

# KIC 004454810

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004454810-01	OBS	No	474.974066	545.559867	28444.2	16.380	58.0	10.4	2.01	7100	57.89	5.22
004454810-02	OBS	No	399.175319	380.970999	5546.6	7.708	41.6	9.3	2.01	7100	17.45	6.58
004454810-04	OBS	No	712.518237	141.002382	577.0	6.000	37.5	-1.0	2.01	7100	4.89	3.04

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004454810-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
004454810-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED—HALO_GHOST
004454810-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_SATURATED

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

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

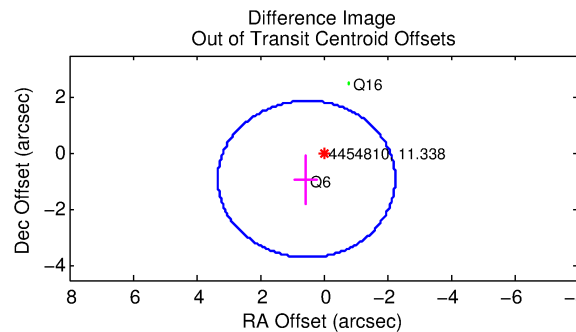
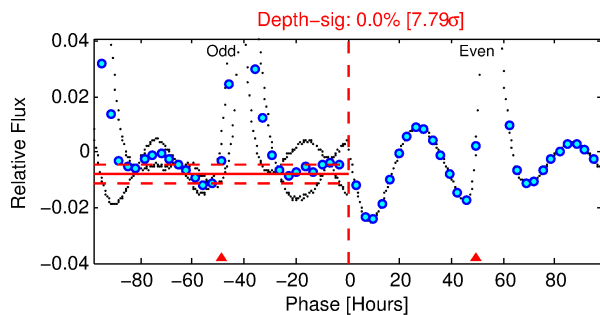
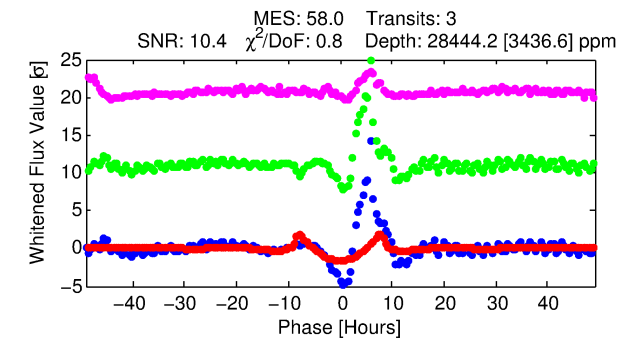
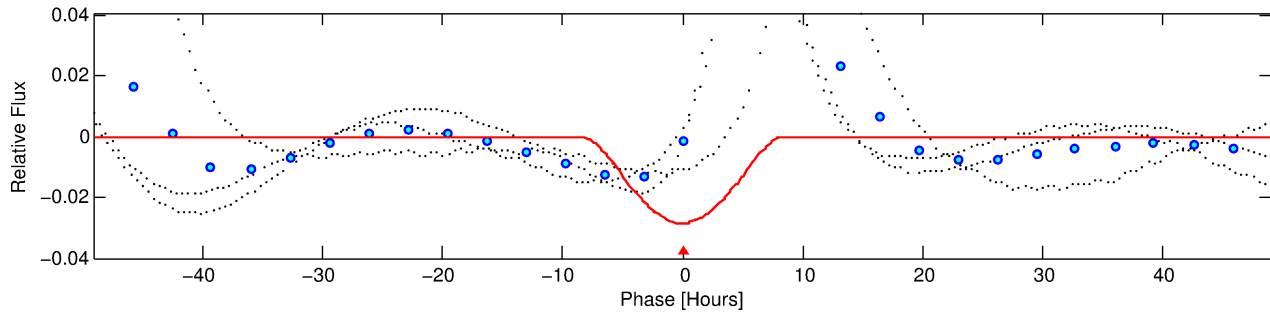
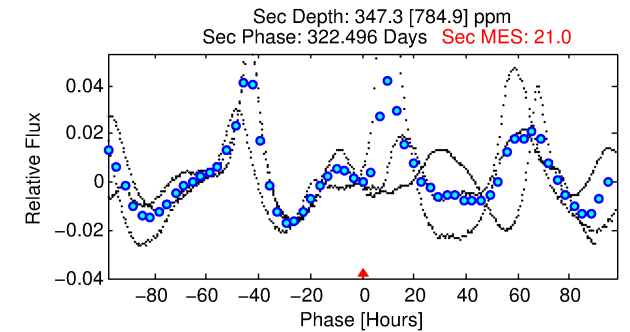
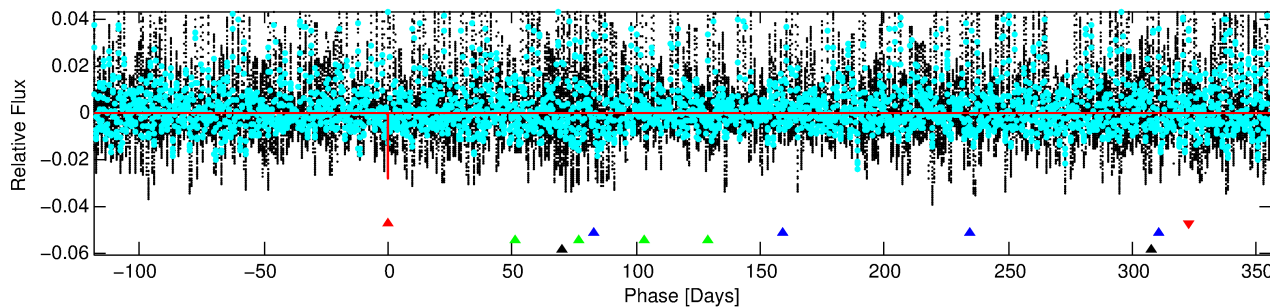
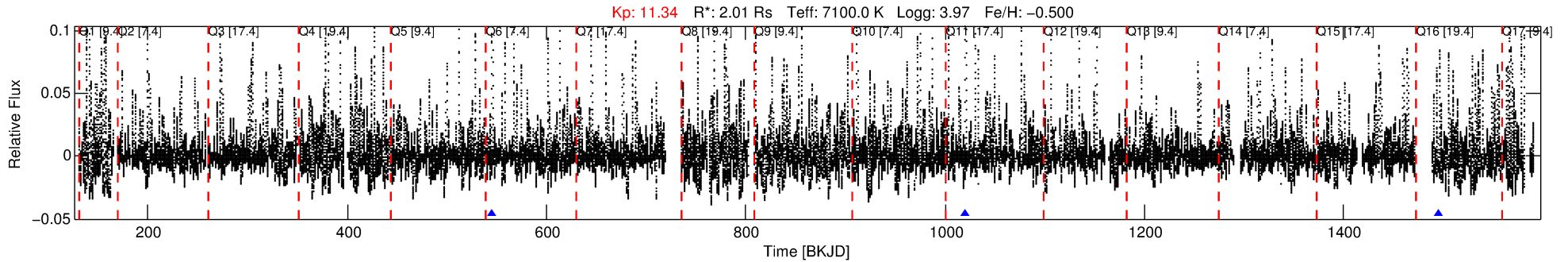
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 004454810-01

No Significant Match Found

# DV One-Page Summary

KIC: 4454810 Candidate: 1 of 4 Period: 474.974 d



## DV Fit Results:

Period = 474.97407 [0.01018] d  
Epoch = 545.5599 [0.0116] BKJD  
Rp/R\* = 0.2639 [0.2500]  
a/R\* = 171.34 [11.32]  
b = 1.00 [0.35]  
Seff = 5.22 [3.07]  
Teq = 385 [57] K  
Rp = 57.89 [59.01] Re  
a = 1.3272 [0.4726] AU  
Ag = 100.45 [301.57] [0.33σ]  
Teffp = 1887 [1393] K [1.08σ]

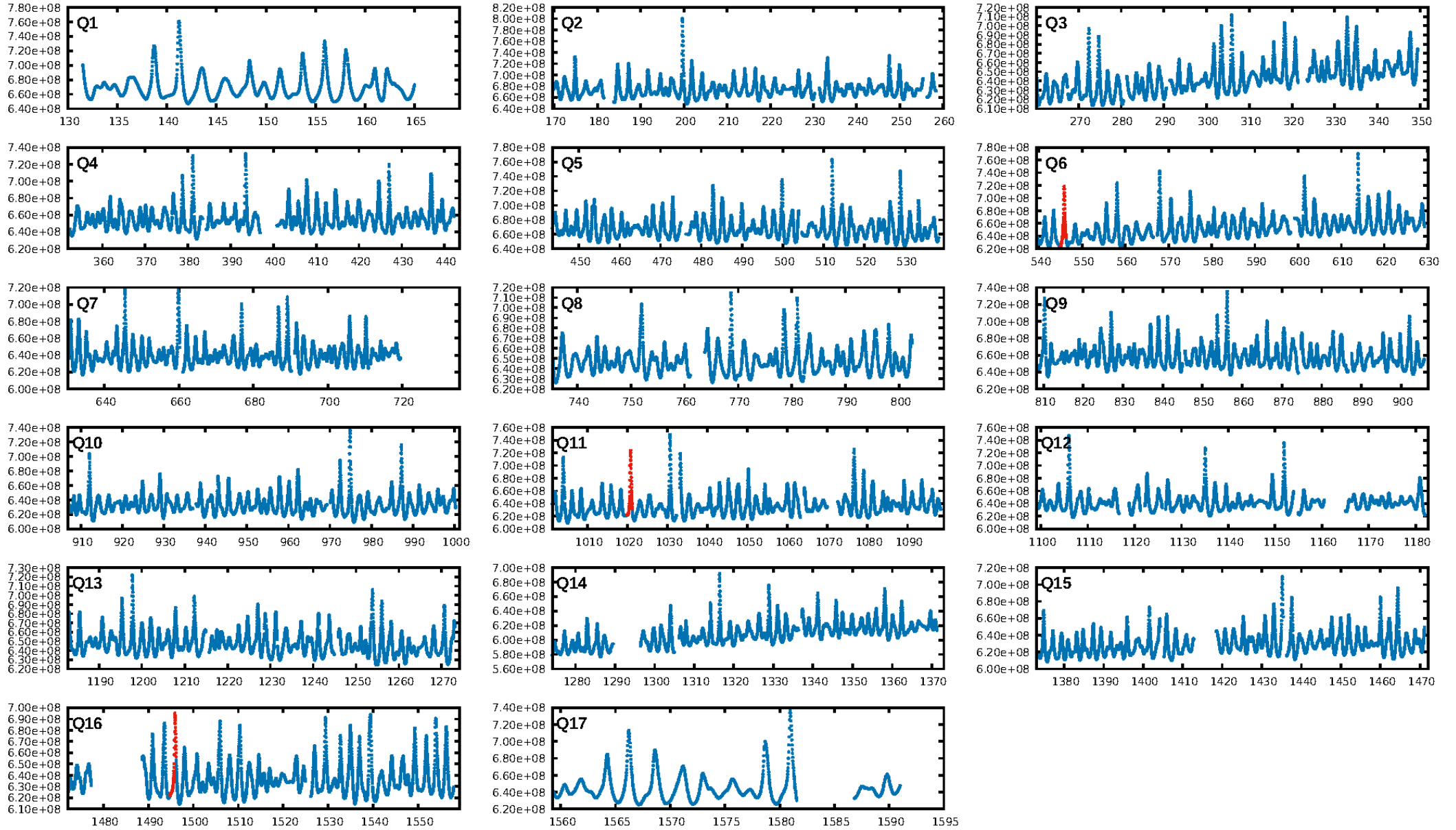
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [33.82σ]  
LongPeriod-sig: 100.0% [326.82σ]  
ModelChiSquare2-sig: 0.2%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.715  
Centroid-sig: 0.1%  
Centroid-so: 0.200 arcsec [5.41σ]  
OotOffset-rm: 1.056 arcsec [1.14σ]  
KicOffset-rm: 1.126 arcsec [0.73σ]  
OotOffset-st: 1/0/1/0 [2]  
KicOffset-st: 1/0/1/0 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 1.00 [2/2]

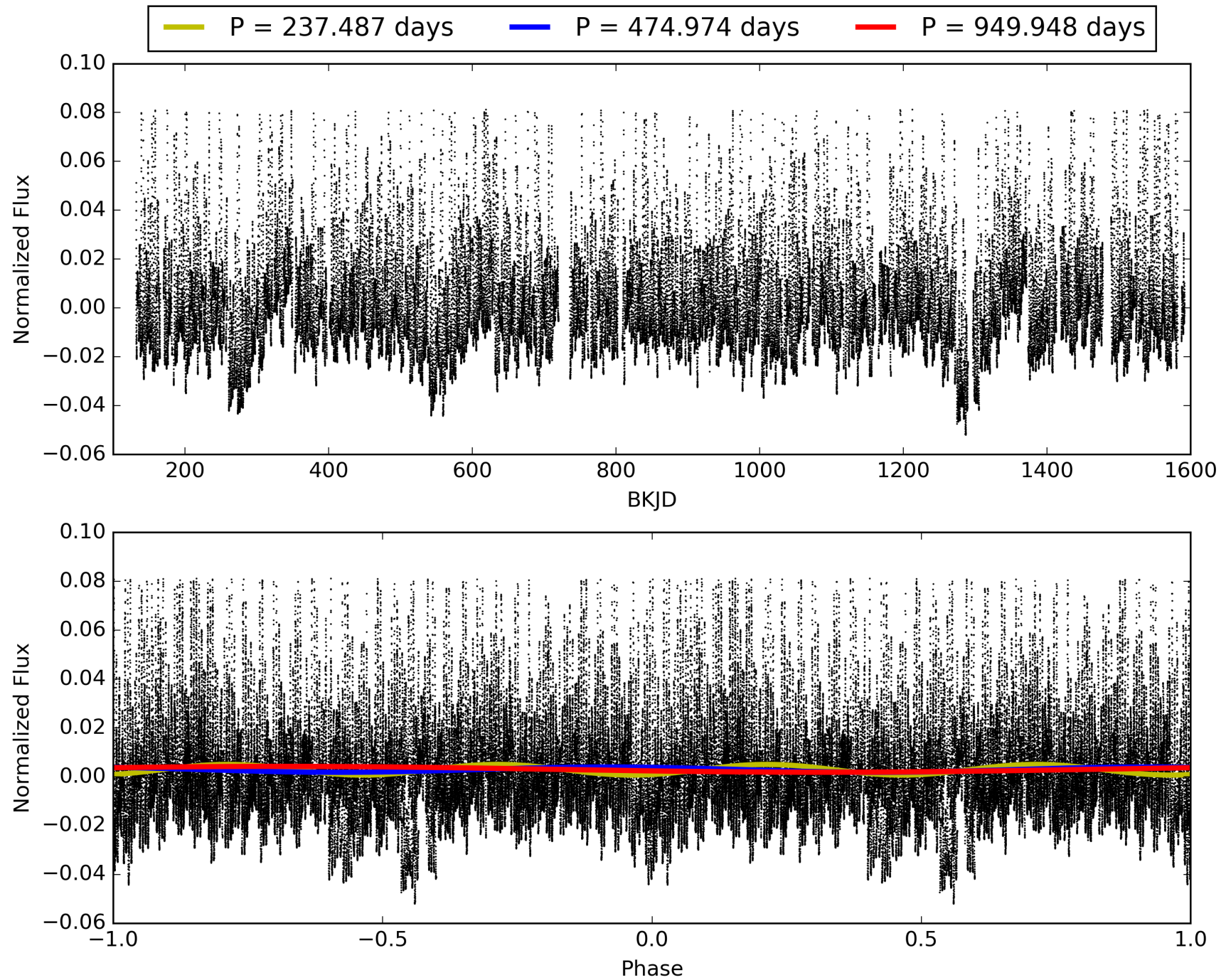
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:39:04 Z

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

# TCE 004454810-01, PDC Light Curves

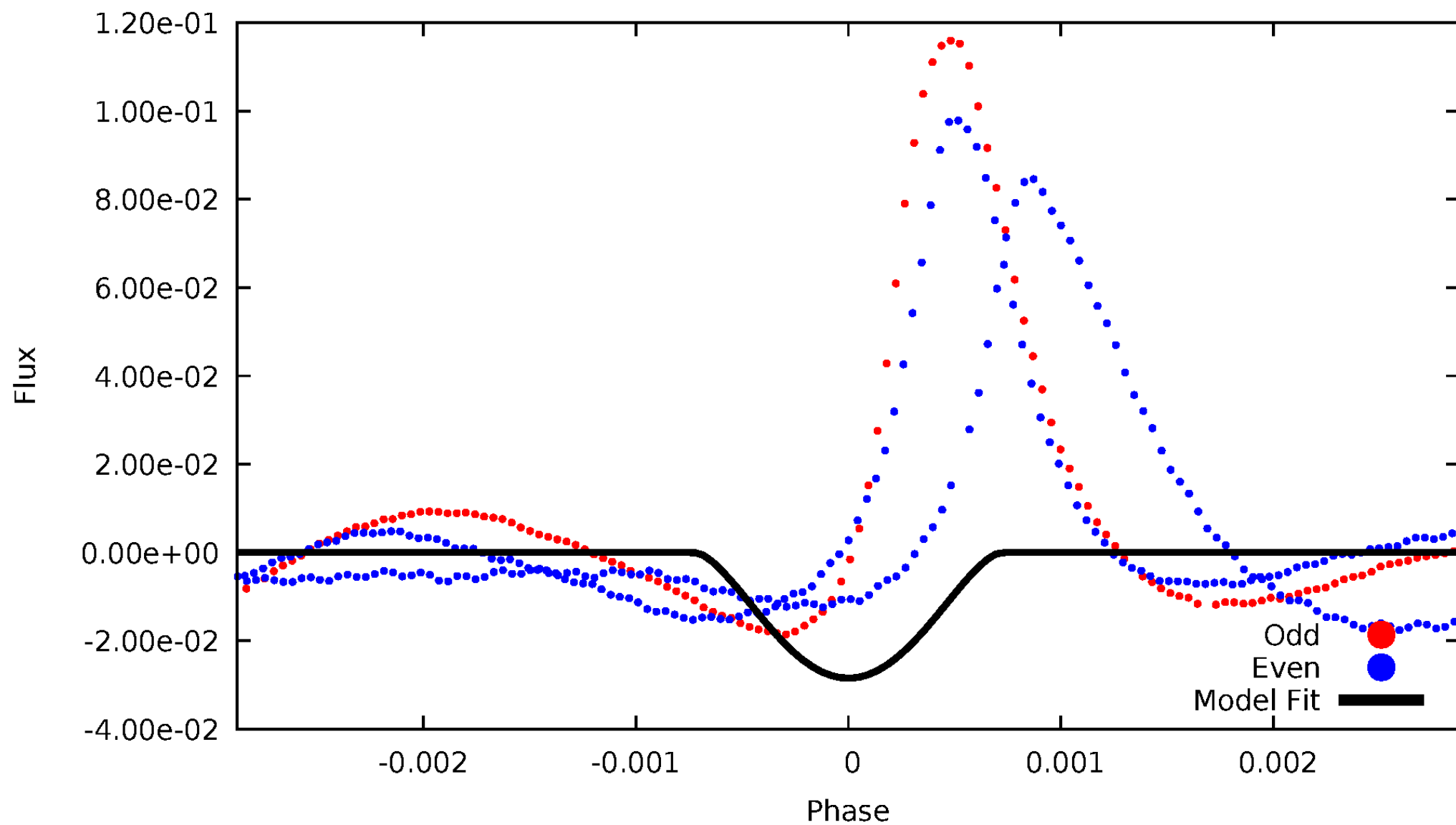


TCE 004454810-01



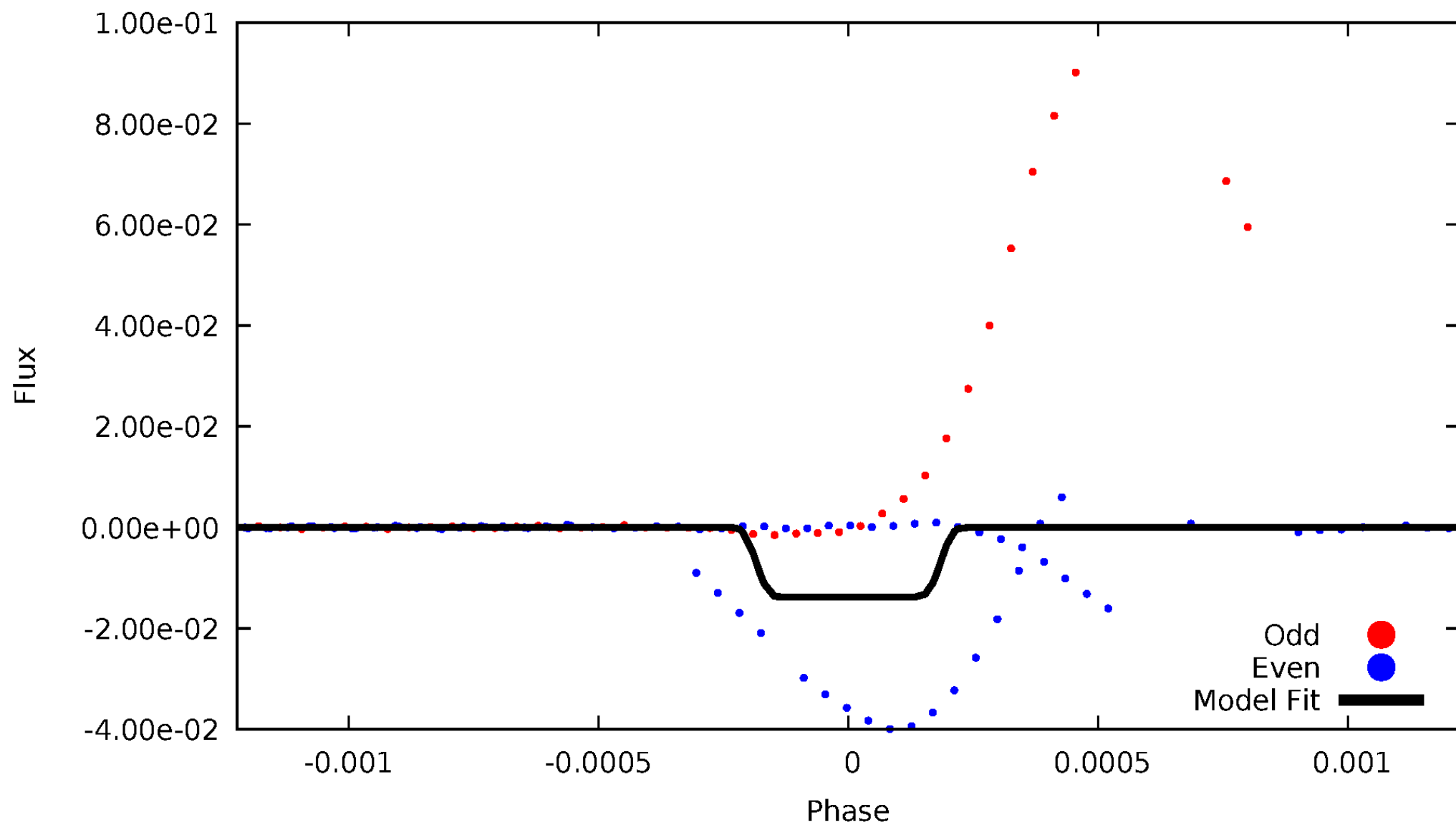
# DV Odd/Even

TCE 004454810-01



# ALT Odd/Even

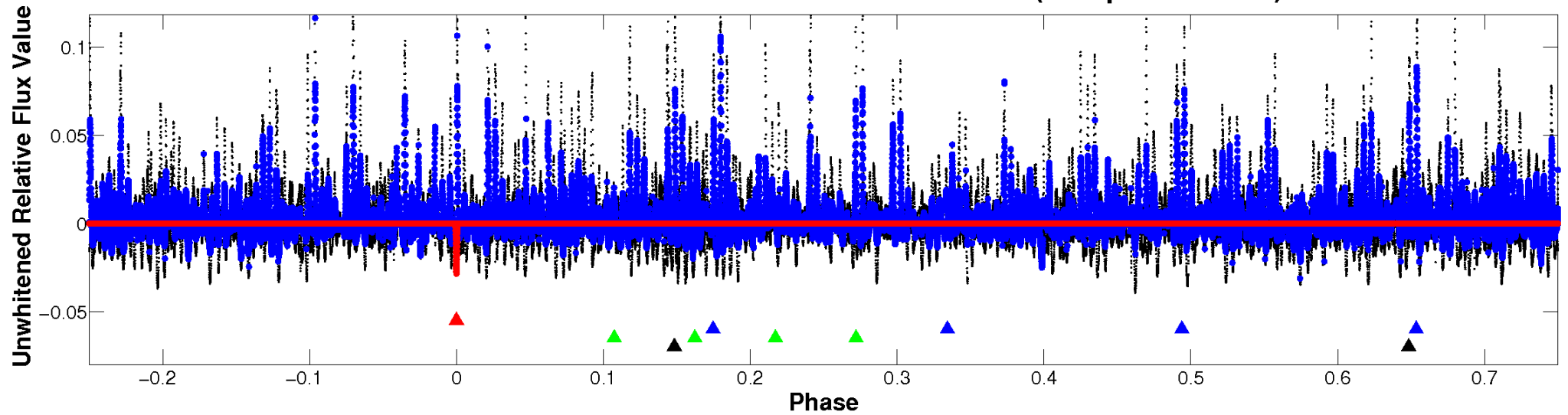
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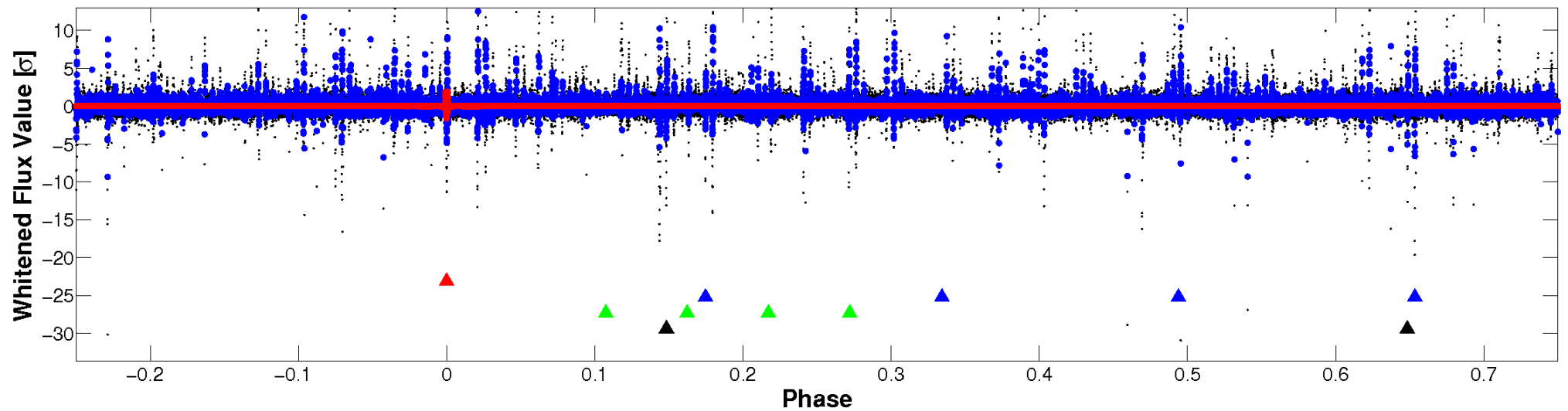


