

# KIC 005480273

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005480273-01	OBS	No	559.670417	430.388399	1772.5	3.716	10.3	6.7	0.55	4701	2.35	0.11
005480273-02	OBS	No	435.490631	252.037619	2379.0	5.170	11.1	8.5	0.55	4701	2.81	0.16
005480273-03	OBS	No	367.616782	245.491503	1354.9	4.546	12.5	5.6	0.55	4701	2.15	0.20
005480273-04	OBS	No	259.148956	345.639123	1563.7	3.388	11.3	6.6	0.55	4701	2.18	0.32

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005480273-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT— INCONSISTENT_TRANS—CENT_FEW_DIFFS
005480273-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS
005480273-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
005480273-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—INCONSISTENT_TRANS

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

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

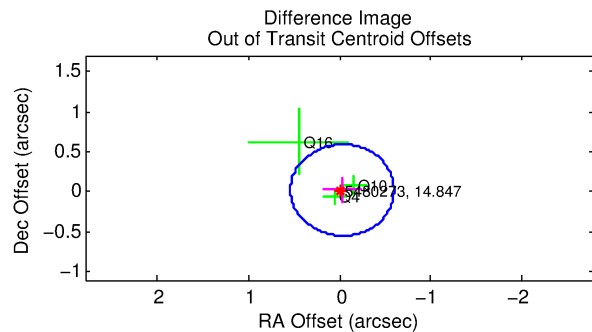
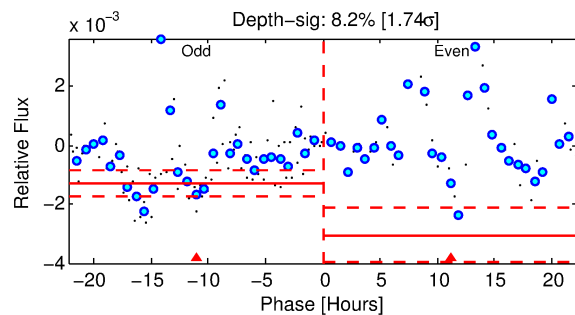
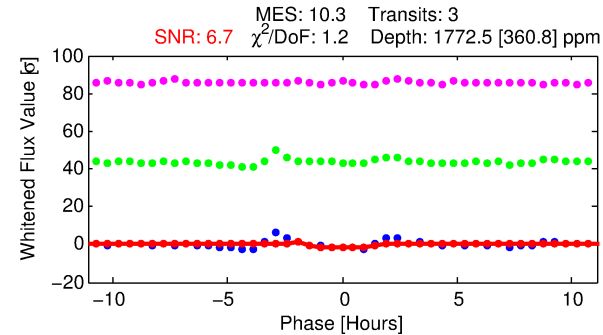
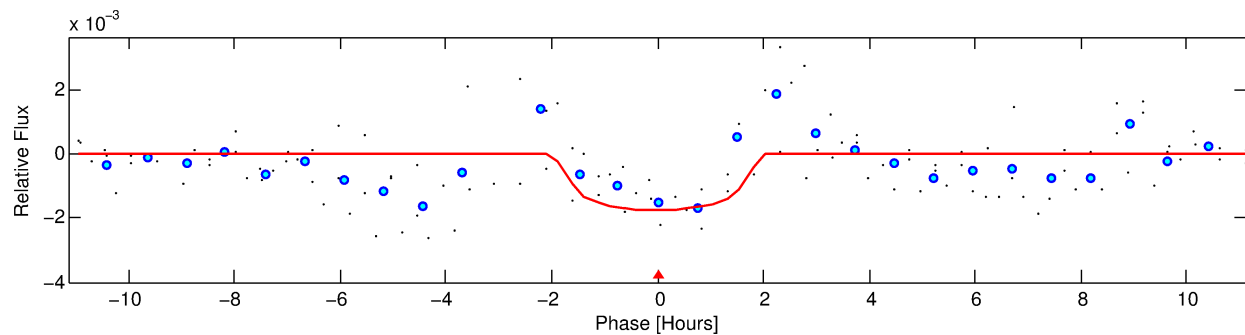
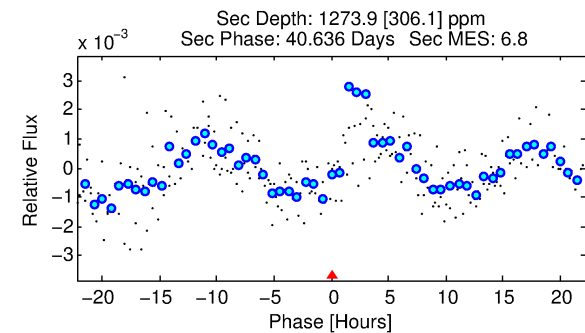
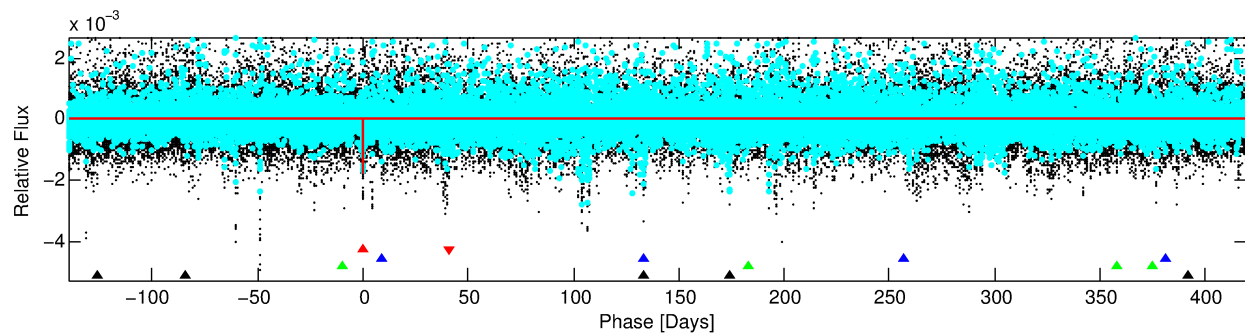
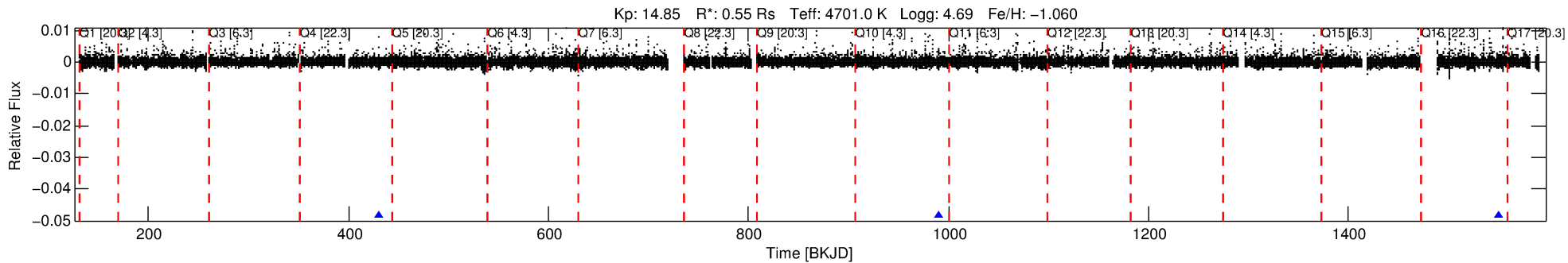
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005480273-01

No Significant Match Found

# DV One-Page Summary

KIC: 5480273 Candidate: 1 of 4 Period: 559.670 d



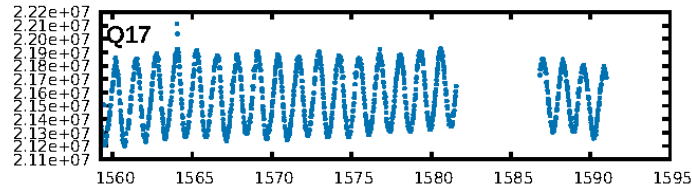
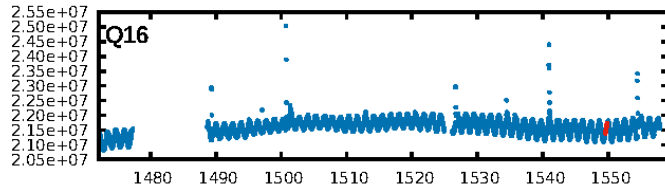
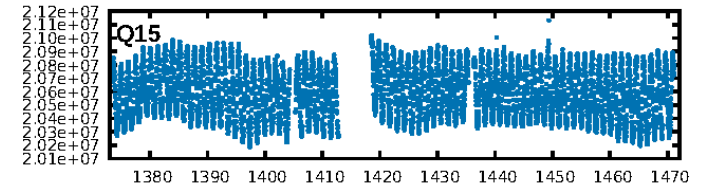
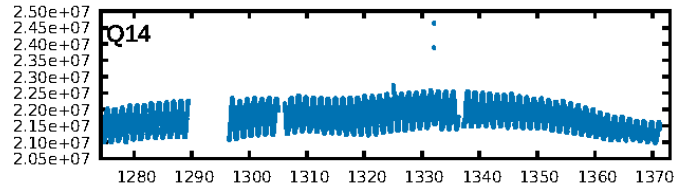
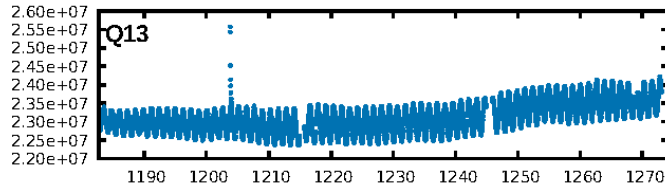
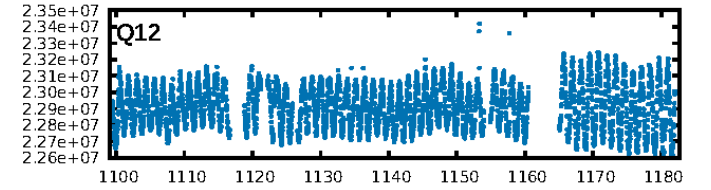
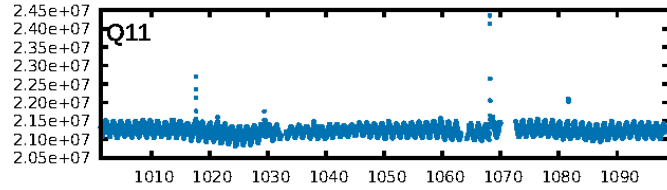
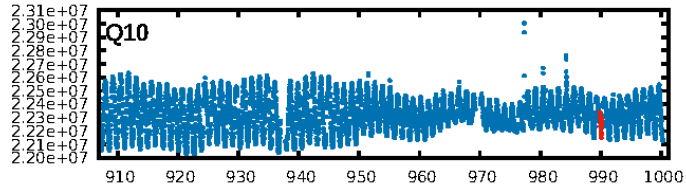
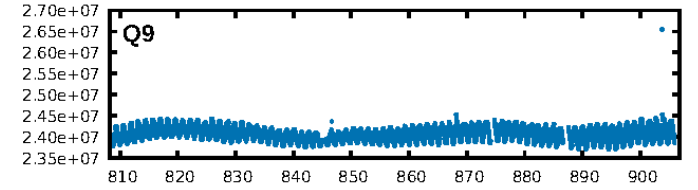
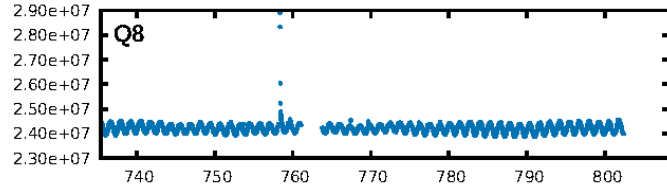
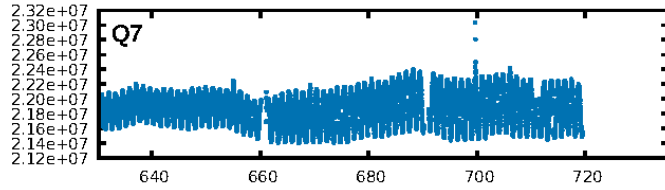
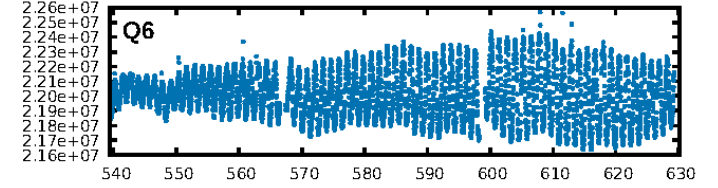
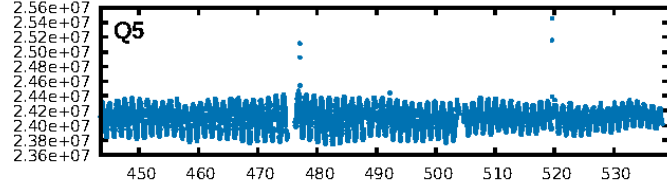
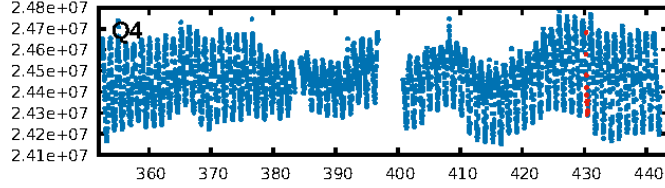
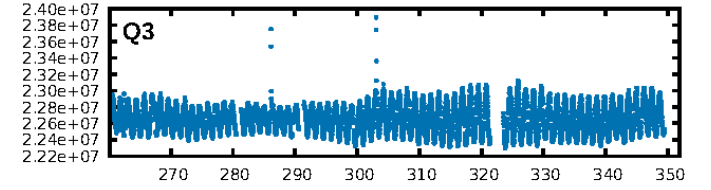
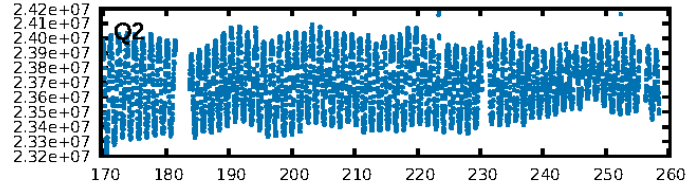
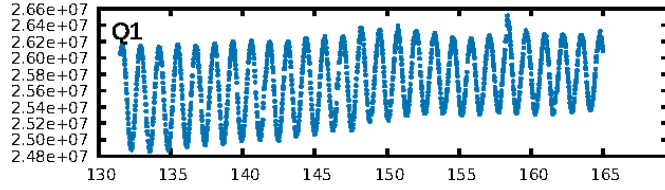
## DV Fit Results:

Period = 559.67042 [0.00660] d  
Epoch = 430.3884 [0.0099] BKJD  
Rp/R\* = 0.0388 [0.0688]  
a/R\* = 1071.53 [6935.74]  
b = 0.46 [11.20]  
Seff = 0.11 [0.02]  
Teq = 148 [6] K  
Rp = 2.35 [4.17] Re  
a = 1.0914 [0.0653] AU  
Ag = 151586.73 [539114.39] [0.28σ]  
Teffp = 4508 [4009] K [1.09σ]

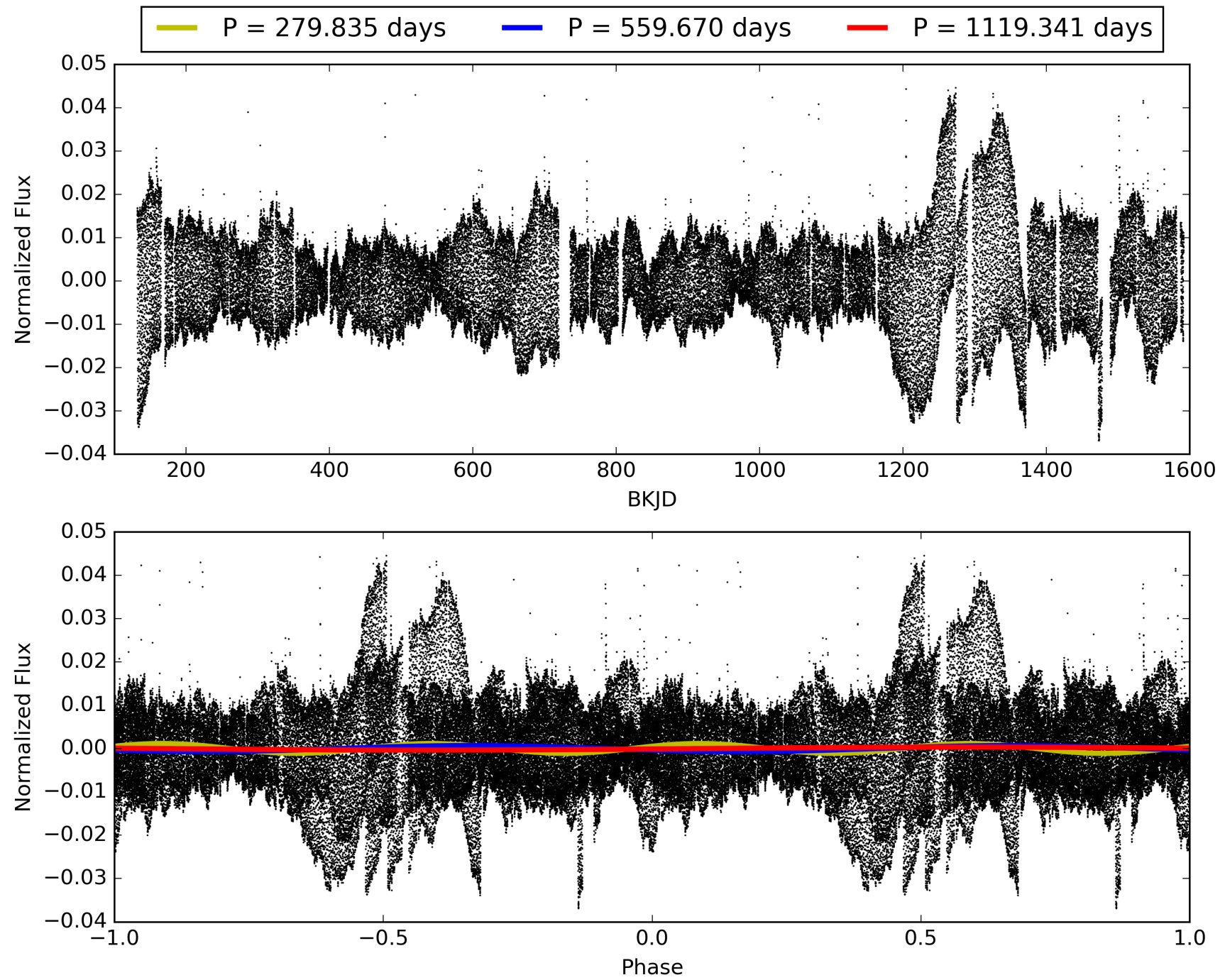
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [468.12σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 3.9%  
ModelChiSquareGof-sig: 93.8%  
Bootstrap-pfa: 1.29e-08  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -21.18  
Centroid-sig: 6.9%  
Centroid-so: 0.973 arcsec [0.93σ]  
OotOffset-rm: 0.036 arcsec [0.19σ]  
OotOffset-st: 1/0/2/0 [3]  
KicOffset-rm: 0.099 arcsec [0.49σ]  
KicOffset-st: 1/0/2/0 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

# TCE 005480273-01, PDC Light Curves



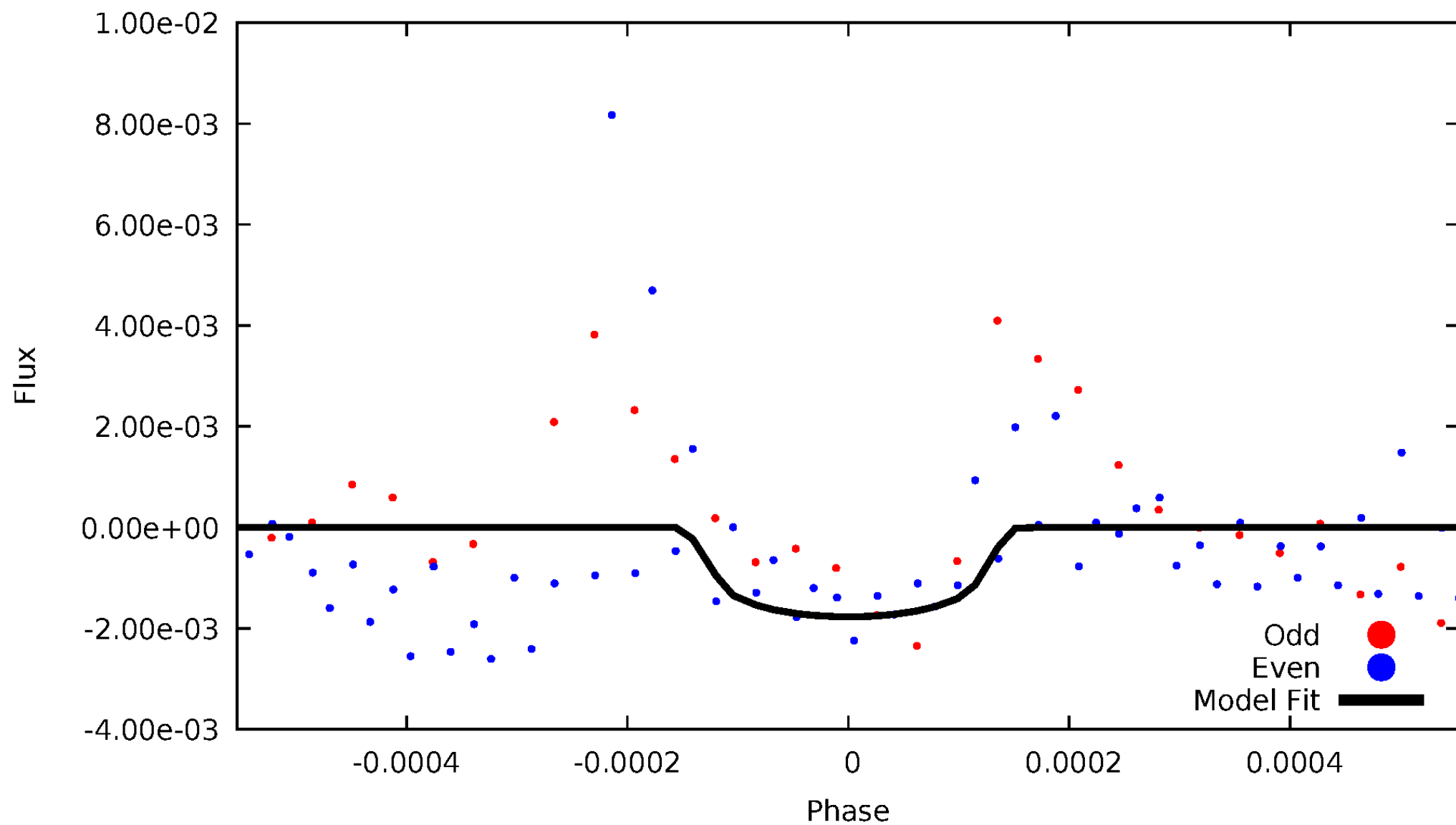
TCE 005480273-01





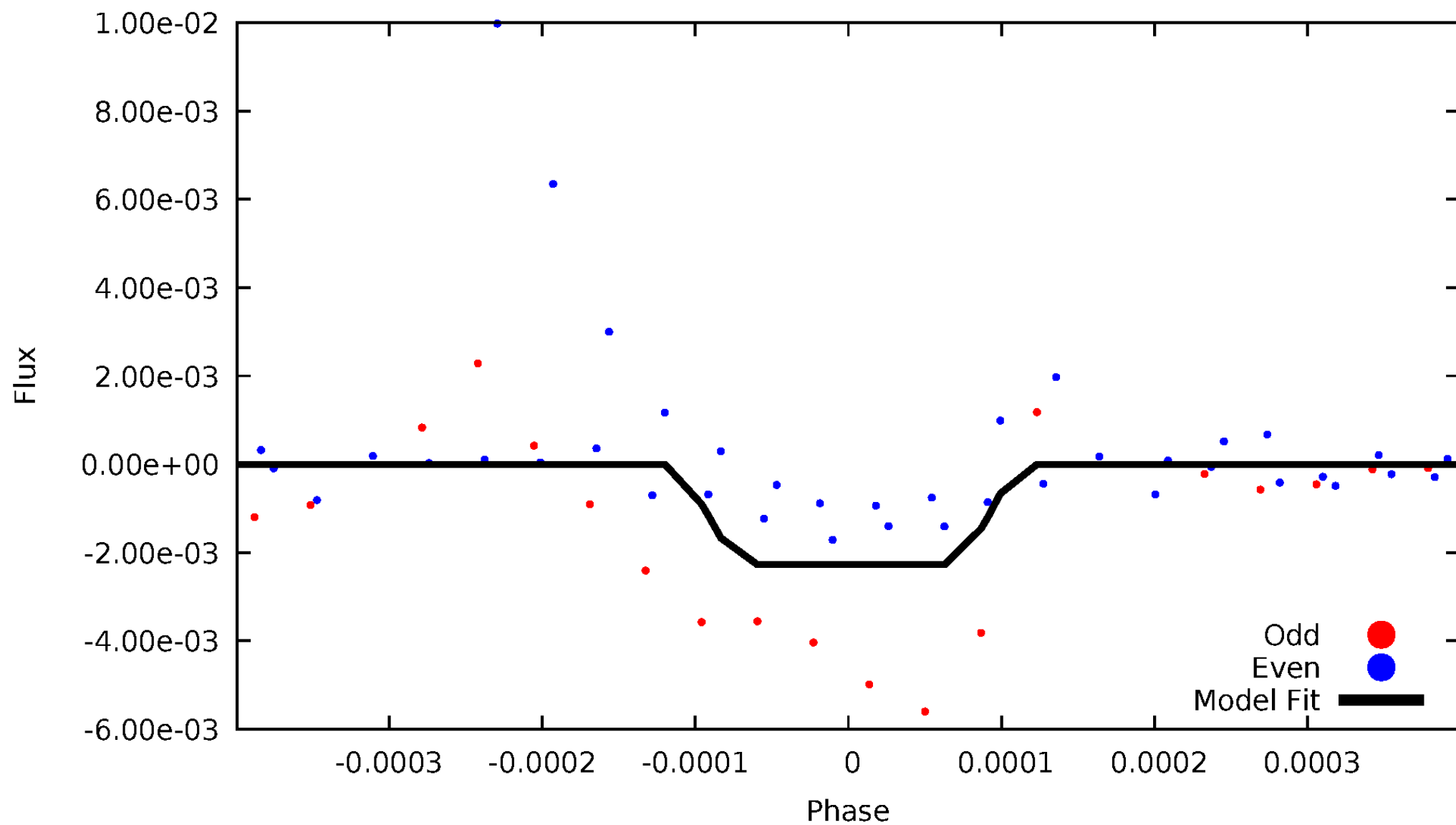
# DV Odd/Even

TCE 005480273-01



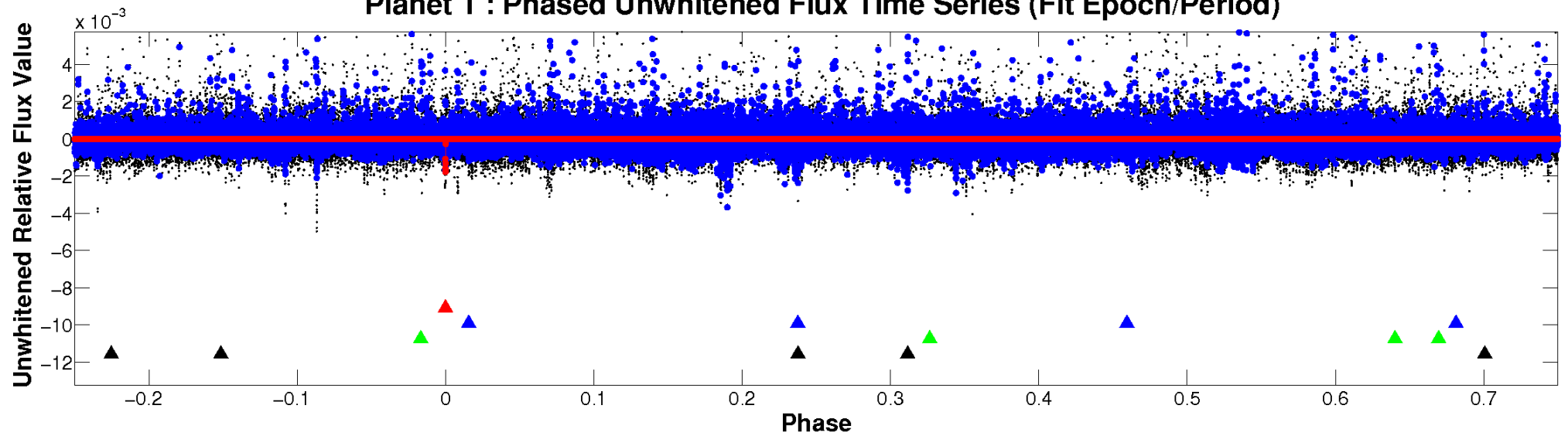
# ALT Odd/Even

TCE 005480273-01

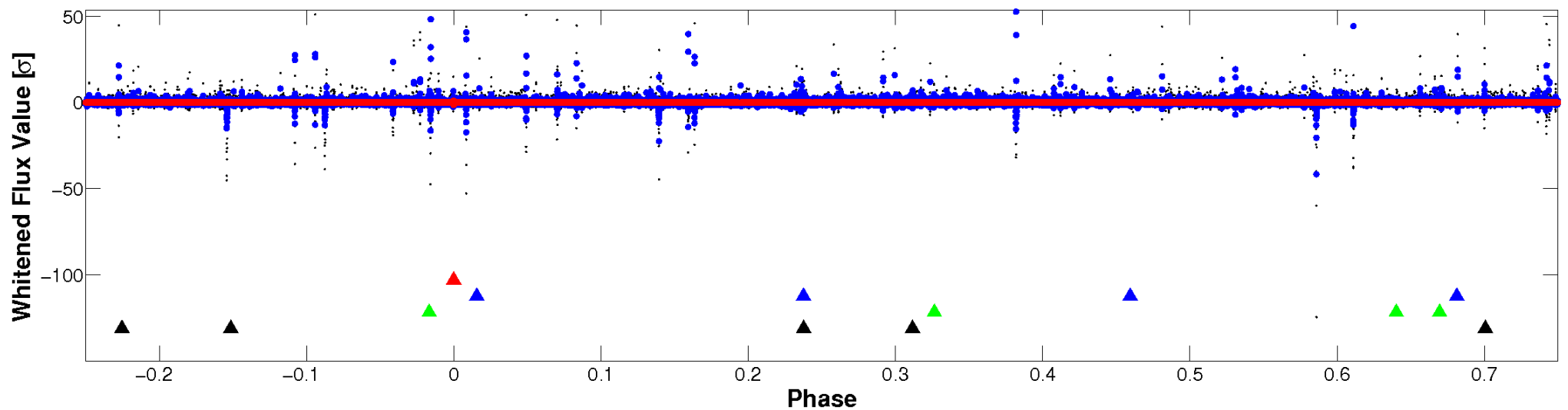


# Non-Whitened Vs. Whitened Light Curve

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

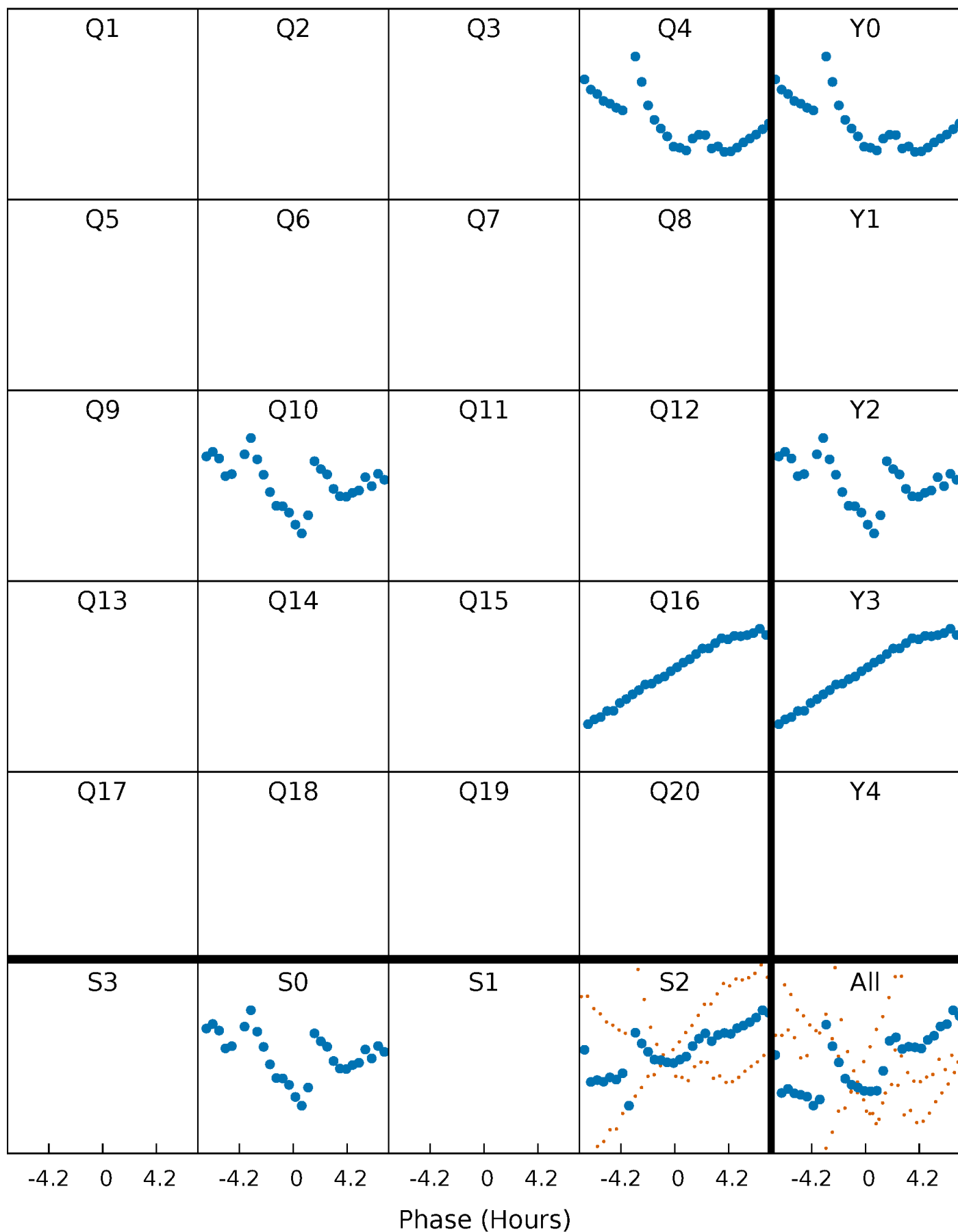


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



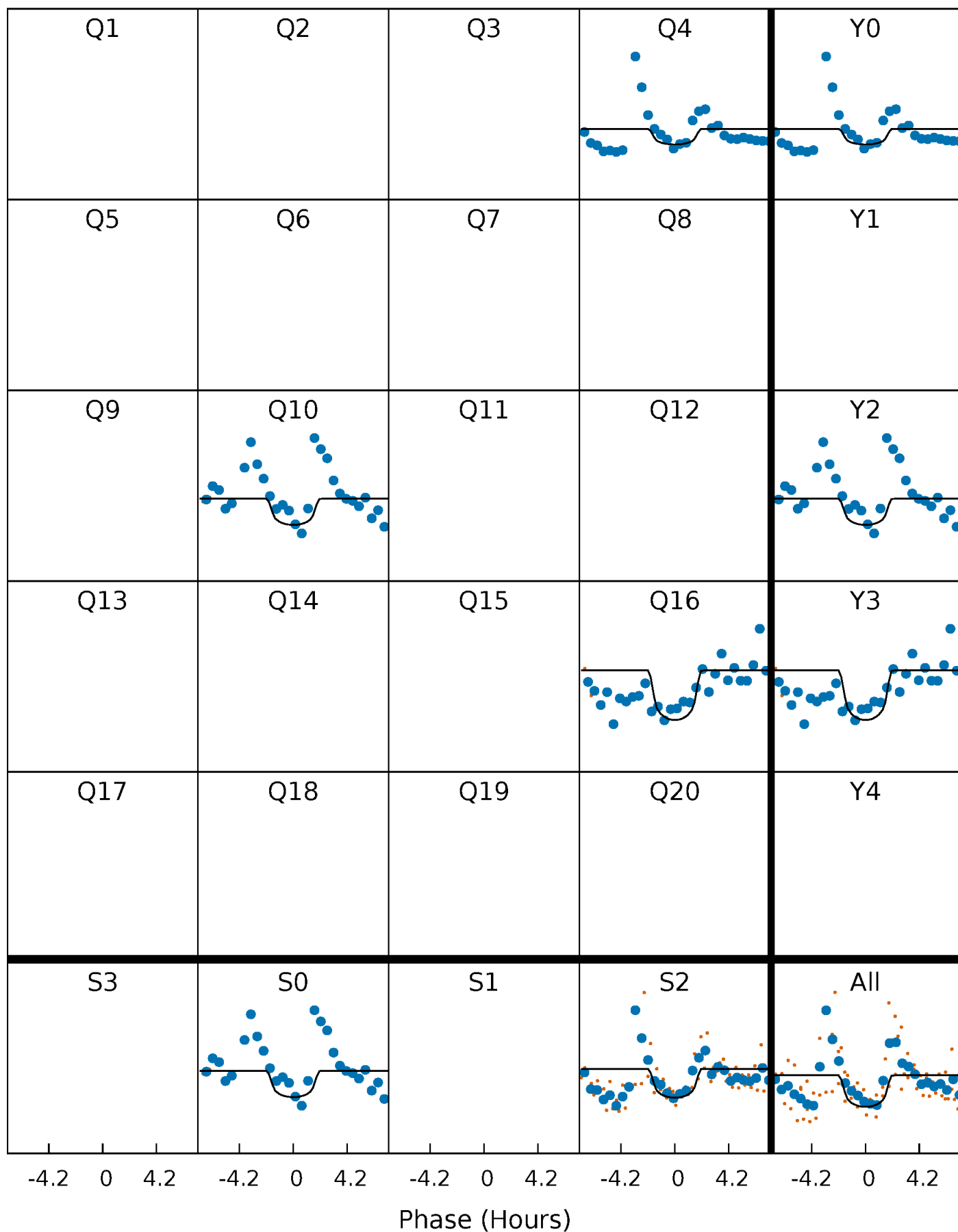
# PDC Quarter-Phased Transit Curves

TCE 005480273-01 P=559.670417 Days  $T_0=430.388399$  (BKJD)



