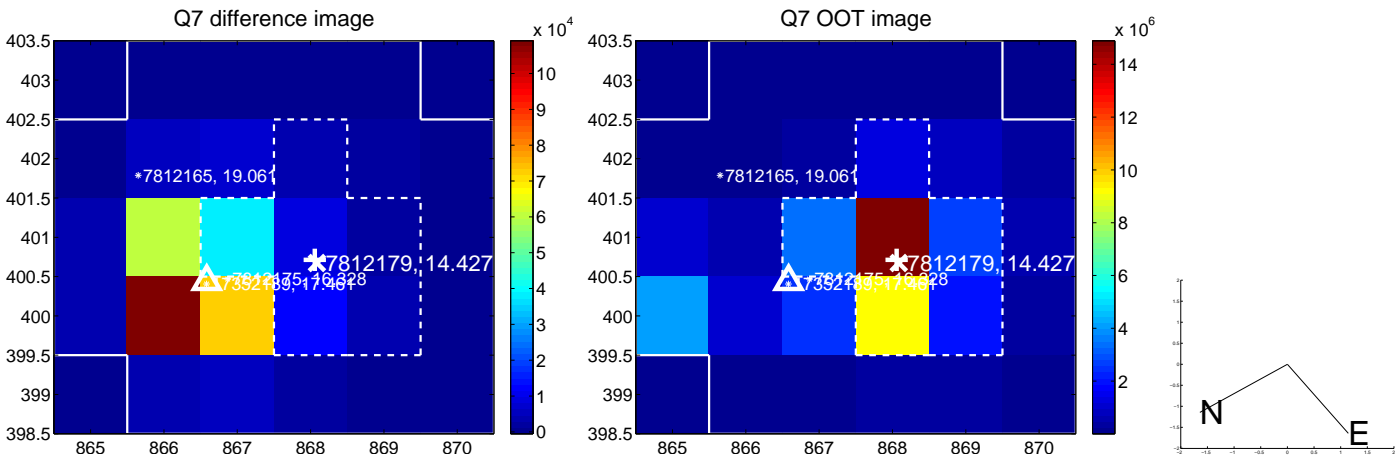
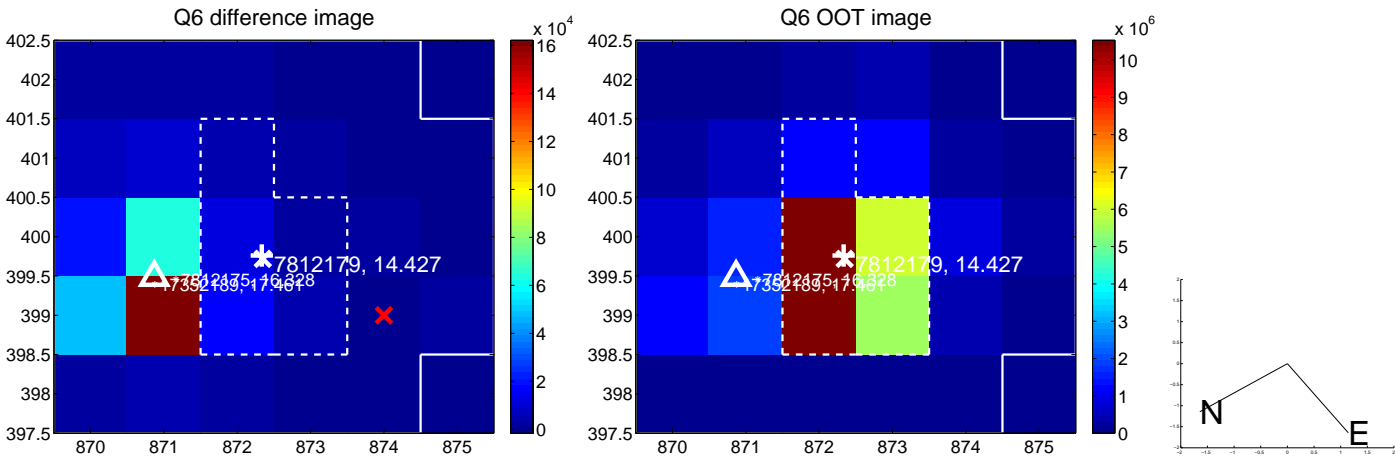
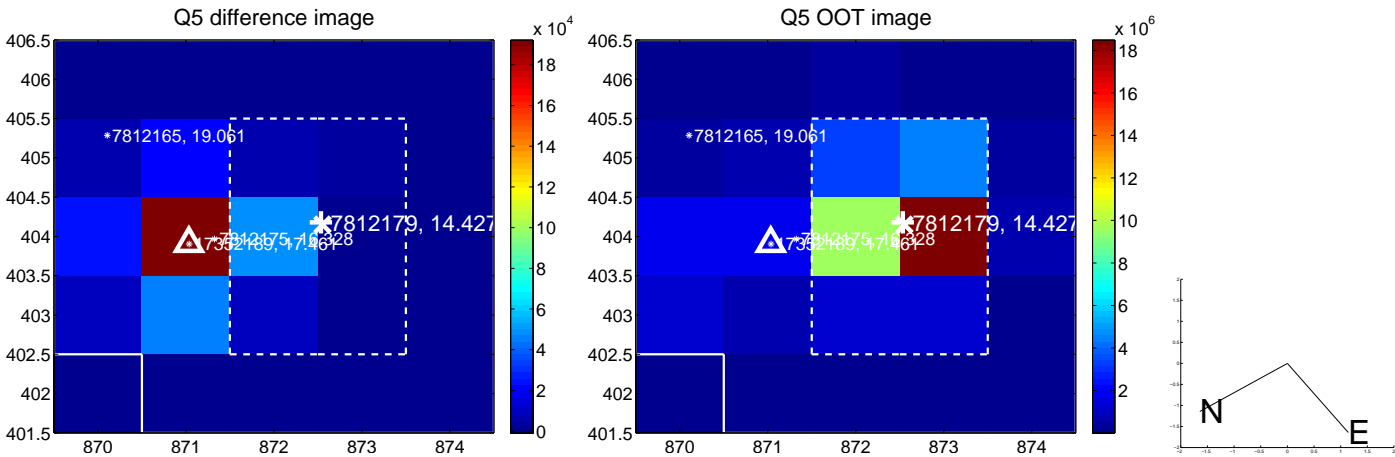
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



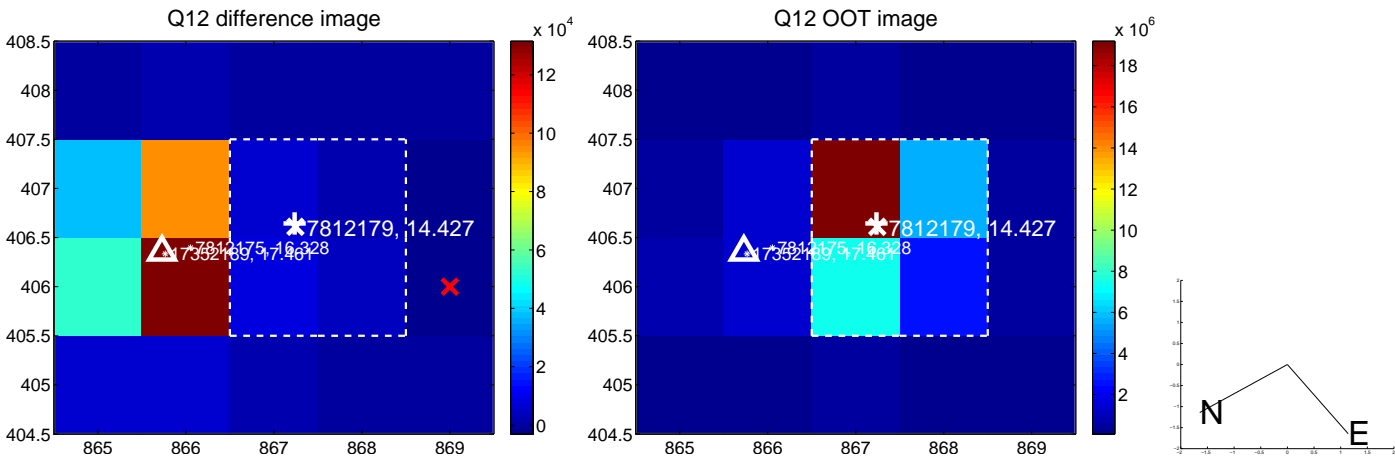
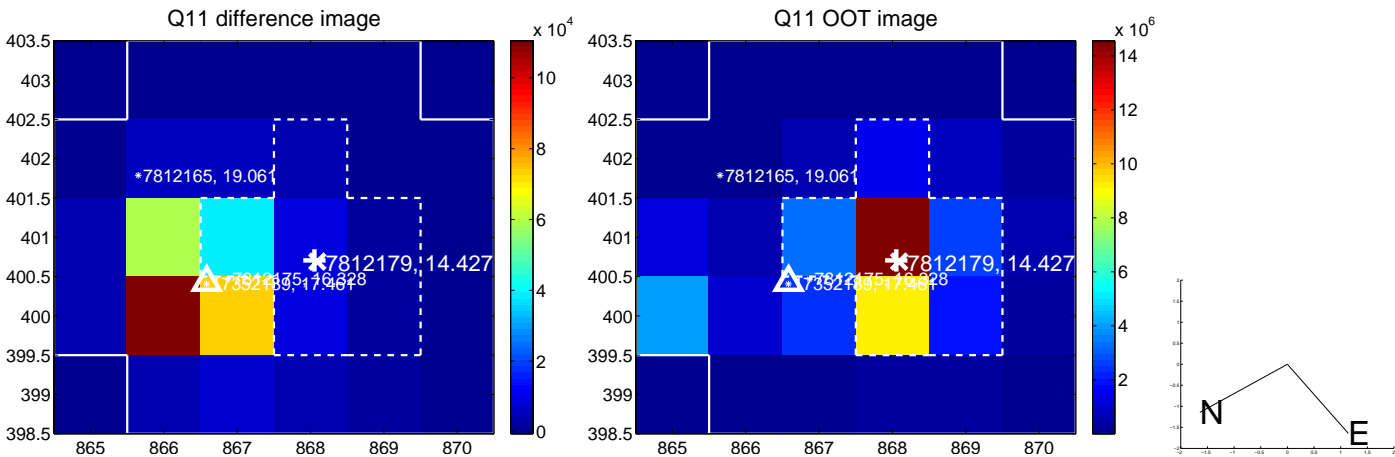
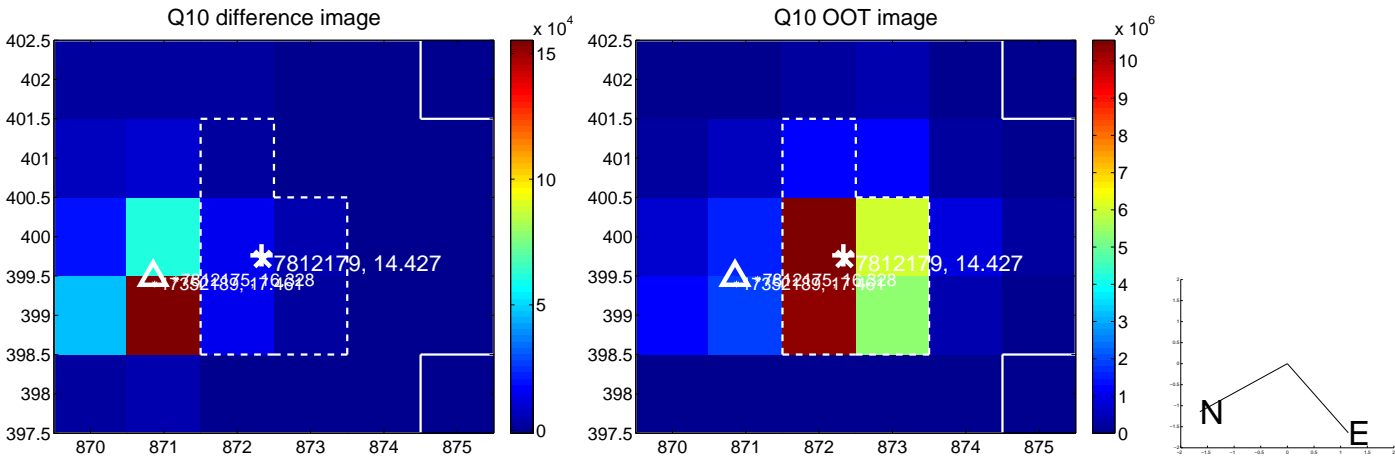
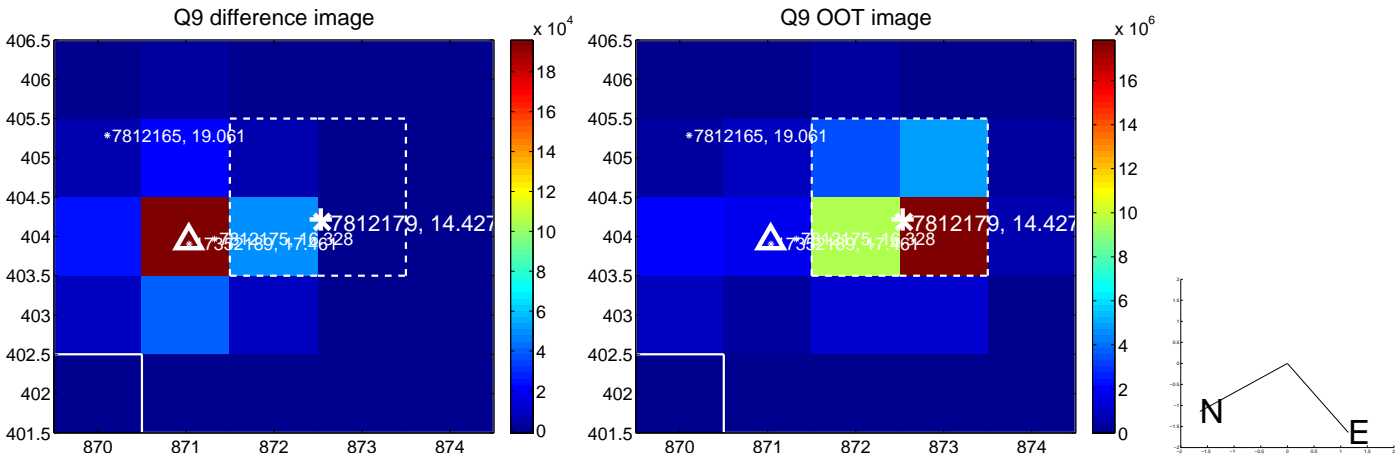
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



