

# KIC 004833135

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004833135-01	OBS	No	380.738920	205.878855	660.0	2.780	8.9	9.8	0.99	6250	2.81	1.22
004833135-02	OBS	No	376.862383	196.213724	334.9	25.456	8.8	9.7	0.99	6250	2.07	1.23
004833135-03	OBS	No	372.081681	238.143115	645.9	3.479	8.1	9.5	0.99	6250	3.10	1.25
004833135-04	OBS	No	372.089452	249.136373	595.1	2.721	8.2	9.0	0.99	6250	2.64	1.25
004833135-05	OBS	No	372.070946	246.814275	476.3	3.988	7.9	8.1	0.99	6250	2.35	1.25
004833135-06	OBS	No	372.079096	240.518256	380.2	5.662	8.1	7.3	0.99	6250	2.11	1.25
004833135-07	OBS	No	372.098902	186.196312	542.8	3.022	7.3	7.9	0.99	6250	2.54	1.25

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004833135-01	OBS	FP	0.00	1	0	0	1	ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_FEW_DIFFS—EPHEM_MATCH
004833135-02	OBS	FP	0.00	1	0	0	1	INDIV_TRANS_MARSHALL—CENT_FEW_DIFFS—EPHEM_MATCH
004833135-03	OBS	FP	0.00	1	0	1	1	INDIV_TRANS_MARSHALL—ALL_TRANS_CHASES—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_UNRESOLVED_OFFSET—EPHEM_MATCH
004833135-04	OBS	FP	0.00	1	0	1	0	ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_UNRESOLVED_OFFSET
004833135-05	OBS	FP	0.00	1	0	0	0	MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_FEW_DIFFS
004833135-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_FEW_MEAS
004833135-07	OBS	FP	0.00	1	0	0	0	MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_UNCERTAIN

**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.

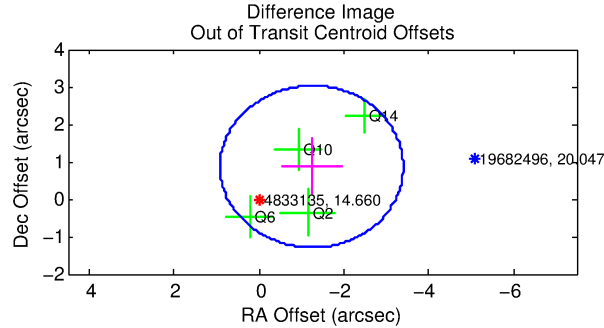
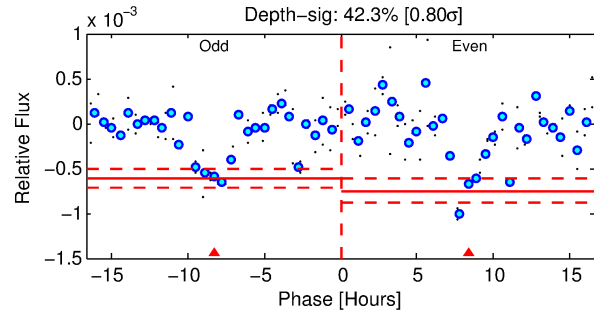
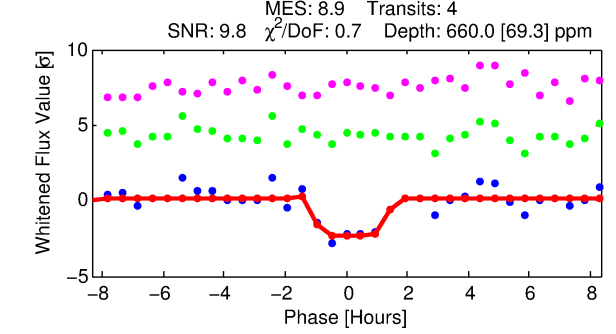
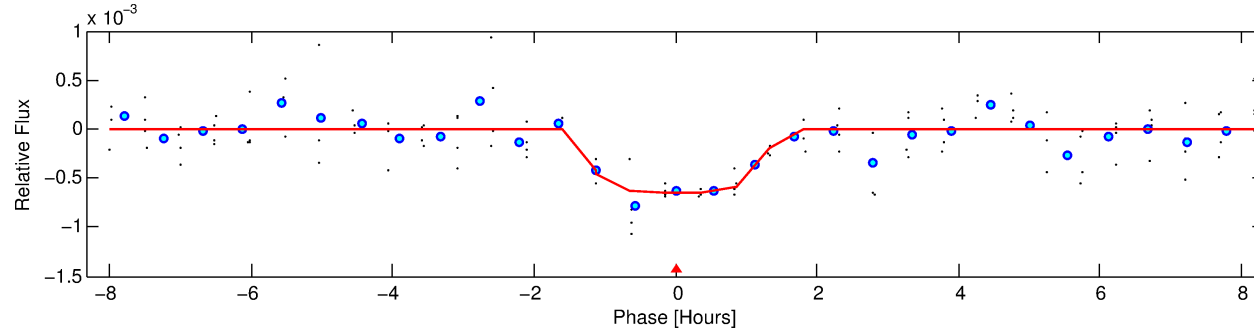
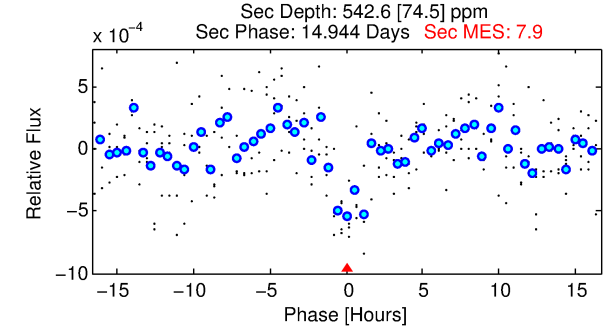
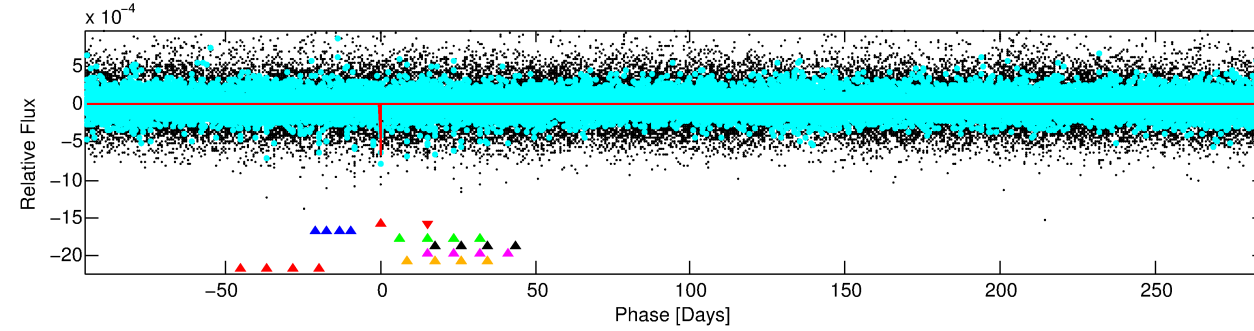
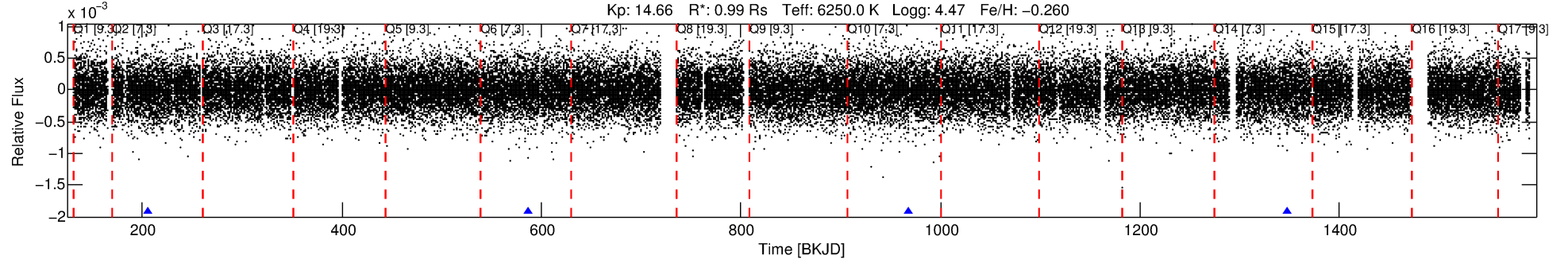
## Ephemeris Match Information For 004833135-01

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
004833135-01	4833135	004150611-01	4150611	43:1	4253.7	4	-1	7.90	14.66	87.99	Cross-Talk	0	4.90	0.05

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

# DV One-Page Summary

KIC: 4833135 Candidate: 1 of 7 Period: 380.739 d  
KOI: K00498 Corr: No Ephemeris Match



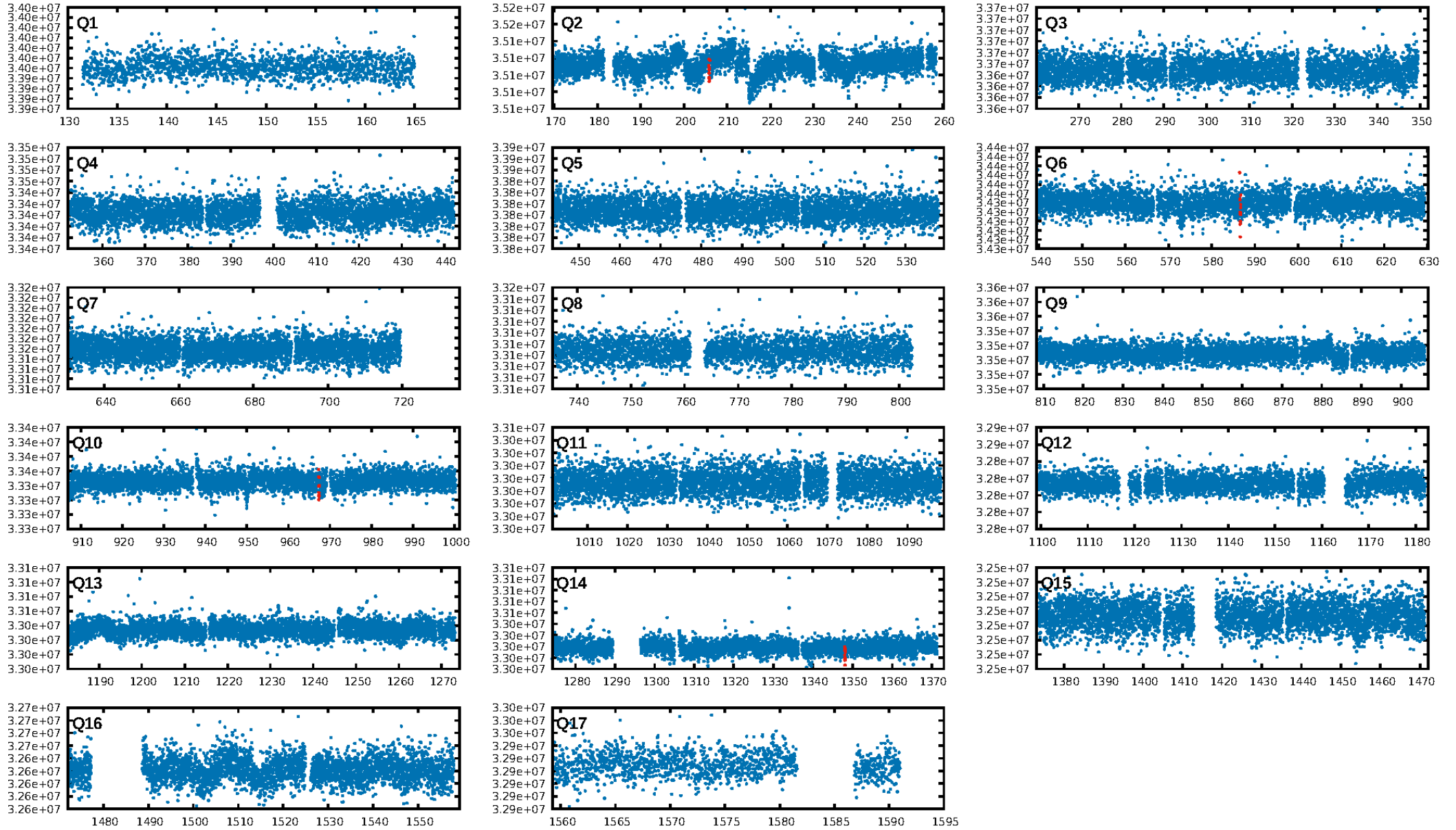
## DV Fit Results:

Period = 380.73892 [0.00276] d  
Epoch = 205.8789 [0.0049] BKJD  
Rp/R\* = 0.0261 [0.0332]  
a/R\* = 672.17 [4562.46]  
b = 0.80 [3.08]  
Seff = 1.22 [0.48]  
Teq = 268 [26] K  
Rp = 2.81 [3.68] Re  
a = 1.0456 [0.2688] AU  
Ag = 41465.86 [106984.63] [0.39 $\sigma$ ]  
Teff = 5907 [3776] K [1.49 $\sigma$ ]

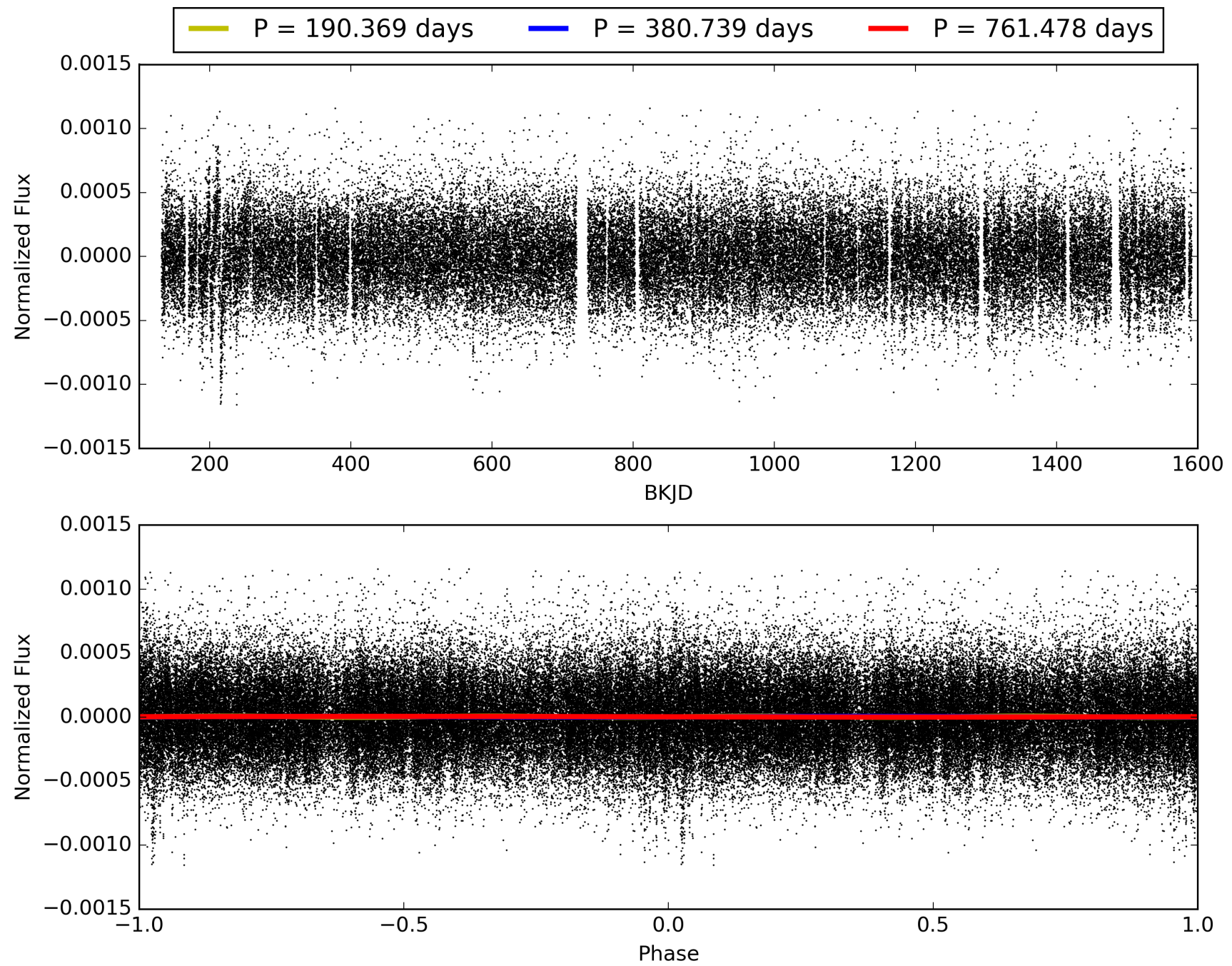
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [3.63 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 69.6%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 8.07e-15  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -9.521  
Centroid-sig: 22.4%  
Centroid-so: 1.459 arcsec [1.01 $\sigma$ ]  
OotOffset-rm: 1.519 arcsec [2.11 $\sigma$ ]  
KicOffset-rm: 1.732 arcsec [2.45 $\sigma$ ]  
OotOffset-st: 4/0/0/0 [4]  
KicOffset-st: 4/0/0/0 [4]  
DiffImageQuality-fgm: 1.00 [4/4]  
DiffImageOverlap-fno: 1.00 [4/4]

# TCE 004833135-01, PDC Light Curves



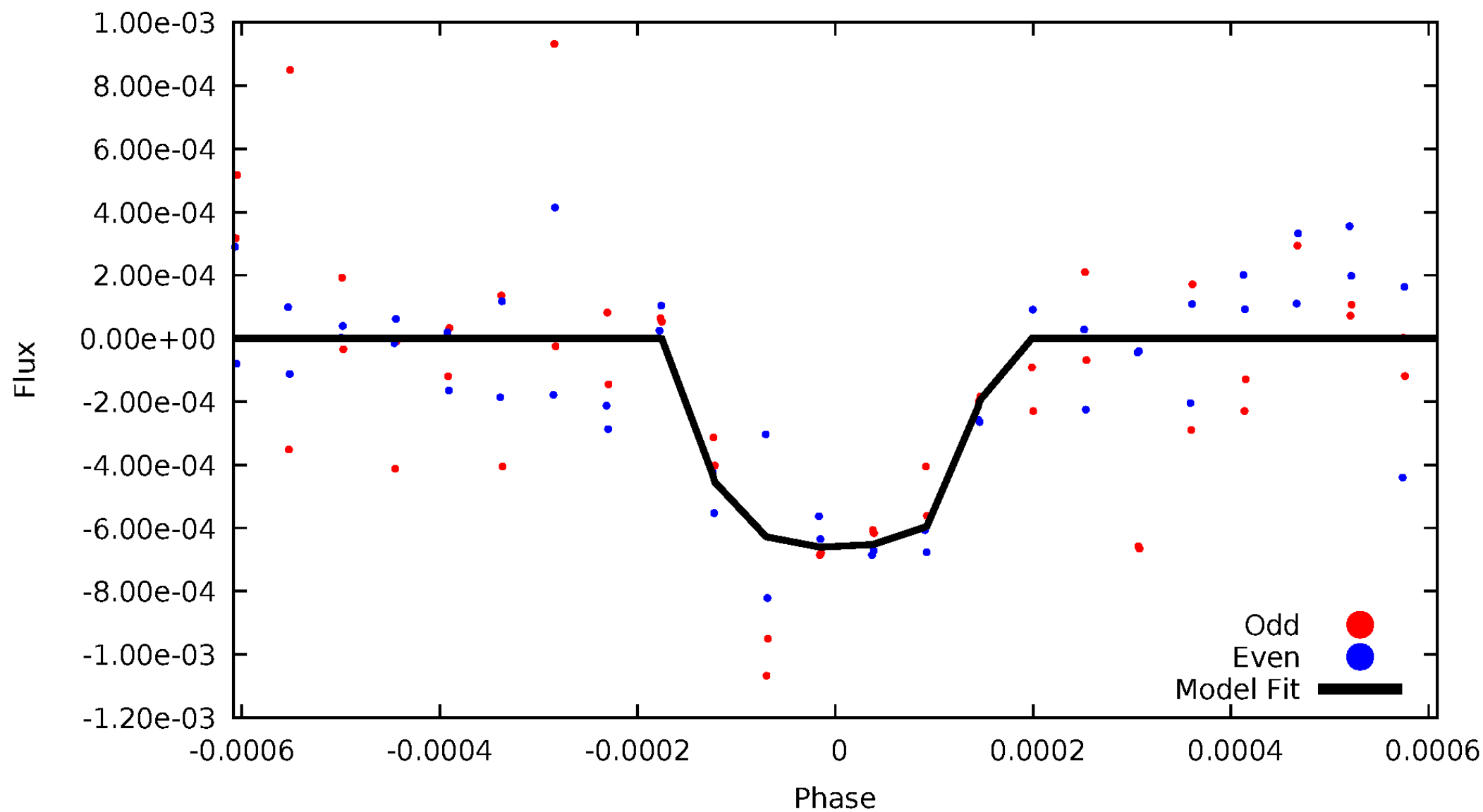
TCE 004833135-01





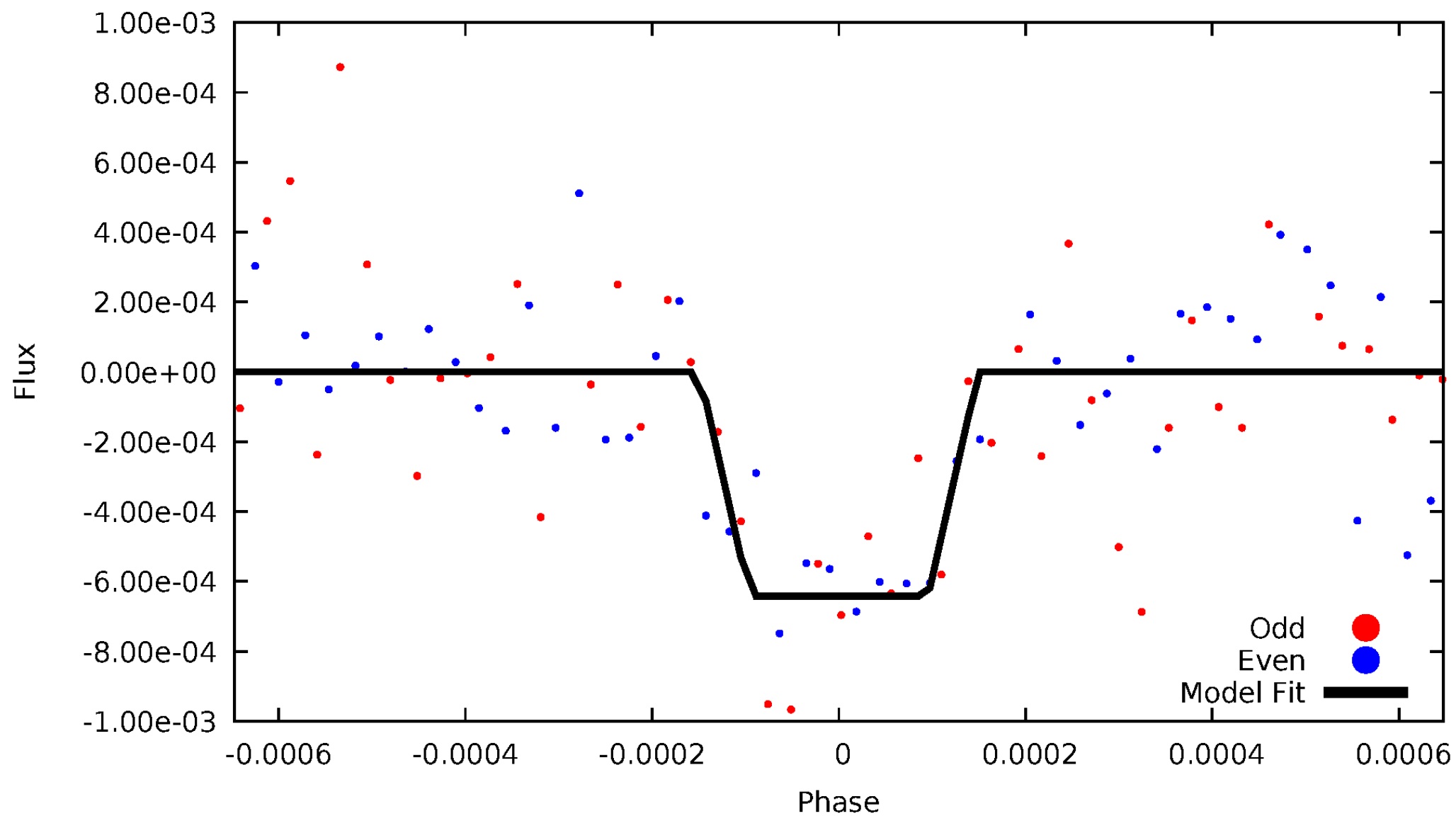
# DV Odd/Even

TCE 004833135-01



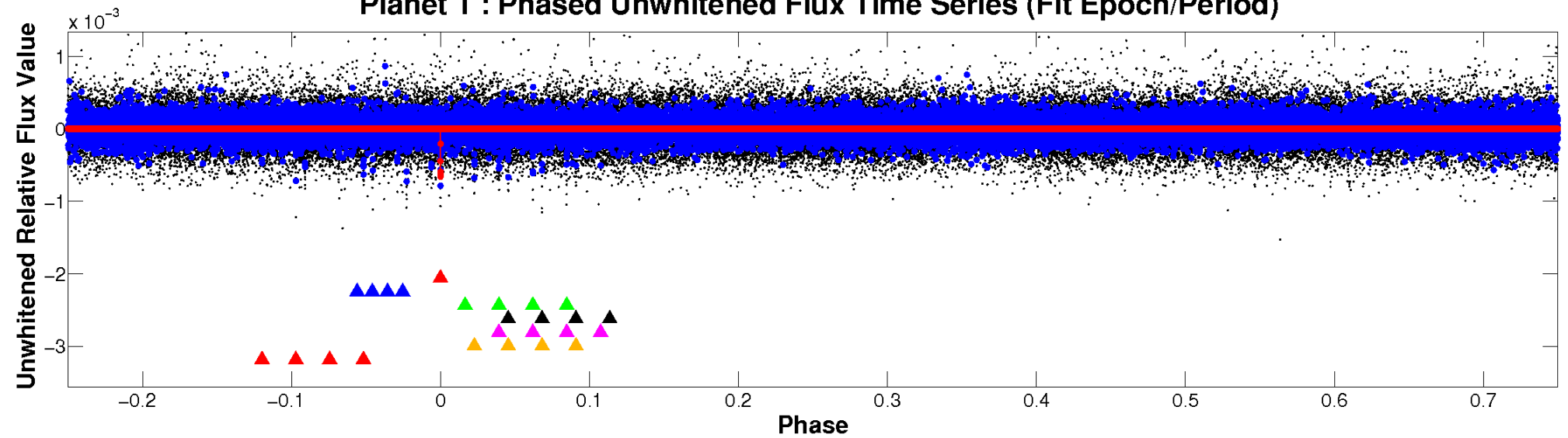
# ALT Odd/Even

TCE 004833135-01

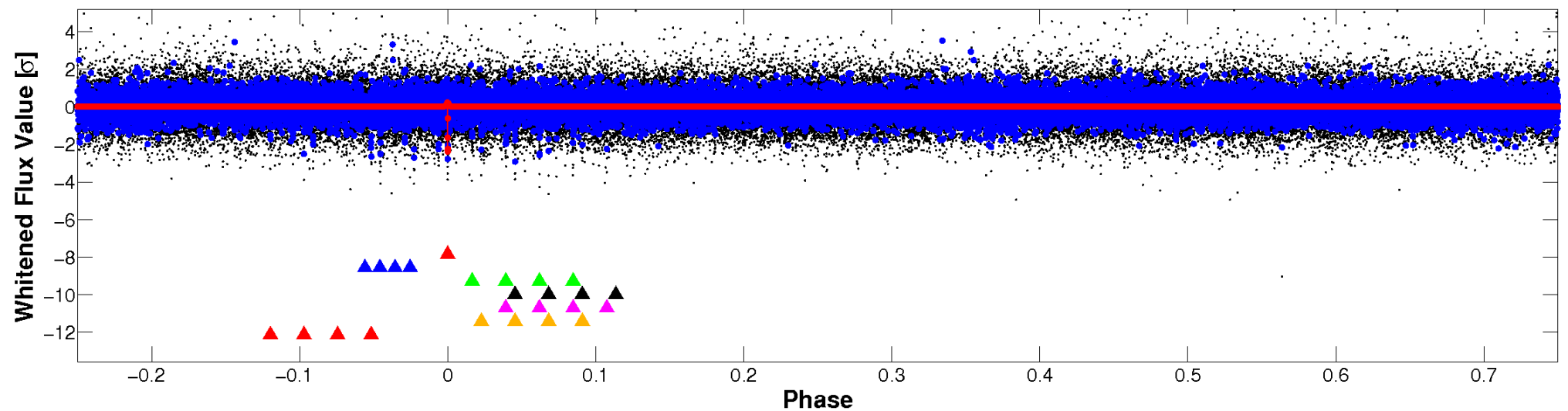


# Non-Whitened Vs. Whitened Light Curve

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

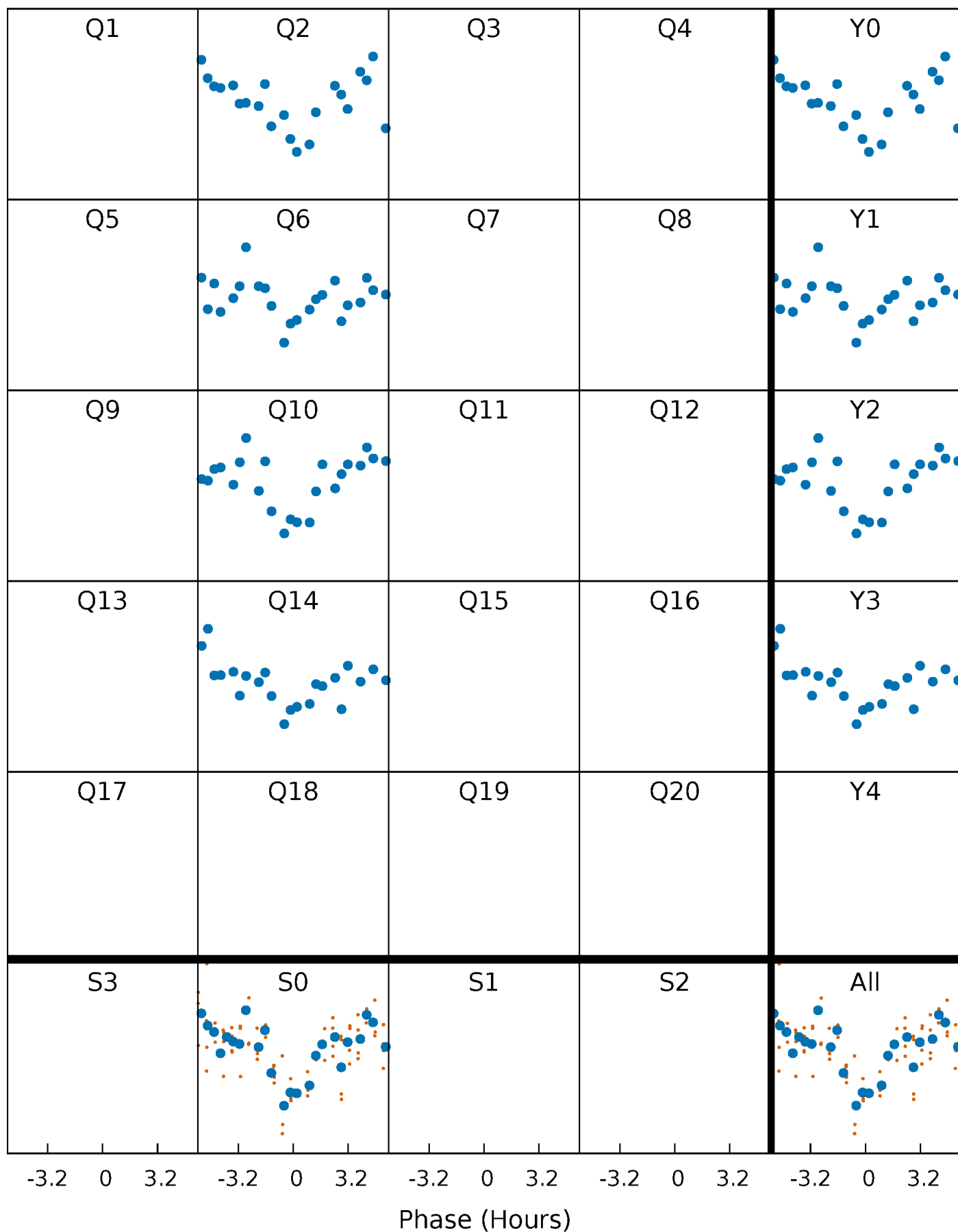


## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

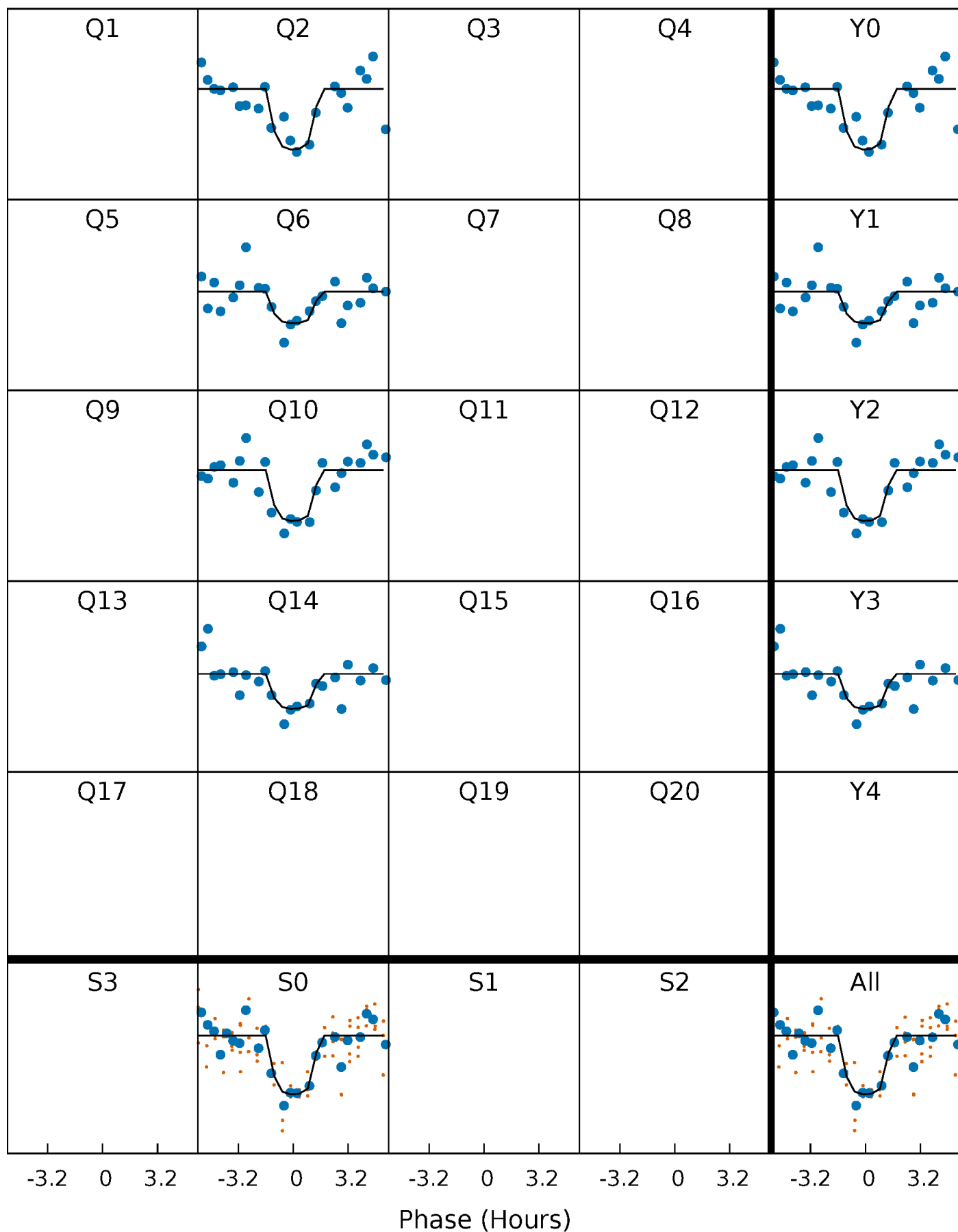
TCE 004833135-01 P=380.738920 Days  $T_0=205.878855$  (BKJD)





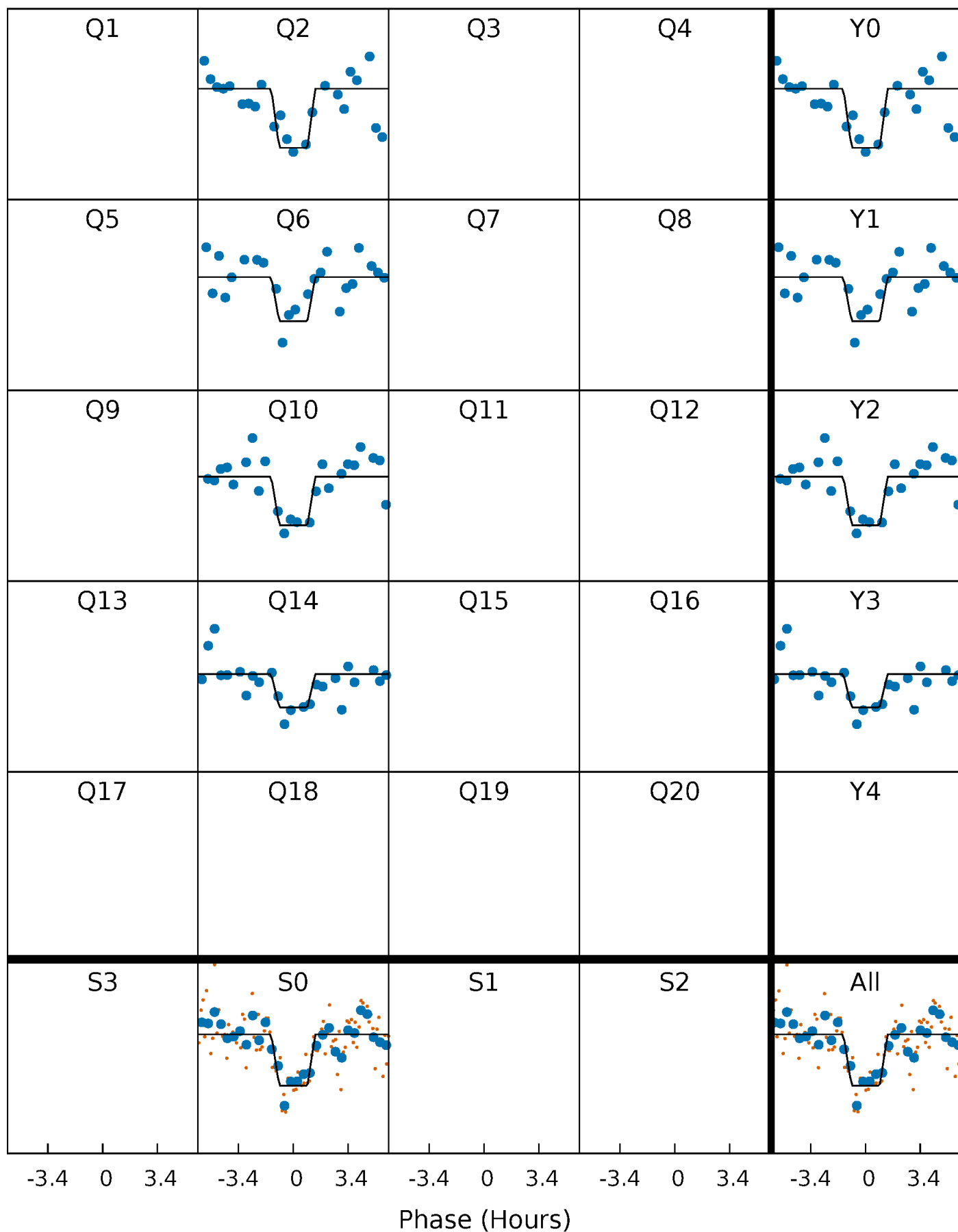
# DV Quarter-Phased Transit Curves

TCE 004833135-01 P=380.738920 Days  $T_0=205.878855$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

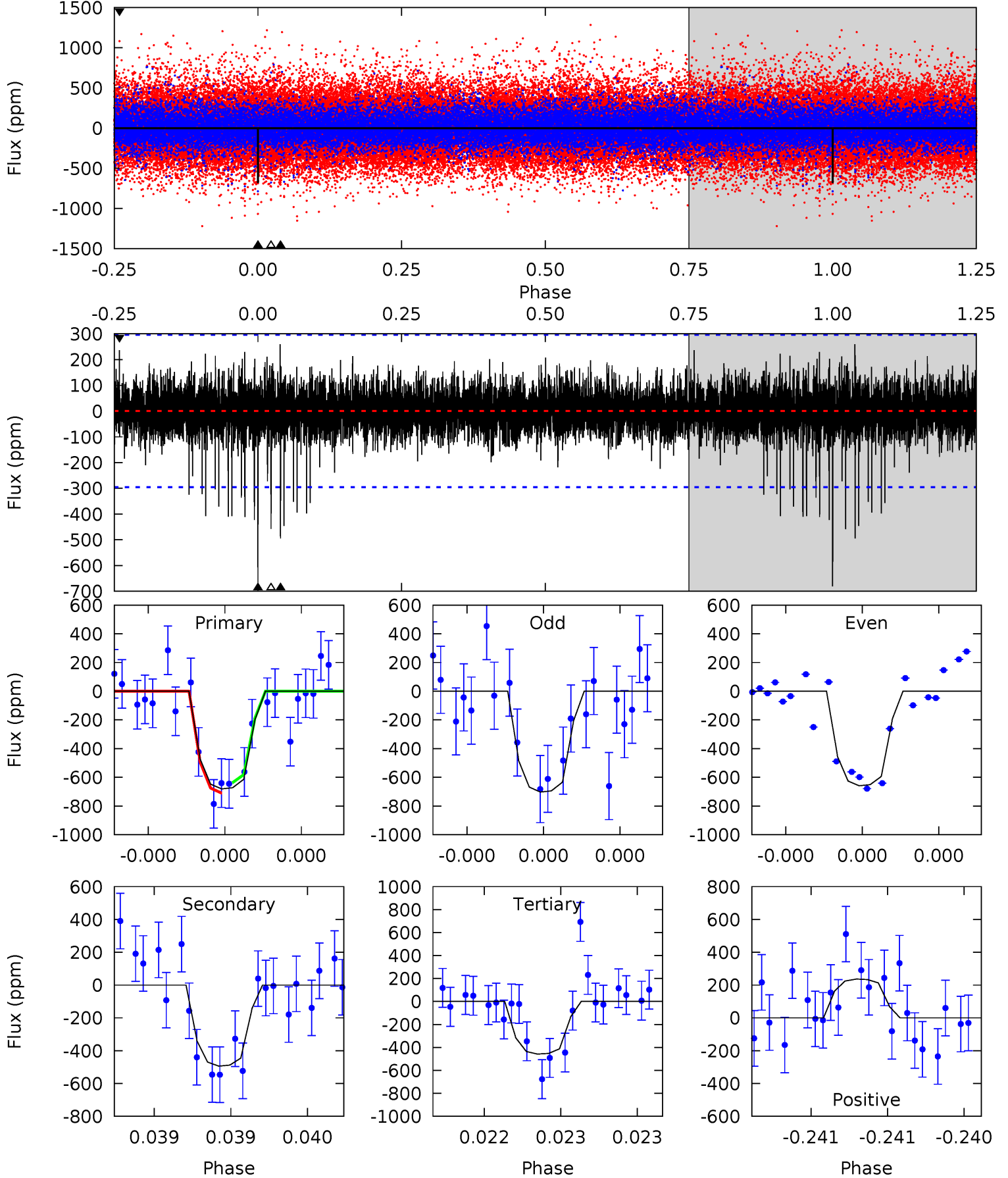
TCE 004833135-01 P=380.734441 Days  $T_0=205.885820$  (BKJD)



# DV Model-Shift Uniqueness Test

004833135-01, P = 380.738920 Days, E = 205.878855 Days

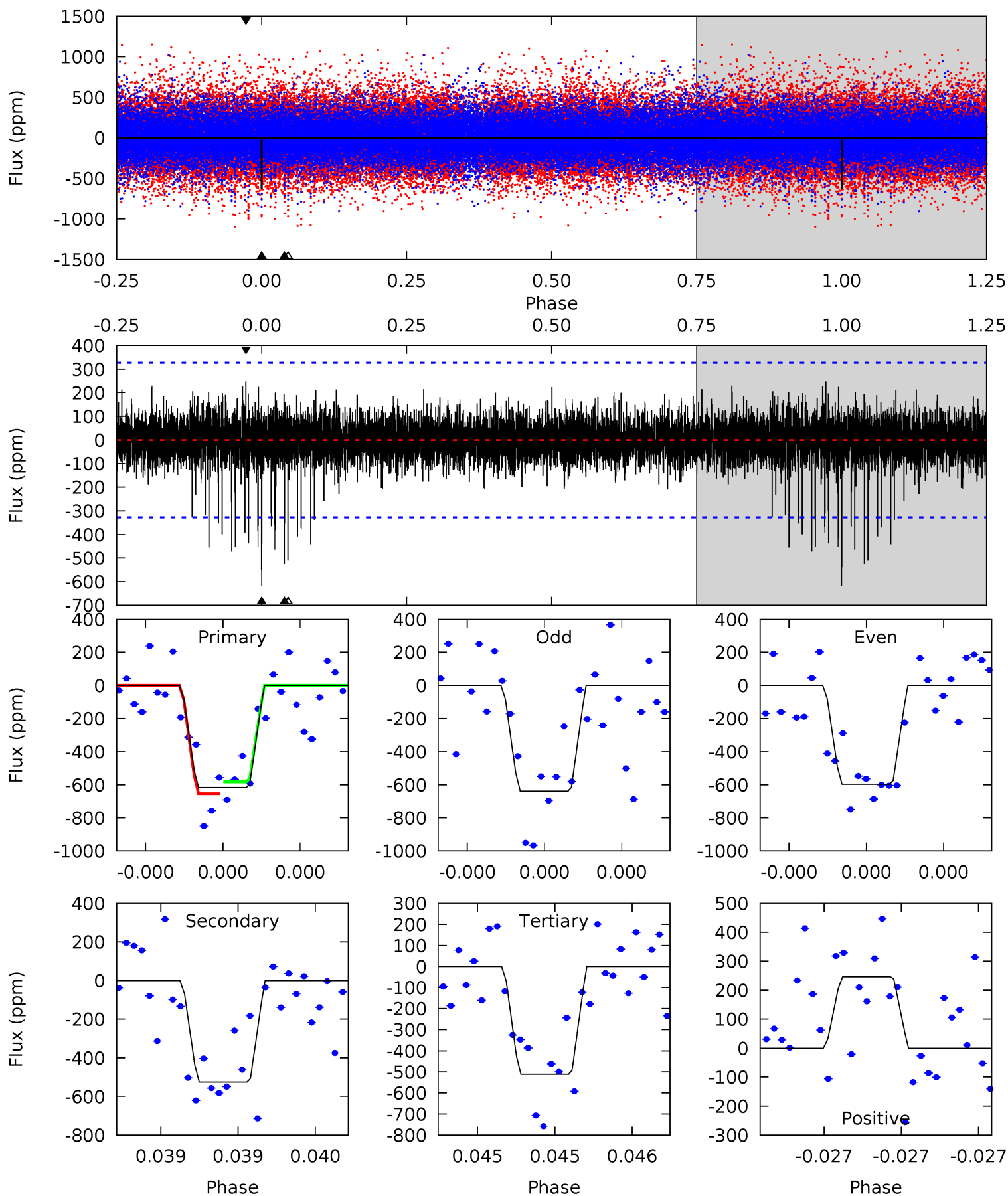
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.9	9.39	8.70	4.49	5.62	3.56	1.20	4.24	8.45	0.69	4.90	0.42	0.97	0.28	0.69



# Alt Model-Shift Uniqueness Test

004833135-01, P = 380.734441 Days, E = 205.885820 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
10.7	9.12	8.86	4.28	5.67	3.63	1.15	1.84	6.42	0.26	4.84	0.38	1.03	0.29	0.62





### Stellar Parameters For KIC 004833135

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6250^{+169}_{-206}$	$4.472^{+0.050}_{-0.200}$	$-0.260^{+0.300}_{-0.300}$	$0.986^{+0.305}_{-0.102}$	$1.052^{+0.147}_{-0.134}$	$1.544^{+0.404}_{-0.769}$
	+3%/-3%	+1%/-4%	+115%/-115%	+31%/-10%	+14%/-13%	+26%/-50%
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 004833135-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-494 \pm 53$	$3.71^{+3.60}_{-2.49}$	$380^{+29}_{-17}$	$5206^{+4350}_{-1193}$	$21576^{+173735}_{-15949}$
Alt.	$-526 \pm 58$	$3.78^{+3.22}_{-2.48}$	$381^{+27}_{-18}$	$5176^{+4396}_{-1112}$	$22012^{+164947}_{-15901}$

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

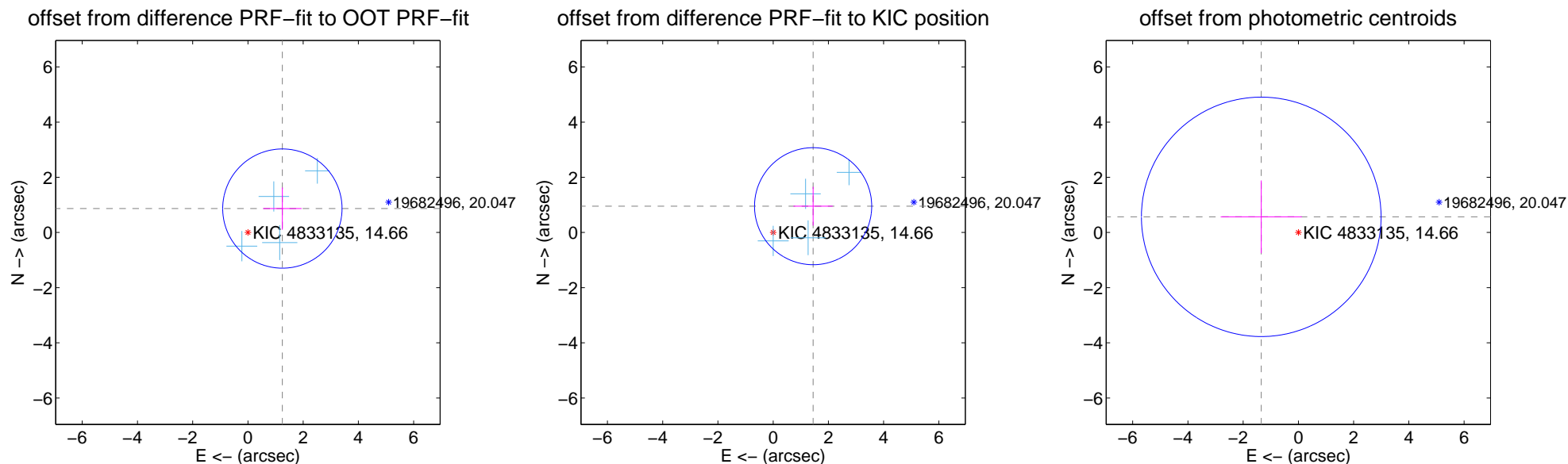
## DV Centroid Data

Supplemental centroid analysis for 004833135-01. Kepler magnitude: 14.66. Transit SNR 9.76

There are 4 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.24 arcsec

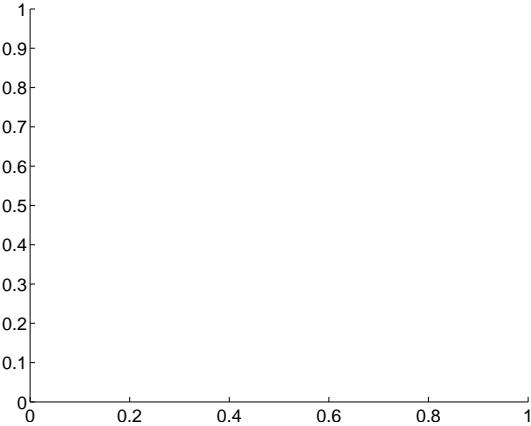
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.519 \pm 0.720$	2.11	$-1.247 \pm 0.697$	$0.867 \pm 0.766$
PRF-fit source offset from KIC position	$1.732 \pm 0.707$	2.45	$-1.447 \pm 0.710$	$0.952 \pm 0.701$
photometric centroid source offset	$1.46 \pm 1.45$	1.01	$1.34 \pm 1.47$	$0.57 \pm 1.32$



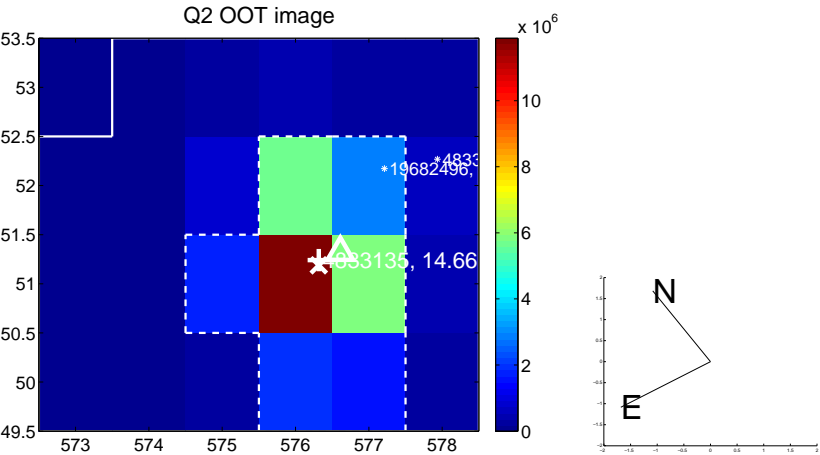
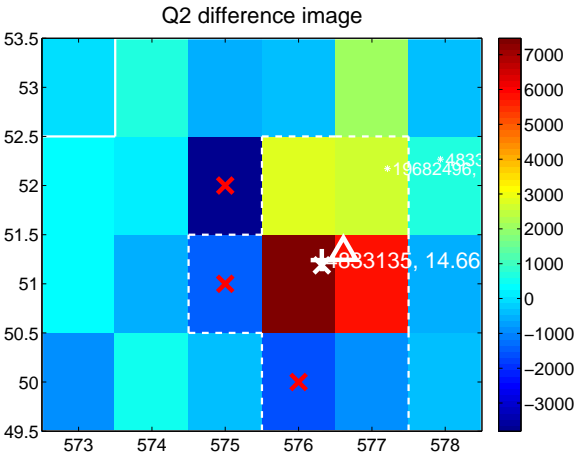
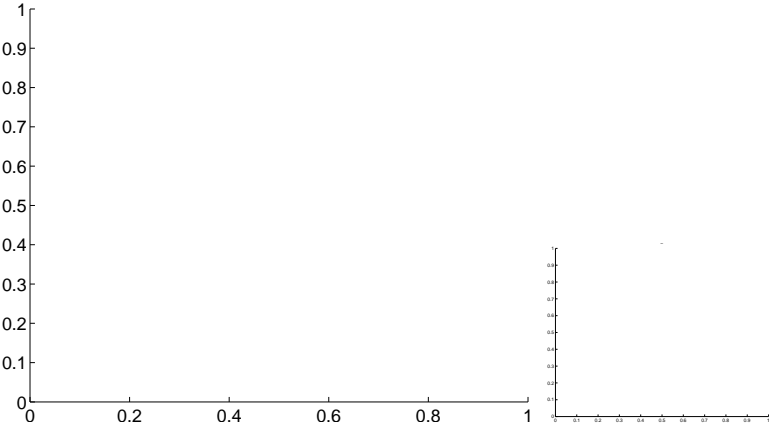
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: 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 ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

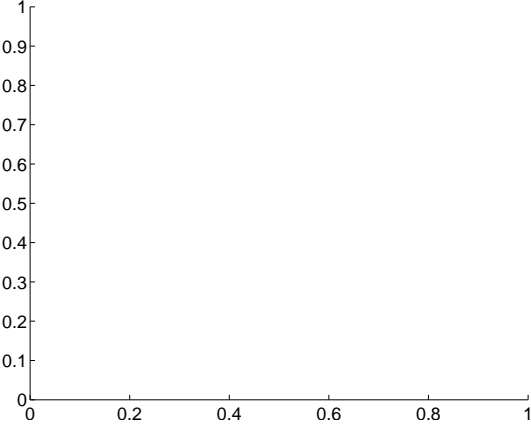
Q1 no difference image



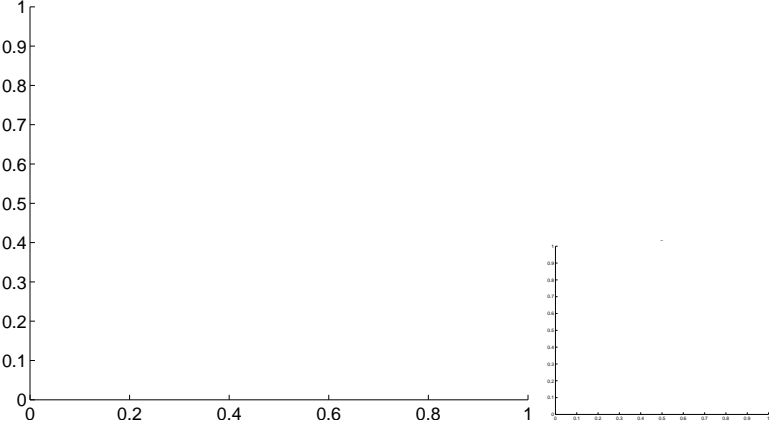
Q1 no OOT image



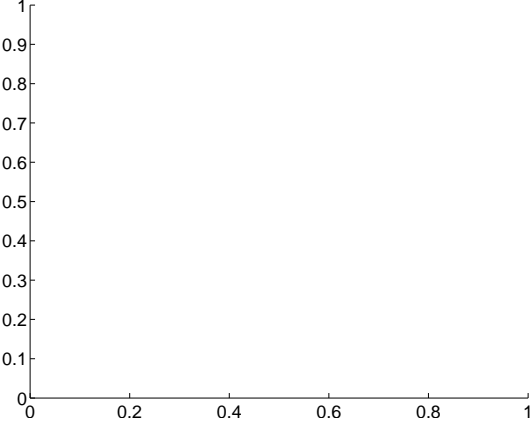
Q3 no difference image



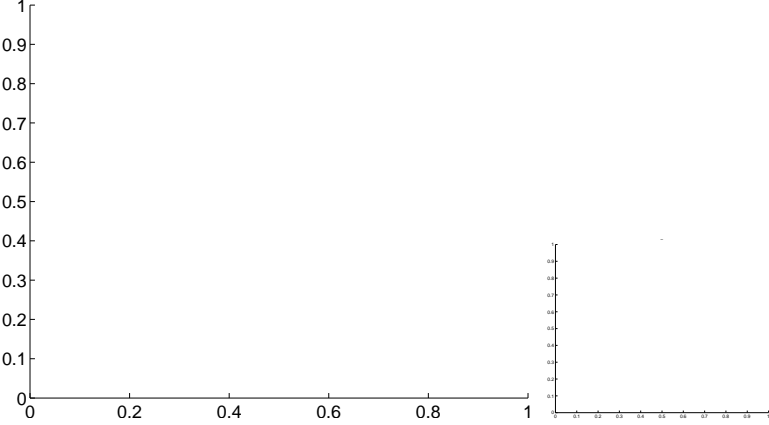
Q3 no OOT image



Q4 no difference image



Q4 no OOT image

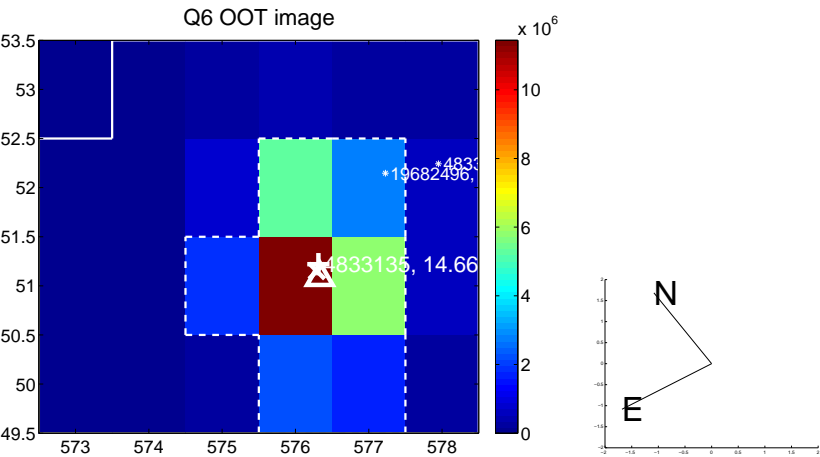
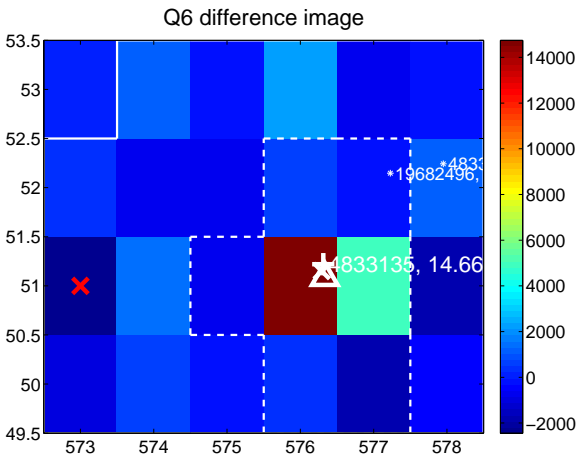


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

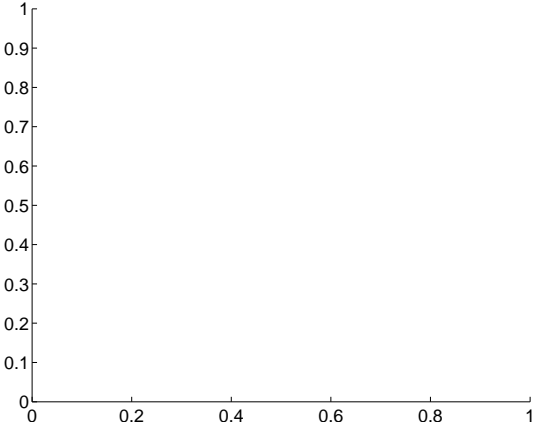
Q5 no difference image



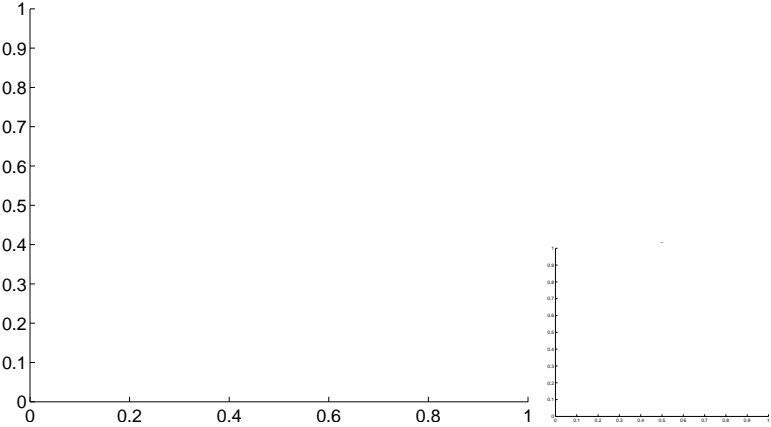
Q5 no OOT image



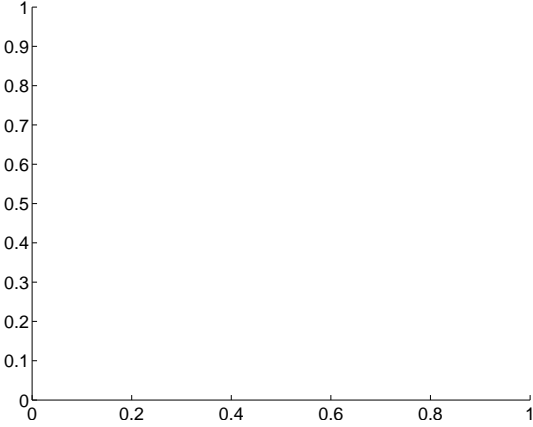
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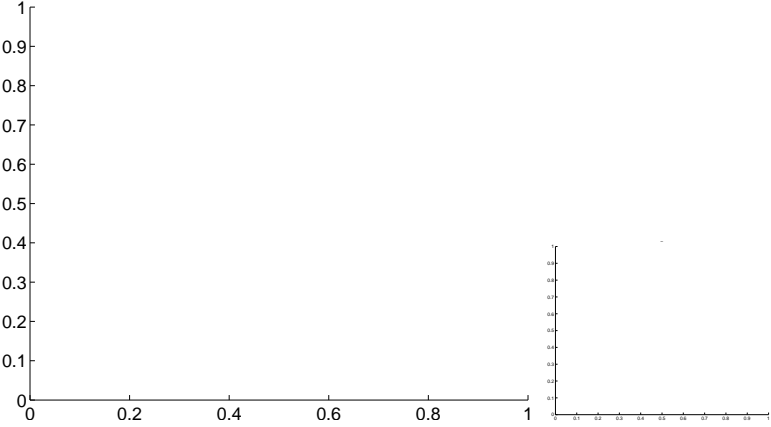
Q7 no OOT image



Q8 no difference image



Q8 no OOT image



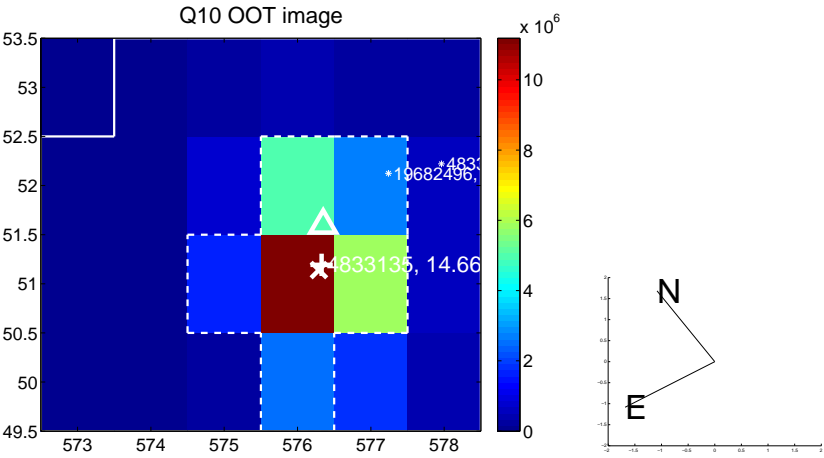
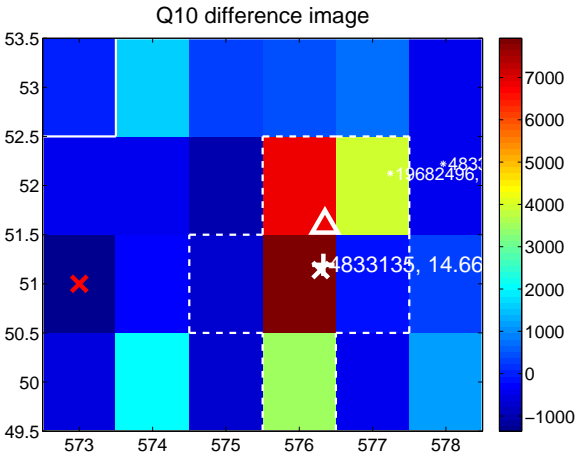


