

# KIC 002713086

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002713086-01	OBS	No	295.877903	417.532159	3246.9	4.902	19.6	10.5	0.55	3920	3.22	0.13
002713086-02	OBS	No	560.806191	154.999723	2548.2	7.541	15.0	6.8	0.55	3920	5.33	0.05
002713086-03	OBS	No	380.584597	331.542108	4501.0	8.795	15.0	13.2	0.55	3920	3.63	0.09
002713086-04	OBS	No	552.496895	156.255602	1482.5	5.682	15.8	5.1	0.55	3920	2.21	0.06
002713086-05	OBS	No	256.316272	200.039801	627.1	1.830	16.1	2.5	0.55	3920	1.59	0.15
002713086-06	OBS	No	360.253914	447.536114	2683.2	5.484	14.3	8.9	0.55	3920	2.87	0.10

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002713086-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
002713086-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002713086-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002713086-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
002713086-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
002713086-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_MEAS

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

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

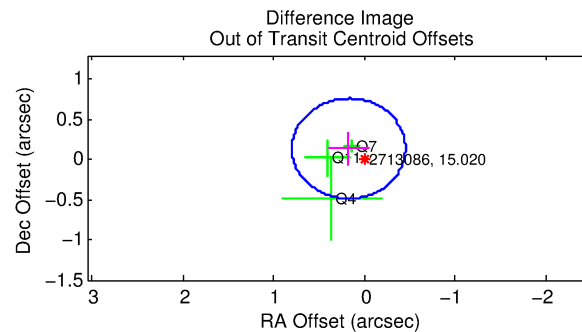
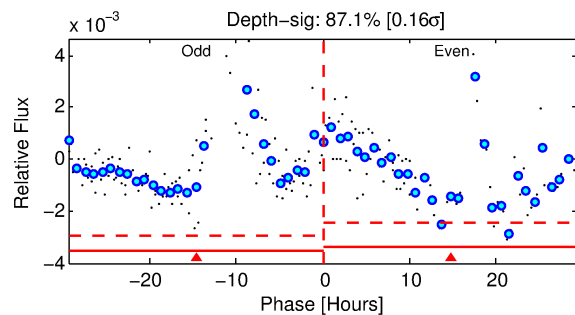
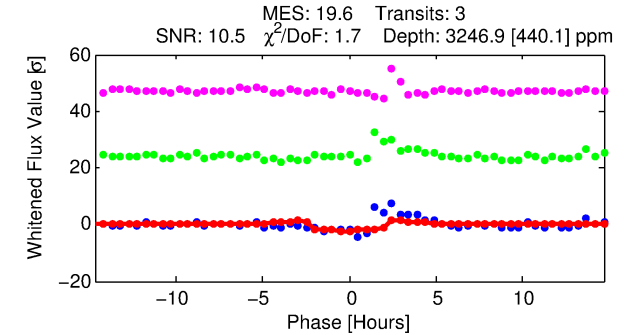
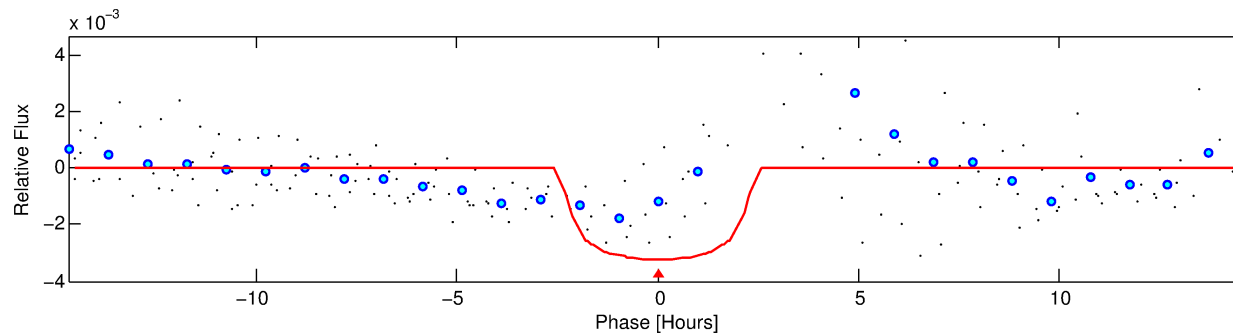
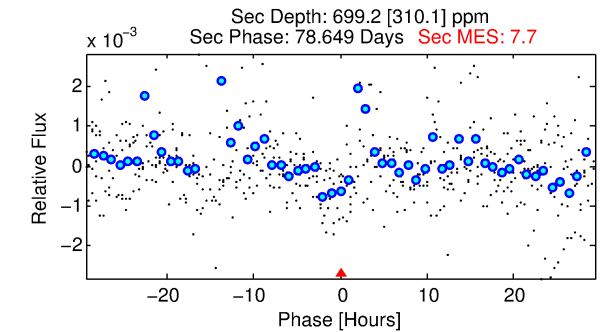
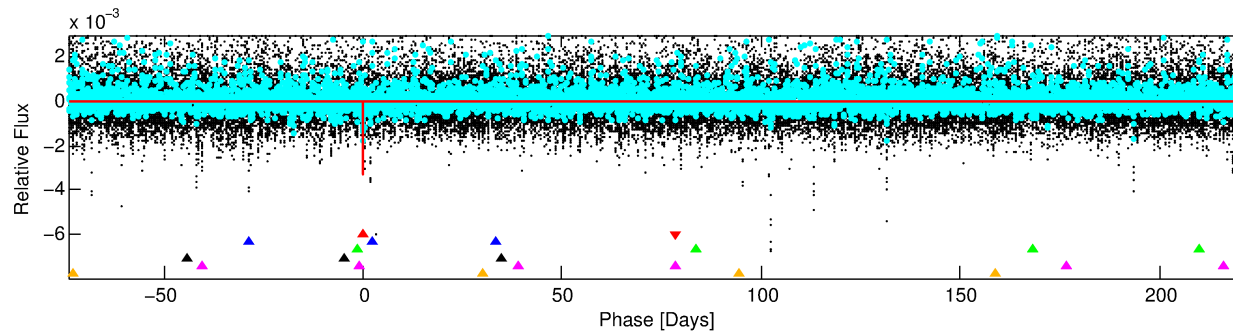
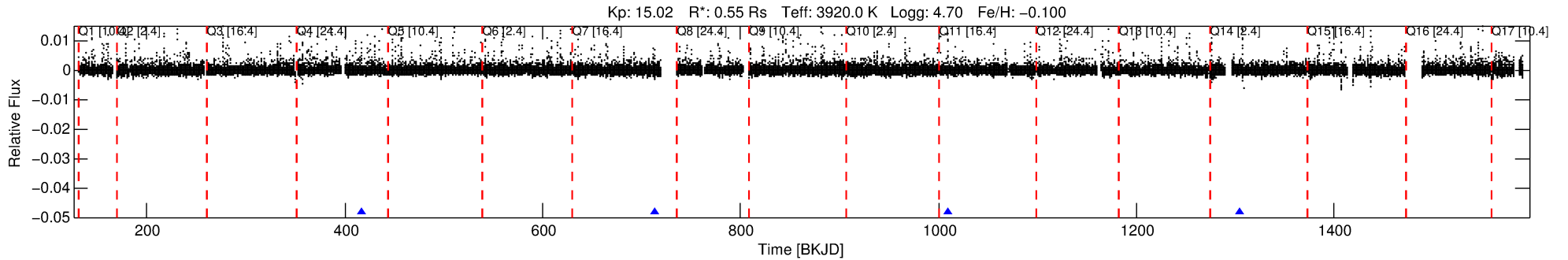
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 002713086-01

No Significant Match Found

# DV One-Page Summary

KIC: 2713086 Candidate: 1 of 6 Period: 295.878 d



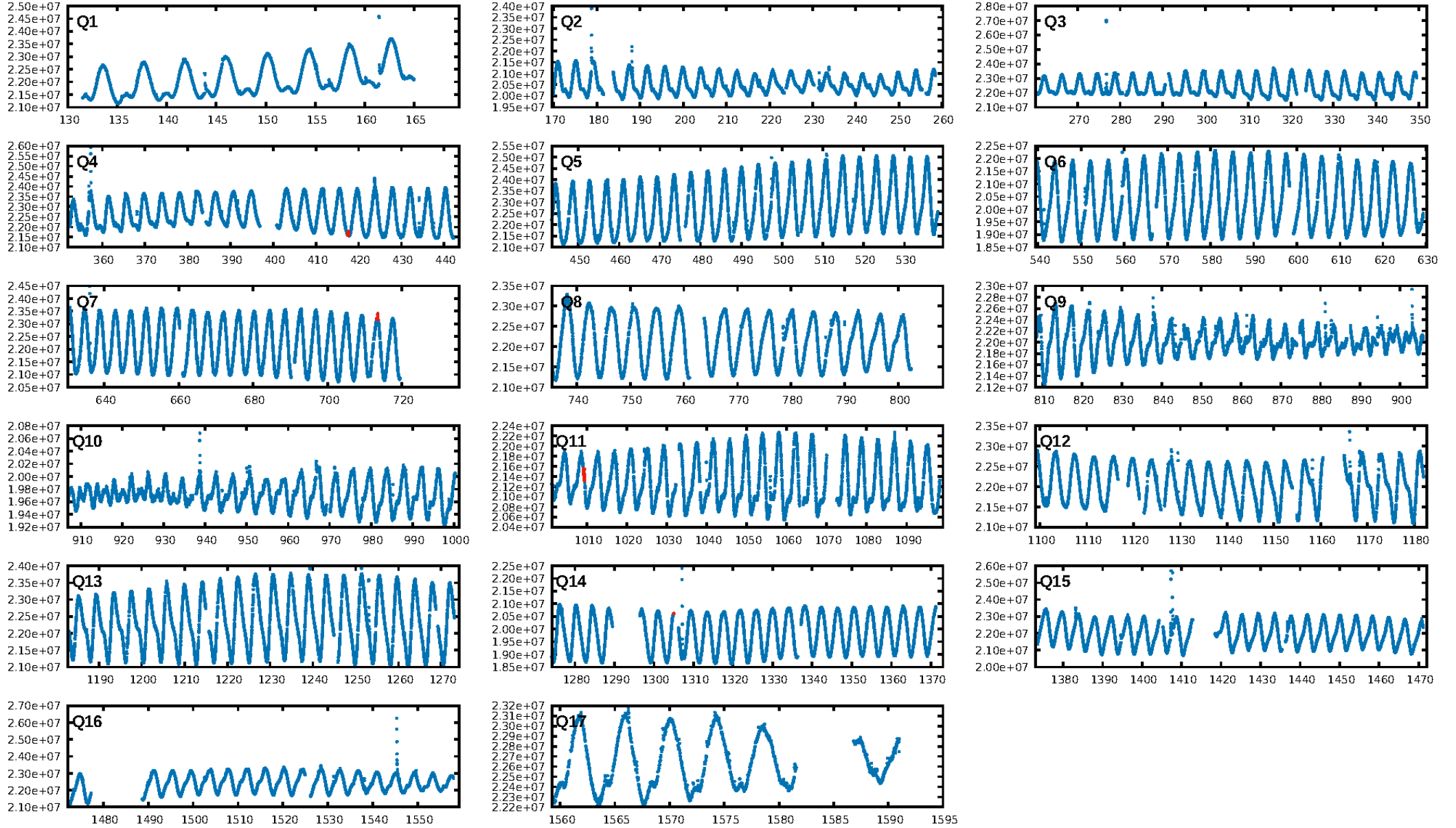
## DV Fit Results:

Period = 295.87790 [0.00481] d  
Epoch = 417.5322 [0.0065] BKJD  
Rp/R\* = 0.0537 [0.0394]  
a/R\* = 413.90 [1225.30]  
b = 0.55 [3.75]  
Seff = 0.13 [0.01]  
Teq = 152 [4] K  
Rp = 3.22 [2.37] Re  
a = 0.7134 [0.0330] AU  
Ag = 18831.71 [28883.94] [0.65σ]  
Teffp = 2750 [1055] K [2.46σ]

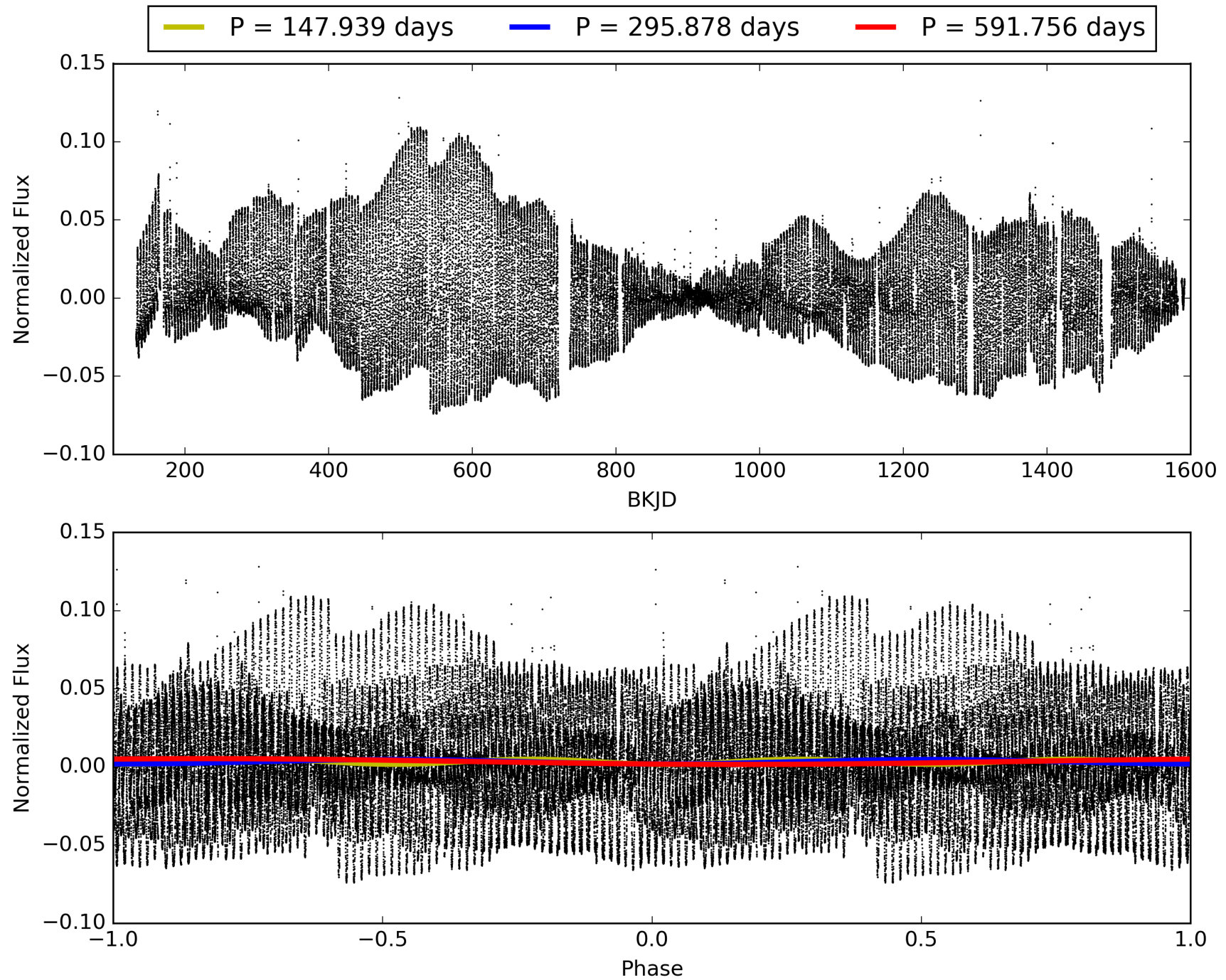
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [181.46σ]  
LongPeriod-sig: 100.0% [210.04σ]  
ModelChiSquare2-sig: 5.3%  
ModelChiSquareGof-sig: 30.8%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 0.5684  
Centroid-sig: 45.7%  
Centroid-so: 0.670 arcsec [0.90σ]  
OotOffset-rm: 0.221 arcsec [1.06σ]  
KicOffset-rm: 0.369 arcsec [1.76σ]  
OotOffset-st: 0/2/1/0 [3]  
KicOffset-st: 0/2/1/0 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

# TCE 002713086-01, PDC Light Curves



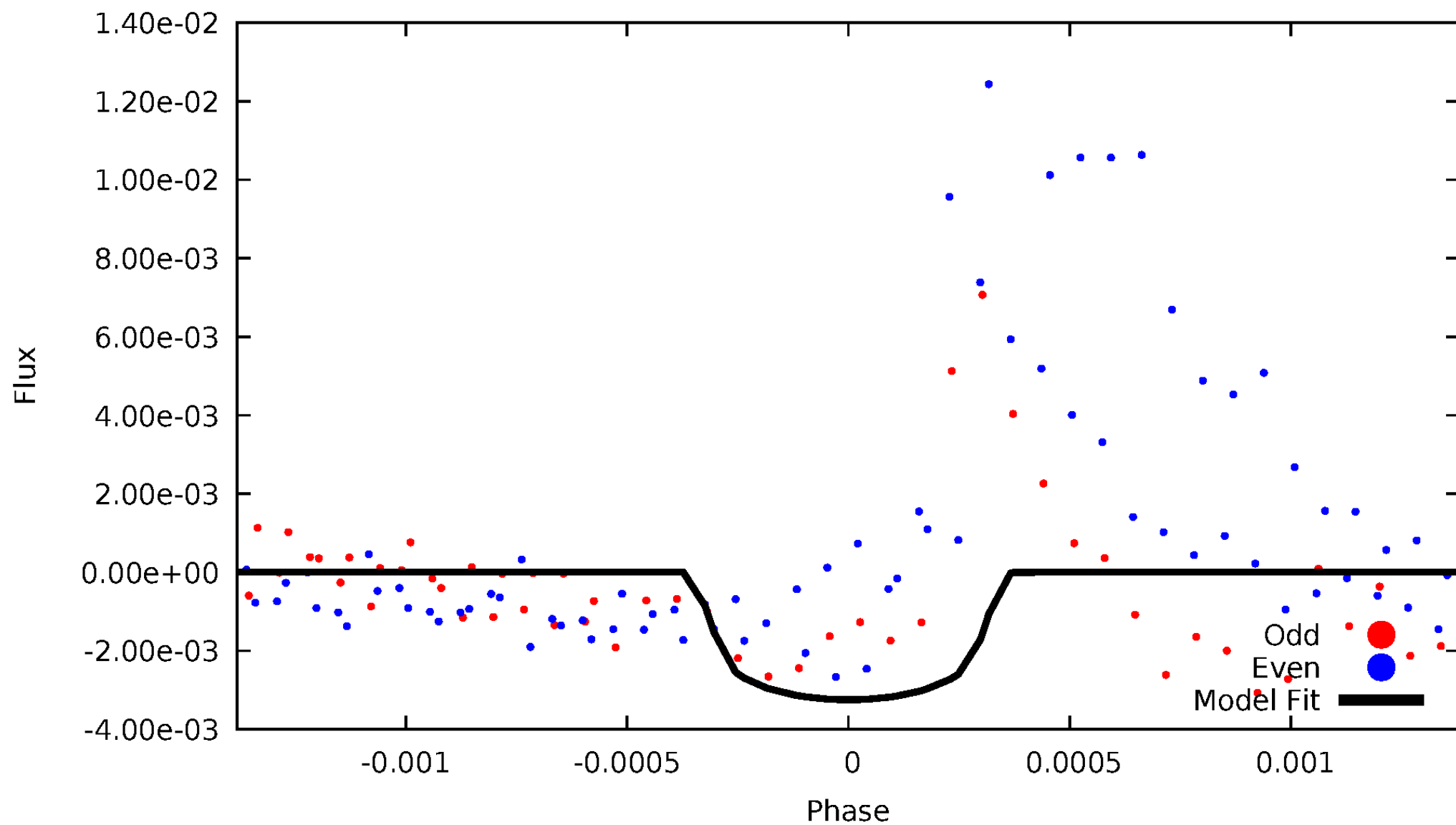
TCE 002713086-01





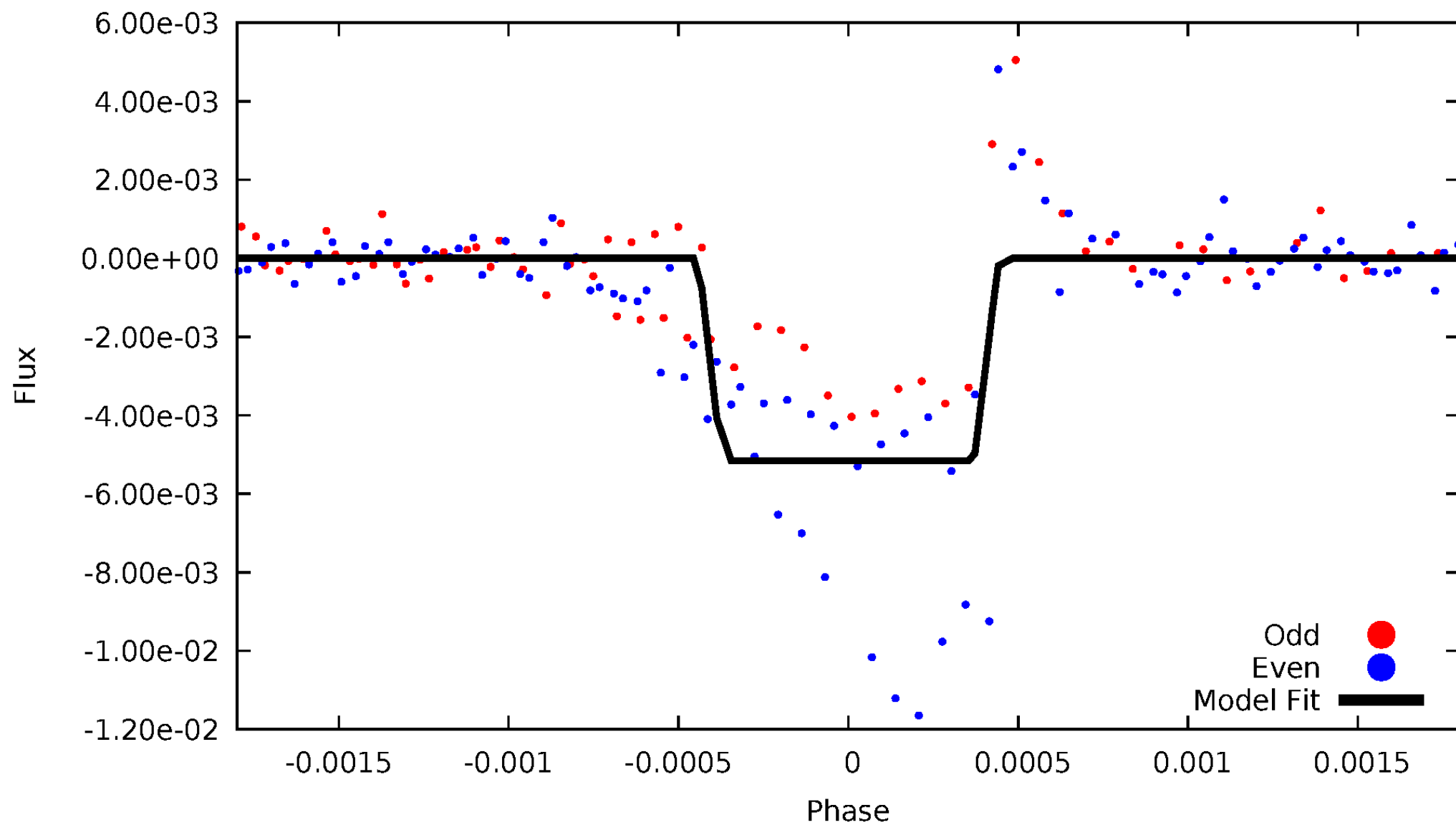
# DV Odd/Even

TCE 002713086-01



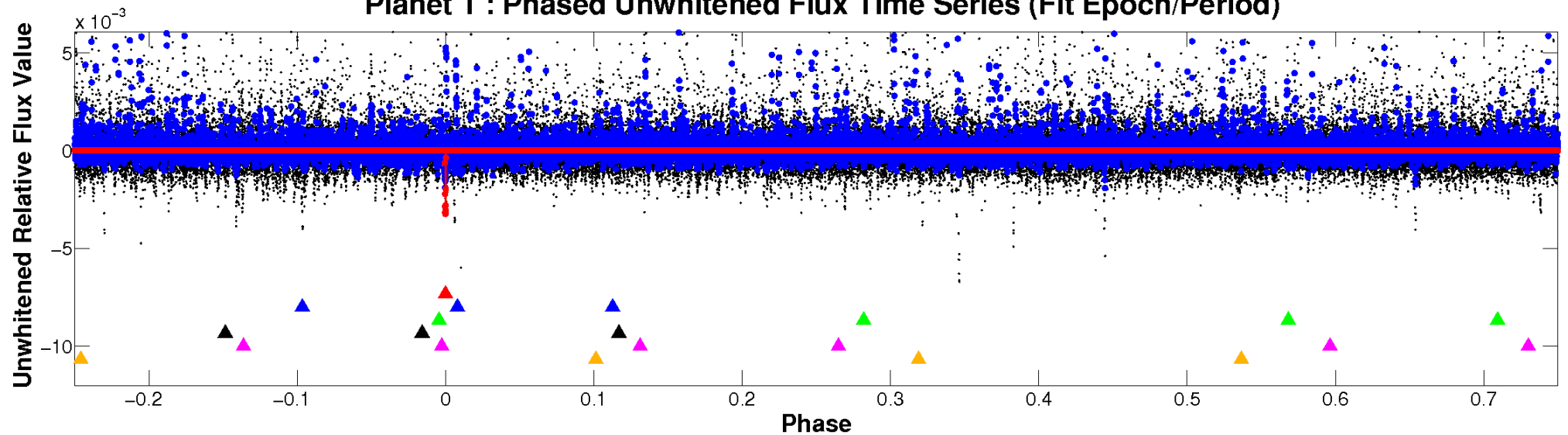
# ALT Odd/Even

TCE 002713086-01

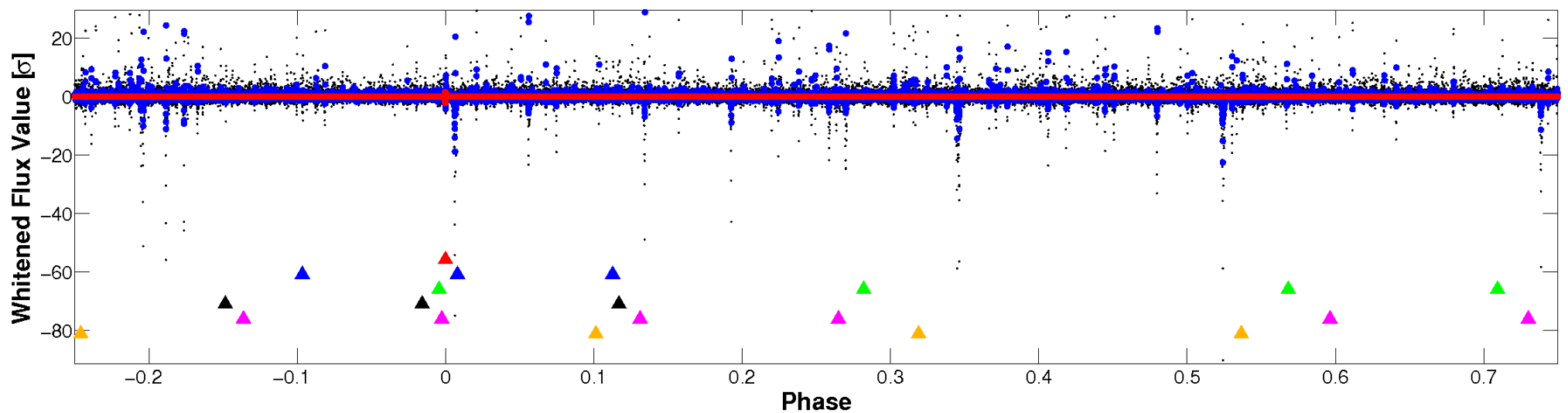


# Non-Whitened Vs. Whitened Light Curve

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

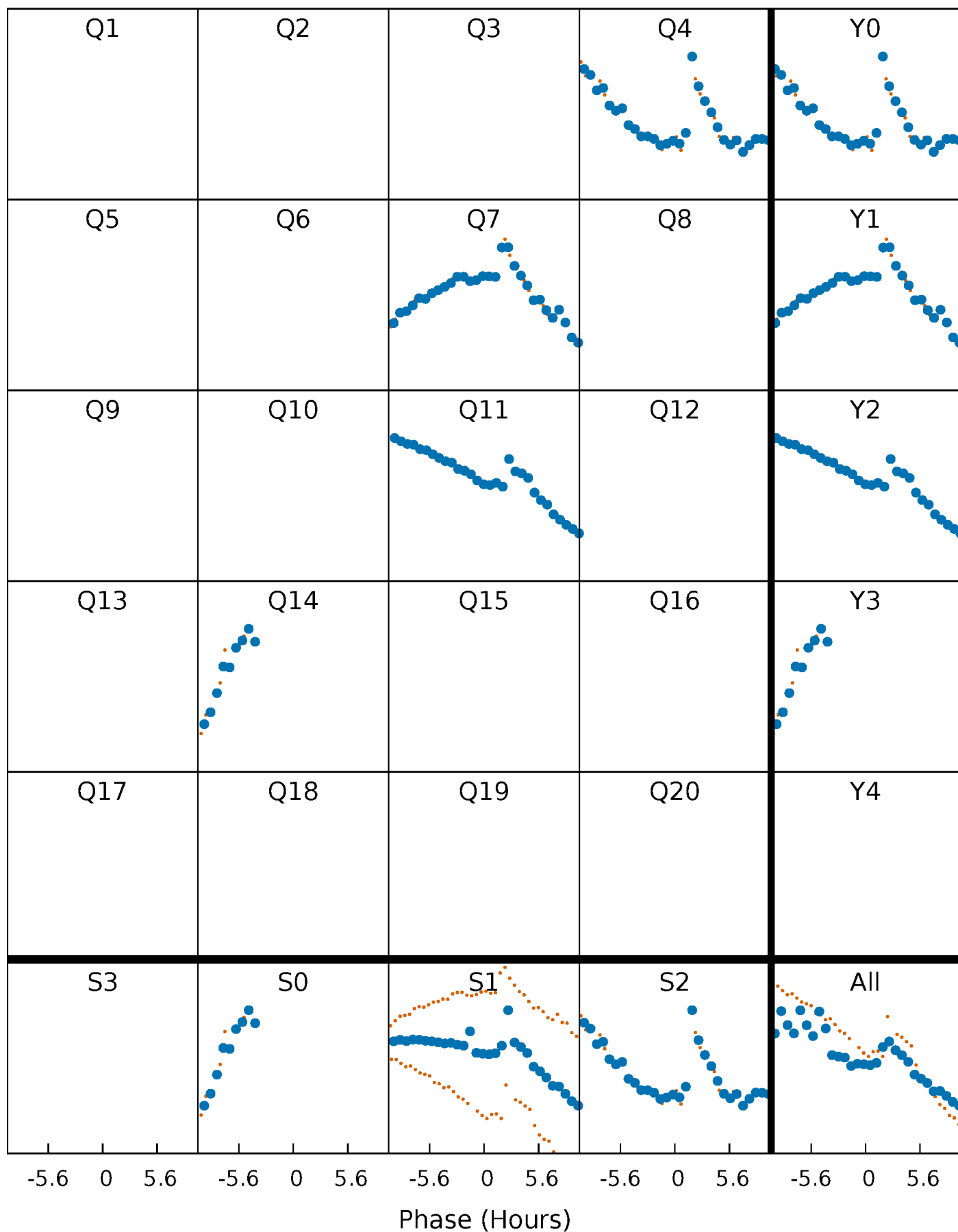


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

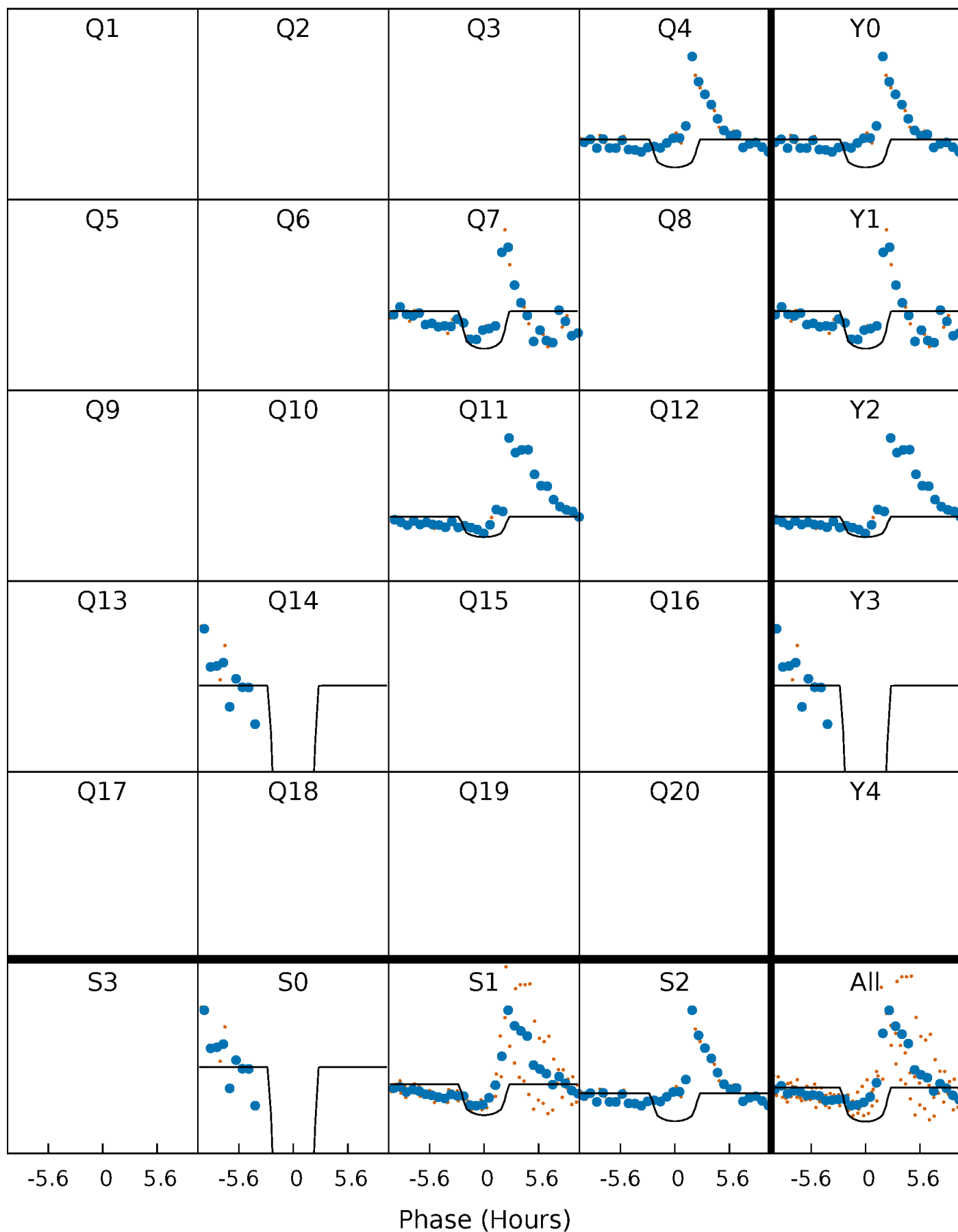
TCE 002713086-01 P=295.877903 Days  $T_0=417.532159$  (BKJD)





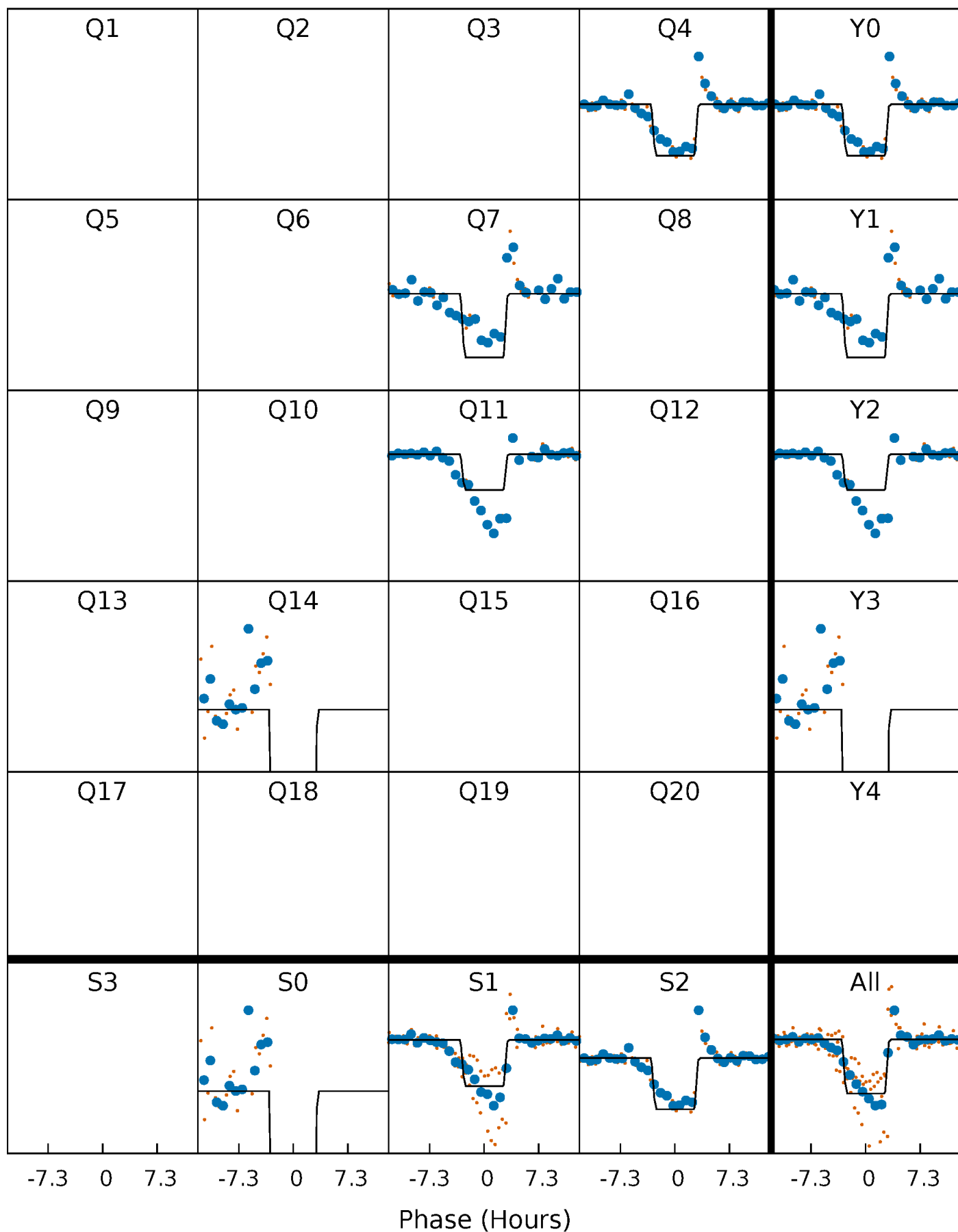
# DV Quarter-Phased Transit Curves

TCE 002713086-01 P=295.877903 Days  $T_0=417.532159$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

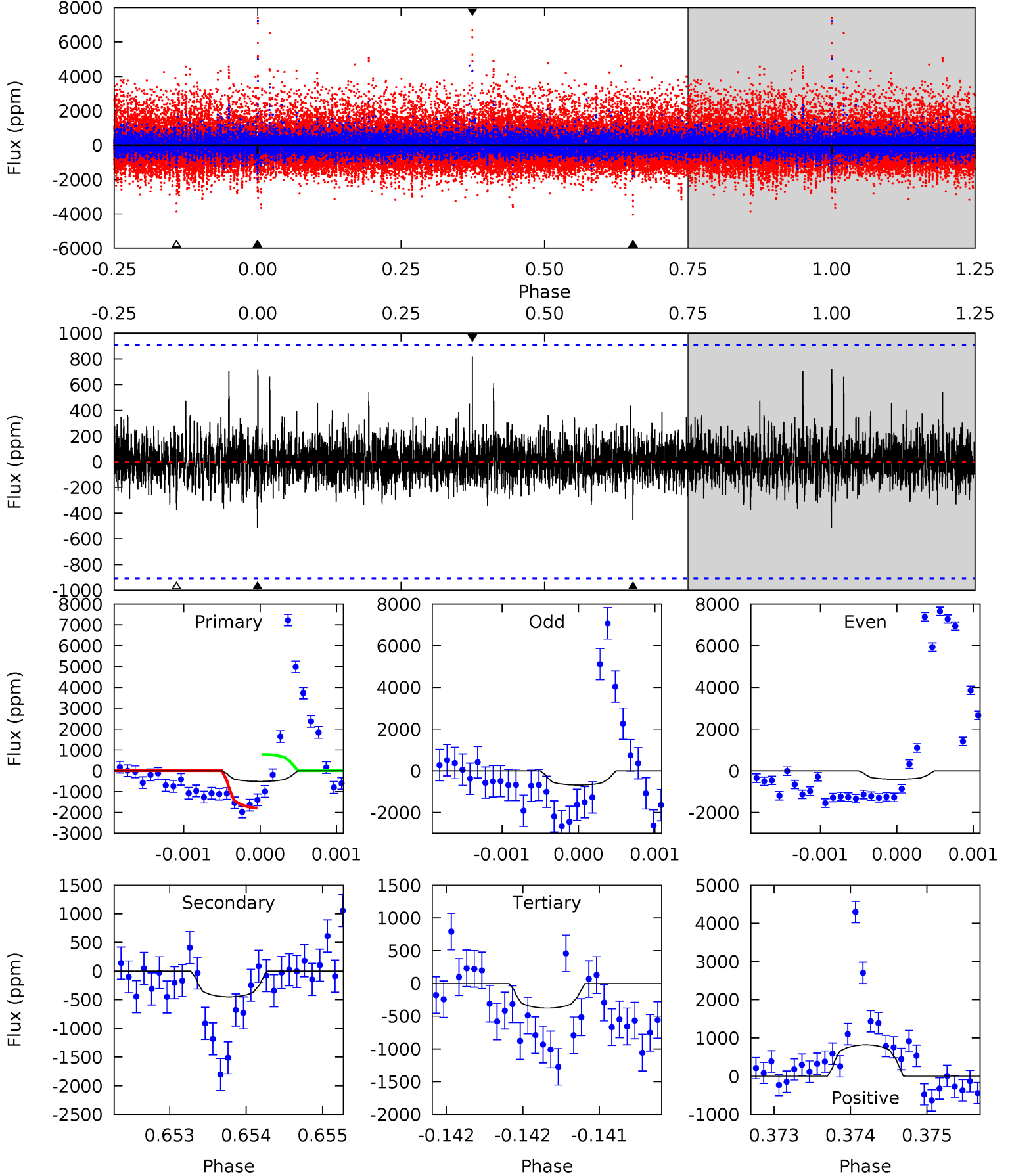
TCE 002713086-01 P=295.884760 Days  $T_0=417.469214$  (BKJD)



# DV Model-Shift Uniqueness Test

002713086-01,  $P = 295.877903$  Days,  $E = 121.654256$  Days

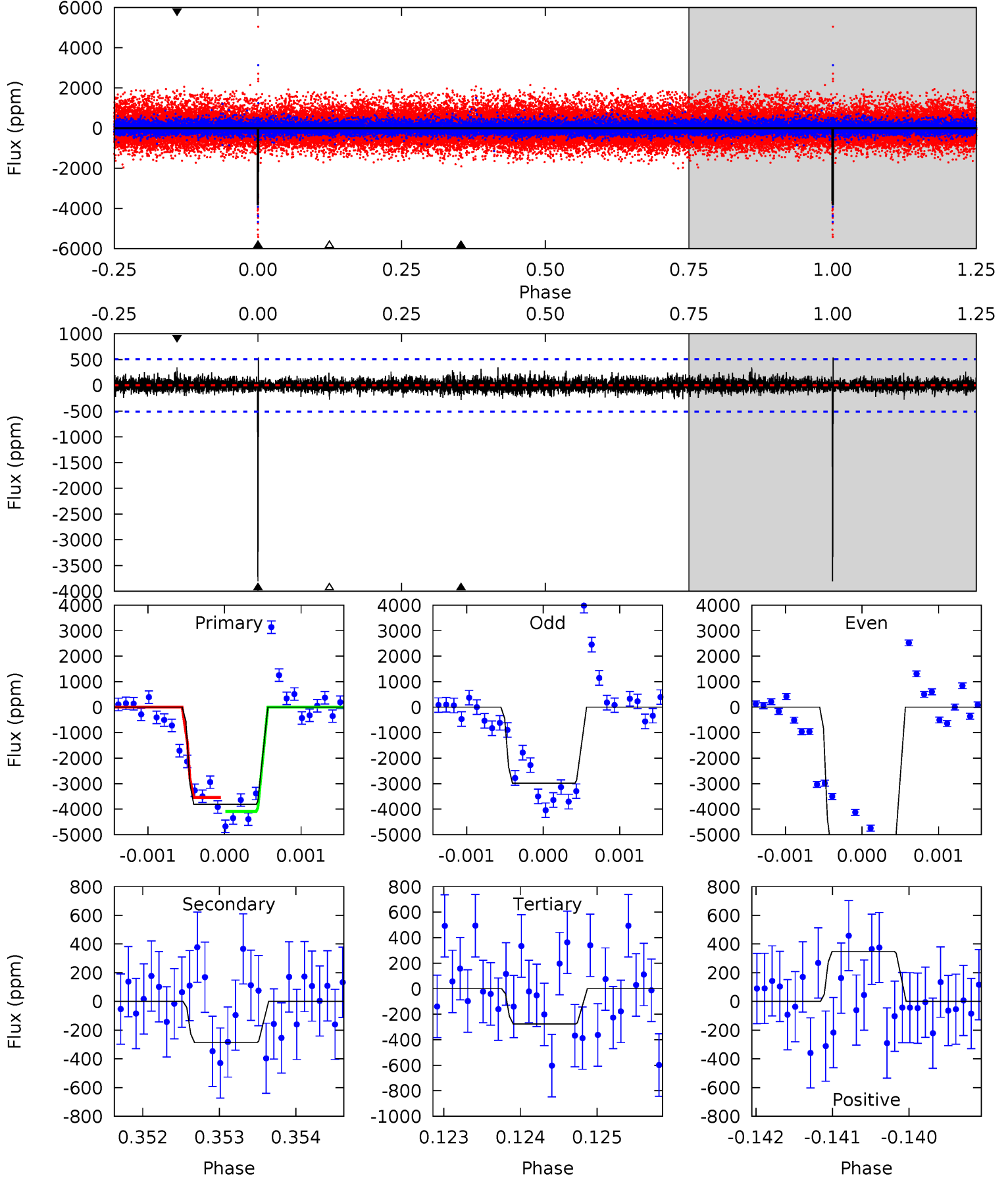
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.09	2.72	2.28	4.95	5.50	3.37	0.70	0.81	-1.86	0.44	-2.23	0.73	-0.19	0.62	3.05



# Alt Model-Shift Uniqueness Test

002713086-01, P = 295.884760 Days, E = 121.584454 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
41.0	3.08	2.97	3.74	5.48	3.33	0.73	38.0	37.2	0.11	-0.66	15.3	1.25	0.12	2.97





### Stellar Parameters For KIC 002713086

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3920^{+86}_{-86}$	$4.700^{+0.033}_{-0.018}$	$-0.100^{+0.100}_{-0.100}$	$0.550^{+0.024}_{-0.032}$	$0.554^{+0.030}_{-0.027}$	$4.675^{+0.689}_{-0.360}$
	+2%/-2%	+1%/-0%	+100%/-100%	+4%/-6%	+5%/-5%	+15%/-8%
Source	PHO2	PHO2	PHO2	DSEP		

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

### Secondary Eclipse Parameters for KIC 002713086-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-450 \pm 165$	$3.45^{+2.16}_{-1.97}$	$212^{+5}_{-5}$	$2855^{+893}_{-375}$	$9825^{+48014}_{-6585}$
Alt.	$-286 \pm 93$	$4.36^{+2.27}_{-2.22}$	$212^{+5}_{-5}$	$2559^{+518}_{-281}$	$4209^{+12023}_{-2599}$

$T_{\text{max}}$  = 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

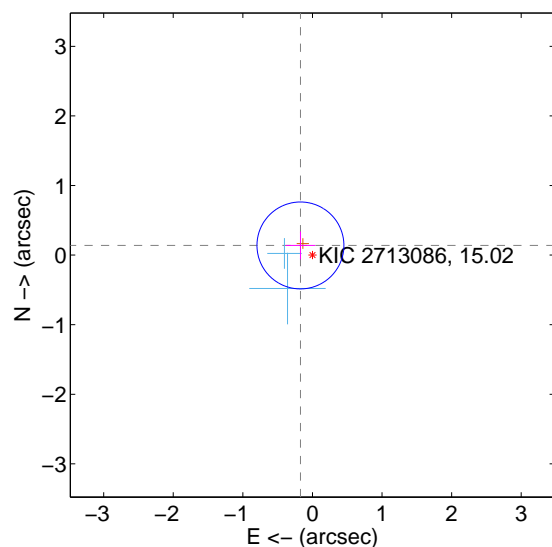
Supplemental centroid analysis for 002713086-01. Kepler magnitude: 15.02. Transit SNR 10.52

There are 2 quarters with good PRF difference image offsets

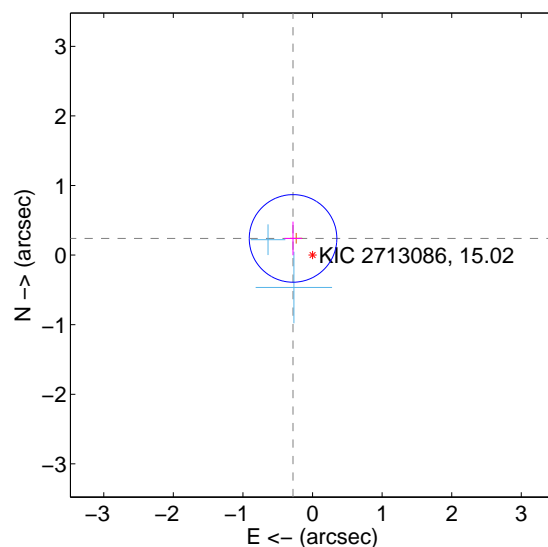
The direct PRF centroid is offset from the target star catalog position by about 0.31 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.221 \pm 0.208$	1.06	$0.173 \pm 0.214$	$0.139 \pm 0.200$
PRF-fit source offset from KIC position	$0.369 \pm 0.210$	1.76	$0.280 \pm 0.126$	$0.240 \pm 0.242$
photometric centroid source offset	$0.67 \pm 0.74$	0.90	$0.56 \pm 0.81$	$-0.37 \pm 0.56$

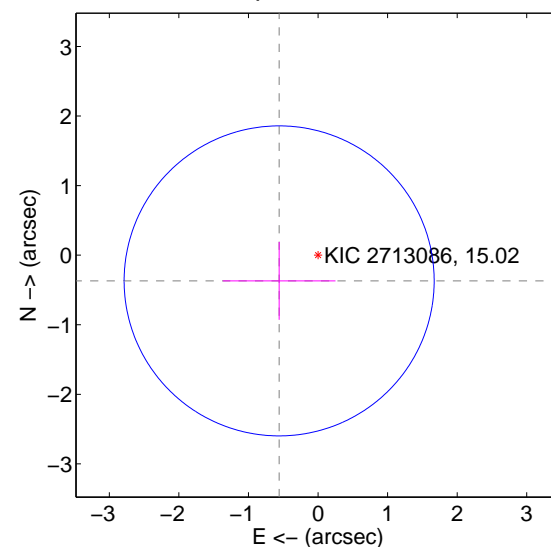
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

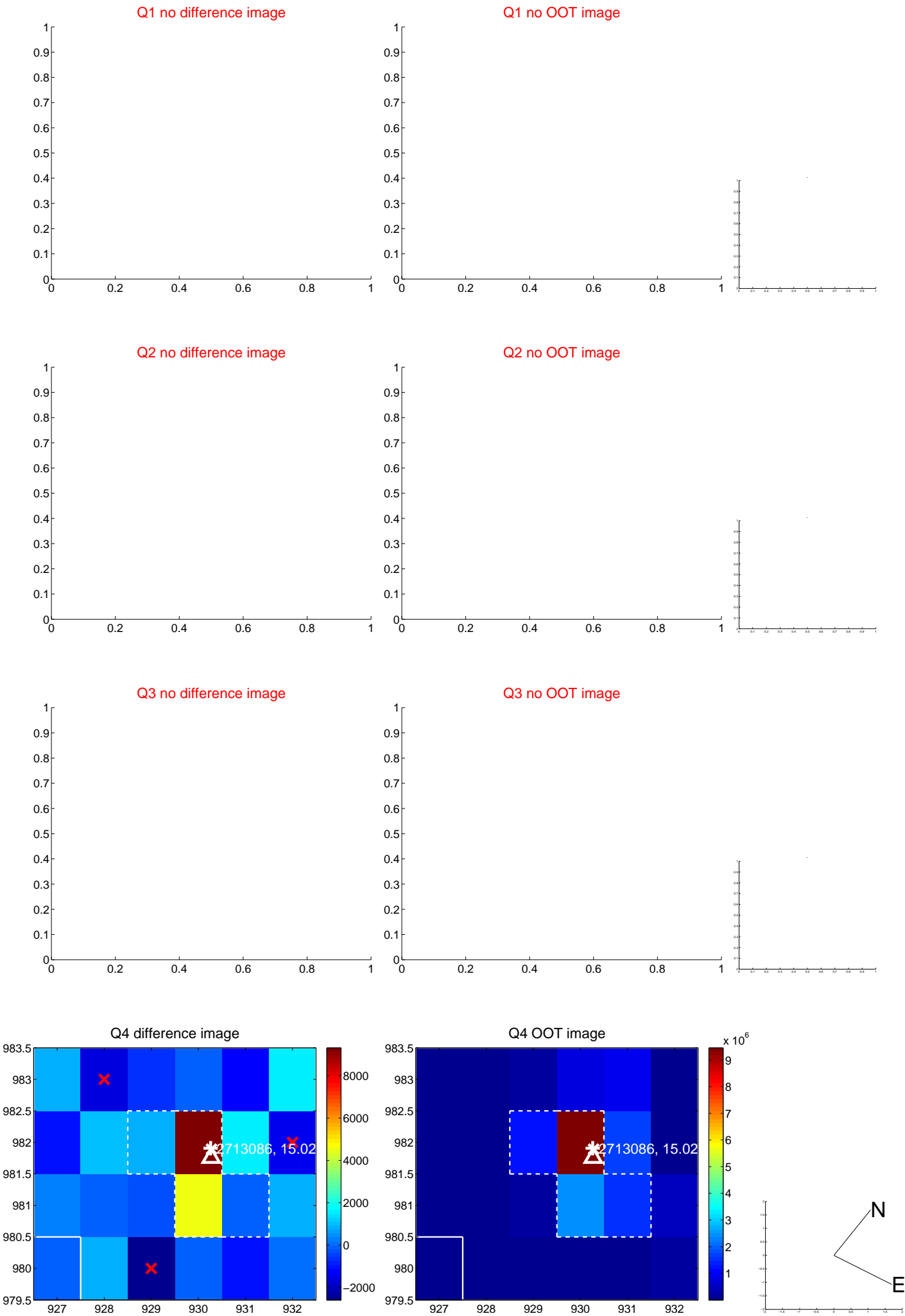


offset from photometric centroids

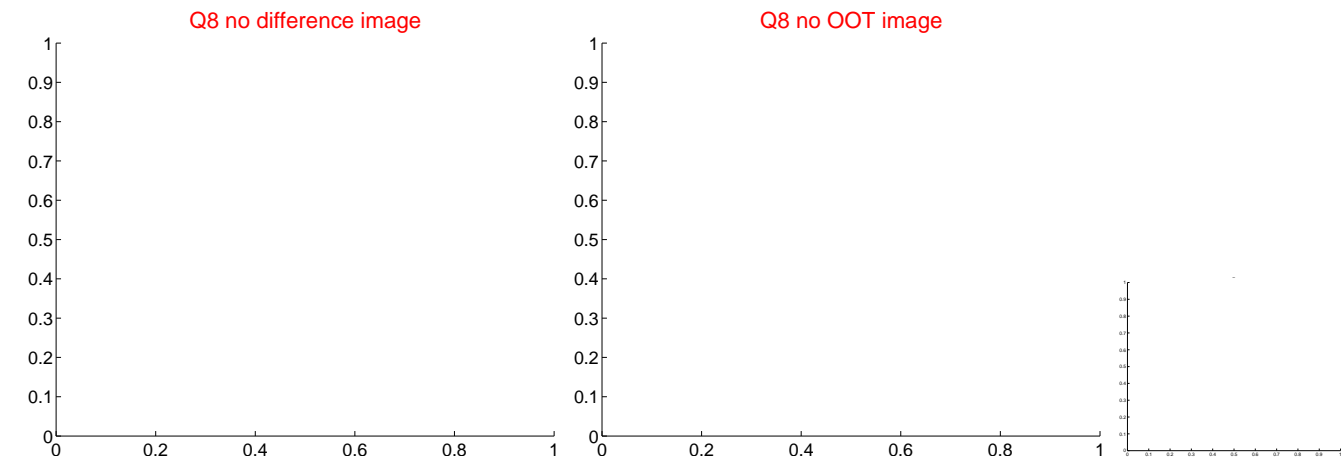
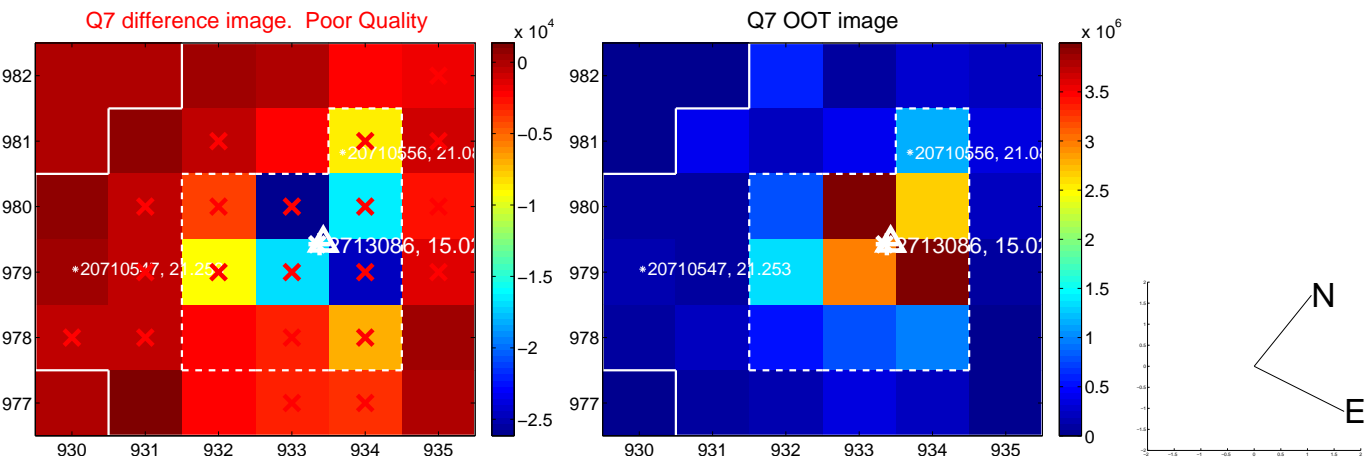


