

# KIC 005780885

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005780885-01	OBS	0097.01	4.885488	134.276997	7470.6	5.232	2252.0	2182.3	1.91	6036	16.98	1185.45
005780885-02	OBS	No	4.885465	131.835257	45.1	4.897	13.6	14.1	1.91	6036	1.50	1185.46

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005780885-01	OBS	PC	1.00	0	1	0	0	MOD_SEC_DV—PLANET_OCCULT_DV—MOD_SEC_ALT—PLANET_OCCULT_ALT—HAS_SEC_TCE
005780885-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

**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.

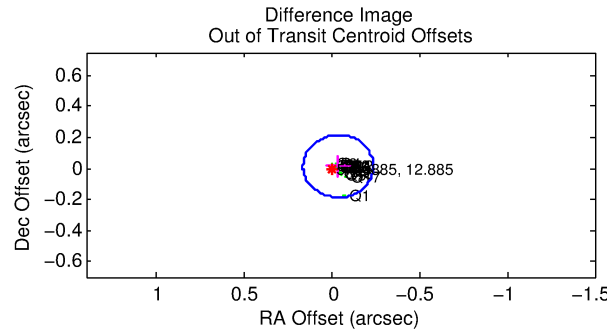
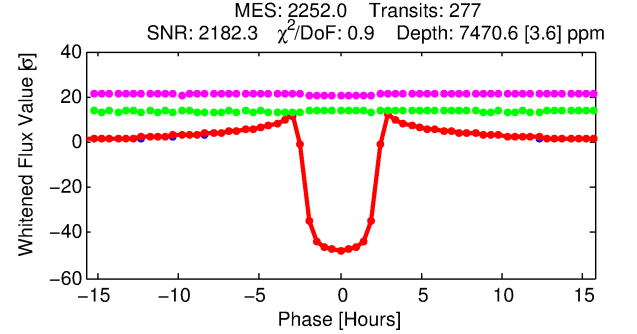
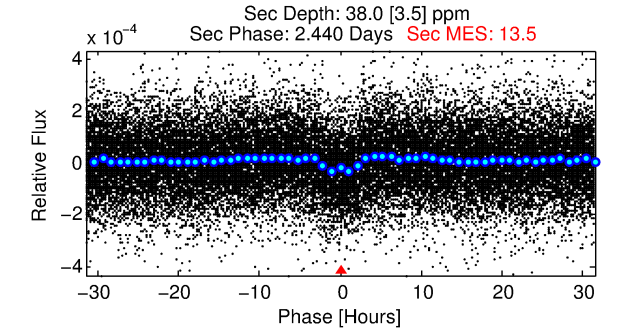
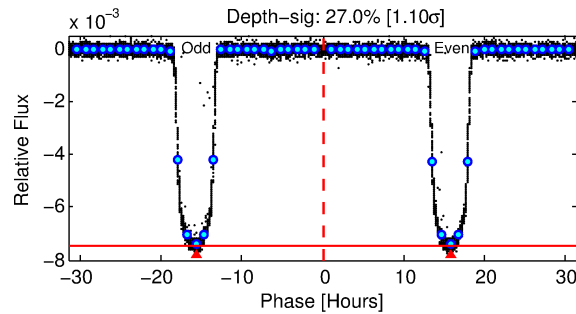
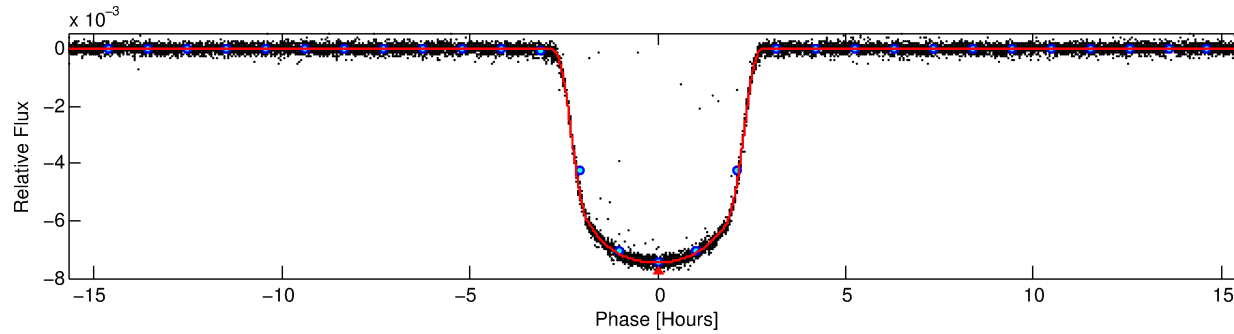
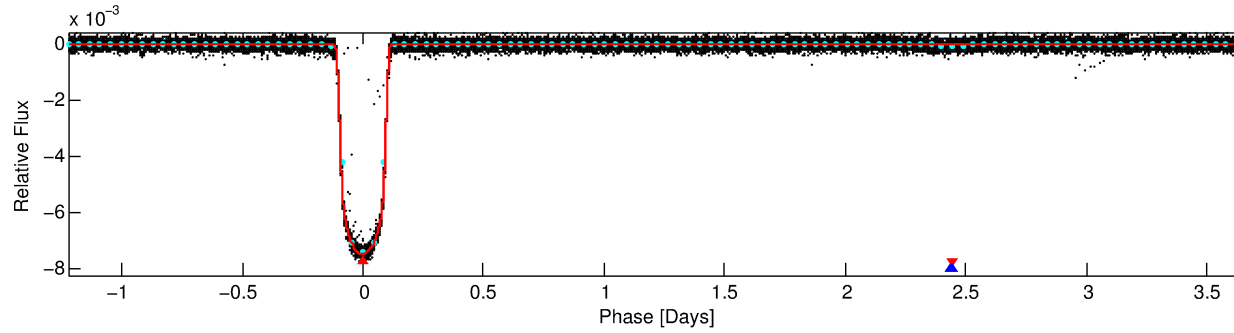
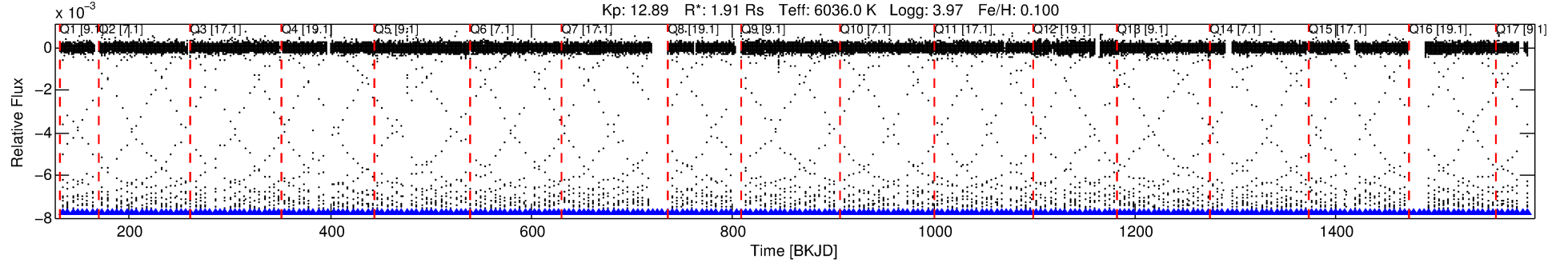
## Ephemeris Match Information For 005780885-01

No Significant Match Found

# DV One-Page Summary

KIC: 5780885 Candidate: 1 of 2 Period: 4.885 d  
KOI: K00097.01 Name: Kepler-7b Corr: 0.990

Kp: 12.89 R\*: 1.91 Rs Teff: 6036.0 K Logg: 3.97 Fe/H: 0.100



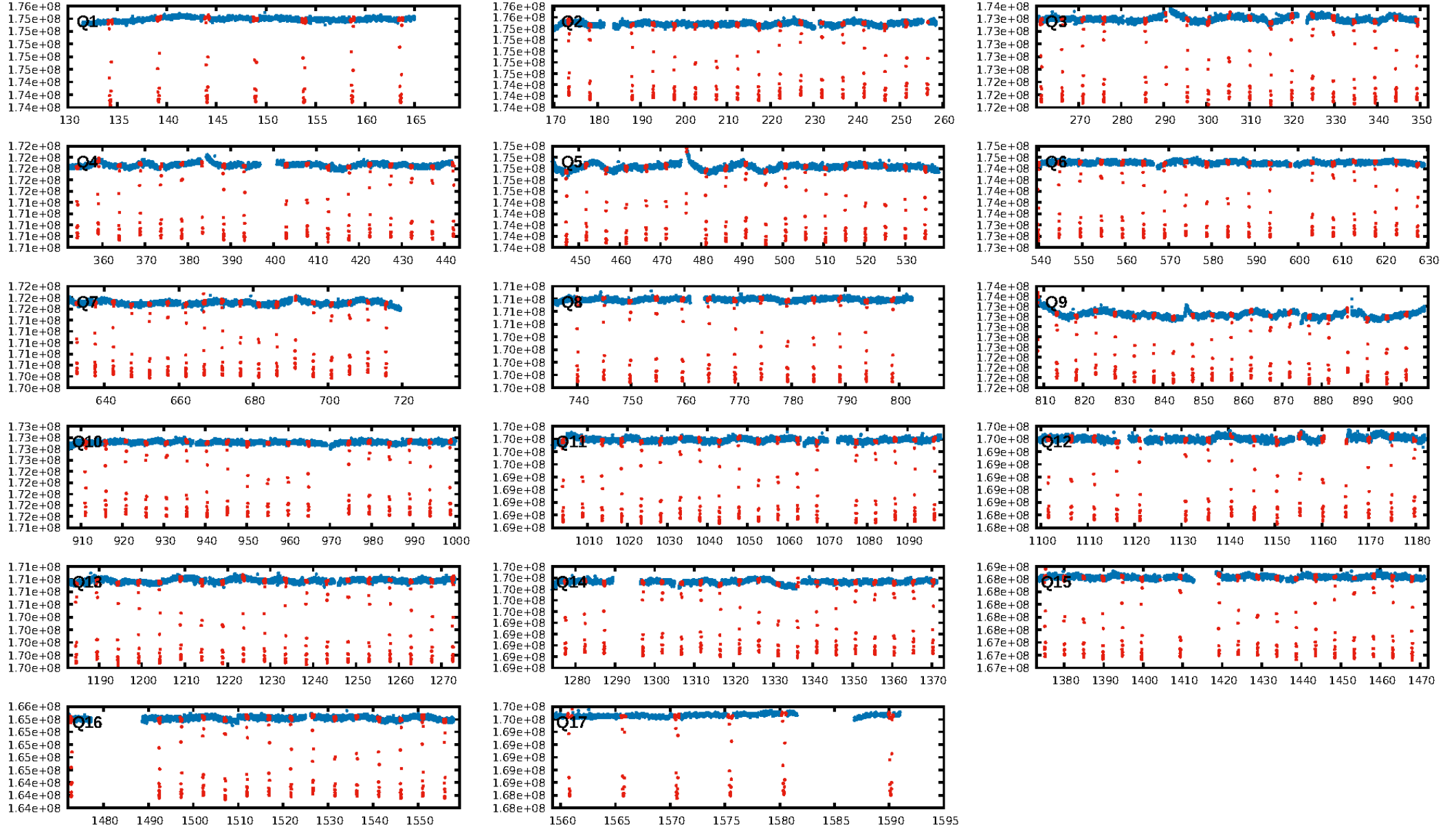
## DV Fit Results:

Period = 4.88549 [0.00000] d  
Epoch = 134.2770 [0.0000] BKJD  
Rp/R\* = 0.0815 [0.0001]  
a/R\* = 6.82 [0.03]  
b = 0.52 [0.01]  
Seff = 1185.45 [86.88]  
Teff = 1496 [27] K  
Rp = 16.98 [1.07] Re  
a = 0.0605 [0.0027] AU  
Ag = 0.27 [0.03] [-26.42σ]  
Teffp = 1660 [43] K [3.19σ]

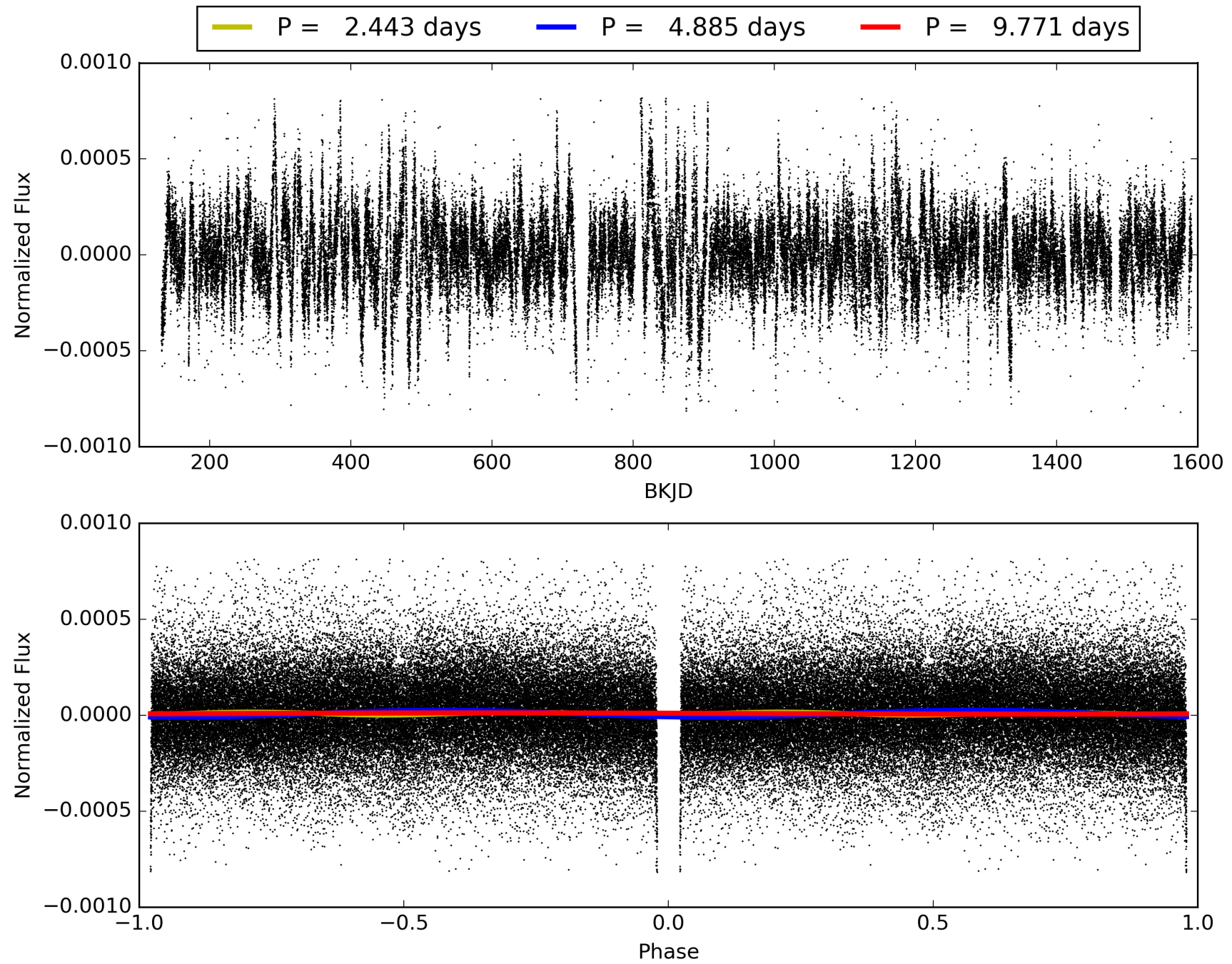
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [264/264]  
GhostDiagnostic-chr: 8.02  
Centroid-sig: 0.0%  
Centroid-so: 0.193 arcsec [56.30σ]  
OotOffset-rm: 0.039 arcsec [0.59σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-rm: 0.215 arcsec [3.16σ]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 005780885-01, PDC Light Curves

