

# KIC 008052474

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008052474-01	OBS	3640.01	245.438273	361.302863	11259.3	14.406	571.7	582.3	0.99	5637	17.06	1.66
008052474-02	OBS	No	245.438908	261.379093	4350.0	9.518	195.9	191.8	0.99	5637	11.27	1.66

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008052474-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
008052474-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

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

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

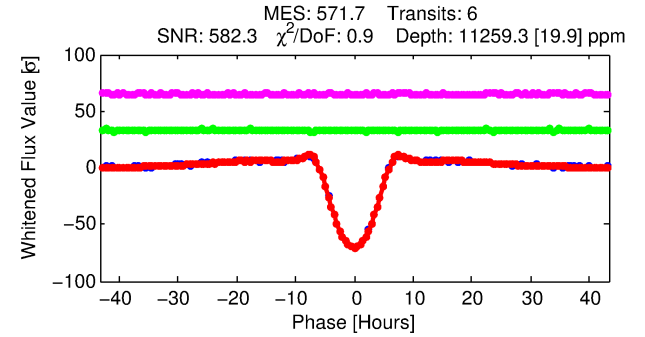
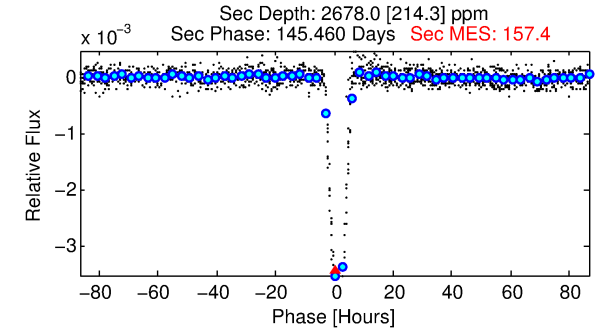
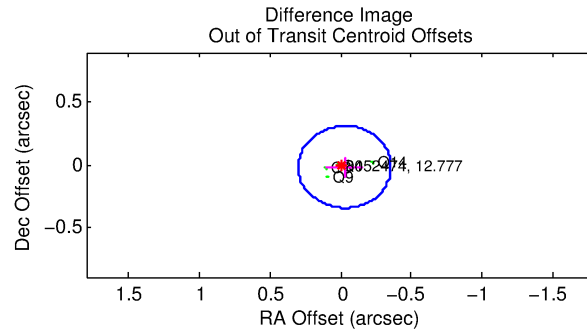
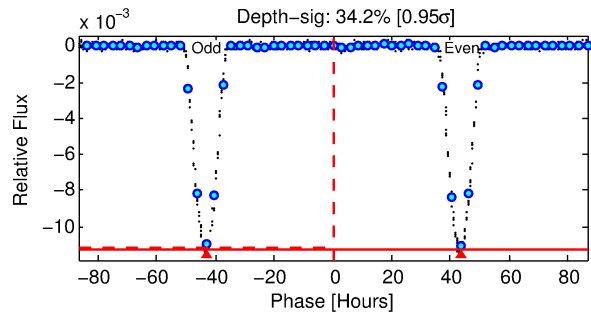
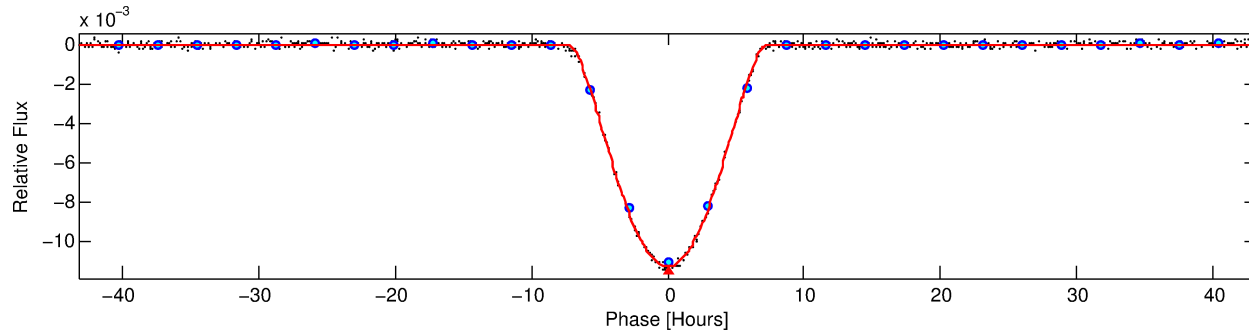
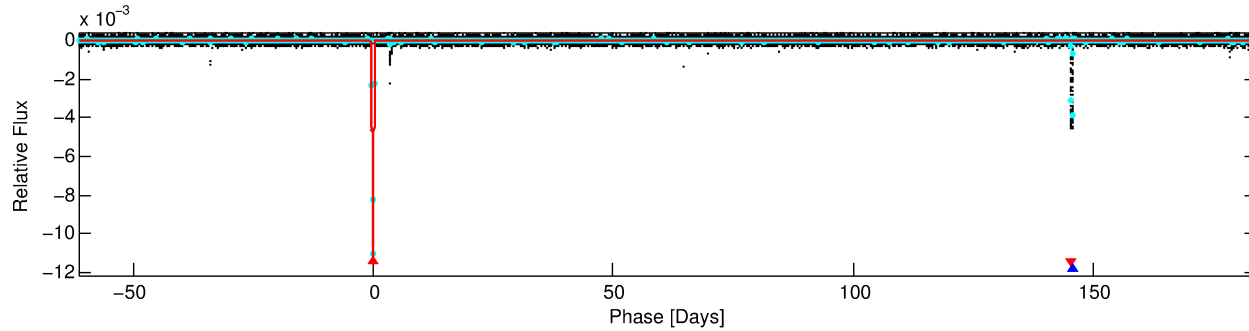
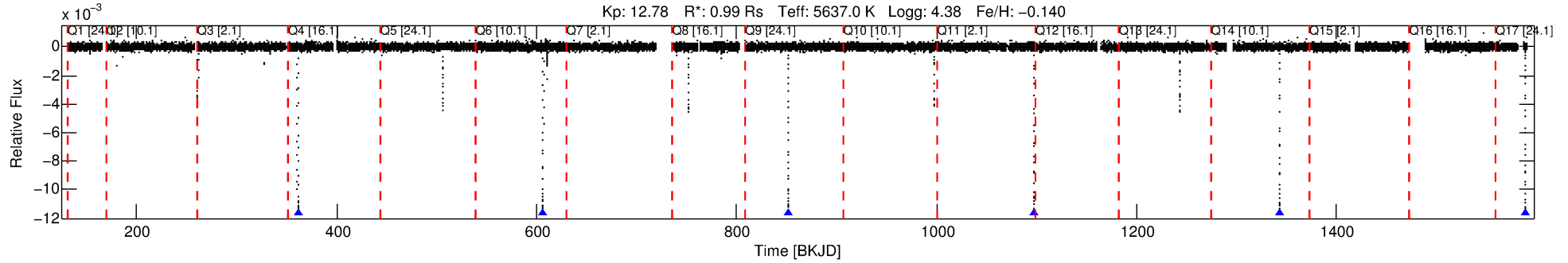
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008052474-01

No Significant Match Found

# DV One-Page Summary

KIC: 8052474 Candidate: 1 of 2 Period: 245.438 d  
KOI: K03640.01 Corr: 1.000



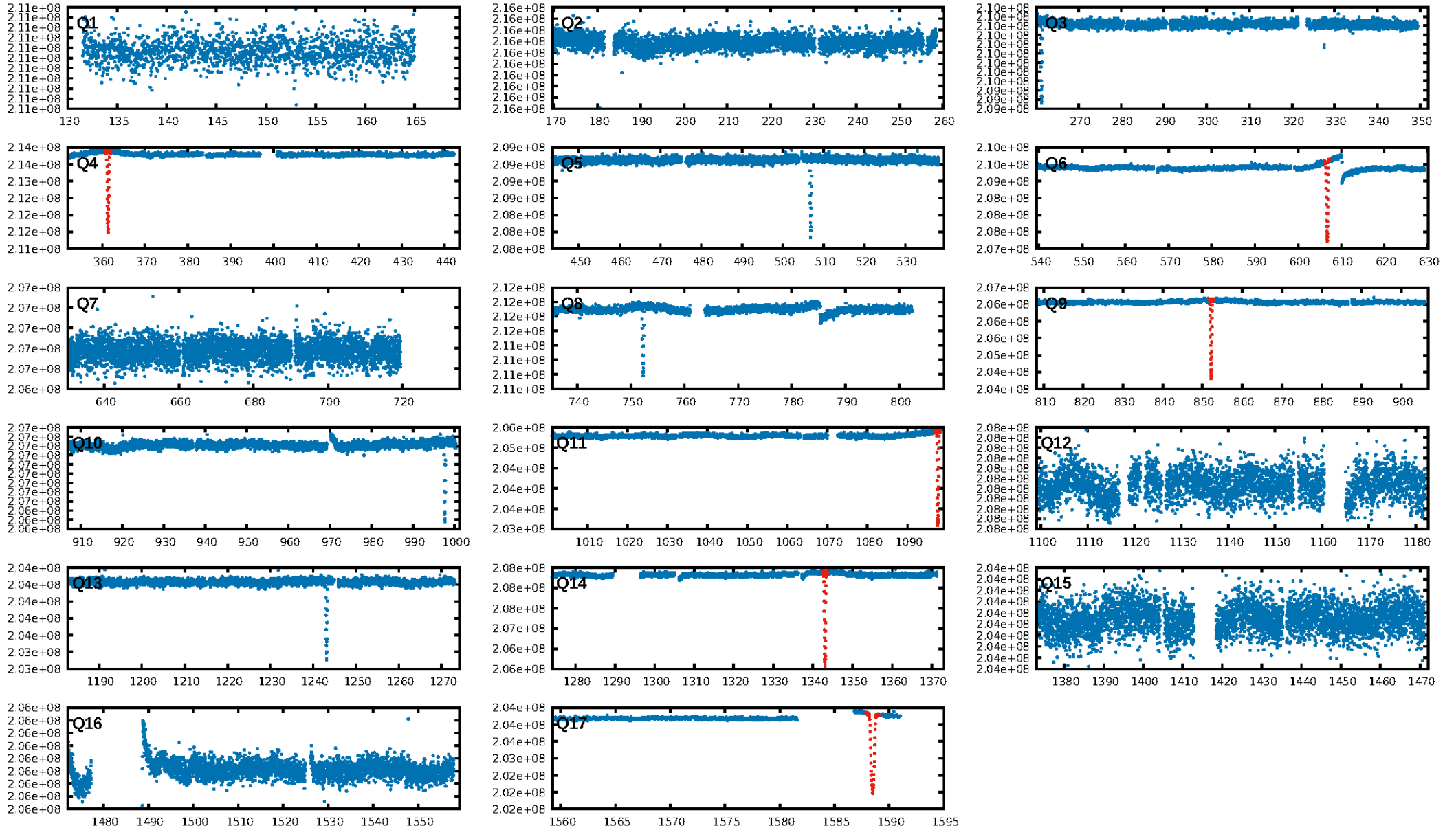
## DV Fit Results:

Period = 245.43827 [0.00015] d  
Epoch = 361.3029 [0.0005] BKJD  
Rp/R\* = 0.1579 [0.0075]  
a/R\* = 81.42 [0.69]  
b = 0.97 [0.01]  
Seff = 1.66 [0.60]  
Teq = 289 [26] K  
Rp = 17.06 [4.71] Re  
a = 0.7307 [0.1689] AU  
Ag = 2703.91 [977.69] [2.76 $\sigma$ ]  
Teffp = 3227 [146] K [19.74 $\sigma$ ]

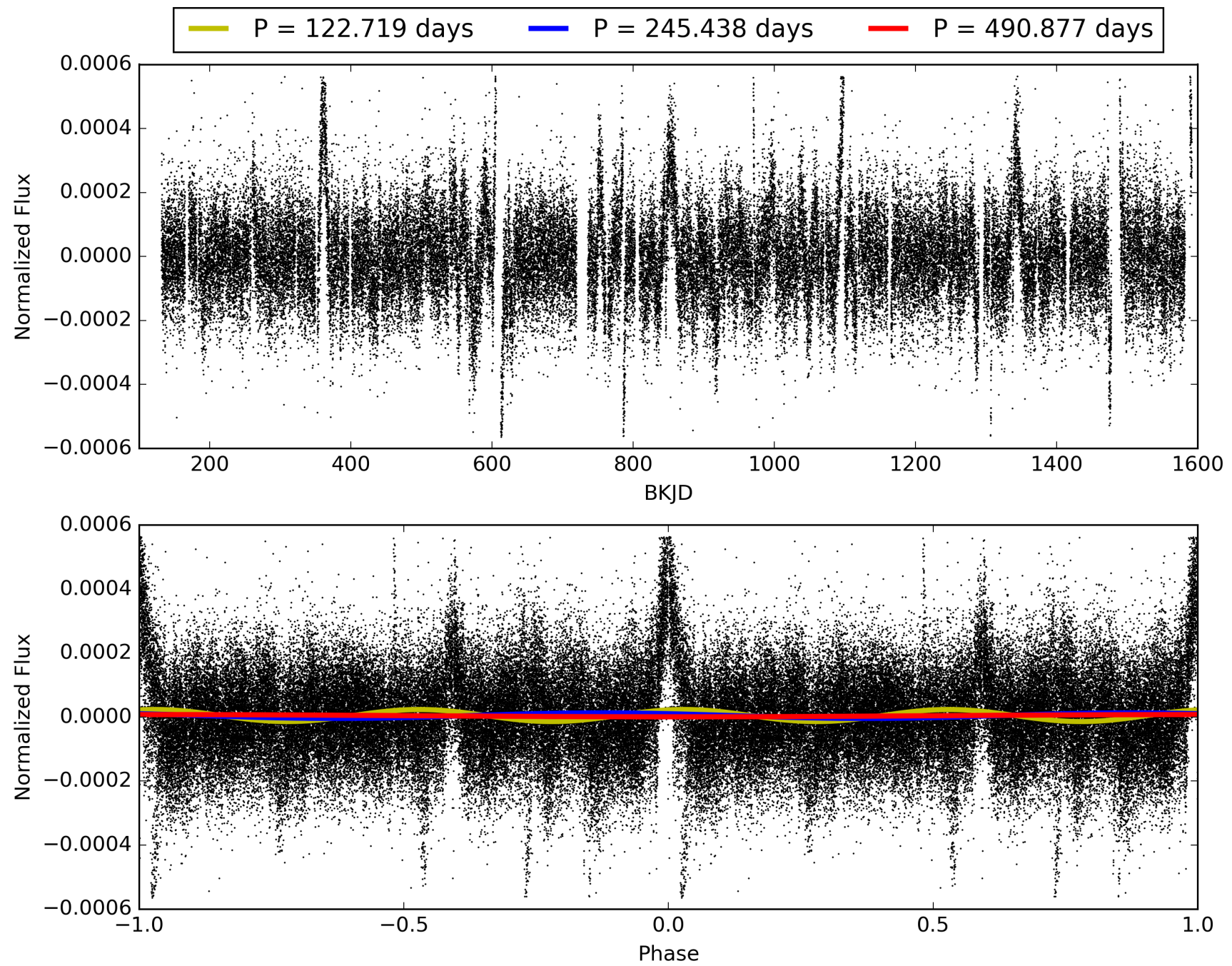
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.1% [0.00 $\sigma$ ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 0.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: 10.58  
Centroid-sig: 90.7%  
Centroid-so: 0.216 arcsec [10.84 $\sigma$ ]  
OotOffset-rm: 0.034 arcsec [0.31 $\sigma$ ]  
KicOffset-rm: 0.184 arcsec [2.09 $\sigma$ ]  
OotOffset-st: 2/0/1/1 [4]  
KicOffset-st: 2/0/1/1 [4]  
DiffImageQuality-fgm: 1.00 [4/4]  
DiffImageOverlap-fno: 1.00 [4/4]