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



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

Q9 no difference image



Q9 no OOT image



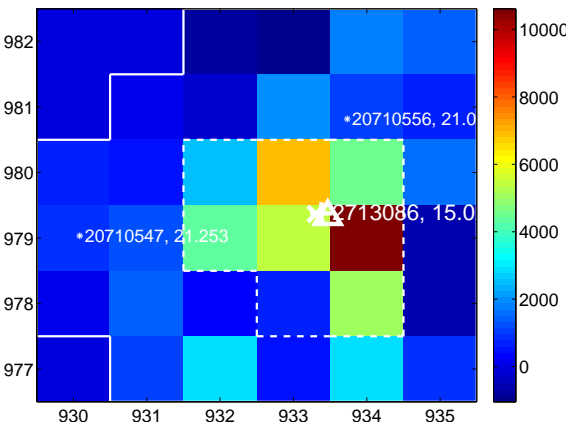
Q10 no difference image



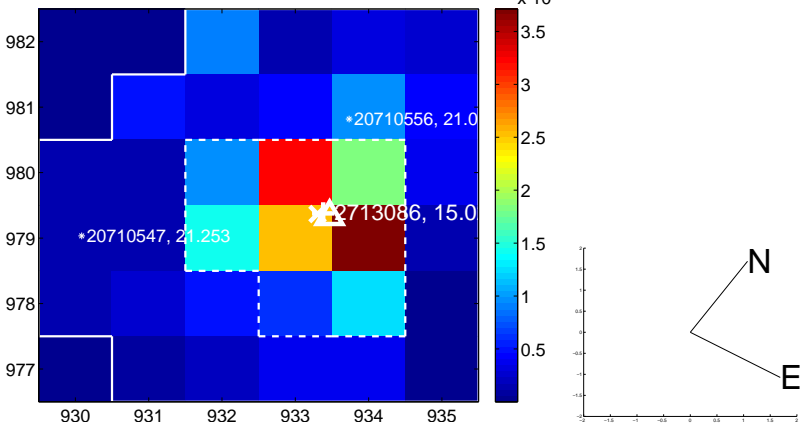
Q10 no OOT image



Q11 difference image



Q11 OOT image



Q12 no difference image



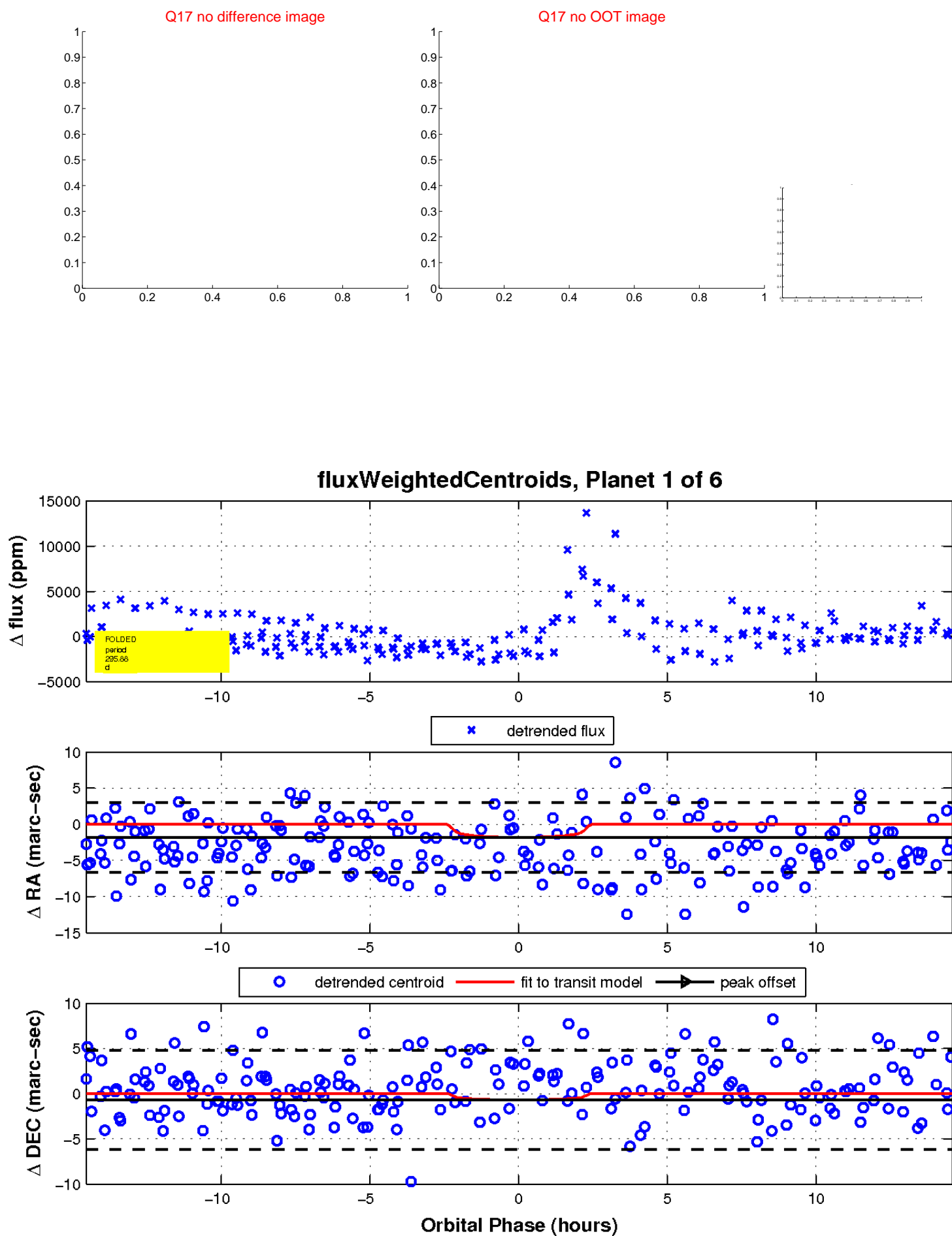
Q12 no OOT image



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

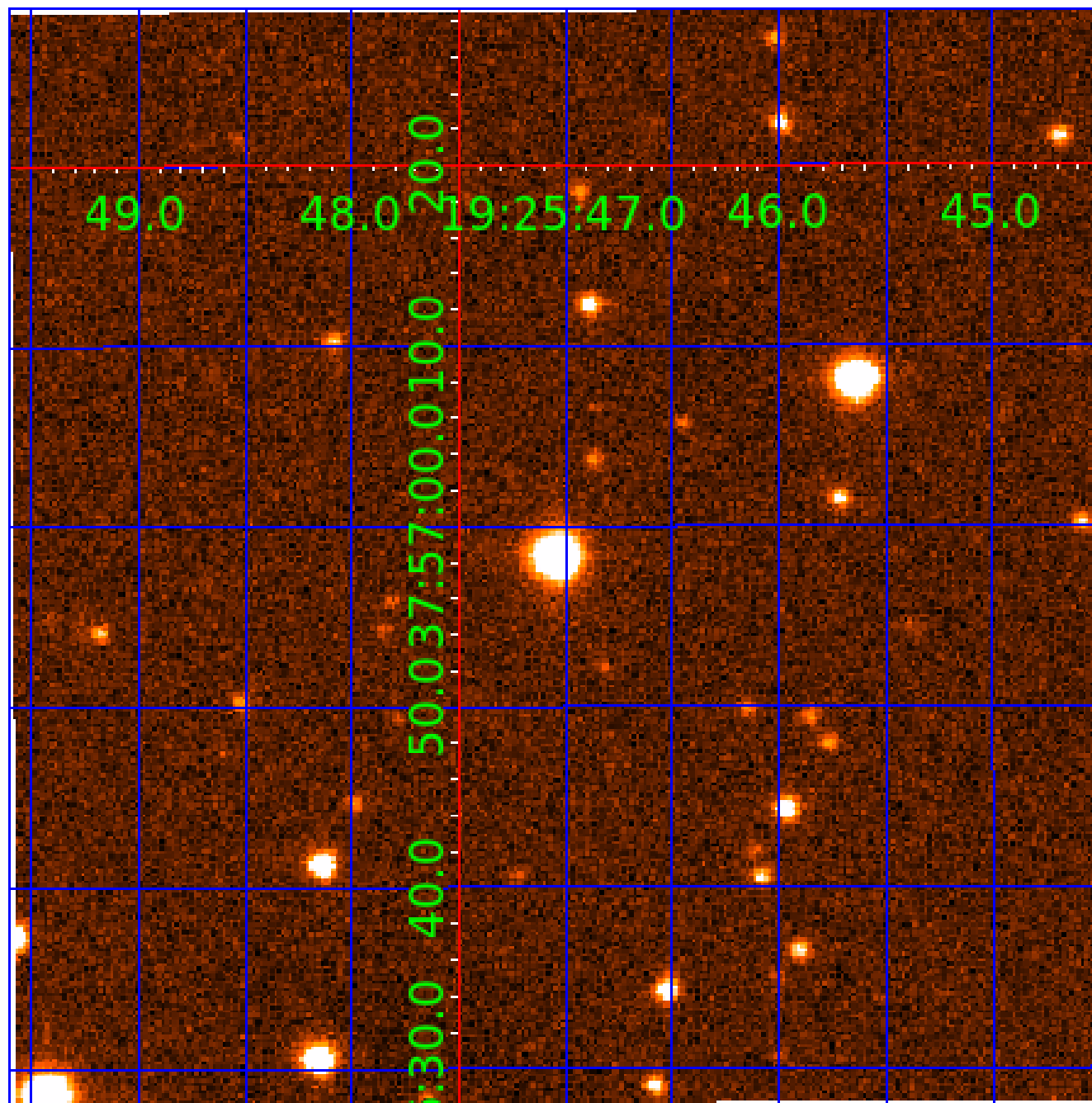


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UKIRT Image

Declination



# KIC 002713086

## Q1-17 DR25 TCE Parameters

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002713086-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002713086-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
002713086-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
002713086-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_MEAS

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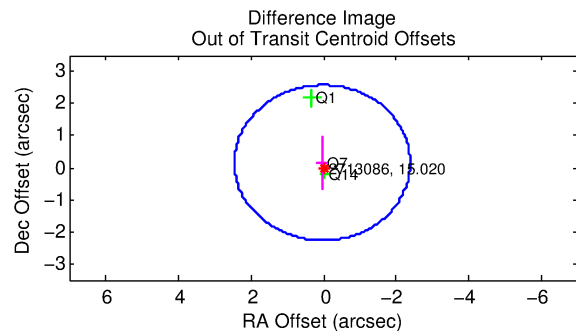
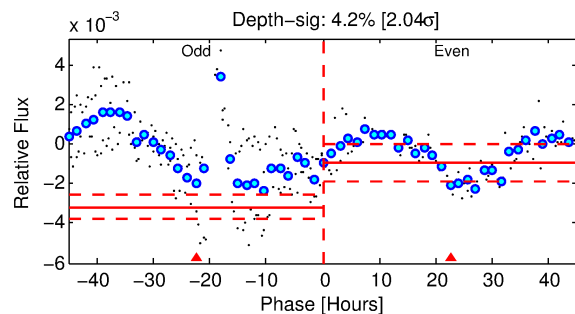
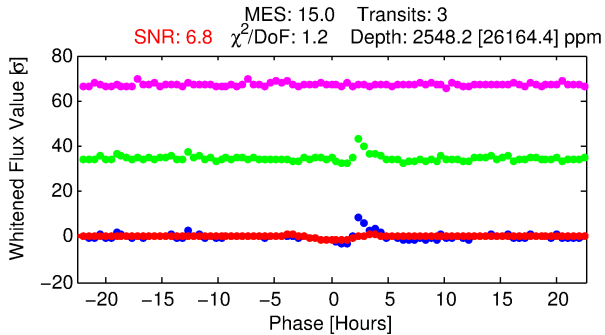
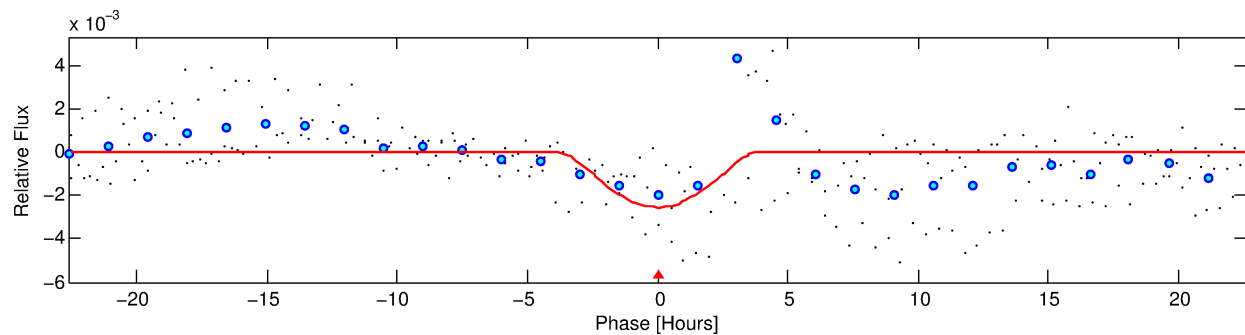
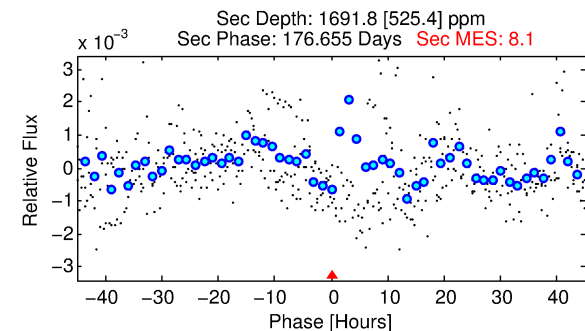
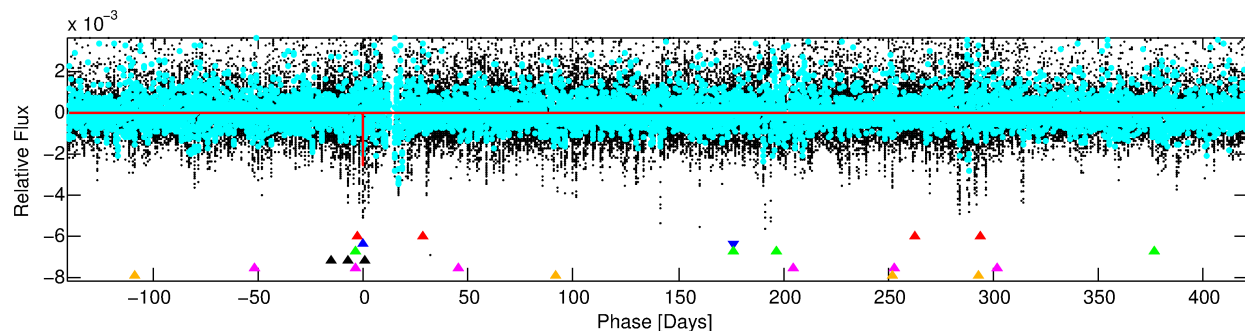
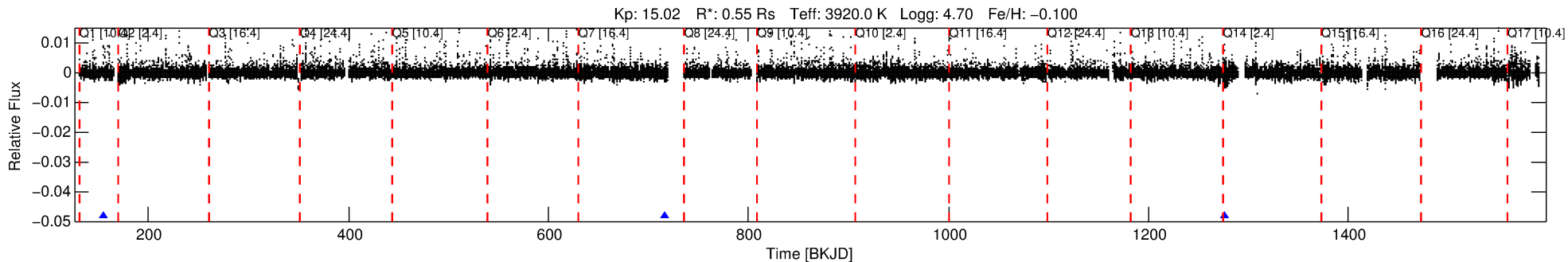
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 002713086-02

No Significant Match Found

# DV One-Page Summary

KIC: 2713086 Candidate: 2 of 6 Period: 560.806 d



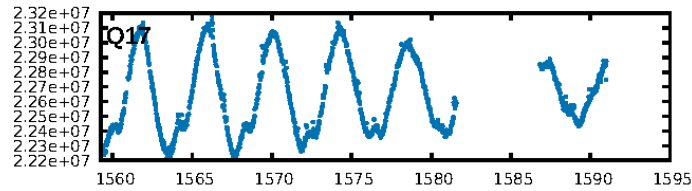
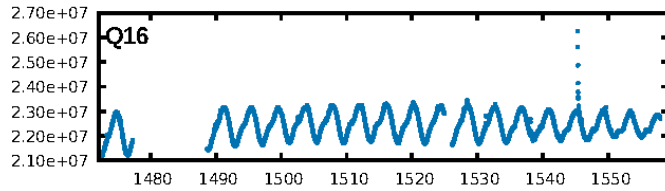
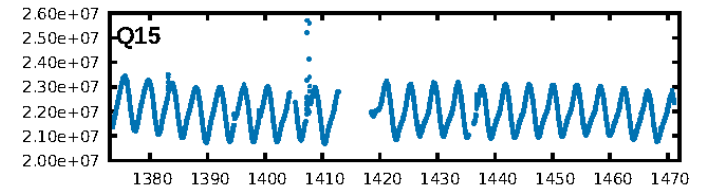
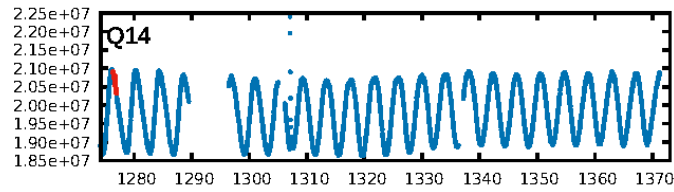
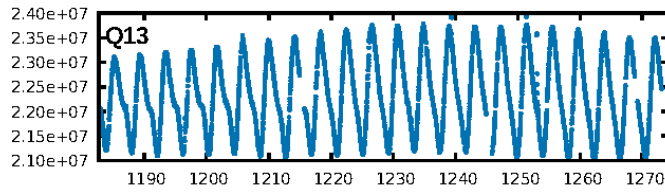
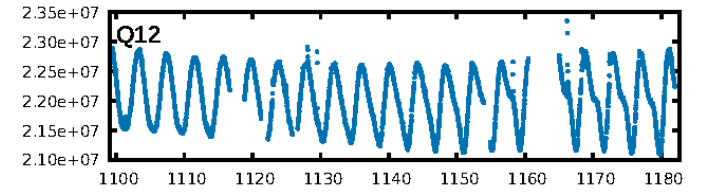
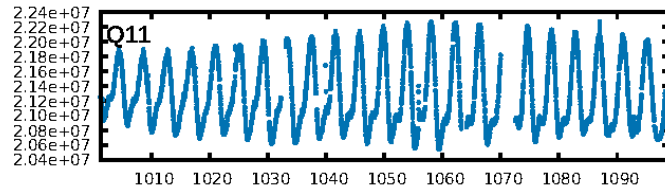
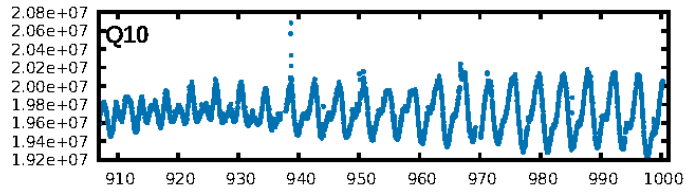
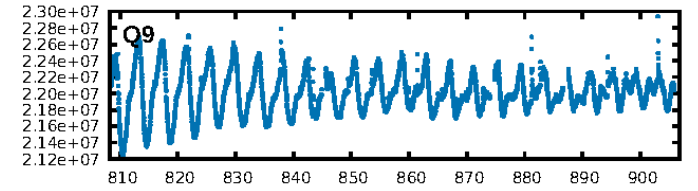
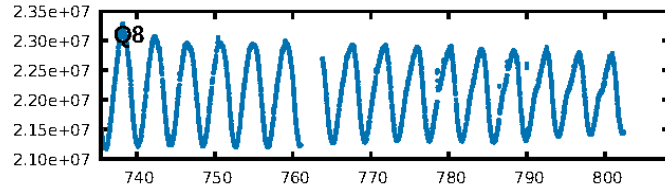
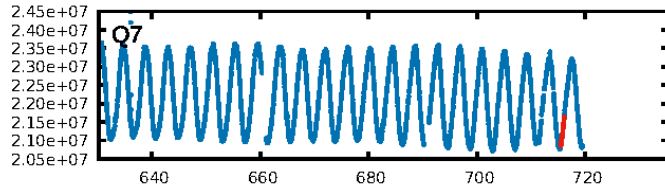
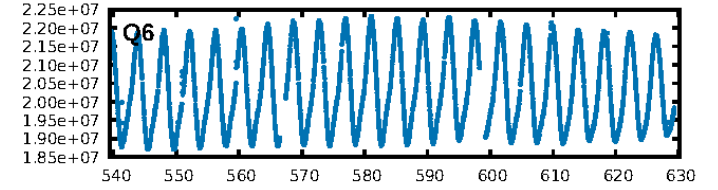
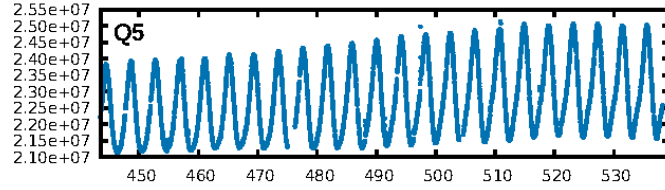
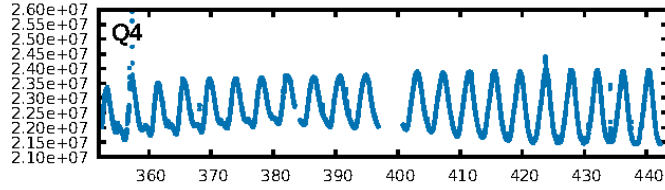
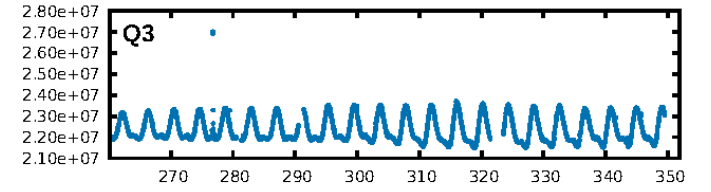
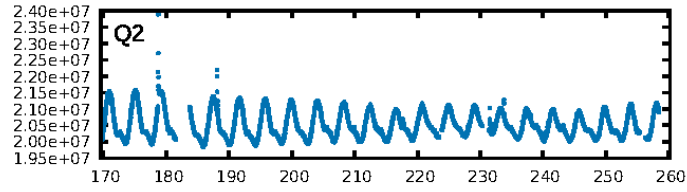
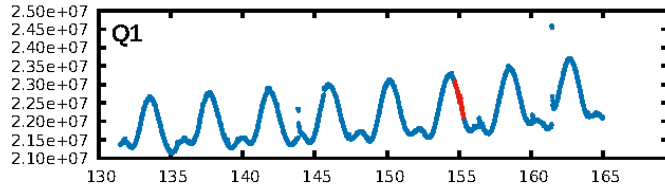
## DV Fit Results:

Period = 560.80619 [0.01547] d  
Epoch = 154.9997 [0.0180] BKJD  
Rp/R\* = 0.0889 [0.4064]  
a/R\* = 244.76 [225.27]  
b = 1.00 [0.02]  
Seff = 0.05 [0.01]  
Teq = 123 [3] K  
Rp = 5.33 [24.39] Re  
a = 1.0926 [0.0506] AU  
Ag = 39062.65 [357476.87] [0.11σ]  
Teffp = 2667 [6102] K [0.42σ]

## DV Diagnostic Results:

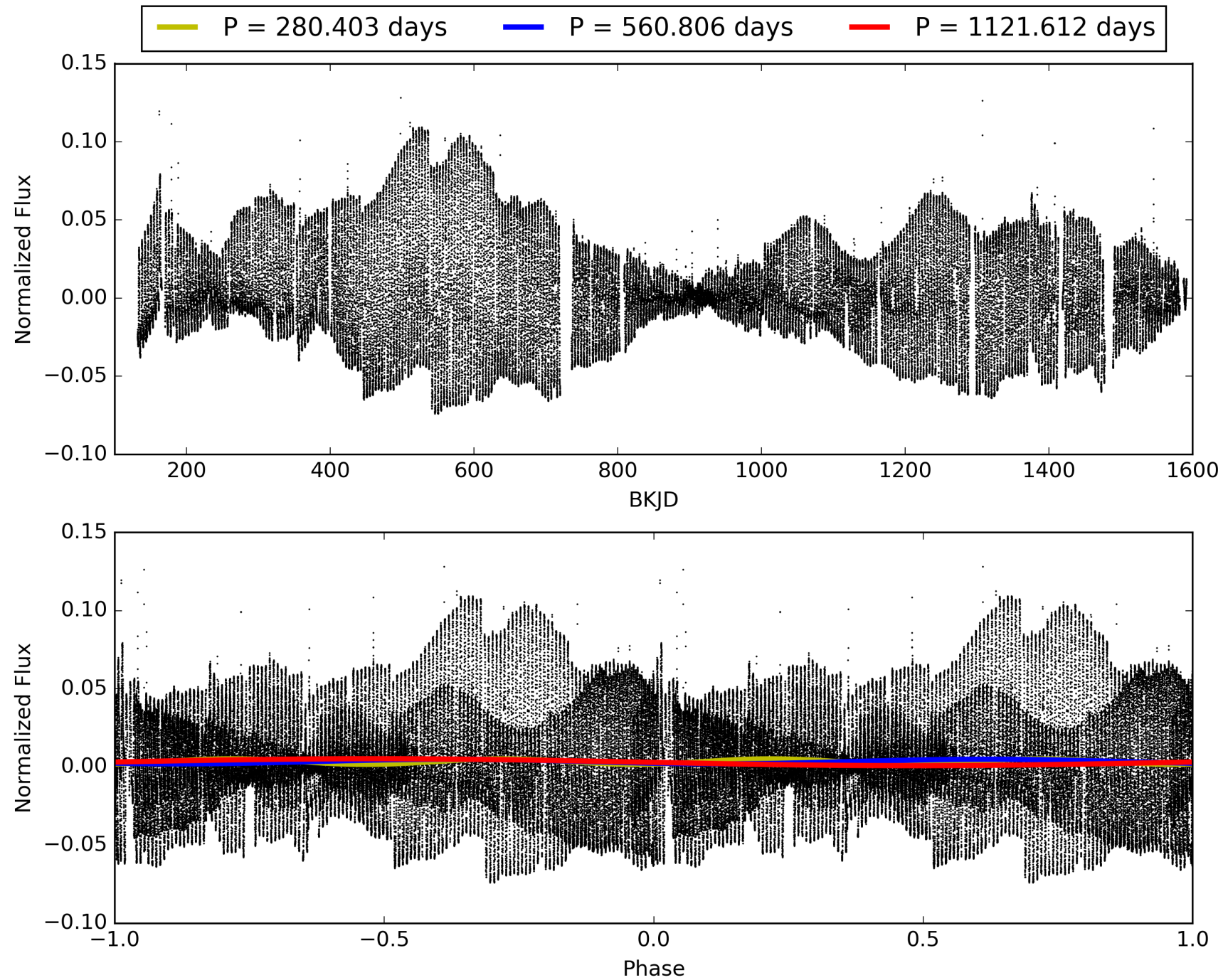
ShortPeriod-sig: 100.0% [21.12σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 3.8%  
ModelChiSquareGof-sig: 91.9%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [2/2]  
**GhostDiagnostic-chr: -1.079**  
Centroid-sig: 56.8%  
Centroid-so: 0.293 arcsec [0.38σ]  
OotOffset-rm: 0.157 arcsec [0.19σ]  
KicOffset-rm: 0.197 arcsec [0.37σ]  
OotOffset-st: 1/1/0/1 [3]  
KicOffset-st: 1/1/0/1 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

# TCE 002713086-02, PDC Light Curves



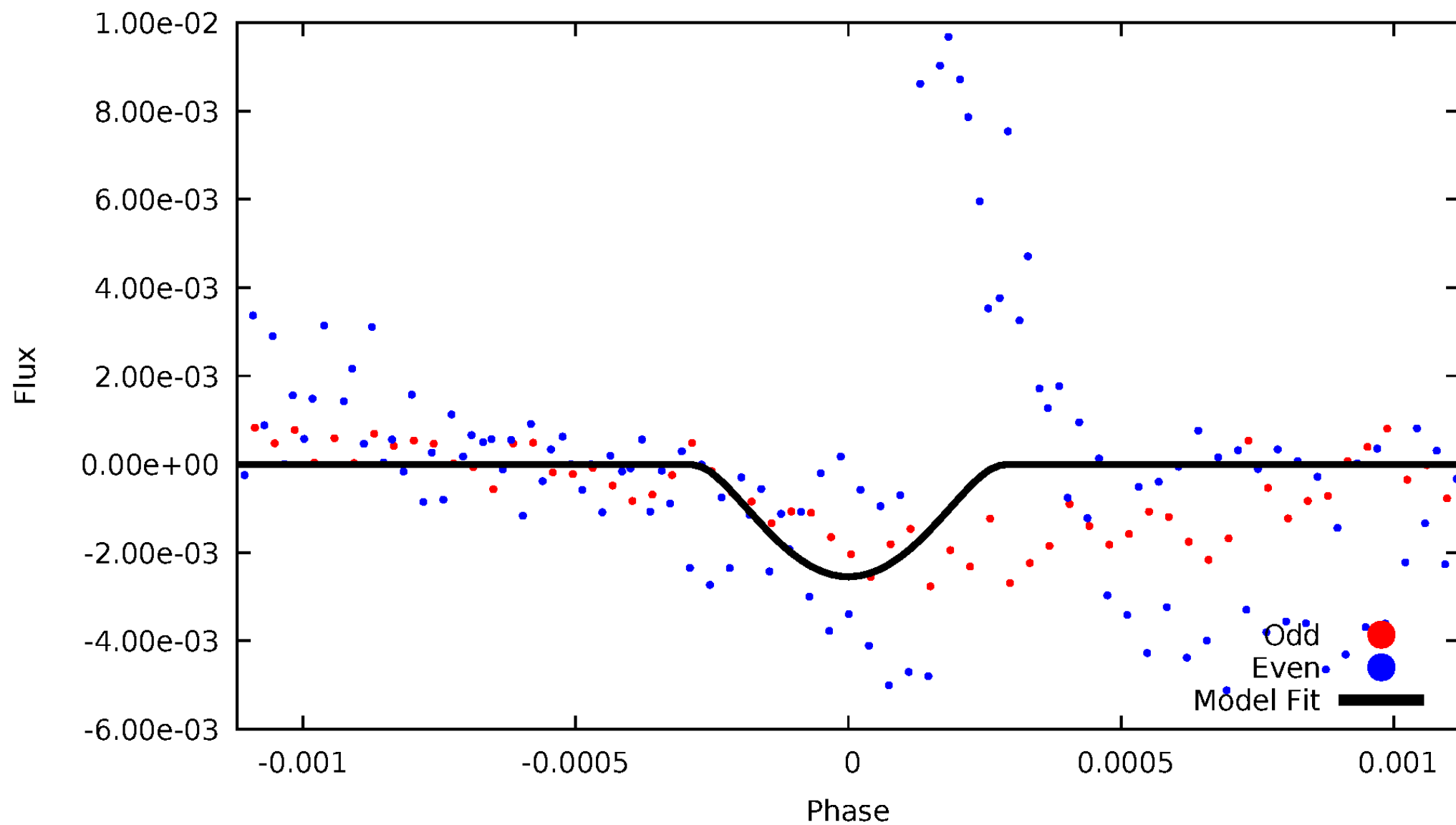


TCE 002713086-02



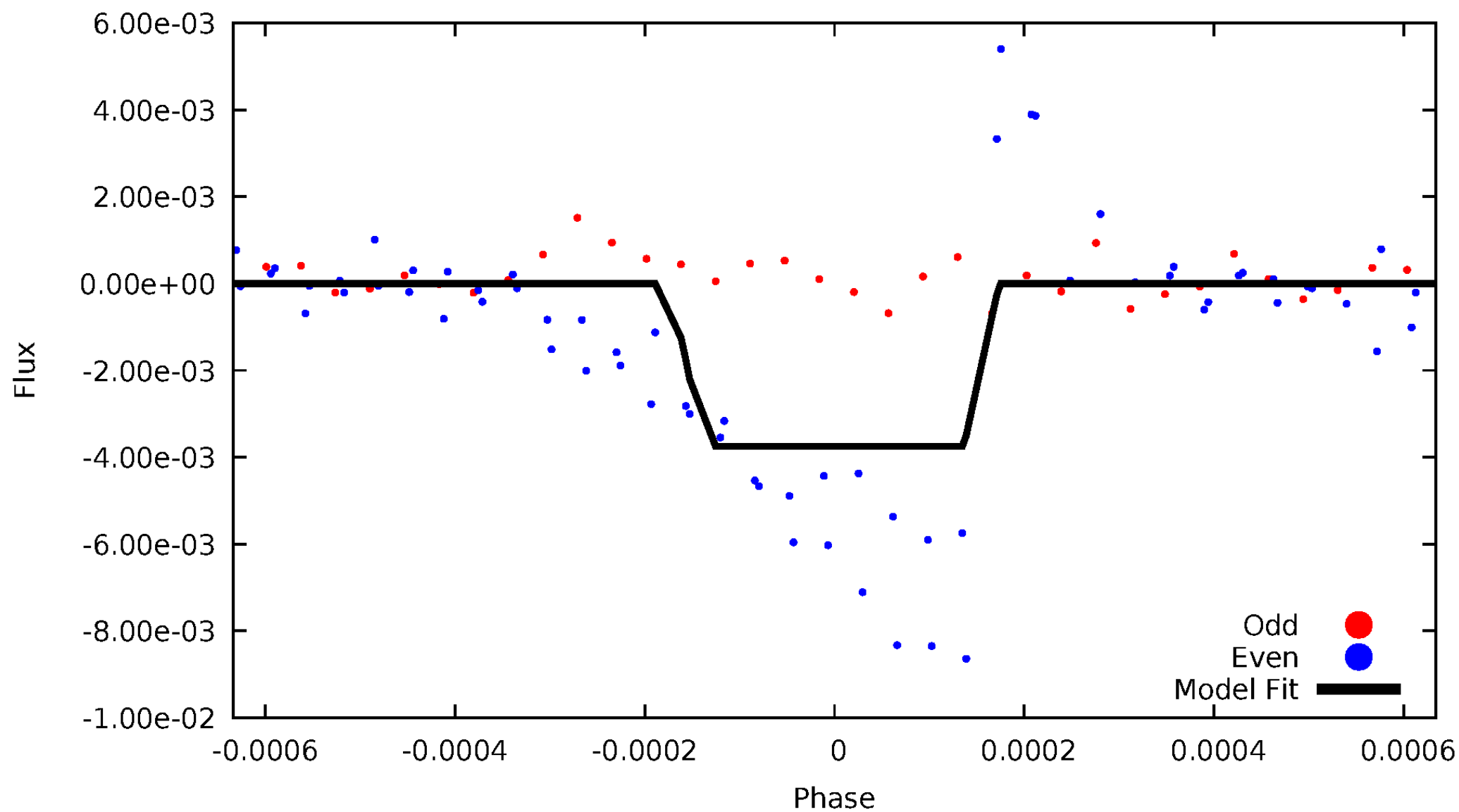
# DV Odd/Even

TCE 002713086-02



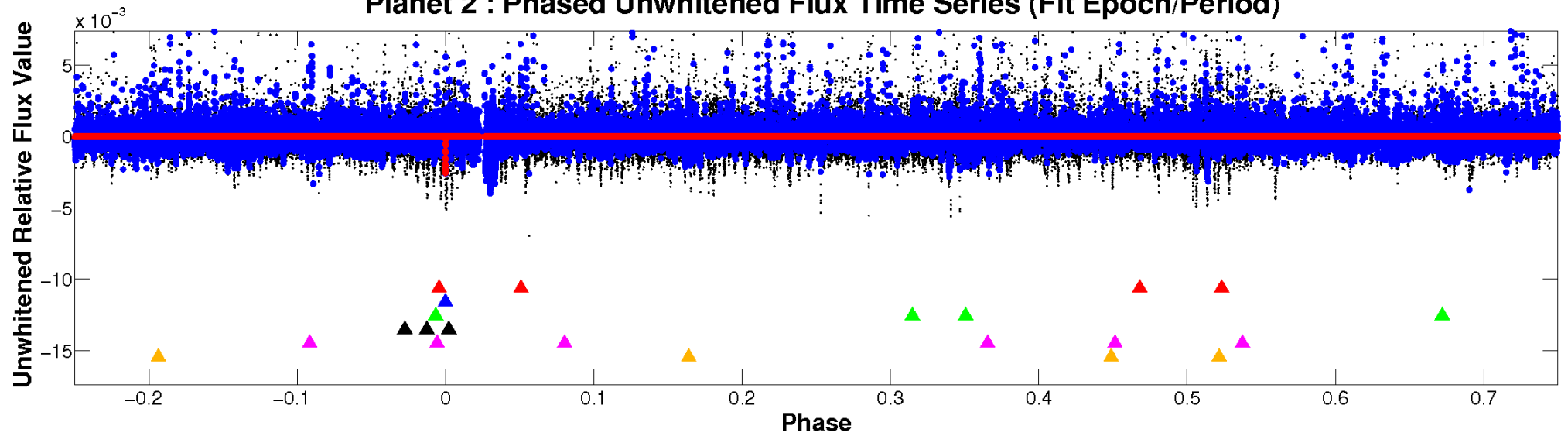
# ALT Odd/Even

TCE 002713086-02

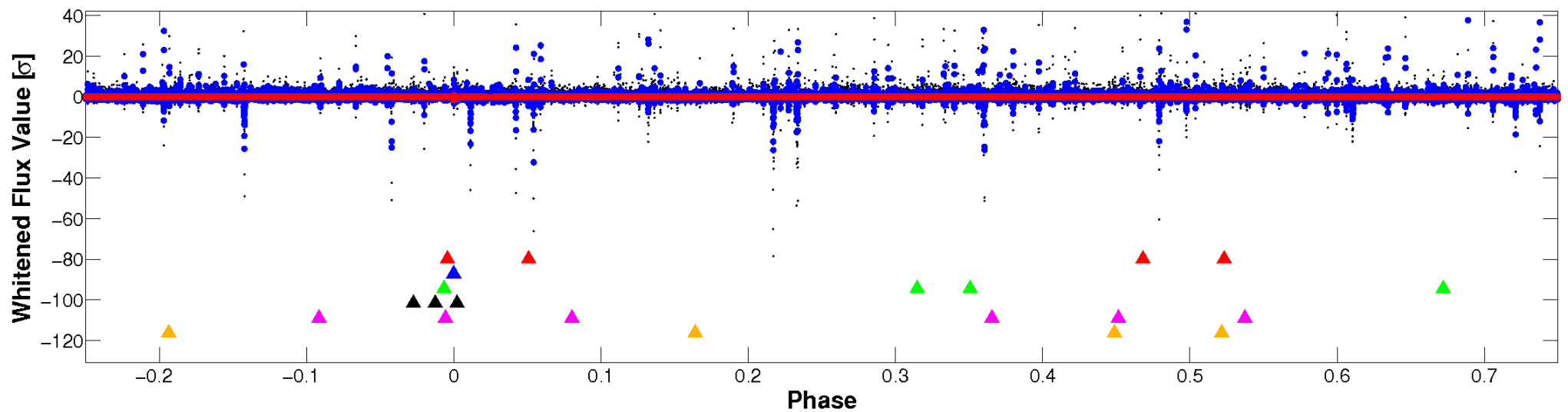


# Non-Whitened Vs. Whitened Light Curve

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

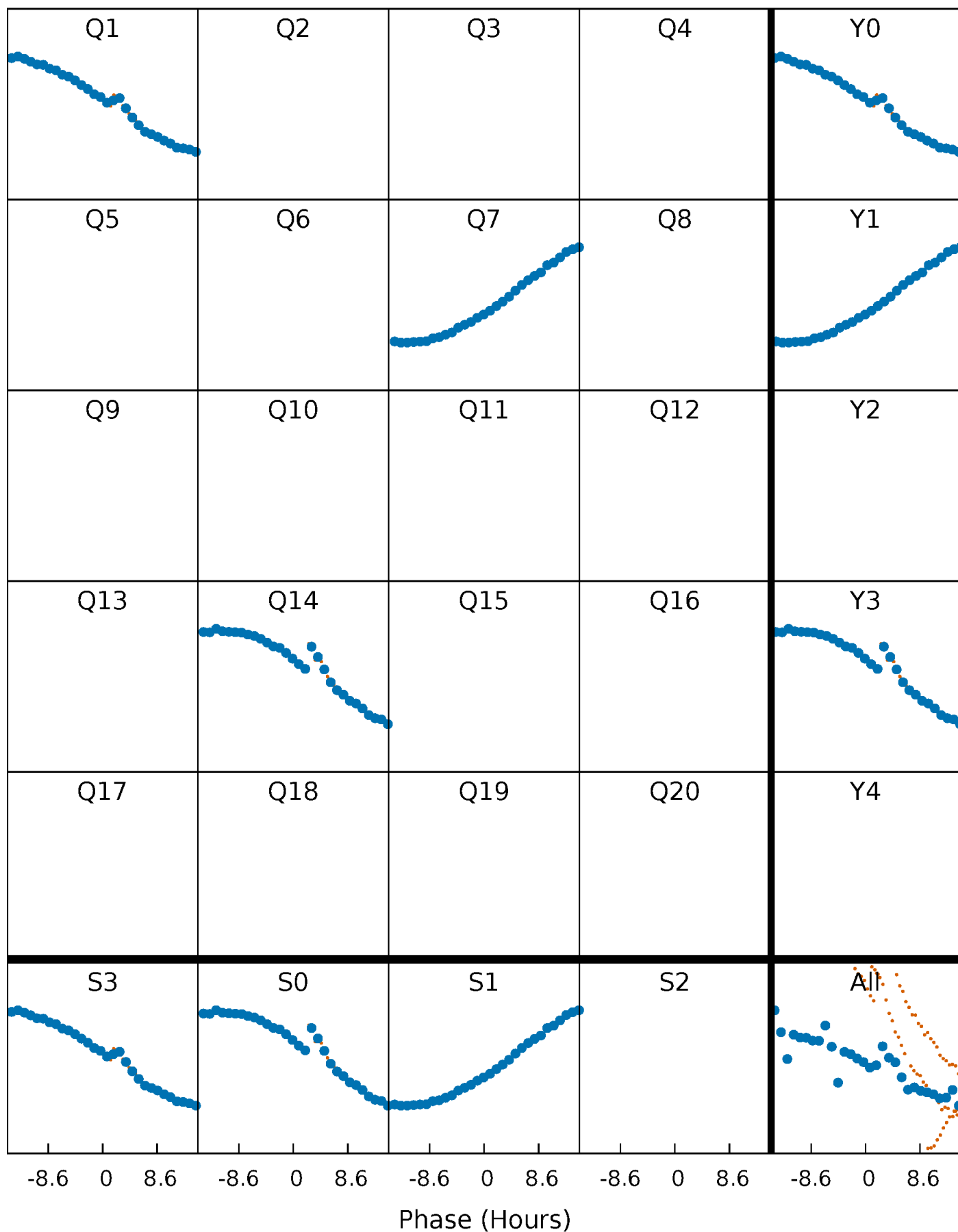


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



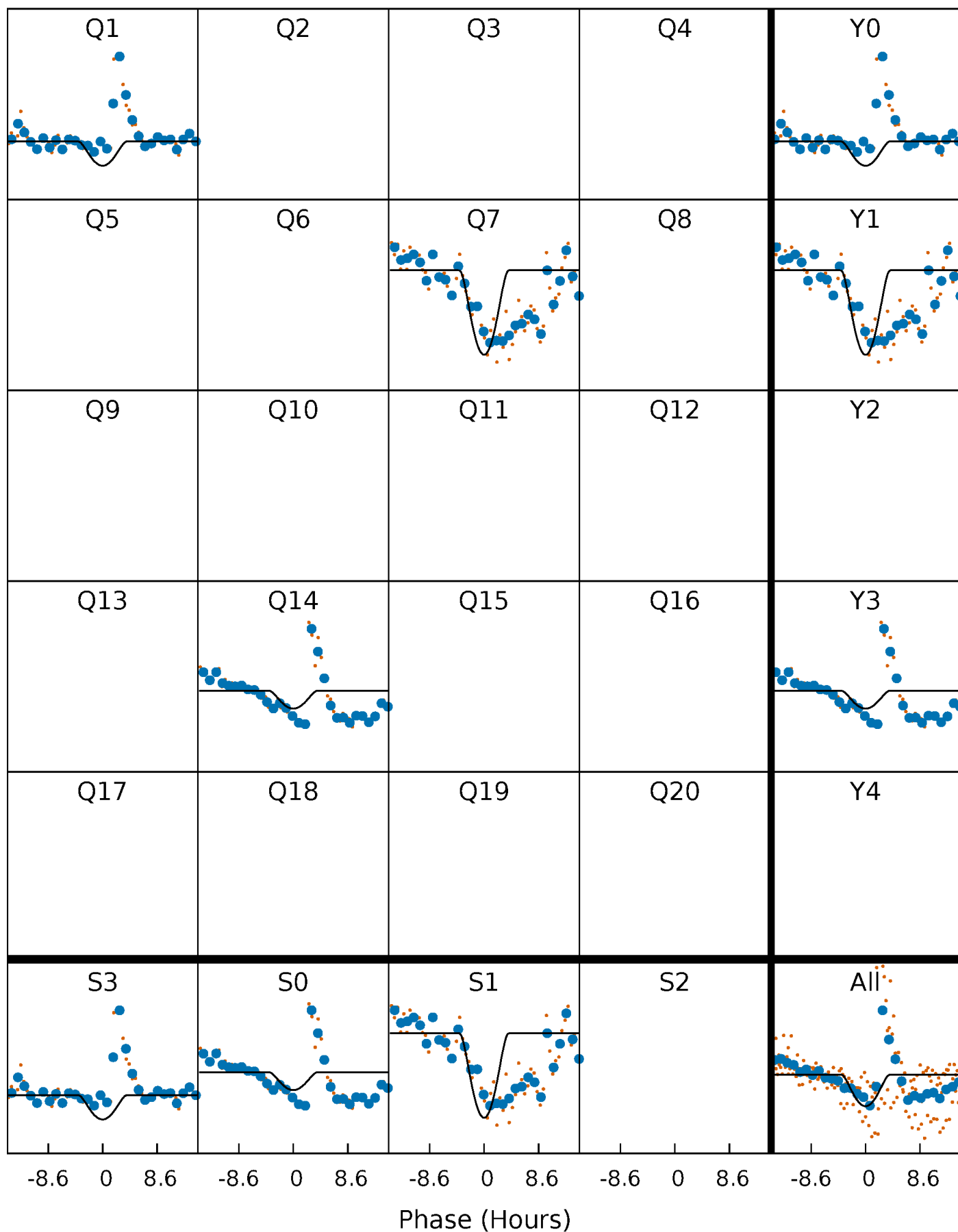
# PDC Quarter-Phased Transit Curves

TCE 002713086-02 P=560.806191 Days  $T_0=154.999723$  (BKJD)



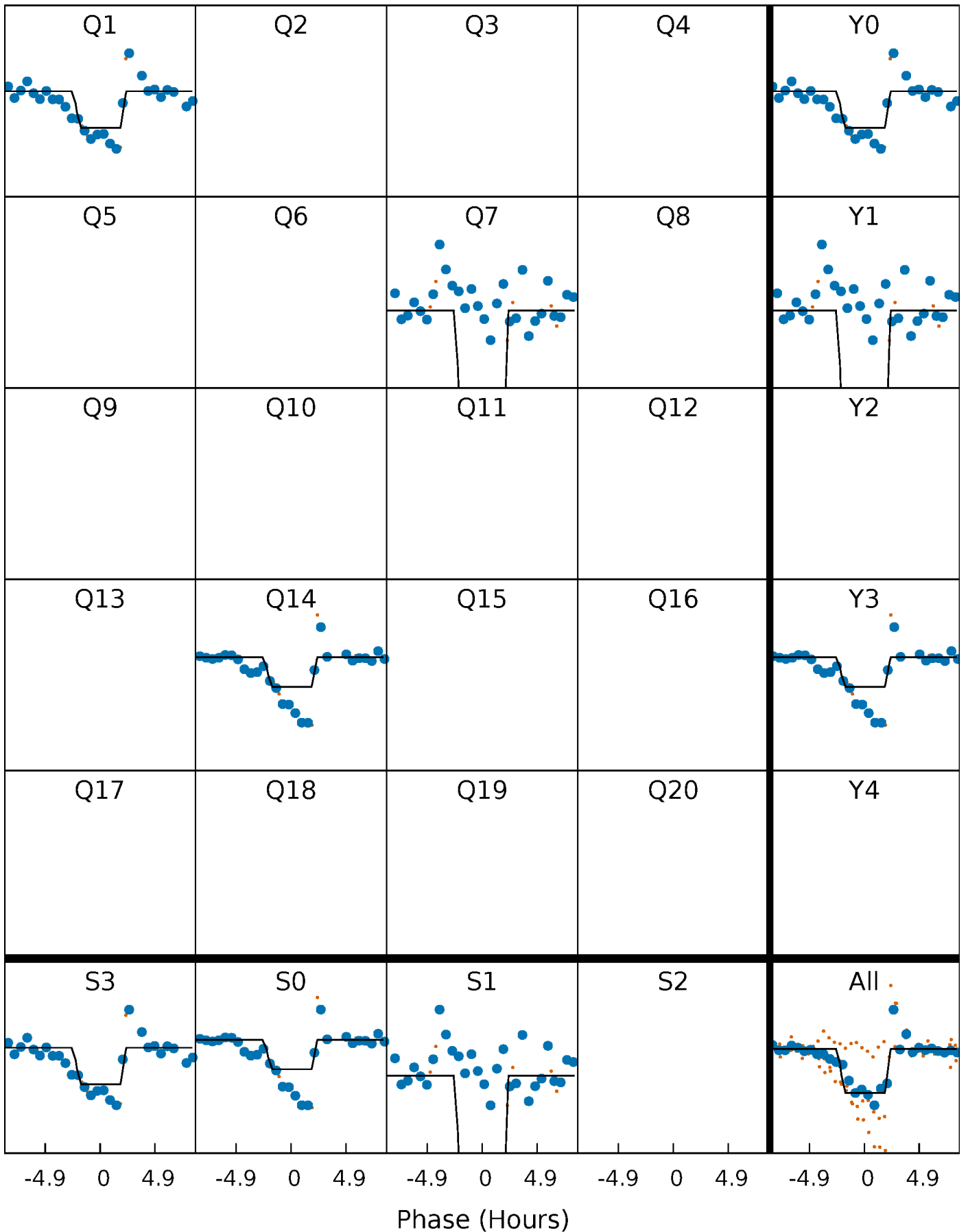
# DV Quarter-Phased Transit Curves

TCE 002713086-02 P=560.806191 Days  $T_0=154.999723$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

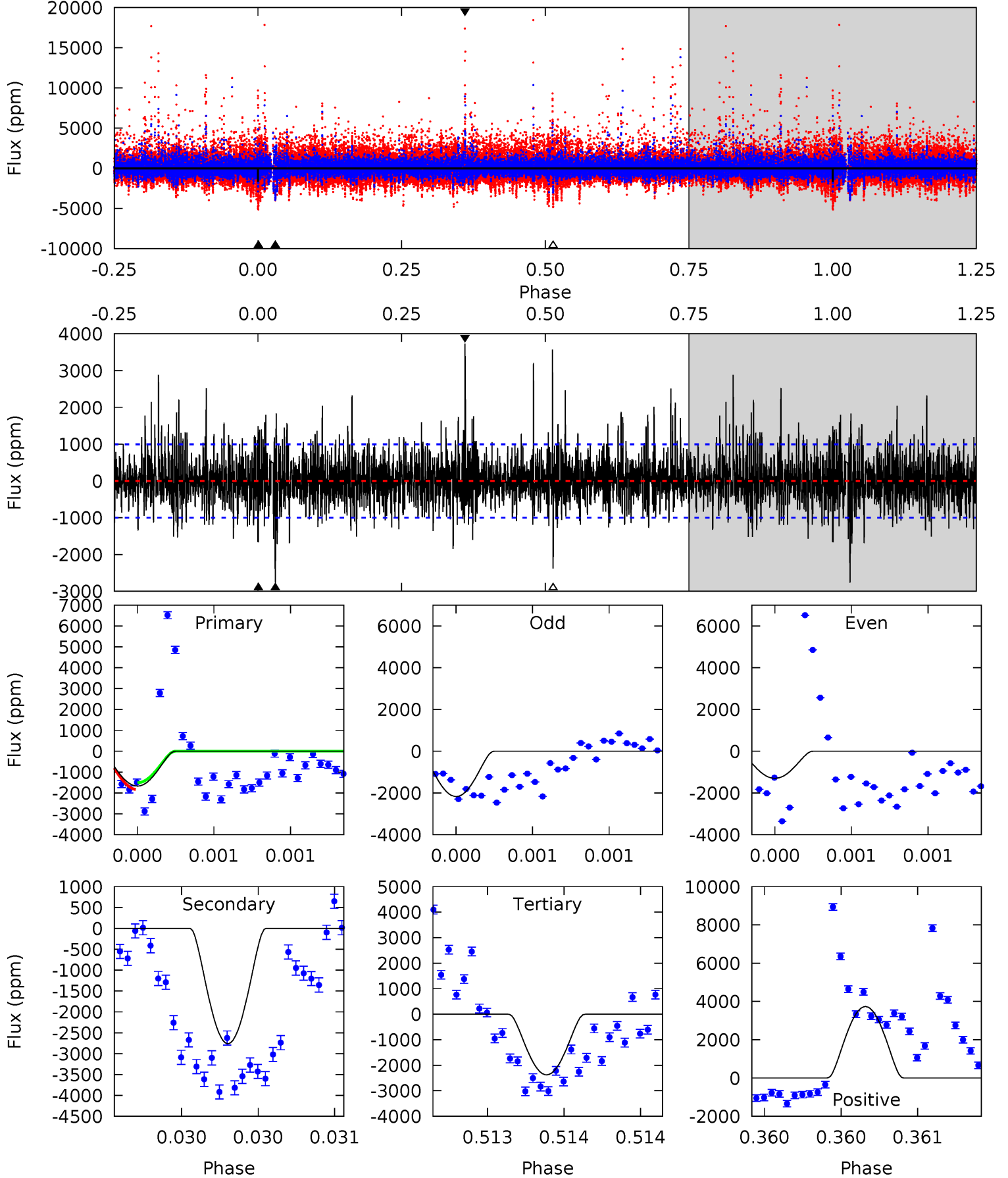
TCE 002713086-02 P=560.819488 Days  $T_0=154.977635$  (BKJD)



# DV Model-Shift Uniqueness Test

002713086-02, P = 560.806191 Days, E = 154.999723 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
9.29	15.4	13.2	20.8	5.55	3.44	3.00	-3.93	-11.5	2.15	-5.41	1.47	0.64	0.57	0.91