# DV Quarter-Phased Transit Curves

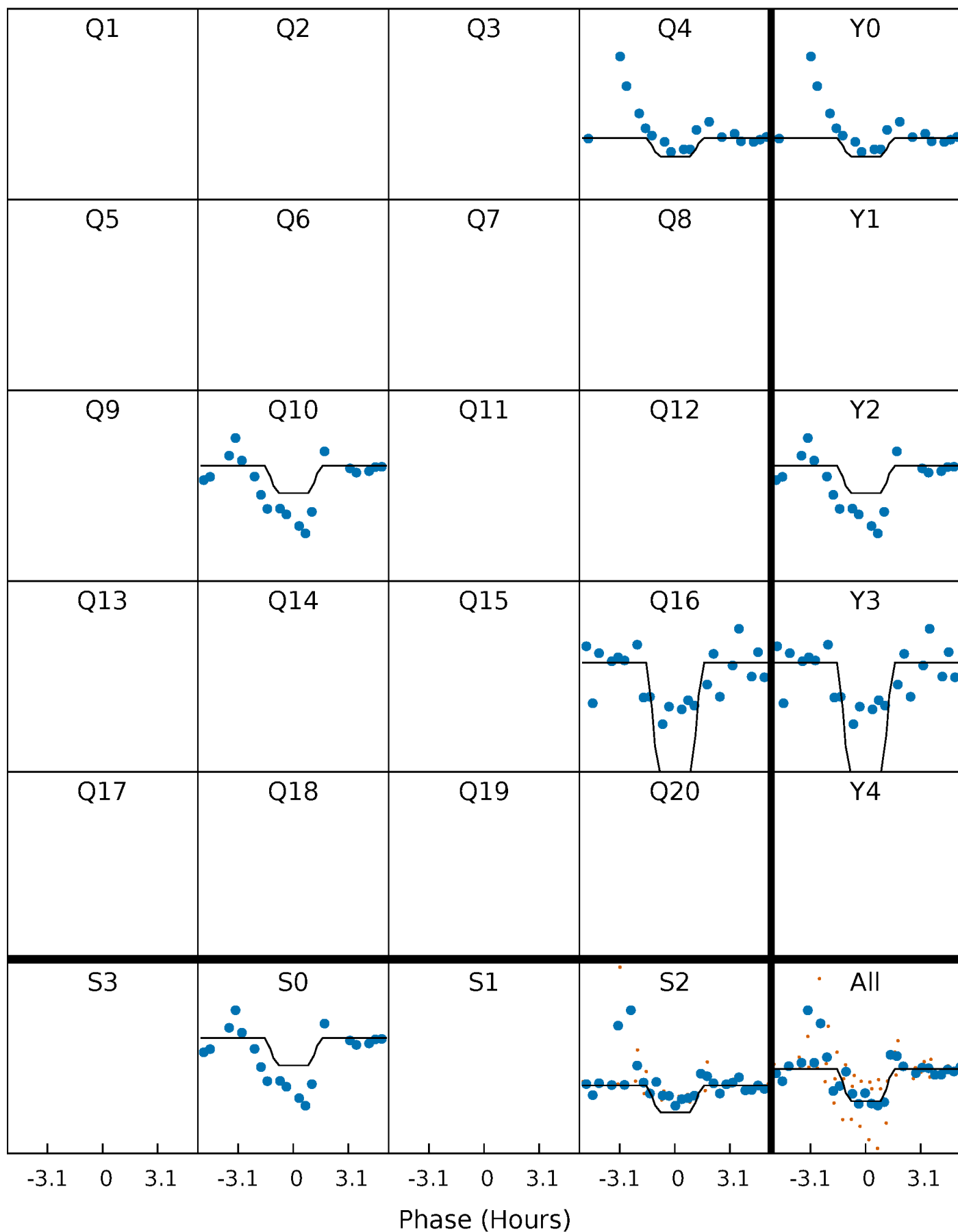
TCE 005480273-01 P=559.670417 Days  $T_0=430.388399$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

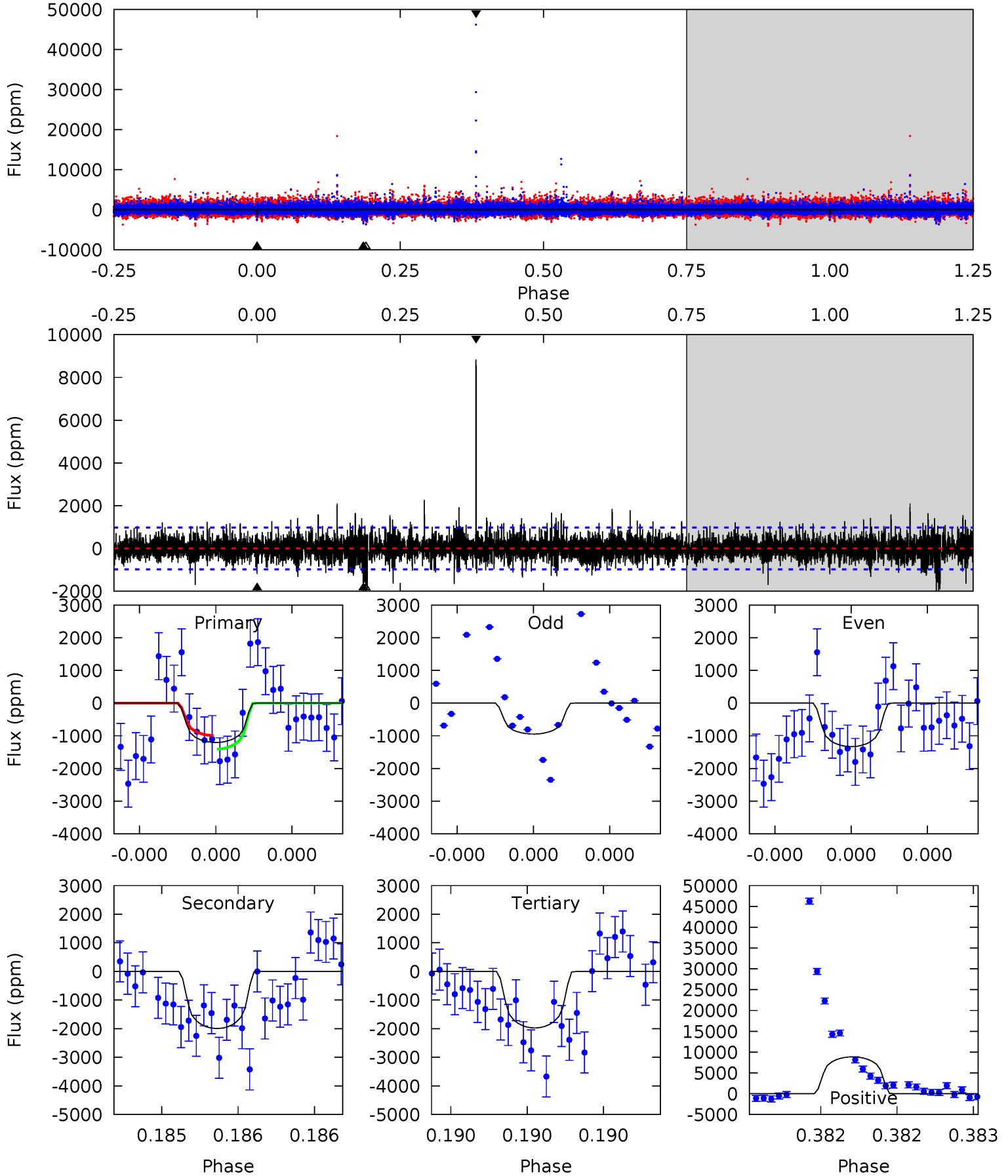
TCE 005480273-01 P=559.668397 Days  $T_0=430.397041$  (BKJD)



# DV Model-Shift Uniqueness Test

005480273-01, P = 559.670417 Days, E = 430.388399 Days

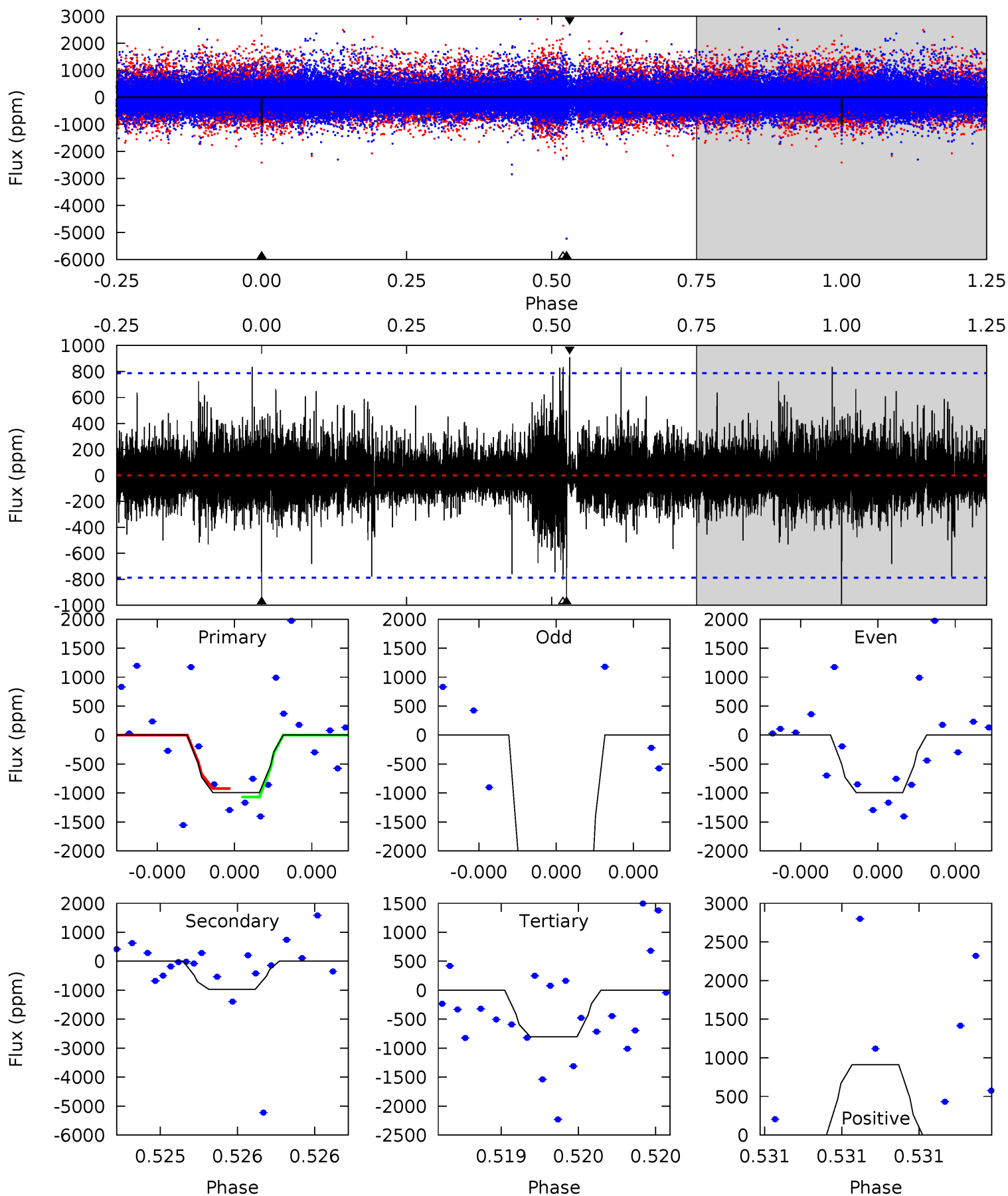
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.96	11.5	11.4	51.2	5.65	3.60	2.36	-4.46	-44.2	0.12	-39.6	0.48	1.07	0.82	1.20



# Alt Model-Shift Uniqueness Test

005480273-01, P = 559.668397 Days, E = 430.397041 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
7.23	7.04	5.86	6.63	5.73	3.73	0.97	1.36	0.59	1.17	0.41	13.8	2.24	0.48	0.53



### Stellar Parameters For KIC 005480273

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4701^{+153}_{-153}$	$4.694^{+0.052}_{-0.028}$	$-1.060^{+0.300}_{-0.300}$	$0.554^{+0.037}_{-0.037}$	$0.553^{+0.047}_{-0.024}$	$4.585^{+0.888}_{-0.554}$
	+3%/-3%	+1%/-1%	+28%/-28%	+7%/-7%	+8%/-4%	+19%/-12%
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 005480273-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-1995 \pm 173$	$3.90^{+3.60}_{-2.68}$	$205^{+8}_{-7}$	$4072^{+2811}_{-765}$	$86630^{+785832}_{-62912}$
Alt.	$-966 \pm 137$	$4.19^{+3.51}_{-2.79}$	$205^{+8}_{-7}$	$3521^{+1779}_{-583}$	$36110^{+291513}_{-25493}$

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

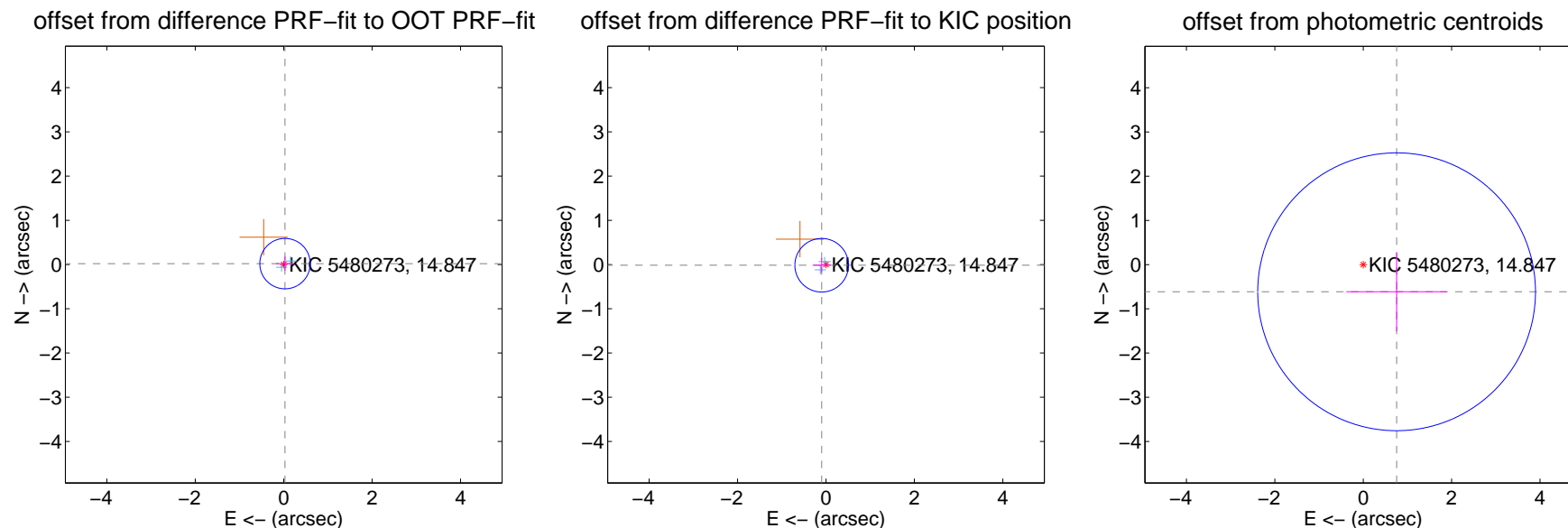
## DV Centroid Data

Supplemental centroid analysis for 005480273-01. Kepler magnitude: 14.85. Transit SNR 6.68

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

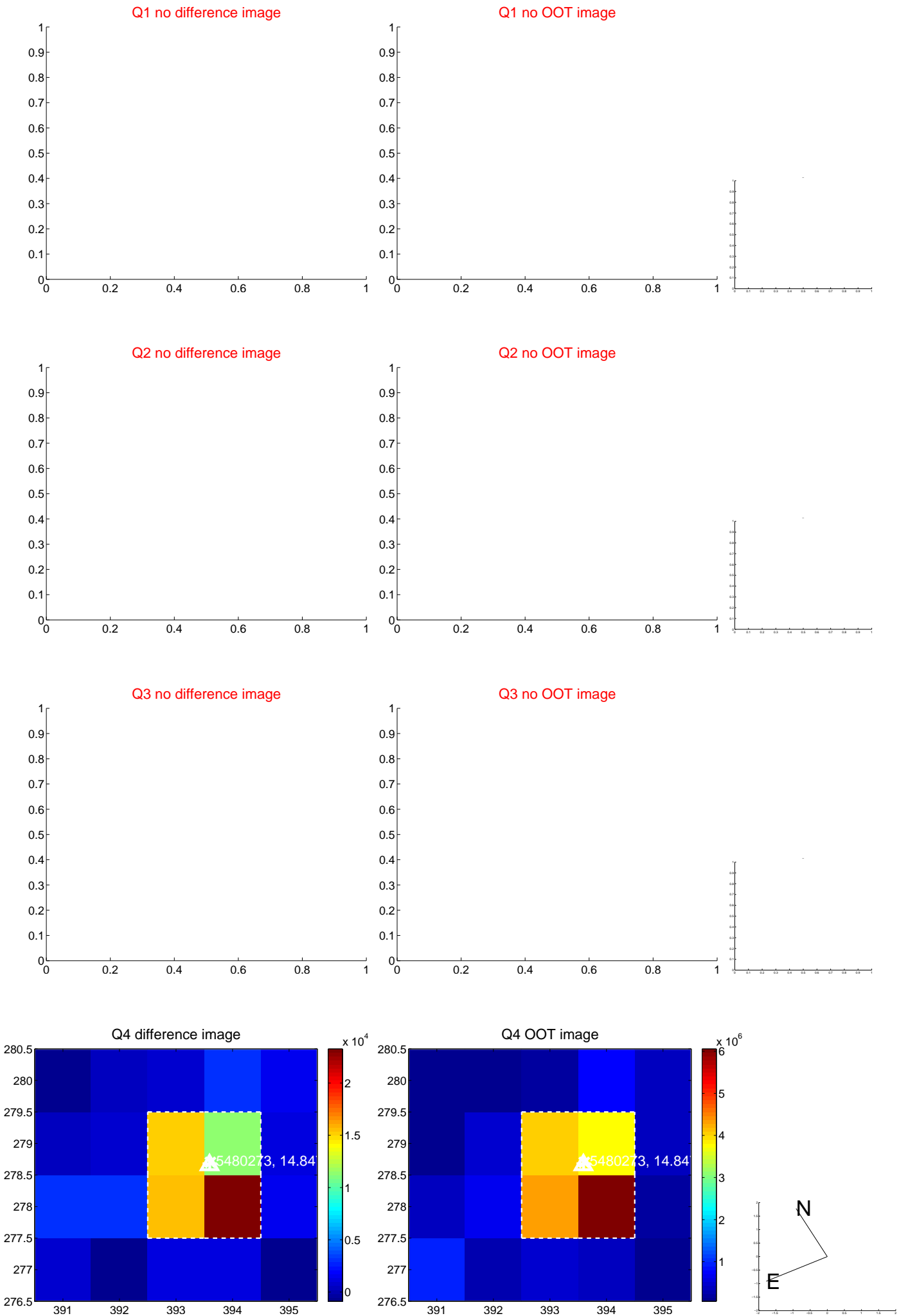
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.036 \pm 0.190$	0.19	$-0.030 \pm 0.203$	$0.021 \pm 0.159$
PRF-fit source offset from KIC position	$0.099 \pm 0.202$	0.49	$0.097 \pm 0.203$	$-0.016 \pm 0.159$
photometric centroid source offset	$0.97 \pm 1.05$	0.93	$-0.76 \pm 1.14$	$-0.61 \pm 0.89$



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



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



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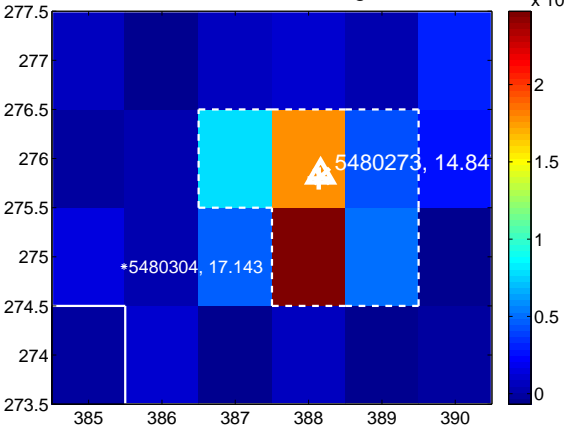
Q9 no difference image



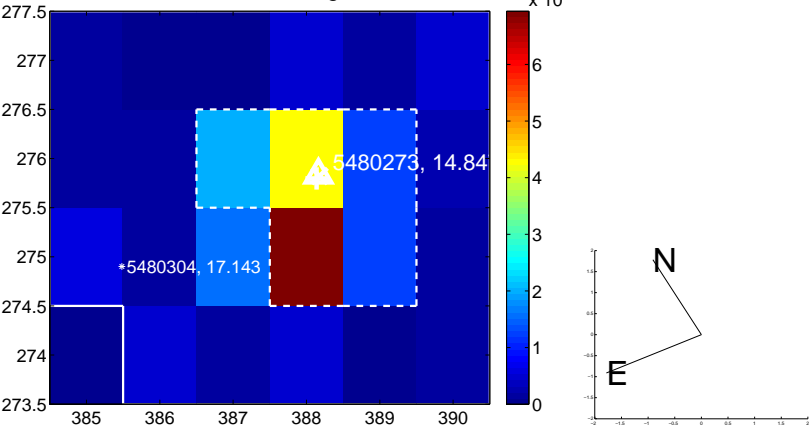
Q9 no OOT image



Q10 difference image



Q10 OOT image



Q11 no difference image



Q11 no OOT image



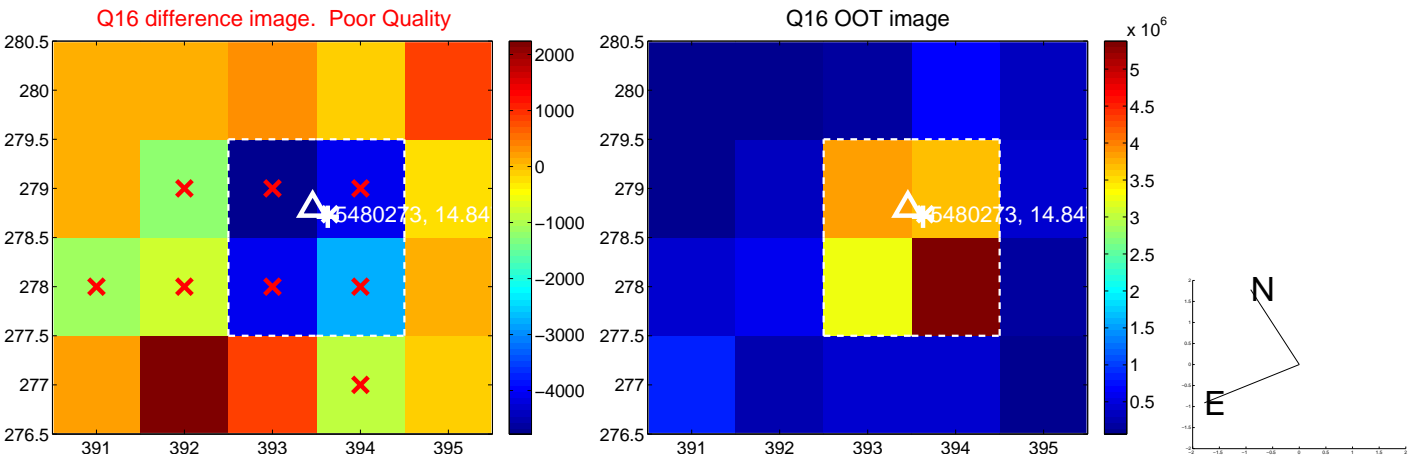
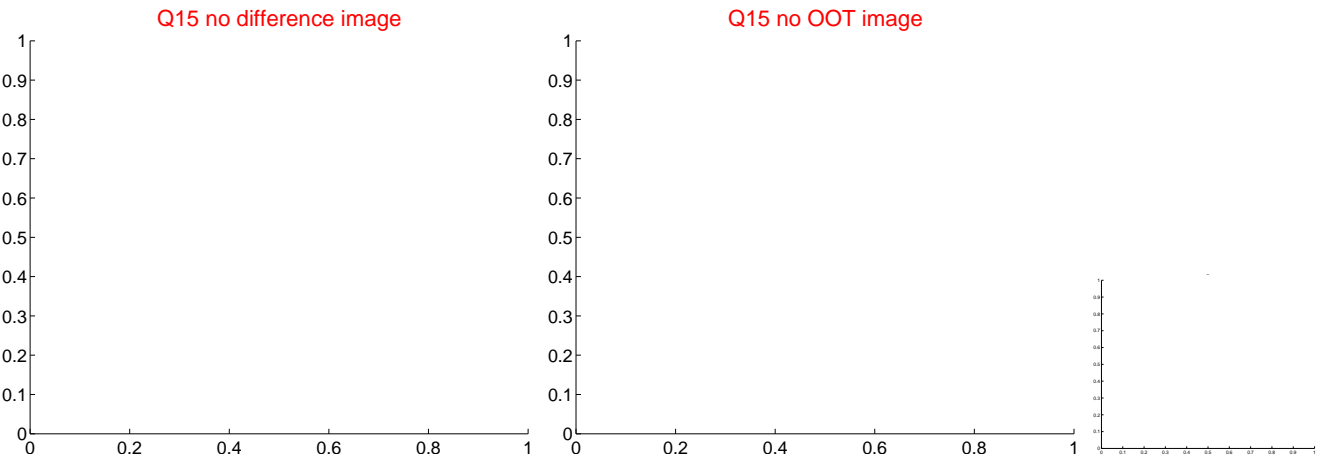
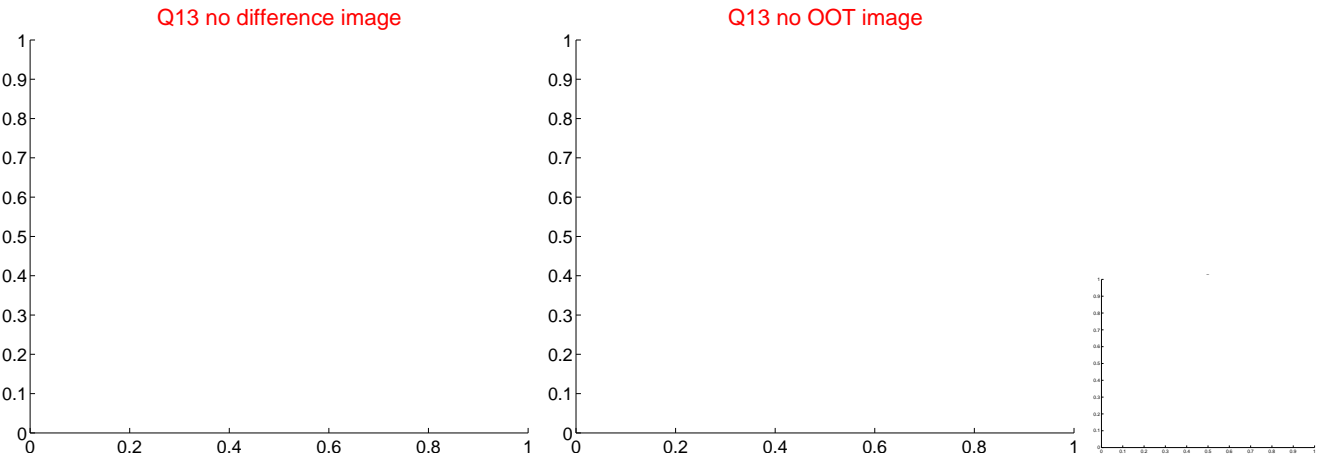
Q12 no difference image



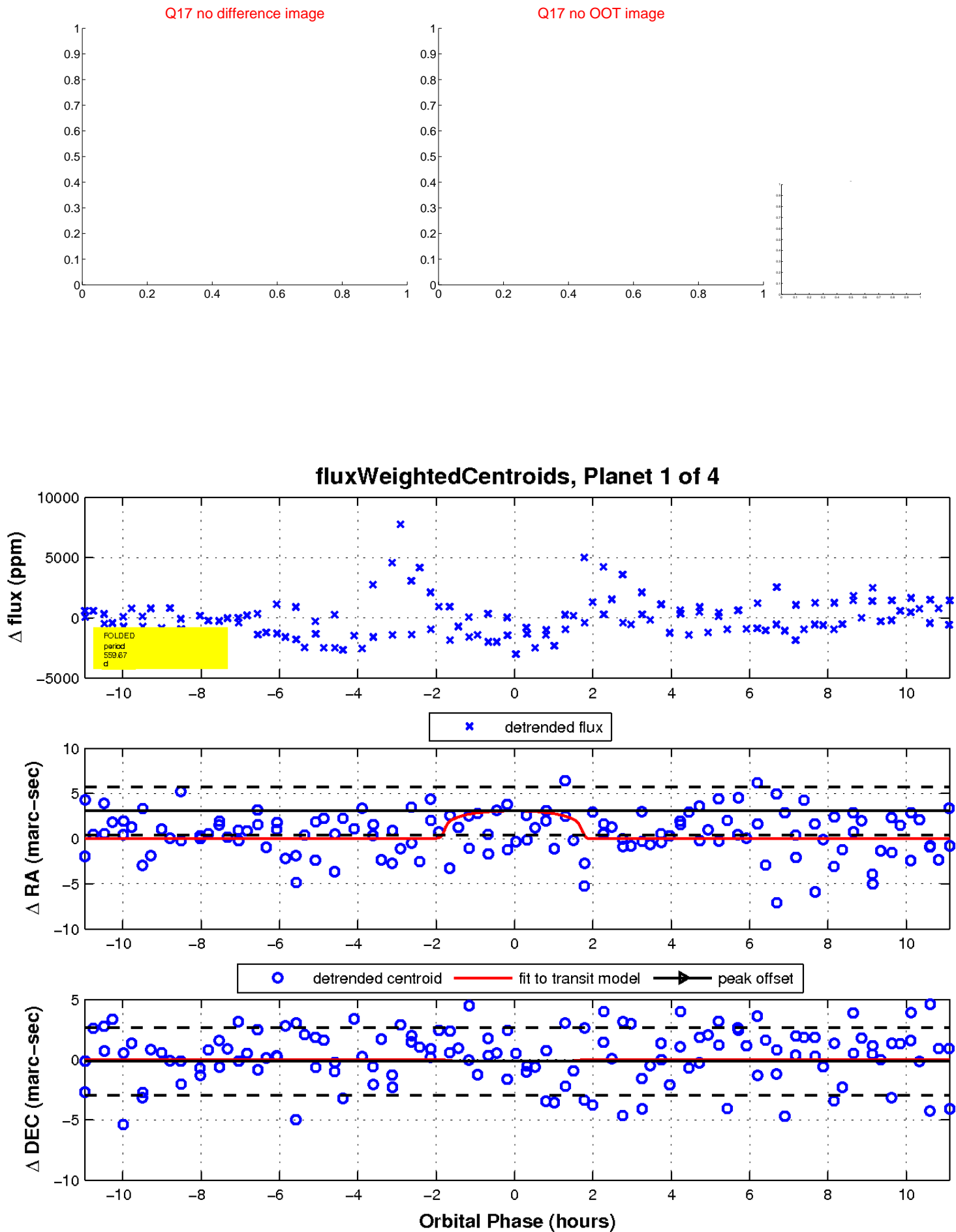
Q12 no OOT image



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



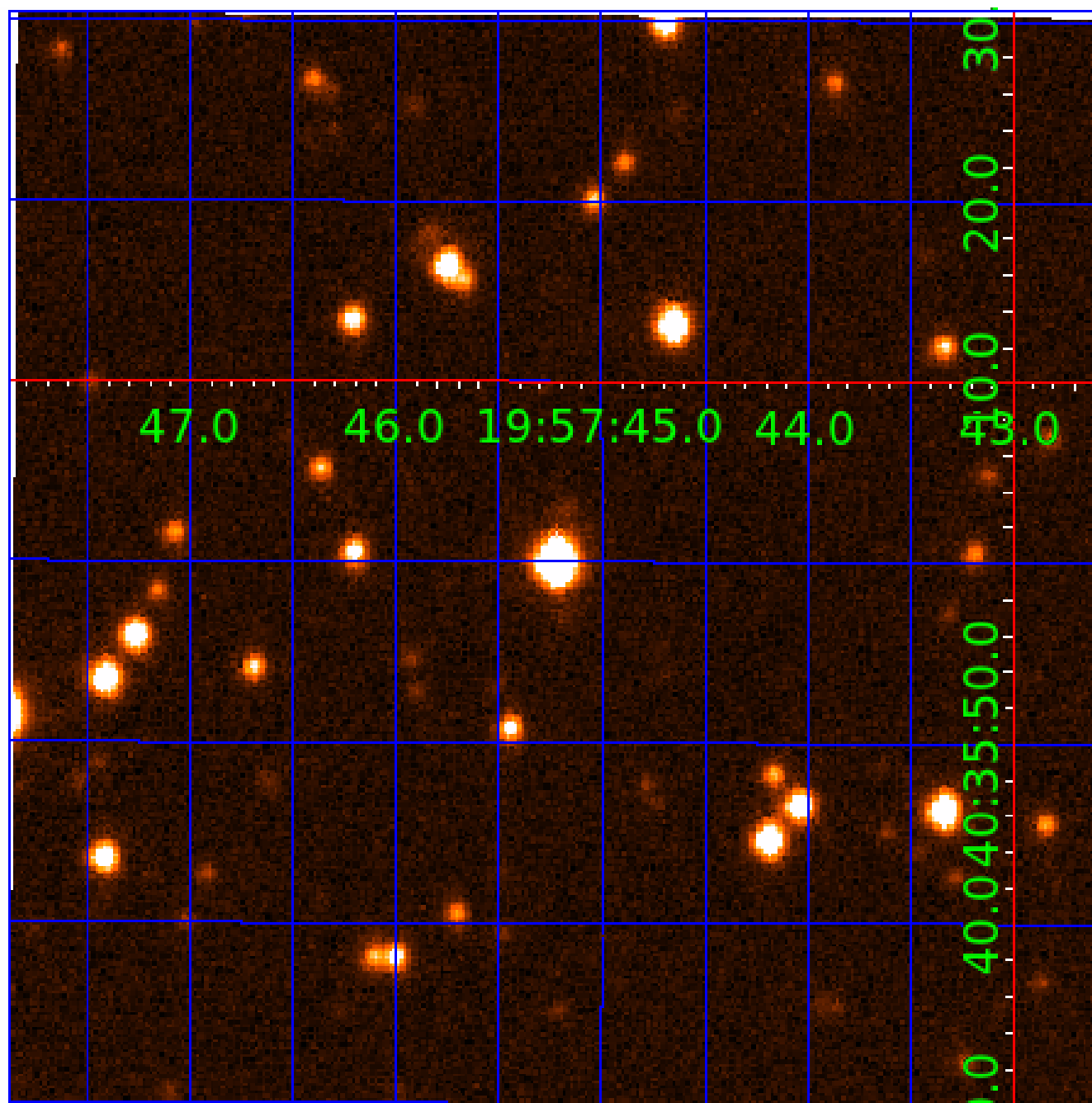
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 005480273

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
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## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
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005480273-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS
005480273-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
005480273-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—INCONSISTENT_TRANS

