

# KIC 008044608

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008044608-01	OBS	3523.01	106.175937	234.641030	164547.5	10.408	4857.8	4799.7	1.14	6038	54.90	8.95
008044608-02	OBS	No	106.175863	218.817861	24844.5	9.079	1057.7	976.1	1.14	6038	22.50	8.95

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008044608-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
008044608-02	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 008044608-01

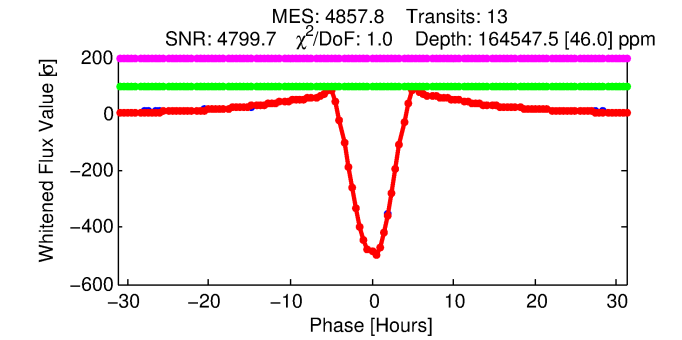
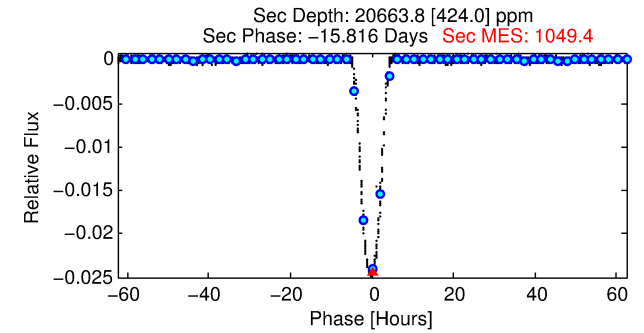
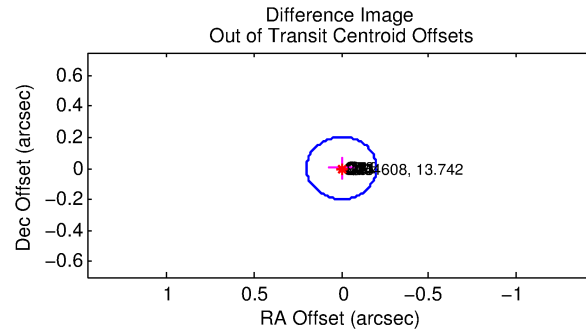
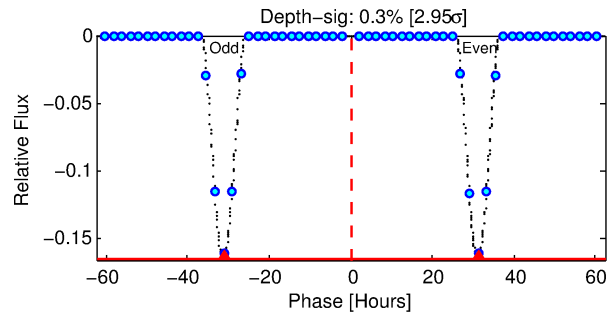
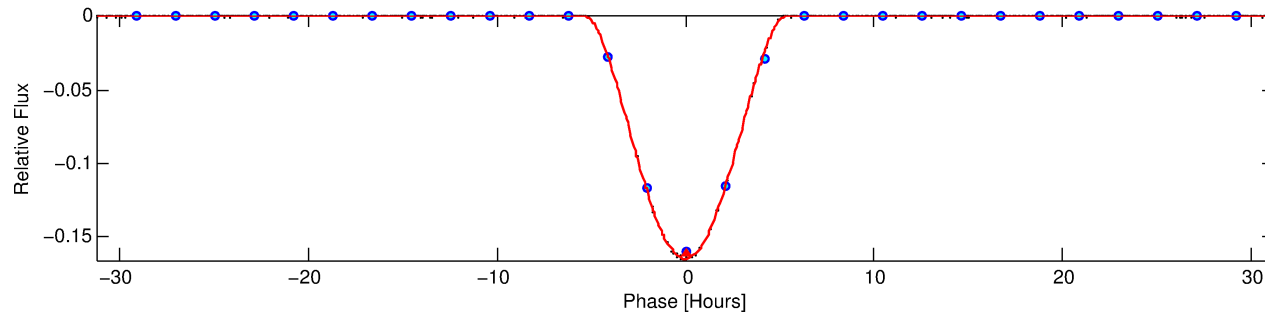
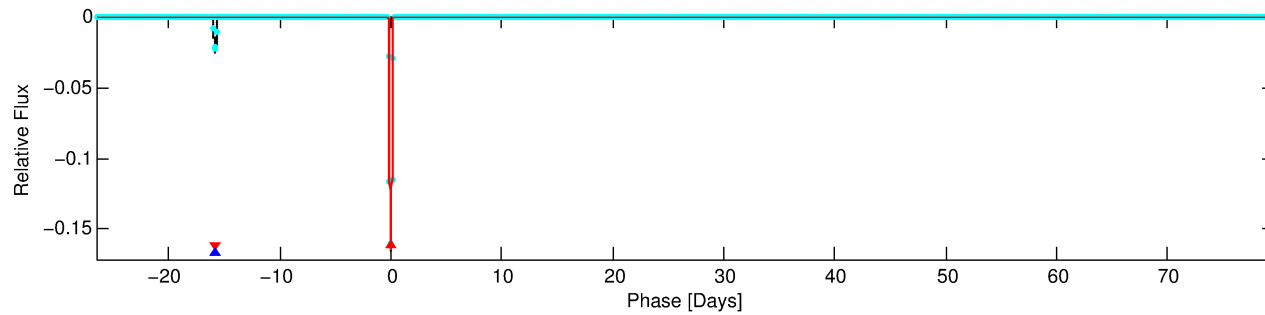
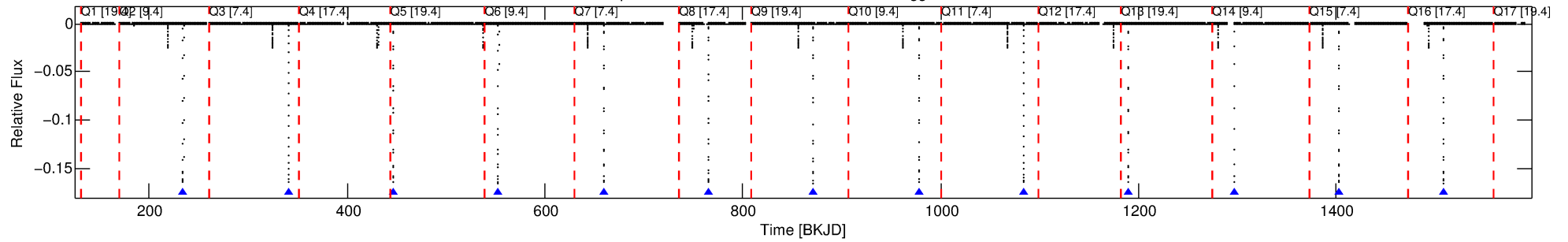
No Significant Match Found

# DV One-Page Summary

KIC: 8044608 Candidate: 1 of 2 Period: 106.176 d

KOI: K03523.01 Corr: 1.000

Kp: 13.74 R\*: 1.14 Rs Teff: 6038.0 K Logg: 4.25 Fe/H: -0.560



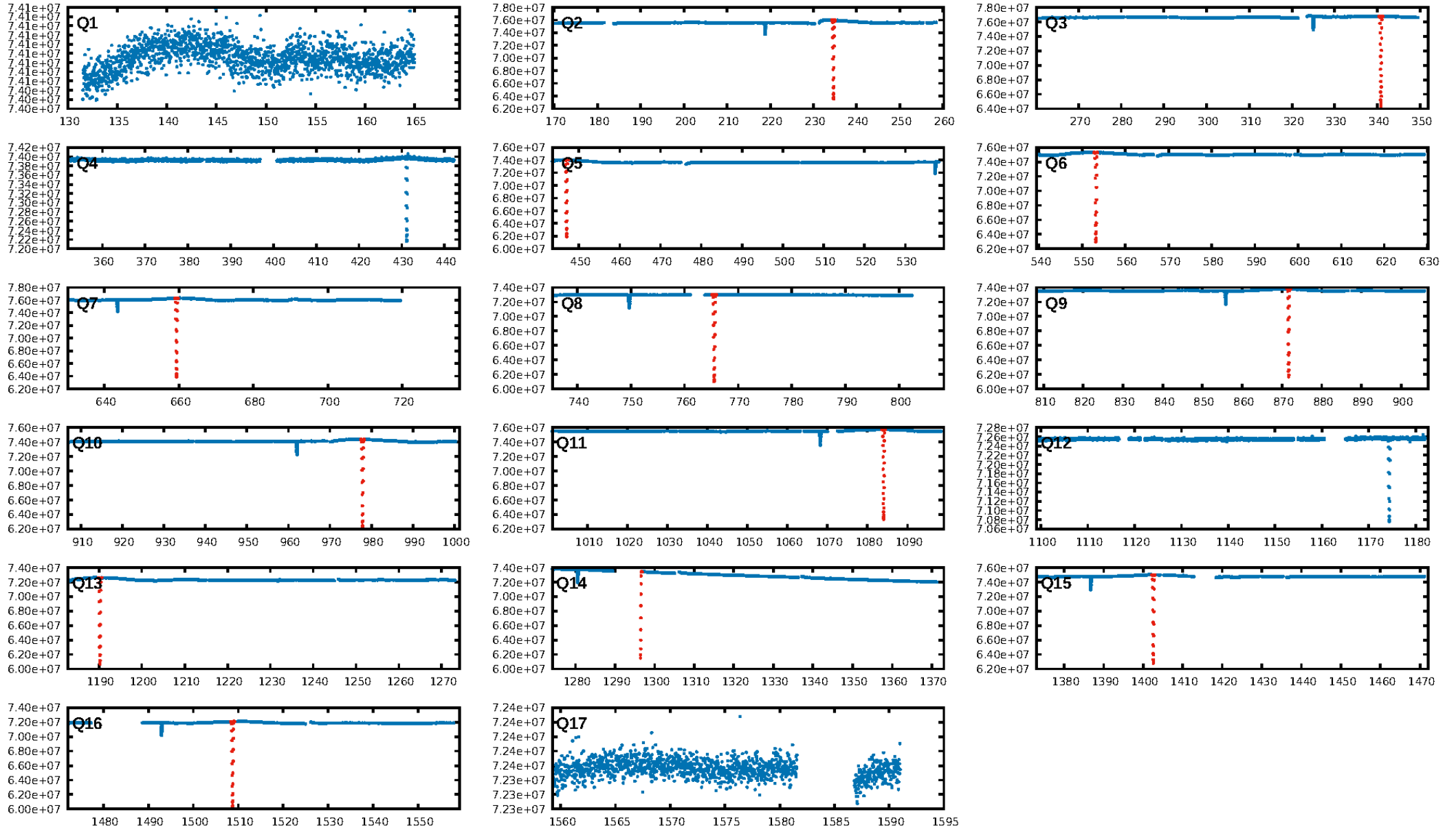
## DV Fit Results:

Period = 106.17594 [0.00001] d  
Epoch = 234.6410 [0.0000] BKJD  
Rp/R\* = 0.4409 [0.0014]  
a/R\* = 97.33 [0.02]  
b = 0.72 [0.00]  
Seff = 8.95 [4.09]  
Teq = 441 [50] K  
Rp = 54.89 [15.93] Re  
a = 0.4161 [0.1152] AU  
Ag = 653.29 [288.27] [2.26σ]  
Teffp = 3448 [105] K [25.82σ]

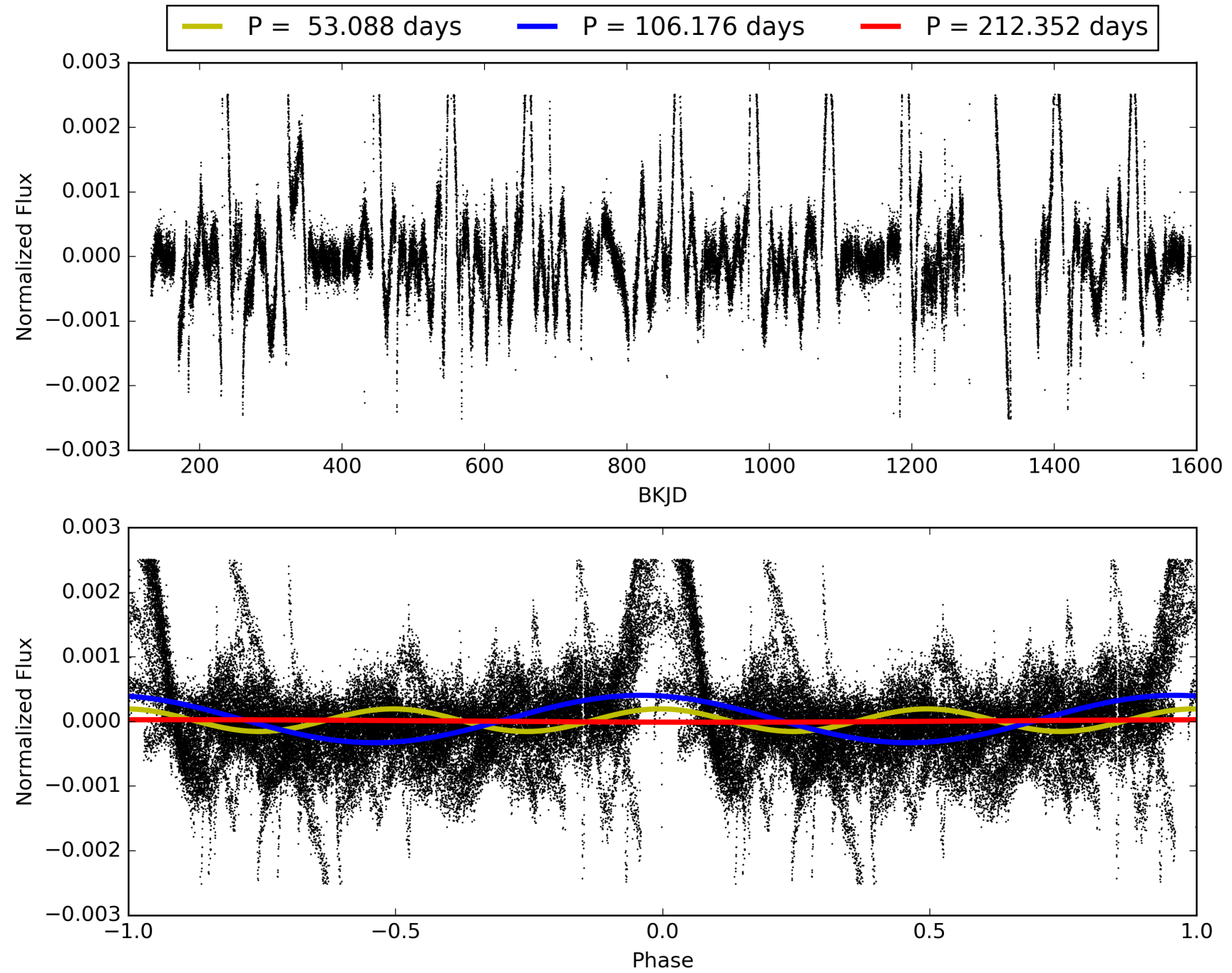
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 99.8%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [13/13]  
GhostDiagnostic-chr: 9.728  
Centroid-sig: 3.6%  
Centroid-so: 0.129 arcsec [102.93σ]  
OotOffset-rm: 0.002 arcsec [0.03σ]  
KicOffset-rm: 0.138 arcsec [2.06σ]  
OotOffset-st: 3/4/2/3 [12]  
KicOffset-st: 3/4/2/3 [12]  
DiffImageQuality-fgm: 1.00 [12/12]  
DiffImageOverlap-fno: 1.00 [12/12]

