

# KIC 010797460

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010797460-01	OBS	0752.01	9.488028	132.588052	630.4	3.419	28.5	31.2	0.93	5455	2.93	93.73
010797460-02	OBS	0752.02	54.418374	162.513825	893.1	4.586	20.1	20.7	0.93	5455	2.97	9.13

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010797460-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
010797460-02	OBS	PC	0.97	0	0	0	0	NO_COMMENT

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

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

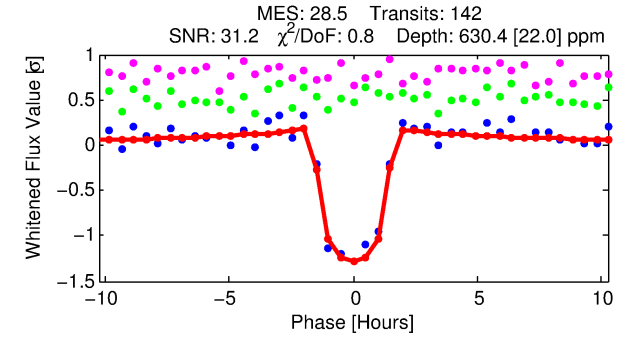
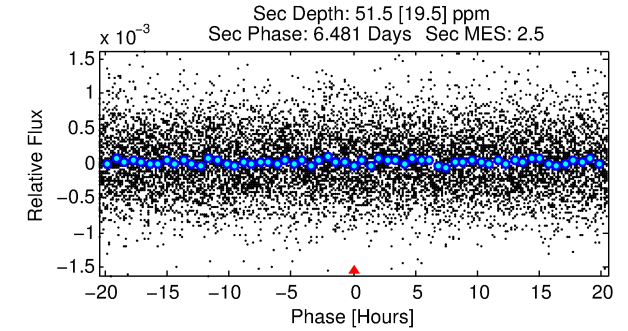
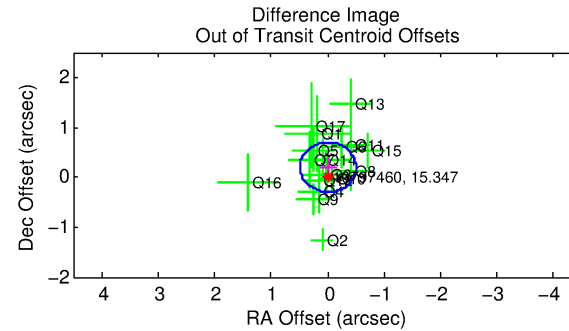
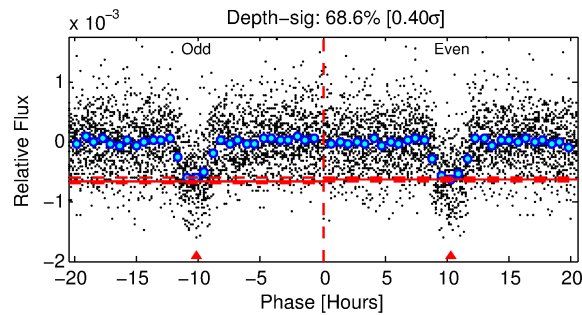
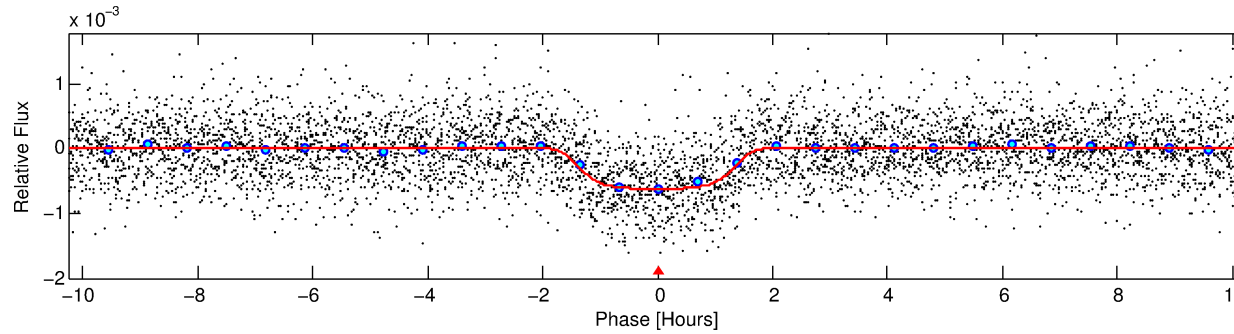
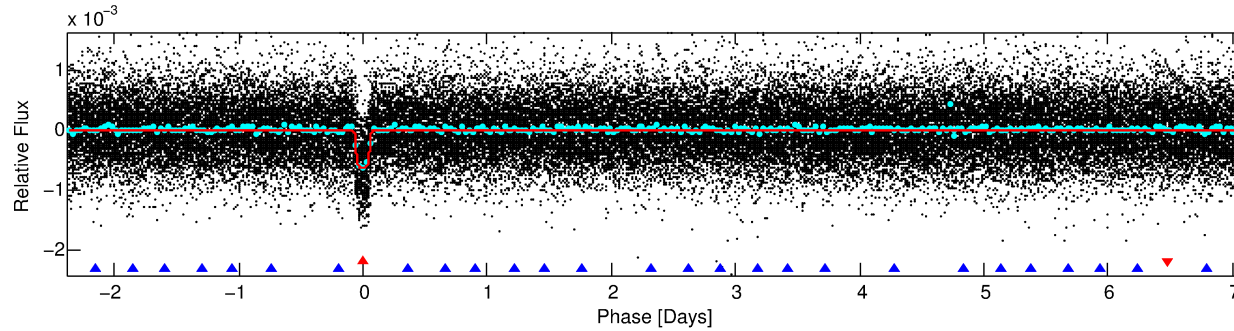
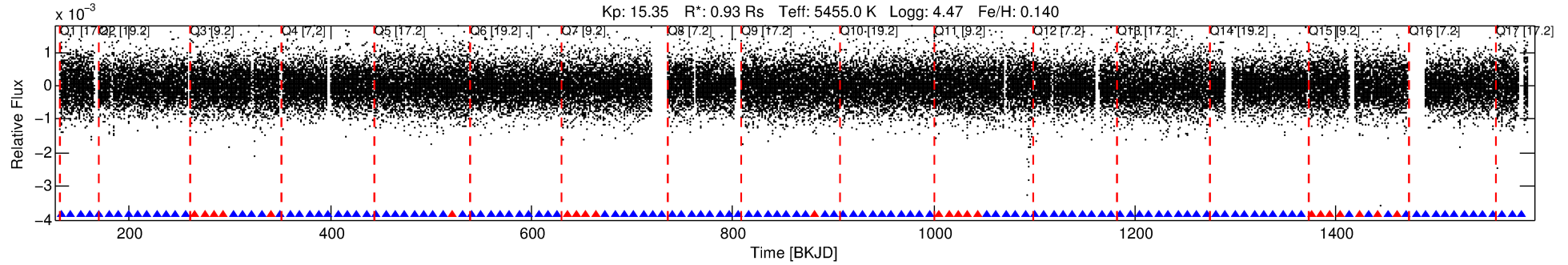
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010797460-01

No Significant Match Found

# DV One-Page Summary

KIC: 10797460 Candidate: 1 of 2 Period: 9.488 d  
KOI: K00752.01 Name: Kepler-227b Corr: 0.951



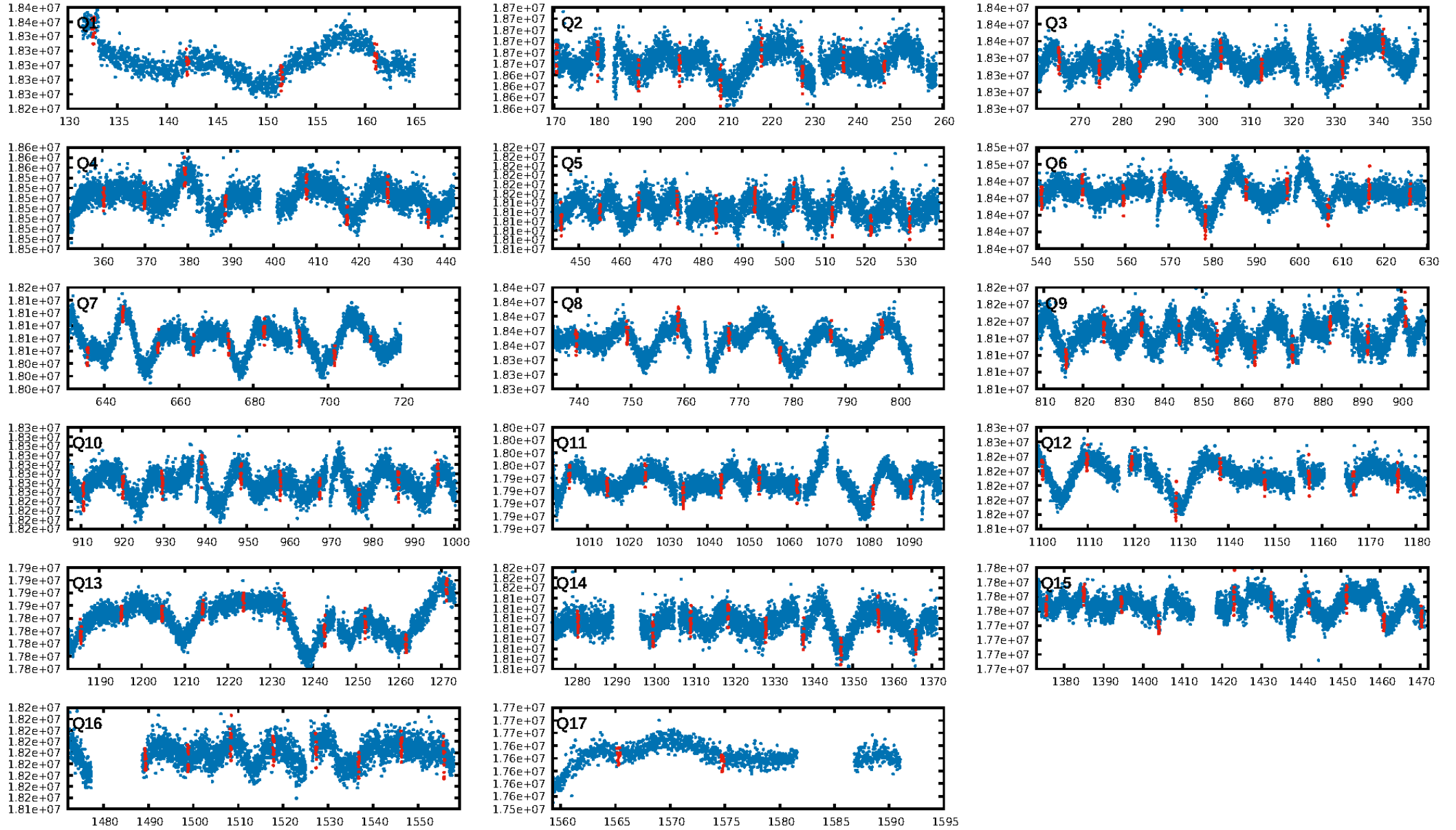
## DV Fit Results:

Period = 9.48803 [0.00003] d  
Epoch = 132.5881 [0.0022] BKJD  
Rp/R\* = 0.0290 [0.0013]  
a/R\* = 9.20 [1.52]  
b = 0.93 [0.02]  
Seff = 93.73 [16.49]  
Teq = 793 [35] K  
Rp = 2.93 [0.36] Re  
a = 0.0853 [0.0090] AU  
Ag = 24.02 [10.17] [2.26 $\sigma$ ]  
Teffp = 2716 [268] K [7.12 $\sigma$ ]

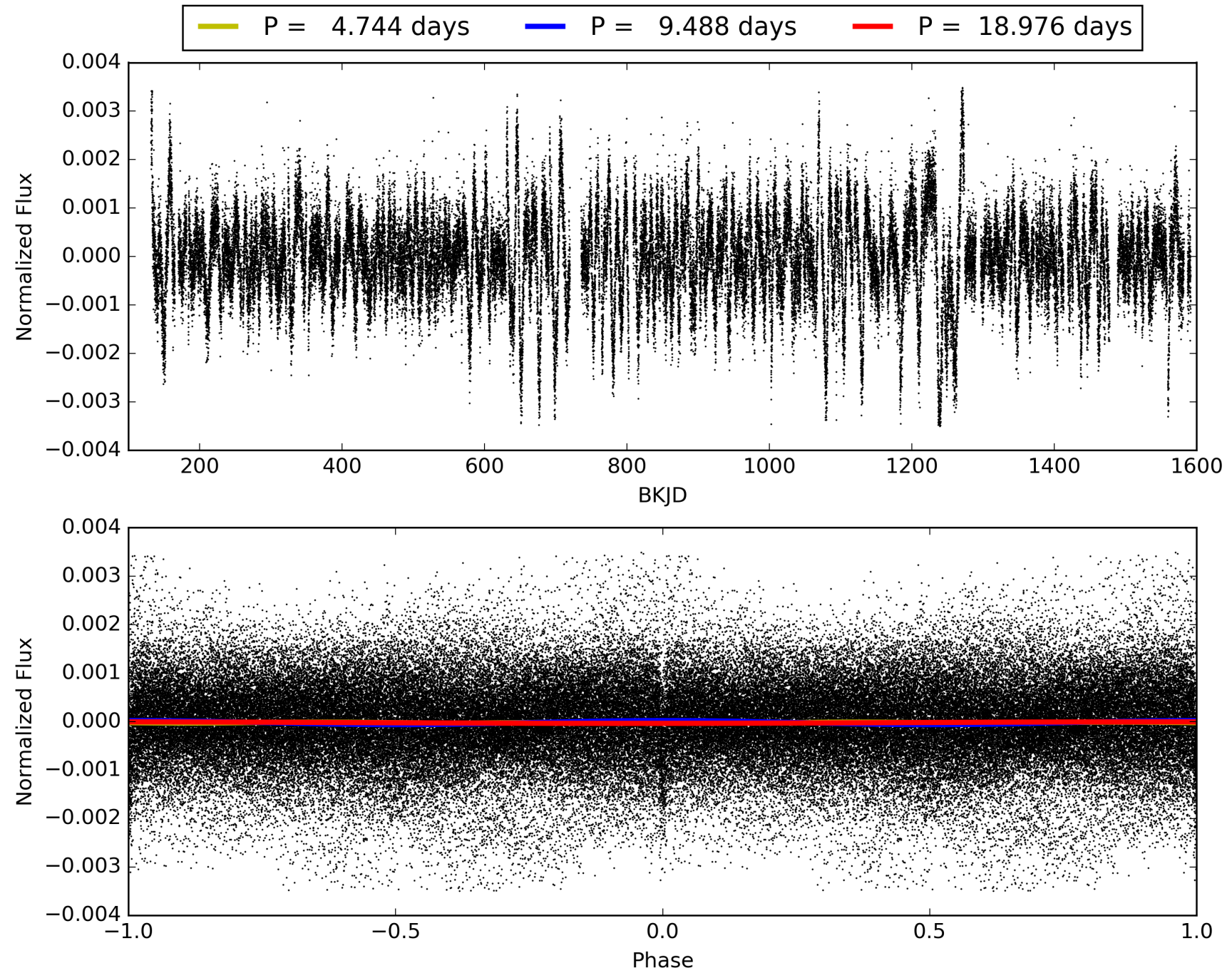
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [188.52 $\sigma$ ]  
ModelChiSquare2-sig: 100.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 2.37e-170  
RollingBand-fgt: 0.83 [113/136]  
GhostDiagnostic-chr: 6.179  
Centroid-sig: 0.2%  
Centroid-so: 1.032 arcsec [2.11 $\sigma$ ]  
OotOffset-rm: 0.201 arcsec [1.22 $\sigma$ ]  
KicOffset-rm: 0.316 arcsec [1.97 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.94 [16/17]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 010797460-01, PDC Light Curves

