

# KIC 010677397

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010677397-01	OBS	No	266.581619	259.553907	5271.7	13.616	15.1	11.1	0.31	3393	2.23	0.04
010677397-02	OBS	No	242.020837	334.411468	3928.4	15.860	14.1	10.1	0.31	3393	2.10	0.04
010677397-03	OBS	No	335.725203	254.705198	1211.1	2.672	13.5	3.1	0.31	3393	1.14	0.03
010677397-04	OBS	No	335.763485	254.689739	4088.6	17.913	13.5	7.7	0.31	3393	1.97	0.03
010677397-05	OBS	No	415.967216	283.119581	3821.0	0.715	13.5	5.5	0.31	3393	4.01	0.02
010677397-06	OBS	No	476.676746	269.771385	4732.4	2.934	13.4	10.4	0.31	3393	2.12	0.02
010677397-07	OBS	No	0.948771	131.969317	363.3	3.614	14.8	14.9	0.31	3393	0.63	71.31

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010677397-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010677397-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_KIC_POS
010677397-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_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_KIC_POS
010677397-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—SAME_NTL_PERIOD—CENT_FEW_DIFFS
010677397-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010677397-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—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
010677397-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—CENT_KIC_POS

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

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

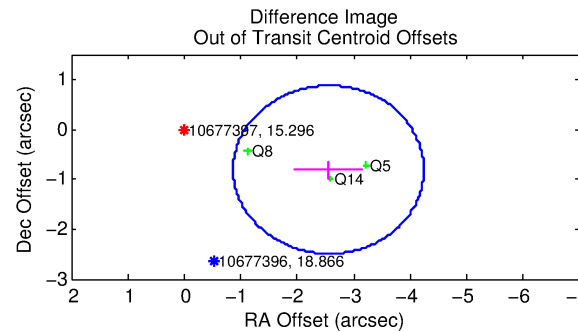
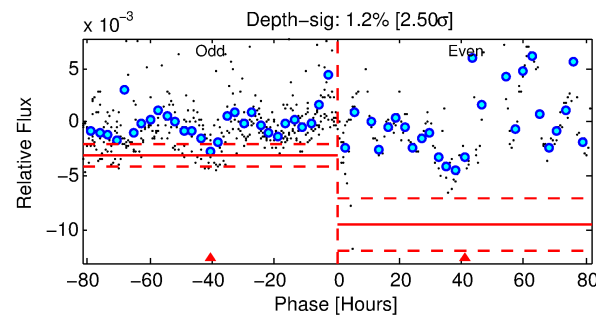
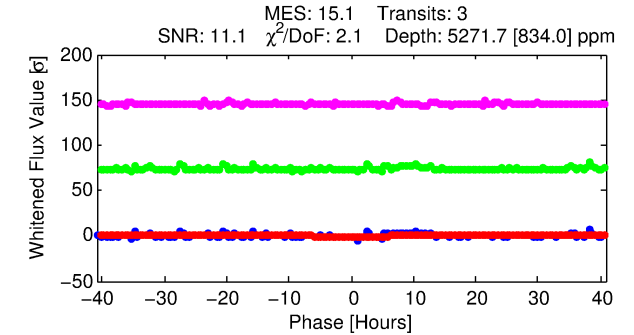
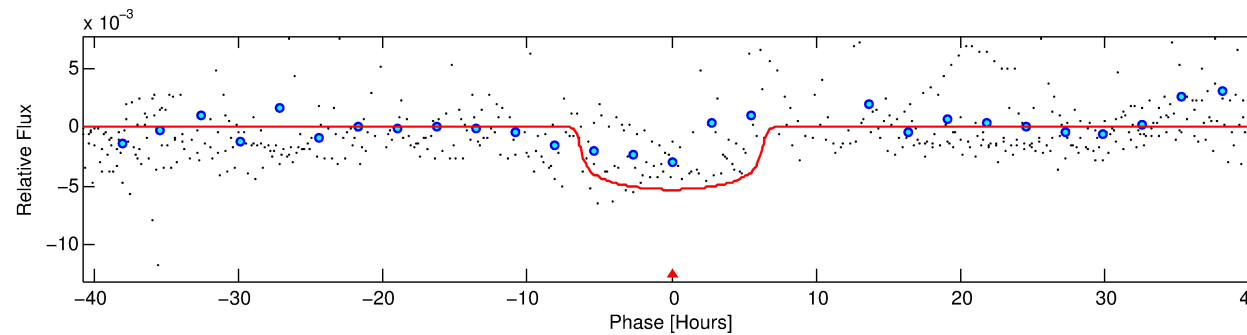
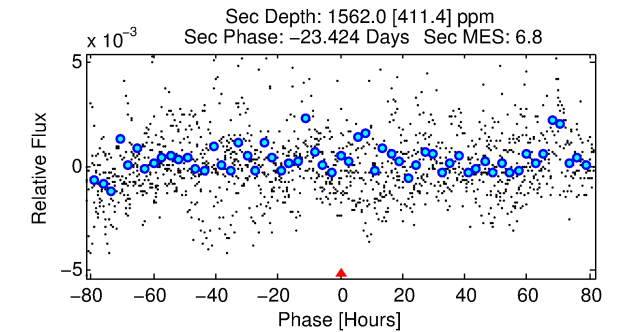
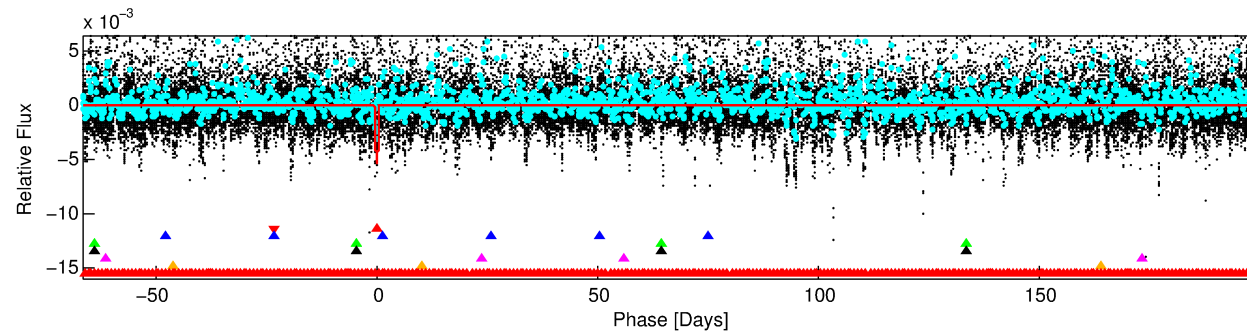
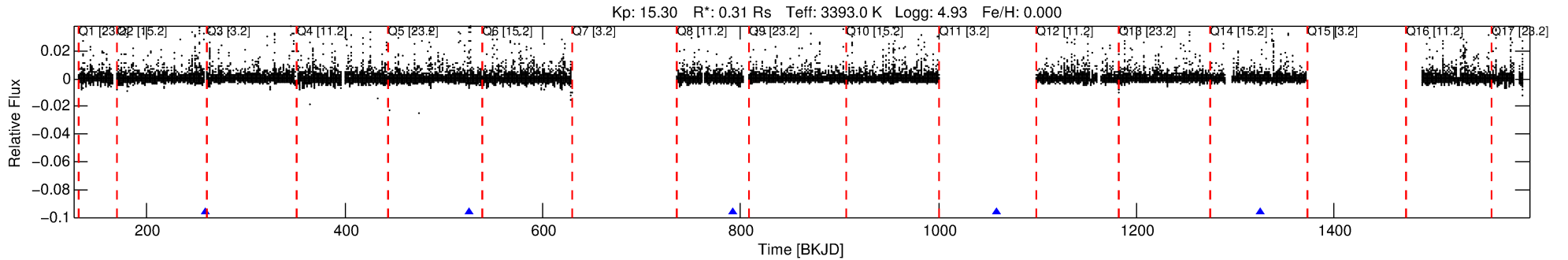
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010677397-01

No Significant Match Found

# DV One-Page Summary

KIC: 10677397 Candidate: 1 of 7 Period: 266.582 d



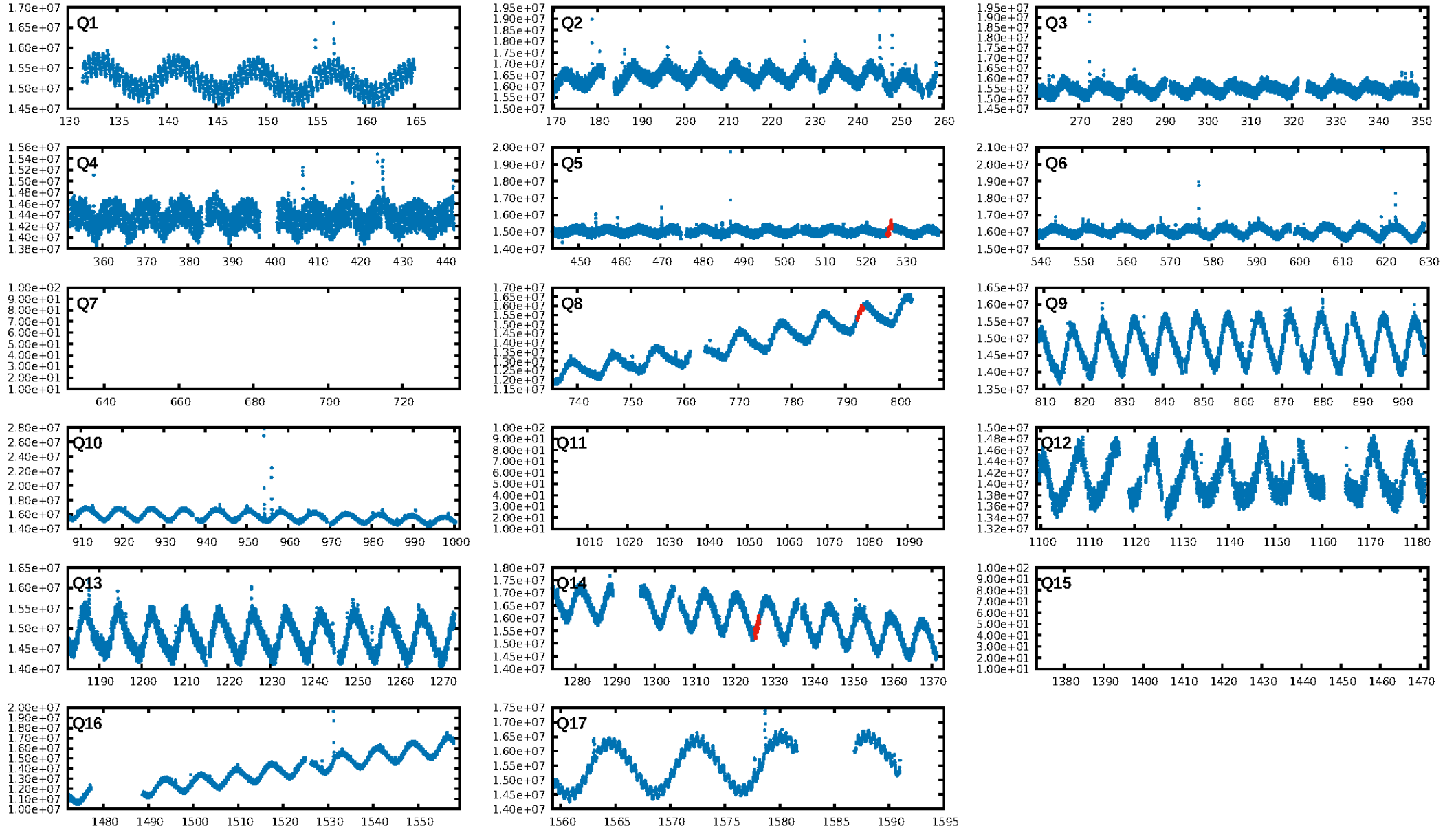
## DV Fit Results:

Period = 266.58162 [0.00580] d  
Epoch = 259.5539 [0.0176] BKJD  
Rp/R\* = 0.0656 [0.0108]  
a/R\* = 159.34 [90.08]  
b = 0.02 [26.32]  
Seff = 0.04 [0.01]  
Teq = 113 [4] K  
Rp = 2.23 [0.47] Re  
a = 0.5462 [0.0531] AU  
Ag = 51444.85 [22602.70] [2.28σ]  
Teffp = 2634 [281] K [8.98σ]

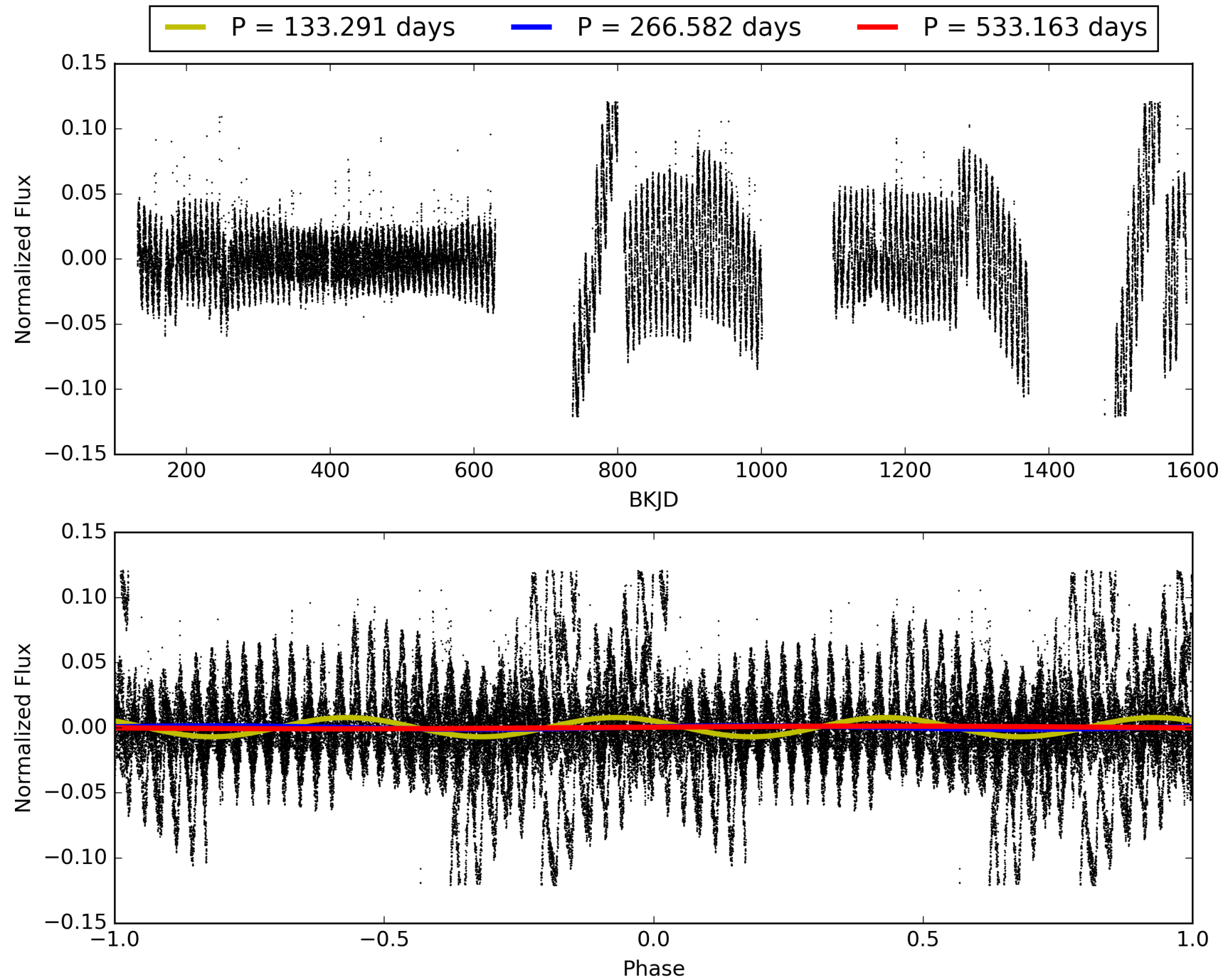
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [28.20σ]  
LongPeriod-sig: 100.0% [119.59σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 4.7%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.061  
Centroid-sig: 0.0%  
Centroid-so: 0.411 arcsec [0.76σ]  
OotOffset-rm: 2.679 arcsec [4.77σ]  
KicOffset-rm: 0.201 arcsec [1.24σ]  
OotOffset-st: 1/0/1/1 [3]  
KicOffset-st: 1/0/1/1 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 0.00 [0/3]

# TCE 010677397-01, PDC Light Curves



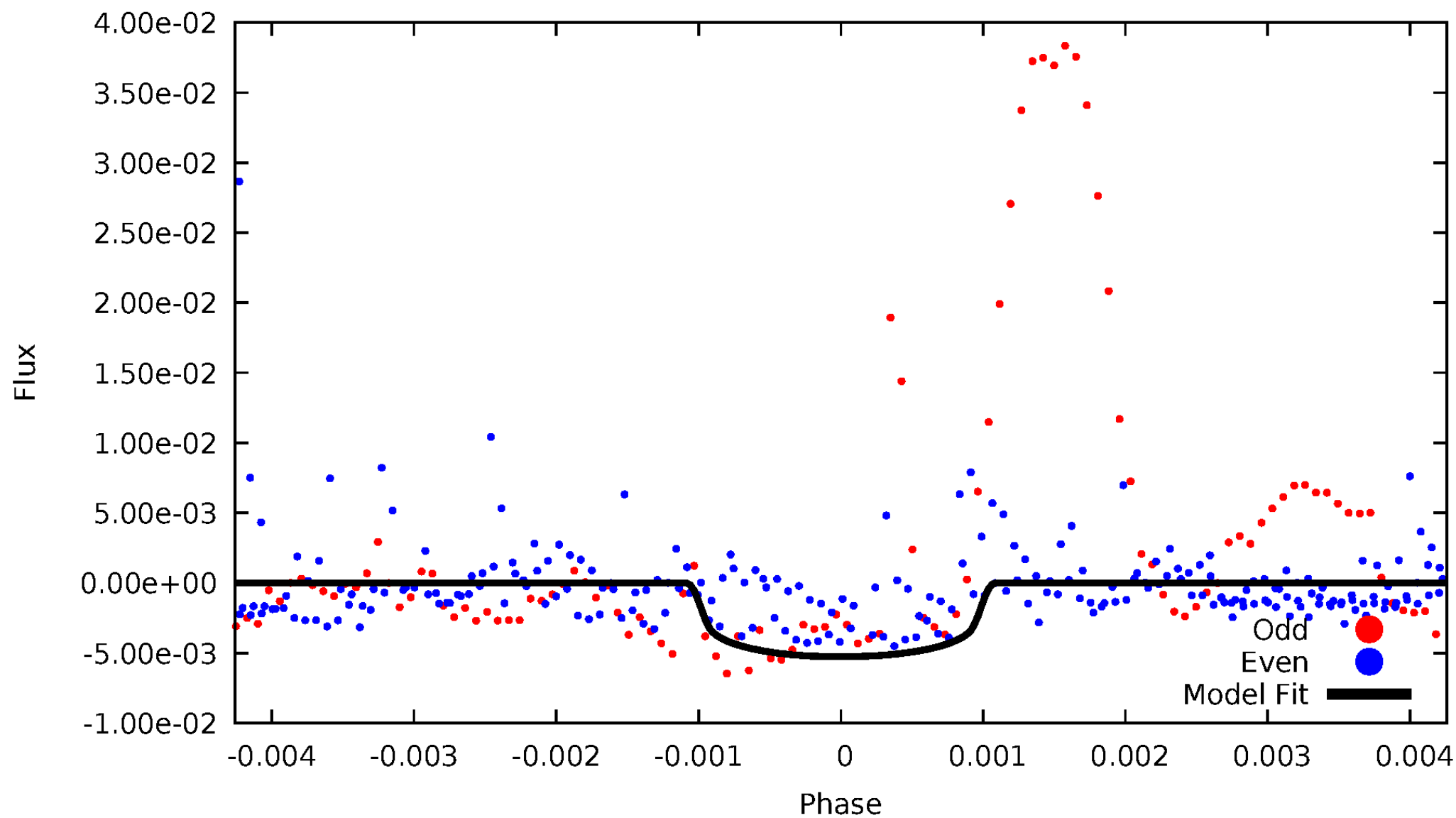
# TCE 010677397-01





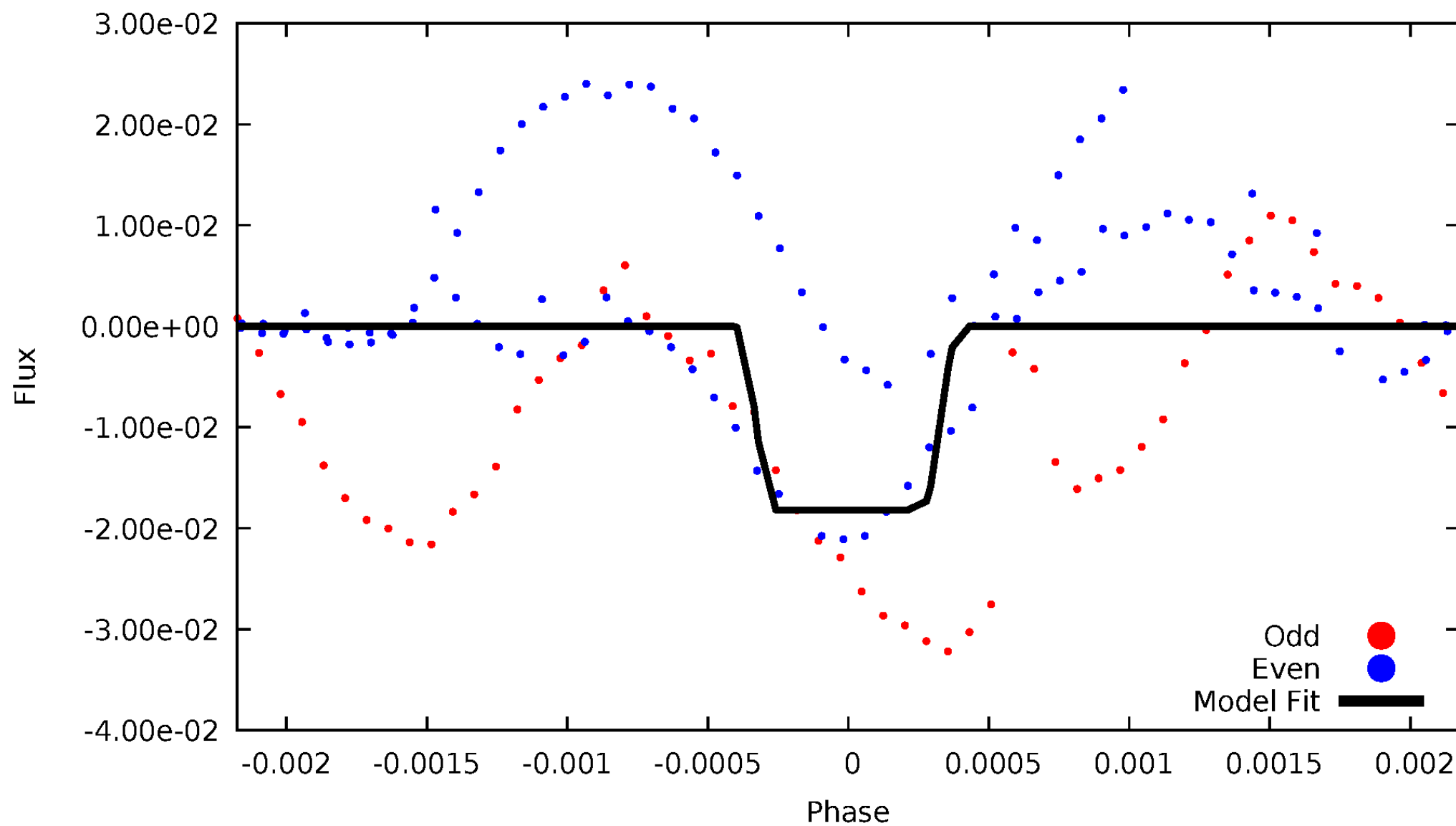
# DV Odd/Even

TCE 010677397-01



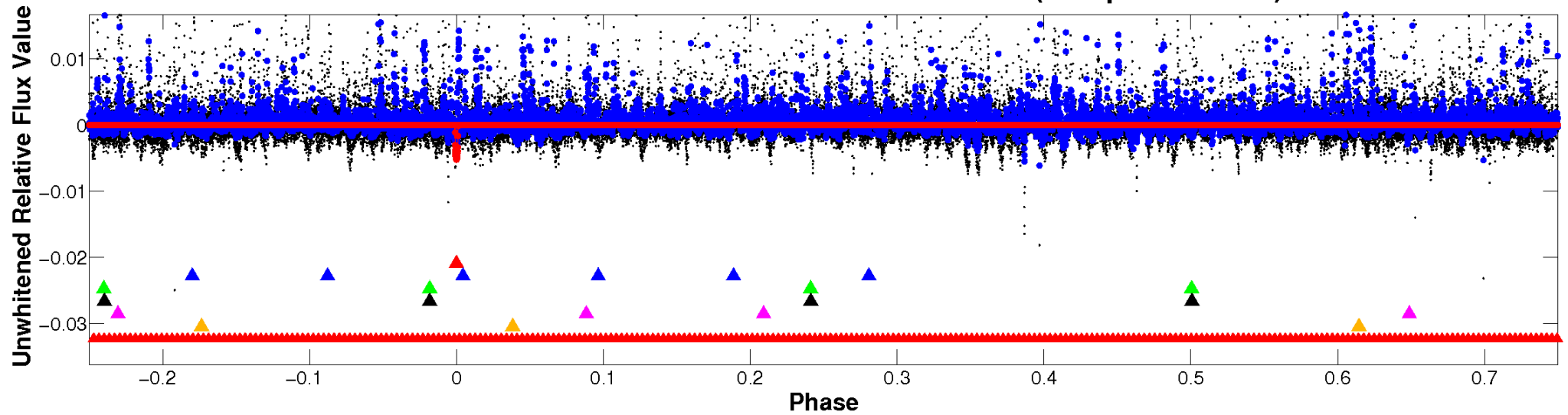
# ALT Odd/Even

TCE 010677397-01

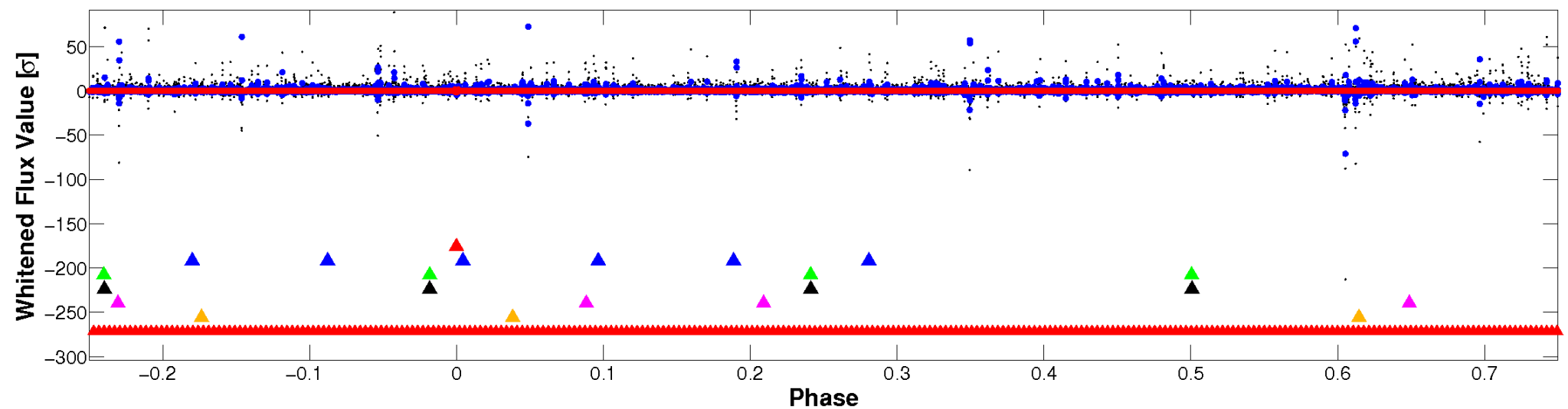


# Non-Whitened Vs. Whitened Light Curve

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

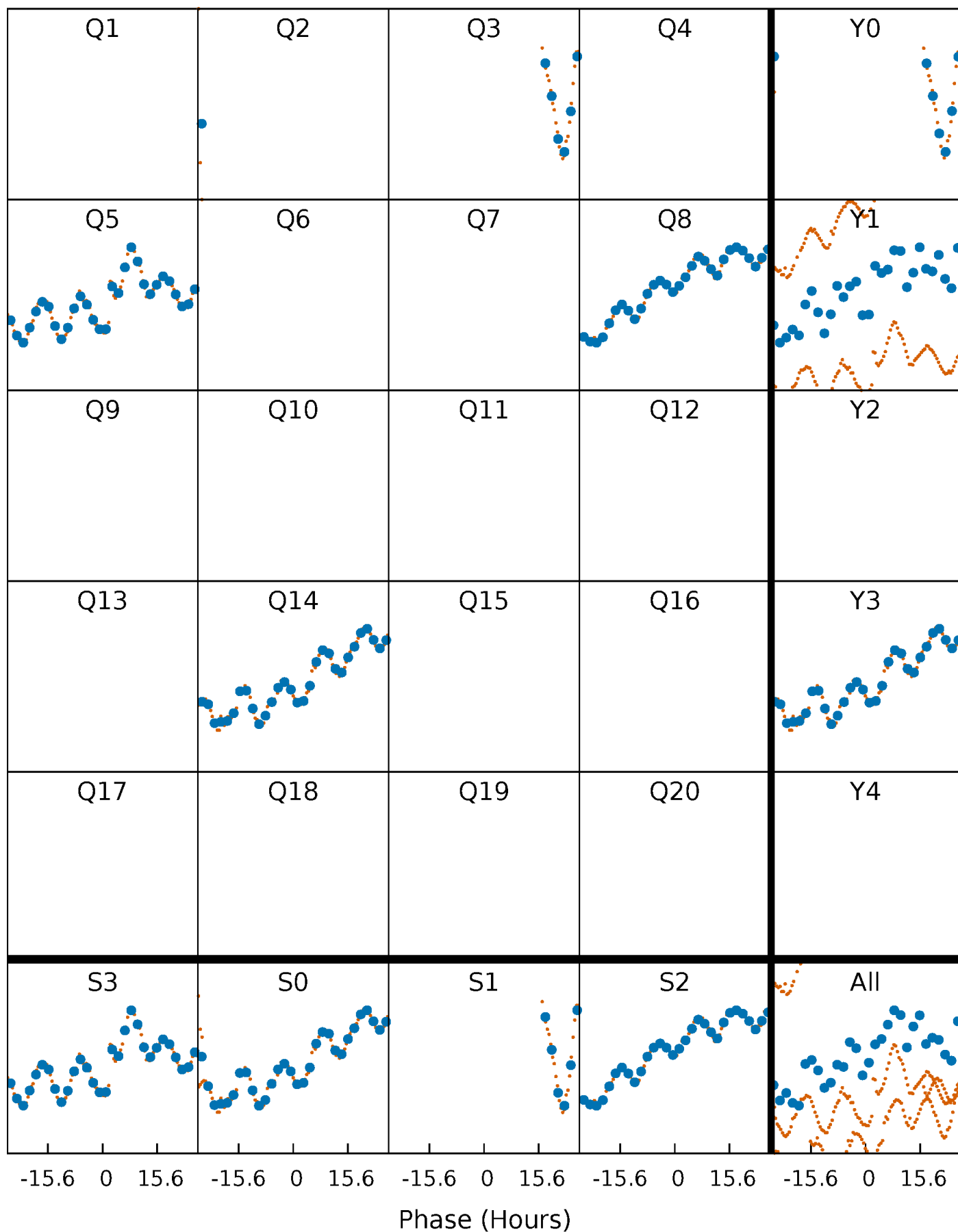


## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



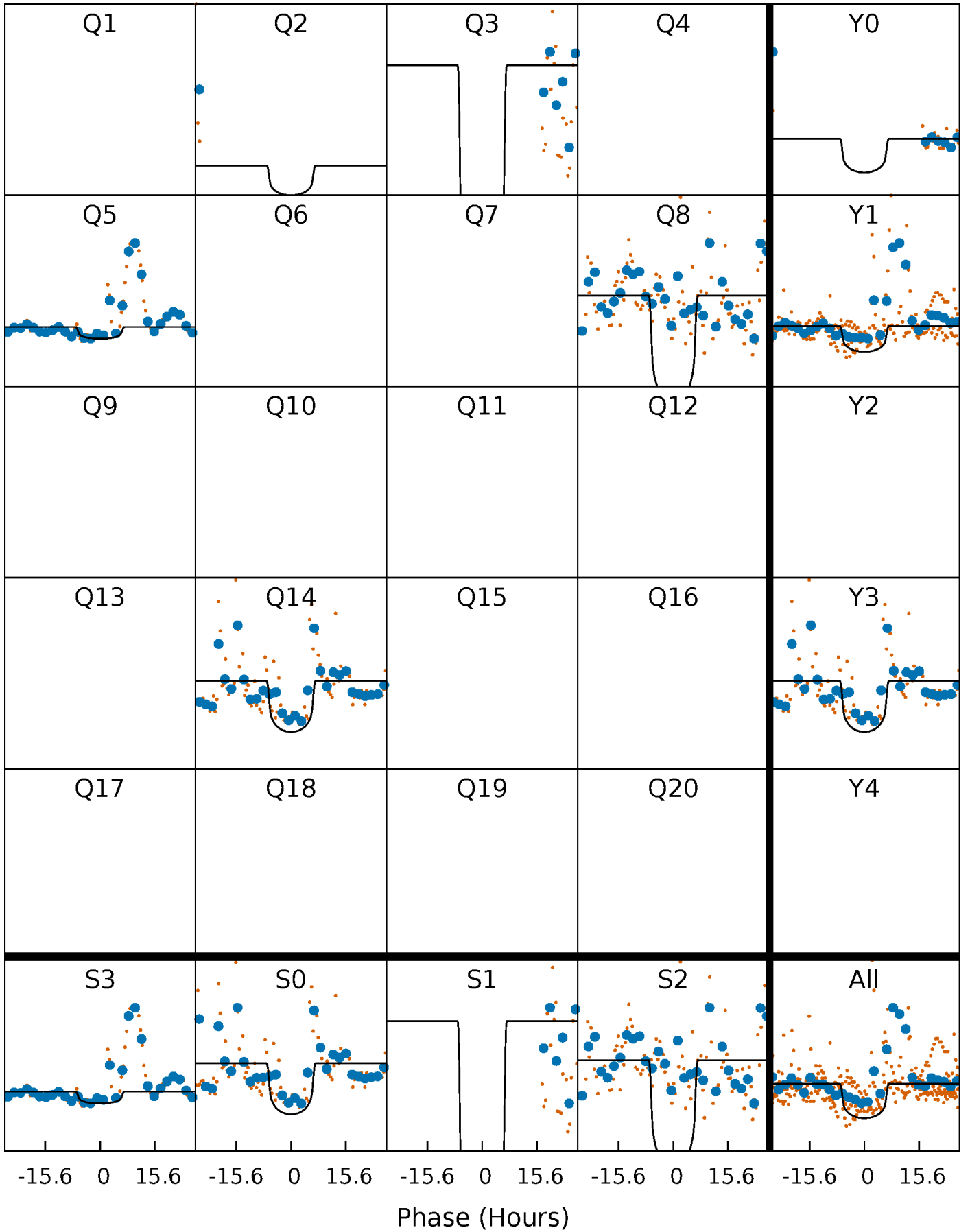
# PDC Quarter-Phased Transit Curves

TCE 010677397-01 P=266.581618 Days  $T_0=259.553907$  (BKJD)



# DV Quarter-Phased Transit Curves

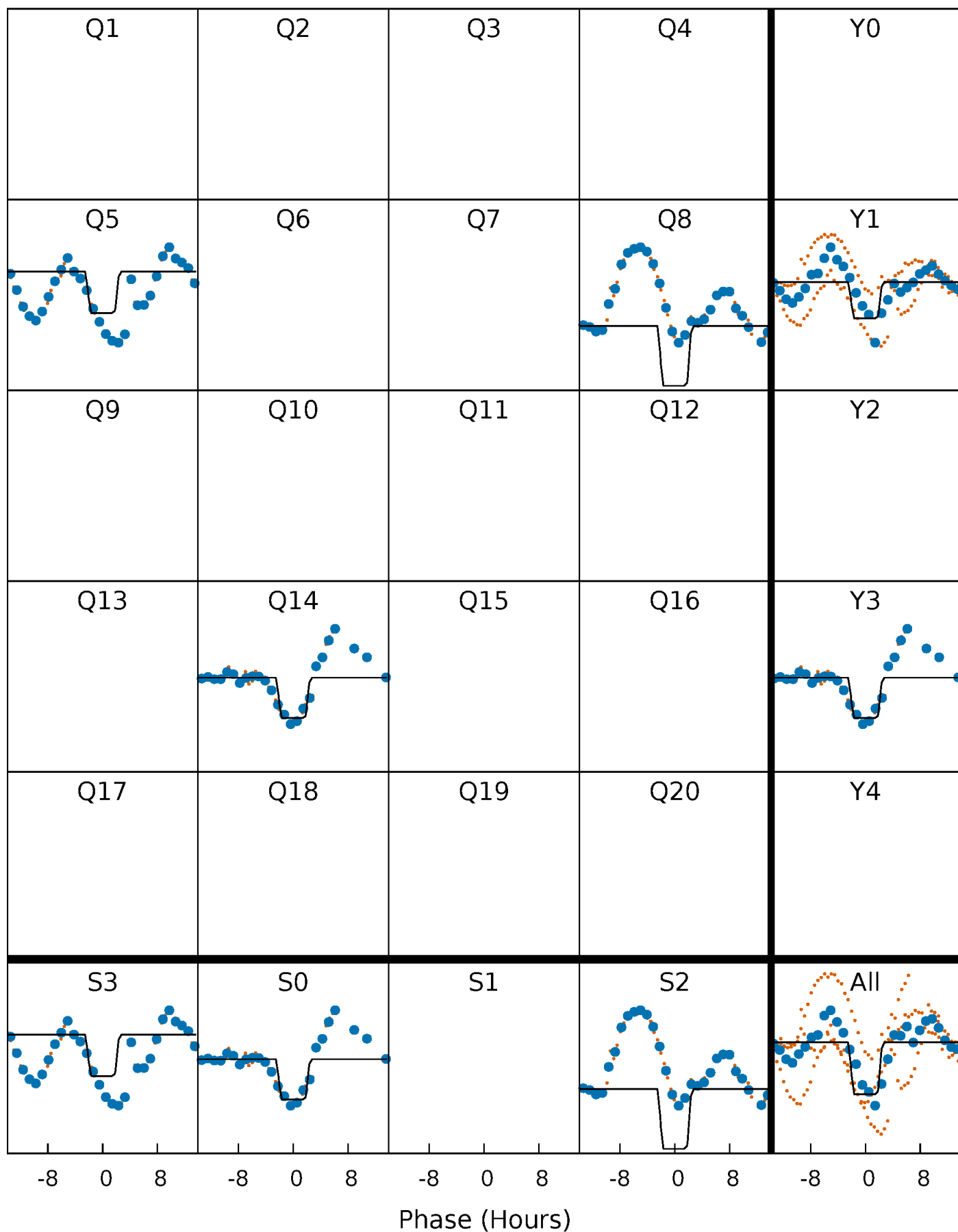
TCE 010677397-01 P=266.581618 Days  $T_0=259.553907$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

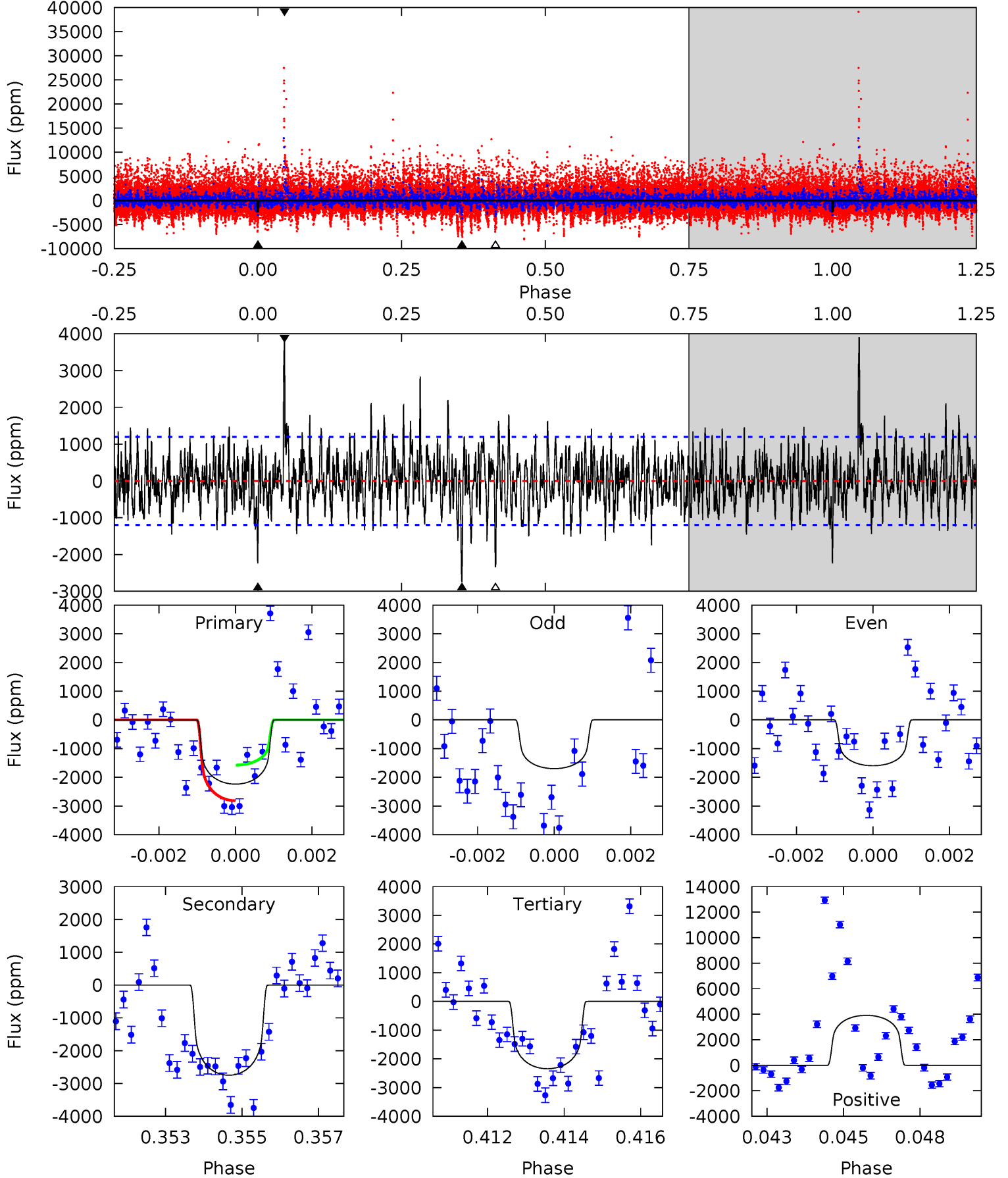
TCE 010677397-01 P=266.630713 Days  $T_0=259.441989$  (BKJD)



# DV Model-Shift Uniqueness Test

010677397-01, P = 266.581618 Days, E = 259.553907 Days

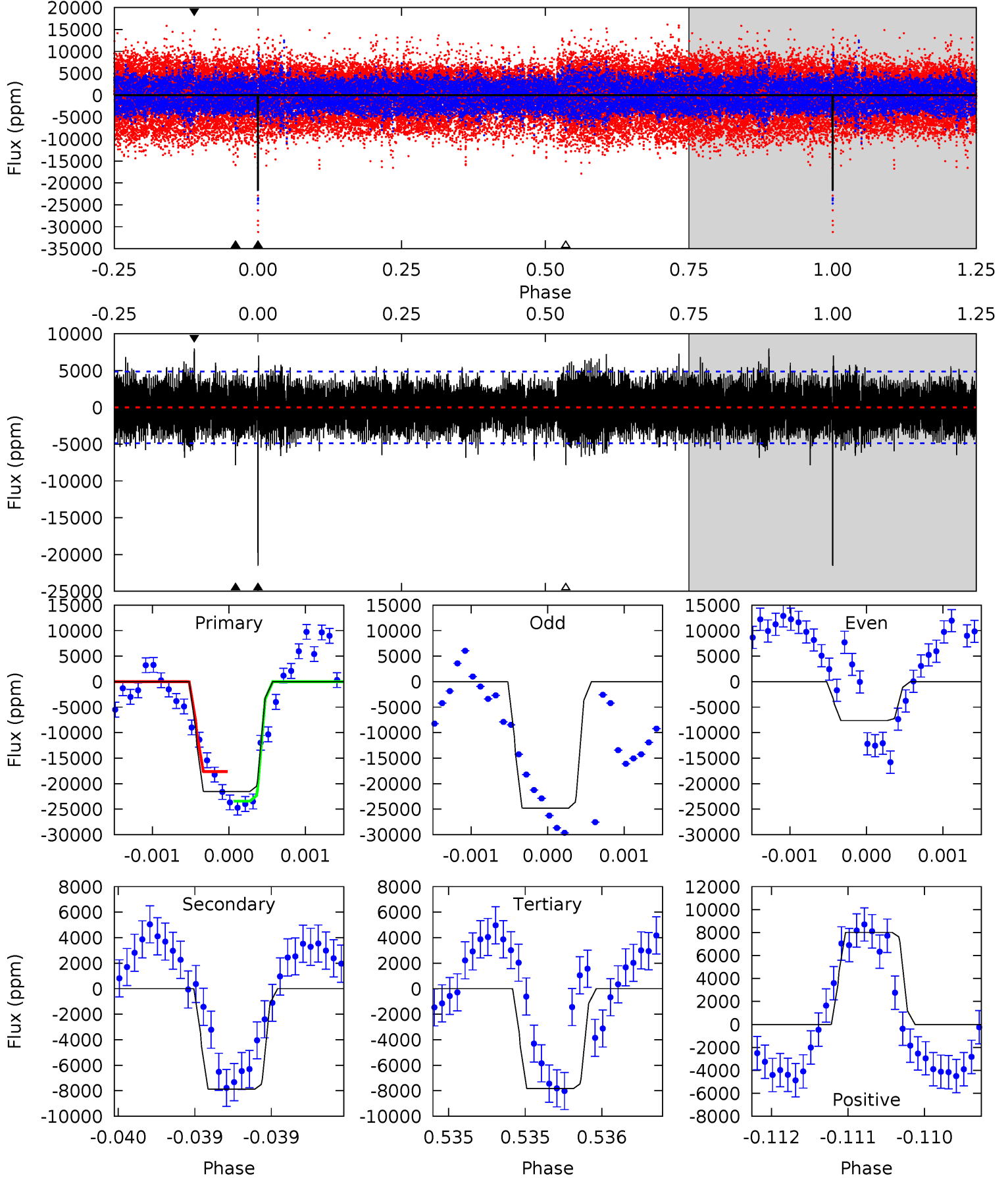
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.93	12.2	10.4	17.4	5.31	3.07	2.72	-0.47	-7.43	1.80	-5.17	0.16	0.96	0.59	2.76



# Alt Model-Shift Uniqueness Test

010677397-01, P = 266.630713 Days, E = 259.441989 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
24.3	8.87	8.82	9.03	5.50	3.36	2.91	15.4	15.2	0.05	-0.15	10.8	0.77	0.27	3.39



### Stellar Parameters For KIC 010677397

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3393^{+50}_{-50}$	$4.935^{+0.055}_{-0.040}$	$0.000^{+0.100}_{-0.100}$	$0.312^{+0.041}_{-0.041}$	$0.306^{+0.051}_{-0.047}$	$14.160^{+4.127}_{-2.680}$
	+1%/-1%	+1%/-1%	+inf%/-inf%	+13%/-13%	+17%/-15%	+29%/-19%
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 010677397-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-2749 \pm 225$	$2.23^{+0.44}_{-0.38}$	$158^{+4}_{-4}$	$3164^{+191}_{-149}$	$90950^{+42810}_{-26448}$
Alt.	$-7875 \pm 887$	$4.63^{+0.49}_{-0.52}$	$157^{+4}_{-4}$	$2994^{+99}_{-87}$	$61819^{+15301}_{-11925}$

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

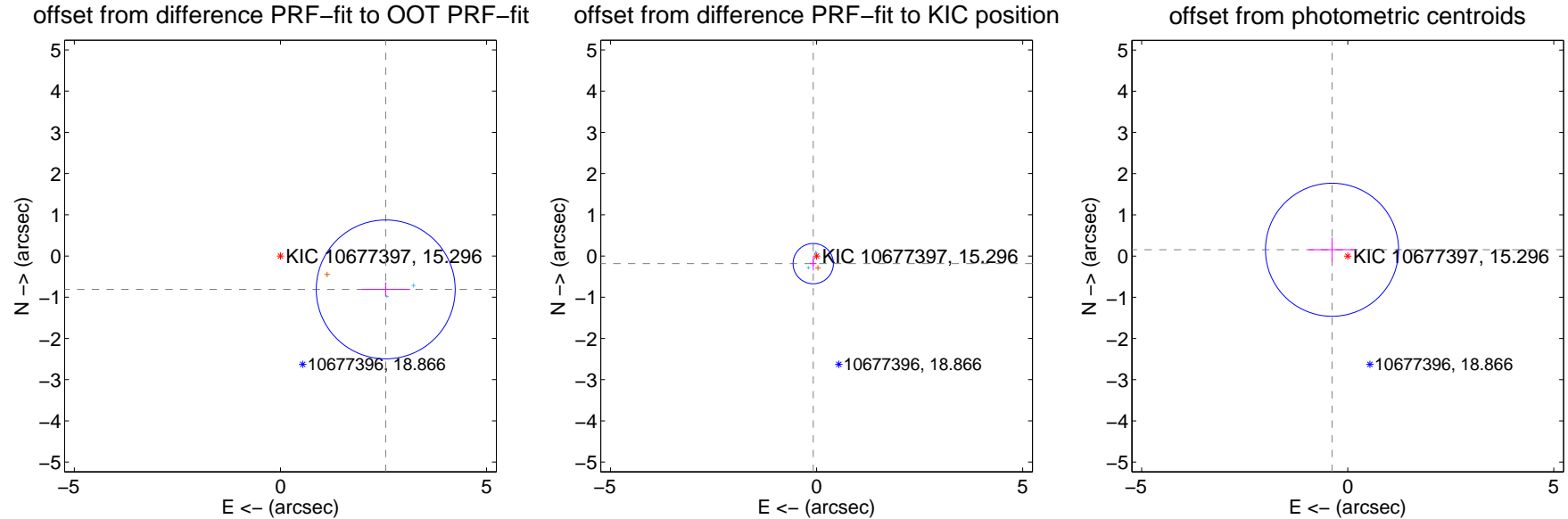
## DV Centroid Data

Supplemental centroid analysis for 010677397-01. Kepler magnitude: 15.30. Transit SNR 11.06

There are 2 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 2.87 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.679 \pm 0.562$	4.77	$-2.554 \pm 0.587$	$-0.810 \pm 0.171$
PRF-fit source offset from KIC position	$0.201 \pm 0.163$	1.24	$0.081 \pm 0.080$	$-0.184 \pm 0.165$
photometric centroid source offset	$0.41 \pm 0.54$	0.76	$0.38 \pm 0.57$	$0.15 \pm 0.29$



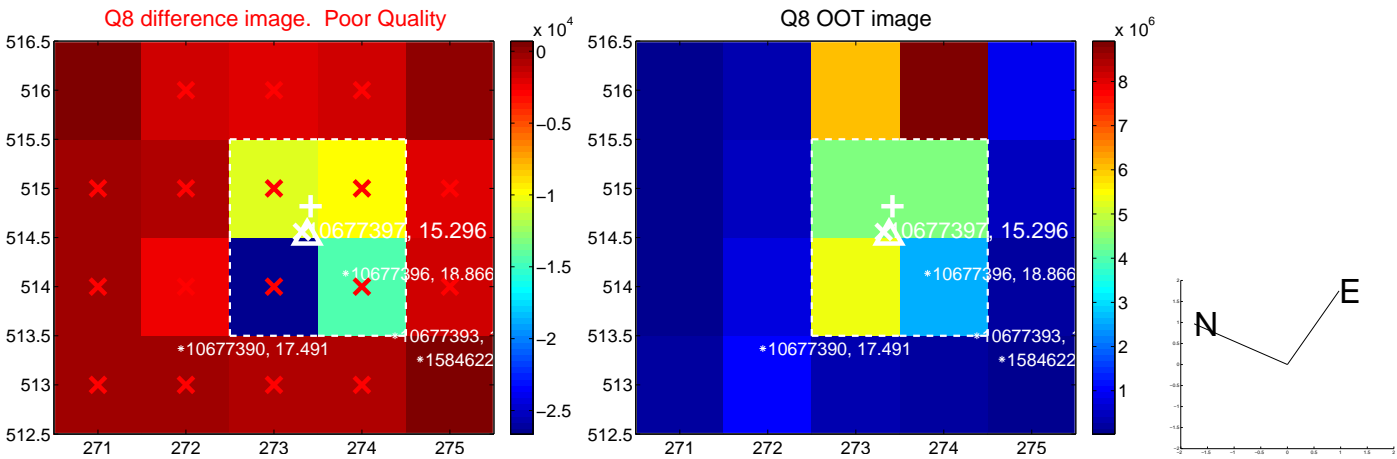
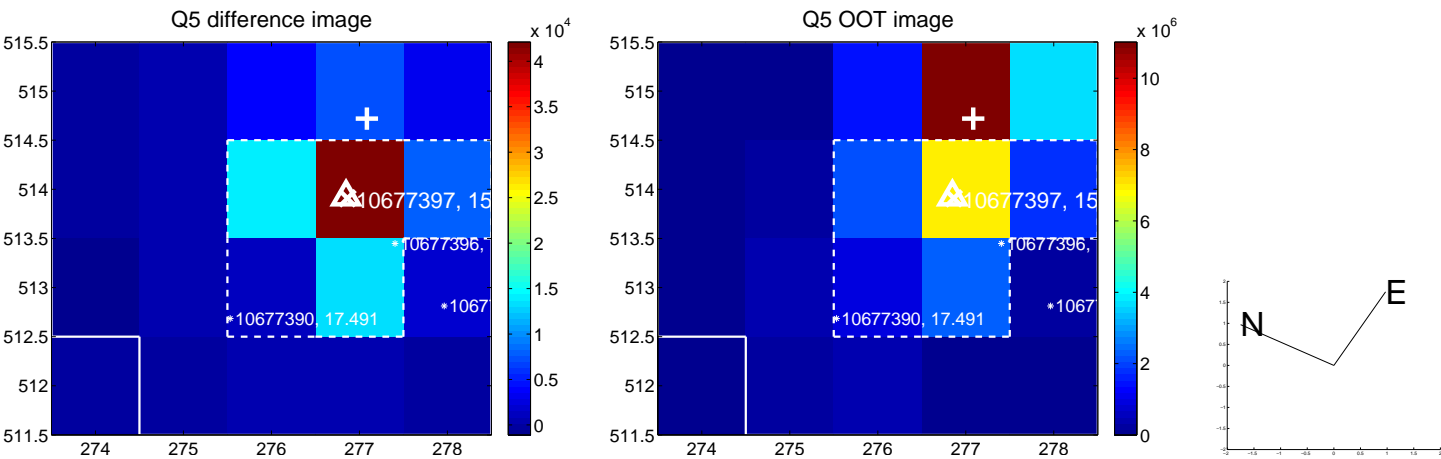
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

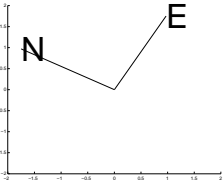
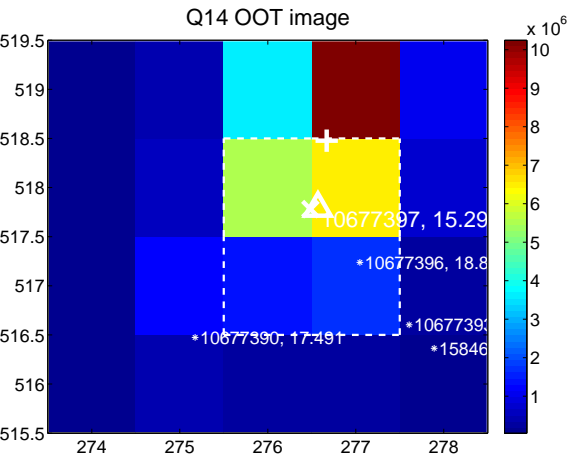
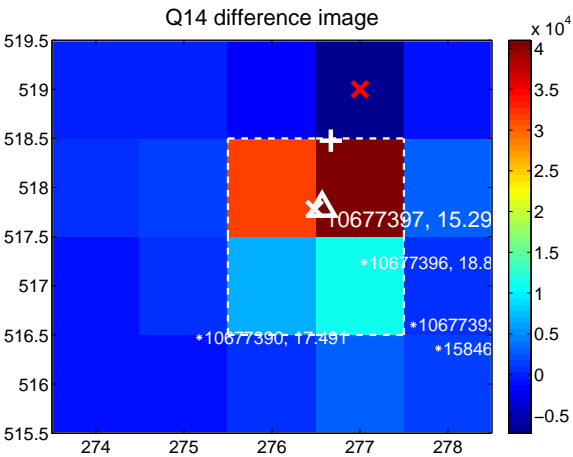


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

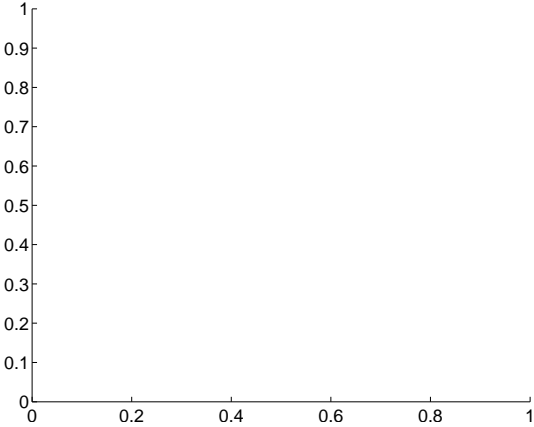
Q13 no difference image



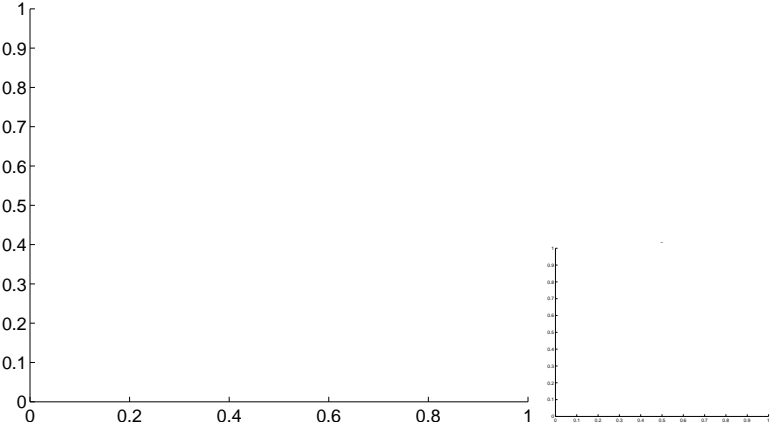
Q13 no OOT image



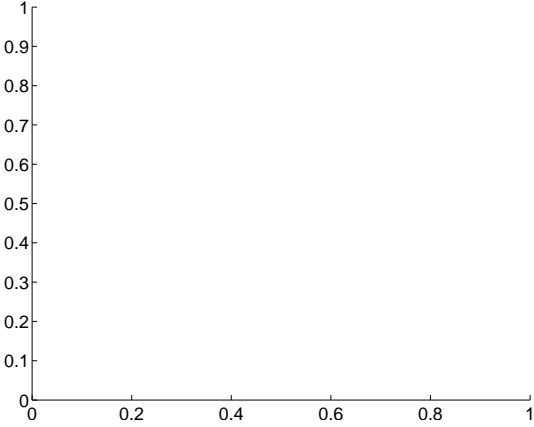
Q15 no difference image



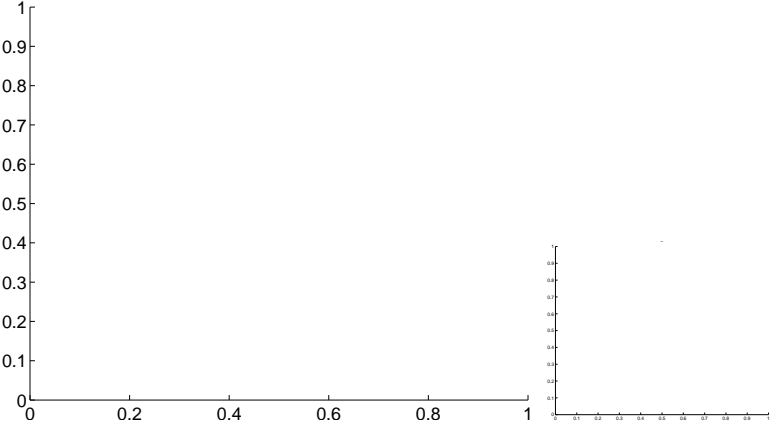
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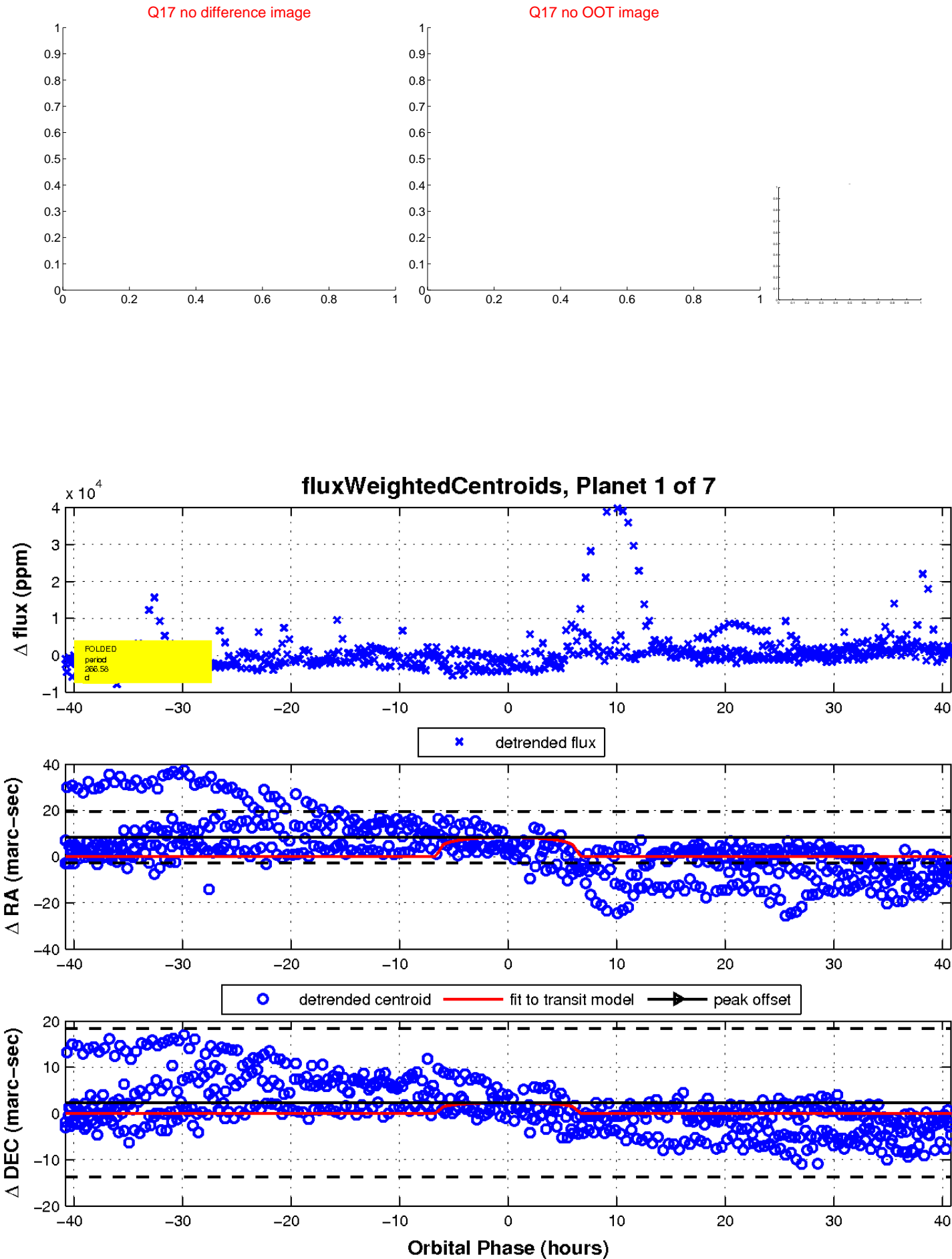
Q16 no difference image