# TCE 008052474-01, PDC Light Curves

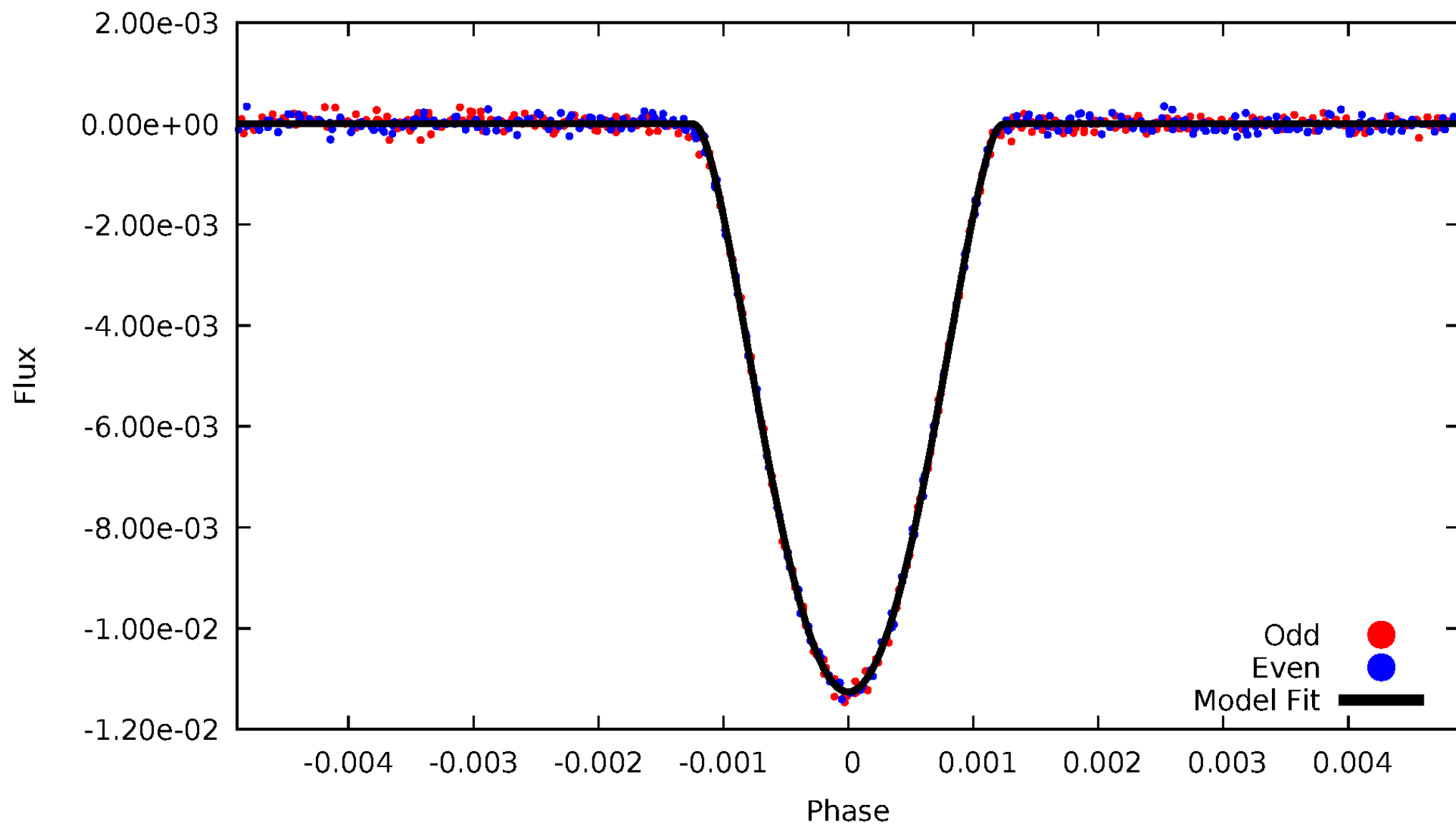


TCE 008052474-01



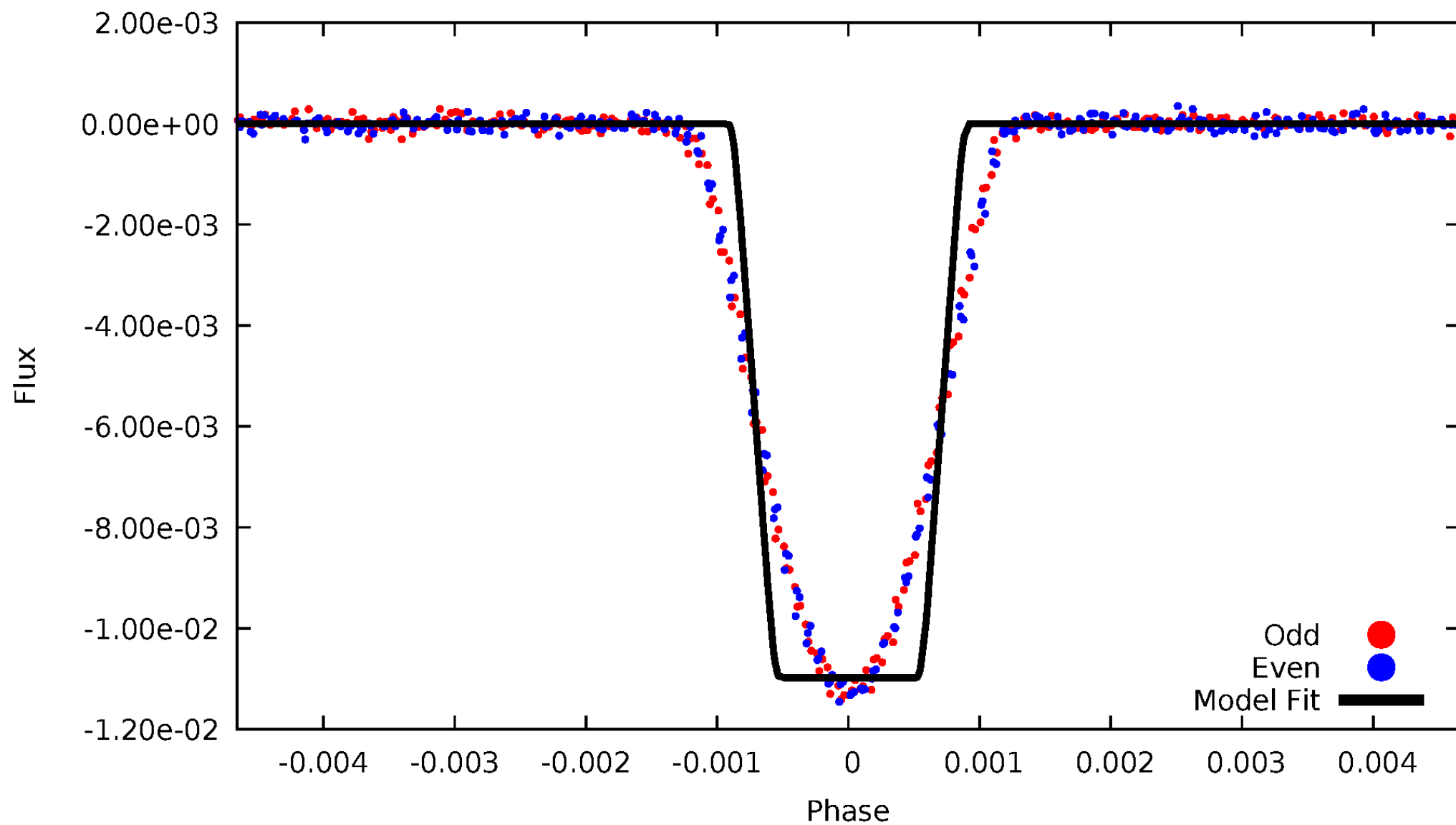
# DV Odd/Even

TCE 008052474-01

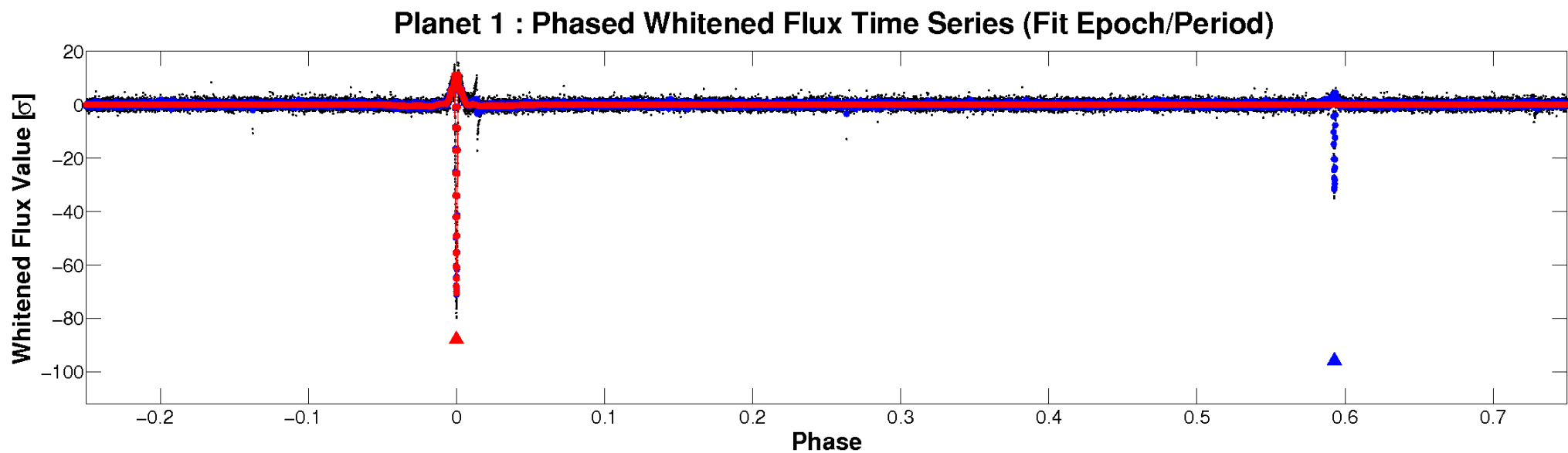
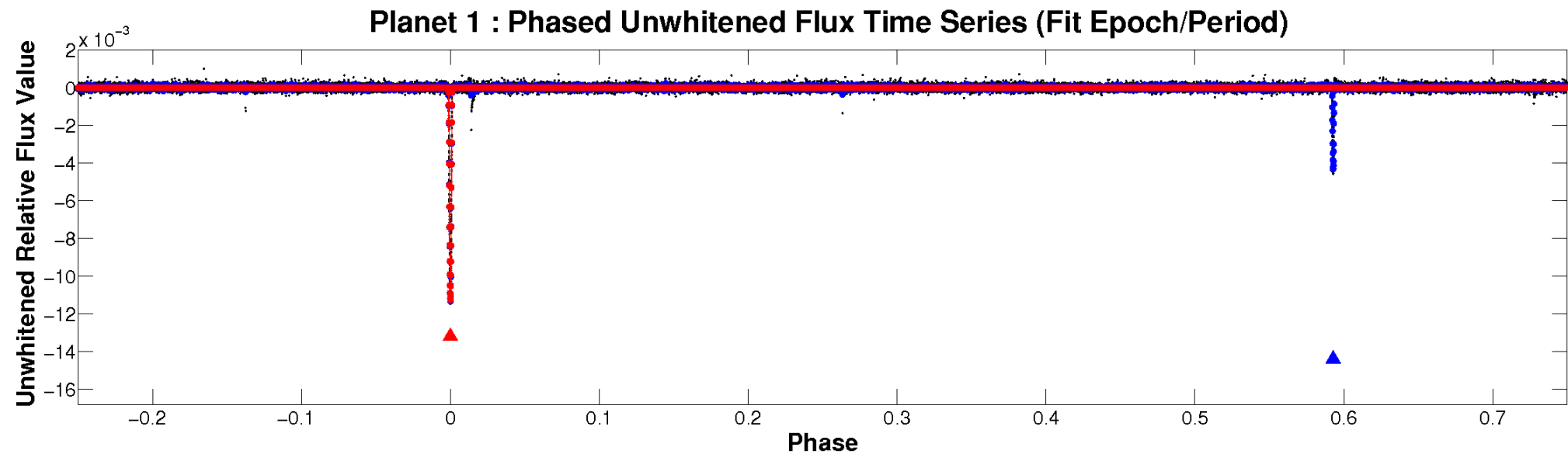


# ALT Odd/Even

TCE 008052474-01

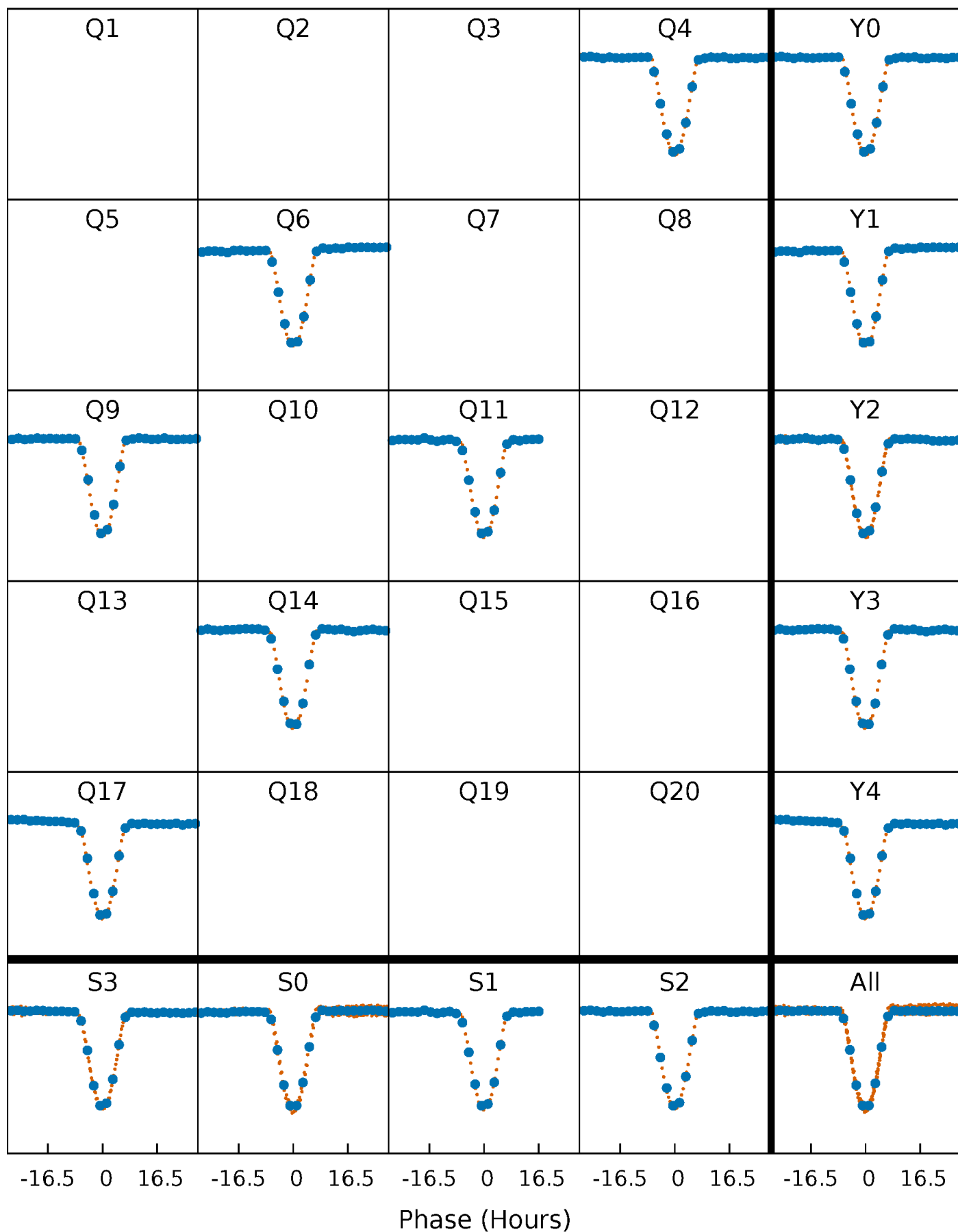


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

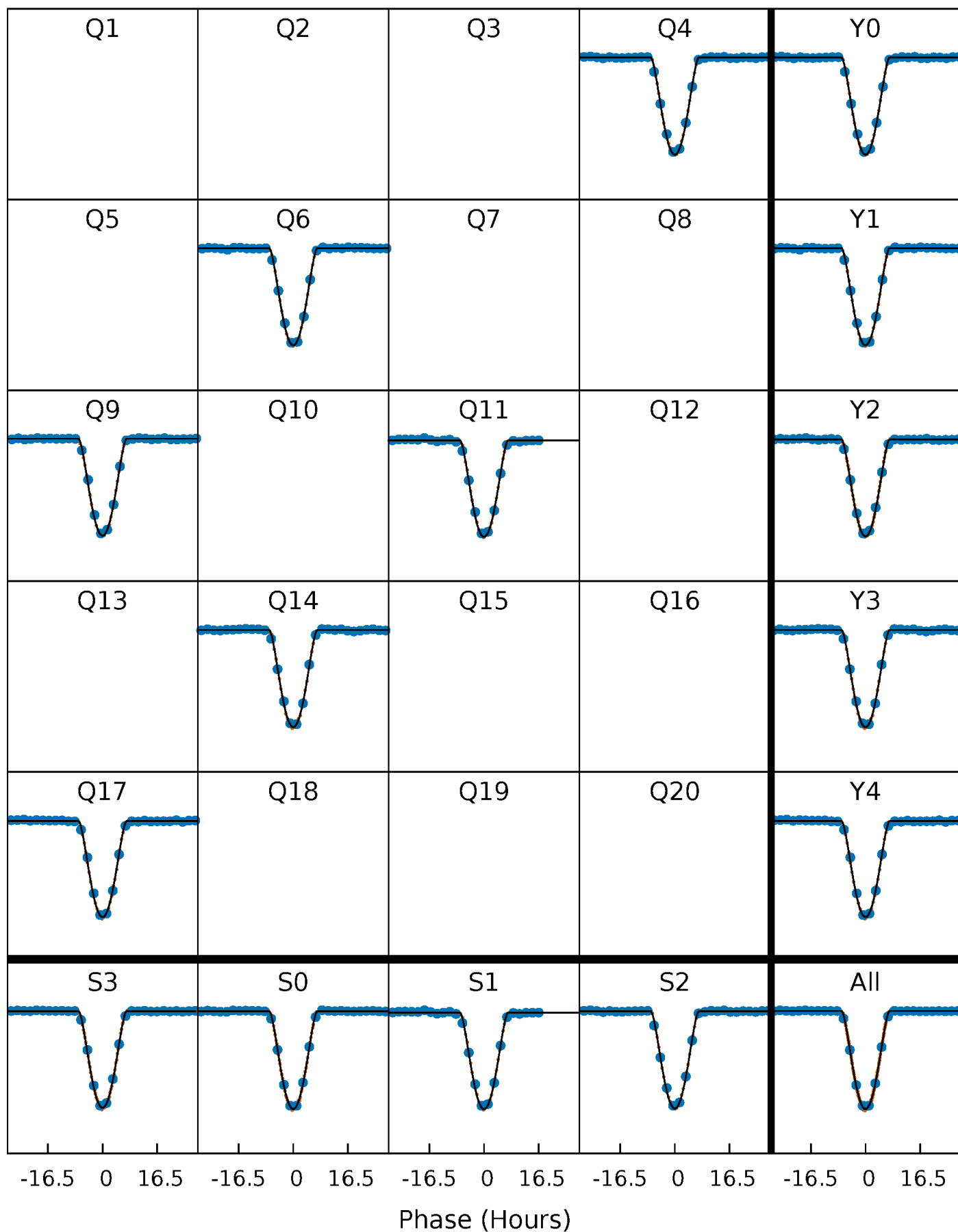
TCE 008052474-01 P=245.438273 Days  $T_0=361.302863$  (BKJD)





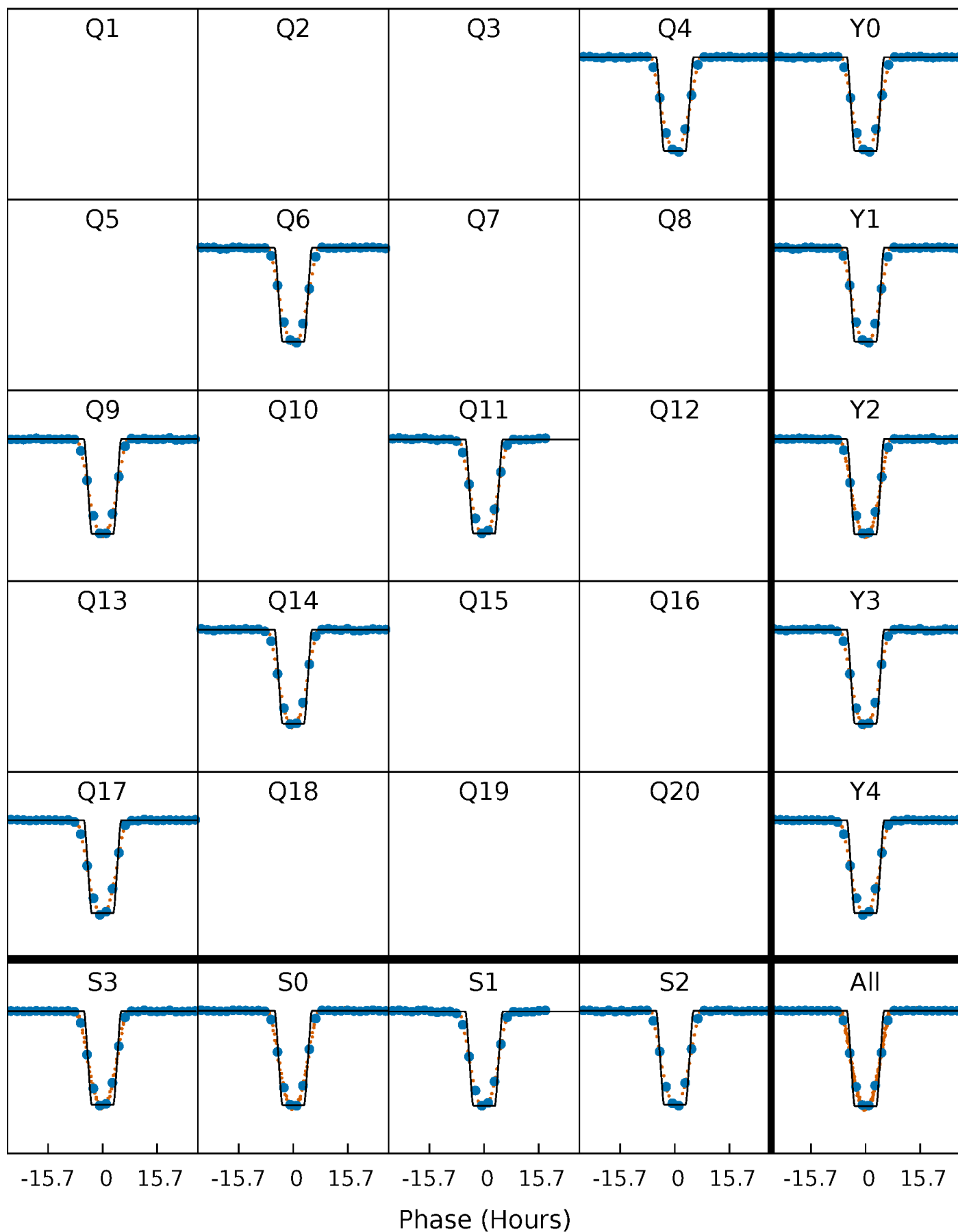
# DV Quarter-Phased Transit Curves

TCE 008052474-01 P=245.438273 Days  $T_0=361.302863$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