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

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

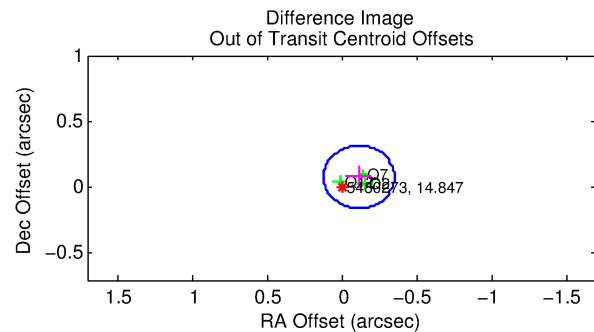
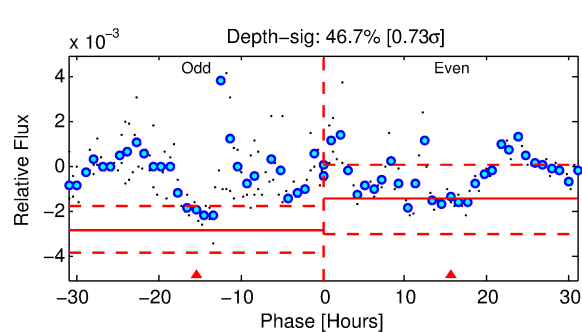
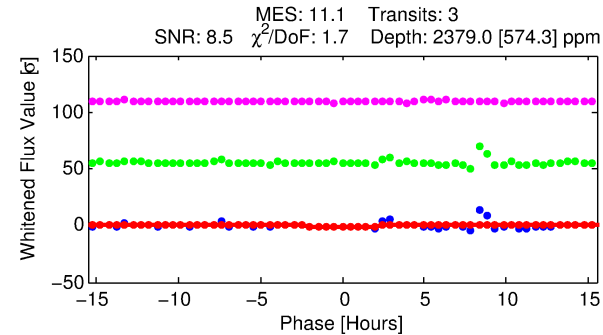
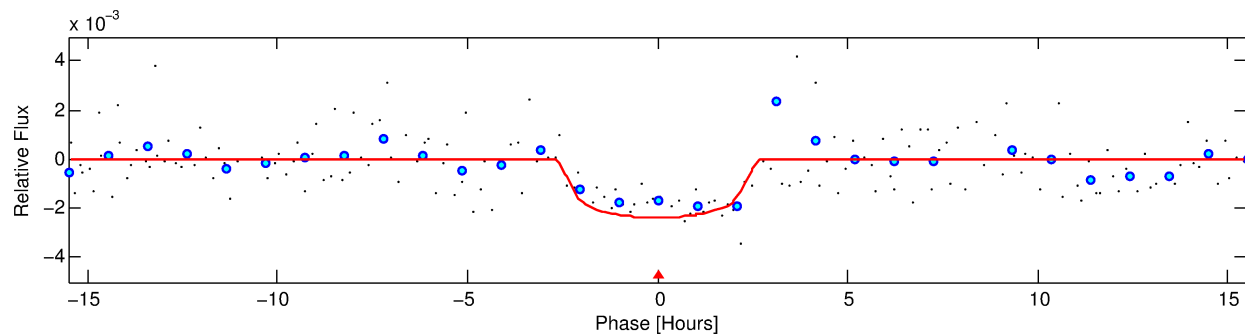
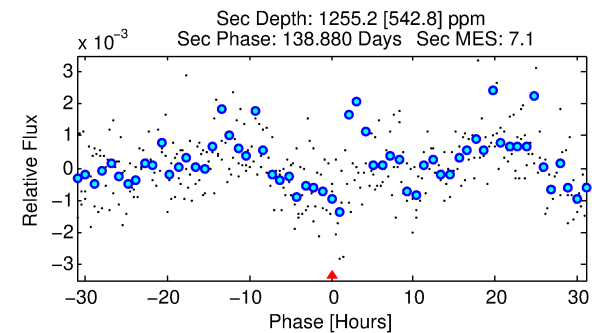
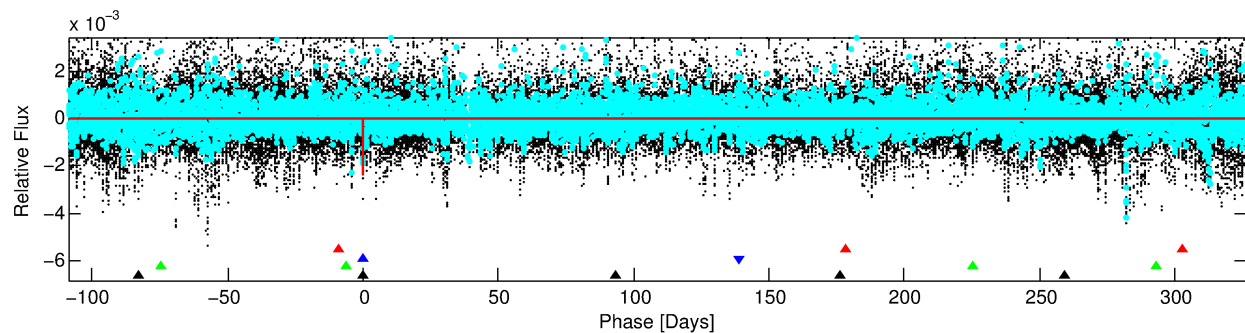
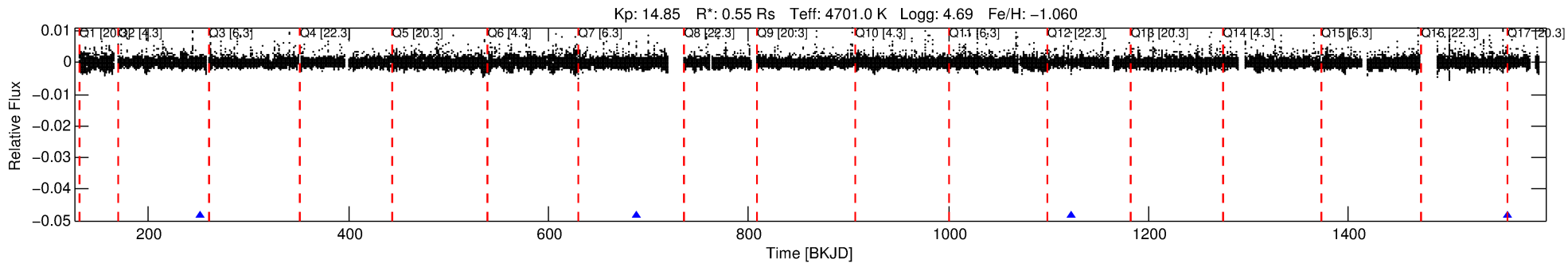
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005480273-02

No Significant Match Found

# DV One-Page Summary

KIC: 5480273 Candidate: 2 of 4 Period: 435.491 d



## DV Fit Results:

Period = 435.49063 [0.00906] d  
Epoch = 252.0376 [0.0110] BKJD  
Rp/R\* = 0.0464 [0.0316]  
a/R\* = 544.91 [1284.29]  
b = 0.61 [2.42]  
Seff = 0.16 [0.03]  
Teq = 161 [6] K  
Rp = 2.80 [1.92] Re  
a = 0.9233 [0.0552] AU  
Ag = 74845.90 [107216.49] [0.70σ]  
Teffp = 4108 [1474] K [2.68σ]

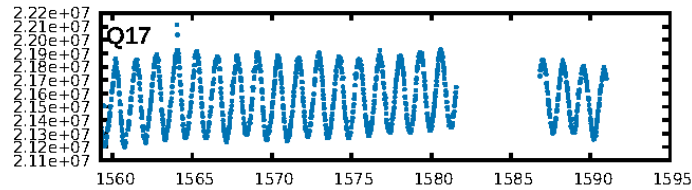
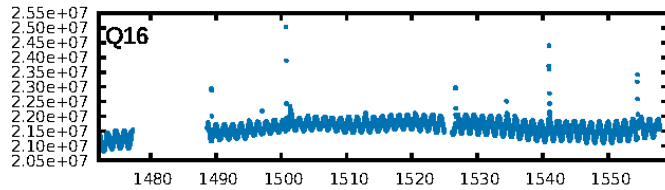
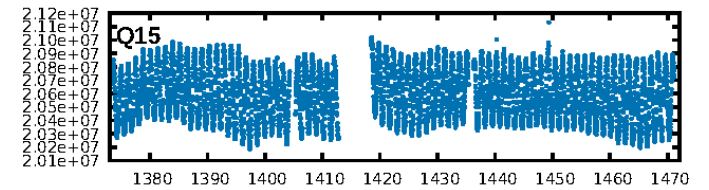
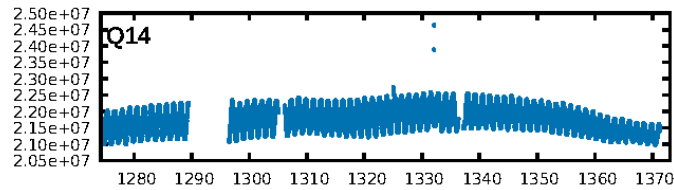
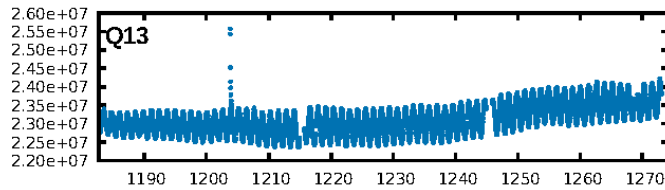
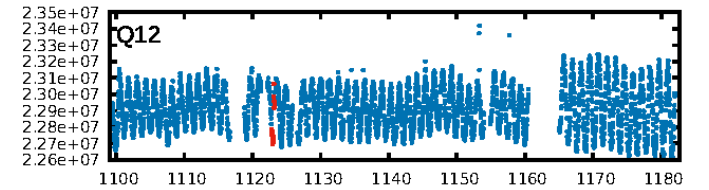
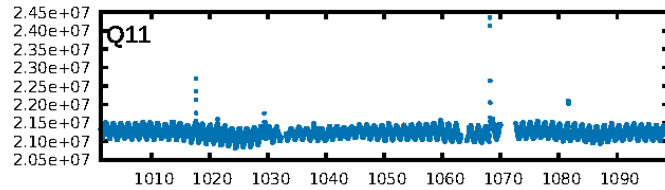
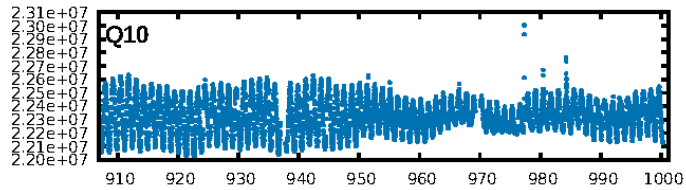
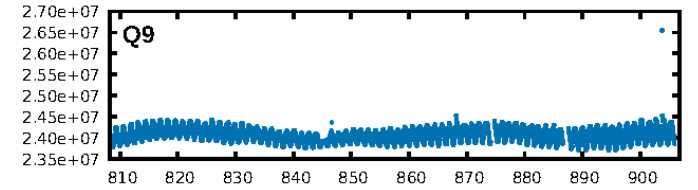
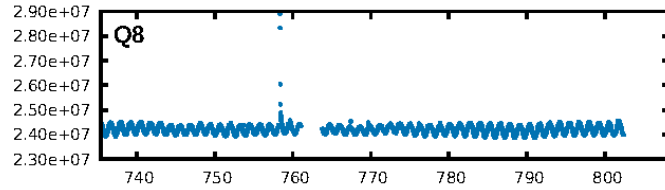
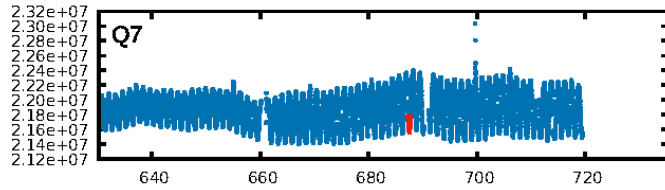
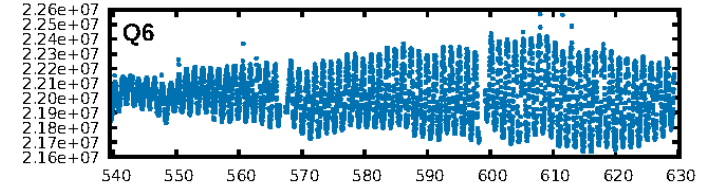
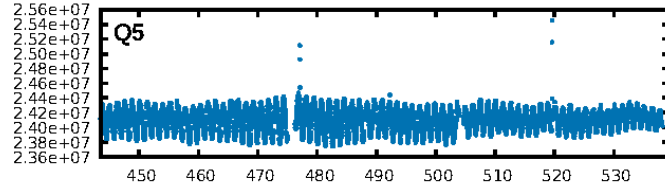
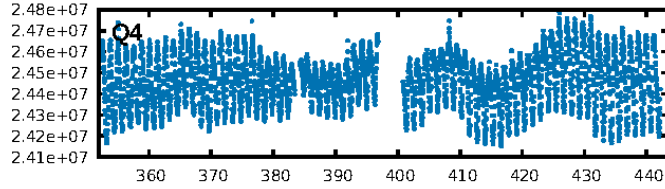
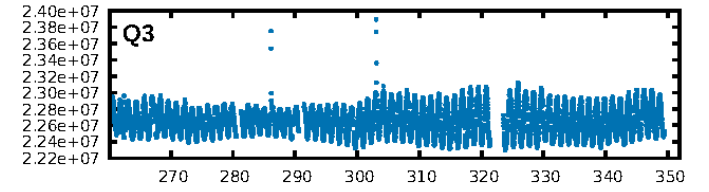
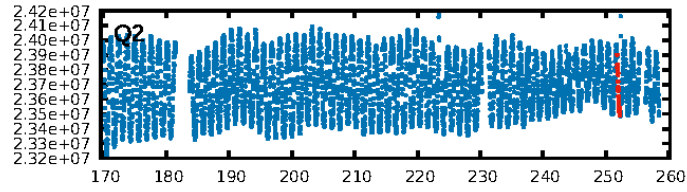
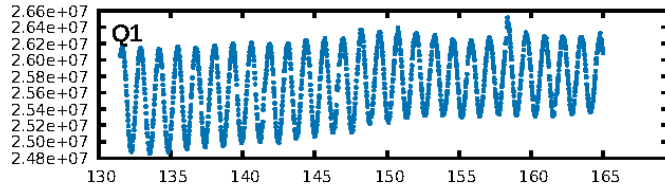
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [236.62σ]  
LongPeriod-sig: 100.0% [468.12σ]  
ModelChiSquare2-sig: 4.3%  
ModelChiSquareGof-sig: 97.8%  
**Bootstrap-pfa: 1.09e-09**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -25.82  
Centroid-sig: 57.8%  
Centroid-so: 1.529 arcsec [2.28σ]  
OotOffset-rm: 0.140 arcsec [1.77σ]  
KicOffset-rm: 0.048 arcsec [0.62σ]  
OotOffset-st: 1/1/1/0 [3]  
KicOffset-st: 1/1/1/0 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 0.67 [2/3]

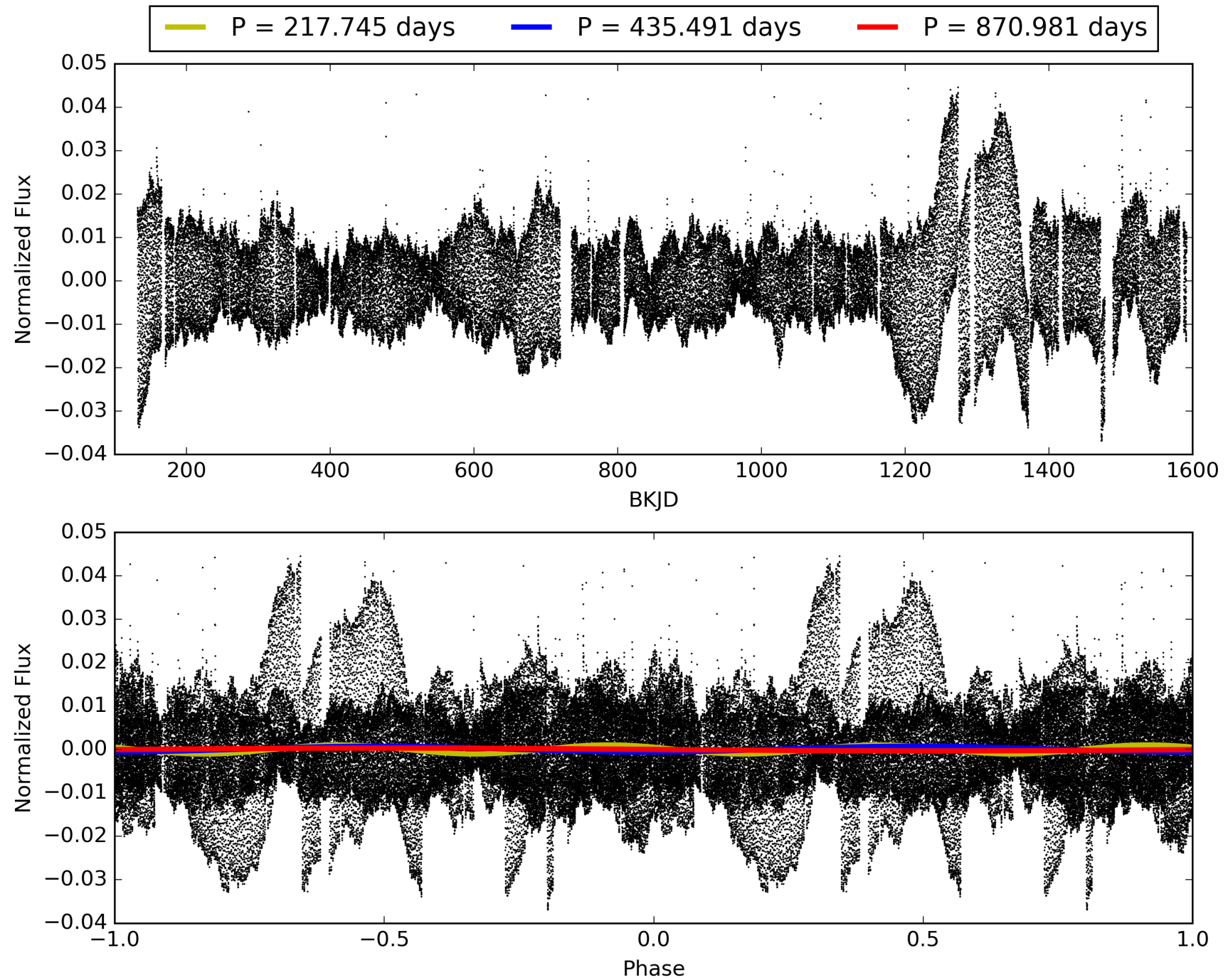
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 12:26:53 Z

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

# TCE 005480273-02, PDC Light Curves



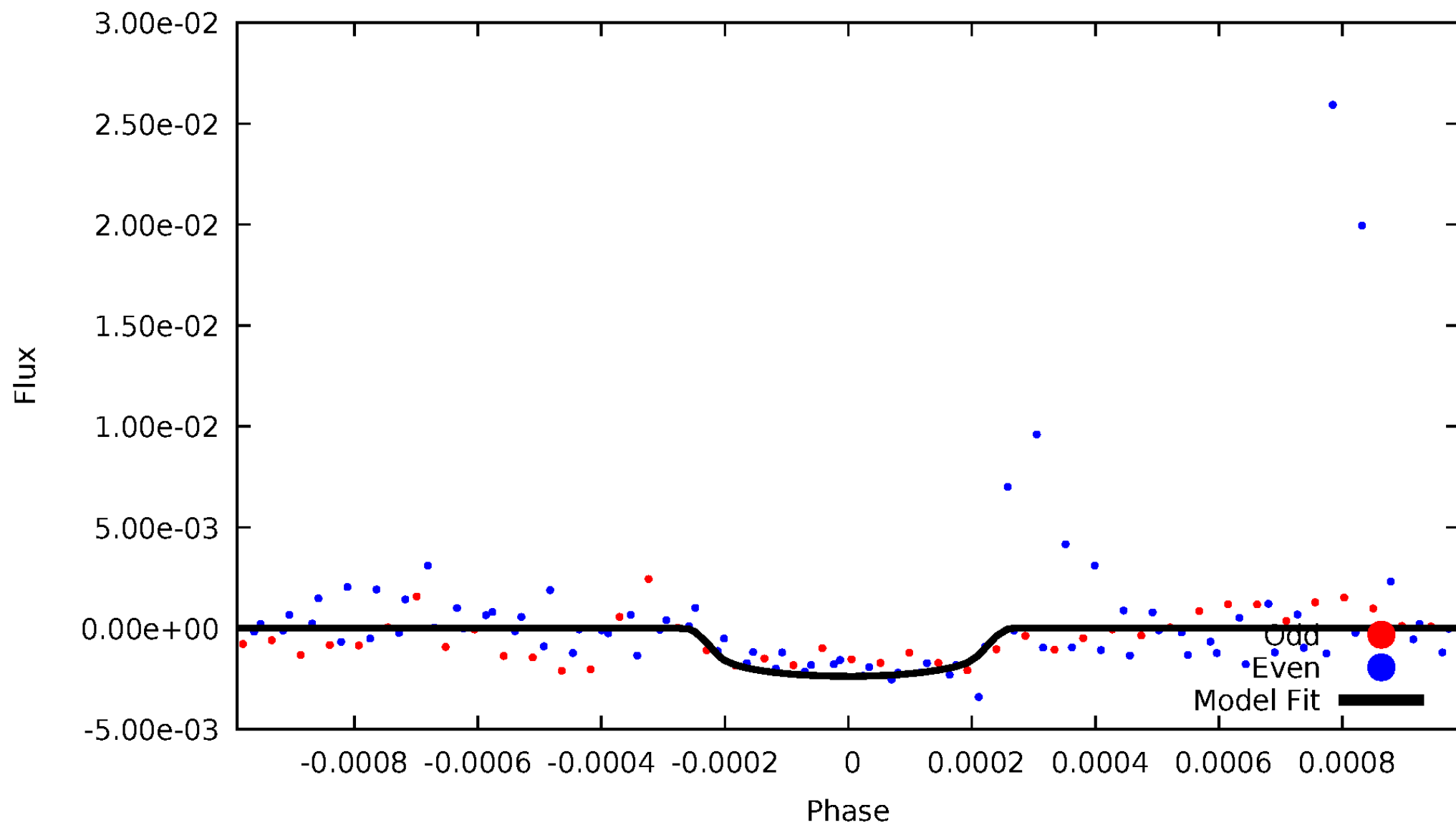
TCE 005480273-02





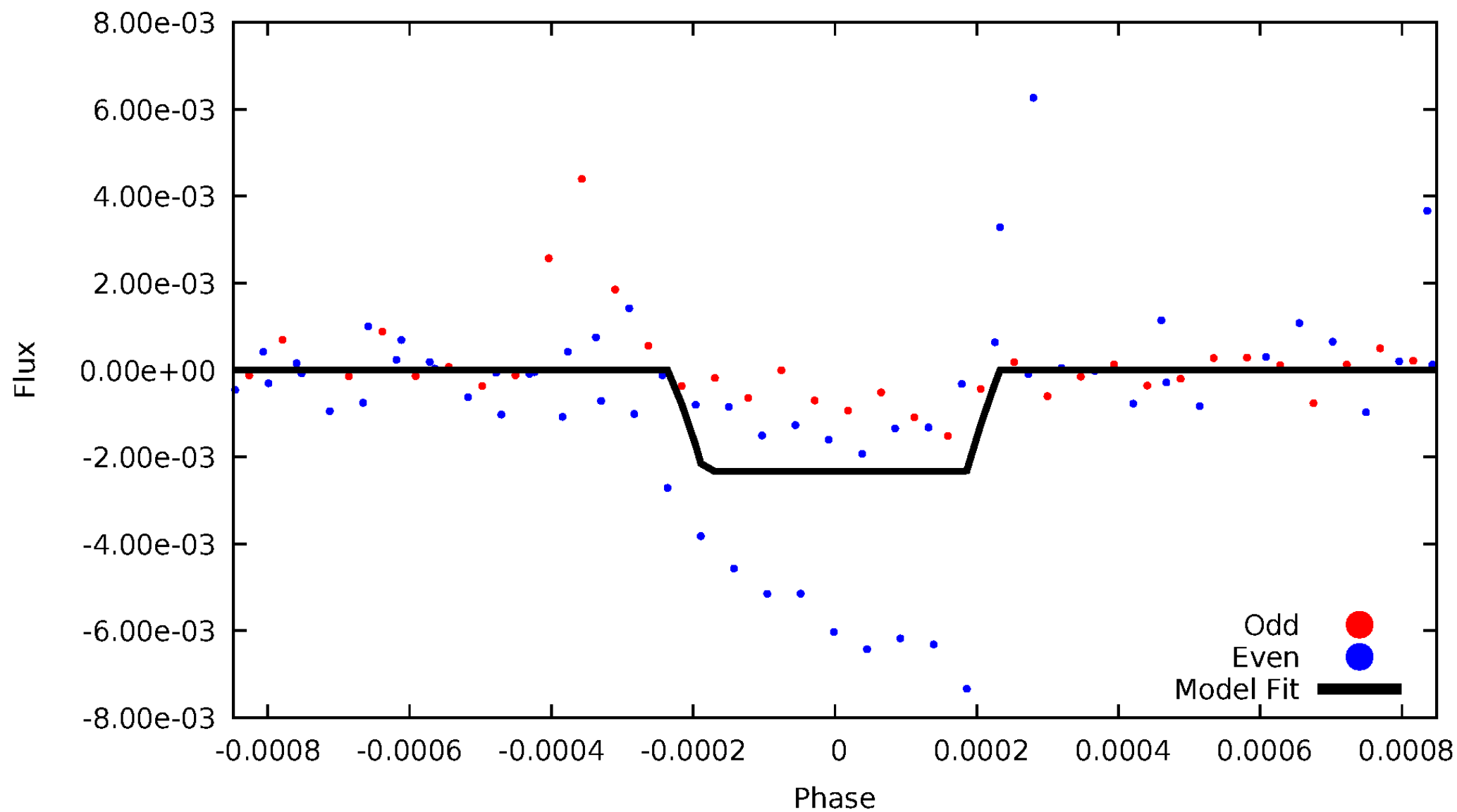
# DV Odd/Even

TCE 005480273-02



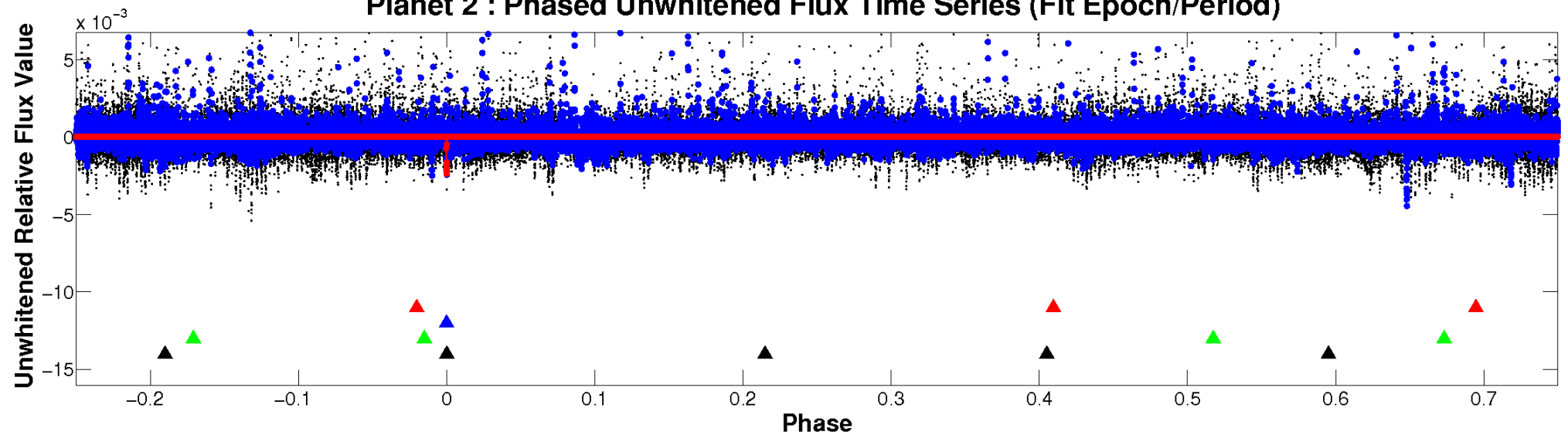
# ALT Odd/Even

TCE 005480273-02

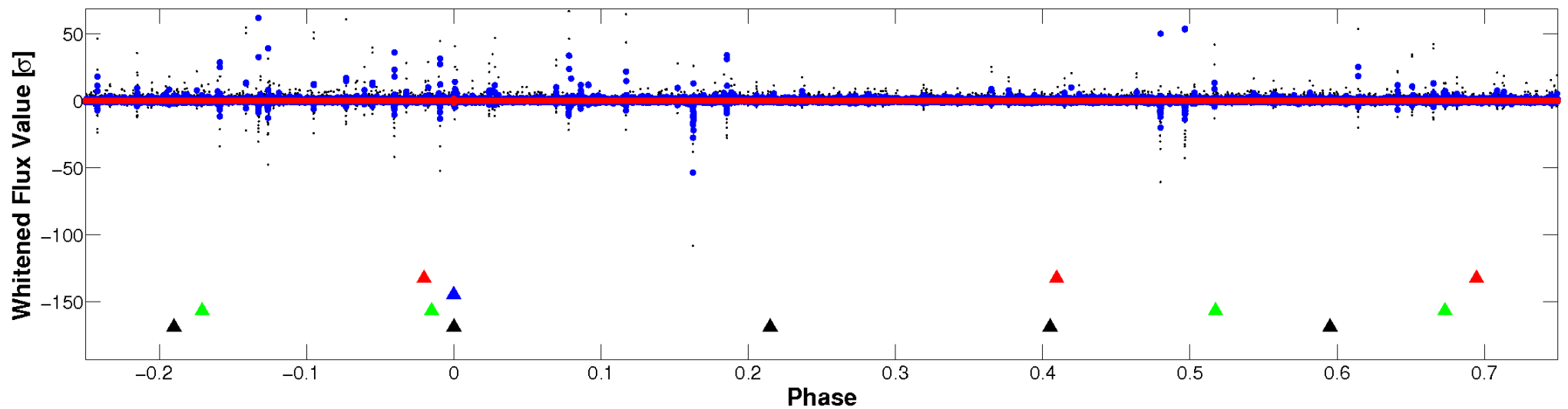


# Non-Whitened Vs. Whitened Light Curve

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

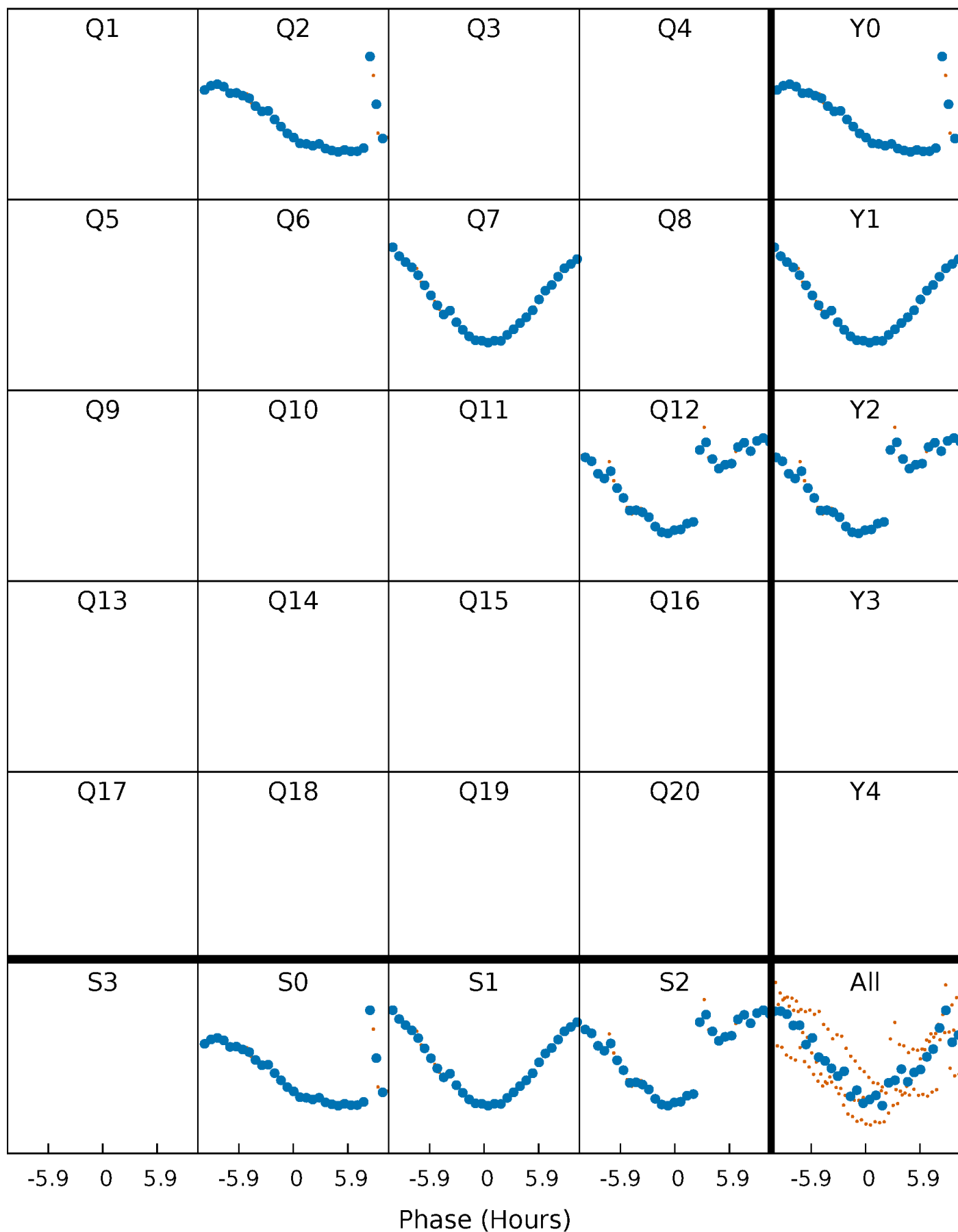


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



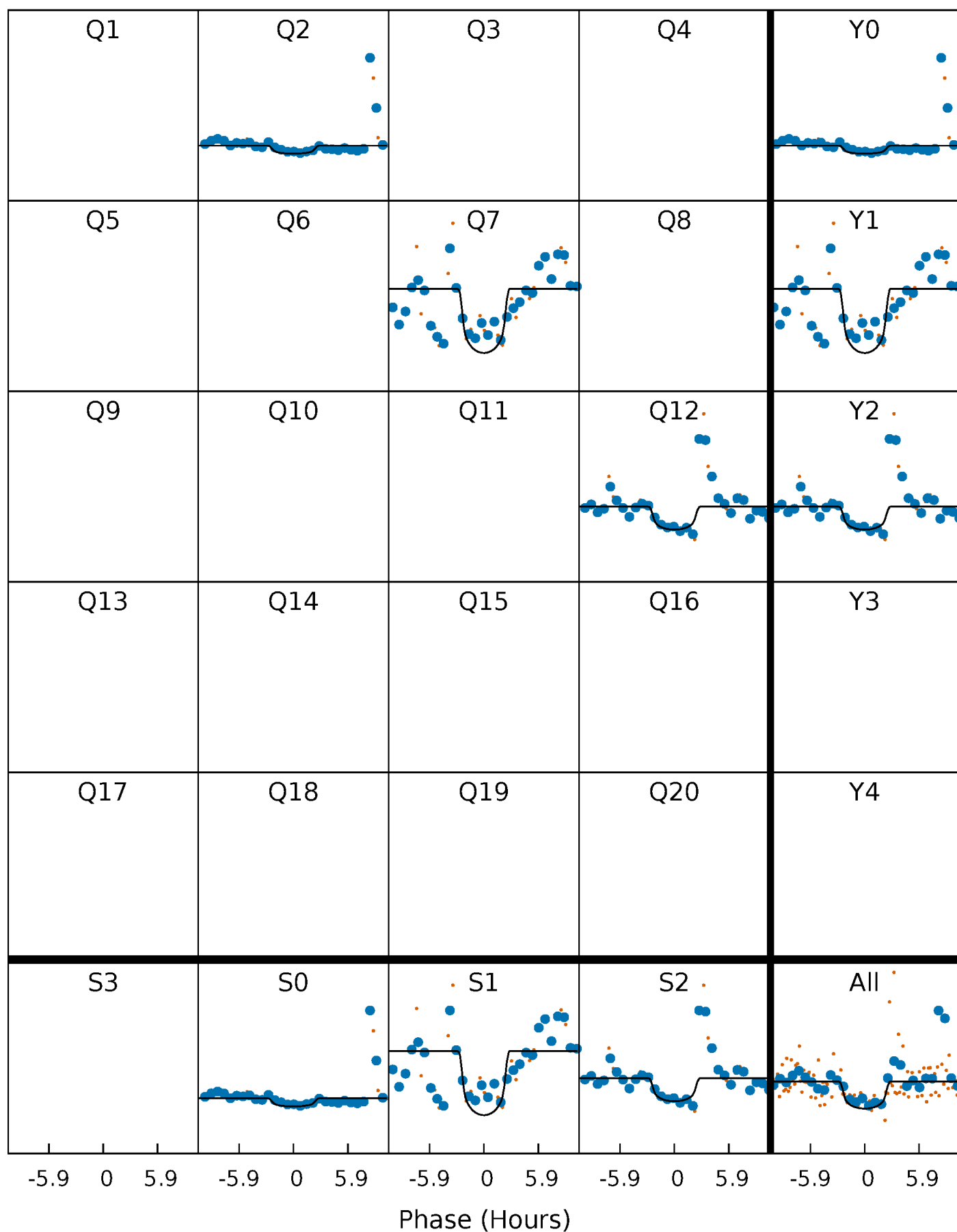
# PDC Quarter-Phased Transit Curves

TCE 005480273-02     $P=435.490631$  Days     $T_0=252.037619$  (BKJD)



