

# KIC 008773948

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008773948-01	OBS	7090.01	33.469521	154.007876	165341.1	11.905	5305.2	4176.8	3.08	5934	127.56	211.83
008773948-02	OBS	No	33.469500	136.873240	104430.5	18.923	3720.0	2508.3	3.08	5934	102.88	211.83
008773948-03	OBS	No	309.443191	318.769324	3225.4	76.254	24.7	26.6	3.08	5934	32.13	10.92
008773948-04	OBS	No	1.595313	133.019672	233.3	6.000	13.1	-1.0	3.08	5934	4.70	12257.07

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008773948-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE
008773948-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE
008773948-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_ZUMA_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008773948-04	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_NOFITS

**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.

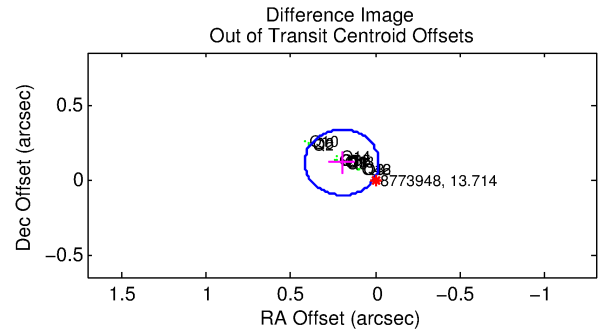
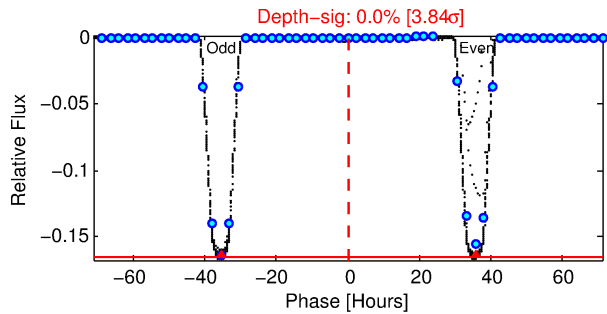
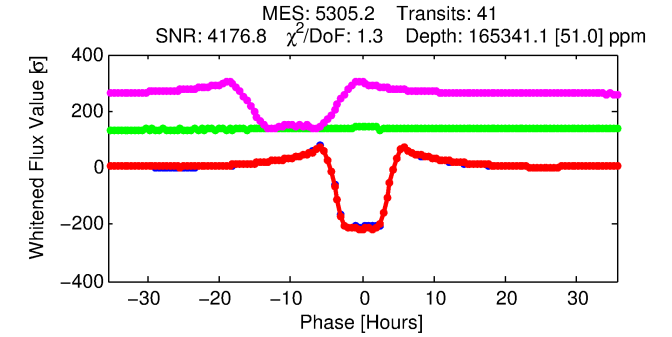
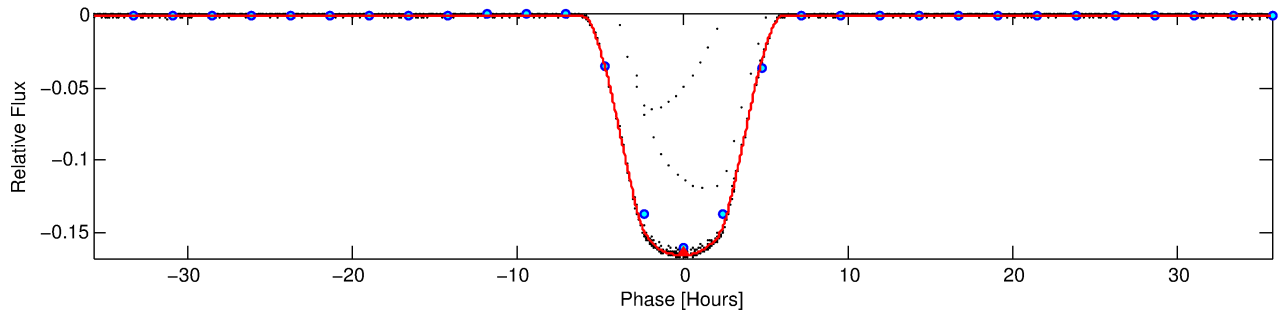
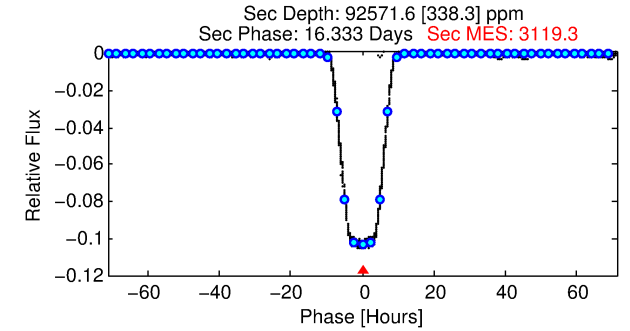
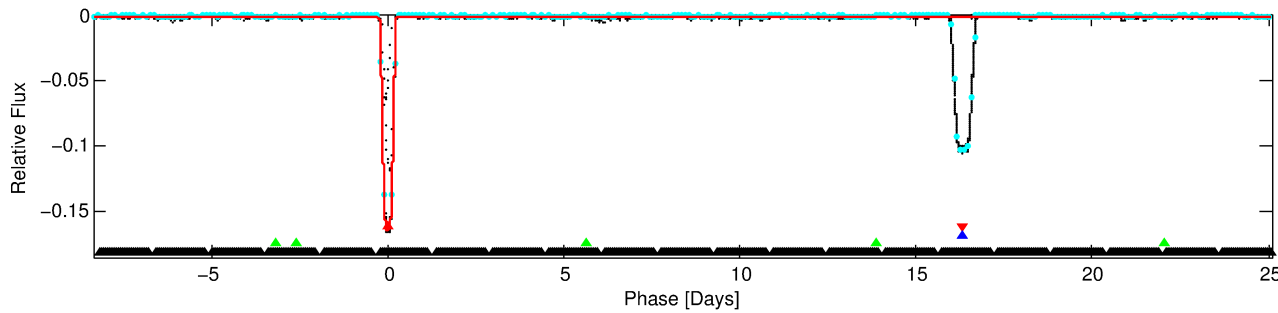
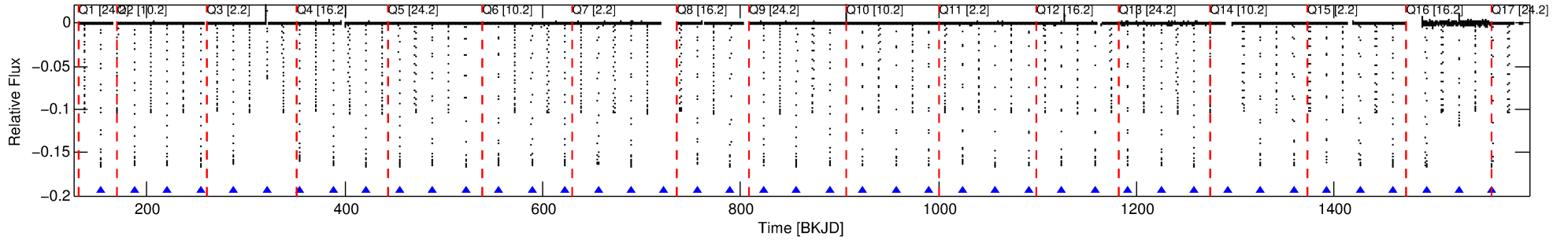
## Ephemeris Match Information For 008773948-01

No Significant Match Found

# DV One-Page Summary

KIC: 8773948 Candidate: 1 of 4 Period: 33.470 d  
KOI: K07090.01 Corr: 1.000

Kp: 13.71 R\*: 3.08 Rs Teff: 5934.0 K Logg: 3.58 Fe/H: -0.620



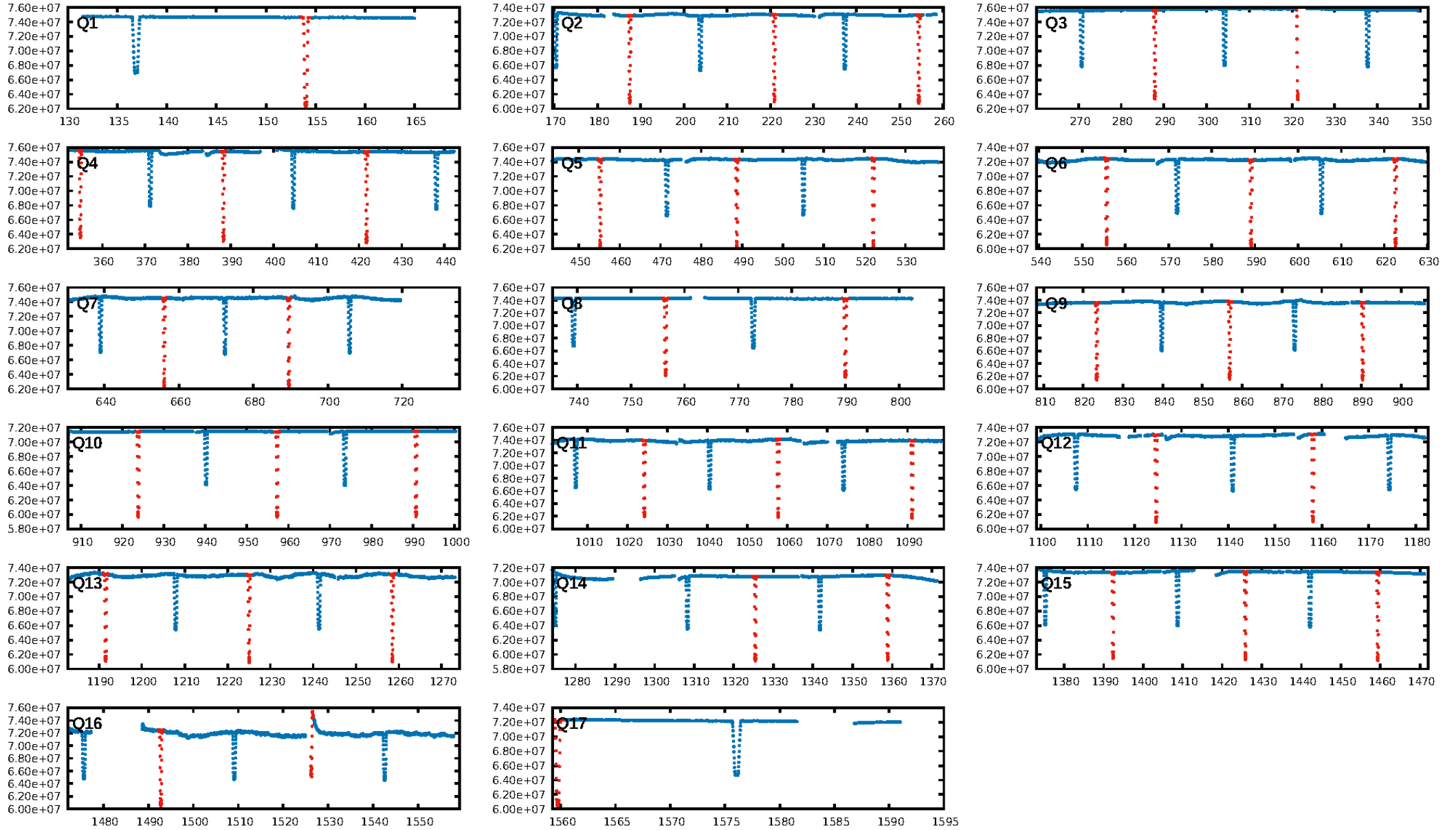
## DV Fit Results:

Period = 33.46952 [0.00000] d  
Epoch = 154.0079 [0.0001] BKJD  
Rp/R\* = 0.3802 [0.0001]  
a/R\* = 28.83 [0.01]  
b = 0.32 [0.00]  
Seff = 211.83 [280.29]  
Teq = 973 [322] K  
Rp = 127.57 [84.84] Re  
a = 0.2227 [0.1696] AU  
Ag = 155.19 [204.20] [0.76σ]  
Teffp = 5309 [186] K [11.66σ]

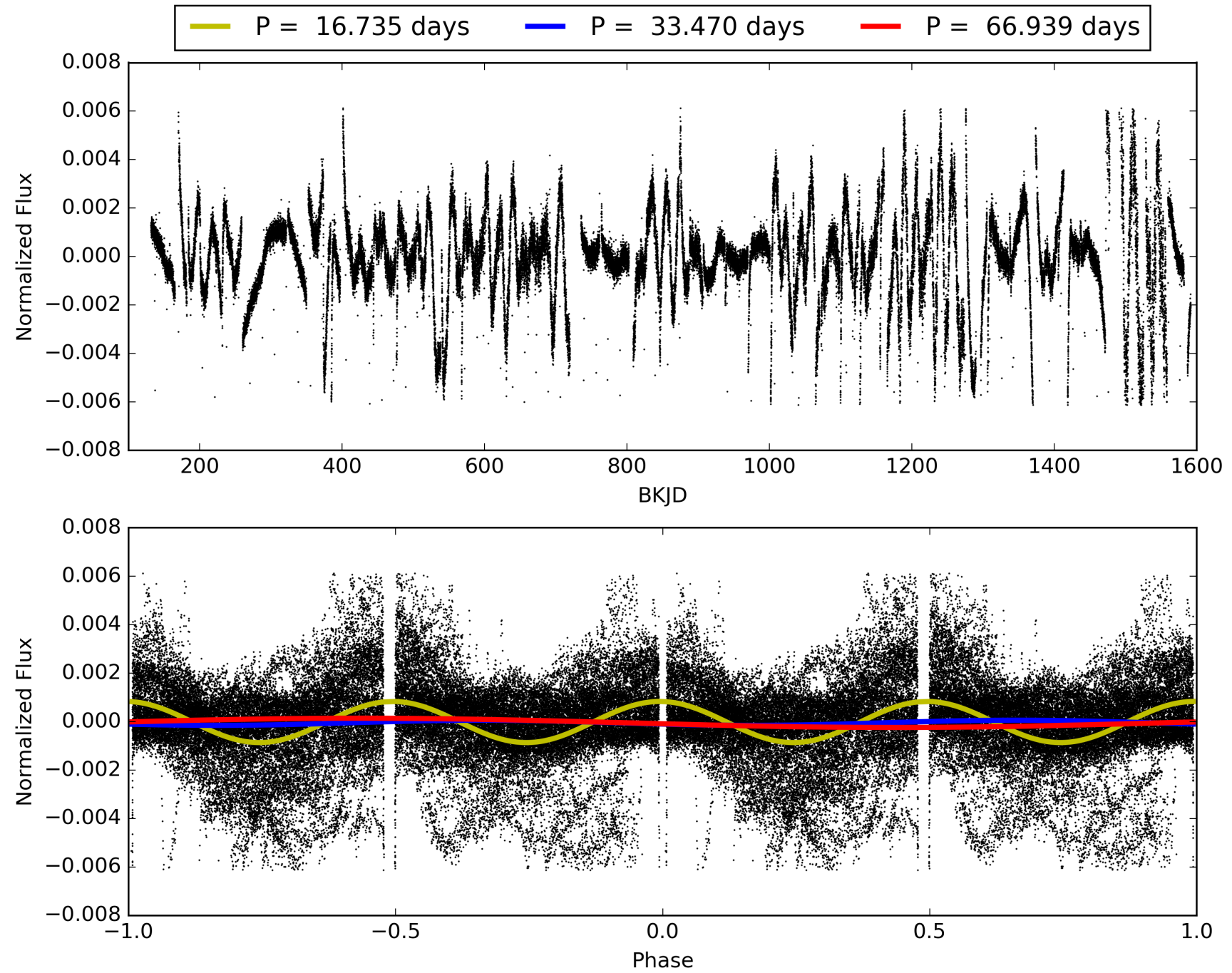
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: 100.0% [85.82σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 15.2%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [39/39]  
GhostDiagnostic-chr: 8.033  
Centroid-sig: N/A  
Centroid-so: 0.003 arcsec [2.37σ]  
OotOffset-rm: 0.229 arcsec [3.15σ]  
KicOffset-rm: 0.034 arcsec [0.49σ]  
OotOffset-st: 4/4/4/4 [16]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 1.00 [16/16]  
DiffImageOverlap-fno: 0.00 [0/16]

# TCE 008773948-01, PDC Light Curves



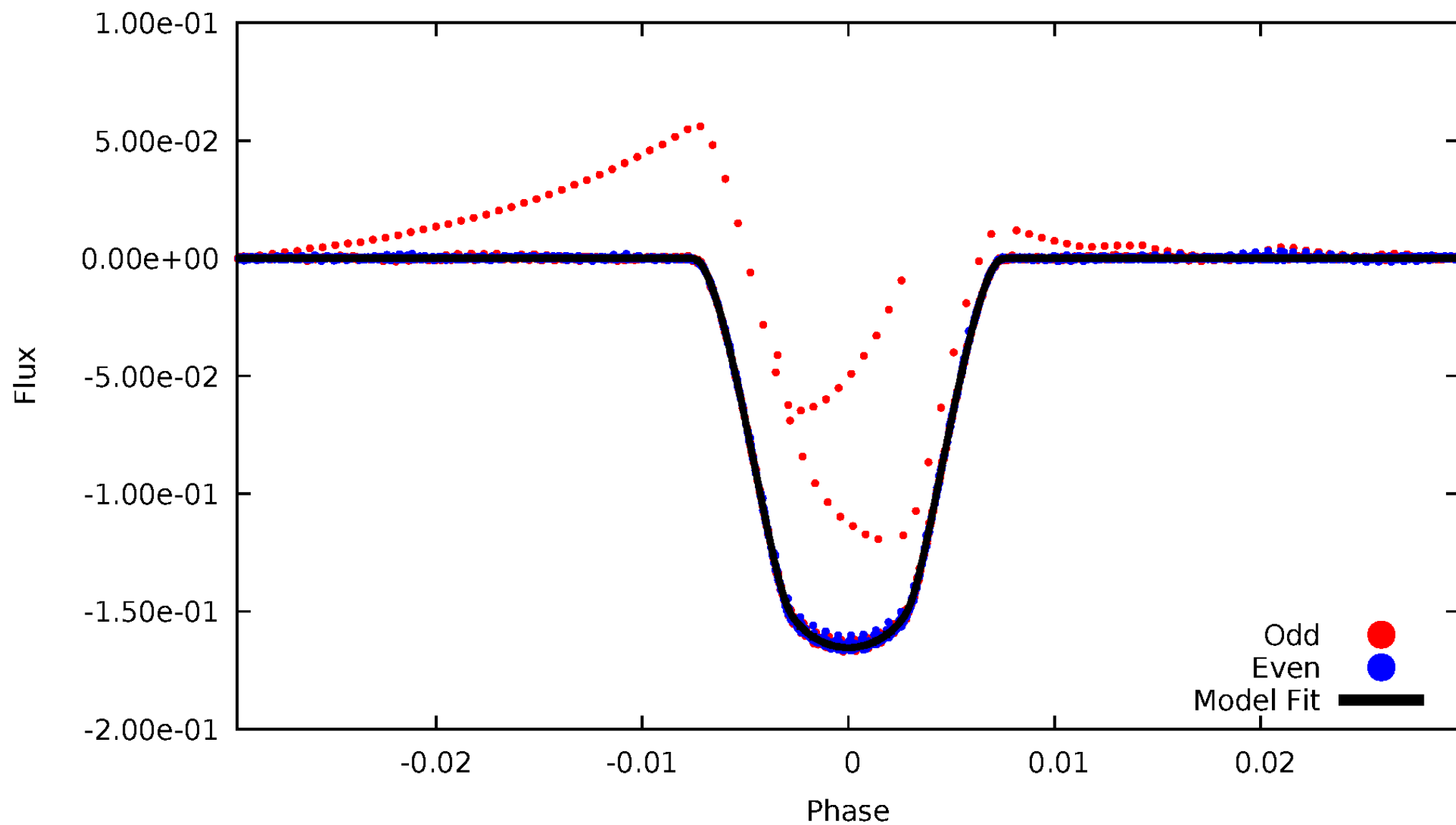
TCE 008773948-01





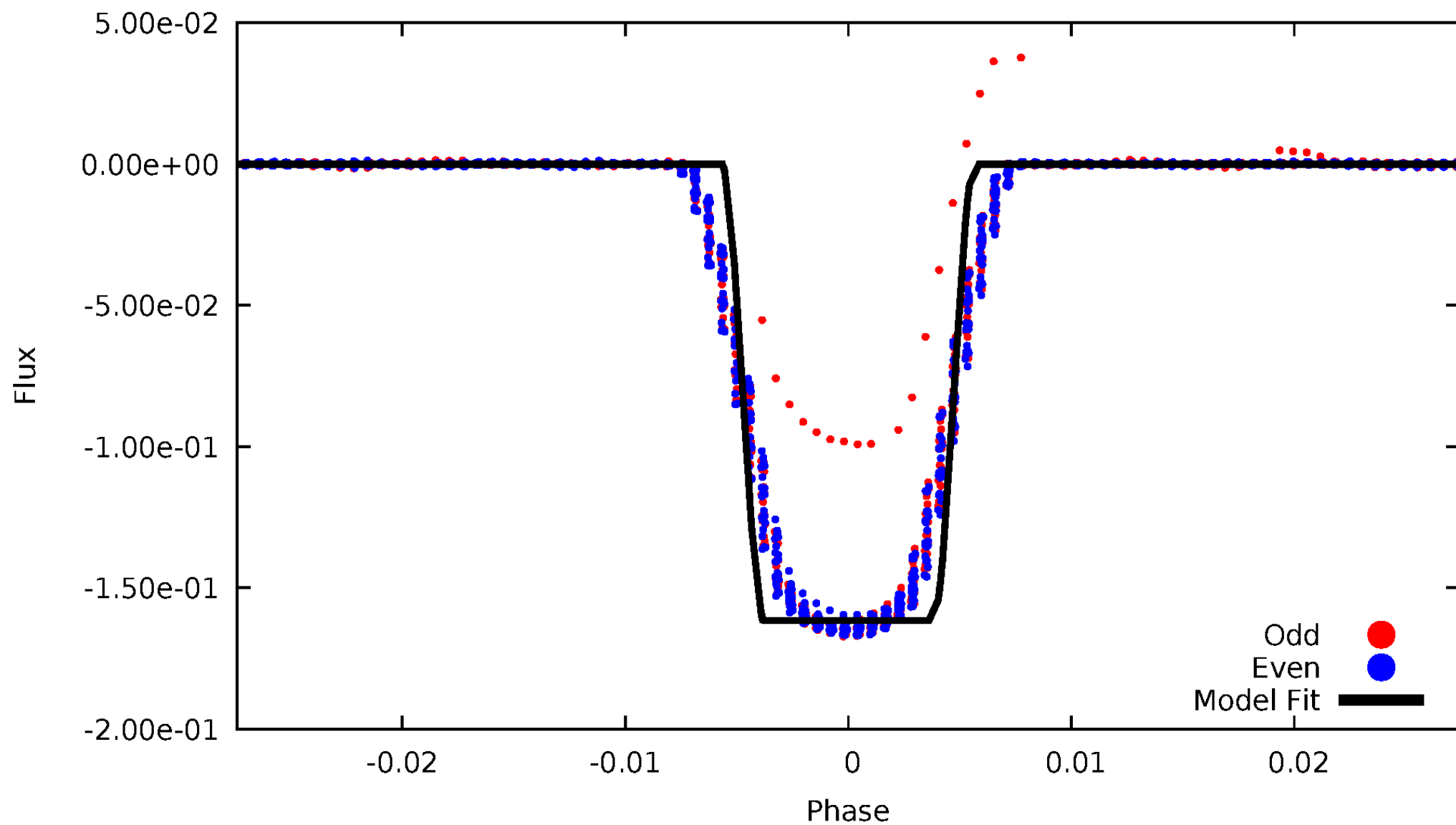
# DV Odd/Even

TCE 008773948-01



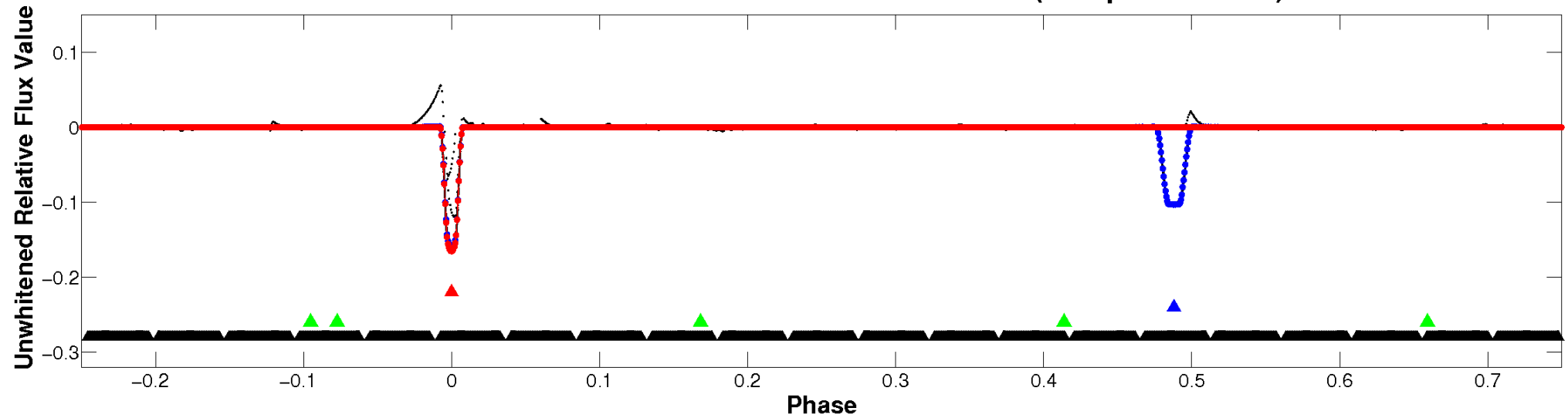
# ALT Odd/Even

TCE 008773948-01

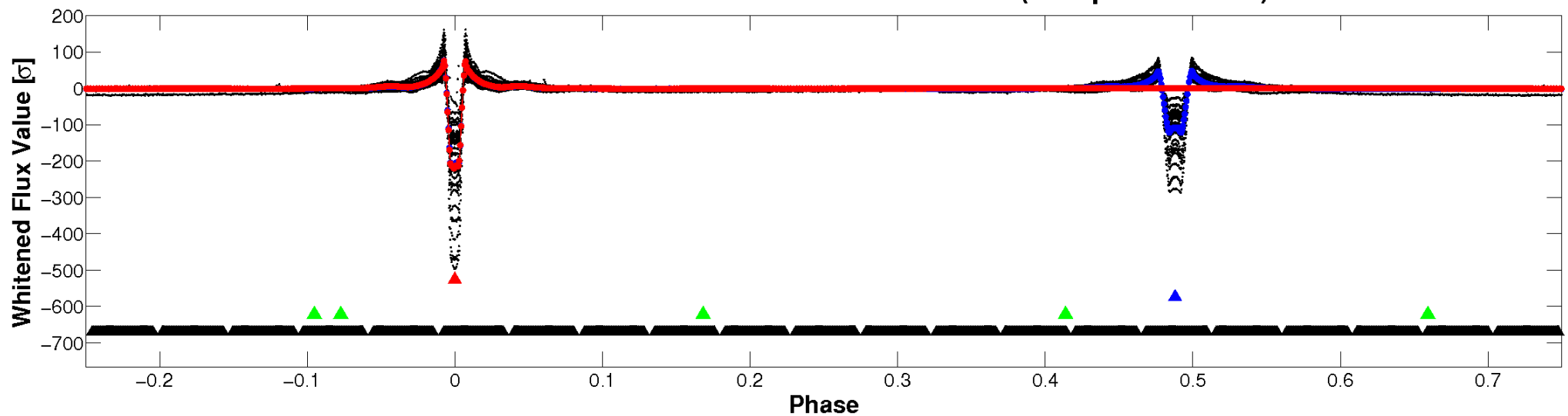


# Non-Whitened Vs. Whitened Light Curve

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

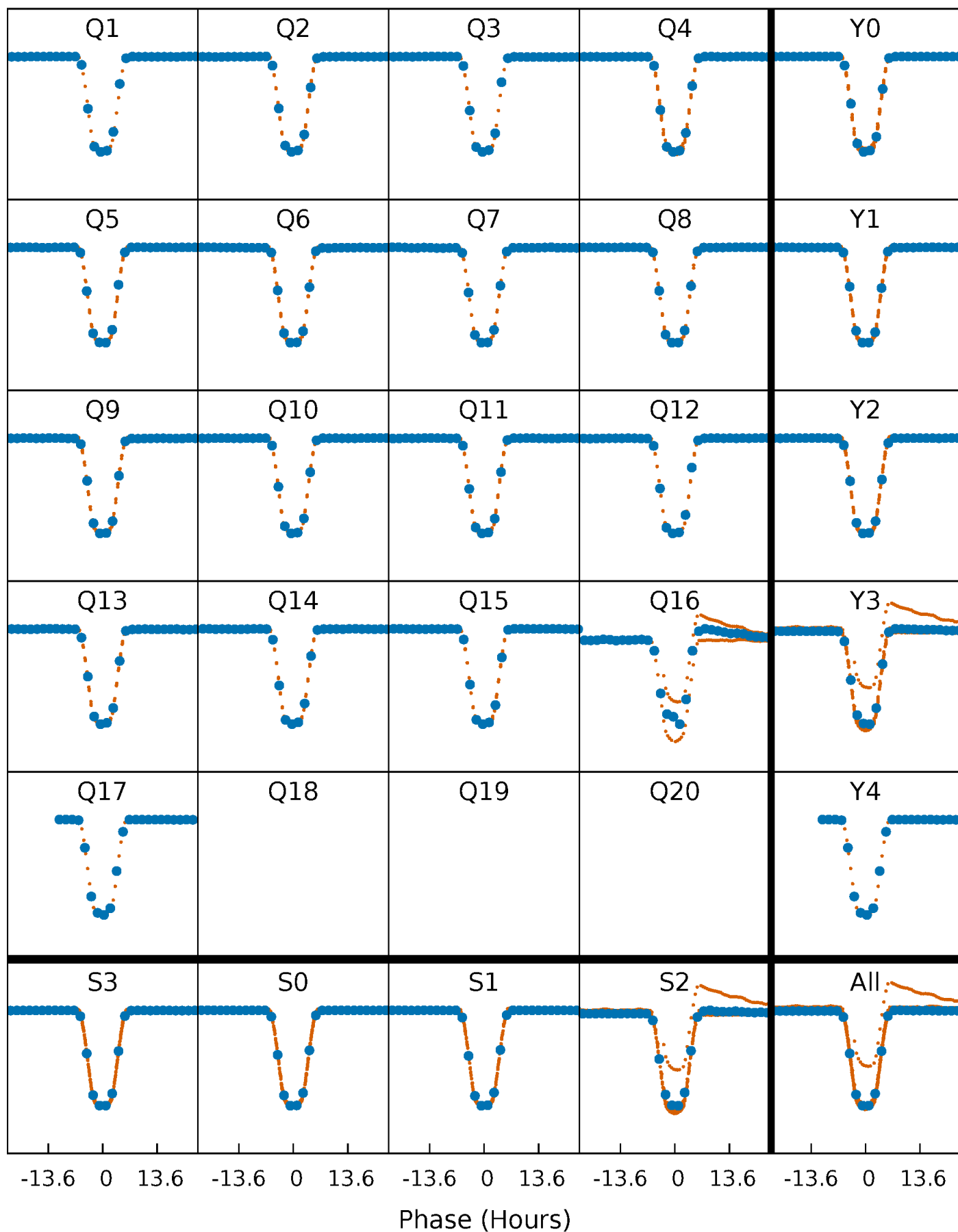


## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



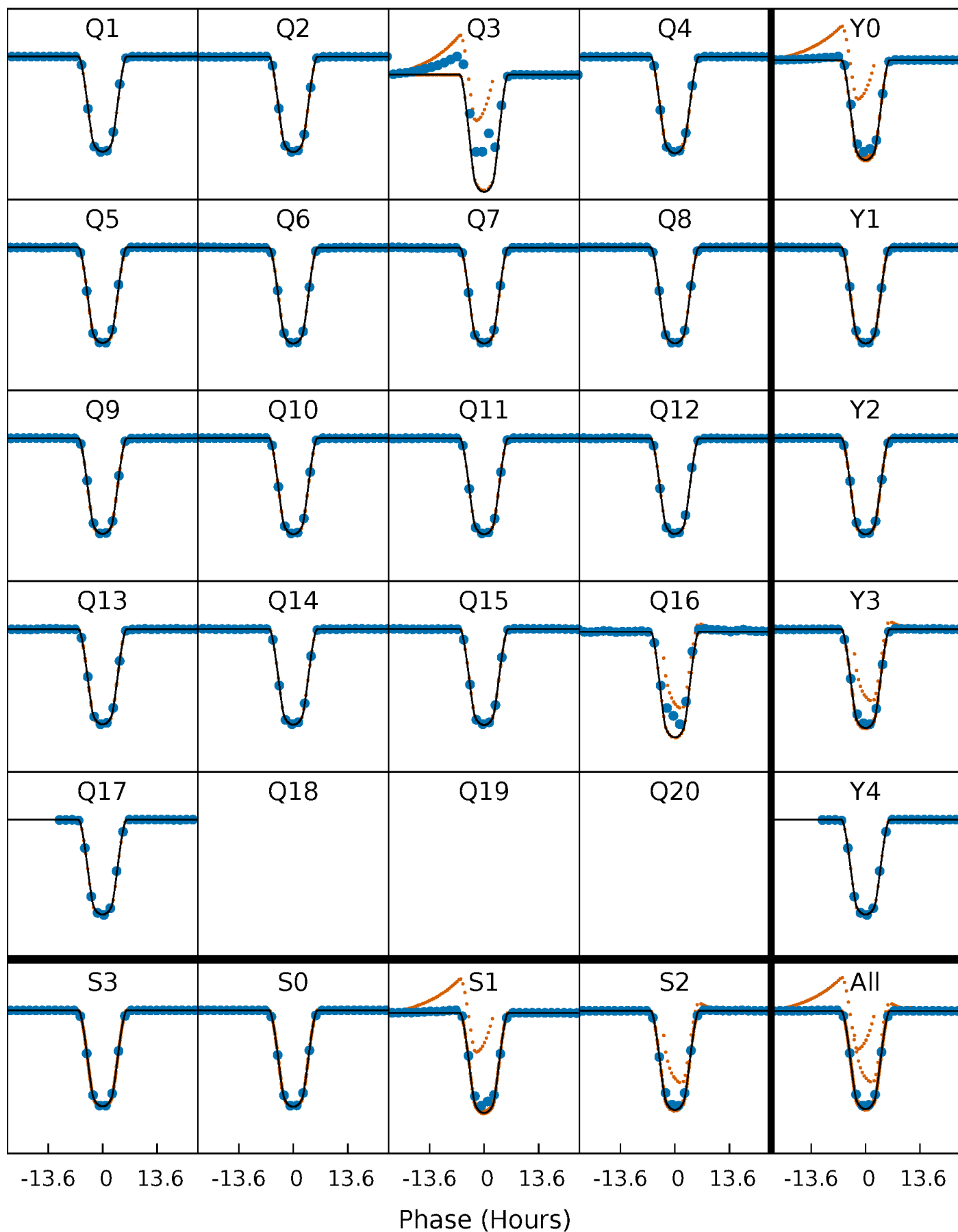
# PDC Quarter-Phased Transit Curves

TCE 008773948-01 P= 33.469521 Days  $T_0=154.007876$  (BKJD)



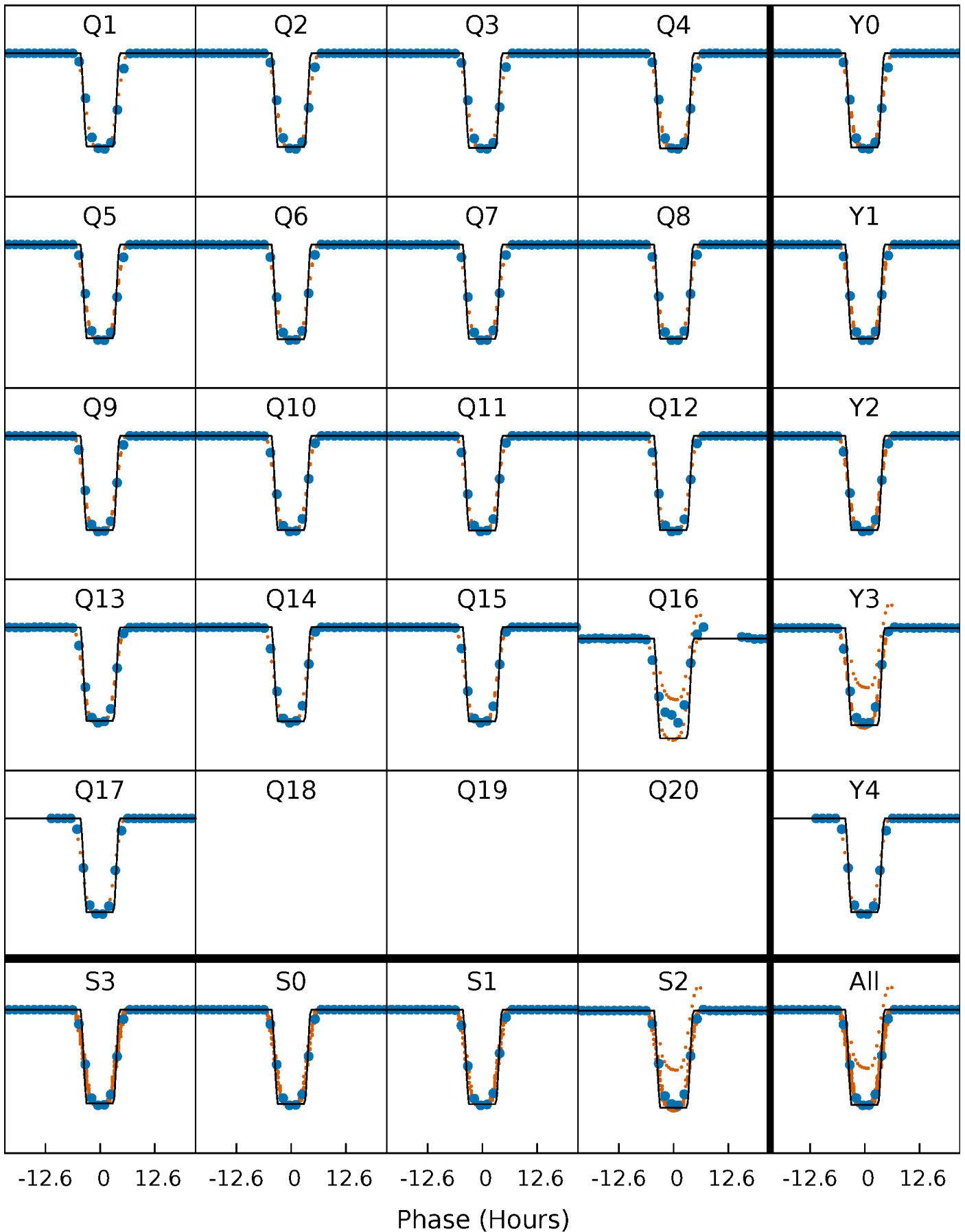
# DV Quarter-Phased Transit Curves

TCE 008773948-01 P= 33.469521 Days  $T_0=154.007876$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 008773948-01 P= 33.470190 Days  $T_0=153.994651$  (BKJD)

