

# KIC 009414097

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009414097-01	OBS	No	294.702973	167.939340	1372.1	3.034	16.7	6.2	0.66	4160	2.32	0.20
009414097-02	OBS	No	422.891713	140.464474	1603.0	6.125	15.8	6.8	0.66	4160	2.67	0.13
009414097-03	OBS	No	435.288269	347.188540	214.3	3.412	15.6	0.9	0.66	4160	1.02	0.12
009414097-04	OBS	No	339.852661	407.529539	1335.5	2.815	15.2	6.0	0.66	4160	2.36	0.17
009414097-06	OBS	No	508.823294	200.602379	2553.4	9.574	15.1	7.6	0.66	4160	3.44	0.10

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009414097-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009414097-02	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—CENT_FEW_DIFFS
009414097-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_POS_ALT—CENT_FEW_DIFFS
009414097-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—HALO_GHOST
009414097-06	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—CENT_FEW_DIFFS

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

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

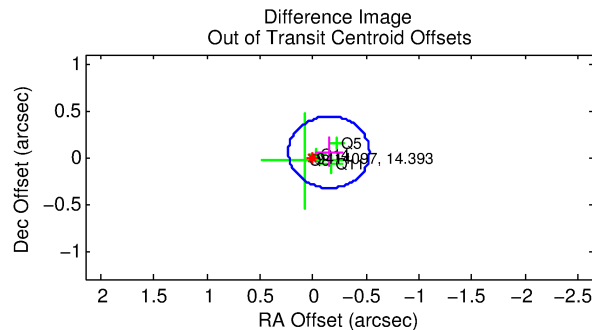
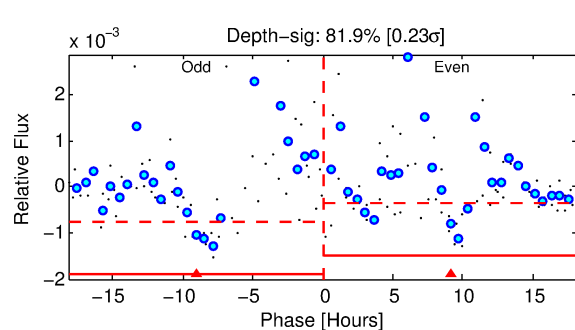
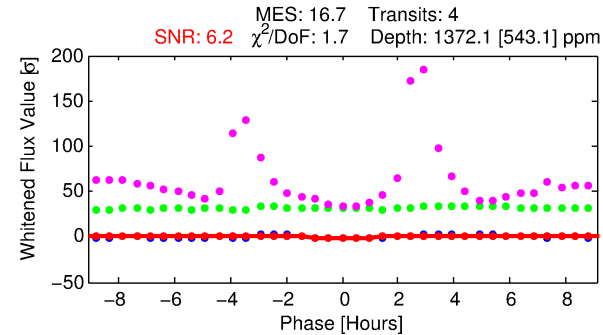
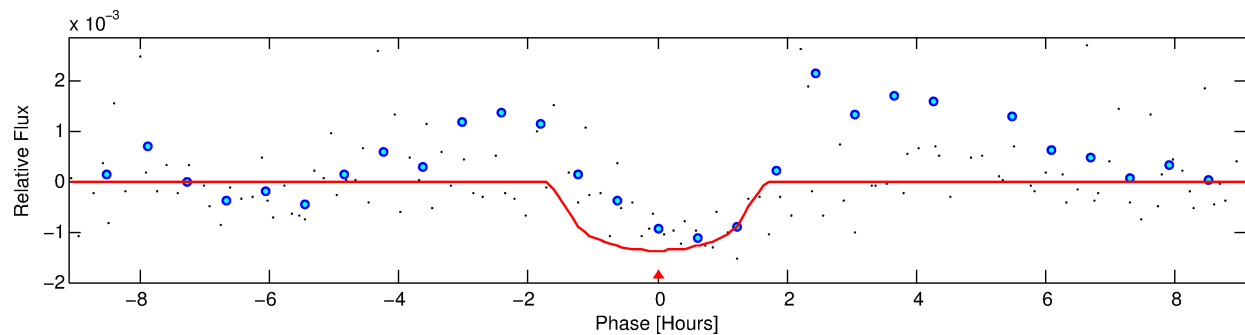
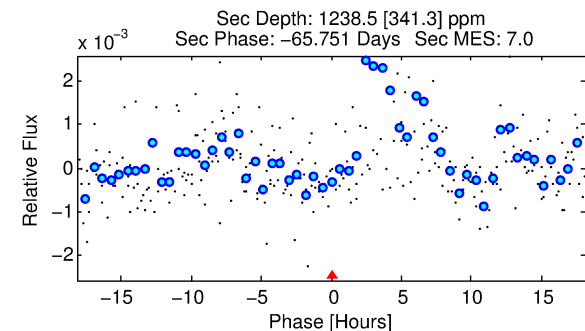
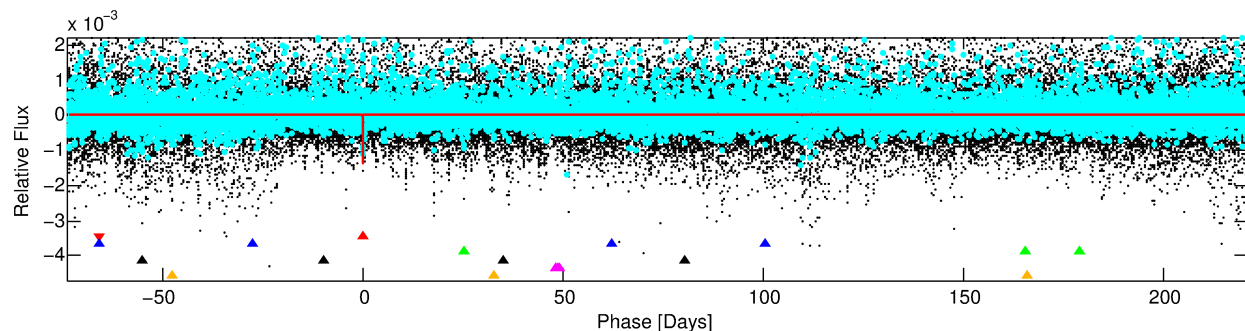
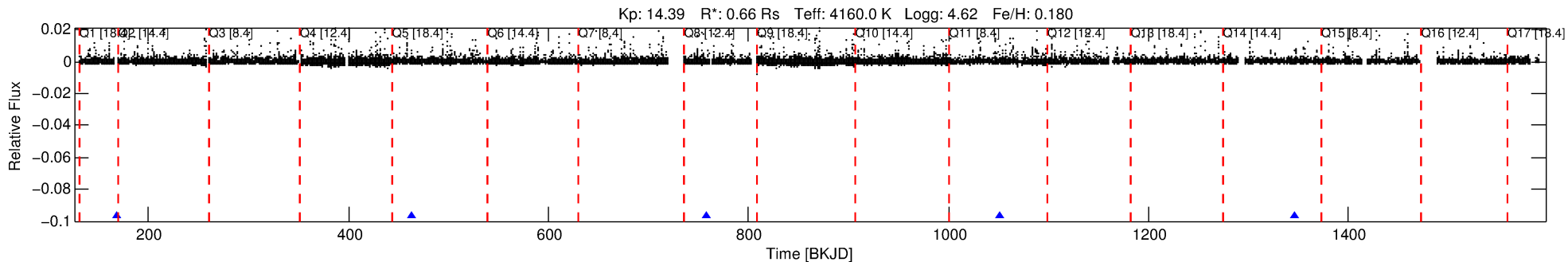
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009414097-01

No Significant Match Found

# DV One-Page Summary

KIC: 9414097 Candidate: 1 of 6 Period: 294.703 d



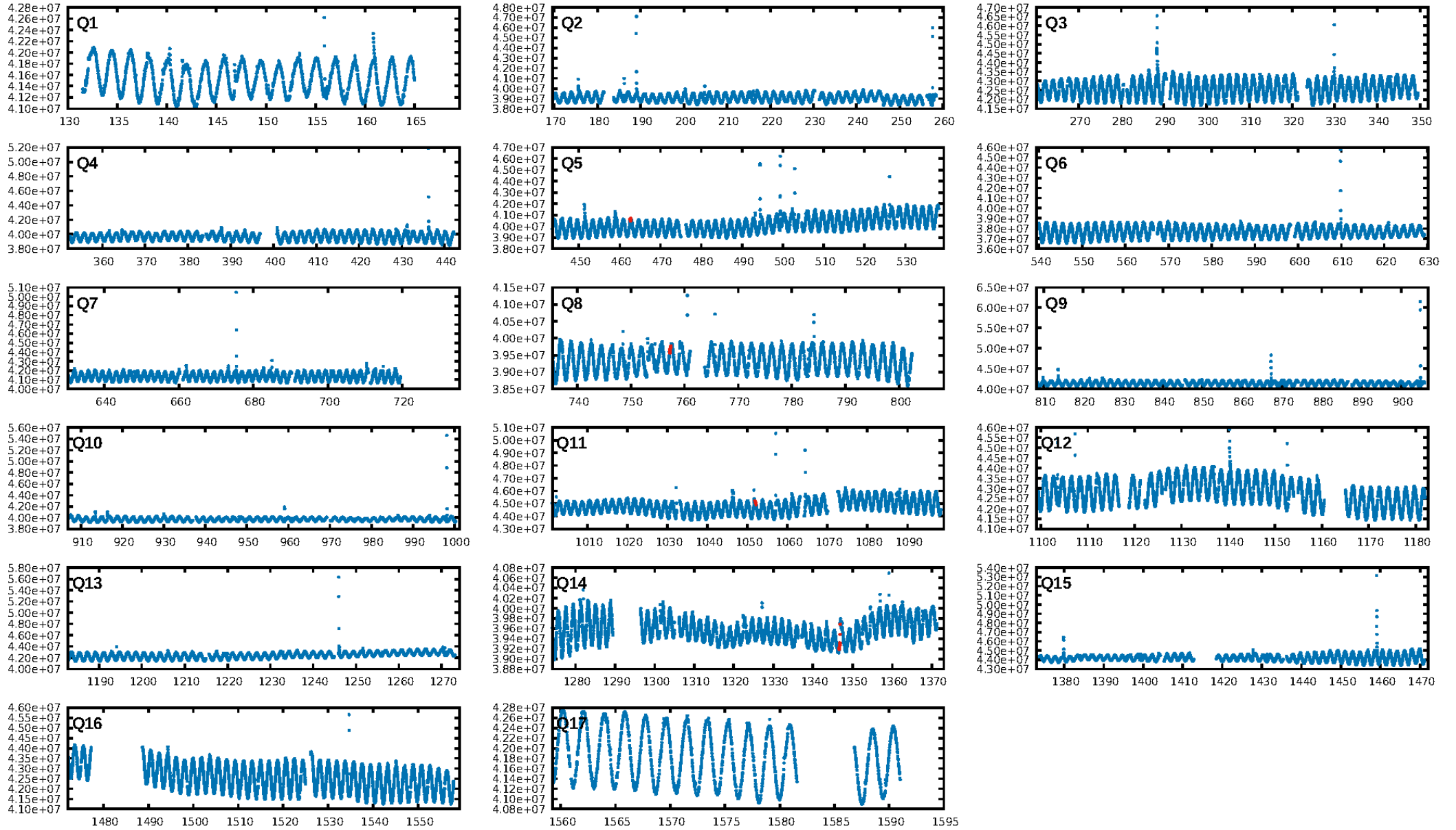
## DV Fit Results:

Period = 294.70297 [0.00854] d  
Epoch = 167.9393 [0.0253] BKJD  
Rp/R\* = 0.0325 [0.1210]  
a/R\* = 765.63 [8313.57]  
b = 0.04 [300.38]  
Seff = 0.20 [0.04]  
Teq = 171 [8] K  
Rp = 2.32 [8.65] Re  
a = 0.7518 [0.0536] AU  
Ag = 71388.73 [531927.70] [0.13σ]  
Teffp = 4329 [8065] K [0.52σ]

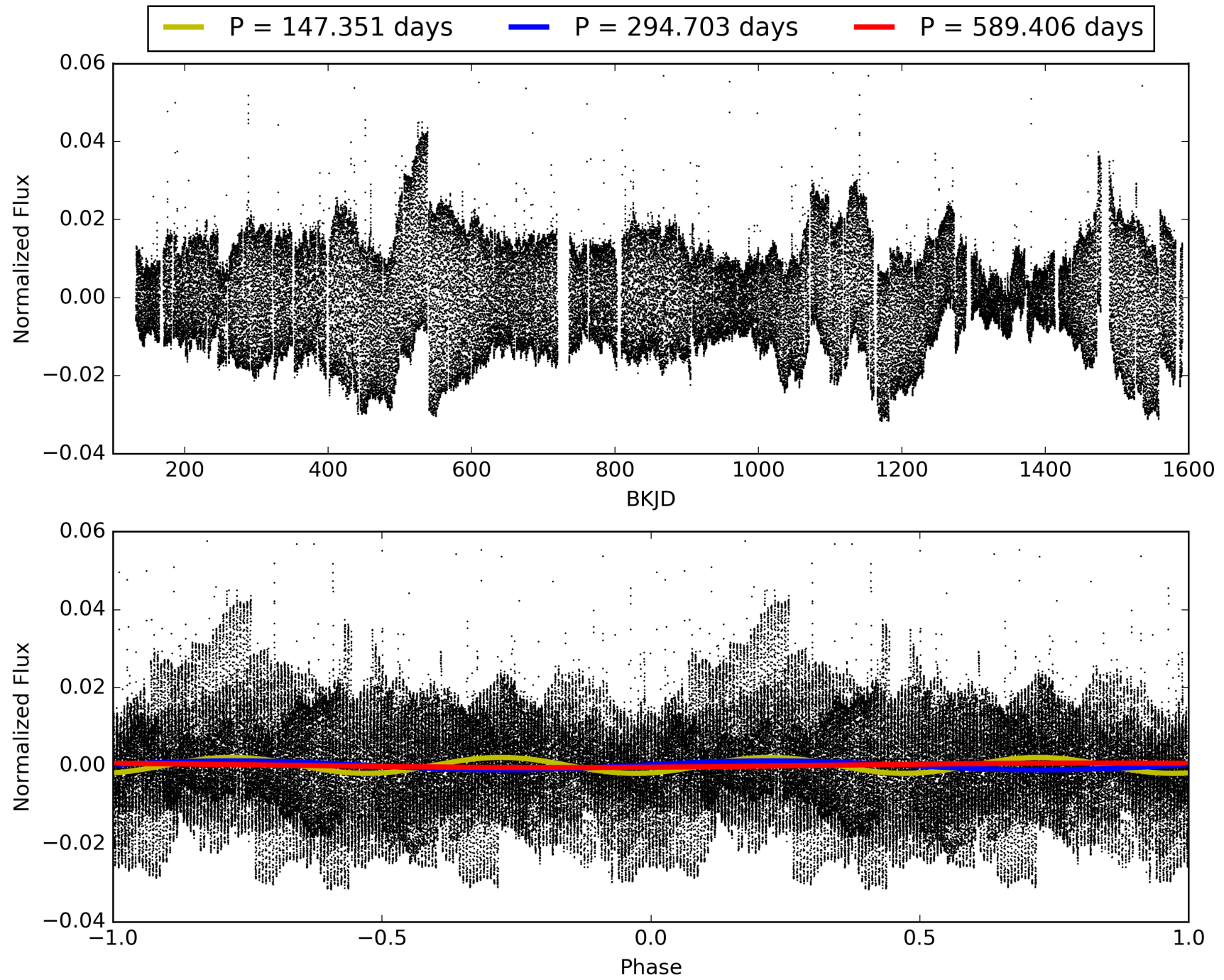
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 79.2% [1.26σ]  
ModelChiSquare2-sig: 1.2%  
ModelChiSquareGof-sig: 75.8%  
Bootstrap-pfa: 1.48e-15  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -3.959  
Centroid-sig: 59.4%  
Centroid-so: 0.727 arcsec [1.21σ]  
OotOffset-rm: 0.160 arcsec [1.25σ]  
KicOffset-rm: 0.081 arcsec [0.57σ]  
OotOffset-st: 1/1/1/1 [4]  
KicOffset-st: 1/1/1/1 [4]  
DiffImageQuality-fgm: 0.25 [1/4]  
DiffImageOverlap-fno: 1.00 [4/4]

# TCE 009414097-01, PDC Light Curves



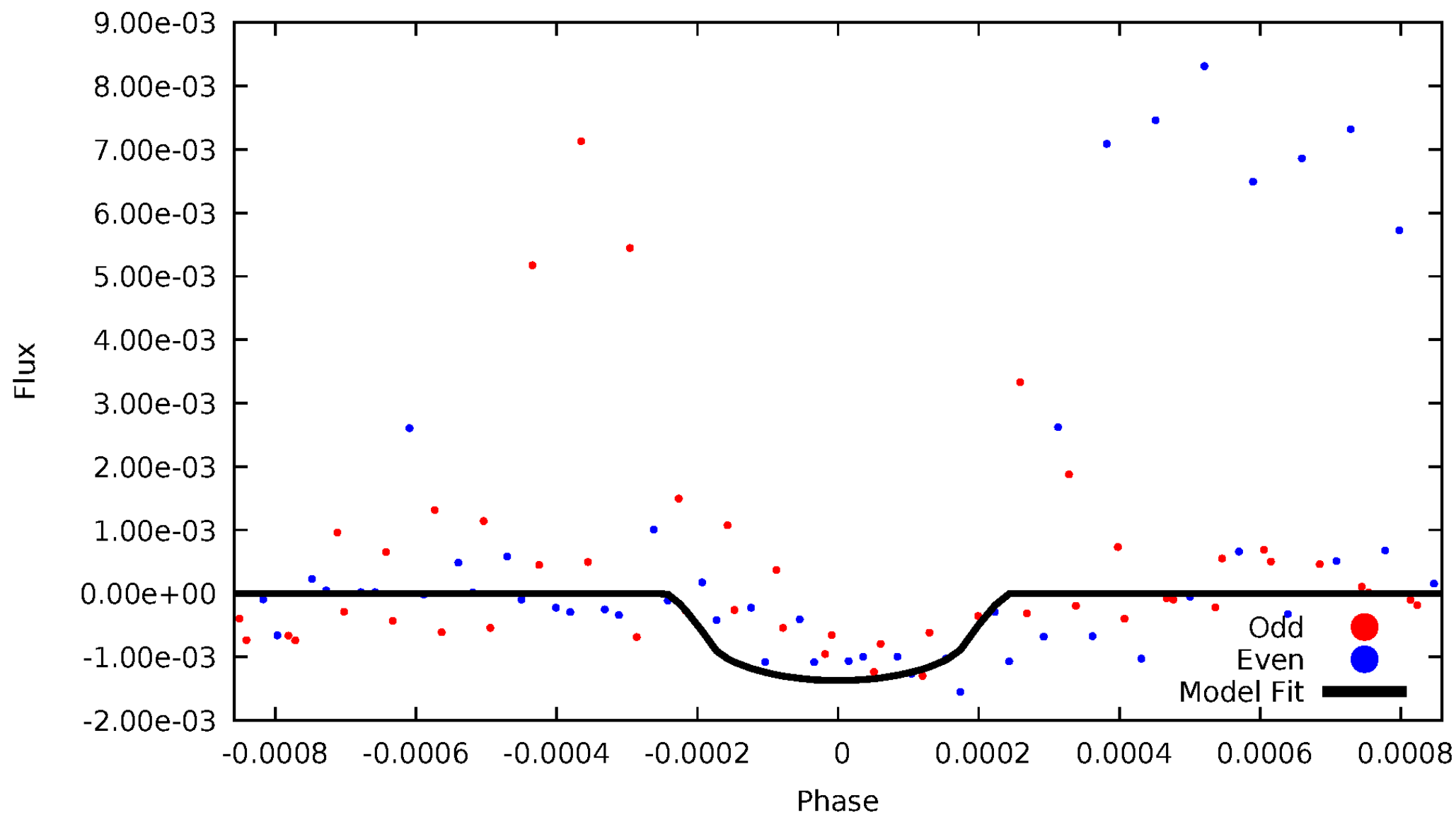
TCE 009414097-01





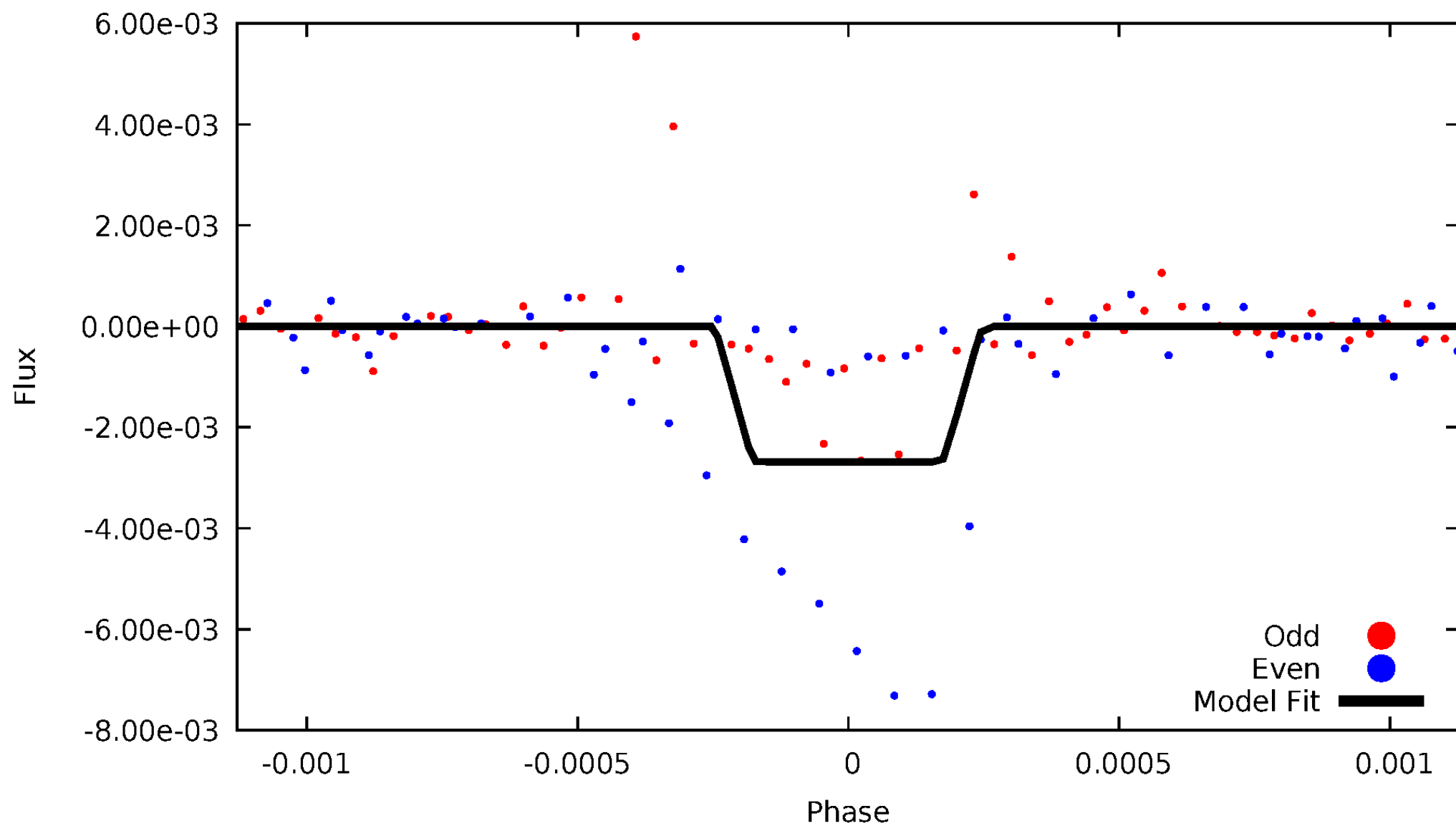
# DV Odd/Even

TCE 009414097-01



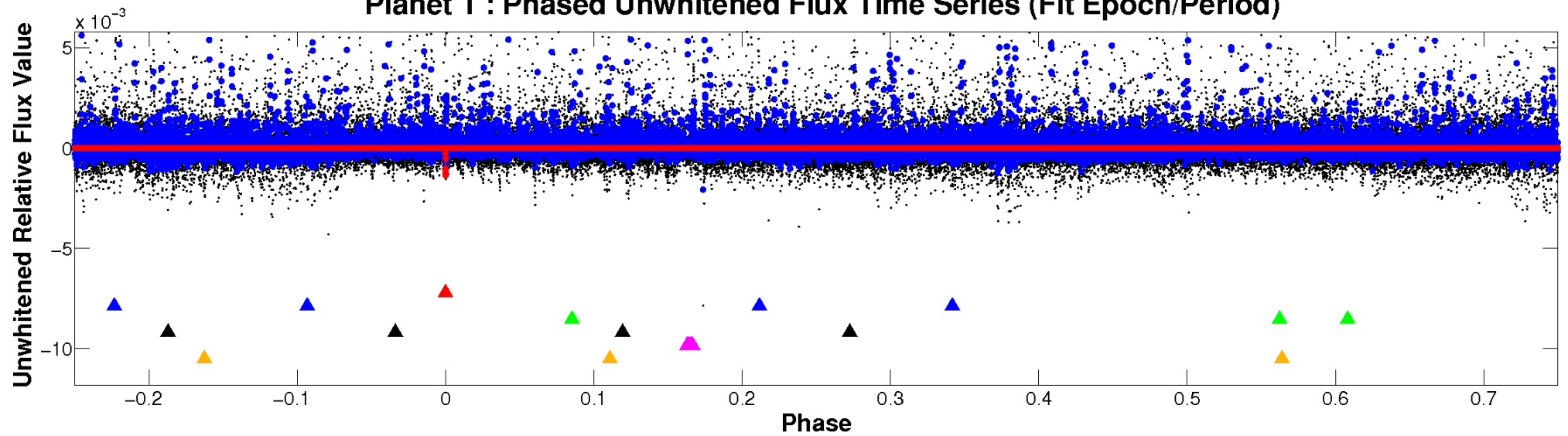
# ALT Odd/Even

TCE 009414097-01

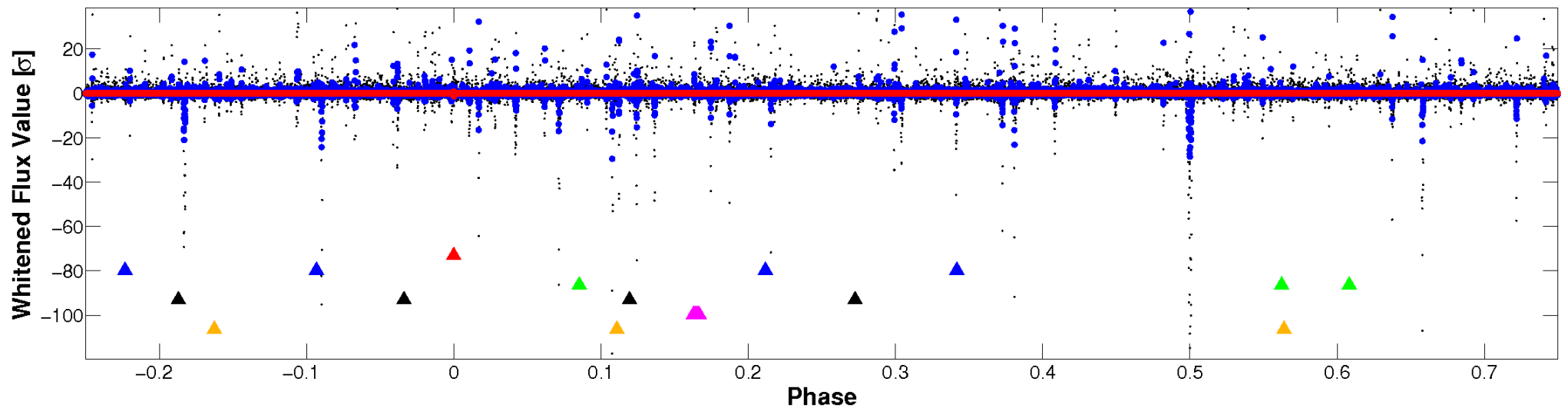


# Non-Whitened Vs. Whitened Light Curve

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

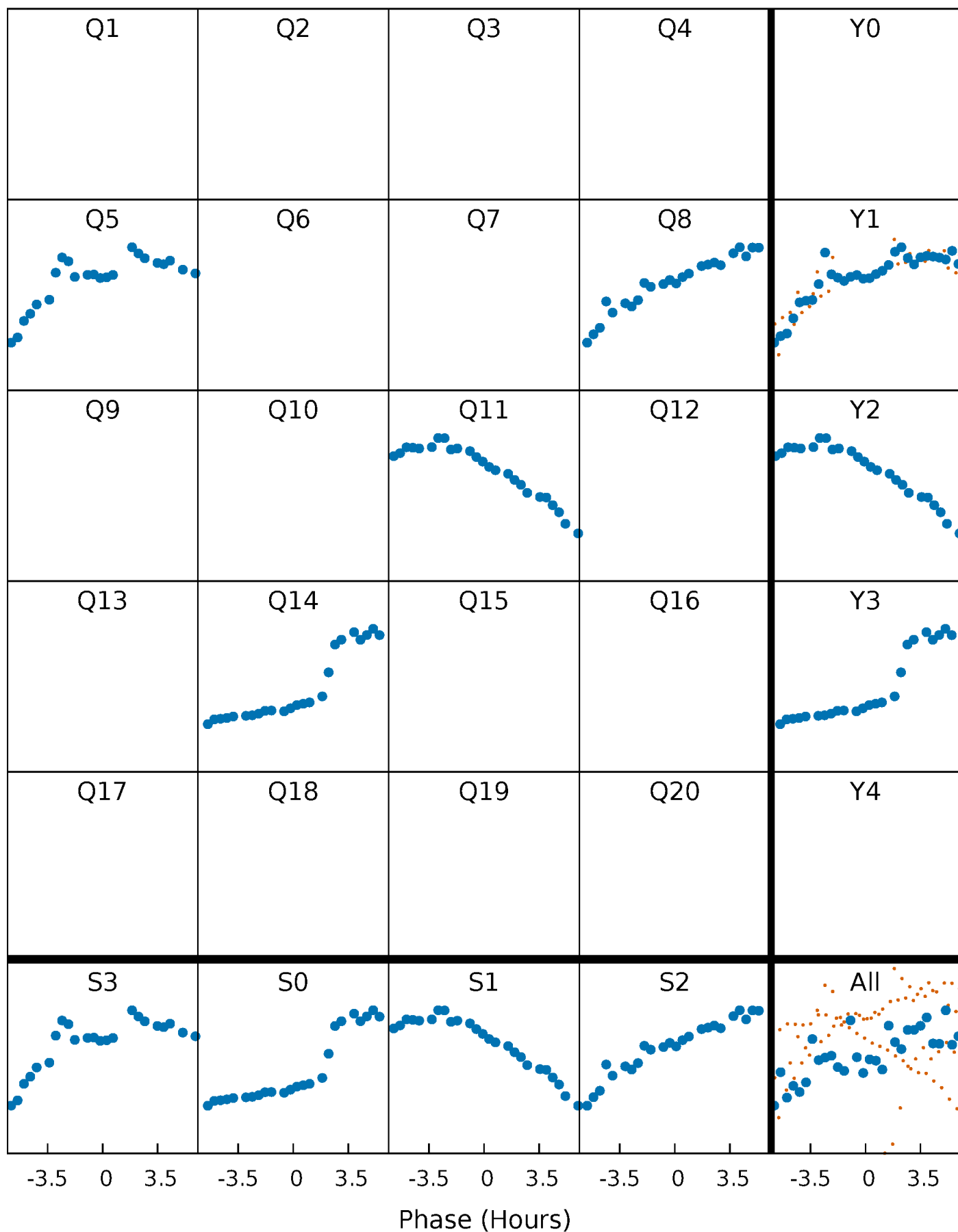


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



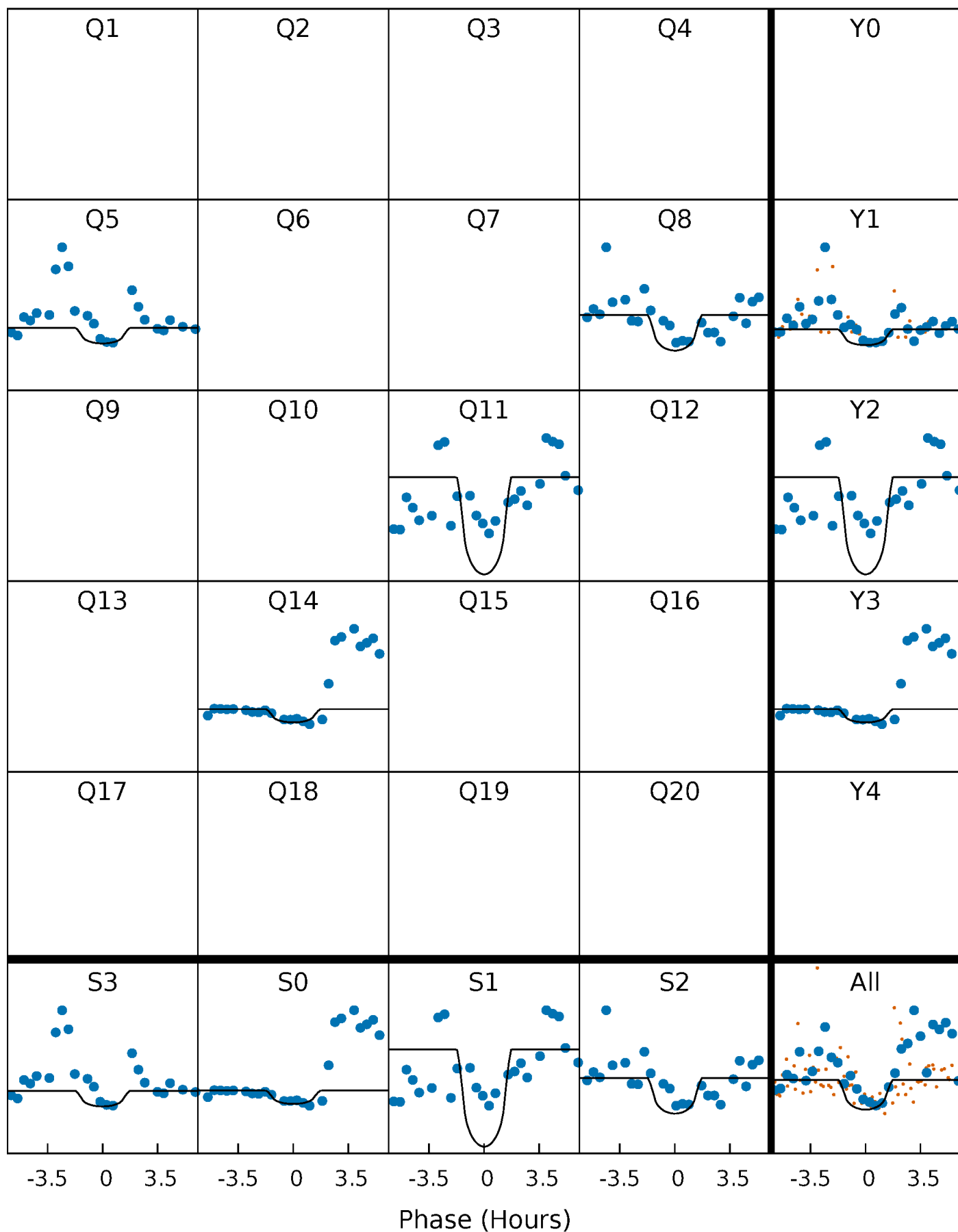
# PDC Quarter-Phased Transit Curves

TCE 009414097-01 P=294.702973 Days  $T_0=167.939340$  (BKJD)



# DV Quarter-Phased Transit Curves

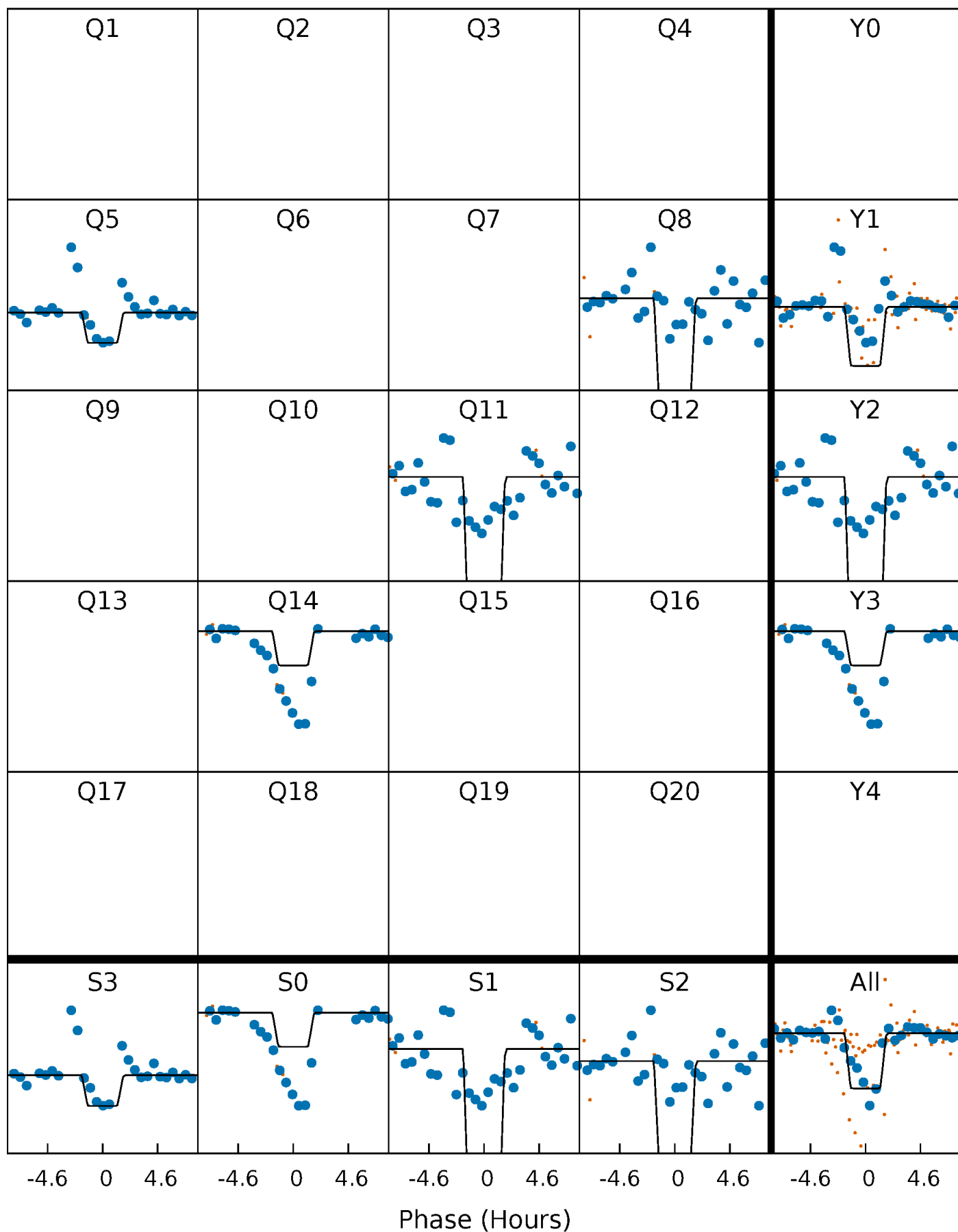
TCE 009414097-01     $P=294.702973$  Days     $T_0=167.939340$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

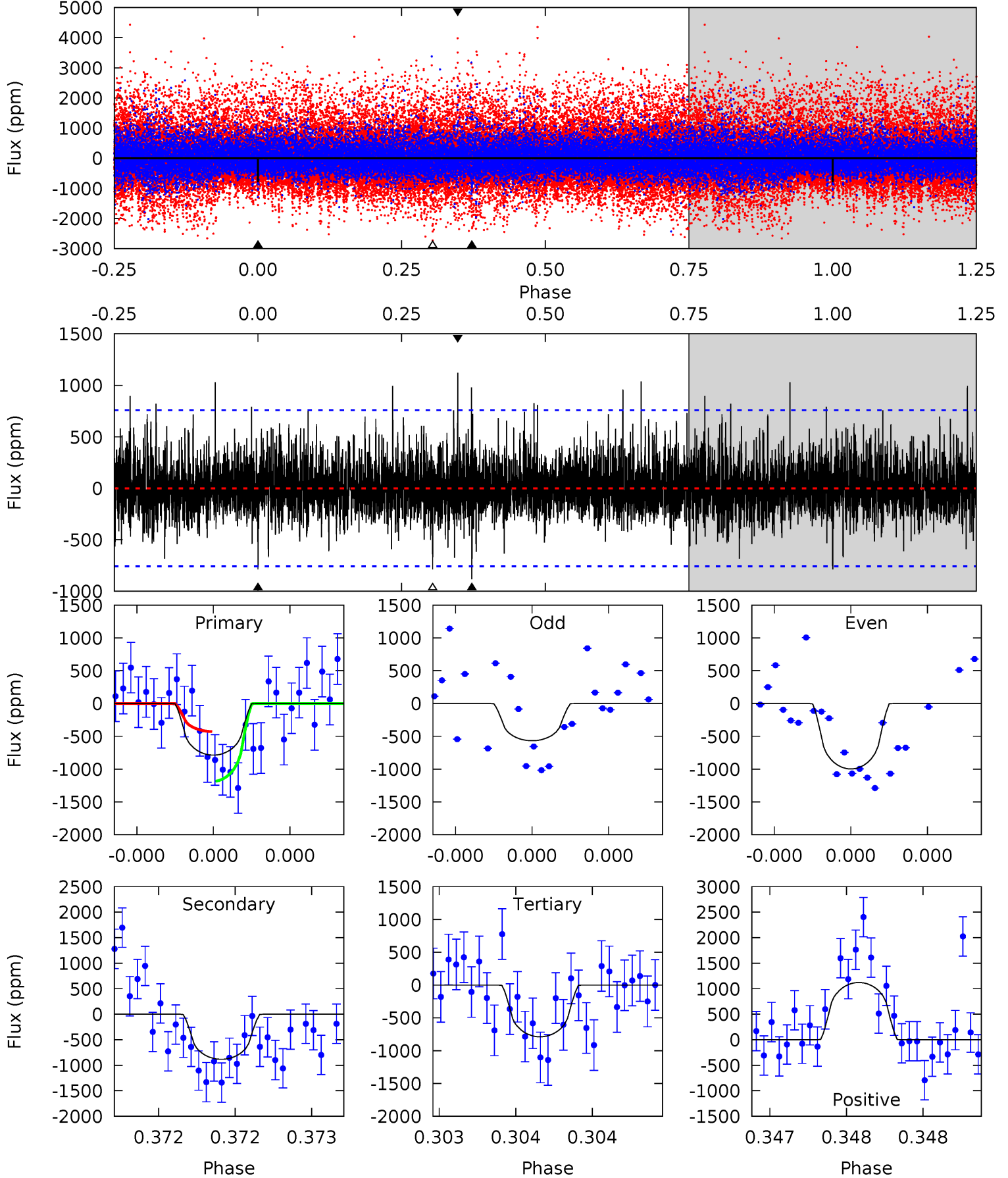
TCE 009414097-01     $P=294.709063$  Days     $T_0=167.941235$  (BKJD)