Q16 no OOT image



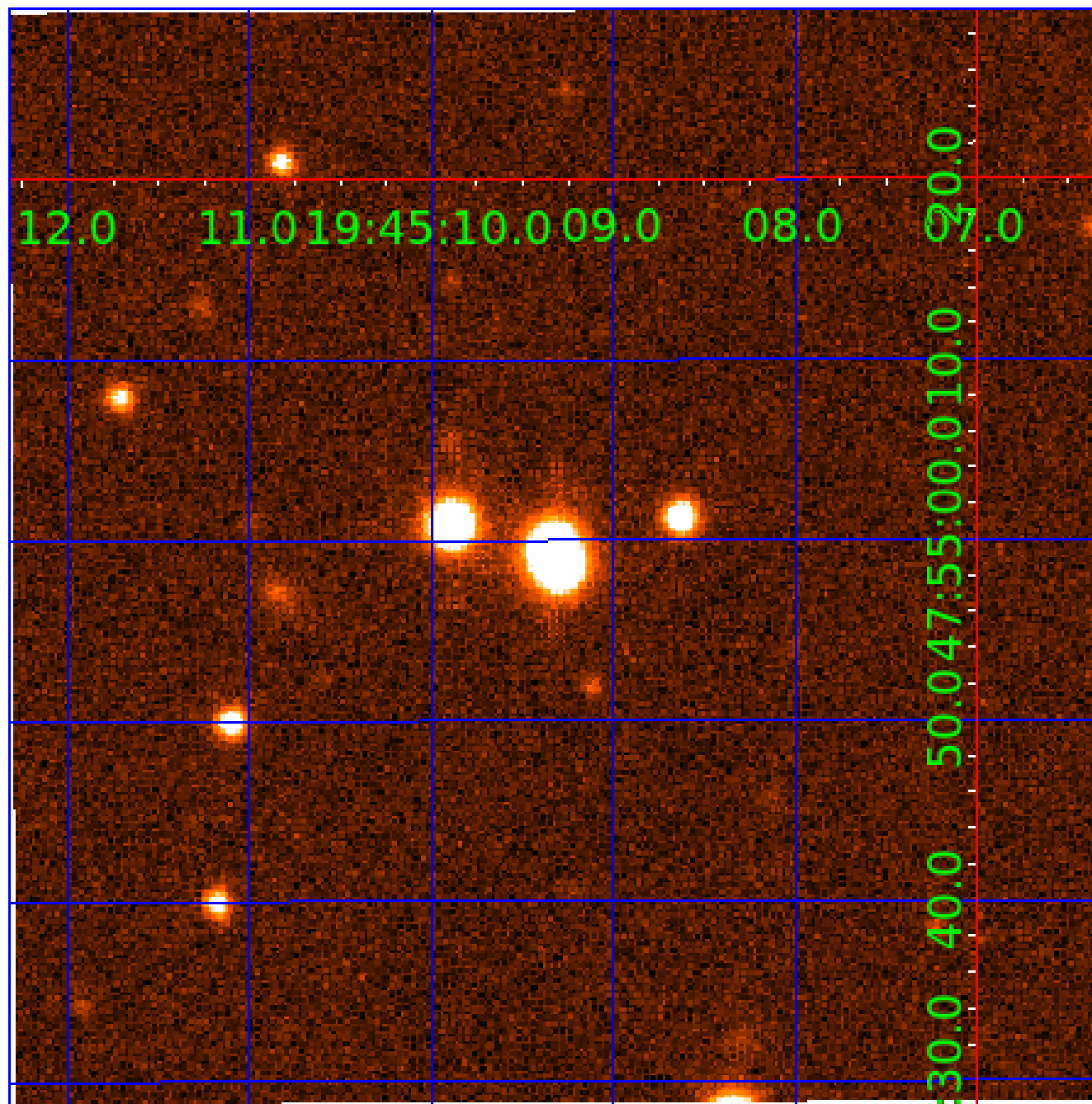
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 010677397

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010677397-01	OBS	No	266.581619	259.553907	5271.7	13.616	15.1	11.1	0.31	3393	2.23	0.04
010677397-02	OBS	No	242.020837	334.411468	3928.4	15.860	14.1	10.1	0.31	3393	2.10	0.04
010677397-03	OBS	No	335.725203	254.705198	1211.1	2.672	13.5	3.1	0.31	3393	1.14	0.03
010677397-04	OBS	No	335.763485	254.689739	4088.6	17.913	13.5	7.7	0.31	3393	1.97	0.03
010677397-05	OBS	No	415.967216	283.119581	3821.0	0.715	13.5	5.5	0.31	3393	4.01	0.02
010677397-06	OBS	No	476.676746	269.771385	4732.4	2.934	13.4	10.4	0.31	3393	2.12	0.02
010677397-07	OBS	No	0.948771	131.969317	363.3	3.614	14.8	14.9	0.31	3393	0.63	71.31

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010677397-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010677397-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_KIC_POS
010677397-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_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_KIC_POS
010677397-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—SAME_NTL_PERIOD—CENT_FEW_DIFFS
010677397-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010677397-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—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
010677397-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—CENT_KIC_POS

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

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

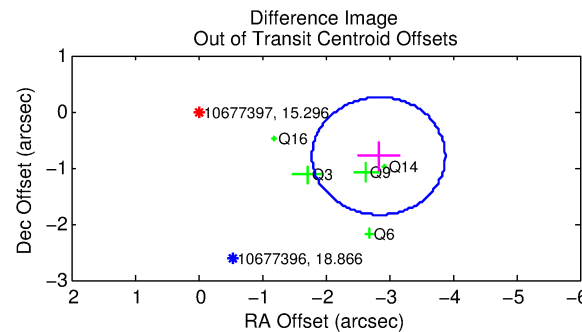
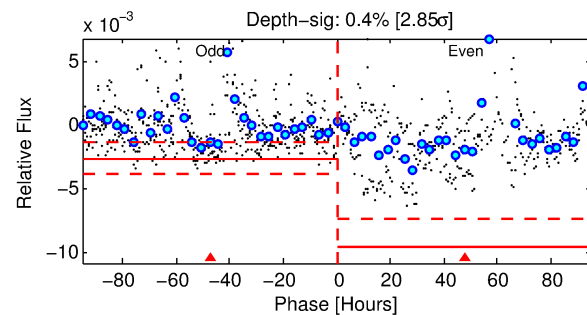
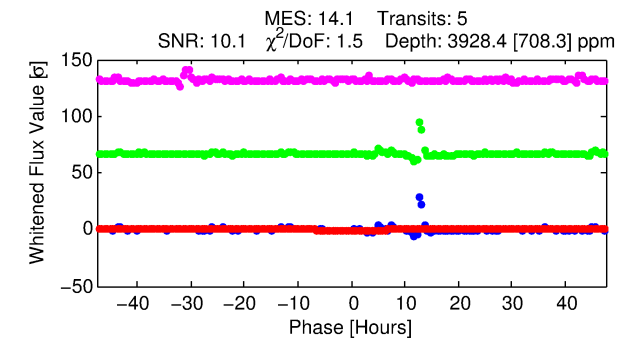
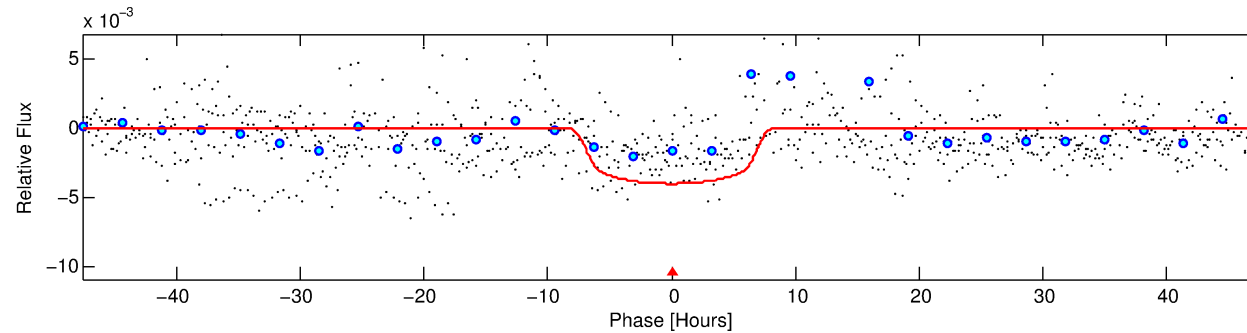
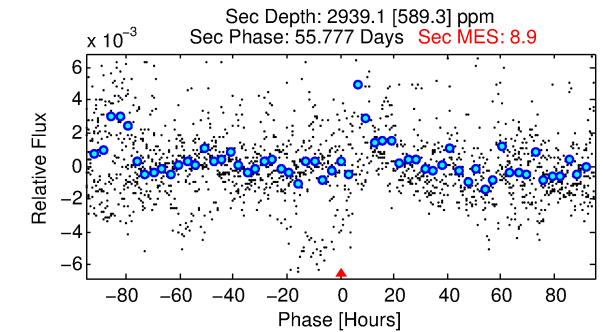
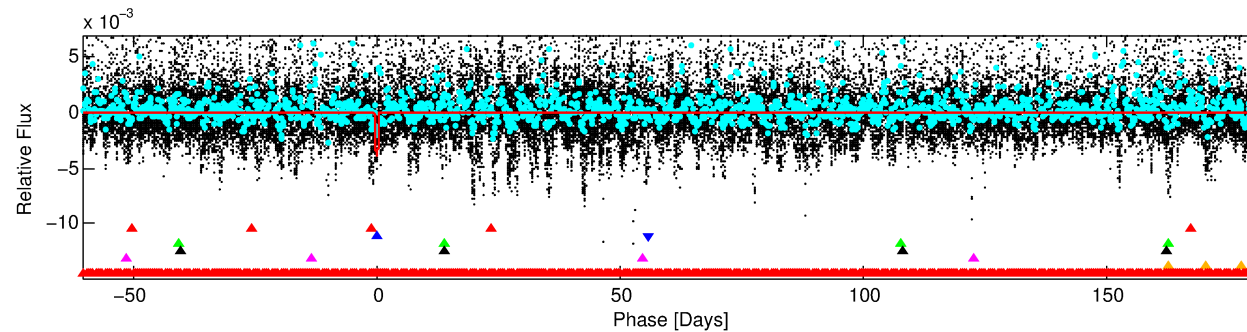
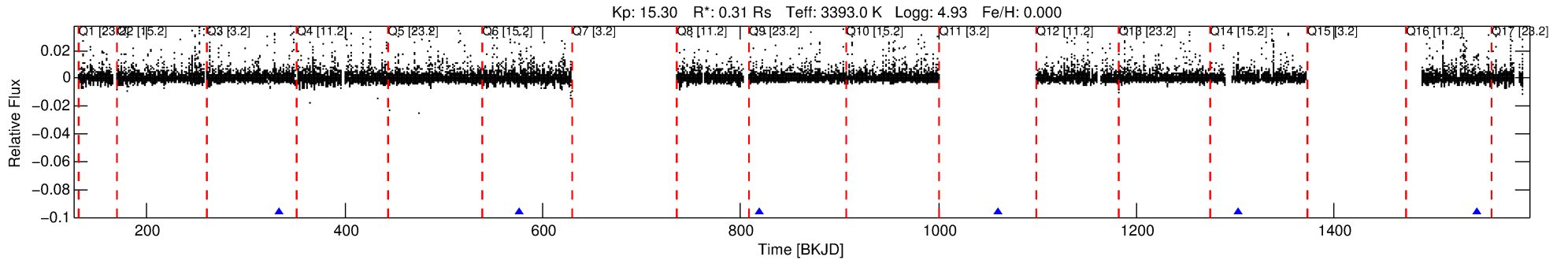
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010677397-02

No Significant Match Found

# DV One-Page Summary

KIC: 10677397 Candidate: 2 of 7 Period: 242.021 d



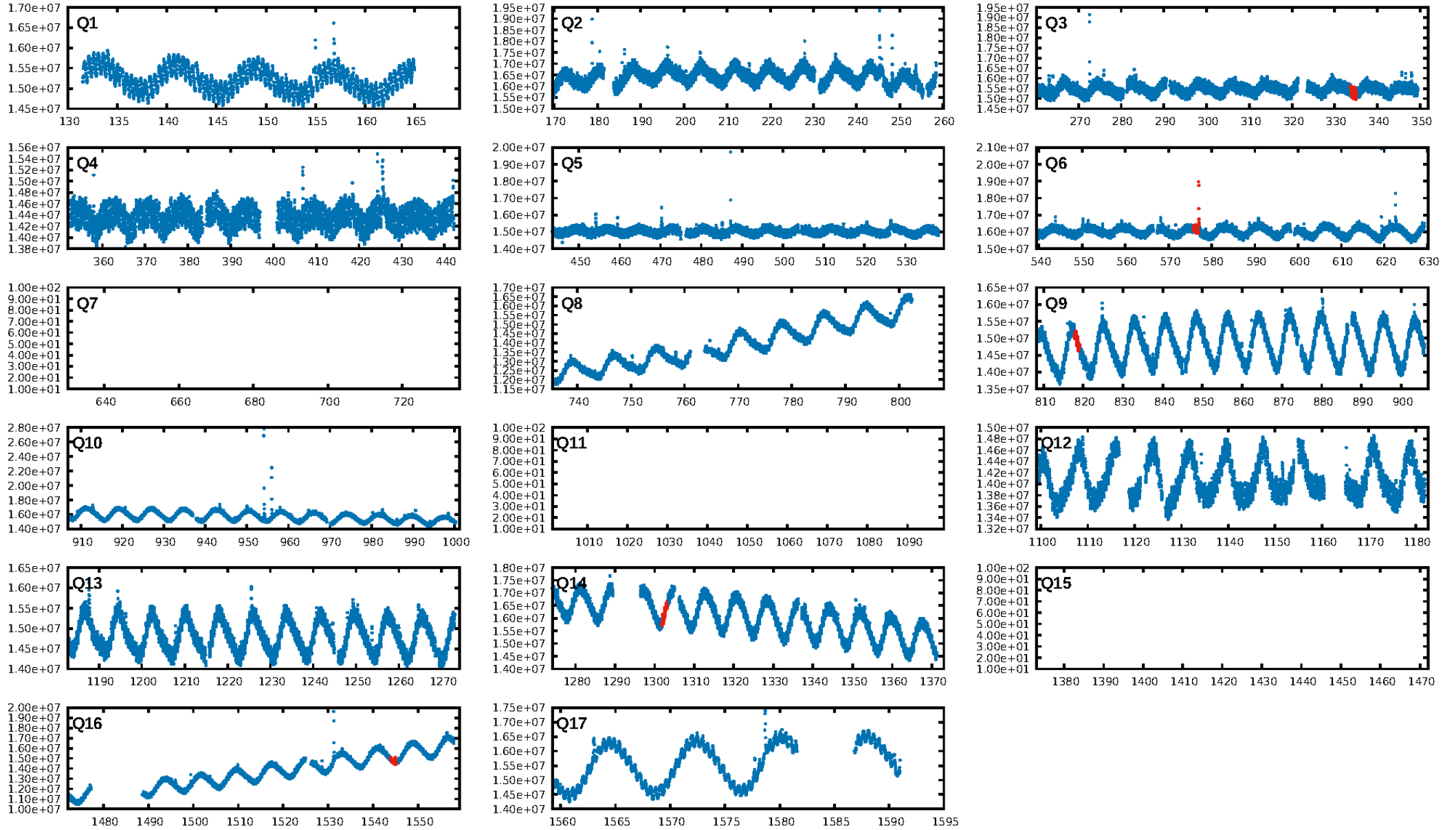
## DV Fit Results:

Period = 242.02084 [0.00726] d  
Epoch = 334.4115 [0.0223] BKJD  
Rp/R\* = 0.0616 [0.0075]  
a/R\* = 91.14 [27.01]  
b = 0.72 [0.20]  
Seff = 0.04 [0.01]  
Teq = 117 [4] K  
Rp = 2.10 [0.37] Re  
a = 0.5121 [0.0498] AU  
Ag = 96546.49 [32554.50] [2.97σ]  
Teffp = 3184 [255] K [12.04σ]

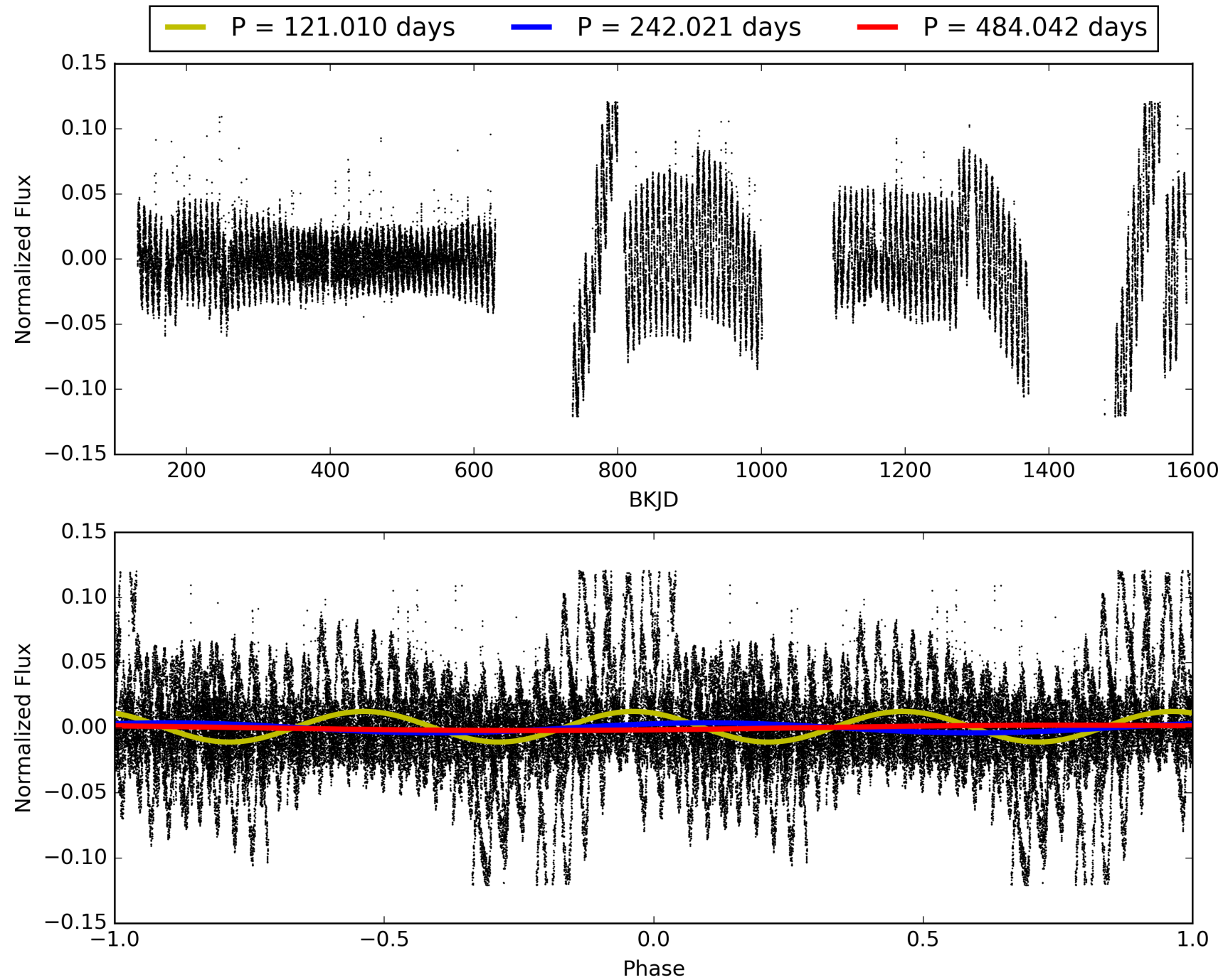
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [355.68σ]  
LongPeriod-sig: 100.0% [28.20σ]  
ModelChiSquare2-sig: 0.4%  
ModelChiSquareGof-sig: 96.7%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: 5.861  
Centroid-sig: 5.7%  
Centroid-so: 1.677 arcsec [2.61σ]  
OotOffset-rm: 2.945 arcsec [8.44σ]  
KicOffset-rm: 0.318 arcsec [1.31σ]  
OotOffset-st: 2/1/1/1 [5]  
KicOffset-st: 2/1/1/1 [5]  
DiffImageQuality-fgm: 0.80 [4/5]  
DiffImageOverlap-fno: 0.00 [0/5]

# TCE 010677397-02, PDC Light Curves

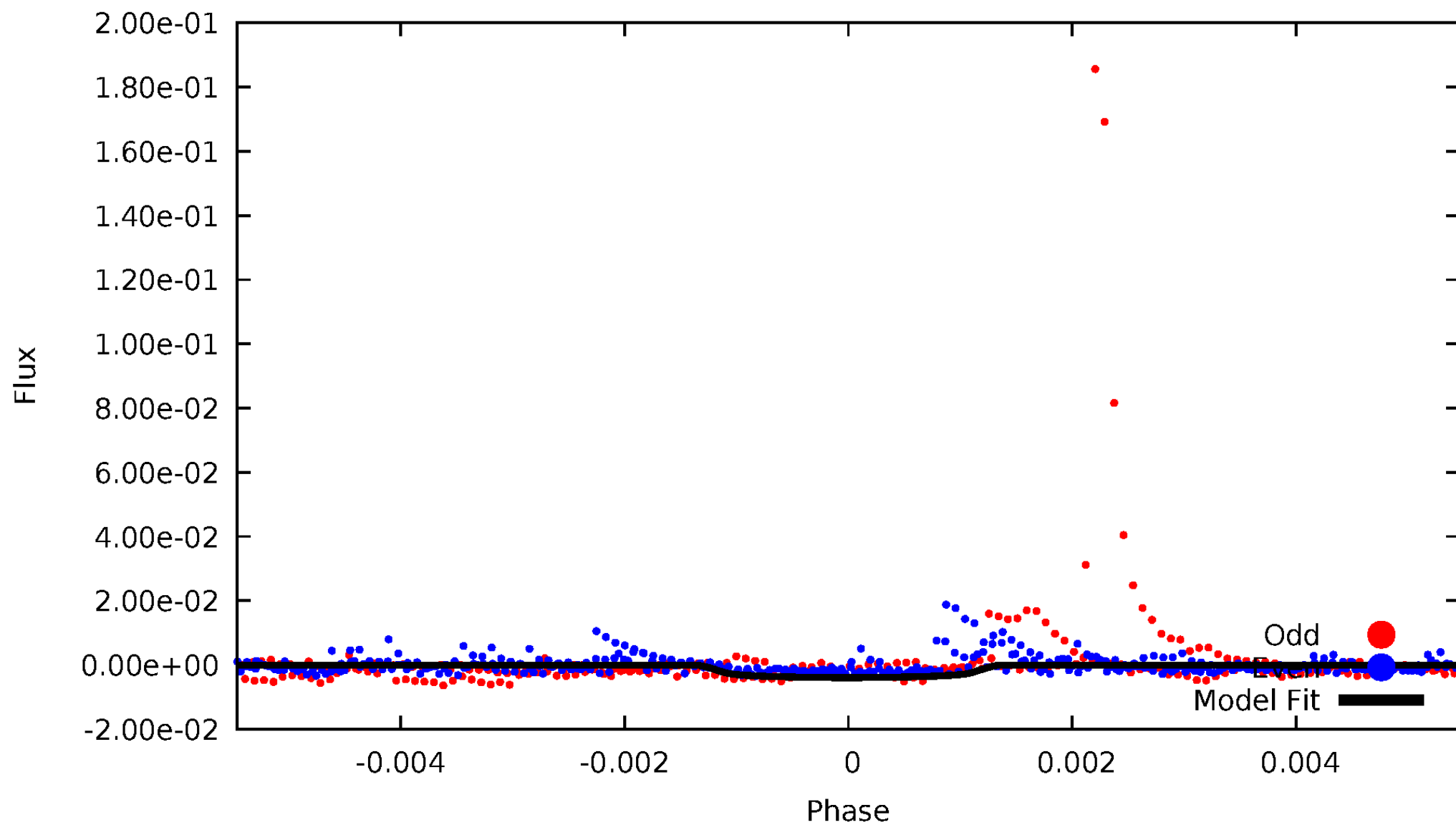


# TCE 010677397-02



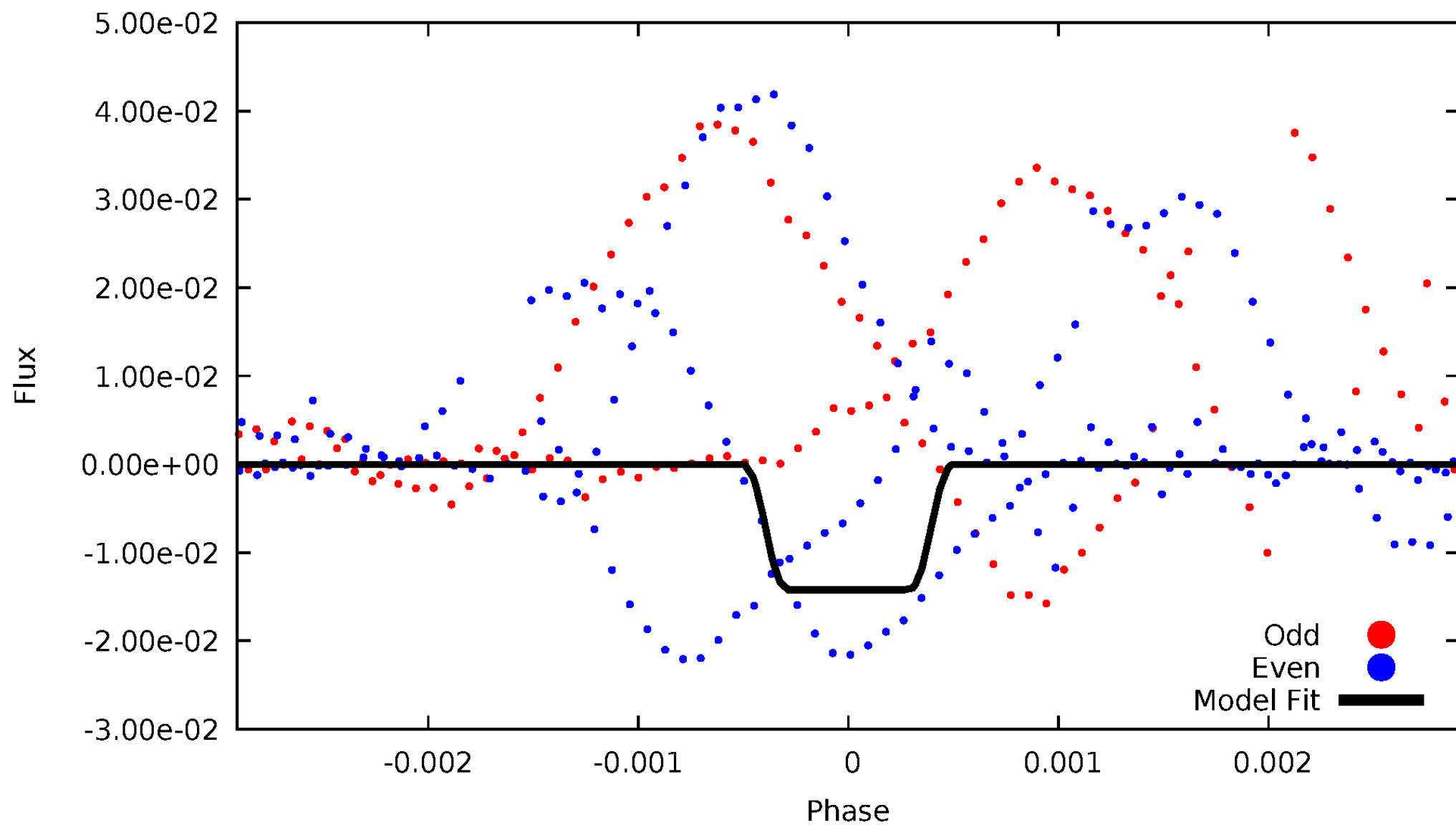
DV Odd/Even

TCE 010677397-02



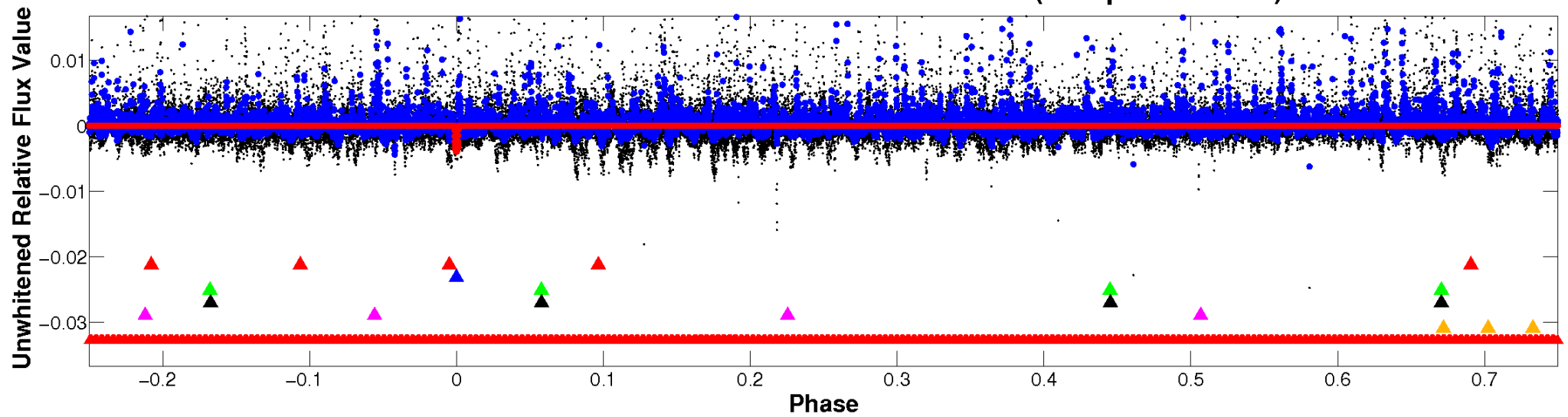
# ALT Odd/Even

TCE 010677397-02

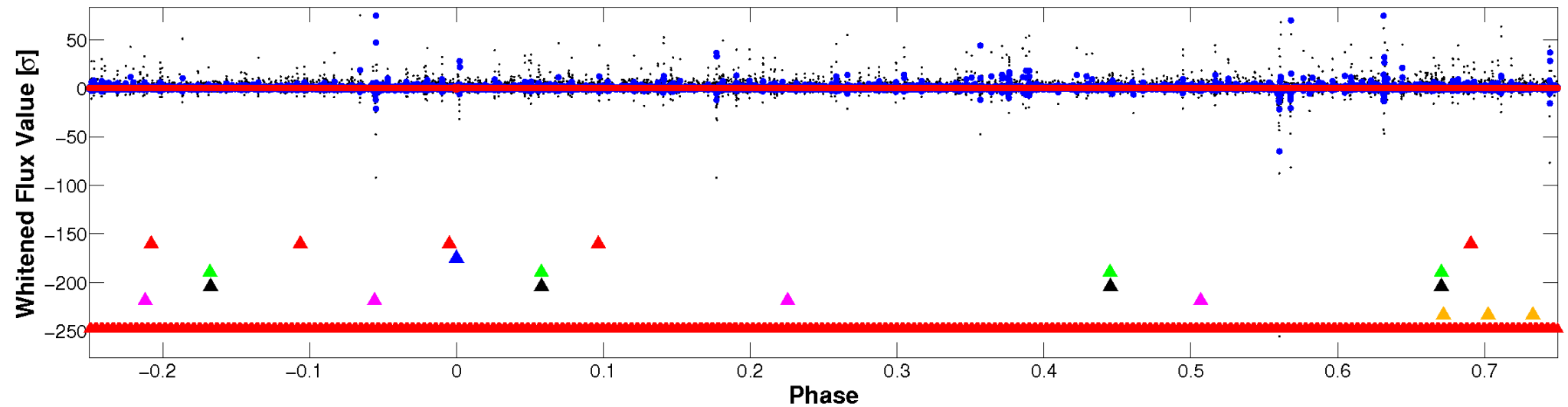


# Non-Whitened Vs. Whitened Light Curve

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



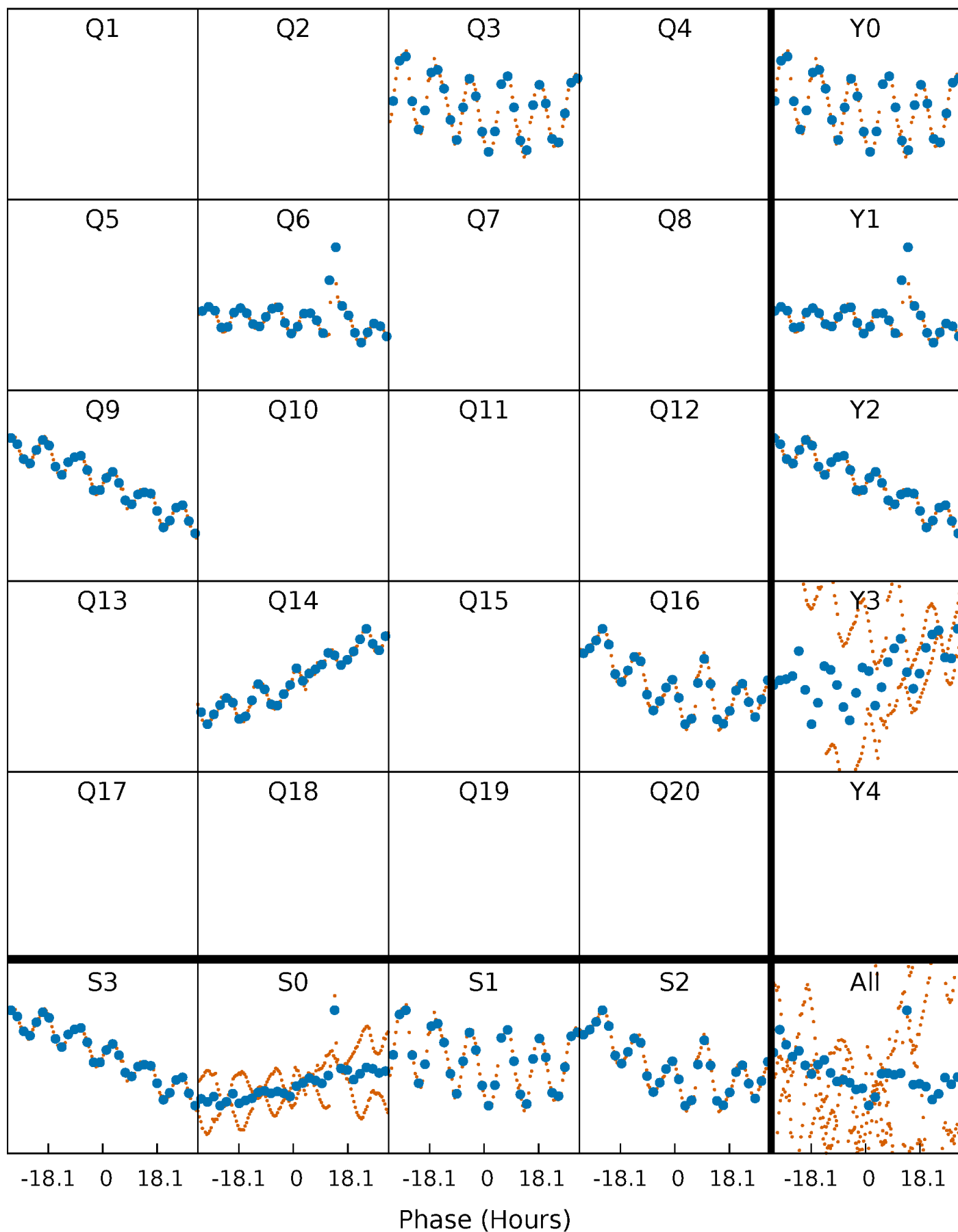
## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)





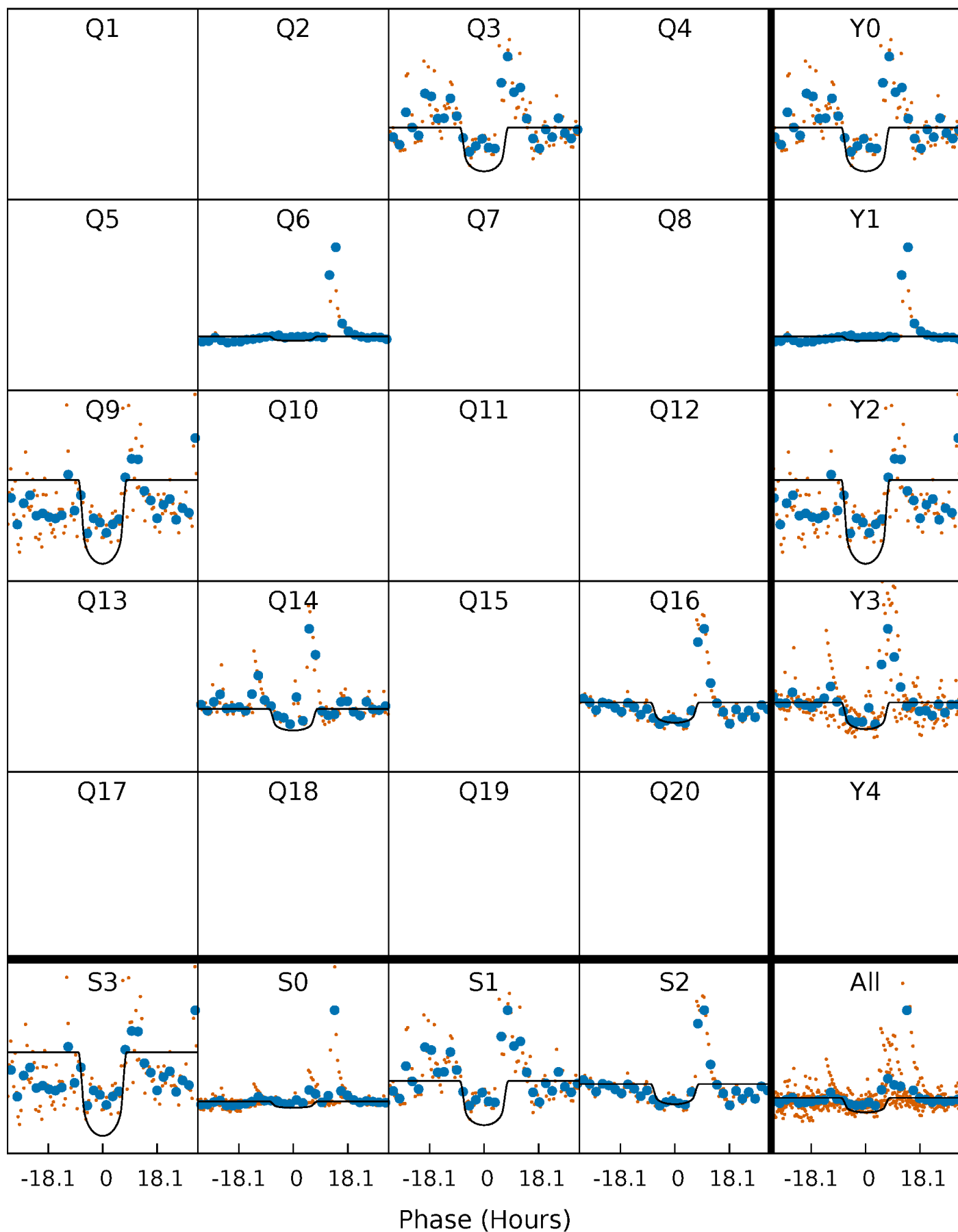
# PDC Quarter-Phased Transit Curves

TCE 010677397-02 P=242.020837 Days  $T_0=334.411468$  (BKJD)



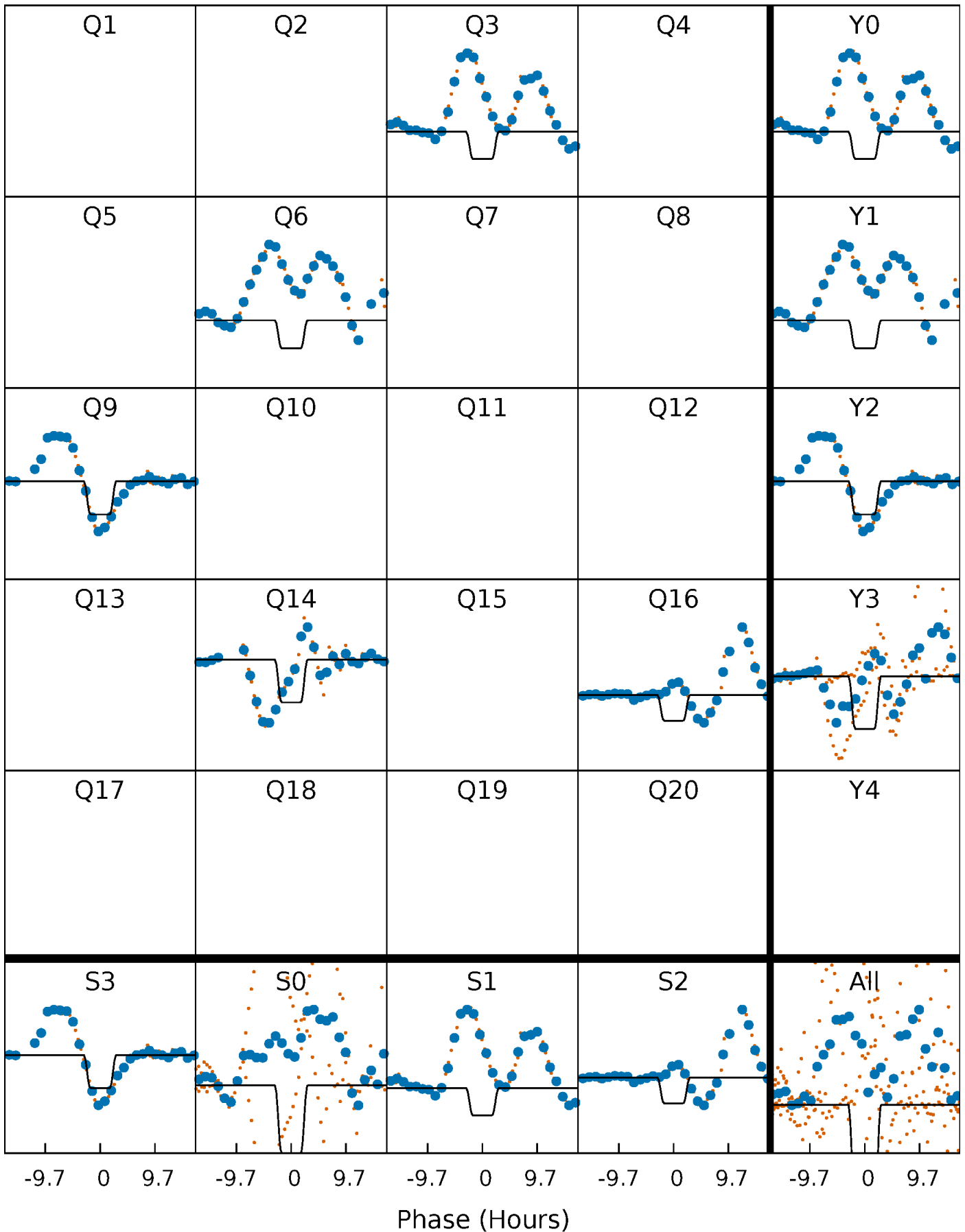
# DV Quarter-Phased Transit Curves

TCE 010677397-02     $P=242.020837$  Days     $T_0=334.411468$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

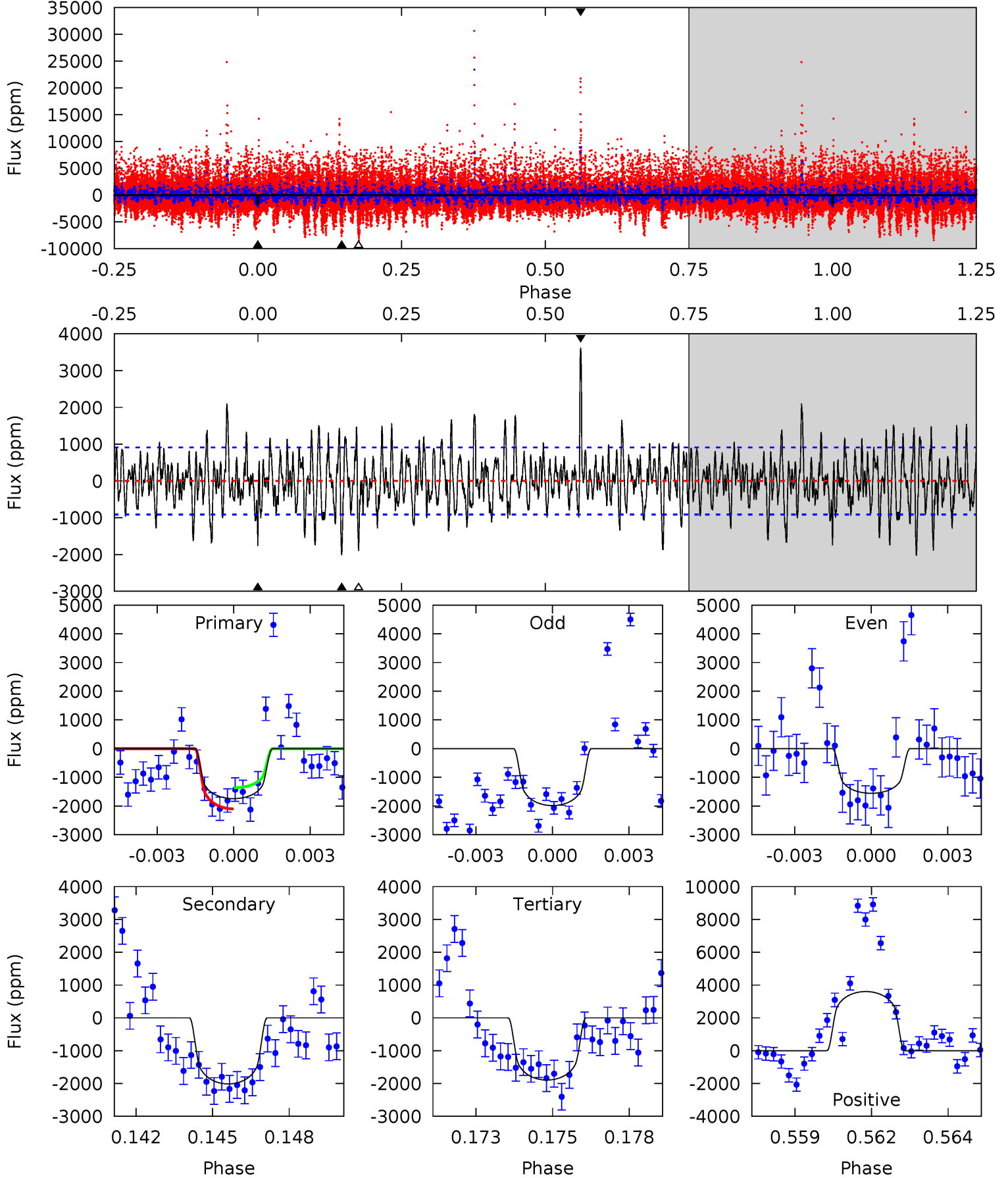
TCE 010677397-02 P=242.021896 Days  $T_0=334.339142$  (BKJD)



# DV Model-Shift Uniqueness Test

010677397-02,  $P = 242.020837$  Days,  $E = 92.390631$  Days

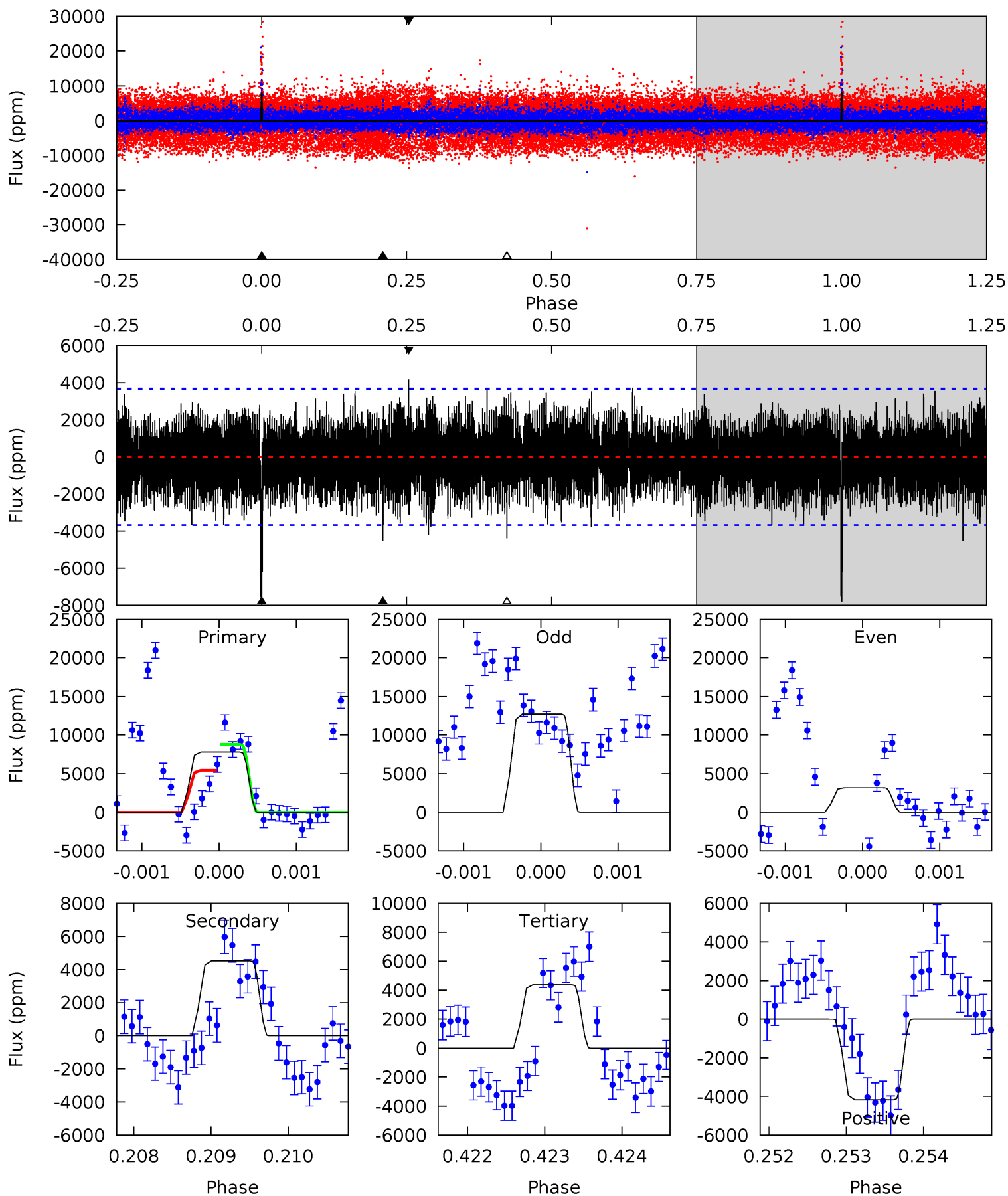
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.1	11.6	10.9	20.8	5.27	3.00	3.49	-0.87	-10.7	0.68	-9.18	0.95	1.07	0.64	2.15



# Alt Model-Shift Uniqueness Test

010677397-02, P = 242.021896 Days, E = 92.317246 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.6	6.72	6.50	6.20	5.45	3.29	2.05	5.08	5.38	0.22	0.52	8.49	1.30	0.35	0



### Stellar Parameters For KIC 010677397

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3393^{+50}_{-50}$	$4.935^{+0.055}_{-0.040}$	$0.000^{+0.100}_{-0.100}$	$0.312^{+0.041}_{-0.041}$	$0.306^{+0.051}_{-0.047}$	$14.160^{+4.127}_{-2.680}$
	+1%/-1%	+1%/-1%	+inf%/-inf%	+13%/-13%	+17%/-15%	+29%/-19%
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 010677397-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-2014 \pm 173$	$2.08^{+0.31}_{-0.27}$	$163^{+4}_{-4}$	$3085^{+119}_{-106}$	$66905^{+19946}_{-14388}$
Alt.	$-4528 \pm 674$	$4.03^{+0.42}_{-0.39}$	$163^{+5}_{-4}$	$2879^{+83}_{-90}$	$41007^{+9110}_{-8471}$

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

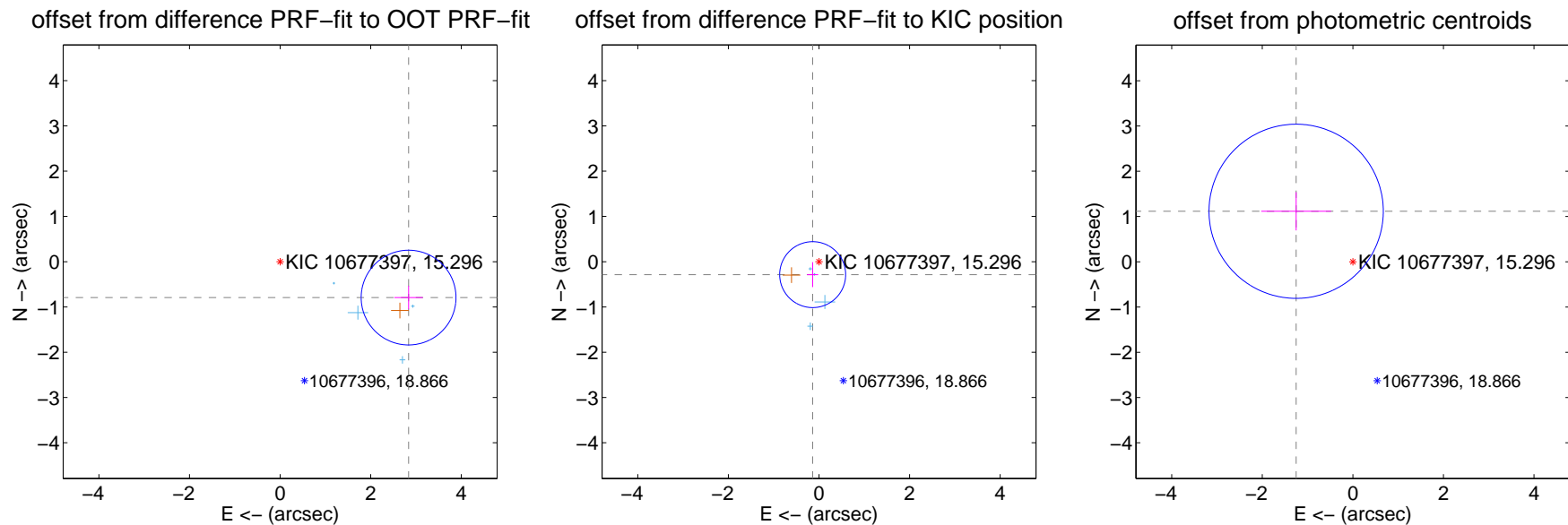
## DV Centroid Data

Supplemental centroid analysis for 010677397-02. Kepler magnitude: 15.30. Transit SNR 10.13

There are 4 quarters with good PRF difference image offsets

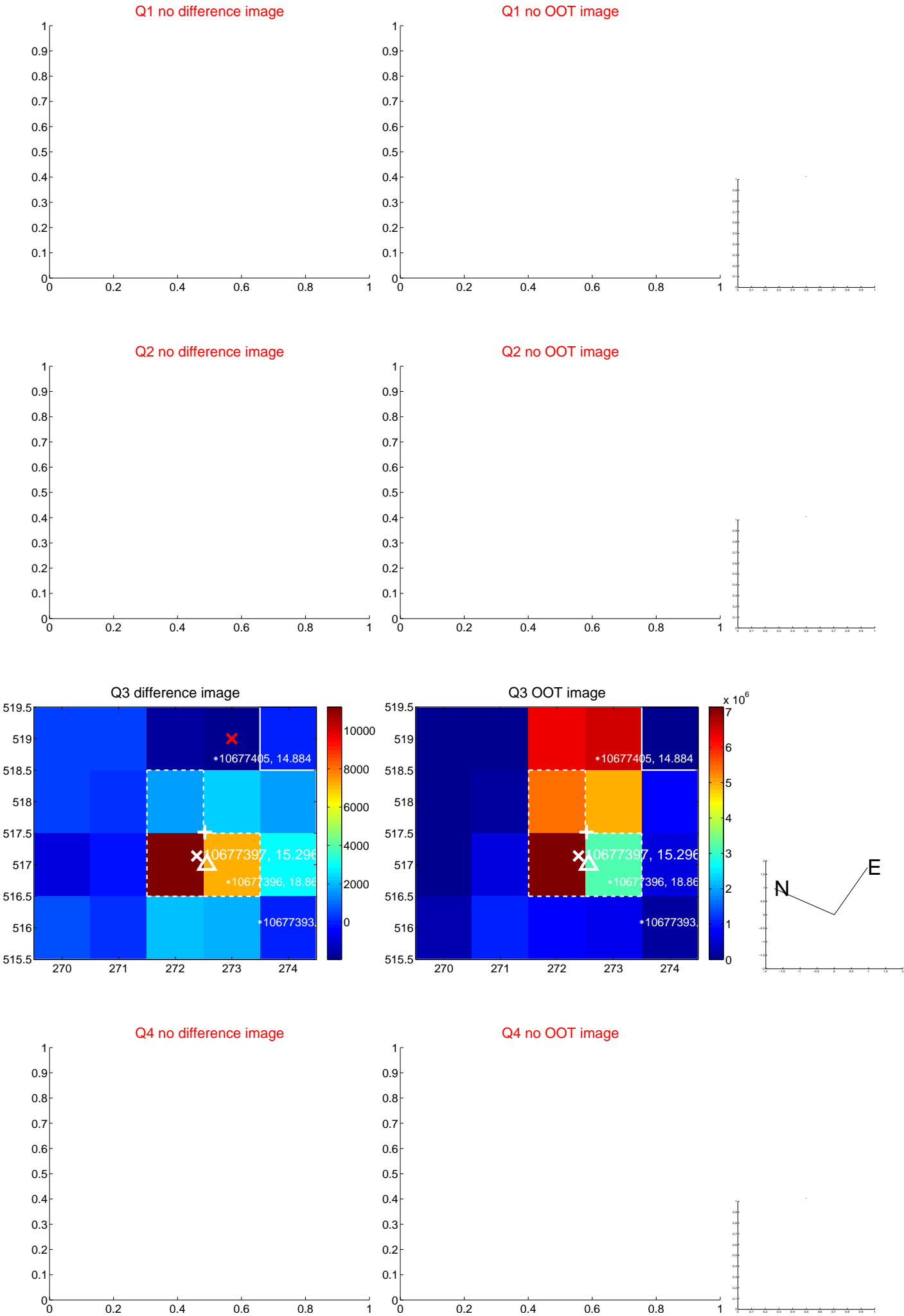
The direct PRF centroid is offset from the target star catalog position by about 1.30 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.945 \pm 0.349$	8.44	$-2.836 \pm 0.314$	$-0.793 \pm 0.258$
PRF-fit source offset from KIC position	$0.318 \pm 0.243$	1.31	$0.139 \pm 0.123$	$-0.286 \pm 0.276$
photometric centroid source offset	$1.68 \pm 0.64$	2.61	$1.25 \pm 0.77$	$1.12 \pm 0.42$



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.