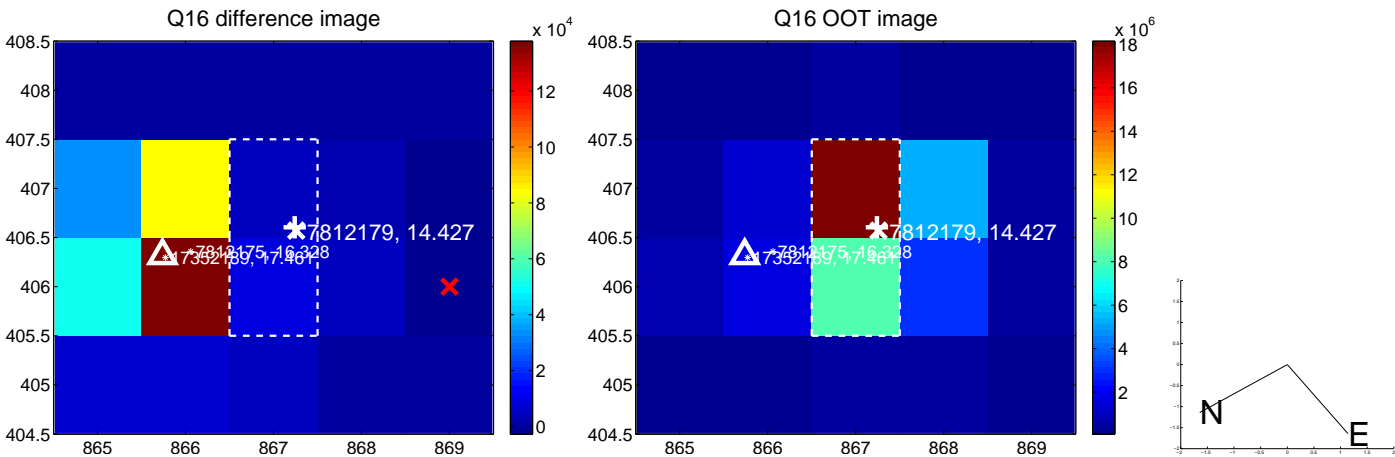
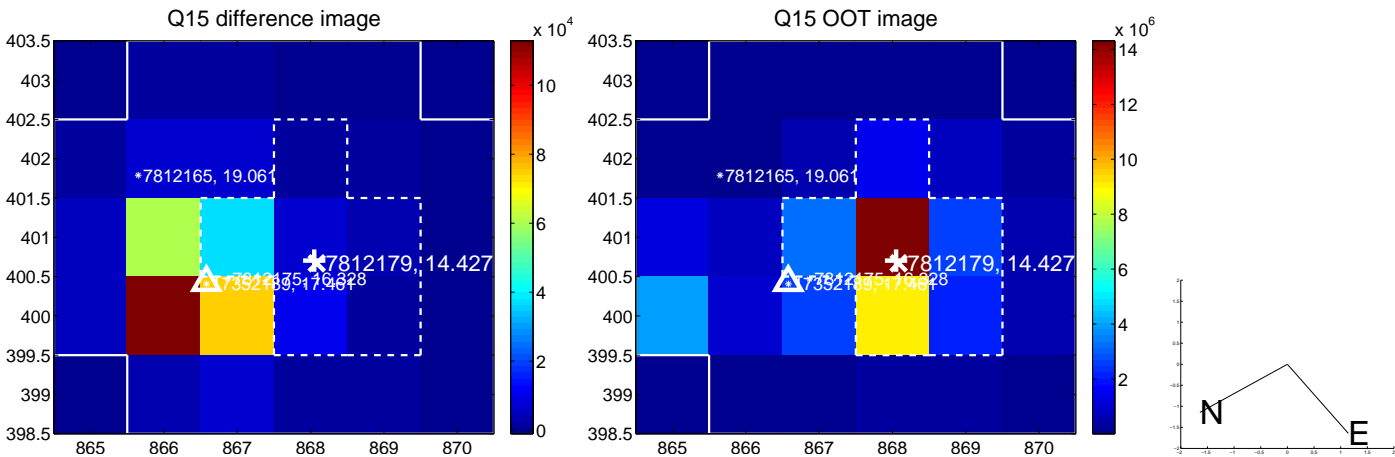
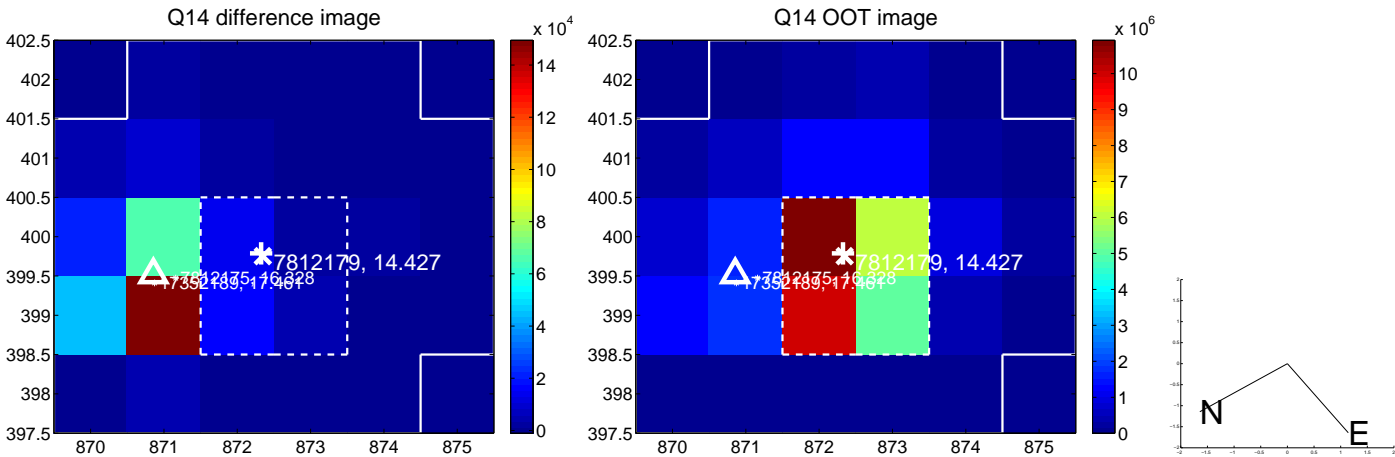
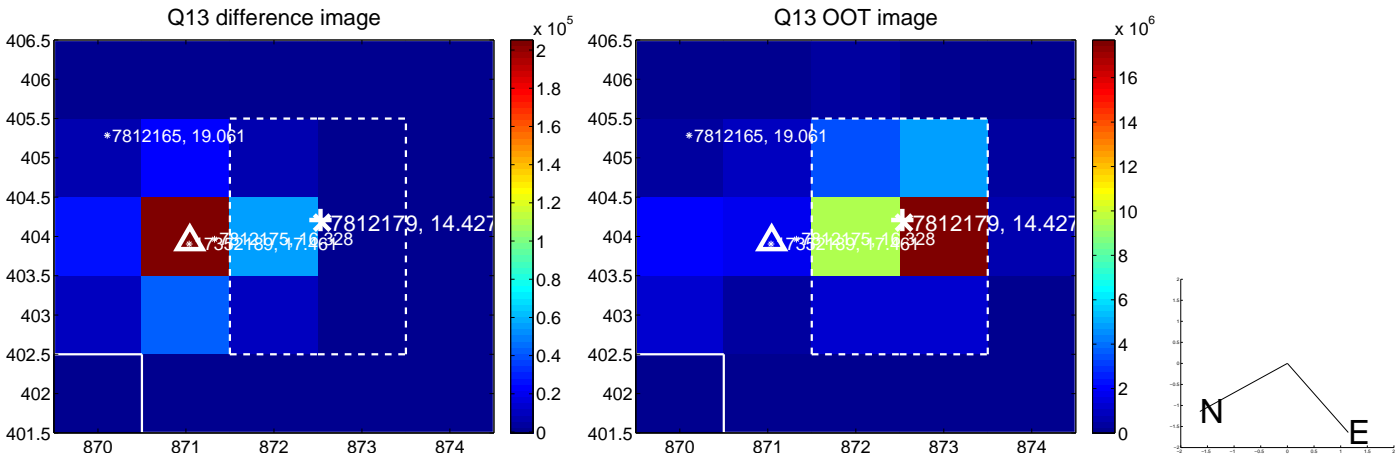
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



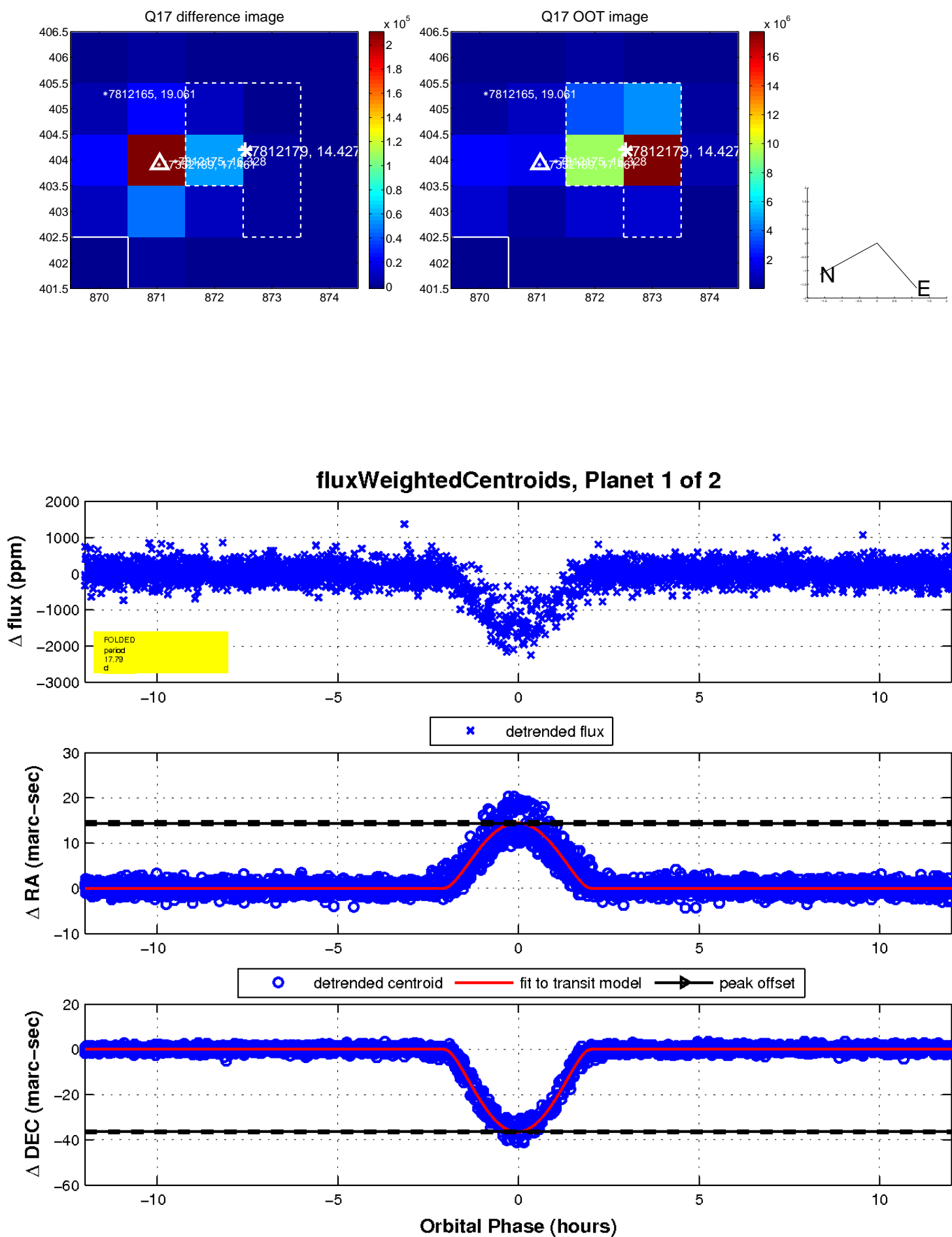
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

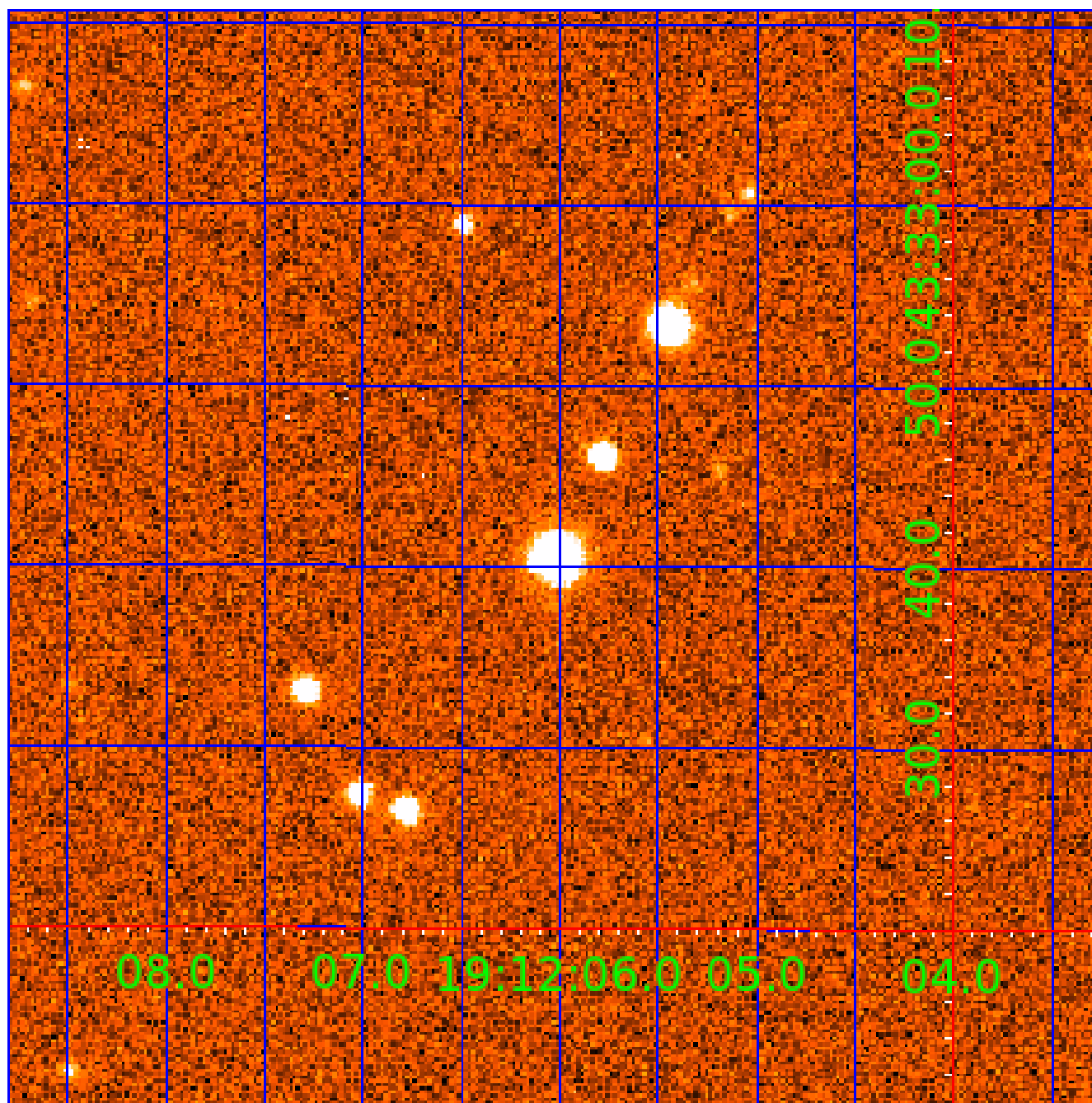


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination





# KIC 007812179

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007812179-01	OBS	0515.01	17.794168	134.018163	1566.7	4.001	103.9	87.7	0.81	5485	6.19	32.00
007812179-02	OBS	No	17.792822	141.455866	358.6	4.534	24.6	26.5	0.81	5485	2.50	32.00