# DV Model-Shift Uniqueness Test

009414097-01, P = 294.702973 Days, E = 167.939340 Days

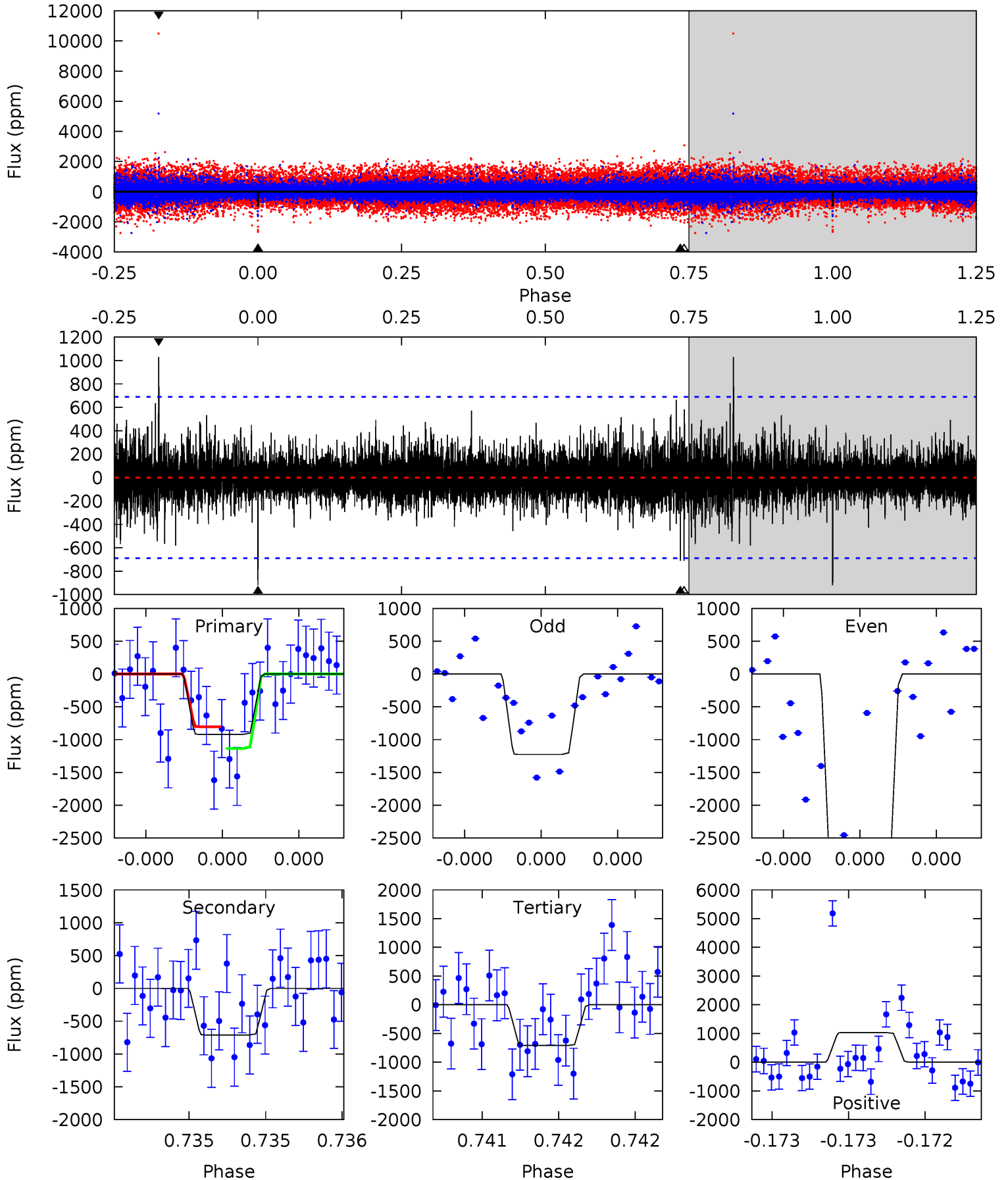
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.79	6.50	5.80	8.25	5.58	3.49	1.47	-0.01	-2.46	0.70	-1.75	1.21	1.10	0.56	2.82



# Alt Model-Shift Uniqueness Test

009414097-01, P = 294.709063 Days, E = 167.941235 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.45	5.74	5.74	8.33	5.58	3.49	1.01	1.70	-0.88	0.00	-2.59	6.50	1.88	0.53	1.31



### Stellar Parameters For KIC 009414097

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4160^{+130}_{-158}$	$4.620^{+0.052}_{-0.016}$	$0.180^{+0.200}_{-0.300}$	$0.655^{+0.031}_{-0.058}$	$0.651^{+0.044}_{-0.058}$	$3.267^{+0.808}_{-0.260}$
	+3%/-4%	+1%/-0%	+111%/-167%	+5%/-9%	+7%/-9%	+25%/-8%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009414097-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-883 \pm 136$	$6.93^{+6.79}_{-4.97}$	$238^{+7}_{-9}$	$2867^{+1407}_{-471}$	$5735^{+68228}_{-4311}$
Alt.	$-710 \pm 124$	$6.85^{+6.73}_{-4.62}$	$237^{+8}_{-9}$	$2780^{+1074}_{-446}$	$4778^{+36162}_{-3573}$

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

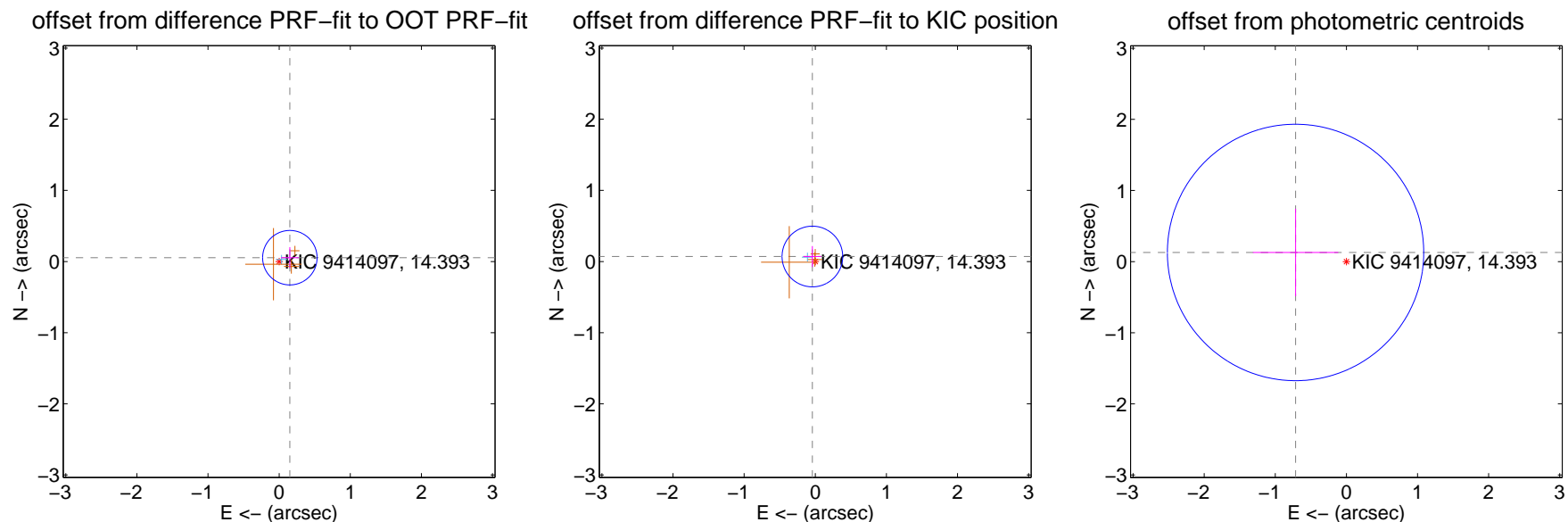
## DV Centroid Data

Supplemental centroid analysis for 009414097-01. Kepler magnitude: 14.39. Transit SNR 6.21

There are 1 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.160 \pm 0.128$	1.25	$-0.150 \pm 0.125$	$0.054 \pm 0.147$
PRF-fit source offset from KIC position	$0.081 \pm 0.142$	0.57	$0.041 \pm 0.125$	$0.071 \pm 0.147$
photometric centroid source offset	$0.73 \pm 0.60$	1.21	$0.72 \pm 0.60$	$0.13 \pm 0.61$



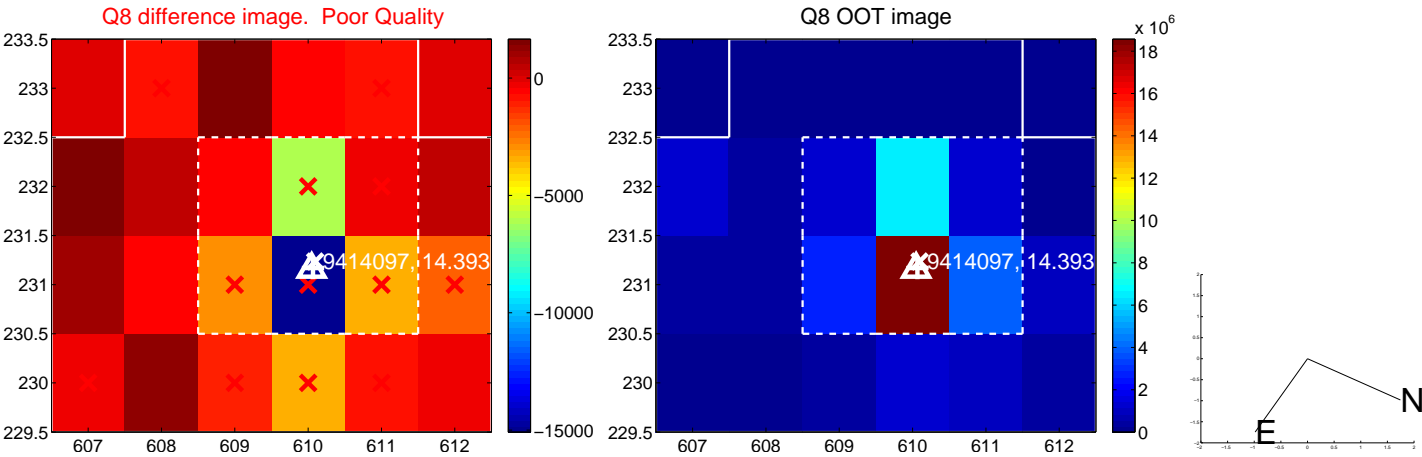
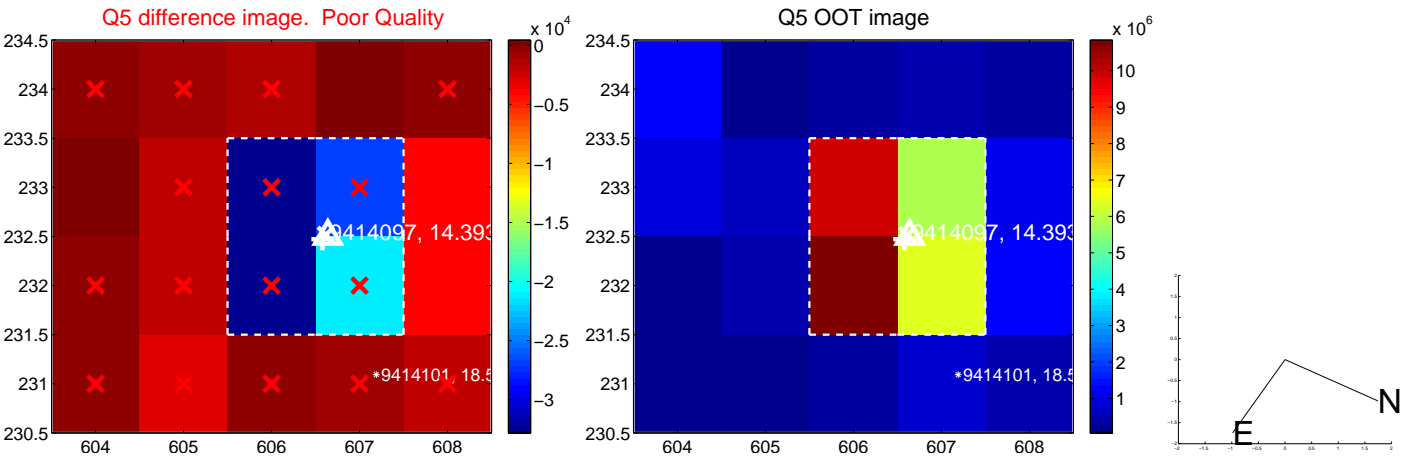
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



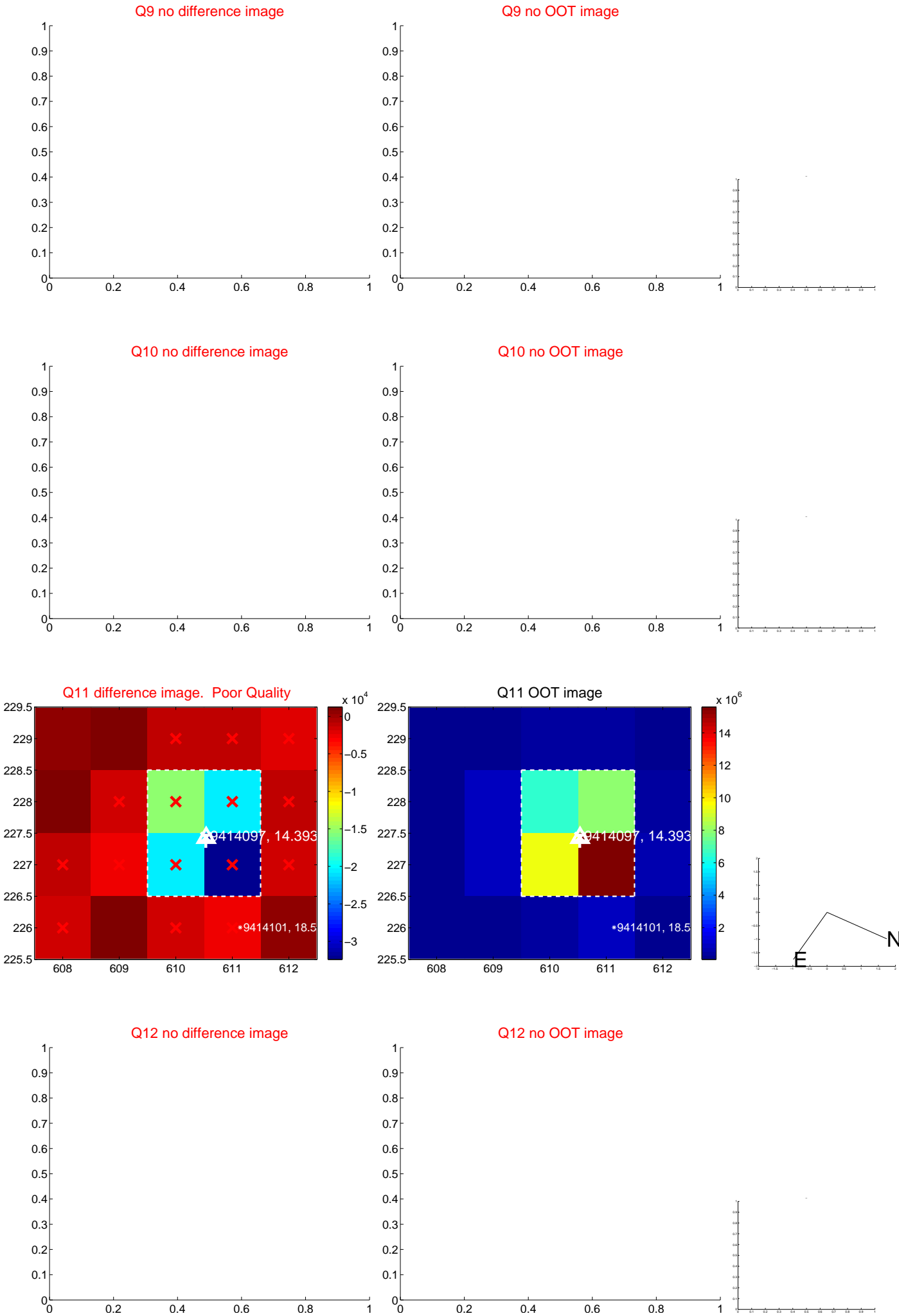
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.

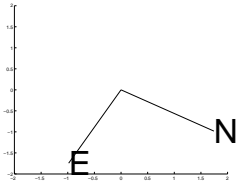
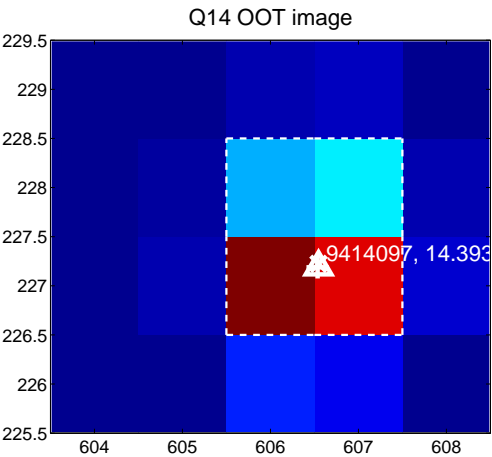
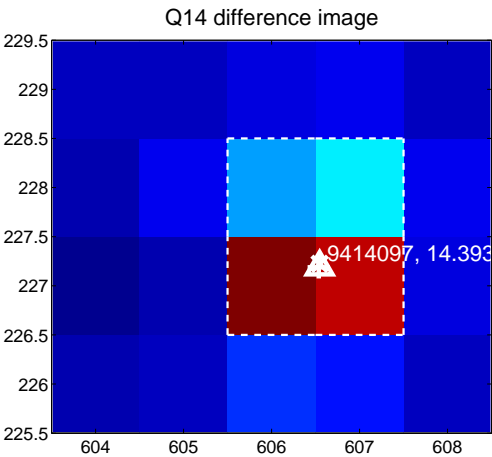


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

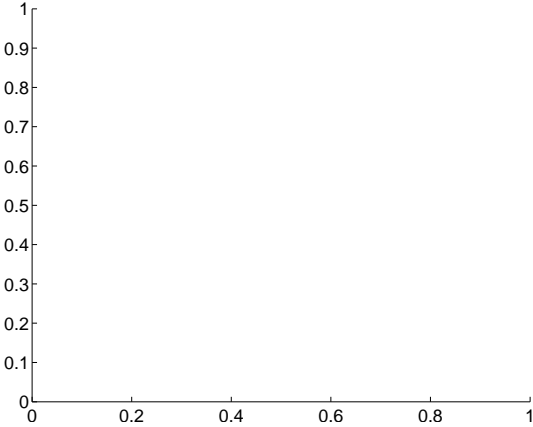
Q13 no difference image



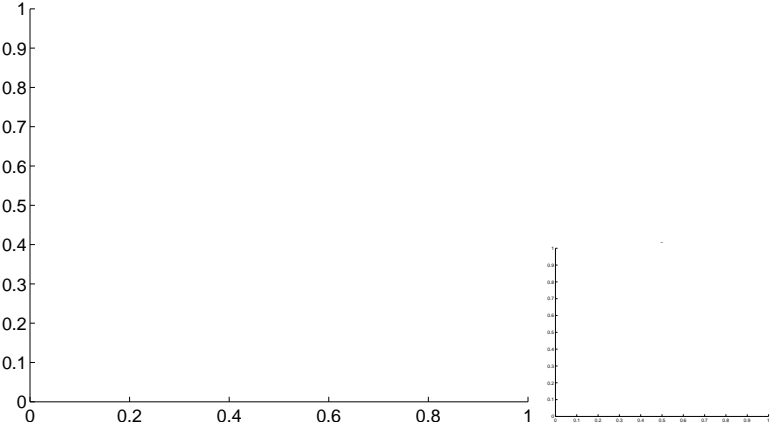
Q13 no OOT image



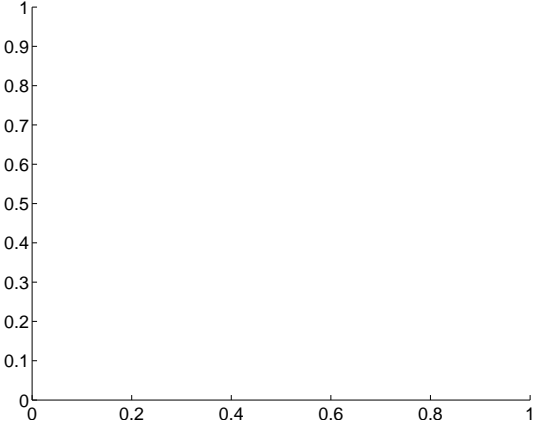
Q15 no difference image



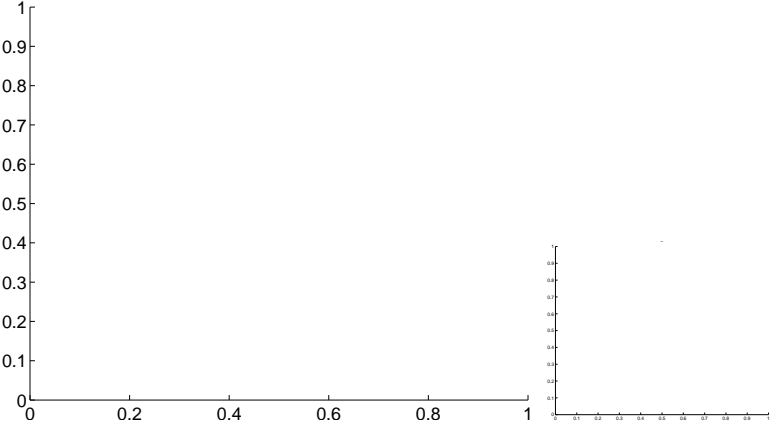
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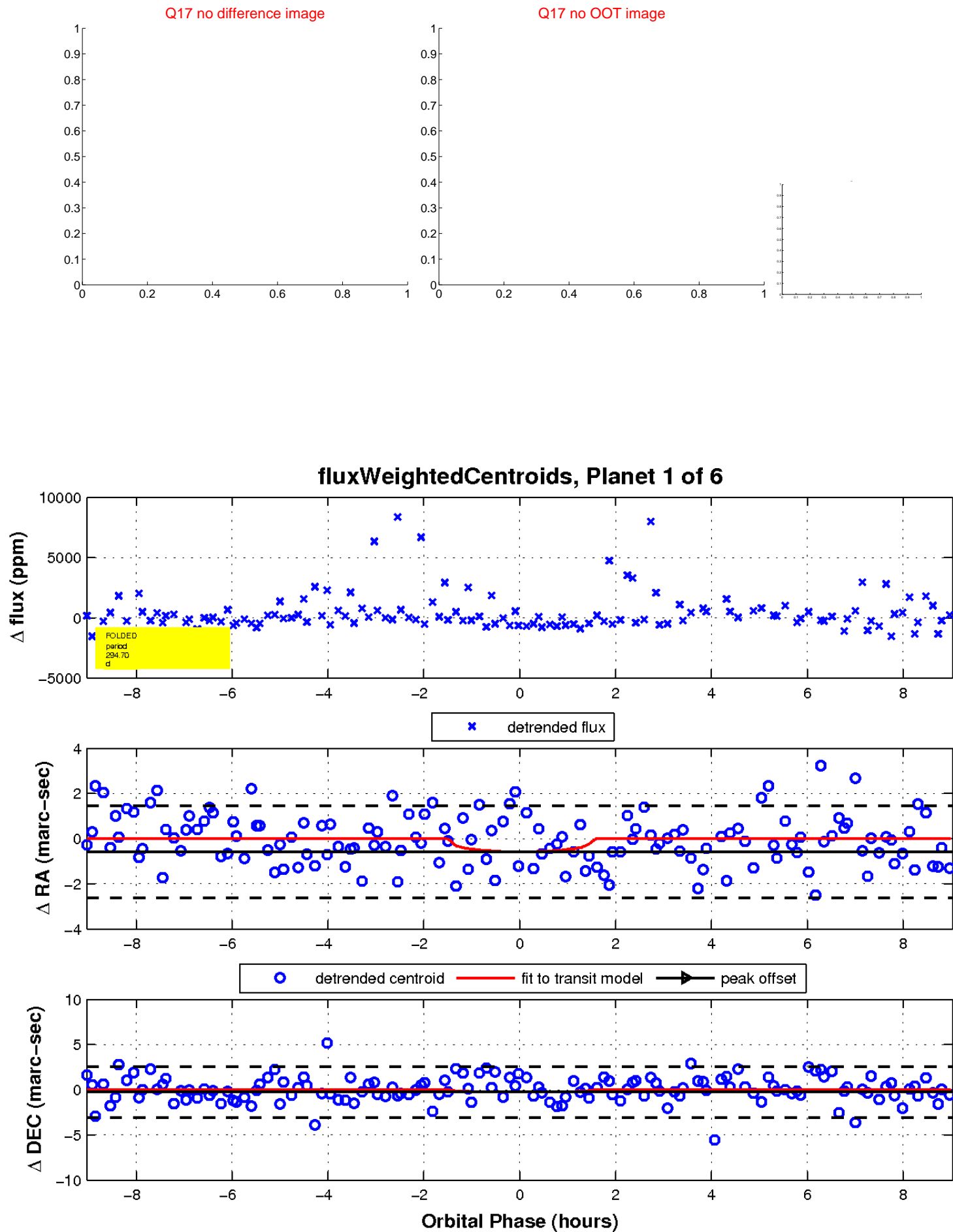
Q16 no difference image



Q16 no OOT image



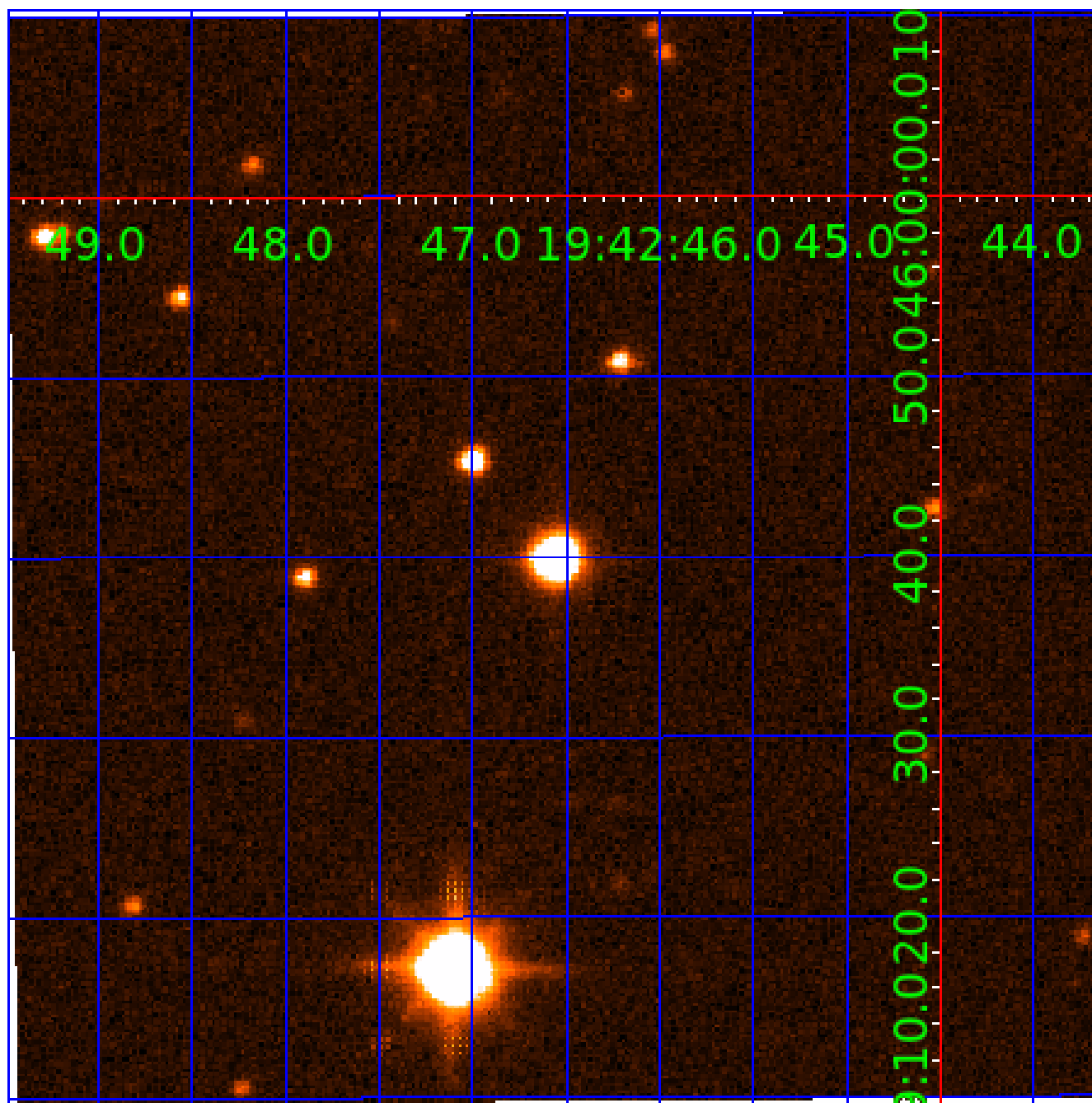
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 009414097

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009414097-01	OBS	No	294.702973	167.939340	1372.1	3.034	16.7	6.2	0.66	4160	2.32	0.20
009414097-02	OBS	No	422.891713	140.464474	1603.0	6.125	15.8	6.8	0.66	4160	2.67	0.13
009414097-03	OBS	No	435.288269	347.188540	214.3	3.412	15.6	0.9	0.66	4160	1.02	0.12
009414097-04	OBS	No	339.852661	407.529539	1335.5	2.815	15.2	6.0	0.66	4160	2.36	0.17
009414097-06	OBS	No	508.823294	200.602379	2553.4	9.574	15.1	7.6	0.66	4160	3.44	0.10

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009414097-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009414097-02	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—CENT_FEW_DIFFS
009414097-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_POS_ALT—CENT_FEW_DIFFS
009414097-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—HALO_GHOST
009414097-06	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—CENT_FEW_DIFFS

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

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

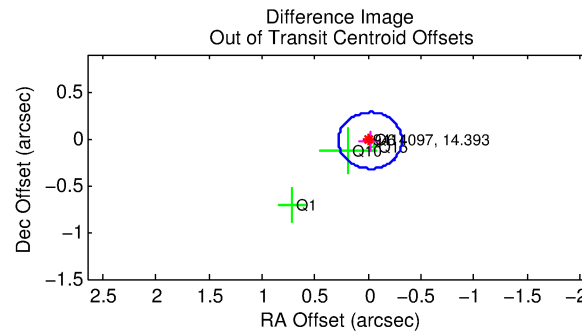
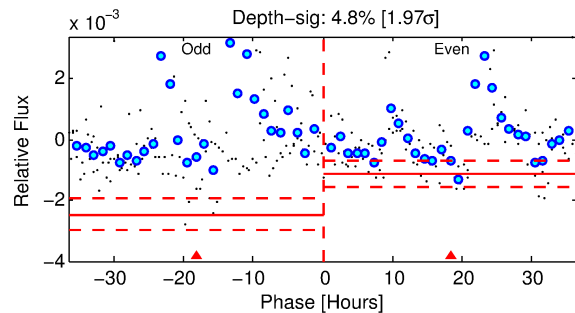
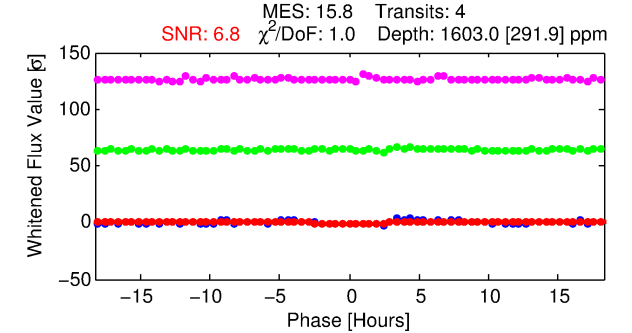
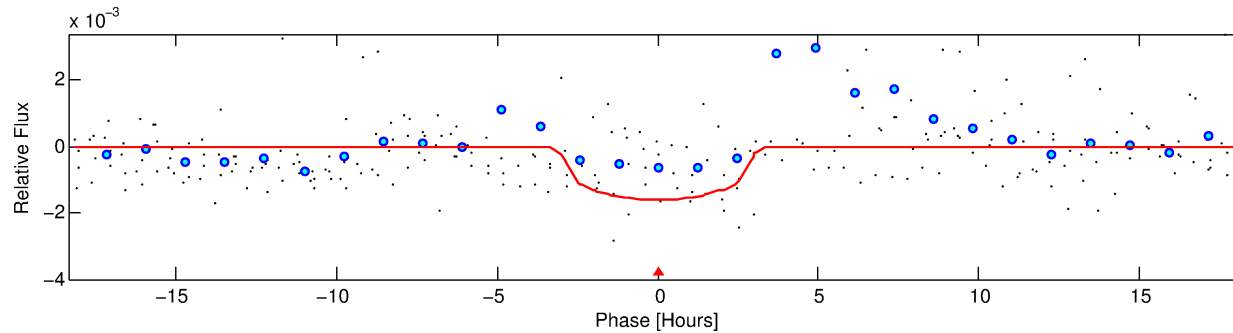
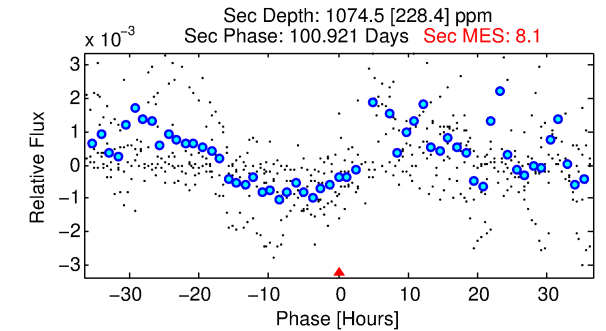
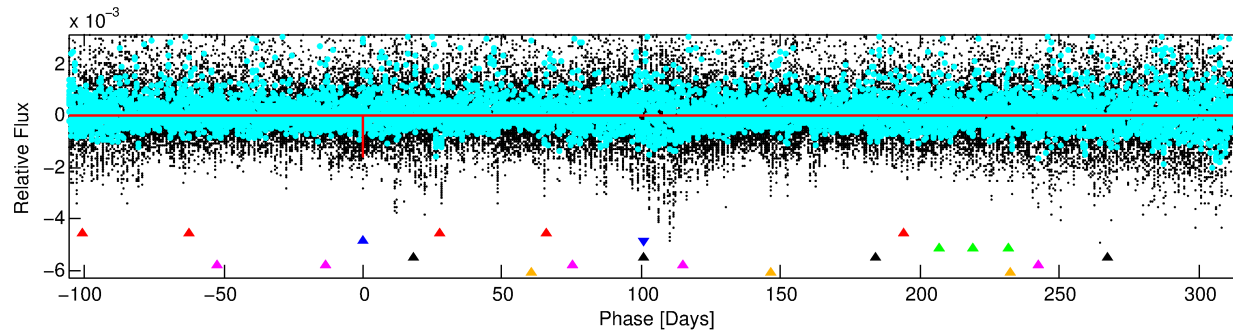
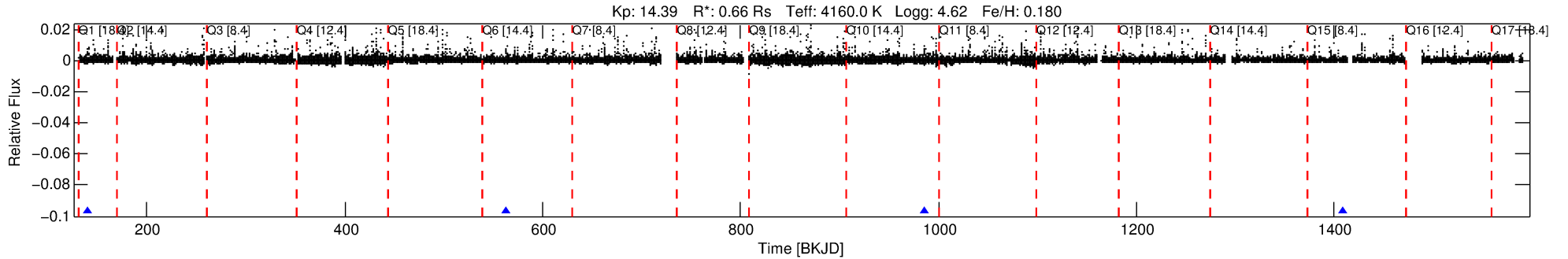
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009414097-02

No Significant Match Found

# DV One-Page Summary

KIC: 9414097 Candidate: 2 of 6 Period: 422.892 d



## DV Fit Results:

Period = 422.89171 [0.00435] d  
Epoch = 140.4645 [0.0090] BKJD  
Rp/R\* = 0.0373 [0.0386]  
a/R\* = 461.70 [1479.05]  
b = 0.56 [4.06]  
Seff = 0.13 [0.02]  
Teq = 152 [7] K  
Rp = 2.67 [2.77] Re  
a = 0.9565 [0.0682] AU  
Ag = 76071.21 [158513.09] [0.48σ]  
Teffp = 3900 [2035] K [1.84σ]

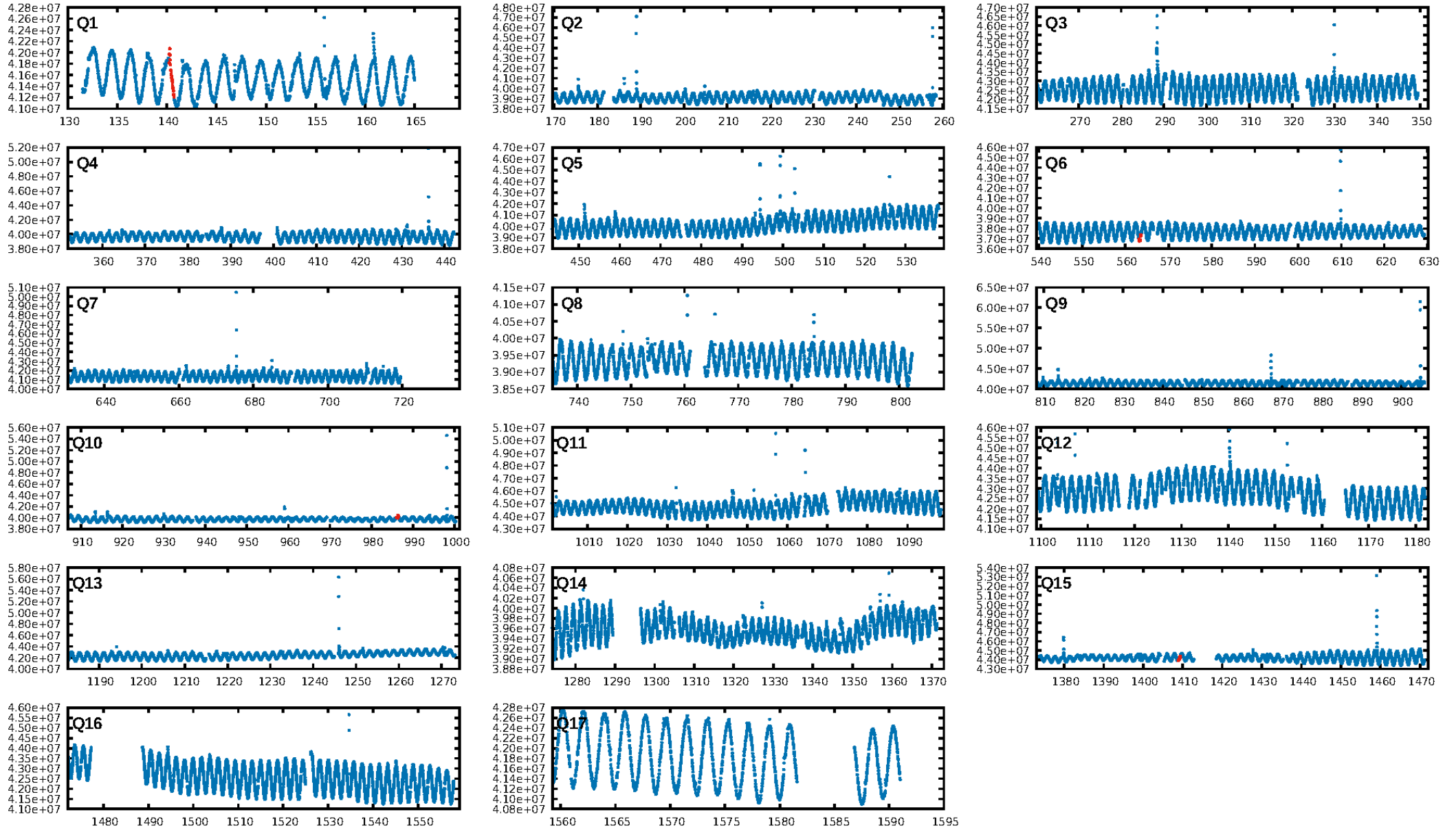
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [295.64σ]  
LongPeriod-sig: 100.0% [42.43σ]  
ModelChiSquare2-sig: 7.0%  
ModelChiSquareGof-sig: 99.2%  
Bootstrap-pfa: 5.18e-13  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 0.8434  
Centroid-sig: 29.4%  
Centroid-so: 0.203 arcsec [0.53σ]  
OotOffset-rm: 0.028 arcsec [0.28σ]  
KicOffset-rm: 0.111 arcsec [0.95σ]  
OotOffset-st: 2/1/0/1 [4]  
KicOffset-st: 2/1/0/1 [4]  
DiffImageQuality-fgm: 0.50 [2/4]  
DiffImageOverlap-fno: 1.00 [4/4]