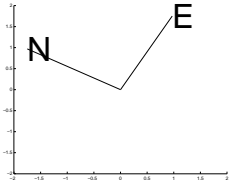
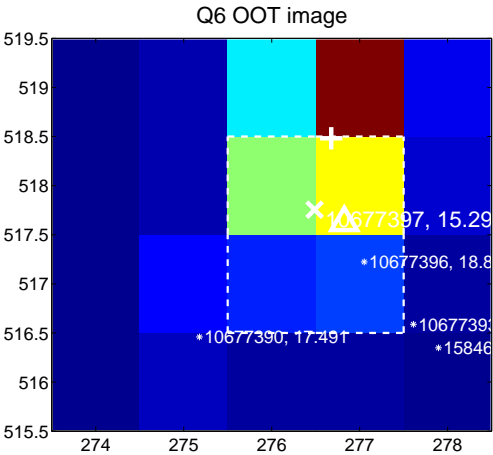
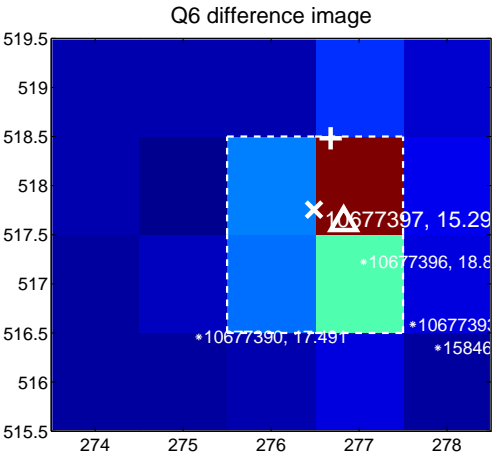


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

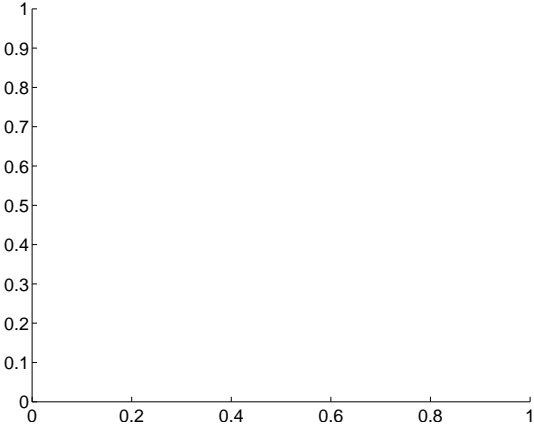
Q5 no difference image



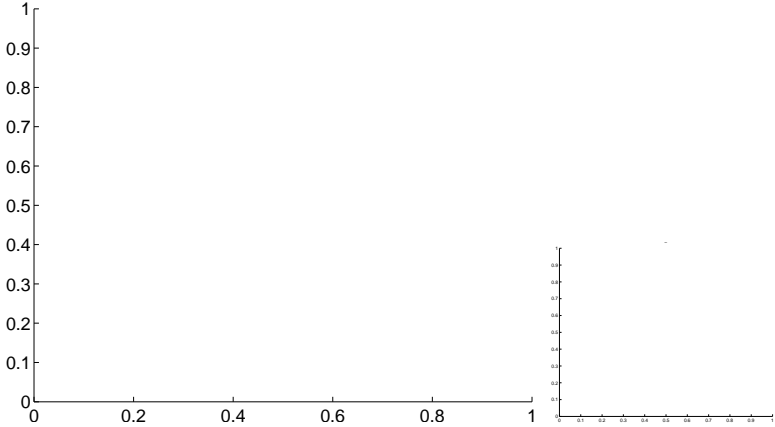
Q5 no OOT image



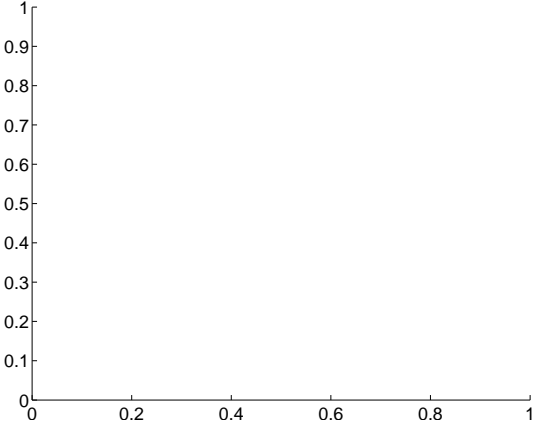
Q7 no difference image



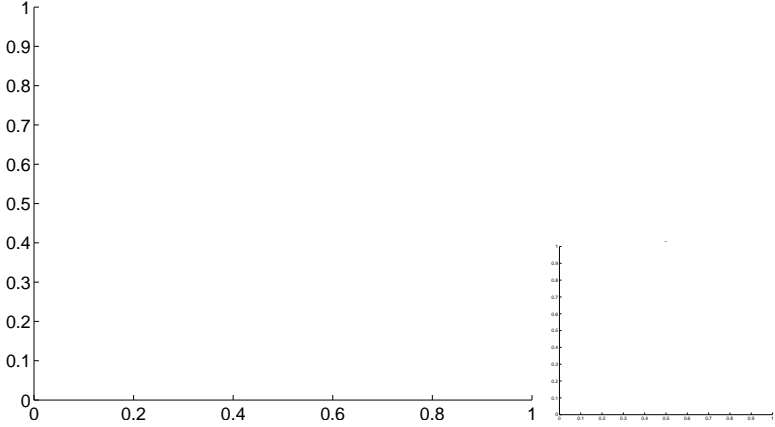
Q7 no OOT image



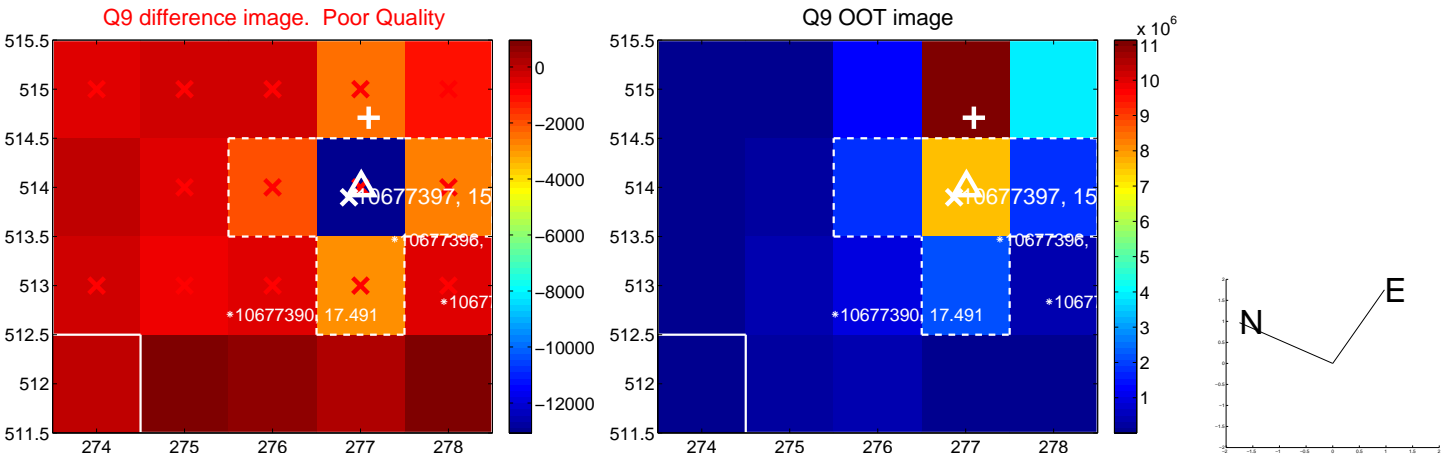
Q8 no difference image



Q8 no OOT image

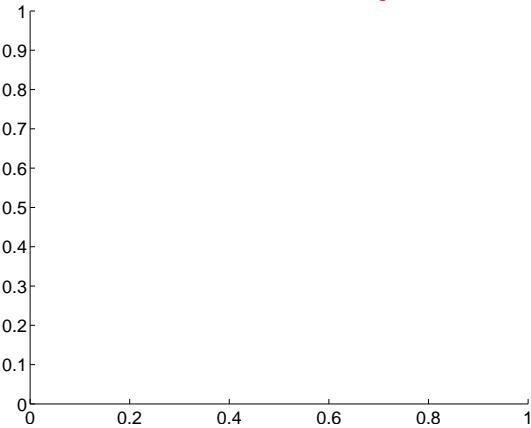


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

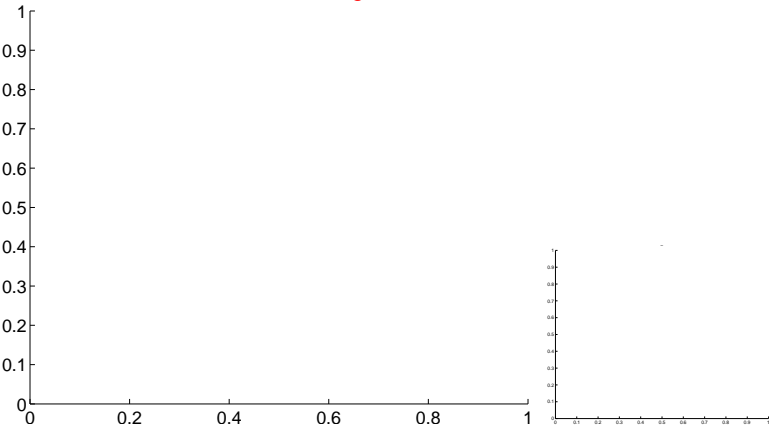


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

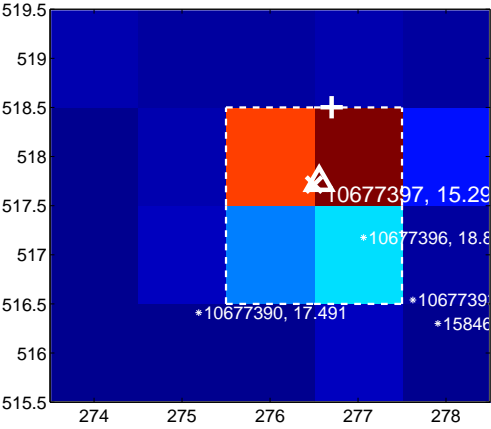
Q13 no difference image



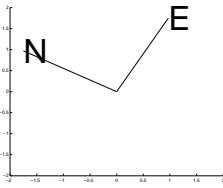
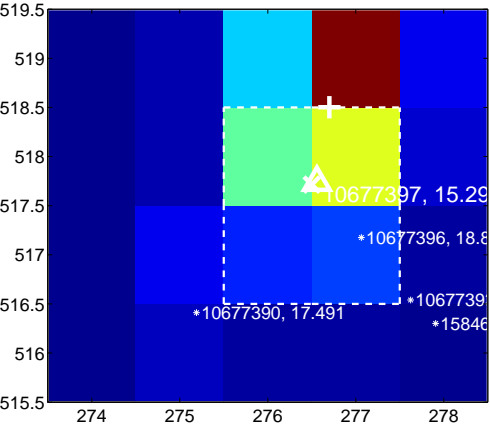
Q13 no OOT image



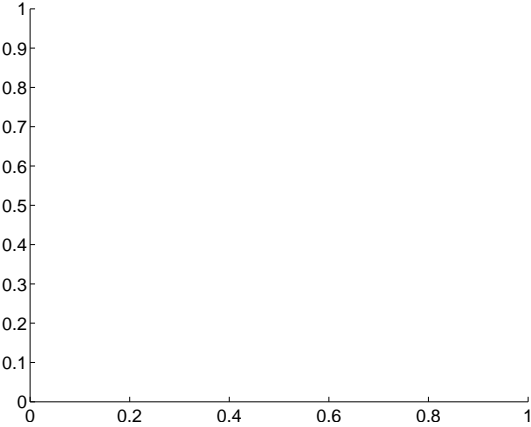
Q14 difference image



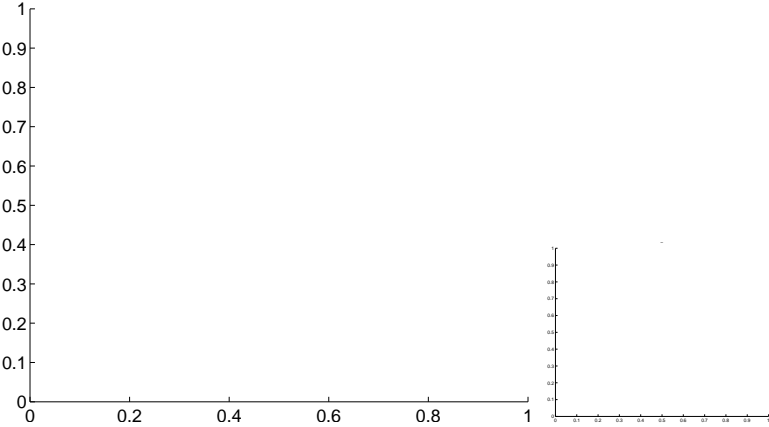
Q14 OOT image



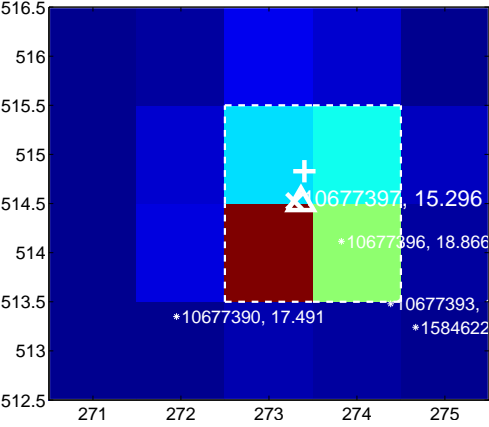
Q15 no difference image



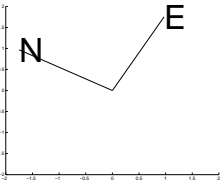
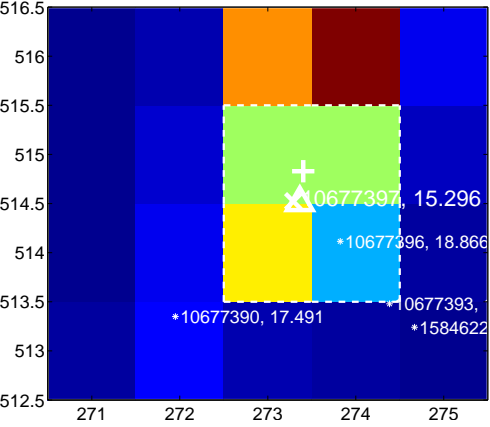
Q15 no OOT image



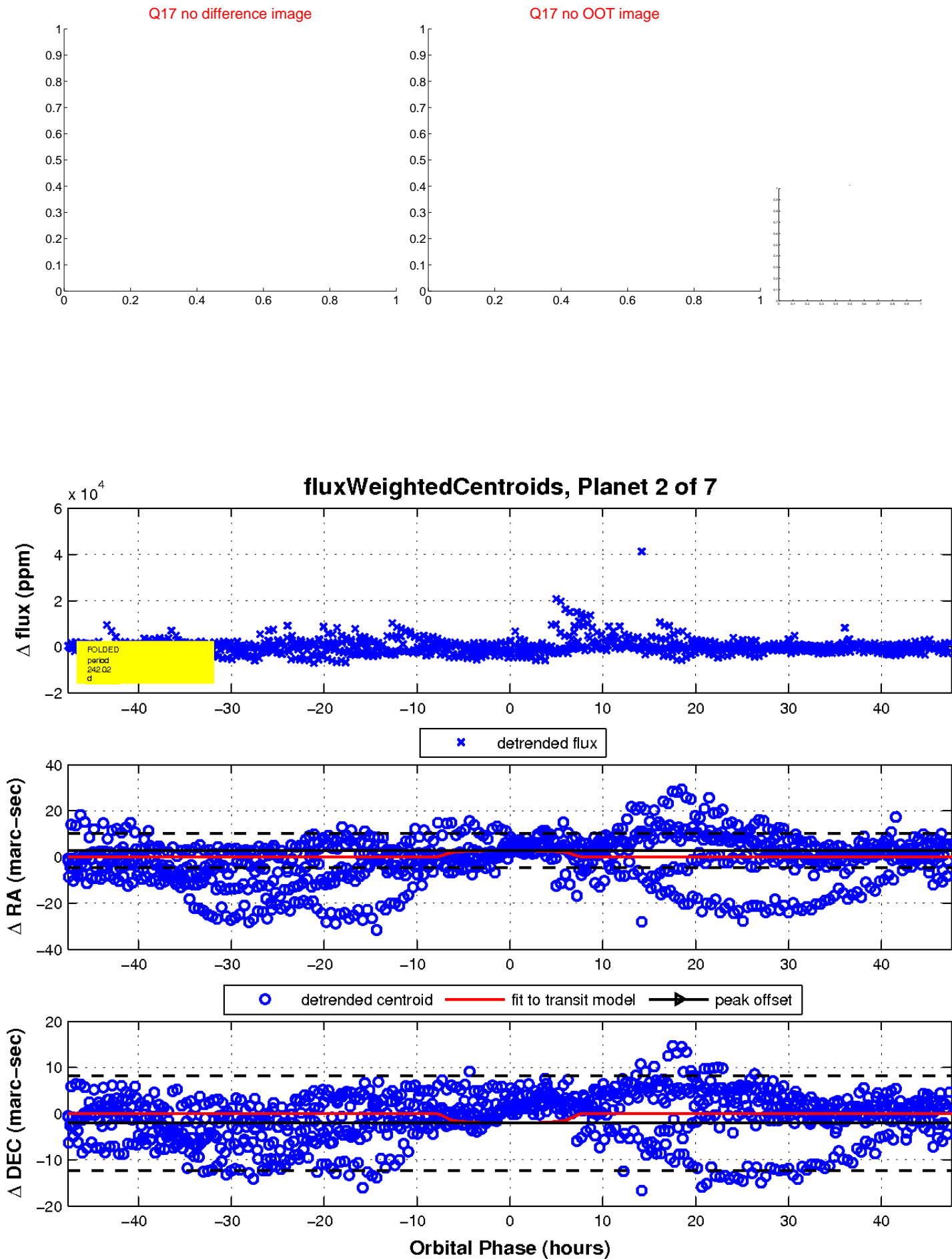
Q16 difference image



Q16 OOT image

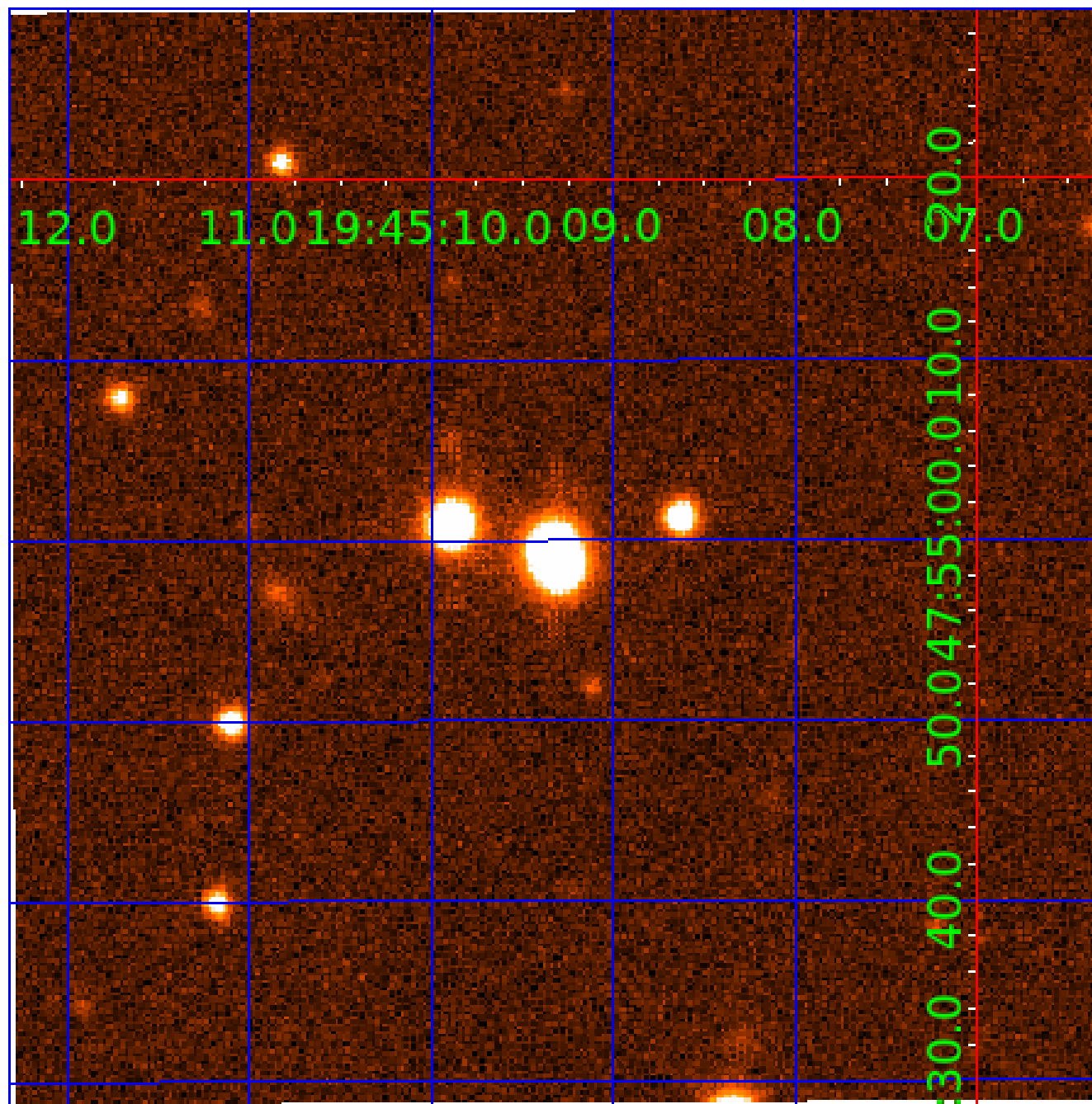


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 010677397

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010677397-01	OBS	No	266.581619	259.553907	5271.7	13.616	15.1	11.1	0.31	3393	2.23	0.04
010677397-02	OBS	No	242.020837	334.411468	3928.4	15.860	14.1	10.1	0.31	3393	2.10	0.04
010677397-03	OBS	No	335.725203	254.705198	1211.1	2.672	13.5	3.1	0.31	3393	1.14	0.03
010677397-04	OBS	No	335.763485	254.689739	4088.6	17.913	13.5	7.7	0.31	3393	1.97	0.03
010677397-05	OBS	No	415.967216	283.119581	3821.0	0.715	13.5	5.5	0.31	3393	4.01	0.02
010677397-06	OBS	No	476.676746	269.771385	4732.4	2.934	13.4	10.4	0.31	3393	2.12	0.02
010677397-07	OBS	No	0.948771	131.969317	363.3	3.614	14.8	14.9	0.31	3393	0.63	71.31

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010677397-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010677397-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_KIC_POS
010677397-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_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_KIC_POS
010677397-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—SAME_NTL_PERIOD—CENT_FEW_DIFFS
010677397-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010677397-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—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
010677397-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—CENT_KIC_POS

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

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

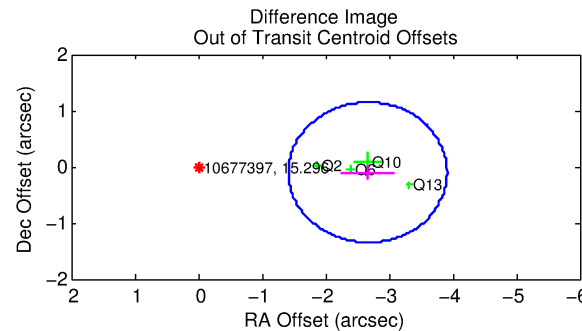
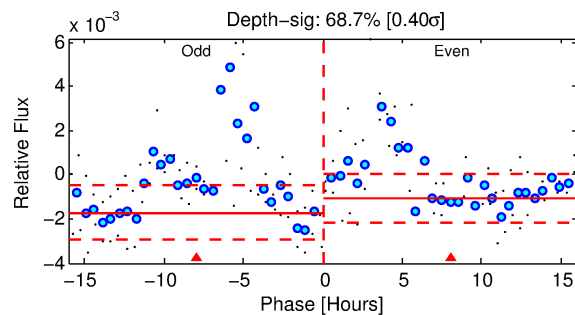
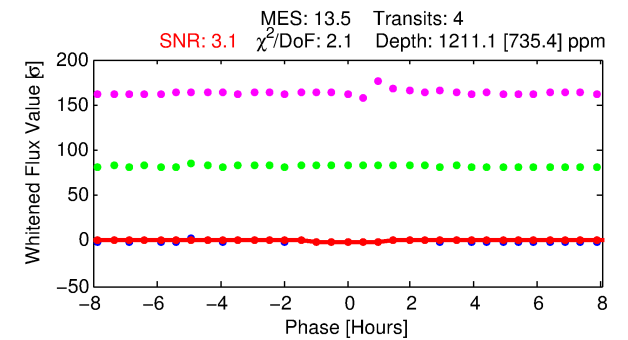
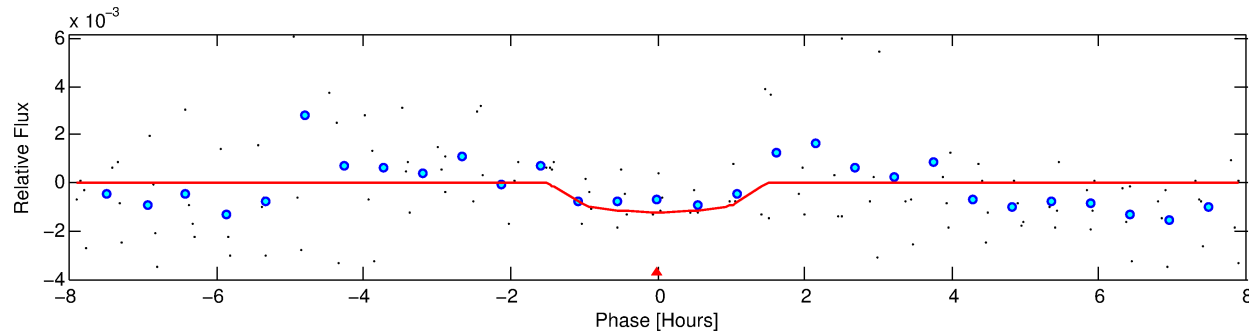
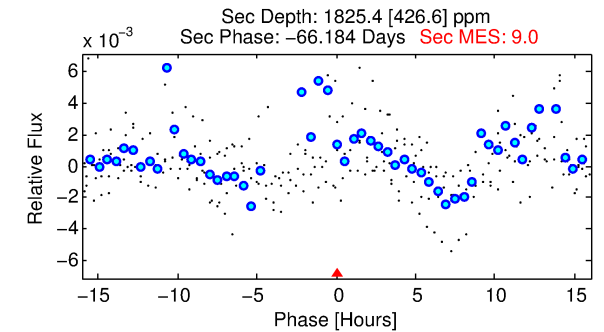
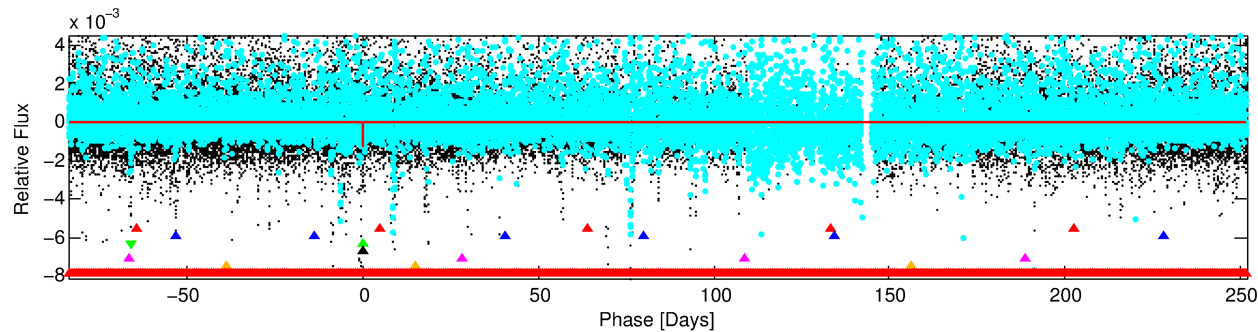
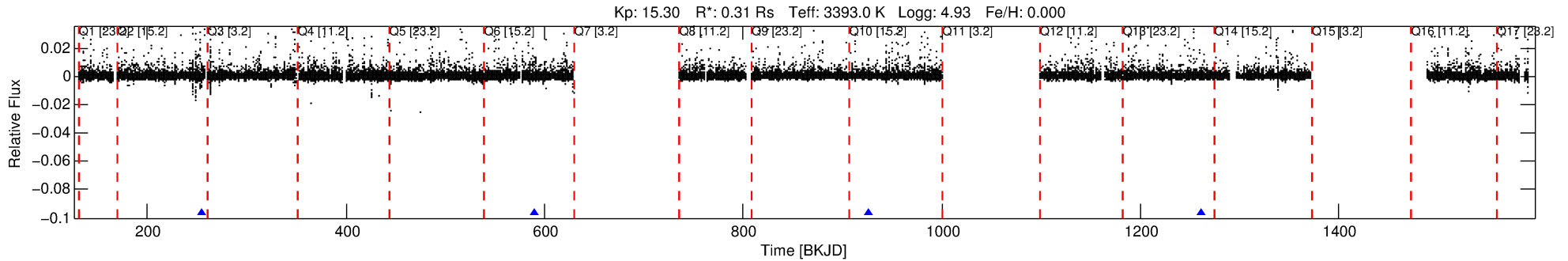
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010677397-03

No Significant Match Found

# DV One-Page Summary

KIC: 10677397 Candidate: 3 of 7 Period: 335.725 d



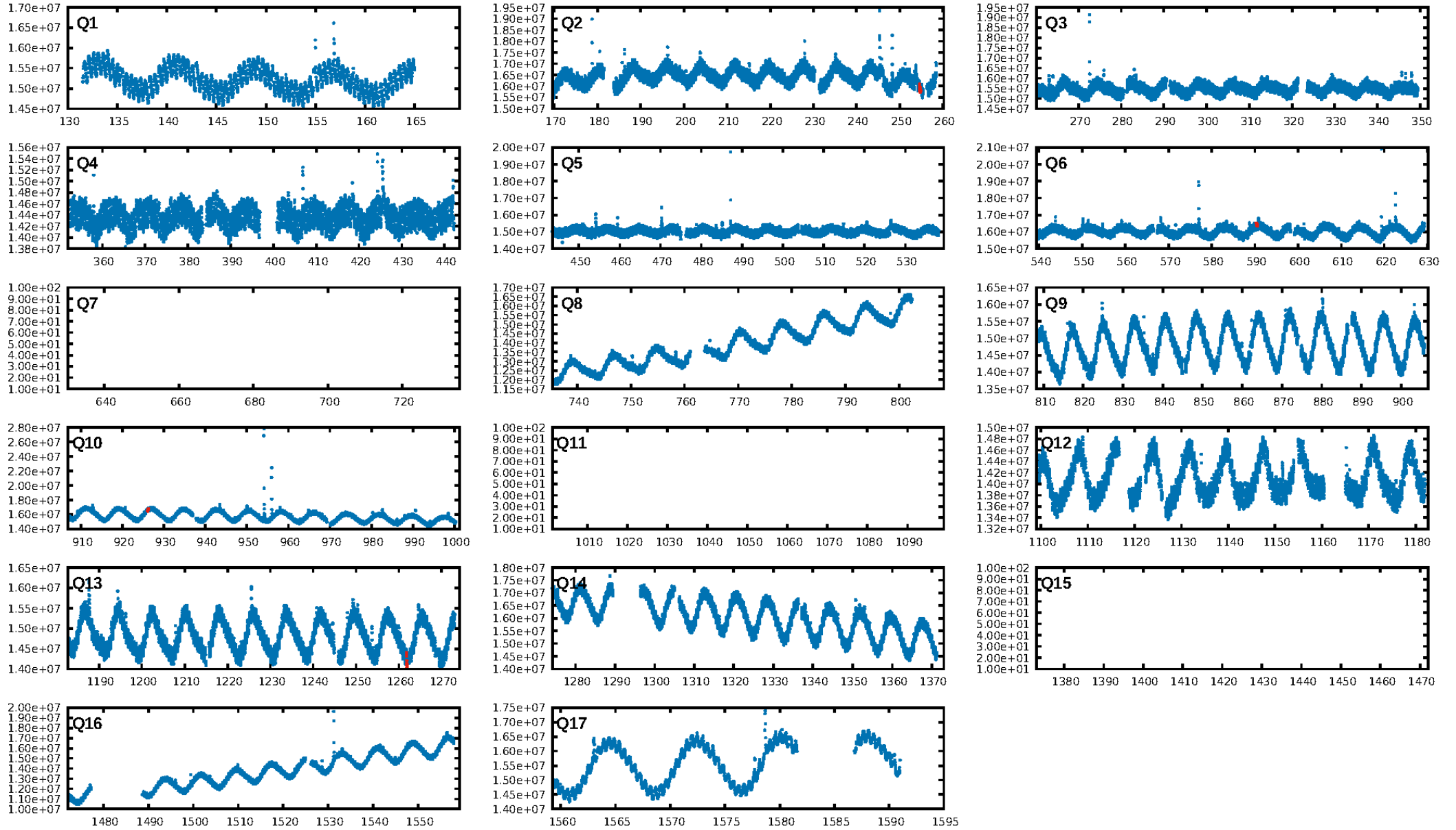
## DV Fit Results:

Period = 335.72520 [0.01331] d  
Epoch = 254.7052 [0.0285] BKJD  
Rp/R\* = 0.0334 [0.0959]  
a/R\* = 782.73 [9298.20]  
b = 0.63 [11.15]  
Seff = 0.03 [0.00]  
Teq = 105 [4] K  
Rp = 1.14 [3.27] Re  
a = 0.6370 [0.0619] AU  
Ag = 315367.19 [1813223.21] [0.17σ]  
Teffp = 3838 [5516] K [0.68σ]

## DV Diagnostic Results:

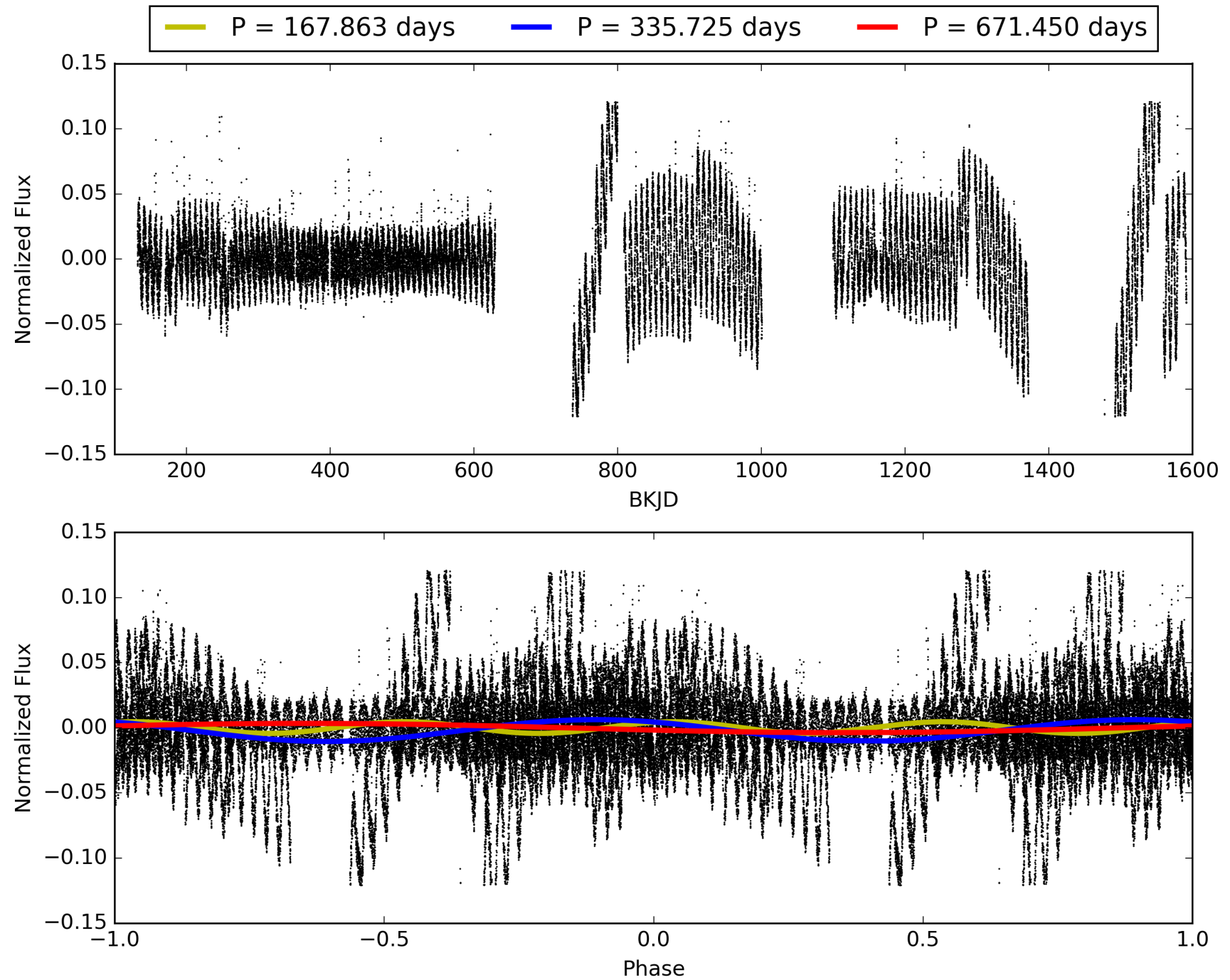
ShortPeriod-sig: 100.0% [119.59σ]  
LongPeriod-sig: 4.0% [0.05σ]  
ModelChiSquare2-sig: 30.3%  
ModelChiSquareGof-sig: 82.7%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -0.5062  
Centroid-sig: 6.3%  
Centroid-so: 2.063 arcsec [1.12σ]  
OotOffset-rm: 2.665 arcsec [6.40σ]  
KicOffset-rm: 0.609 arcsec [4.13σ]  
OotOffset-st: 3/0/0/1 [4]  
KicOffset-st: 3/0/0/1 [4]  
DiffImageQuality-fgm: 0.75 [3/4]  
DiffImageOverlap-fno: 0.00 [0/4]

# TCE 010677397-03, PDC Light Curves



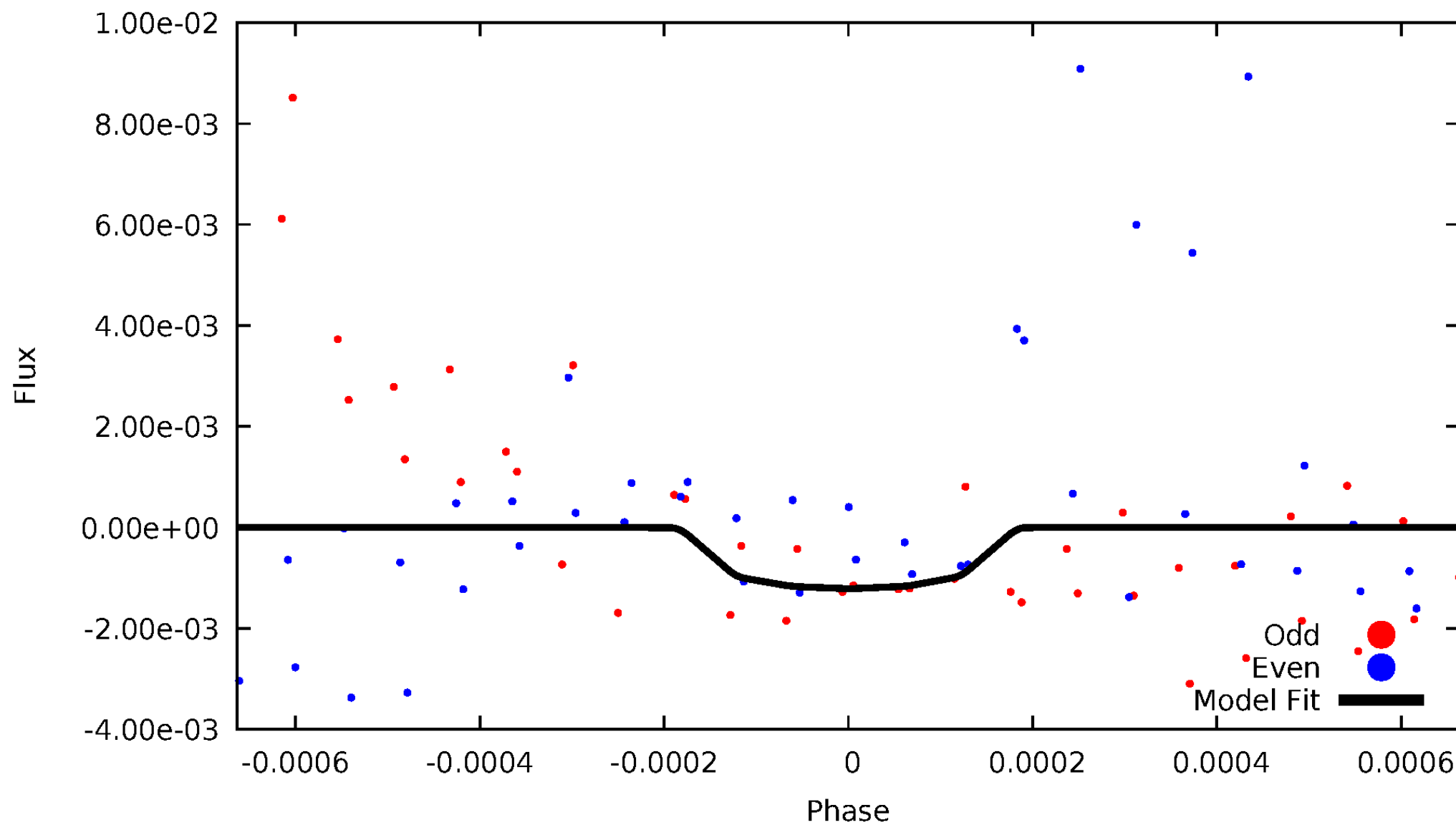


# TCE 010677397-03



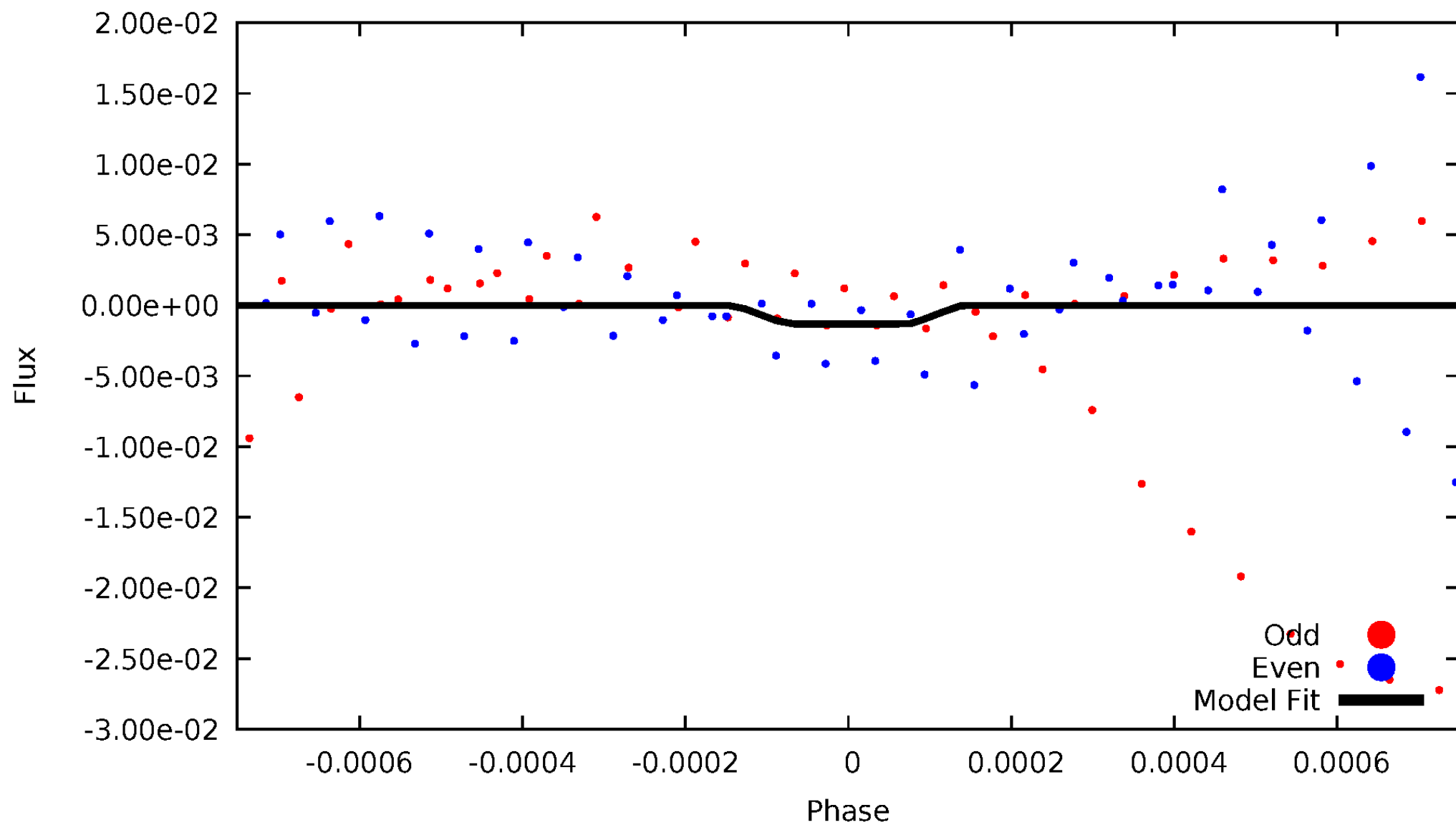
# DV Odd/Even

TCE 010677397-03



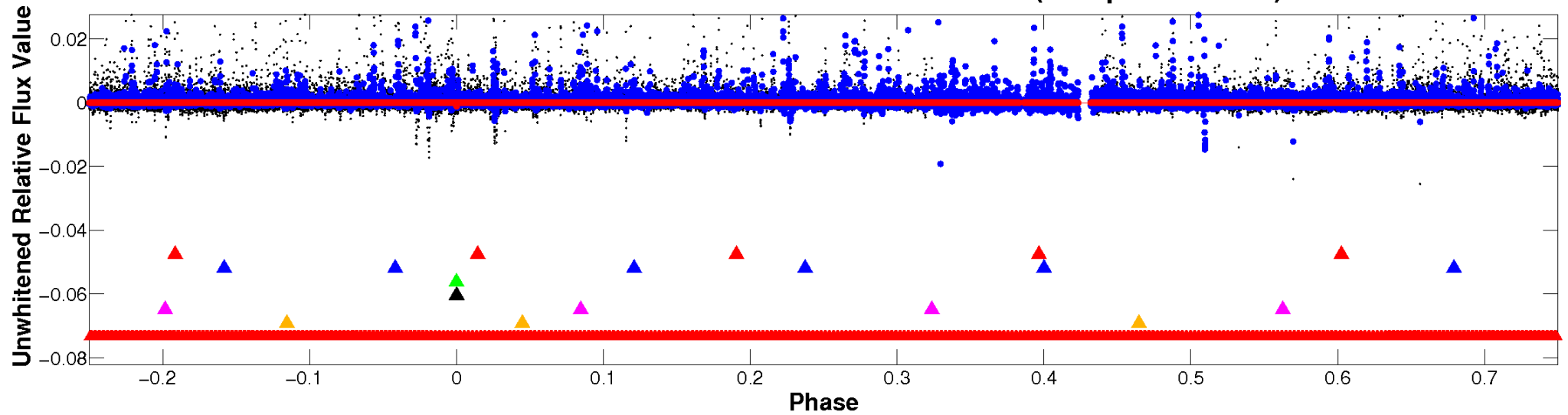
# ALT Odd/Even

TCE 010677397-03

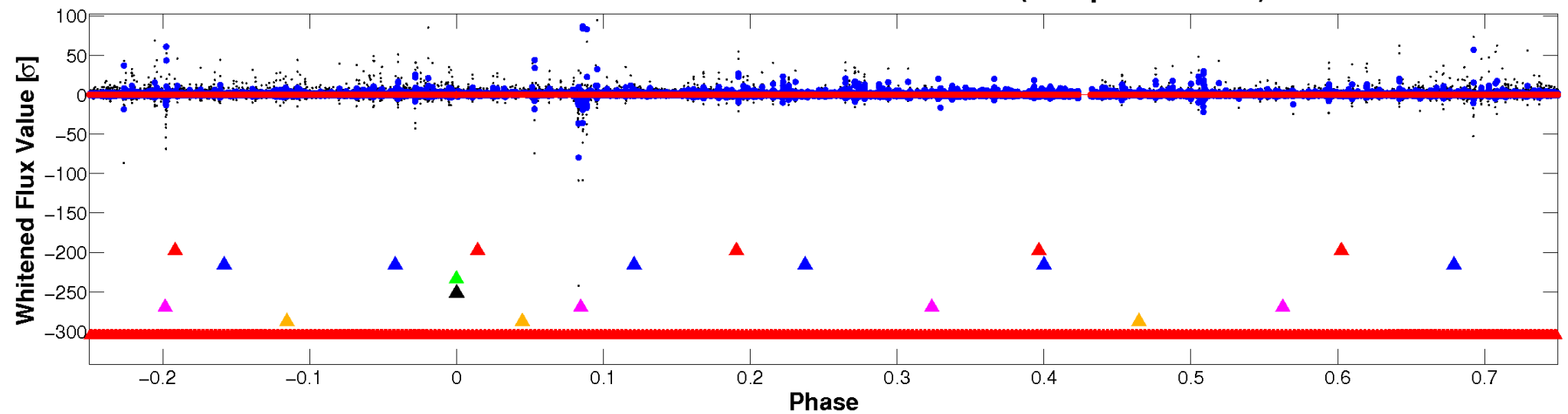


# Non-Whitened Vs. Whitened Light Curve

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

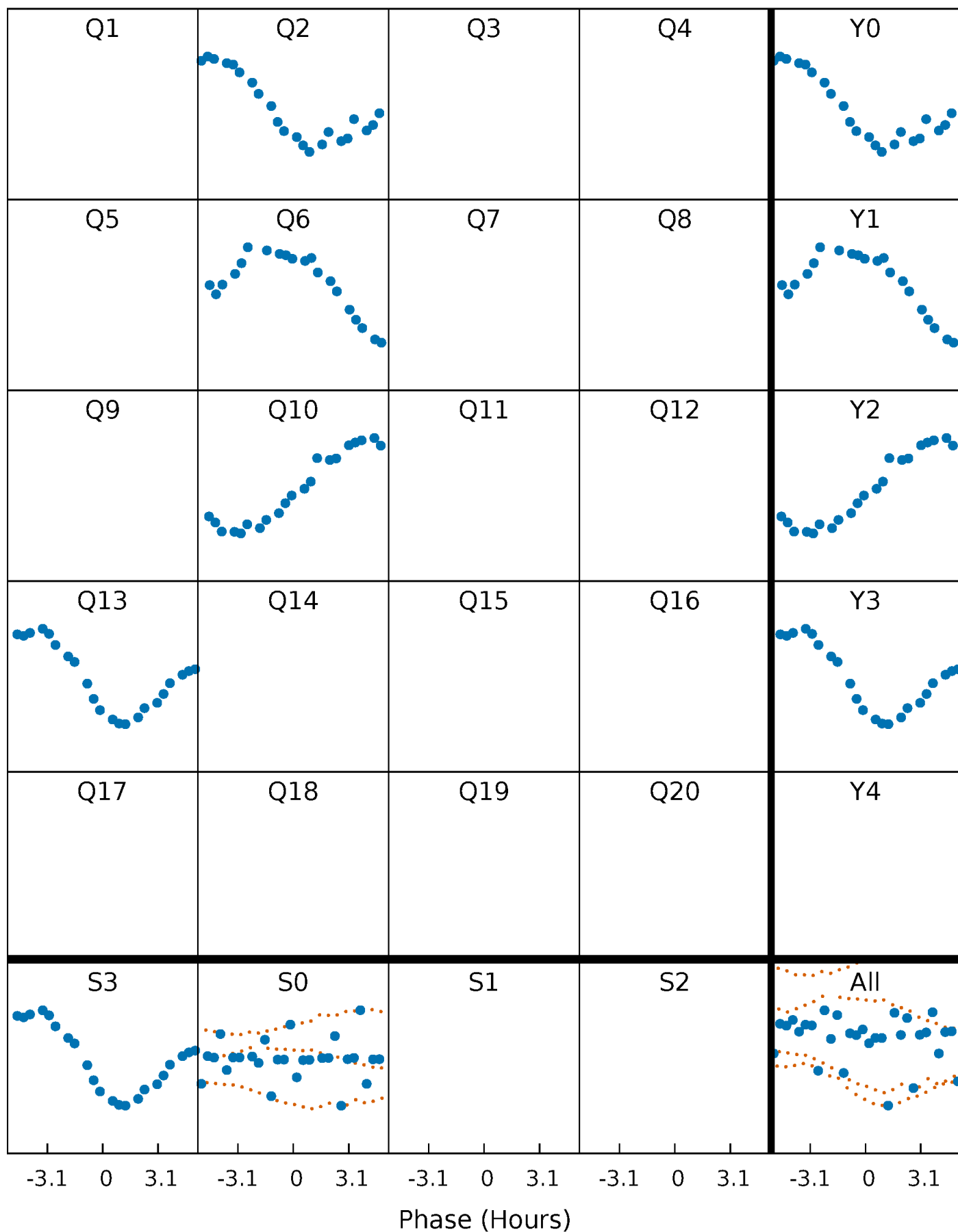


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



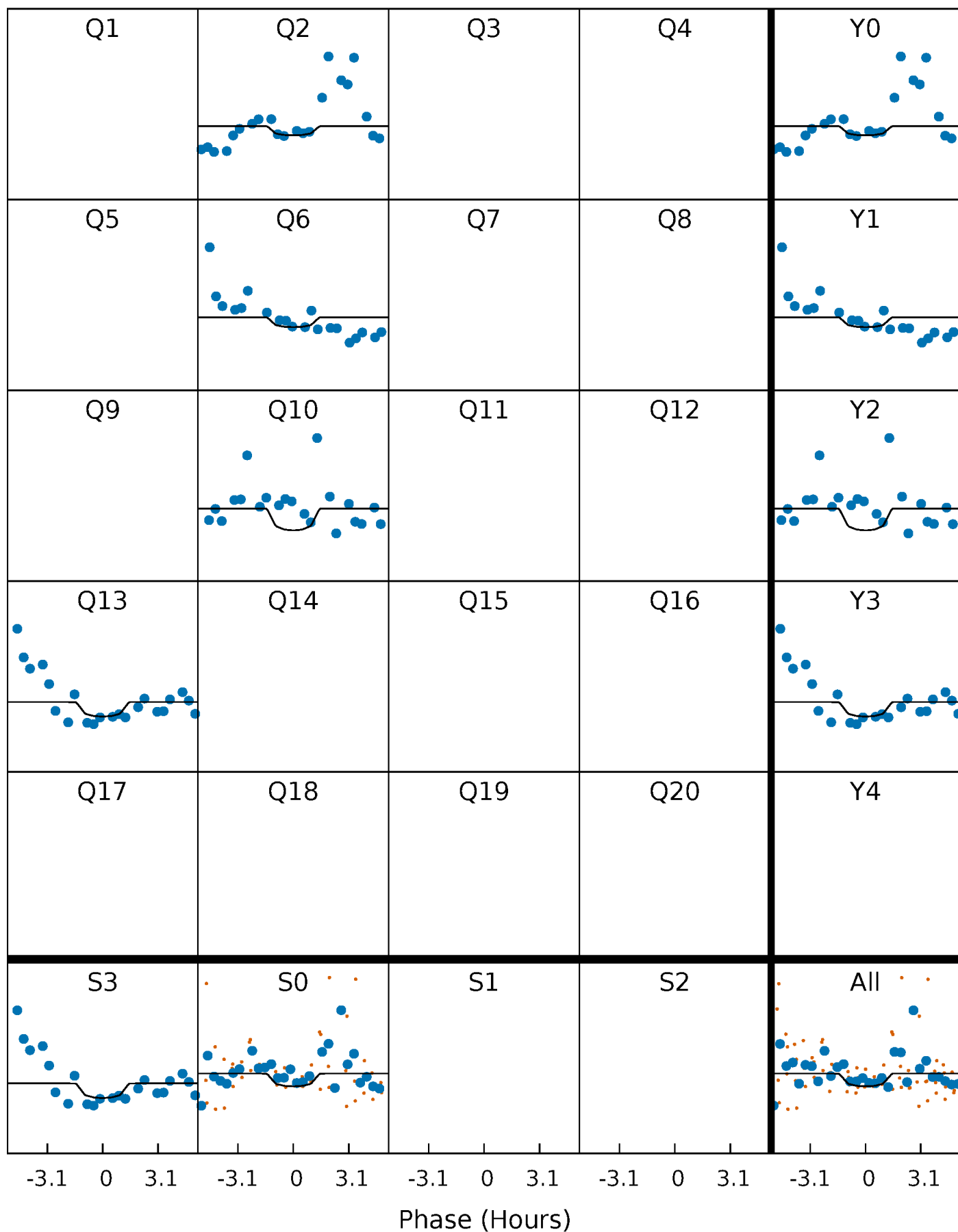
# PDC Quarter-Phased Transit Curves

TCE 010677397-03     $P=335.725203$  Days     $T_0=254.705198$  (BKJD)



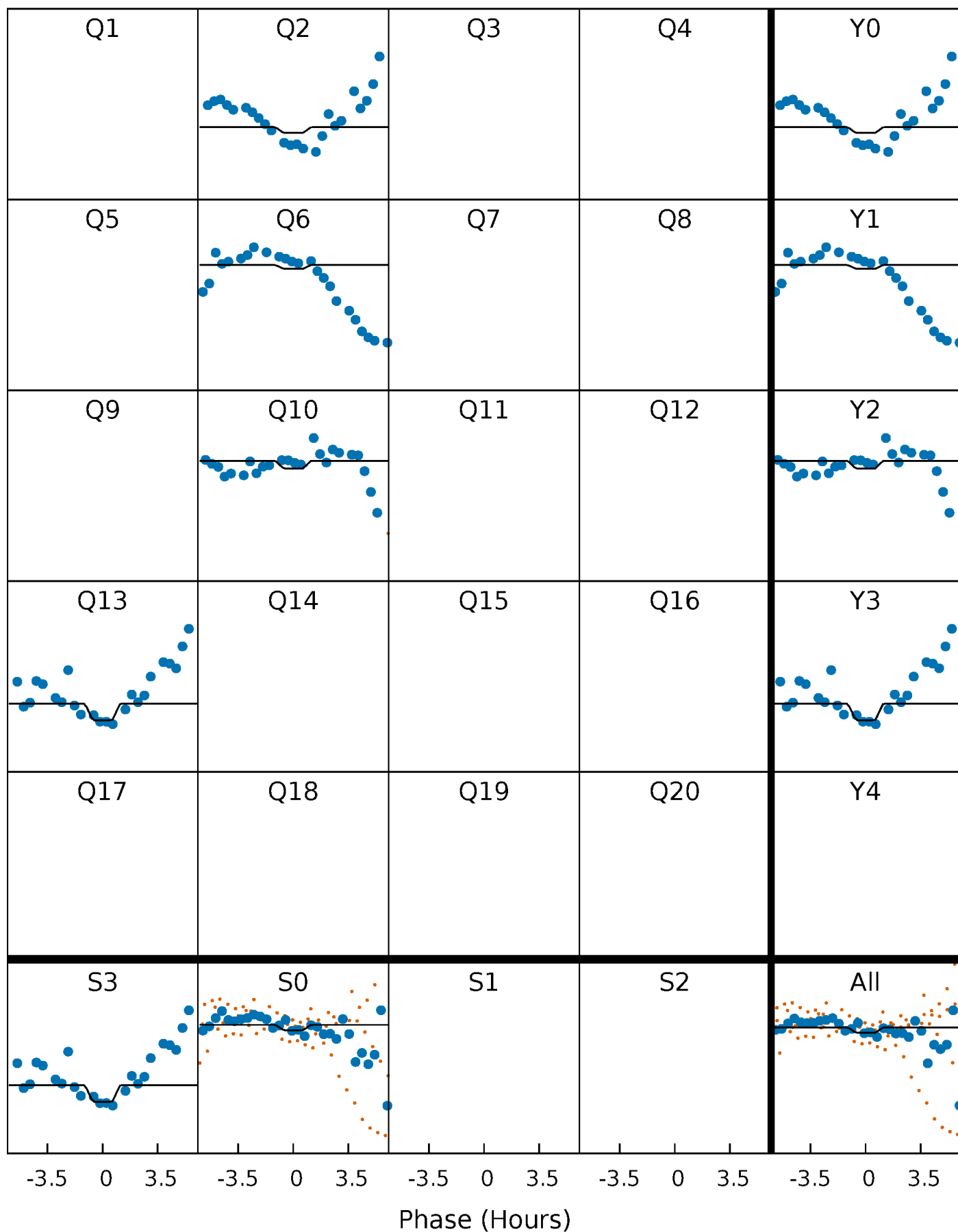
# DV Quarter-Phased Transit Curves

TCE 010677397-03 P=335.725203 Days  $T_0=254.705198$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

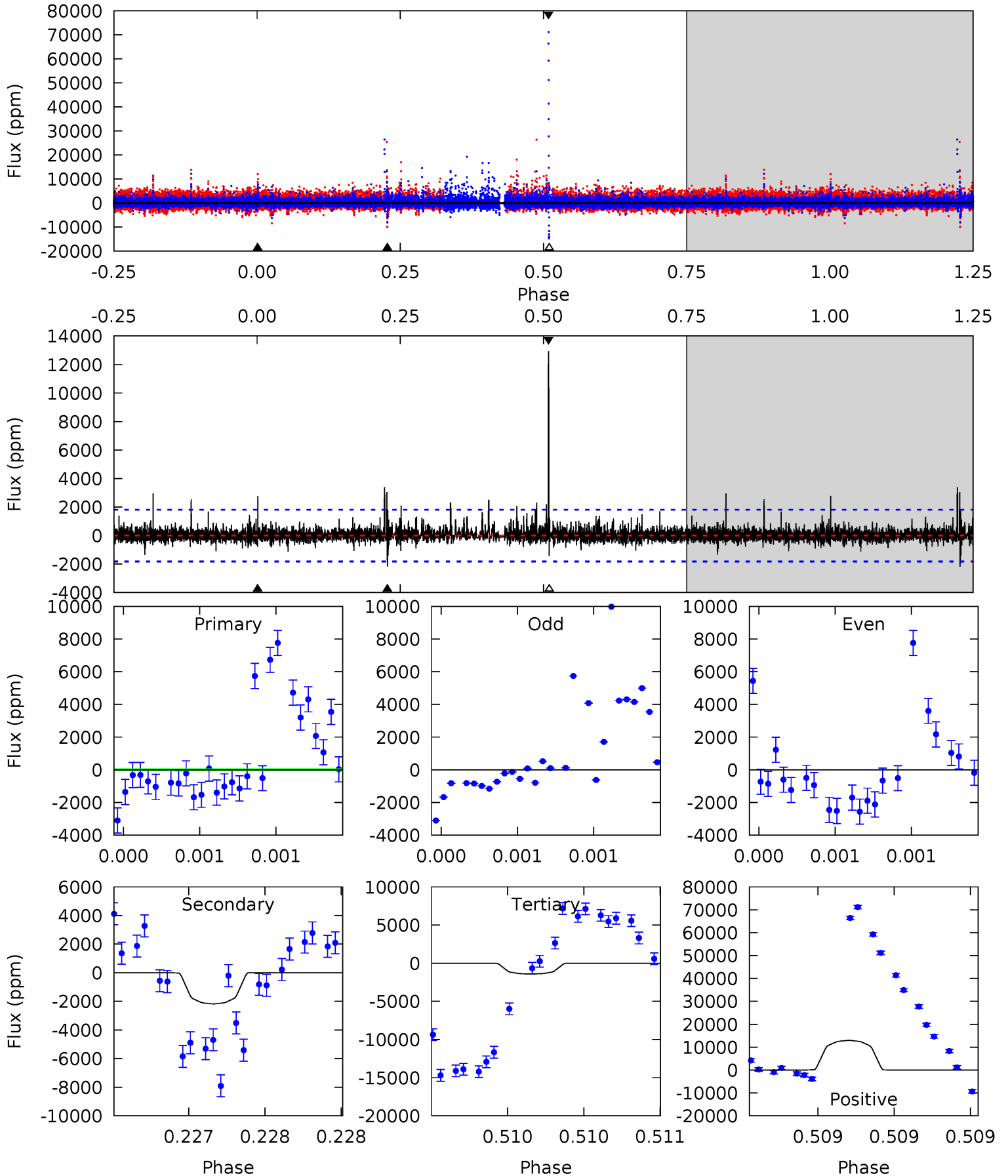
TCE 010677397-03 P=335.737013 Days  $T_0=254.696892$  (BKJD)



# DV Model-Shift Uniqueness Test

010677397-03, P = 335.725203 Days, E = 254.705198 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.39	6.72	4.38	40.0	5.60	3.53	1.24	-2.00	-37.6	2.34	-33.2	0.63	0.97	0.86	0.27

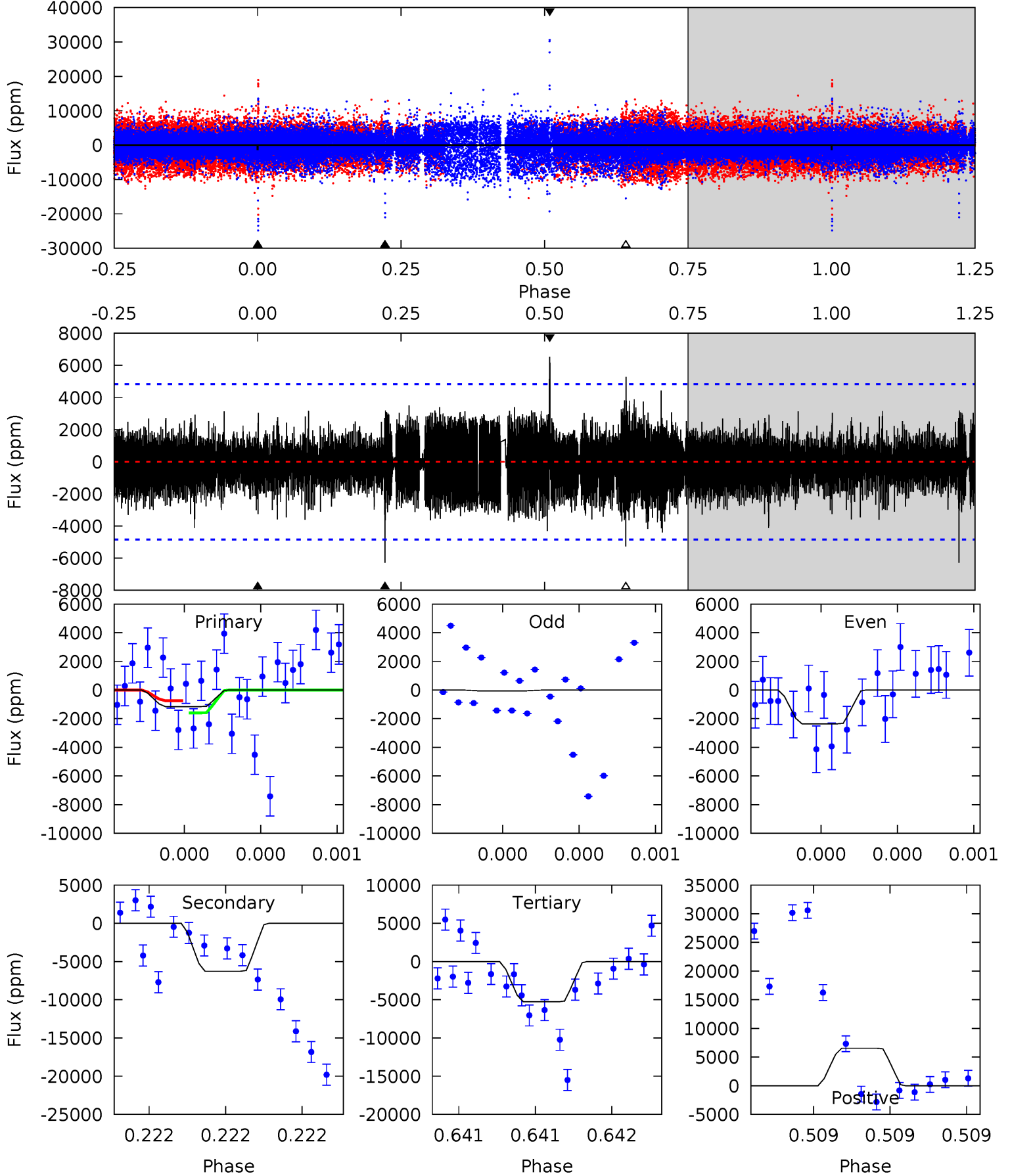




# Alt Model-Shift Uniqueness Test

010677397-03, P = 335.737013 Days, E = 254.696892 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
1.36	7.38	6.19	7.69	5.68	3.65	1.53	-4.83	-6.33	1.18	-0.32	1.32	1.35	0.51	0.50



### Stellar Parameters For KIC 010677397

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3393^{+50}_{-50}$	$4.935^{+0.055}_{-0.040}$	$0.000^{+0.100}_{-0.100}$	$0.312^{+0.041}_{-0.041}$	$0.306^{+0.051}_{-0.047}$	$14.160^{+4.127}_{-2.680}$
	+1%/-1%	+1%/-1%	+inf%/-inf%	+13%/-13%	+17%/-15%	+29%/-19%
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 010677397-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-2176 \pm 324$	$2.70^{+2.46}_{-1.85}$	$146^{+3}_{-4}$	$2914^{+1273}_{-454}$	$67788^{+631787}_{-49325}$
Alt.	$-6273 \pm 850$	$2.72^{+2.62}_{-1.78}$	$146^{+4}_{-4}$	$3400^{+1554}_{-604}$	$192688^{+1468598}_{-142362}$

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

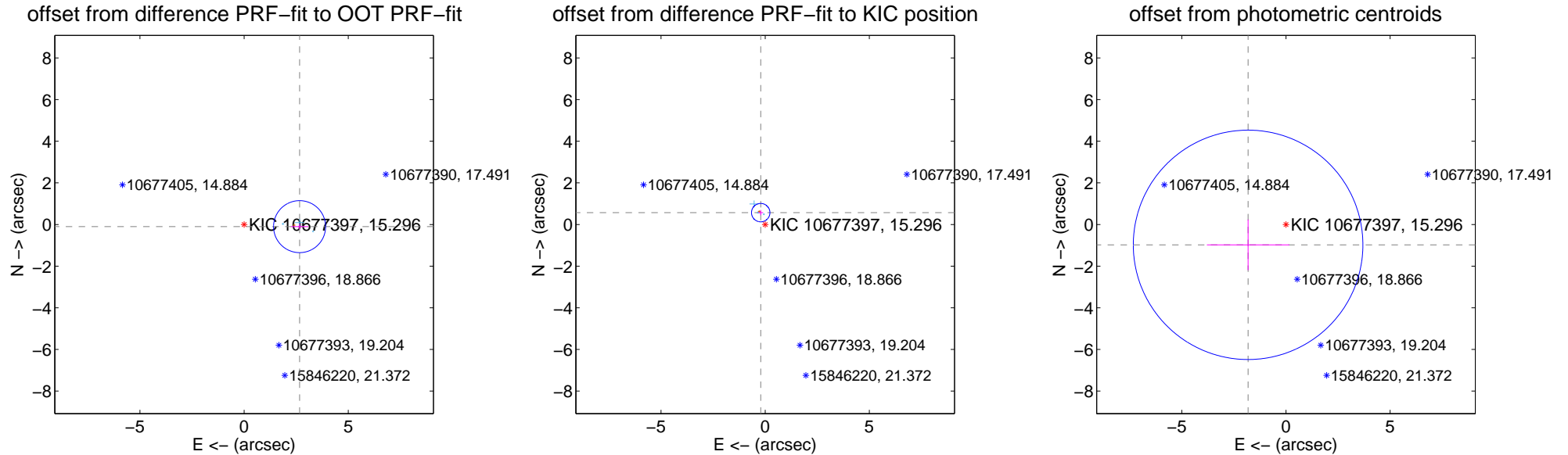
## DV Centroid Data

Supplemental centroid analysis for 010677397-03. Kepler magnitude: 15.30. Transit SNR 3.07

There are 3 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 3.47 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.665 \pm 0.416$	6.40	$-2.663 \pm 0.417$	$-0.102 \pm 0.130$
PRF-fit source offset from KIC position	$0.609 \pm 0.147$	4.13	$0.214 \pm 0.117$	$0.570 \pm 0.126$
photometric centroid source offset	$2.06 \pm 1.84$	1.12	$1.82 \pm 1.98$	$-0.98 \pm 1.22$



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

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

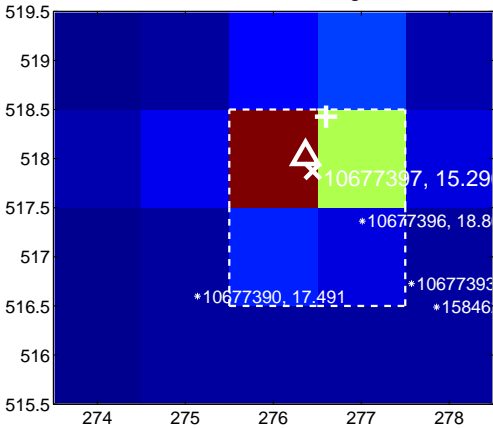
Q1 no difference image



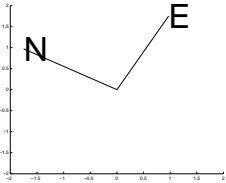
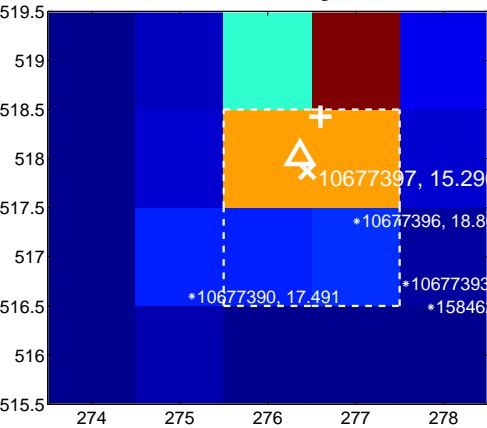
Q1 no OOT image