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

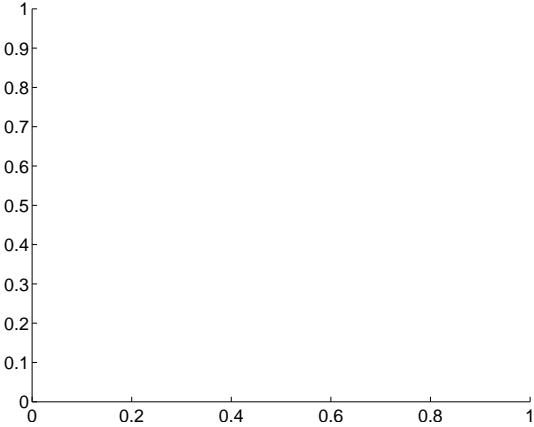
Q9 no difference image



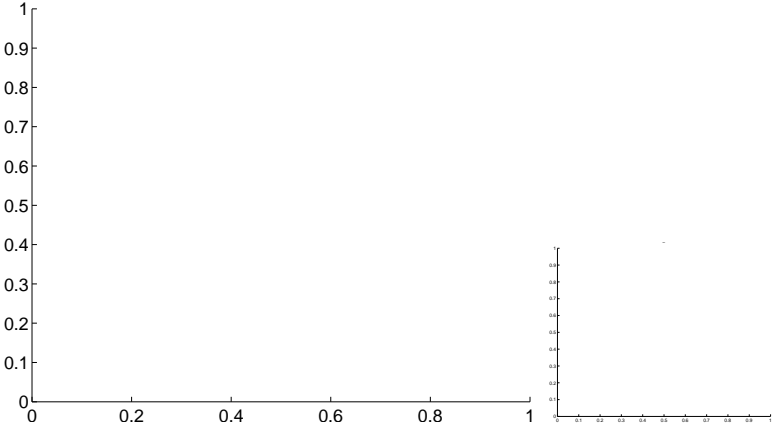
Q9 no OOT image



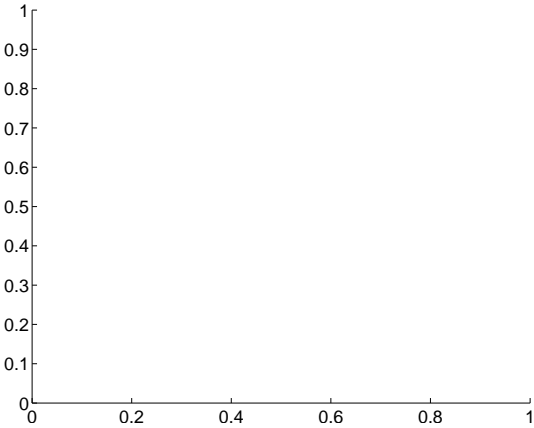
Q11 no difference image



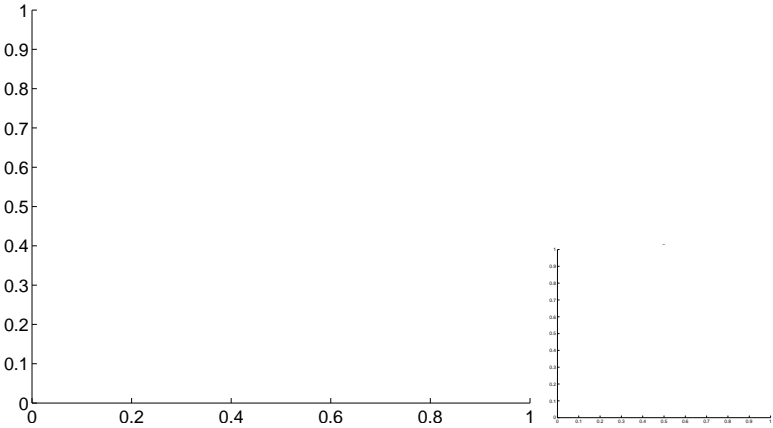
Q11 no OOT image



Q12 no difference image



Q12 no OOT image



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

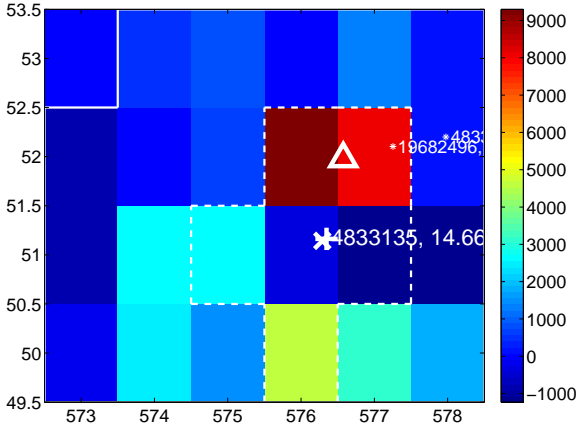
Q13 no difference image



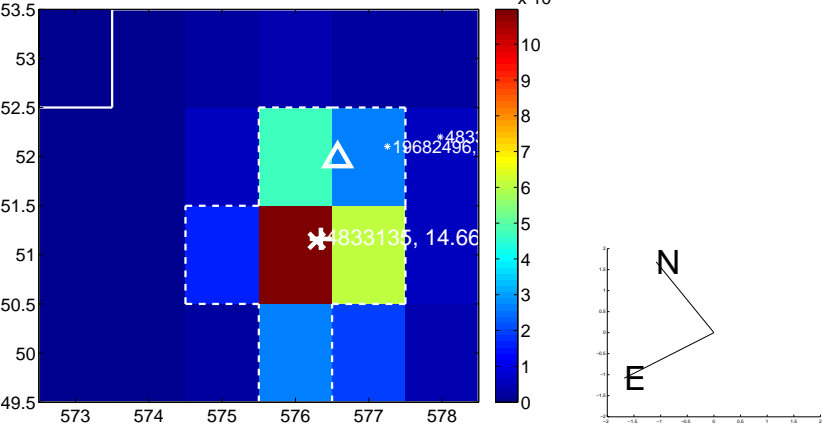
Q13 no OOT image



Q14 difference image



Q14 OOT image



Q15 no difference image



Q15 no OOT image



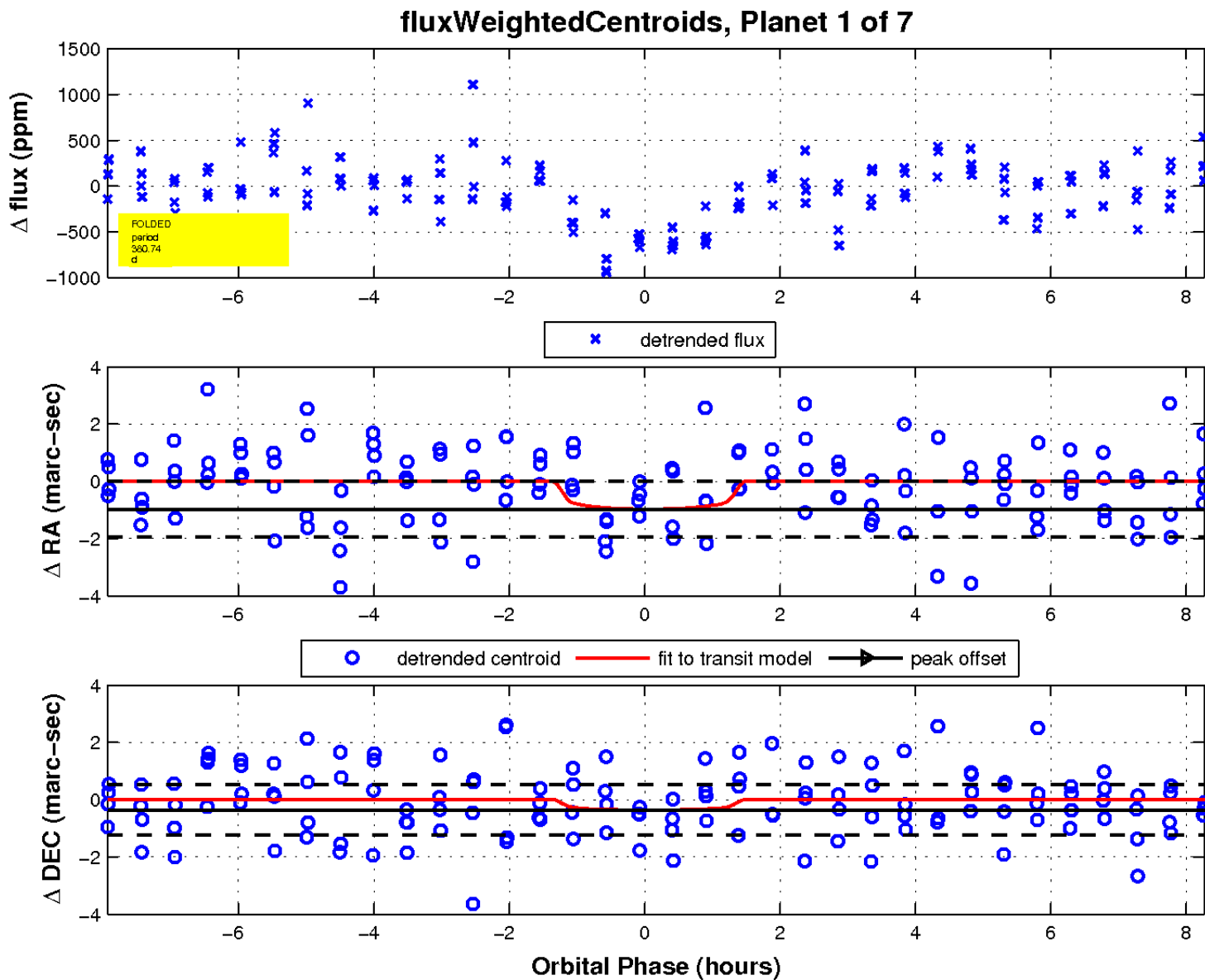
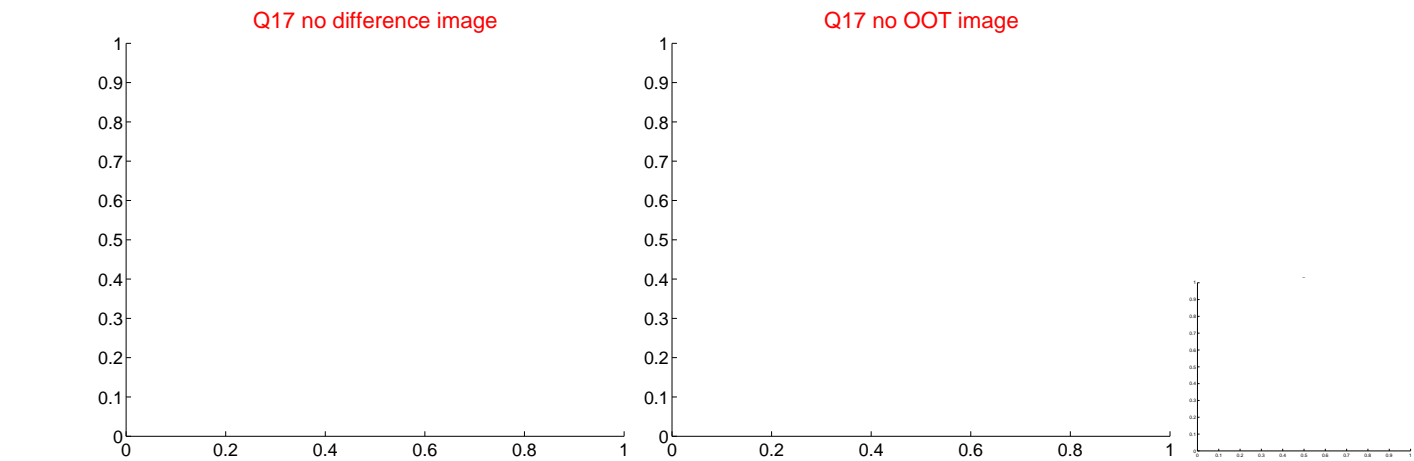
Q16 no difference image



Q16 no OOT image

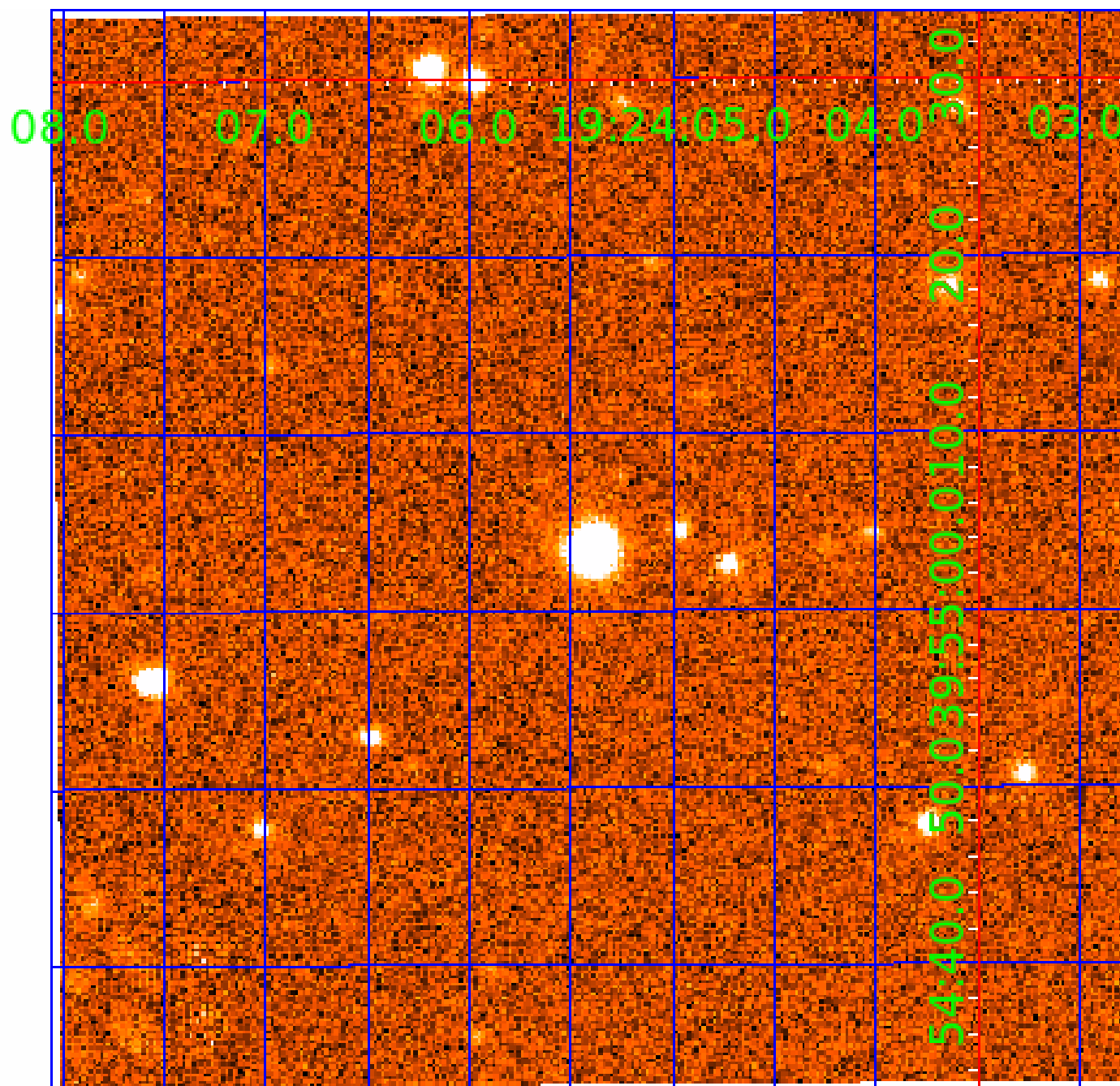


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# UKIRT Image

Declination



# KIC 004833135

## Q1-17 DR25 TCE Parameters

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004833135-02	OBS	FP	0.00	1	0	0	1	INDIV_TRANS_MARSHALL—CENT_FEW_DIFFS—EPHEM_MATCH
004833135-03	OBS	FP	0.00	1	0	1	1	INDIV_TRANS_MARSHALL—ALL_TRANS_CHASES—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_UNRESOLVED_OFFSET—EPHEM_MATCH
004833135-04	OBS	FP	0.00	1	0	1	0	ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_UNRESOLVED_OFFSET
004833135-05	OBS	FP	0.00	1	0	0	0	MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_FEW_DIFFS
004833135-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_FEW_MEAS
004833135-07	OBS	FP	0.00	1	0	0	0	MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_UNCERTAIN

**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 004833135-02

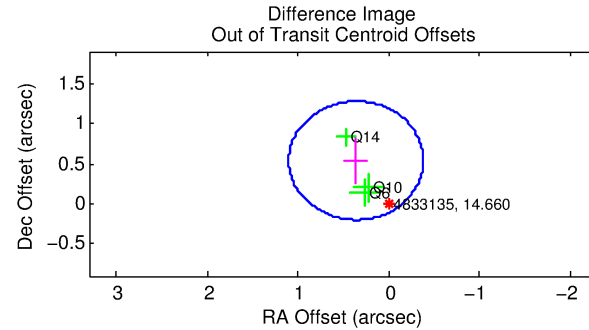
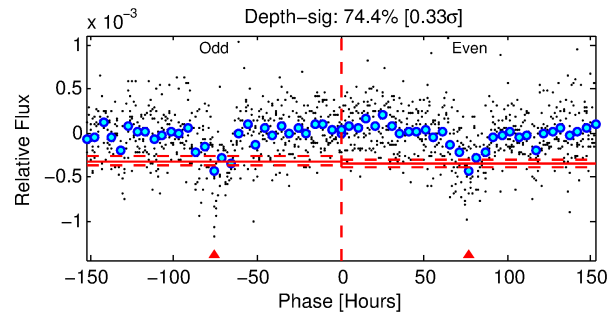
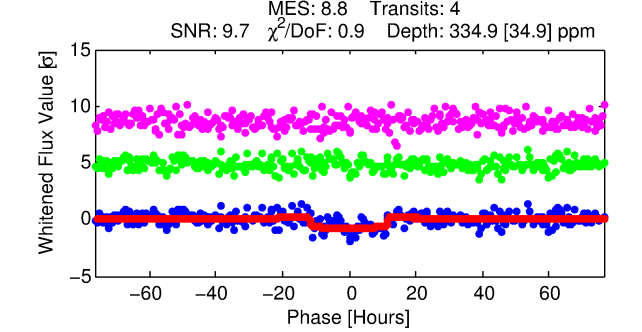
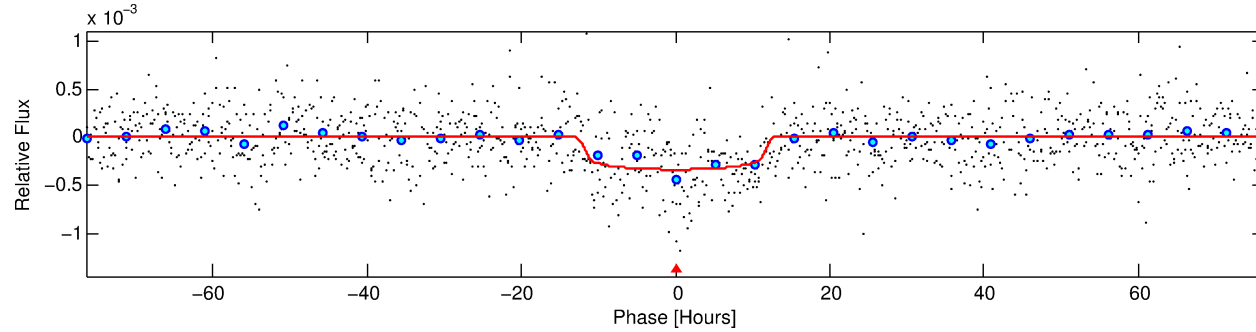
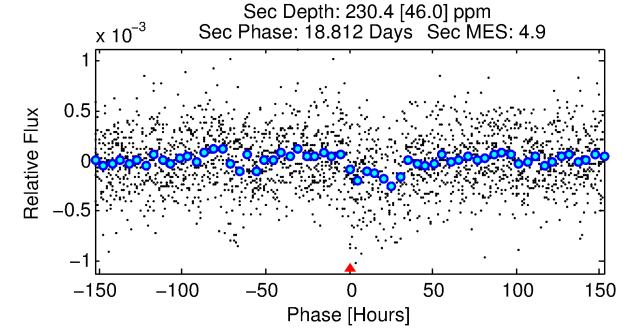
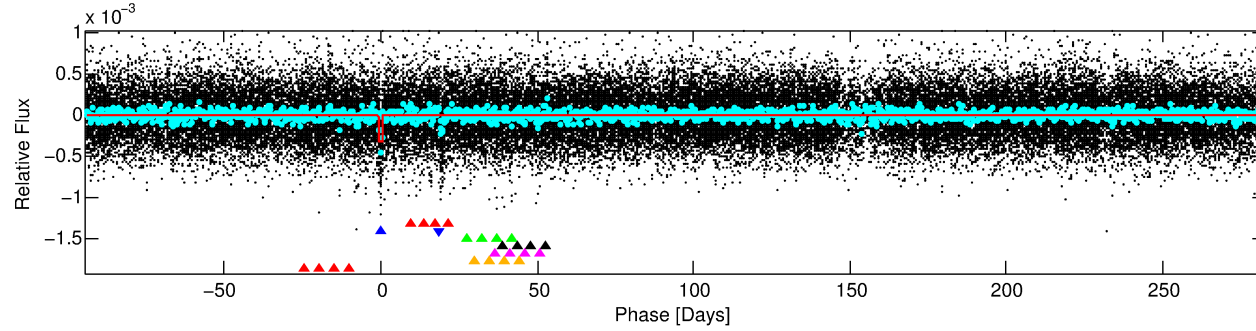
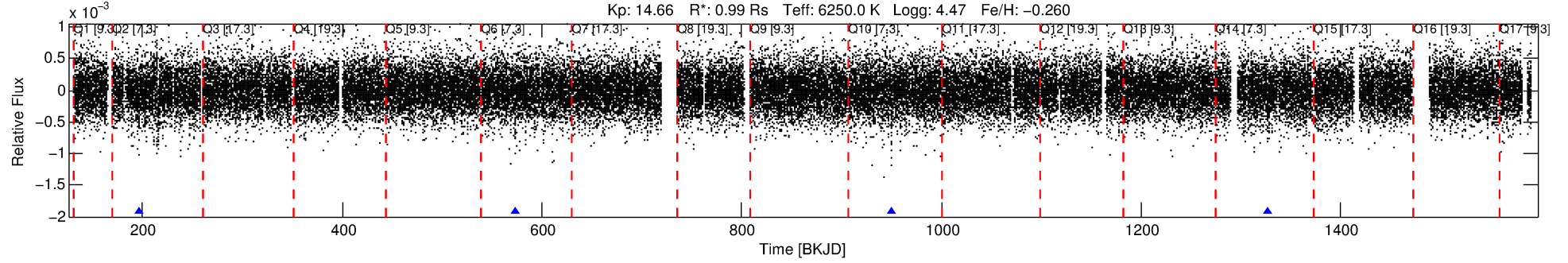
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist (")	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
004833135-02	4833135	1334.02	4150624	2:1	4212.3	-10	-12	15.45	14.66	1.69	Col-Anomaly	1	3.36	0.98

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

# DV One-Page Summary

KIC: 4833135 Candidate: 2 of 7 Period: 376.862 d  
KOI: K00498 Corr: No Ephemeris Match

Kp: 14.66 R\*: 0.99 Rs Teff: 6250.0 K Logg: 4.47 Fe/H: -0.260



## DV Fit Results:

Period = 376.86238 [0.01460] d  
Epoch = 196.2137 [0.0276] BKJD  
Rp/R\* = 0.0192 [0.0019]  
a/R\* = 59.91 [26.68]  
b = 0.87 [0.12]  
Seff = 1.23 [0.48]  
Teq = 269 [26] K  
Rp = 2.07 [0.67] Re  
a = 1.0385 [0.2670] AU  
Ag = 31951.30 [14889.14] [2.15σ]  
Teffp = 5554 [434] K [12.15σ]

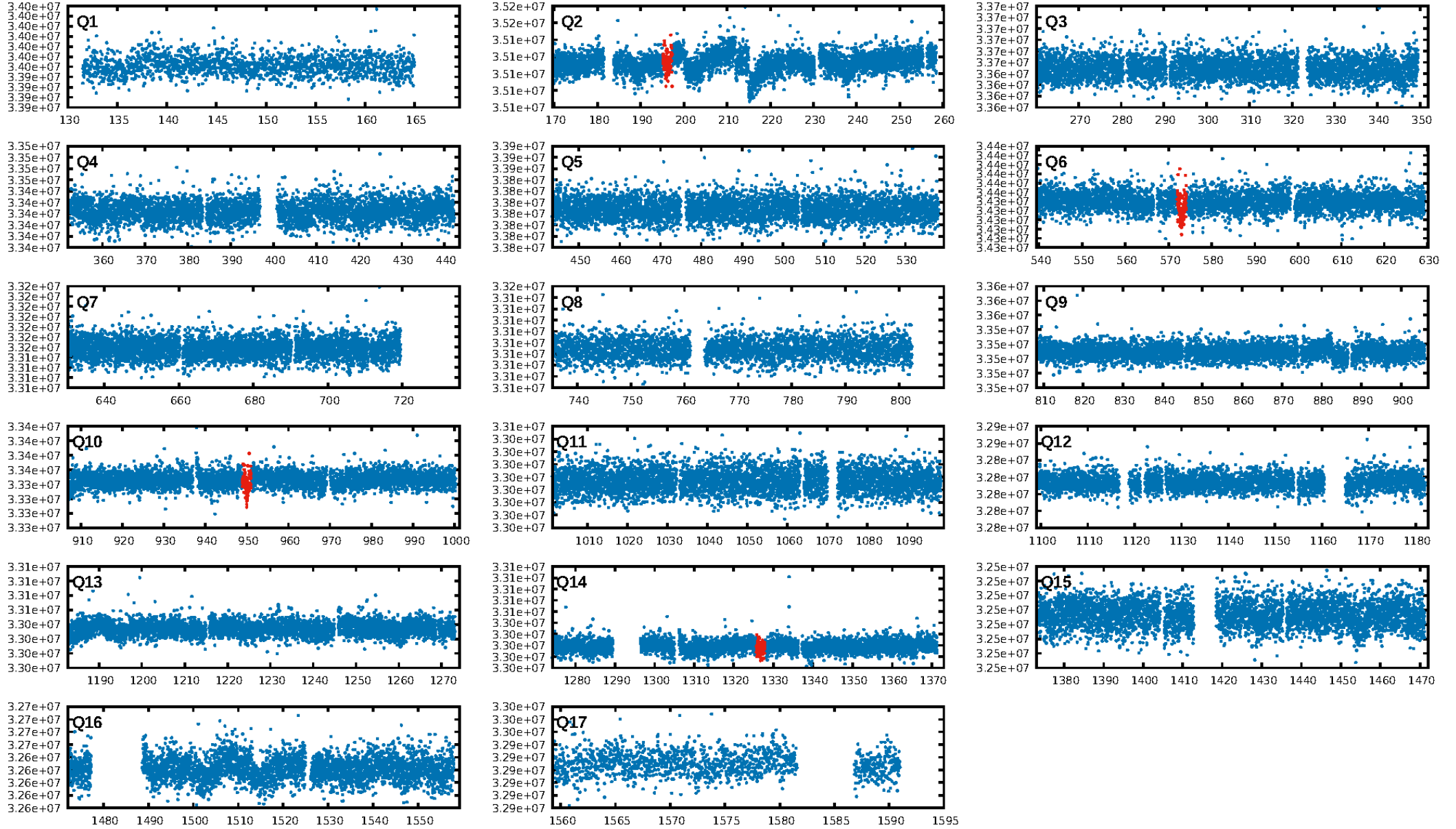
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [4.46σ]  
LongPeriod-sig: 100.0% [3.63σ]  
ModelChiSquare2-sig: 15.1%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 4.52e-15  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -0.3788  
Centroid-sig: 0.4%  
Centroid-so: 1.879 arcsec [1.88σ]  
OotOffset-rm: 0.649 arcsec [2.63σ]  
KicOffset-rm: 0.615 arcsec [2.72σ]  
OotOffset-st: 3/0/0/0 [3]  
KicOffset-st: 3/0/0/0 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [4/4]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 02:05:30 Z

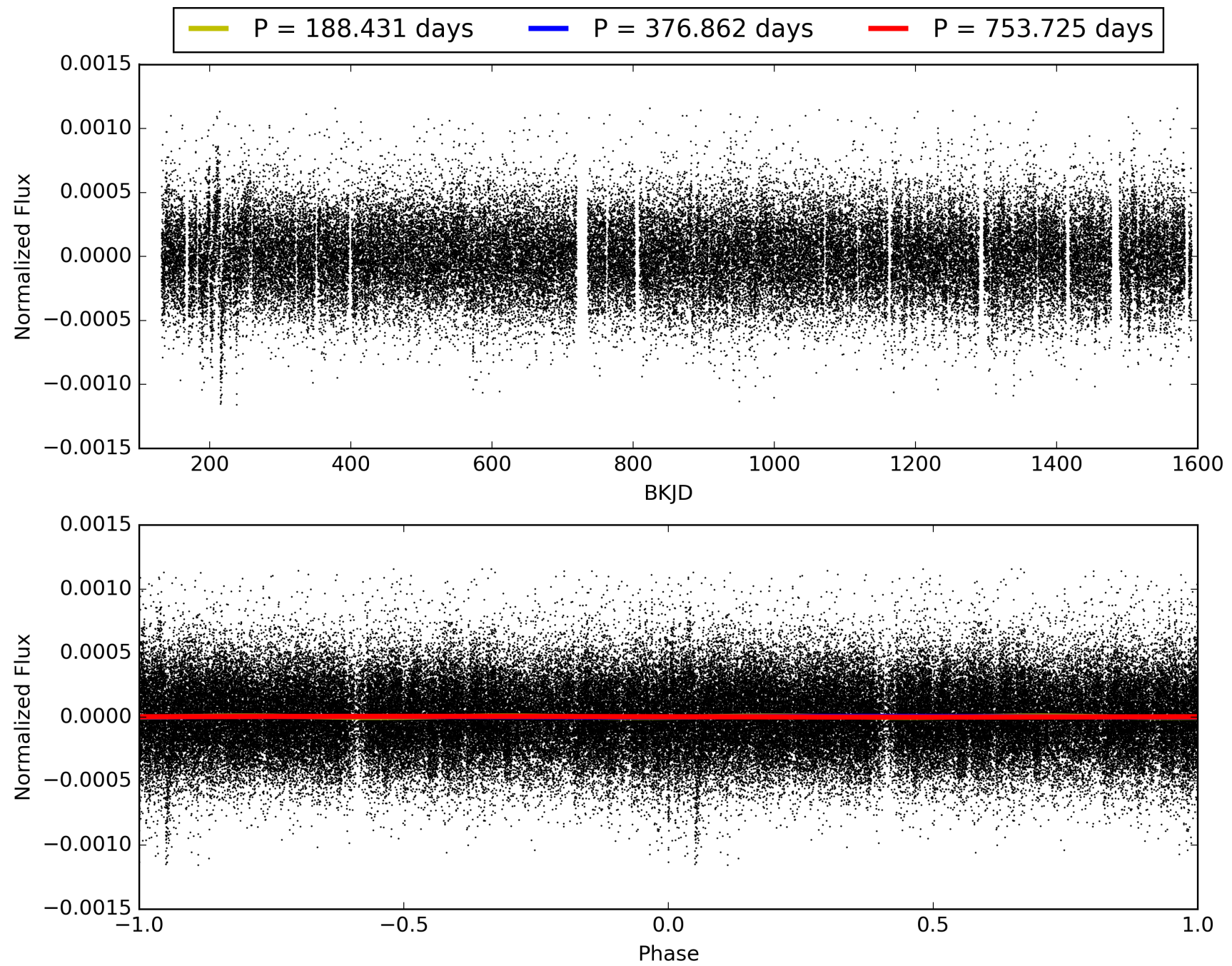
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 004833135-02, PDC Light Curves





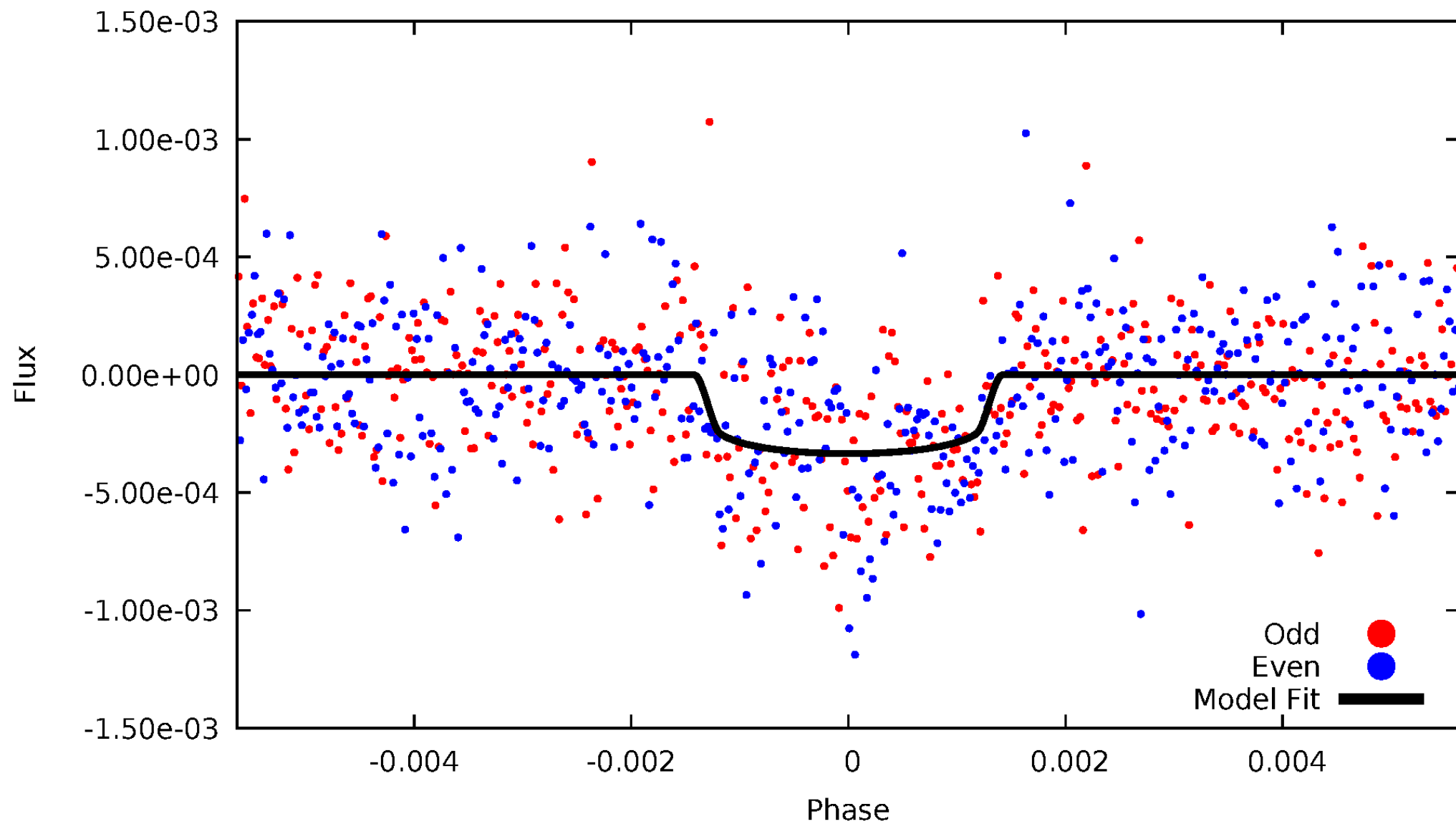
TCE 004833135-02





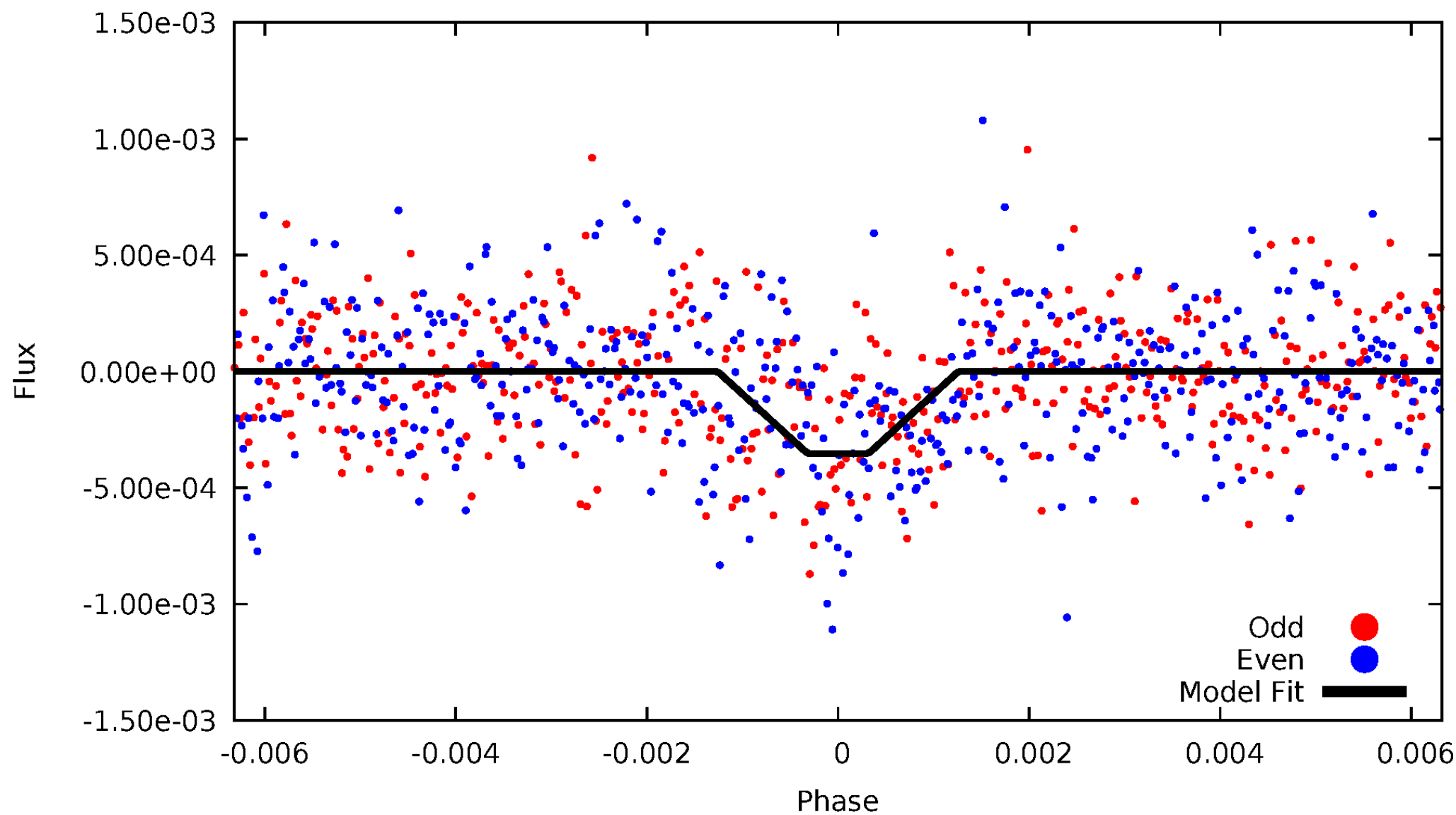
# DV Odd/Even

TCE 004833135-02



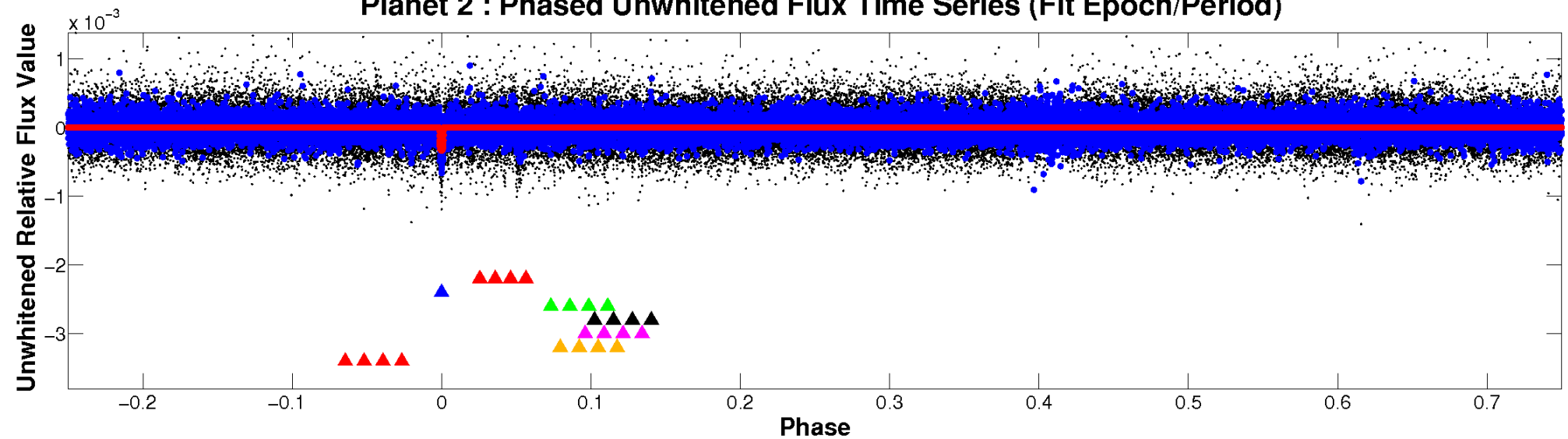
# ALT Odd/Even

TCE 004833135-02

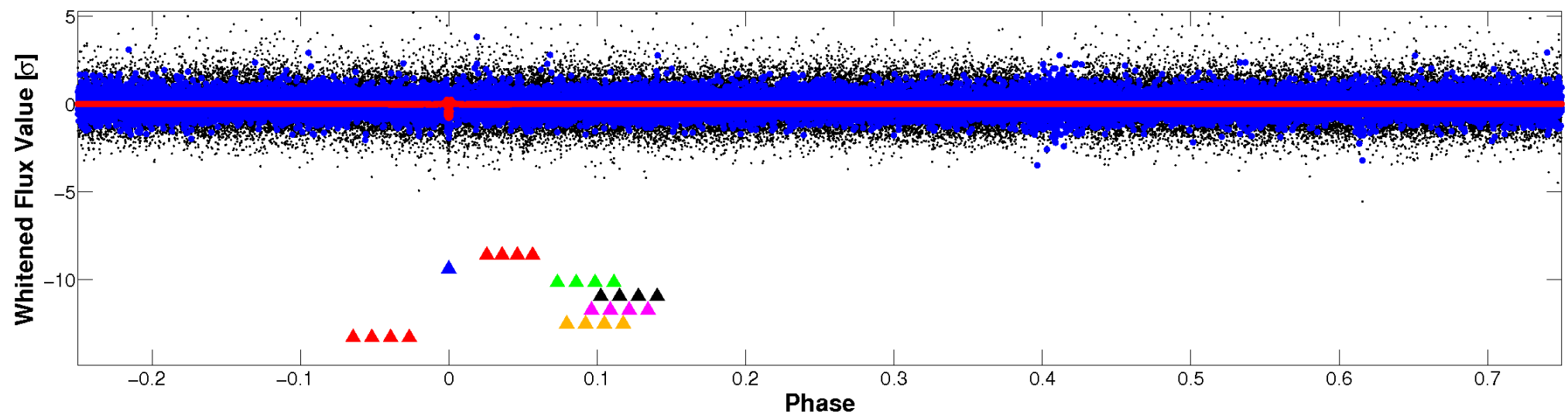


# Non-Whitened Vs. Whitened Light Curve

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

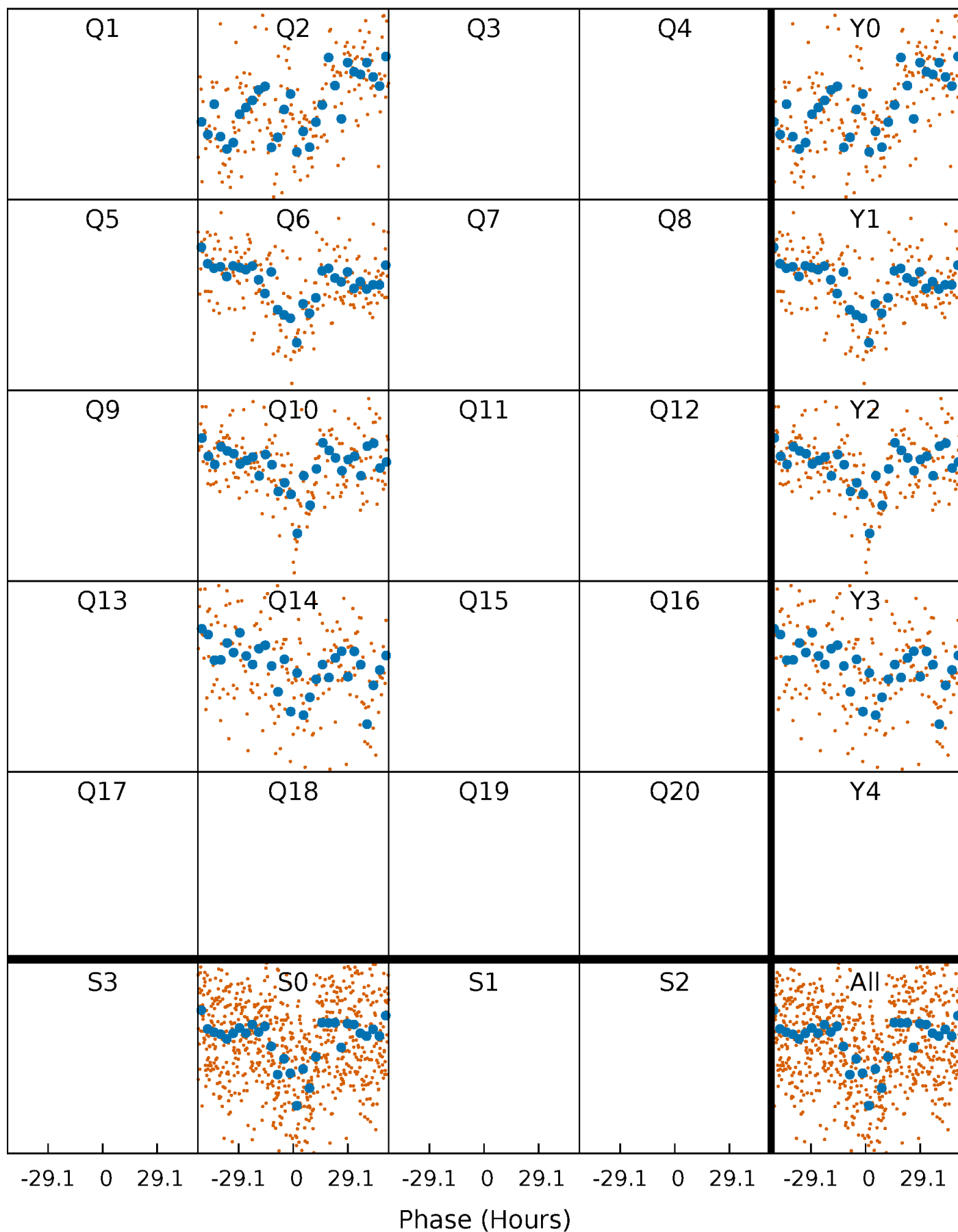


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



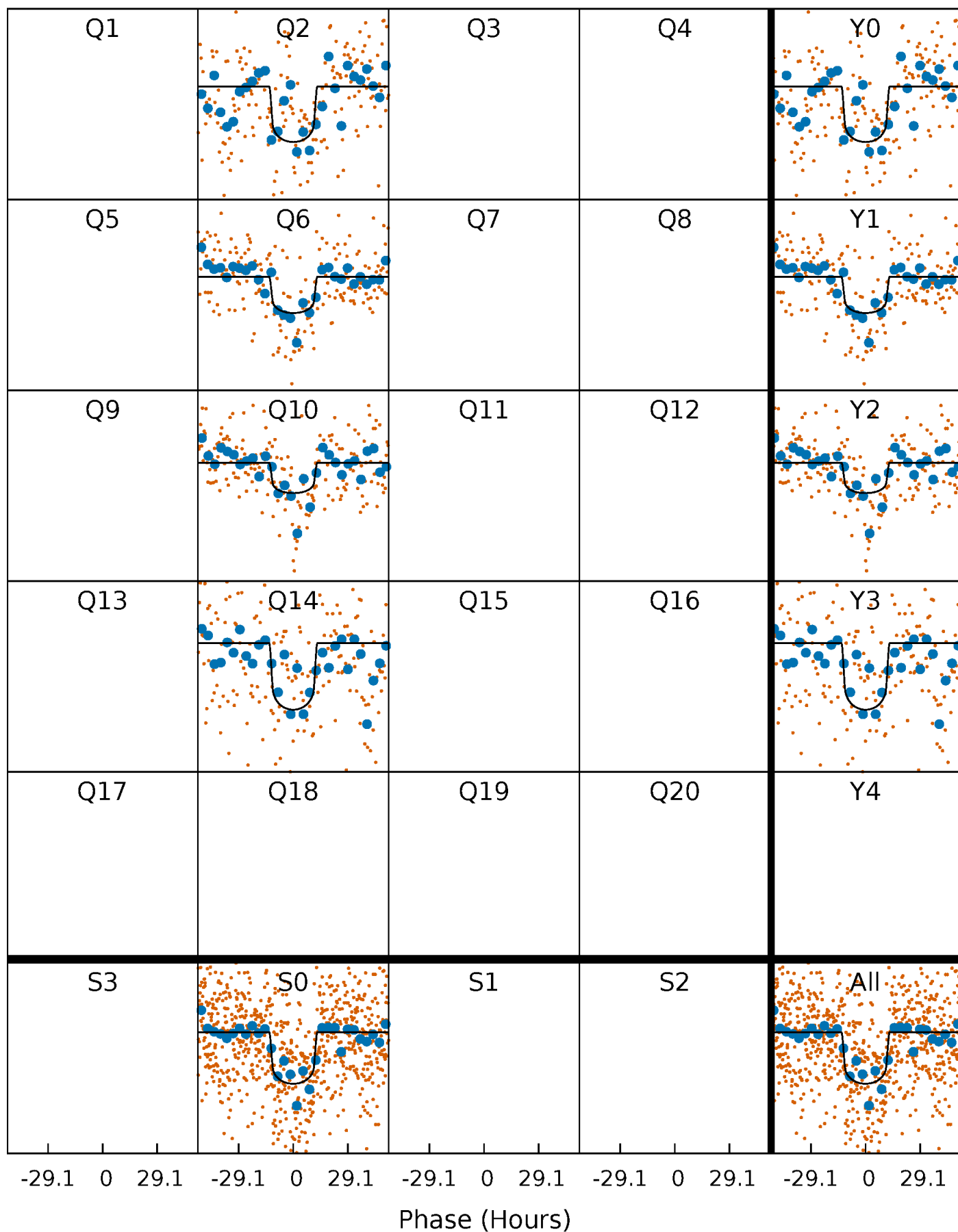
# PDC Quarter-Phased Transit Curves

TCE 004833135-02     $P=376.862383$  Days     $T_0=196.213723$  (BKJD)



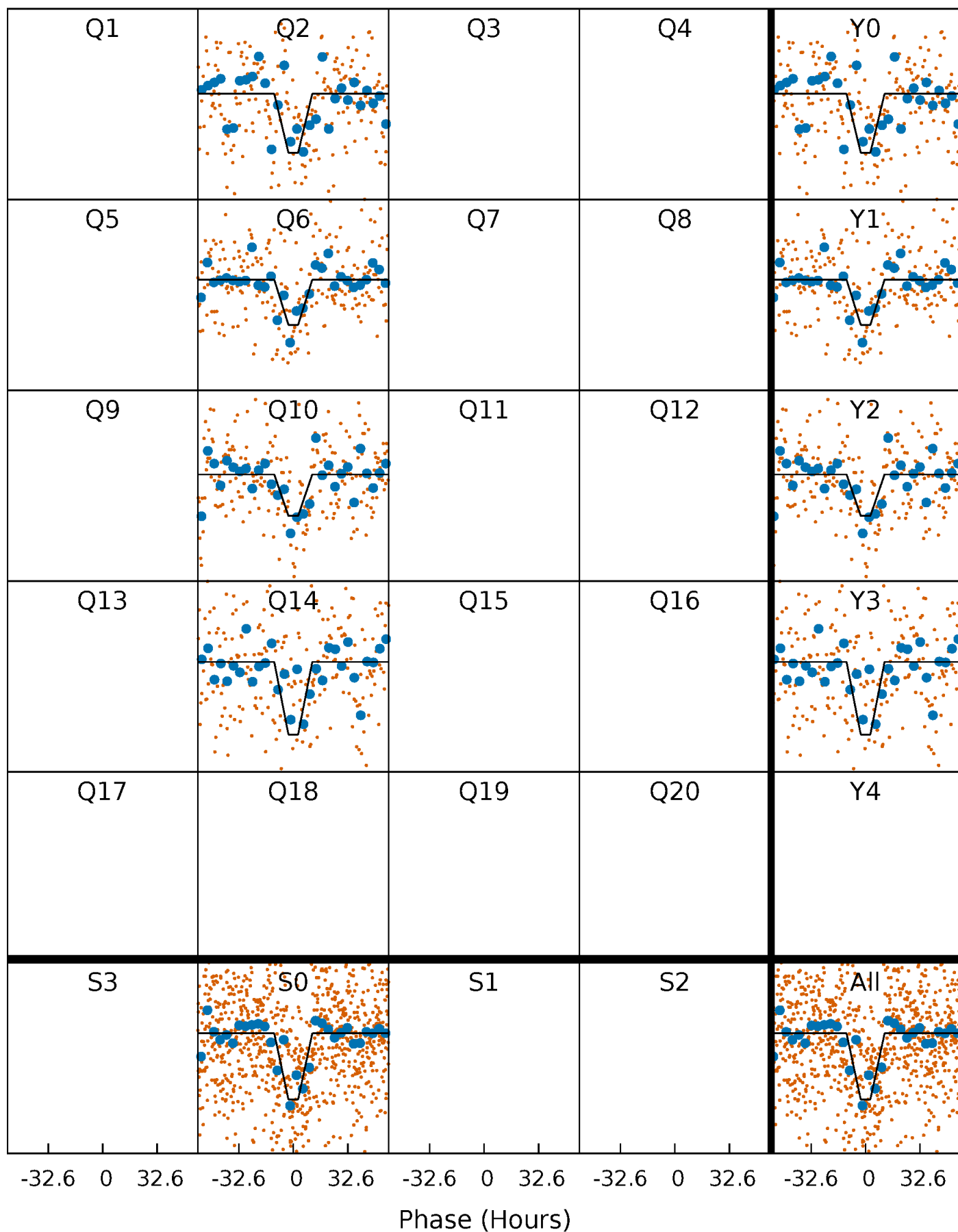
# DV Quarter-Phased Transit Curves

TCE 004833135-02 P=376.862383 Days  $T_0=196.213723$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

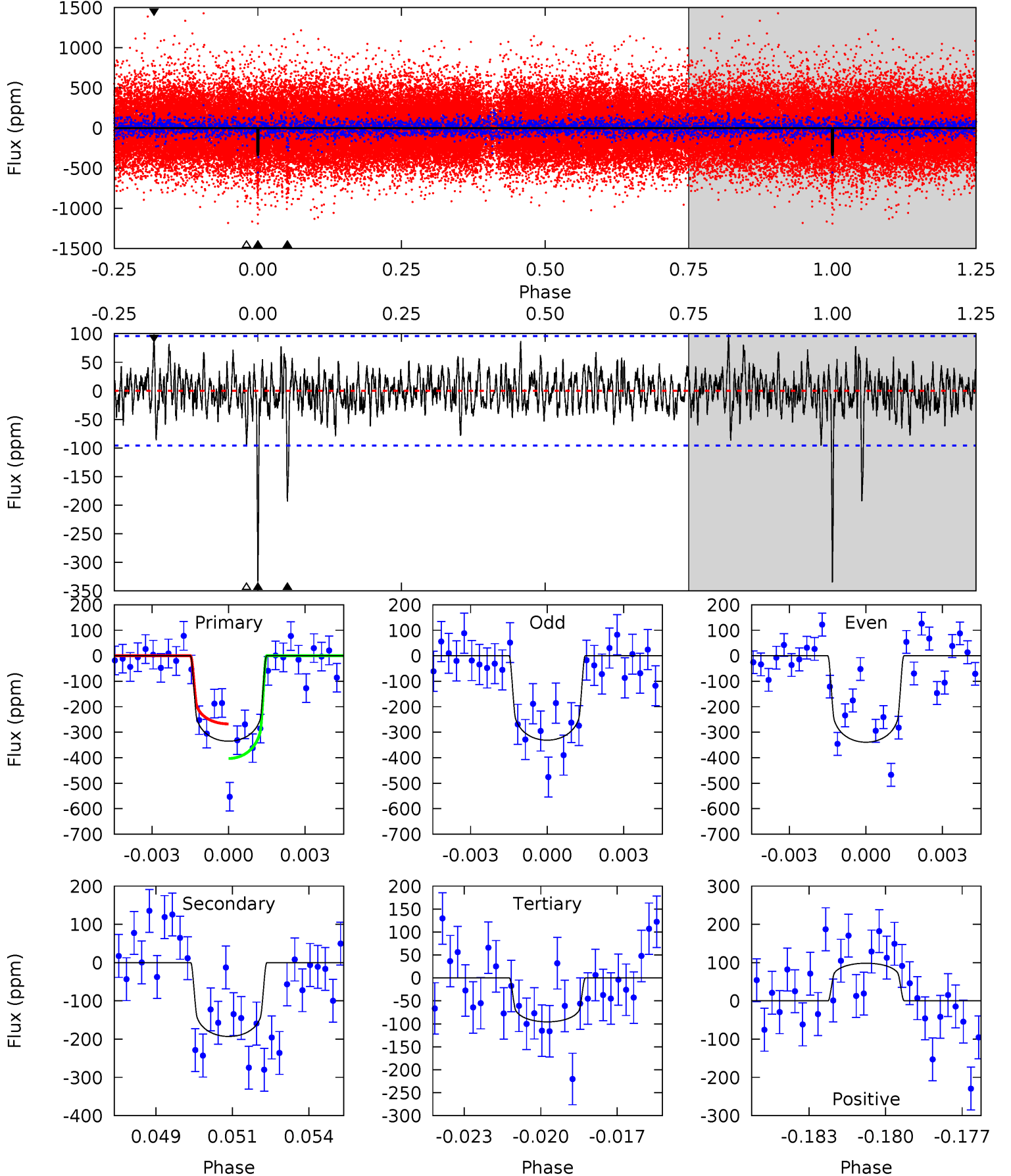
TCE 004833135-02 P=376.828902 Days  $T_0=196.326238$  (BKJD)



# DV Model-Shift Uniqueness Test

004833135-02, P = 376.862383 Days, E = 196.213723 Days

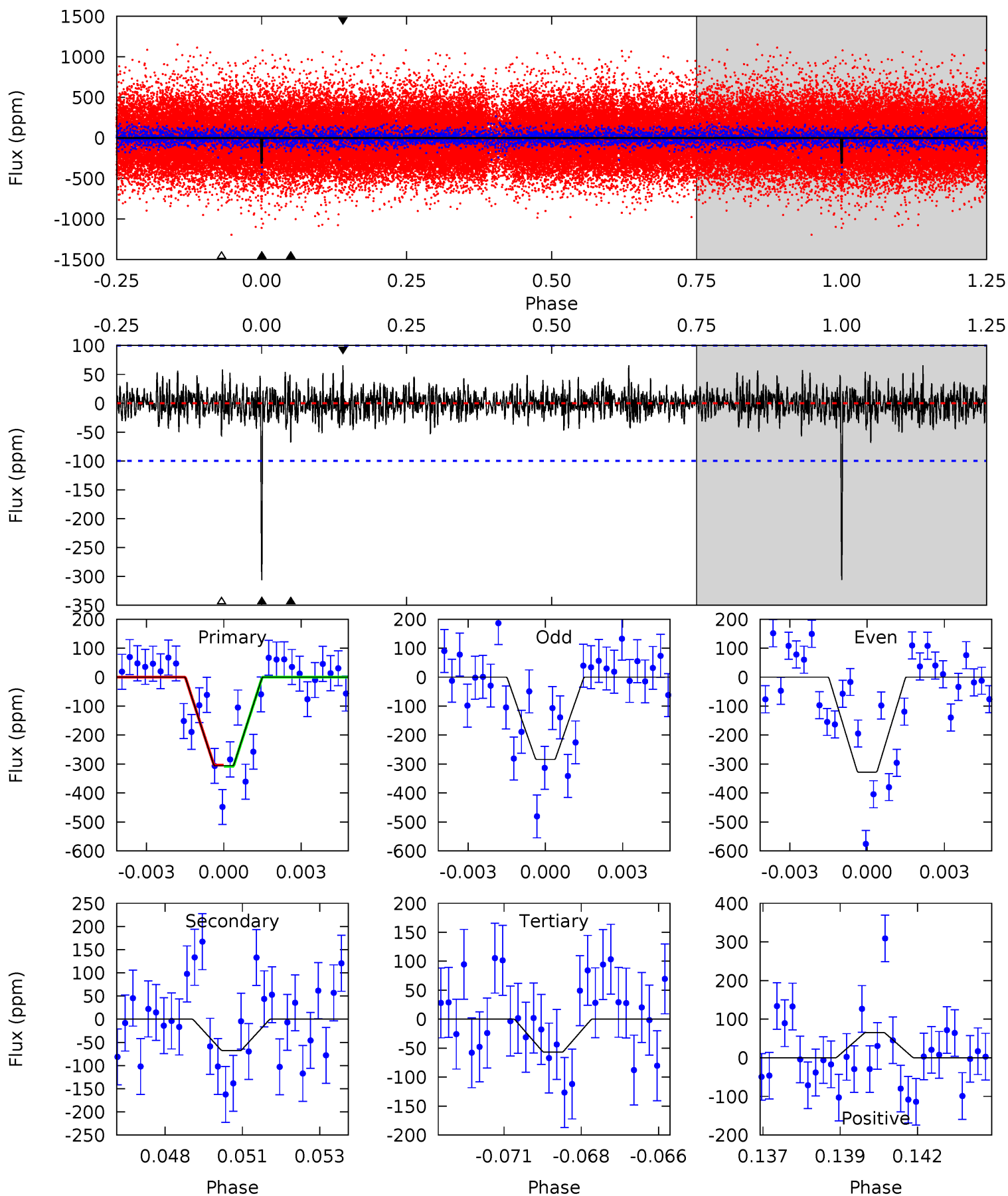
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.4	10.6	5.25	5.40	5.26	2.98	1.43	13.2	13.0	5.35	5.20	0.22	1.00	0.23	3.73



# Alt Model-Shift Uniqueness Test

004833135-02, P = 376.828902 Days, E = 196.326238 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
16.2	3.58	3.01	3.46	5.28	3.02	0.91	13.2	12.7	0.57	0.12	1.16	1.04	0.18	0.10





### Stellar Parameters For KIC 004833135

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6250^{+169}_{-206}$	$4.472^{+0.050}_{-0.200}$	$-0.260^{+0.300}_{-0.300}$	$0.986^{+0.305}_{-0.102}$	$1.052^{+0.147}_{-0.134}$	$1.544^{+0.404}_{-0.769}$
	+3%/-3%	+1%/-4%	+115%/-115%	+31%/-10%	+14%/-13%	+26%/-50%
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 004833135-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-193 \pm 18$	$2.16^{+0.40}_{-0.29}$	$384^{+25}_{-17}$	$5346^{+296}_{-287}$	$23709^{+8136}_{-6101}$
Alt.	$-68 \pm 19$	$2.11^{+0.40}_{-0.29}$	$383^{+28}_{-18}$	$4328^{+294}_{-300}$	$8579^{+3839}_{-3118}$

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

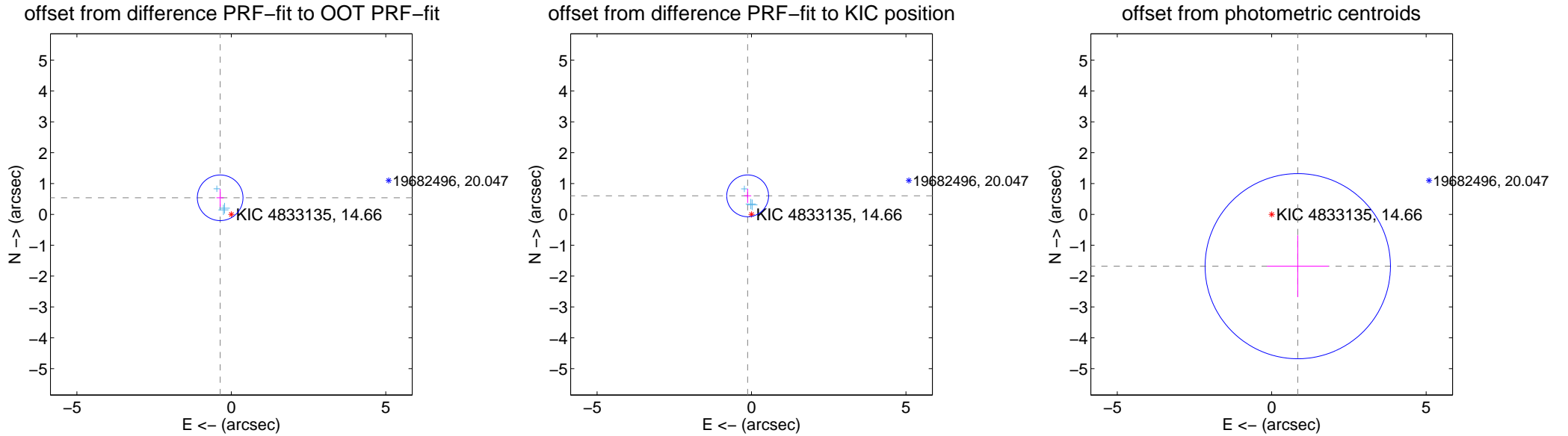
## DV Centroid Data

Supplemental centroid analysis for 004833135-02. Kepler magnitude: 14.66. Transit SNR 9.74

There are 3 quarters with good PRF difference image offsets

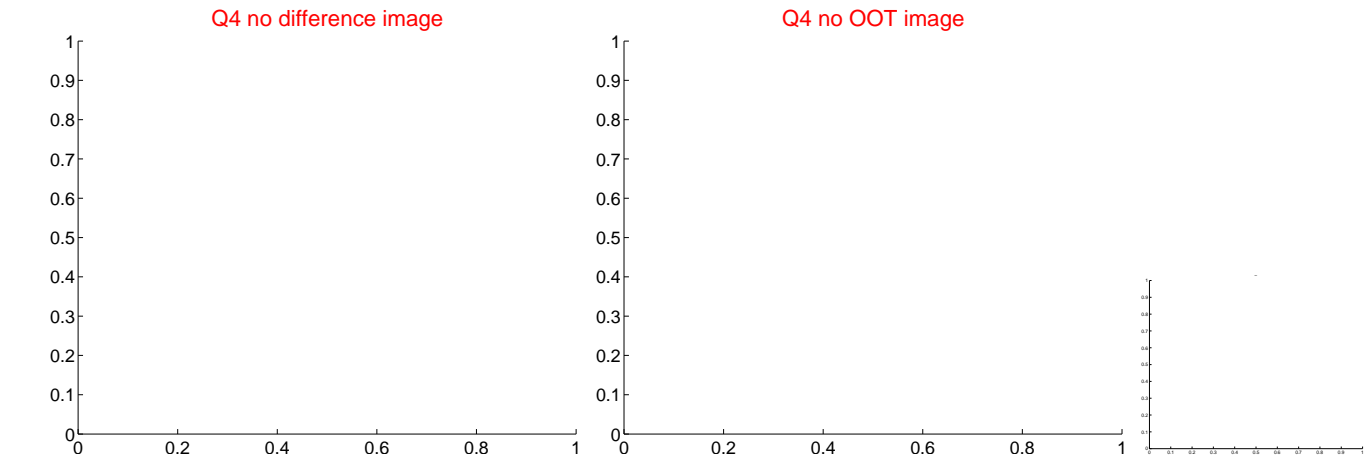
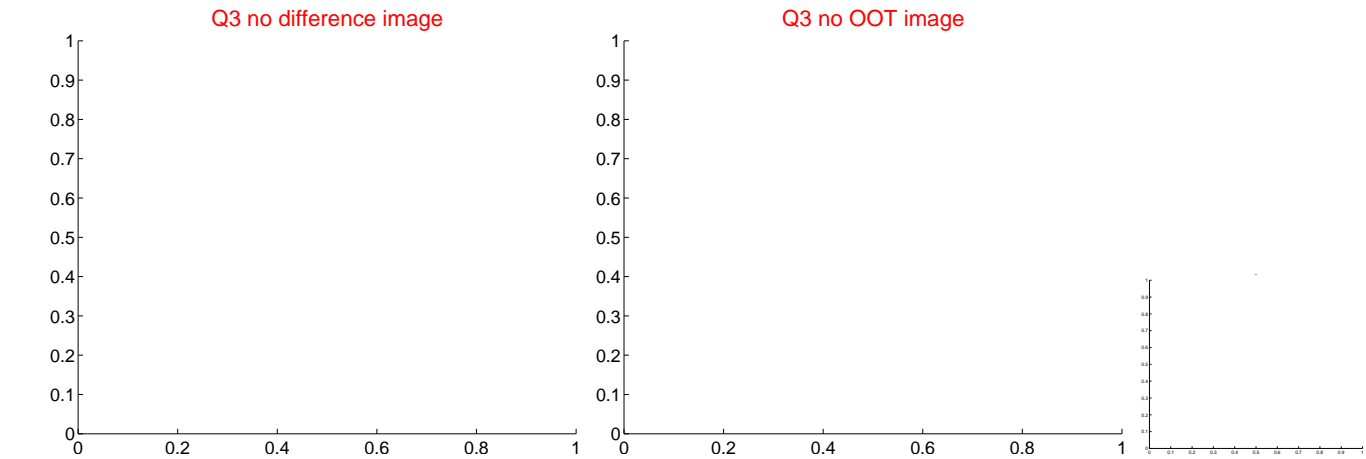
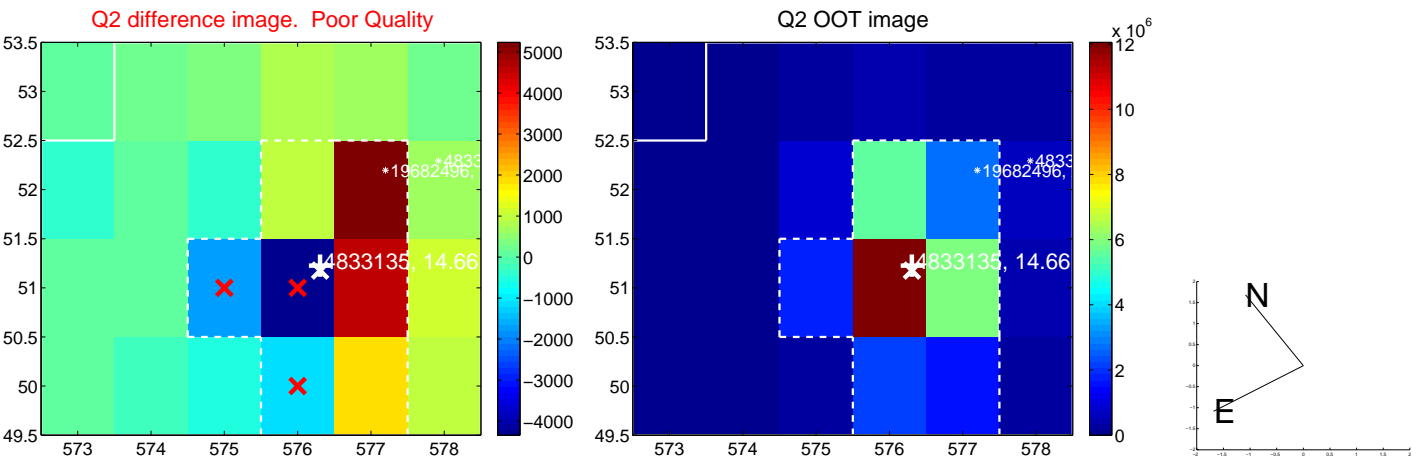
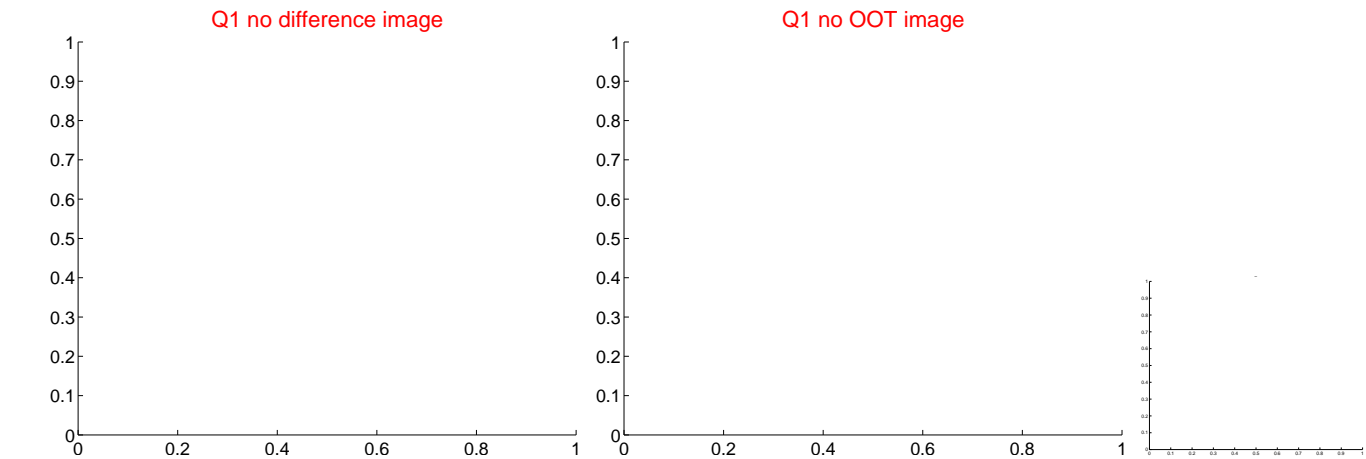
The direct PRF centroid is offset from the target star catalog position by about 0.24 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.649 \pm 0.246$	2.63	$0.362 \pm 0.118$	$0.538 \pm 0.286$
PRF-fit source offset from KIC position	$0.615 \pm 0.226$	2.72	$0.126 \pm 0.116$	$0.602 \pm 0.229$
photometric centroid source offset	$1.88 \pm 1.00$	1.88	$-0.84 \pm 0.99$	$-1.68 \pm 1.00$



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.