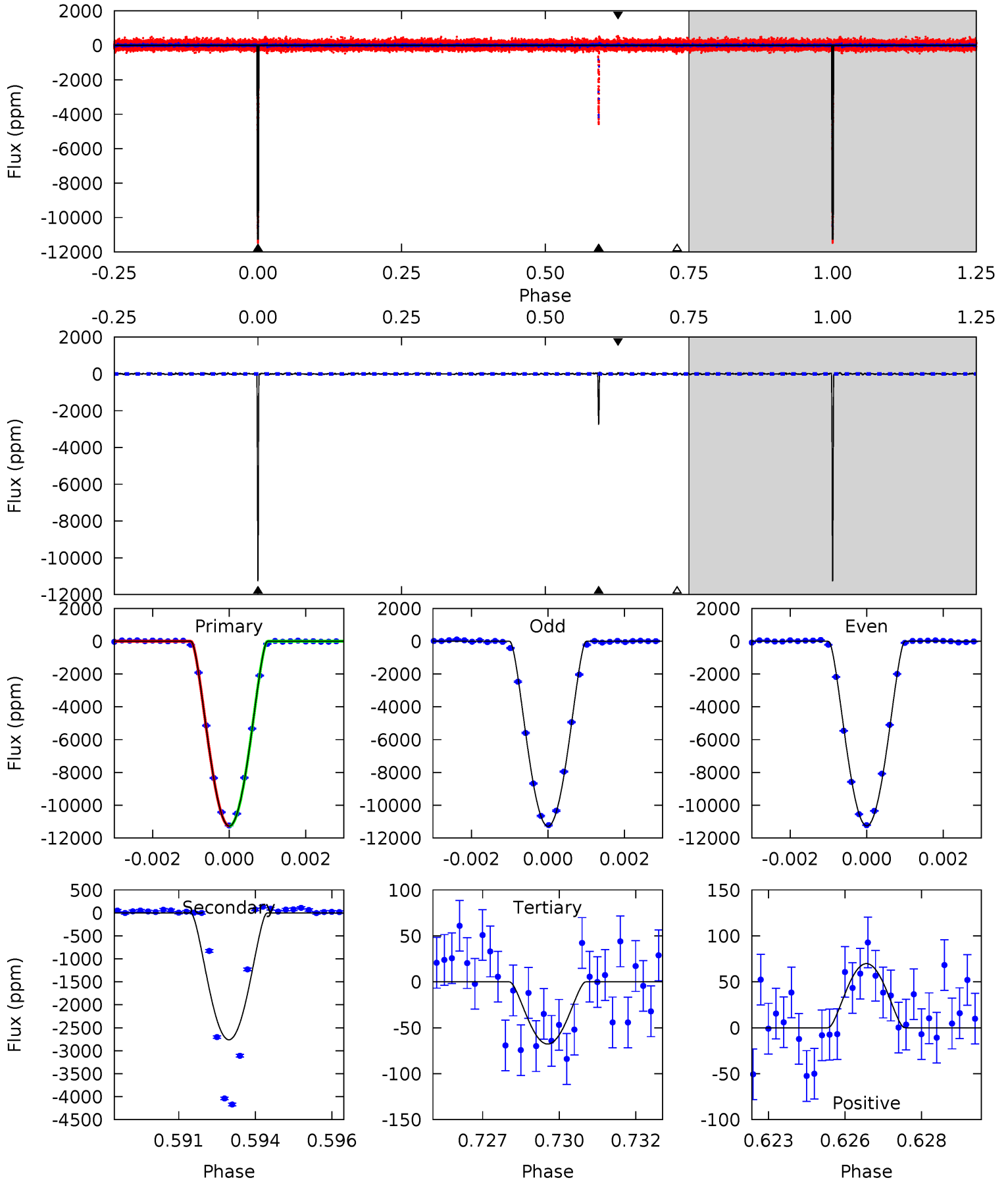
TCE 008052474-01 P=245.441112 Days  $T_0=361.295401$  (BKJD)



# DV Model-Shift Uniqueness Test

008052474-01, P = 245.438273 Days, E = 115.864590 Days

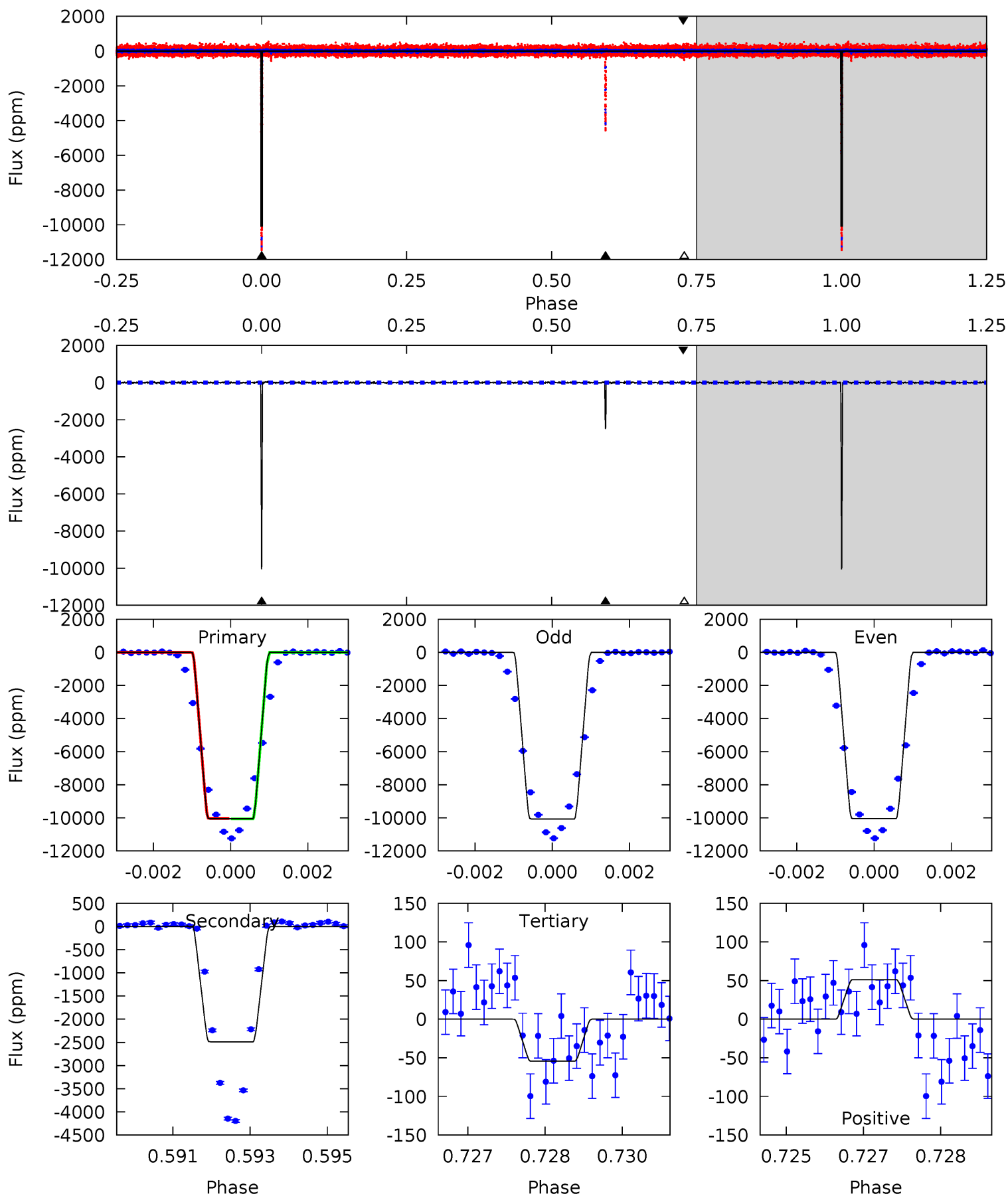
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1336	327.4	8.03	8.27	5.29	3.03	2.09	1328	1328	319.3	319.1	1.48	1.00	0.01	0.62



# Alt Model-Shift Uniqueness Test

008052474-01, P = 245.441112 Days, E = 115.854289 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
966.5	239.1	5.23	4.91	5.34	3.12	1.15	961.3	961.6	233.9	234.2	0.93	1.00	0.01	1.04



### Stellar Parameters For KIC 008052474

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5637^{+186}_{-186}$	$4.383^{+0.153}_{-0.187}$	$-0.140^{+0.300}_{-0.300}$	$0.990^{+0.269}_{-0.179}$	$0.866^{+0.125}_{-0.073}$	$1.256^{+0.878}_{-0.594}$
	+3%/-3%	+3%/-4%	+214%/-214%	+27%/-18%	+14%/-8%	+70%/-47%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 008052474-01 / KOI 3640.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-2762 \pm 8$	$17.29^{+3.09}_{-1.88}$	$406^{+34}_{-24}$	$3663^{+118}_{-97}$	$2723^{+695}_{-702}$
Alt.	$-2488 \pm 10$	$11.56^{+1.86}_{-1.59}$	$405^{+31}_{-24}$	$4145^{+162}_{-151}$	$5518^{+1855}_{-1378}$

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

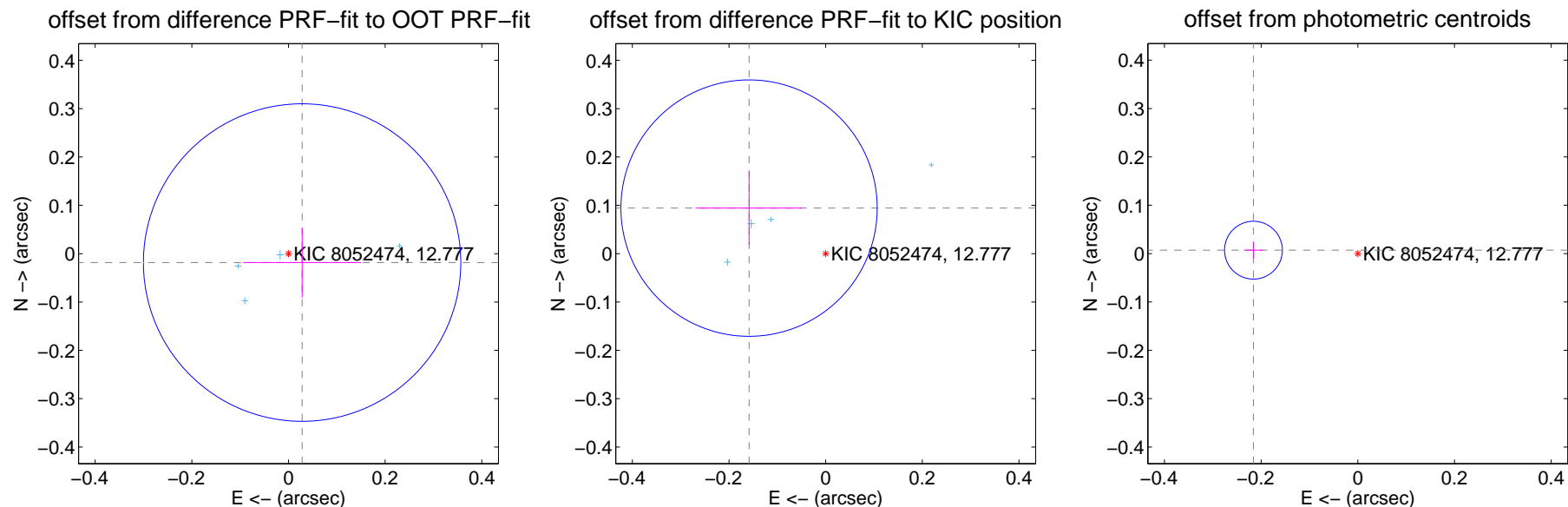
## DV Centroid Data

Supplemental centroid analysis for 008052474-01. Kepler magnitude: 12.78. Transit SNR 582.29

There are 4 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.034 \pm 0.109$	0.31	$-0.028 \pm 0.122$	$-0.018 \pm 0.072$
PRF-fit source offset from KIC position	$0.184 \pm 0.088$	2.09	$0.158 \pm 0.110$	$0.094 \pm 0.076$
photometric centroid source offset	$0.22 \pm 0.02$	10.84	$0.22 \pm 0.02$	$0.01 \pm 0.02$



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.

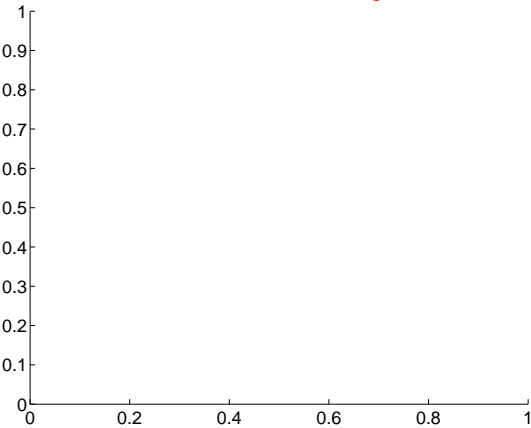
Q1 no difference image



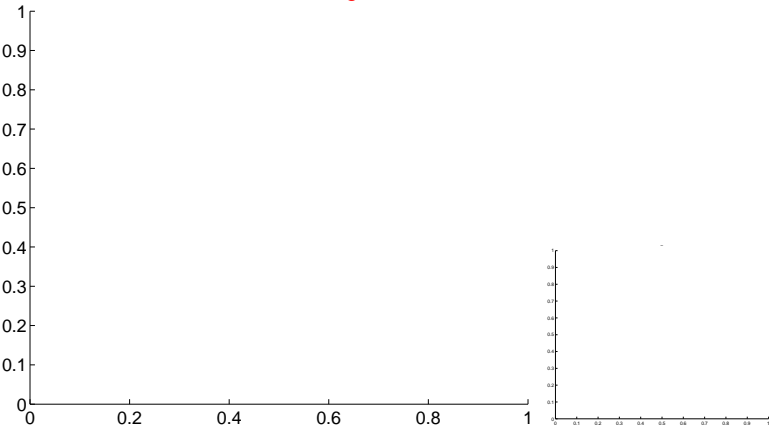
Q1 no OOT image



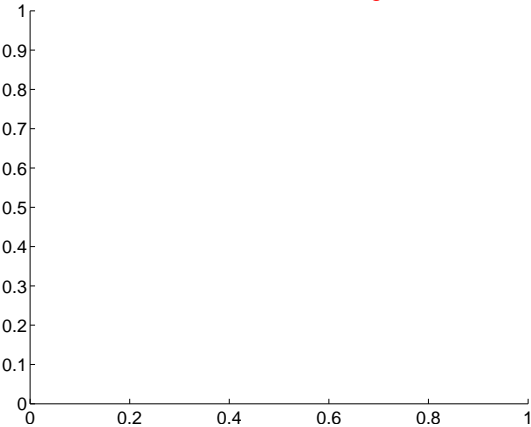
Q2 no difference image



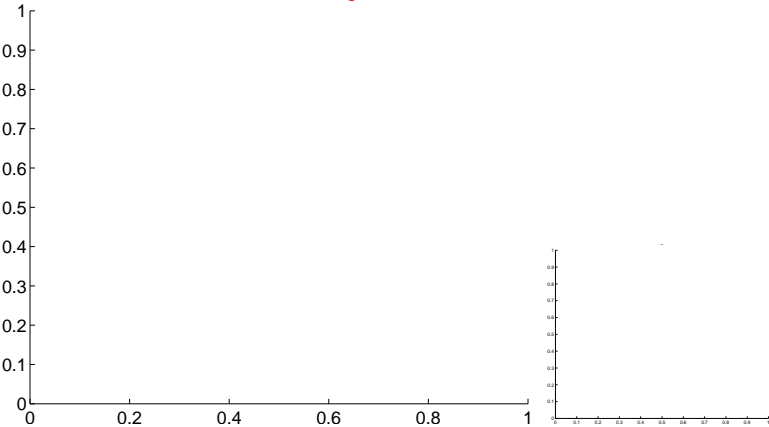
Q2 no OOT image



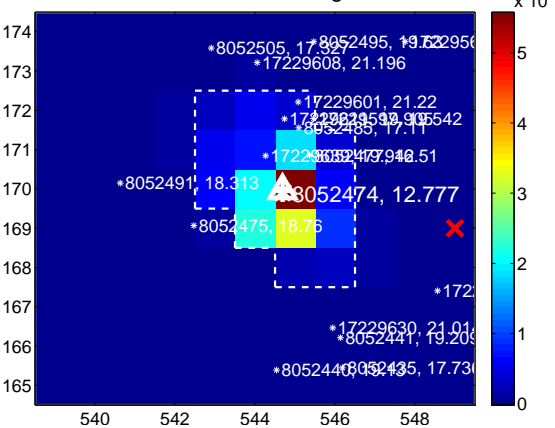
Q3 no difference image



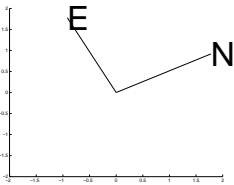
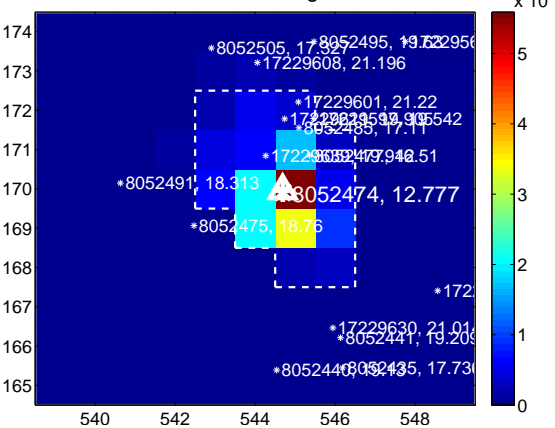
Q3 no OOT image