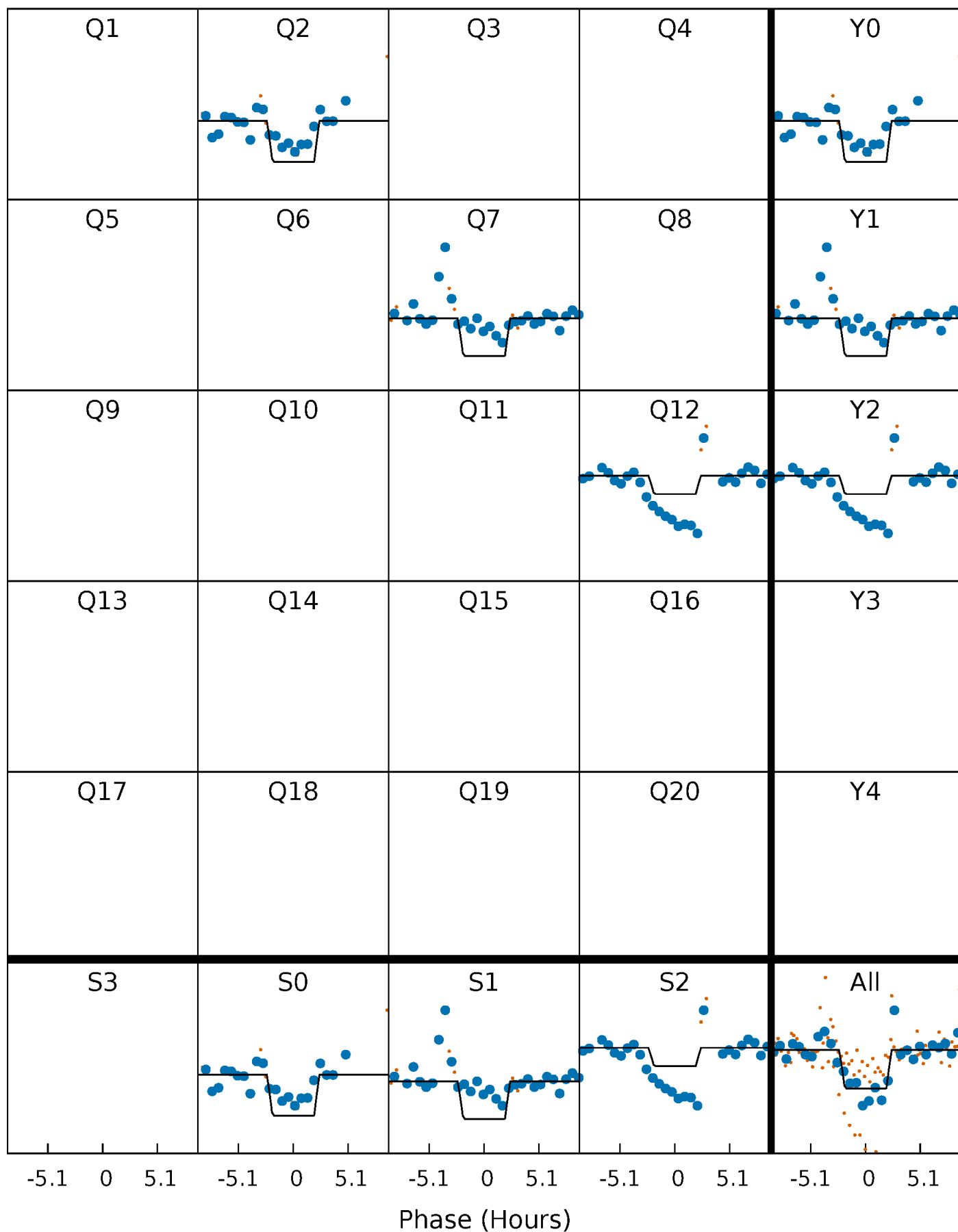
# DV Quarter-Phased Transit Curves

TCE 005480273-02     $P=435.490631$  Days     $T_0=252.037619$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

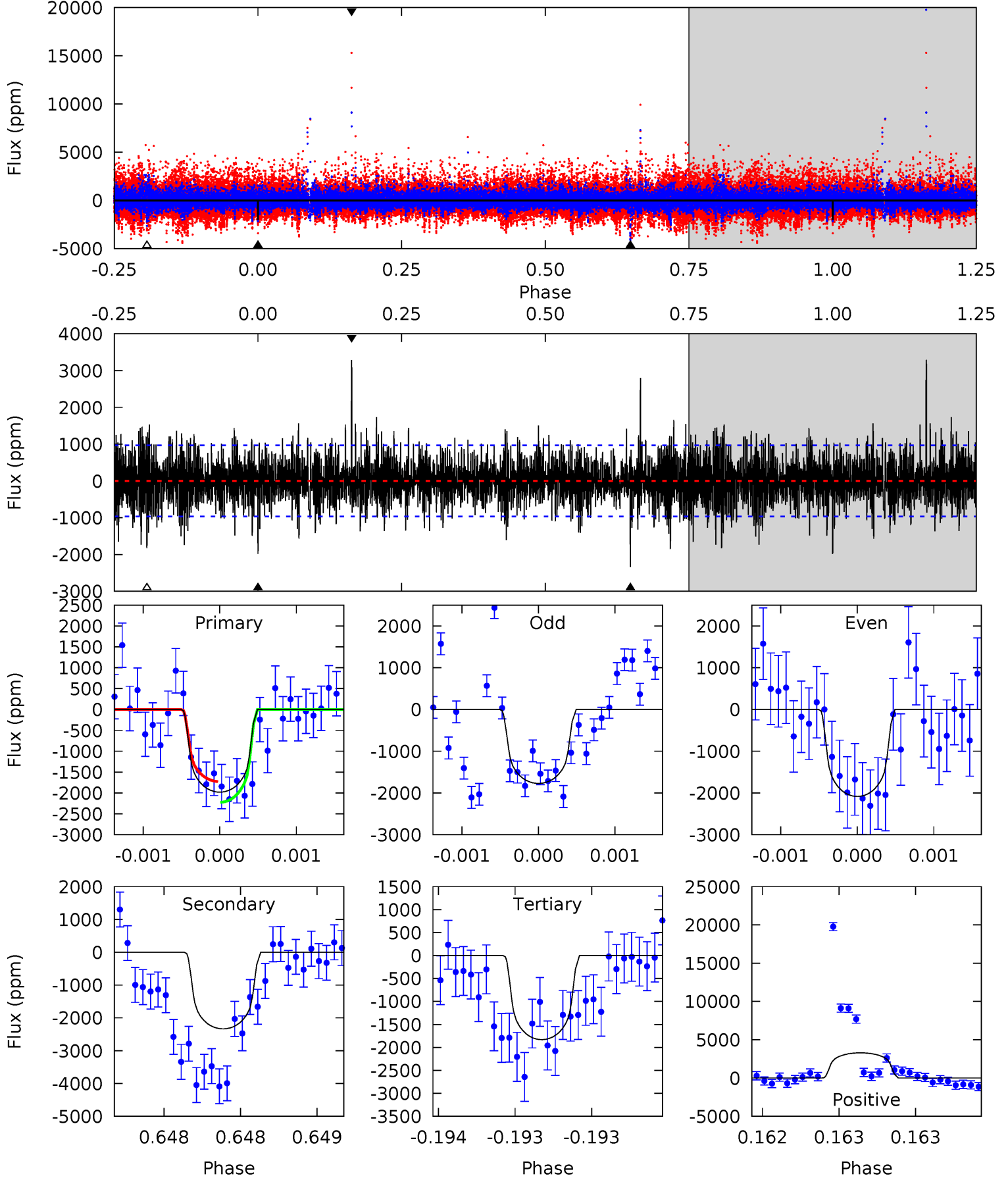
TCE 005480273-02 P=435.486842 Days  $T_0=252.056064$  (BKJD)



# DV Model-Shift Uniqueness Test

005480273-02, P = 435.490631 Days, E = 252.037619 Days

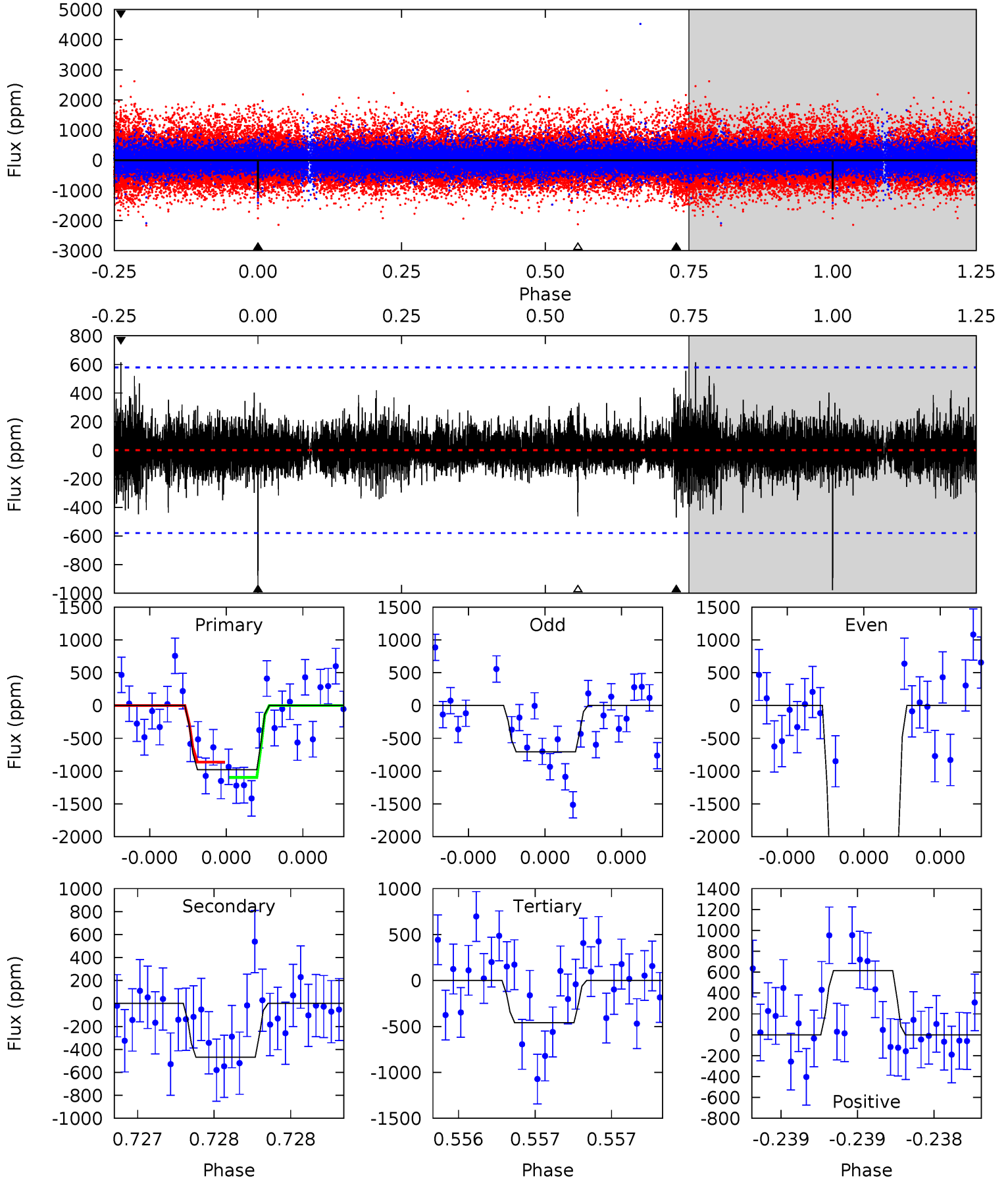
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.4	13.4	10.5	18.9	5.56	3.46	2.84	0.86	-7.51	2.90	-5.48	0.51	1.11	0.58	1.43



# Alt Model-Shift Uniqueness Test

005480273-02, P = 435.486842 Days, E = 252.056064 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
9.45	4.53	4.45	5.93	5.59	3.51	0.88	4.99	3.51	0.08	-1.40	15.0	2.06	0.39	0





### Stellar Parameters For KIC 005480273

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4701^{+153}_{-153}$	$4.694^{+0.052}_{-0.028}$	$-1.060^{+0.300}_{-0.300}$	$0.554^{+0.037}_{-0.037}$	$0.553^{+0.047}_{-0.024}$	$4.585^{+0.888}_{-0.554}$
	+3%/-3%	+1%/-1%	+28%/-28%	+7%/-7%	+8%/-4%	+19%/-12%
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 005480273-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-2336 \pm 174$	$3.03^{+1.72}_{-1.76}$	$223^{+8}_{-8}$	$4627^{+2203}_{-743}$	$123860^{+554622}_{-74839}$
Alt.	$-469 \pm 103$	$3.12^{+1.87}_{-1.60}$	$223^{+8}_{-8}$	$3442^{+1071}_{-467}$	$23163^{+74846}_{-14774}$

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

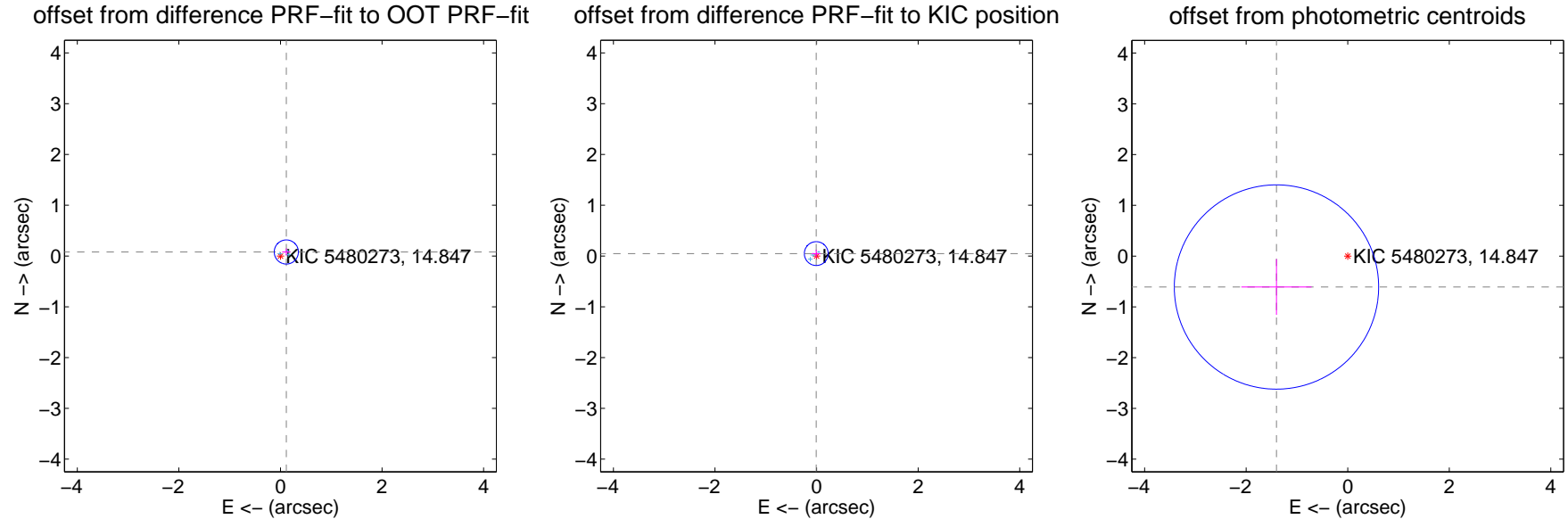
## DV Centroid Data

Supplemental centroid analysis for 005480273-02. Kepler magnitude: 14.85. Transit SNR 8.49

There are 3 quarters with good PRF difference image offsets

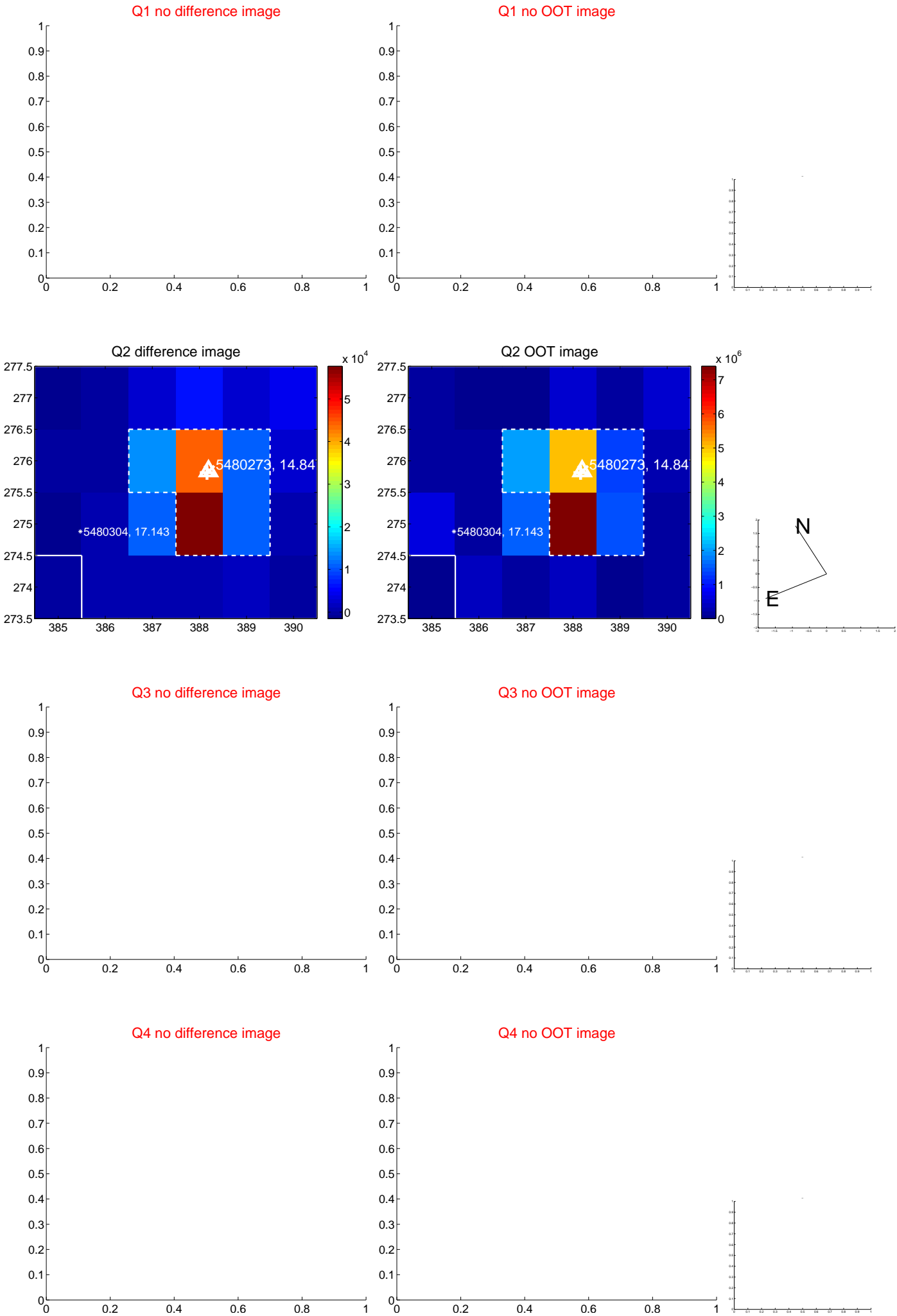
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.140 \pm 0.079$	1.77	$-0.115 \pm 0.083$	$0.079 \pm 0.071$
PRF-fit source offset from KIC position	$0.048 \pm 0.078$	0.62	$0.006 \pm 0.086$	$0.048 \pm 0.078$
photometric centroid source offset	$1.53 \pm 0.67$	2.28	$1.40 \pm 0.69$	$-0.61 \pm 0.55$

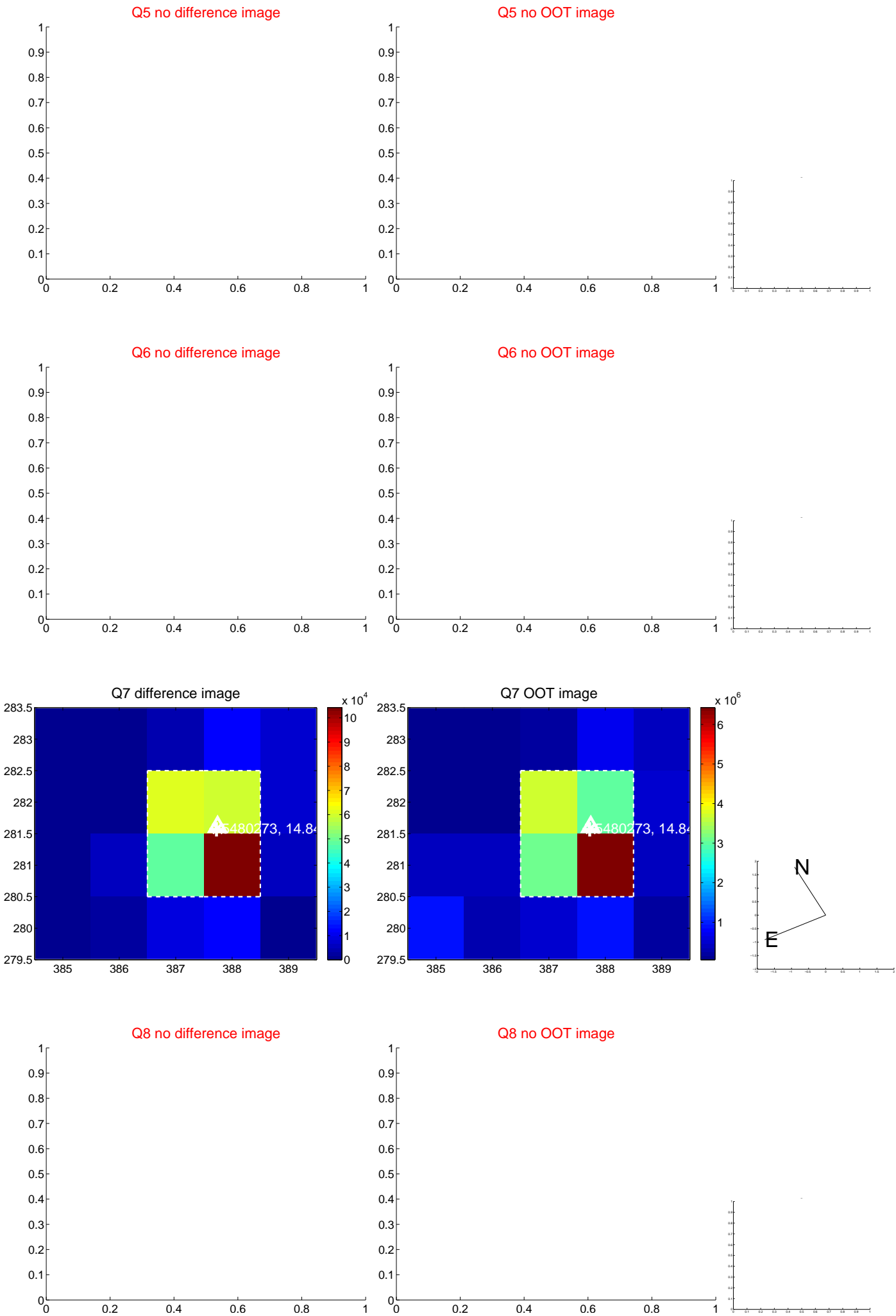


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

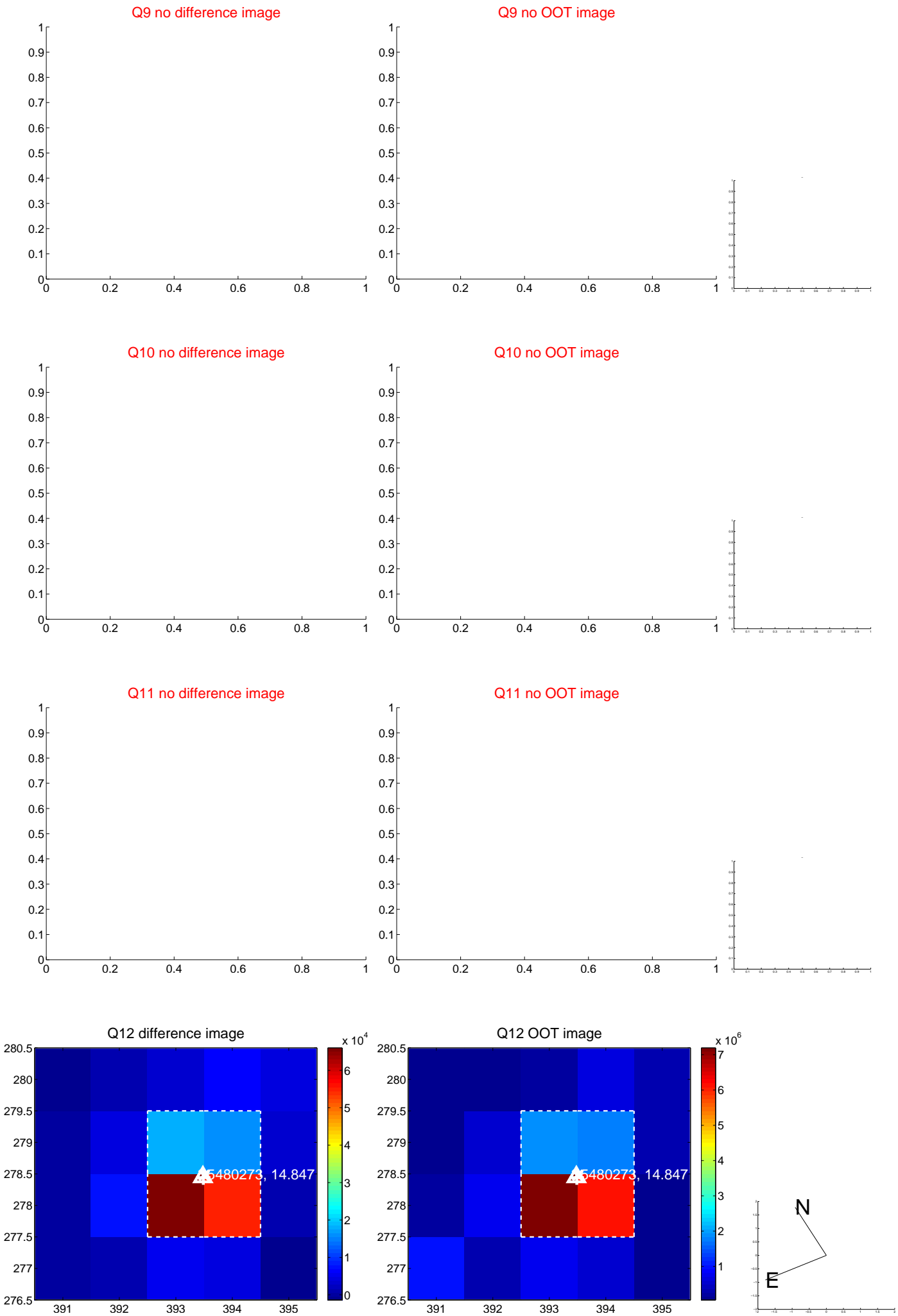
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



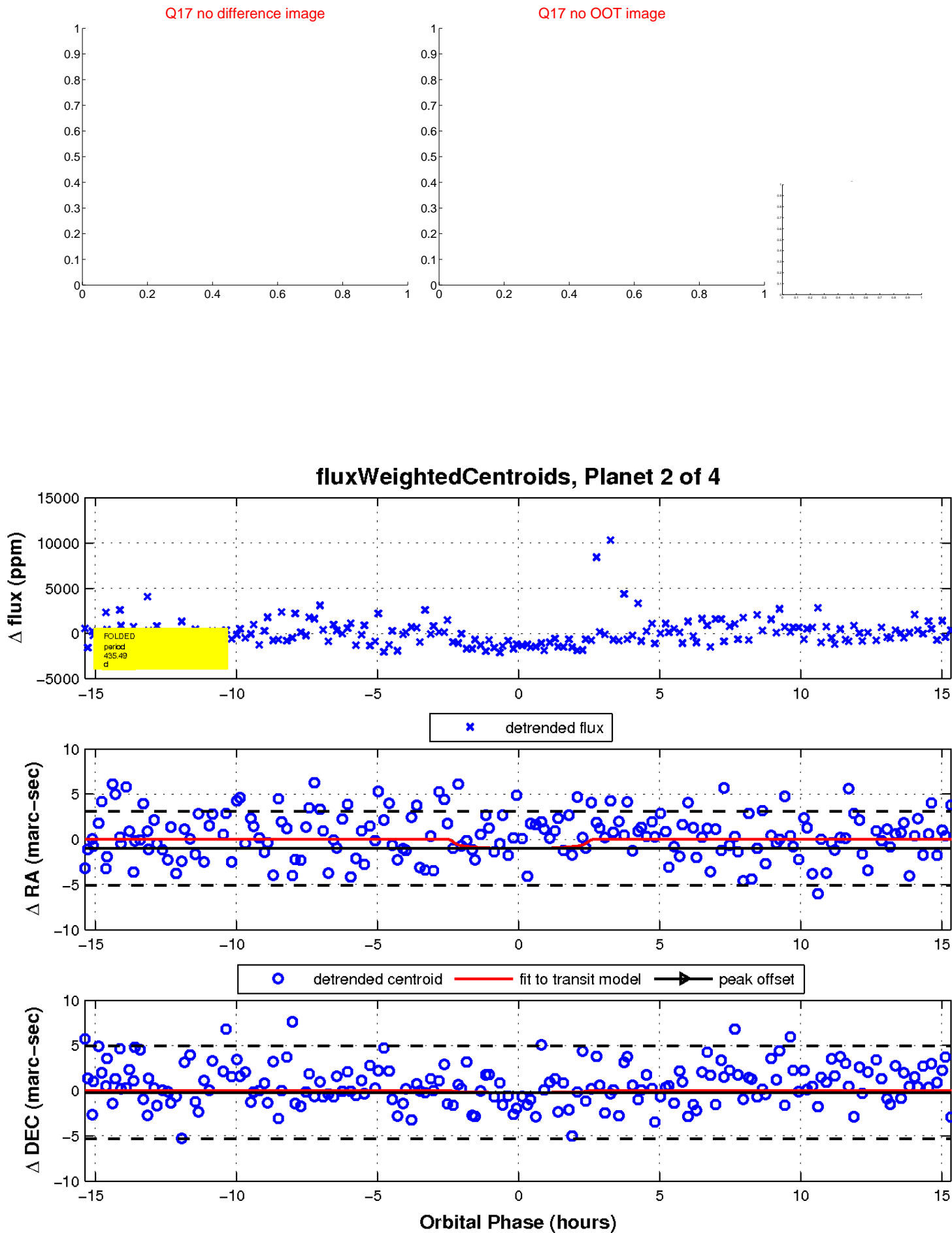
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

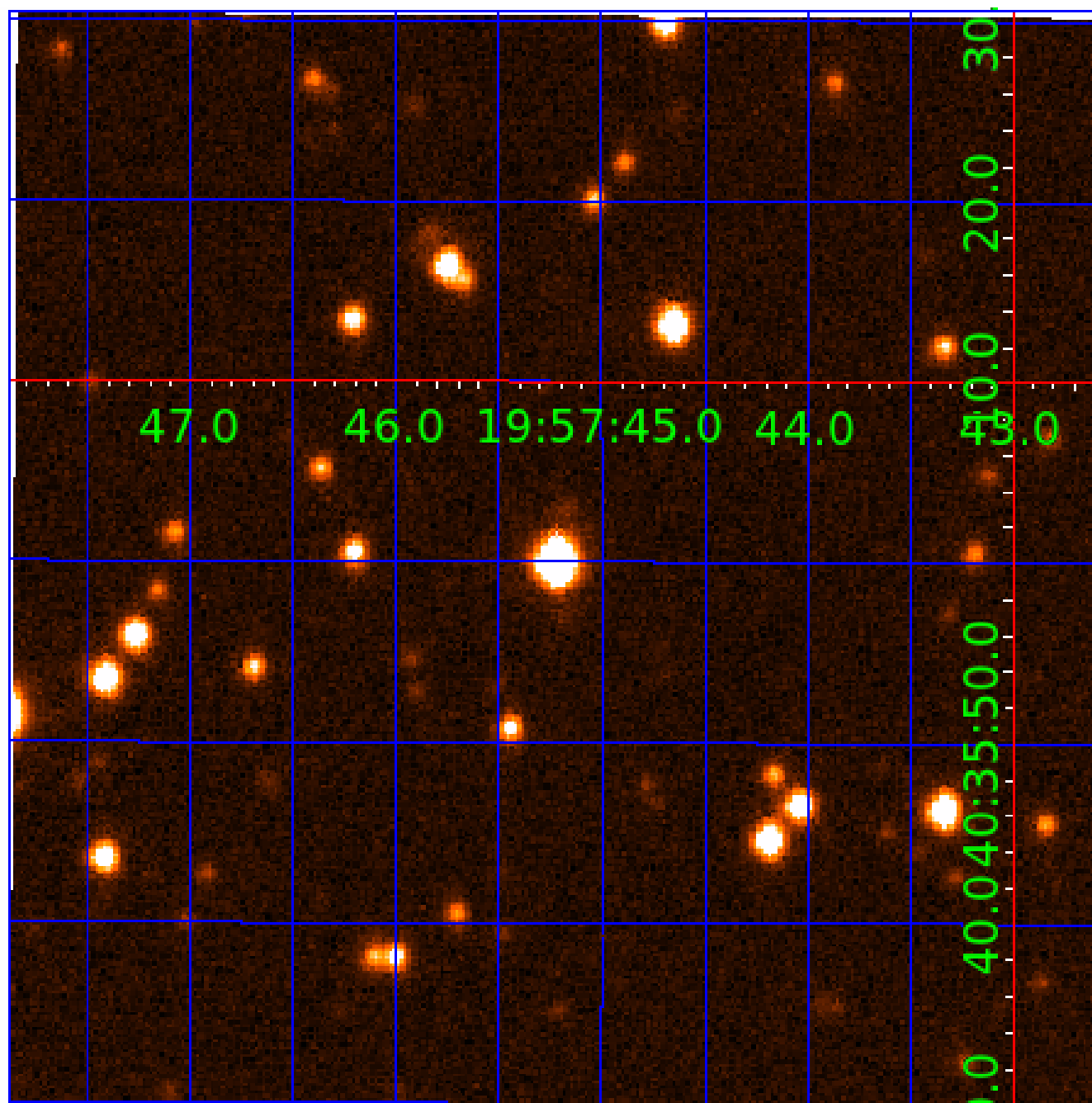


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 005480273

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005480273-01	OBS	No	559.670417	430.388399	1772.5	3.716	10.3	6.7	0.55	4701	2.35	0.11
005480273-02	OBS	No	435.490631	252.037619	2379.0	5.170	11.1	8.5	0.55	4701	2.81	0.16
005480273-03	OBS	No	367.616782	245.491503	1354.9	4.546	12.5	5.6	0.55	4701	2.15	0.20
005480273-04	OBS	No	259.148956	345.639123	1563.7	3.388	11.3	6.6	0.55	4701	2.18	0.32

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005480273-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT— INCONSISTENT_TRANS—CENT_FEW_DIFFS
005480273-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS
005480273-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
005480273-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—INCONSISTENT_TRANS

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

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

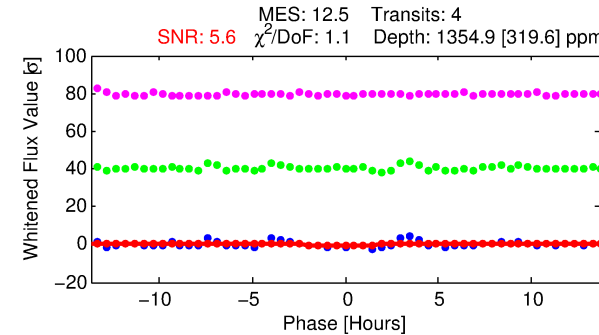
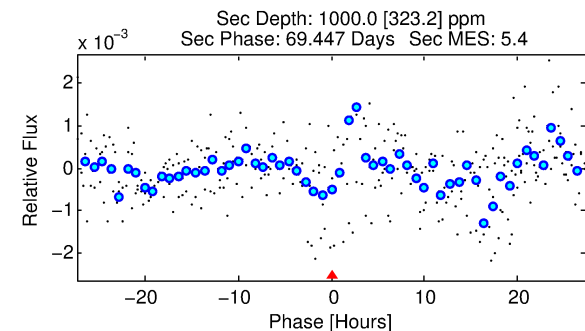
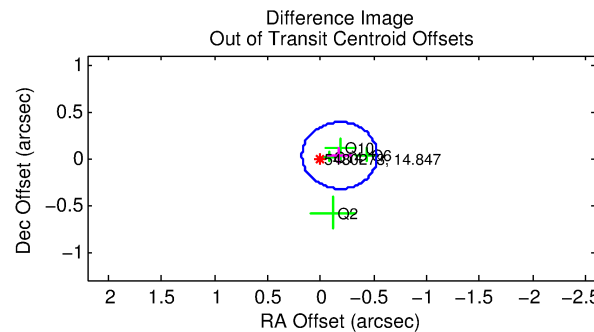
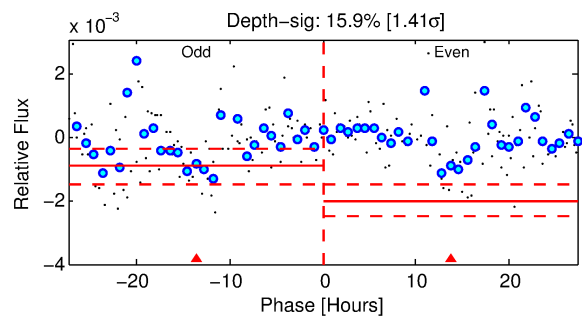
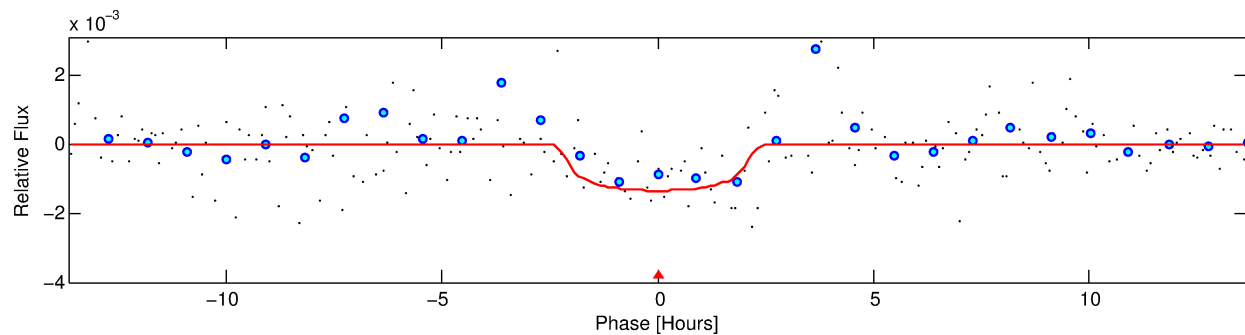
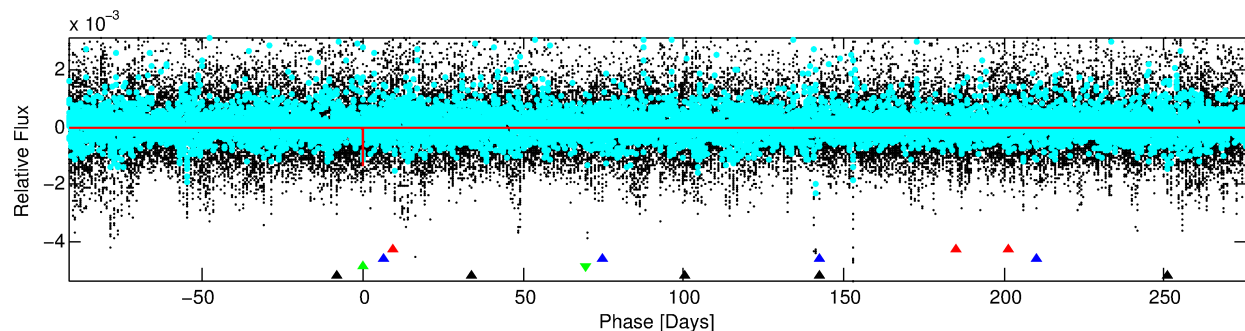
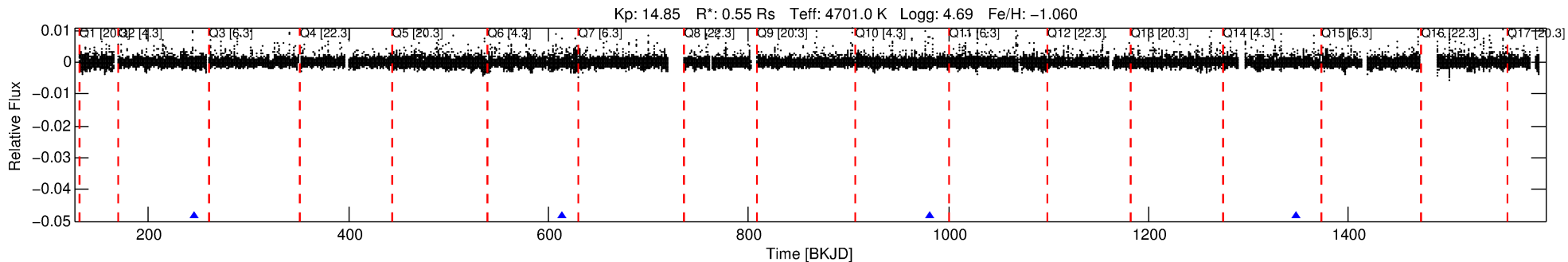
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005480273-03