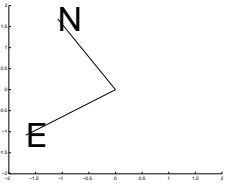
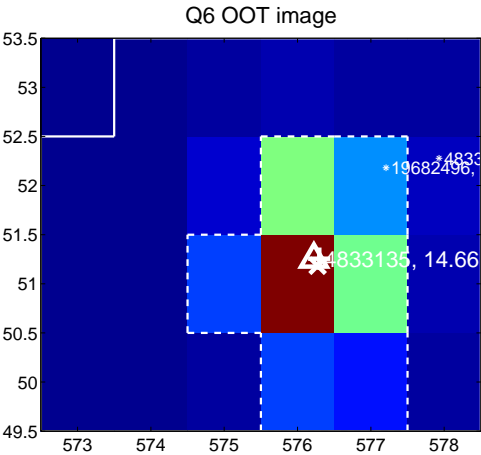
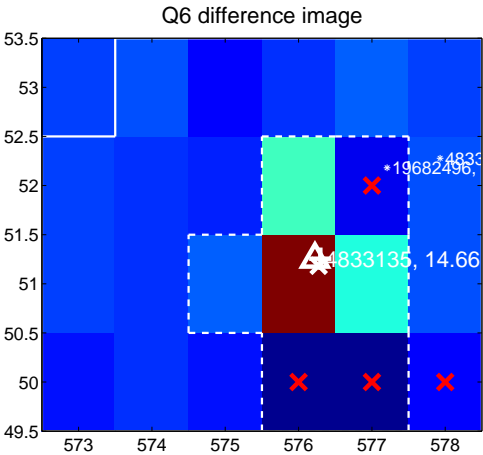


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

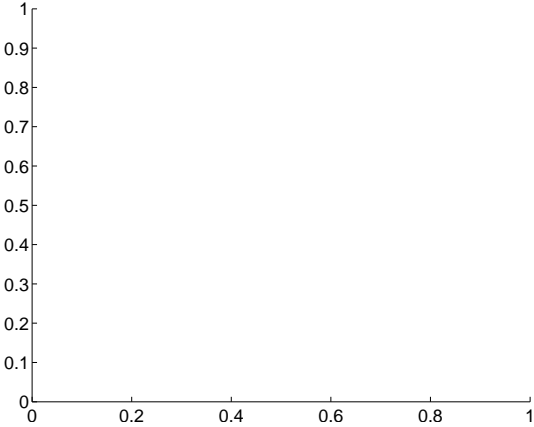
Q5 no difference image



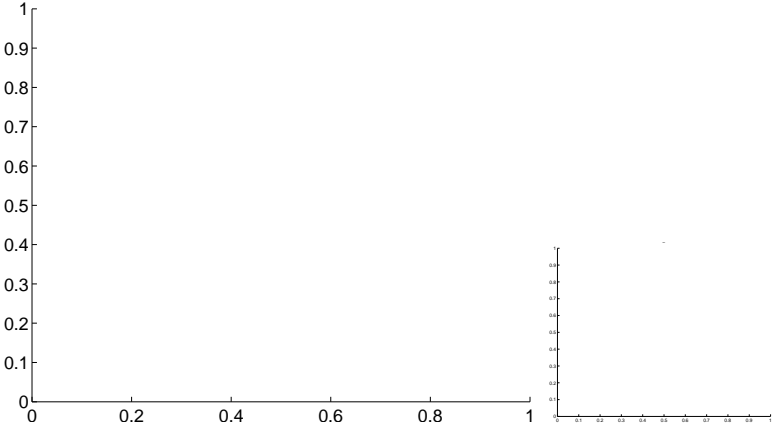
Q5 no OOT image



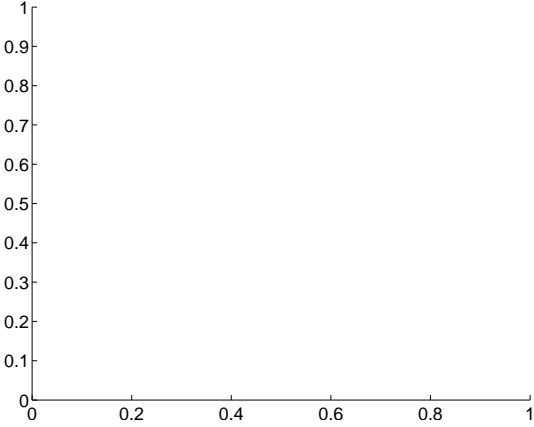
Q7 no difference image



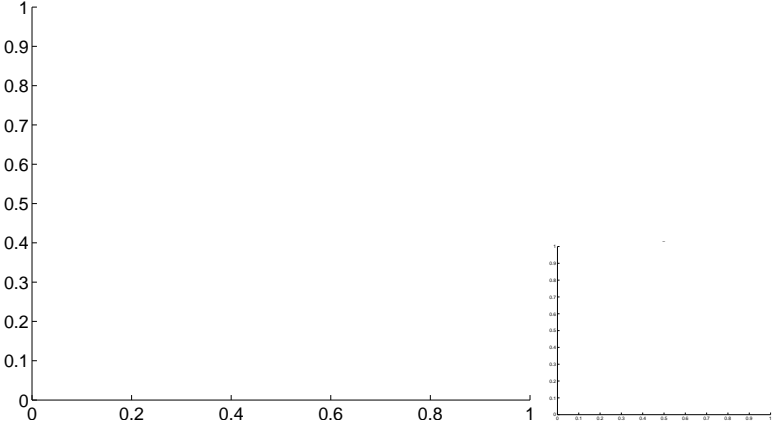
Q7 no OOT image



Q8 no difference image



Q8 no OOT image

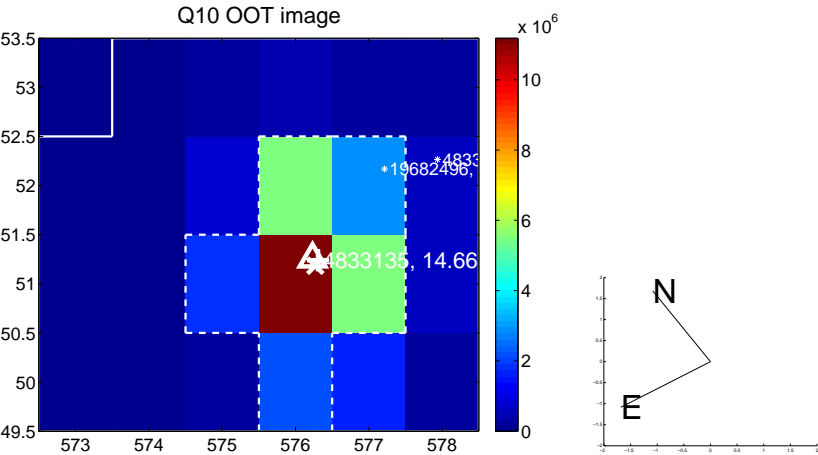
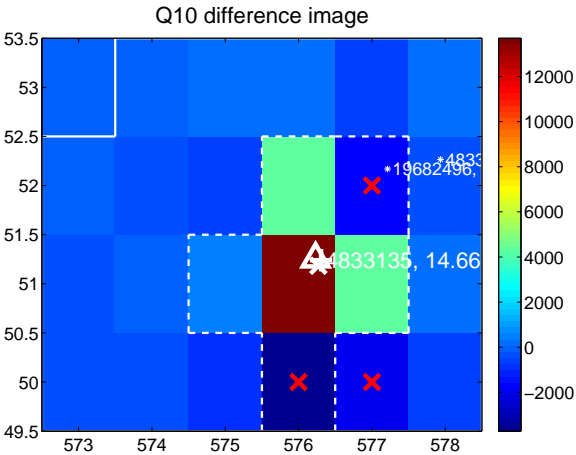


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

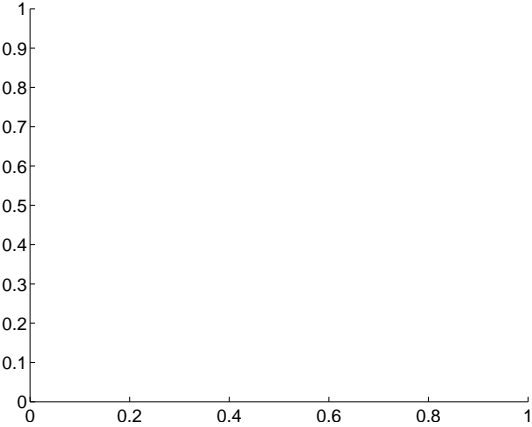
Q9 no difference image



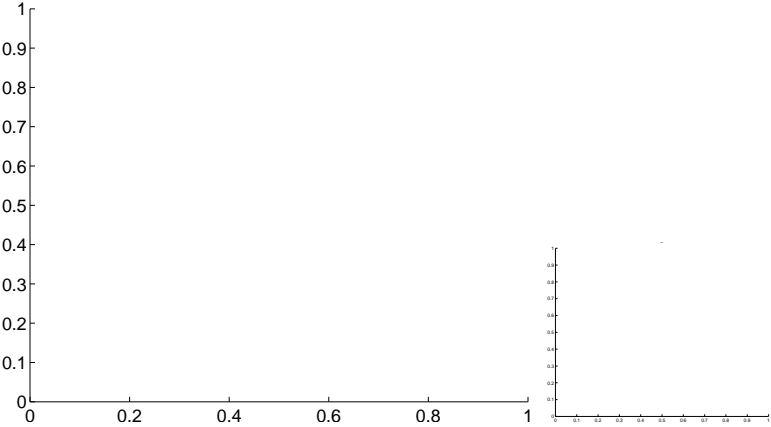
Q9 no OOT image



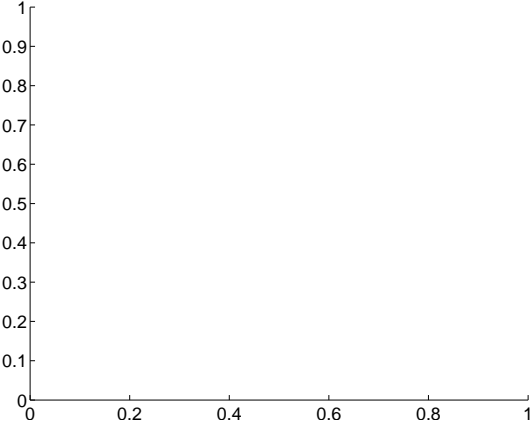
Q11 no difference image



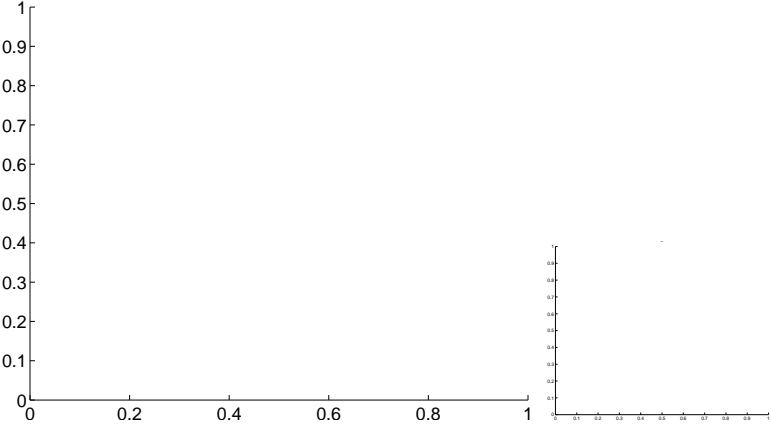
Q11 no OOT image



Q12 no difference image



Q12 no OOT image

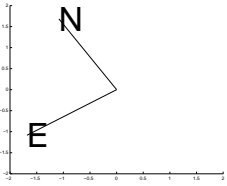
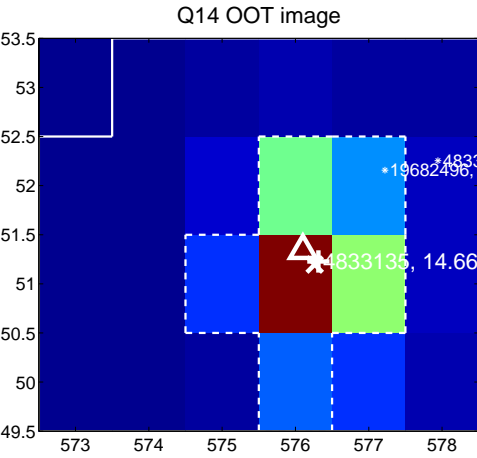
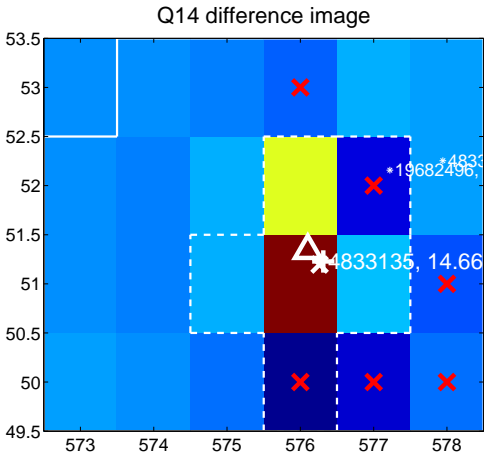


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

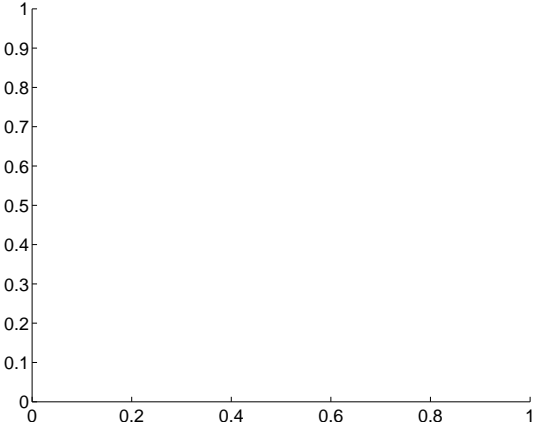
Q13 no difference image



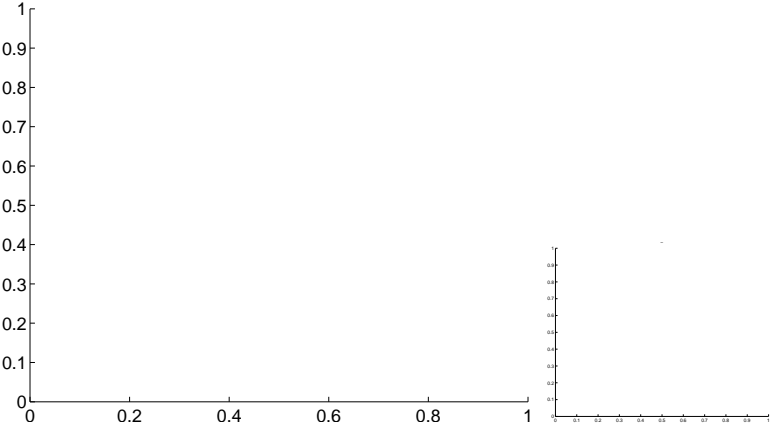
Q13 no OOT image



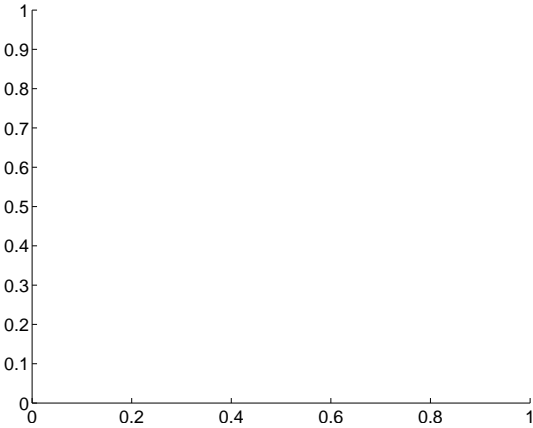
Q15 no difference image



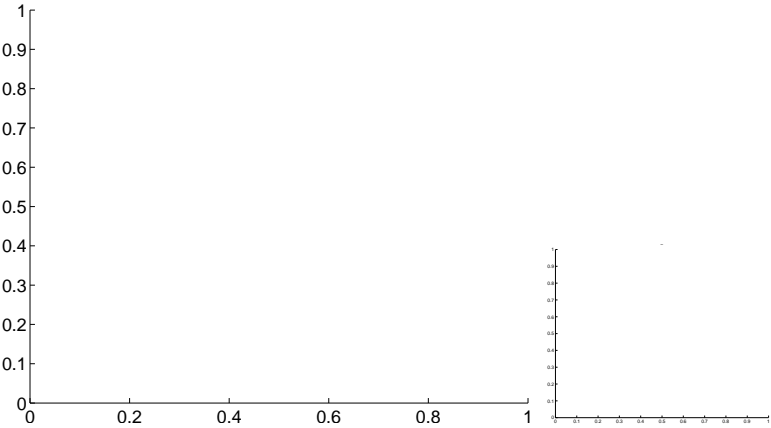
Q15 no OOT image



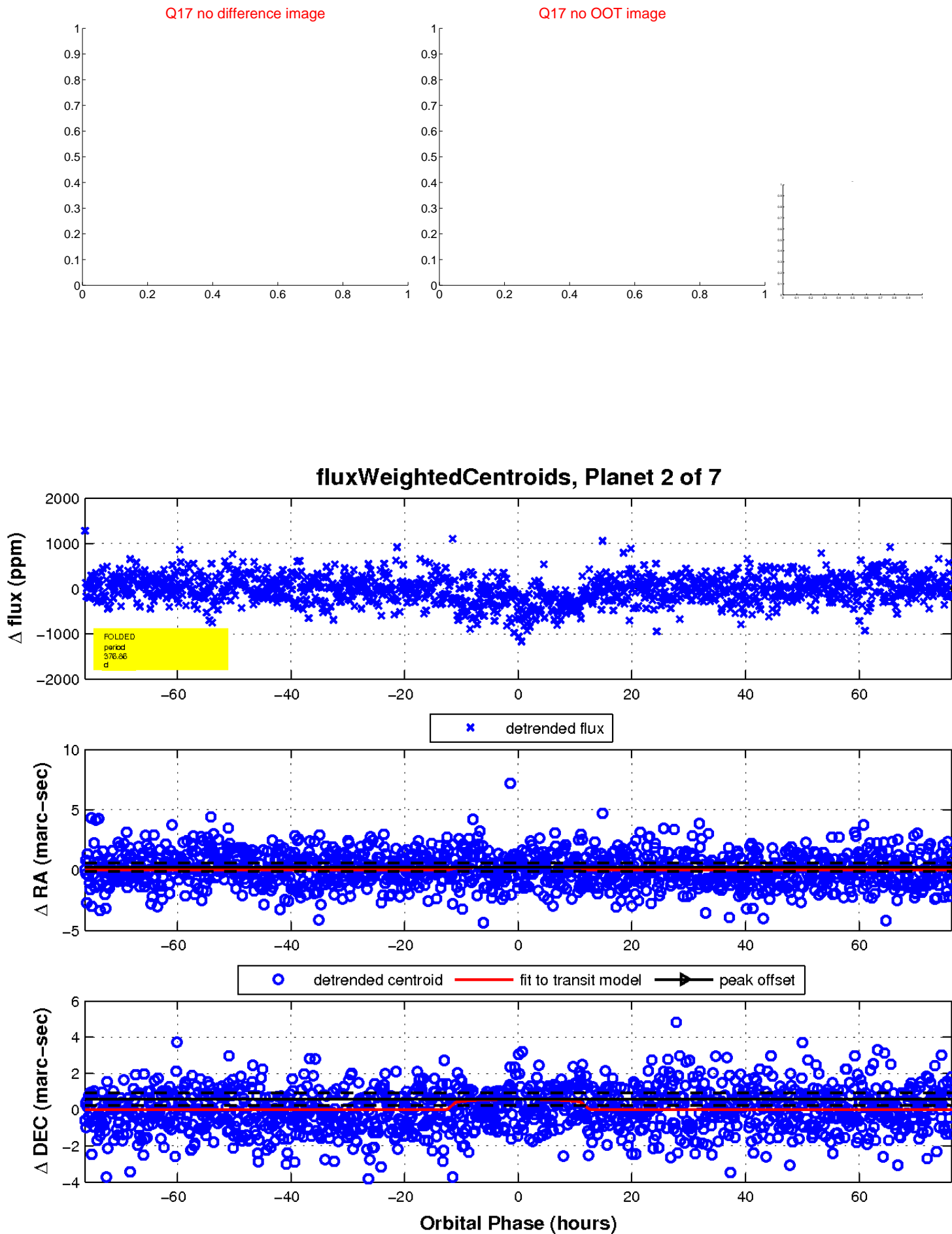
Q16 no difference image



Q16 no OOT image

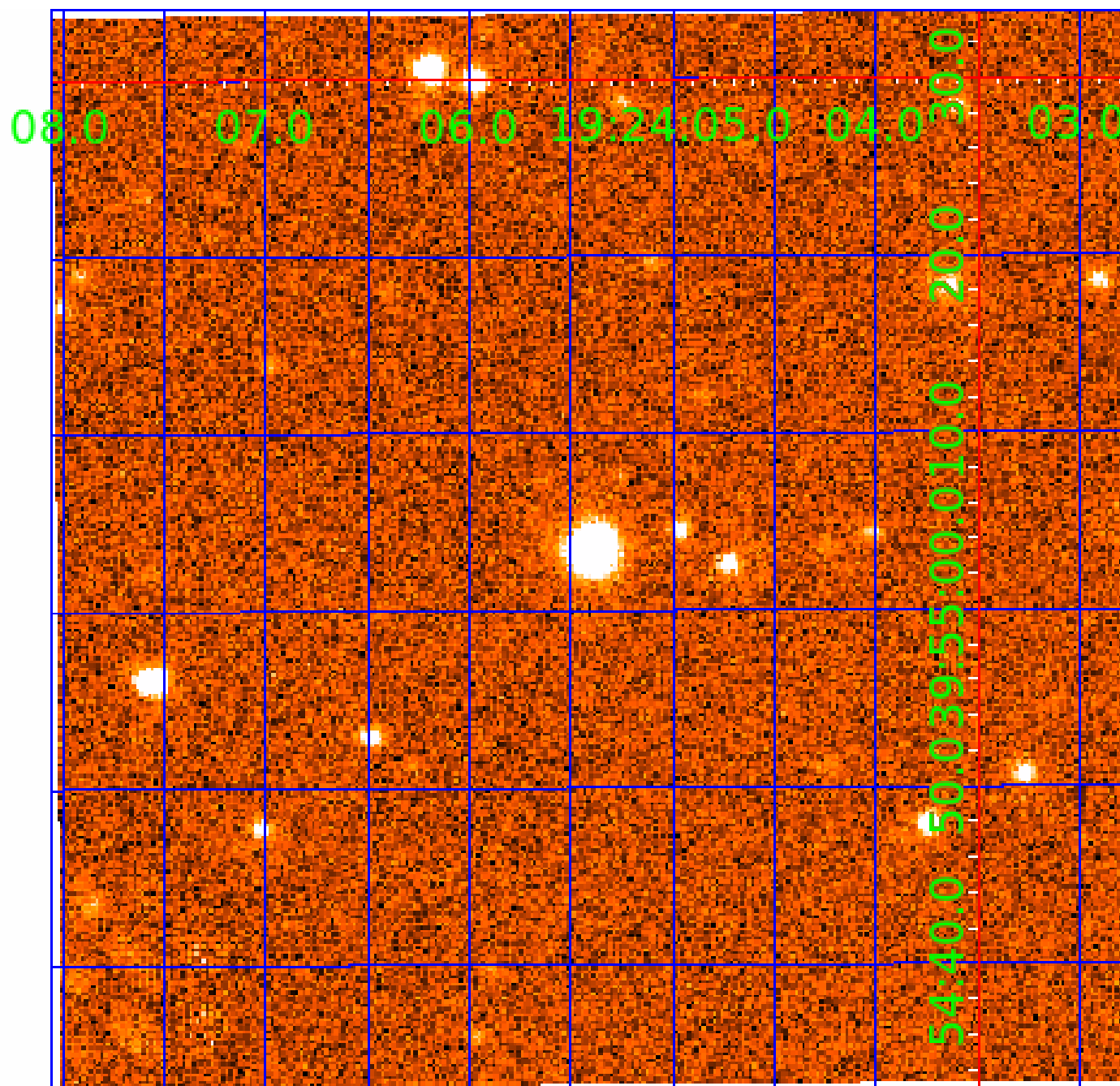


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination





# KIC 004833135

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004833135-01	OBS	No	380.738920	205.878855	660.0	2.780	8.9	9.8	0.99	6250	2.81	1.22
004833135-02	OBS	No	376.862383	196.213724	334.9	25.456	8.8	9.7	0.99	6250	2.07	1.23
004833135-03	OBS	No	372.081681	238.143115	645.9	3.479	8.1	9.5	0.99	6250	3.10	1.25
004833135-04	OBS	No	372.089452	249.136373	595.1	2.721	8.2	9.0	0.99	6250	2.64	1.25
004833135-05	OBS	No	372.070946	246.814275	476.3	3.988	7.9	8.1	0.99	6250	2.35	1.25
004833135-06	OBS	No	372.079096	240.518256	380.2	5.662	8.1	7.3	0.99	6250	2.11	1.25
004833135-07	OBS	No	372.098902	186.196312	542.8	3.022	7.3	7.9	0.99	6250	2.54	1.25

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004833135-01	OBS	FP	0.00	1	0	0	1	ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_FEW_DIFFS—EPHEM_MATCH
004833135-02	OBS	FP	0.00	1	0	0	1	INDIV_TRANS_MARSHALL—CENT_FEW_DIFFS—EPHEM_MATCH
004833135-03	OBS	FP	0.00	1	0	1	1	INDIV_TRANS_MARSHALL—ALL_TRANS_CHASES—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_UNRESOLVED_OFFSET—EPHEM_MATCH
004833135-04	OBS	FP	0.00	1	0	1	0	ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_UNRESOLVED_OFFSET
004833135-05	OBS	FP	0.00	1	0	0	0	MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_FEW_DIFFS
004833135-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_FEW_MEAS
004833135-07	OBS	FP	0.00	1	0	0	0	MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_UNCERTAIN

**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 004833135-03

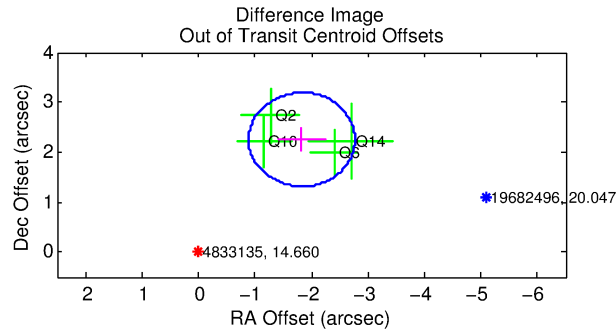
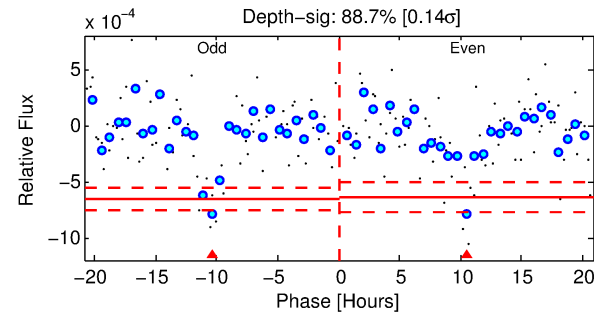
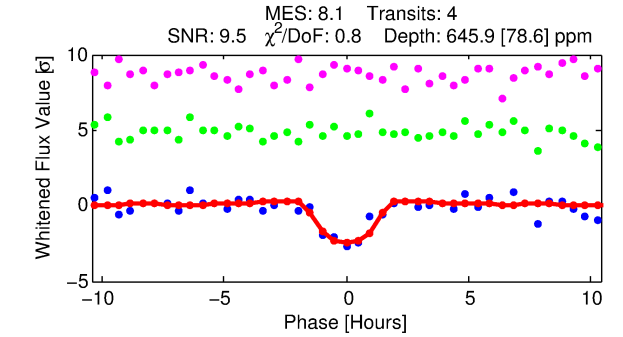
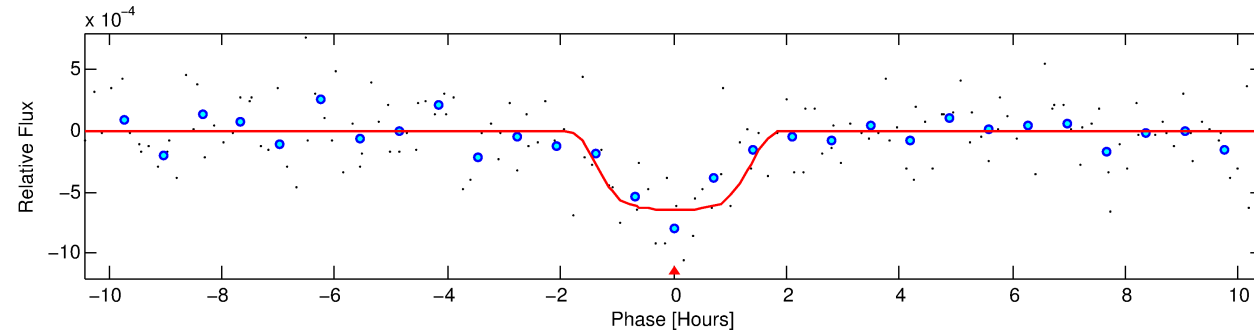
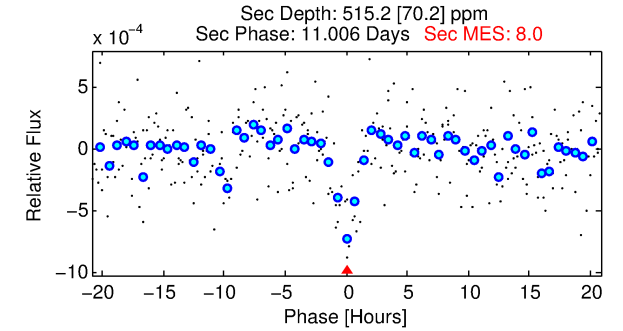
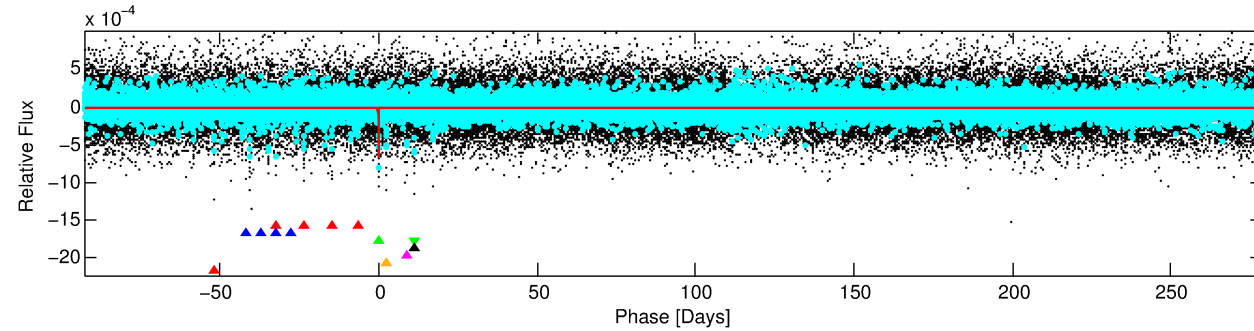
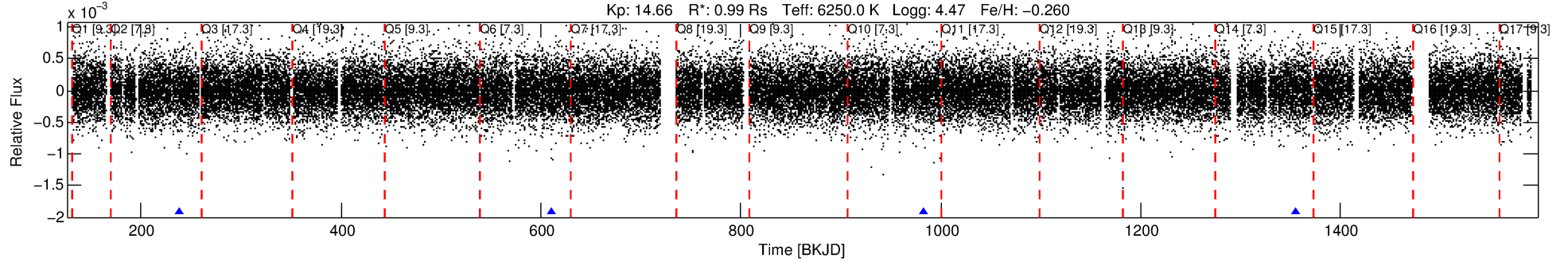
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist (")	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
004833135-03	4833135	1330.01	4150539	43:1	4280.3	-7	5	15.70	14.66	1.51	Col-Anomaly	1	0.36	0.16

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

# DV One-Page Summary

KIC: 4833135 Candidate: 3 of 7 Period: 372.082 d  
KOI: K00498 Corr: No Ephemeris Match

Kp: 14.66 R\*: 0.99 Rs Teff: 6250.0 K Logg: 4.47 Fe/H: -0.260



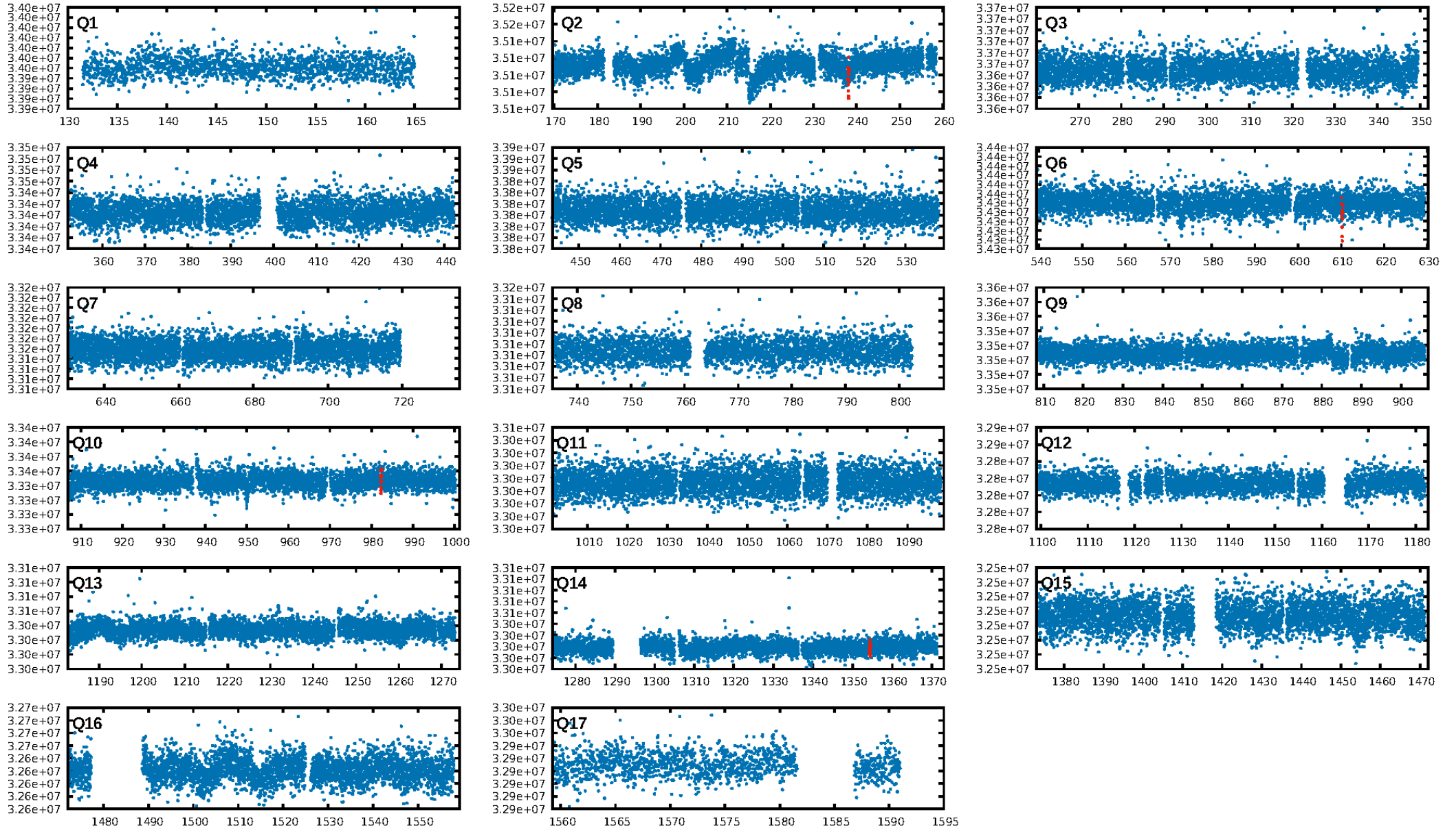
## DV Fit Results:

Period = 372.08168 [0.00388] d  
Epoch = 238.1431 [0.0073] BKJD  
Rp/R\* = 0.0288 [0.0035]  
a/R\* = 330.32 [153.67]  
b = 0.95 [0.05]  
Seff = 1.25 [0.49]  
Teq = 270 [26] K  
Rp = 3.10 [1.03] Re  
a = 1.0297 [0.2647] AU  
Ag = 31281.10 [14492.18] [2.16σ]  
Teff = 5548 [428] K [12.31σ]

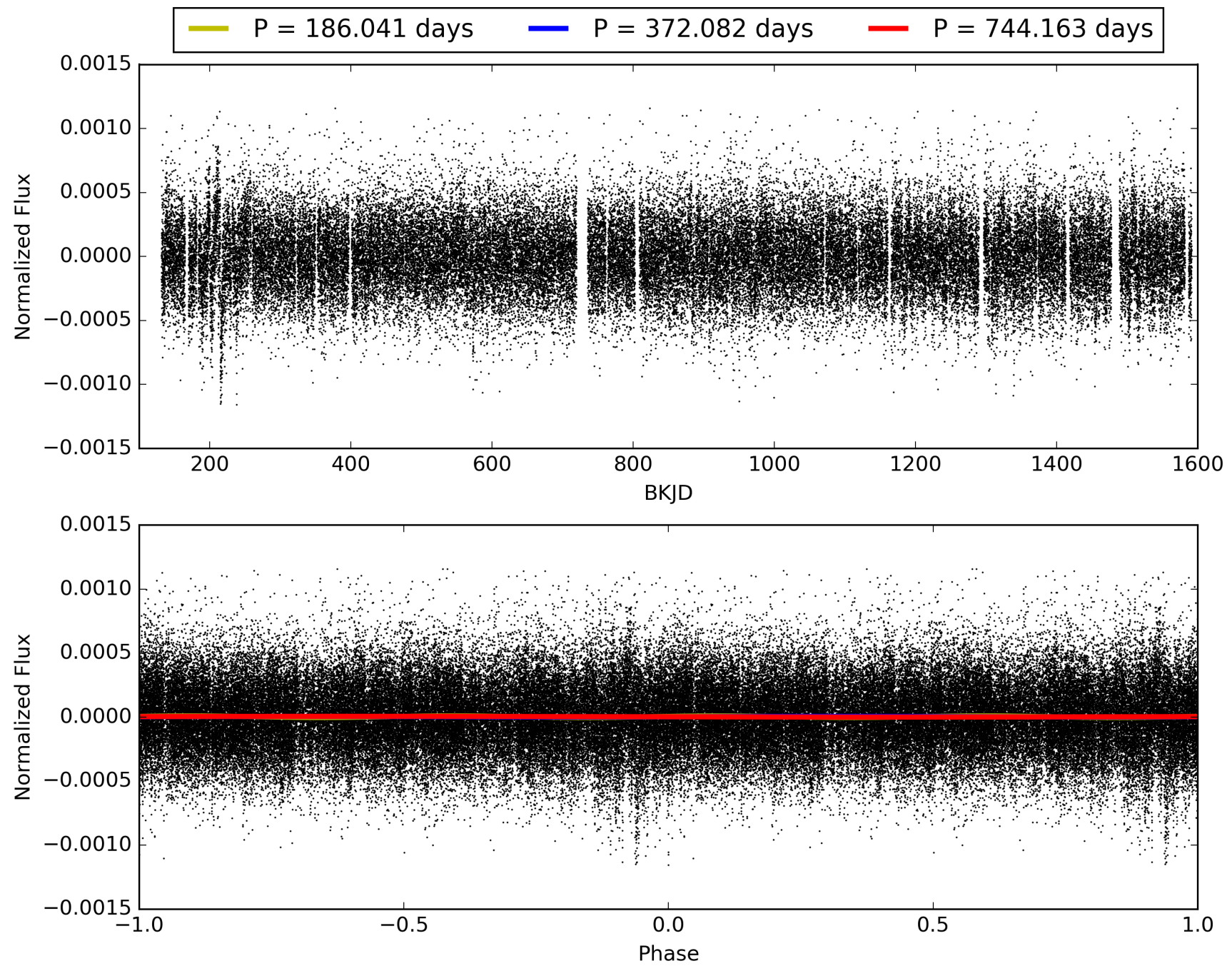
## DV Diagnostic Results:

ShortPeriod-sig: 0.7% [0.01σ]  
LongPeriod-sig: 3.4% [0.04σ]  
ModelChiSquare2-sig: 37.3%  
ModelChiSquareGof-sig: 99.4%  
Bootstrap-pfa: 9.51e-13  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -9.98  
Centroid-sig: 0.0%  
Centroid-so: 2.995 arcsec [2.12σ]  
OotOffset-rm: 2.901 arcsec [9.26σ]  
KicOffset-rm: 2.948 arcsec [9.56σ]  
OotOffset-st: 4/0/0/0 [4]  
KicOffset-st: 4/0/0/0 [4]  
DiffImageQuality-fgm: 0.75 [3/4]  
DiffImageOverlap-fno: 1.00 [4/4]

# TCE 004833135-03, PDC Light Curves

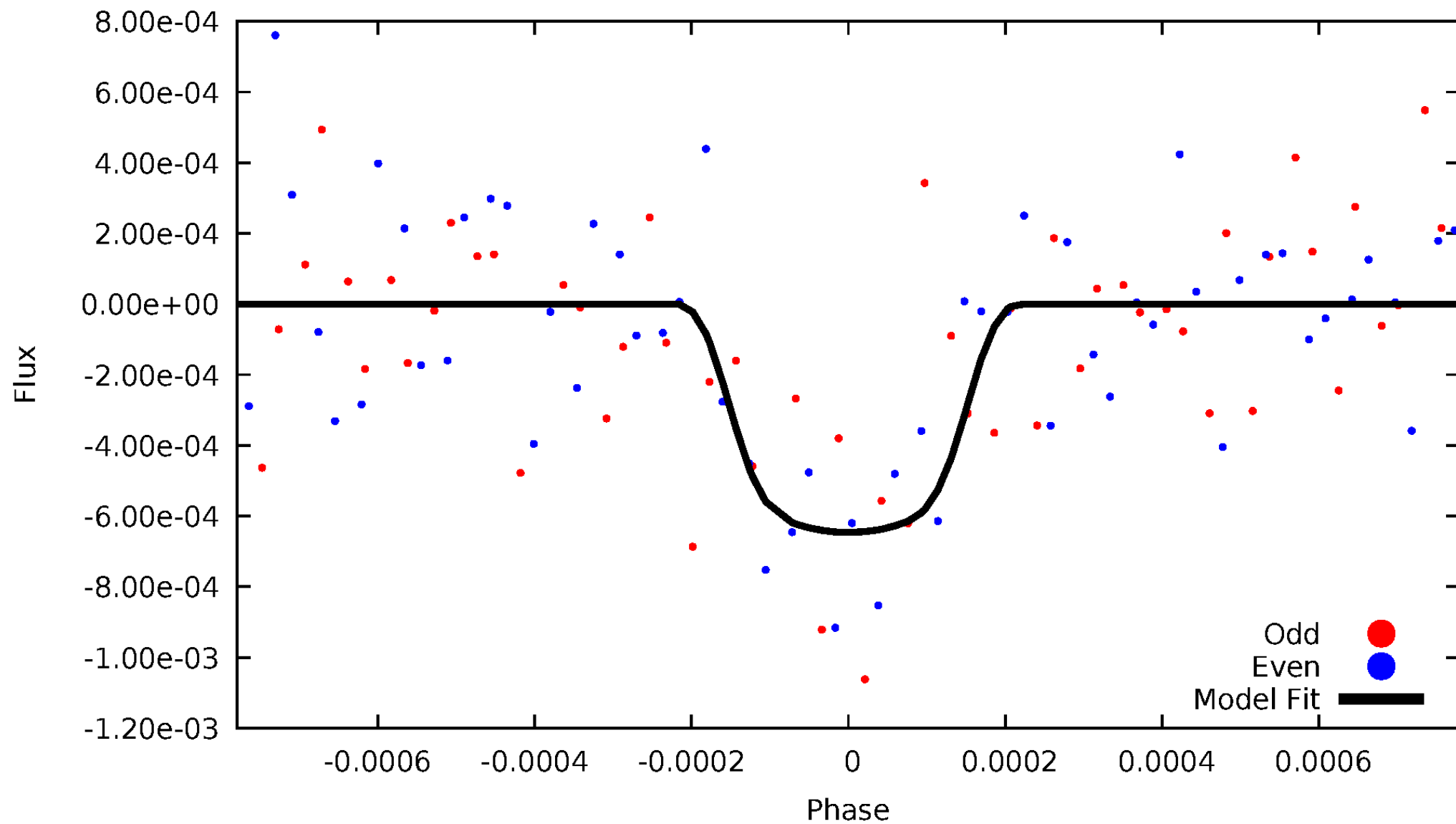


TCE 004833135-03



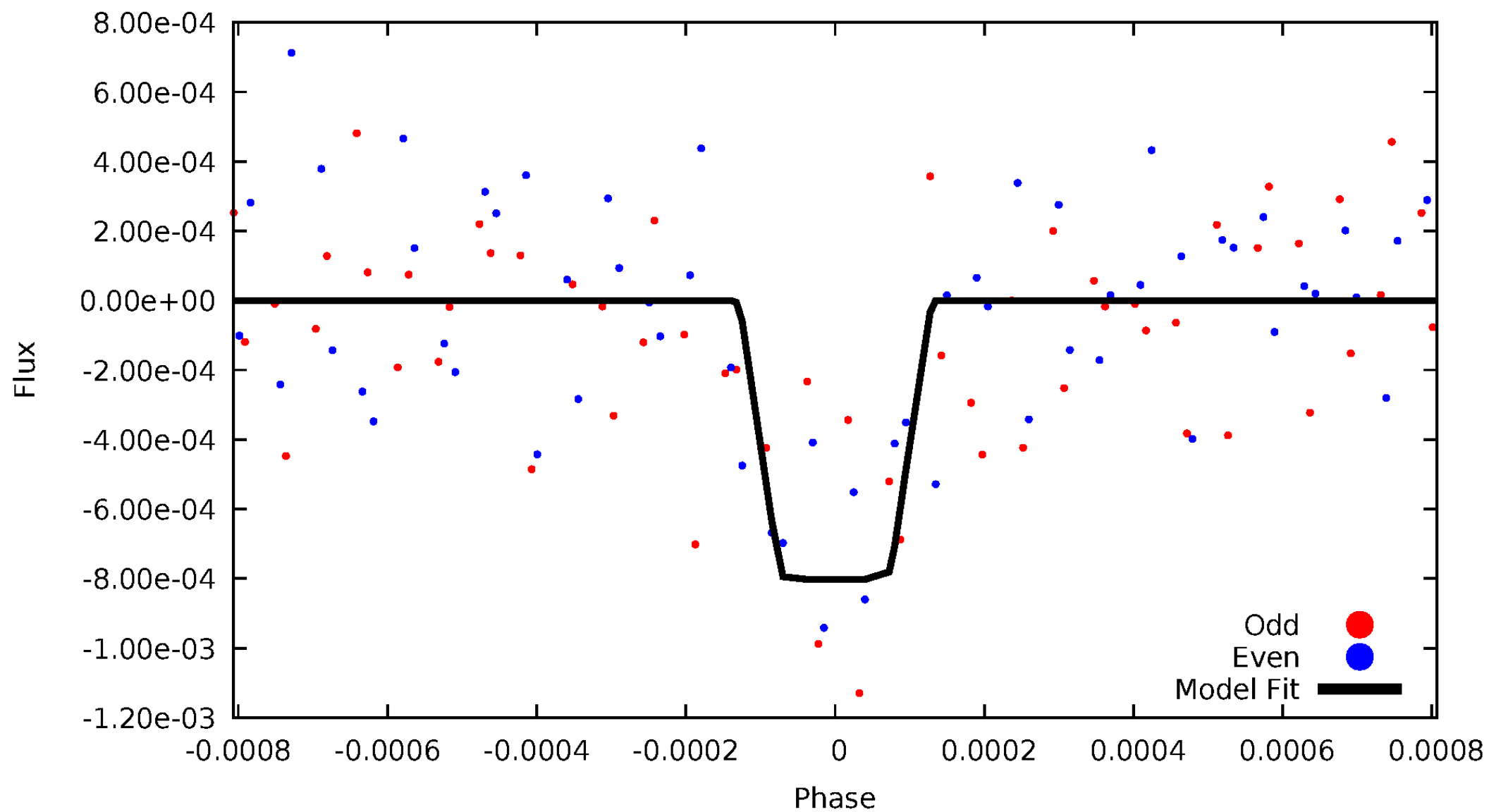
# DV Odd/Even

TCE 004833135-03



# ALT Odd/Even

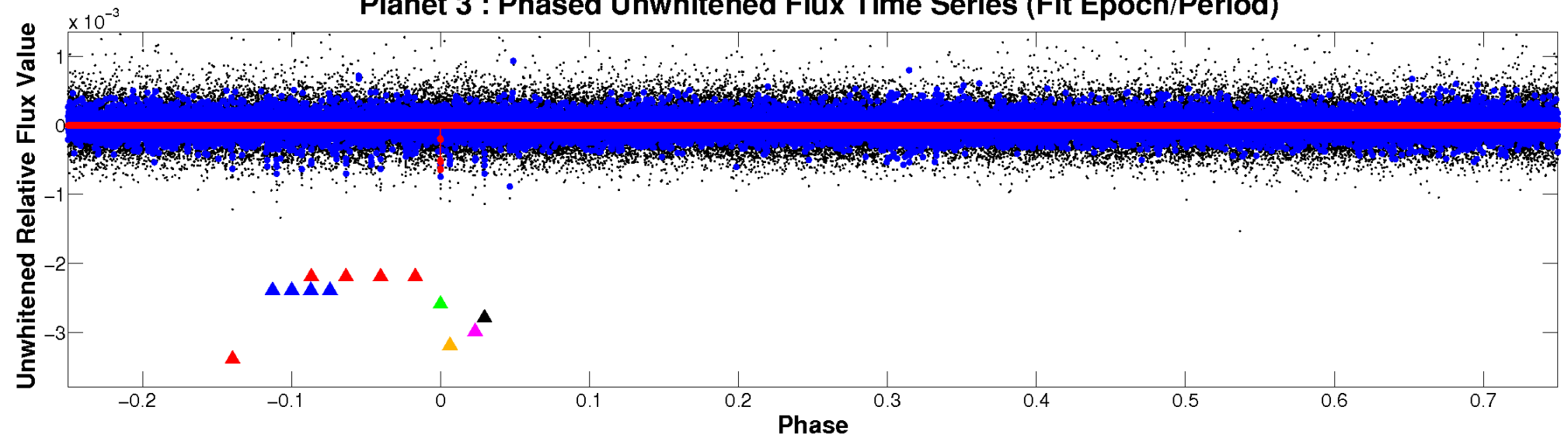
TCE 004833135-03



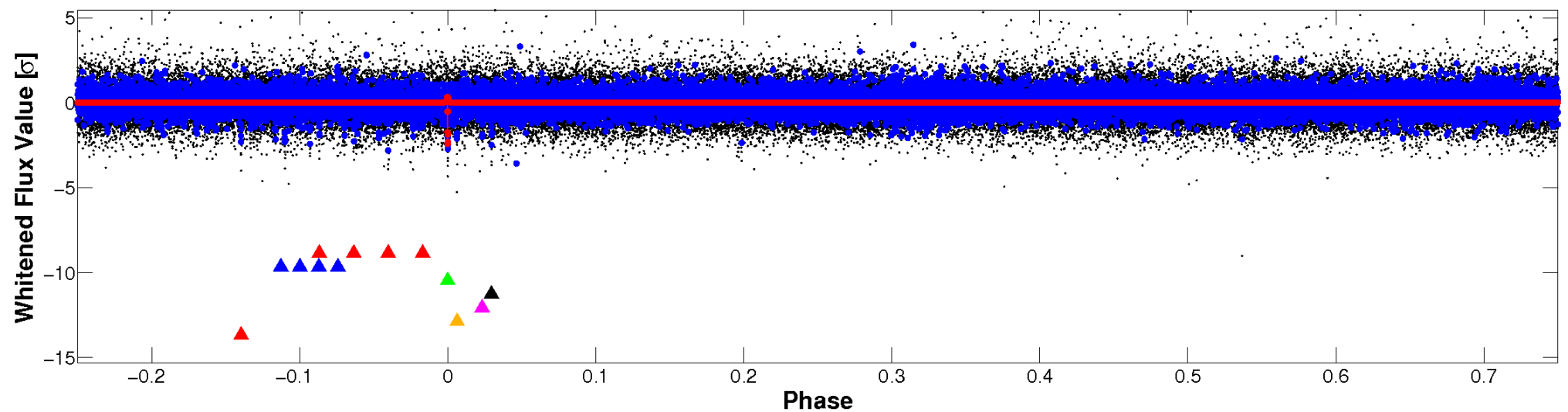


# Non-Whitened Vs. Whitened Light Curve

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

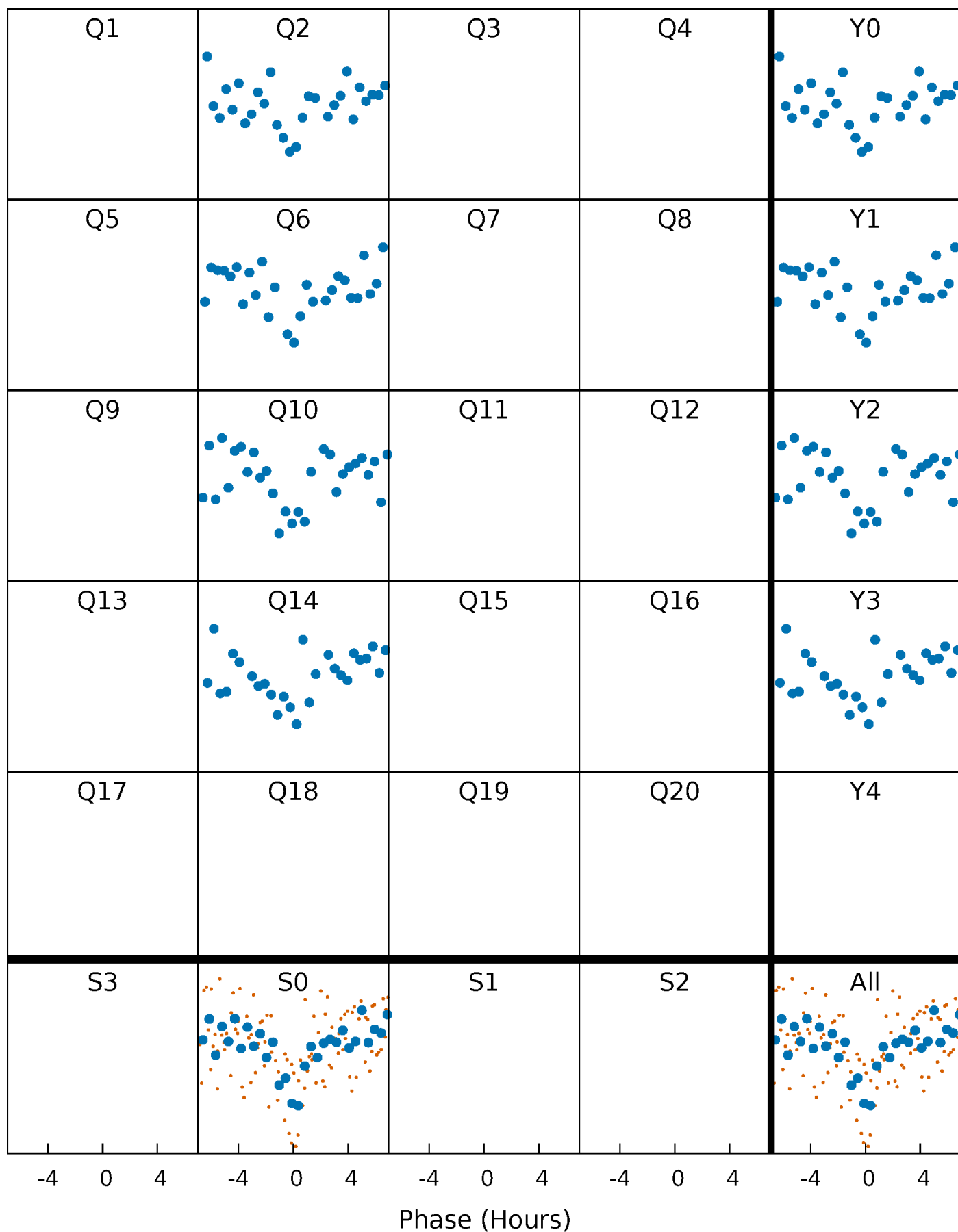


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

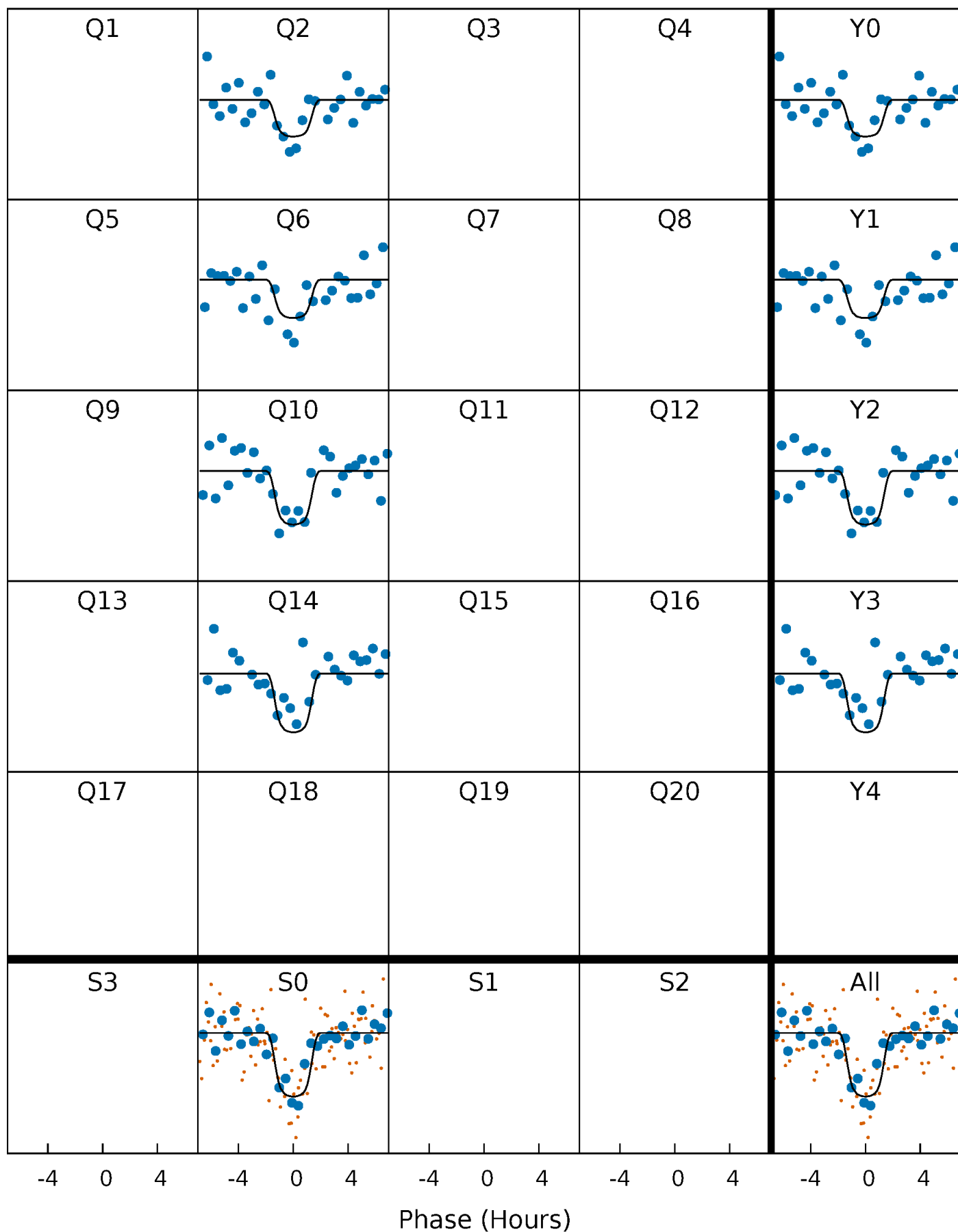
TCE 004833135-03 P=372.081681 Days  $T_0=238.143115$  (BKJD)





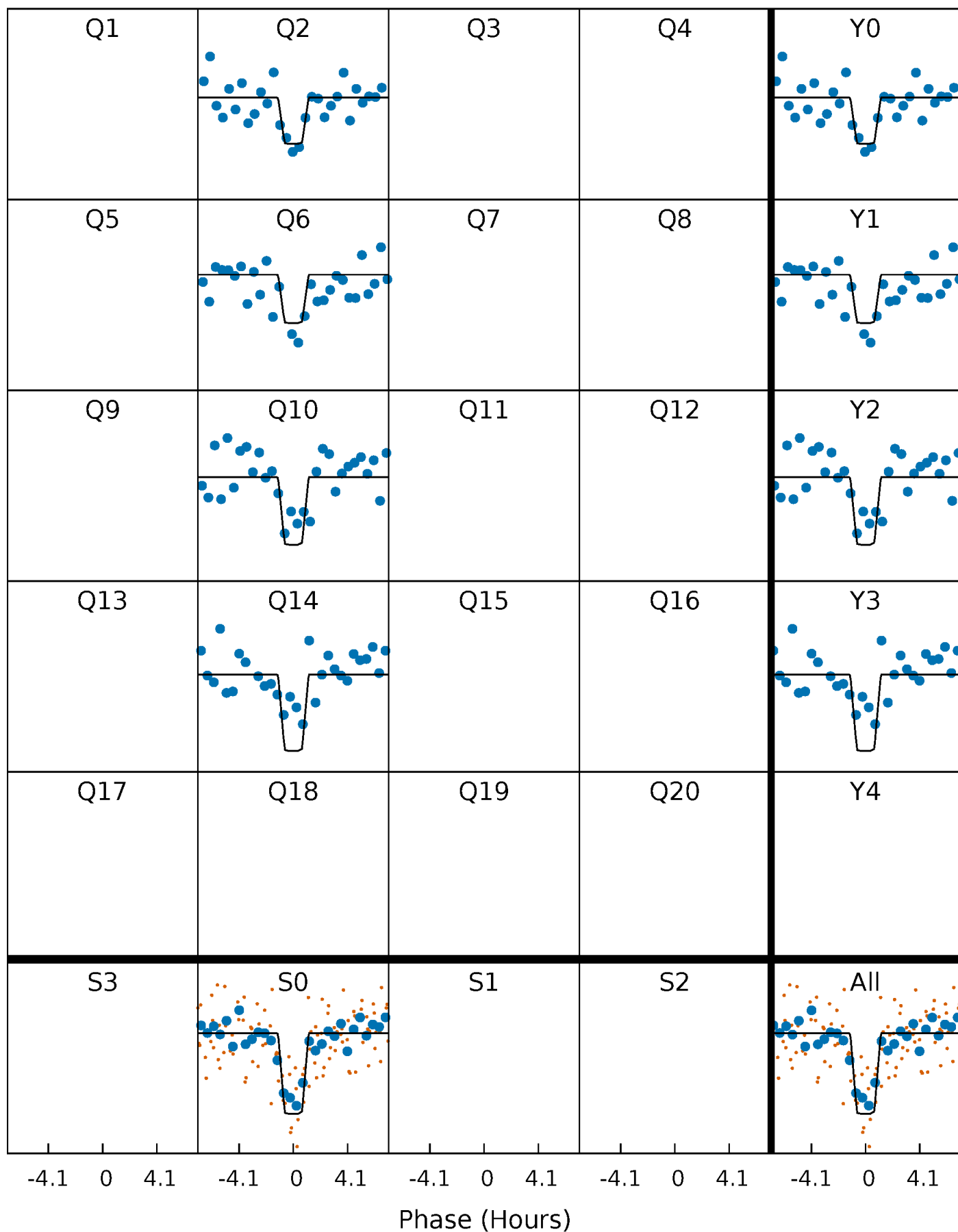
# DV Quarter-Phased Transit Curves

TCE 004833135-03 P=372.081681 Days  $T_0=238.143115$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