# Non-Whitened Vs. Whitened Light Curve

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

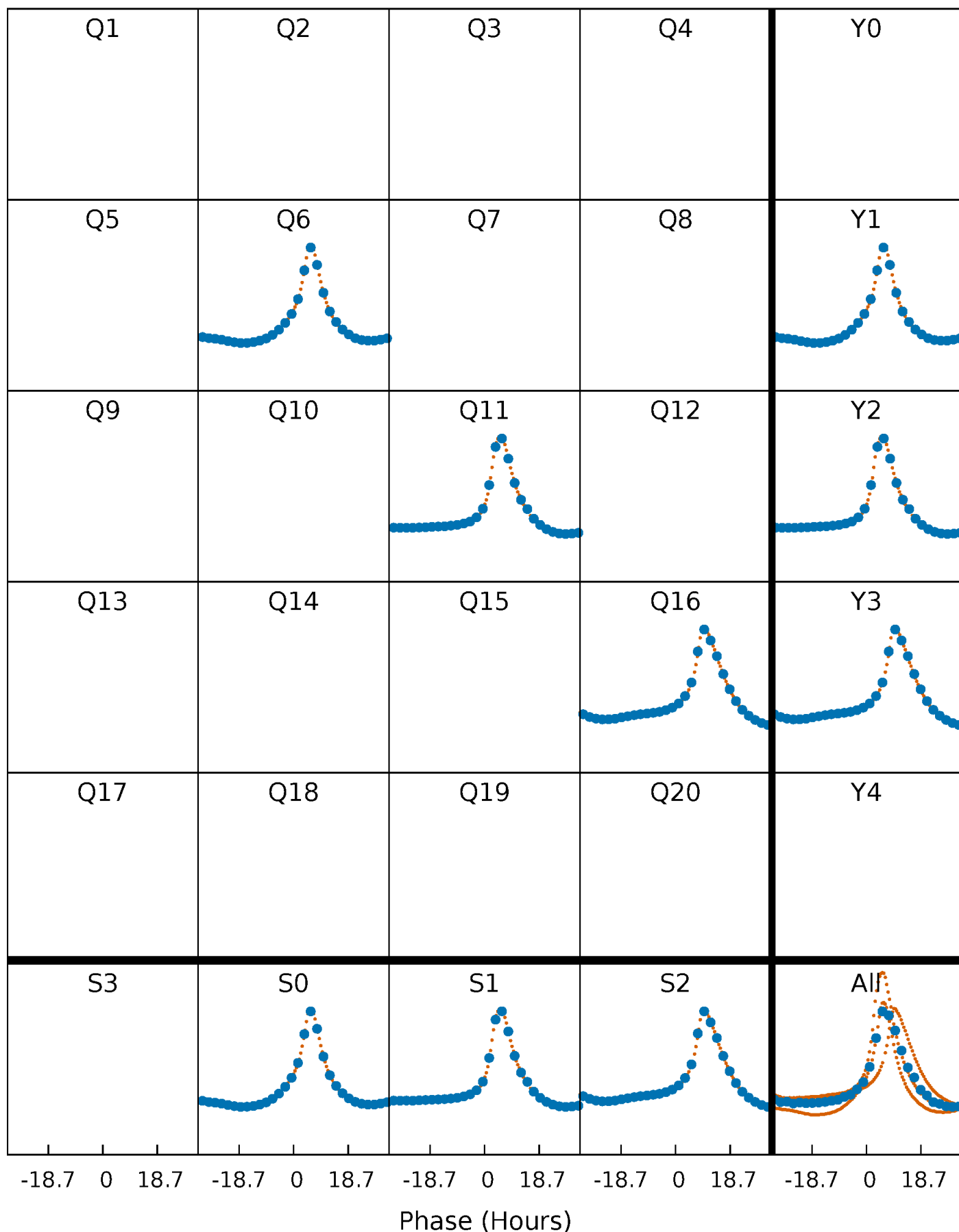


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

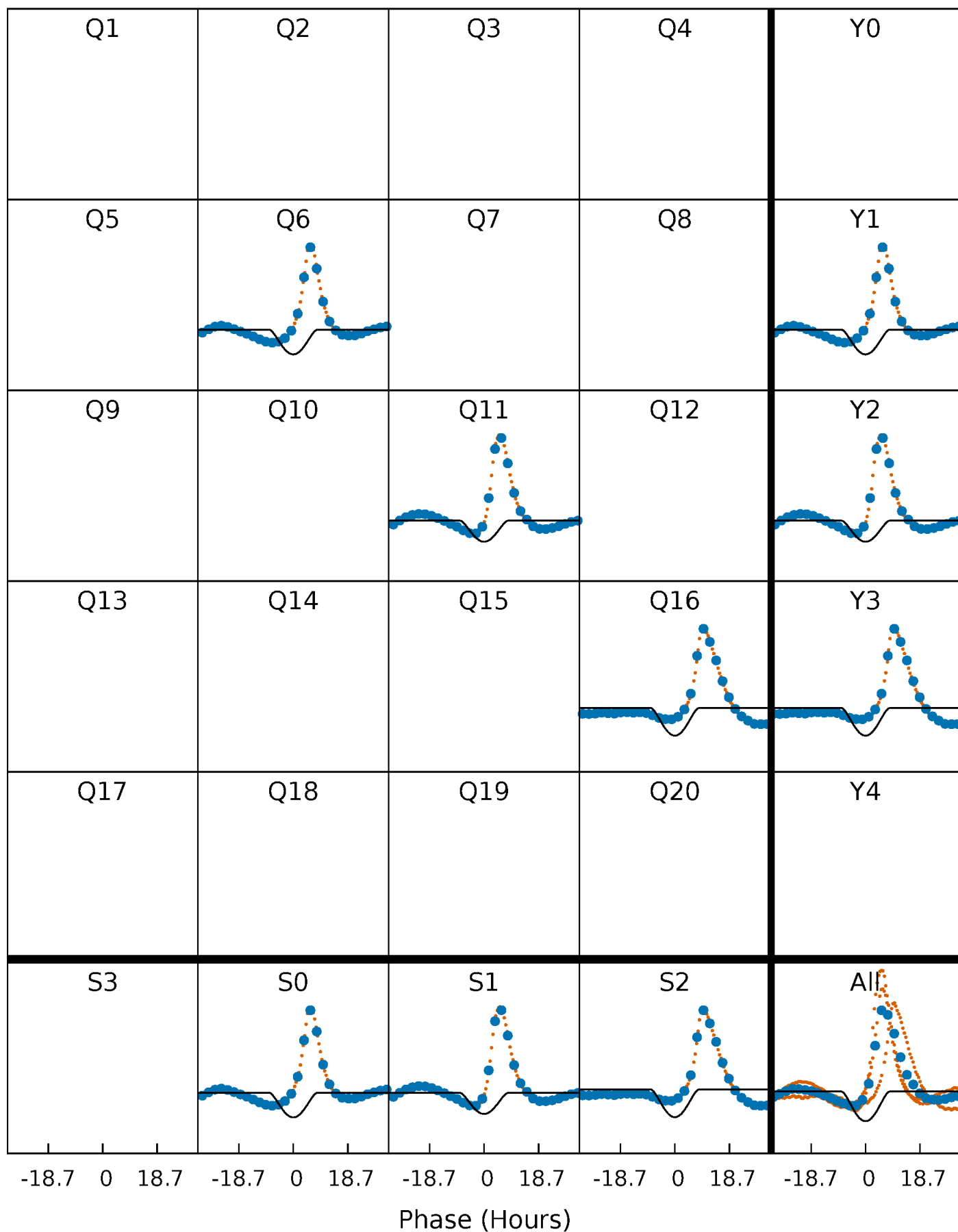
TCE 004454810-01 P=474.974066 Days  $T_0=545.559867$  (BKJD)





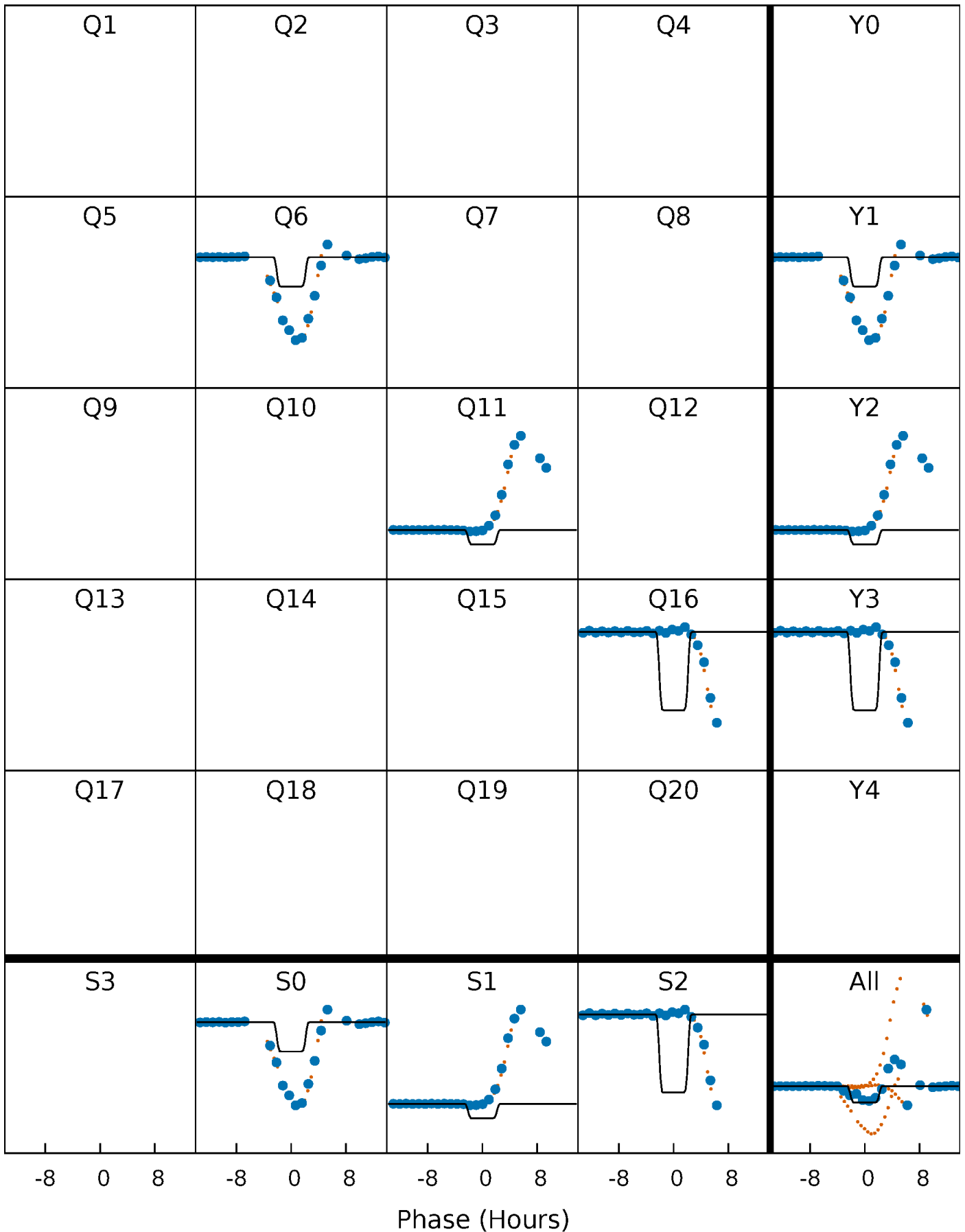
# DV Quarter-Phased Transit Curves

TCE 004454810-01 P=474.974066 Days  $T_0=545.559867$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

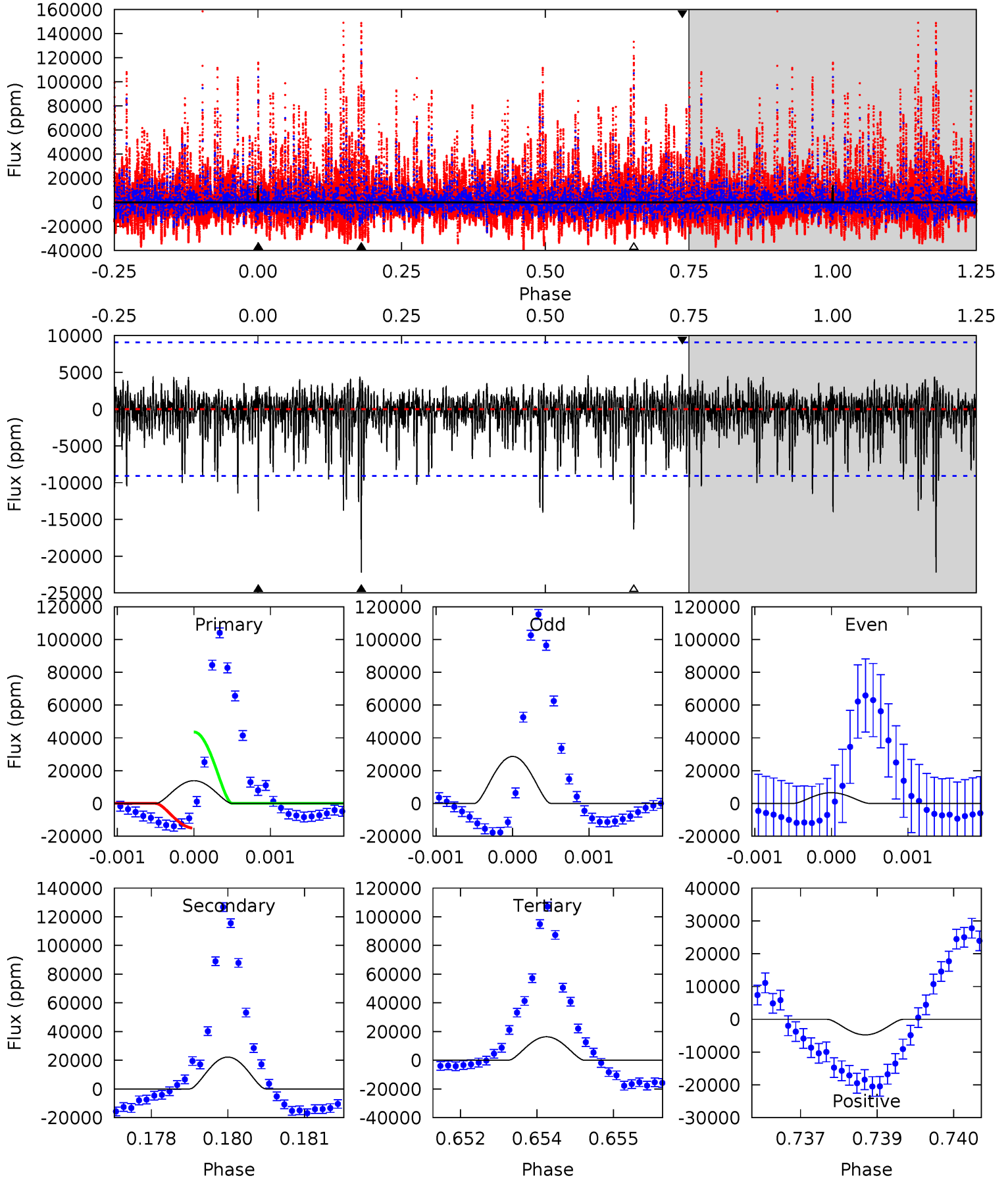
TCE 004454810-01 P=474.903179 Days  $T_0=545.582157$  (BKJD)



# DV Model-Shift Uniqueness Test

004454810-01, P = 474.974066 Days, E = 70.585801 Days

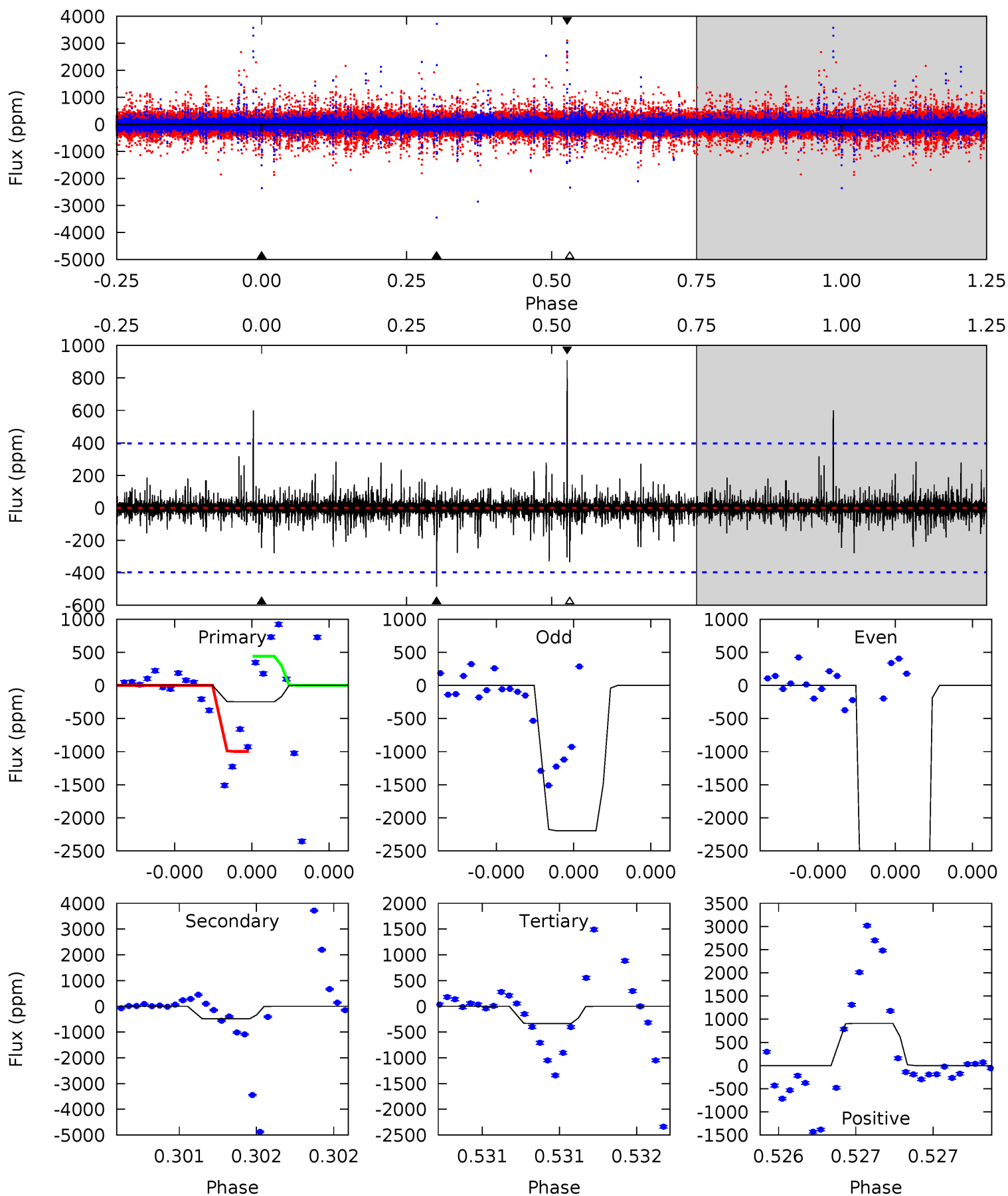
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.23	13.2	9.70	2.83	5.38	3.18	1.49	-1.47	5.40	3.47	10.3	5.77	0.64	0.18	8.45



# Alt Model-Shift Uniqueness Test

004454810-01,  $P = 474.903179$  Days,  $E = 70.678978$  Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.47	6.86	4.71	12.8	5.59	3.50	0.47	-1.24	-9.34	2.15	-5.95	39.1	-42.1	0.65	0



### Stellar Parameters For KIC 004454810

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7100^{+200}_{-300}$	$3.972^{+0.329}_{-0.141}$	$-0.500^{+0.250}_{-0.300}$	$2.010^{+0.505}_{-0.757}$	$1.382^{+0.193}_{-0.289}$	$0.240^{+0.576}_{-0.097}$
	+3%/-4%	+8%/-4%	+50%/-60%	+25%/-38%	+14%/-21%	+240%/-40%
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 004454810-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-22220 \pm 1687$	$62.06^{+48.94}_{-39.54}$	$527^{+41}_{-52}$	$5081^{+3283}_{-1007}$	$5735^{+38000}_{-3945}$
Alt.	$-486 \pm 71$	$43.43^{+49.27}_{-30.16}$	$528^{+42}_{-54}$	$2948^{+1278}_{-499}$	$243^{+2465}_{-188}$

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

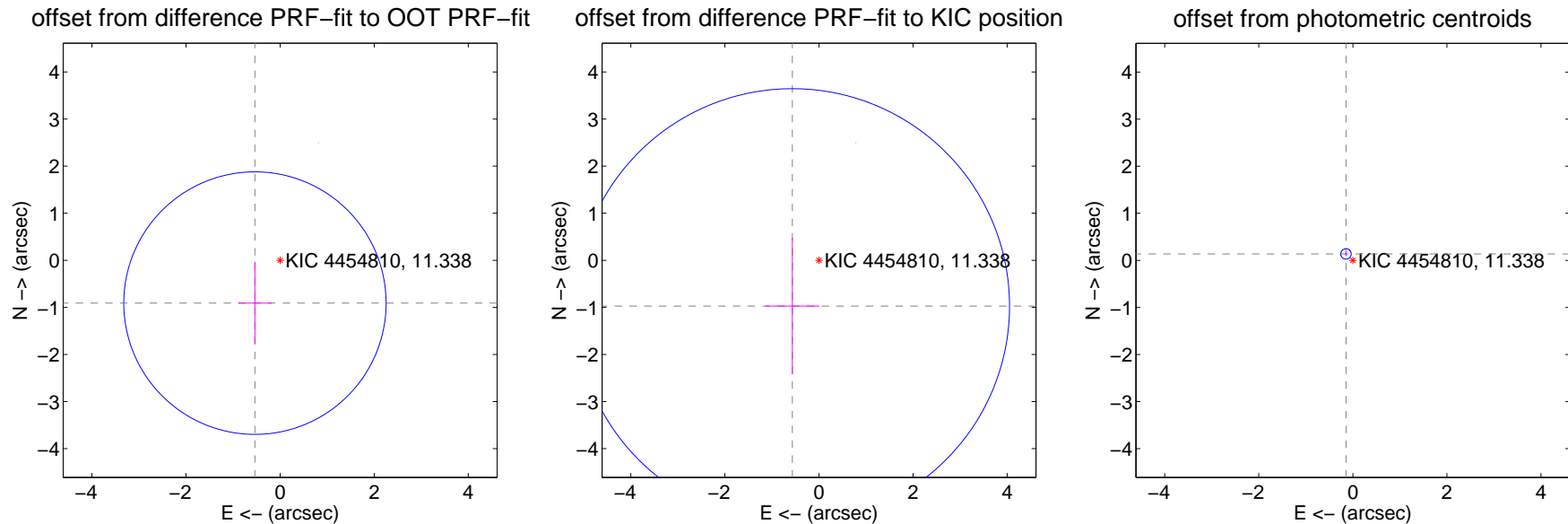
## DV Centroid Data

Supplemental centroid analysis for 004454810-01. **Kepler magnitude: 11.34.** Transit SNR 10.40

**There are 1 quarters with good PRF difference image offsets**

The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.056 \pm 0.930$	1.14	$0.535 \pm 0.355$	$-0.910 \pm 0.873$
PRF-fit source offset from KIC position	$1.126 \pm 1.539$	0.73	$0.567 \pm 0.574$	$-0.973 \pm 1.449$
photometric centroid source offset	<b><math>0.20 \pm 0.04</math></b>	<b>5.41</b>	$0.15 \pm 0.02$	$0.14 \pm 0.05$