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007812179-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_RESOLVED_OFFSET—EPHEM_MATCH
007812179-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH

**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 007812179-02

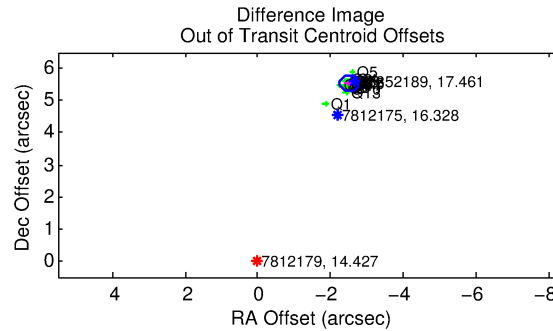
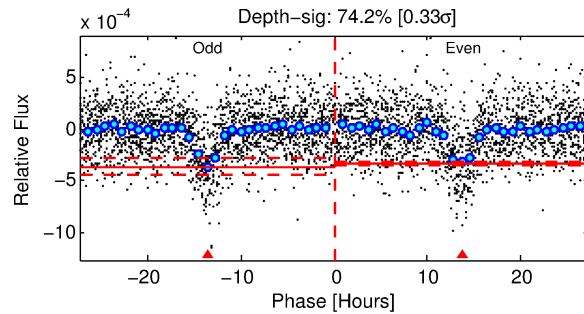
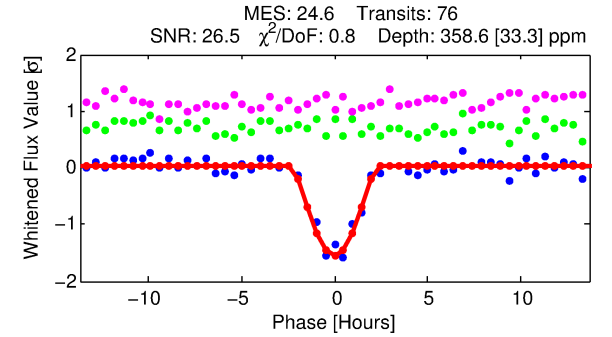
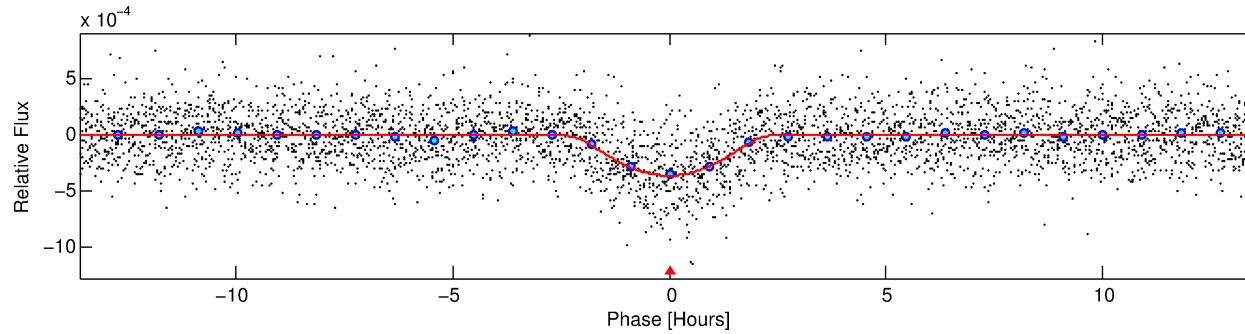
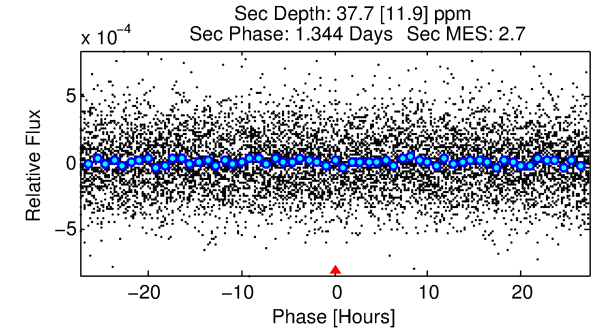
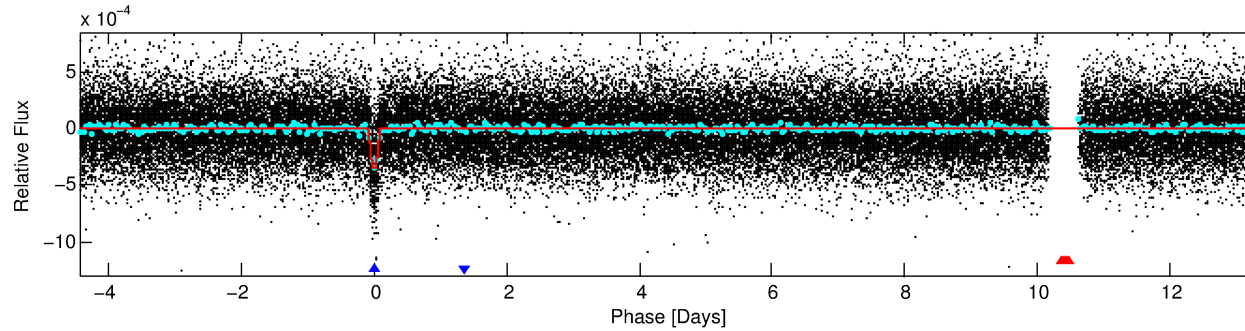
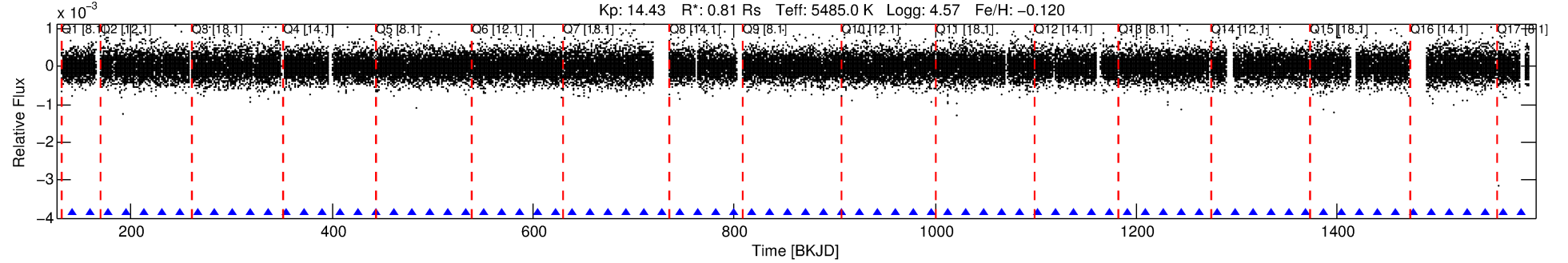
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
007812179-02	7812179	007812175-sec	7812175	1:1	5.1	1	1	16.33	14.43	48.19	Direct-PRF	0	1.93	1.87

**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: 7812179 Candidate: 2 of 2 Period: 17.793 d  
KOI: K00515 Corr: No Ephemeris Match

Kp: 14.43 R\*: 0.81 Rs Teff: 5485.0 K Logg: 4.57 Fe/H: -0.120



## DV Fit Results:

Period = 17.79282 [0.00009] d  
Epoch = 141.4559 [0.0042] BKJD  
Rp/R\* = 0.0285 [0.0164]  
a/R\* = 8.60 [1.90]  
b = 0.99 [0.03]  
Seff = 32.00 [9.13]  
Teq = 606 [43] K  
Rp = 2.50 [1.54] Re  
a = 0.1282 [0.0234] AU  
Ag = 54.35 [66.46] [0.80σ]  
Teffp = 2546 [763] K [2.54σ]

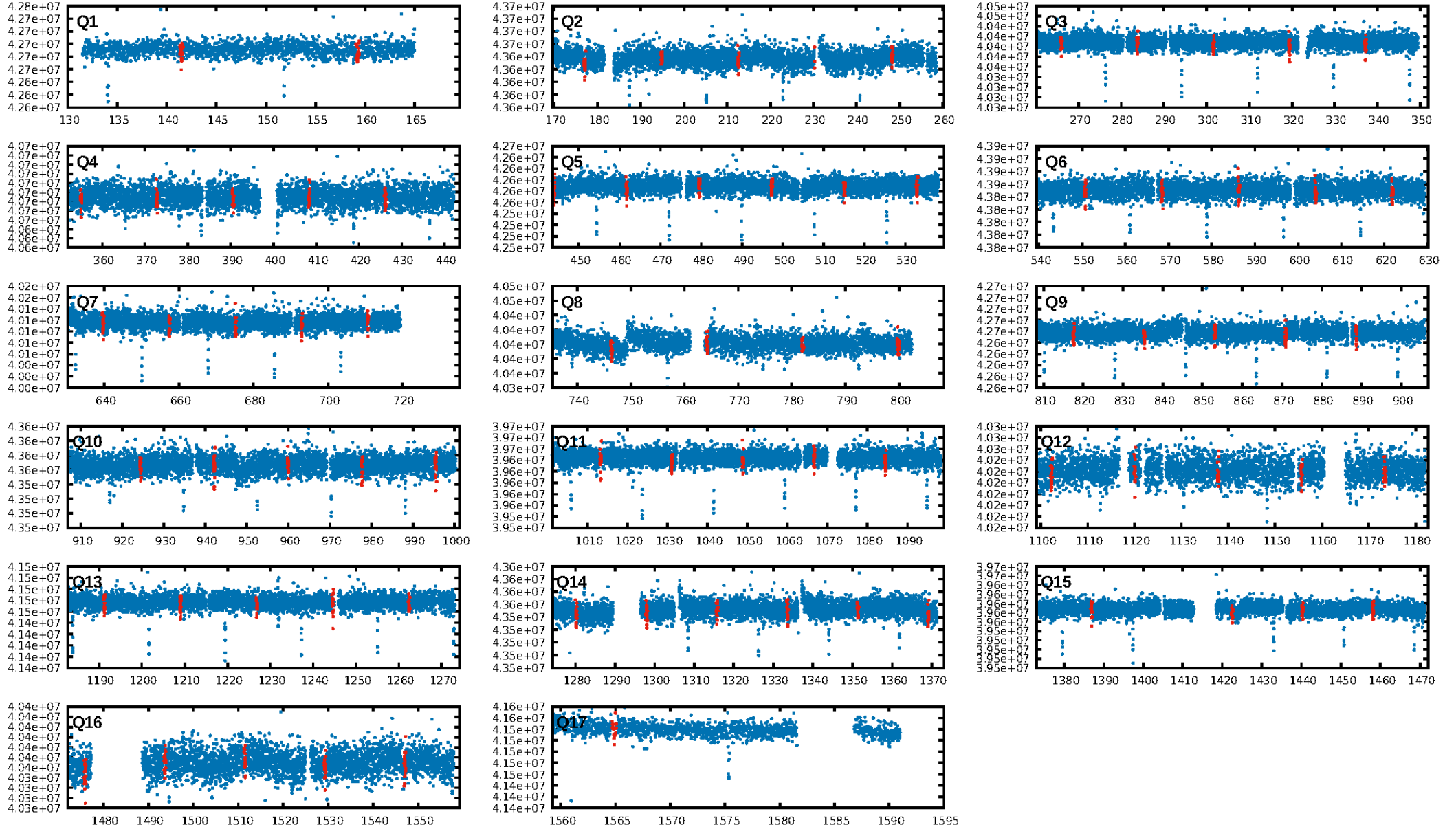
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.4% [0.01σ]  
ModelChiSquare2-sig: 39.4%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 8.18e-127  
RollingBand-fgt: 1.00 [73/73]  
GhostDiagnostic-chr: -0.2032  
Centroid-sig: 0.0%  
Centroid-so: 23.409 arcsec [48.43σ]  
OotOffset-rm: 6.075 arcsec [70.32σ]  
KicOffset-rm: 6.124 arcsec [67.70σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

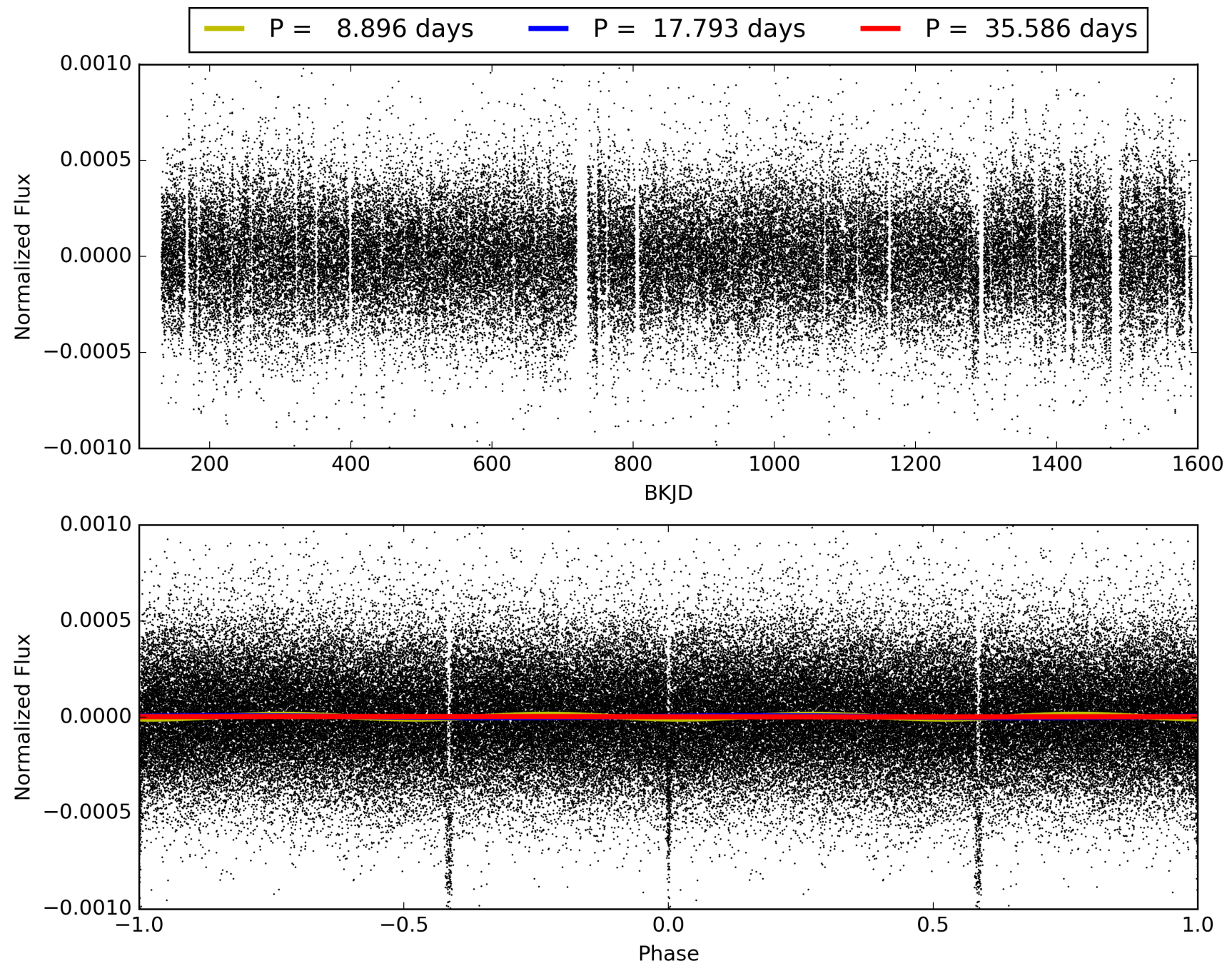
Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 04:10:11 Z