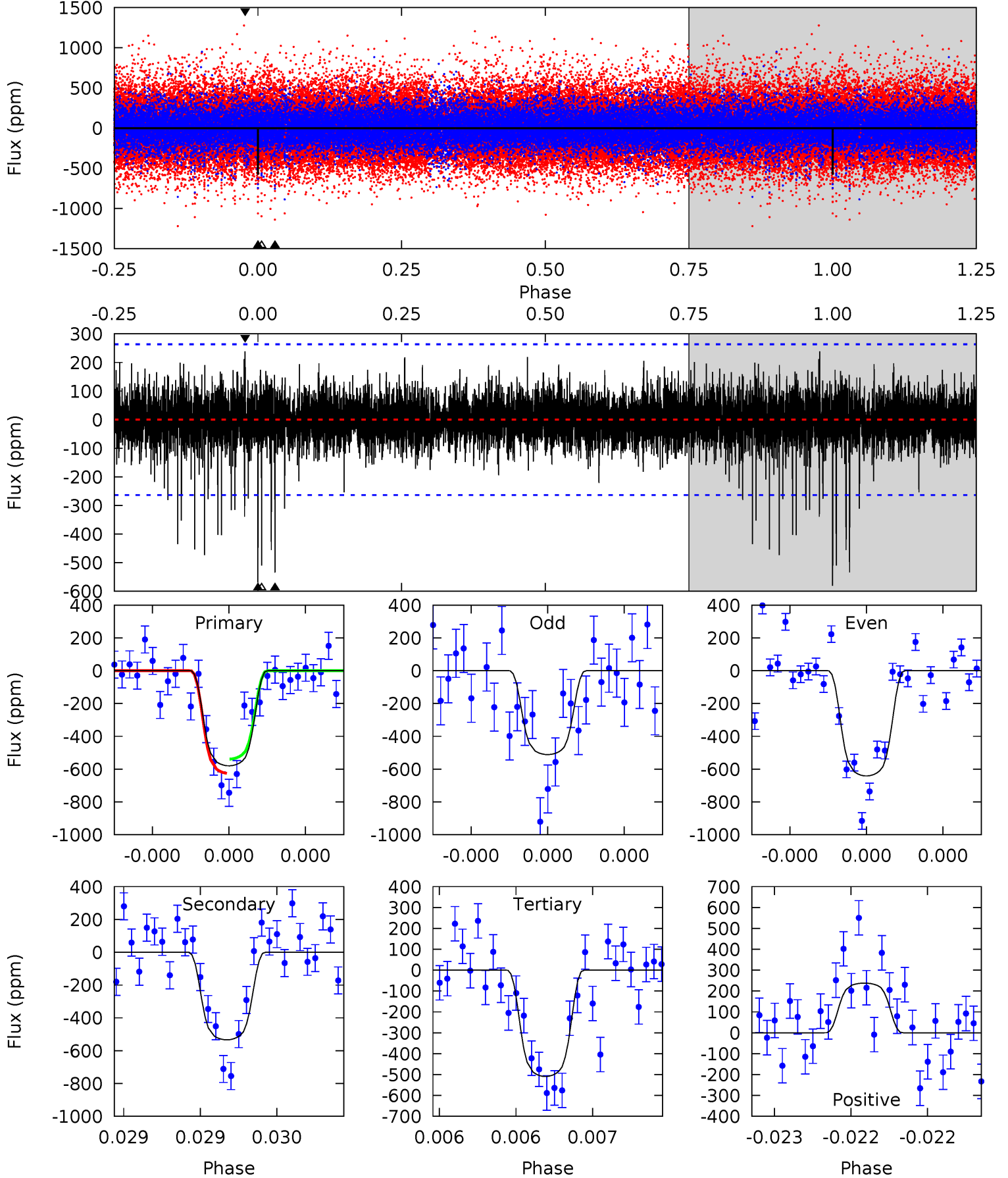
TCE 004833135-03 P=372.078189 Days  $T_0=238.142434$  (BKJD)



# DV Model-Shift Uniqueness Test

004833135-03, P = 372.081681 Days, E = 238.143115 Days

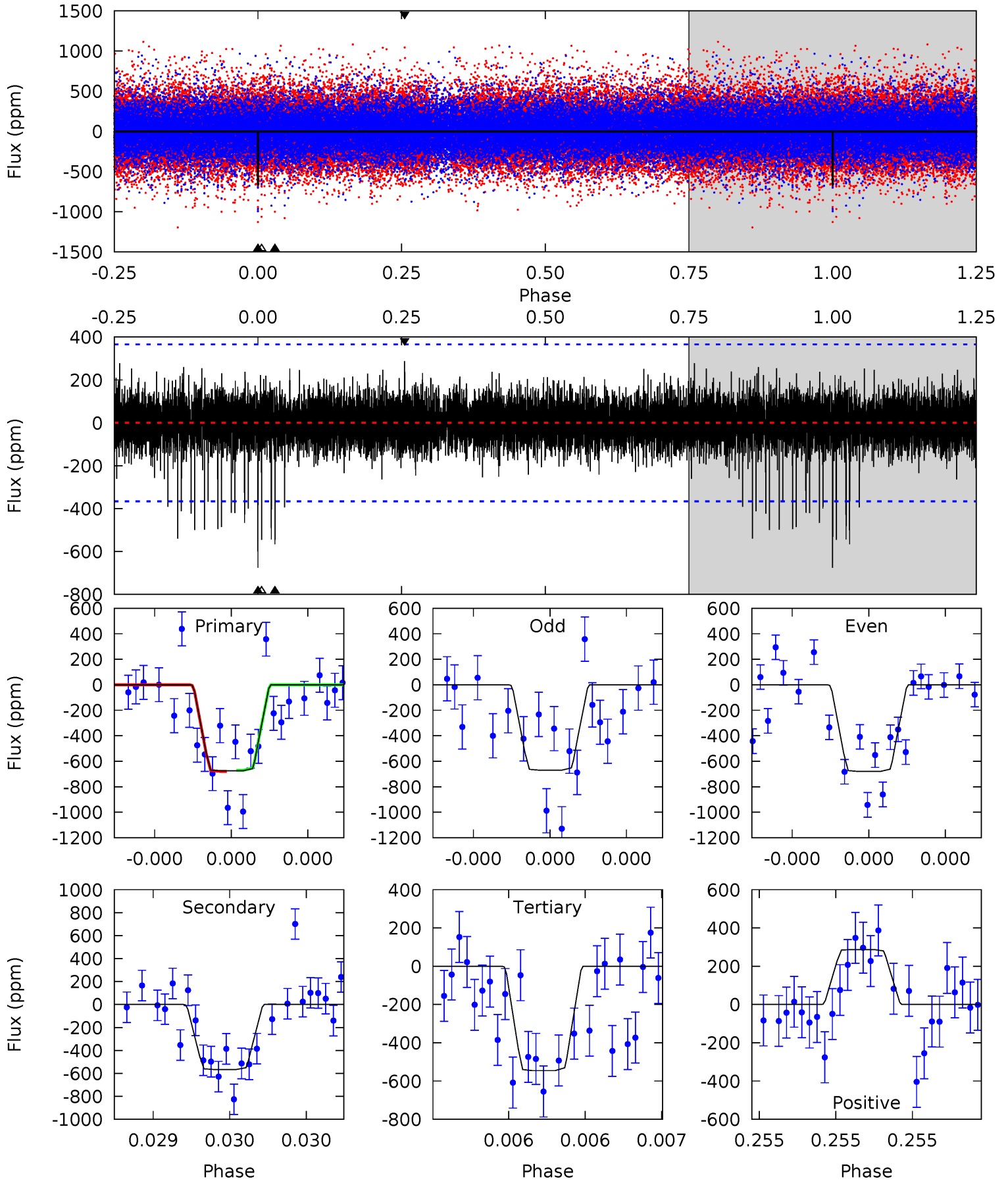
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.3	11.3	10.8	5.05	5.60	3.52	1.35	1.50	7.26	0.52	6.28	1.41	0.92	0.29	0.92



# Alt Model-Shift Uniqueness Test

004833135-03, P = 372.078189 Days, E = 238.142434 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
10.5	8.80	8.48	4.47	5.69	3.65	1.16	2.02	6.03	0.32	4.33	0.08	1.02	0.30	0.06



### Stellar Parameters For KIC 004833135

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6250^{+169}_{-206}$	$4.472^{+0.050}_{-0.200}$	$-0.260^{+0.300}_{-0.300}$	$0.986^{+0.305}_{-0.102}$	$1.052^{+0.147}_{-0.134}$	$1.544^{+0.404}_{-0.769}$
	+3%/-3%	+1%/-4%	+115%/-115%	+31%/-10%	+14%/-13%	+26%/-50%
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 004833135-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-534 \pm 47$	$3.23^{+0.65}_{-0.49}$	$385^{+27}_{-18}$	$5616^{+407}_{-351}$	$29478^{+10191}_{-8925}$
Alt.	$-566 \pm 64$	$3.17^{+0.66}_{-0.51}$	$385^{+28}_{-19}$	$5728^{+440}_{-379}$	$31399^{+13487}_{-9100}$

$T_{max}$  = 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

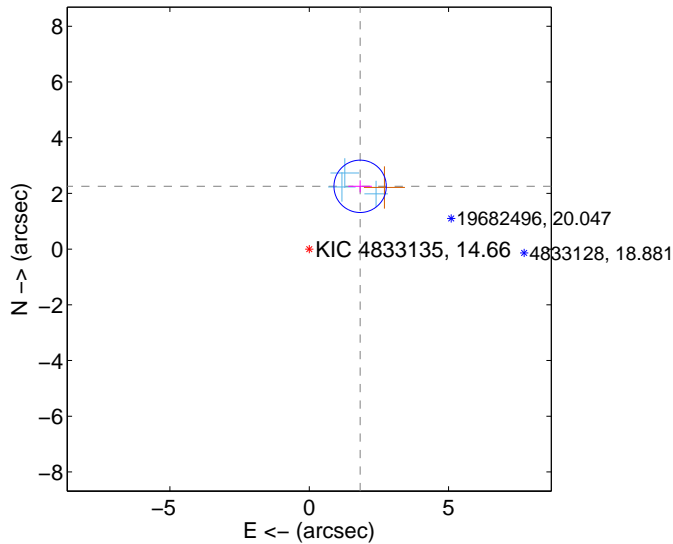
Supplemental centroid analysis for 004833135-03. Kepler magnitude: 14.66. Transit SNR 9.46

There are 3 quarters with good PRF difference image offsets

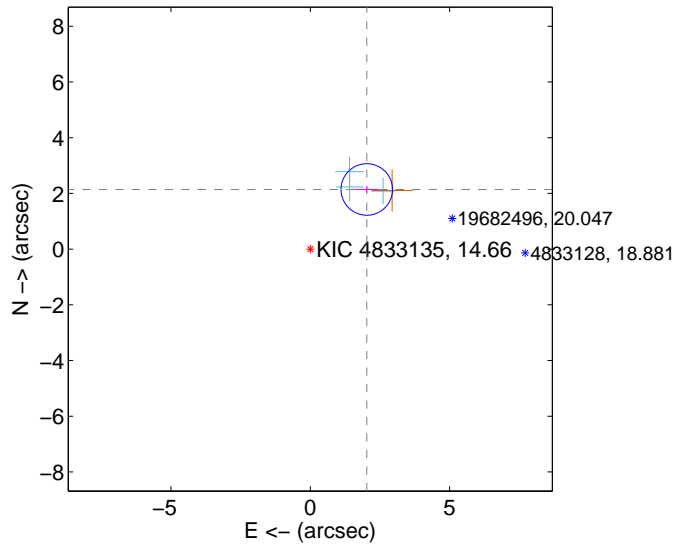
The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.901 \pm 0.313$	9.26	$-1.827 \pm 0.421$	$2.253 \pm 0.215$
PRF-fit source offset from KIC position	$2.948 \pm 0.308$	9.56	$-2.028 \pm 0.433$	$2.140 \pm 0.111$
photometric centroid source offset	$3.00 \pm 1.41$	2.12	$-1.98 \pm 1.50$	$2.25 \pm 1.35$

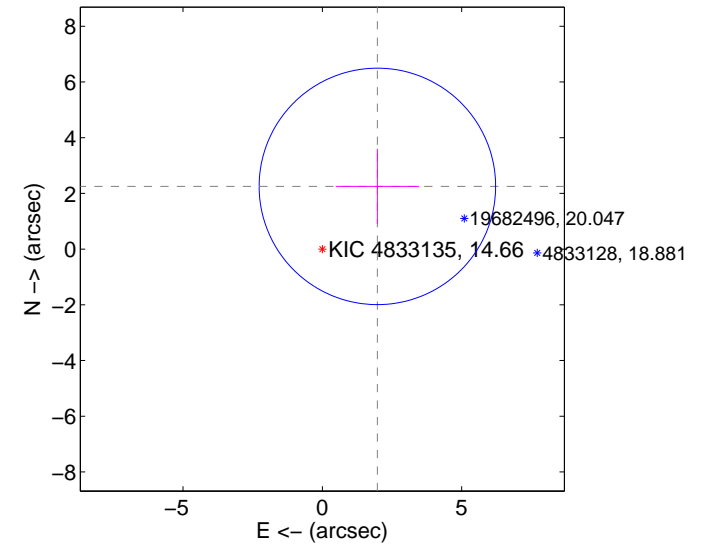
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

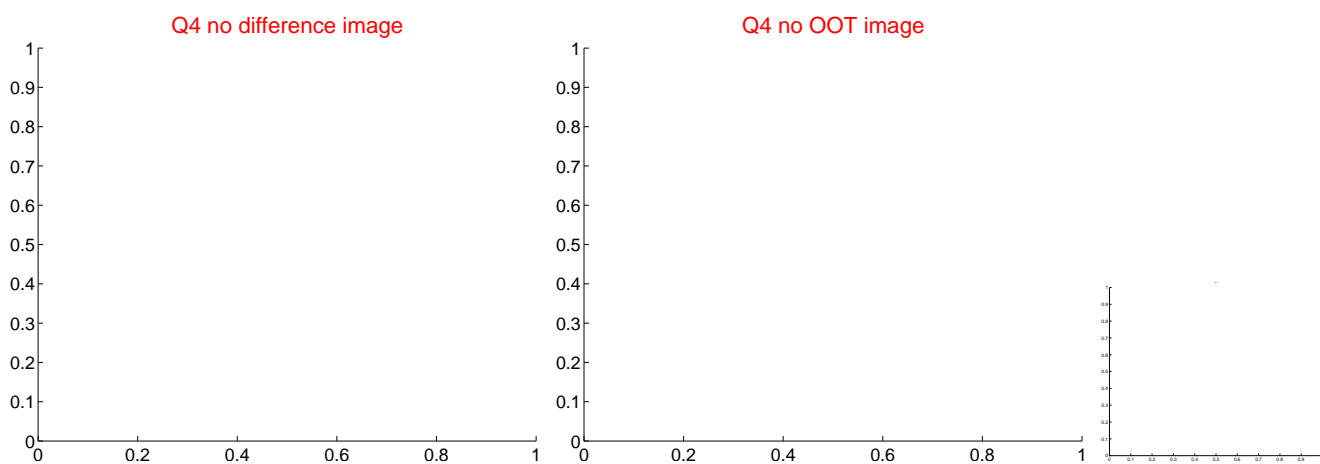
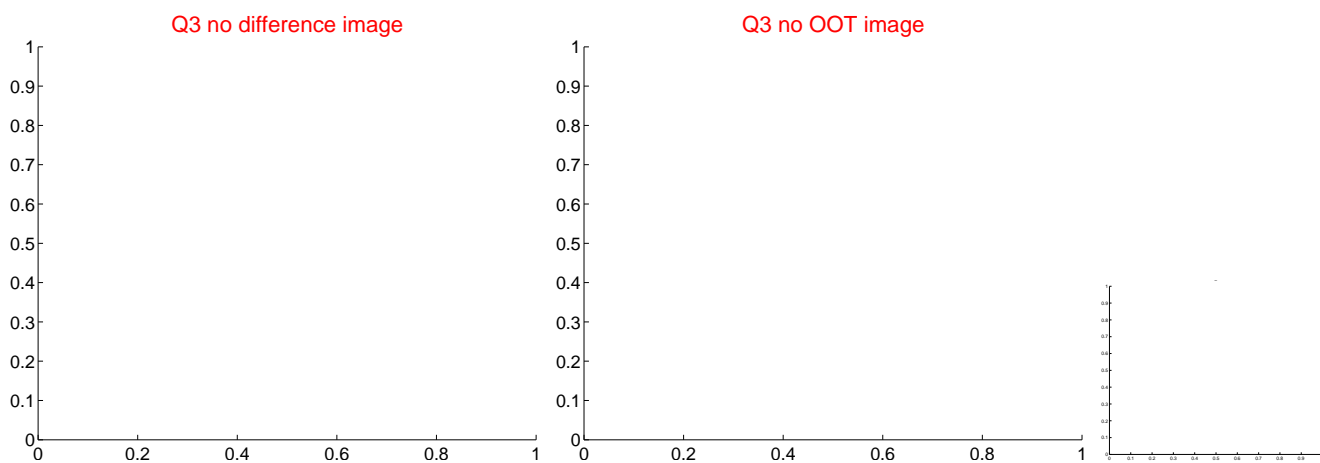
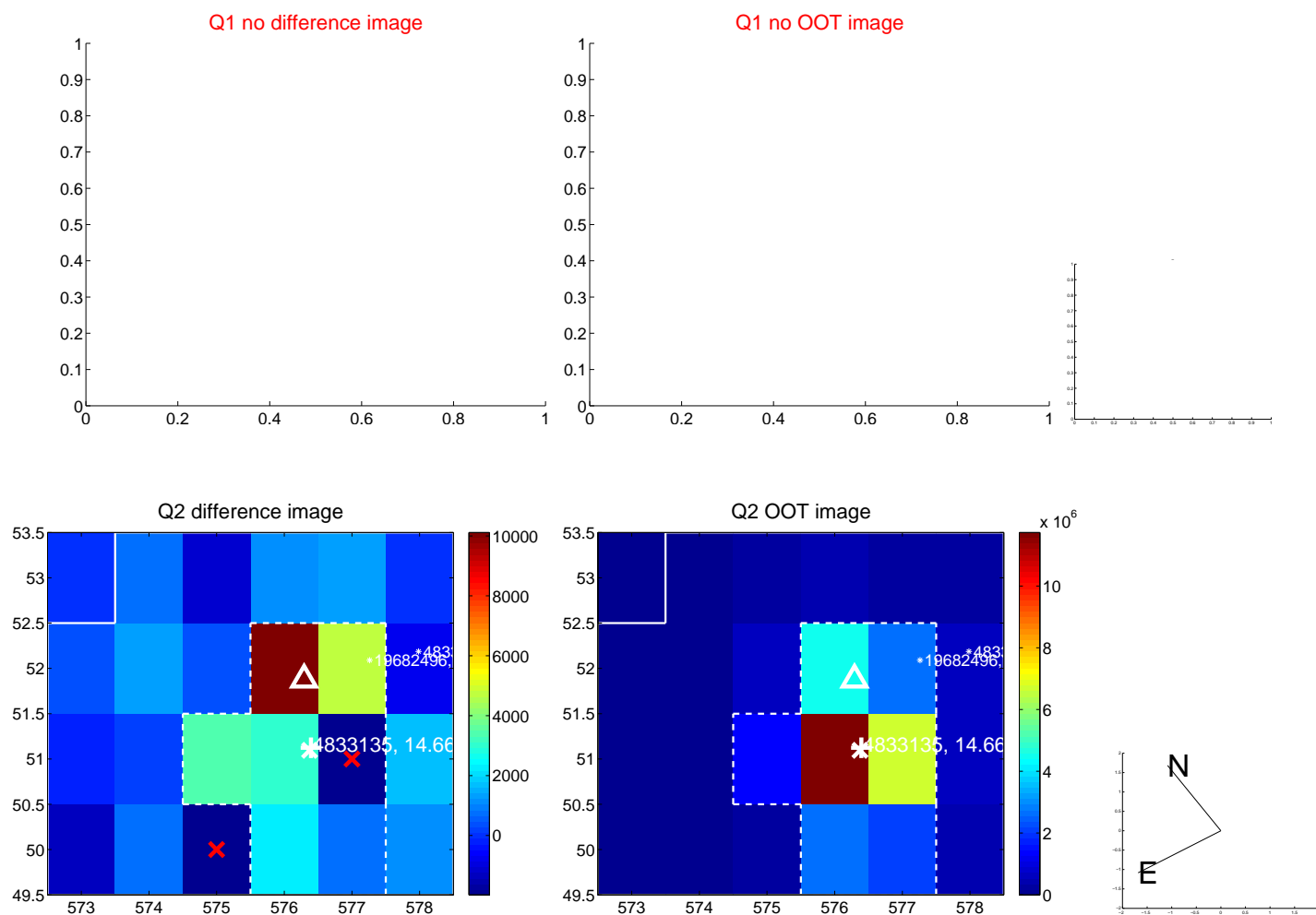


offset from photometric centroids



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.

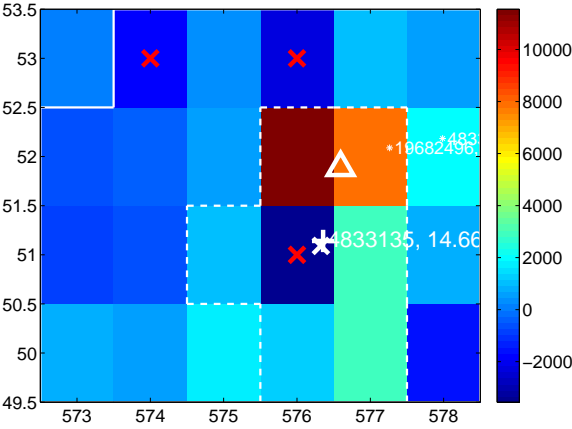
Q5 no difference image



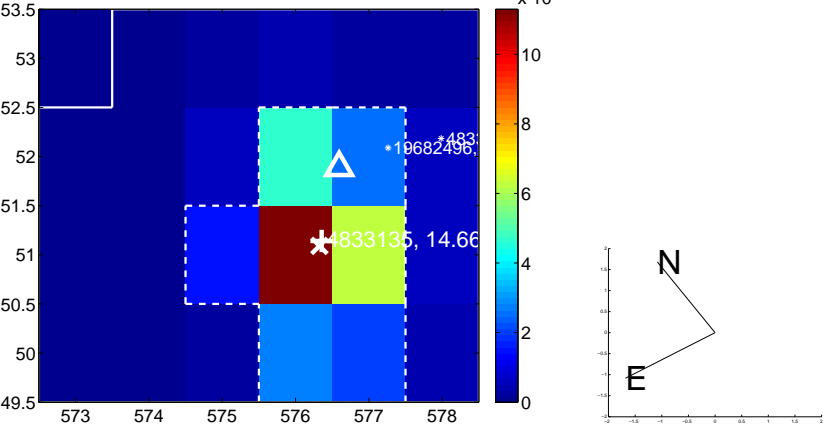
Q5 no OOT image



Q6 difference image



Q6 OOT image



Q7 no difference image



Q7 no OOT image



Q8 no difference image



Q8 no OOT image



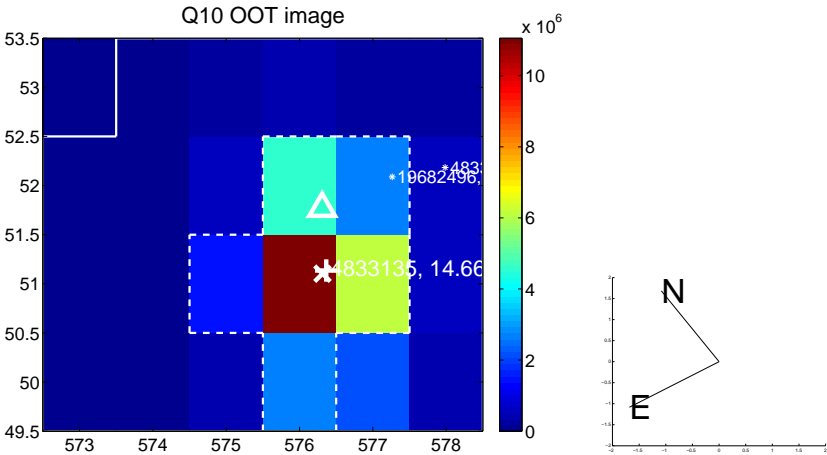
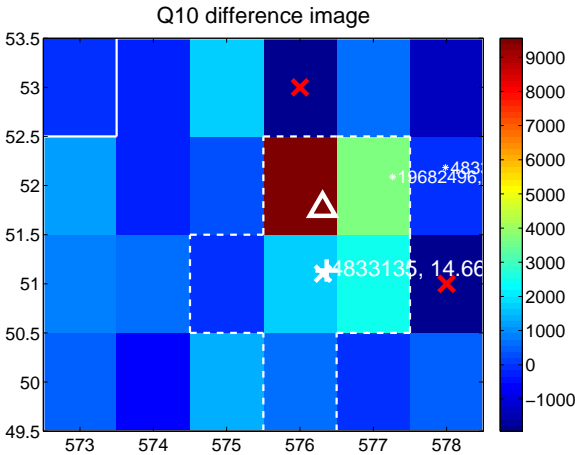


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

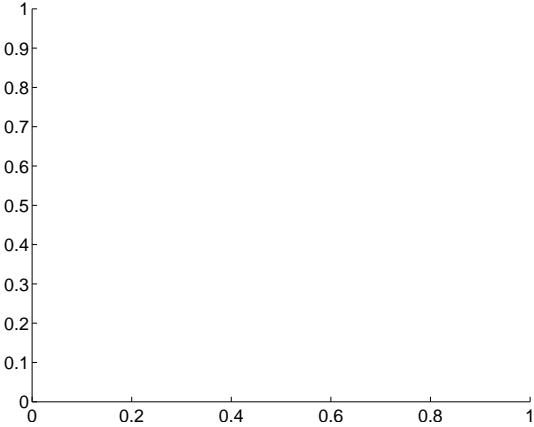
Q9 no difference image



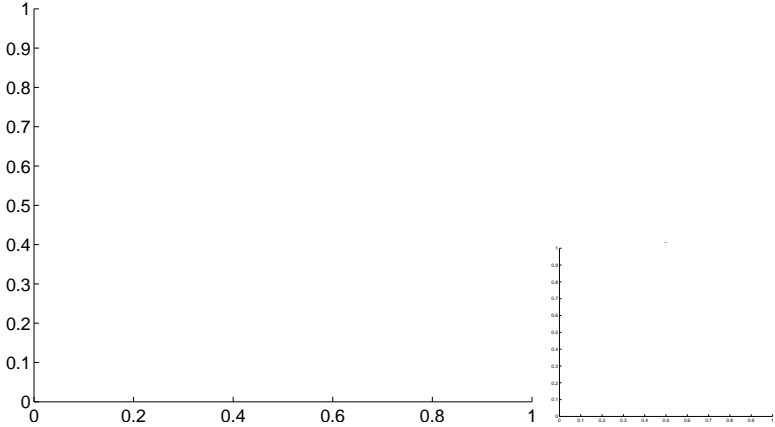
Q9 no OOT image



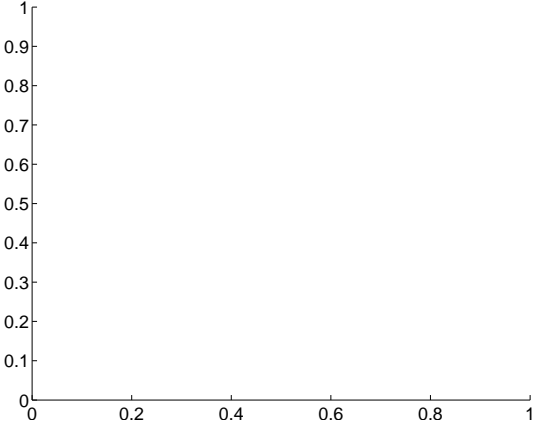
Q11 no difference image



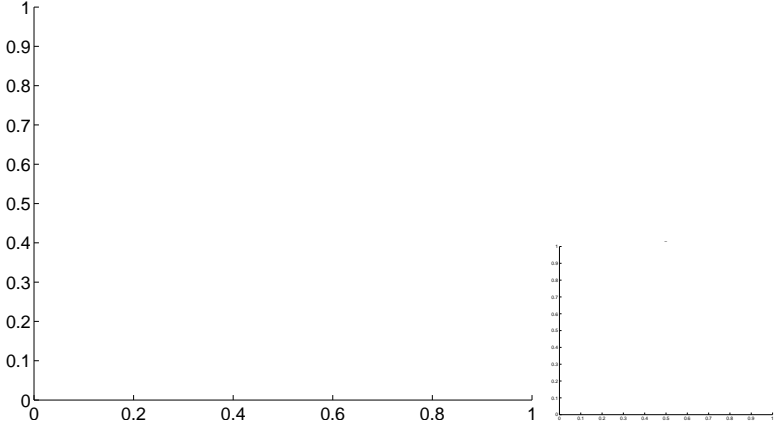
Q11 no OOT image



Q12 no difference image



Q12 no OOT image



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

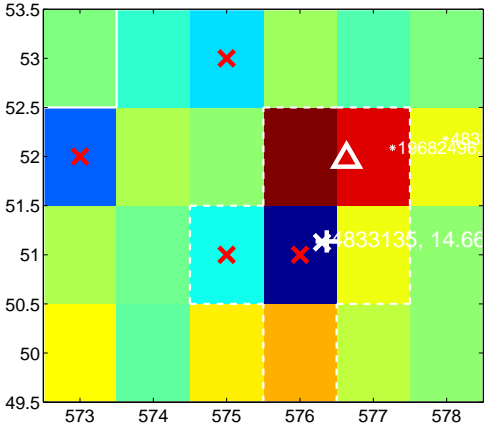
Q13 no difference image



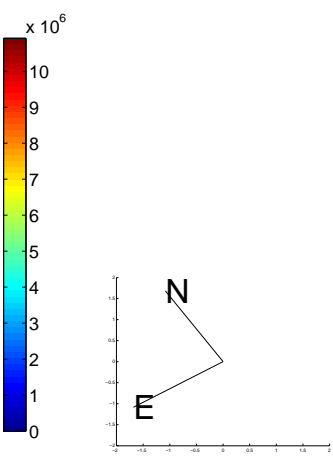
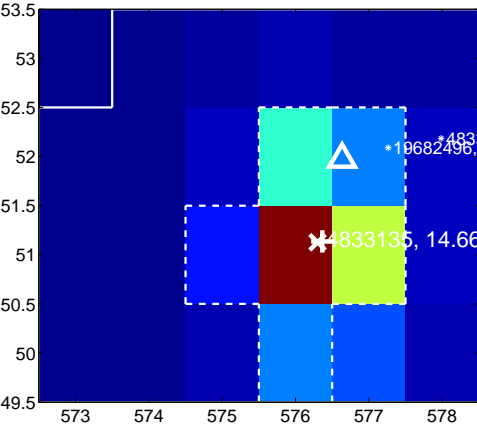
Q13 no OOT image



Q14 difference image. Poor Quality



Q14 OOT image



Q15 no difference image



Q15 no OOT image



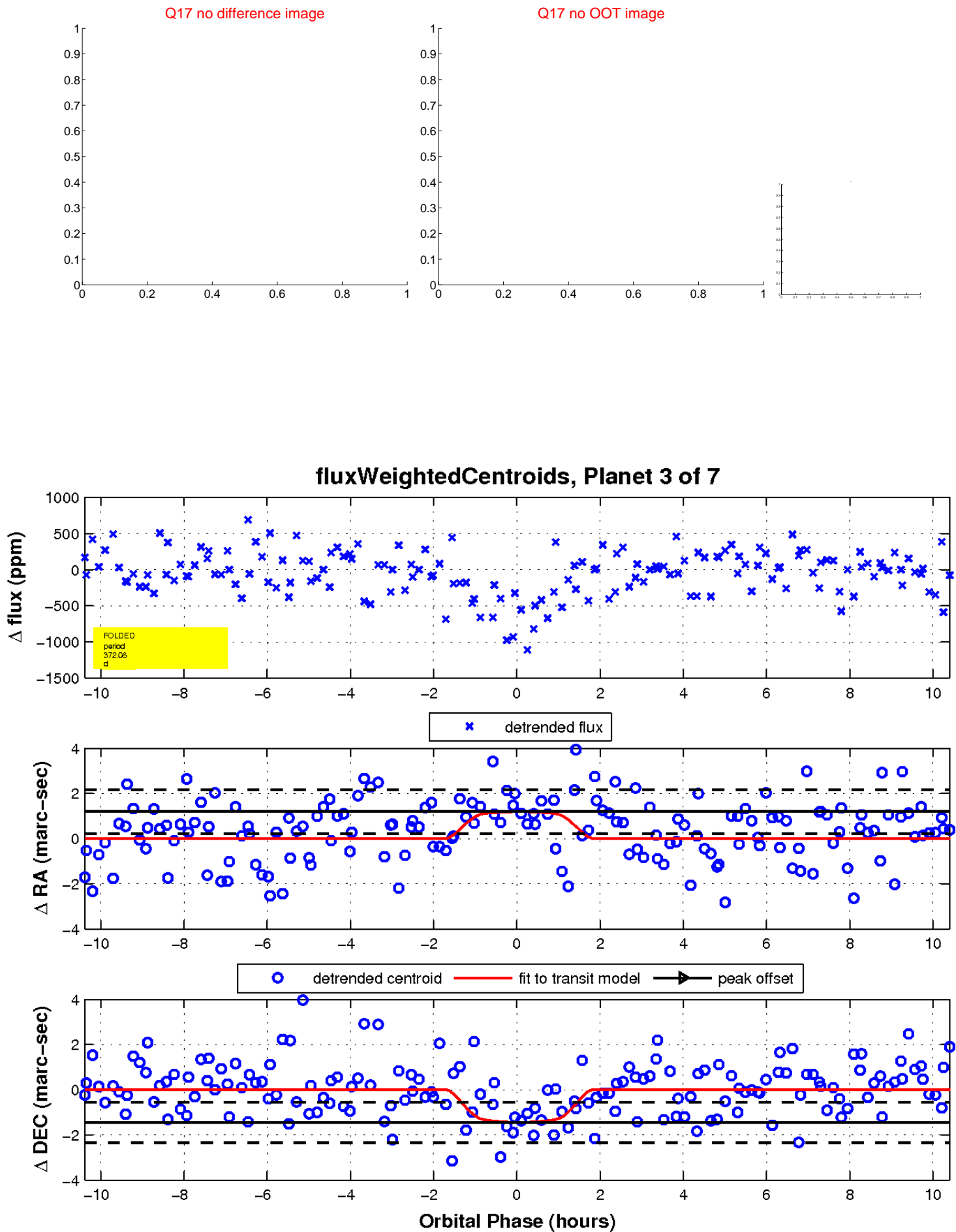
Q16 no difference image



Q16 no OOT image

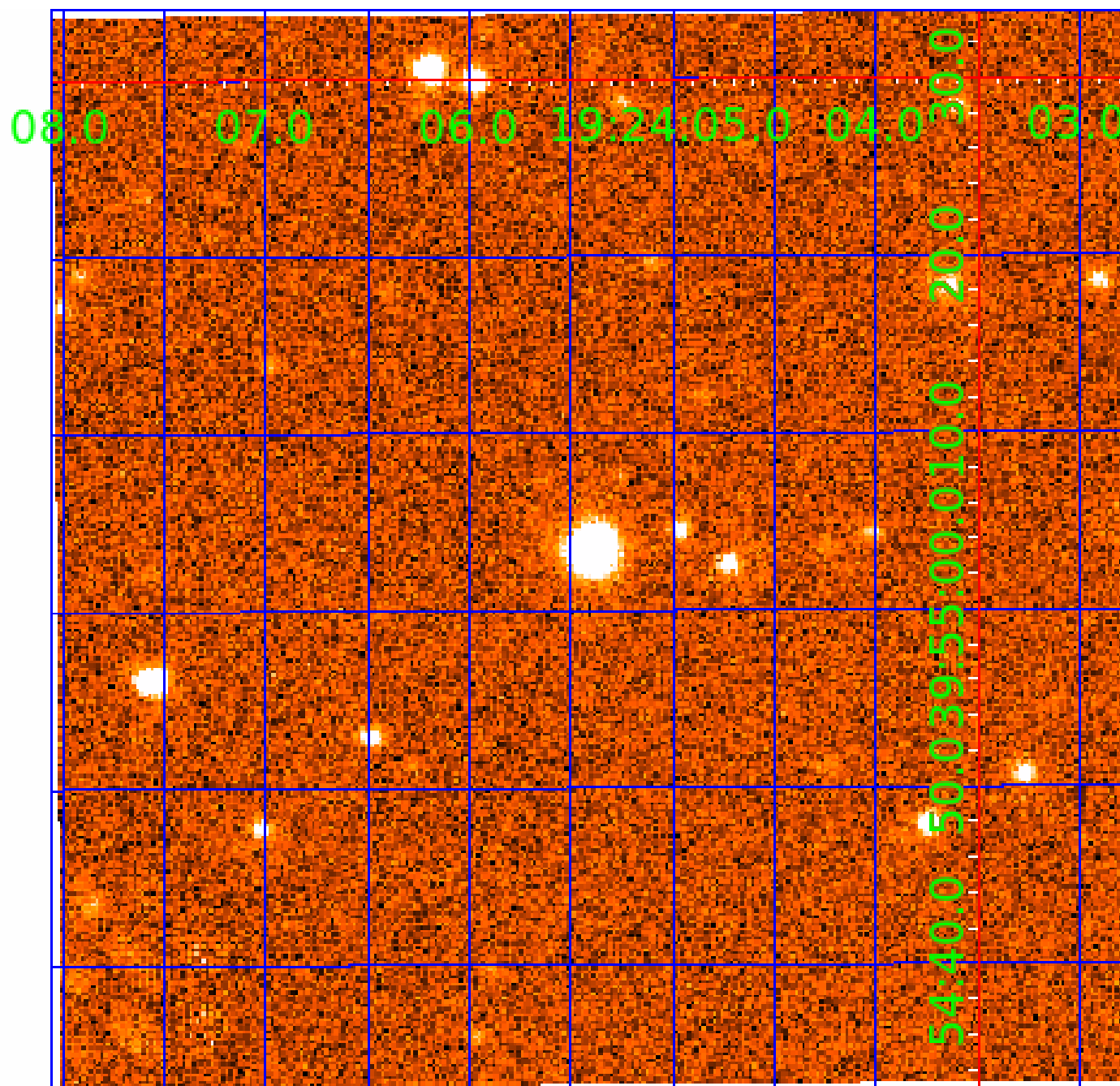


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination



# KIC 004833135

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004833135-01	OBS	No	380.738920	205.878855	660.0	2.780	8.9	9.8	0.99	6250	2.81	1.22
004833135-02	OBS	No	376.862383	196.213724	334.9	25.456	8.8	9.7	0.99	6250	2.07	1.23
004833135-03	OBS	No	372.081681	238.143115	645.9	3.479	8.1	9.5	0.99	6250	3.10	1.25
004833135-04	OBS	No	372.089452	249.136373	595.1	2.721	8.2	9.0	0.99	6250	2.64	1.25
004833135-05	OBS	No	372.070946	246.814275	476.3	3.988	7.9	8.1	0.99	6250	2.35	1.25
004833135-06	OBS	No	372.079096	240.518256	380.2	5.662	8.1	7.3	0.99	6250	2.11	1.25
004833135-07	OBS	No	372.098902	186.196312	542.8	3.022	7.3	7.9	0.99	6250	2.54	1.25

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004833135-01	OBS	FP	0.00	1	0	0	1	ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_FEW_DIFFS—EPHEM_MATCH
004833135-02	OBS	FP	0.00	1	0	0	1	INDIV_TRANS_MARSHALL—CENT_FEW_DIFFS—EPHEM_MATCH
004833135-03	OBS	FP	0.00	1	0	1	1	INDIV_TRANS_MARSHALL—ALL_TRANS_CHASES—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_UNRESOLVED_OFFSET—EPHEM_MATCH
004833135-04	OBS	FP	0.00	1	0	1	0	ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_UNRESOLVED_OFFSET
004833135-05	OBS	FP	0.00	1	0	0	0	MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_FEW_DIFFS
004833135-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_FEW_MEAS
004833135-07	OBS	FP	0.00	1	0	0	0	MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_UNCERTAIN

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

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

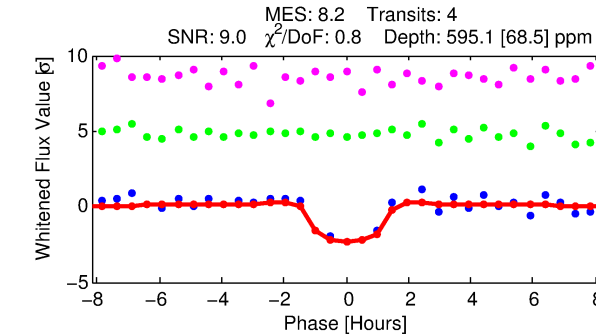
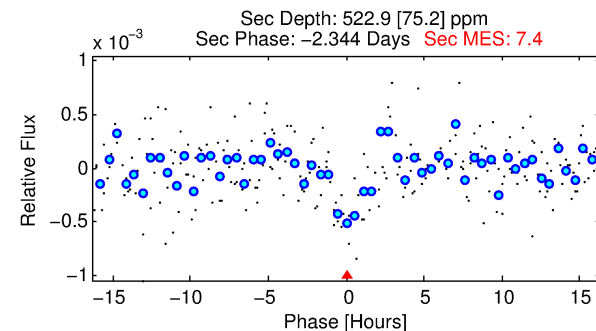
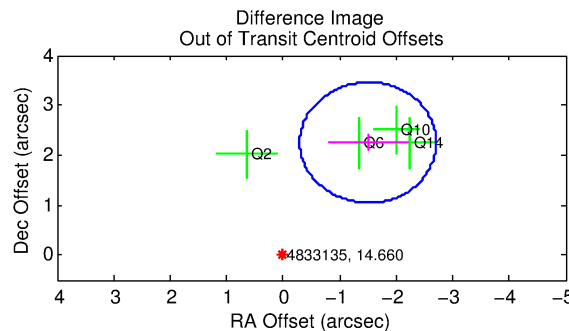
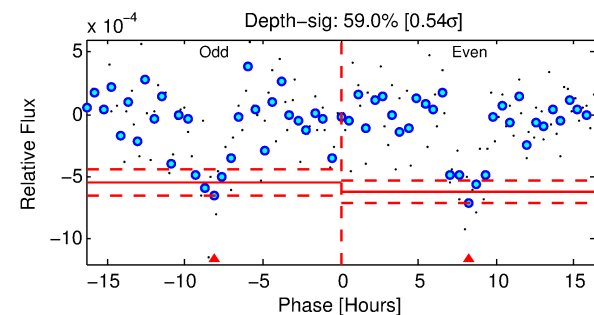
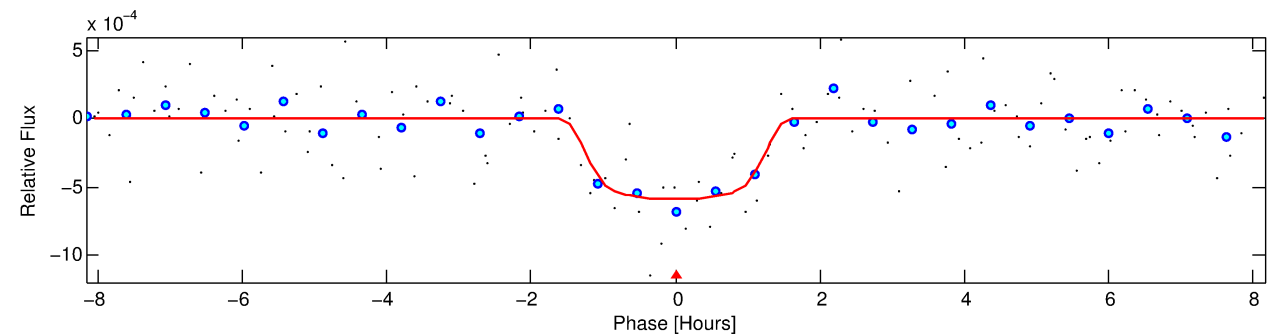
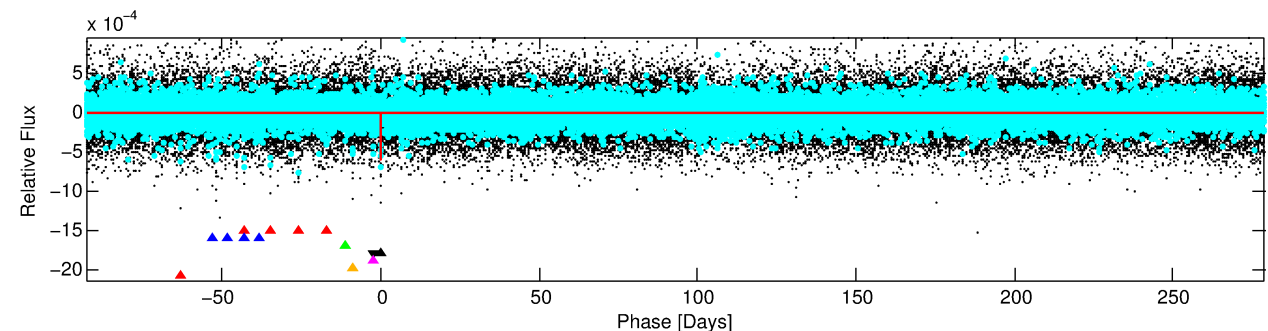
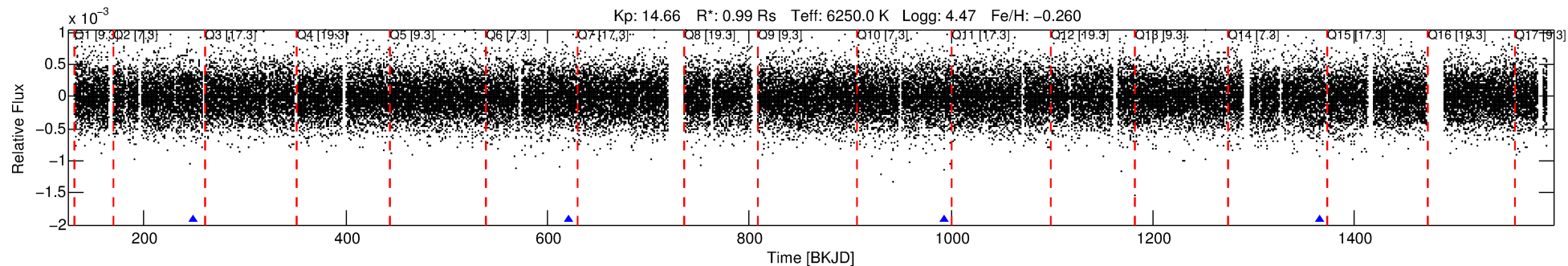
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 004833135-04

No Significant Match Found

# DV One-Page Summary

KIC: 4833135 Candidate: 4 of 7 Period: 372.089 d  
KOI: K00498 Corr: No Ephemeris Match



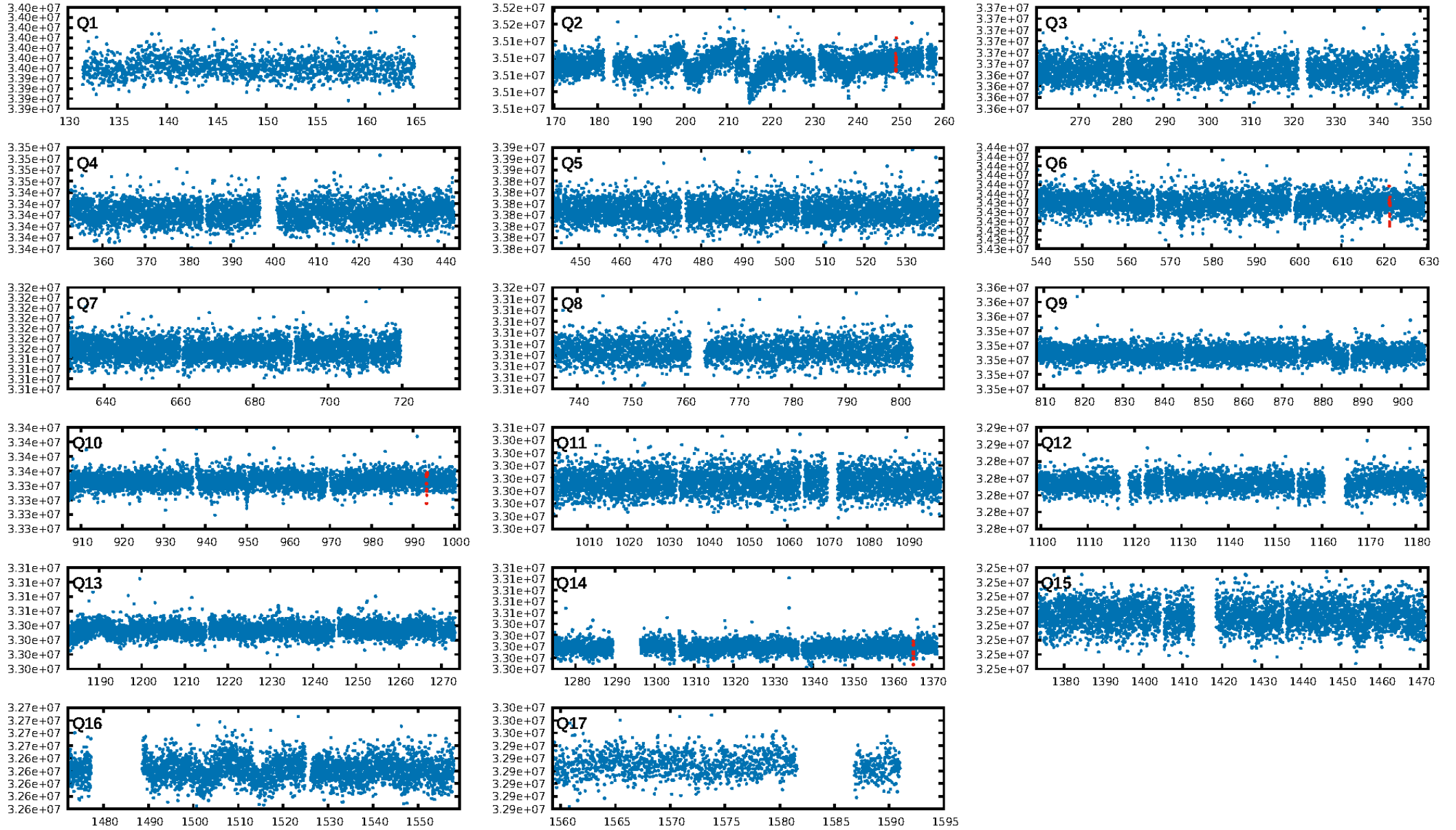
## DV Fit Results:

Period = 372.08945 [0.00301] d  
Epoch = 249.1364 [0.0058] BKJD  
Rp/R\* = 0.0246 [0.0228]  
a/R\* = 689.73 [3303.45]  
b = 0.78 [2.41]  
Seff = 1.25 [0.49]  
Teq = 270 [26] K  
Rp = 2.64 [2.59] Re  
a = 1.0297 [0.2647] AU  
Ag = 43635.86 [82800.58] [0.53 $\sigma$ ]  
Teff = 6029 [2812] K [2.05 $\sigma$ ]

## DV Diagnostic Results:

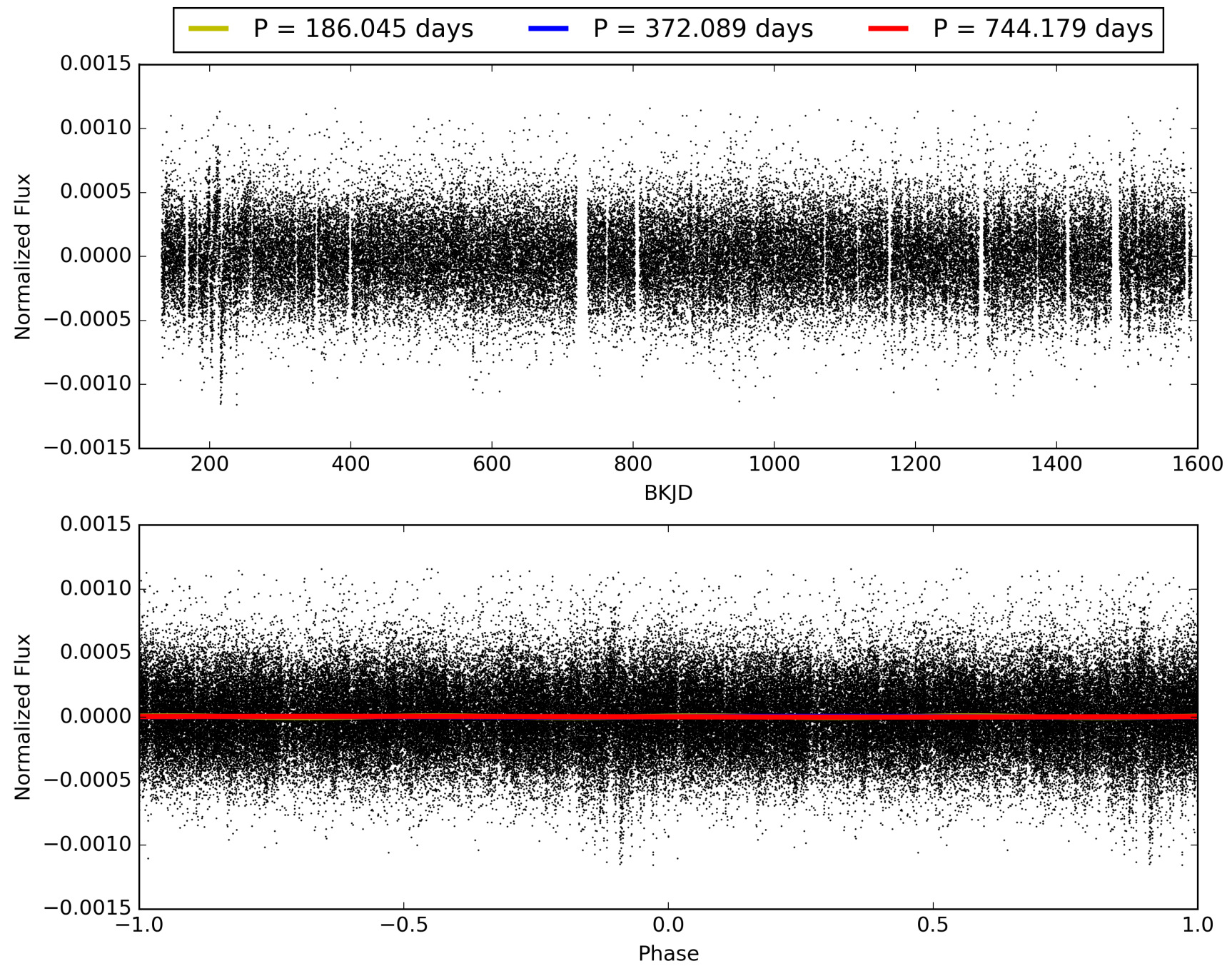
ShortPeriod-sig: 3.4% [0.04 $\sigma$ ]  
LongPeriod-sig: 4.4% [0.06 $\sigma$ ]  
ModelChiSquare2-sig: 30.2%  
ModelChiSquareGof-sig: 98.5%  
Bootstrap-pfa: 4.42e-13  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 1.765  
Centroid-sig: 0.3%  
Centroid-so: 3.355 arcsec [2.11 $\sigma$ ]  
OotOffset-rm: 2.706 arcsec [6.72 $\sigma$ ]  
KicOffset-rm: 2.837 arcsec [5.65 $\sigma$ ]  
OotOffset-st: 4/0/0/0 [4]  
KicOffset-st: 4/0/0/0 [4]  
DiffImageQuality-fgm: 0.75 [3/4]  
DiffImageOverlap-fno: 1.00 [4/4]

# TCE 004833135-04, PDC Light Curves





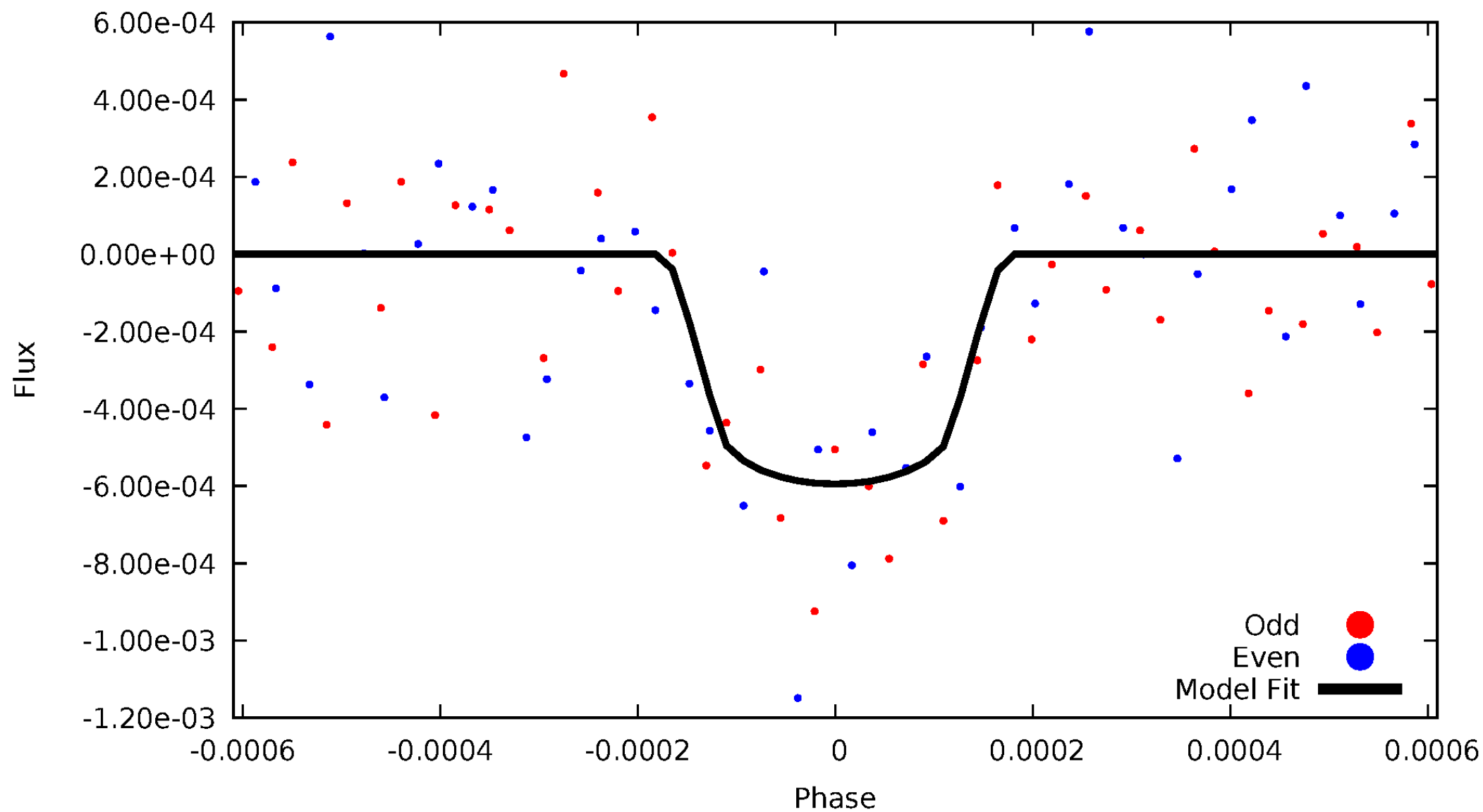
TCE 004833135-04





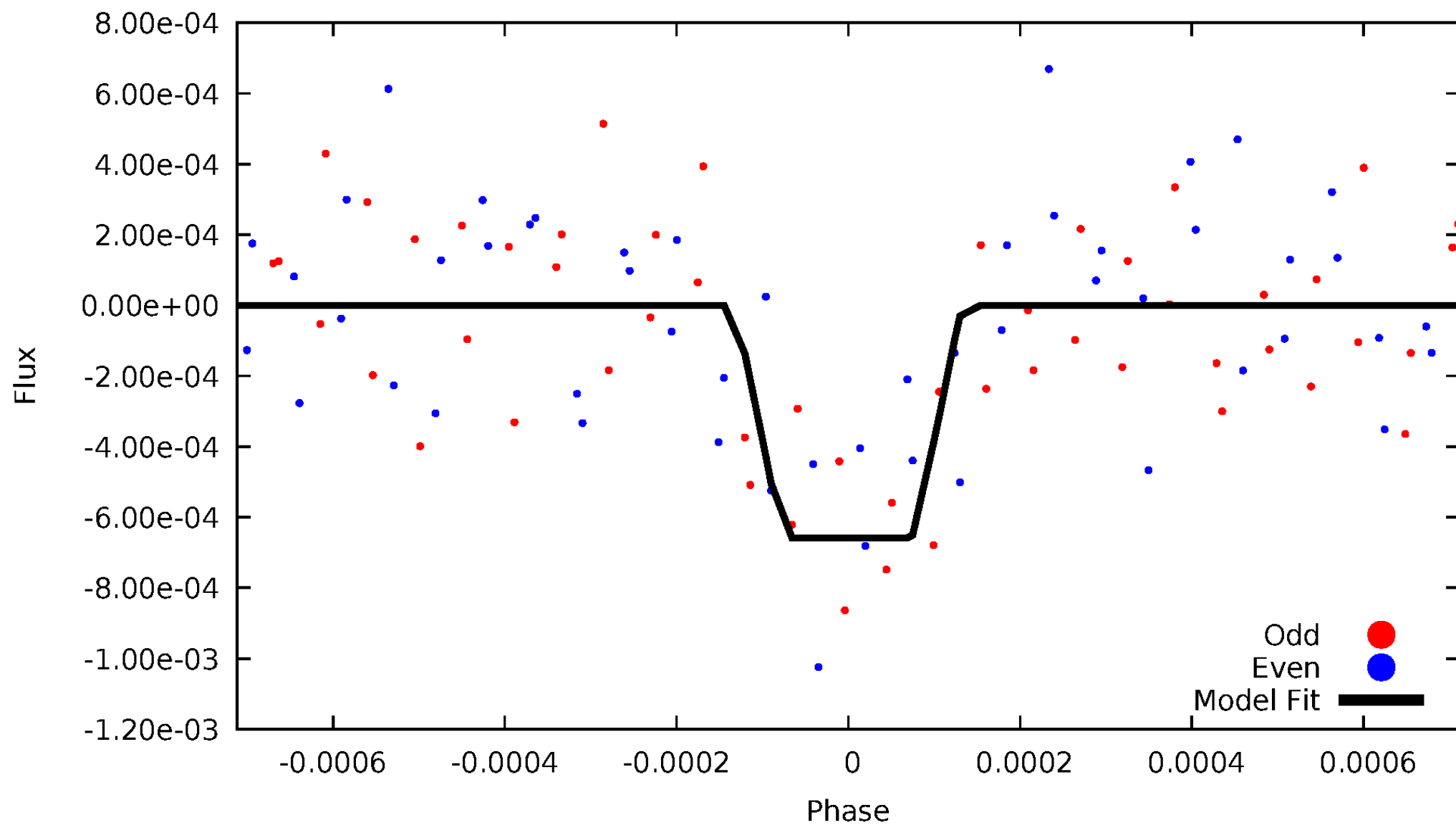
# DV Odd/Even

TCE 004833135-04



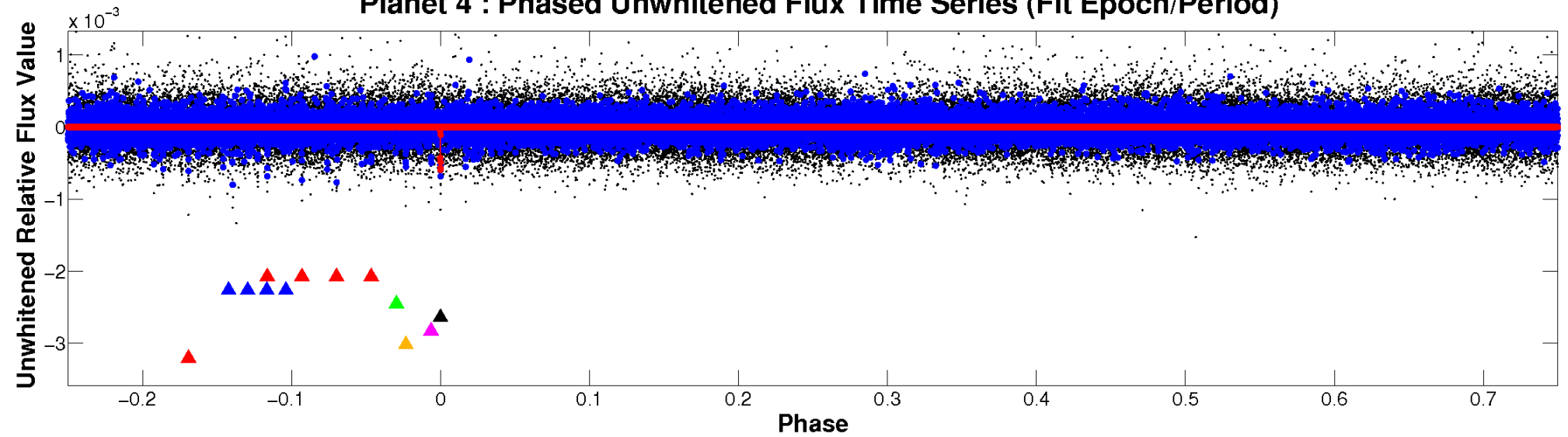
# ALT Odd/Even

TCE 004833135-04

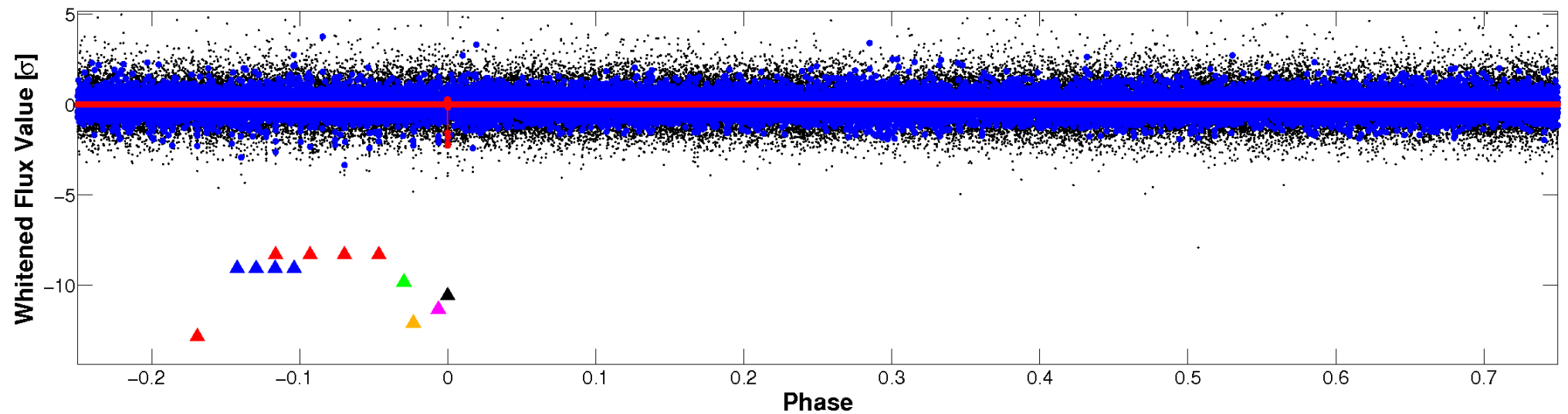


# Non-Whitened Vs. Whitened Light Curve

## Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

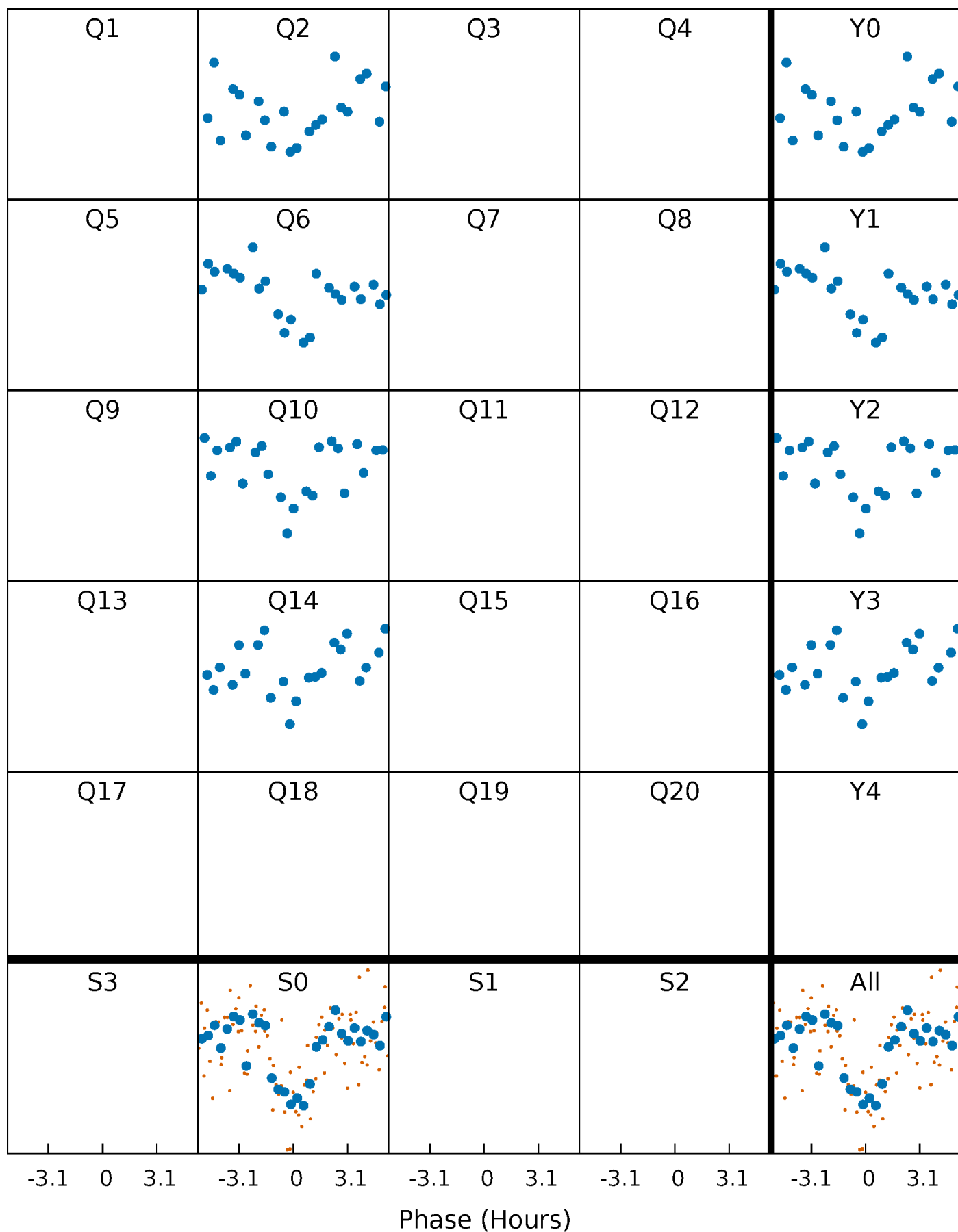


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



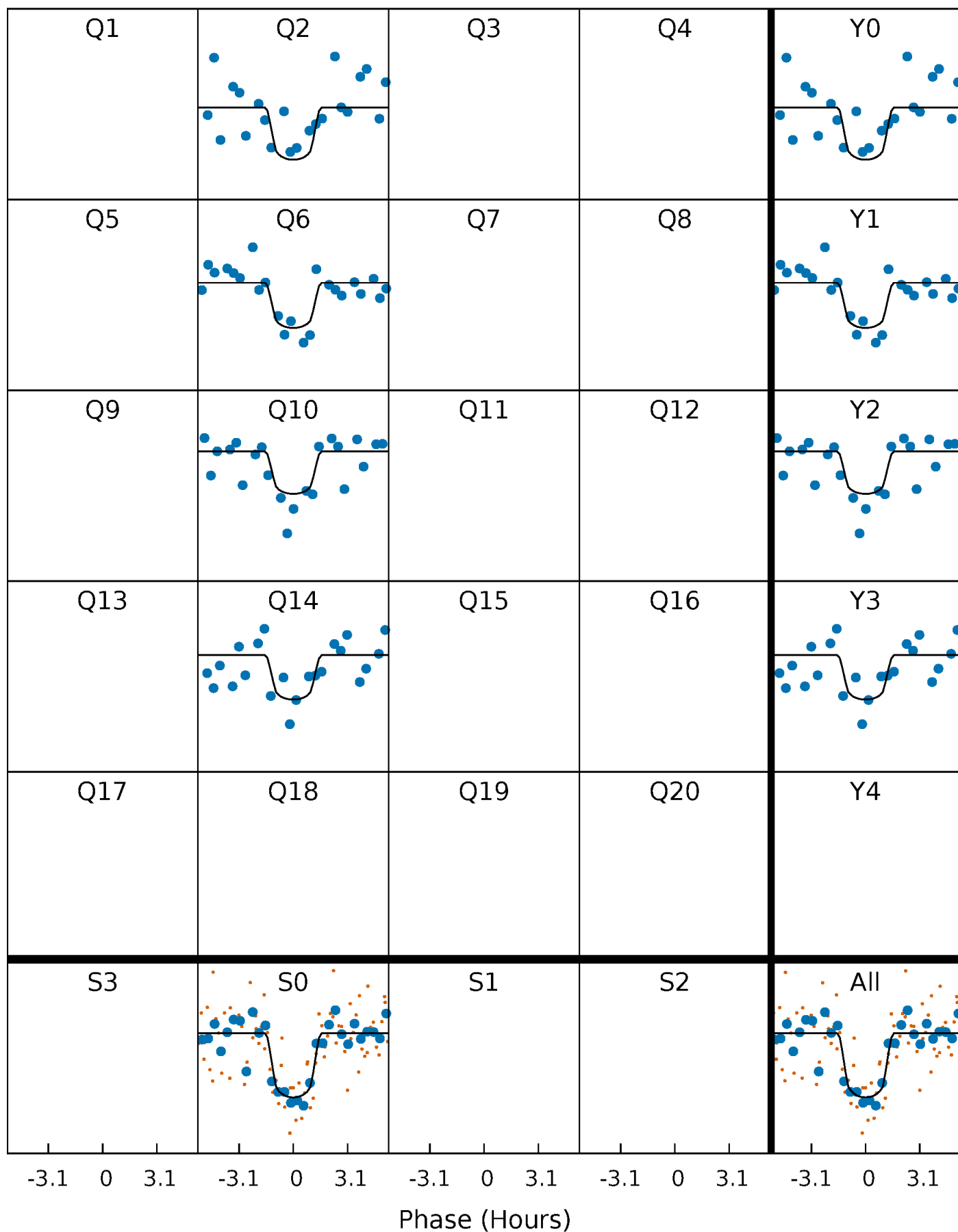
# PDC Quarter-Phased Transit Curves

TCE 004833135-04 P=372.089452 Days  $T_0=249.136373$  (BKJD)