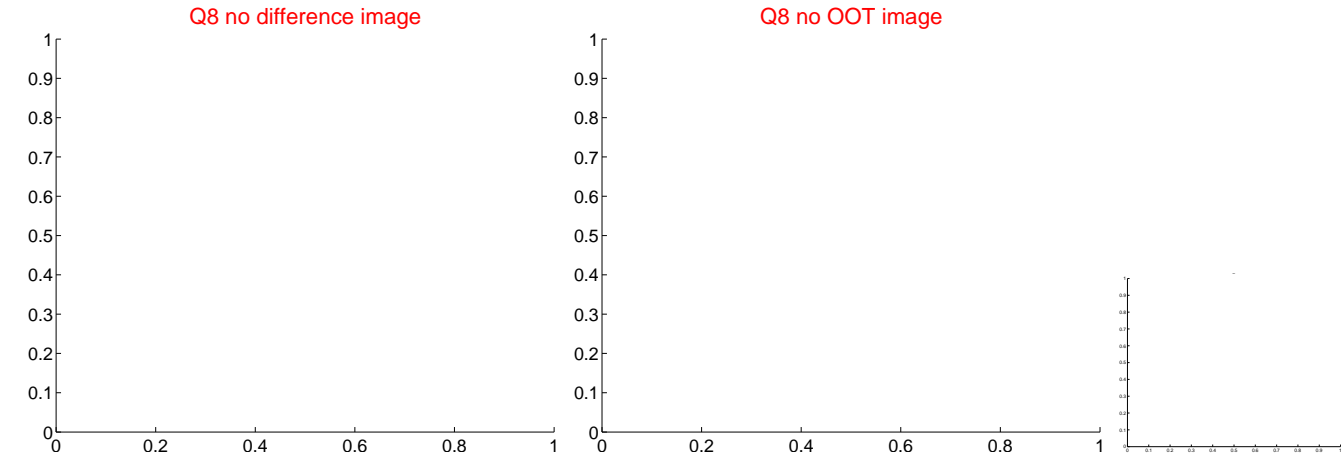
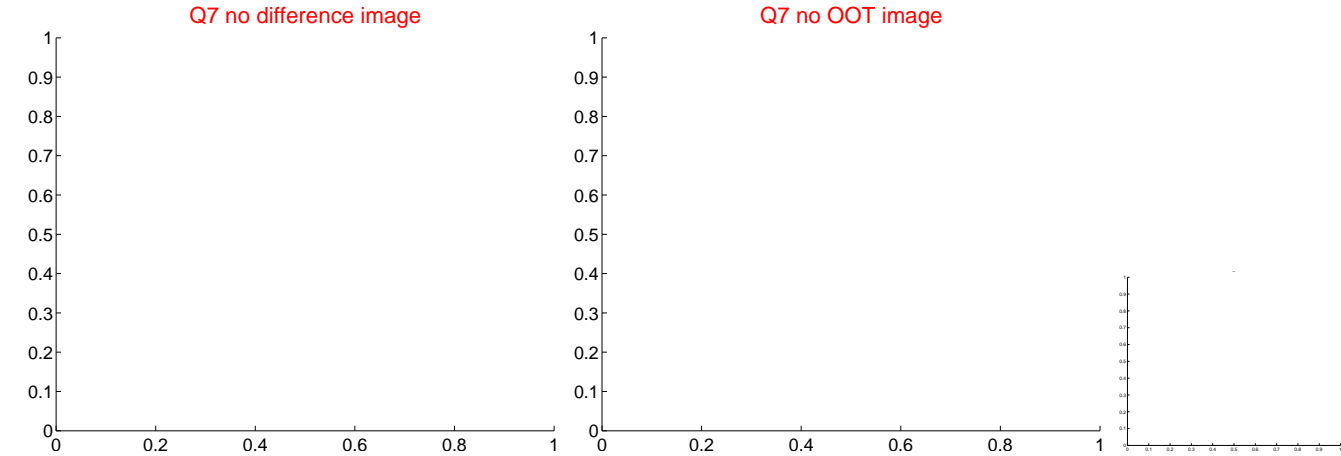
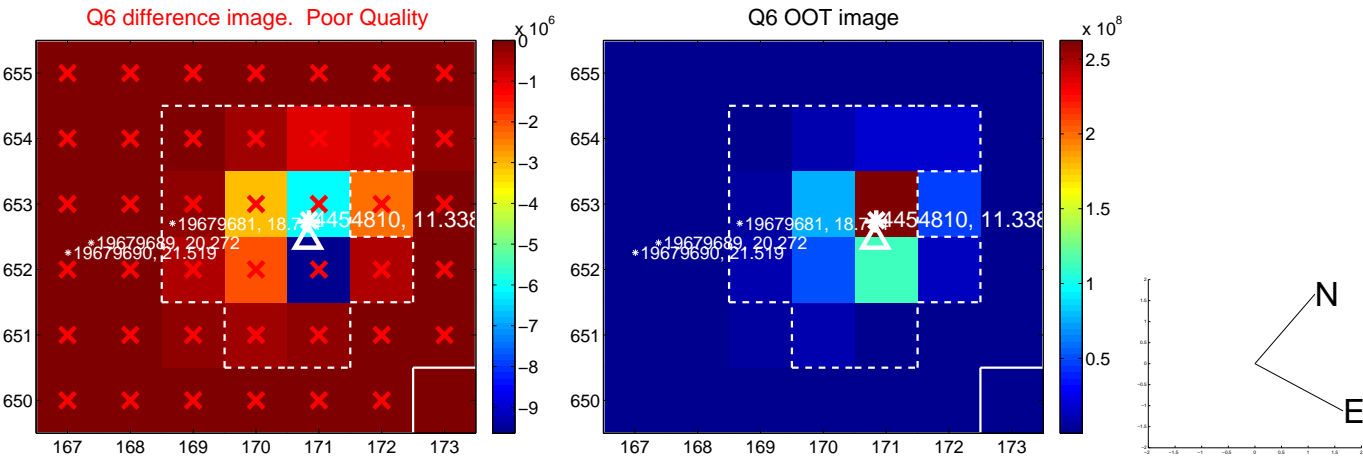
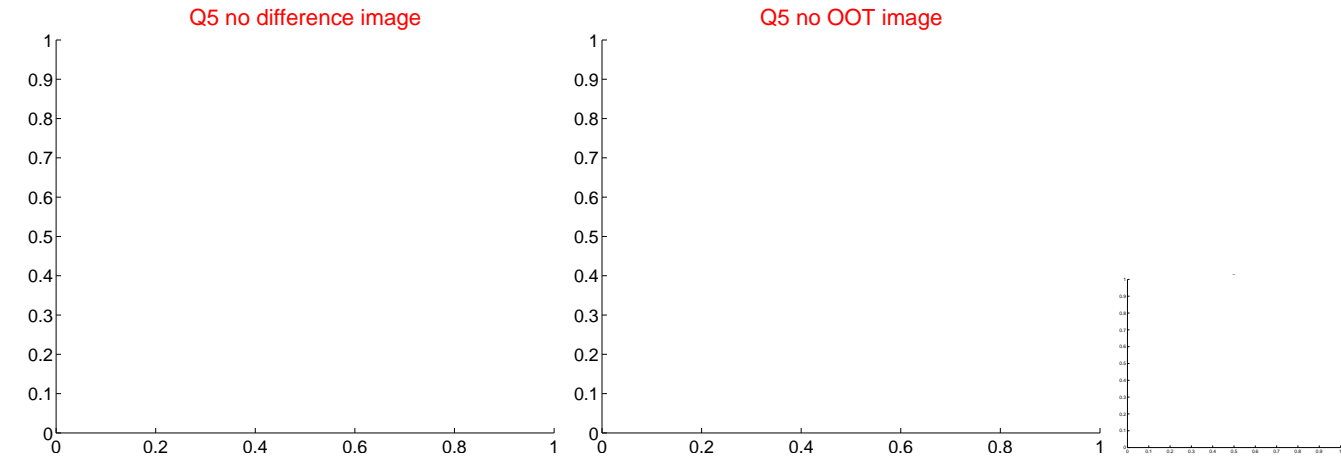
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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





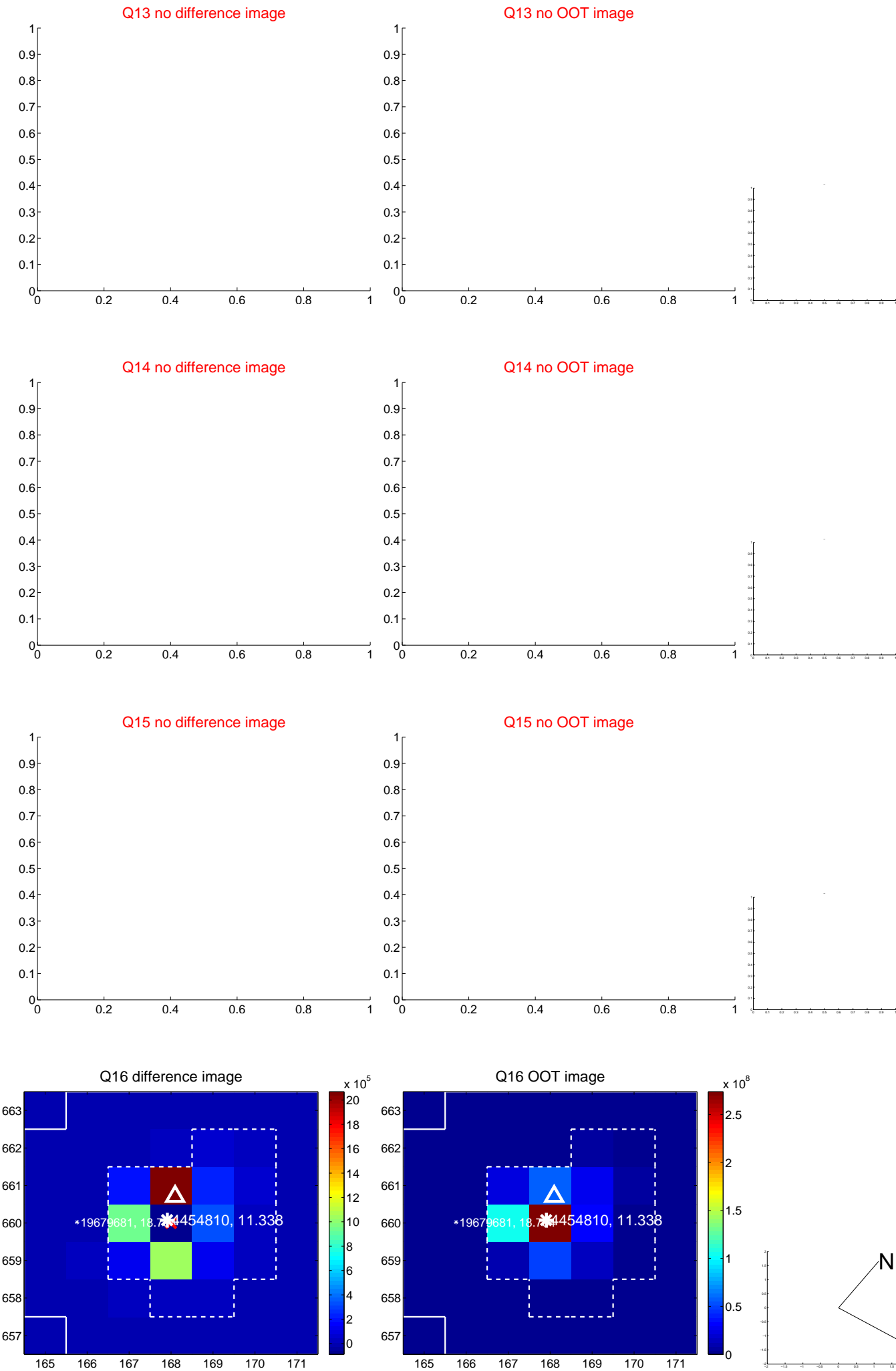
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



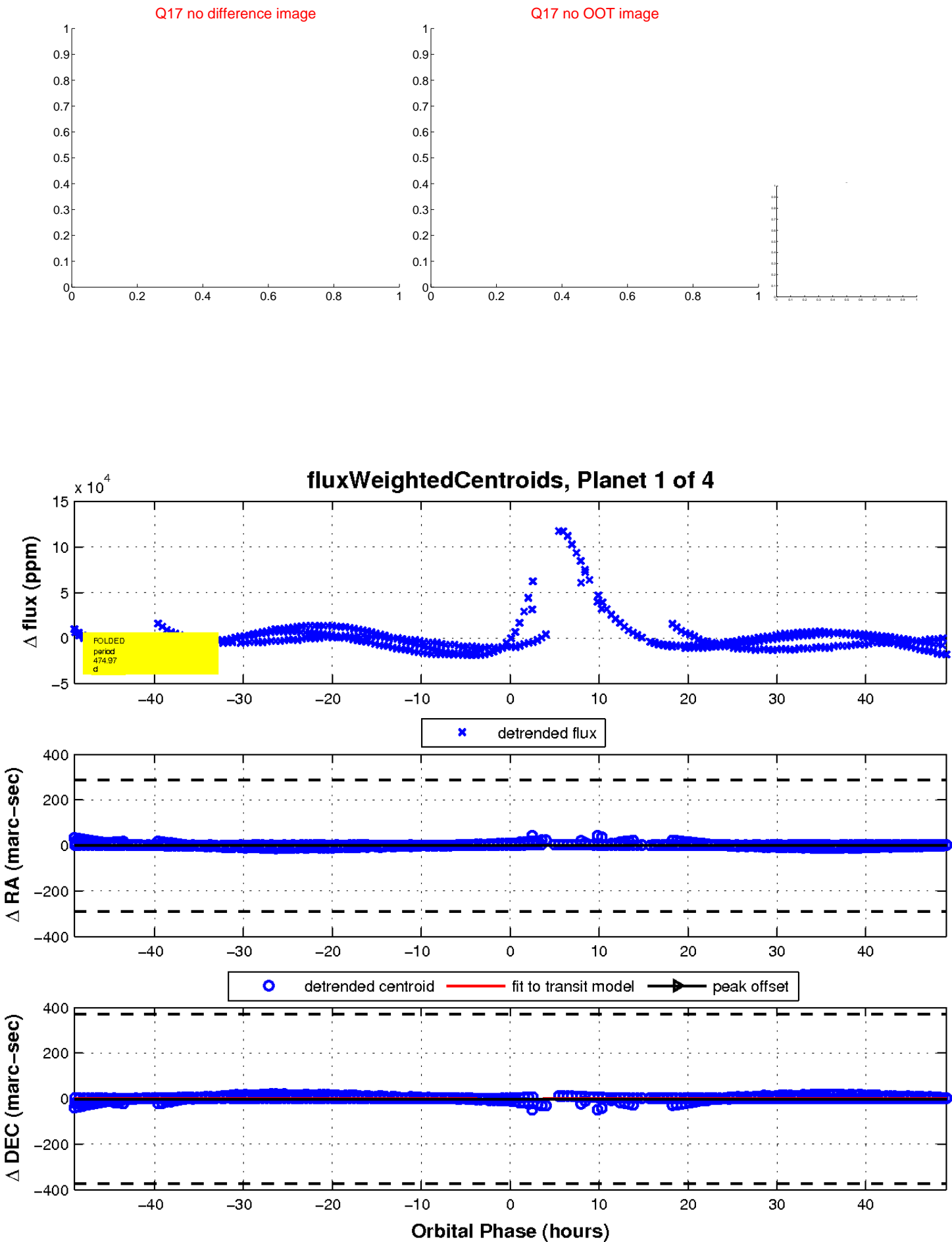
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

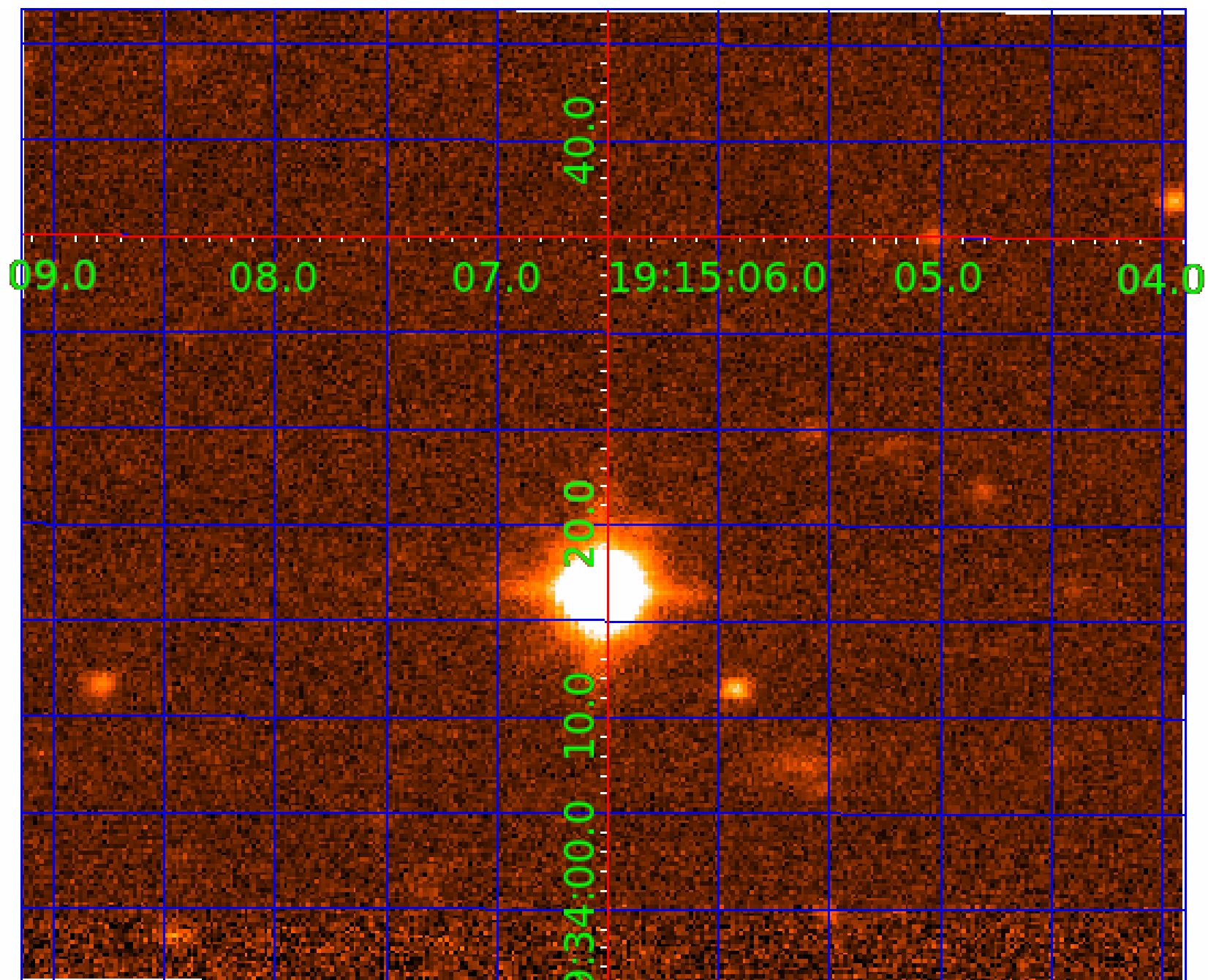


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 004454810

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004454810-01	OBS	No	474.974066	545.559867	28444.2	16.380	58.0	10.4	2.01	7100	57.89	5.22
004454810-02	OBS	No	399.175319	380.970999	5546.6	7.708	41.6	9.3	2.01	7100	17.45	6.58
004454810-04	OBS	No	712.518237	141.002382	577.0	6.000	37.5	-1.0	2.01	7100	4.89	3.04

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004454810-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
004454810-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED—HALO_GHOST
004454810-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_SATURATED

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

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

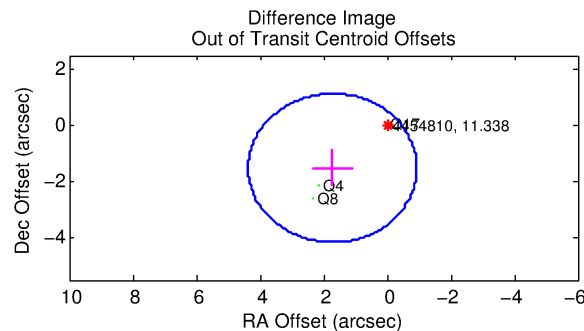
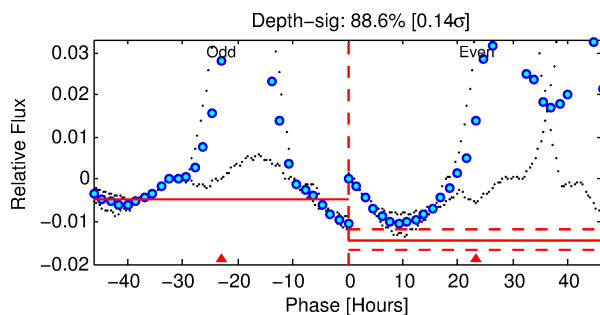
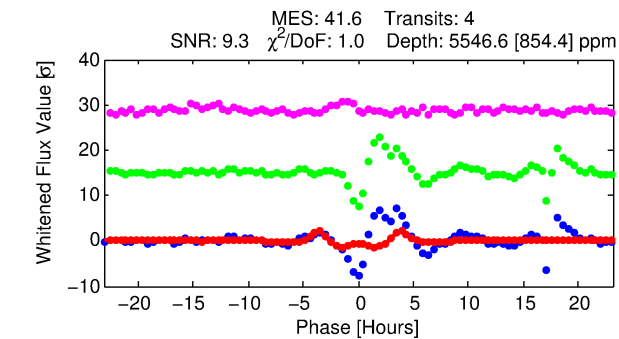
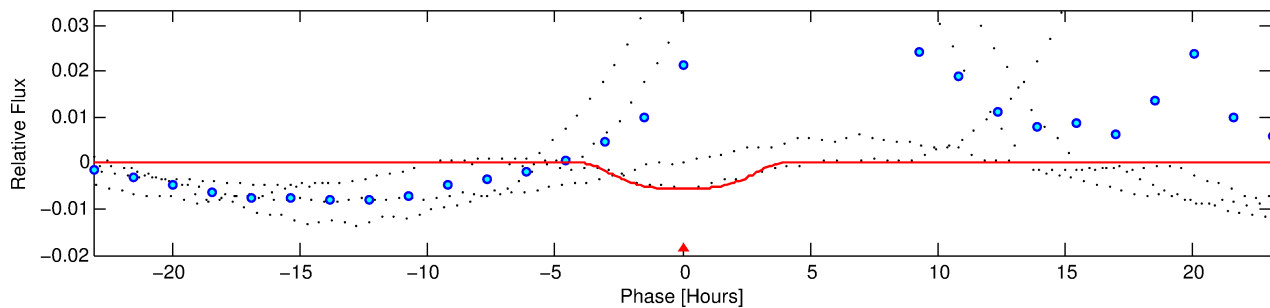
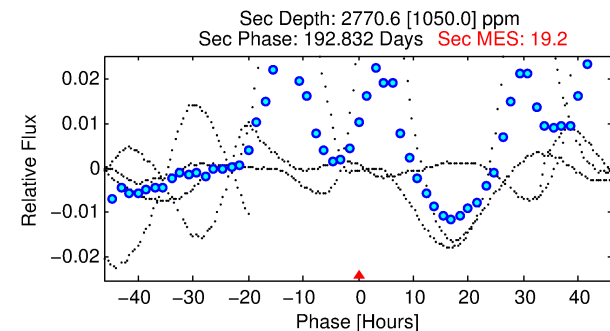
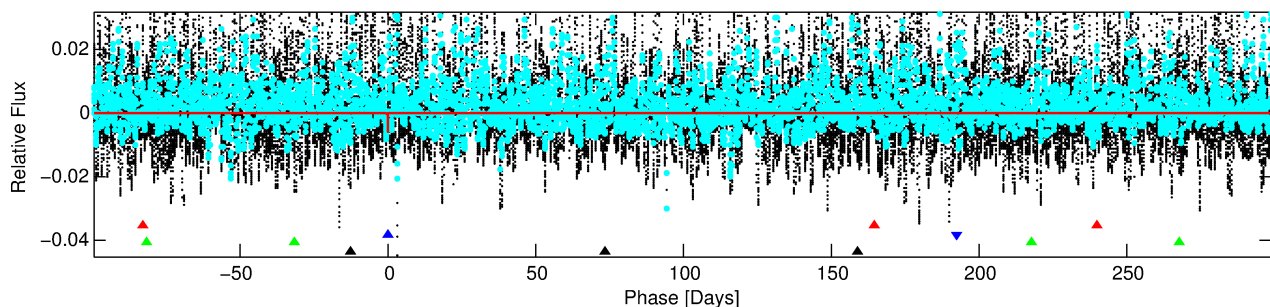
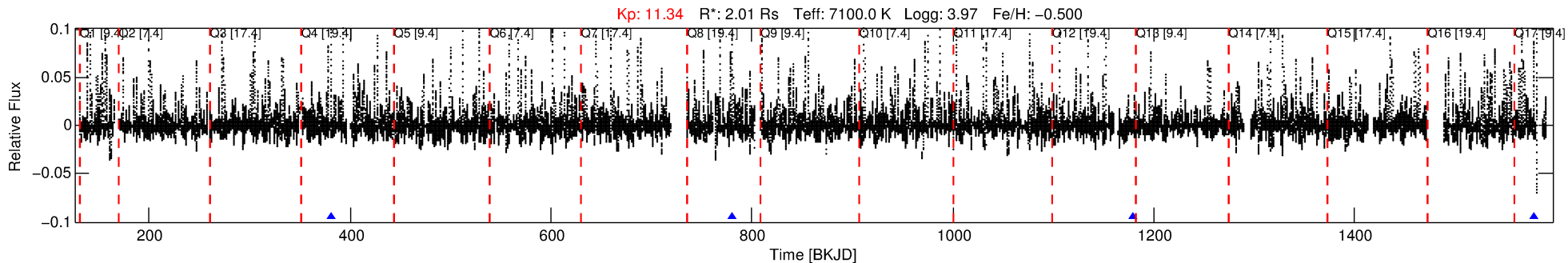
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 004454810-02

No Significant Match Found

# DV One-Page Summary

KIC: 4454810 Candidate: 2 of 4 Period: 399.175 d



## DV Fit Results:

Period = 399.17532 [0.00349] d  
Epoch = 380.9710 [0.0045] BKJD  
Rp/R\* = 0.0796 [0.0063]  
a/R\* = 237.07 [11.42]  
b = 0.90 [0.01]  
Seff = 6.58 [3.88]  
Teq = 408 [60] K  
Rp = 17.45 [6.72] Re  
a = 1.1820 [0.4209] AU  
Ag = 6991.01 [4878.88] [1.43σ]  
Teffp = 5775 [642] K [8.33σ]