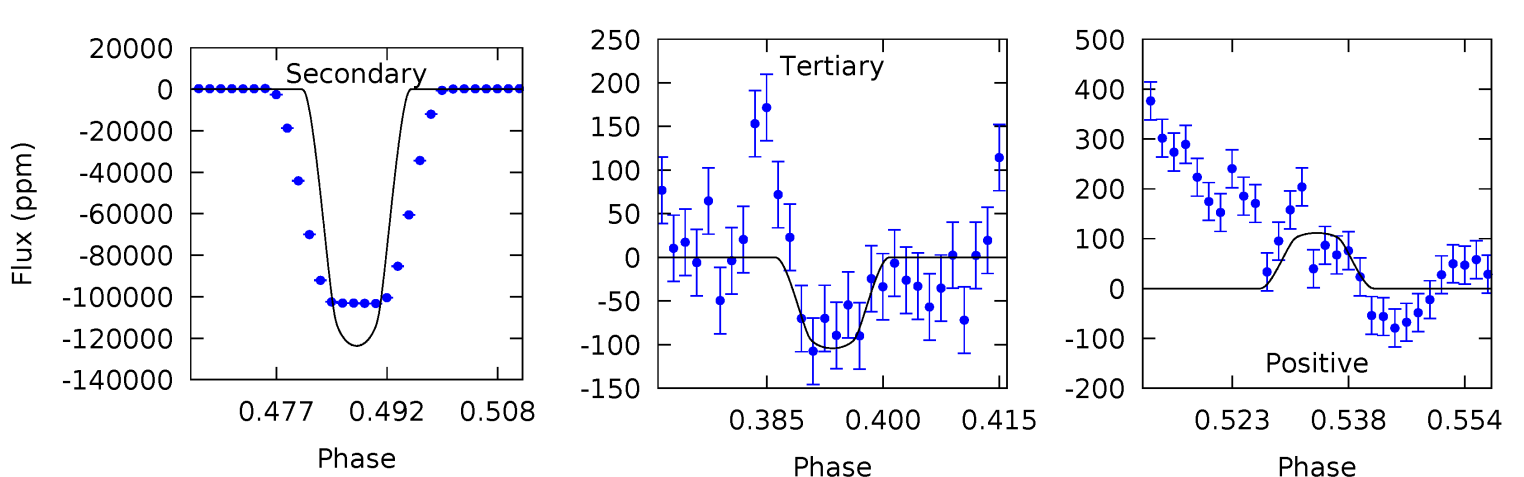
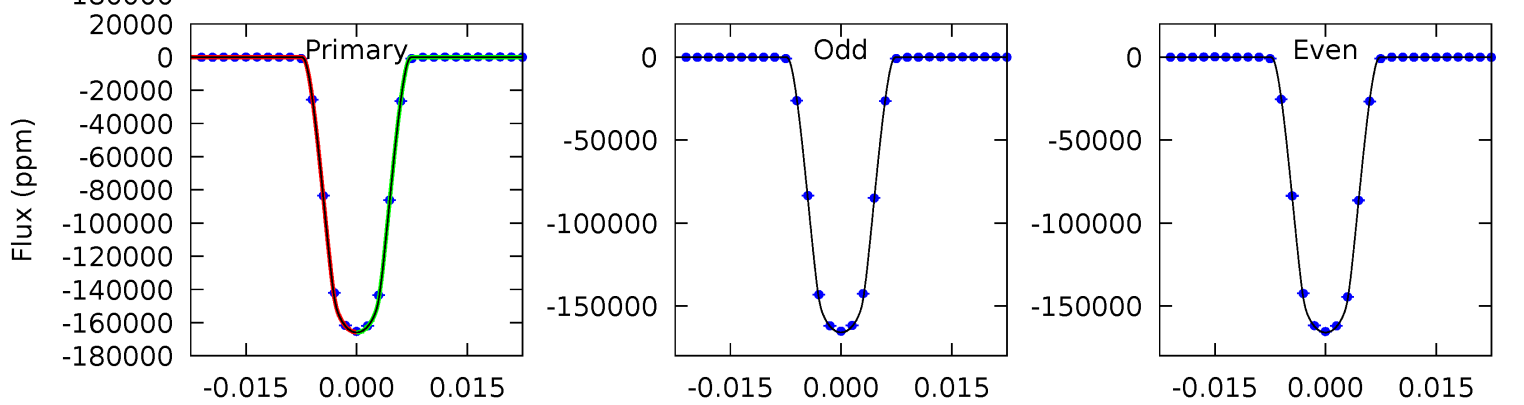
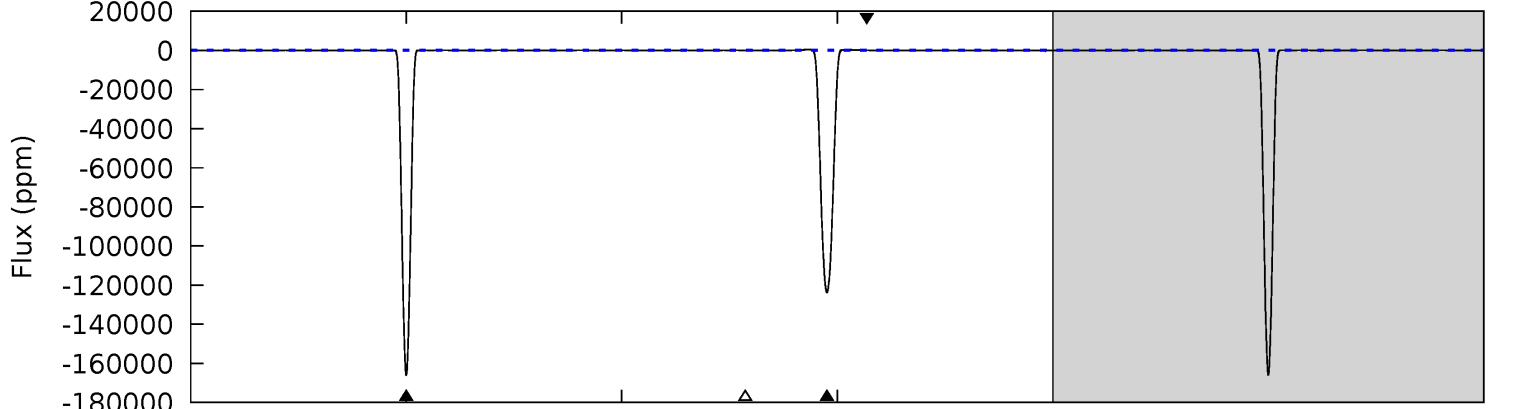
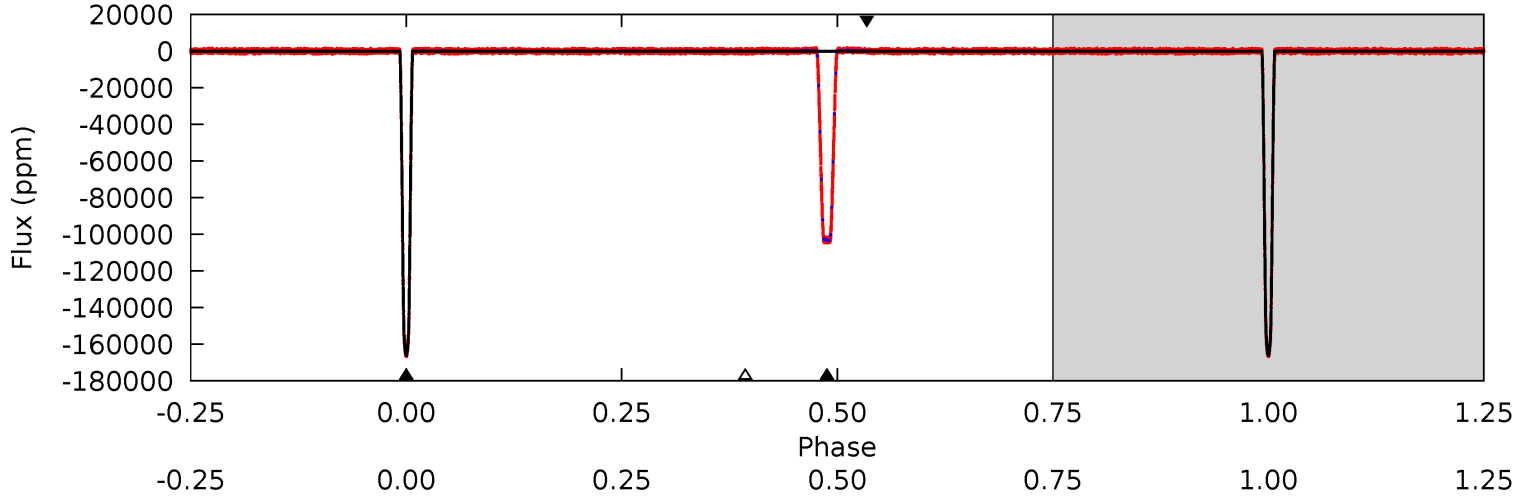




# DV Model-Shift Uniqueness Test

008773948-01, P = 33.469521 Days, E = 120.538355 Days

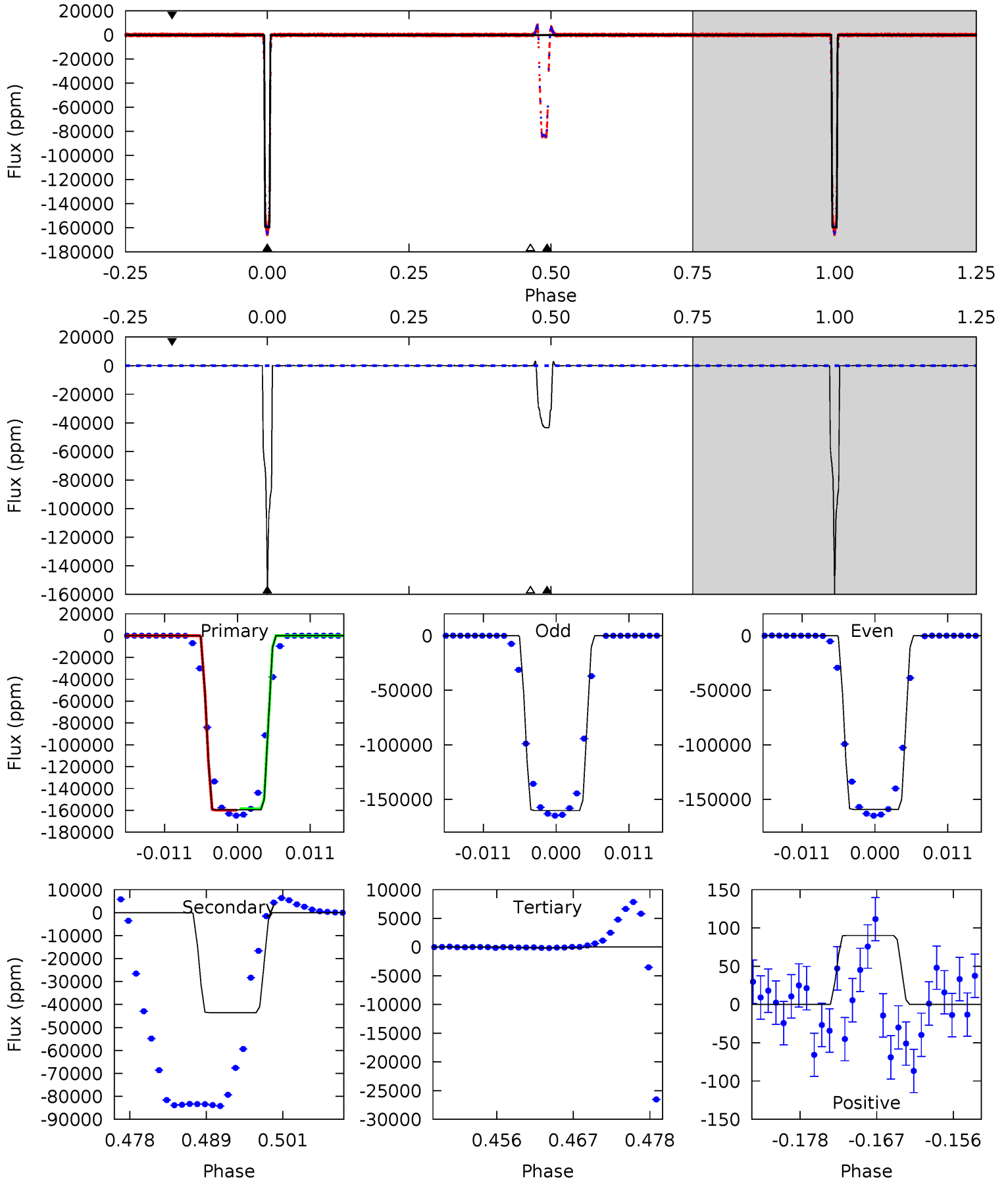
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12089	9012	7.59	8.12	4.94	2.42	5.30	12082	12081	9005	9004	1.91	0.97	0.00	0.31



# Alt Model-Shift Uniqueness Test

008773948-01, P = 33.470190 Days, E = 120.524461 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
2819	769.1	2.42	1.59	5.01	2.54	14.3	2816	2817	766.6	767.5	11.9	0.99	0.02	3.34



### Stellar Parameters For KIC 008773948

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5934^{+208}_{-187}$	$3.581^{+0.807}_{-0.142}$	$-0.620^{+0.350}_{-0.250}$	$3.075^{+0.877}_{-2.045}$	$1.315^{+0.169}_{-0.474}$	$0.064^{+1.052}_{-0.033}$
	+4%/-3%	+23%/-4%	+56%/-40%	+29%/-67%	+13%/-36%	+1652%/-52%
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 008773948-01 / KOI 7090.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-123701 \pm 14$	$115.07^{+26.80}_{-40.42}$	$1302^{+132}_{-237}$	$5898^{+206}_{-191}$	$281^{+347}_{-85}$
Alt.	$-43536 \pm 57$	$122.38^{+26.42}_{-43.05}$	$1302^{+129}_{-234}$	$4502^{+122}_{-122}$	$79^{+103}_{-22}$

$T_{\text{max}}$  = 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

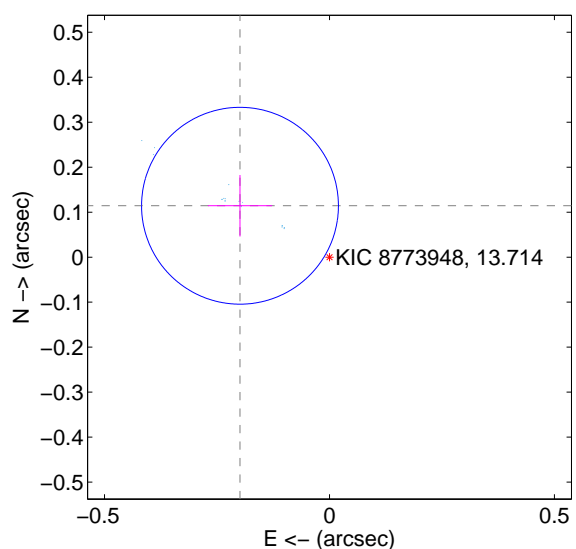
Supplemental centroid analysis for 008773948-01. Kepler magnitude: 13.71. Transit SNR 4176.85

There are 16 quarters with good PRF difference image offsets

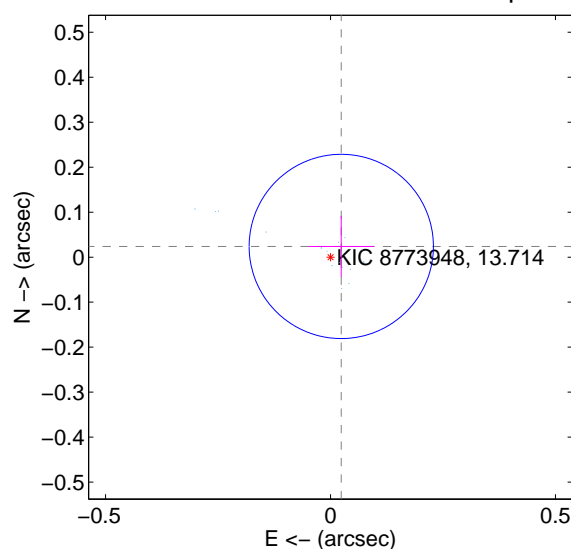
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>0.229 \pm 0.073</math></b>	<b>3.15</b>	$0.199 \pm 0.071$	$0.114 \pm 0.068$
PRF-fit source offset from KIC position	$0.034 \pm 0.068$	0.49	$-0.024 \pm 0.073$	$0.024 \pm 0.068$
photometric centroid source offset	$0.00 \pm 0.00$	2.37	$0.00 \pm 0.00$	$-0.00 \pm 0.00$

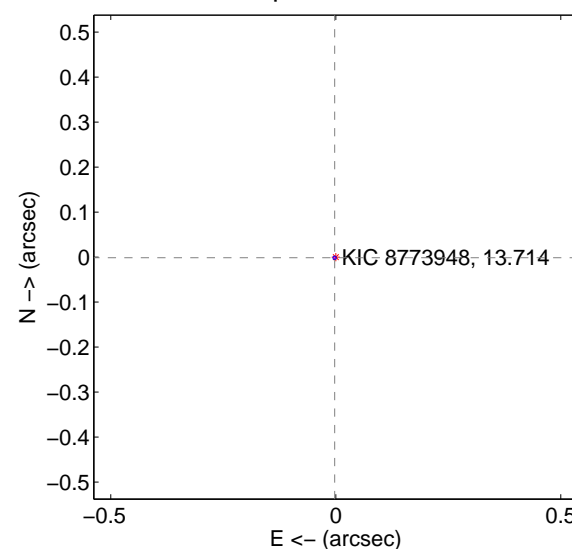
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

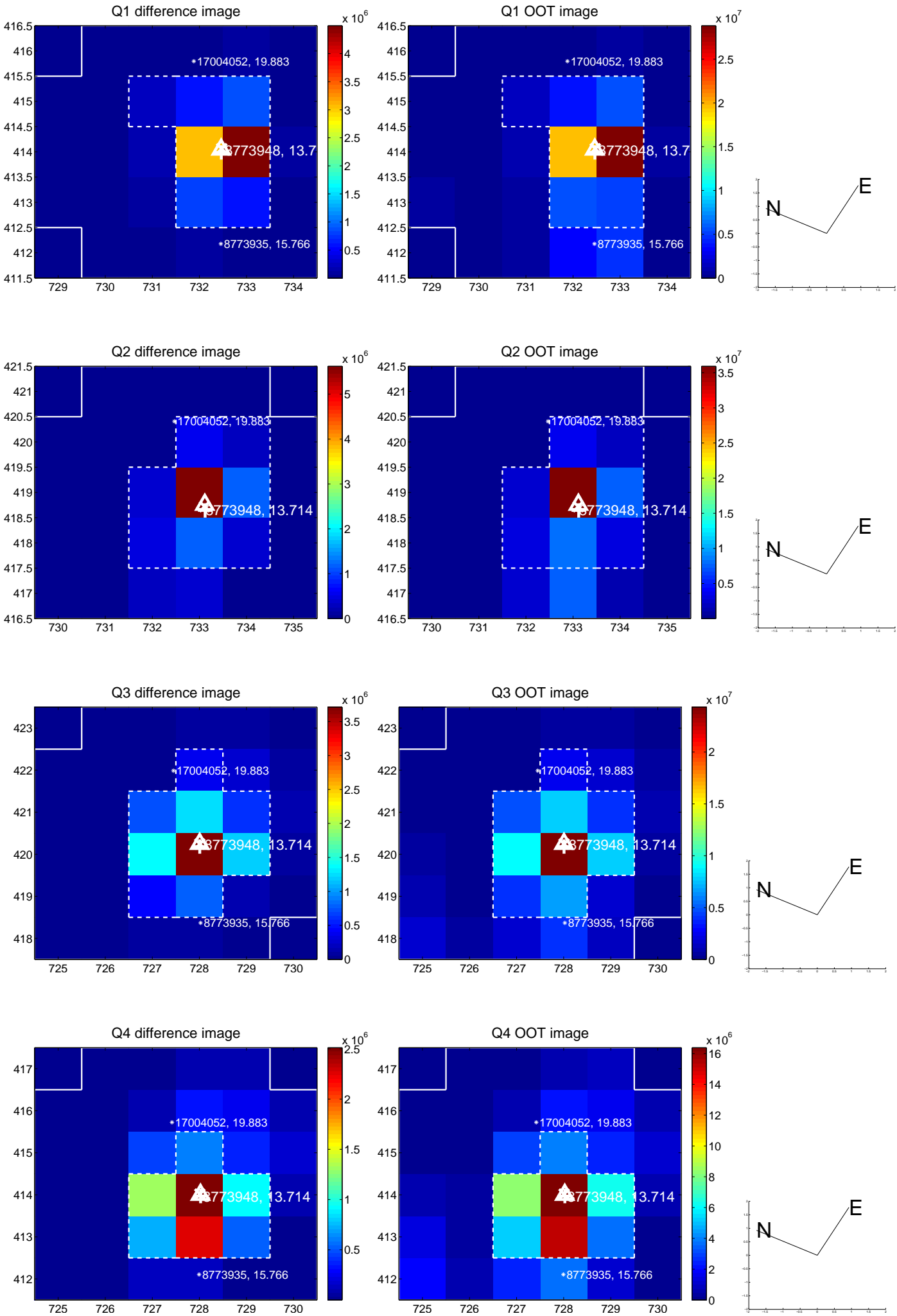


offset from photometric centroids

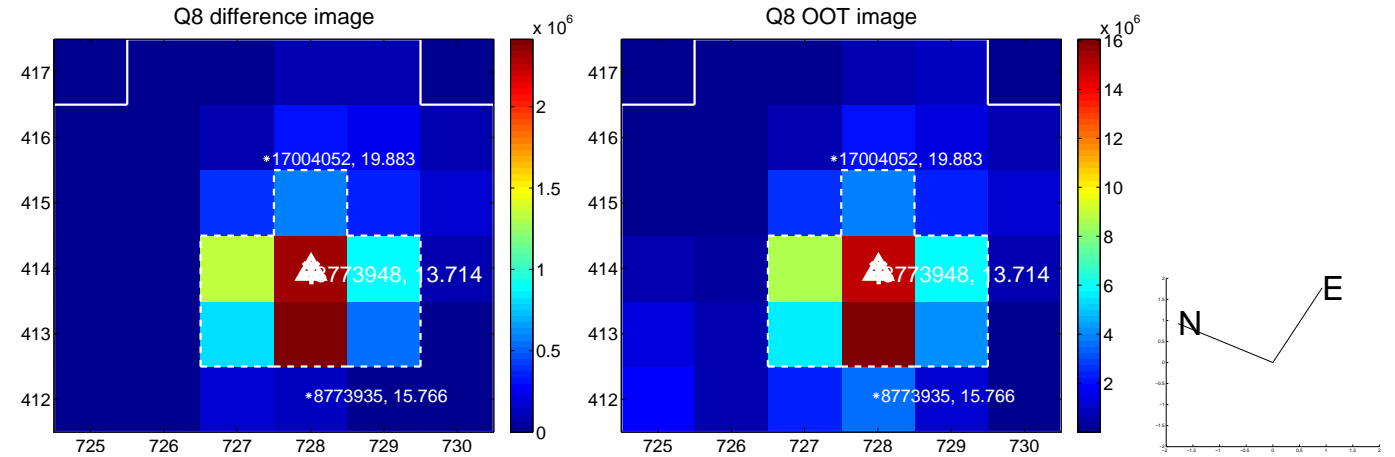
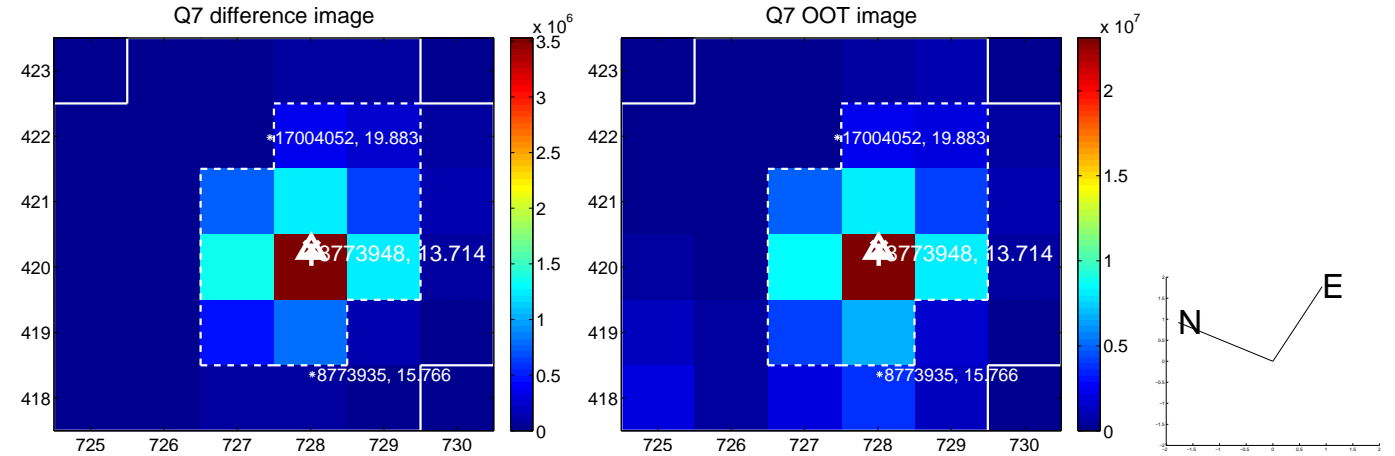
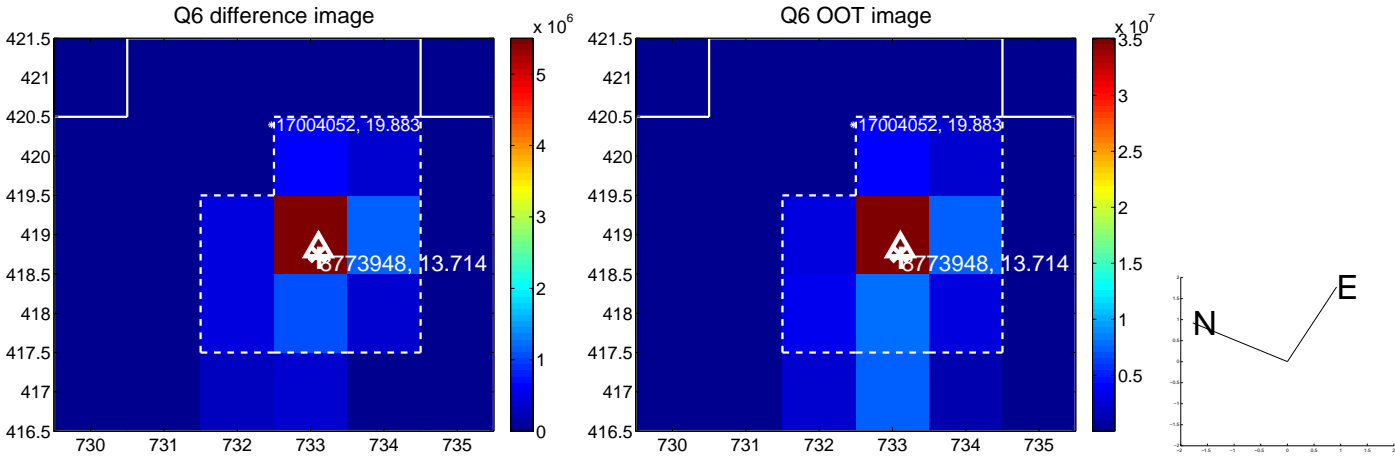
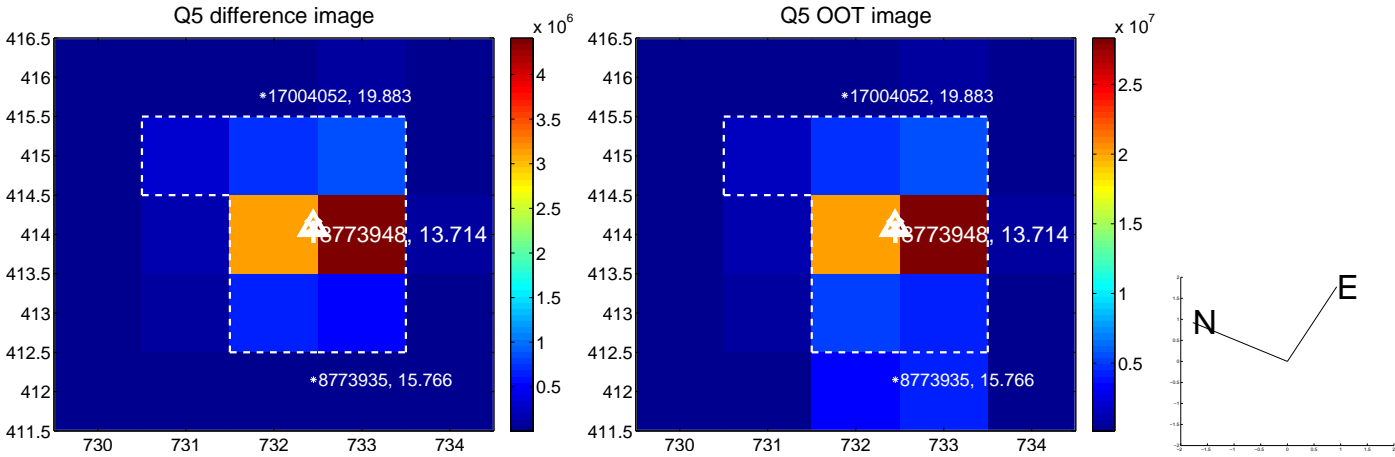


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

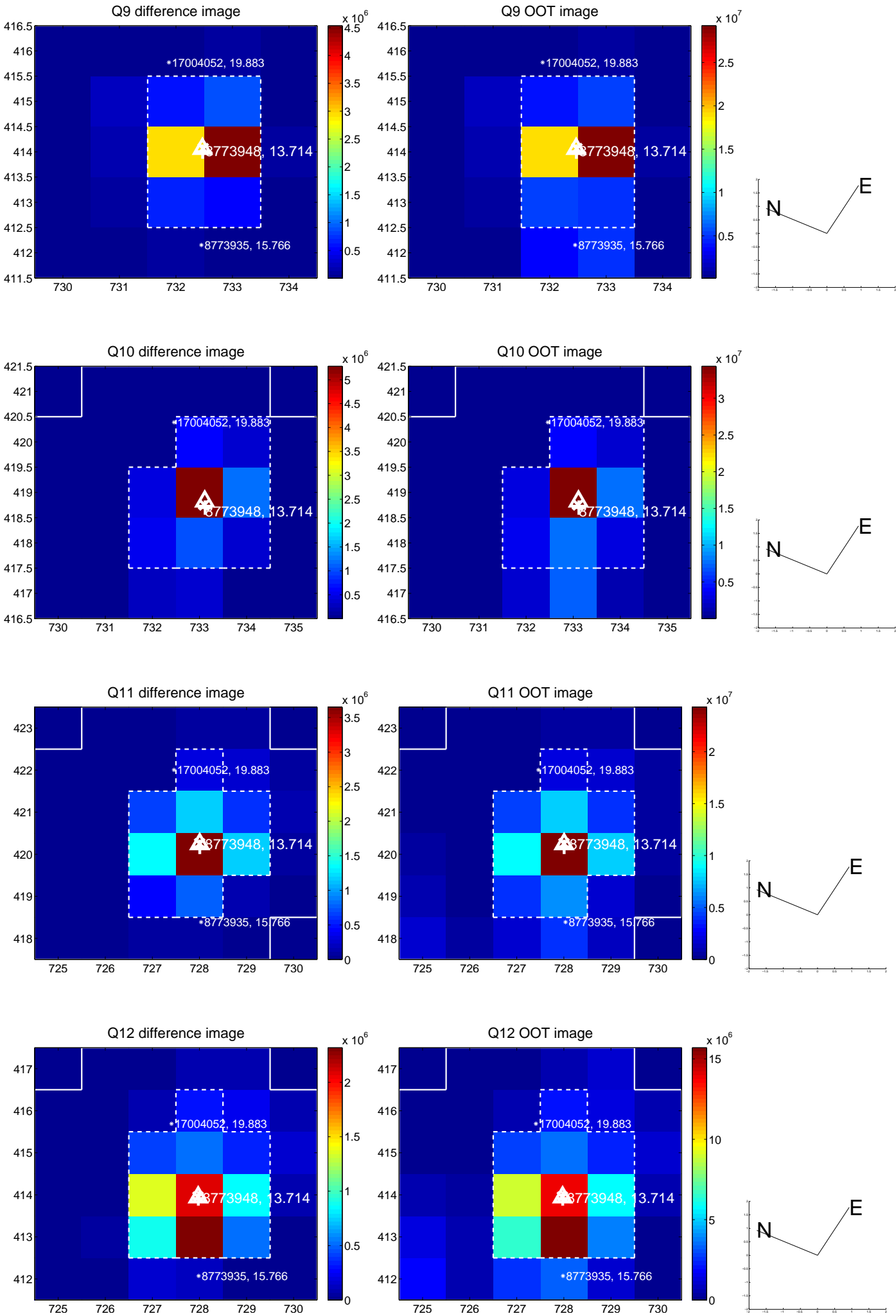


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

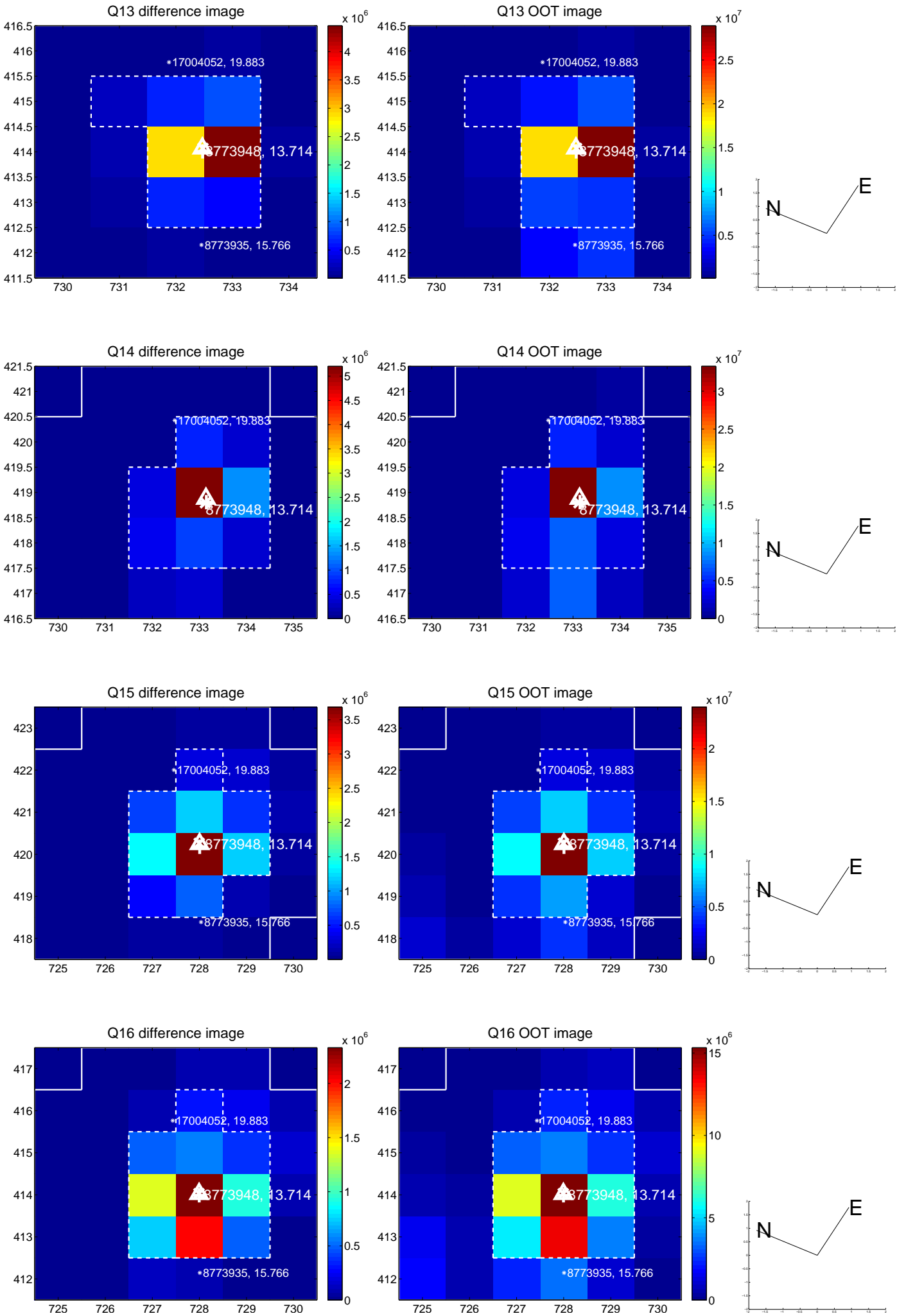




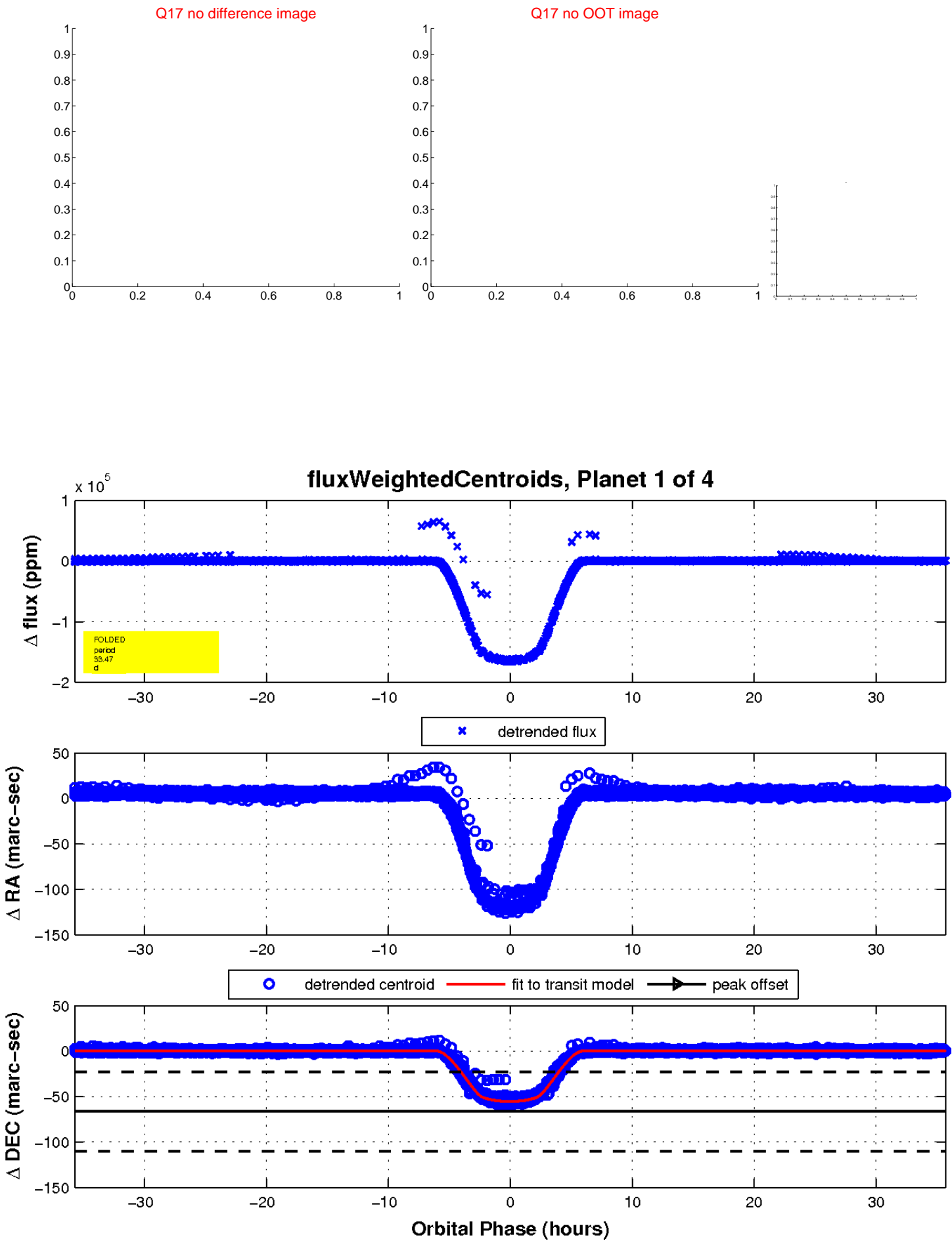
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