Q2 difference image



Q2 OOT image



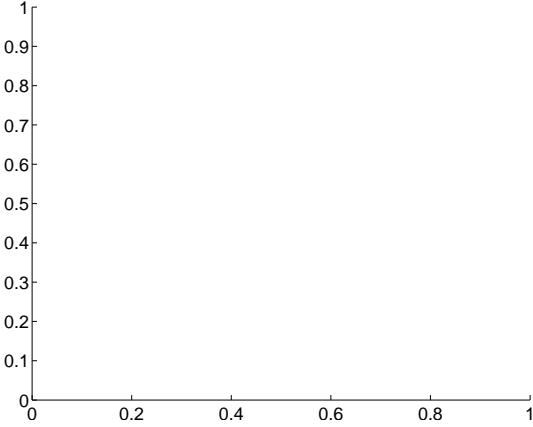
Q3 no difference image



Q3 no OOT image



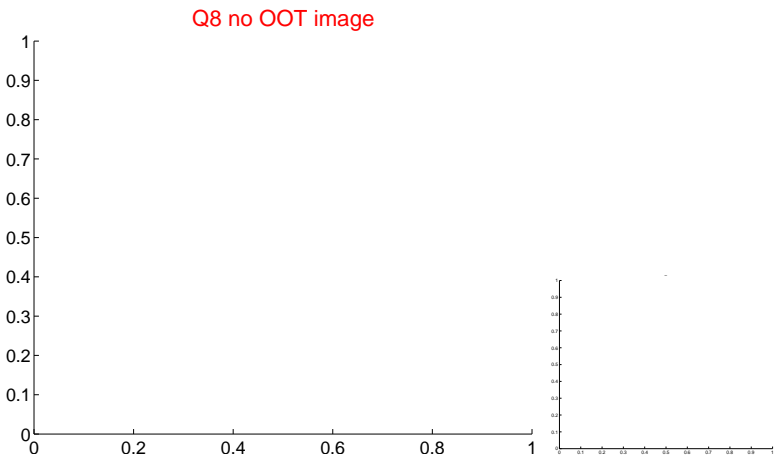
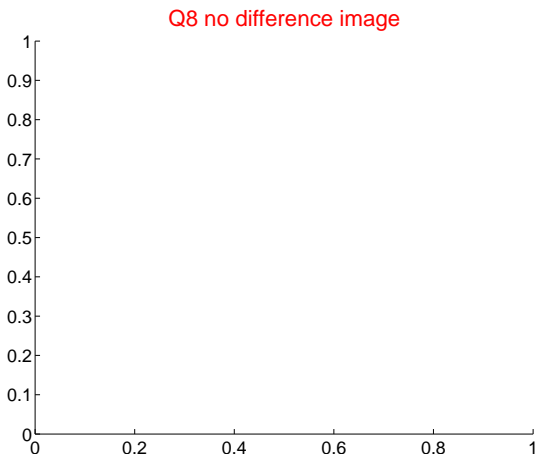
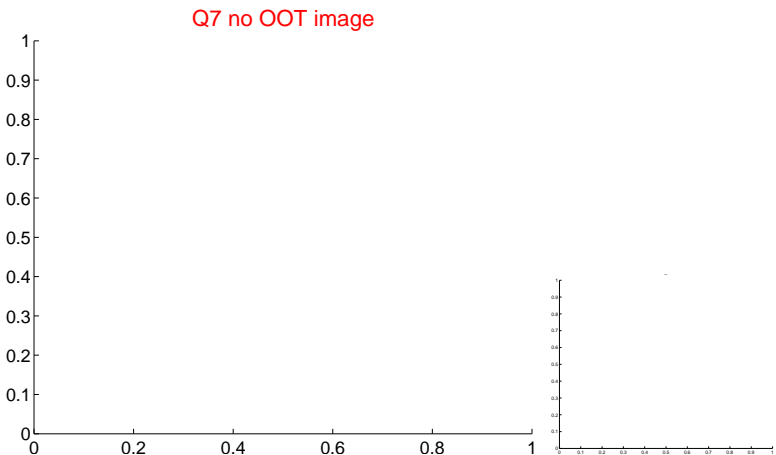
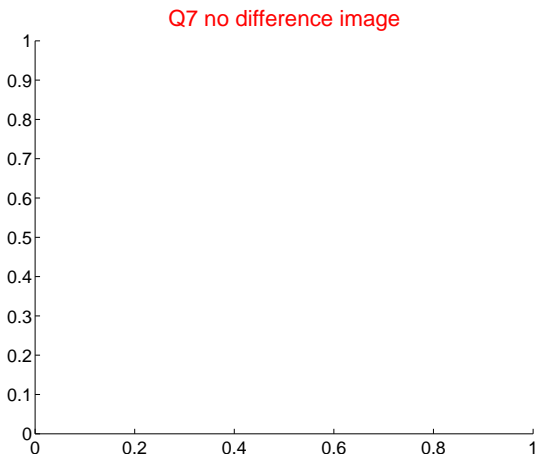
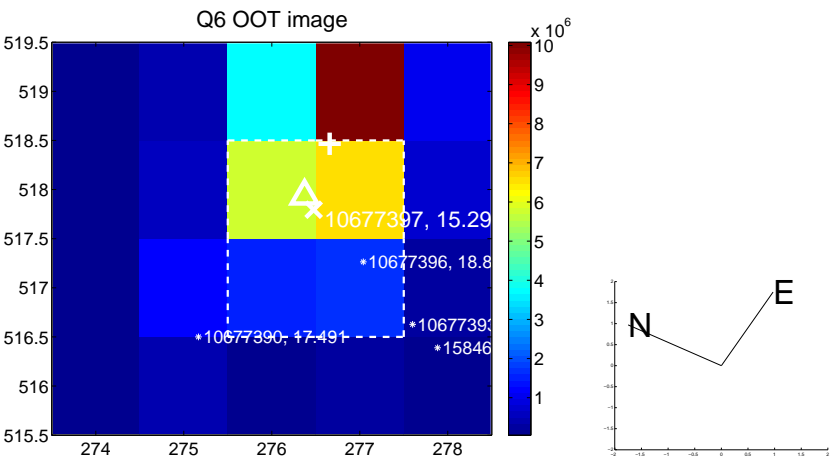
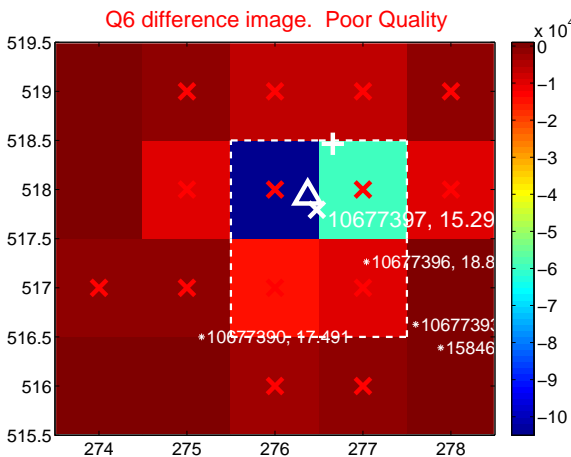
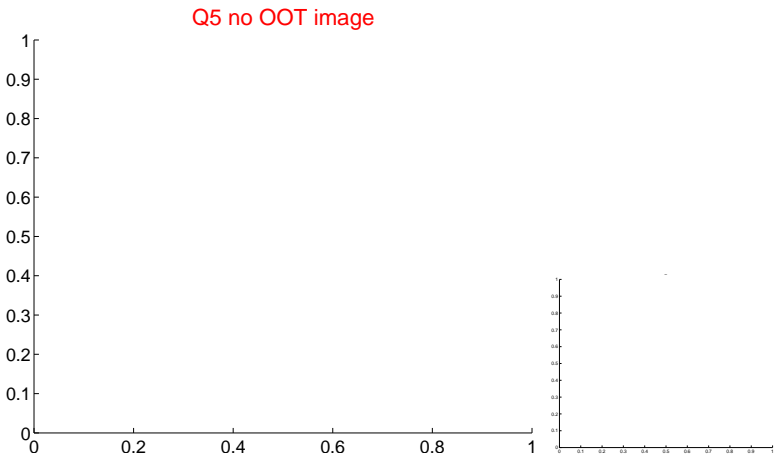
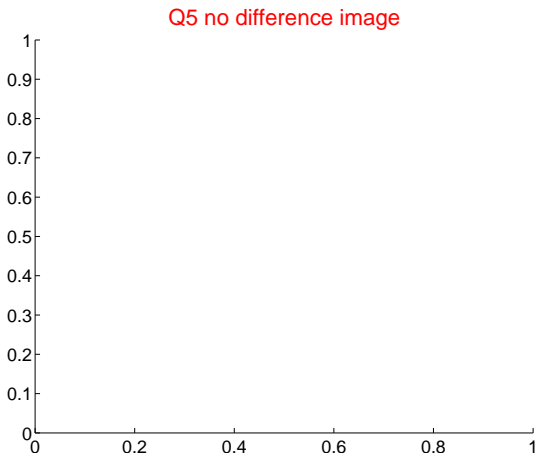
Q4 no difference image



Q4 no OOT image

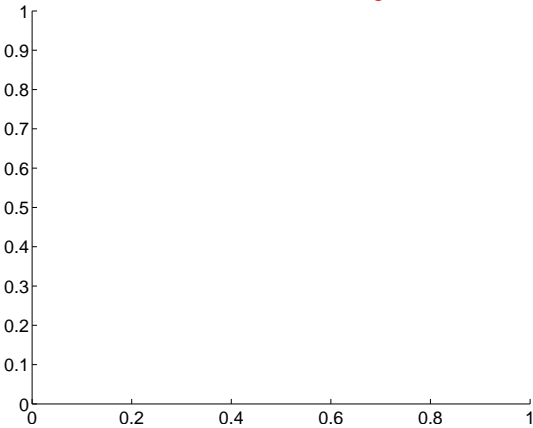


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value

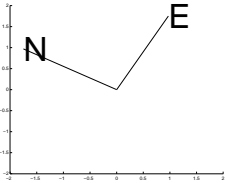
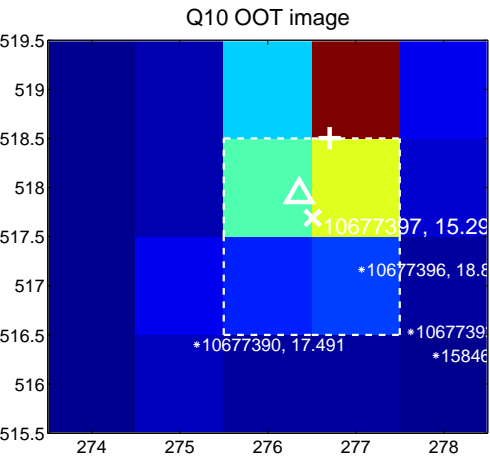
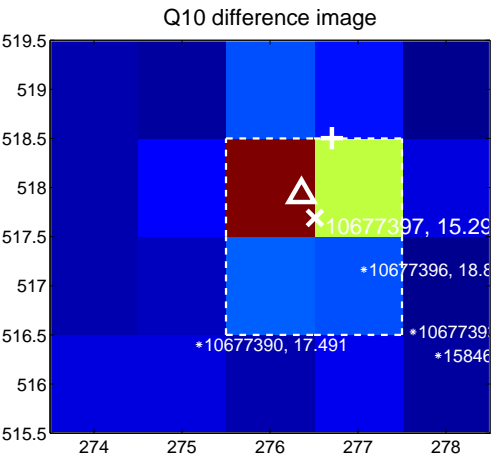


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\Delta$ : difference centroid. red  $\times$ : large negative pixel value.

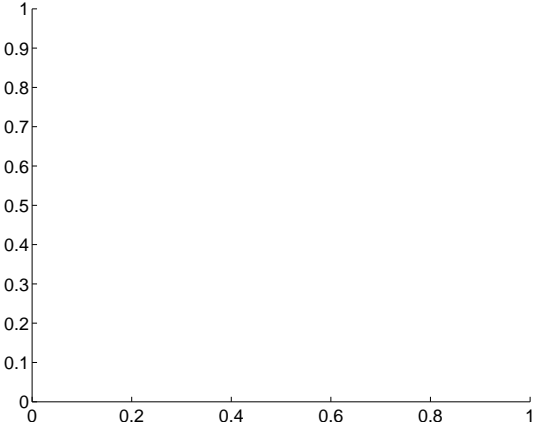
Q9 no difference image



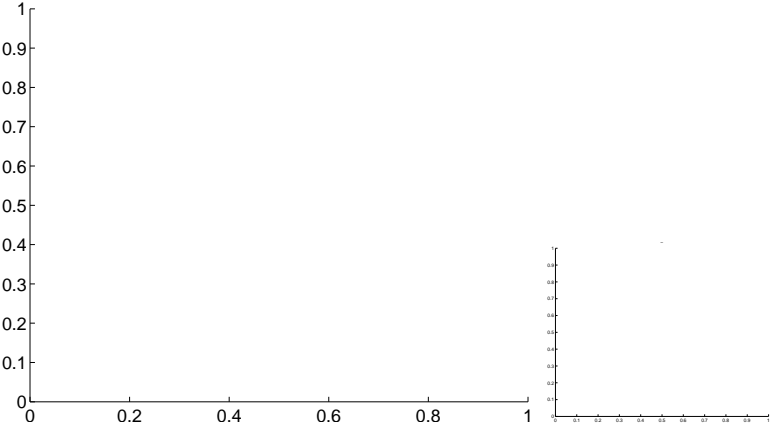
Q9 no OOT image



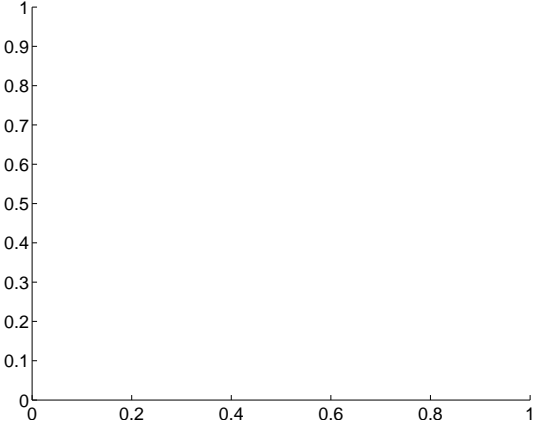
Q11 no difference image



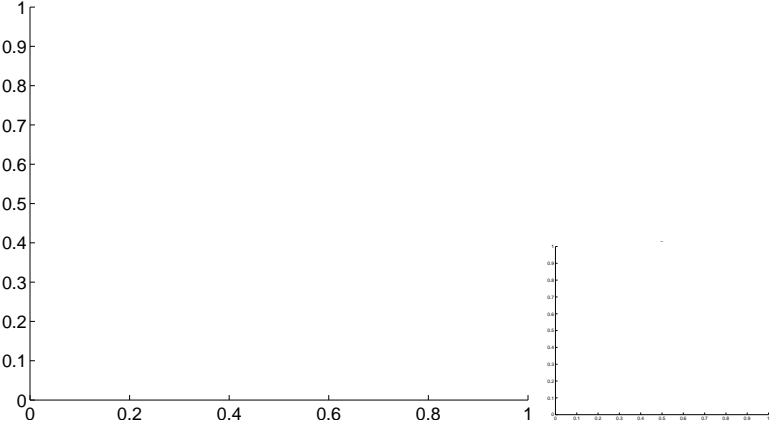
Q11 no OOT image



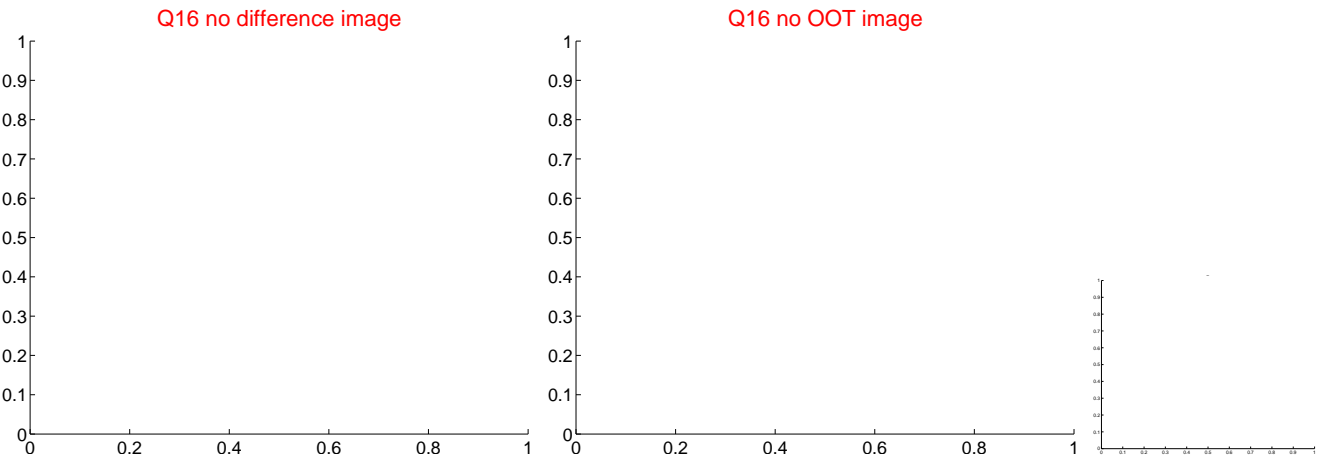
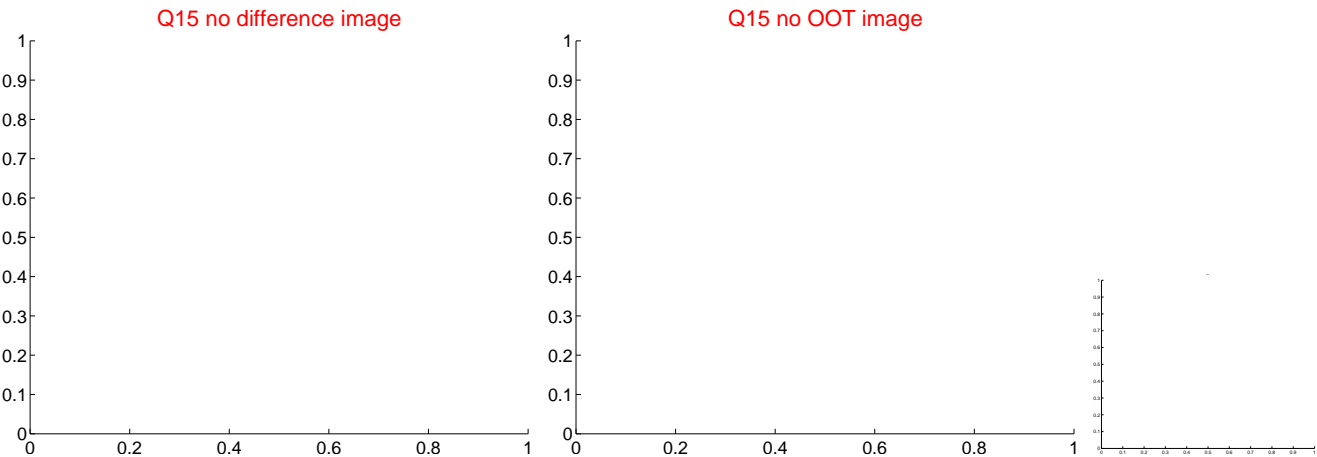
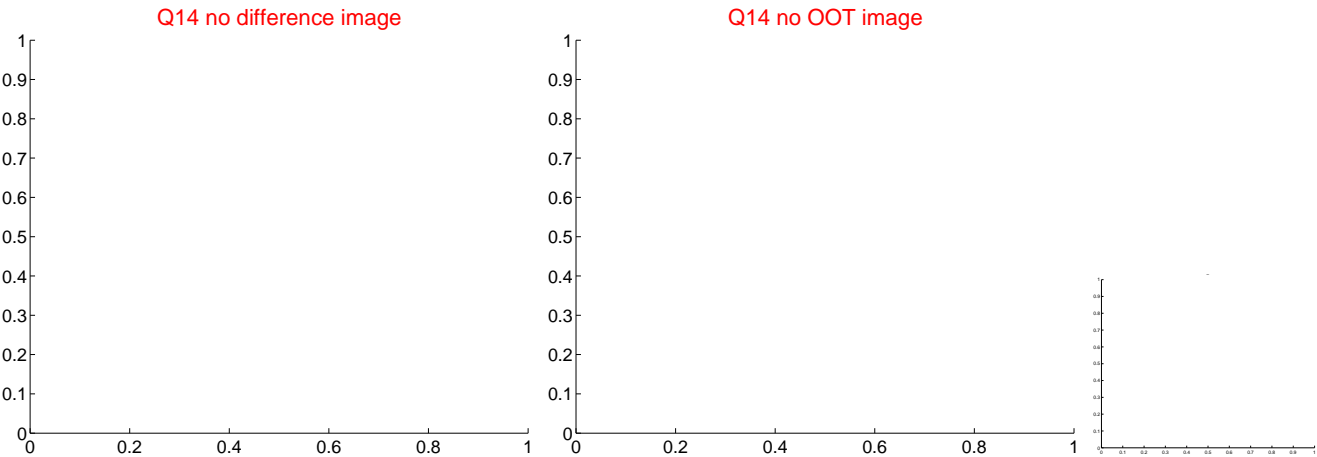
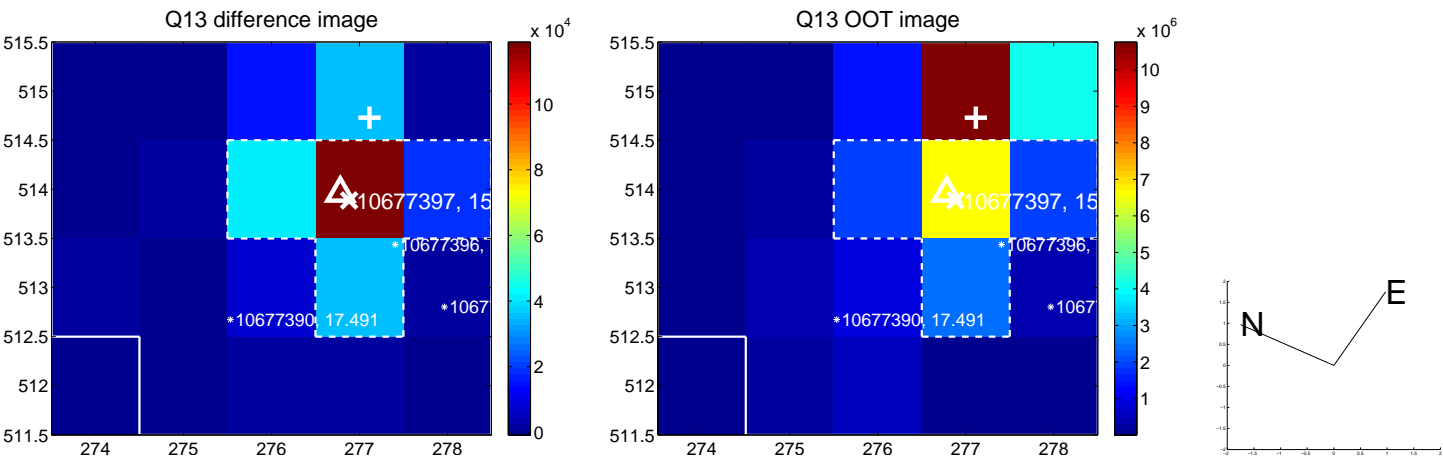
Q12 no difference image



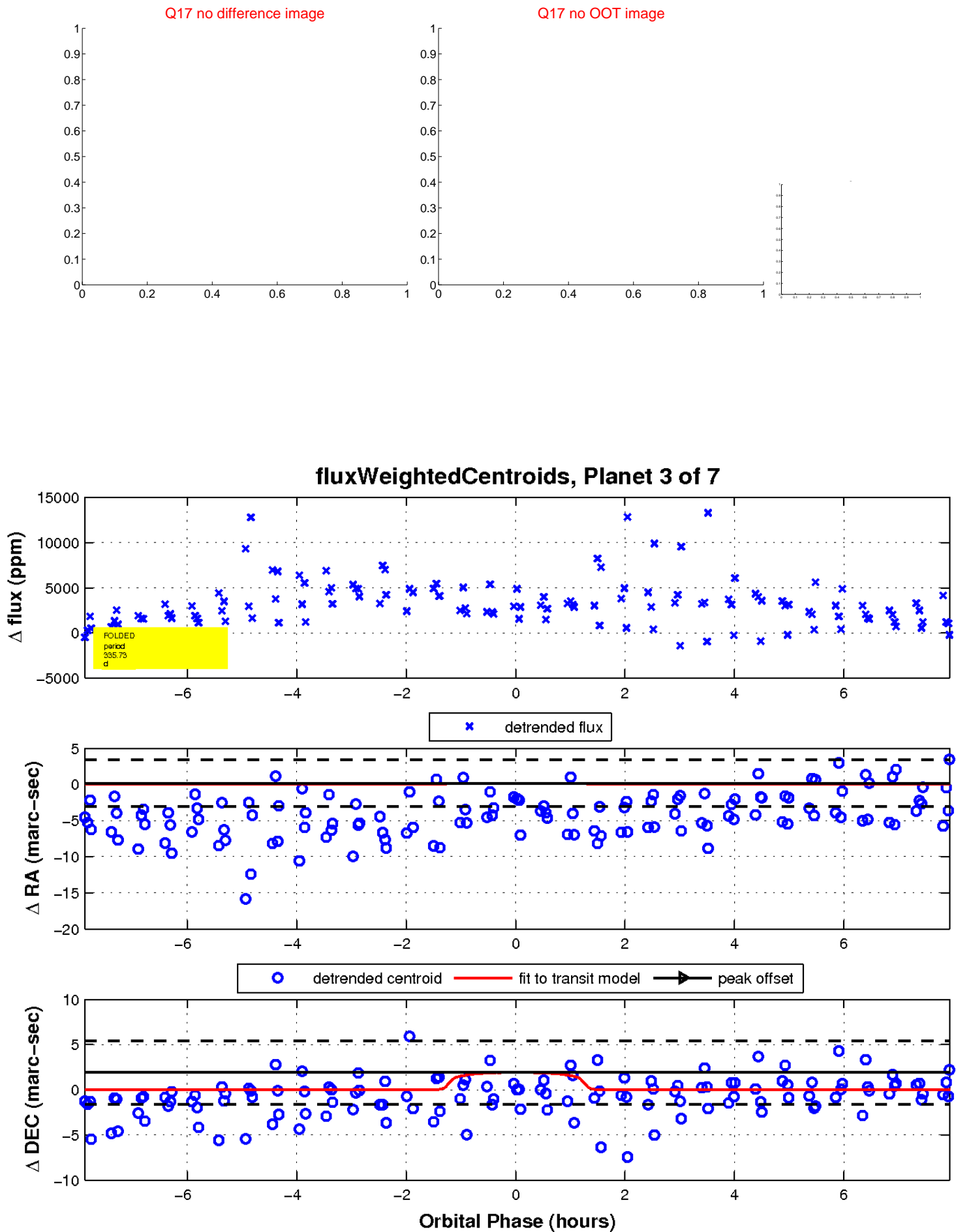
Q12 no OOT image



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



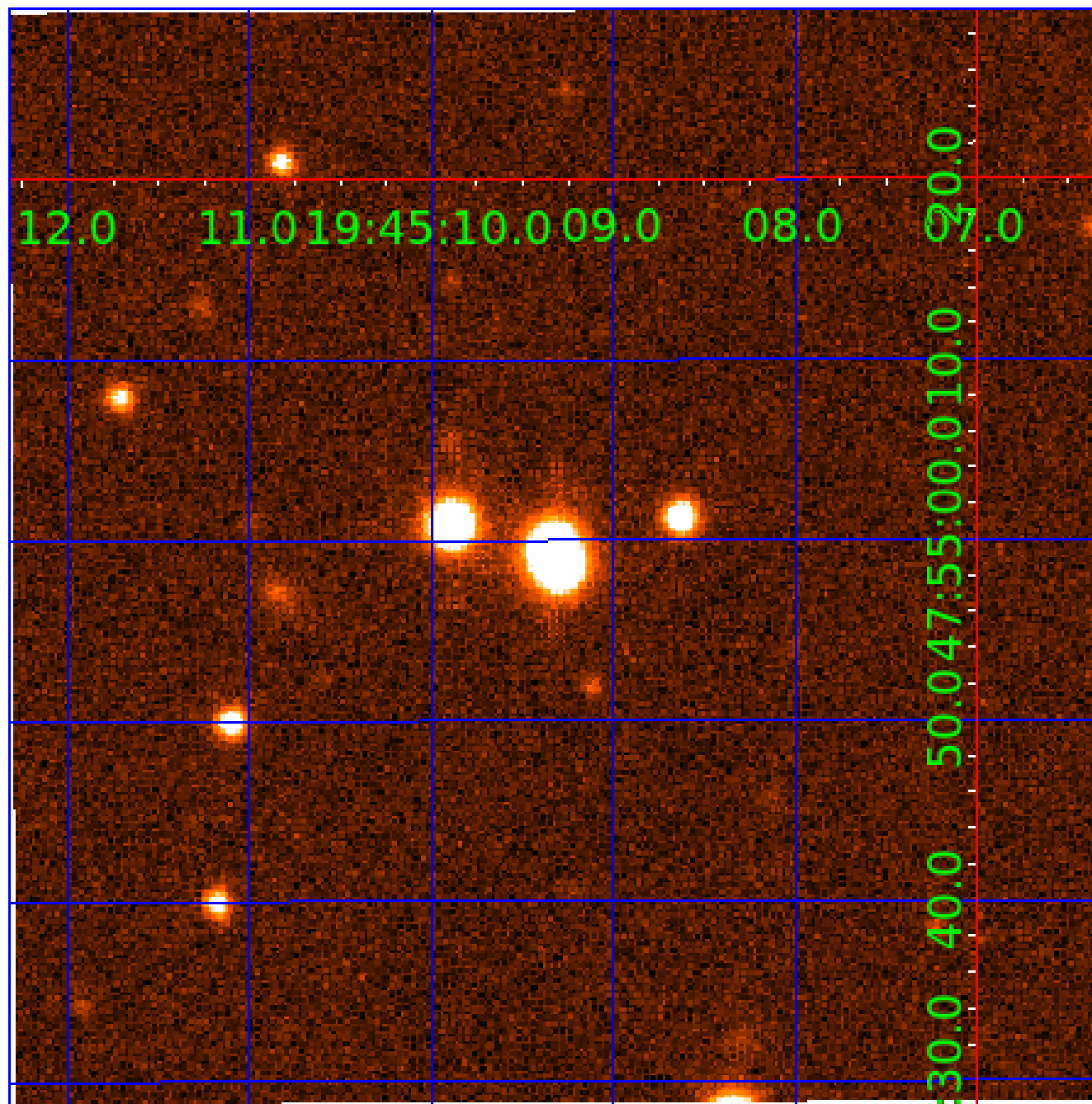
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 010677397

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010677397-01	OBS	No	266.581619	259.553907	5271.7	13.616	15.1	11.1	0.31	3393	2.23	0.04
010677397-02	OBS	No	242.020837	334.411468	3928.4	15.860	14.1	10.1	0.31	3393	2.10	0.04
010677397-03	OBS	No	335.725203	254.705198	1211.1	2.672	13.5	3.1	0.31	3393	1.14	0.03
010677397-04	OBS	No	335.763485	254.689739	4088.6	17.913	13.5	7.7	0.31	3393	1.97	0.03
010677397-05	OBS	No	415.967216	283.119581	3821.0	0.715	13.5	5.5	0.31	3393	4.01	0.02
010677397-06	OBS	No	476.676746	269.771385	4732.4	2.934	13.4	10.4	0.31	3393	2.12	0.02
010677397-07	OBS	No	0.948771	131.969317	363.3	3.614	14.8	14.9	0.31	3393	0.63	71.31

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010677397-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010677397-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_KIC_POS
010677397-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_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_KIC_POS
010677397-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—SAME_NTL_PERIOD—CENT_FEW_DIFFS
010677397-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010677397-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—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
010677397-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—CENT_KIC_POS

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

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

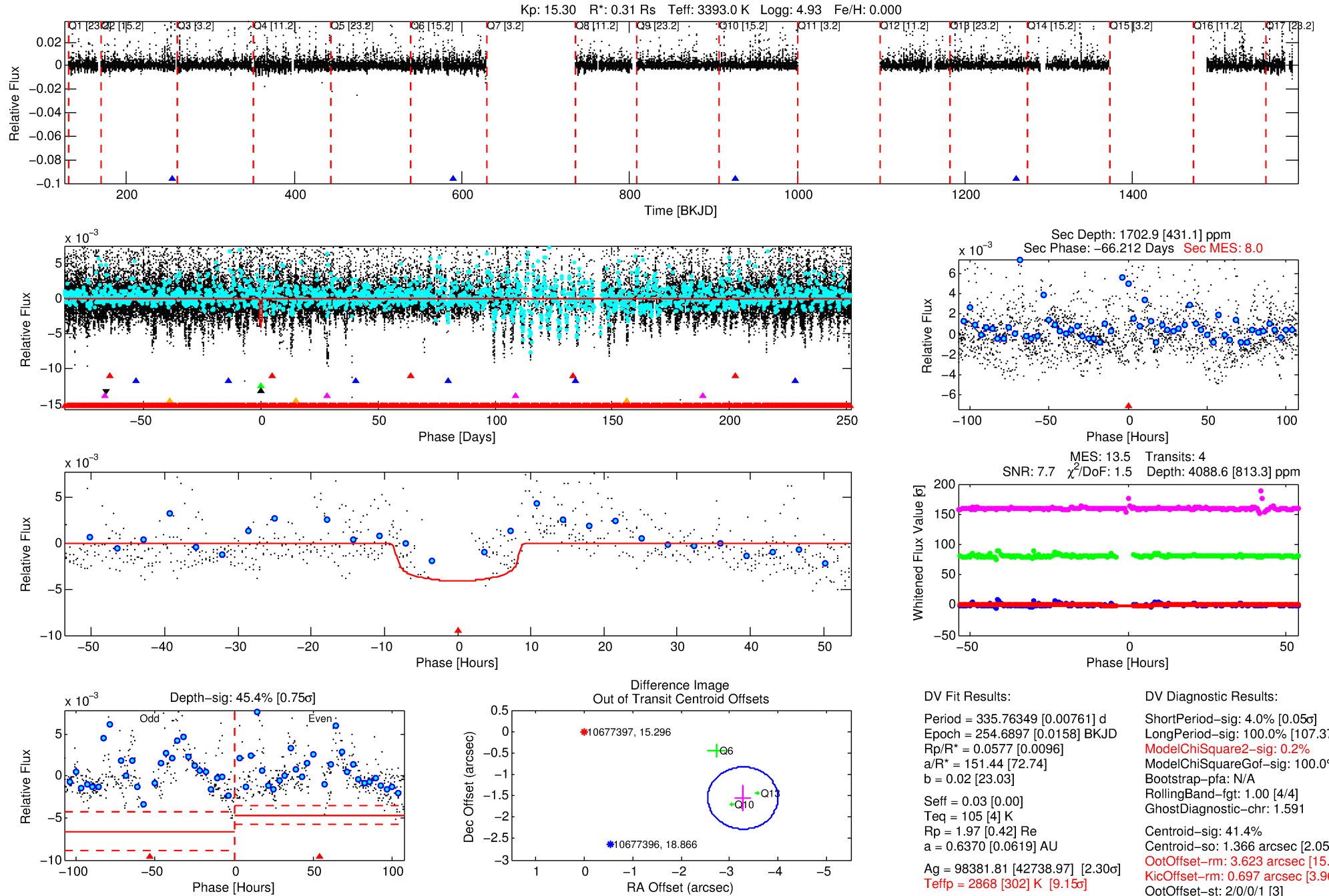
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010677397-04

No Significant Match Found

# DV One-Page Summary

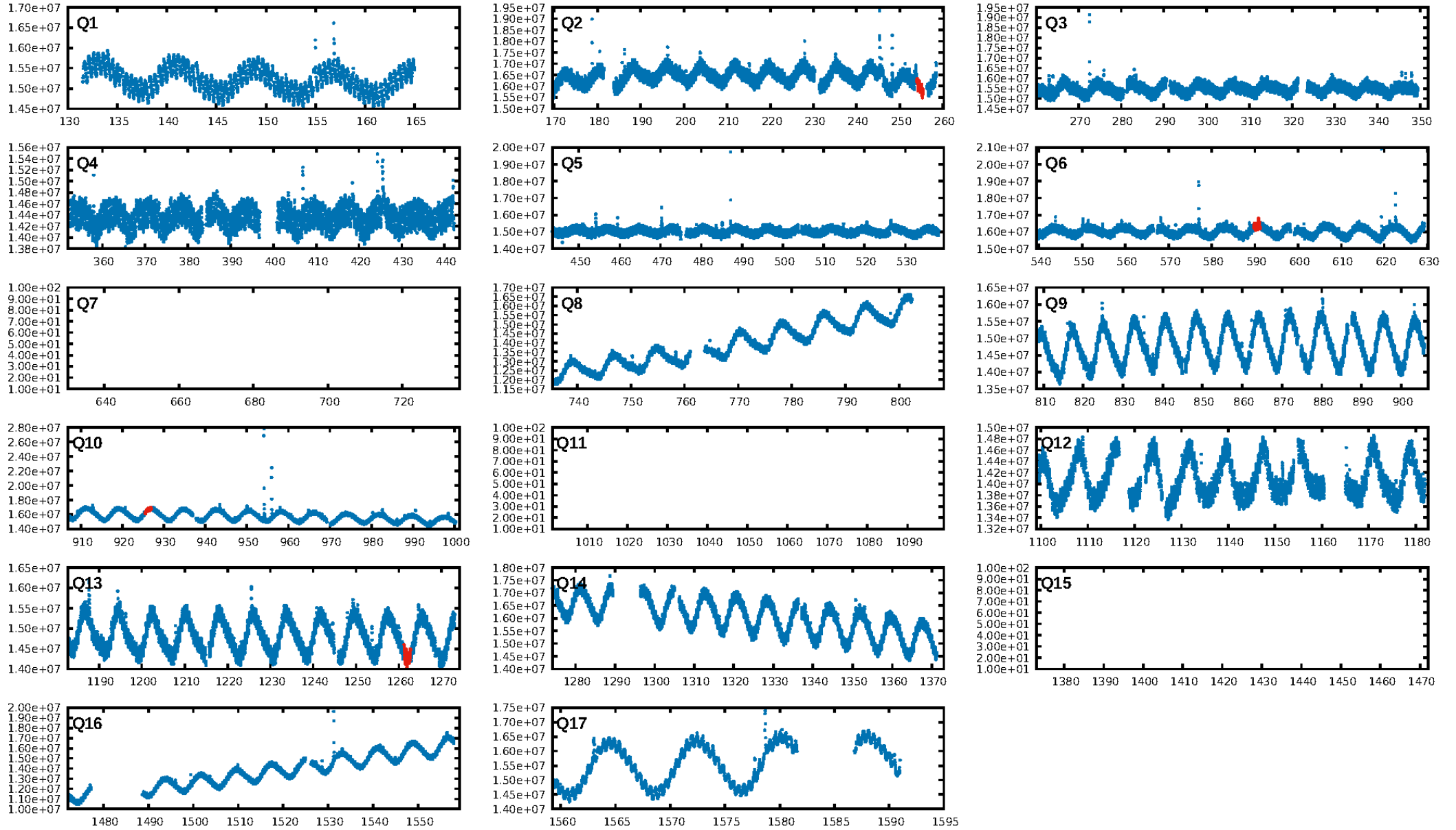
KIC: 10677397 Candidate: 4 of 7 Period: 335.763 d



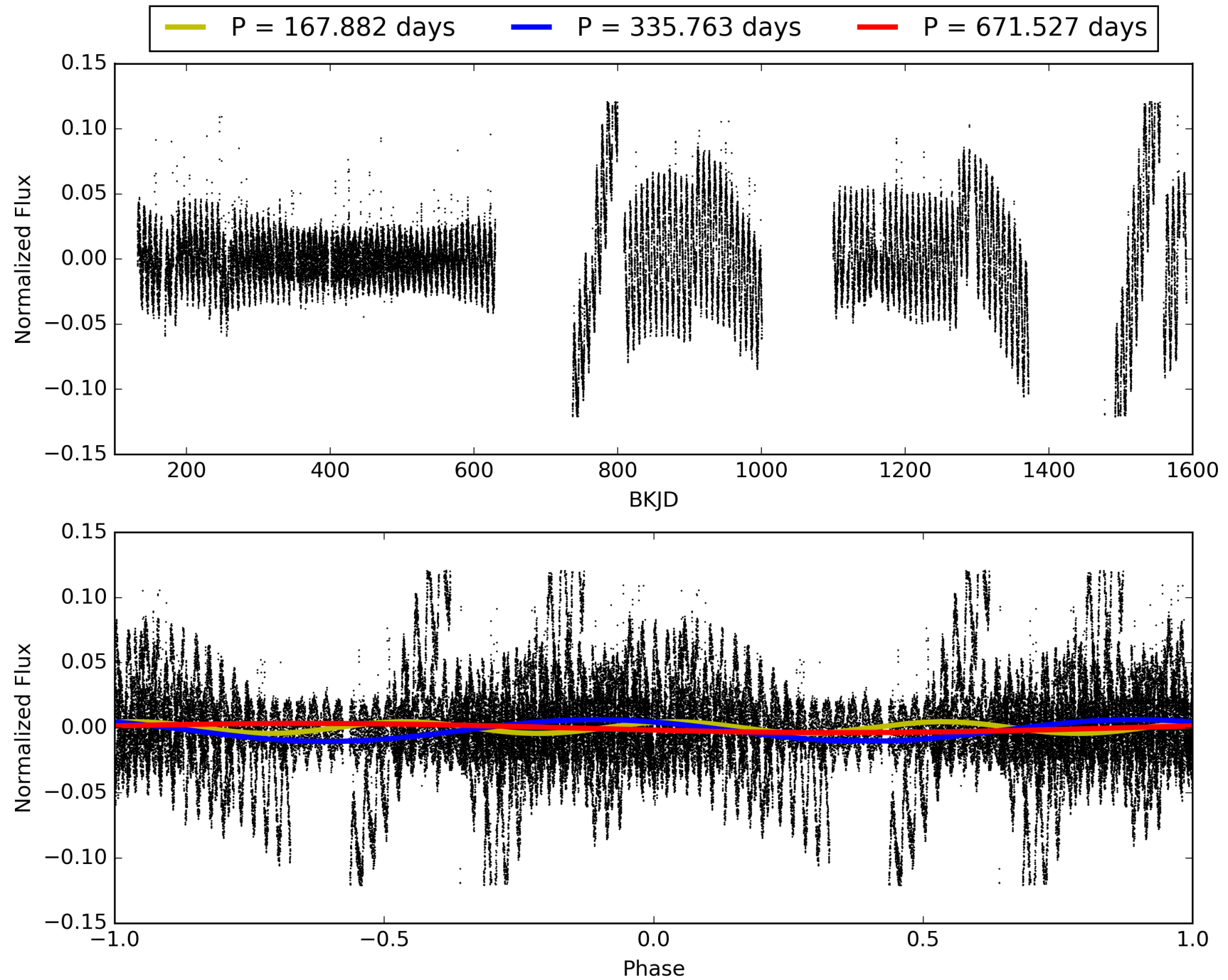
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:59:36 Z

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

# TCE 010677397-04, PDC Light Curves

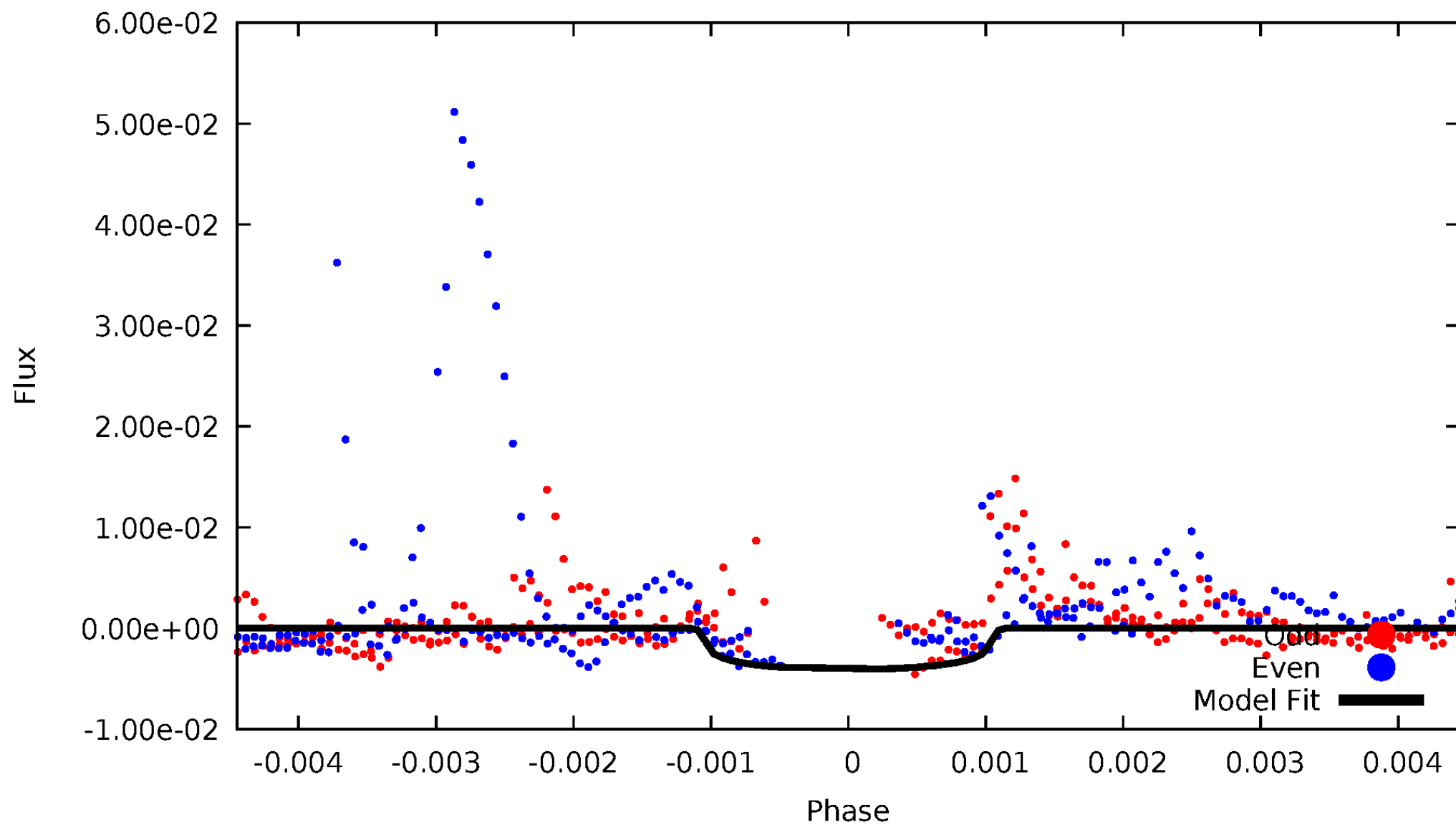


TCE 010677397-04



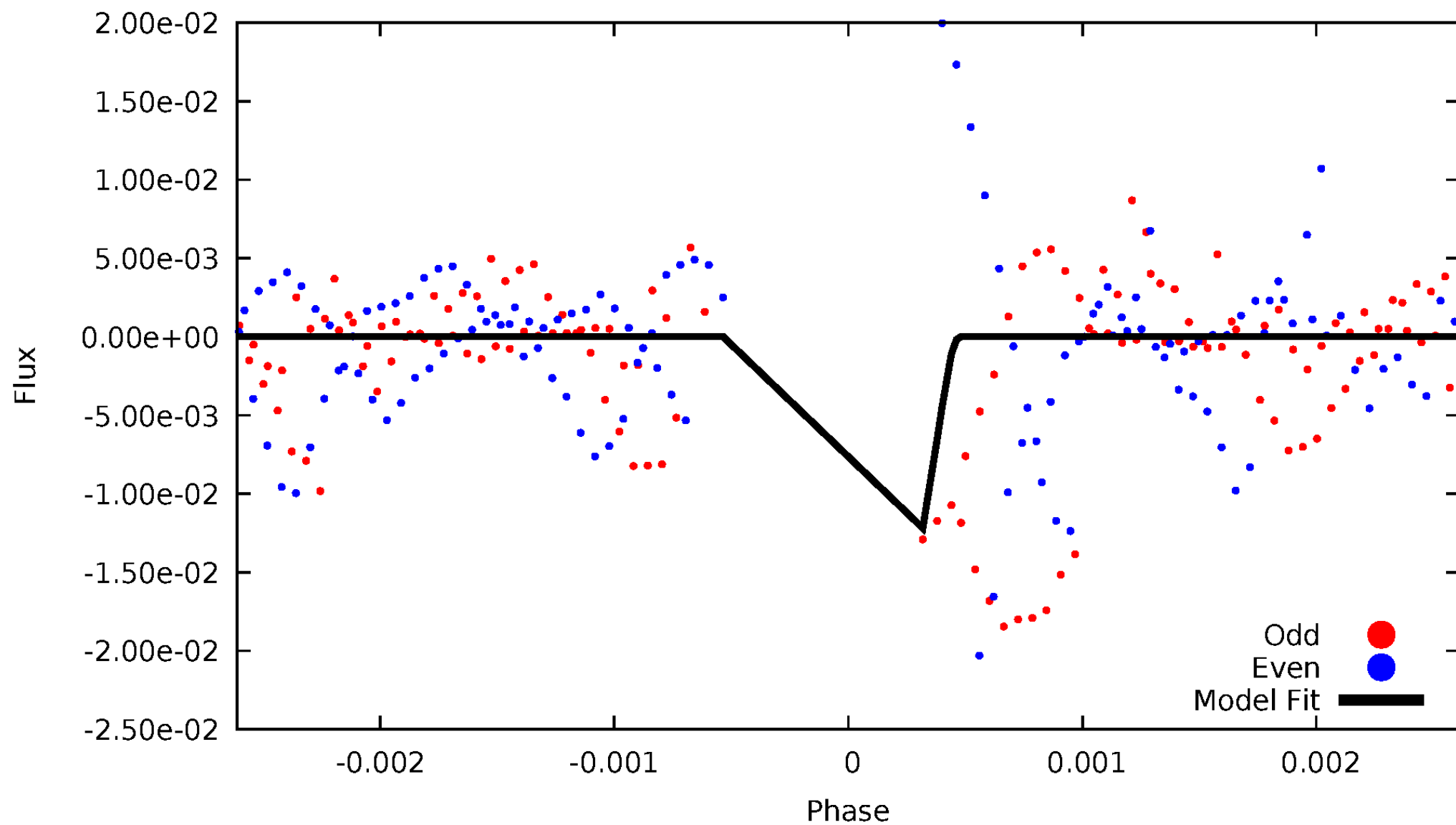
# DV Odd/Even

TCE 010677397-04



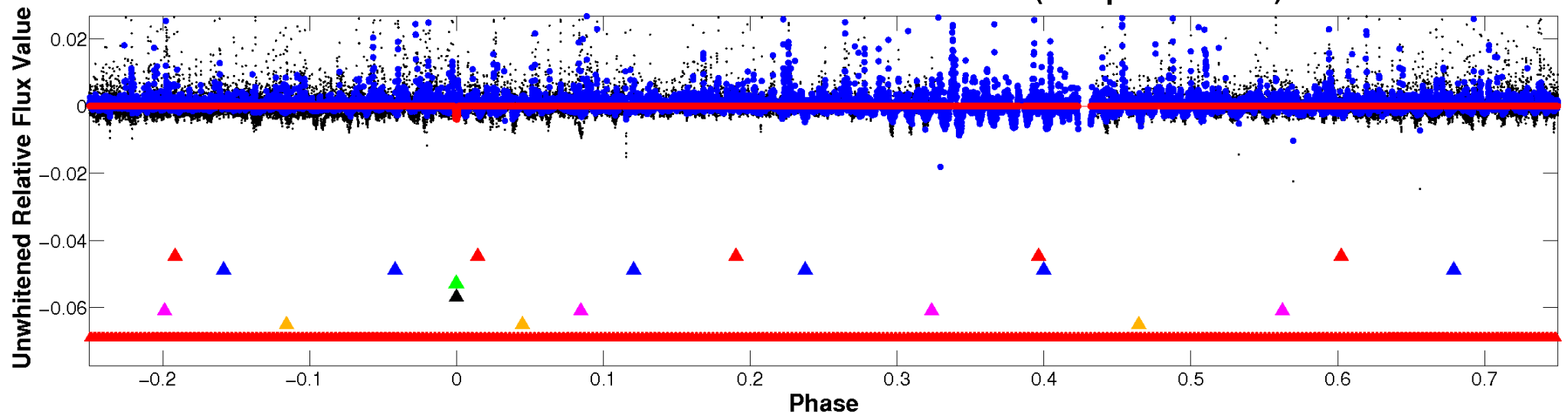
# ALT Odd/Even

TCE 010677397-04

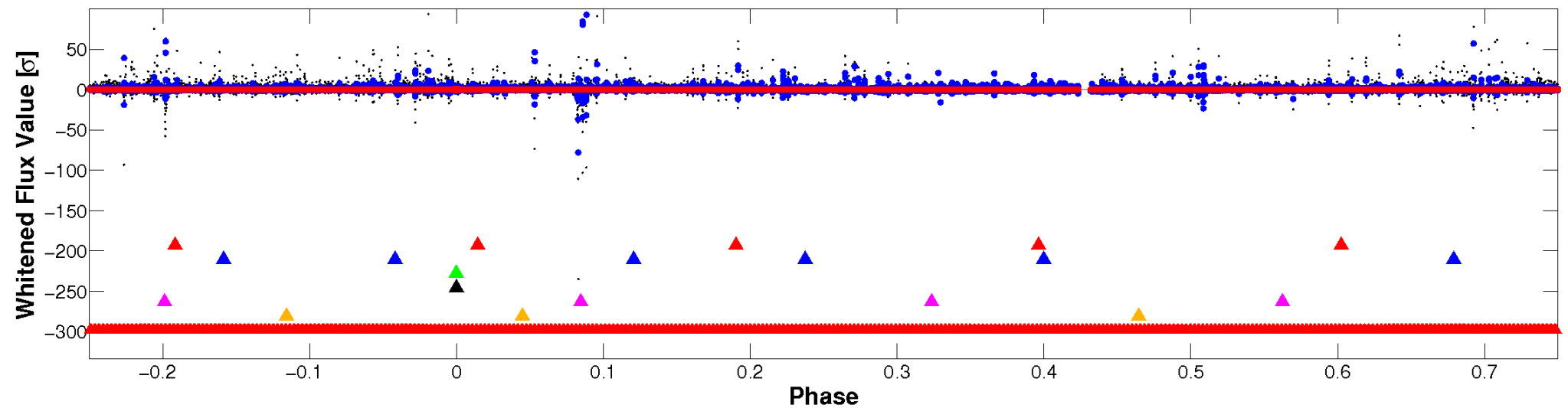


# Non-Whitened Vs. Whitened Light Curve

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



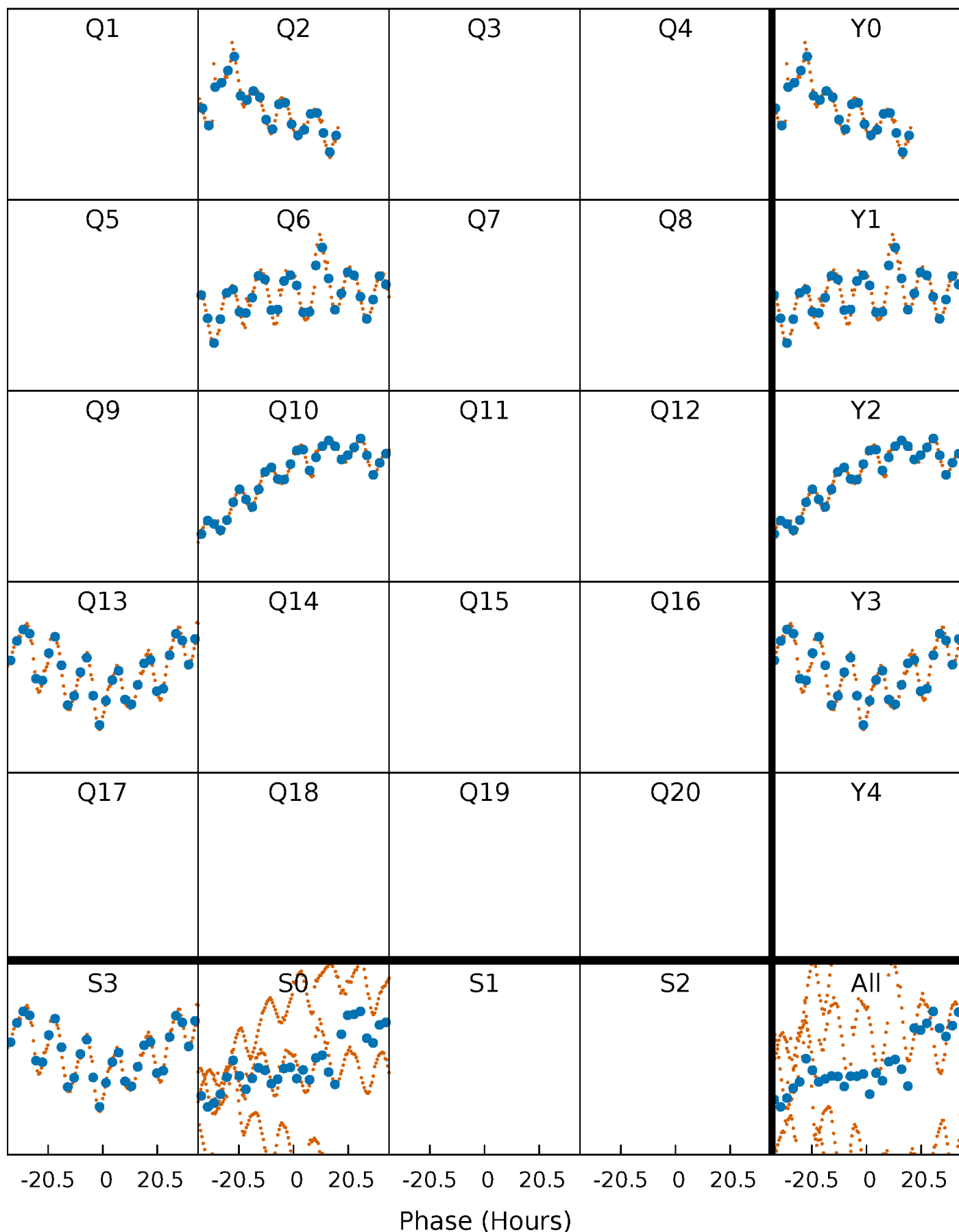
## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)





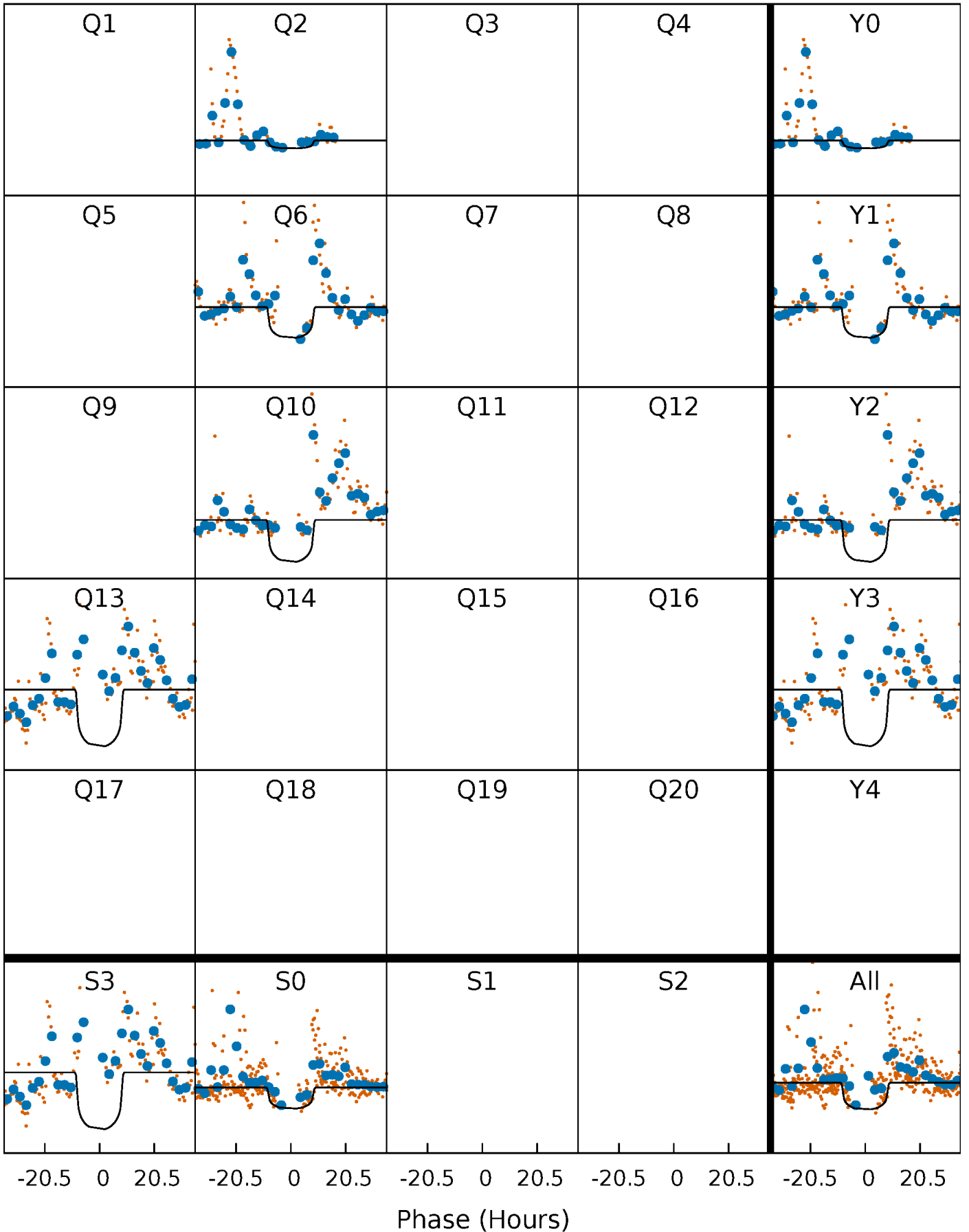
# PDC Quarter-Phased Transit Curves

TCE 010677397-04     $P=335.763485$  Days     $T_0=254.689739$  (BKJD)



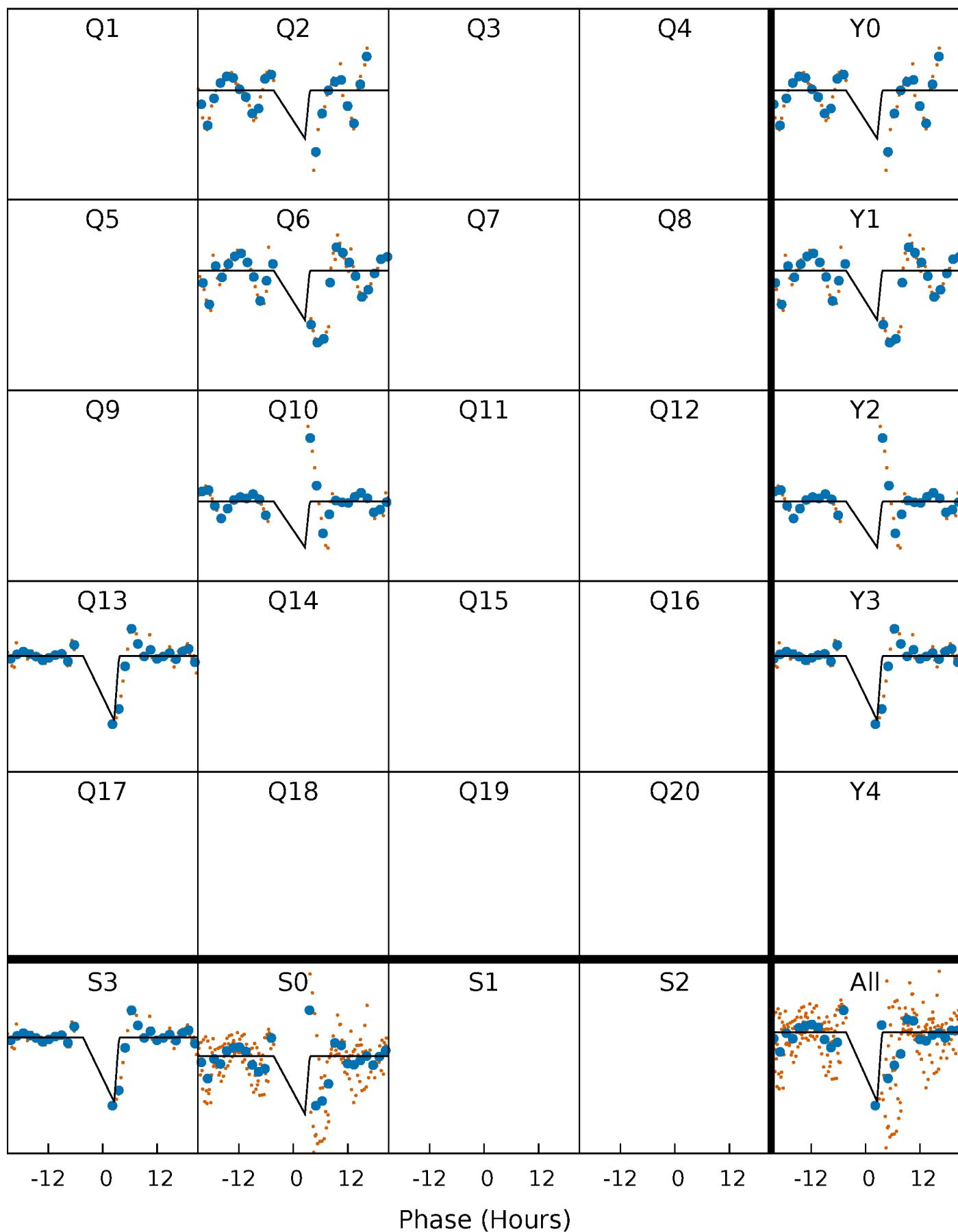
# DV Quarter-Phased Transit Curves

TCE 010677397-04     $P=335.763485$  Days     $T_0=254.689739$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