## DV Diagnostic Results:

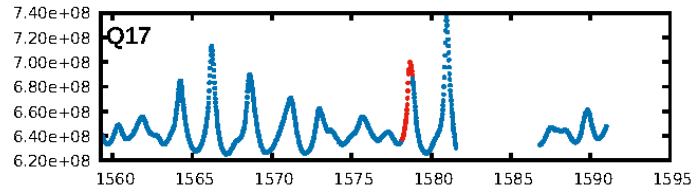
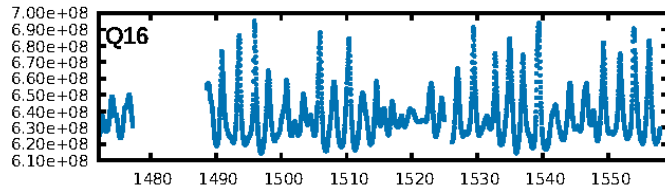
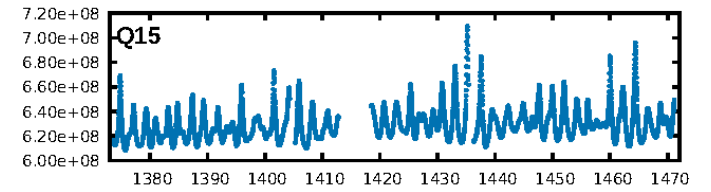
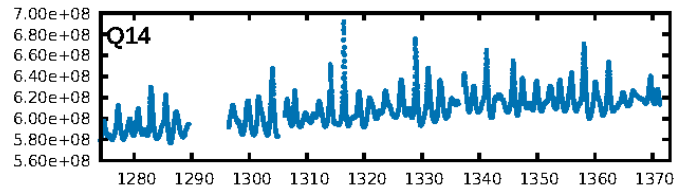
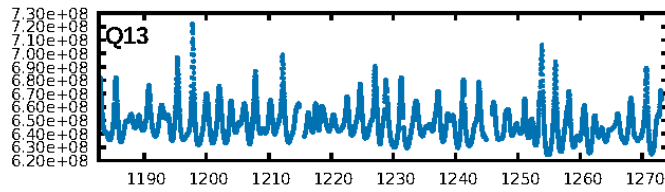
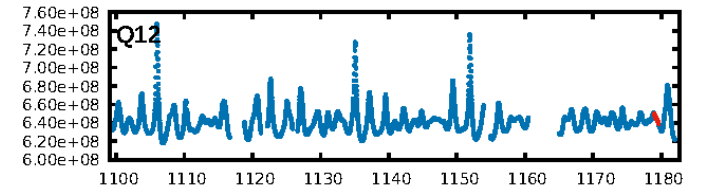
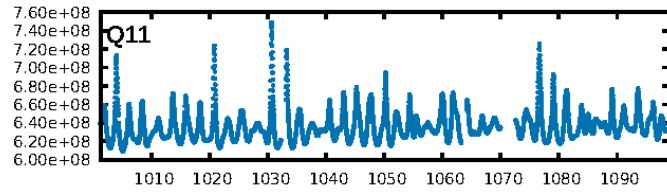
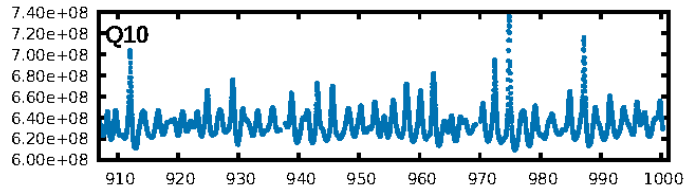
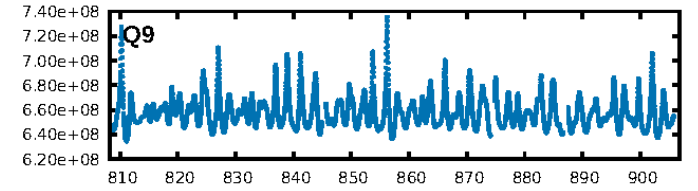
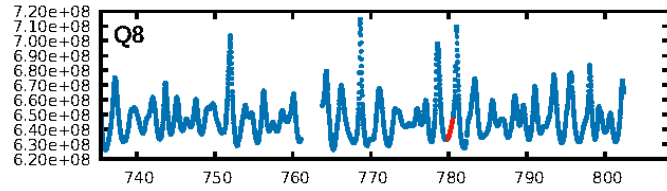
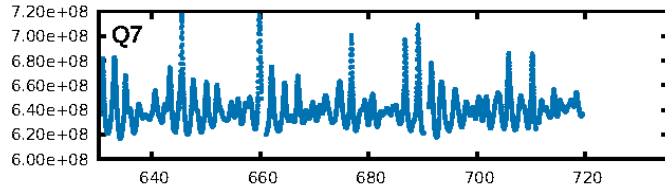
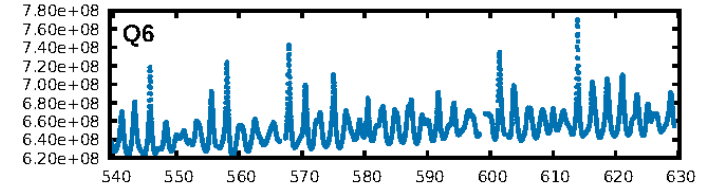
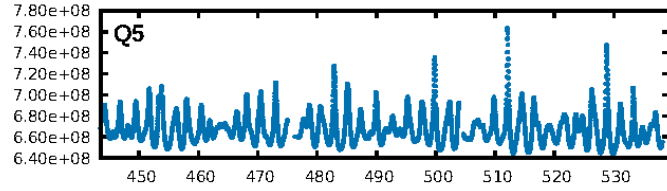
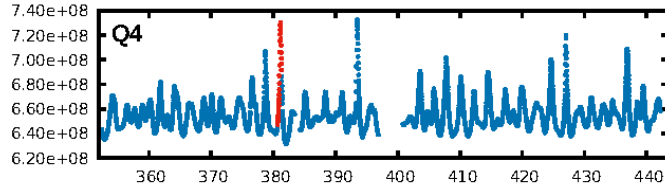
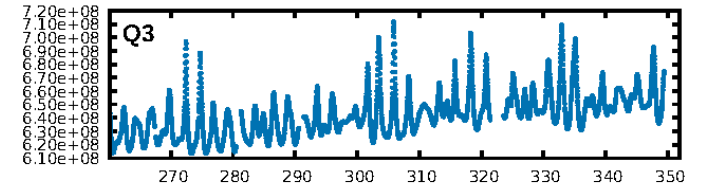
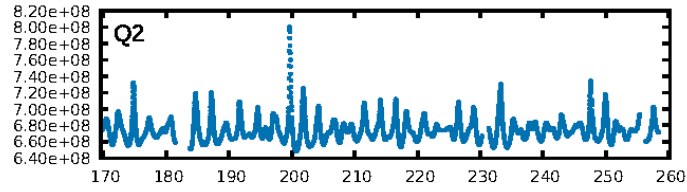
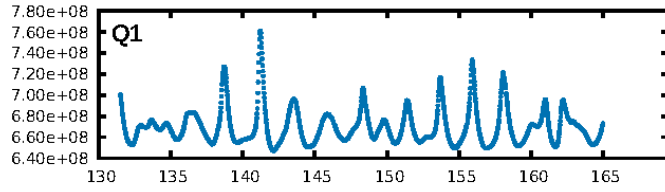
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [103.42σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 99.8%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -0.1687  
Centroid-sig: 1.1%  
Centroid-so: 0.387 arcsec [3.30σ]  
OotOffset-rm: 2.292 arcsec [2.60σ]  
KicOffset-rm: 2.205 arcsec [3.32σ]  
OotOffset-st: 0/0/2/1 [3]  
KicOffset-st: 0/0/2/1 [3]  
DiffImageQuality-fgm: 0.33 [1/3]  
DiffImageOverlap-fno: 1.00 [3/3]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:39:15 Z

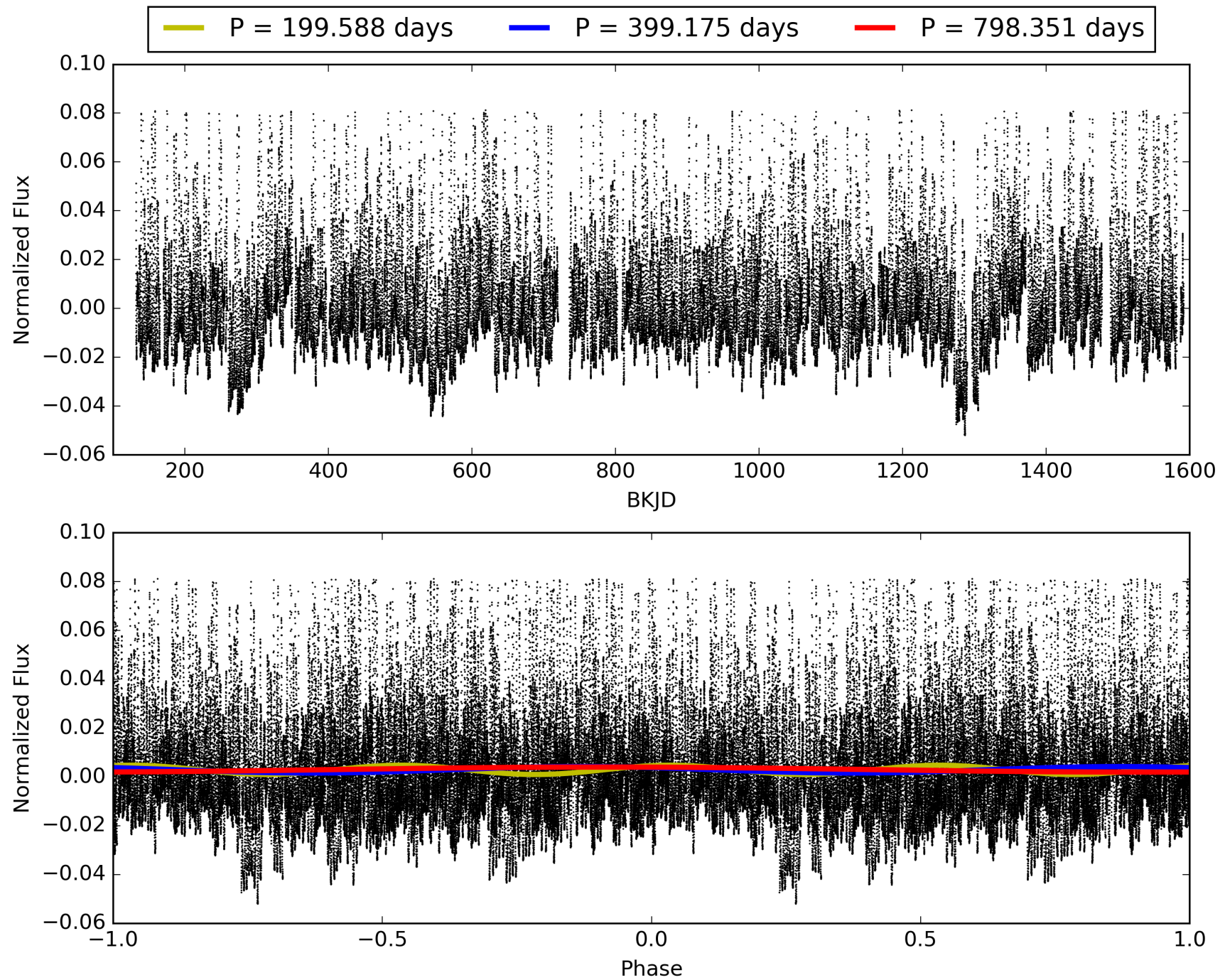
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 004454810-02, PDC Light Curves

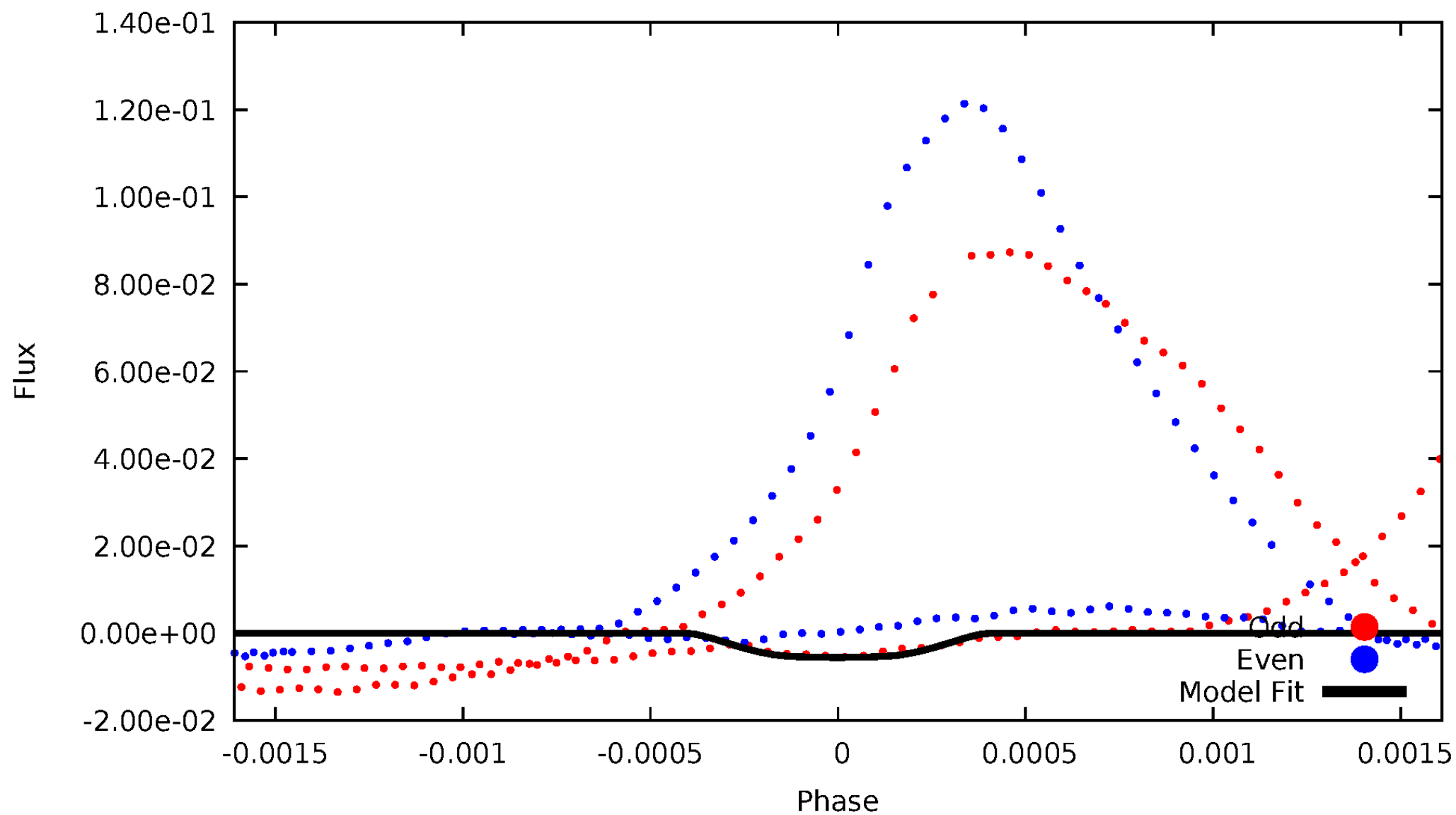


TCE 004454810-02



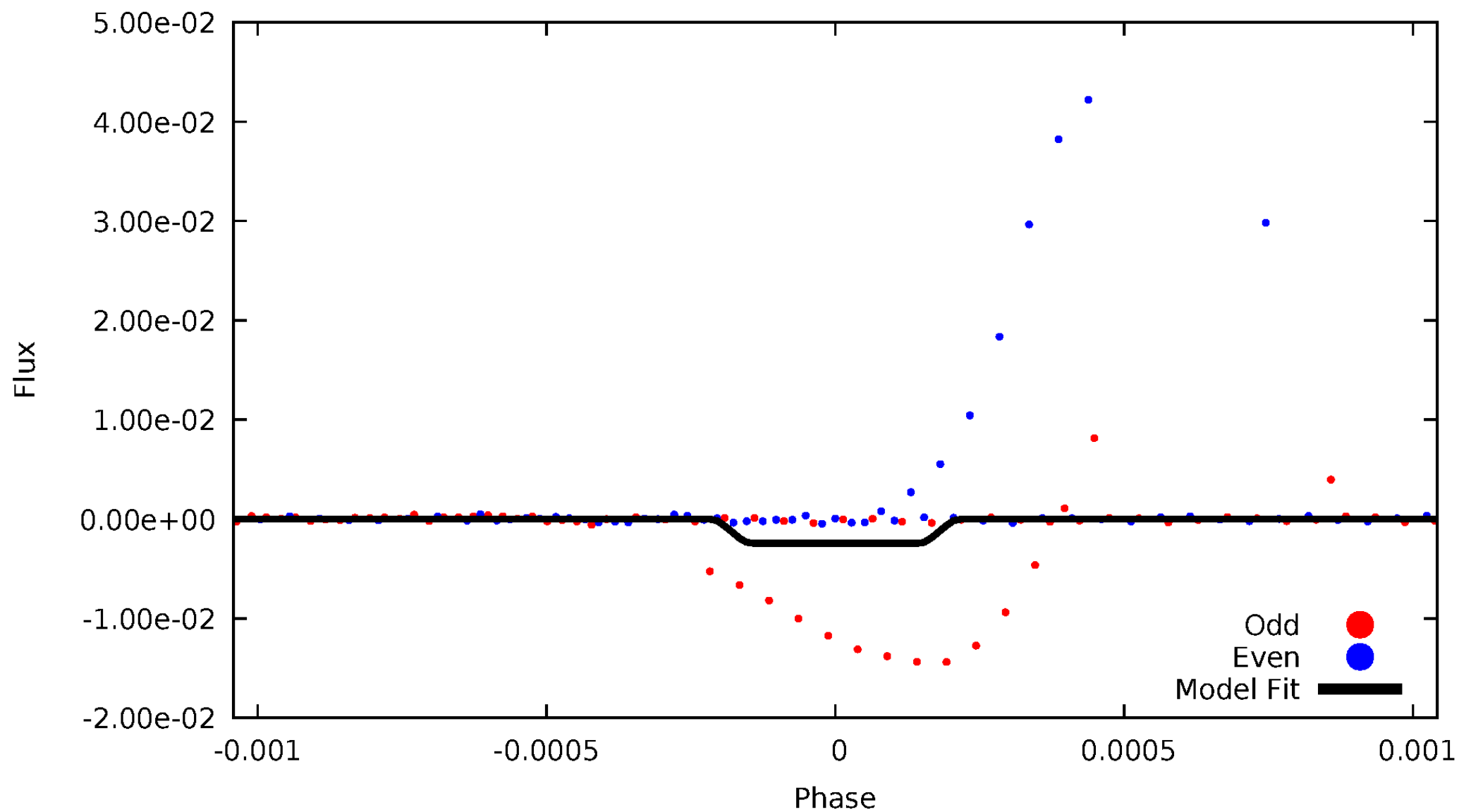
# DV Odd/Even

TCE 004454810-02



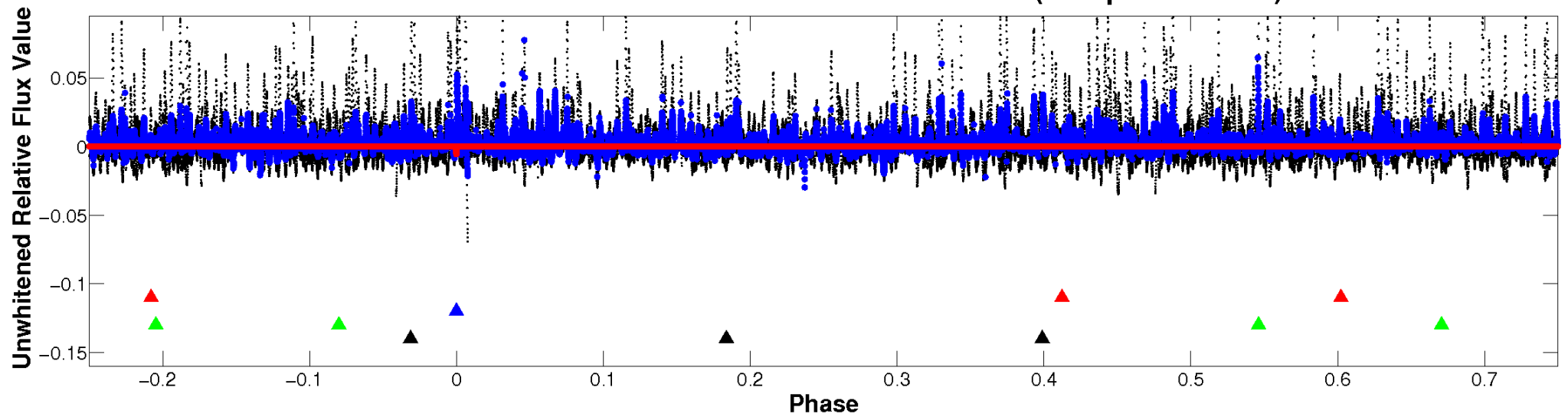
# ALT Odd/Even

TCE 004454810-02

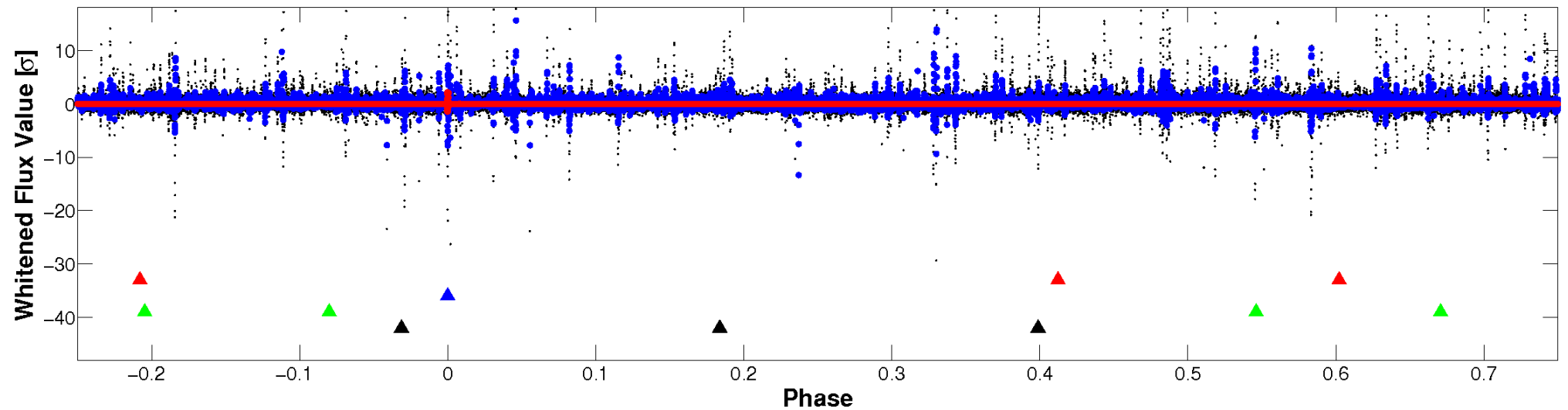


# Non-Whitened Vs. Whitened Light Curve

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

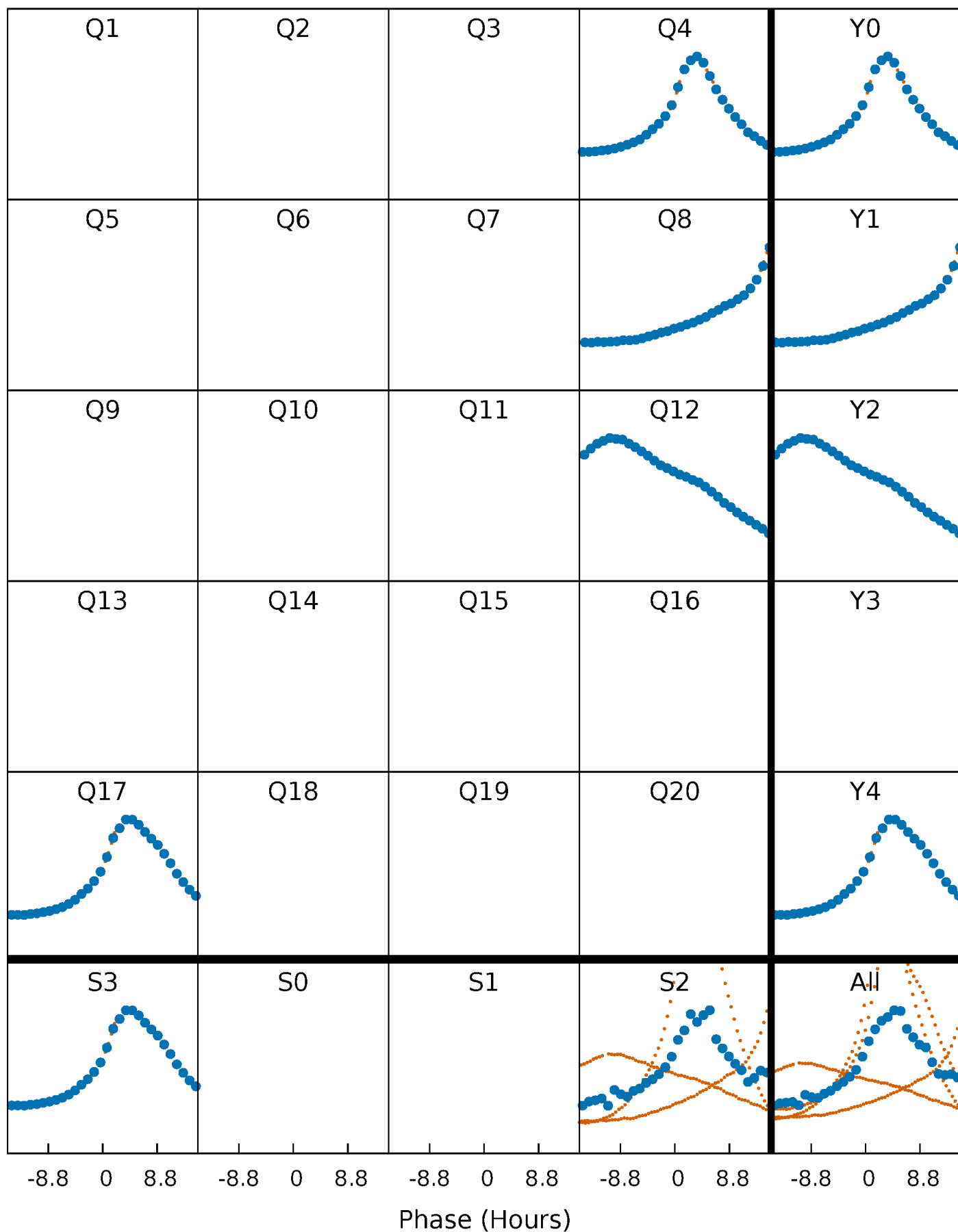


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



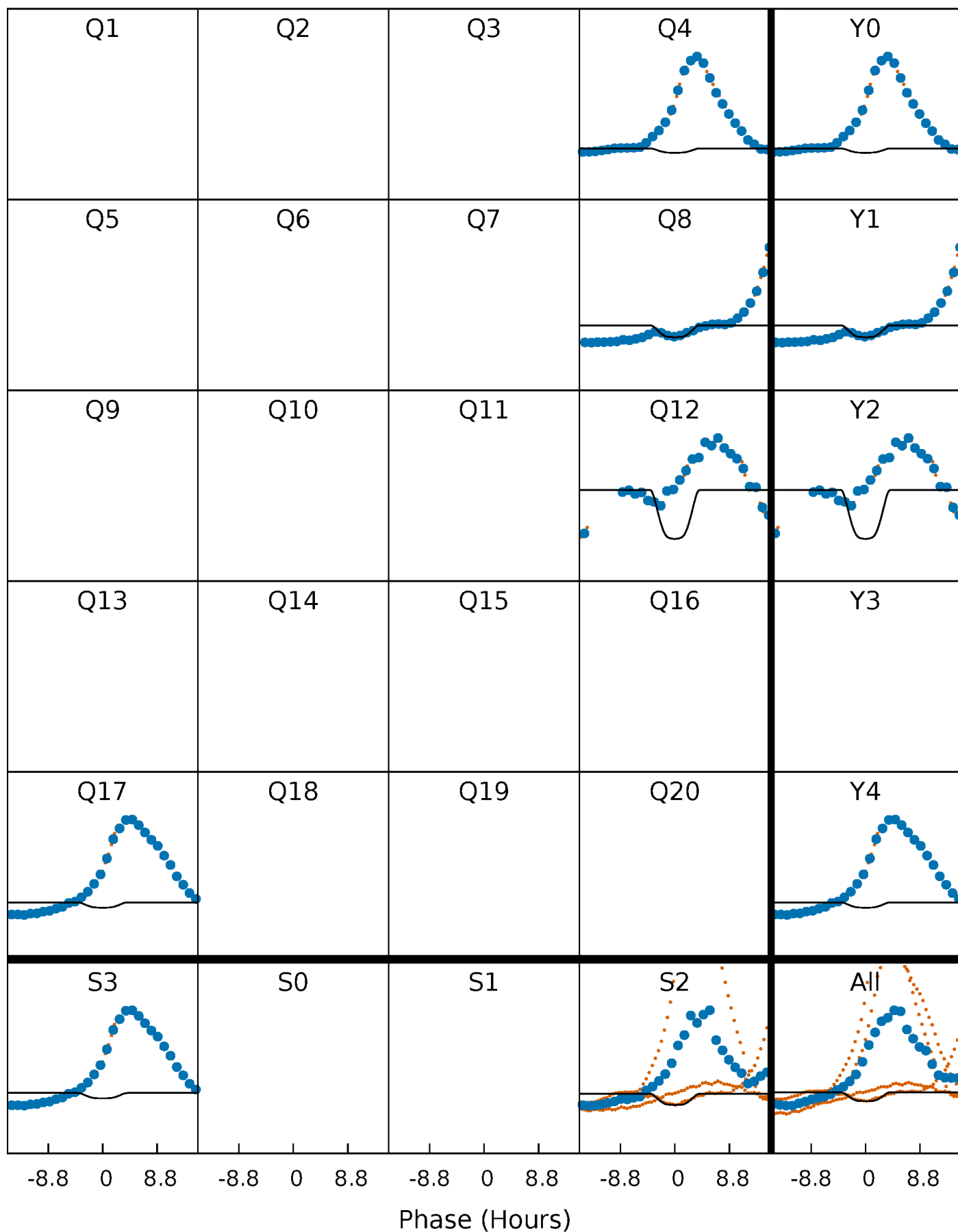
# PDC Quarter-Phased Transit Curves

TCE 004454810-02 P=399.175319 Days  $T_0=380.970999$  (BKJD)