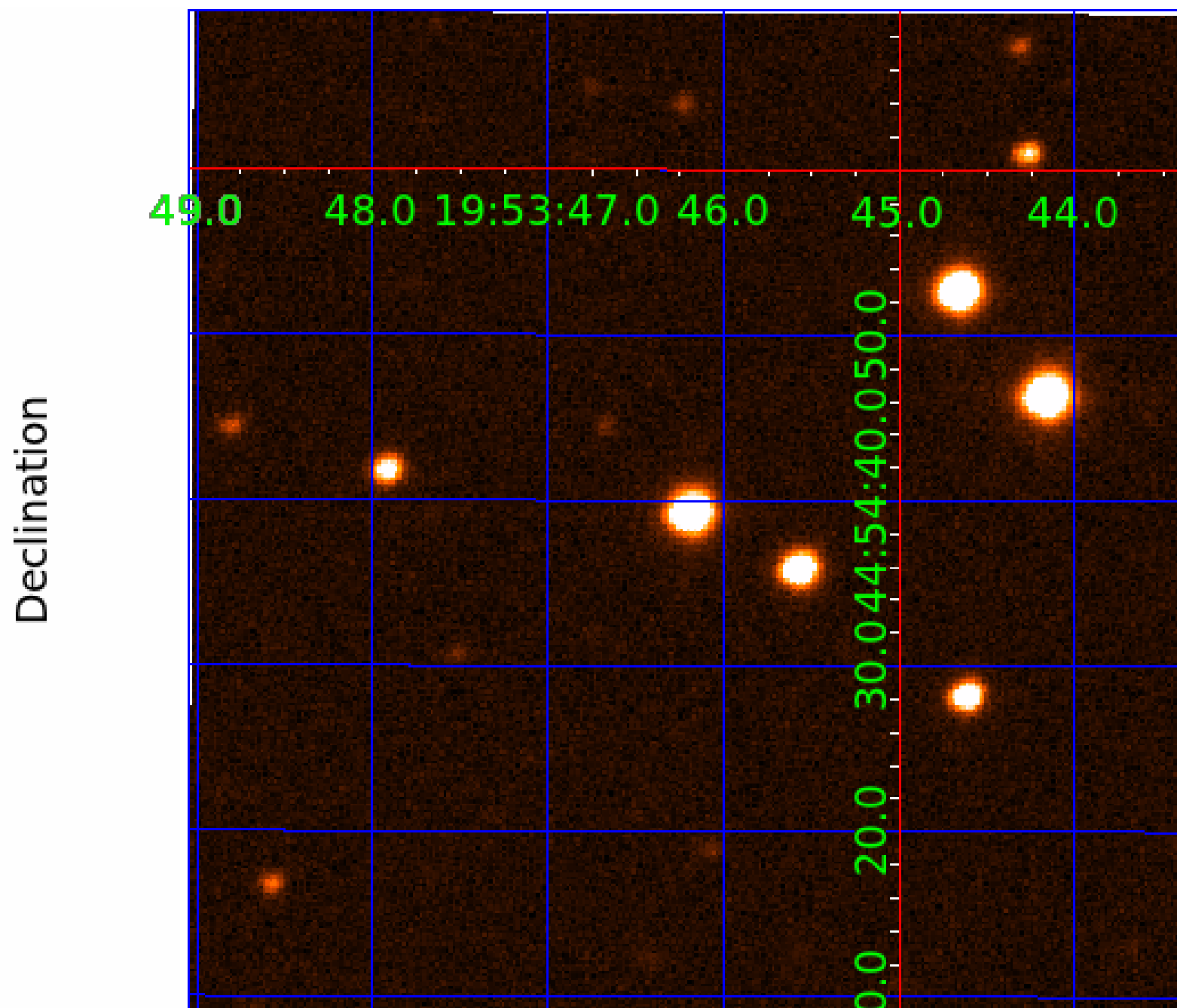
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 008773948

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008773948-01	OBS	7090.01	33.469521	154.007876	165341.1	11.905	5305.2	4176.8	3.08	5934	127.56	211.83
008773948-02	OBS	No	33.469500	136.873240	104430.5	18.923	3720.0	2508.3	3.08	5934	102.88	211.83
008773948-03	OBS	No	309.443191	318.769324	3225.4	76.254	24.7	26.6	3.08	5934	32.13	10.92
008773948-04	OBS	No	1.595313	133.019672	233.3	6.000	13.1	-1.0	3.08	5934	4.70	12257.07

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008773948-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE
008773948-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE
008773948-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_ZUMA_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008773948-04	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_NOFITS

**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.

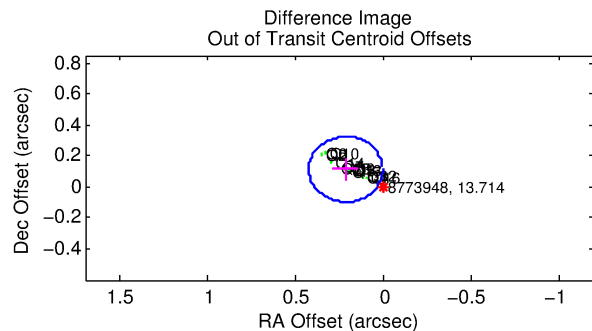
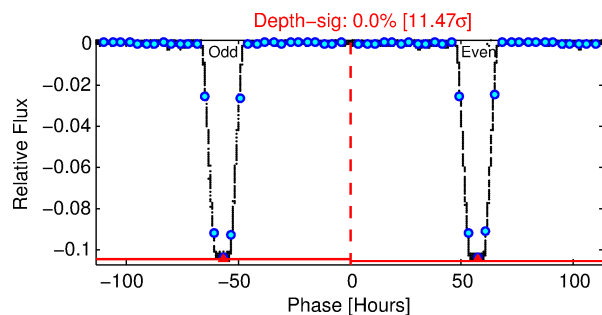
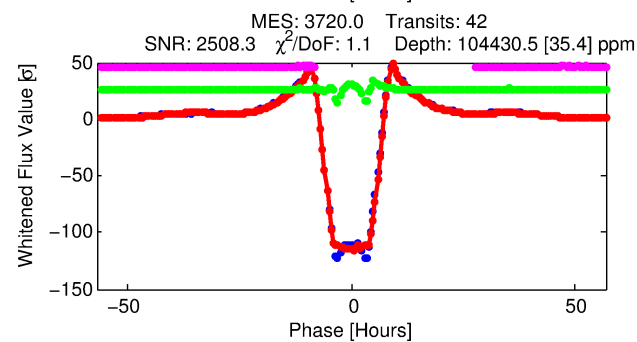
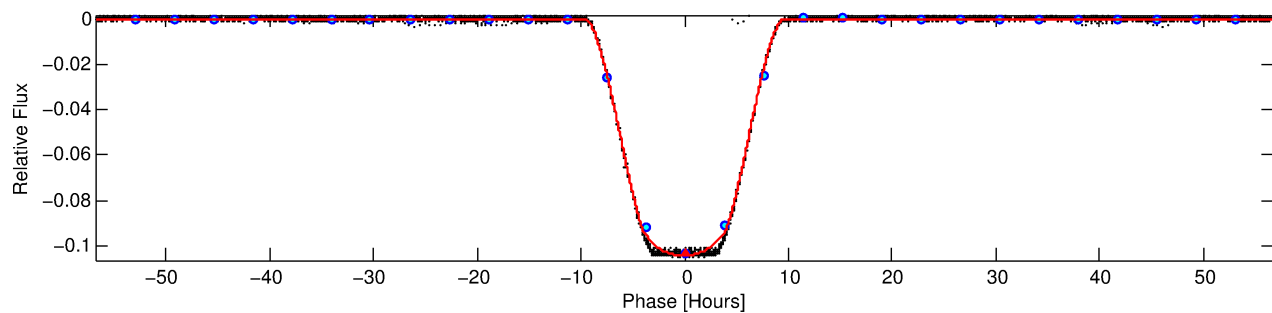
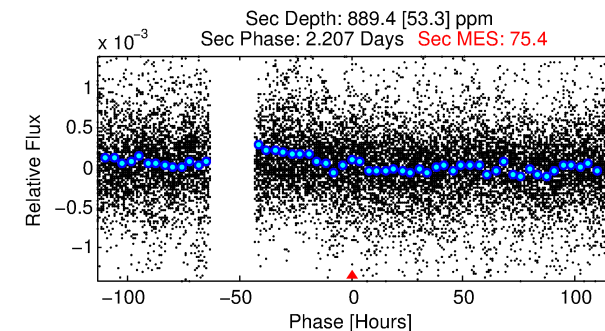
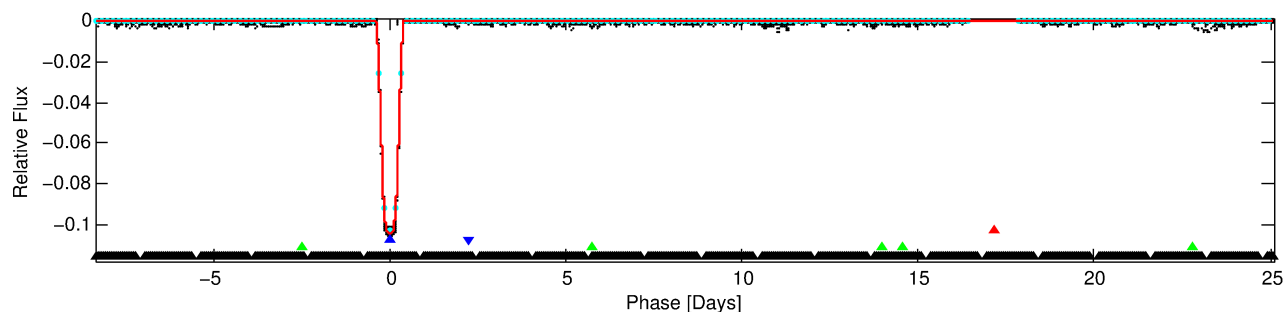
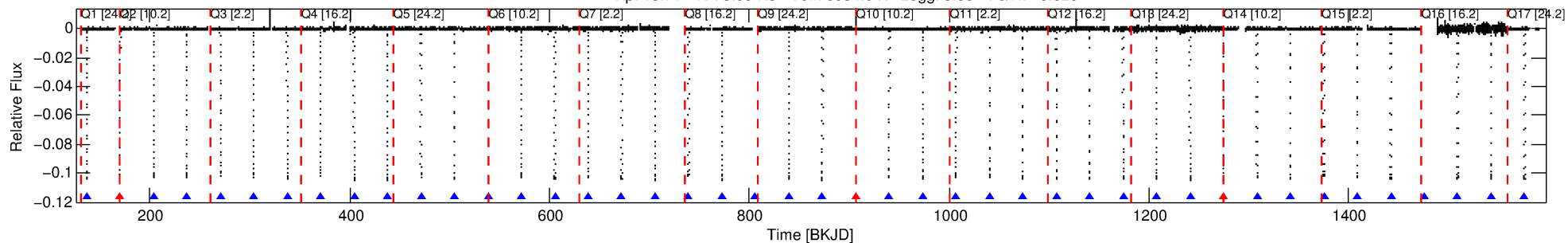
## Ephemeris Match Information For 008773948-02

No Significant Match Found

# DV One-Page Summary

KIC: 8773948 Candidate: 2 of 4 Period: 33.469 d  
KOI: K07090 Corr: No Ephemeris Match

Kp: 13.71 R\*: 3.08 Rs Teff: 5934.0 K Logg: 3.58 Fe/H: -0.620



## DV Fit Results:

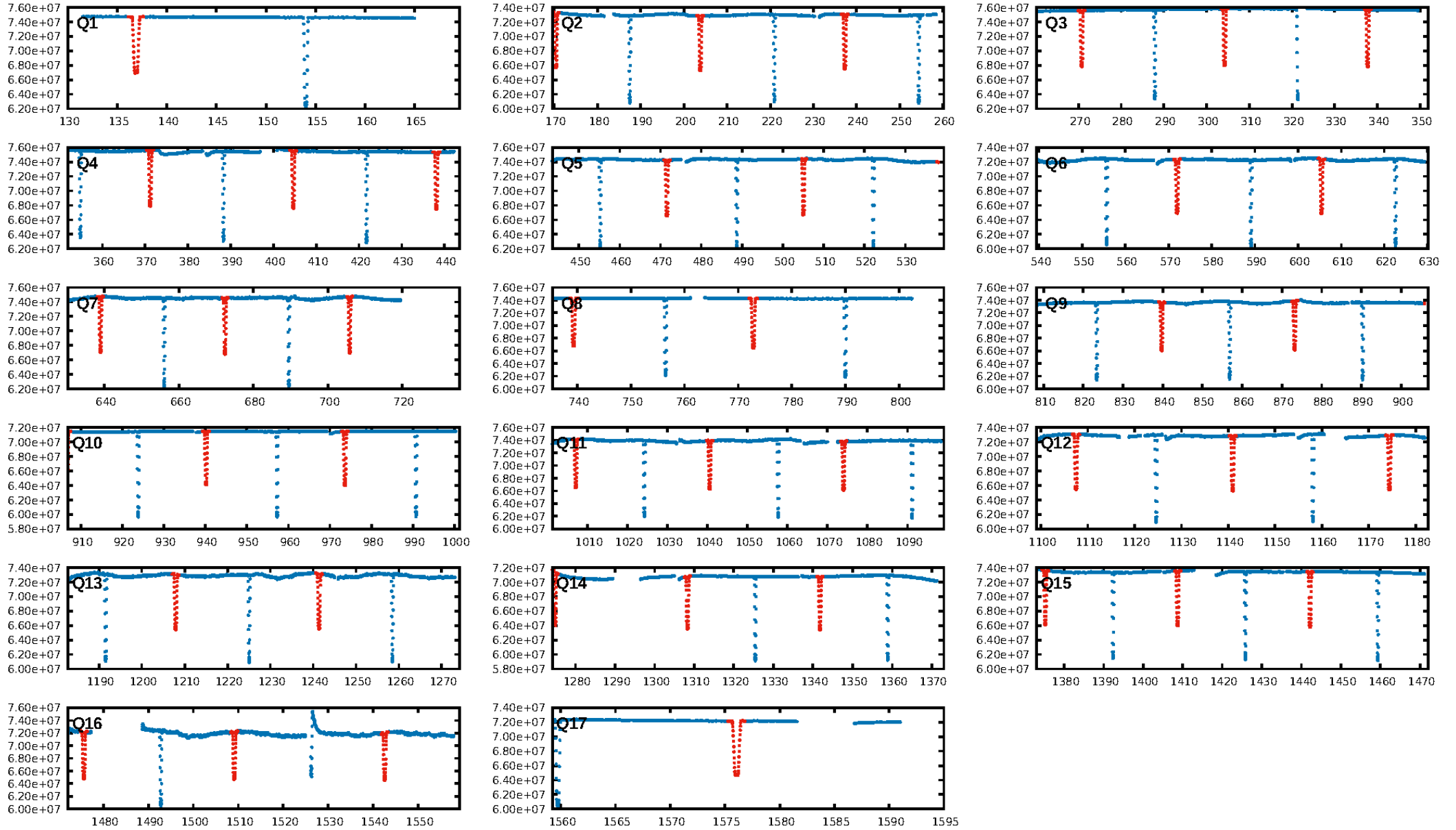
Period = 33.46950 [0.00000] d  
Epoch = 136.8732 [0.0001] BKJD  
Rp/R\* = 0.3066 [0.0001]  
a/R\* = 16.41 [0.01]  
b = 0.49 [0.00]  
Seff = 211.83 [280.29]  
Teq = 973 [322] K  
Rp = 102.88 [68.42] Re  
a = 0.2227 [0.1696] AU  
Ag = 2.29 [3.02] [0.43σ]  
Teffp = 1851 [71] K [2.66σ]

## DV Diagnostic Results:

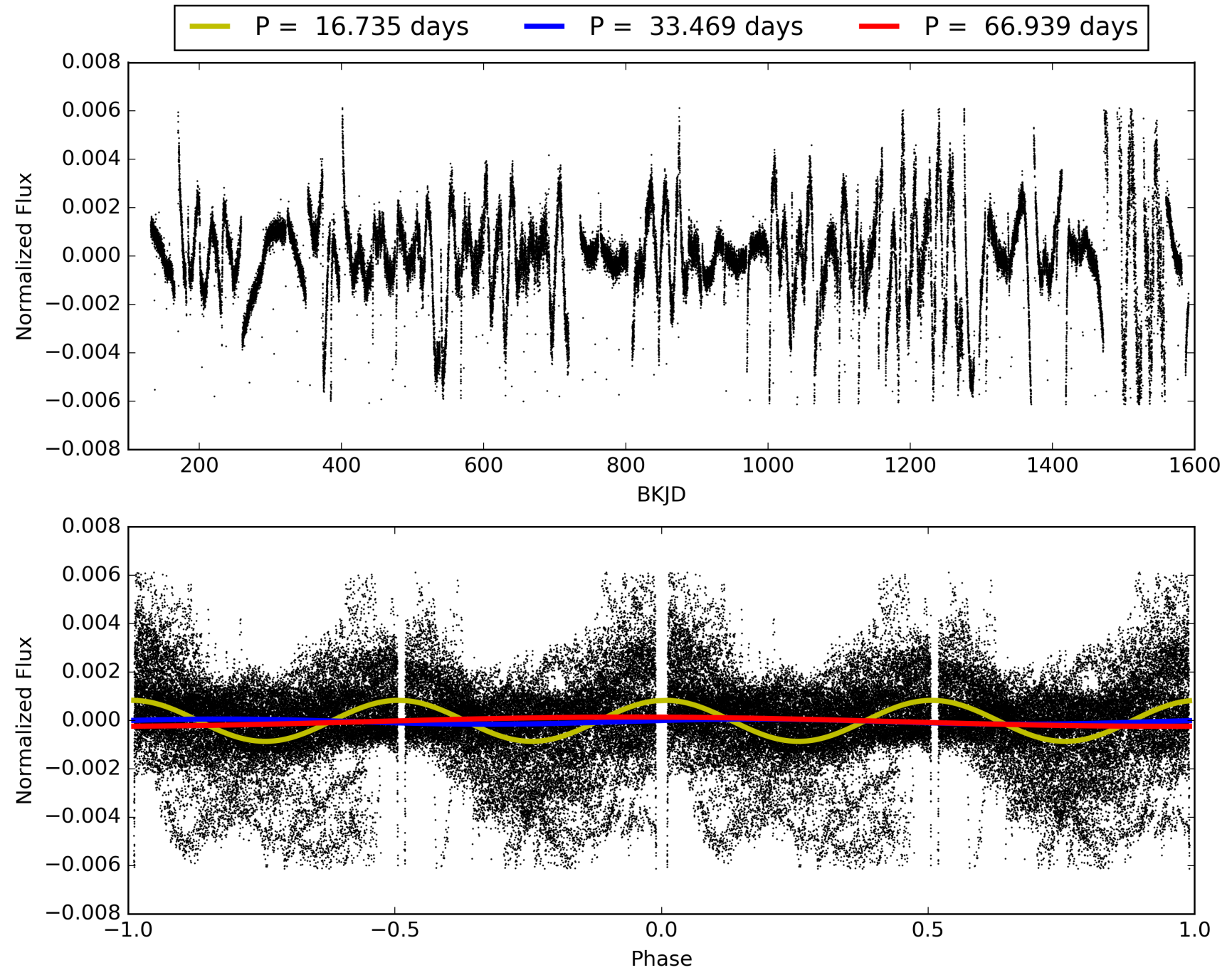
ShortPeriod-sig: 100.0% [38.54σ]  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 0.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.93 [37/40]  
GhostDiagnostic-chr: 5.478  
Centroid-sig: N/A  
Centroid-so: 0.026 arcsec [19.69σ]  
OotOffset-rm: 0.243 arcsec [3.46σ]  
KicOffset-rm: 0.010 arcsec [0.15σ]  
OotOffset-st: 4/3/4/5 [16]  
KicOffset-st: 4/3/4/5 [16]  
DiffImageQuality-fgm: 1.00 [16/16]  
DiffImageOverlap-fno: 0.00 [0/16]



# TCE 008773948-02, PDC Light Curves

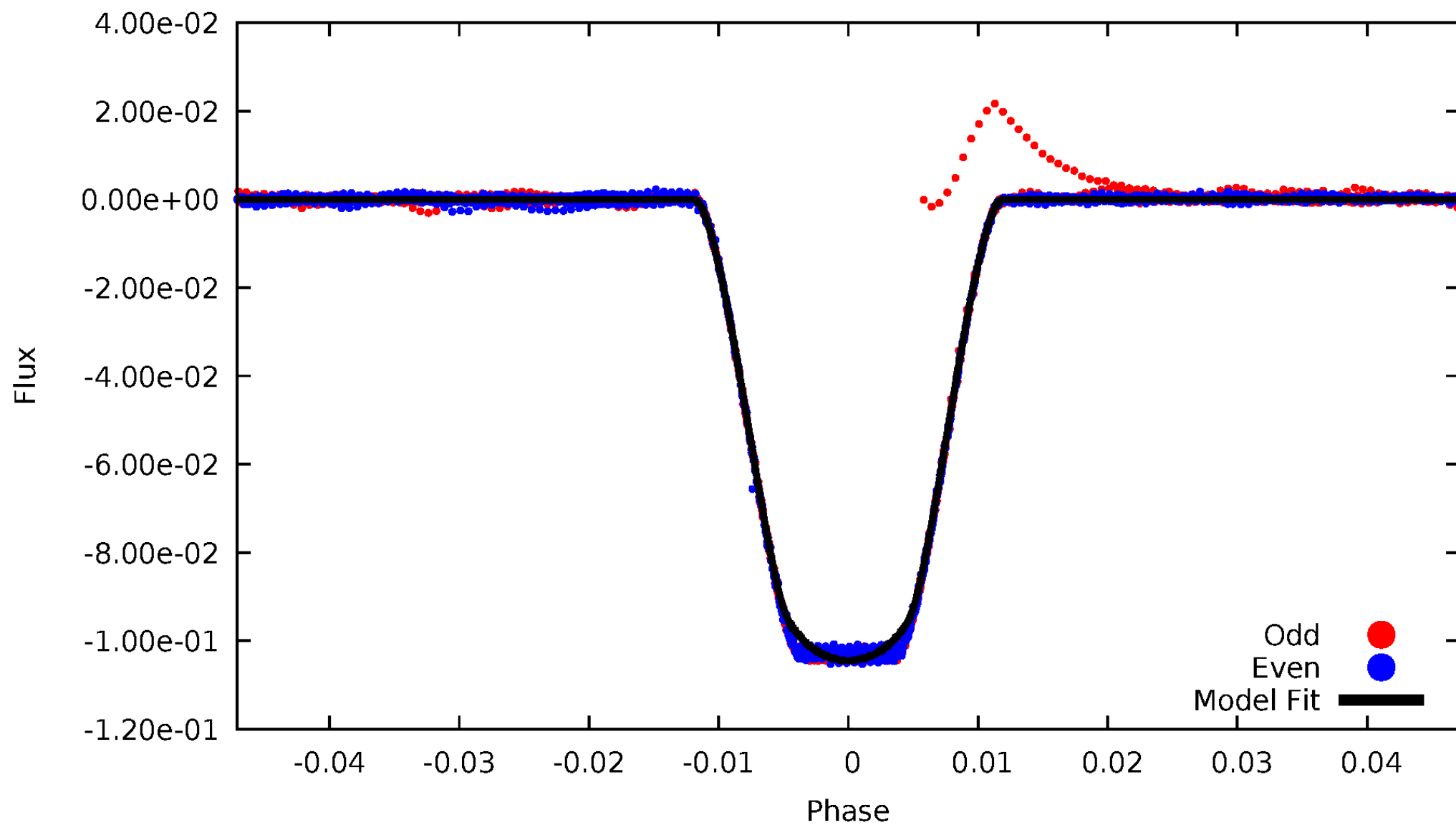


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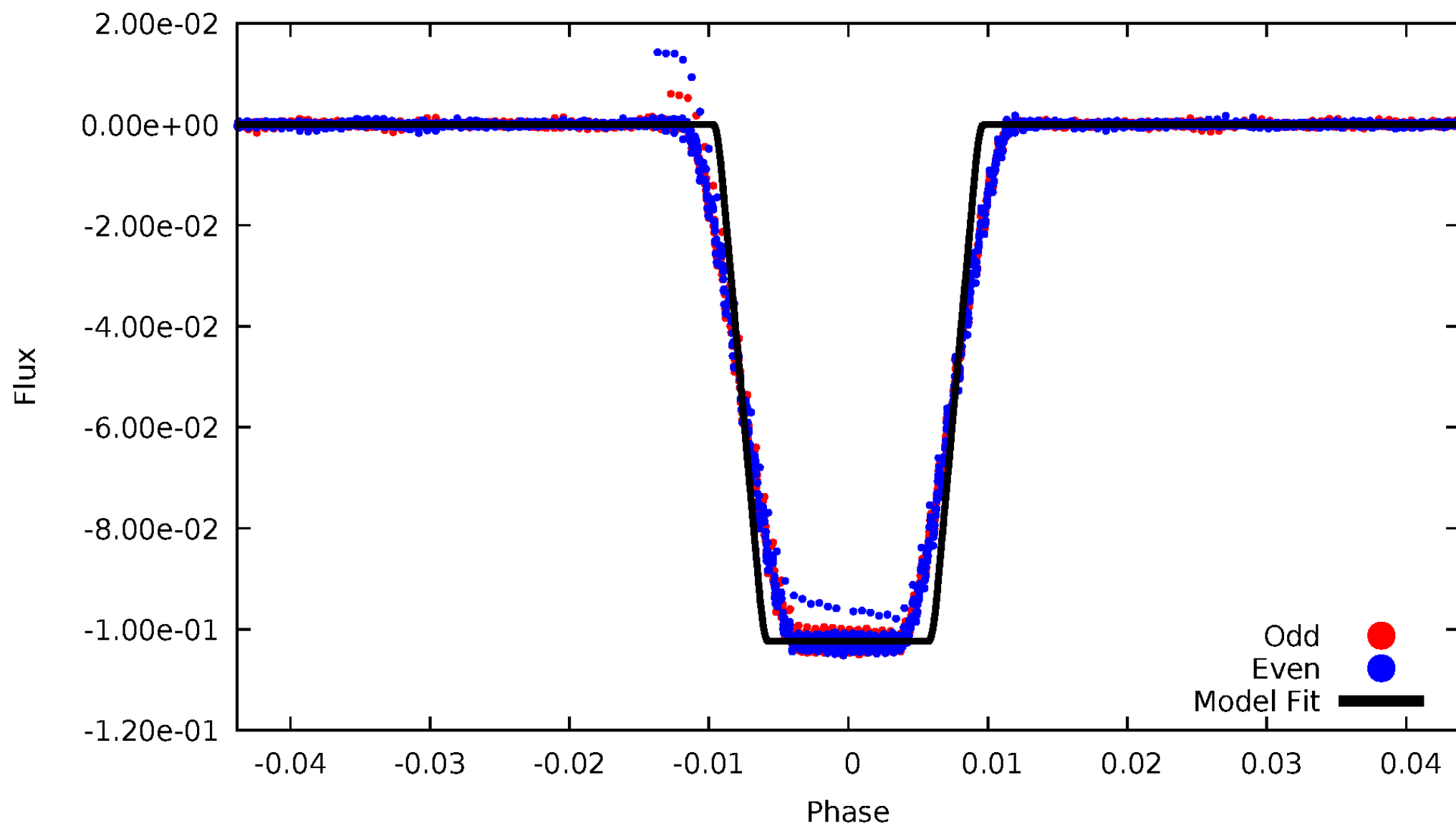
# DV Odd/Even

TCE 008773948-02



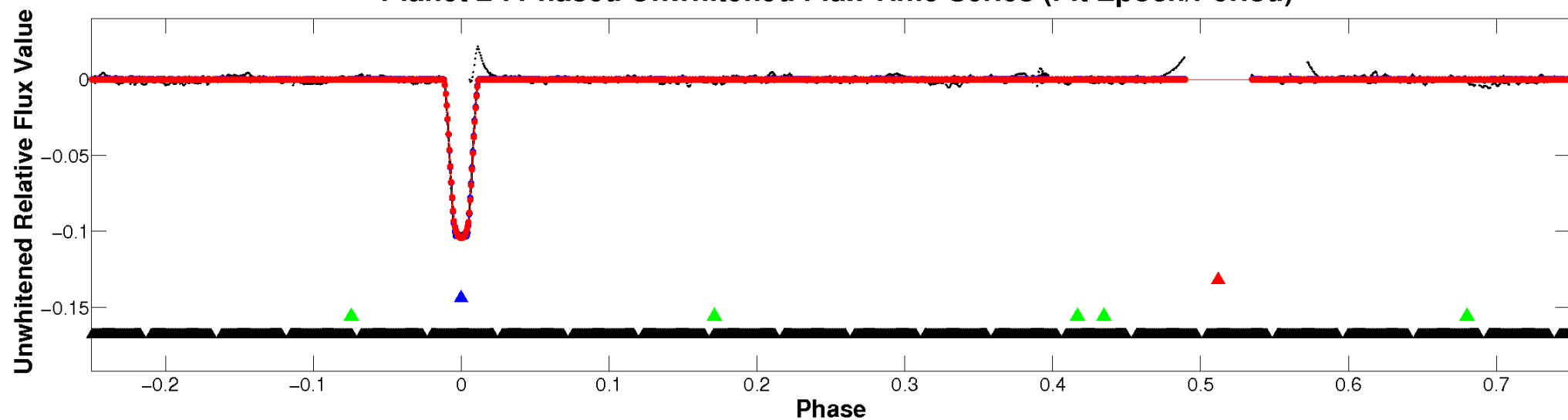
# ALT Odd/Even

TCE 008773948-02

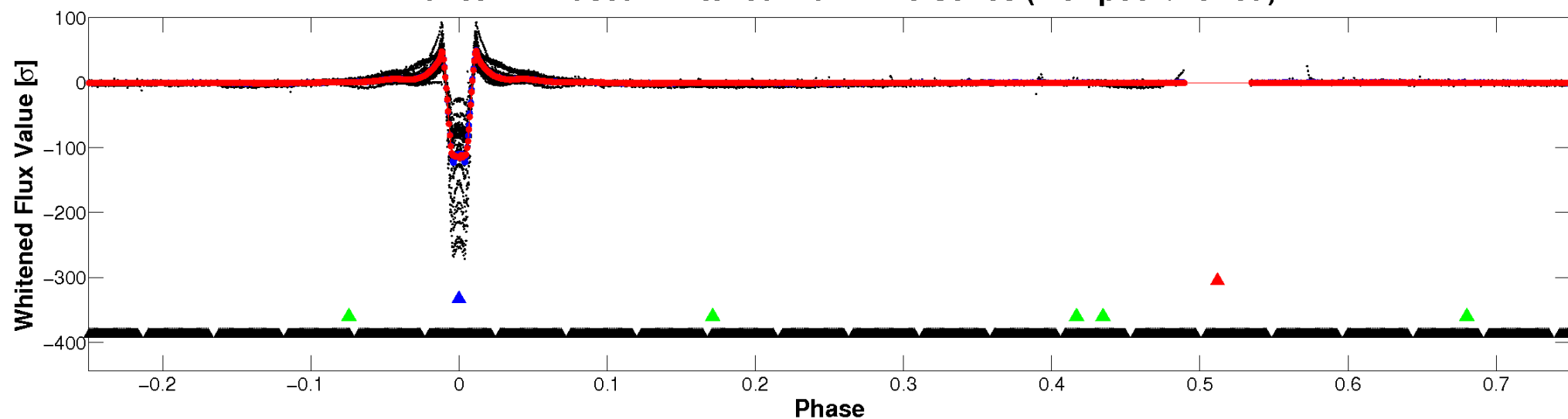


# Non-Whitened Vs. Whitened Light Curve

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

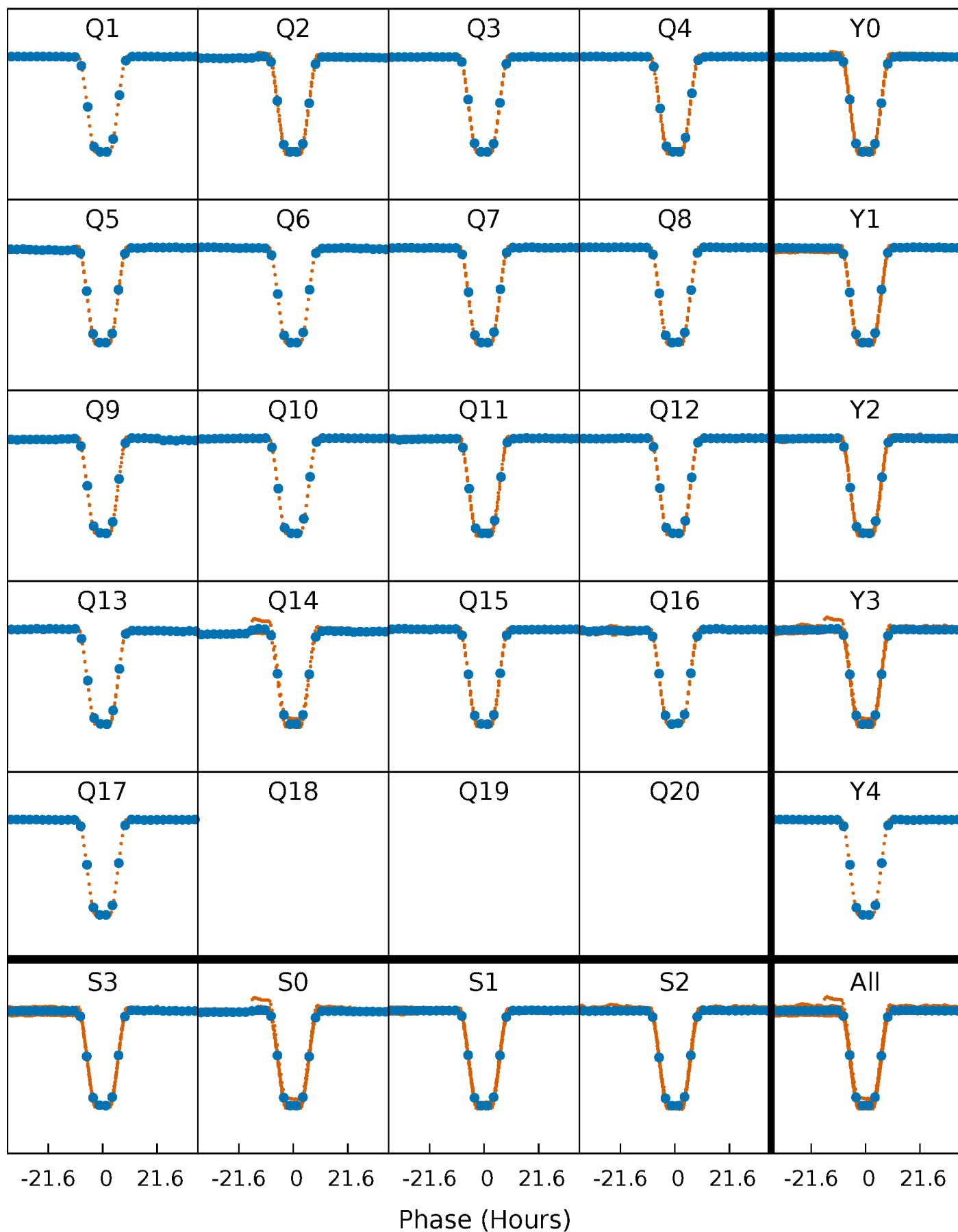


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

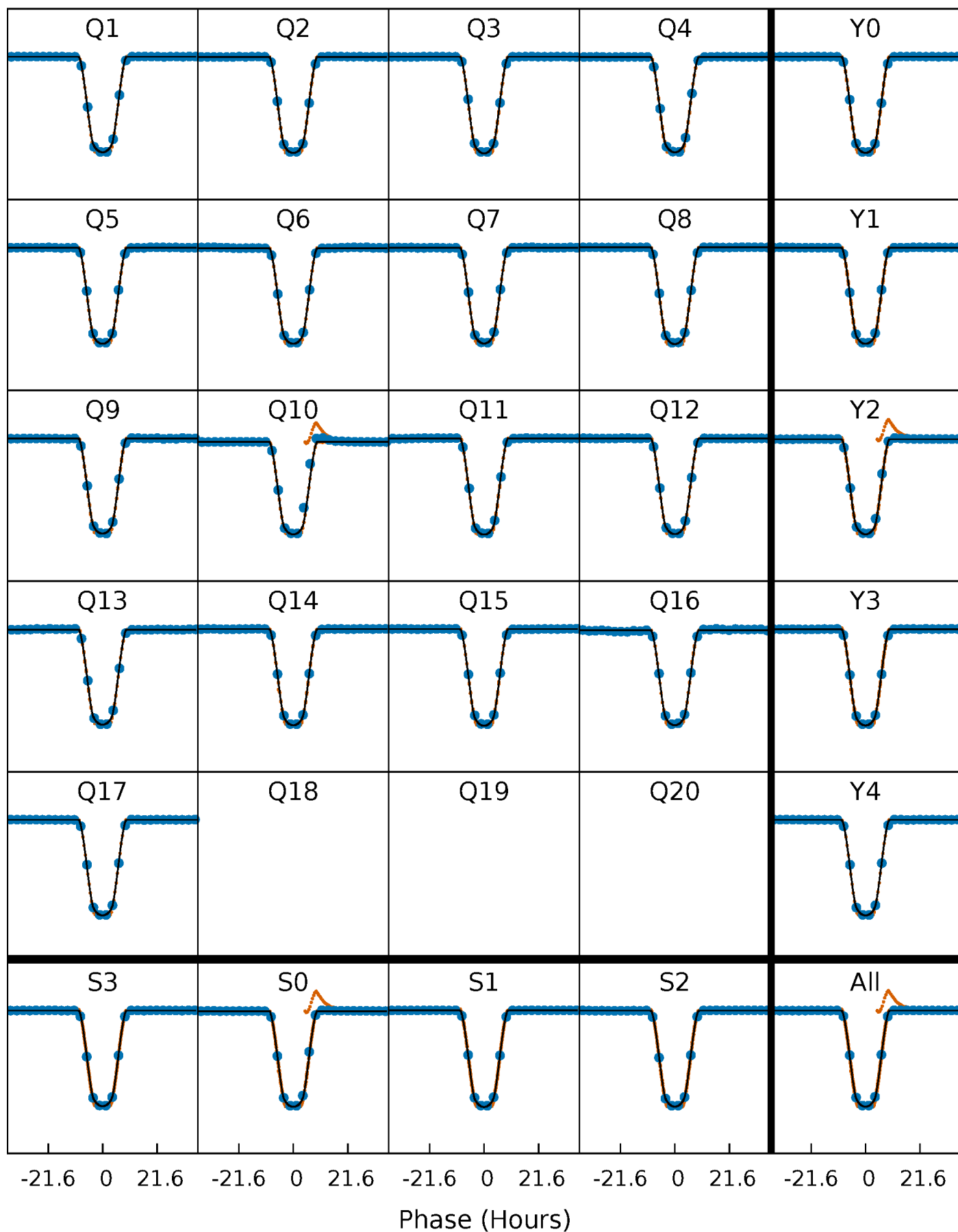
TCE 008773948-02 P= 33.469500 Days  $T_0=136.873240$  (BKJD)