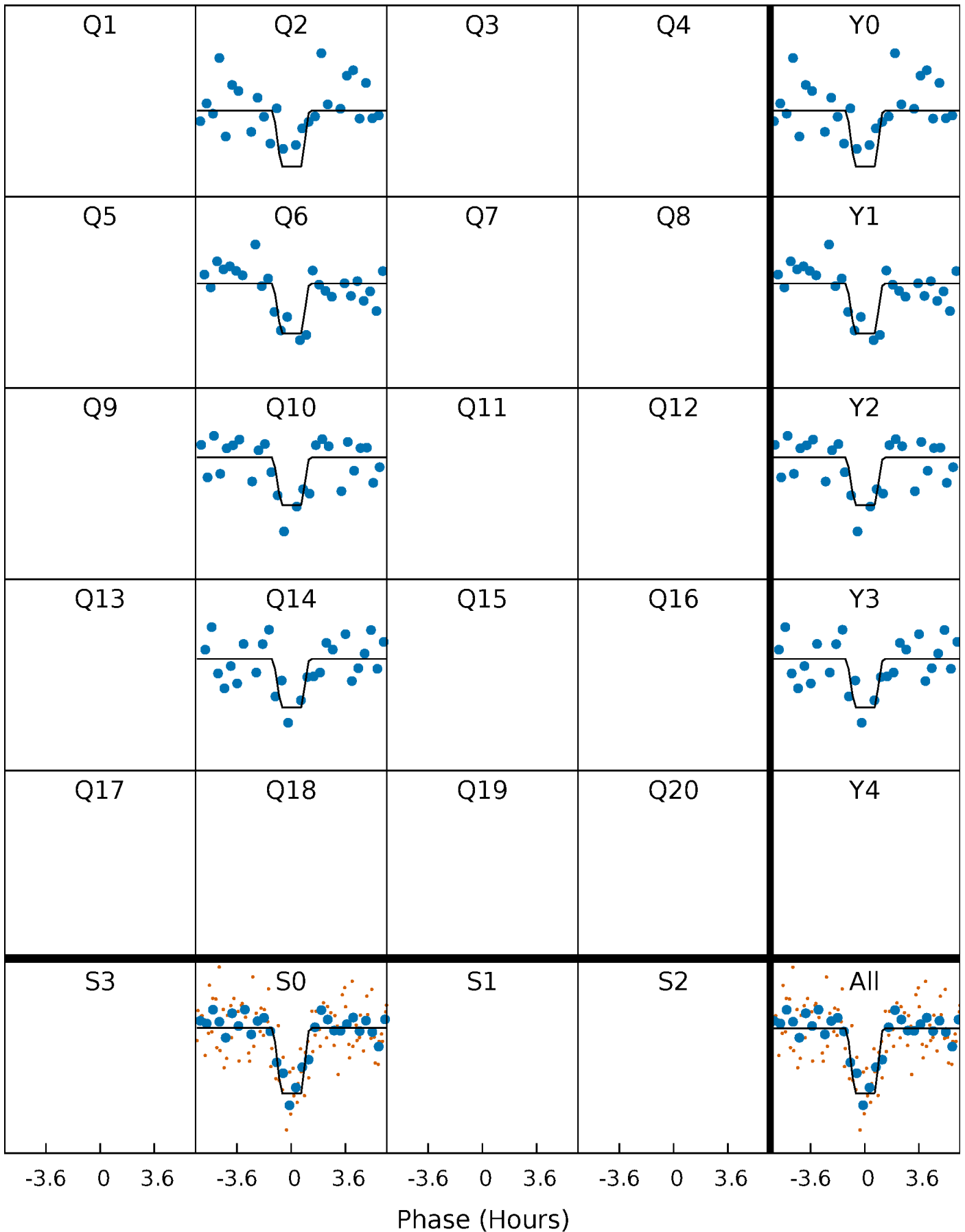
# DV Quarter-Phased Transit Curves

TCE 004833135-04 P=372.089452 Days  $T_0=249.136373$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

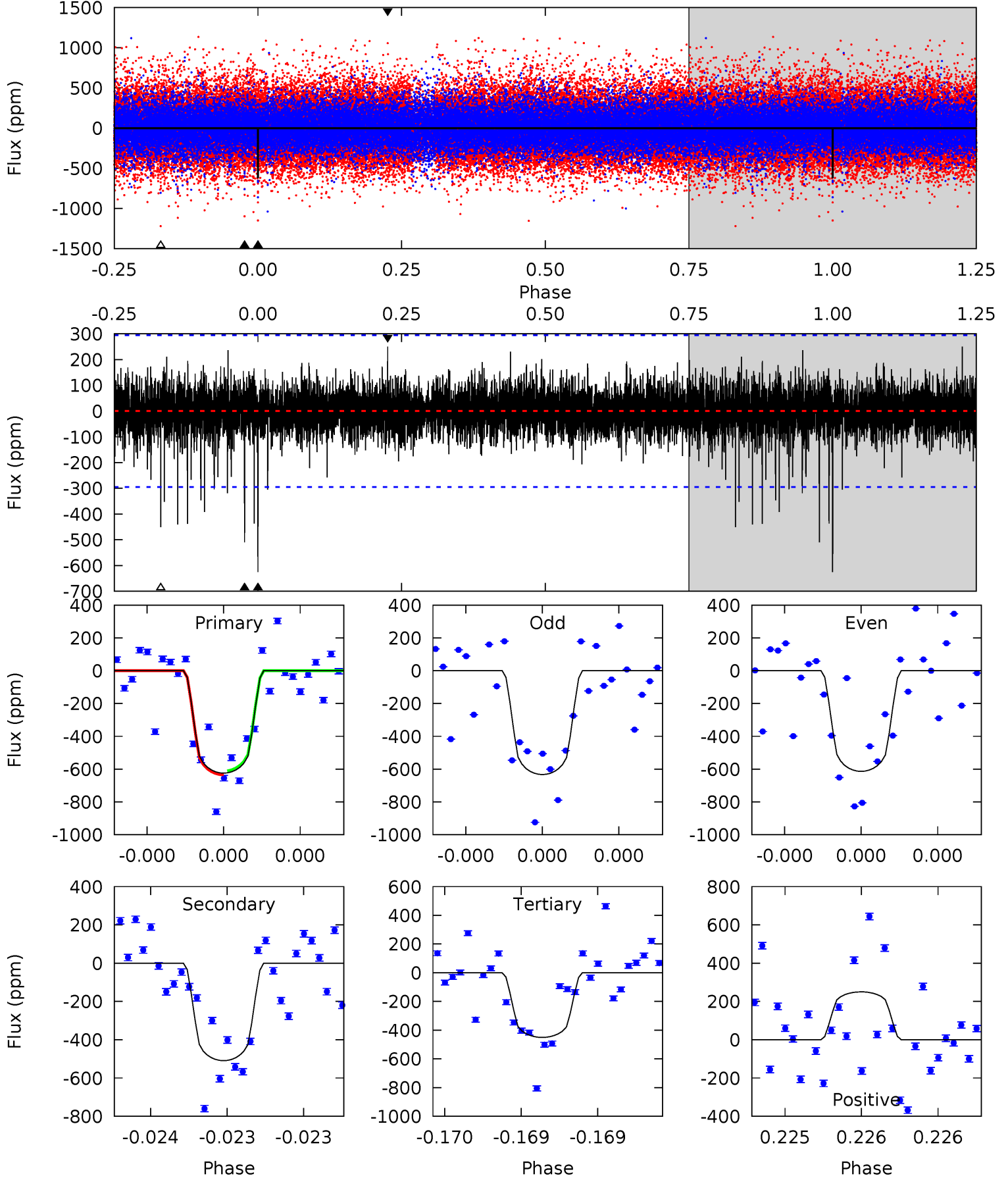
TCE 004833135-04 P=372.084438 Days  $T_0=249.145201$  (BKJD)



# DV Model-Shift Uniqueness Test

004833135-04, P = 372.089452 Days, E = 249.136373 Days

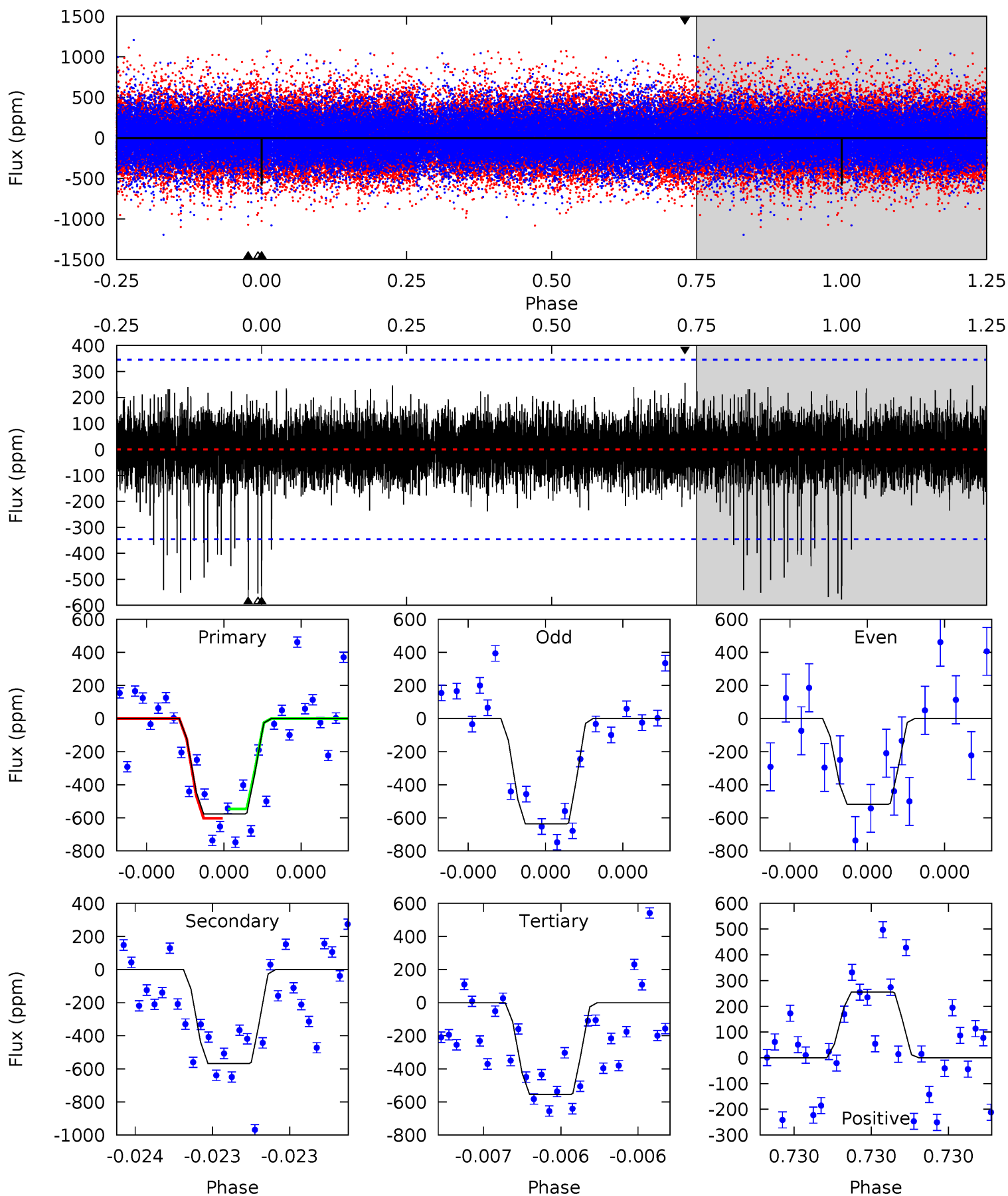
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.9	9.73	8.60	4.78	5.64	3.58	1.18	3.32	7.15	1.13	4.95	0.19	0.99	0.29	0.23



# Alt Model-Shift Uniqueness Test

004833135-04, P = 372.084438 Days, E = 249.145201 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
9.50	9.36	9.14	4.21	5.69	3.66	1.18	0.36	5.30	0.22	5.15	0.98	0.90	0.31	0.47





### Stellar Parameters For KIC 004833135

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6250^{+169}_{-206}$	$4.472^{+0.050}_{-0.200}$	$-0.260^{+0.300}_{-0.300}$	$0.986^{+0.305}_{-0.102}$	$1.052^{+0.147}_{-0.134}$	$1.544^{+0.404}_{-0.769}$
	+3%/-3%	+1%/-4%	+115%/-115%	+31%/-10%	+14%/-13%	+26%/-50%
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 004833135-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-509 \pm 52$	$3.21^{+2.38}_{-1.97}$	$384^{+25}_{-18}$	$5575^{+4029}_{-1158}$	$28543^{+169451}_{-19095}$
Alt.	$-568 \pm 61$	$3.20^{+2.62}_{-1.99}$	$386^{+26}_{-19}$	$5666^{+4522}_{-1179}$	$30855^{+187025}_{-21285}$

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

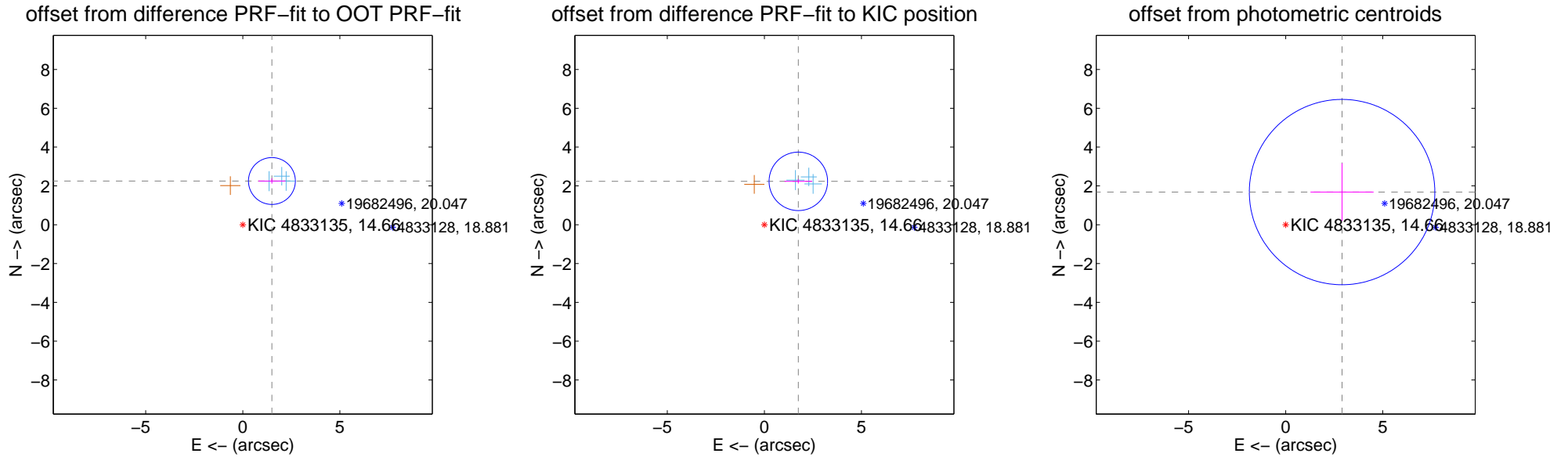
## DV Centroid Data

Supplemental centroid analysis for 004833135-04. Kepler magnitude: 14.66. Transit SNR 8.97

There are 3 quarters with good PRF difference image offsets

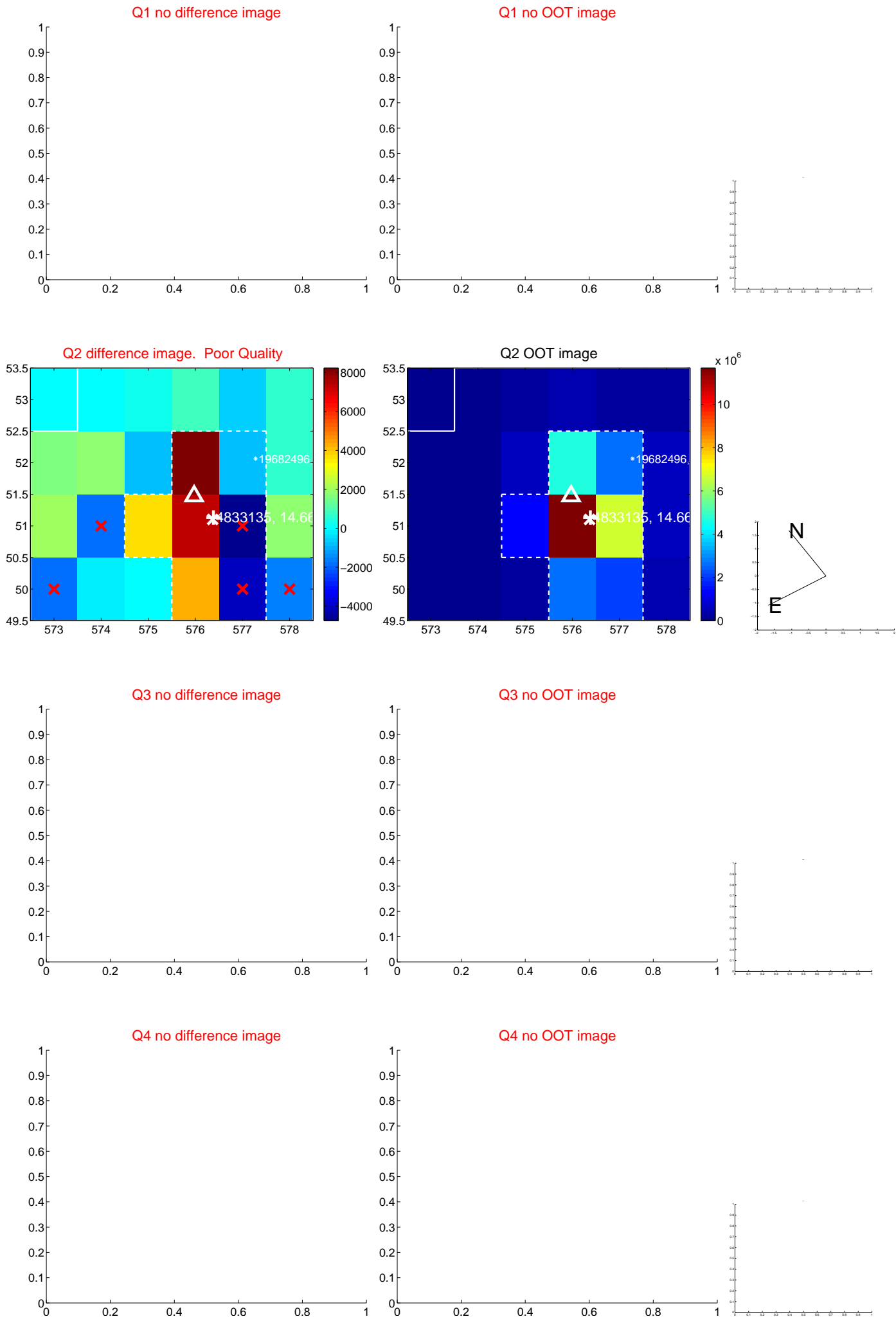
The direct PRF centroid is offset from the target star catalog position by about 0.31 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.706 \pm 0.402$	6.72	$-1.499 \pm 0.696$	$2.252 \pm 0.137$
PRF-fit source offset from KIC position	$2.837 \pm 0.502$	5.65	$-1.748 \pm 0.713$	$2.235 \pm 0.116$
photometric centroid source offset	$3.36 \pm 1.59$	2.11	$-2.90 \pm 1.63$	$1.68 \pm 1.48$



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.

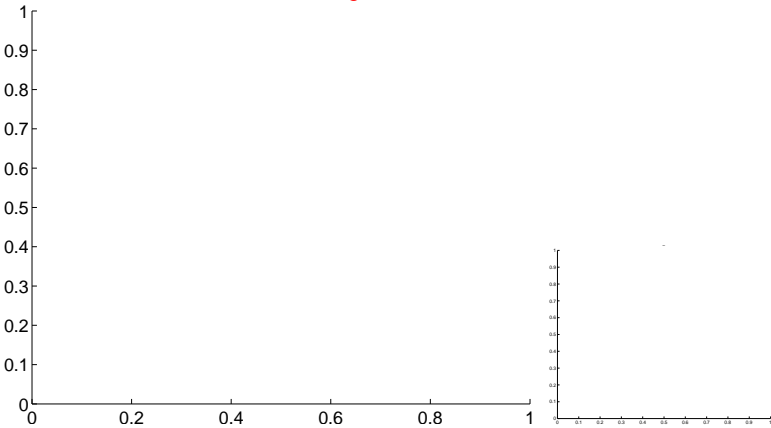


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

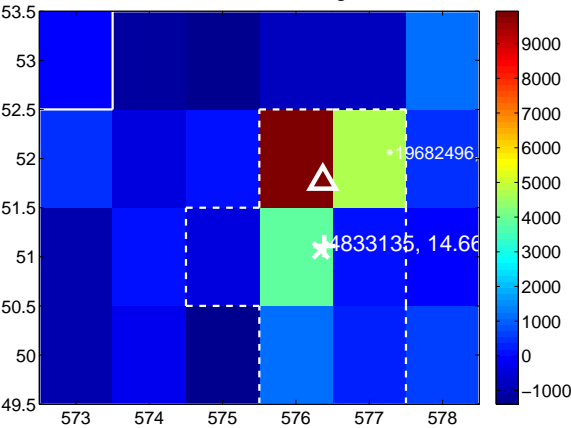
Q5 no difference image



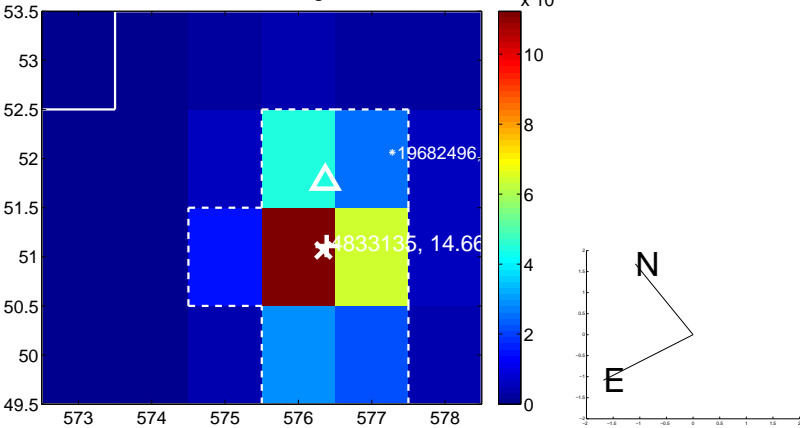
Q5 no OOT image



Q6 difference image



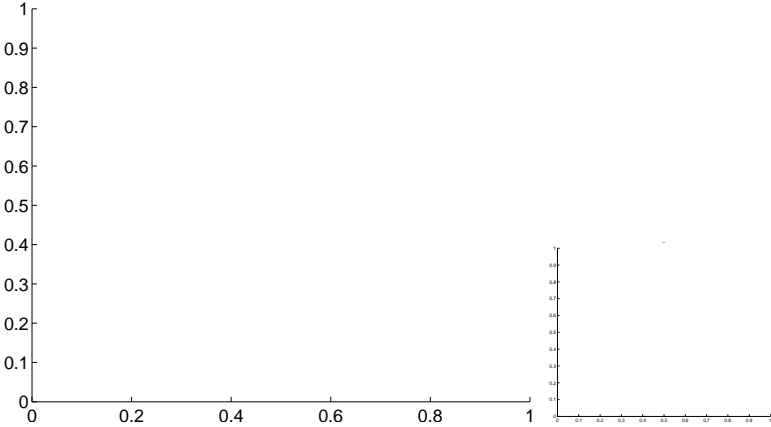
Q6 OOT image



Q7 no difference image



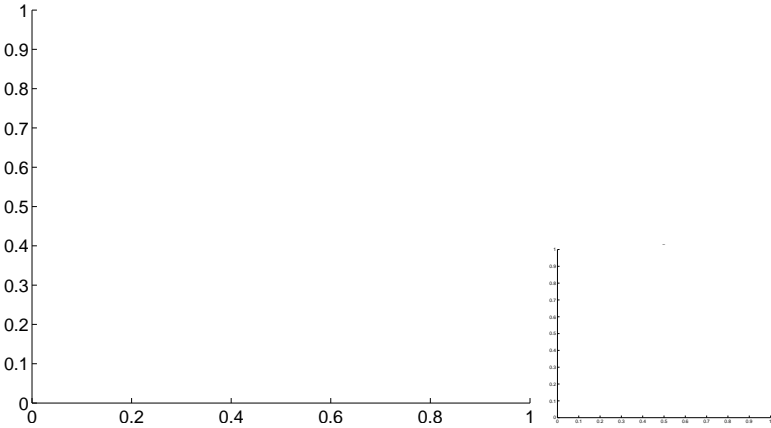
Q7 no OOT image



Q8 no difference image



Q8 no OOT image

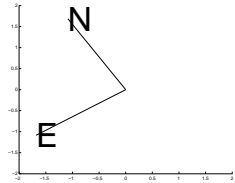
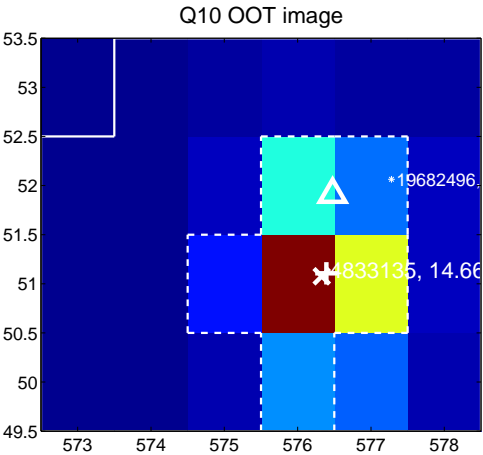
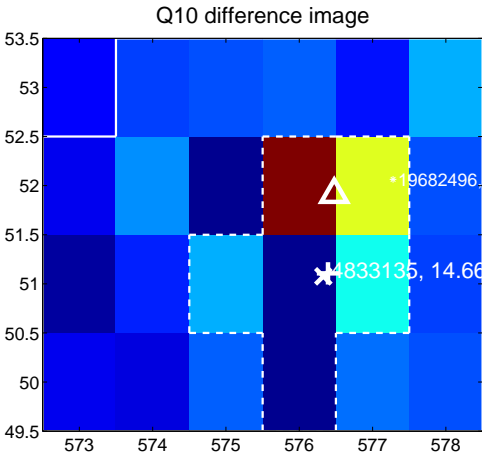


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

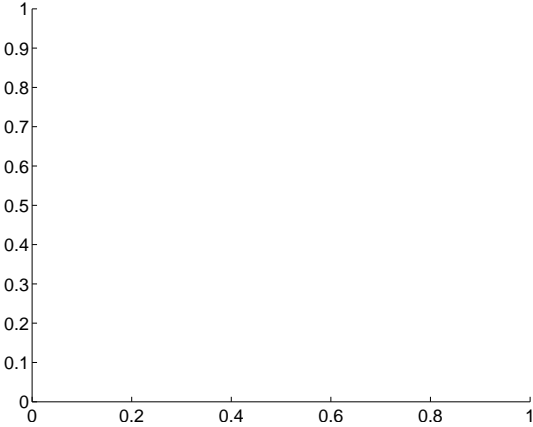
Q9 no difference image



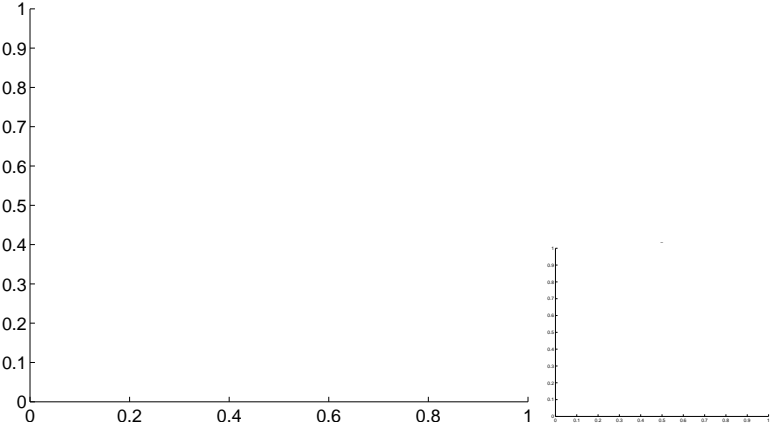
Q9 no OOT image



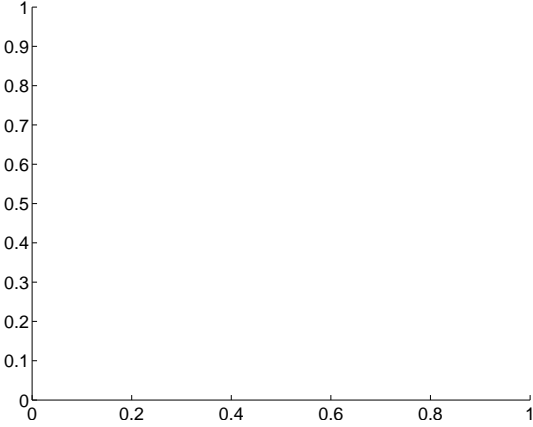
Q11 no difference image



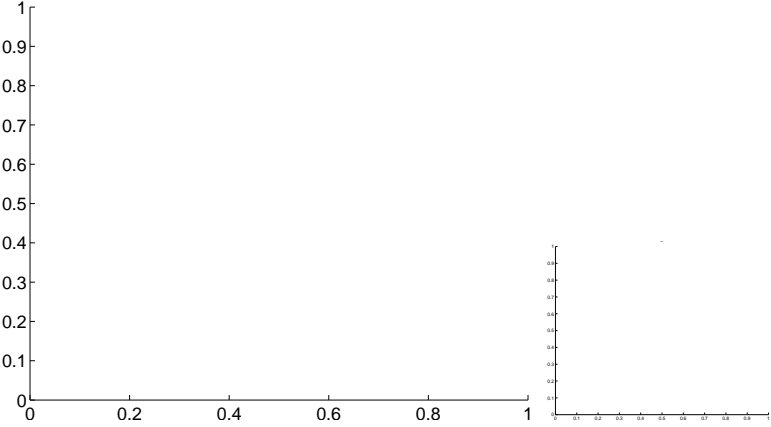
Q11 no OOT image



Q12 no difference image



Q12 no OOT image



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

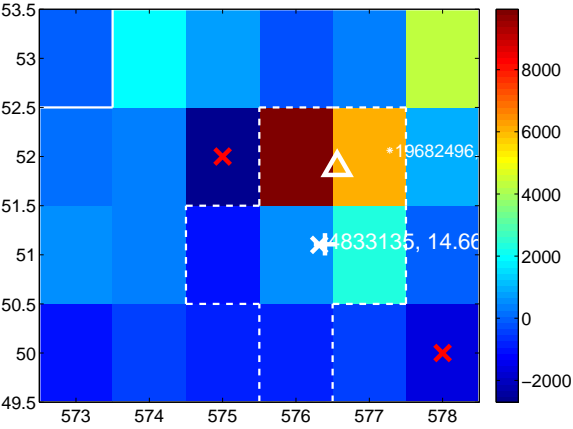
Q13 no difference image



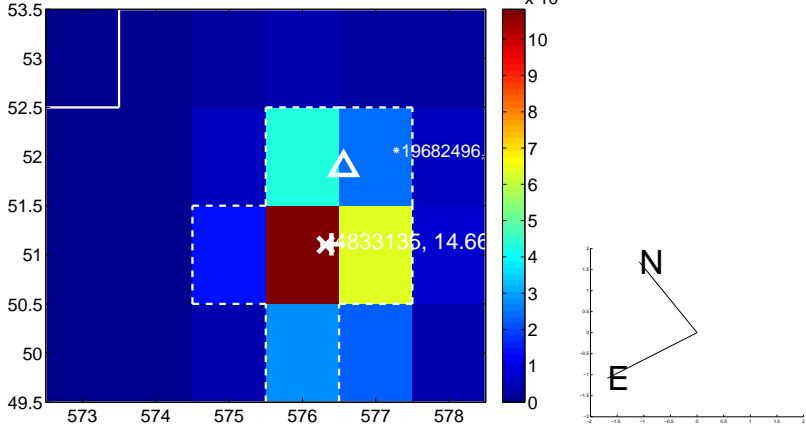
Q13 no OOT image



Q14 difference image



Q14 OOT image



Q15 no difference image



Q15 no OOT image



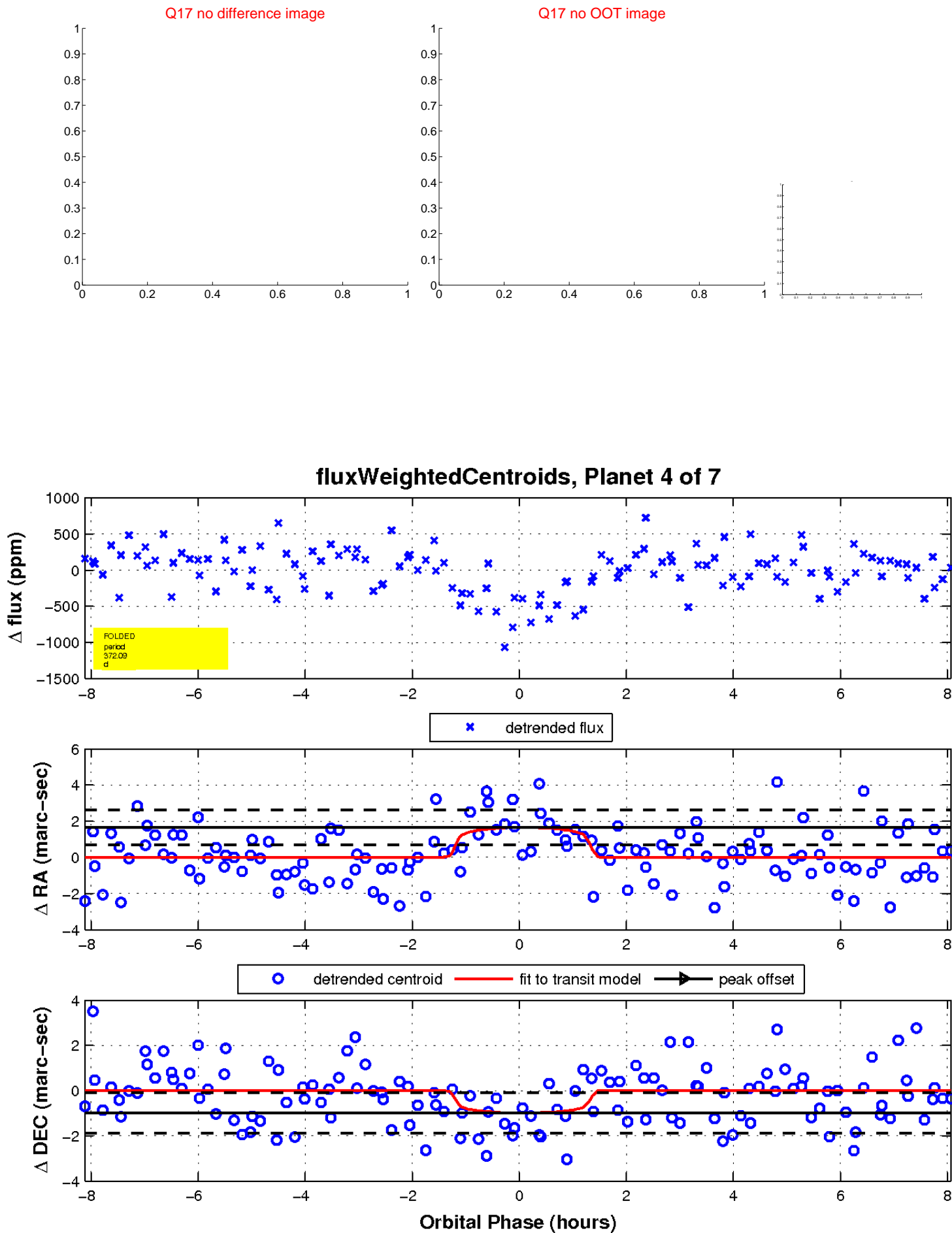
Q16 no difference image



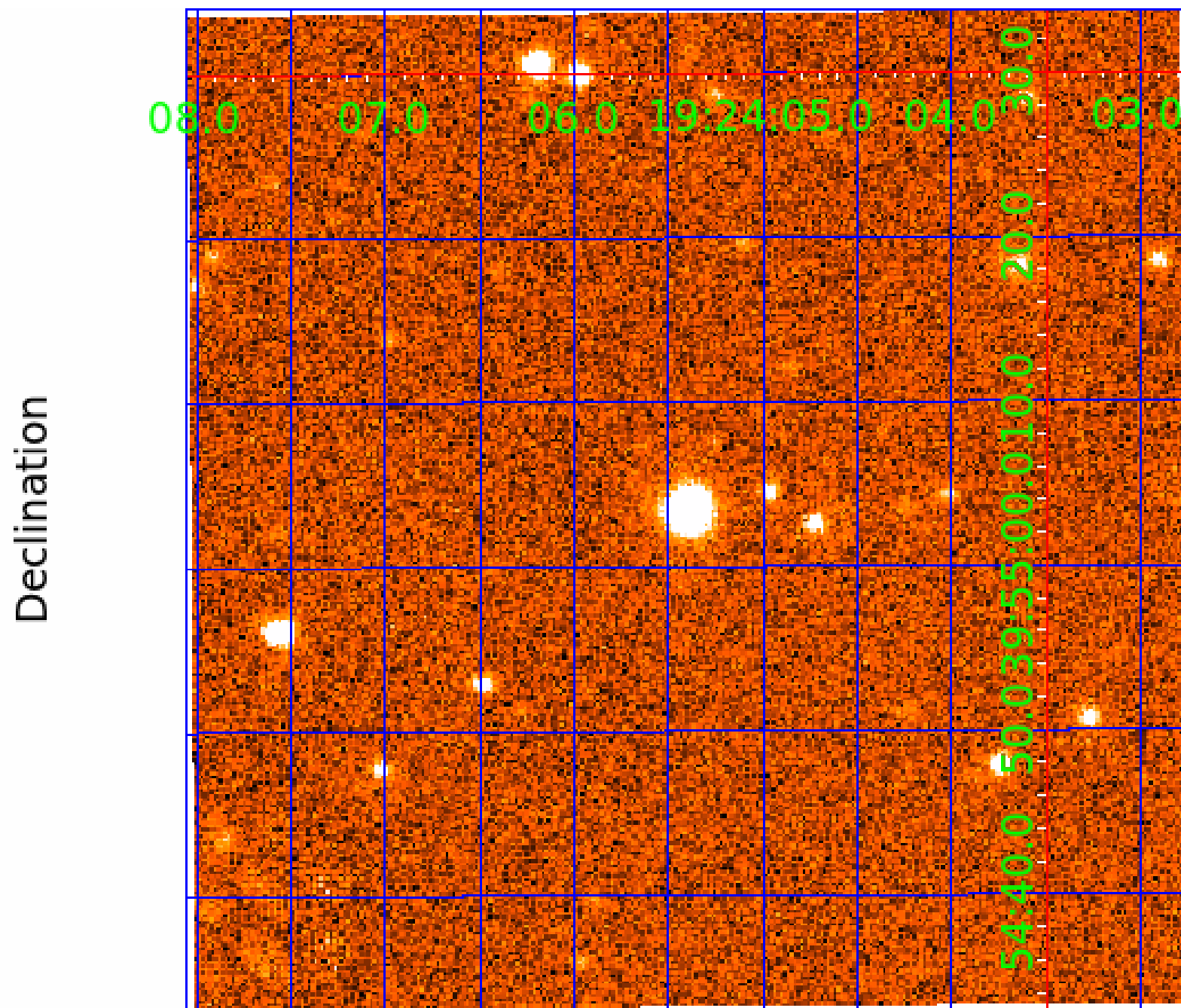
Q16 no OOT image



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



UKIRT Image





# KIC 004833135

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004833135-01	OBS	No	380.738920	205.878855	660.0	2.780	8.9	9.8	0.99	6250	2.81	1.22
004833135-02	OBS	No	376.862383	196.213724	334.9	25.456	8.8	9.7	0.99	6250	2.07	1.23
004833135-03	OBS	No	372.081681	238.143115	645.9	3.479	8.1	9.5	0.99	6250	3.10	1.25
004833135-04	OBS	No	372.089452	249.136373	595.1	2.721	8.2	9.0	0.99	6250	2.64	1.25
004833135-05	OBS	No	372.070946	246.814275	476.3	3.988	7.9	8.1	0.99	6250	2.35	1.25
004833135-06	OBS	No	372.079096	240.518256	380.2	5.662	8.1	7.3	0.99	6250	2.11	1.25
004833135-07	OBS	No	372.098902	186.196312	542.8	3.022	7.3	7.9	0.99	6250	2.54	1.25

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004833135-01	OBS	FP	0.00	1	0	0	1	ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_FEW_DIFFS—EPHEM_MATCH
004833135-02	OBS	FP	0.00	1	0	0	1	INDIV_TRANS_MARSHALL—CENT_FEW_DIFFS—EPHEM_MATCH
004833135-03	OBS	FP	0.00	1	0	1	1	INDIV_TRANS_MARSHALL—ALL_TRANS_CHASES—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_UNRESOLVED_OFFSET—EPHEM_MATCH
004833135-04	OBS	FP	0.00	1	0	1	0	ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_UNRESOLVED_OFFSET
004833135-05	OBS	FP	0.00	1	0	0	0	MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_FEW_DIFFS
004833135-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_FEW_MEAS
004833135-07	OBS	FP	0.00	1	0	0	0	MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_UNCERTAIN

**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 004833135-05

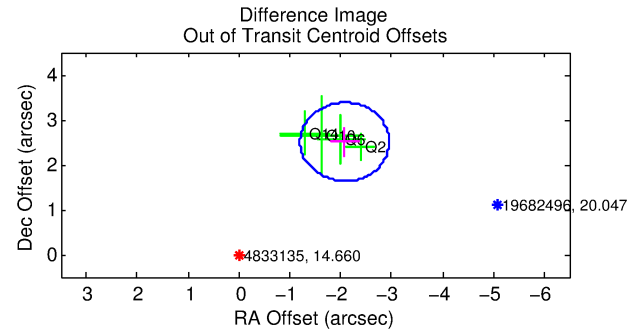
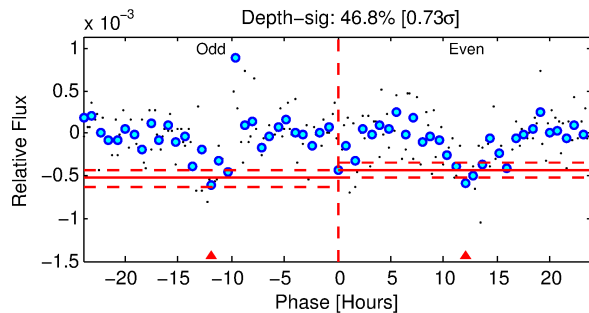
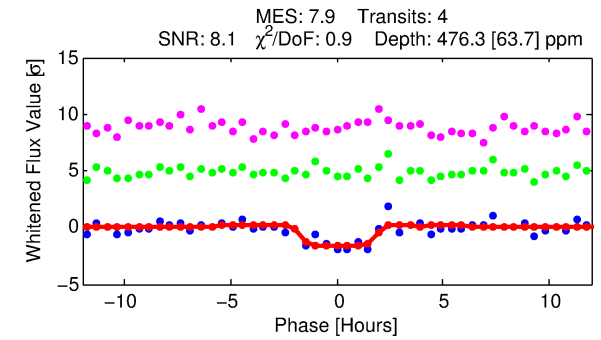
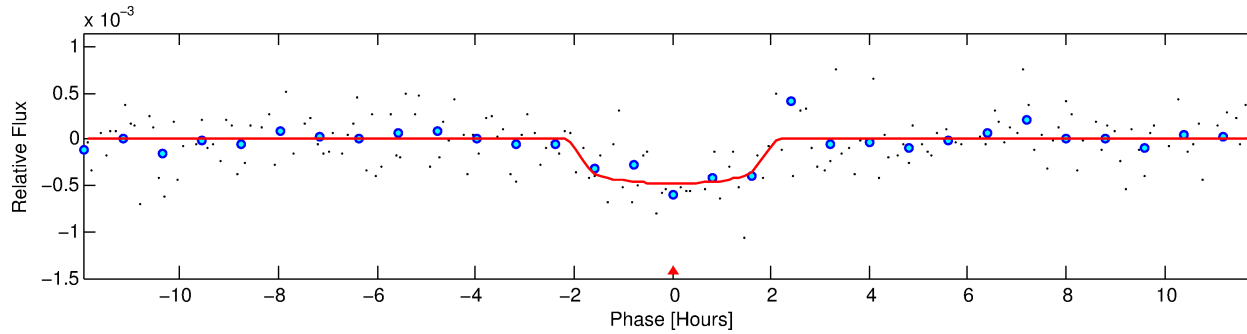
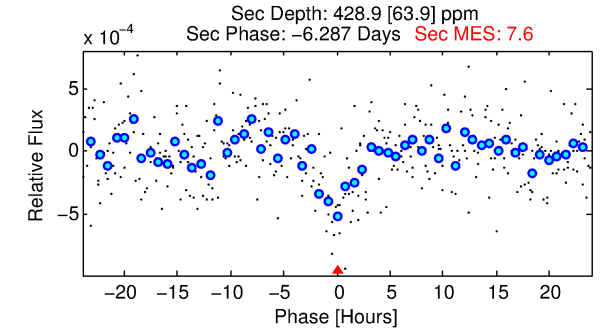
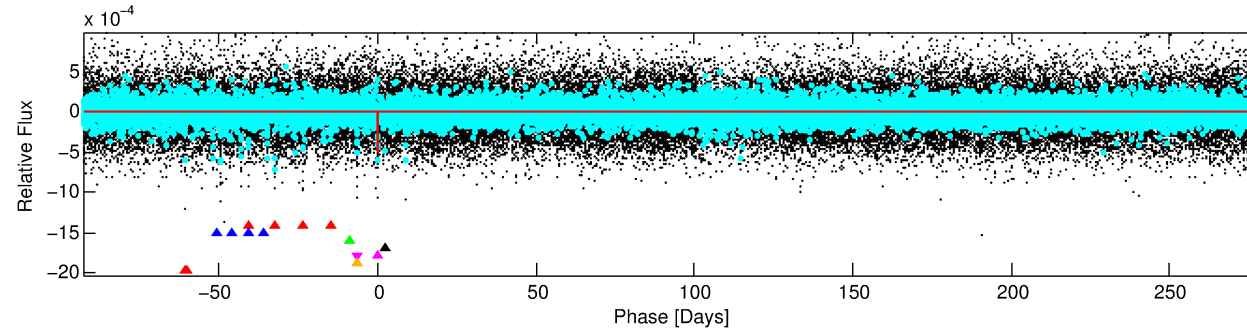
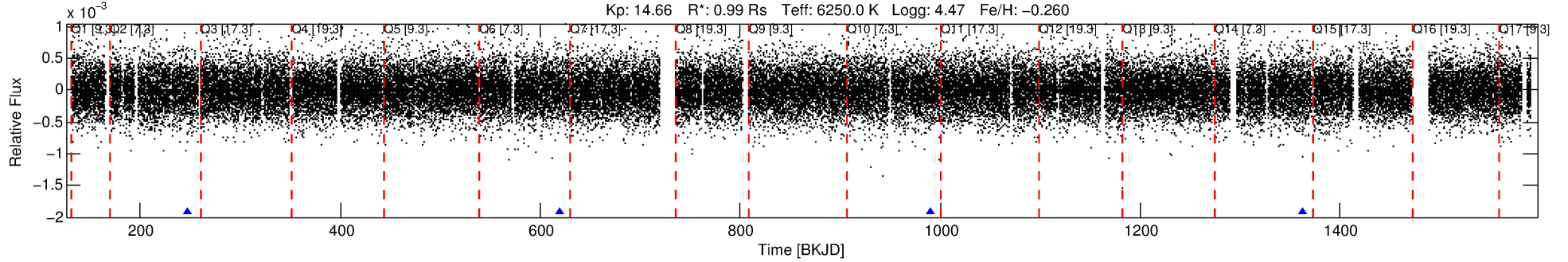
No Significant Match Found

# DV One-Page Summary

KIC: 4833135 Candidate: 5 of 7 Period: 372.071 d

KOI: K00498 Corr: No Ephemeris Match

Kp: 14.66 R\*: 0.99 Rs Teff: 6250.0 K Logg: 4.47 Fe/H: -0.260



## DV Fit Results:

Period = 372.07095 [0.00513] d  
Epoch = 246.8143 [0.0094] BKJD  
Rp/R\* = 0.0218 [0.0186]  
a/R\* = 483.18 [2149.42]  
b = 0.76 [2.45]  
Seff = 1.25 [0.49]  
Teq = 270 [26] K  
Rp = 2.35 [2.13] Re  
a = 1.0297 [0.2647] AU  
Ag = 45394.40 [79571.78] [0.57σ]  
Teffp = 6089 [2616] K [2.22σ]

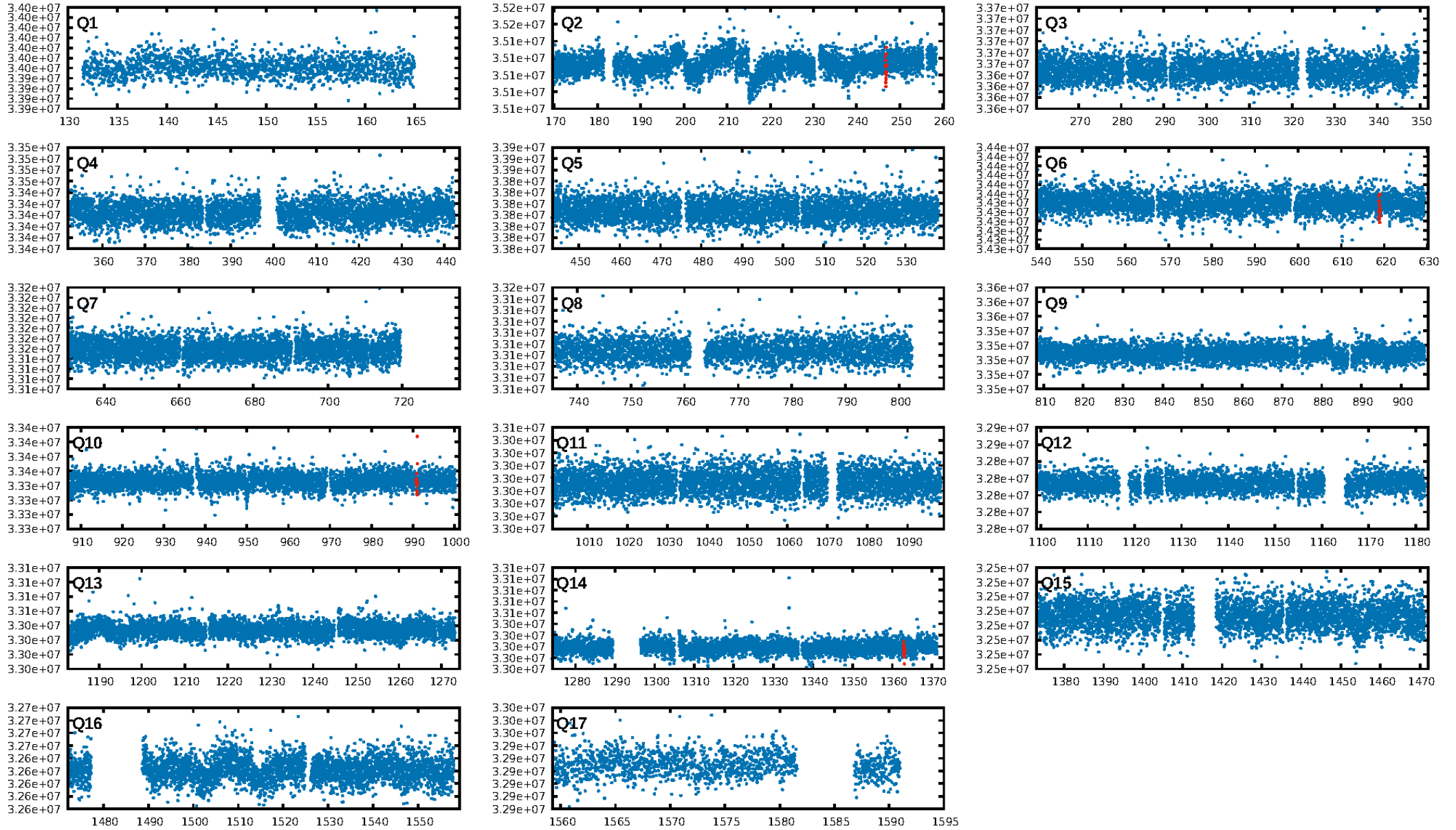
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 2.3% [0.03σ]  
ModelChiSquare2-sig: 56.7%  
ModelChiSquareGof-sig: 98.9%  
**Bootstrap-pfa: 6.63e-12**  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 3.468  
**Centroid-sig: 0.2%**  
Centroid-so: 4.370 arcsec [2.63σ]  
**OotOffset-rm: 3.257 arcsec [11.17σ]**  
**KicOffset-rm: 3.397 arcsec [11.68σ]**  
OotOffset-st: 4/0/0/0 [4]  
KicOffset-st: 4/0/0/0 [4]  
DiffImageQuality-fgm: 1.00 [4/4]  
DiffImageOverlap-fno: 1.00 [4/4]

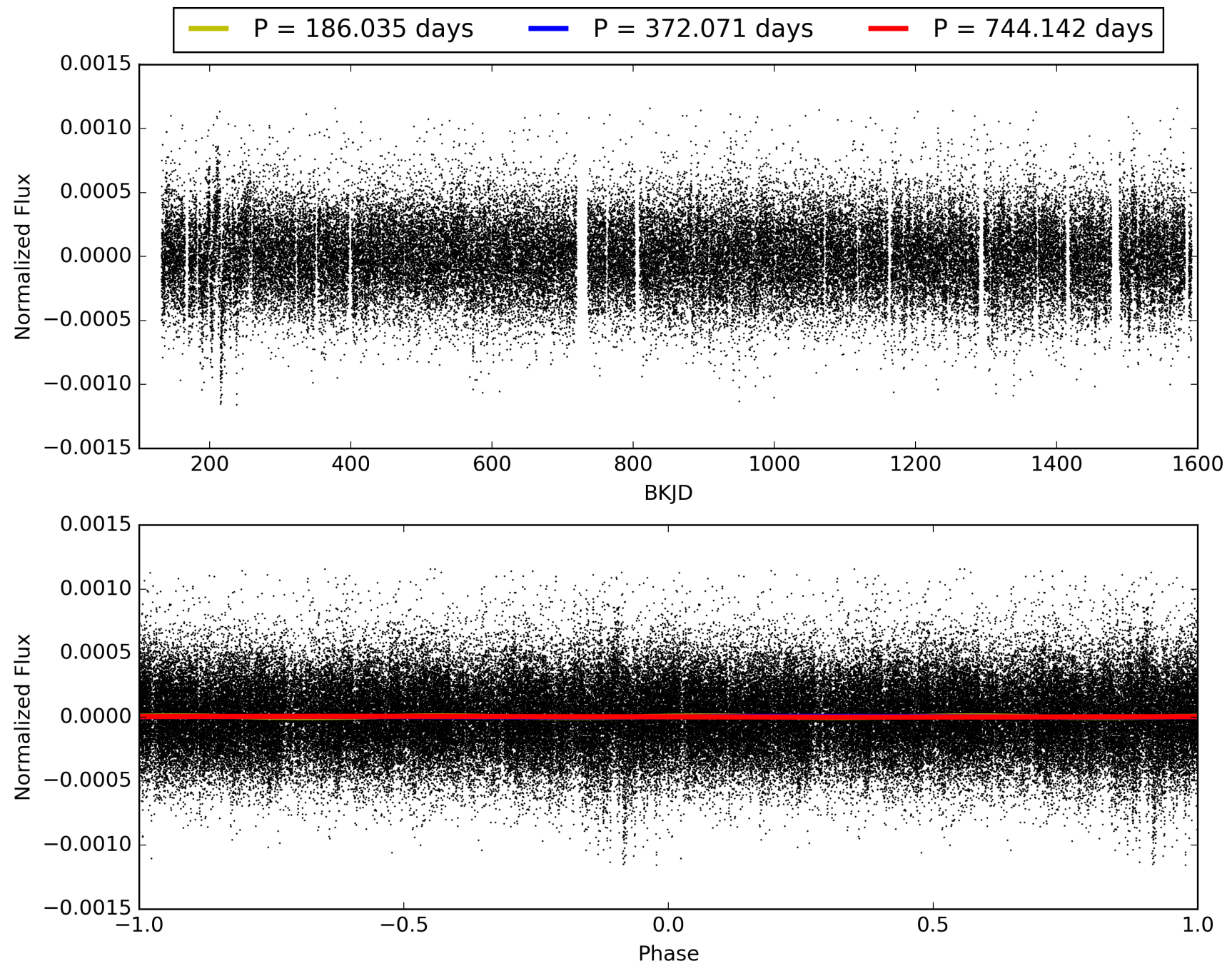
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 02:06:23 Z