No Significant Match Found

# DV One-Page Summary

KIC: 5480273 Candidate: 3 of 4 Period: 367.617 d



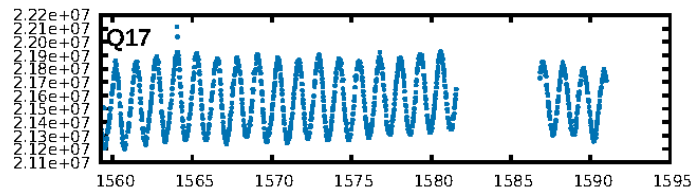
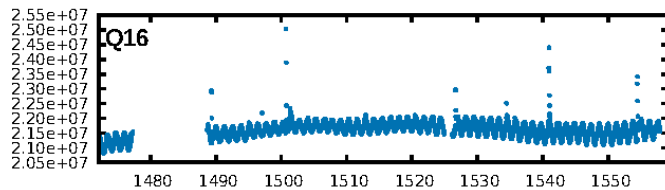
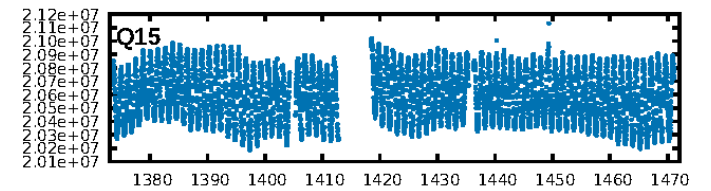
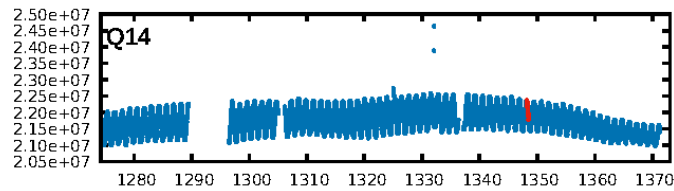
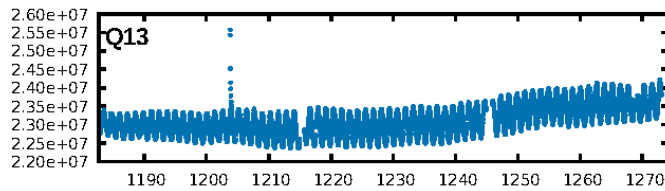
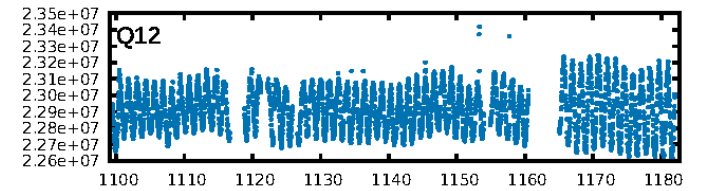
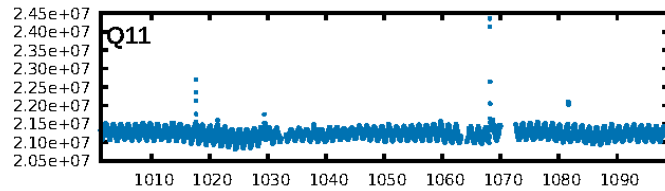
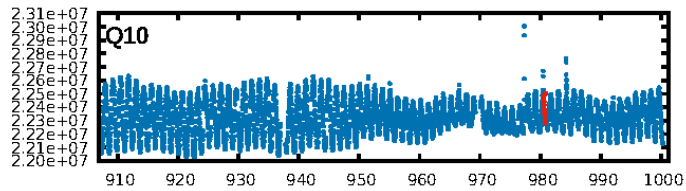
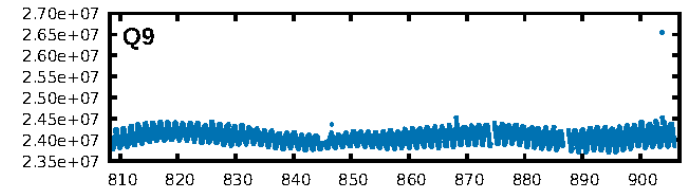
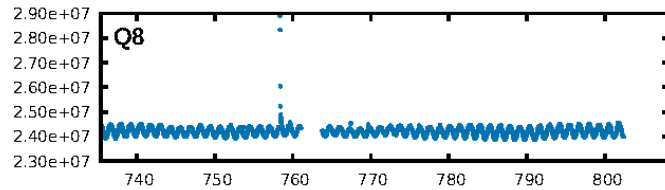
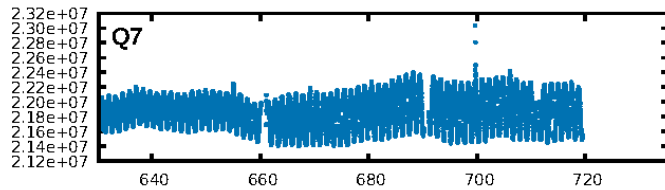
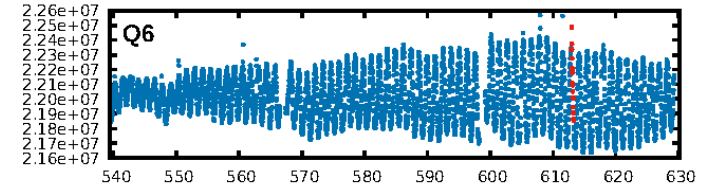
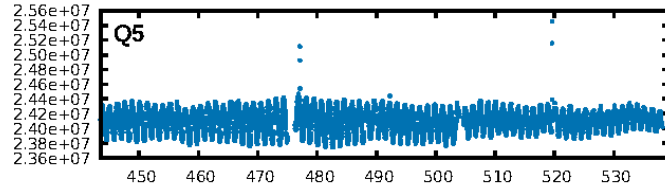
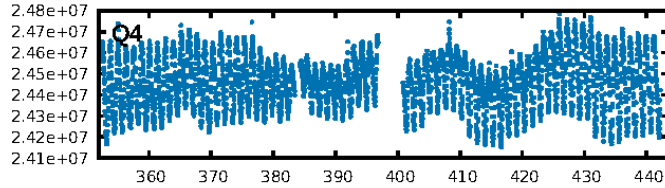
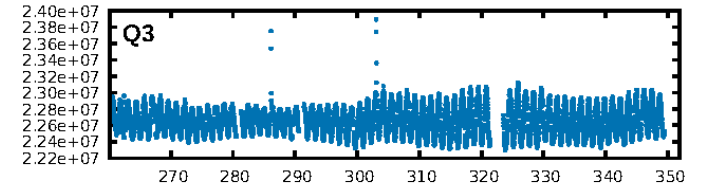
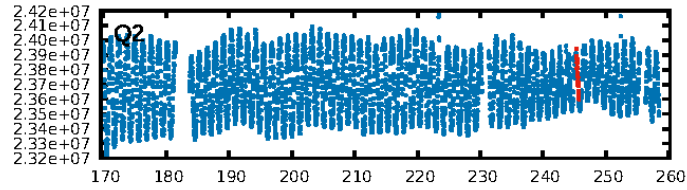
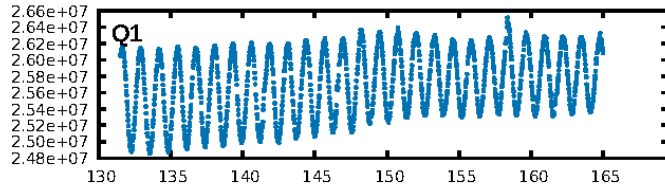
## DV Fit Results:

Period = 367.61678 [0.00609] d  
Epoch = 245.4915 [0.0119] BKJD  
Rp/R\* = 0.0356 [0.0491]  
a/R\* = 487.30 [2422.53]  
b = 0.67 [4.14]  
Seff = 0.20 [0.03]  
Teq = 170 [7] K  
Rp = 2.15 [2.97] Re  
a = 0.8247 [0.0493] AU  
Ag = 80804.06 [224341.23] [0.36σ]  
Teffp = 4431 [3077] K [1.38σ]

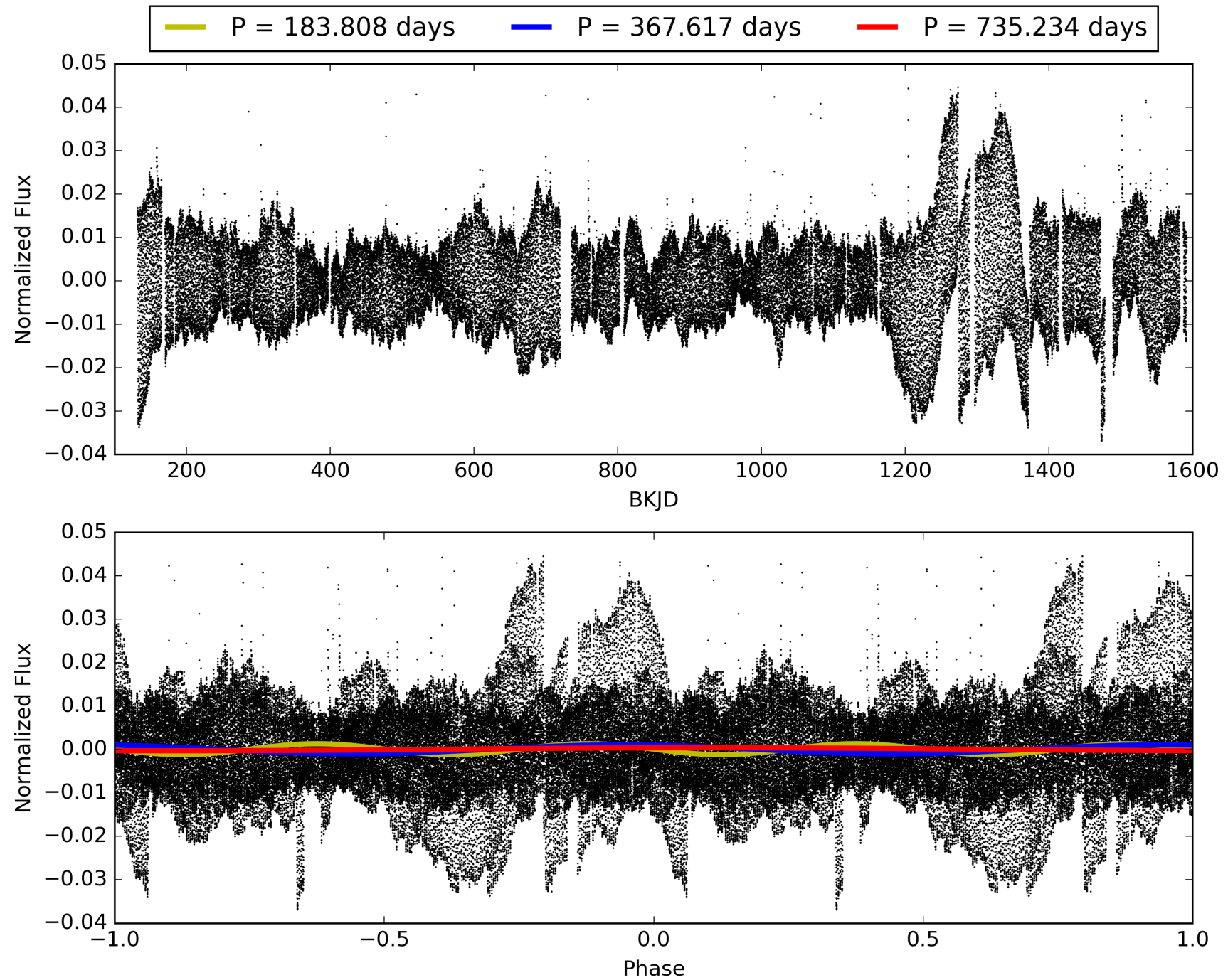
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [459.14σ]  
LongPeriod-sig: 100.0% [236.62σ]  
ModelChiSquare2-sig: 22.1%  
ModelChiSquareGof-sig: 83.1%  
**Bootstrap-pfa: 5.79e-11**  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 139.1  
Centroid-sig: 85.8%  
Centroid-so: 1.403 arcsec [1.05σ]  
OotOffset-rm: 0.184 arcsec [1.56σ]  
KicOffset-rm: 0.072 arcsec [0.47σ]  
OotOffset-st: 4/0/0/0 [4]  
KicOffset-st: 4/0/0/0 [4]  
DiffImageQuality-fgm: 0.25 [1/4]  
DiffImageOverlap-fno: 1.00 [4/4]

# TCE 005480273-03, PDC Light Curves

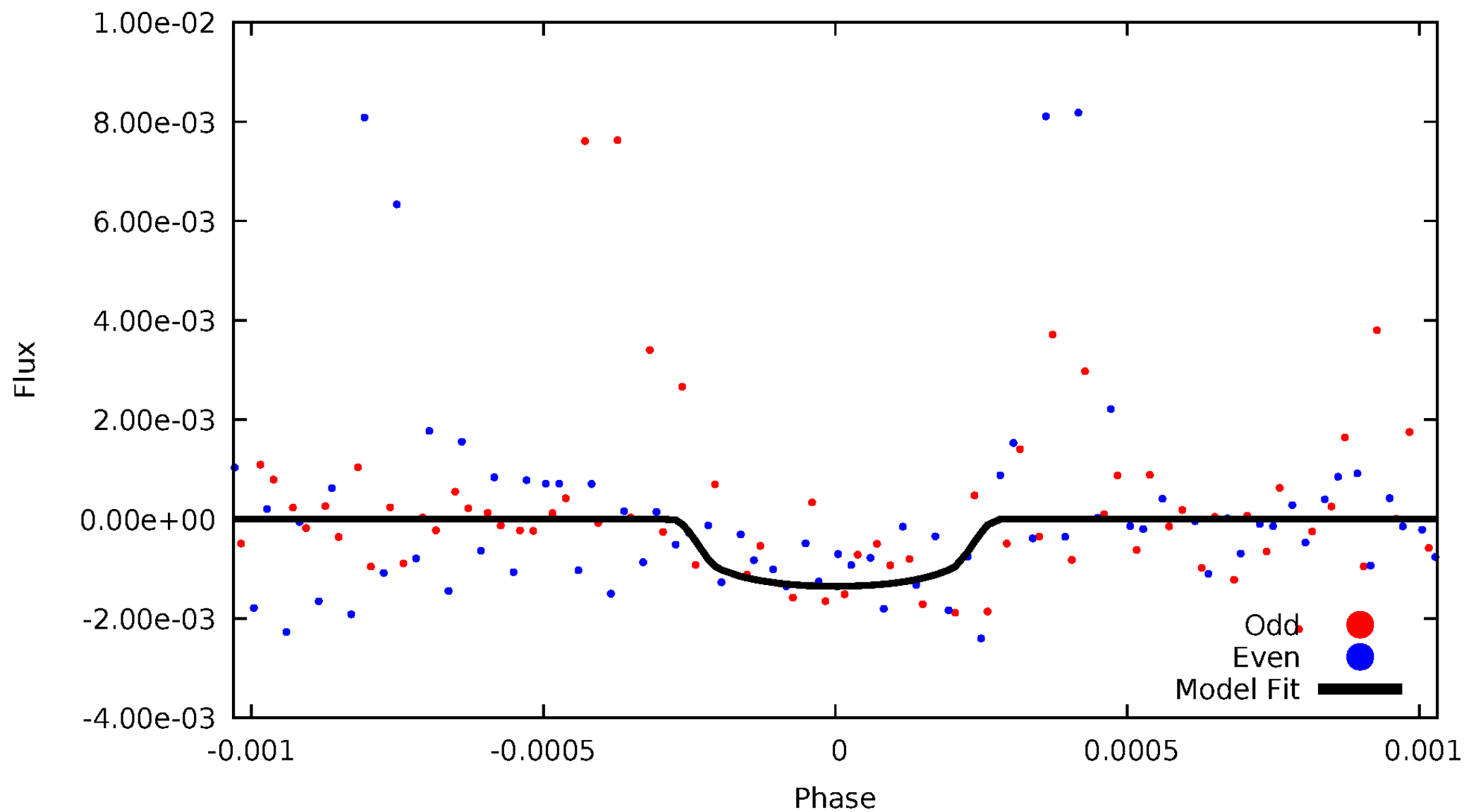


TCE 005480273-03



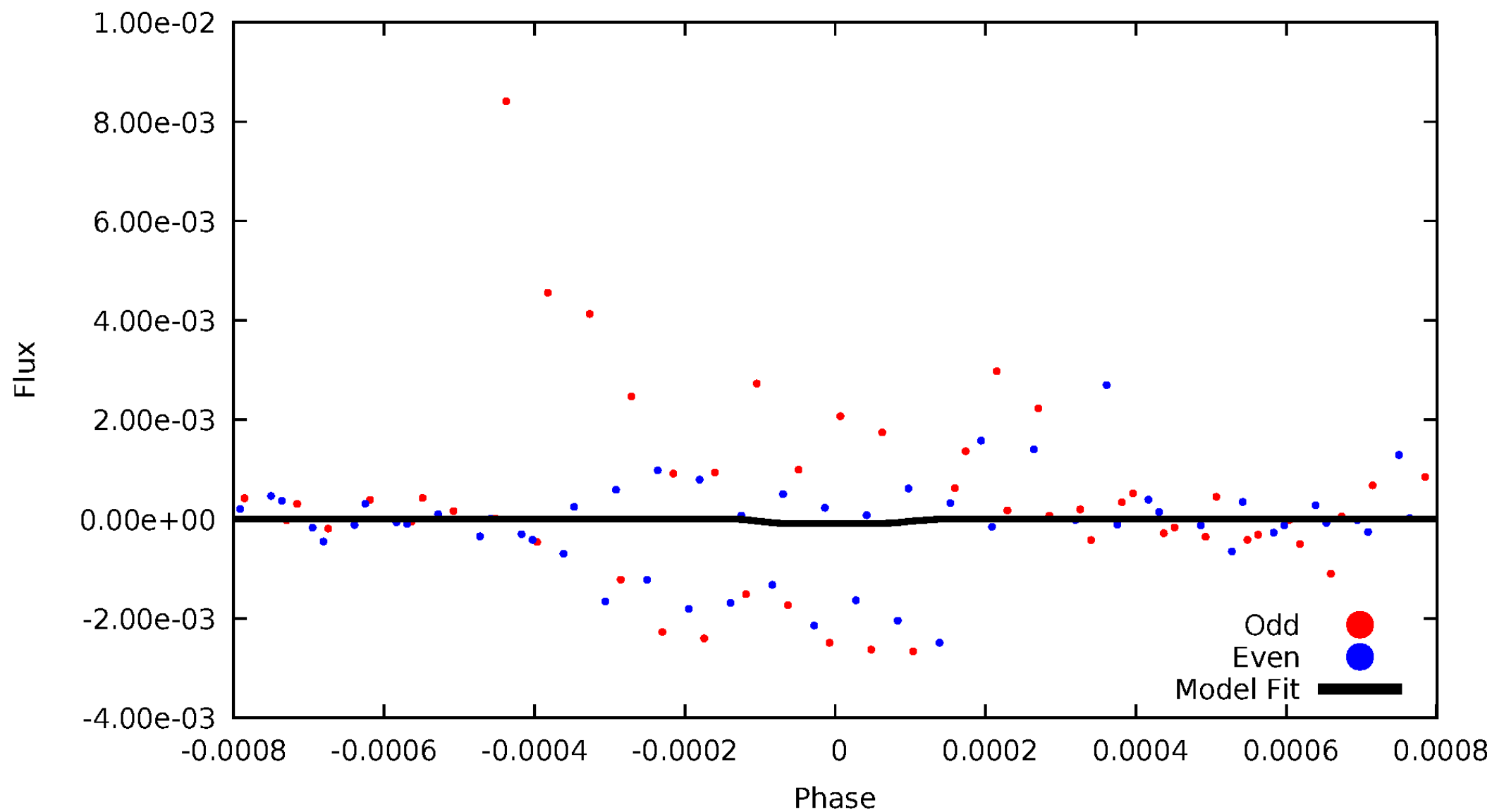
# DV Odd/Even

TCE 005480273-03



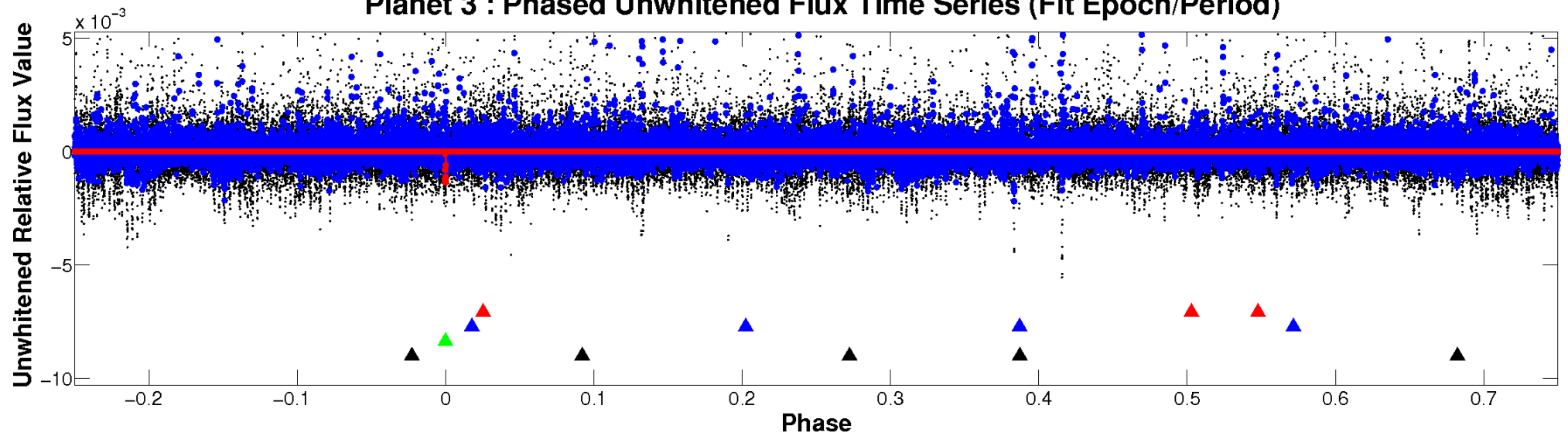
# ALT Odd/Even

TCE 005480273-03

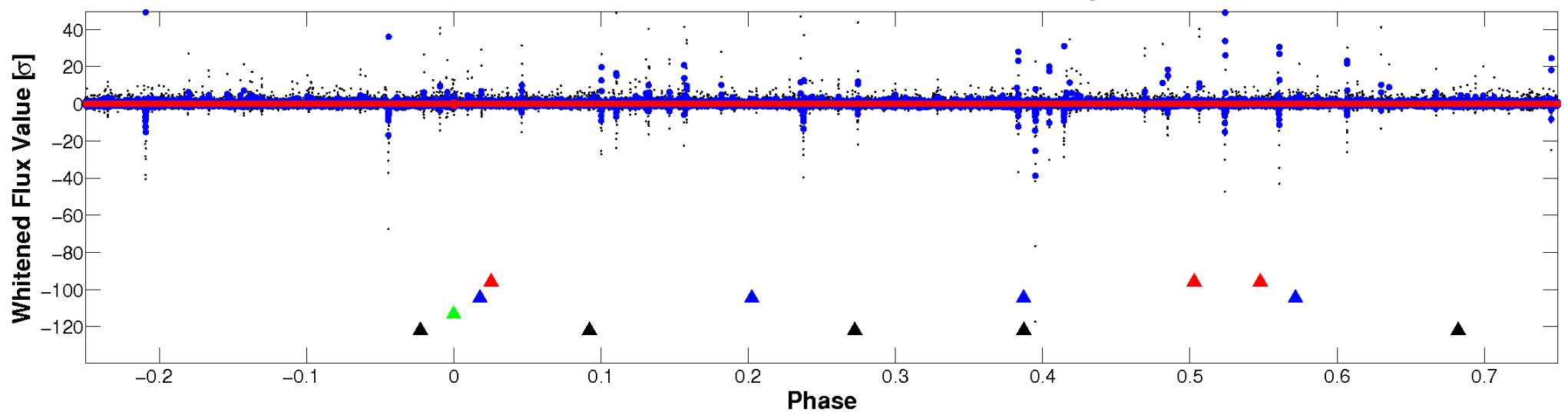


# Non-Whitened Vs. Whitened Light Curve

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

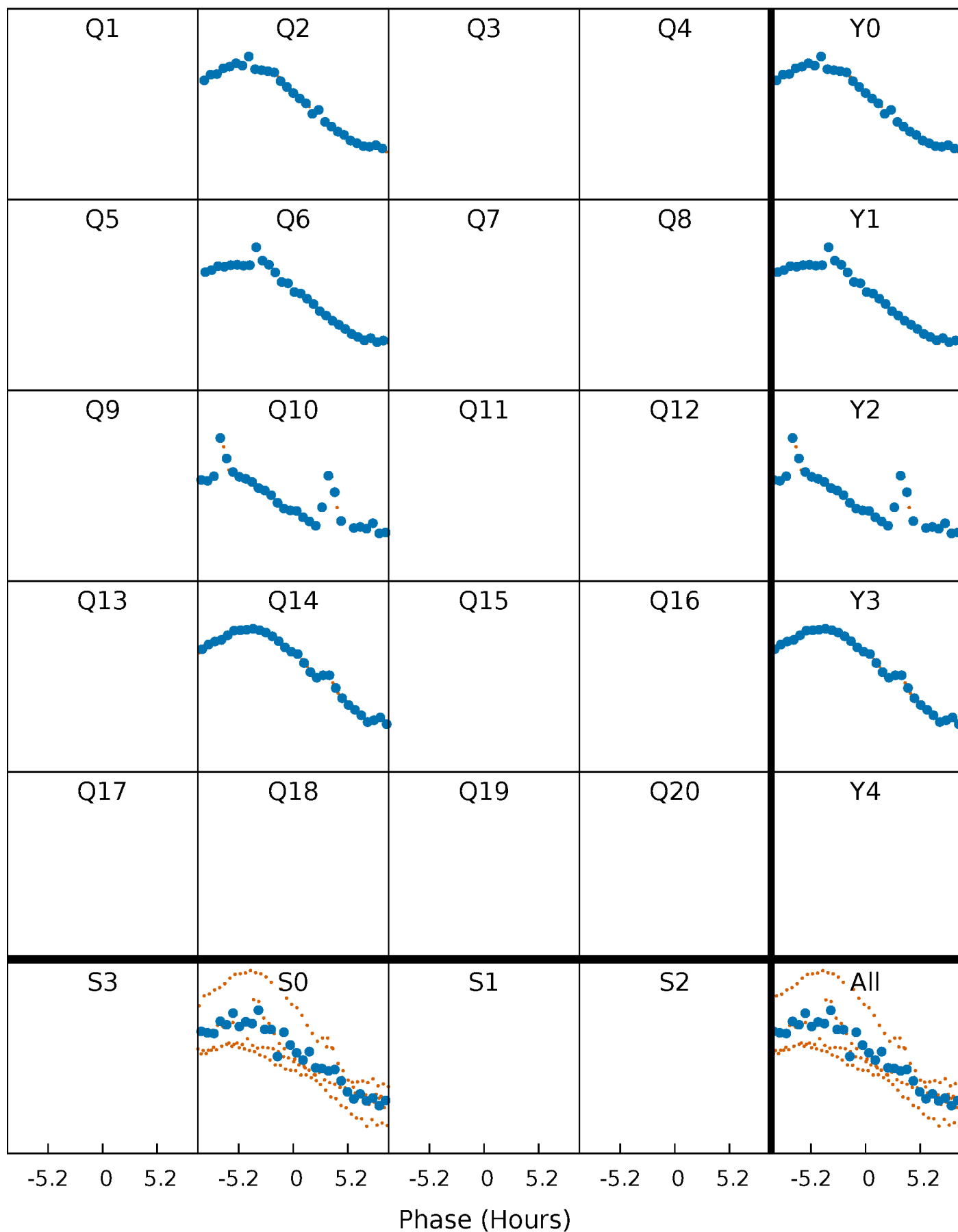


**Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

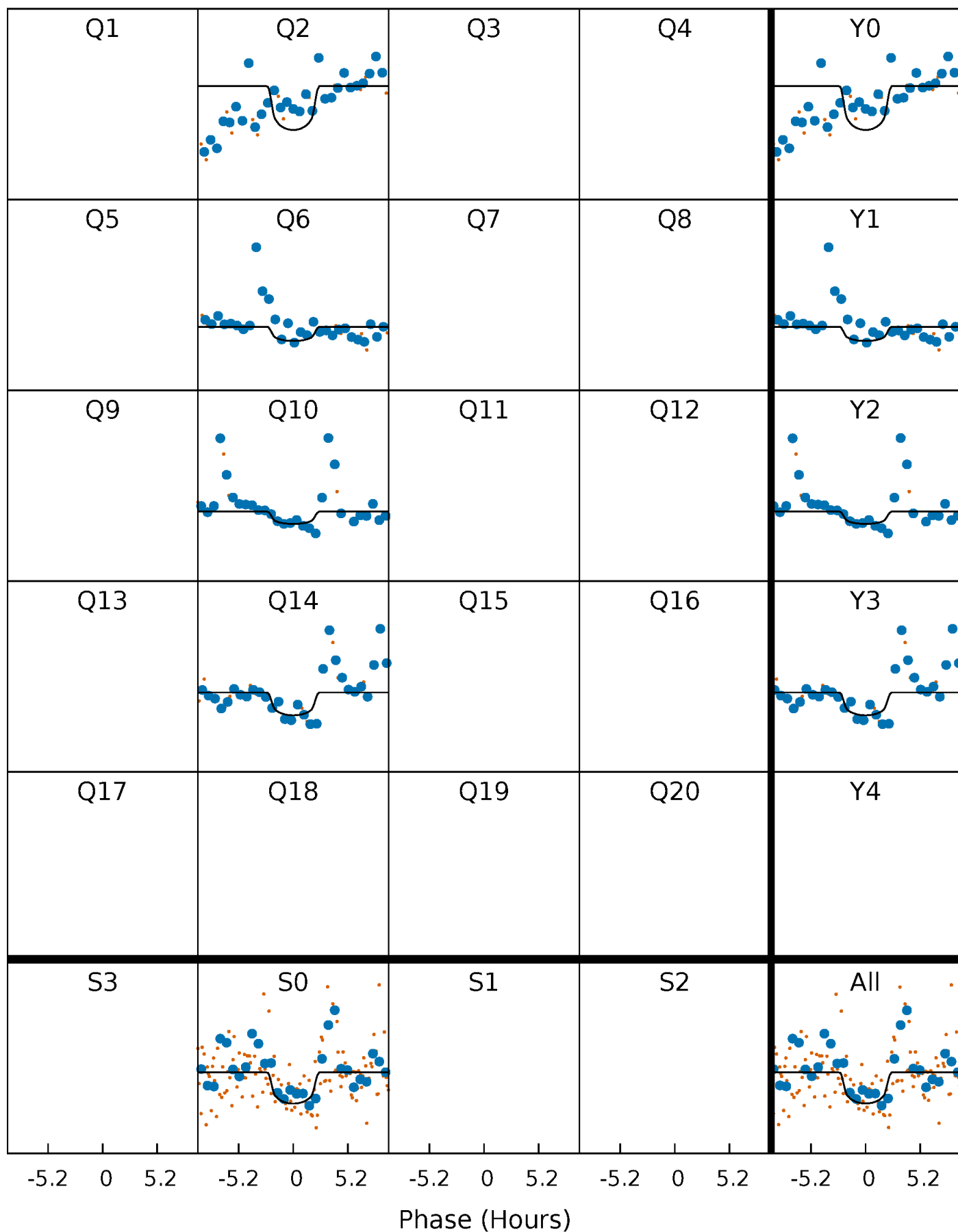
TCE 005480273-03 P=367.616782 Days  $T_0=245.491503$  (BKJD)





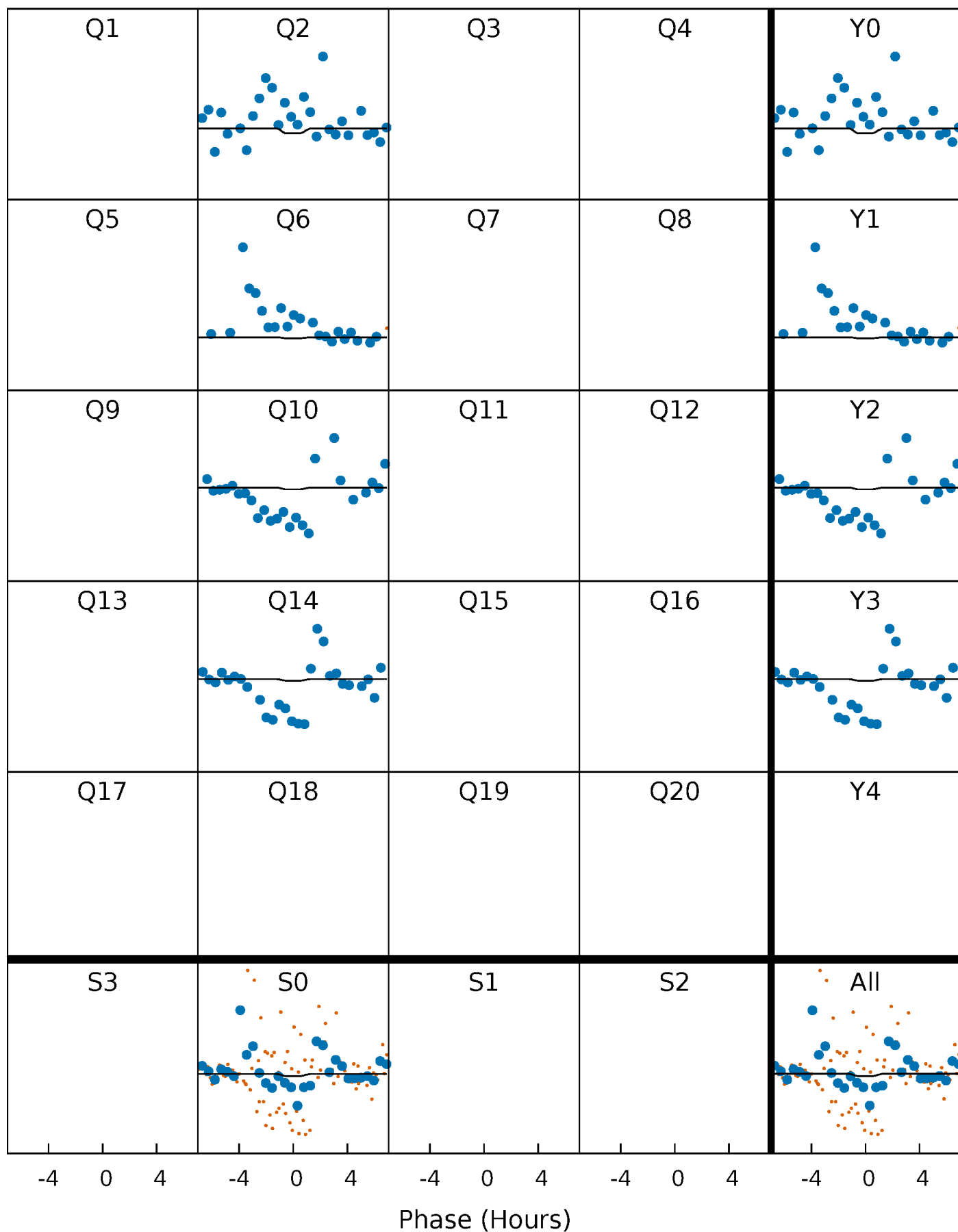
# DV Quarter-Phased Transit Curves

TCE 005480273-03 P=367.616782 Days  $T_0=245.491503$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