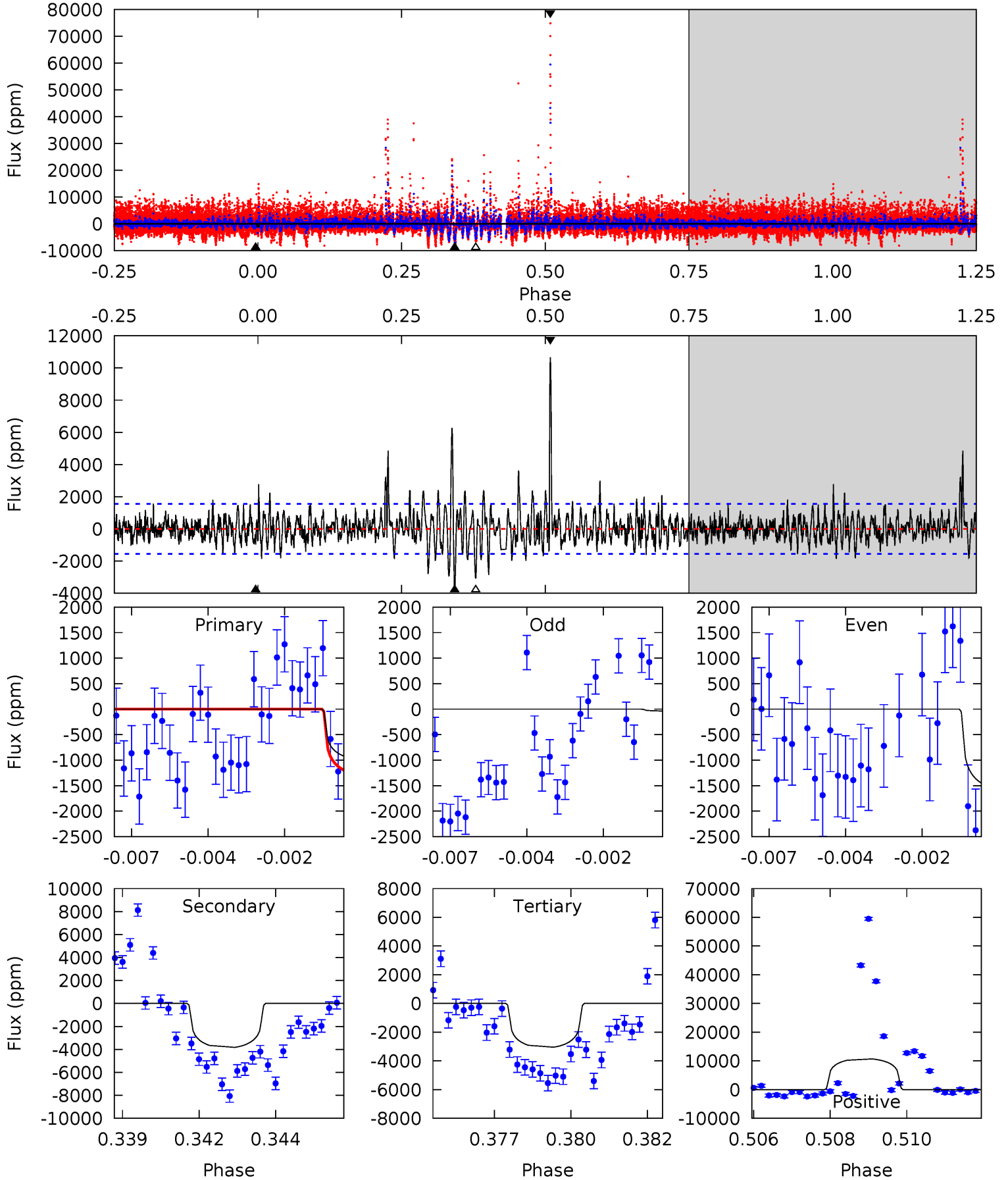
TCE 010677397-04     $P=335.750635$  Days     $T_0=254.703769$  (BKJD)



# DV Model-Shift Uniqueness Test

010677397-04, P = 335.763485 Days, E = 254.689739 Days

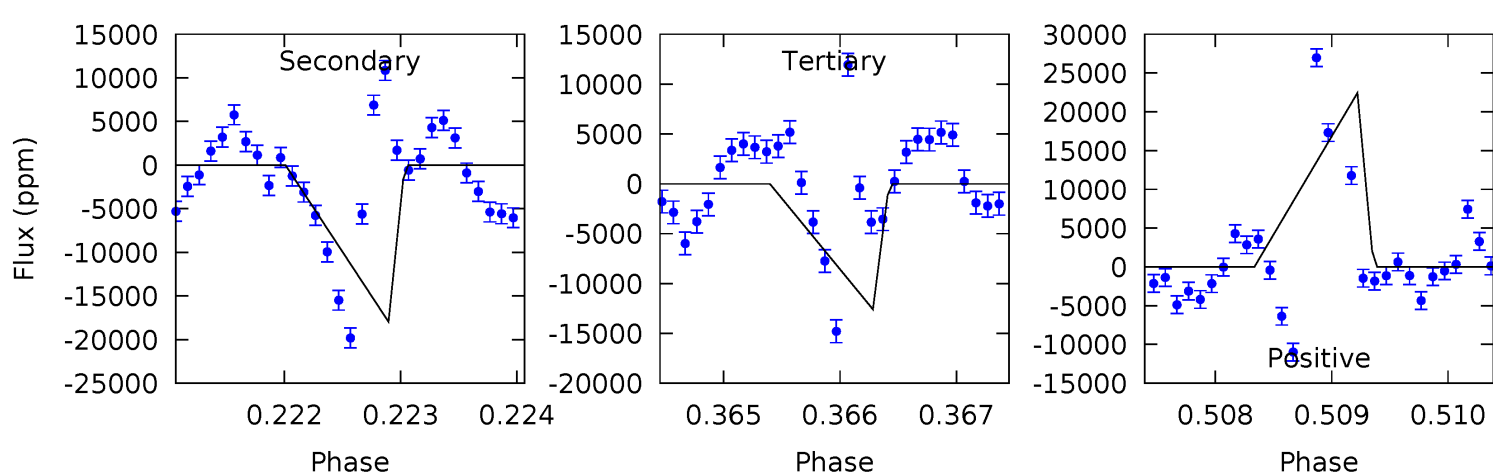
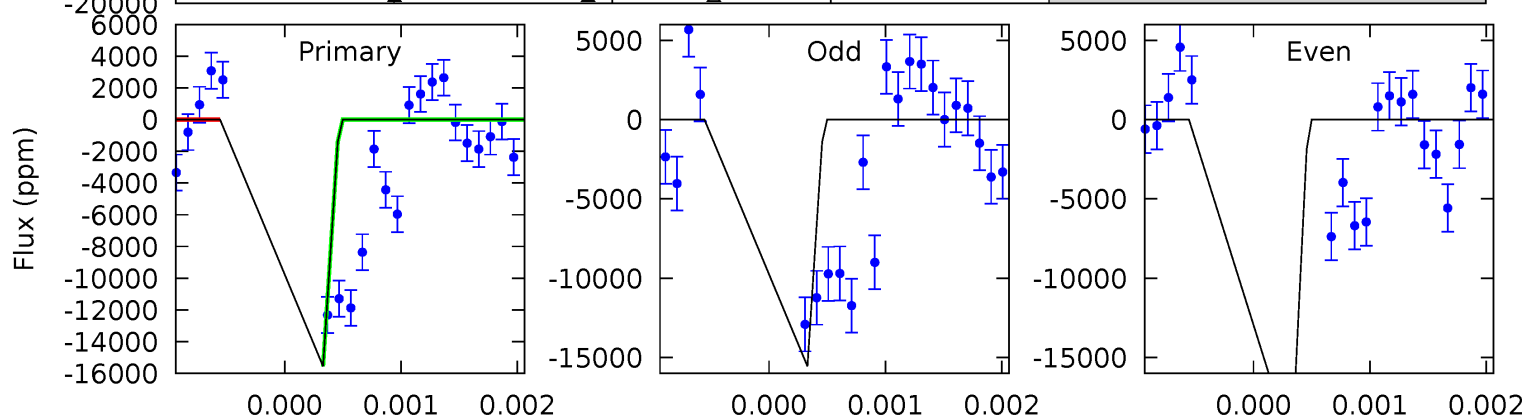
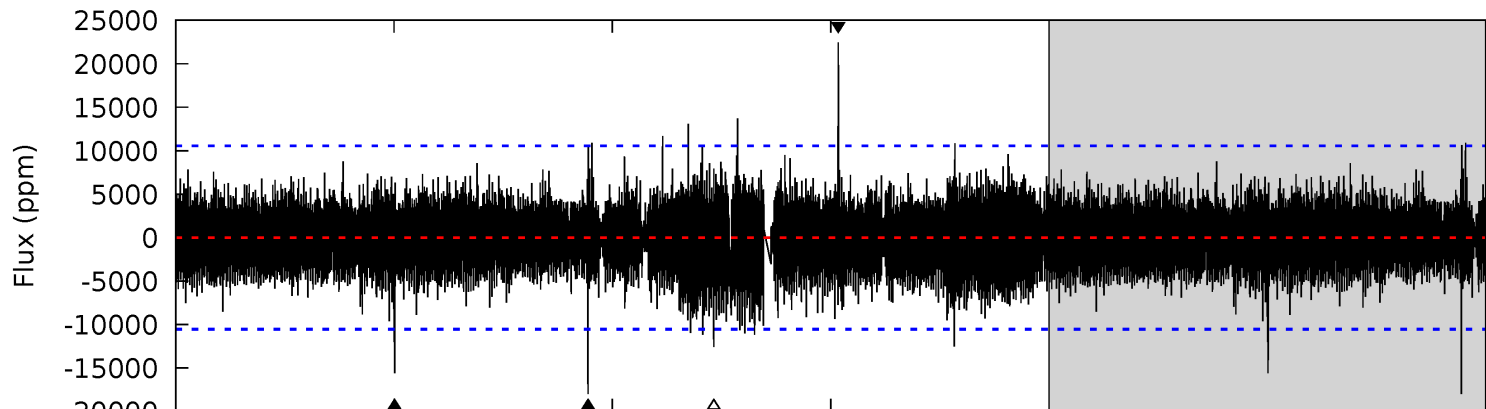
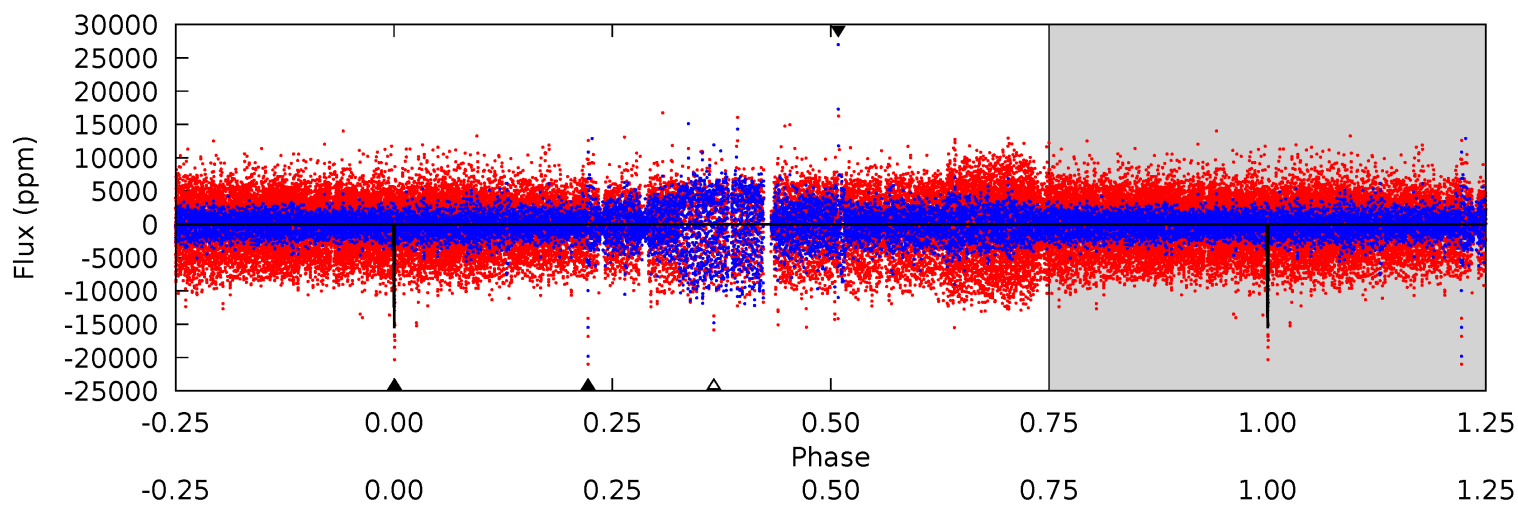
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.29	13.0	10.4	36.4	5.31	3.06	2.73	-7.09	-33.1	2.65	-23.3	2.18	1.24	0.74	0.64



# Alt Model-Shift Uniqueness Test

010677397-04, P = 335.750635 Days, E = 254.703769 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
8.05	9.29	6.51	11.6	5.46	3.30	1.20	1.53	-3.56	2.78	-2.32	1.62	1.00	0.56	0



### Stellar Parameters For KIC 010677397

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3393^{+50}_{-50}$	$4.935^{+0.055}_{-0.040}$	$0.000^{+0.100}_{-0.100}$	$0.312^{+0.041}_{-0.041}$	$0.306^{+0.051}_{-0.047}$	$14.160^{+4.127}_{-2.680}$
	+1%/-1%	+1%/-1%	+inf%/-inf%	+13%/-13%	+17%/-15%	+29%/-19%
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 010677397-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-3824 \pm 293$	$1.97^{+0.36}_{-0.40}$	$146^{+4}_{-4}$	$3467^{+247}_{-177}$	$220783^{+119544}_{-61362}$
Alt.	$-17966 \pm 1933$	$3.93^{+0.45}_{-0.39}$	$146^{+4}_{-4}$	$3554^{+134}_{-118}$	$263812^{+64467}_{-50924}$

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

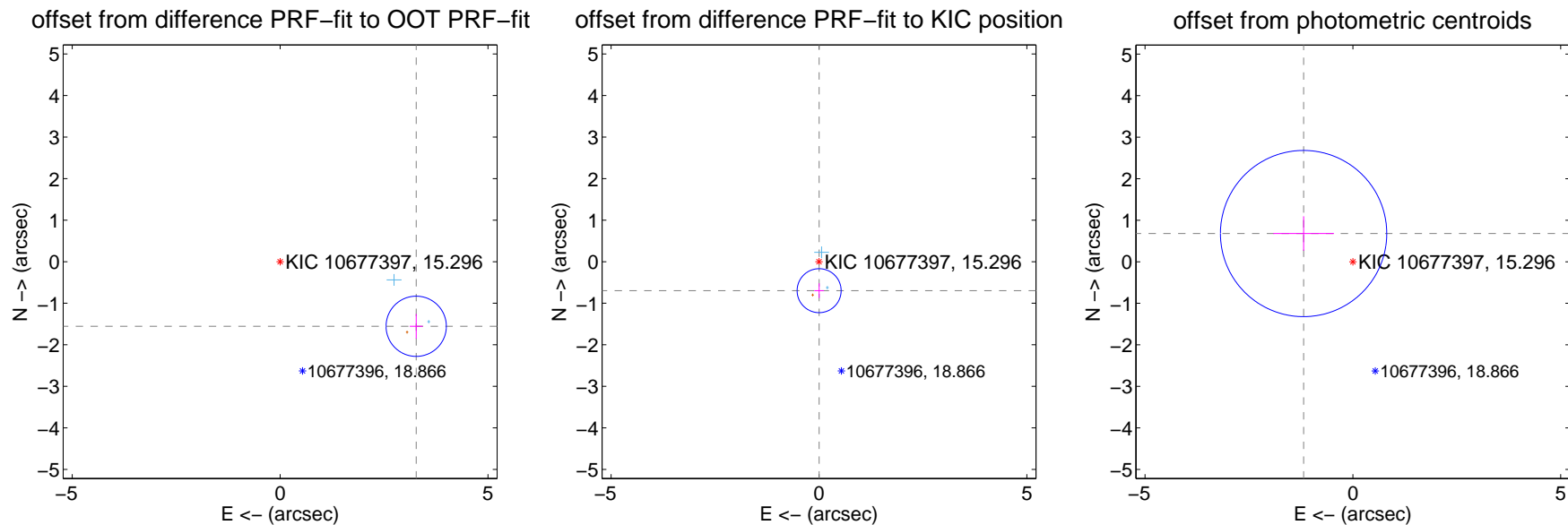
## DV Centroid Data

Supplemental centroid analysis for 010677397-04. Kepler magnitude: 15.30. Transit SNR 7.67

There are 2 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 3.47 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.623 \pm 0.242$	15.00	$-3.273 \pm 0.155$	$-1.554 \pm 0.297$
PRF-fit source offset from KIC position	$0.697 \pm 0.176$	3.96	$-0.003 \pm 0.115$	$-0.697 \pm 0.176$
photometric centroid source offset	$1.37 \pm 0.67$	2.05	$1.19 \pm 0.73$	$0.68 \pm 0.42$



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

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





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

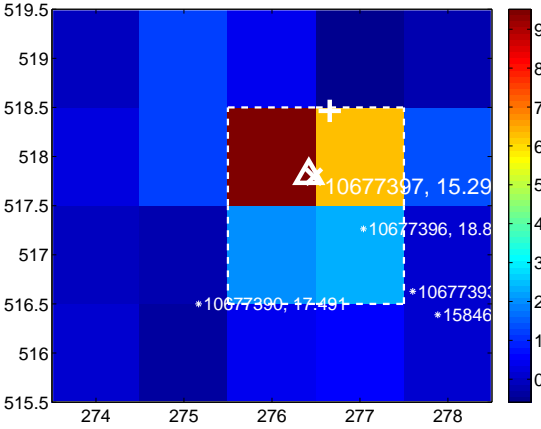
Q5 no difference image



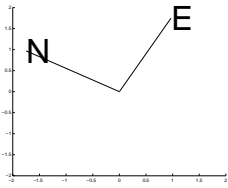
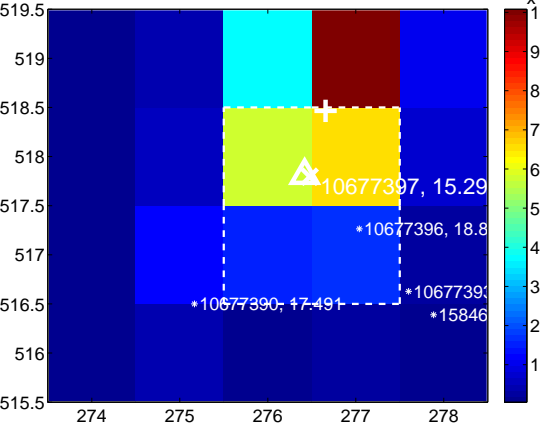
Q5 no OOT image



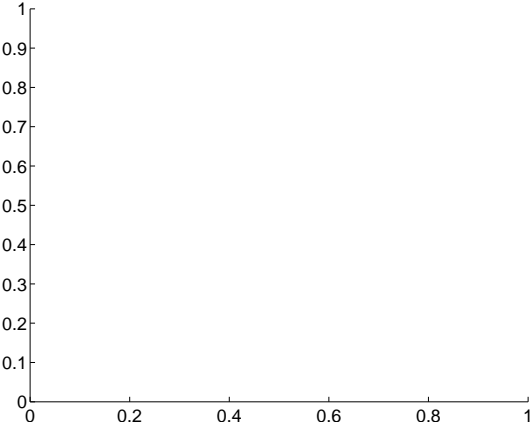
Q6 difference image



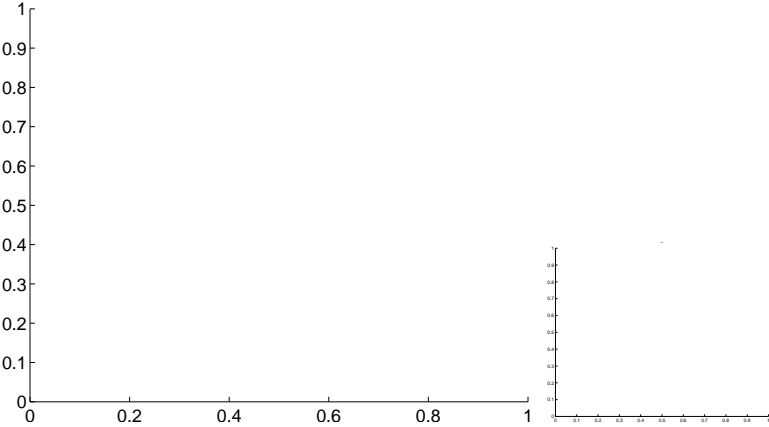
Q6 OOT image



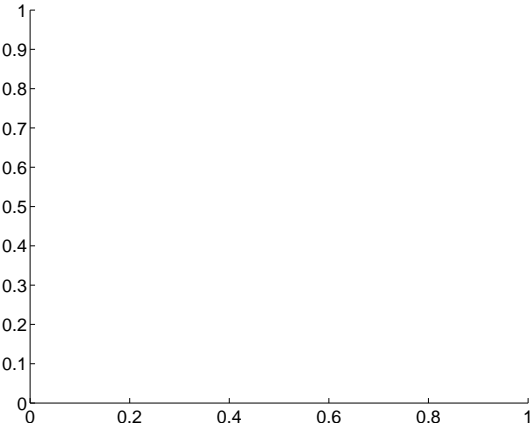
Q7 no difference image



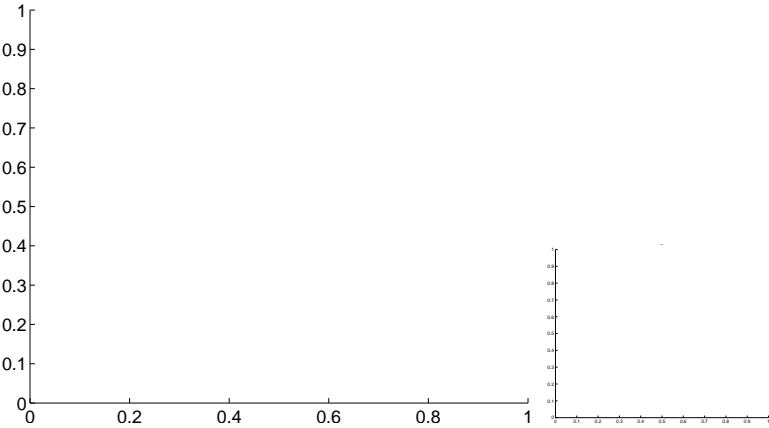
Q7 no OOT image



Q8 no difference image



Q8 no OOT image

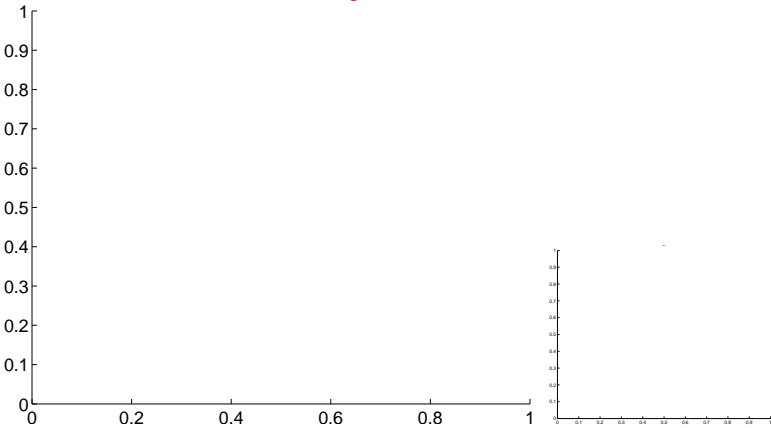


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

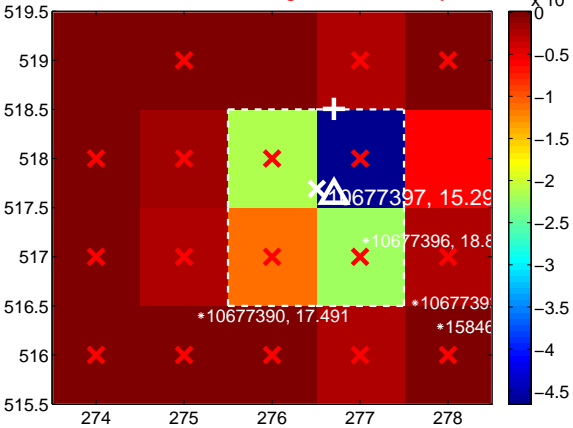
Q9 no difference image



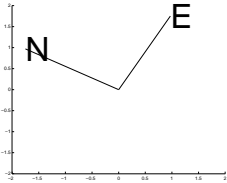
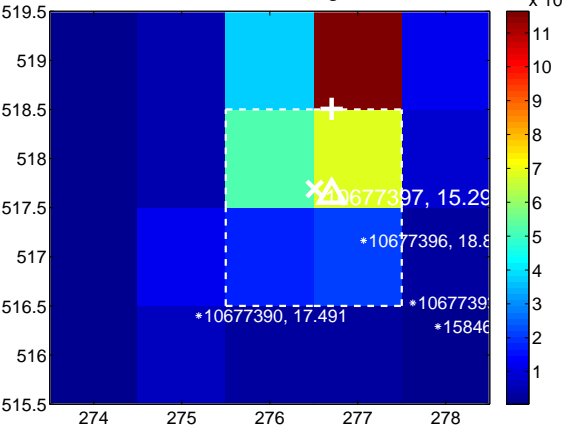
Q9 no OOT image



Q10 difference image. Poor Quality



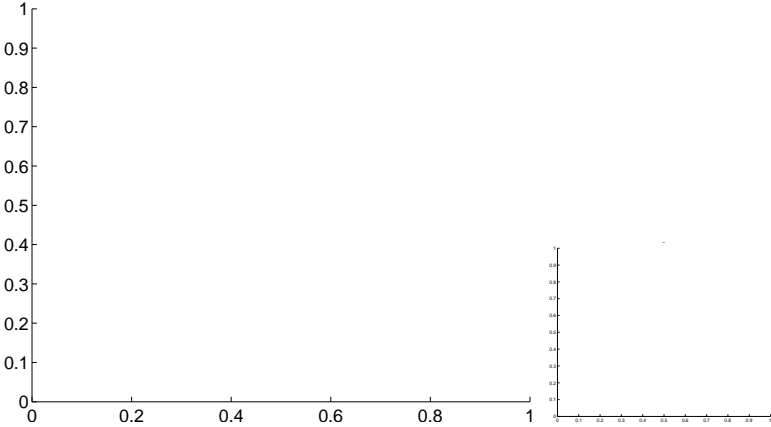
Q10 OOT image



Q11 no difference image



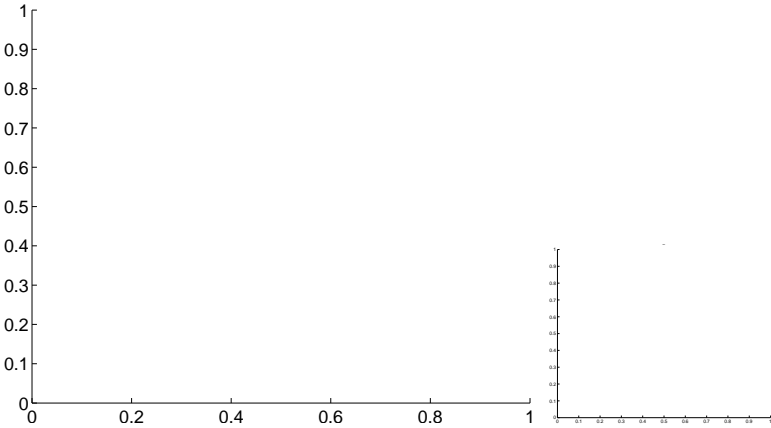
Q11 no OOT image



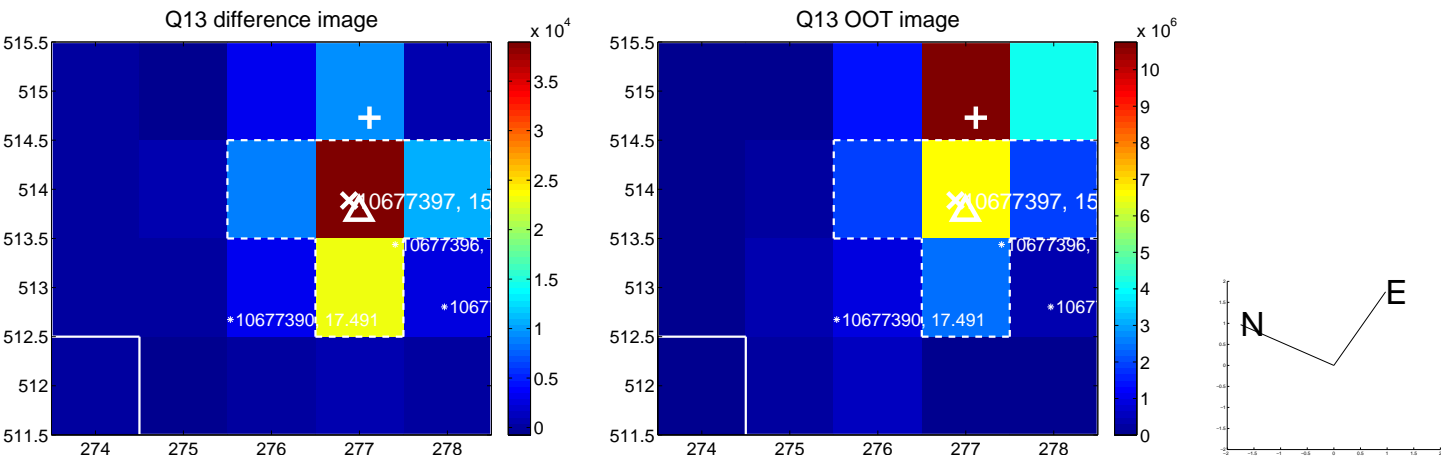
Q12 no difference image



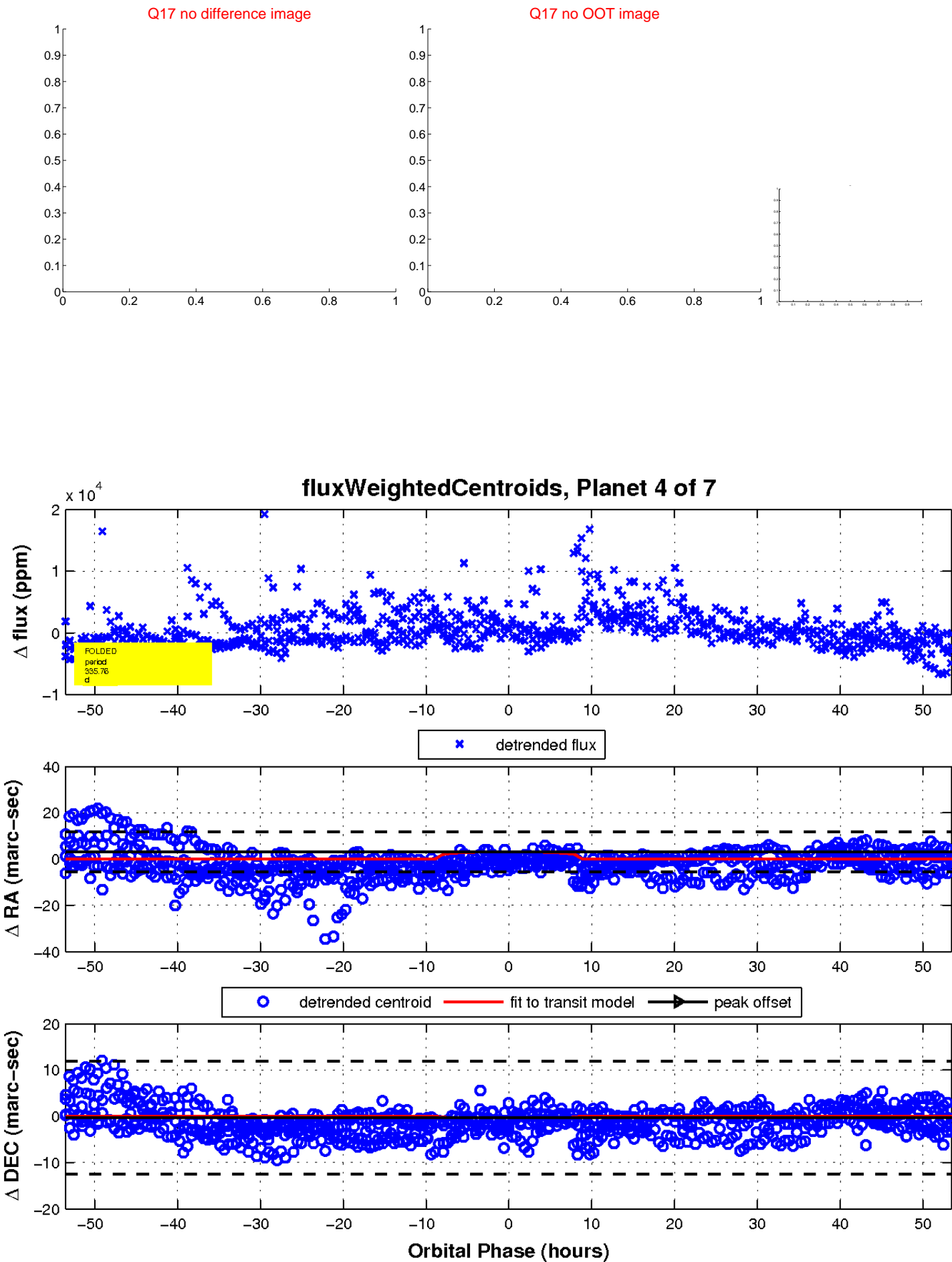
Q12 no OOT image



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

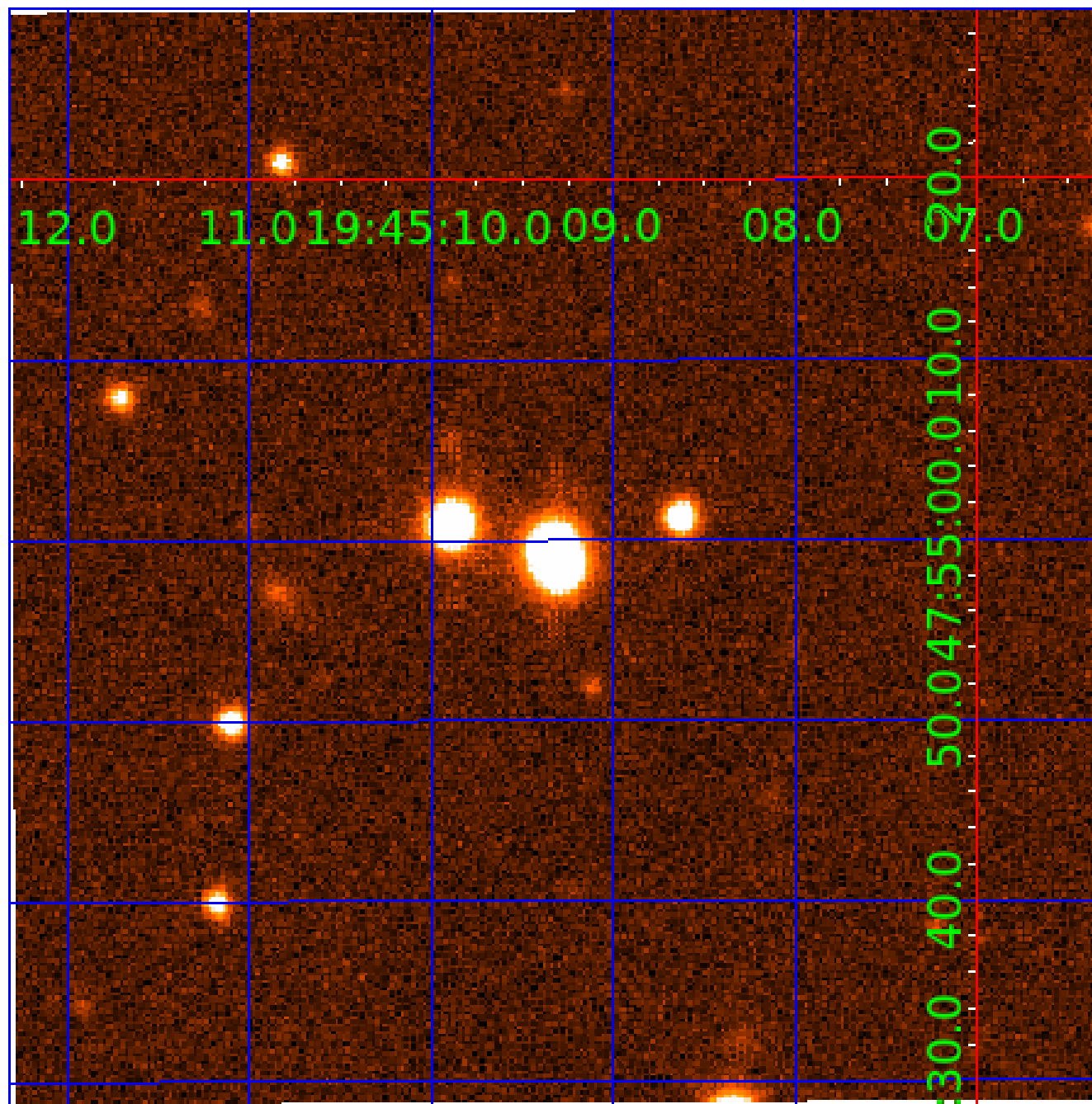


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 010677397

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010677397-01	OBS	No	266.581619	259.553907	5271.7	13.616	15.1	11.1	0.31	3393	2.23	0.04
010677397-02	OBS	No	242.020837	334.411468	3928.4	15.860	14.1	10.1	0.31	3393	2.10	0.04
010677397-03	OBS	No	335.725203	254.705198	1211.1	2.672	13.5	3.1	0.31	3393	1.14	0.03
010677397-04	OBS	No	335.763485	254.689739	4088.6	17.913	13.5	7.7	0.31	3393	1.97	0.03
010677397-05	OBS	No	415.967216	283.119581	3821.0	0.715	13.5	5.5	0.31	3393	4.01	0.02
010677397-06	OBS	No	476.676746	269.771385	4732.4	2.934	13.4	10.4	0.31	3393	2.12	0.02
010677397-07	OBS	No	0.948771	131.969317	363.3	3.614	14.8	14.9	0.31	3393	0.63	71.31

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010677397-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010677397-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_KIC_POS
010677397-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_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_KIC_POS
010677397-04	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—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—SAME_NTL_PERIOD—CENT_FEW_DIFFS
010677397-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010677397-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—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
010677397-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—CENT_KIC_POS

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

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

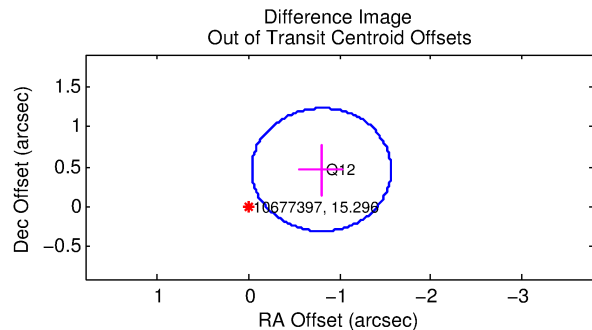
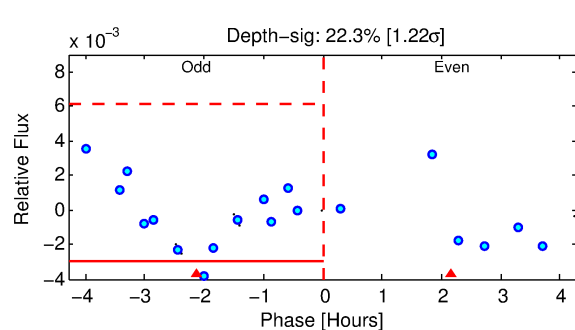
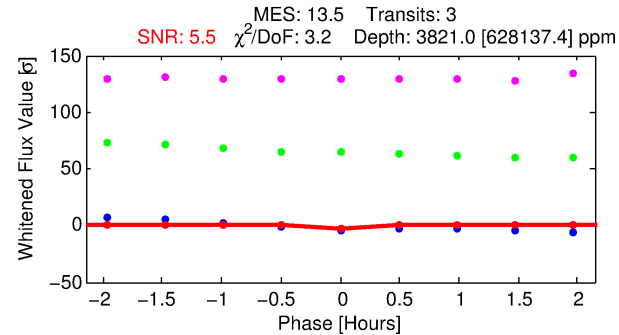
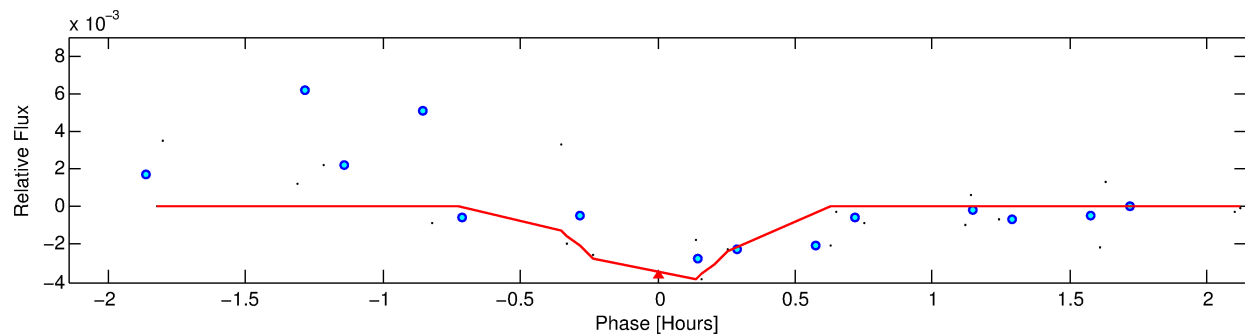
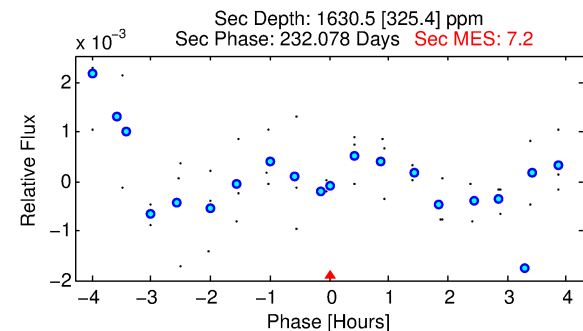
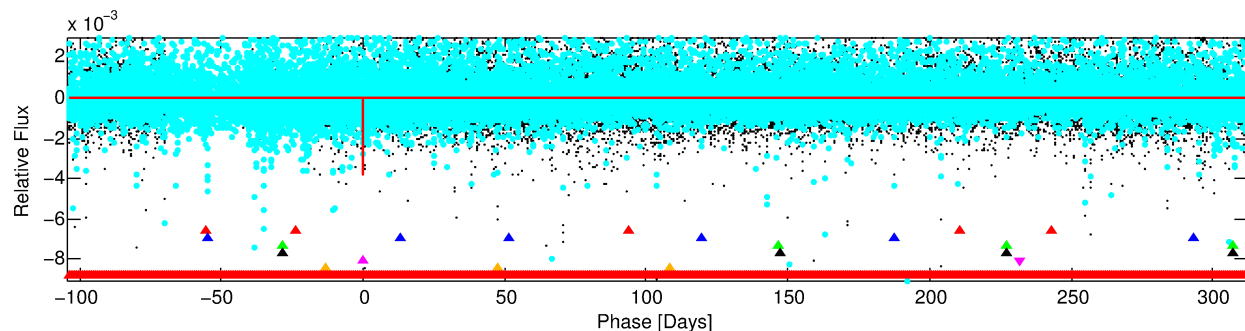
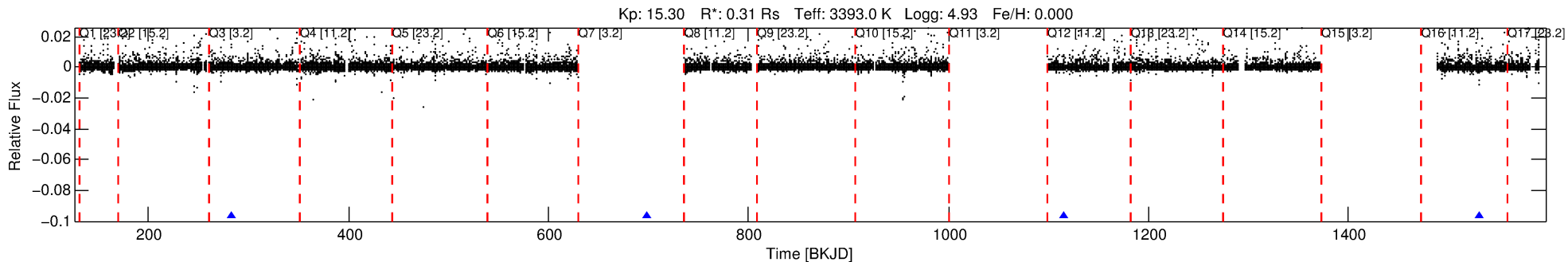
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010677397-05

No Significant Match Found

# DV One-Page Summary

KIC: 10677397 Candidate: 5 of 7 Period: 415.967 d



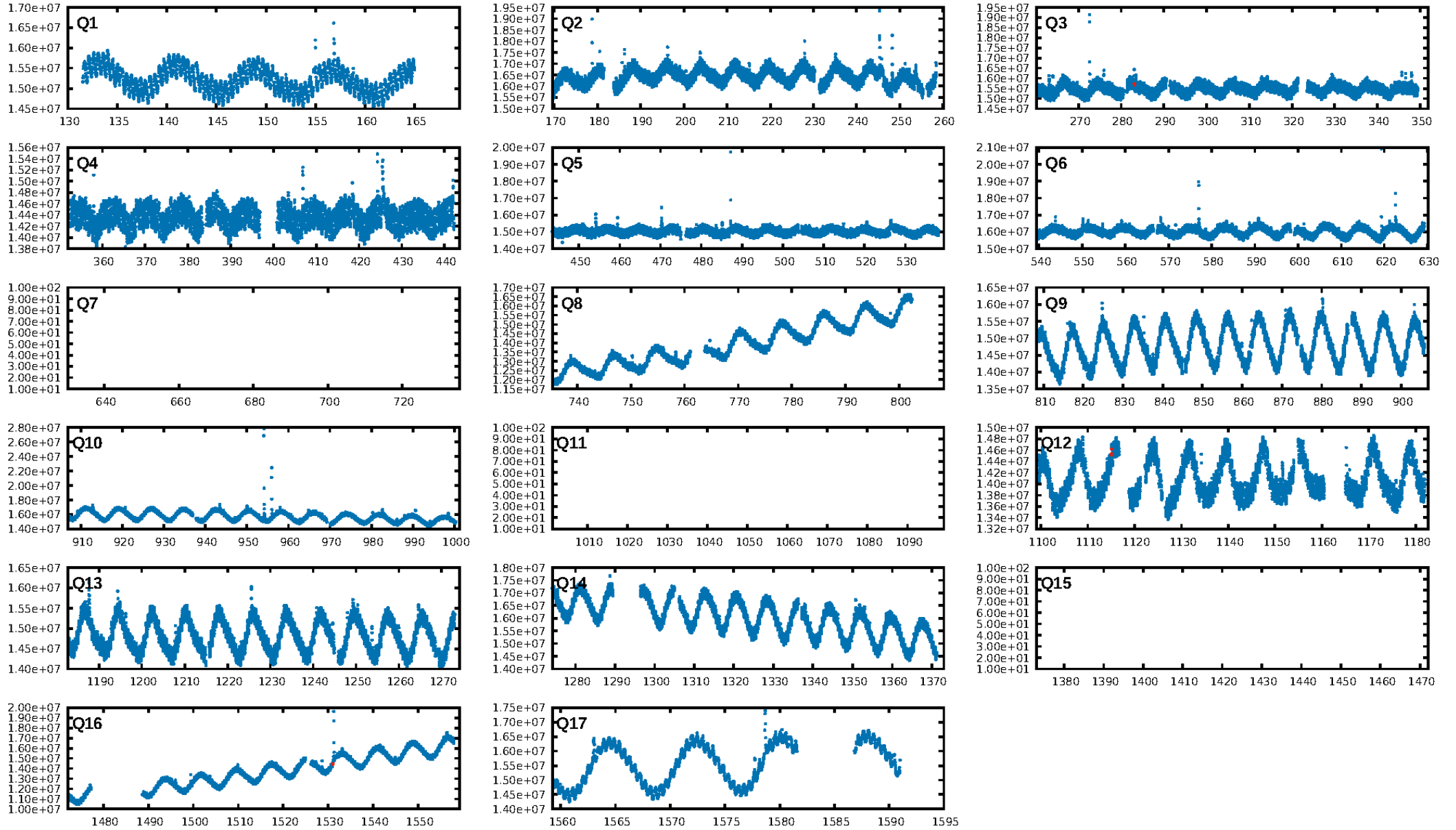
## DV Fit Results:

Period = 415.96722 [0.17793] d  
Epoch = 283.1196 [0.0792] BKJD  
Rp/R\* = 0.1178 [211.4129]  
a/R\* = 2417.81 [1281456.10]  
b = 0.98 [342.41]  
Seff = 0.02 [0.00]  
Teq = 98 [3] K  
Rp = 4.01 [7197.83] Re  
a = 0.7348 [0.0715] AU  
Ag = 30090.29 [107969309.98] [0.00 $\sigma$ ]  
Teffp = 1986 [1781698] K [0.00 $\sigma$ ]

## DV Diagnostic Results:

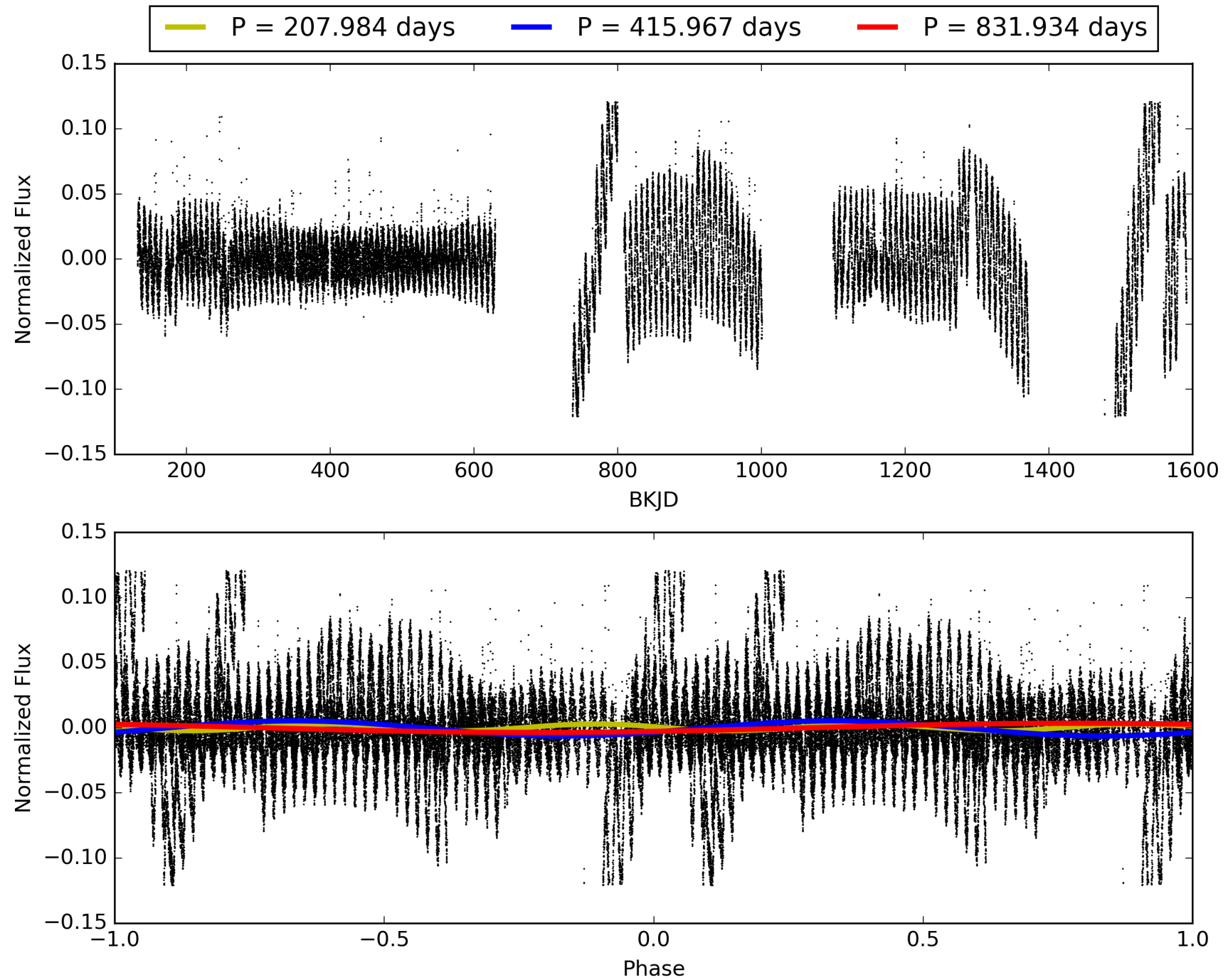
ShortPeriod-sig: 100.0% [107.37 $\sigma$ ]  
LongPeriod-sig: 100.0% [482.54 $\sigma$ ]  
ModelChiSquare2-sig: 5.9%  
ModelChiSquareGof-sig: 47.2%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 333.8  
Centroid-sig: 28.2%  
Centroid-so: 0.863 arcsec [0.90 $\sigma$ ]  
**OotOffset-rm: 0.924 arcsec [3.62 $\sigma$ ]**  
KicOffset-rm: 0.427 arcsec [1.37 $\sigma$ ]  
OotOffset-st: 0/0/1/0 [1]  
KicOffset-st: 0/0/1/0 [1]  
DiffImageQuality-fgm: 0.00 [0/1]  
DiffImageOverlap-fno: 0.50 [1/2]

# TCE 010677397-05, PDC Light Curves



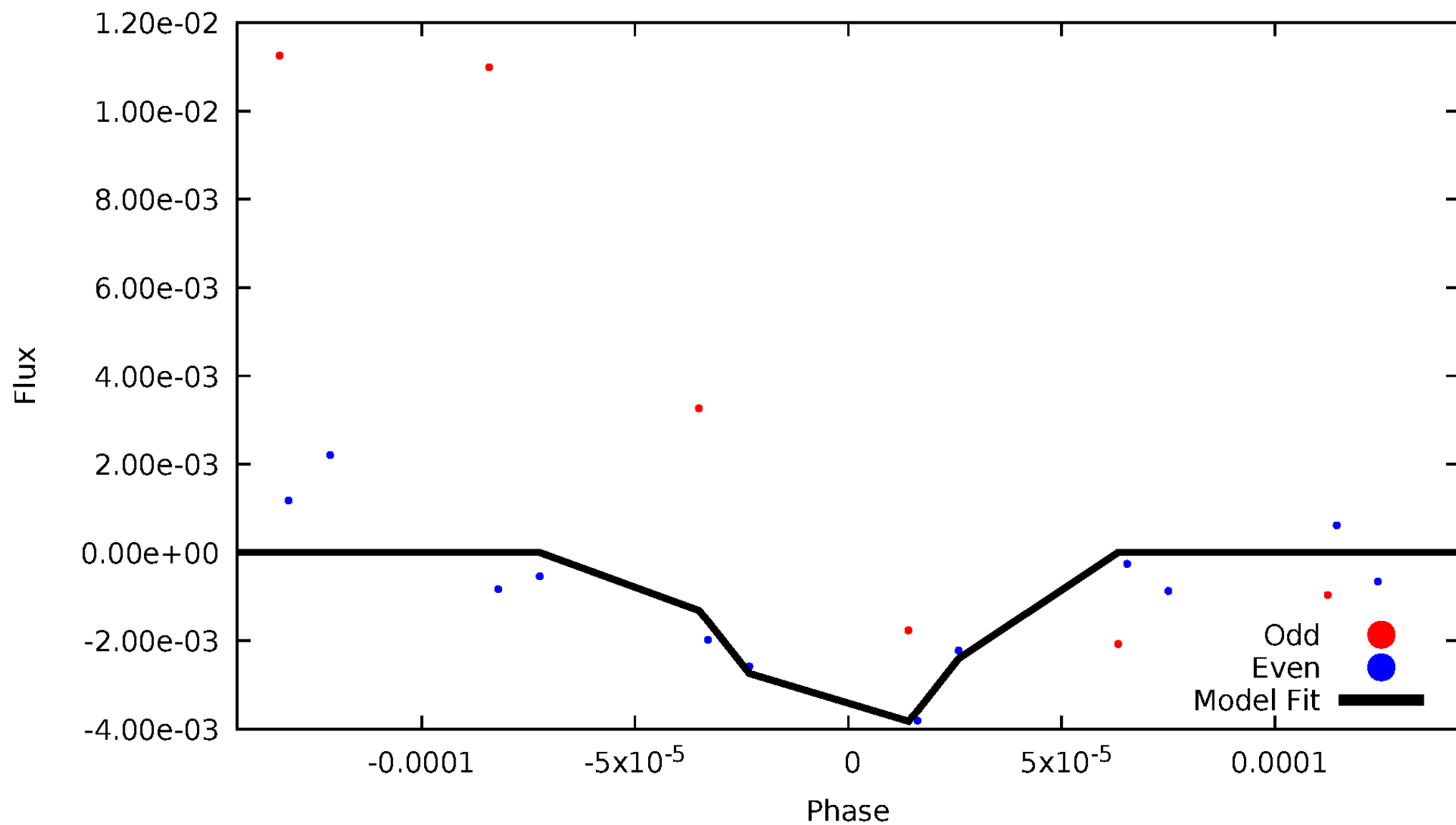


TCE 010677397-05



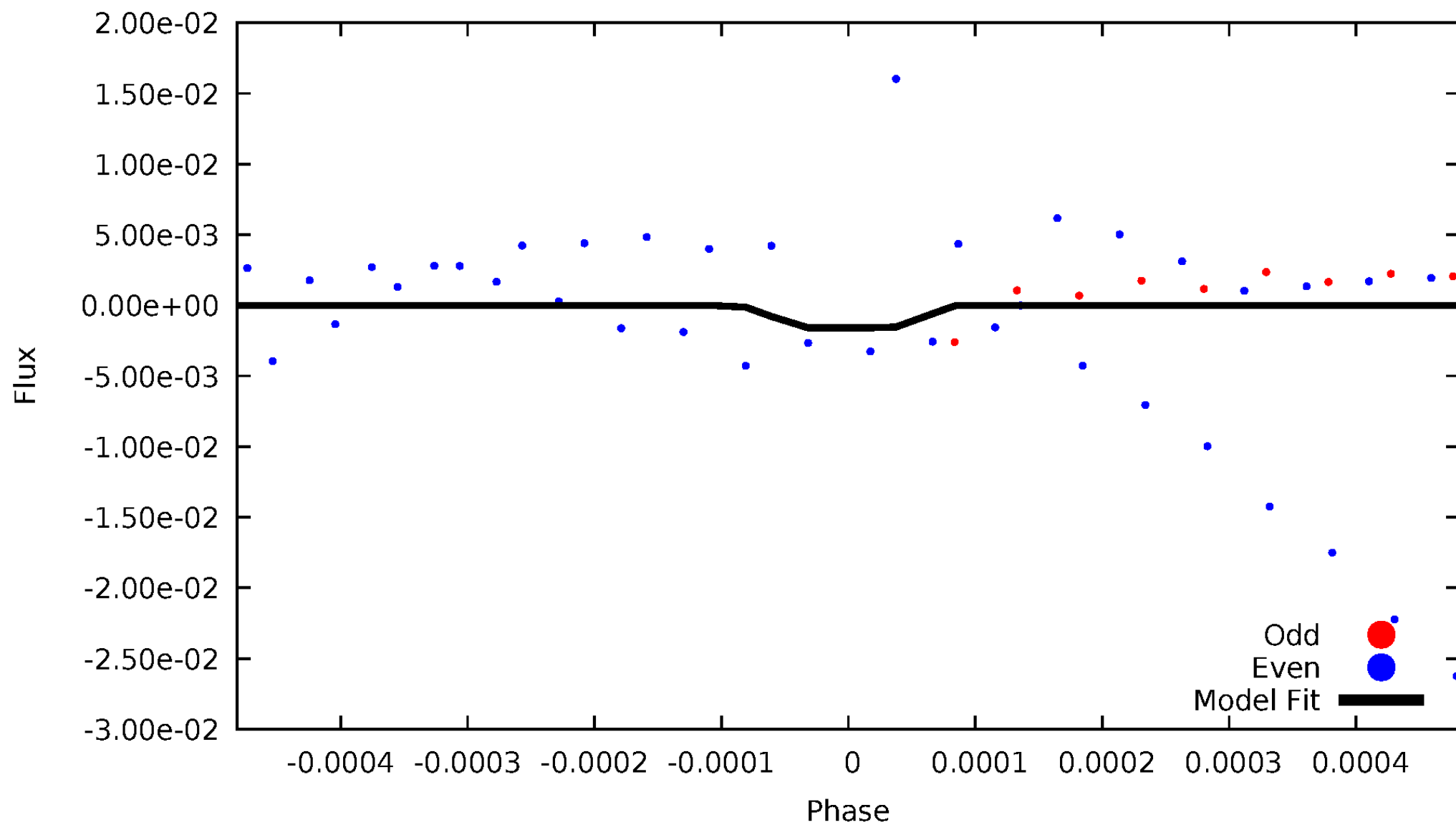
# DV Odd/Even

TCE 010677397-05



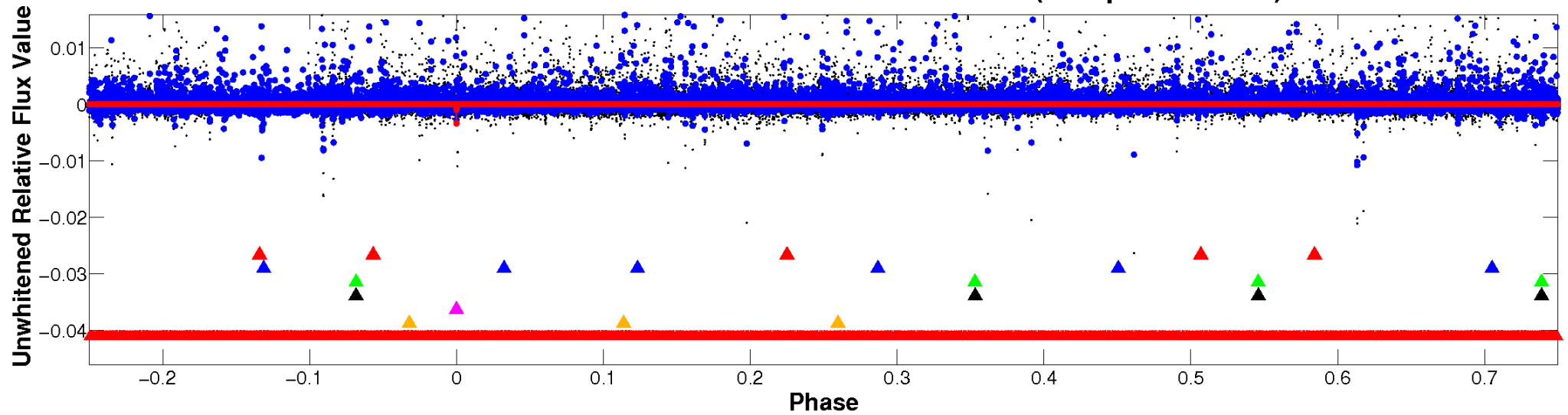
# ALT Odd/Even

TCE 010677397-05

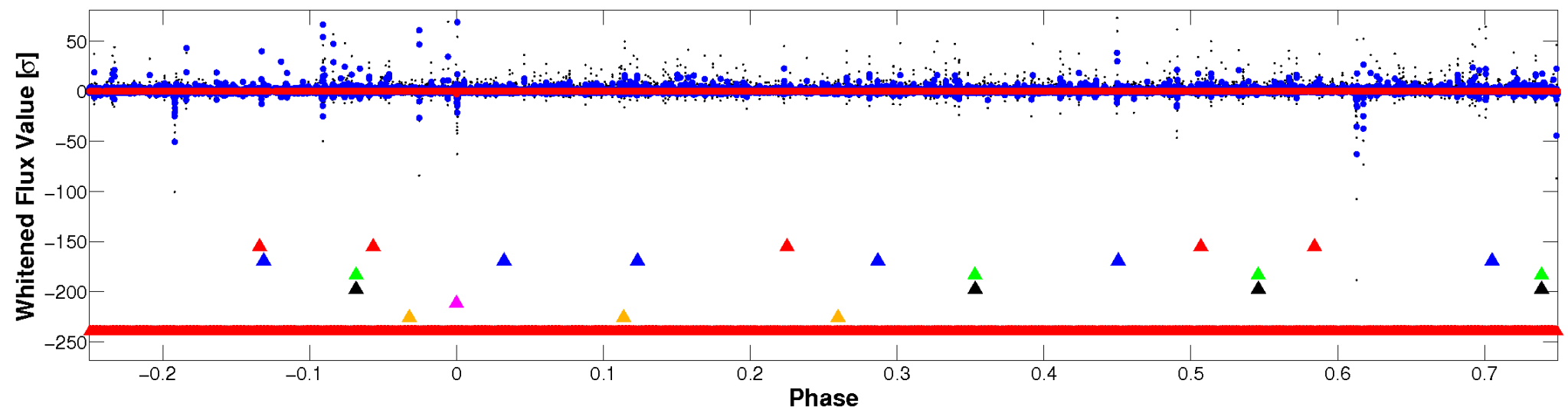


# Non-Whitened Vs. Whitened Light Curve

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

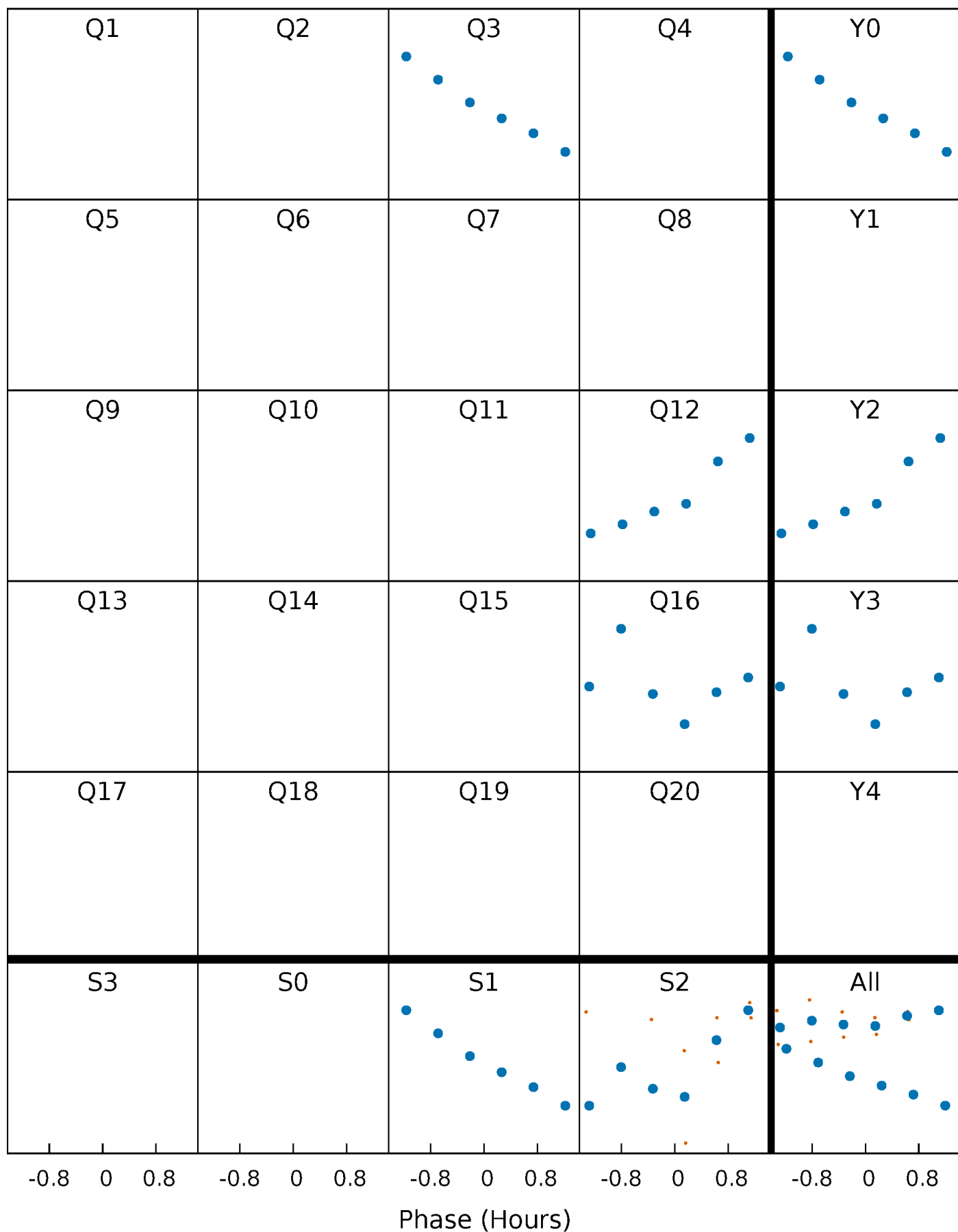


**Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



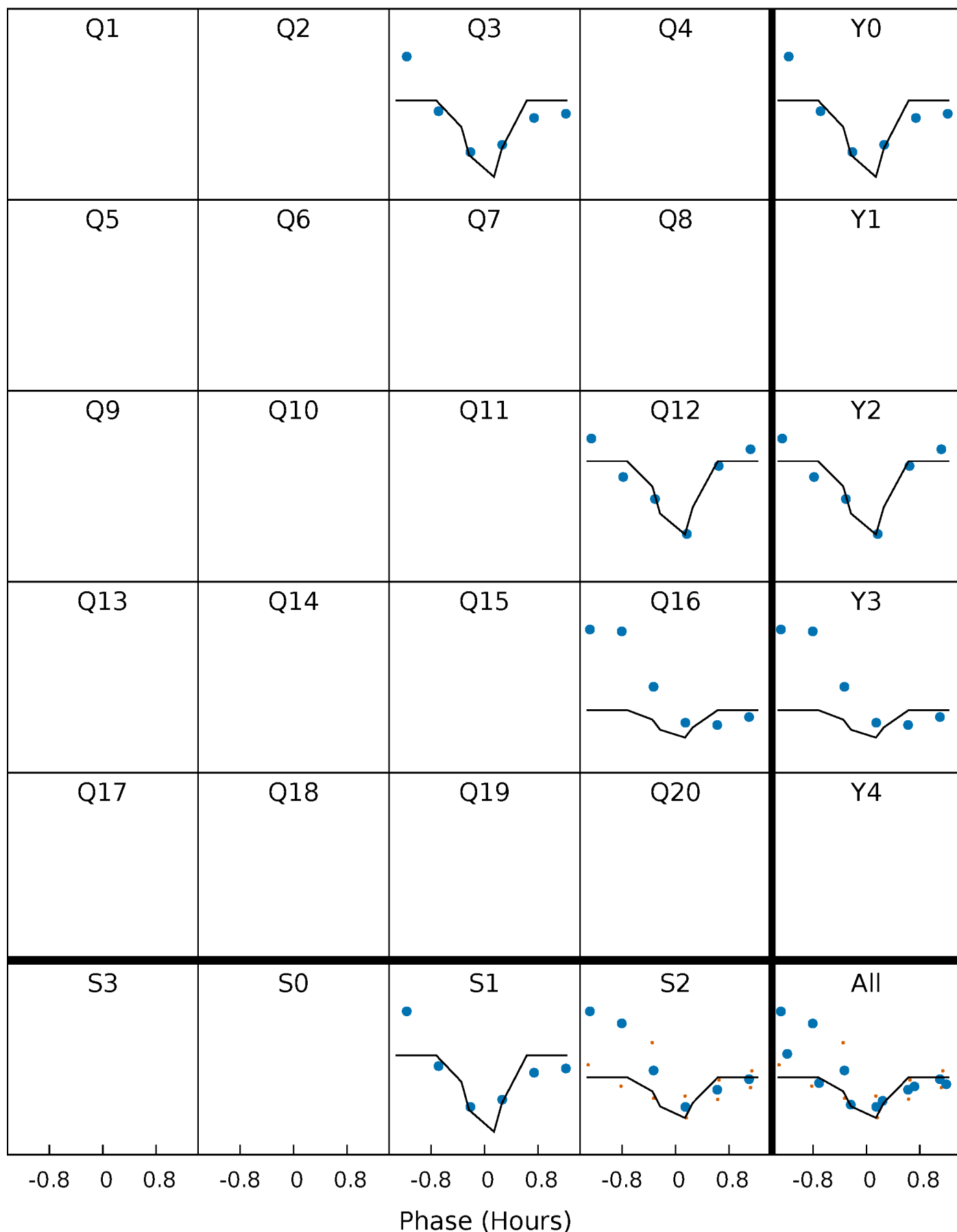
# PDC Quarter-Phased Transit Curves

TCE 010677397-05     $P=415.967216$  Days     $T_0=283.119581$  (BKJD)