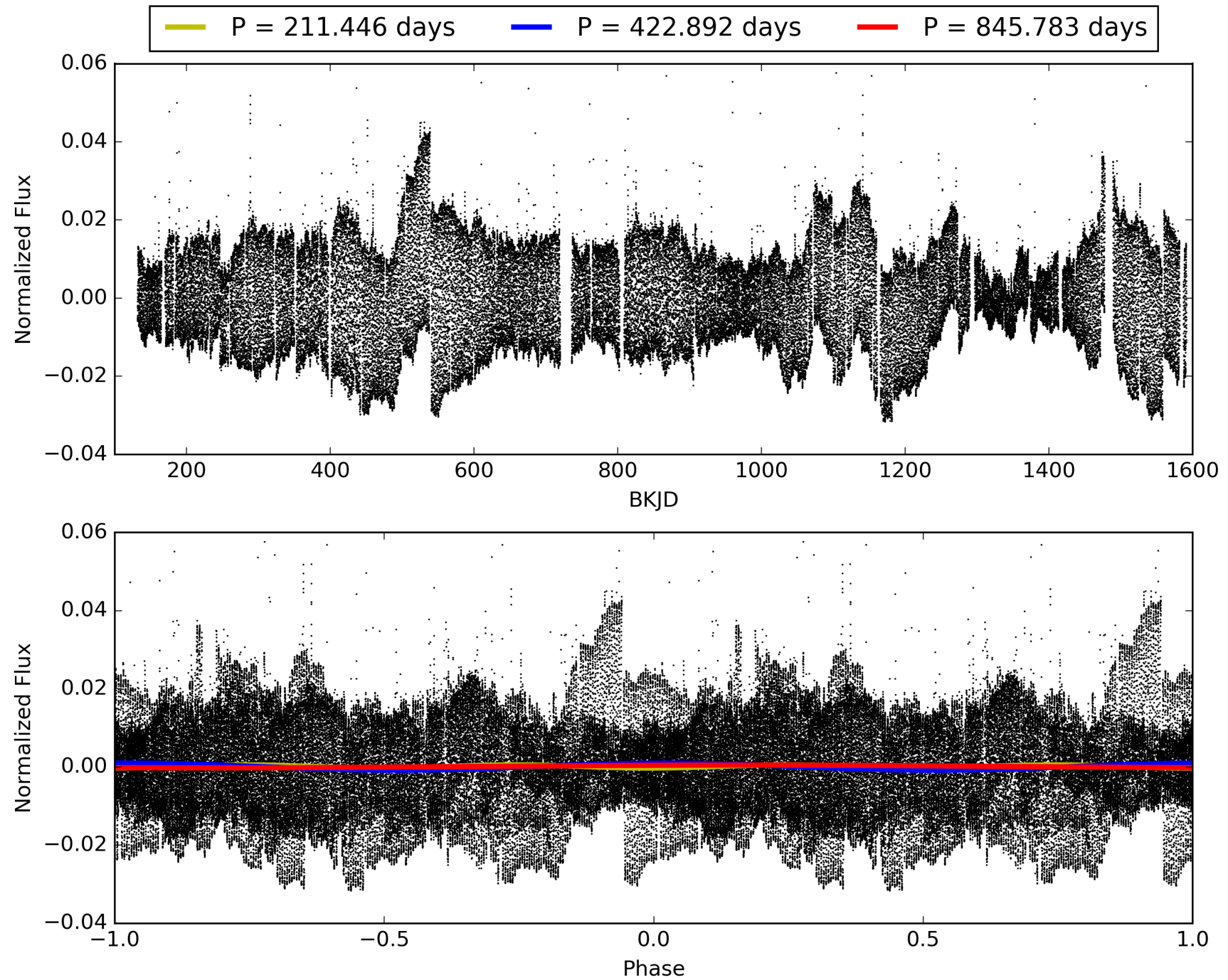
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 08:16:25 Z

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

# TCE 009414097-02, PDC Light Curves



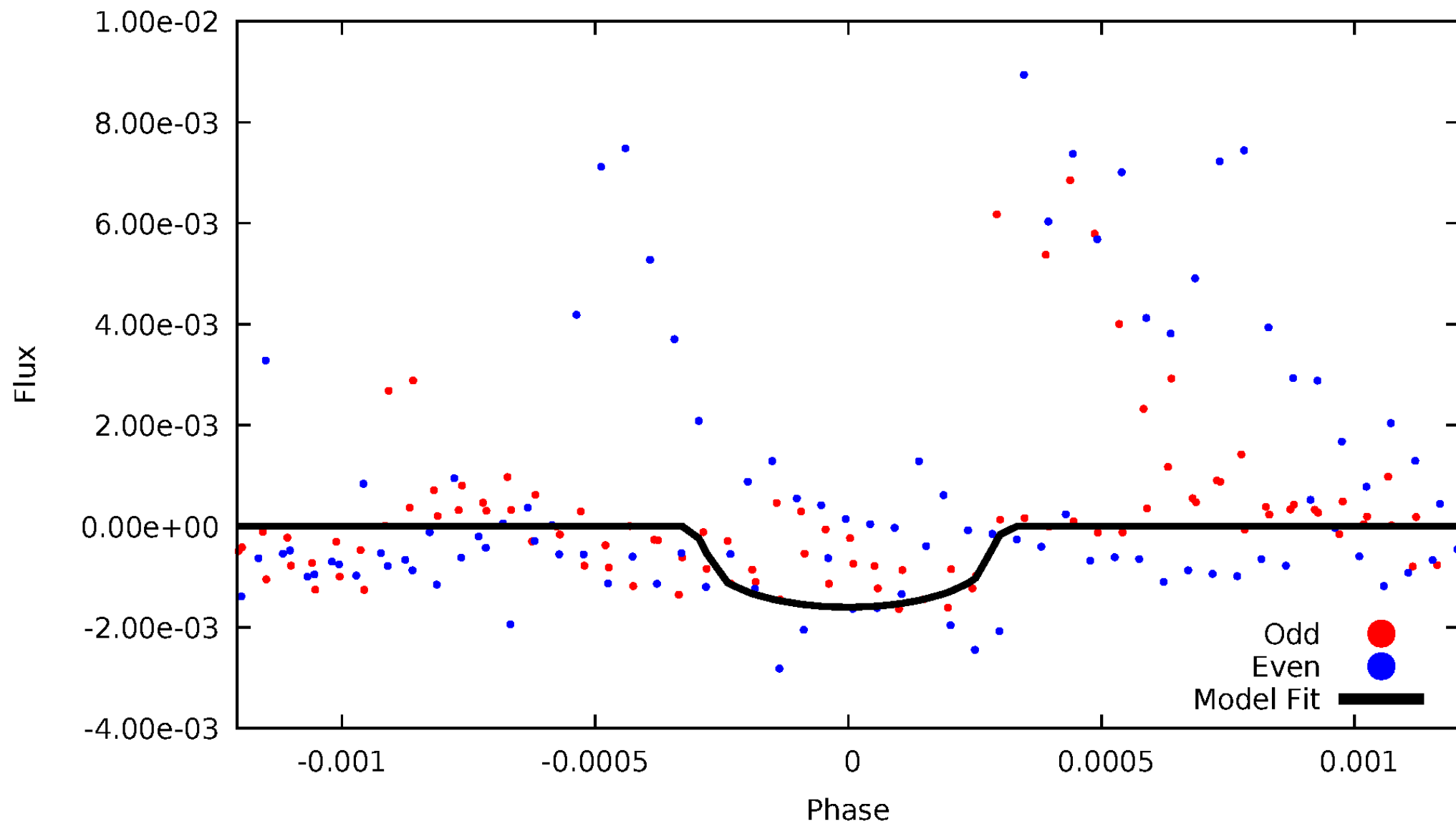
TCE 009414097-02





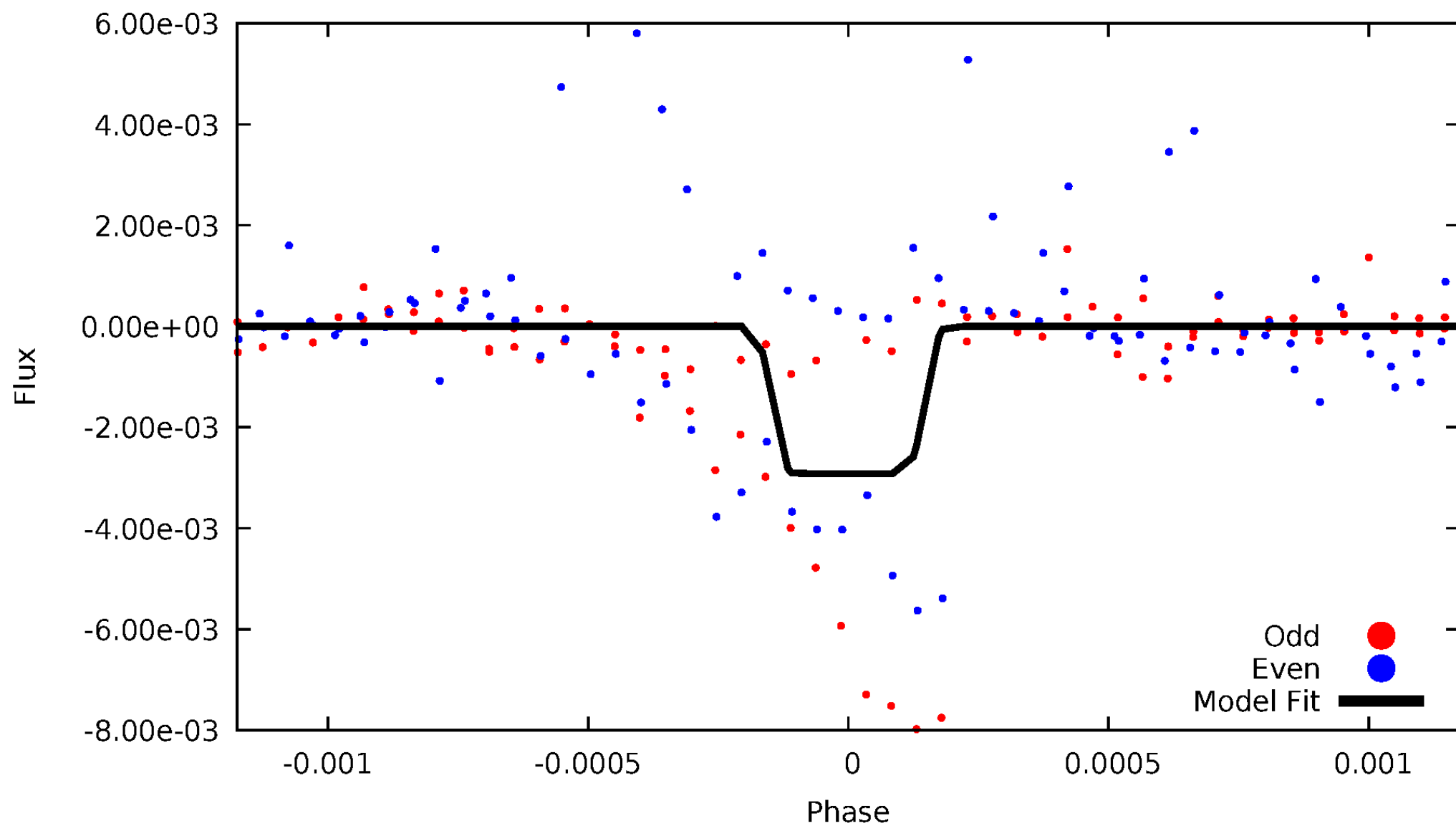
# DV Odd/Even

TCE 009414097-02



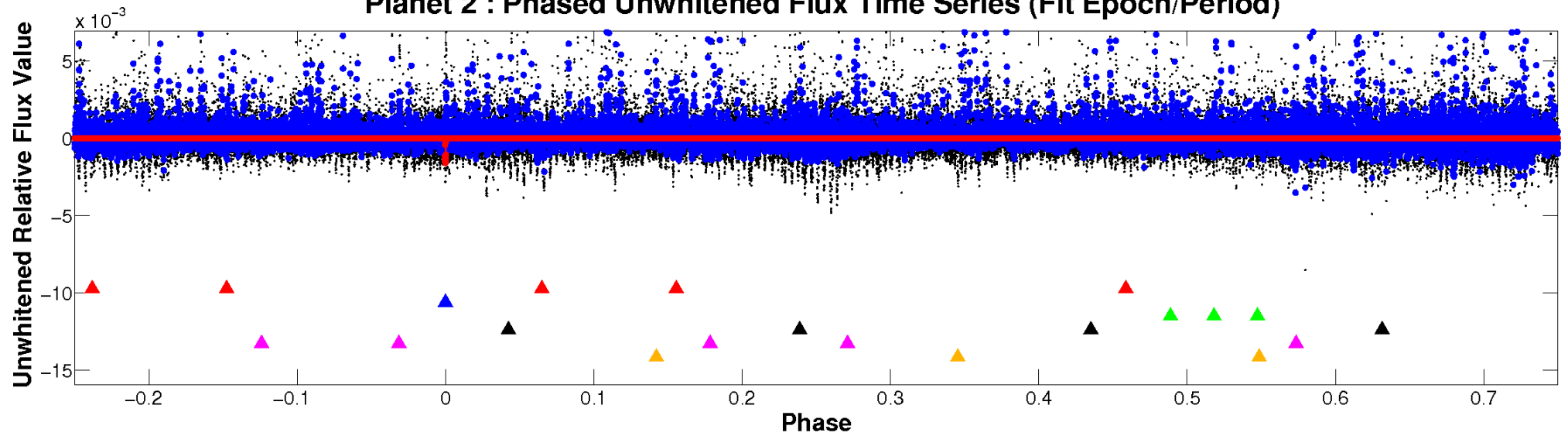
# ALT Odd/Even

TCE 009414097-02

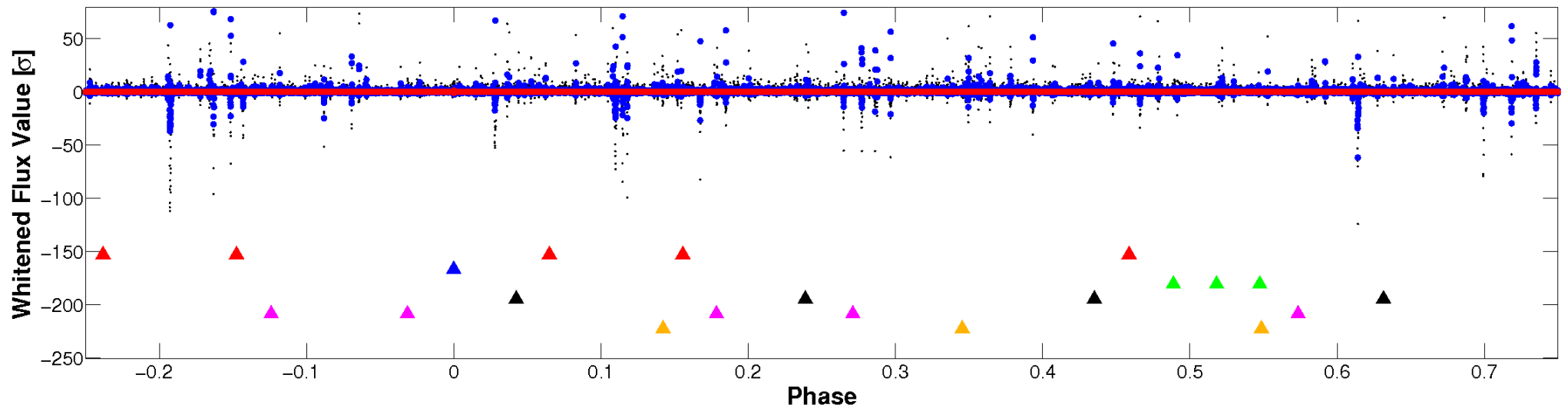


# Non-Whitened Vs. Whitened Light Curve

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

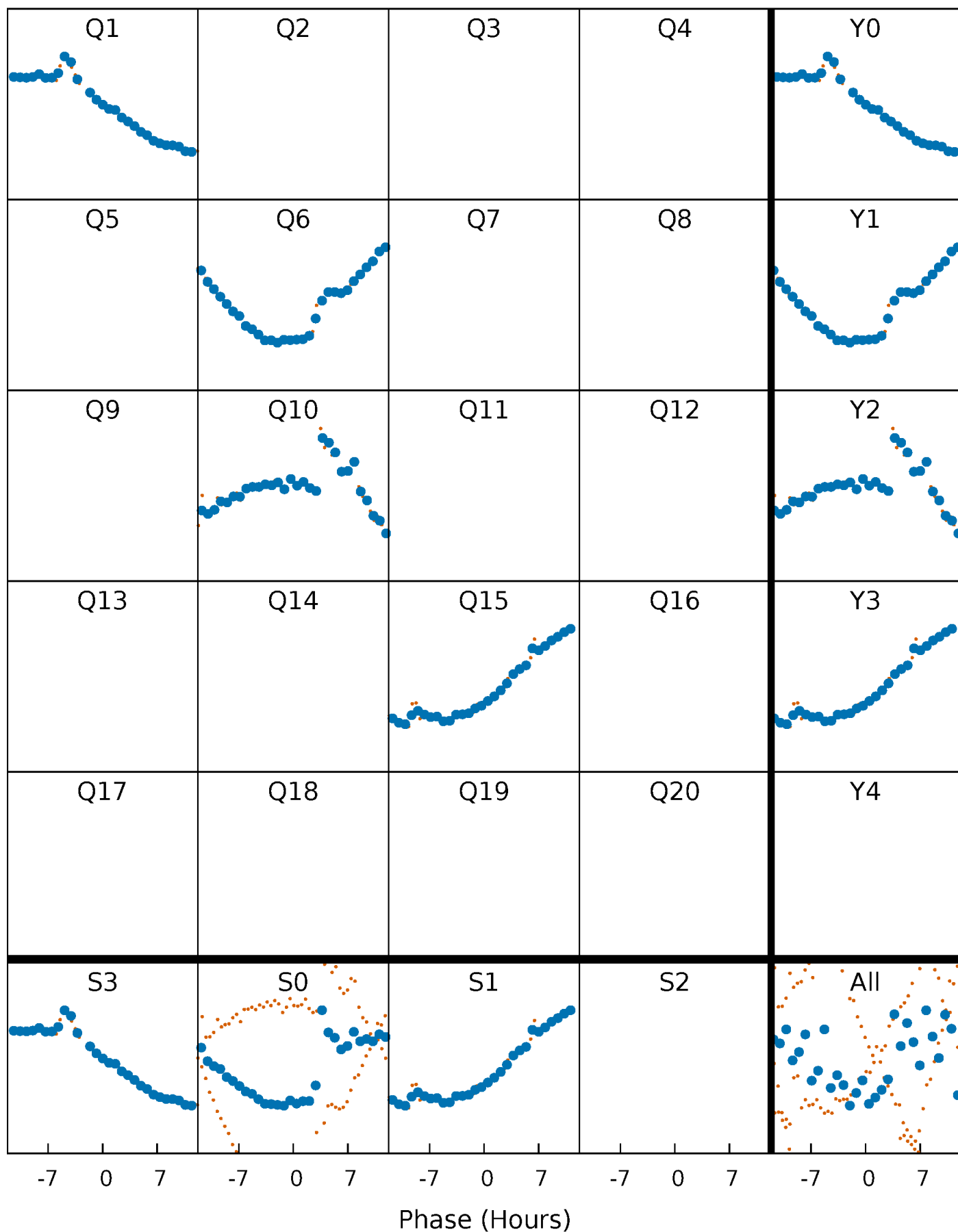


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



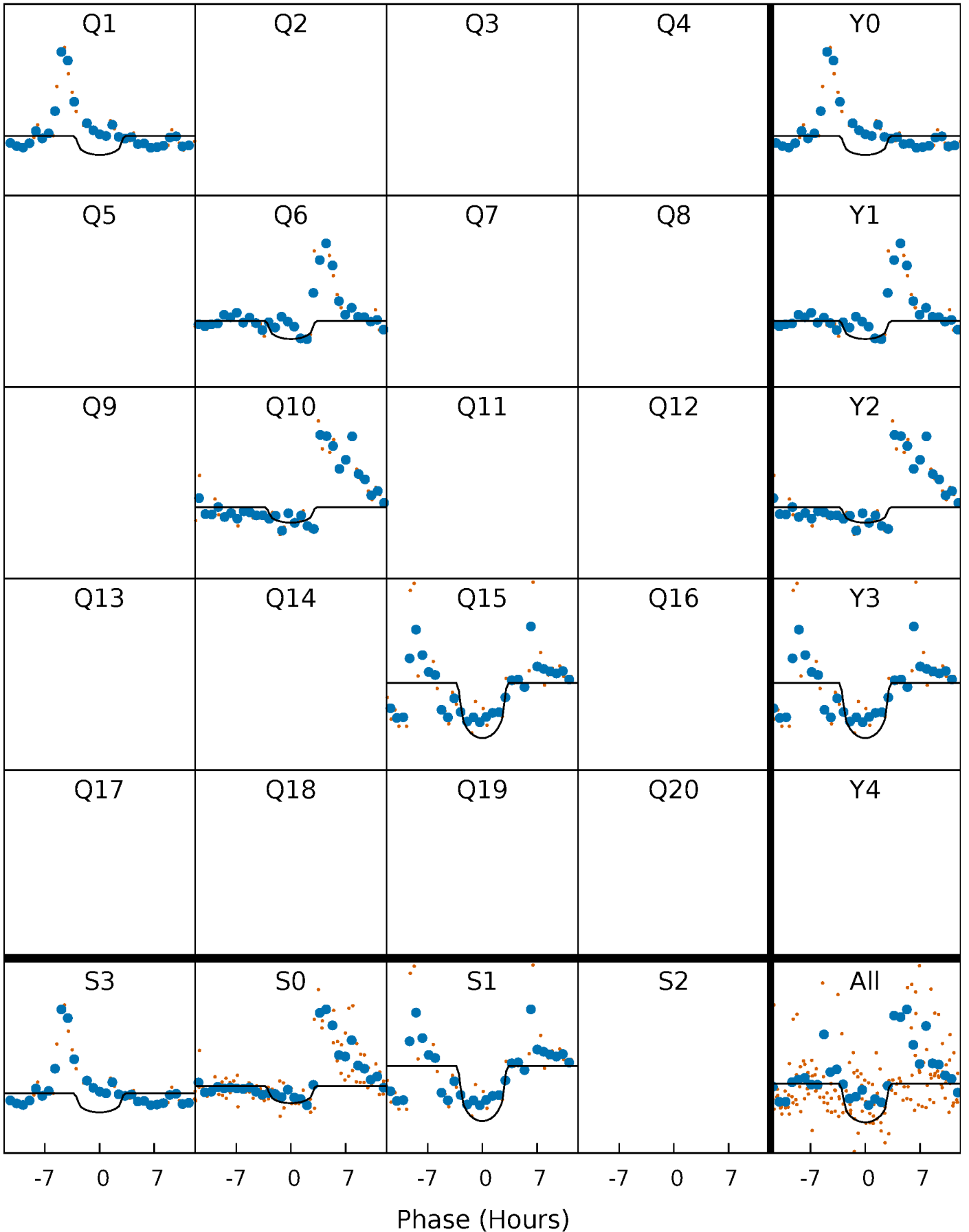
# PDC Quarter-Phased Transit Curves

TCE 009414097-02     $P=422.891713$  Days     $T_0=140.464474$  (BKJD)



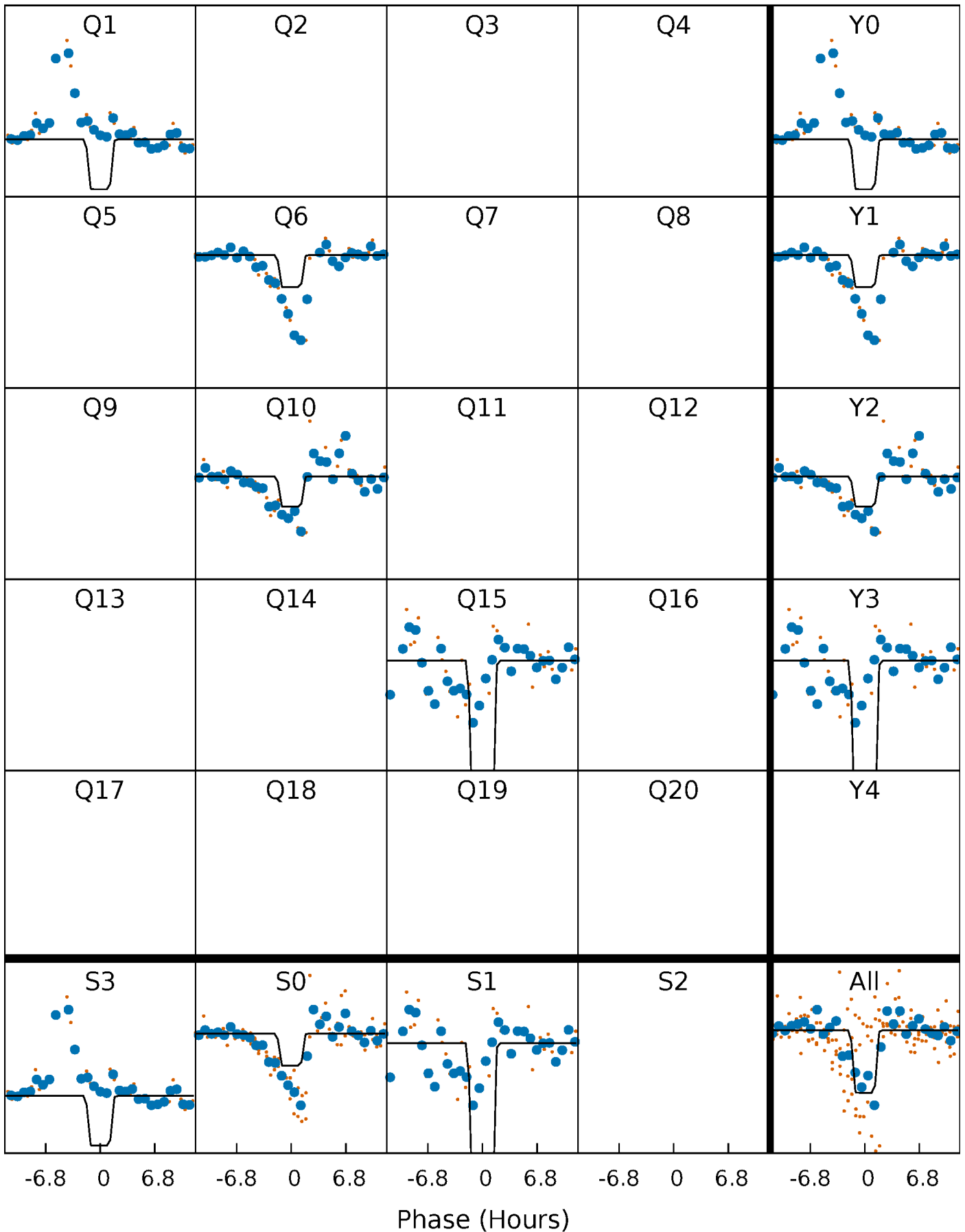
# DV Quarter-Phased Transit Curves

TCE 009414097-02     $P=422.891713$  Days     $T_0=140.464474$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

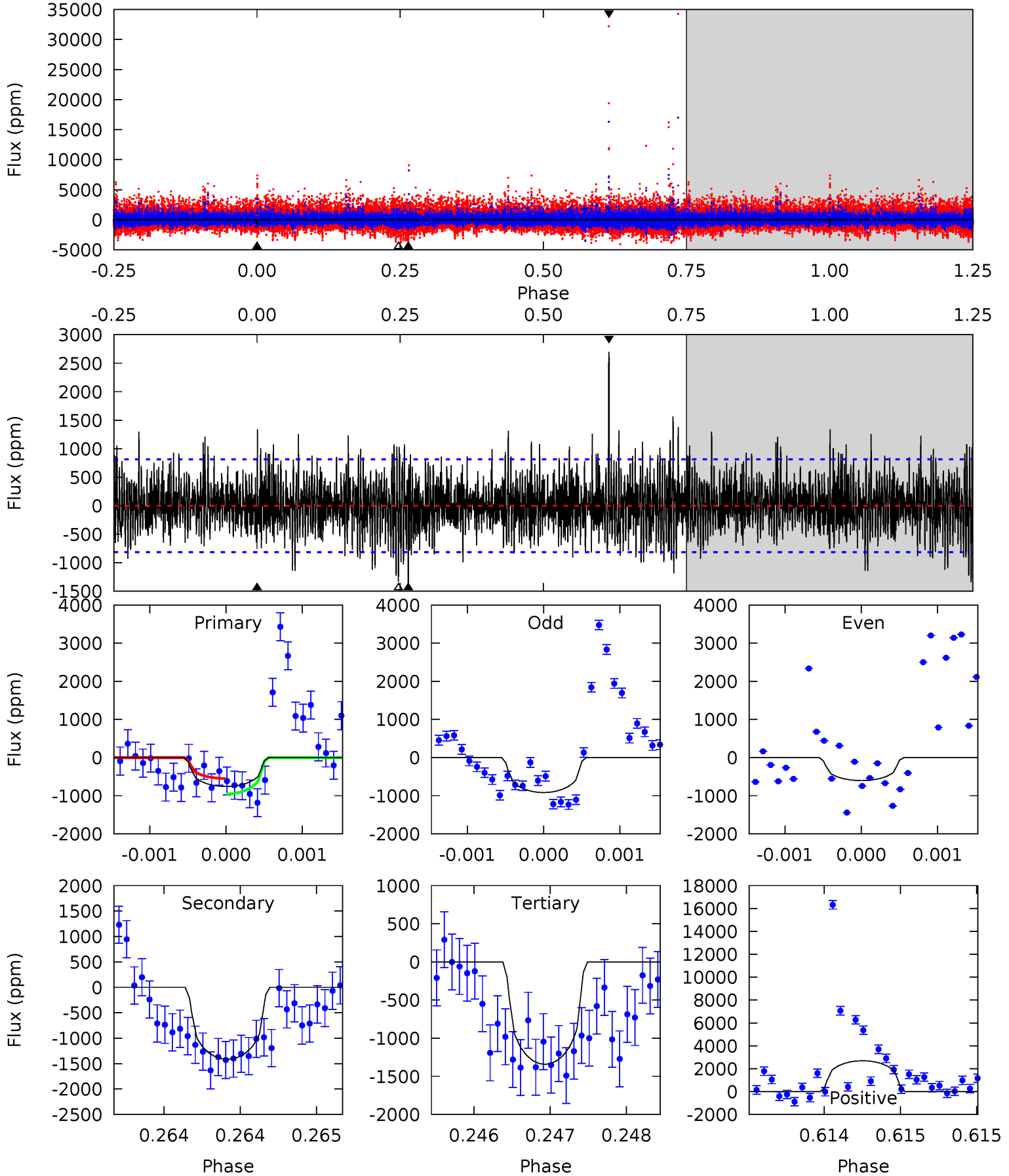
TCE 009414097-02 P=422.913391 Days  $T_0=140.470646$  (BKJD)



# DV Model-Shift Uniqueness Test

009414097-02, P = 422.891713 Days, E = 140.464474 Days

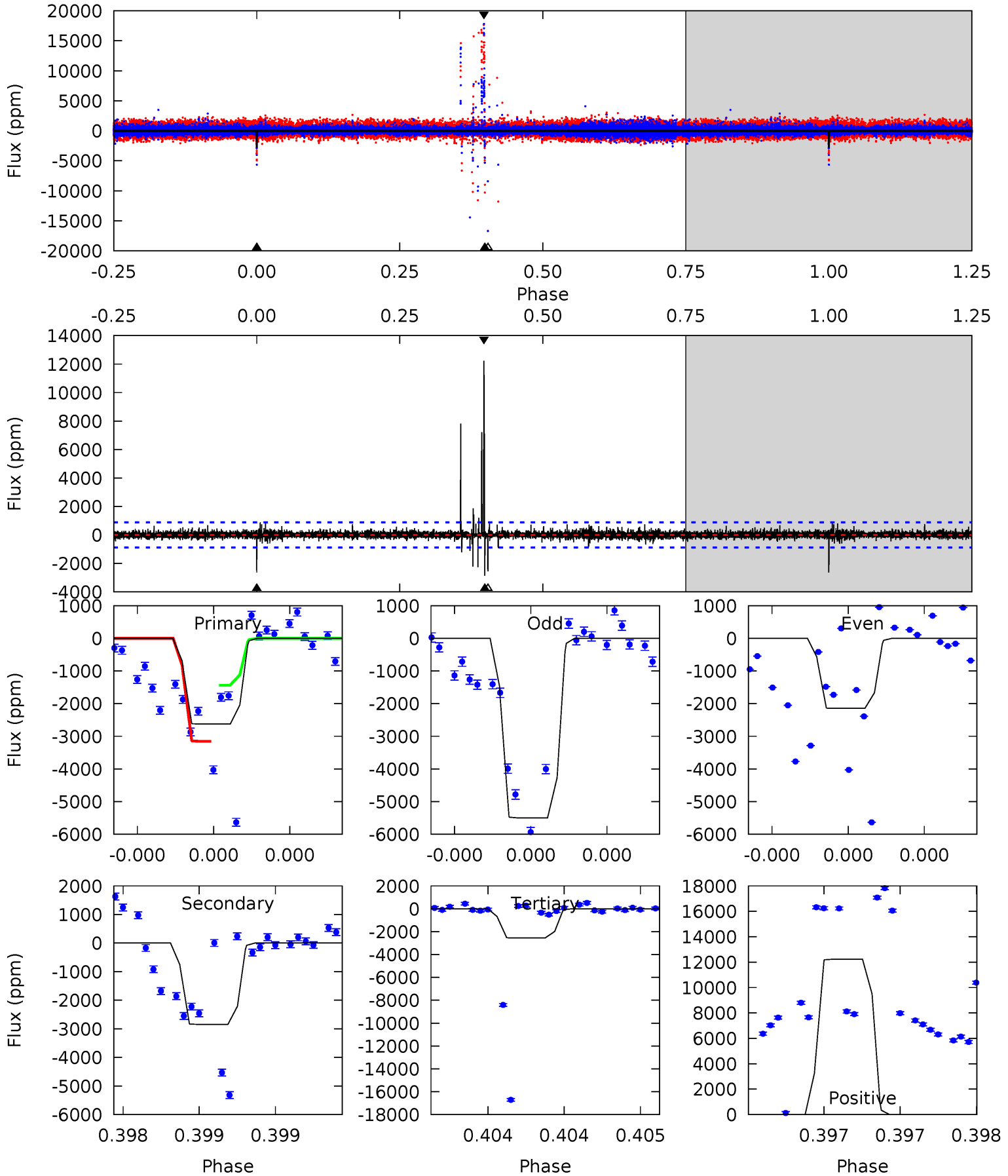
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.15	9.61	9.12	18.3	5.54	3.43	2.53	-3.97	-13.2	0.49	-8.72	0.40	0.83	0.66	1.38



# Alt Model-Shift Uniqueness Test

009414097-02, P = 422.913391 Days, E = 140.470646 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.7	18.1	16.2	77.8	5.62	3.55	2.10	0.50	-61.1	1.89	-59.7	4.47	1.10	0.81	5.43





### Stellar Parameters For KIC 009414097

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4160^{+130}_{-158}$	$4.620^{+0.052}_{-0.016}$	$0.180^{+0.200}_{-0.300}$	$0.655^{+0.031}_{-0.058}$	$0.651^{+0.044}_{-0.058}$	$3.267^{+0.808}_{-0.260}$
	+3%/-4%	+1%/-0%	+111%/-167%	+5%/-9%	+7%/-9%	+25%/-8%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009414097-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-1414 \pm 147$	$3.20^{+2.56}_{-2.00}$	$210^{+7}_{-8}$	$3880^{+2024}_{-663}$	$70638^{+425974}_{-48593}$
Alt.	$-2845 \pm 157$	$4.08^{+2.67}_{-2.52}$	$210^{+8}_{-8}$	$4036^{+1918}_{-658}$	$85686^{+469323}_{-54858}$

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

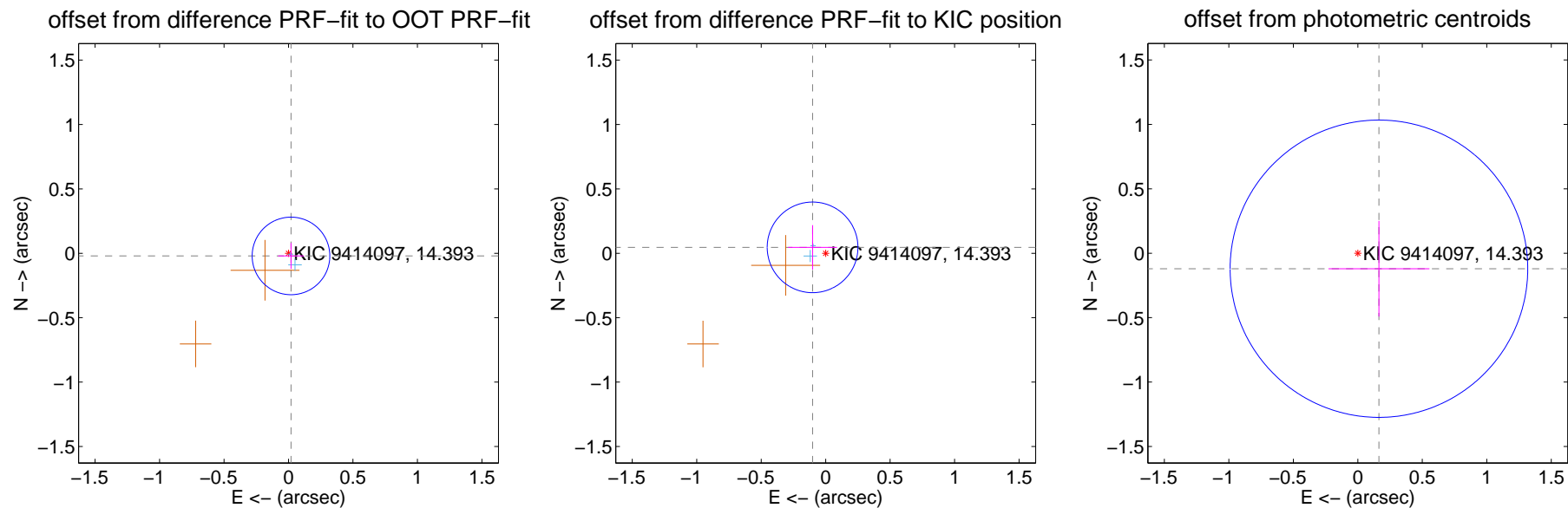
## DV Centroid Data

Supplemental centroid analysis for 009414097-02. Kepler magnitude: 14.39. Transit SNR 6.77

There are 2 quarters with good PRF difference image offsets

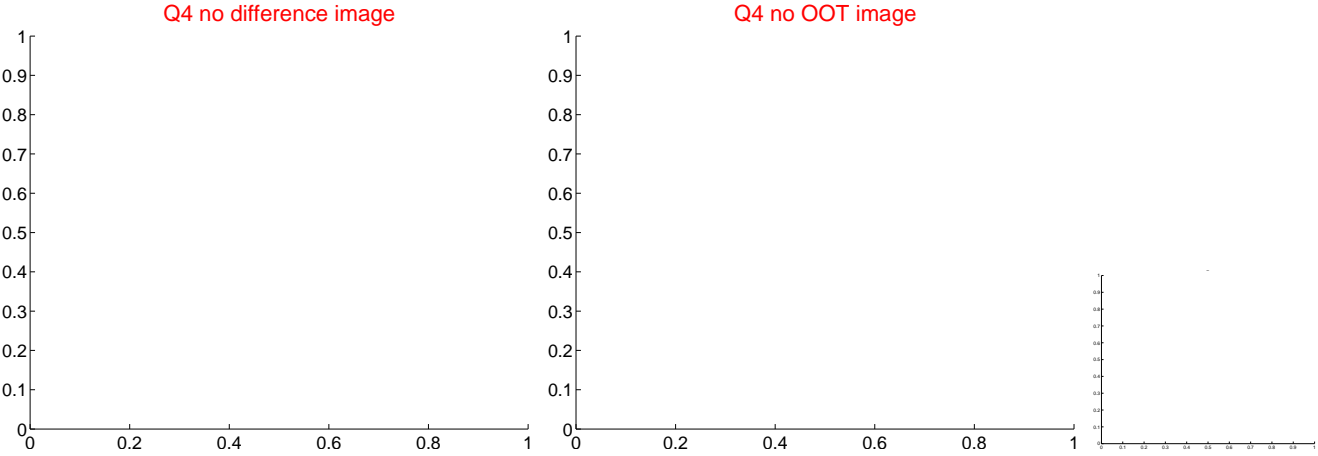
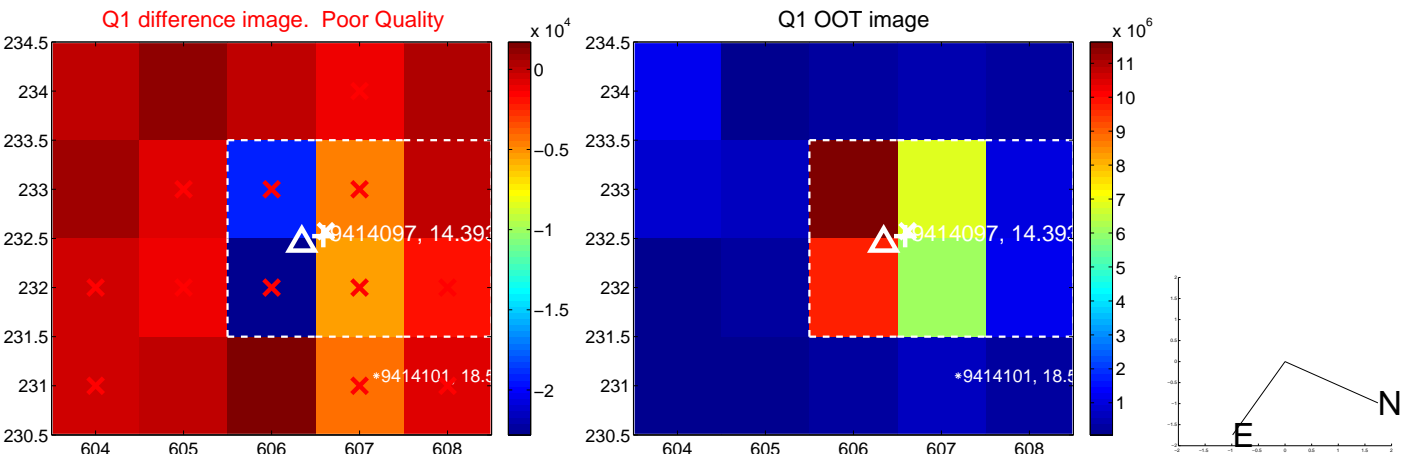
The direct PRF centroid is offset from the target star catalog position by about 0.18 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.028 \pm 0.100$	0.28	$-0.019 \pm 0.100$	$-0.021 \pm 0.101$
PRF-fit source offset from KIC position	$0.111 \pm 0.117$	0.95	$0.102 \pm 0.189$	$0.046 \pm 0.172$
photometric centroid source offset	$0.20 \pm 0.38$	0.53	$-0.16 \pm 0.39$	$-0.12 \pm 0.37$