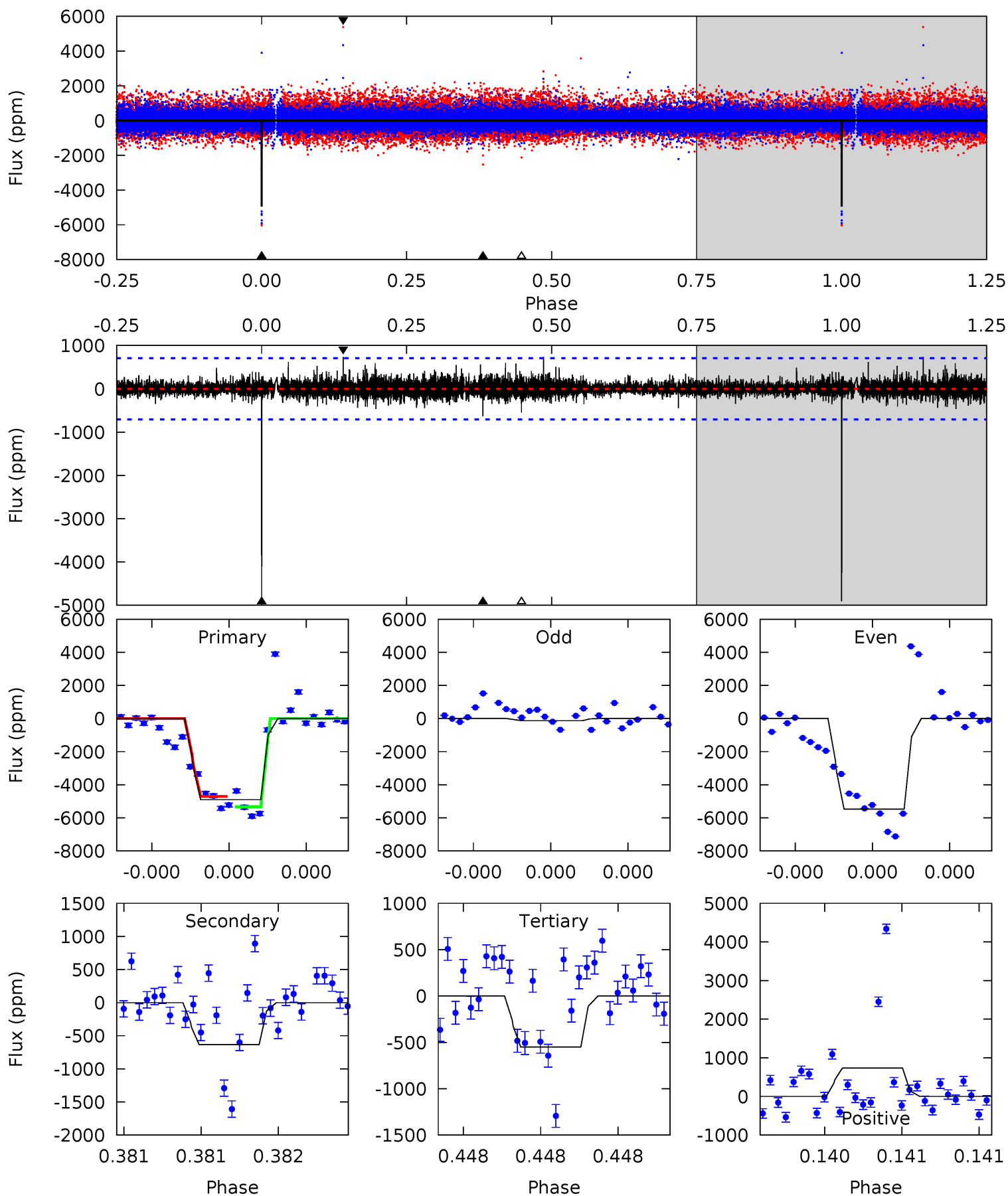




# Alt Model-Shift Uniqueness Test

002713086-02, P = 560.819488 Days, E = 154.977635 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
39.2	5.06	4.40	5.89	5.65	3.59	0.79	34.8	33.3	0.65	-0.84	26.5	0.77	0.13	2.36



### Stellar Parameters For KIC 002713086

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3920^{+86}_{-86}$	$4.700^{+0.033}_{-0.018}$	$-0.100^{+0.100}_{-0.100}$	$0.550^{+0.024}_{-0.032}$	$0.554^{+0.030}_{-0.027}$	$4.675^{+0.689}_{-0.360}$
	+2%/-2%	+1%/-0%	+100%/-100%	+4%/-6%	+5%/-5%	+15%/-8%
Source	PHO2	PHO2	PHO2	DSEP		

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

### Secondary Eclipse Parameters for KIC 002713086-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-2762 \pm 180$	$18.80^{+17.90}_{-12.50}$	$171^{+4}_{-4}$	$2360^{+792}_{-322}$	$5140^{+40855}_{-3749}$
Alt.	$-632 \pm 125$	$18.07^{+18.71}_{-12.78}$	$171^{+4}_{-4}$	$2020^{+644}_{-264}$	$1238^{+13412}_{-941}$

$T_{max}$  = 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

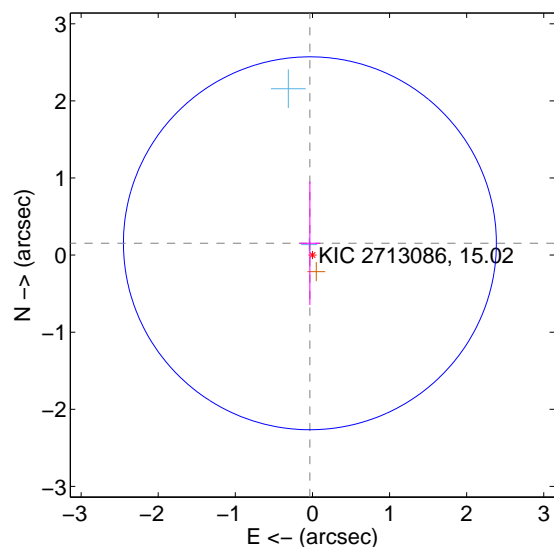
Supplemental centroid analysis for 002713086-02. Kepler magnitude: 15.02. Transit SNR 6.80

There are 2 quarters with good PRF difference image offsets

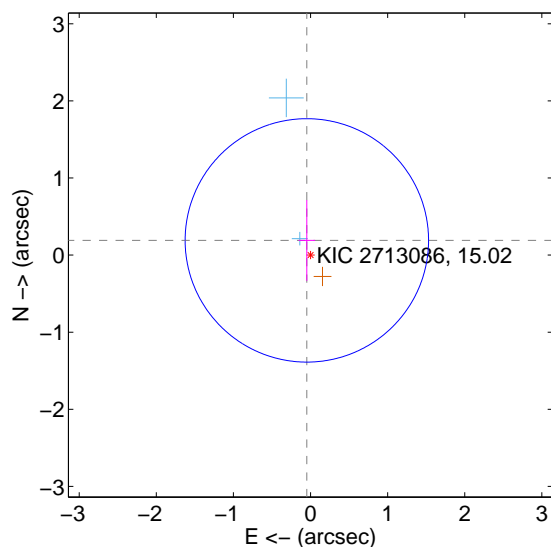
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.157 \pm 0.806$	0.19	$0.033 \pm 0.134$	$0.153 \pm 0.800$
PRF-fit source offset from KIC position	$0.197 \pm 0.526$	0.37	$0.048 \pm 0.106$	$0.191 \pm 0.524$
photometric centroid source offset	$0.29 \pm 0.77$	0.38	$0.21 \pm 0.81$	$-0.20 \pm 0.74$

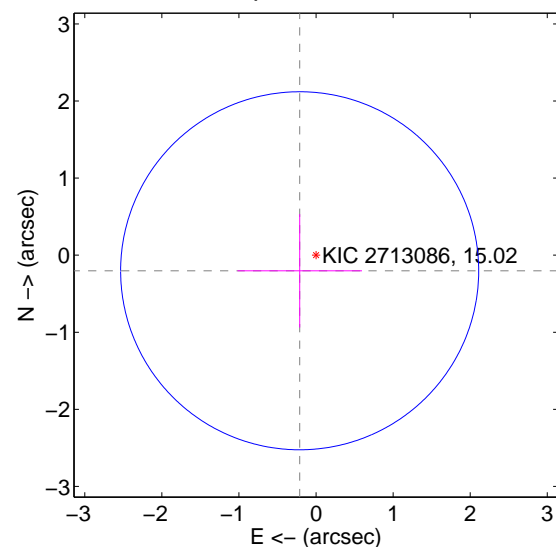
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

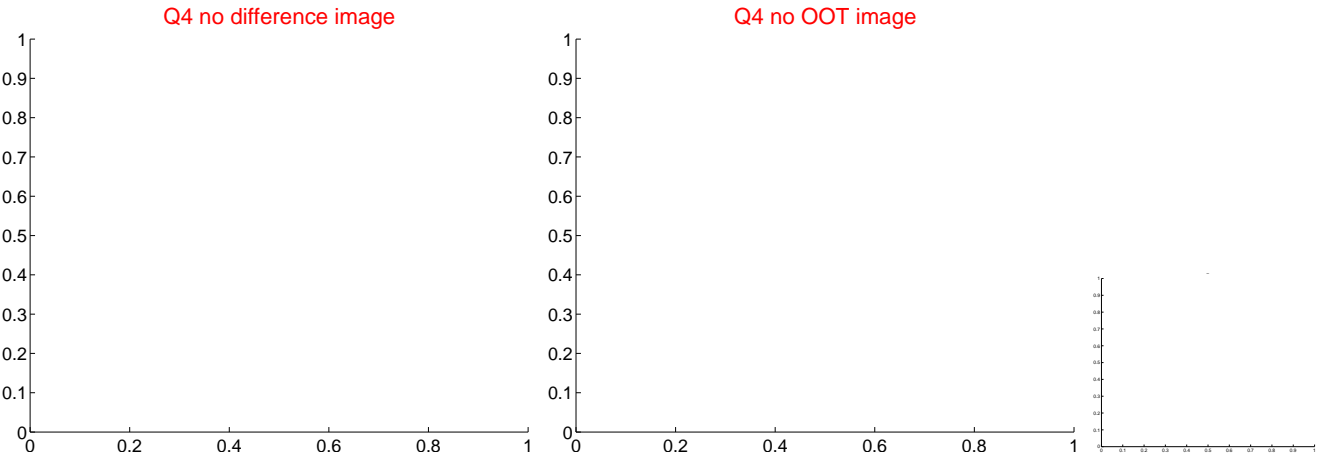
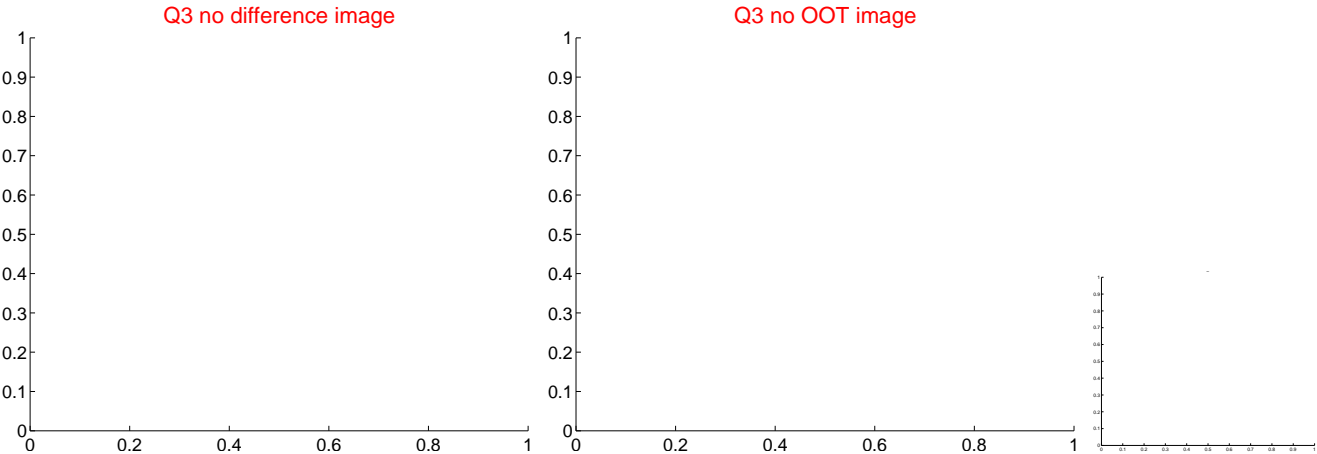
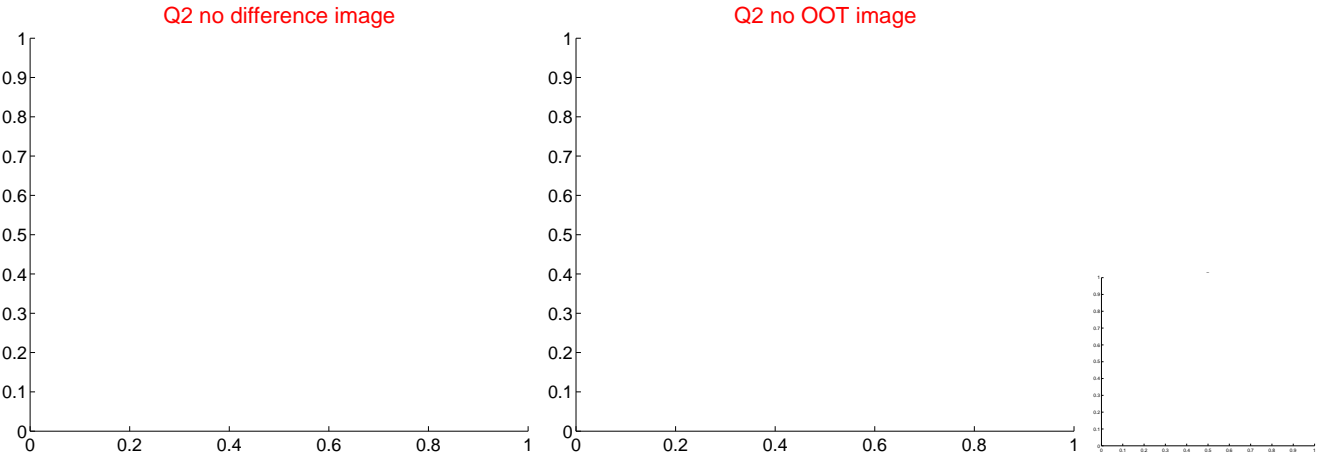
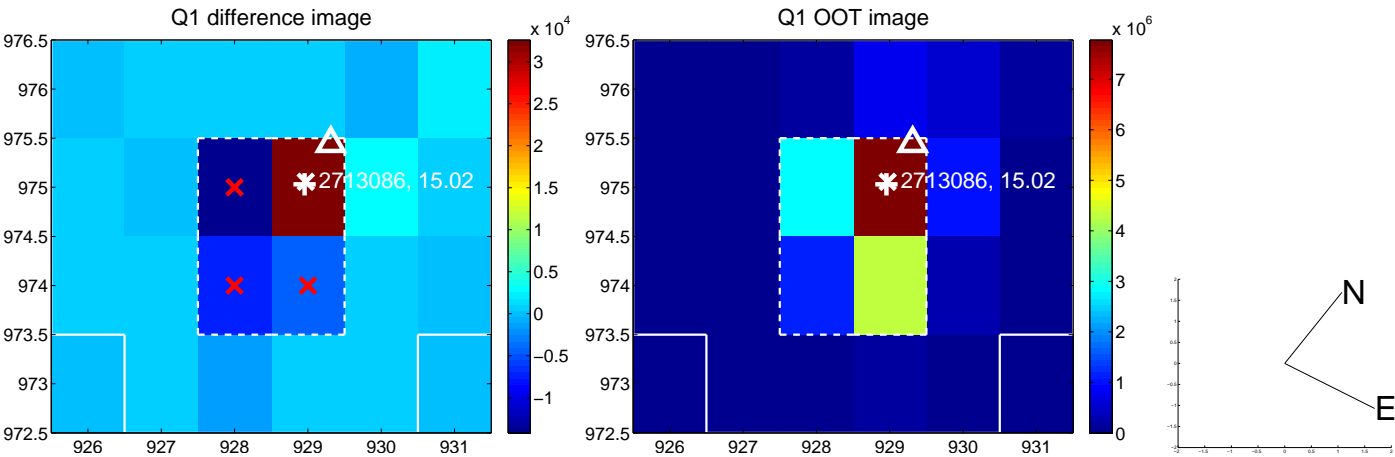


offset from photometric centroids

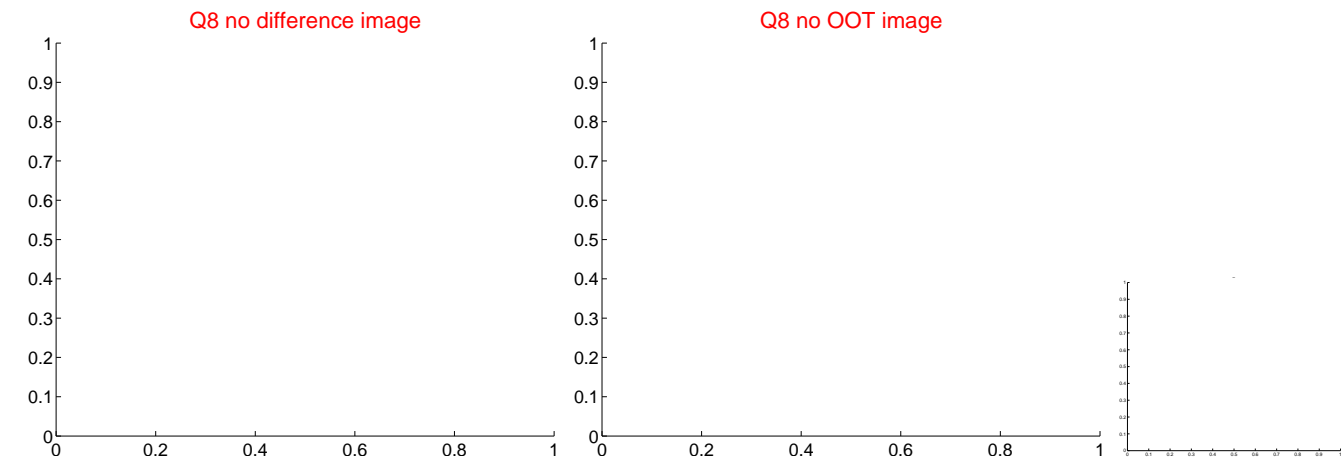
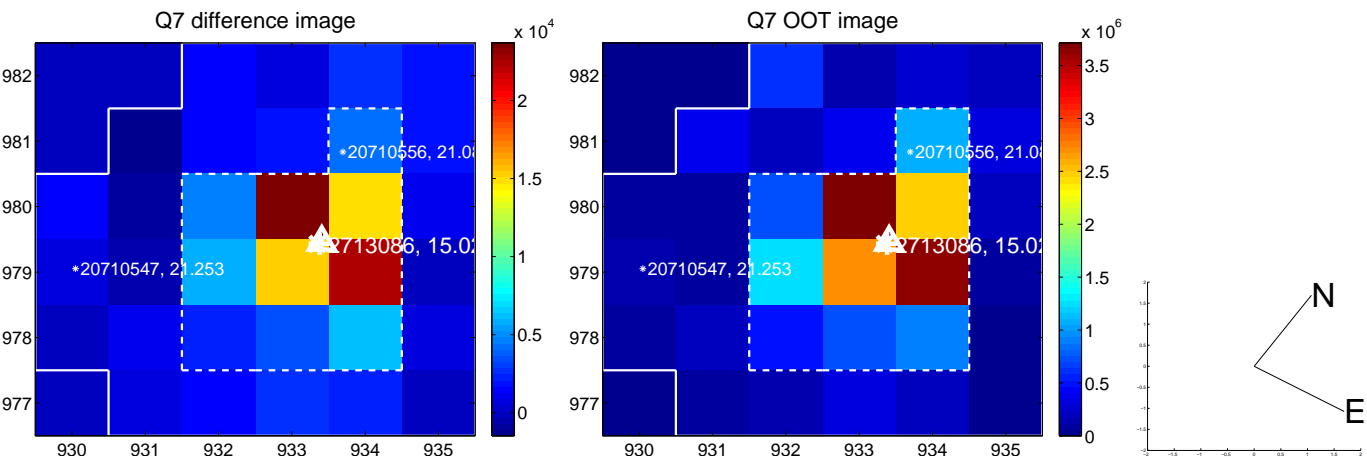
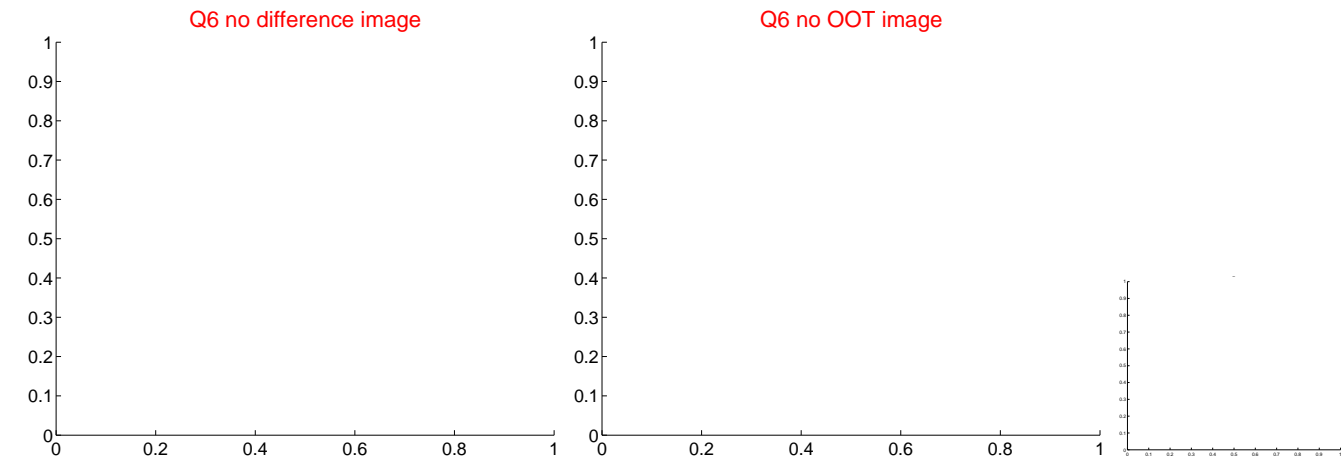


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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



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

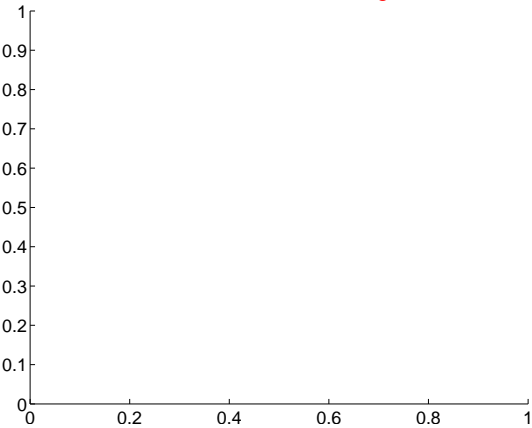


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

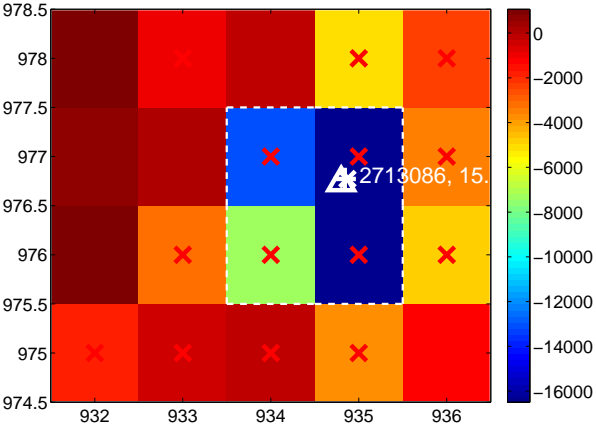
Q13 no difference image



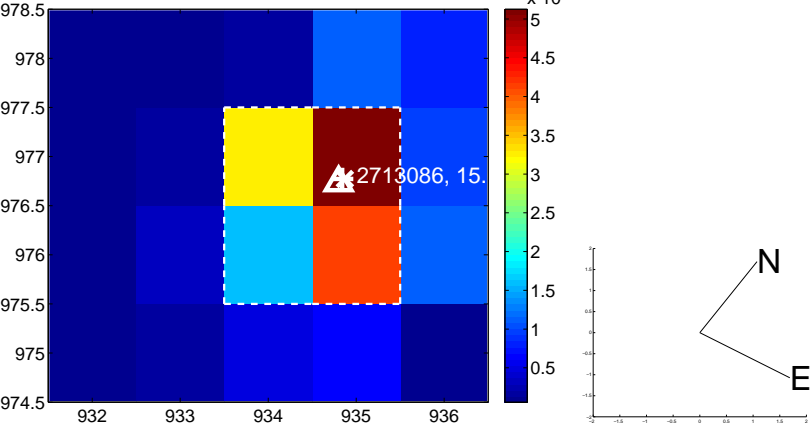
Q13 no OOT image



Q14 difference image. Poor Quality



Q14 OOT image



Q15 no difference image



Q15 no OOT image



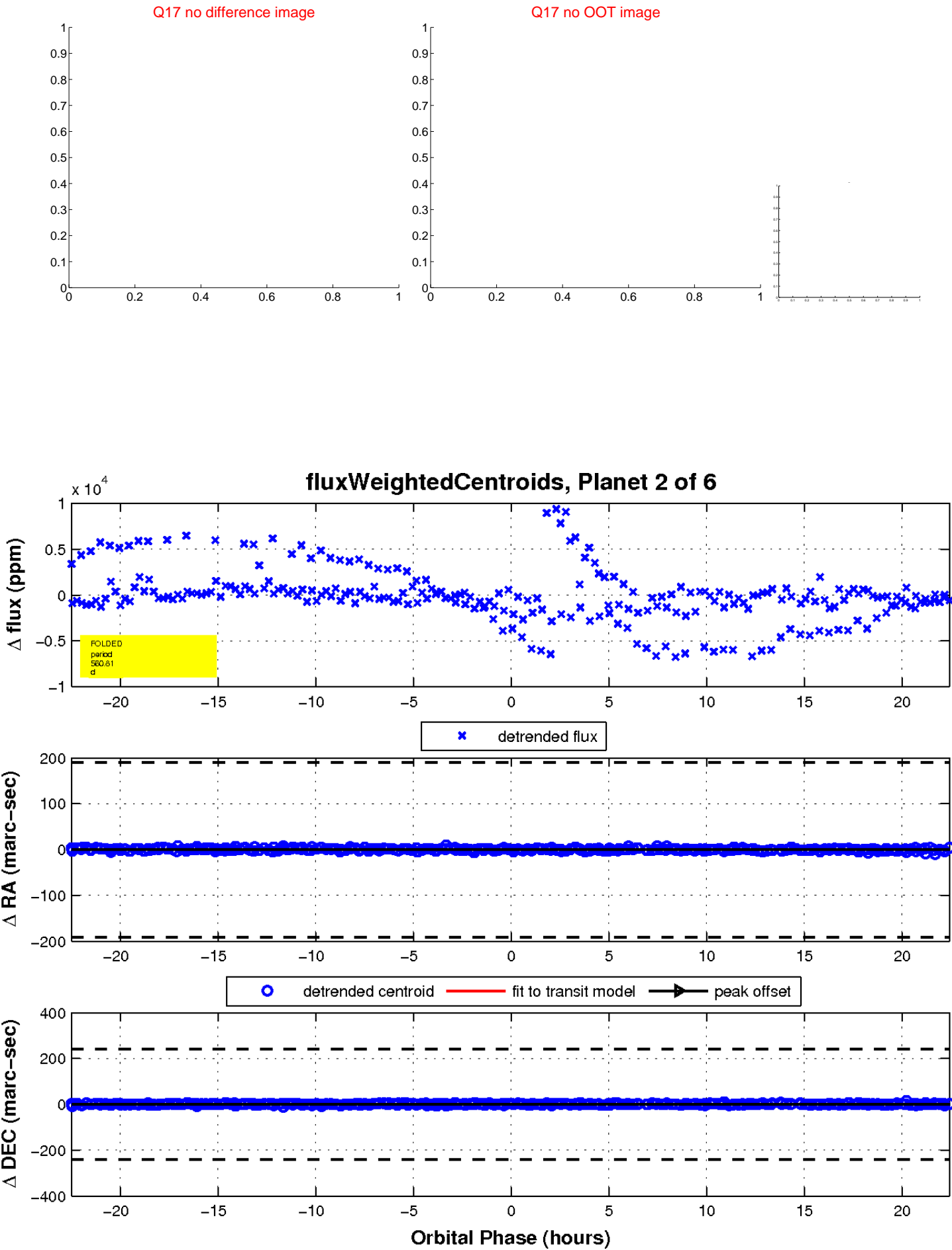
Q16 no difference image



Q16 no OOT image



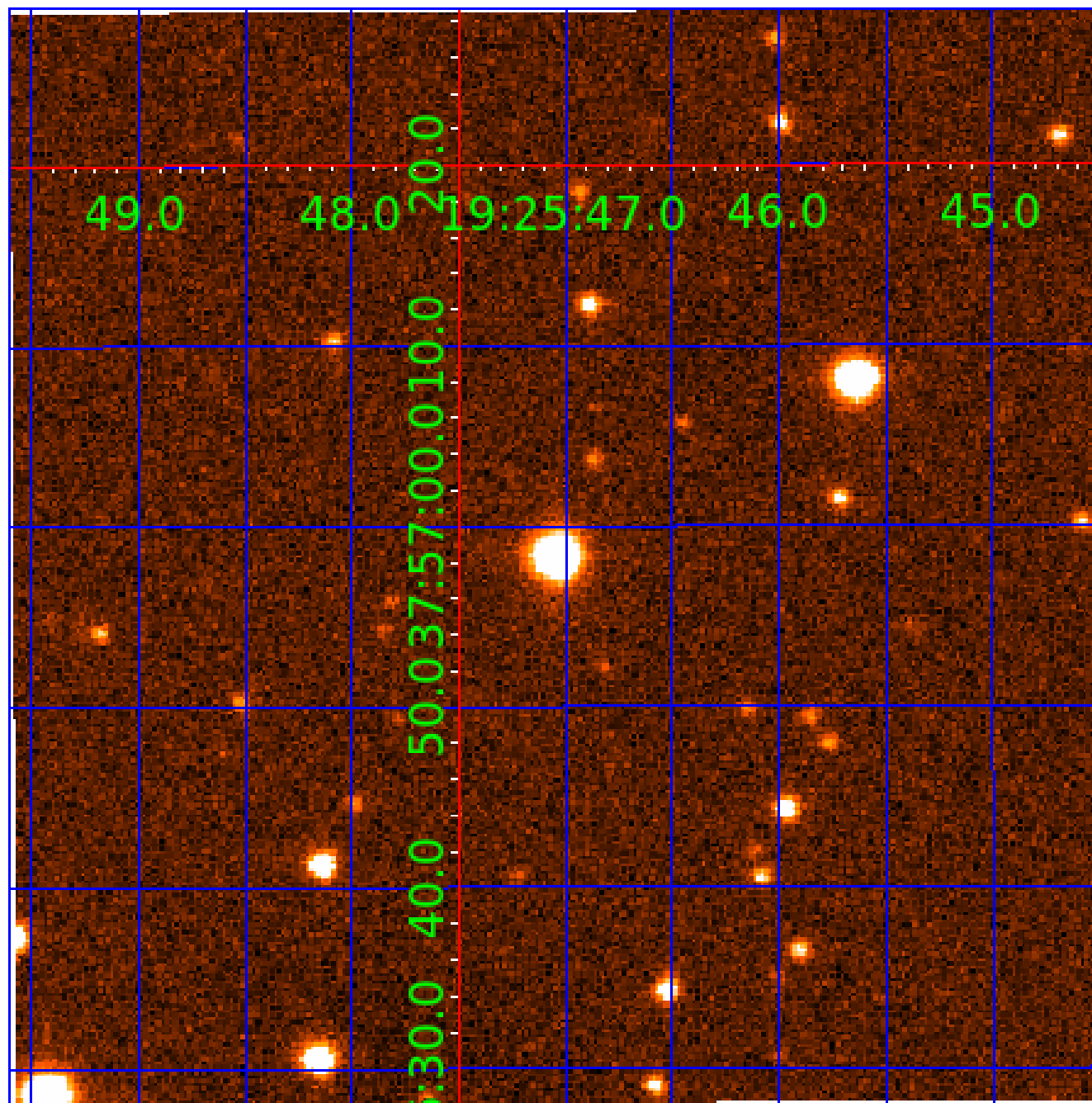
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 002713086

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002713086-01	OBS	No	295.877903	417.532159	3246.9	4.902	19.6	10.5	0.55	3920	3.22	0.13
002713086-02	OBS	No	560.806191	154.999723	2548.2	7.541	15.0	6.8	0.55	3920	5.33	0.05
002713086-03	OBS	No	380.584597	331.542108	4501.0	8.795	15.0	13.2	0.55	3920	3.63	0.09
002713086-04	OBS	No	552.496895	156.255602	1482.5	5.682	15.8	5.1	0.55	3920	2.21	0.06
002713086-05	OBS	No	256.316272	200.039801	627.1	1.830	16.1	2.5	0.55	3920	1.59	0.15
002713086-06	OBS	No	360.253914	447.536114	2683.2	5.484	14.3	8.9	0.55	3920	2.87	0.10

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002713086-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
002713086-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002713086-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002713086-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
002713086-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
002713086-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_MEAS

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

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

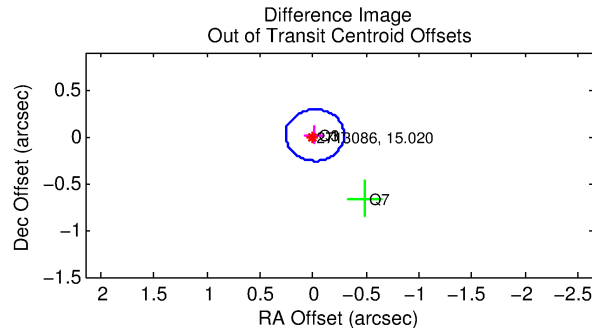
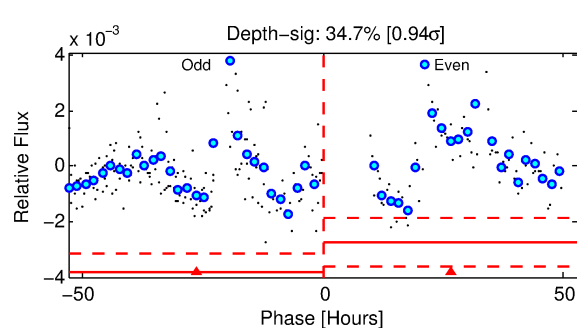
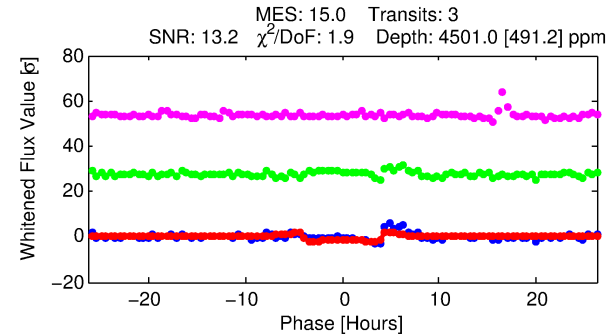
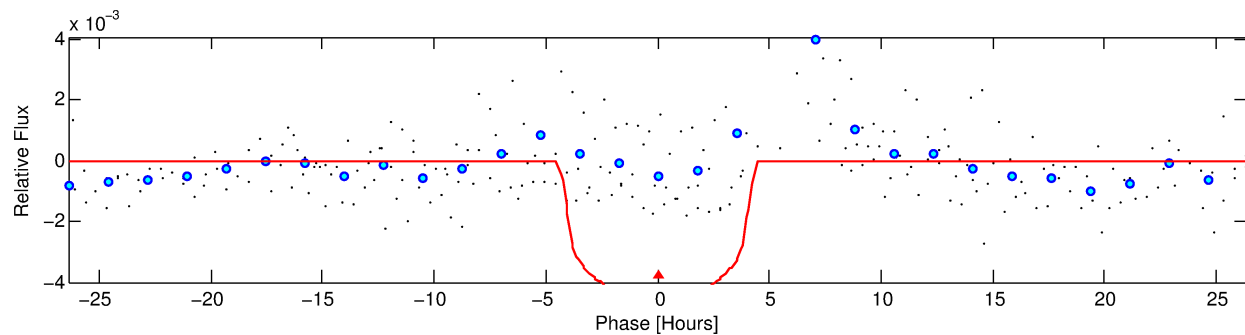
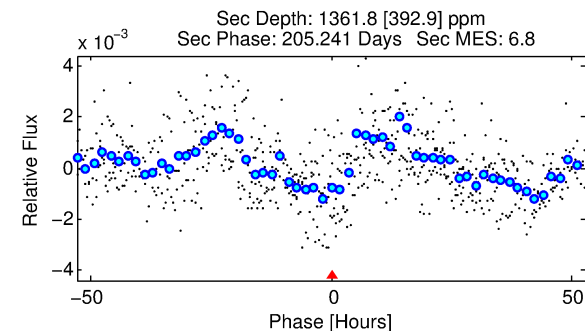
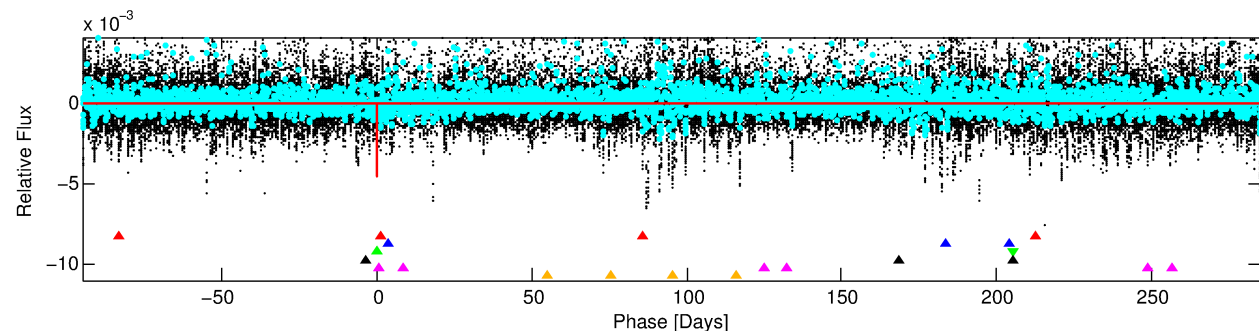
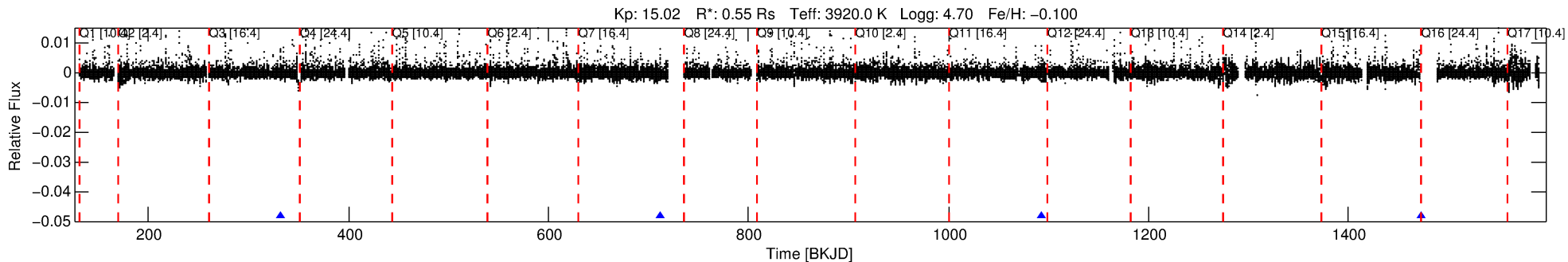
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 002713086-03

No Significant Match Found

# DV One-Page Summary

KIC: 2713086 Candidate: 3 of 6 Period: 380.585 d



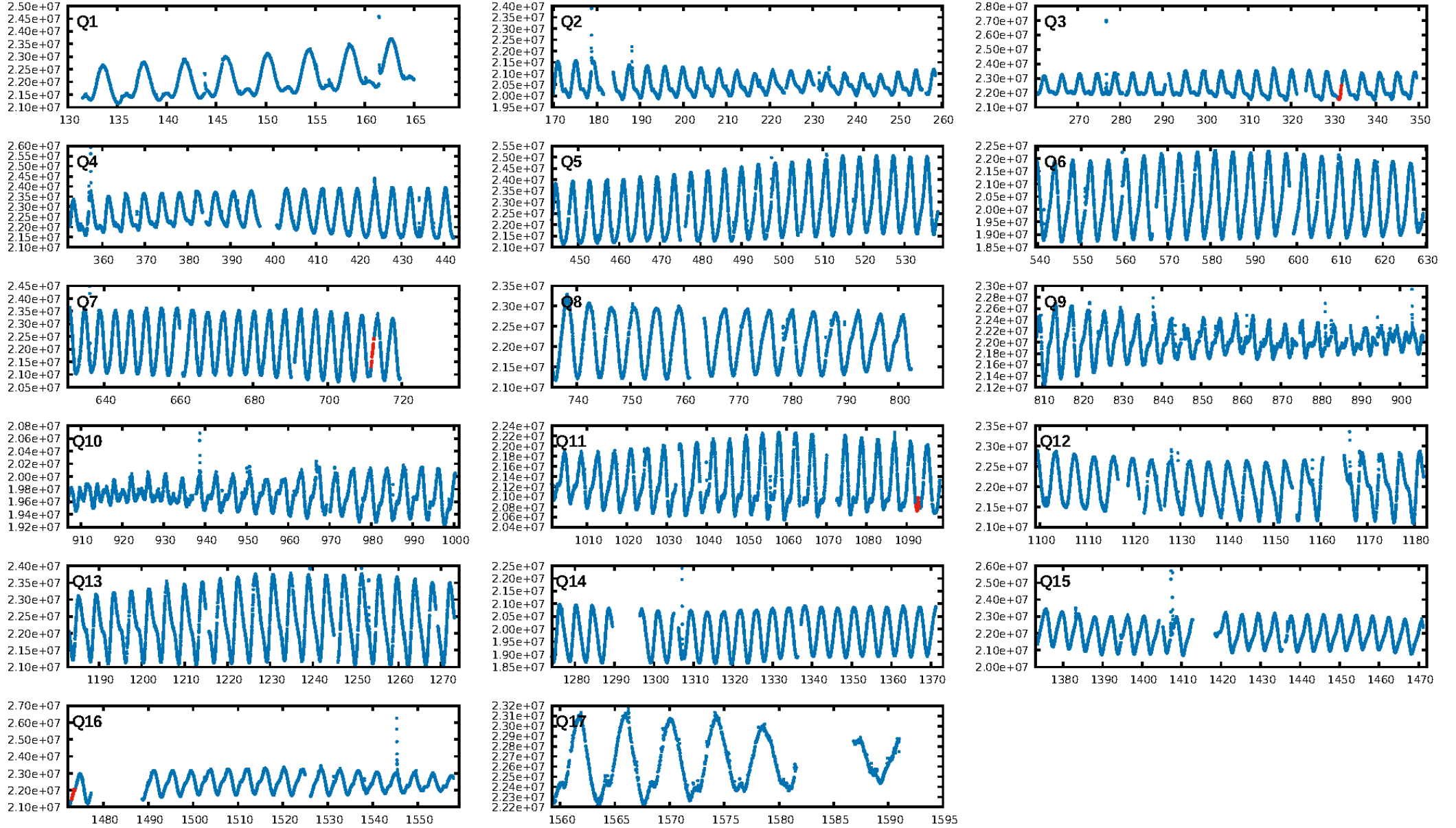
## DV Fit Results:

Period = 380.58460 [0.00383] d  
Epoch = 331.5421 [0.0048] BKJD  
Rp/R\* = 0.0604 [0.0142]  
a/R\* = 350.57 [304.82]  
b = 0.00 [847.61]  
Seff = 0.09 [0.01]  
Teq = 140 [4] K  
Rp = 3.63 [0.88] Re  
a = 0.8438 [0.0391] AU  
Ag = 40533.28 [22450.44] [1.81σ]  
Teffp = 3063 [427] K [6.85σ]

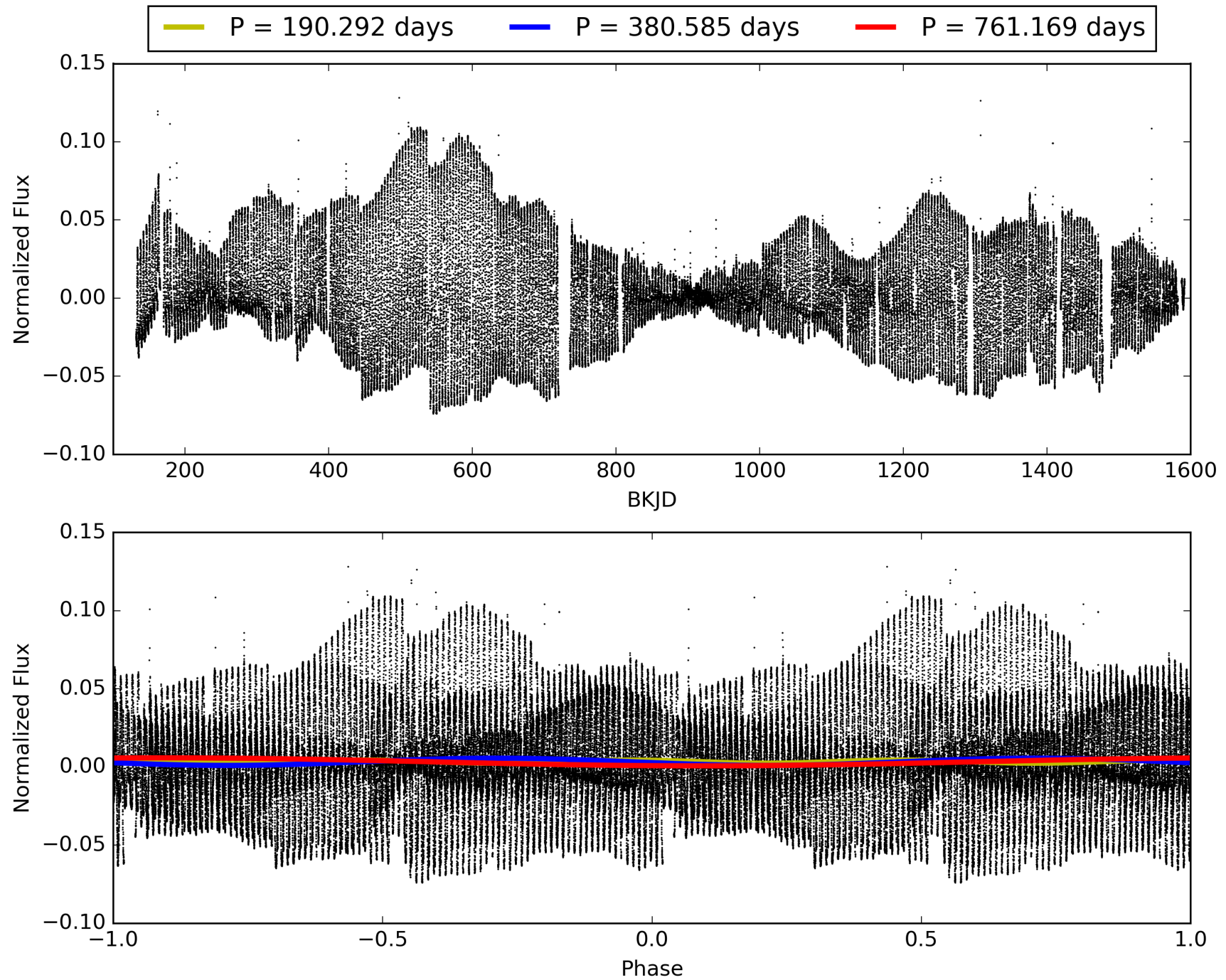
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [47.08σ]  
LongPeriod-sig: 100.0% [394.05σ]  
ModelChiSquare2-sig: 0.4%  
ModelChiSquareGof-sig: 6.5%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -0.7099  
Centroid-sig: 88.8%  
Centroid-so: 0.613 arcsec [1.44σ]  
OotOffset-rm: 0.022 arcsec [0.24σ]  
KicOffset-rm: 0.089 arcsec [0.68σ]  
OotOffset-st: 0/3/0/0 [3]  
KicOffset-st: 0/3/0/0 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 0.67 [2/3]

# TCE 002713086-03, PDC Light Curves

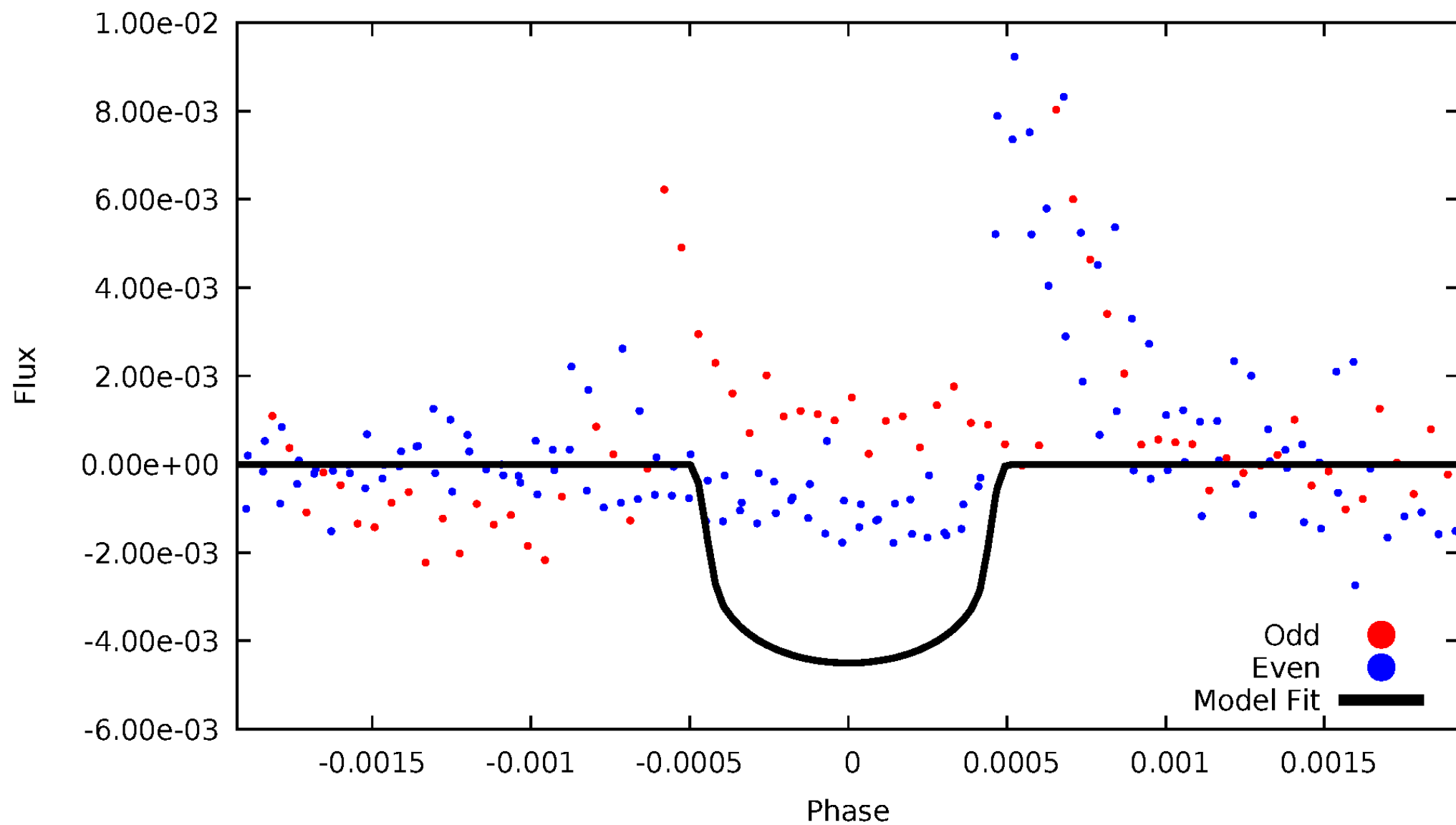


TCE 002713086-03



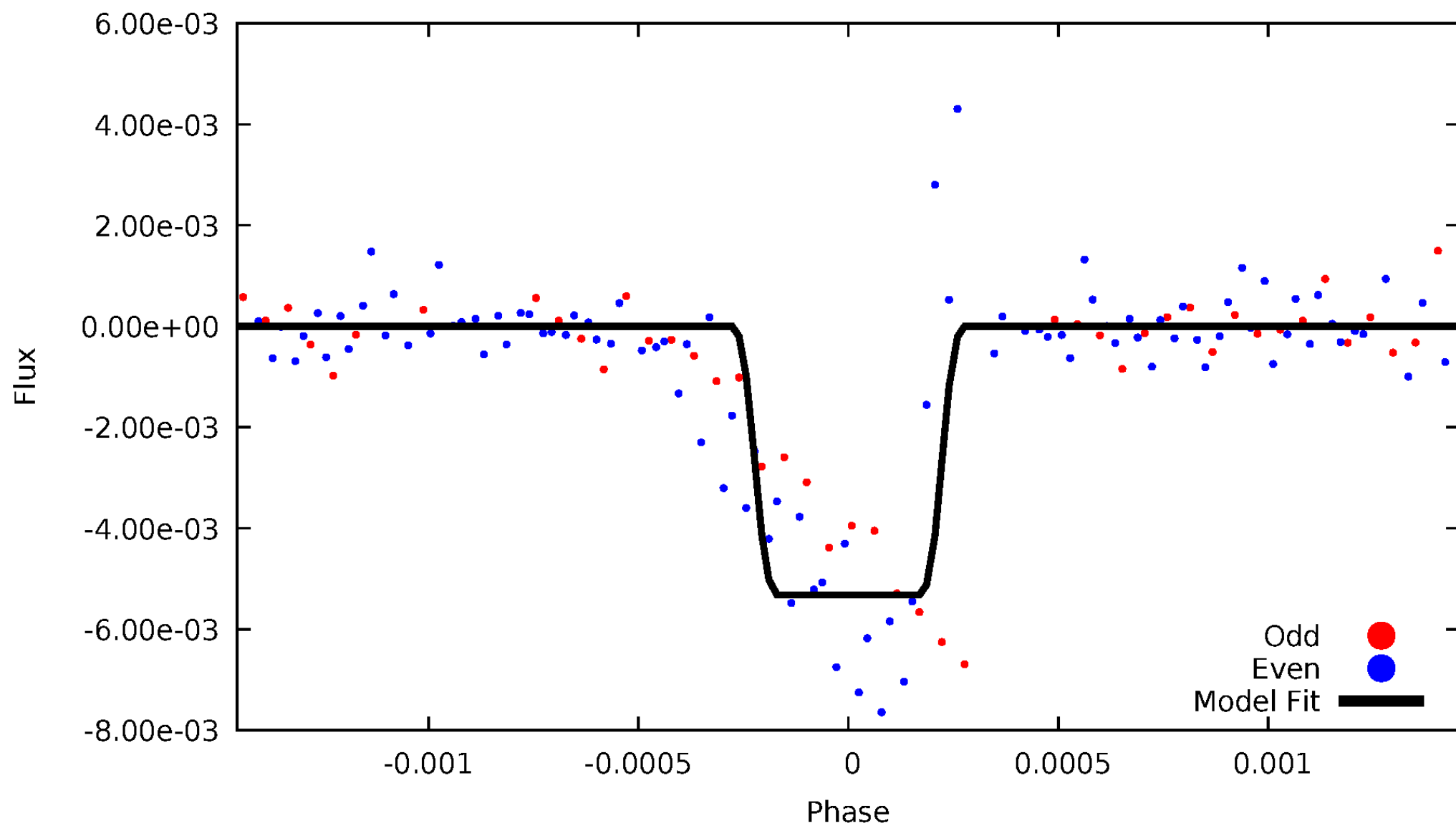
# DV Odd/Even

TCE 002713086-03



# ALT Odd/Even

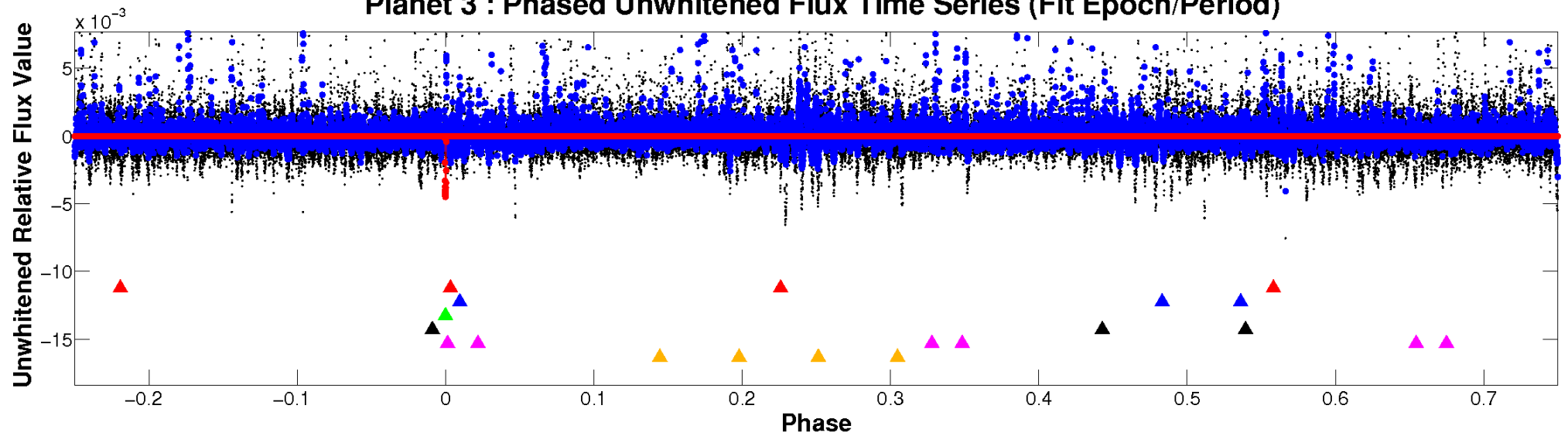
TCE 002713086-03



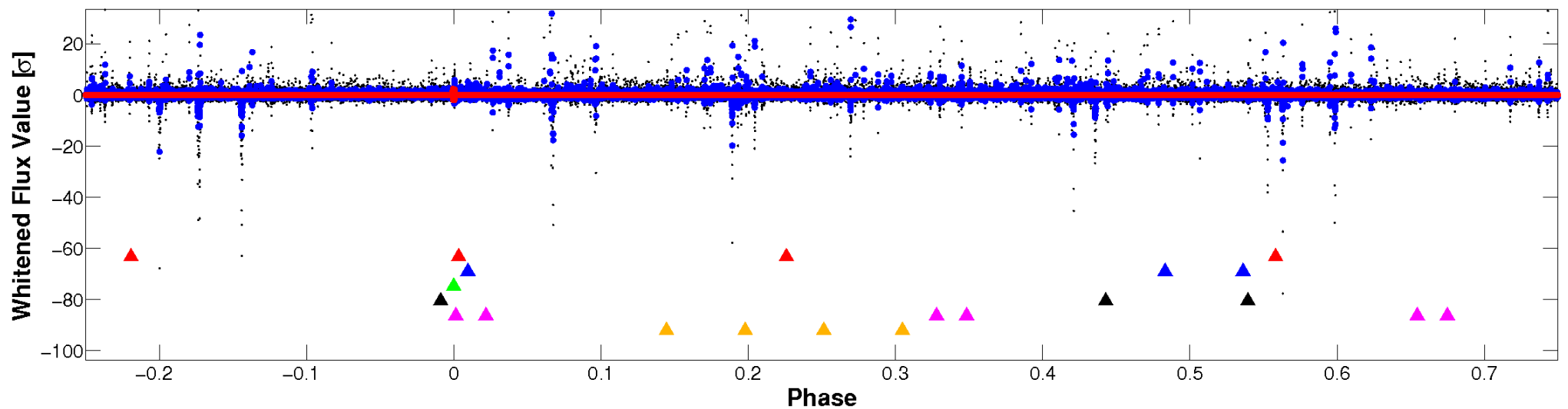


# Non-Whitened Vs. Whitened Light Curve

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



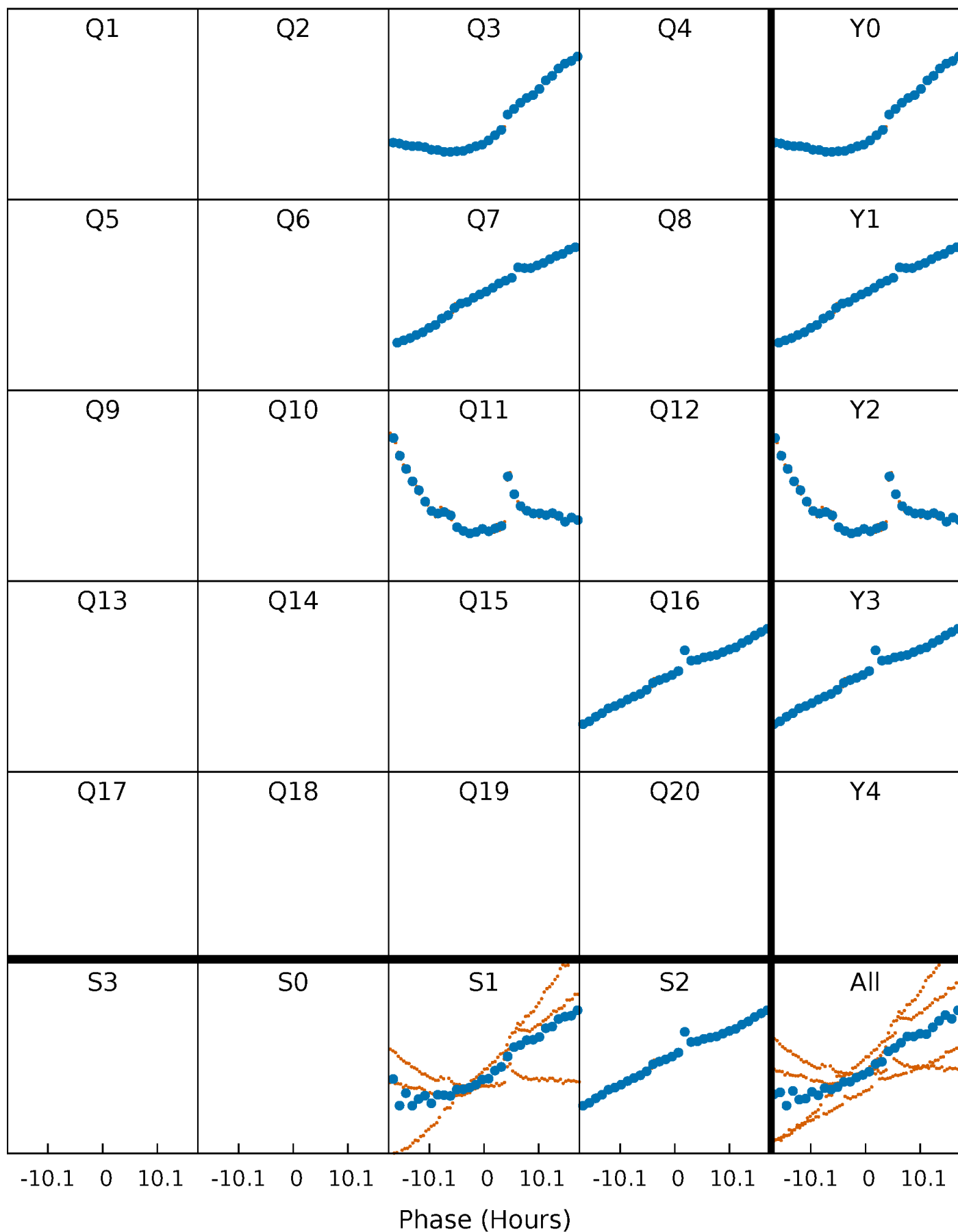
## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)