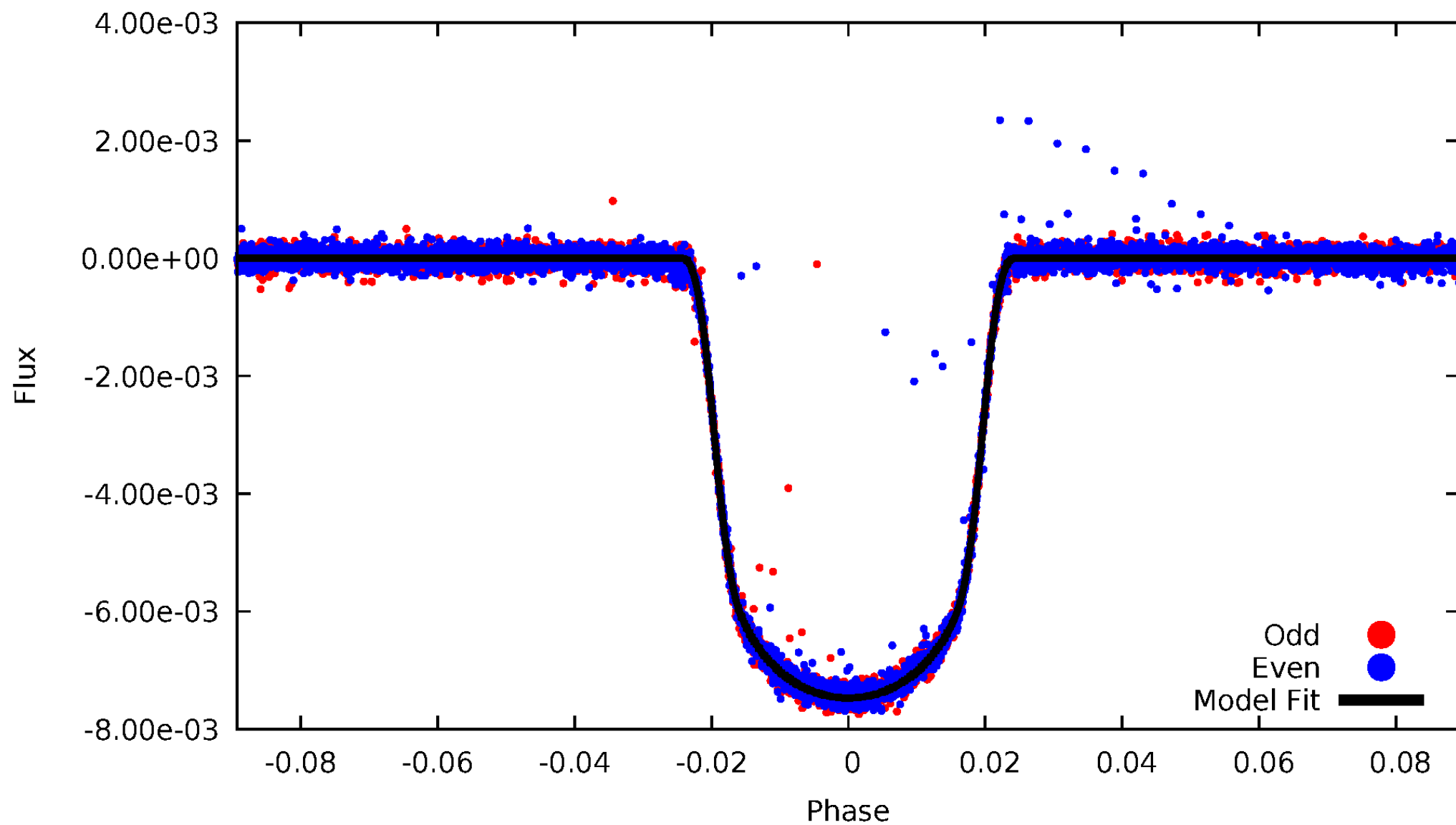


TCE 005780885-01



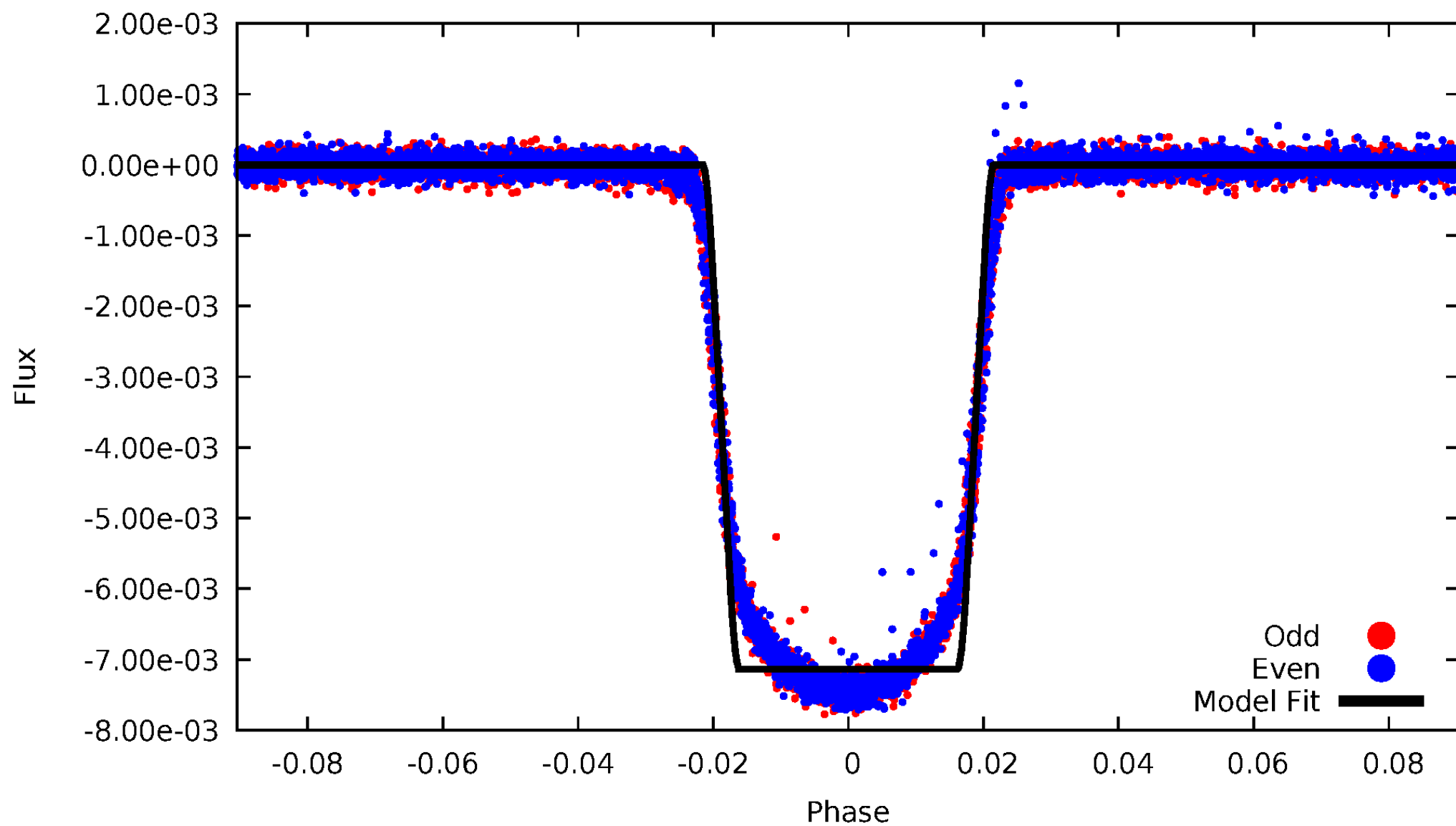
# DV Odd/Even

TCE 005780885-01



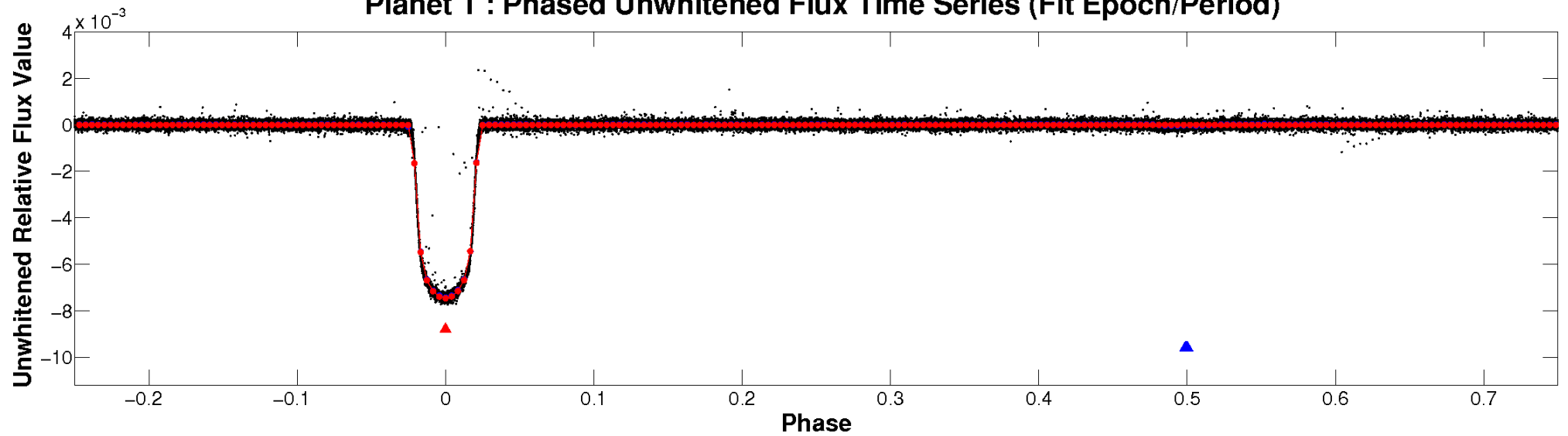
# ALT Odd/Even

TCE 005780885-01

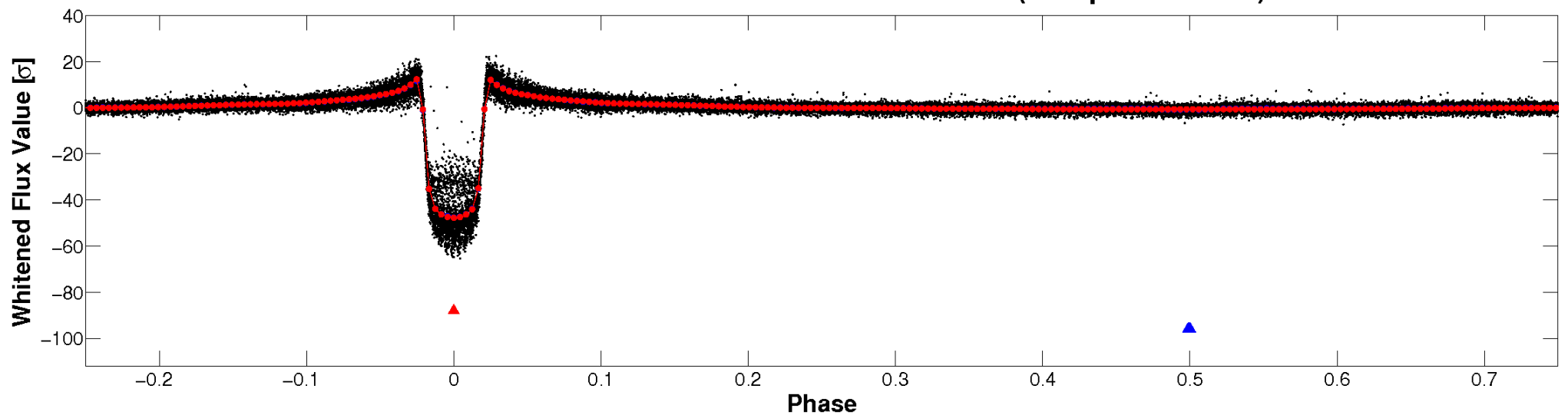


# Non-Whitened Vs. Whitened Light Curve

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

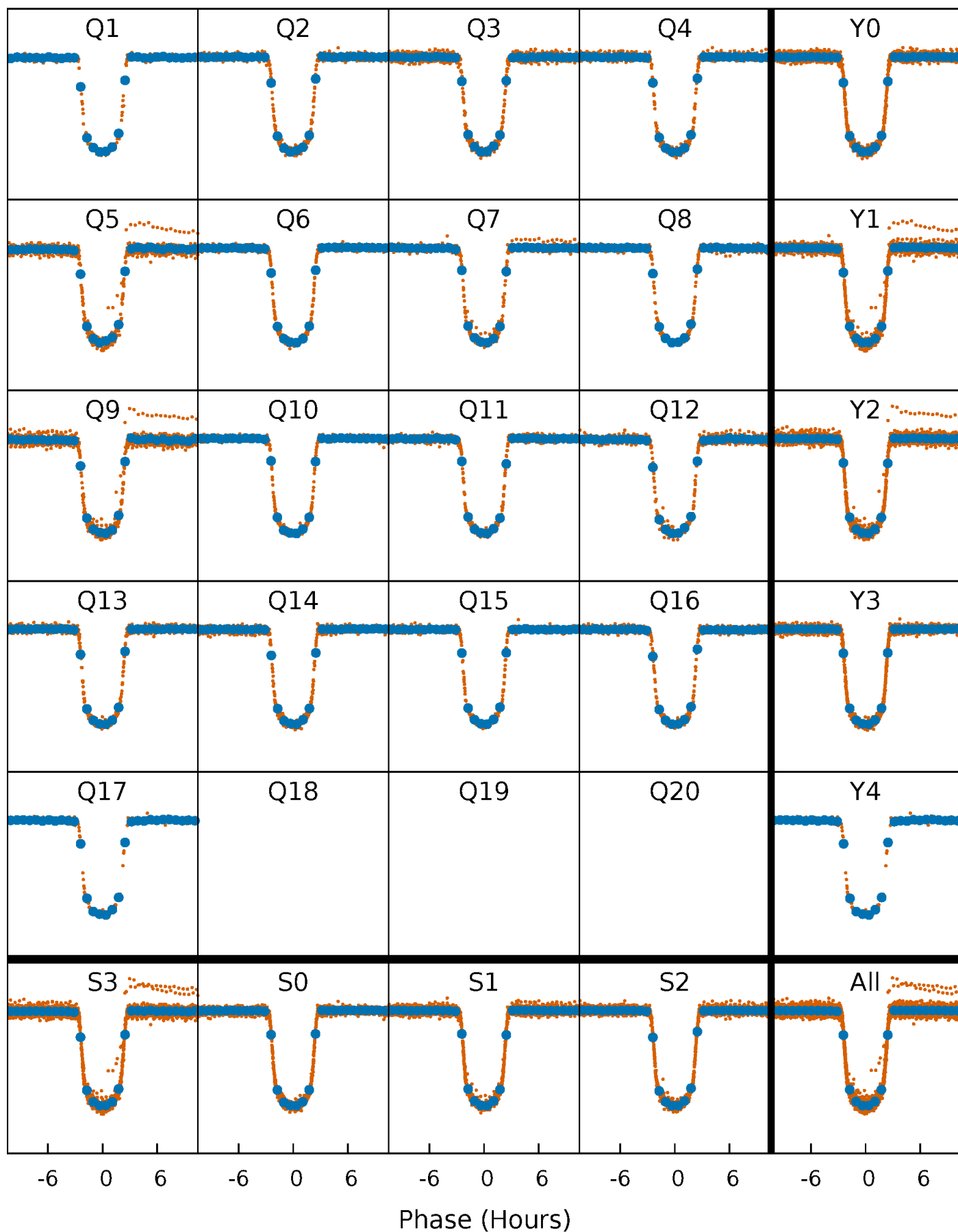


## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

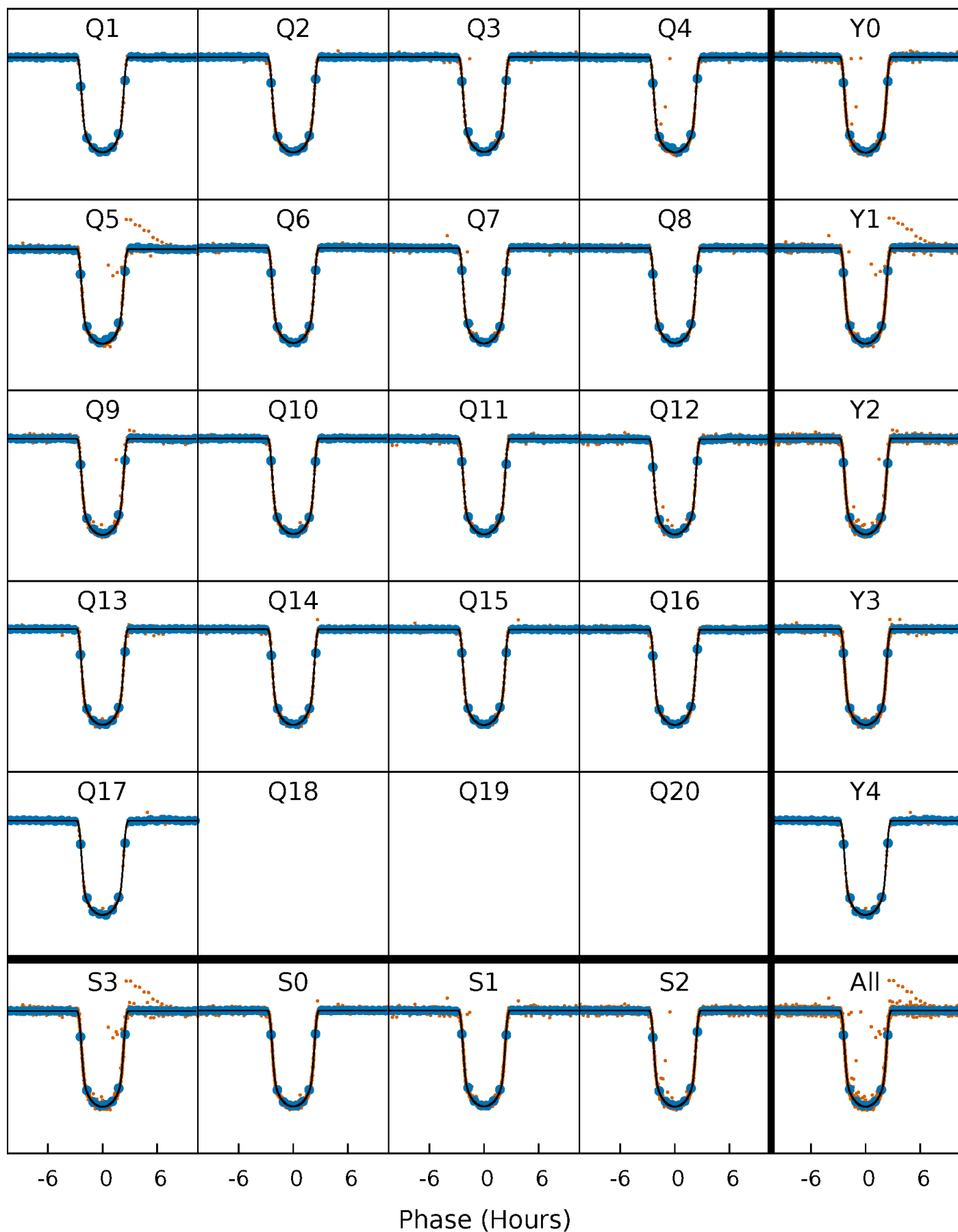
TCE 005780885-01   P= 4.885488 Days    $T_0=134.276997$  (BKJD)





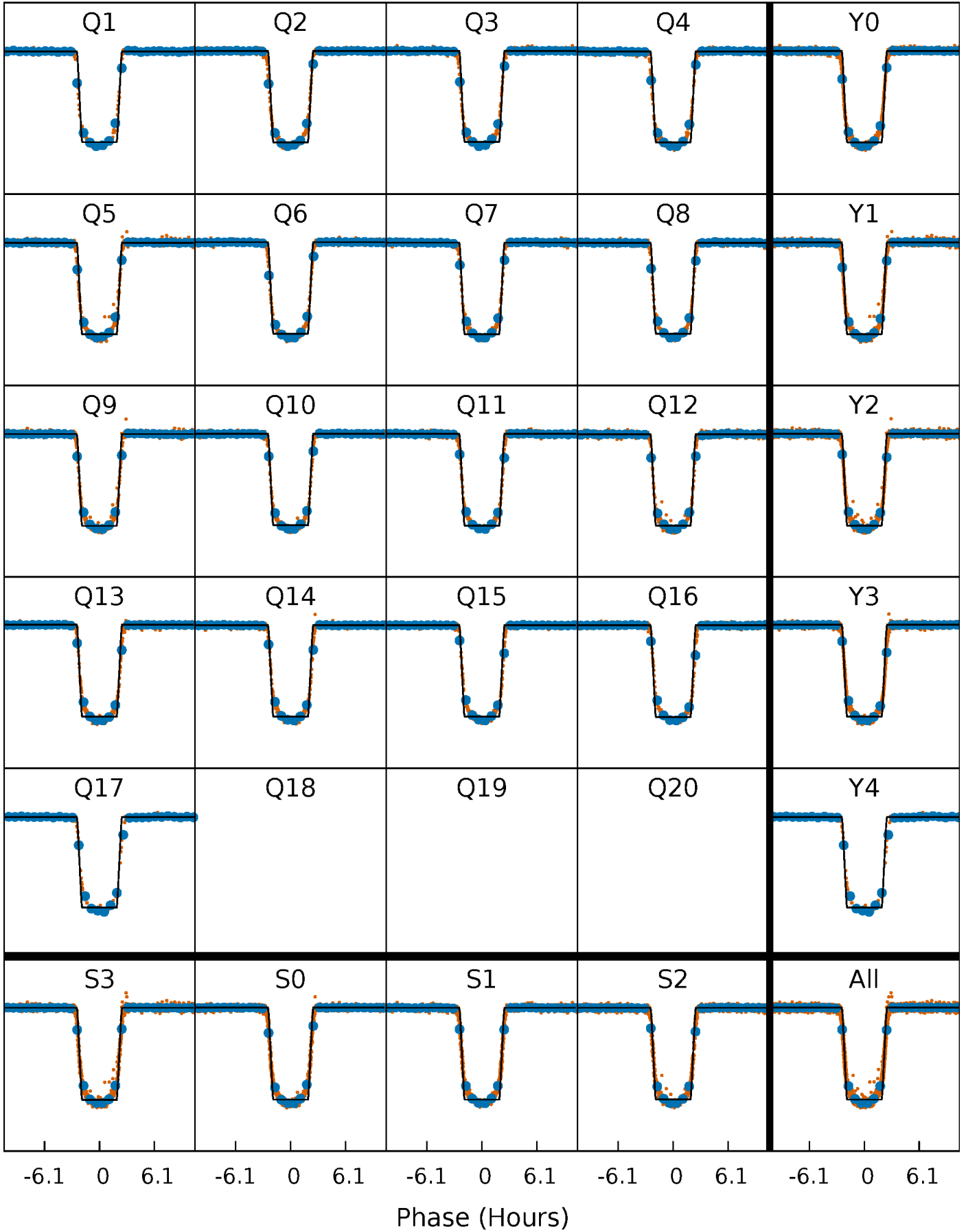
# DV Quarter-Phased Transit Curves

TCE 005780885-01 P= 4.885488 Days  $T_0=134.276997$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

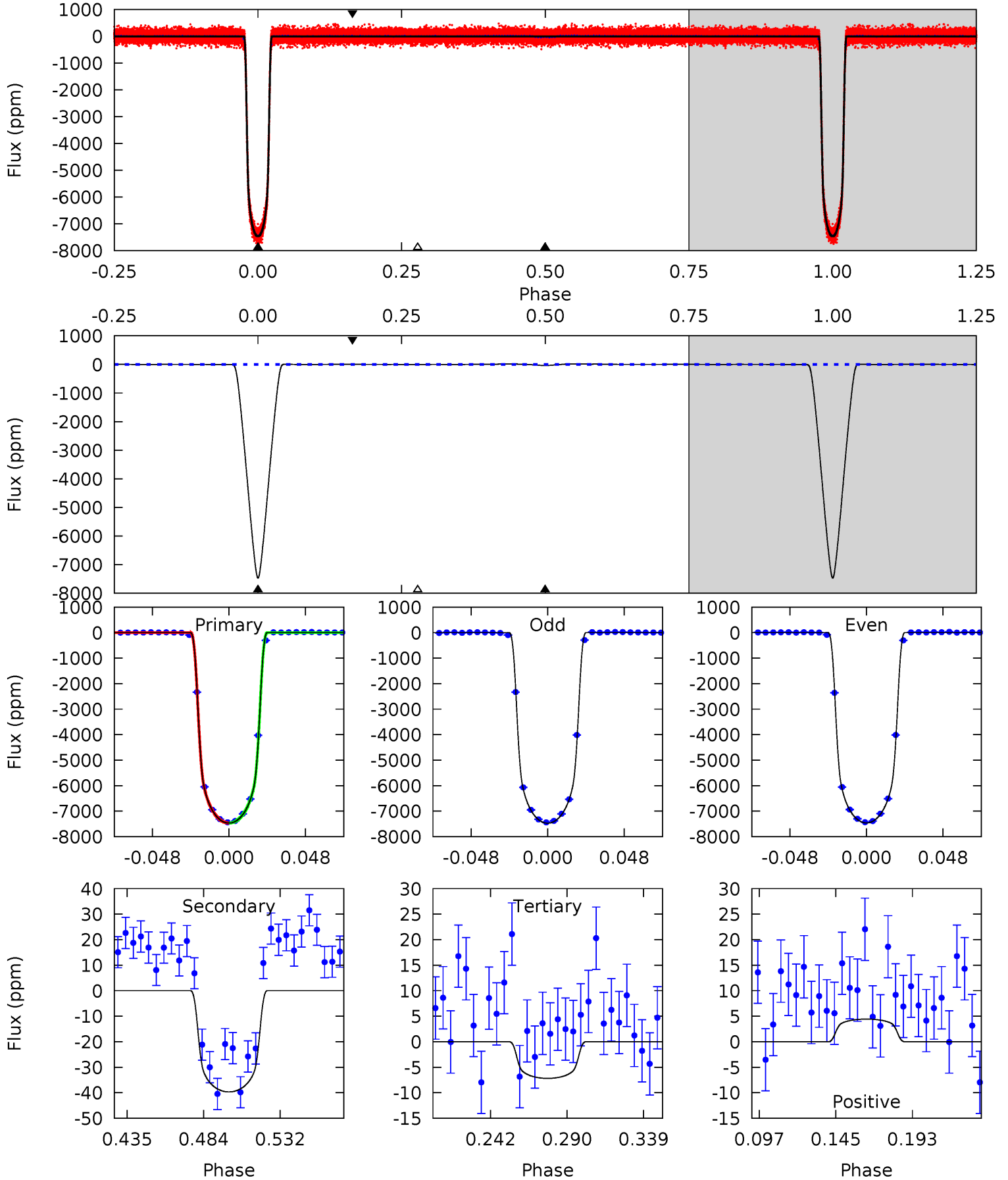
TCE 005780885-01 P= 4.885464 Days  $T_0=134.280529$  (BKJD)



# DV Model-Shift Uniqueness Test

005780885-01, P = 4.885488 Days, E = 129.391509 Days

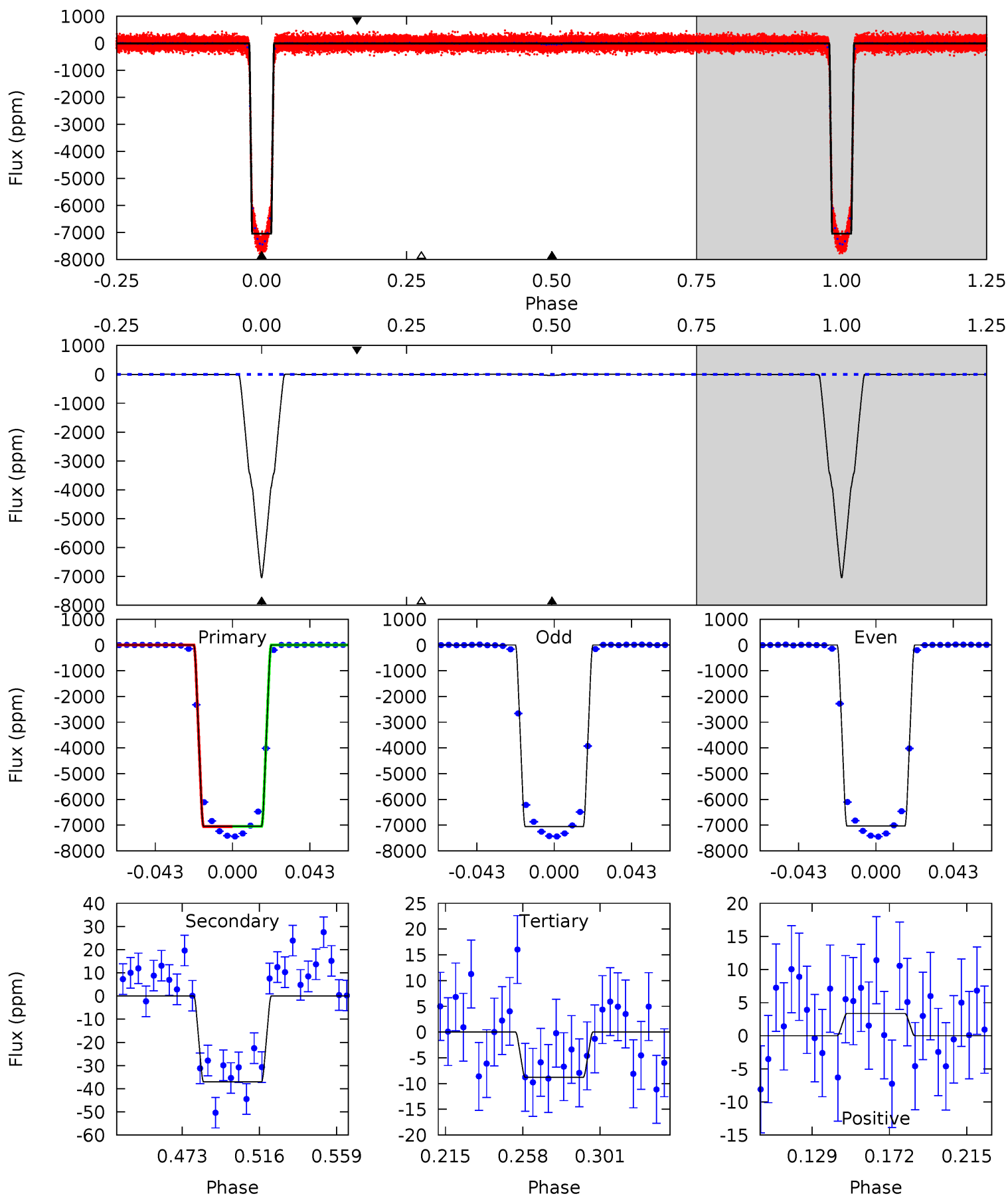
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3757	20.0	3.61	2.23	4.71	1.97	2.38	3753	3754	16.3	17.7	2.77	0.99	0.00	0.14