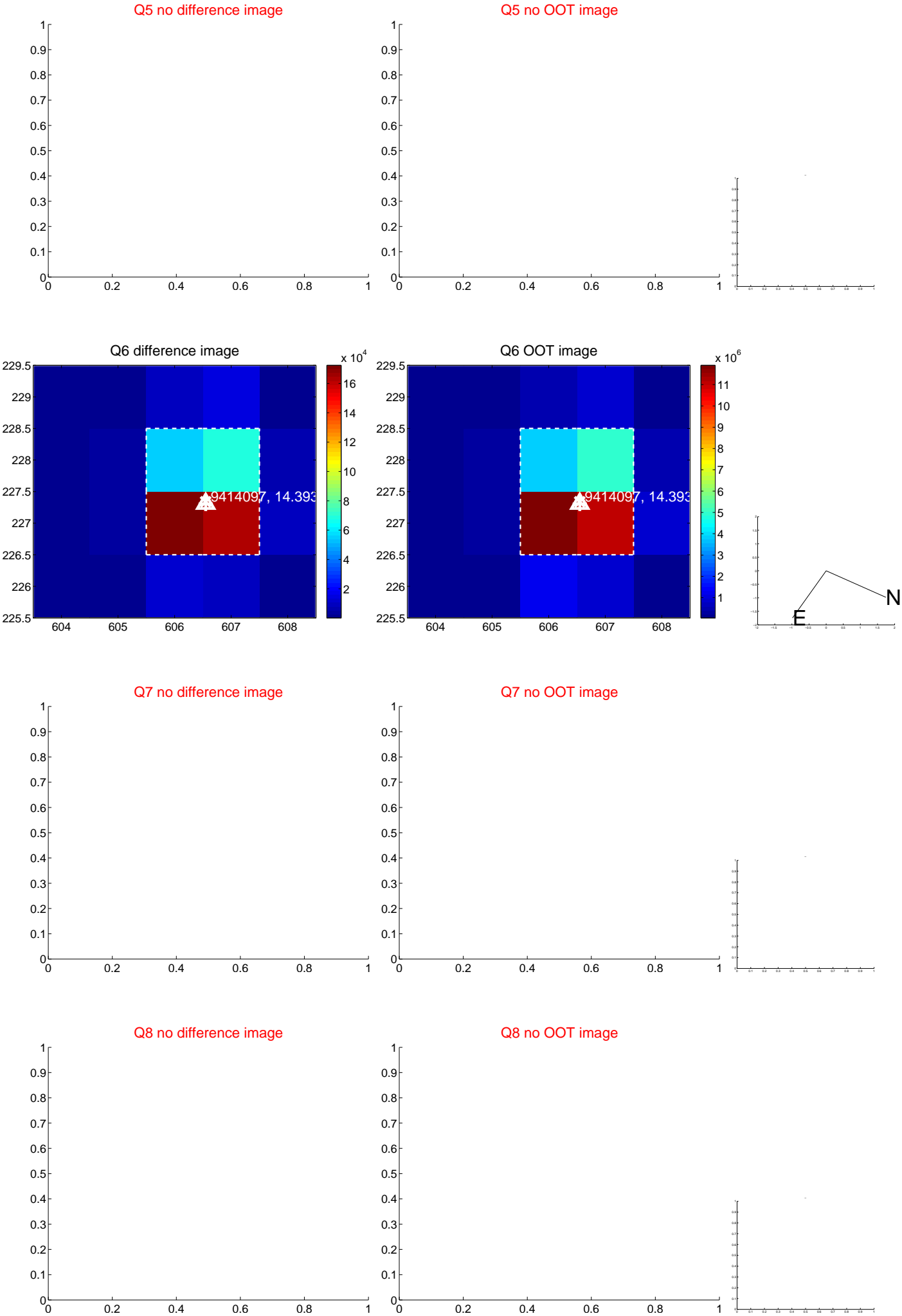


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

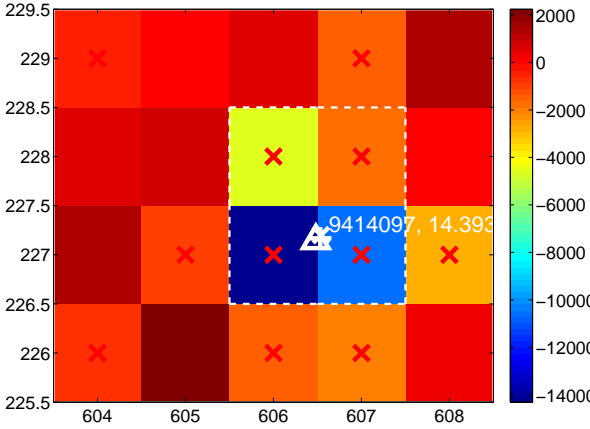
Q9 no difference image



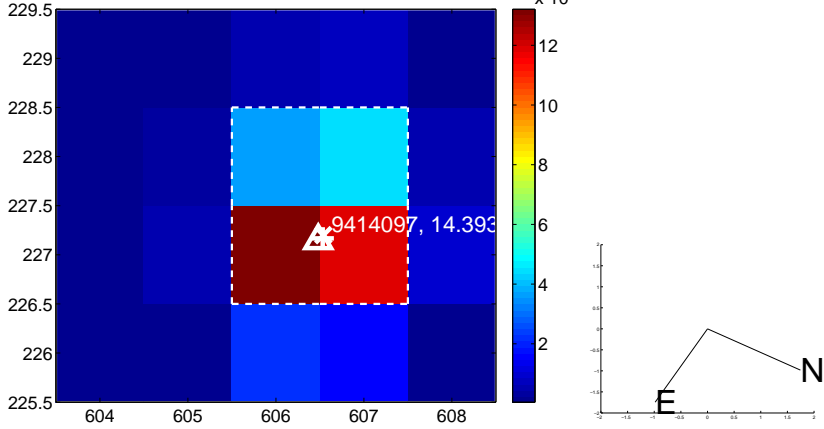
Q9 no OOT image



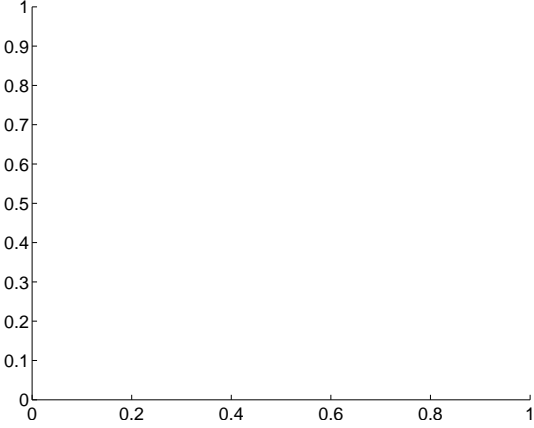
Q10 difference image. Poor Quality



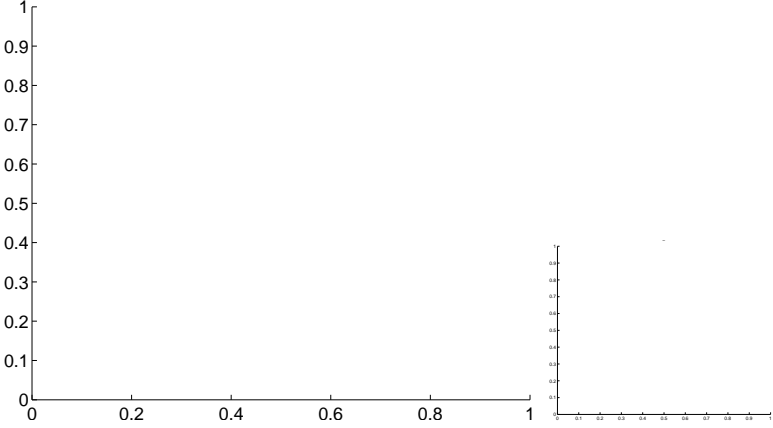
Q10 OOT image



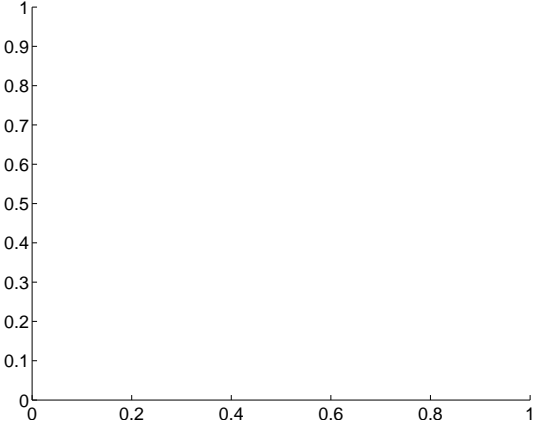
Q11 no difference image



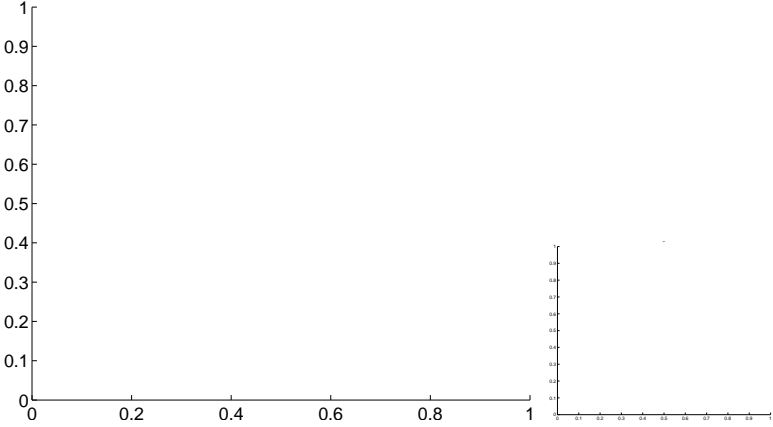
Q11 no OOT image



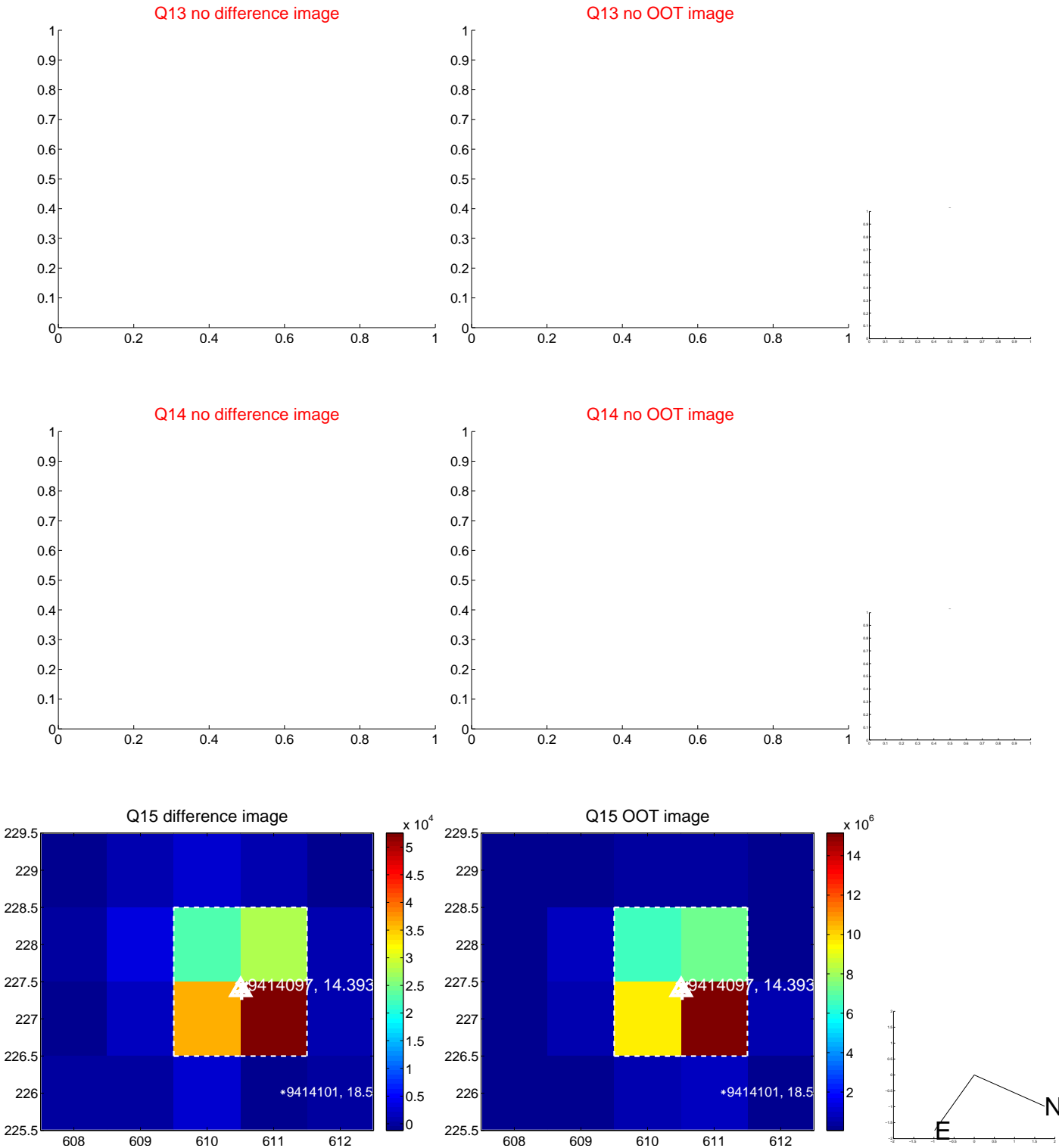
Q12 no difference image



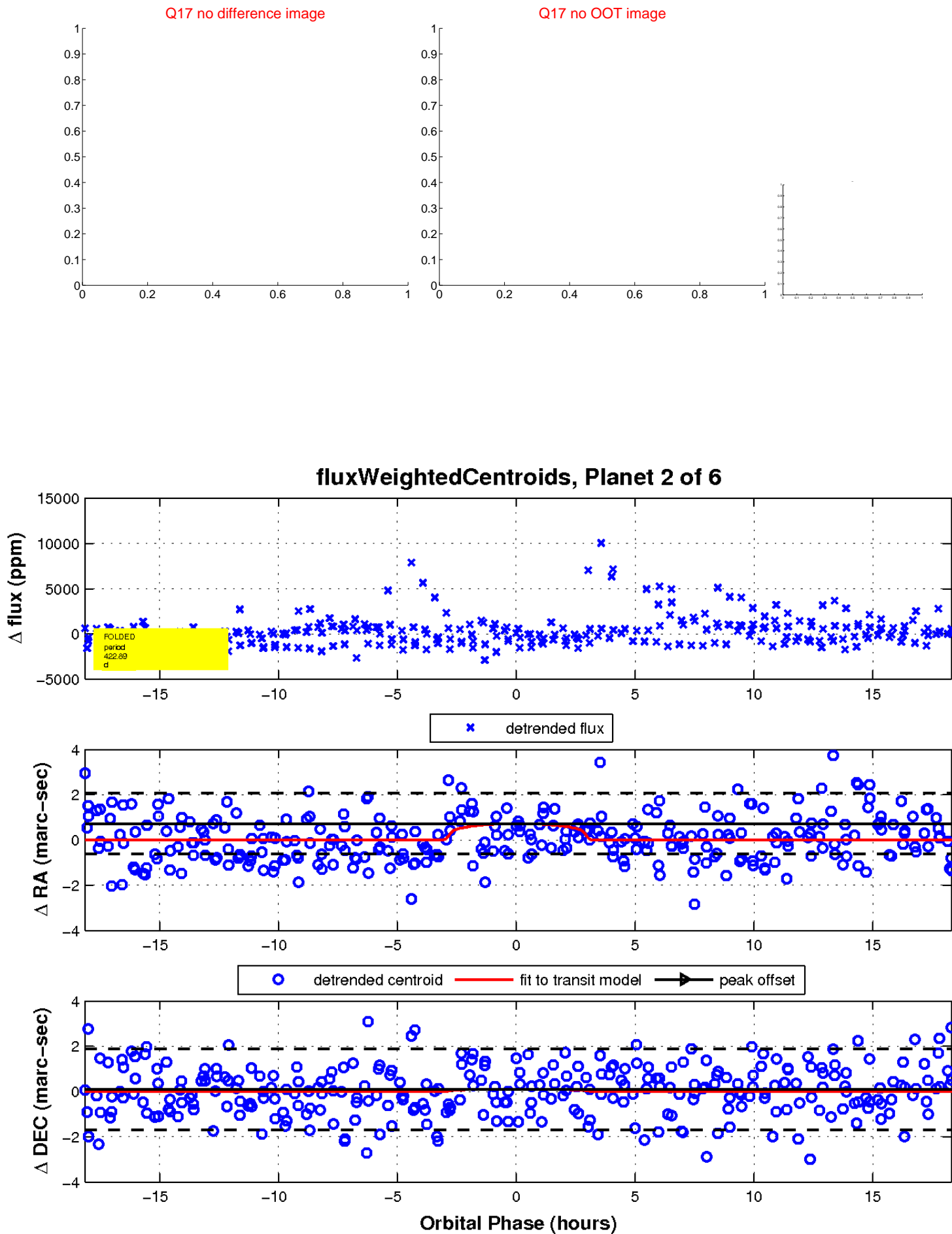
Q12 no OOT image



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

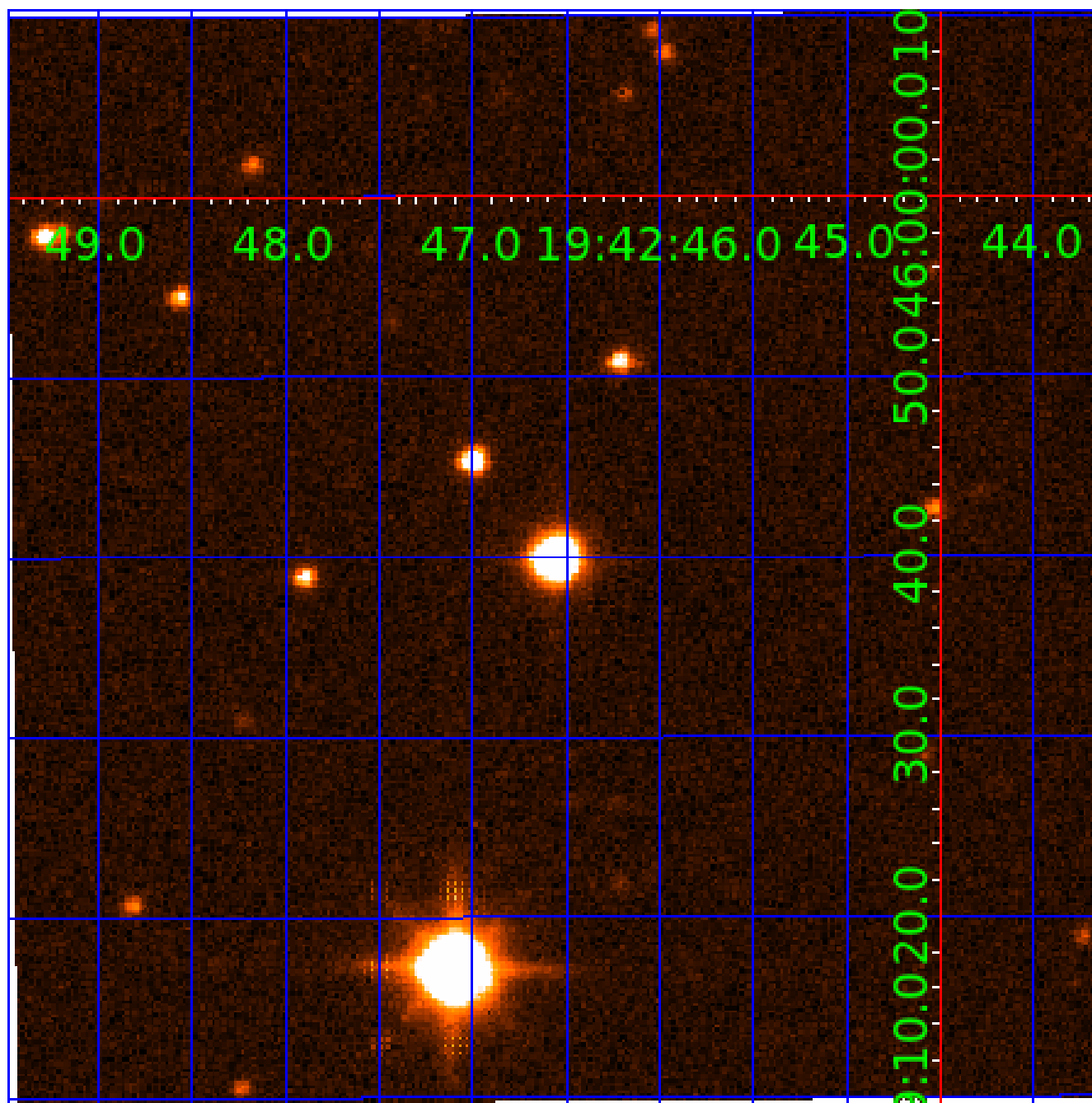


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 009414097

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009414097-01	OBS	No	294.702973	167.939340	1372.1	3.034	16.7	6.2	0.66	4160	2.32	0.20
009414097-02	OBS	No	422.891713	140.464474	1603.0	6.125	15.8	6.8	0.66	4160	2.67	0.13
009414097-03	OBS	No	435.288269	347.188540	214.3	3.412	15.6	0.9	0.66	4160	1.02	0.12
009414097-04	OBS	No	339.852661	407.529539	1335.5	2.815	15.2	6.0	0.66	4160	2.36	0.17
009414097-06	OBS	No	508.823294	200.602379	2553.4	9.574	15.1	7.6	0.66	4160	3.44	0.10

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009414097-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009414097-02	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—CENT_FEW_DIFFS
009414097-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_POS_ALT—CENT_FEW_DIFFS
009414097-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—HALO_GHOST
009414097-06	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—CENT_FEW_DIFFS

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

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

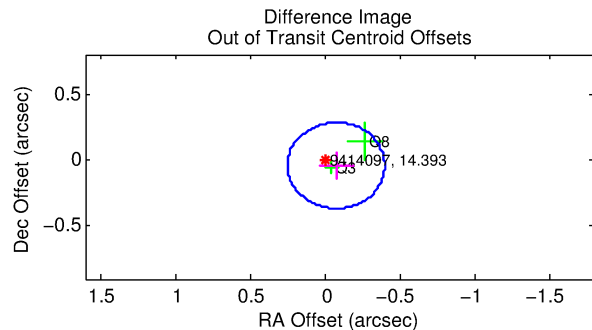
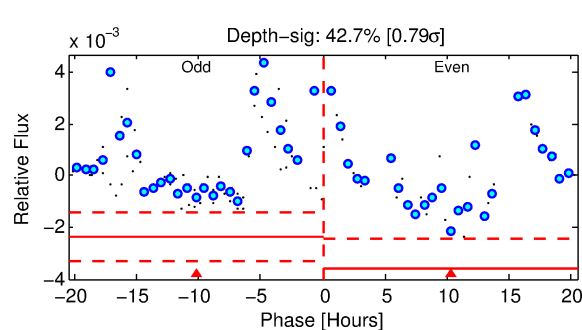
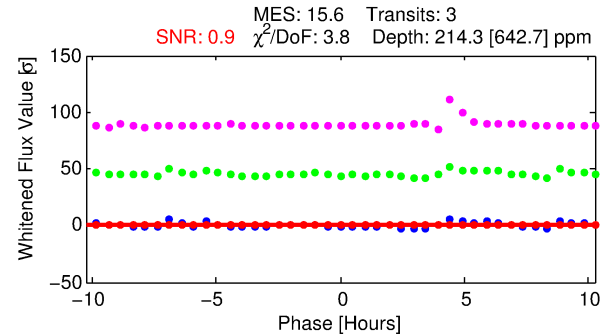
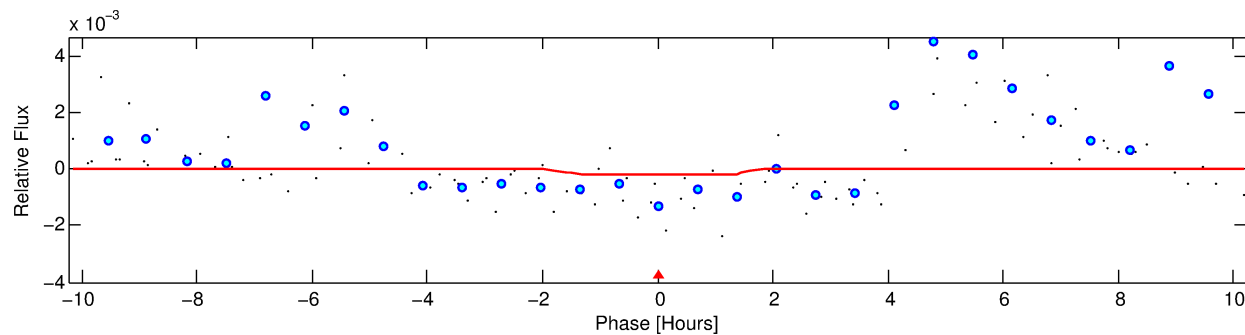
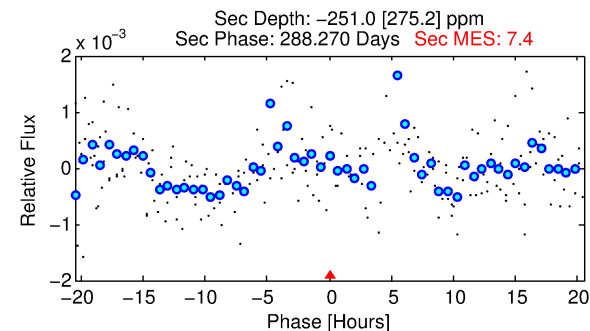
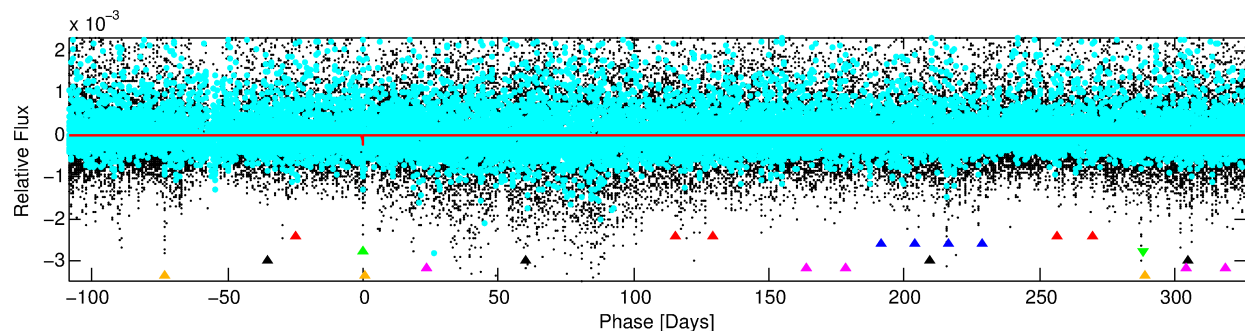
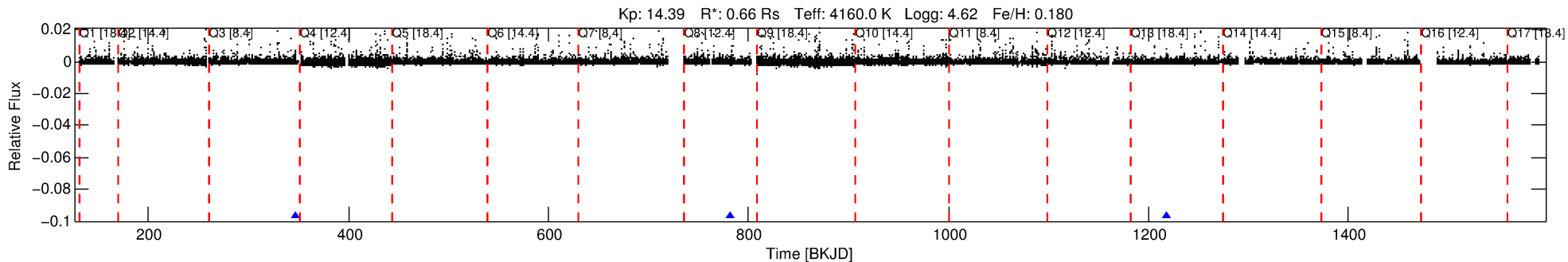
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009414097-03

No Significant Match Found

# DV One-Page Summary

KIC: 9414097 Candidate: 3 of 6 Period: 435.288 d



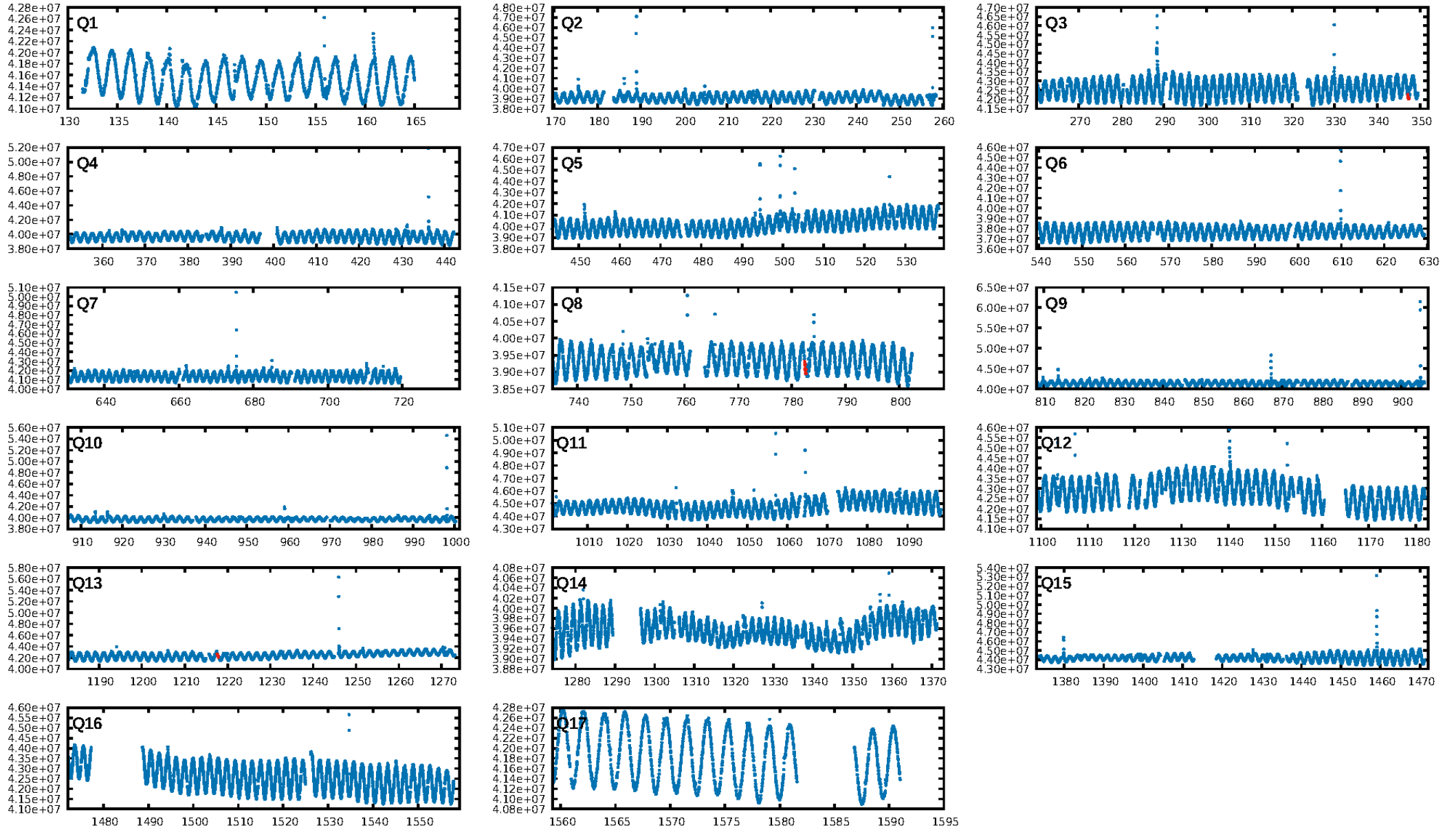
## DV Fit Results:

Period = 435.28827 [0.08098] d  
Epoch = 347.1885 [0.1132] BKJD  
Rp/R\* = 0.0143 [0.2149]  
a/R\* = 719.55 [34646.19]  
b = 0.70 [36.47]  
Seff = 0.12 [0.02]  
Teq = 150 [7] K  
Rp = 1.02 [15.36] Re  
a = 0.9751 [0.0695] AU  
Ag = N/A  
Teffp = N/A

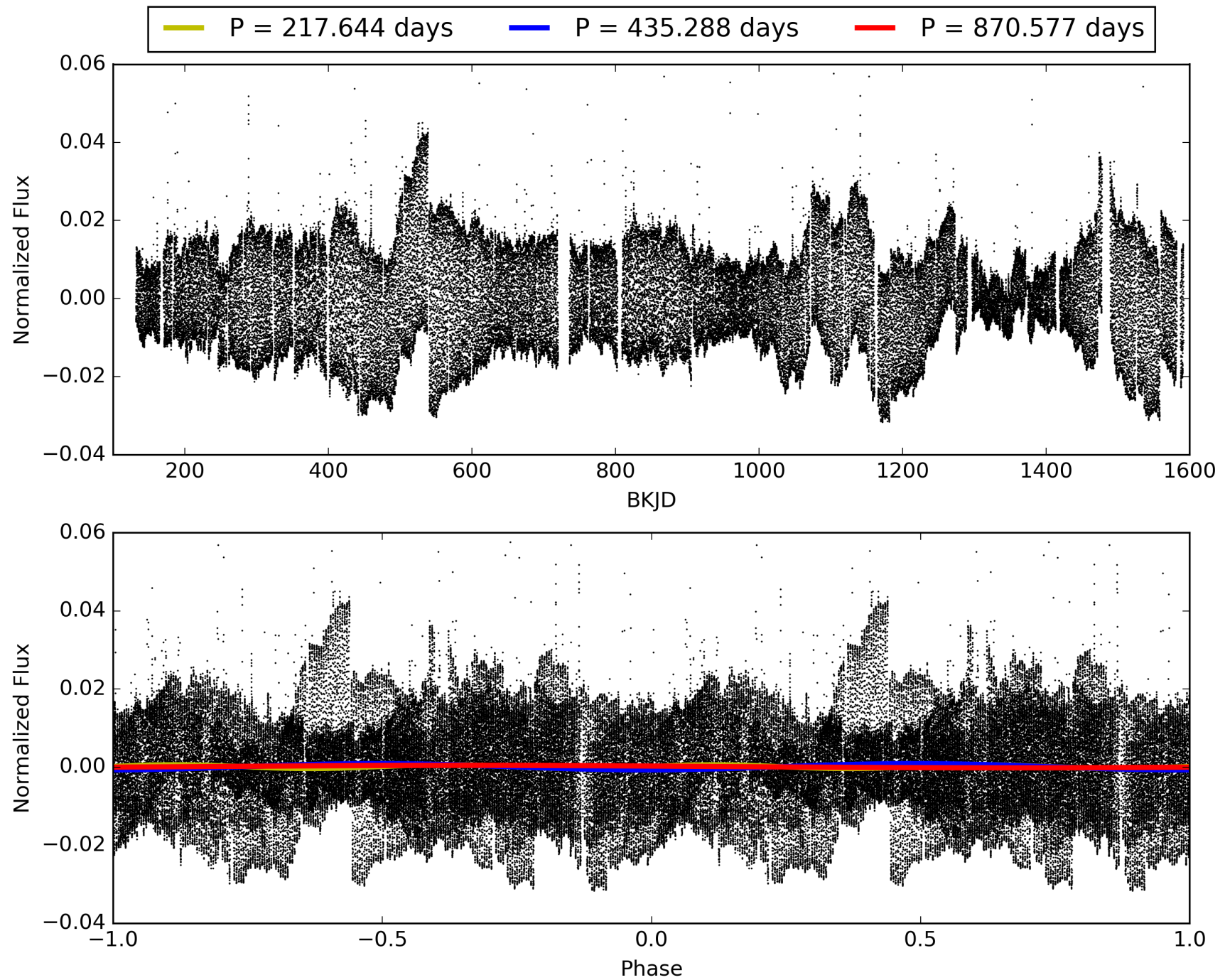
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [42.43σ]  
LongPeriod-sig: 100.0% [173.64σ]  
ModelChiSquare2-sig: 44.8%  
ModelChiSquareGof-sig: 29.9%  
**Bootstrap-pfa: 1.28e-12**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 2.035  
Centroid-sig: 7.8%  
Centroid-so: 5.817 arcsec [1.30σ]  
OotOffset-rm: 0.087 arcsec [0.80σ]  
KicOffset-rm: 0.142 arcsec [1.55σ]  
OotOffset-st: 0/1/1/0 [2]  
KicOffset-st: 0/1/1/0 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 1.00 [2/2]