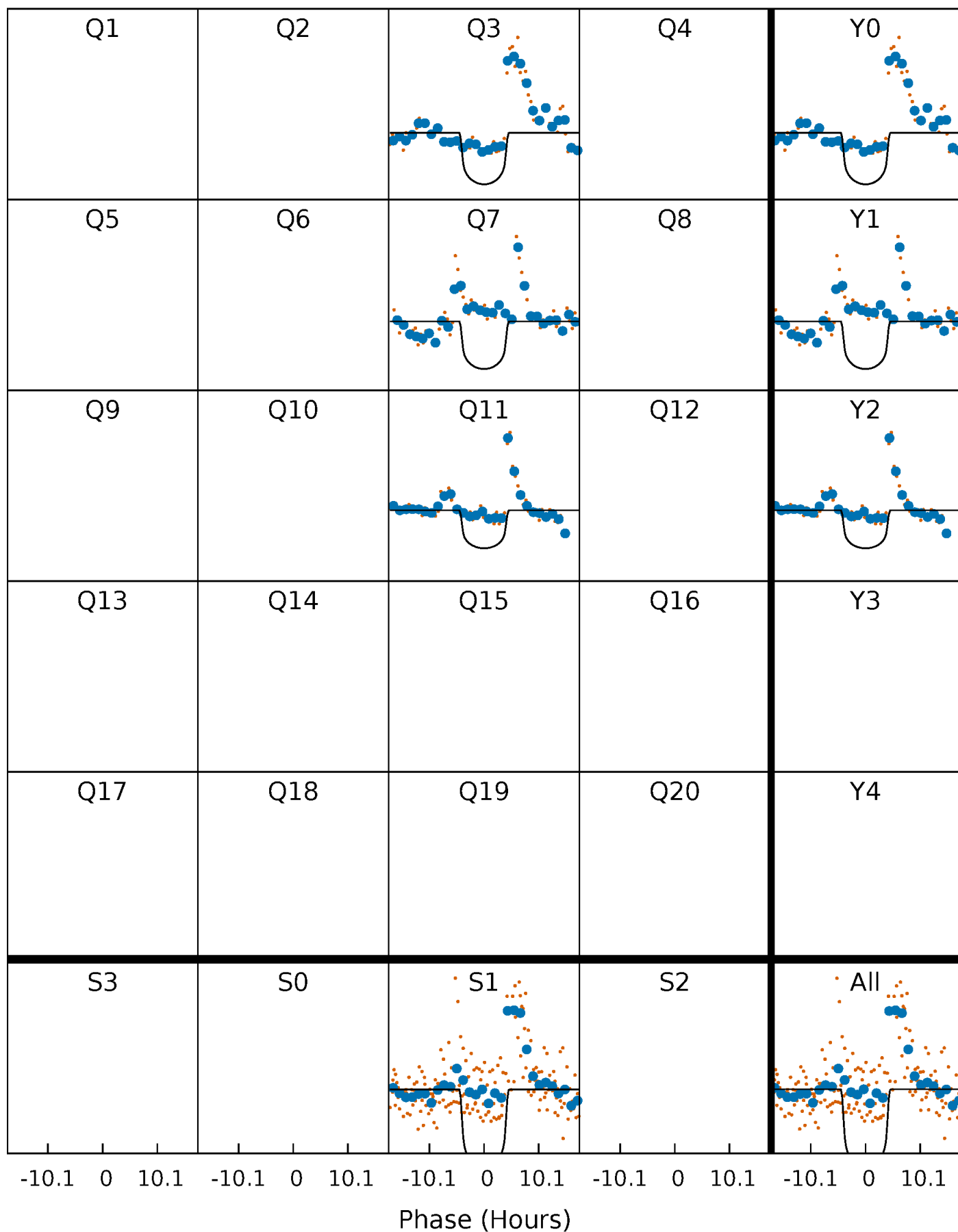
# PDC Quarter-Phased Transit Curves

TCE 002713086-03     $P=380.584597$  Days     $T_0=331.542108$  (BKJD)



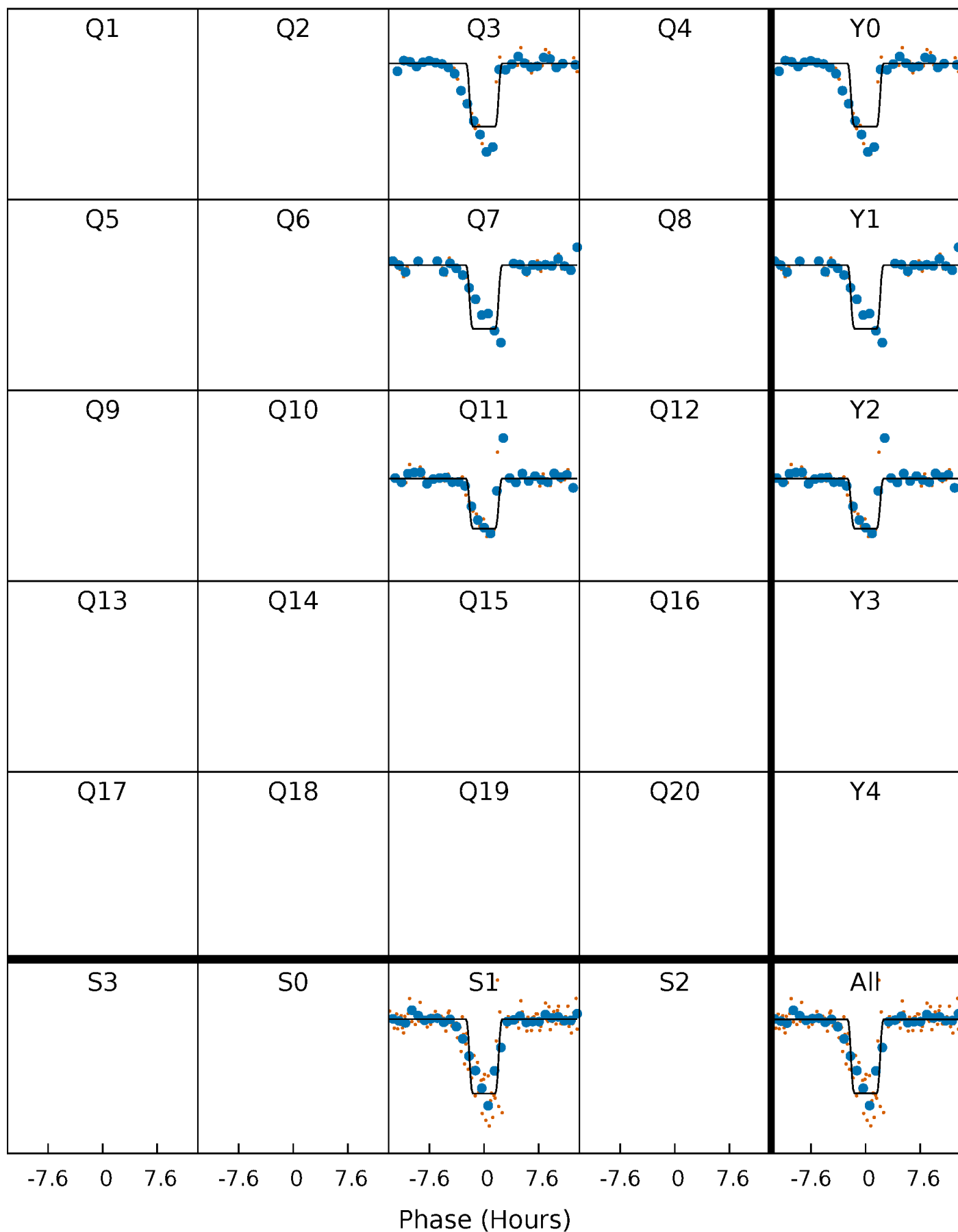
# DV Quarter-Phased Transit Curves

TCE 002713086-03     $P=380.584597$  Days     $T_0=331.542108$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

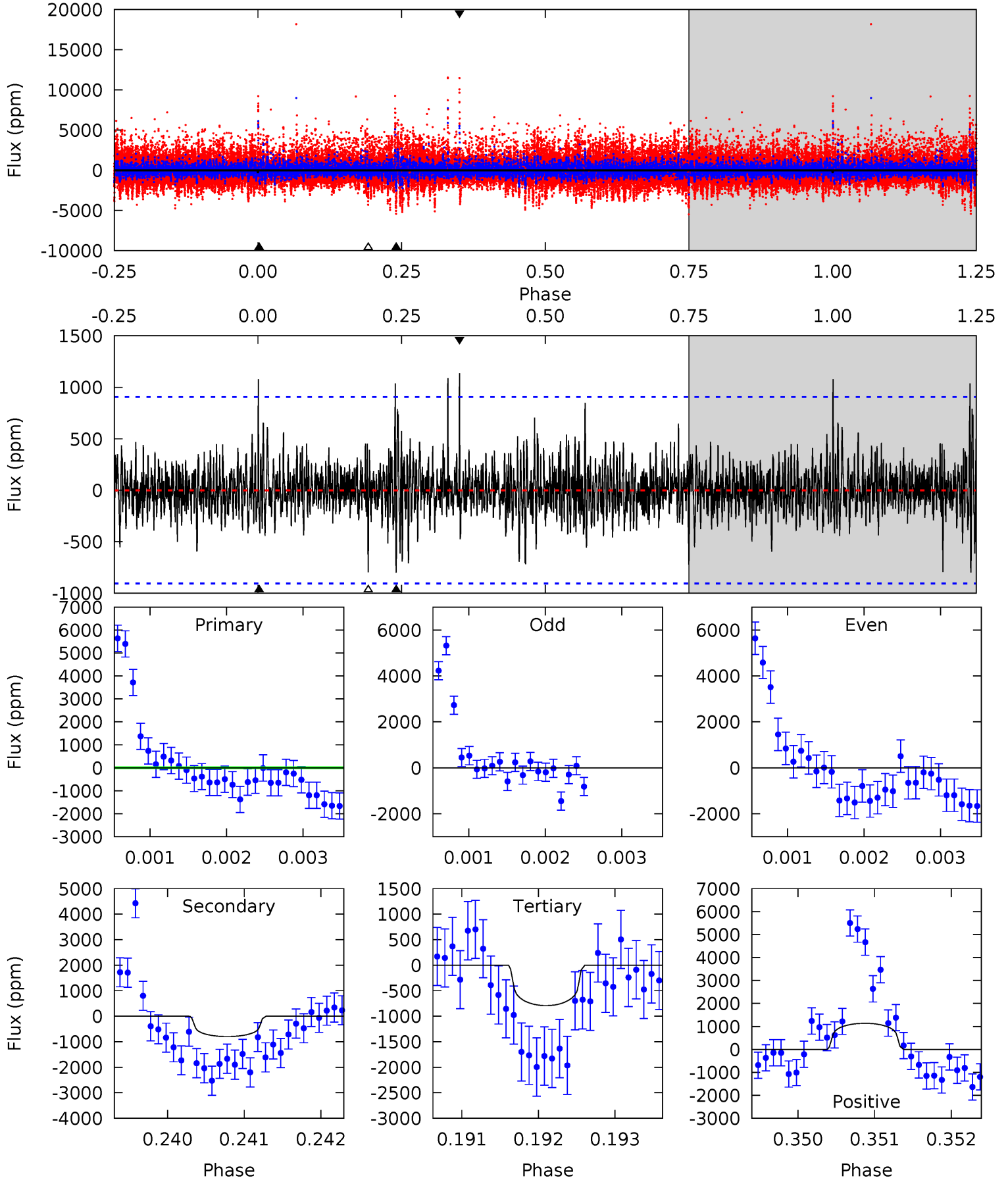
TCE 002713086-03     $P=380.581866$  Days     $T_0=331.647842$  (BKJD)



# DV Model-Shift Uniqueness Test

002713086-03, P = 380.584597 Days, E = 331.542108 Days

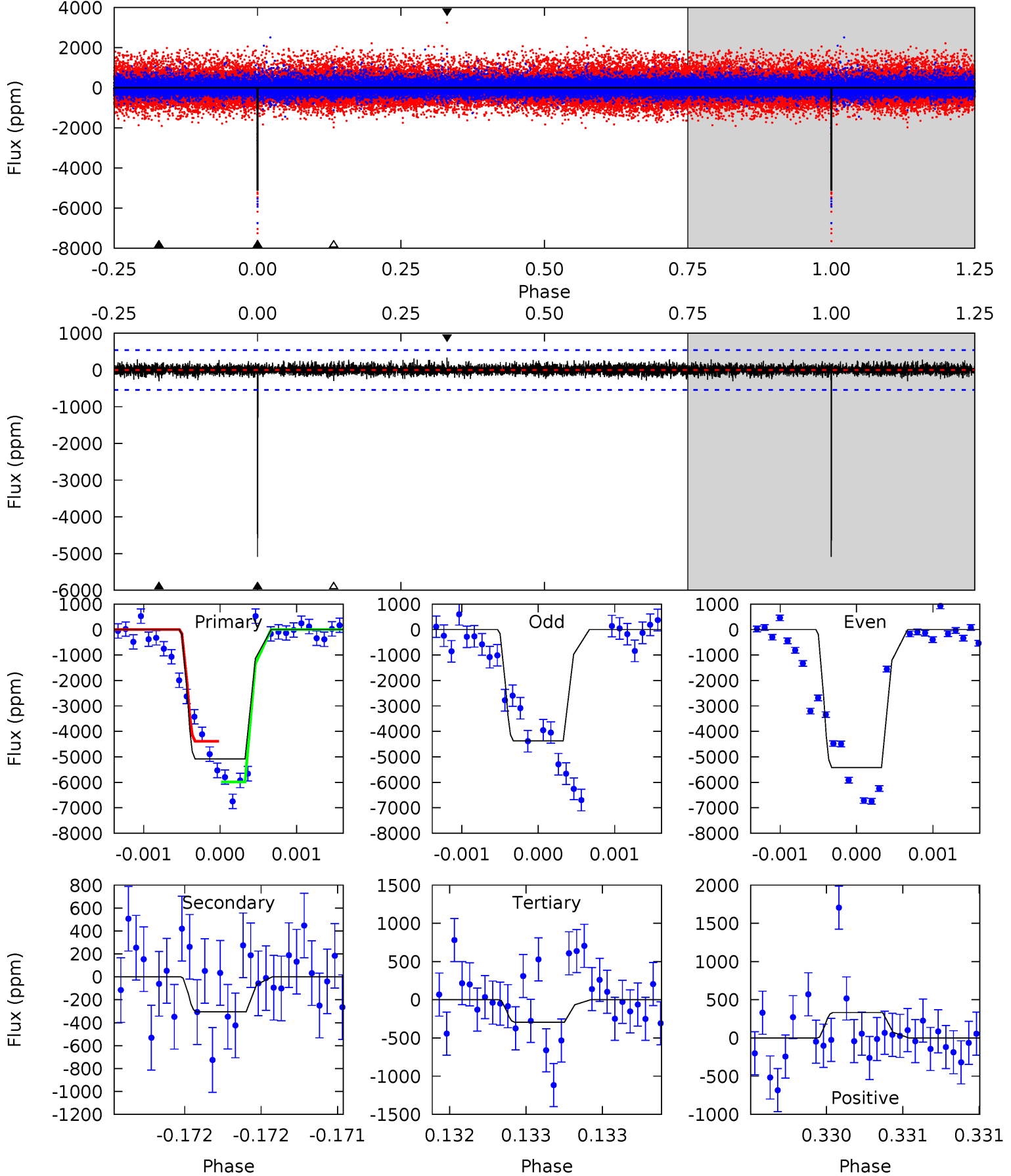
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.51	4.80	4.77	6.84	5.45	3.28	1.22	-3.26	-5.33	0.03	-2.04	0.67	0.34	0.59	0.72



# Alt Model-Shift Uniqueness Test

002713086-03, P = 380.581866 Days, E = 331.647842 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
52.2	3.13	3.01	3.41	5.57	3.47	0.72	49.2	48.8	0.12	-0.28	5.15	1.09	0.06	8.22



### Stellar Parameters For KIC 002713086

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3920^{+86}_{-86}$	$4.700^{+0.033}_{-0.018}$	$-0.100^{+0.100}_{-0.100}$	$0.550^{+0.024}_{-0.032}$	$0.554^{+0.030}_{-0.027}$	$4.675^{+0.689}_{-0.360}$
	+2%/-2%	+1%/-0%	+100%/-100%	+4%/-6%	+5%/-5%	+15%/-8%
Source	PHO2	PHO2	PHO2	DSEP		

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

### Secondary Eclipse Parameters for KIC 002713086-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-797 \pm 166$	$3.67^{+0.85}_{-0.82}$	$195^{+5}_{-5}$	$3066^{+280}_{-202}$	$23515^{+16440}_{-9297}$
Alt.	$-305 \pm 97$	$4.34^{+0.91}_{-0.88}$	$195^{+5}_{-5}$	$2577^{+169}_{-170}$	$6259^{+4318}_{-2647}$

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

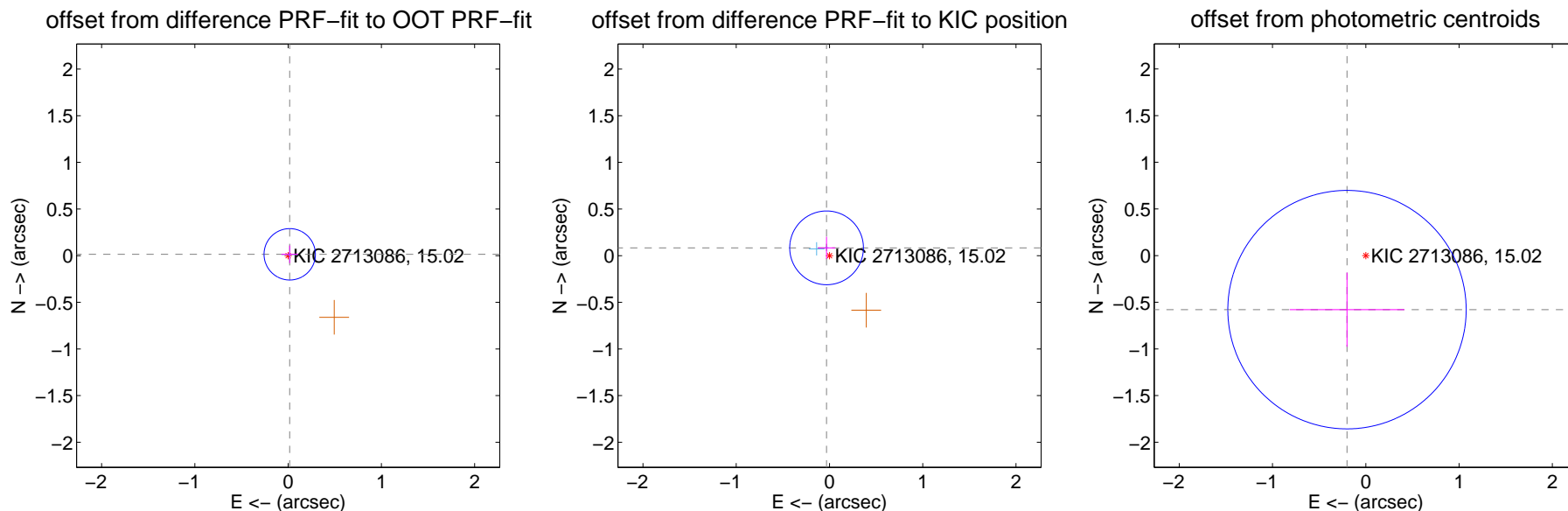
## DV Centroid Data

Supplemental centroid analysis for 002713086-03. Kepler magnitude: 15.02. Transit SNR 13.19

There are 2 quarters with good PRF difference image offsets

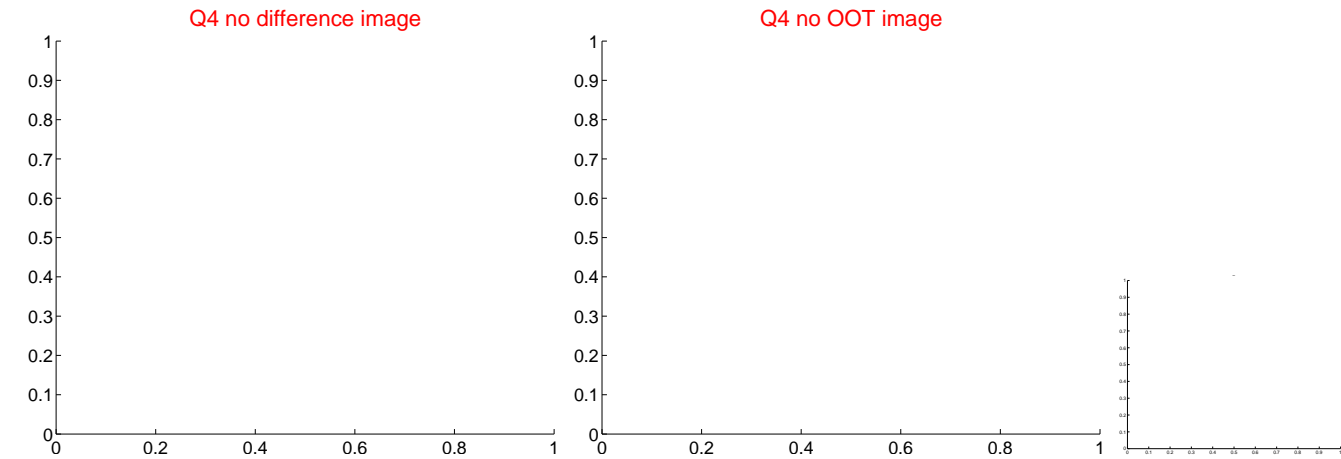
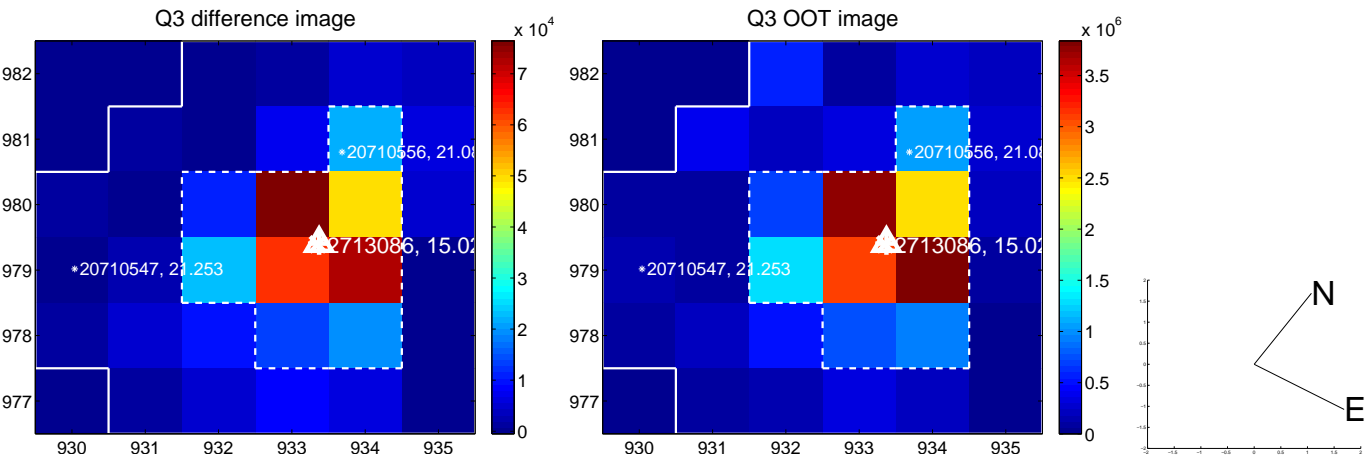
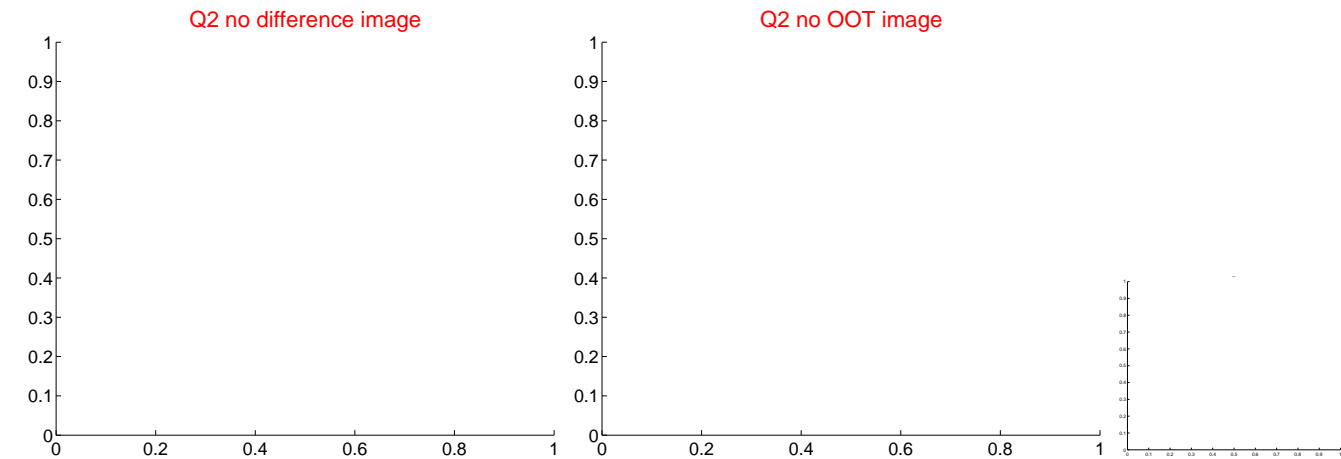
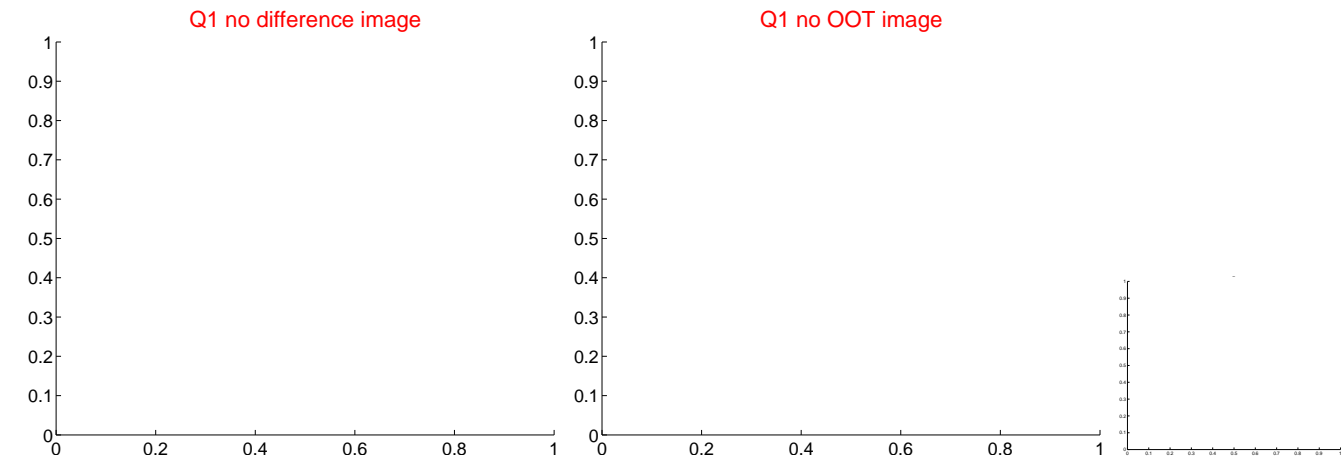
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.022 \pm 0.092$	0.24	$-0.017 \pm 0.090$	$0.014 \pm 0.094$
PRF-fit source offset from KIC position	$0.089 \pm 0.132$	0.68	$0.031 \pm 0.092$	$0.084 \pm 0.119$
photometric centroid source offset	$0.61 \pm 0.43$	1.44	$0.20 \pm 0.62$	$-0.58 \pm 0.40$



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



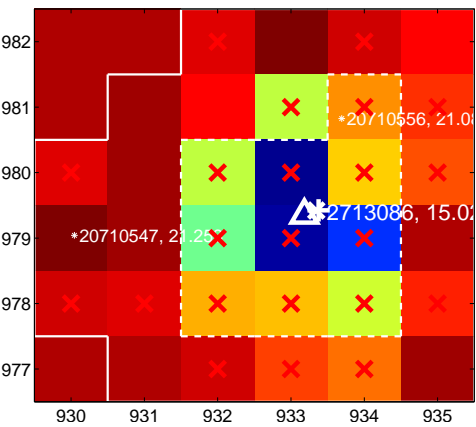
Q6 no difference image



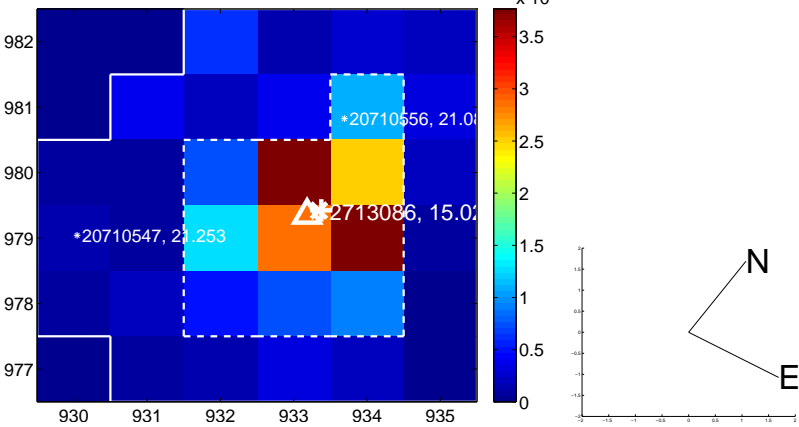
Q6 no OOT image



Q7 difference image. Poor Quality



Q7 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



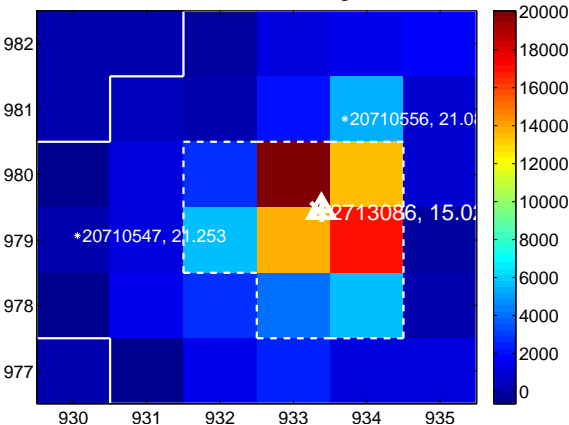
Q10 no difference image



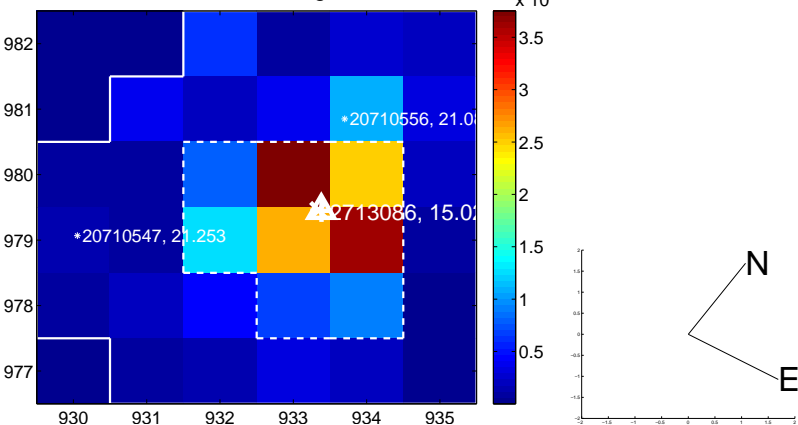
Q10 no OOT image



Q11 difference image



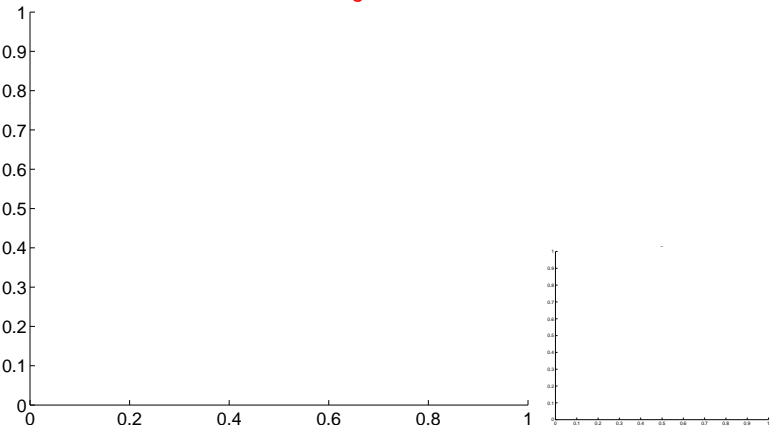
Q11 OOT image



Q12 no difference image



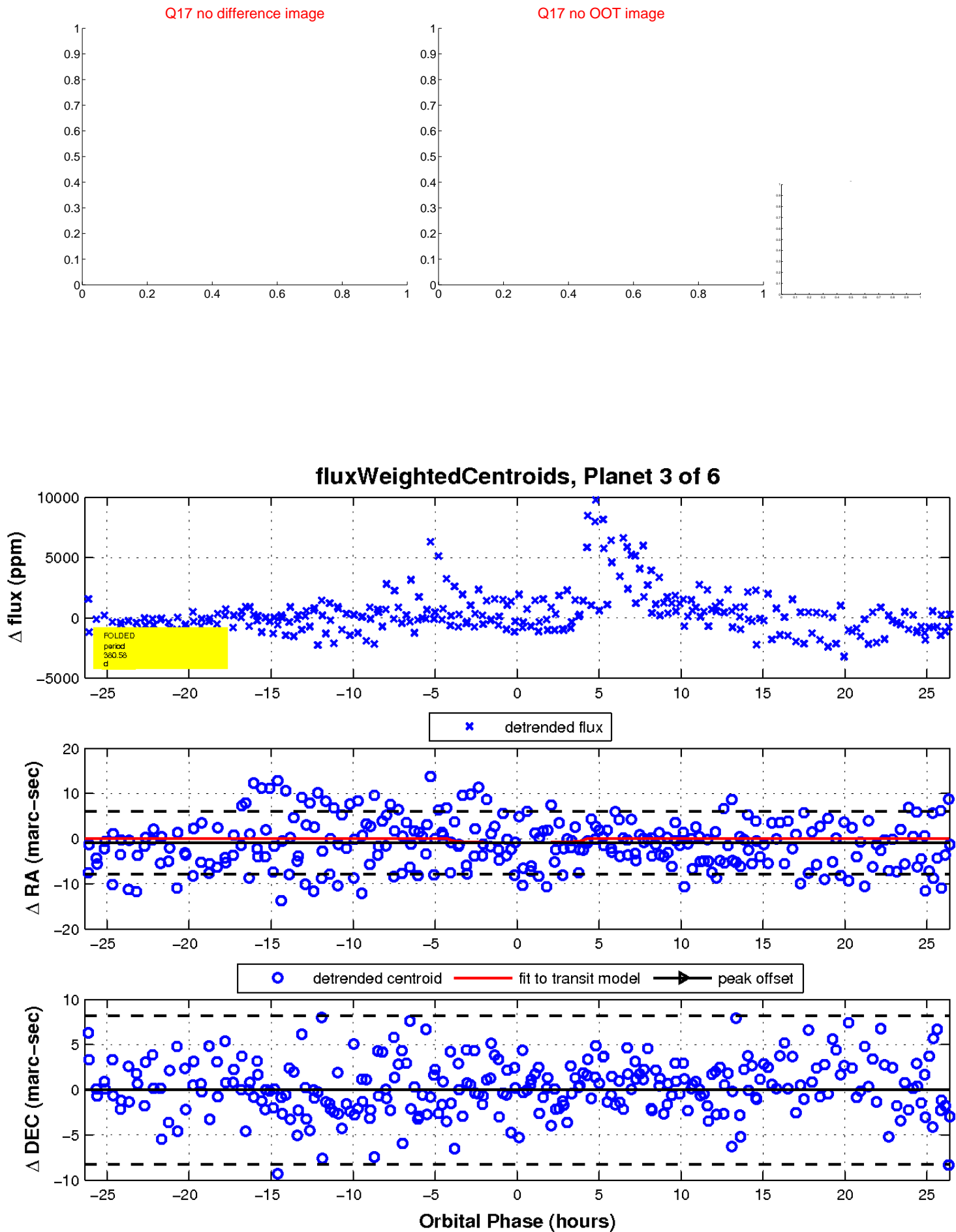
Q12 no OOT image



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

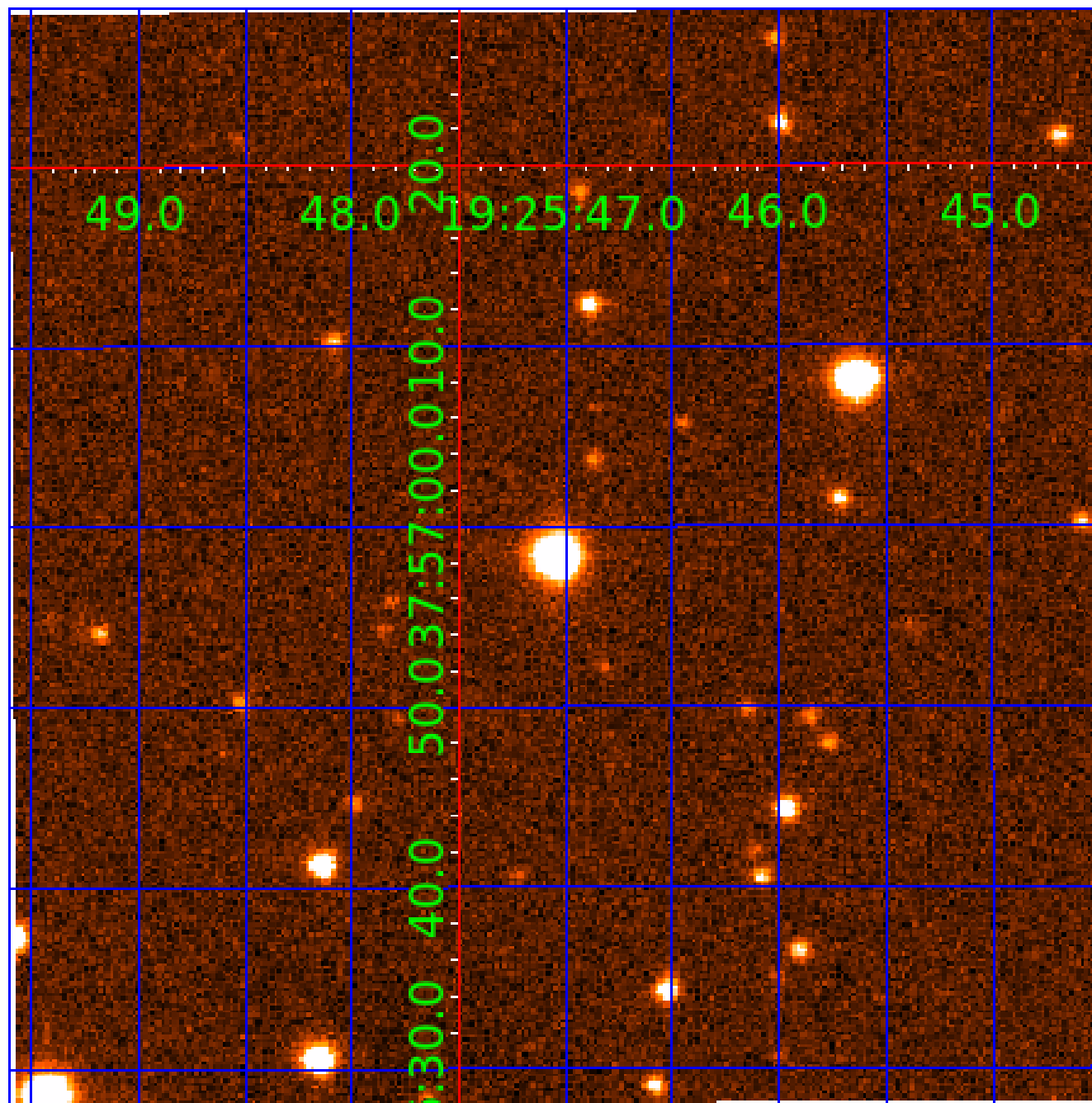


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 002713086

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002713086-01	OBS	No	295.877903	417.532159	3246.9	4.902	19.6	10.5	0.55	3920	3.22	0.13
002713086-02	OBS	No	560.806191	154.999723	2548.2	7.541	15.0	6.8	0.55	3920	5.33	0.05
002713086-03	OBS	No	380.584597	331.542108	4501.0	8.795	15.0	13.2	0.55	3920	3.63	0.09
002713086-04	OBS	No	552.496895	156.255602	1482.5	5.682	15.8	5.1	0.55	3920	2.21	0.06
002713086-05	OBS	No	256.316272	200.039801	627.1	1.830	16.1	2.5	0.55	3920	1.59	0.15
002713086-06	OBS	No	360.253914	447.536114	2683.2	5.484	14.3	8.9	0.55	3920	2.87	0.10

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002713086-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
002713086-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002713086-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002713086-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
002713086-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
002713086-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_MEAS

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

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

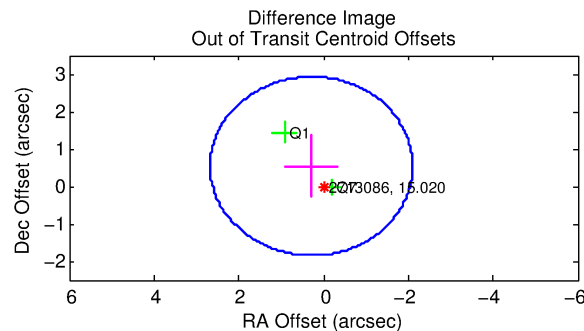
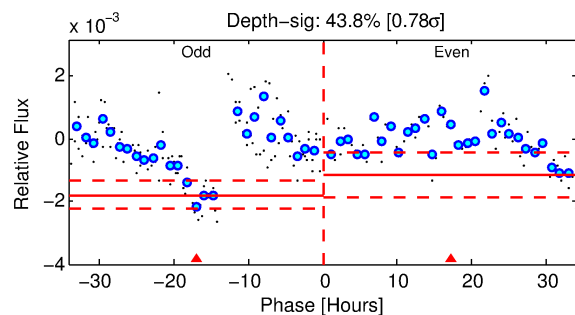
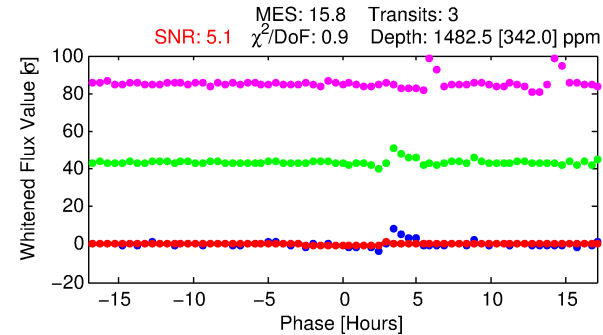
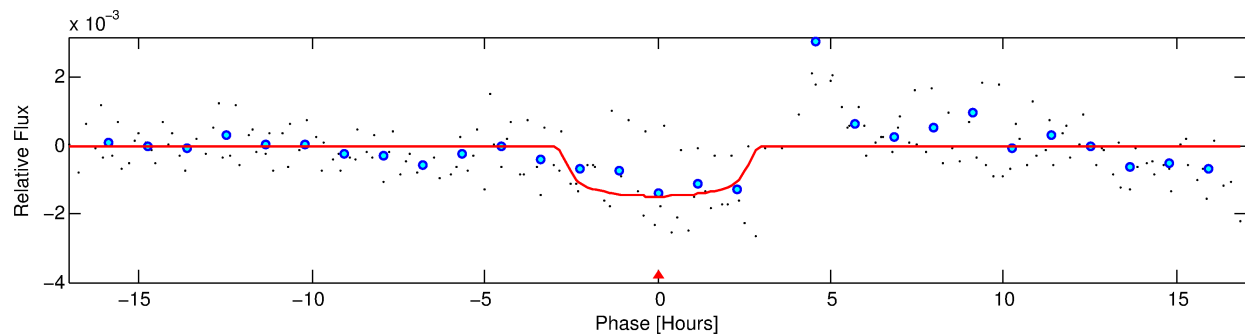
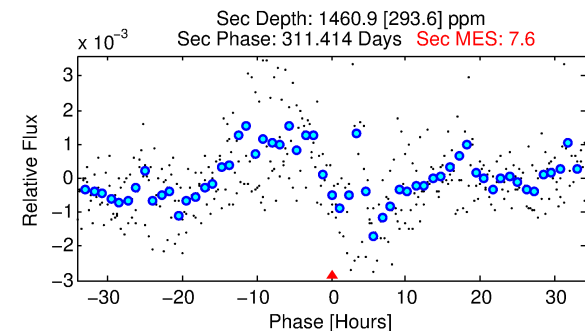
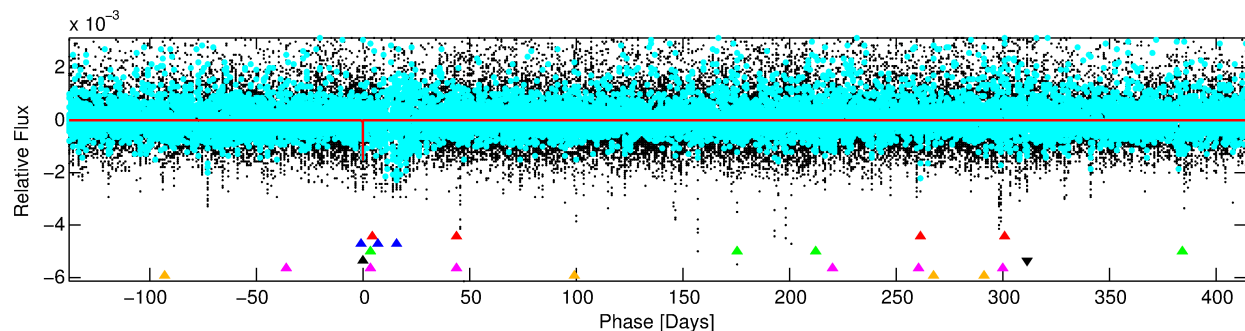
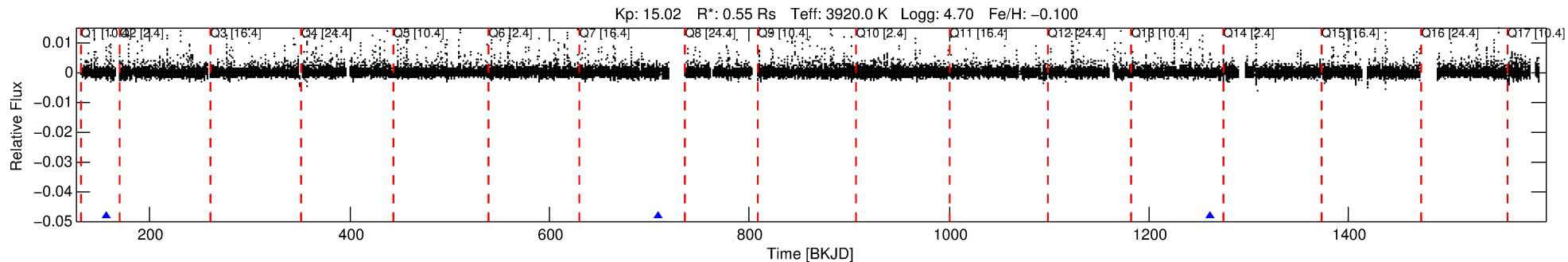
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 002713086-04

No Significant Match Found

# DV One-Page Summary

KIC: 2713086 Candidate: 4 of 6 Period: 552.497 d



## DV Fit Results:

Period = 552.49689 [0.00829] d  
Epoch = 156.2556 [0.0113] BKJD  
Rp/R\* = 0.0369 [0.0205]  
a/R\* = 613.17 [1317.99]  
b = 0.63 [2.09]  
Seff = 0.05 [0.01]  
Teq = 123 [3] K  
Rp = 2.21 [1.24] Re  
a = 1.0818 [0.0501] AU  
Ag = 192012.35 [217481.67] [0.88σ]  
Teffp = 3991 [1132] K [3.42σ]

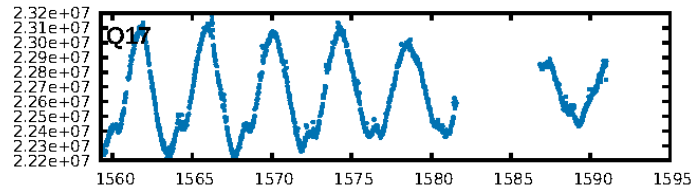
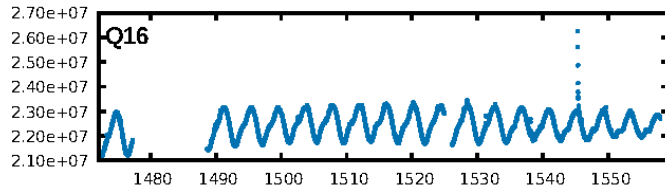
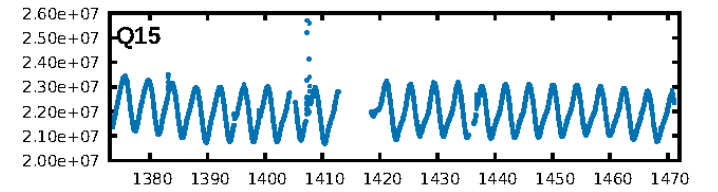
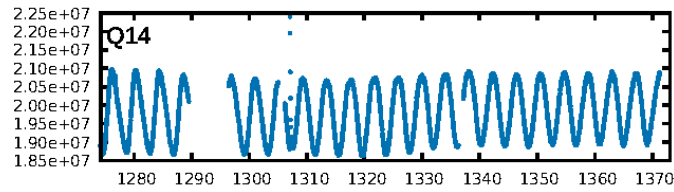
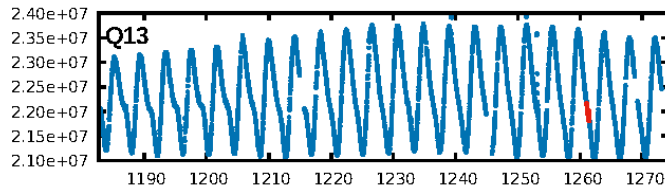
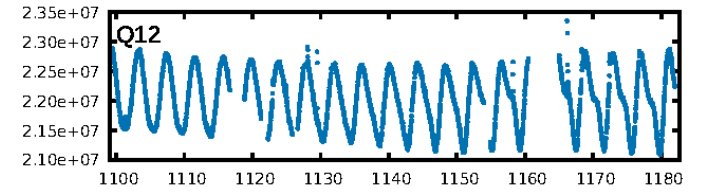
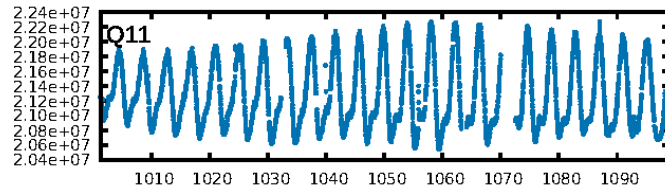
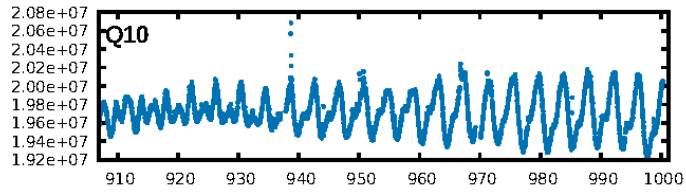
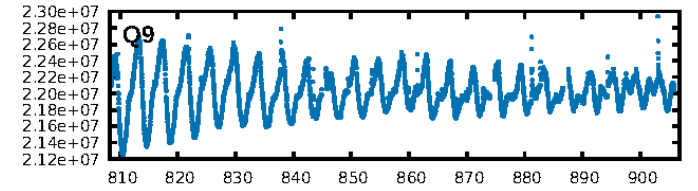
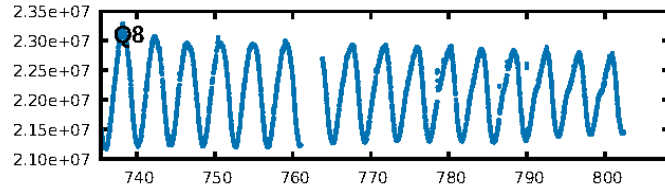
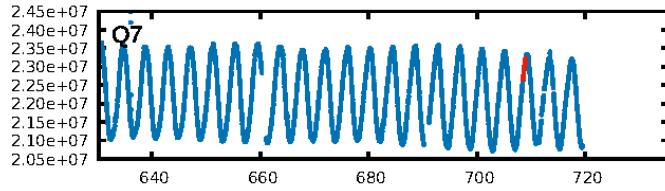
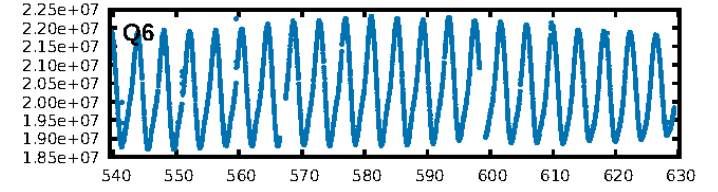
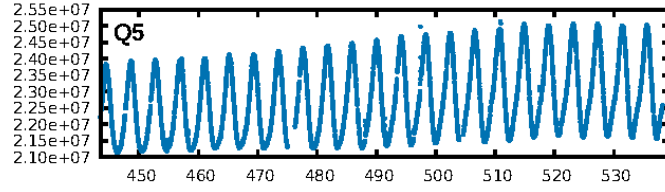
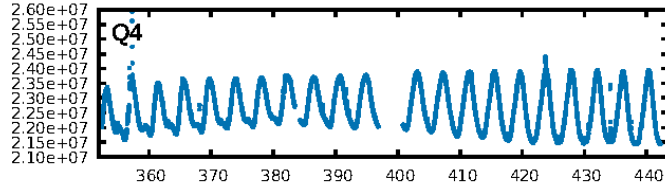
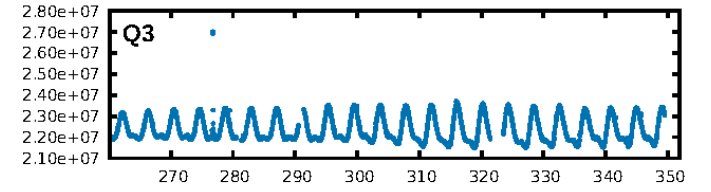
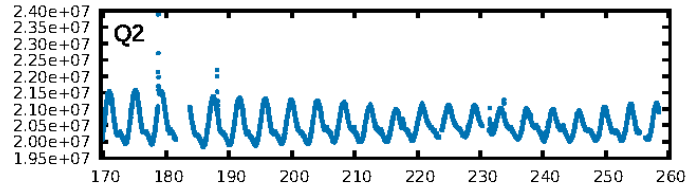
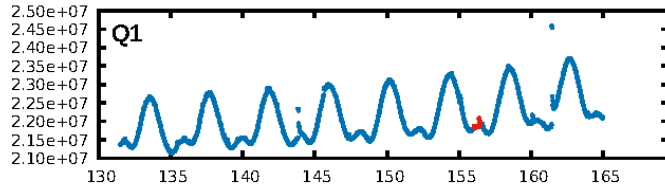
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [394.05σ]  
LongPeriod-sig: 100.0% [21.12σ]  
ModelChiSquare2-sig: 9.9%  
ModelChiSquareGof-sig: 70.2%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: 0.1482  
Centroid-sig: 2.7%  
Centroid-so: 2.104 arcsec [2.16σ]  
OotOffset-rm: 0.612 arcsec [0.77σ]  
OotOffset-st: 0/1/0/1 [2]  
KicOffset-rm: 0.634 arcsec [0.93σ]  
KicOffset-st: 0/1/0/1 [2]  
DiffImageQuality-fgm: 0.00 [0/2]  
DiffImageOverlap-fno: 1.00 [3/3]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:28:18 Z