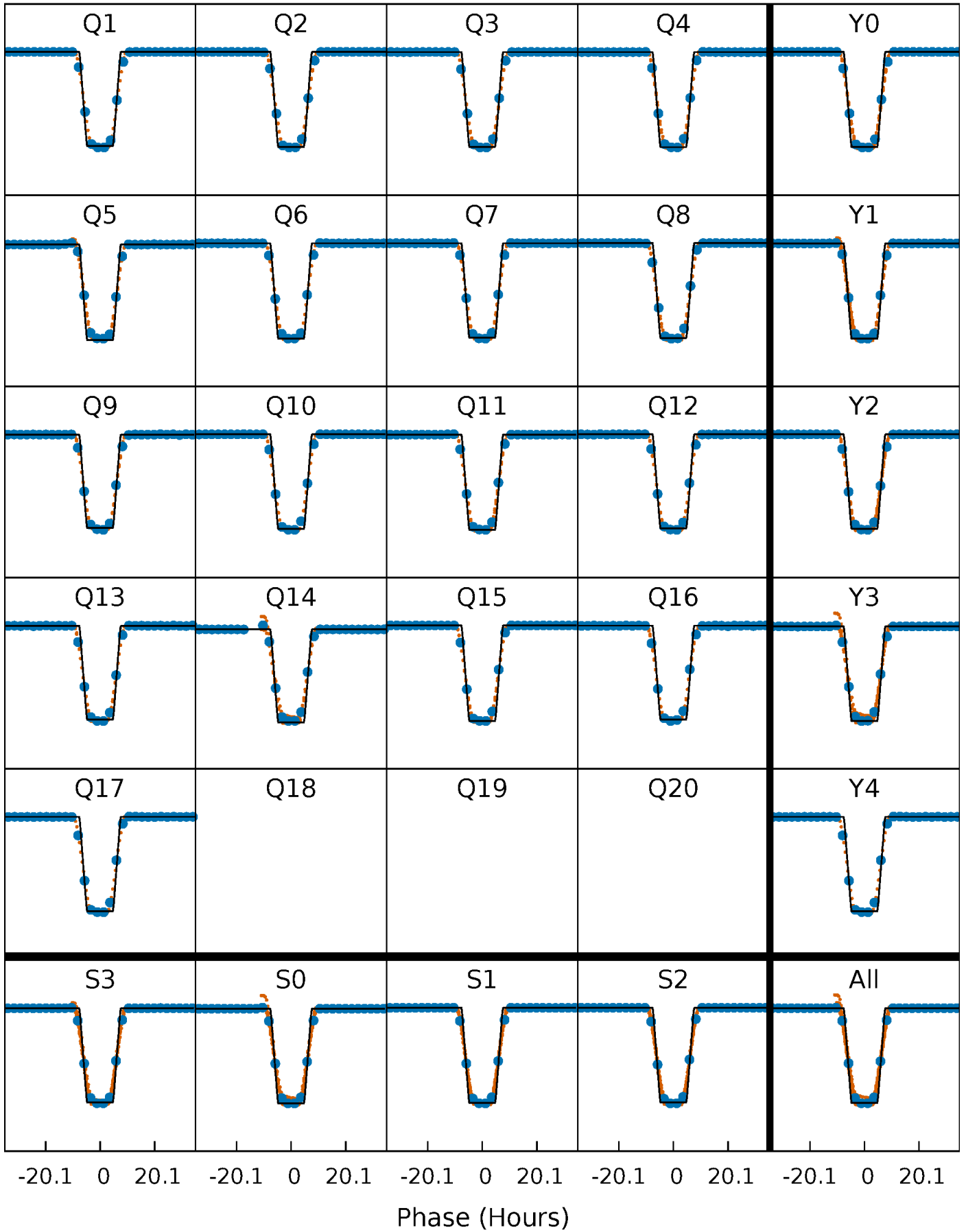
# DV Quarter-Phased Transit Curves

TCE 008773948-02 P= 33.469500 Days  $T_0=136.873240$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

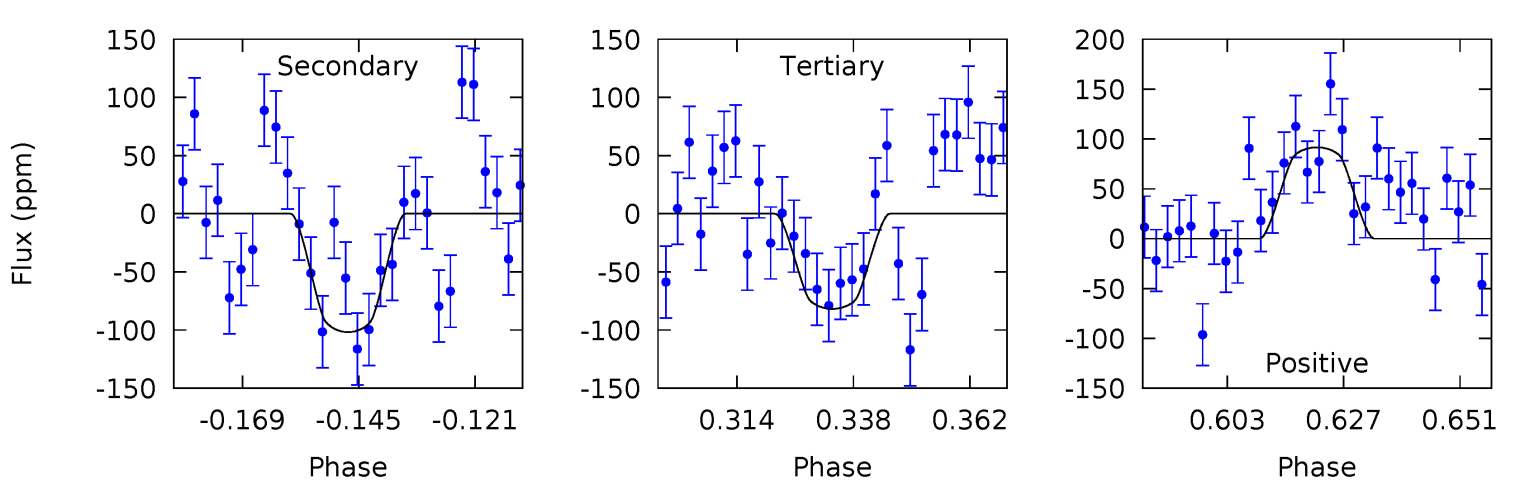
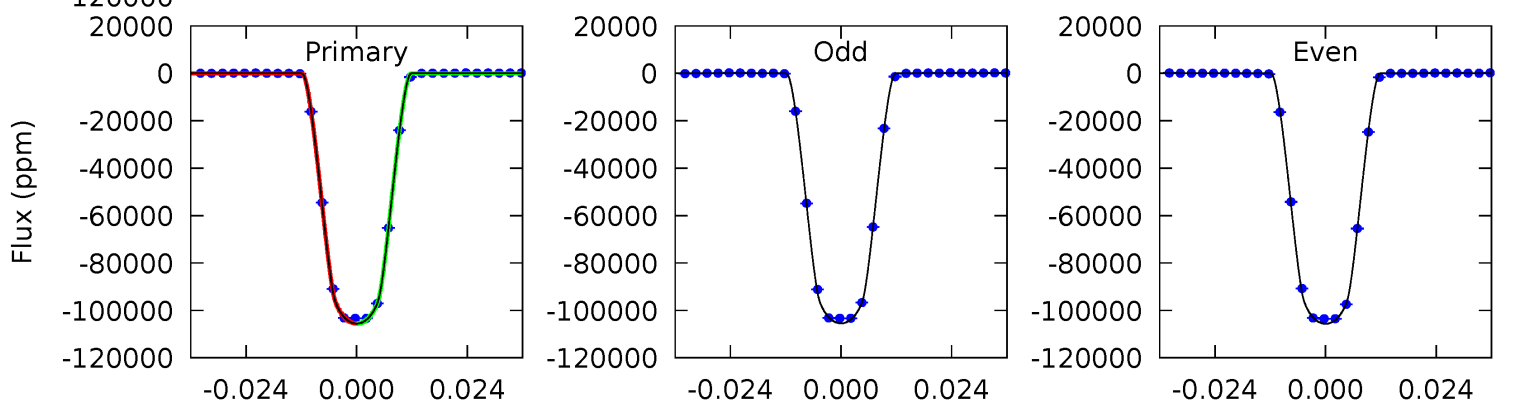
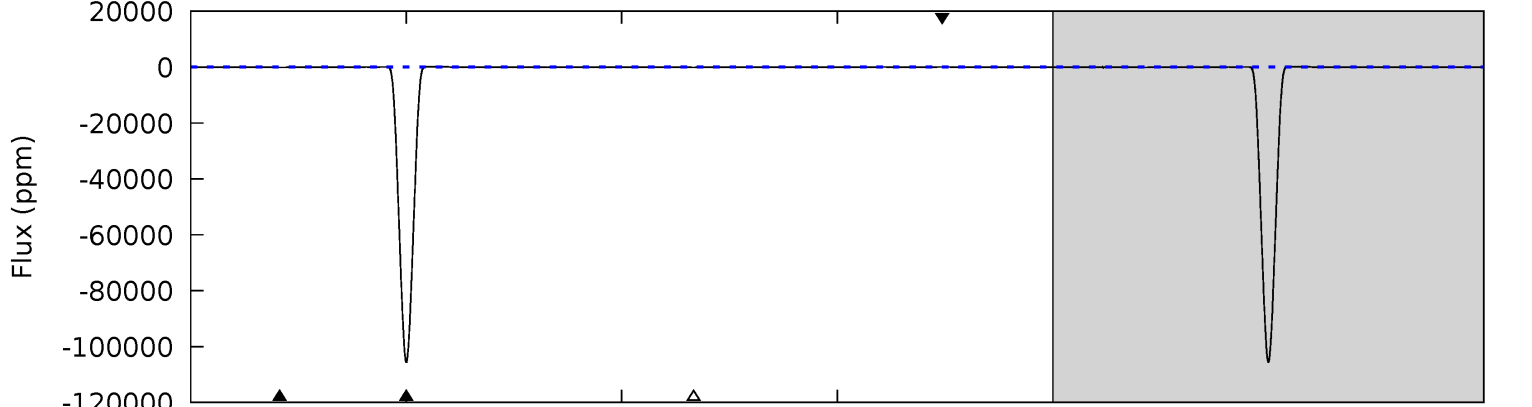
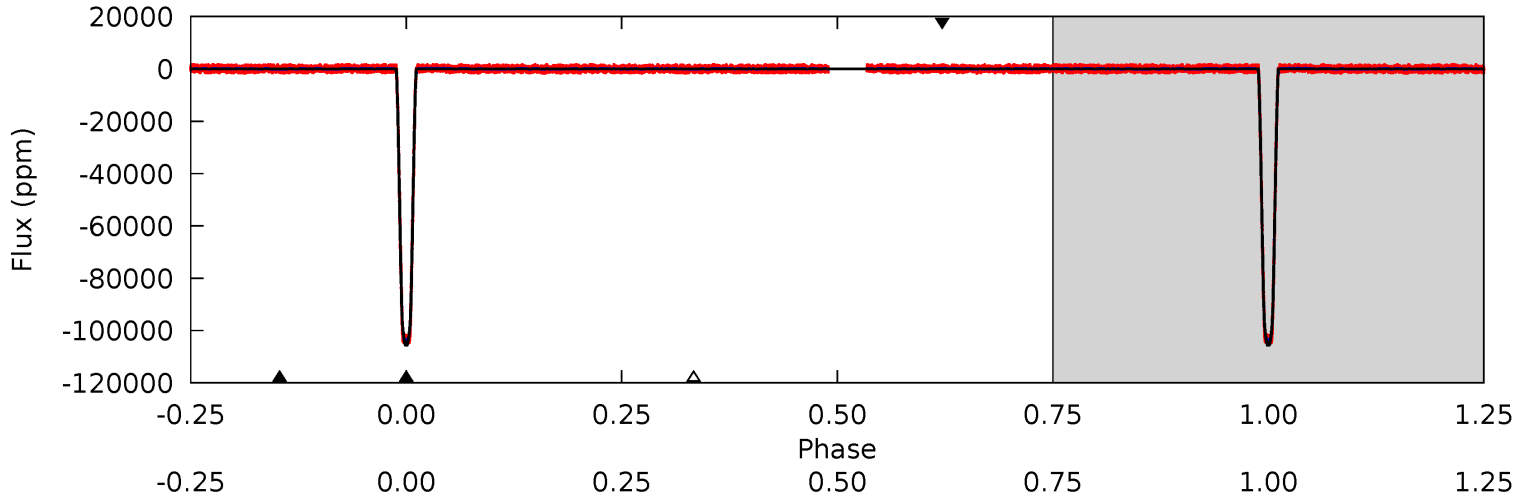
TCE 008773948-02   P= 33.469889 Days    $T_0=136.866188$  (BKJD)



# DV Model-Shift Uniqueness Test

008773948-02, P = 33.469500 Days, E = 103.403740 Days

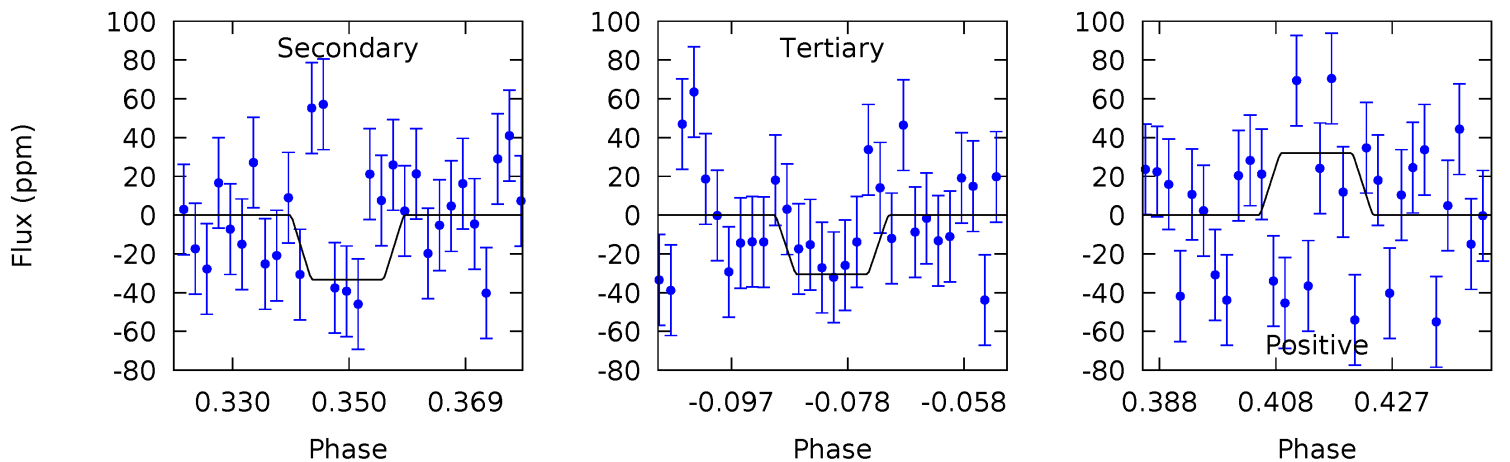
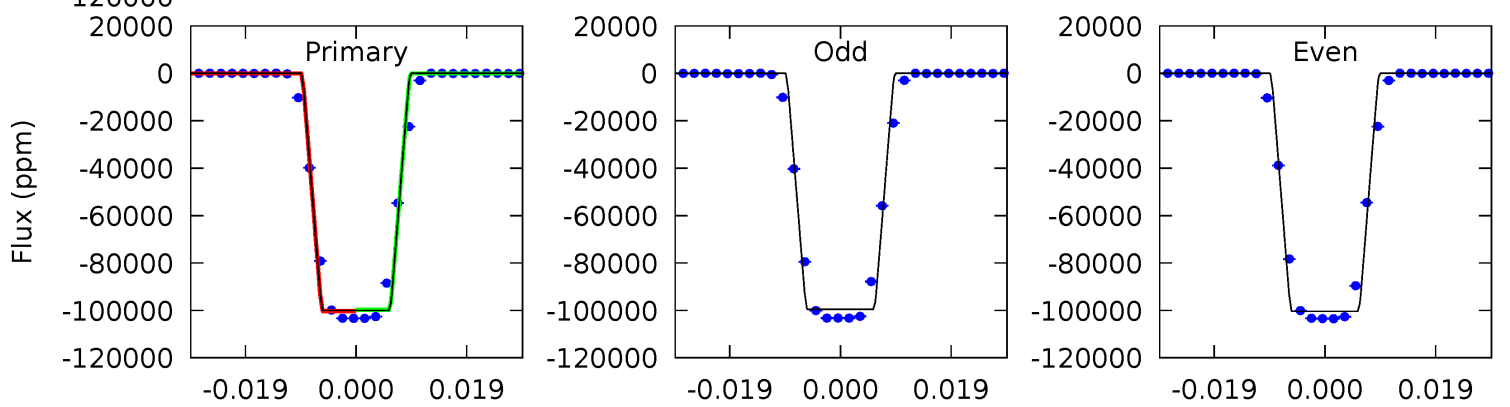
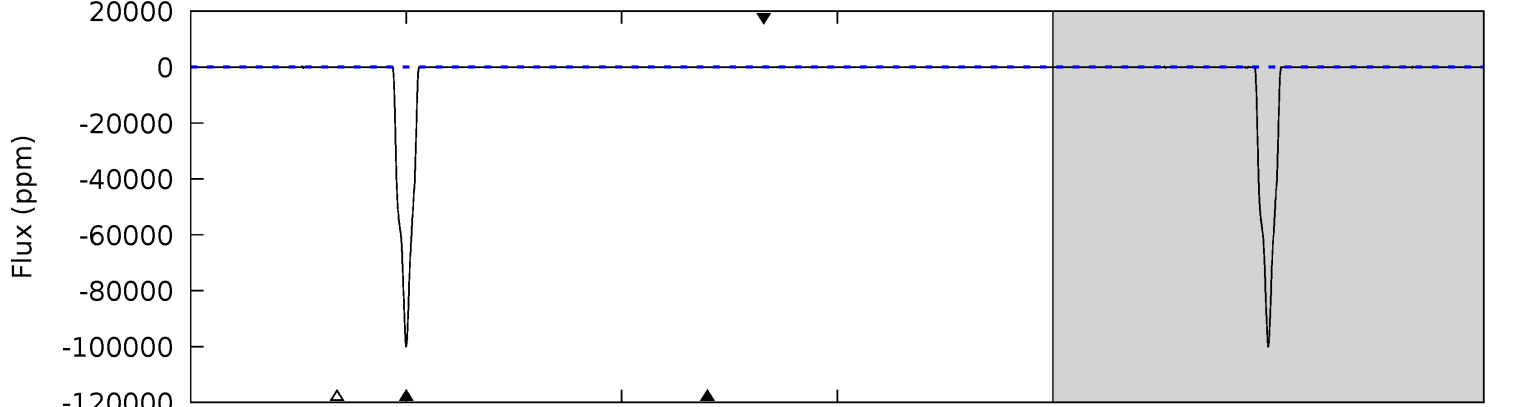
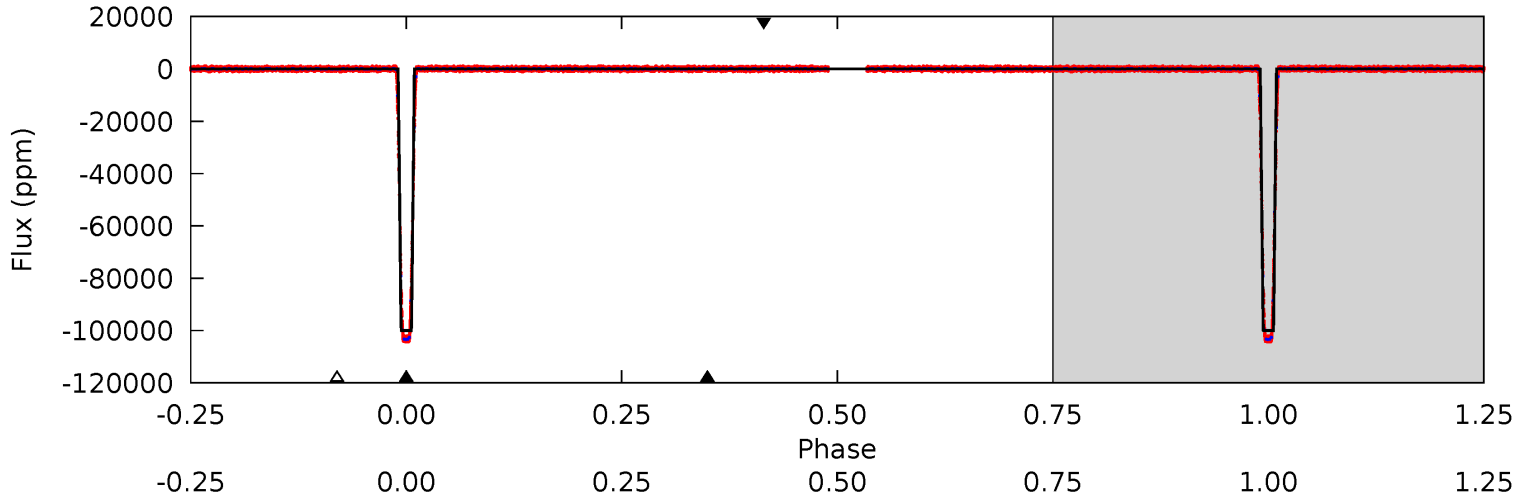
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9590	9.24	7.43	8.32	4.85	2.26	4.27	9583	9582	1.81	0.92	6.37	0.97	0.00	5.24



# Alt Model-Shift Uniqueness Test

008773948-02, P = 33.469889 Days, E = 103.396299 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
8641	2.87	2.64	2.76	4.90	2.34	0.87	8638	8638	0.23	0.11	36.0	0.99	0.00	0



### Stellar Parameters For KIC 008773948

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5934^{+208}_{-187}$	$3.581^{+0.807}_{-0.142}$	$-0.620^{+0.350}_{-0.250}$	$3.075^{+0.877}_{-2.045}$	$1.315^{+0.169}_{-0.474}$	$0.064^{+1.052}_{-0.033}$
	+4%/-3%	+23%/-4%	+56%/-40%	+29%/-67%	+13%/-36%	+1652%/-52%
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 008773948-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-102 \pm 11$	$93.89^{+21.98}_{-33.68}$	$1306^{+137}_{-234}$	$1453^{+502}_{-3352}$	$0.306^{+0.384}_{-0.097}$
Alt.	$-33 \pm 12$	$96.69^{+23.33}_{-33.51}$	$1295^{+143}_{-232}$	$-1978^{+290}_{-114}$	$0.094^{+0.116}_{-0.039}$

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

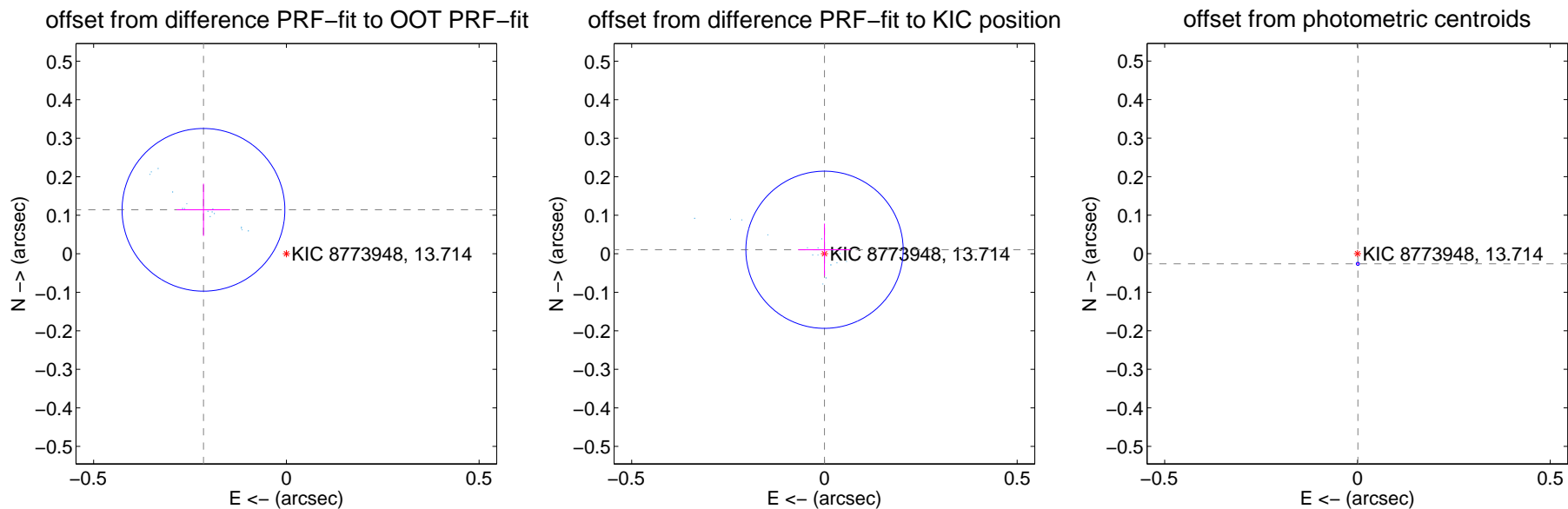
## DV Centroid Data

Supplemental centroid analysis for 008773948-02. Kepler magnitude: 13.71. Transit SNR 2508.34

There are 16 quarters with good PRF difference image offsets

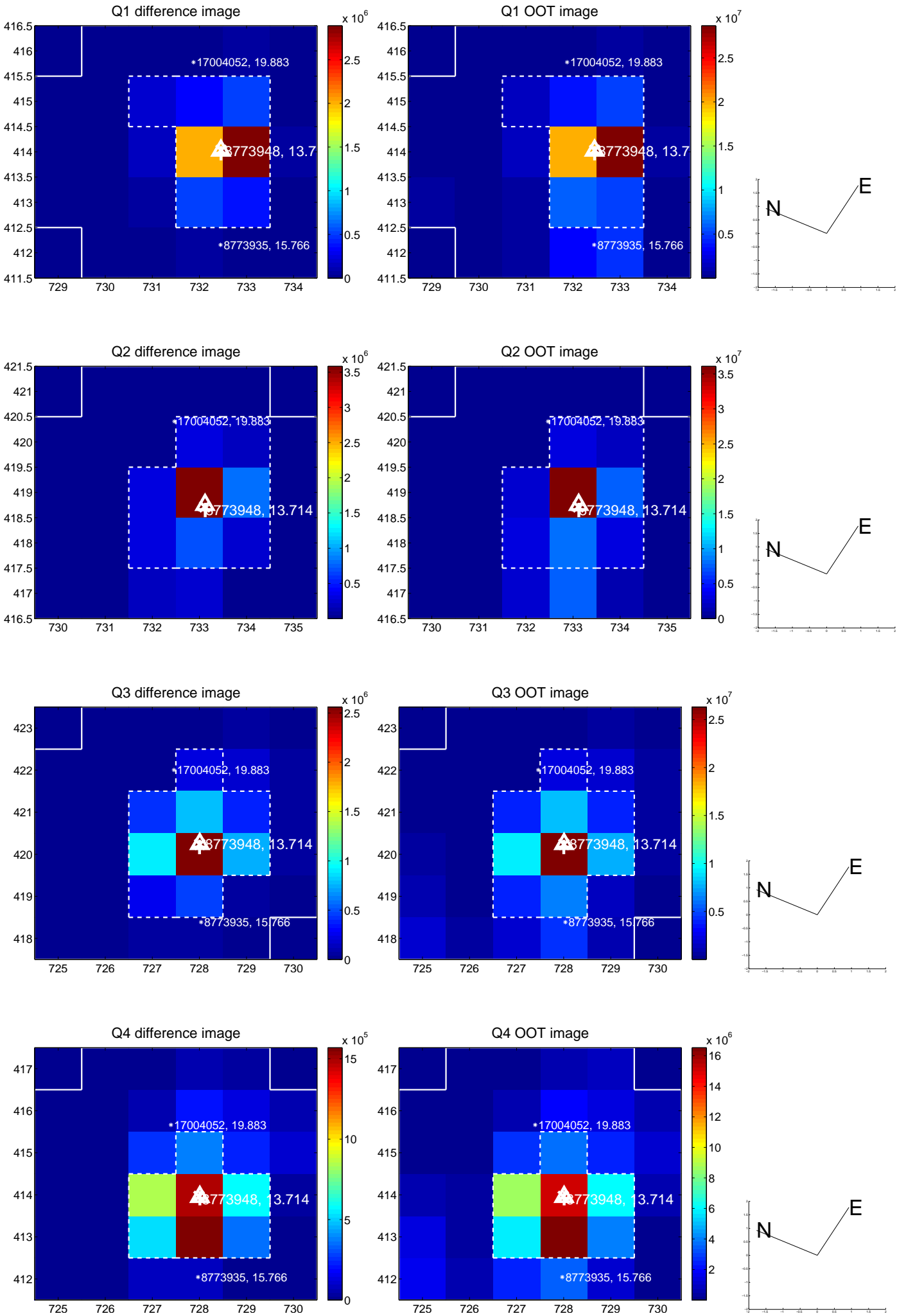
The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>0.243 \pm 0.070</math></b>	<b>3.46</b>	$0.215 \pm 0.069$	$0.114 \pm 0.068$
PRF-fit source offset from KIC position	$0.010 \pm 0.068$	0.15	$-0.000 \pm 0.068$	$0.010 \pm 0.068$
photometric centroid source offset	<b><math>0.03 \pm 0.00</math></b>	<b>19.69</b>	$-0.00 \pm 0.00$	$-0.03 \pm 0.00$

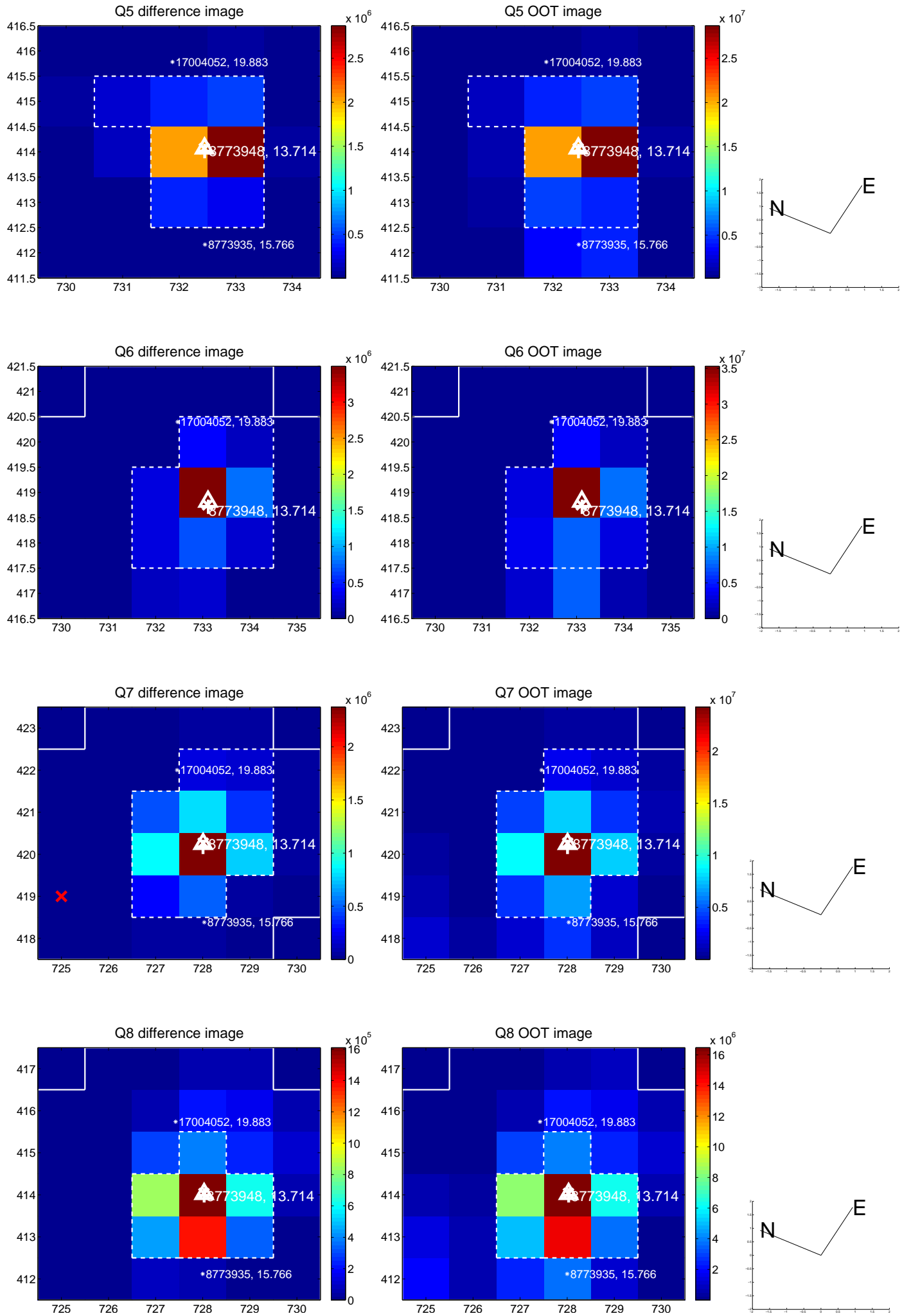


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

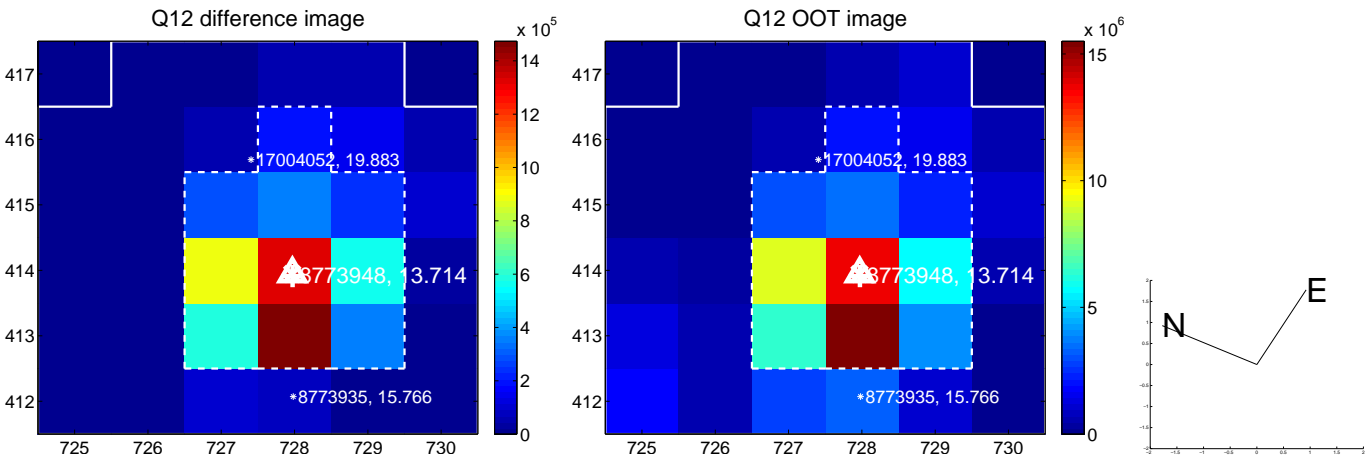
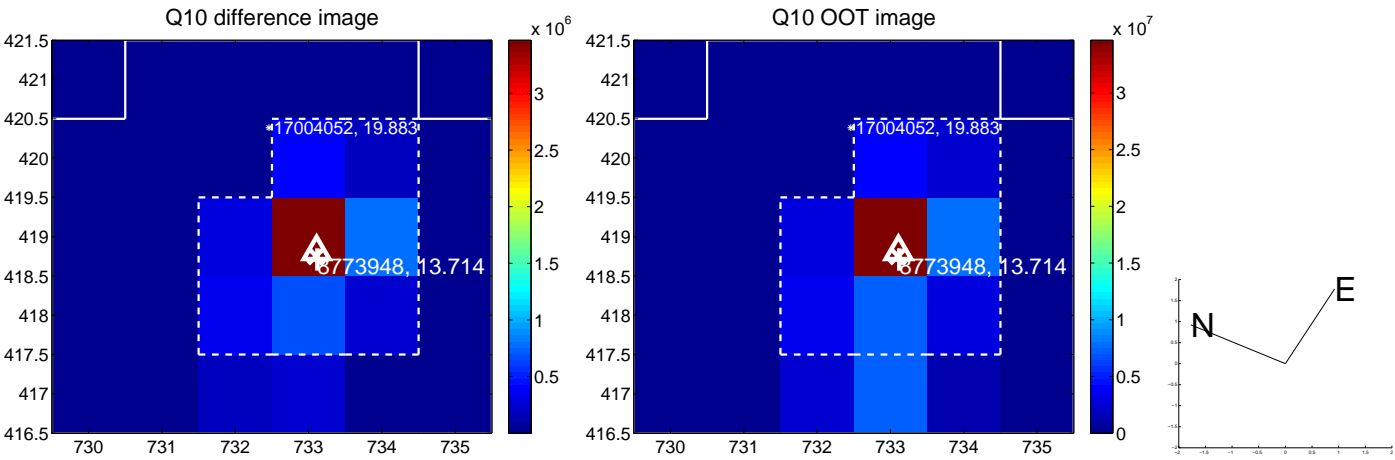
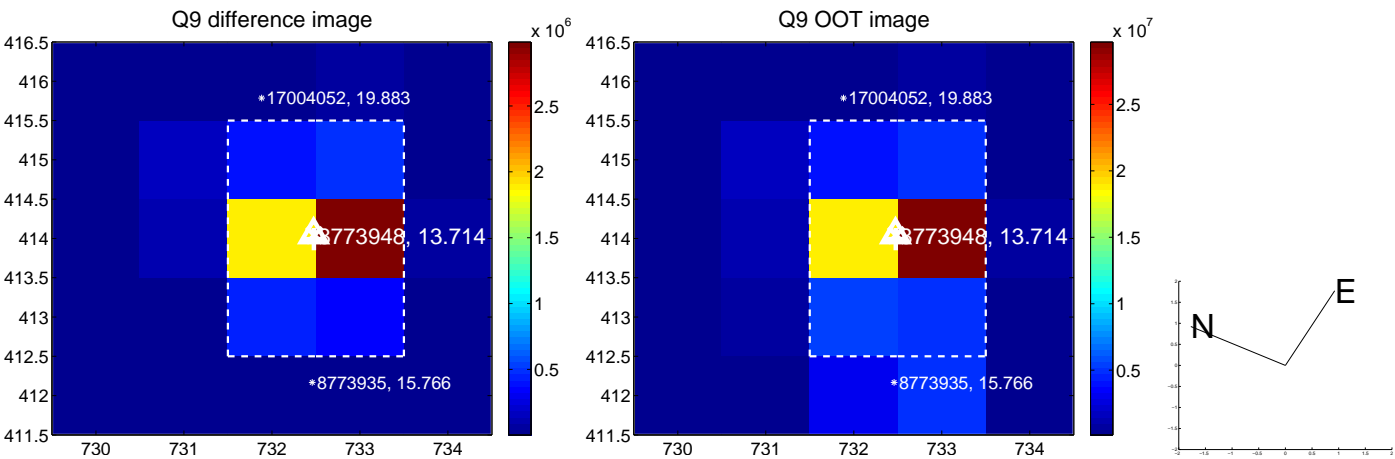