# DV Quarter-Phased Transit Curves

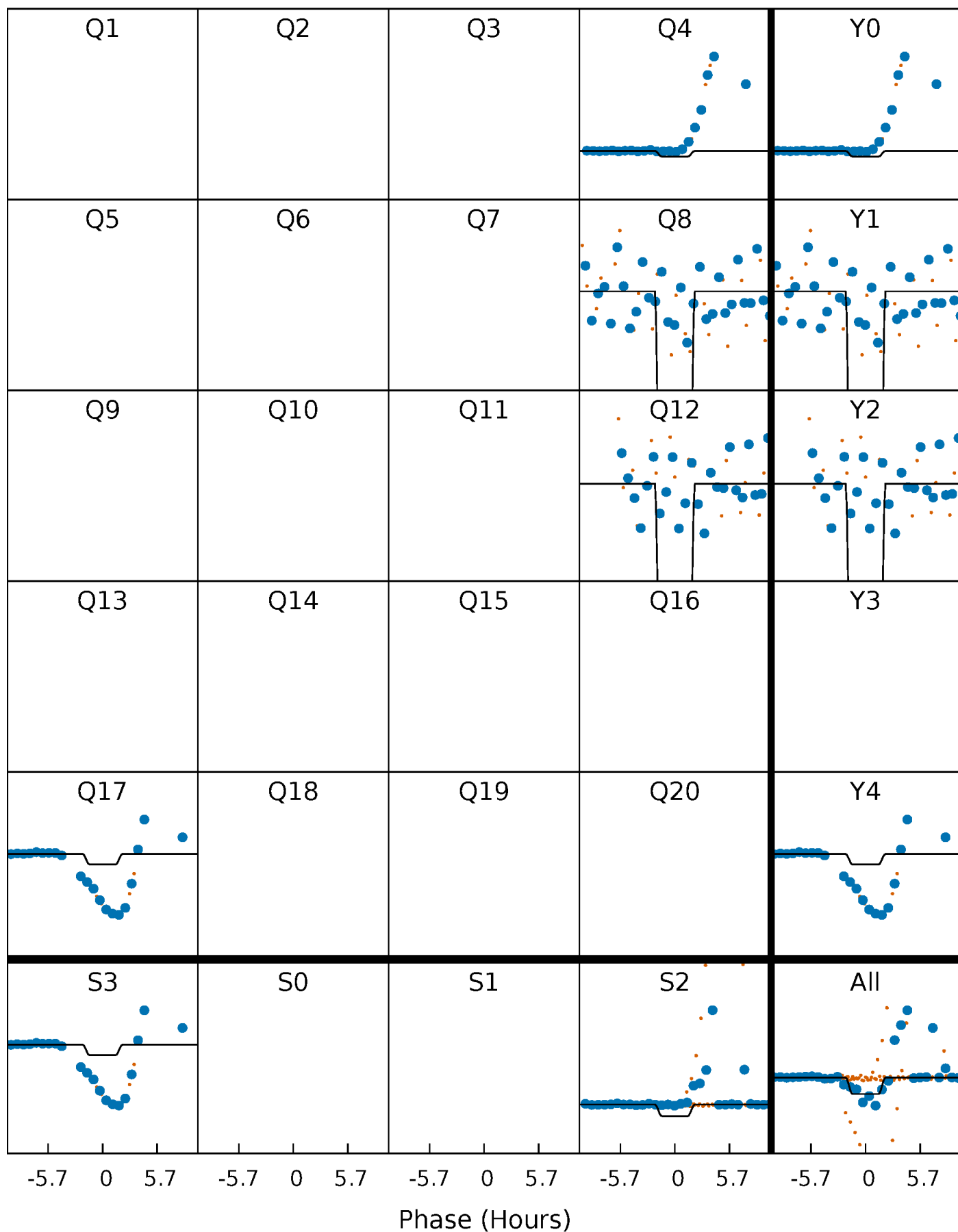
TCE 004454810-02     $P=399.175319$  Days     $T_0=380.970999$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

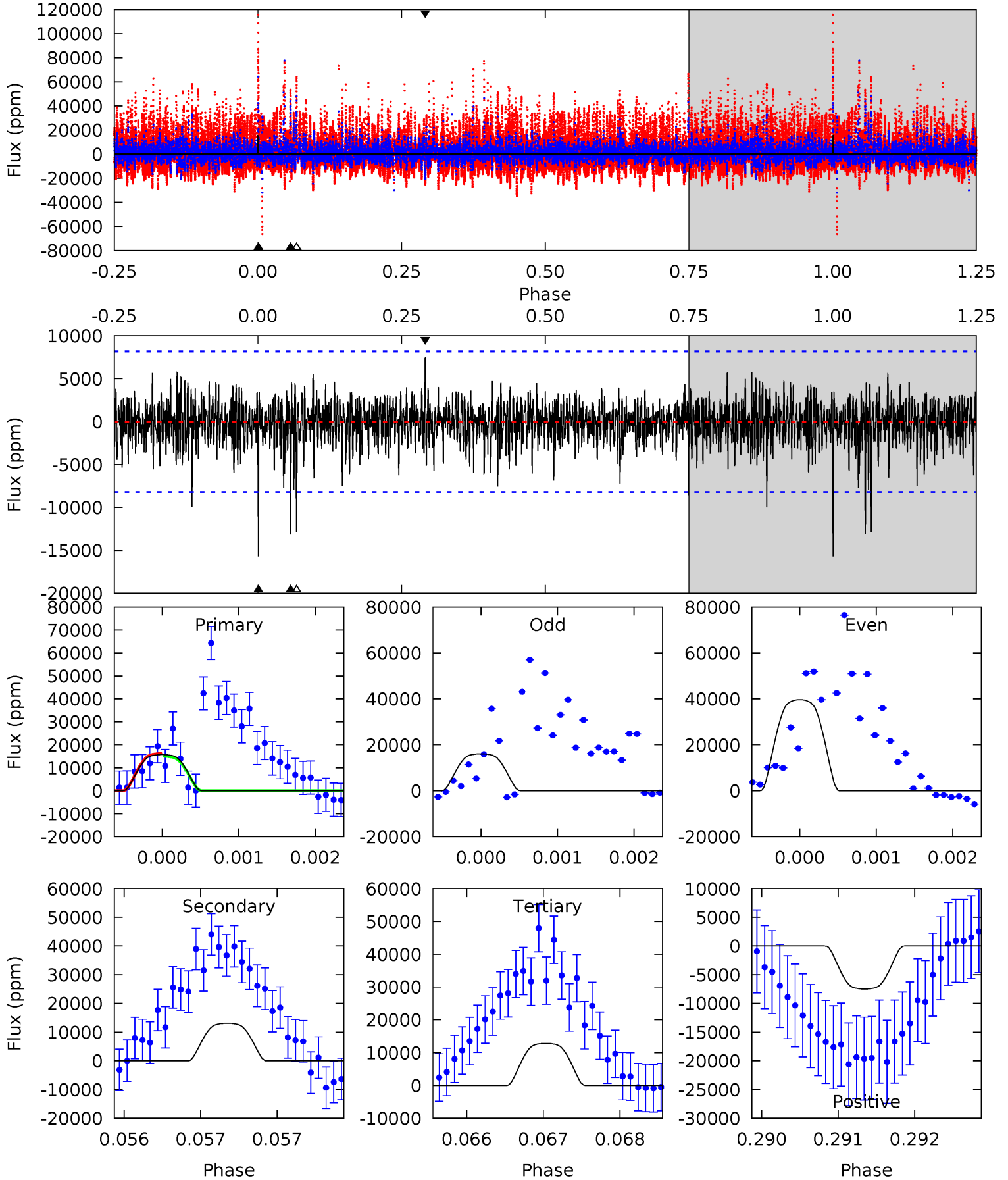
TCE 004454810-02 P=399.176406 Days  $T_0=380.869299$  (BKJD)



# DV Model-Shift Uniqueness Test

004454810-02, P = 399.175319 Days, E = 380.970999 Days

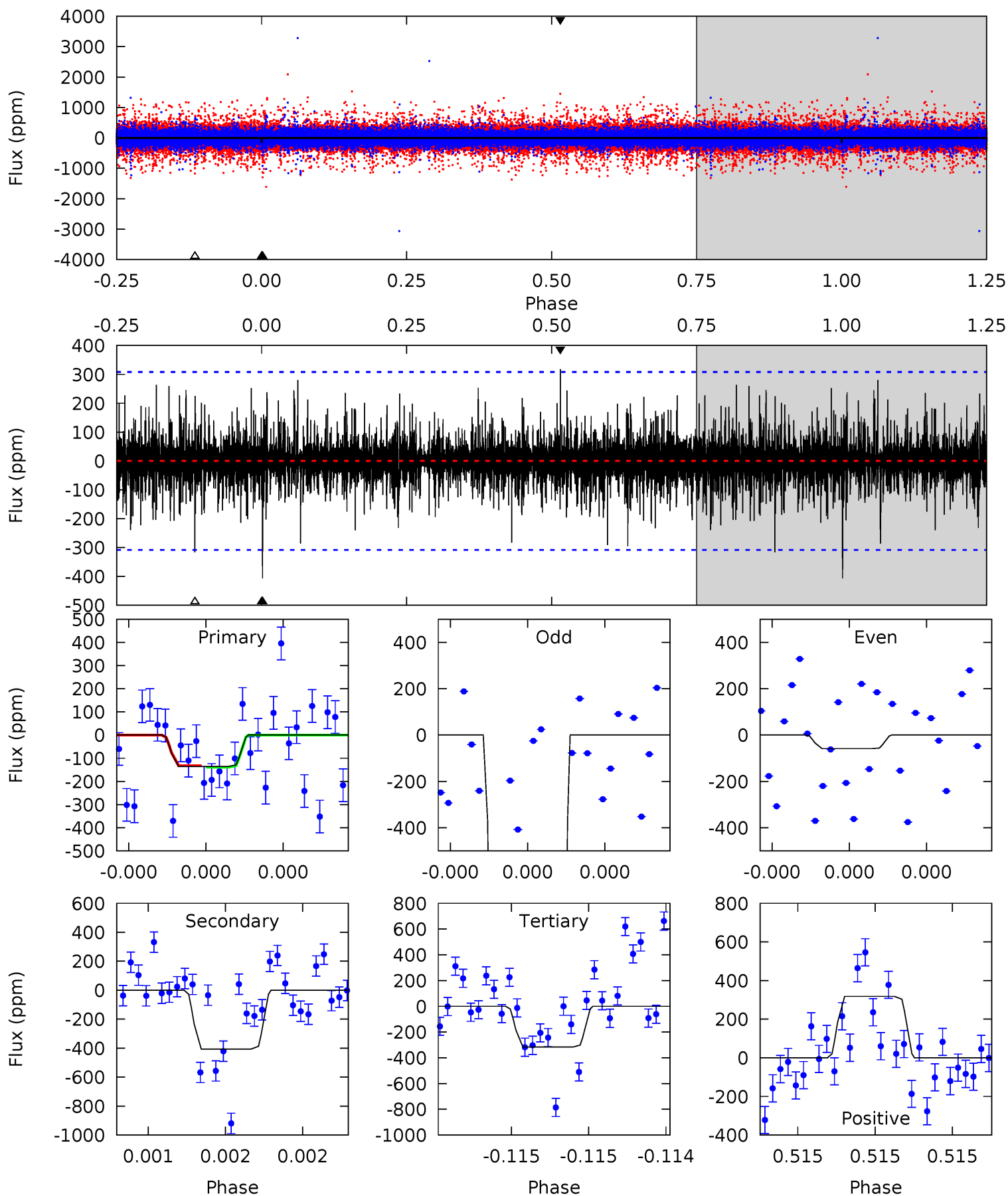
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.5	8.77	8.60	5.02	5.49	3.35	1.32	1.93	5.51	0.17	3.75	5.86	1.34	0.32	0.39



# Alt Model-Shift Uniqueness Test

004454810-02, P = 399.176406 Days, E = 380.869299 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.47	7.39	5.76	5.79	5.61	3.54	0.93	-3.29	-3.32	1.64	1.61	46.0	32.6	0.44	0



### Stellar Parameters For KIC 004454810

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7100^{+200}_{-300}$	$3.972^{+0.329}_{-0.141}$	$-0.500^{+0.250}_{-0.300}$	$2.010^{+0.505}_{-0.757}$	$1.382^{+0.193}_{-0.289}$	$0.240^{+0.576}_{-0.097}$
	+3%/-4%	+8%/-4%	+50%/-60%	+25%/-38%	+14%/-21%	+240%/-40%
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 004454810-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-13086 \pm 1493$	$16.93^{+2.93}_{-3.66}$	$558^{+43}_{-58}$	$8853^{+740}_{-692}$	$35802^{+20595}_{-10360}$
Alt.	$-406 \pm 55$	$10.38^{+2.24}_{-2.44}$	$559^{+45}_{-58}$	$4644^{+325}_{-295}$	$2862^{+1973}_{-957}$

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

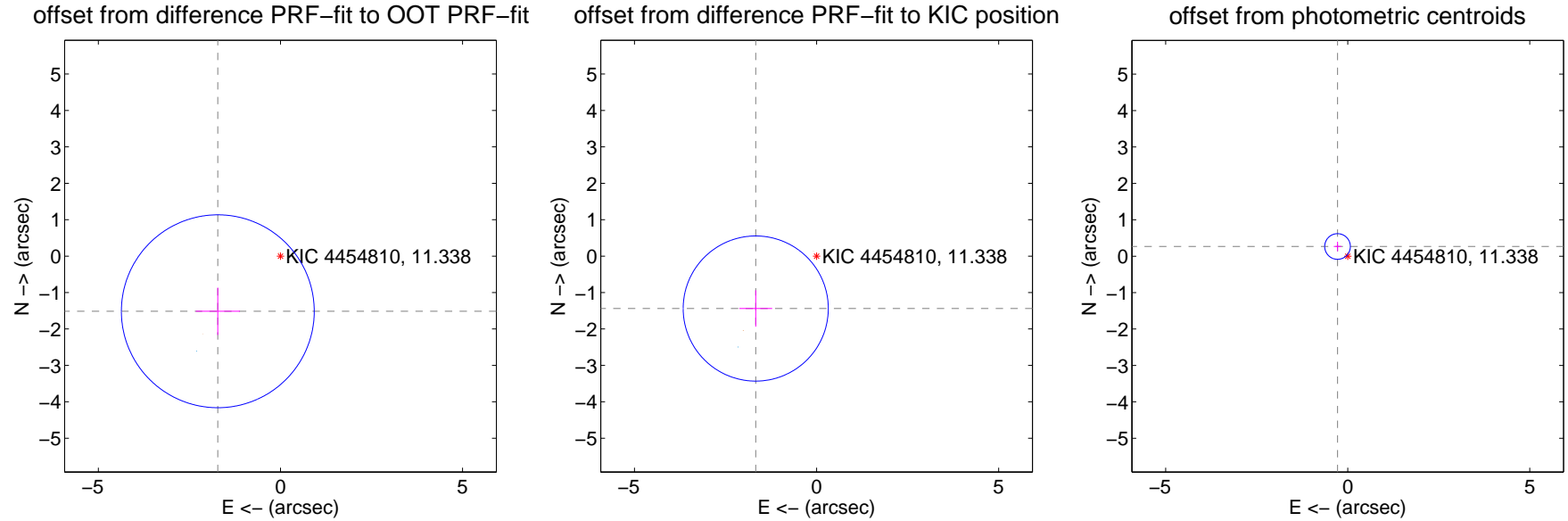
## DV Centroid Data

Supplemental centroid analysis for 004454810-02. **Kepler magnitude: 11.34.** Transit SNR 9.32

**There are 1 quarters with good PRF difference image offsets**

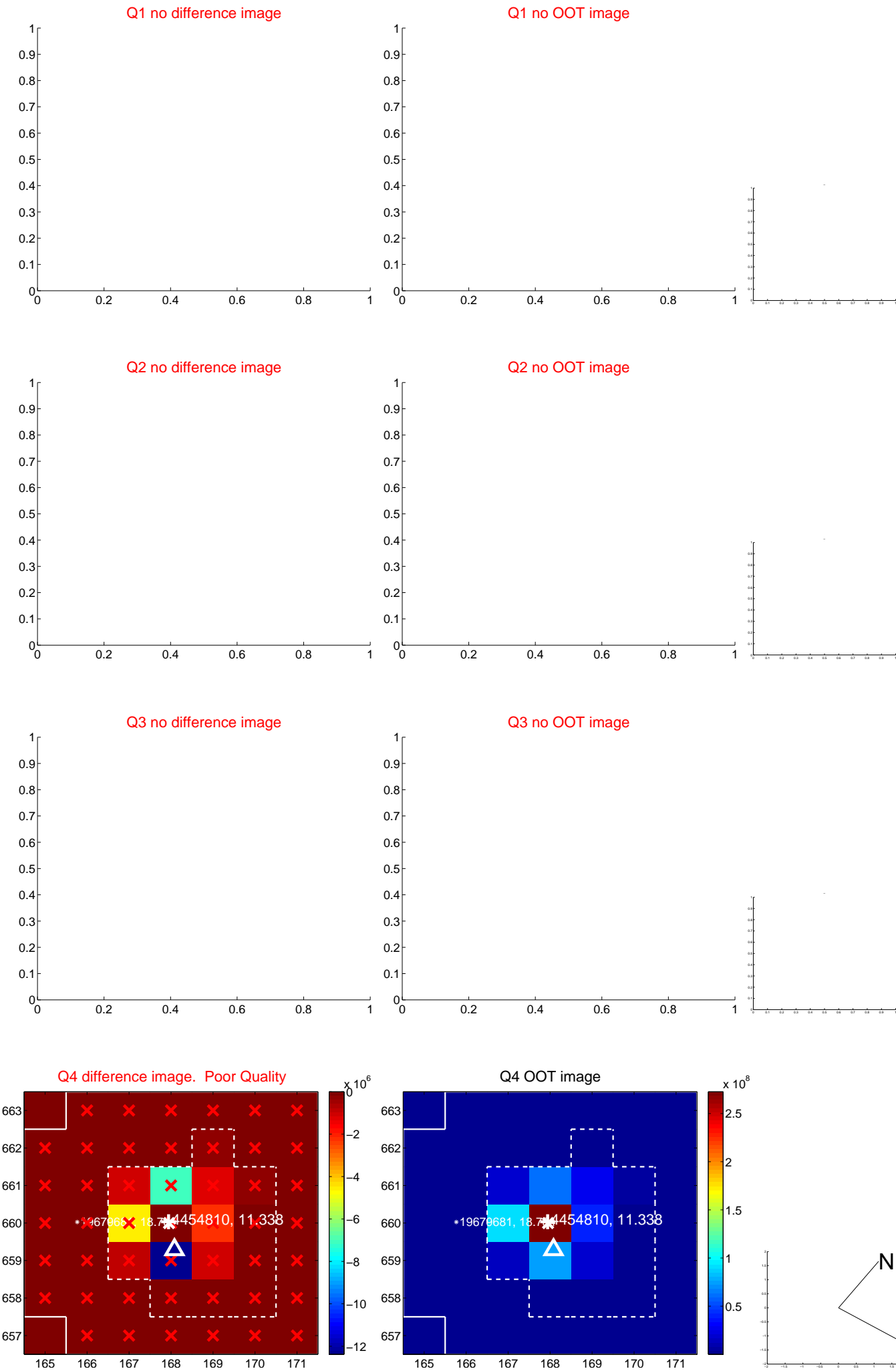
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.292 \pm 0.883$	2.60	$1.720 \pm 0.608$	$-1.514 \pm 0.650$
PRF-fit source offset from KIC position	<b><math>2.205 \pm 0.664</math></b>	<b>3.32</b>	$1.671 \pm 0.453$	$-1.439 \pm 0.499$
photometric centroid source offset	<b><math>0.39 \pm 0.12</math></b>	<b>3.30</b>	$0.28 \pm 0.10$	$0.27 \pm 0.13$

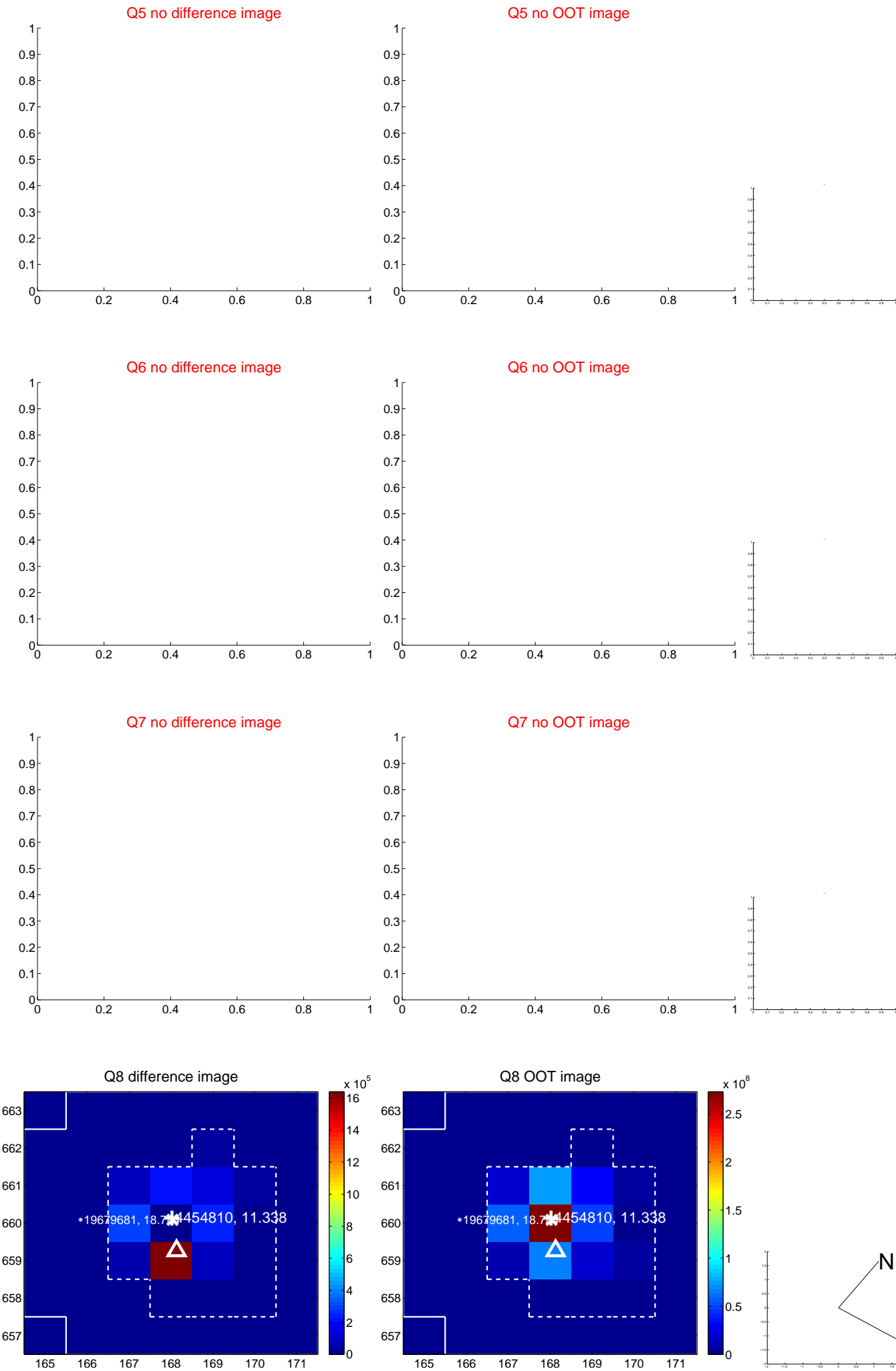


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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