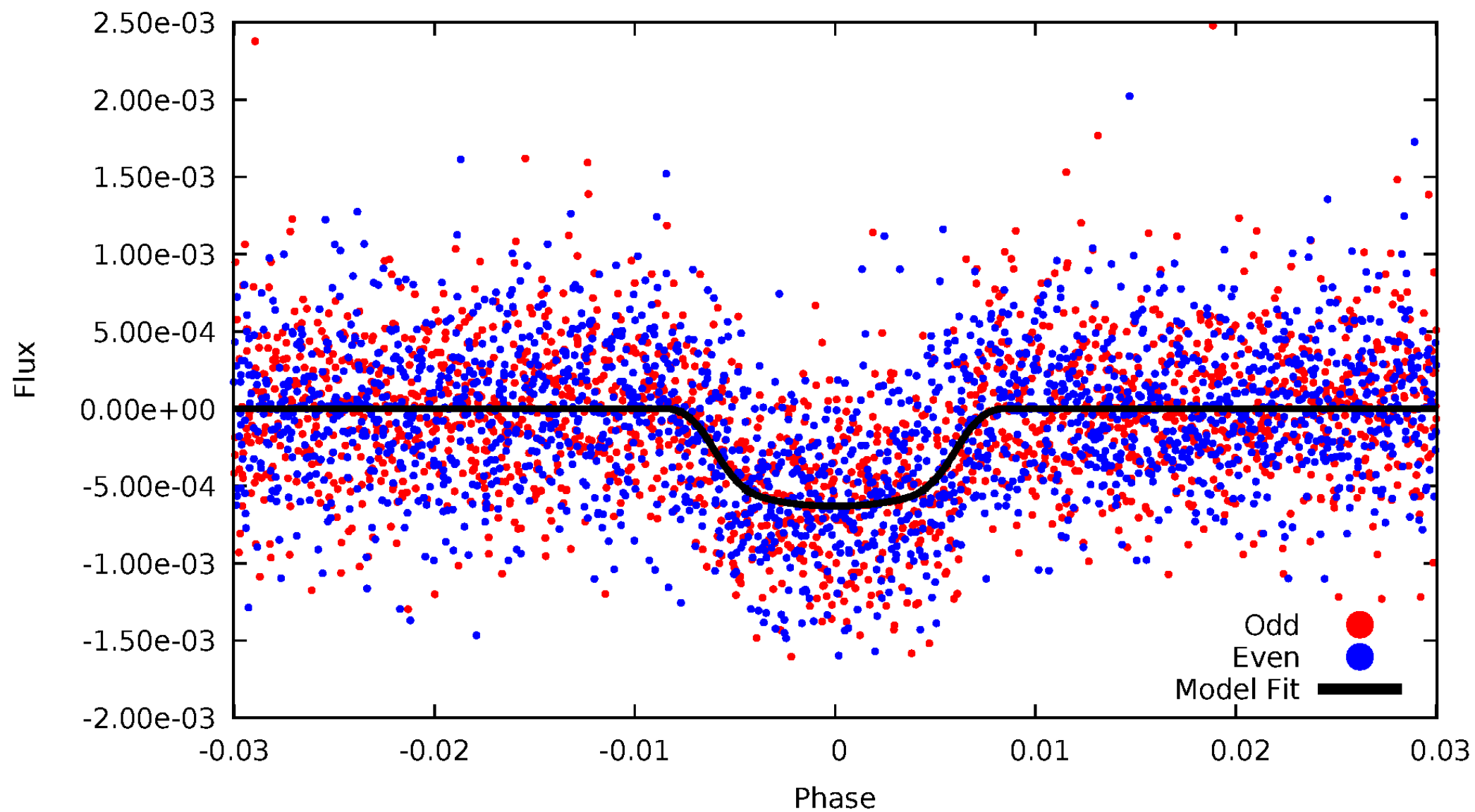


TCE 010797460-01



# DV Odd/Even

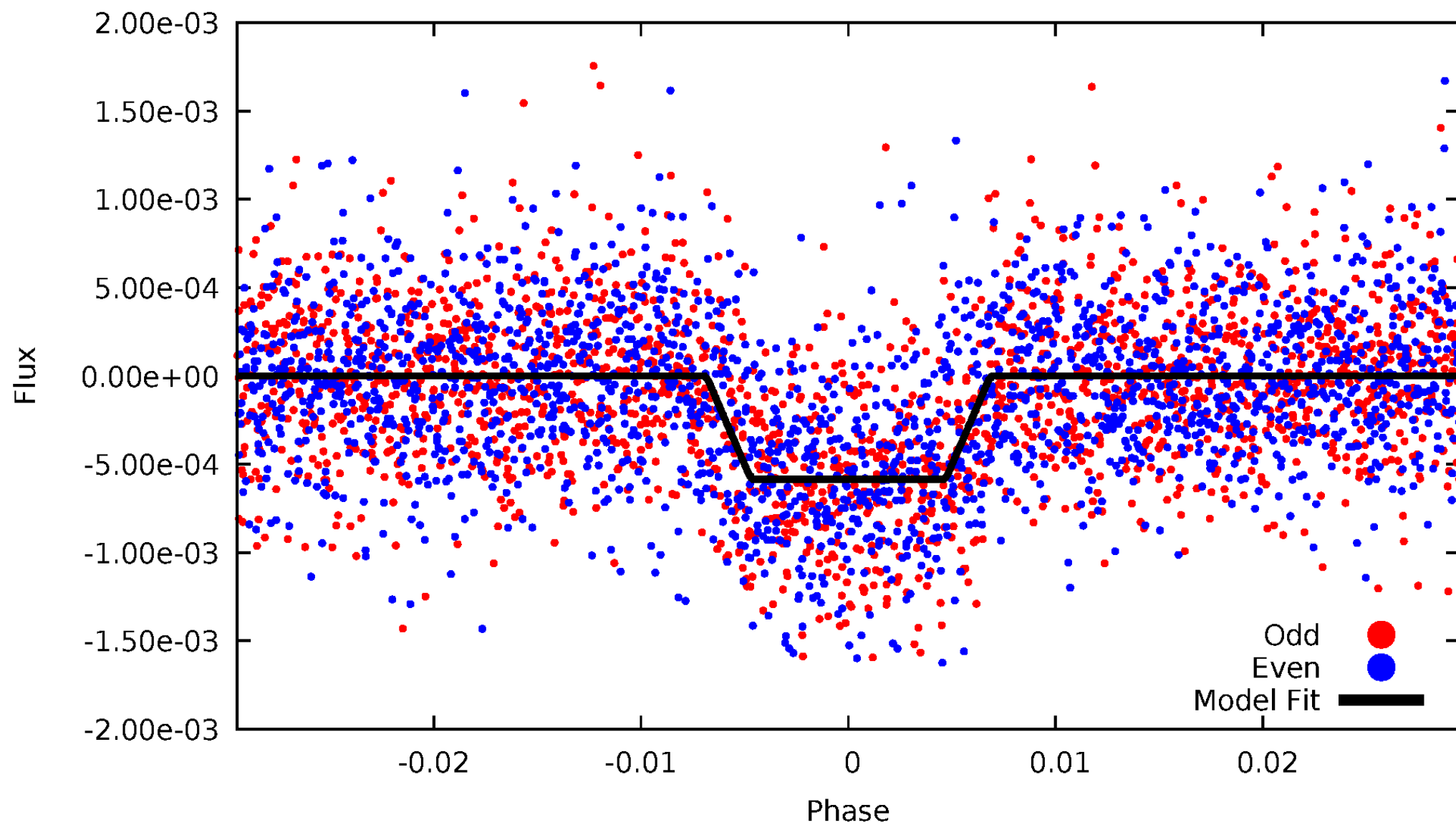
TCE 010797460-01





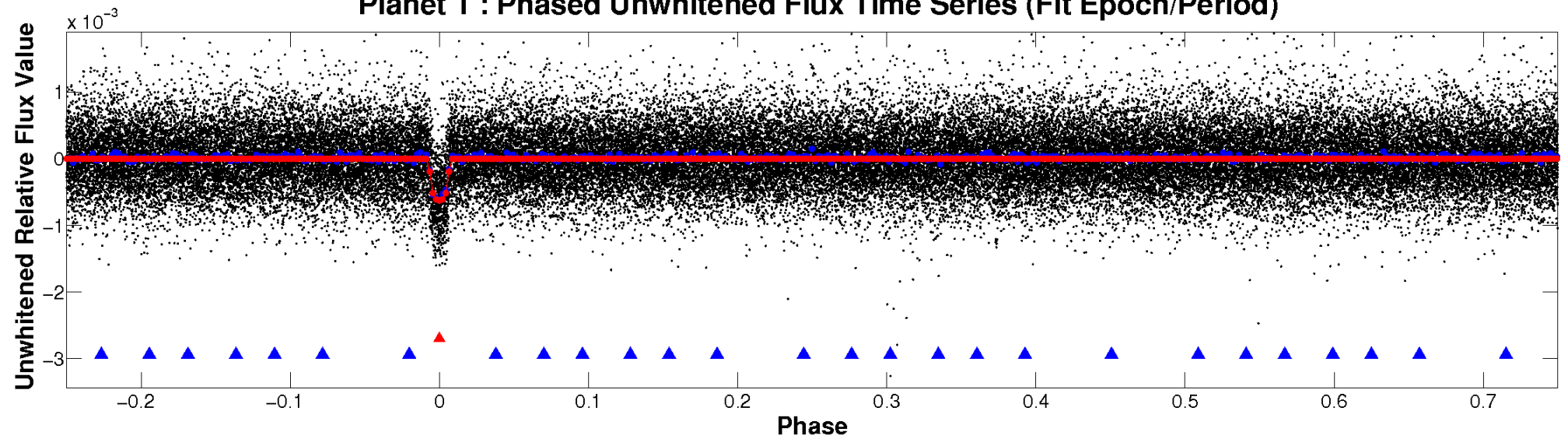
# ALT Odd/Even

TCE 010797460-01

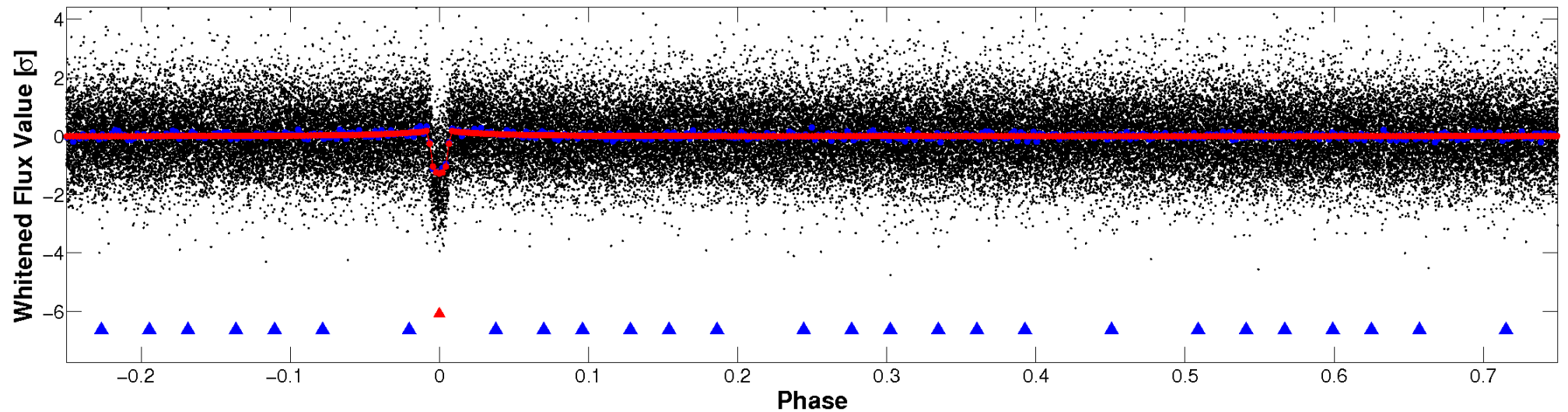


# Non-Whitened Vs. Whitened Light Curve

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

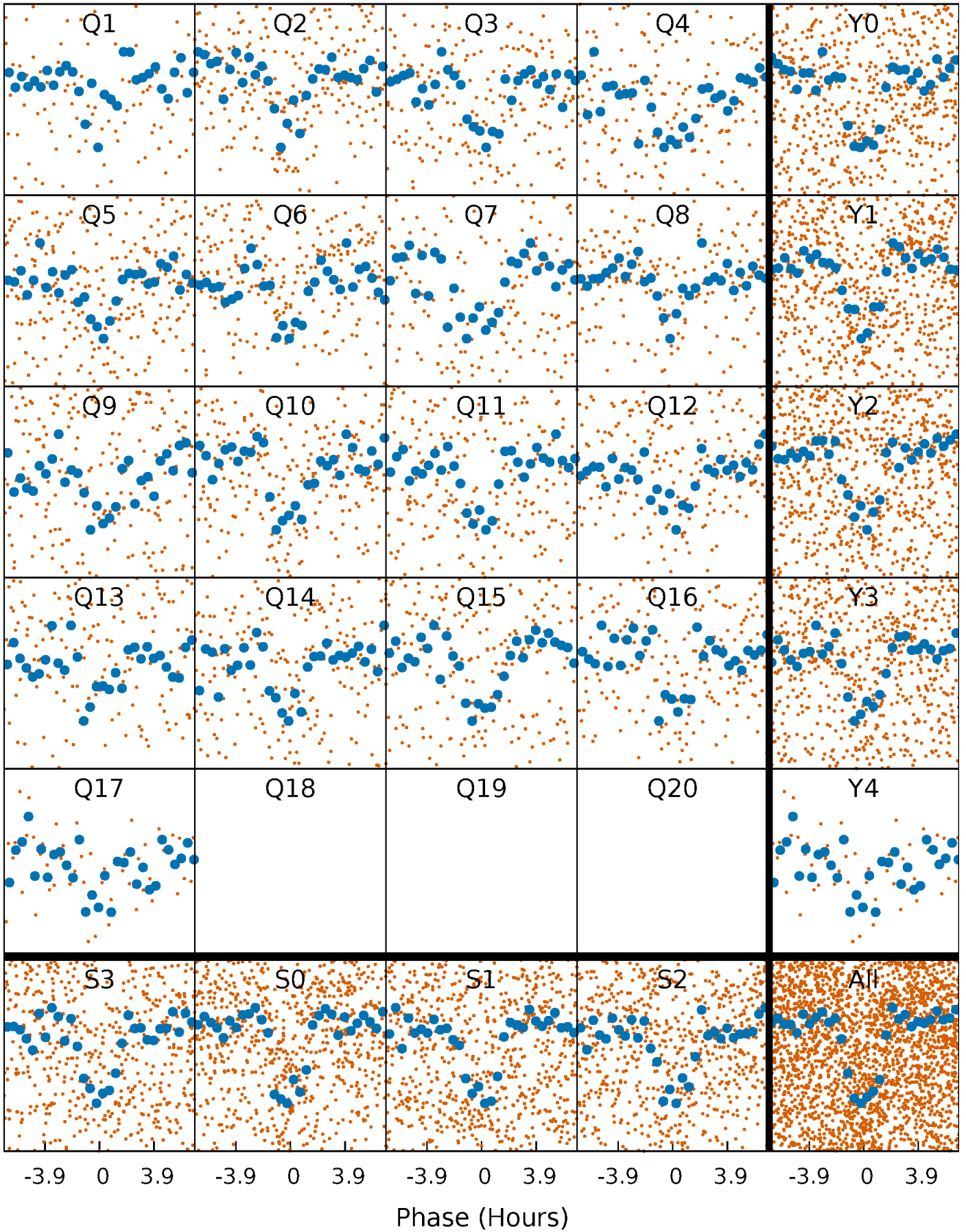


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

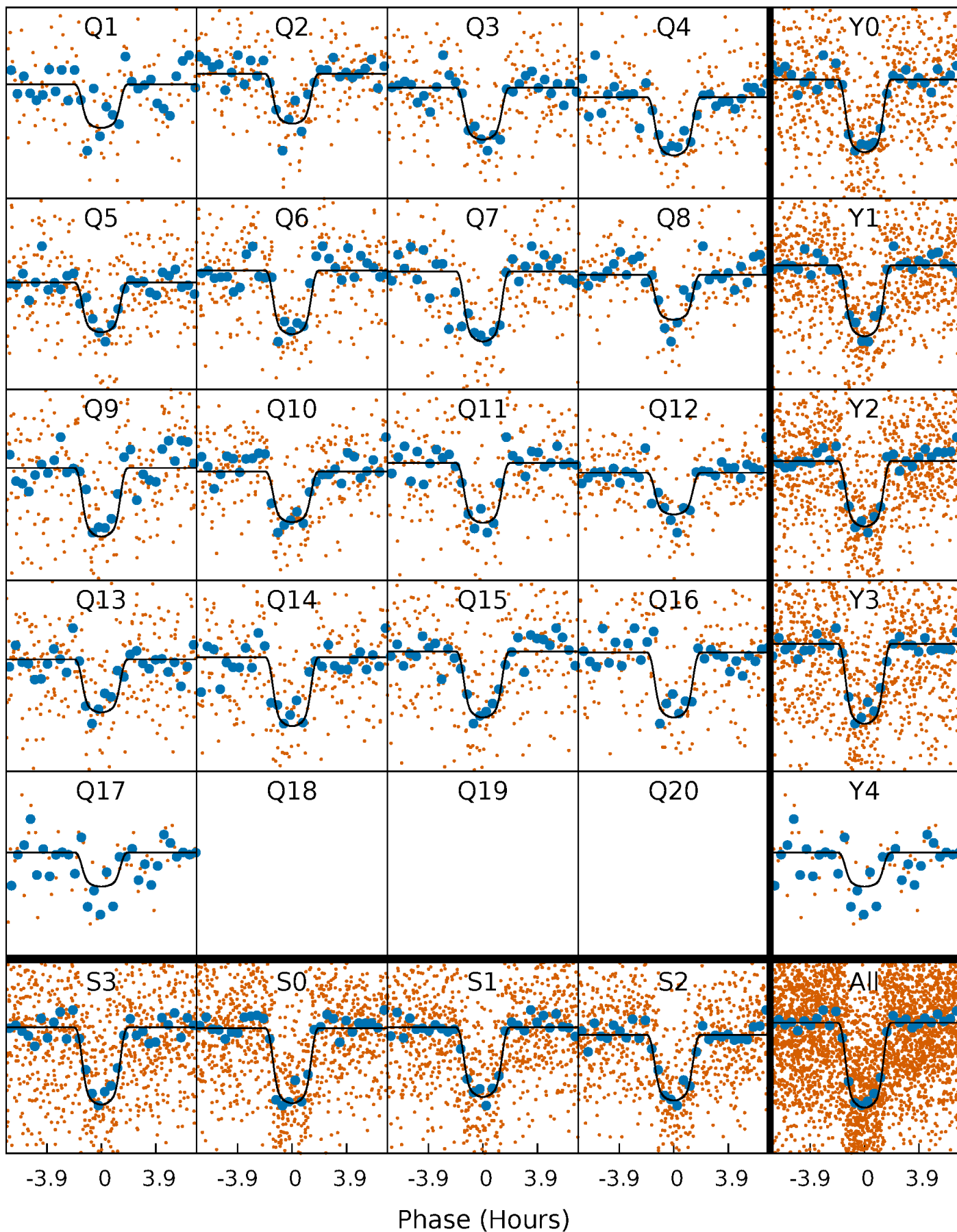
TCE 010797460-01 P= 9.488028 Days  $T_0=132.588052$  (BKJD)





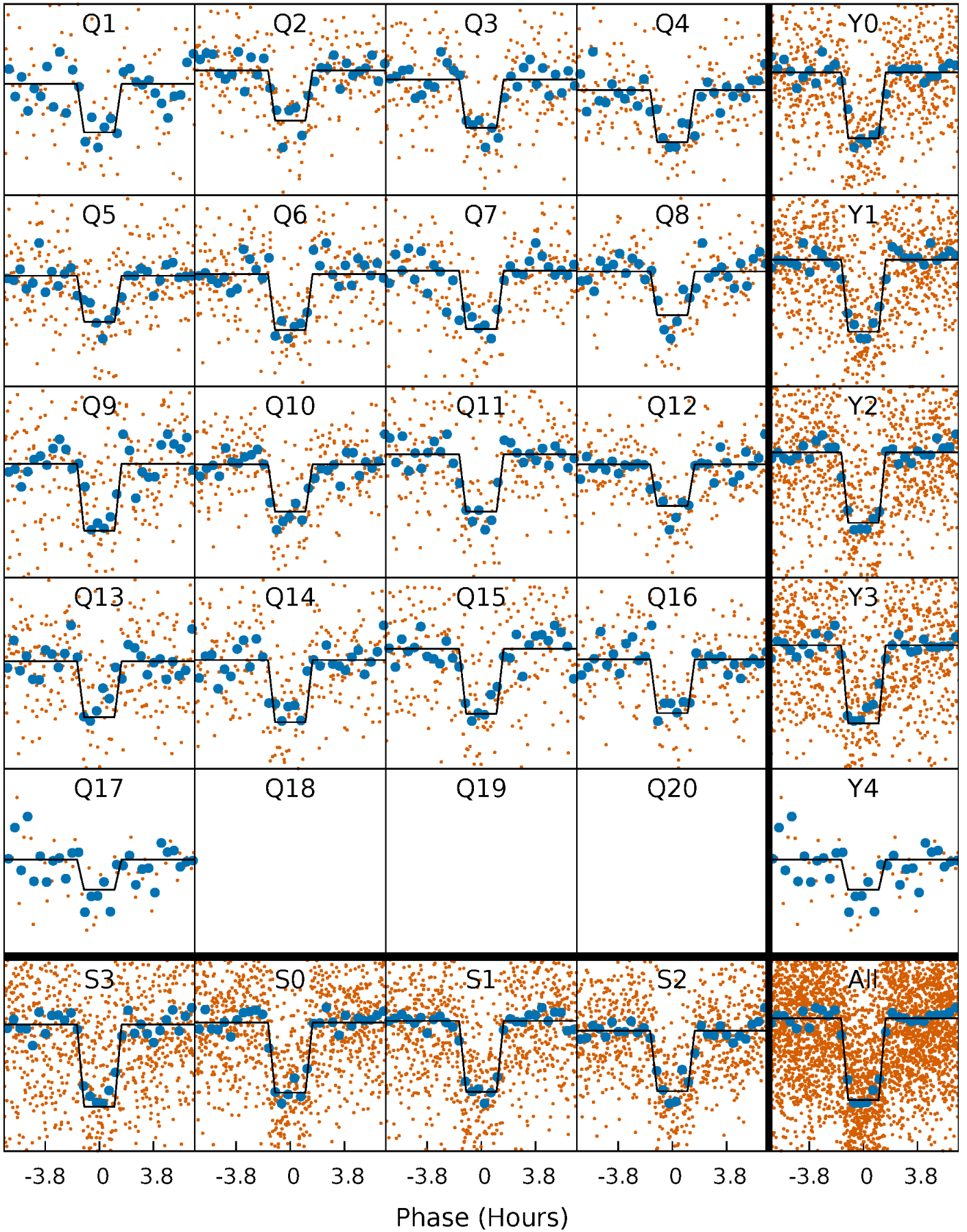
# DV Quarter-Phased Transit Curves

TCE 010797460-01 P= 9.488028 Days  $T_0=132.588052$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

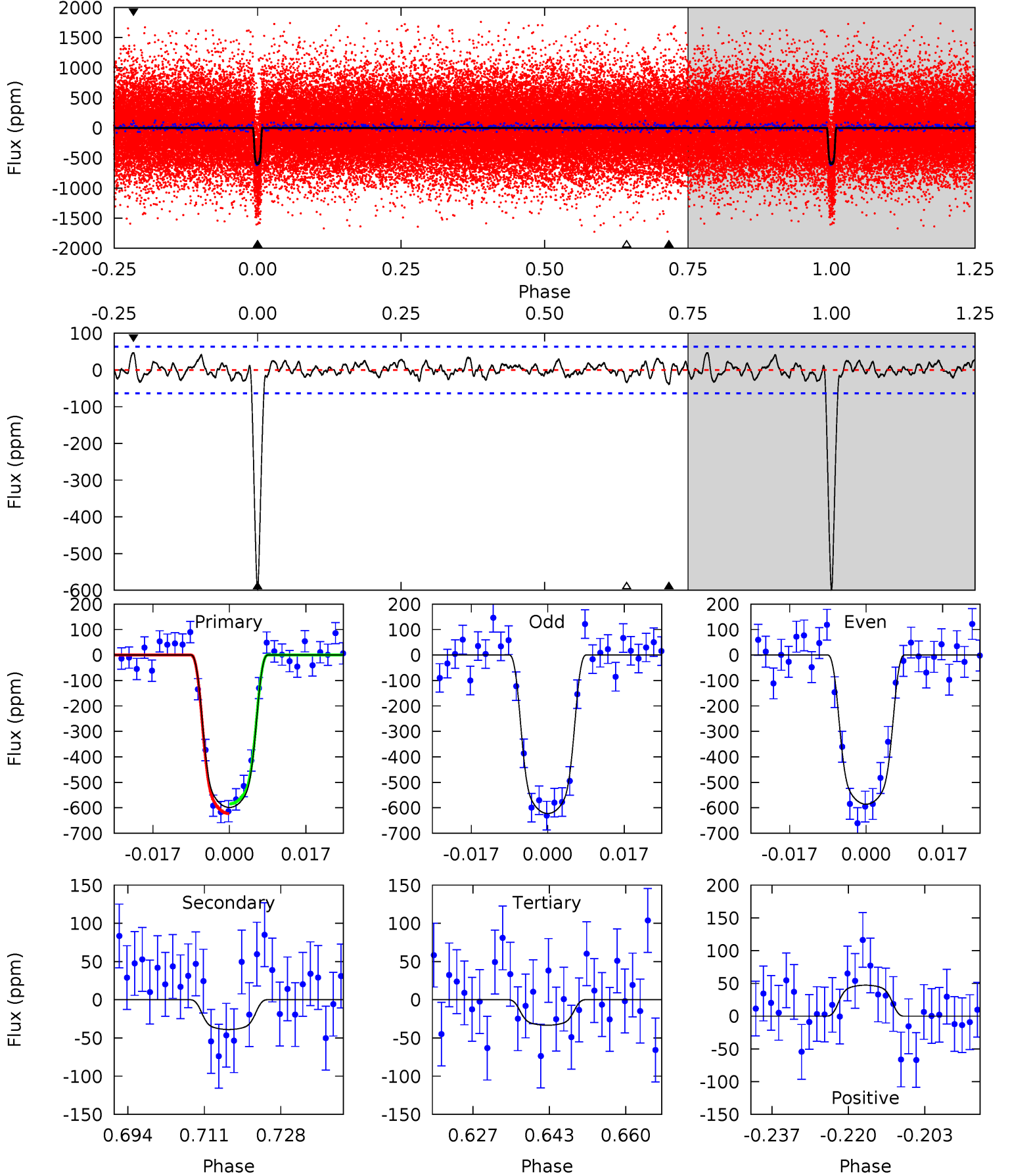
TCE 010797460-01 P= 9.488086 Days  $T_0=132.583067$  (BKJD)