# Alt Model-Shift Uniqueness Test

005780885-01, P = 4.885464 Days, E = 129.395065 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
3156	16.6	3.94	1.51	4.74	2.02	1.71	3152	3154	12.7	15.1	5.49	1.00	0.00	2.00



### Stellar Parameters For KIC 005780885

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	$6036^{+78}_{-72}$	$3.968^{+0.020}_{-0.016}$	$0.100^{+0.100}_{-0.100}$	$1.909^{+0.120}_{-0.080}$	$1.236^{+0.154}_{-0.066}$	$0.250^{+0.021}_{-0.019}$
	+1%/-1%	+1%/-0%	+100%/-100%	+6%/-4%	+12%/-5%	+8%/-8%
Source	SPE8	AST8	SPE8	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 005780885-01 / KOI 0097.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-40 \pm 2$	$16.91^{+0.73}_{-0.41}$	$2088^{+35}_{-30}$	$-1903^{+251}_{-130}$	$0.279^{+0.017}_{-0.018}$
Alt.	$-37 \pm 2$	$17.52^{+0.75}_{-0.43}$	$2090^{+34}_{-30}$	$-2115^{+79}_{-61}$	$0.242^{+0.017}_{-0.016}$

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

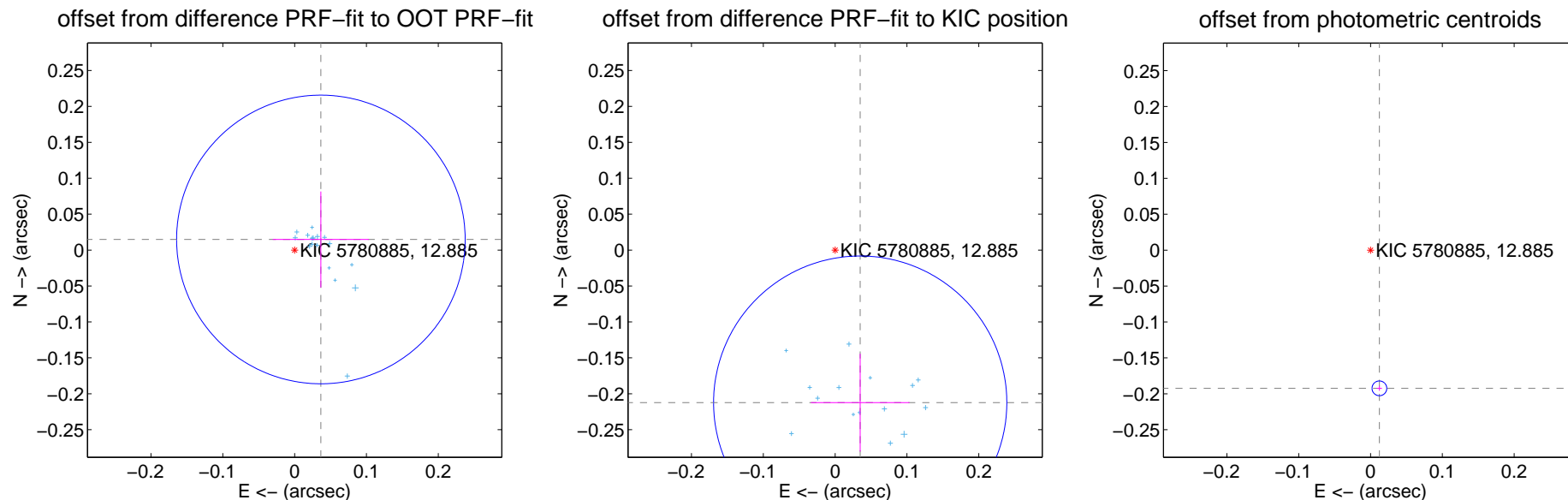
## DV Centroid Data

Supplemental centroid analysis for 005780885-01. Kepler magnitude: 12.88. Transit SNR 2182.34

There are 17 quarters with good PRF difference image offsets

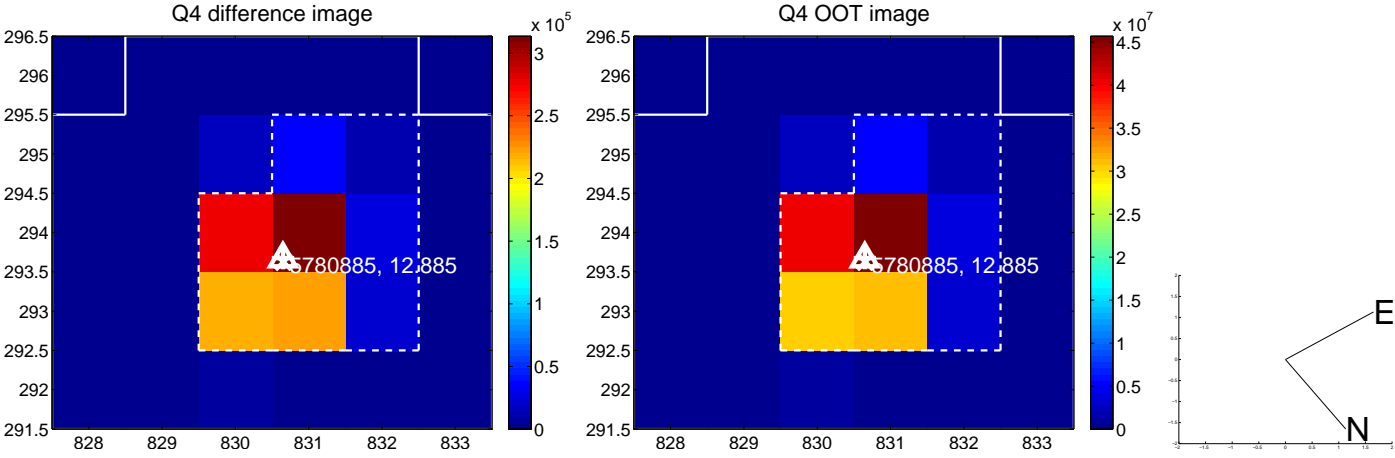
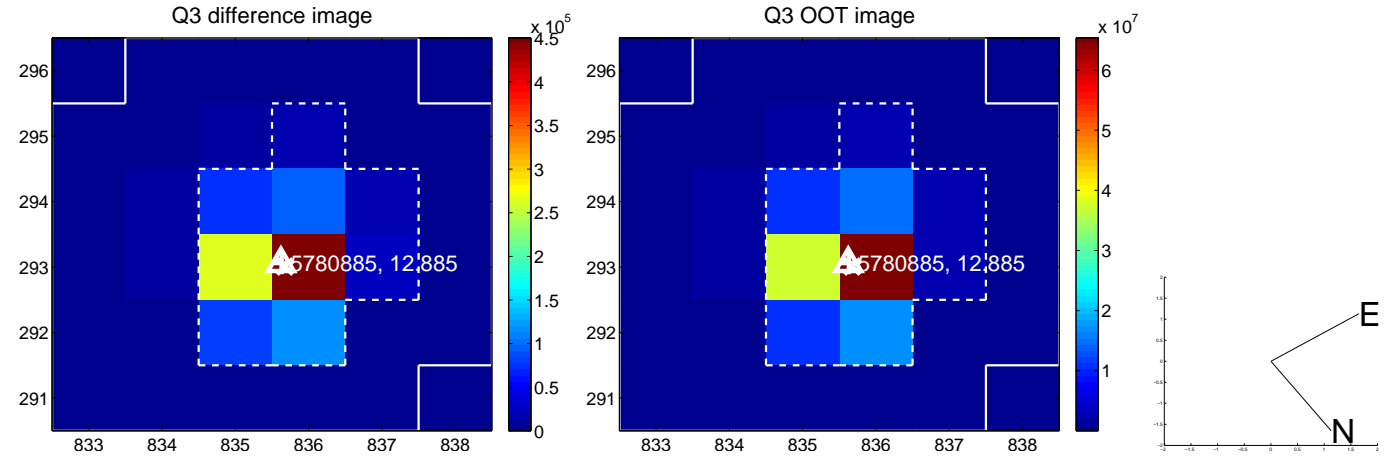
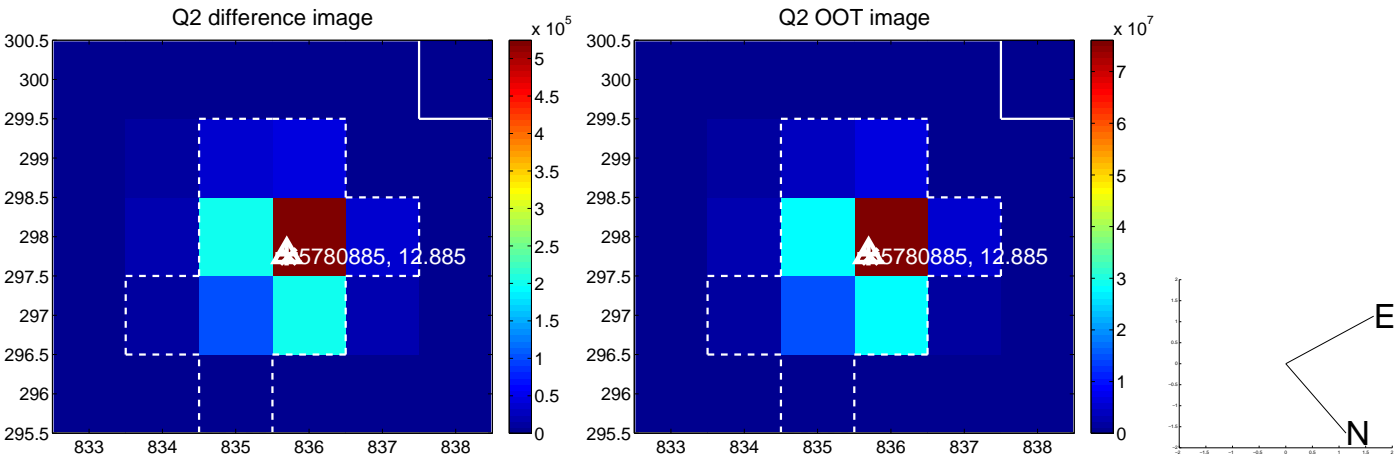
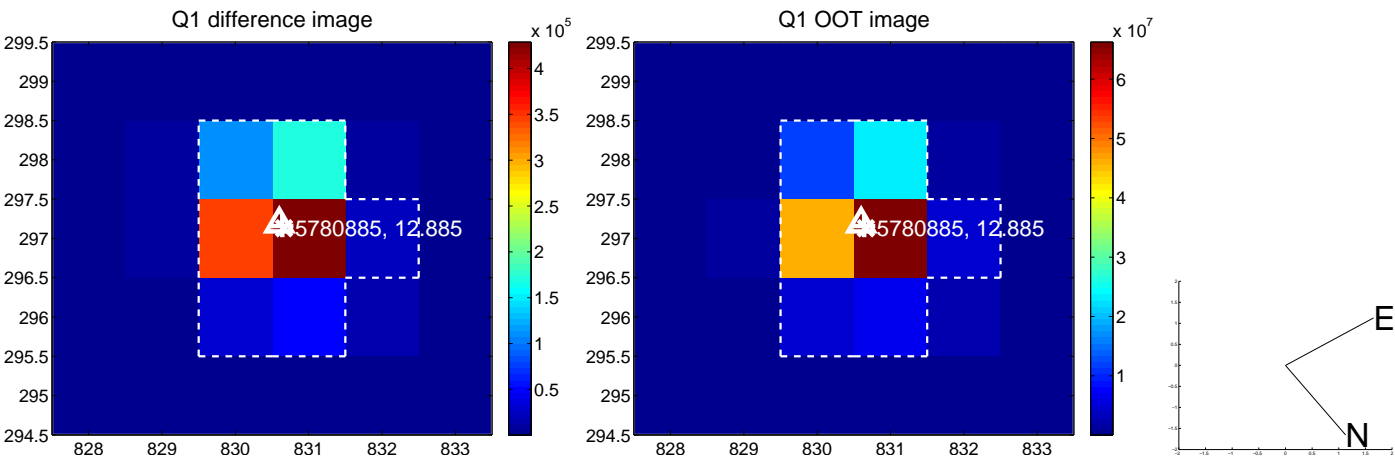
The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.039 \pm 0.067$	0.59	$-0.037 \pm 0.067$	$0.015 \pm 0.067$
PRF-fit source offset from KIC position	$0.215 \pm 0.068$	3.16	$-0.035 \pm 0.069$	$-0.212 \pm 0.068$
photometric centroid source offset	$0.19 \pm 0.00$	56.30	$-0.01 \pm 0.00$	$-0.19 \pm 0.00$

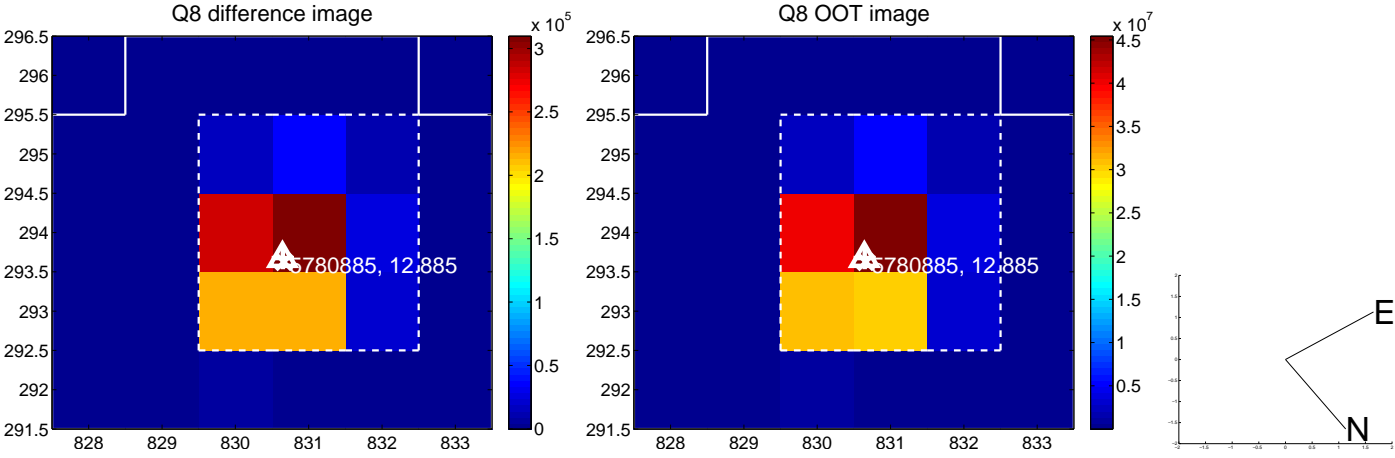
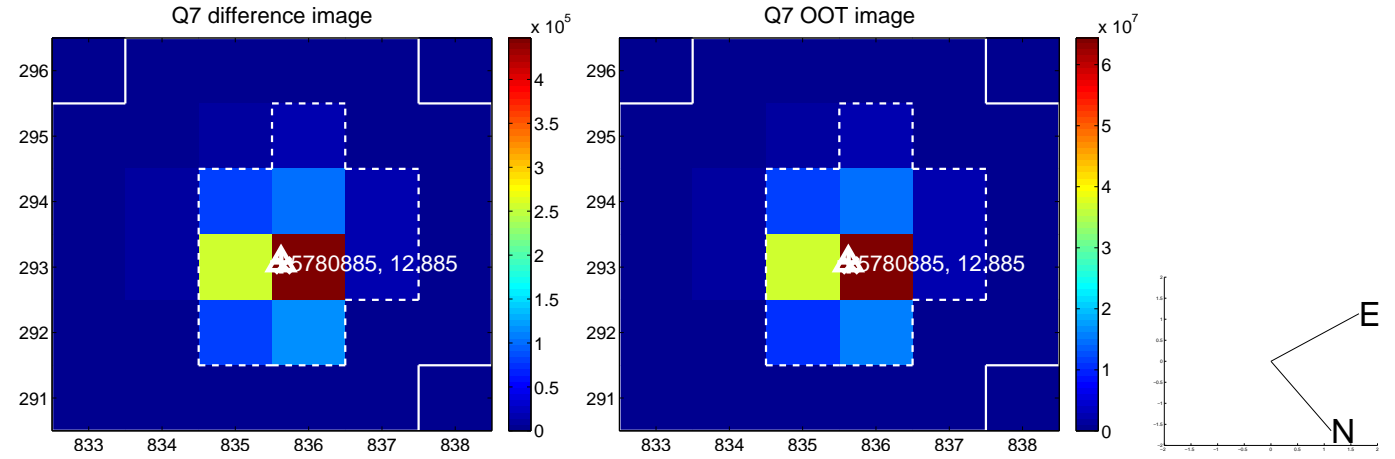
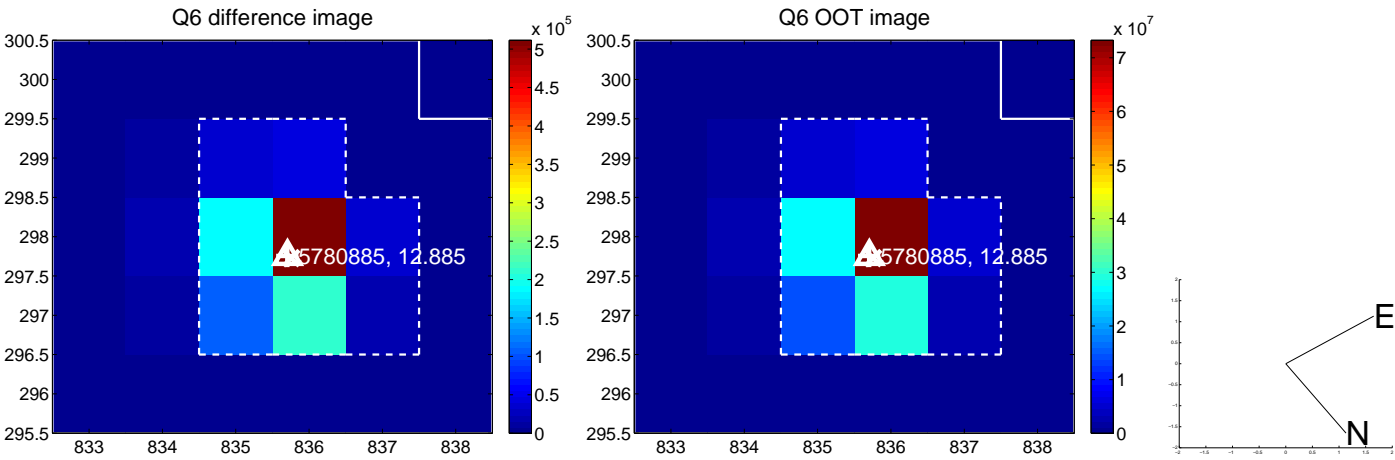
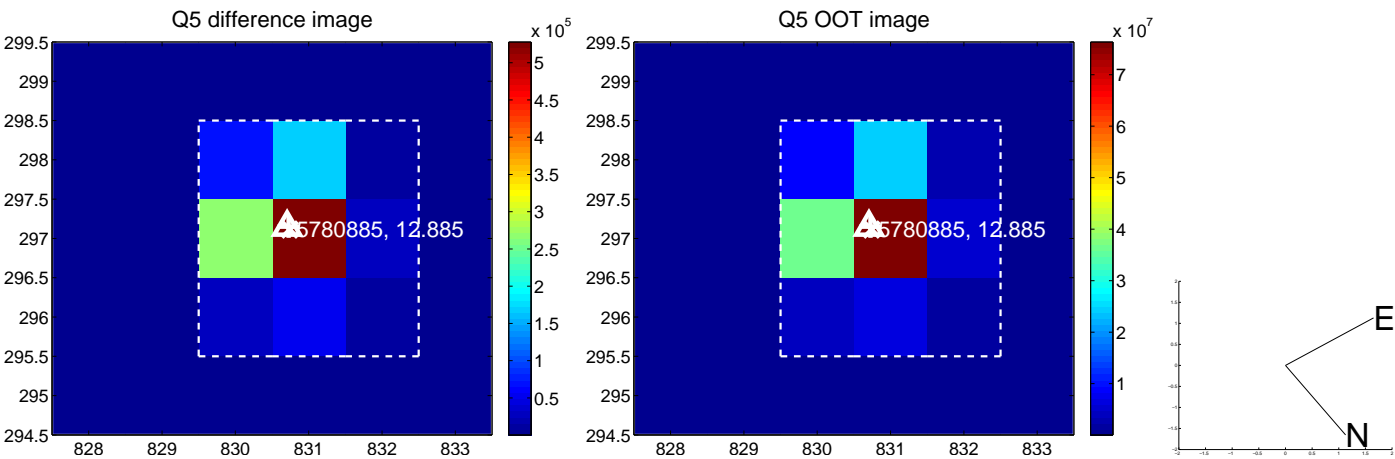