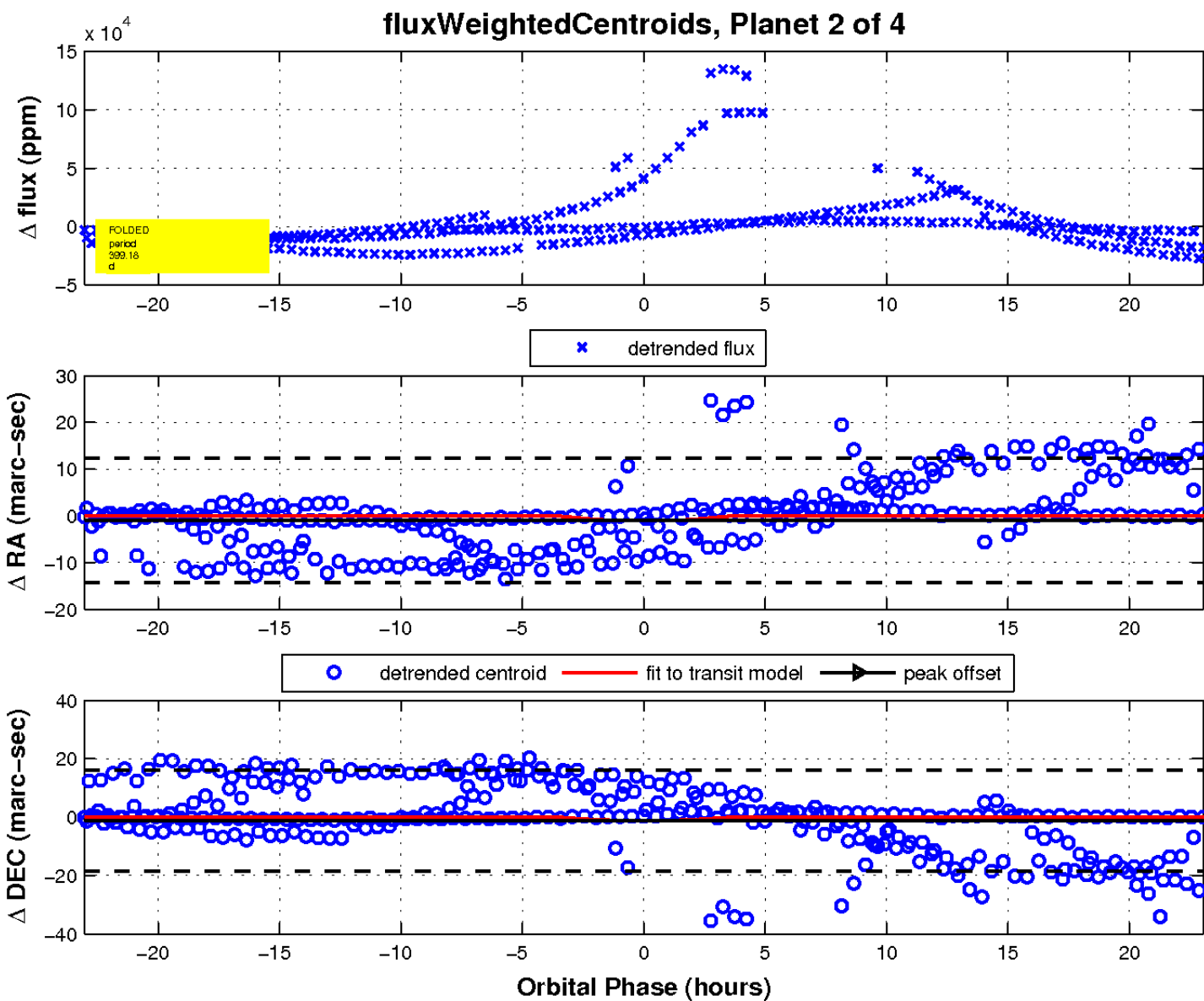
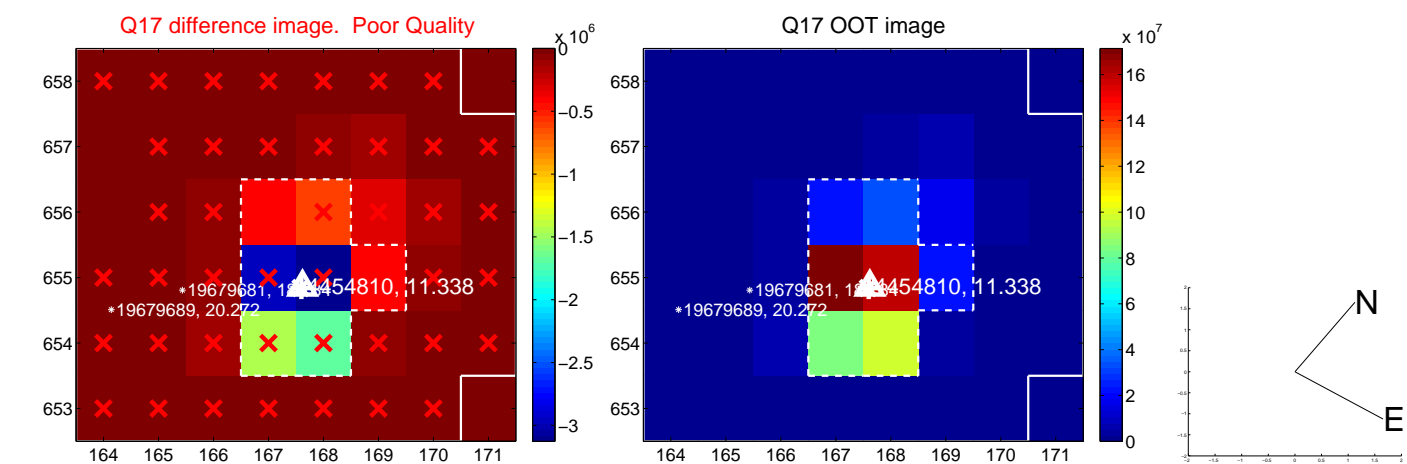
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

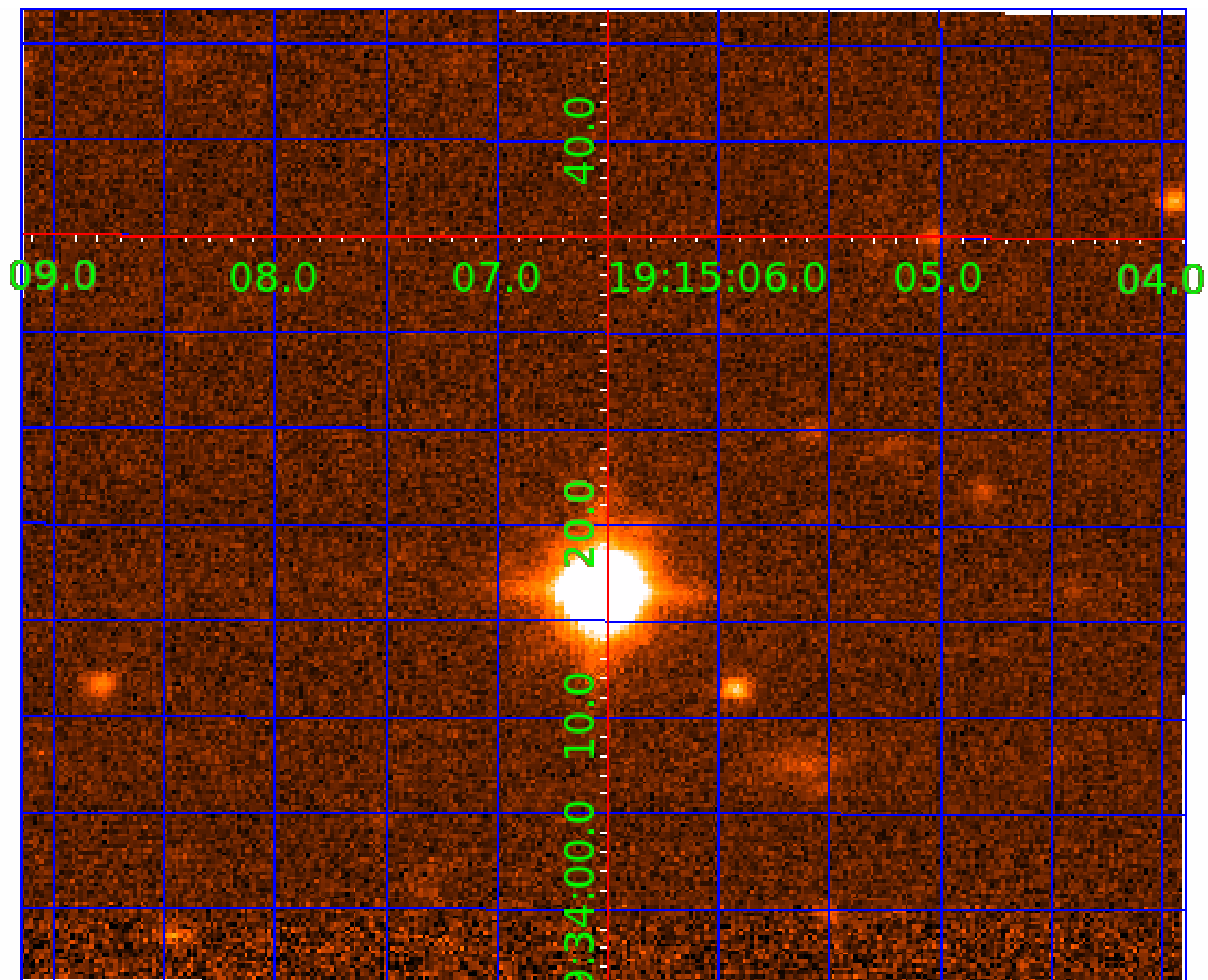


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 004454810

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004454810-01	OBS	No	474.974066	545.559867	28444.2	16.380	58.0	10.4	2.01	7100	57.89	5.22
004454810-02	OBS	No	399.175319	380.970999	5546.6	7.708	41.6	9.3	2.01	7100	17.45	6.58
004454810-04	OBS	No	712.518237	141.002382	577.0	6.000	37.5	-1.0	2.01	7100	4.89	3.04

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004454810-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
004454810-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED—HALO_GHOST
004454810-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_SATURATED

**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.

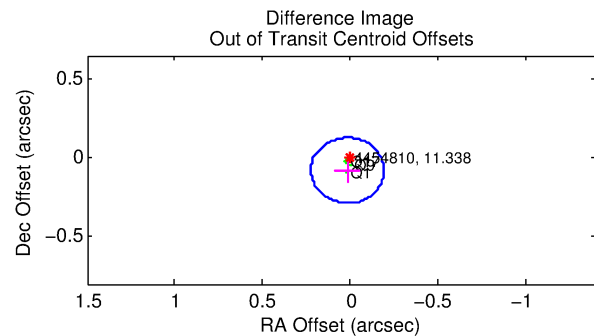
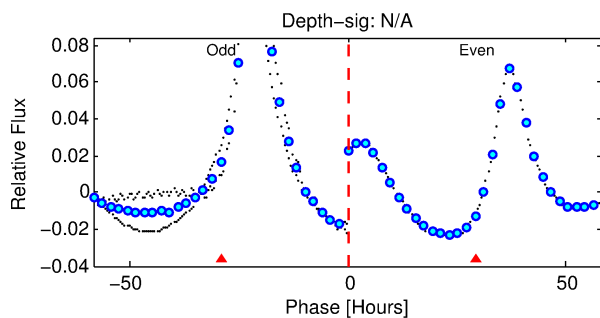
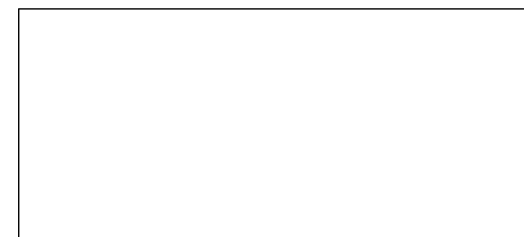
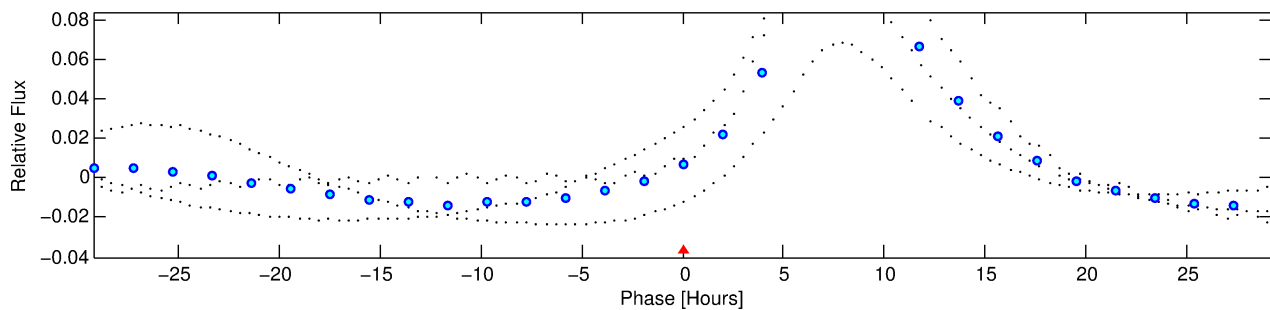
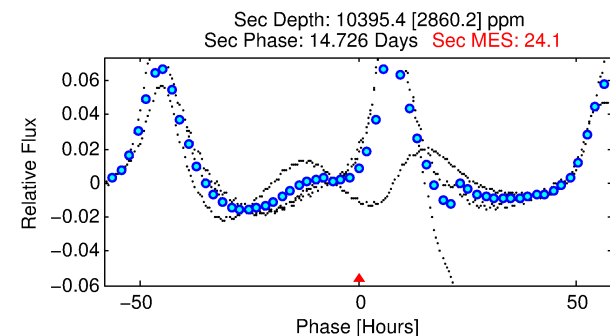
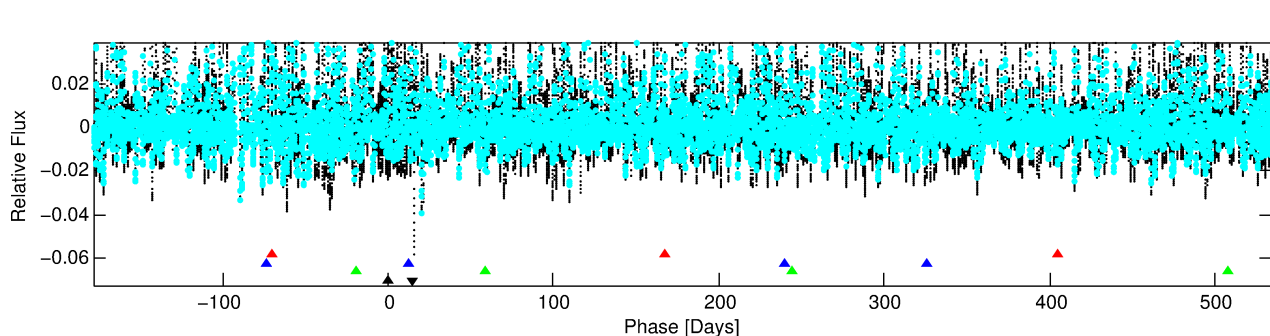
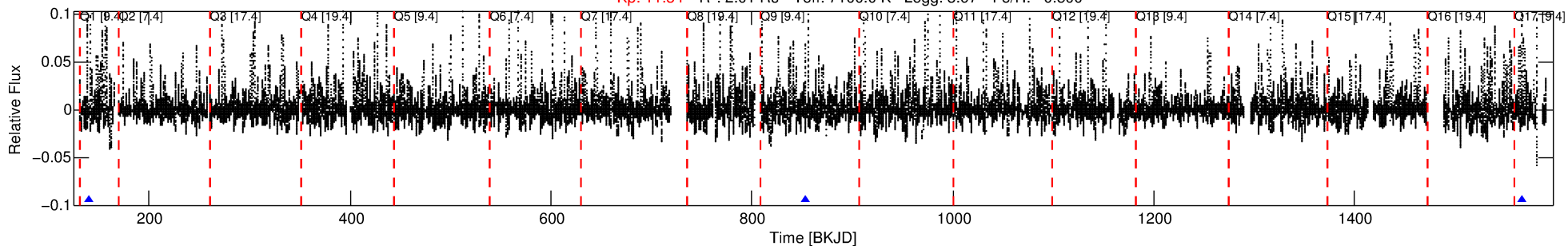
Ephemeris Match Information For 004454810-04

No Significant Match Found

# DV One-Page Summary

KIC: 4454810 Candidate: 4 of 4 Period: 712.518 d

Kp: 11.34 R\*: 2.01 Rs Teff: 7100.0 K Logg: 3.97 Fe/H: -0.500



## TPS TCE Results:

Period = 712.51824 d  
Epoch = 141.0024 BKJD

DV fit results are unavailable

## DV Diagnostic Results:

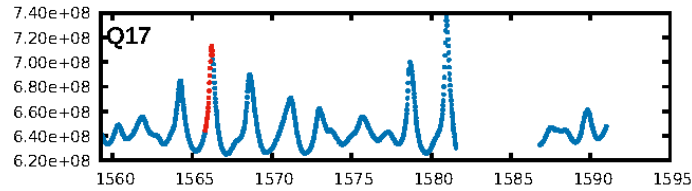
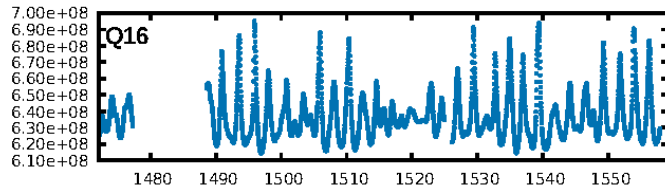
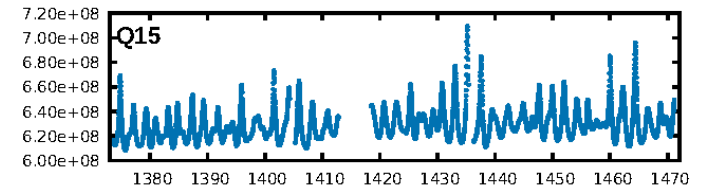
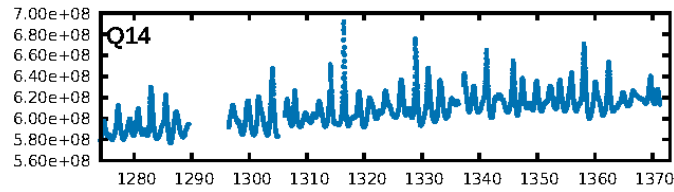
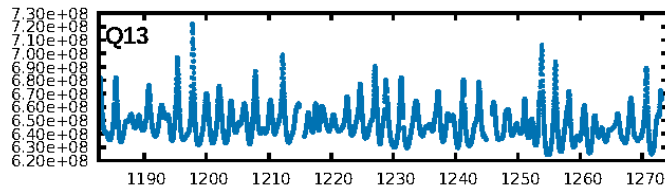
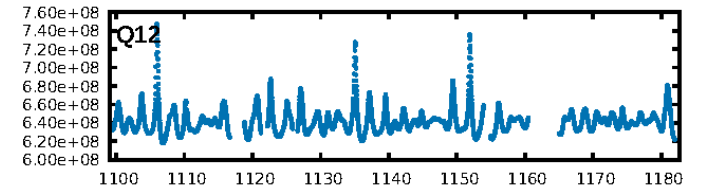
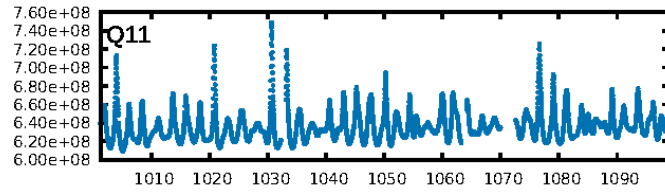
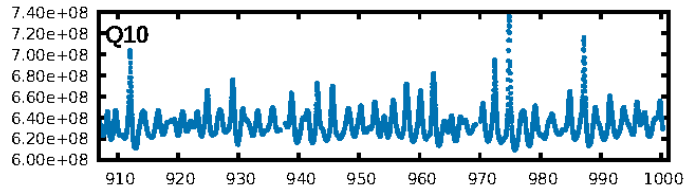
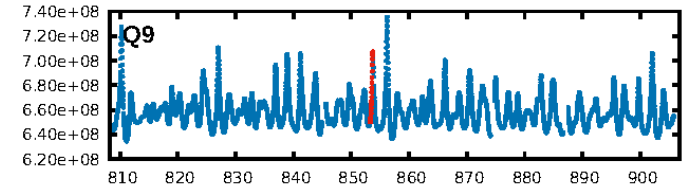
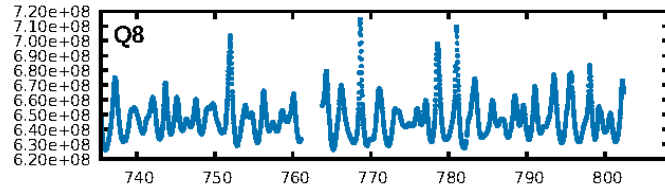
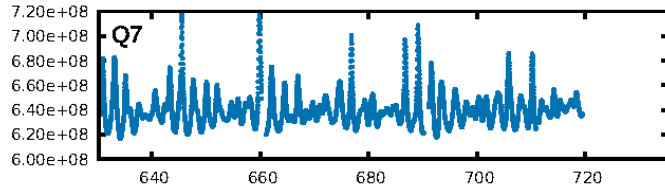
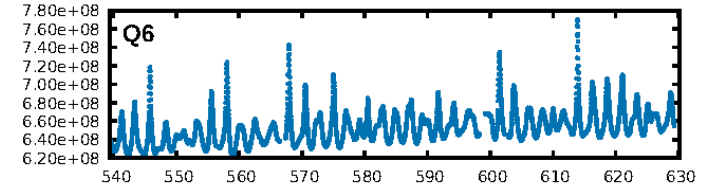
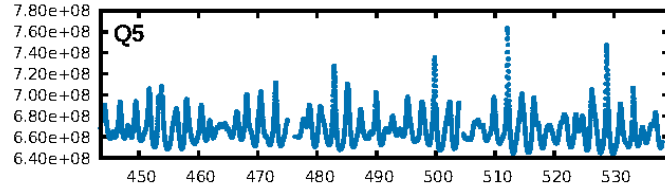
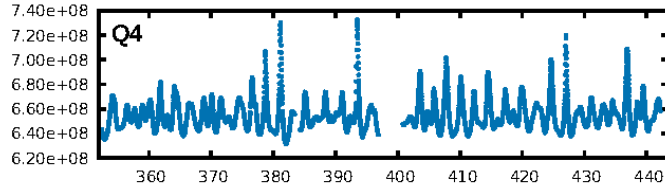
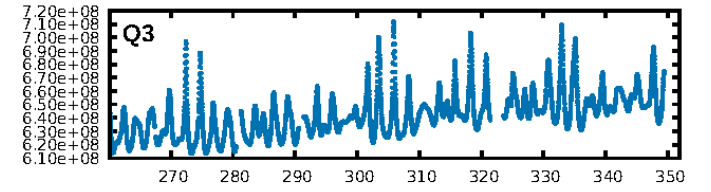
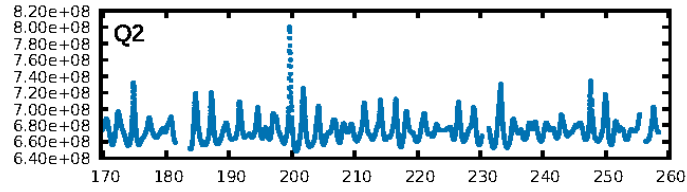
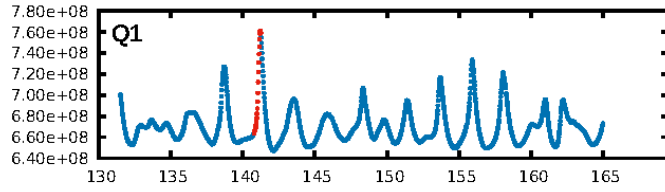
ShortPeriod-sig: 100.0% [326.82σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [1/1]  
GhostDiagnostic-chr: 0.6628

Centroid-sig: 63.4%  
Centroid-so: 0.110 arcsec [8.51σ]  
OotOffset-rm: 0.081 arcsec [1.17σ]  
KicOffset-rm: 0.087 arcsec [1.22σ]  
OotOffset-st: 0/0/0/3 [3]  
KicOffset-st: 0/0/0/3 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:39:37 Z