# DV Model-Shift Uniqueness Test

010797460-01, P = 9.488028 Days, E = 123.100024 Days

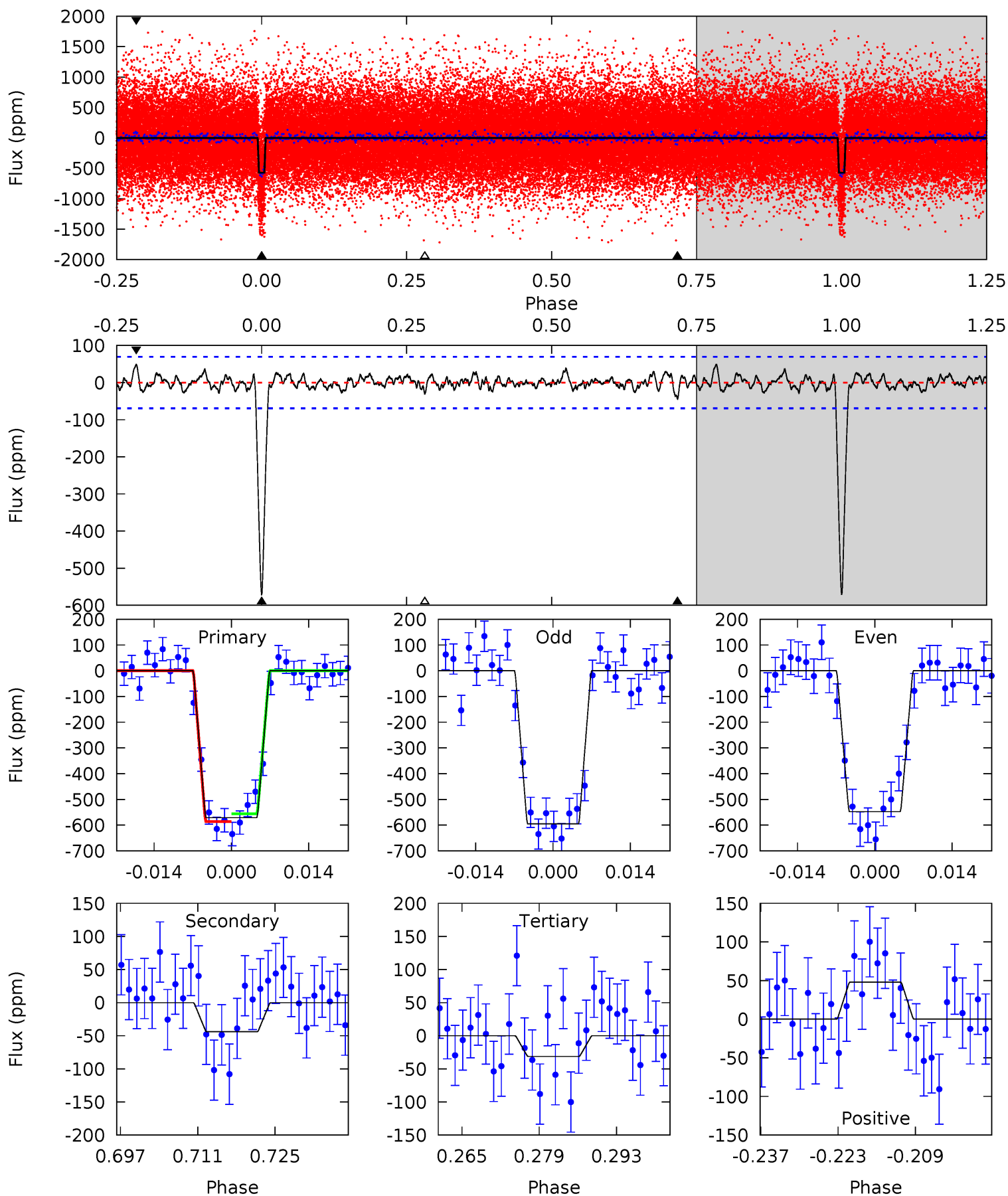
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
46.5	3.03	2.59	3.67	4.92	2.39	1.10	43.9	42.8	0.44	-0.65	1.42	1.00	0.07	1.49



# Alt Model-Shift Uniqueness Test

010797460-01, P = 9.488086 Days, E = 123.094981 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
40.8	3.13	2.24	3.43	4.96	2.46	0.93	38.6	37.4	0.90	-0.30	1.70	0.99	0.08	1.10



### Stellar Parameters For KIC 010797460

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5455^{+81}_{-81}$	$4.467^{+0.064}_{-0.096}$	$0.140^{+0.150}_{-0.150}$	$0.927^{+0.105}_{-0.061}$	$0.919^{+0.052}_{-0.046}$	$1.623^{+0.387}_{-0.478}$
	+1%/-1%	+1%/-2%	+107%/-107%	+11%/-7%	+6%/-5%	+24%/-29%
Source	SPE90	SPE90	SPE90	DSEP		

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

### Secondary Eclipse Parameters for KIC 010797460-01 / KOI 0752.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-39 \pm 13$	$2.94^{+0.24}_{-0.18}$	$1112^{+36}_{-29}$	$3126^{+161}_{-183}$	$18^{+7}_{-6}$
Alt.	$-44 \pm 14$	$2.47^{+0.20}_{-0.19}$	$1113^{+37}_{-30}$	$3366^{+158}_{-205}$	$29^{+10}_{-10}$

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



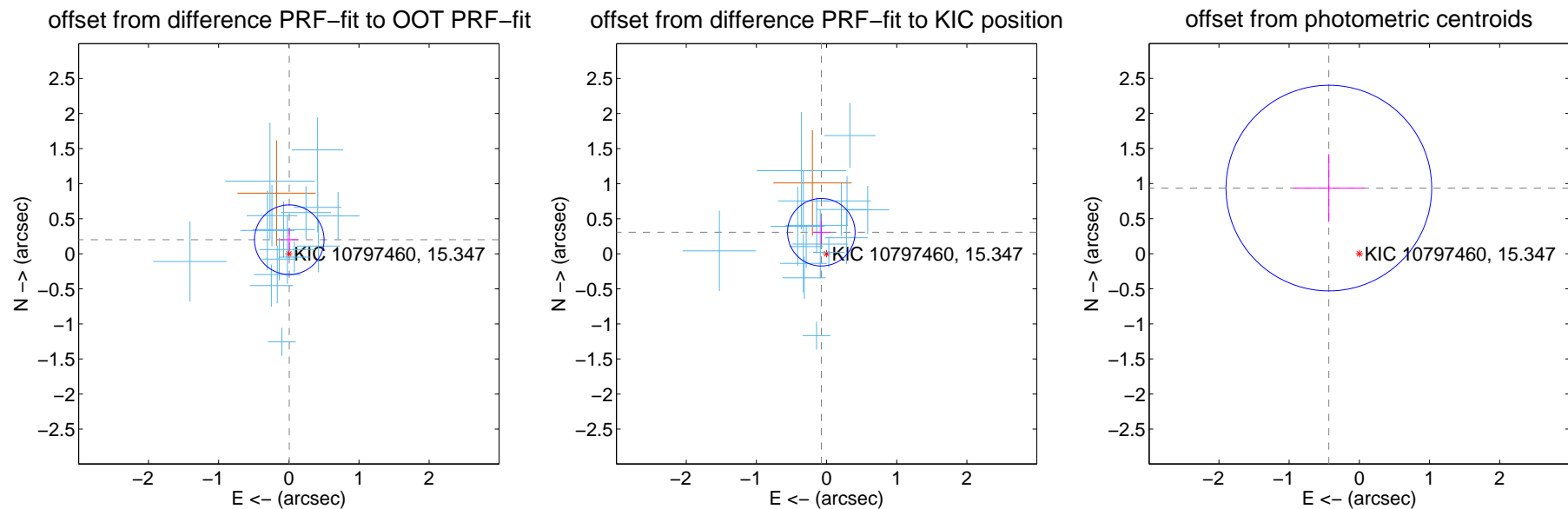
## DV Centroid Data

Supplemental centroid analysis for 010797460-01. Kepler magnitude: 15.35. Transit SNR 31.18

There are 16 quarters with good PRF difference image offsets

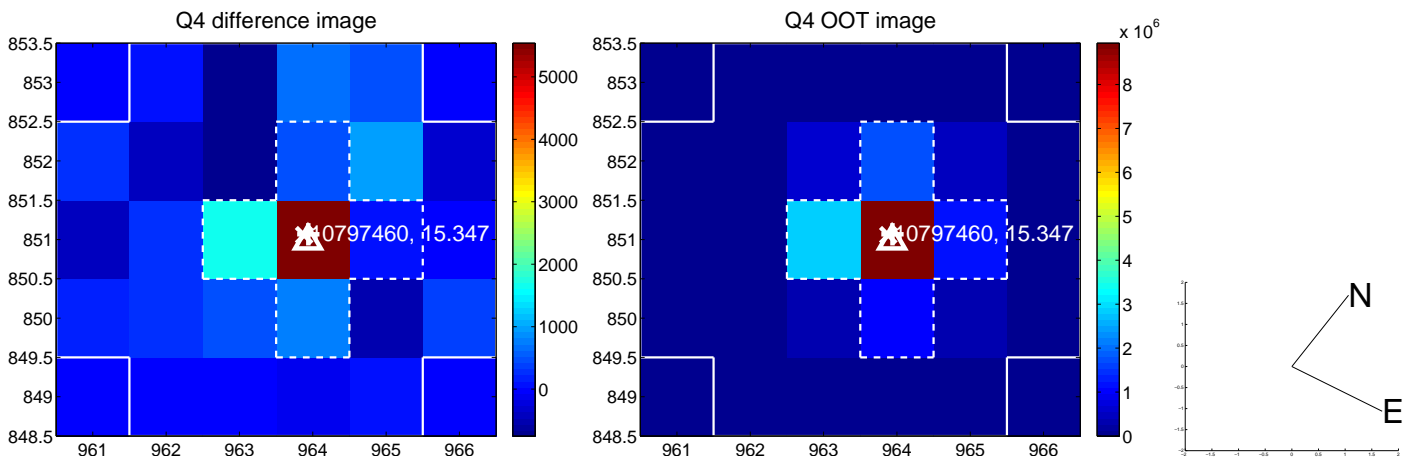
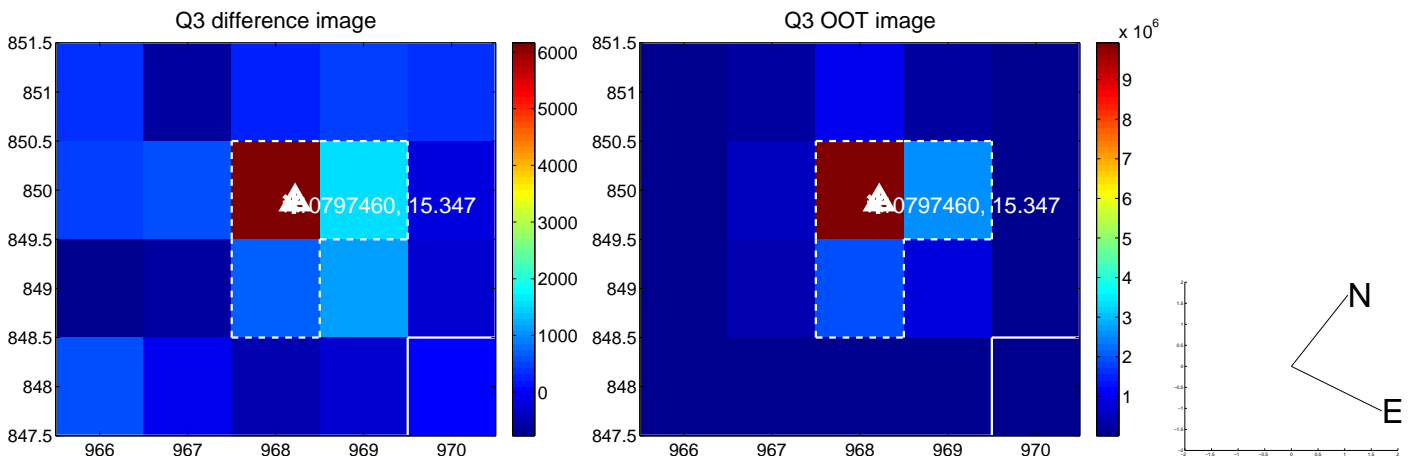
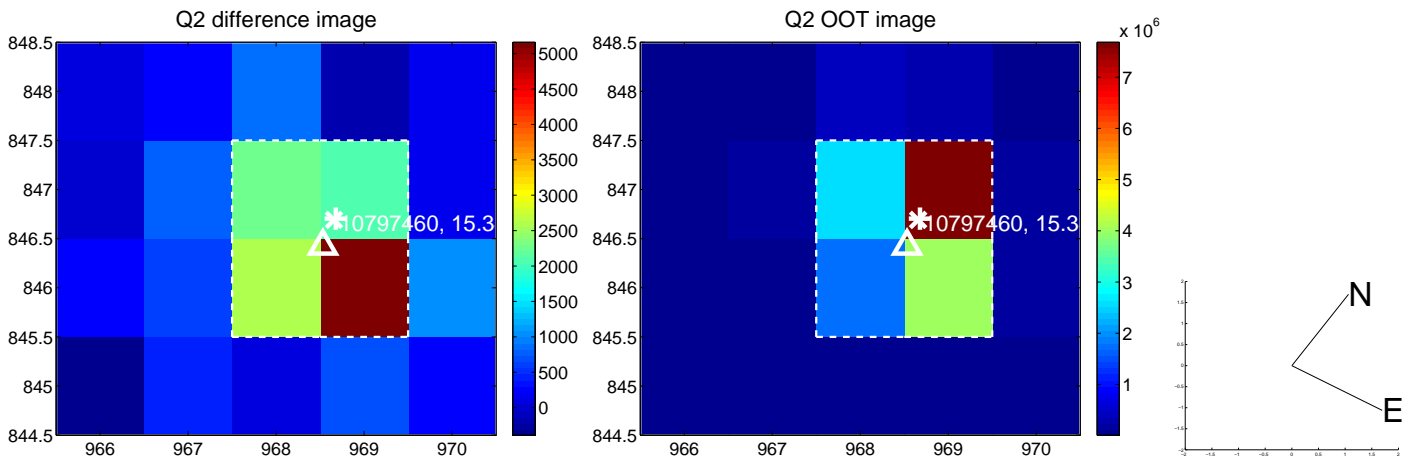
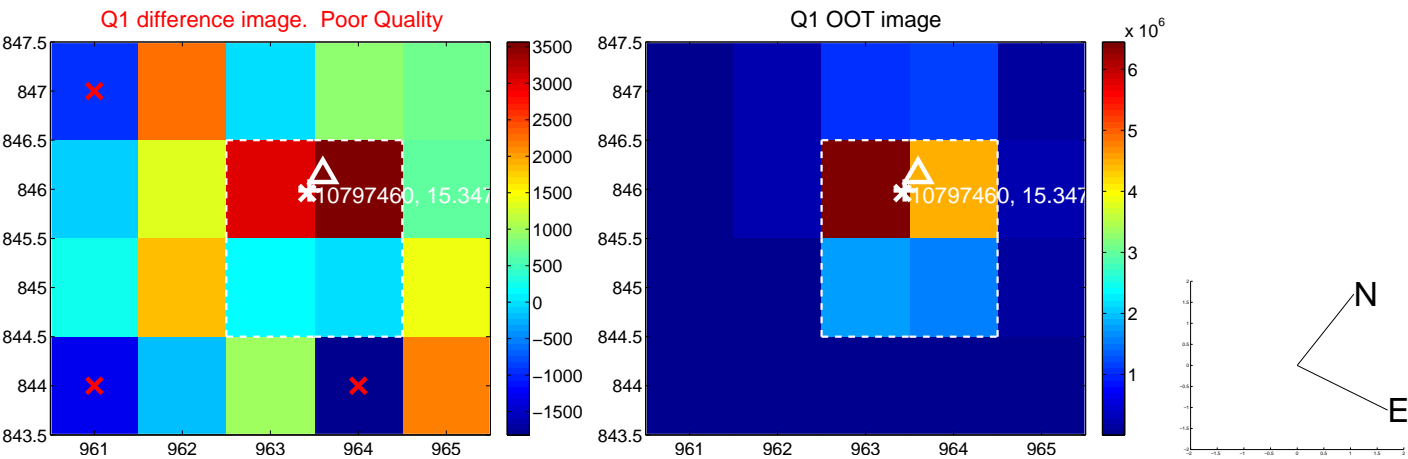
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.201 \pm 0.165$	1.22	$-0.006 \pm 0.128$	$0.201 \pm 0.165$
PRF-fit source offset from KIC position	$0.316 \pm 0.161$	1.97	$0.075 \pm 0.127$	$0.307 \pm 0.168$
photometric centroid source offset	$1.03 \pm 0.49$	2.11	$0.43 \pm 0.51$	$0.94 \pm 0.48$

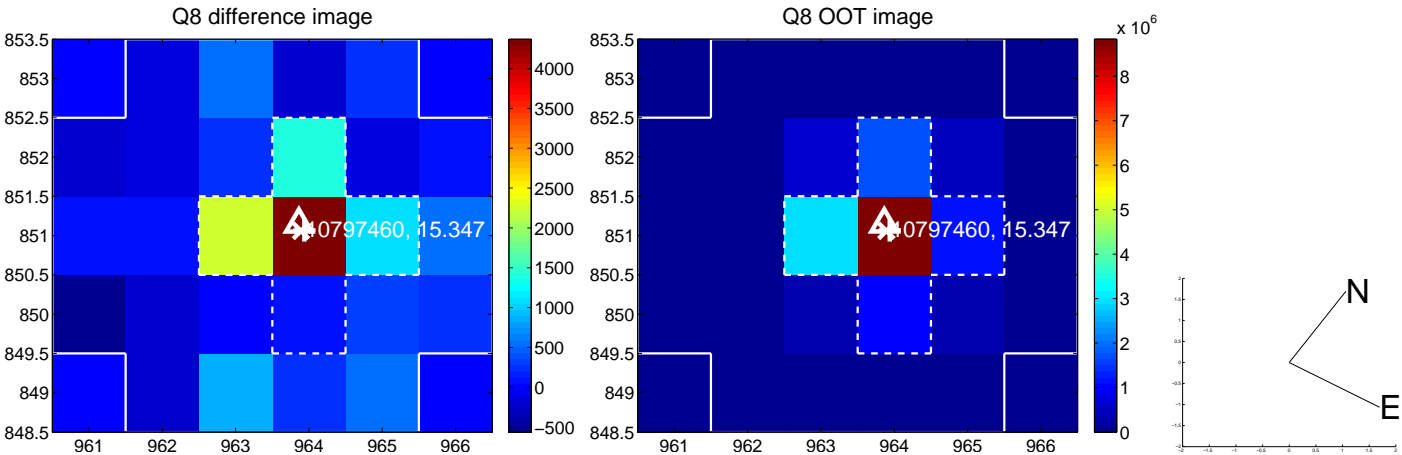
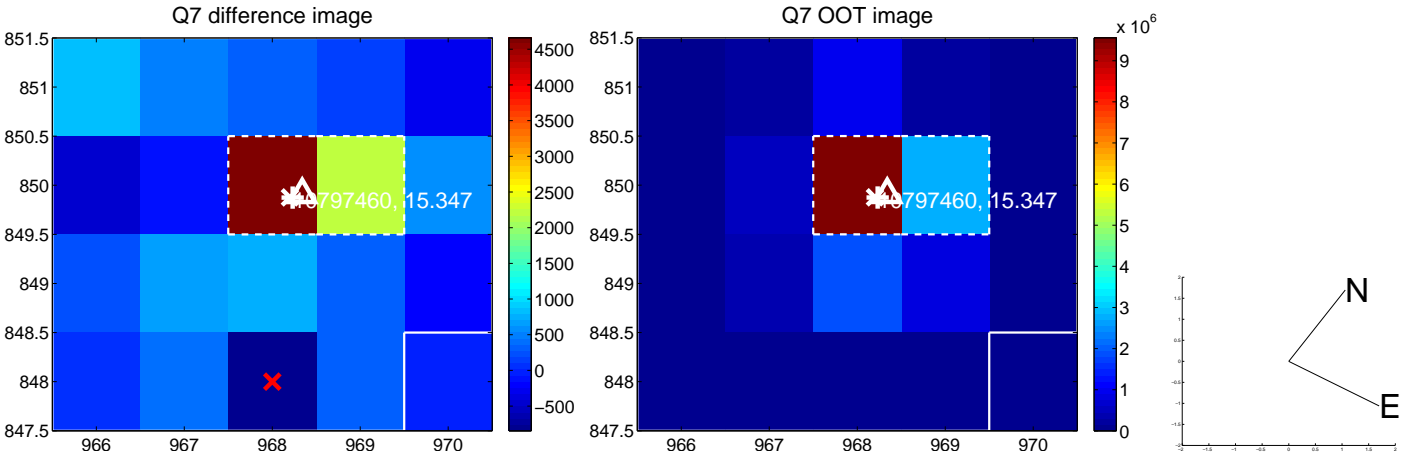
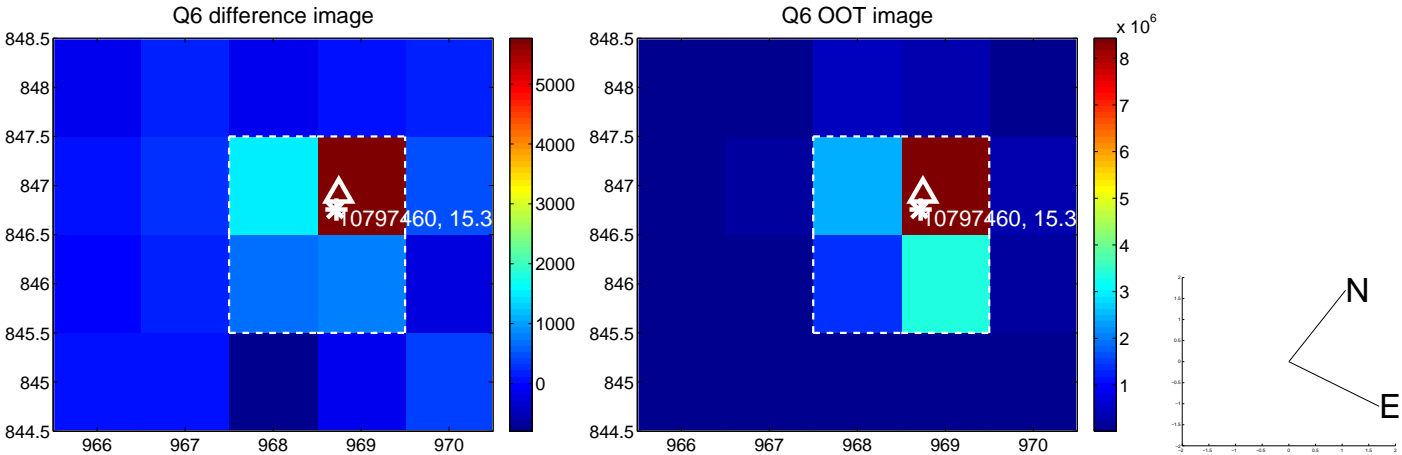
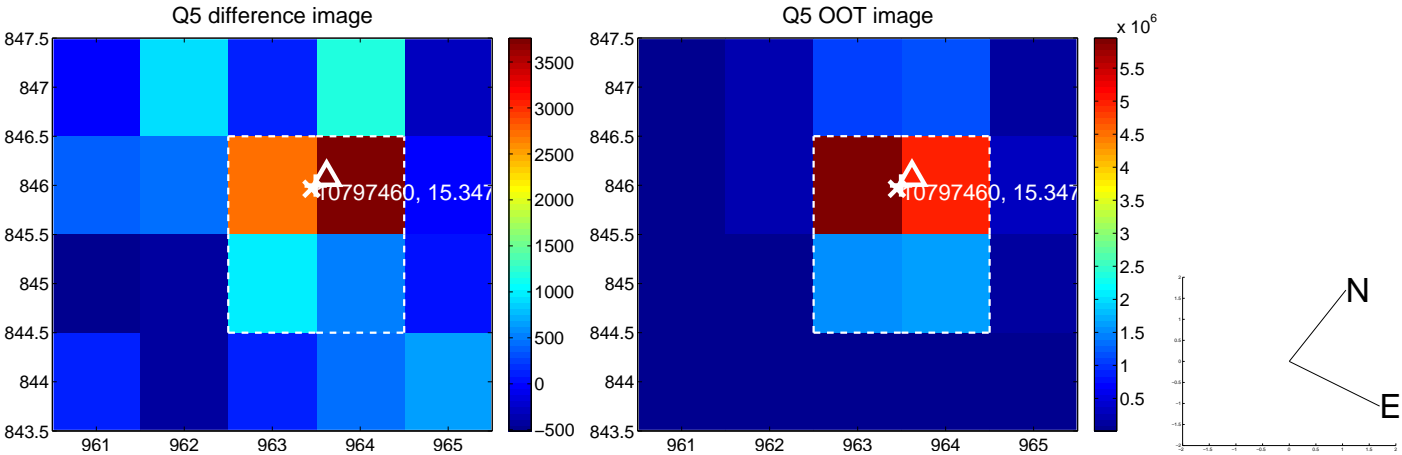