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

# TCE 007812179-02, PDC Light Curves



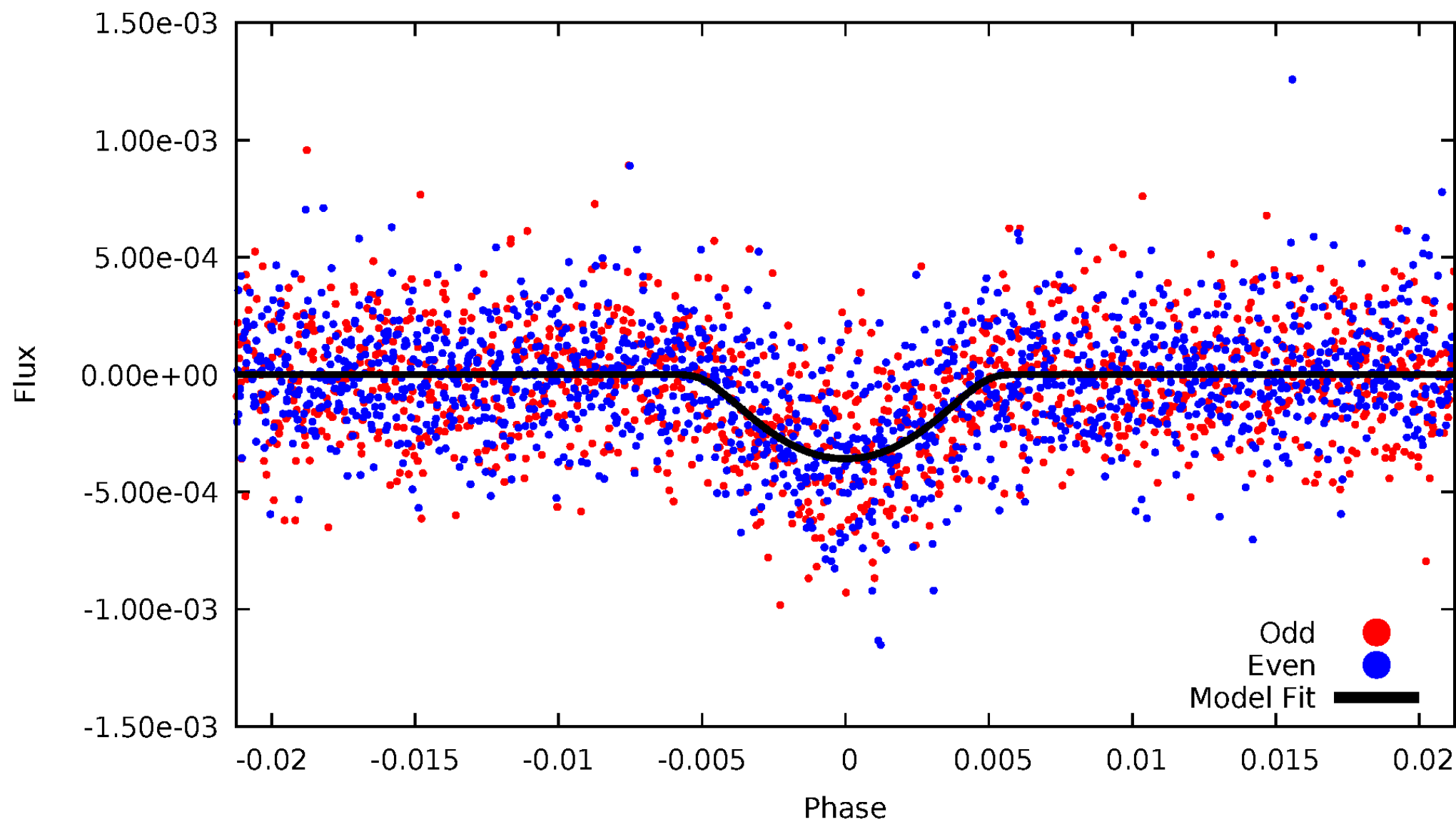
TCE 007812179-02





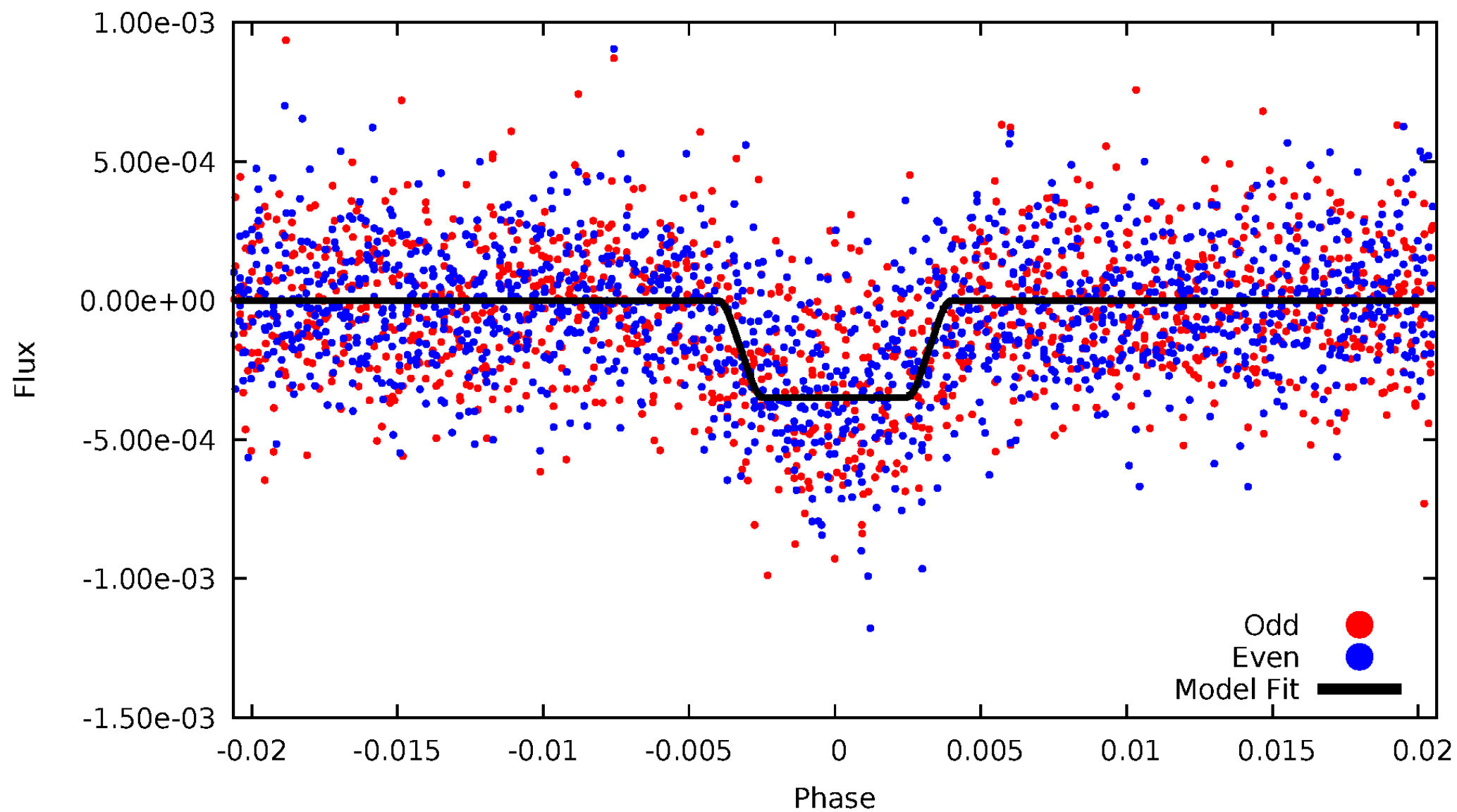
# DV Odd/Even

TCE 007812179-02



# ALT Odd/Even

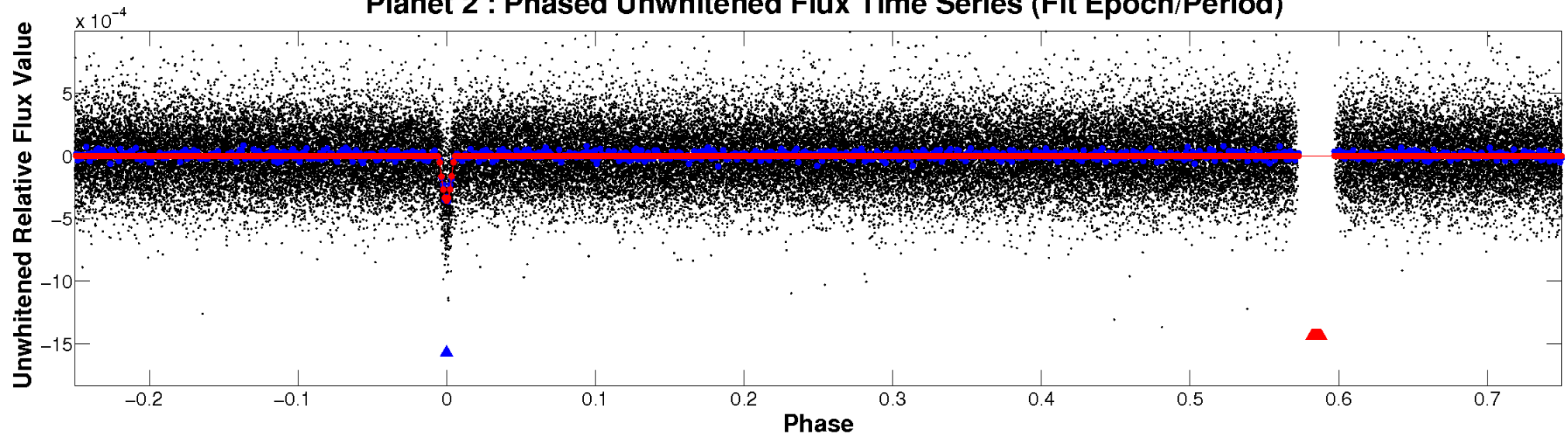
TCE 007812179-02



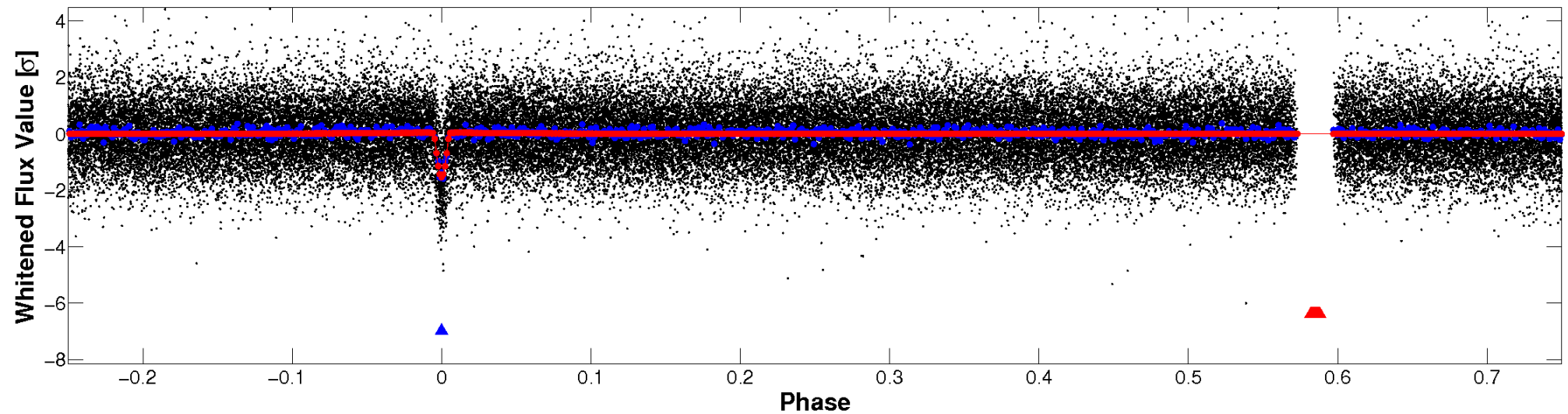


# Non-Whitened Vs. Whitened Light Curve

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

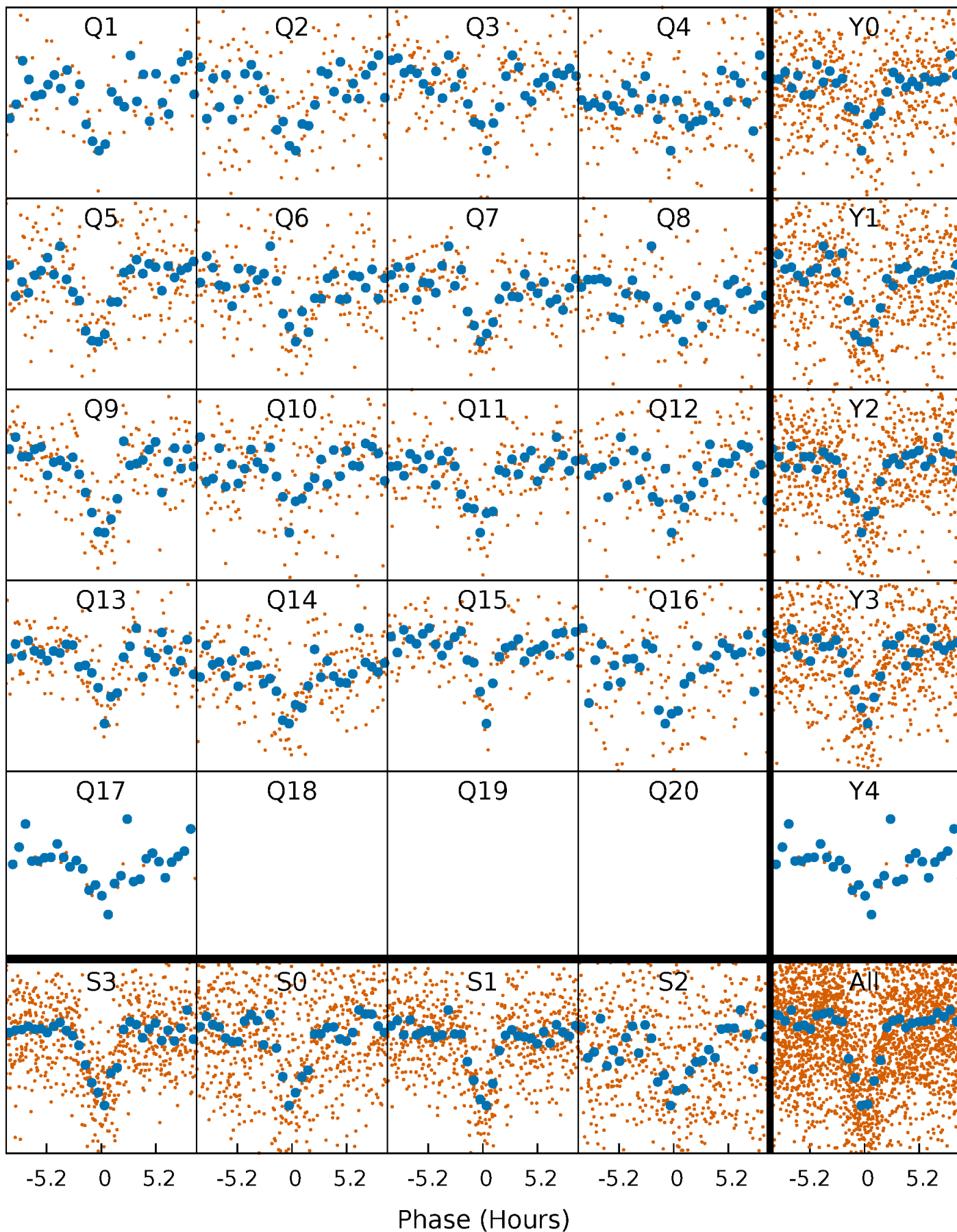


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



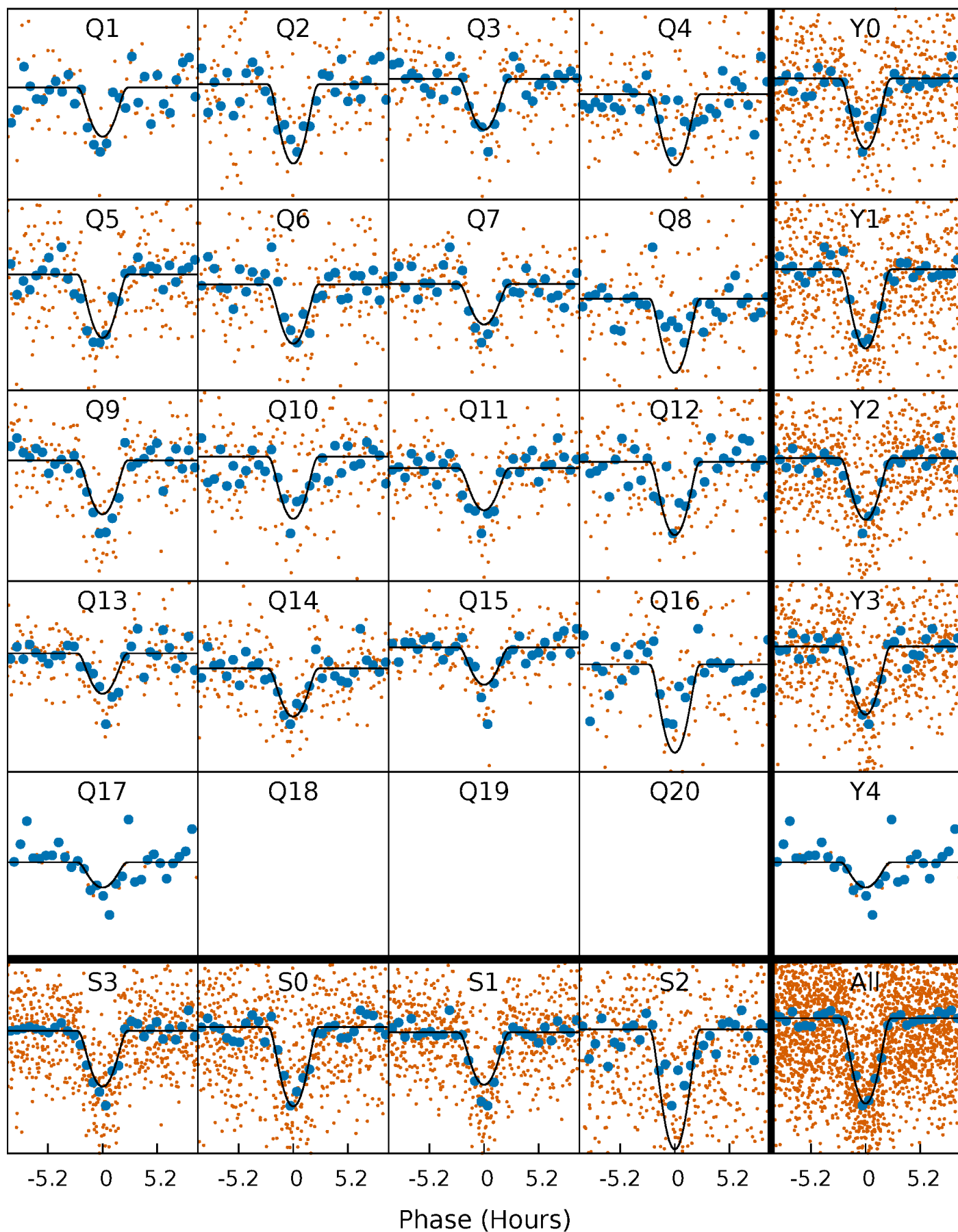