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

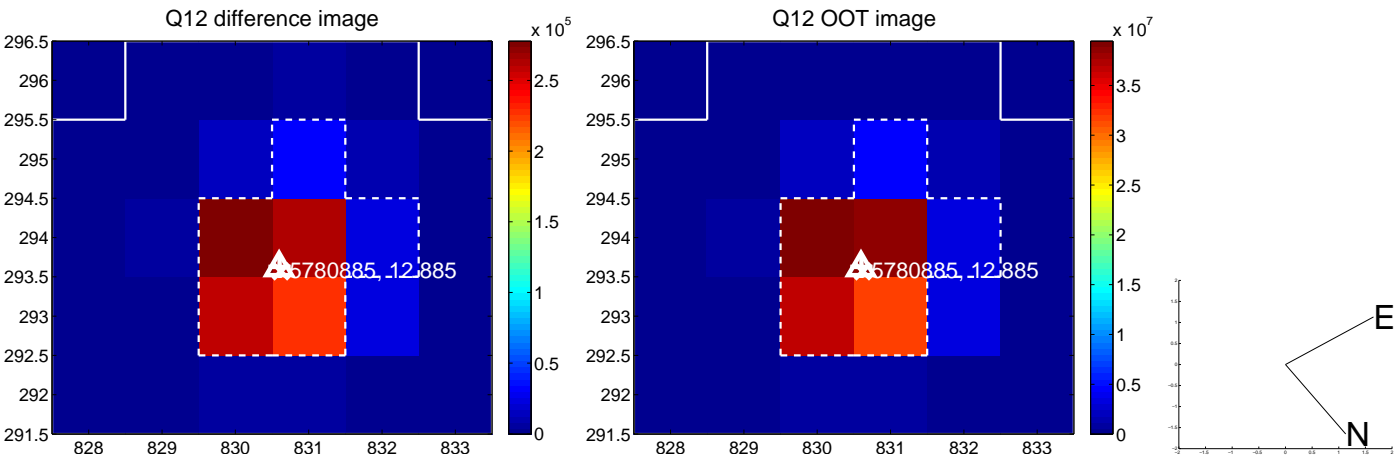
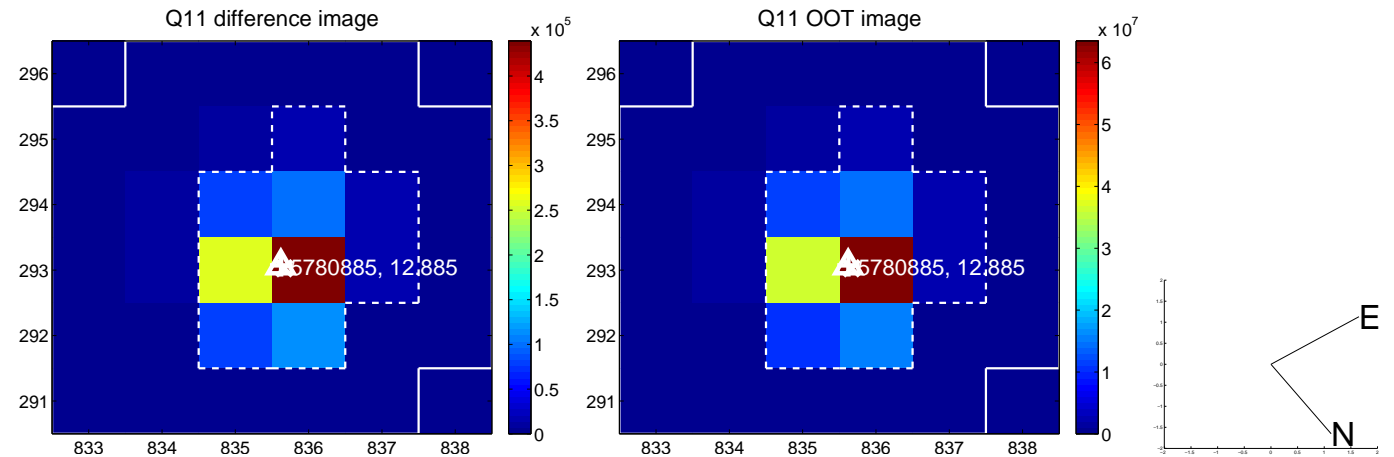
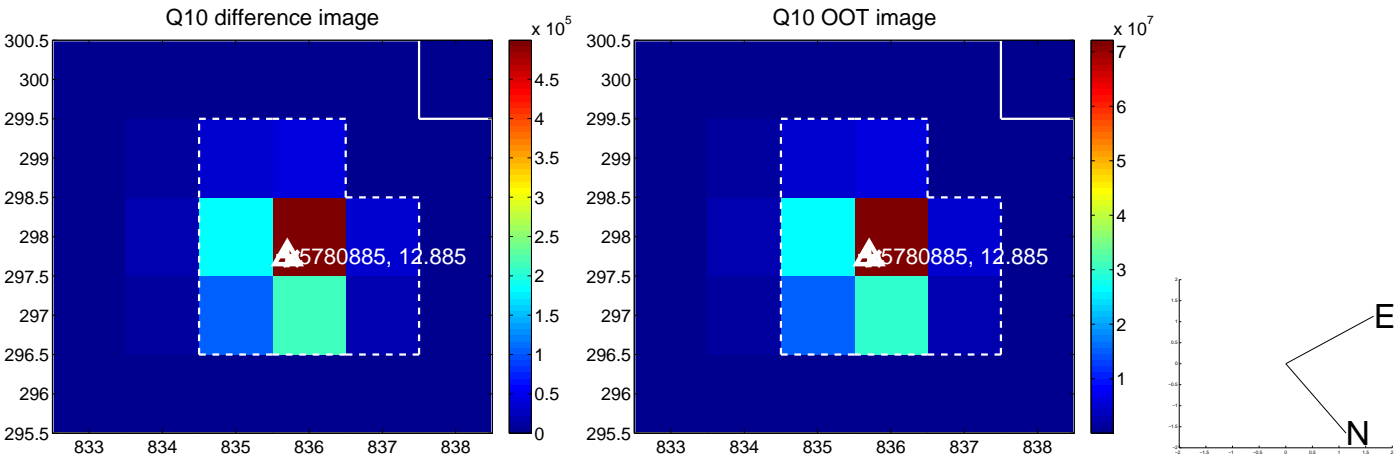
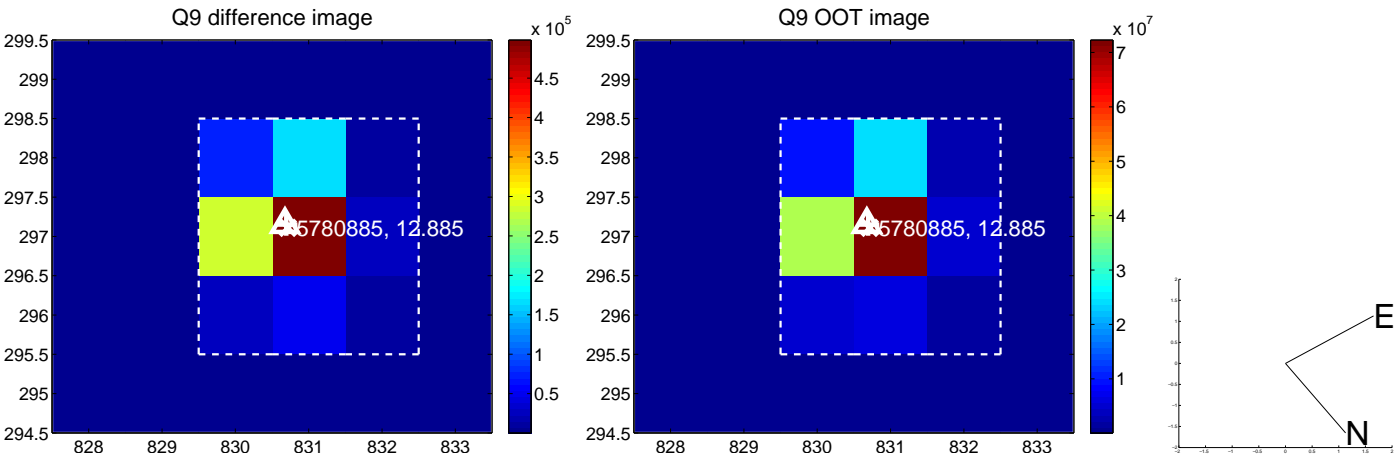


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

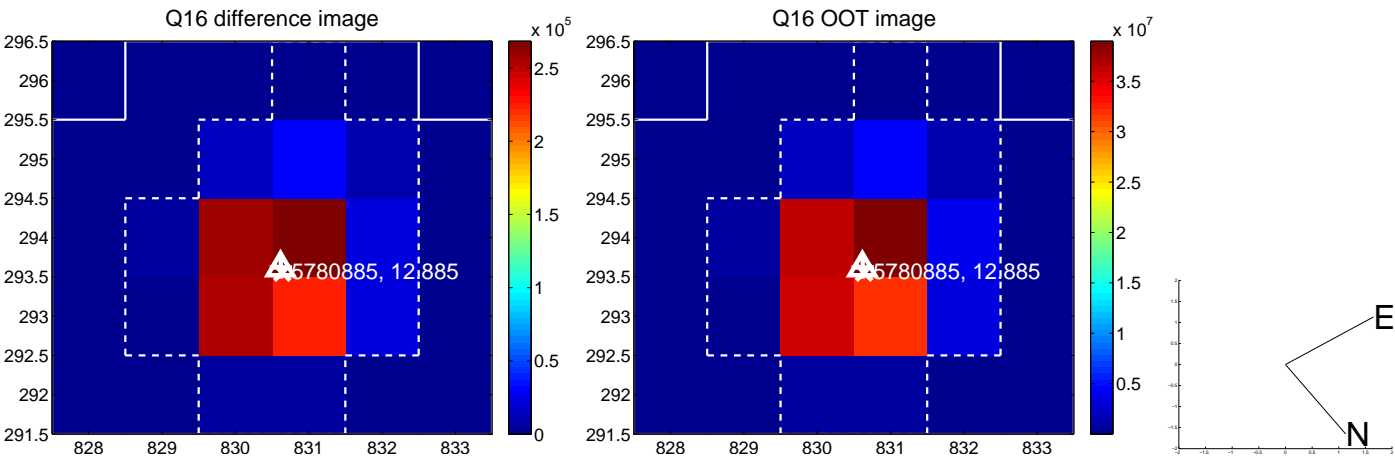
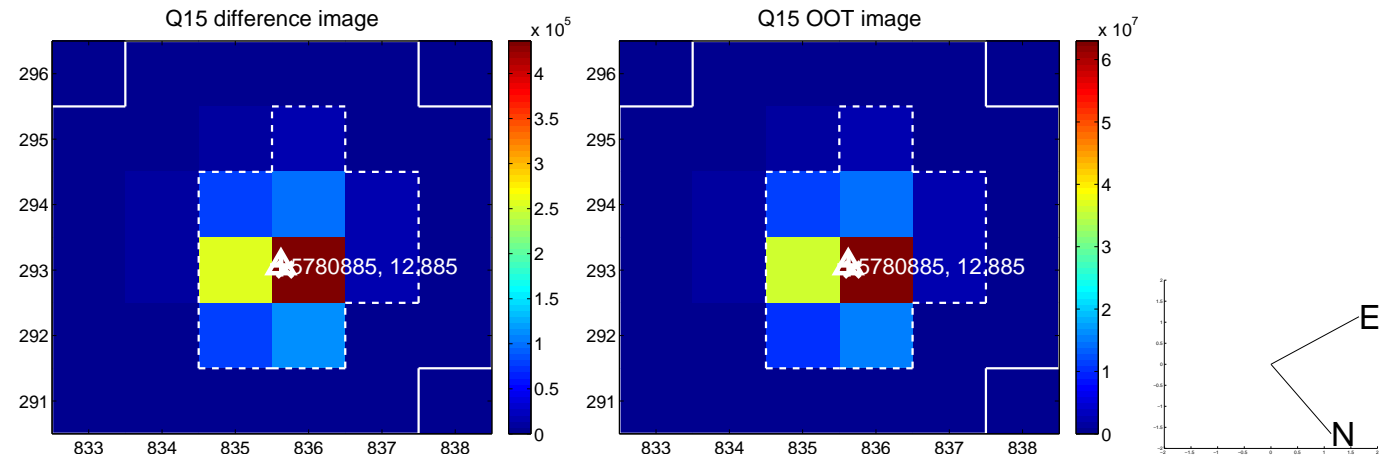
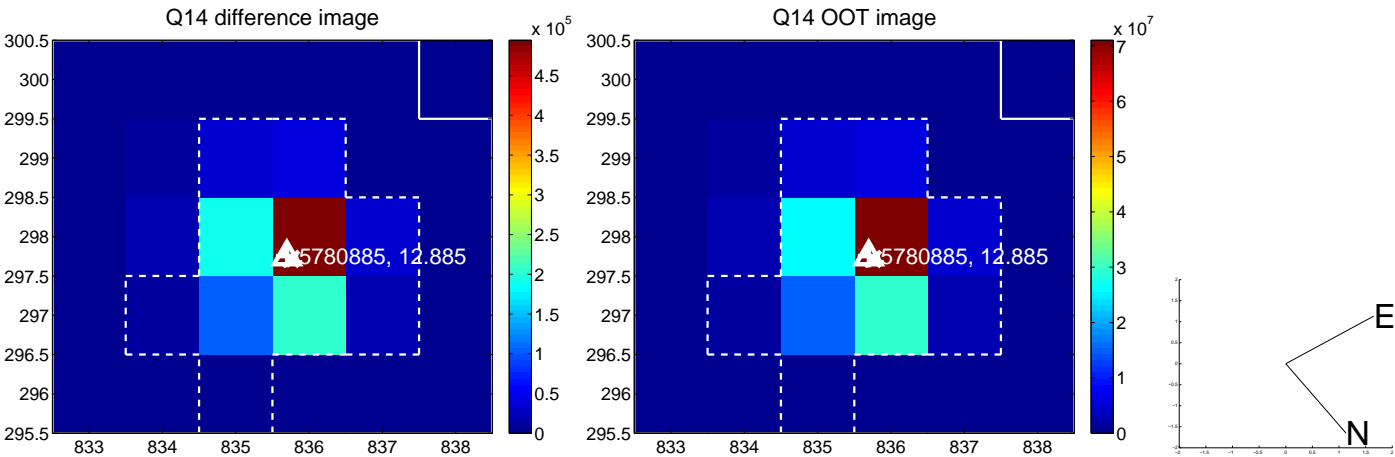
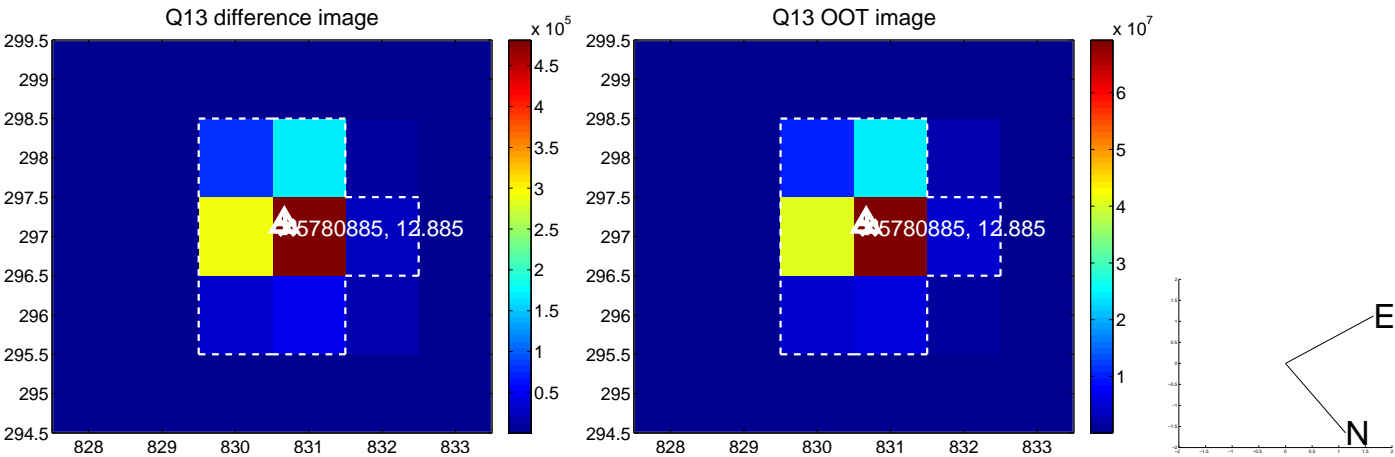




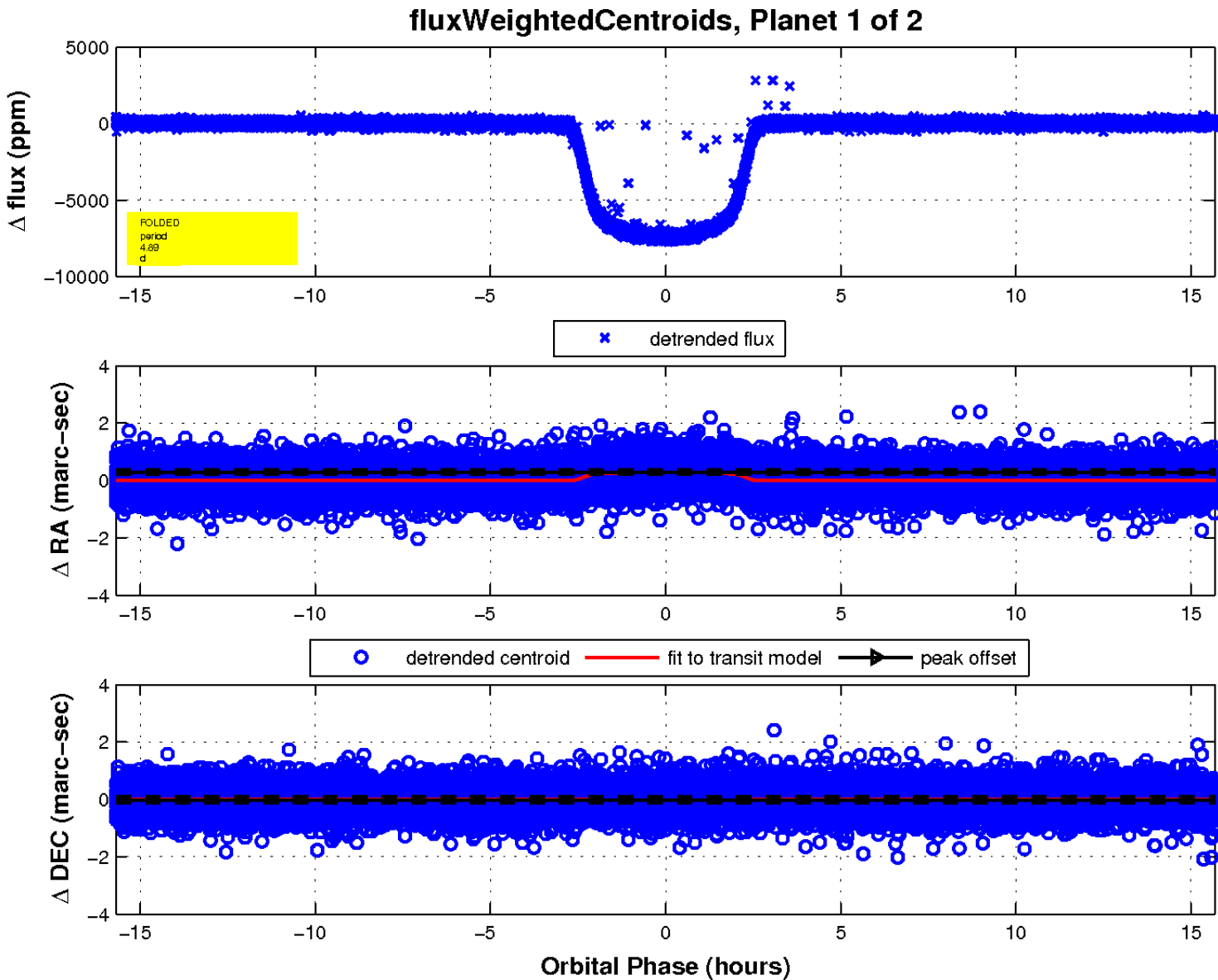
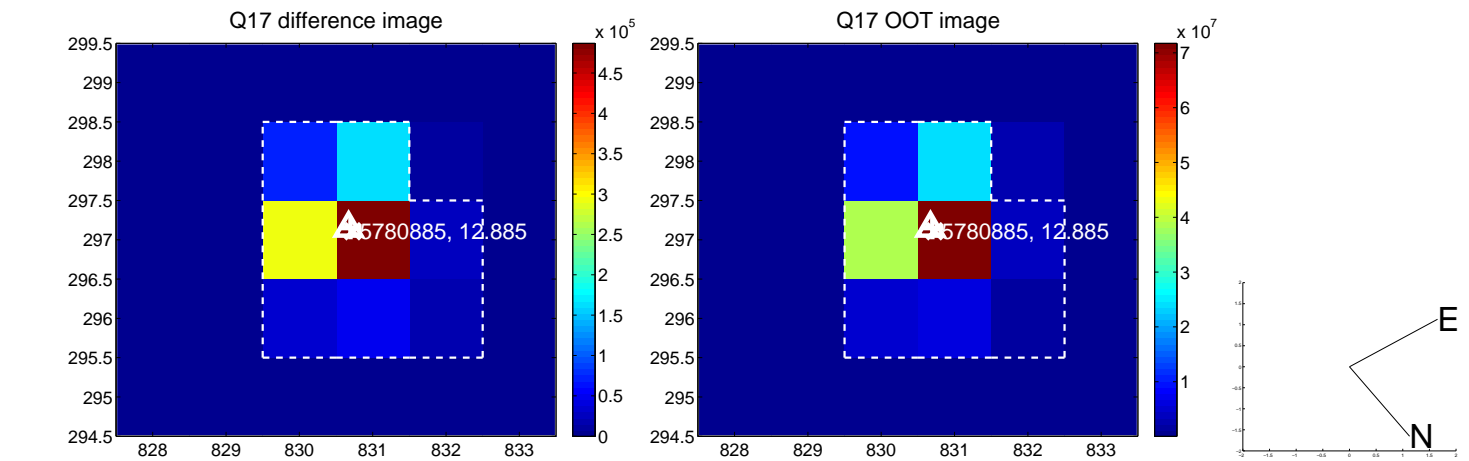
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