# TCE 008044608-01, PDC Light Curves

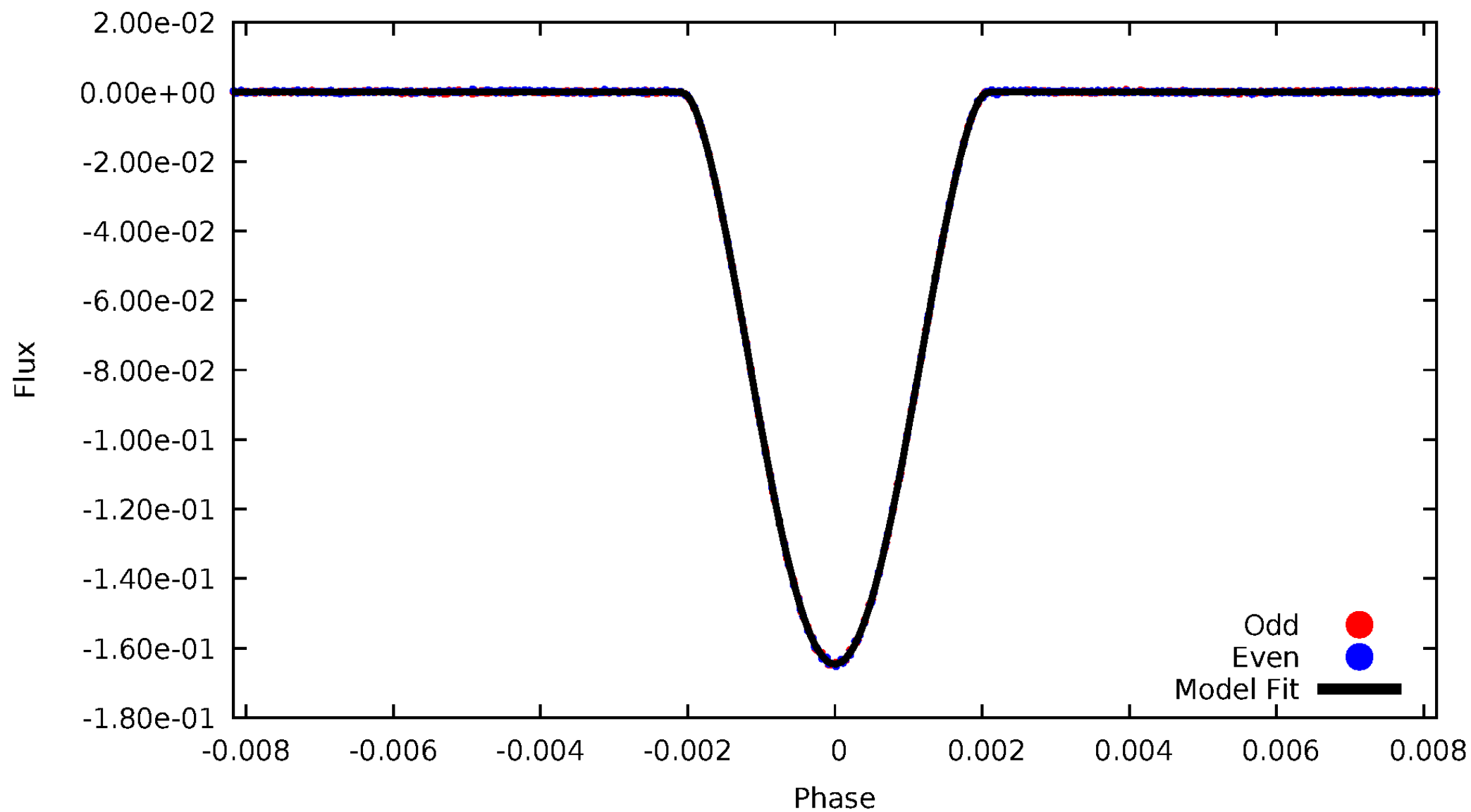


TCE 008044608-01



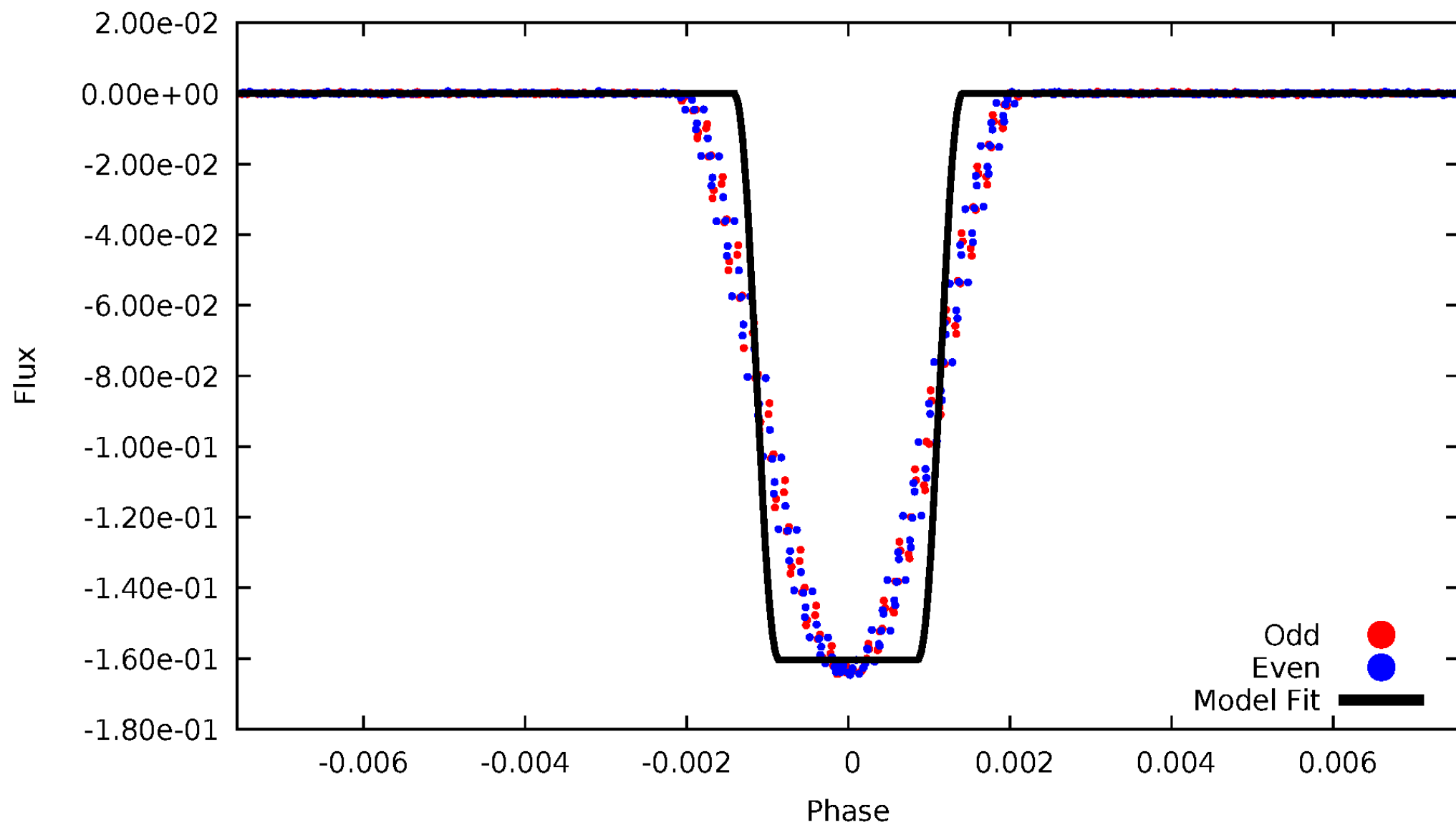
# DV Odd/Even

TCE 008044608-01



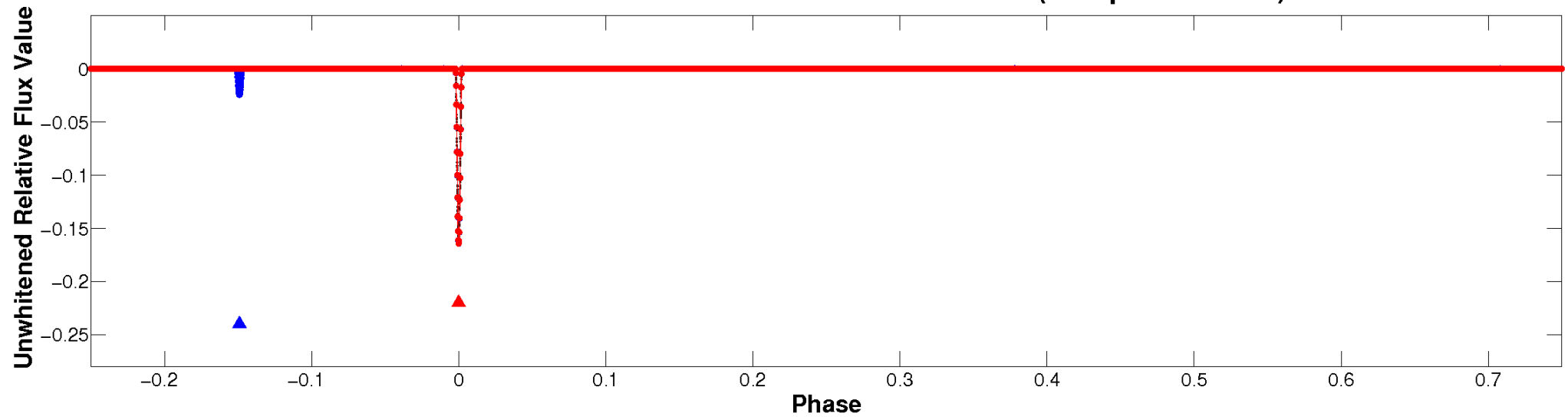
# ALT Odd/Even

TCE 008044608-01

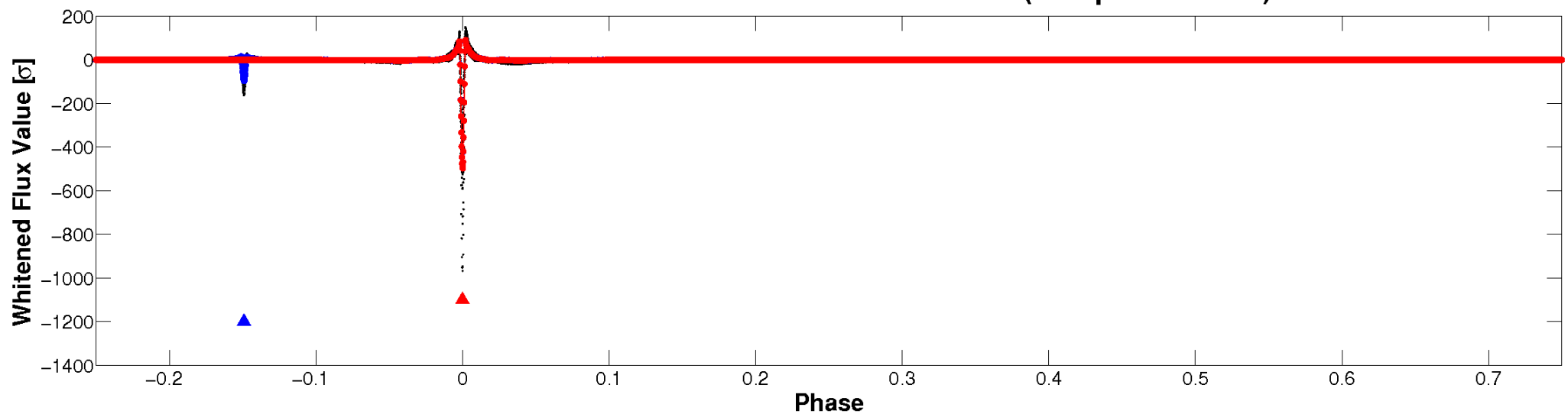


# Non-Whitened Vs. Whitened Light Curve

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

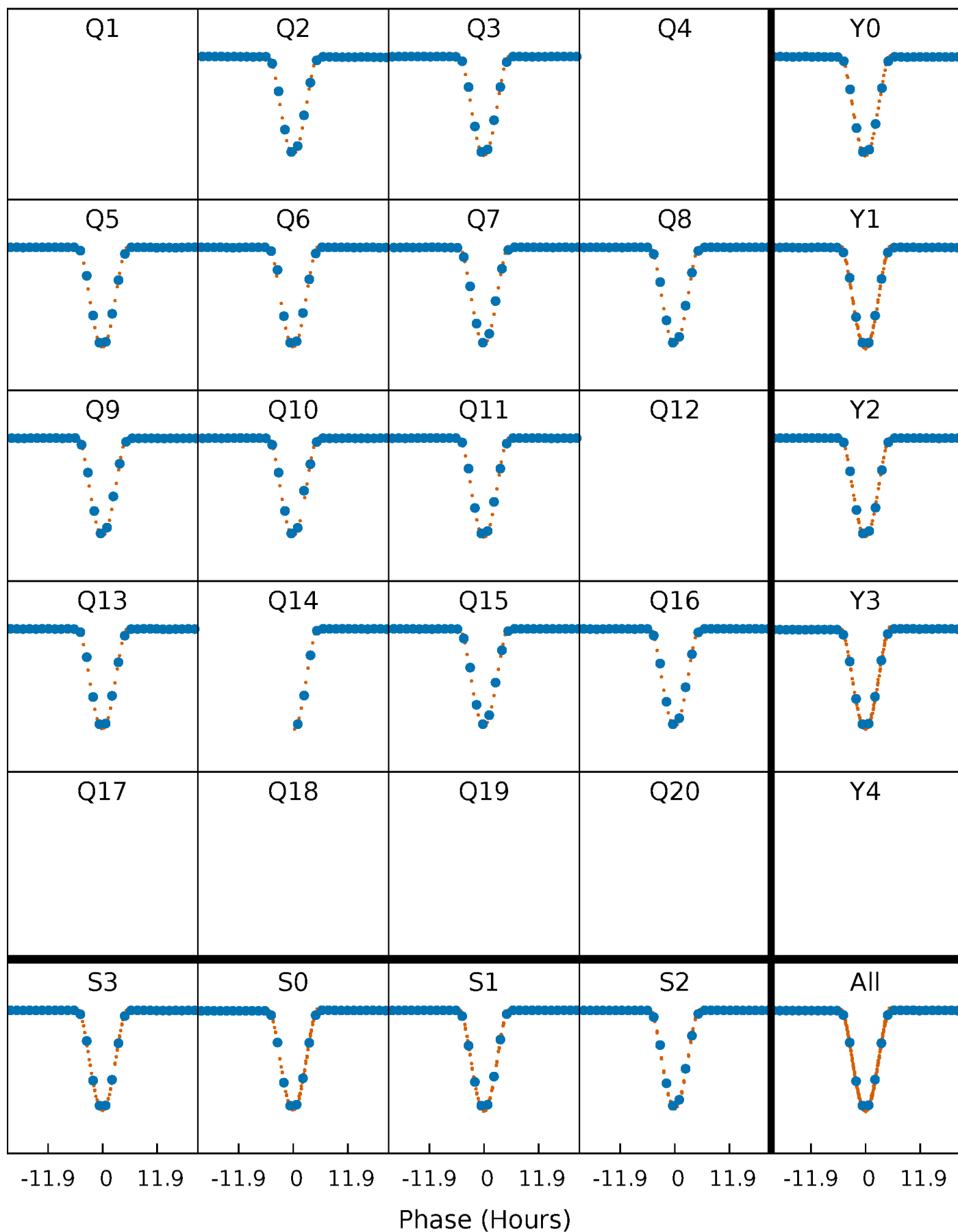


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

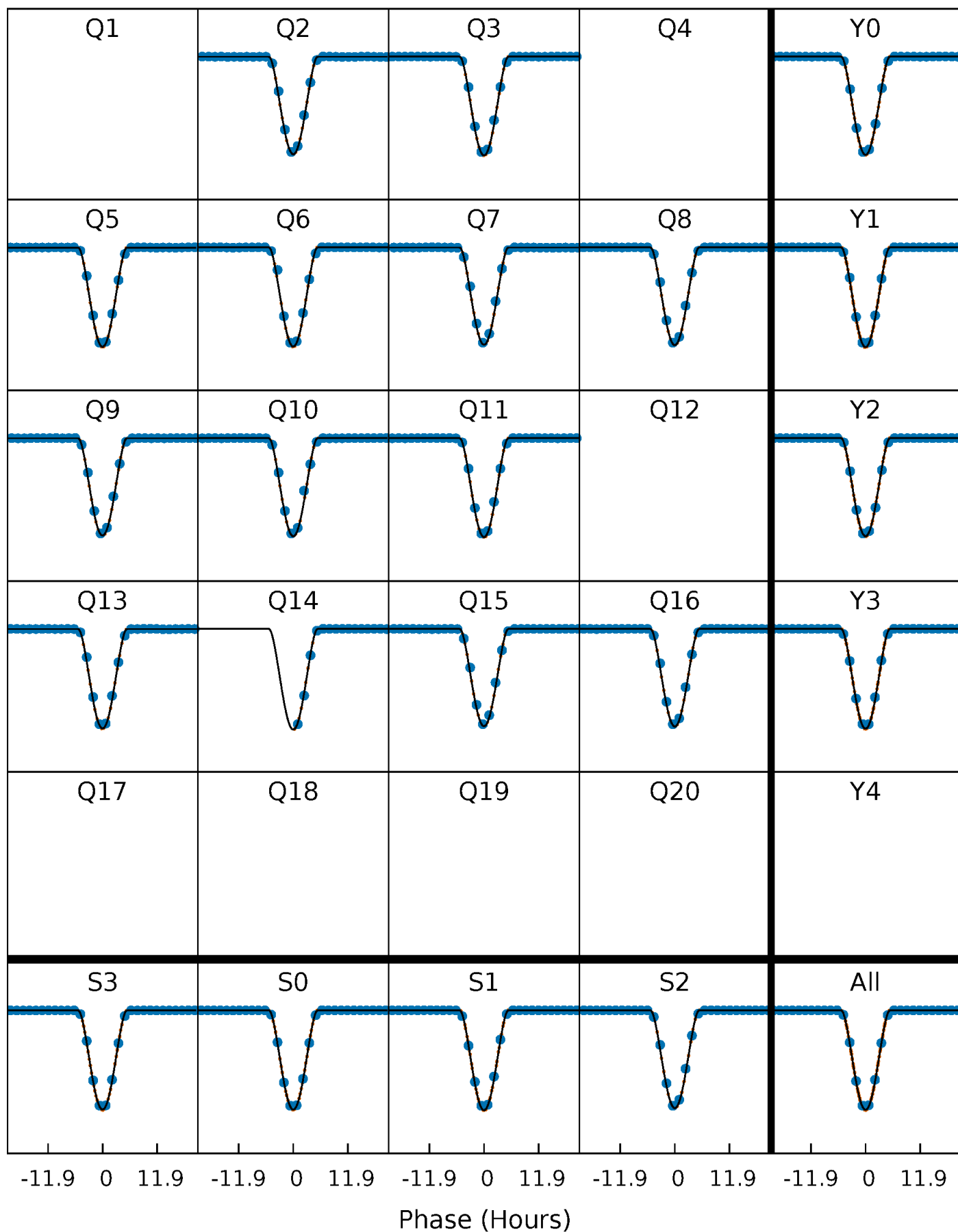
TCE 008044608-01 P=106.175937 Days  $T_0=234.641030$  (BKJD)





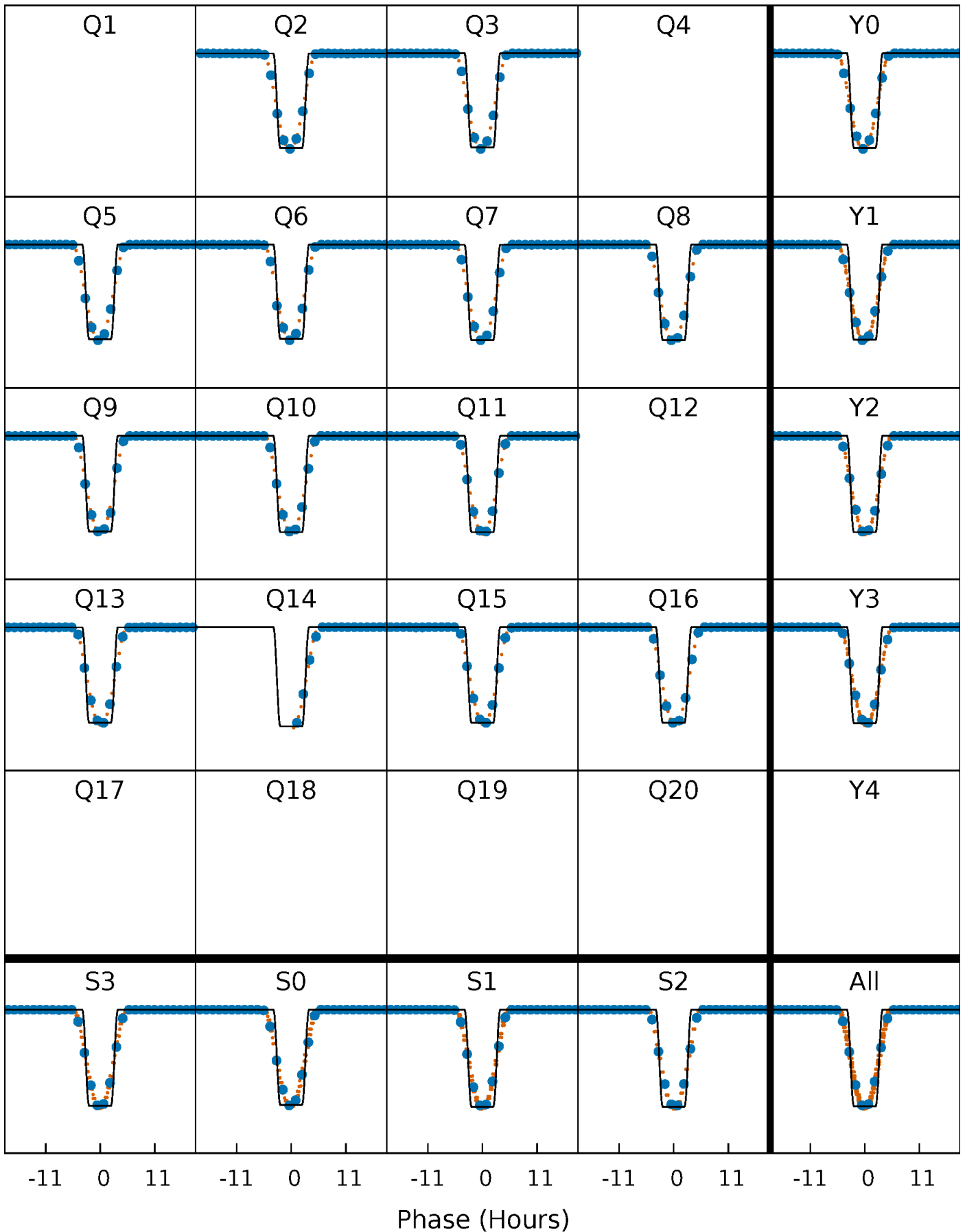
# DV Quarter-Phased Transit Curves

TCE 008044608-01 P=106.175937 Days  $T_0=234.641030$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

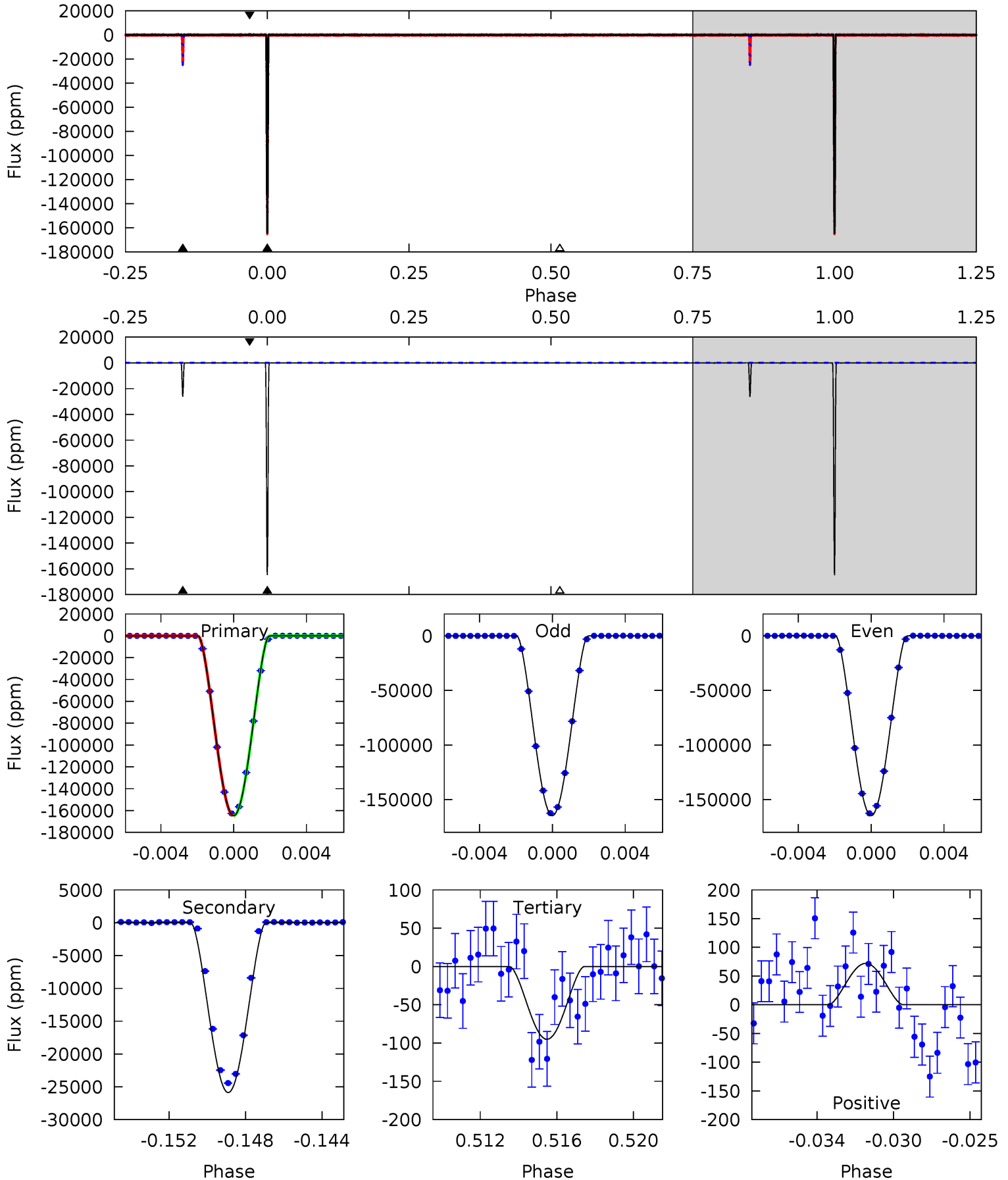
TCE 008044608-01 P=106.173949 Days  $T_0=234.652602$  (BKJD)