# PDC Quarter-Phased Transit Curves

TCE 007812179-02 P= 17.792822 Days  $T_0=141.455866$  (BKJD)



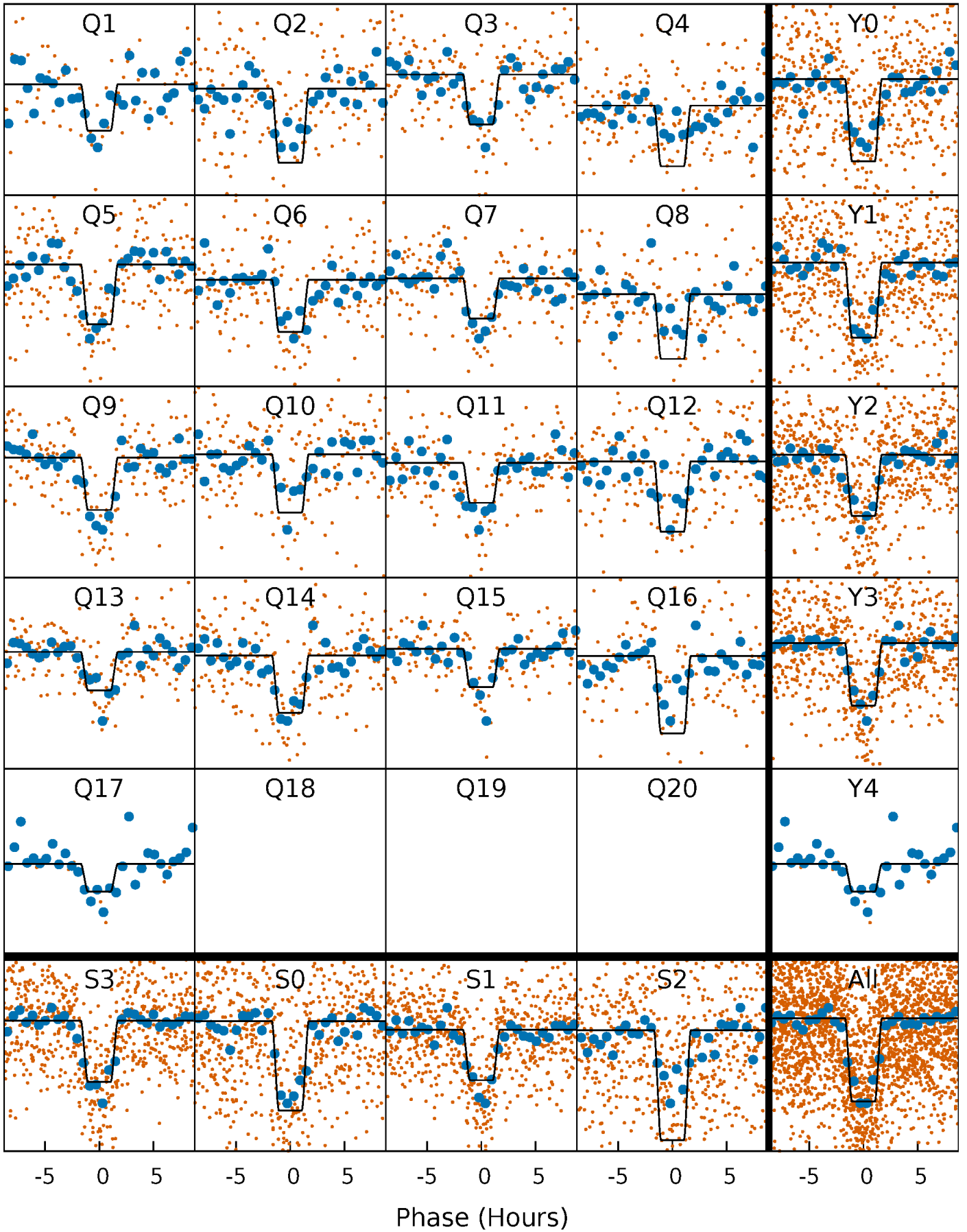
# DV Quarter-Phased Transit Curves

TCE 007812179-02 P= 17.792822 Days  $T_0=141.455866$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

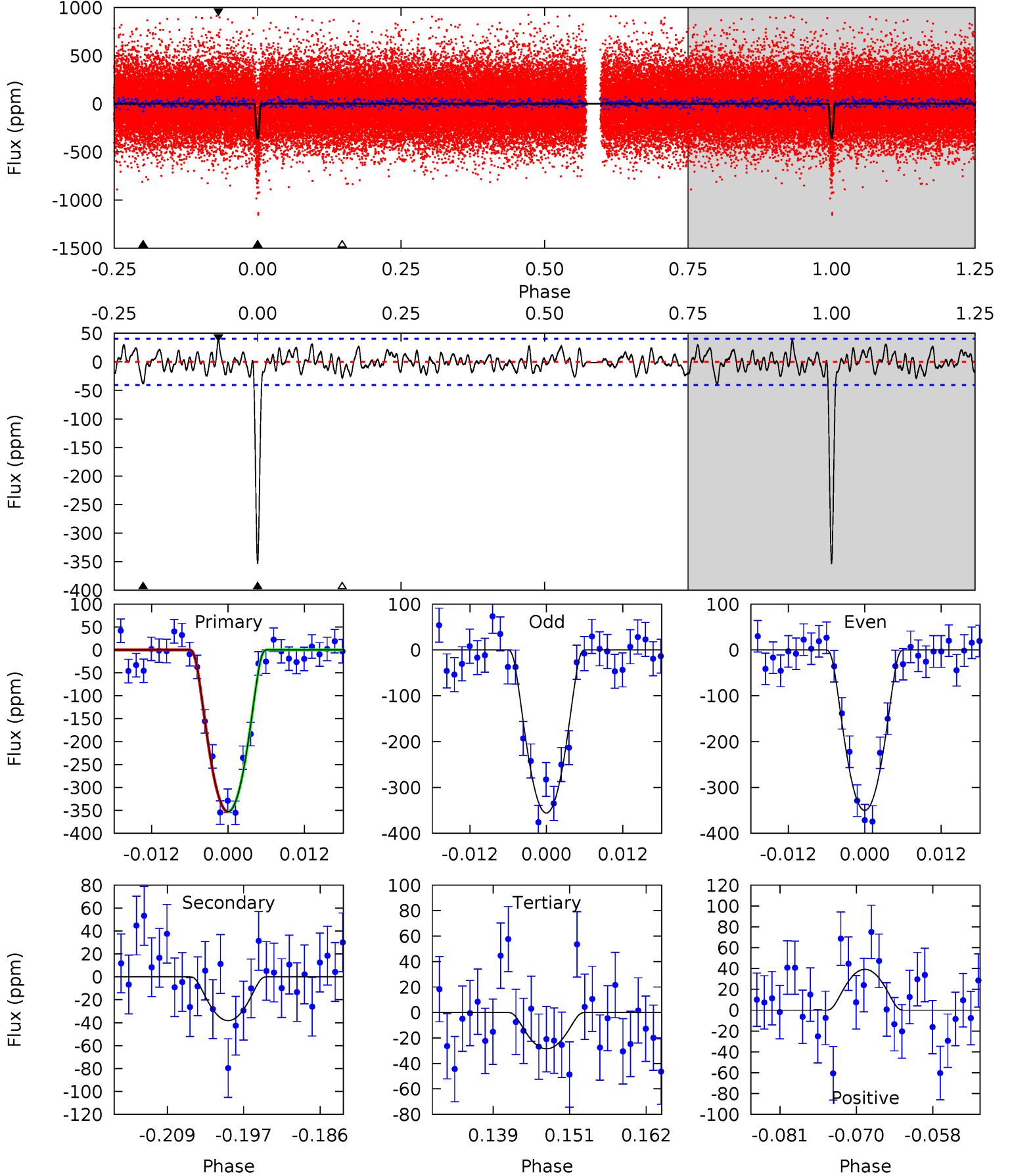
TCE 007812179-02 P= 17.792801 Days  $T_0=141.457503$  (BKJD)



# DV Model-Shift Uniqueness Test

007812179-02, P = 17.792822 Days, E = 123.663044 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
43.4	4.69	3.50	4.81	5.00	2.52	1.46	39.9	38.5	1.19	-0.12	0.35	0.98	0.10	0.05