# TCE 009414097-03, PDC Light Curves

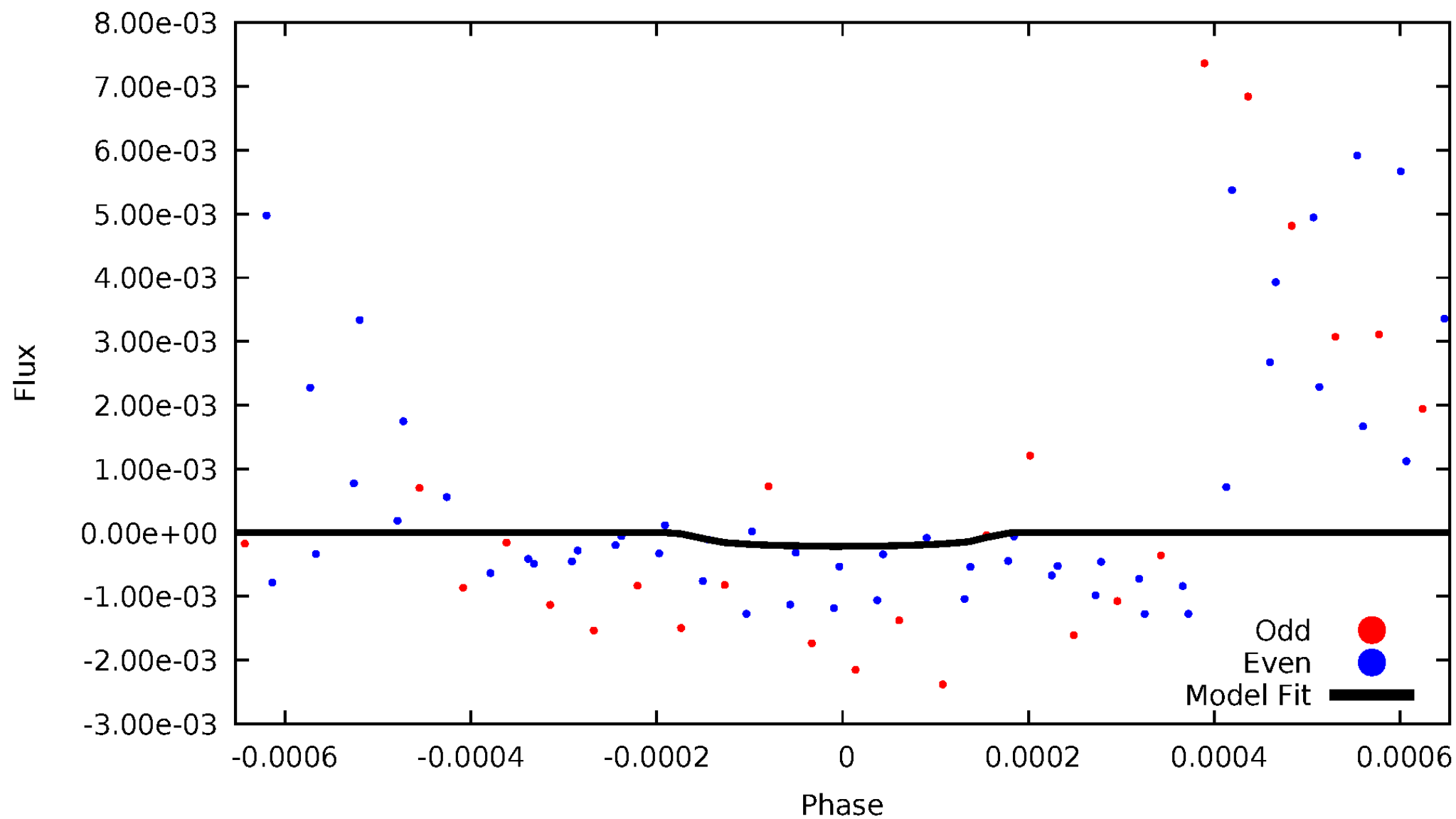


# TCE 009414097-03



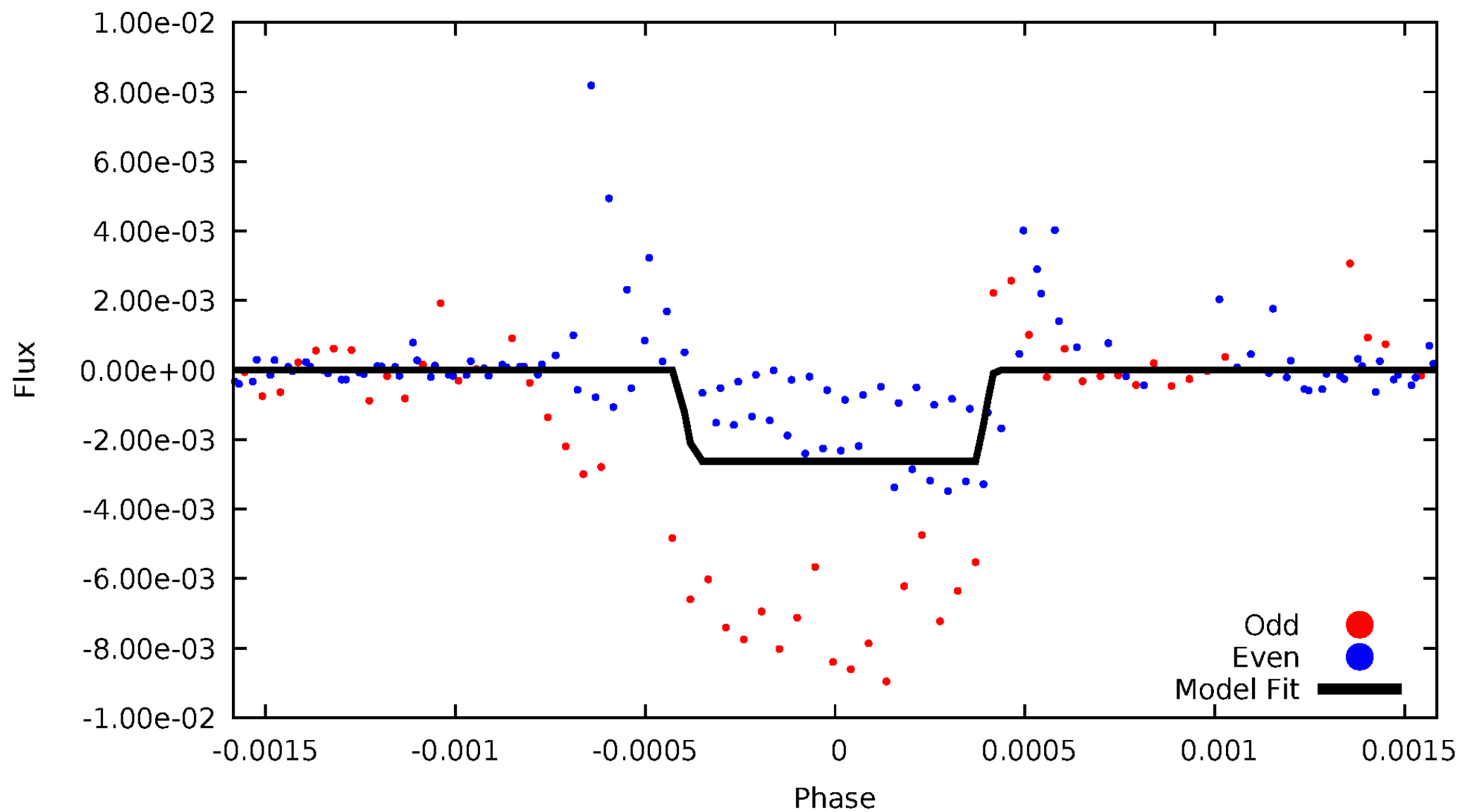
# DV Odd/Even

TCE 009414097-03



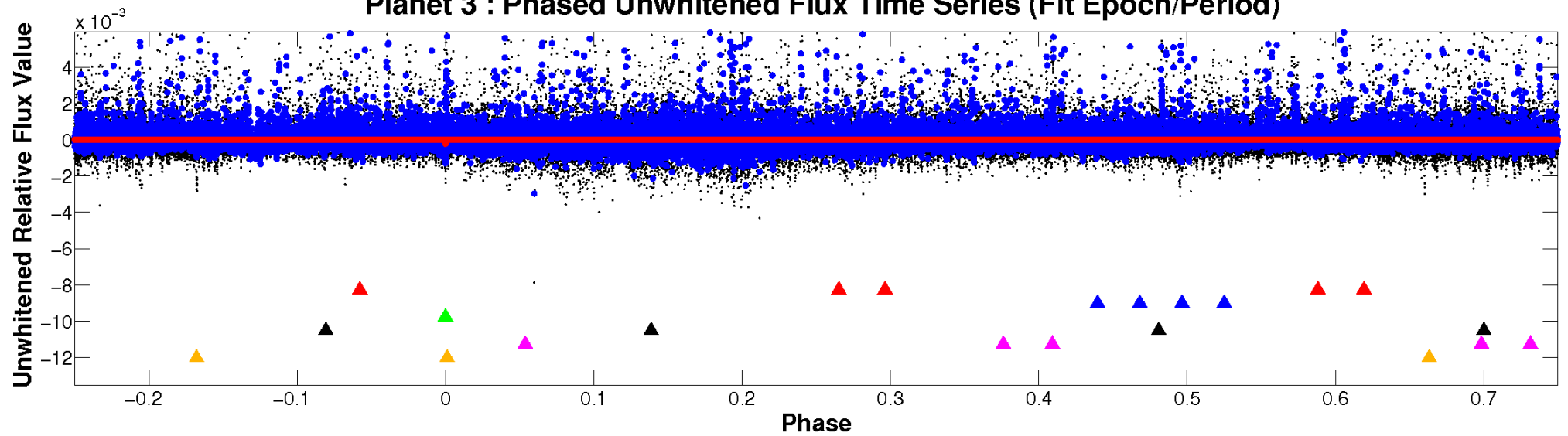
# ALT Odd/Even

TCE 009414097-03

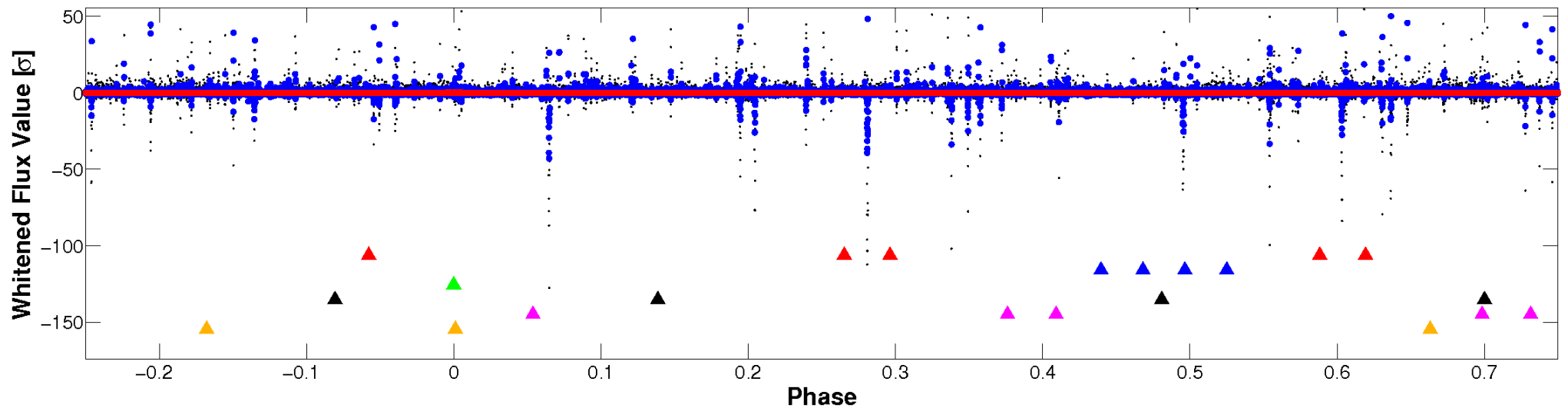


# Non-Whitened Vs. Whitened Light Curve

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

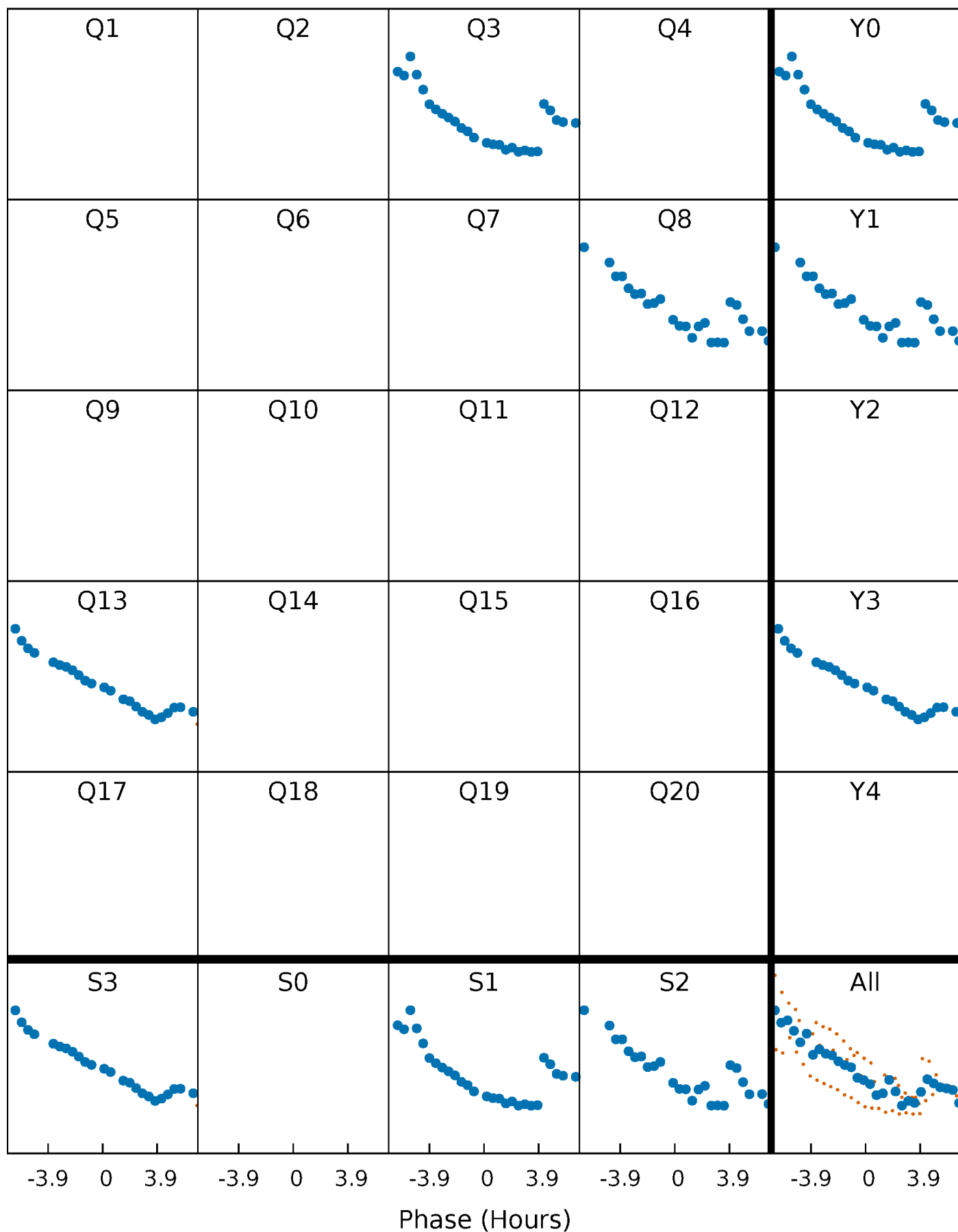


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

TCE 009414097-03     $P=435.288269$  Days     $T_0=347.188540$  (BKJD)





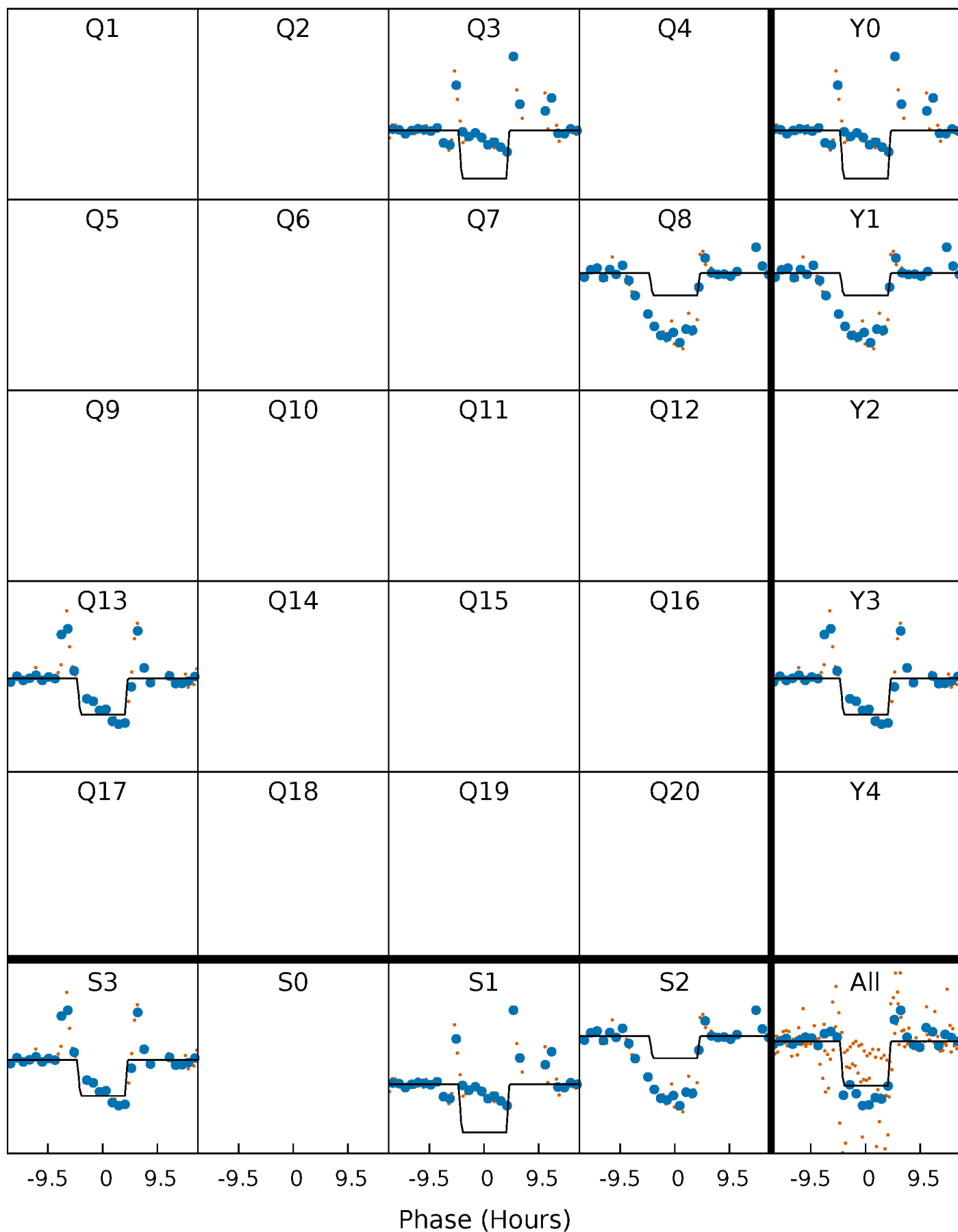
# DV Quarter-Phased Transit Curves

TCE 009414097-03     $P=435.288269$  Days     $T_0=347.188540$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

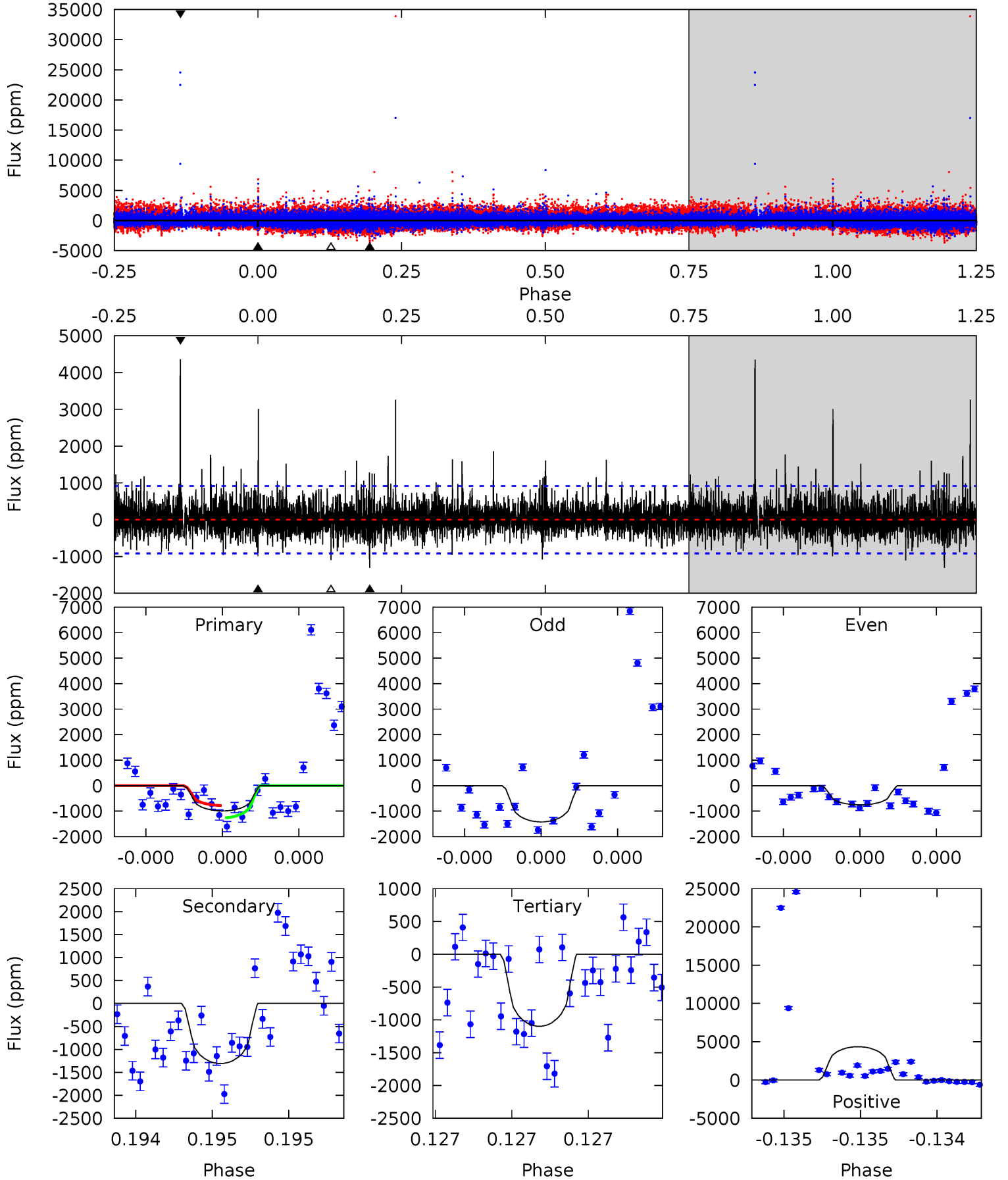
TCE 009414097-03     $P=435.289317$  Days     $T_0=347.175598$  (BKJD)



# DV Model-Shift Uniqueness Test

009414097-03, P = 435.288269 Days, E = 347.188540 Days

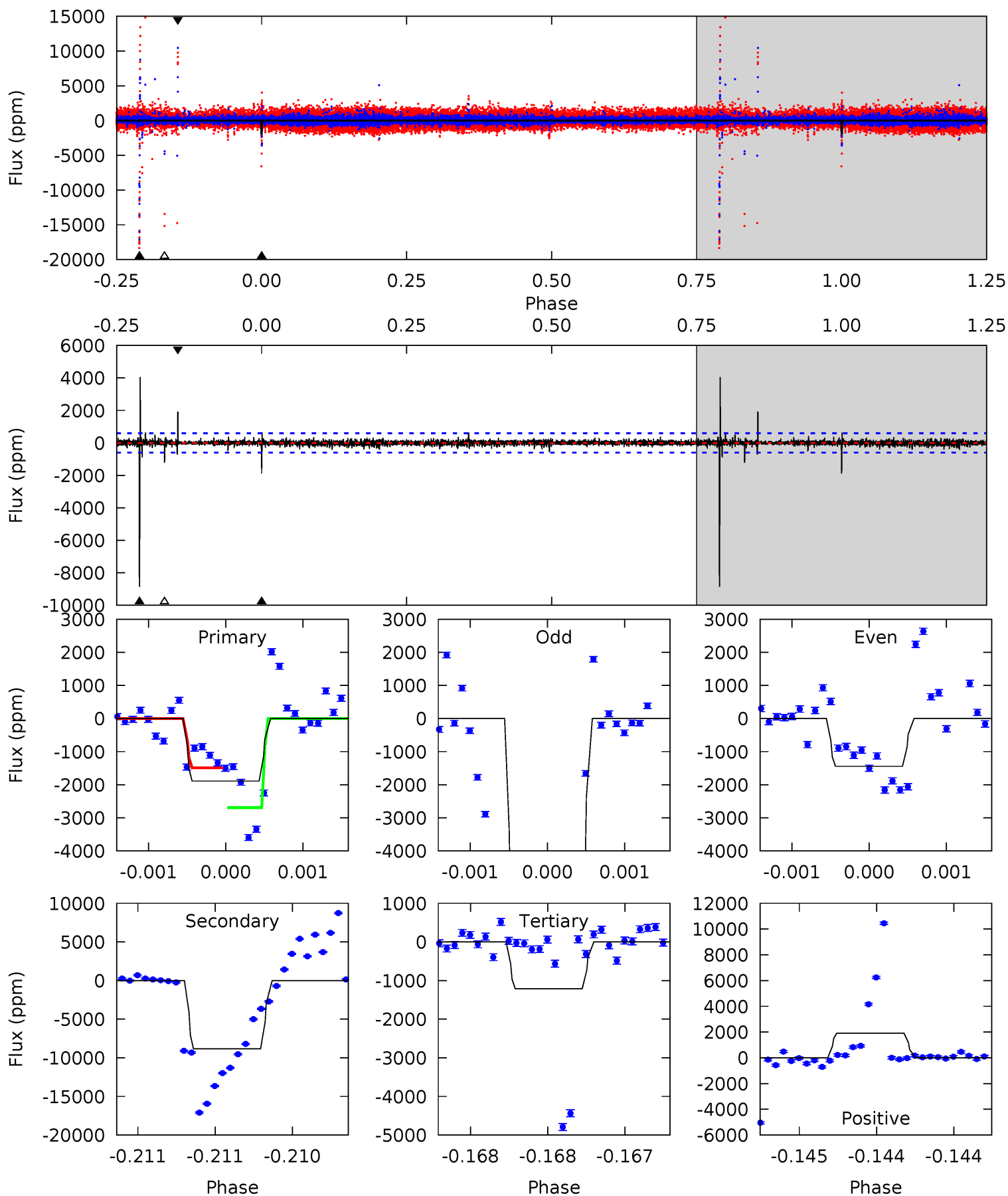
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.07	8.02	6.74	26.7	5.62	3.56	1.91	-0.67	-20.6	1.28	-18.7	0.45	0.79	0.77	1.46



# Alt Model-Shift Uniqueness Test

009414097-03, P = 435.289317 Days, E = 347.175598 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
17.3	81.1	11.1	17.6	5.49	3.35	1.11	6.24	-0.26	70.0	63.5	8.29	1.38	0.31	0



### Stellar Parameters For KIC 009414097

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4160^{+130}_{-158}$	$4.620^{+0.052}_{-0.016}$	$0.180^{+0.200}_{-0.300}$	$0.655^{+0.031}_{-0.058}$	$0.651^{+0.044}_{-0.058}$	$3.267^{+0.808}_{-0.260}$
	+3%/-4%	+1%/-0%	+111%/-167%	+5%/-9%	+7%/-9%	+25%/-8%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009414097-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	-1309±163	$10.13^{+12.02}_{-7.12}$	$208^{+8}_{-8}$	$2725^{+1189}_{-476}$	$6866^{+68155}_{-5420}$
Alt.	-8847±109	$11.10^{+12.85}_{-7.76}$	$208^{+7}_{-8}$	$3481^{+2016}_{-704}$	$38818^{+381733}_{-30749}$

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

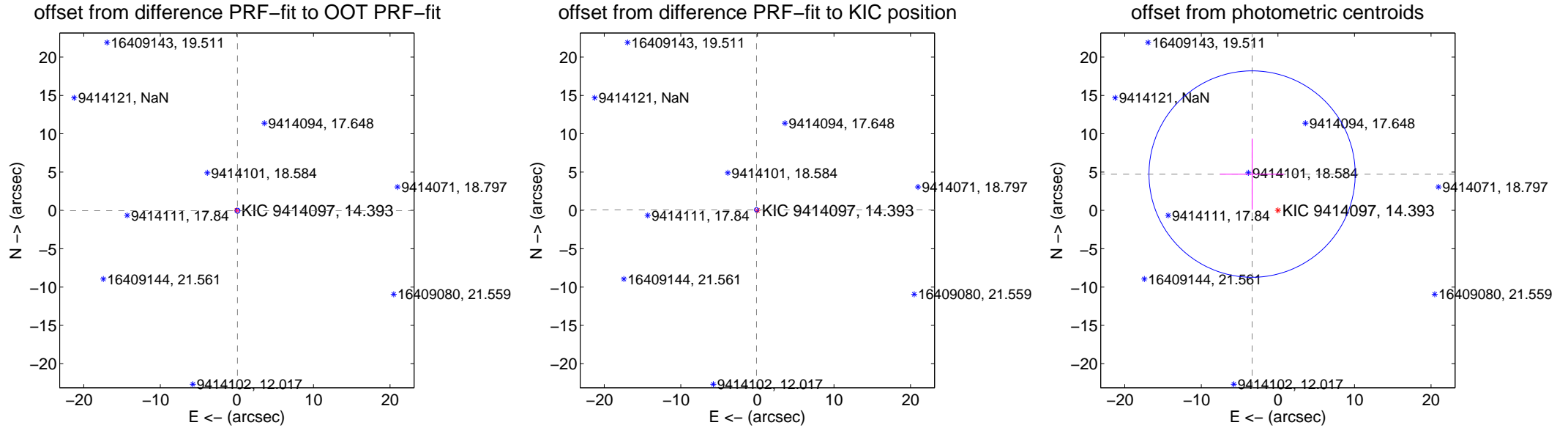
## DV Centroid Data

Supplemental centroid analysis for 009414097-03. Kepler magnitude: 14.39. Transit SNR 0.86

There are 2 quarters with good PRF difference image offsets

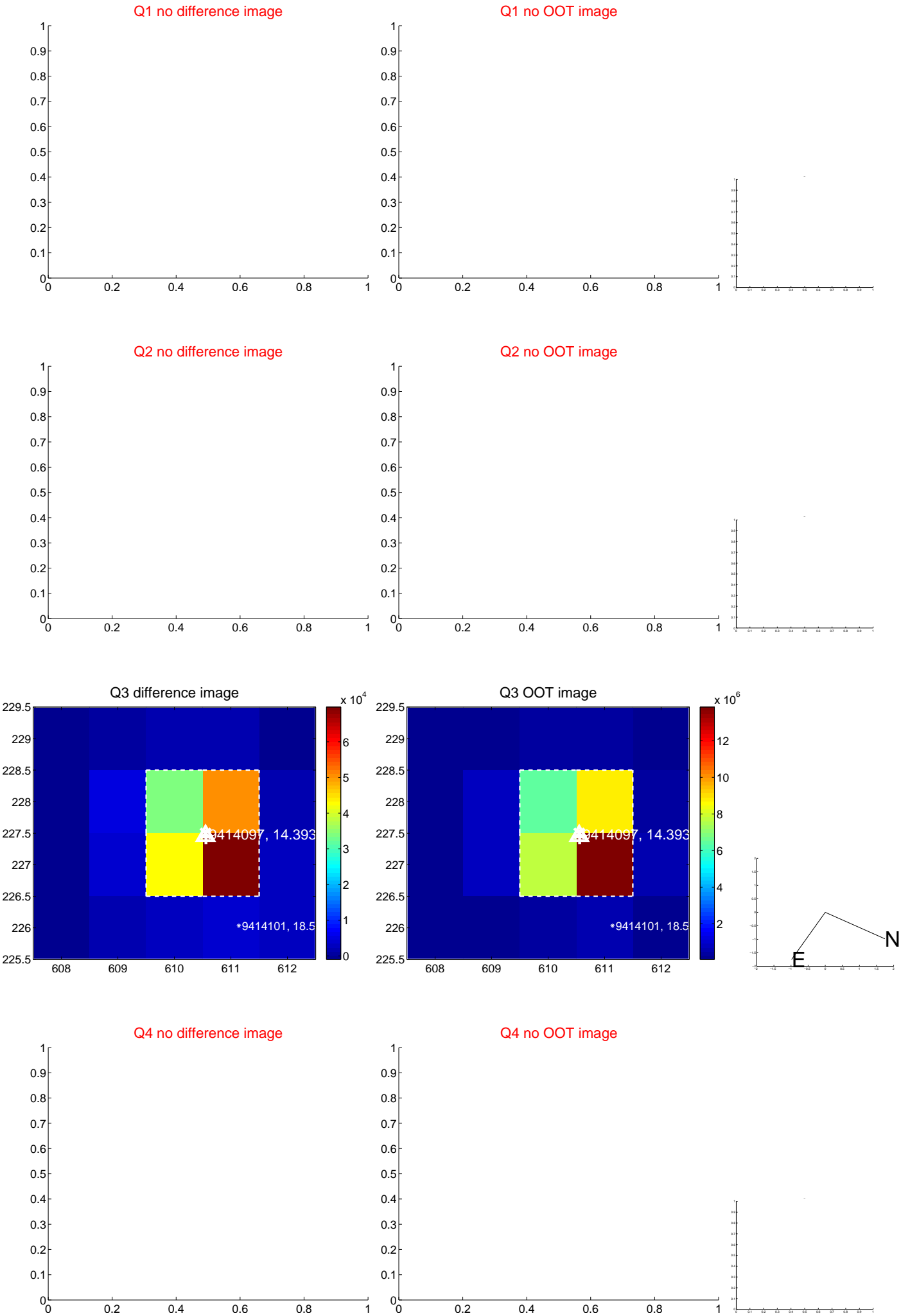
The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.087 \pm 0.108$	0.80	$-0.076 \pm 0.112$	$-0.042 \pm 0.096$
PRF-fit source offset from KIC position	$0.142 \pm 0.092$	1.55	$0.116 \pm 0.088$	$0.082 \pm 0.098$
photometric centroid source offset	$5.82 \pm 4.49$	1.30	$3.37 \pm 4.19$	$4.74 \pm 4.63$

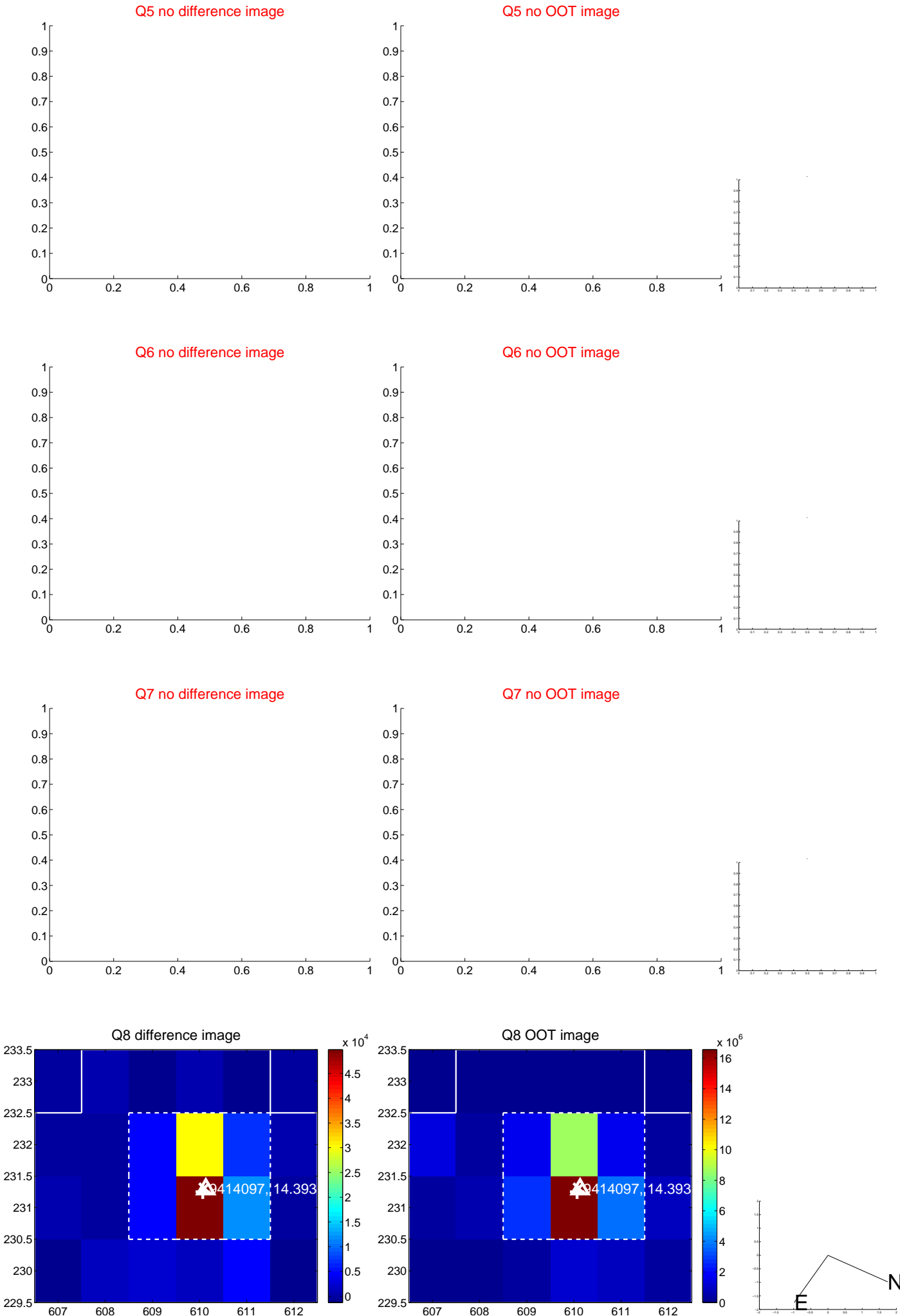


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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



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





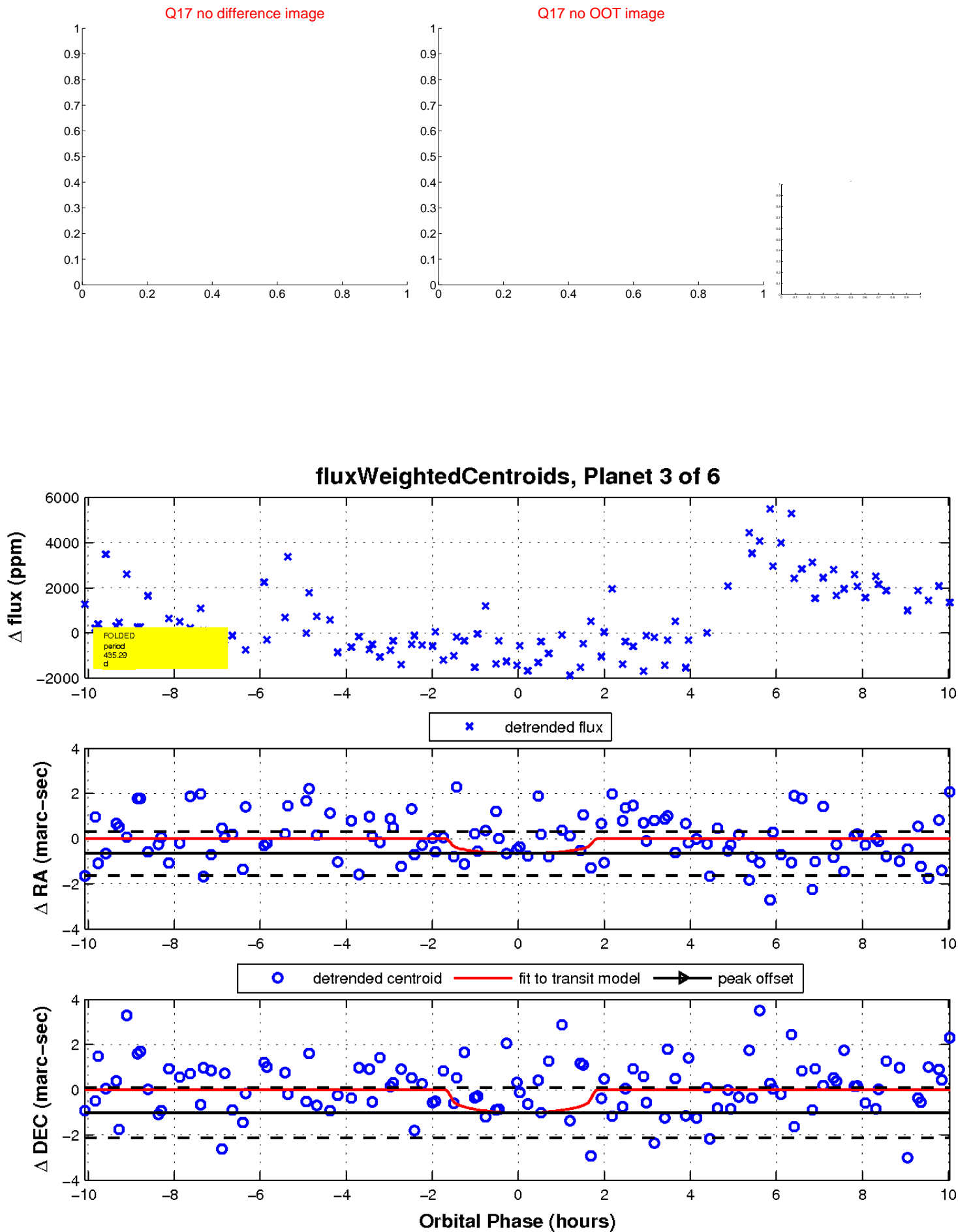
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

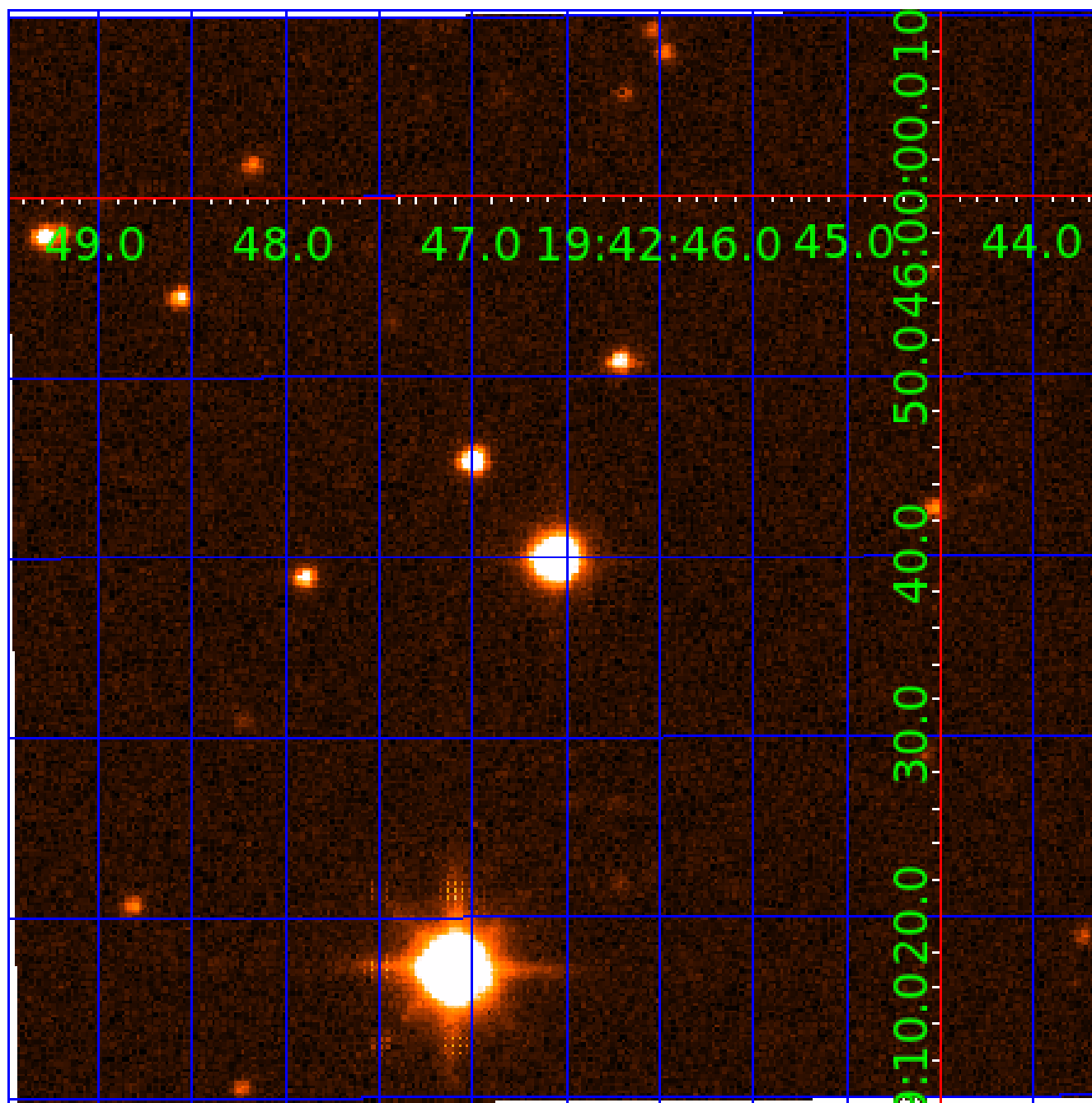


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009414097

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009414097-01	OBS	No	294.702973	167.939340	1372.1	3.034	16.7	6.2	0.66	4160	2.32	0.20
009414097-02	OBS	No	422.891713	140.464474	1603.0	6.125	15.8	6.8	0.66	4160	2.67	0.13
009414097-03	OBS	No	435.288269	347.188540	214.3	3.412	15.6	0.9	0.66	4160	1.02	0.12
009414097-04	OBS	No	339.852661	407.529539	1335.5	2.815	15.2	6.0	0.66	4160	2.36	0.17
009414097-06	OBS	No	508.823294	200.602379	2553.4	9.574	15.1	7.6	0.66	4160	3.44	0.10

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009414097-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009414097-02	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—CENT_FEW_DIFFS
009414097-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_POS_ALT—CENT_FEW_DIFFS
009414097-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—HALO_GHOST
009414097-06	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—CENT_FEW_DIFFS