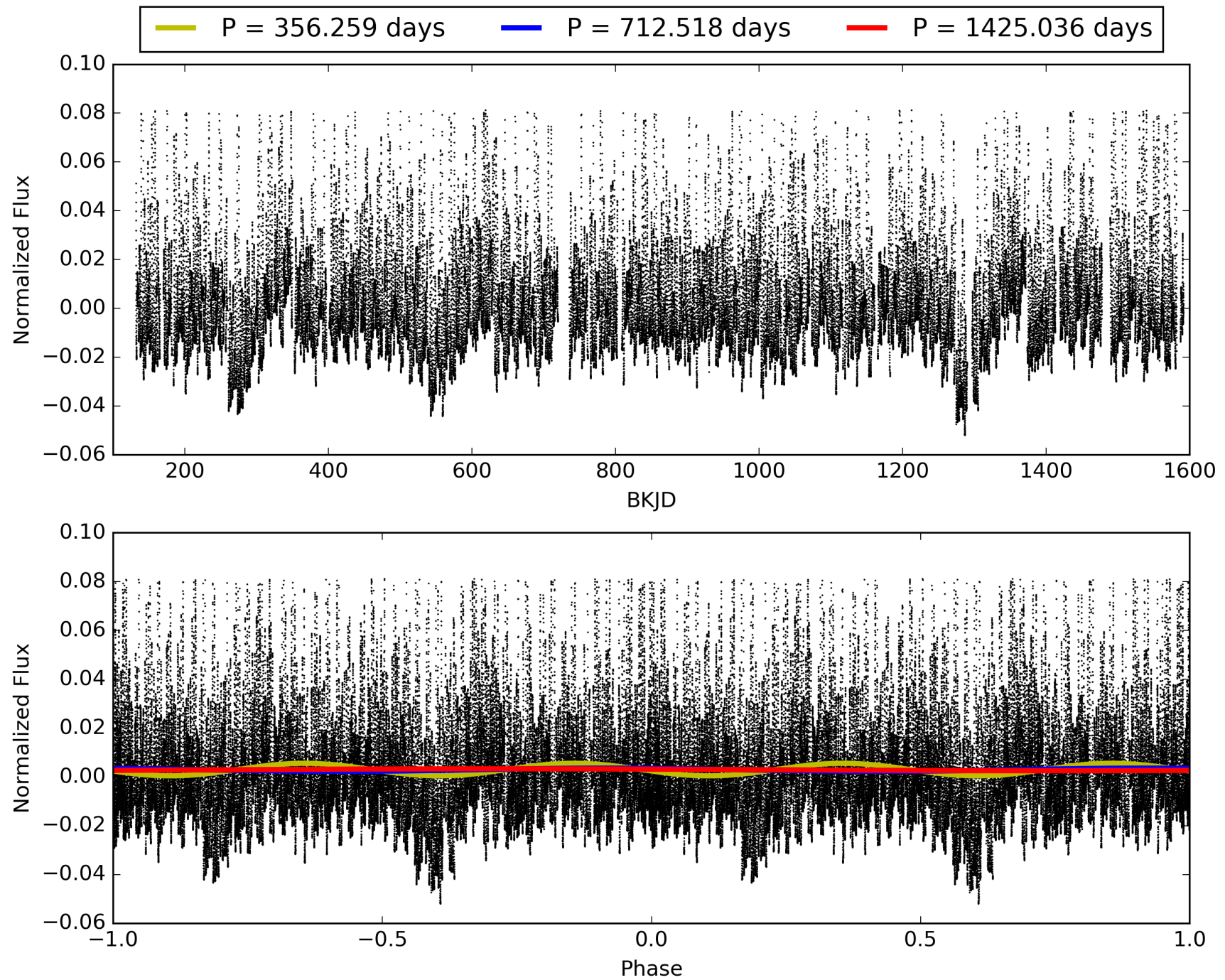
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 004454810-04, PDC Light Curves





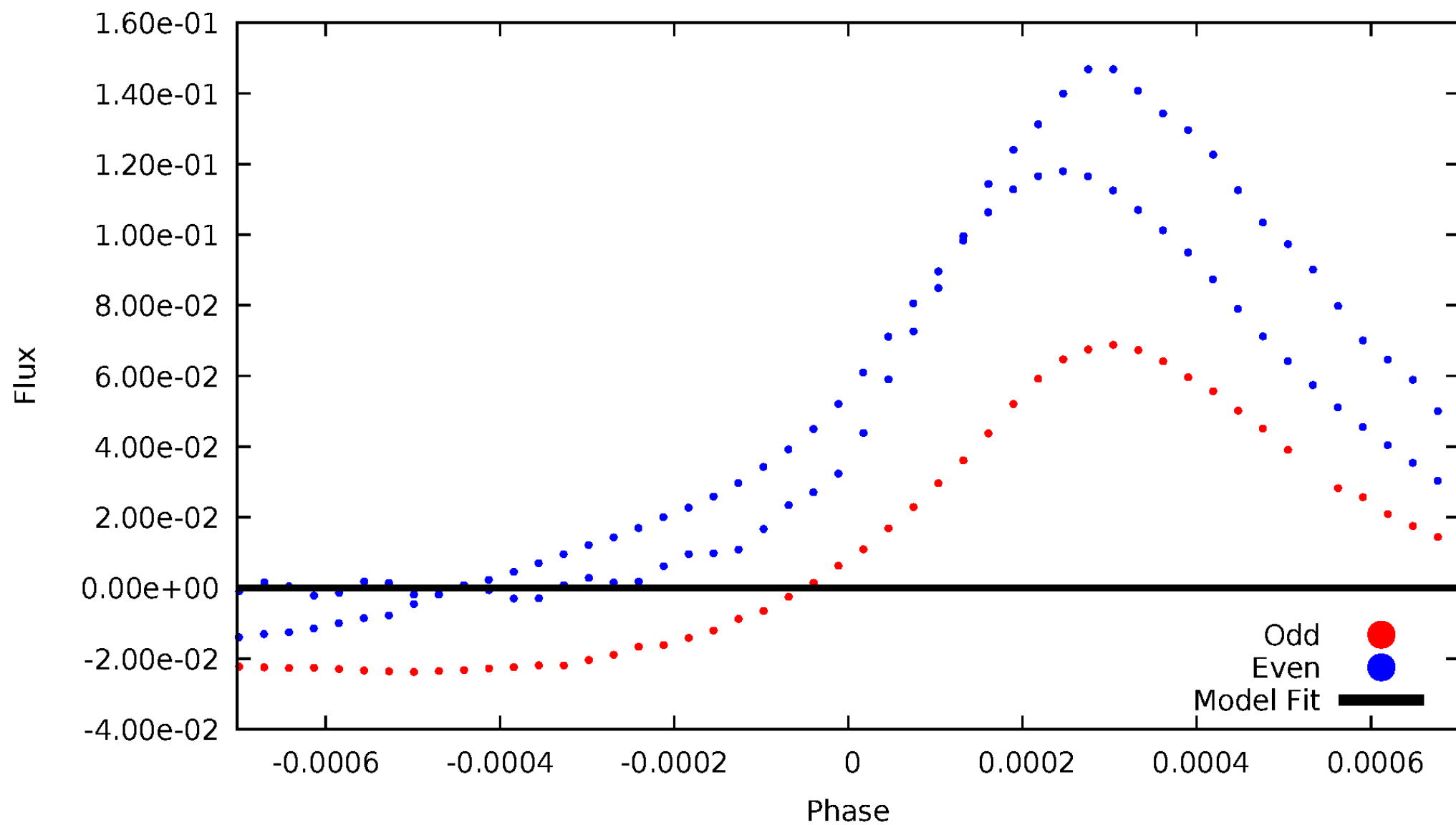
TCE 004454810-04





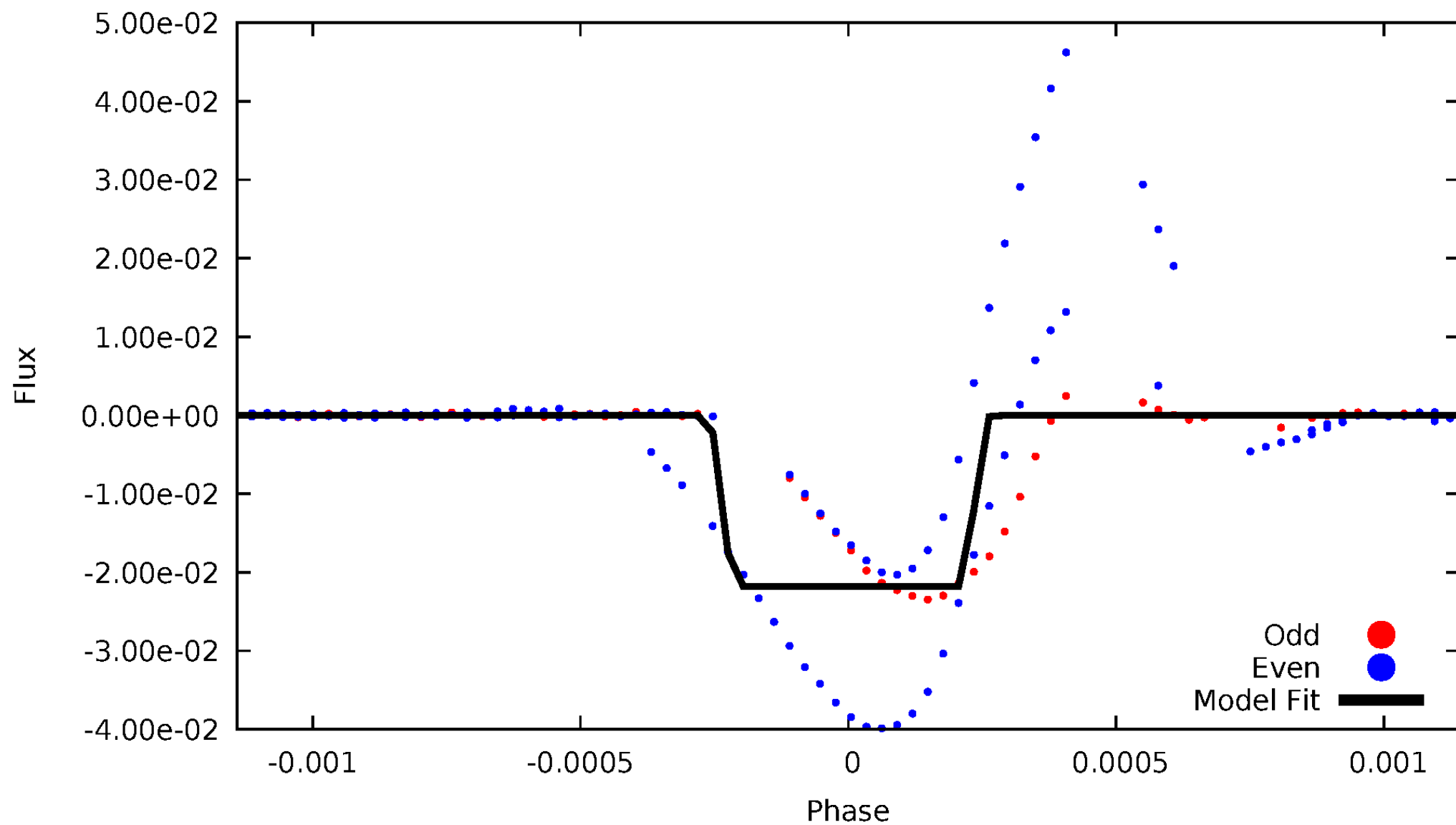
# DV Odd/Even

TCE 004454810-04



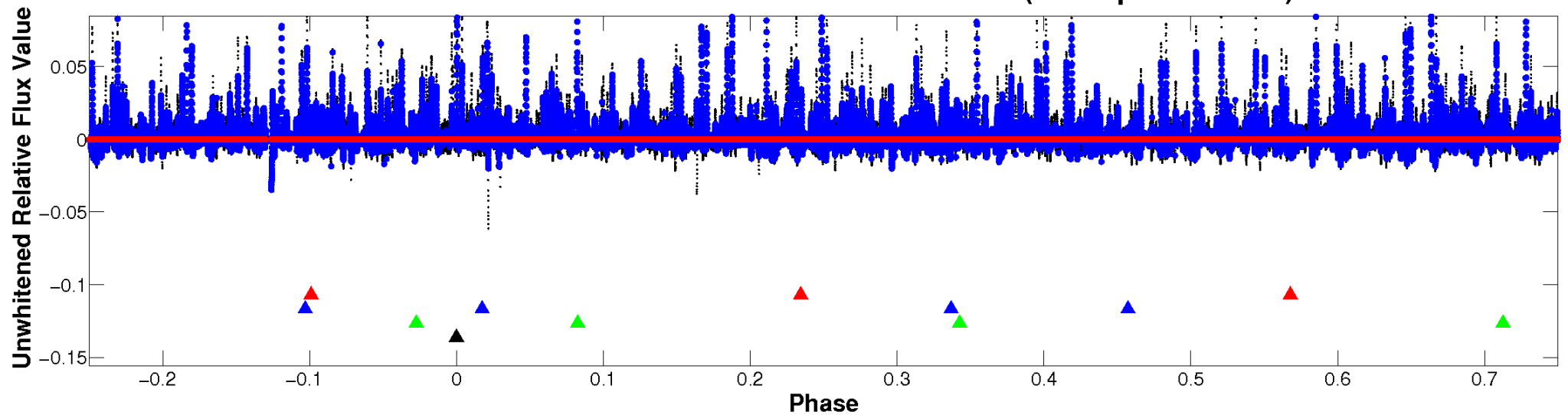
# ALT Odd/Even

TCE 004454810-04



# Non-Whitened Vs. Whitened Light Curve

**Planet 4 : Phased Unwhitened Flux Time Series (TPS Epoch/Period)**

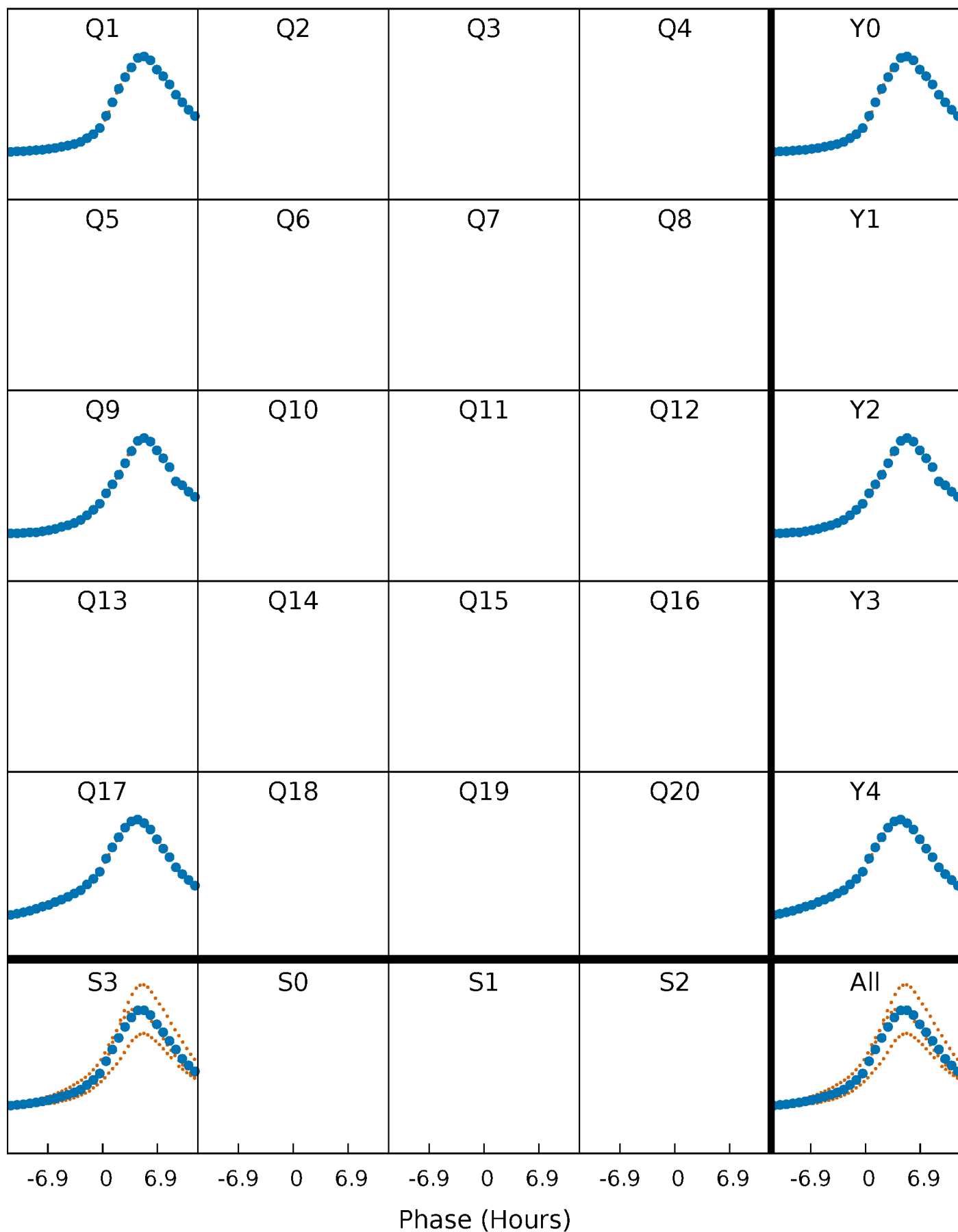


**Planet 4 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



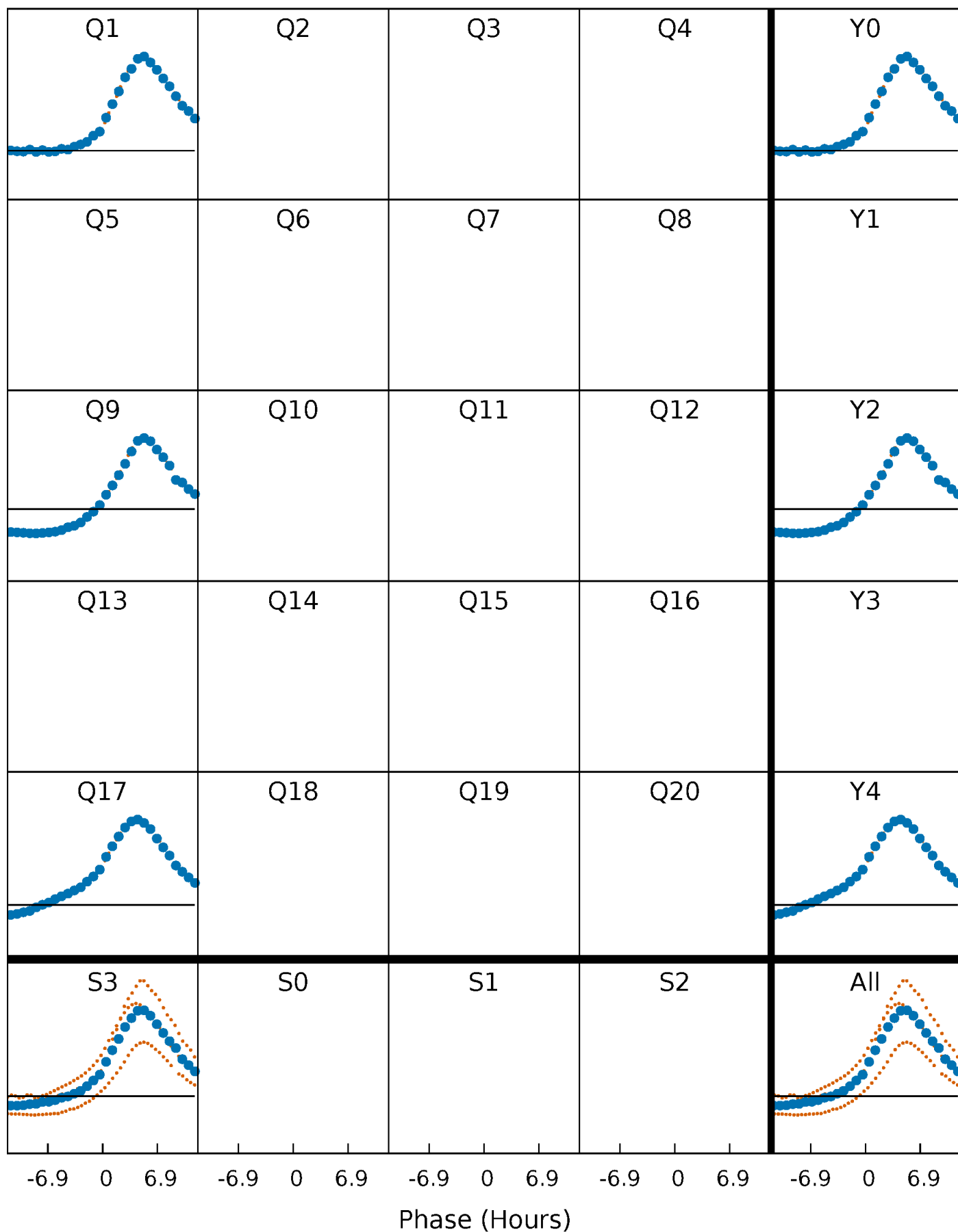
# PDC Quarter-Phased Transit Curves

TCE 004454810-04 P=712.518237 Days  $T_0=141.002382$  (BKJD)



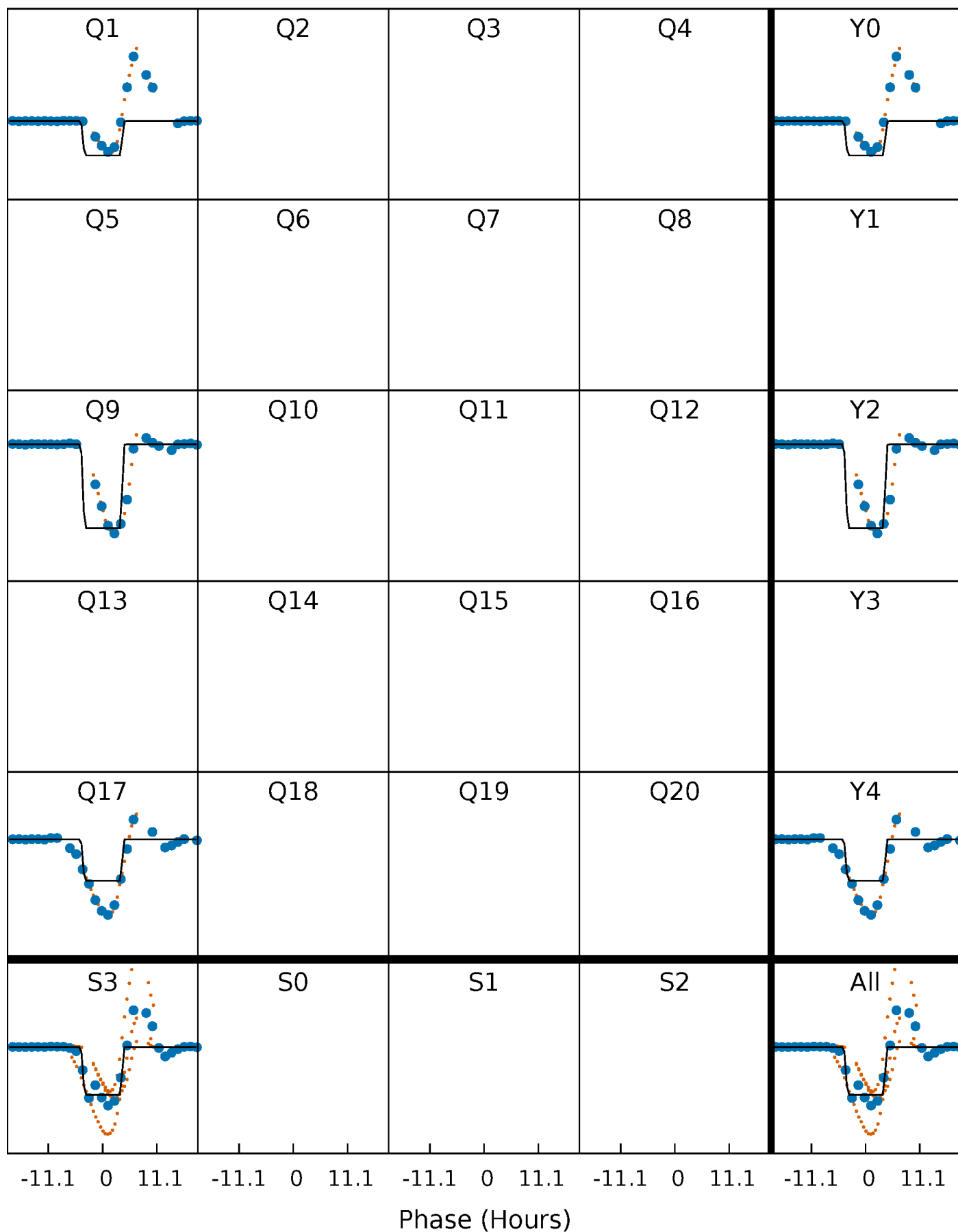
# DV Quarter-Phased Transit Curves

TCE 004454810-04 P=712.518237 Days  $T_0=141.002382$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

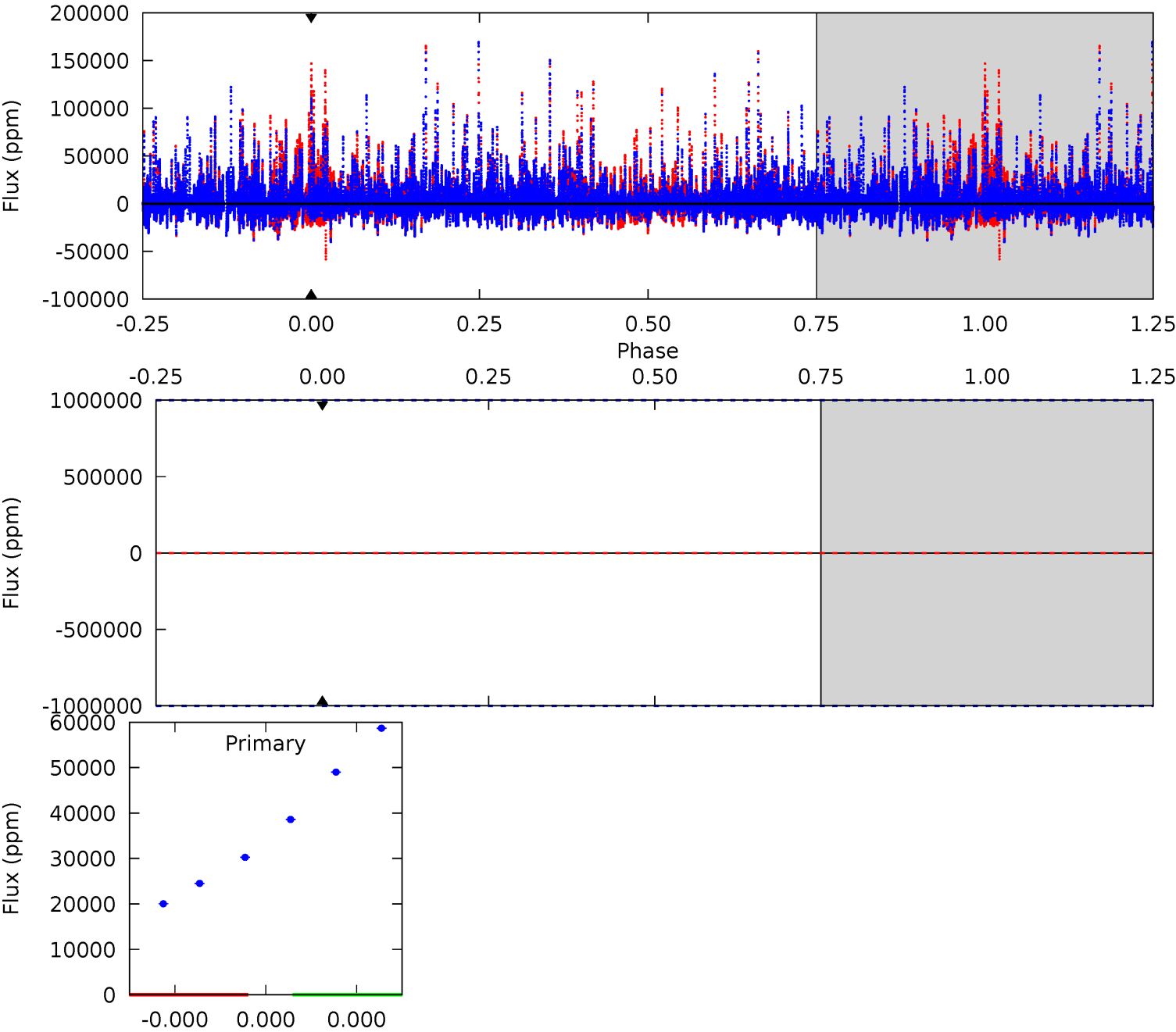
TCE 004454810-04 P=712.518237 Days  $T_0=140.888524$  (BKJD)