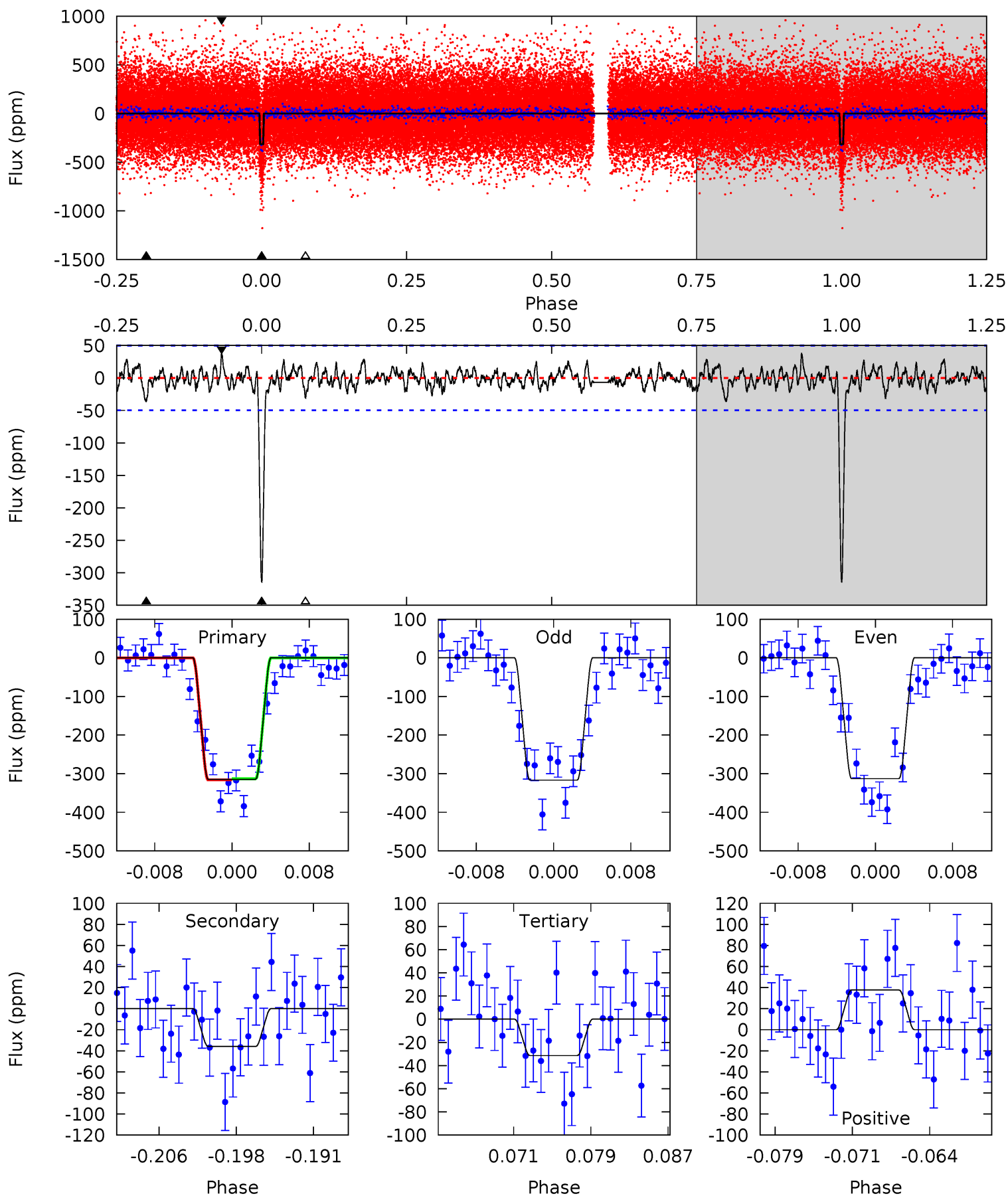




# Alt Model-Shift Uniqueness Test

007812179-02,  $P = 17.792801$  Days,  $E = 123.664702$  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
32.0	3.66	3.19	3.84	5.07	2.65	1.10	28.8	28.2	0.46	-0.18	0.20	1.04	0.11	0.14





### Stellar Parameters For KIC 007812179

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5485^{+147}_{-147}$	$4.574^{+0.034}_{-0.144}$	$-0.120^{+0.300}_{-0.300}$	$0.805^{+0.175}_{-0.070}$	$0.891^{+0.082}_{-0.101}$	$2.406^{+0.446}_{-0.958}$
	+3%/-3%	+1%/-3%	+250%/-250%	+22%/-9%	+9%/-11%	+19%/-40%
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 007812179-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-38 \pm 8$	$2.55^{+1.50}_{-1.35}$	$864^{+42}_{-33}$	$3172^{+928}_{-394}$	$52^{+179}_{-32}$
Alt.	$-36 \pm 10$	$2.03^{+1.38}_{-1.19}$	$864^{+48}_{-33}$	$3368^{+1253}_{-488}$	$75^{+381}_{-48}$

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

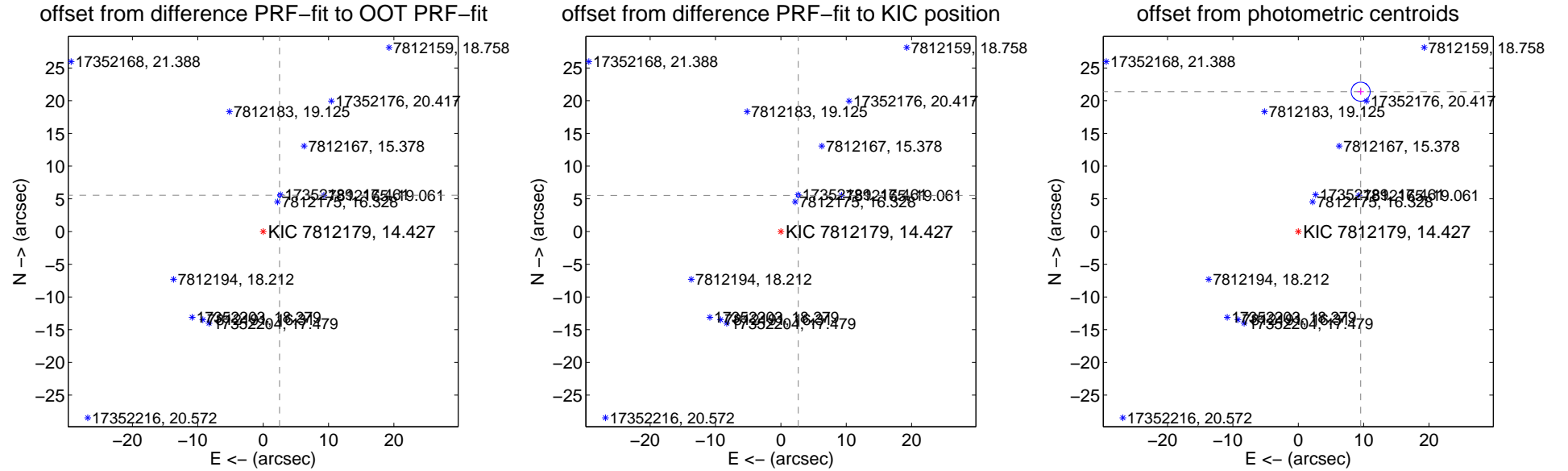
## DV Centroid Data

Supplemental centroid analysis for 007812179-02. Kepler magnitude: 14.43. Transit SNR 26.49

There are 17 quarters with good PRF difference image offsets

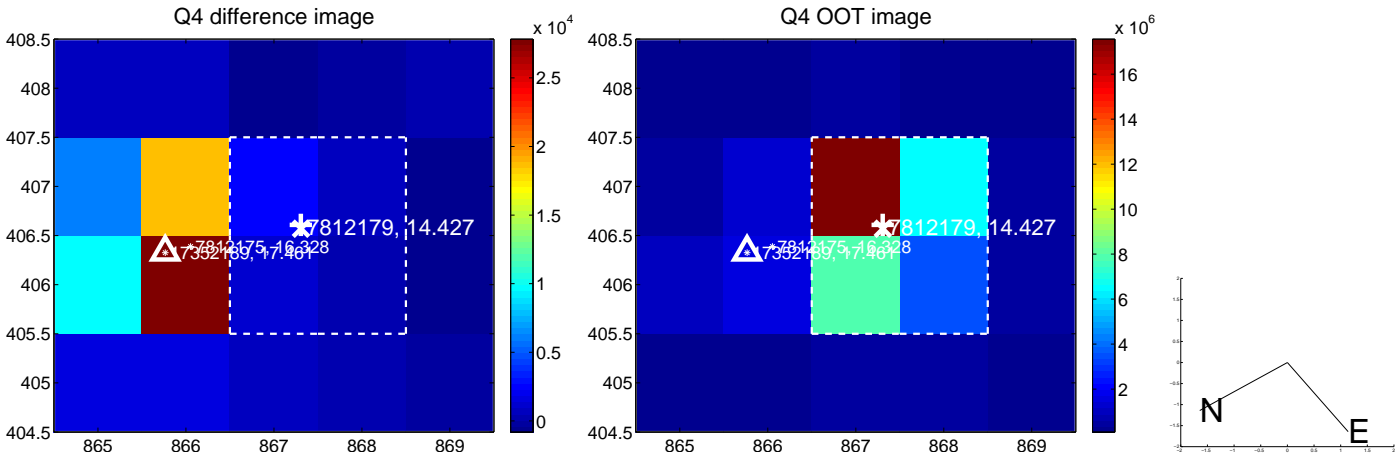
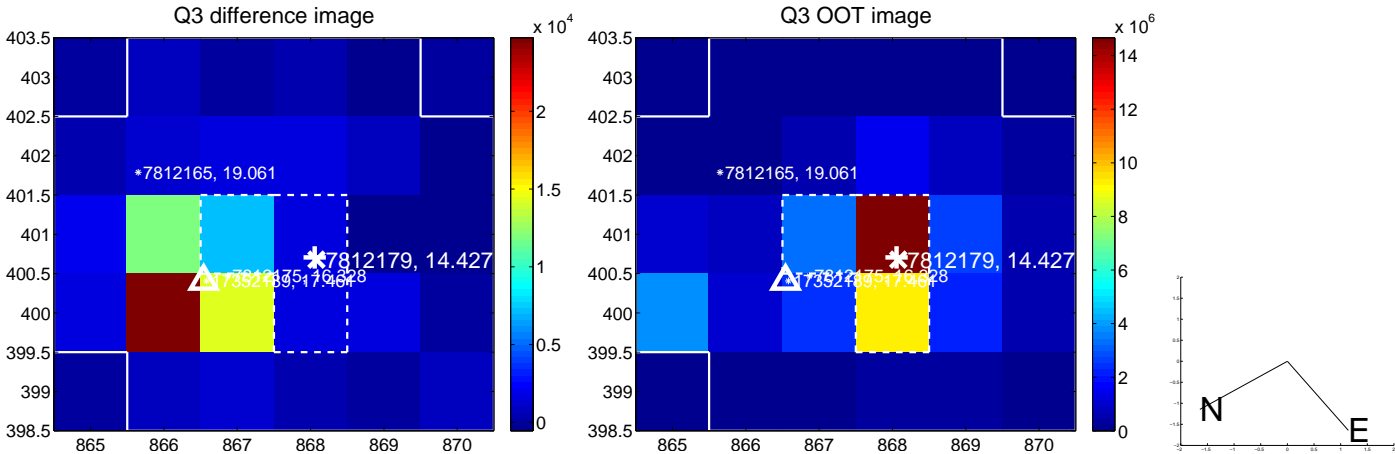
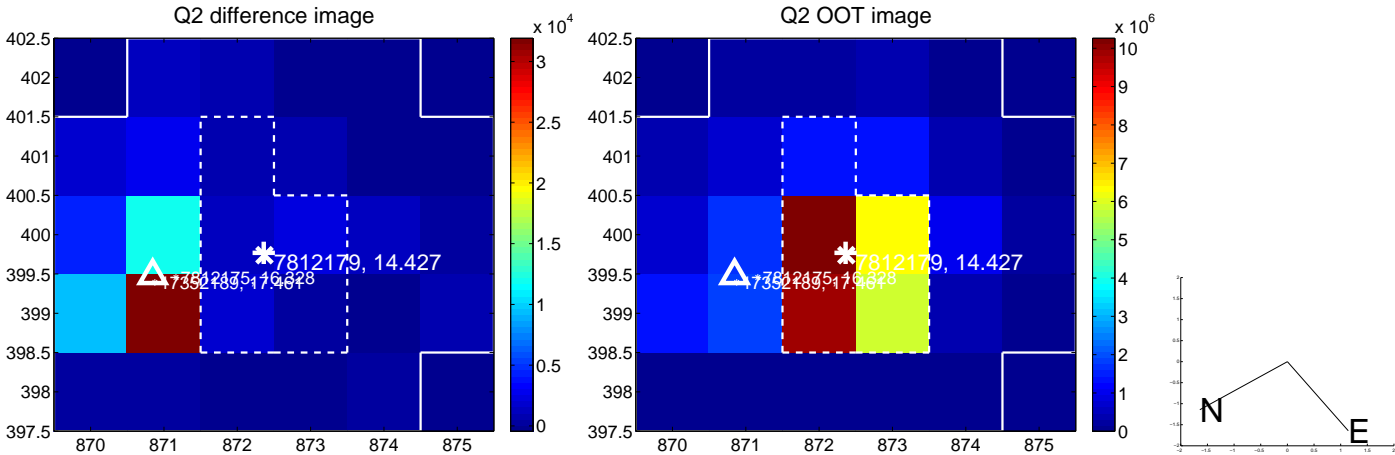
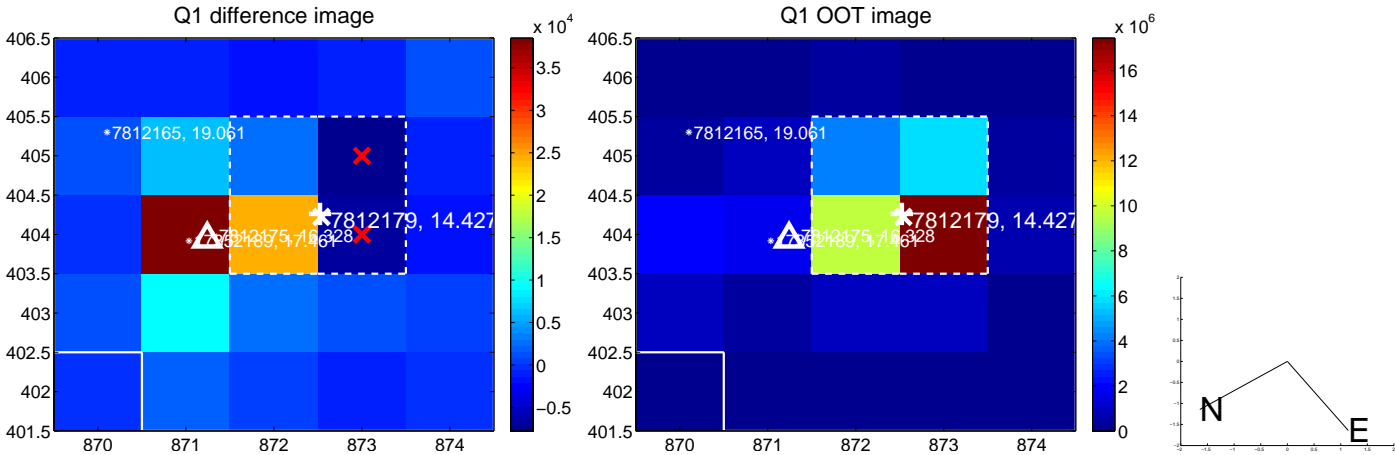
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>6.075 <math>\pm</math> 0.086</b>	<b>70.32</b>	-2.501 $\pm$ 0.077	5.536 $\pm$ 0.081
PRF-fit source offset from KIC position	<b>6.124 <math>\pm</math> 0.090</b>	<b>67.70</b>	-2.654 $\pm$ 0.078	5.519 $\pm$ 0.084
photometric centroid source offset	<b>23.41 <math>\pm</math> 0.48</b>	<b>48.43</b>	-9.55 $\pm$ 0.50	21.37 $\pm$ 0.48