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

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

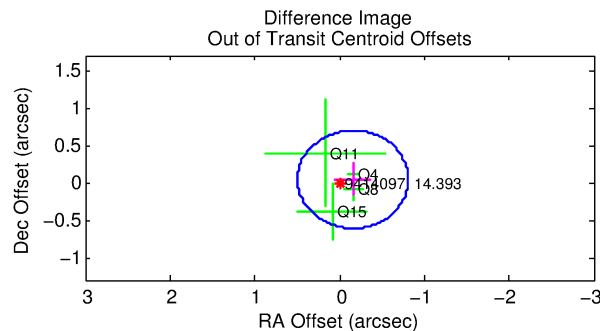
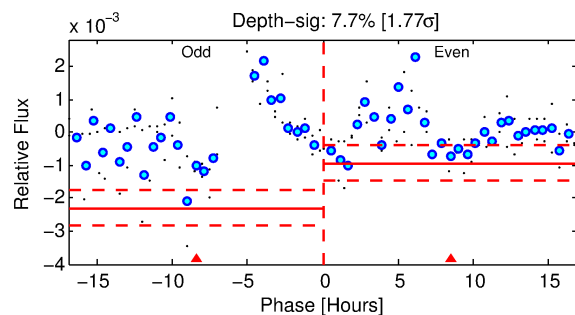
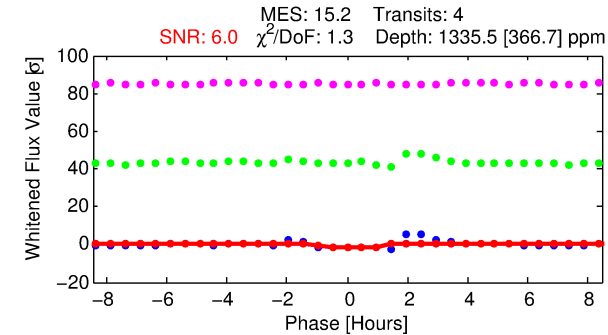
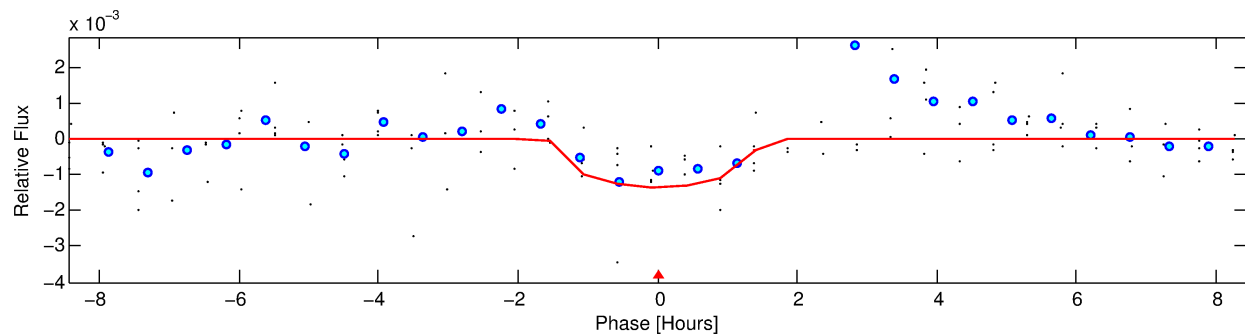
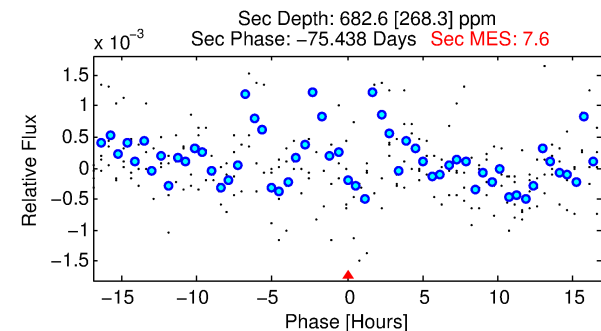
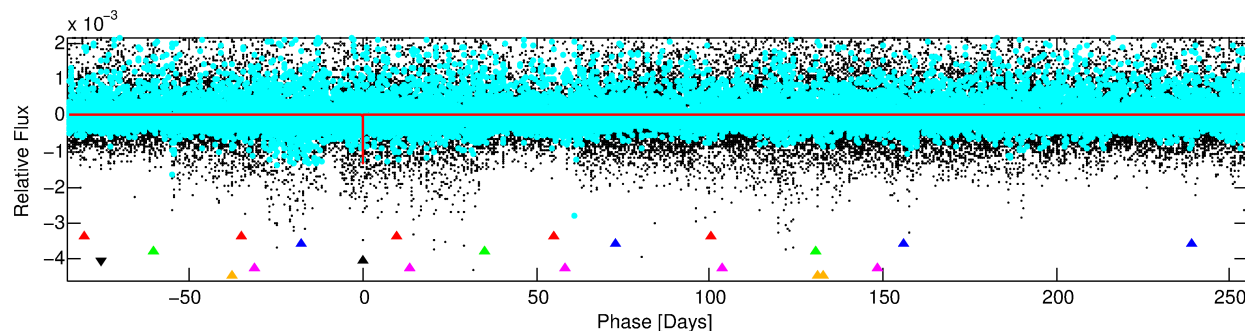
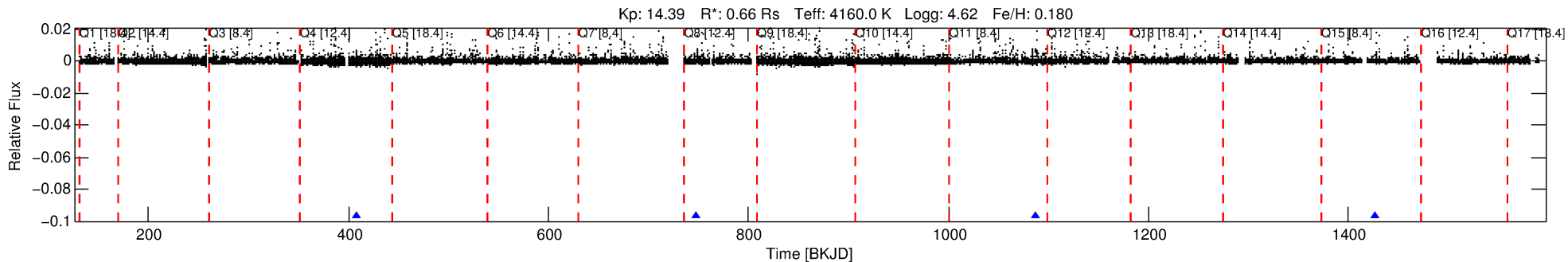
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009414097-04

No Significant Match Found

# DV One-Page Summary

KIC: 9414097 Candidate: 4 of 6 Period: 339.853 d



## DV Fit Results:

Period = 339.85266 [0.00531] d  
Epoch = 407.5295 [0.0105] BKJD  
Rp/R\* = 0.0330 [0.0890]  
a/R\* = 881.41 [7050.22]  
b = 0.39 [17.83]  
Seff = 0.17 [0.03]  
Teq = 163 [7] K  
Rp = 2.36 [6.36] Re  
a = 0.8268 [0.0589] AU  
Ag = 46177.21 [249833.11] [0.18σ]  
Teffp = 3702 [5009] K [0.71σ]

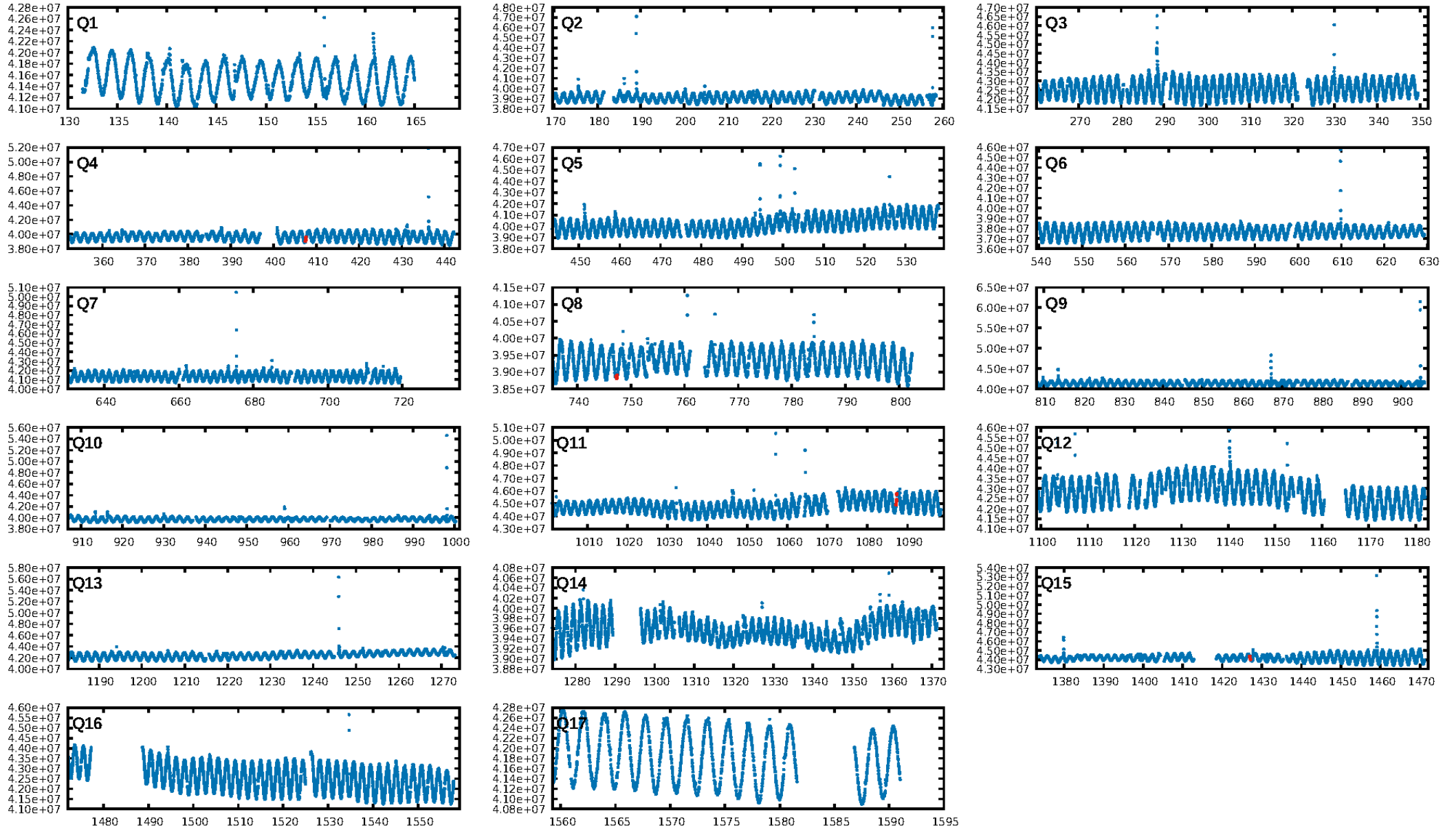
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [208.46σ]  
LongPeriod-sig: 100.0% [295.64σ]  
ModelChiSquare2-sig: 0.2%  
ModelChiSquareGof-sig: 59.6%  
Bootstrap-pfa: 2.42e-13  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 0.0197  
Centroid-sig: 32.4%  
Centroid-so: 0.388 arcsec [0.60σ]  
OotOffset-rm: 0.162 arcsec [0.75σ]  
KicOffset-rm: 0.105 arcsec [0.48σ]  
OotOffset-st: 0/2/2/0 [4]  
KicOffset-st: 0/2/2/0 [4]  
DiffImageQuality-fgm: 1.00 [4/4]  
DiffImageOverlap-fno: 1.00 [4/4]

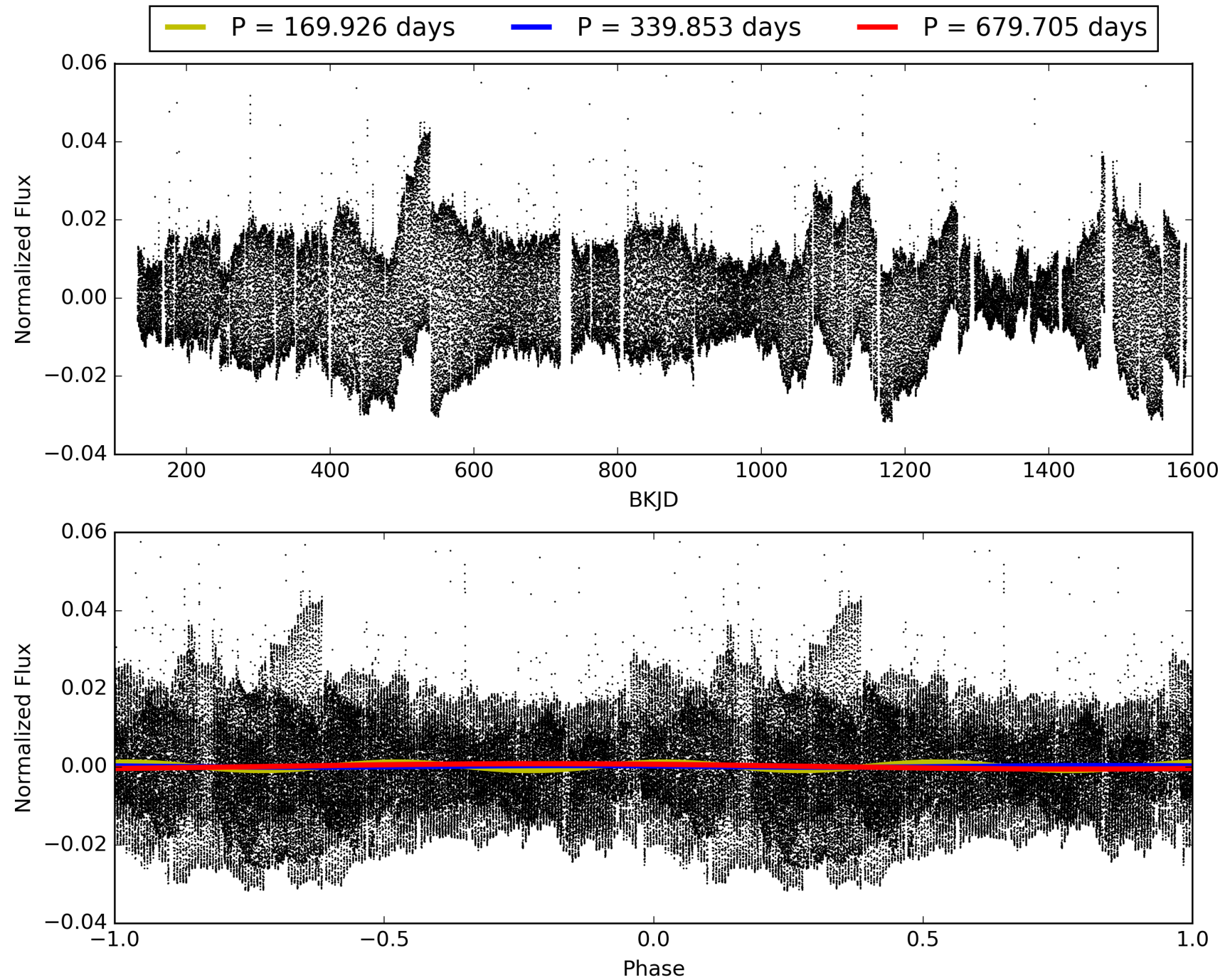
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 08:17:00 Z

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

# TCE 009414097-04, PDC Light Curves



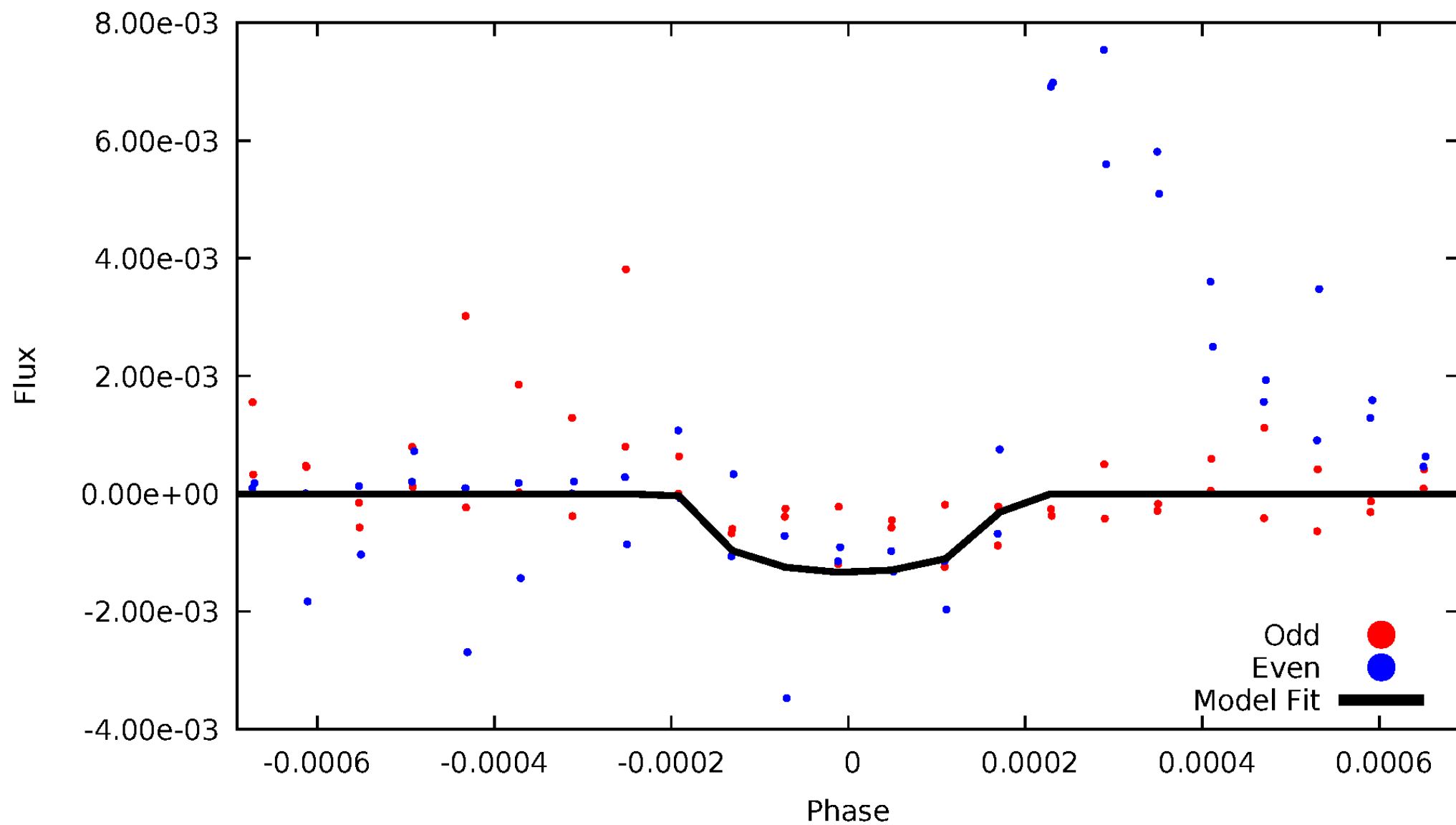
# TCE 009414097-04





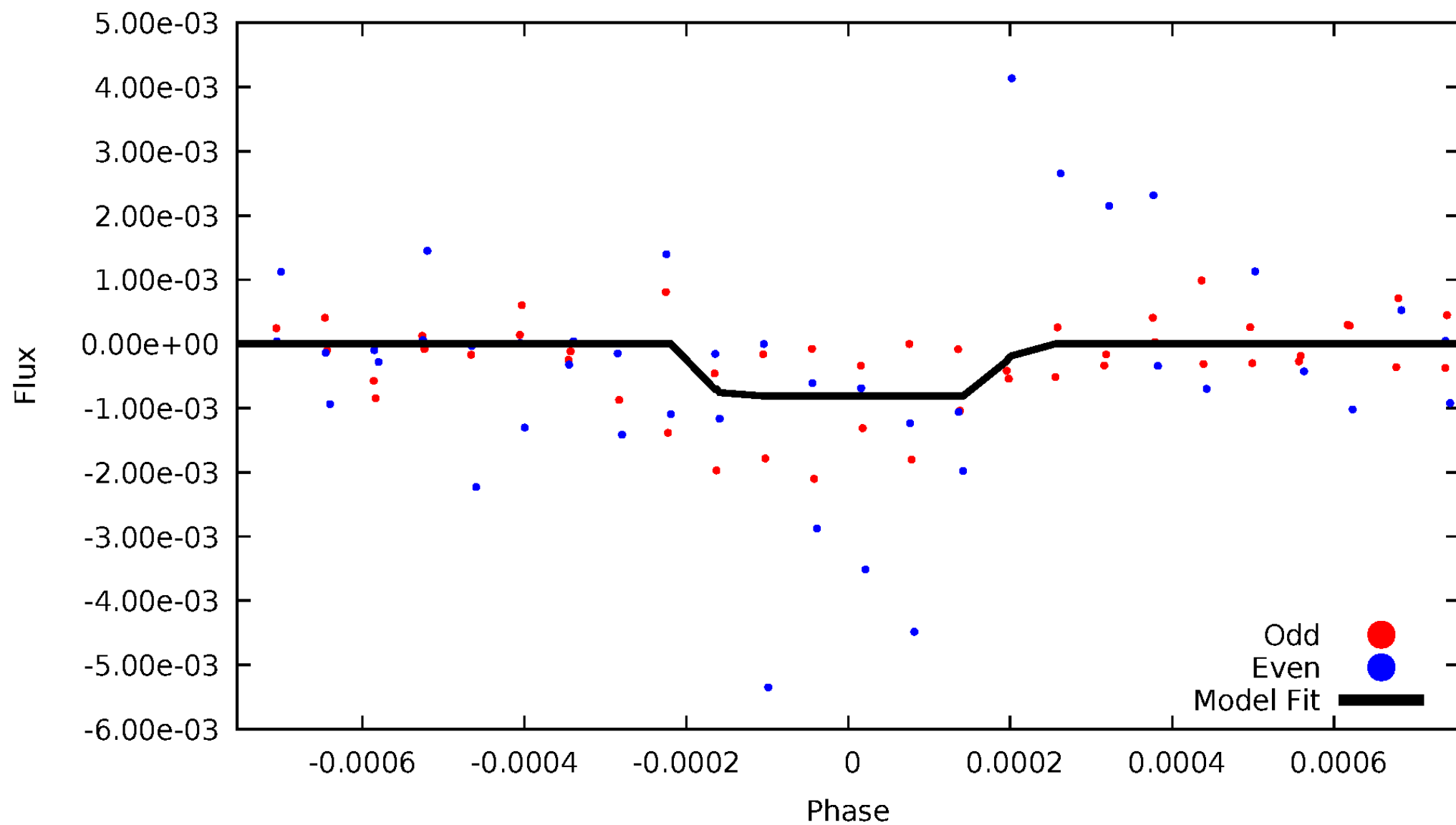
# DV Odd/Even

TCE 009414097-04



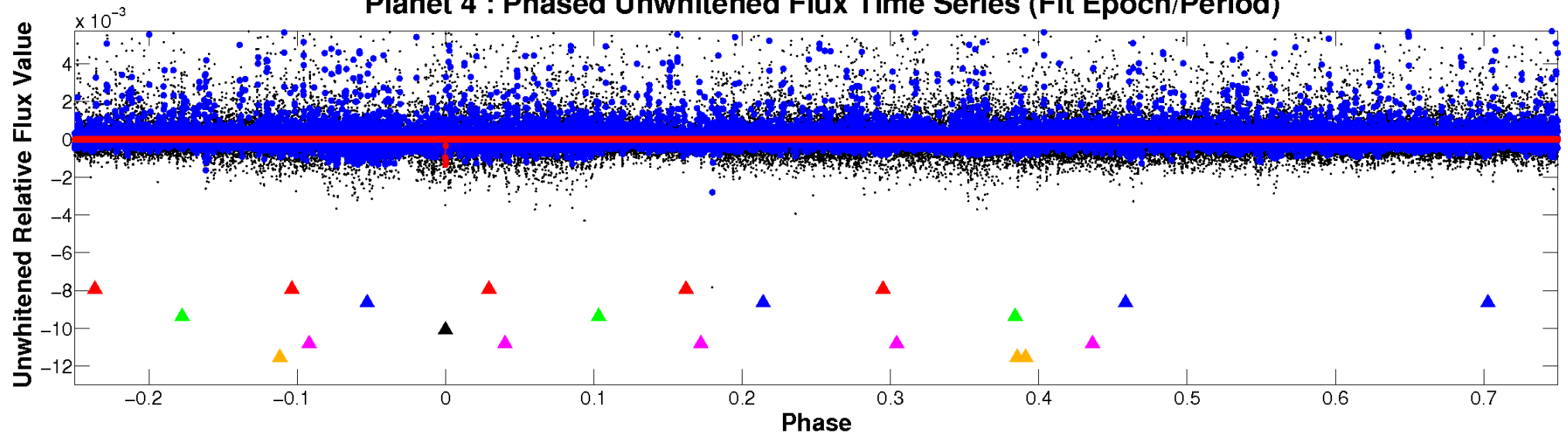
# ALT Odd/Even

TCE 009414097-04

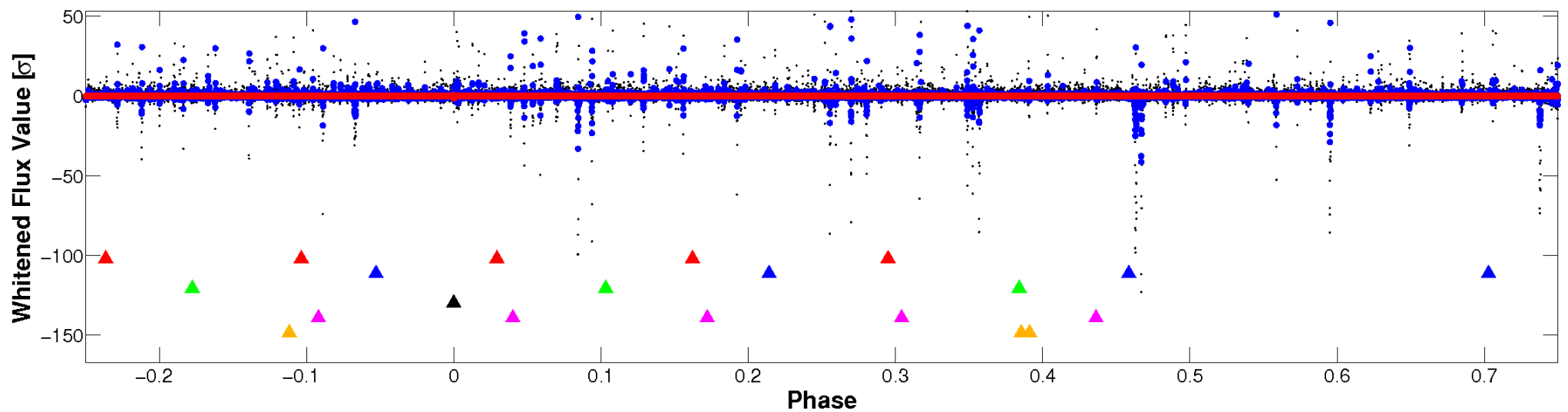


# Non-Whitened Vs. Whitened Light Curve

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

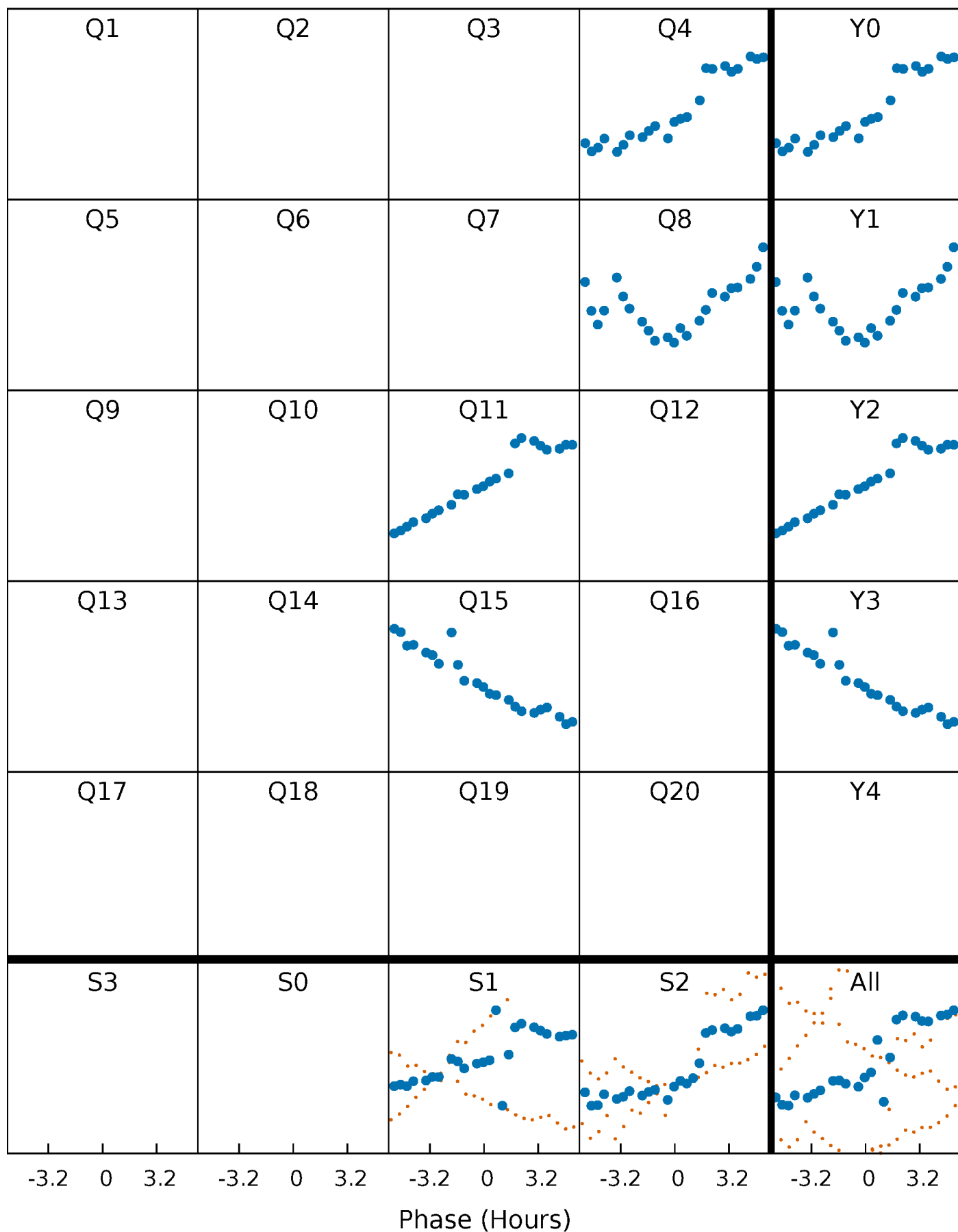


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



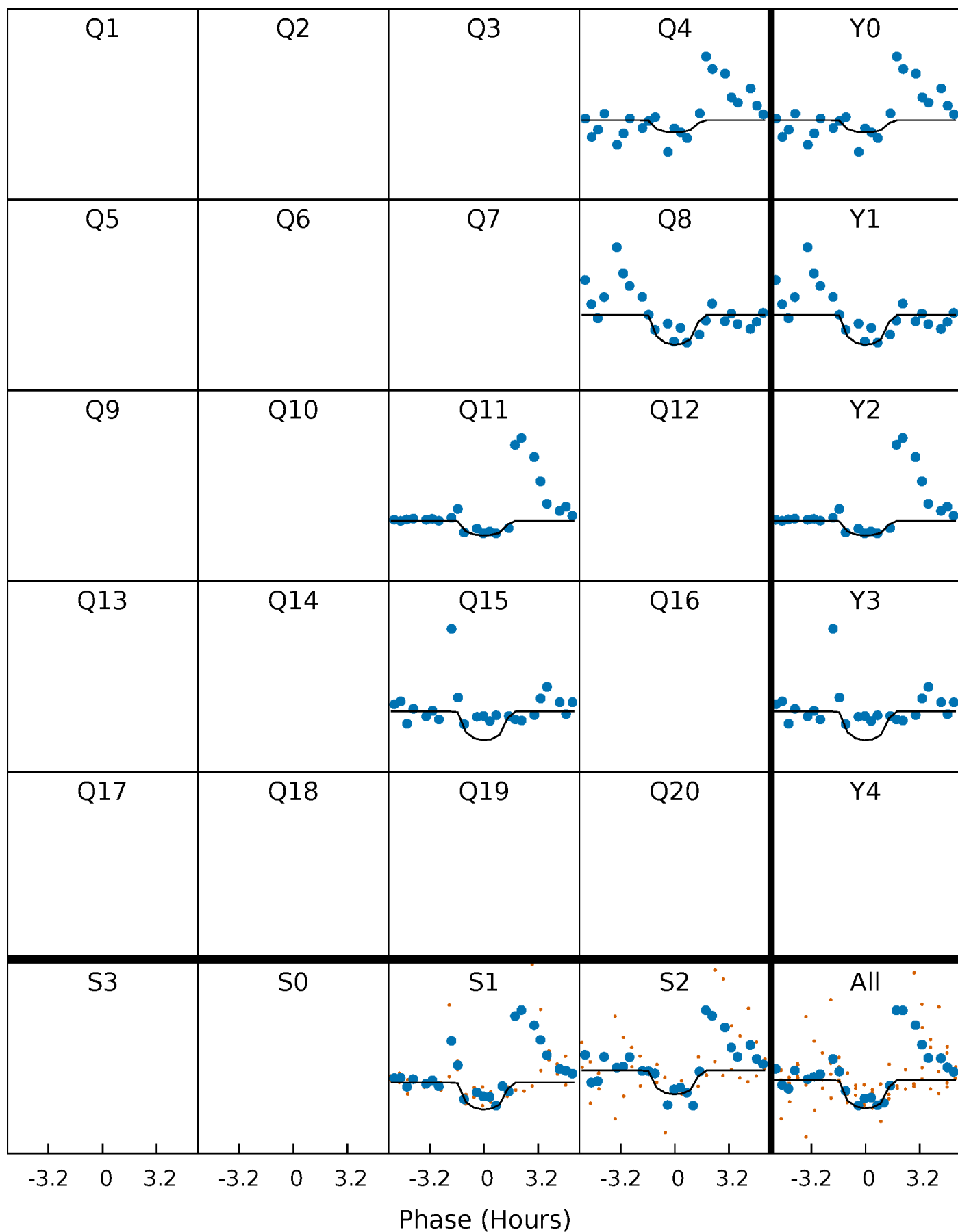
# PDC Quarter-Phased Transit Curves

TCE 009414097-04     $P=339.852661$  Days     $T_0=407.529539$  (BKJD)



# DV Quarter-Phased Transit Curves

TCE 009414097-04     $P=339.852661$  Days     $T_0=407.529539$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

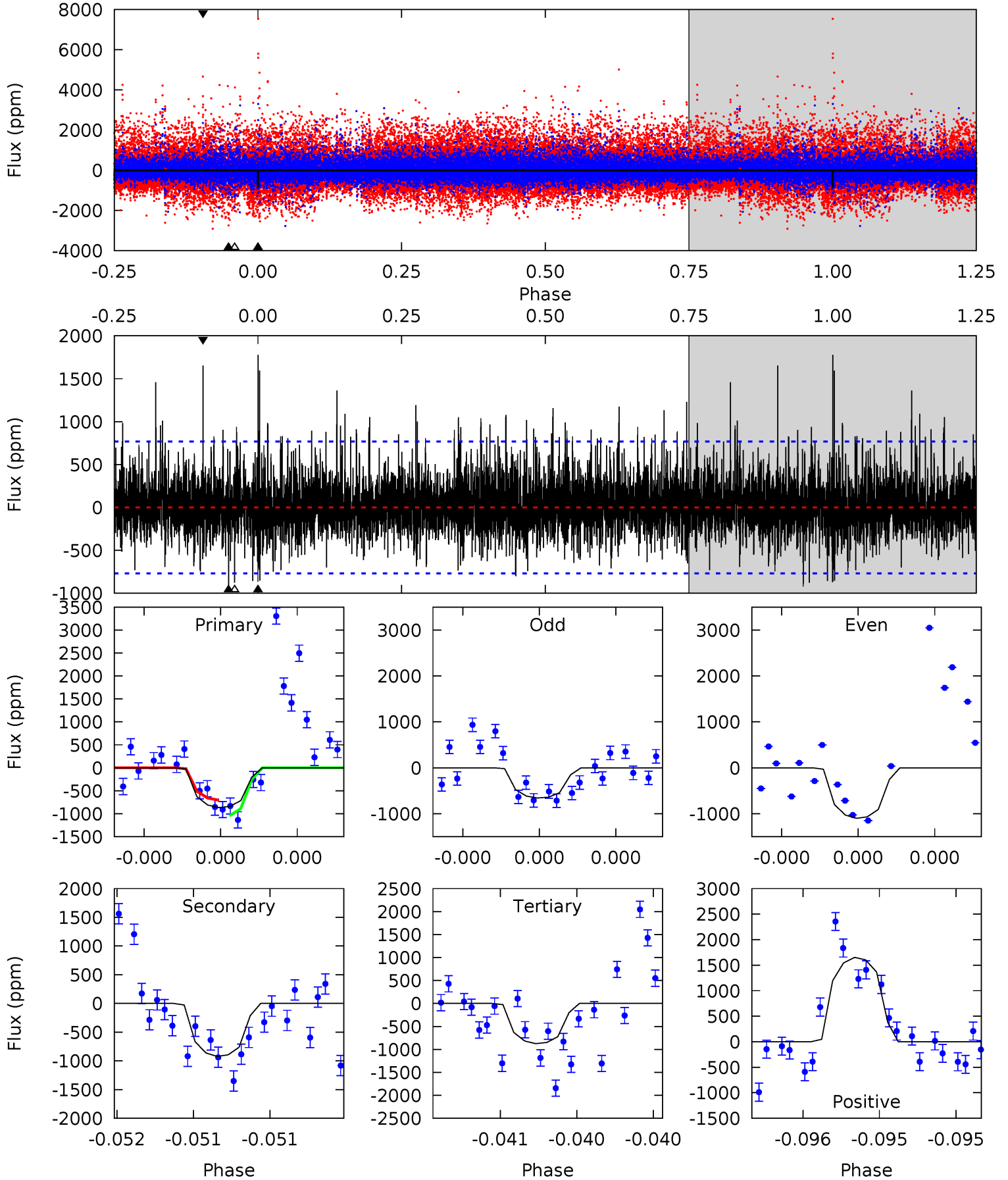
TCE 009414097-04 P=339.853181 Days  $T_0=407.539526$  (BKJD)



# DV Model-Shift Uniqueness Test

009414097-04, P = 339.852661 Days, E = 67.676878 Days

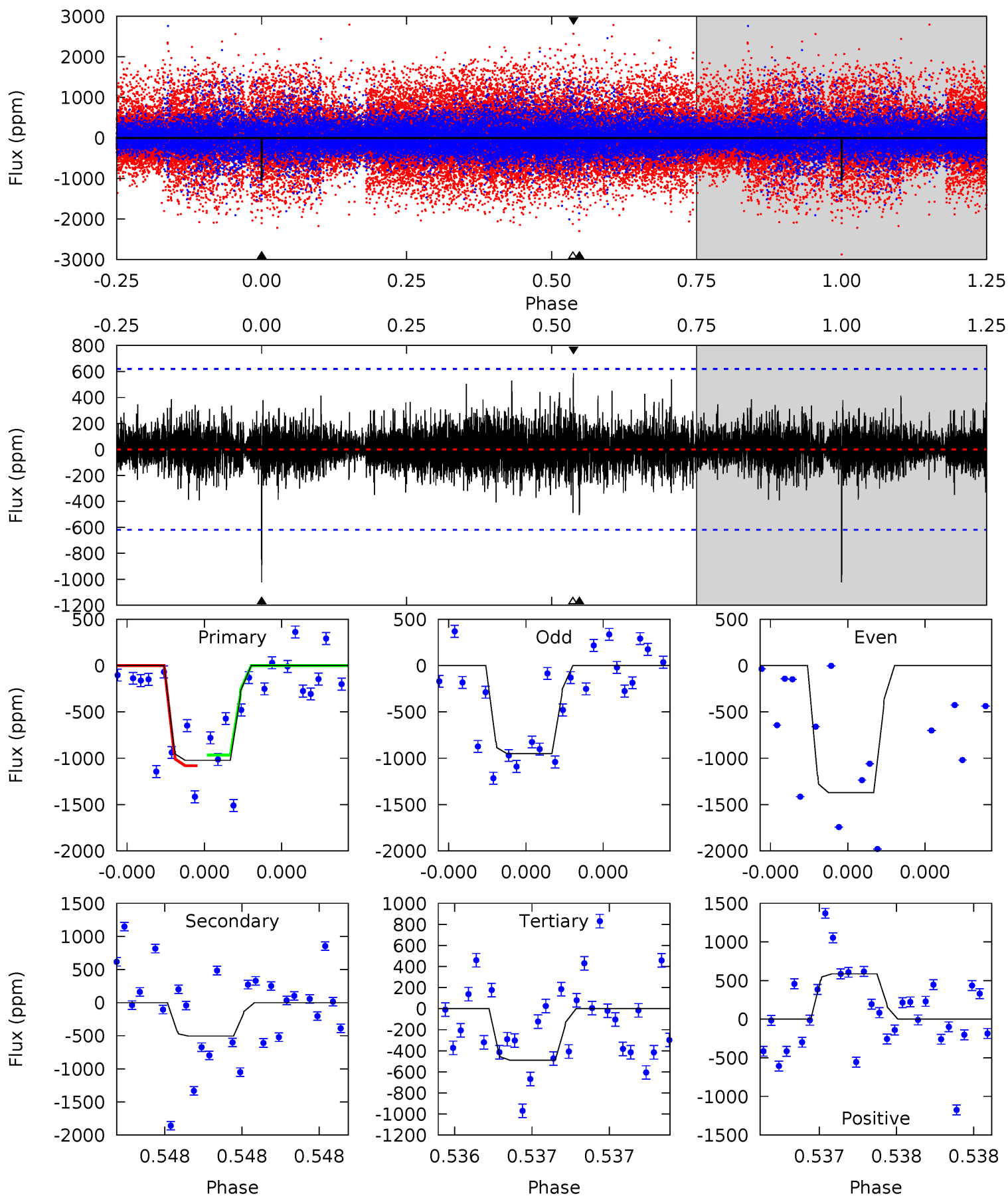
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.32	6.72	6.38	12.0	5.60	3.53	1.84	-0.06	-5.73	0.34	-5.32	0.79	0.98	0.66	1.25



# Alt Model-Shift Uniqueness Test

009414097-04, P = 339.853181 Days, E = 67.686345 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
9.25	4.57	4.43	5.30	5.60	3.53	0.91	4.82	3.95	0.14	-0.74	1.52	1.20	0.36	0.52





### Stellar Parameters For KIC 009414097

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4160^{+130}_{-158}$	$4.620^{+0.052}_{-0.016}$	$0.180^{+0.200}_{-0.300}$	$0.655^{+0.031}_{-0.058}$	$0.651^{+0.044}_{-0.058}$	$3.267^{+0.808}_{-0.260}$
	+3%/-4%	+1%/-0%	+111%/-167%	+5%/-9%	+7%/-9%	+25%/-8%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009414097-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-922 \pm 137$	$5.34^{+4.88}_{-3.76}$	$226^{+8}_{-9}$	$3105^{+1564}_{-532}$	$12404^{+123193}_{-9193}$
Alt.	$-505 \pm 111$	$5.01^{+4.99}_{-3.40}$	$226^{+8}_{-9}$	$2866^{+1198}_{-470}$	$7050^{+62766}_{-5239}$