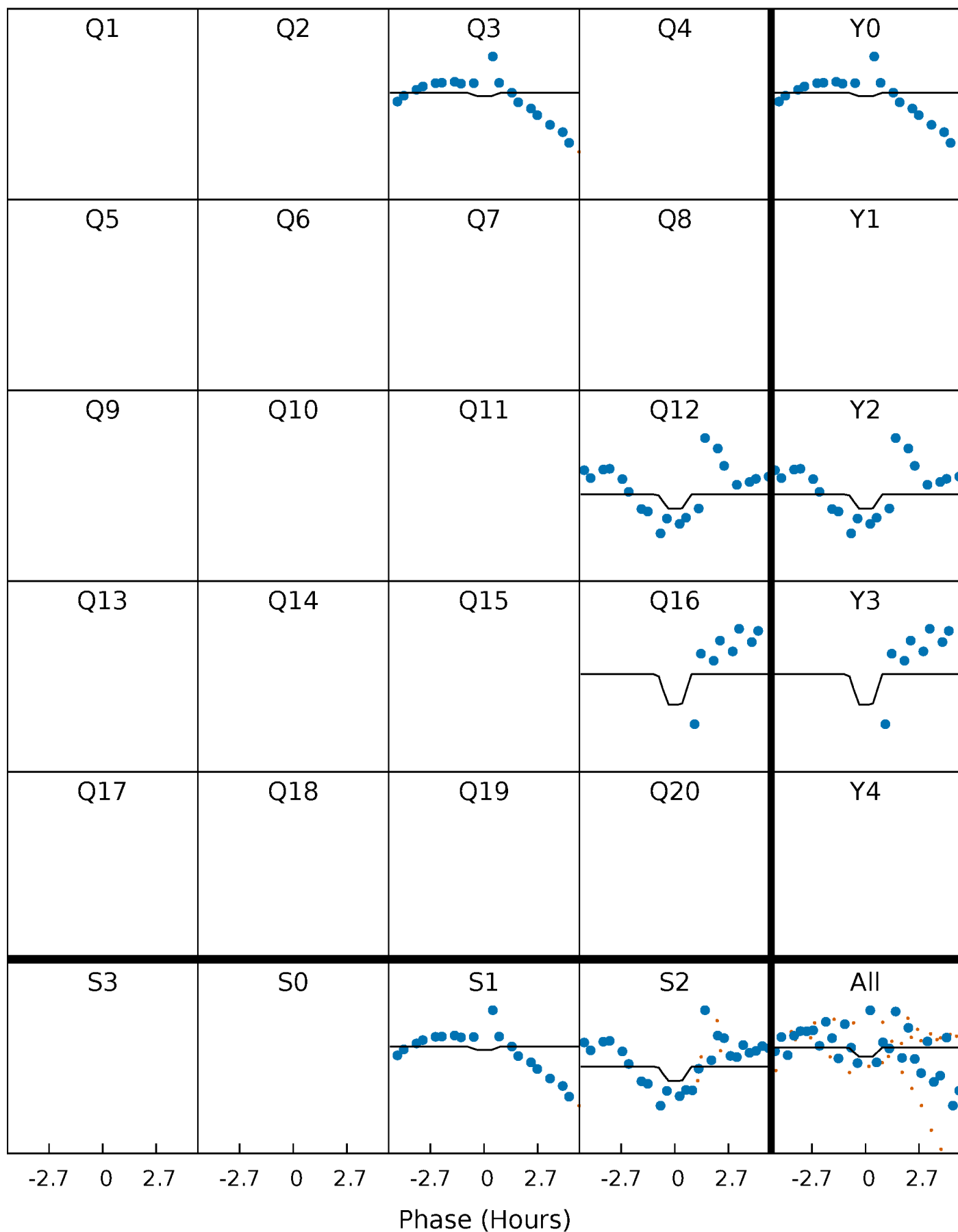
# DV Quarter-Phased Transit Curves

TCE 010677397-05     $P=415.967216$  Days     $T_0=283.119581$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

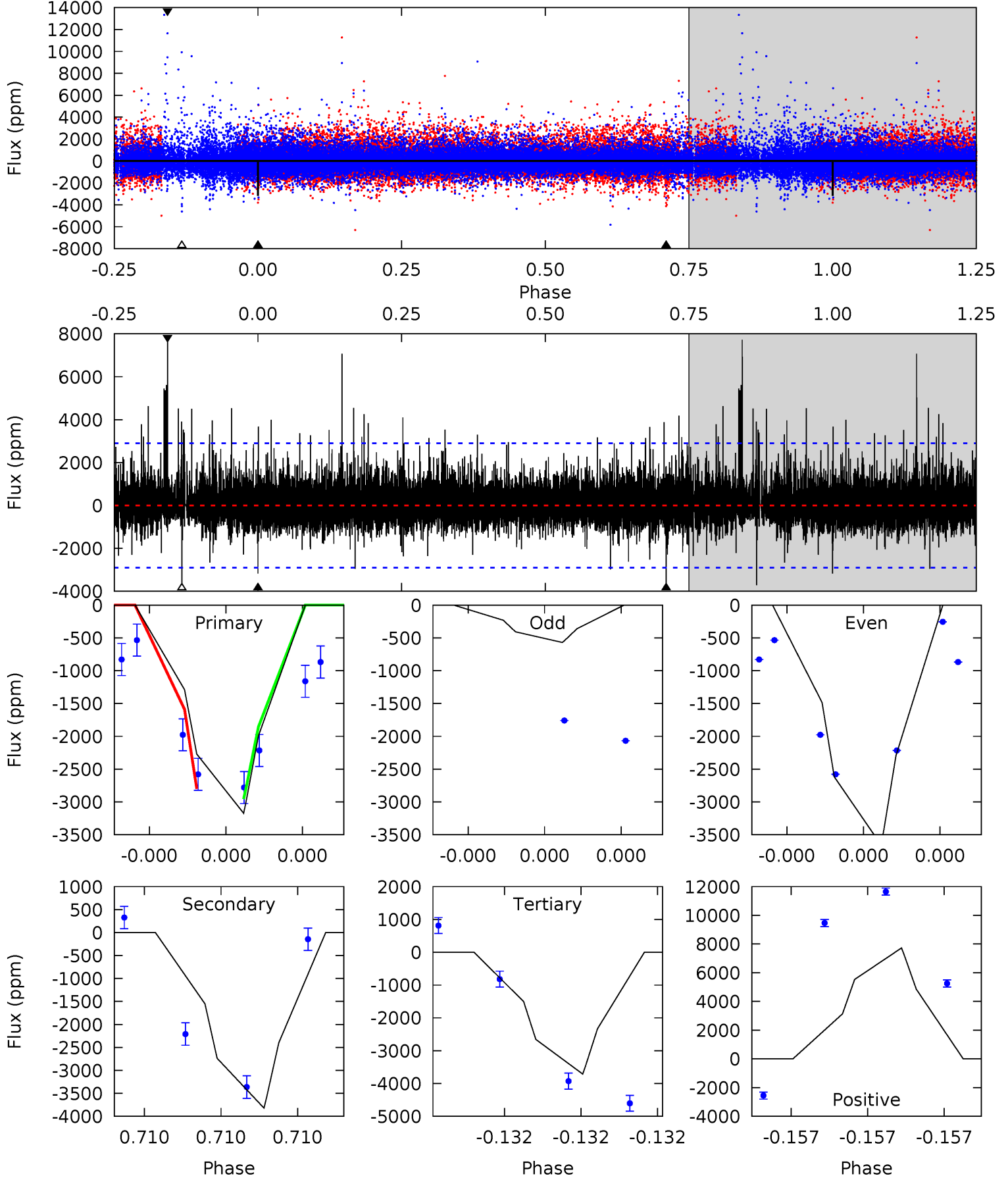
TCE 010677397-05     $P=416.143072$  Days     $T_0=283.033003$  (BKJD)



# DV Model-Shift Uniqueness Test

010677397-05, P = 415.967216 Days, E = 283.119581 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
6.50	7.82	7.60	15.8	5.93	4.01	1.28	-1.10	-9.32	0.22	-7.99	0.75	0.78	0.67	0.16

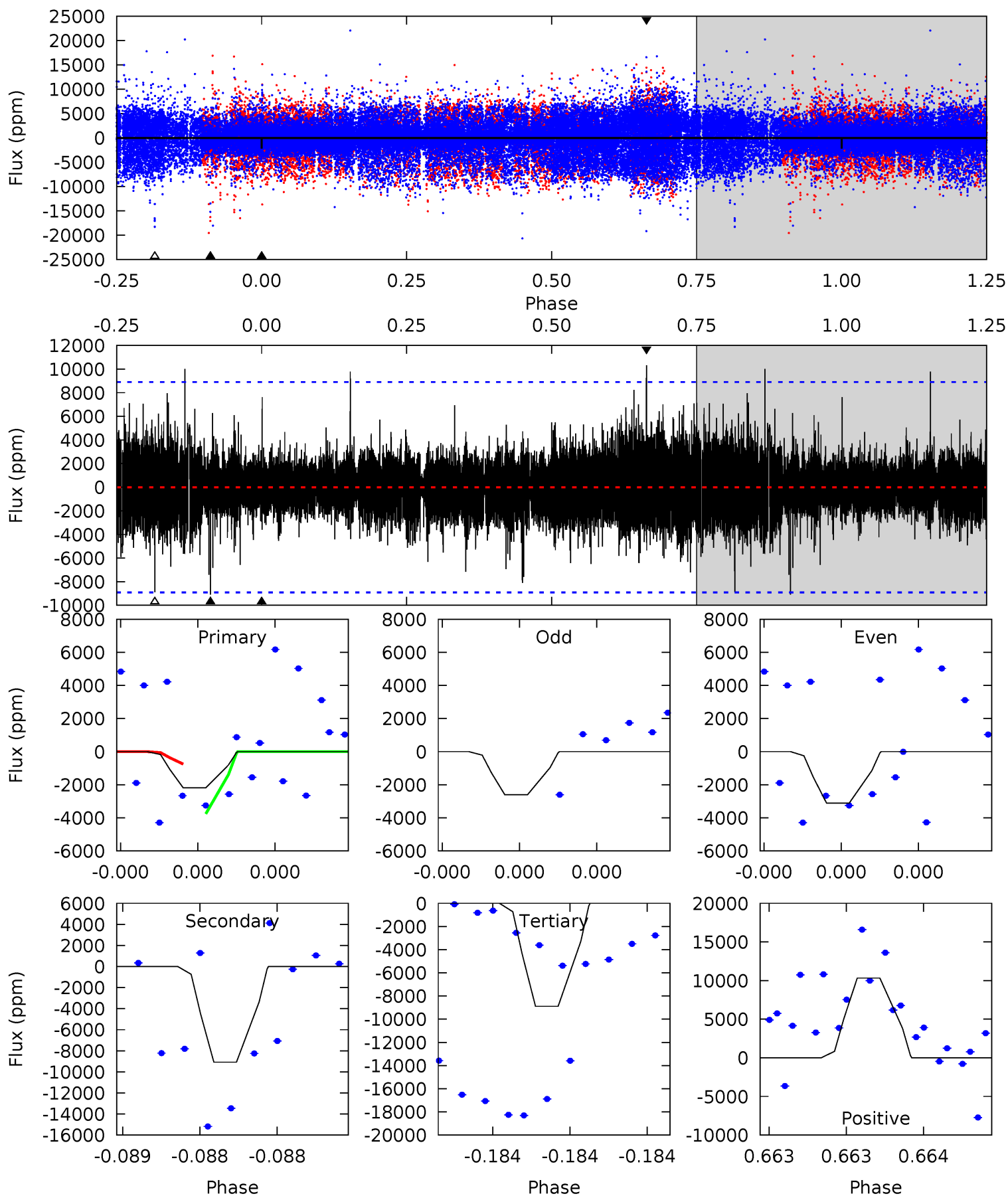




# Alt Model-Shift Uniqueness Test

010677397-05, P = 416.143072 Days, E = 283.033003 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
1.41	5.87	5.75	6.68	5.76	3.76	1.15	-4.34	-5.27	0.12	-0.80	0.15	1.00	0.53	0.91



### Stellar Parameters For KIC 010677397

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3393^{+50}_{-50}$	$4.935^{+0.055}_{-0.040}$	$0.000^{+0.100}_{-0.100}$	$0.312^{+0.041}_{-0.041}$	$0.306^{+0.051}_{-0.047}$	$14.160^{+4.127}_{-2.680}$
	+1%/-1%	+1%/-1%	+inf%/-inf%	+13%/-13%	+17%/-15%	+29%/-19%
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 010677397-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-3822 \pm 489$	$4660.13^{+5034.38}_{-3314.86}$	$136^{+4}_{-4}$	$-973^{+1968}_{-14}$	$0.053^{+0.587}_{-0.041}$
Alt.	$-9081 \pm 1546$	$5081.83^{+5067.07}_{-3637.22}$	$136^{+4}_{-3}$	$-961^{+2017}_{-23}$	$0.102^{+1.149}_{-0.077}$

$T_{max}$  = 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

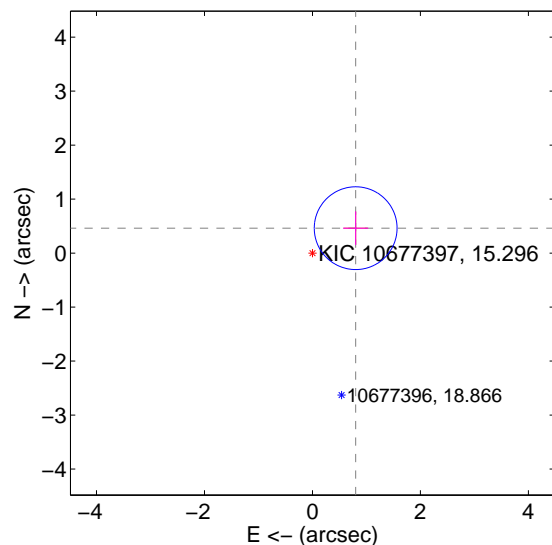
Supplemental centroid analysis for 010677397-05. Kepler magnitude: 15.30. Transit SNR 5.50

There are 0 quarters with good PRF difference image offsets

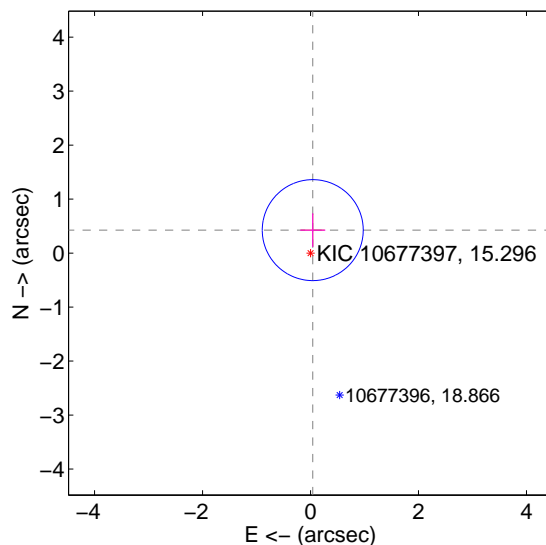
The direct PRF centroid is offset from the target star catalog position by about 0.76 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.924 \pm 0.256$	3.62	$-0.800 \pm 0.234$	$0.462 \pm 0.312$
PRF-fit source offset from KIC position	$0.427 \pm 0.312$	1.37	$-0.041 \pm 0.234$	$0.425 \pm 0.312$
photometric centroid source offset	$0.86 \pm 0.96$	0.90	$0.49 \pm 1.28$	$0.71 \pm 0.76$

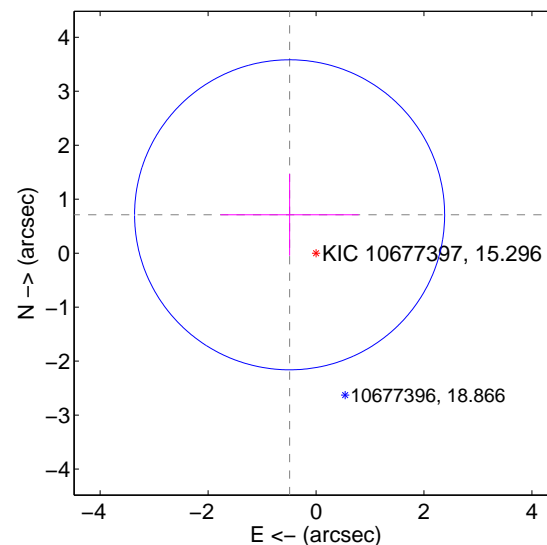
offset from difference PRF-fit to OOT PRF-fit



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.

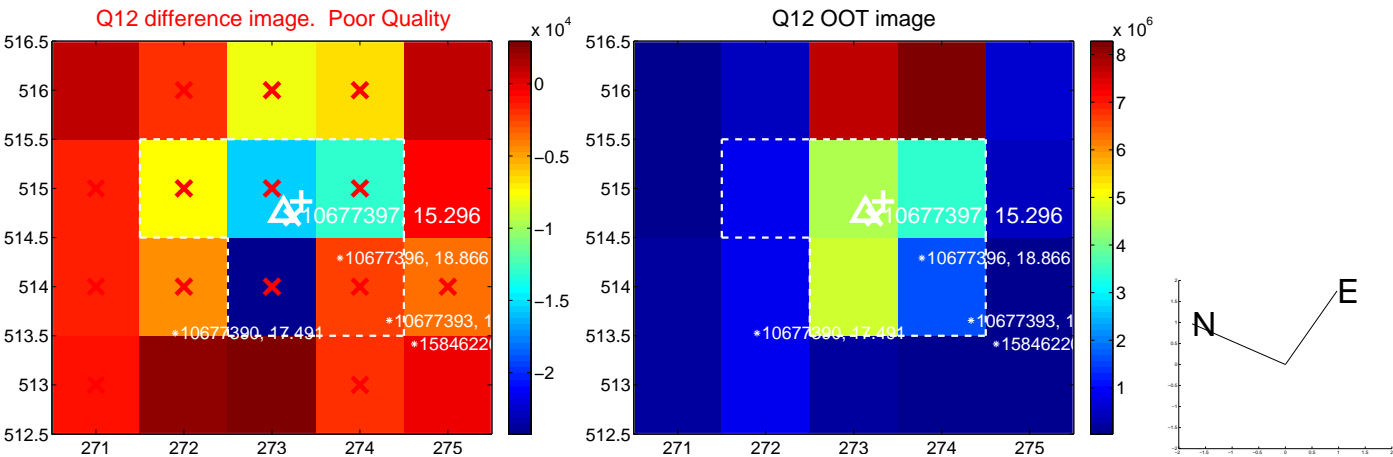
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



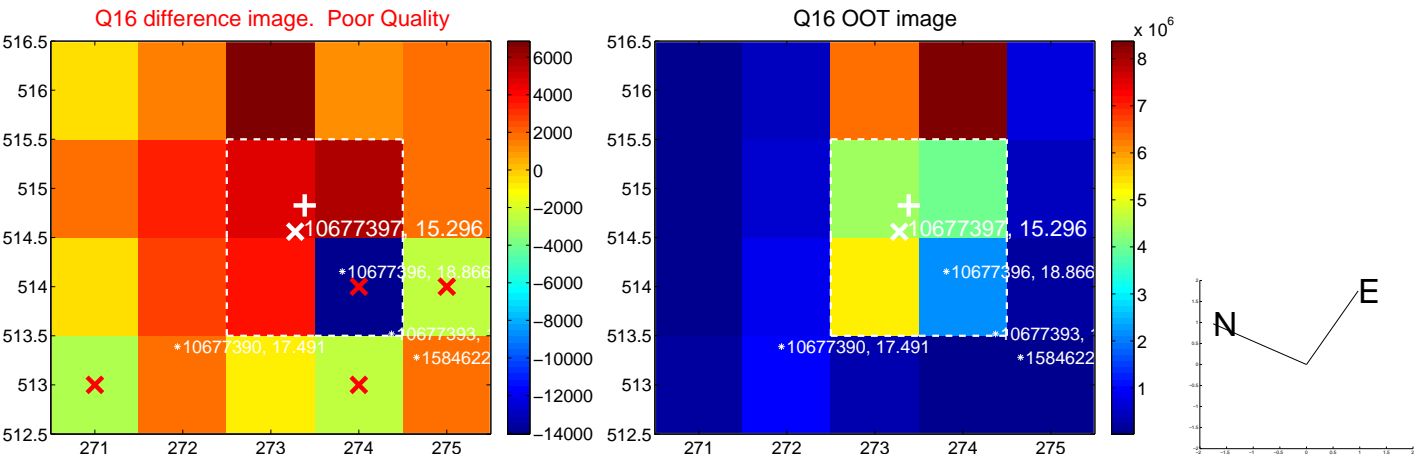
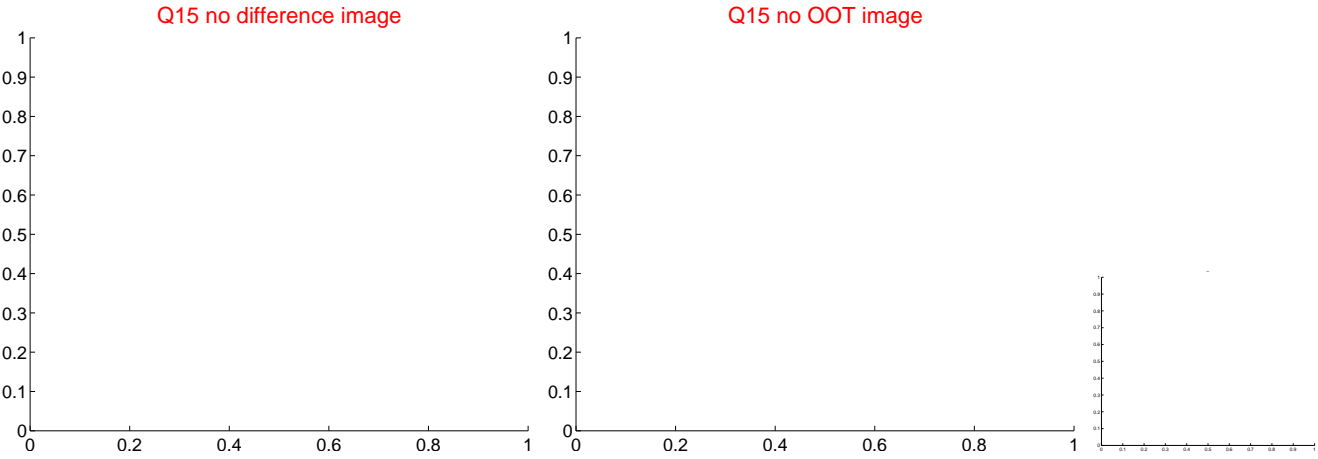
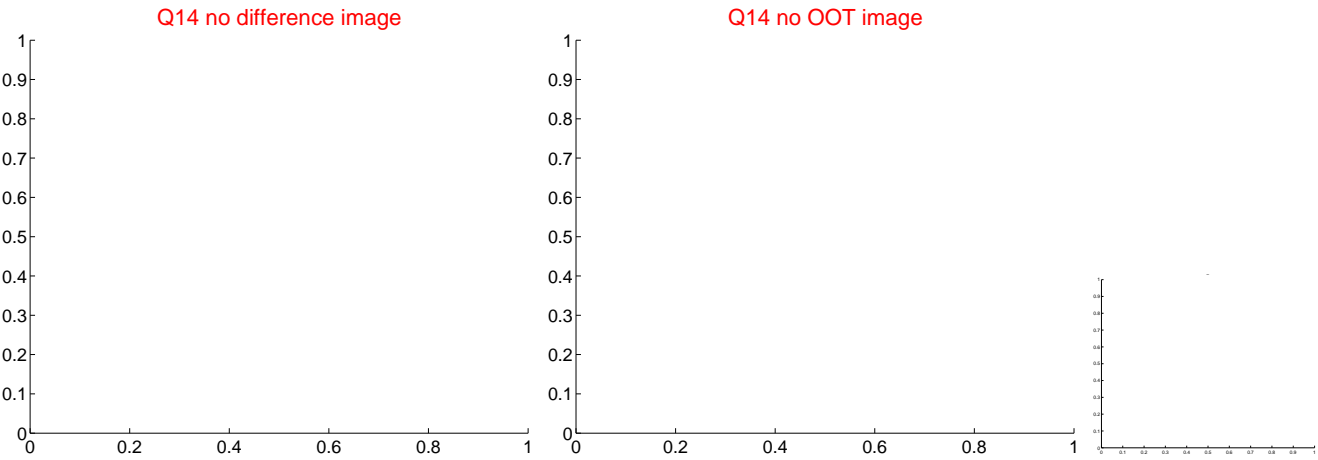
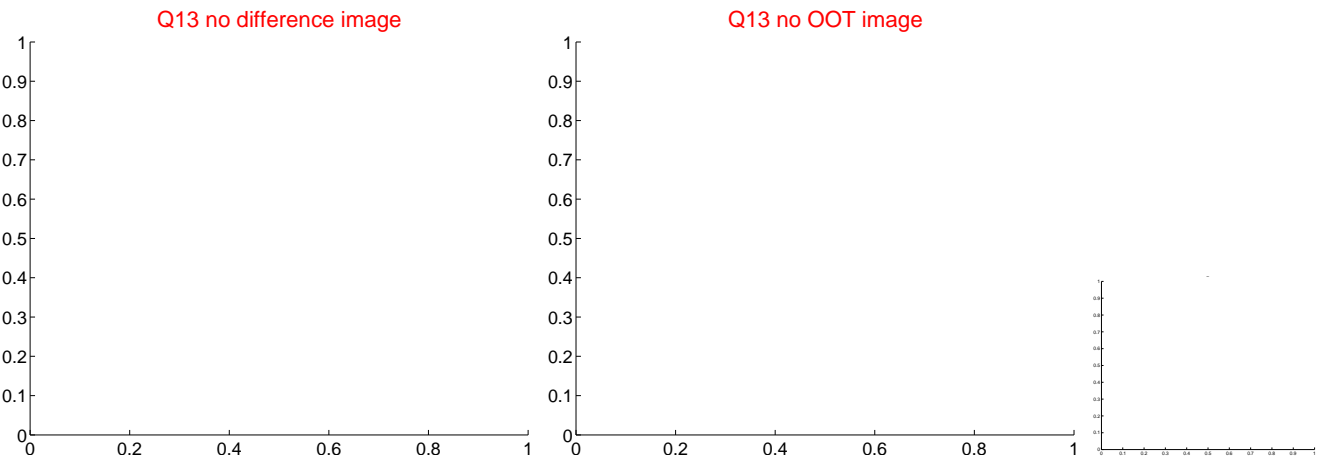
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



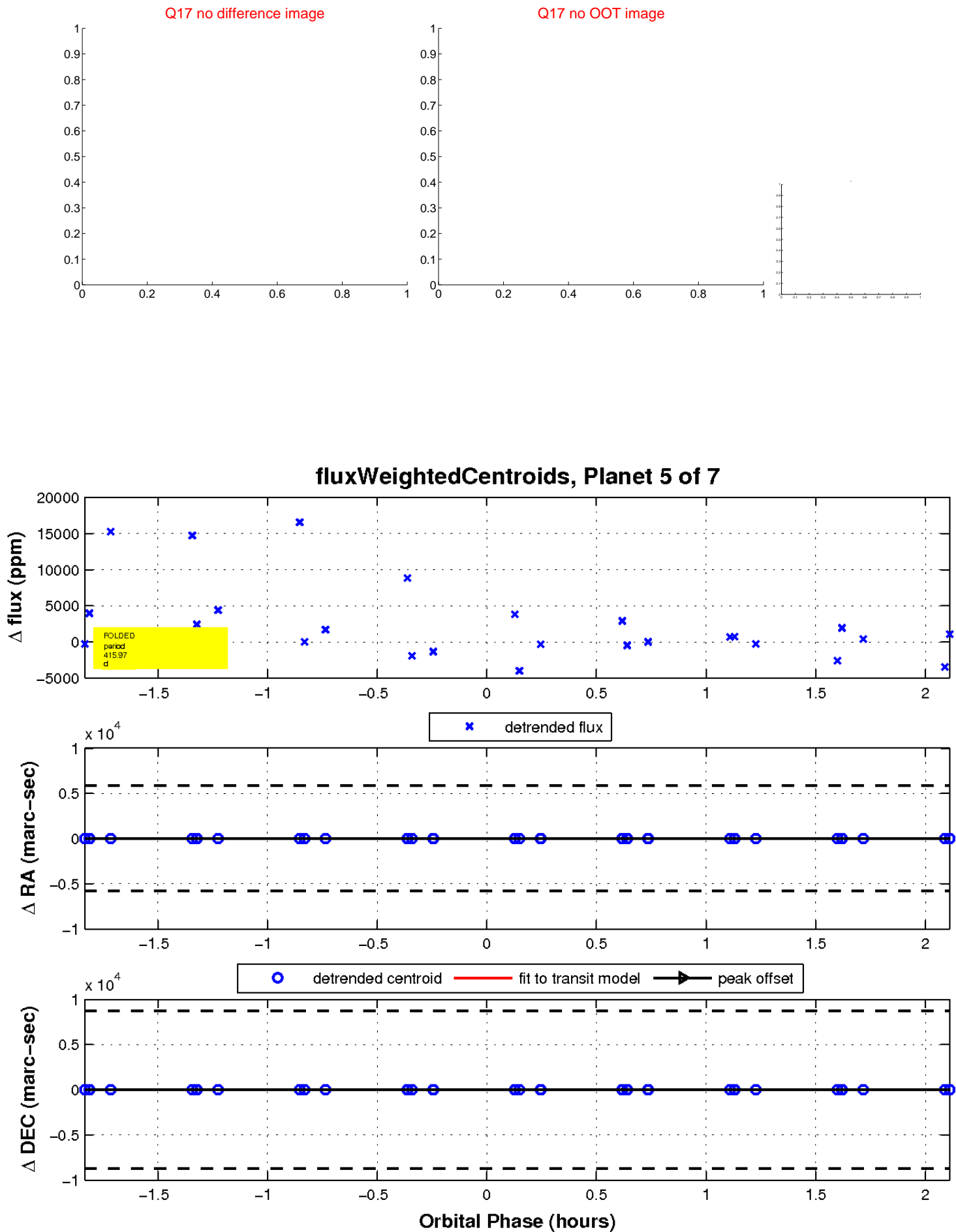
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



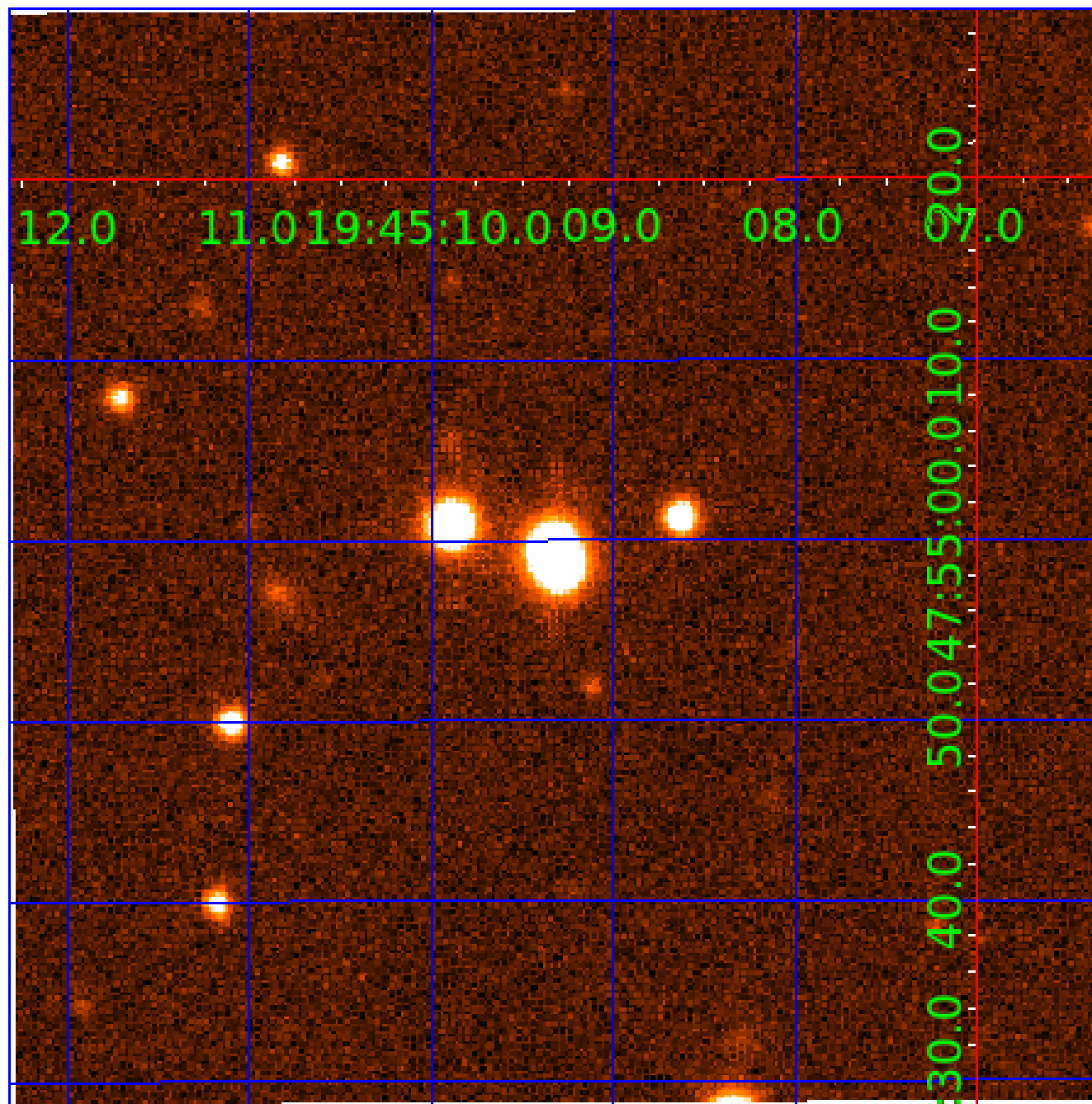
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 010677397

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010677397-01	OBS	No	266.581619	259.553907	5271.7	13.616	15.1	11.1	0.31	3393	2.23	0.04
010677397-02	OBS	No	242.020837	334.411468	3928.4	15.860	14.1	10.1	0.31	3393	2.10	0.04
010677397-03	OBS	No	335.725203	254.705198	1211.1	2.672	13.5	3.1	0.31	3393	1.14	0.03
010677397-04	OBS	No	335.763485	254.689739	4088.6	17.913	13.5	7.7	0.31	3393	1.97	0.03
010677397-05	OBS	No	415.967216	283.119581	3821.0	0.715	13.5	5.5	0.31	3393	4.01	0.02
010677397-06	OBS	No	476.676746	269.771385	4732.4	2.934	13.4	10.4	0.31	3393	2.12	0.02
010677397-07	OBS	No	0.948771	131.969317	363.3	3.614	14.8	14.9	0.31	3393	0.63	71.31

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010677397-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010677397-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_KIC_POS
010677397-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_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_KIC_POS
010677397-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—SAME_NTL_PERIOD—CENT_FEW_DIFFS
010677397-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010677397-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—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
010677397-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—CENT_KIC_POS

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

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

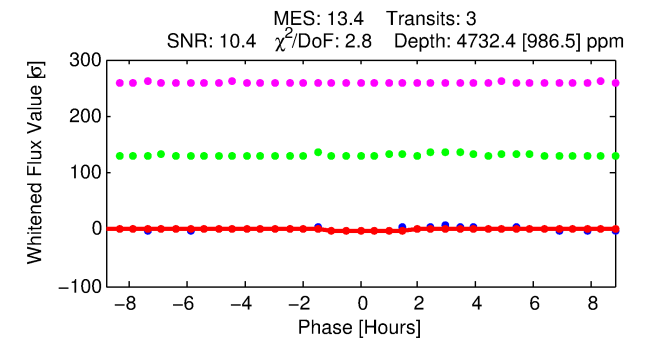
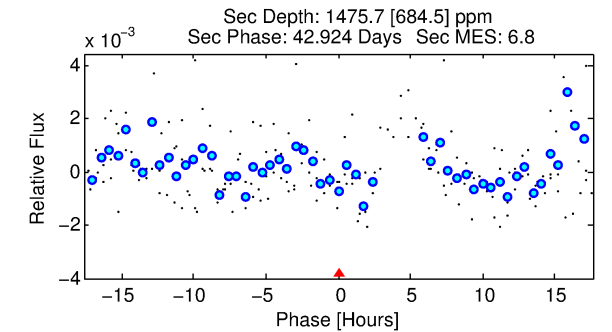
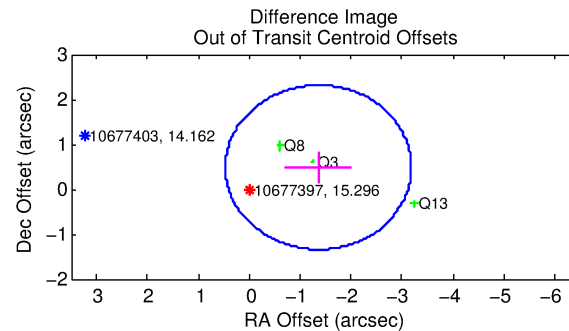
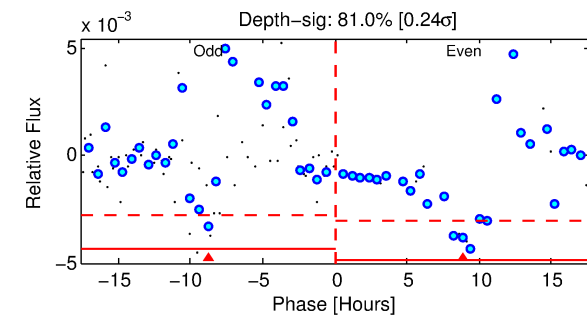
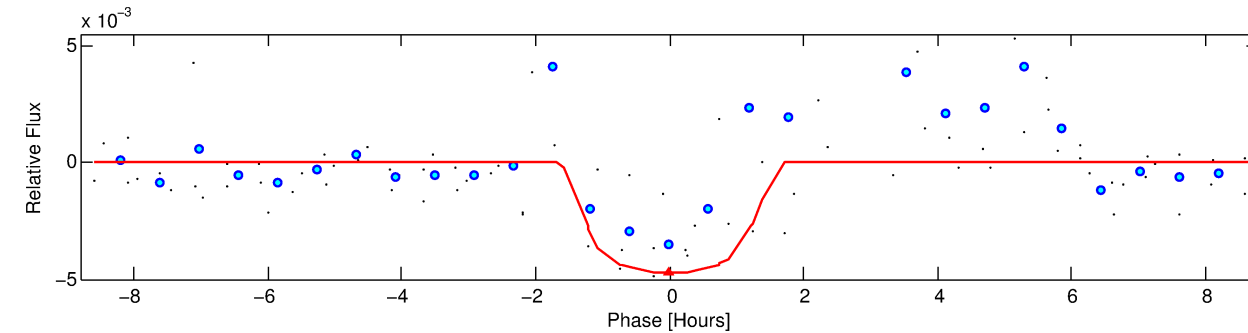
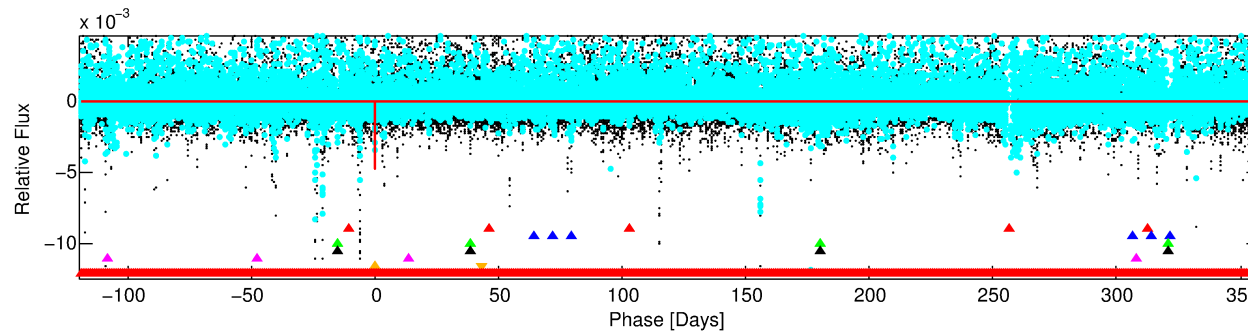
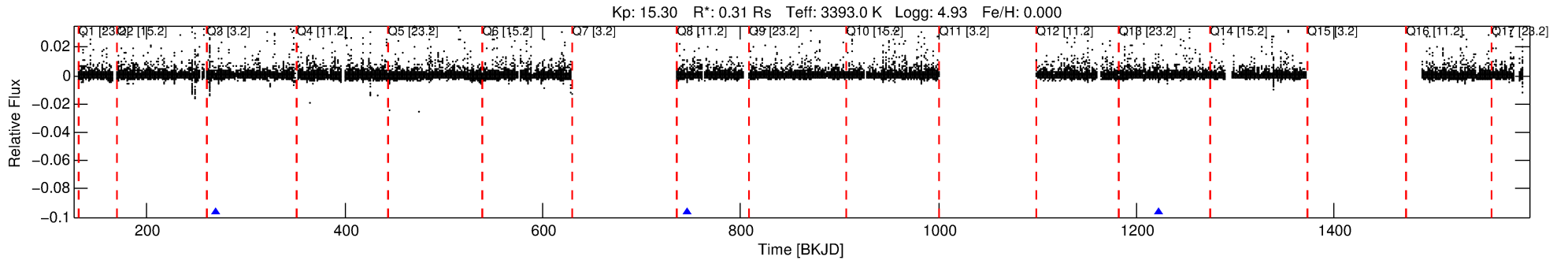
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010677397-06

No Significant Match Found

# DV One-Page Summary

KIC: 10677397 Candidate: 6 of 7 Period: 476.677 d



## DV Fit Results:

Period = 476.67675 [0.00560] d  
Epoch = 269.7714 [0.0089] BKJD  
Rp/R\* = 0.0624 [0.1112]  
a/R\* = 1304.39 [9906.21]  
b = 0.16 [47.55]  
Seff = 0.02 [0.00]  
Teq = 93 [3] K  
Rp = 2.12 [3.80] Re  
a = 0.8047 [0.0783] AU  
Ag = 116447.53 [418605.65] [0.28σ]  
Teffp = 2662 [2391] K [1.07σ]

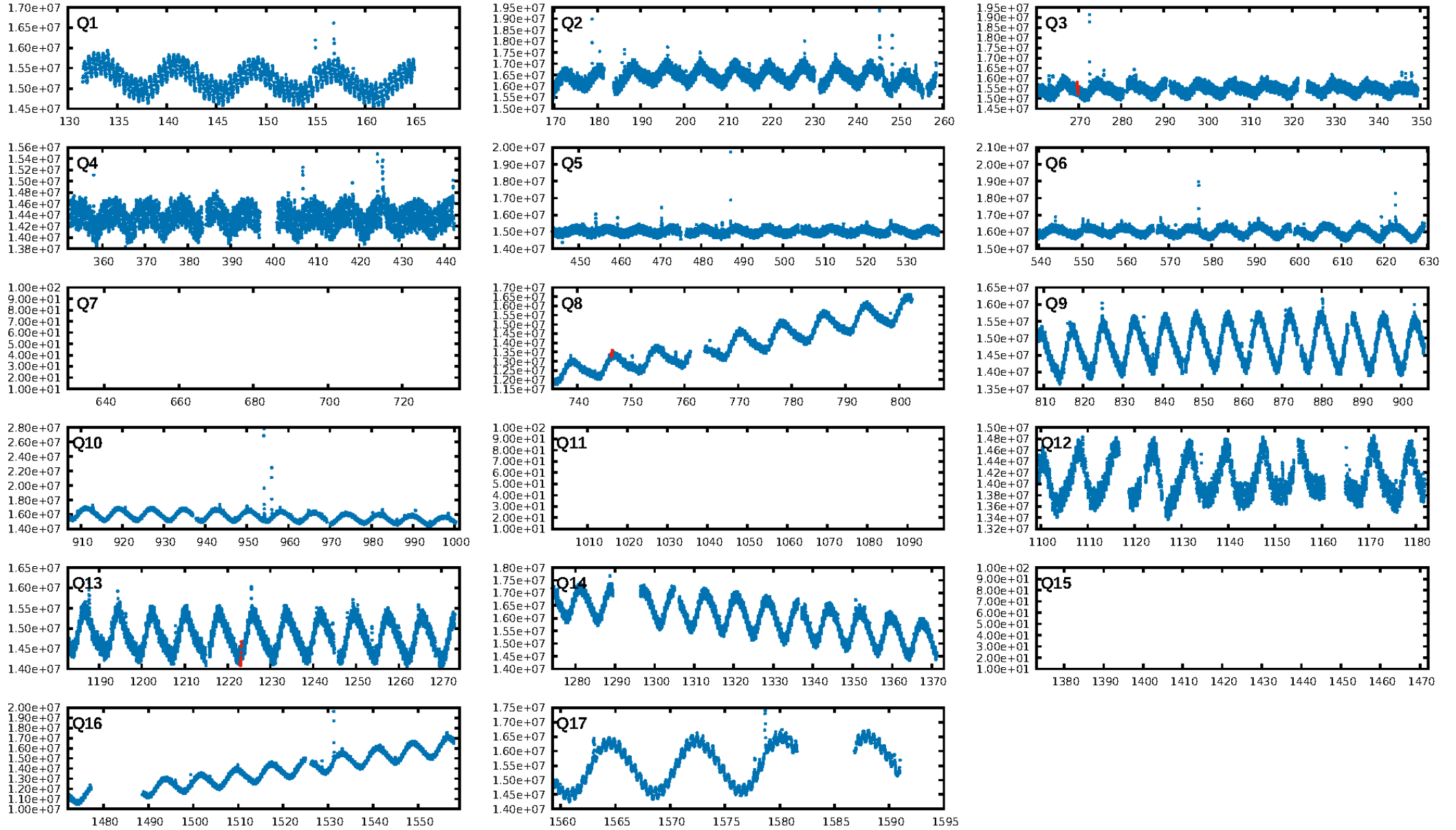
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [482.54σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 1.2%  
ModelChiSquareGof-sig: 9.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.204  
Centroid-sig: 37.6%  
Centroid-so: 1.461 arcsec [2.35σ]  
OotOffset-rm: 1.440 arcsec [2.36σ]  
OotOffset-st: 0/1/1/1 [3]  
KicOffset-rm: 0.767 arcsec [6.79σ]  
KicOffset-st: 0/1/1/1 [3]  
DiffImageQuality-fgm: 0.33 [1/3]  
DiffImageOverlap-fno: 0.00 [0/3]

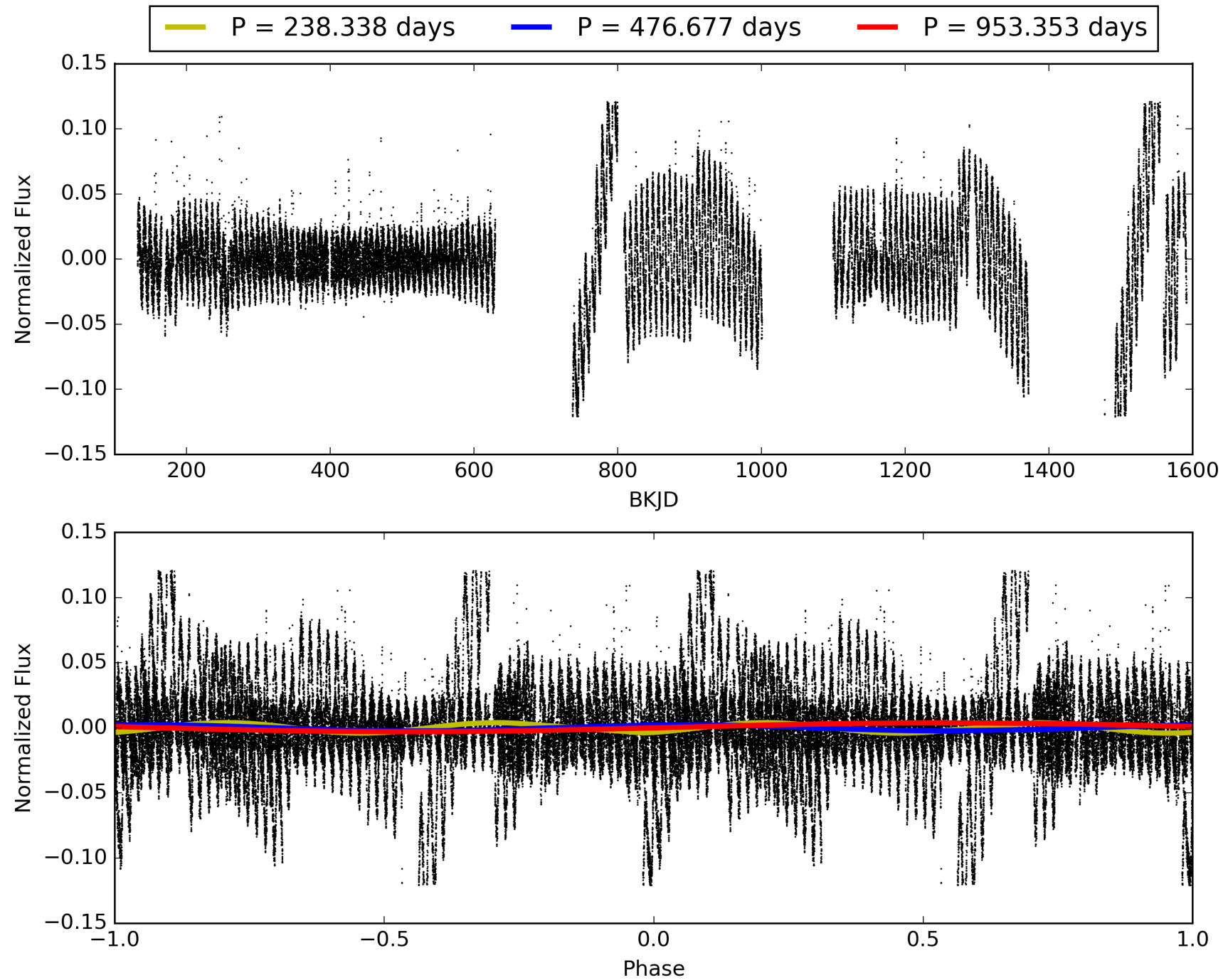
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 07:00:44 Z

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

# TCE 010677397-06, PDC Light Curves

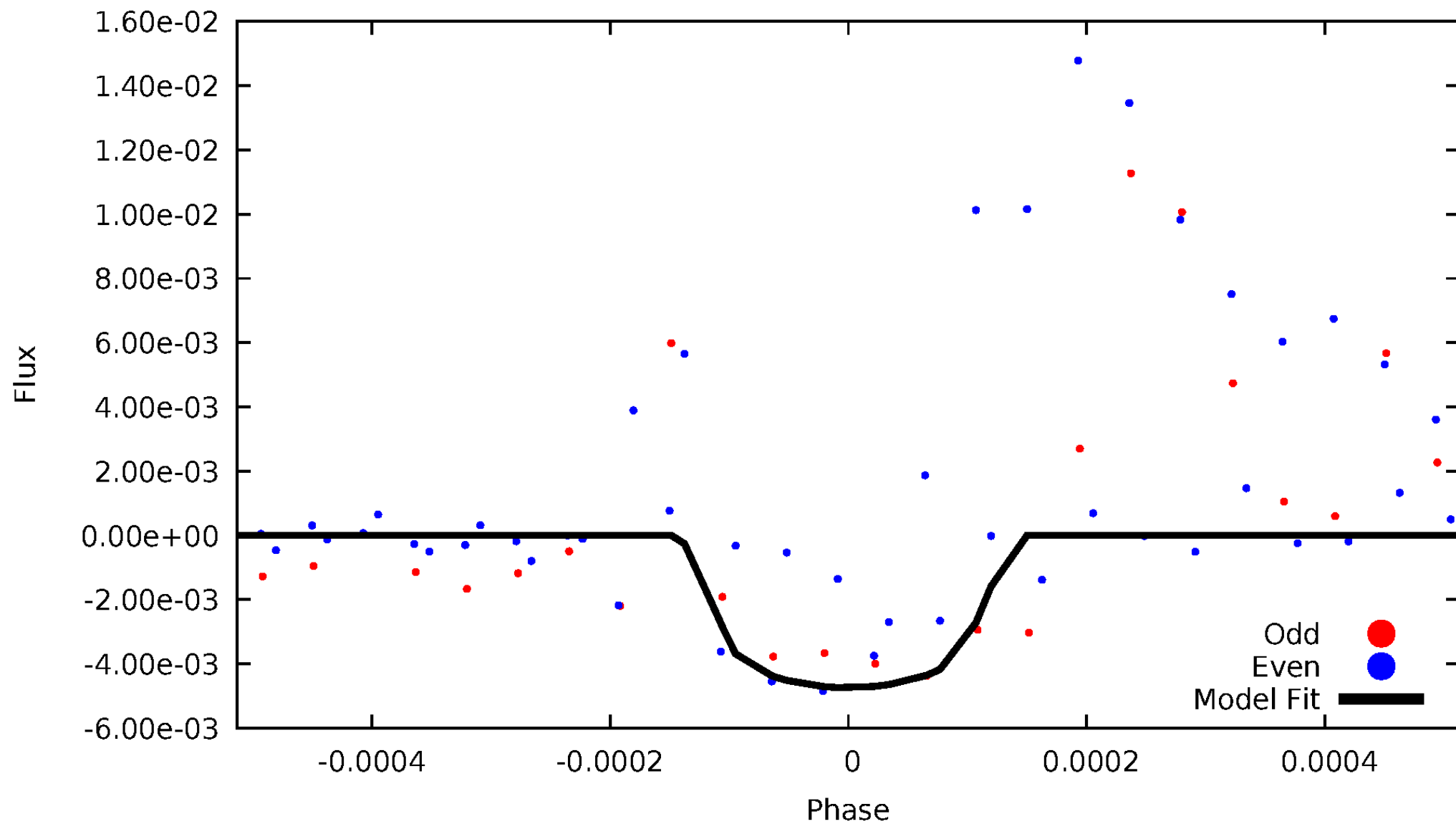


# TCE 010677397-06



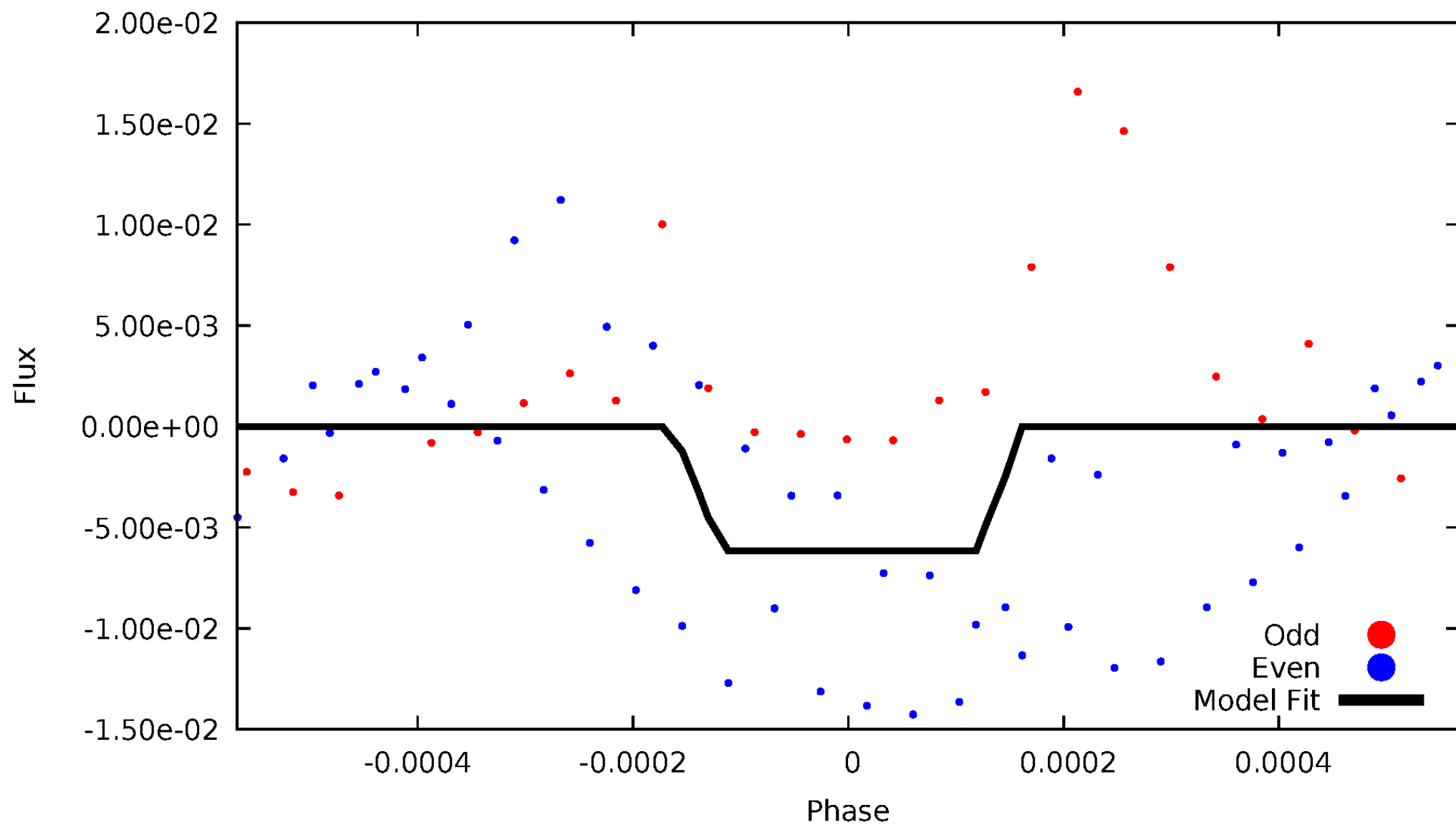
# DV Odd/Even

TCE 010677397-06



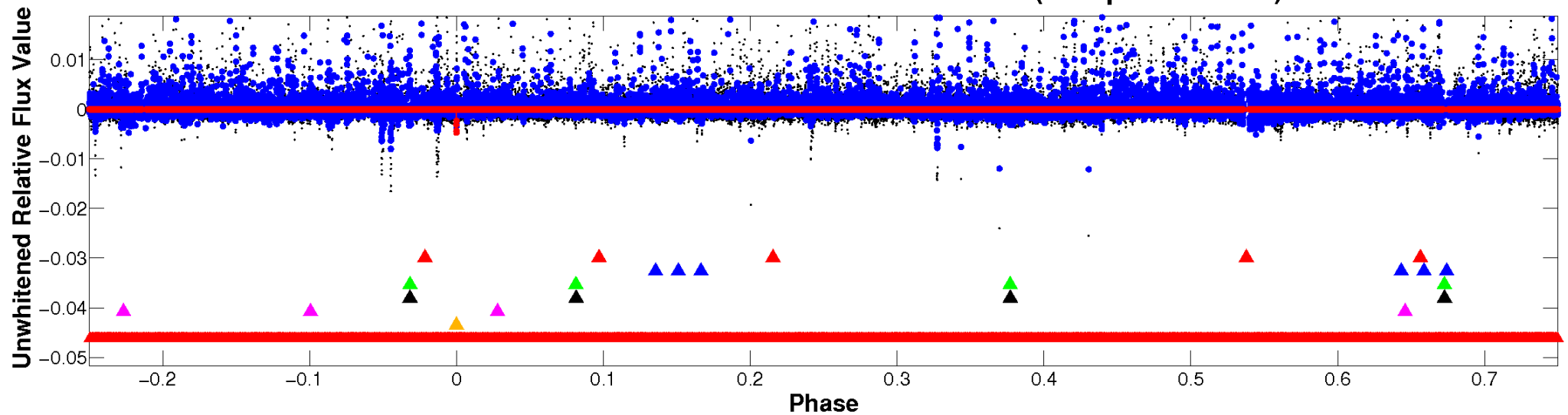
# ALT Odd/Even

TCE 010677397-06

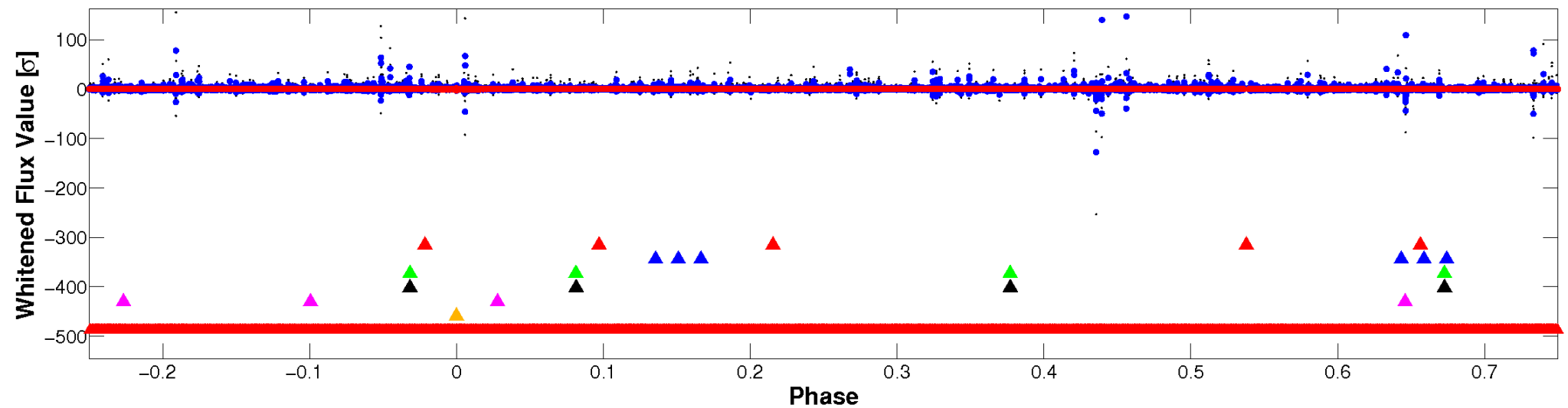


# Non-Whitened Vs. Whitened Light Curve

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



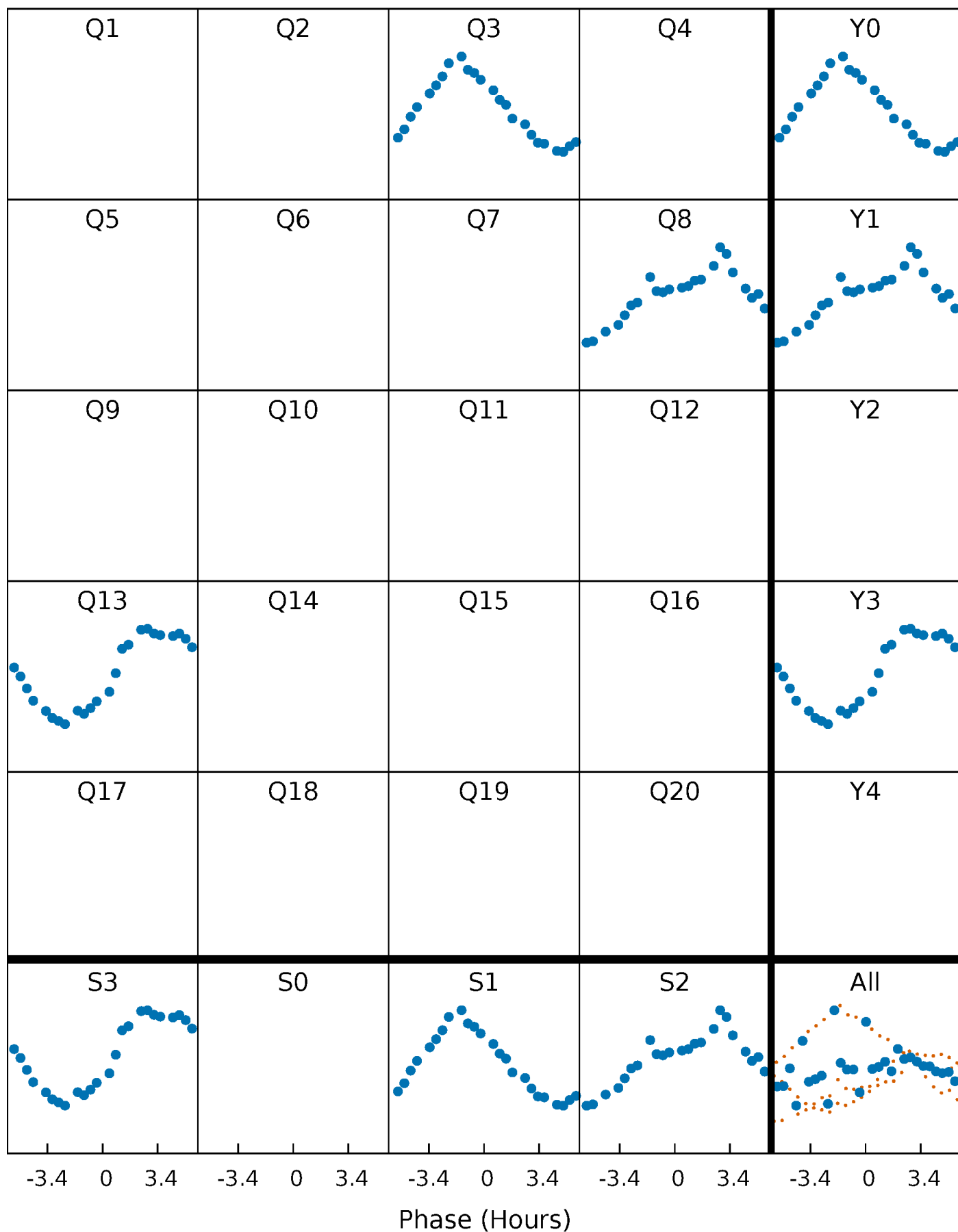
## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)