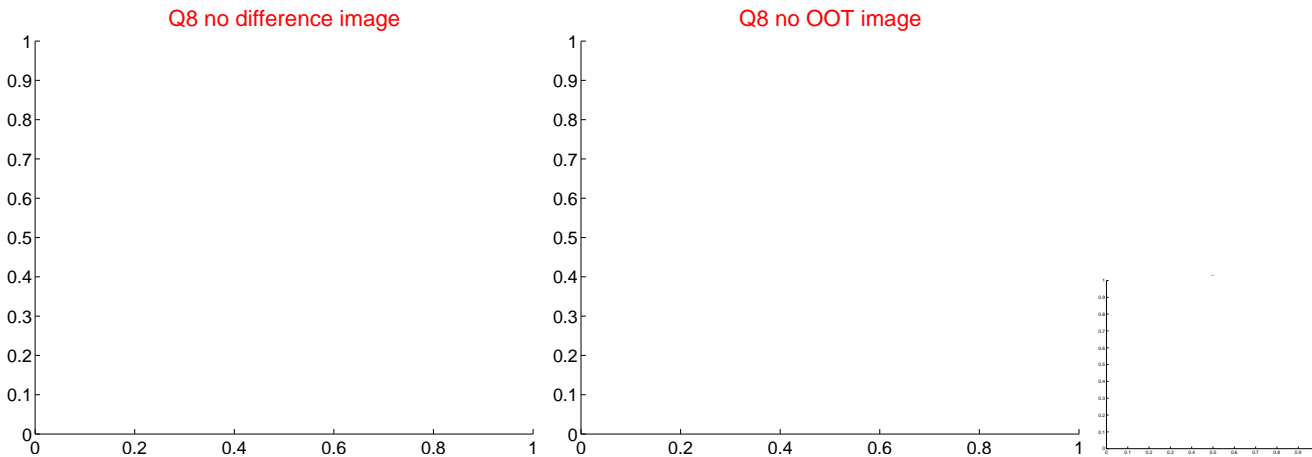
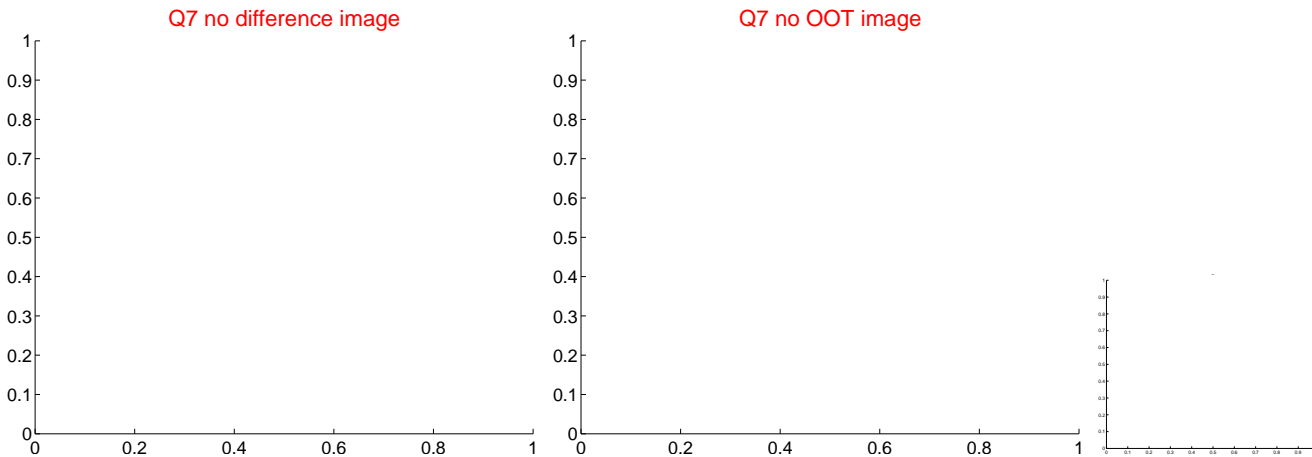
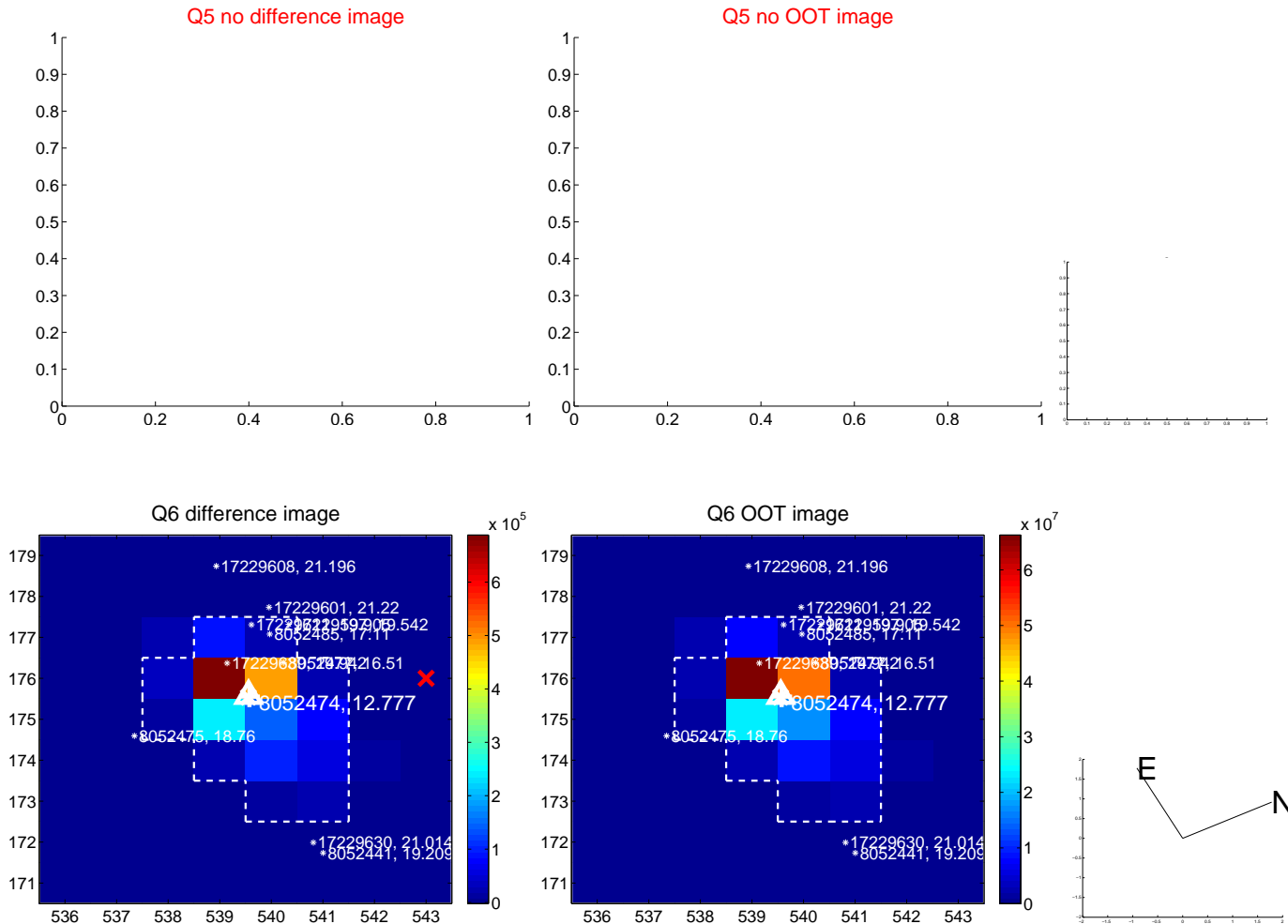
Q4 difference image



Q4 OOT image

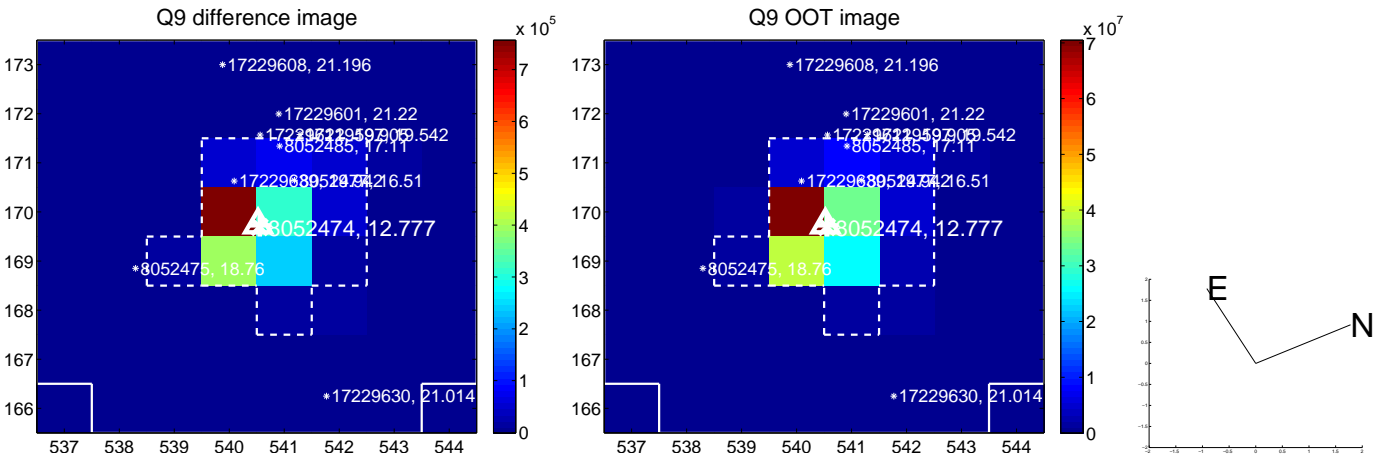


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value

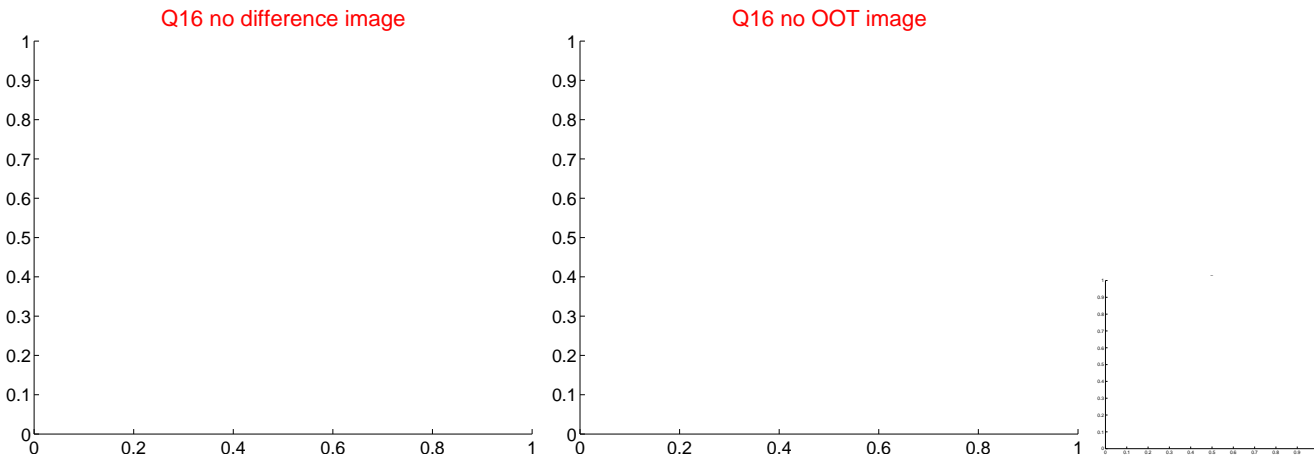
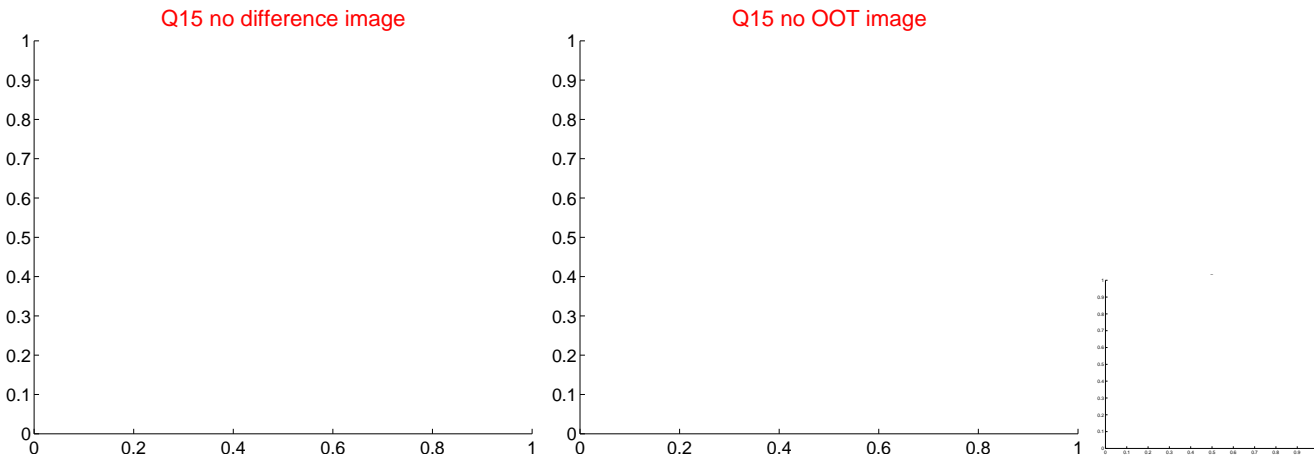
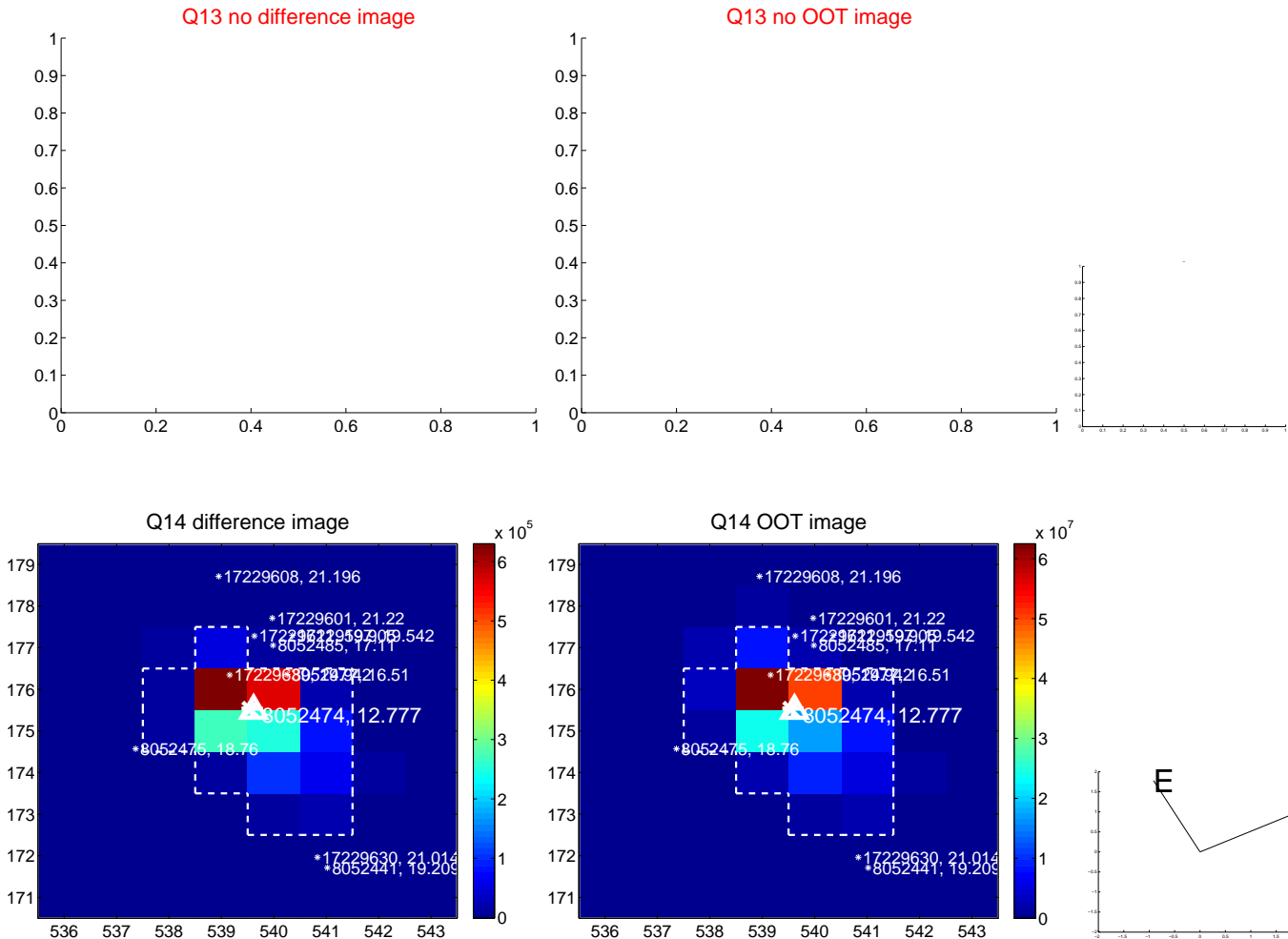