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

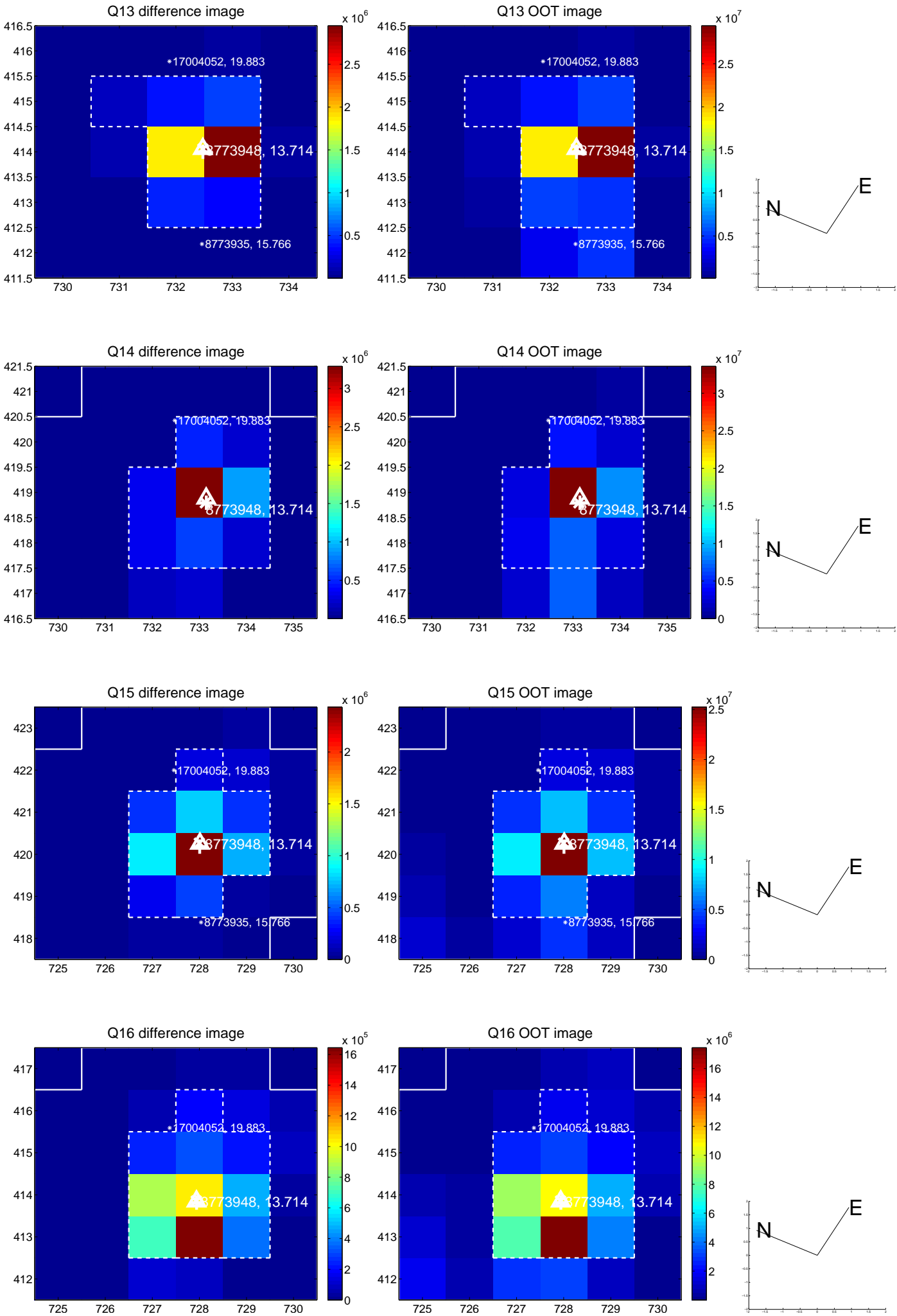




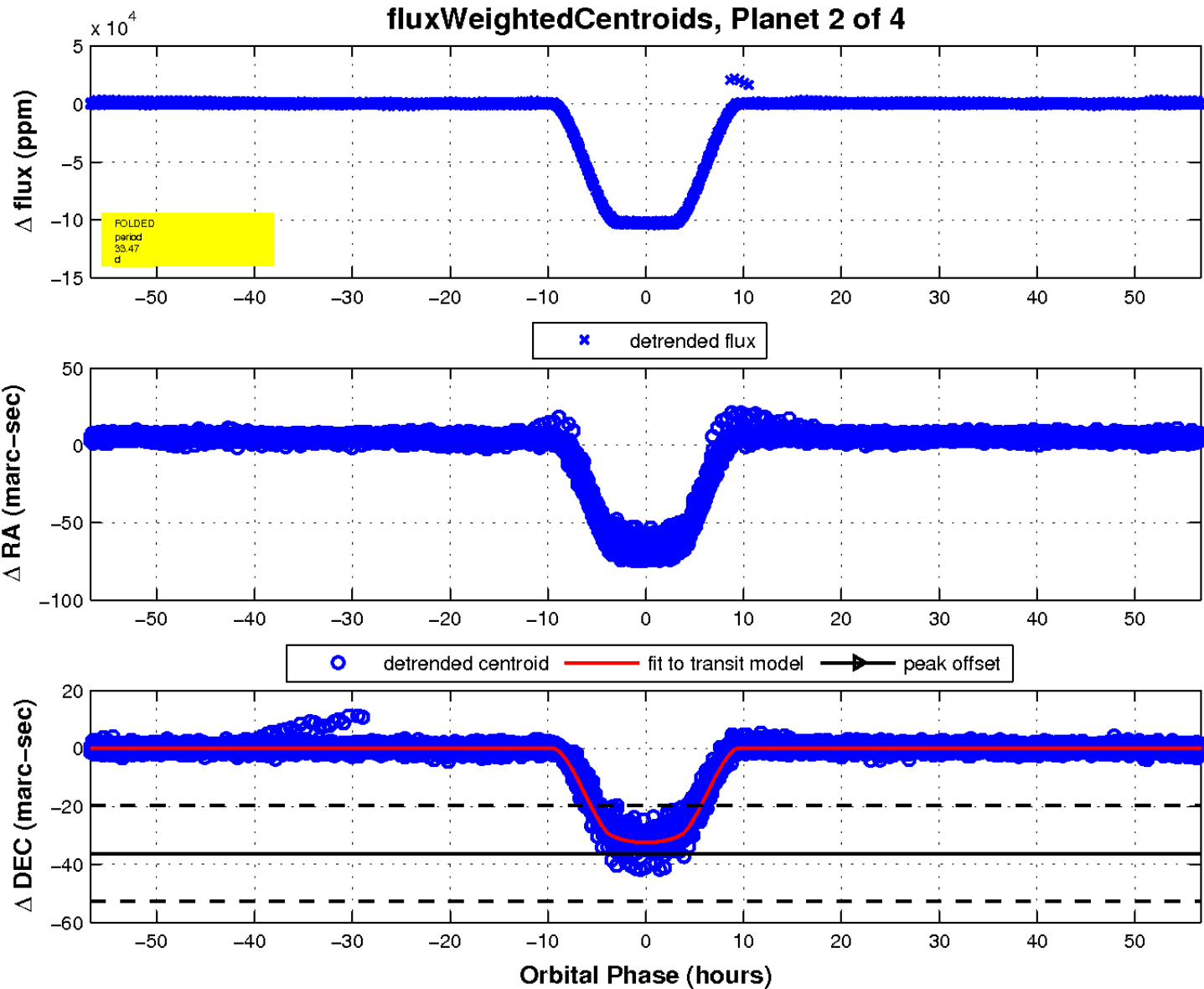
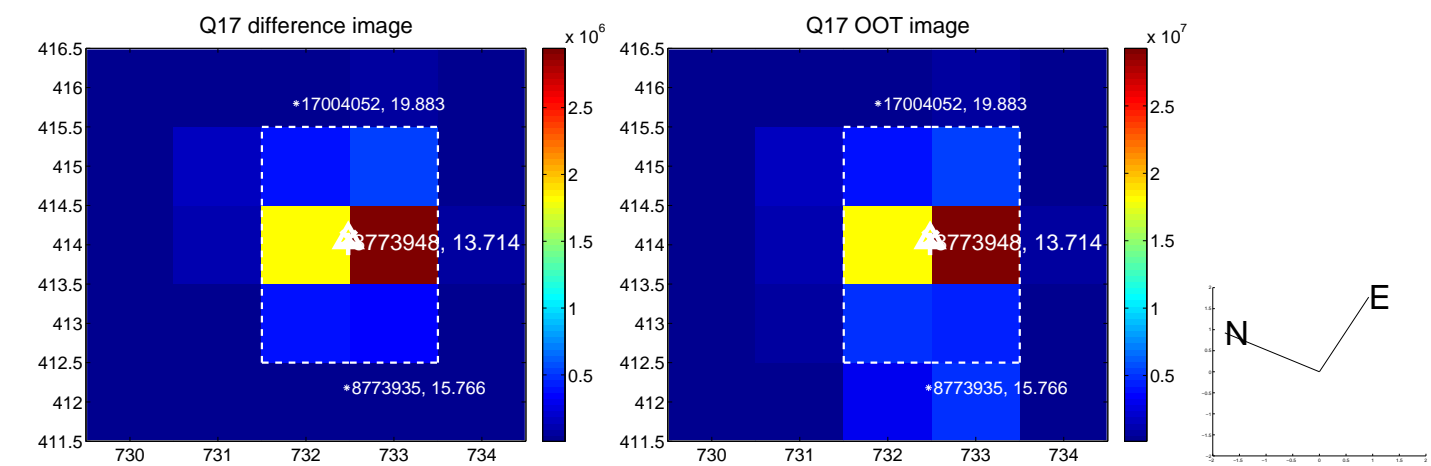
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



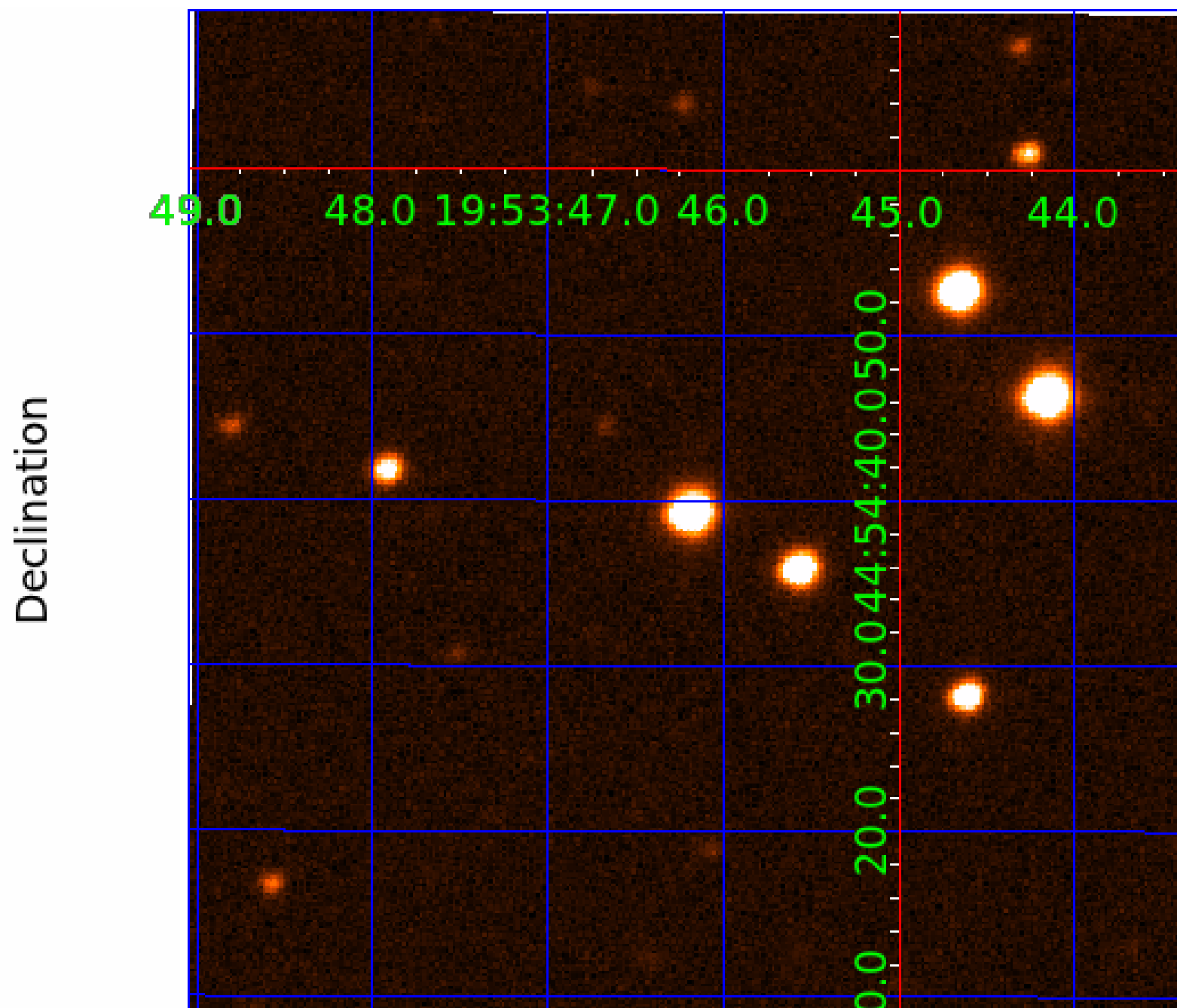
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 008773948

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008773948-01	OBS	7090.01	33.469521	154.007876	165341.1	11.905	5305.2	4176.8	3.08	5934	127.56	211.83
008773948-02	OBS	No	33.469500	136.873240	104430.5	18.923	3720.0	2508.3	3.08	5934	102.88	211.83
008773948-03	OBS	No	309.443191	318.769324	3225.4	76.254	24.7	26.6	3.08	5934	32.13	10.92
008773948-04	OBS	No	1.595313	133.019672	233.3	6.000	13.1	-1.0	3.08	5934	4.70	12257.07

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008773948-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE
008773948-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE
008773948-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_ZUMA_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008773948-04	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_NOFITS

**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.

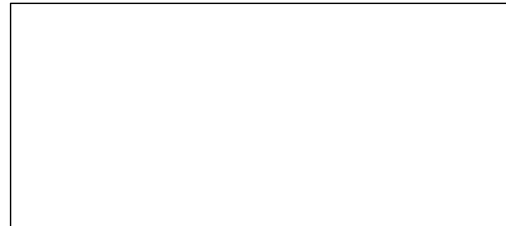
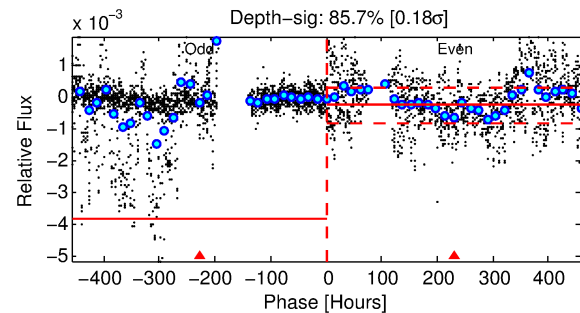
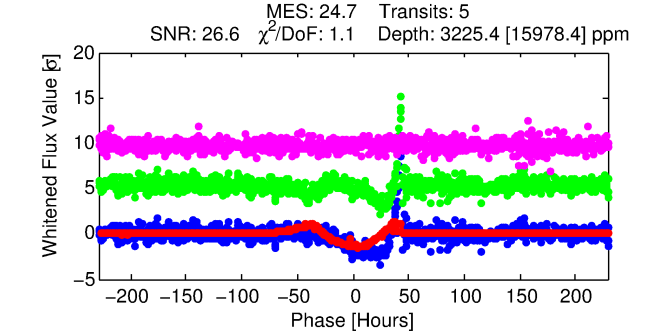
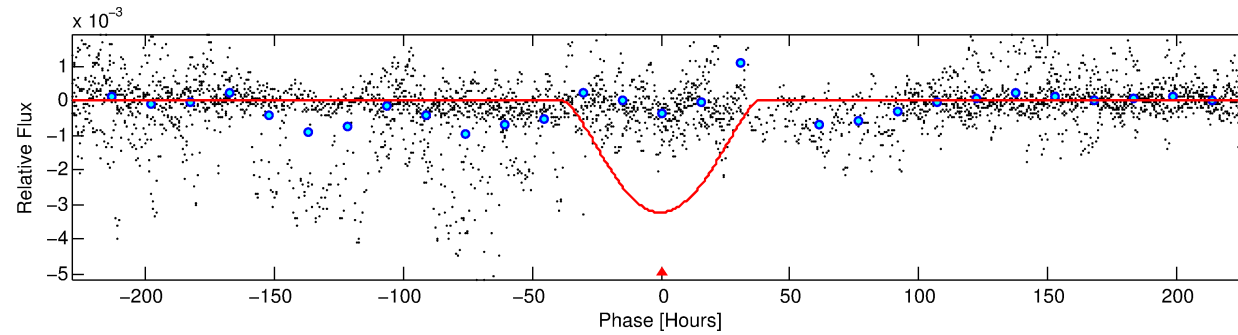
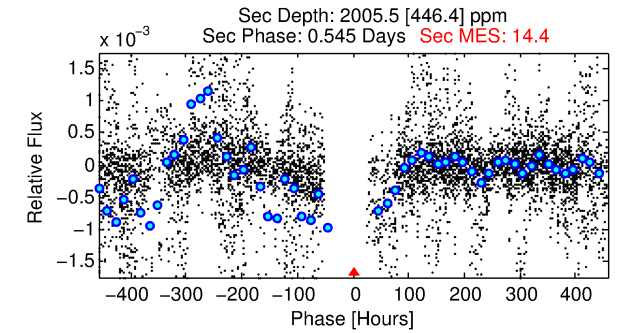
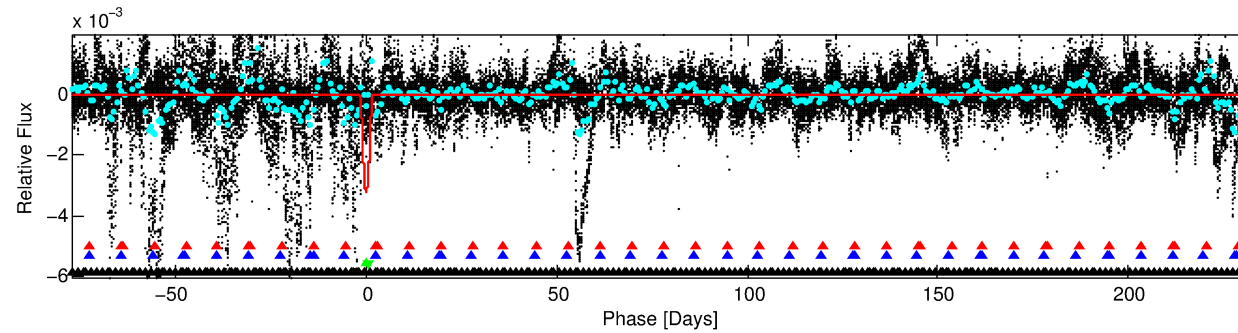
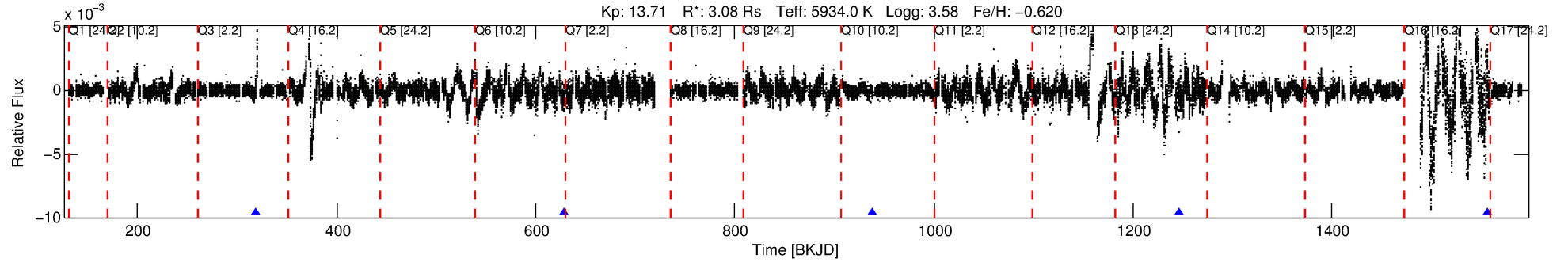
## Ephemeris Match Information For 008773948-03

No Significant Match Found

# DV One-Page Summary

KIC: 8773948 Candidate: 3 of 4 Period: 309.443 d  
KOI: K07090 Corr: No Ephemeris Match

Kp: 13.71 R\*: 3.08 Rs Teff: 5934.0 K Logg: 3.58 Fe/H: -0.620



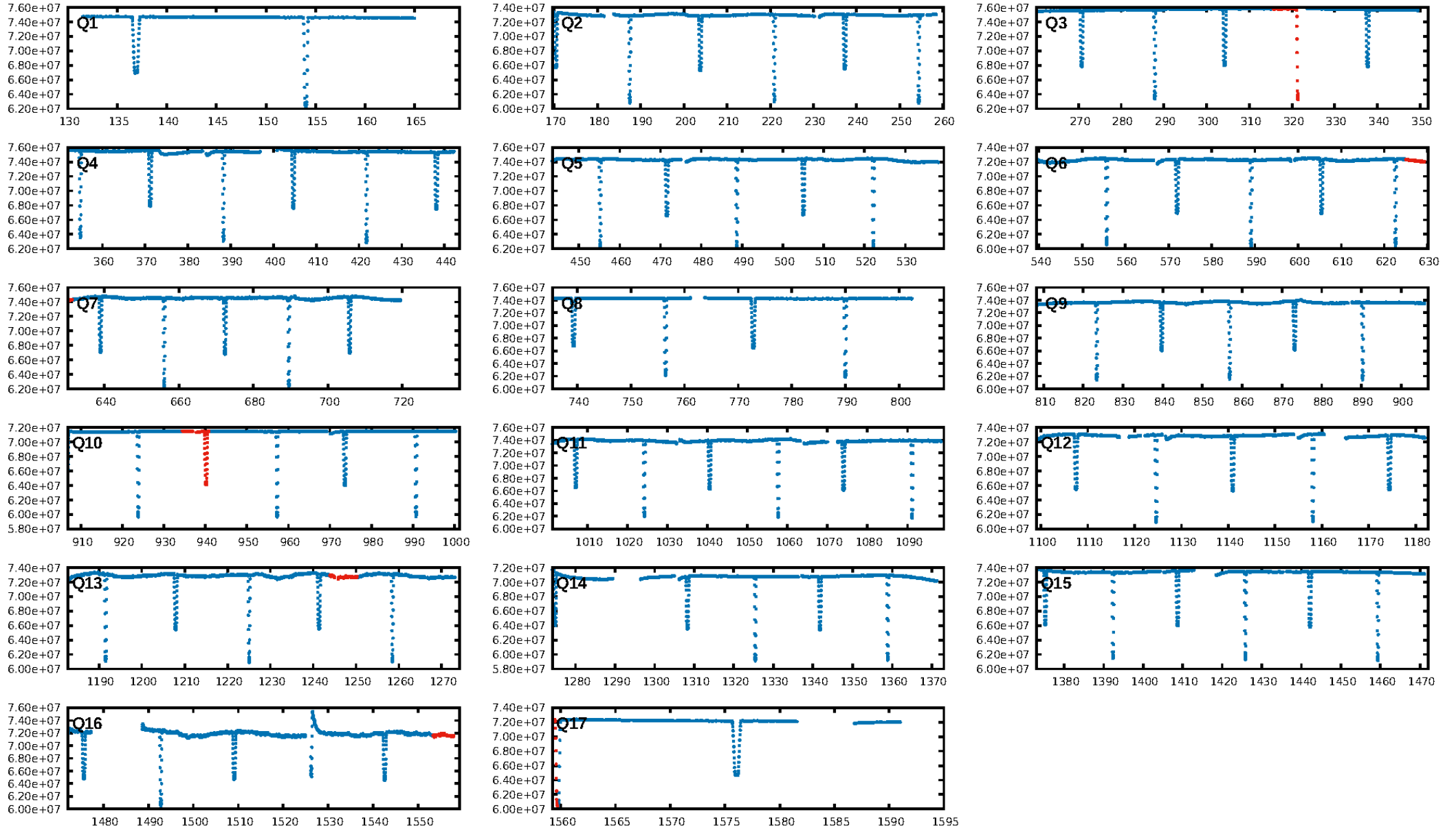
## DV Fit Results:

Period = 309.44319 [0.02019] d  
Epoch = 318.7693 [0.0222] BKJD  
Rp/R\* = 0.0958 [0.0729]  
a/R\* = 13.93 [2.12]  
b = 1.00 [0.21]  
Seff = 10.92 [14.44]  
Teq = 463 [153] K  
Rp = 32.13 [32.47] Re  
a = 0.9810 [0.7472] AU  
Ag = 1028.42 [2081.45] [0.49σ]  
Teffp = 4058 [1567] K [2.28σ]

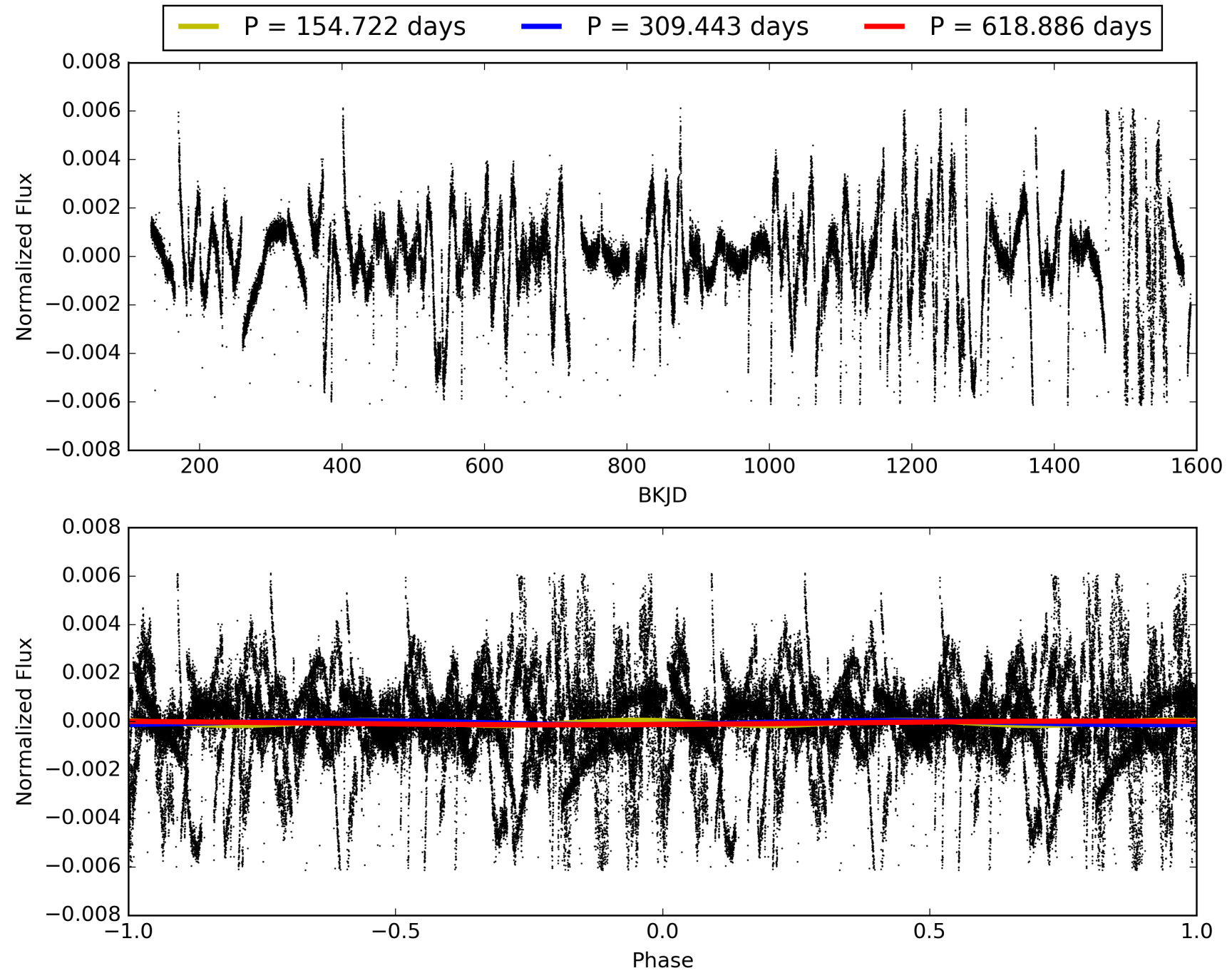
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [85.82σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: -0.4893  
Centroid-sig: N/A  
Centroid-so: 0.551 arcsec [5.47σ]  
OotOffset-rm: N/A  
OotOffset-st: 0/0/0 [0]  
KicOffset-rm: N/A  
KicOffset-st: 0/0/0 [0]  
DiffImageQuality-fgm: N/A  
DiffImageOverlap-fno: N/A