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

# TCE 004833135-05, PDC Light Curves

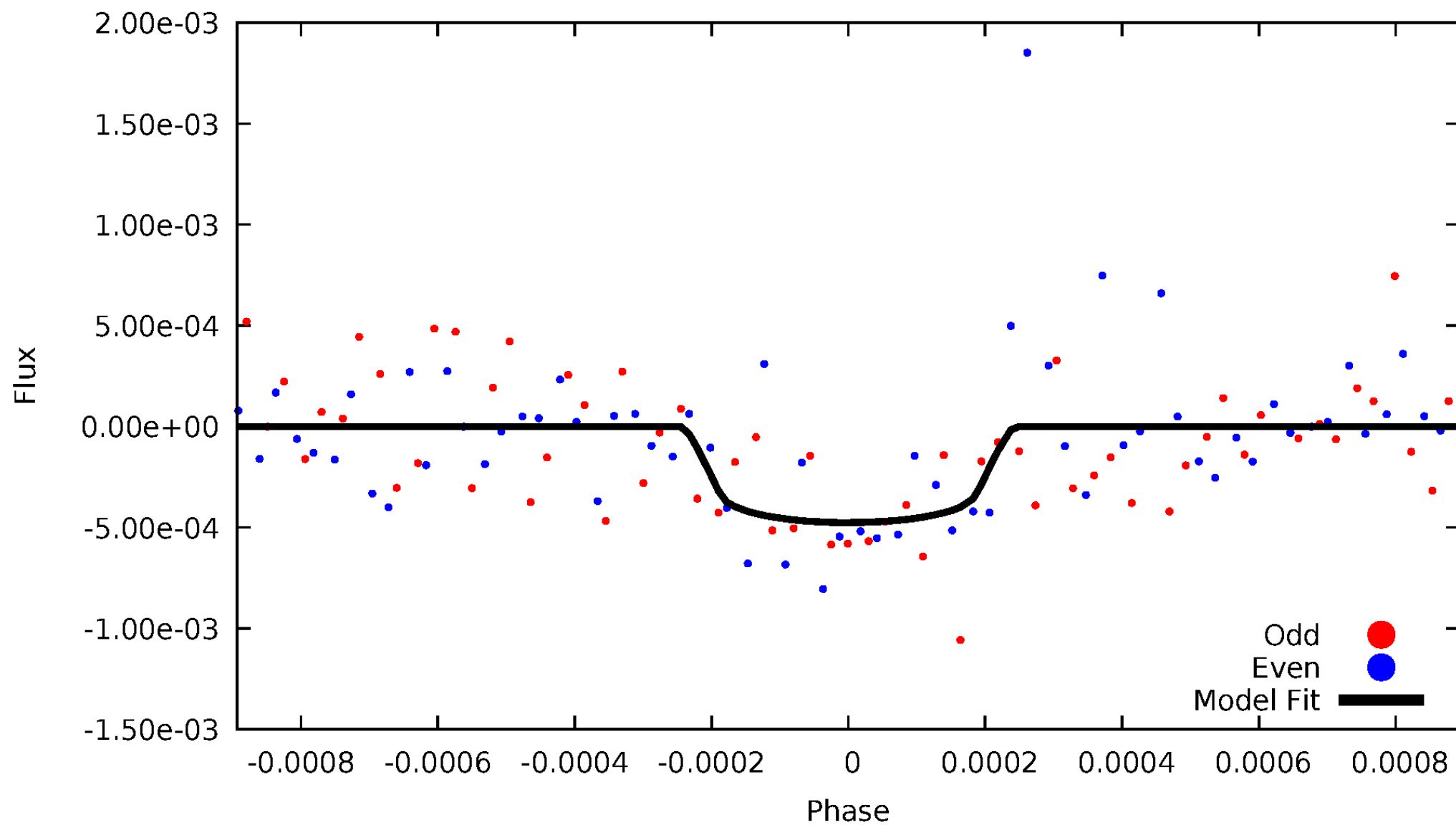


TCE 004833135-05



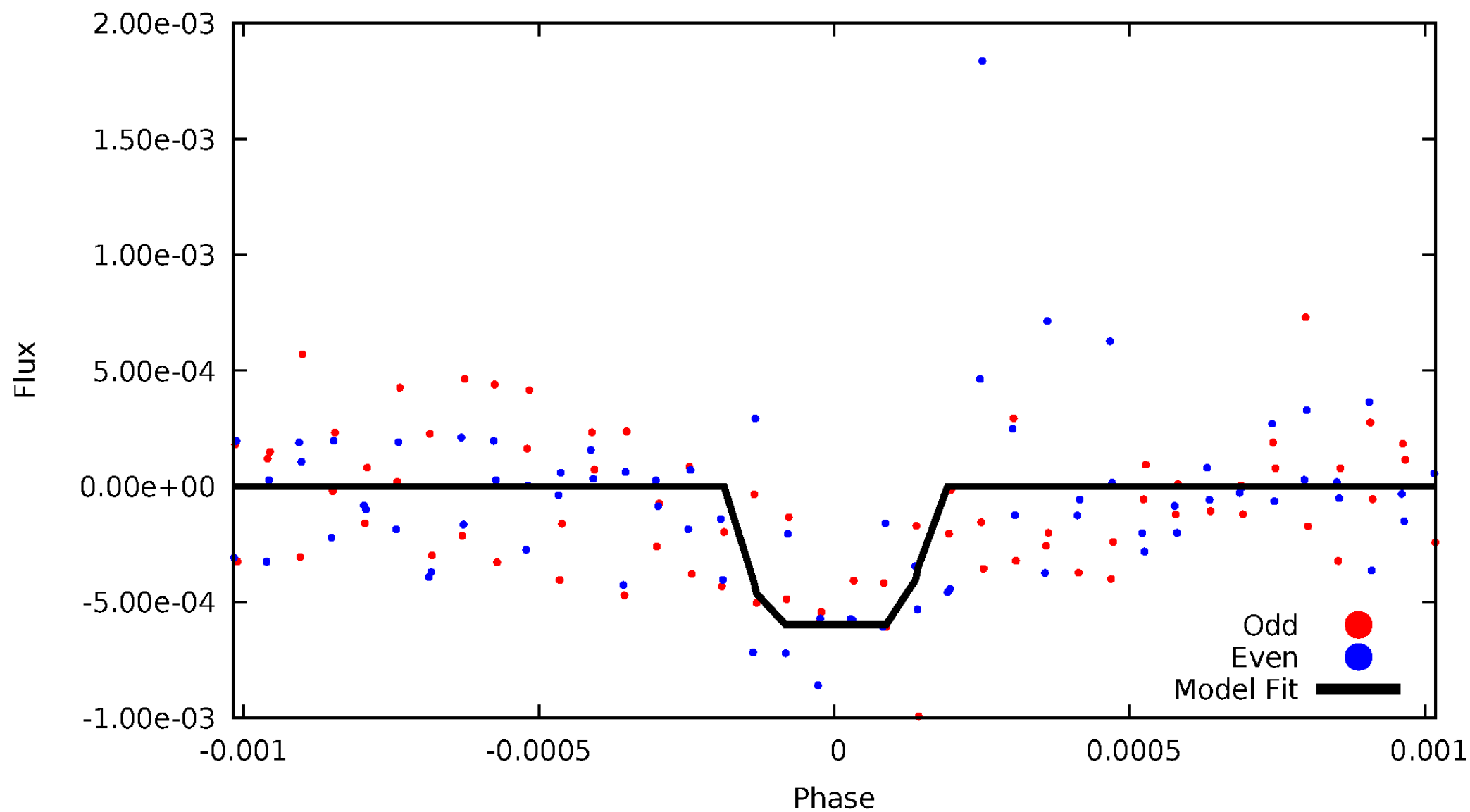
# DV Odd/Even

TCE 004833135-05



# ALT Odd/Even

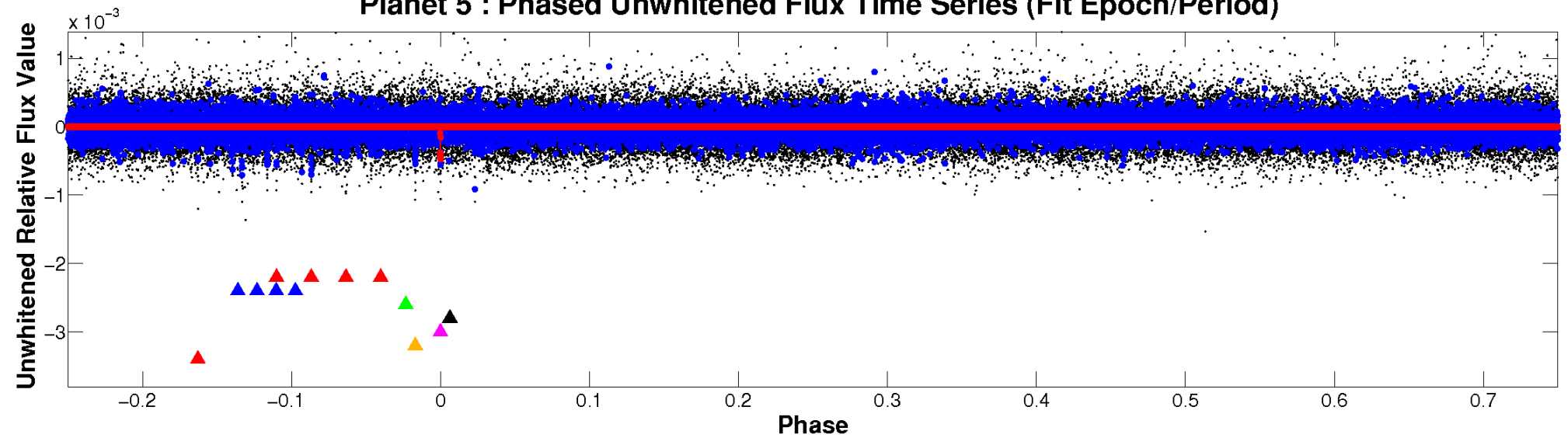
TCE 004833135-05



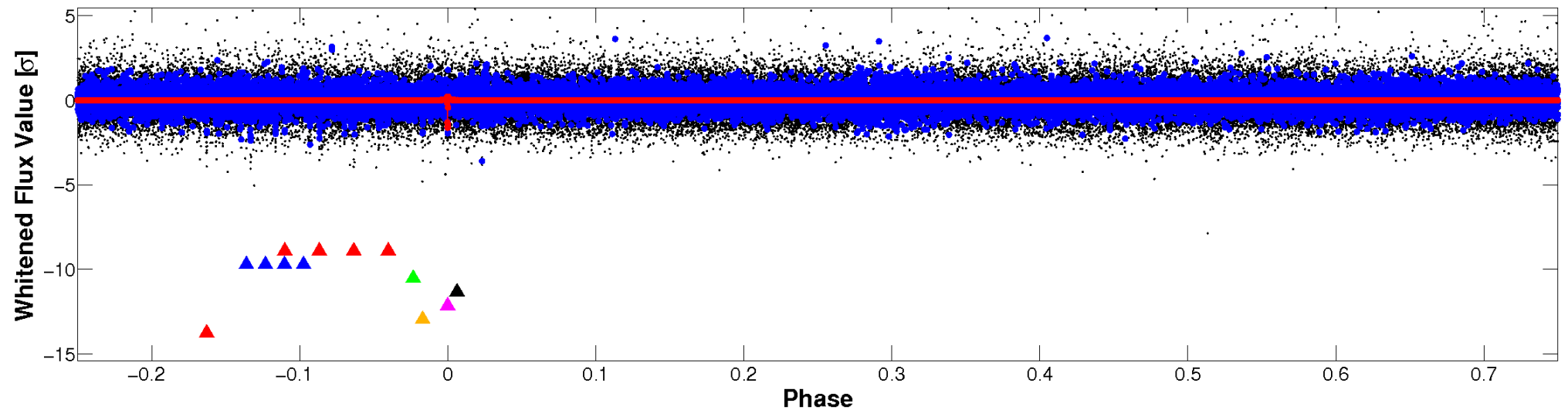


# Non-Whitened Vs. Whitened Light Curve

## Planet 5 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

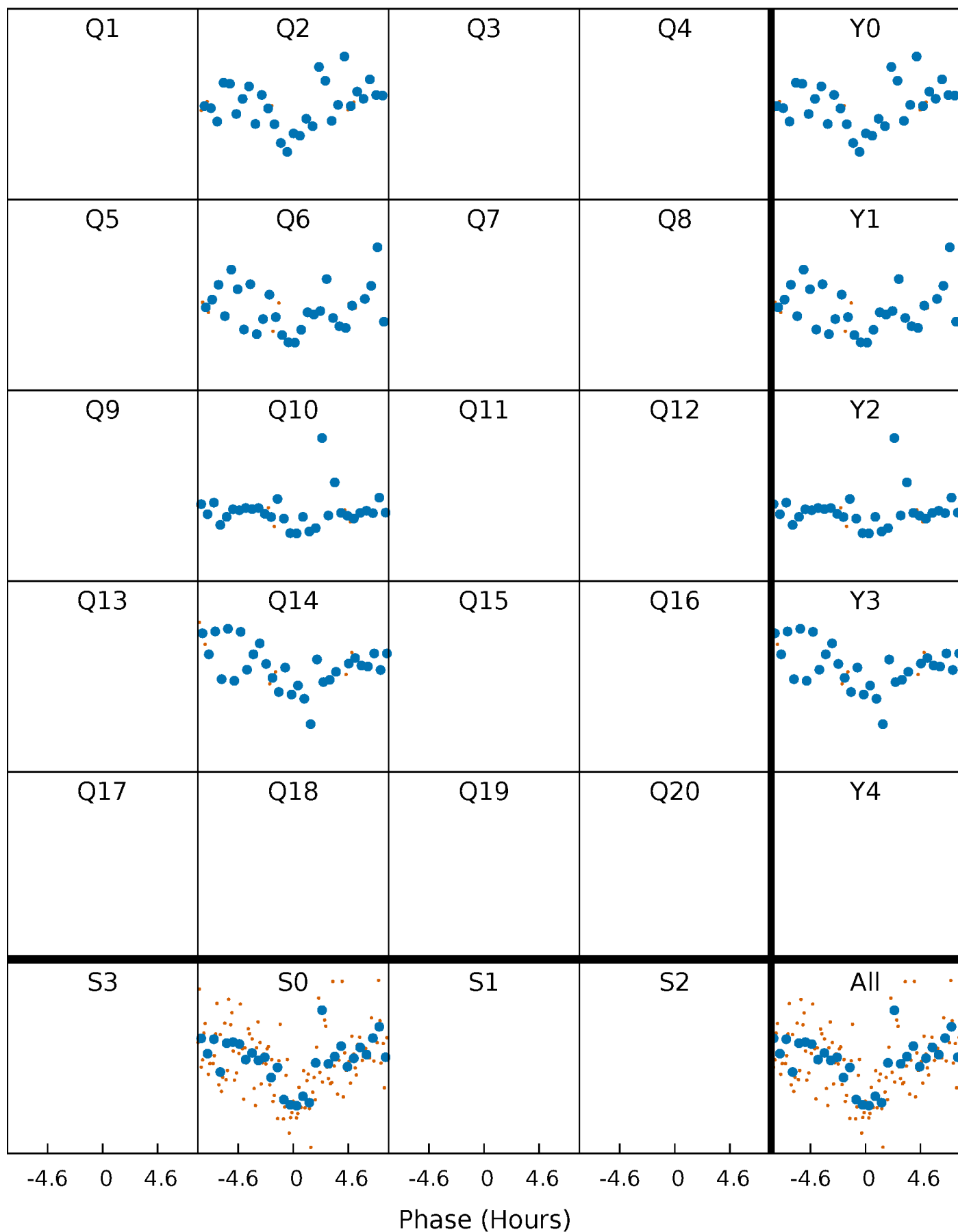


## Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

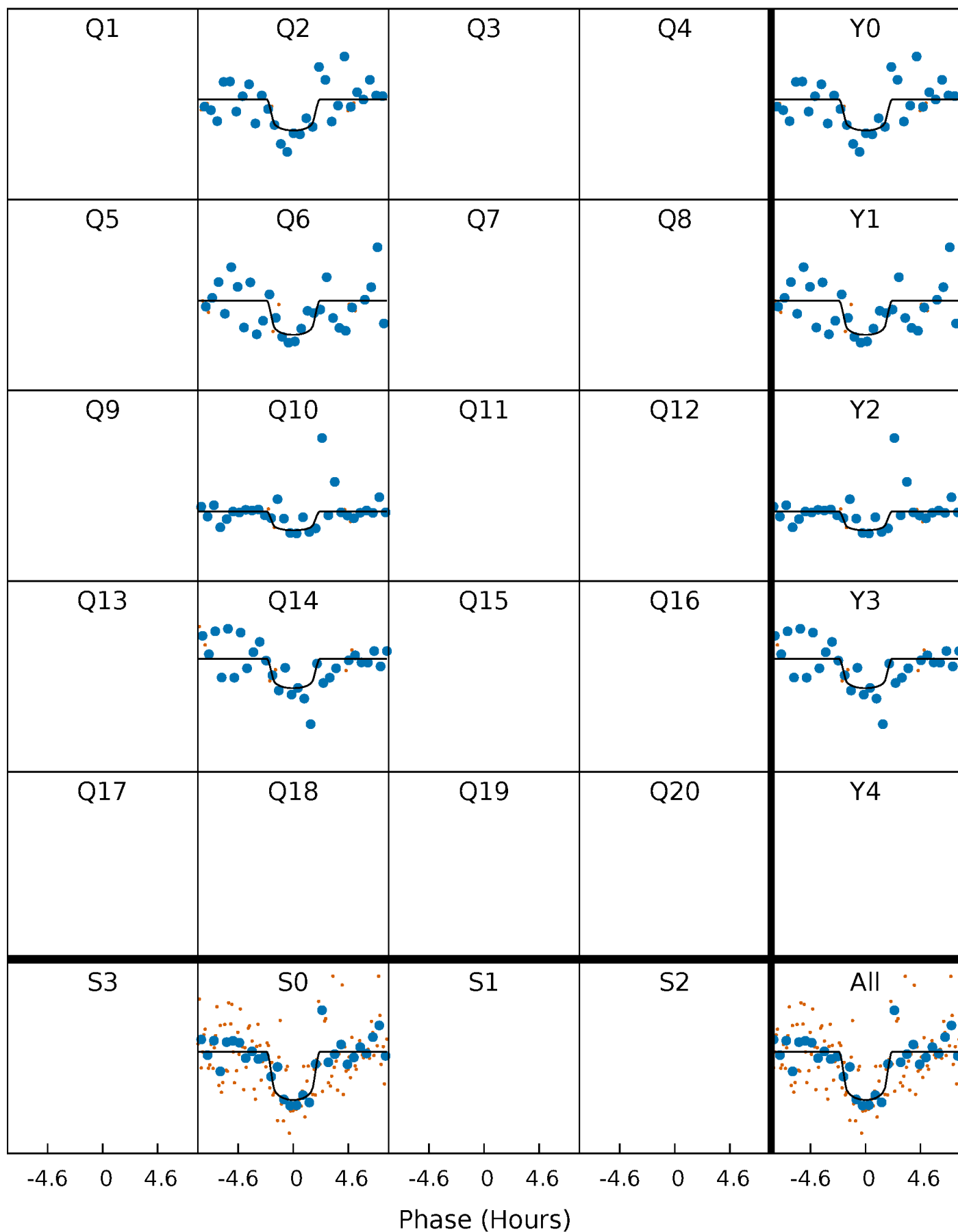
TCE 004833135-05     $P=372.070946$  Days     $T_0=246.814275$  (BKJD)





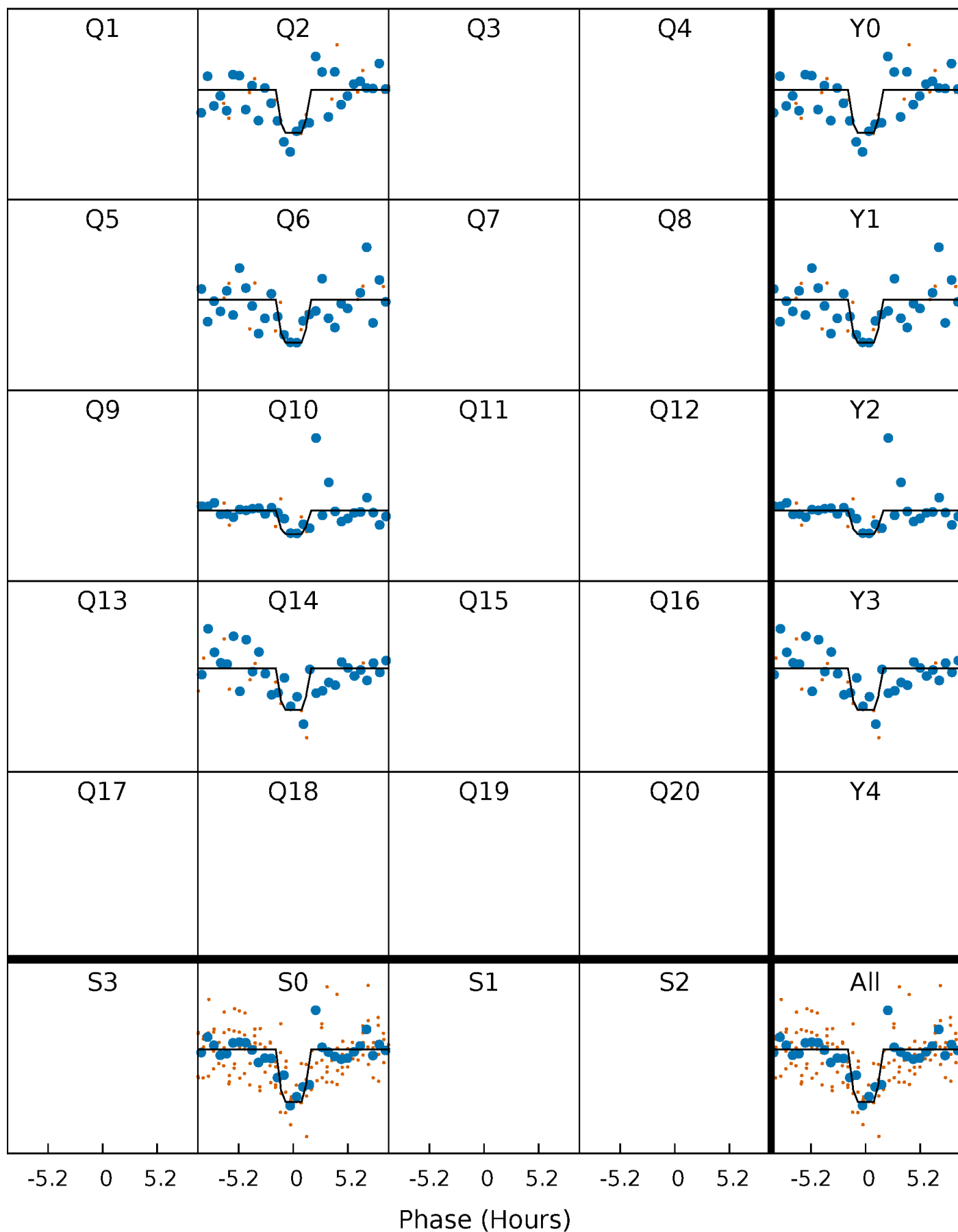
# DV Quarter-Phased Transit Curves

TCE 004833135-05     $P=372.070946$  Days     $T_0=246.814275$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

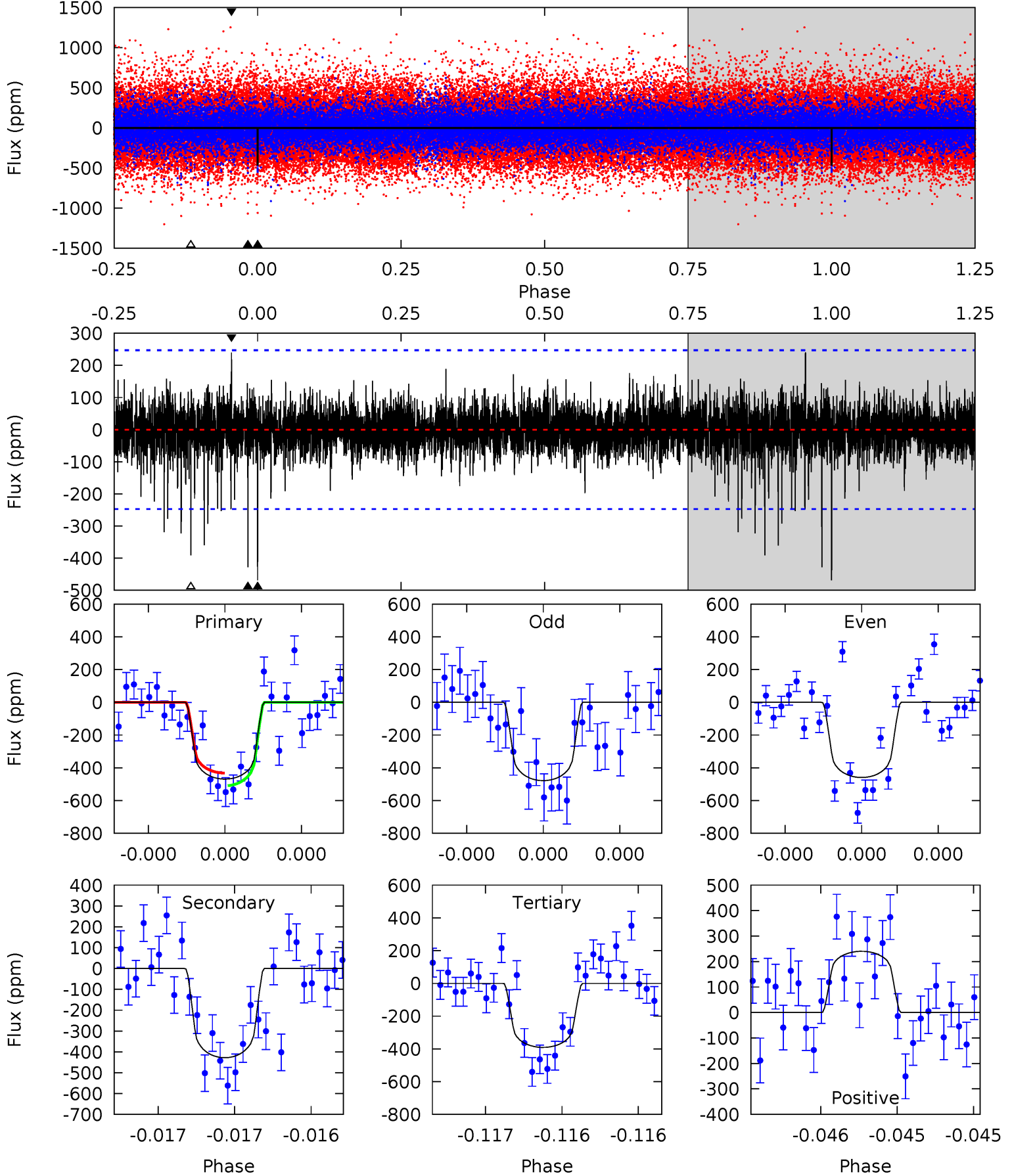
TCE 004833135-05     $P=372.074694$  Days     $T_0=246.810809$  (BKJD)



# DV Model-Shift Uniqueness Test

004833135-05,  $P = 372.070946$  Days,  $E = 246.814275$  Days

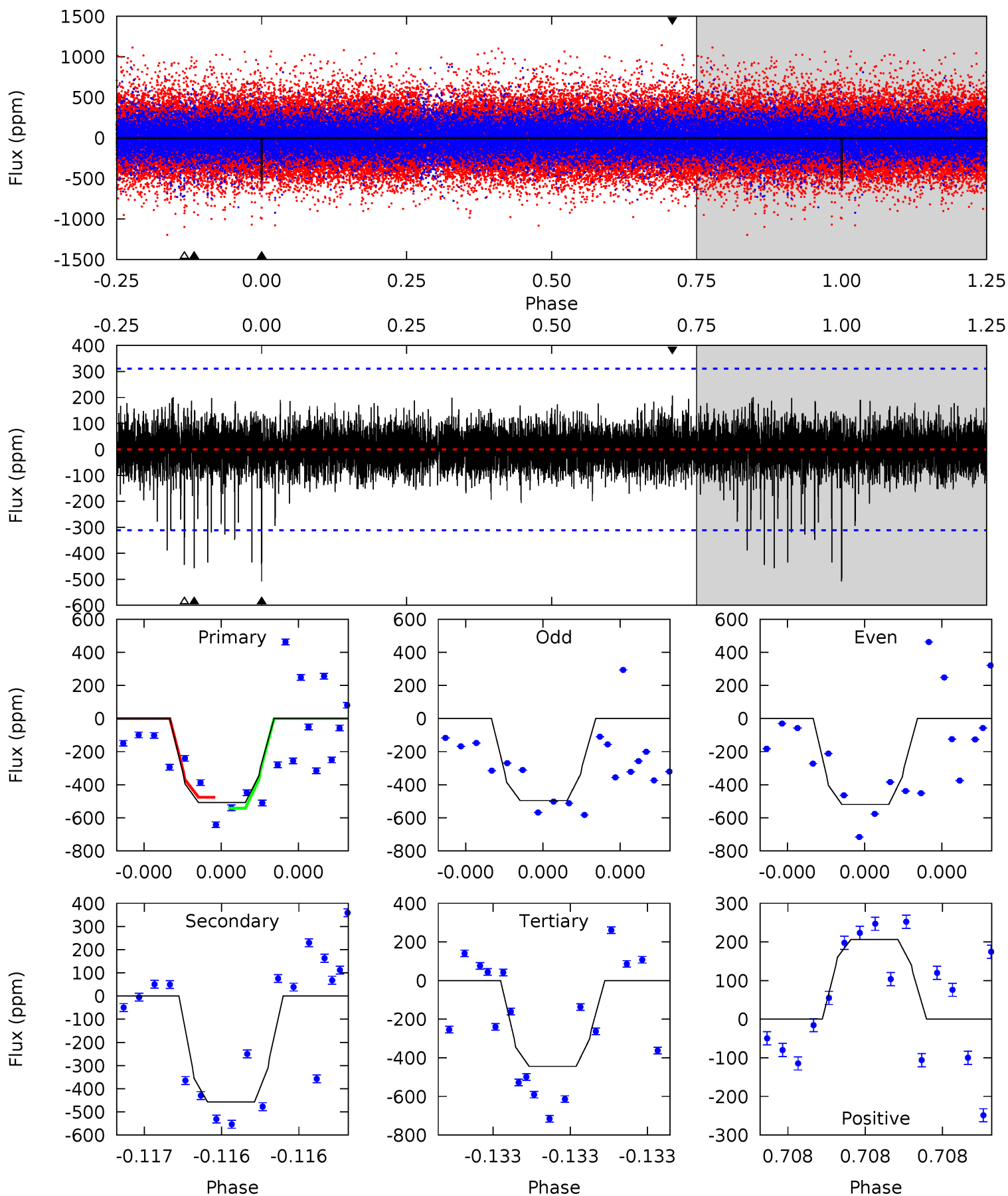
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.6	9.66	8.83	5.42	5.58	3.49	1.18	1.76	5.17	0.84	4.24	0.22	0.98	0.34	0.87



# Alt Model-Shift Uniqueness Test

004833135-05, P = 372.074694 Days, E = 246.810809 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
9.26	8.34	8.10	3.77	5.67	3.63	1.06	1.15	5.49	0.23	4.57	0.21	1.02	0.29	0.61



### Stellar Parameters For KIC 004833135

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6250^{+169}_{-206}$	$4.472^{+0.050}_{-0.200}$	$-0.260^{+0.300}_{-0.300}$	$0.986^{+0.305}_{-0.102}$	$1.052^{+0.147}_{-0.134}$	$1.544^{+0.404}_{-0.769}$
	+3%/-3%	+1%/-4%	+115%/-115%	+31%/-10%	+14%/-13%	+26%/-50%
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 004833135-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-428 \pm 44$	$2.86^{+1.92}_{-1.64}$	$385^{+27}_{-19}$	$5615^{+3306}_{-1087}$	$29947^{+128881}_{-19415}$
Alt.	$-457 \pm 55$	$2.96^{+2.05}_{-1.73}$	$384^{+26}_{-18}$	$5647^{+3726}_{-1126}$	$30163^{+142322}_{-19527}$

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

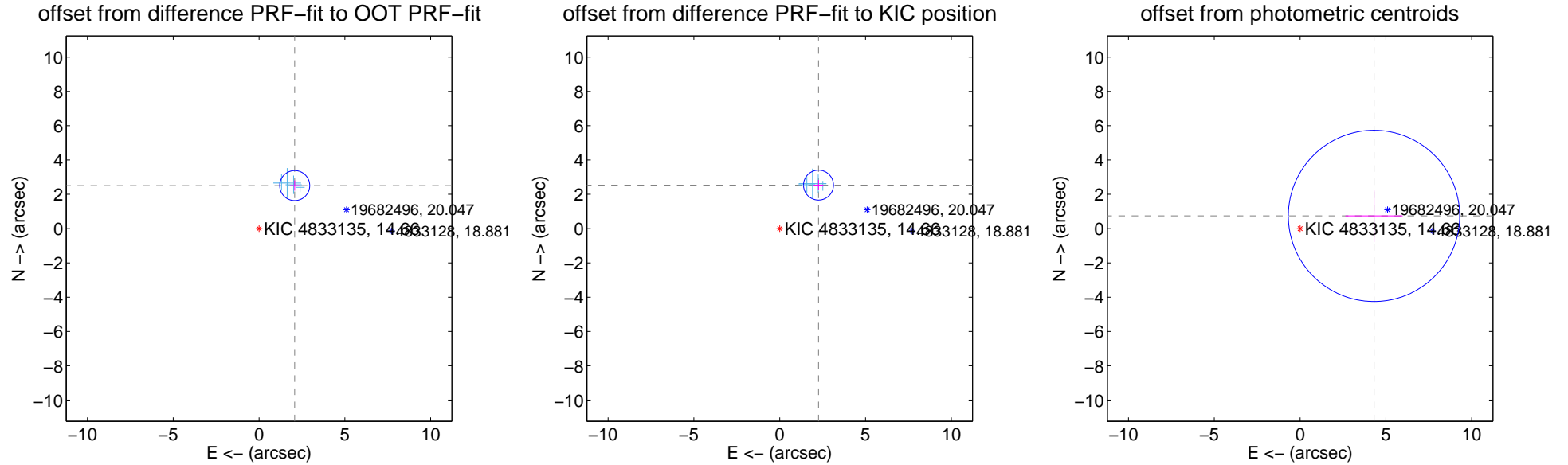
## DV Centroid Data

Supplemental centroid analysis for 004833135-05. Kepler magnitude: 14.66. Transit SNR 8.08

There are 4 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.31 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>3.257 <math>\pm</math> 0.292</b>	<b>11.17</b>	-2.078 $\pm$ 0.278	2.508 $\pm$ 0.300
PRF-fit source offset from KIC position	<b>3.397 <math>\pm</math> 0.291</b>	<b>11.68</b>	-2.260 $\pm$ 0.278	2.536 $\pm$ 0.300
photometric centroid source offset	4.37 $\pm$ 1.66	2.63	-4.31 $\pm$ 1.67	0.74 $\pm$ 1.52



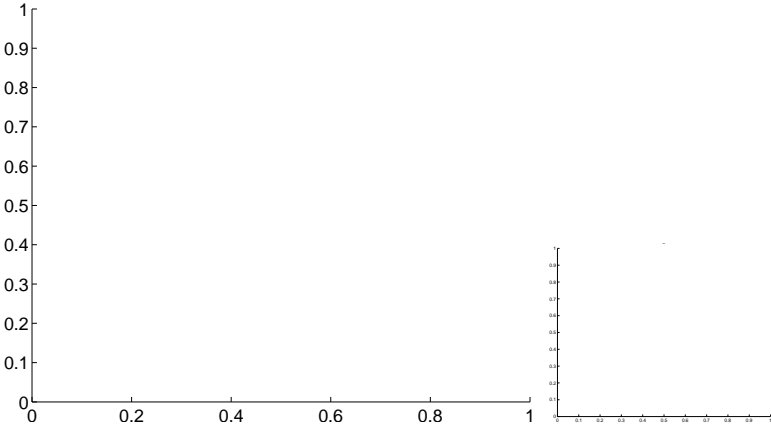
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

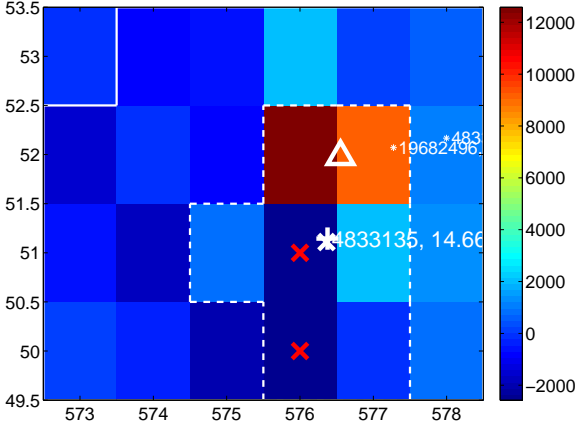
Q1 no difference image



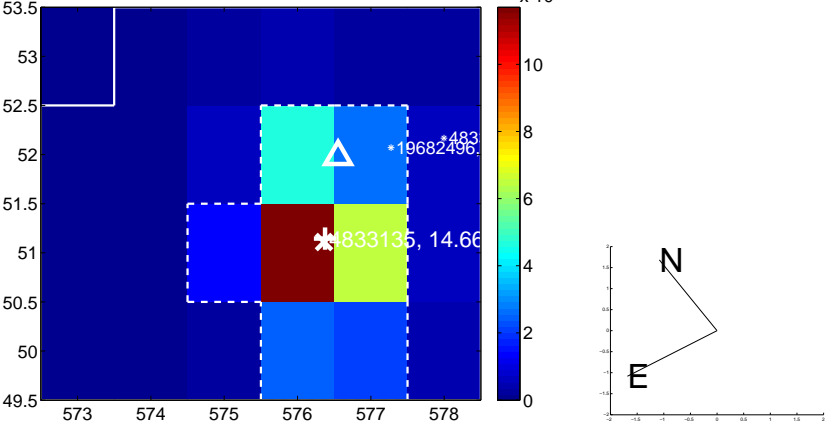
Q1 no OOT image



Q2 difference image



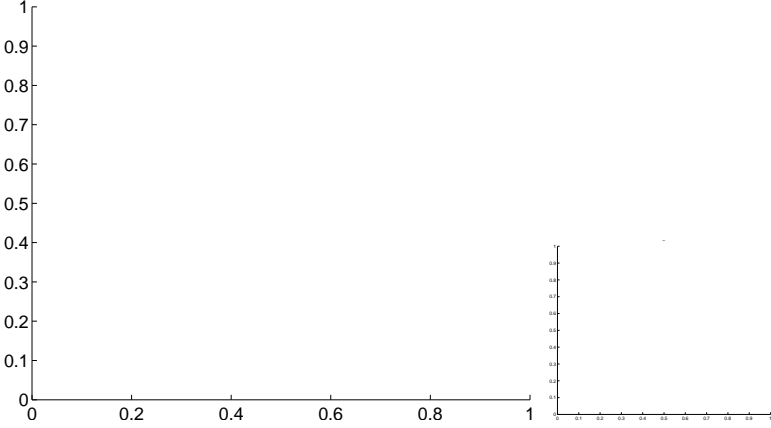
Q2 OOT image



Q3 no difference image



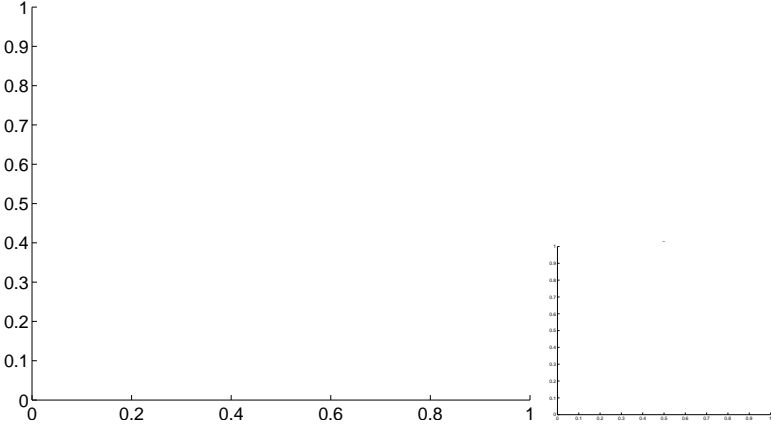
Q3 no OOT image



Q4 no difference image



Q4 no OOT image



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

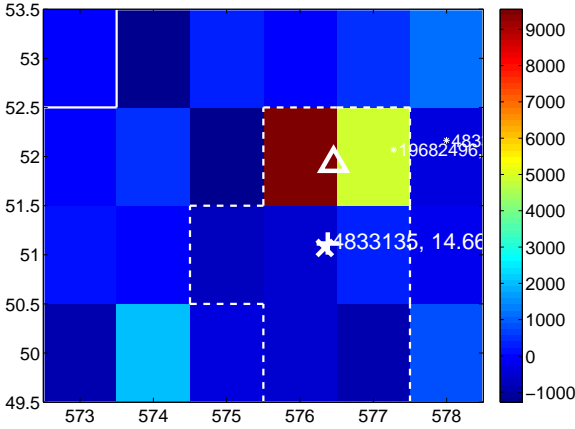
Q5 no difference image



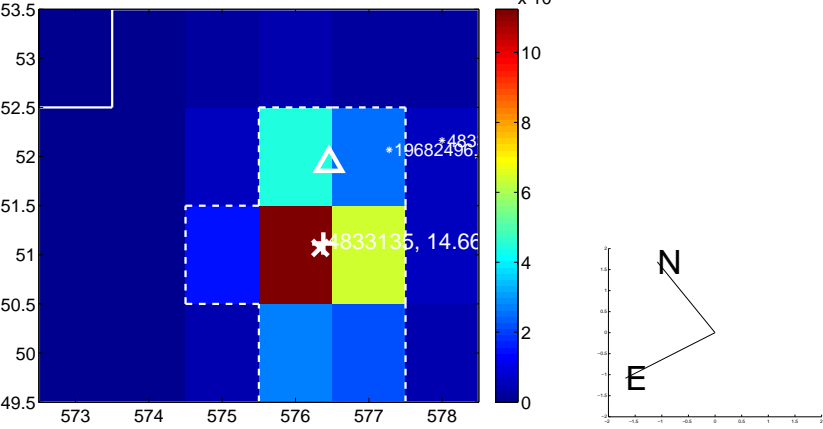
Q5 no OOT image



Q6 difference image



Q6 OOT image



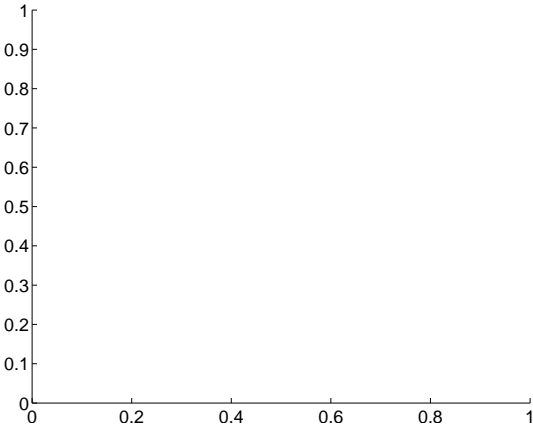
Q7 no difference image



Q7 no OOT image



Q8 no difference image

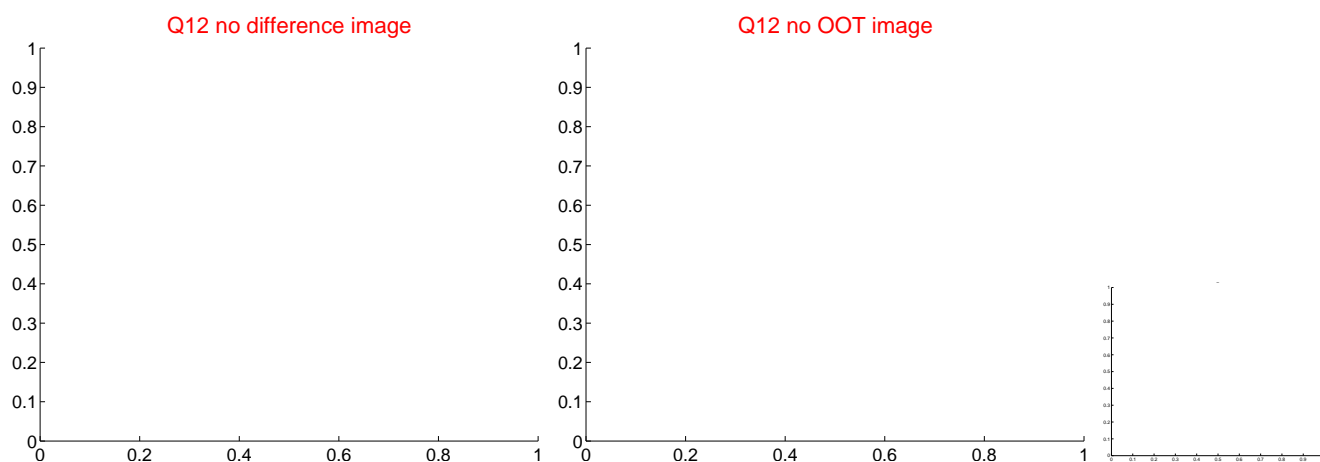
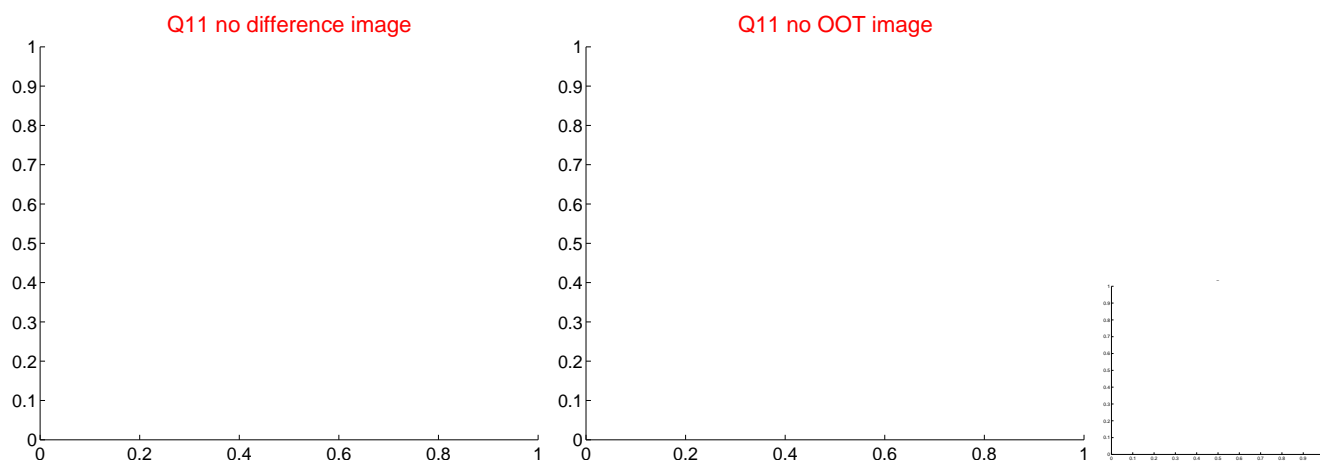
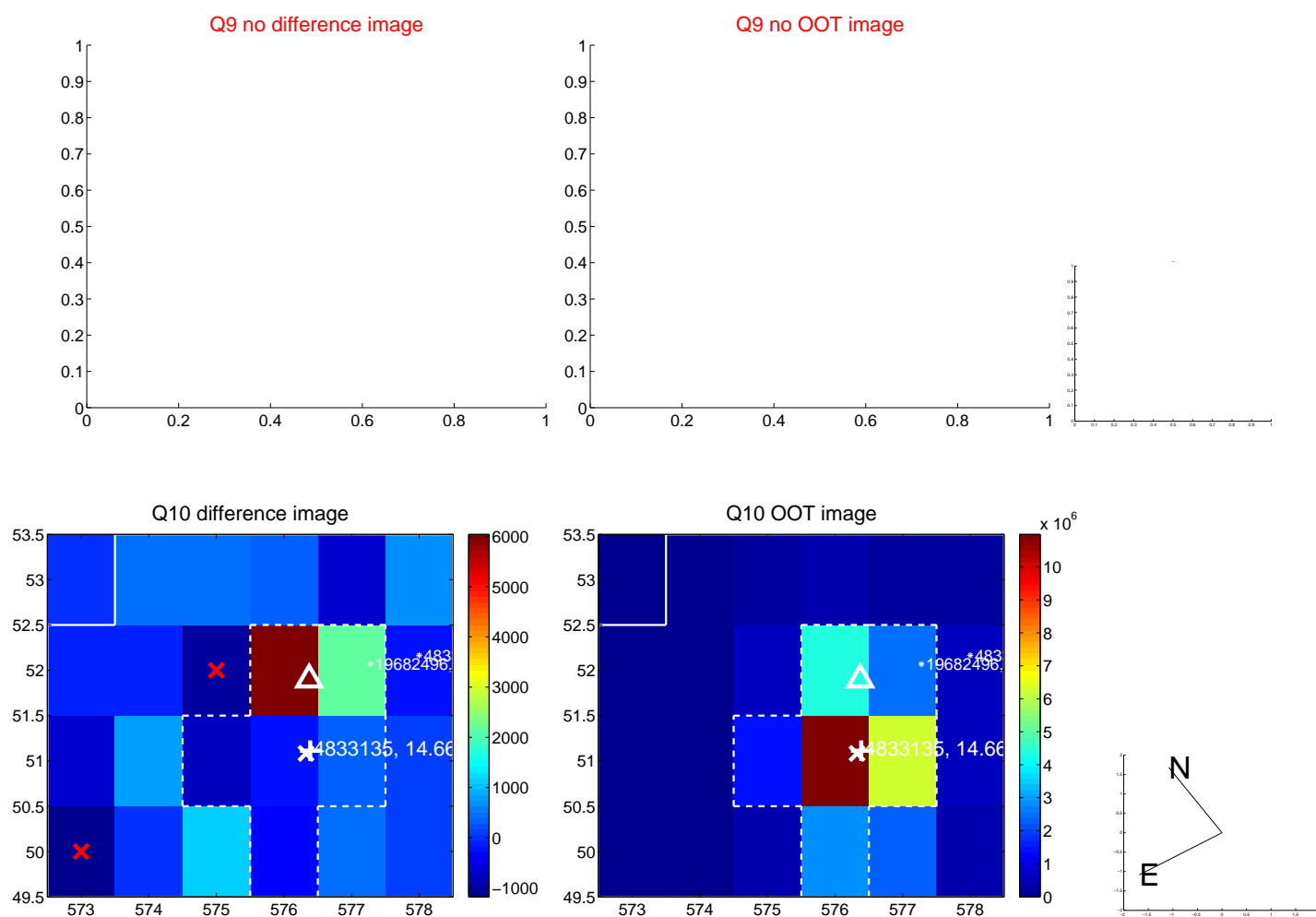


Q8 no OOT image





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.

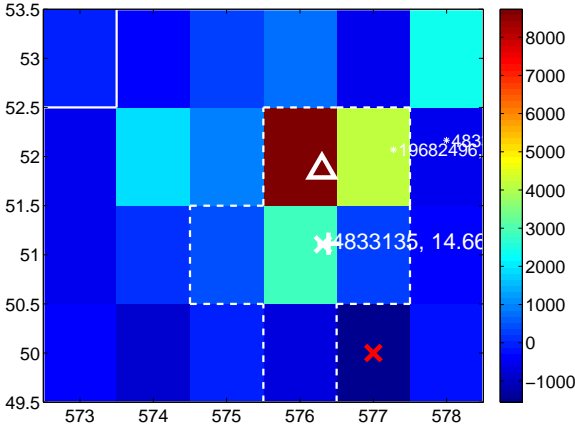
Q13 no difference image



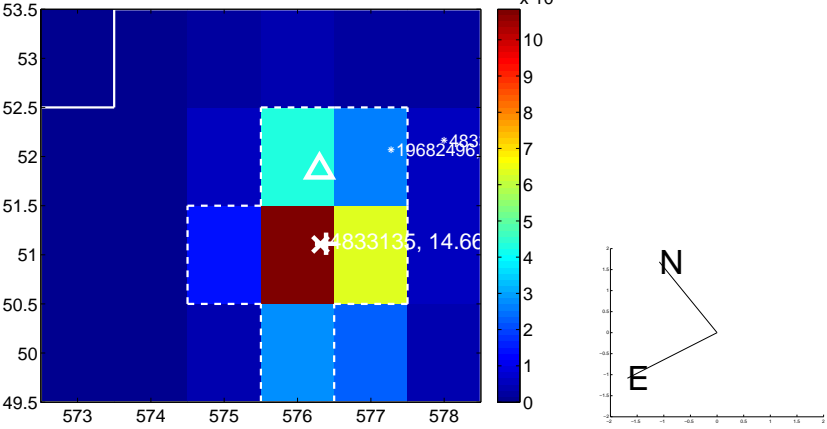
Q13 no OOT image



Q14 difference image



Q14 OOT image



Q15 no difference image



Q15 no OOT image



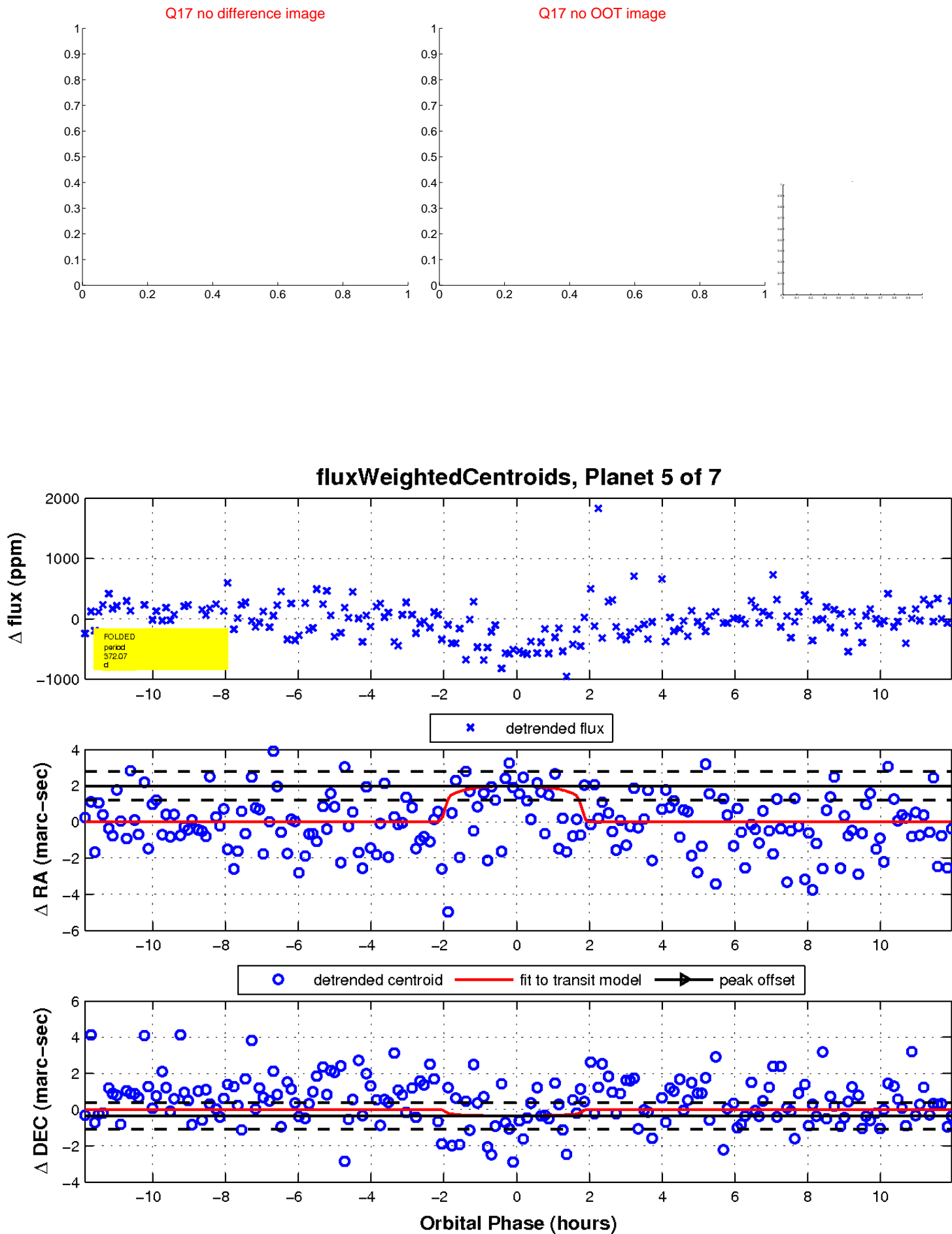
Q16 no difference image



Q16 no OOT image

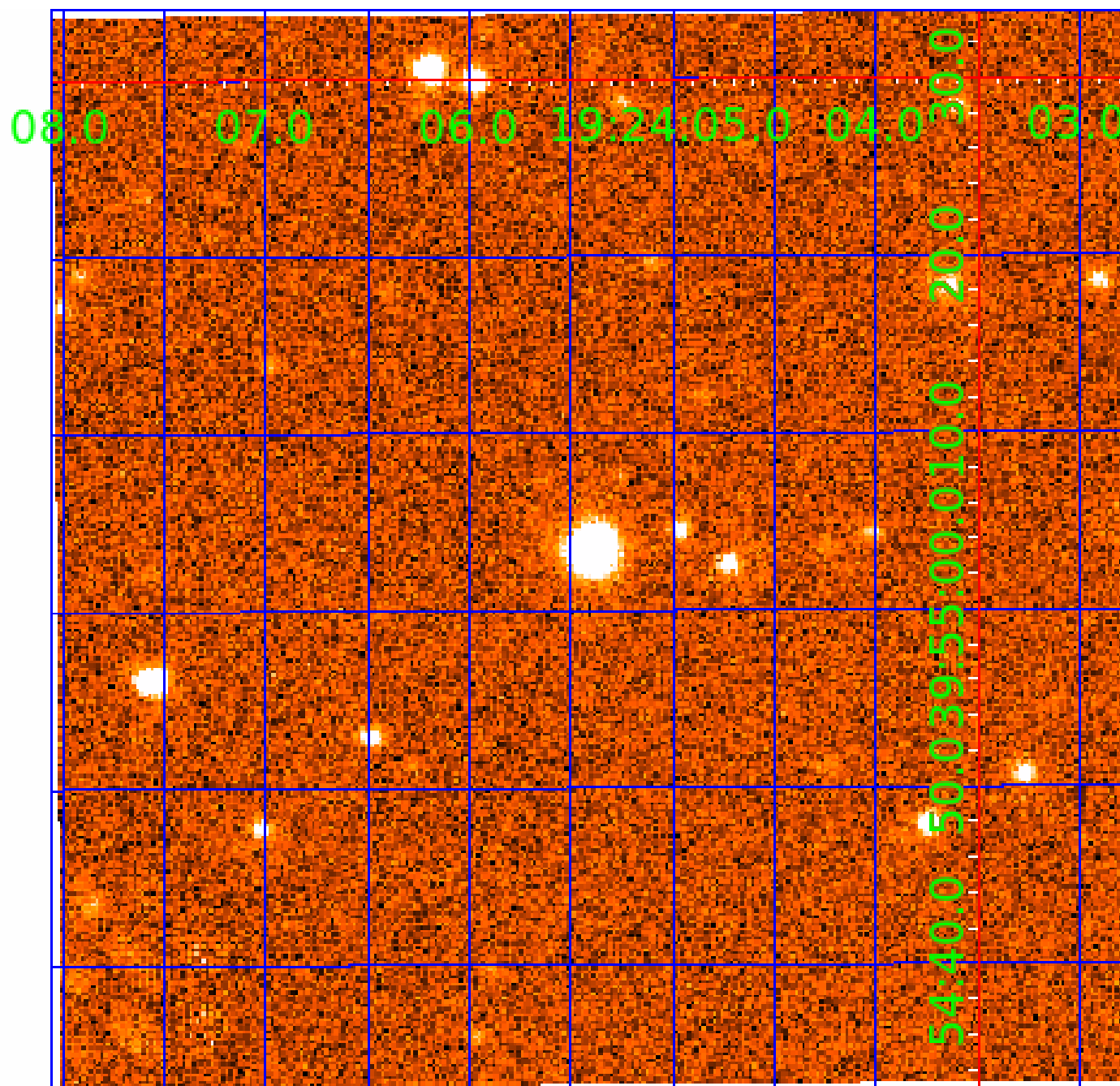


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination



# KIC 004833135

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004833135-01	OBS	No	380.738920	205.878855	660.0	2.780	8.9	9.8	0.99	6250	2.81	1.22
004833135-02	OBS	No	376.862383	196.213724	334.9	25.456	8.8	9.7	0.99	6250	2.07	1.23
004833135-03	OBS	No	372.081681	238.143115	645.9	3.479	8.1	9.5	0.99	6250	3.10	1.25
004833135-04	OBS	No	372.089452	249.136373	595.1	2.721	8.2	9.0	0.99	6250	2.64	1.25
004833135-05	OBS	No	372.070946	246.814275	476.3	3.988	7.9	8.1	0.99	6250	2.35	1.25
004833135-06	OBS	No	372.079096	240.518256	380.2	5.662	8.1	7.3	0.99	6250	2.11	1.25
004833135-07	OBS	No	372.098902	186.196312	542.8	3.022	7.3	7.9	0.99	6250	2.54	1.25

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004833135-01	OBS	FP	0.00	1	0	0	1	ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_FEW_DIFFS—EPHEM_MATCH
004833135-02	OBS	FP	0.00	1	0	0	1	INDIV_TRANS_MARSHALL—CENT_FEW_DIFFS—EPHEM_MATCH
004833135-03	OBS	FP	0.00	1	0	1	1	INDIV_TRANS_MARSHALL—ALL_TRANS_CHASES—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_UNRESOLVED_OFFSET—EPHEM_MATCH
004833135-04	OBS	FP	0.00	1	0	1	0	ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_UNRESOLVED_OFFSET
004833135-05	OBS	FP	0.00	1	0	0	0	MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_FEW_DIFFS
004833135-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_FEW_MEAS
004833135-07	OBS	FP	0.00	1	0	0	0	MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_UNCERTAIN

**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.

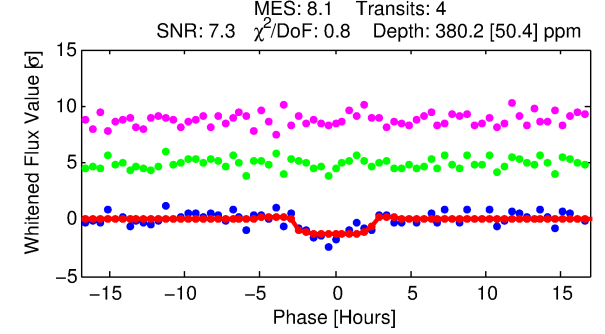
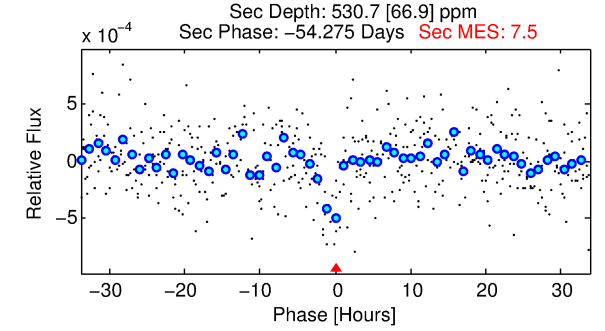
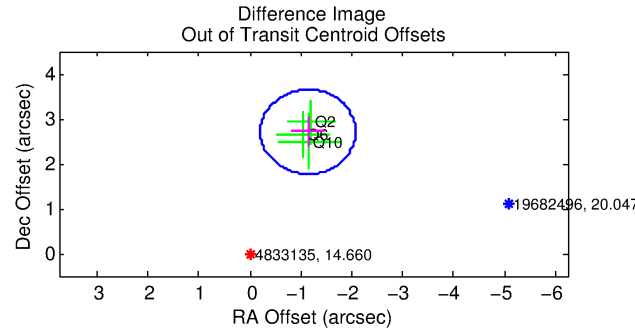
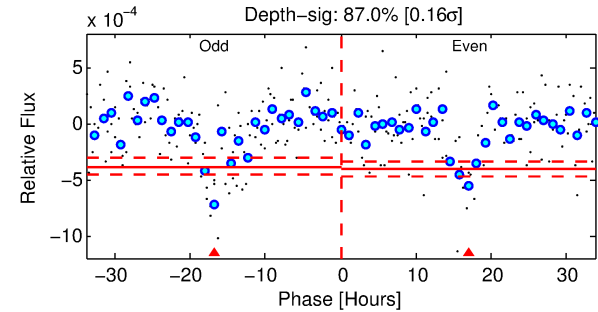
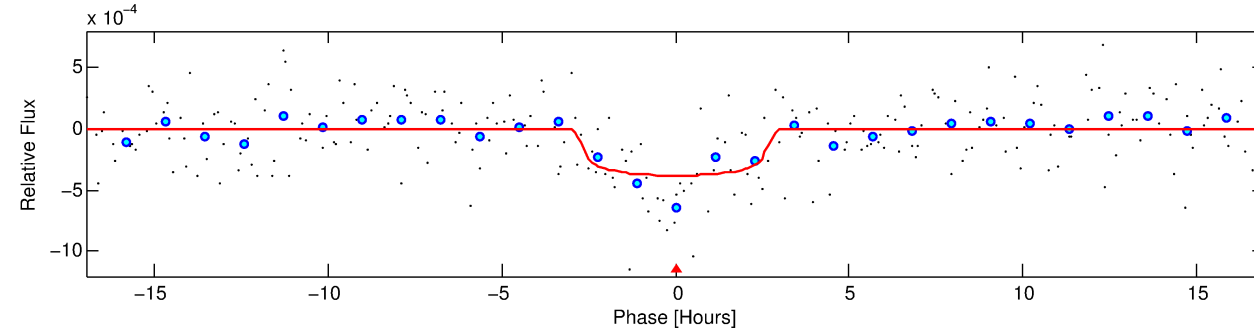
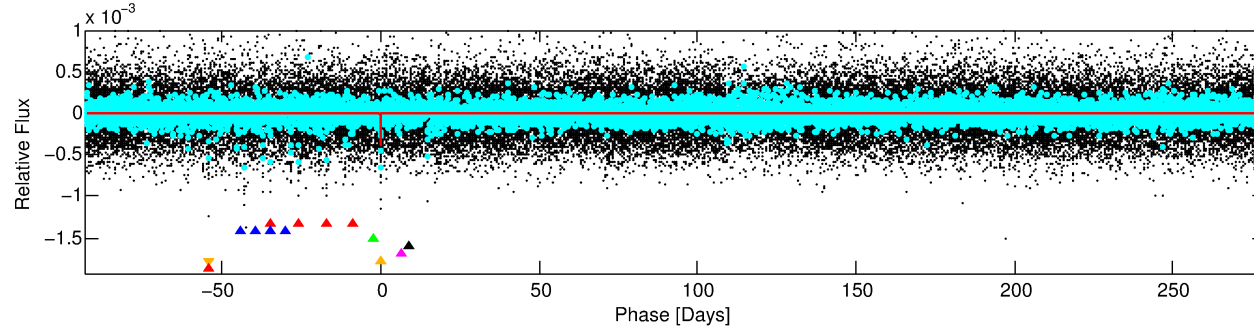
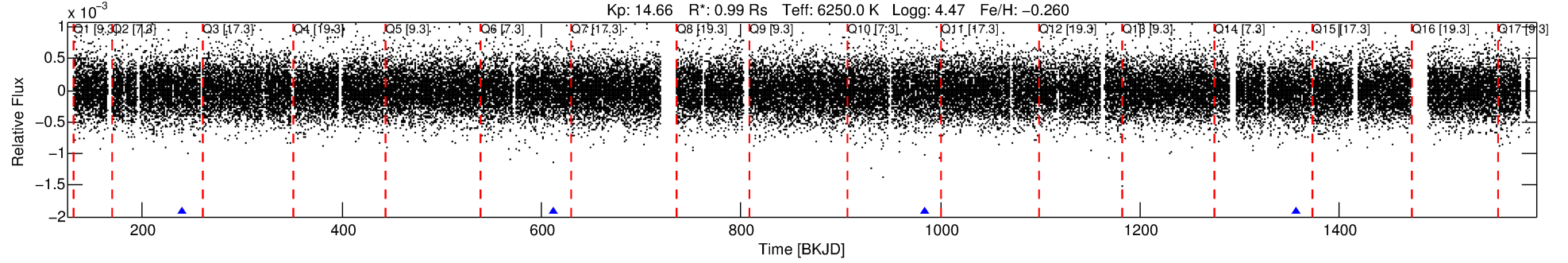
Ephemeris Match Information For 004833135-06

No Significant Match Found

# DV One-Page Summary

KIC: 4833135 Candidate: 6 of 7 Period: 372.079 d  
KOI: K00498 Corr: No Ephemeris Match

Kp: 14.66 R\*: 0.99 Rs Teff: 6250.0 K Logg: 4.47 Fe/H: -0.260



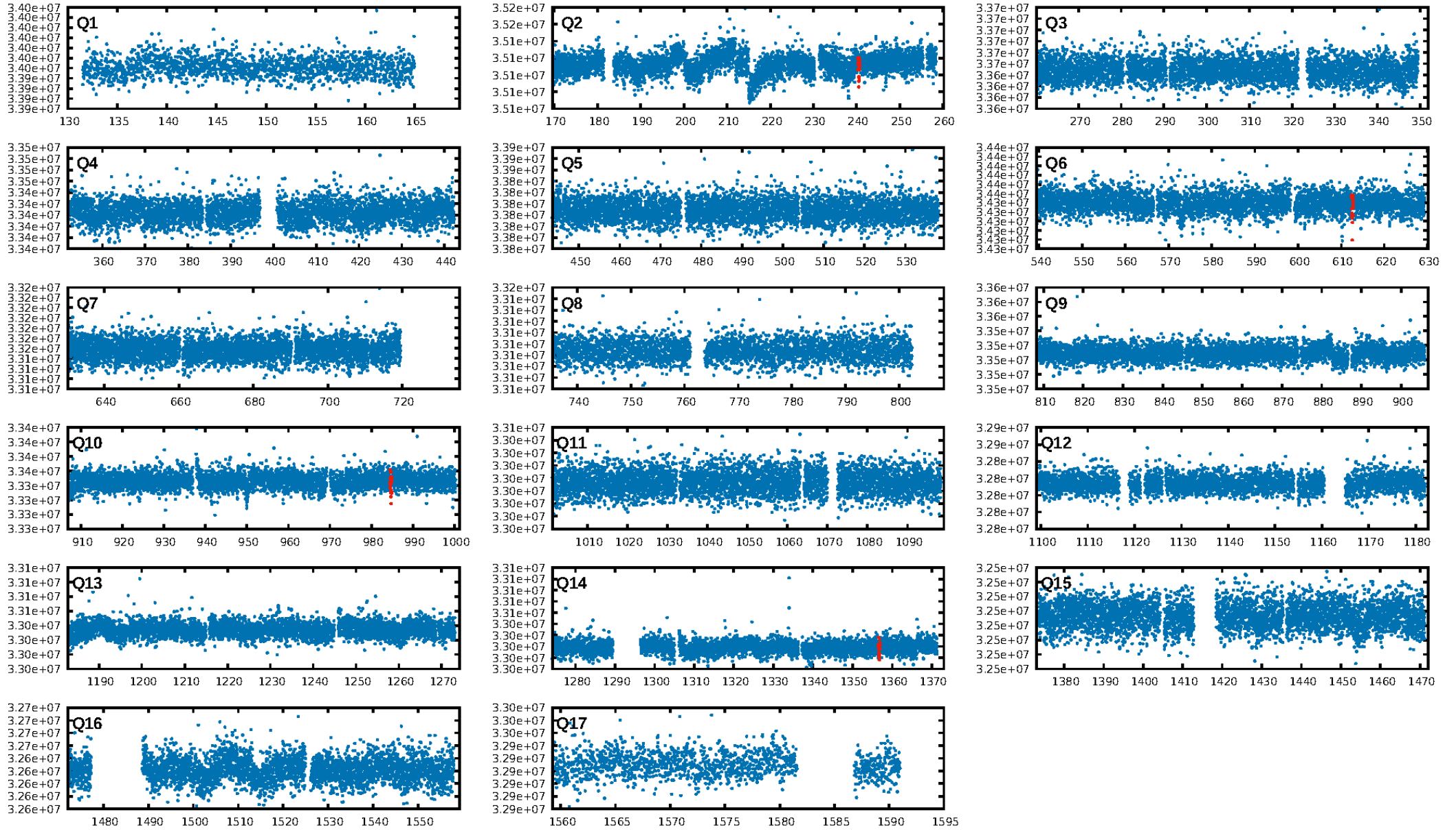
## DV Fit Results:

Period = 372.07910 [0.00625] d  
Epoch = 240.5183 [0.0109] BKJD  
Rp/R\* = 0.0196 [0.0110]  
a/R\* = 330.33 [968.13]  
b = 0.78 [1.49]  
Seff = 1.25 [0.49]  
Teq = 270 [26] K  
Rp = 2.11 [1.35] Re  
a = 1.0297 [0.2647] AU  
Ag = 69691.97 [82891.94] [0.84σ]  
Teffp = 6778 [1929] K [3.37σ]