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

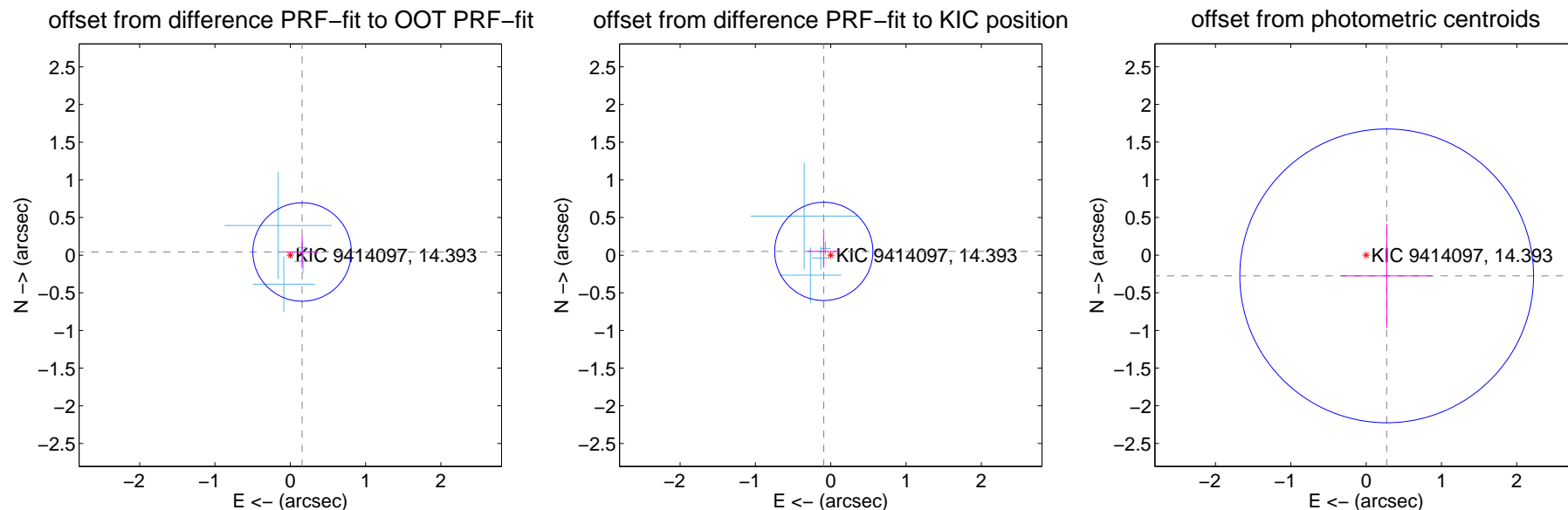
## DV Centroid Data

Supplemental centroid analysis for 009414097-04. Kepler magnitude: 14.39. Transit SNR 6.00

There are 4 quarters with good PRF difference image offsets

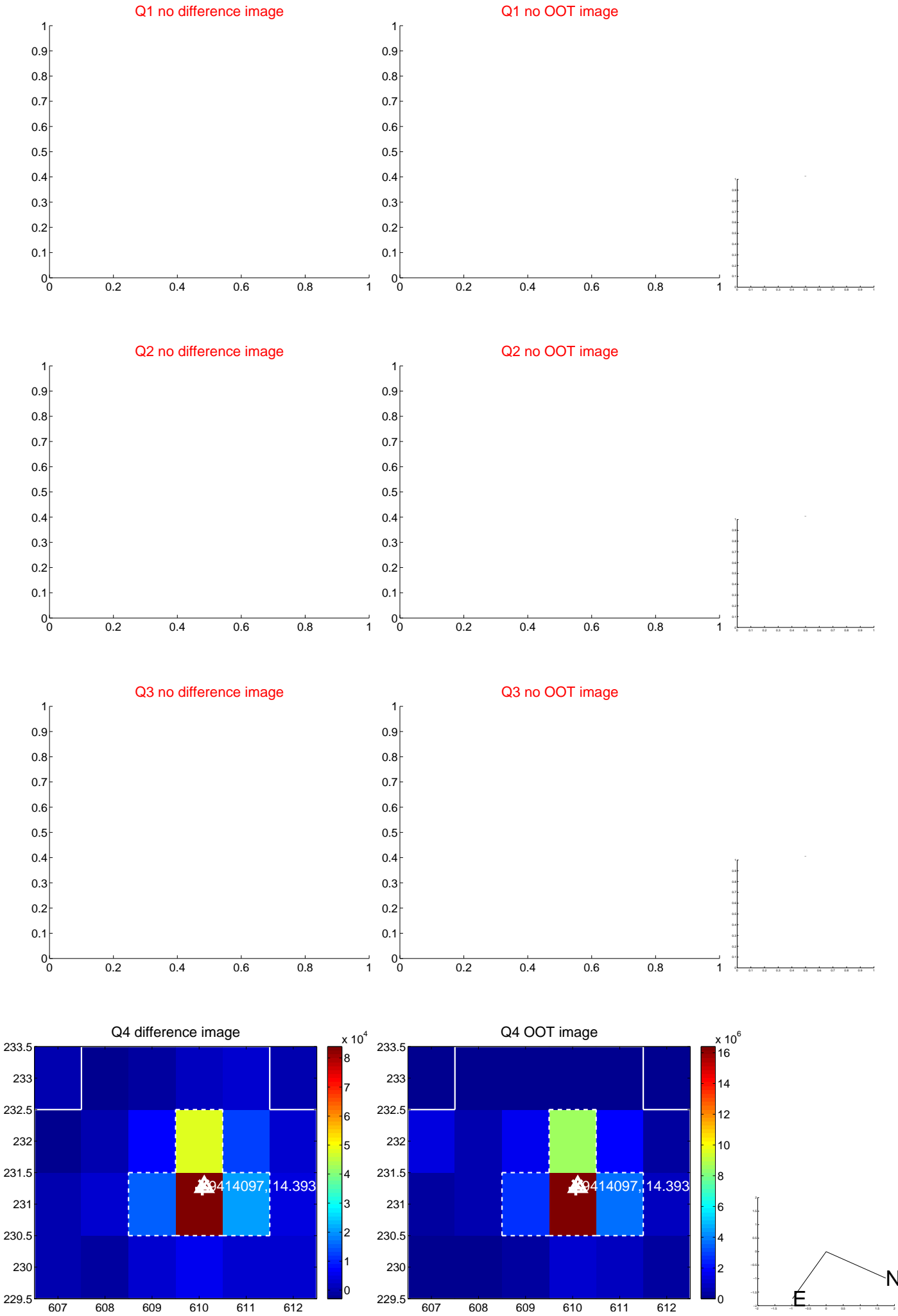
The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.162 \pm 0.218$	0.75	$-0.157 \pm 0.218$	$0.042 \pm 0.215$
PRF-fit source offset from KIC position	$0.105 \pm 0.217$	0.48	$0.092 \pm 0.218$	$0.050 \pm 0.215$
photometric centroid source offset	$0.39 \pm 0.65$	0.60	$-0.27 \pm 0.60$	$-0.28 \pm 0.69$

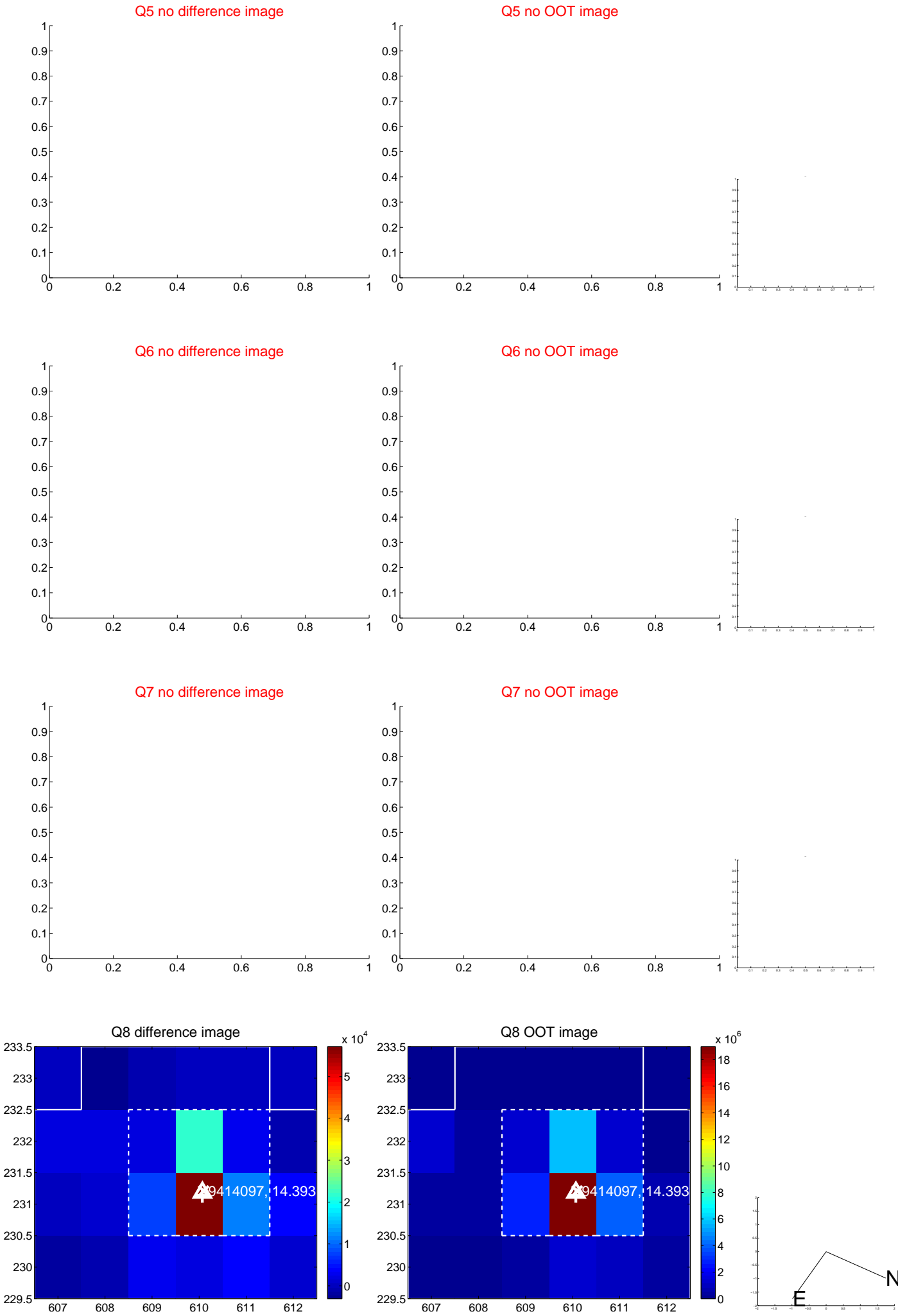


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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



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



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

Q9 no difference image



Q9 no OOT image



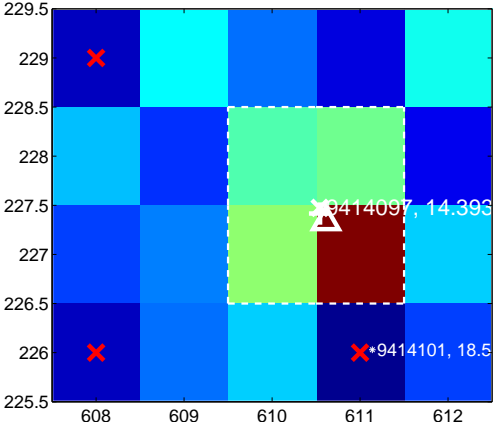
Q10 no difference image



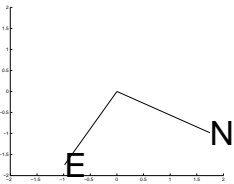
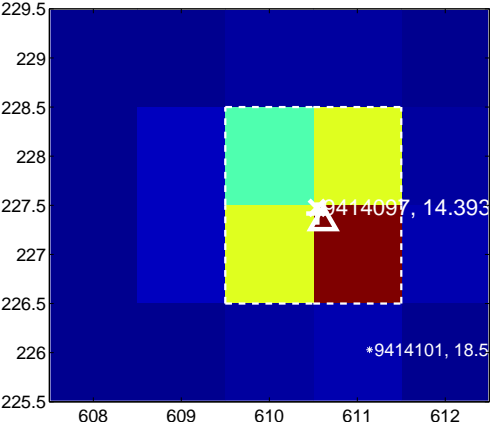
Q10 no OOT image



Q11 difference image



Q11 OOT image



Q12 no difference image



Q12 no OOT image



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

Q13 no difference image



Q13 no OOT image



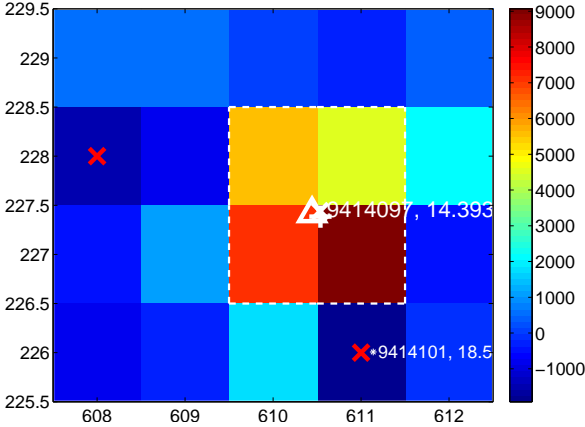
Q14 no difference image



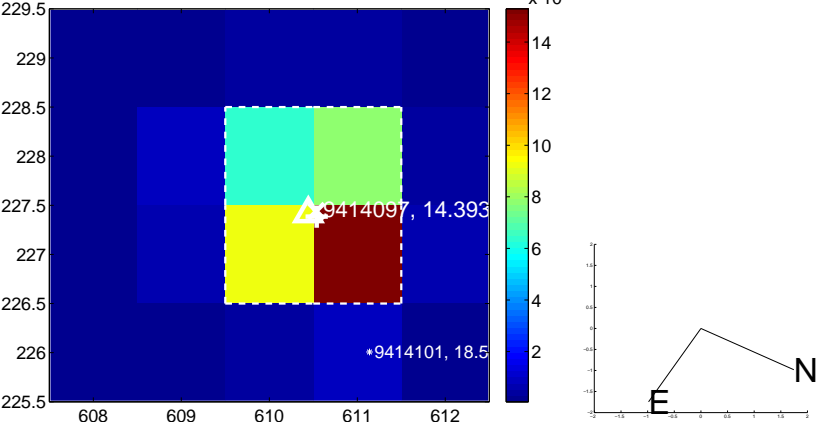
Q14 no OOT image



Q15 difference image



Q15 OOT image



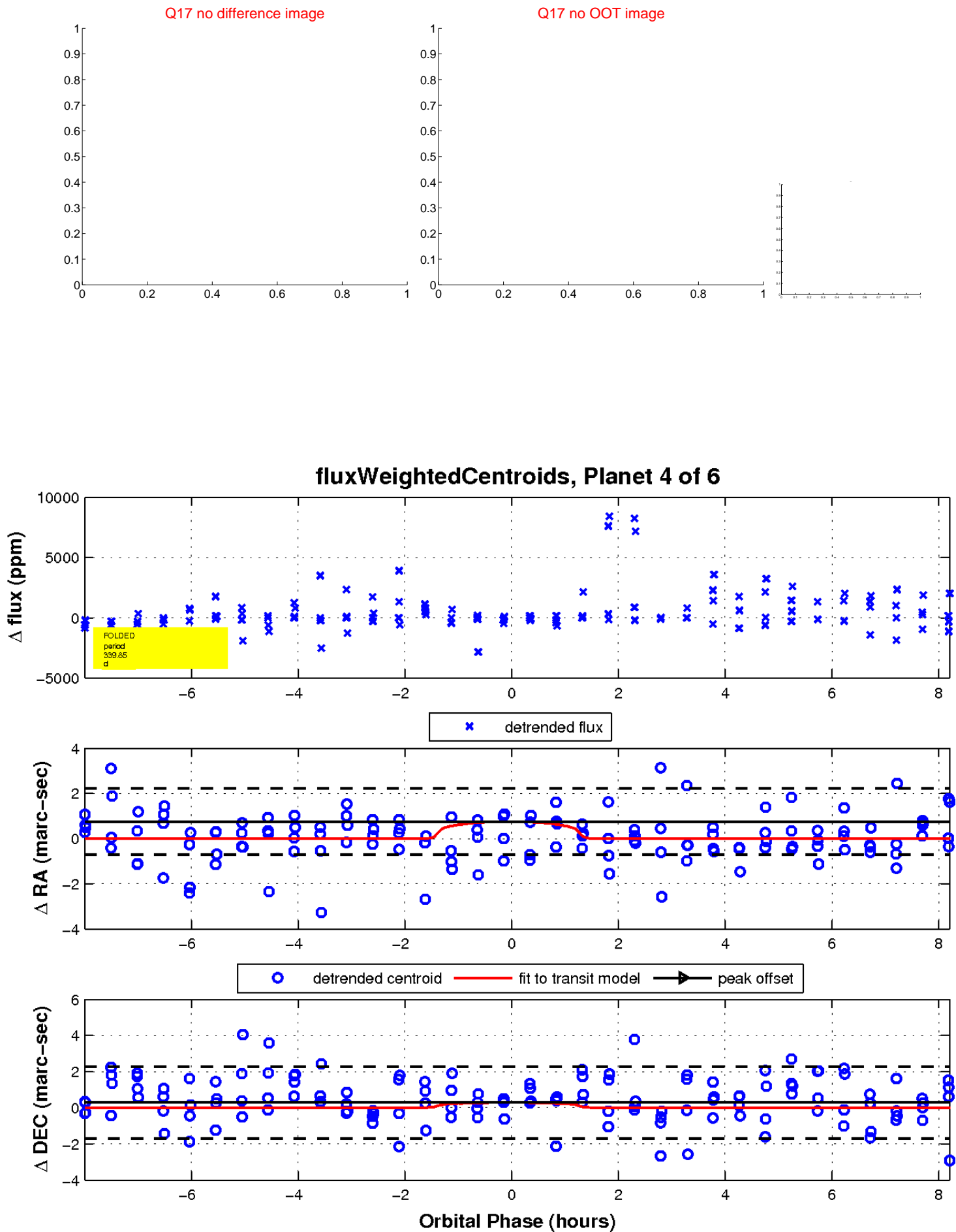
Q16 no difference image



Q16 no OOT image

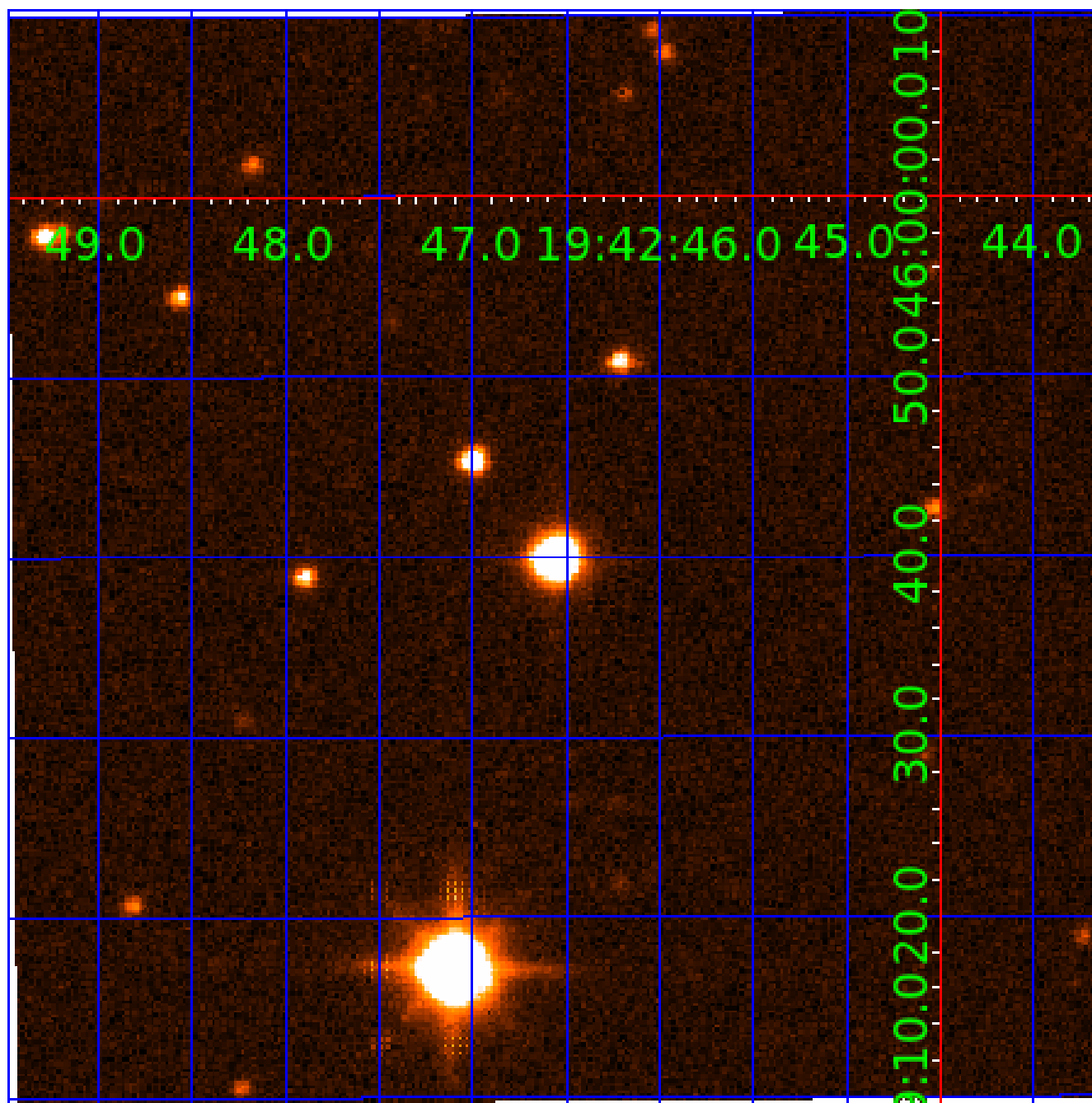


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 009414097

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009414097-01	OBS	No	294.702973	167.939340	1372.1	3.034	16.7	6.2	0.66	4160	2.32	0.20
009414097-02	OBS	No	422.891713	140.464474	1603.0	6.125	15.8	6.8	0.66	4160	2.67	0.13
009414097-03	OBS	No	435.288269	347.188540	214.3	3.412	15.6	0.9	0.66	4160	1.02	0.12
009414097-04	OBS	No	339.852661	407.529539	1335.5	2.815	15.2	6.0	0.66	4160	2.36	0.17
009414097-06	OBS	No	508.823294	200.602379	2553.4	9.574	15.1	7.6	0.66	4160	3.44	0.10

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009414097-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009414097-02	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—CENT_FEW_DIFFS
009414097-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_POS_ALT—CENT_FEW_DIFFS
009414097-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—HALO_GHOST
009414097-06	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—CENT_FEW_DIFFS

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

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

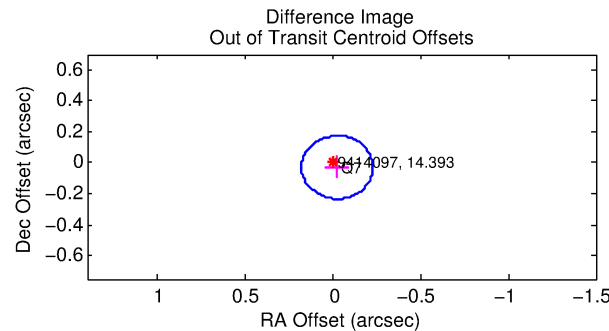
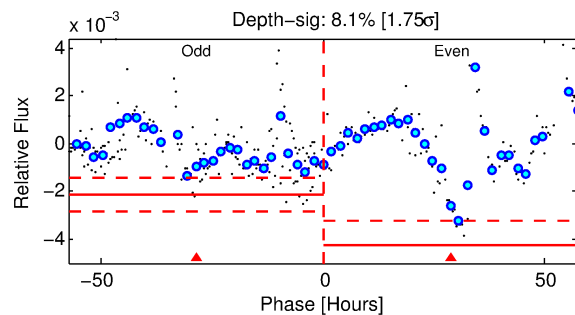
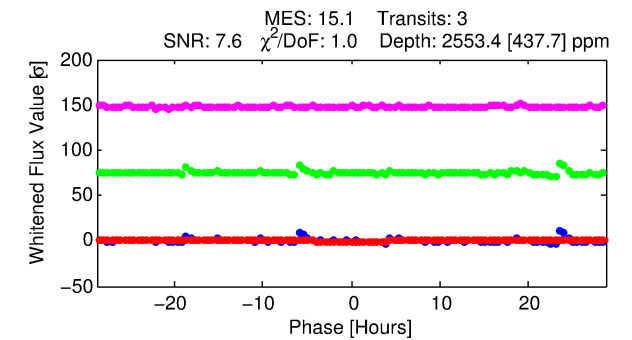
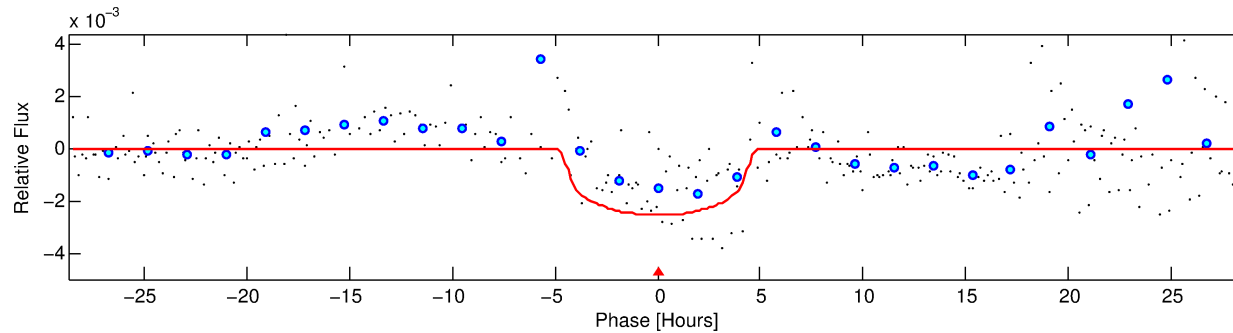
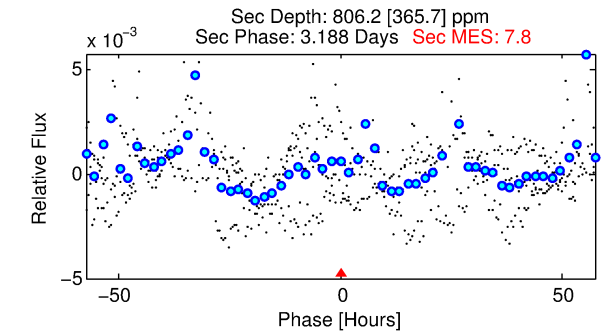
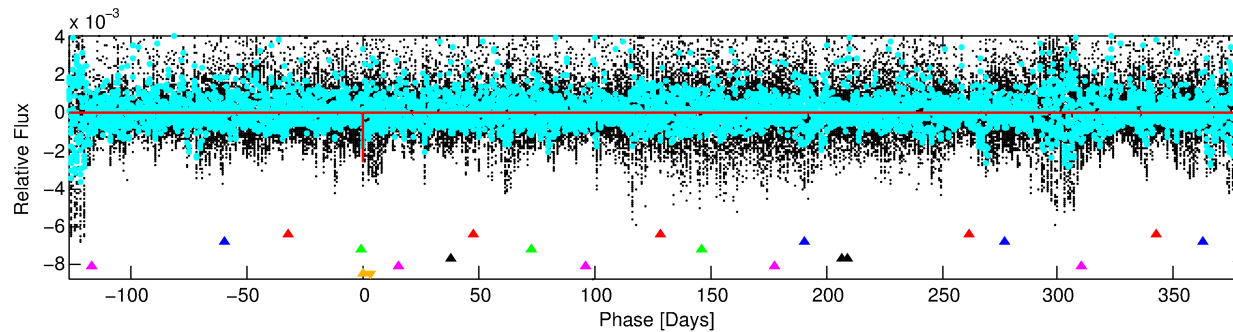
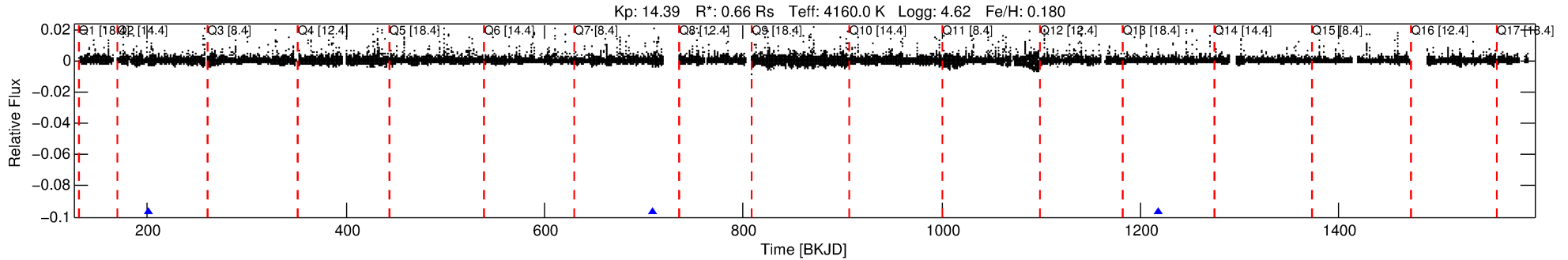
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009414097-06

No Significant Match Found

# DV One-Page Summary

KIC: 9414097 Candidate: 6 of 6 Period: 508.823 d



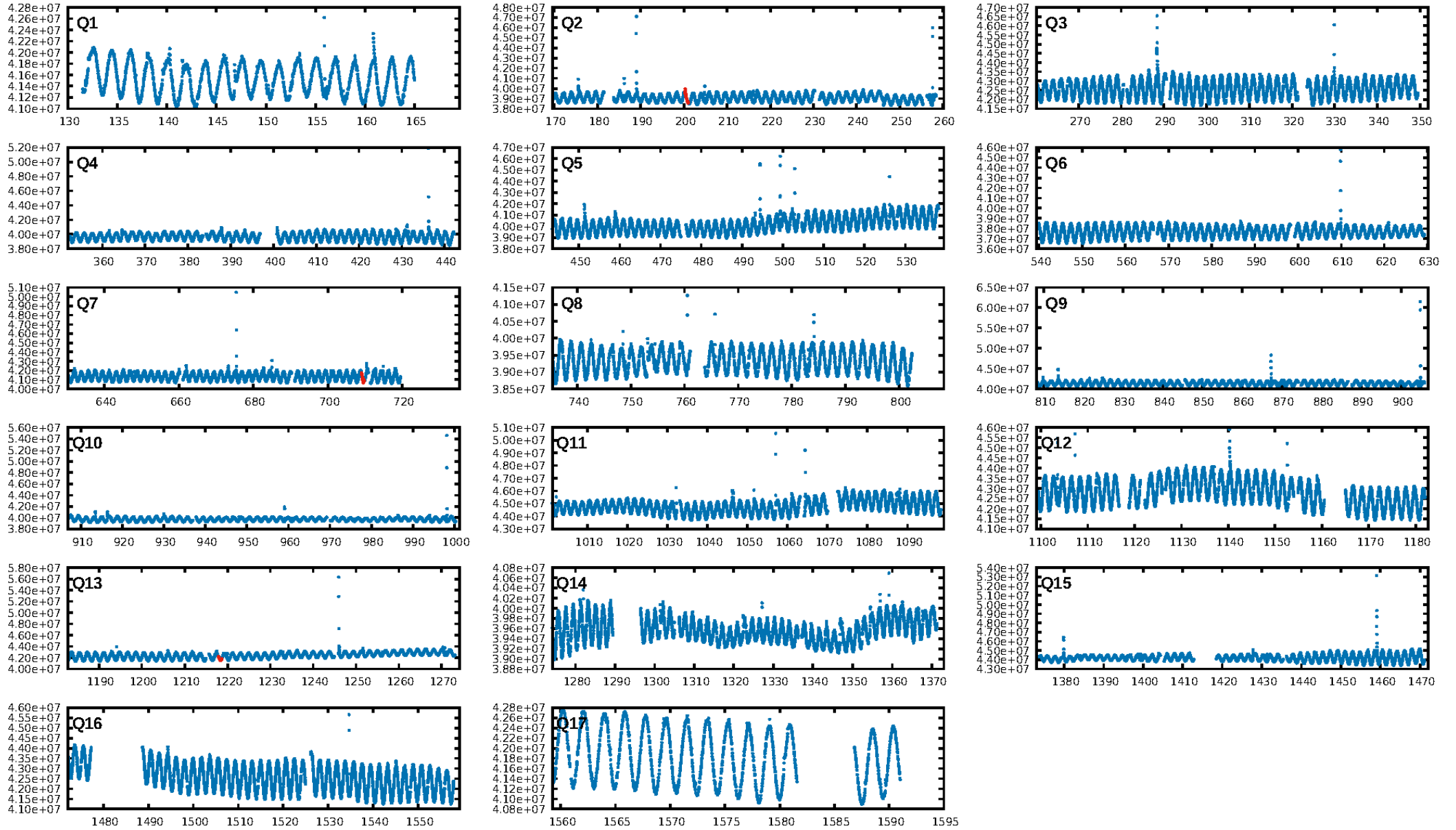
## DV Fit Results:

Period = 508.82329 [0.00736] d  
Epoch = 200.6024 [0.0102] BKJD  
Rp/R\* = 0.0482 [0.0124]  
a/R\* = 338.76 [242.08]  
b = 0.63 [0.68]  
Seff = 0.10 [0.02]  
Teq = 143 [6] K  
Rp = 3.44 [0.94] Re  
a = 1.0820 [0.0771] AU  
Ag = 43766.42 [30349.20] [1.44σ]  
**Teffp = 3193 [561] K [5.44σ]**

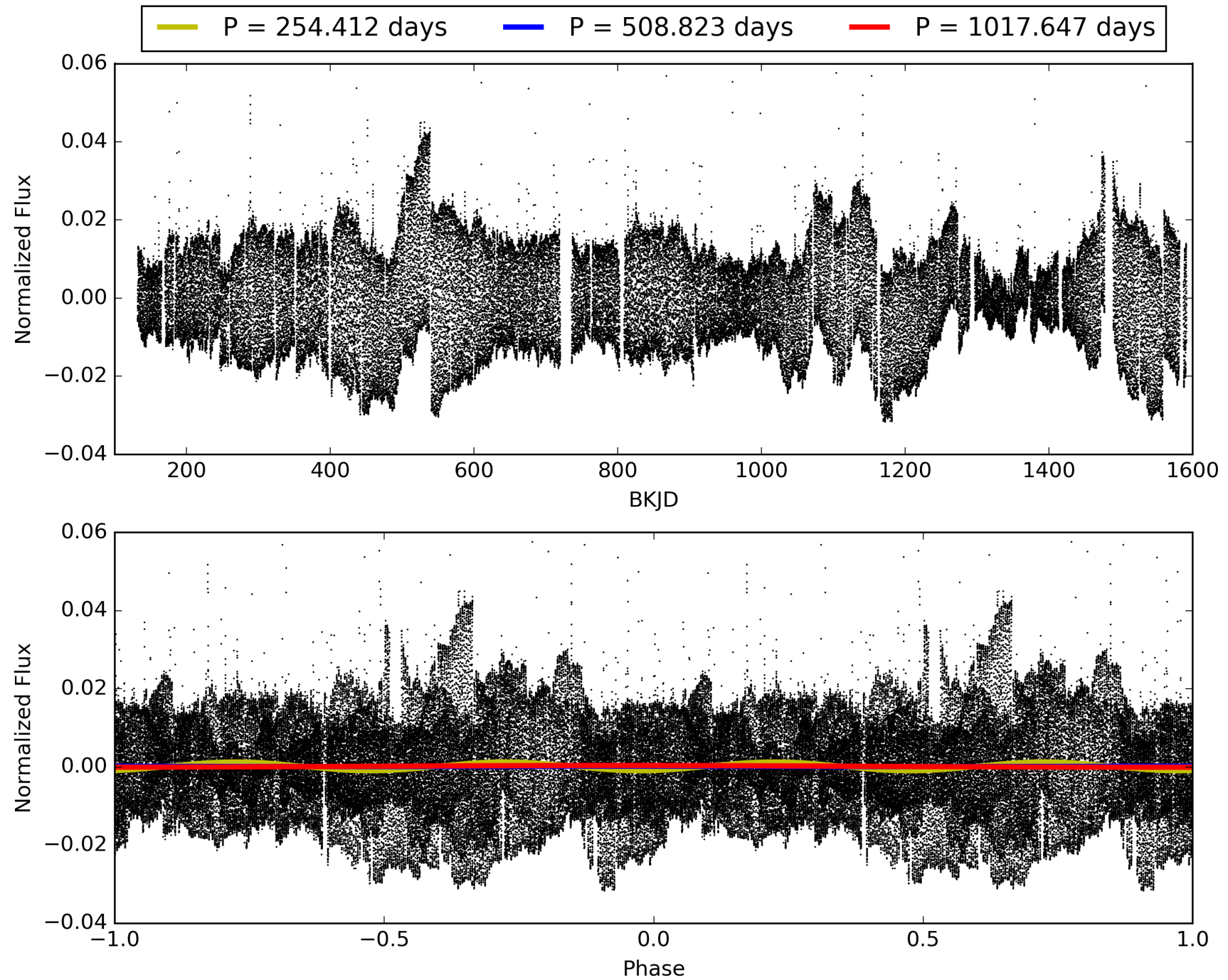
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [173.64σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 34.9%  
ModelChiSquareGof-sig: 98.8%  
**Bootstrap-pfa: 2.03e-12**  
RollingBand-fgt: 1.00 [3/3]  
**GhostDiagnostic-chr: 0.5506**  
Centroid-sig: 8.7%  
Centroid-so: 0.521 arcsec [2.26σ]  
OotOffset-rm: 0.038 arcsec [0.56σ]  
KicOffset-rm: 0.178 arcsec [2.63σ]  
OotOffset-st: 0/1/0/0 [1]  
KicOffset-st: 0/1/0/0 [1]  
DiffImageQuality-fgm: 1.00 [1/1]  
DiffImageOverlap-fno: 1.00 [1/1]