# DV Model-Shift Uniqueness Test

008044608-01, P = 106.175937 Days, E = 128.465093 Days

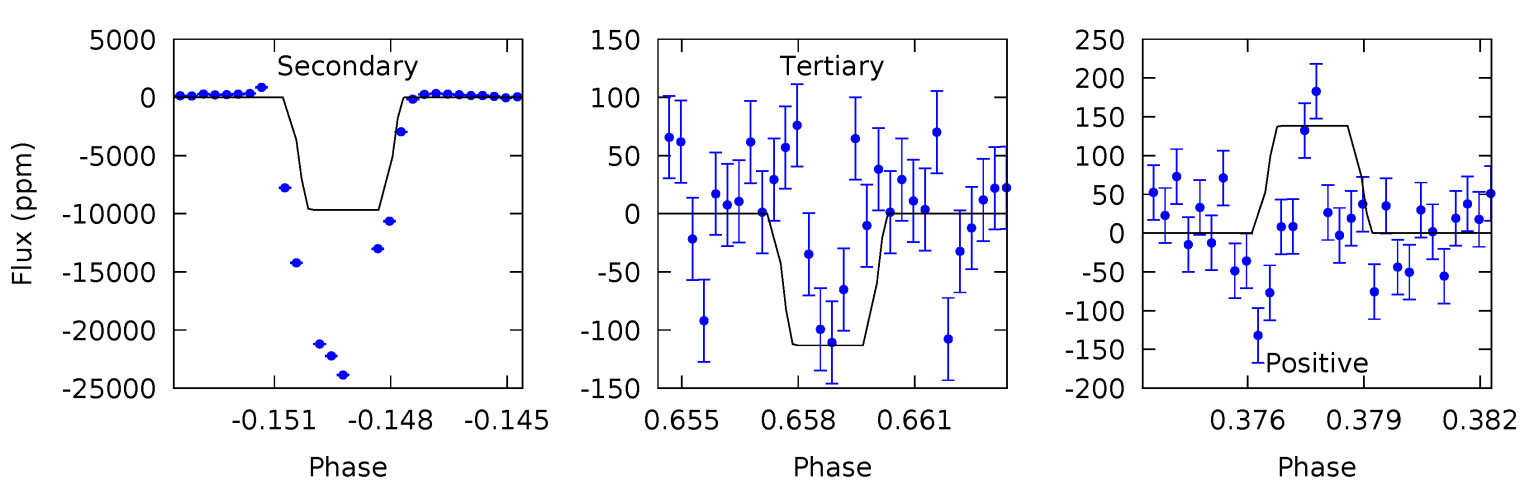
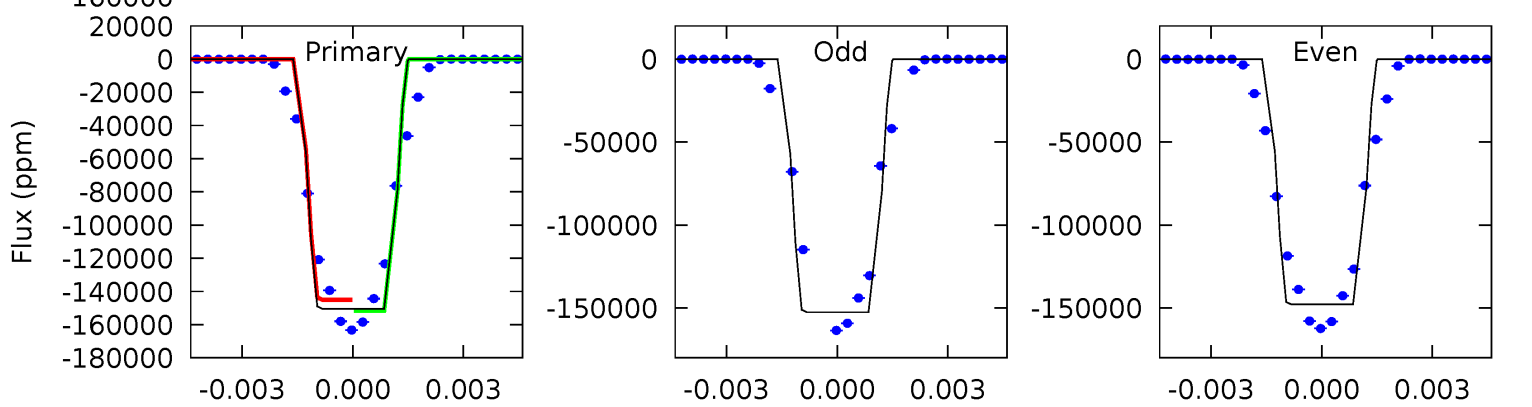
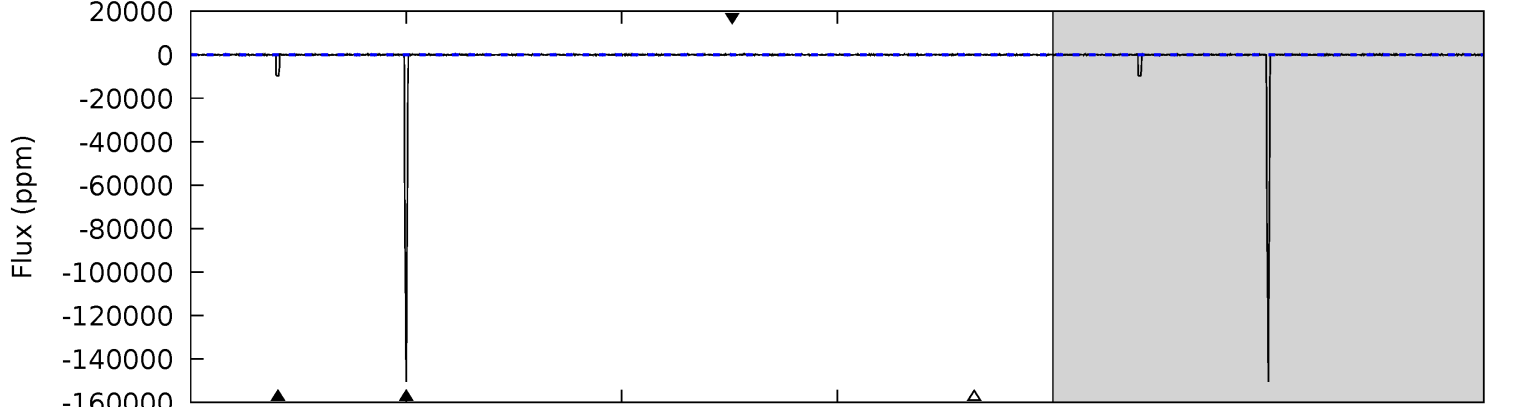
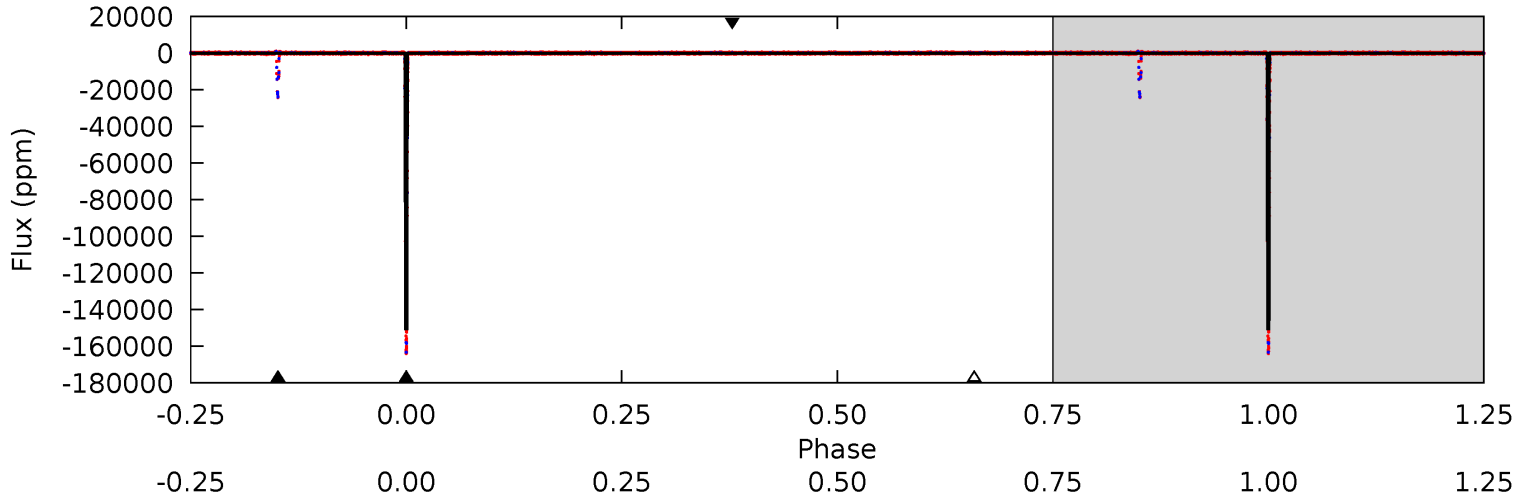
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13973	2195	8.06	6.11	5.19	2.86	2.62	13965	13967	2187	2189	3.16	1.00	0.00	0.43



# Alt Model-Shift Uniqueness Test

008044608-01, P = 106.173949 Days, E = 128.478653 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
6202	398.3	4.67	5.71	5.27	2.99	1.32	6198	6197	393.6	392.6	96.3	1.00	0.00	0



### Stellar Parameters For KIC 008044608

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6038^{+163}_{-181}$	$4.254^{+0.258}_{-0.172}$	$-0.560^{+0.300}_{-0.300}$	$1.141^{+0.331}_{-0.300}$	$0.852^{+0.119}_{-0.069}$	$0.808^{+1.062}_{-0.403}$
	+3%/-3%	+6%/-4%	+54%/-54%	+29%/-26%	+14%/-8%	+132%/-50%
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 008044608-01 / KOI 3523.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-25883 \pm 12$	$54.35^{+8.89}_{-7.46}$	$611^{+51}_{-50}$	$3991^{+90}_{-88}$	$866^{+294}_{-228}$
Alt.	$-9660 \pm 24$	$49.50^{+8.03}_{-7.30}$	$612^{+51}_{-51}$	$3486^{+64}_{-62}$	$383^{+148}_{-95}$

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

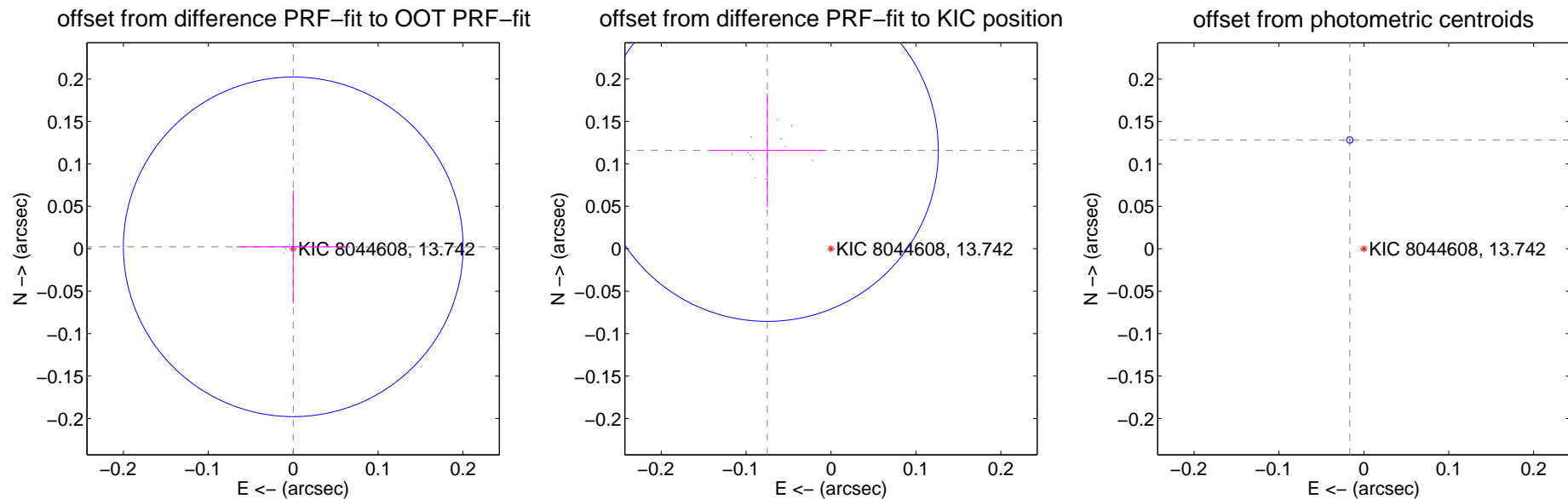
## DV Centroid Data

Supplemental centroid analysis for 008044608-01. Kepler magnitude: 13.74. Transit SNR 4799.73

There are 12 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	$0.002 \pm 0.067$	0.03	$-0.000 \pm 0.067$	$0.002 \pm 0.067$
PRF-fit source offset from KIC position	$0.138 \pm 0.067$	2.06	$0.075 \pm 0.067$	$0.116 \pm 0.067$
photometric centroid source offset	$0.13 \pm 0.00$	102.93	$0.02 \pm 0.00$	$0.13 \pm 0.00$



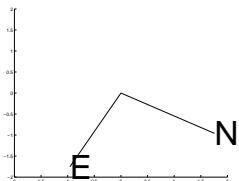
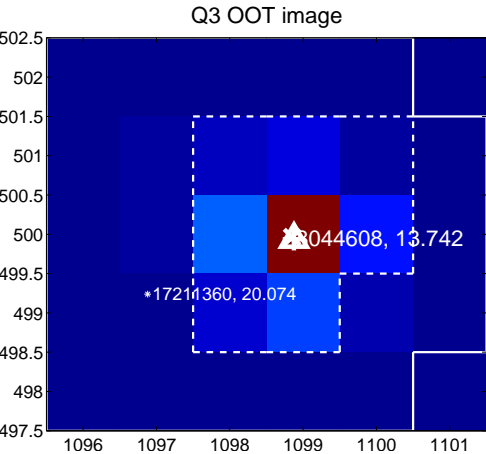
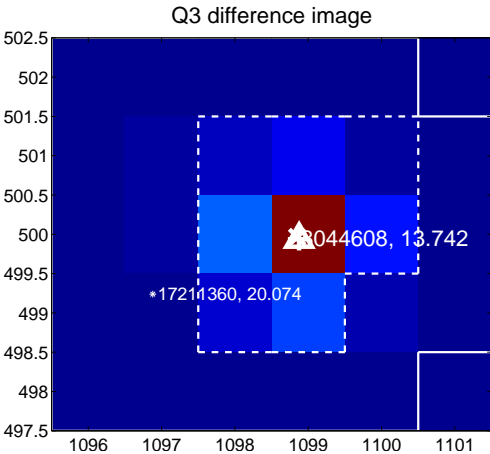
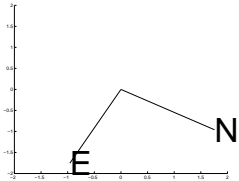
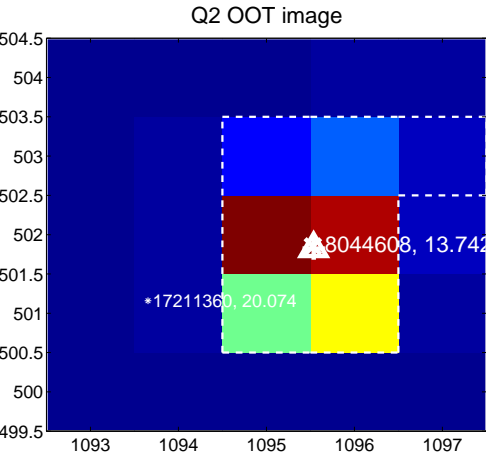
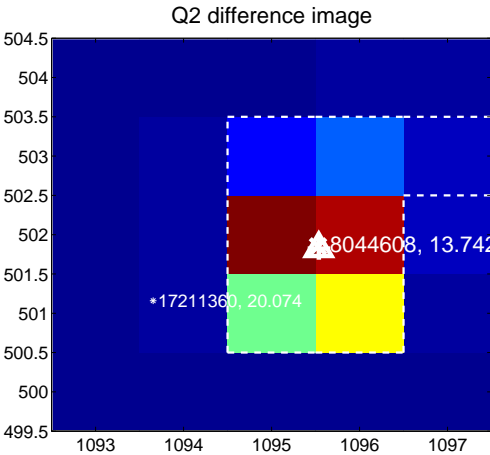
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