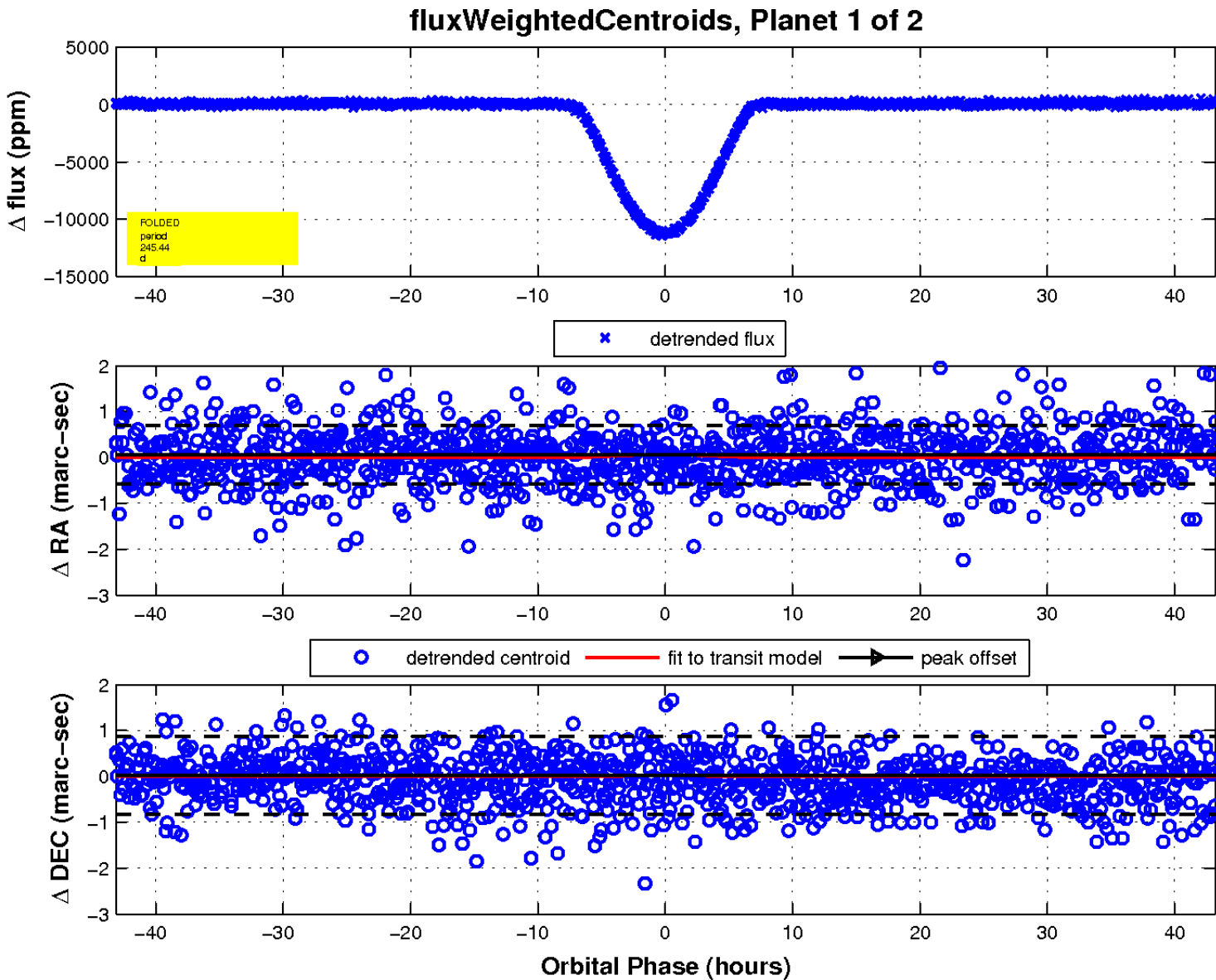
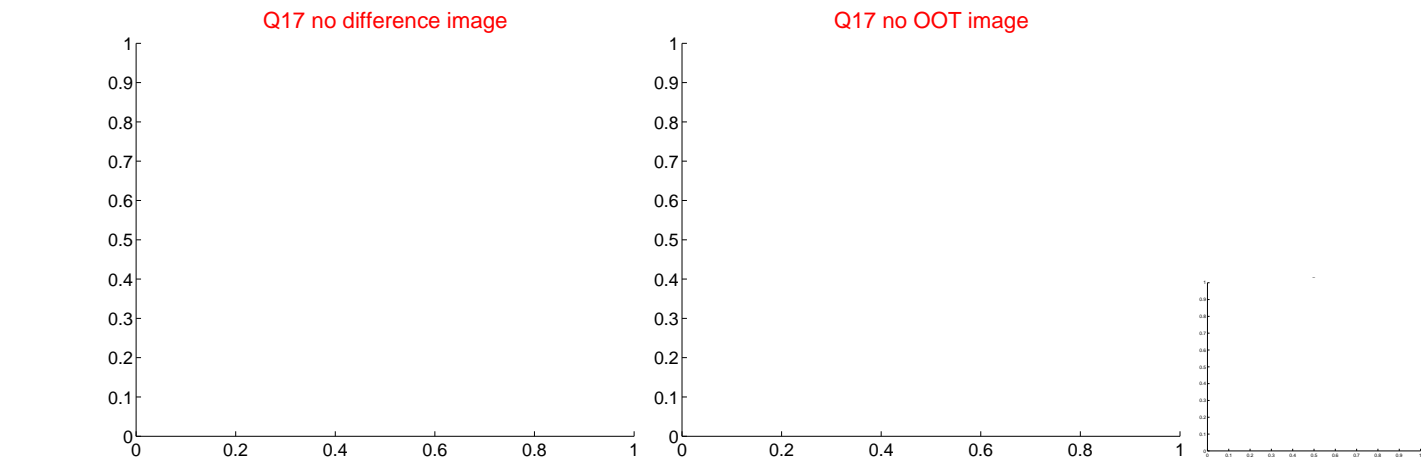
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

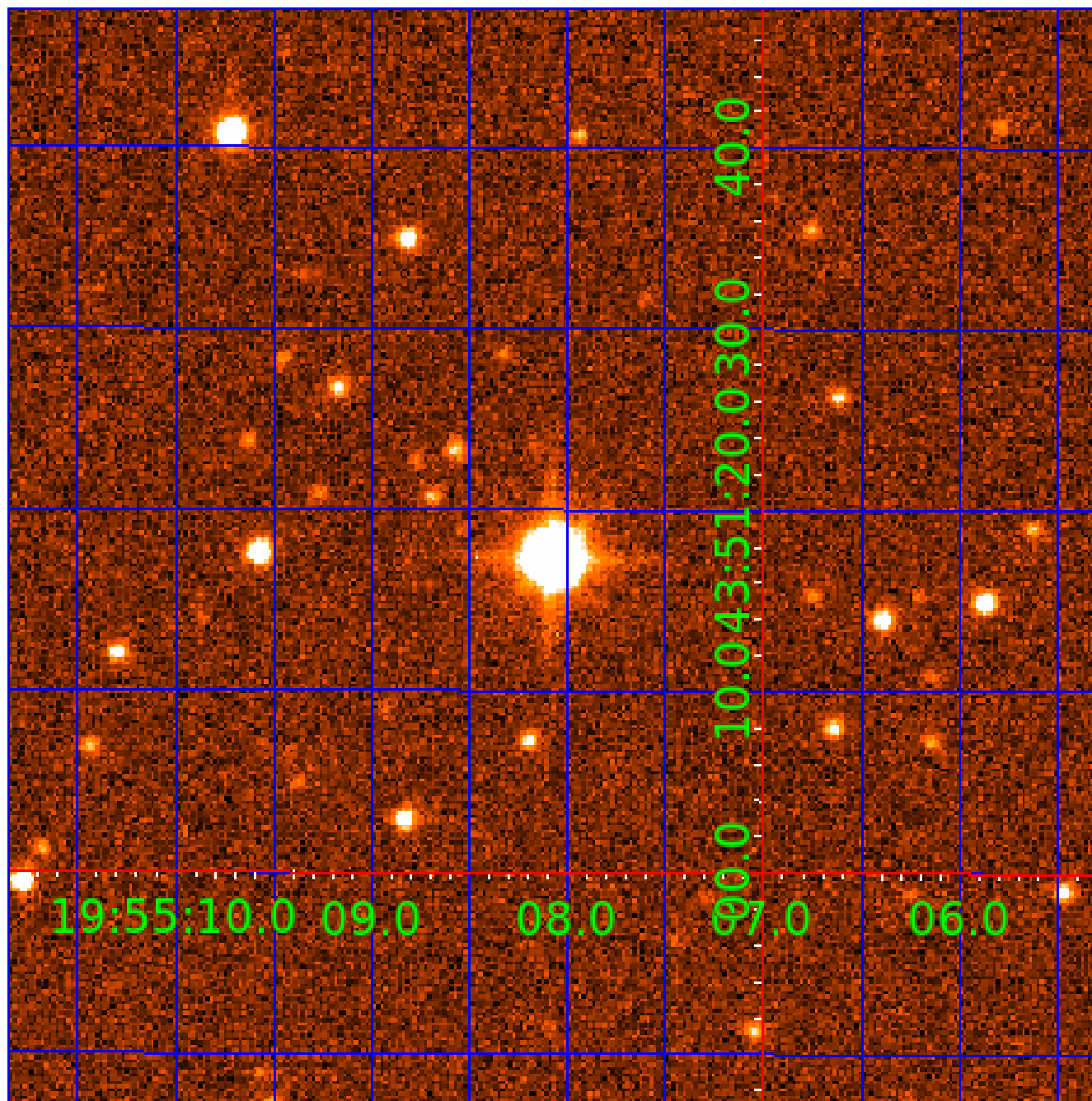


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\Delta$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 008052474

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008052474-01	OBS	3640.01	245.438273	361.302863	11259.3	14.406	571.7	582.3	0.99	5637	17.06	1.66
008052474-02	OBS	No	245.438908	261.379093	4350.0	9.518	195.9	191.8	0.99	5637	11.27	1.66

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008052474-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
008052474-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

**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.

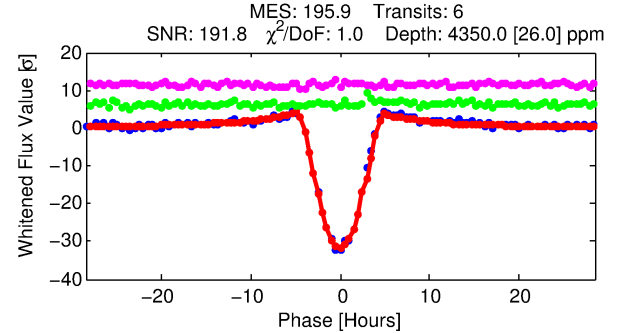
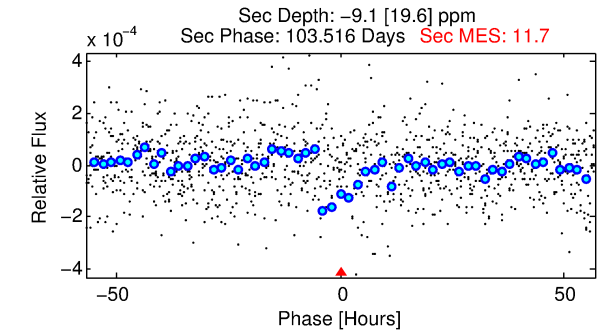
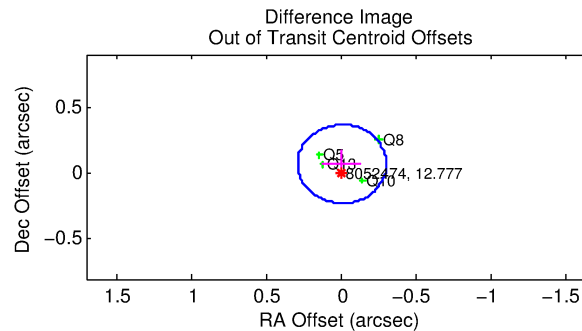
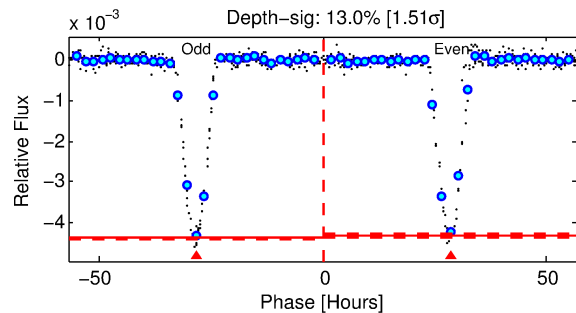
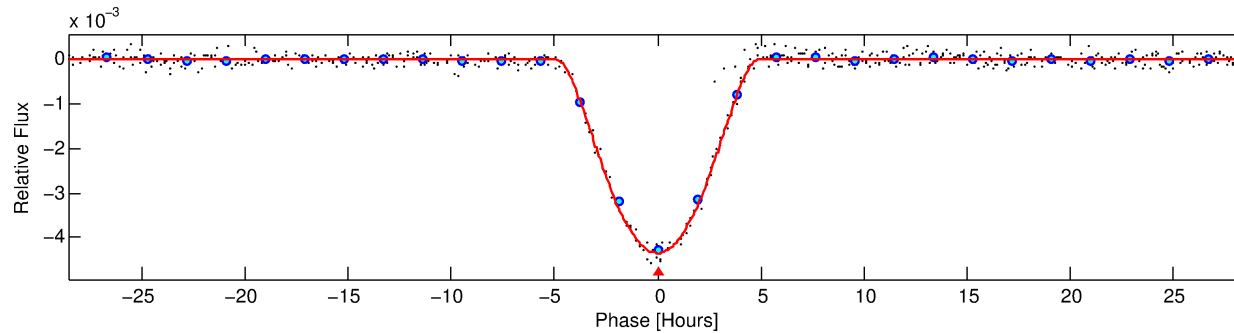
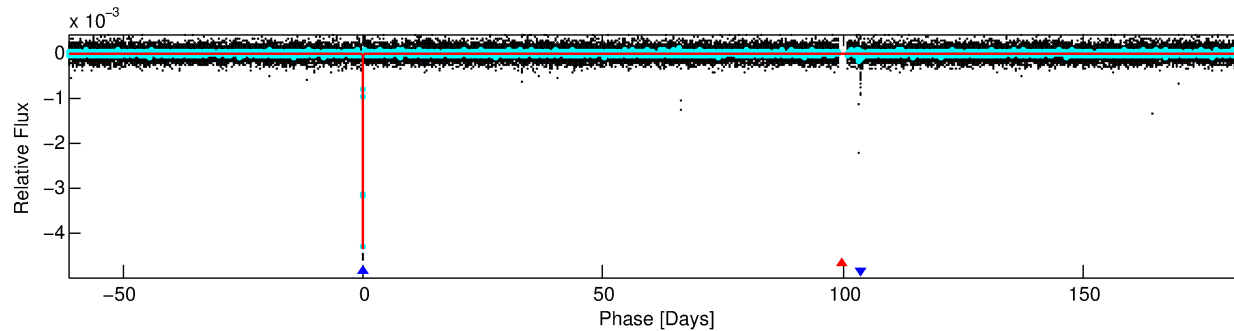
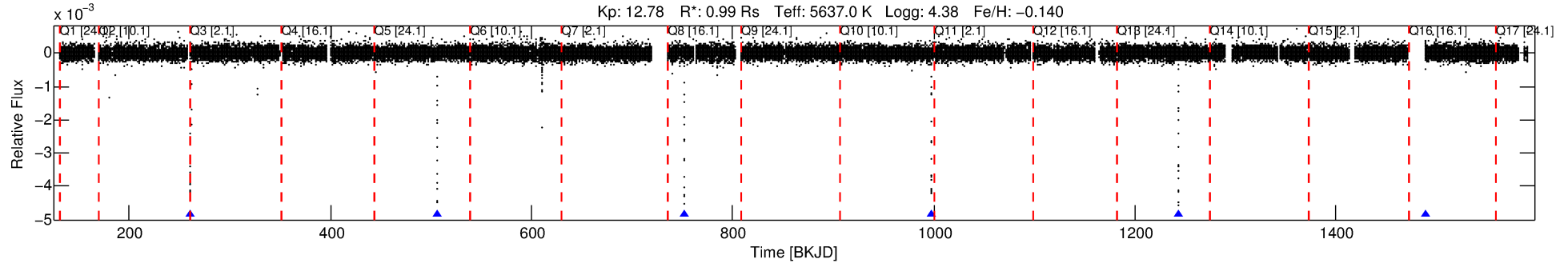
## Ephemeris Match Information For 008052474-02

No Significant Match Found

# DV One-Page Summary

KIC: 8052474 Candidate: 2 of 2 Period: 245.439 d  
KOI: K03640 Corr: No Ephemeris Match

Kp: 12.78 R\*: 0.99 Rs Teff: 5637.0 K Logg: 4.38 Fe/H: -0.140



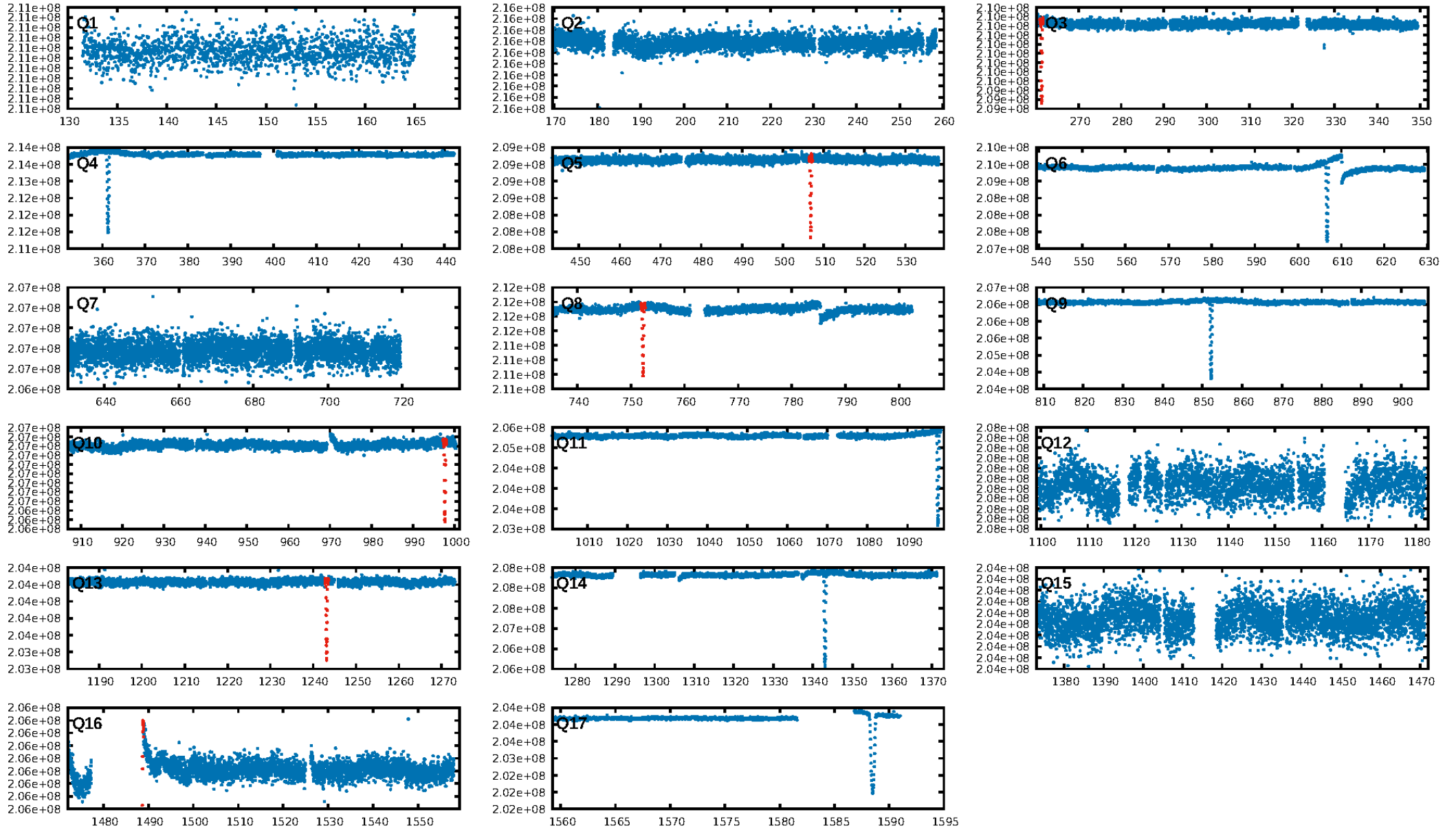
## DV Fit Results:

Period = 245.43891 [0.00035] d  
Epoch = 261.3791 [0.0009] BKJD  
Rp/R\* = 0.1043 [0.0166]  
a/R\* = 97.28 [3.30]  
b = 0.99 [0.03]  
Seff = 1.66 [0.60]  
Teq = 289 [26] K  
Rp = 11.27 [3.55] Re  
a = 0.7307 [0.1689] AU  
Ag = N/A  
Teffp = N/A