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

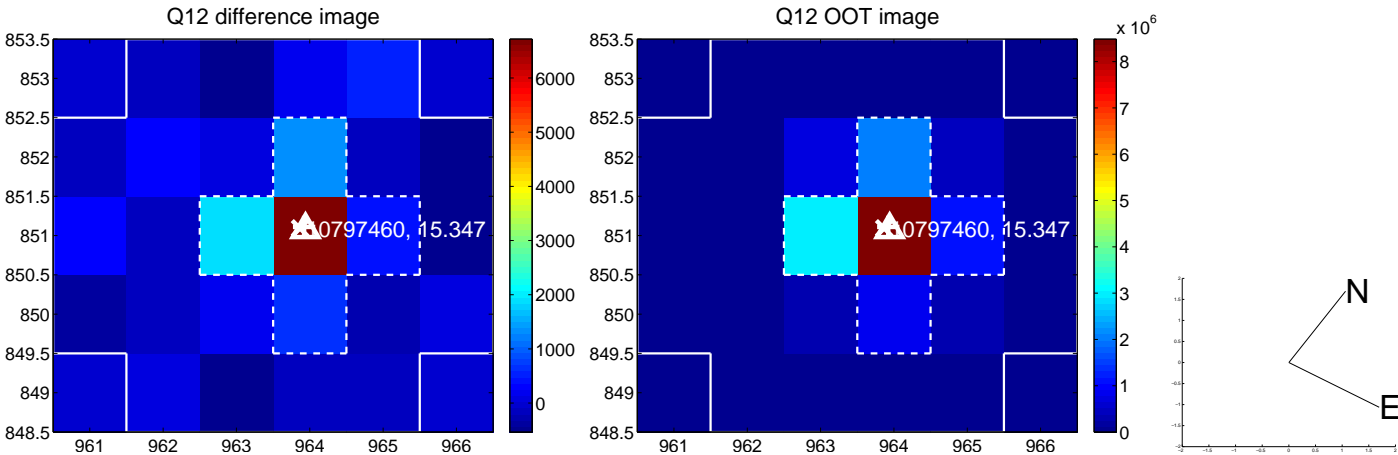
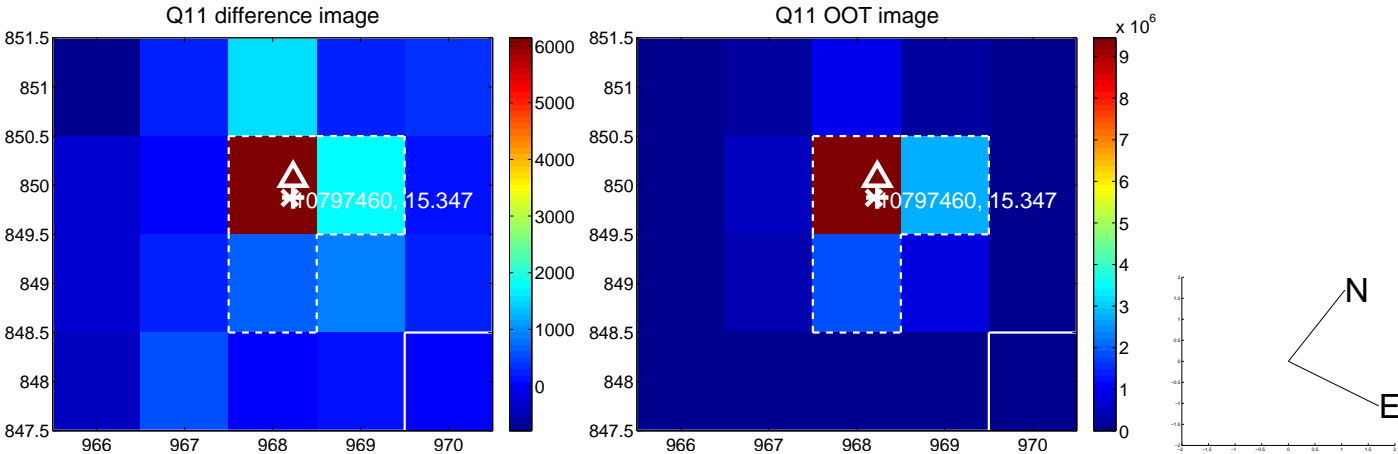
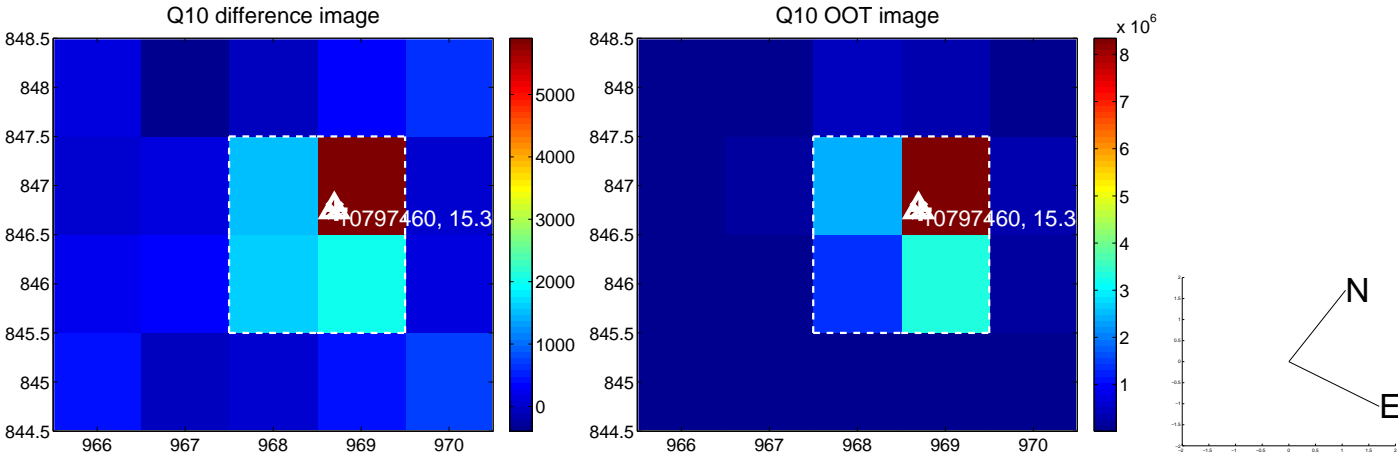
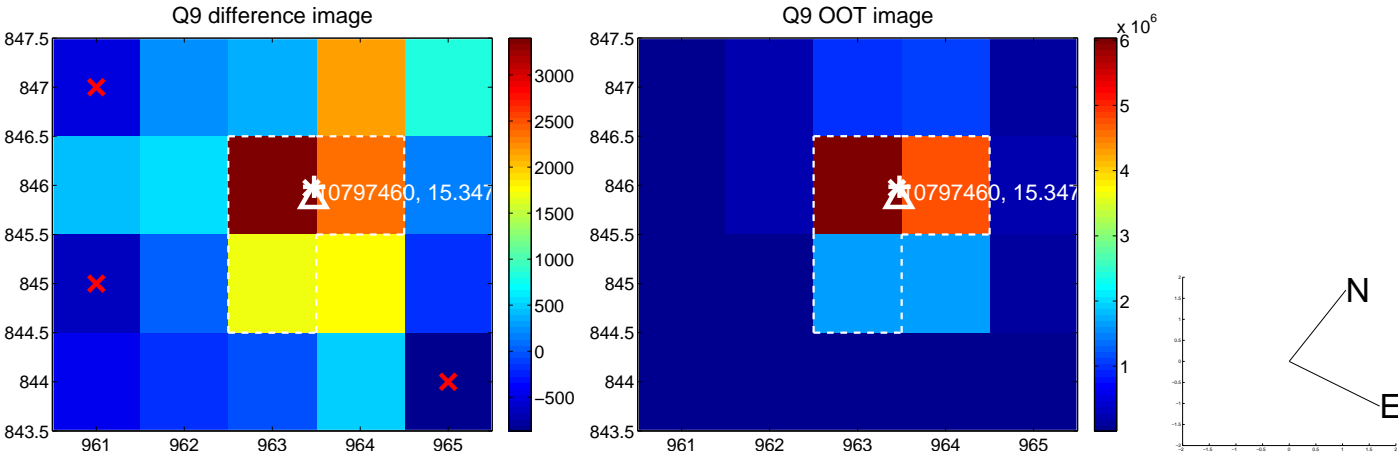
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



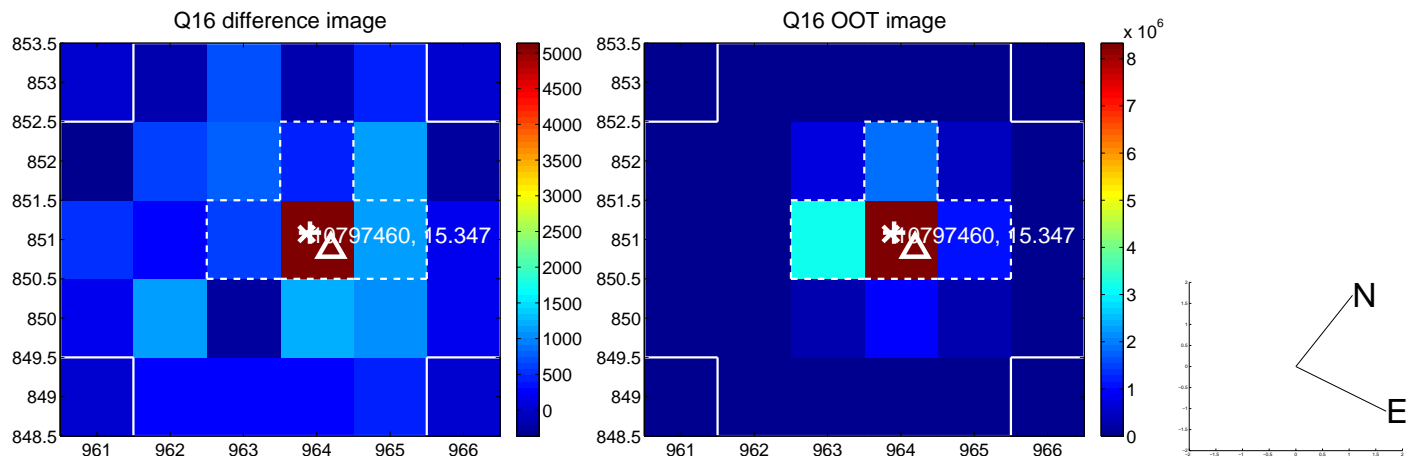
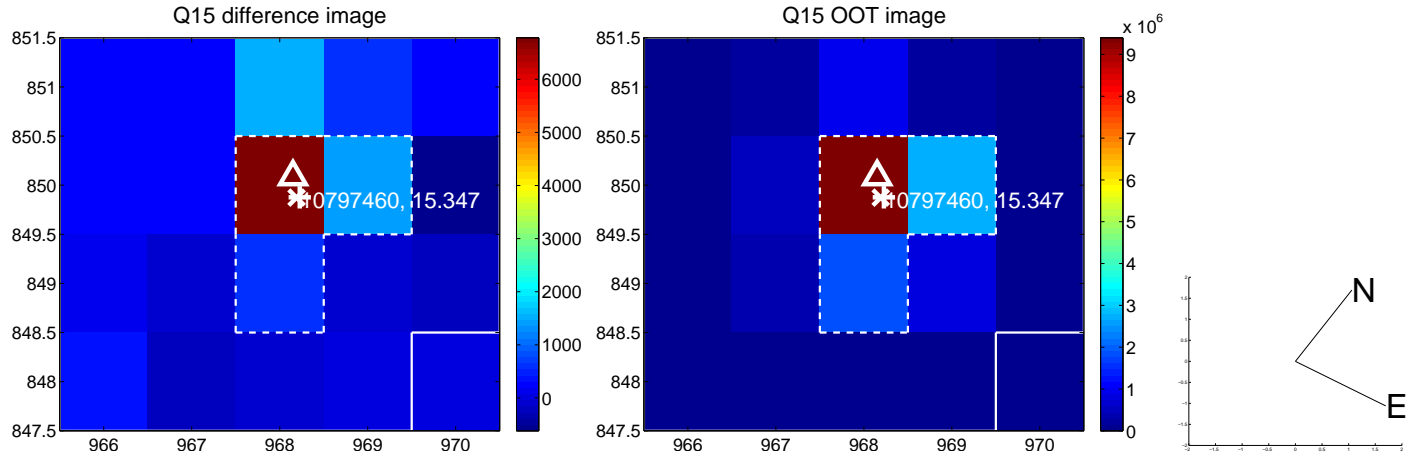
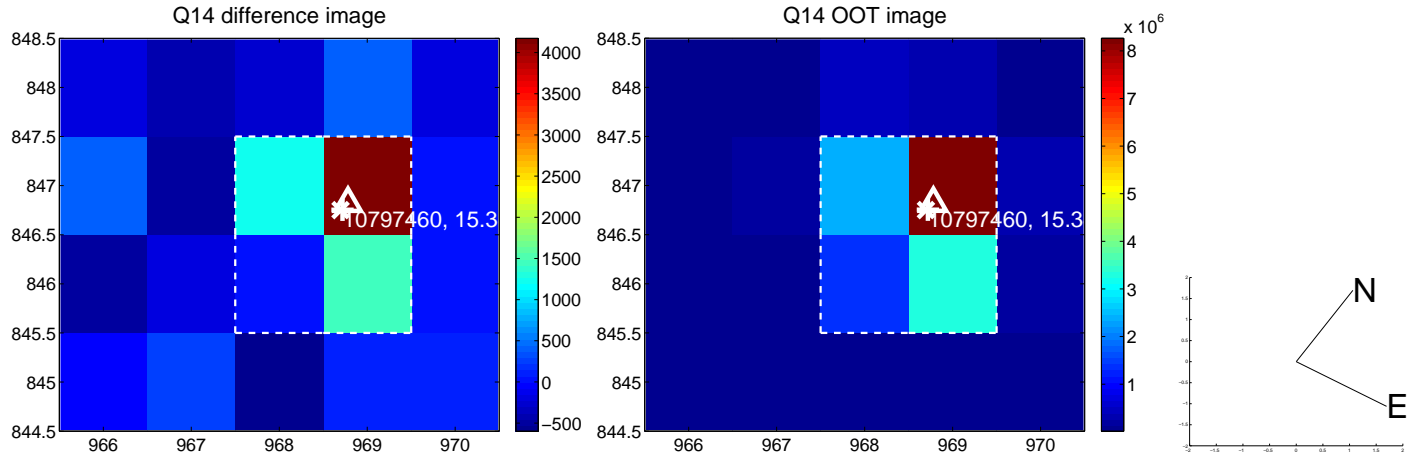
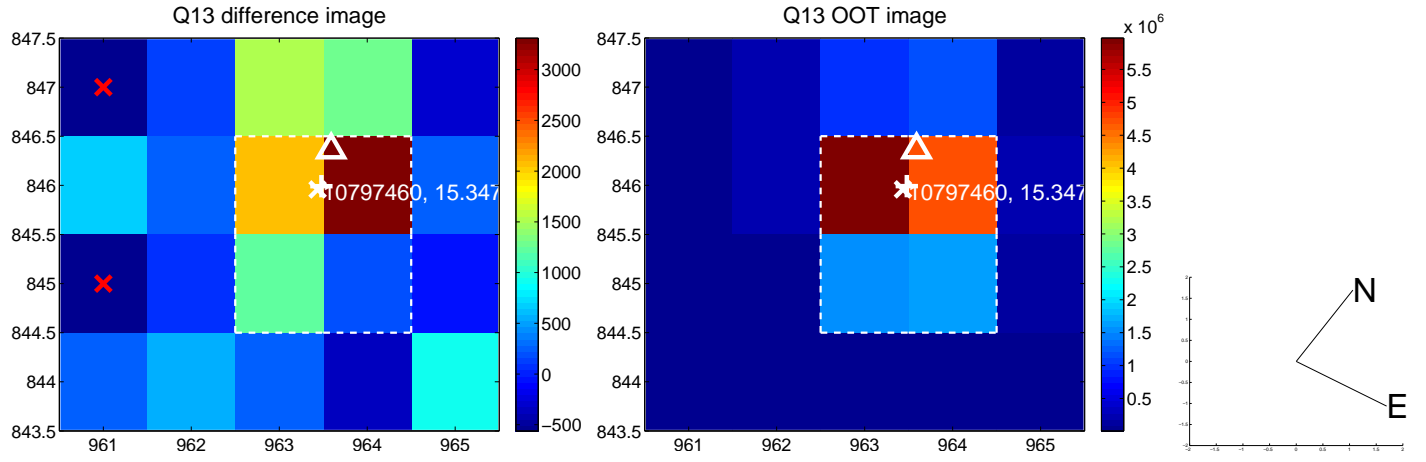
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