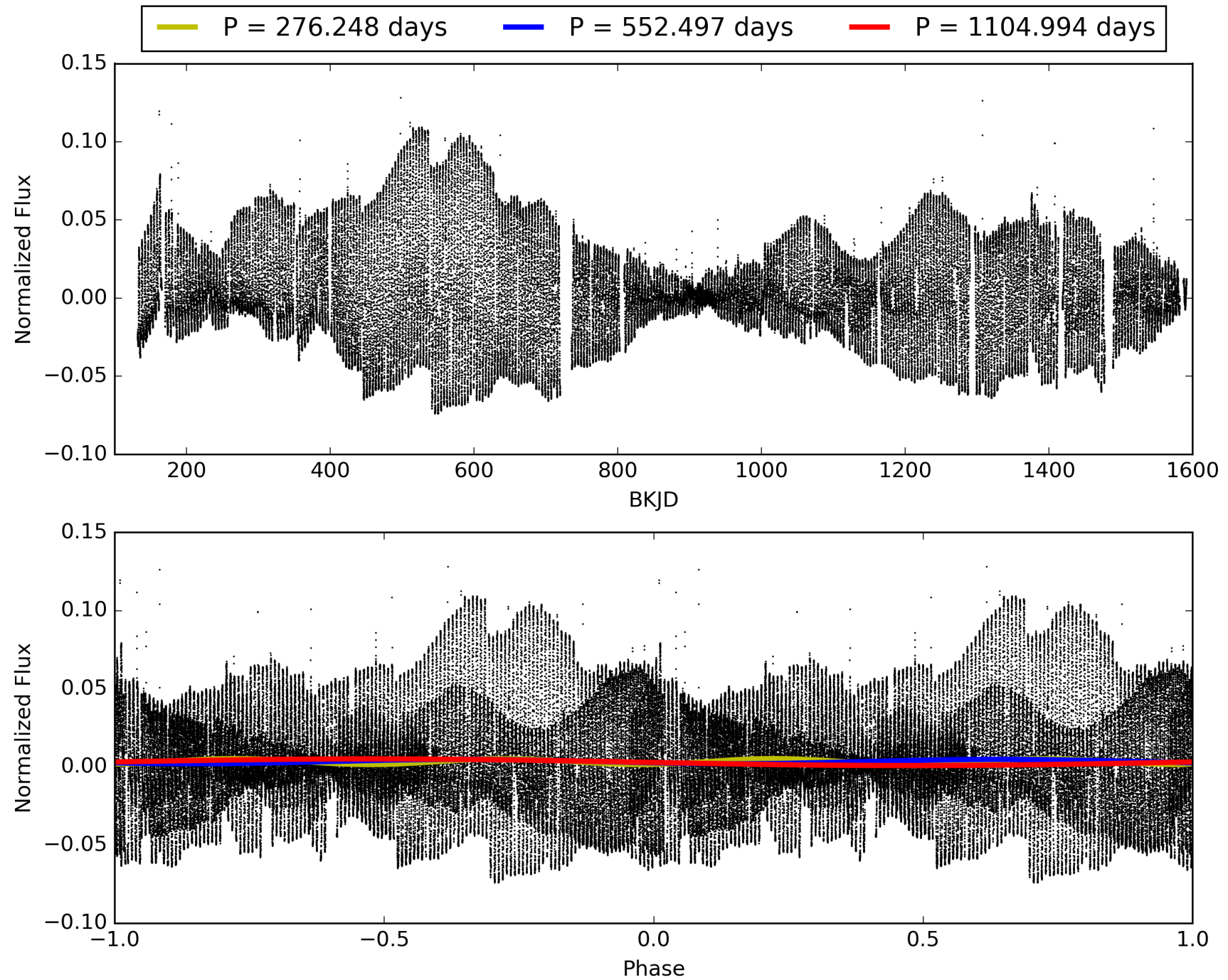
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 002713086-04, PDC Light Curves



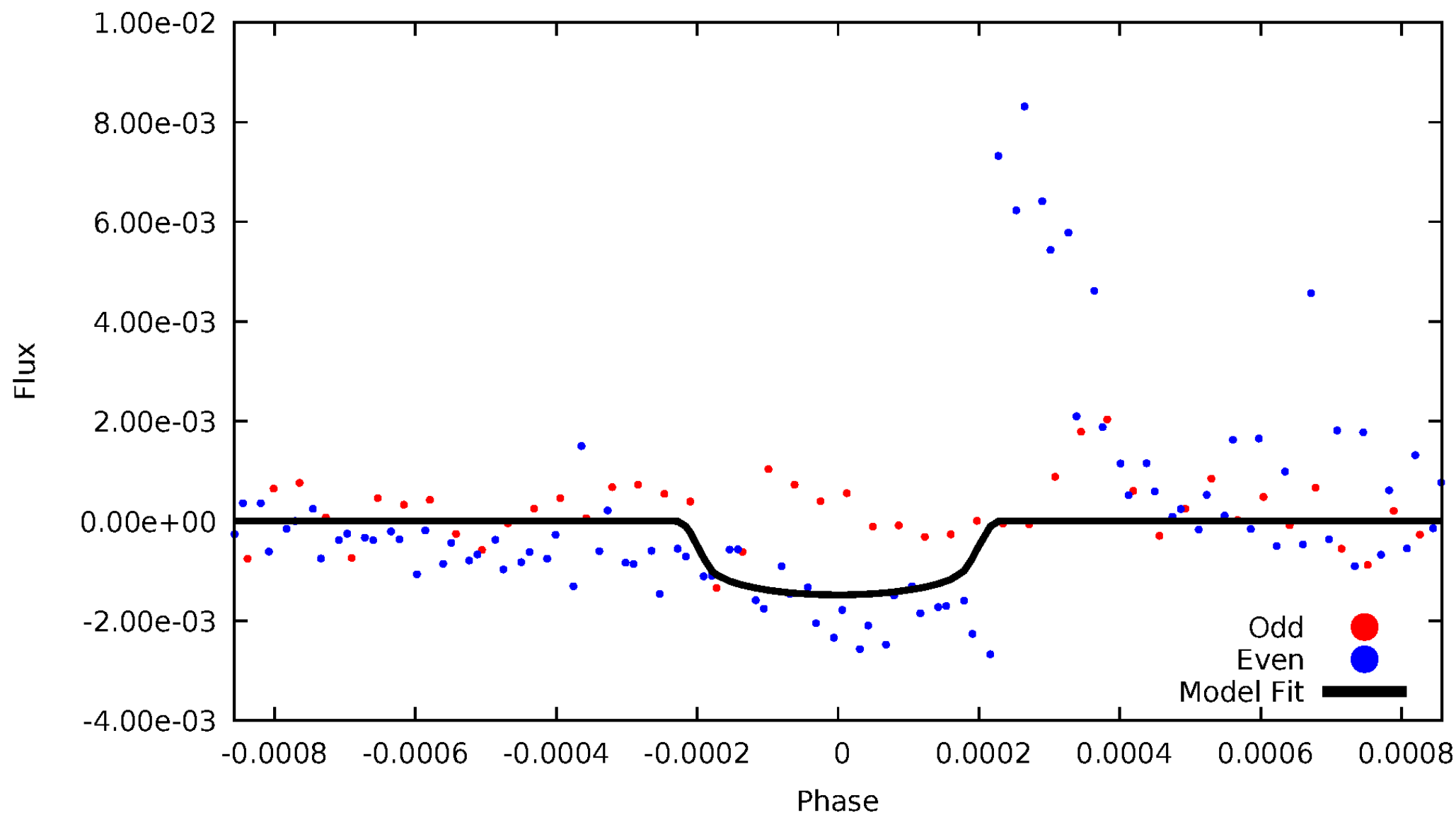


TCE 002713086-04



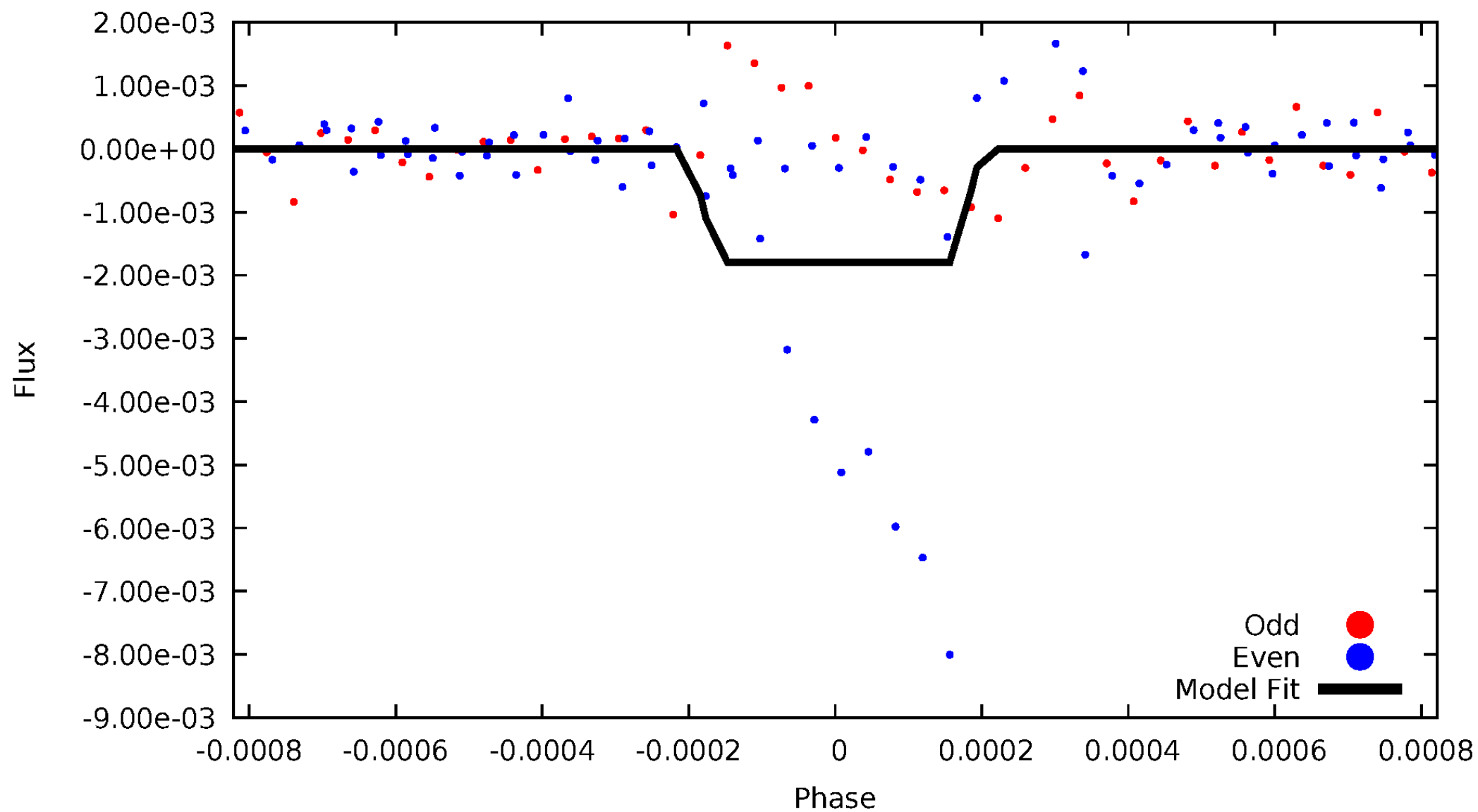
# DV Odd/Even

TCE 002713086-04



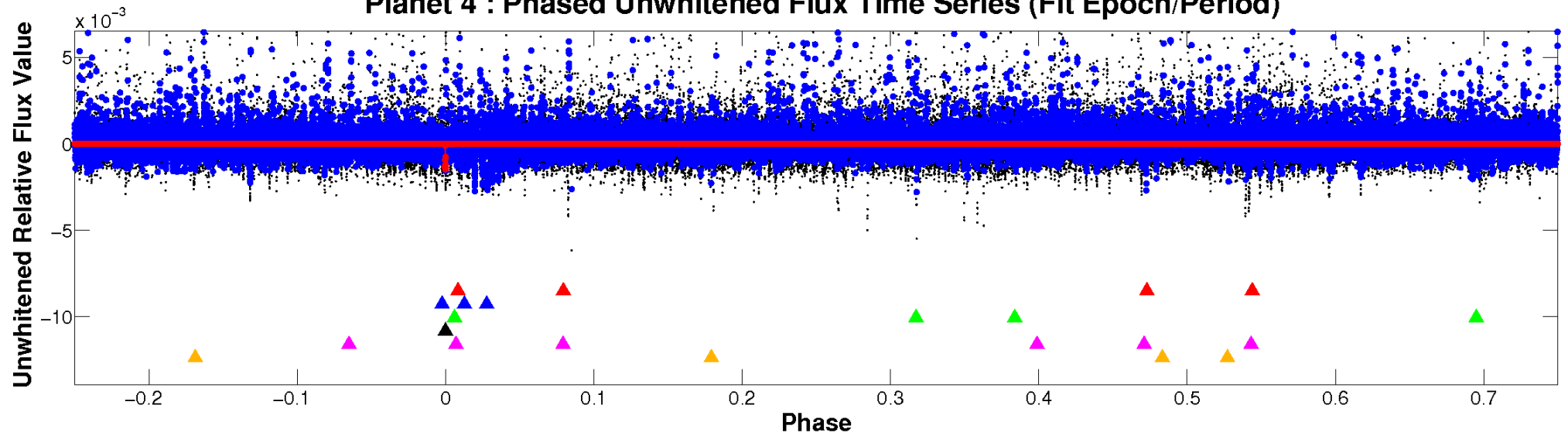
# ALT Odd/Even

TCE 002713086-04

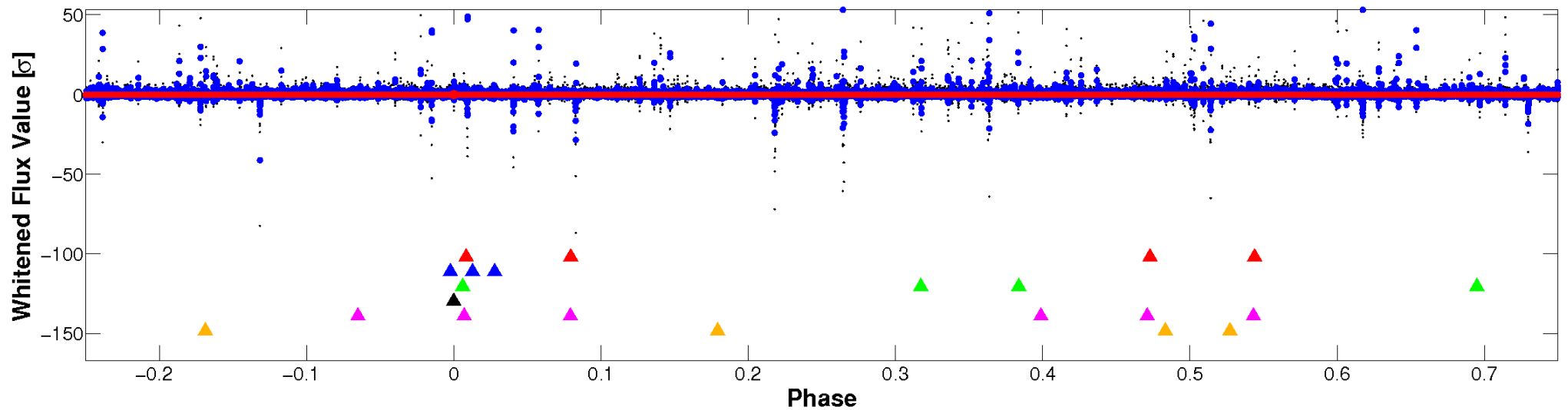


# Non-Whitened Vs. Whitened Light Curve

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

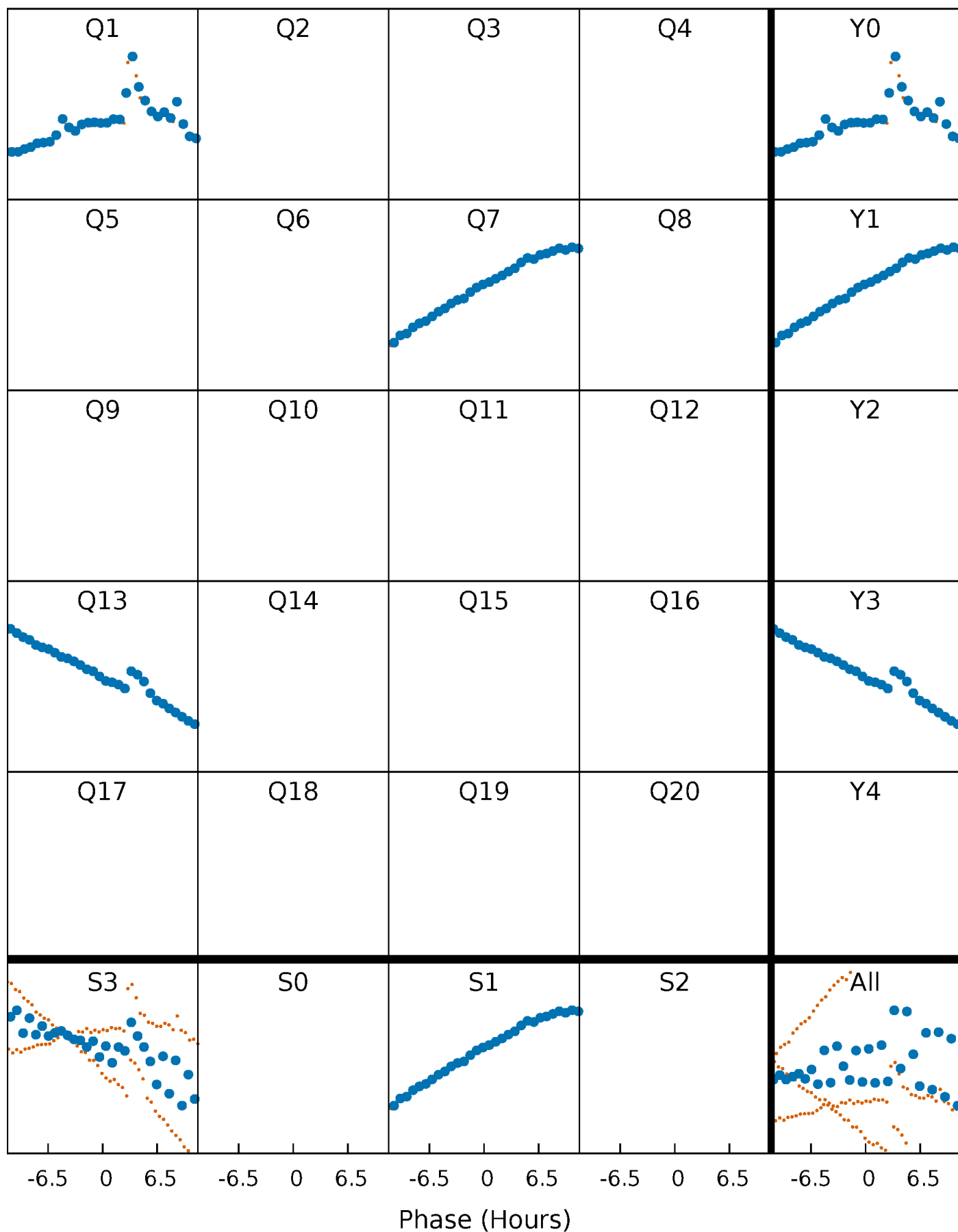


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



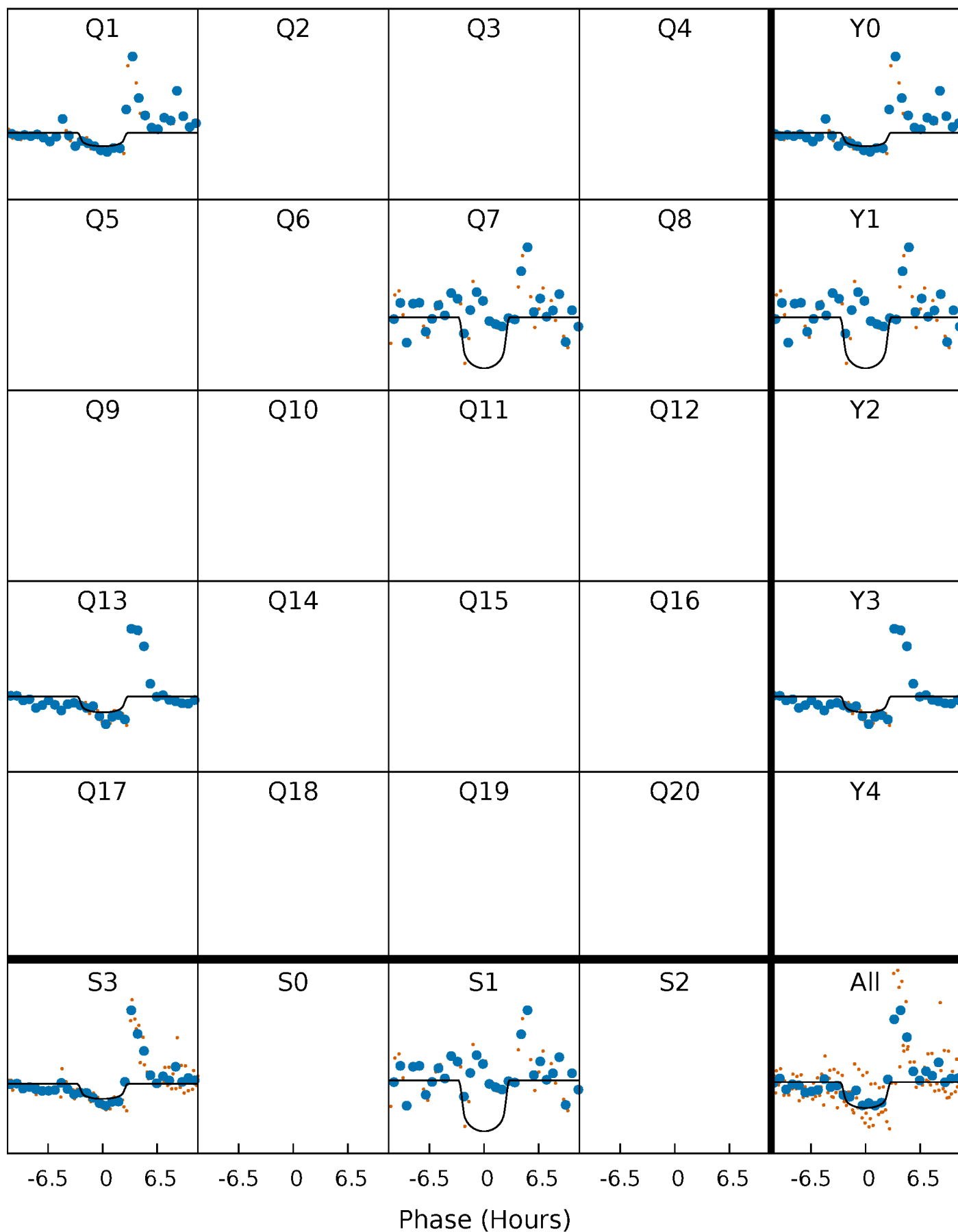
# PDC Quarter-Phased Transit Curves

TCE 002713086-04 P=552.496895 Days  $T_0=156.255603$  (BKJD)



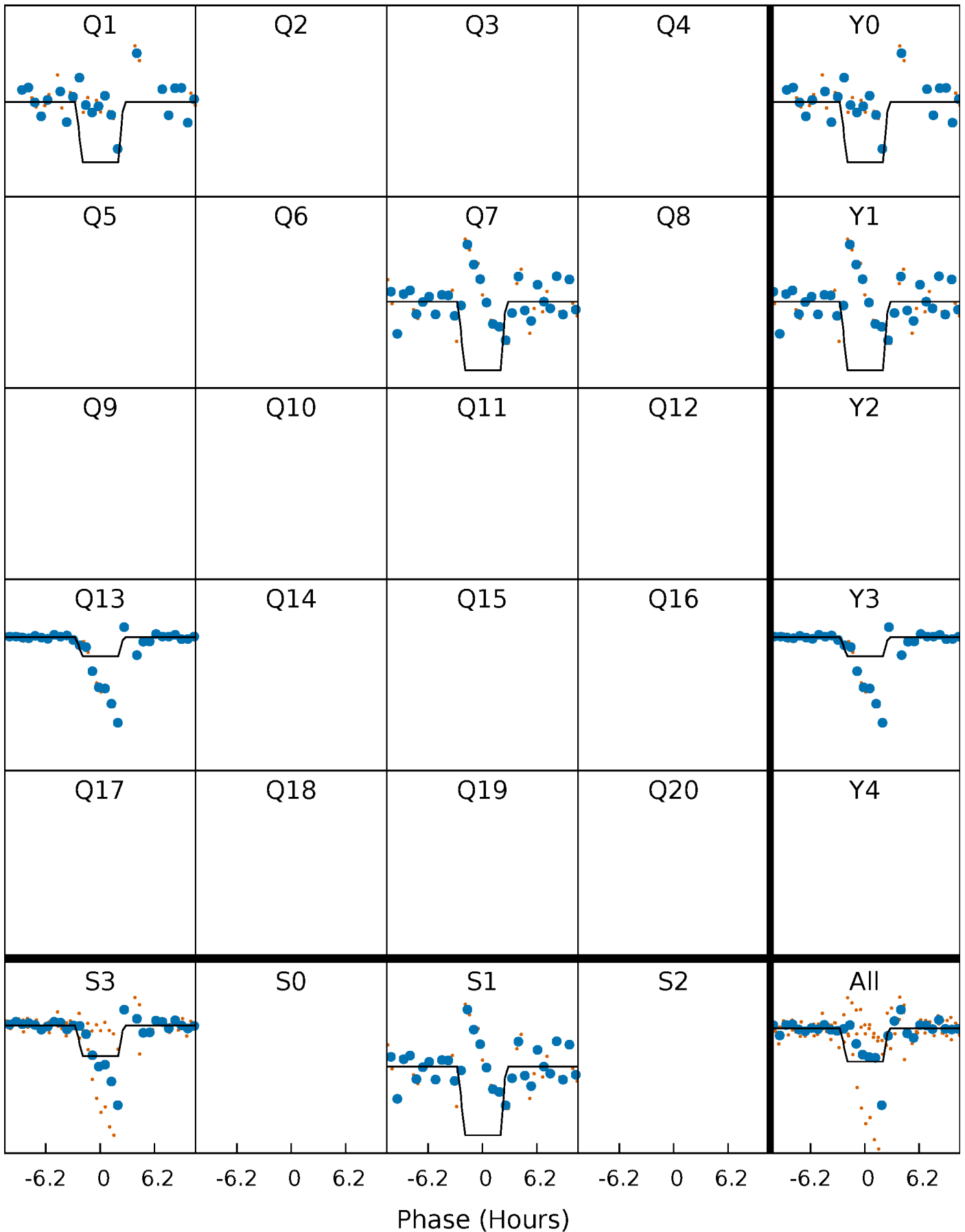
# DV Quarter-Phased Transit Curves

TCE 002713086-04     $P=552.496895$  Days     $T_0=156.255603$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

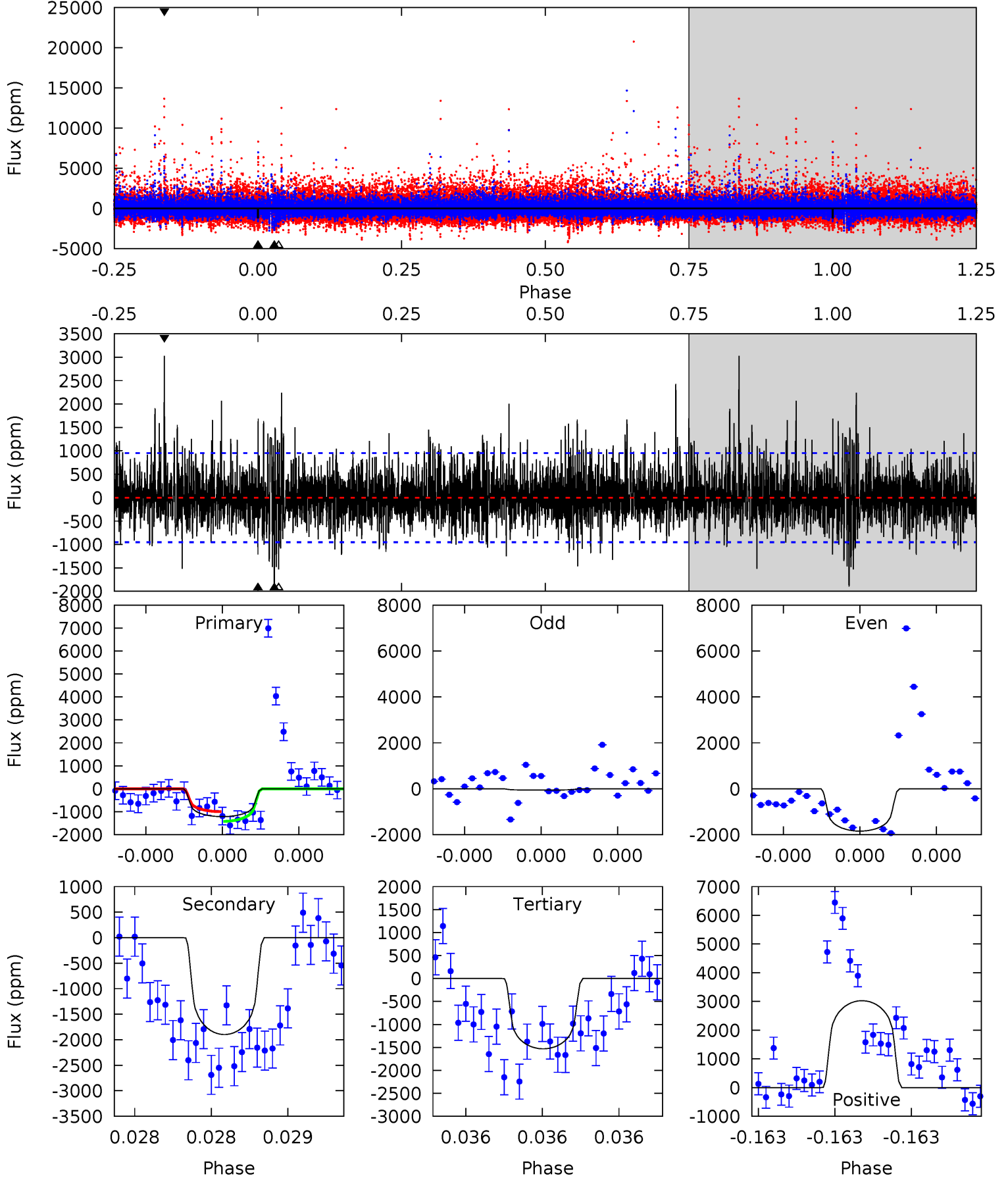
TCE 002713086-04 P=552.503029 Days  $T_0=156.276359$  (BKJD)



# DV Model-Shift Uniqueness Test

002713086-04, P = 552.496895 Days, E = 156.255603 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
7.12	11.1	8.99	17.8	5.59	3.51	2.53	-1.87	-10.7	2.15	-6.63	3.14	0.66	0.61	1.24

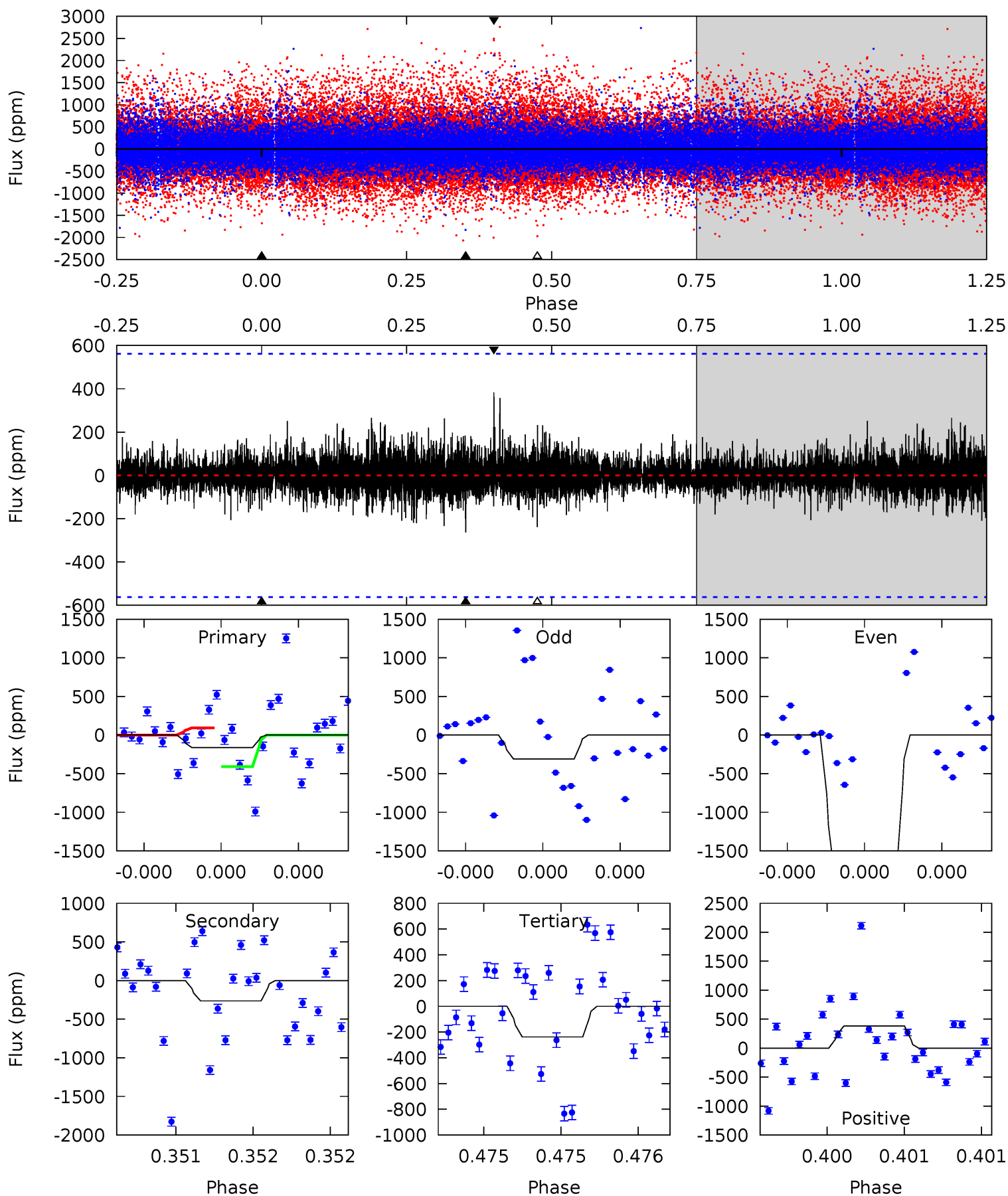




# Alt Model-Shift Uniqueness Test

002713086-04, P = 552.503029 Days, E = 156.276359 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
1.63	2.64	2.38	3.84	5.62	3.56	0.51	-0.75	-2.21	0.26	-1.20	7.85	5.52	0.59	0



### Stellar Parameters For KIC 002713086

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$3920^{+86}_{-86}$	$4.700^{+0.033}_{-0.018}$	$-0.100^{+0.100}_{-0.100}$	$0.550^{+0.024}_{-0.032}$	$0.554^{+0.030}_{-0.027}$	$4.675^{+0.689}_{-0.360}$
	+2%/-2%	+1%/-0%	+100%/-100%	+4%/-6%	+5%/-5%	+15%/-8%
Source	PHO2	PHO2	PHO2	DSEP		

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

### Secondary Eclipse Parameters for KIC 002713086-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-1897 \pm 170$	$2.22^{+1.19}_{-1.13}$	$172^{+4}_{-5}$	$4157^{+1433}_{-597}$	$249721^{+834927}_{-146602}$
Alt.	$-264 \pm 100$	$2.53^{+1.25}_{-1.22}$	$172^{+4}_{-4}$	$2920^{+582}_{-354}$	$26293^{+65133}_{-16254}$

$T_{\text{max}}$  = 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

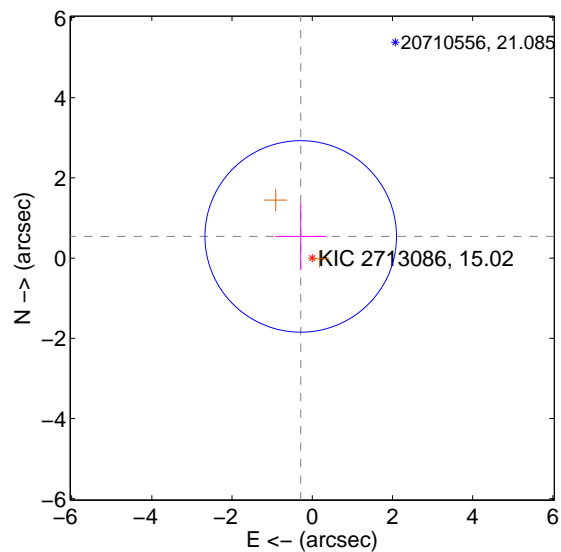
Supplemental centroid analysis for 002713086-04. Kepler magnitude: 15.02. Transit SNR 5.10

There are 0 quarters with good PRF difference image offsets

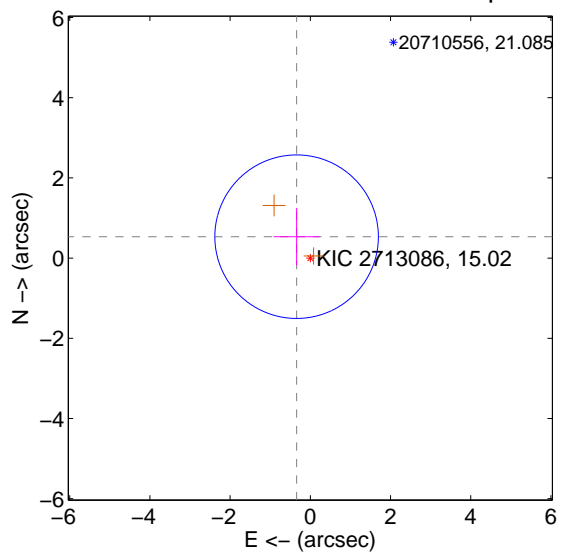
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.612 \pm 0.796$	0.77	$0.287 \pm 0.636$	$0.540 \pm 0.836$
PRF-fit source offset from KIC position	$0.634 \pm 0.680$	0.93	$0.342 \pm 0.575$	$0.534 \pm 0.718$
photometric centroid source offset	$2.10 \pm 0.98$	2.16	$-1.14 \pm 1.04$	$-1.77 \pm 0.95$

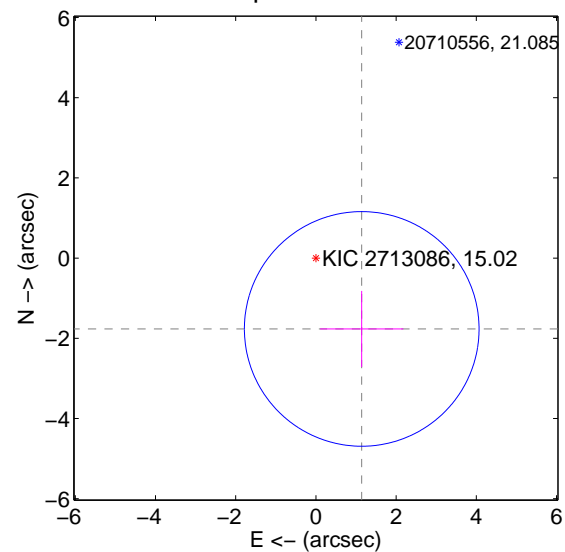
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

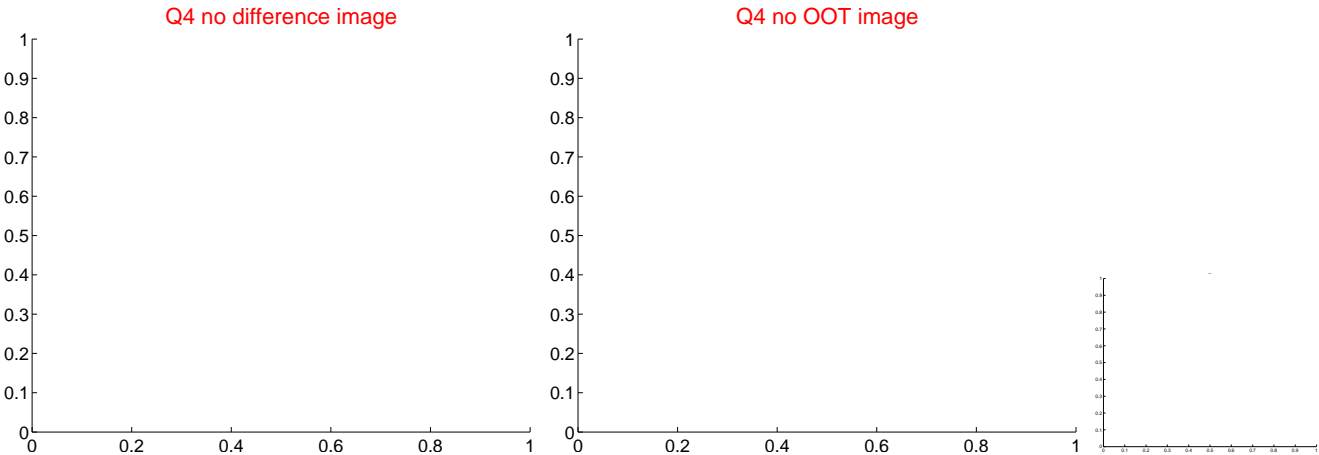
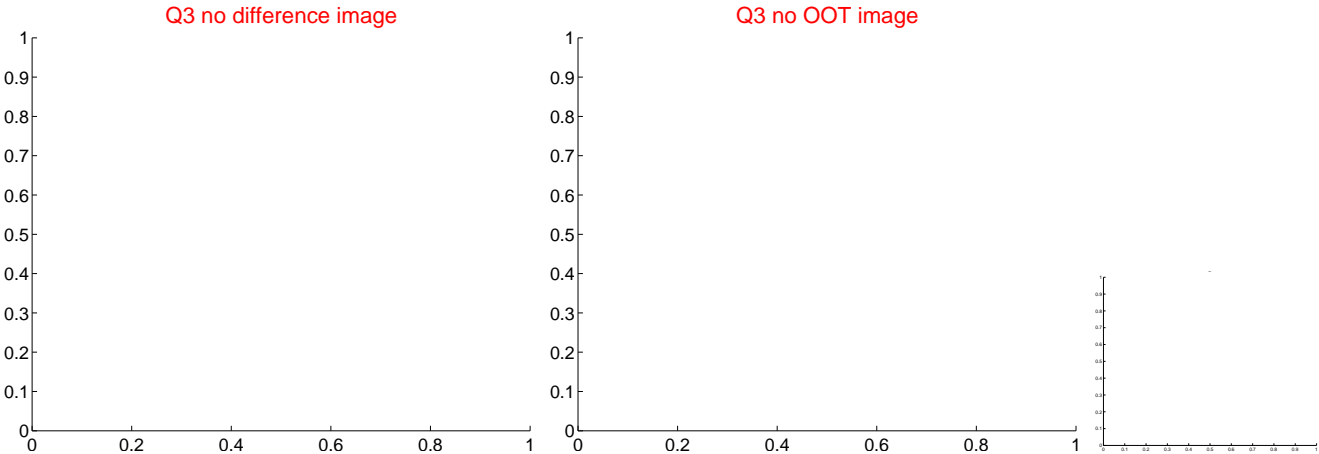
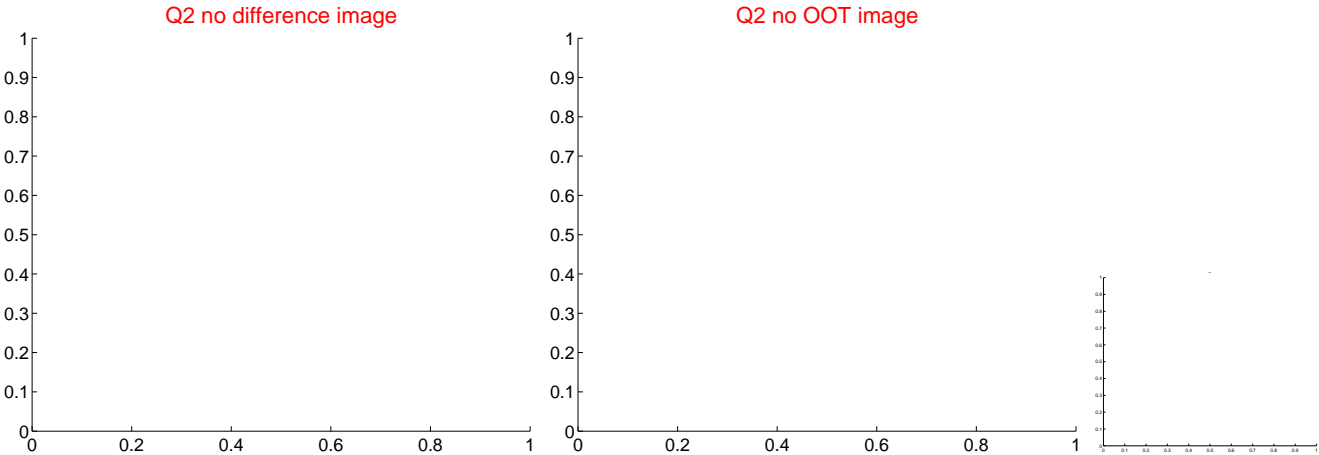
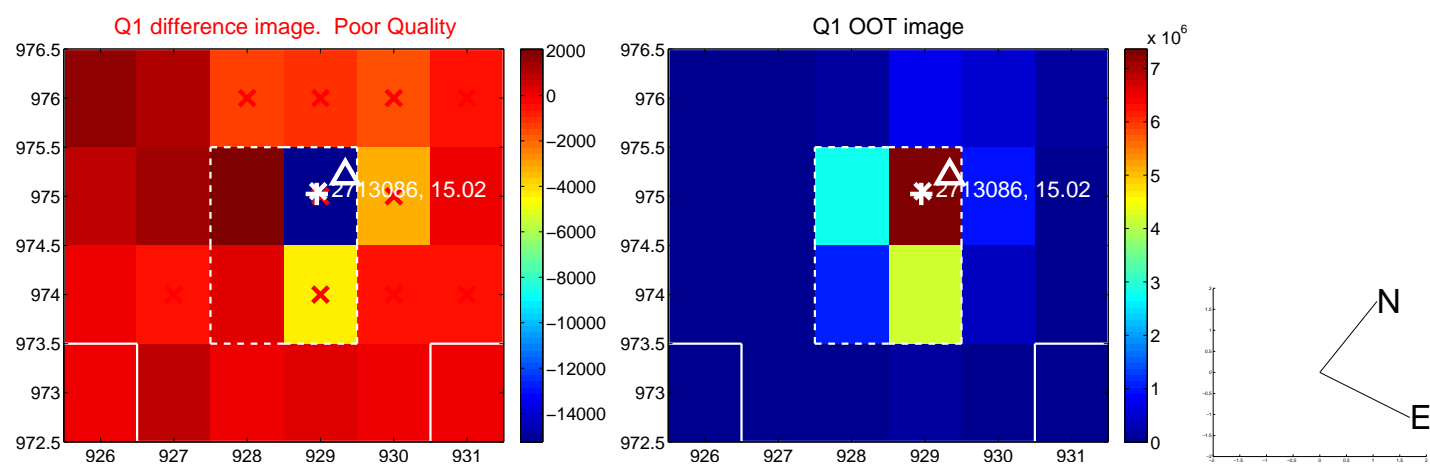


offset from photometric centroids



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



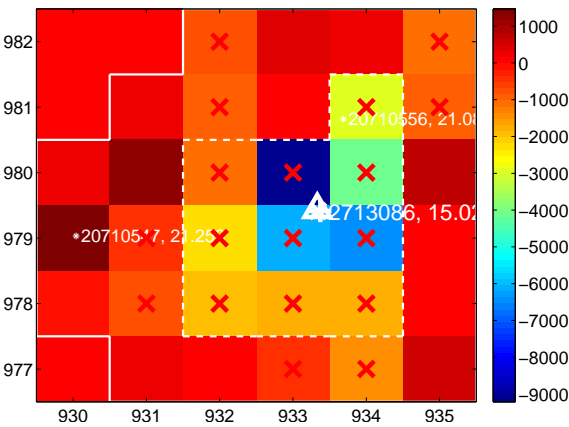
Q6 no difference image



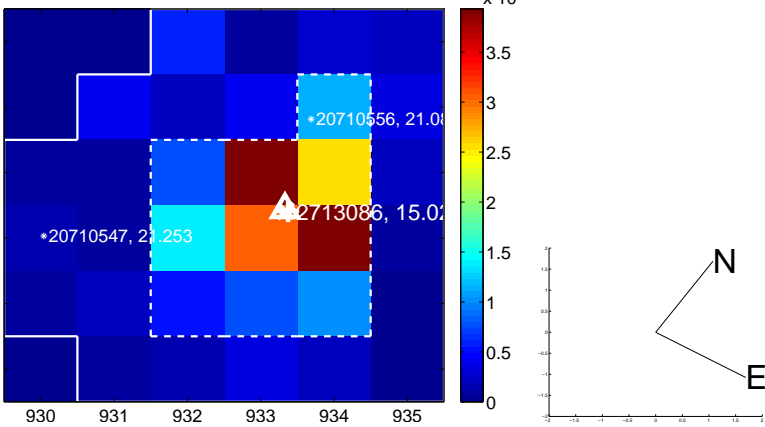
Q6 no OOT image



Q7 difference image. Poor Quality



Q7 OOT image



Q8 no difference image



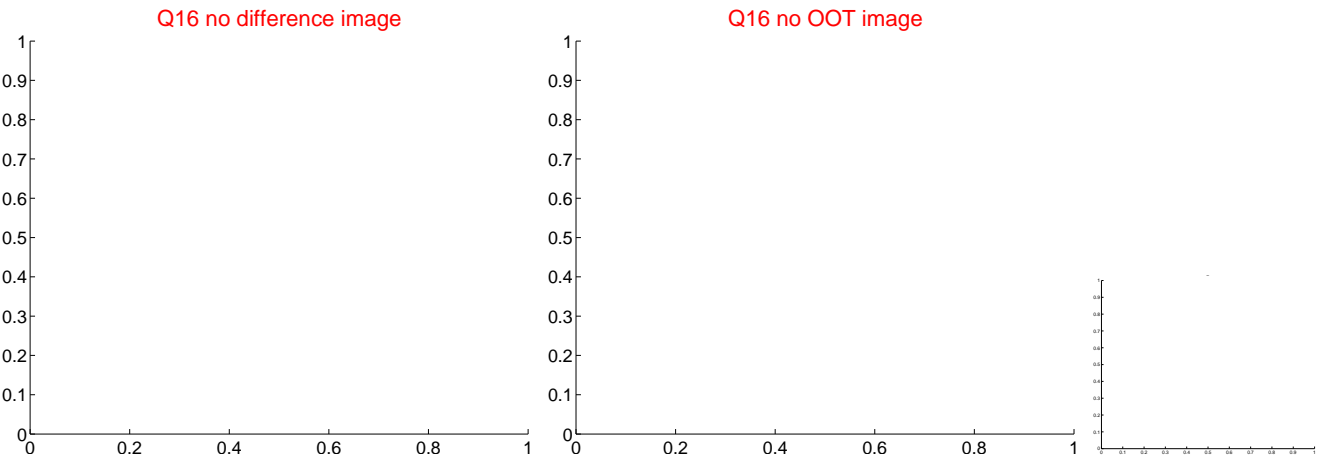
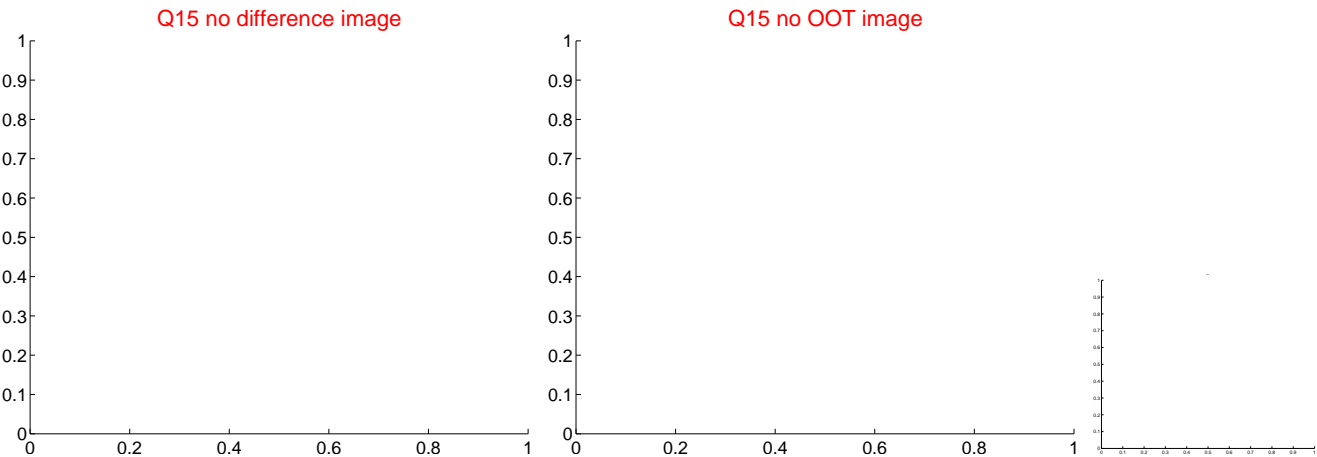
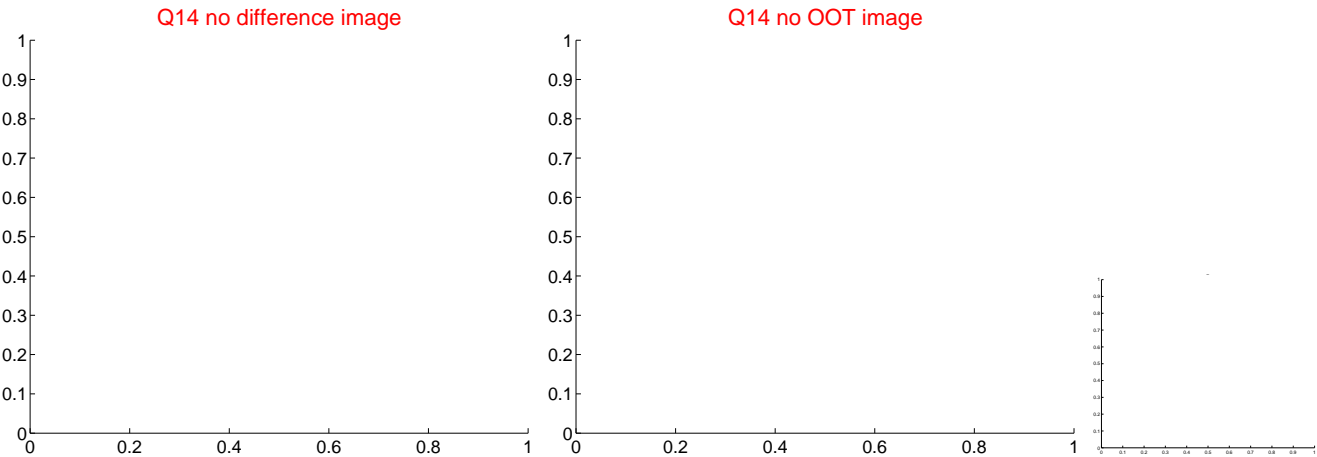
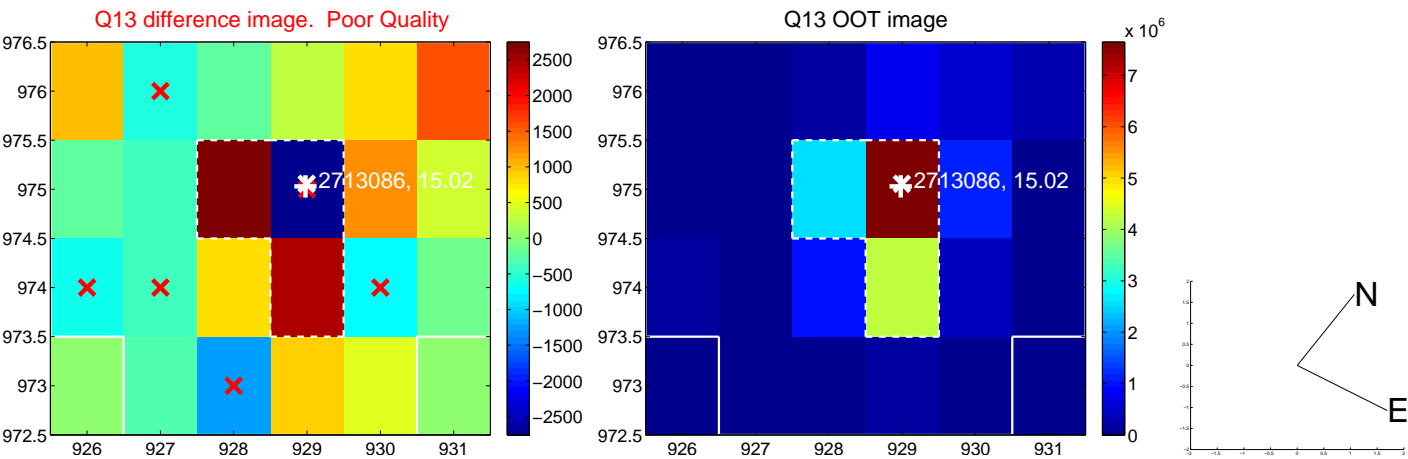
Q8 no OOT image