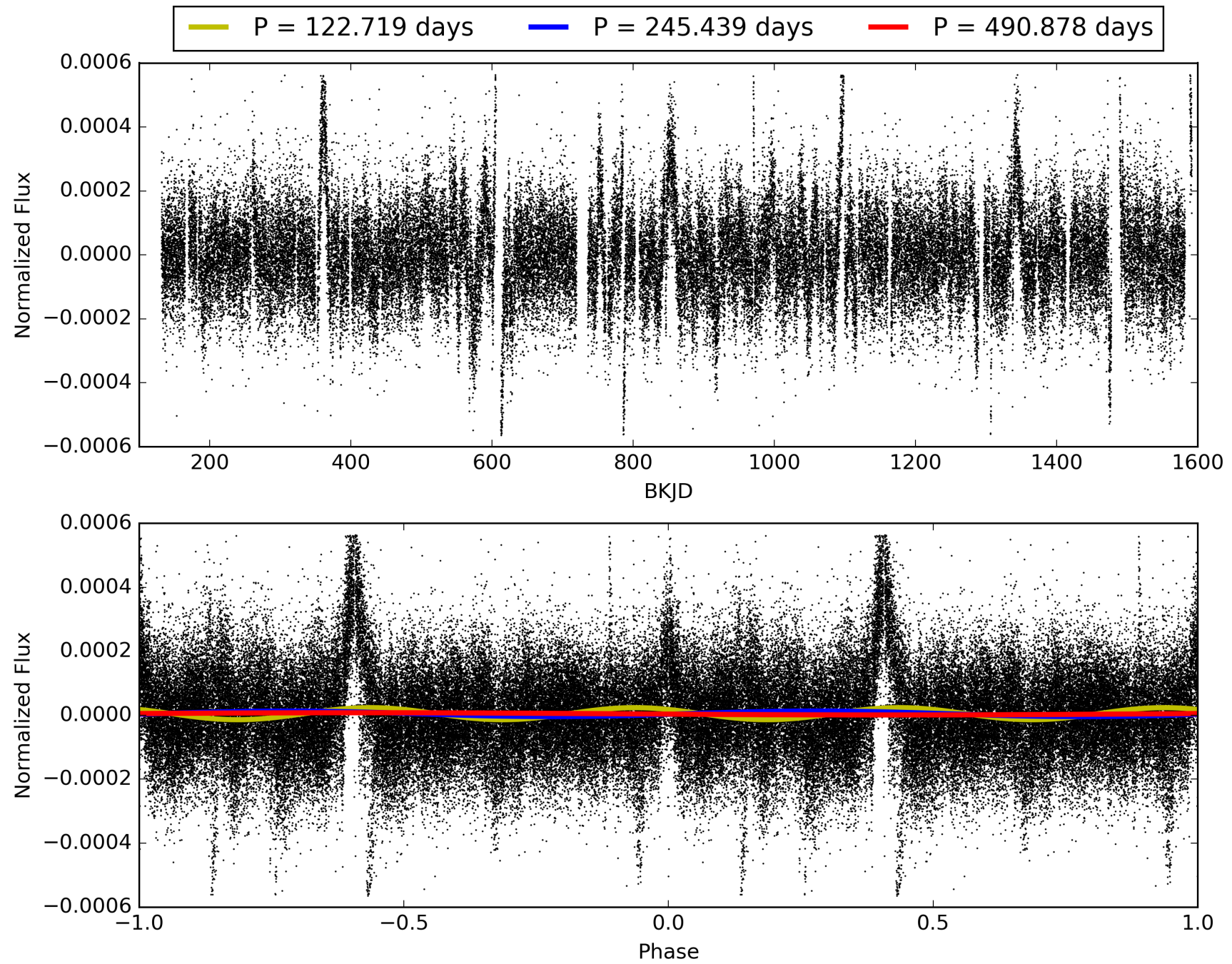
## DV Diagnostic Results:

ShortPeriod-sig: 0.1% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 16.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [6/6]  
GhostDiagnostic-chr: 6.73  
Centroid-sig: 23.1%  
Centroid-so: 0.273 arcsec [4.47σ]  
OotOffset-rm: 0.070 arcsec [0.71σ]  
KicOffset-rm: 0.186 arcsec [2.17σ]  
OotOffset-st: 1/0/1/2 [4]  
KicOffset-st: 1/0/1/2 [4]  
DiffImageQuality-fgm: 1.00 [4/4]  
DiffImageOverlap-fno: 1.00 [4/4]