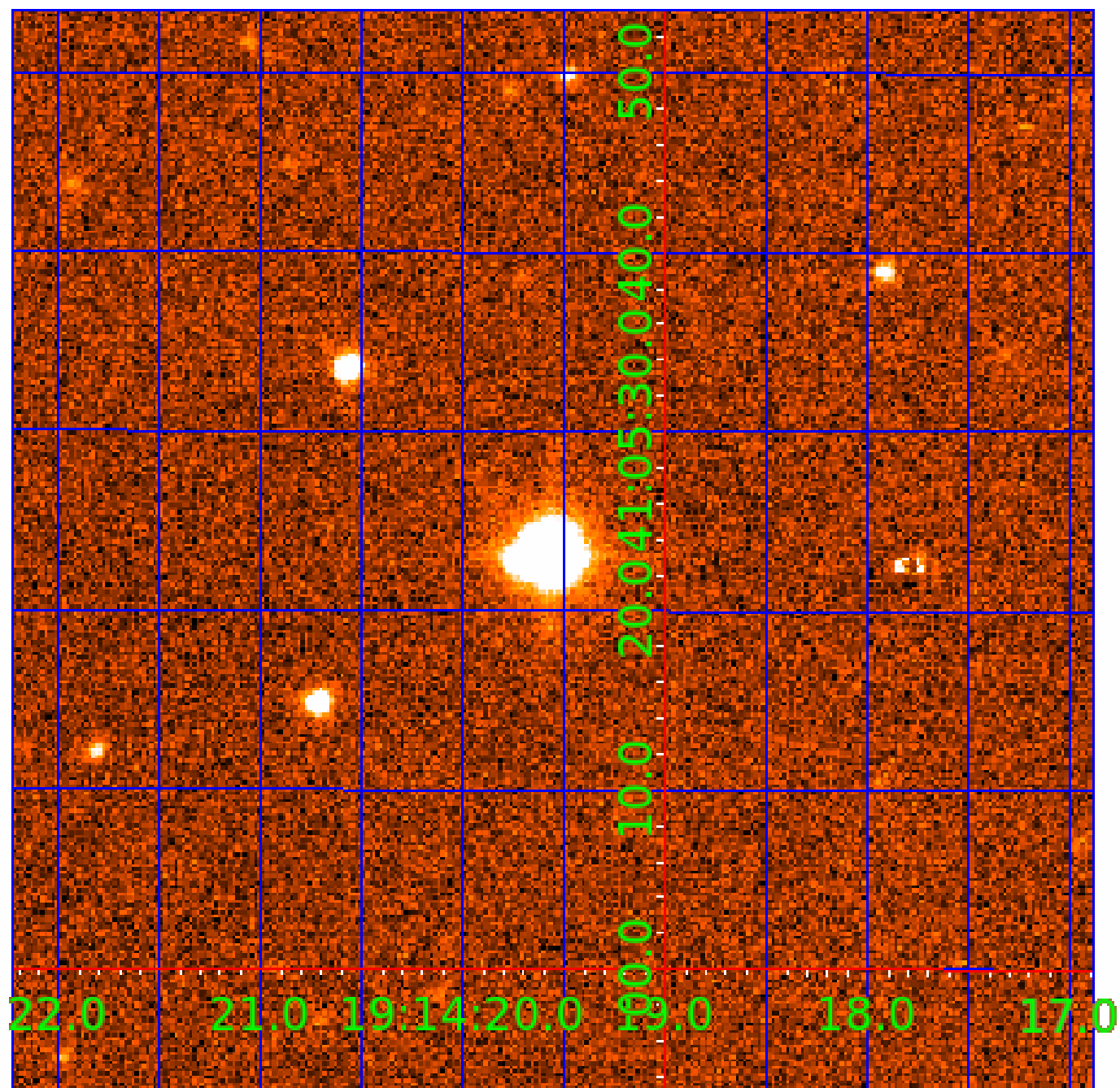


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 005780885

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005780885-01	OBS	0097.01	4.885488	134.276997	7470.6	5.232	2252.0	2182.3	1.91	6036	16.98	1185.45
005780885-02	OBS	No	4.885465	131.835257	45.1	4.897	13.6	14.1	1.91	6036	1.50	1185.46

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005780885-01	OBS	PC	1.00	0	1	0	0	MOD_SEC_DV—PLANET_OCCULT_DV—MOD_SEC_ALT—PLANET_OCCULT_ALT—HAS_SEC_TCE
005780885-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

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

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

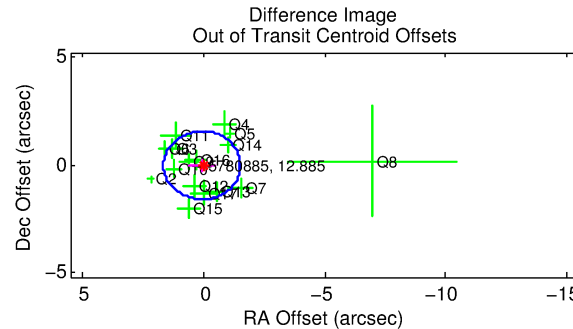
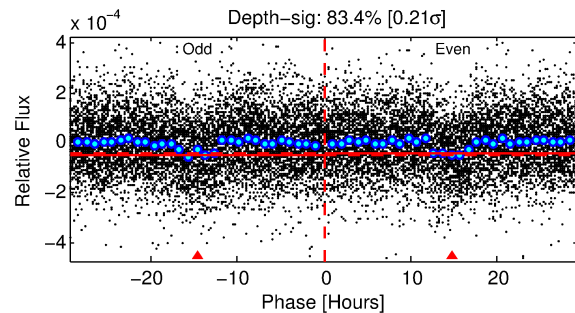
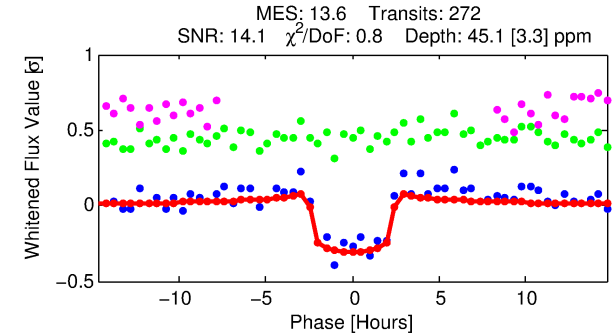
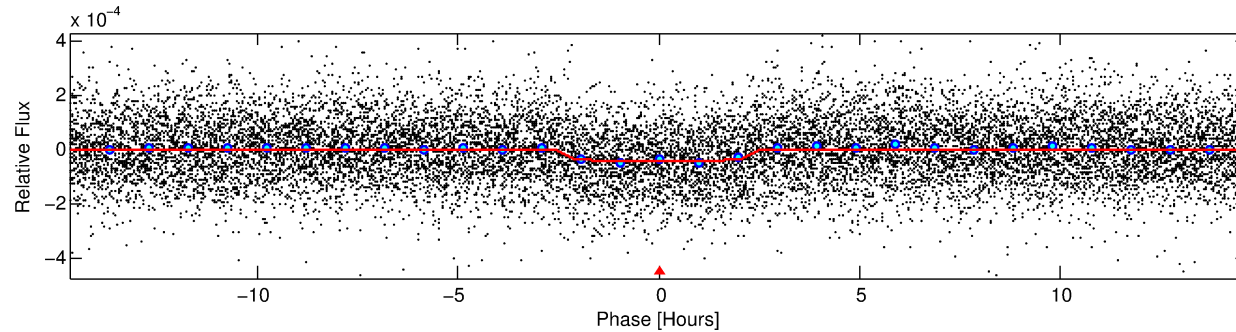
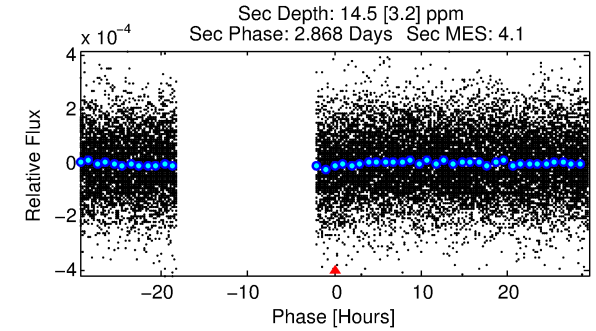
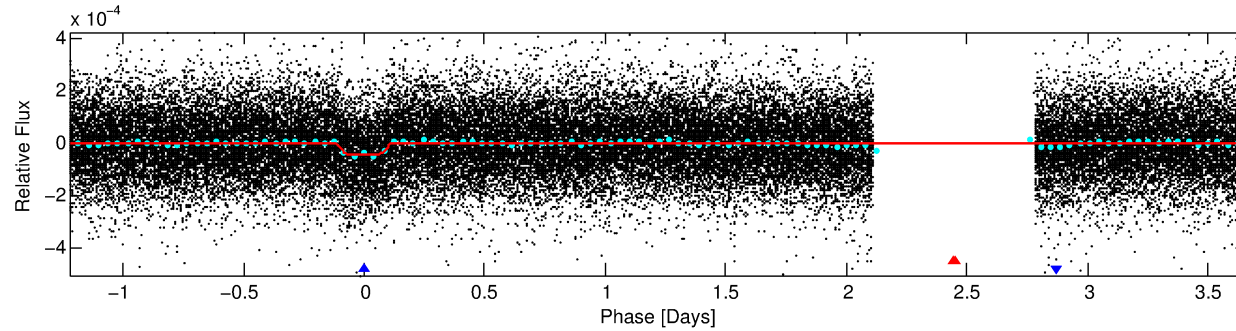
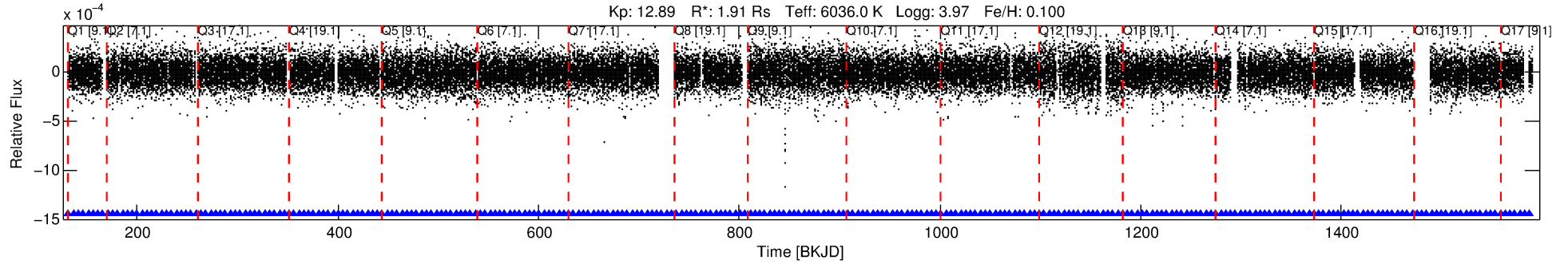
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005780885-02

No Significant Match Found

# DV One-Page Summary

KIC: 5780885 Candidate: 2 of 2 Period: 4.885 d  
KOI: K00097 Name: Kepler-7 Corr: No Ephemeris Match



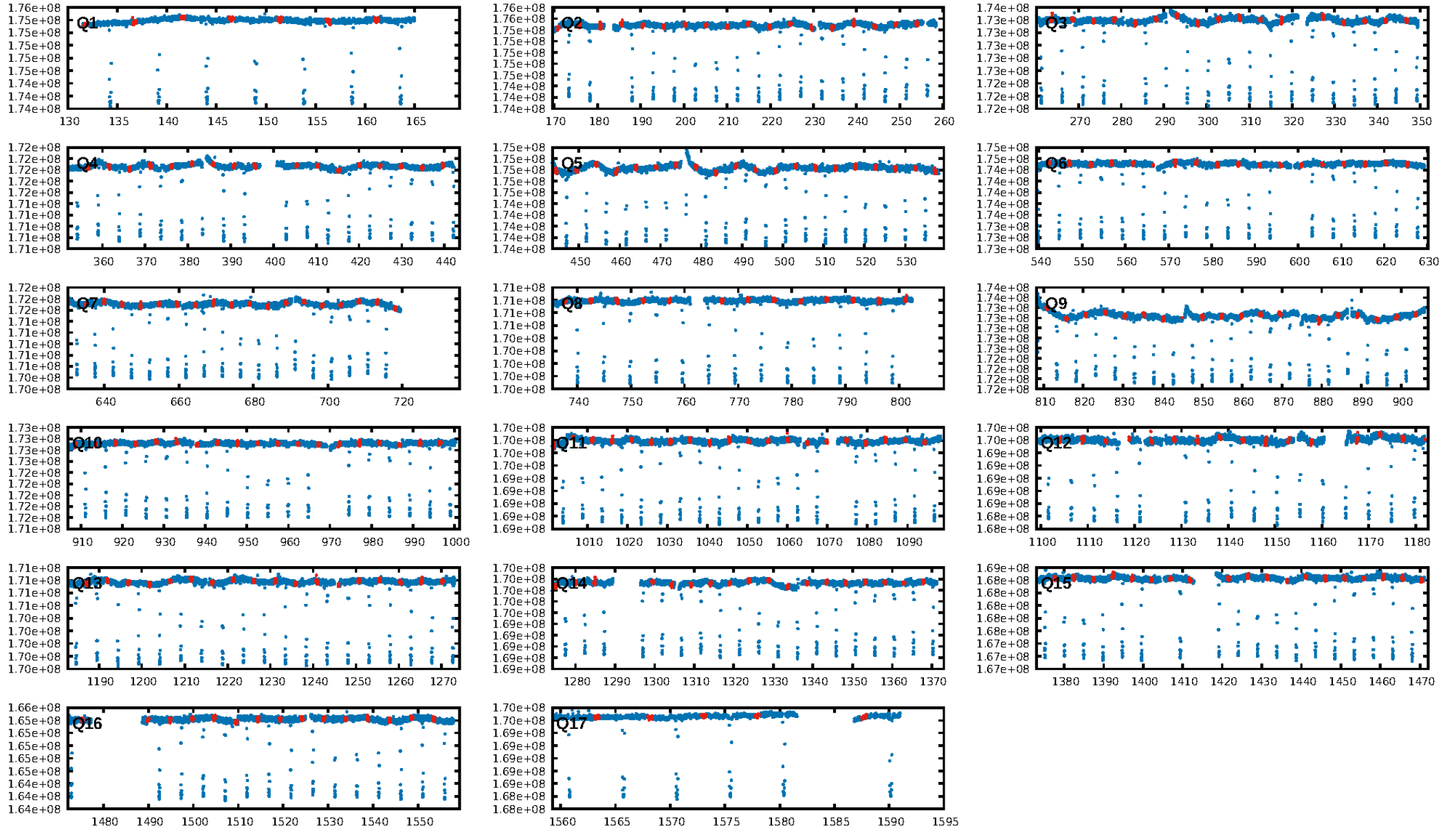
## DV Fit Results:

Period = 4.88546 [0.00003] d  
Epoch = 131.8353 [0.0042] BKJD  
Rp/R\* = 0.0072 [0.0019]  
a/R\* = 3.66 [4.66]  
b = 0.89 [0.31]  
Seff = 1185.46 [86.88]  
Teq = 1496 [27] K  
Rp = 1.50 [0.42] Re  
a = 0.0605 [0.0027] AU  
Ag = 12.92 [7.52] [1.59σ]  
Teffp = 4386 [638] K [4.52σ]

## DV Diagnostic Results:

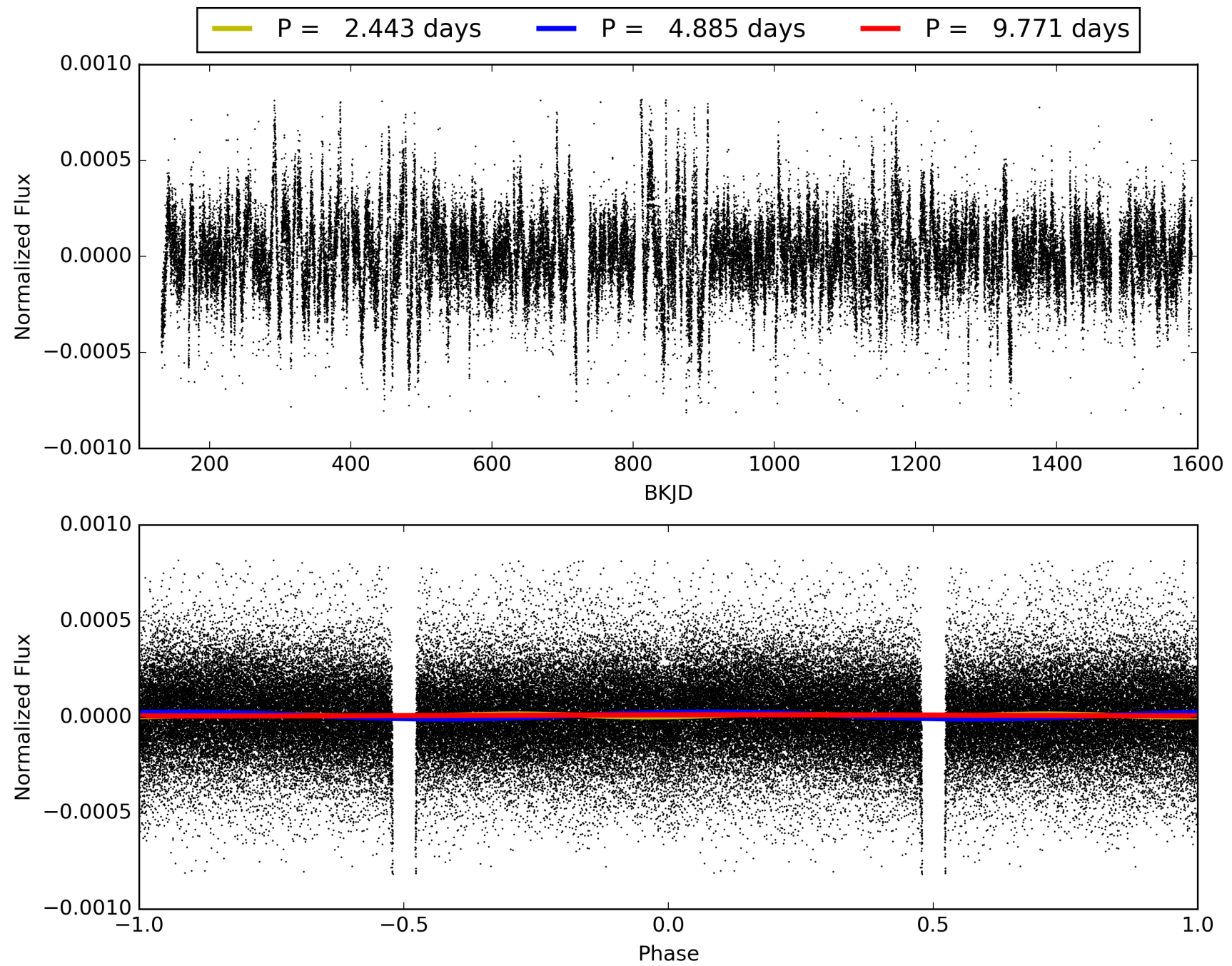
ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 6.83e-36  
RollingBand-fgt: 1.00 [260/260]  
GhostDiagnostic-chr: 1.727  
Centroid-sig: 40.6%  
Centroid-so: 0.629 arcsec [1.09σ]  
OotOffset-rm: 0.073 arcsec [0.14σ]  
OotOffset-st: 4/4/4/4 [16]  
KicOffset-rm: 0.250 arcsec [0.75σ]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 0.88 [14/16]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 005780885-02, PDC Light Curves