# TCE 008773948-03, PDC Light Curves



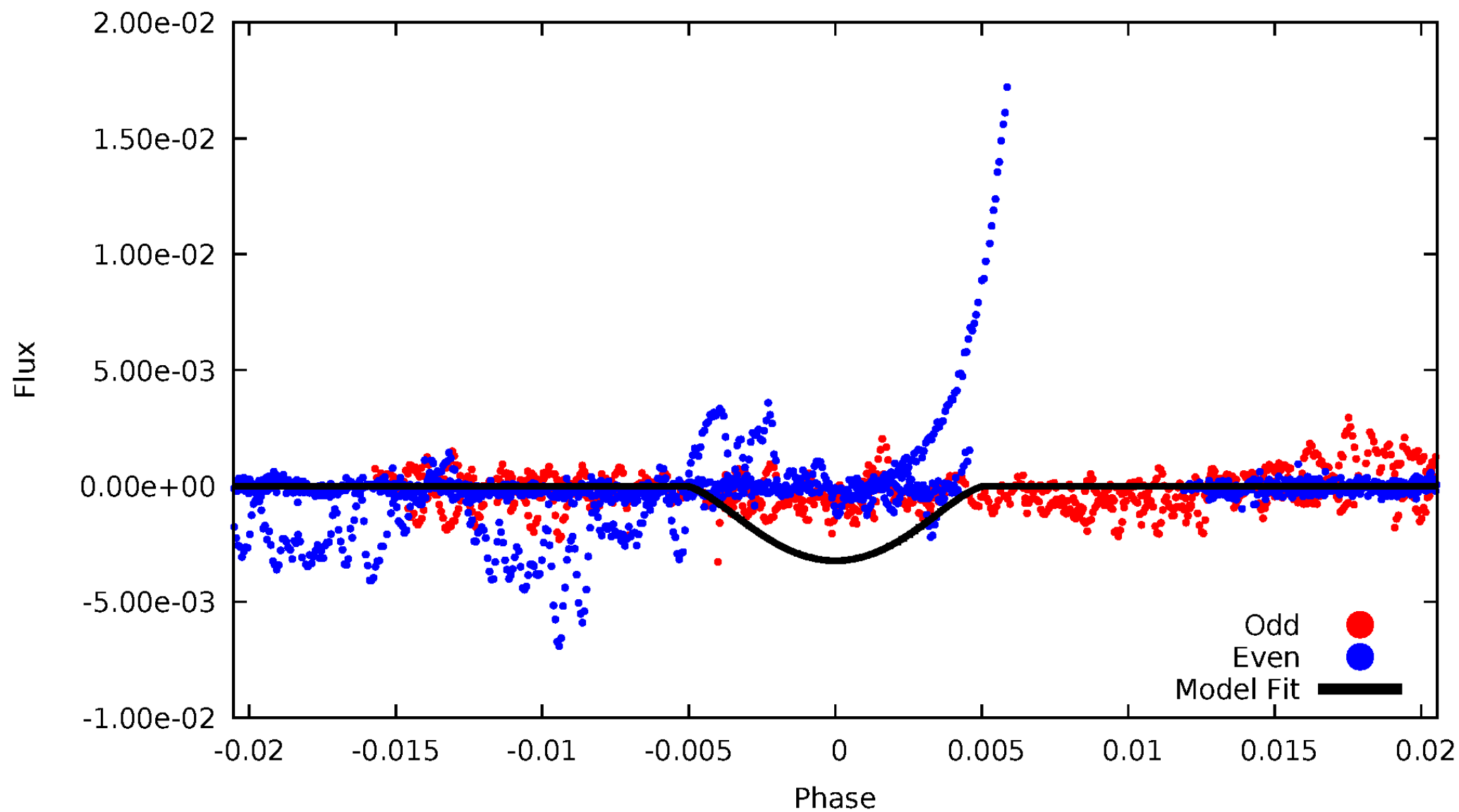
# TCE 008773948-03





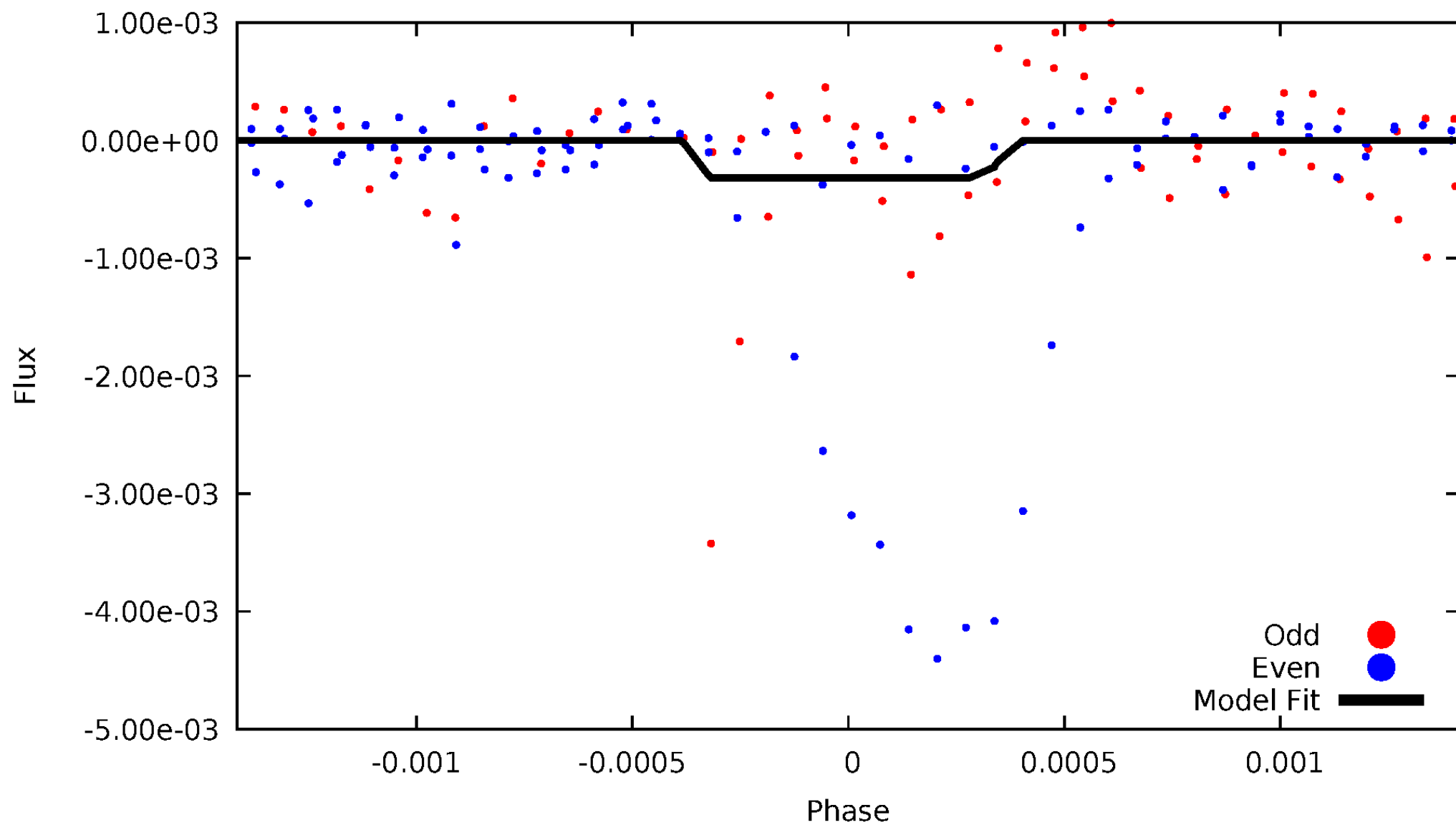
# DV Odd/Even

TCE 008773948-03



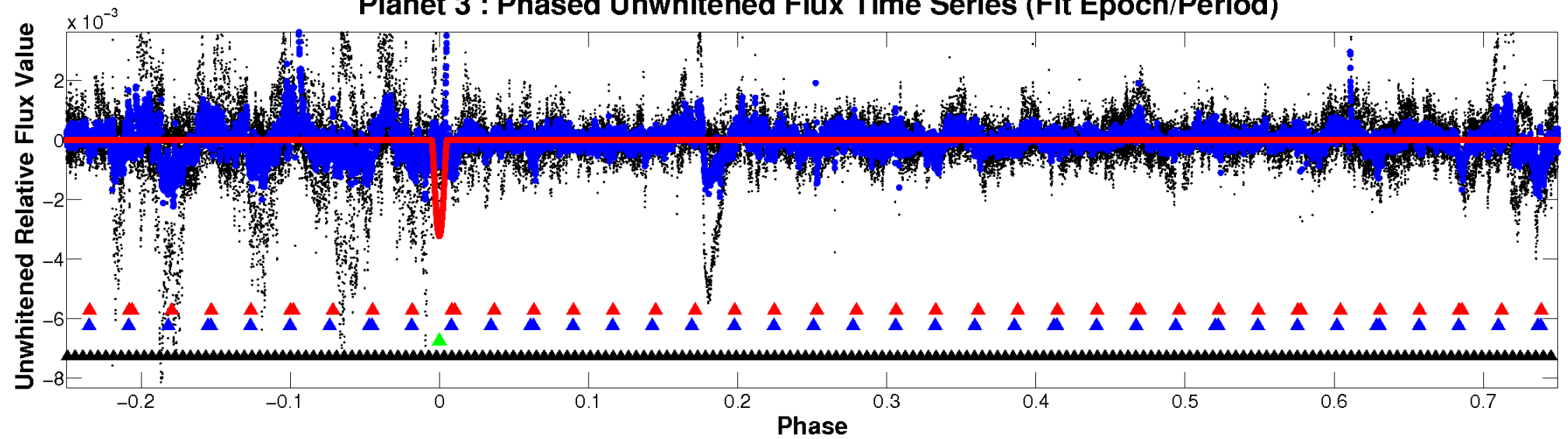
# ALT Odd/Even

TCE 008773948-03

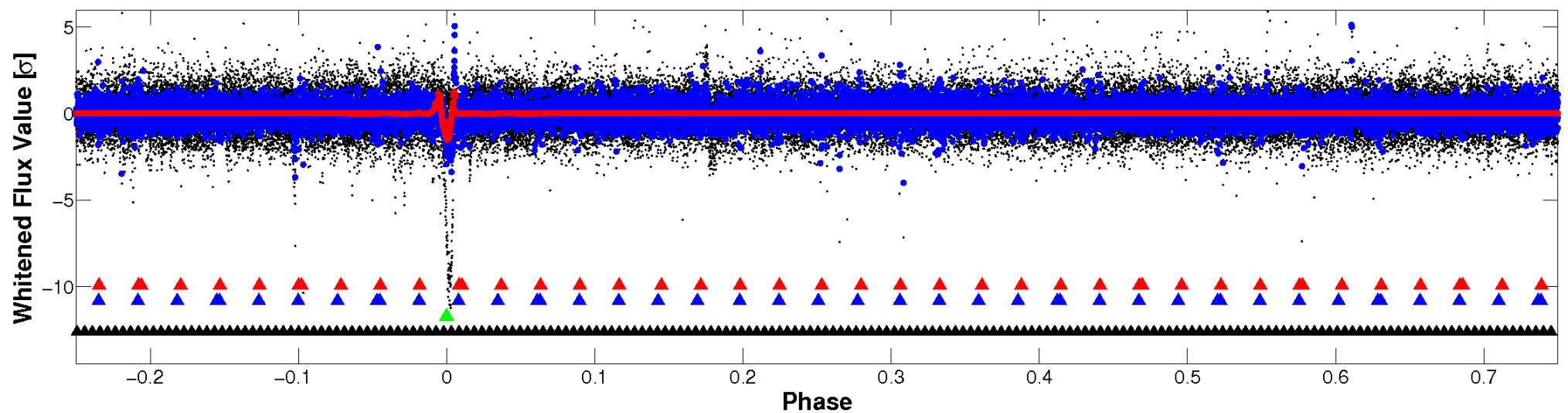


# Non-Whitened Vs. Whitened Light Curve

Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

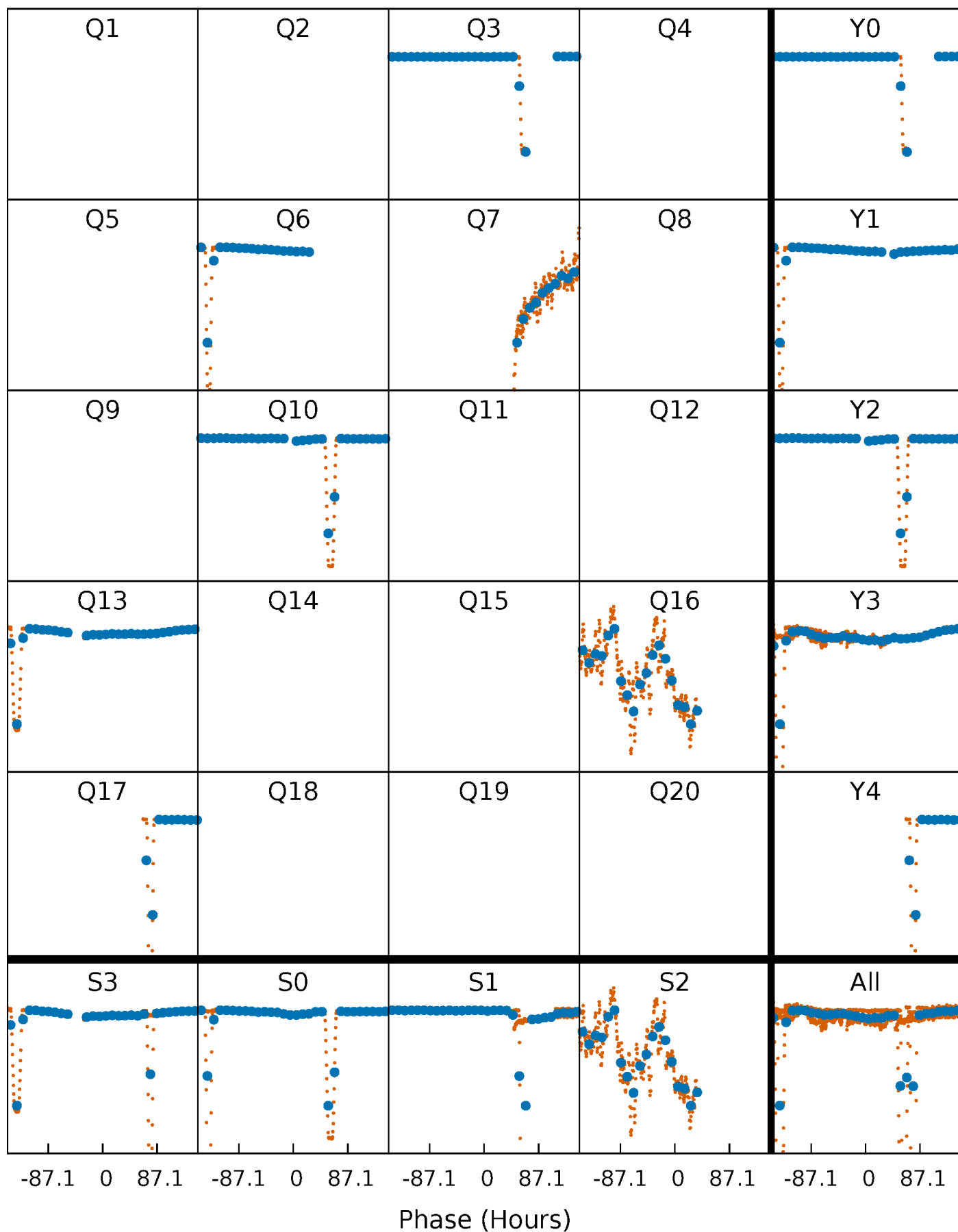


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



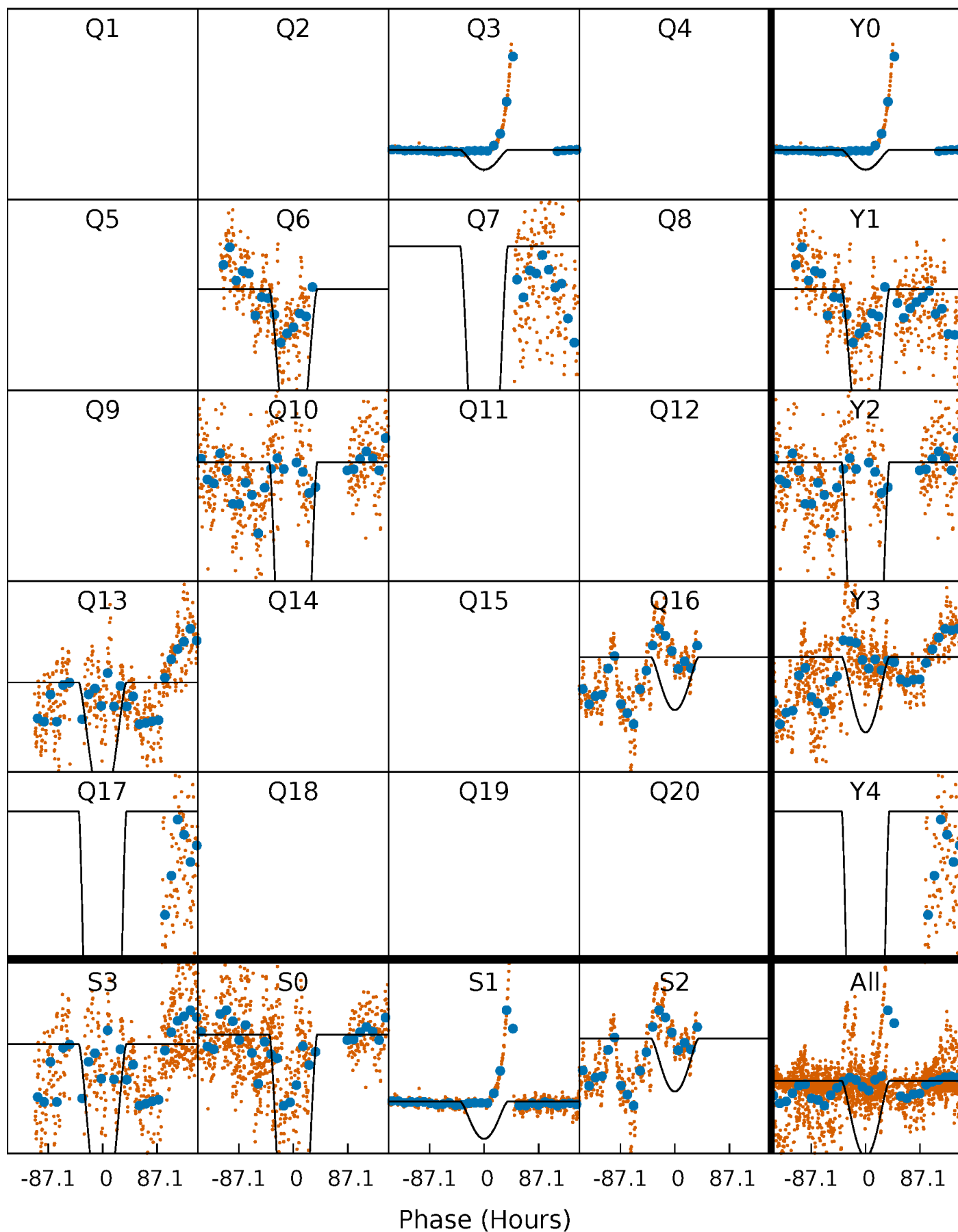
# PDC Quarter-Phased Transit Curves

TCE 008773948-03 P=309.443191 Days  $T_0=318.769324$  (BKJD)



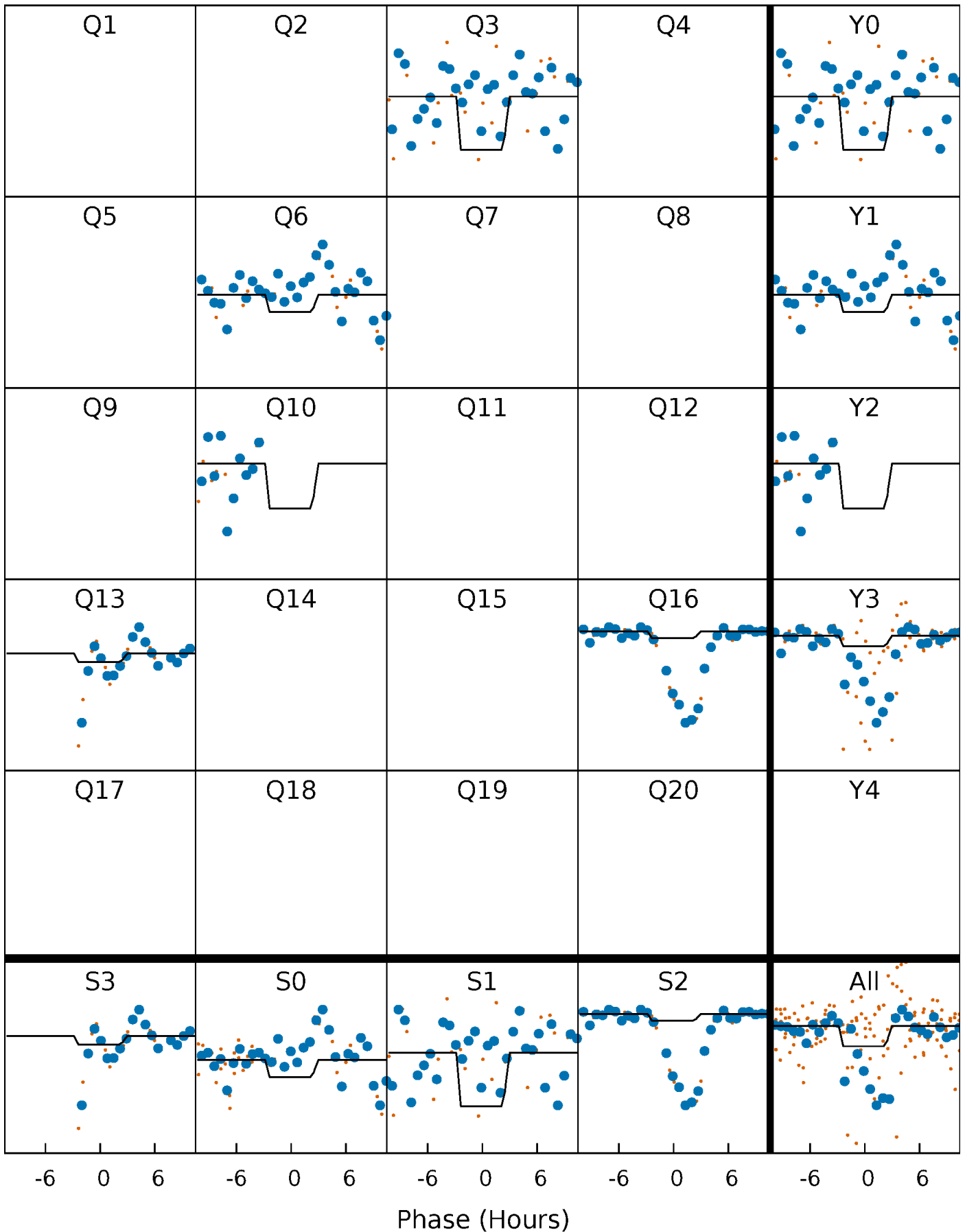
# DV Quarter-Phased Transit Curves

TCE 008773948-03 P=309.443191 Days  $T_0=318.769324$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

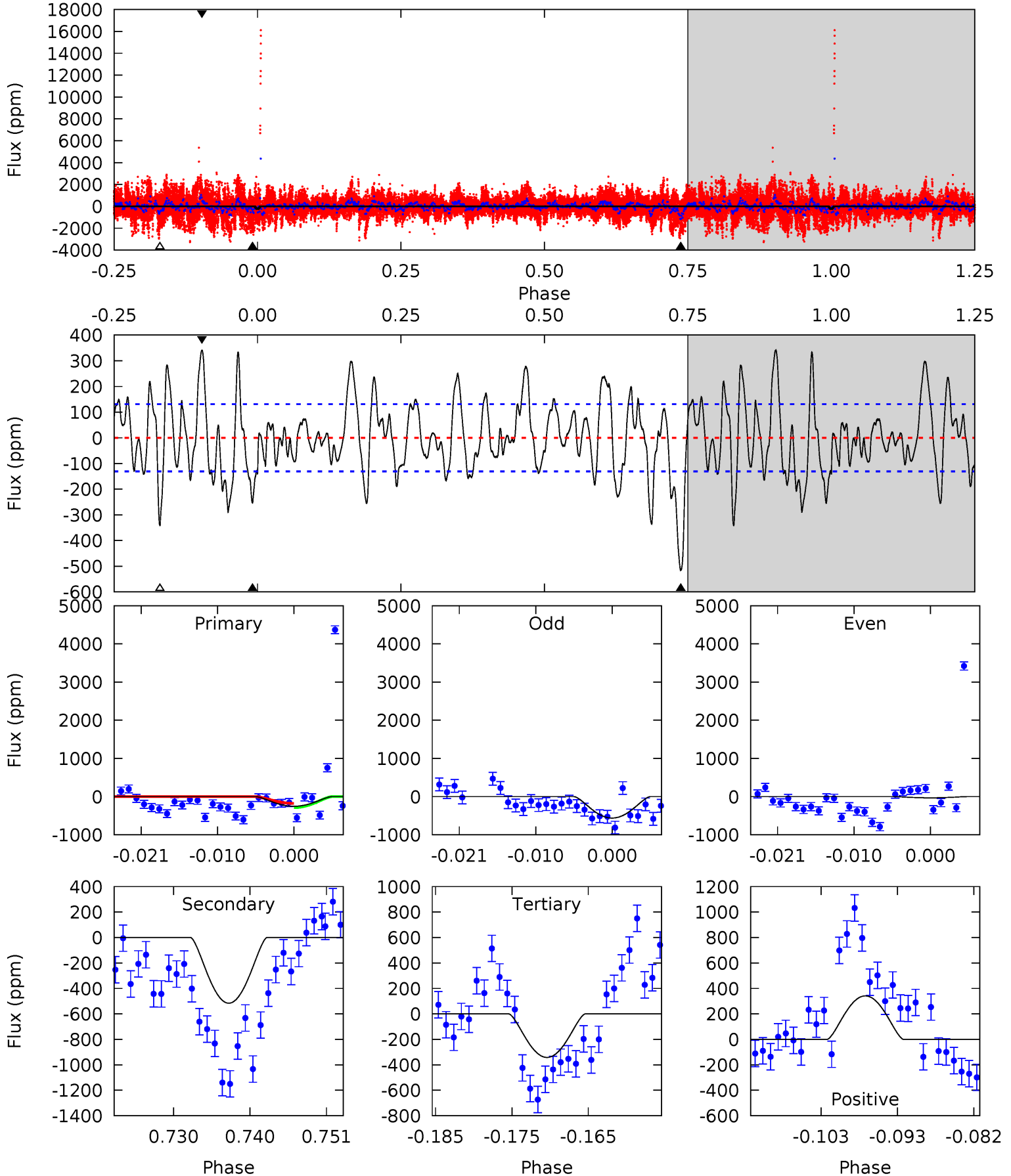
TCE 008773948-03 P=308.873693 Days  $T_0=319.335204$  (BKJD)



# DV Model-Shift Uniqueness Test

008773948-03, P = 309.443191 Days, E = 9.326133 Days

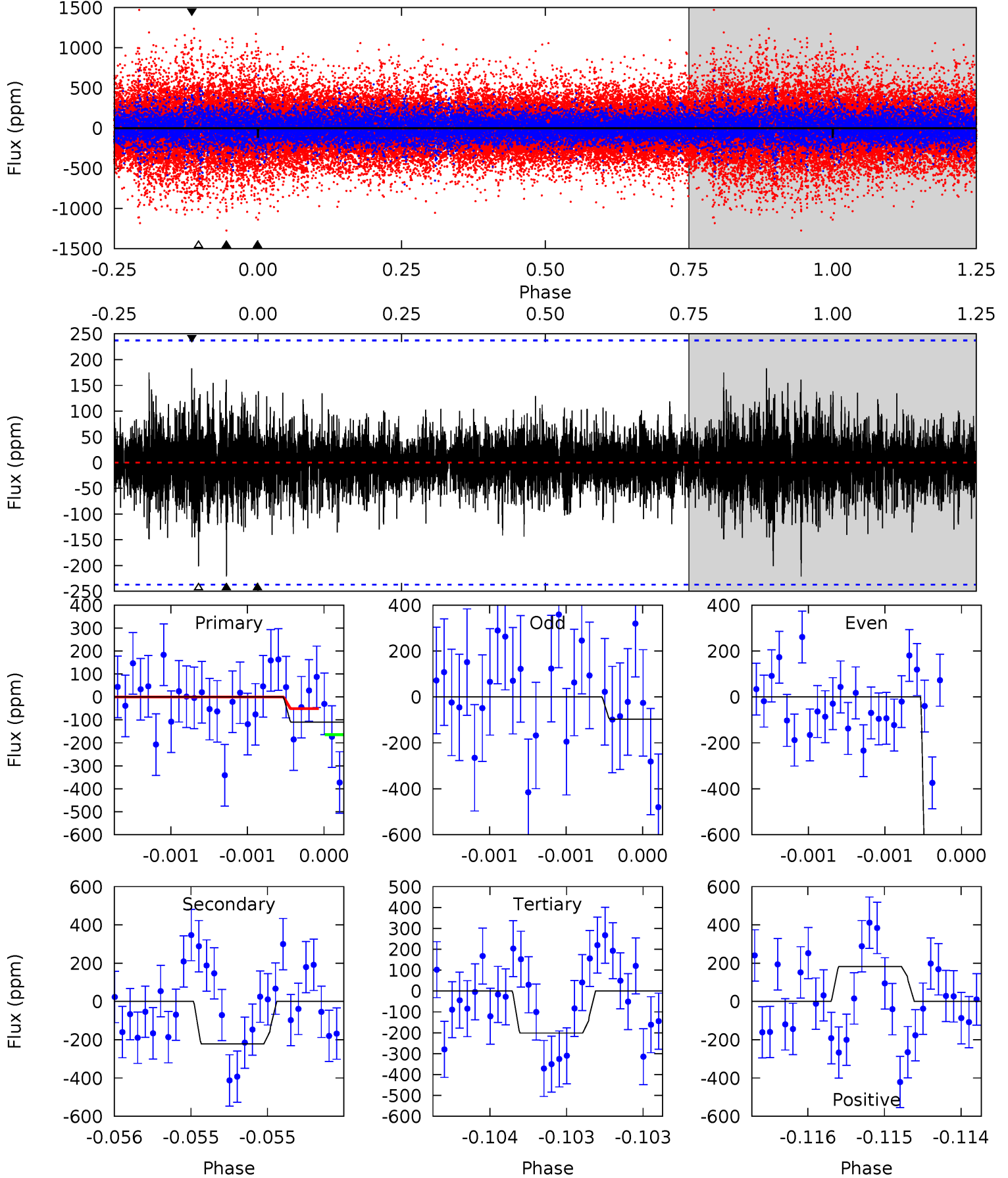
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.71	19.8	13.1	13.1	5.02	2.57	4.76	-3.40	-3.38	6.67	6.69	8.90	1.41	0.40	2.16



# Alt Model-Shift Uniqueness Test

008773948-03, P = 308.873693 Days, E = 10.461511 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.55	5.13	4.67	4.24	5.51	3.38	0.88	-2.12	-1.69	0.46	0.89	17.0	2.11	0.45	1.32





### Stellar Parameters For KIC 008773948

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5934^{+208}_{-187}$	$3.581^{+0.807}_{-0.142}$	$-0.620^{+0.350}_{-0.250}$	$3.075^{+0.877}_{-2.045}$	$1.315^{+0.169}_{-0.474}$	$0.064^{+1.052}_{-0.033}$
	+4%/-3%	+23%/-4%	+56%/-40%	+29%/-67%	+13%/-36%	+1652%/-52%
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 008773948-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-516 \pm 26$	$28.15^{+23.25}_{-17.09}$	$622^{+63}_{-115}$	$3342^{+1113}_{-457}$	$332^{+1802}_{-232}$
Alt.	$-221 \pm 43$	$15.03^{+19.57}_{-10.92}$	$629^{+63}_{-116}$	$3556^{+2106}_{-706}$	$493^{+6080}_{-398}$

$T_{\text{max}}$  = 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

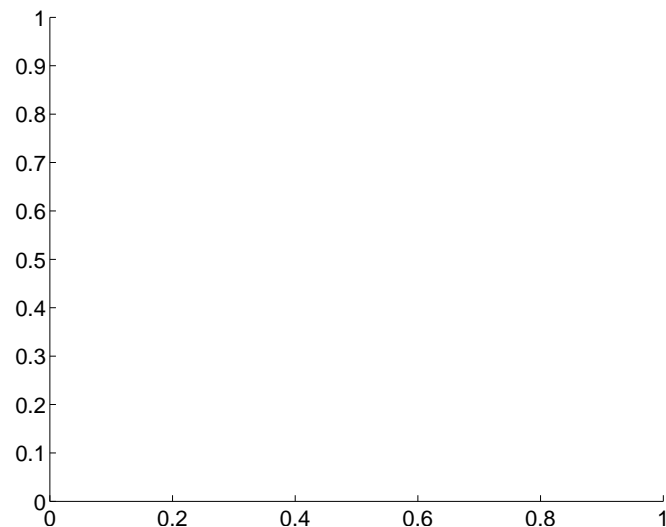
Supplemental centroid analysis for 008773948-03. Kepler magnitude: 13.71. Transit SNR 26.60

There are 0 quarters with good PRF difference image offsets

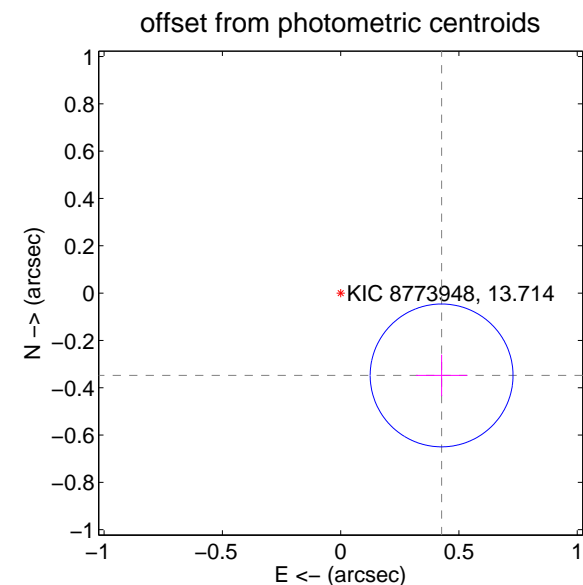
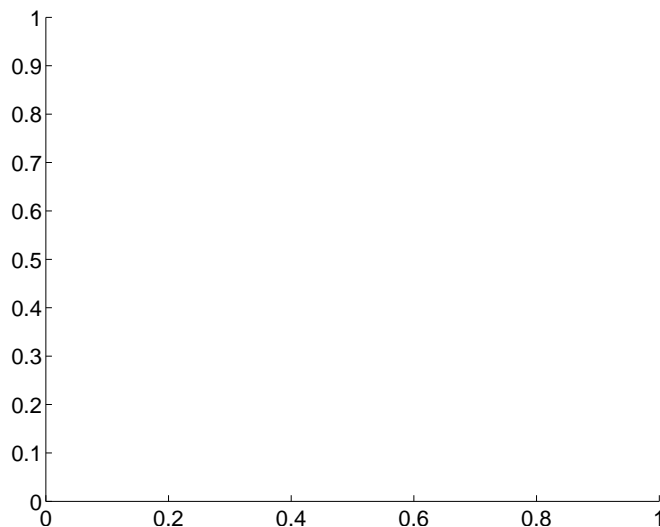
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	—	—	—	—
photometric centroid source offset	$0.55 \pm 0.10$	$5.47$	$-0.43 \pm 0.11$	$-0.35 \pm 0.09$

There is no PRF-fit offset from OOT-fit



There is no PRF-fit offset from KIC



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.



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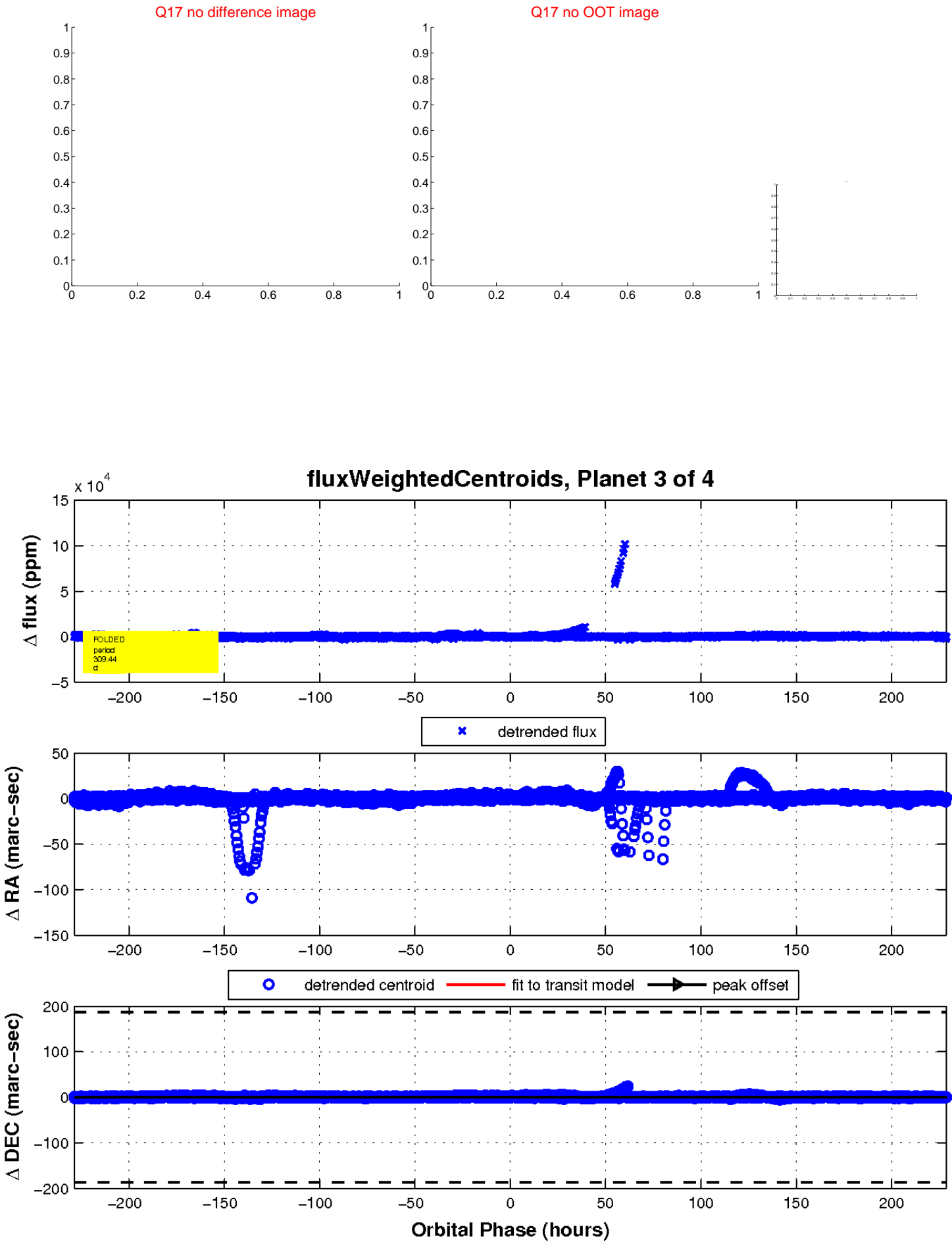
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



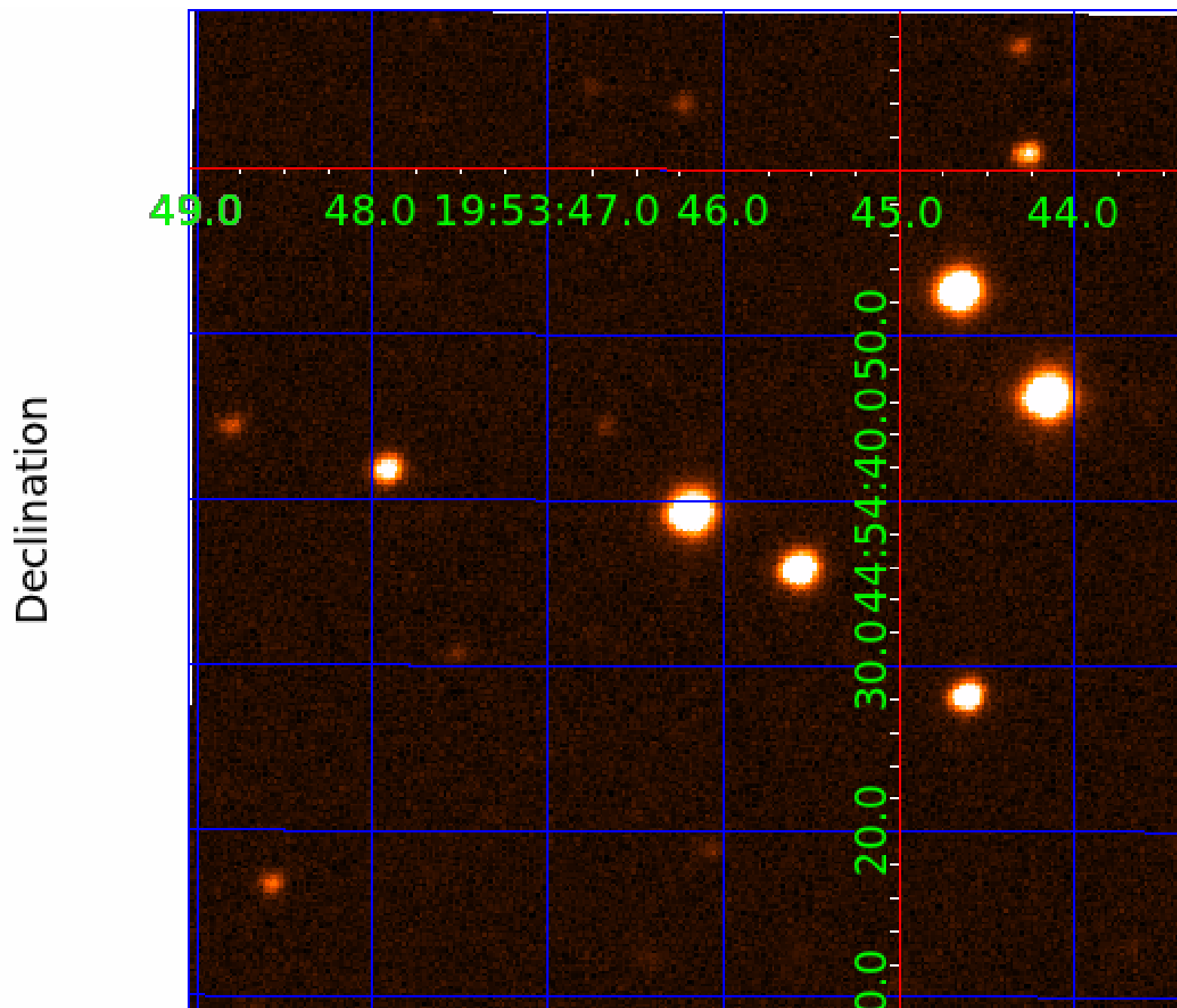
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 008773948

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008773948-01	OBS	7090.01	33.469521	154.007876	165341.1	11.905	5305.2	4176.8	3.08	5934	127.56	211.83
008773948-02	OBS	No	33.469500	136.873240	104430.5	18.923	3720.0	2508.3	3.08	5934	102.88	211.83
008773948-03	OBS	No	309.443191	318.769324	3225.4	76.254	24.7	26.6	3.08	5934	32.13	10.92
008773948-04	OBS	No	1.595313	133.019672	233.3	6.000	13.1	-1.0	3.08	5934	4.70	12257.07

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008773948-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE
008773948-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE
008773948-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_ZUMA_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008773948-04	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_NOFITS