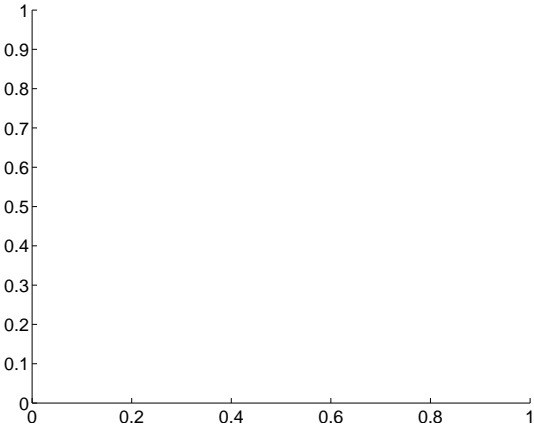
Q1 no difference image



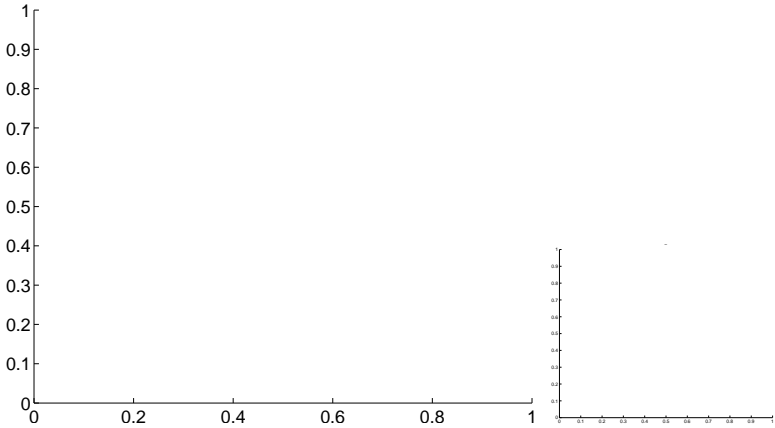
Q1 no OOT image



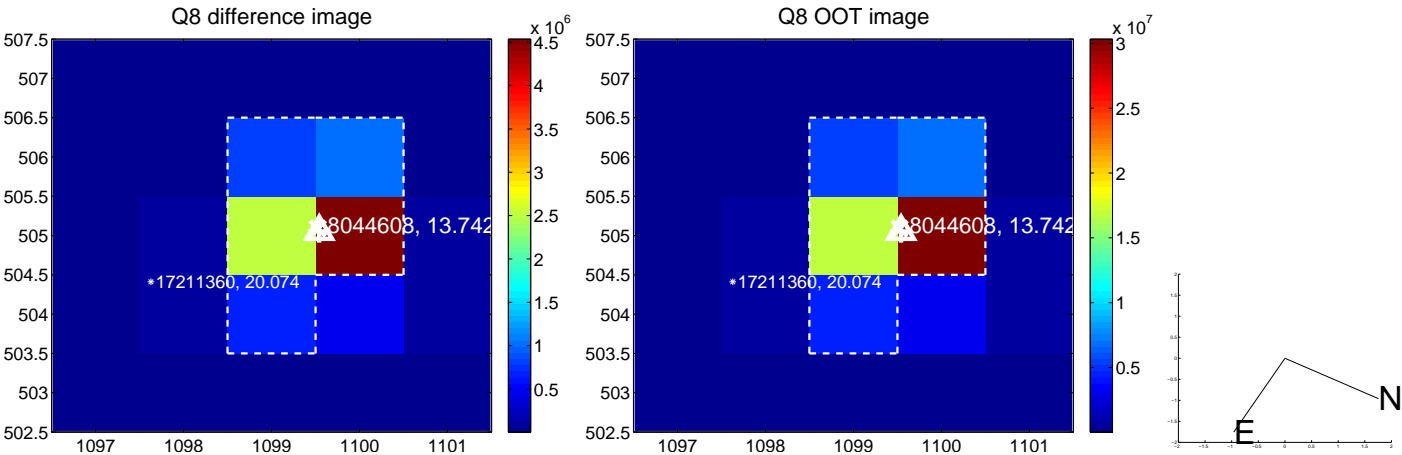
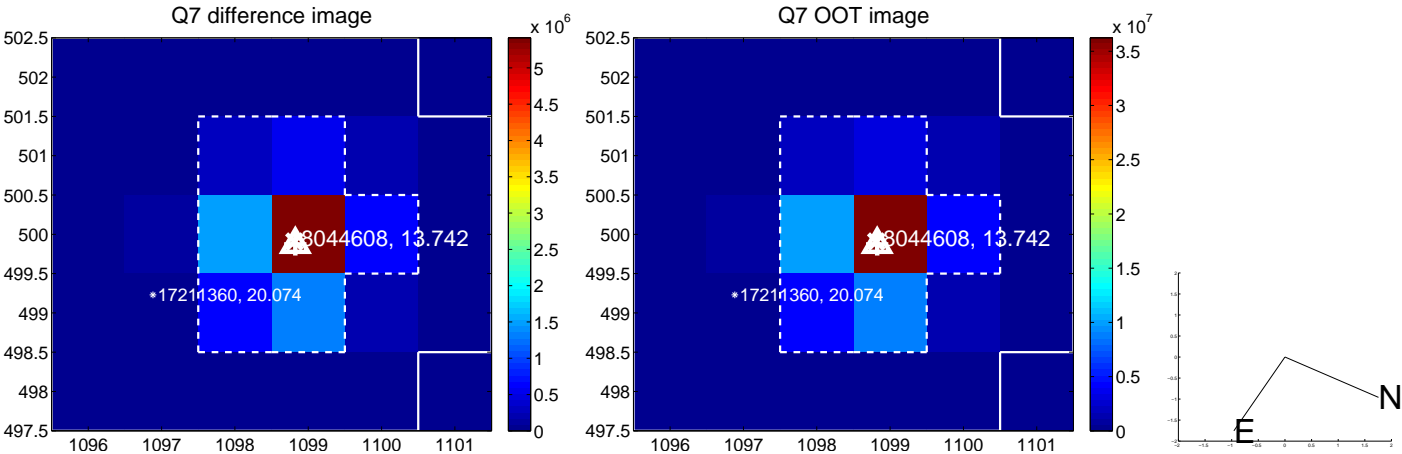
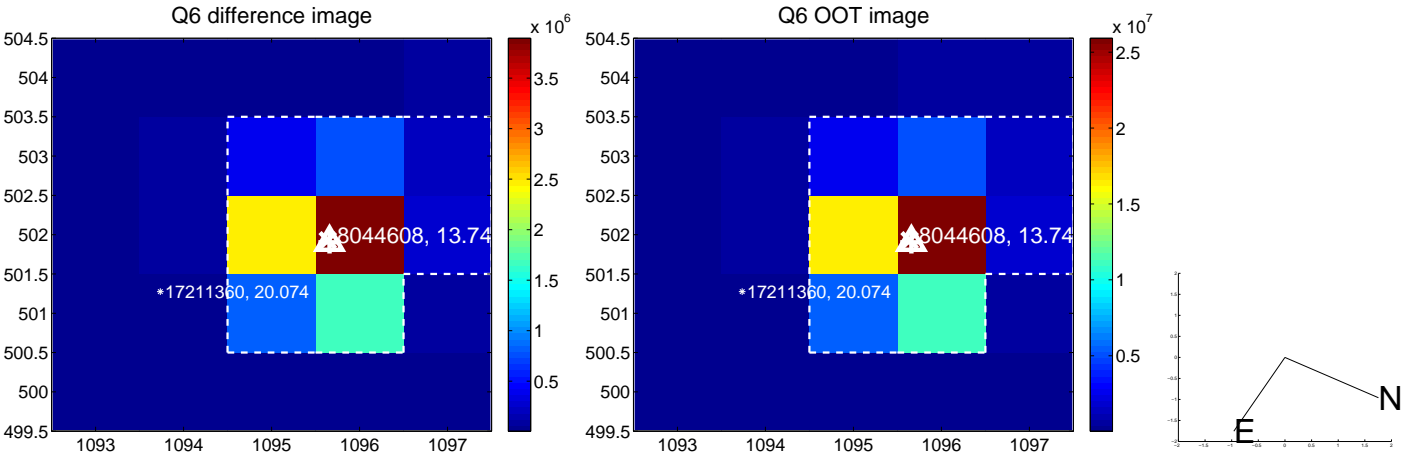
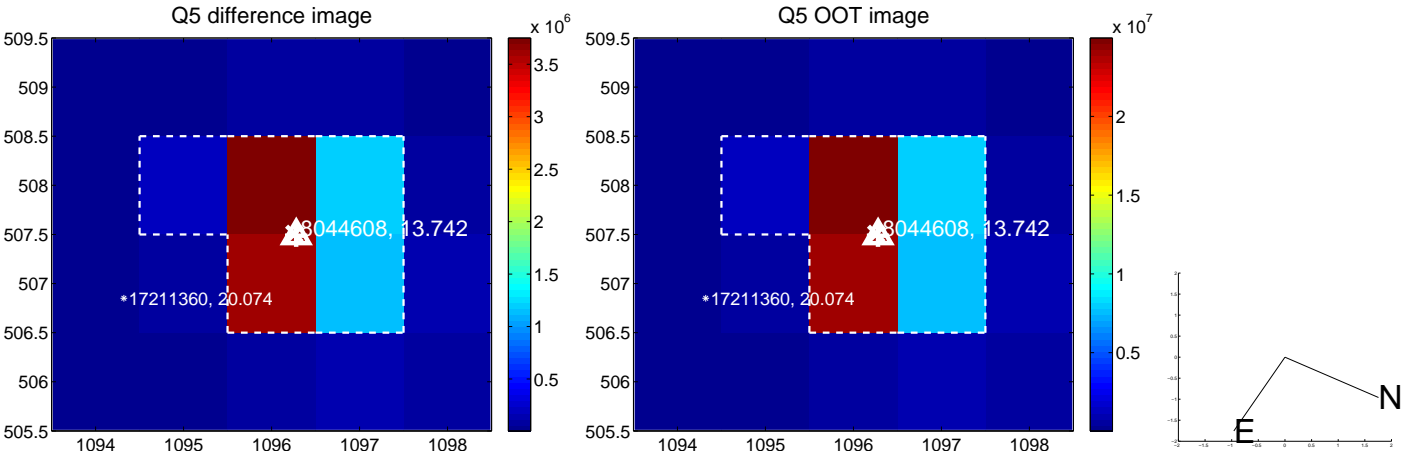
Q4 no difference image



Q4 no OOT image

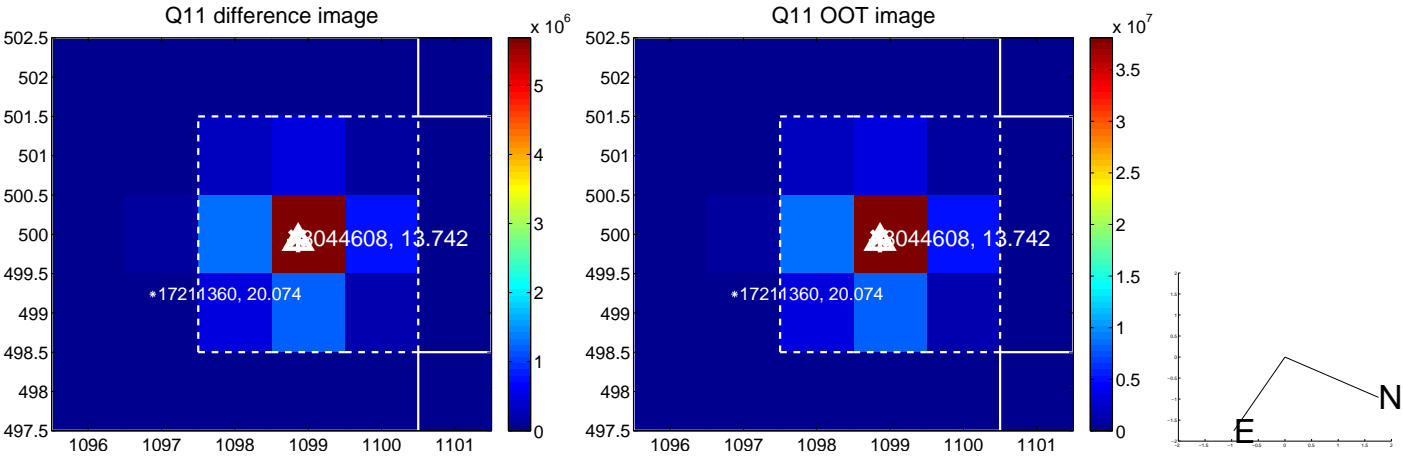
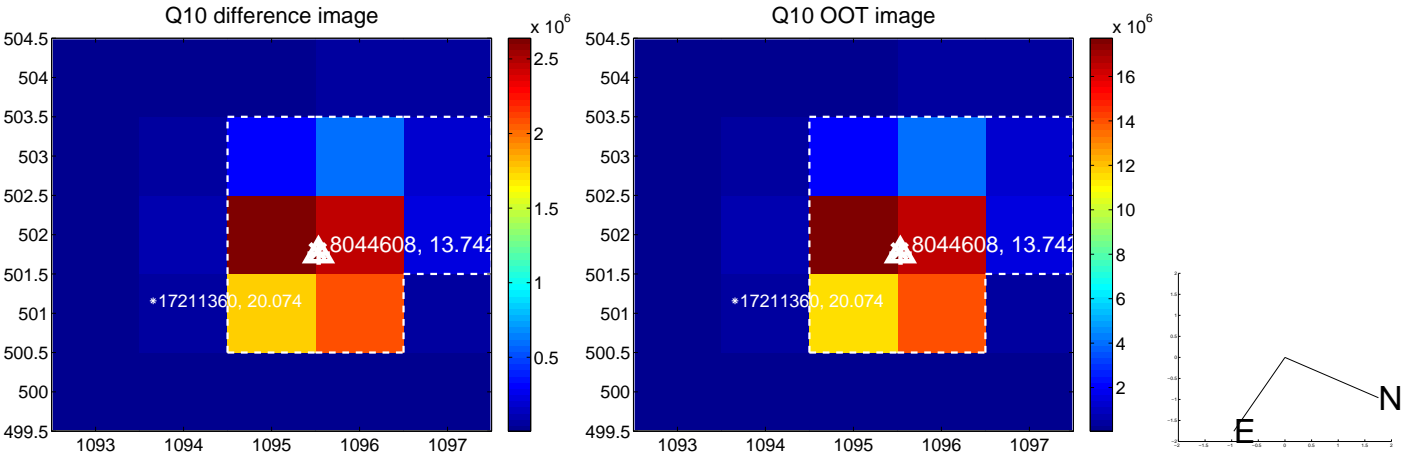
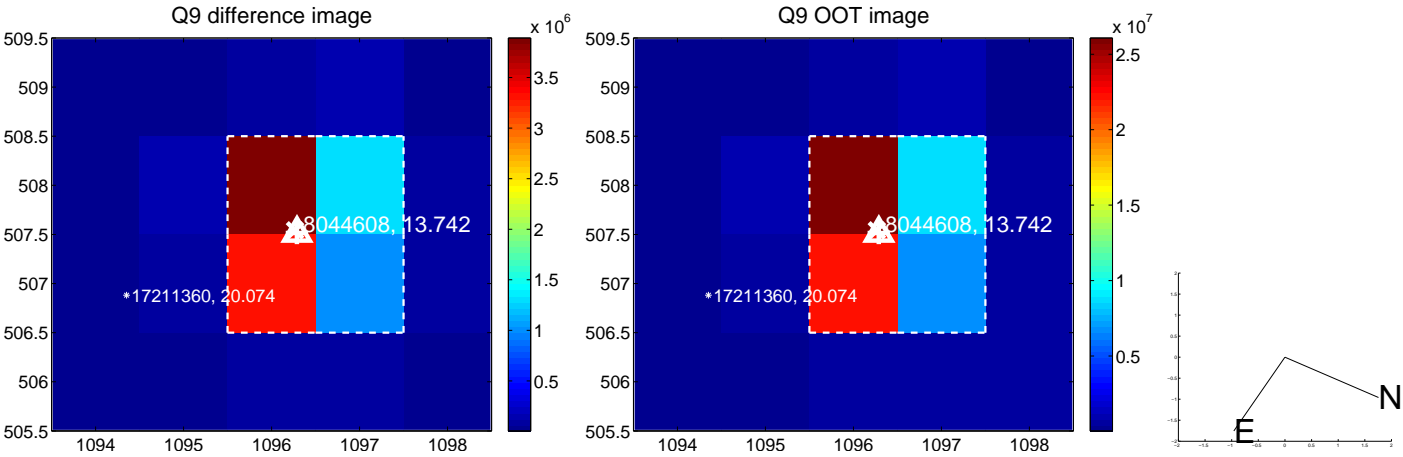


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

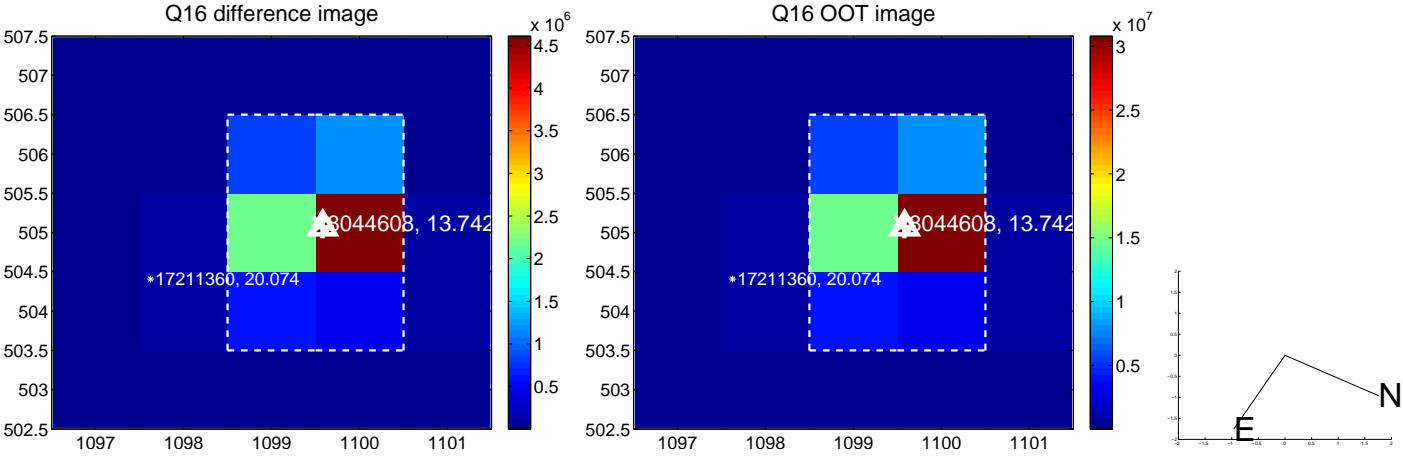
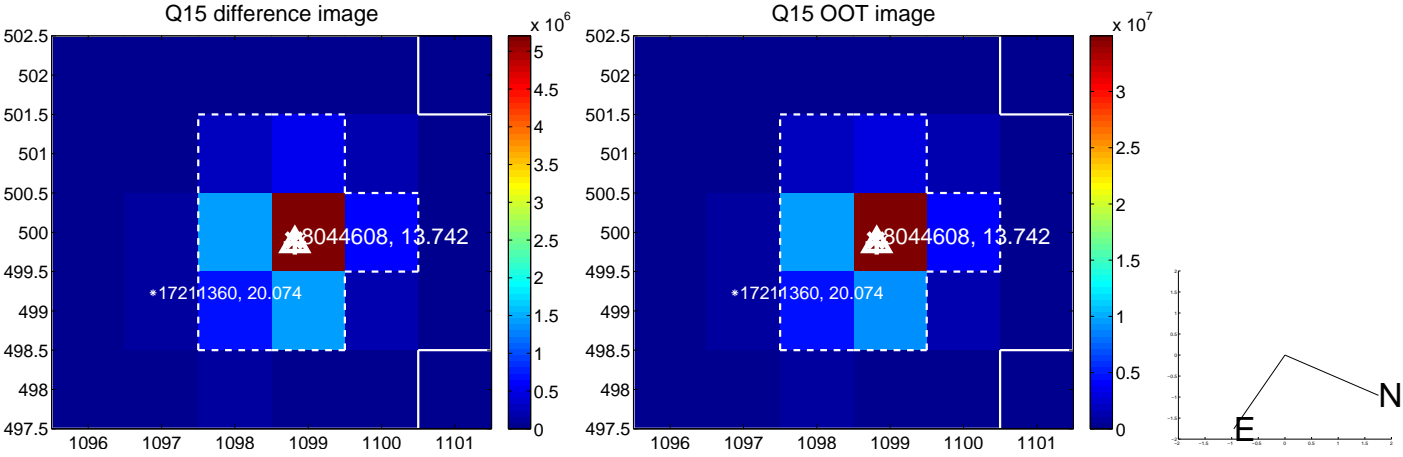
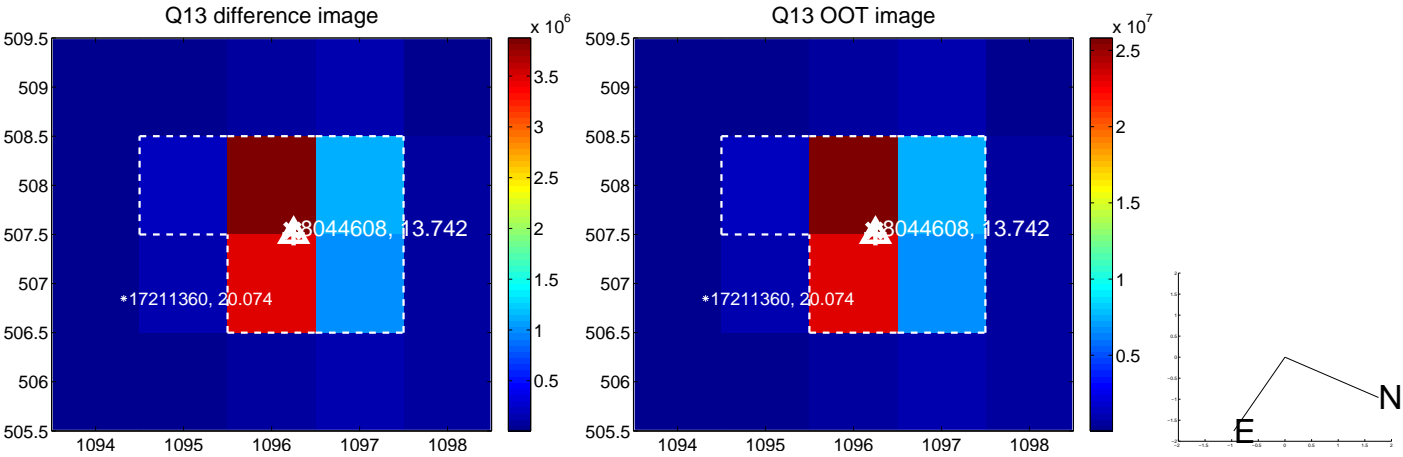