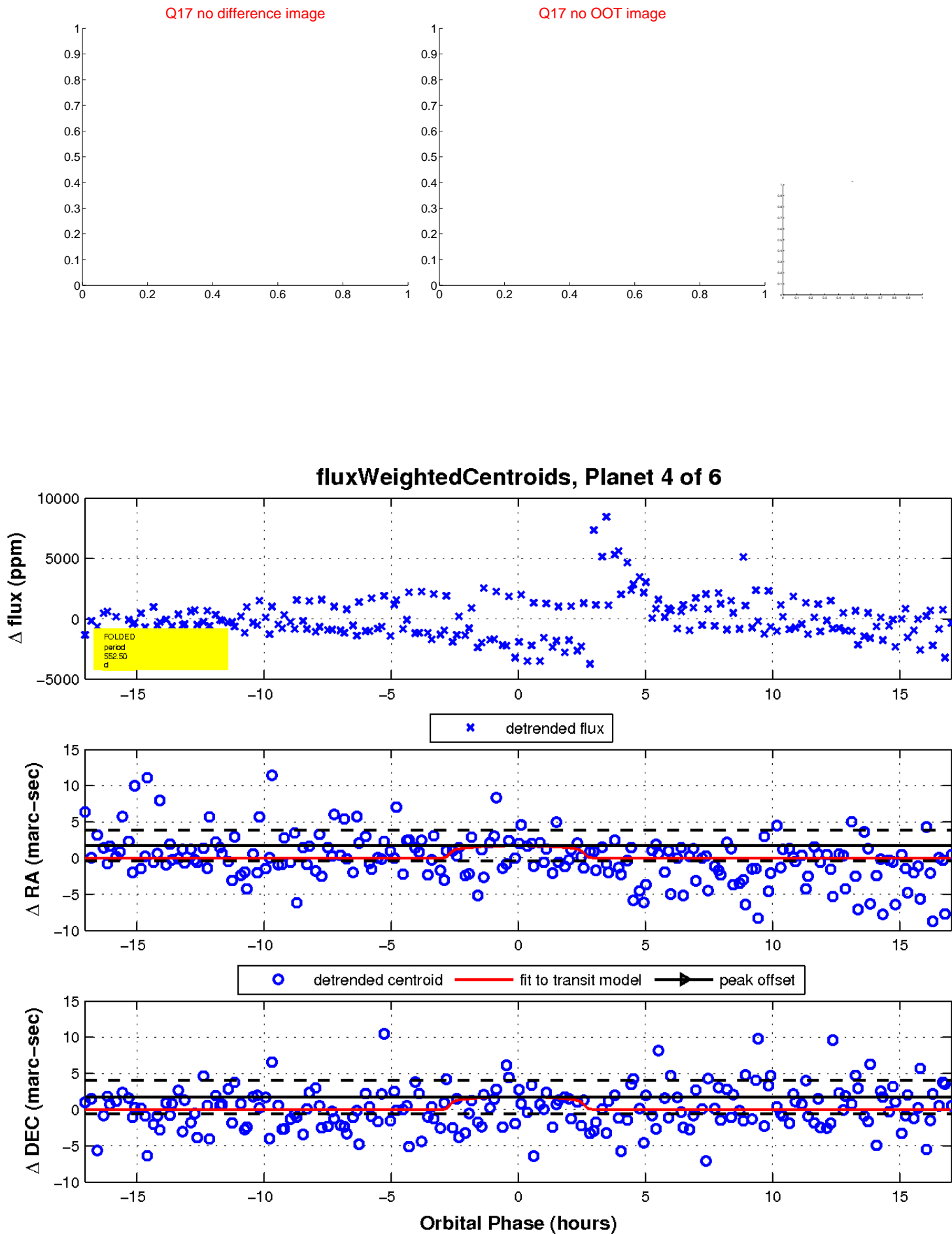
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



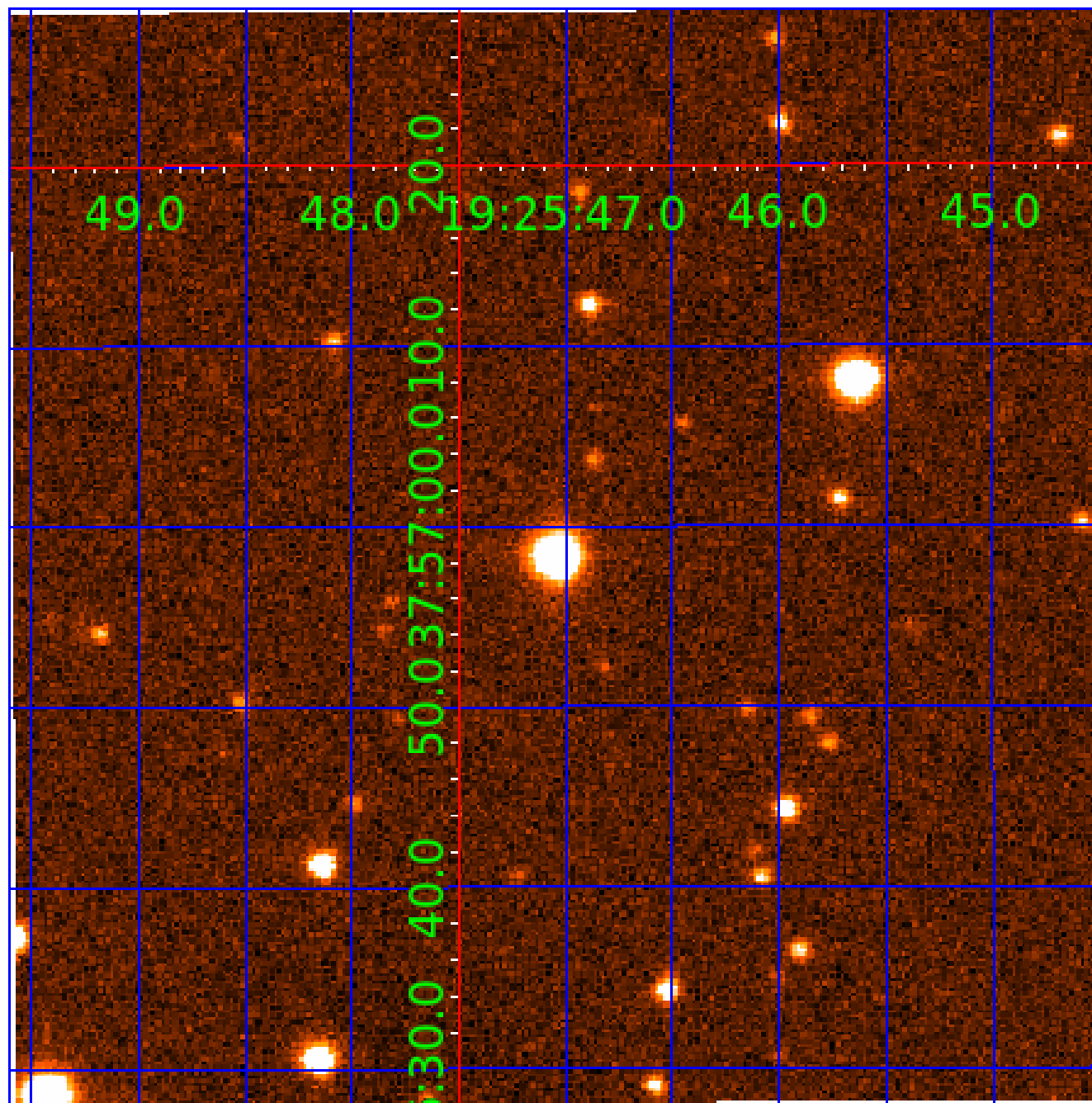
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 002713086

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002713086-01	OBS	No	295.877903	417.532159	3246.9	4.902	19.6	10.5	0.55	3920	3.22	0.13
002713086-02	OBS	No	560.806191	154.999723	2548.2	7.541	15.0	6.8	0.55	3920	5.33	0.05
002713086-03	OBS	No	380.584597	331.542108	4501.0	8.795	15.0	13.2	0.55	3920	3.63	0.09
002713086-04	OBS	No	552.496895	156.255602	1482.5	5.682	15.8	5.1	0.55	3920	2.21	0.06
002713086-05	OBS	No	256.316272	200.039801	627.1	1.830	16.1	2.5	0.55	3920	1.59	0.15
002713086-06	OBS	No	360.253914	447.536114	2683.2	5.484	14.3	8.9	0.55	3920	2.87	0.10

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002713086-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
002713086-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002713086-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002713086-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
002713086-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
002713086-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_MEAS

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

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

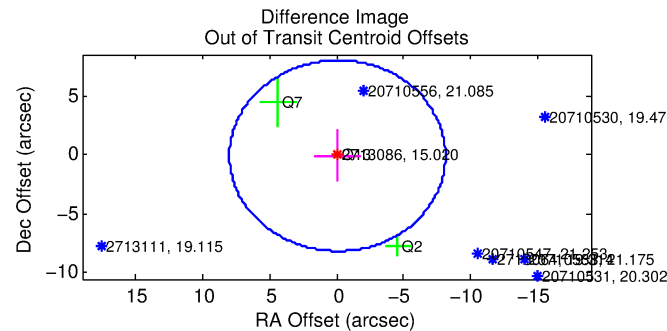
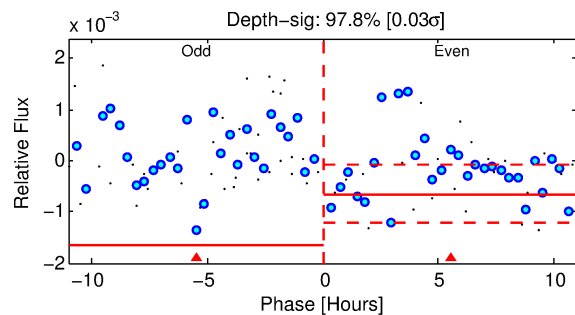
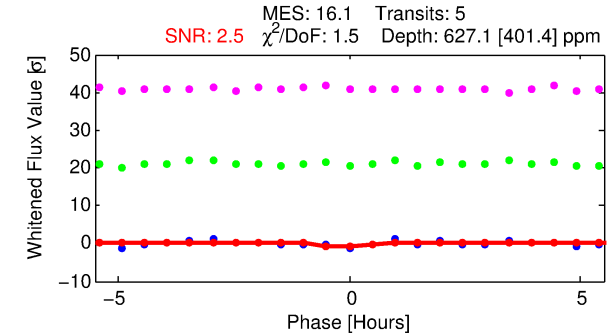
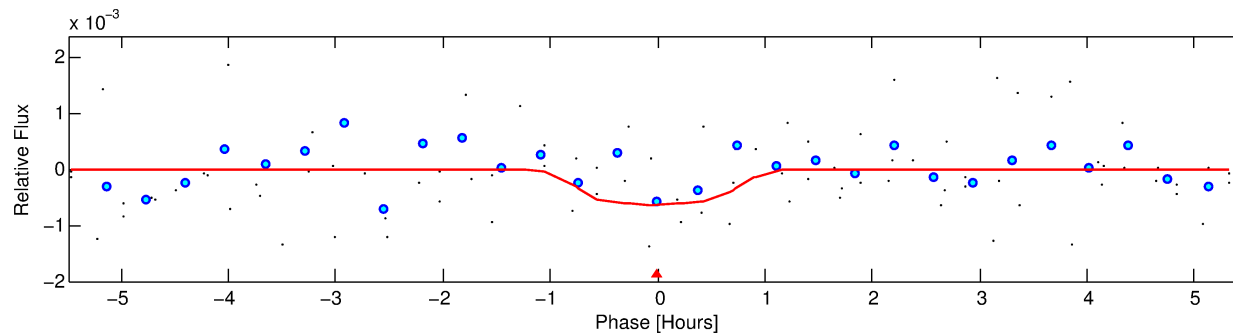
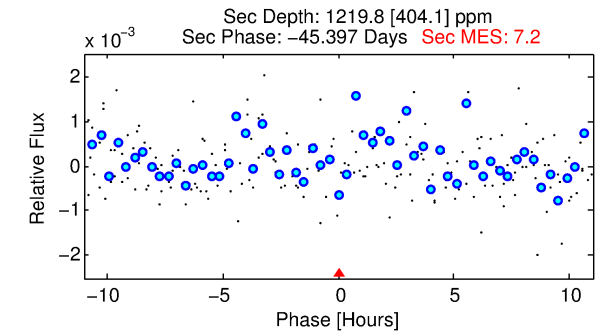
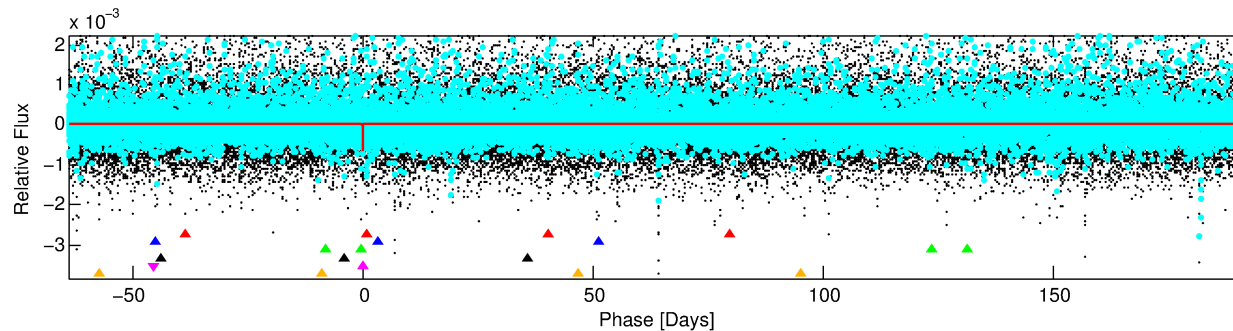
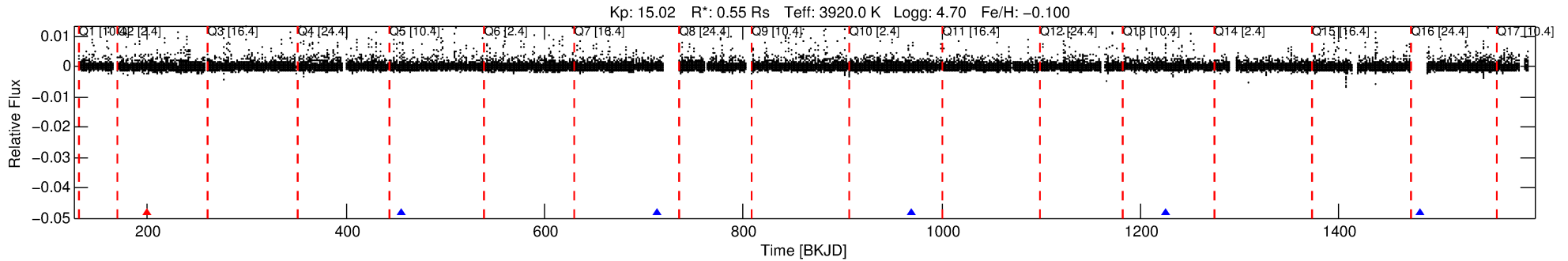
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 002713086-05

No Significant Match Found

# DV One-Page Summary

KIC: 2713086 Candidate: 5 of 6 Period: 256.316 d



## DV Fit Results:

Period = 256.31627 [0.00761] d  
Epoch = 200.0398 [0.0178] BKJD  
Rp/R\* = 0.0265 [0.0809]  
a/R\* = 601.11 [7756.27]  
b = 0.86 [3.99]  
Seff = 0.15 [0.02]  
Teq = 159 [4] K  
Rp = 1.59 [4.86] Re  
a = 0.6483 [0.0300] AU  
Ag = 111209.73 [679133.44] [0.16σ]  
Teffp = 4497 [6866] K [0.63σ]

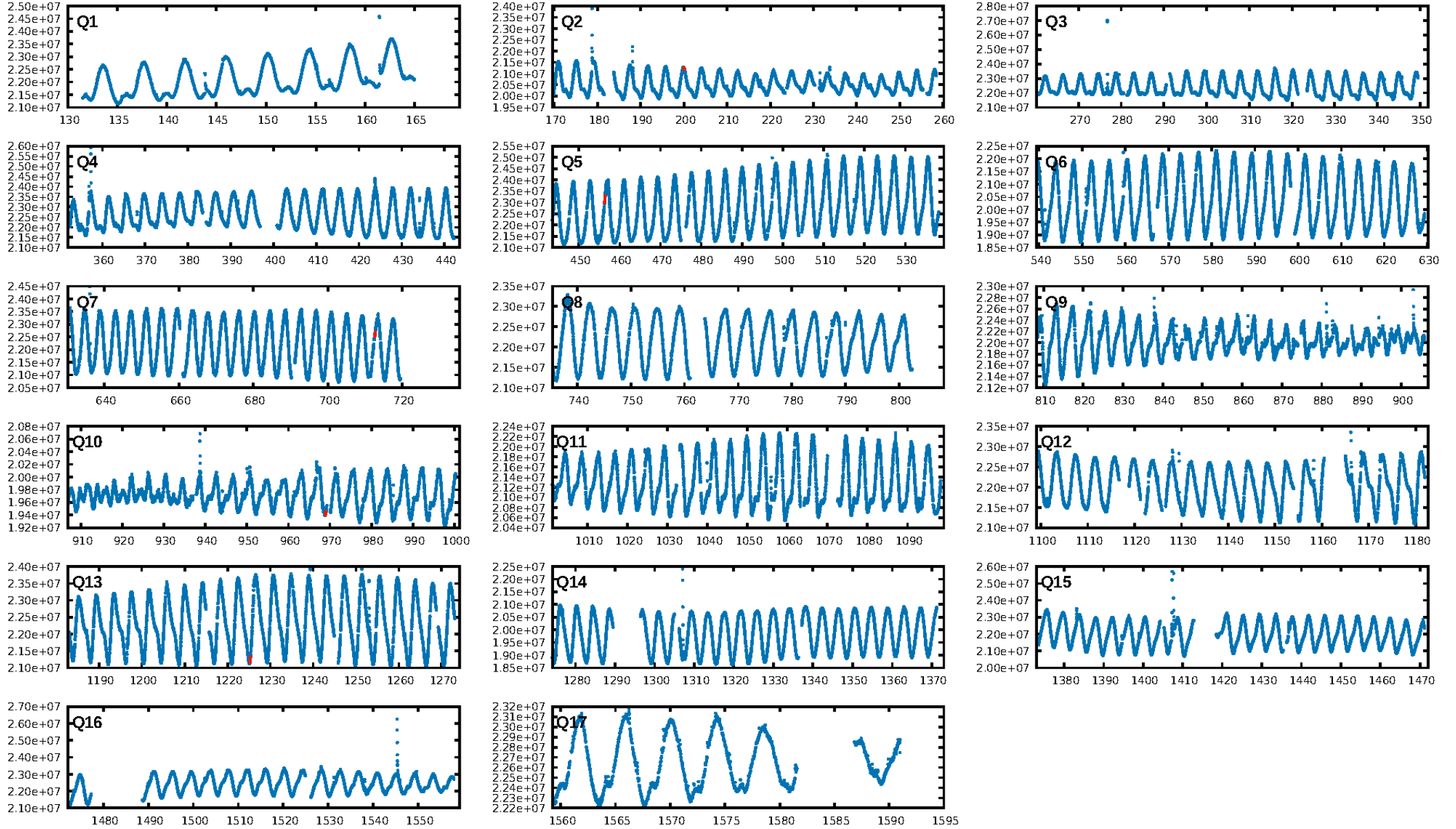
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [181.46σ]  
ModelChiSquare2-sig: 29.4%  
ModelChiSquareGof-sig: 89.6%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.80 [4/5]  
GhostDiagnostic-chr: 0.6706  
Centroid-sig: 14.6%  
Centroid-so: 2.416 arcsec [0.78σ]  
OotOffset-rm: 0.106 arcsec [0.04σ]  
OotOffset-st: 1/1/0/1 [3]  
KicOffset-rm: 0.094 arcsec [0.04σ]  
KicOffset-st: 1/1/0/1 [3]  
DiffImageQuality-fgm: 0.33 [1/3]  
DiffImageOverlap-fno: 1.00 [5/5]

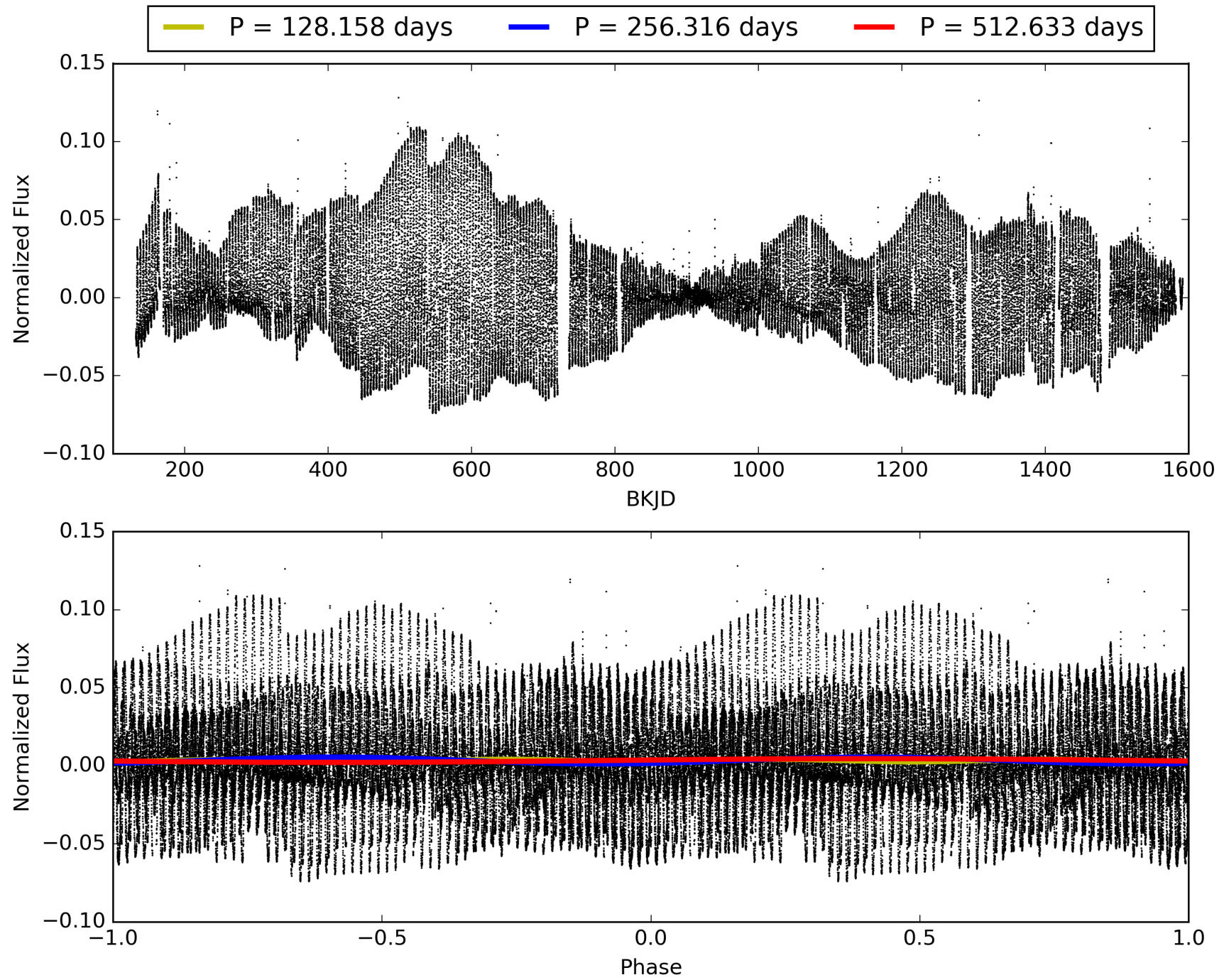
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:28:37 Z

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

# TCE 002713086-05, PDC Light Curves

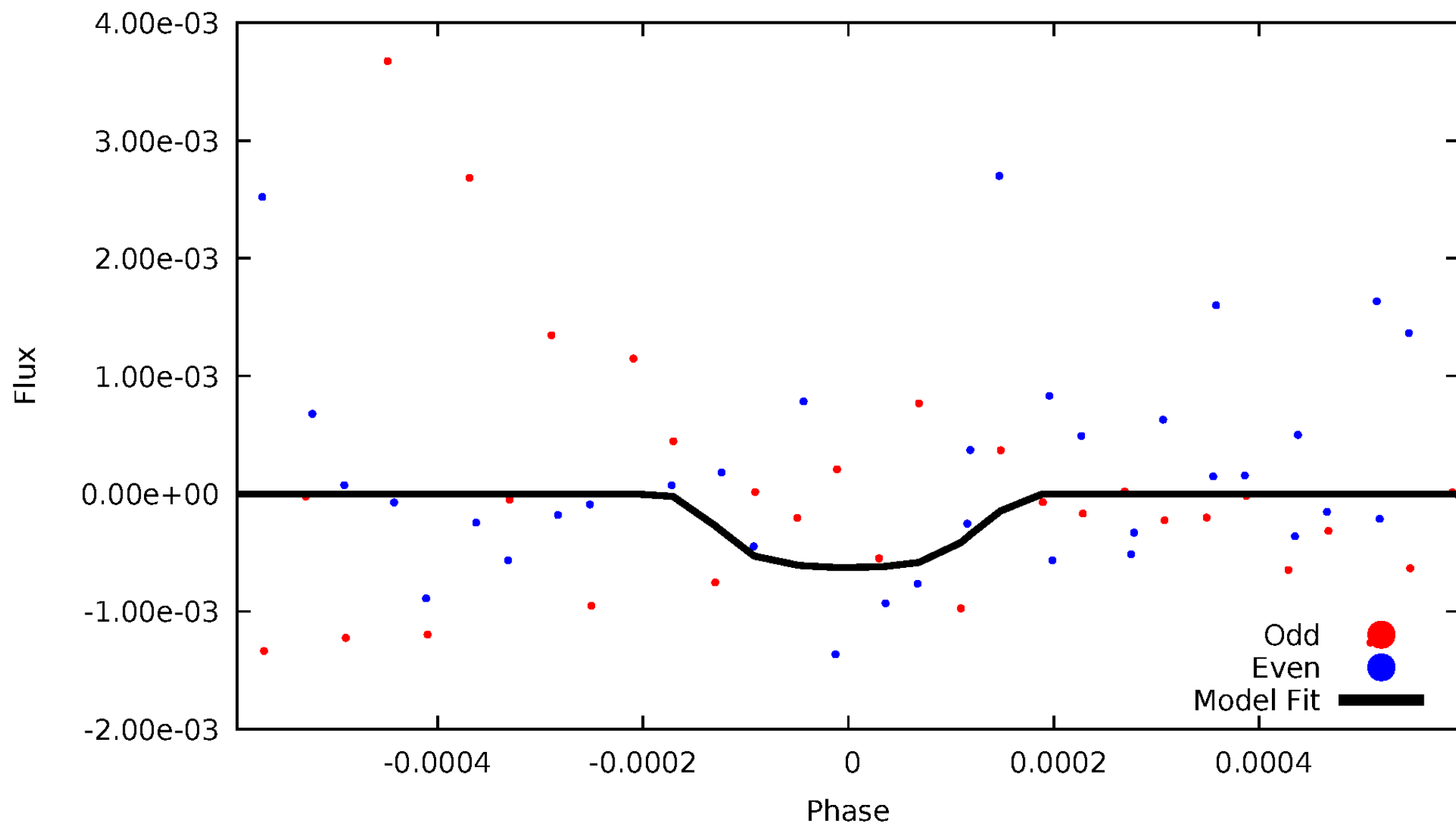


TCE 002713086-05



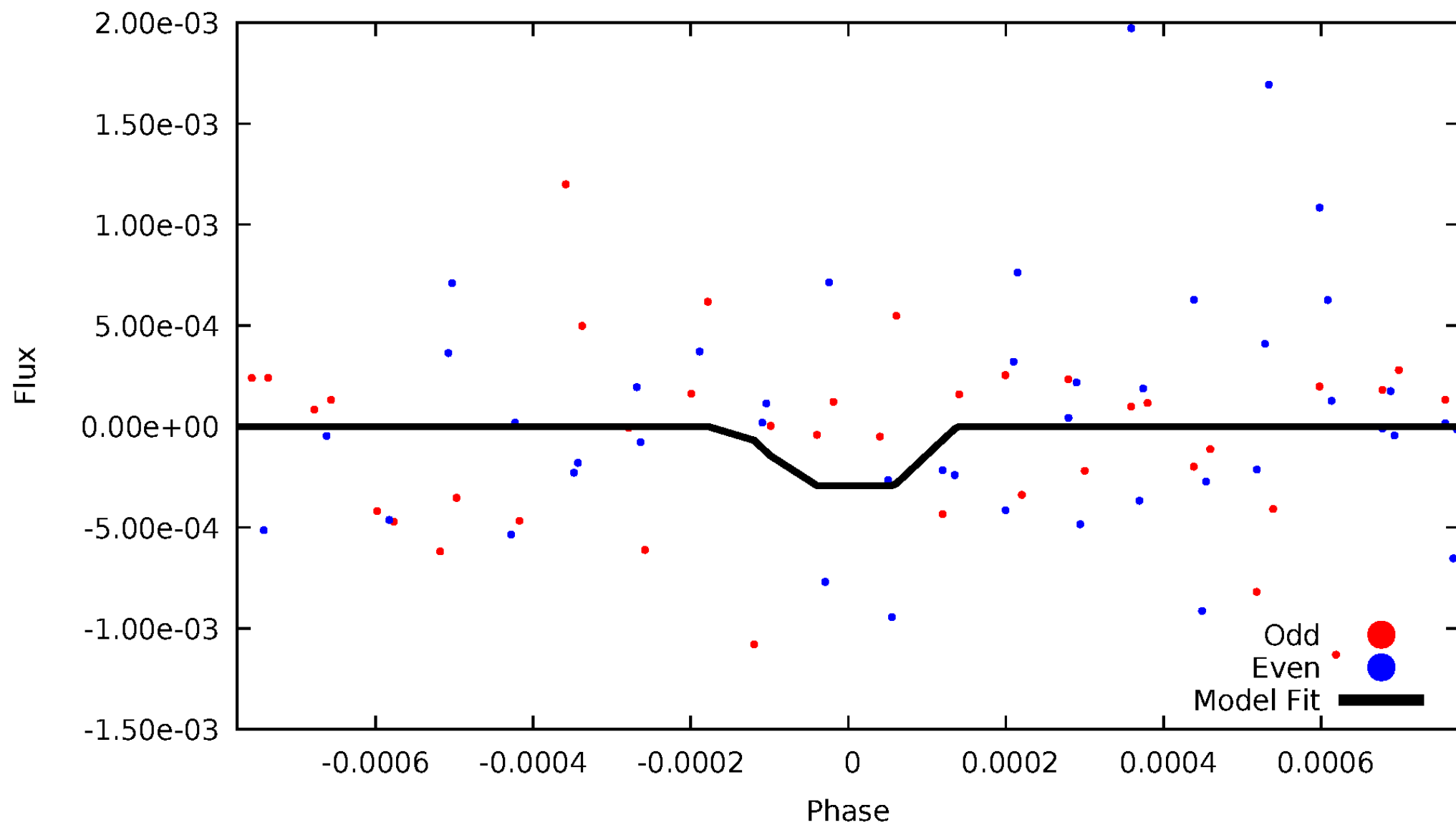
# DV Odd/Even

TCE 002713086-05



# ALT Odd/Even

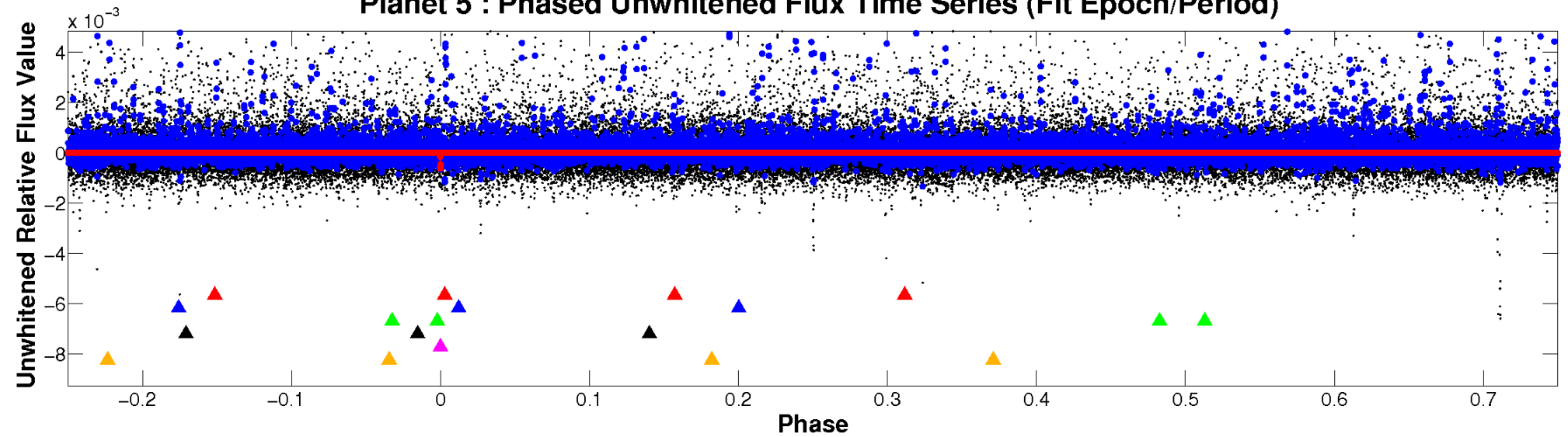
TCE 002713086-05



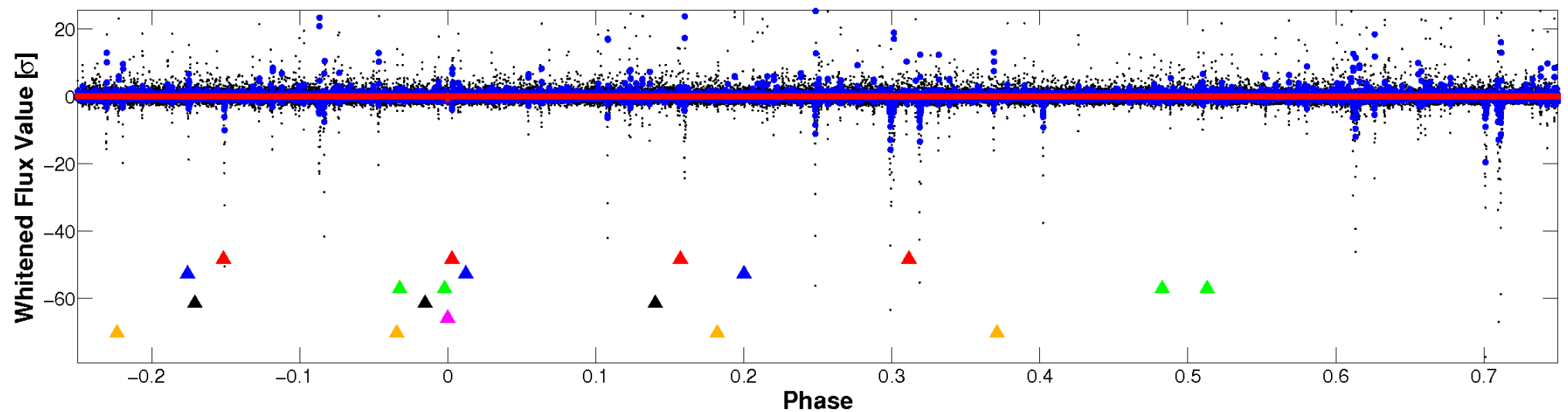


# Non-Whitened Vs. Whitened Light Curve

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



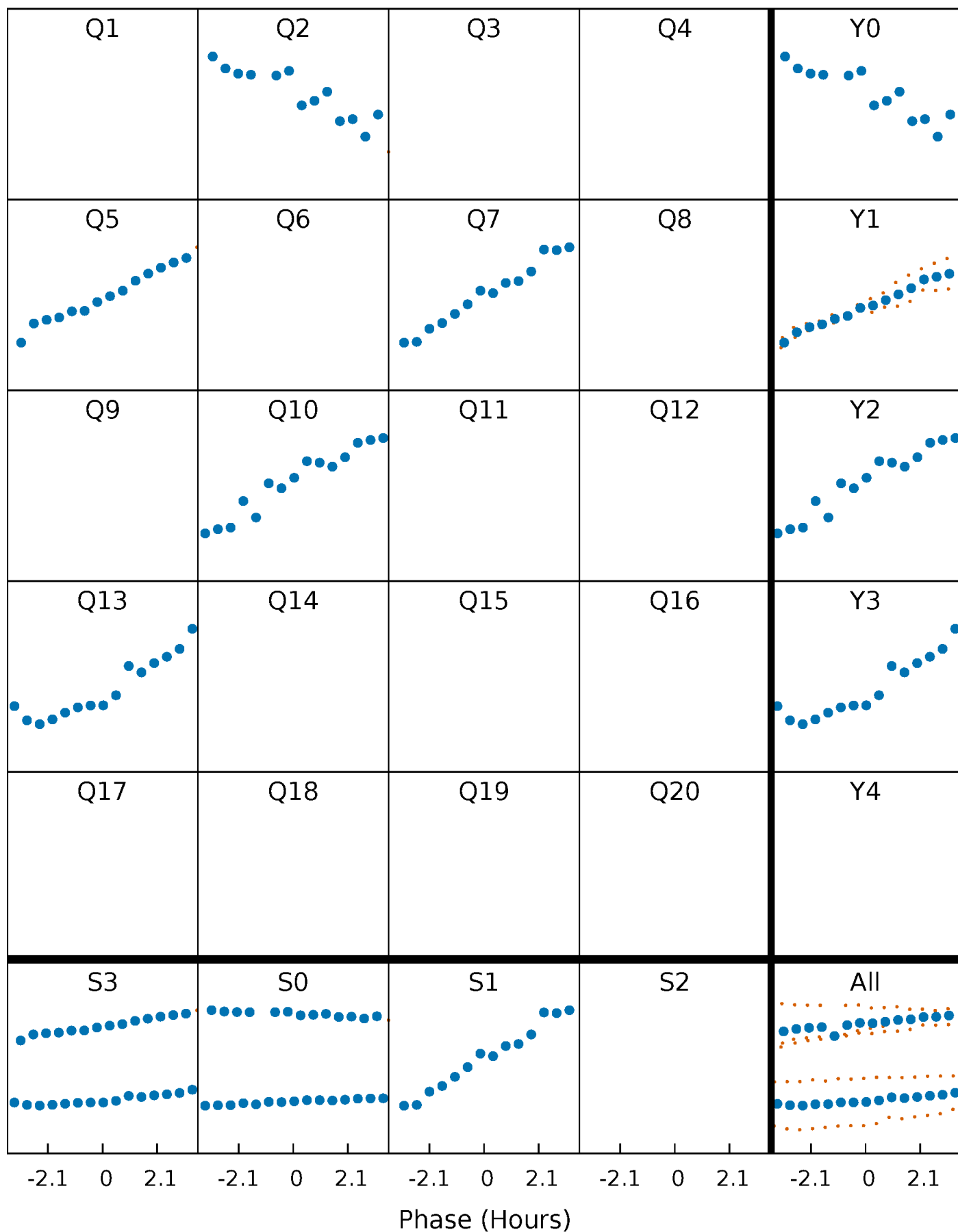
Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)





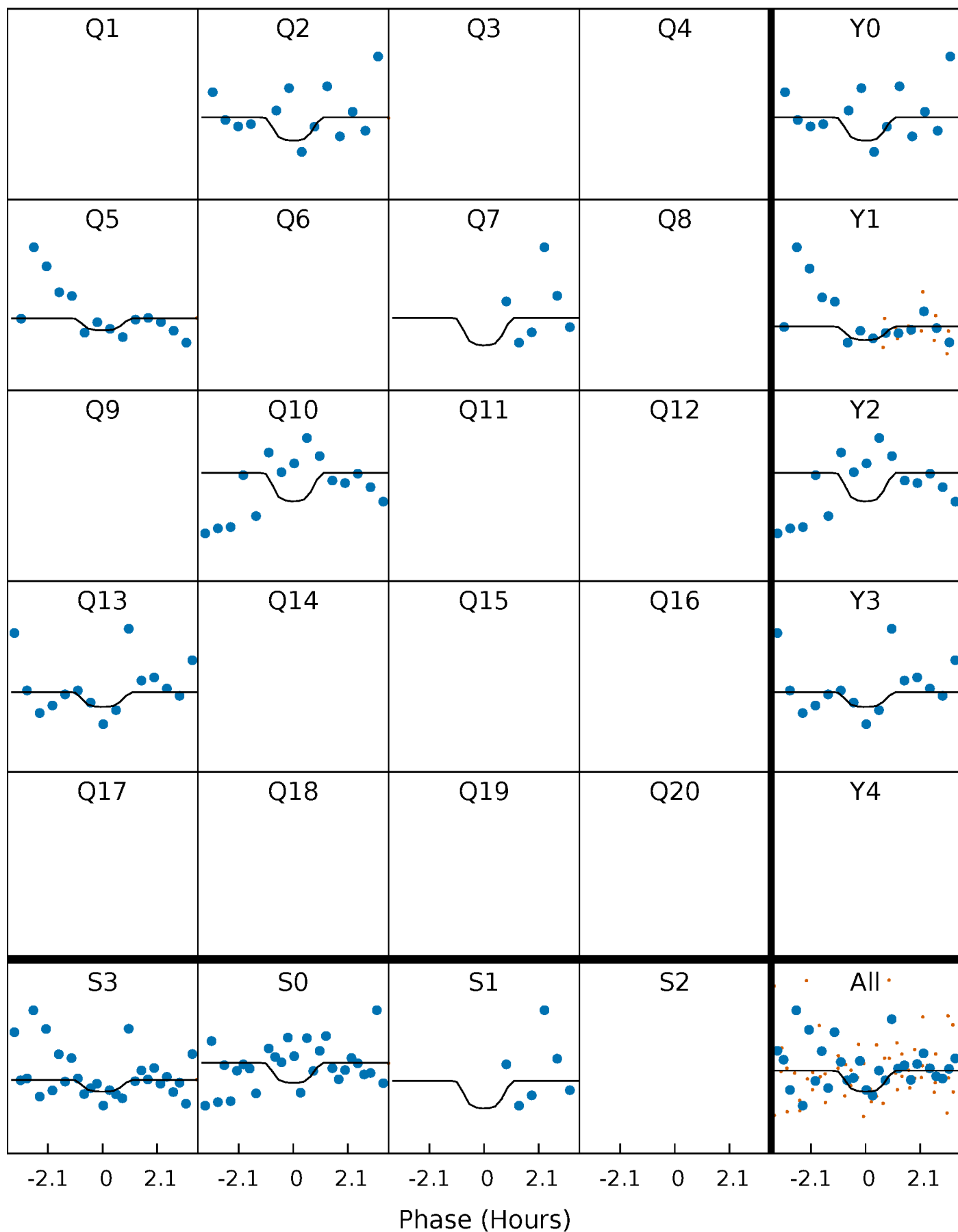
# PDC Quarter-Phased Transit Curves

TCE 002713086-05     $P=256.316272$  Days     $T_0=200.039801$  (BKJD)



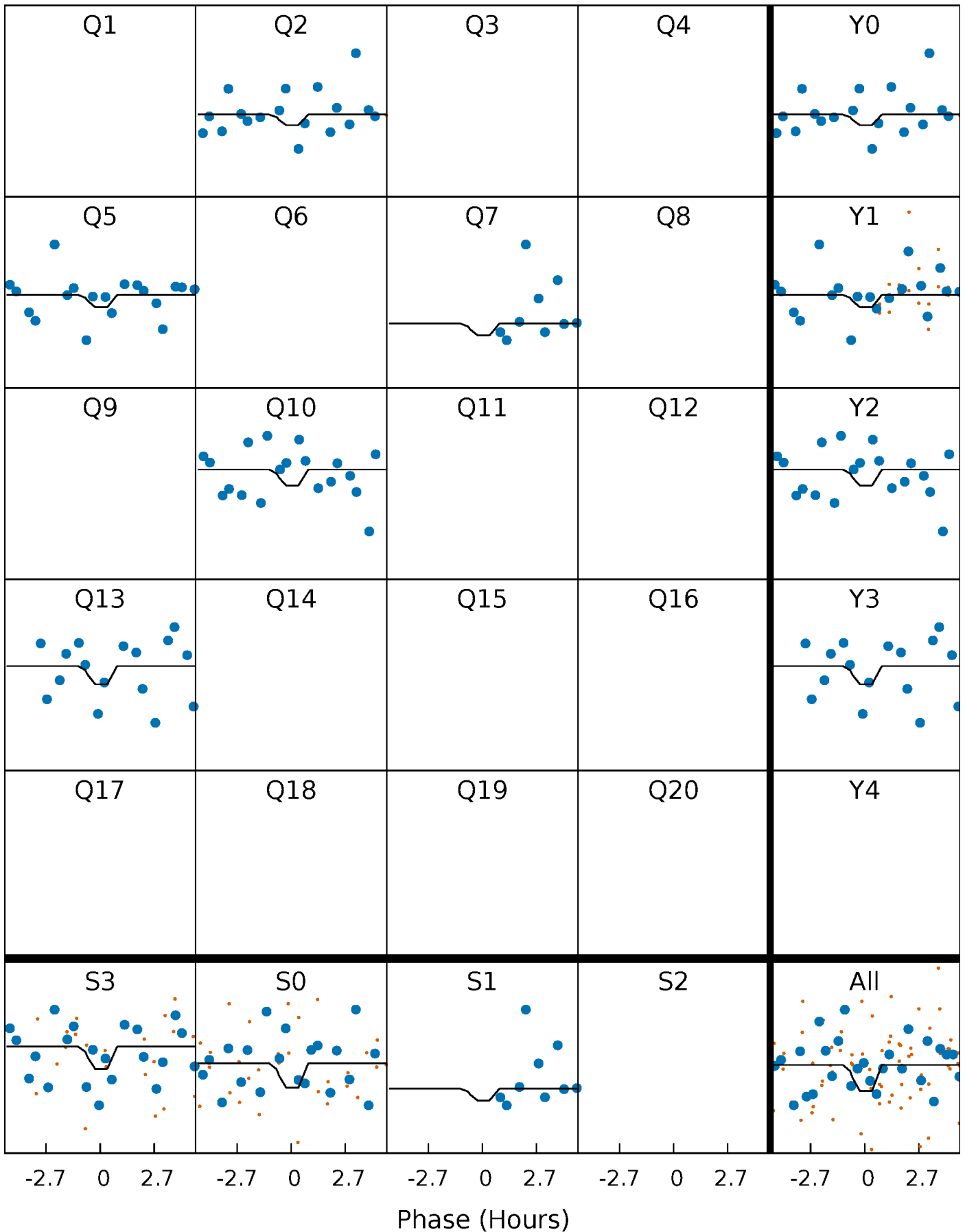
# DV Quarter-Phased Transit Curves

TCE 002713086-05     $P=256.316272$  Days     $T_0=200.039801$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

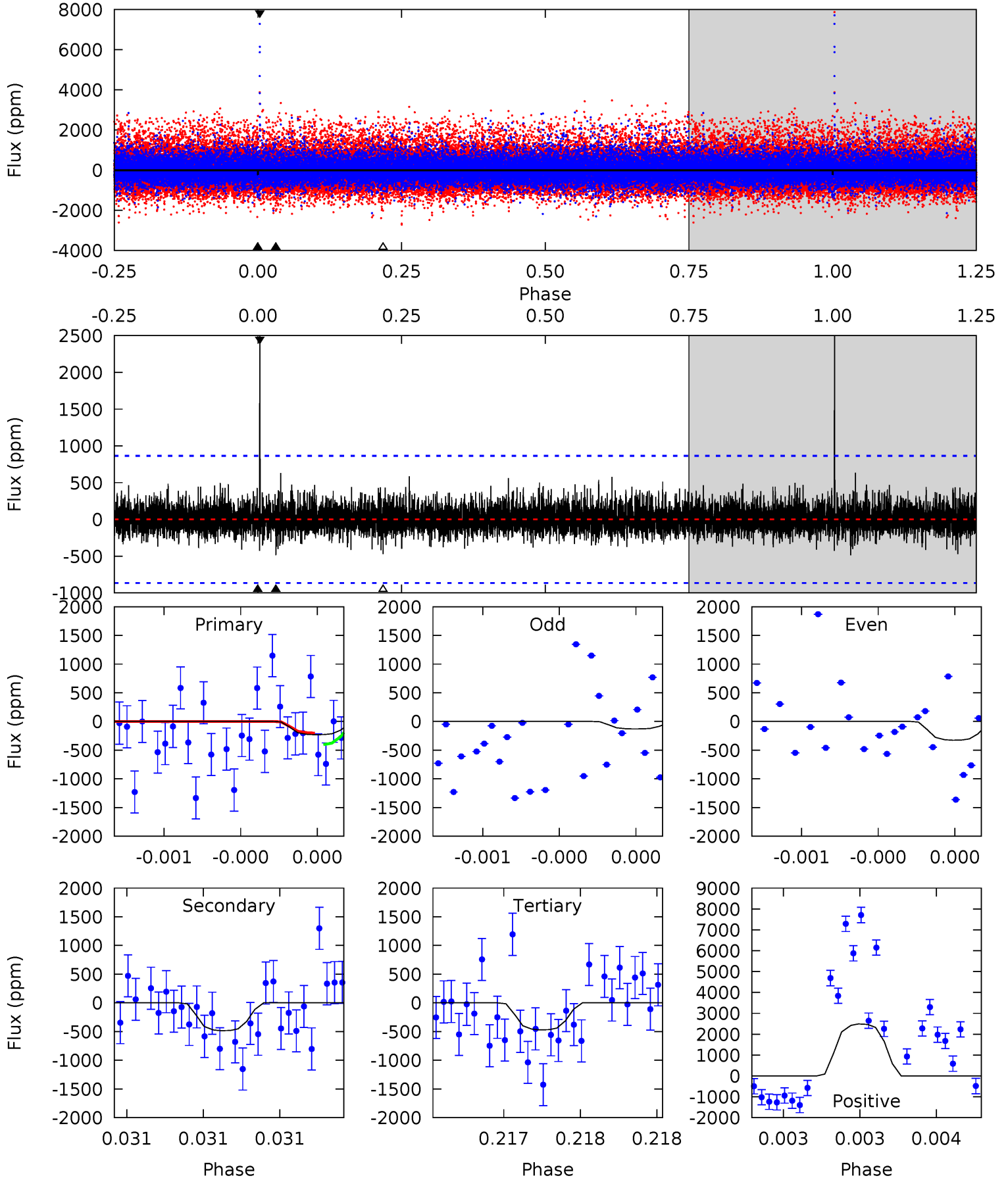
TCE 002713086-05     $P=256.318577$  Days     $T_0=200.034911$  (BKJD)



# DV Model-Shift Uniqueness Test

002713086-05, P = 256.316272 Days, E = 200.039801 Days

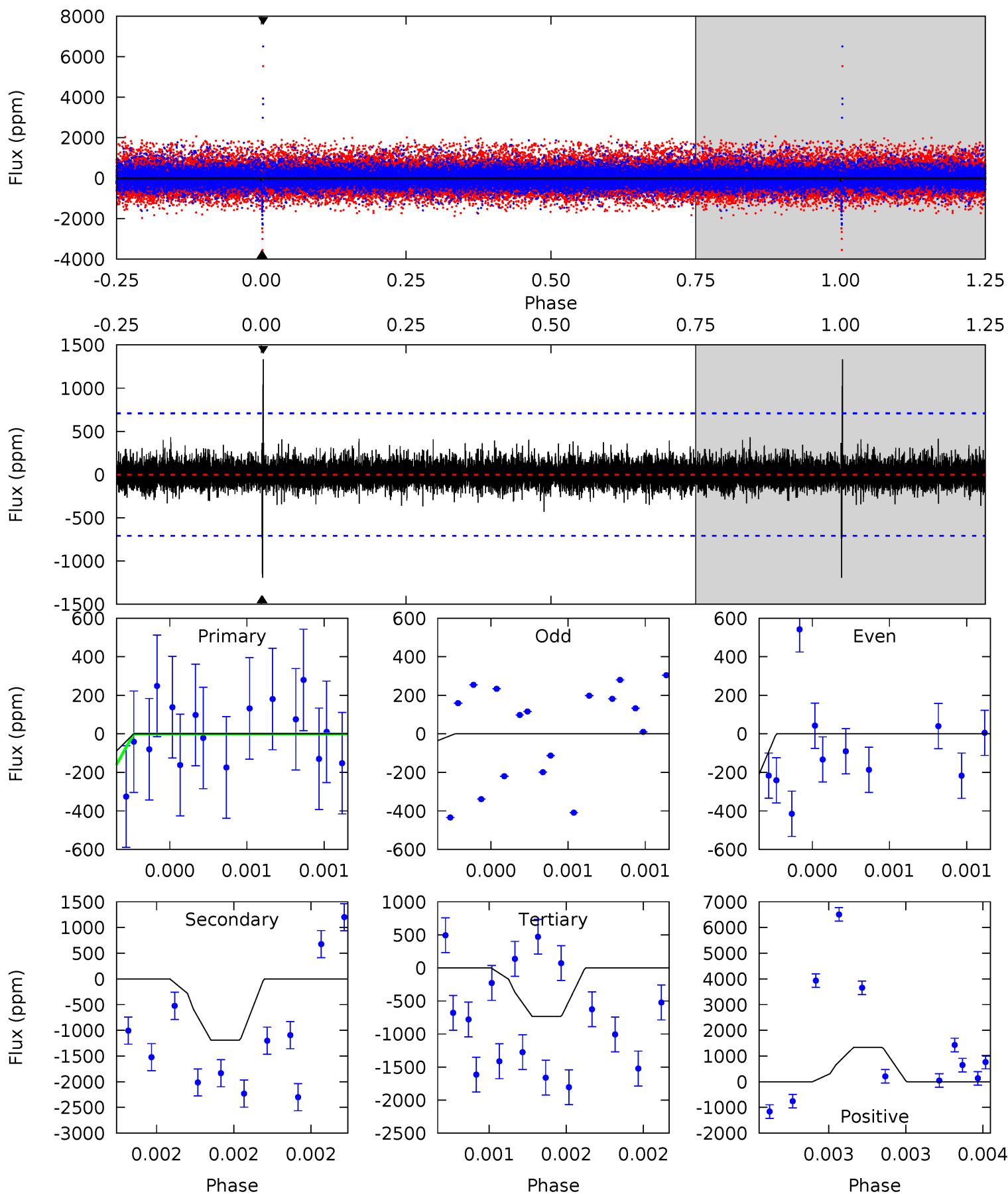
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.50	3.16	3.07	16.2	5.63	3.57	0.87	-1.56	-14.7	0.09	-13.1	0.50	0.69	0.84	0.64



# Alt Model-Shift Uniqueness Test

002713086-05, P = 256.318577 Days, E = 200.034911 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.99	9.58	5.91	10.7	5.69	3.65	0.75	-4.92	-9.74	3.67	-1.15	0.93	0.81	0.53	0.74



### Stellar Parameters For KIC 002713086

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3920^{+86}_{-86}$	$4.700^{+0.033}_{-0.018}$	$-0.100^{+0.100}_{-0.100}$	$0.550^{+0.024}_{-0.032}$	$0.554^{+0.030}_{-0.027}$	$4.675^{+0.689}_{-0.360}$
	+2%/-2%	+1%/-0%	+100%/-100%	+4%/-6%	+5%/-5%	+15%/-8%
Source	PHO2	PHO2	PHO2	DSEP		

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

### Secondary Eclipse Parameters for KIC 002713086-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-485 \pm 154$	$3.96^{+3.72}_{-2.65}$	$222^{+6}_{-5}$	$2797^{+1166}_{-447}$	$6886^{+59803}_{-5114}$
Alt.	$-1192 \pm 124$	$3.61^{+3.55}_{-2.59}$	$222^{+5}_{-5}$	$3293^{+1830}_{-615}$	$21837^{+229764}_{-16503}$