DV Model-Shift Uniqueness Test

004454810-04, P = 712.518237 Days, E = 141.002382 Days

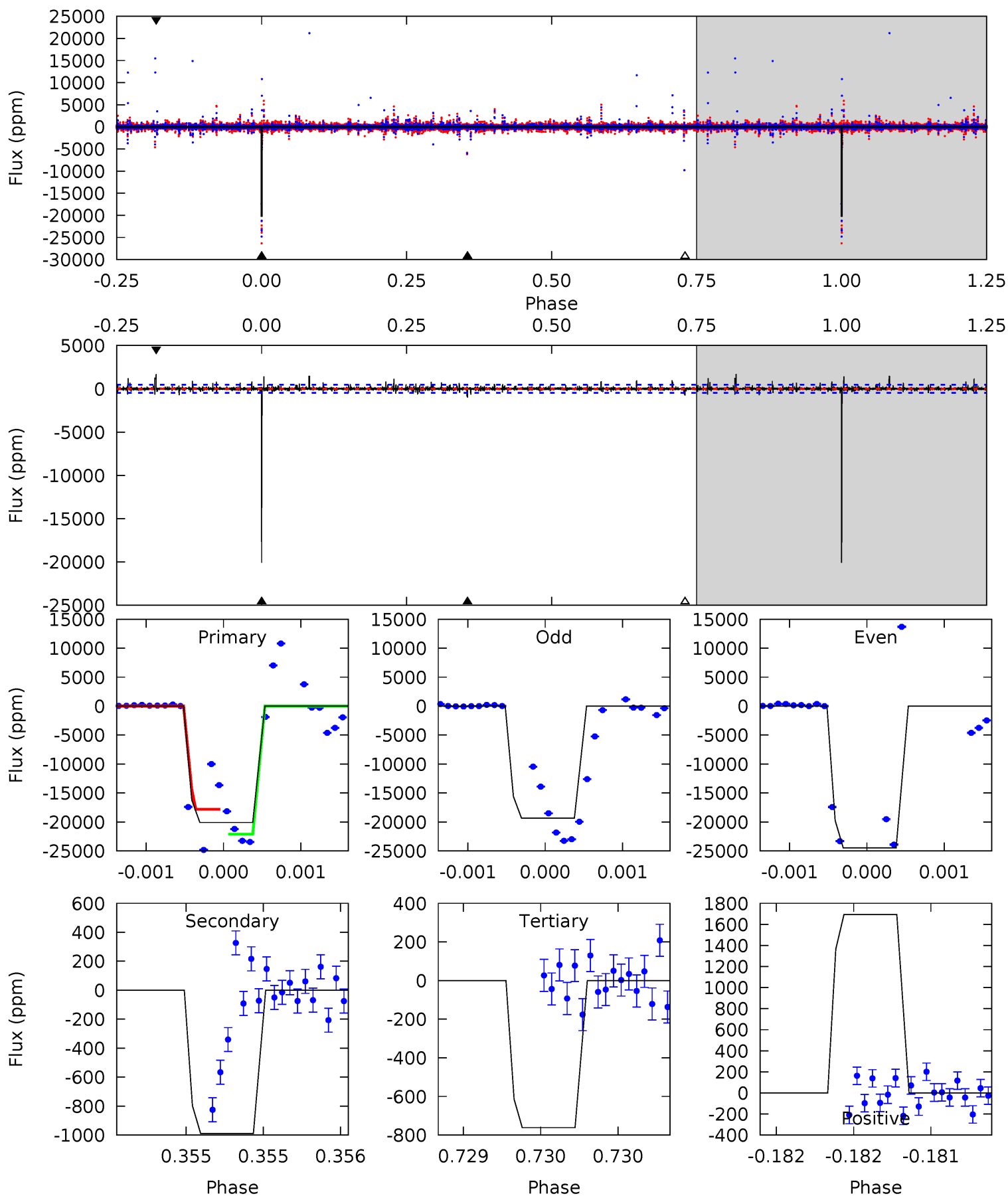
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

004454810-04, P = 712.518237 Days, E = 140.888524 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
242.8	11.9	9.20	20.5	5.56	3.46	1.04	233.6	222.3	2.74	-8.53	18.2	1.16	0.08	26.8





### Stellar Parameters For KIC 004454810

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7100^{+200}_{-300}$	$3.972^{+0.329}_{-0.141}$	$-0.500^{+0.250}_{-0.300}$	$2.010^{+0.505}_{-0.757}$	$1.382^{+0.193}_{-0.289}$	$0.240^{+0.576}_{-0.097}$
	+3%/-4%	+8%/-4%	+50%/-60%	+25%/-38%	+14%/-21%	+240%/-40%
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 004454810-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$0 \pm 1000000$	$16.23^{+16.70}_{-11.08}$	$461^{+35}_{-43}$	$-4101^{+35602}_{-25639}$	$-3171.792^{+1089116.044}_{-1019278.308}$
Alt.	$-988 \pm 83$	$31.43^{+22.88}_{-16.77}$	$463^{+35}_{-50}$	$3644^{+1122}_{-553}$	$1593^{+5590}_{-1033}$

$T_{max}$  = 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

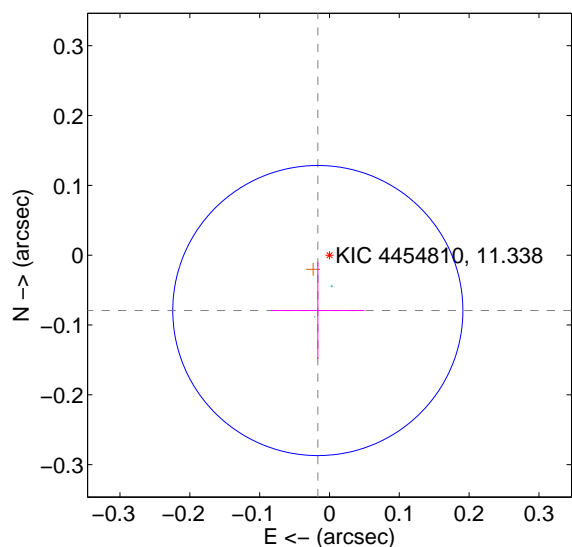
Supplemental centroid analysis for 004454810-04. **Kepler magnitude: 11.34.** Transit SNR -1.00

**There are 2 quarters with good PRF difference image offsets**

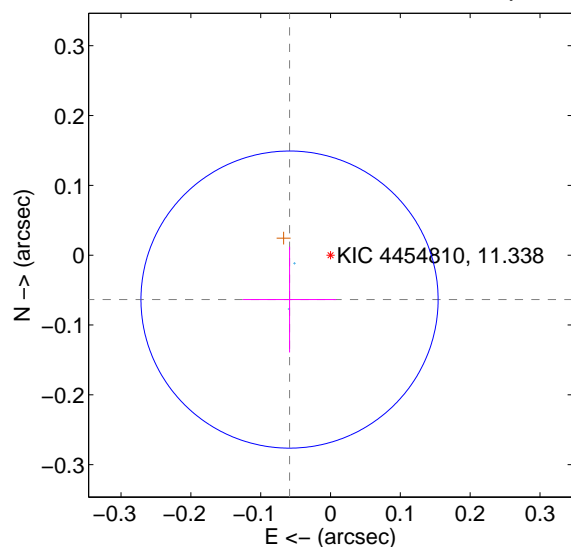
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.081 \pm 0.069$	1.17	$0.017 \pm 0.067$	$-0.079 \pm 0.069$
PRF-fit source offset from KIC position	$0.087 \pm 0.071$	1.22	$0.059 \pm 0.067$	$-0.064 \pm 0.076$
photometric centroid source offset	<b><math>0.11 \pm 0.01</math></b>	<b>8.51</b>	$0.10 \pm 0.01$	$0.05 \pm 0.02$

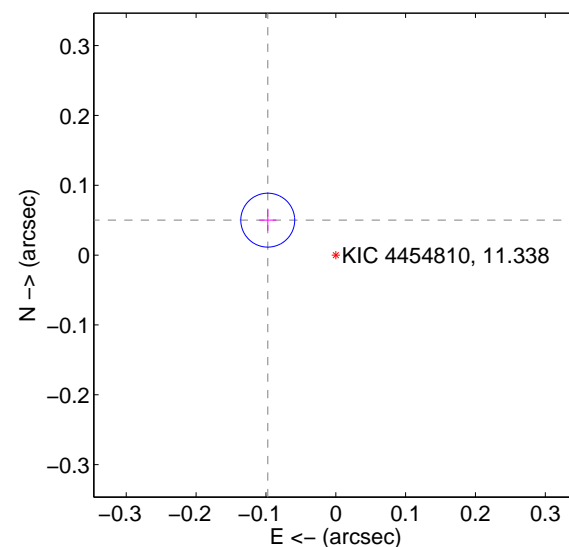
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

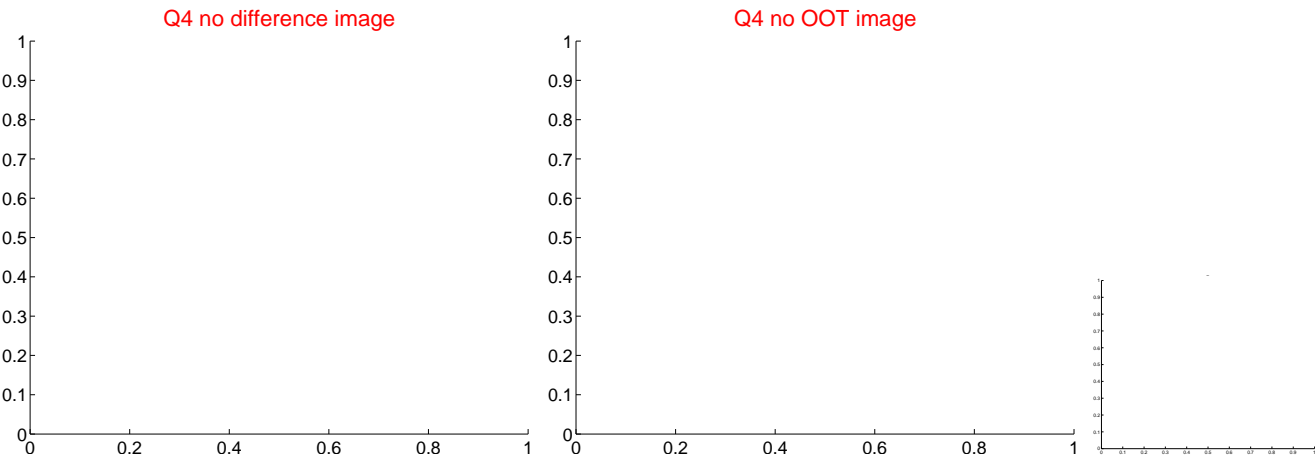
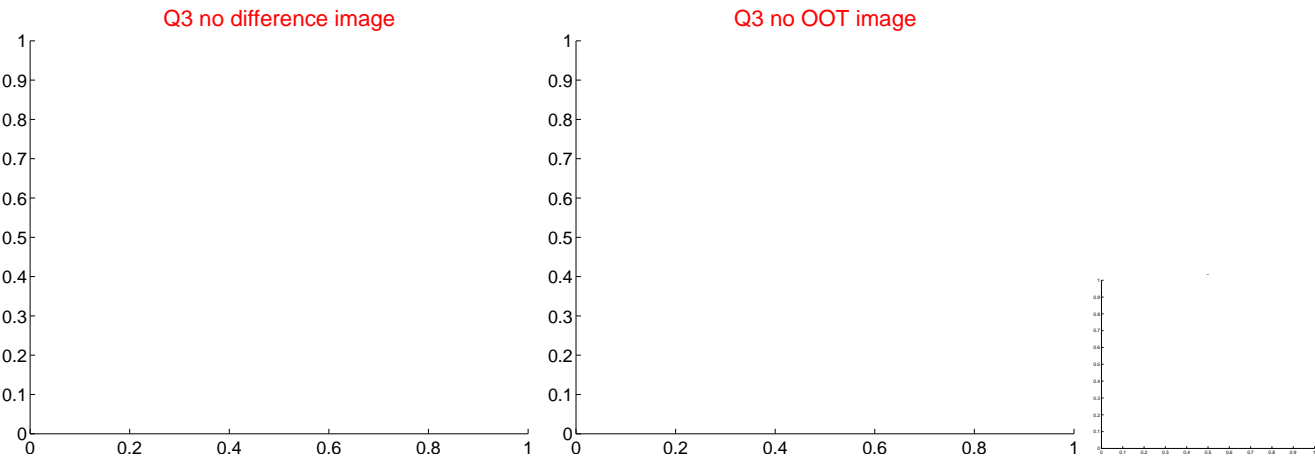
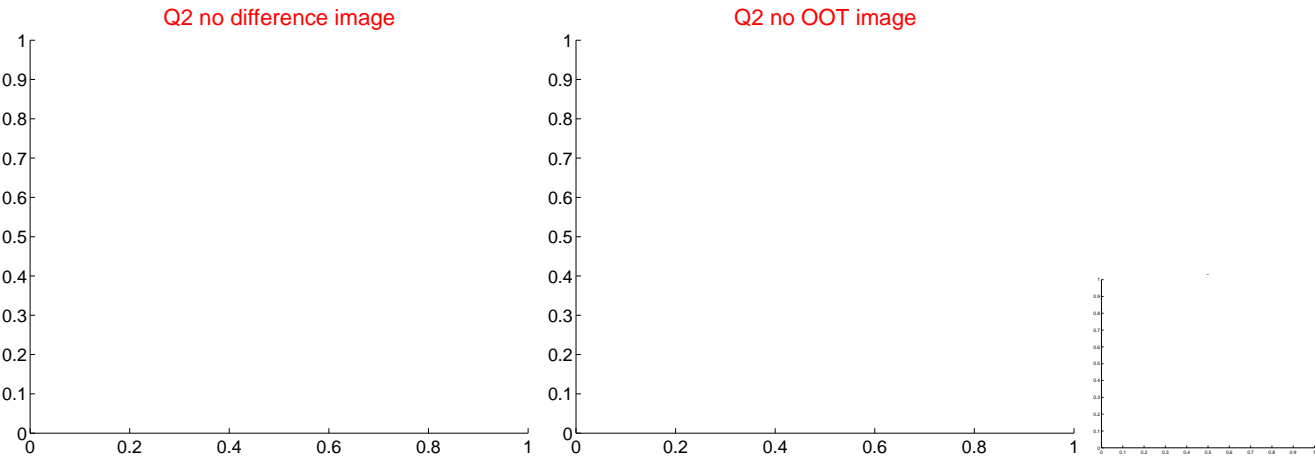
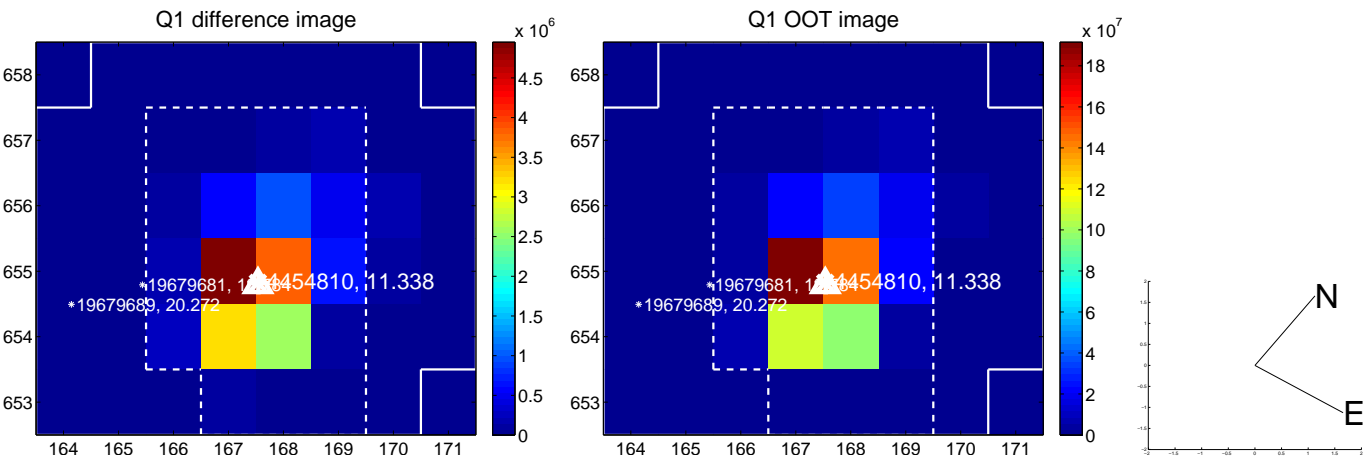


offset from photometric centroids



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

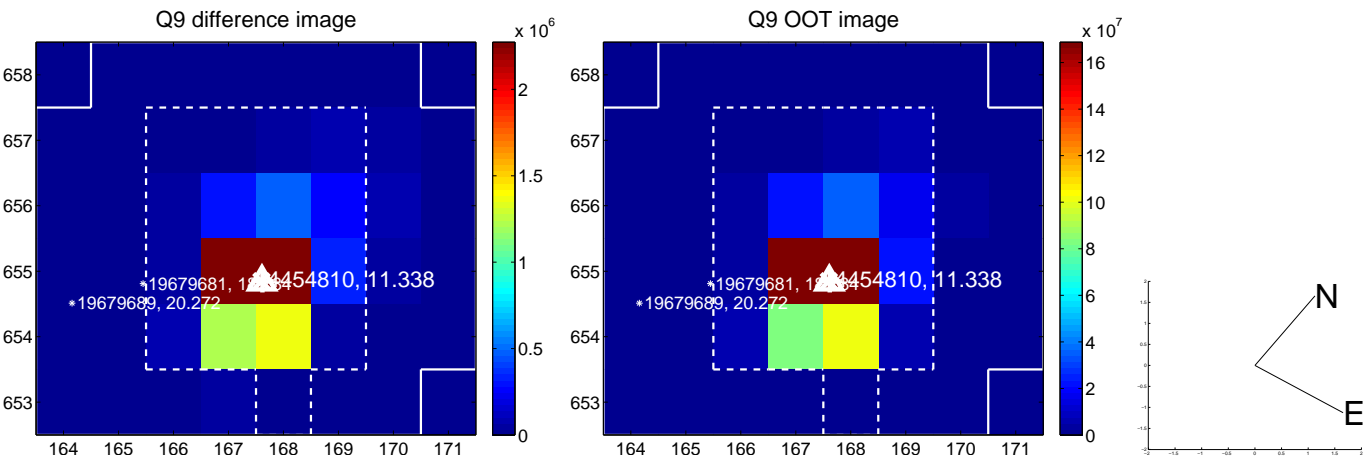
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



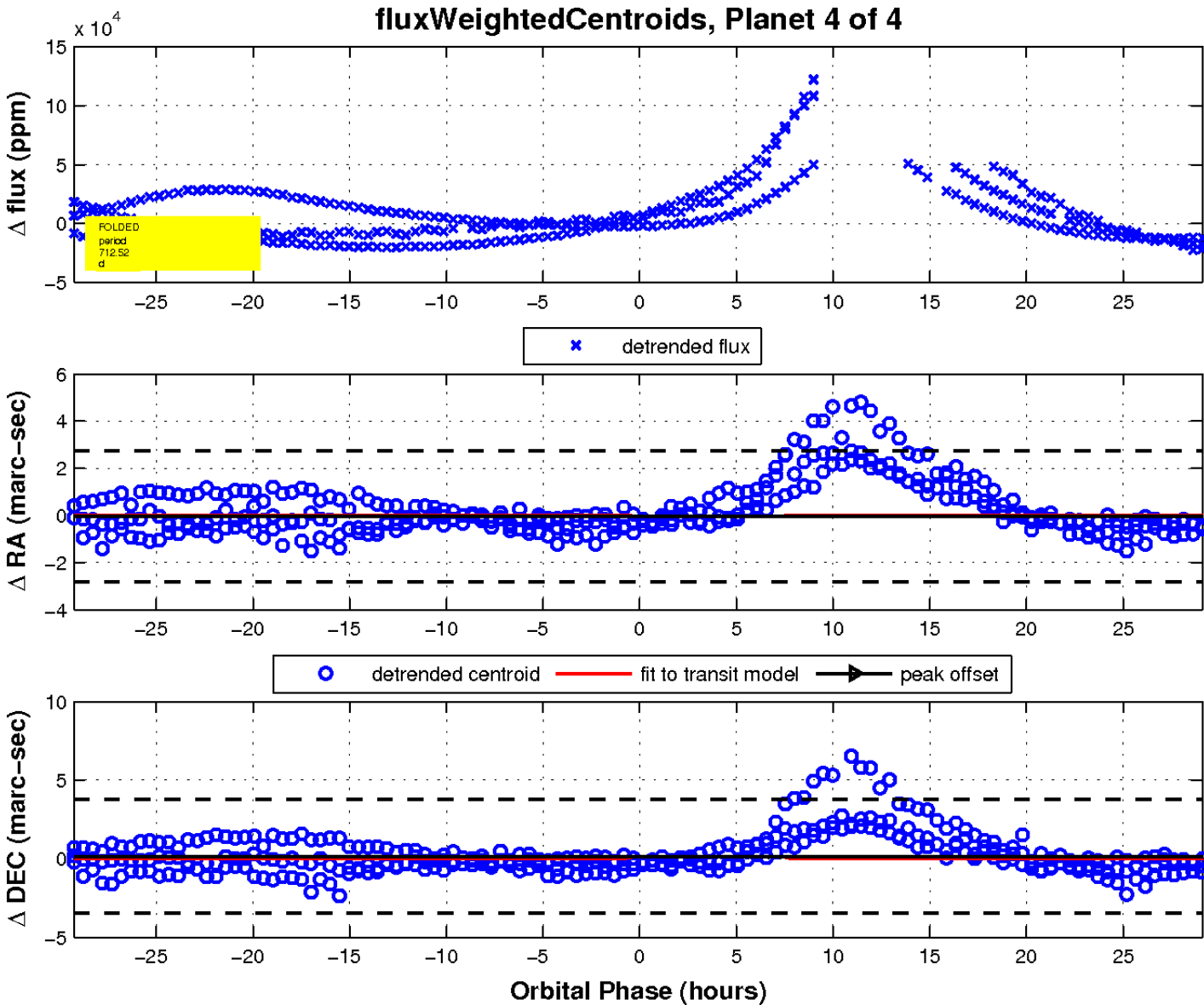
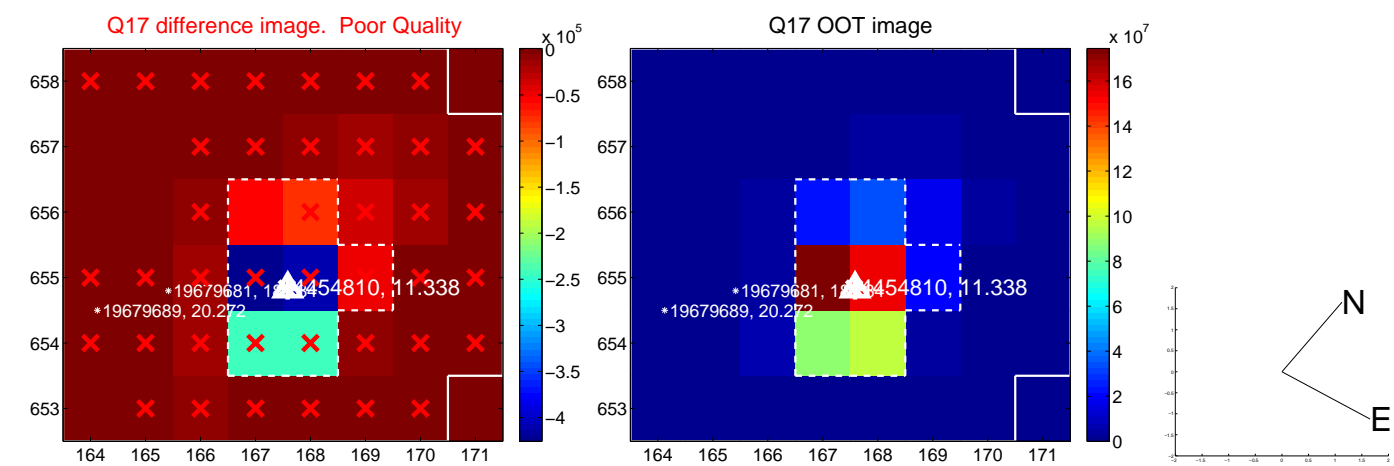
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



UKIRT Image

Declination