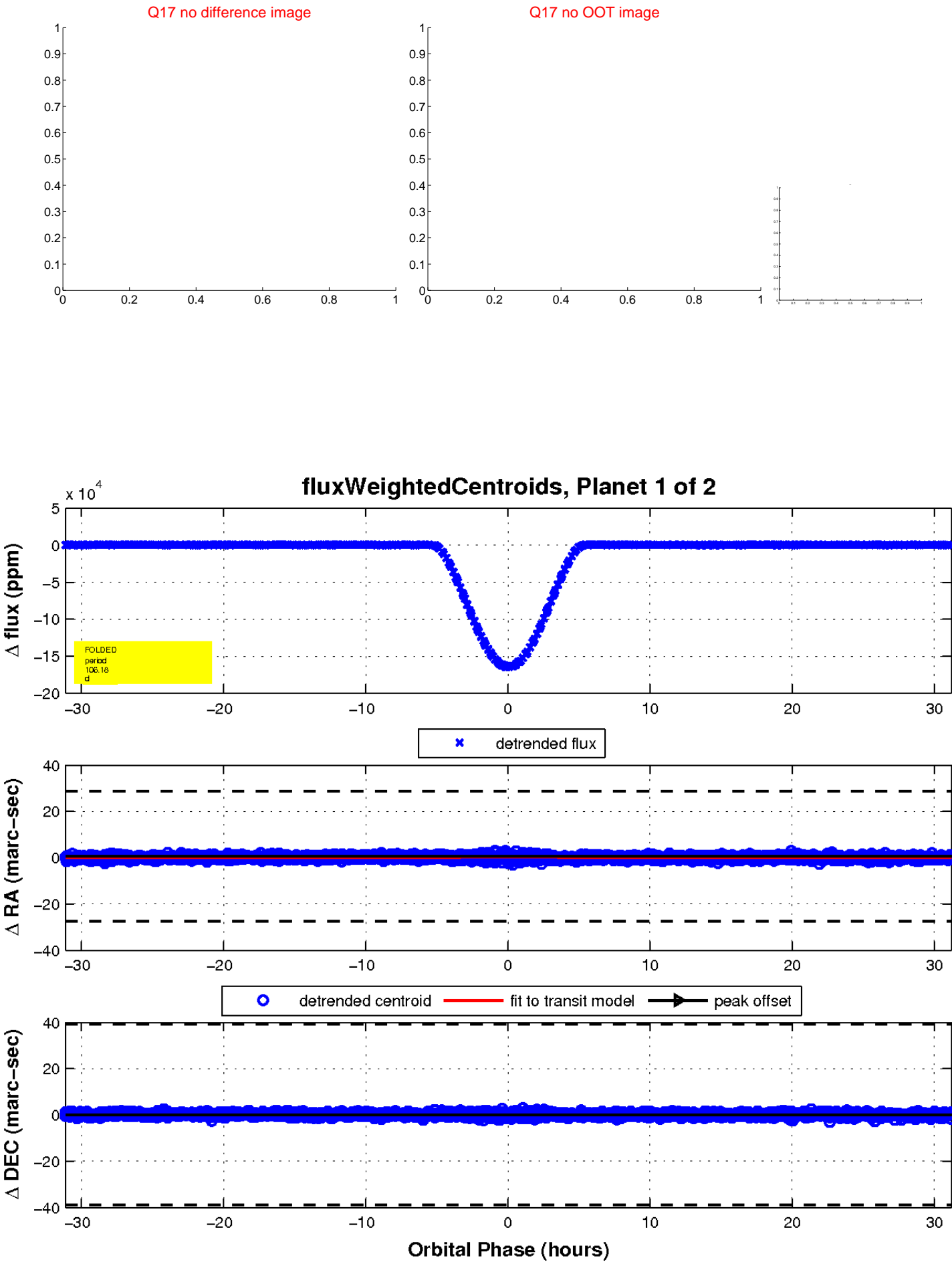
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

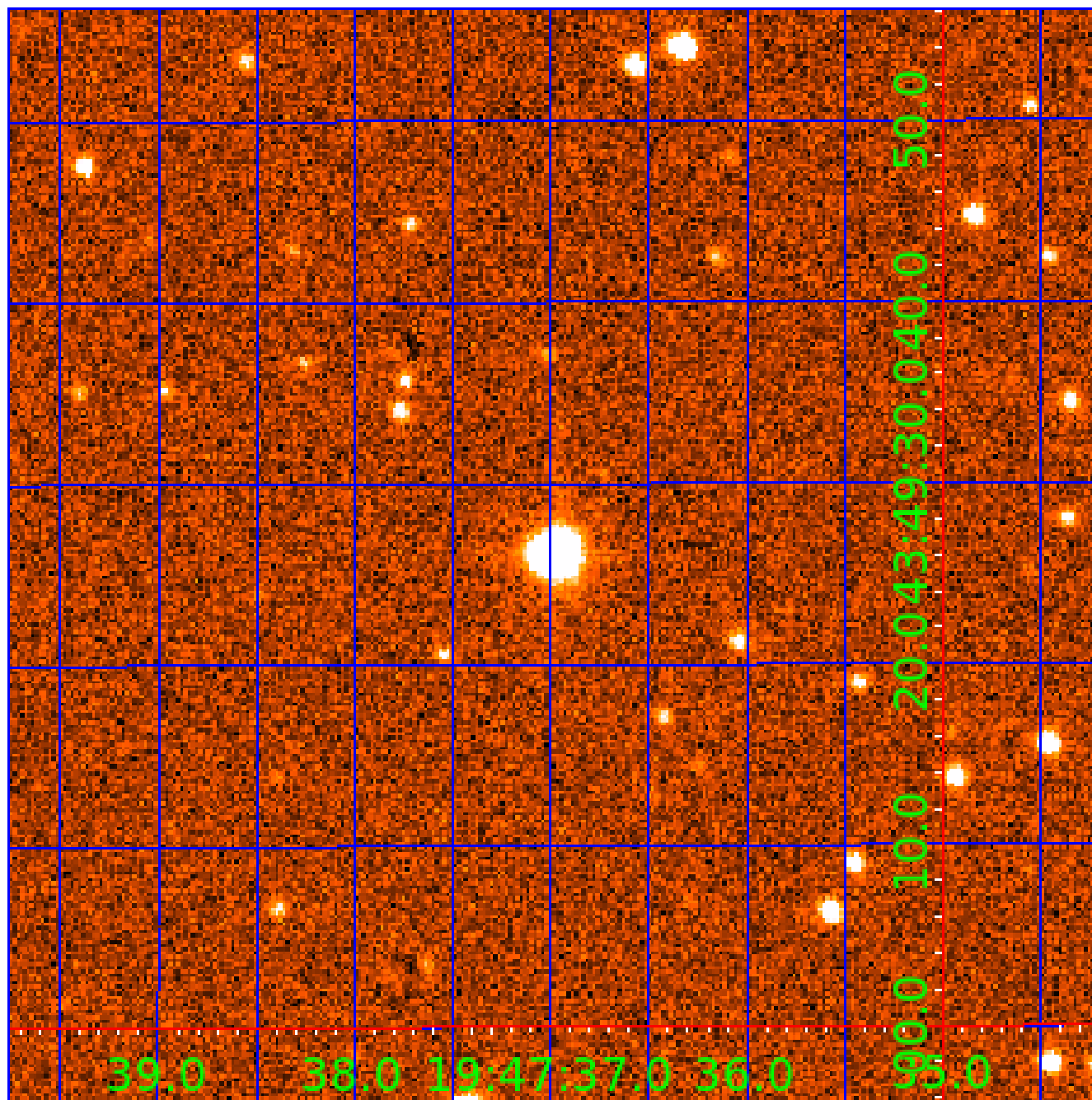


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination



# KIC 008044608

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008044608-01	OBS	3523.01	106.175937	234.641030	164547.5	10.408	4857.8	4799.7	1.14	6038	54.90	8.95
008044608-02	OBS	No	106.175863	218.817861	24844.5	9.079	1057.7	976.1	1.14	6038	22.50	8.95

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008044608-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
008044608-02	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 008044608-02

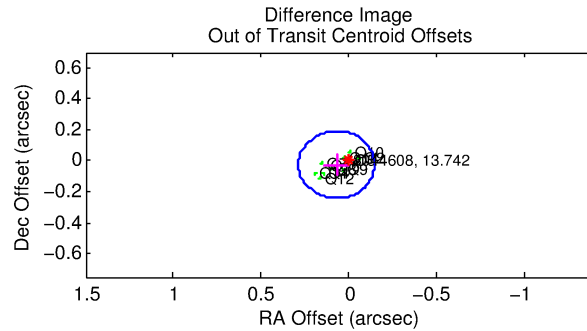
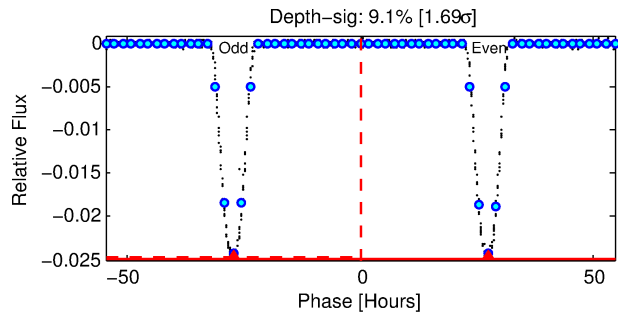
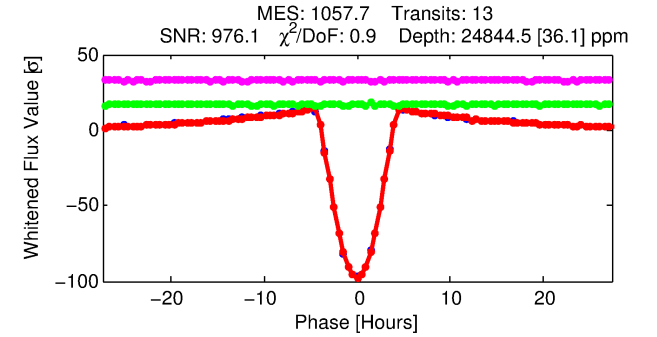
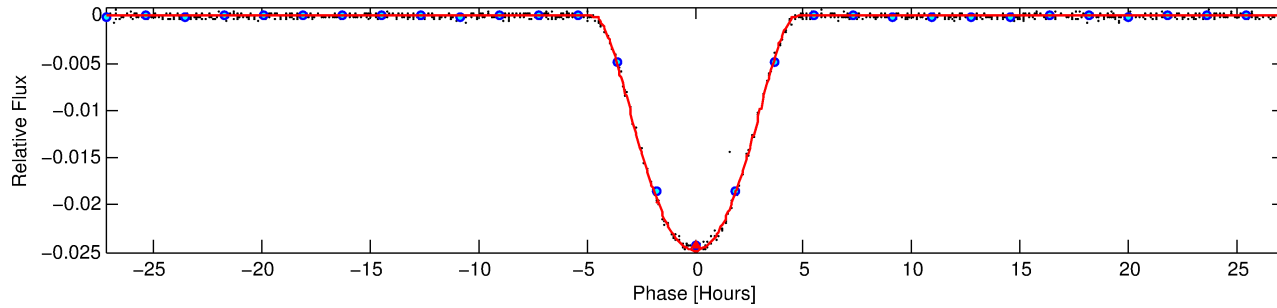
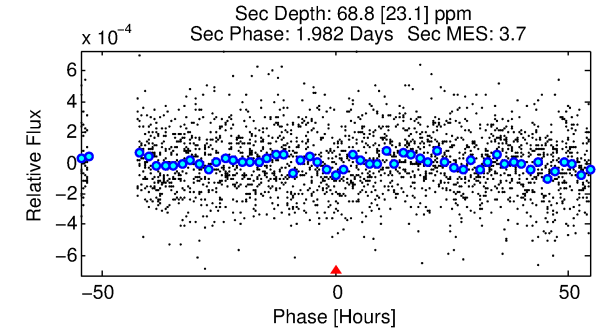
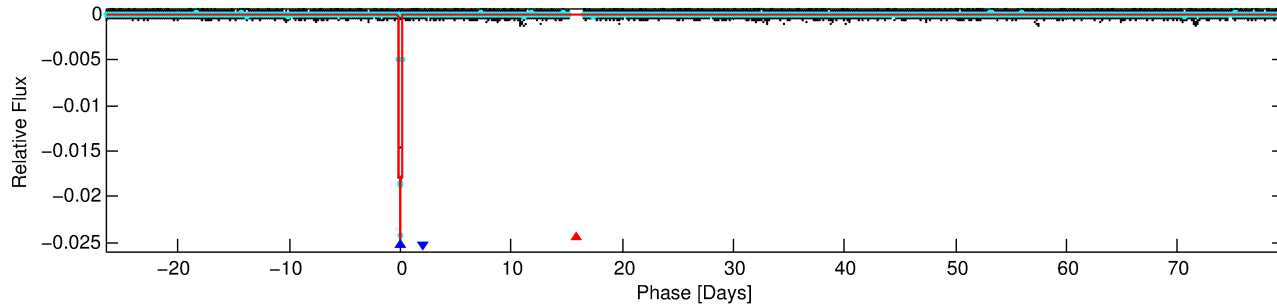
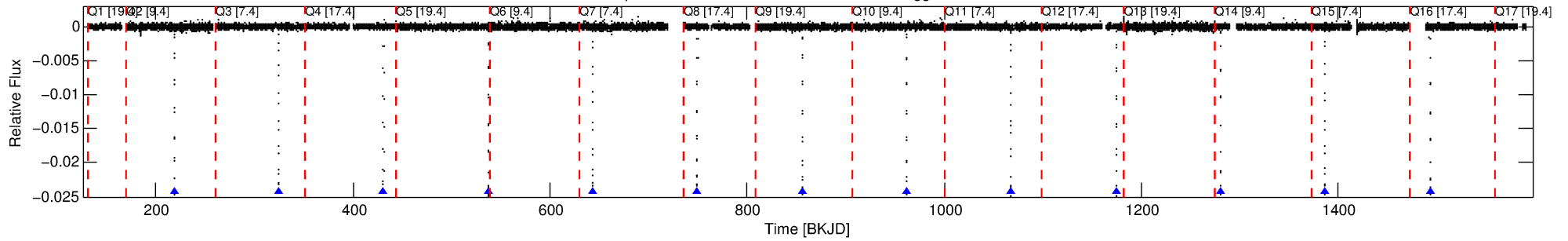
No Significant Match Found

# DV One-Page Summary

KIC: 8044608 Candidate: 2 of 2 Period: 106.176 d

KOI: K03523 Corr: No Ephemeris Match

Kp: 13.74 R\*: 1.14 Rs Teff: 6038.0 K Logg: 4.25 Fe/H: -0.560



## DV Fit Results:

Period = 106.17586 [0.00003] d  
Epoch = 218.8179 [0.0002] BKJD  
Rp/R\* = 0.1808 [0.0016]  
a/R\* = 69.92 [0.22]  
b = 0.88 [0.00]  
Seff = 8.95 [4.09]  
Teq = 441 [50] K  
Rp = 22.51 [6.53] Re  
a = 0.4161 [0.1152] AU  
Ag = 12.94 [7.17] [1.67σ]  
Teff = 1293 [115] K [6.77σ]

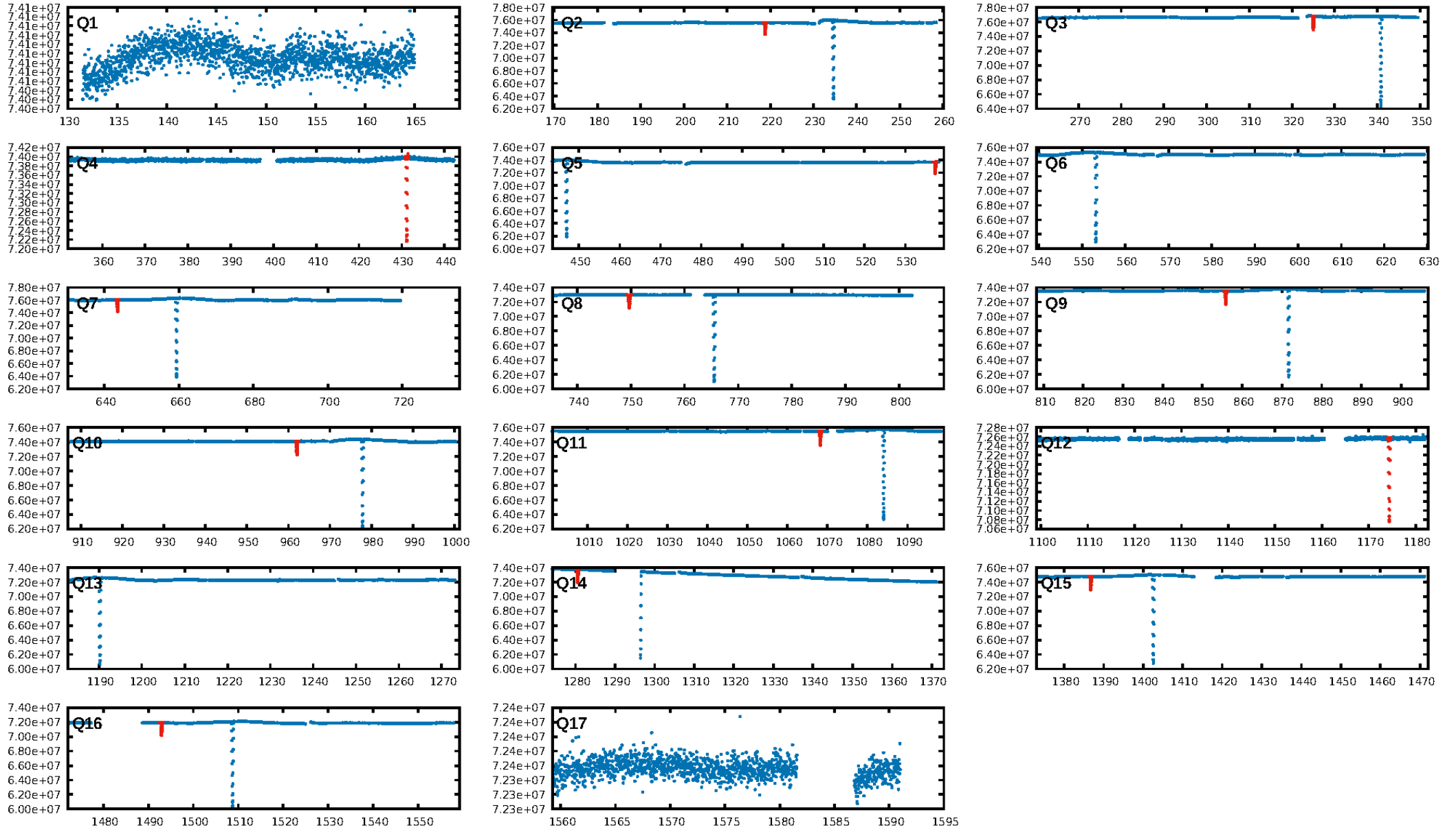
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 98.6%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [13/13]  
GhostDiagnostic-chr: 8.189  
Centroid-sig: 0.0%  
Centroid-so: 0.135 arcsec [16.84σ]  
OotOffset-rm: 0.076 arcsec [1.05σ]  
KicOffset-rm: 0.172 arcsec [2.30σ]  
OotOffset-st: 3/2/4/2 [11]  
KicOffset-st: 3/2/4/2 [11]  
DiffImageQuality-fgm: 1.00 [11/11]  
DiffImageOverlap-fno: 1.00 [11/11]

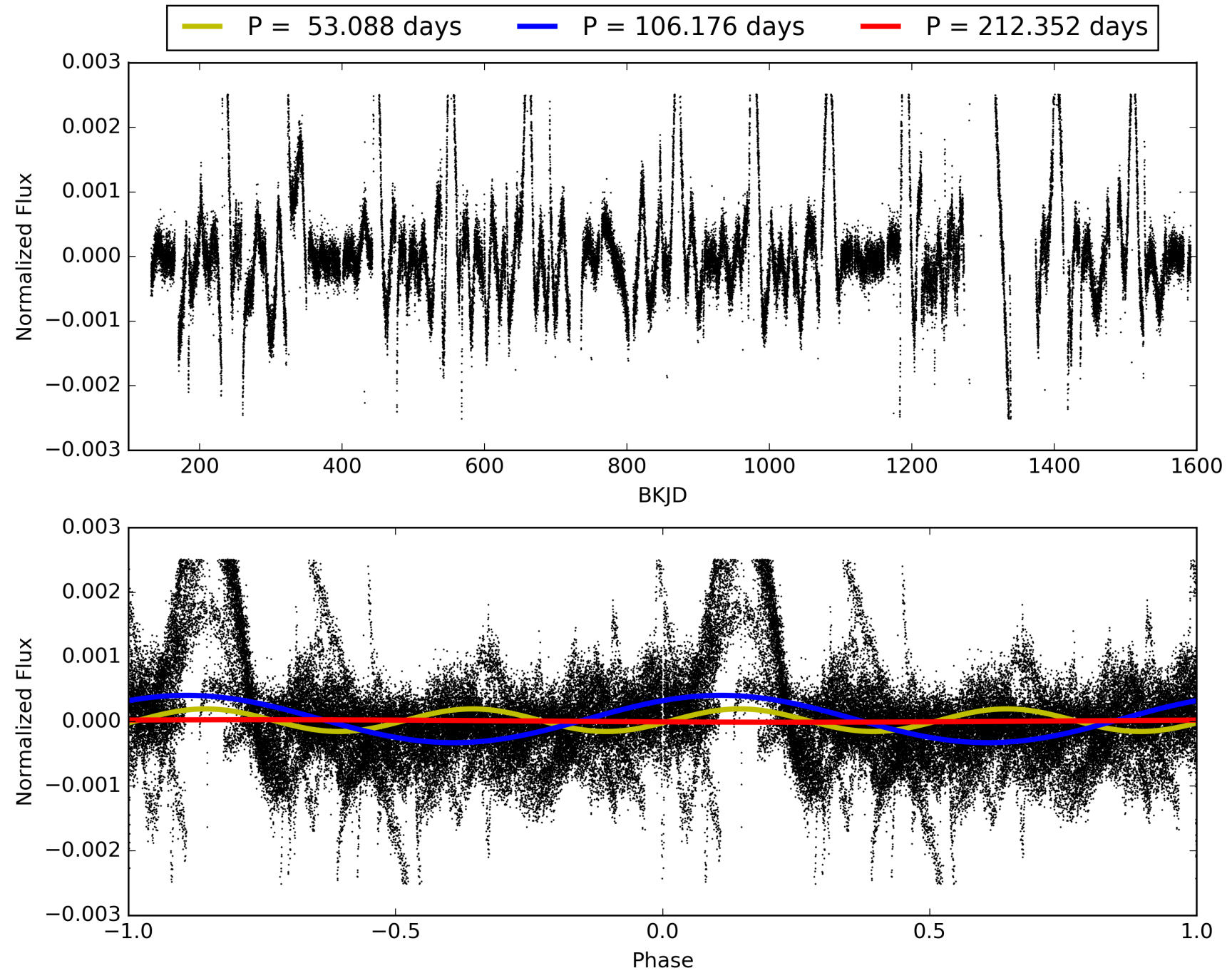
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 02:28:56 Z