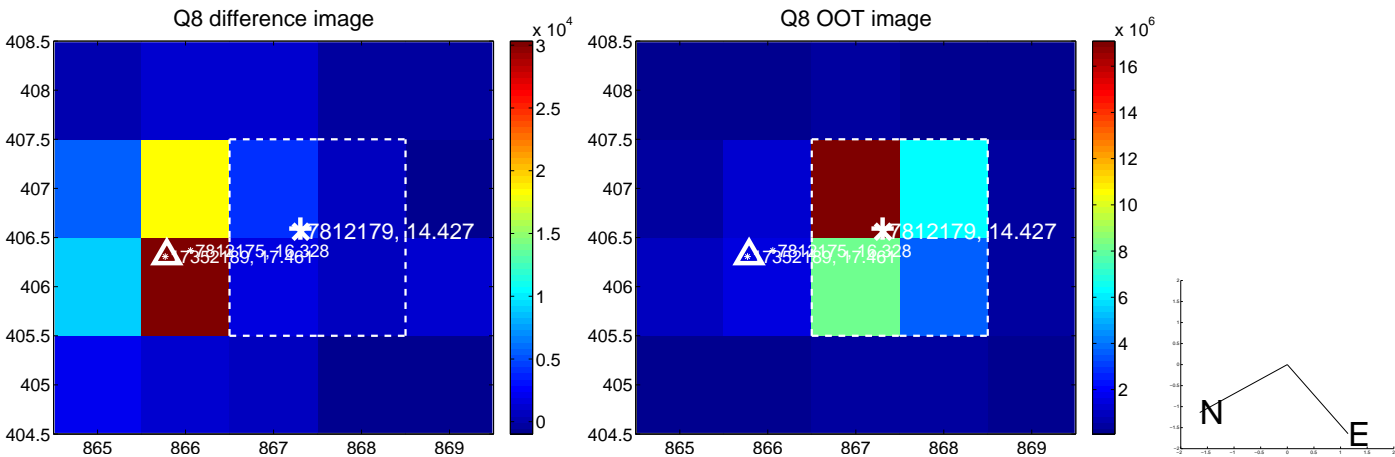
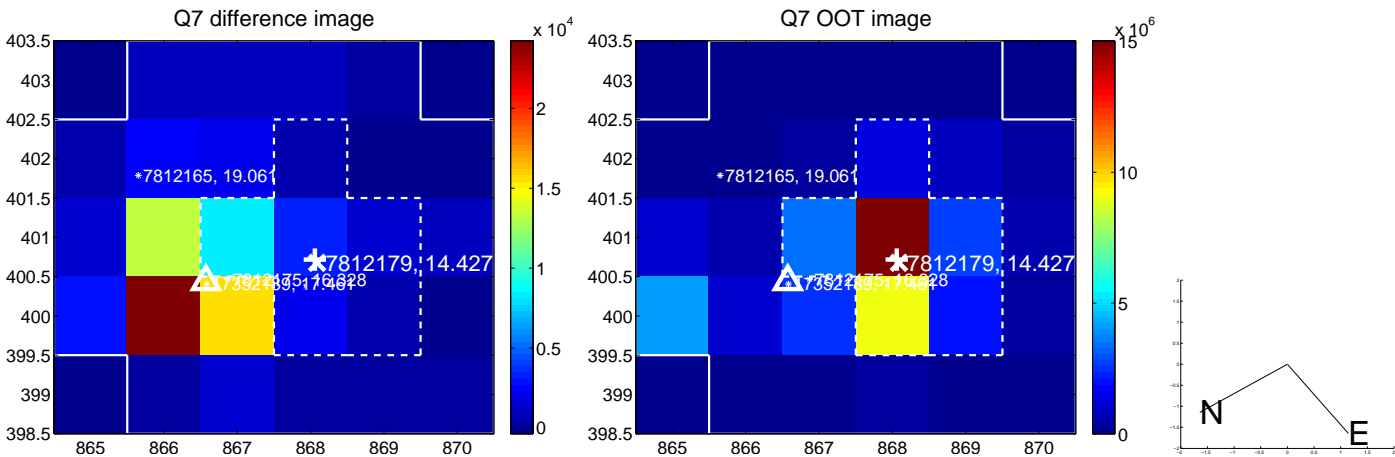
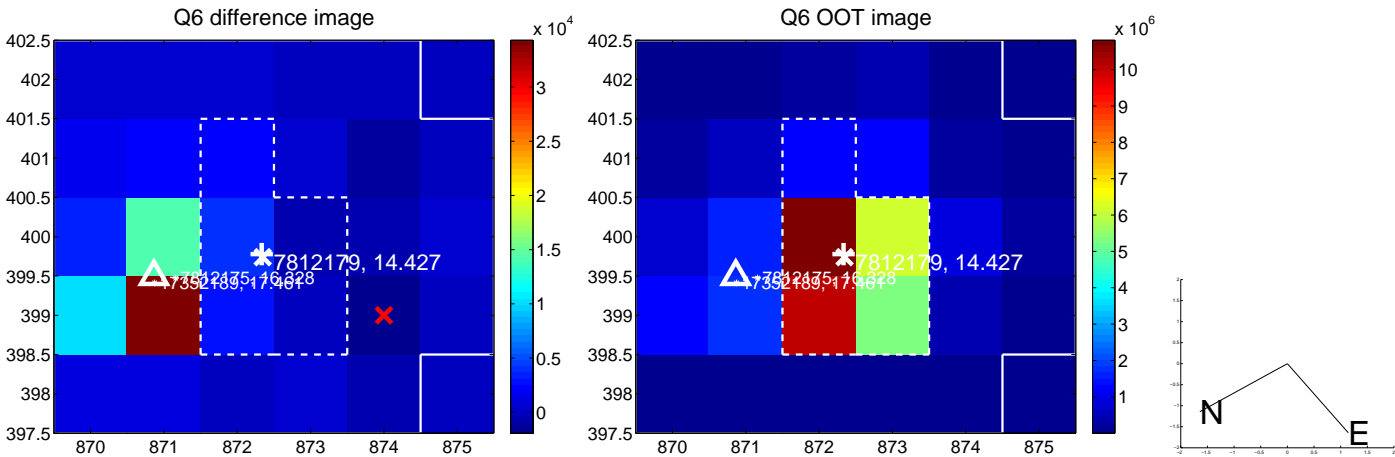
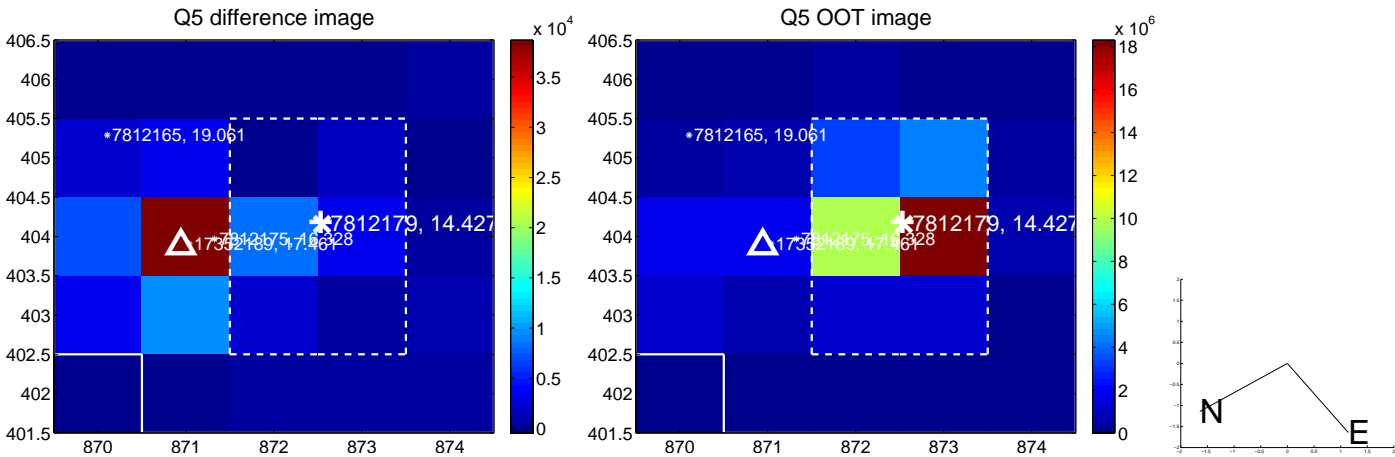


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

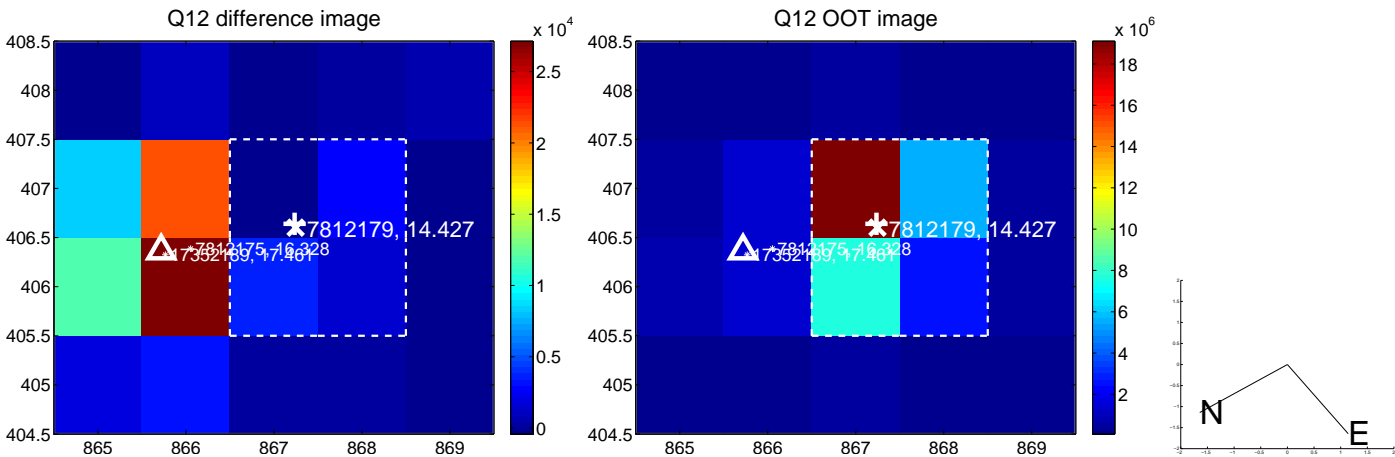
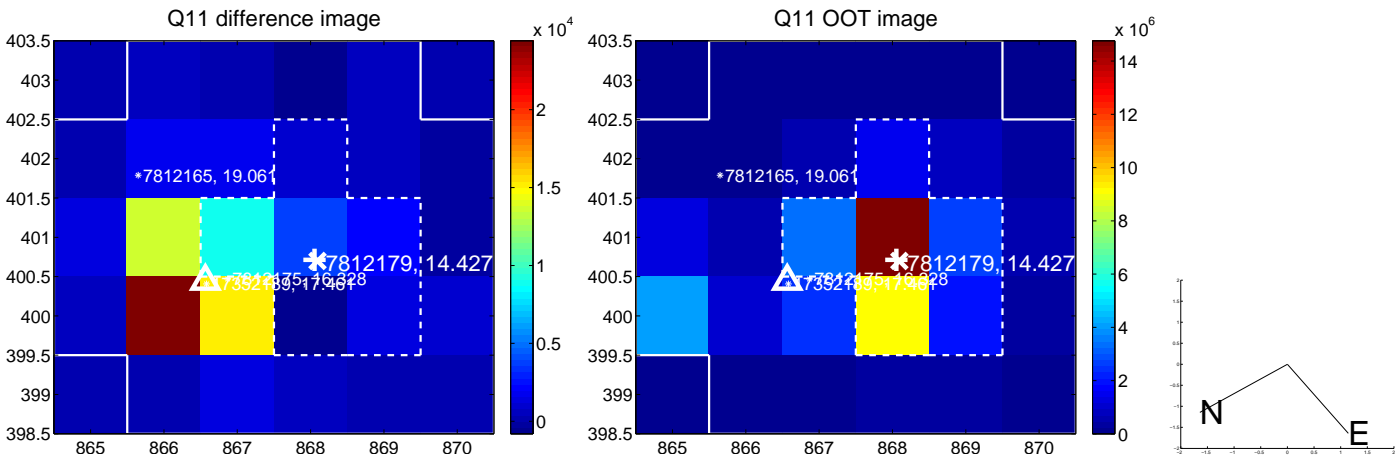
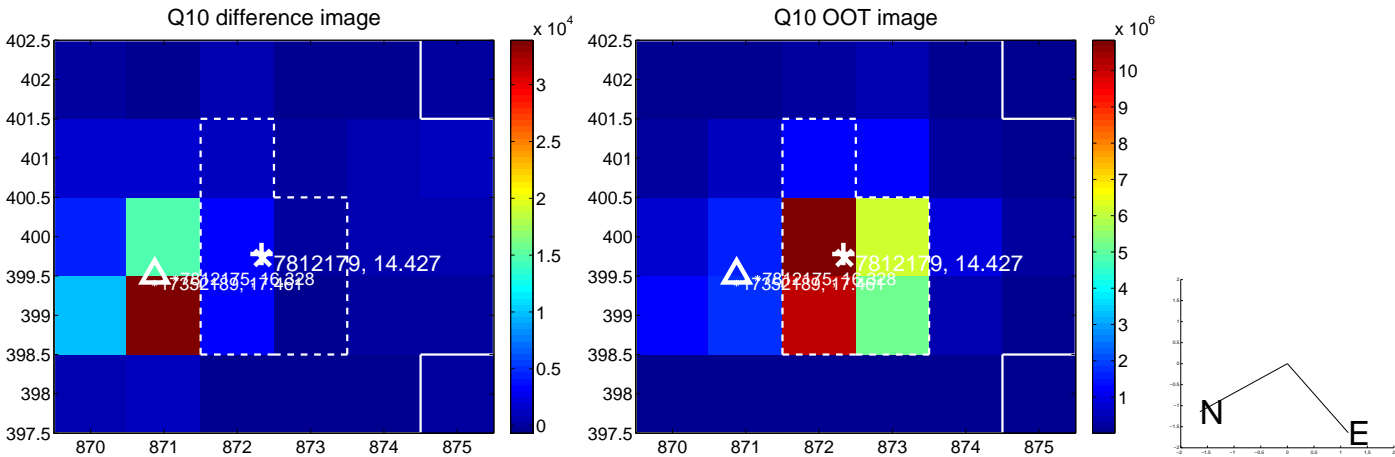
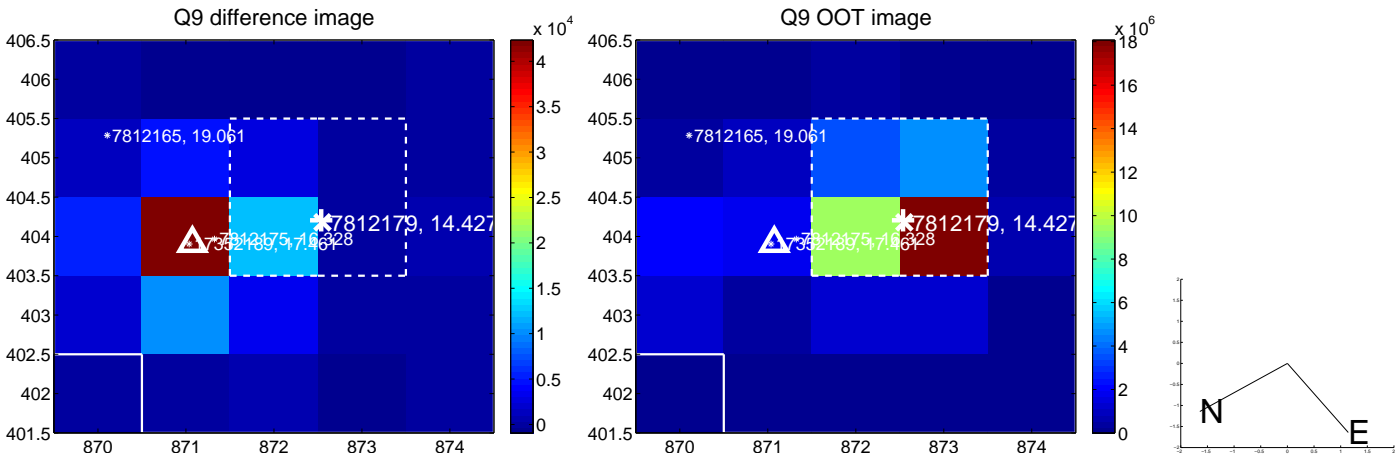
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