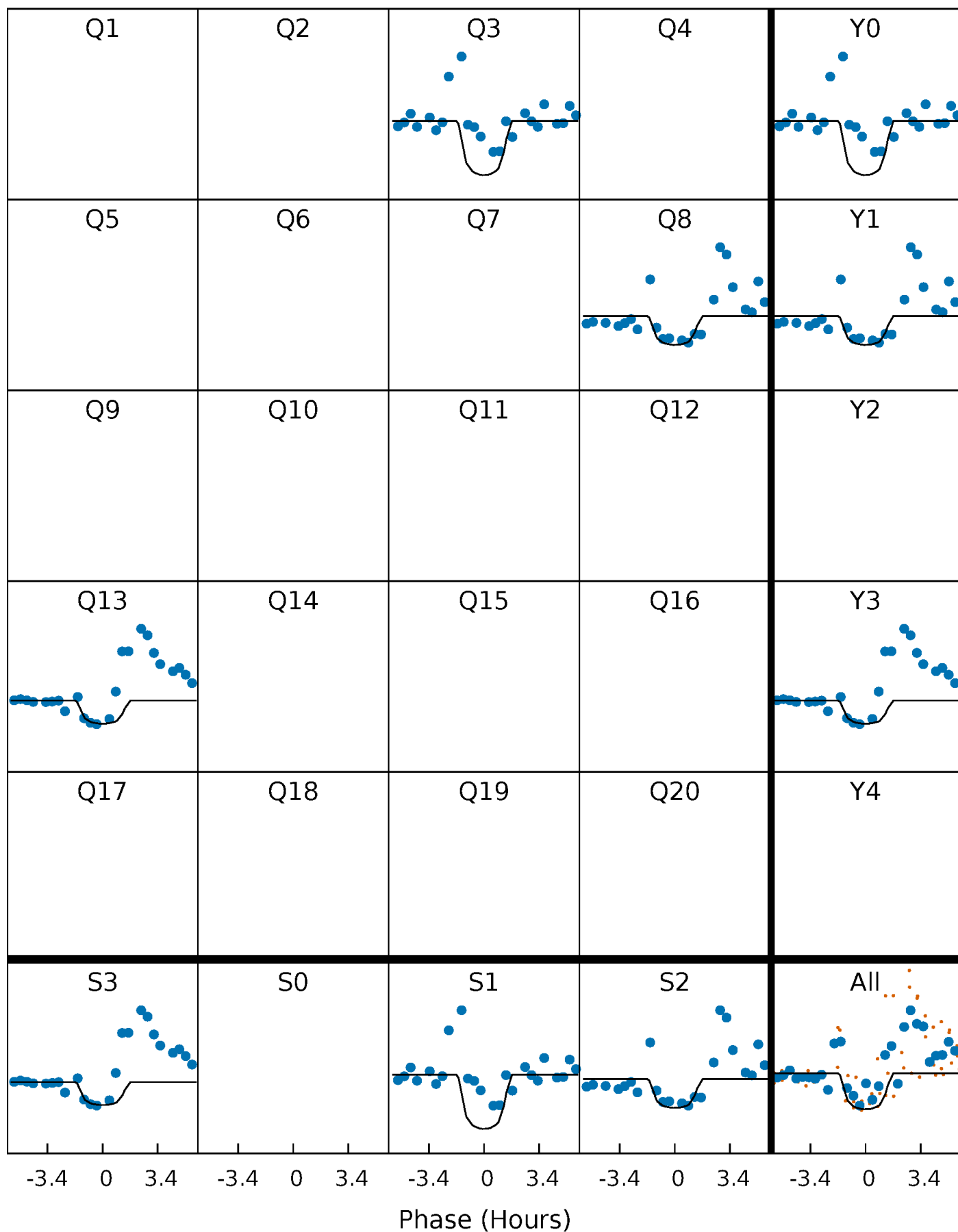
# PDC Quarter-Phased Transit Curves

TCE 010677397-06 P=476.676746 Days  $T_0=269.771385$  (BKJD)



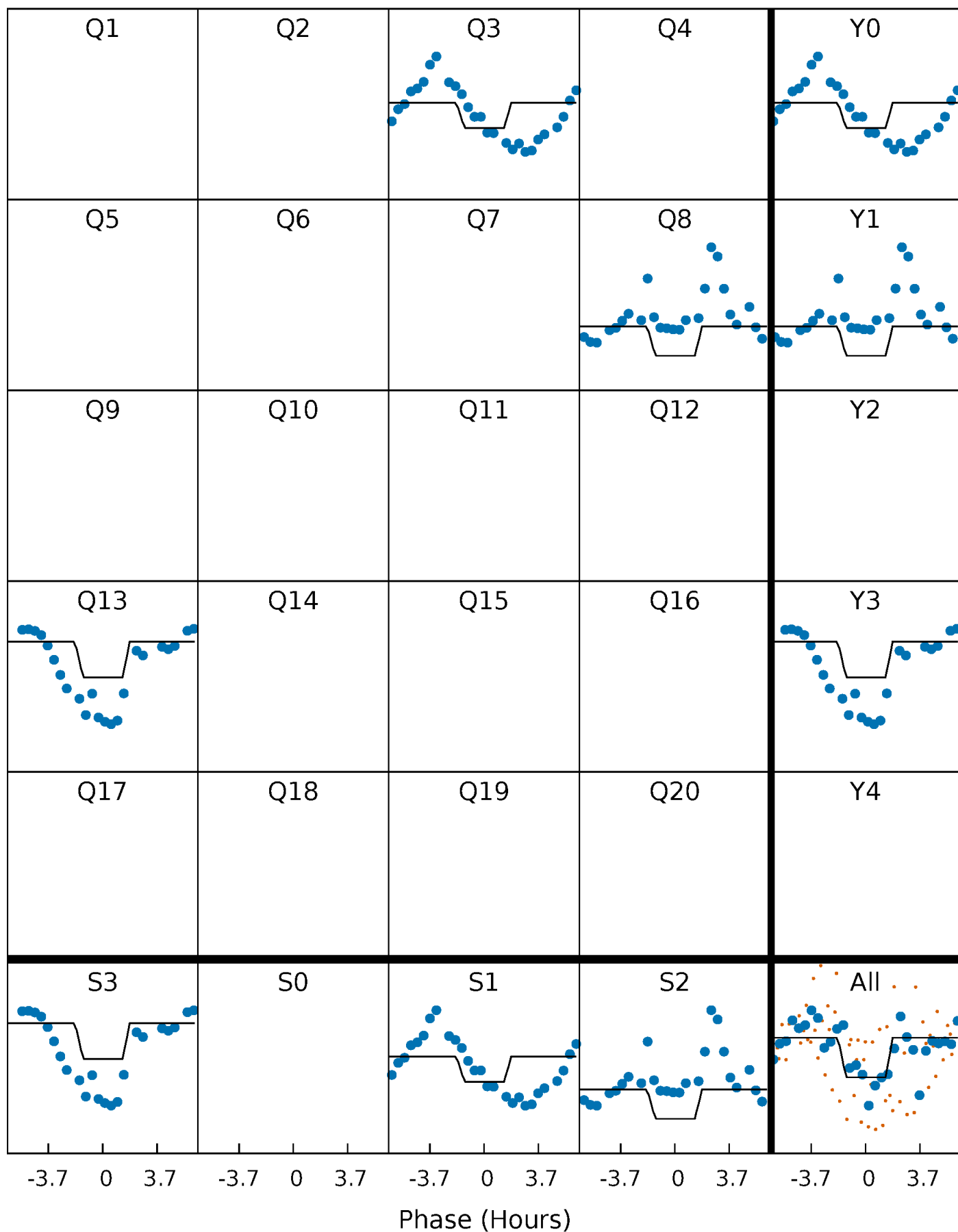
# DV Quarter-Phased Transit Curves

TCE 010677397-06     $P=476.676746$  Days     $T_0=269.771385$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

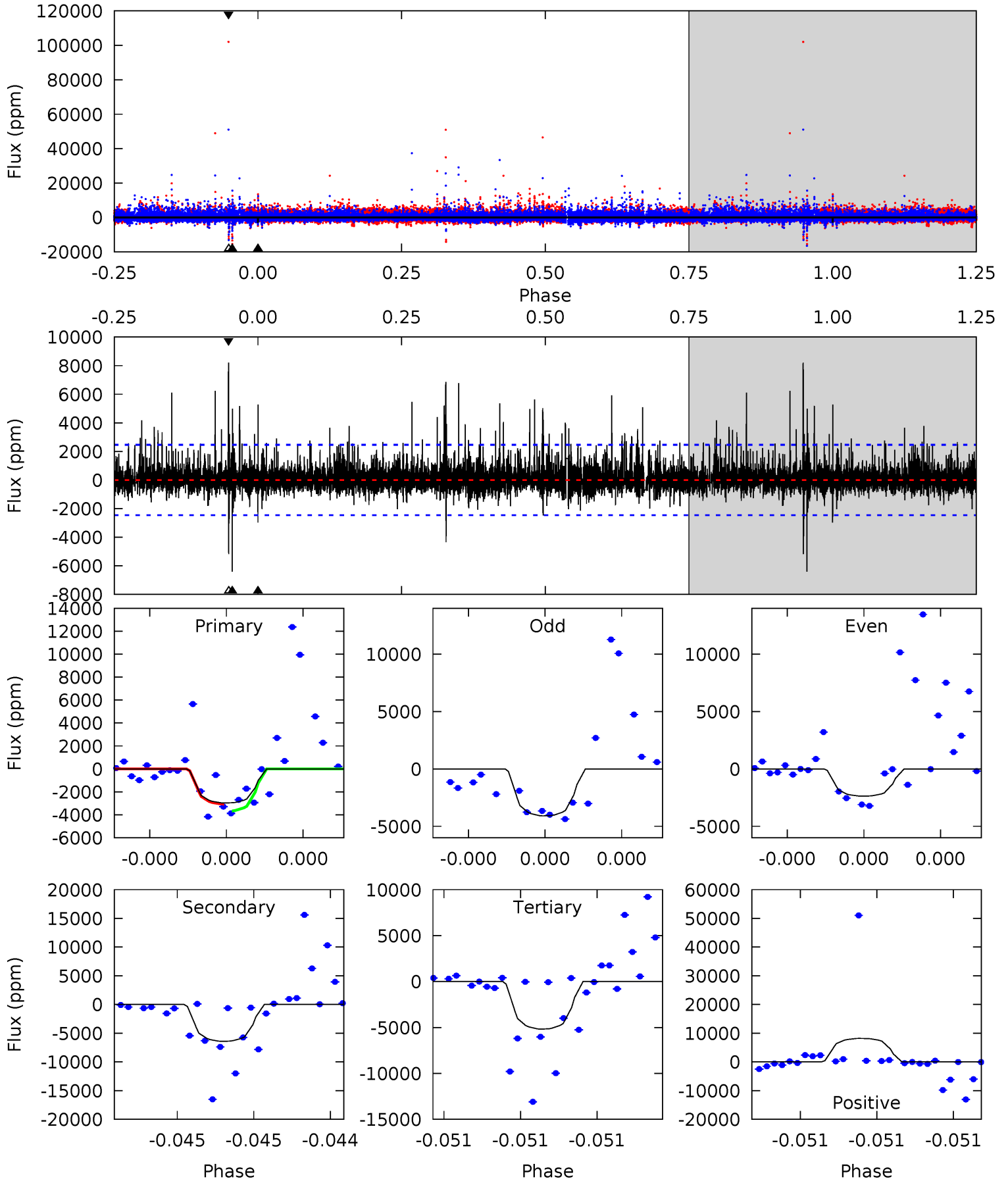
TCE 010677397-06 P=476.626409 Days  $T_0=269.833235$  (BKJD)



# DV Model-Shift Uniqueness Test

010677397-06, P = 476.676746 Days, E = 269.771385 Days

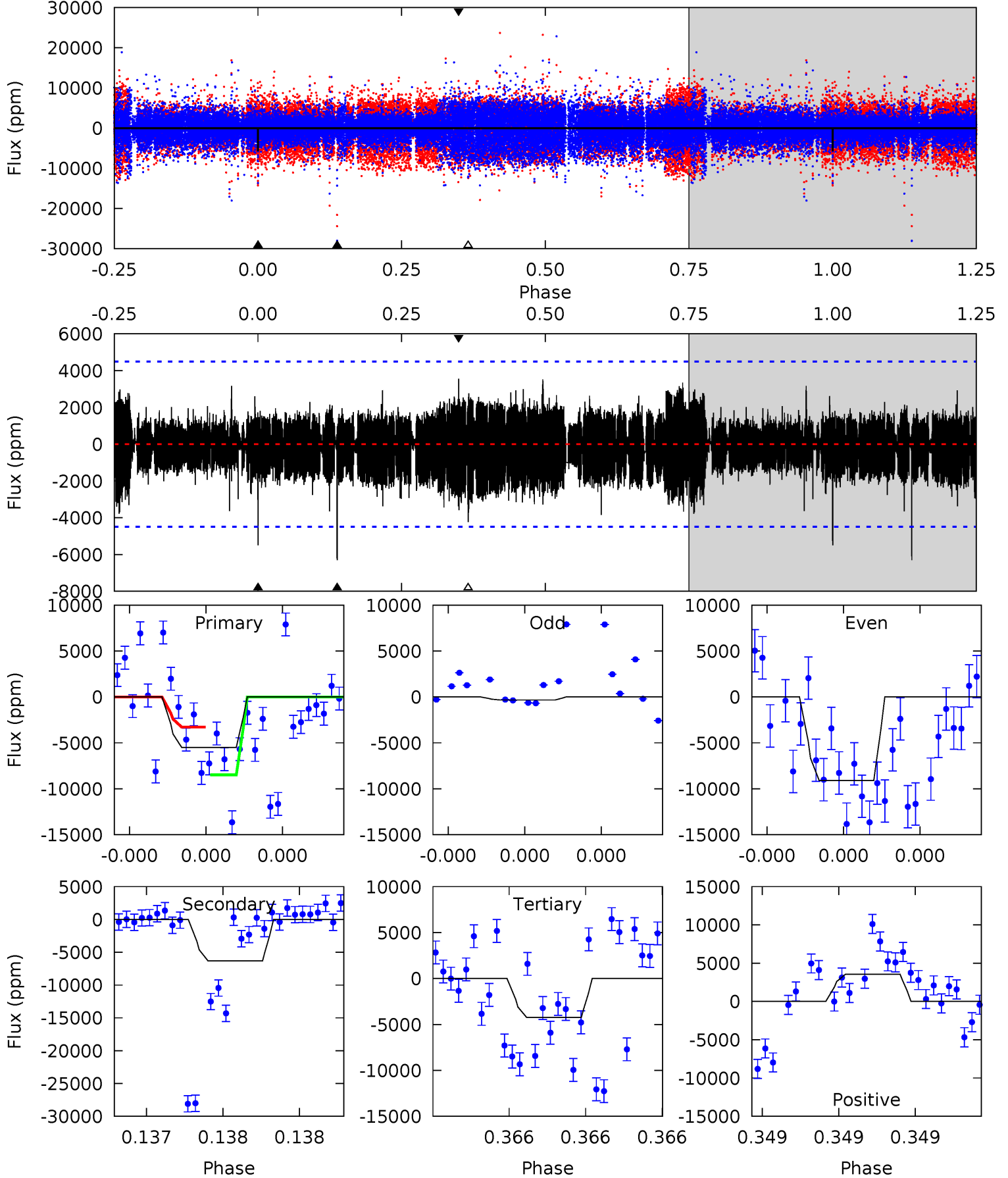
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.83	14.8	11.9	18.9	5.67	3.63	1.79	-5.09	-12.0	2.84	-4.11	0.60	1.46	0.56	0.67



# Alt Model-Shift Uniqueness Test

010677397-06, P = 476.626409 Days, E = 269.833235 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
6.92	7.95	5.34	4.48	5.66	3.62	1.49	1.58	2.44	2.61	3.46	5.48	1.20	0.36	3.19



### Stellar Parameters For KIC 010677397

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3393^{+50}_{-50}$	$4.935^{+0.055}_{-0.040}$	$0.000^{+0.100}_{-0.100}$	$0.312^{+0.041}_{-0.041}$	$0.306^{+0.051}_{-0.047}$	$14.160^{+4.127}_{-2.680}$
	+1%/-1%	+1%/-1%	+inf%/-inf%	+13%/-13%	+17%/-15%	+29%/-19%
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 010677397-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-6413 \pm 435$	$3.62^{+3.12}_{-2.50}$	$130^{+3}_{-4}$	$3127^{+1488}_{-497}$	$176958^{+1704476}_{-126544}$
Alt.	$-6302 \pm 793$	$3.73^{+3.41}_{-2.39}$	$130^{+4}_{-3}$	$3103^{+1169}_{-521}$	$168112^{+1089517}_{-123963}$

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

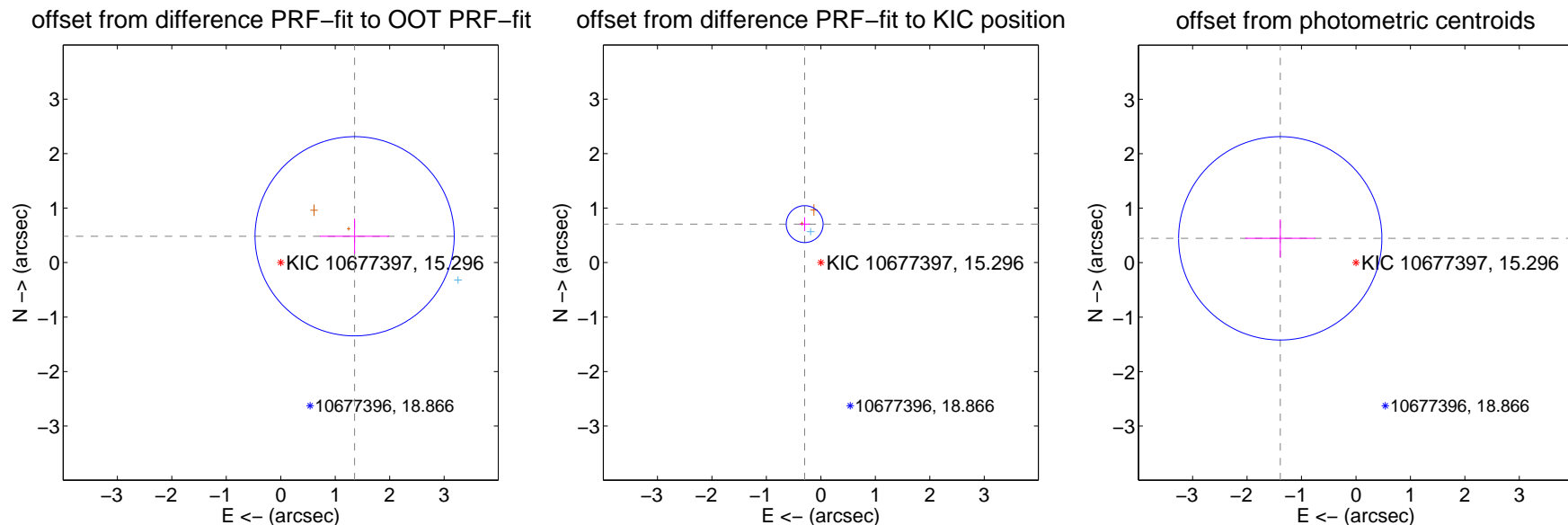
## DV Centroid Data

Supplemental centroid analysis for 010677397-06. Kepler magnitude: 15.30. Transit SNR 10.40

There are 1 quarters with good PRF difference image offsets

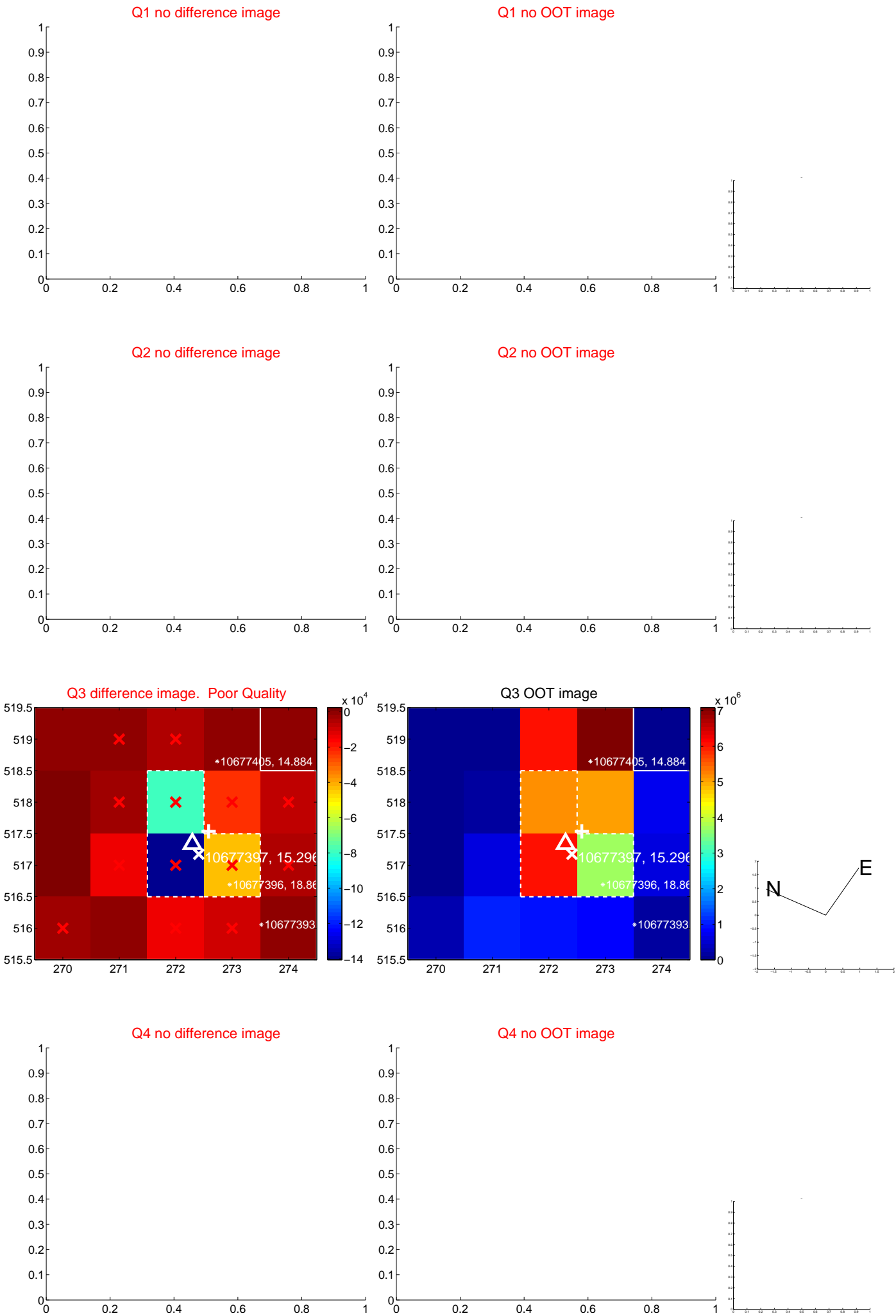
The OOT PRF centroid is offset from the target star catalog position by about 3.56 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.440 \pm 0.610$	2.36	$-1.357 \pm 0.637$	$0.483 \pm 0.324$
PRF-fit source offset from KIC position	$0.767 \pm 0.113$	6.79	$0.298 \pm 0.095$	$0.706 \pm 0.125$
photometric centroid source offset	$1.46 \pm 0.62$	2.35	$1.39 \pm 0.64$	$0.45 \pm 0.35$



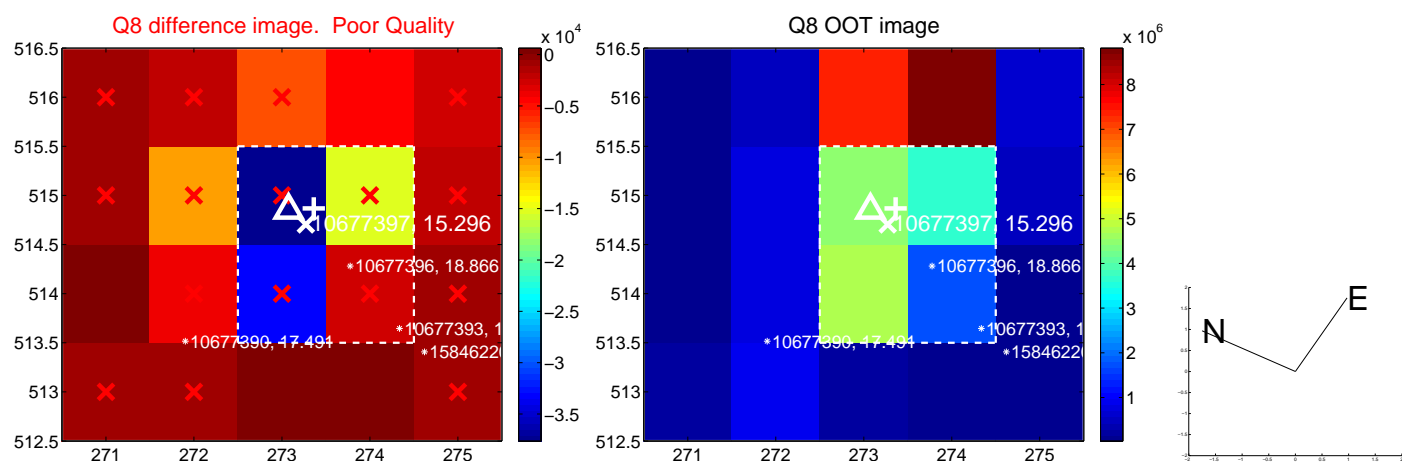
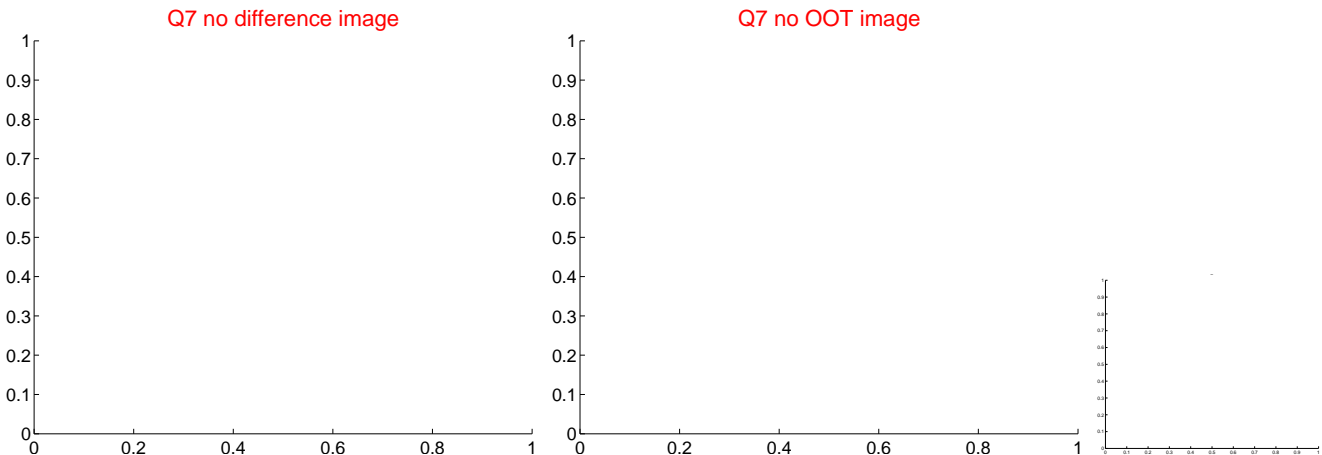
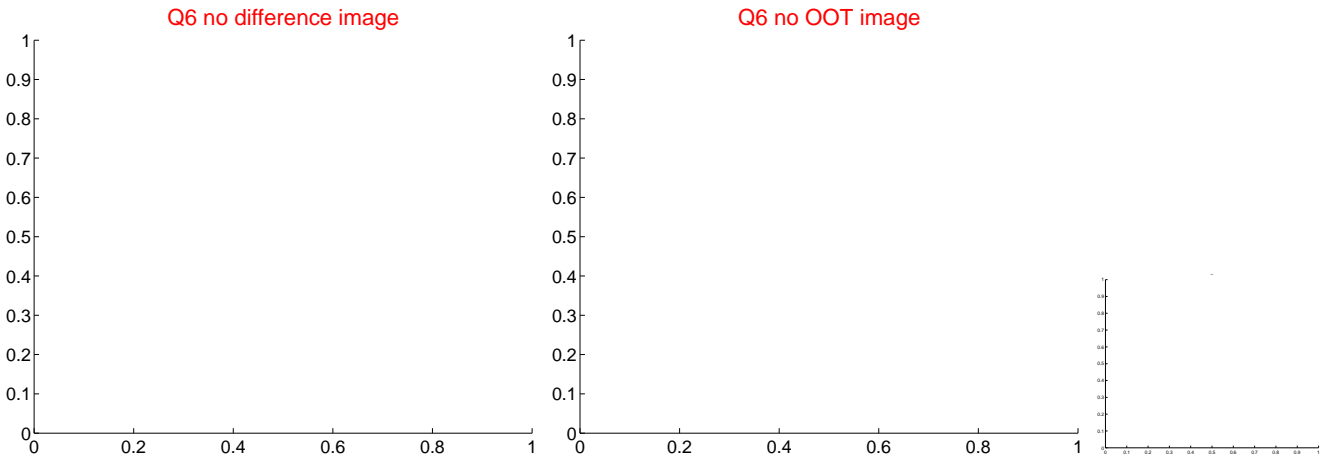
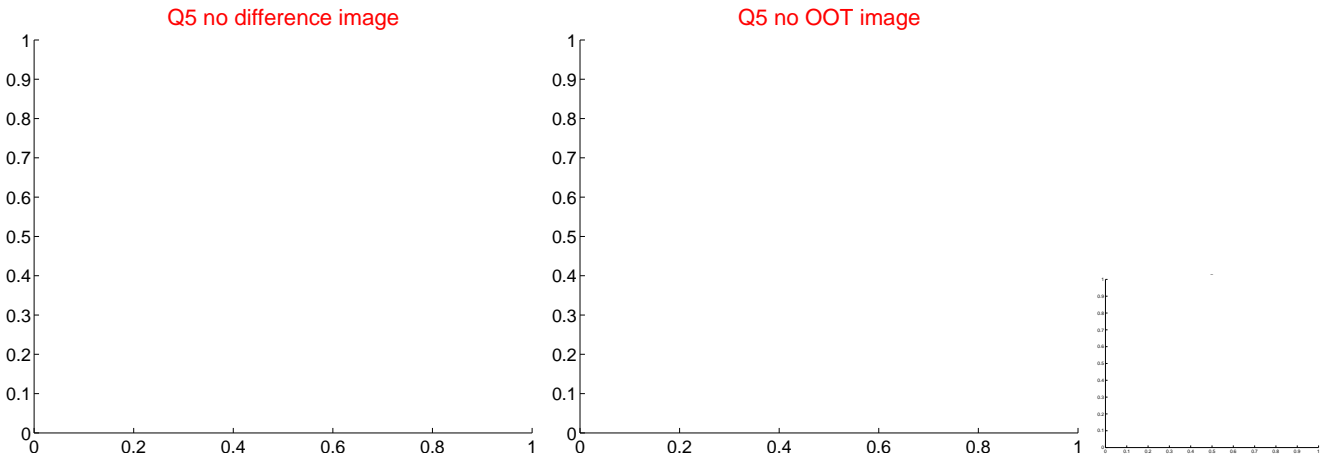
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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





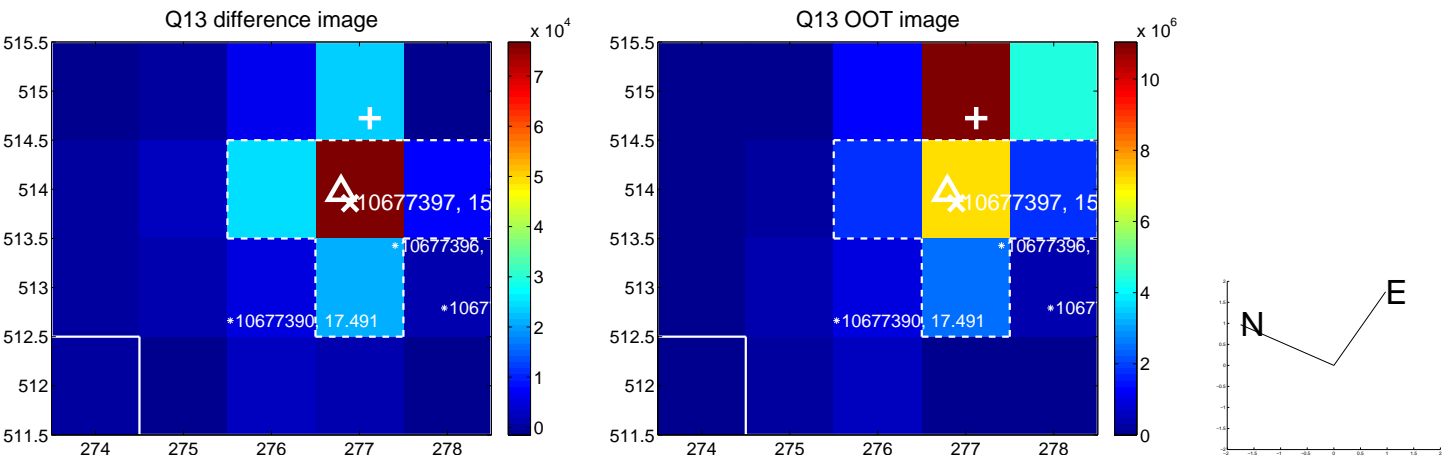
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



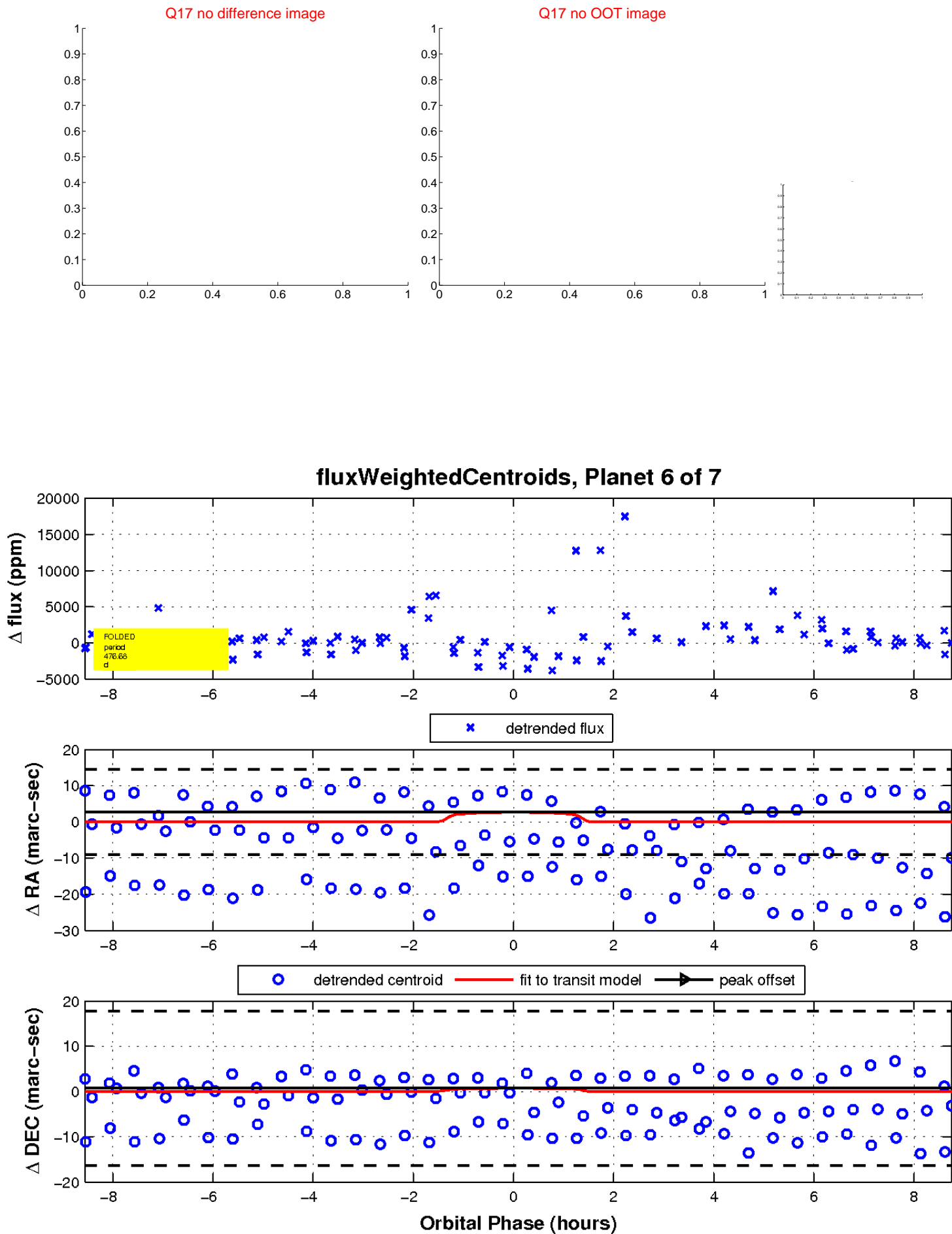
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

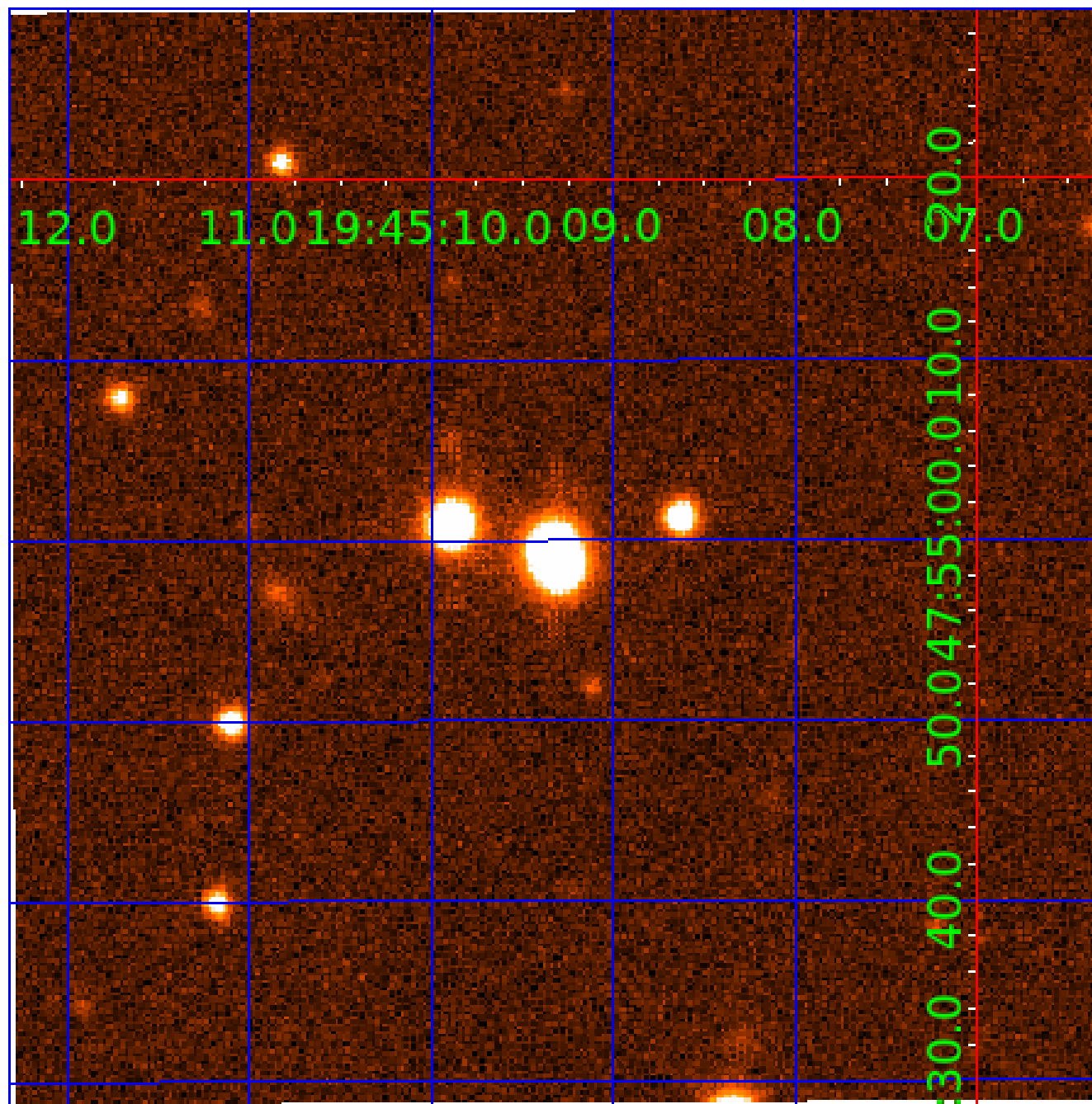


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 010677397

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010677397-01	OBS	No	266.581619	259.553907	5271.7	13.616	15.1	11.1	0.31	3393	2.23	0.04
010677397-02	OBS	No	242.020837	334.411468	3928.4	15.860	14.1	10.1	0.31	3393	2.10	0.04
010677397-03	OBS	No	335.725203	254.705198	1211.1	2.672	13.5	3.1	0.31	3393	1.14	0.03
010677397-04	OBS	No	335.763485	254.689739	4088.6	17.913	13.5	7.7	0.31	3393	1.97	0.03
010677397-05	OBS	No	415.967216	283.119581	3821.0	0.715	13.5	5.5	0.31	3393	4.01	0.02
010677397-06	OBS	No	476.676746	269.771385	4732.4	2.934	13.4	10.4	0.31	3393	2.12	0.02
010677397-07	OBS	No	0.948771	131.969317	363.3	3.614	14.8	14.9	0.31	3393	0.63	71.31

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010677397-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010677397-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_KIC_POS
010677397-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_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_KIC_POS
010677397-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—SAME_NTL_PERIOD—CENT_FEW_DIFFS
010677397-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010677397-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—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
010677397-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—CENT_KIC_POS

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

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

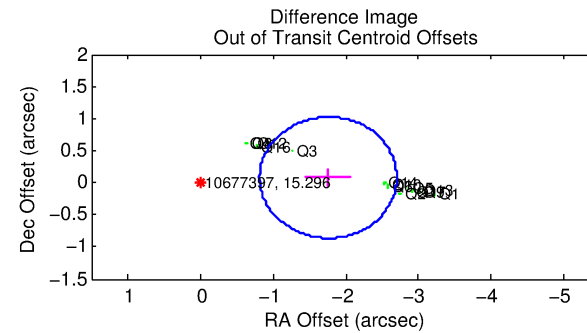
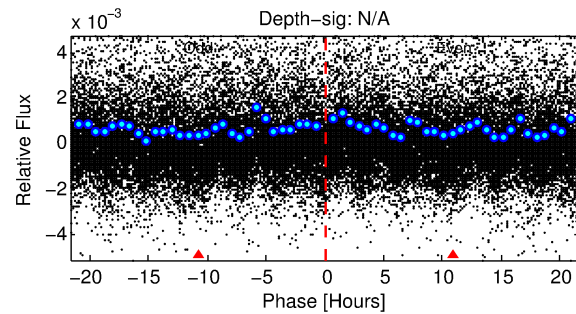
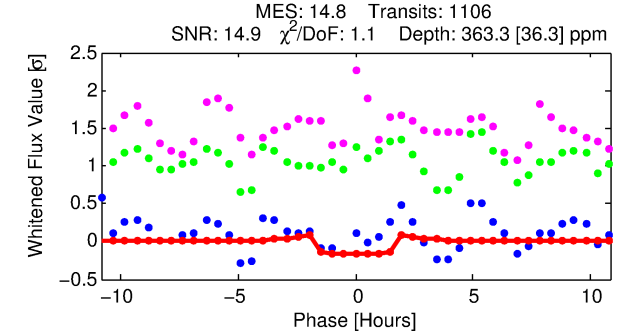
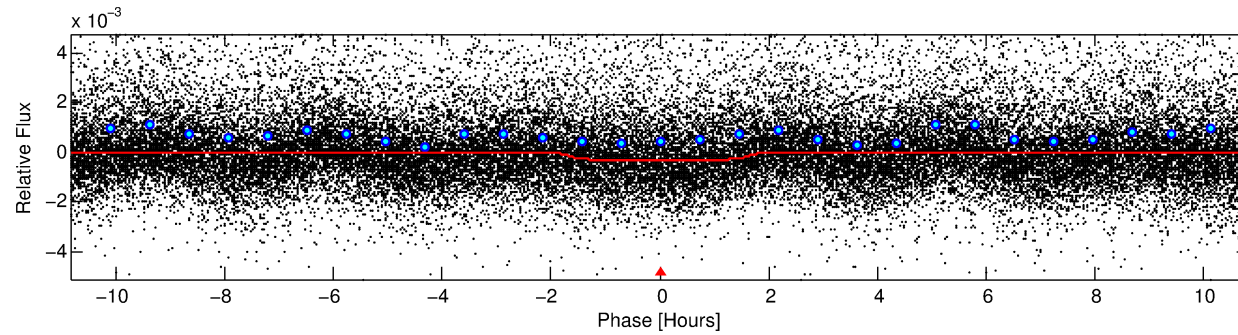
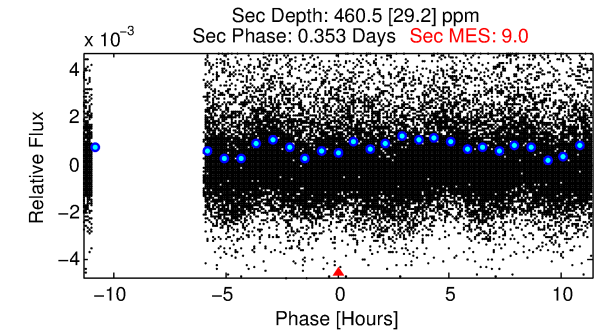
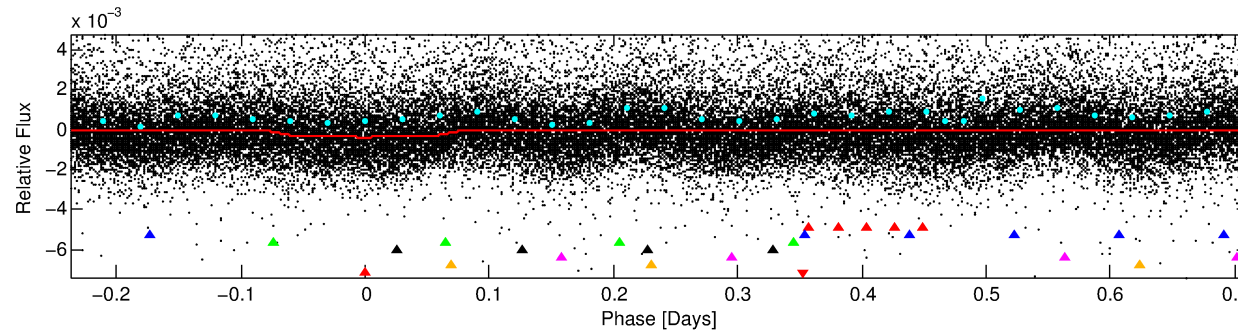
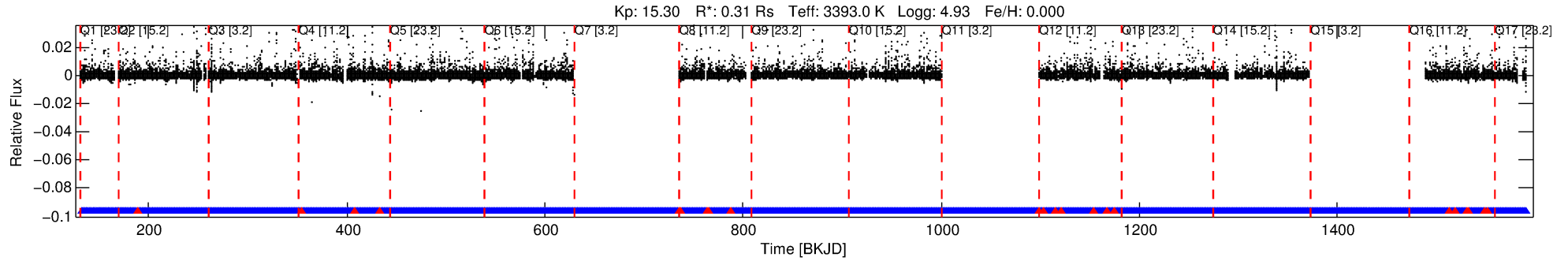
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010677397-07

No Significant Match Found

# DV One-Page Summary

KIC: 10677397 Candidate: 7 of 7 Period: 0.949 d



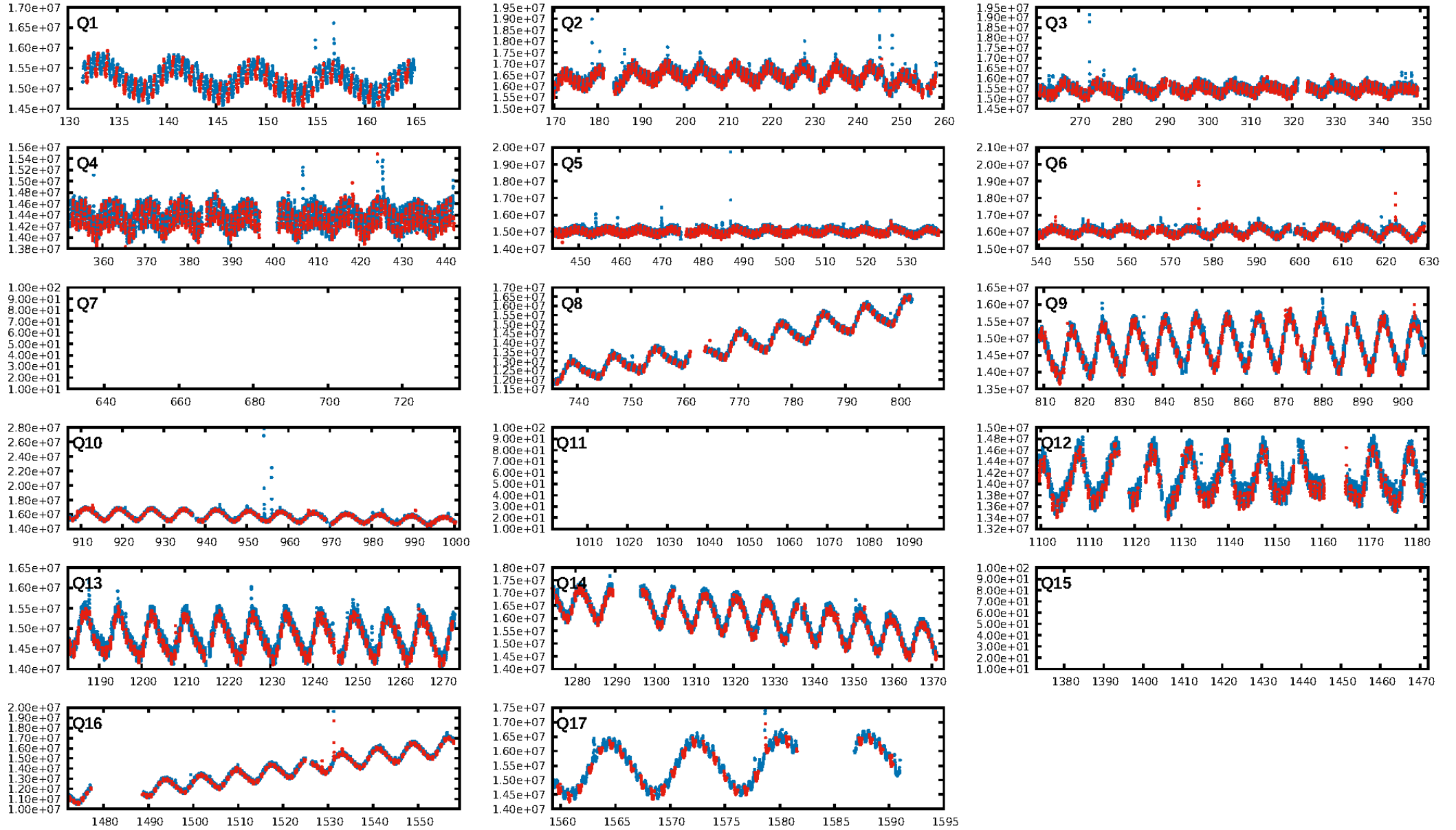
## DV Fit Results:

Period = 0.94877 [0.00001] d  
Epoch = 131.9693 [0.0019] BKJD  
Rp/R\* = 0.0186 [0.0095]  
a/R\* = 1.70 [2.39]  
b = 0.70 [1.58]  
Seff = 71.30 [9.64]  
Teq = 741 [25] K  
Rp = 0.63 [0.33] Re  
a = 0.0127 [0.0012] AU  
Ag = 102.25 [105.61] [0.96σ]  
**Teff = 3643 [936] K [3.10σ]**

## DV Diagnostic Results:

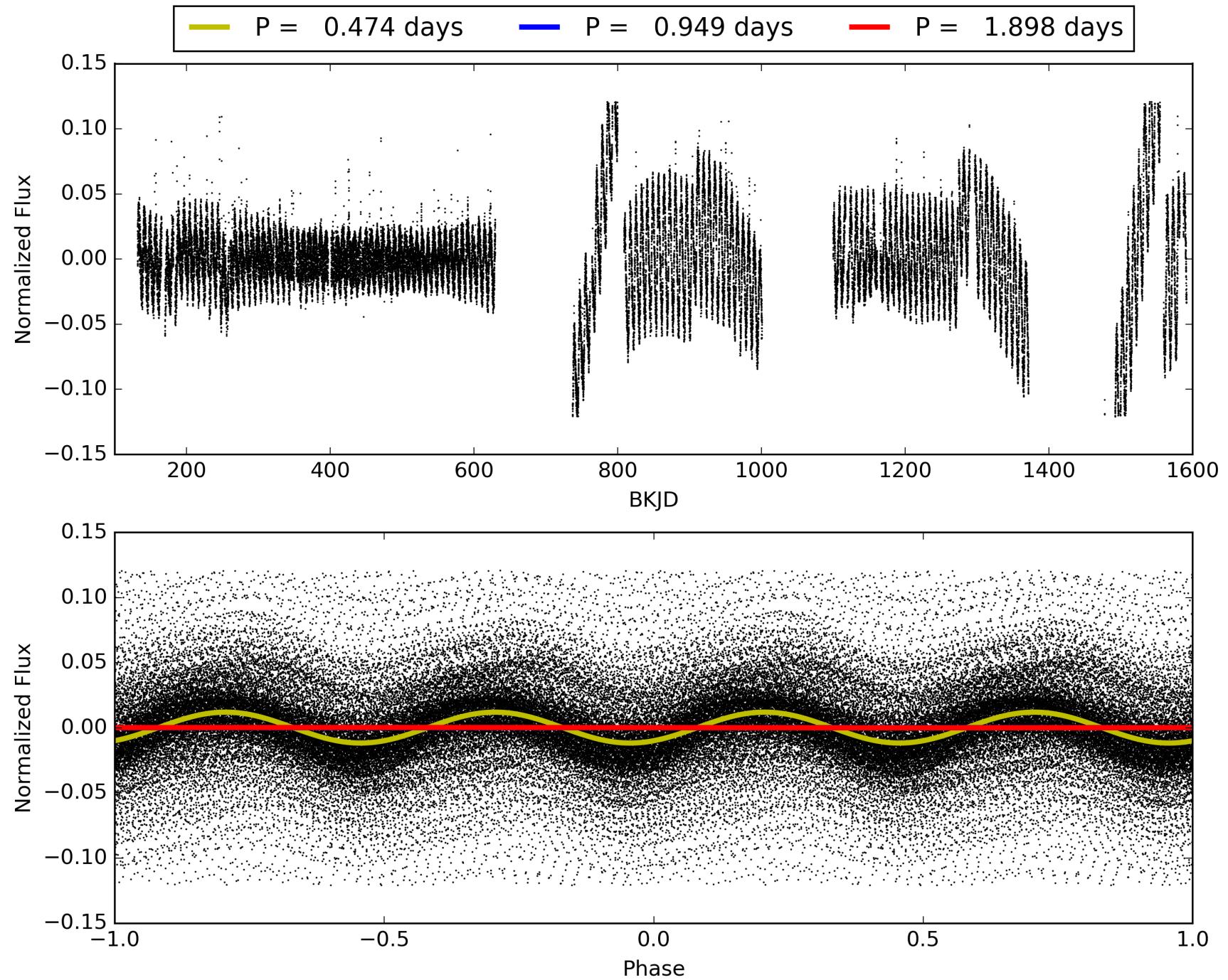
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [355.68σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGoF-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.98 [1021/1044]  
GhostDiagnostic-chr: 1.087  
**Centroid-sig: 0.0%**  
Centroid-so: 0.915 arcsec [2.25σ]  
**OotOffset-rm: 1.760 arcsec [5.60σ]**  
**KicOffset-rm: 0.740 arcsec [10.86σ]**  
OotOffset-st: 4/1/4/5 [14]  
KicOffset-st: 4/1/4/5 [14]  
DiffImageQuality-fgm: 1.00 [14/14]  
DiffImageOverlap-fno: 1.00 [14/14]