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

# TCE 008044608-02, PDC Light Curves



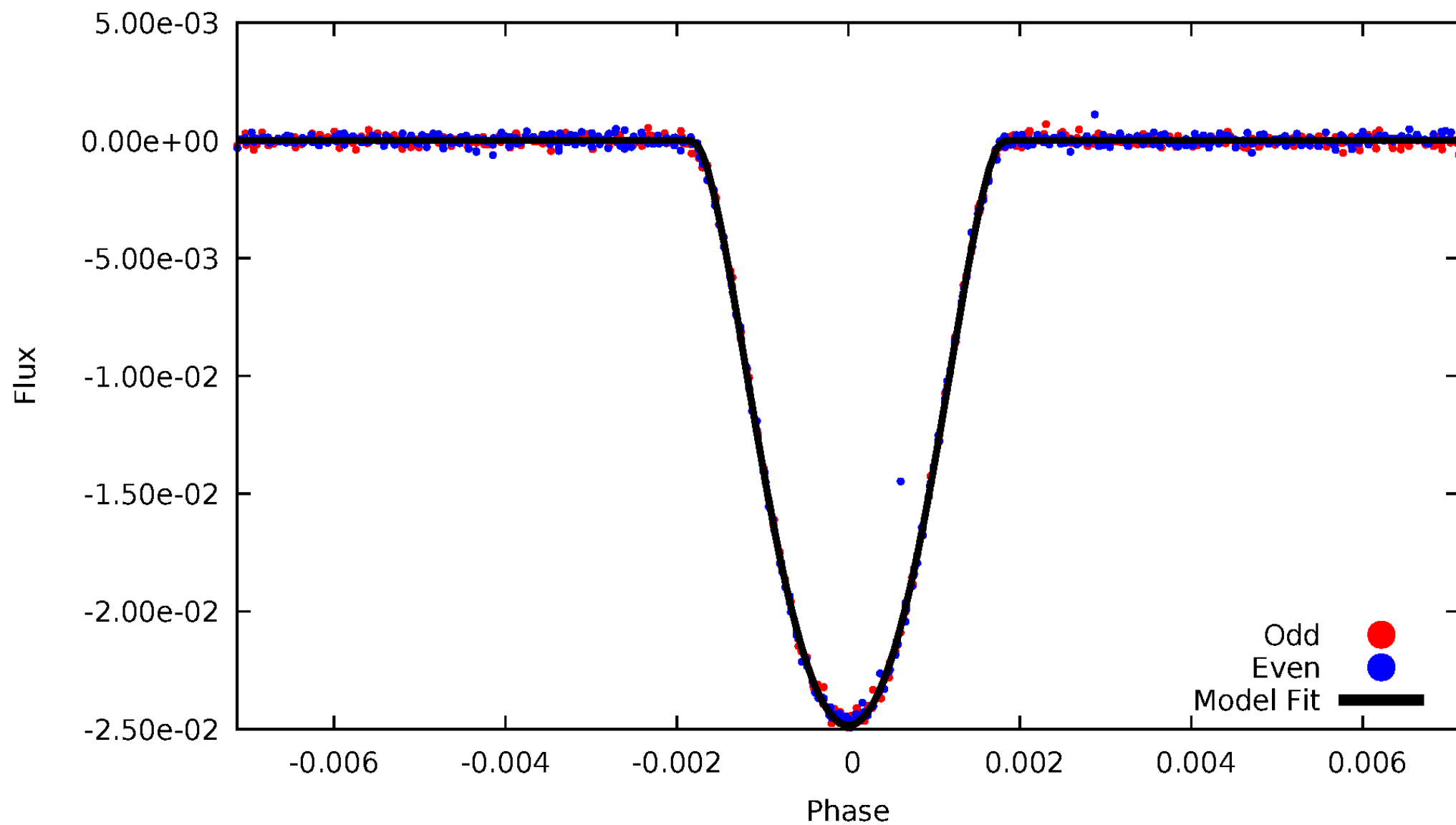
TCE 008044608-02





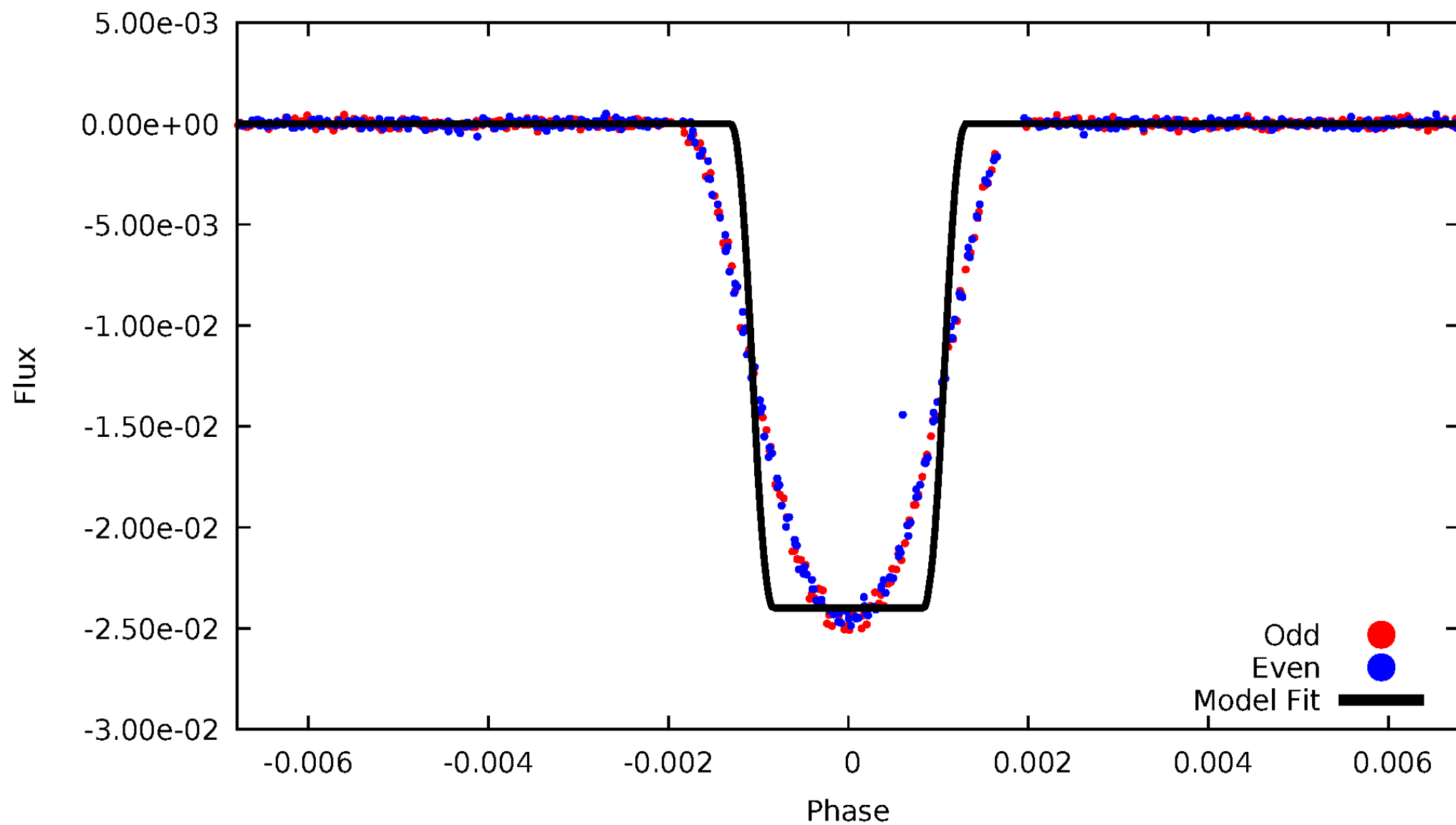
# DV Odd/Even

TCE 008044608-02



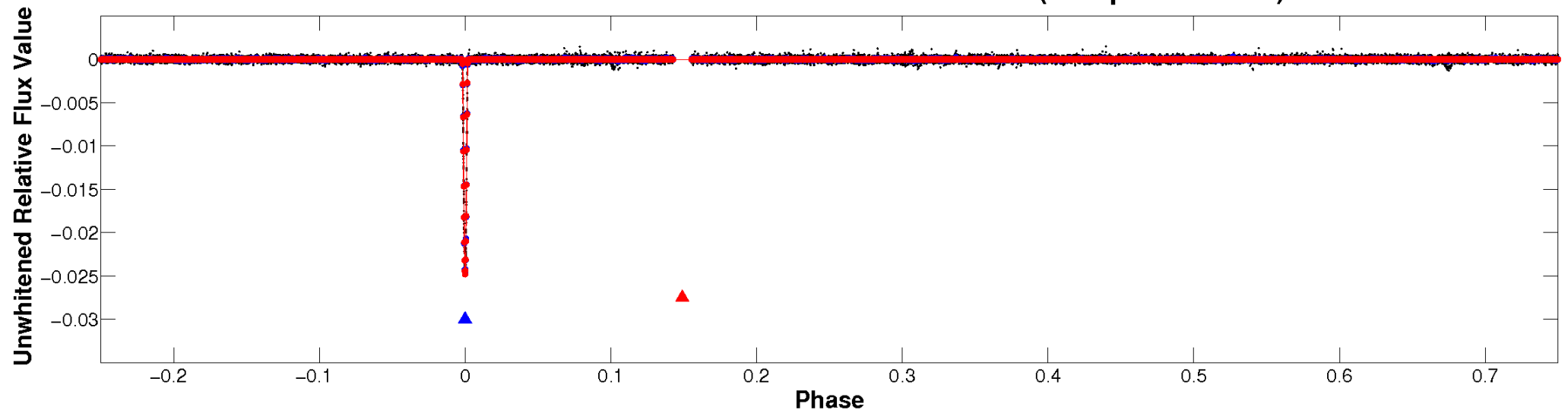
# ALT Odd/Even

TCE 008044608-02

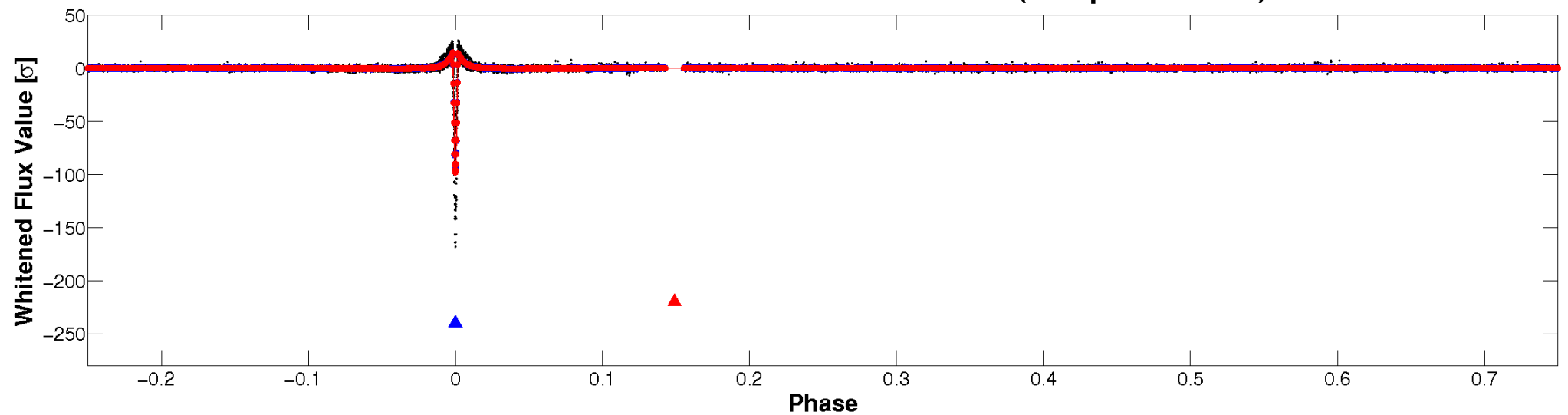


# Non-Whitened Vs. Whitened Light Curve

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

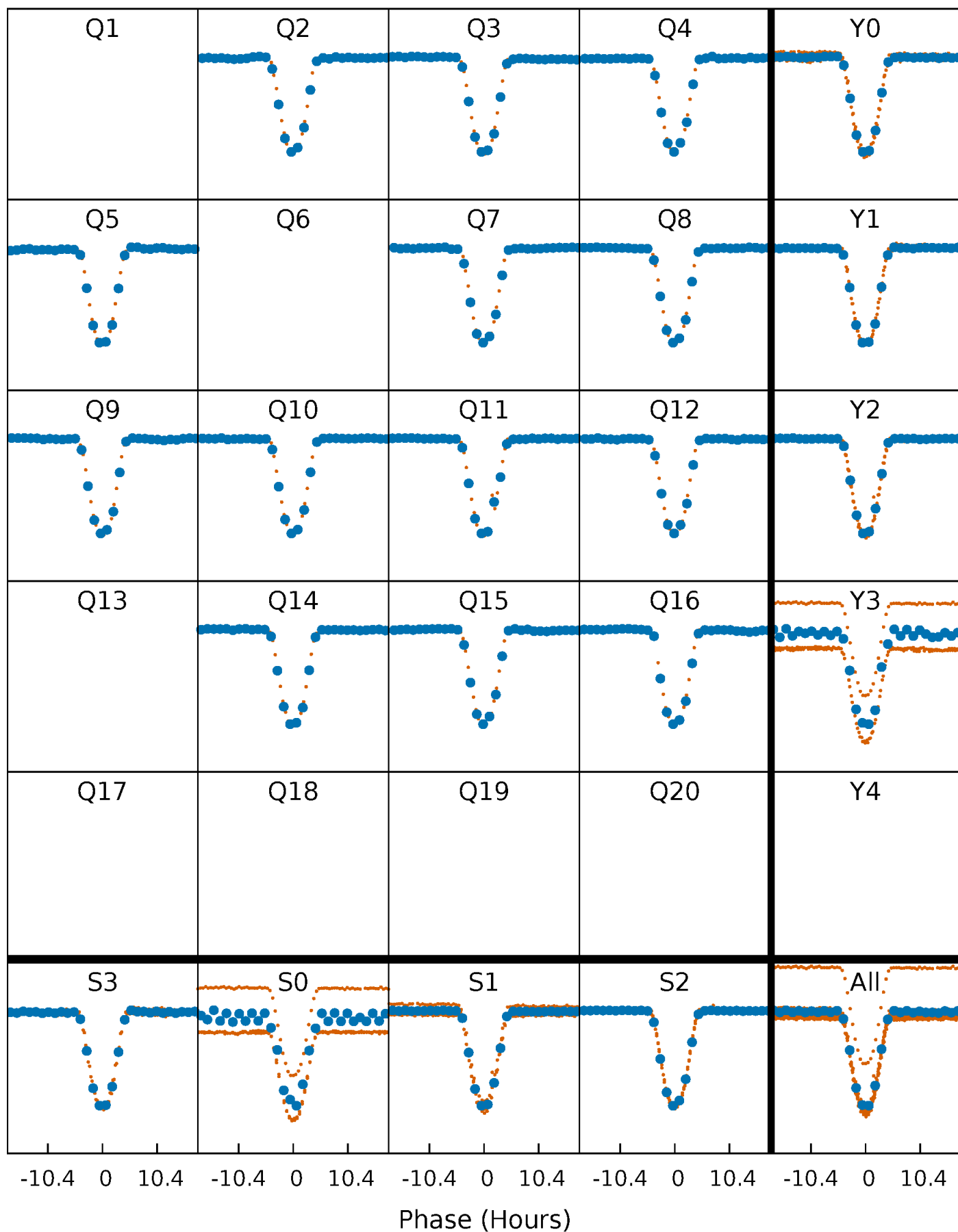


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



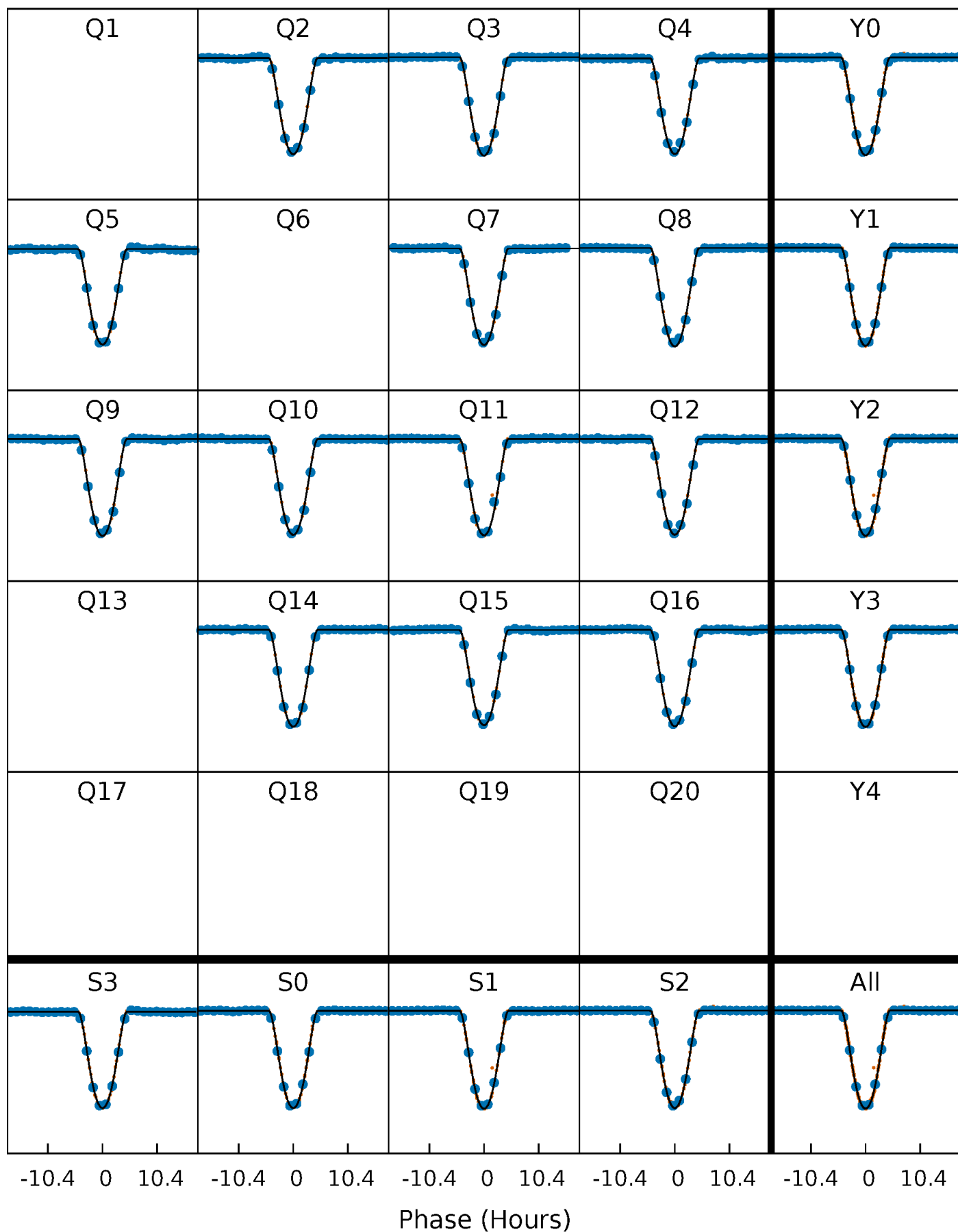
# PDC Quarter-Phased Transit Curves

TCE 008044608-02 P=106.175863 Days  $T_0=218.817861$  (BKJD)