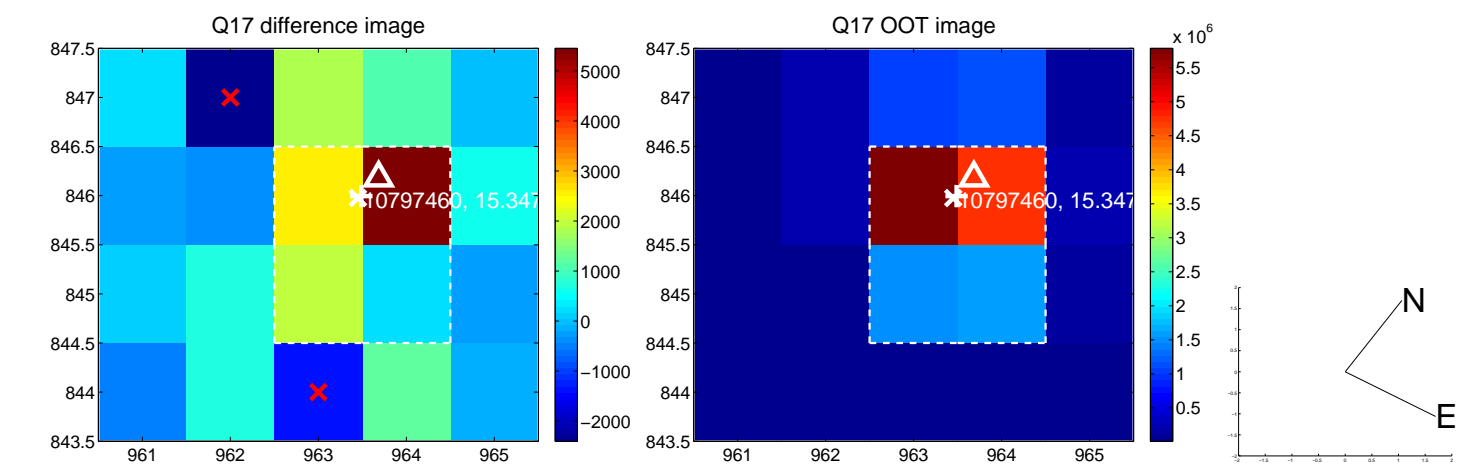


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

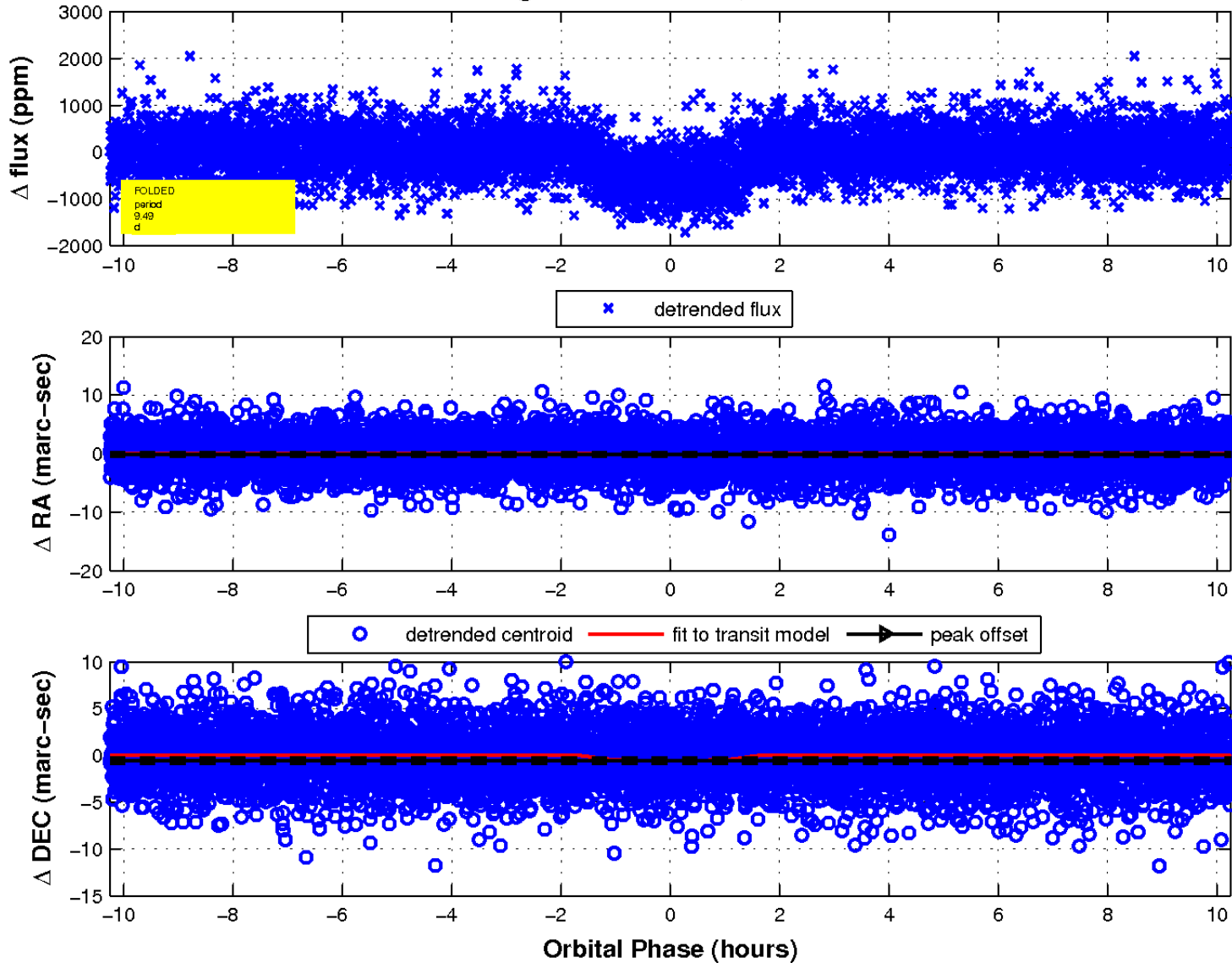




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

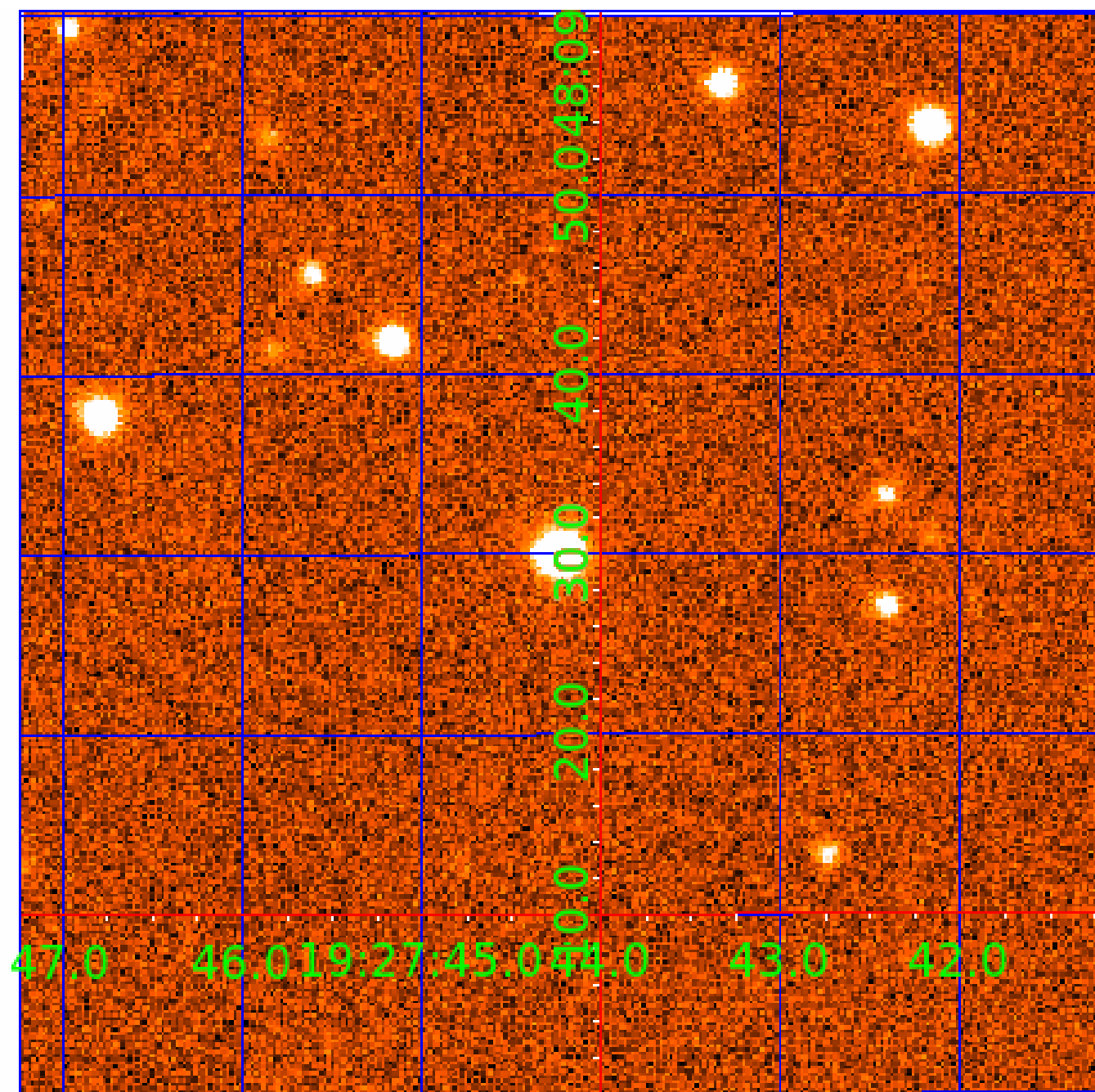


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



# KIC 010797460

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010797460-01	OBS	0752.01	9.488028	132.588052	630.4	3.419	28.5	31.2	0.93	5455	2.93	93.73
010797460-02	OBS	0752.02	54.418374	162.513825	893.1	4.586	20.1	20.7	0.93	5455	2.97	9.13

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010797460-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
010797460-02	OBS	PC	0.97	0	0	0	0	NO_COMMENT

**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.

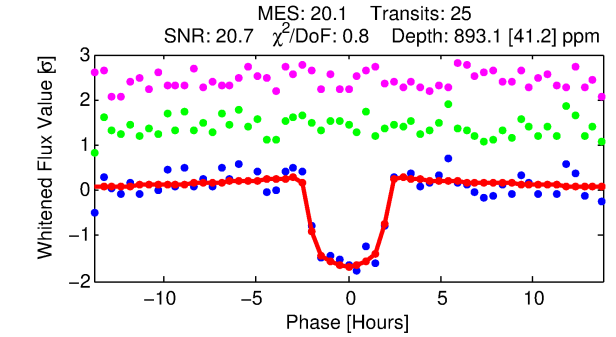
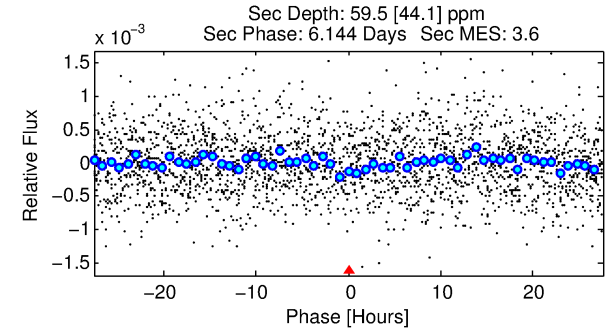
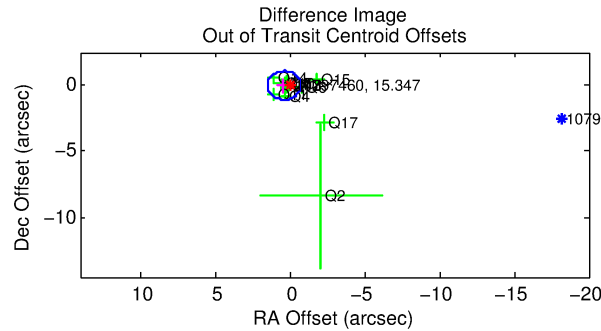
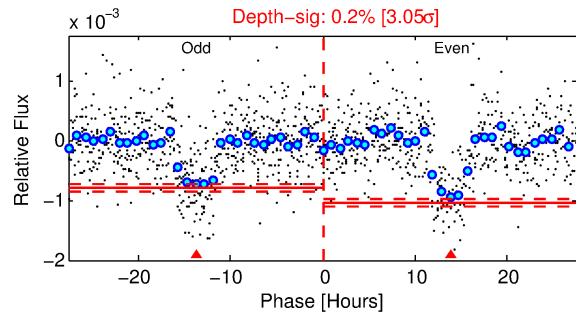
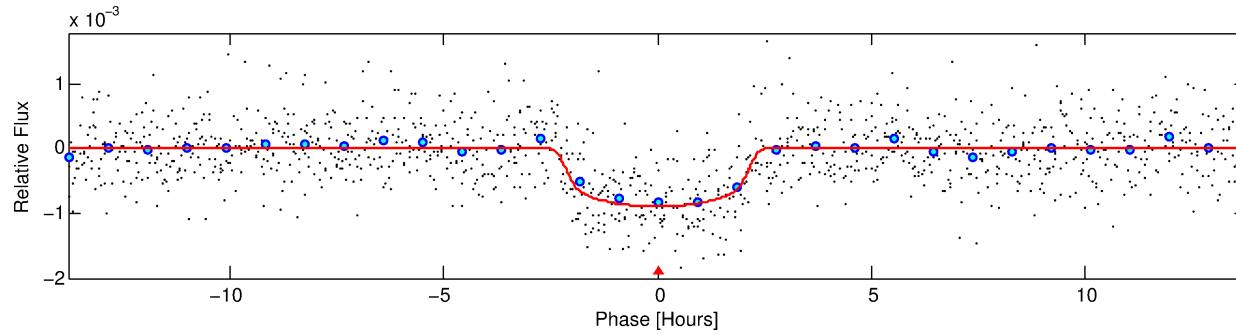
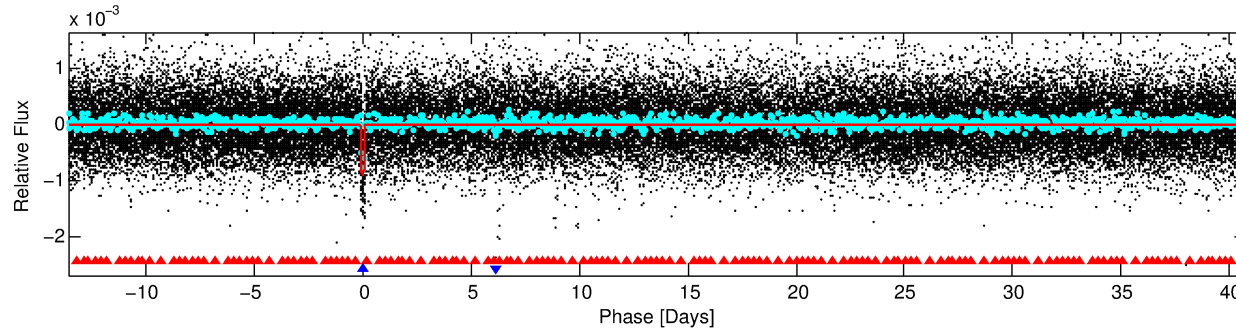
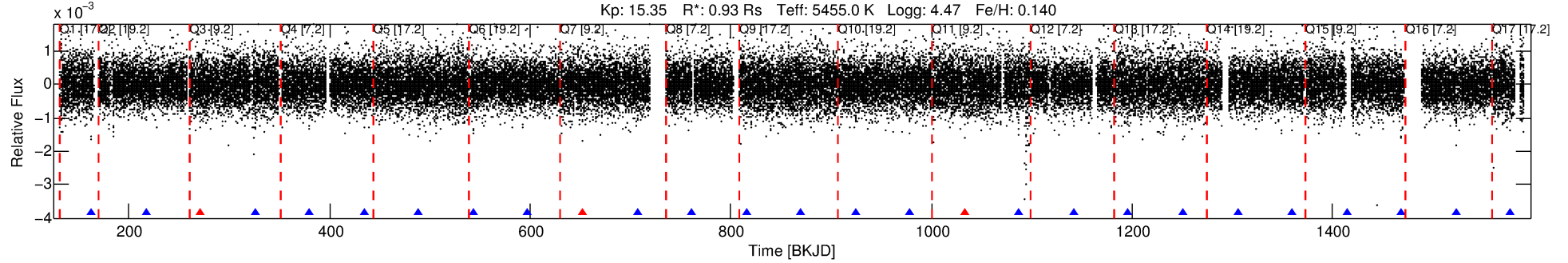
## Ephemeris Match Information For 010797460-02

No Significant Match Found

# DV One-Page Summary

KIC: 10797460 Candidate: 2 of 2 Period: 54.418 d  
KOI: K00752.02 Name: Kepler-227c Corr: 0.980

Kp: 15.35 R\*: 0.93 Rs Teff: 5455.0 K Logg: 4.47 Fe/H: 0.140



## DV Fit Results:

Period = 54.41837 [0.00026] d  
Epoch = 162.5138 [0.0037] BKJD  
Rp/R\* = 0.0293 [0.0109]  
a/R\* = 67.43 [97.09]  
b = 0.71 [1.02]  
Seff = 9.13 [1.61]  
Teq = 443 [19] K  
Rp = 2.97 [1.15] Re  
a = 0.2733 [0.0288] AU  
Ag = 277.30 [294.03] [0.94σ]  
Teffp = 2797 [733] K [3.21σ]

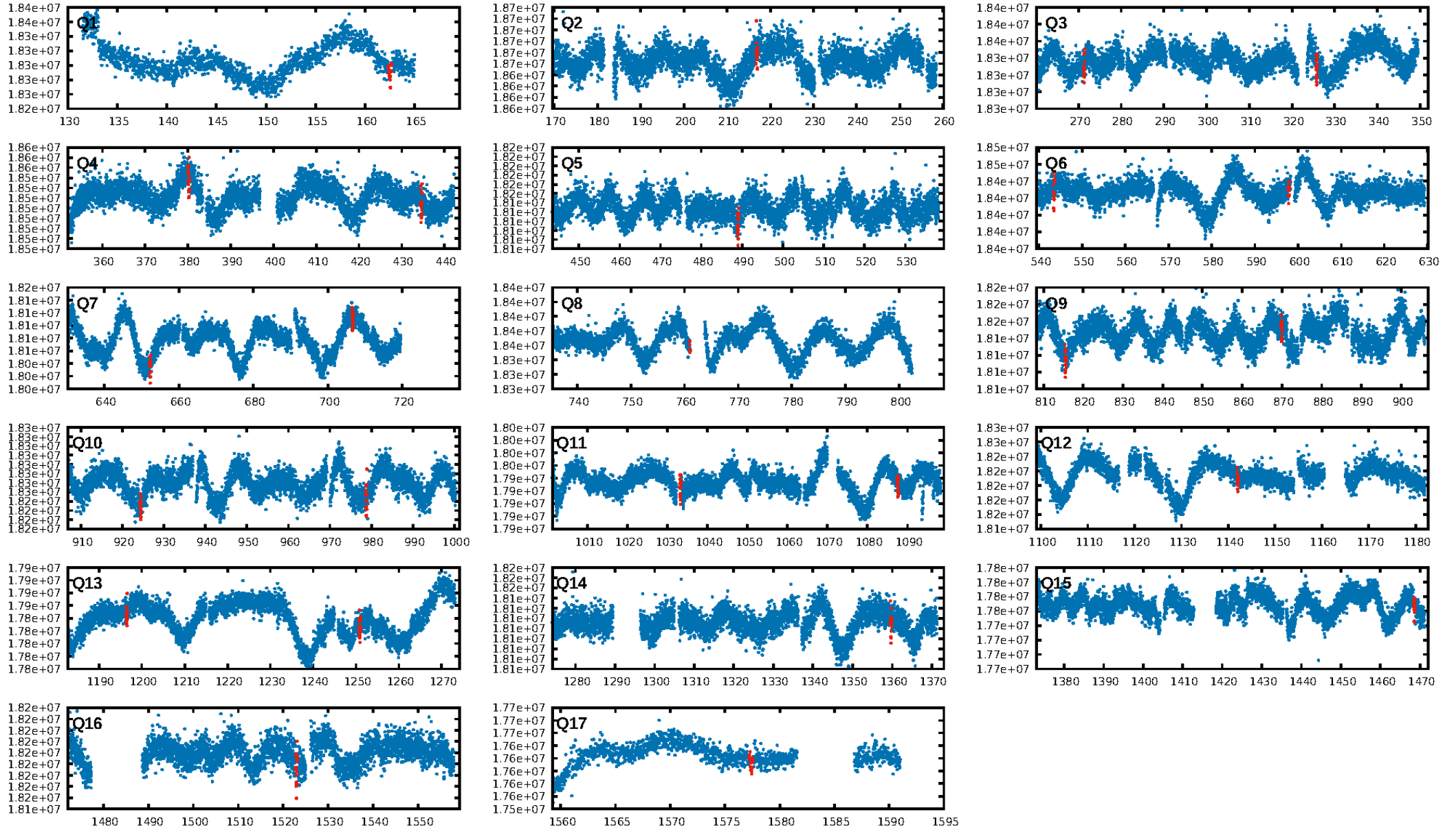
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [188.52σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 12.6%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.07e-76  
RollingBand-fgt: 0.87 [20/23]  
GhostDiagnostic-chr: -4.245  
Centroid-sig: 0.3%  
Centroid-so: 1.378 arcsec [1.99σ]  
OotOffset-rm: 0.387 arcsec [1.06σ]  
KicOffset-rm: 0.503 arcsec [1.13σ]  
OotOffset-st: 4/3/2/3 [12]  
KicOffset-st: 4/3/2/3 [12]  
DiffImageQuality-fgm: 0.92 [11/12]  
DiffImageOverlap-fno: 1.00 [16/16]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 03:43:36 Z

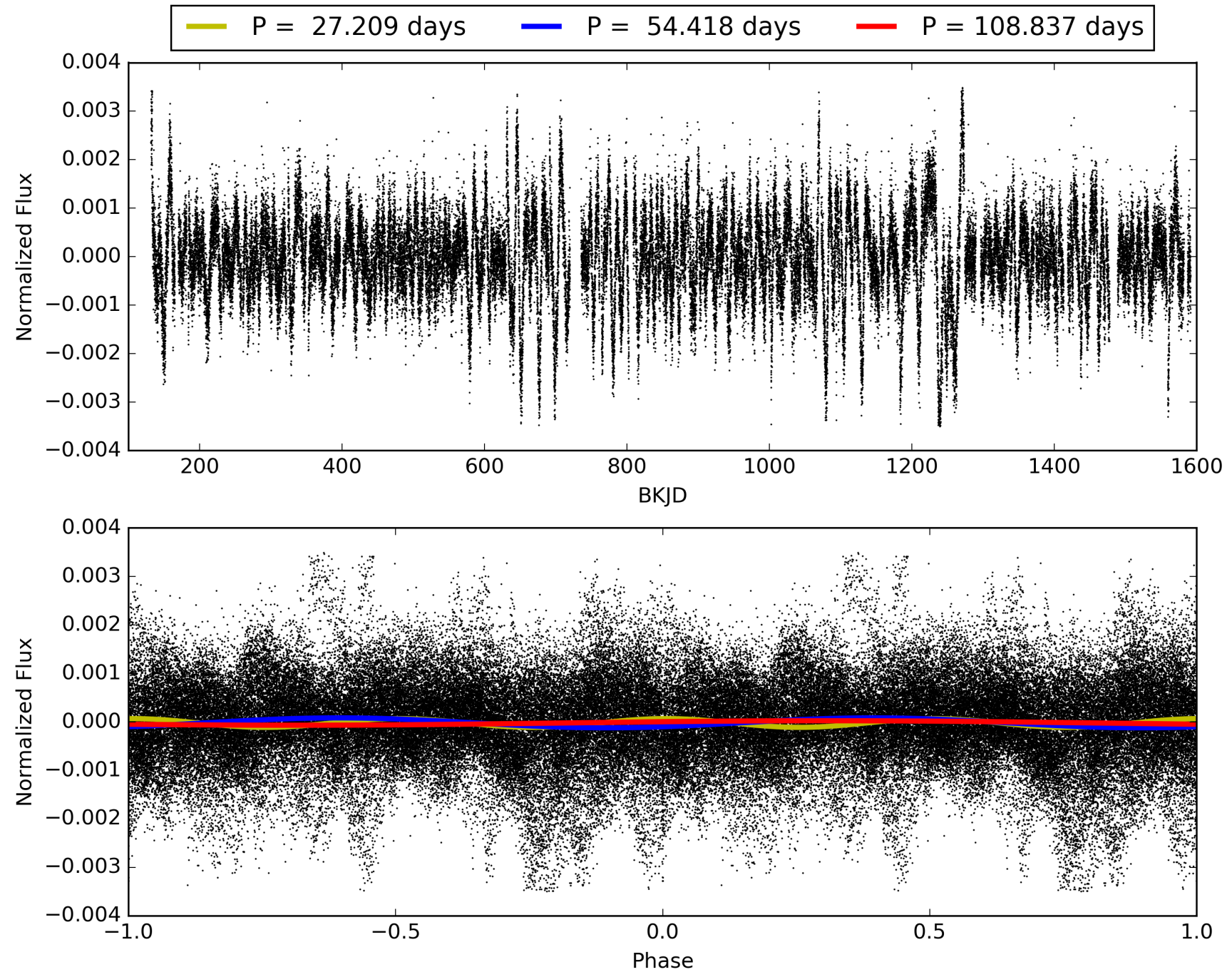
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010797460-02, PDC Light Curves