# TCE 010677397-07, PDC Light Curves



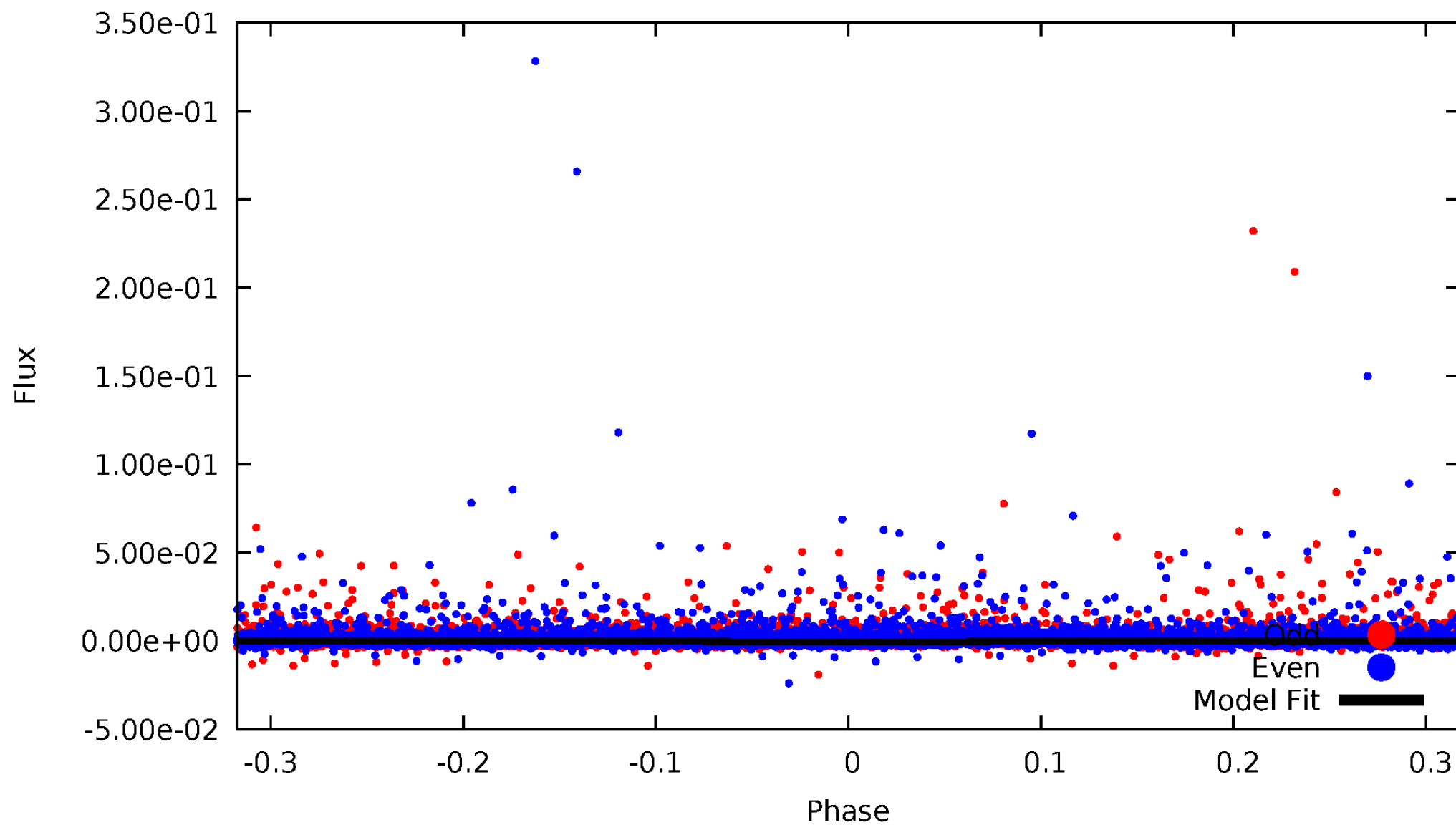


# TCE 010677397-07



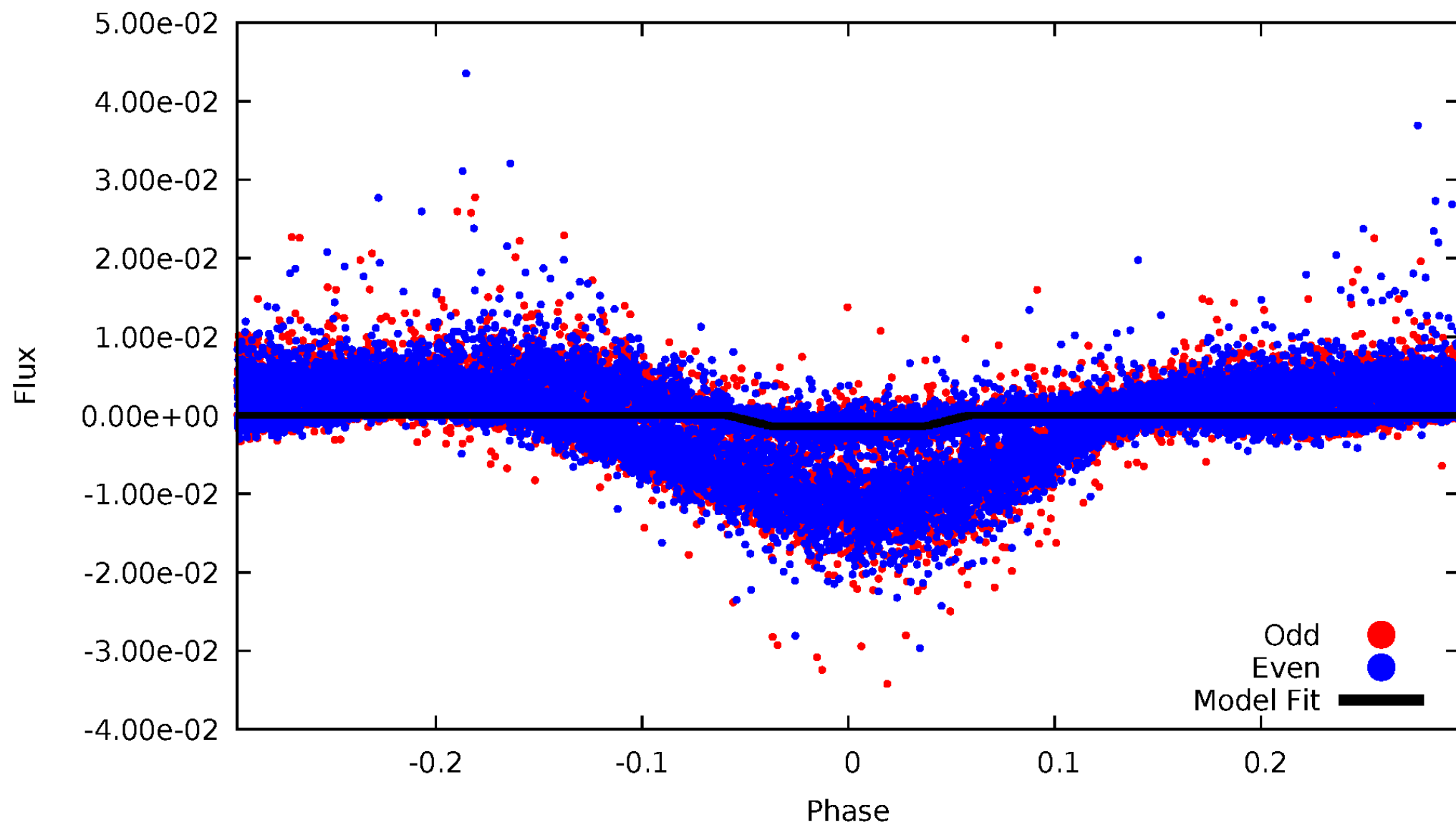
# DV Odd/Even

TCE 010677397-07



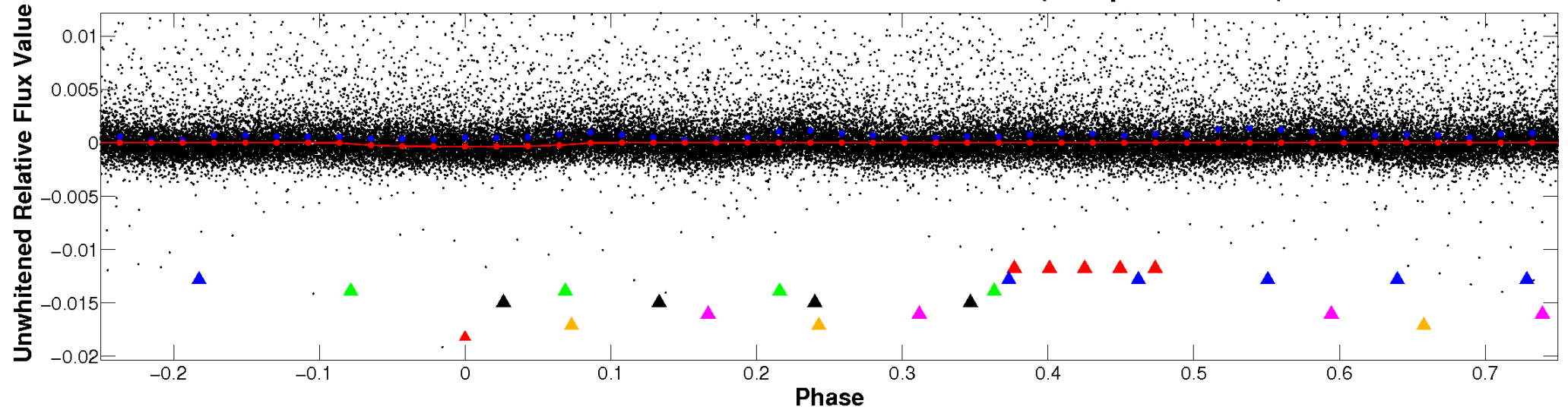
# ALT Odd/Even

TCE 010677397-07

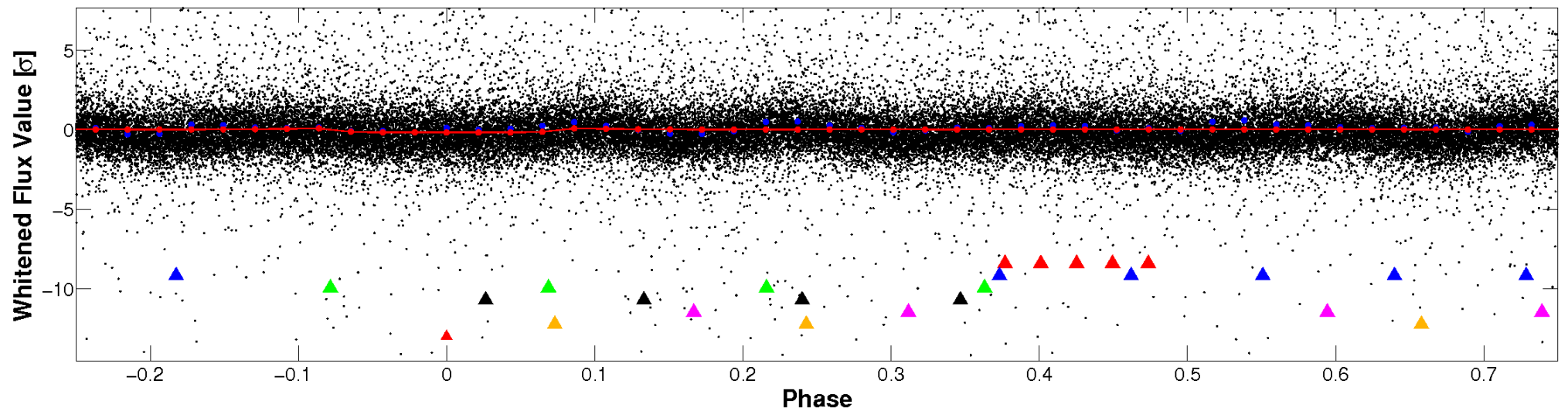


# Non-Whitened Vs. Whitened Light Curve

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

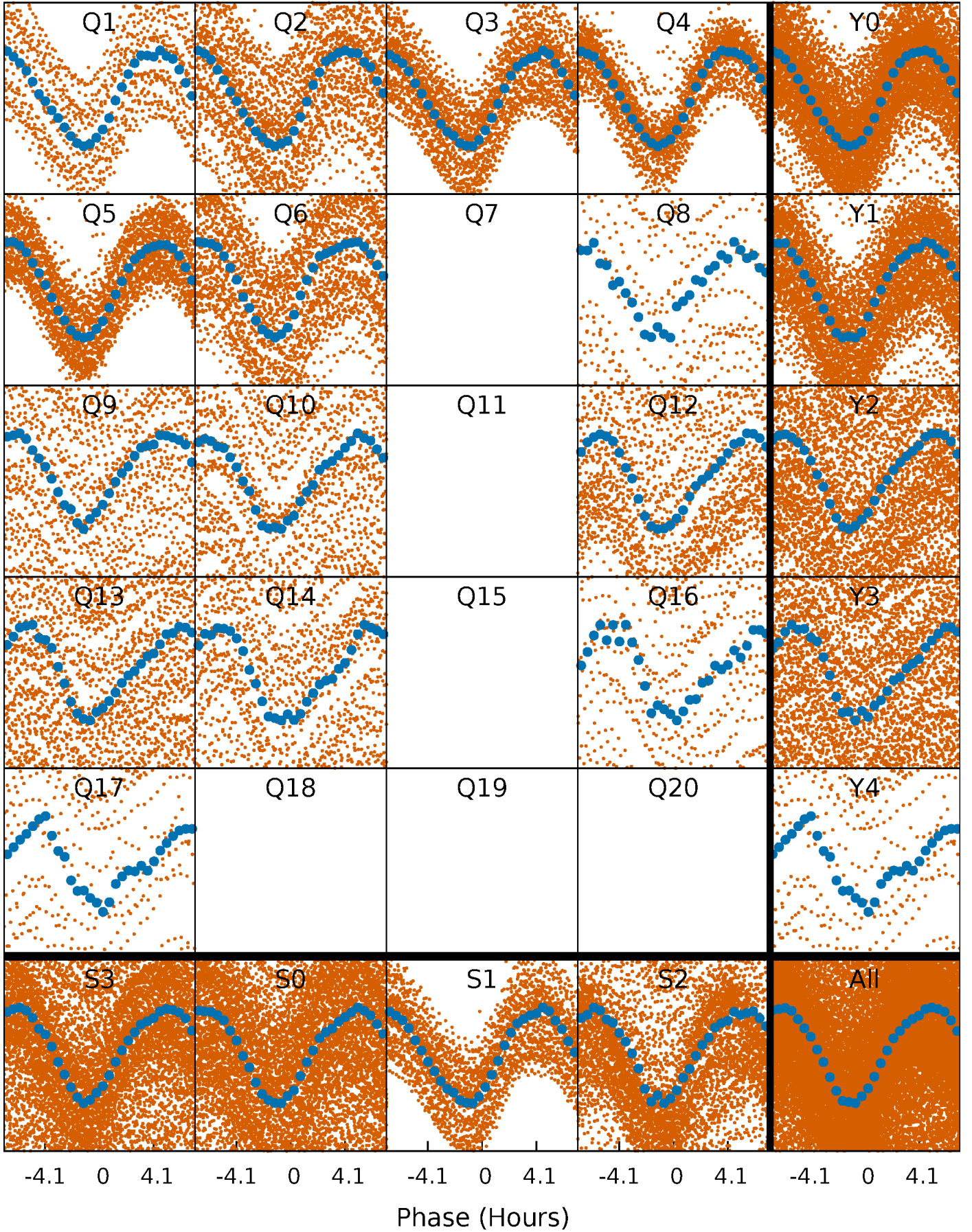


**Planet 7 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

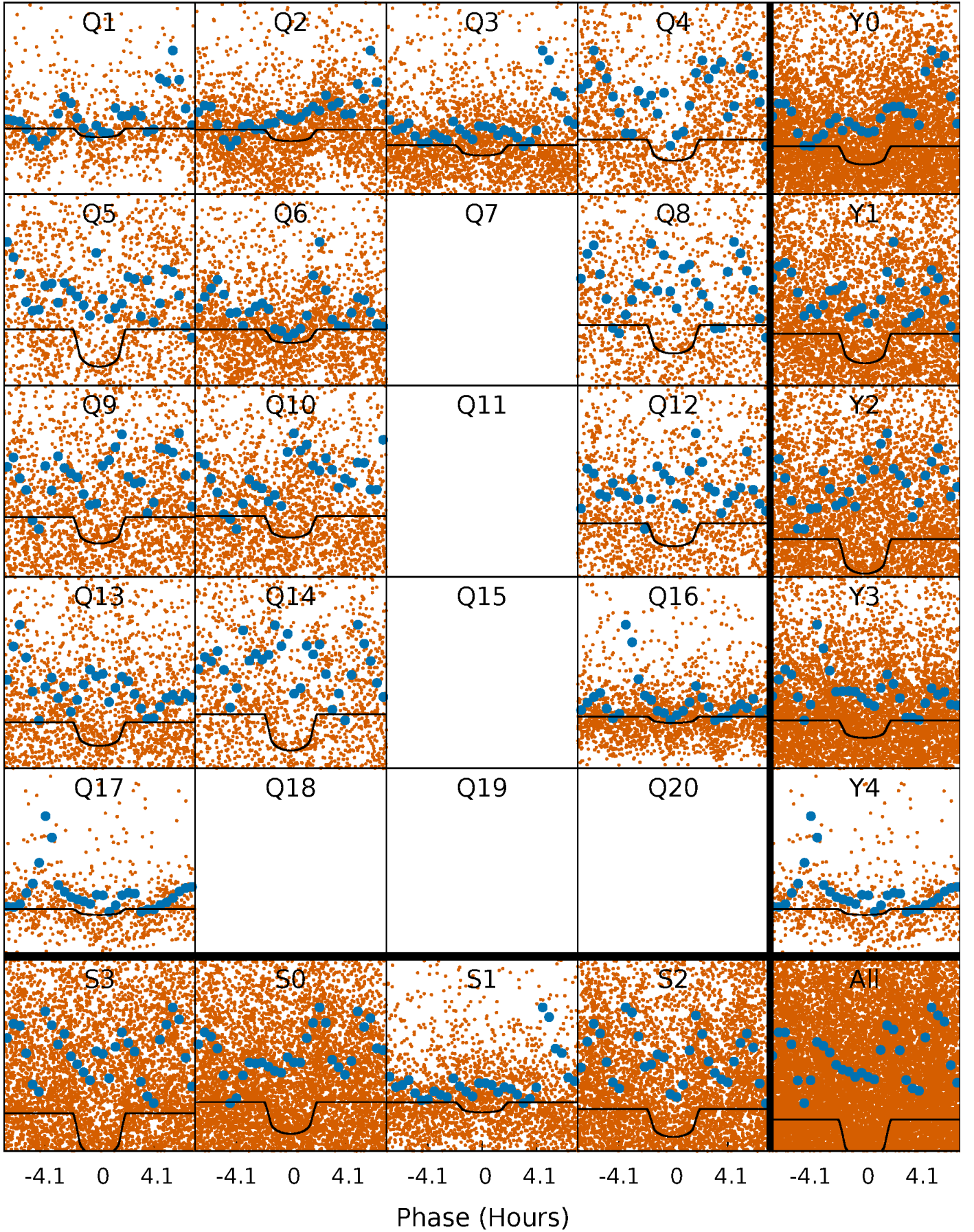
TCE 010677397-07     $P = 0.948771$  Days     $T_0 = 131.969317$  (BKJD)





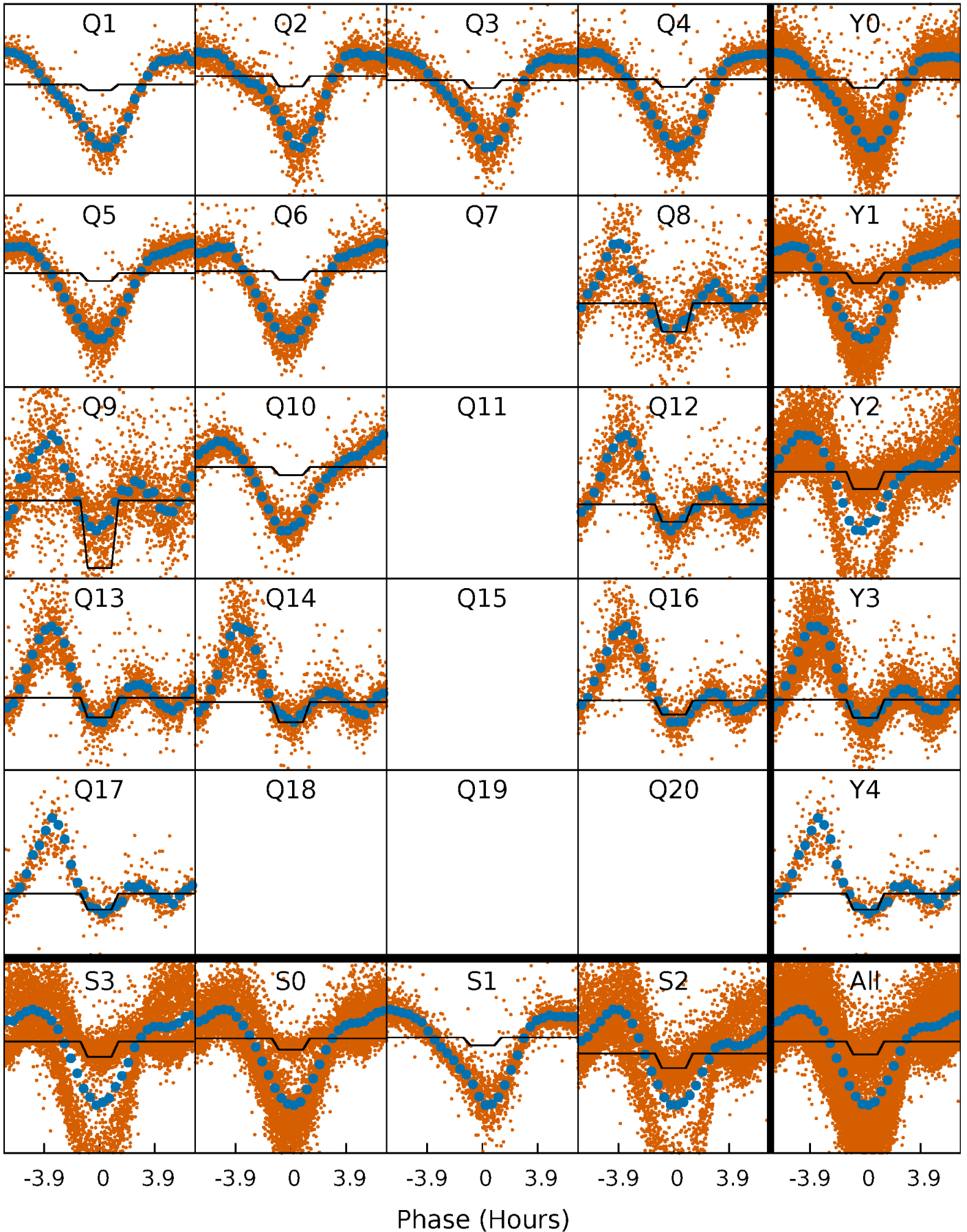
# DV Quarter-Phased Transit Curves

TCE 010677397-07     $P = 0.948771$  Days     $T_0 = 131.969317$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

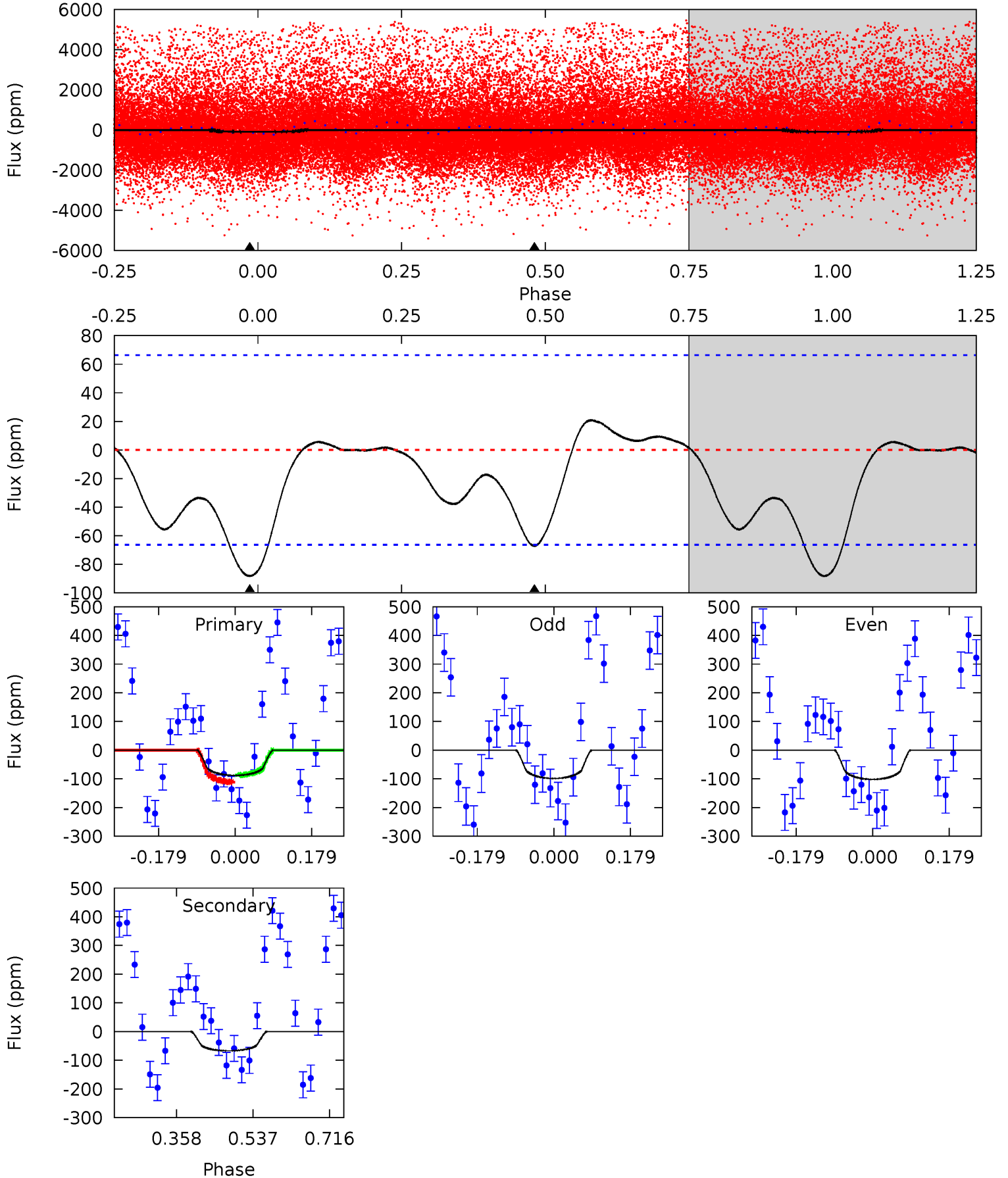
TCE 010677397-07     $P = 0.948776$  Days     $T_0 = 131.920250$  (BKJD)



# DV Model-Shift Uniqueness Test

010677397-07, P = 0.948771 Days, E = 131.020546 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
5.90	4.49	0	0	4.44	1.34	0.75	5.90	5.90	4.49	4.49	0.11	-22.7	0.19	0.82

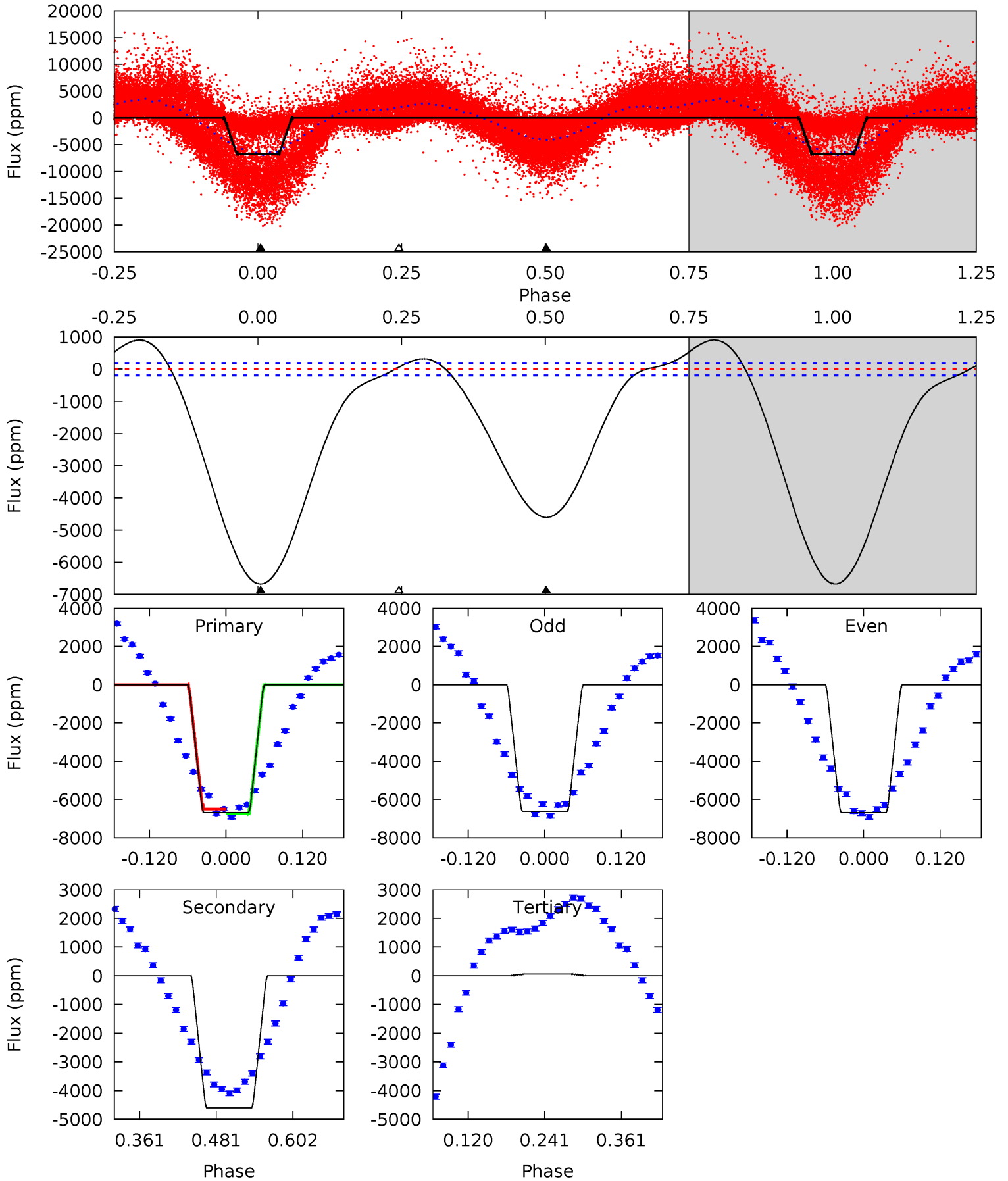




# Alt Model-Shift Uniqueness Test

010677397-07, P = 0.948776 Days, E = 130.971474 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
156.0	107.7	-1.49	0	4.53	1.55	14.4	157.5	156.0	109.2	107.7	0.67	0.95	0.12	2.49



### Stellar Parameters For KIC 010677397

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3393^{+50}_{-50}$	$4.935^{+0.055}_{-0.040}$	$0.000^{+0.100}_{-0.100}$	$0.312^{+0.041}_{-0.041}$	$0.306^{+0.051}_{-0.047}$	$14.160^{+4.127}_{-2.680}$
	+1%/-1%	+1%/-1%	+inf%/-inf%	+13%/-13%	+17%/-15%	+29%/-19%
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 010677397-07 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-67 \pm 15$	$0.63^{+0.32}_{-0.32}$	$1033^{+29}_{-26}$	$2683^{+583}_{-275}$	$15^{+46}_{-8}$
Alt.	$-4606 \pm 43$	$1.26^{+0.37}_{-0.31}$	$1035^{+24}_{-30}$	$4152^{+464}_{-336}$	$262^{+201}_{-101}$

$T_{max}$  = 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

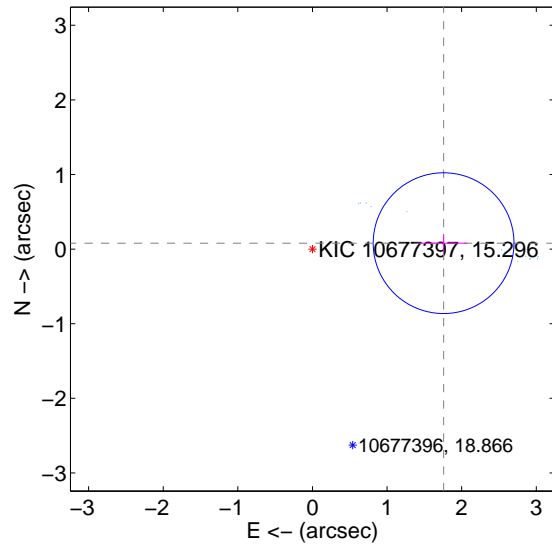
Supplemental centroid analysis for 010677397-07. Kepler magnitude: 15.30. Transit SNR 14.88

There are 14 quarters with good PRF difference image offsets

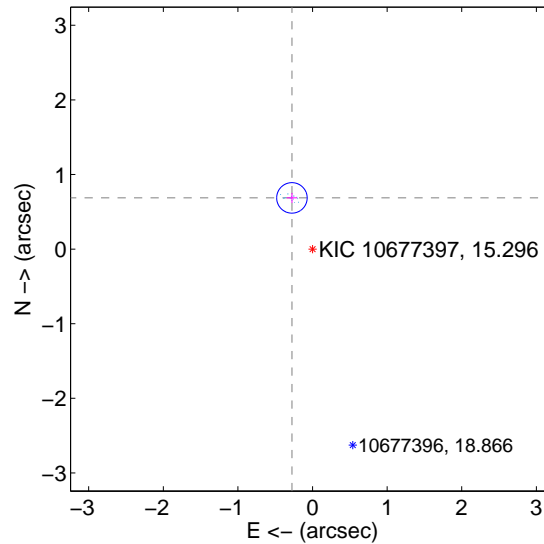
The OOT PRF centroid is offset from the target star catalog position by about 3.40 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.760 \pm 0.314$	5.60	$-1.758 \pm 0.315$	$0.079 \pm 0.122$
PRF-fit source offset from KIC position	$0.740 \pm 0.068$	10.86	$0.276 \pm 0.069$	$0.686 \pm 0.067$
photometric centroid source offset	$0.91 \pm 0.41$	2.25	$0.90 \pm 0.41$	$0.18 \pm 0.23$

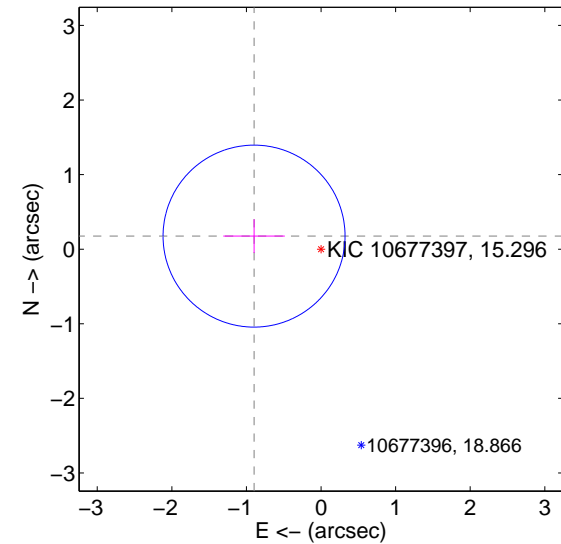
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

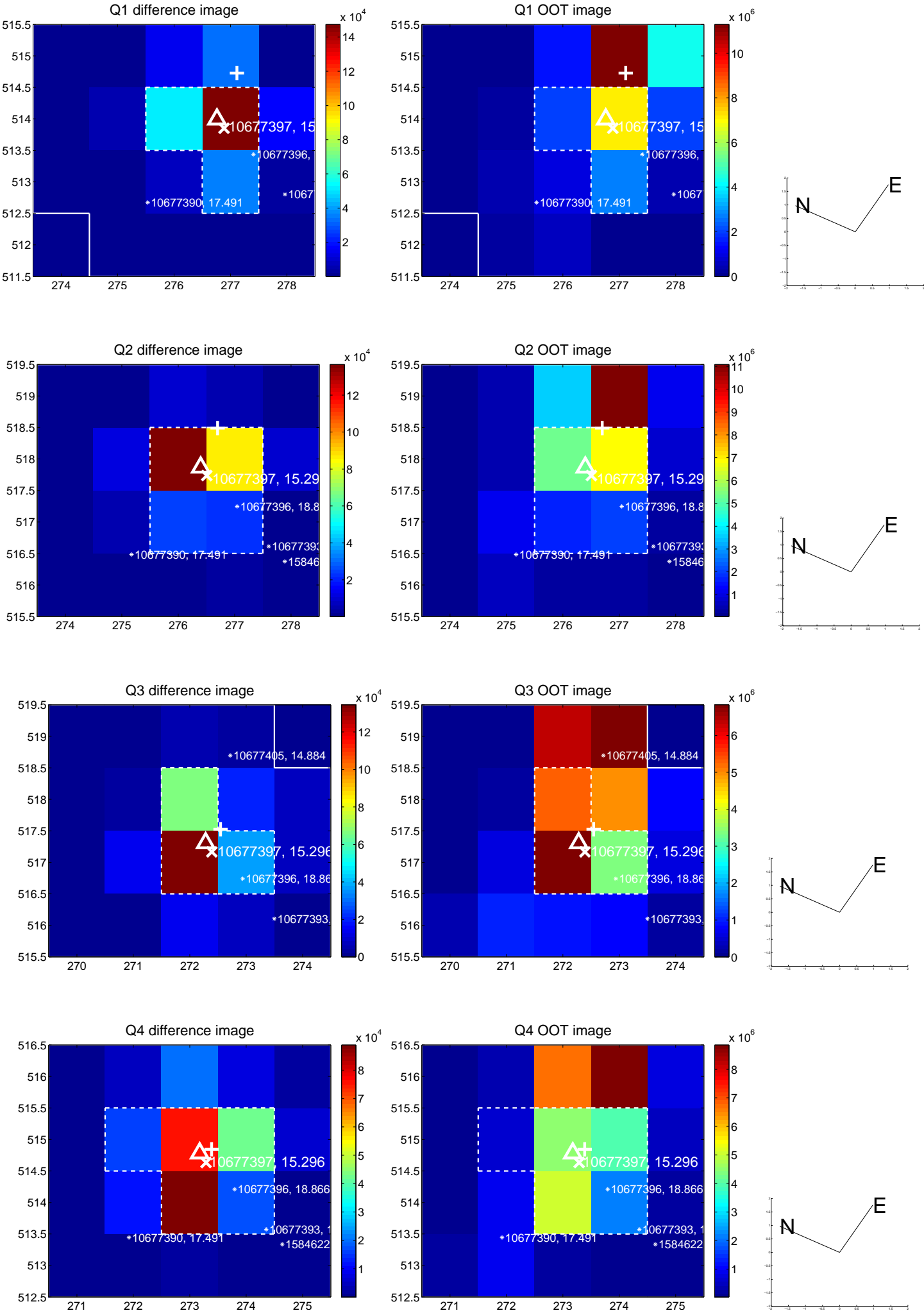


offset from photometric centroids

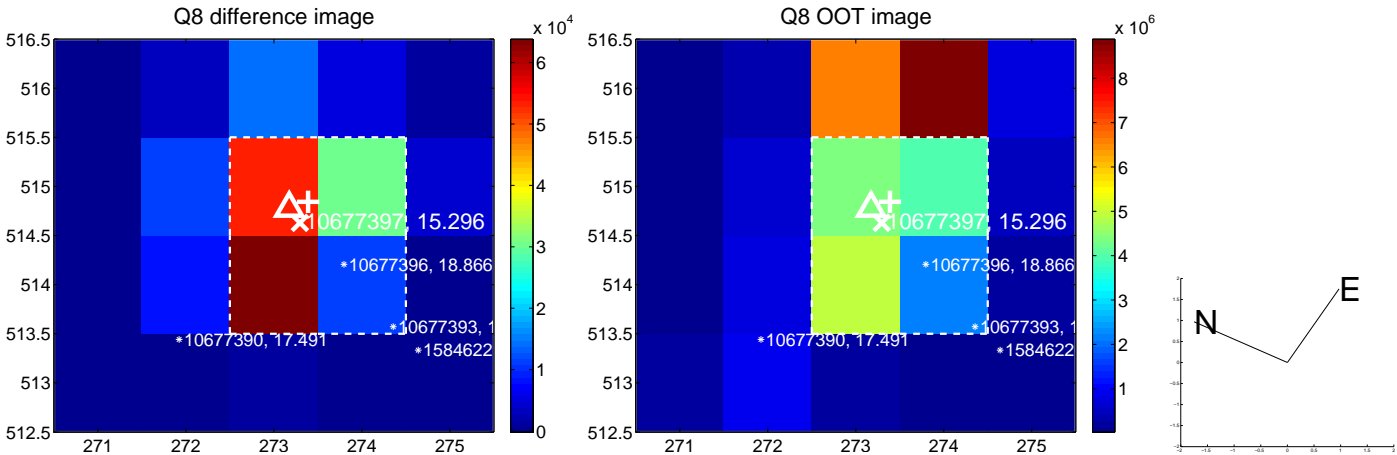
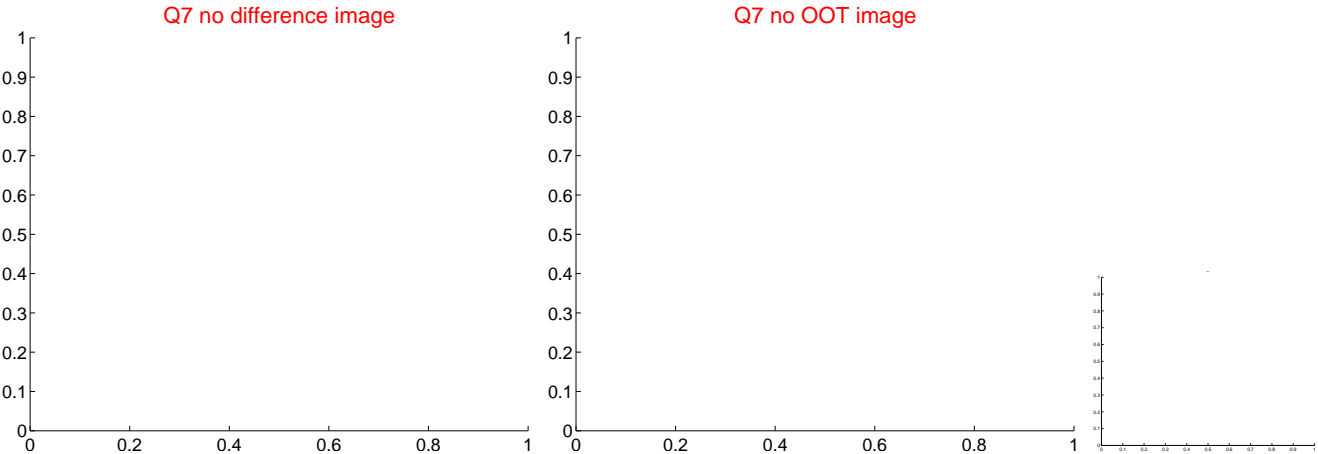
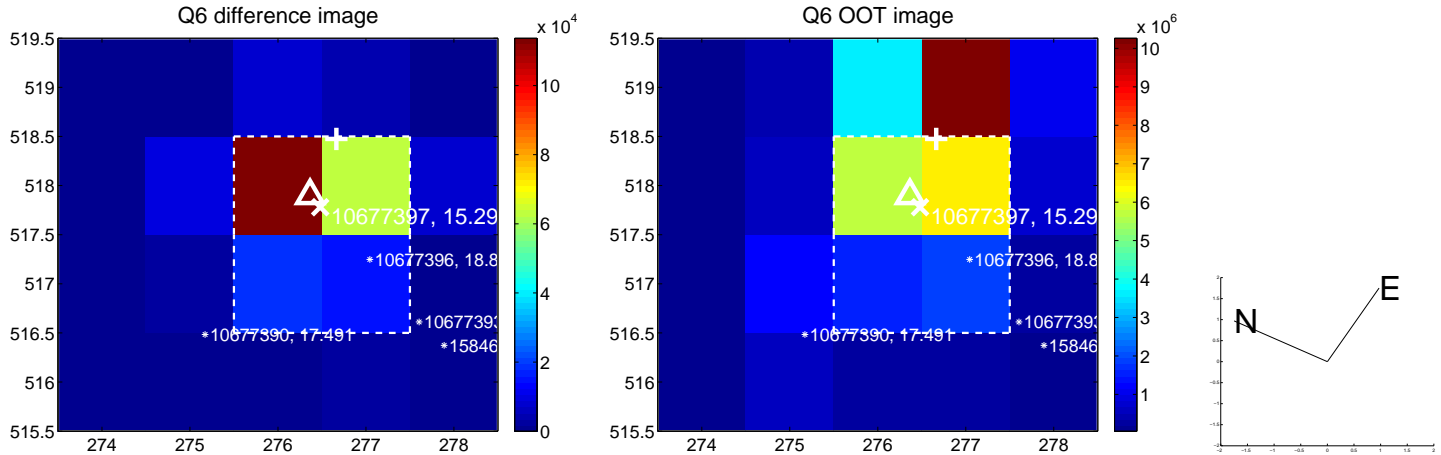
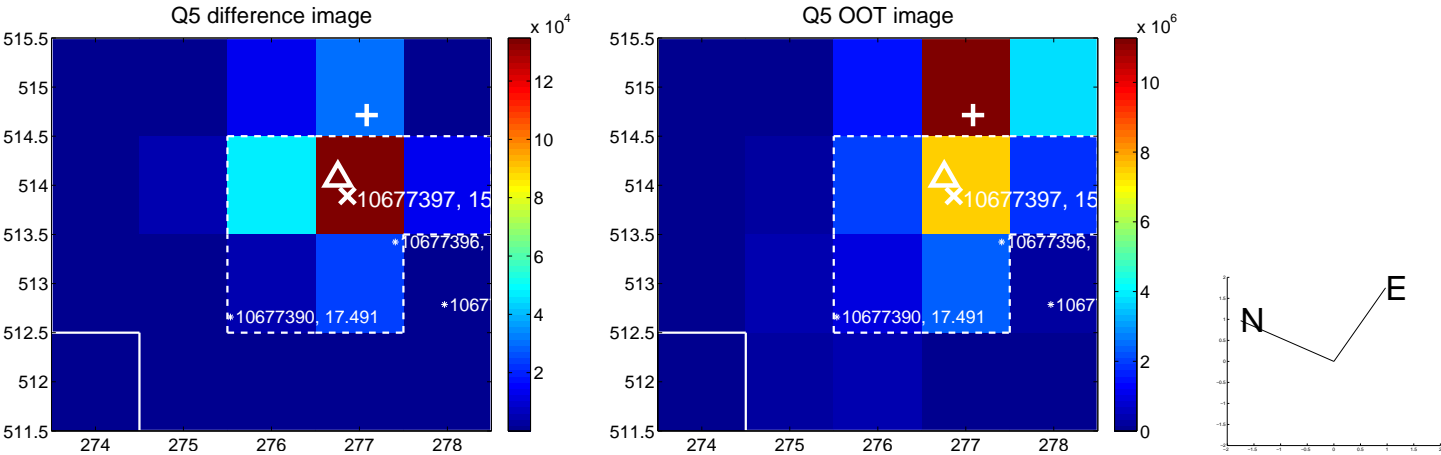


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

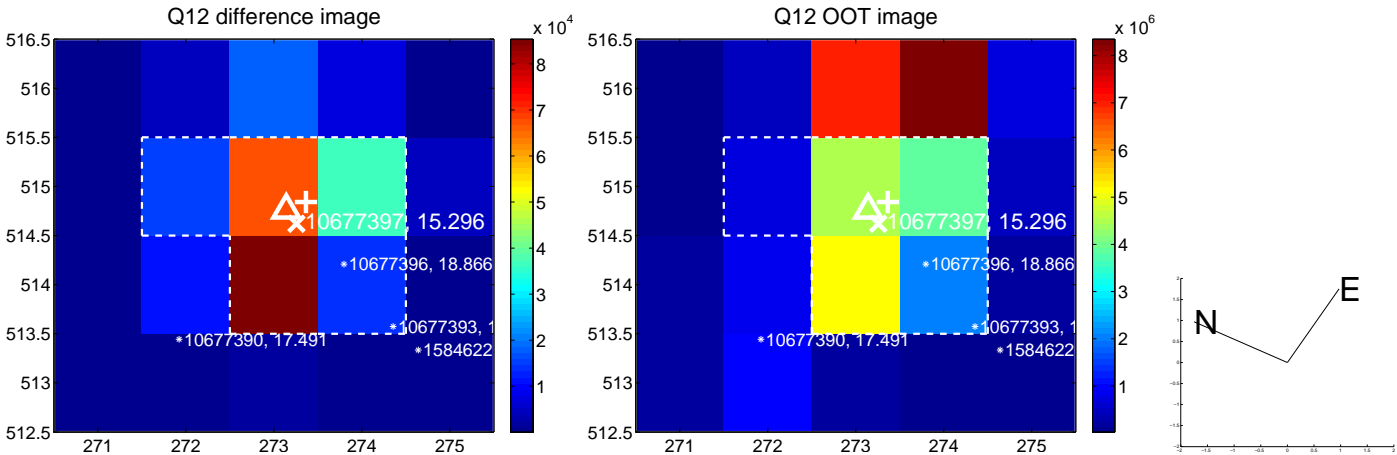
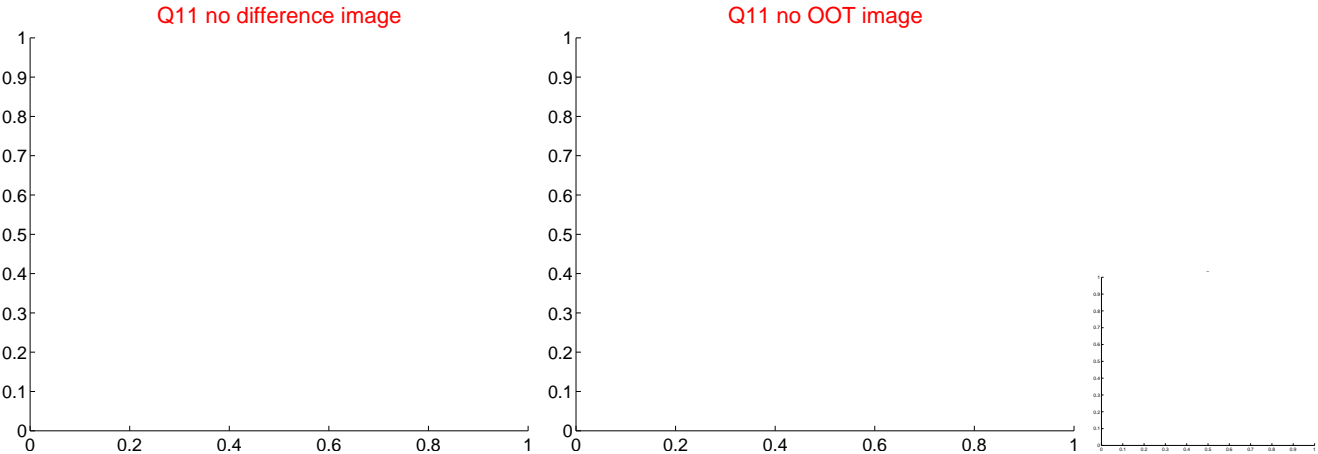
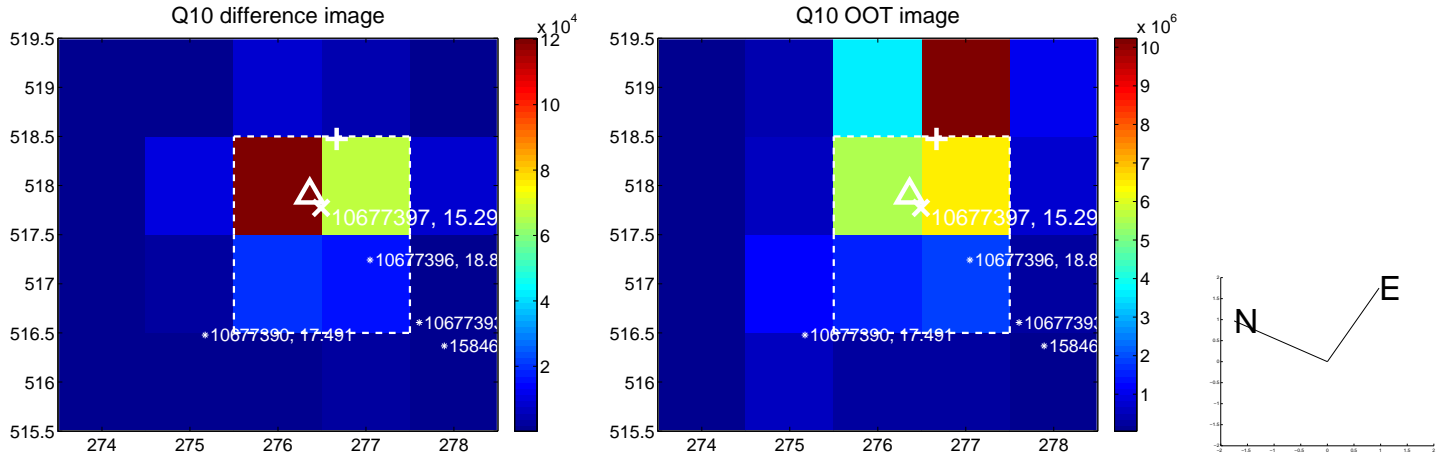
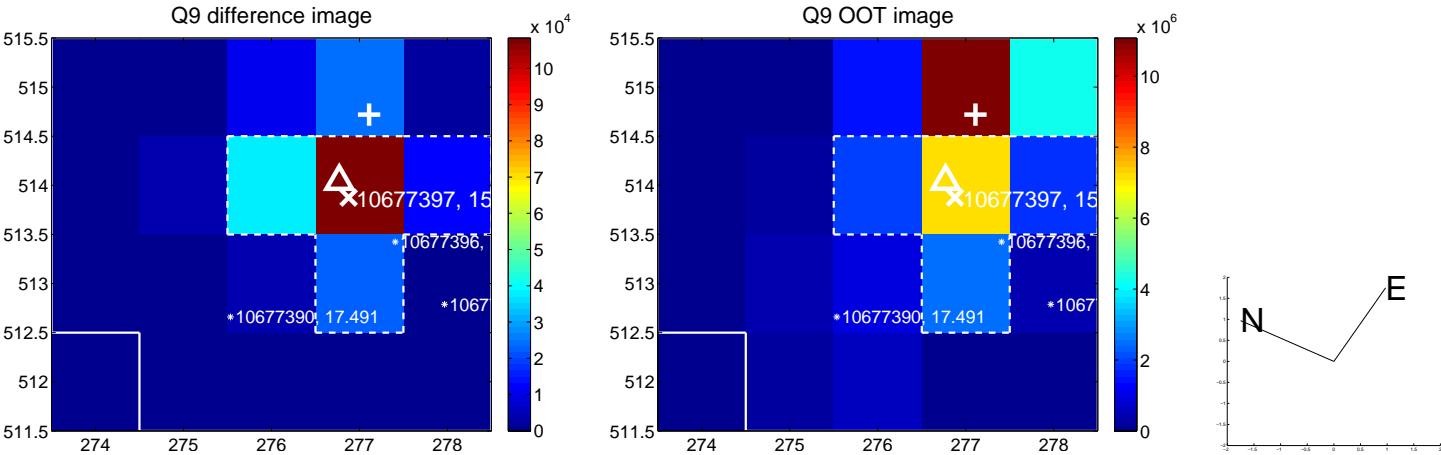
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



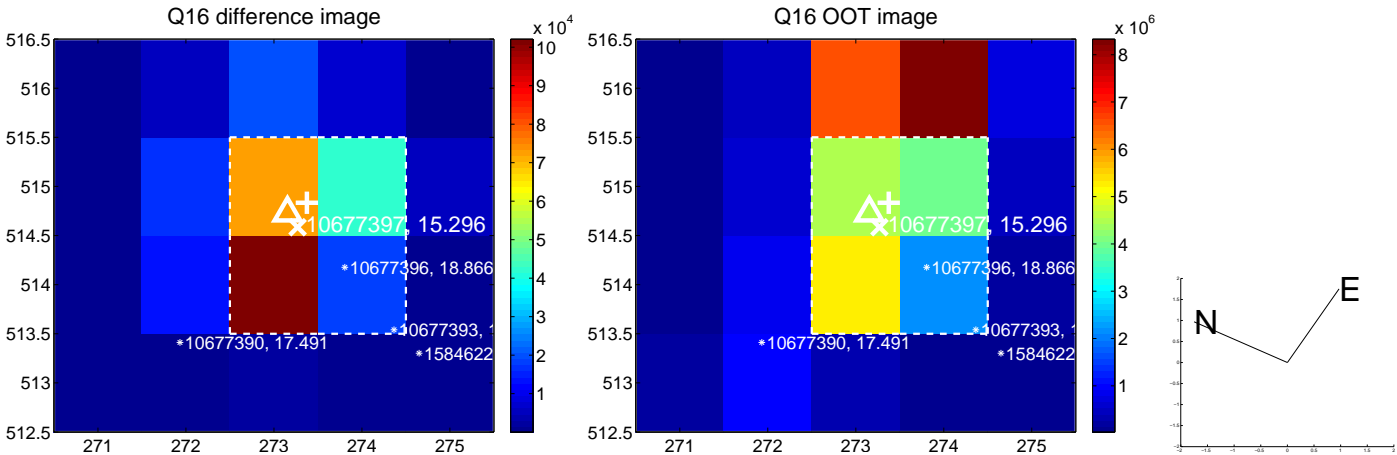
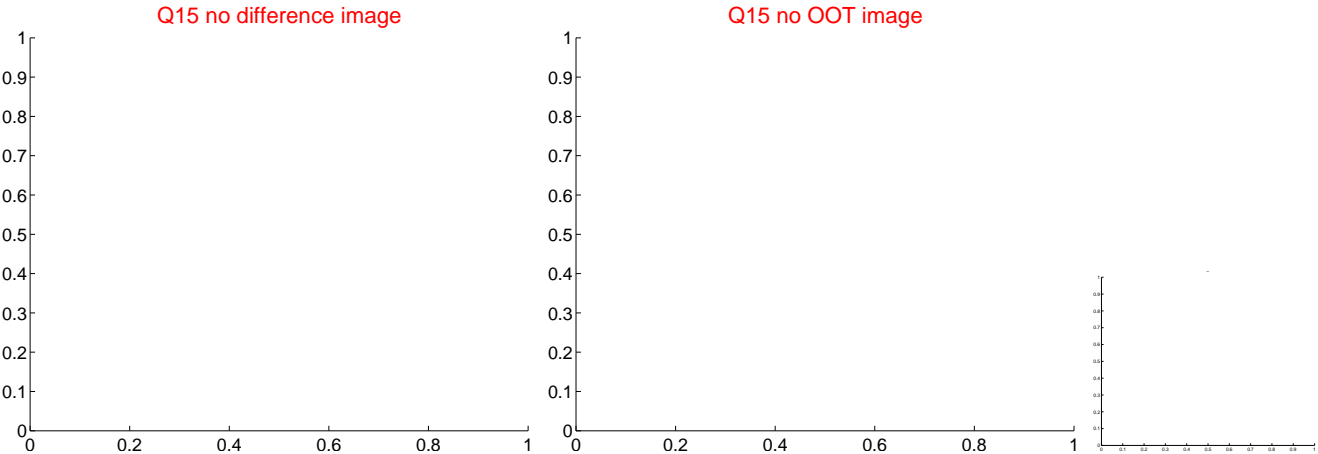
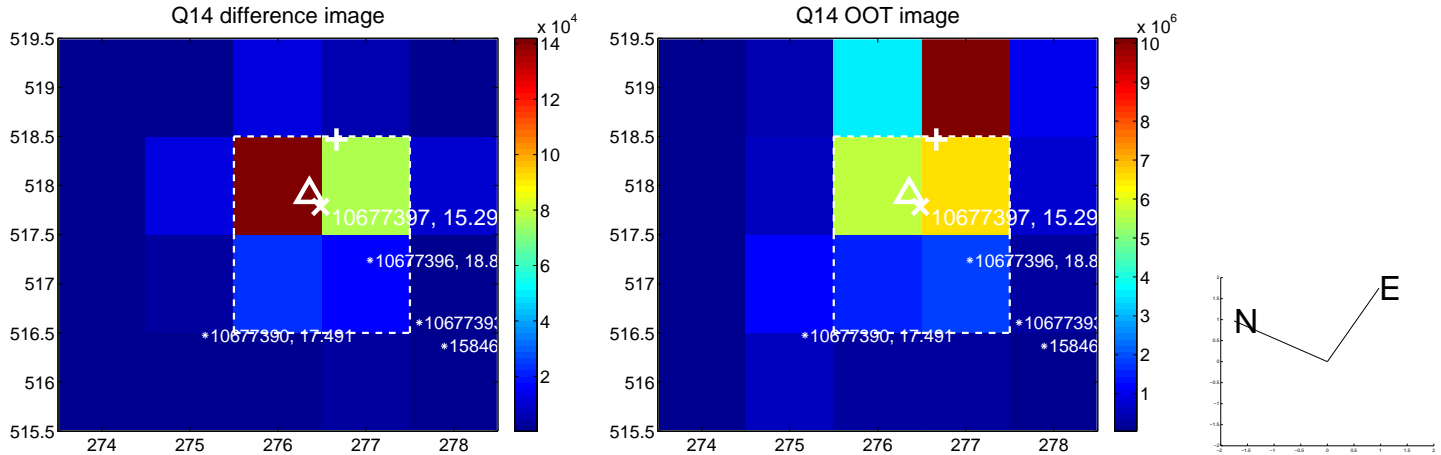
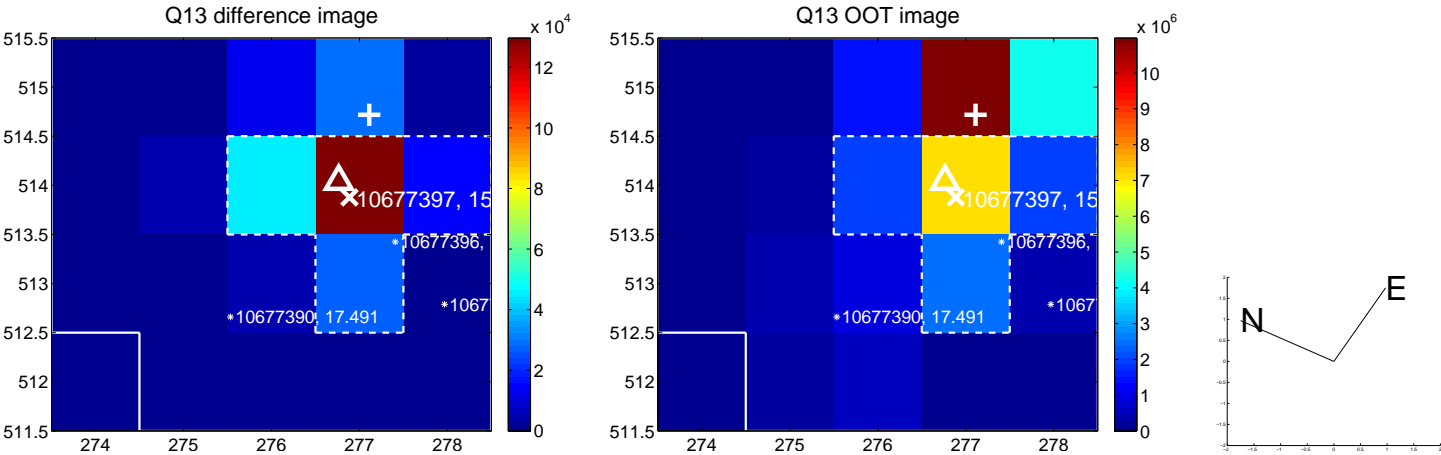
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



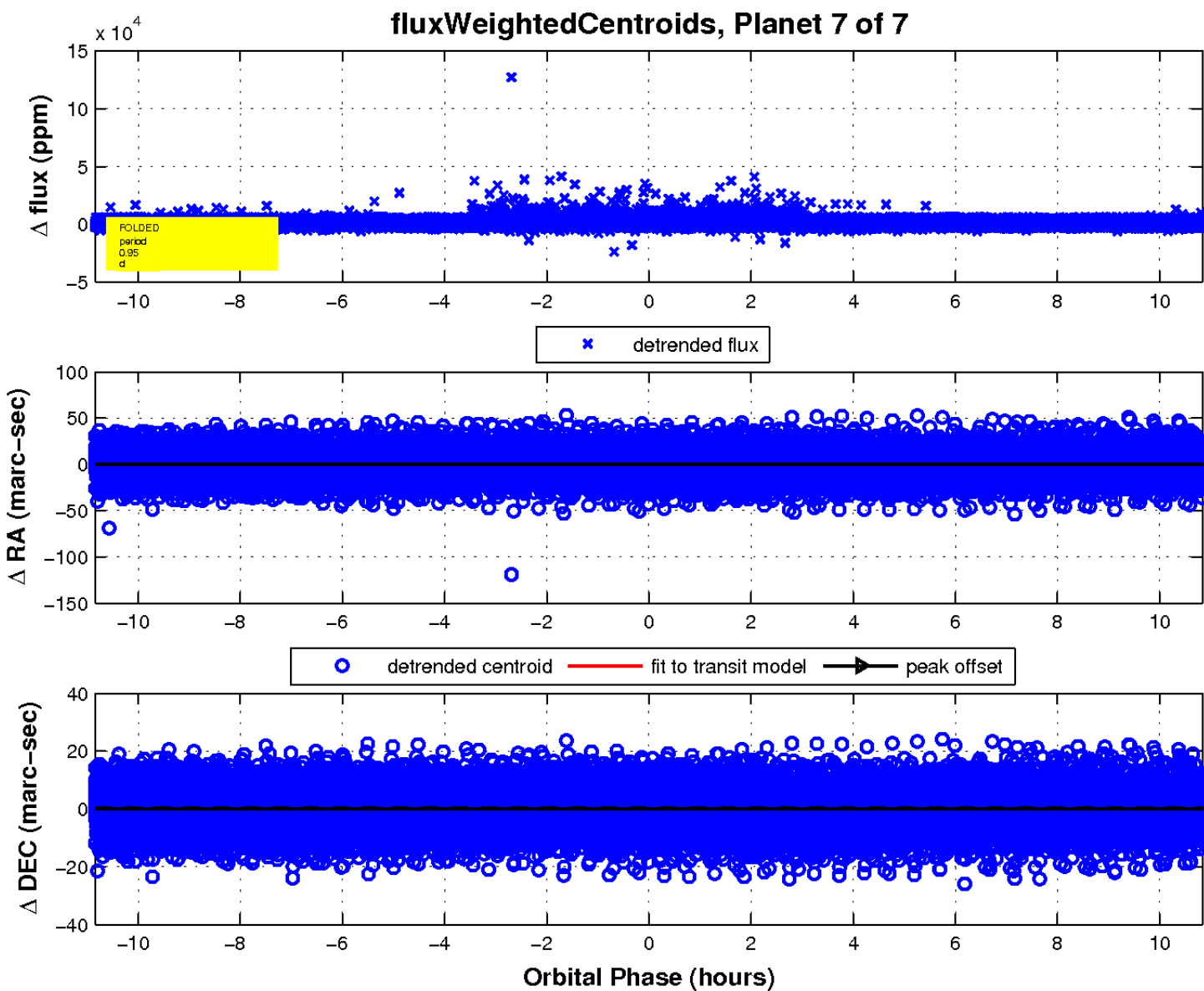
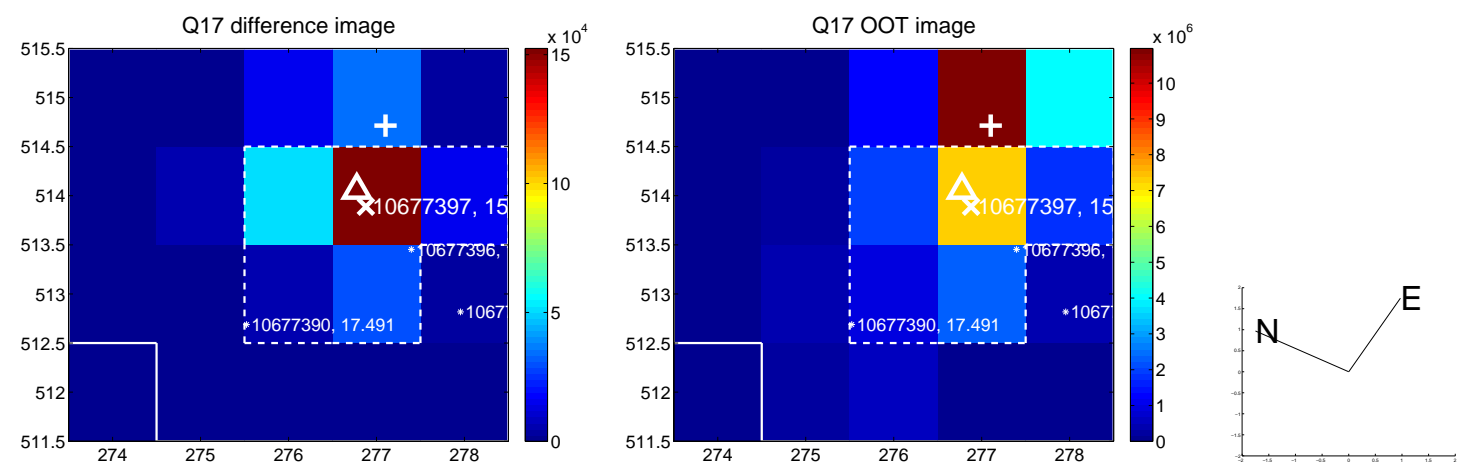
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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





UKIRT Image

Declination