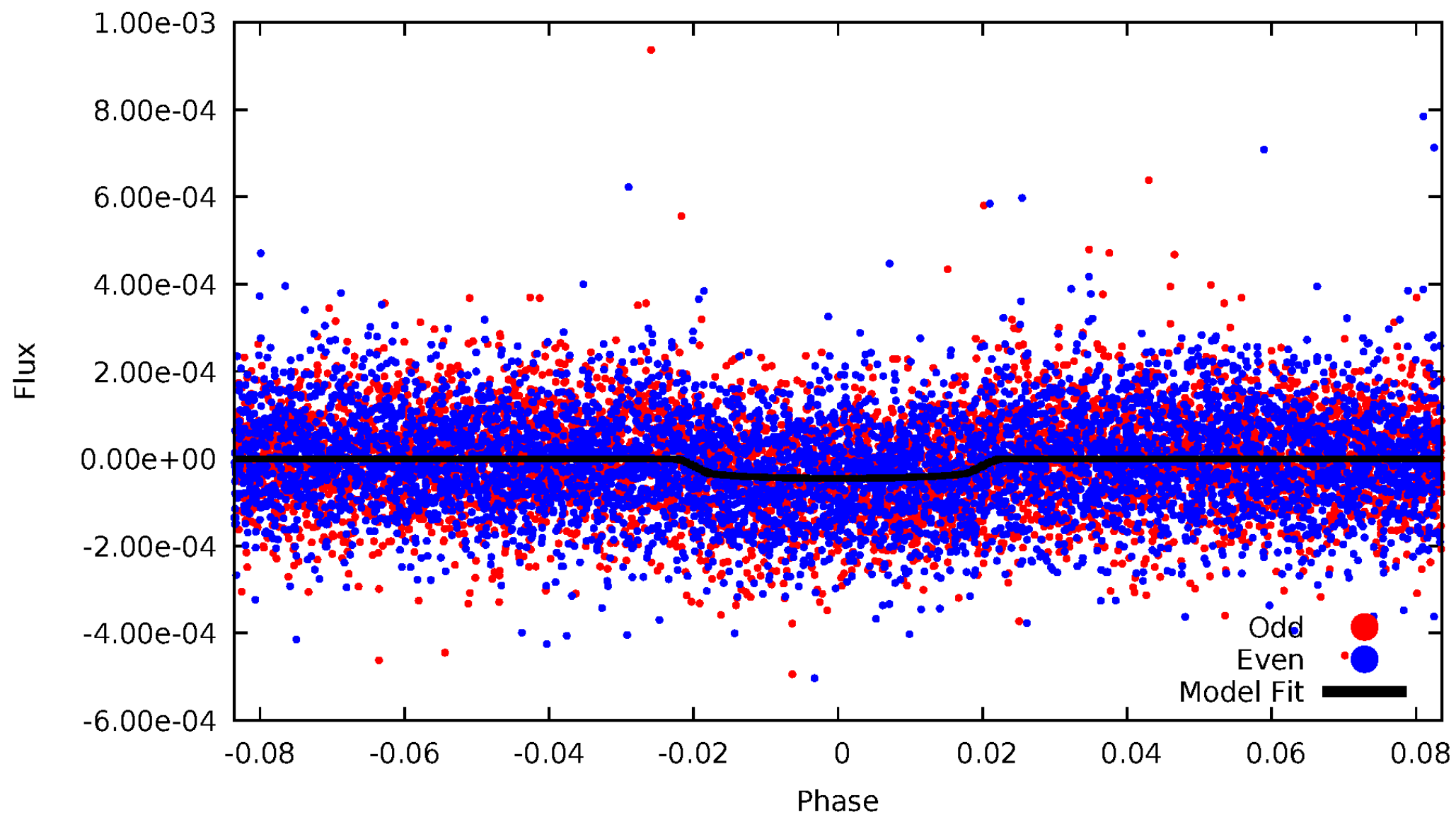
TCE 005780885-02





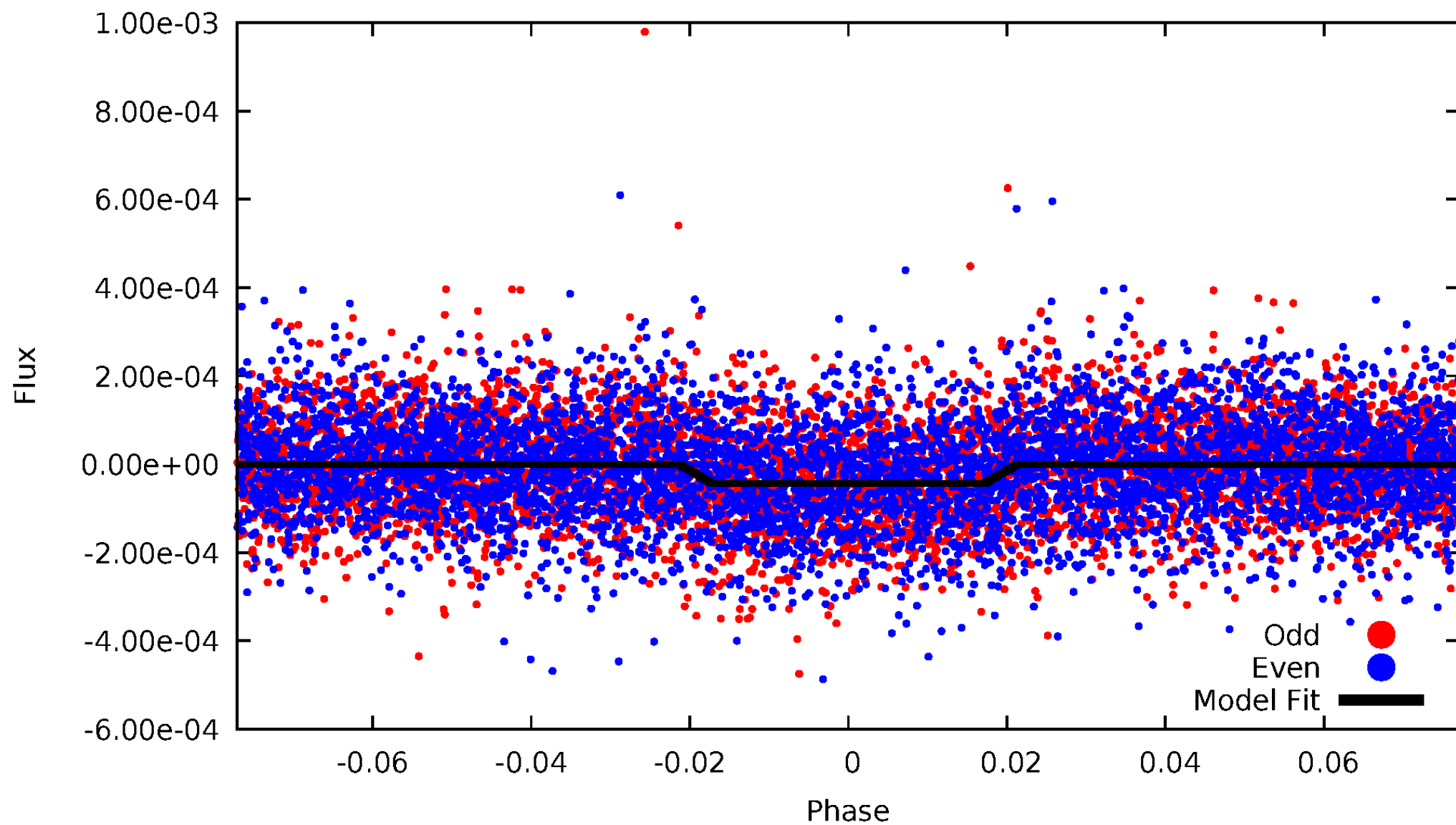
# DV Odd/Even

TCE 005780885-02



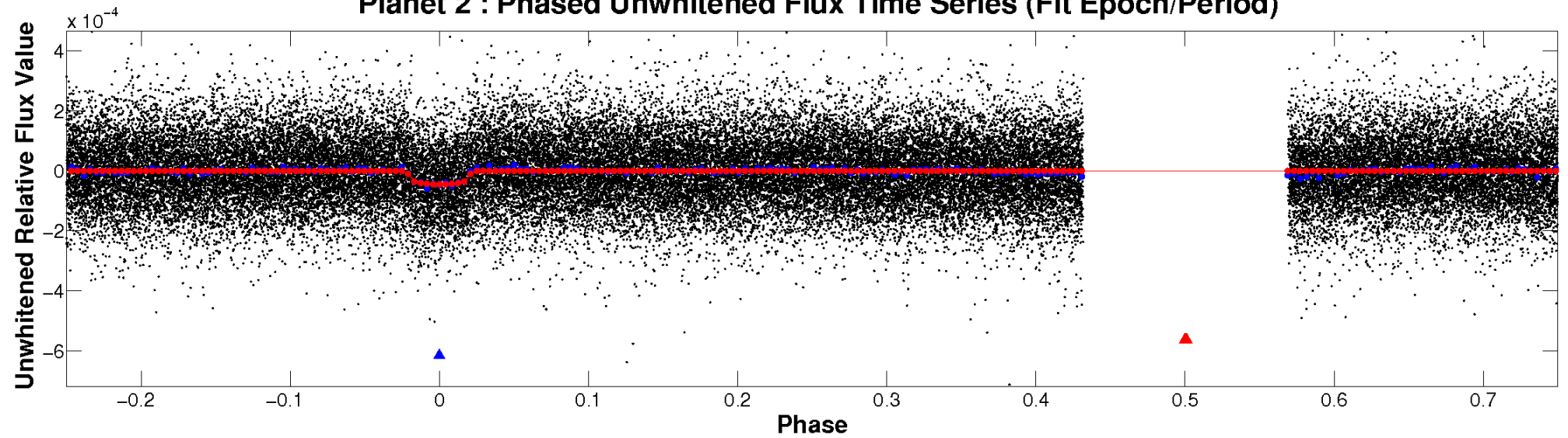
# ALT Odd/Even

TCE 005780885-02

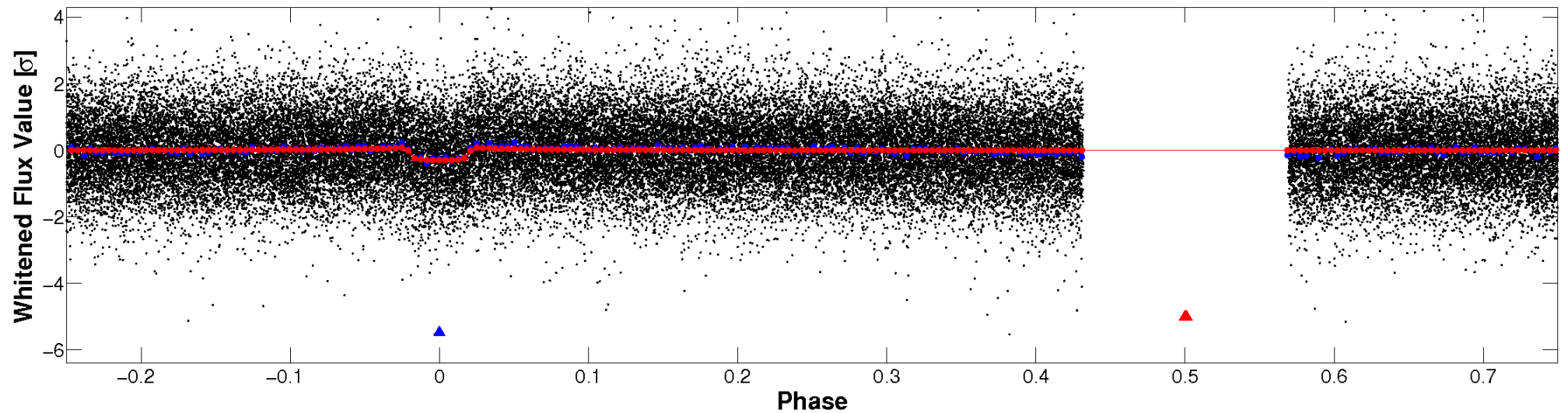


# Non-Whitened Vs. Whitened Light Curve

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

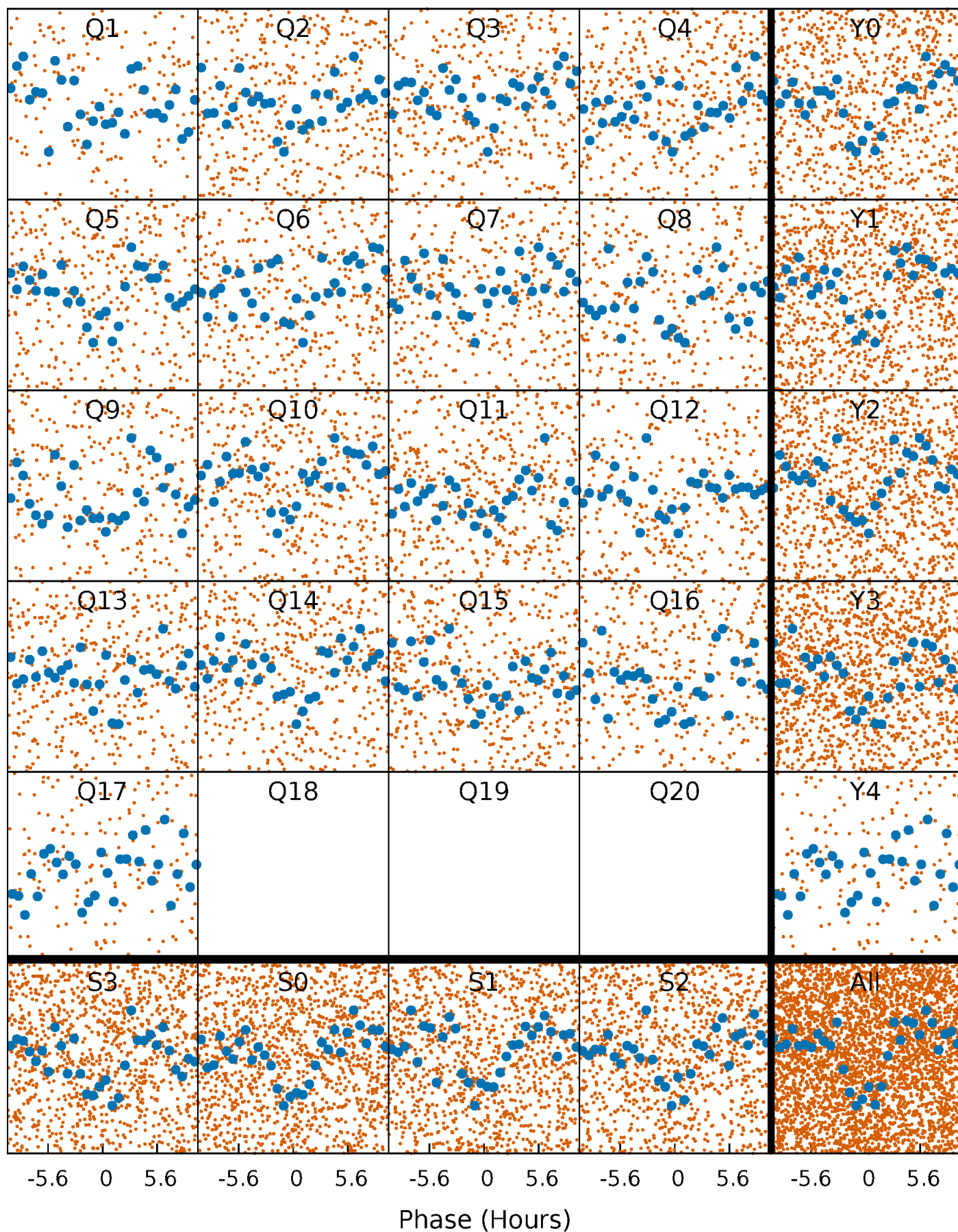


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

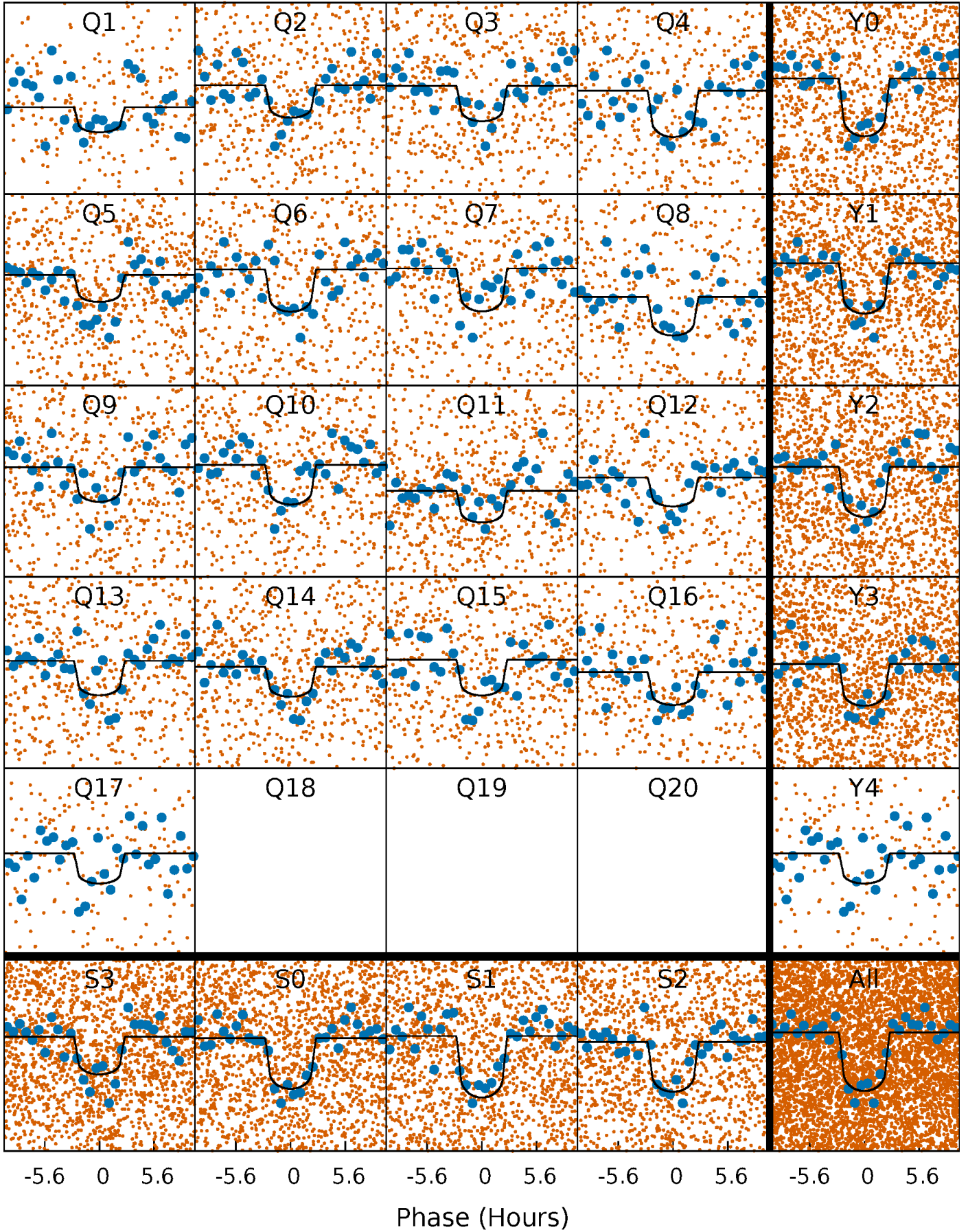
TCE 005780885-02   P= 4.885465 Days    $T_0=131.835257$  (BKJD)





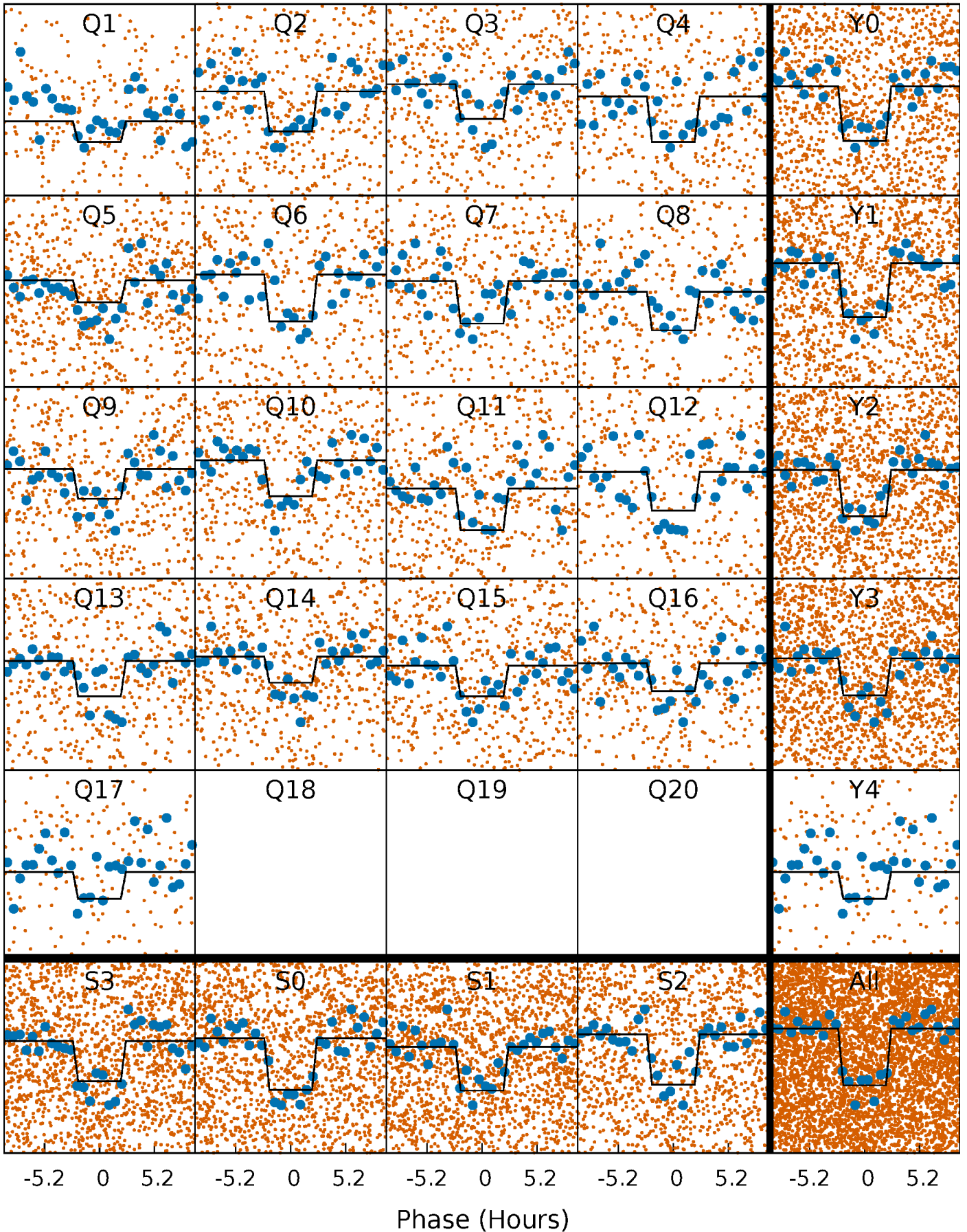
# DV Quarter-Phased Transit Curves

TCE 005780885-02    P= 4.885465 Days     $T_0=131.835257$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

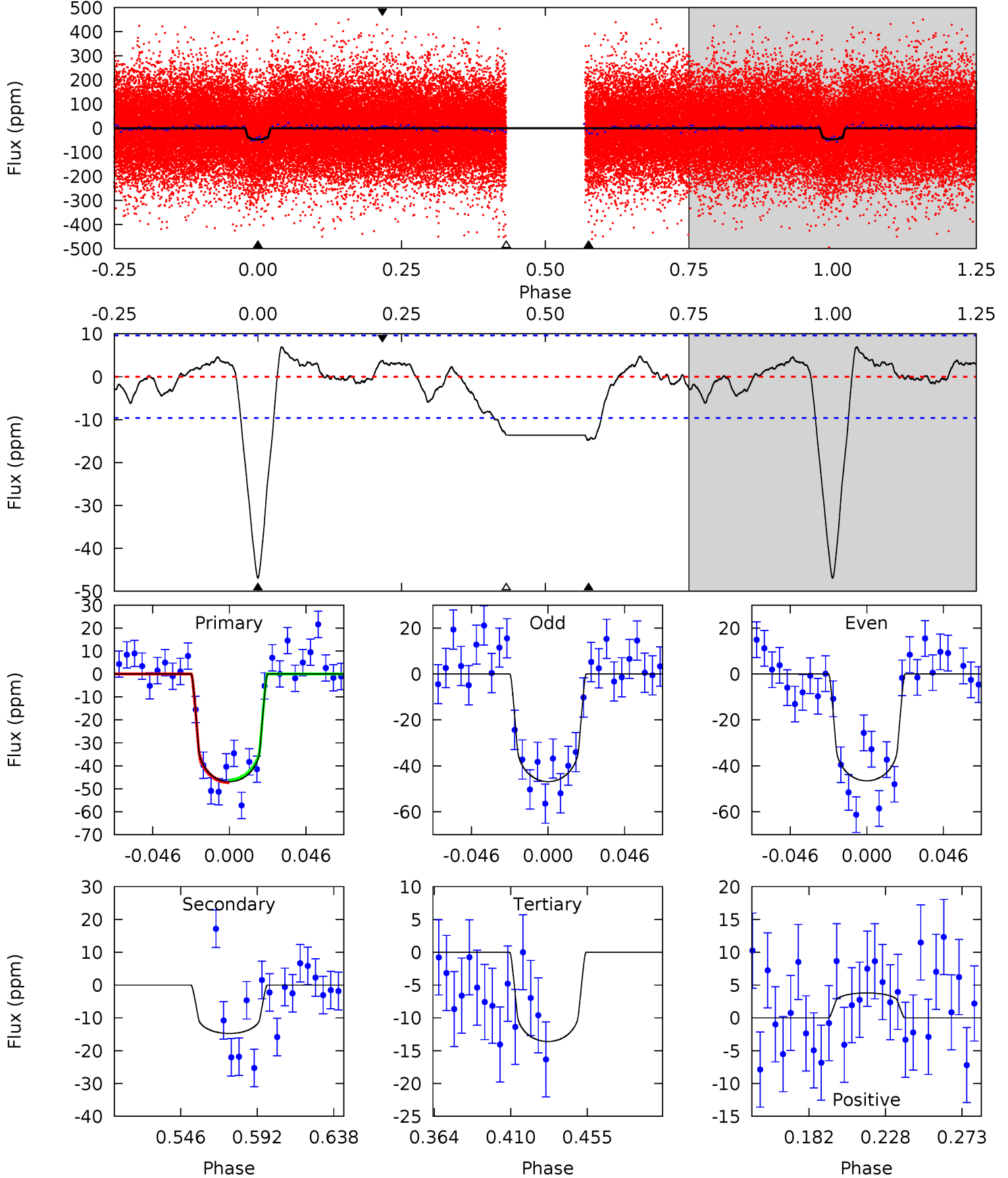
TCE 005780885-02   P= 4.885458 Days    $T_0=131.835727$  (BKJD)