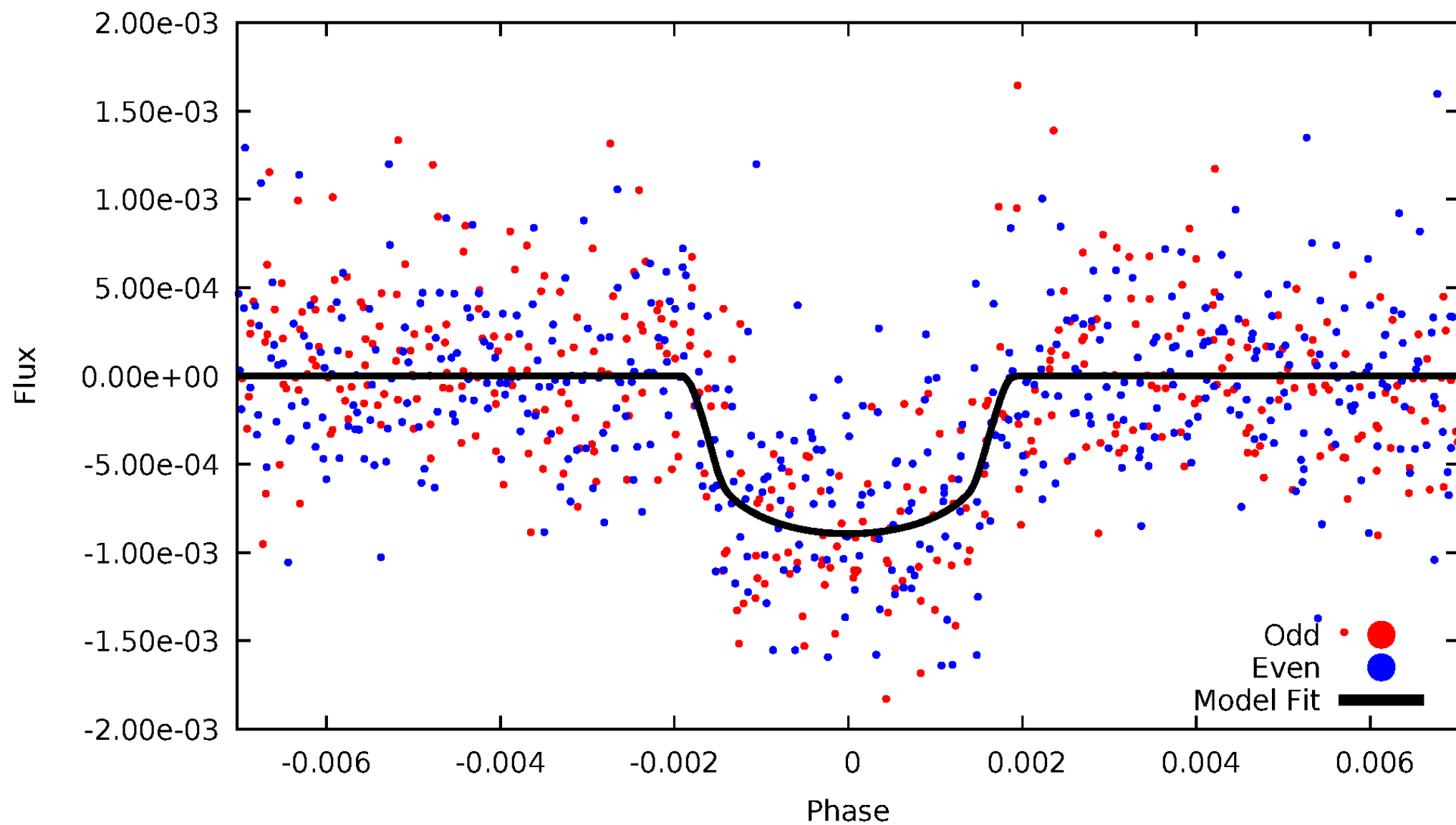


# TCE 010797460-02



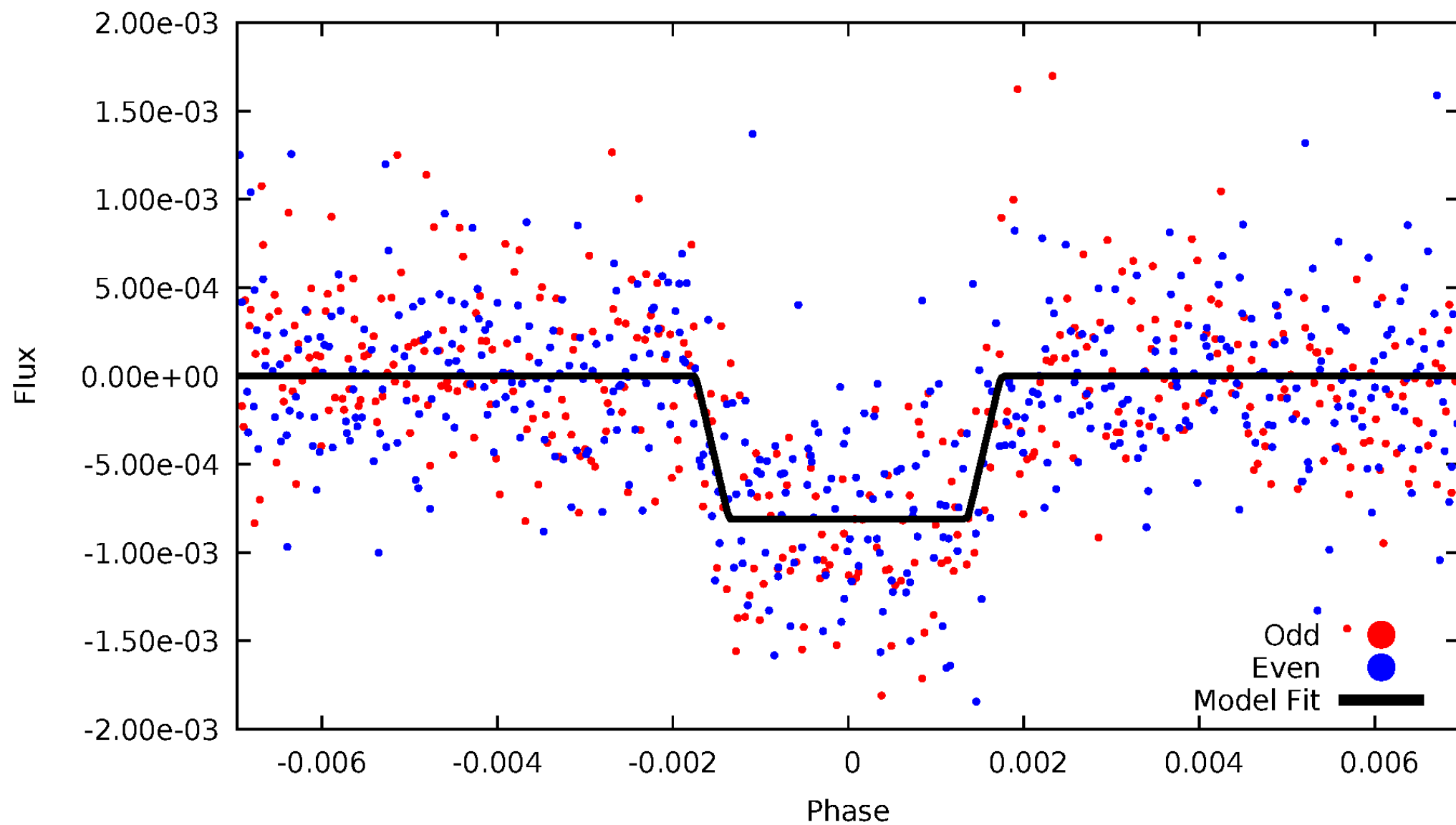
# DV Odd/Even

TCE 010797460-02



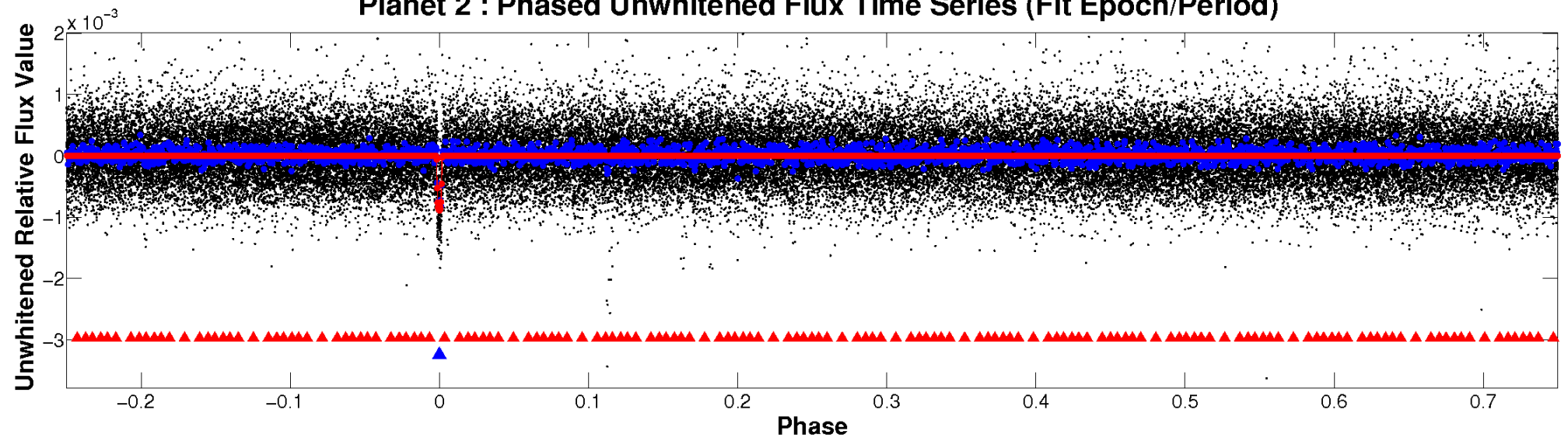
# ALT Odd/Even

TCE 010797460-02

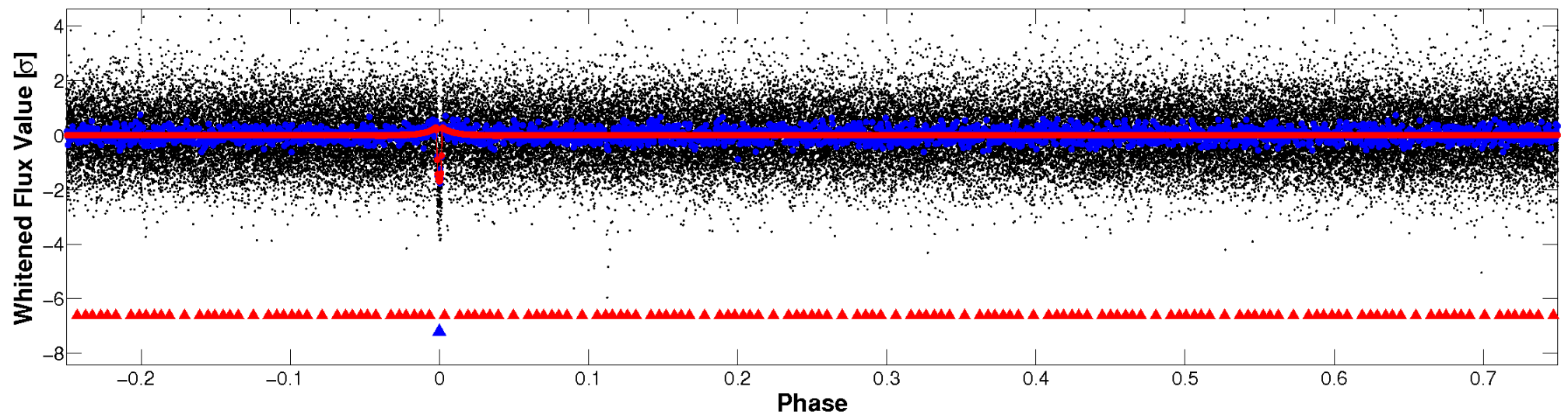


# Non-Whitened Vs. Whitened Light Curve

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

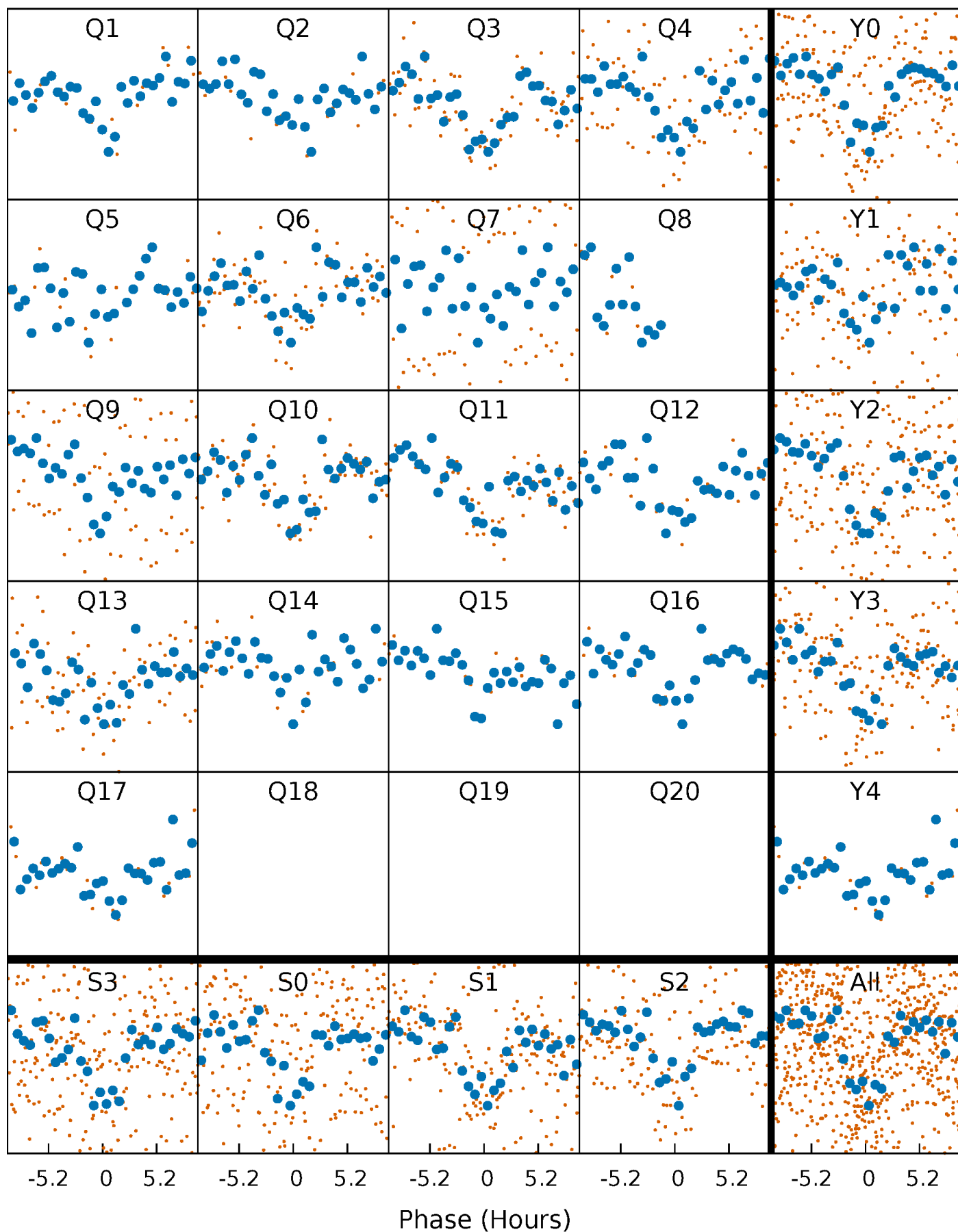


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

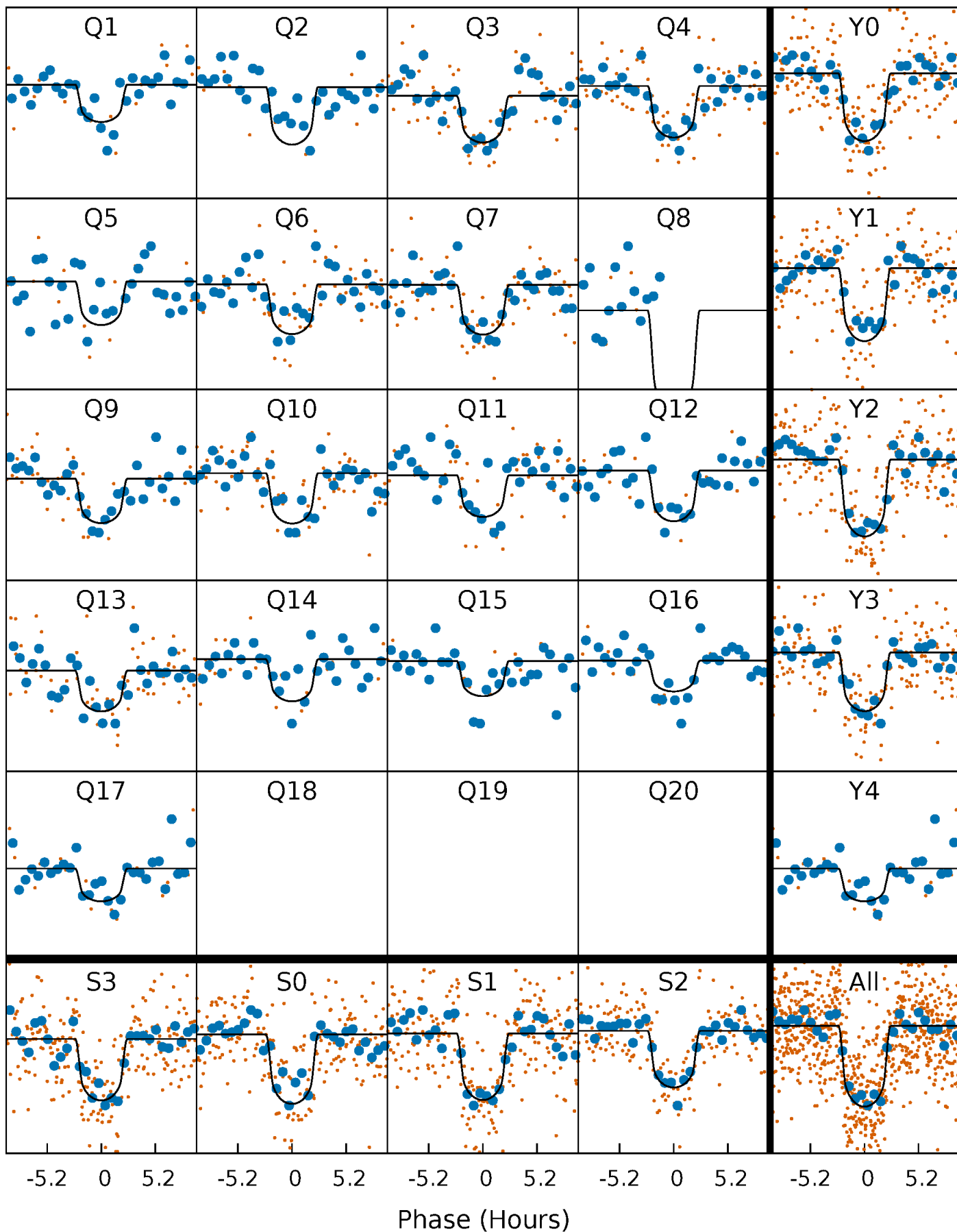
TCE 010797460-02   P= 54.418374 Days    $T_0=162.513825$  (BKJD)





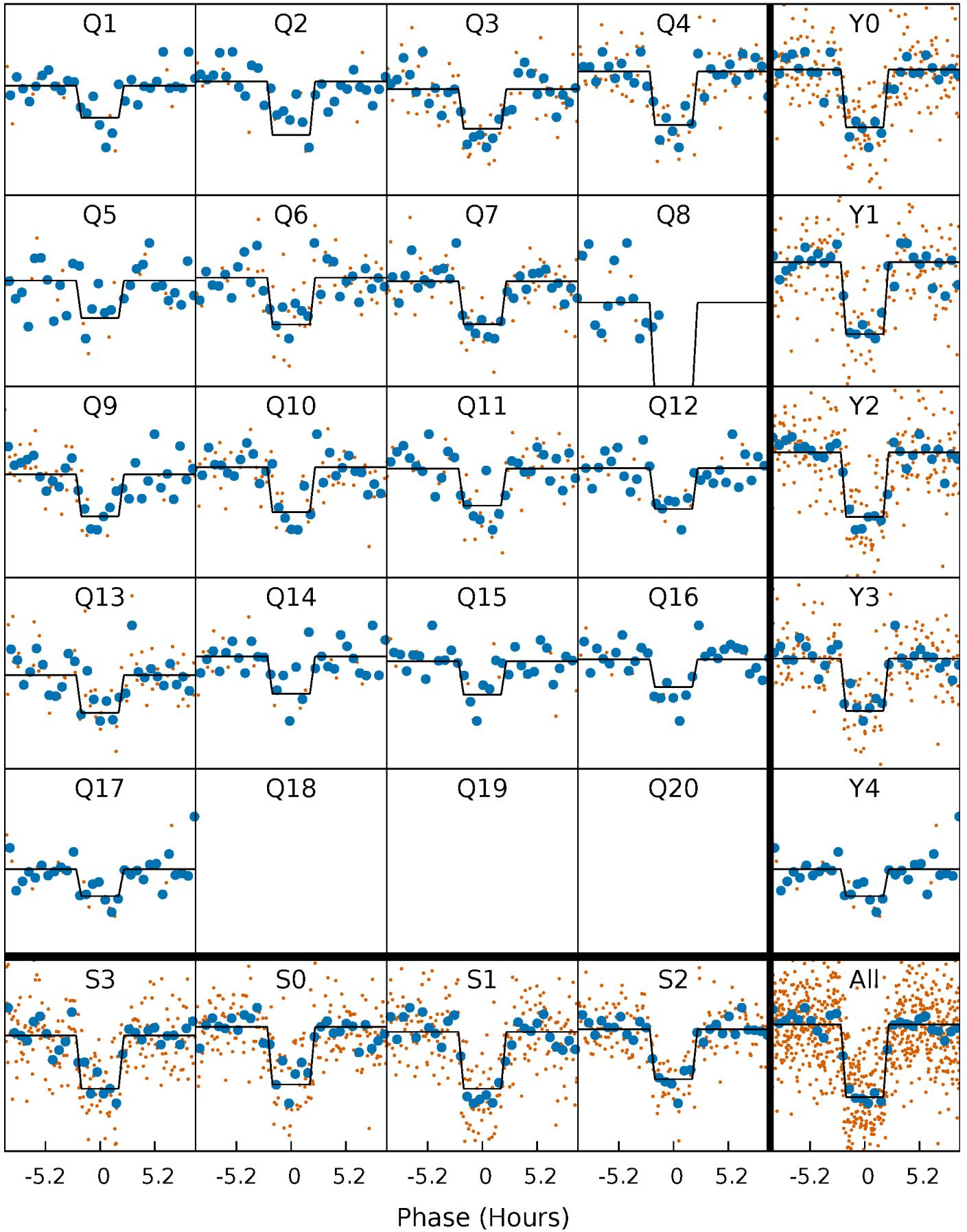
# DV Quarter-Phased Transit Curves

TCE 010797460-02   P= 54.418374 Days    $T_0=162.513825$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