# TCE 008052474-02, PDC Light Curves



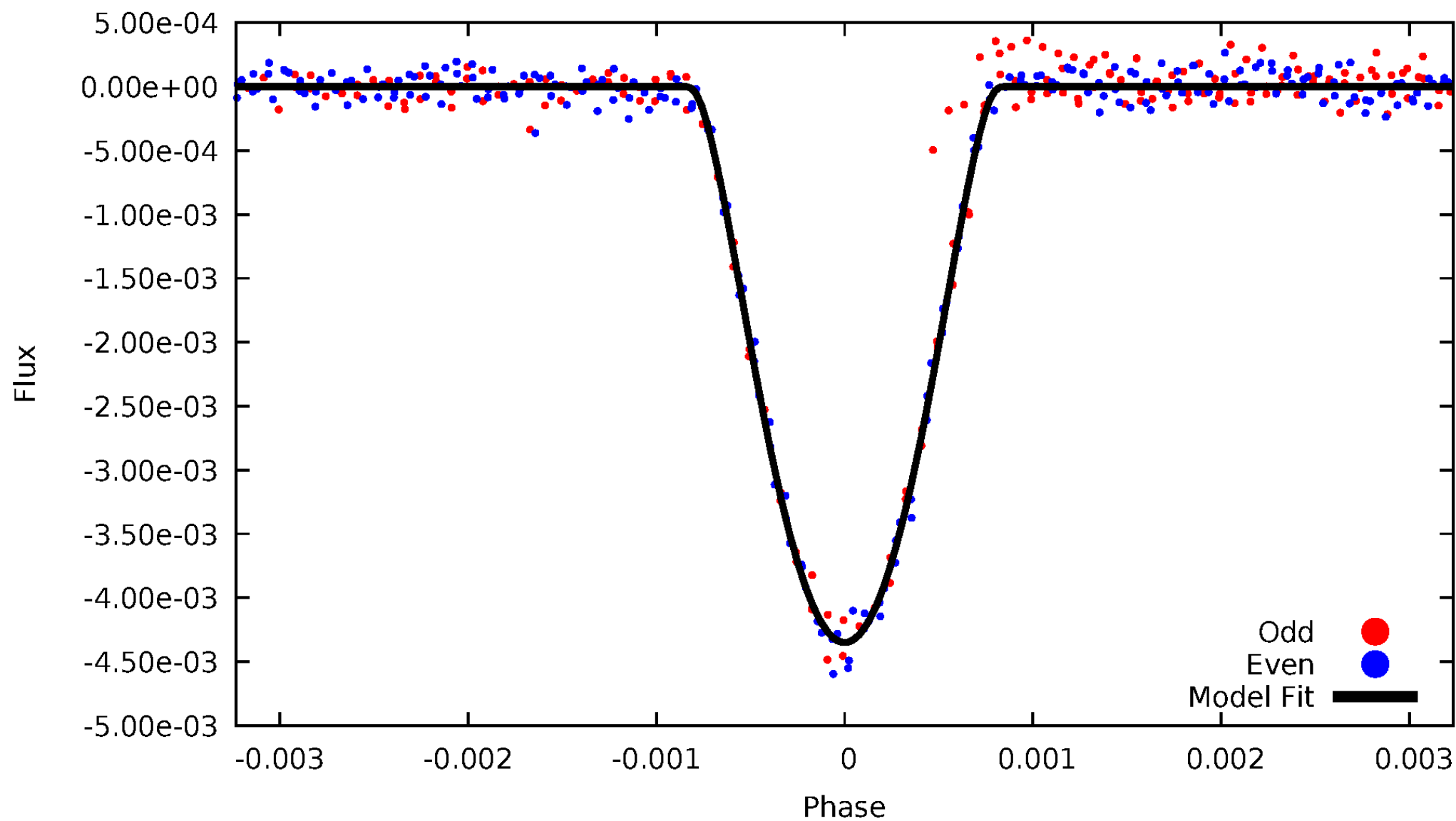
TCE 008052474-02





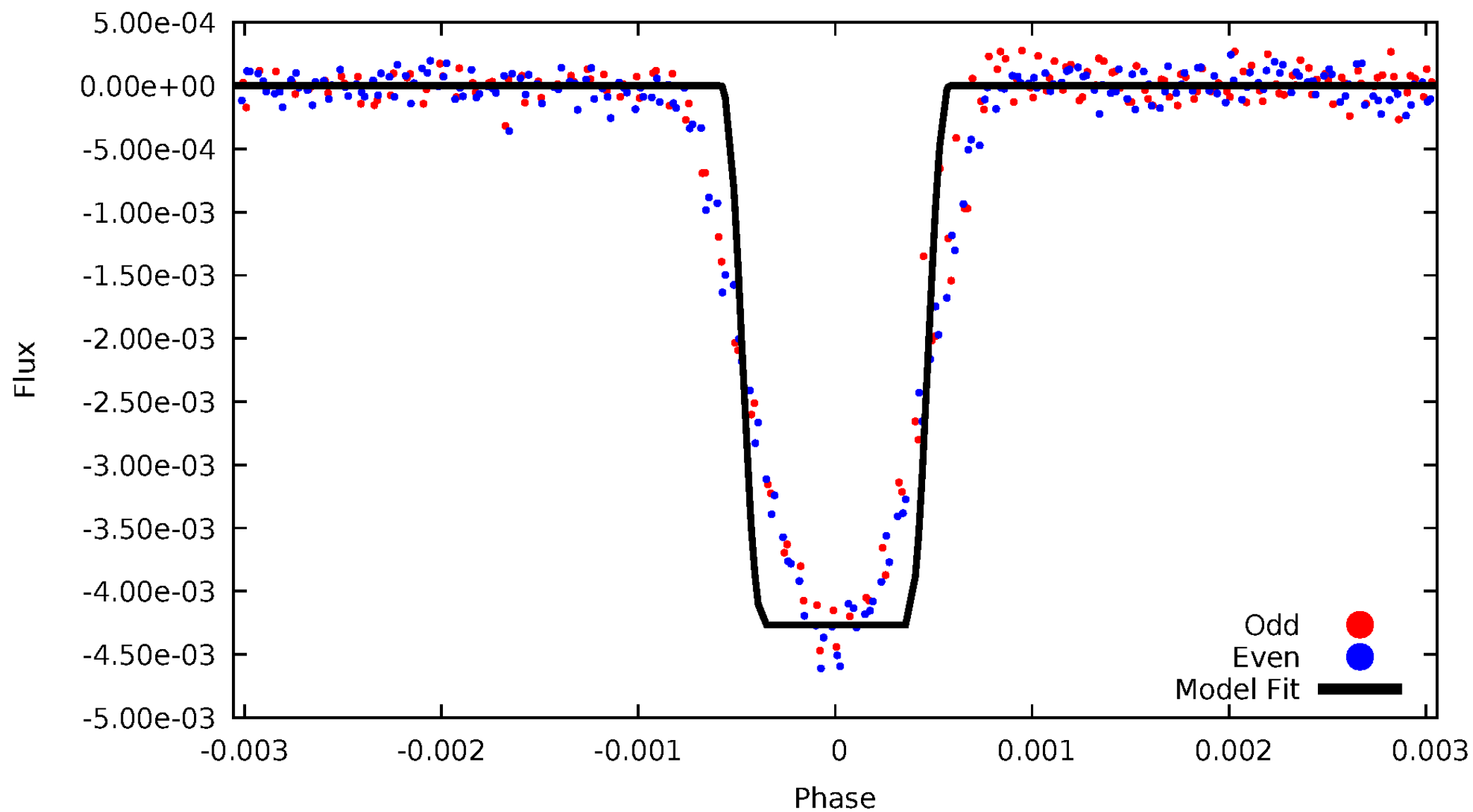
DV Odd/Even

TCE 008052474-02



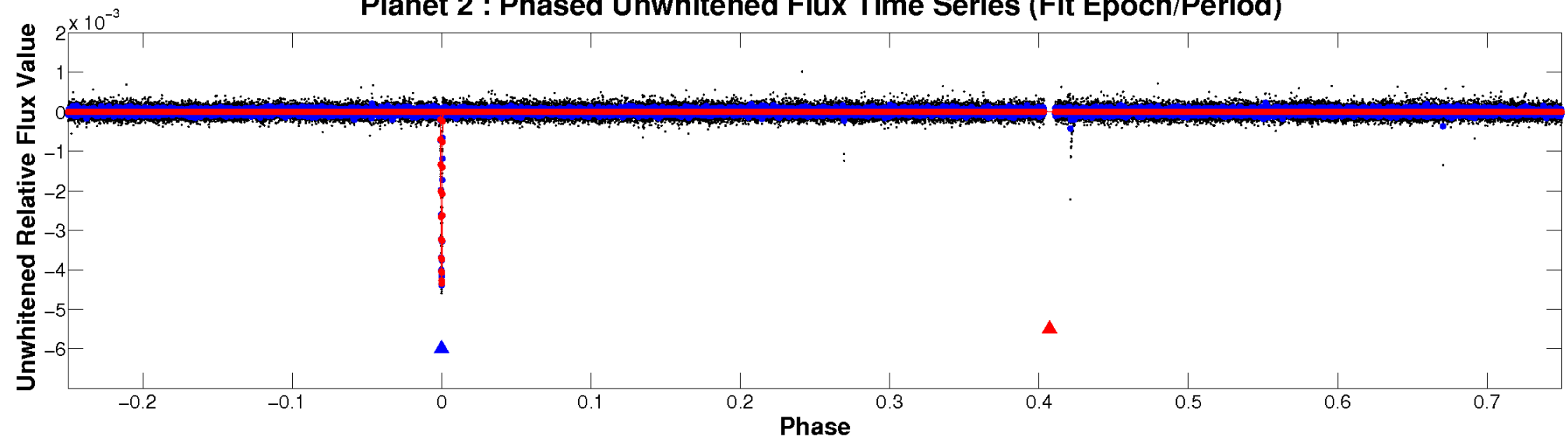
# ALT Odd/Even

TCE 008052474-02

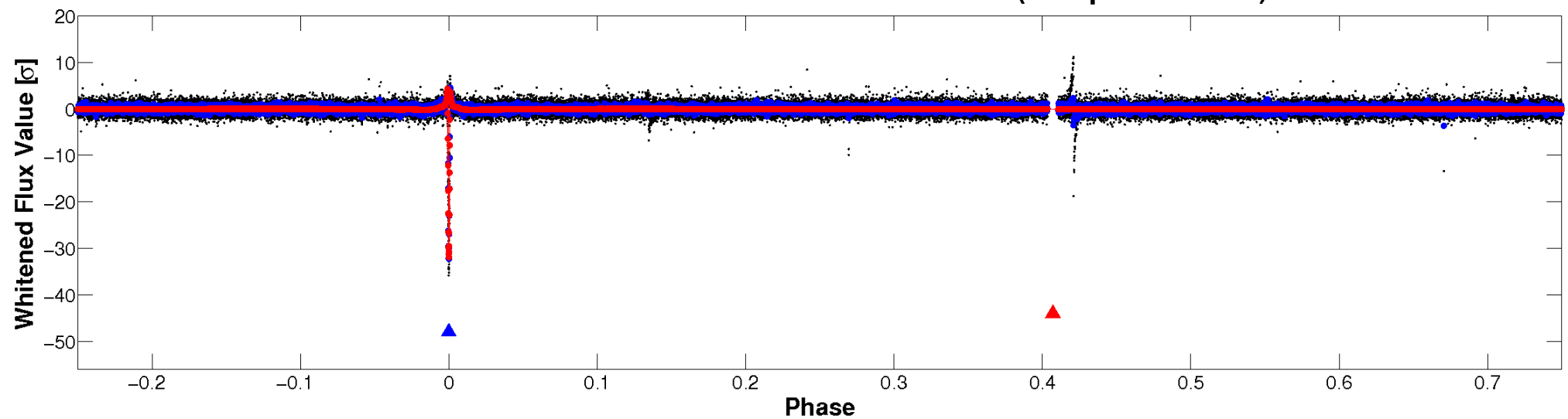


# Non-Whitened Vs. Whitened Light Curve

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

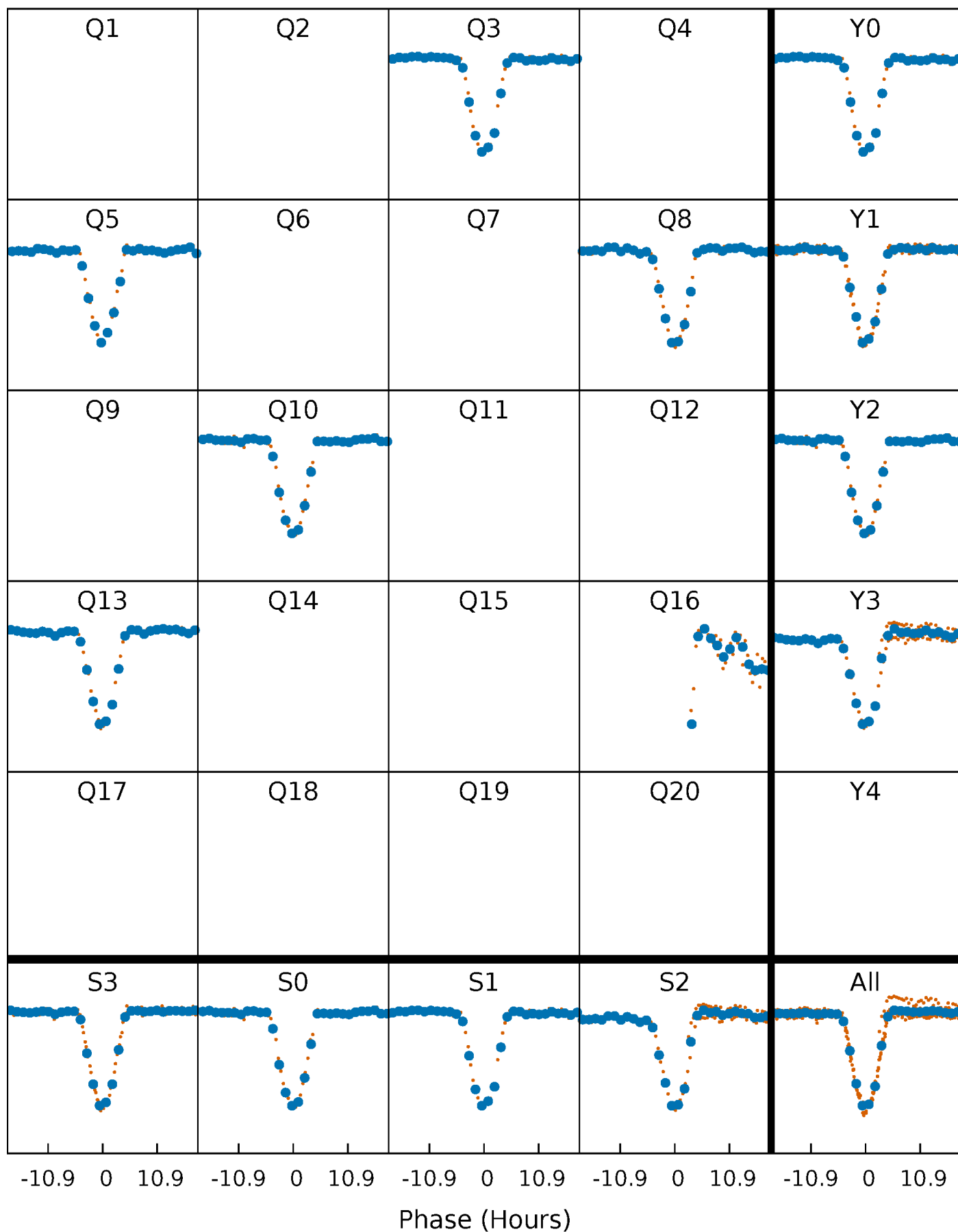


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



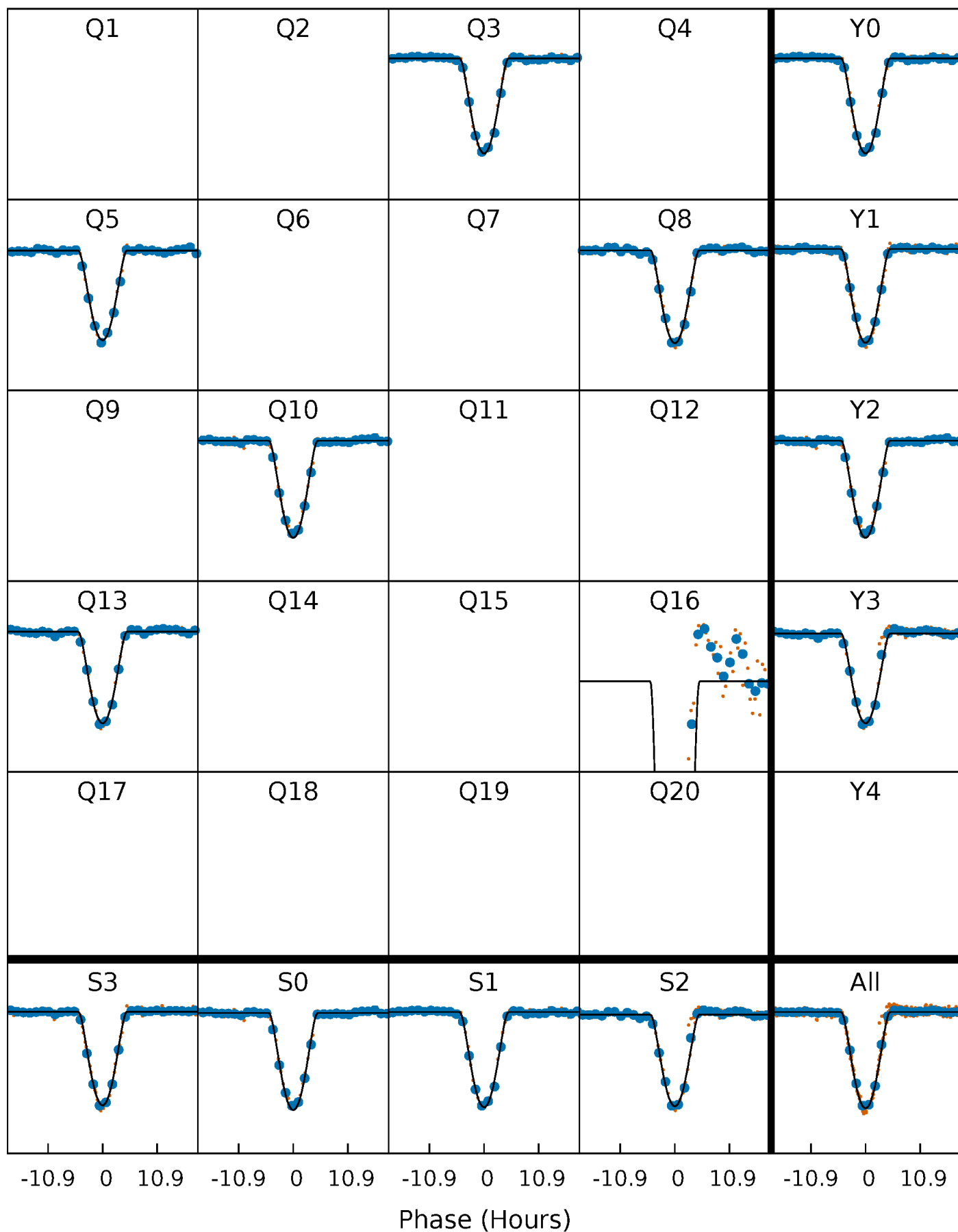
# PDC Quarter-Phased Transit Curves

TCE 008052474-02     $P=245.438908$  Days     $T_0=261.379093$  (BKJD)



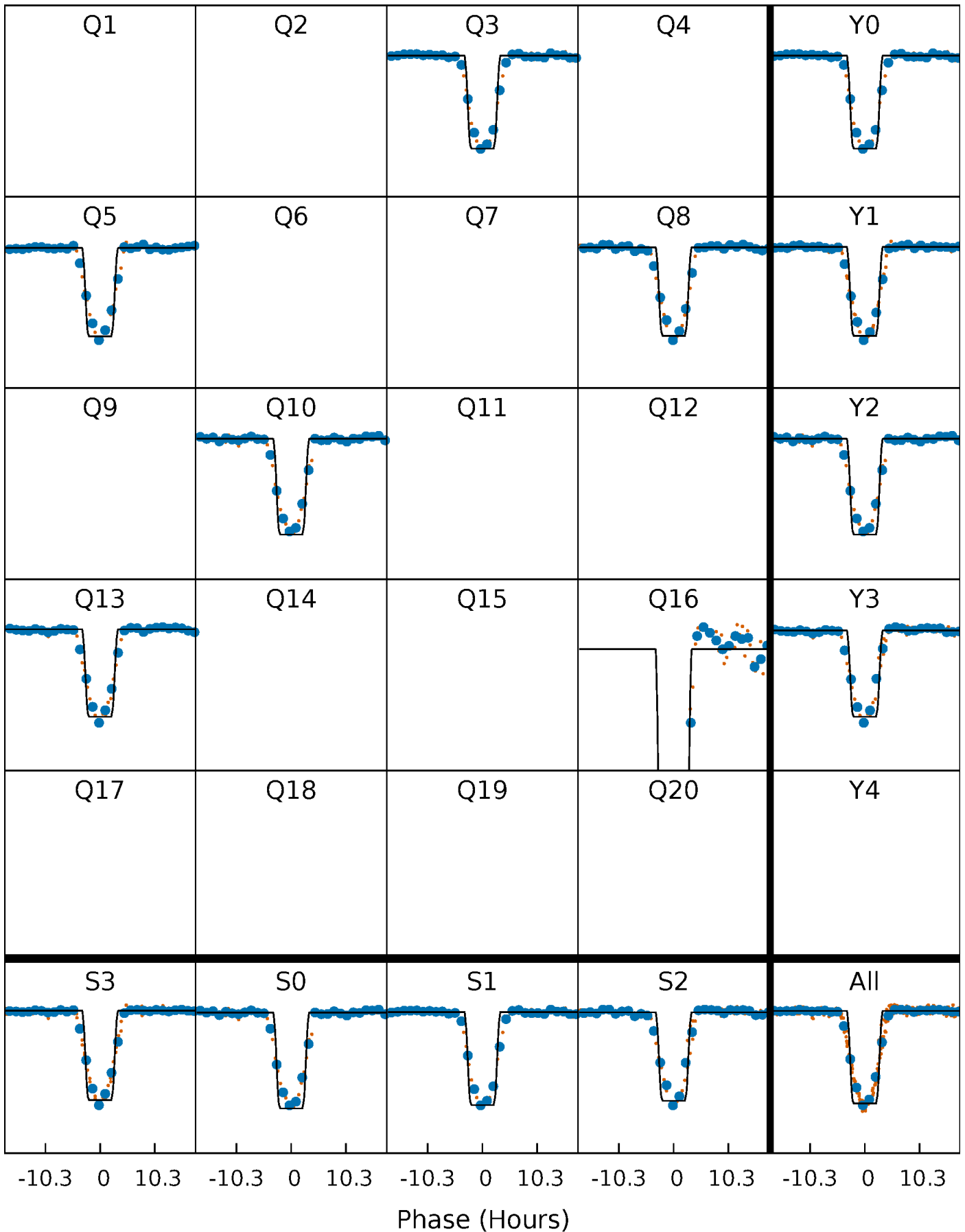
# DV Quarter-Phased Transit Curves

TCE 008052474-02     $P=245.438908$  Days     $T_0=261.379093$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

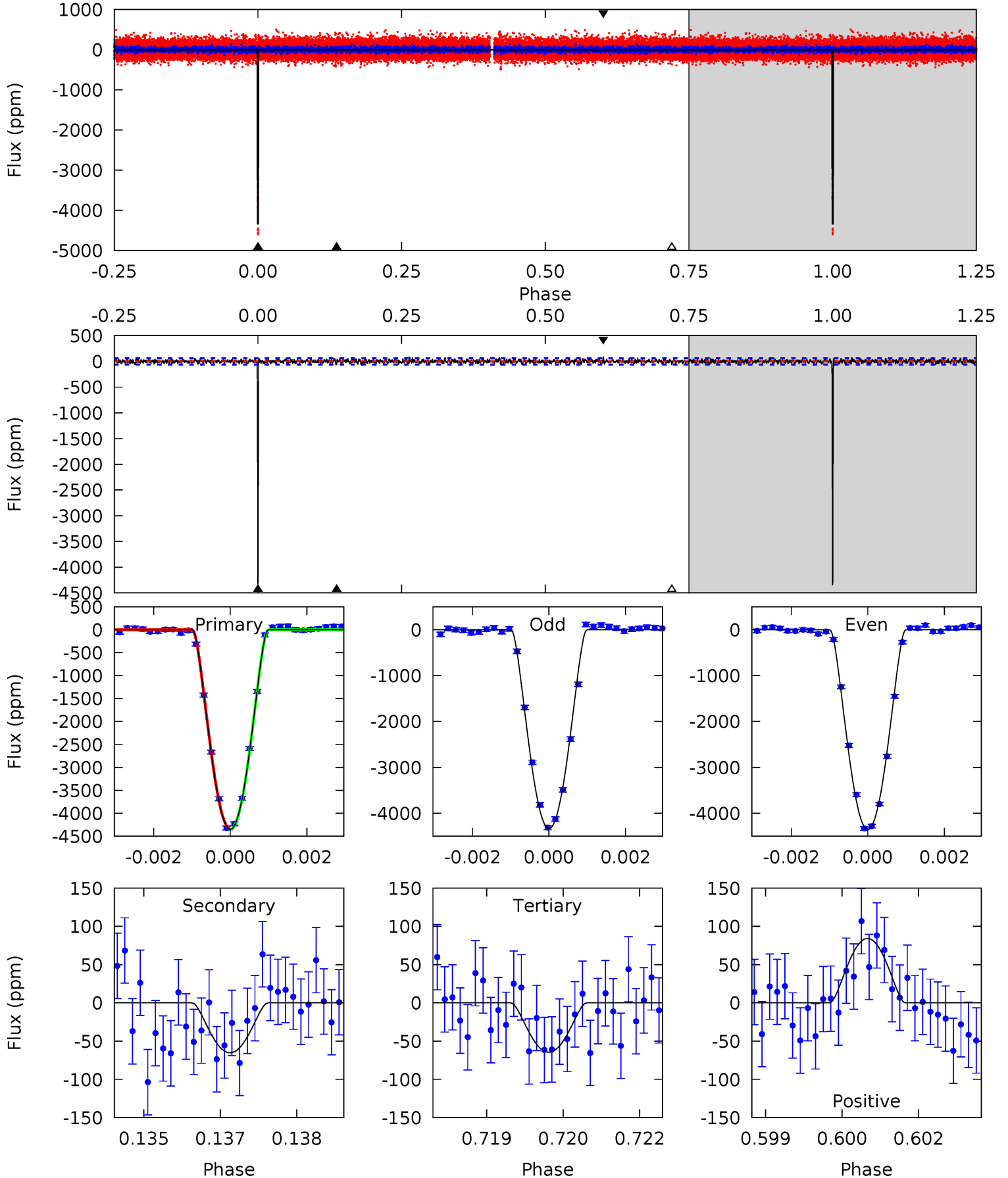
TCE 008052474-02 P=245.441112 Days  $T_0=261.373363$  (BKJD)



# DV Model-Shift Uniqueness Test

008052474-02, P = 245.438908 Days, E = 15.940185 Days

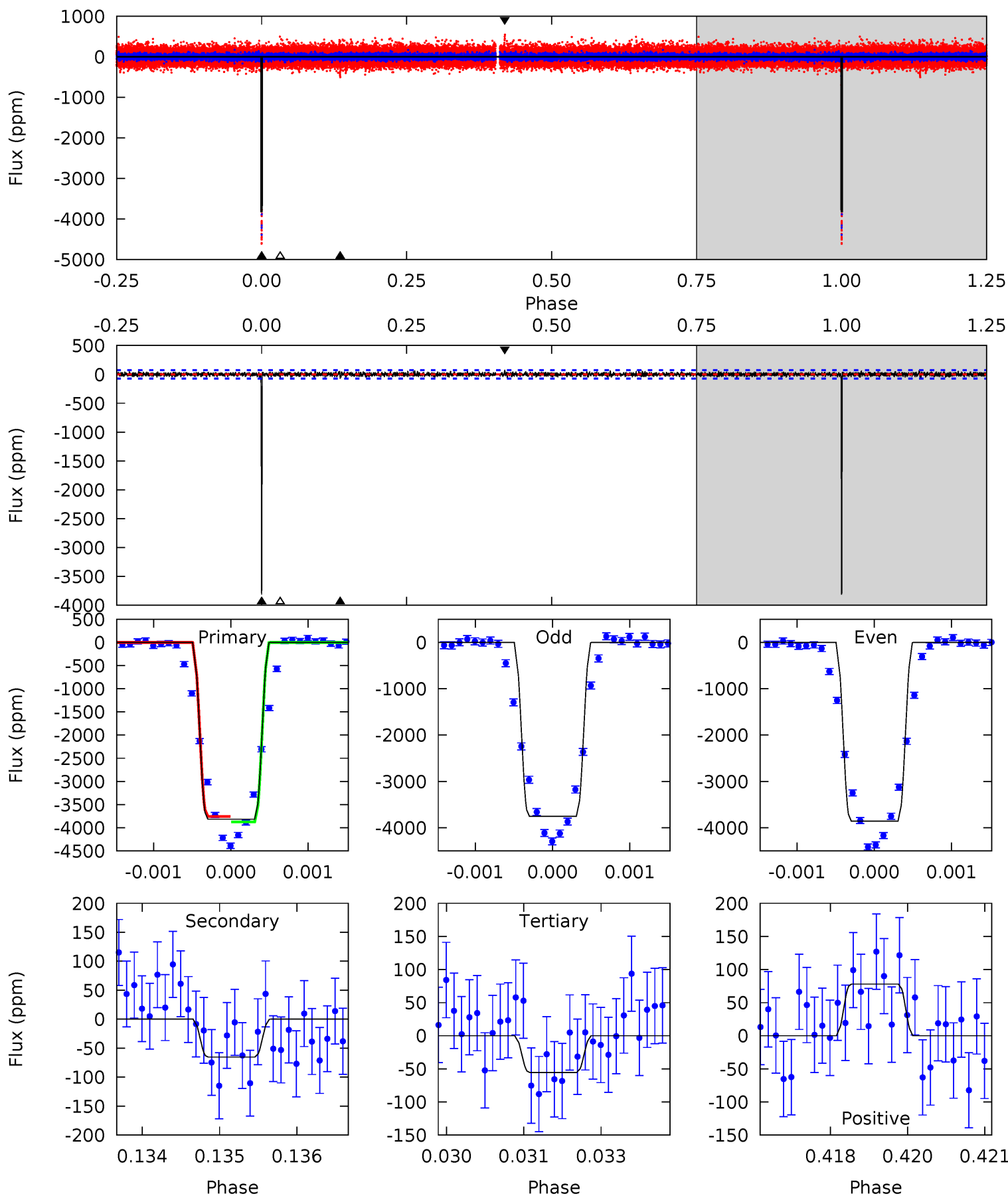
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
388.5	5.82	5.76	7.51	5.36	3.14	1.83	382.8	381.0	0.06	-1.69	0.96	0.86	0.02	0.56



# Alt Model-Shift Uniqueness Test

008052474-02, P = 245.441112 Days, E = 15.932251 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
278.3	4.77	4.05	5.69	5.42	3.25	1.17	274.2	272.6	0.72	-0.92	3.52	0.92	0.02	4.30





### Stellar Parameters For KIC 008052474

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5637^{+186}_{-186}$	$4.383^{+0.153}_{-0.187}$	$-0.140^{+0.300}_{-0.300}$	$0.990^{+0.269}_{-0.179}$	$0.866^{+0.125}_{-0.073}$	$1.256^{+0.878}_{-0.594}$
	+3%/-3%	+3%/-4%	+214%/-214%	+27%/-18%	+14%/-8%	+70%/-47%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 008052474-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-65 \pm 11$	$11.60^{+2.65}_{-2.29}$	$406^{+33}_{-27}$	$2437^{+130}_{-107}$	$146^{+84}_{-50}$
Alt.	$-65 \pm 14$	$7.12^{+2.27}_{-1.89}$	$407^{+28}_{-28}$	$2743^{+230}_{-182}$	$375^{+352}_{-162}$

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

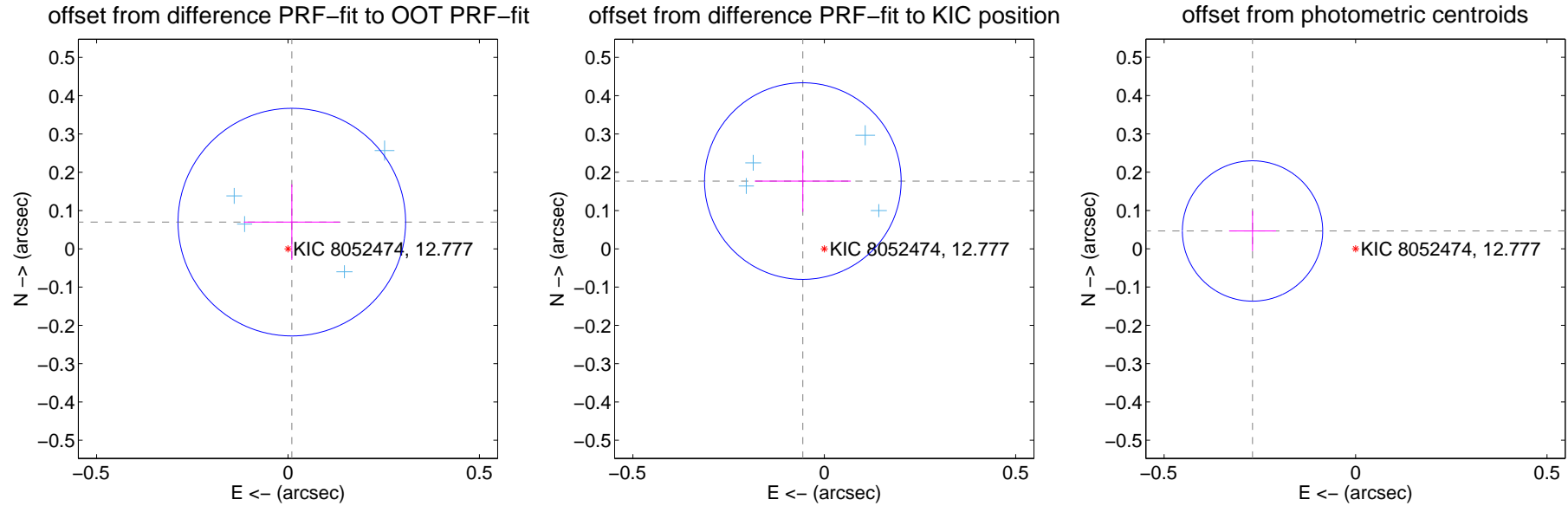
## DV Centroid Data

Supplemental centroid analysis for 008052474-02. Kepler magnitude: 12.78. Transit SNR 191.78