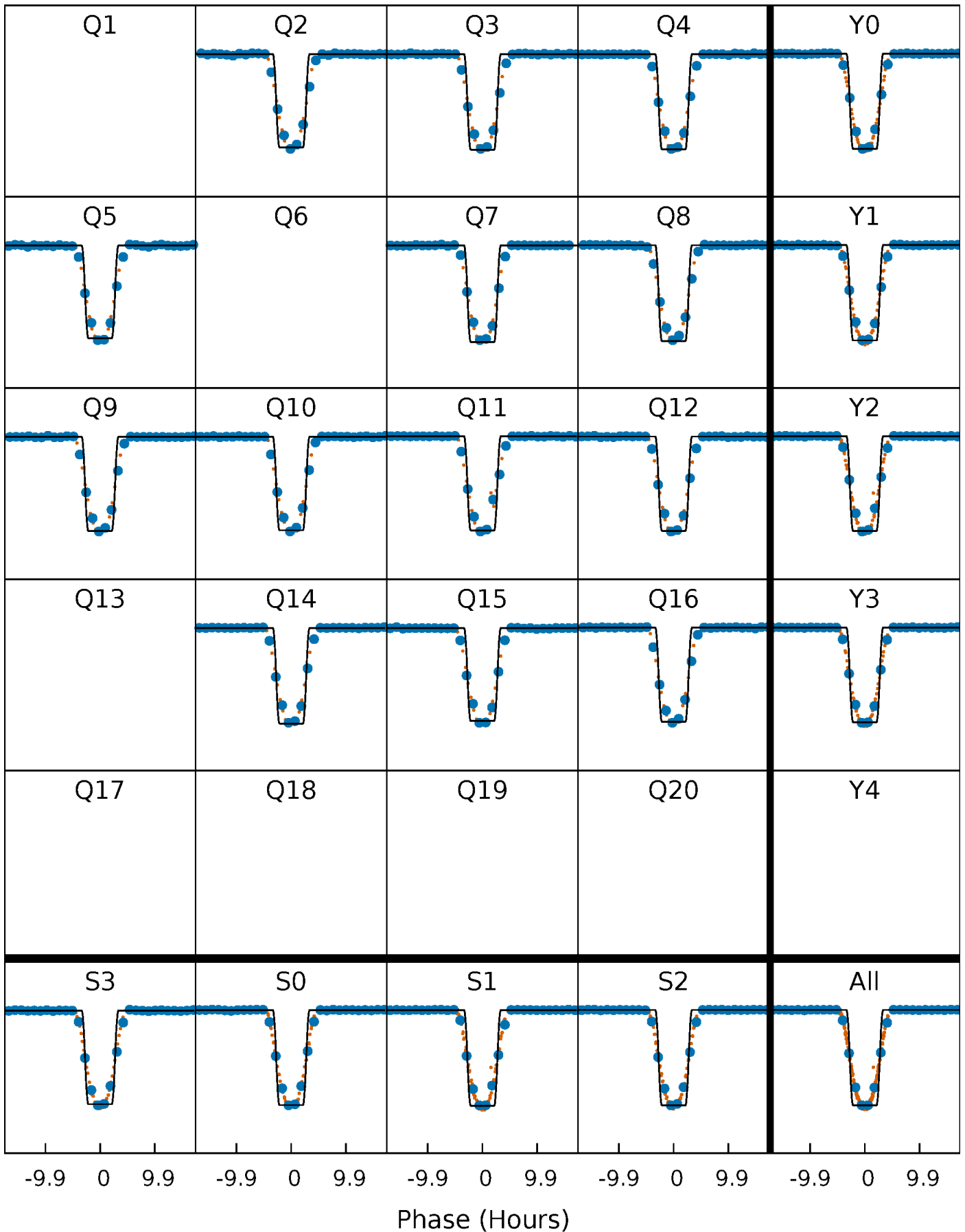
# DV Quarter-Phased Transit Curves

TCE 008044608-02 P=106.175863 Days  $T_0=218.817861$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

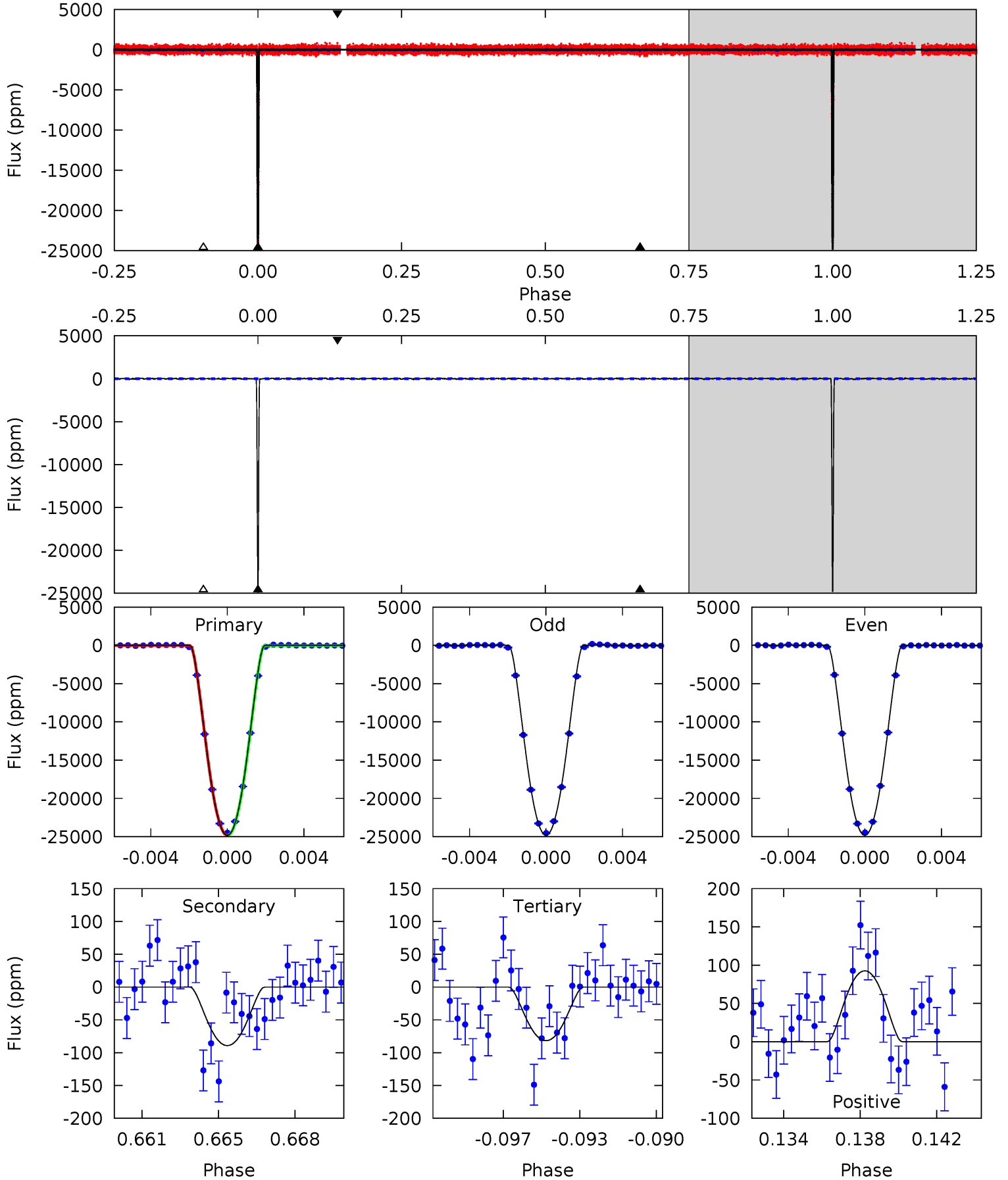
TCE 008044608-02 P=106.176287 Days  $T_0=218.815095$  (BKJD)



# DV Model-Shift Uniqueness Test

008044608-02, P = 106.175863 Days, E = 112.641998 Days

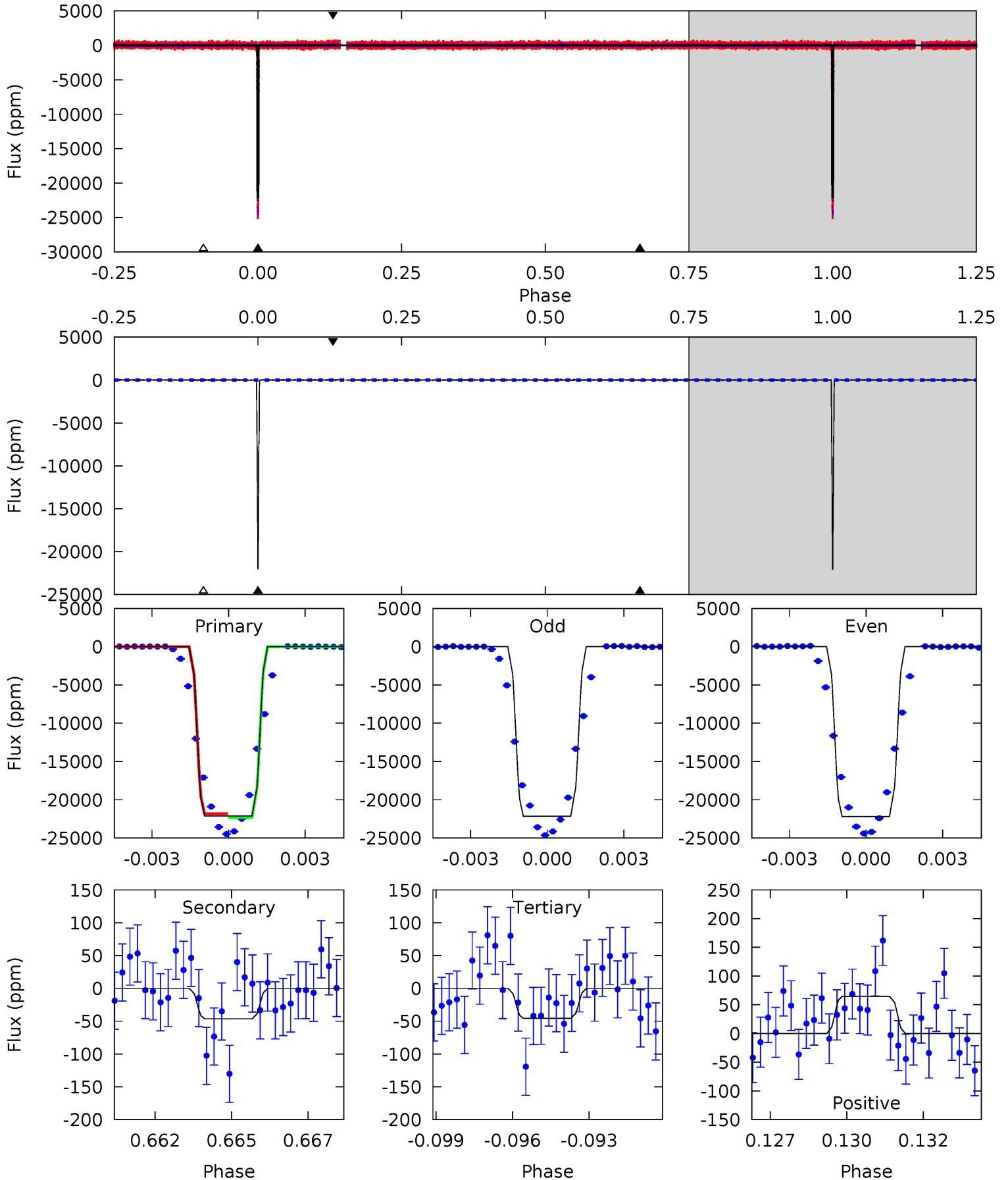
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2089	7.51	6.88	7.80	5.21	2.90	2.27	2082	2081	0.63	-0.29	1.04	1.00	0.00	1.11



# Alt Model-Shift Uniqueness Test

008044608-02, P = 106.176287 Days, E = 112.638808 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
1591	3.34	3.30	4.65	5.28	3.01	1.10	1588	1586	0.05	-1.31	1.21	1.00	0.00	18.2





### Stellar Parameters For KIC 008044608

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6038^{+163}_{-181}$	$4.254^{+0.258}_{-0.172}$	$-0.560^{+0.300}_{-0.300}$	$1.141^{+0.331}_{-0.300}$	$0.852^{+0.119}_{-0.069}$	$0.808^{+1.062}_{-0.403}$
	+3%/-3%	+6%/-4%	+54%/-54%	+29%/-26%	+14%/-8%	+132%/-50%
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 008044608-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-89 \pm 12$	$22.47^{+3.46}_{-3.39}$	$614^{+45}_{-51}$	$2295^{+44}_{-47}$	$17^{+7}_{-4}$
Alt.	$-46 \pm 14$	$19.11^{+3.16}_{-2.81}$	$609^{+51}_{-47}$	$2202^{+79}_{-92}$	$12^{+7}_{-4}$

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

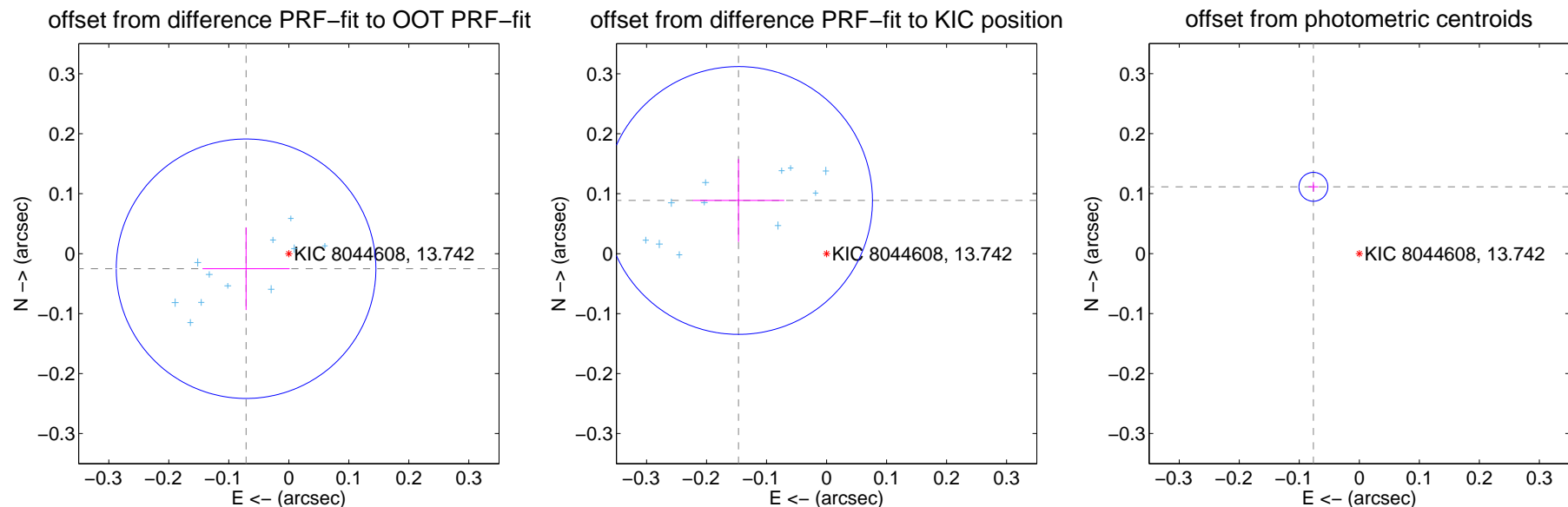
## DV Centroid Data

Supplemental centroid analysis for 008044608-02. Kepler magnitude: 13.74. Transit SNR 976.06

There are 11 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	$0.076 \pm 0.072$	1.05	$0.071 \pm 0.072$	$-0.025 \pm 0.069$
PRF-fit source offset from KIC position	$0.172 \pm 0.074$	2.30	$0.147 \pm 0.076$	$0.089 \pm 0.069$
photometric centroid source offset	$0.14 \pm 0.01$	16.84	$0.08 \pm 0.01$	$0.11 \pm 0.01$



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

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

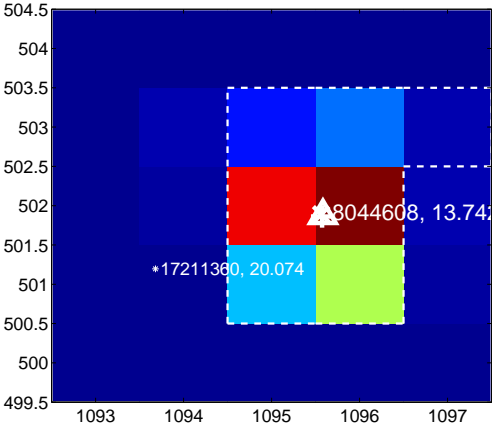
Q1 no difference image



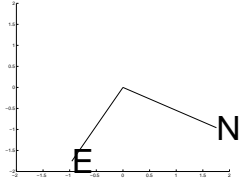
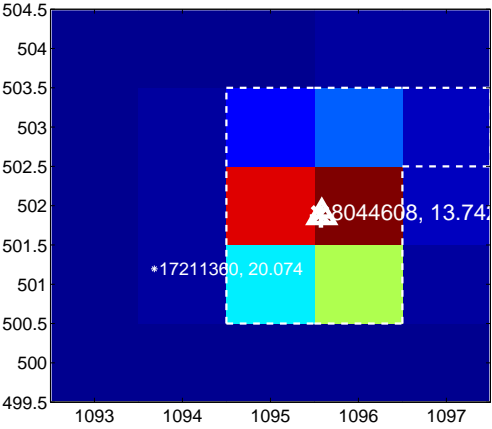
Q1 no OOT image



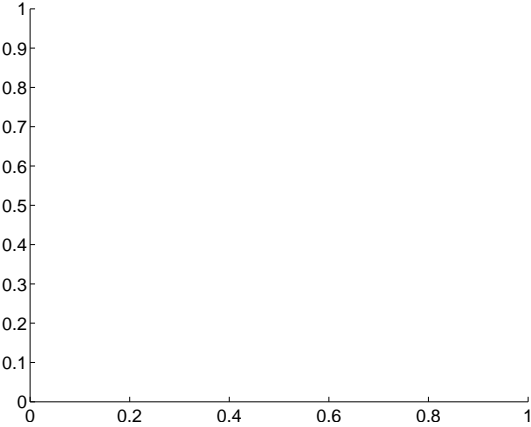
Q2 difference image



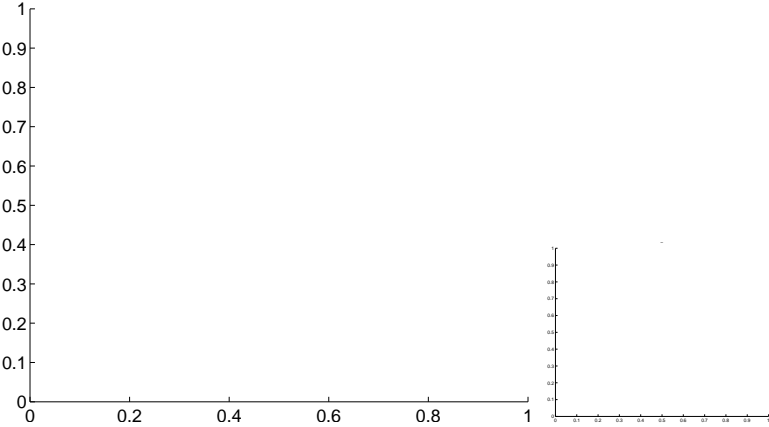
Q2 OOT image



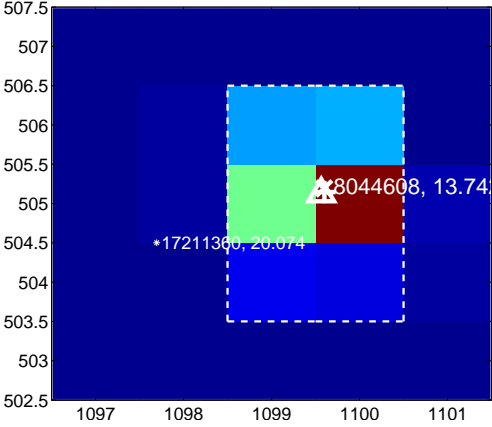
Q3 no difference image



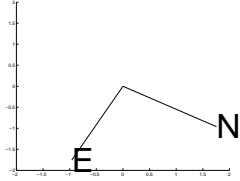
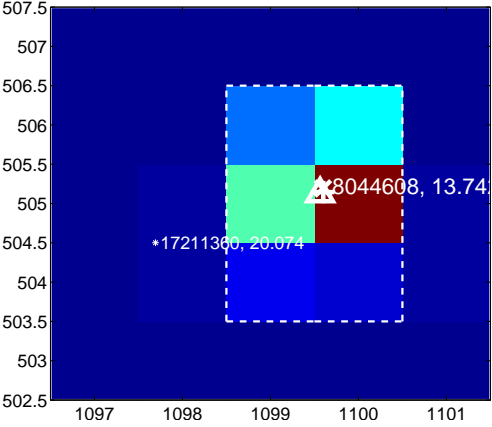
Q3 no OOT image