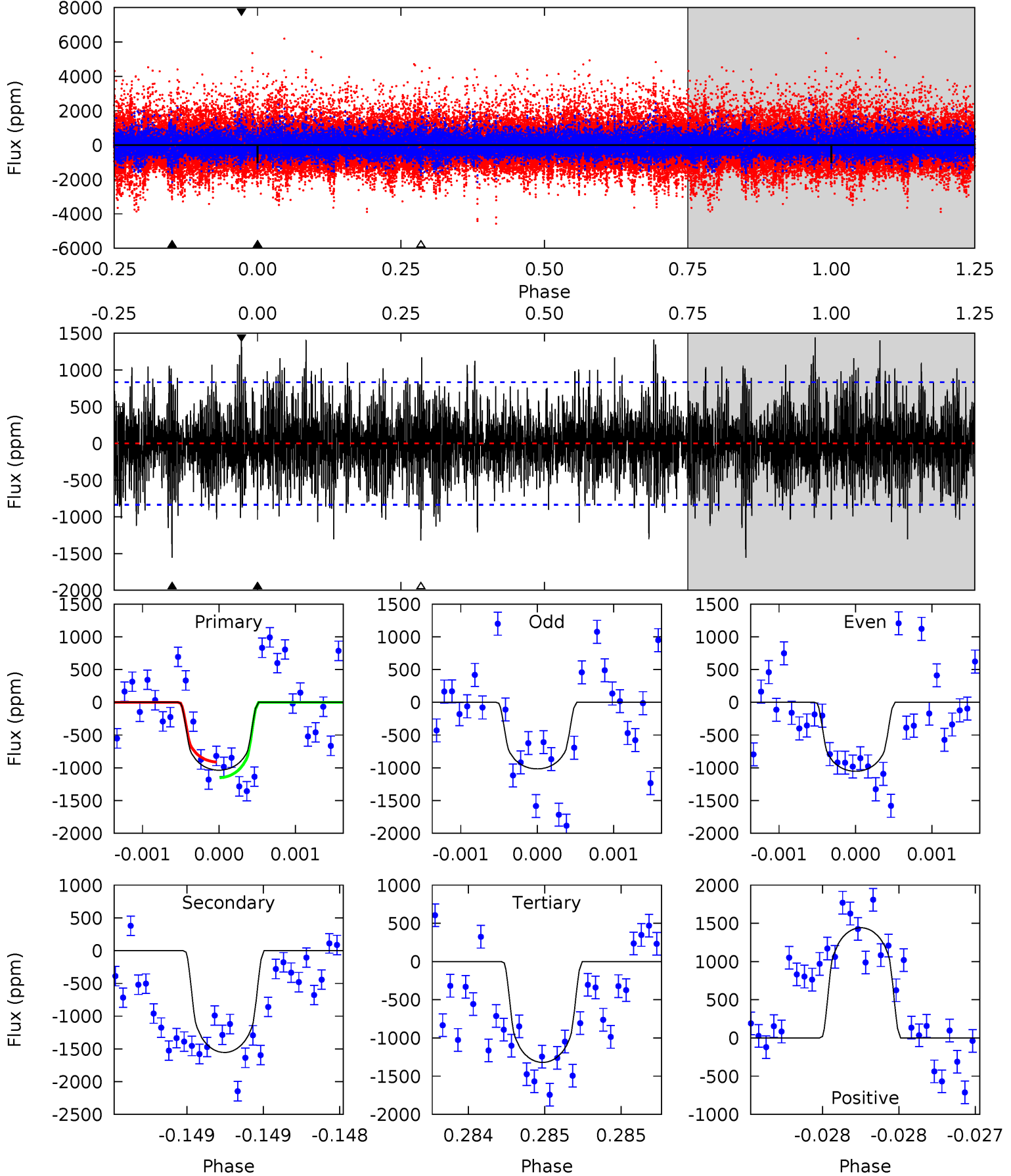
TCE 005480273-03     $P=367.633800$  Days     $T_0=245.498227$  (BKJD)



# DV Model-Shift Uniqueness Test

005480273-03, P = 367.616782 Days, E = 245.491503 Days

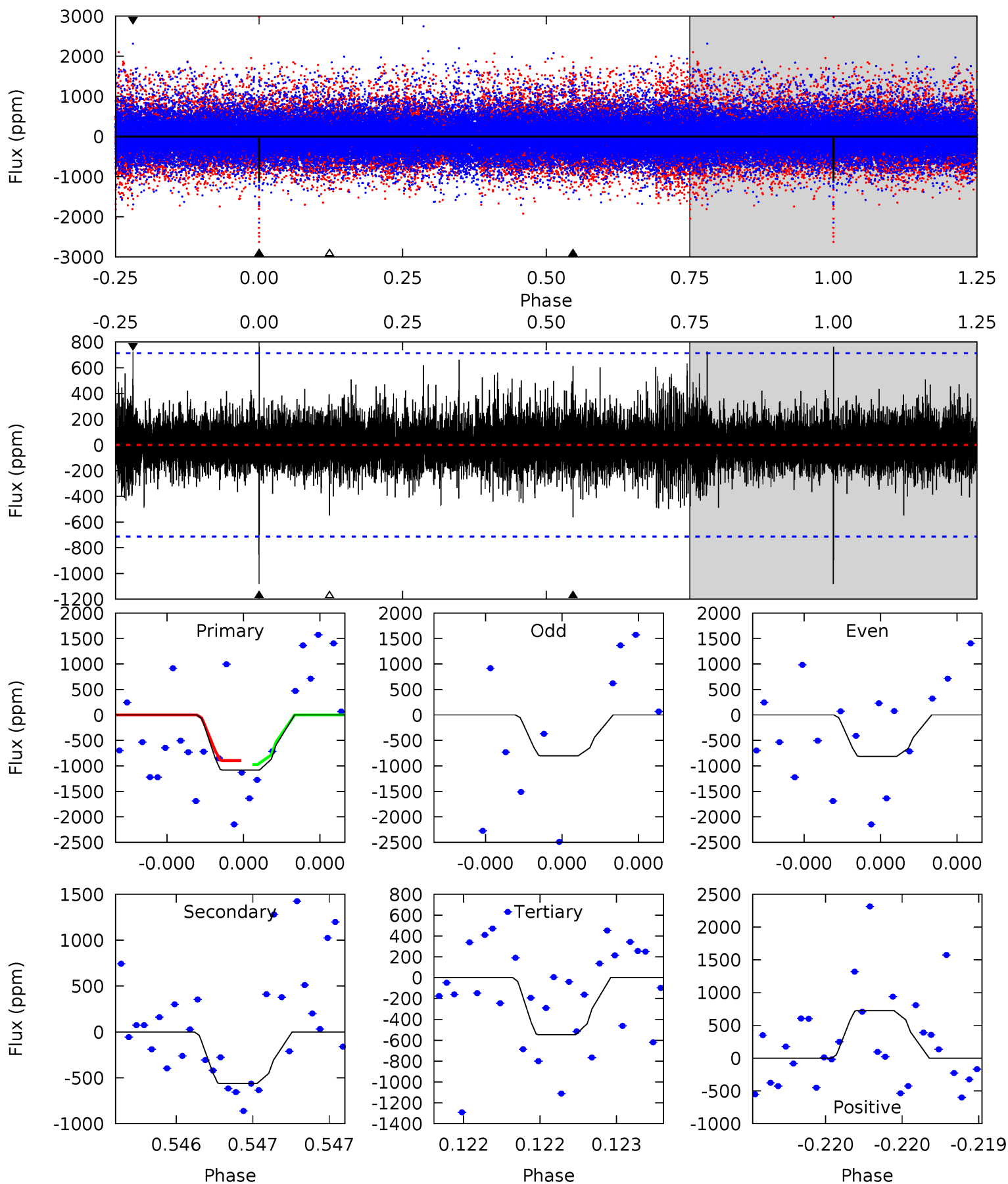
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.91	10.4	8.79	9.61	5.56	3.46	2.41	-1.89	-2.70	1.57	0.75	0.09	1.02	0.48	0.80



# Alt Model-Shift Uniqueness Test

005480273-03, P = 367.633800 Days, E = 245.498227 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
8.66	4.51	4.38	5.81	5.71	3.69	1.01	4.27	2.85	0.12	-1.30	0.04	0.71	0.41	0.29



### Stellar Parameters For KIC 005480273

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4701^{+153}_{-153}$	$4.694^{+0.052}_{-0.028}$	$-1.060^{+0.300}_{-0.300}$	$0.554^{+0.037}_{-0.037}$	$0.553^{+0.047}_{-0.024}$	$4.585^{+0.888}_{-0.554}$
	+3%/-3%	+1%/-1%	+28%/-28%	+7%/-7%	+8%/-4%	+19%/-12%
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 005480273-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1555 \pm 150$	$2.91^{+2.62}_{-1.92}$	$237^{+9}_{-9}$	$4339^{+2705}_{-864}$	$67362^{+510964}_{-47945}$
Alt.	$-563 \pm 125$	$2.12^{+2.44}_{-1.49}$	$236^{+8}_{-8}$	$4037^{+2692}_{-887}$	$46693^{+477044}_{-36538}$

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

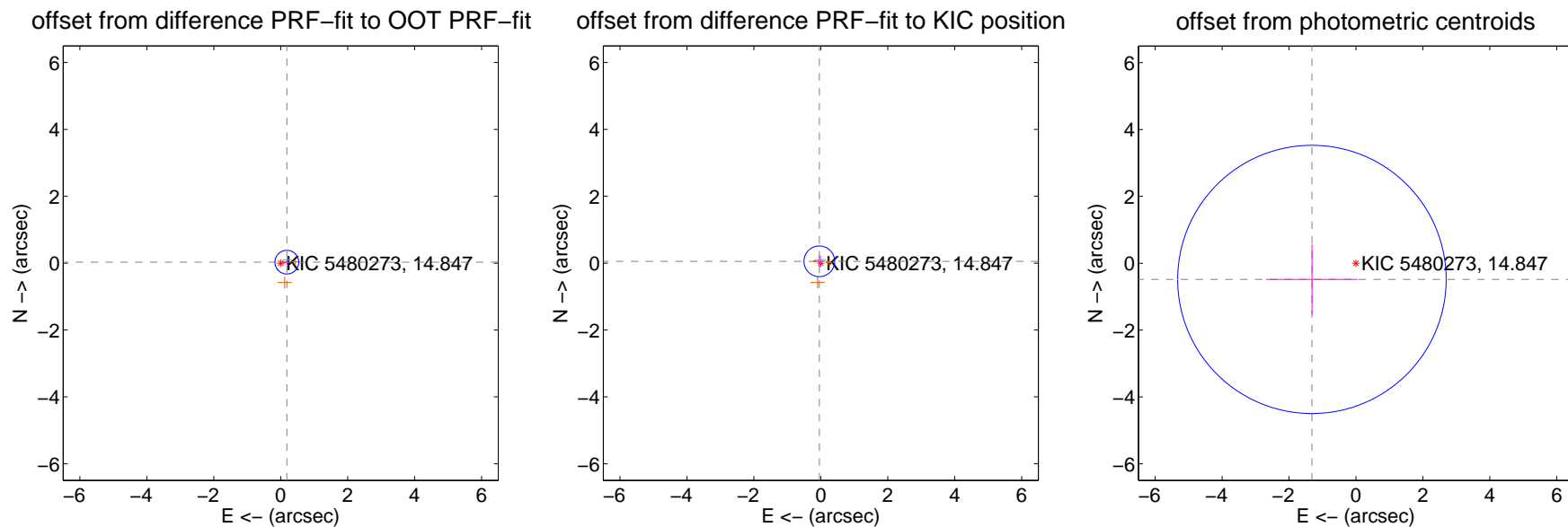
## DV Centroid Data

Supplemental centroid analysis for 005480273-03. Kepler magnitude: 14.85. Transit SNR 5.60

There are 1 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.27 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.184 \pm 0.118$	1.56	$-0.182 \pm 0.119$	$0.030 \pm 0.083$
PRF-fit source offset from KIC position	$0.072 \pm 0.153$	0.47	$0.046 \pm 0.098$	$0.055 \pm 0.187$
photometric centroid source offset	$1.40 \pm 1.34$	1.05	$1.32 \pm 1.37$	$-0.48 \pm 1.04$



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.

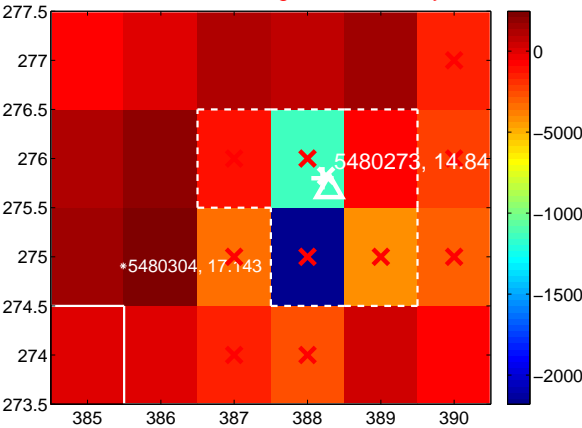
Q1 no difference image



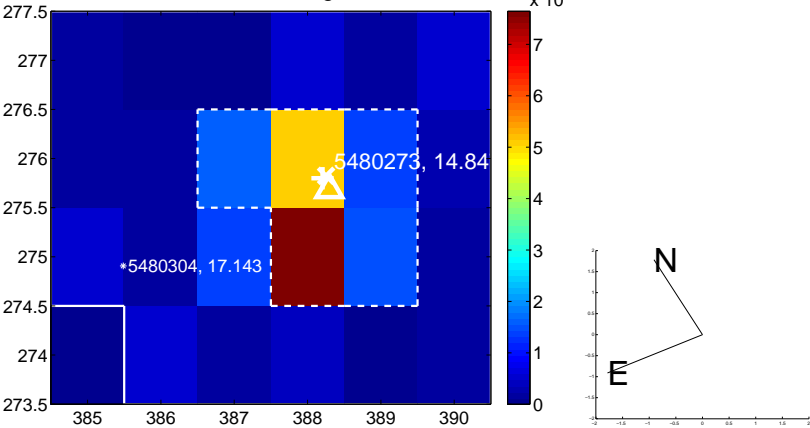
Q1 no OOT image



Q2 difference image. Poor Quality



Q2 OOT image



Q3 no difference image



Q3 no OOT image



Q4 no difference image



Q4 no OOT image



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

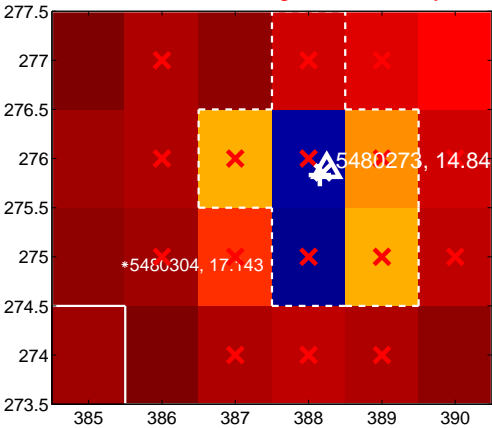
Q5 no difference image



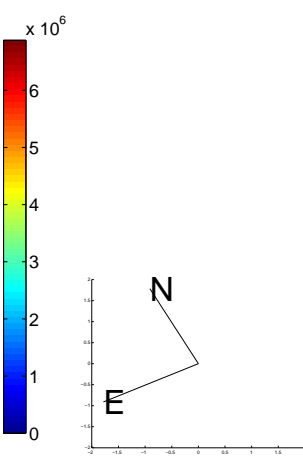
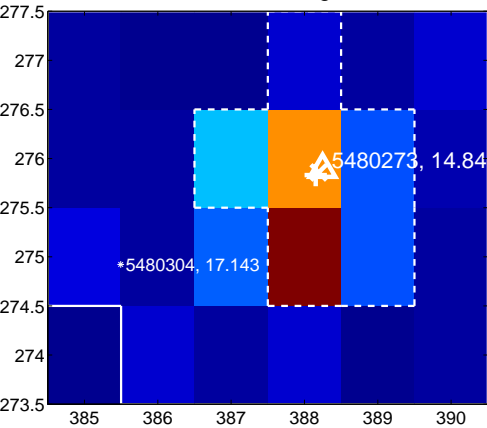
Q5 no OOT image



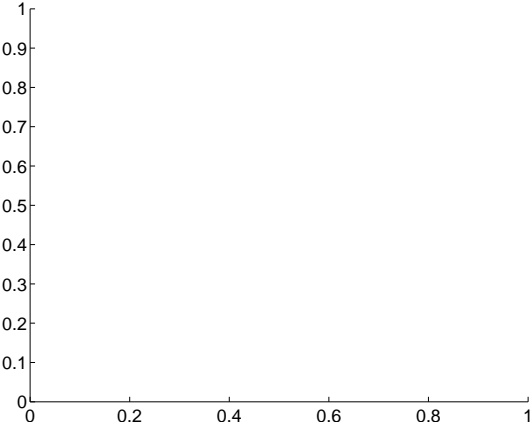
Q6 difference image. Poor Quality



Q6 OOT image



Q7 no difference image



Q7 no OOT image



Q8 no difference image



Q8 no OOT image





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

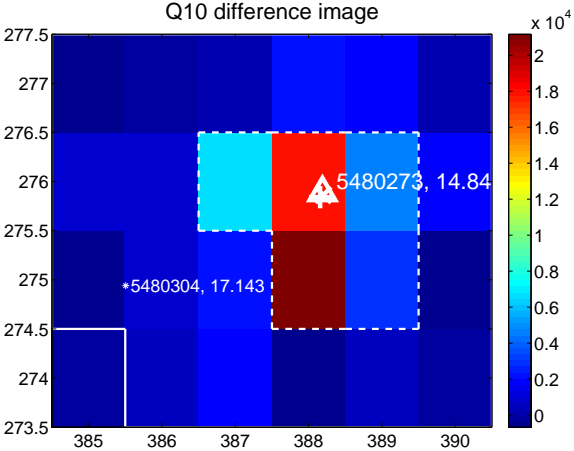
Q9 no difference image



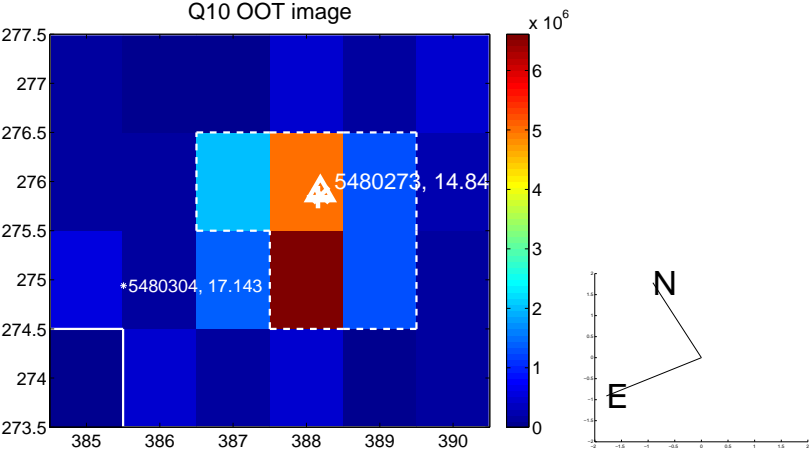
Q9 no OOT image



Q10 difference image



Q10 OOT image



Q11 no difference image



Q11 no OOT image



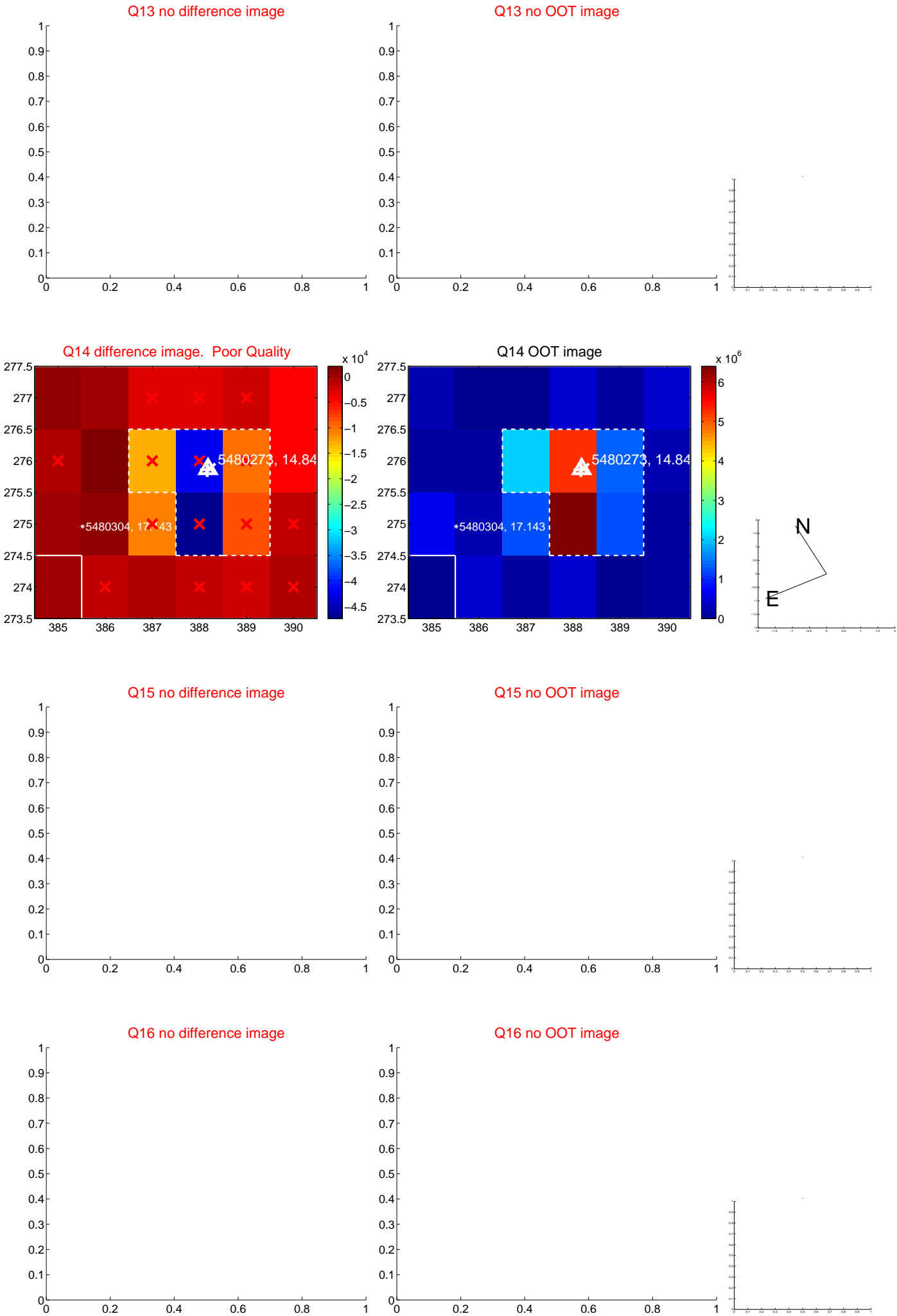
Q12 no difference image



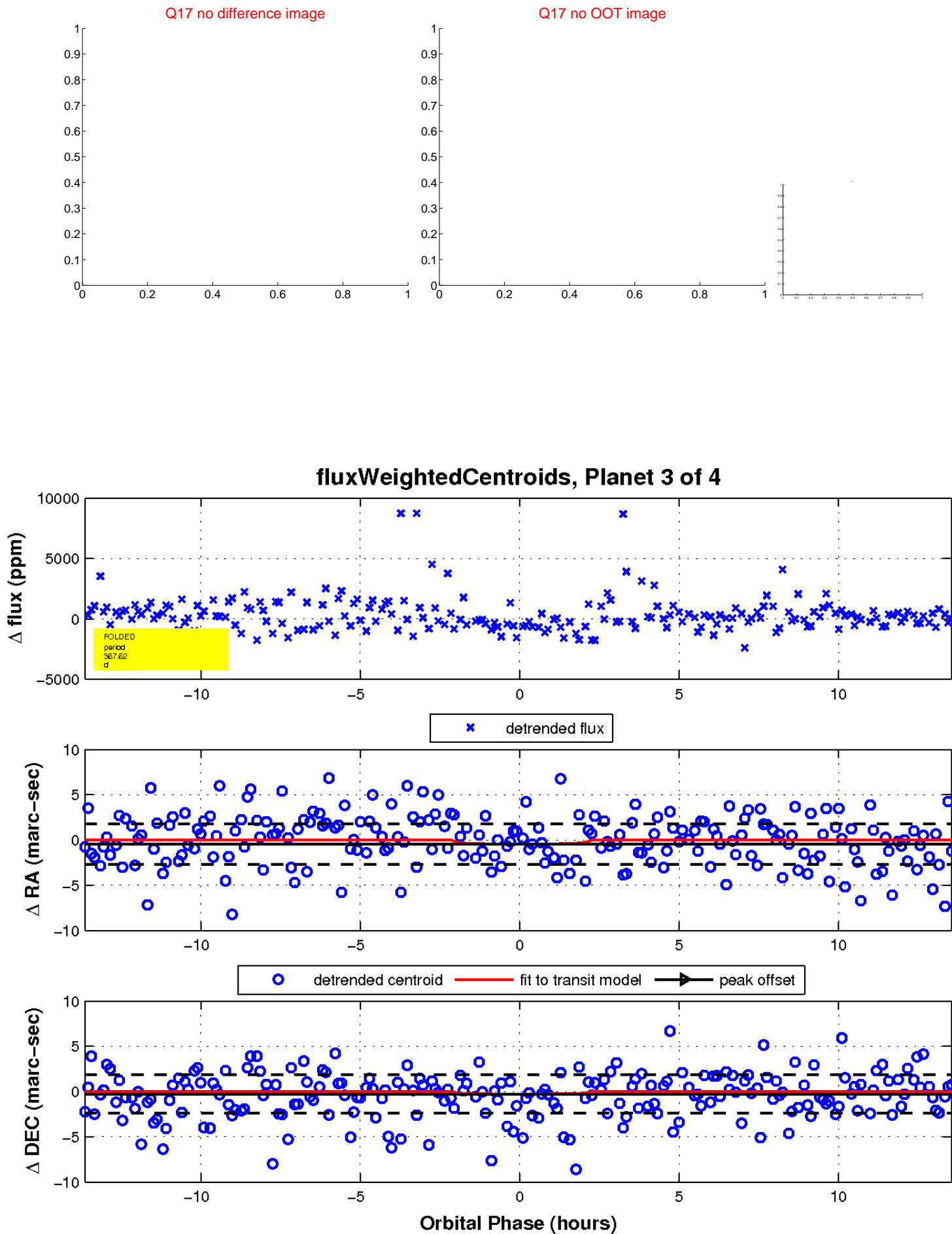
Q12 no OOT image



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

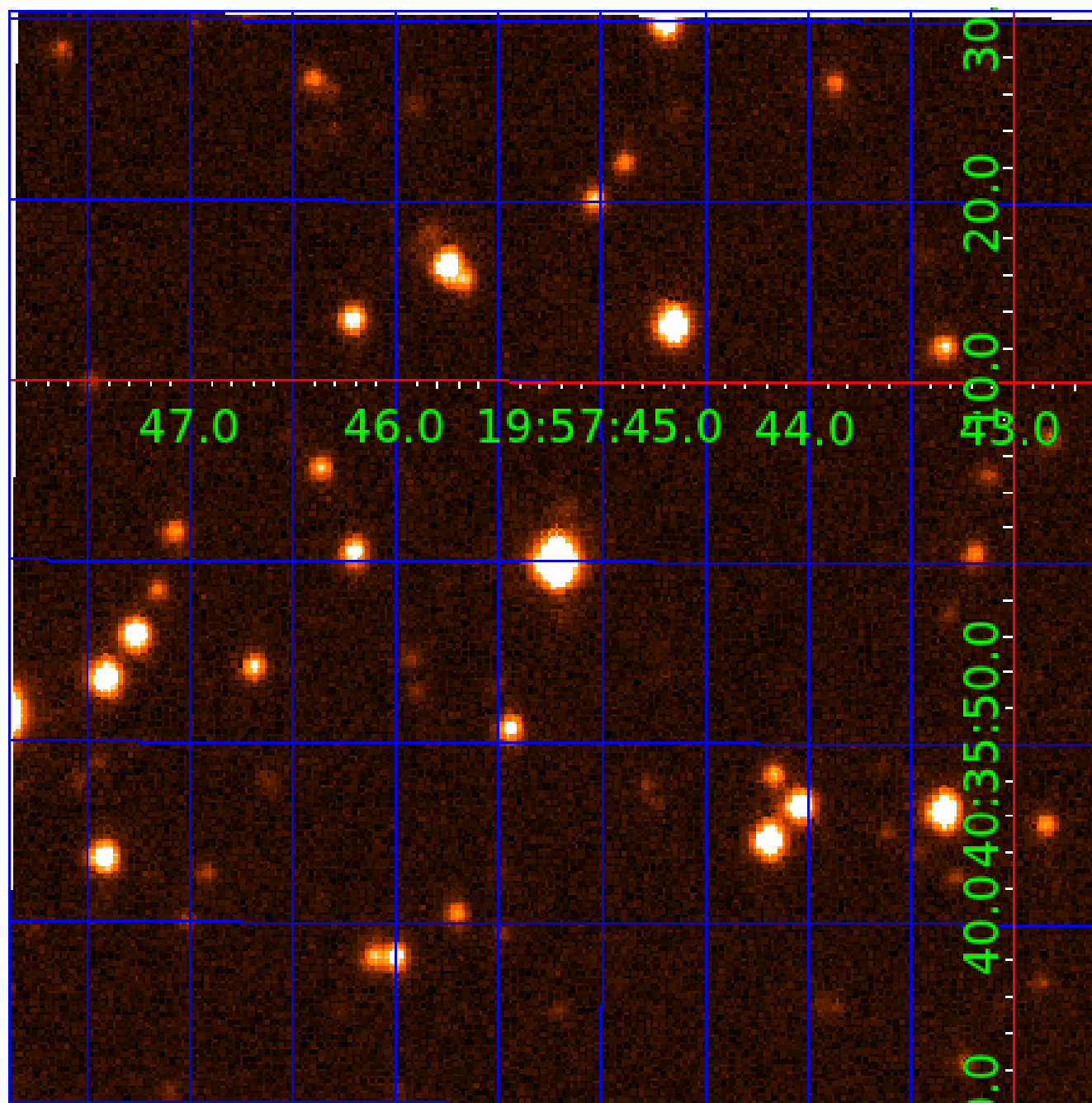


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 005480273

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005480273-01	OBS	No	559.670417	430.388399	1772.5	3.716	10.3	6.7	0.55	4701	2.35	0.11
005480273-02	OBS	No	435.490631	252.037619	2379.0	5.170	11.1	8.5	0.55	4701	2.81	0.16
005480273-03	OBS	No	367.616782	245.491503	1354.9	4.546	12.5	5.6	0.55	4701	2.15	0.20
005480273-04	OBS	No	259.148956	345.639123	1563.7	3.388	11.3	6.6	0.55	4701	2.18	0.32

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005480273-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT— INCONSISTENT_TRANS—CENT_FEW_DIFFS
005480273-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS
005480273-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
005480273-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—INCONSISTENT_TRANS

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

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

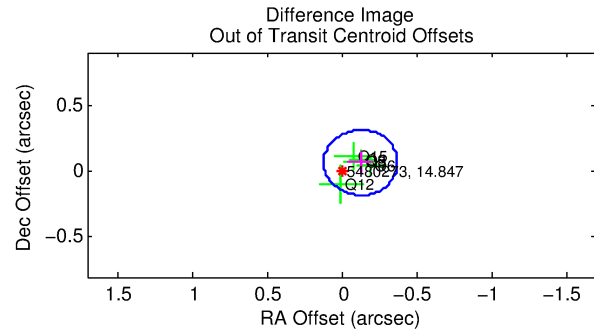
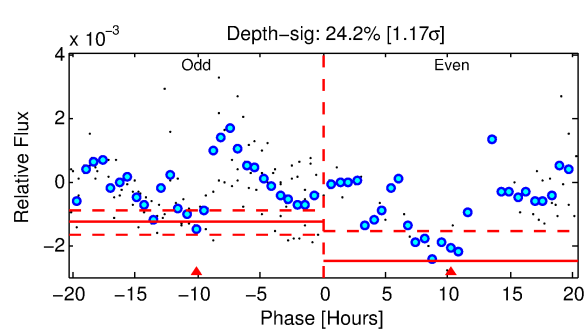
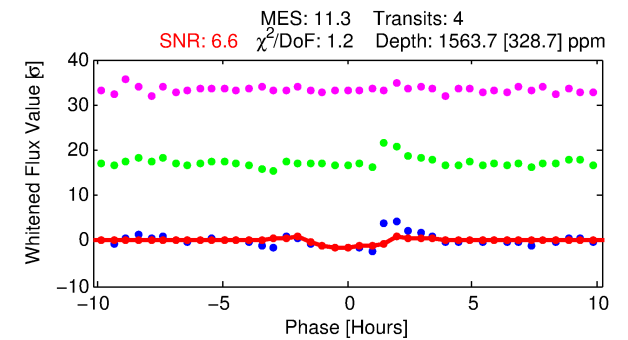
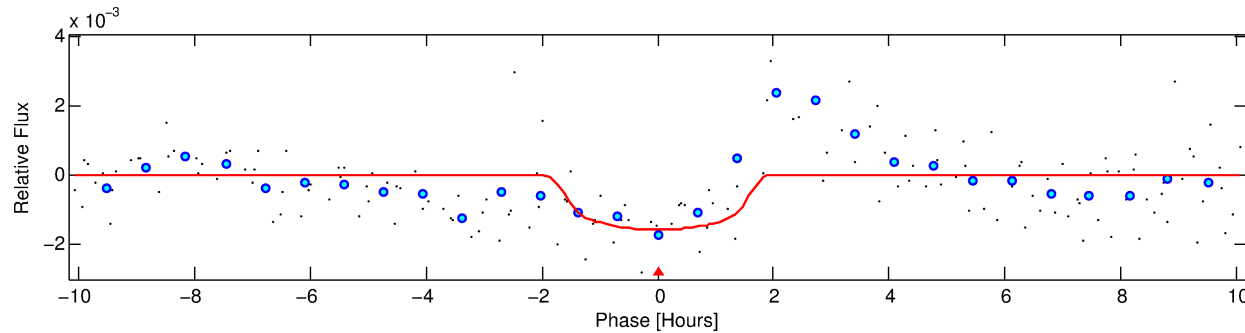
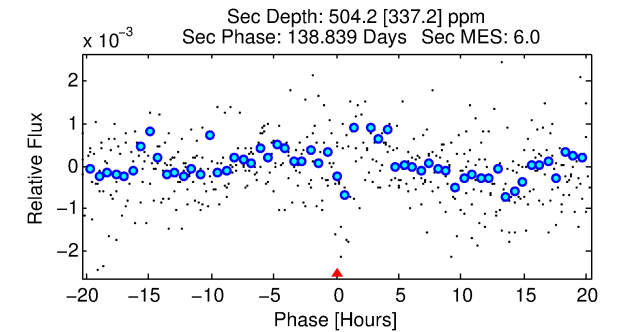
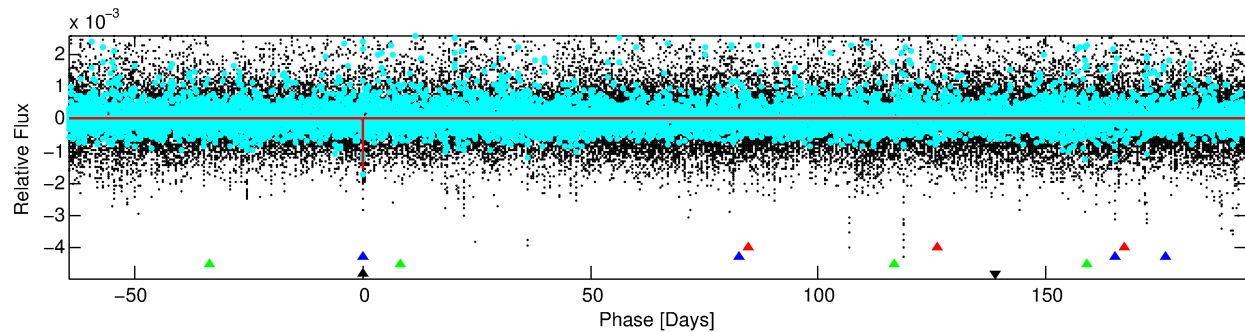
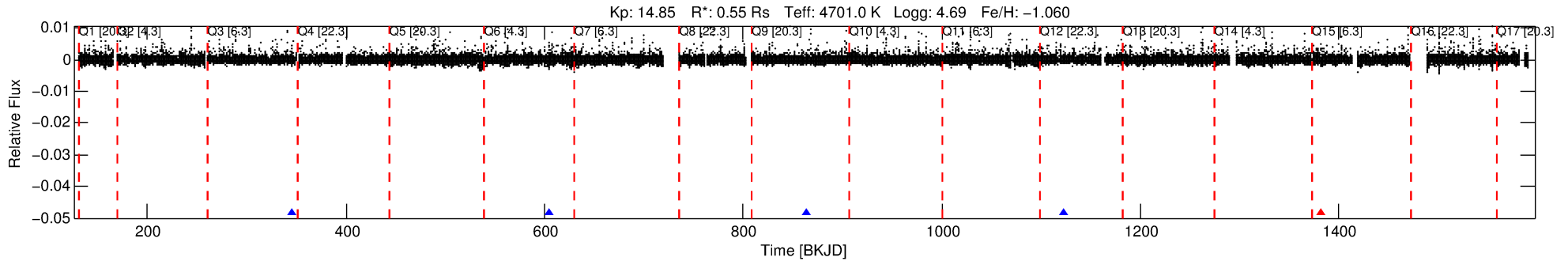
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005480273-04