## DV Diagnostic Results:

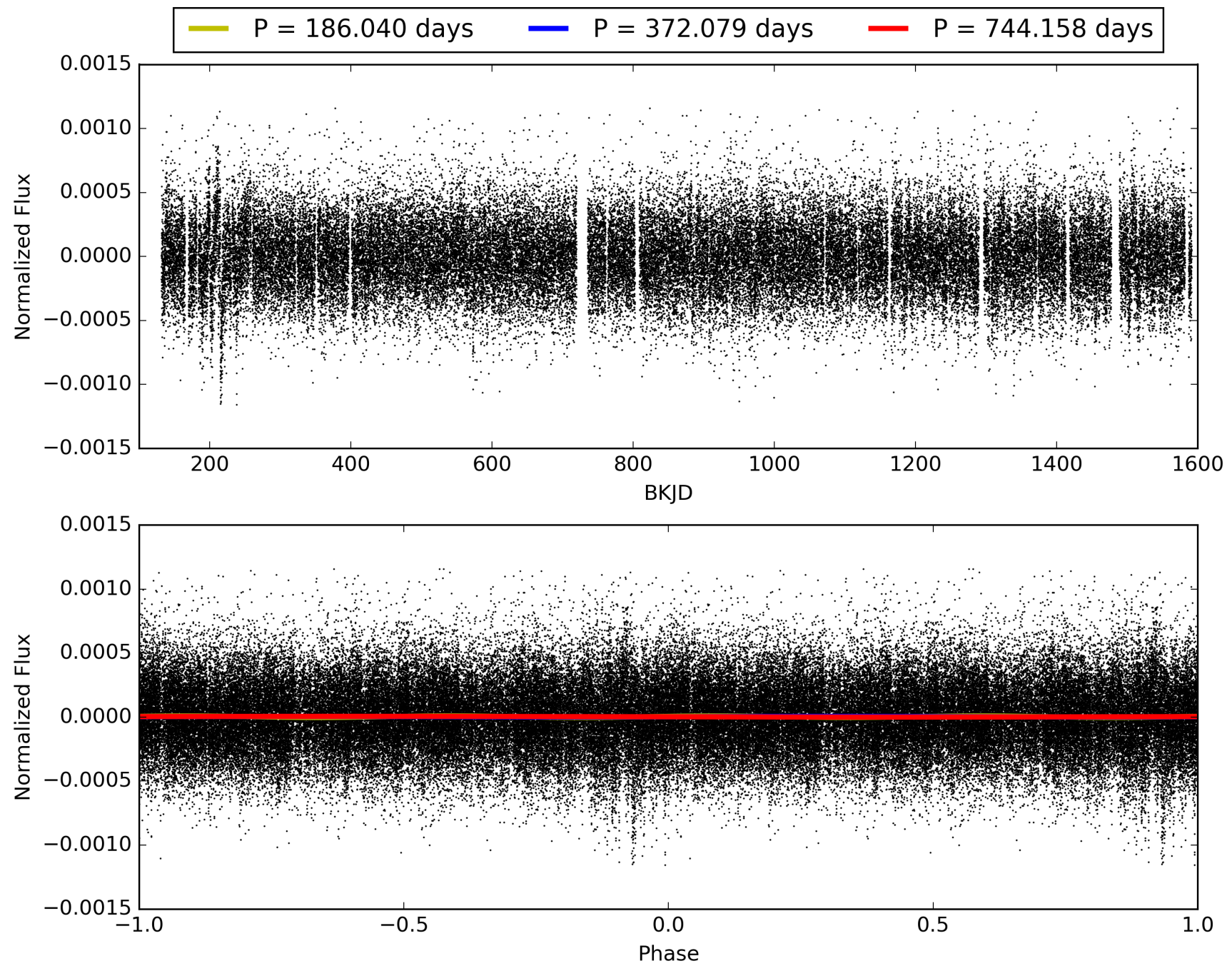
ShortPeriod-sig: 2.3% [0.03σ]  
LongPeriod-sig: 0.7% [0.01σ]  
ModelChiSquare2-sig: 98.4%  
ModelChiSquareGof-sig: 99.5%  
Bootstrap-pfa: 7.48e-13  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -4.641  
Centroid-sig: 0.0%  
Centroid-so: 4.916 arcsec [2.93σ]  
OotOffset-rm: 2.940 arcsec [9.41σ]  
KicOffset-rm: 3.061 arcsec [9.80σ]  
OotOffset-st: 3/0/0/0 [3]  
KicOffset-st: 3/0/0/0 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [4/4]

# TCE 004833135-06, PDC Light Curves





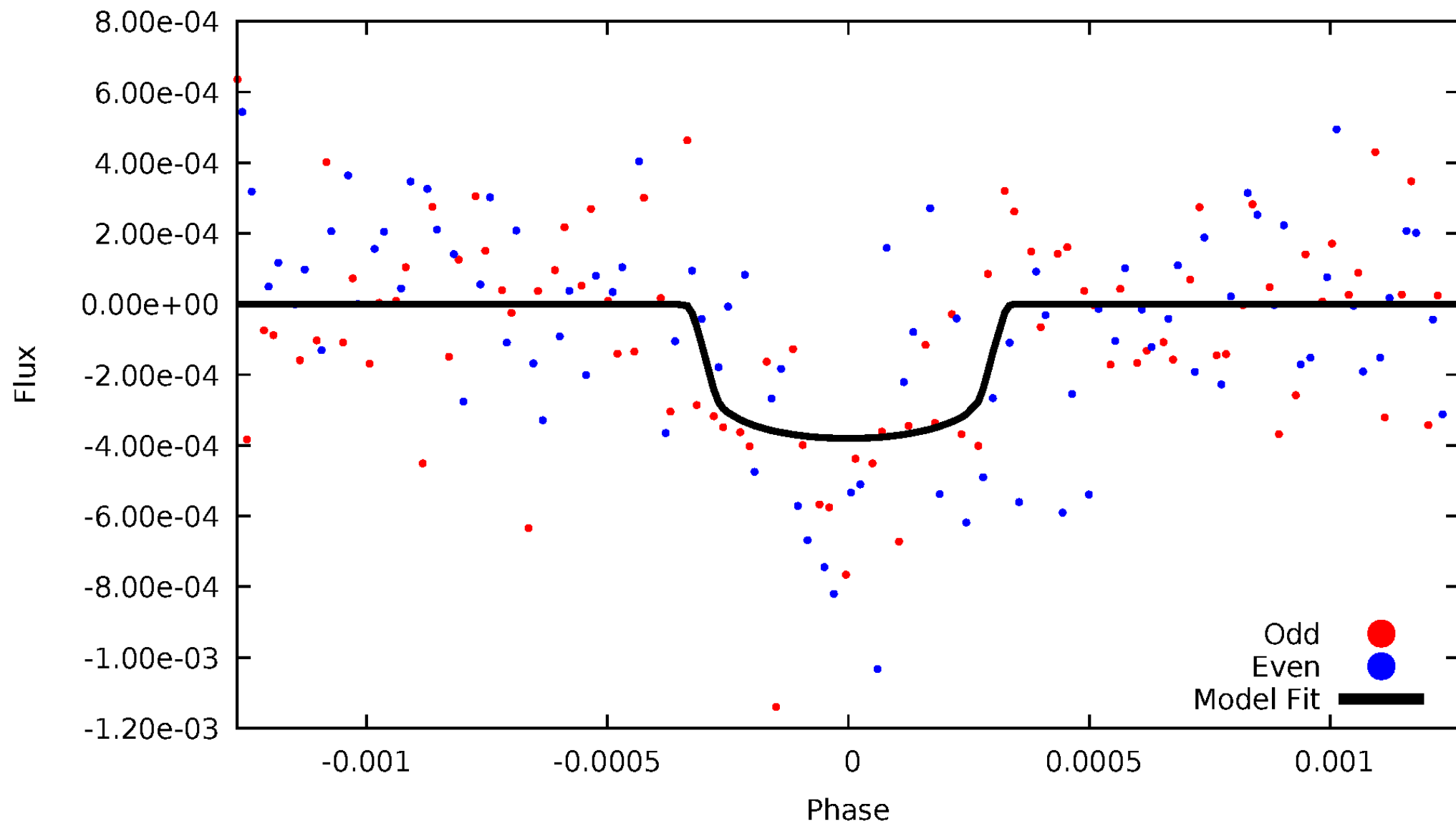
TCE 004833135-06





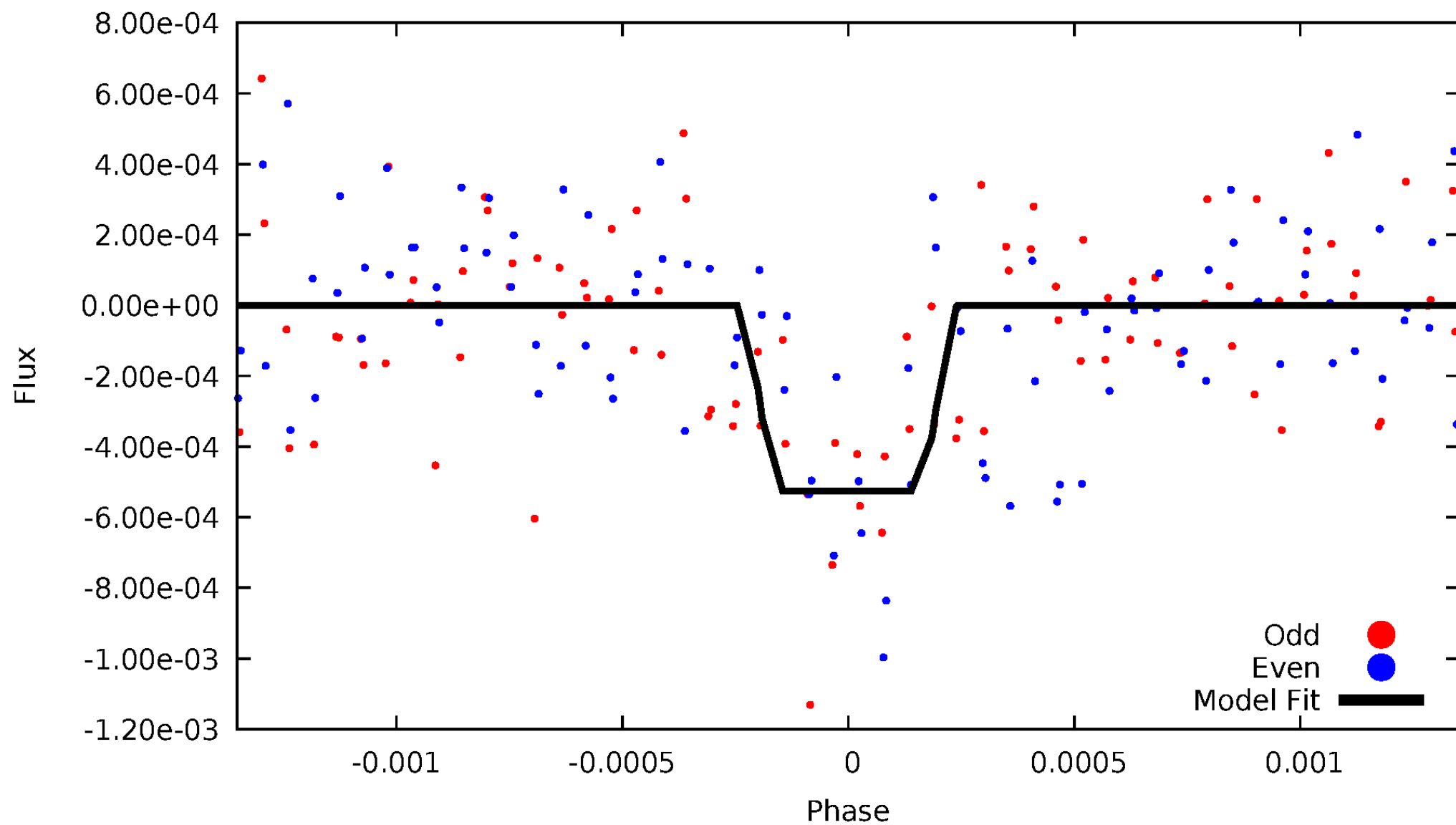
# DV Odd/Even

TCE 004833135-06



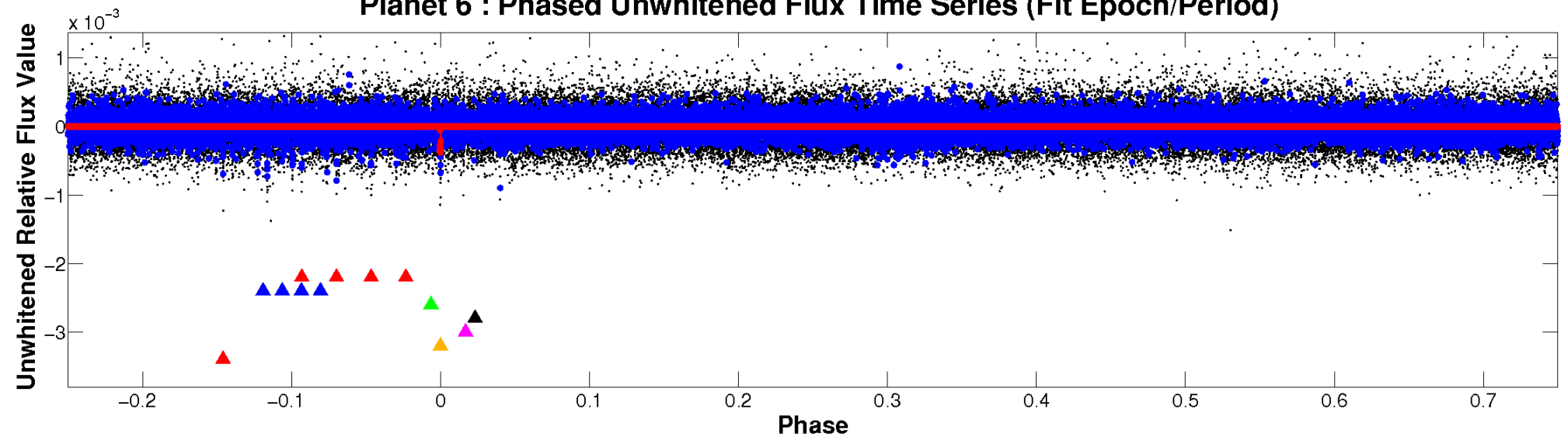
# ALT Odd/Even

TCE 004833135-06

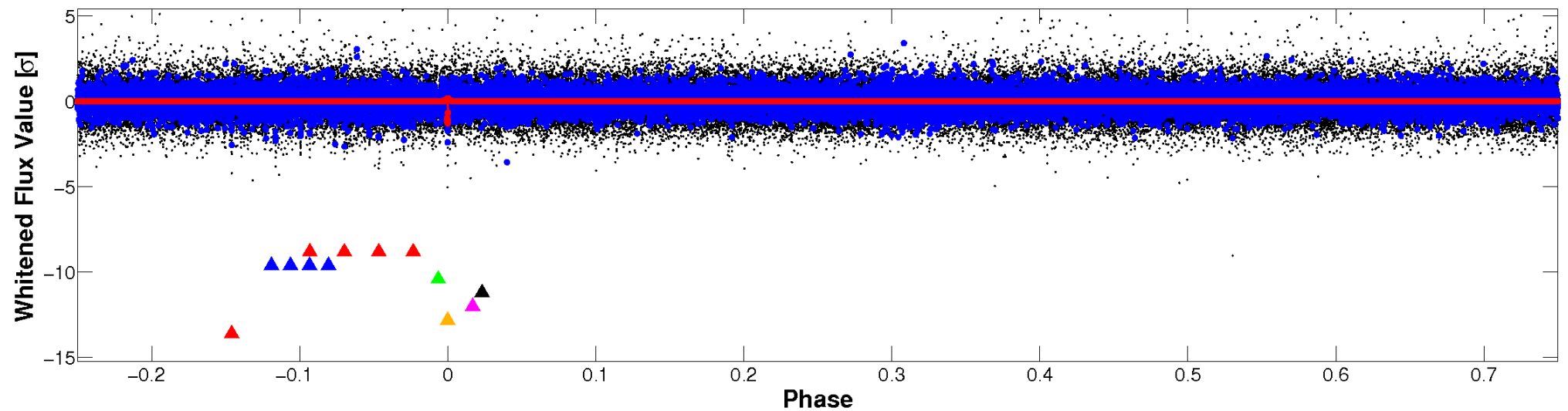


# Non-Whitened Vs. Whitened Light Curve

## Planet 6 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

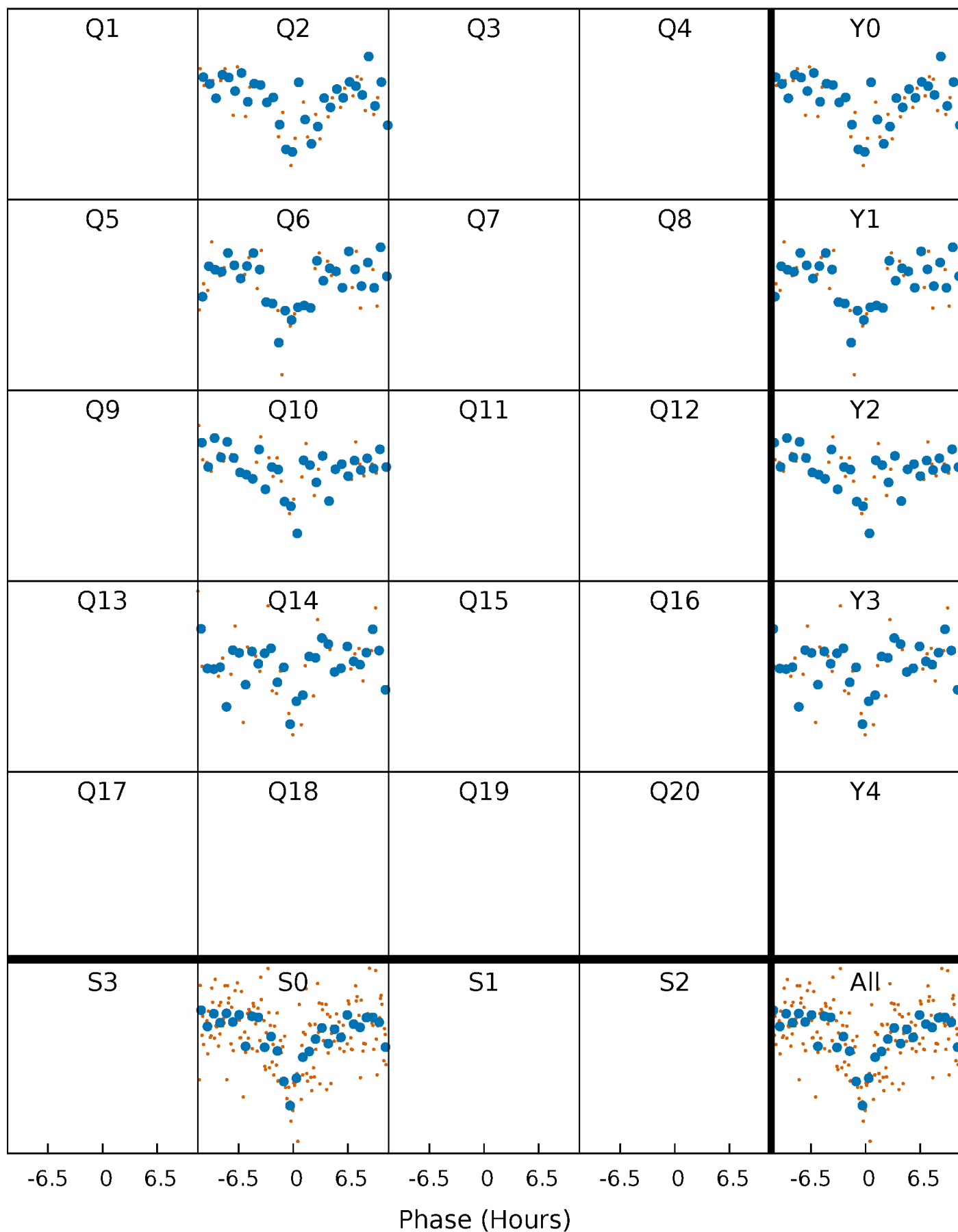


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



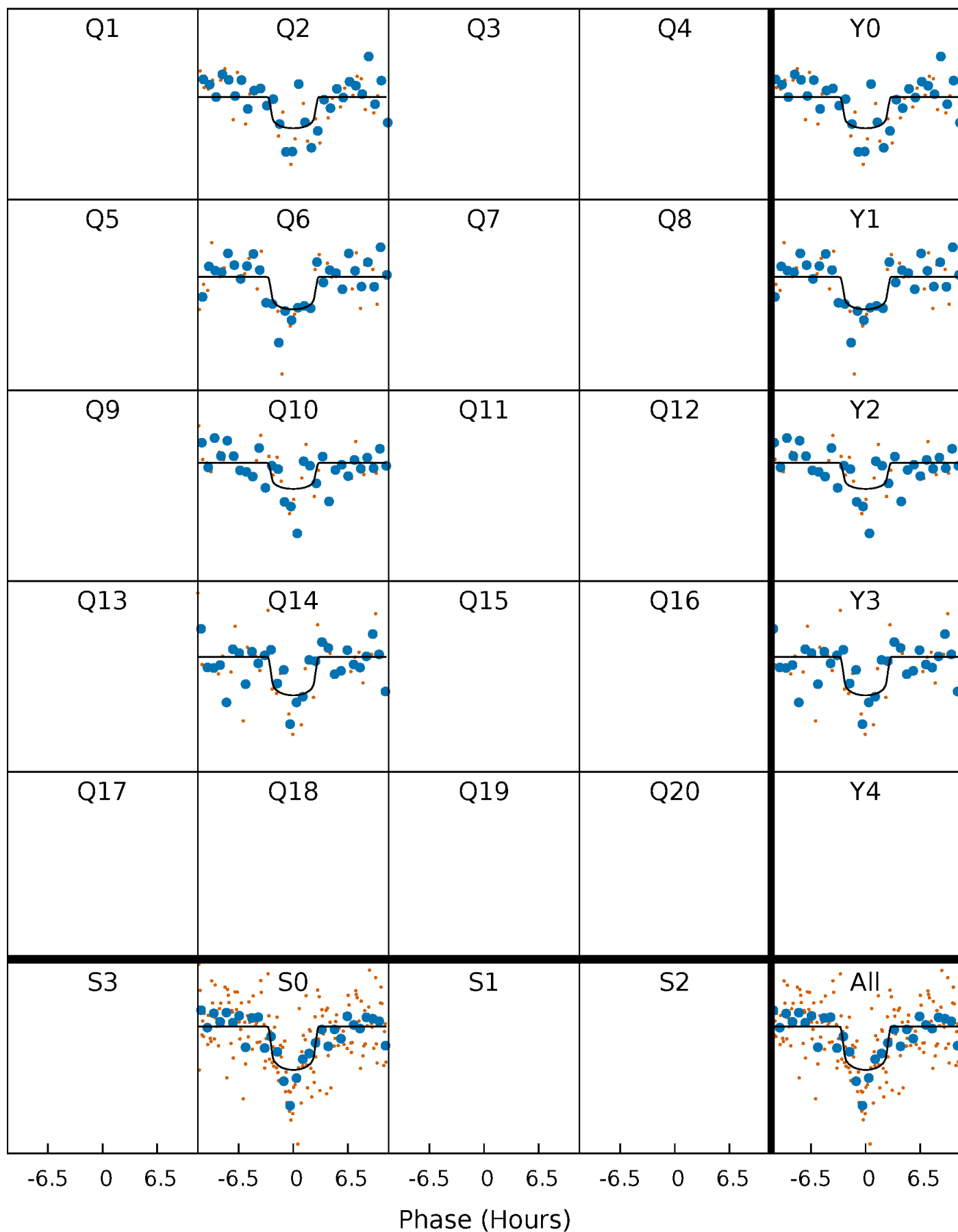
# PDC Quarter-Phased Transit Curves

TCE 004833135-06 P=372.079096 Days  $T_0=240.518256$  (BKJD)



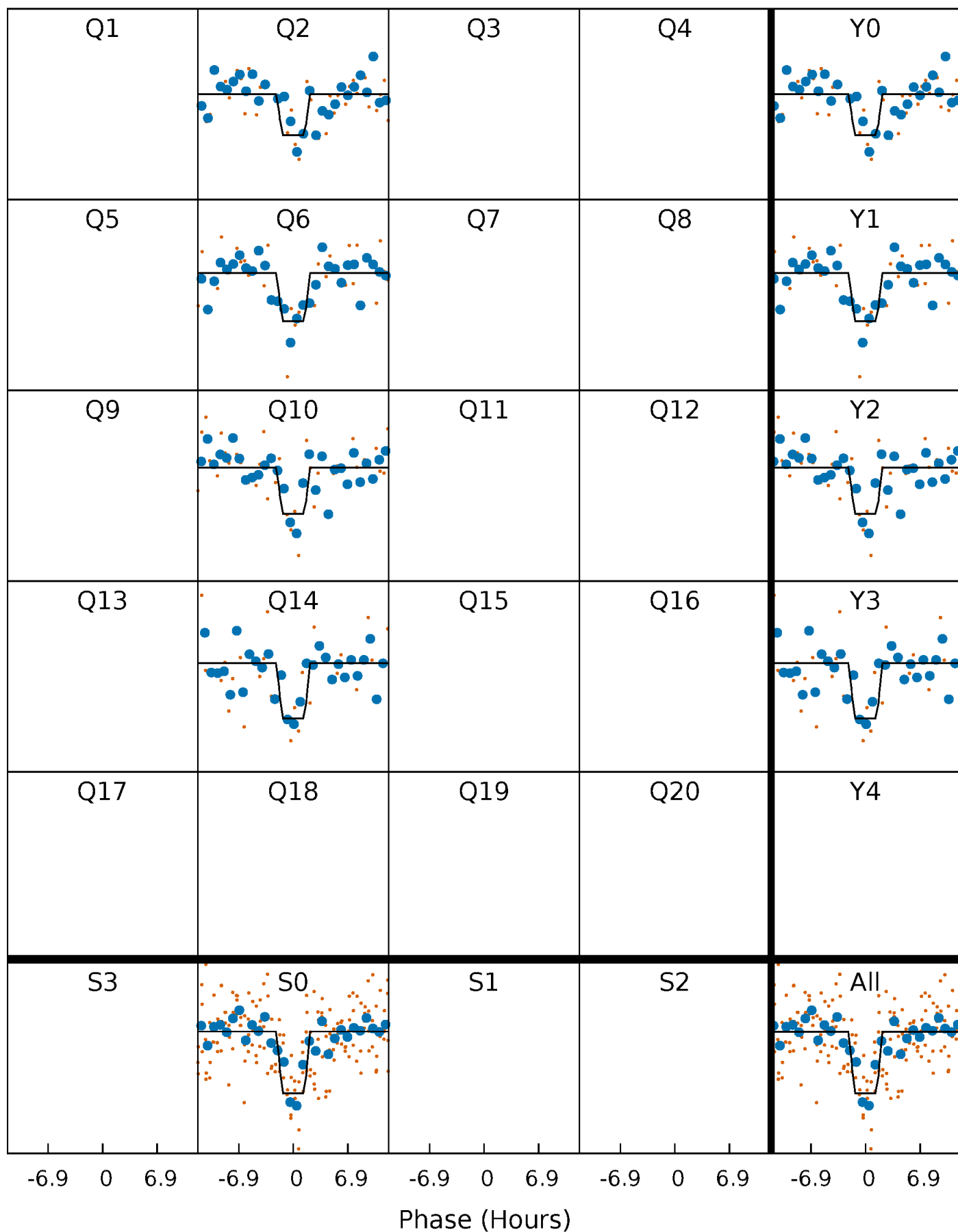
# DV Quarter-Phased Transit Curves

TCE 004833135-06 P=372.079096 Days  $T_0=240.518256$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

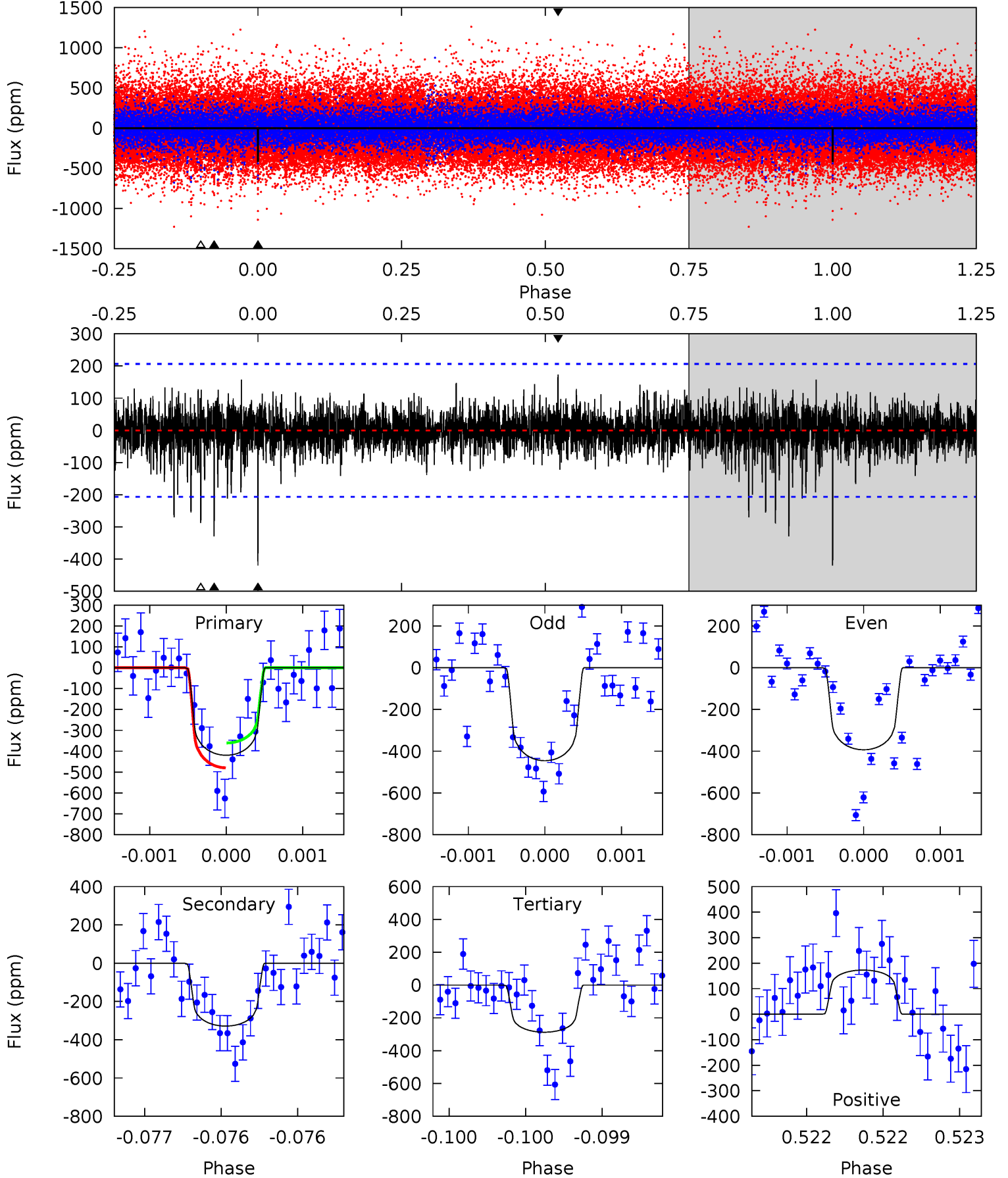
TCE 004833135-06 P=372.096939 Days  $T_0=240.476049$  (BKJD)



# DV Model-Shift Uniqueness Test

004833135-06, P = 372.079096 Days, E = 240.518256 Days

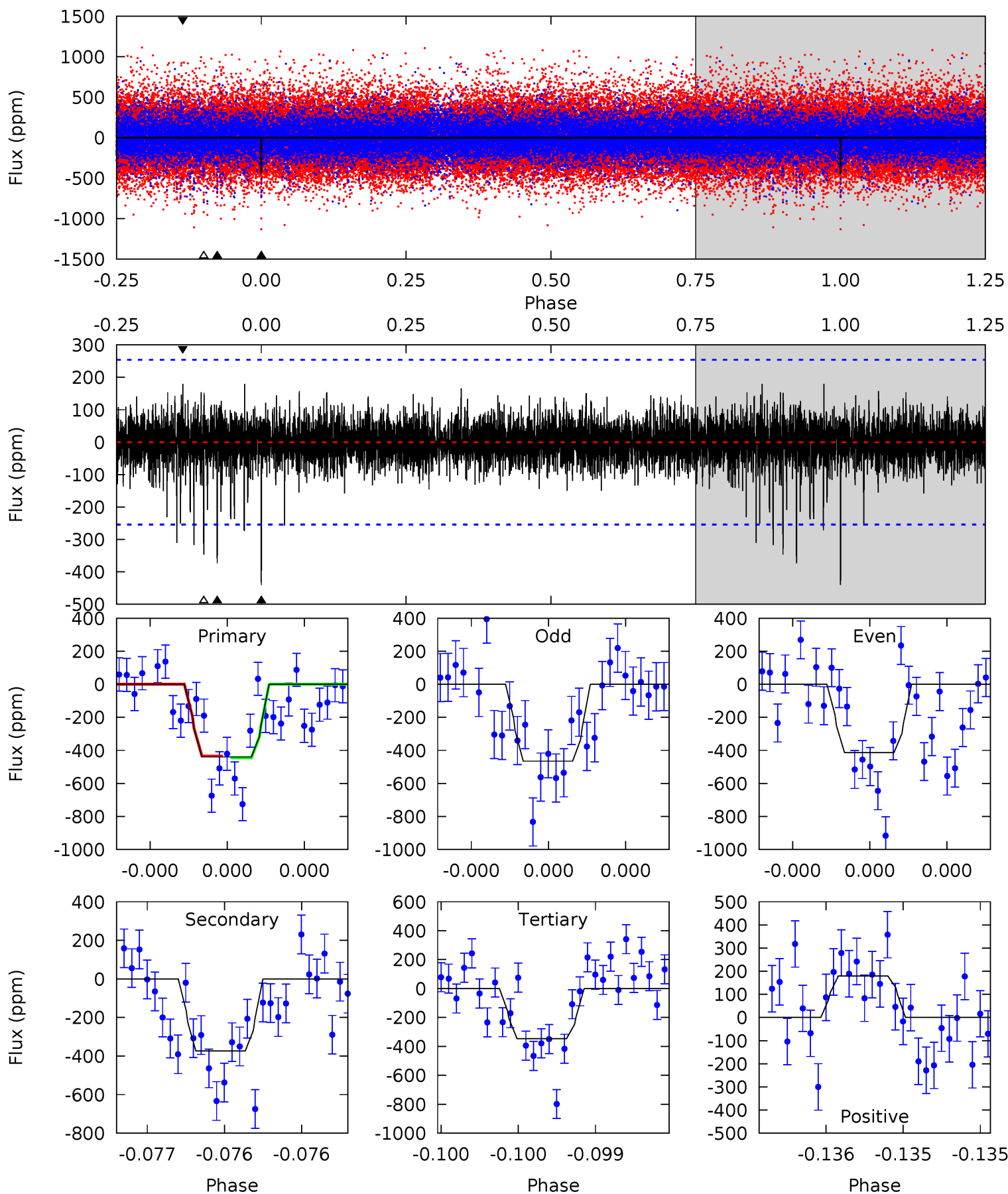
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.2	8.79	7.68	4.63	5.52	3.40	1.19	3.53	6.59	1.11	4.16	0.70	1.04	0.29	1.59



# Alt Model-Shift Uniqueness Test

004833135-06, P = 372.096939 Days, E = 240.476049 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
9.68	8.22	7.63	3.95	5.59	3.51	1.07	2.05	5.72	0.59	4.27	0.57	1.06	0.29	0.10





### Stellar Parameters For KIC 004833135

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6250^{+169}_{-206}$	$4.472^{+0.050}_{-0.200}$	$-0.260^{+0.300}_{-0.300}$	$0.986^{+0.305}_{-0.102}$	$1.052^{+0.147}_{-0.134}$	$1.544^{+0.404}_{-0.769}$
	+3%/-3%	+1%/-4%	+115%/-115%	+31%/-10%	+14%/-13%	+26%/-50%
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 004833135-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-329 \pm 37$	$2.27^{+1.30}_{-1.10}$	$385^{+27}_{-18}$	$5956^{+2404}_{-1097}$	$36171^{+94882}_{-21023}$
Alt.	$-374 \pm 45$	$2.63^{+1.22}_{-1.14}$	$386^{+26}_{-19}$	$5725^{+2027}_{-893}$	$31414^{+65107}_{-17323}$

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

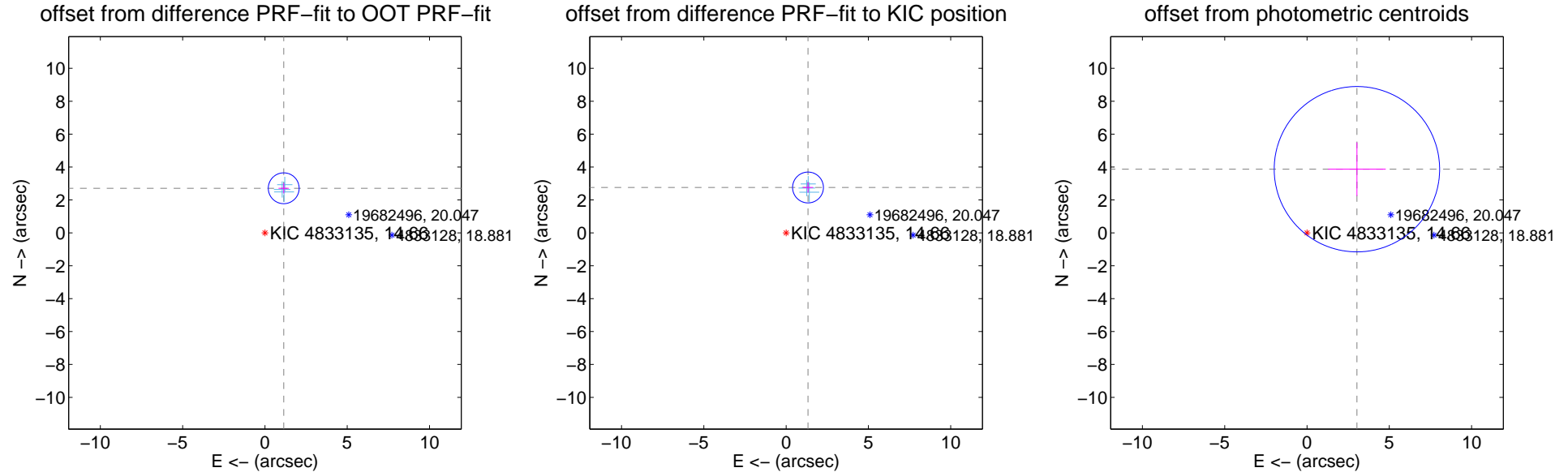
## DV Centroid Data

Supplemental centroid analysis for 004833135-06. Kepler magnitude: 14.66. Transit SNR 7.31

There are 3 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.940 \pm 0.312$	9.41	$-1.141 \pm 0.312$	$2.709 \pm 0.312$
PRF-fit source offset from KIC position	$3.061 \pm 0.312$	9.80	$-1.330 \pm 0.312$	$2.757 \pm 0.312$
photometric centroid source offset	$4.92 \pm 1.68$	2.93	$-3.03 \pm 1.75$	$3.87 \pm 1.63$



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.

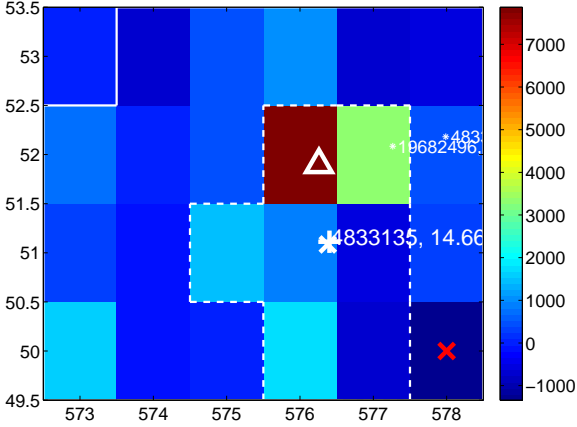
Q1 no difference image



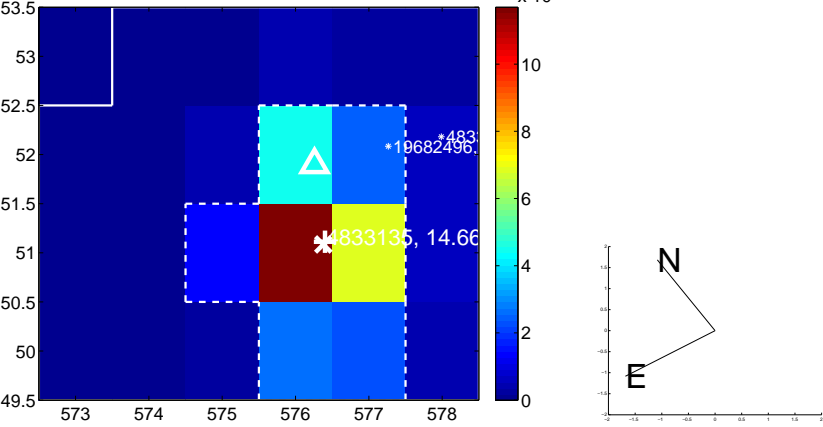
Q1 no OOT image



Q2 difference image



Q2 OOT image



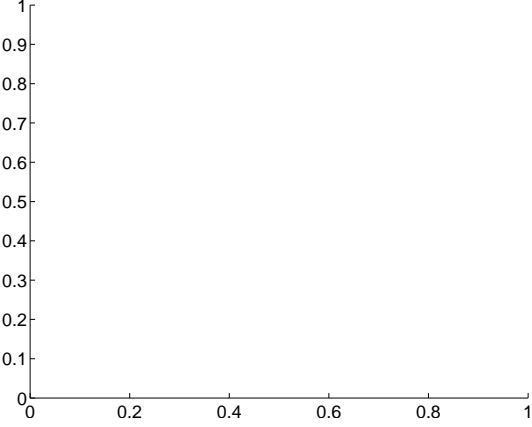
Q3 no difference image



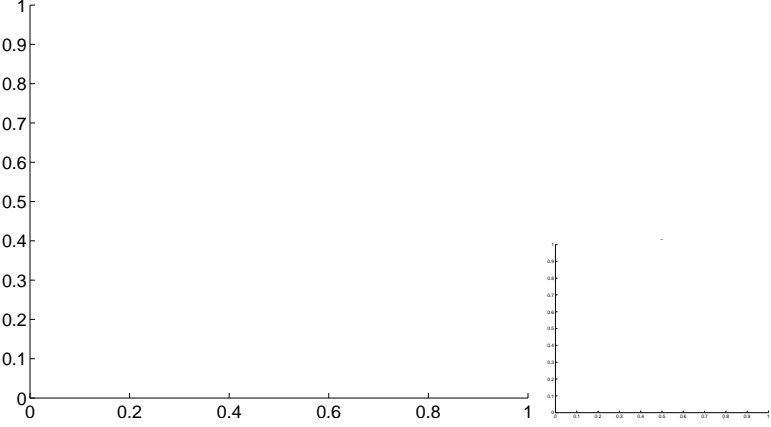
Q3 no OOT image



Q4 no difference image



Q4 no OOT image



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

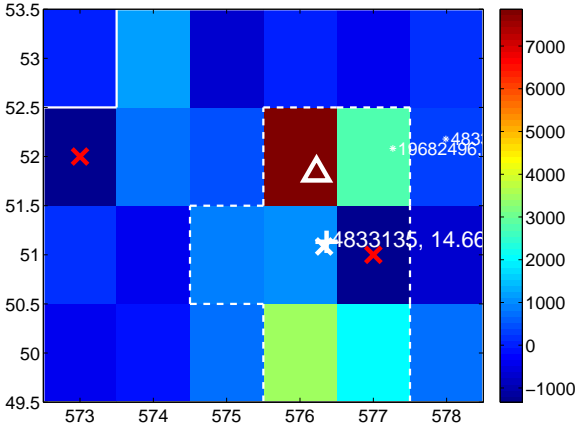
Q5 no difference image



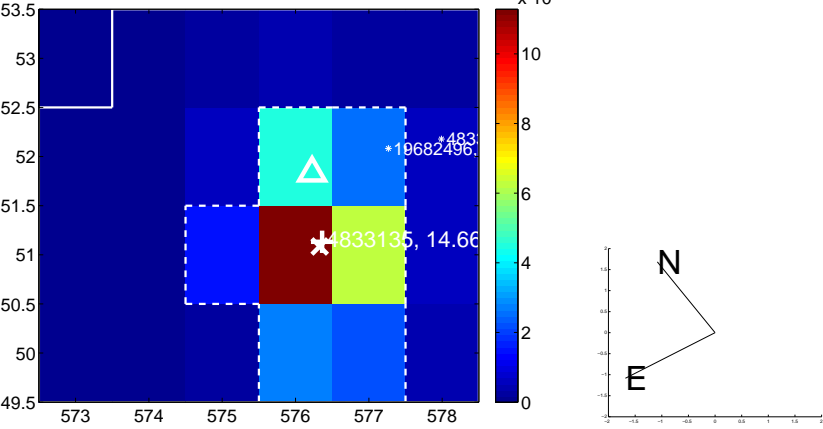
Q5 no OOT image



Q6 difference image



Q6 OOT image



Q7 no difference image



Q7 no OOT image



Q8 no difference image



Q8 no OOT image



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

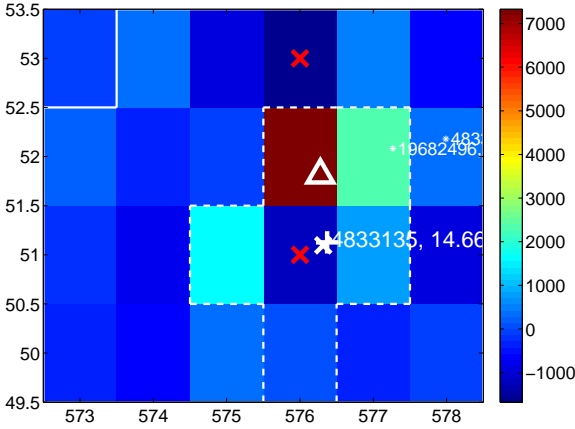
Q9 no difference image



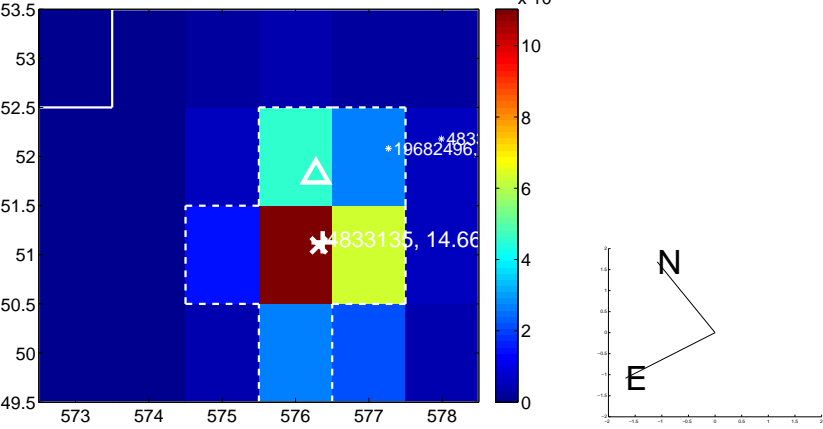
Q9 no OOT image



Q10 difference image



Q10 OOT image



Q11 no difference image



Q11 no OOT image



Q12 no difference image



Q12 no OOT image



white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

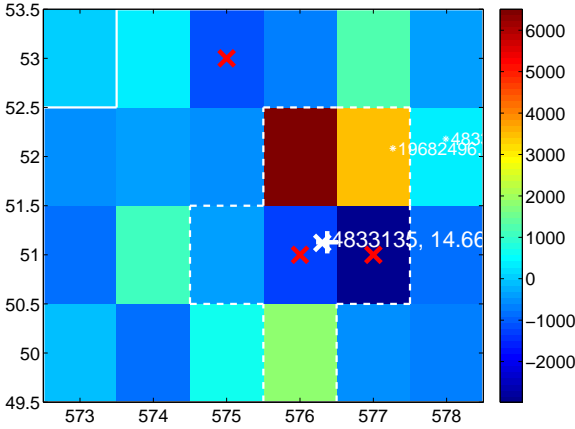
Q13 no difference image



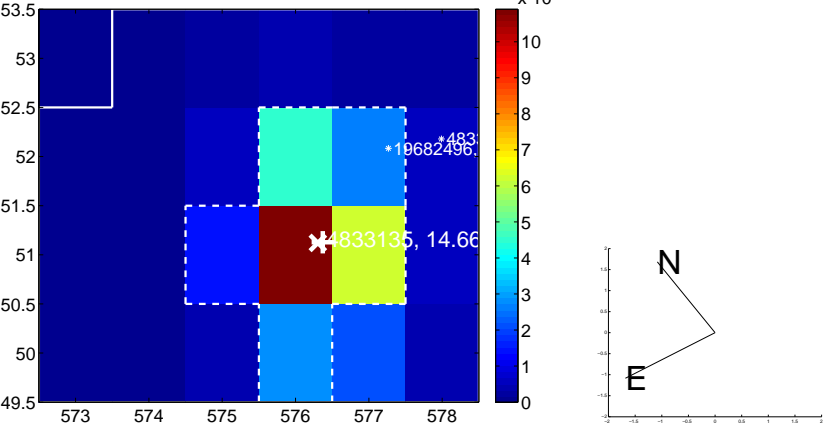
Q13 no OOT image



Q14 difference image. Poor Quality



Q14 OOT image



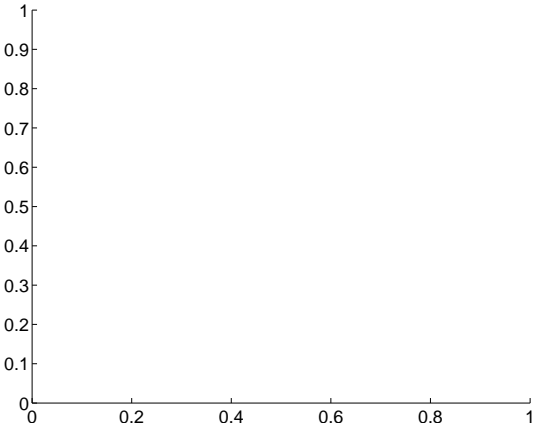
Q15 no difference image



Q15 no OOT image



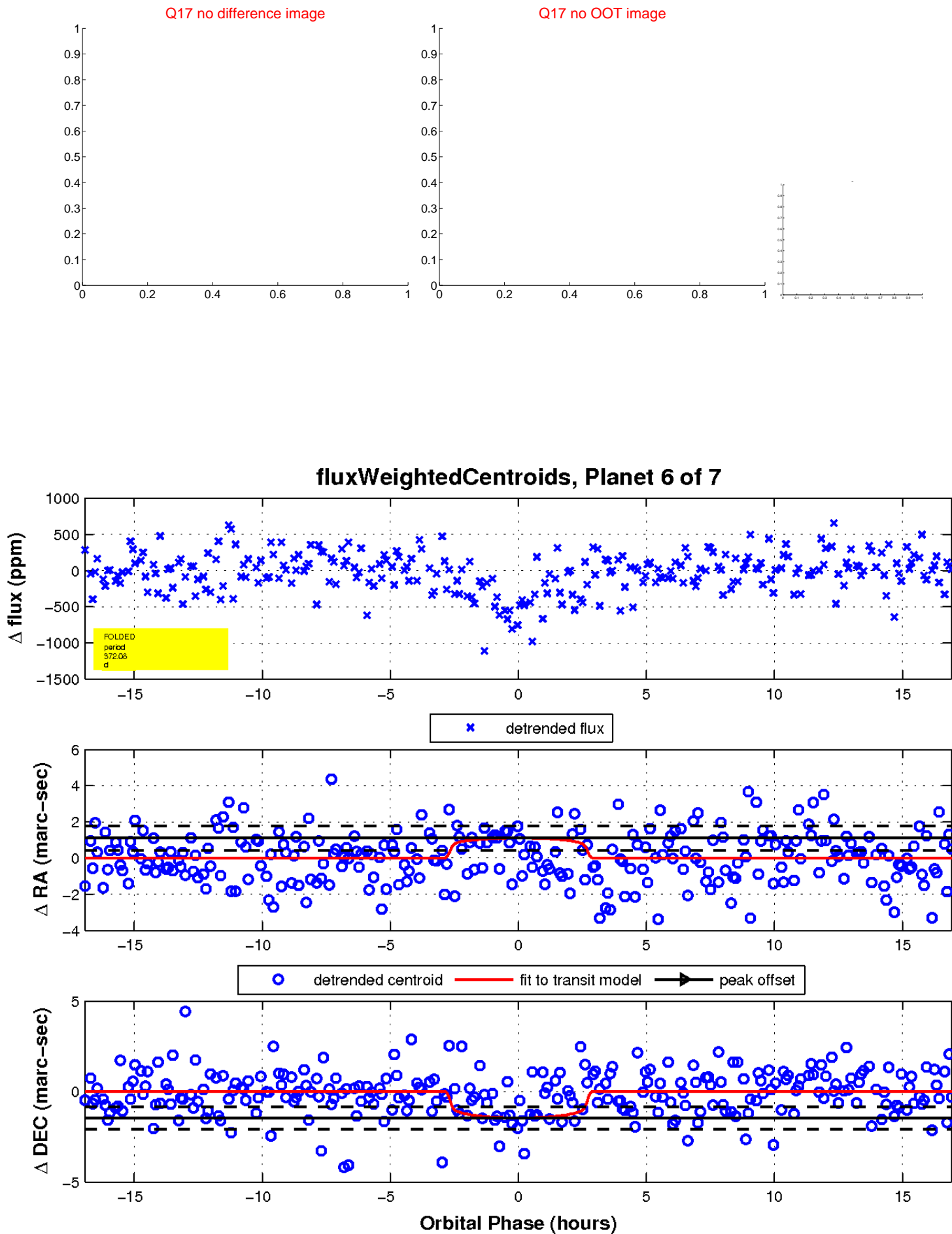
Q16 no difference image



Q16 no OOT image

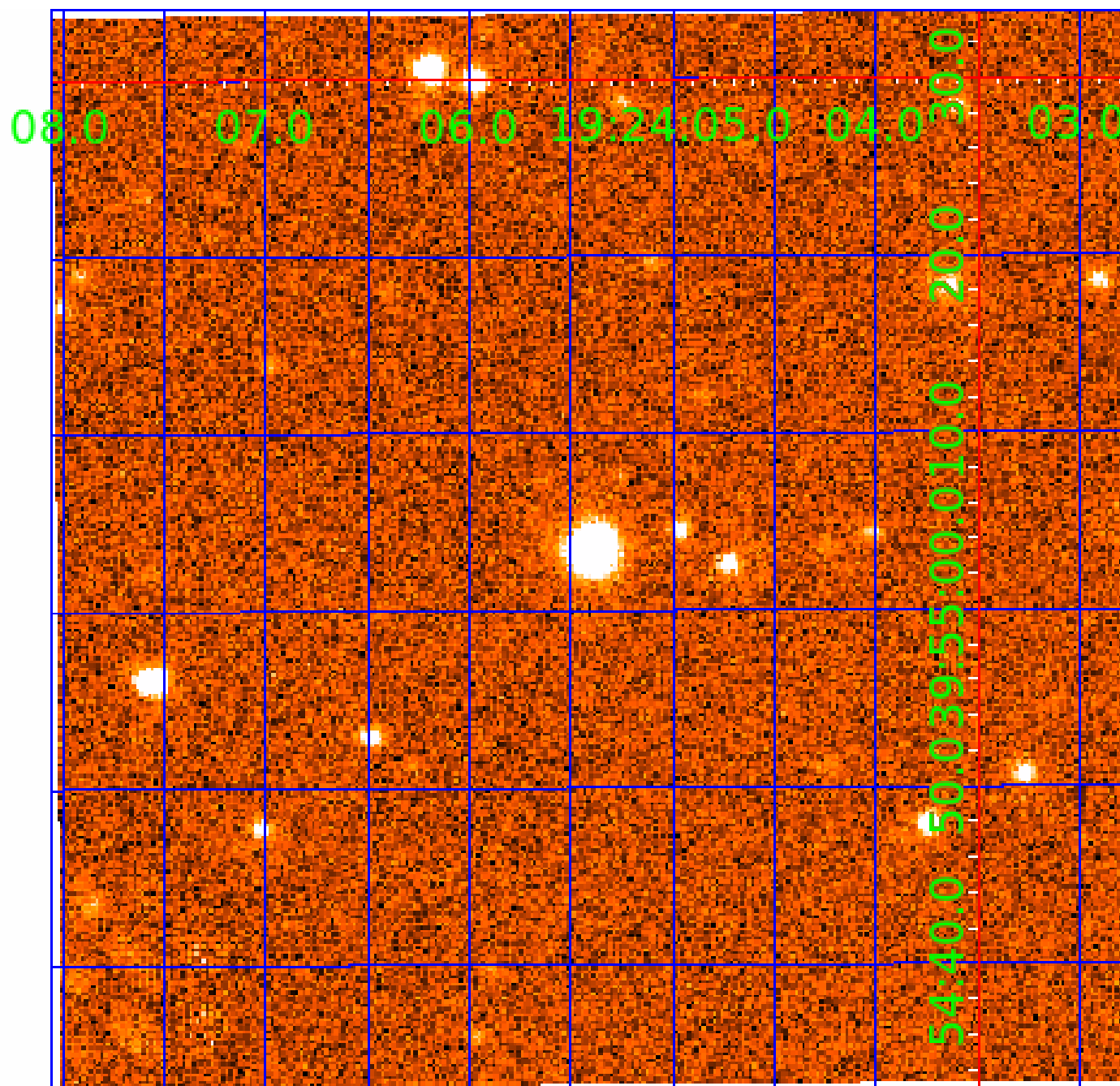


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination





# KIC 004833135

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004833135-01	OBS	No	380.738920	205.878855	660.0	2.780	8.9	9.8	0.99	6250	2.81	1.22
004833135-02	OBS	No	376.862383	196.213724	334.9	25.456	8.8	9.7	0.99	6250	2.07	1.23
004833135-03	OBS	No	372.081681	238.143115	645.9	3.479	8.1	9.5	0.99	6250	3.10	1.25
004833135-04	OBS	No	372.089452	249.136373	595.1	2.721	8.2	9.0	0.99	6250	2.64	1.25
004833135-05	OBS	No	372.070946	246.814275	476.3	3.988	7.9	8.1	0.99	6250	2.35	1.25
004833135-06	OBS	No	372.079096	240.518256	380.2	5.662	8.1	7.3	0.99	6250	2.11	1.25
004833135-07	OBS	No	372.098902	186.196312	542.8	3.022	7.3	7.9	0.99	6250	2.54	1.25

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004833135-01	OBS	FP	0.00	1	0	0	1	ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_FEW_DIFFS—EPHEM_MATCH
004833135-02	OBS	FP	0.00	1	0	0	1	INDIV_TRANS_MARSHALL—CENT_FEW_DIFFS—EPHEM_MATCH
004833135-03	OBS	FP	0.00	1	0	1	1	INDIV_TRANS_MARSHALL—ALL_TRANS_CHASES—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_UNRESOLVED_OFFSET—EPHEM_MATCH
004833135-04	OBS	FP	0.00	1	0	1	0	ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_UNRESOLVED_OFFSET
004833135-05	OBS	FP	0.00	1	0	0	0	MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_FEW_DIFFS
004833135-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_FEW_MEAS
004833135-07	OBS	FP	0.00	1	0	0	0	MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_UNCERTAIN

**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.

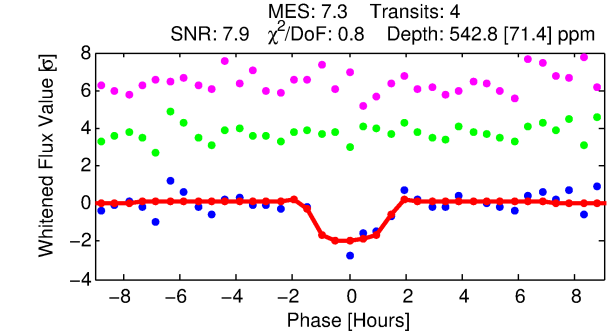
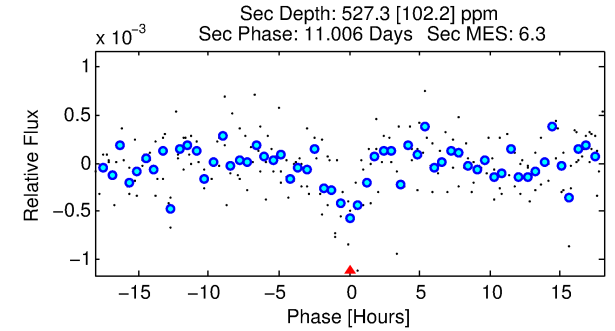
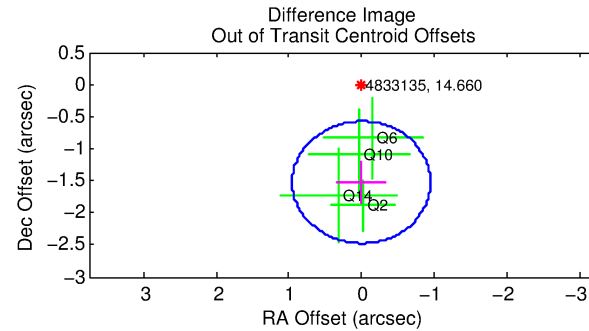
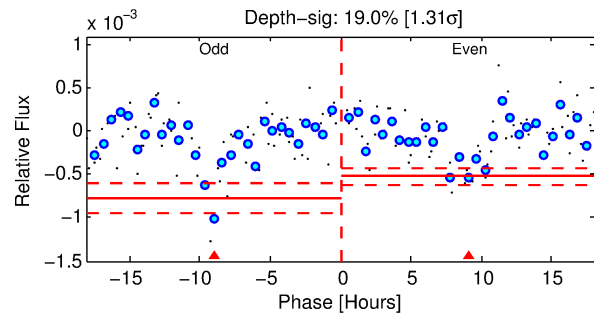
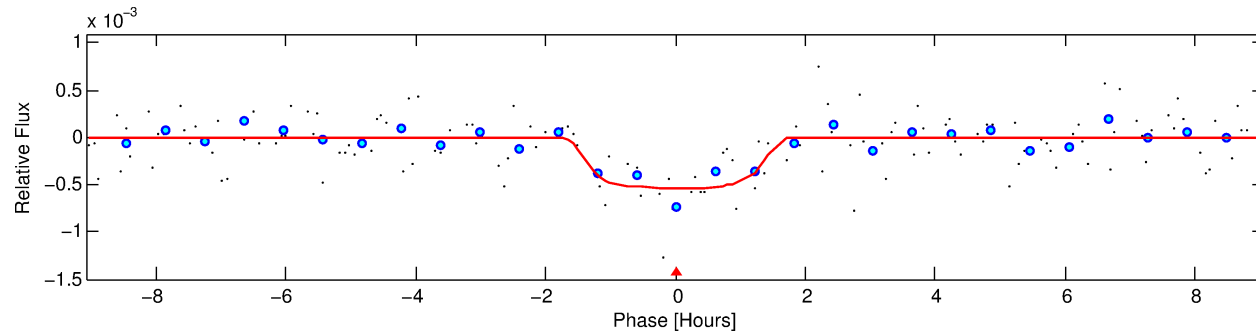
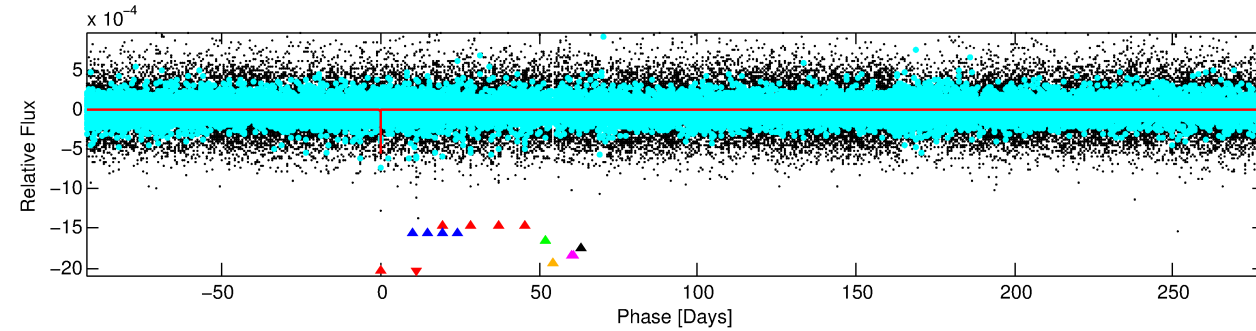
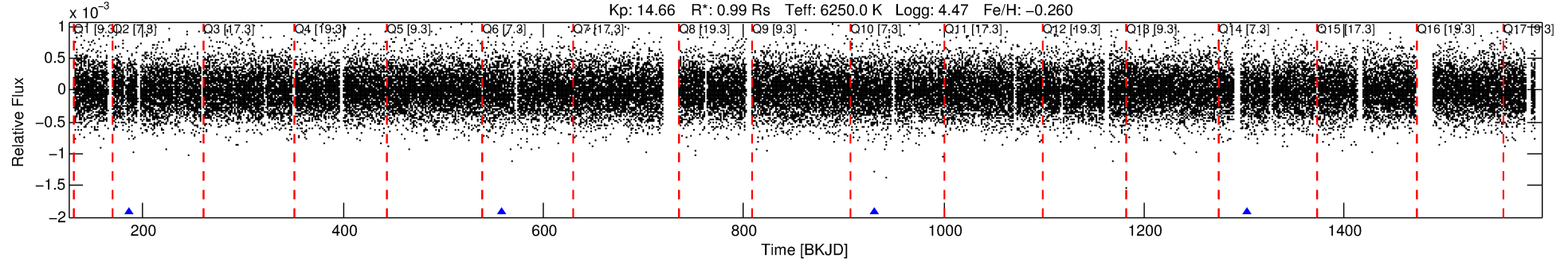
Ephemeris Match Information For 004833135-07

No Significant Match Found

# DV One-Page Summary

KIC: 4833135 Candidate: 7 of 7 Period: 372.099 d  
KOI: K00498 Corr: No Ephemeris Match

Kp: 14.66 R\*: 0.99 Rs Teff: 6250.0 K Logg: 4.47 Fe/H: -0.260



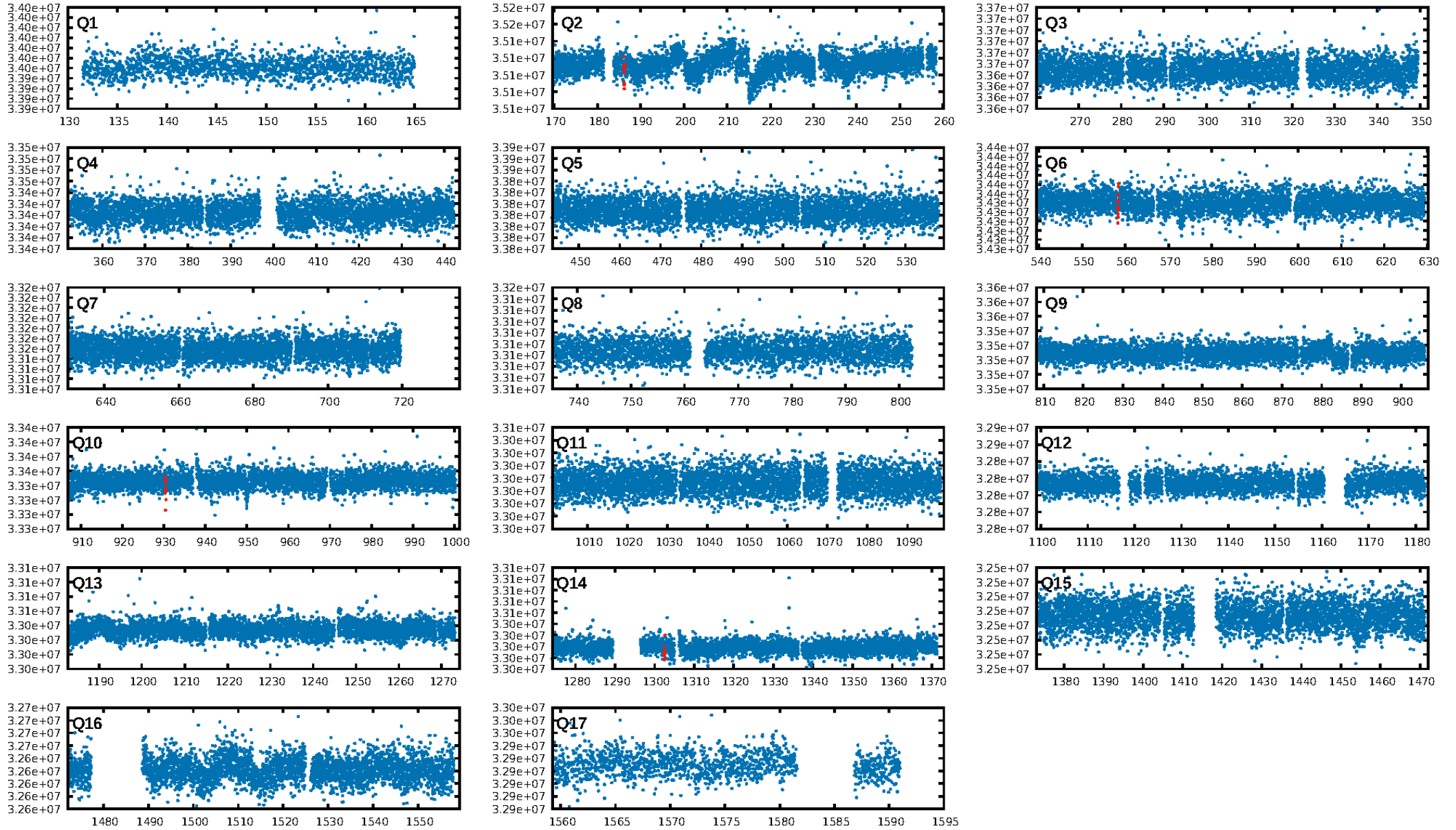
## DV Fit Results:

Period = 372.09890 [0.00397] d  
Epoch = 186.1963 [0.0069] BKJD  
Rp/R\* = 0.0236 [0.0222]  
a/R\* = 607.67 [3001.64]  
b = 0.79 [2.33]  
Seff = 1.25 [0.49]  
Teff = 270 [26] K  
Rp = 2.53 [2.51] Re  
a = 1.0297 [0.2647] AU  
Ag = 47869.90 [92353.75] [0.52σ]  
Teffp = 6170 [2928] K [2.02σ]