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

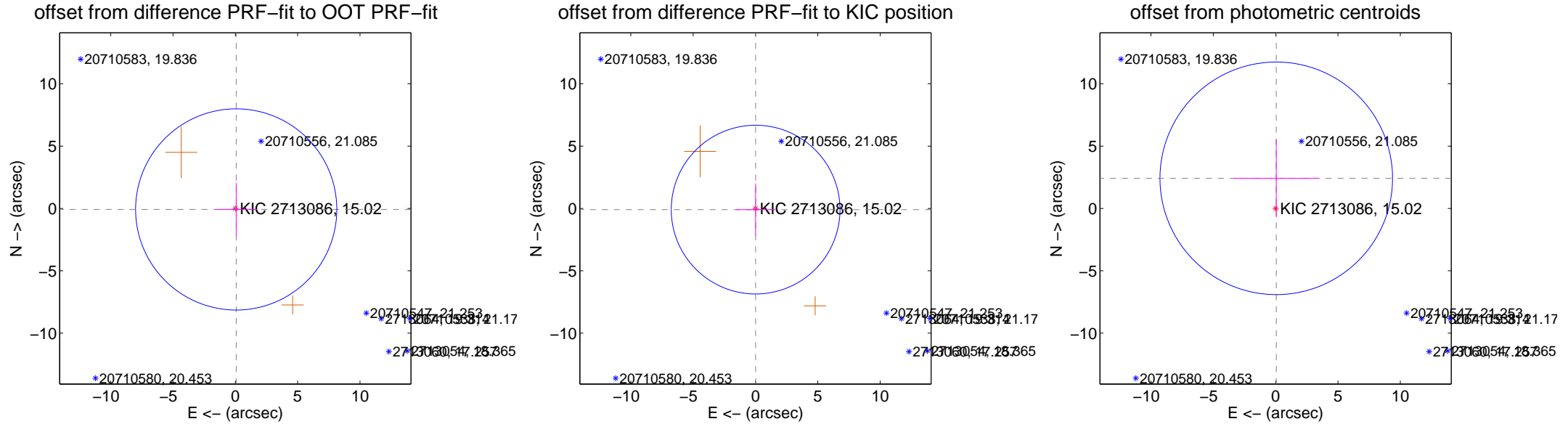
## DV Centroid Data

Supplemental centroid analysis for 002713086-05. Kepler magnitude: 15.02. Transit SNR 2.47

There are 1 quarters with good PRF difference image offsets

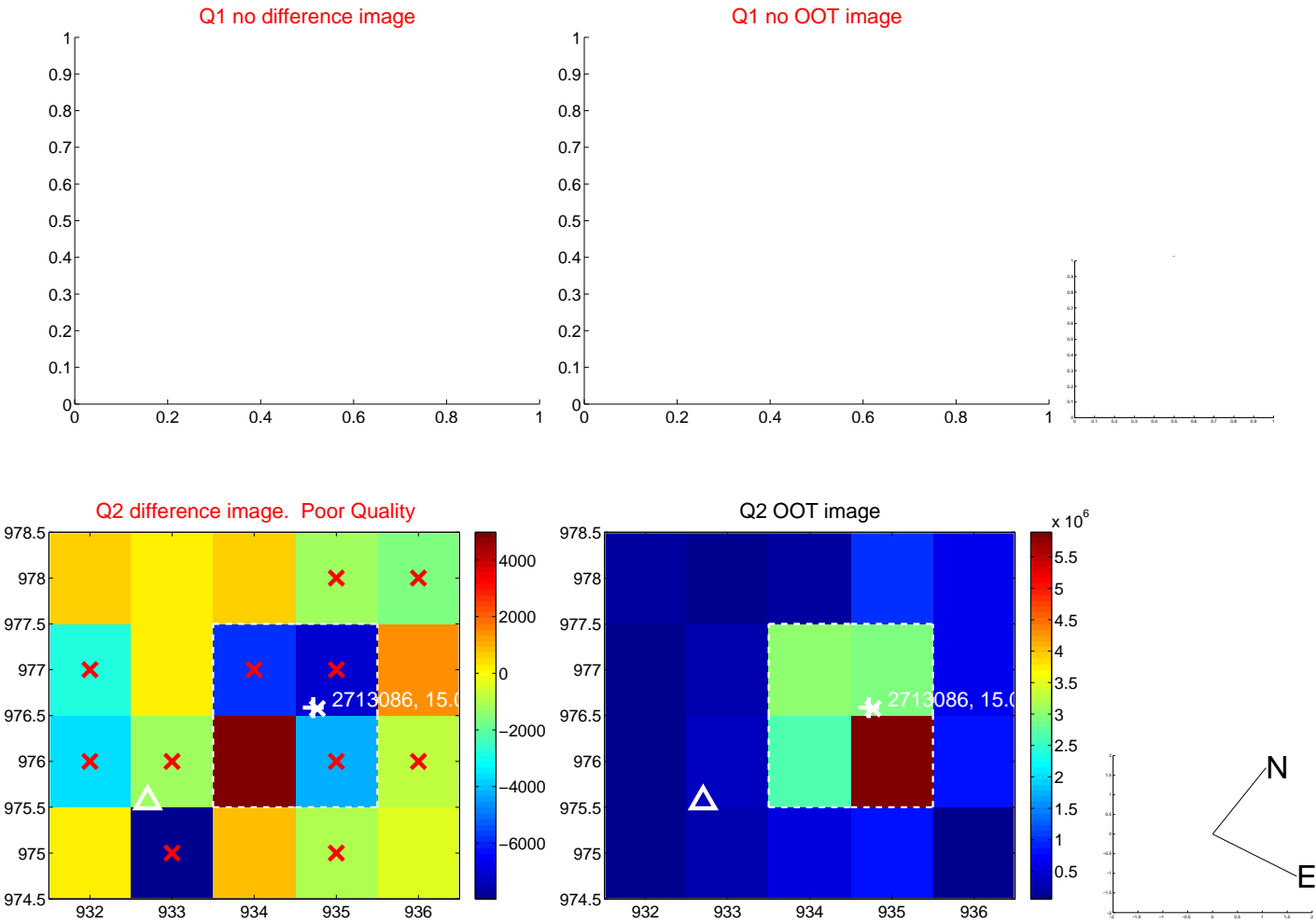
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.106 \pm 2.689$	0.04	$-0.070 \pm 1.673$	$-0.080 \pm 2.123$
PRF-fit source offset from KIC position	$0.094 \pm 2.255$	0.04	$-0.011 \pm 1.539$	$-0.094 \pm 2.097$
photometric centroid source offset	$2.42 \pm 3.11$	0.78	$-0.05 \pm 3.42$	$2.42 \pm 3.11$



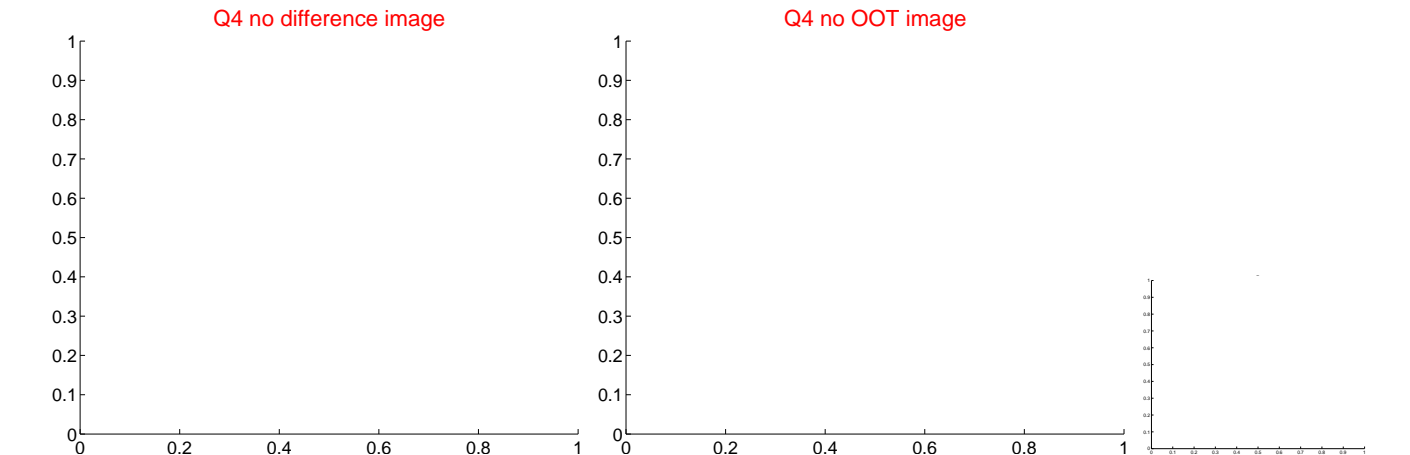
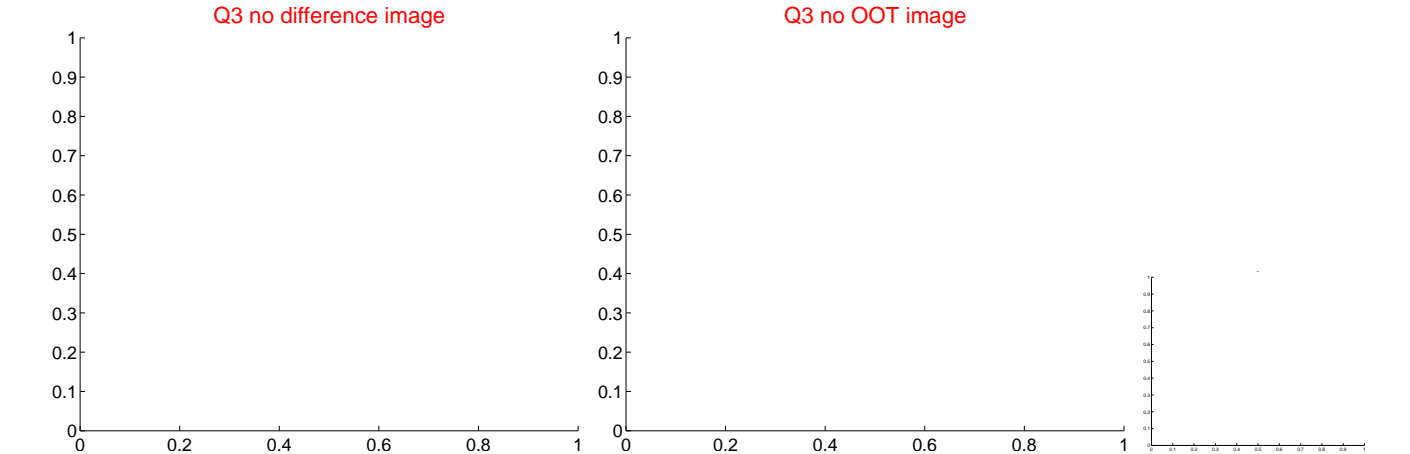
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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



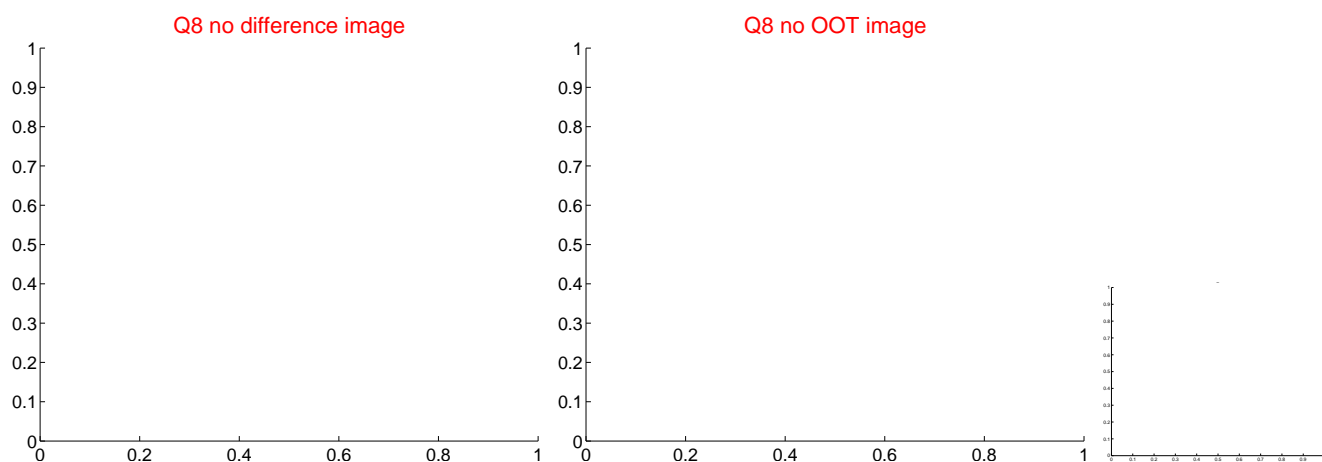
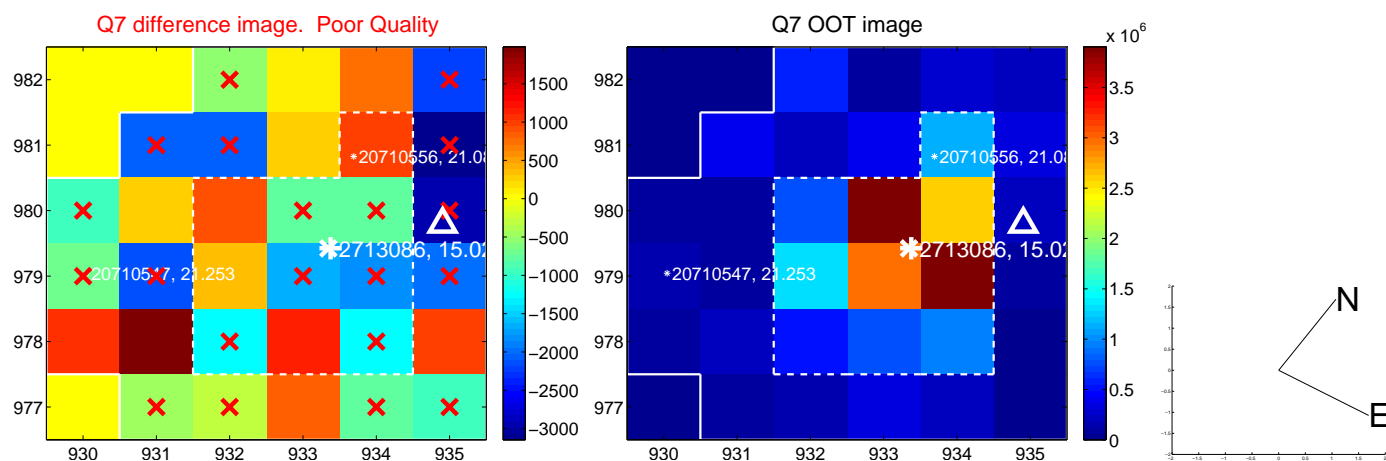
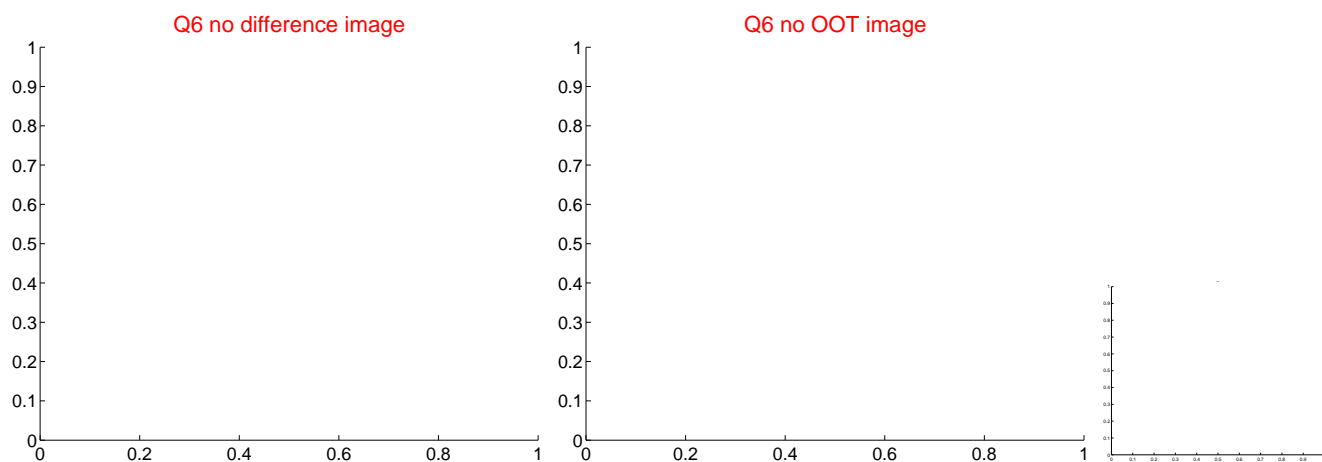
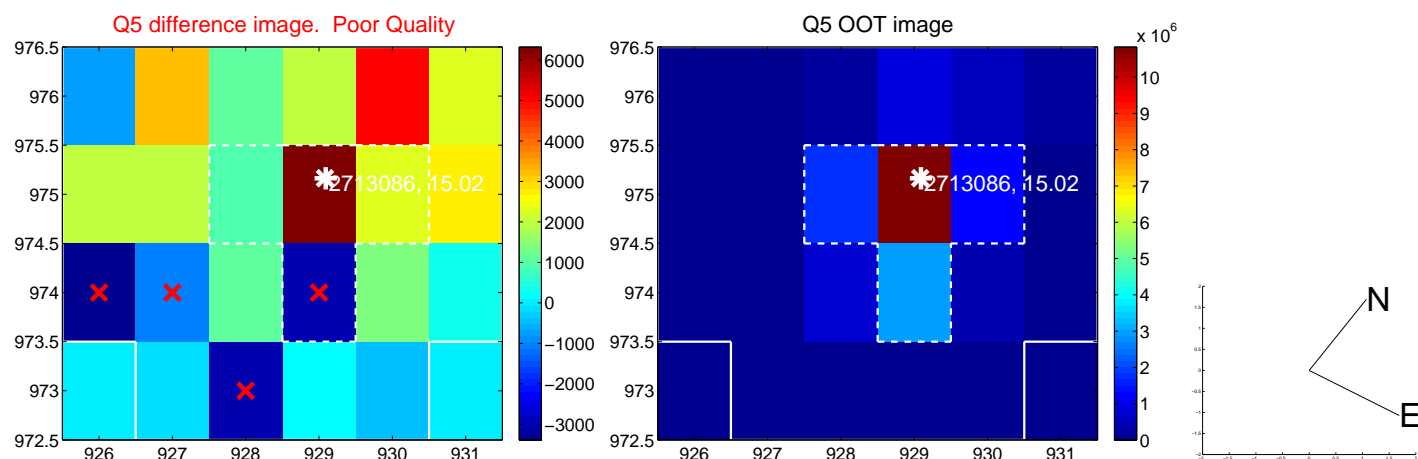
Q2 difference image. Poor Quality

Q2 OOT image

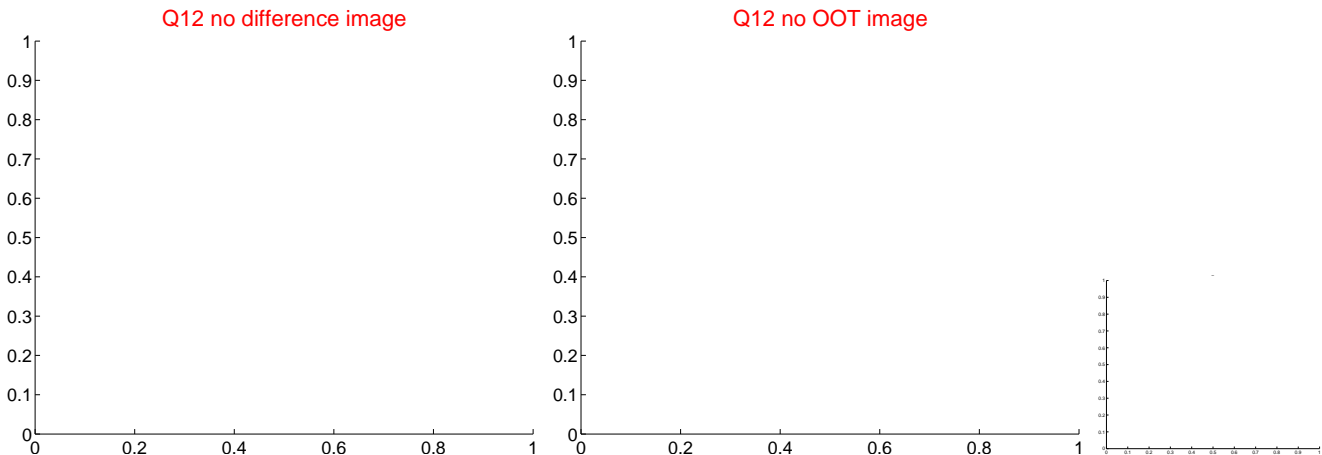
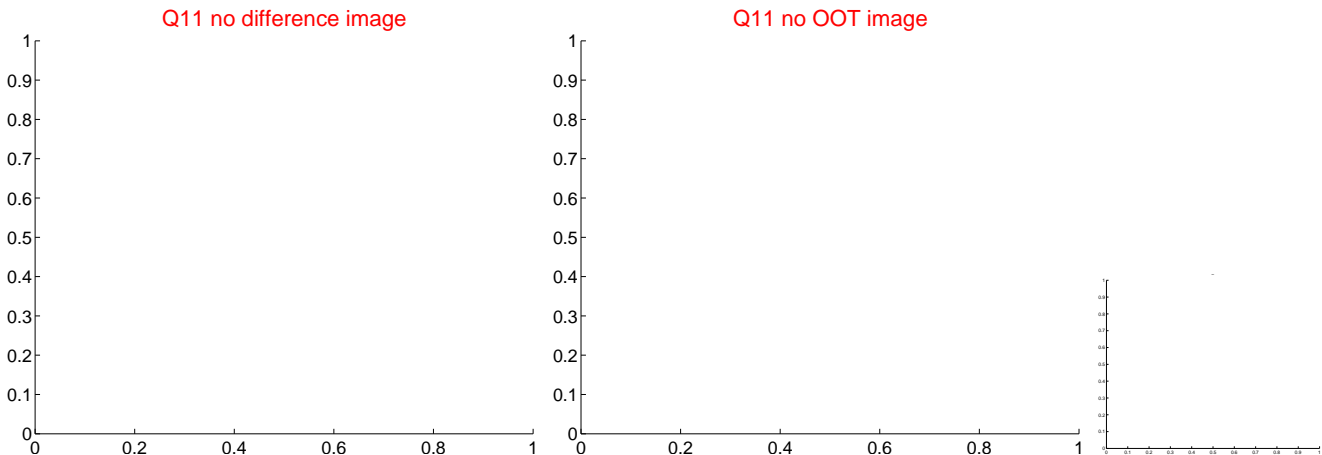
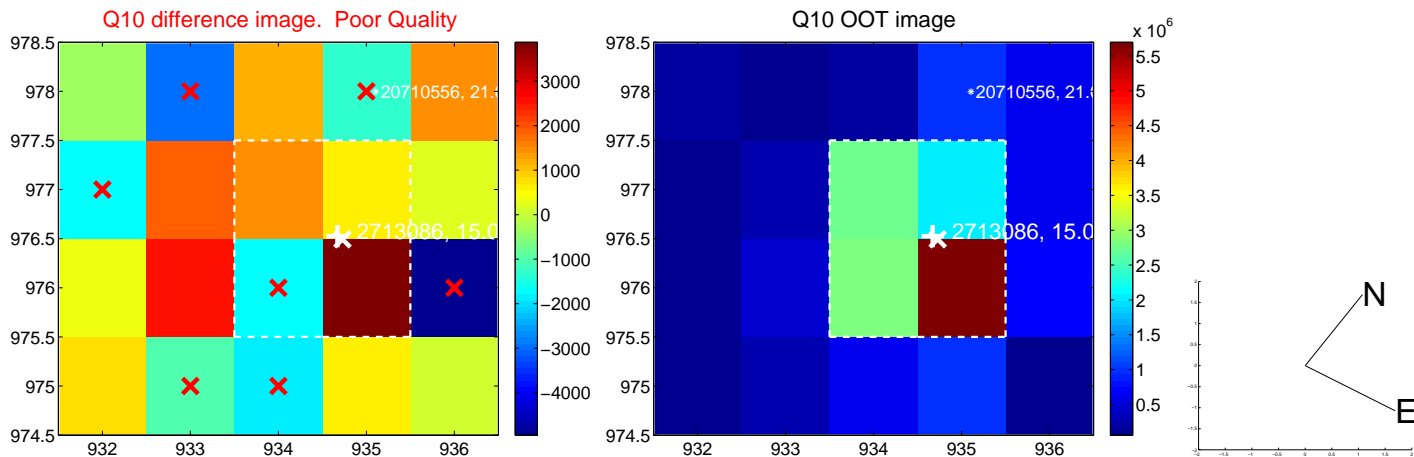
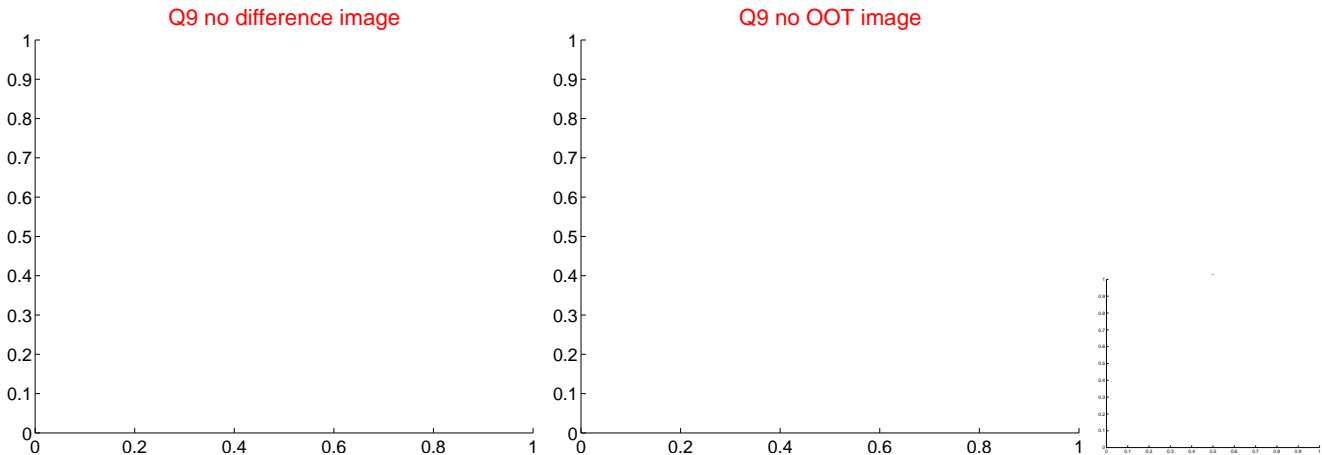




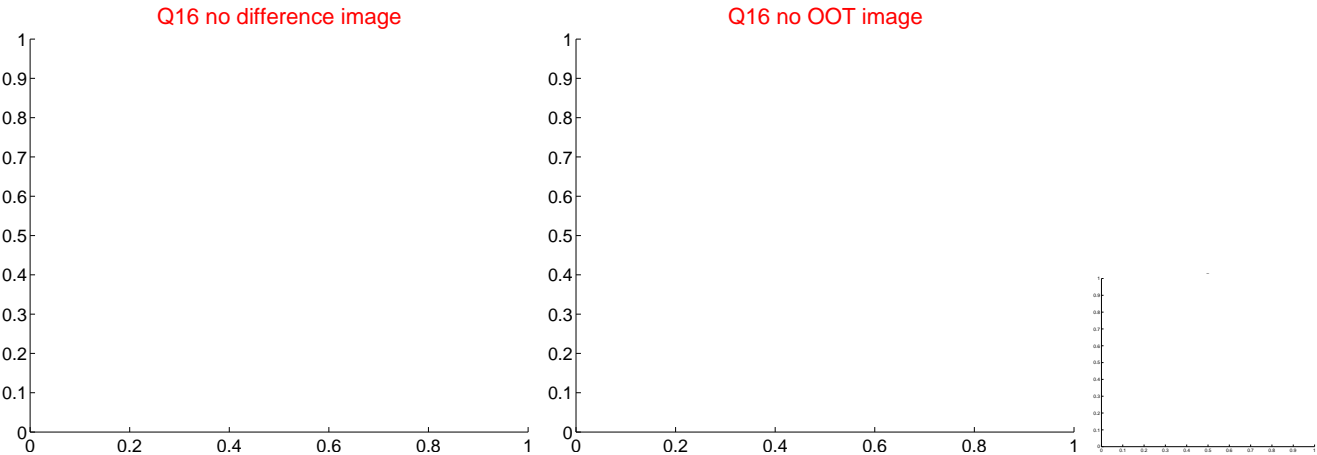
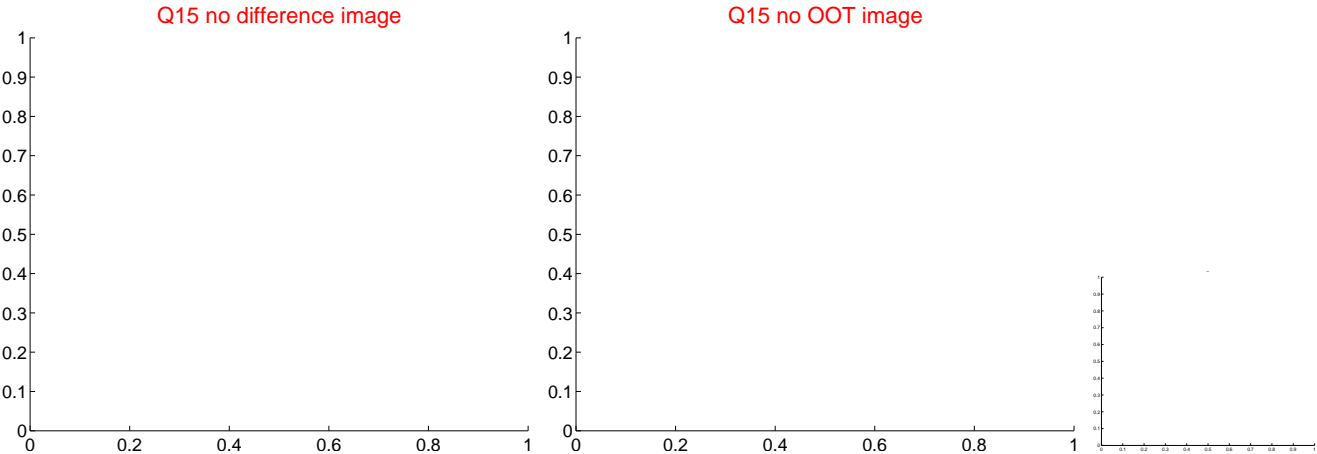
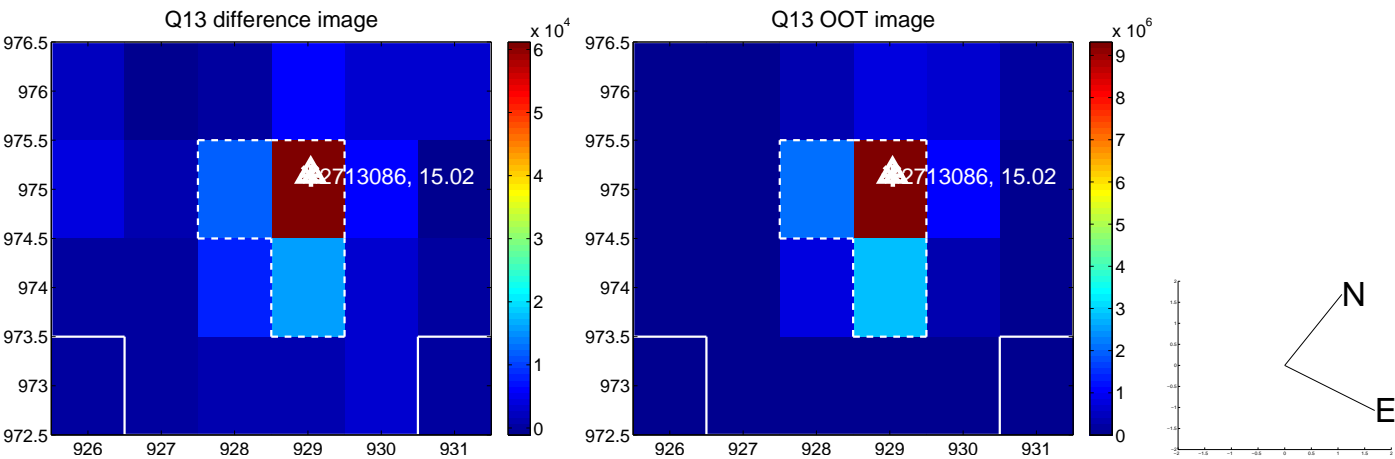
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



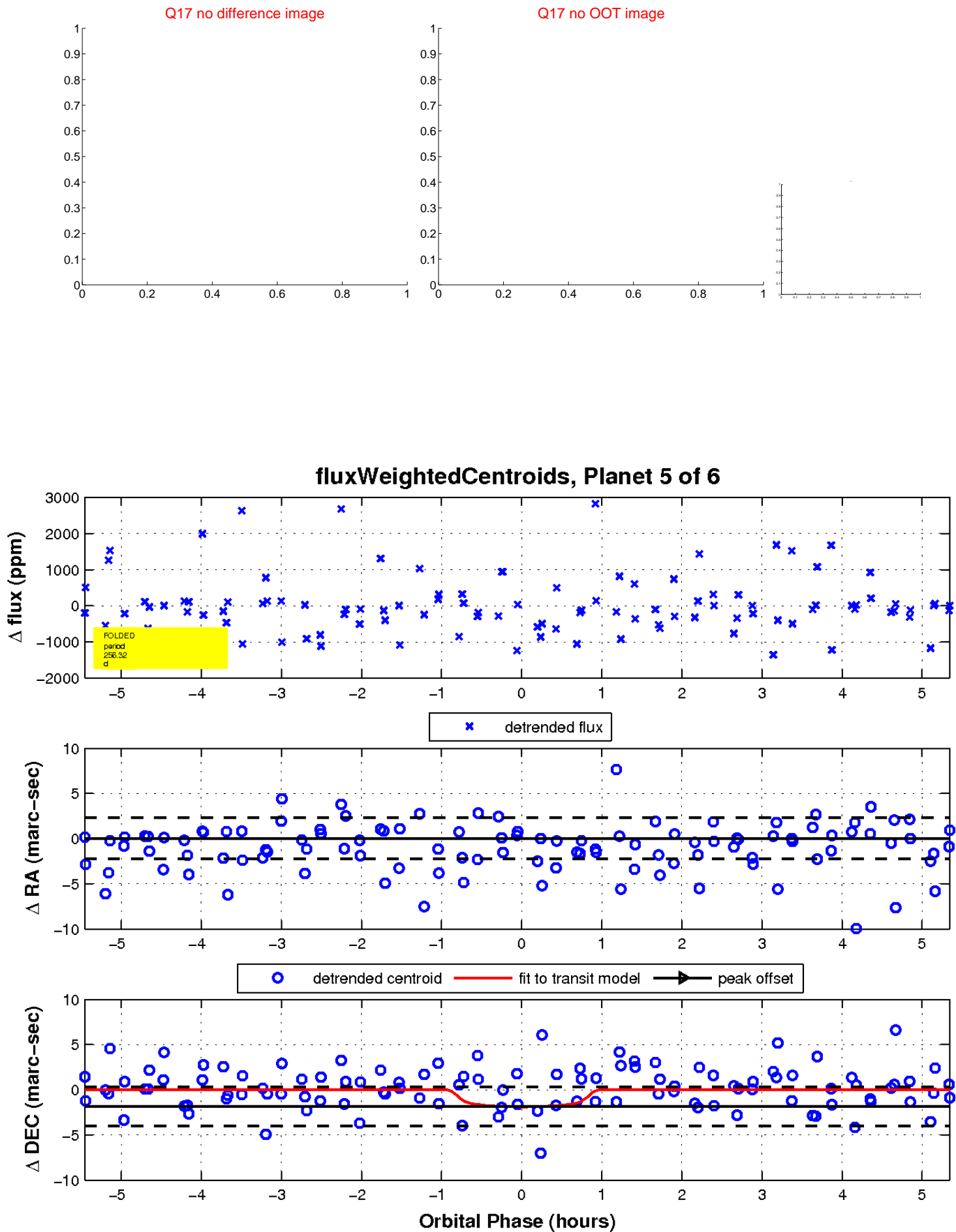
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



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

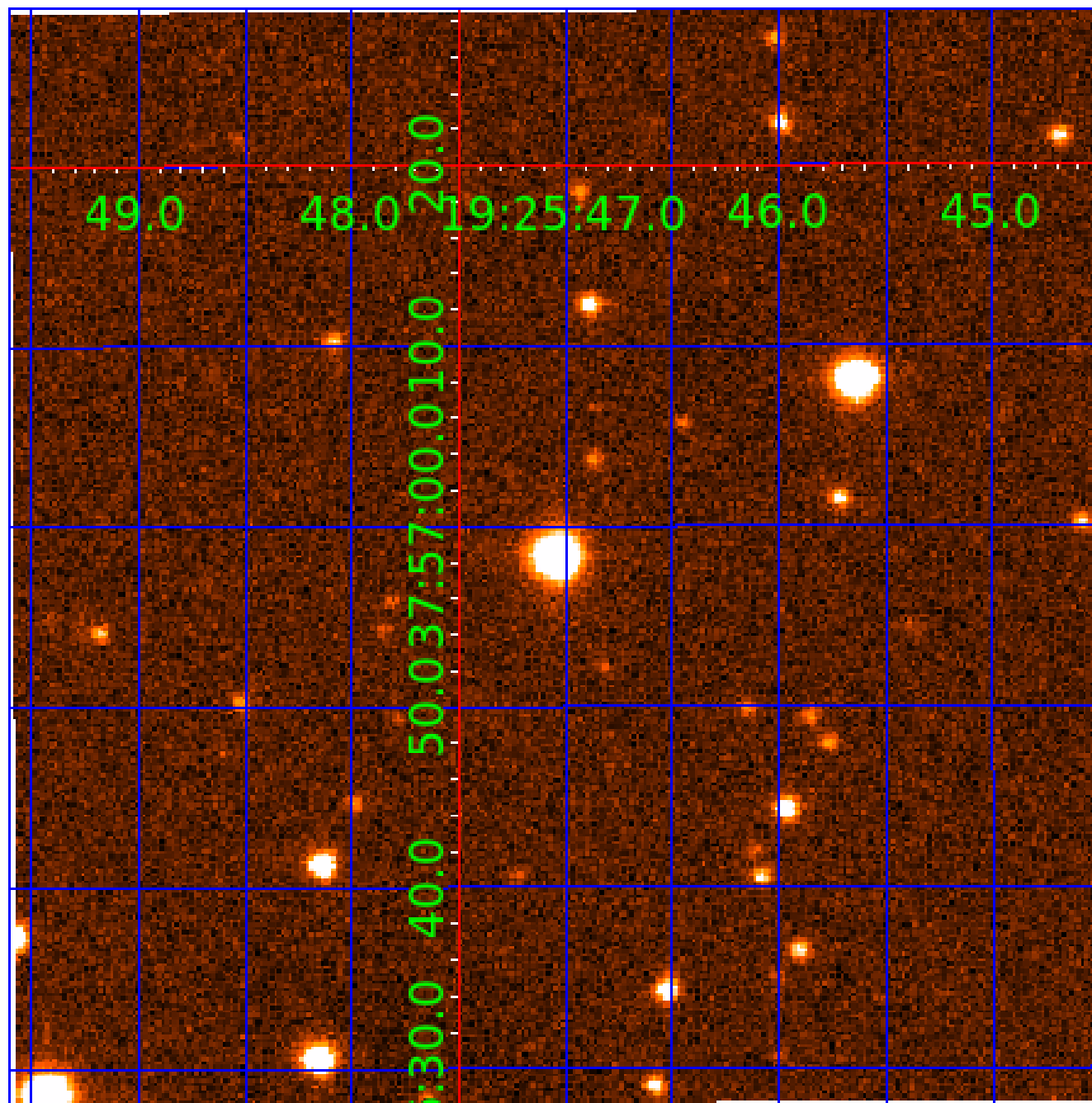


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 002713086

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002713086-01	OBS	No	295.877903	417.532159	3246.9	4.902	19.6	10.5	0.55	3920	3.22	0.13
002713086-02	OBS	No	560.806191	154.999723	2548.2	7.541	15.0	6.8	0.55	3920	5.33	0.05
002713086-03	OBS	No	380.584597	331.542108	4501.0	8.795	15.0	13.2	0.55	3920	3.63	0.09
002713086-04	OBS	No	552.496895	156.255602	1482.5	5.682	15.8	5.1	0.55	3920	2.21	0.06
002713086-05	OBS	No	256.316272	200.039801	627.1	1.830	16.1	2.5	0.55	3920	1.59	0.15
002713086-06	OBS	No	360.253914	447.536114	2683.2	5.484	14.3	8.9	0.55	3920	2.87	0.10

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002713086-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
002713086-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002713086-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002713086-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
002713086-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
002713086-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_MEAS

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

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

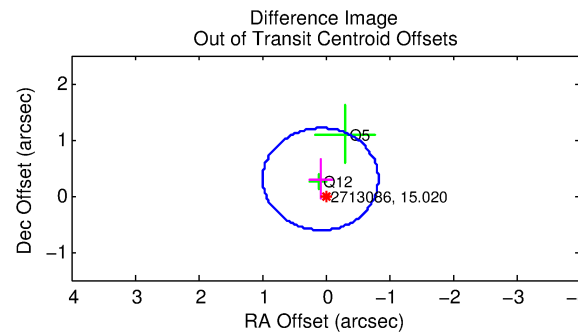
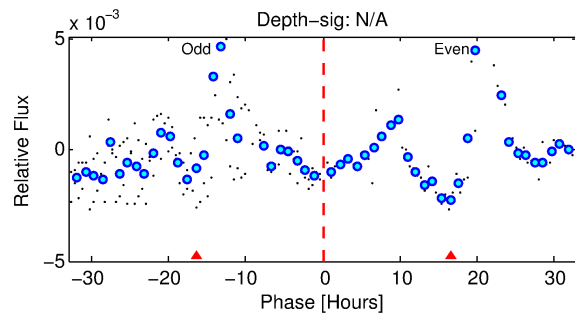
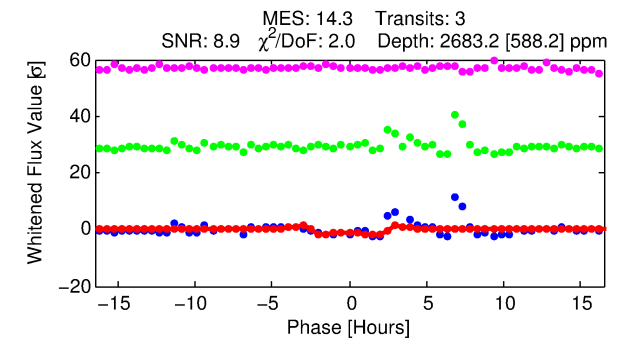
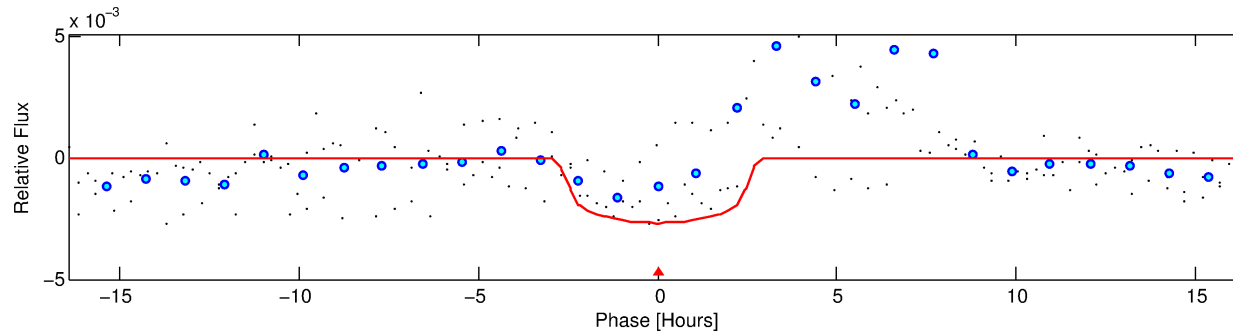
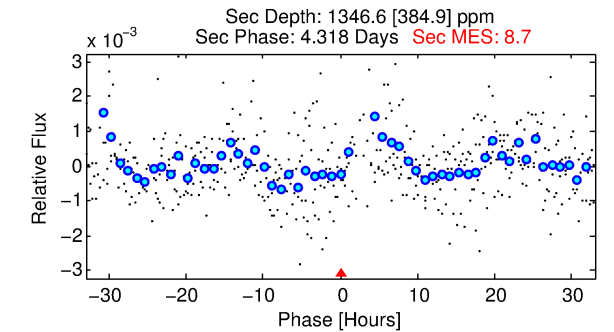
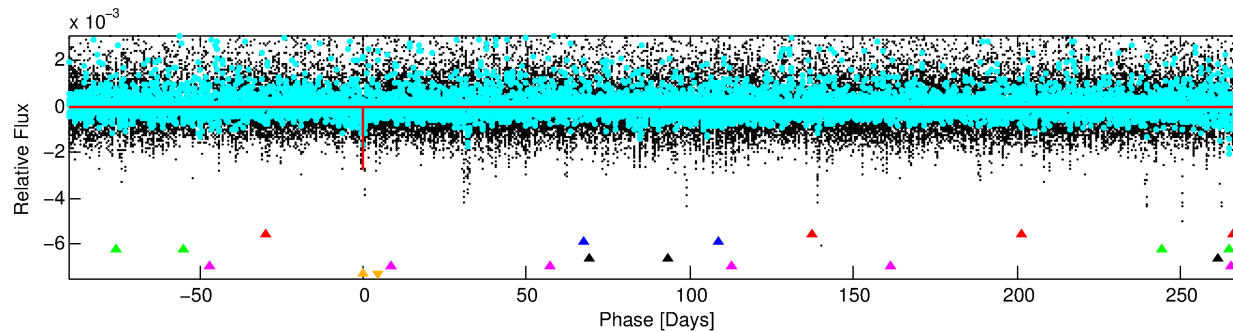
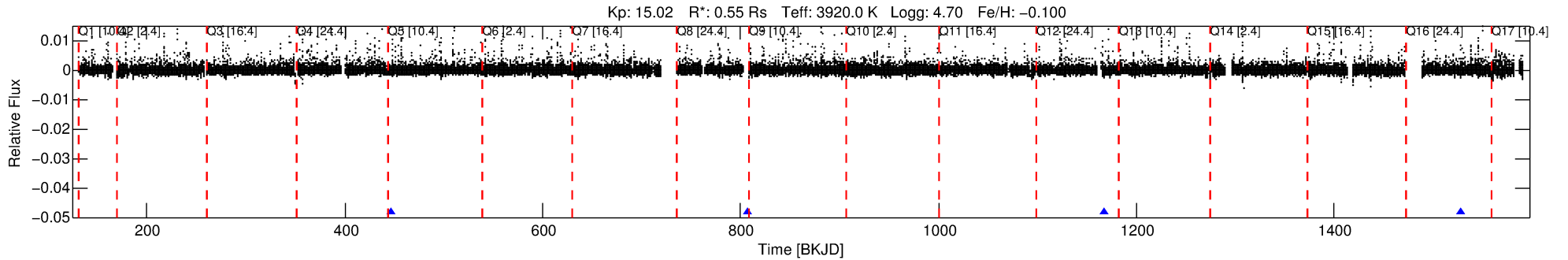
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 002713086-06

No Significant Match Found

# DV One-Page Summary

KIC: 2713086 Candidate: 6 of 6 Period: 360.254 d



## DV Fit Results:

Period = 360.25391 [0.00444] d  
Epoch = 447.5361 [0.0084] BKJD  
Rp/R\* = 0.0479 [0.0679]  
a/R\* = 478.67 [2729.22]  
b = 0.43 [10.73]  
Seff = 0.10 [0.01]  
Teq = 142 [4] K  
Rp = 2.87 [4.08] Re  
a = 0.8135 [0.0377] AU  
Ag = 59345.51 [169250.81] [0.35σ]  
Teffp = 3431 [2447] K [1.34σ]

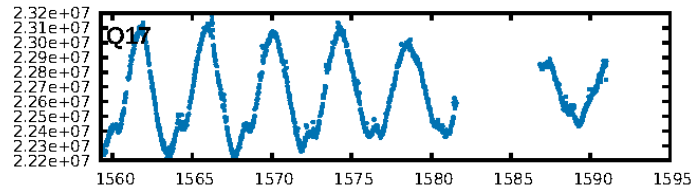
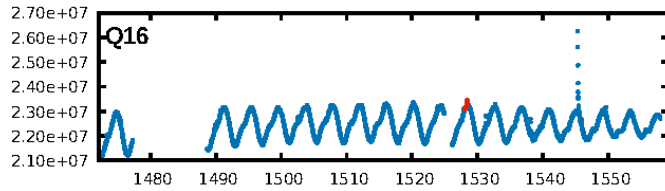
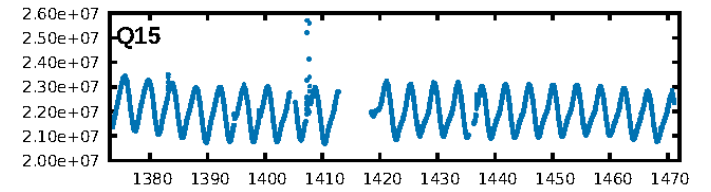
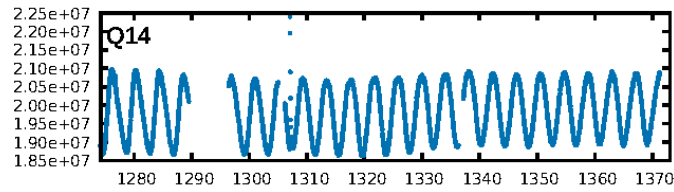
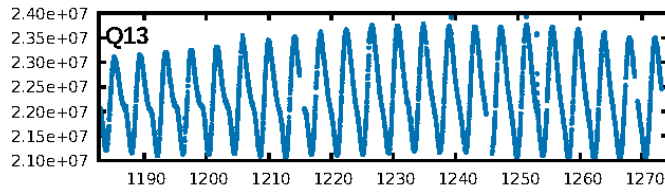
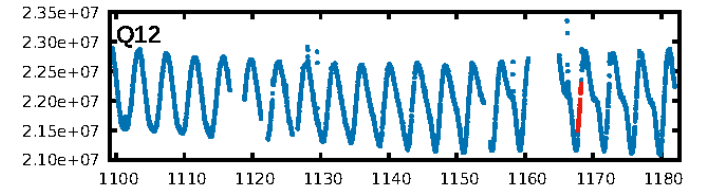
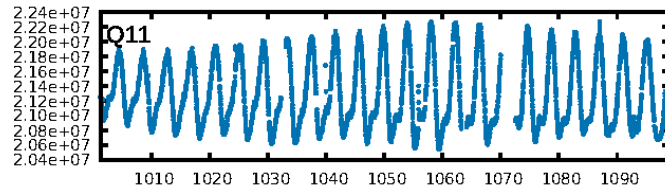
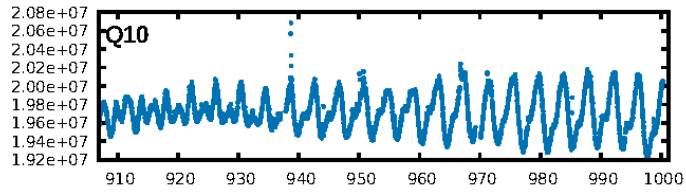
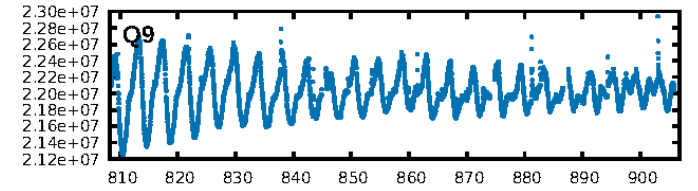
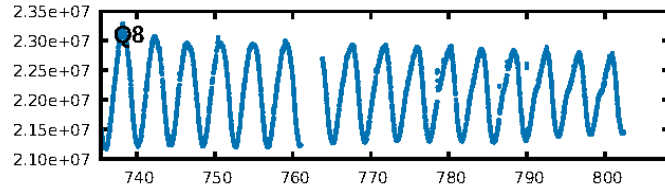
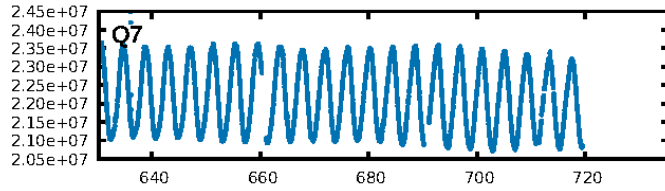
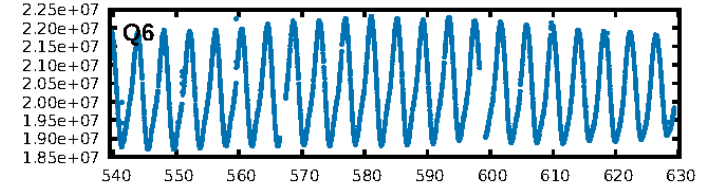
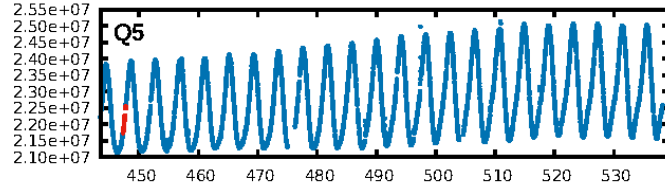
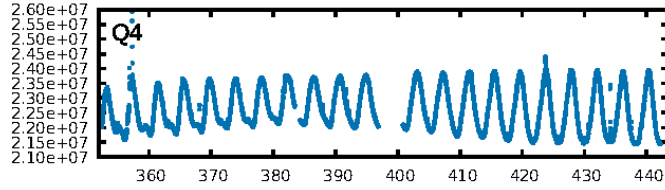
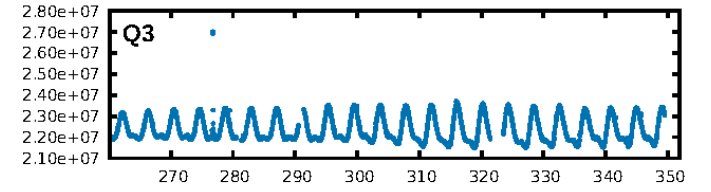
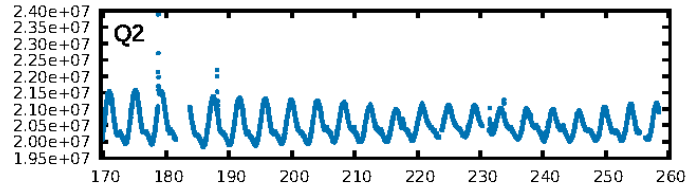
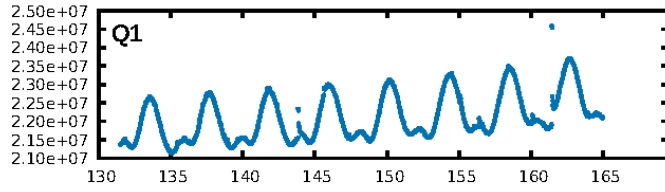
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [210.04σ]  
LongPeriod-sig: 100.0% [47.08σ]  
ModelChiSquare2-sig: 29.3%  
ModelChiSquareGof-sig: 85.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -4.949  
Centroid-sig: 53.9%  
Centroid-so: 0.644 arcsec [0.97σ]  
OotOffset-rm: 0.306 arcsec [1.01σ]  
KicOffset-rm: 0.437 arcsec [1.63σ]  
OotOffset-st: 0/0/1/1 [2]  
KicOffset-st: 0/0/1/1 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 1.00 [3/3]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:28:50 Z

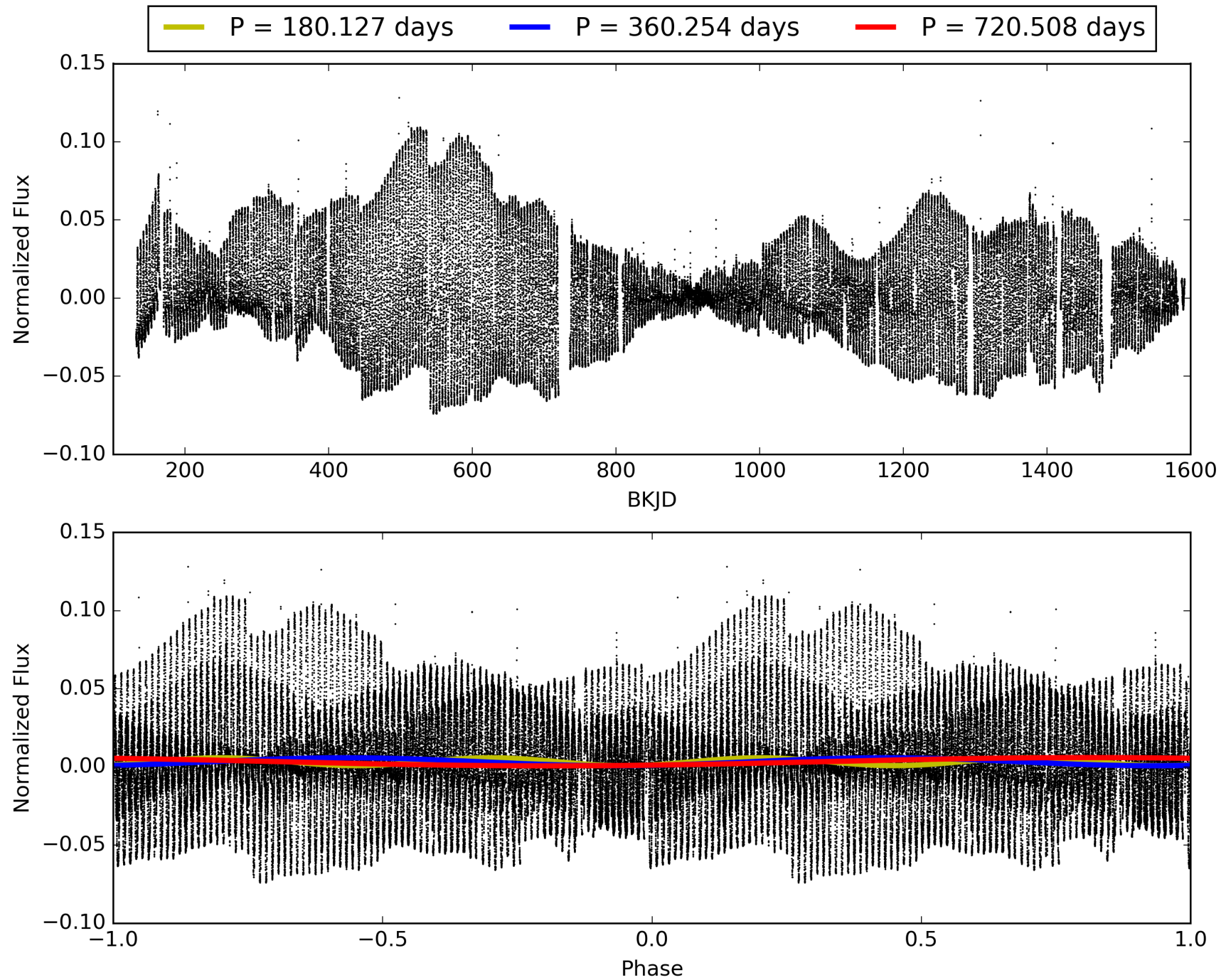
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 002713086-06, PDC Light Curves