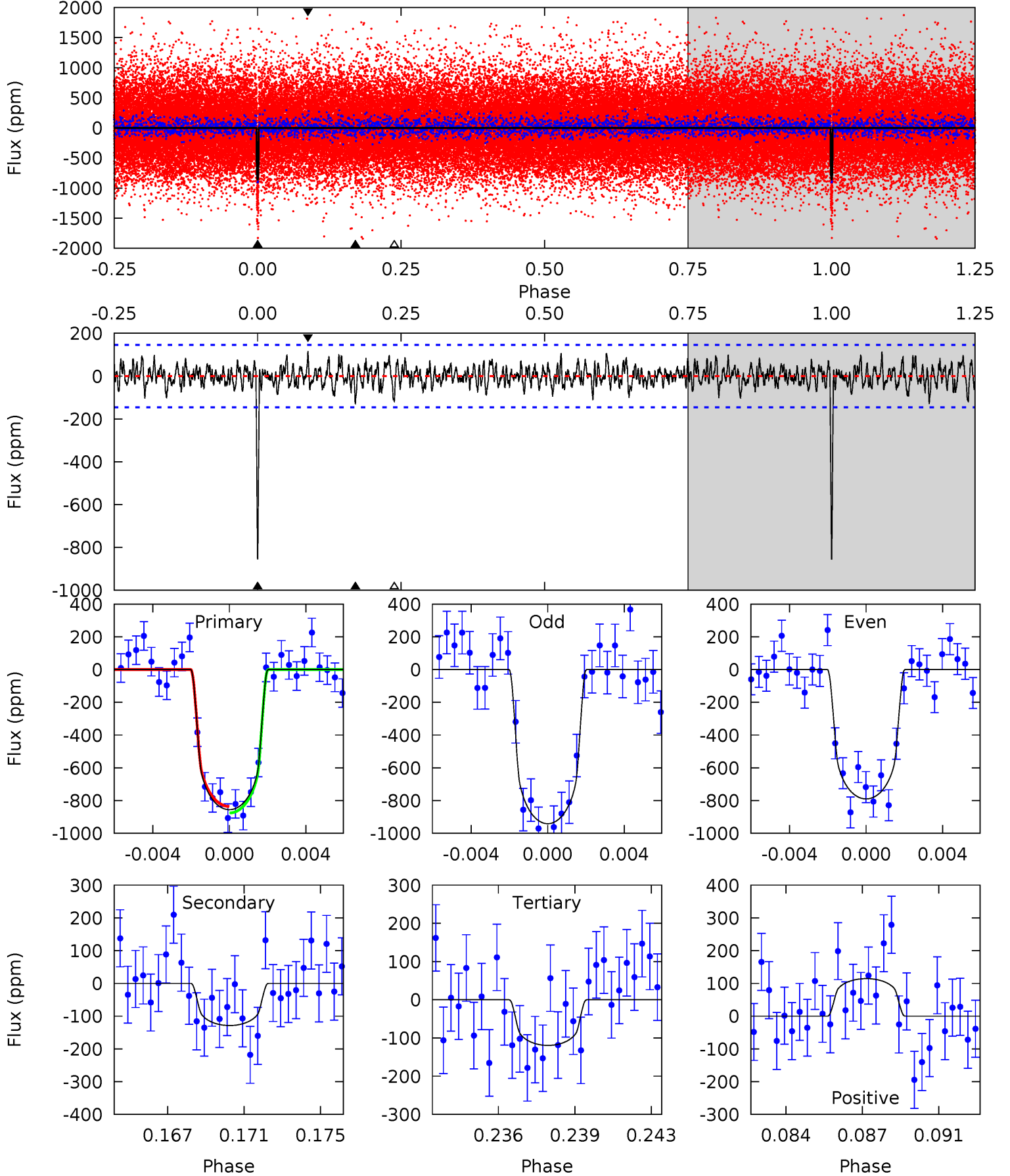
TCE 010797460-02 P= 54.418595 Days  $T_0=162.511315$  (BKJD)



# DV Model-Shift Uniqueness Test

010797460-02,  $P = 54.418374$  Days,  $E = 108.095451$  Days

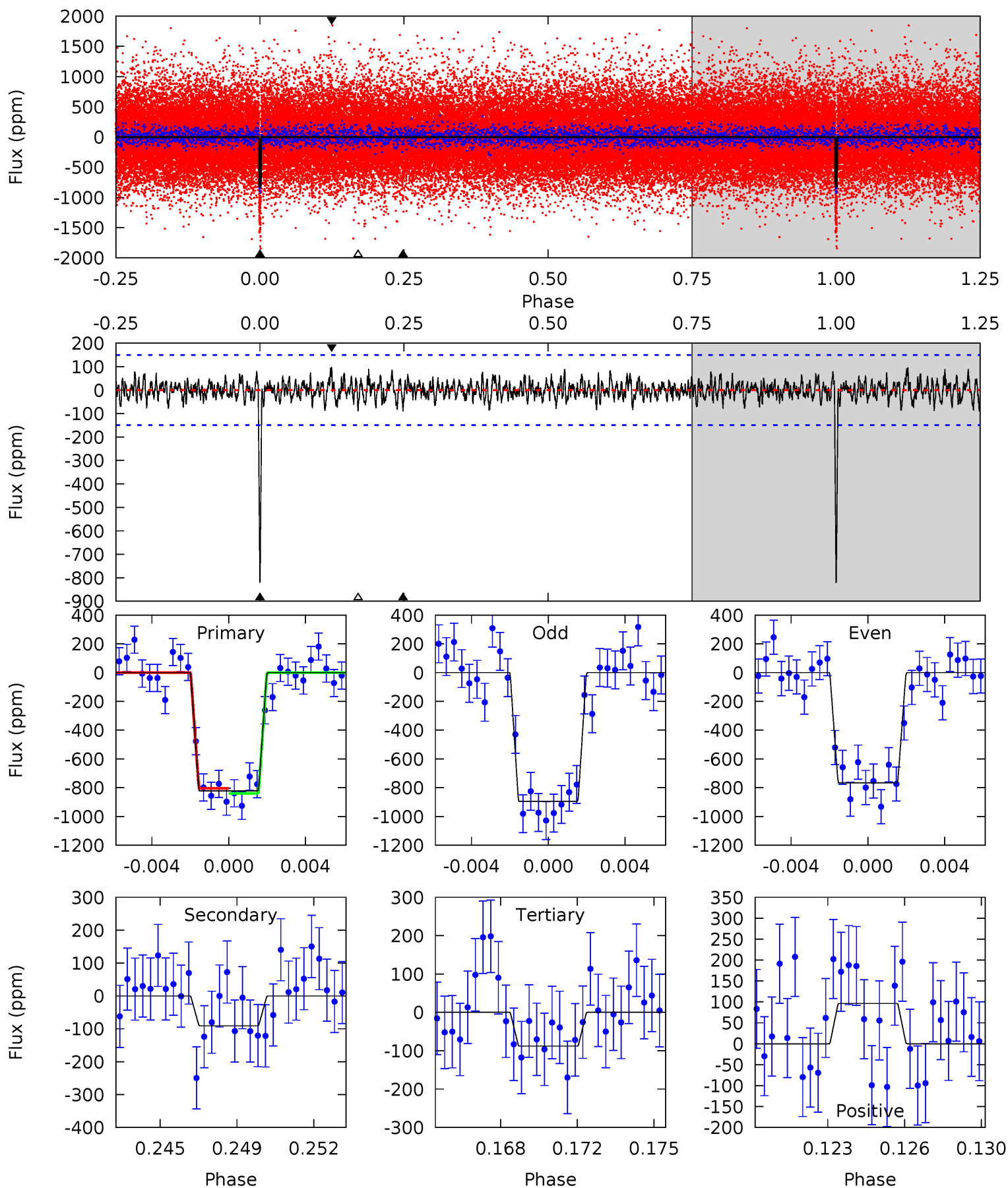
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
30.6	4.60	4.27	4.09	5.21	2.89	1.34	26.3	26.5	0.33	0.51	2.69	0.98	0.12	0.71



# Alt Model-Shift Uniqueness Test

010797460-02, P = 54.418595 Days, E = 108.092720 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
28.7	3.17	3.07	3.37	5.22	2.92	1.06	25.7	25.4	0.10	-0.19	2.23	1.00	0.10	0.63



### Stellar Parameters For KIC 010797460

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5455^{+81}_{-81}$	$4.467^{+0.064}_{-0.096}$	$0.140^{+0.150}_{-0.150}$	$0.927^{+0.105}_{-0.061}$	$0.919^{+0.052}_{-0.046}$	$1.623^{+0.387}_{-0.478}$
	+1%/-1%	+1%/-2%	+107%/-107%	+11%/-7%	+6%/-5%	+24%/-29%
Source	SPE90	SPE90	SPE90	DSEP		

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

### Secondary Eclipse Parameters for KIC 010797460-02 / KOI 0752.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-129 \pm 28$	$2.93^{+1.19}_{-1.08}$	$621^{+20}_{-17}$	$3759^{+701}_{-390}$	$600^{+952}_{-314}$
Alt.	$-91 \pm 29$	$3.00^{+1.09}_{-1.18}$	$620^{+23}_{-18}$	$3531^{+745}_{-344}$	$406^{+756}_{-205}$

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

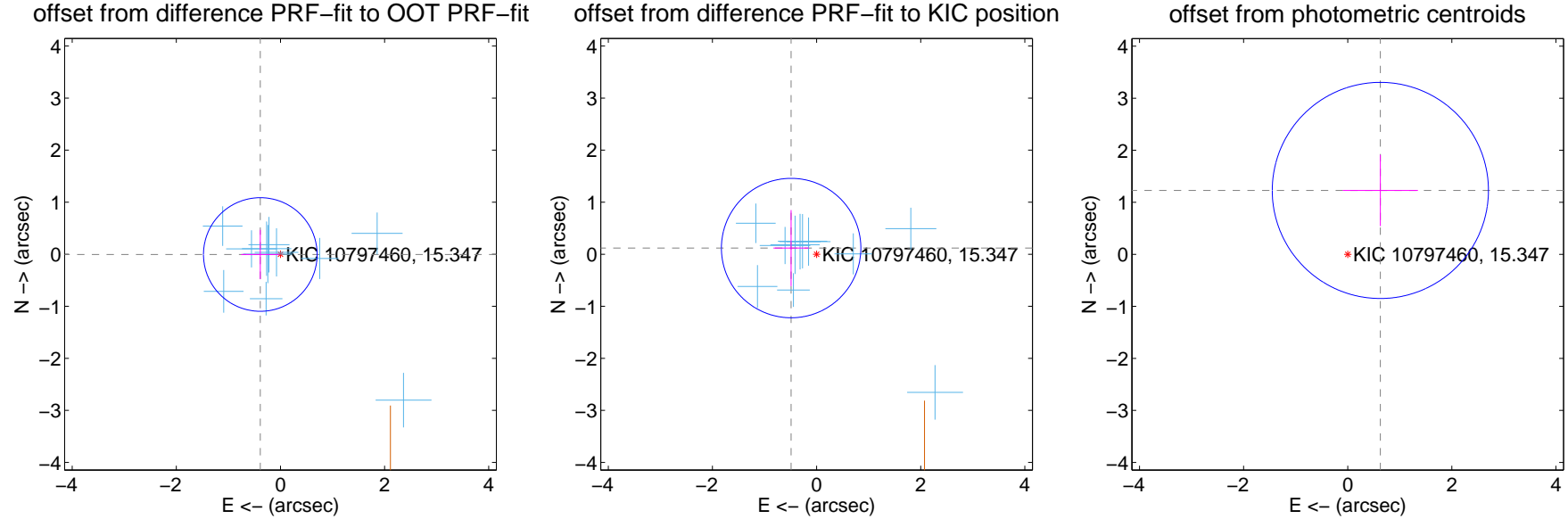
## DV Centroid Data

Supplemental centroid analysis for 010797460-02. Kepler magnitude: 15.35. Transit SNR 20.69

There are 11 quarters with good PRF difference image offsets

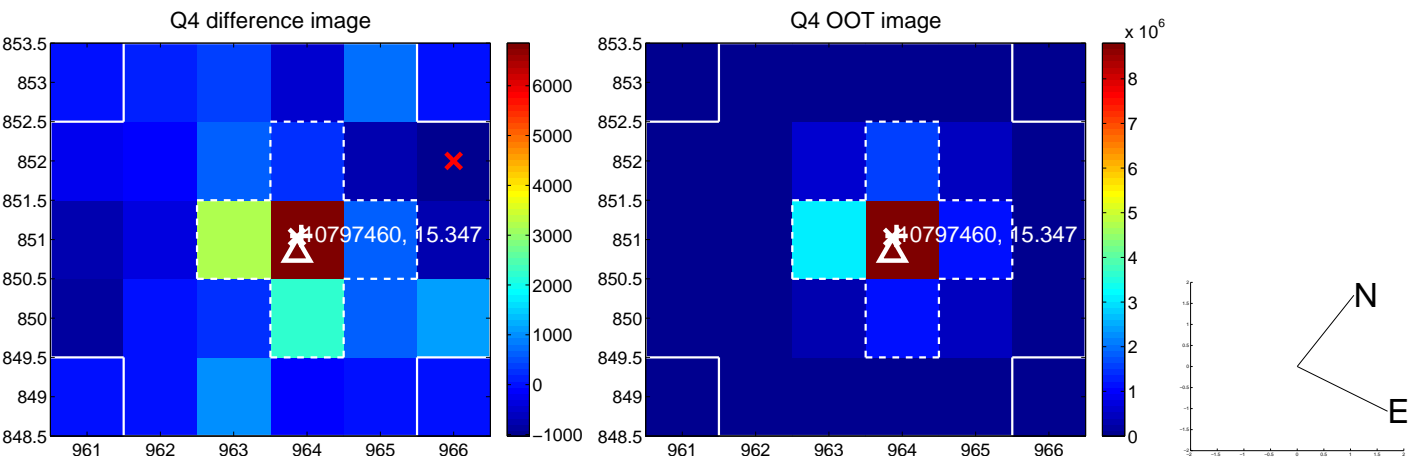
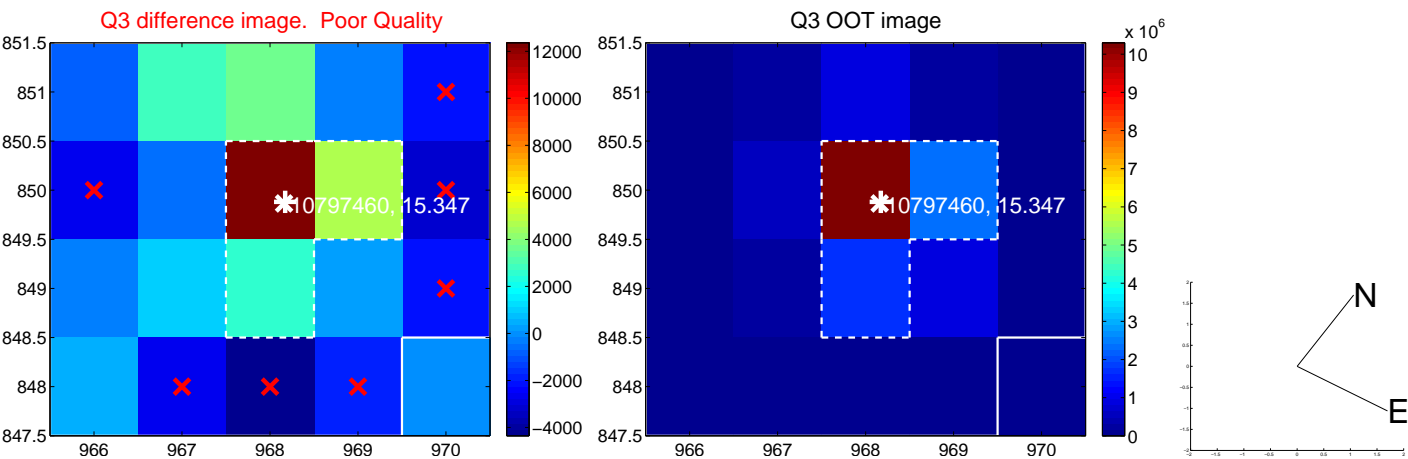
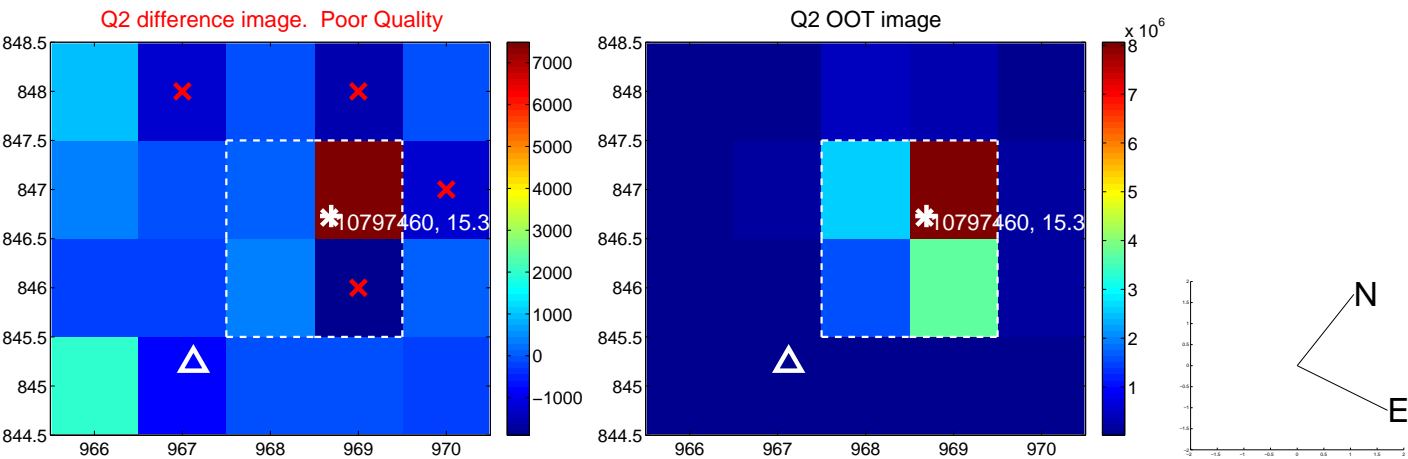
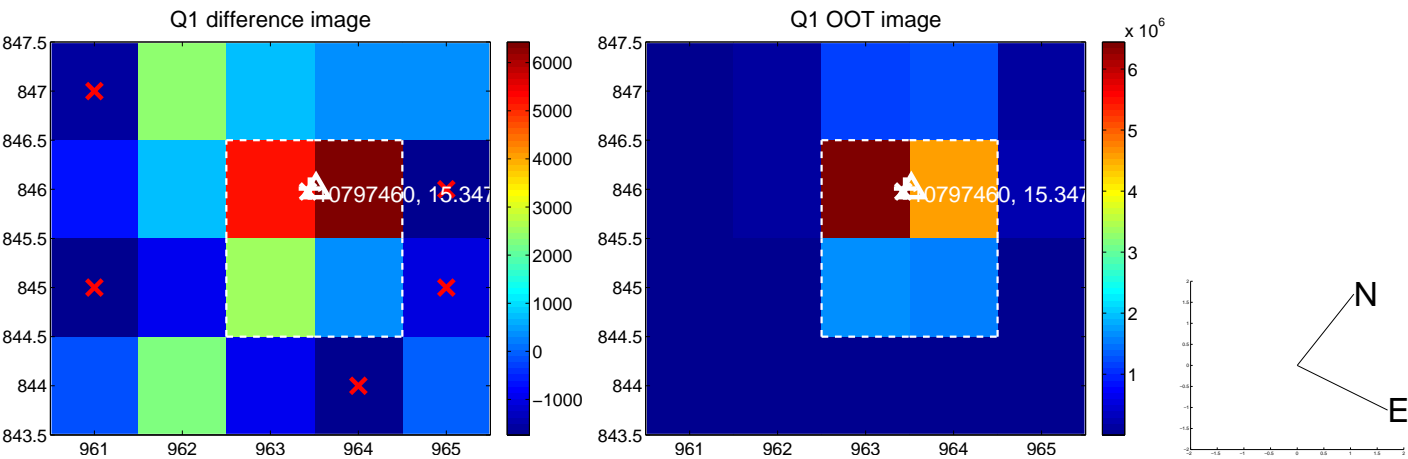
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.387 \pm 0.364$	1.06	$0.387 \pm 0.364$	$-0.005 \pm 0.476$
PRF-fit source offset from KIC position	$0.503 \pm 0.446$	1.13	$0.489 \pm 0.341$	$0.119 \pm 0.731$
photometric centroid source offset	$1.38 \pm 0.69$	1.99	$-0.63 \pm 0.72$	$1.23 \pm 0.68$