# DV Model-Shift Uniqueness Test

005780885-02, P = 4.885465 Days, E = 126.949792 Days

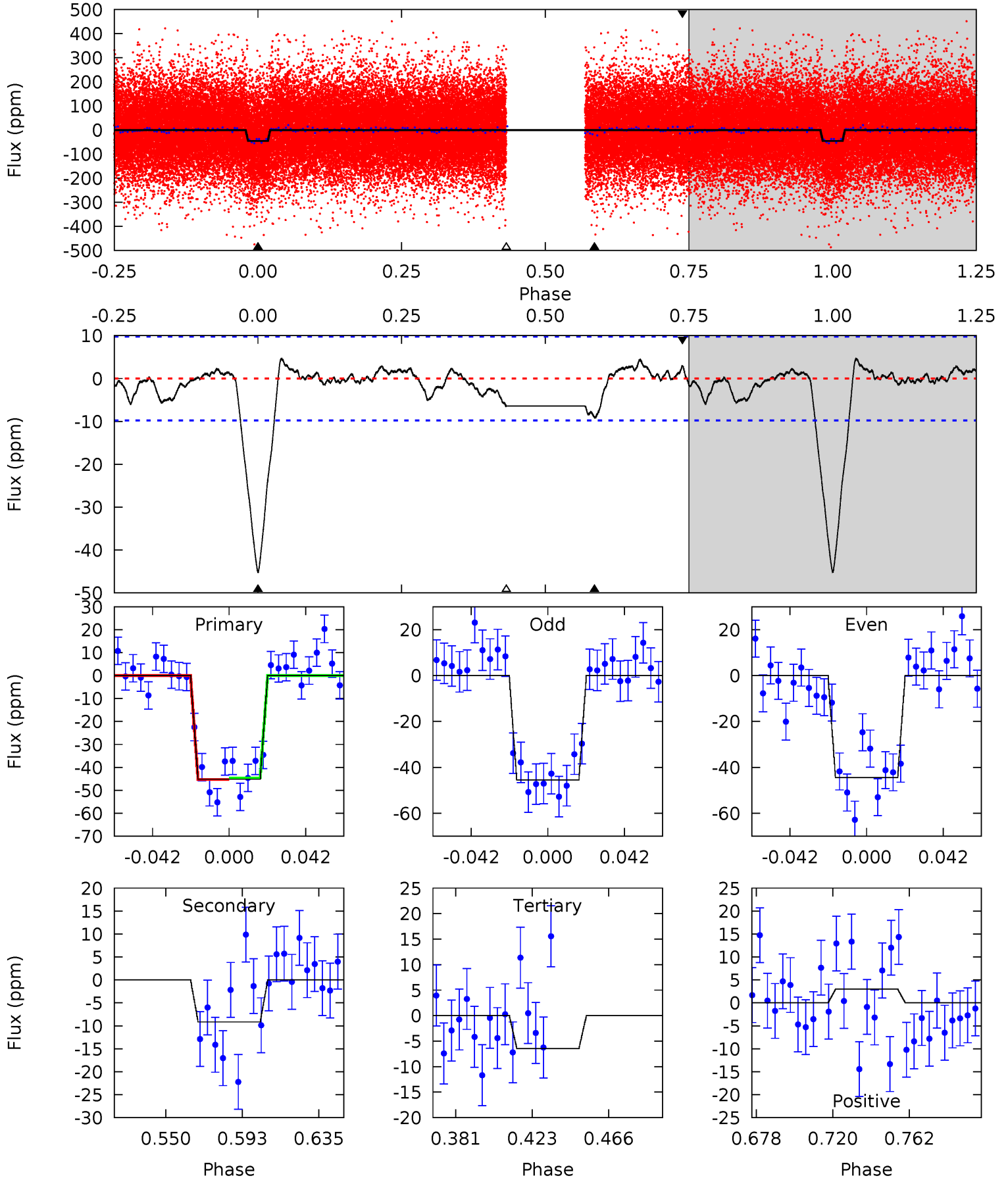
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.1	7.26	6.70	1.87	4.73	2.00	1.77	16.4	21.2	0.57	5.39	0.09	1.03	0.13	0.28



# Alt Model-Shift Uniqueness Test

005780885-02, P = 4.885458 Days, E = 126.950269 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
21.9	4.45	3.14	1.45	4.74	2.03	1.08	18.8	20.5	1.31	2.99	0.24	1.03	0.09	0.15





### Stellar Parameters For KIC 005780885

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	$6036^{+78}_{-72}$	$3.968^{+0.020}_{-0.016}$	$0.100^{+0.100}_{-0.100}$	$1.909^{+0.120}_{-0.080}$	$1.236^{+0.154}_{-0.066}$	$0.250^{+0.021}_{-0.019}$
	+1%/-1%	+1%/-0%	+100%/-100%	+6%/-4%	+12%/-5%	+8%/-8%
Source	SPE8	AST8	SPE8	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 005780885-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-15 \pm 2$	$1.52^{+0.42}_{-0.42}$	$2092^{+30}_{-31}$	$4567^{+640}_{-435}$	$13^{+11}_{-6}$
Alt.	$-9 \pm 2$	$1.37^{+0.42}_{-0.40}$	$2091^{+32}_{-32}$	$4296^{+656}_{-444}$	$9.627^{+10.288}_{-4.134}$

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

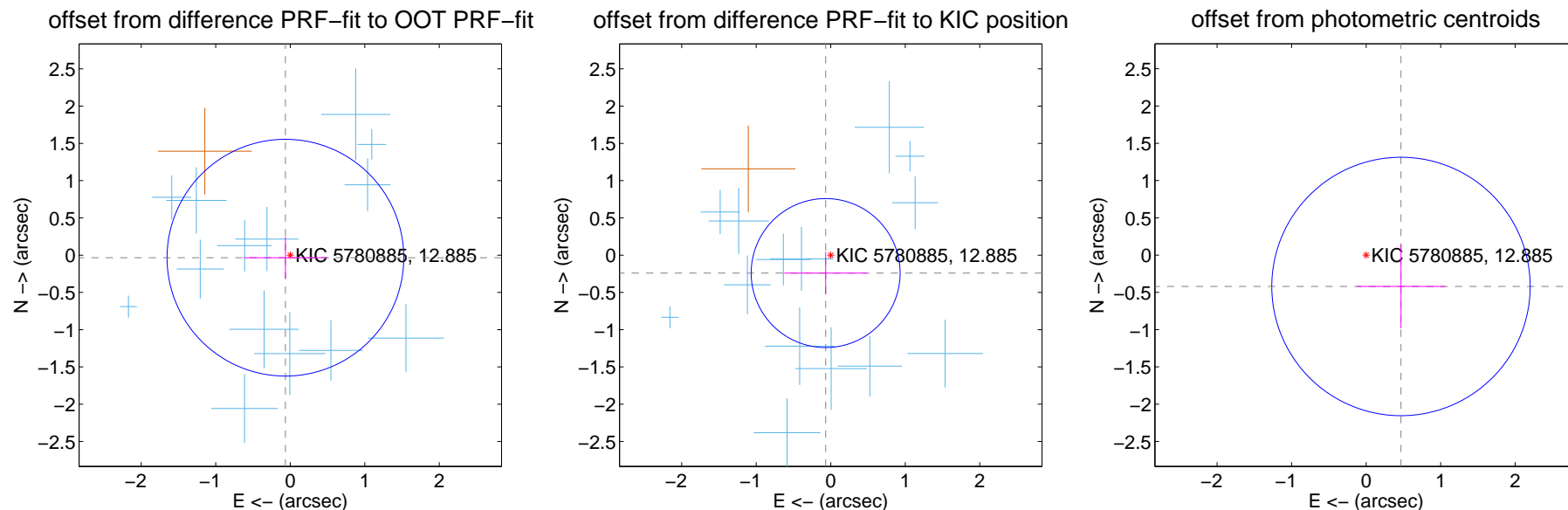
## DV Centroid Data

Supplemental centroid analysis for 005780885-02. Kepler magnitude: 12.88. Transit SNR 14.08

There are 14 quarters with good PRF difference image offsets

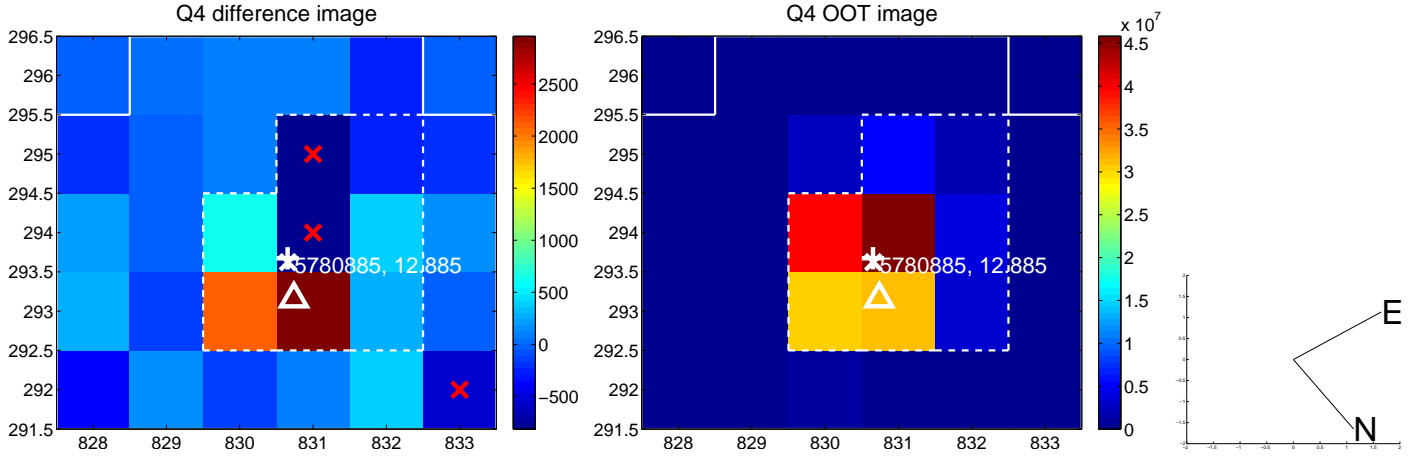
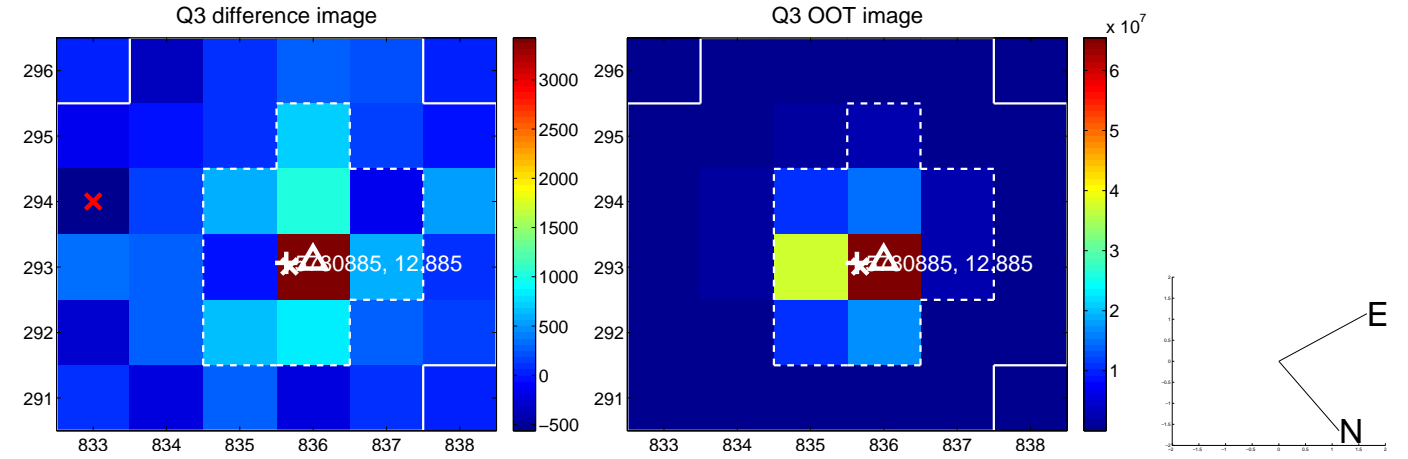
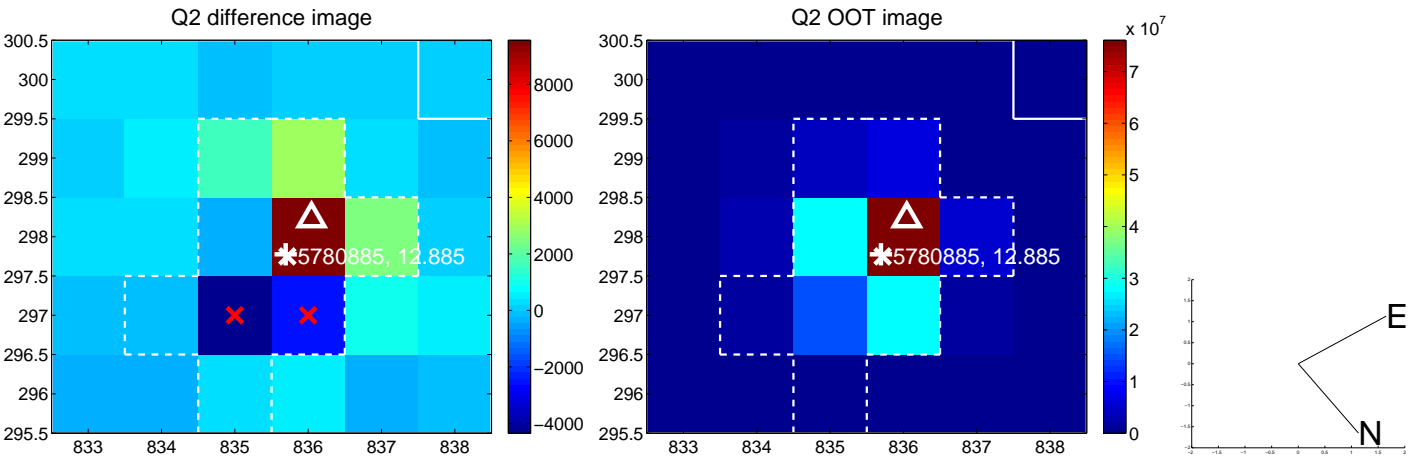
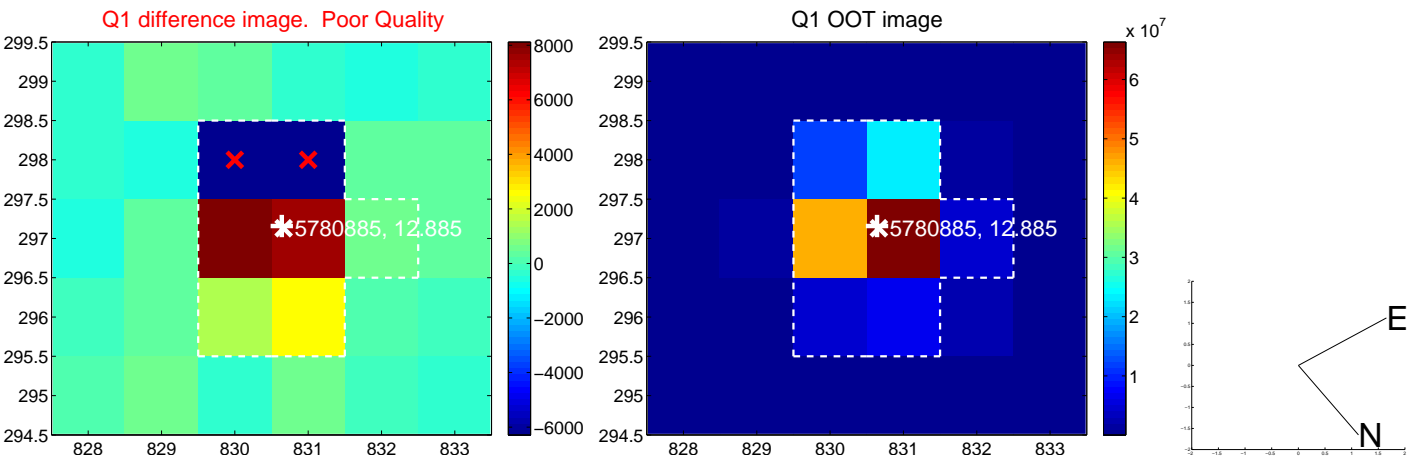
The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.073 \pm 0.529$	0.14	$0.065 \pm 0.560$	$-0.034 \pm 0.278$
PRF-fit source offset from KIC position	$0.250 \pm 0.333$	0.75	$0.068 \pm 0.555$	$-0.240 \pm 0.288$
photometric centroid source offset	$0.63 \pm 0.58$	1.09	$-0.47 \pm 0.59$	$-0.42 \pm 0.56$

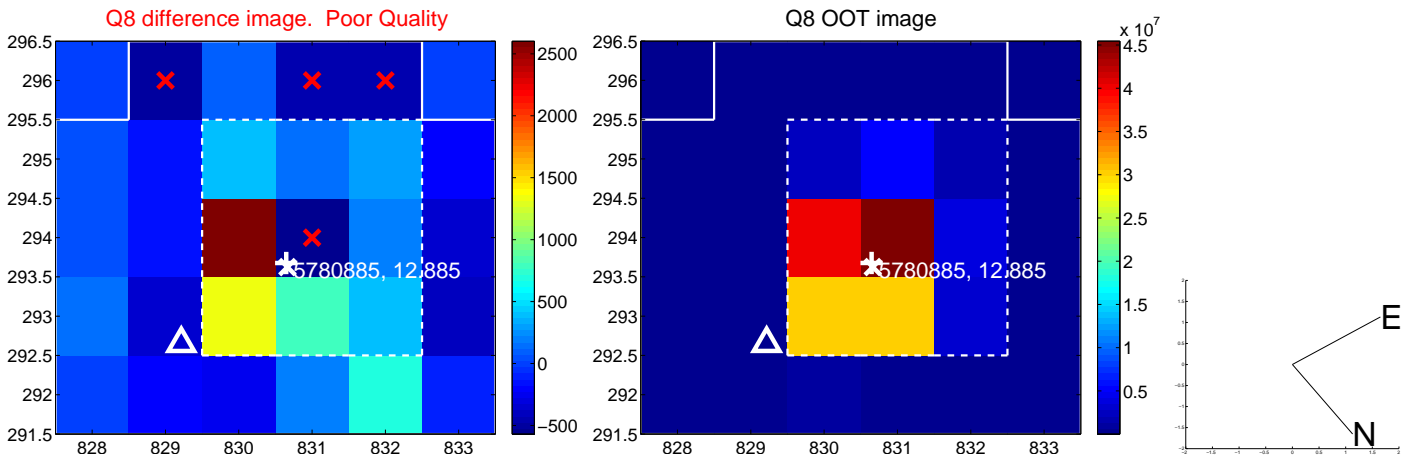
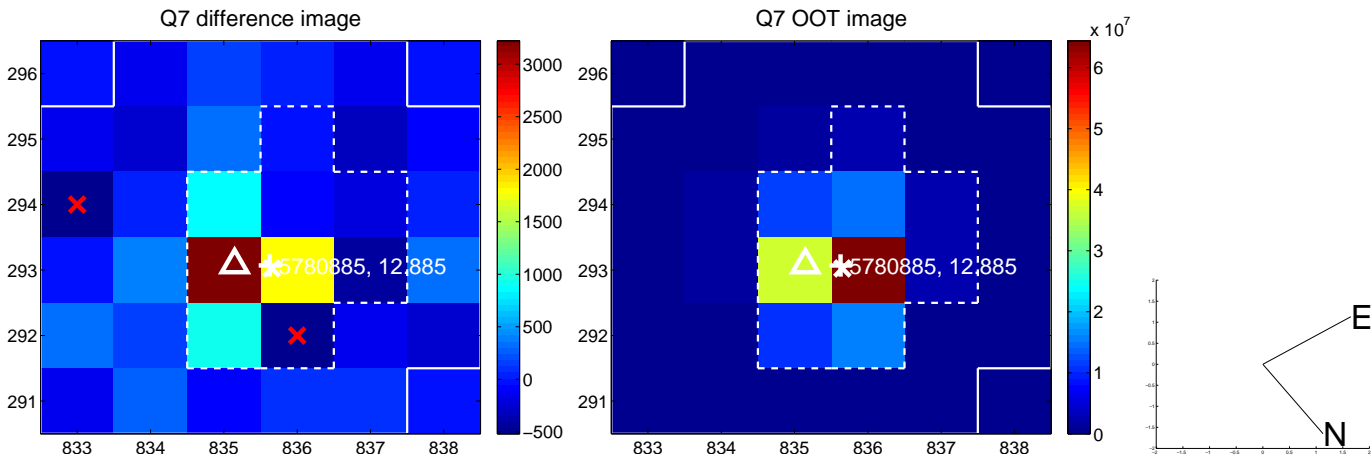
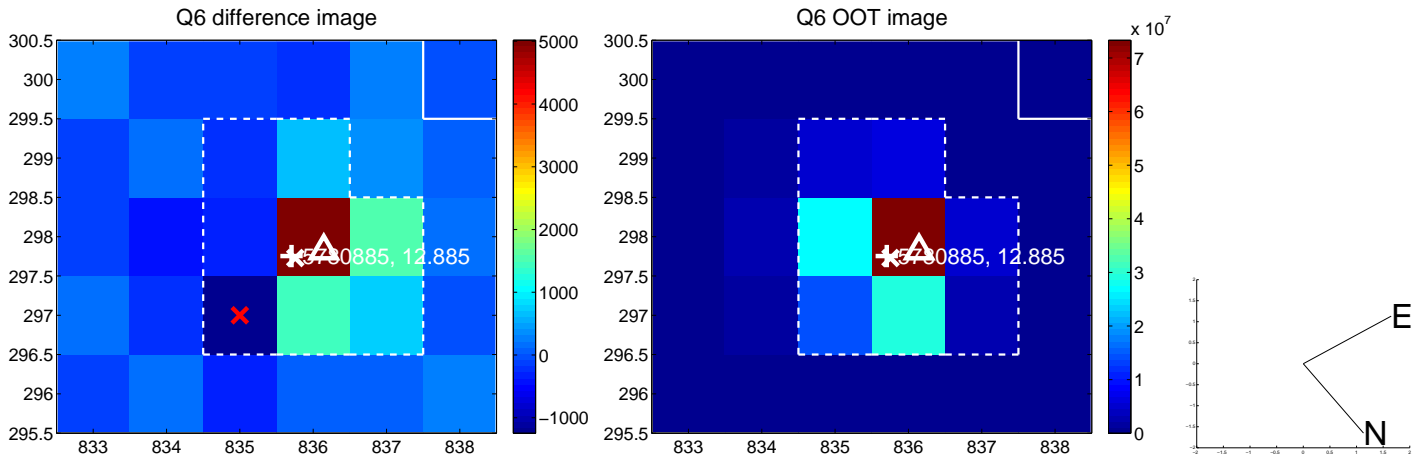
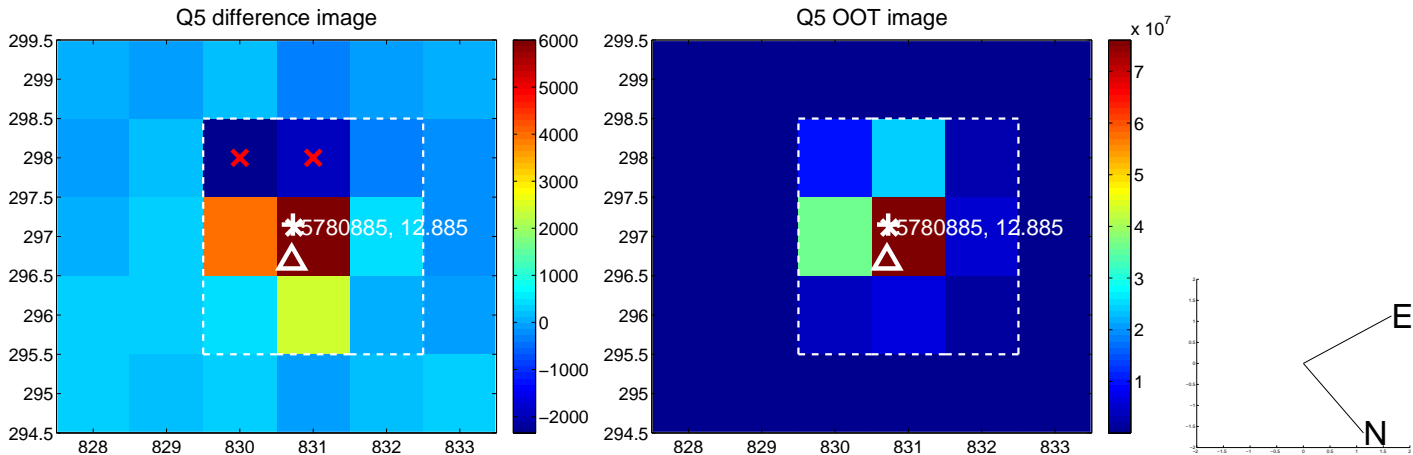