There are 4 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.070 \pm 0.099$	0.71	$-0.010 \pm 0.125$	$0.070 \pm 0.098$
PRF-fit source offset from KIC position	$0.186 \pm 0.086$	2.17	$0.056 \pm 0.125$	$0.177 \pm 0.081$
photometric centroid source offset	$0.27 \pm 0.06$	4.47	$0.27 \pm 0.06$	$0.05 \pm 0.05$

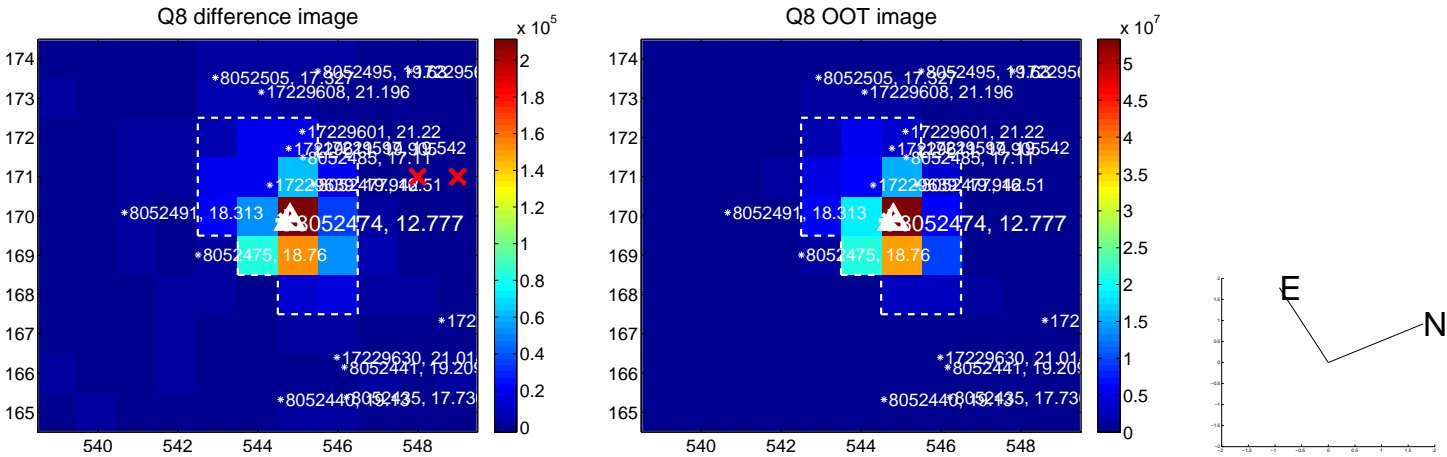
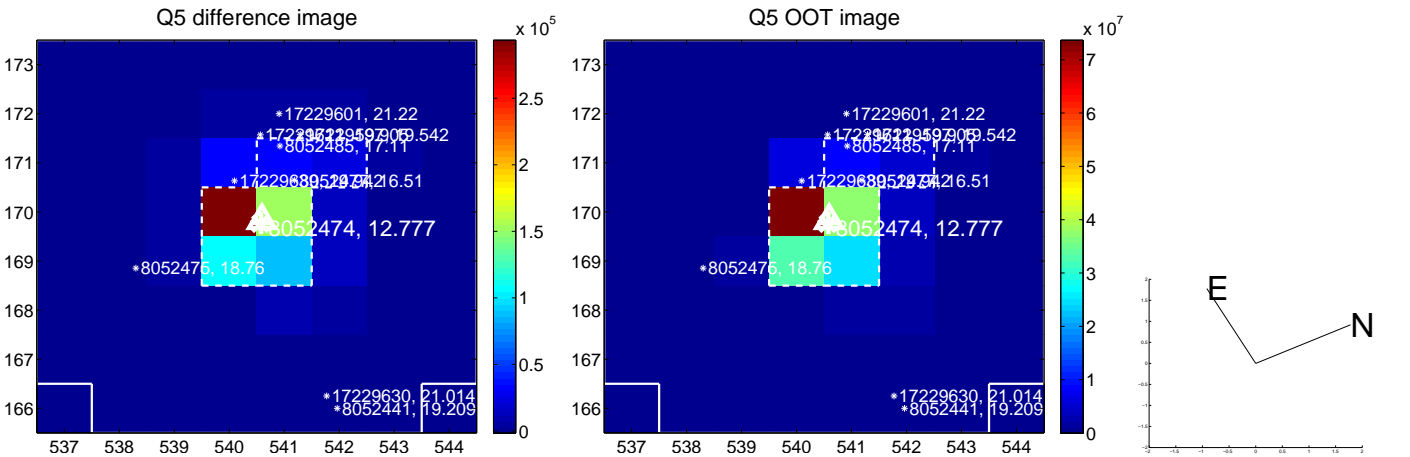


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

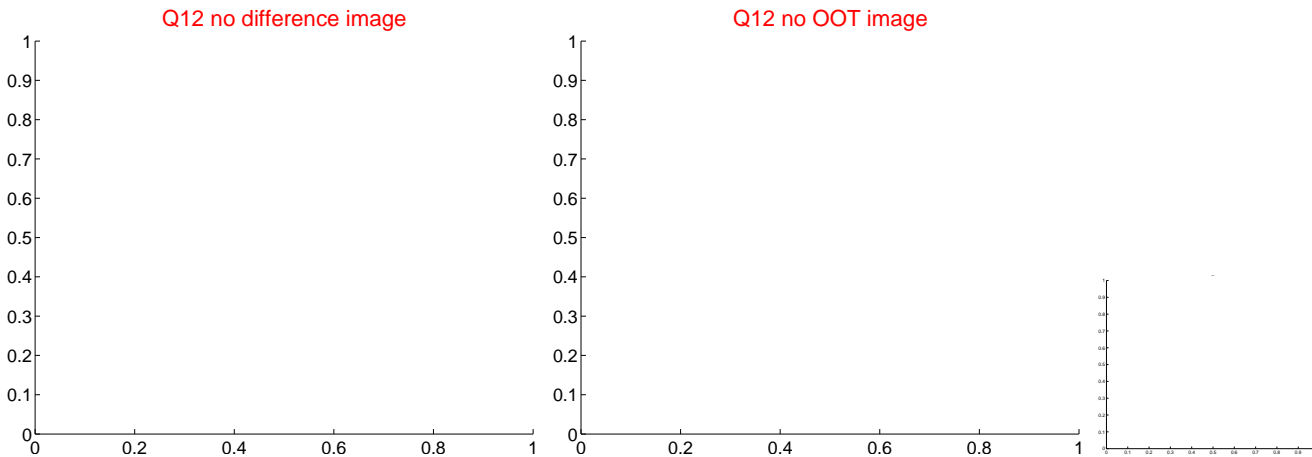
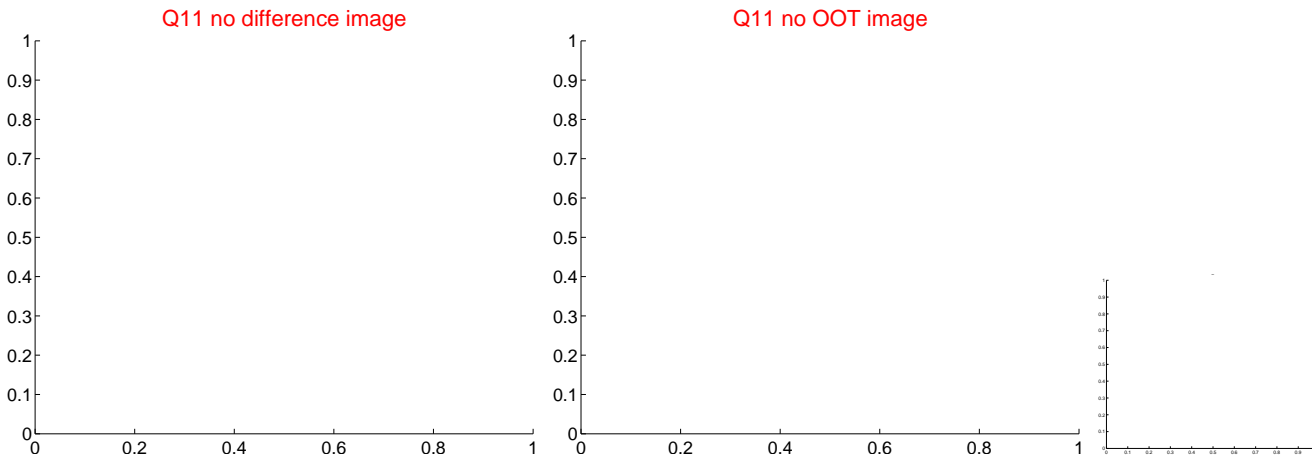
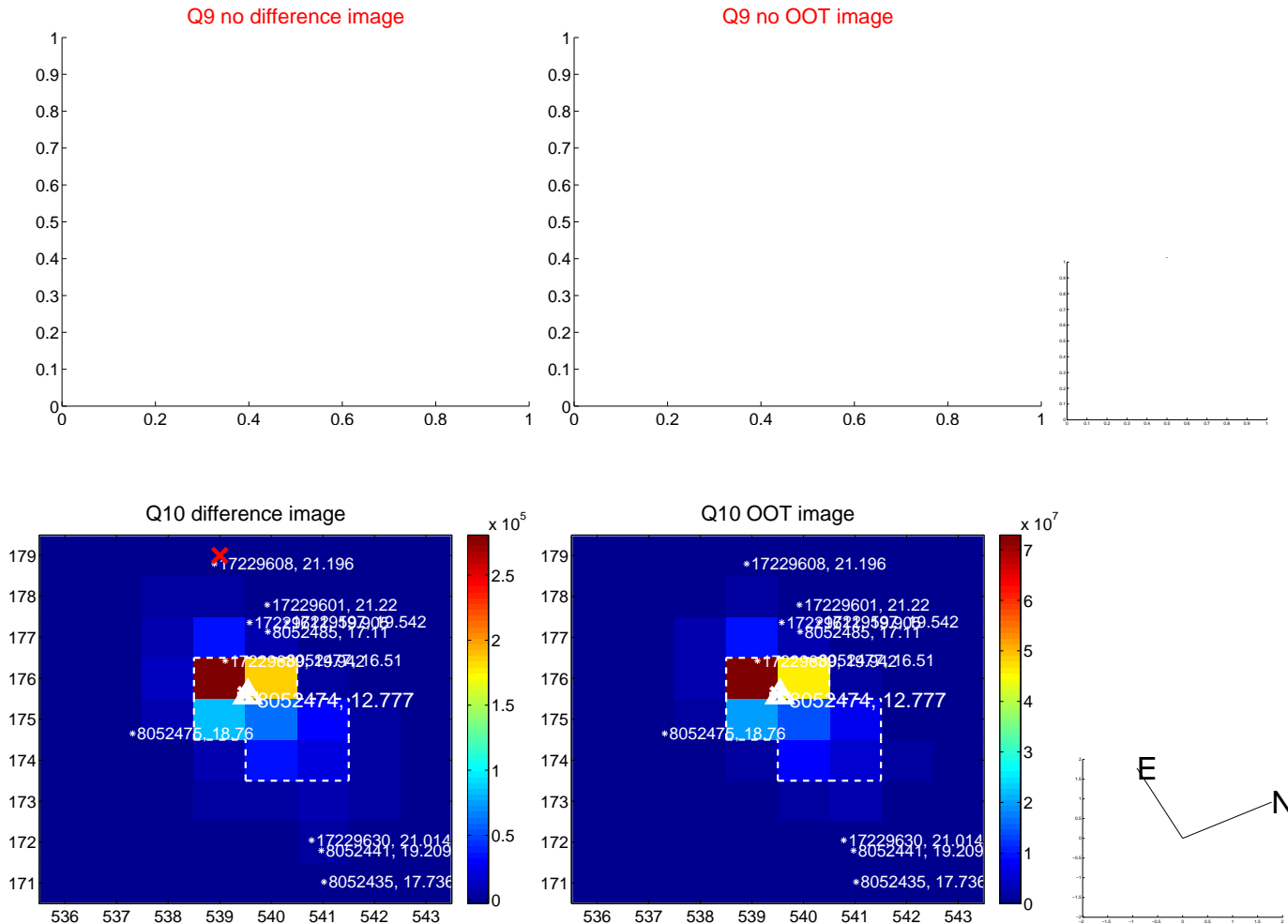
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



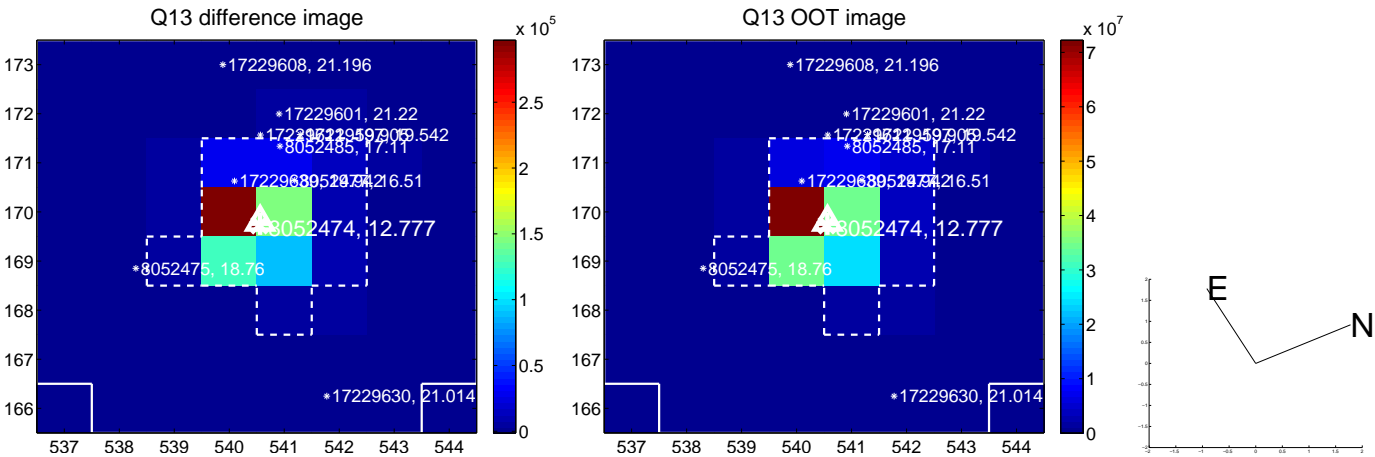
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



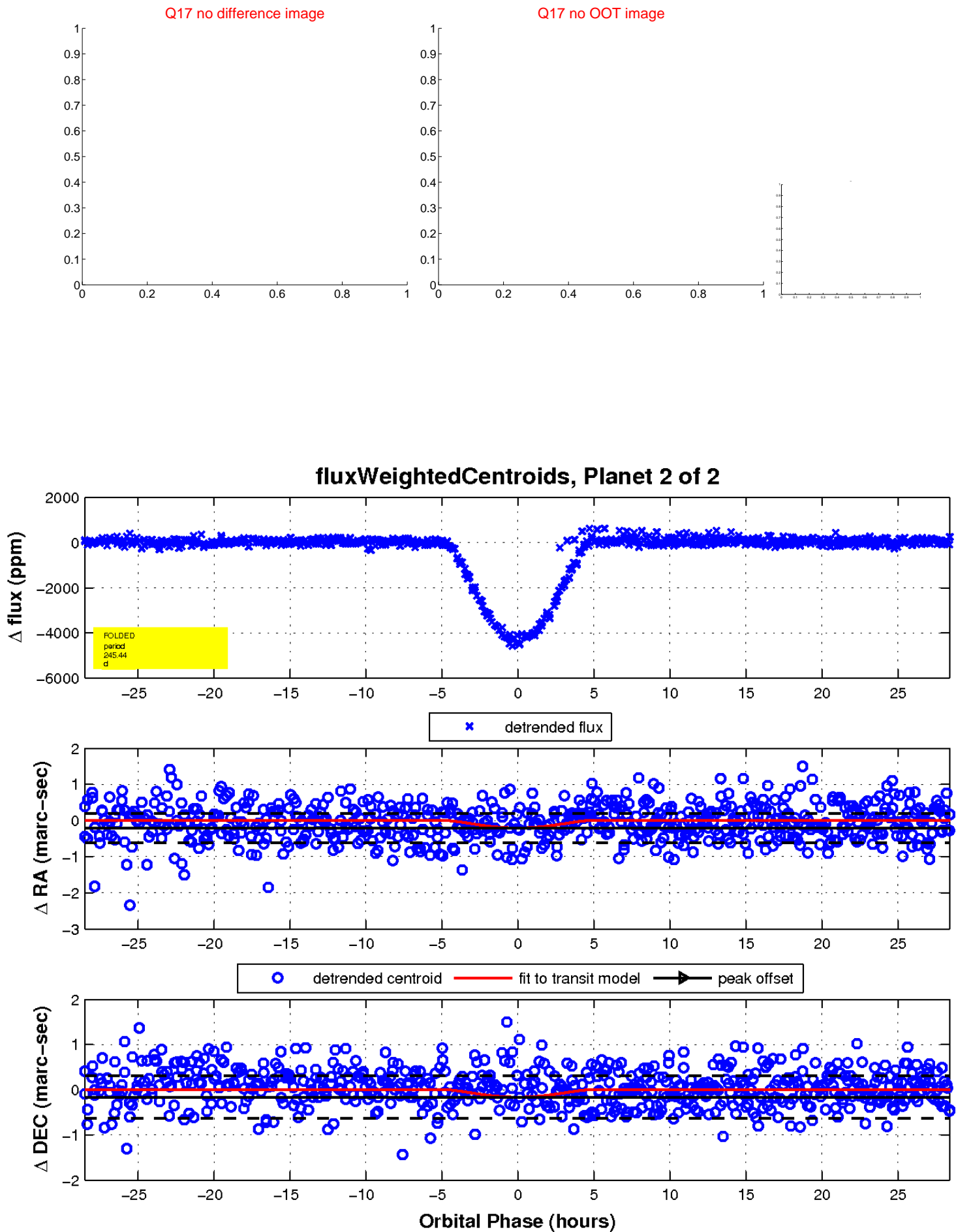
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



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