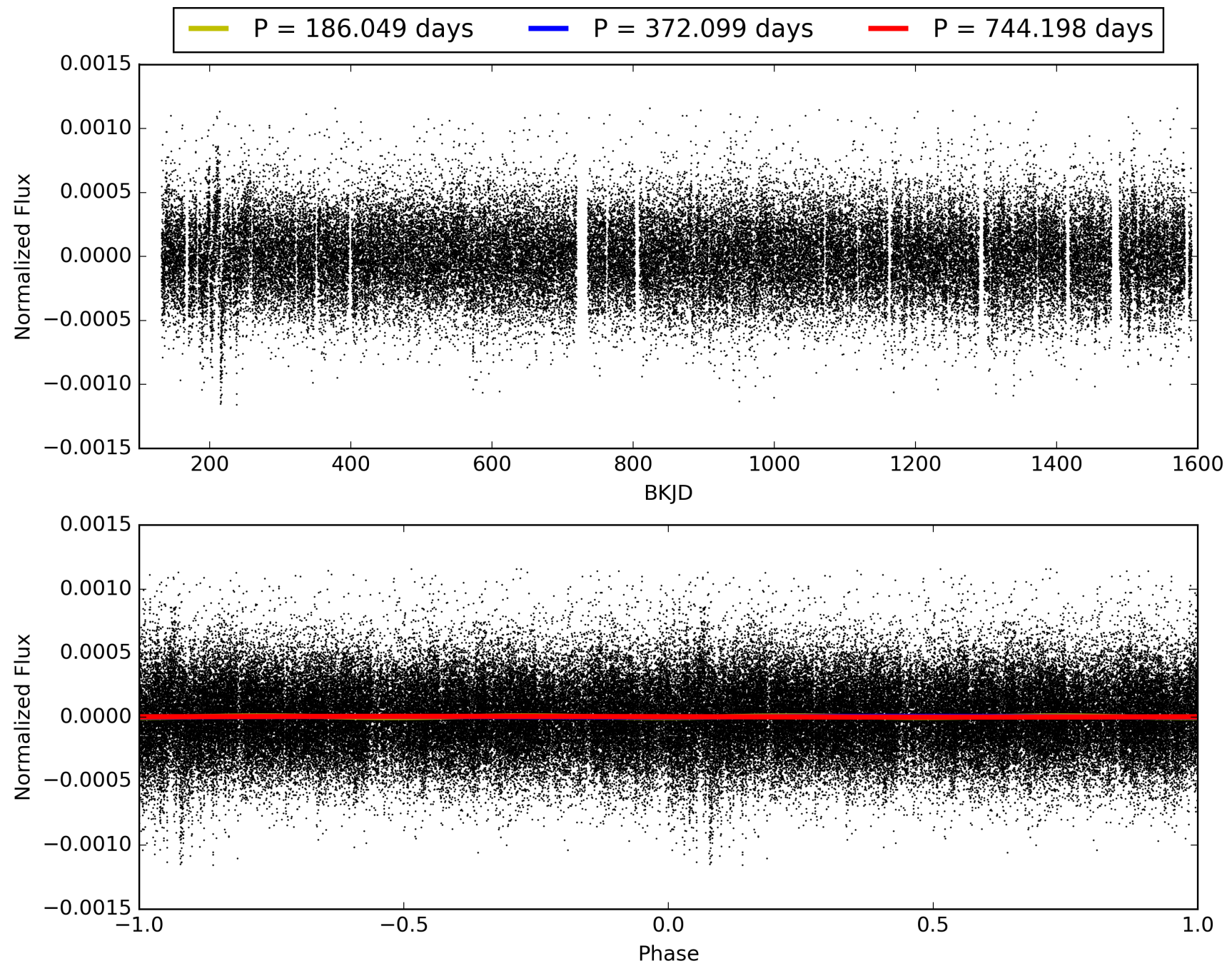
## DV Diagnostic Results:

ShortPeriod-sig: 4.4% [0.06σ]  
LongPeriod-sig: 100.0% [4.46σ]  
ModelChiSquare2-sig: 60.8%  
ModelChiSquareGof-sig: 98.3%  
**Bootstrap-pfa: 4.48e-11**  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -45.04  
Centroid-sig: 2.5%  
Centroid-so: 2.897 arcsec [1.73σ]  
**OotOffset-rm: 1.526 arcsec [4.82σ]**  
**KicOffset-rm: 1.393 arcsec [4.39σ]**  
OotOffset-st: 4/0/0/0 [4]  
KicOffset-st: 4/0/0/0 [4]  
DiffImageQuality-fgm: 1.00 [4/4]  
DiffImageOverlap-fno: 1.00 [4/4]

# TCE 004833135-07, PDC Light Curves

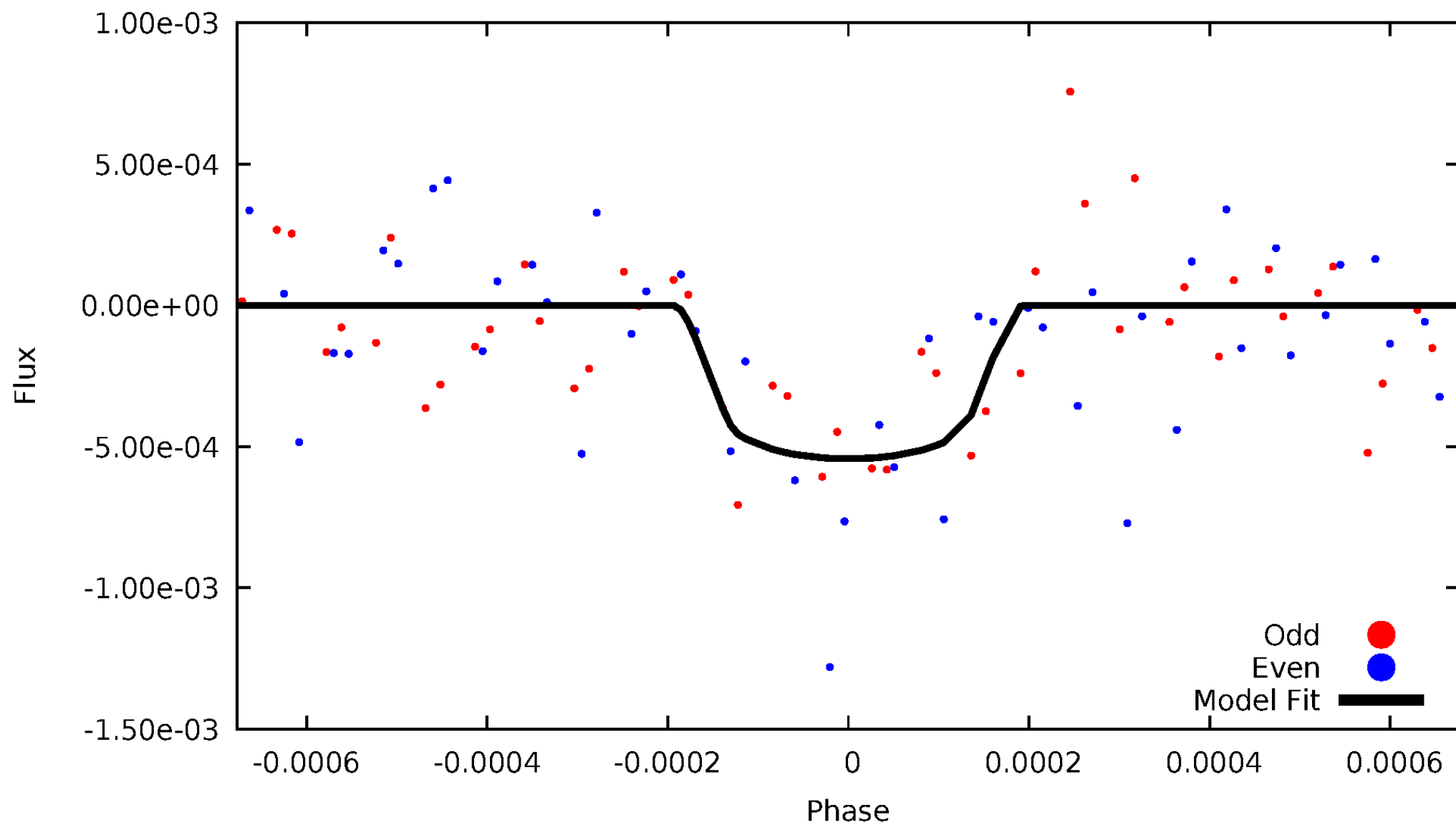


TCE 004833135-07



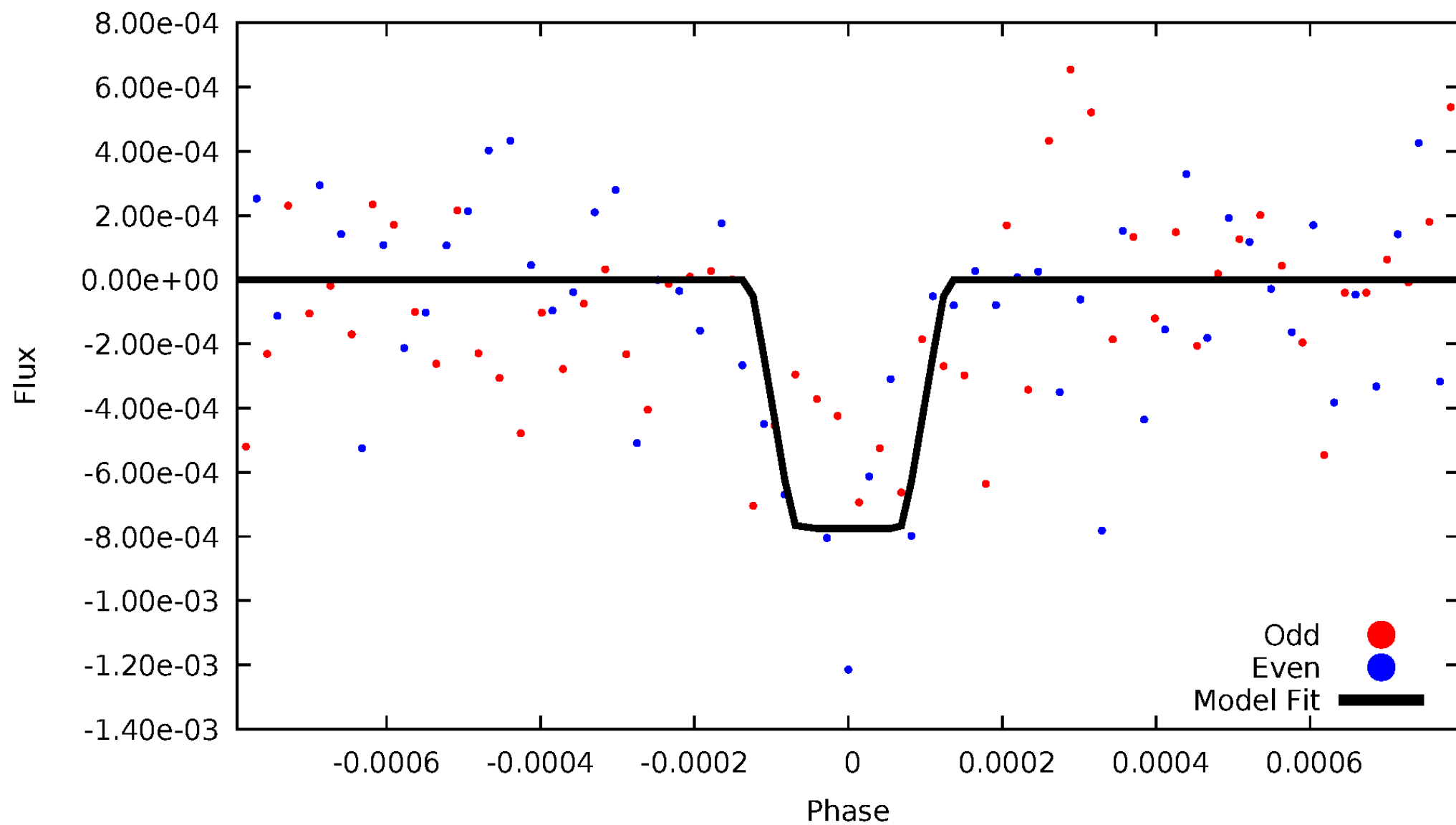
# DV Odd/Even

TCE 004833135-07



# ALT Odd/Even

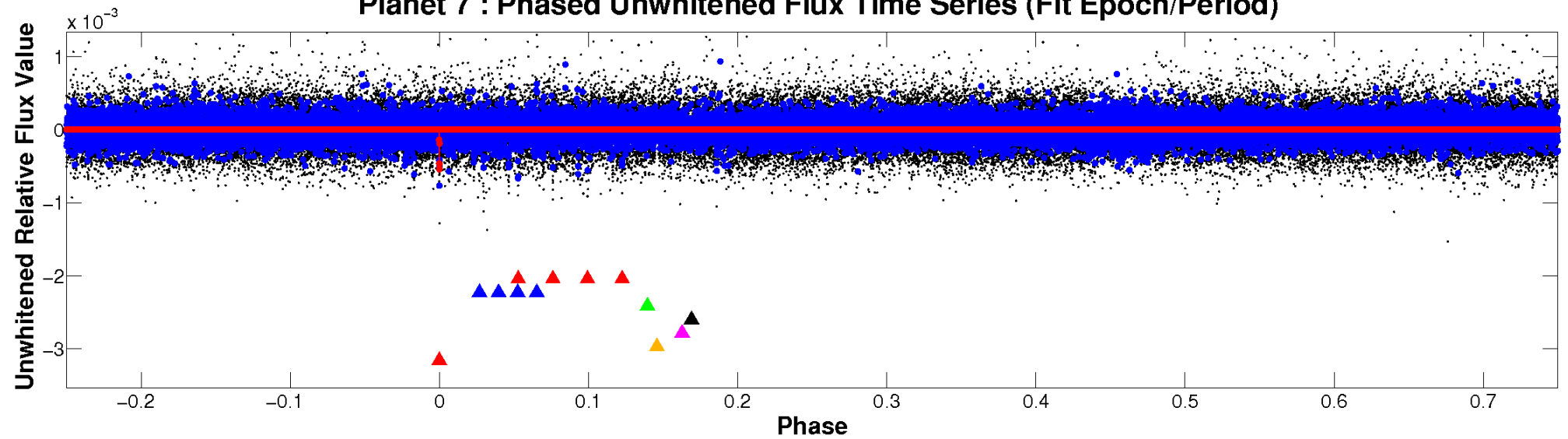
TCE 004833135-07



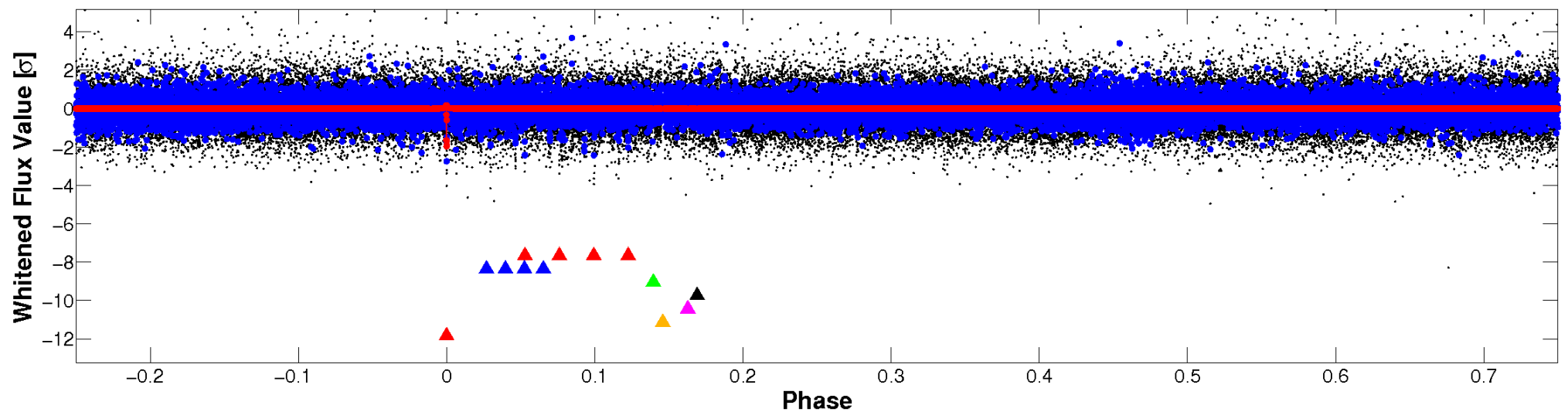


# Non-Whitened Vs. Whitened Light Curve

Planet 7 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

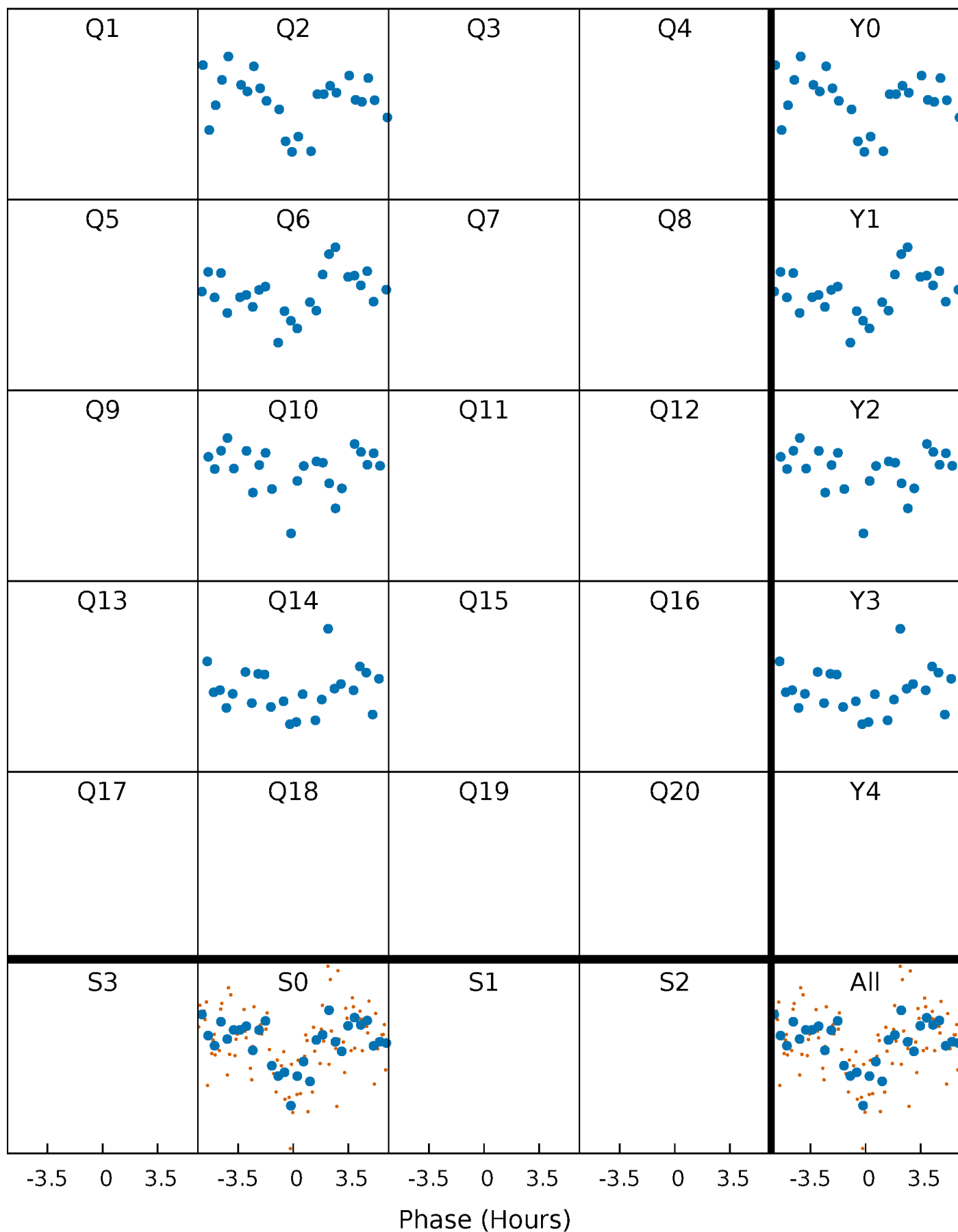


Planet 7 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

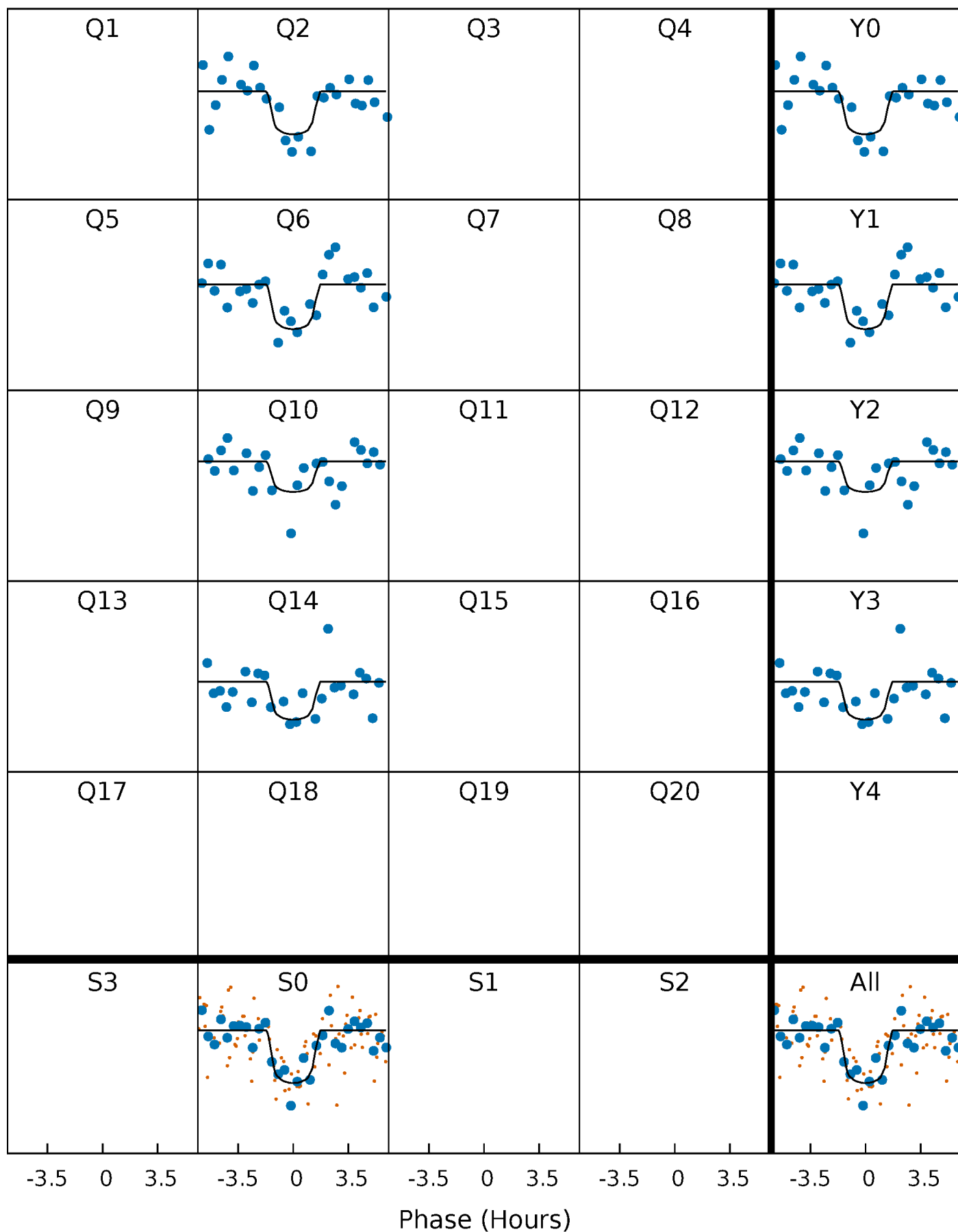
TCE 004833135-07   P=372.098902 Days    $T_0=186.196312$  (BKJD)





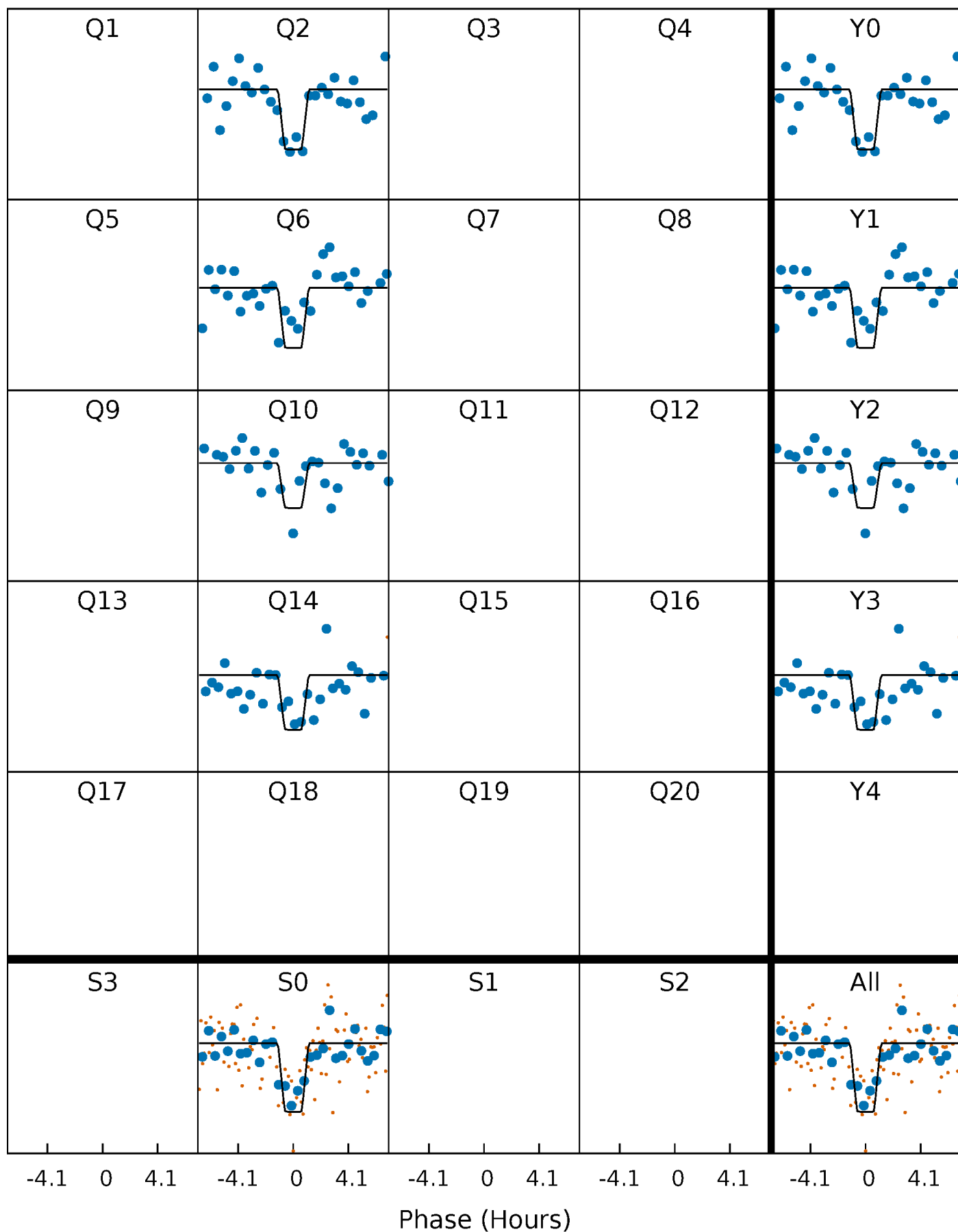
# DV Quarter-Phased Transit Curves

TCE 004833135-07 P=372.098902 Days  $T_0=186.196312$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

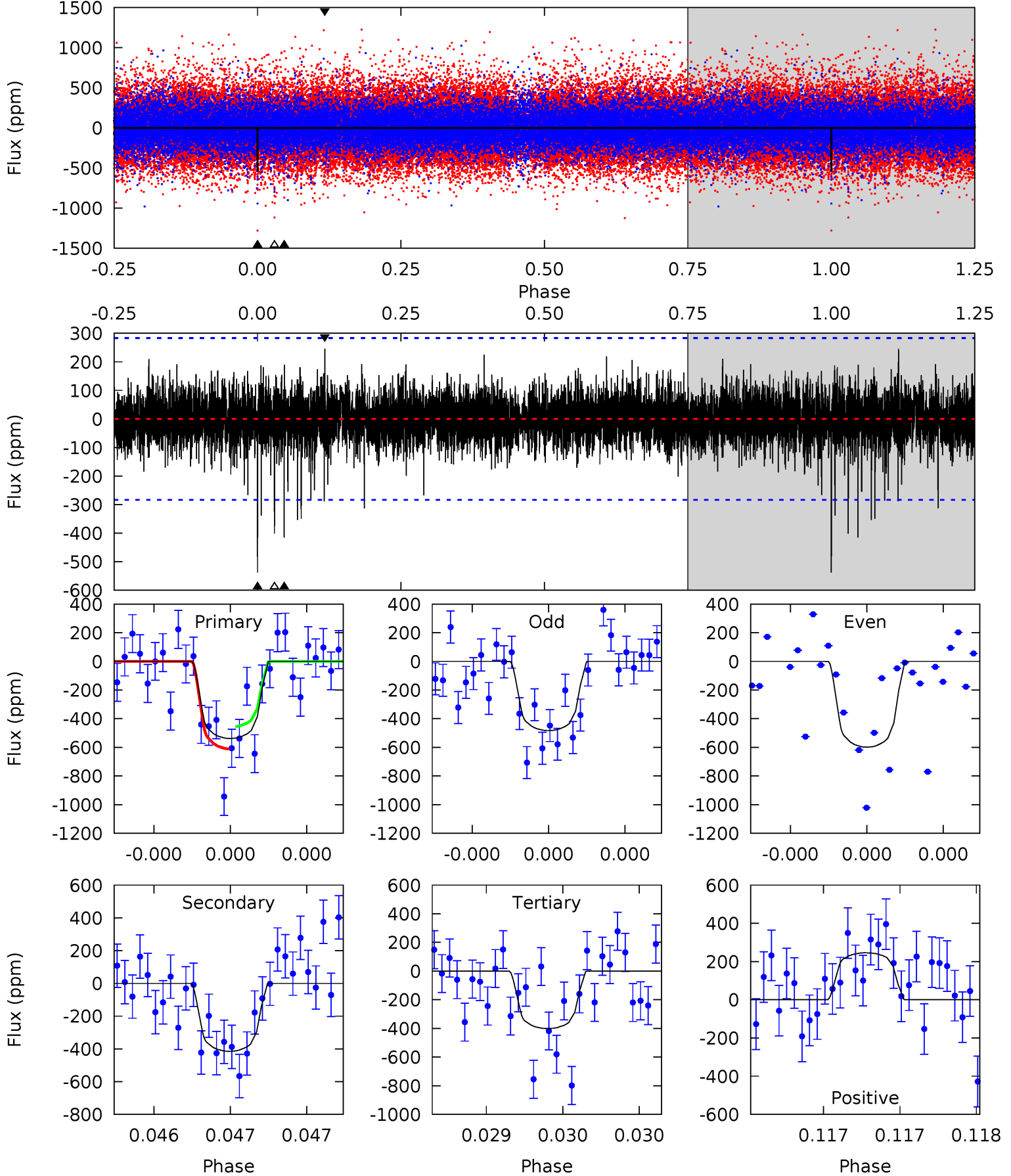
TCE 004833135-07 P=372.090688 Days  $T_0=186.205074$  (BKJD)



# DV Model-Shift Uniqueness Test

004833135-07, P = 372.098902 Days, E = 186.196312 Days

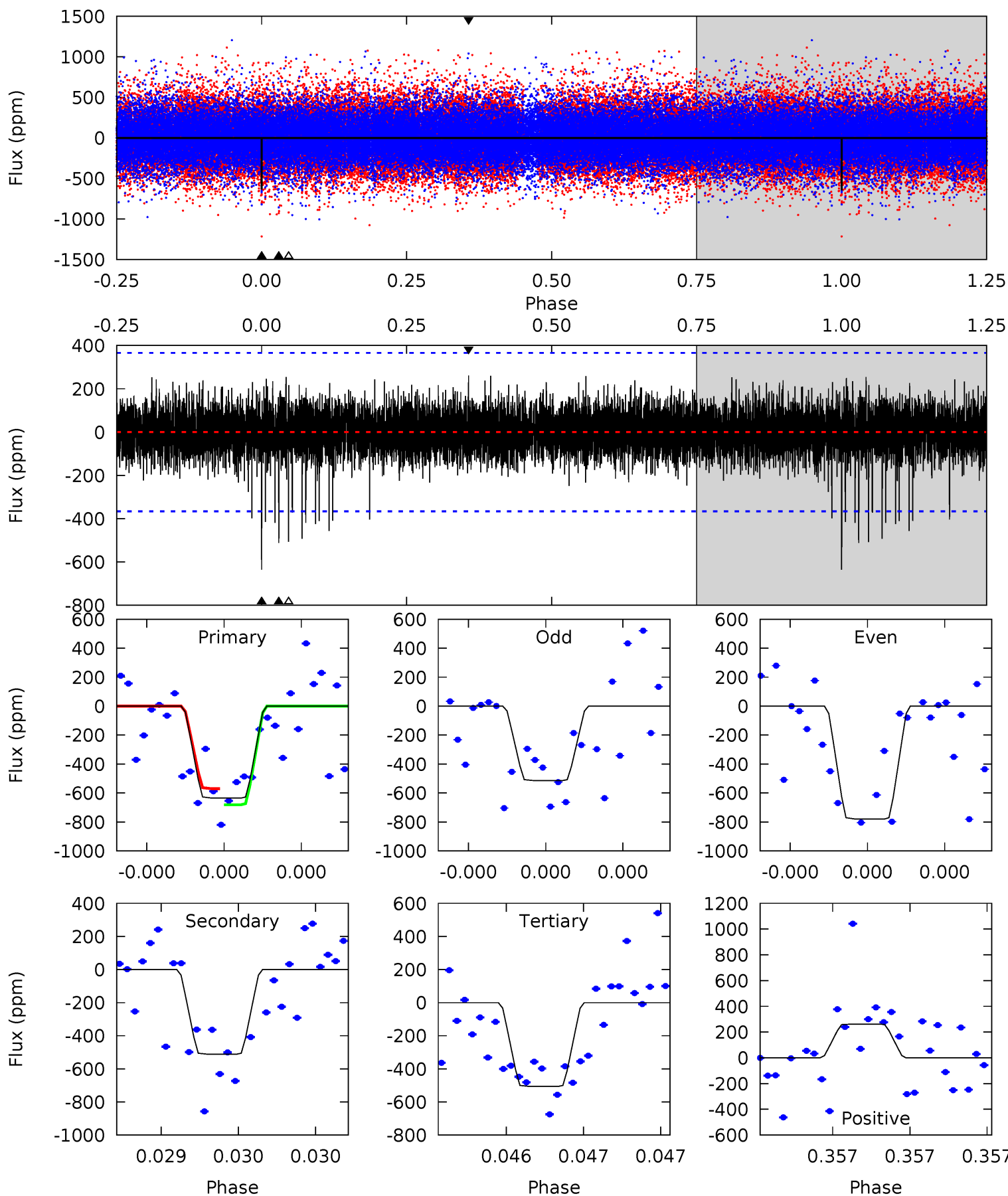
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.7	8.23	7.96	4.88	5.62	3.55	1.18	2.72	5.80	0.27	3.36	1.15	1.00	0.31	1.54



# Alt Model-Shift Uniqueness Test

004833135-07, P = 372.090688 Days, E = 186.205074 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
9.88	7.96	7.87	4.06	5.69	3.67	1.15	2.00	5.81	0.09	3.89	2.05	0.94	0.29	0.84



### Stellar Parameters For KIC 004833135

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6250^{+169}_{-206}$	$4.472^{+0.050}_{-0.200}$	$-0.260^{+0.300}_{-0.300}$	$0.986^{+0.305}_{-0.102}$	$1.052^{+0.147}_{-0.134}$	$1.544^{+0.404}_{-0.769}$
	+3%/-3%	+1%/-4%	+115%/-115%	+31%/-10%	+14%/-13%	+26%/-50%
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 004833135-07 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-415 \pm 50$	$3.27^{+2.19}_{-1.98}$	$385^{+27}_{-19}$	$5278^{+3633}_{-1037}$	$21989^{+122523}_{-14441}$
Alt.	$-511 \pm 64$	$3.42^{+2.49}_{-2.08}$	$385^{+24}_{-18}$	$5330^{+3724}_{-996}$	$24070^{+139921}_{-15650}$

$T_{max}$  = 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

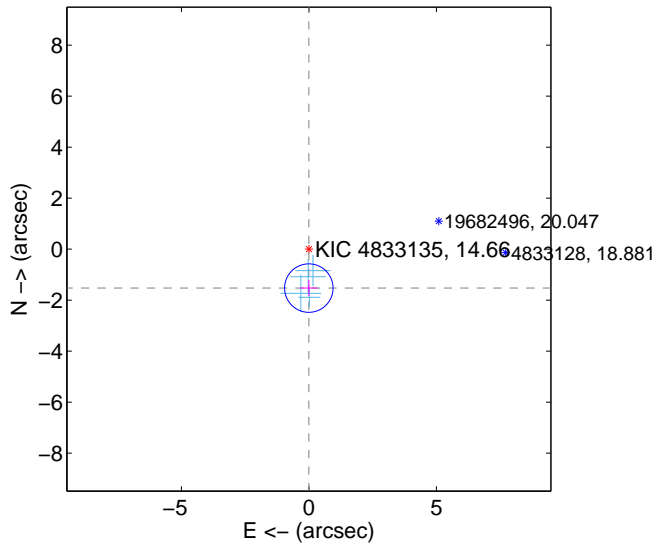
Supplemental centroid analysis for 004833135-07. Kepler magnitude: 14.66. Transit SNR 7.95

There are 4 quarters with good PRF difference image offsets

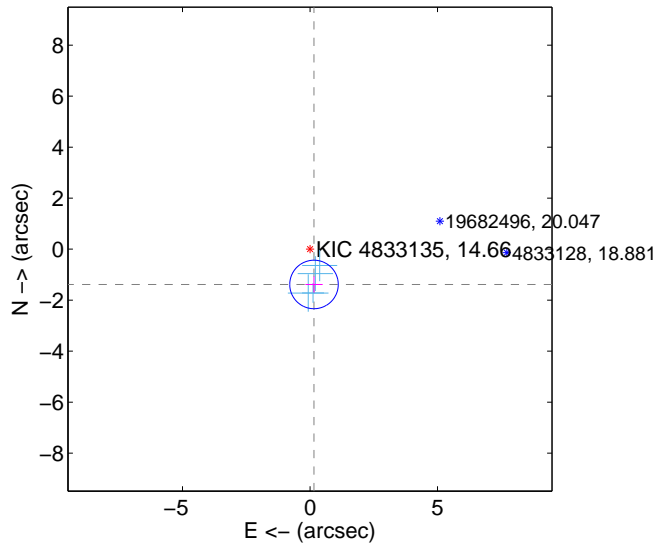
The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.526 \pm 0.317$	4.82	$0.004 \pm 0.340$	$-1.526 \pm 0.317$
PRF-fit source offset from KIC position	$1.393 \pm 0.317$	4.39	$-0.156 \pm 0.340$	$-1.384 \pm 0.317$
photometric centroid source offset	$2.90 \pm 1.67$	1.73	$-2.33 \pm 1.73$	$-1.72 \pm 1.55$

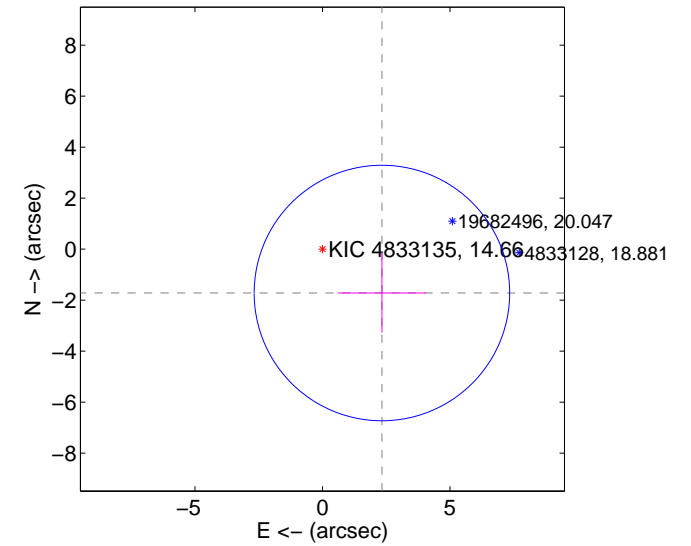
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

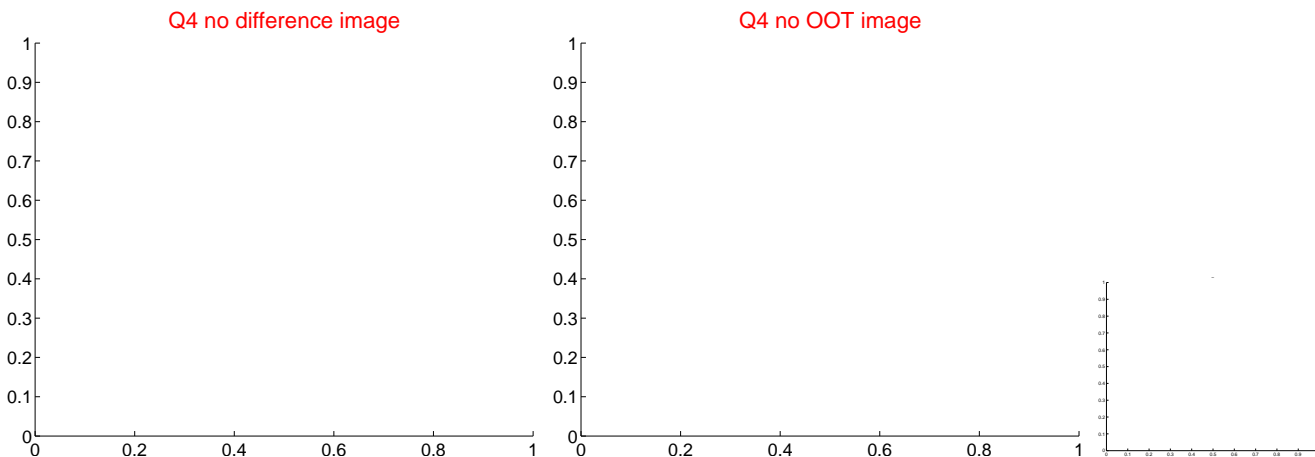
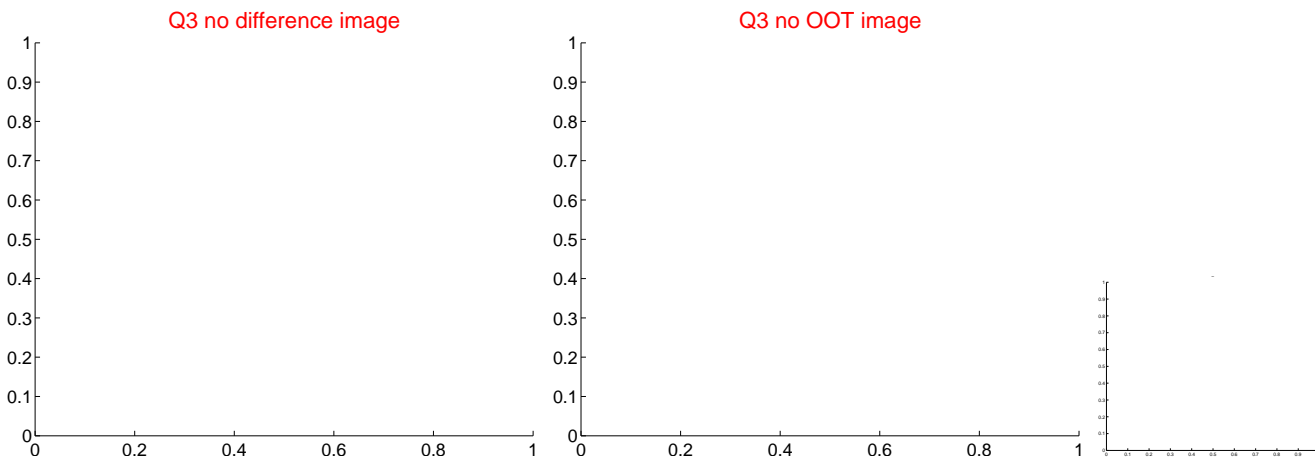
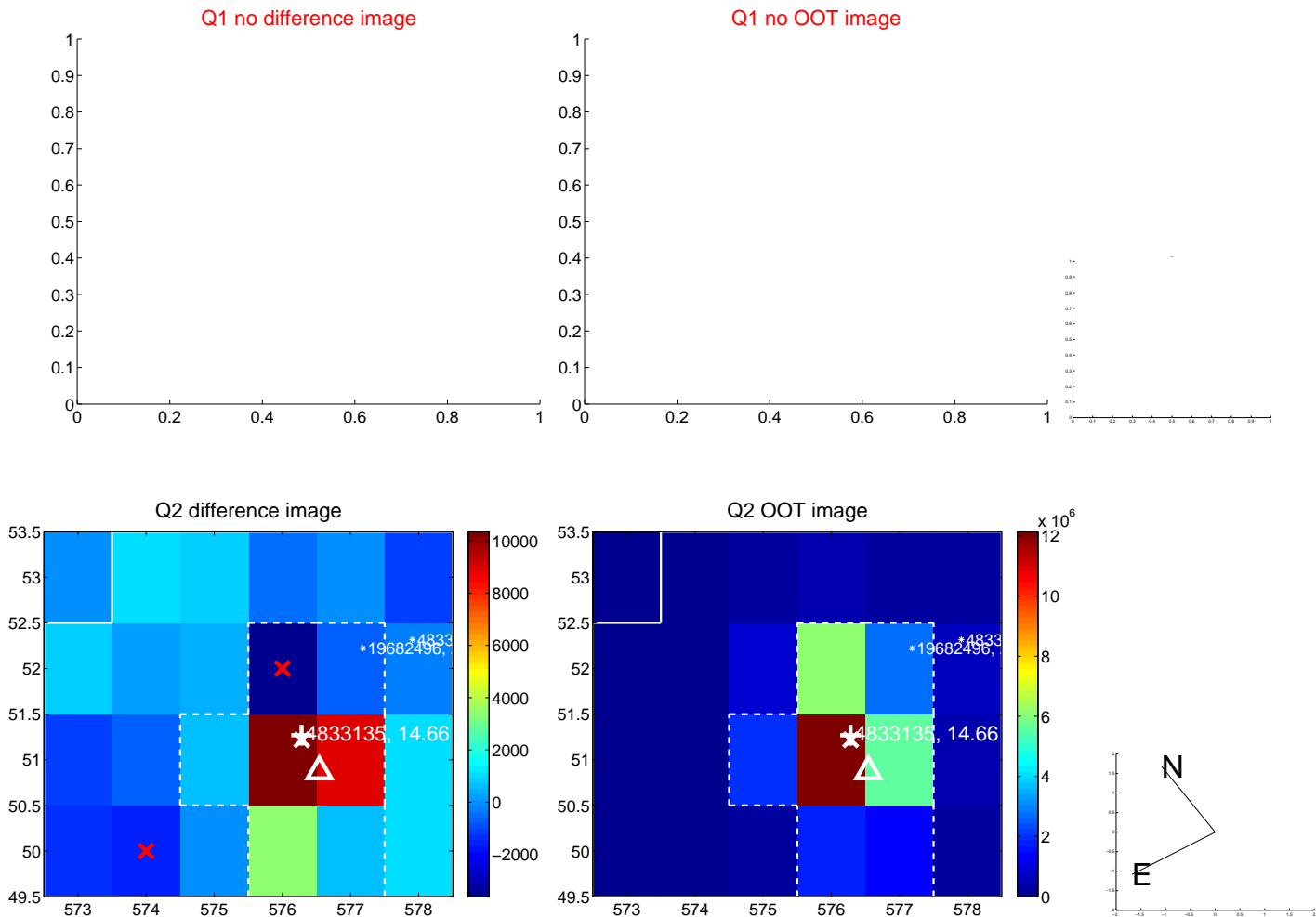


offset from photometric centroids

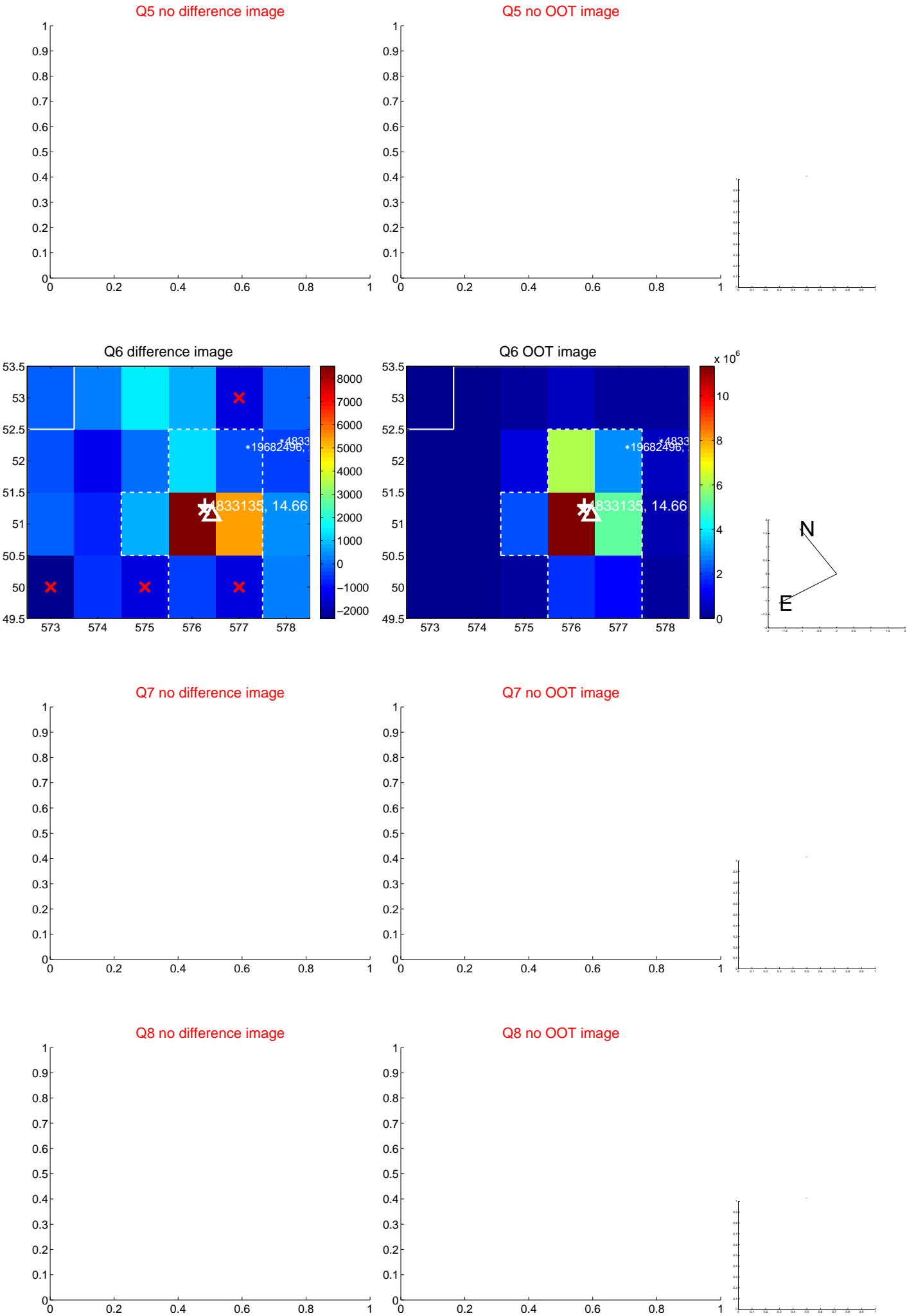


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



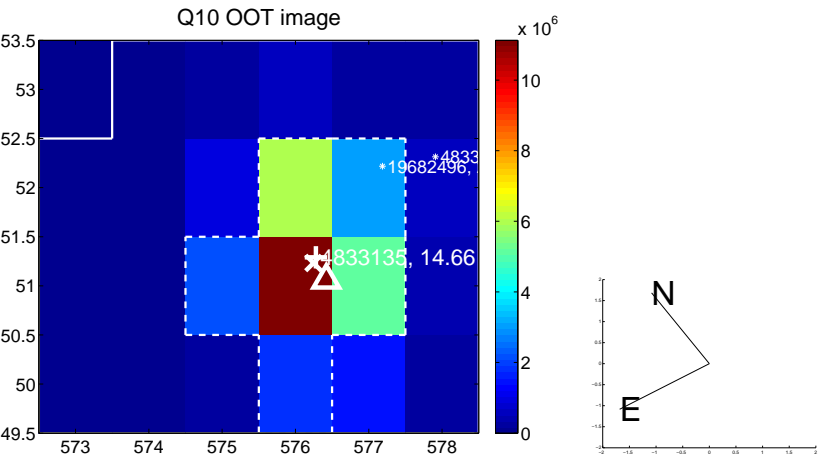
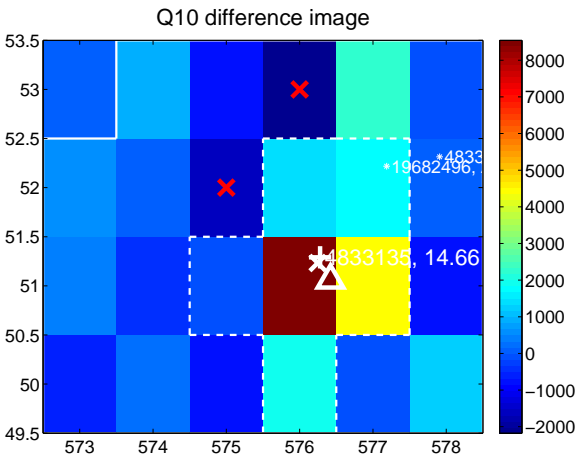


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

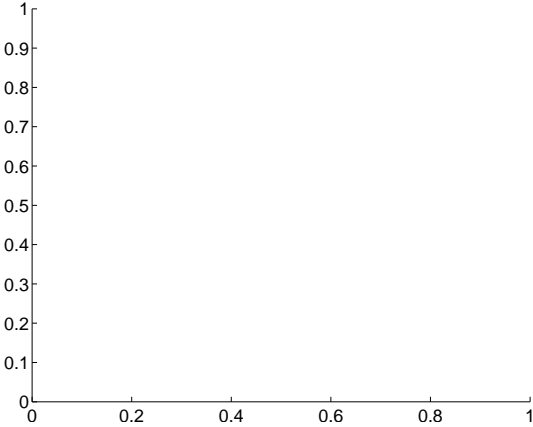
Q9 no difference image



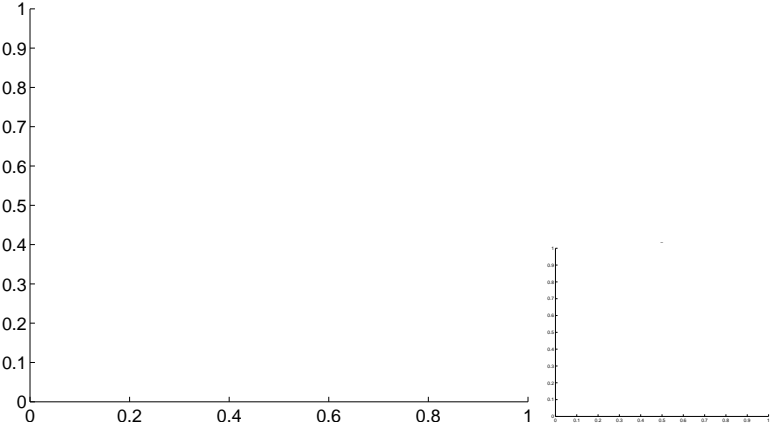
Q9 no OOT image



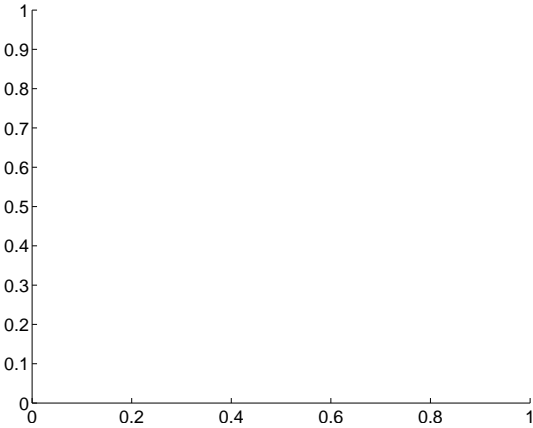
Q11 no difference image



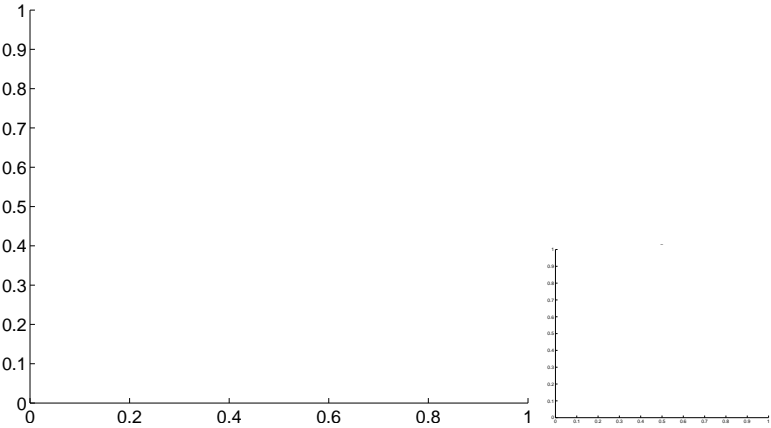
Q11 no OOT image



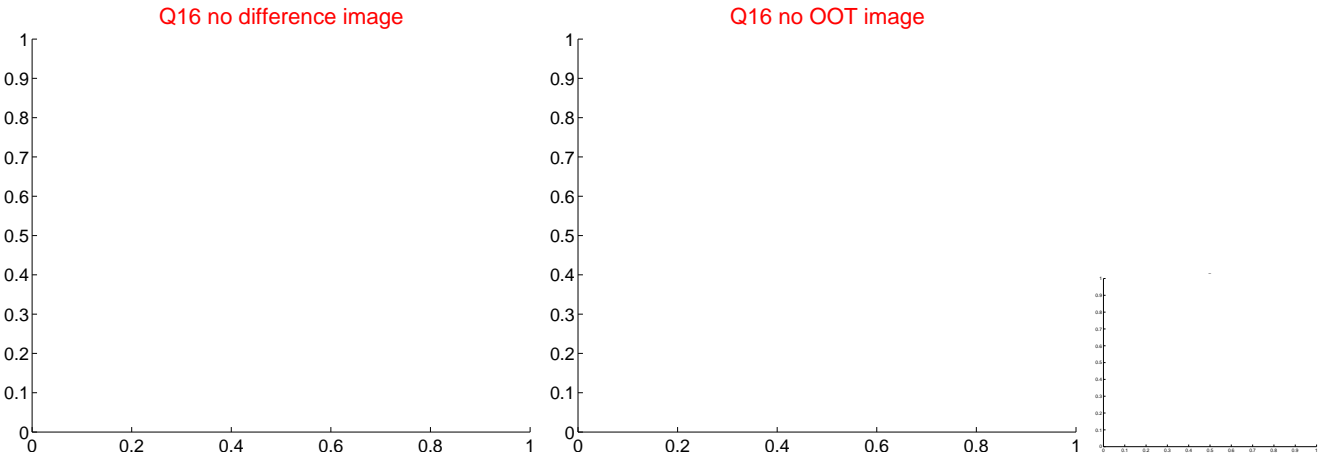
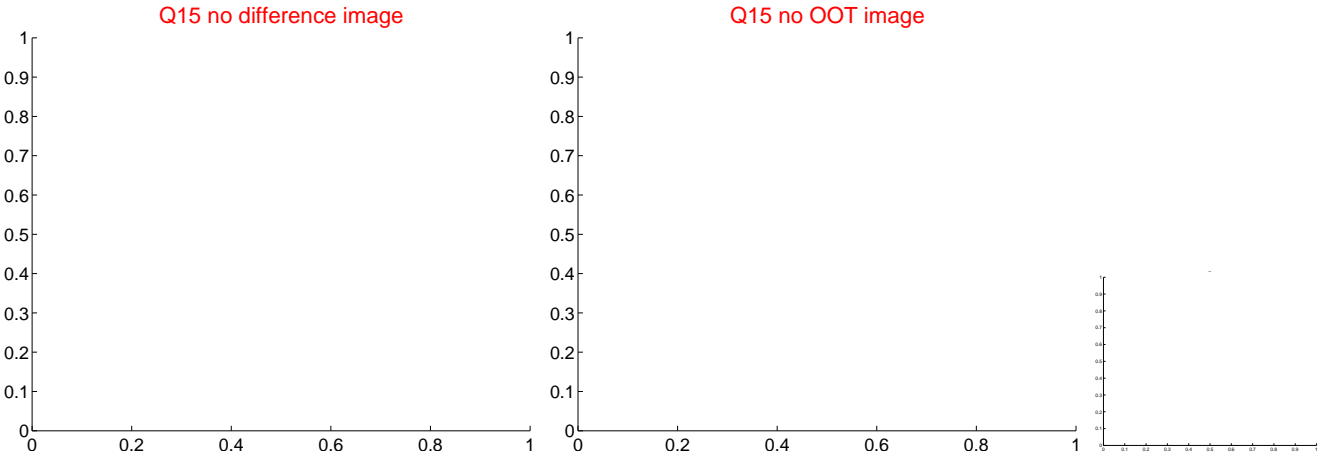
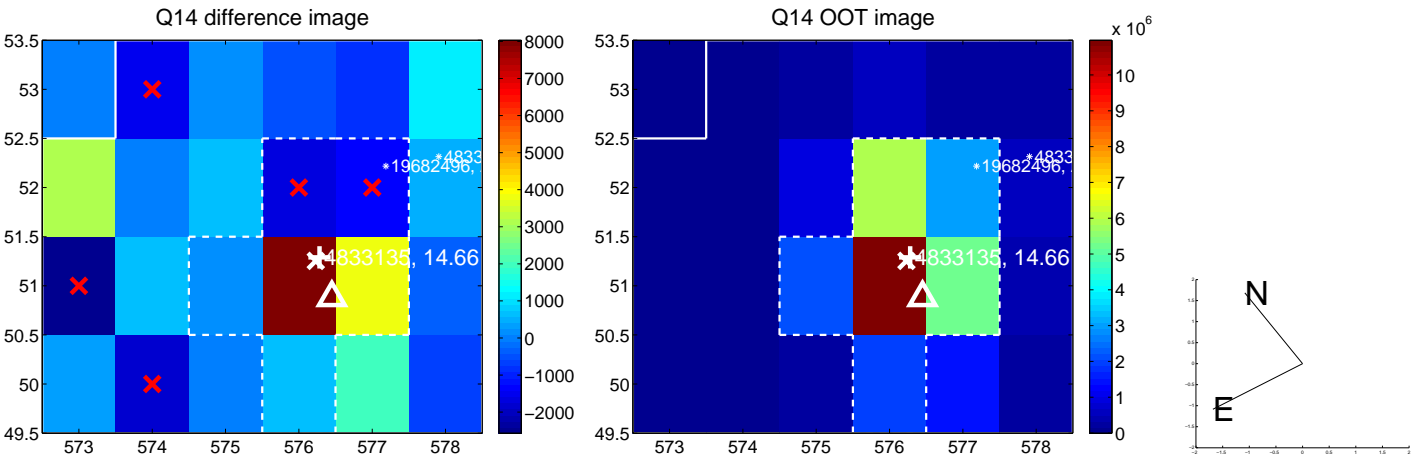
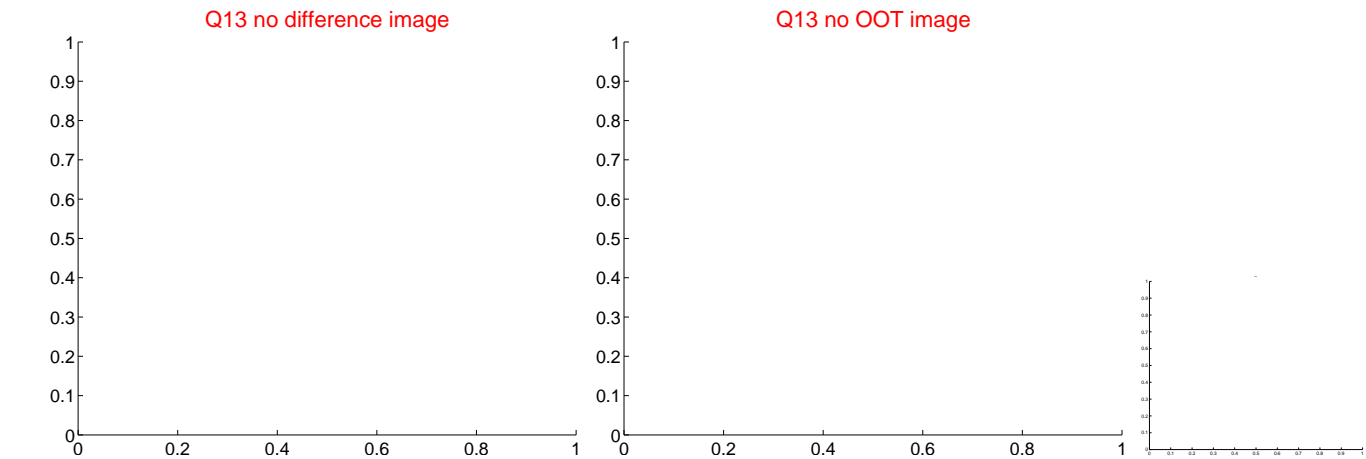
Q12 no difference image



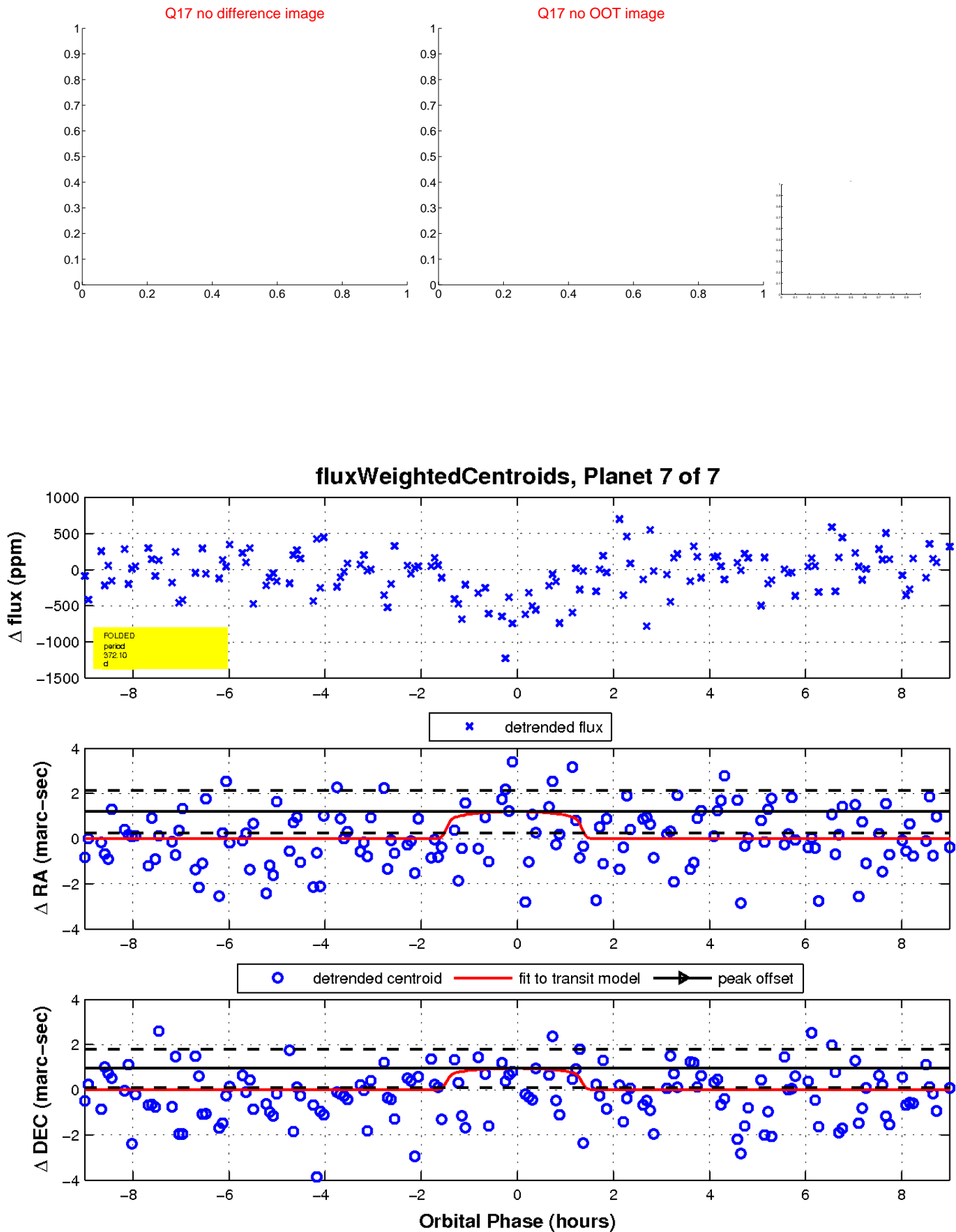
Q12 no OOT image



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