**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 008773948-04

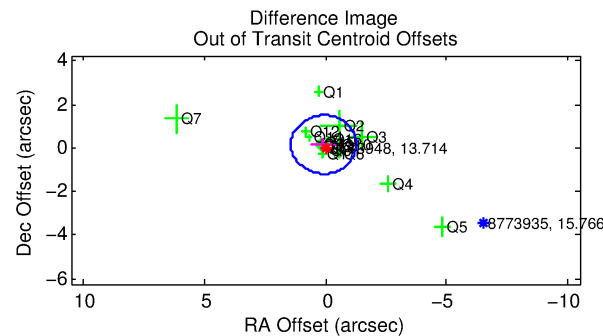
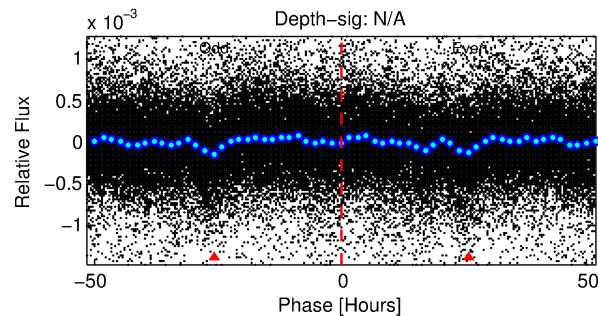
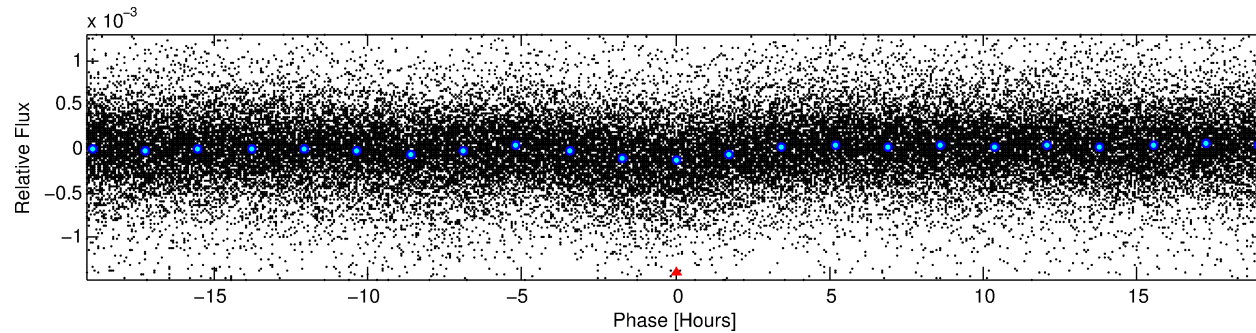
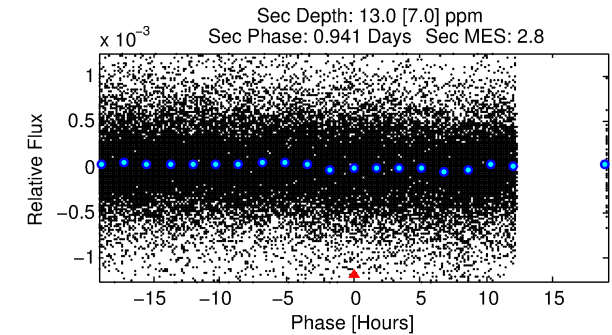
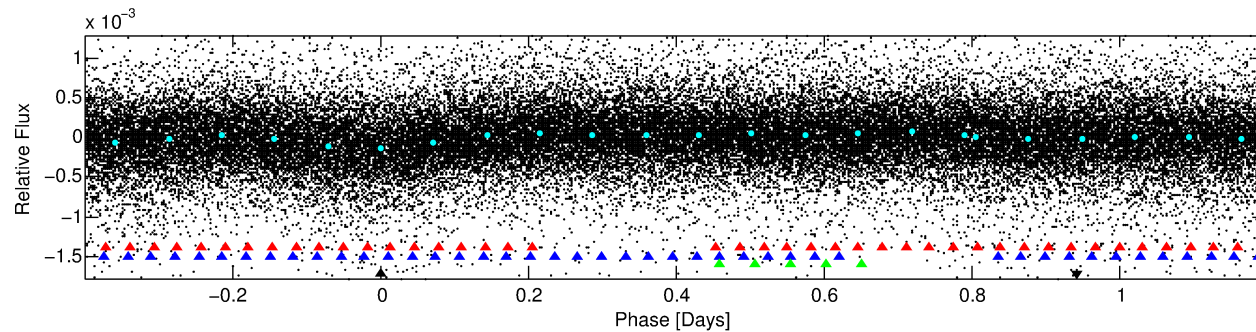
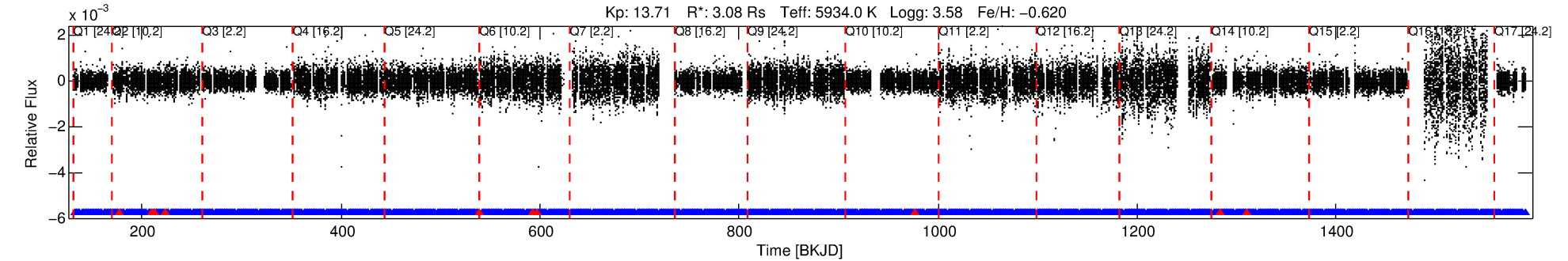
No Significant Match Found

# DV One-Page Summary

KIC: 8773948 Candidate: 4 of 4 Period: 1.595 d

KOI: K07090 Corr: No Ephemeris Match

Kp: 13.71 R\*: 3.08 Rs Teff: 5934.0 K Logg: 3.58 Fe/H: -0.620



## TPS TCE Results:

Period = 1.59531 d  
Epoch = 133.0197 BKJD

DV fit results are unavailable

## DV Diagnostic Results:

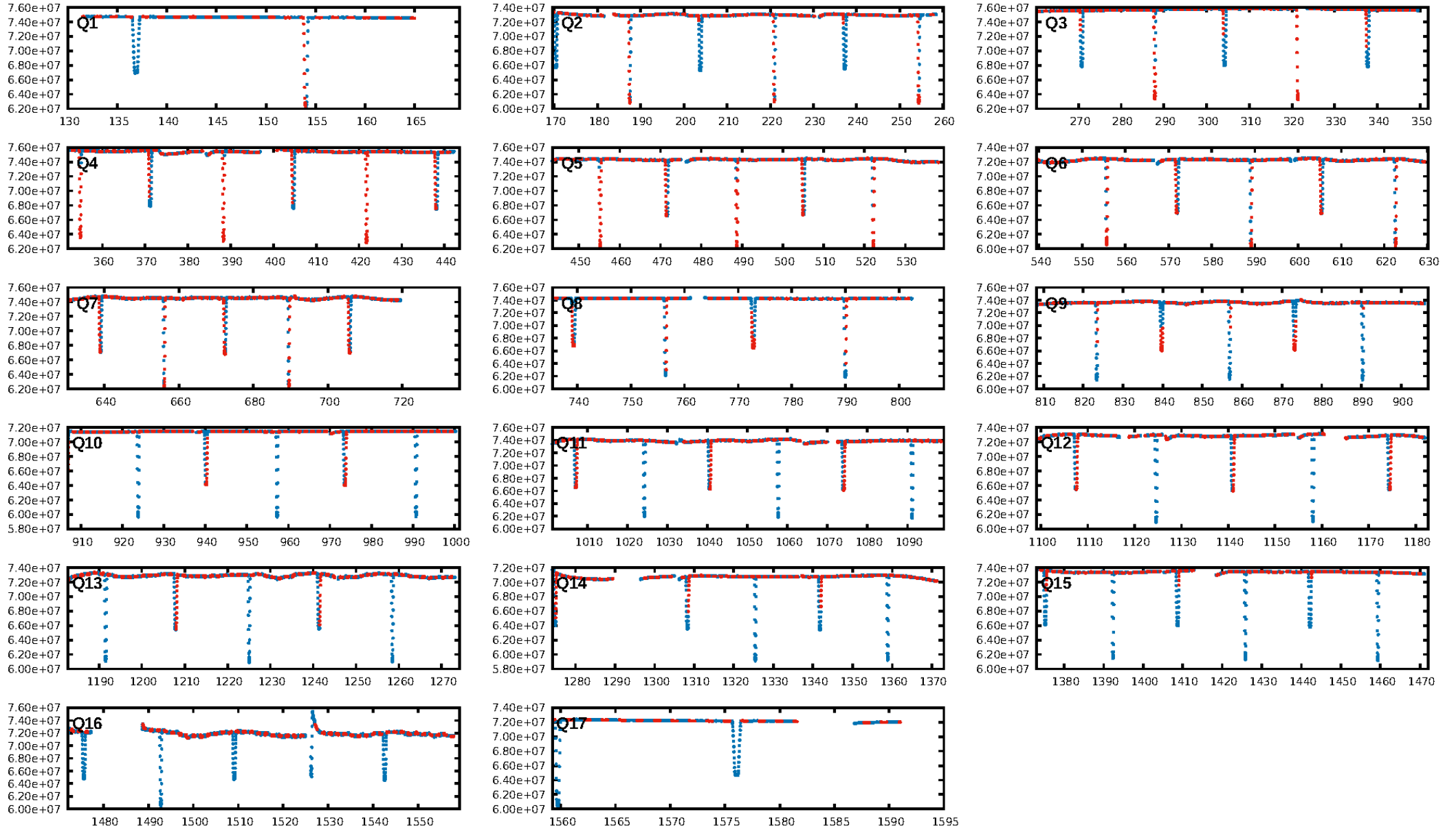
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [38.54σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.99 [706/716]  
GhostDiagnostic-chr: 1.446

Centroid-sig: N/A  
Centroid-so: 0.341 arcsec [1.60σ]  
OotOffset-rm: 0.179 arcsec [0.40σ]  
KicOffset-rm: 0.107 arcsec [0.26σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.88 [15/17]  
DiffImageOverlap-fno: 1.00 [17/17]

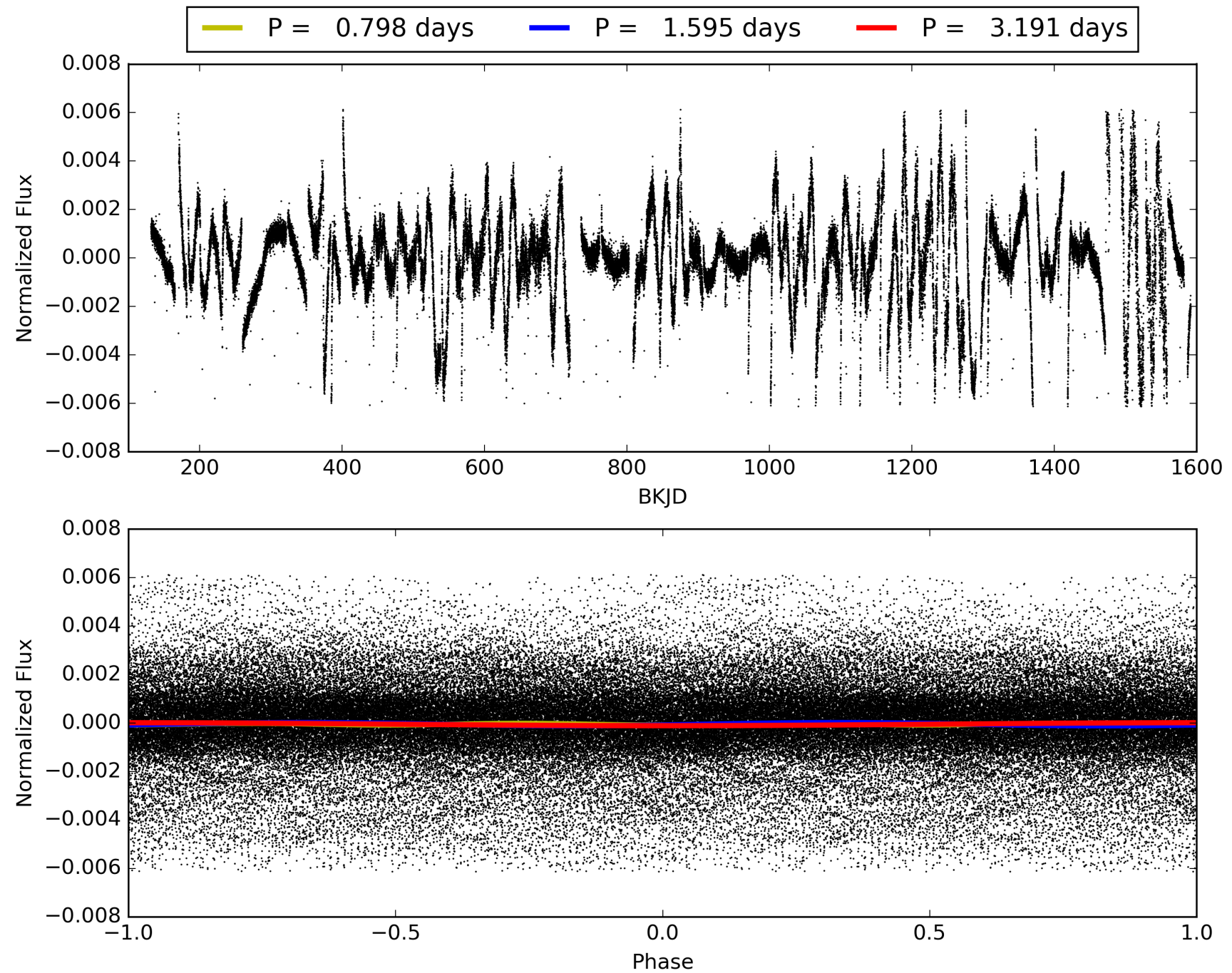
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:53:50 Z

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

# TCE 008773948-04, PDC Light Curves

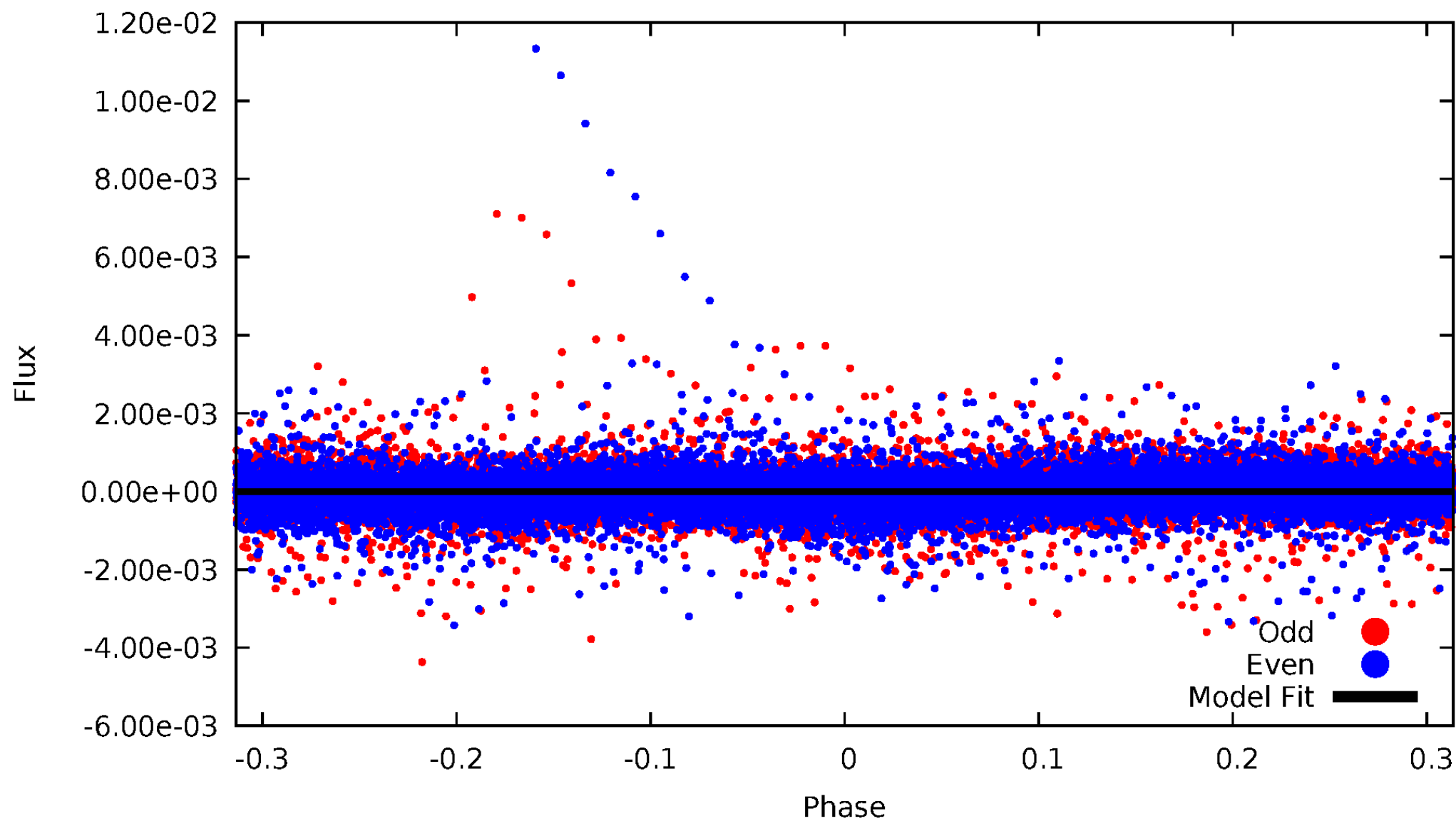


# TCE 008773948-04



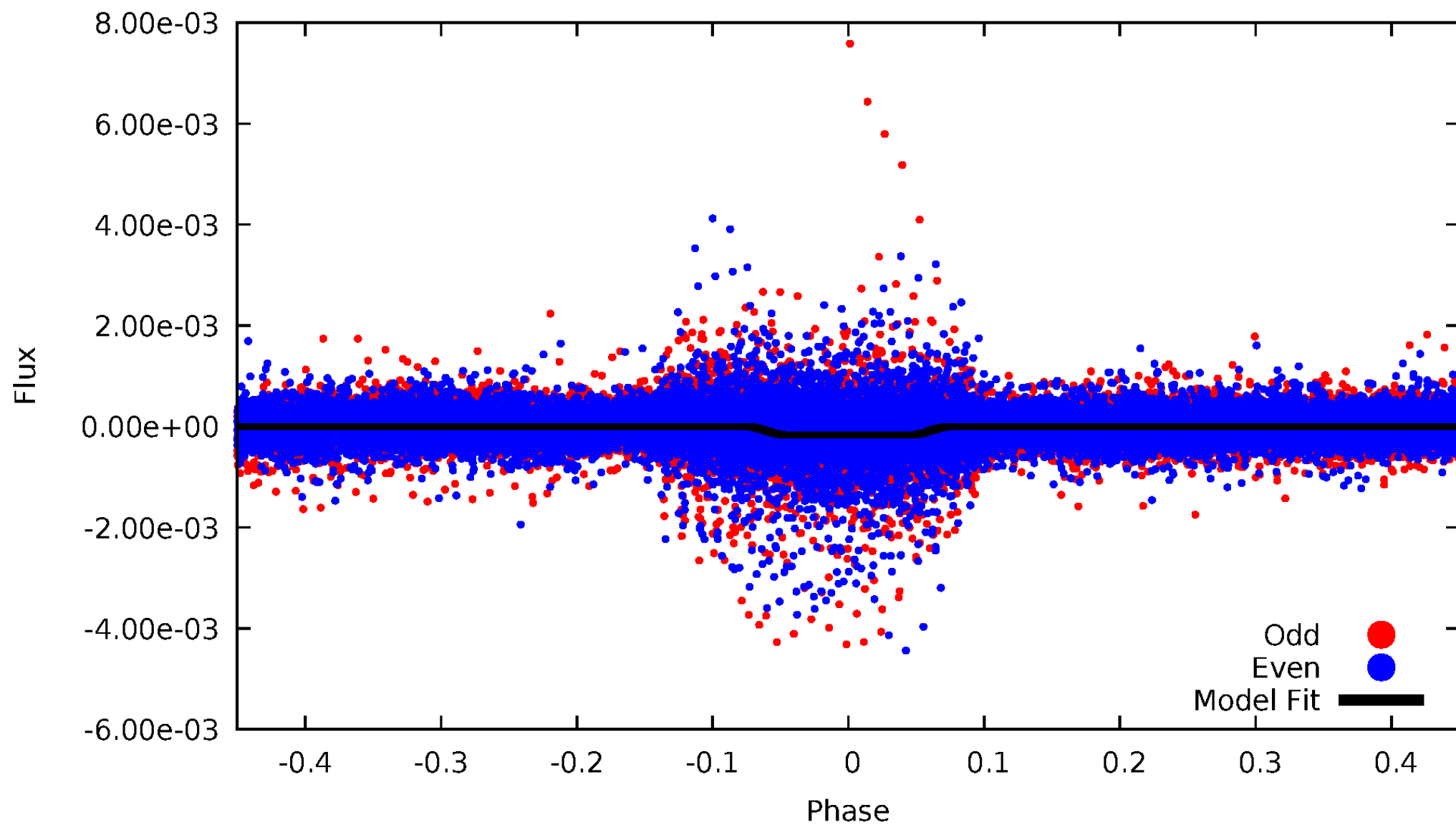
# DV Odd/Even

TCE 008773948-04



# ALT Odd/Even

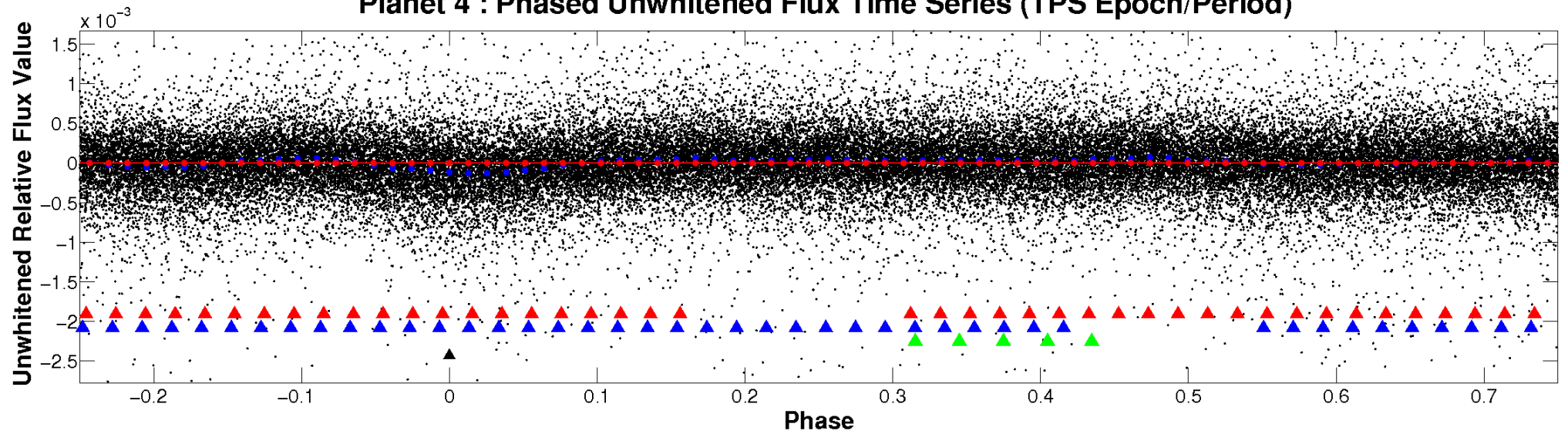
TCE 008773948-04



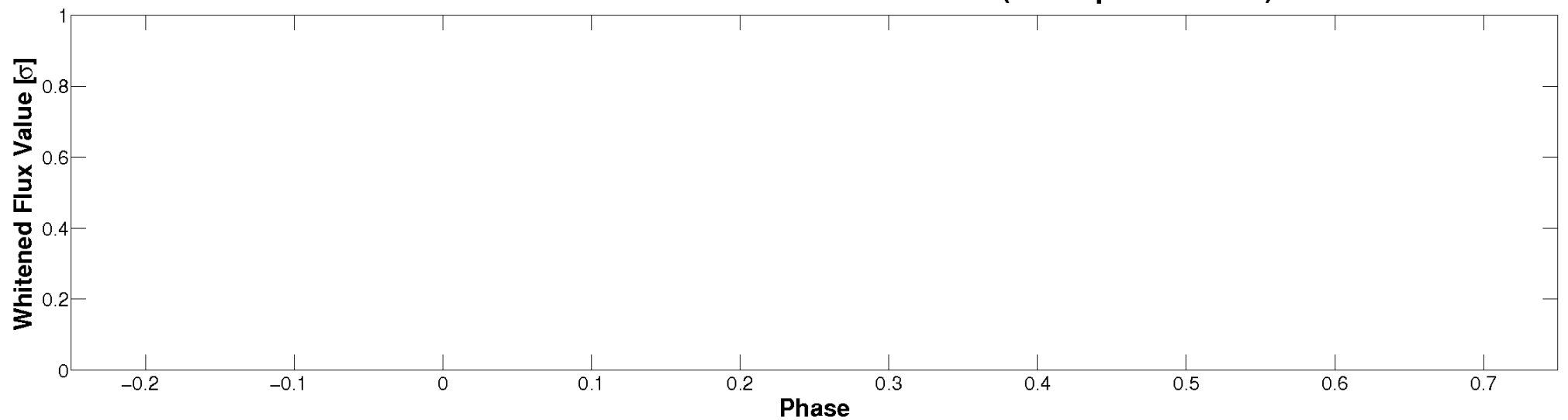


# Non-Whitened Vs. Whitened Light Curve

**Planet 4 : Phased Unwhitened Flux Time Series (TPS Epoch/Period)**

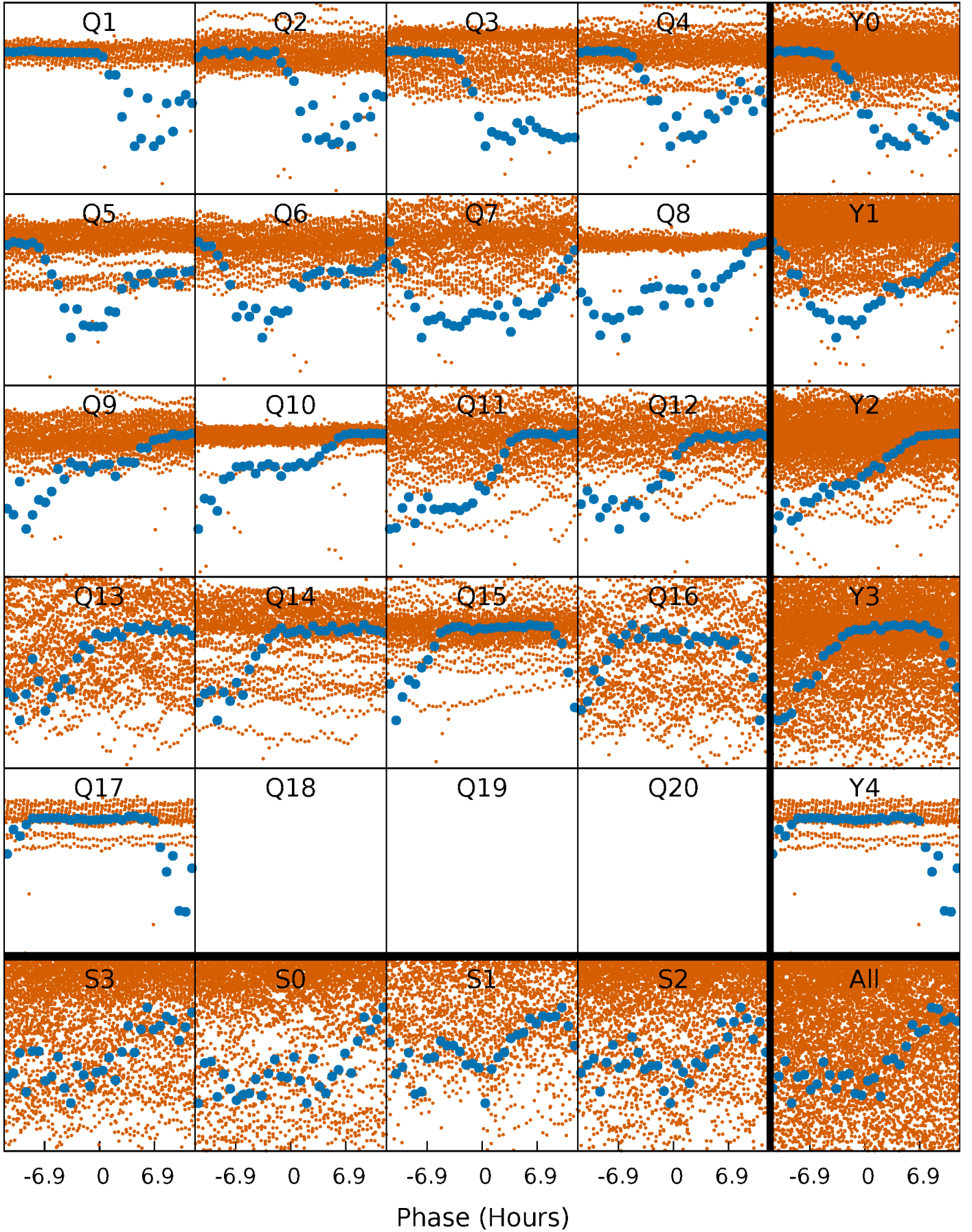


**Planet 4 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



# PDC Quarter-Phased Transit Curves

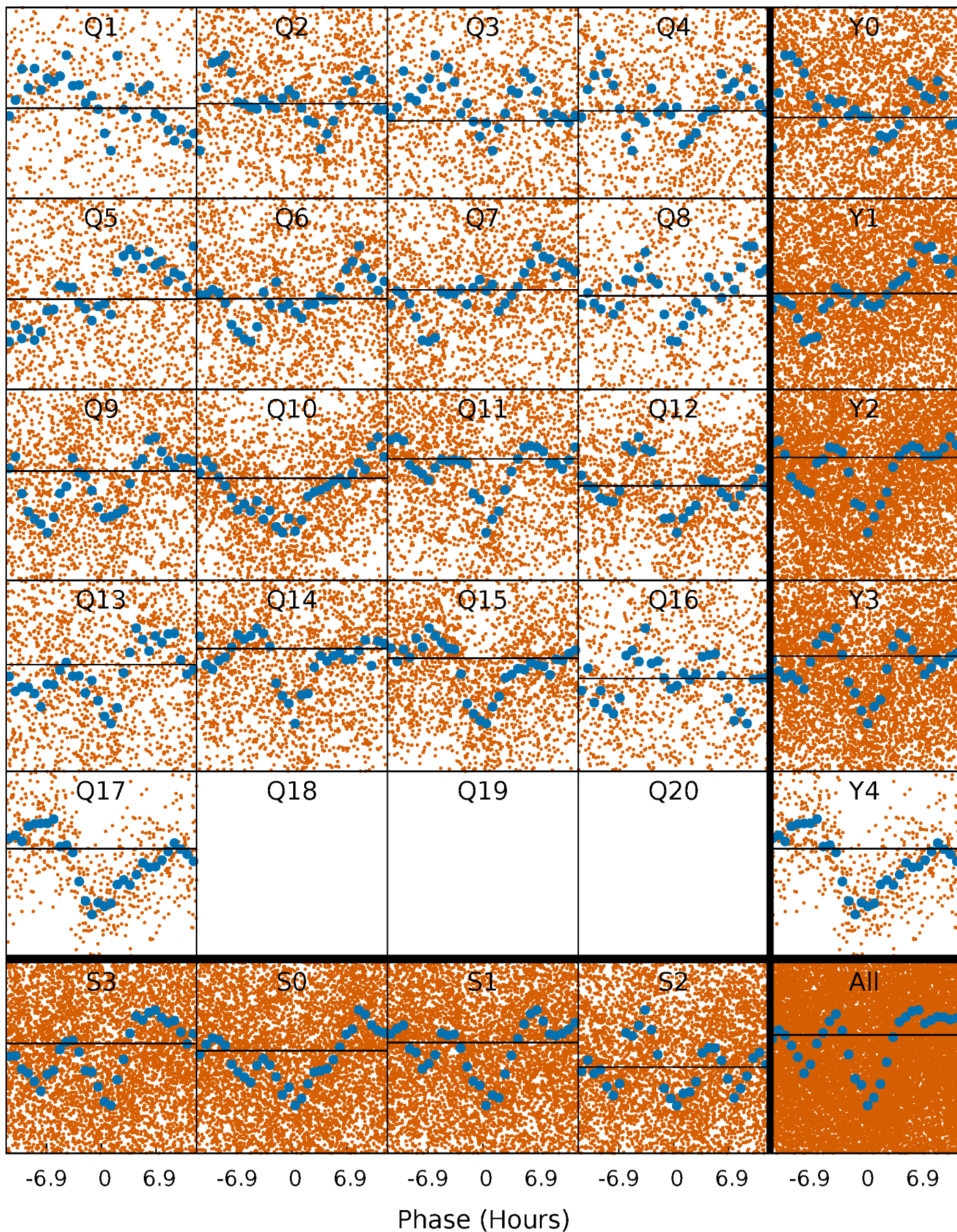
TCE 008773948-04   P= 1.595313 Days    $T_0=133.019672$  (BKJD)





# DV Quarter-Phased Transit Curves

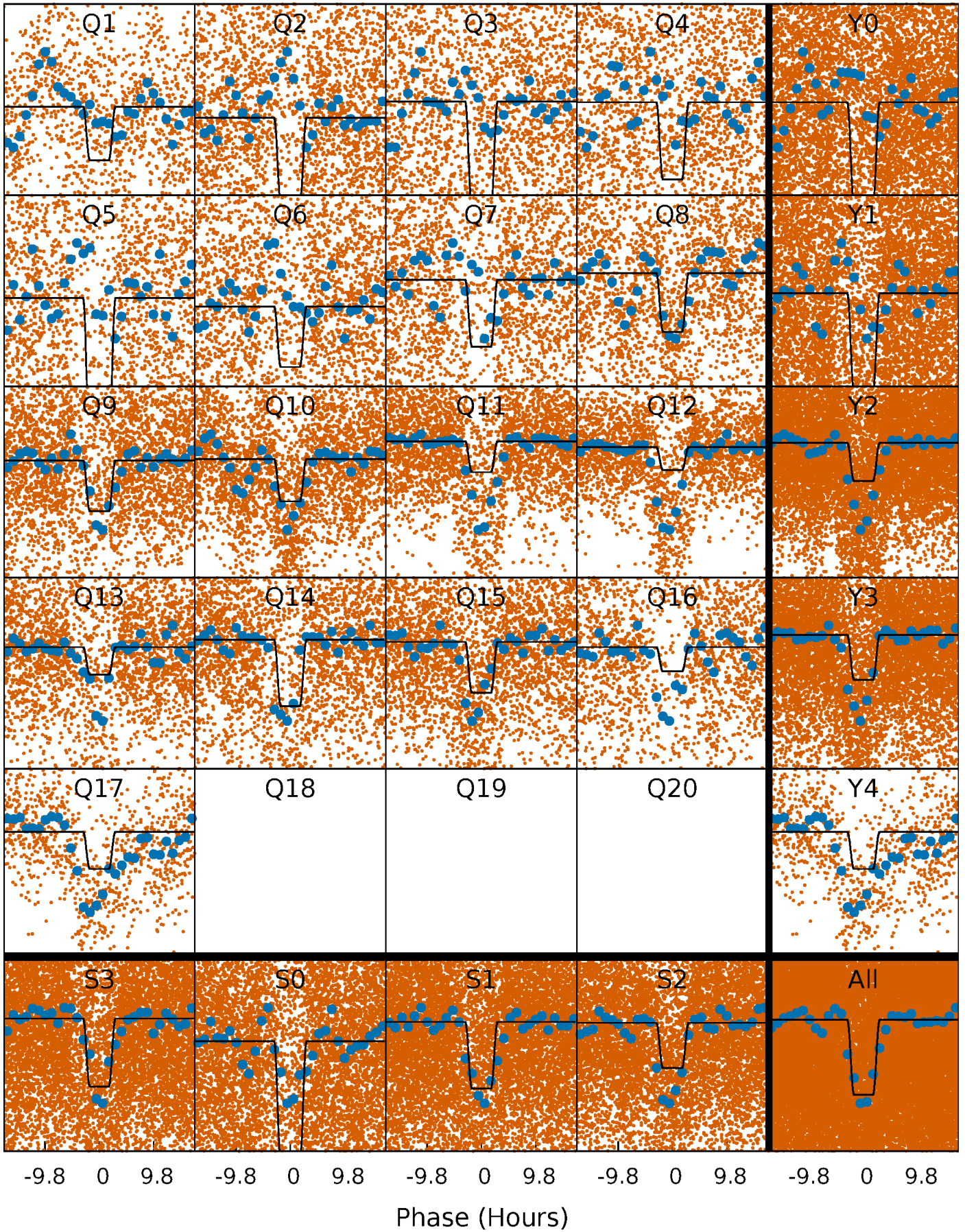
TCE 008773948-04 P= 1.595313 Days  $T_0=133.019672$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

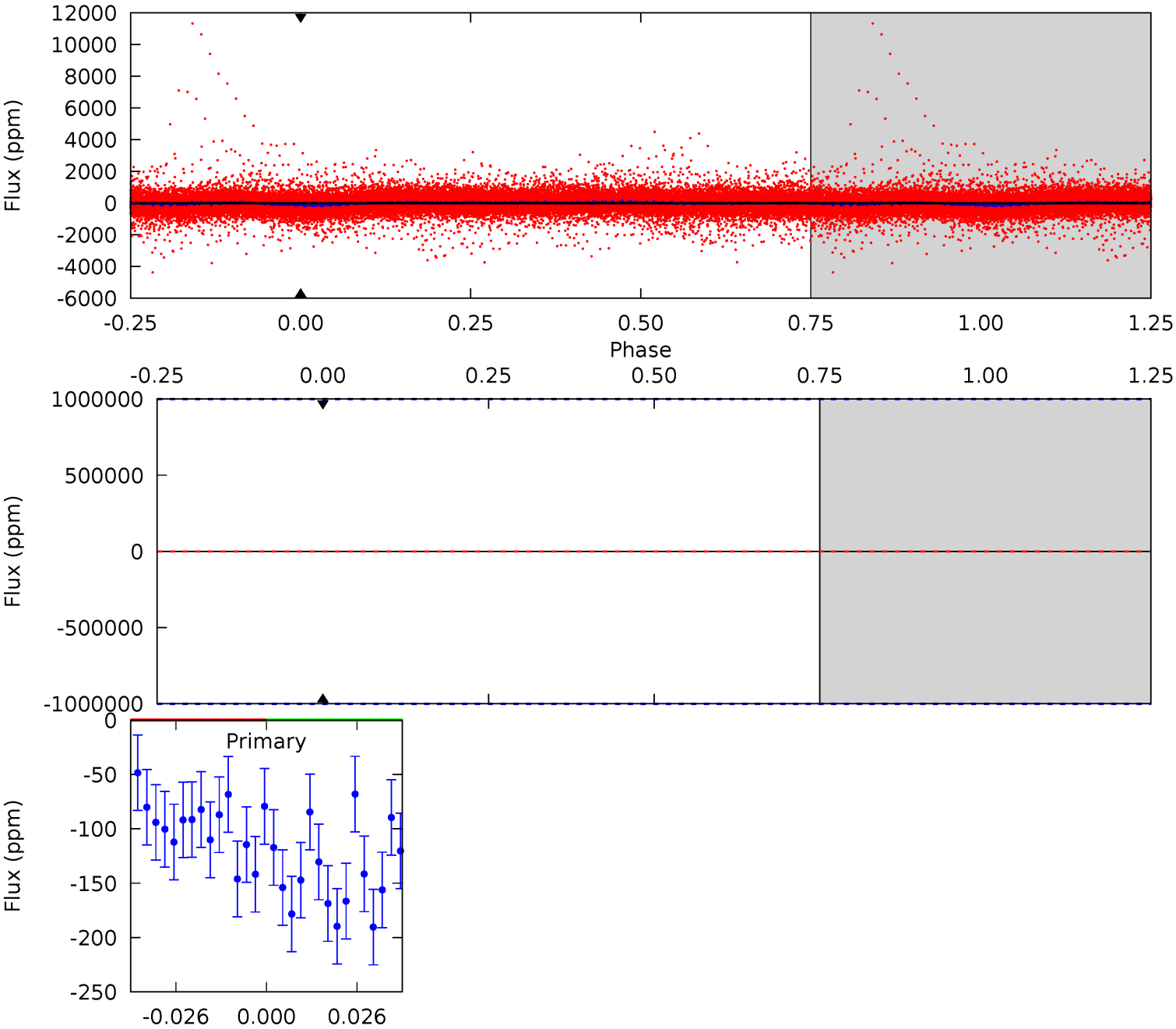
TCE 008773948-04 P= 1.595313 Days  $T_0=133.063288$  (BKJD)