# TCE 009414097-06, PDC Light Curves

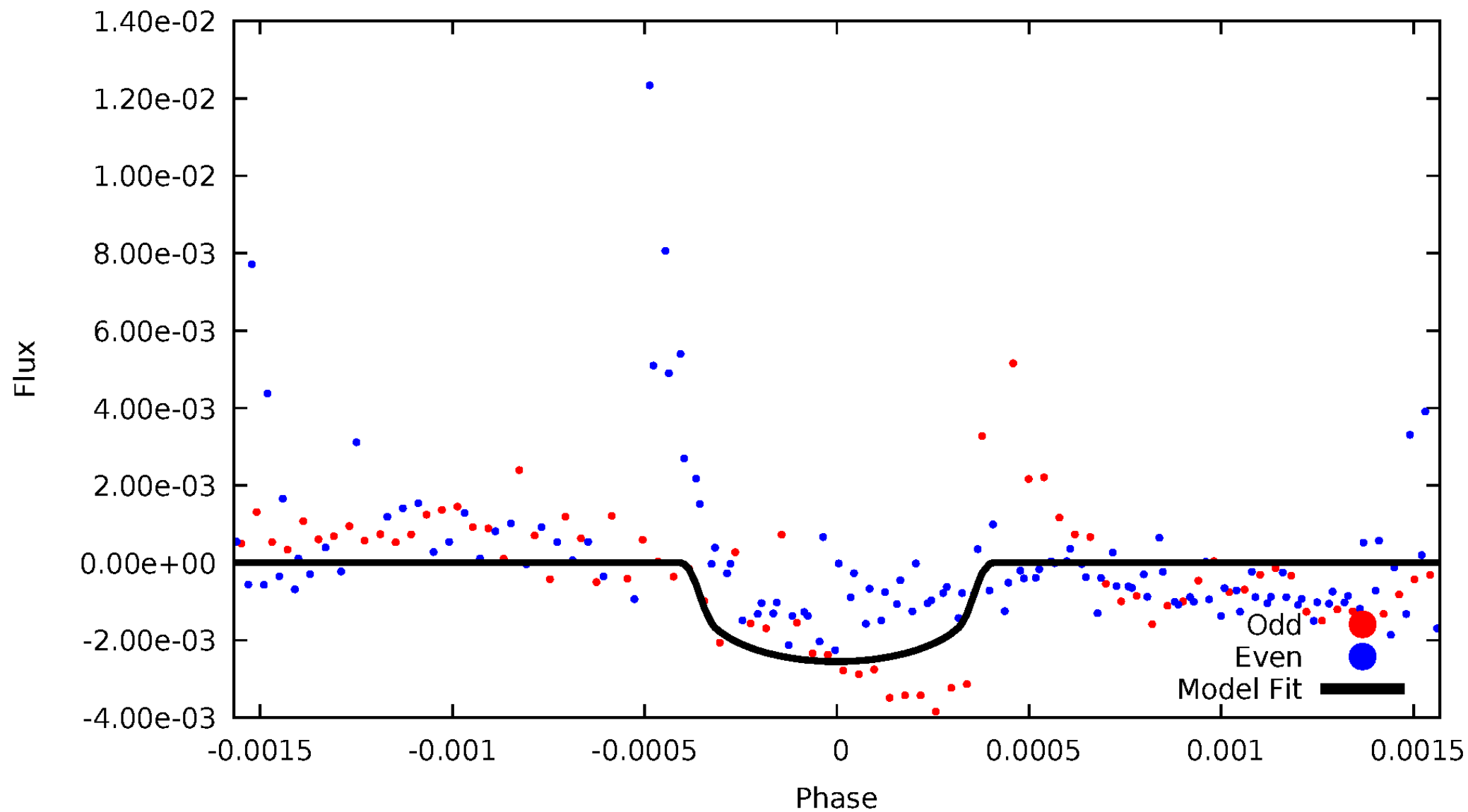


TCE 009414097-06



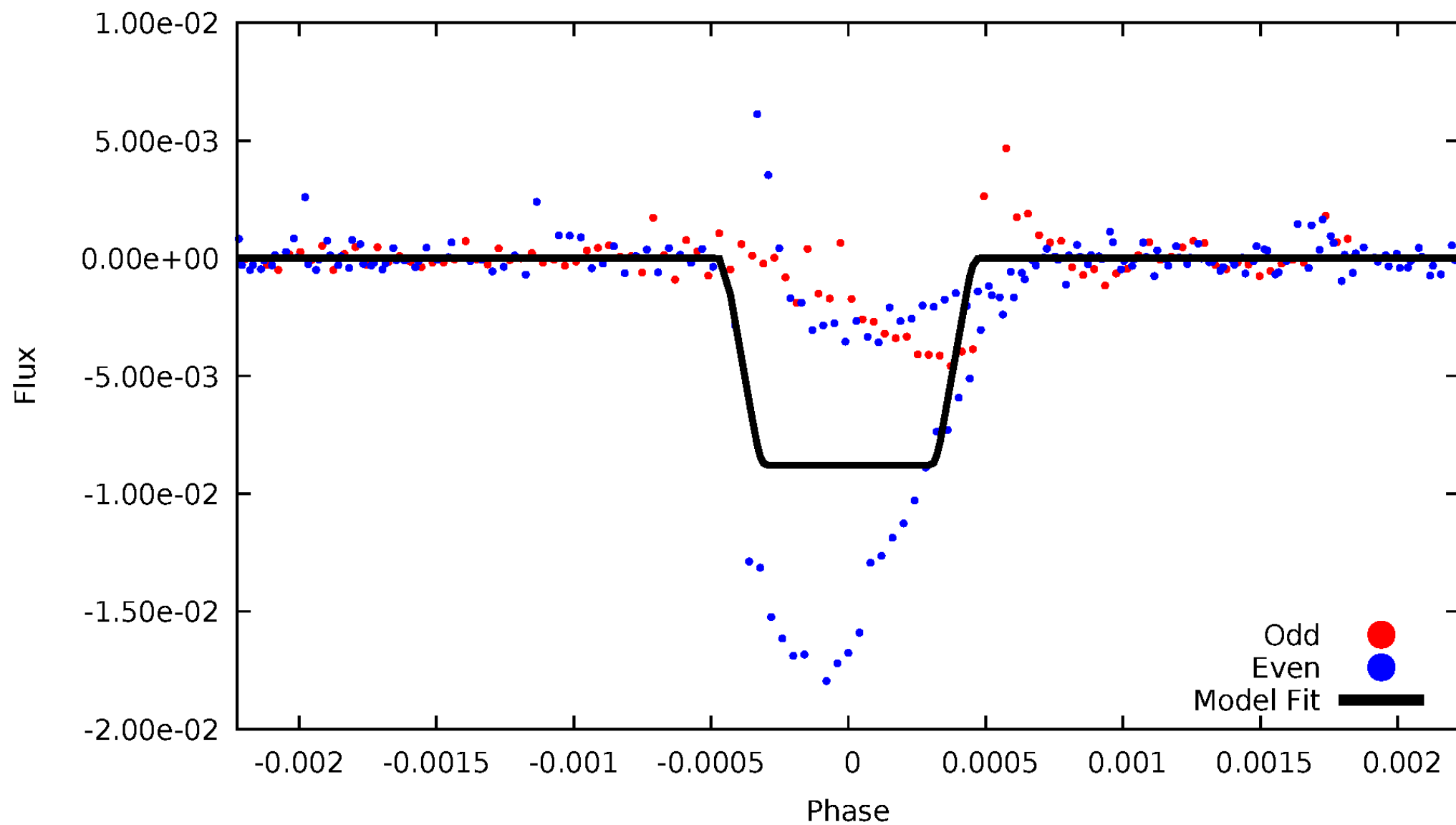
# DV Odd/Even

TCE 009414097-06



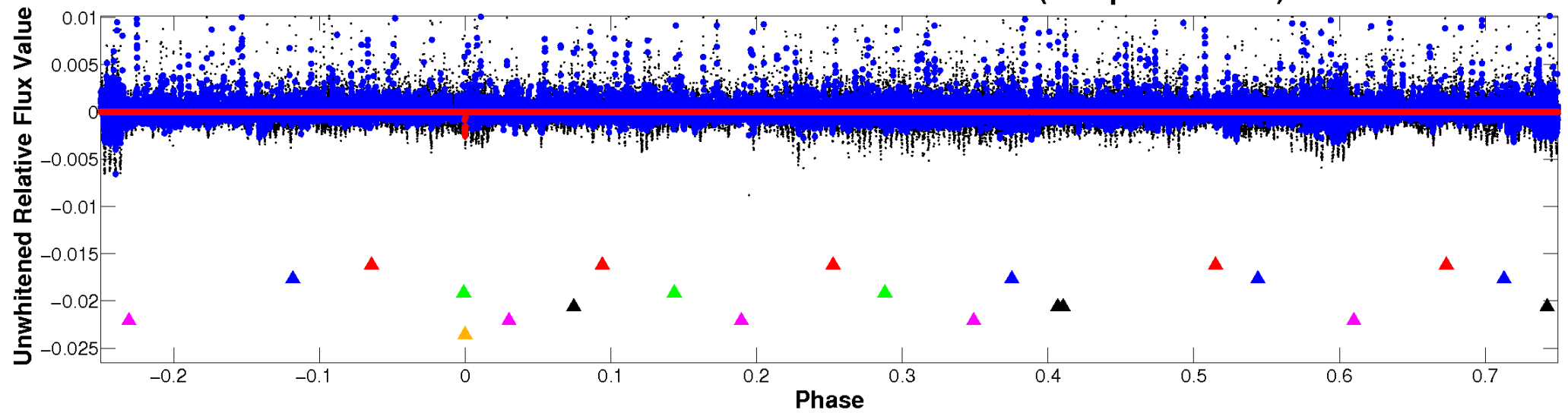
# ALT Odd/Even

TCE 009414097-06

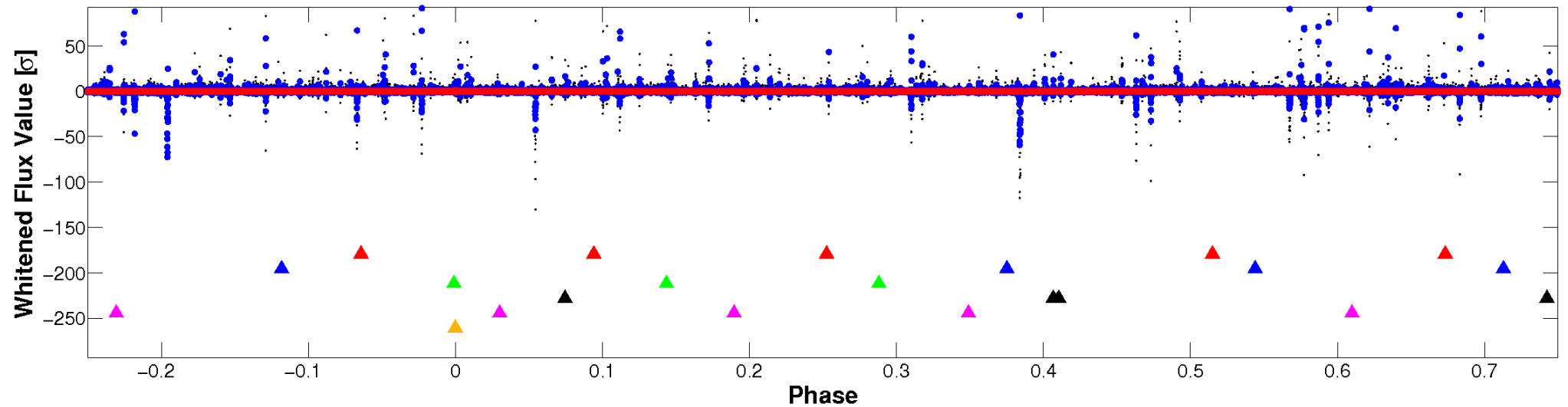


# Non-Whitened Vs. Whitened Light Curve

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

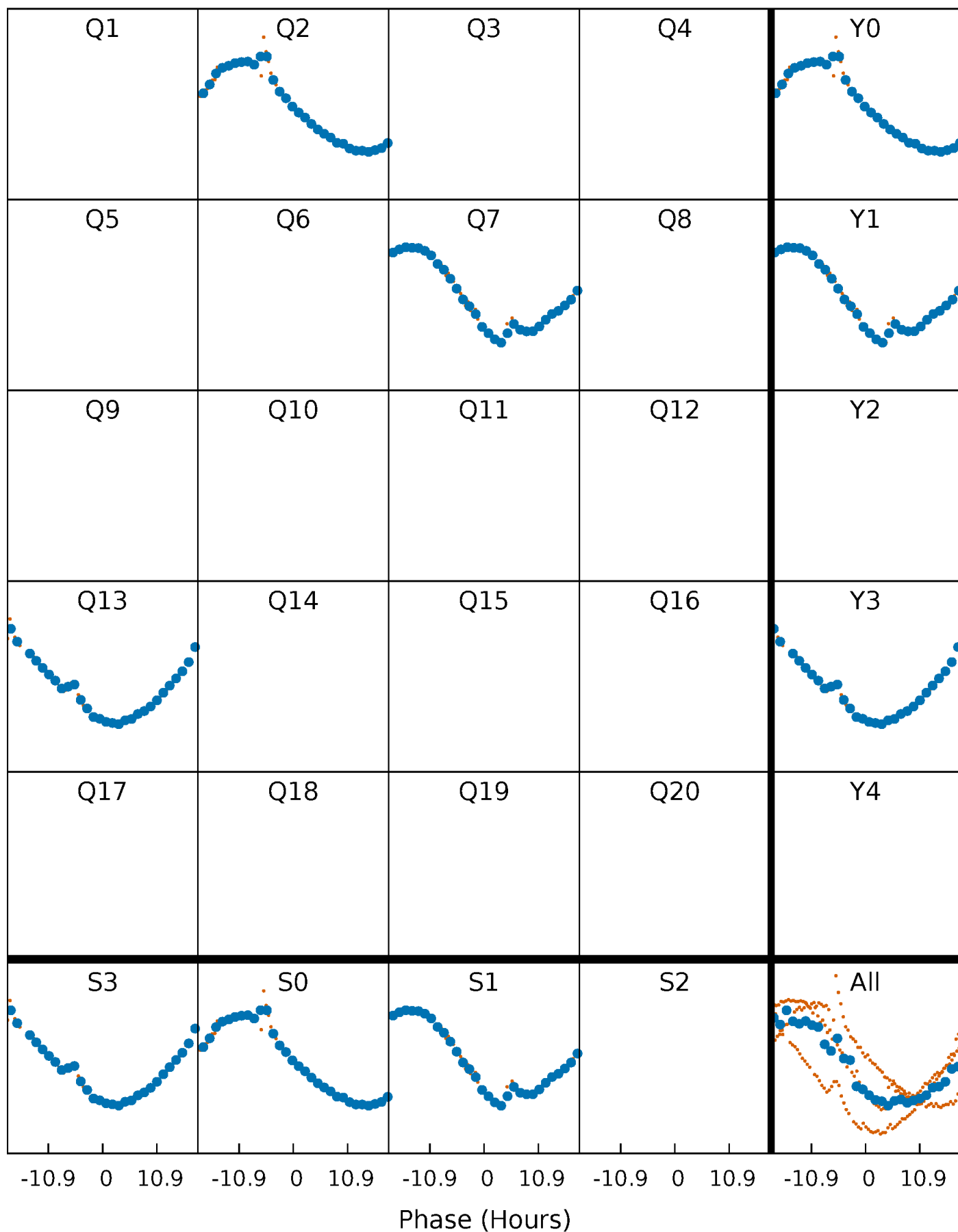


**Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

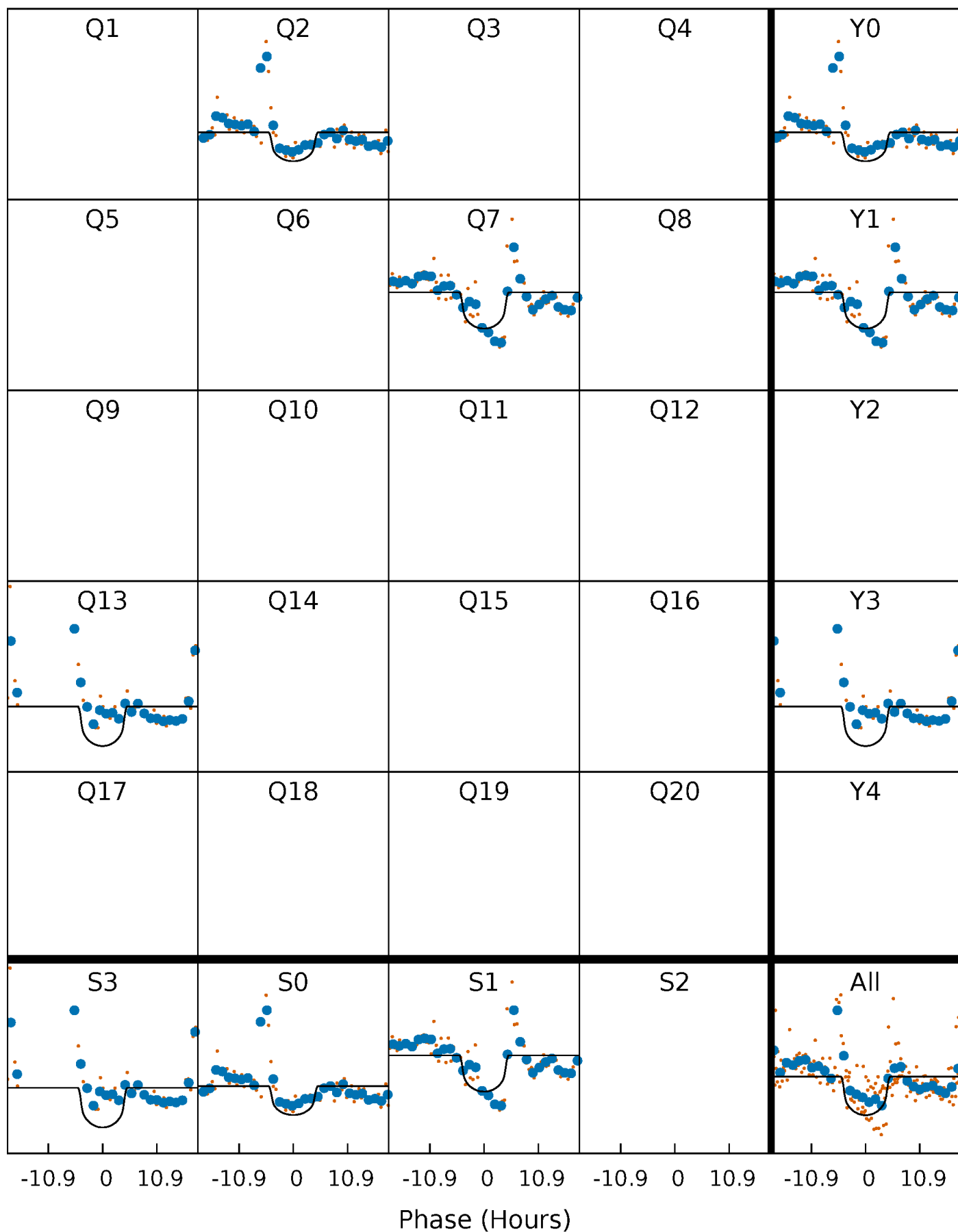
TCE 009414097-06     $P=508.823294$  Days     $T_0=200.602379$  (BKJD)





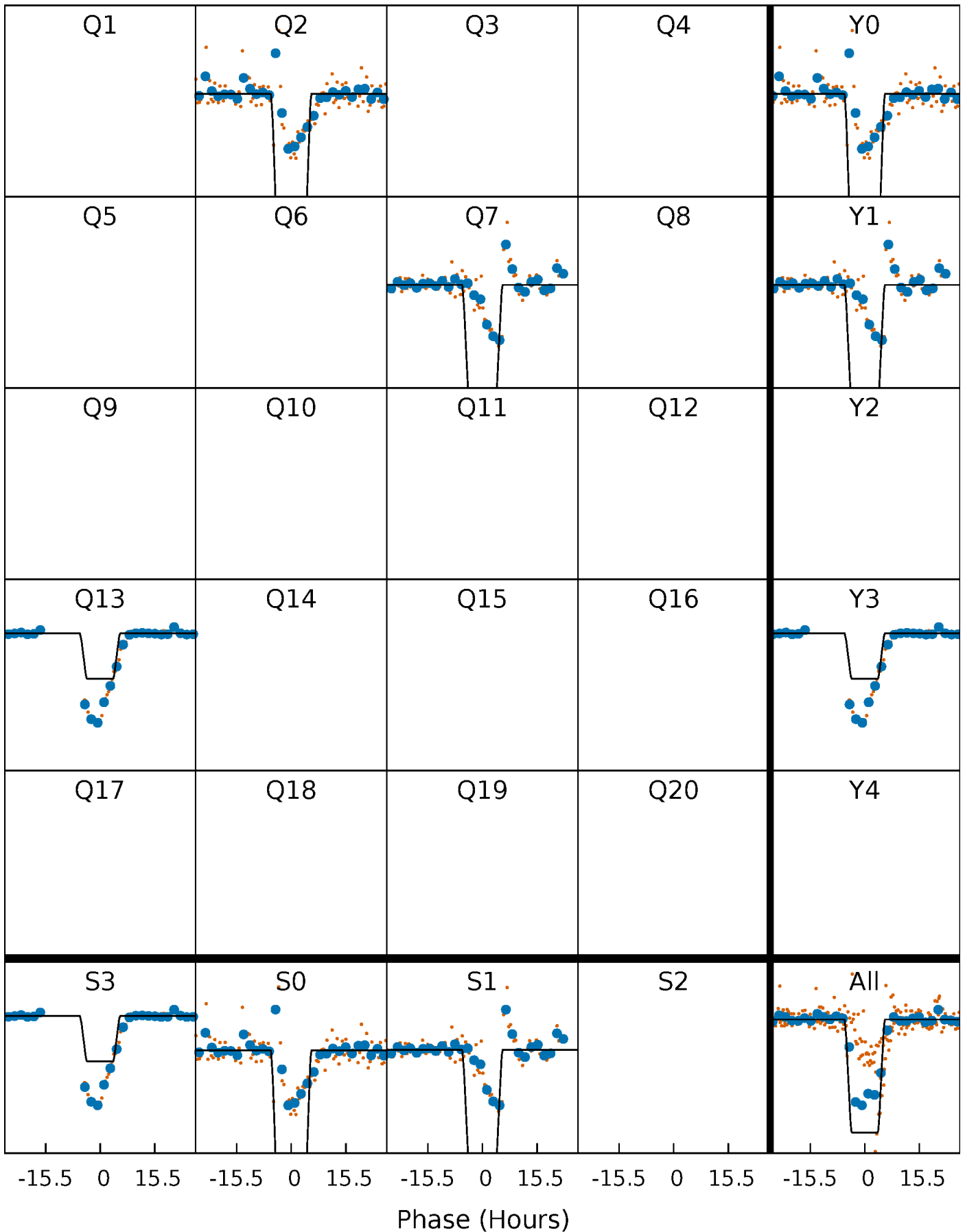
# DV Quarter-Phased Transit Curves

TCE 009414097-06 P=508.823294 Days  $T_0=200.602379$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

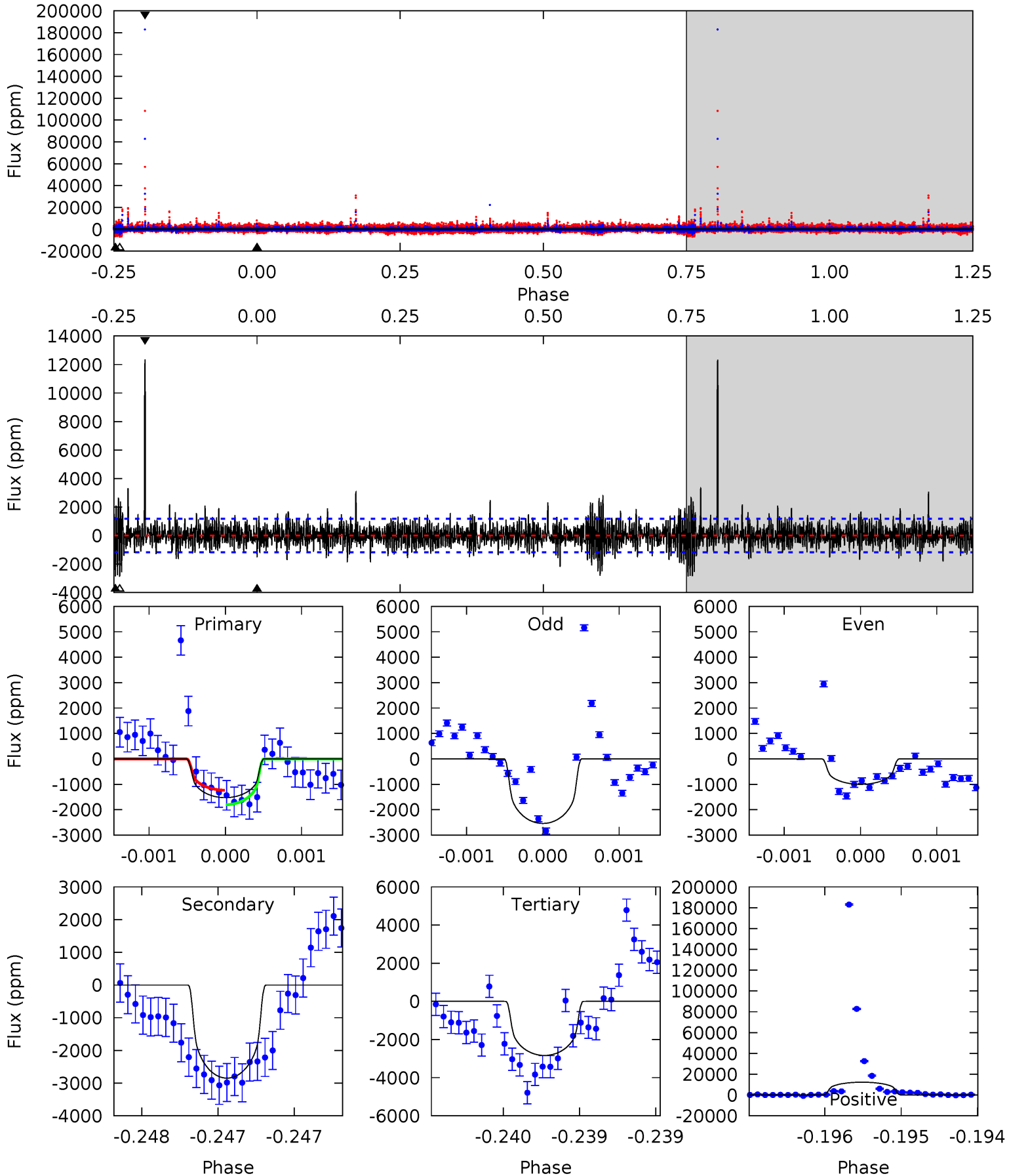
TCE 009414097-06     $P=508.822889$  Days     $T_0=200.544103$  (BKJD)



# DV Model-Shift Uniqueness Test

009414097-06, P = 508.823294 Days, E = 200.602379 Days

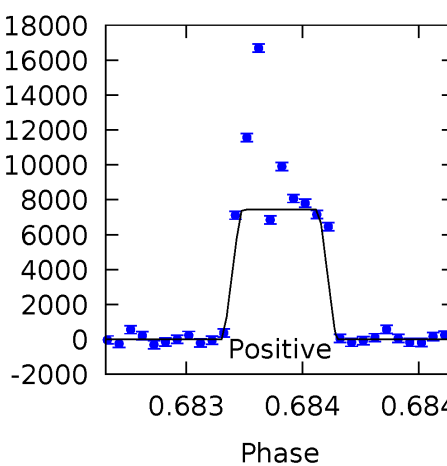
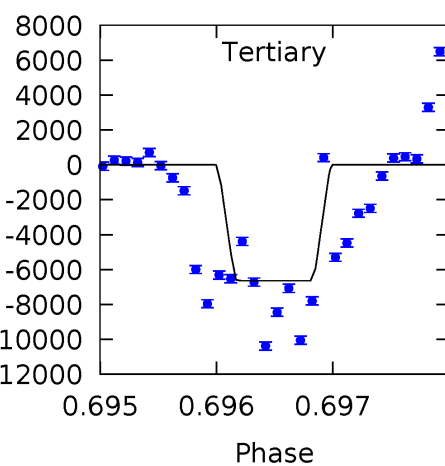
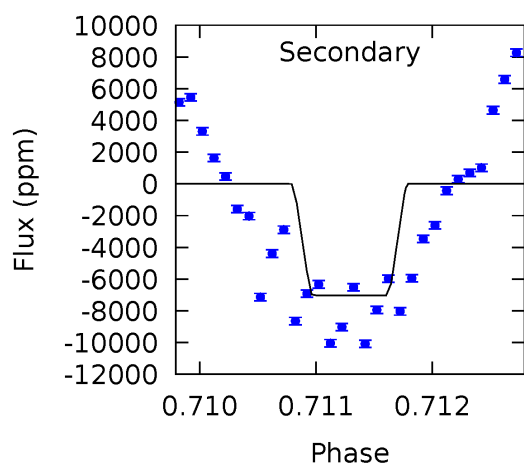
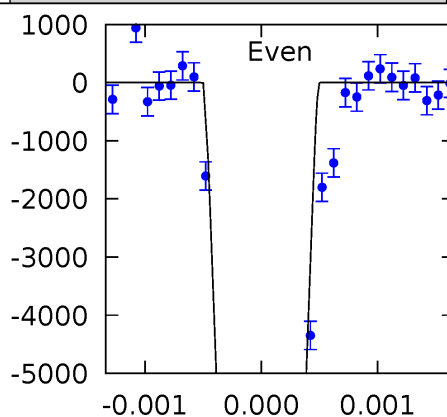
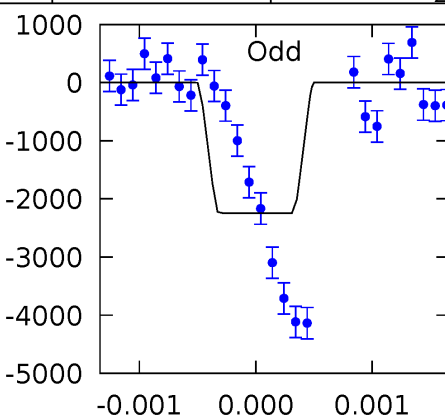
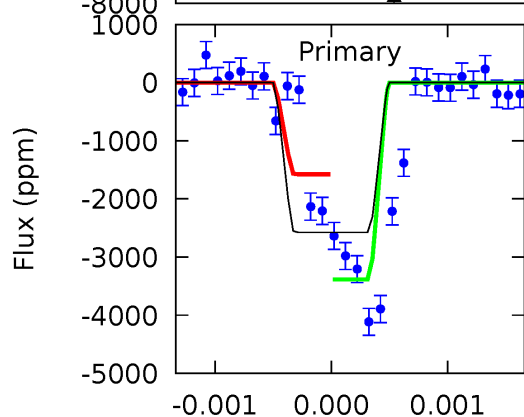
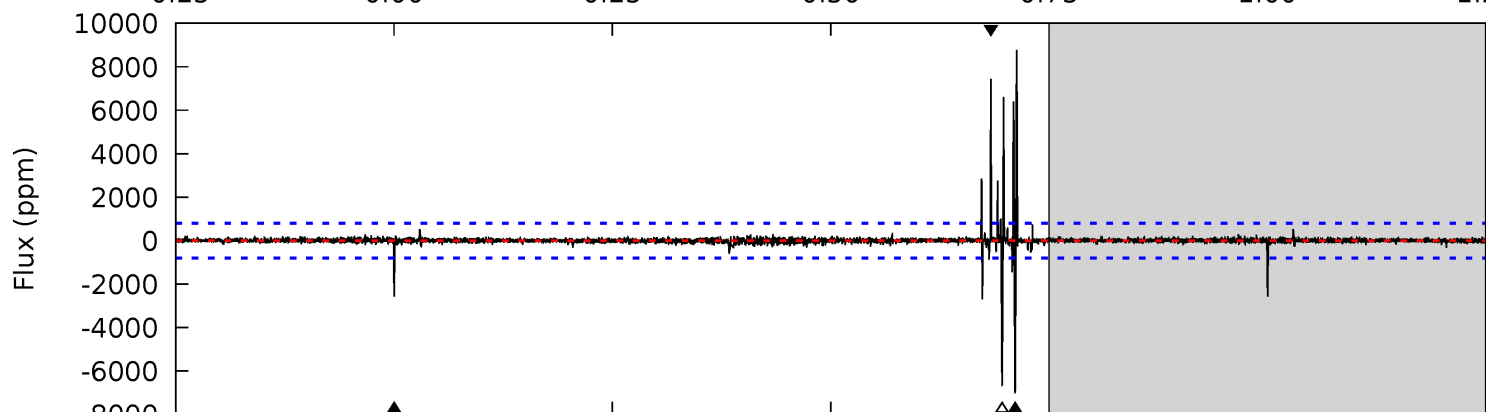
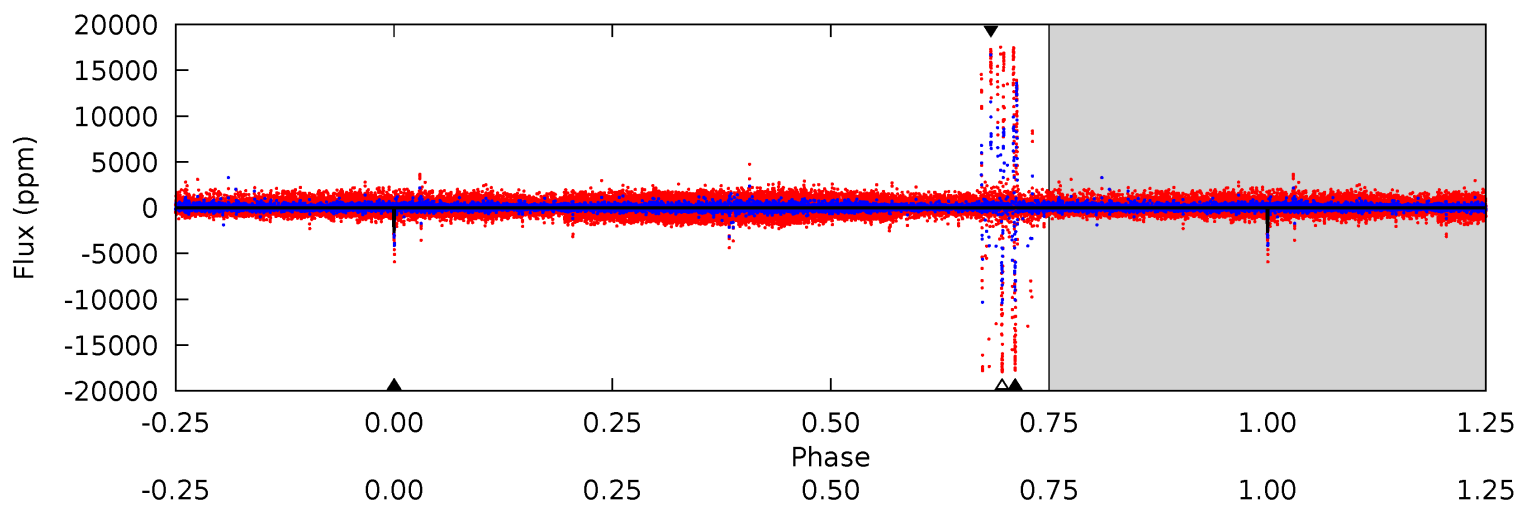
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.14	13.4	13.3	57.8	5.49	3.35	3.46	-6.15	-50.7	0.05	-44.5	1.59	1.04	0.81	1.33



# Alt Model-Shift Uniqueness Test

009414097-06, P = 508.822889 Days, E = 200.544103 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
17.6	48.1	45.5	50.9	5.46	3.31	2.64	-27.8	-33.2	2.66	-2.73	9.01	2.85	0.55	5.57



### Stellar Parameters For KIC 009414097

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4160^{+130}_{-158}$	$4.620^{+0.052}_{-0.016}$	$0.180^{+0.200}_{-0.300}$	$0.655^{+0.031}_{-0.058}$	$0.651^{+0.044}_{-0.058}$	$3.267^{+0.808}_{-0.260}$
	+3%/-4%	+1%/-0%	+111%/-167%	+5%/-9%	+7%/-9%	+25%/-8%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009414097-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-2847 \pm 213$	$3.43^{+0.90}_{-0.86}$	$198^{+7}_{-8}$	$4310^{+521}_{-387}$	$155864^{+129457}_{-56192}$
Alt.	$-7033 \pm 146$	$6.60^{+0.87}_{-0.95}$	$198^{+7}_{-8}$	$4002^{+257}_{-215}$	$105206^{+37361}_{-23283}$

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

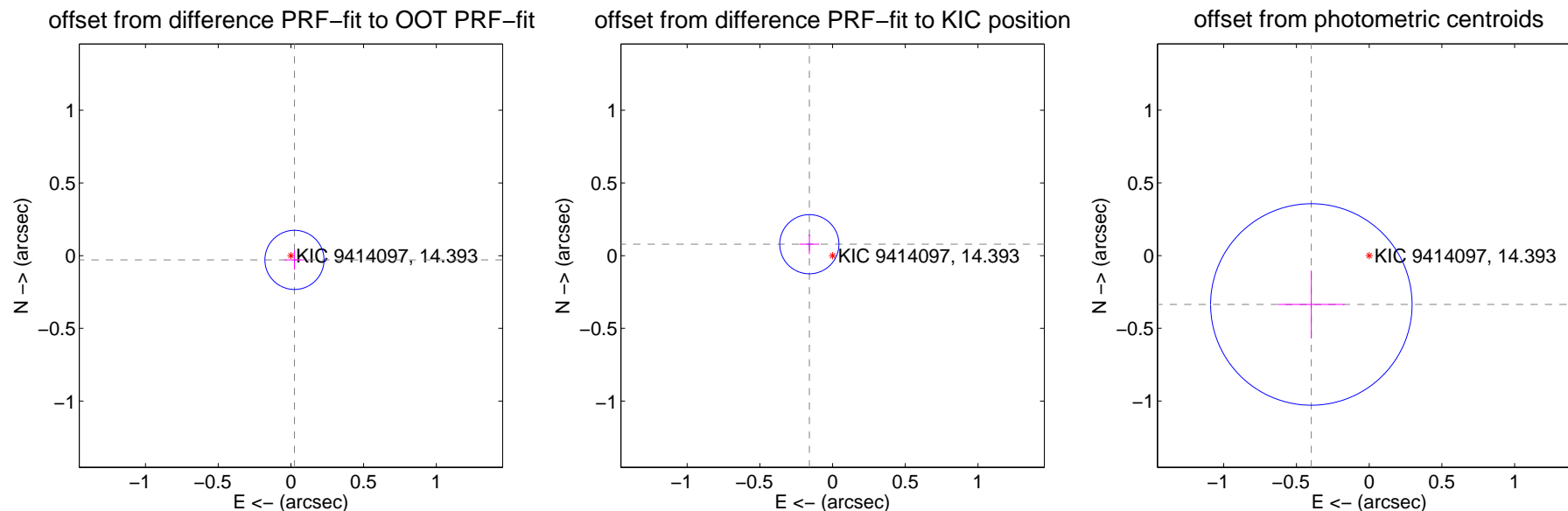
## DV Centroid Data

Supplemental centroid analysis for 009414097-06. Kepler magnitude: 14.39. Transit SNR 7.62

There are 1 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.038 \pm 0.068$	0.56	$-0.024 \pm 0.068$	$-0.029 \pm 0.068$
PRF-fit source offset from KIC position	$0.178 \pm 0.068$	2.63	$0.160 \pm 0.068$	$0.079 \pm 0.068$
photometric centroid source offset	$0.52 \pm 0.23$	2.26	$0.40 \pm 0.23$	$-0.34 \pm 0.23$

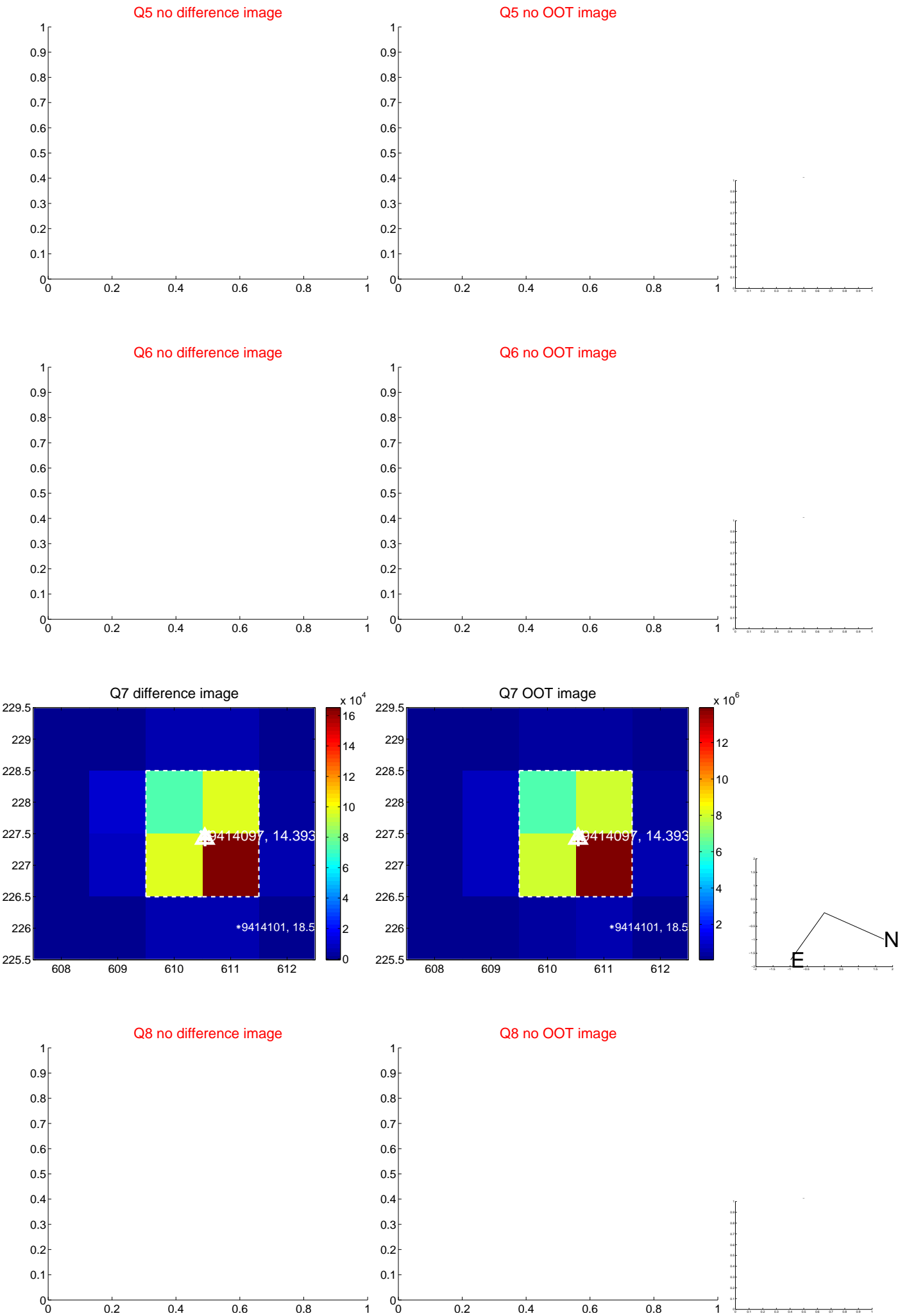


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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





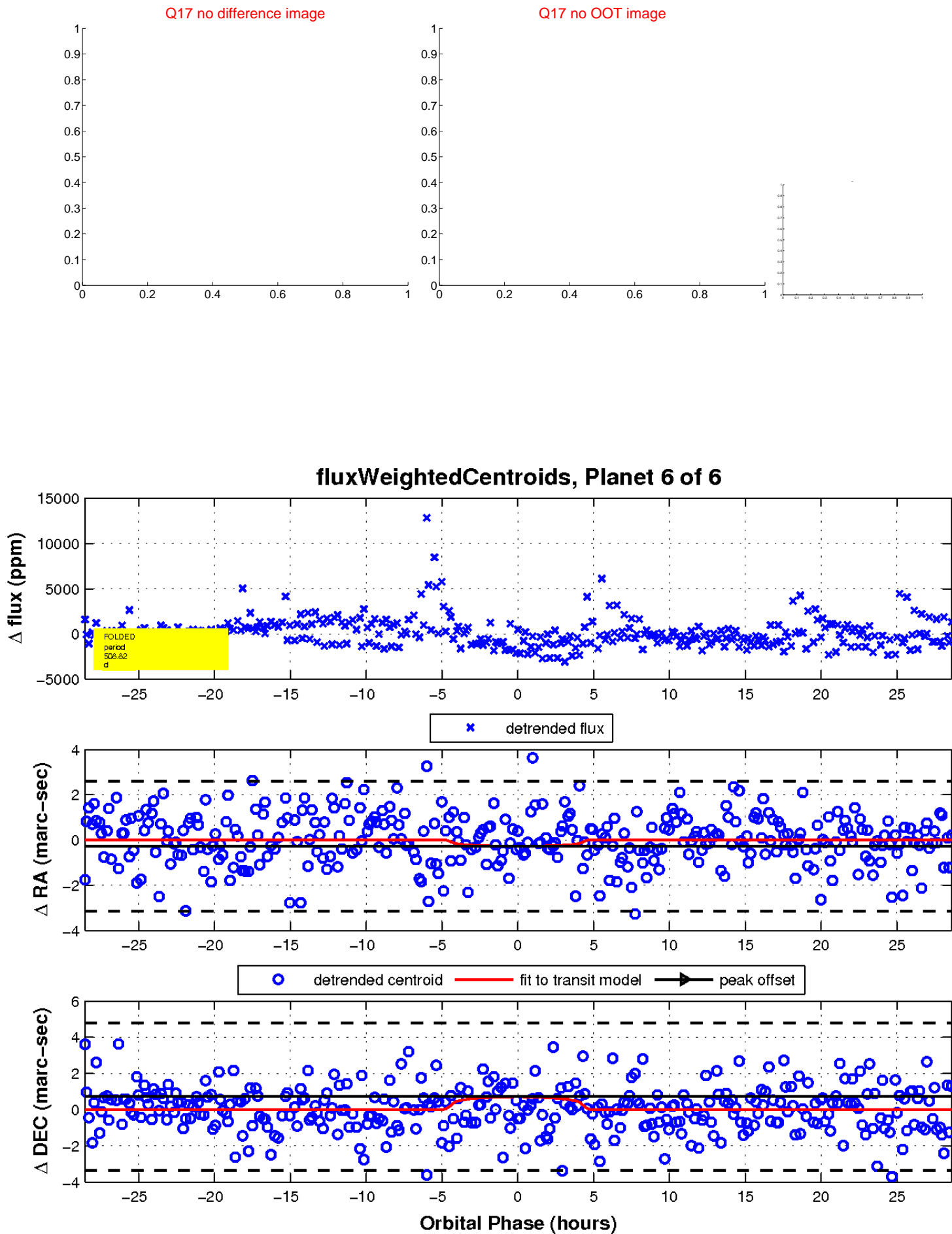
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