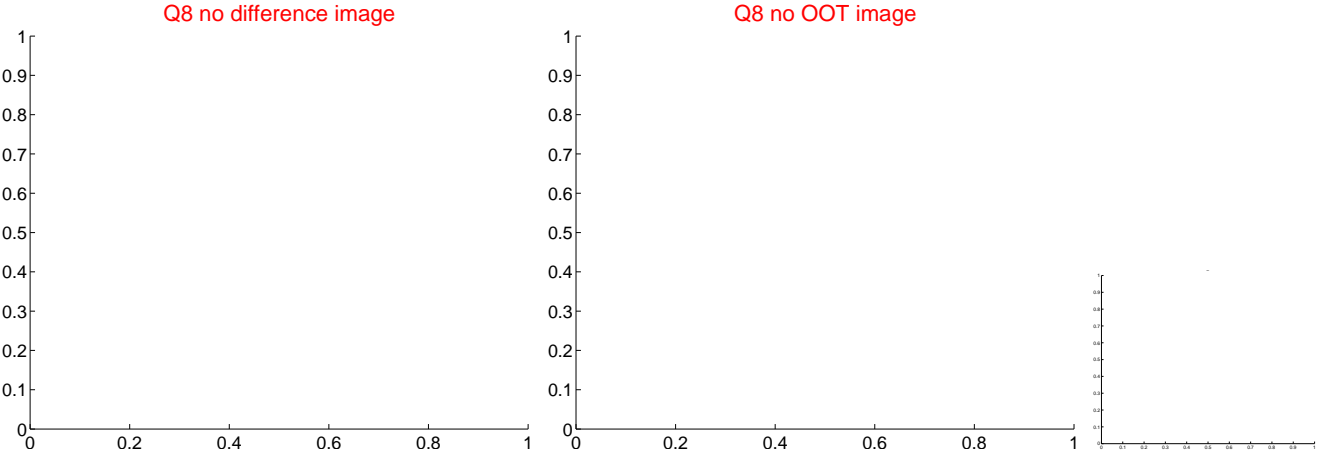
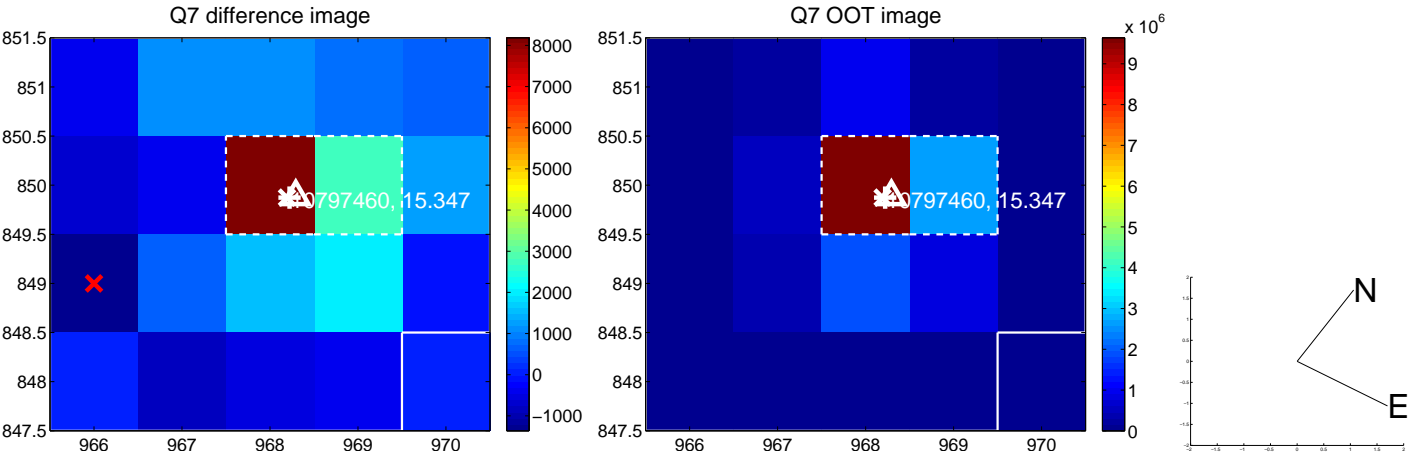
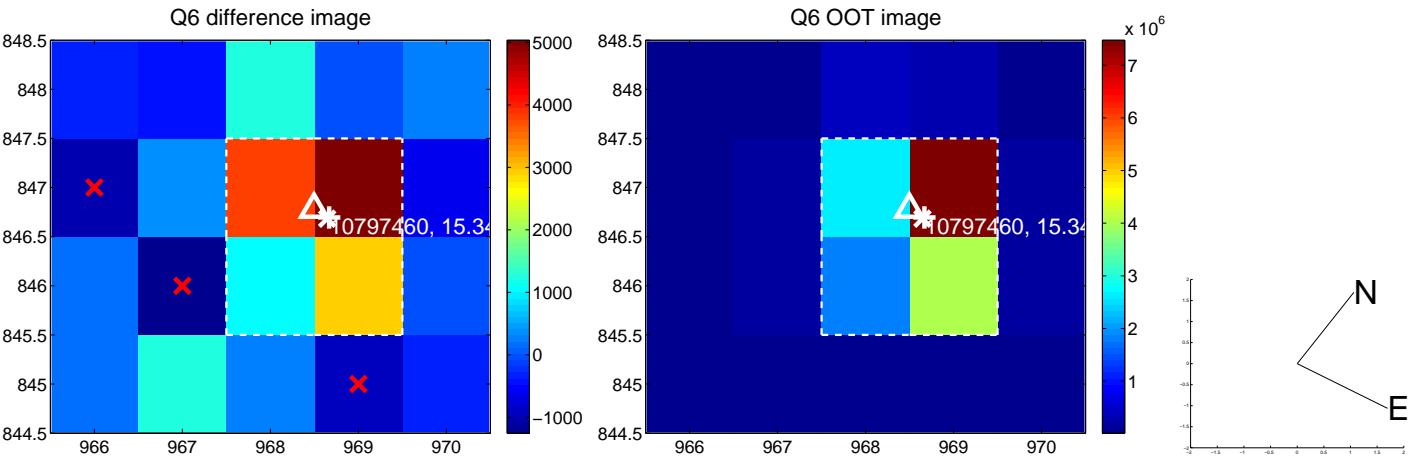
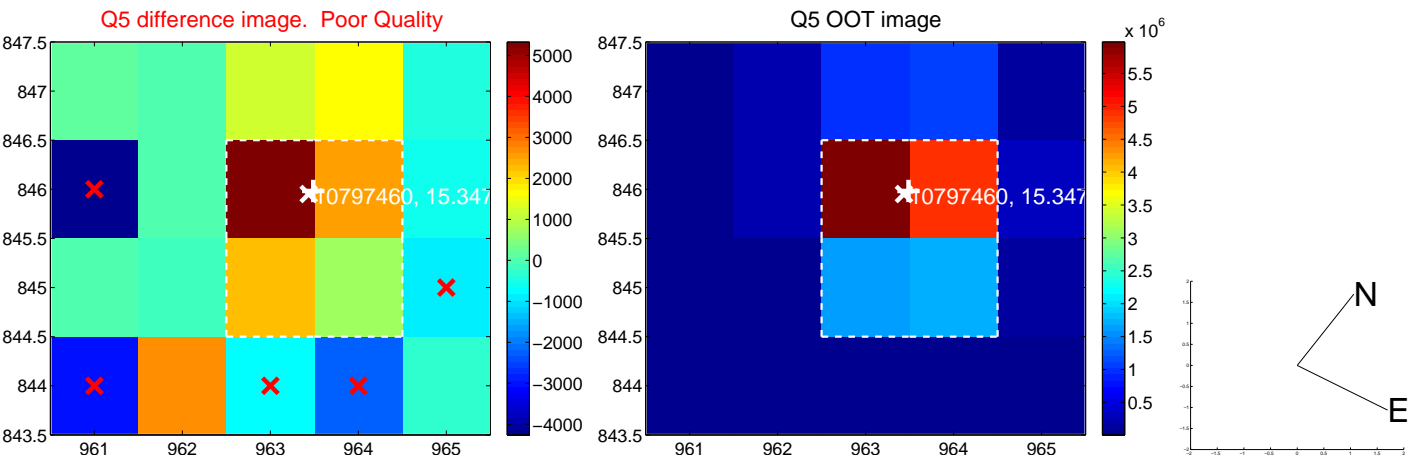
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

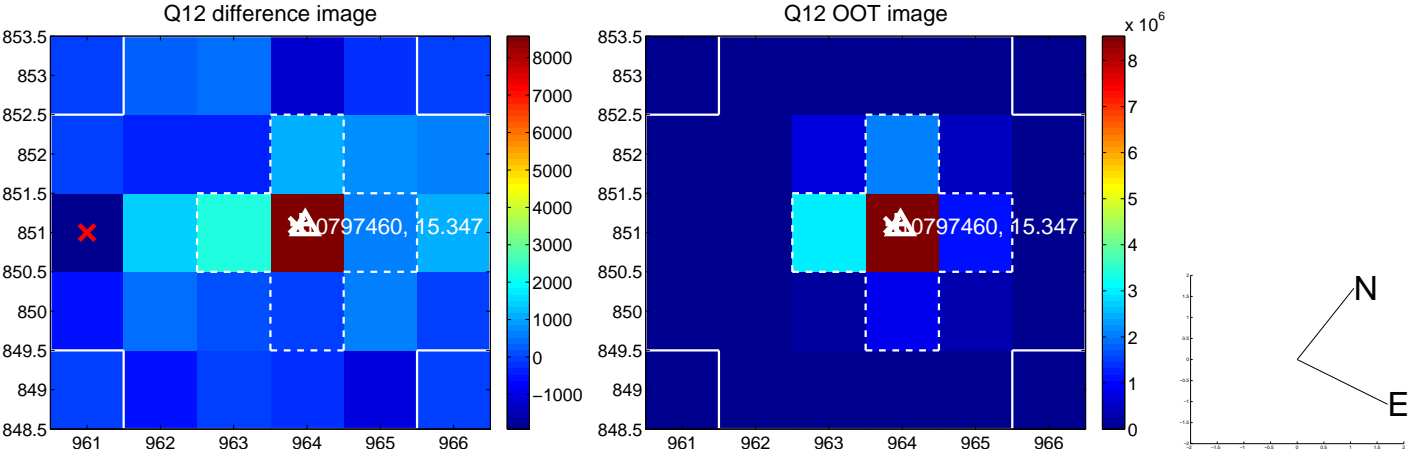
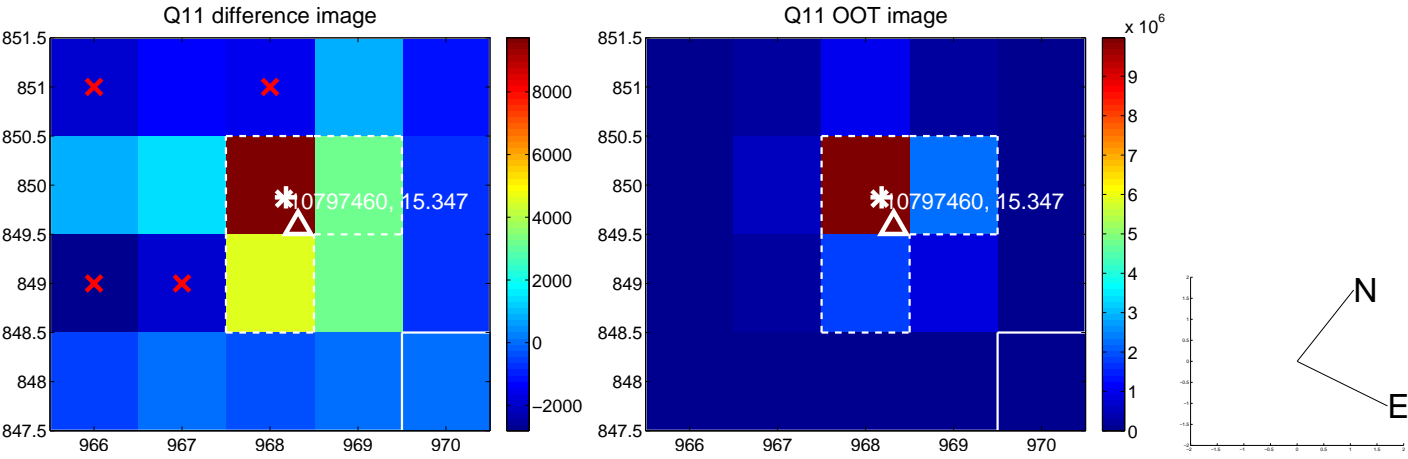
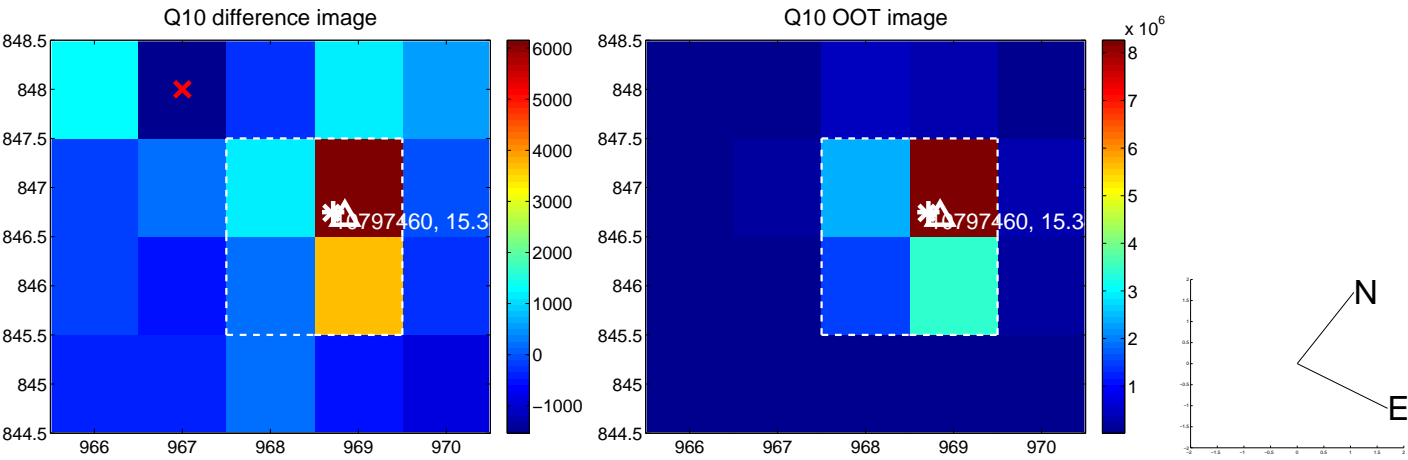
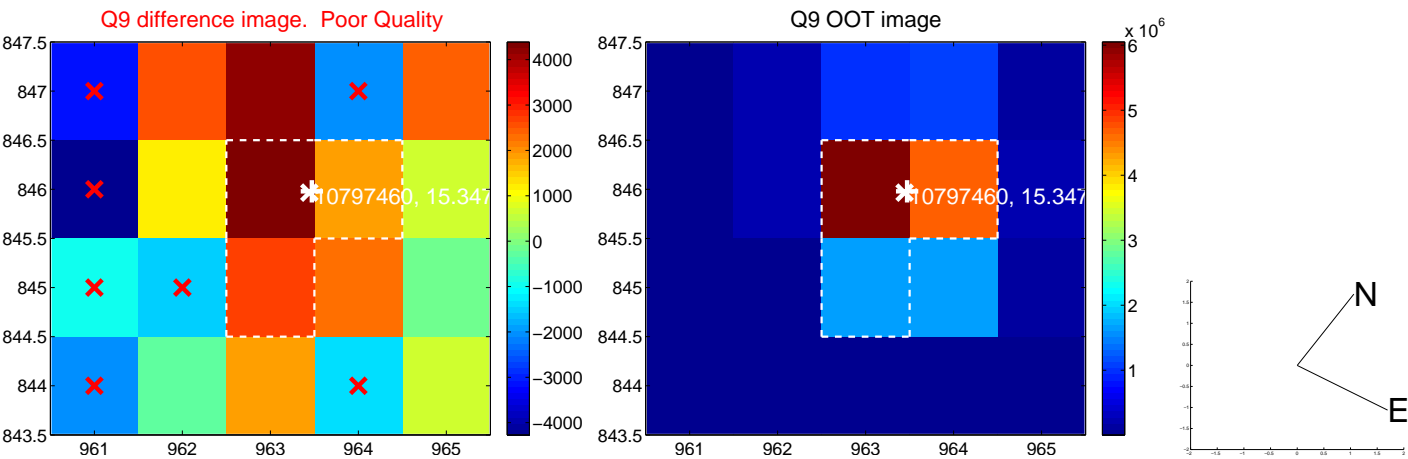




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

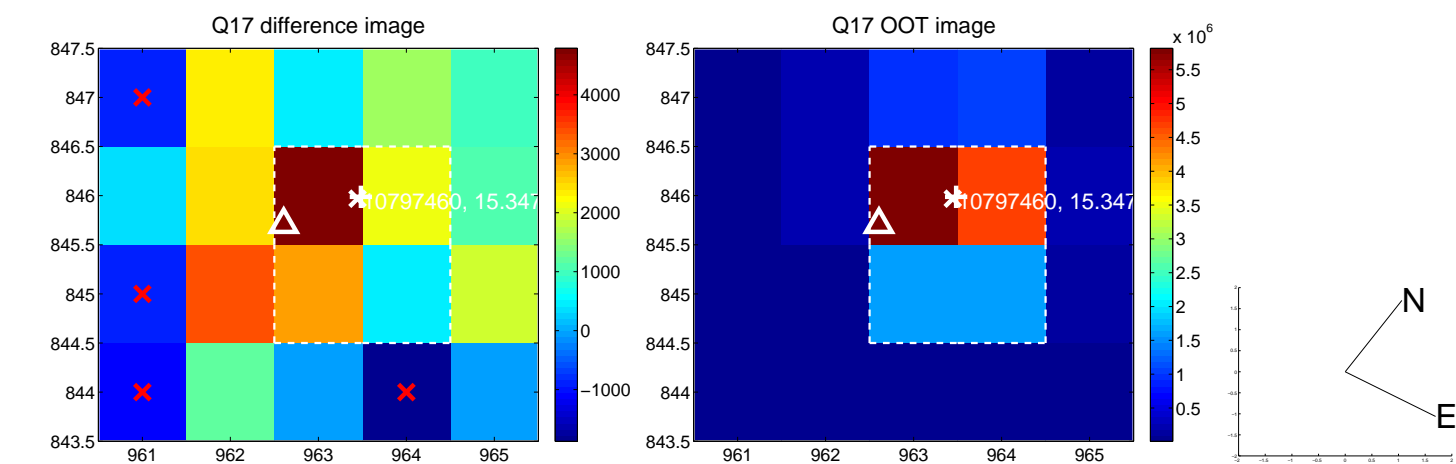


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

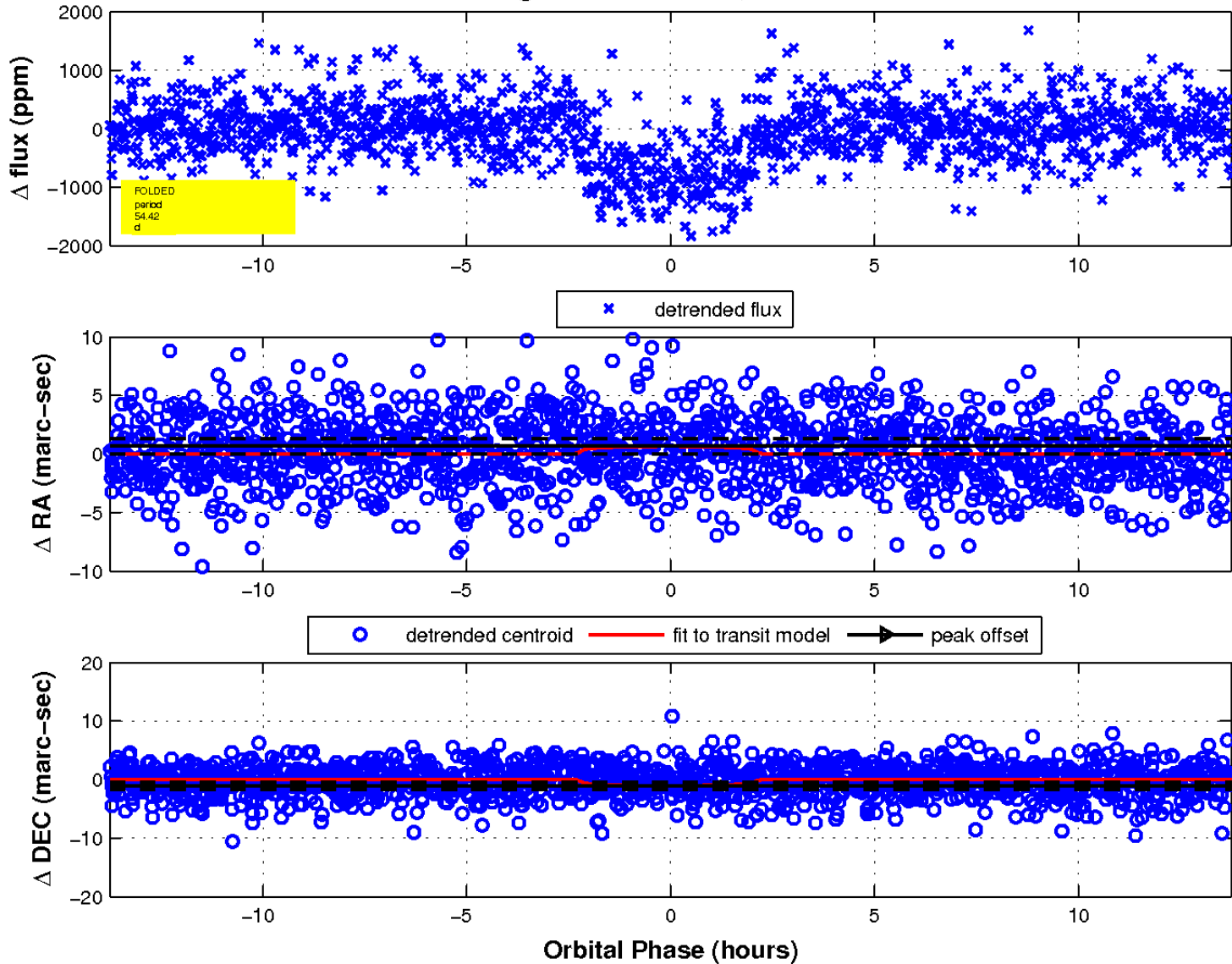




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