# DV Model-Shift Uniqueness Test

008773948-04, P = 1.595313 Days, E = 131.424359 Days

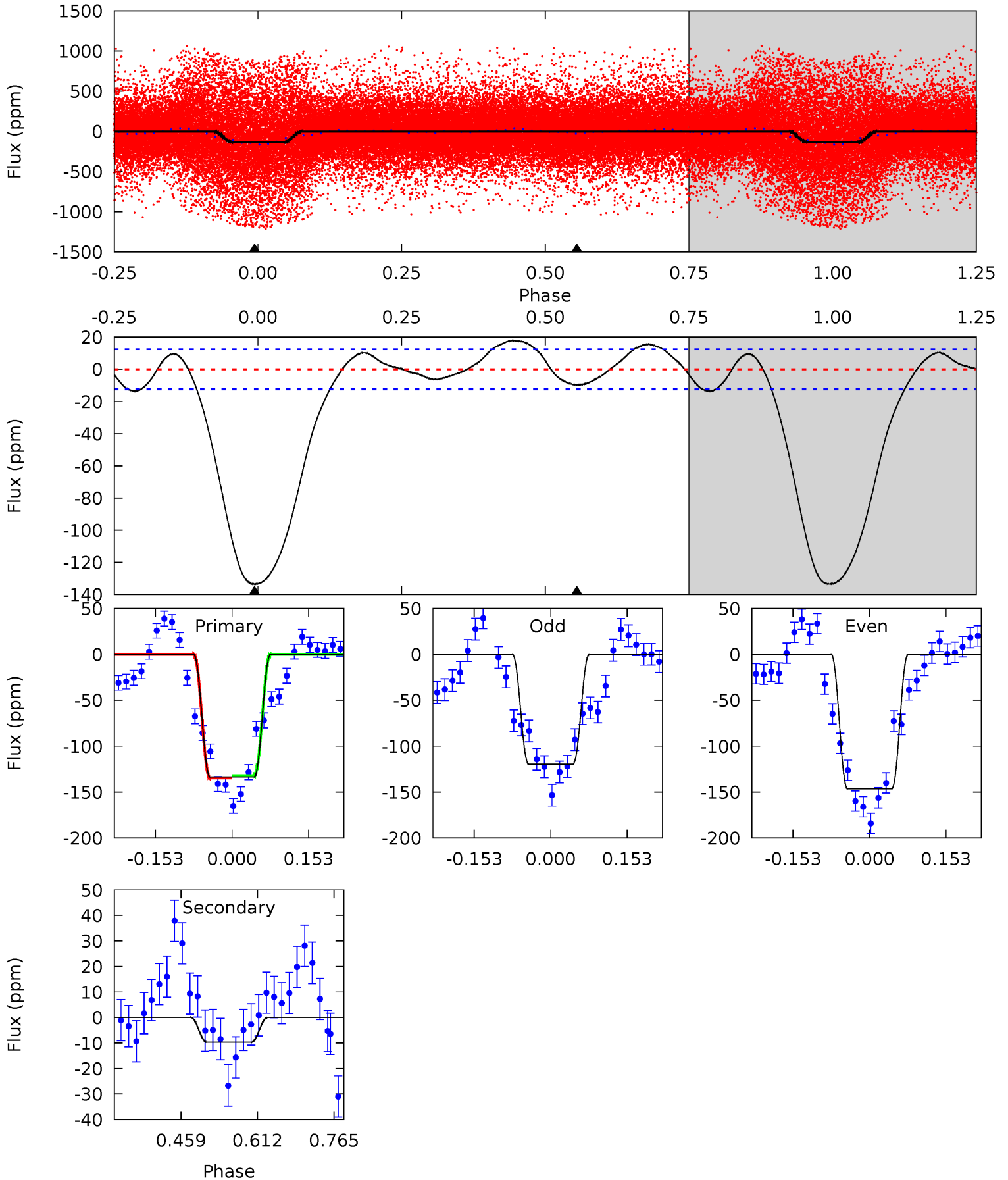
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

008773948-04, P = 1.595313 Days, E = 131.467975 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
48.0	3.49	0	0	4.47	1.43	2.37	48.0	48.0	3.49	3.49	4.83	1.20	0.12	0.48



### Stellar Parameters For KIC 008773948

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5934^{+208}_{-187}$	$3.581^{+0.807}_{-0.142}$	$-0.620^{+0.350}_{-0.250}$	$3.075^{+0.877}_{-2.045}$	$1.315^{+0.169}_{-0.474}$	$0.064^{+1.052}_{-0.033}$
	+4%/-3%	+23%/-4%	+56%/-40%	+29%/-67%	+13%/-36%	+1652%/-52%
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 008773948-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$0 \pm 1000000$	$20.60^{+26.60}_{-14.53}$	$3635^{+346}_{-629}$	$4619^{+18078}_{-26108}$	$1.966^{+202.793}_{-179.569}$
Alt.	$-10 \pm 3$	$20.02^{+23.23}_{-14.16}$	$3543^{+418}_{-642}$	$-3337^{+622}_{-287}$	$0.011^{+0.096}_{-0.008}$

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

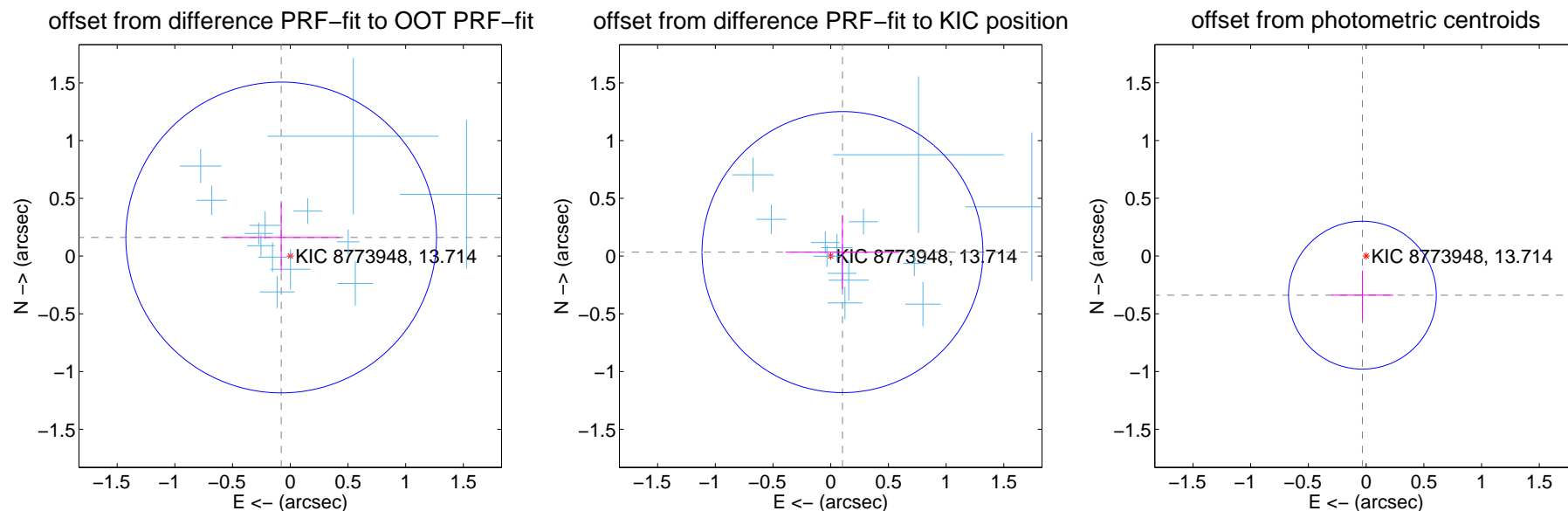
## DV Centroid Data

Supplemental centroid analysis for 008773948-04. Kepler magnitude: 13.71. Transit SNR -1.00

There are 15 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

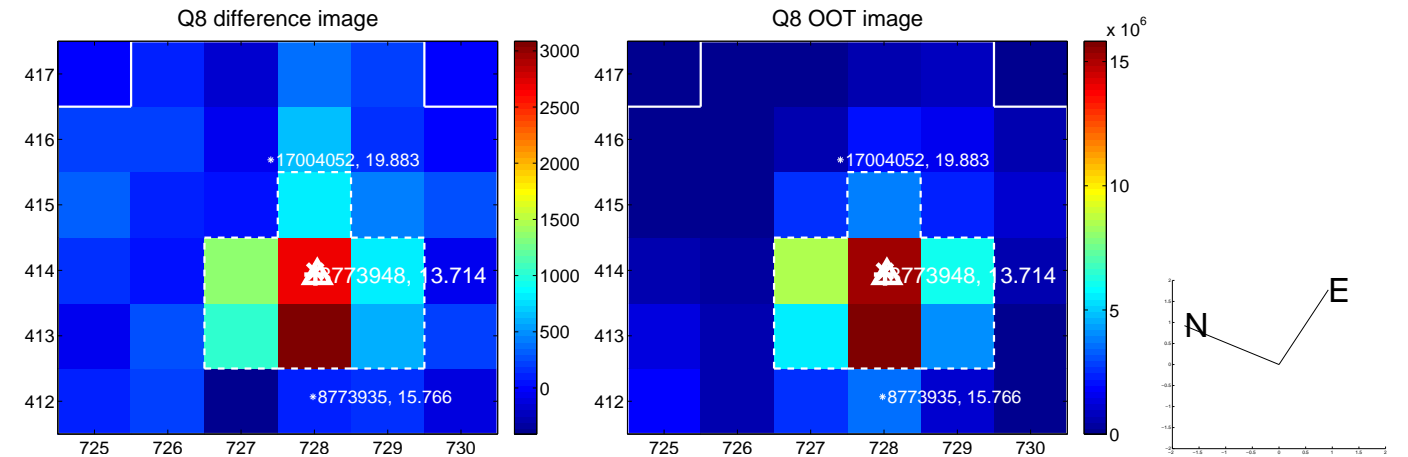
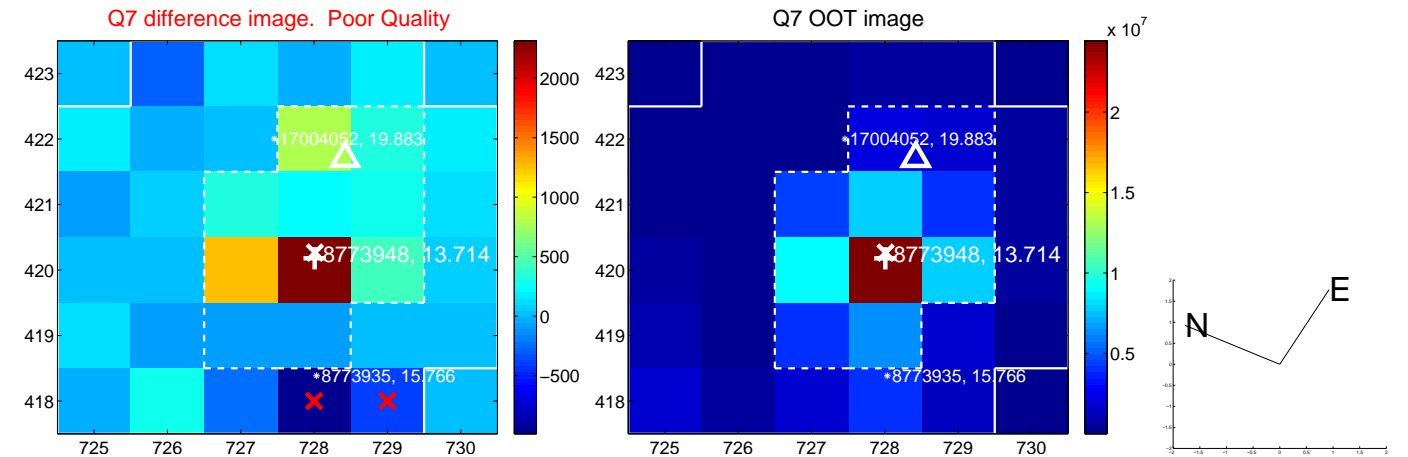
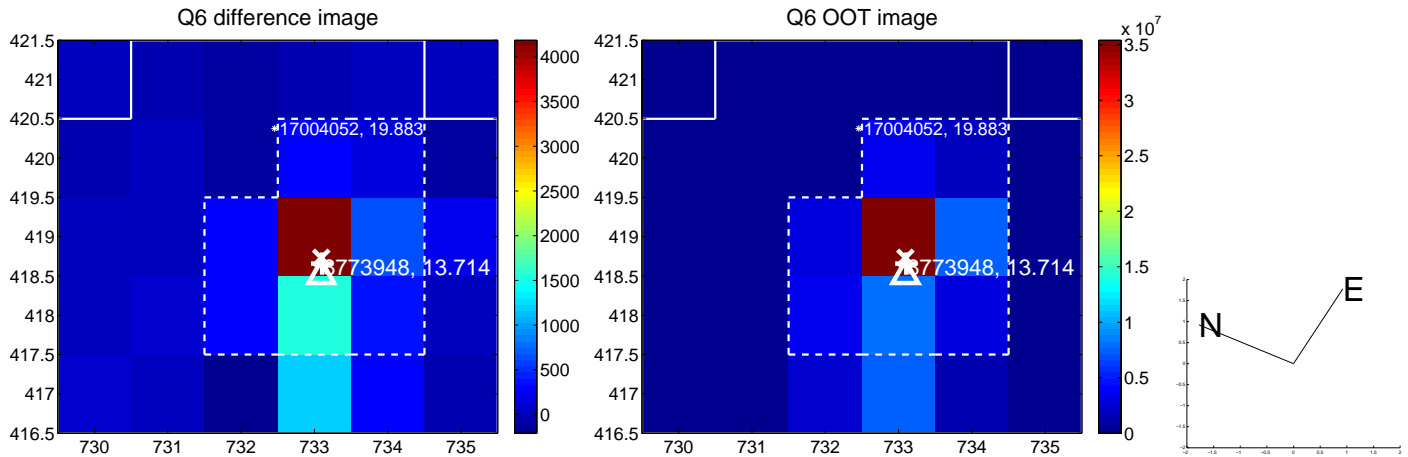
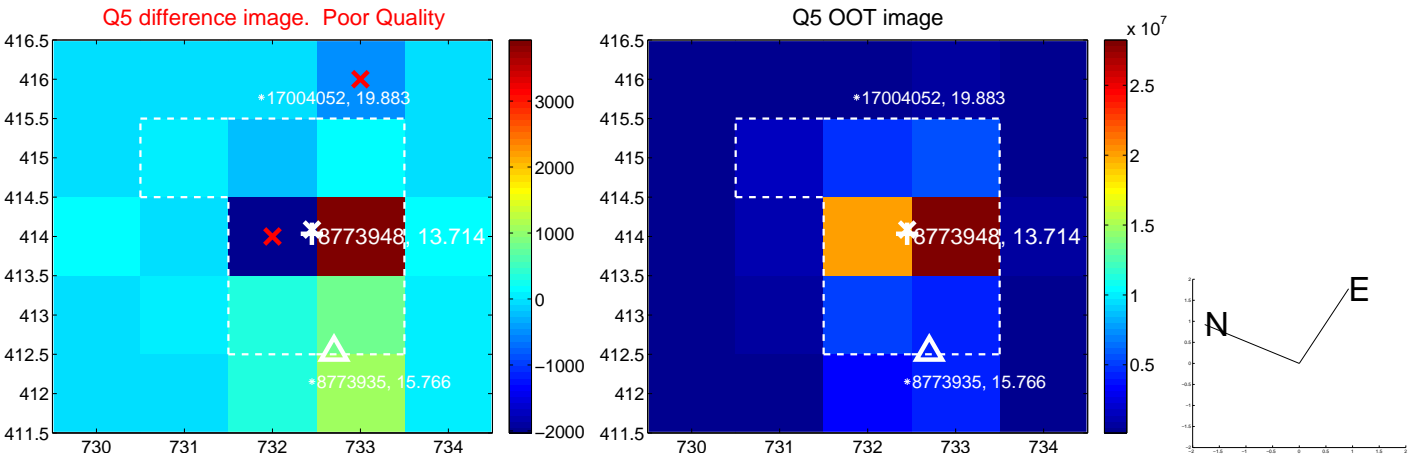
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.179 \pm 0.449$	0.40	$0.079 \pm 0.507$	$0.161 \pm 0.300$
PRF-fit source offset from KIC position	$0.107 \pm 0.406$	0.26	$-0.102 \pm 0.495$	$0.035 \pm 0.320$
photometric centroid source offset	$0.34 \pm 0.21$	1.60	$0.03 \pm 0.27$	$-0.34 \pm 0.21$



Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

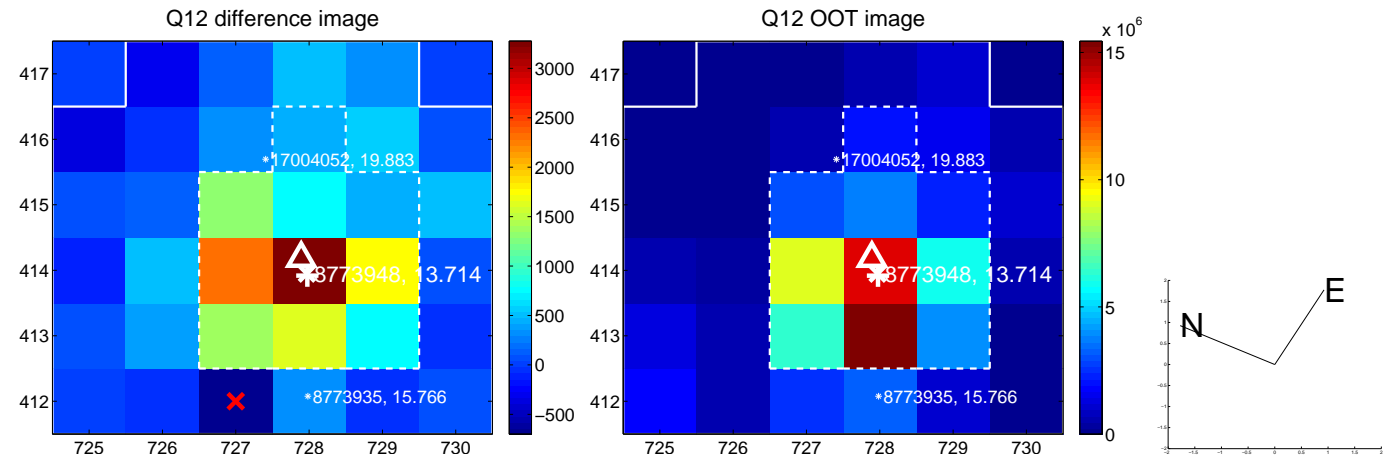
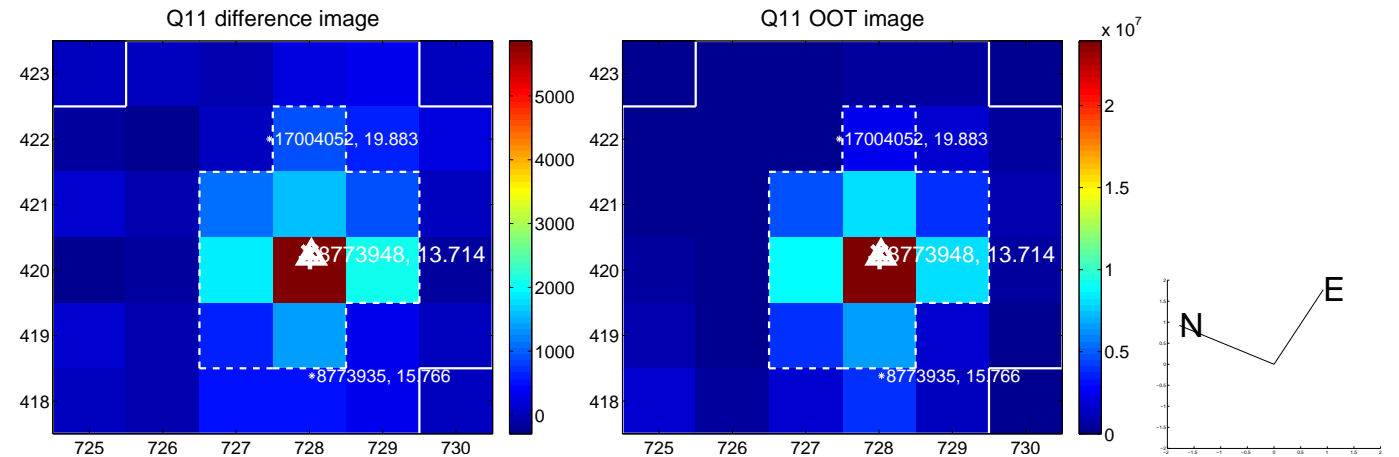
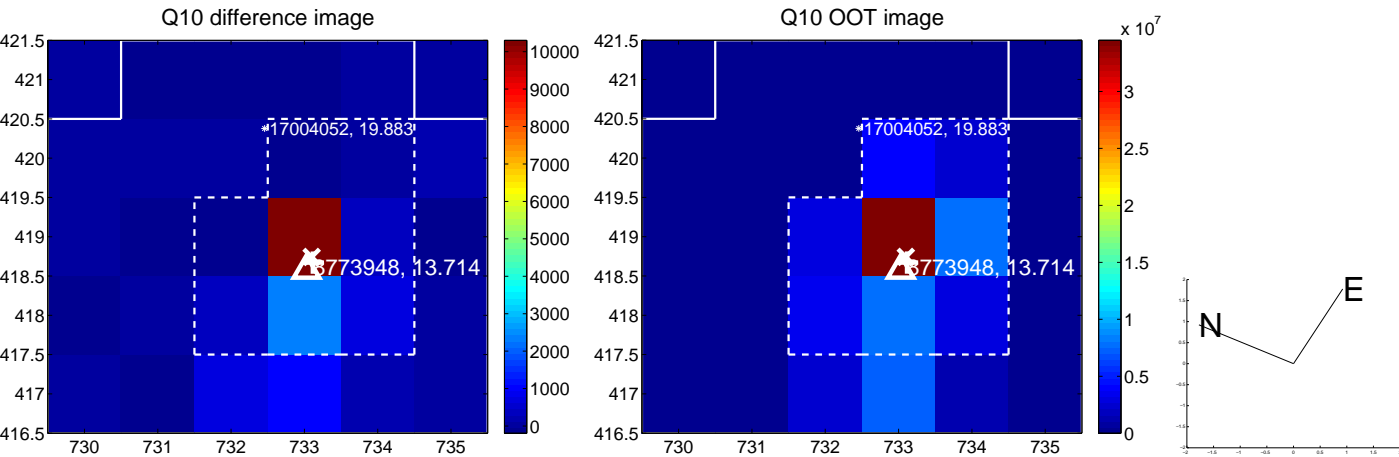
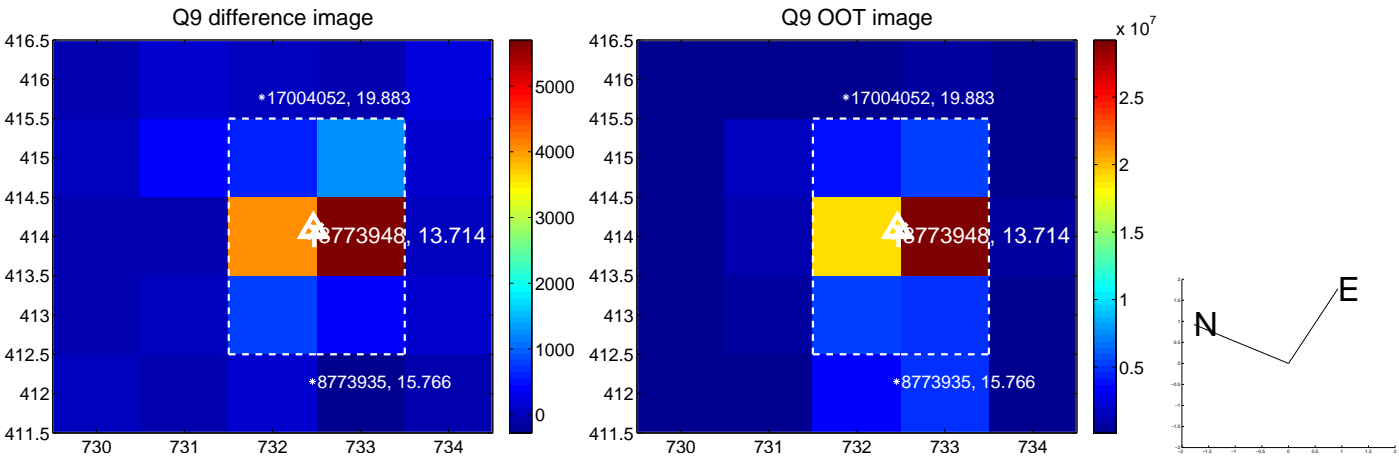


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

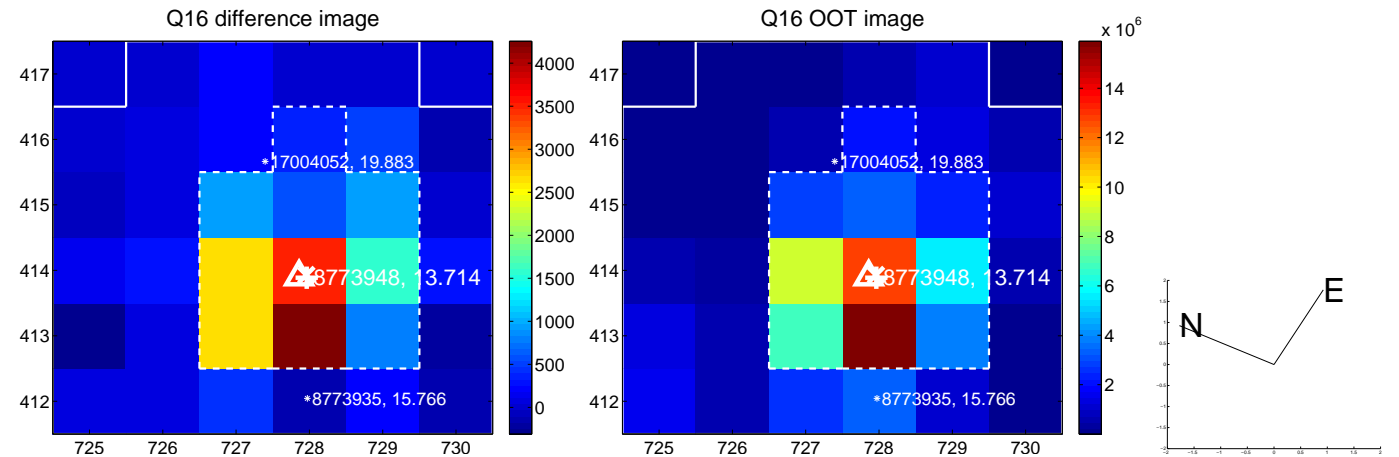
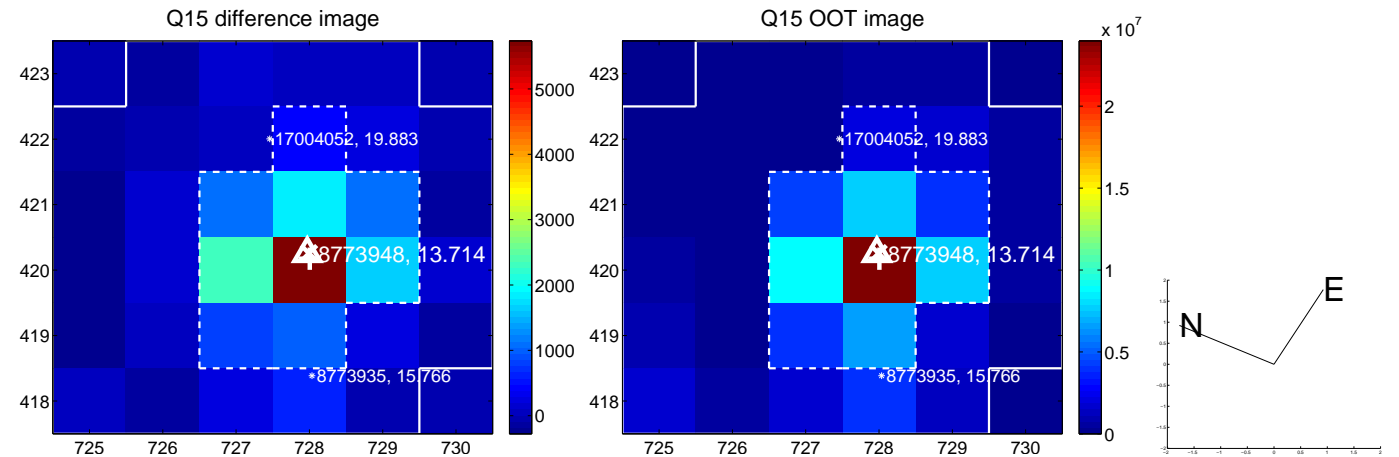
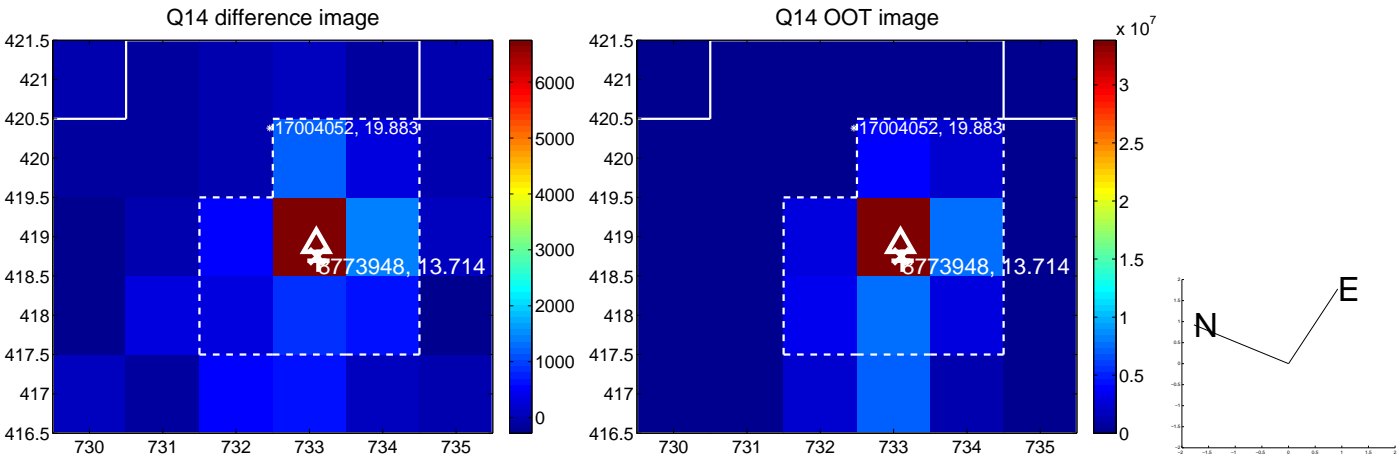
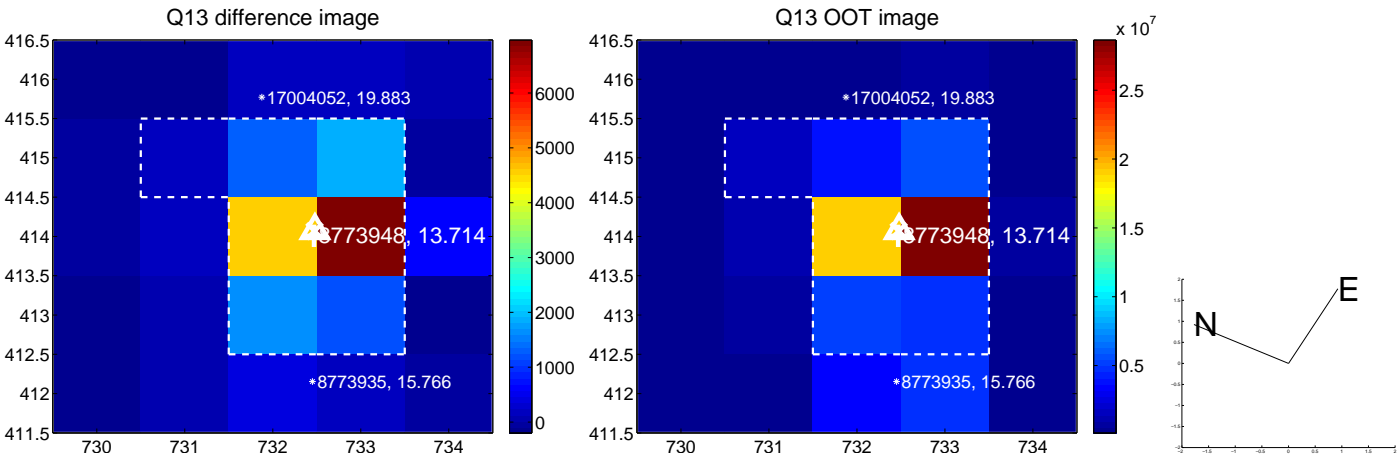




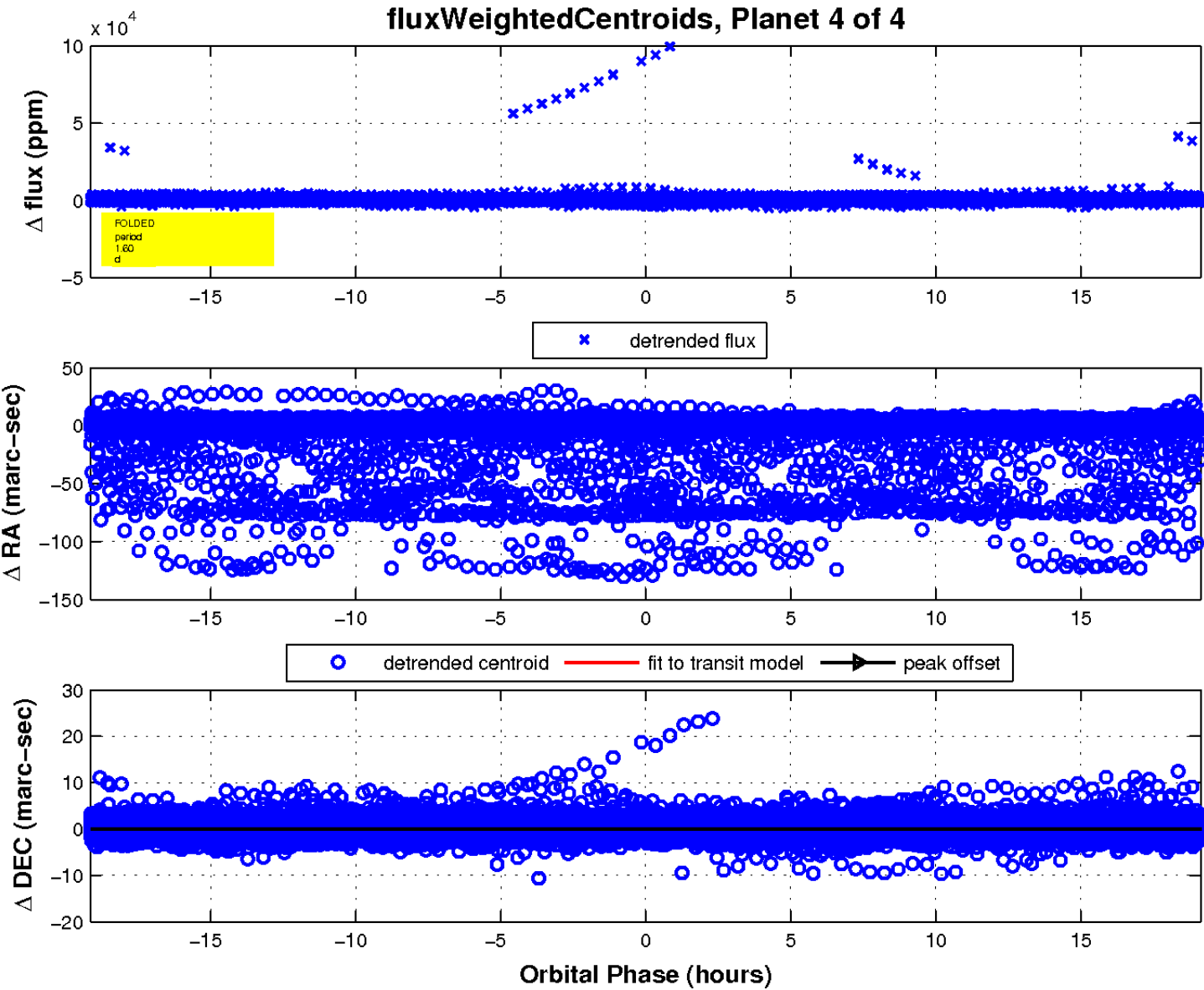
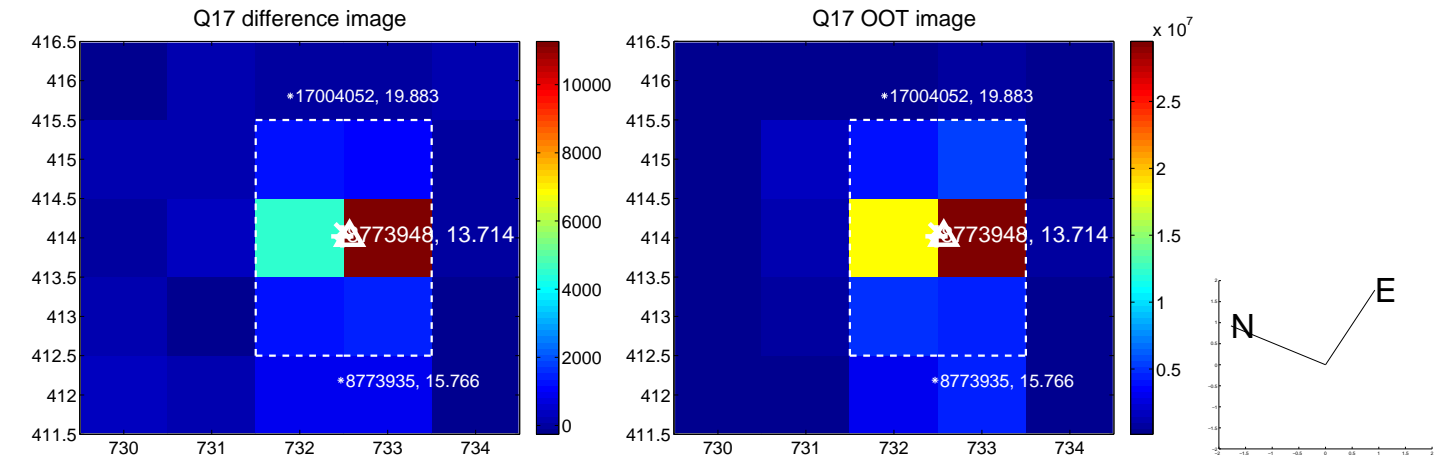
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



UKIRT Image