No Significant Match Found

# DV One-Page Summary

KIC: 5480273 Candidate: 4 of 4 Period: 259.149 d



## DV Fit Results:

Period = 259.14896 [0.00276] d  
Epoch = 345.6391 [0.0088] BKJD  
Rp/R\* = 0.0360 [0.0854]  
a/R\* = 566.49 [4924.92]  
b = 0.37 [20.88]  
Seff = 0.31 [0.05]  
Teq = 191 [8] K  
Rp = 2.18 [5.17] Re  
a = 0.6532 [0.0391] AU  
Ag = 24988.10 [119798.70] [0.21σ]  
Teffp = 3713 [4451] K [0.79σ]

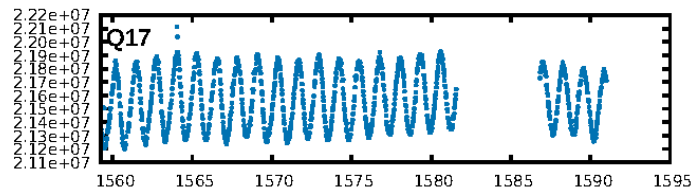
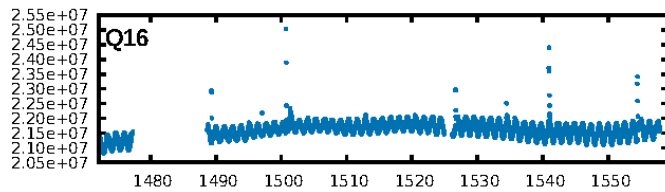
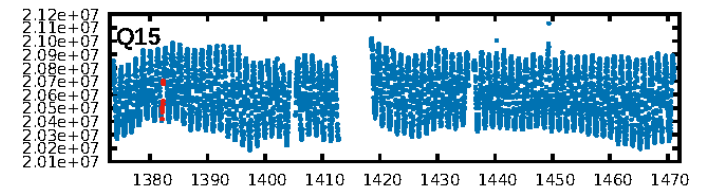
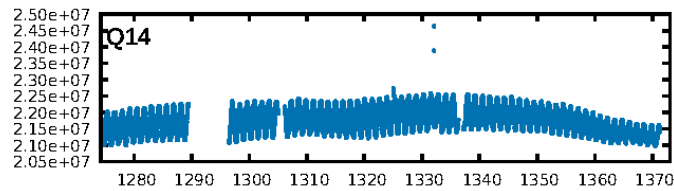
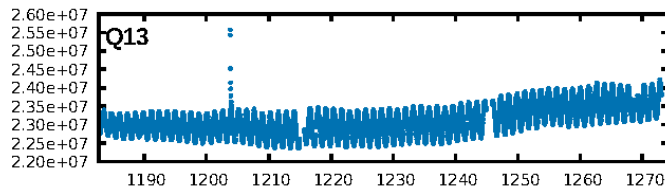
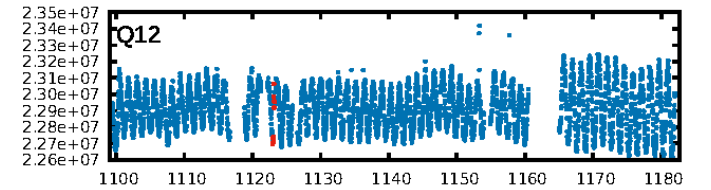
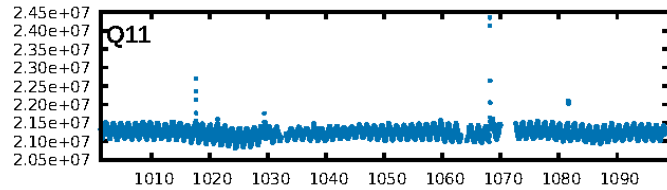
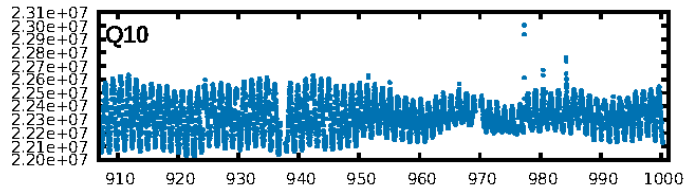
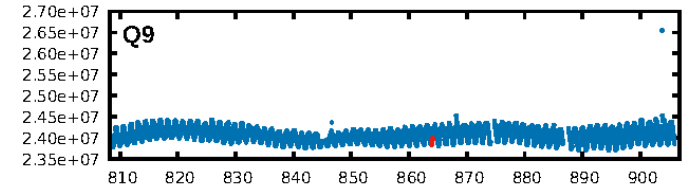
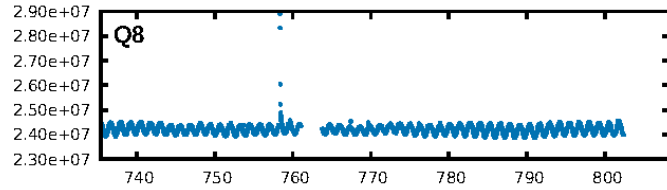
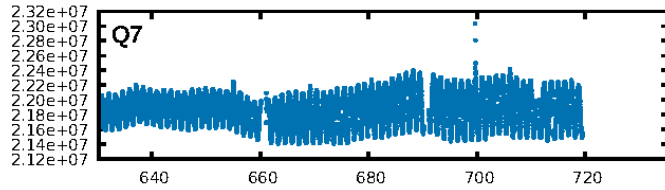
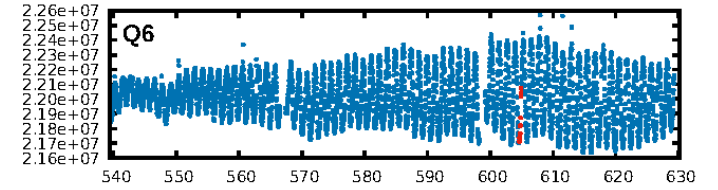
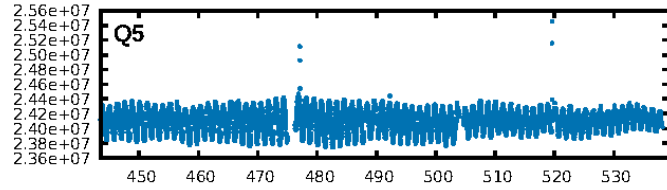
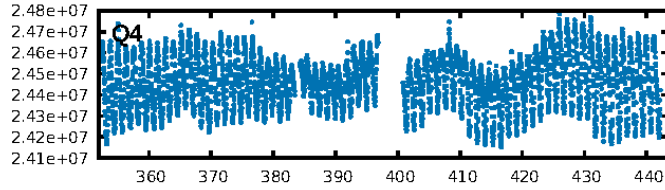
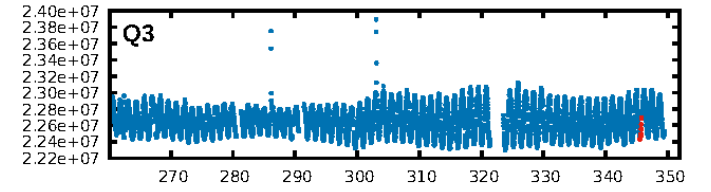
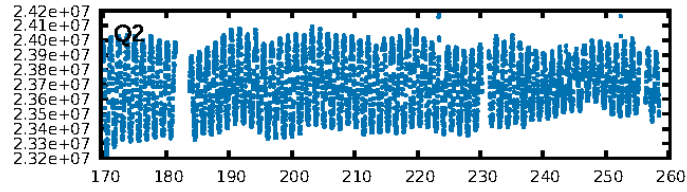
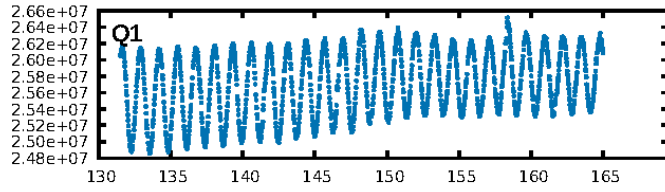
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [459.14σ]  
ModelChiSquare2-sig: 1.3%  
ModelChiSquareGof-sig: 69.5%  
Bootstrap-pfa: 1.04e-10  
RollingBand-fgt: 0.75 [3/4]  
GhostDiagnostic-chr: -1.156  
Centroid-sig: 2.1%  
Centroid-so: 0.594 arcsec [0.71σ]  
OotOffset-rm: 0.143 arcsec [1.74σ]  
KicOffset-rm: 0.053 arcsec [0.65σ]  
OotOffset-st: 1/2/1/1 [5]  
KicOffset-st: 1/2/1/1 [5]  
DiffImageQuality-fgm: 1.00 [5/5]  
DiffImageOverlap-fno: 0.80 [4/5]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 12:27:20 Z

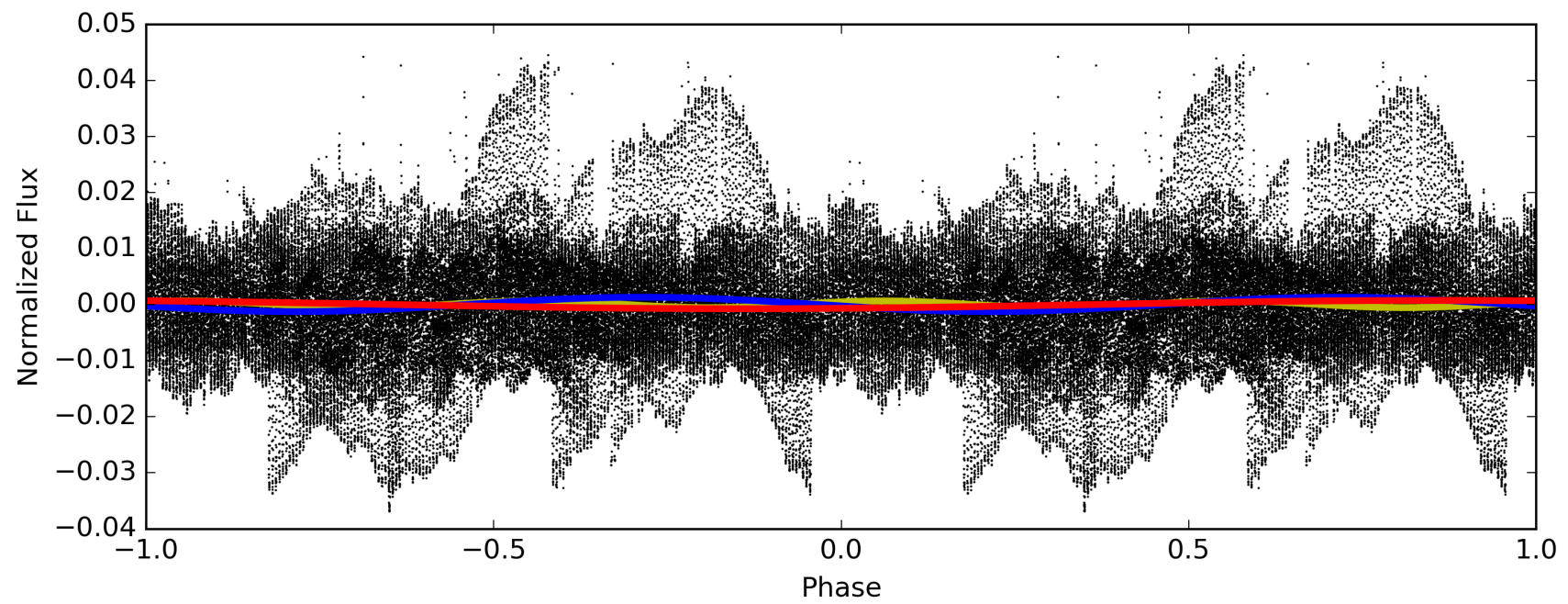
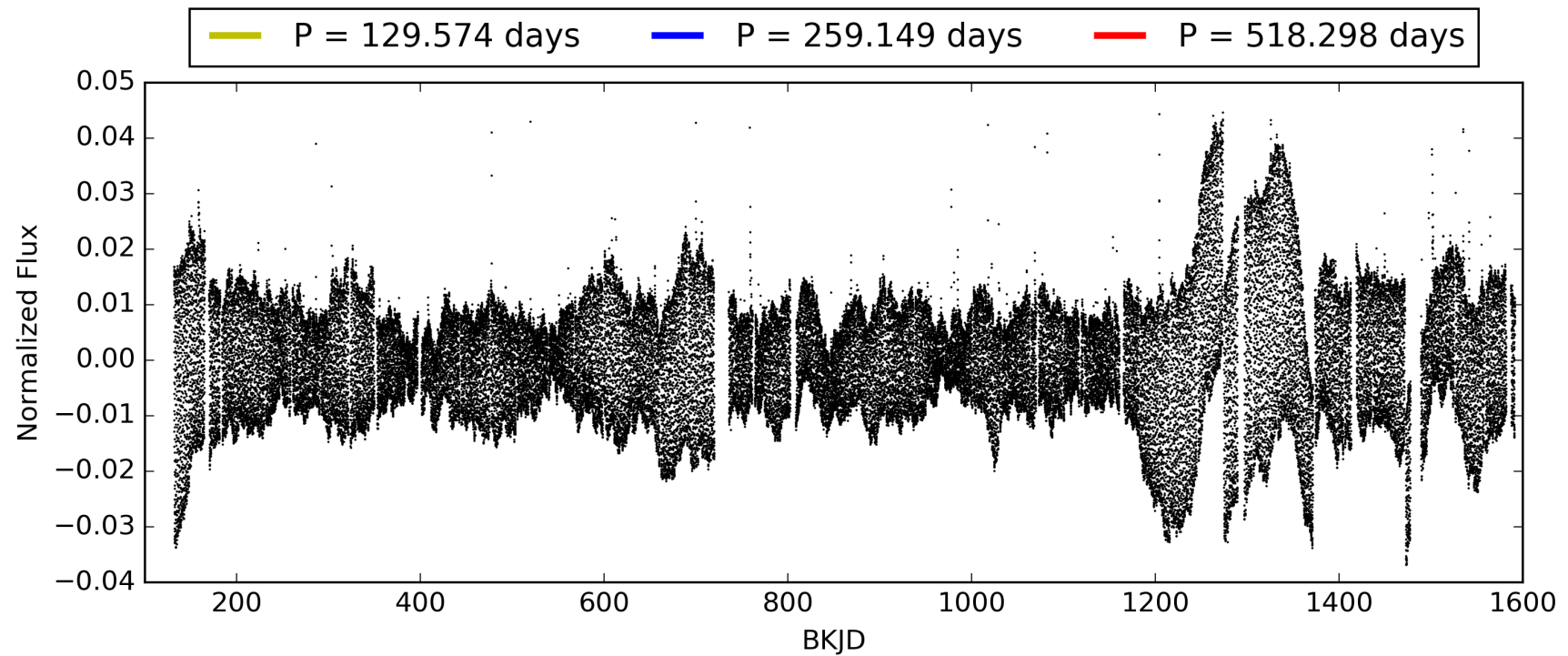
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005480273-04, PDC Light Curves





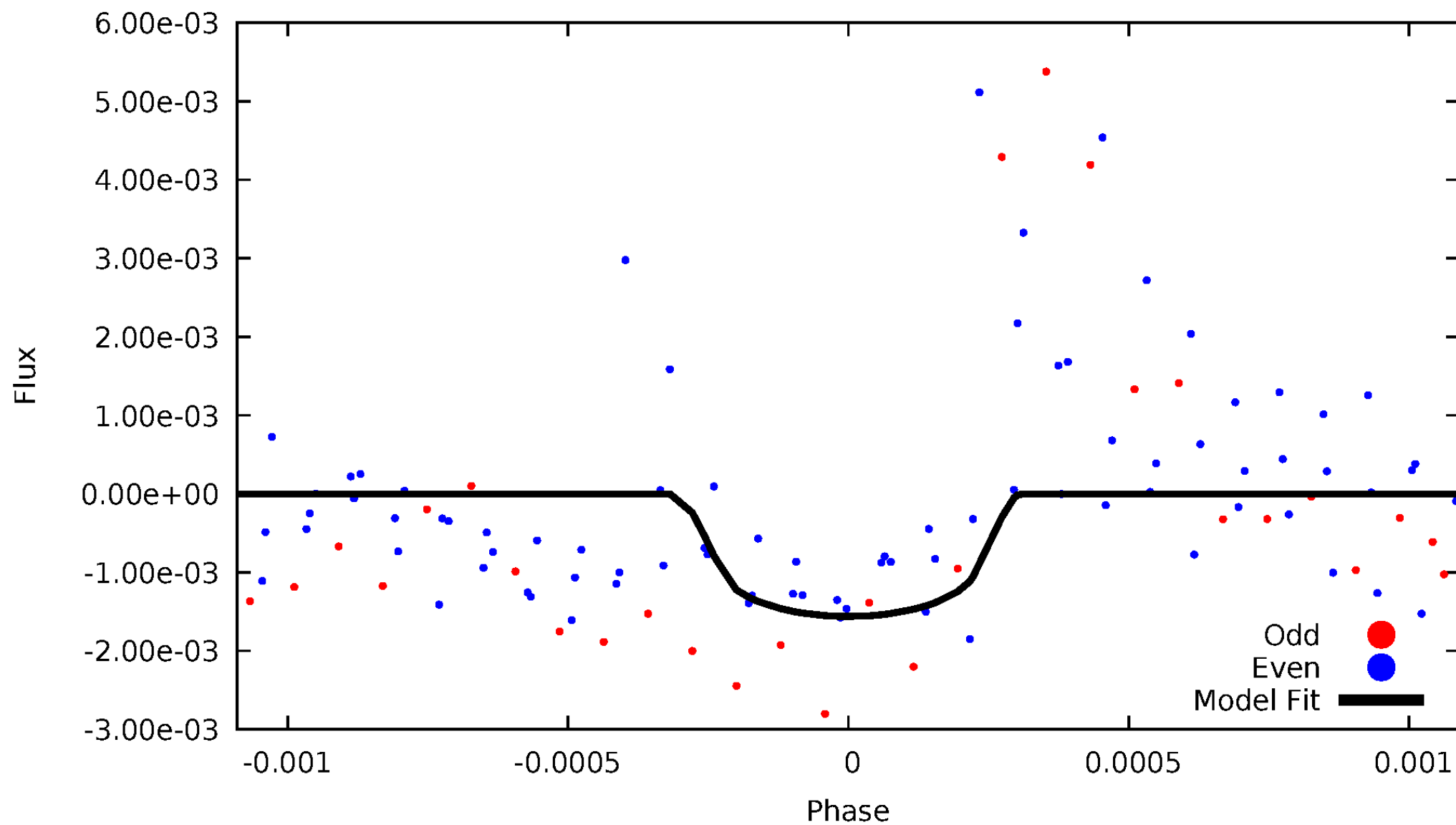
TCE 005480273-04





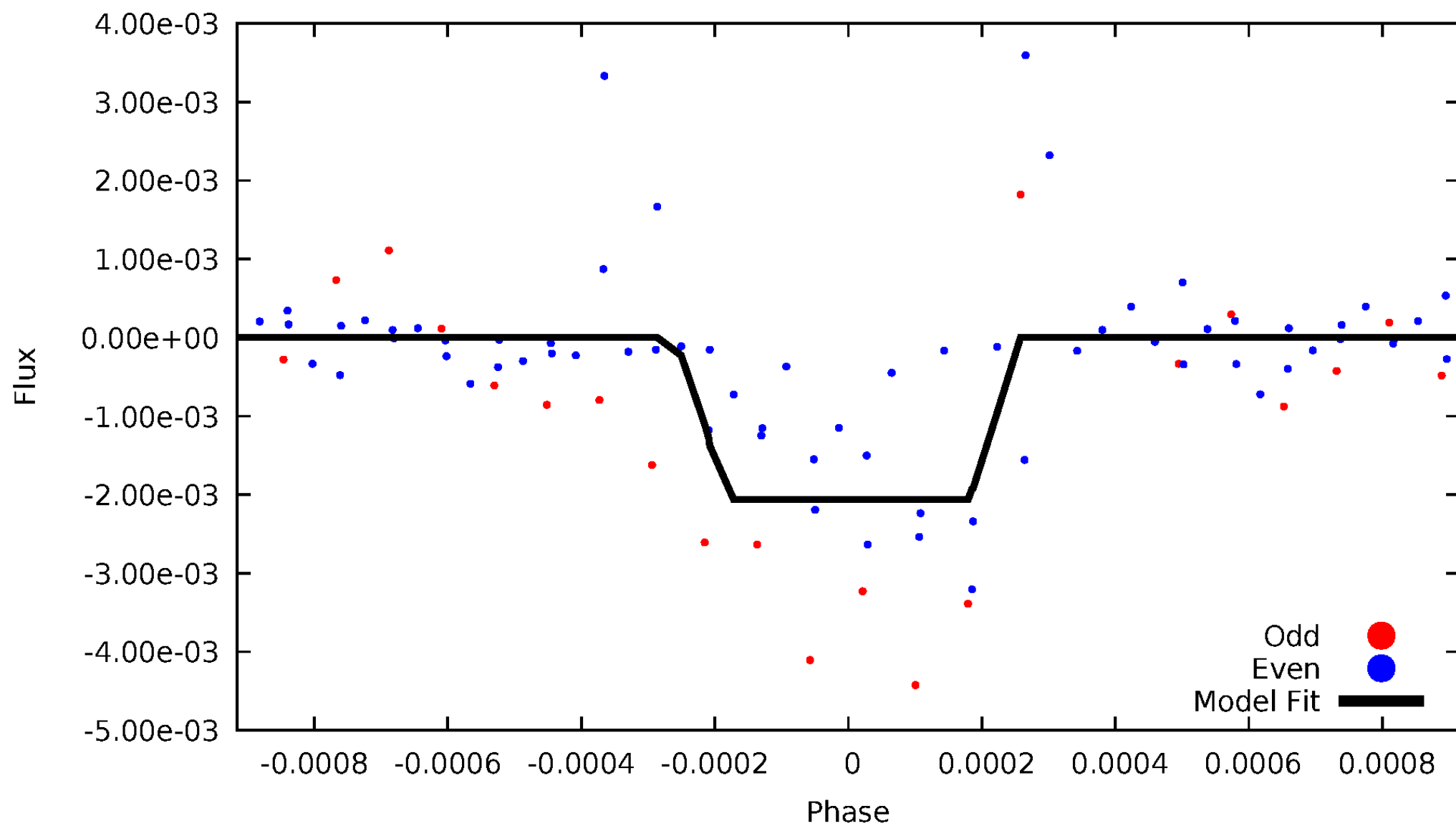
# DV Odd/Even

TCE 005480273-04



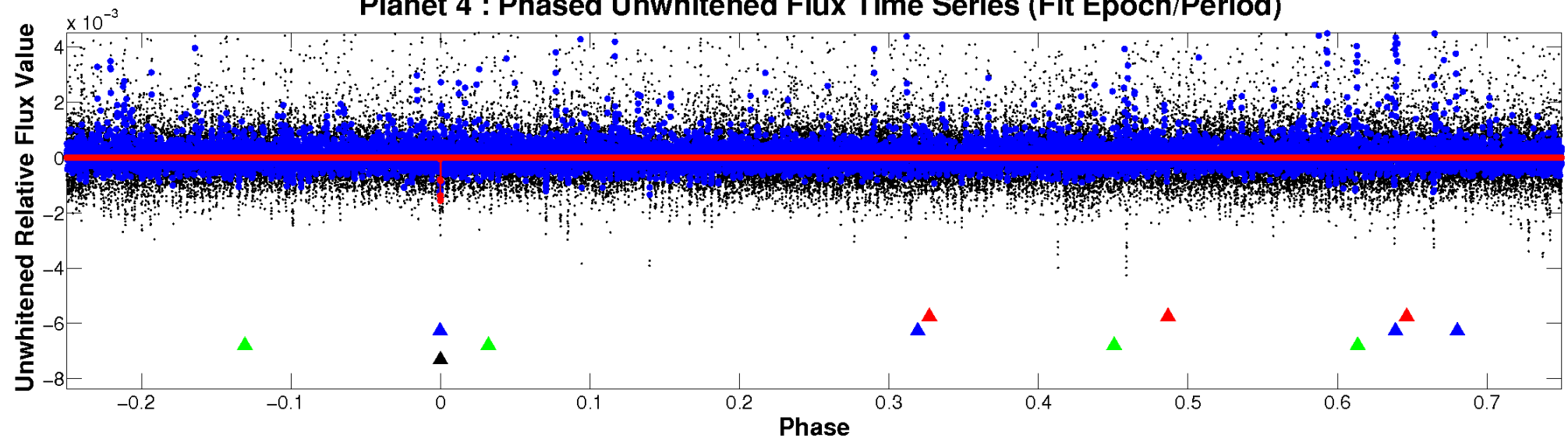
# ALT Odd/Even

TCE 005480273-04

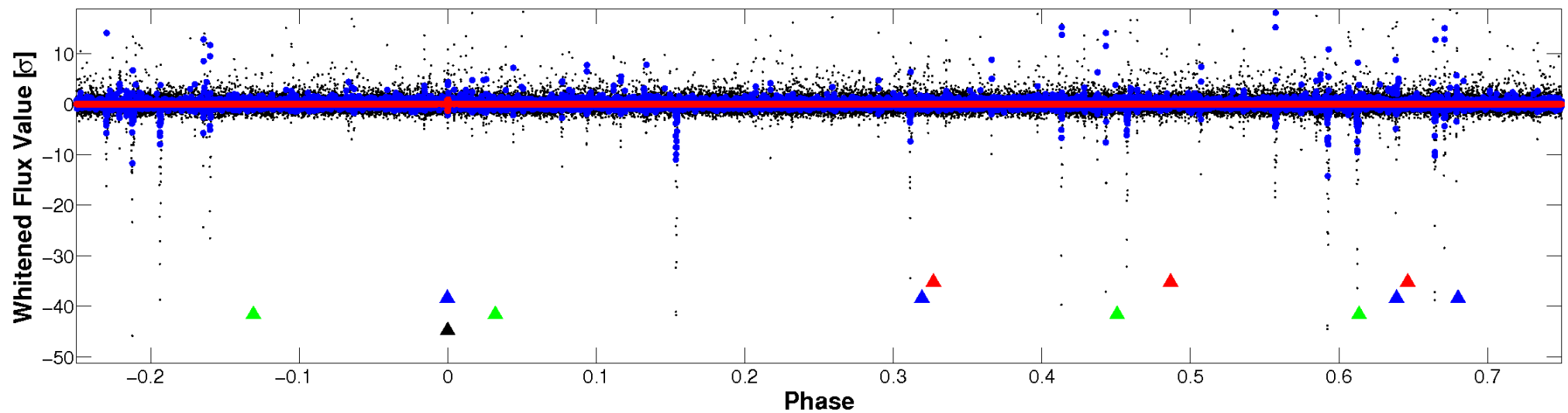


# Non-Whitened Vs. Whitened Light Curve

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

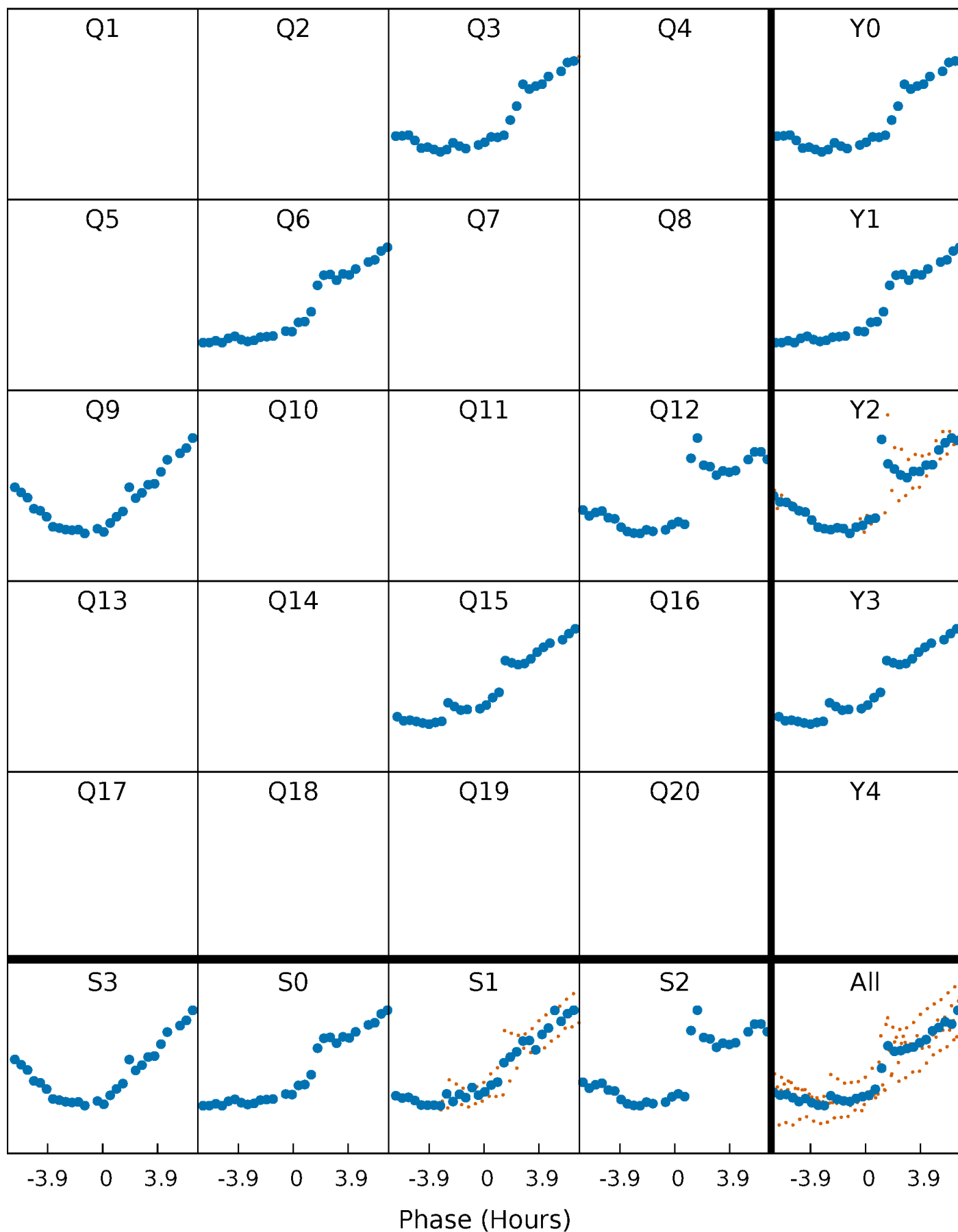


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



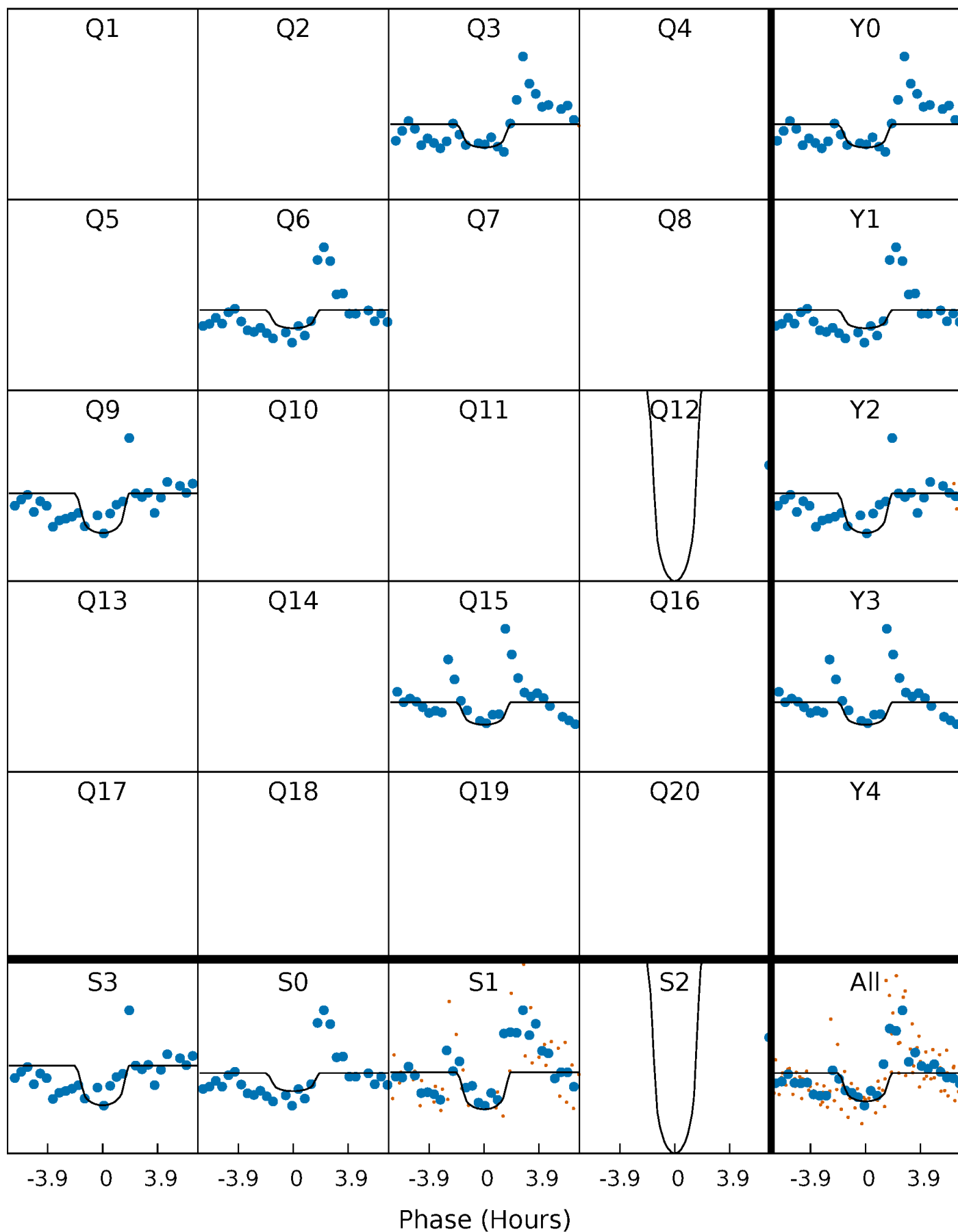
# PDC Quarter-Phased Transit Curves

TCE 005480273-04 P=259.148956 Days  $T_0=345.639123$  (BKJD)



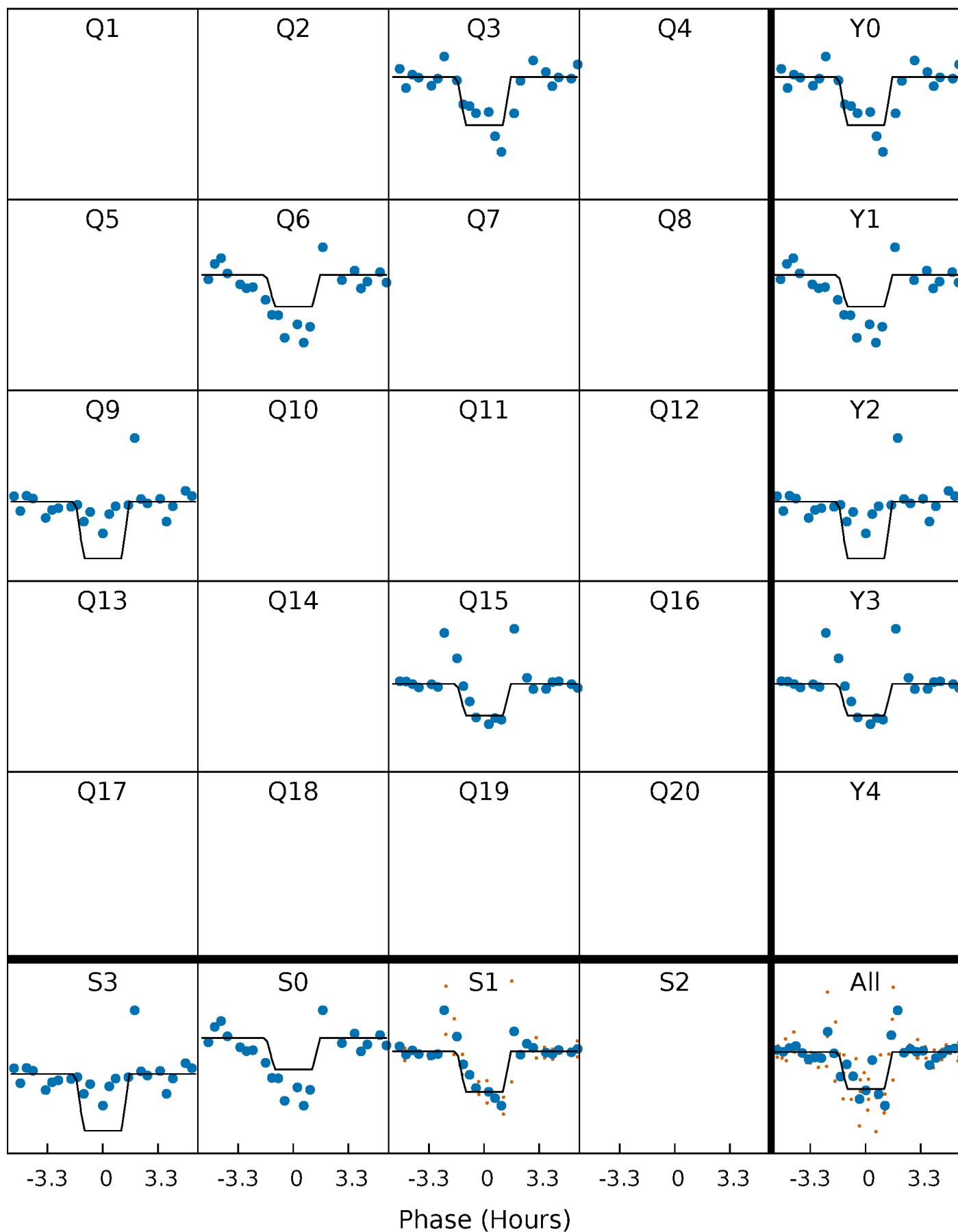
# DV Quarter-Phased Transit Curves

TCE 005480273-04     $P=259.148956$  Days     $T_0=345.639123$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