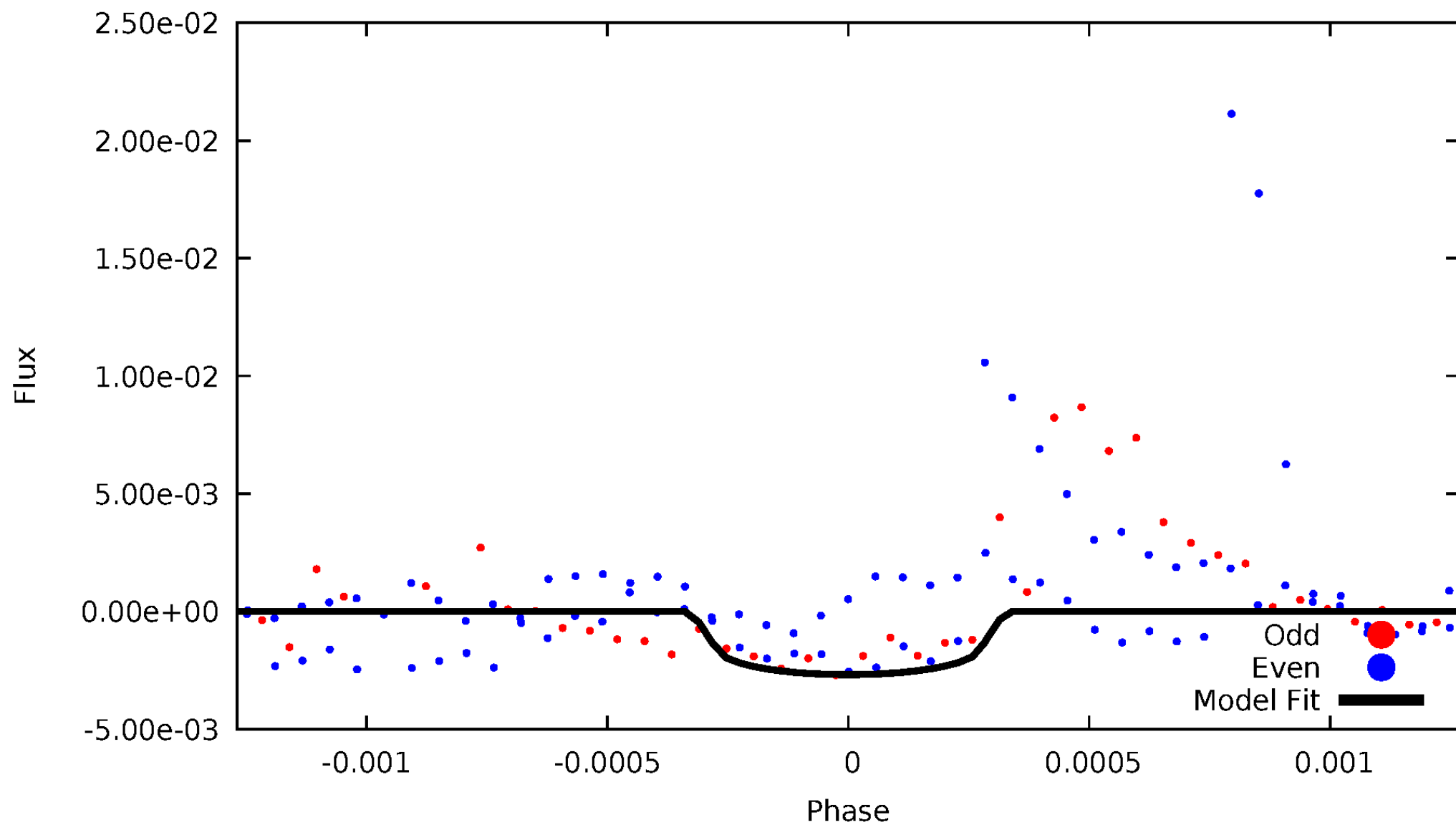


TCE 002713086-06



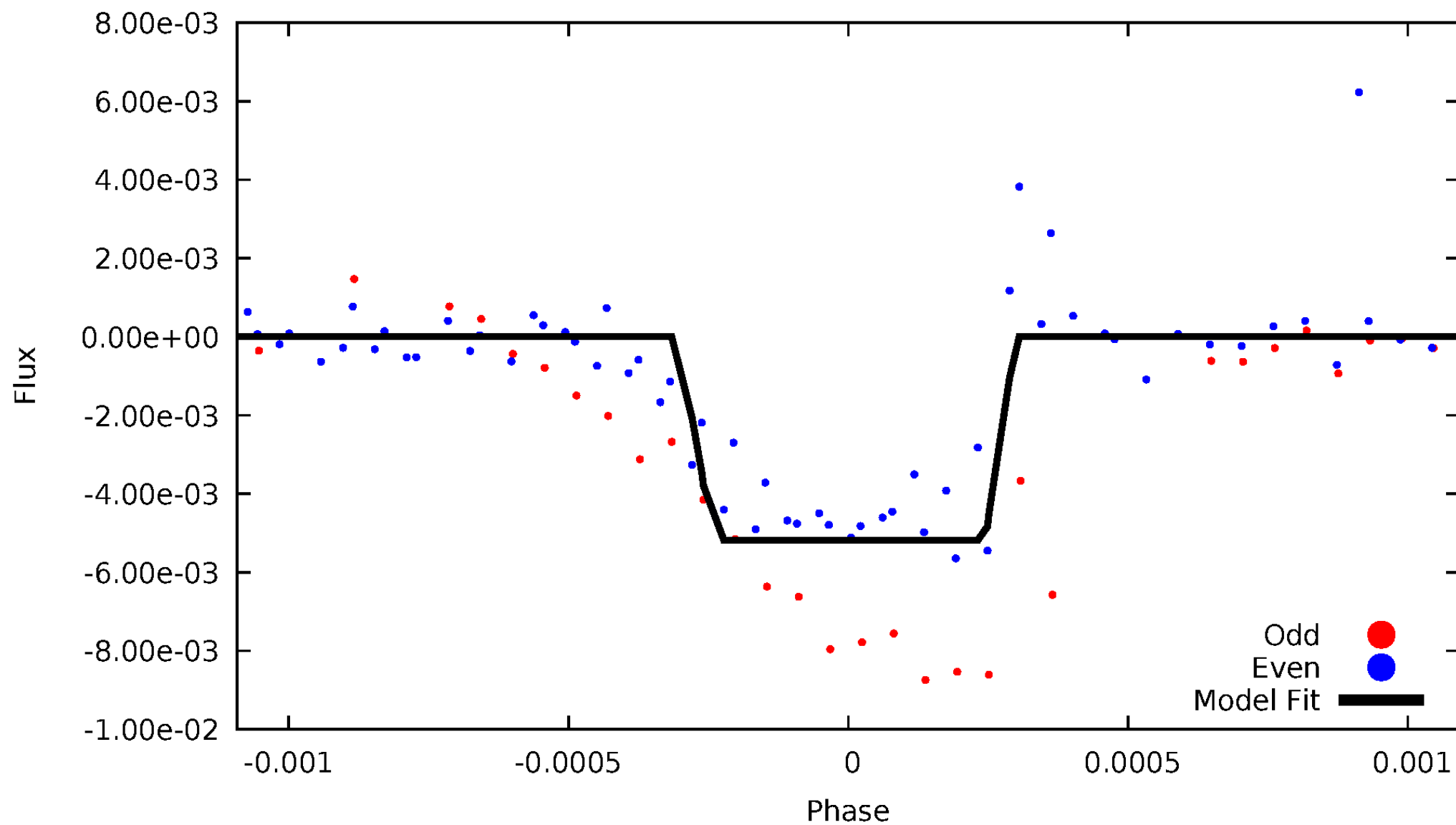
# DV Odd/Even

TCE 002713086-06



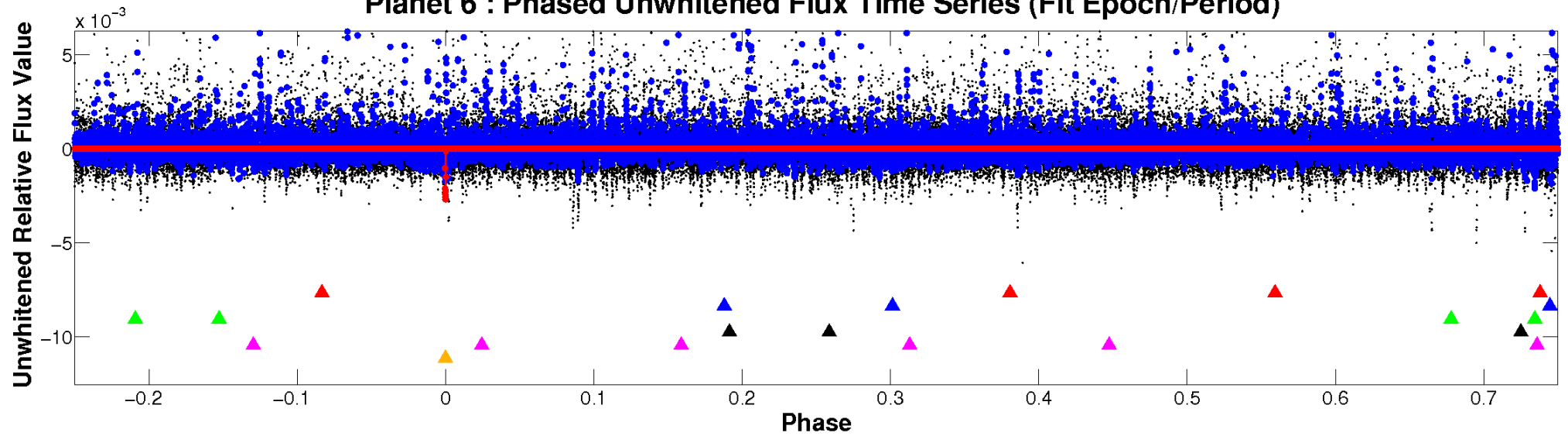
# ALT Odd/Even

TCE 002713086-06

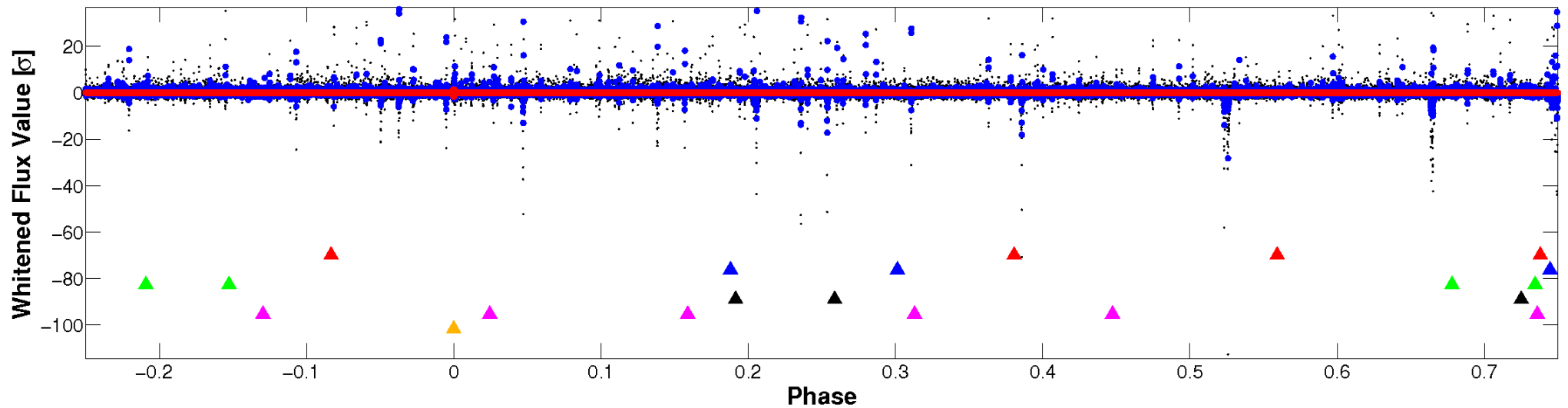


# Non-Whitened Vs. Whitened Light Curve

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

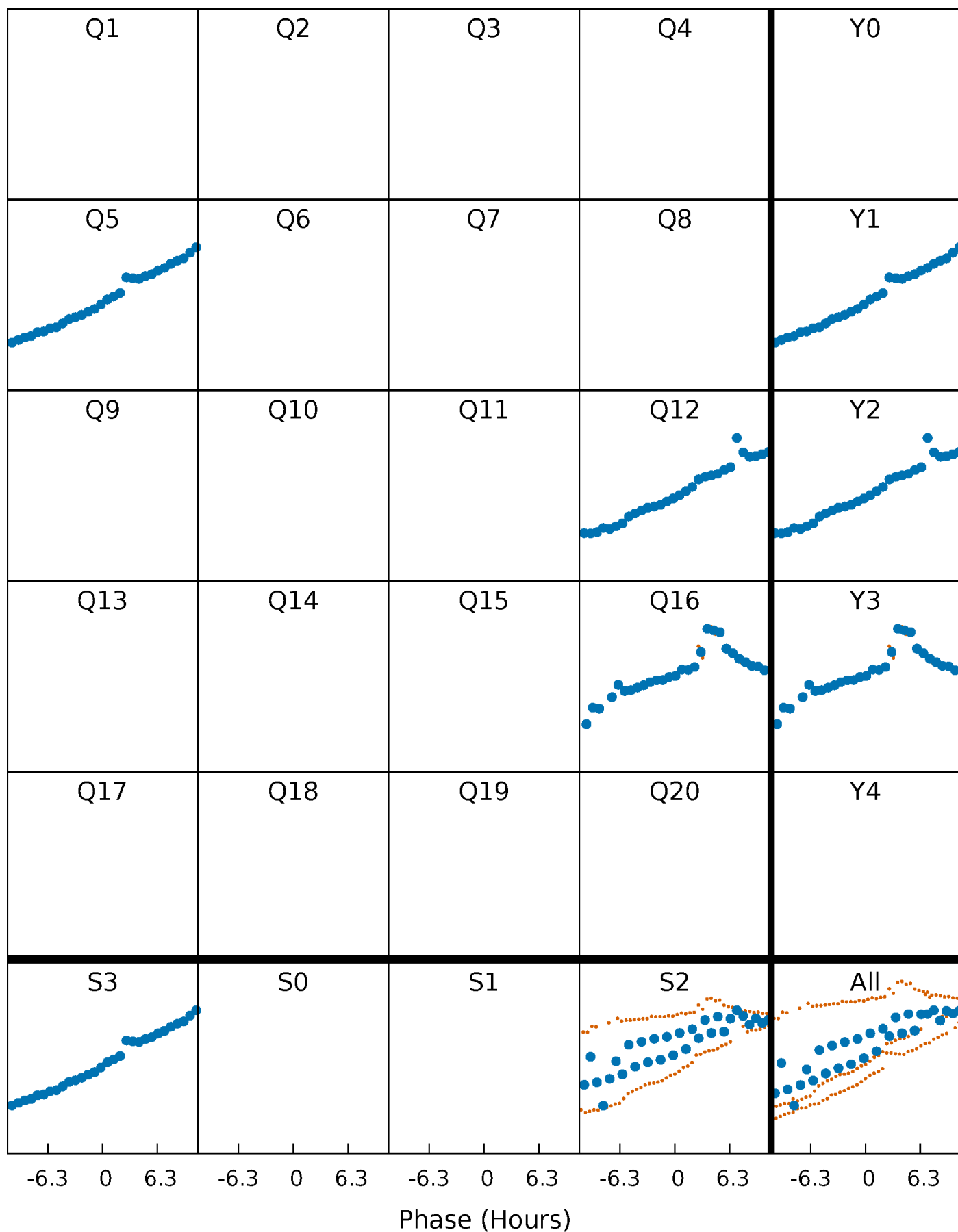


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



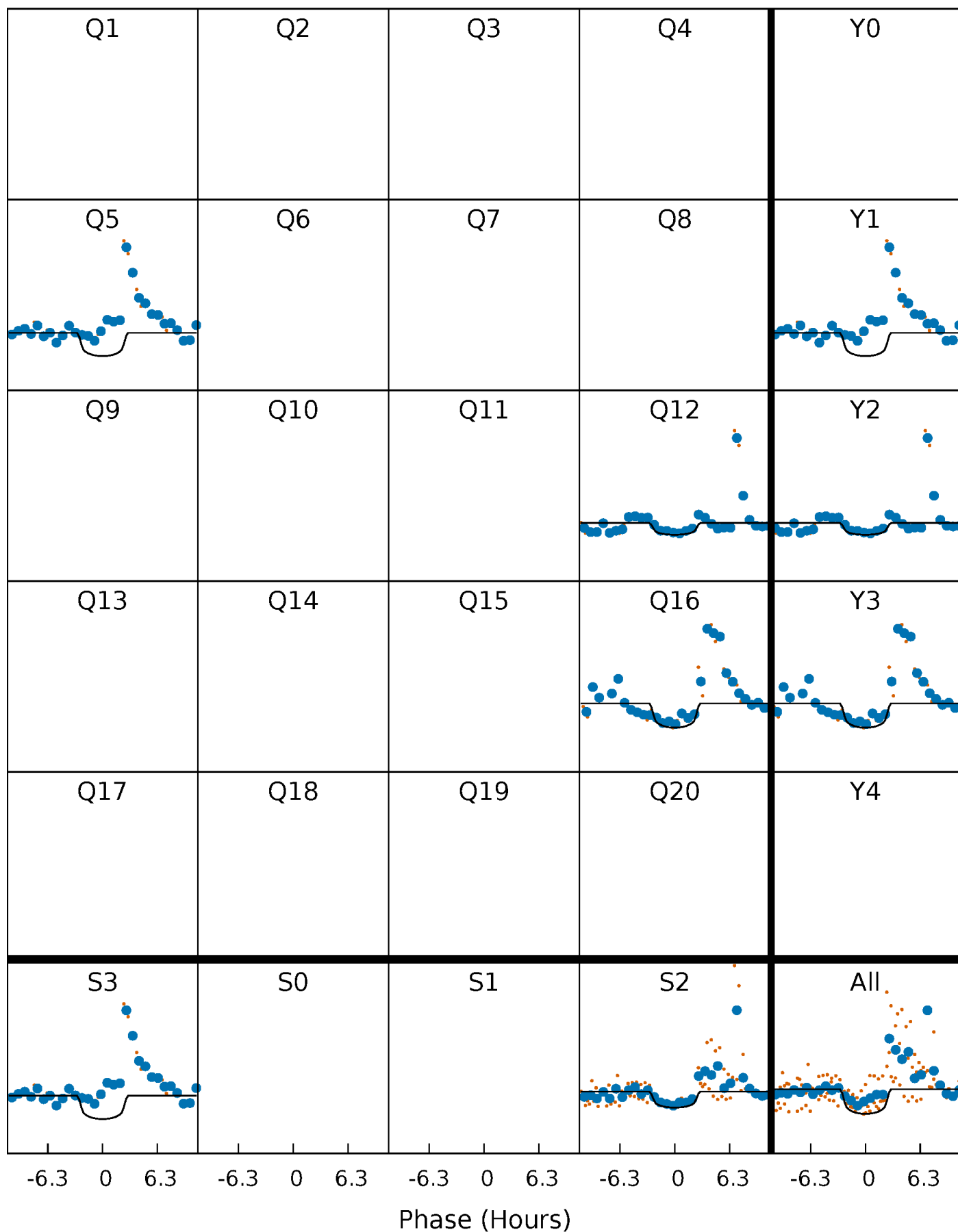
# PDC Quarter-Phased Transit Curves

TCE 002713086-06     $P=360.253914$  Days     $T_0=447.536114$  (BKJD)



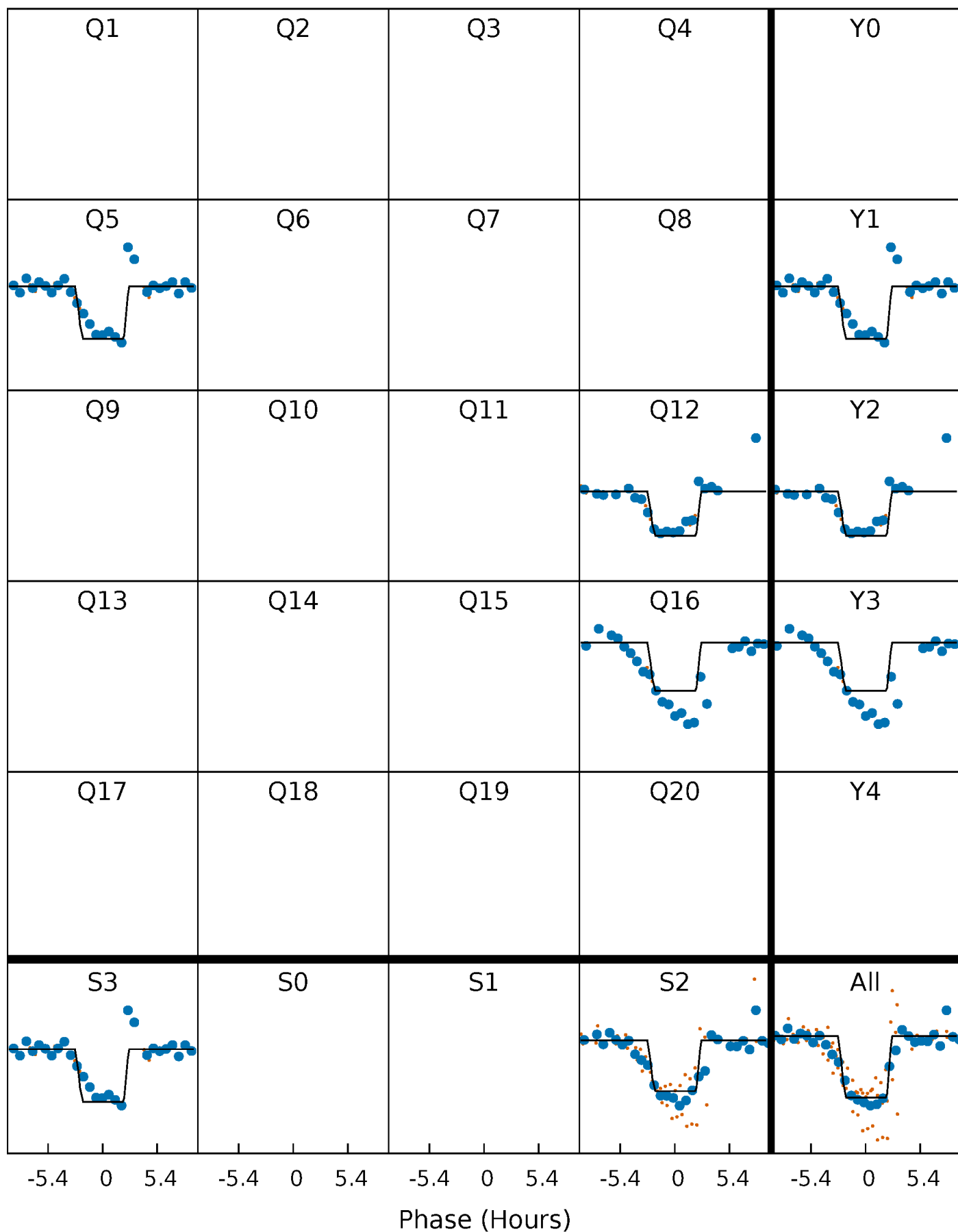
# DV Quarter-Phased Transit Curves

TCE 002713086-06     $P=360.253914$  Days     $T_0=447.536114$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

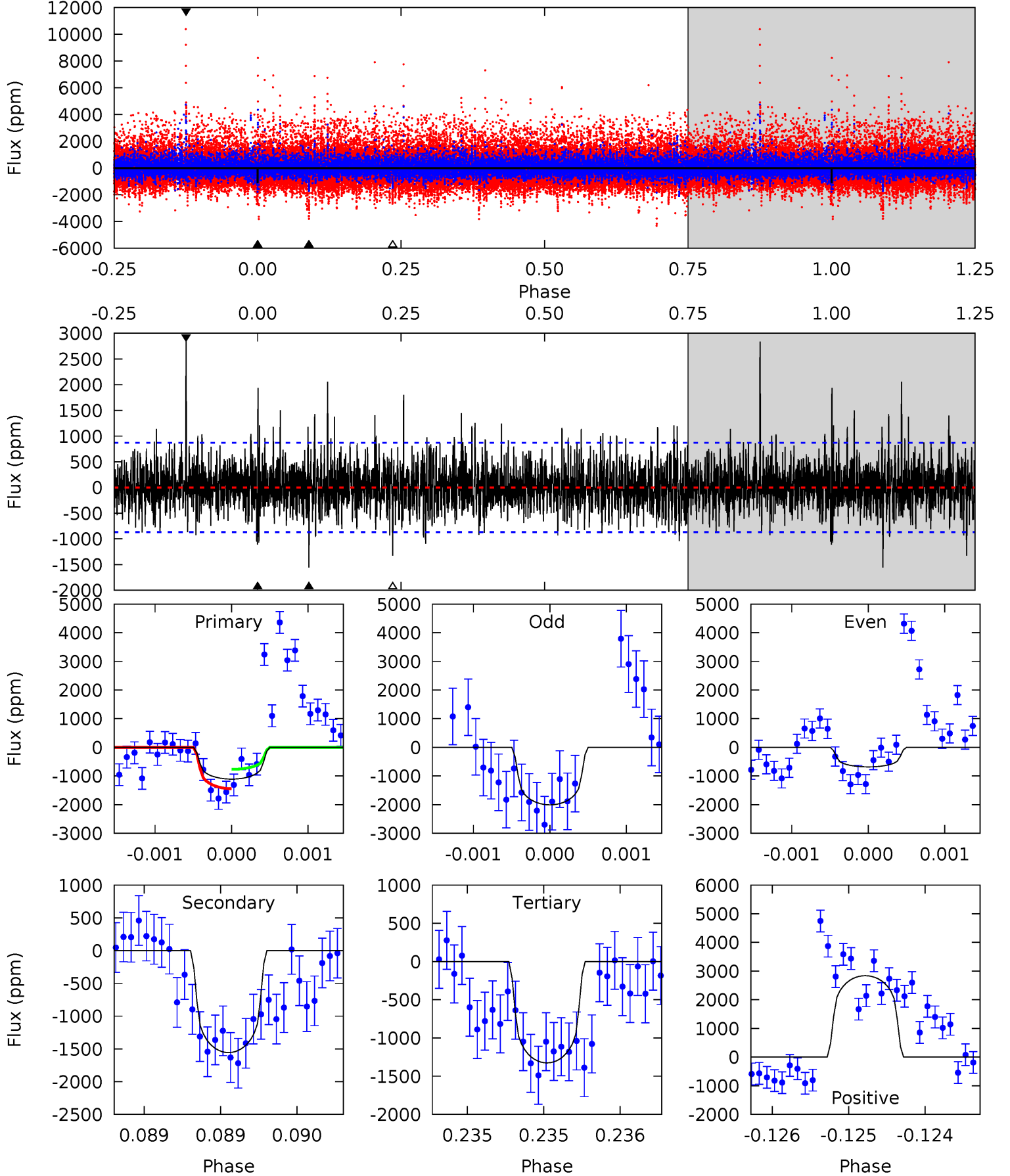
TCE 002713086-06     $P=360.257285$  Days     $T_0=447.528143$  (BKJD)



# DV Model-Shift Uniqueness Test

002713086-06, P = 360.253914 Days, E = 87.282200 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
7.04	9.88	8.41	18.0	5.52	3.40	2.25	-1.37	-11.0	1.46	-8.14	3.19	0.49	0.65	2.16

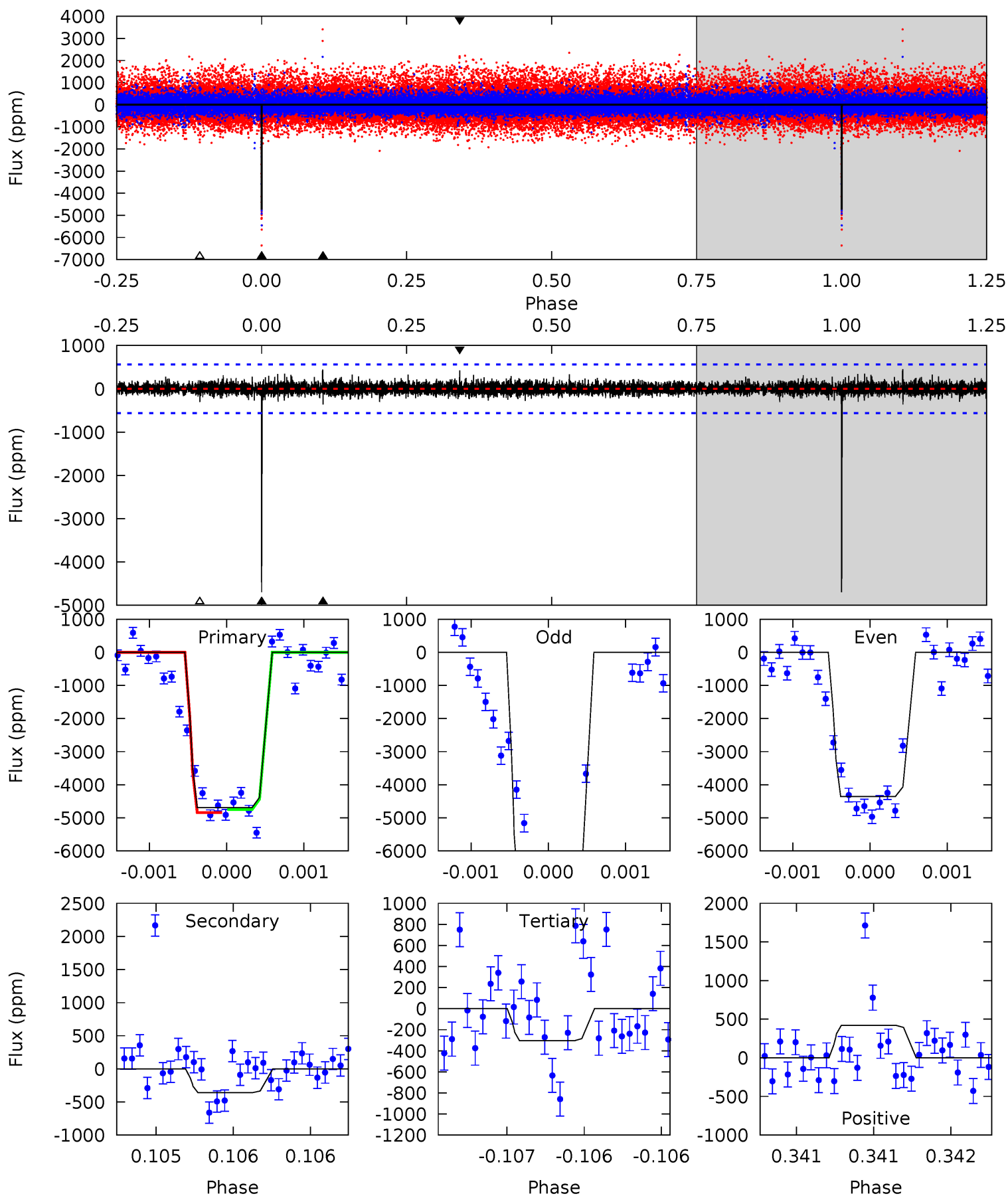




# Alt Model-Shift Uniqueness Test

002713086-06,  $P = 360.257285$  Days,  $E = 87.270858$  Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
46.2	3.53	3.00	4.14	5.55	3.44	0.73	43.2	42.1	0.53	-0.61	16.4	1.19	0.09	0



### Stellar Parameters For KIC 002713086

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3920^{+86}_{-86}$	$4.700^{+0.033}_{-0.018}$	$-0.100^{+0.100}_{-0.100}$	$0.550^{+0.024}_{-0.032}$	$0.554^{+0.030}_{-0.027}$	$4.675^{+0.689}_{-0.360}$
	+2%/-2%	+1%/-0%	+100%/-100%	+4%/-6%	+5%/-5%	+15%/-8%
Source	PHO2	PHO2	PHO2	DSEP		

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

### Secondary Eclipse Parameters for KIC 002713086-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-1556 \pm 158$	$4.27^{+3.39}_{-2.72}$	$198^{+5}_{-5}$	$3250^{+1332}_{-500}$	$32521^{+210765}_{-22860}$
Alt.	$-359 \pm 102$	$5.00^{+3.73}_{-3.07}$	$198^{+5}_{-5}$	$2541^{+768}_{-328}$	$5268^{+30788}_{-3668}$

$T_{max}$  = 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

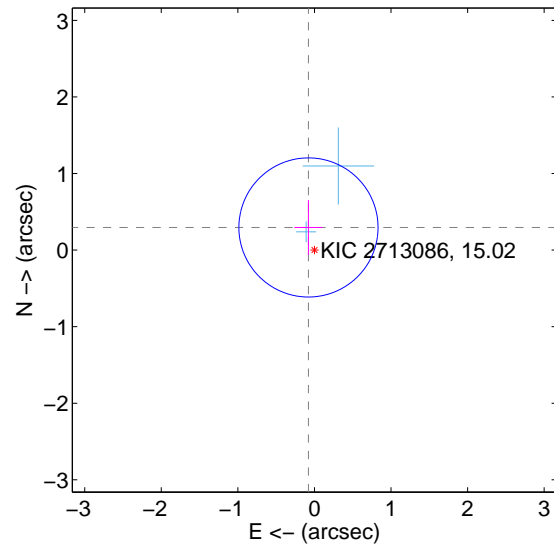
Supplemental centroid analysis for 002713086-06. Kepler magnitude: 15.02. Transit SNR 8.89

There are 2 quarters with good PRF difference image offsets

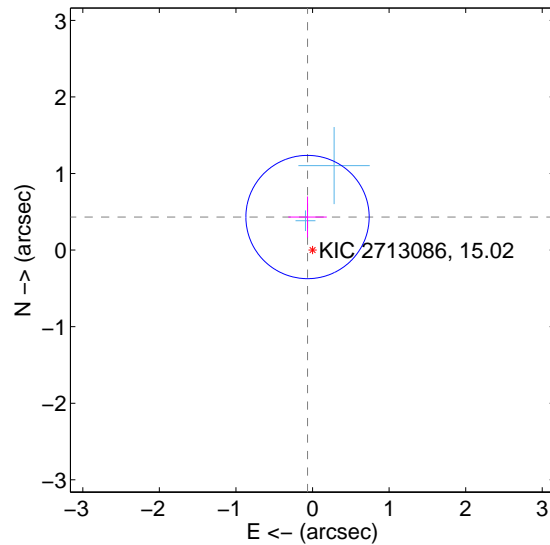
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.306 \pm 0.303$	1.01	$0.078 \pm 0.184$	$0.296 \pm 0.357$
PRF-fit source offset from KIC position	$0.437 \pm 0.268$	1.63	$0.065 \pm 0.251$	$0.432 \pm 0.269$
photometric centroid source offset	$0.64 \pm 0.66$	0.97	$0.47 \pm 0.72$	$-0.44 \pm 0.60$

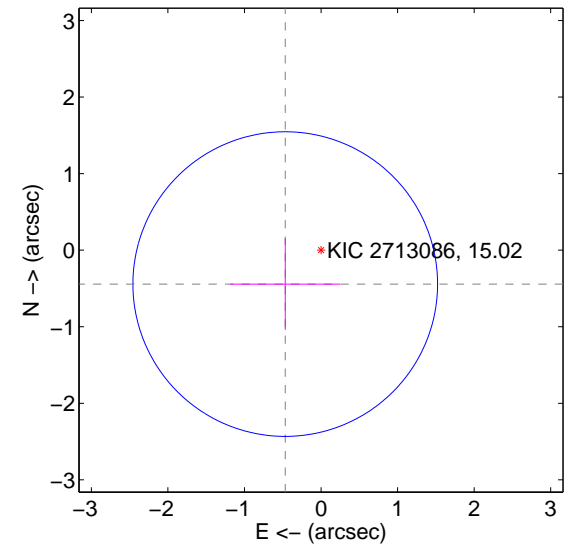
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

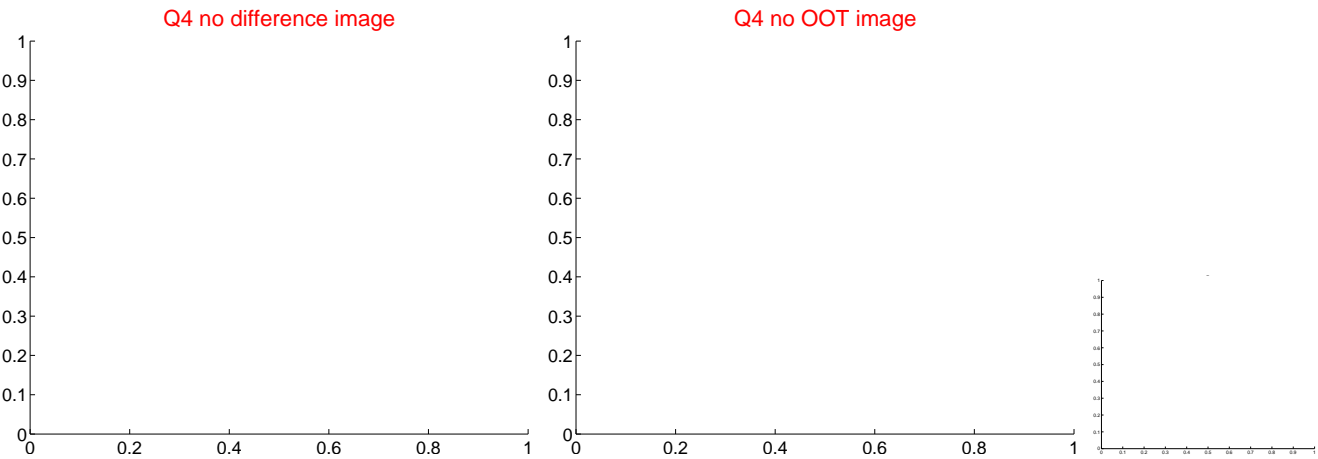
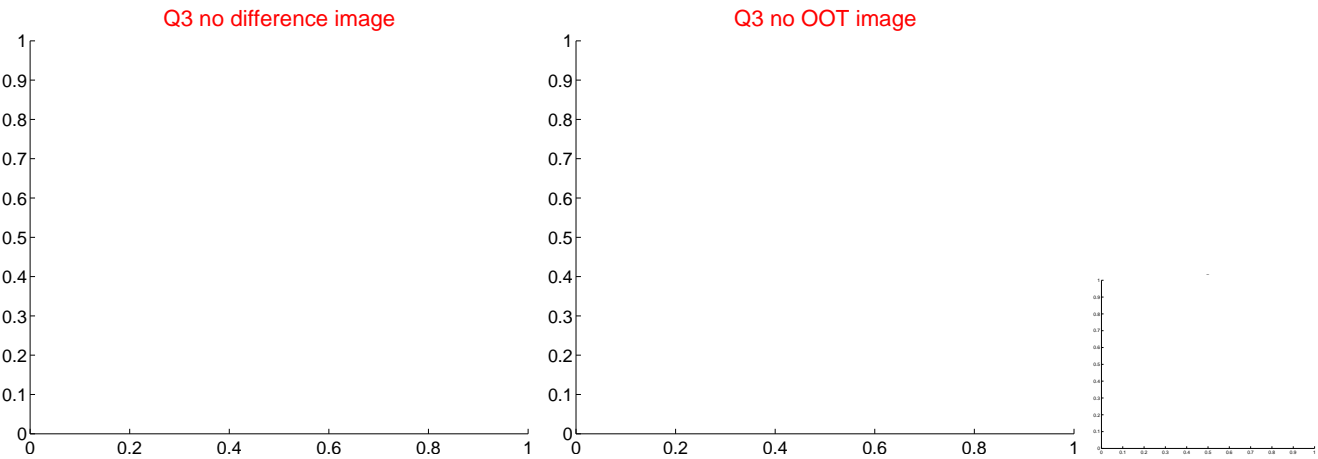
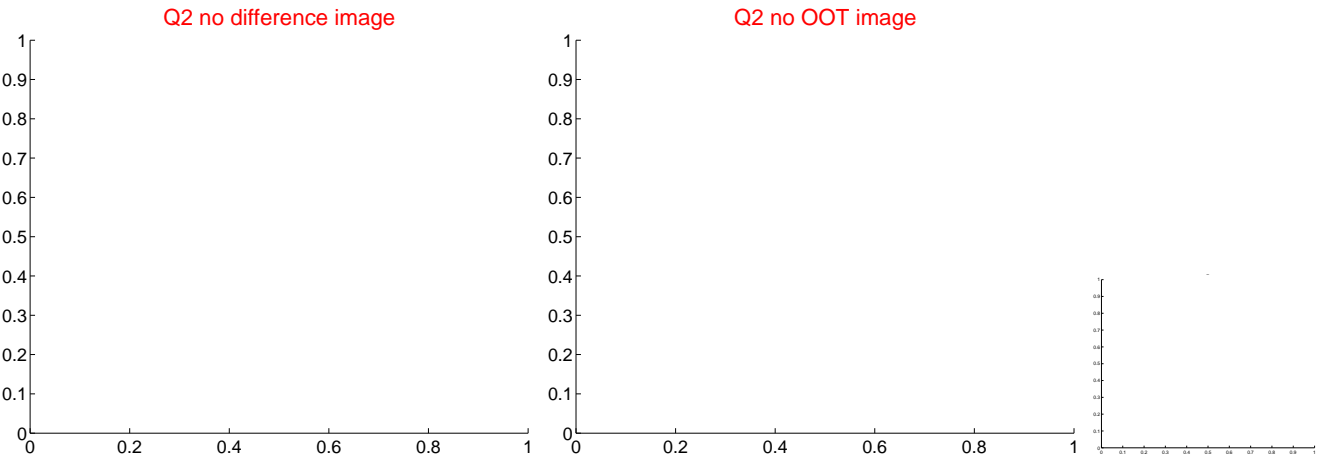
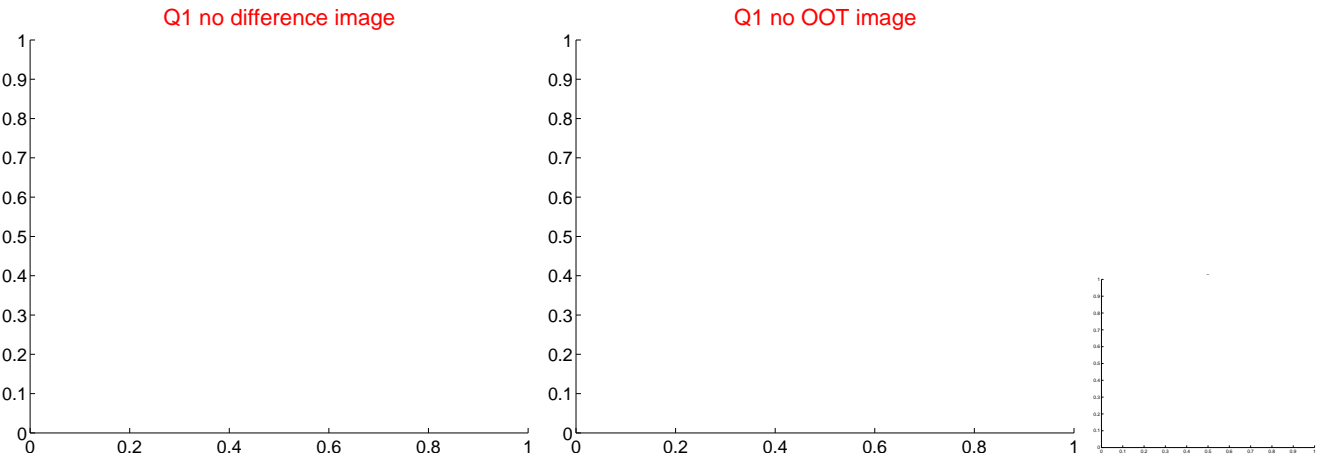


offset from photometric centroids

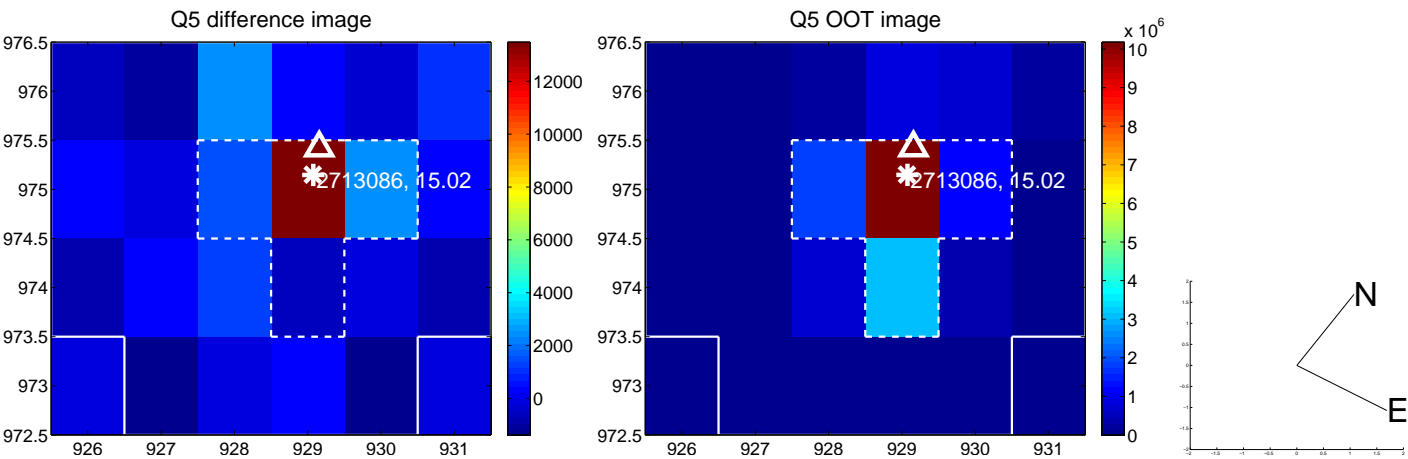


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

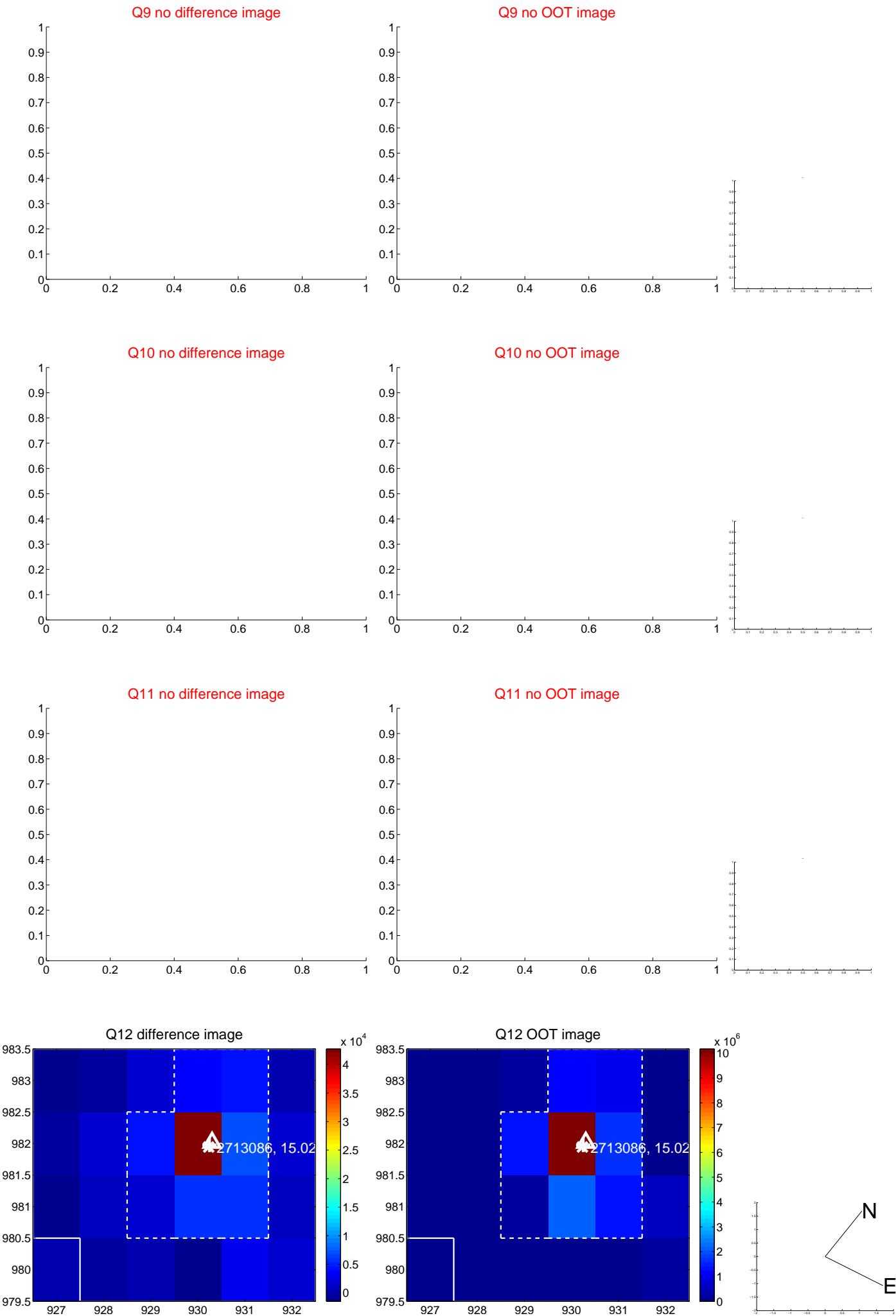
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



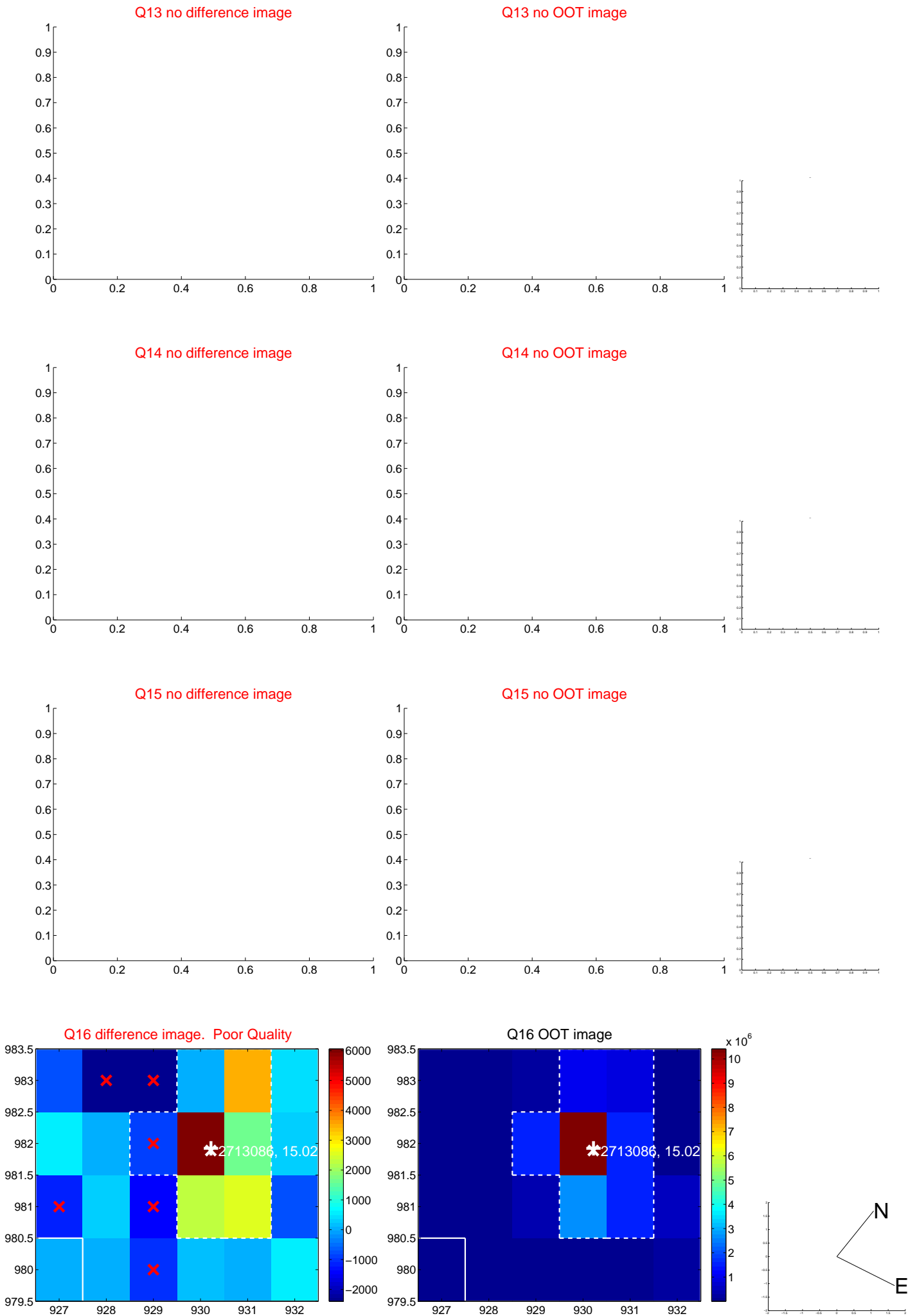
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



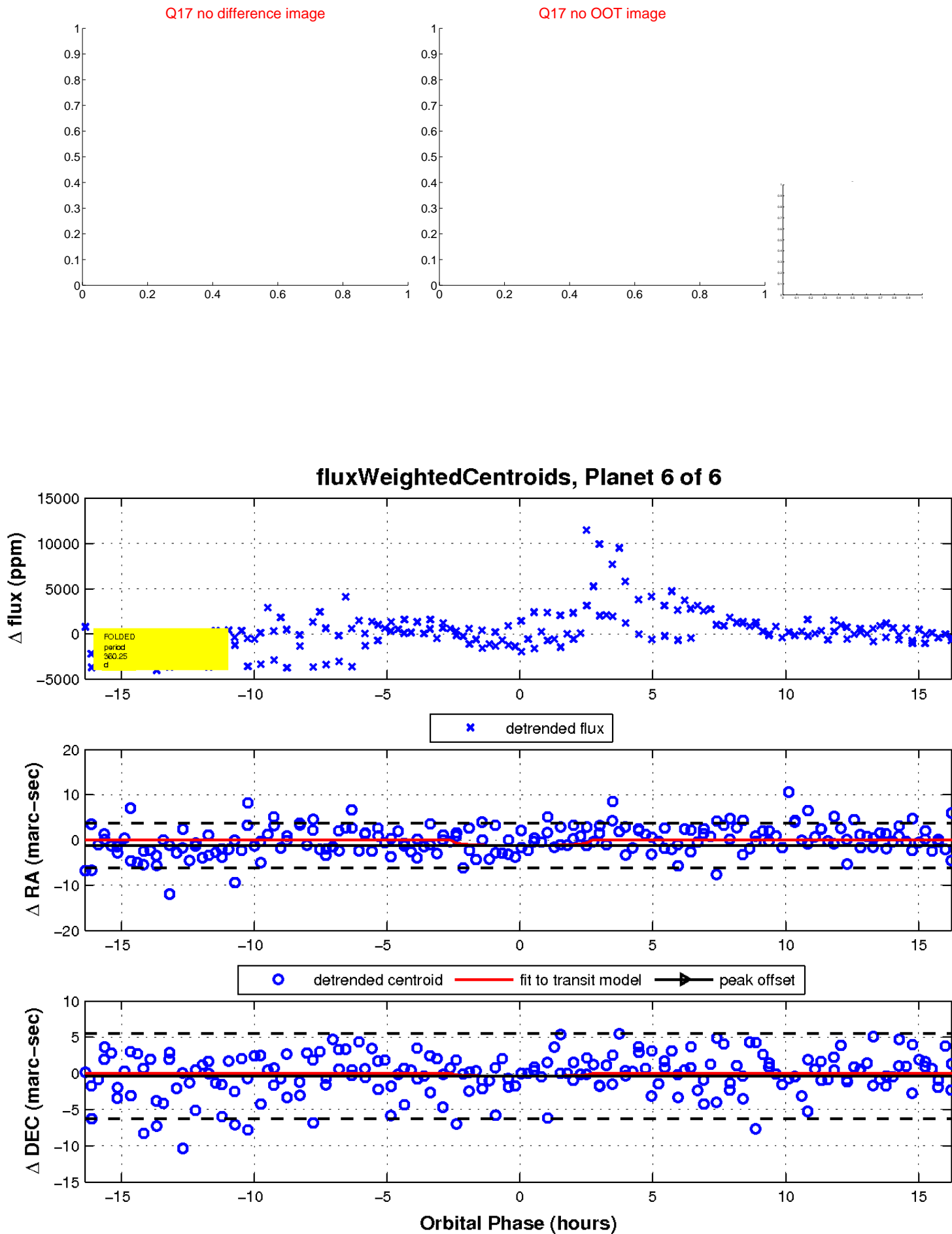
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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





UKIRT Image

Declination