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

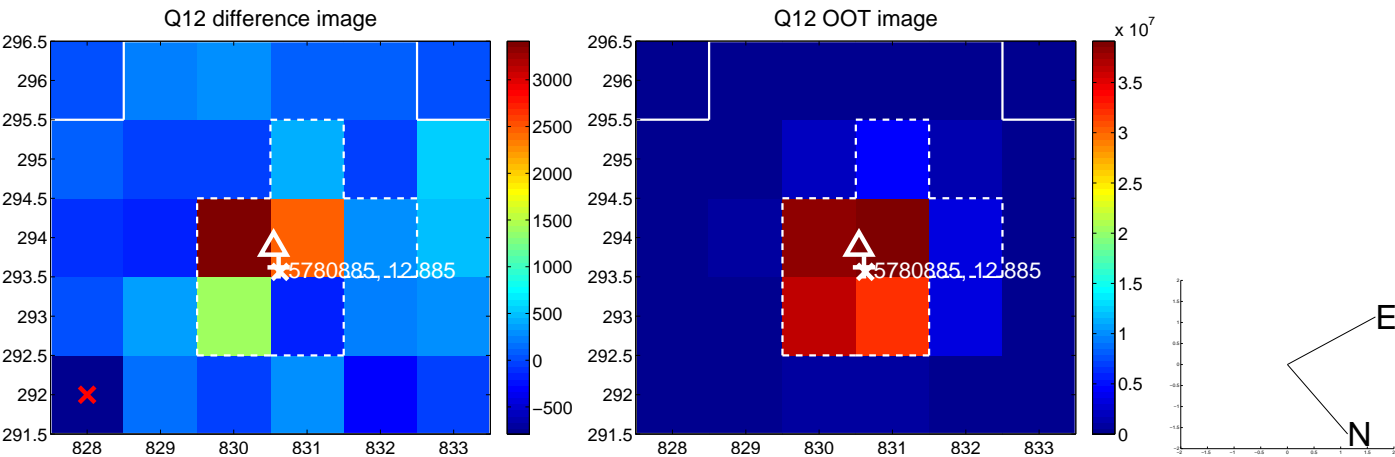
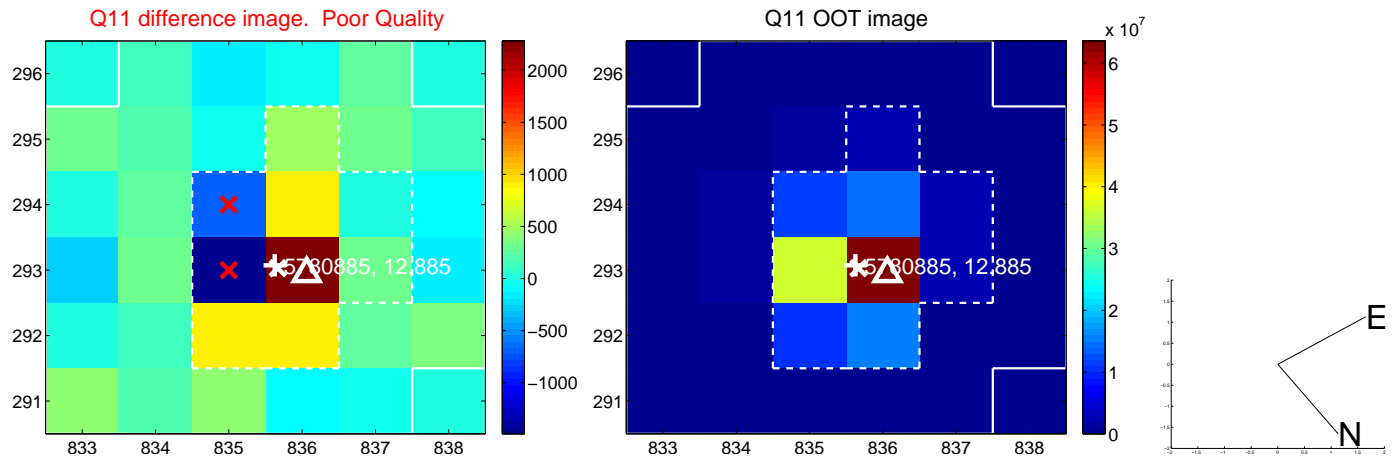
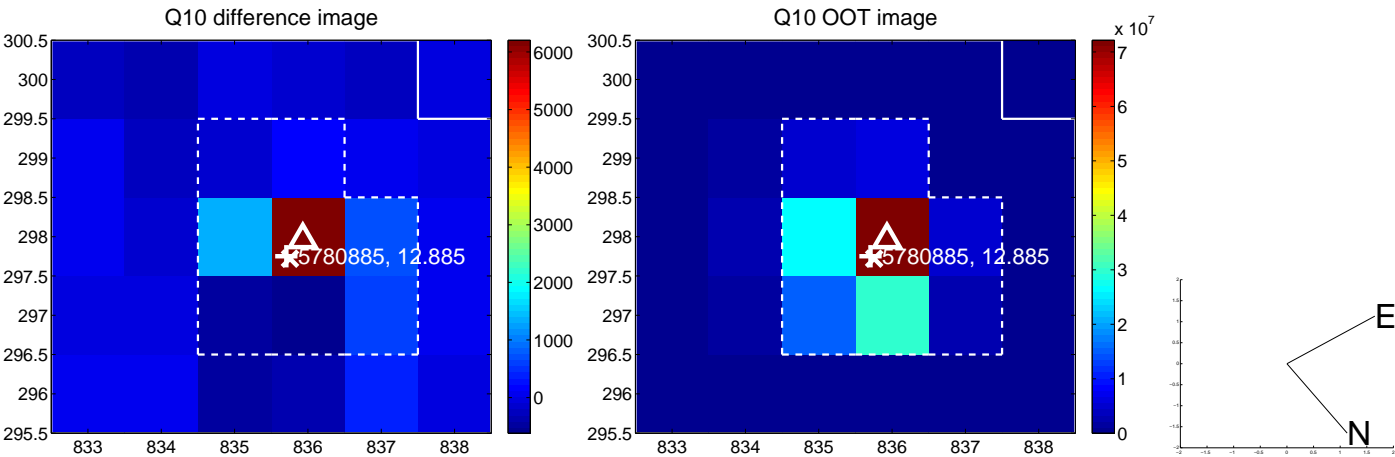
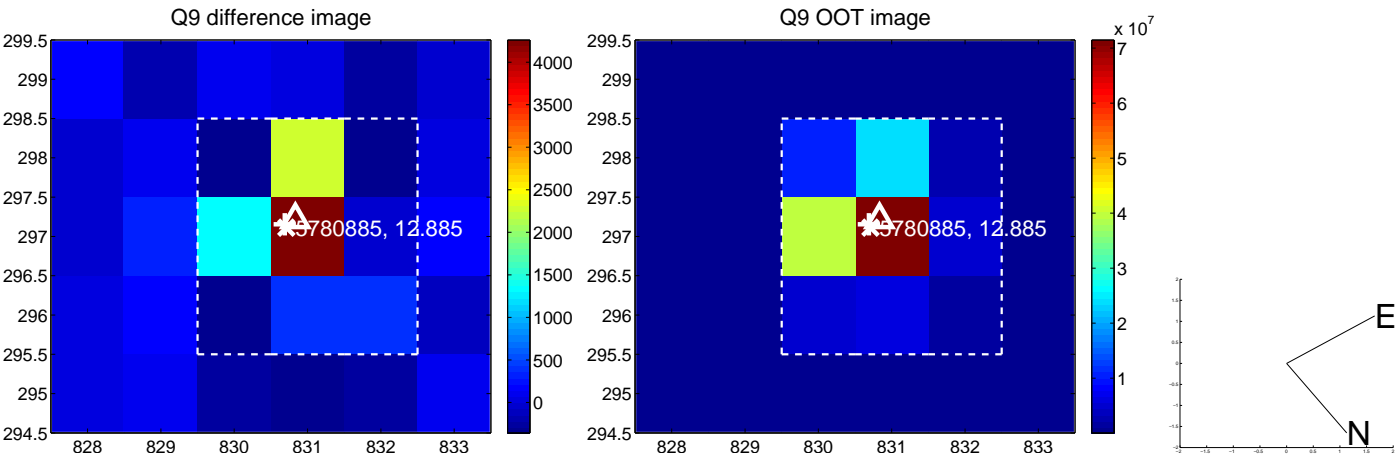
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



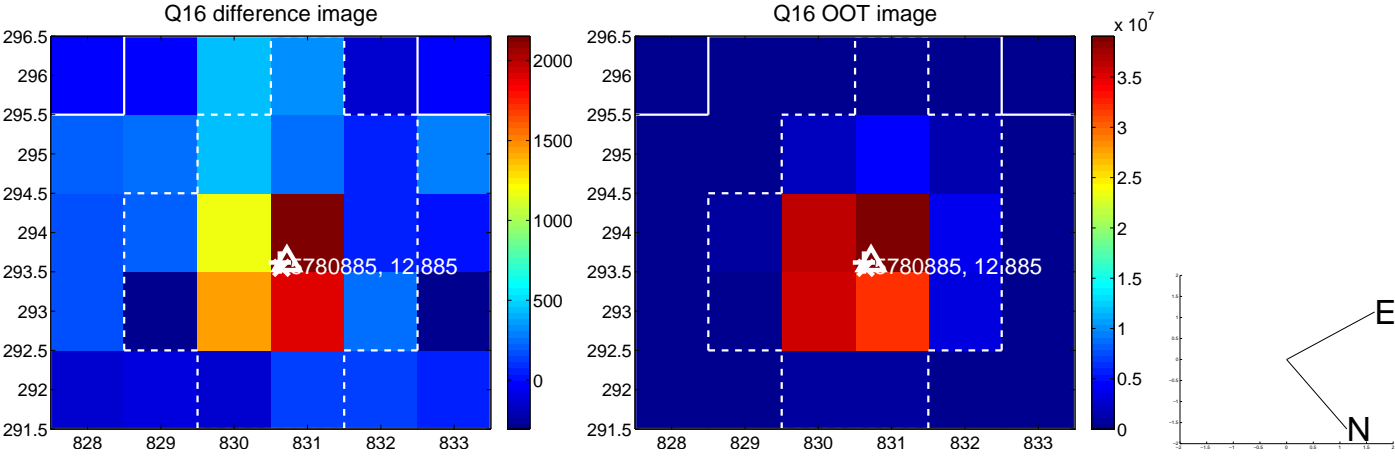
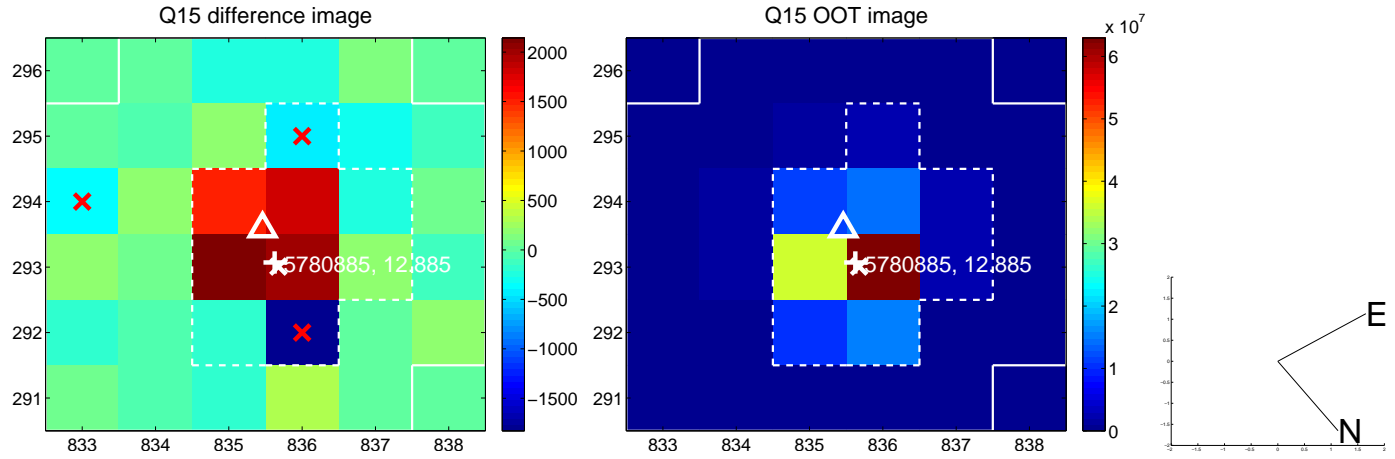
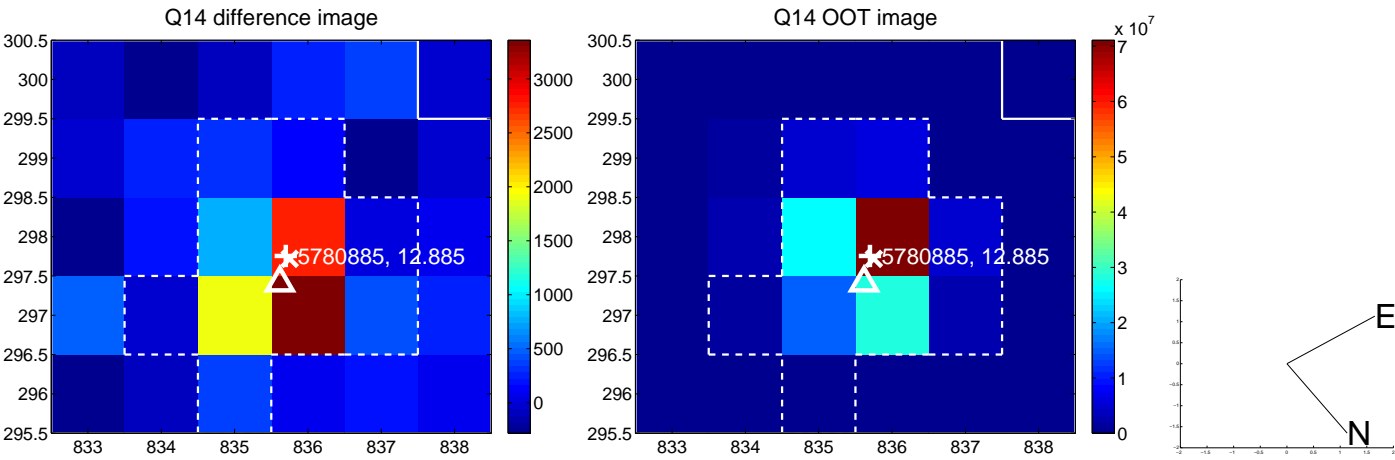
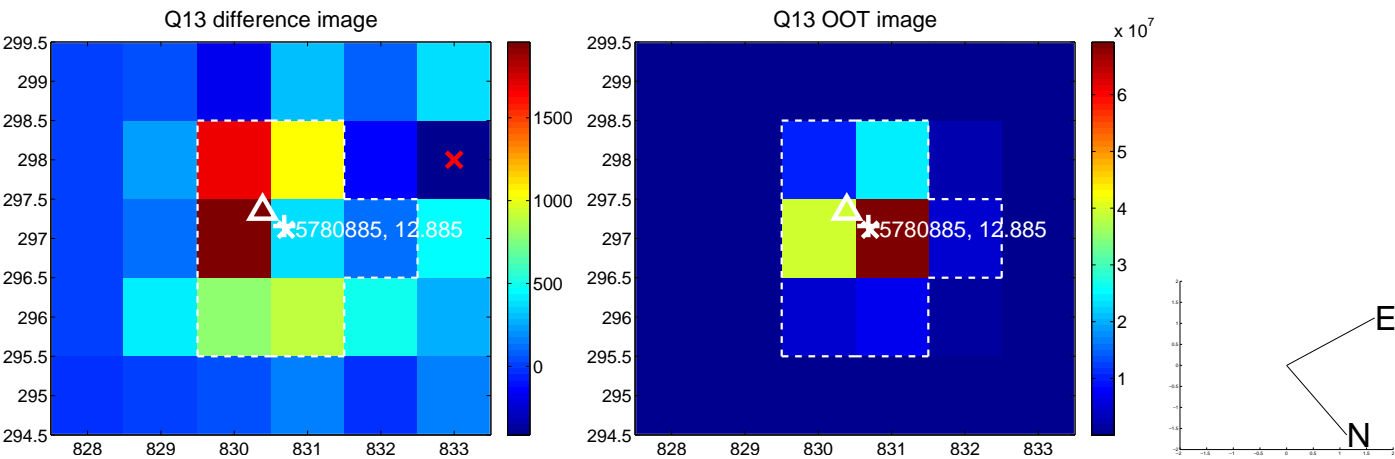
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



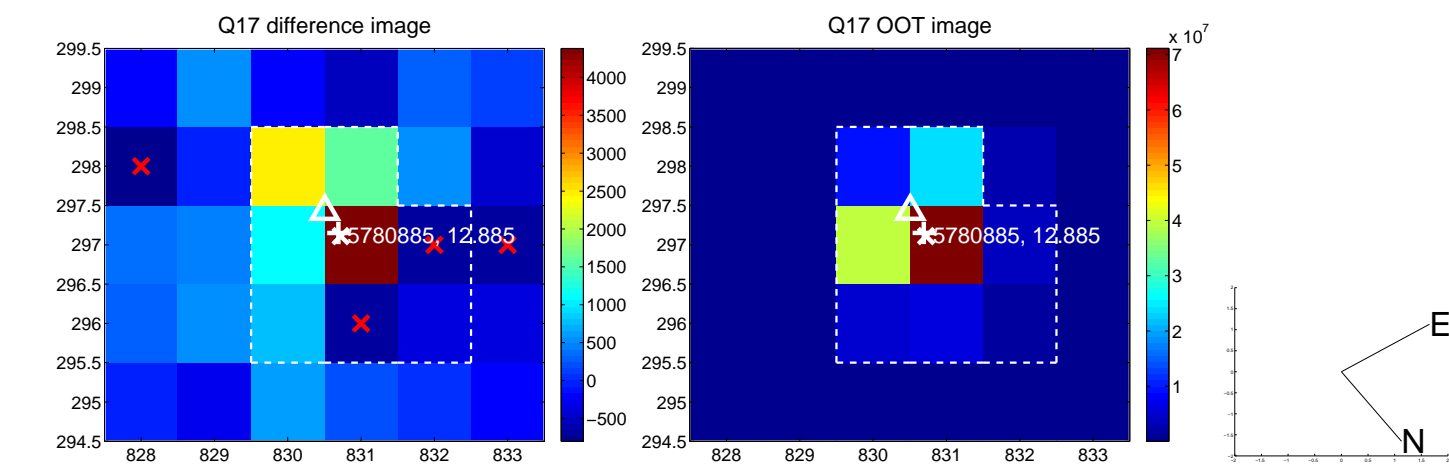
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



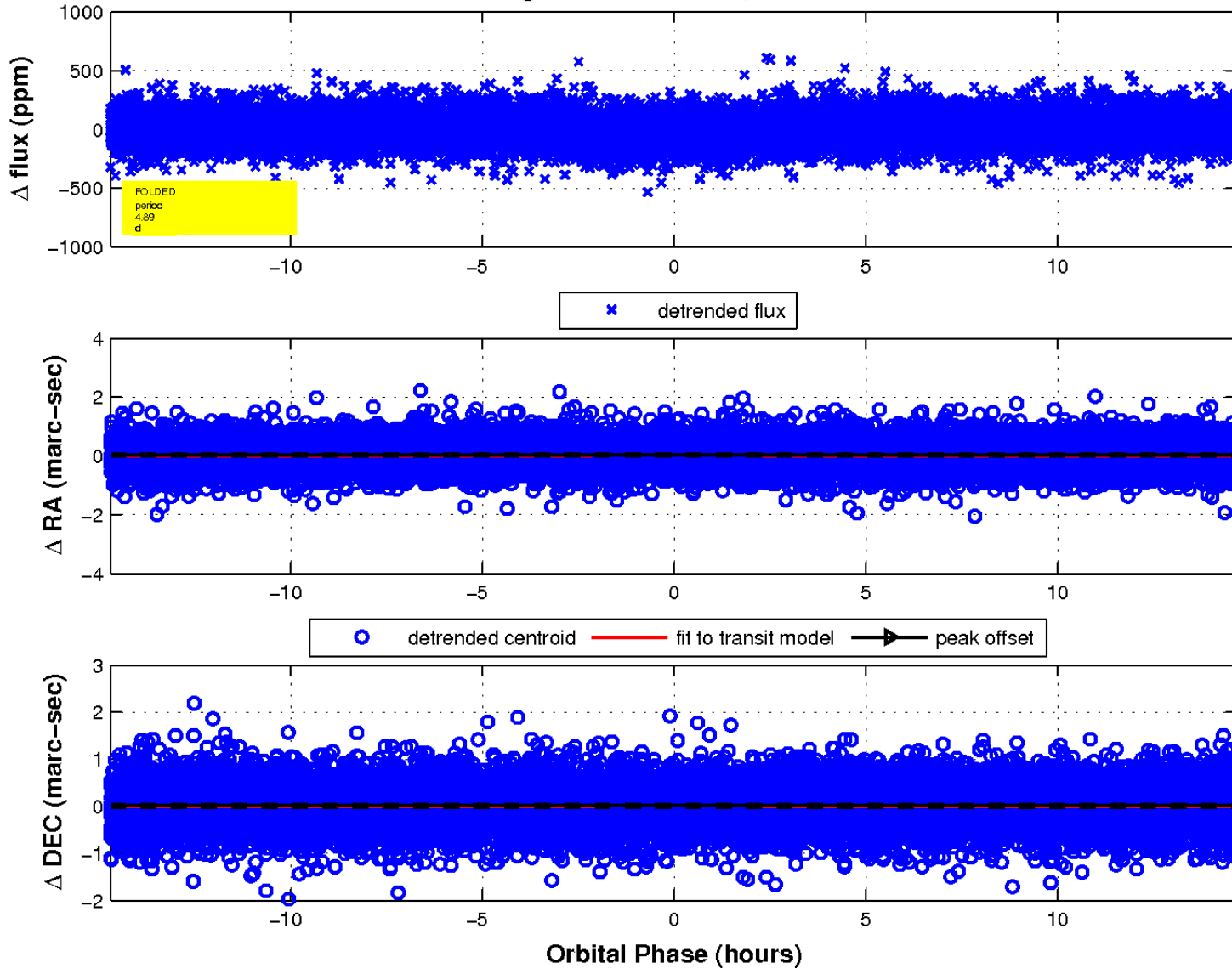
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



### fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