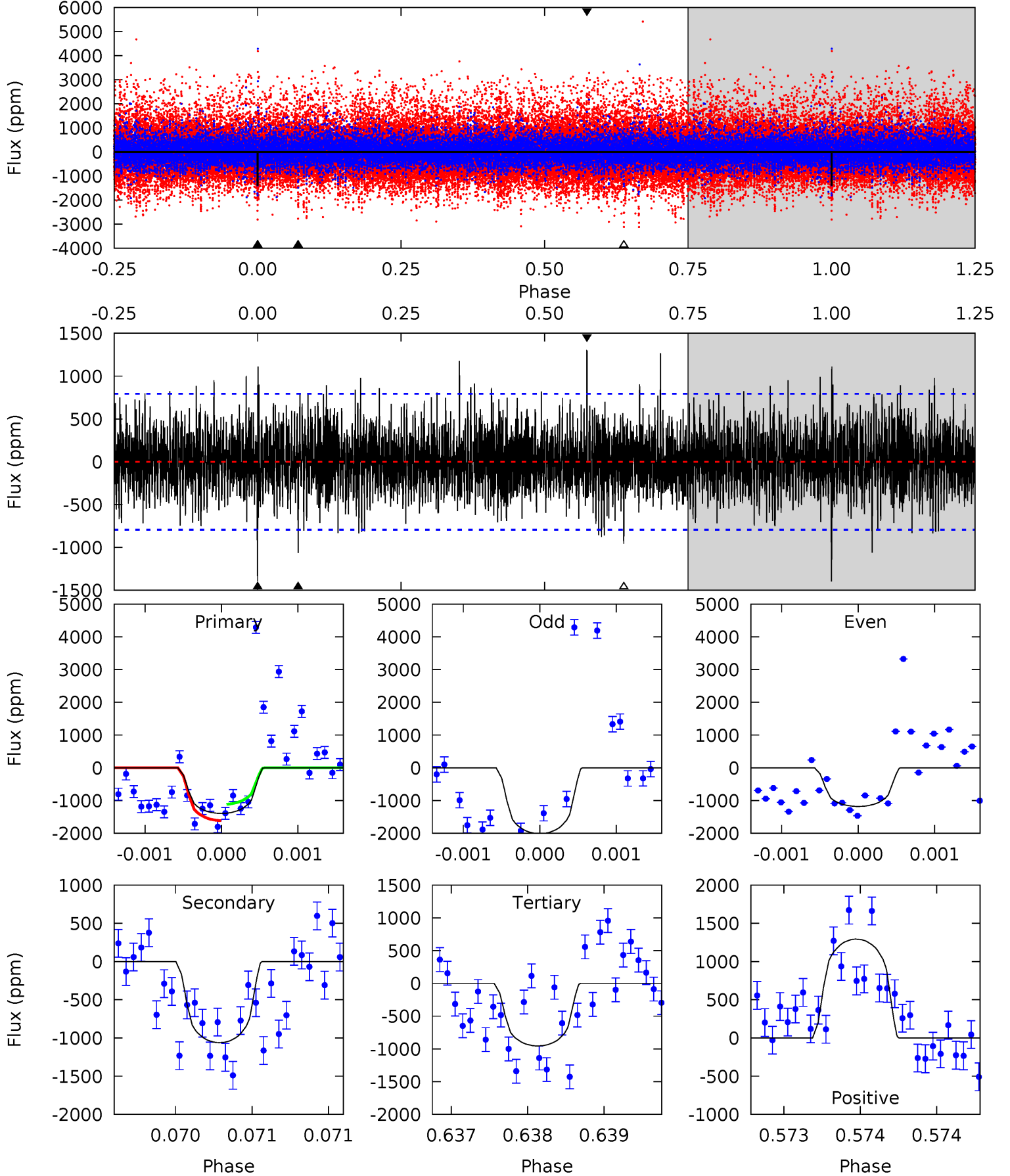
TCE 005480273-04 P=259.144828 Days  $T_0=345.647331$  (BKJD)



# DV Model-Shift Uniqueness Test

005480273-04, P = 259.148956 Days, E = 86.490167 Days

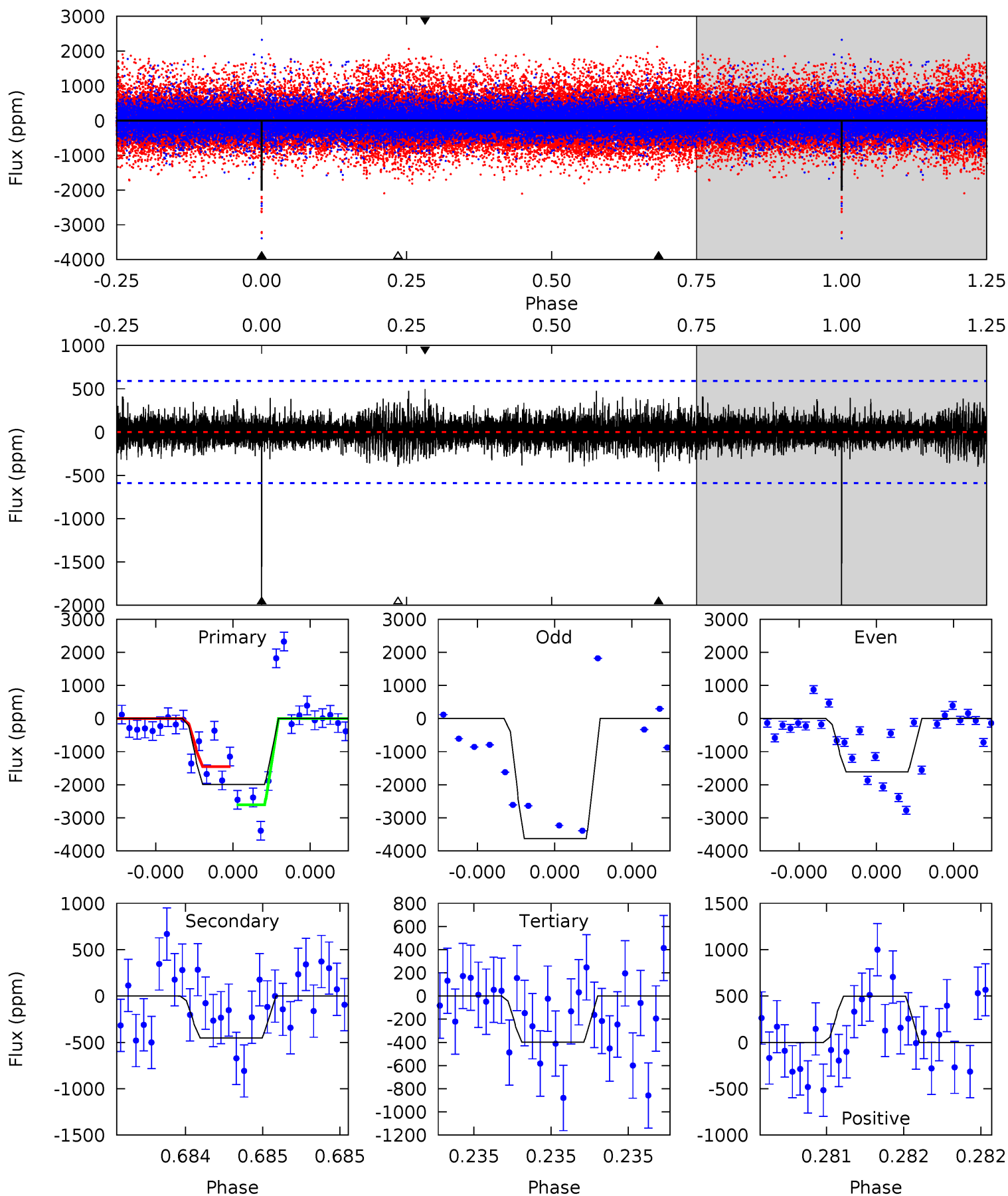
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.77	7.43	6.69	9.06	5.55	3.45	1.92	3.08	0.71	0.74	-1.62	2.37	0.97	0.48	1.75



# Alt Model-Shift Uniqueness Test

005480273-04, P = 259.144828 Days, E = 86.502503 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.9	4.30	3.78	4.73	5.60	3.52	0.96	15.1	14.2	0.52	-0.43	8.72	1.03	0.20	5.49





### Stellar Parameters For KIC 005480273

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4701^{+153}_{-153}$	$4.694^{+0.052}_{-0.028}$	$-1.060^{+0.300}_{-0.300}$	$0.554^{+0.037}_{-0.037}$	$0.553^{+0.047}_{-0.024}$	$4.585^{+0.888}_{-0.554}$
	+3%/-3%	+1%/-1%	+28%/-28%	+7%/-7%	+8%/-4%	+19%/-12%
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 005480273-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-1062 \pm 143$	$4.28^{+4.47}_{-2.82}$	$266^{+10}_{-10}$	$3534^{+1838}_{-659}$	$13620^{+105531}_{-10239}$
Alt.	$-453 \pm 105$	$4.65^{+4.43}_{-3.13}$	$267^{+9}_{-11}$	$3042^{+1347}_{-506}$	$4863^{+41936}_{-3579}$

$T_{max}$  = 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

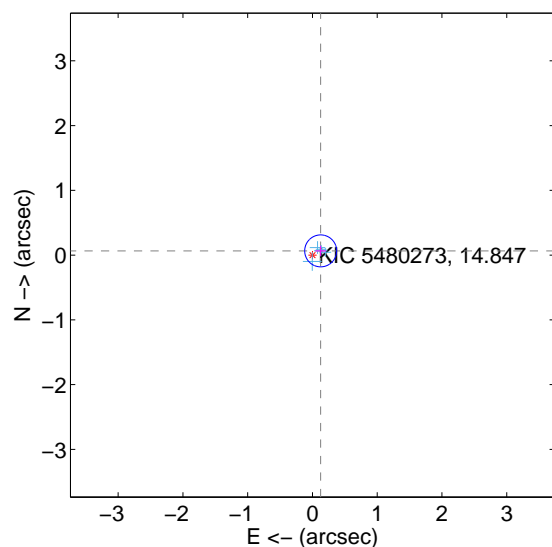
Supplemental centroid analysis for 005480273-04. Kepler magnitude: 14.85. Transit SNR 6.58

There are 5 quarters with good PRF difference image offsets

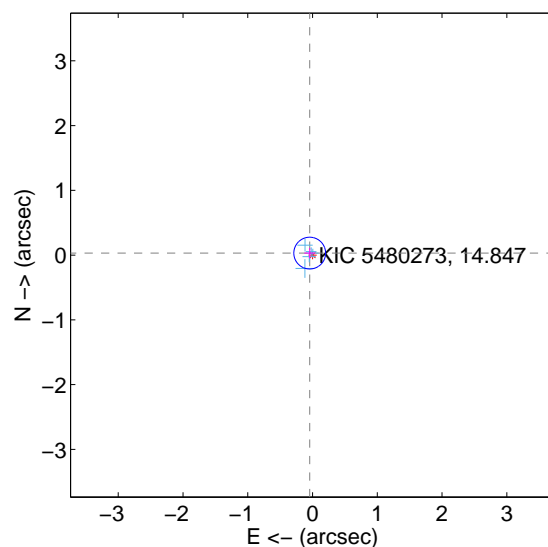
The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.143 \pm 0.082$	1.74	$-0.127 \pm 0.083$	$0.065 \pm 0.079$
PRF-fit source offset from KIC position	$0.053 \pm 0.082$	0.65	$0.044 \pm 0.083$	$0.031 \pm 0.079$
photometric centroid source offset	$0.59 \pm 0.84$	0.71	$0.38 \pm 0.95$	$0.46 \pm 0.76$

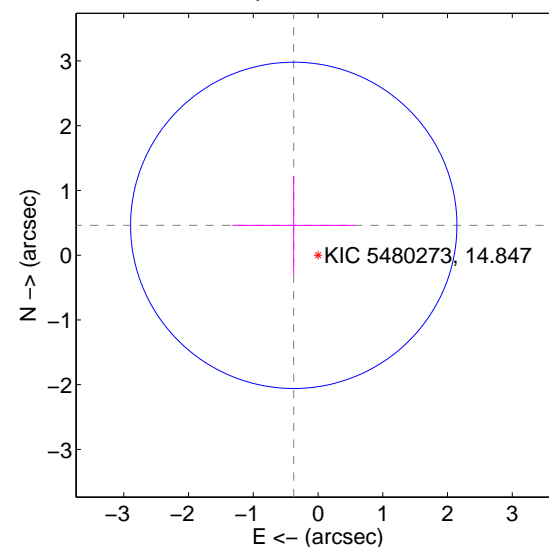
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

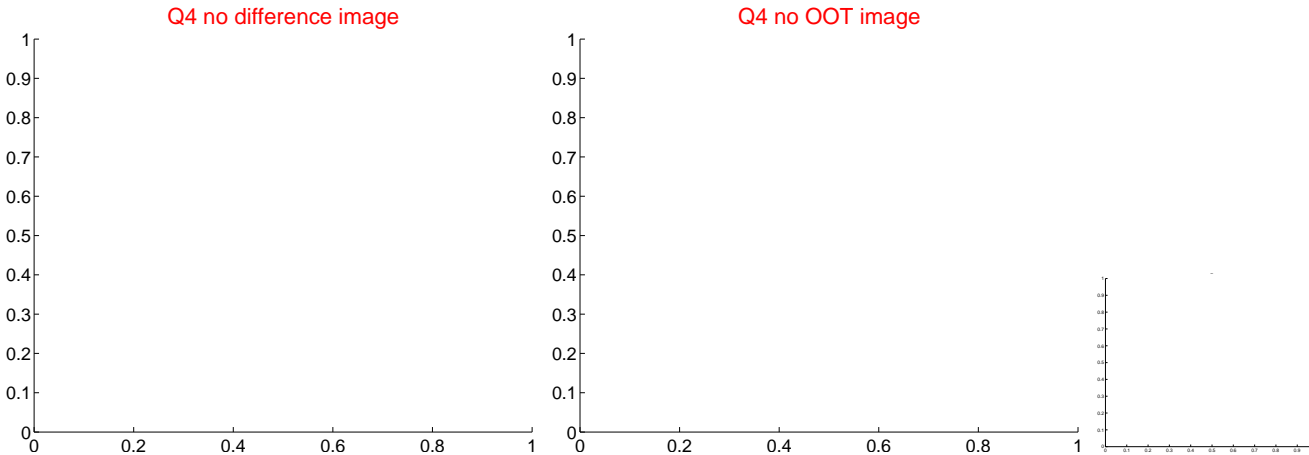
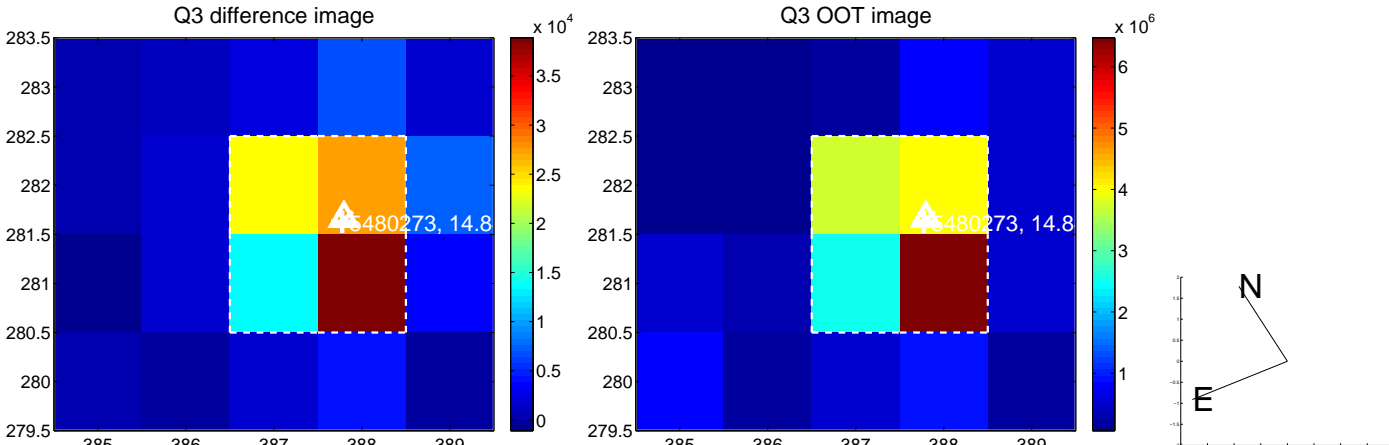
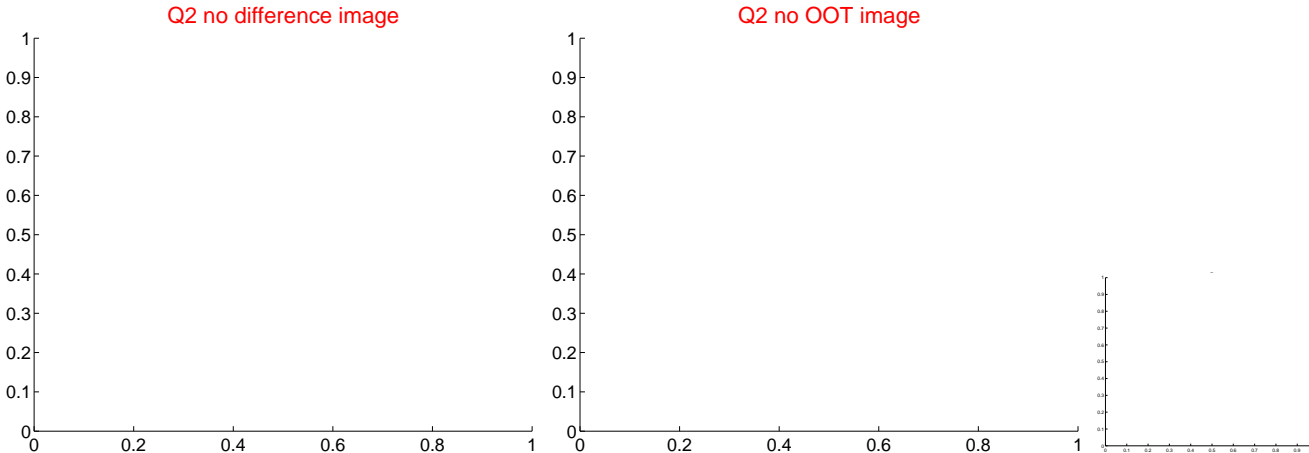
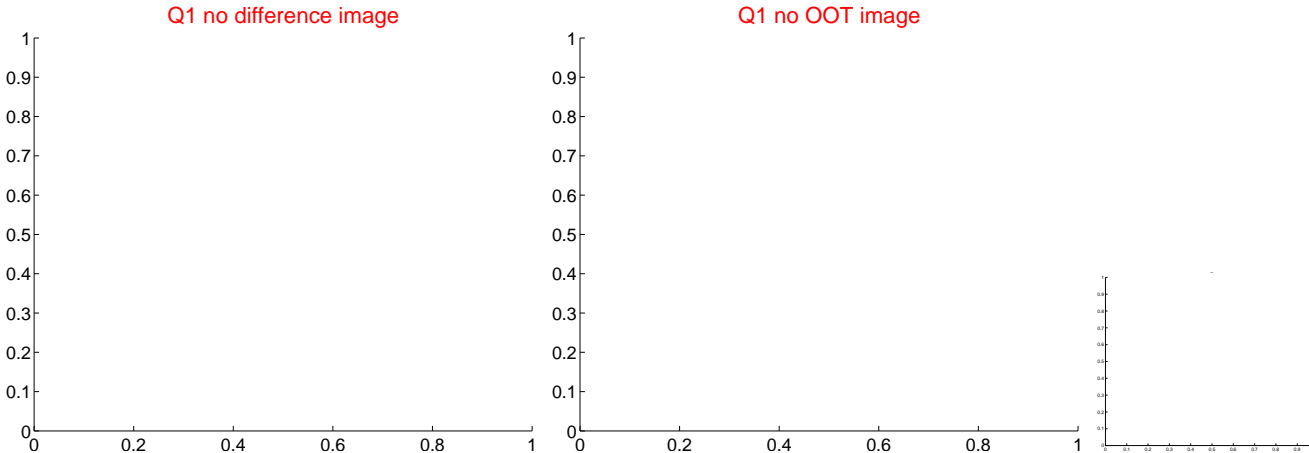


offset from photometric centroids



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.

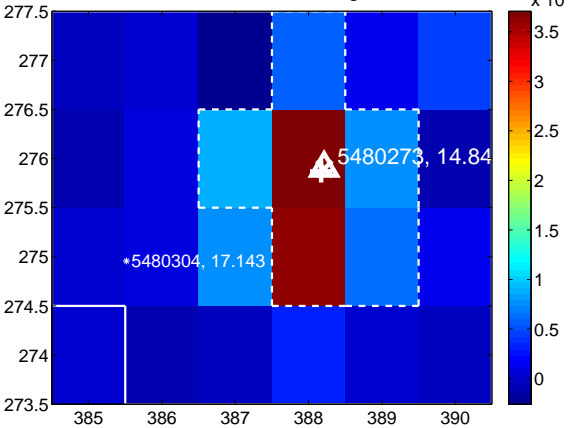
Q5 no difference image



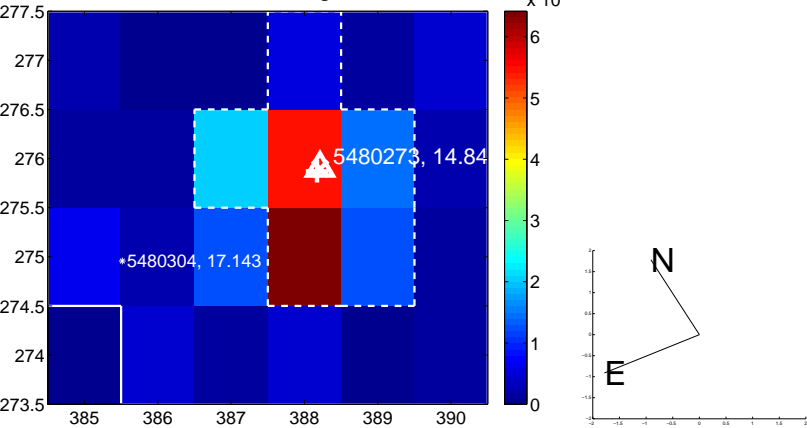
Q5 no OOT image



Q6 difference image



Q6 OOT image



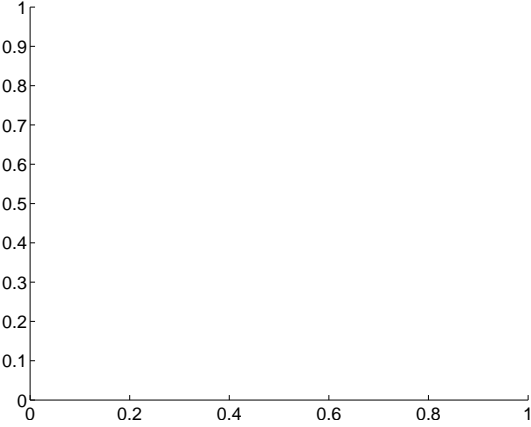
Q7 no difference image



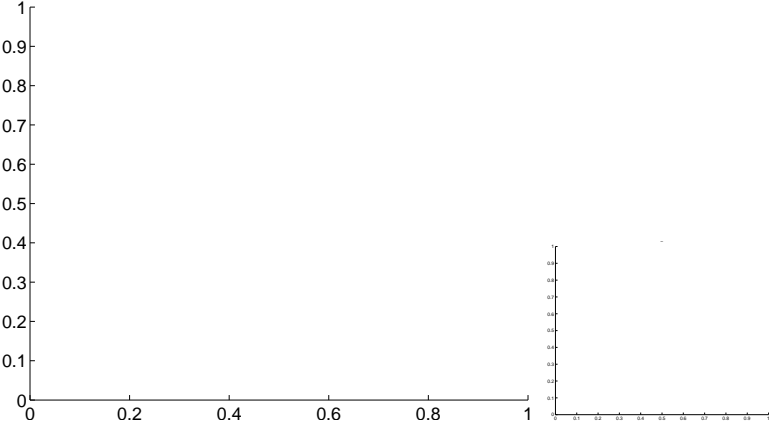
Q7 no OOT image



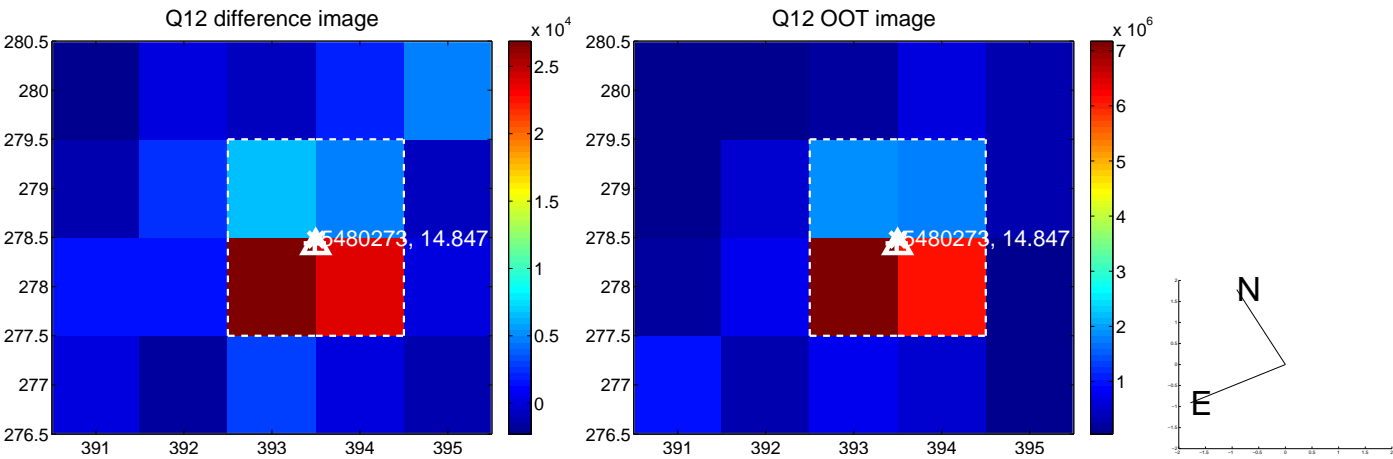
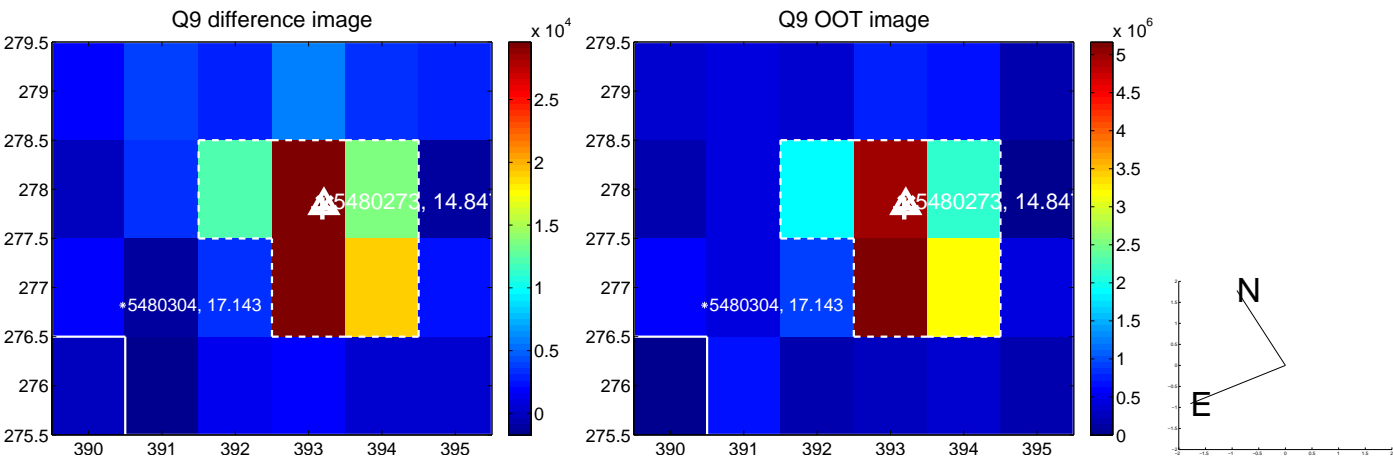
Q8 no difference image



Q8 no OOT image

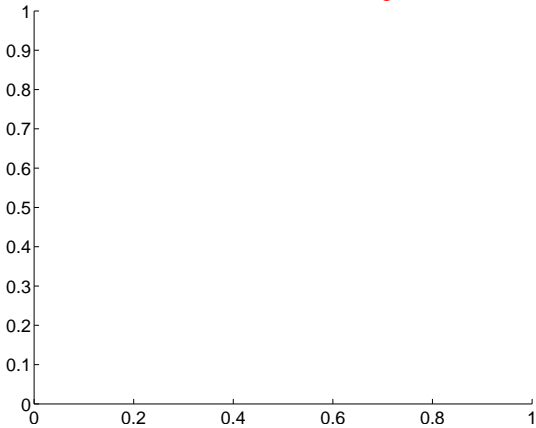


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

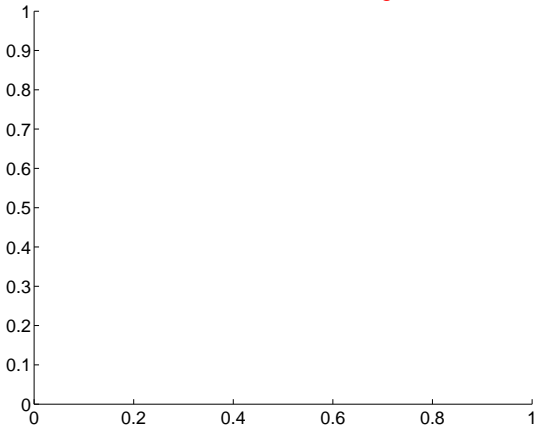
Q13 no difference image



Q13 no OOT image



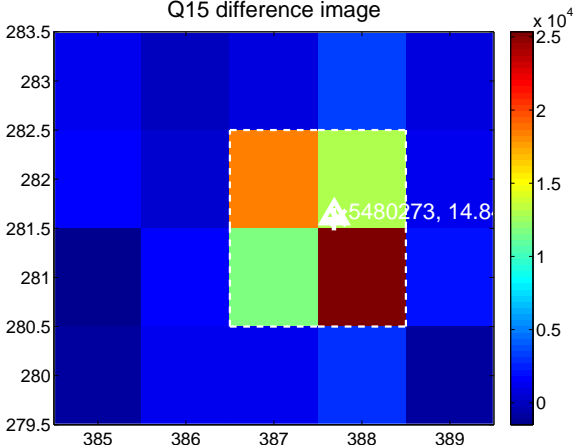
Q14 no difference image



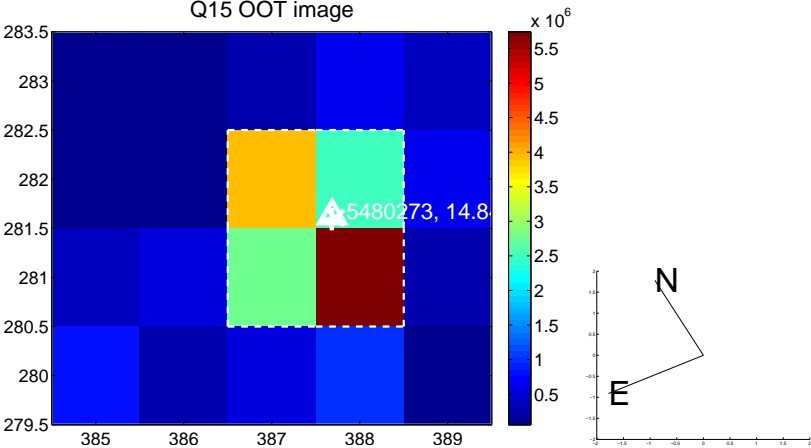
Q14 no OOT image



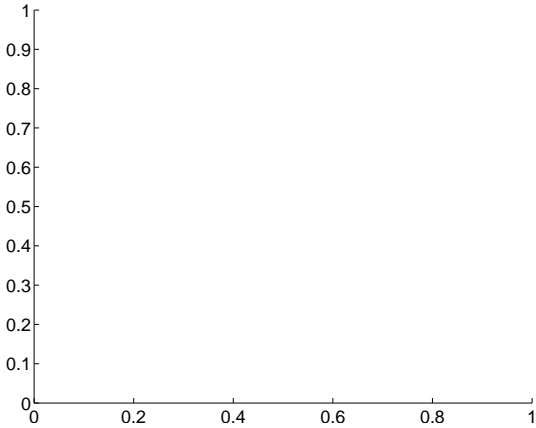
Q15 difference image



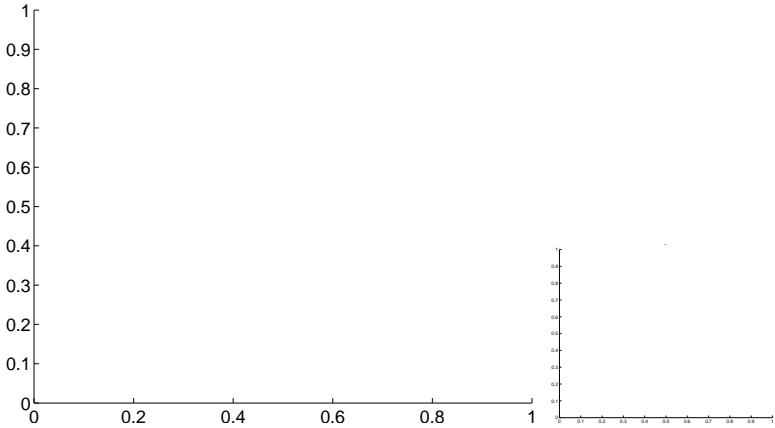
Q15 OOT image



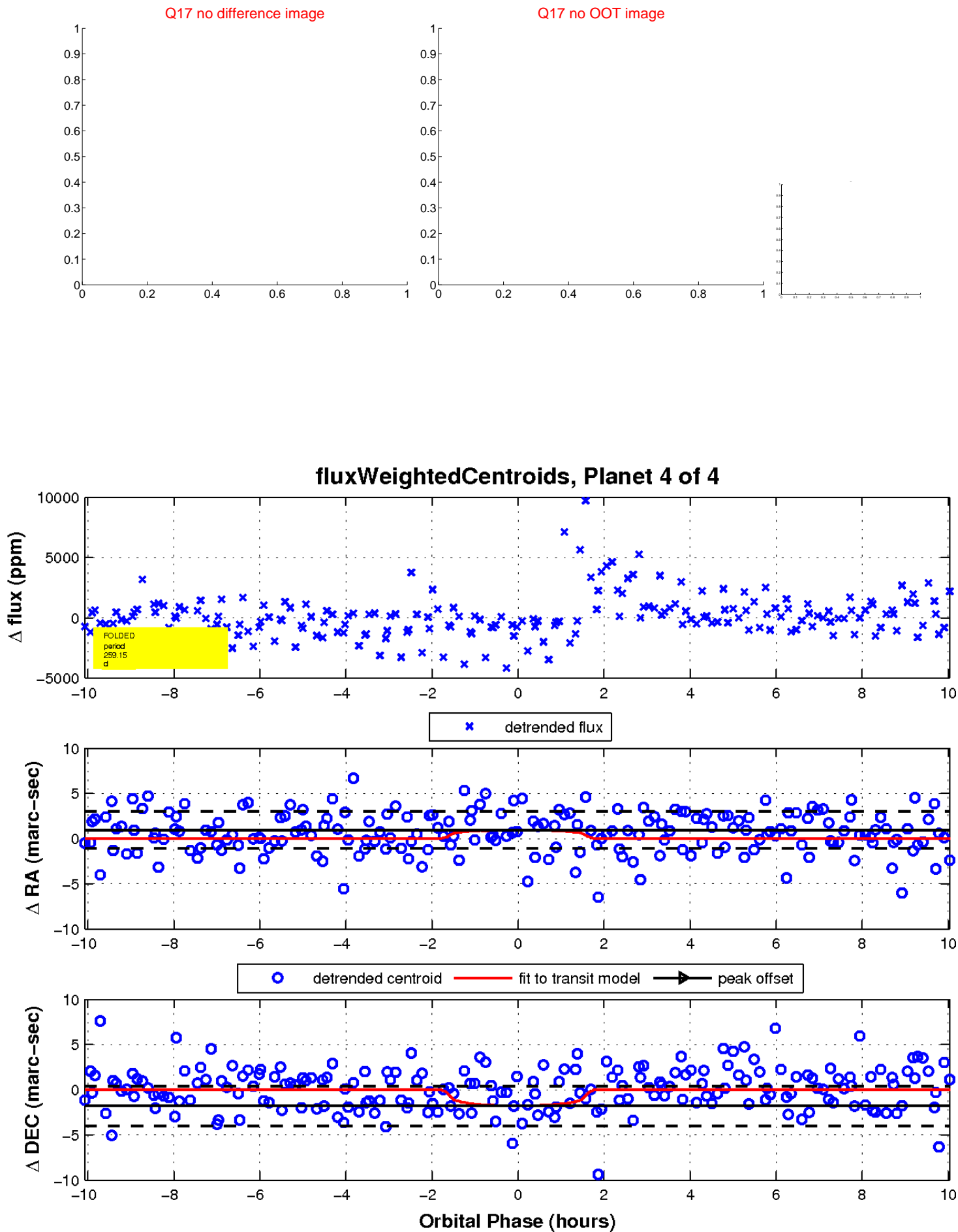
Q16 no difference image



Q16 no OOT image



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



UKIRT Image

Declination