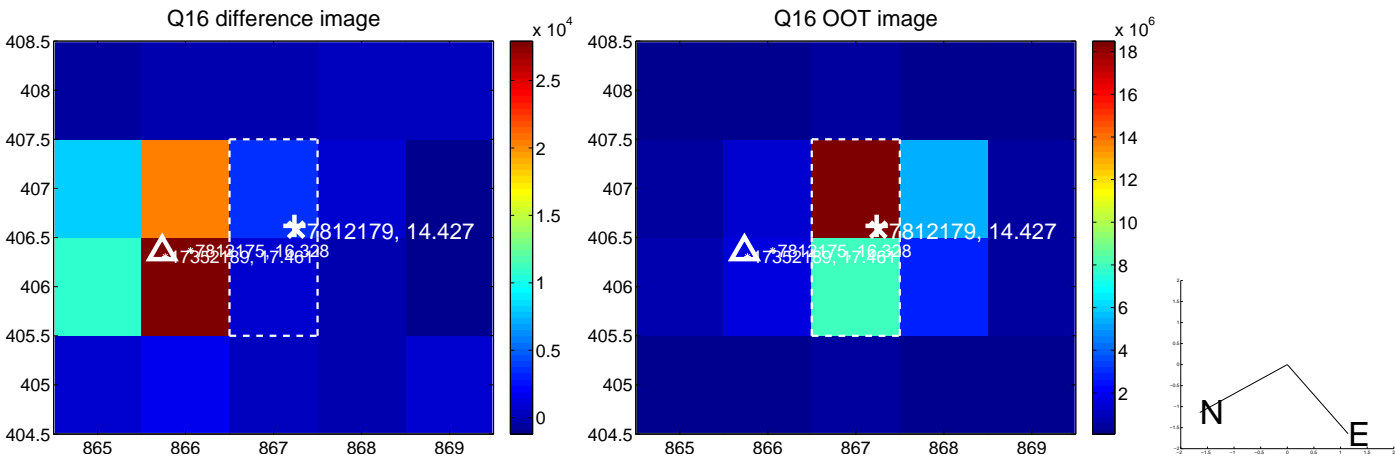
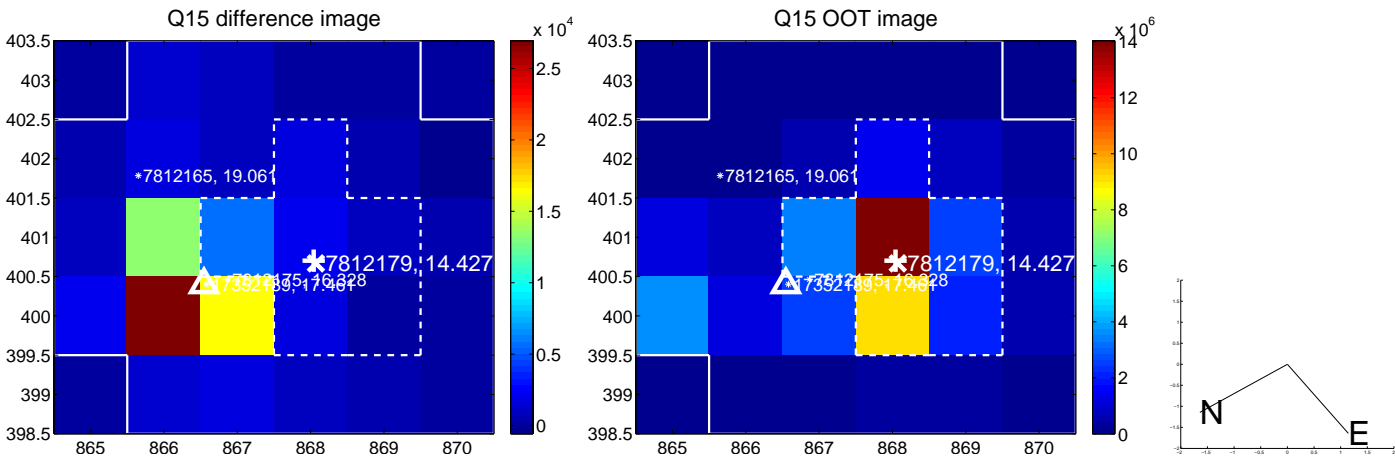
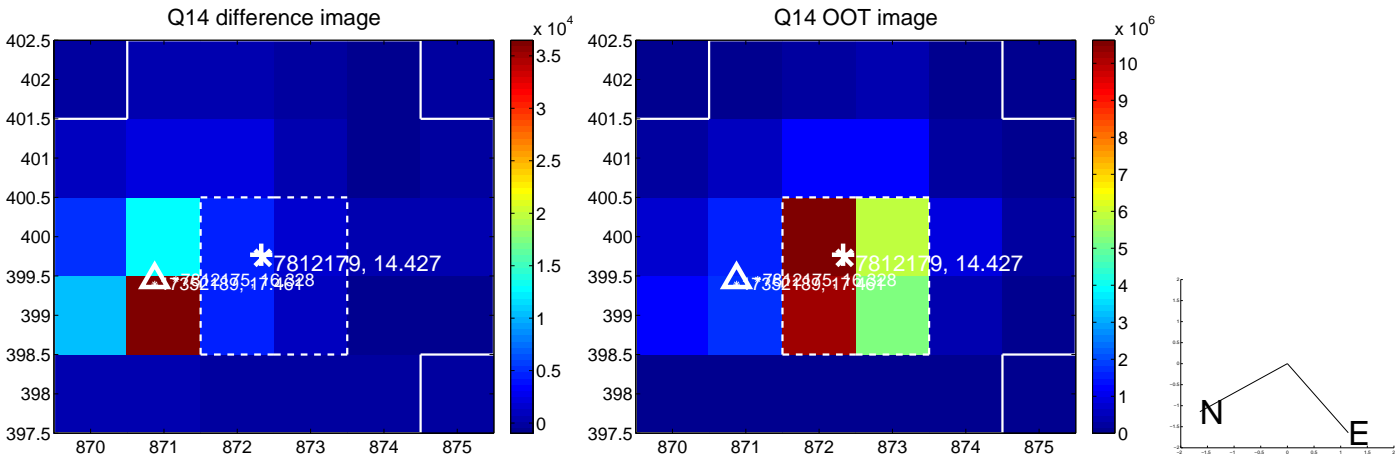
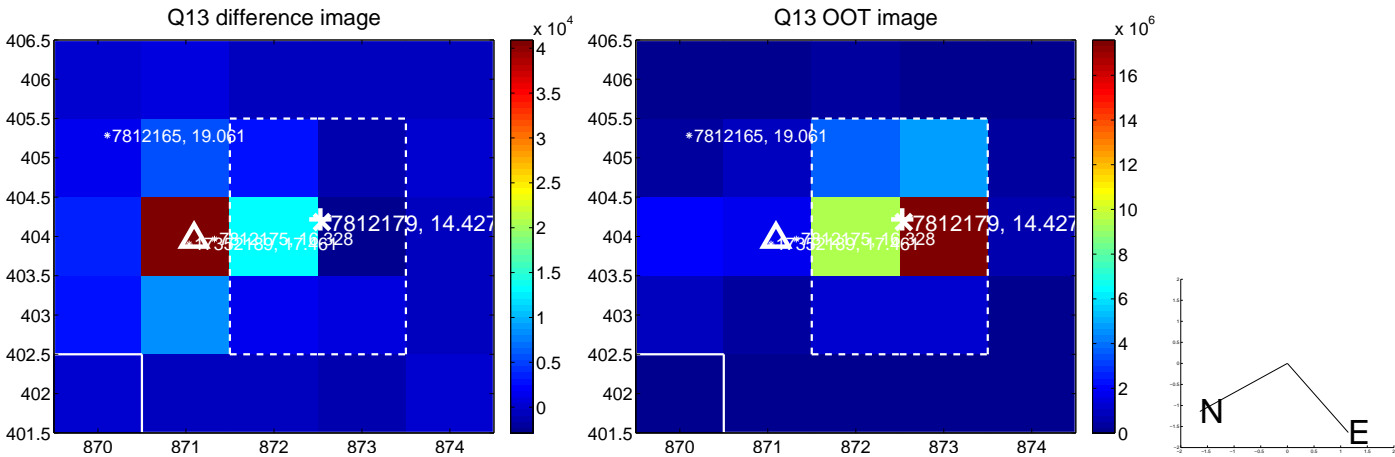
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



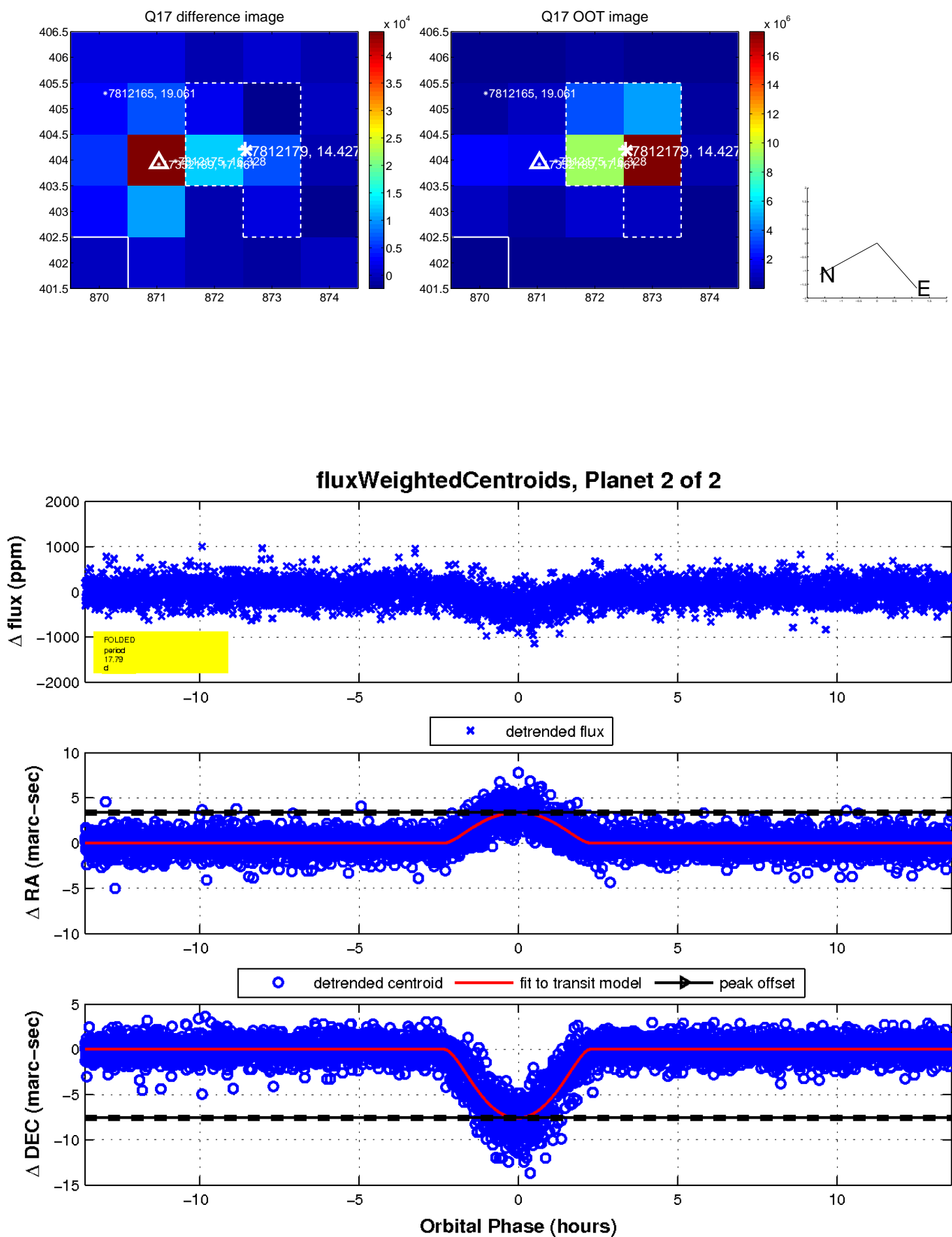
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