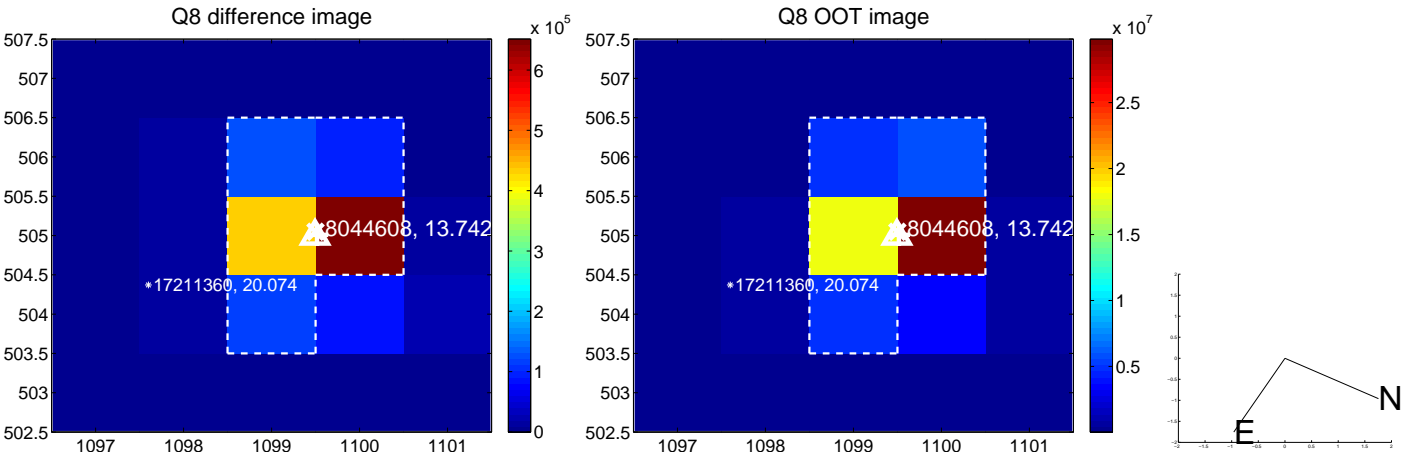
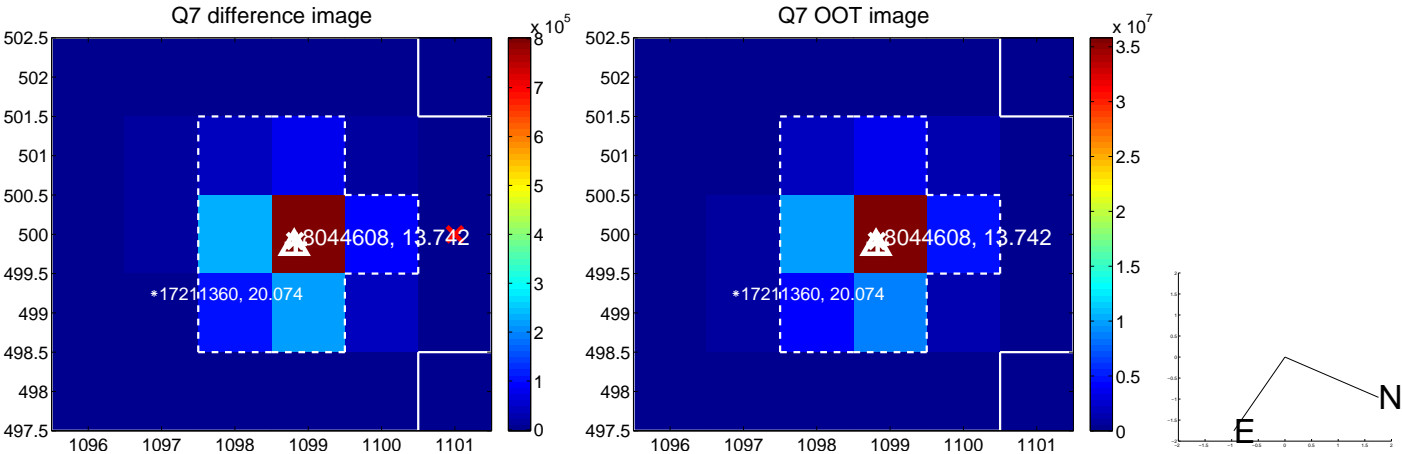
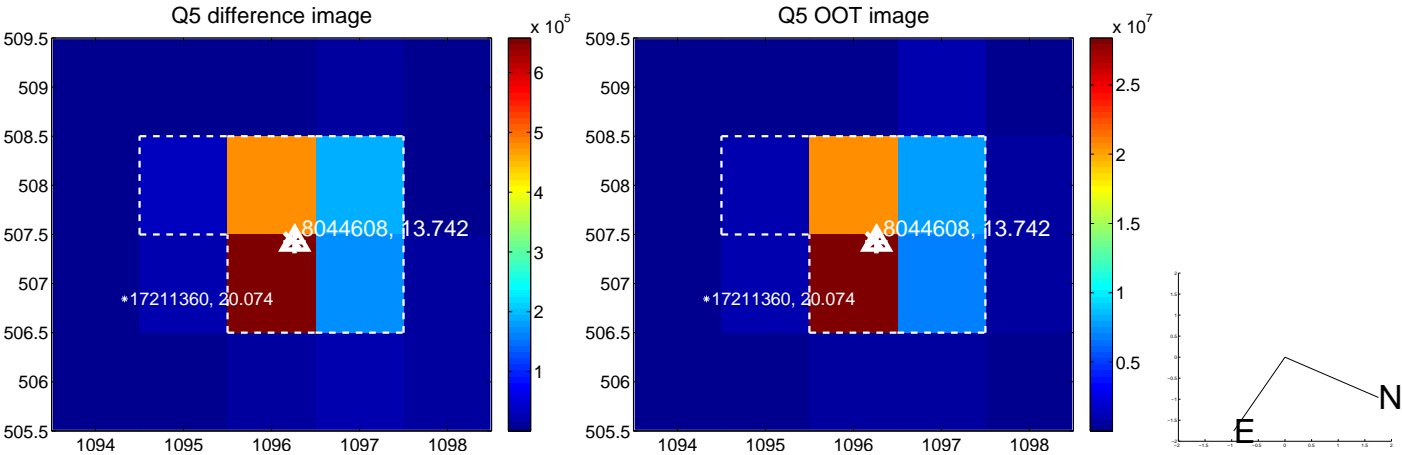
Q4 difference image



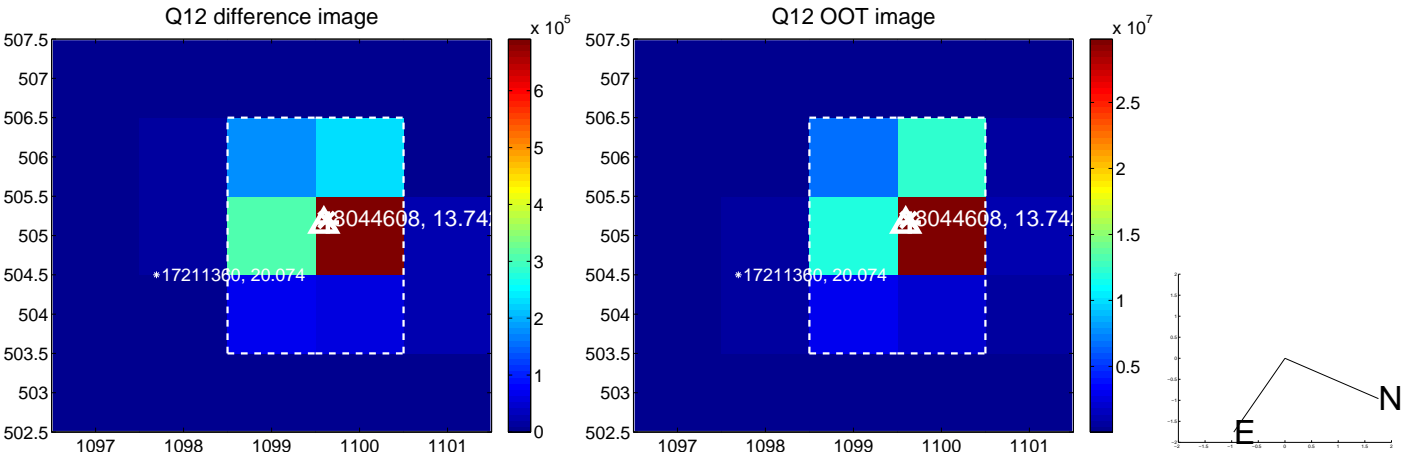
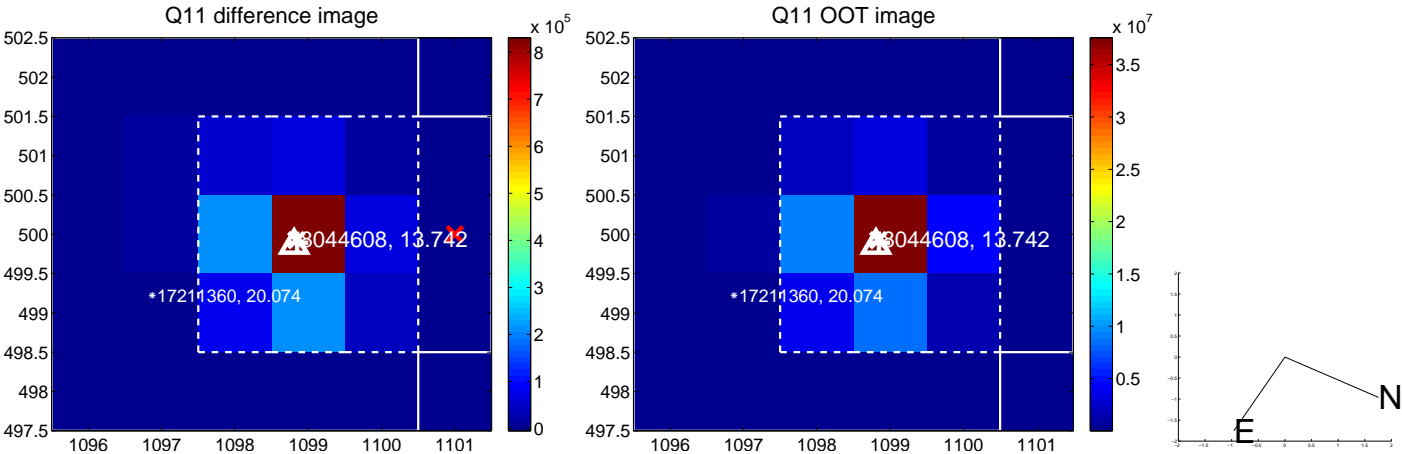
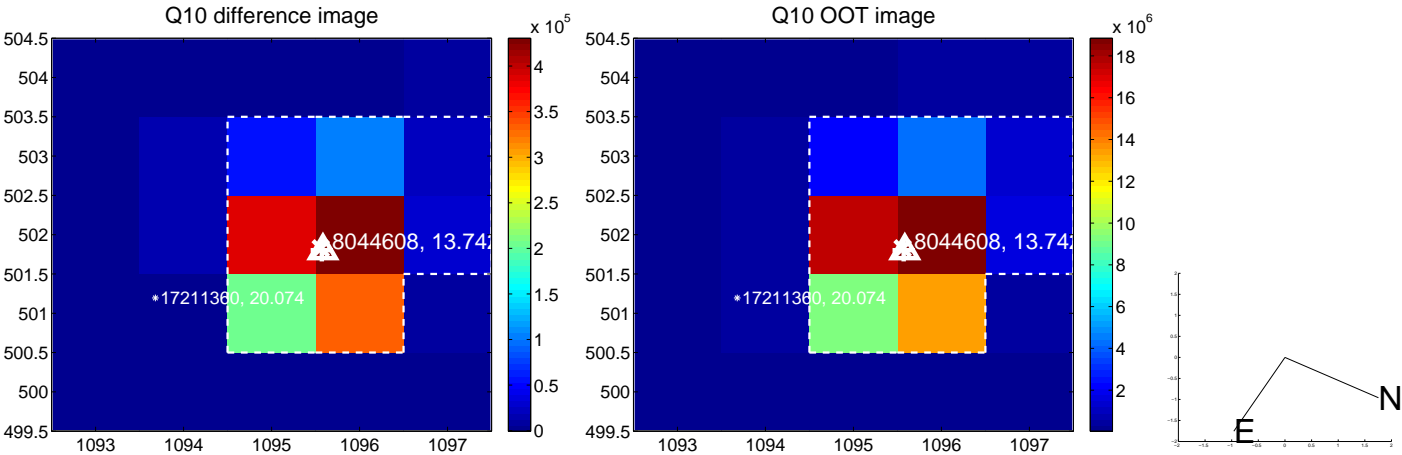
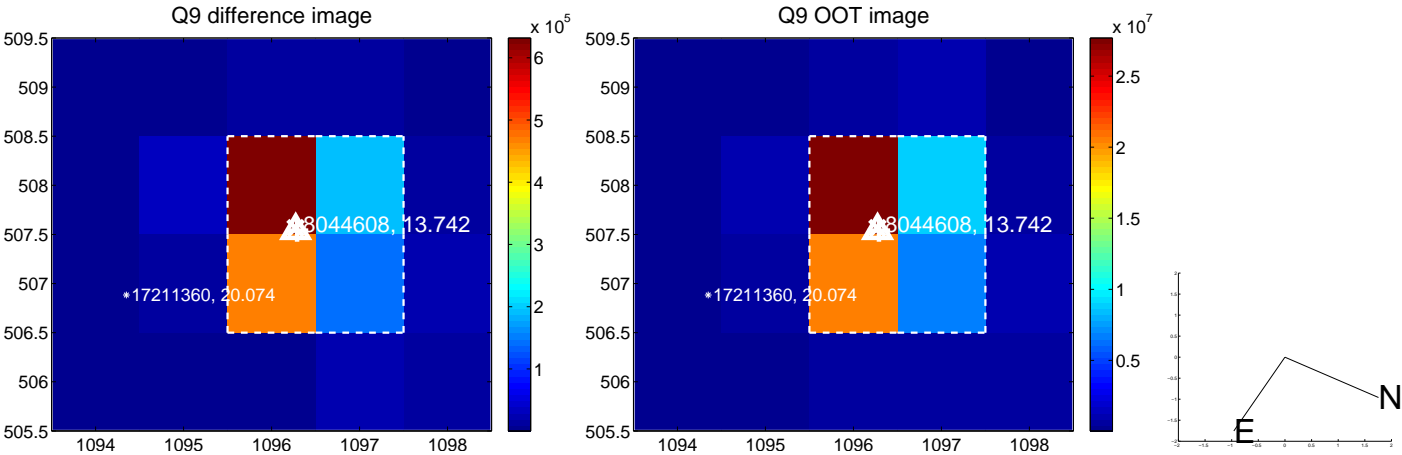
Q4 OOT image



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

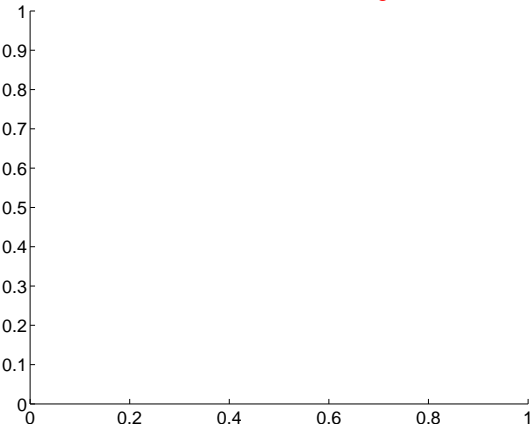


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

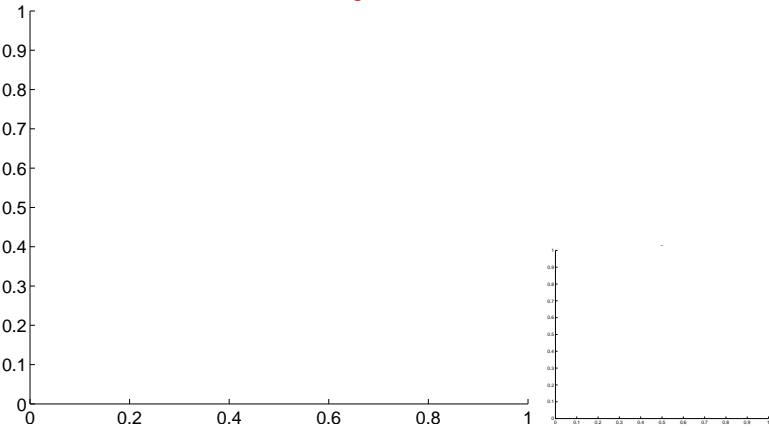


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

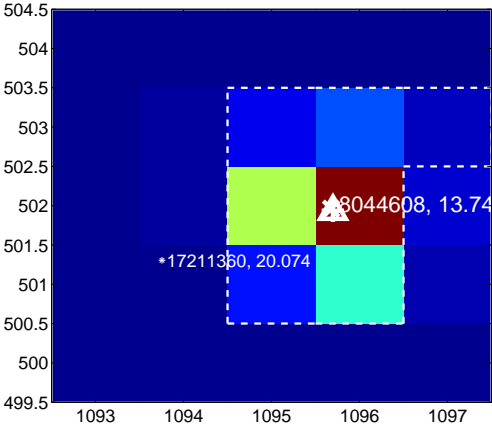
Q13 no difference image



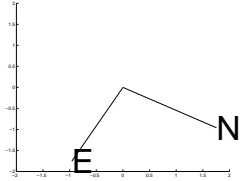
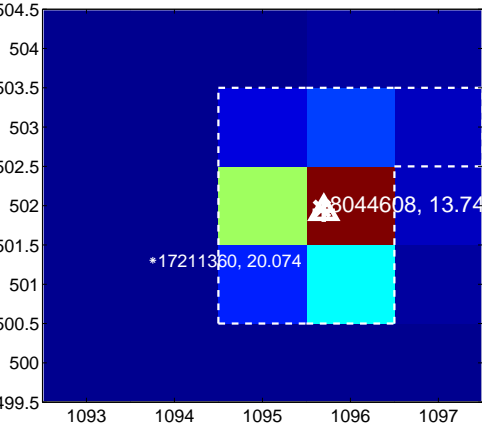
Q13 no OOT image



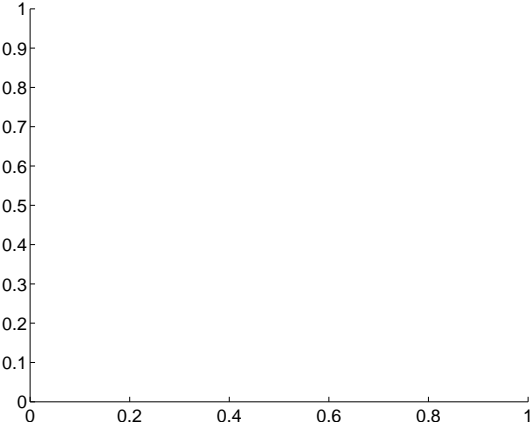
Q14 difference image



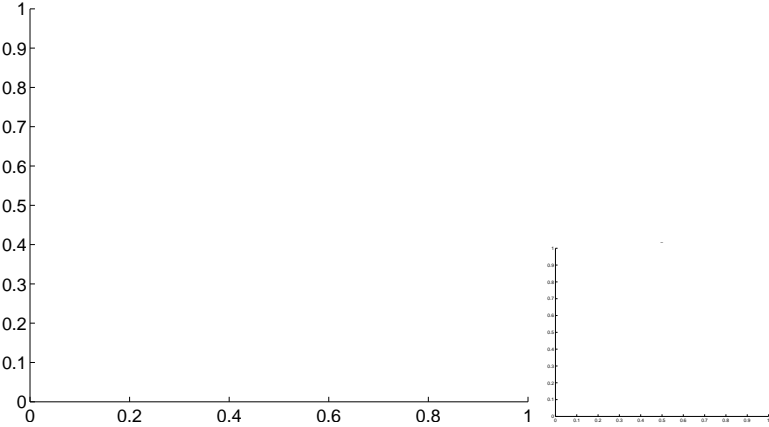
Q14 OOT image



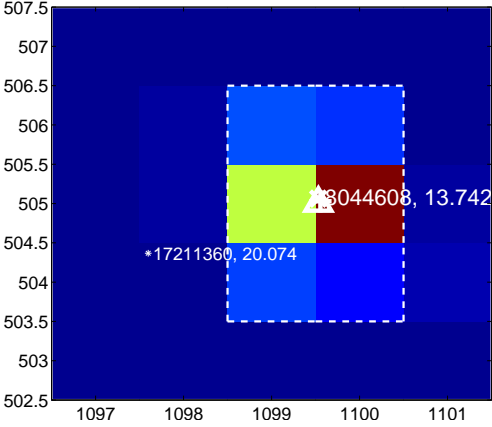
Q15 no difference image



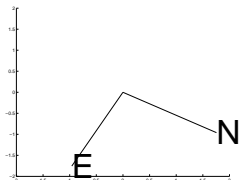
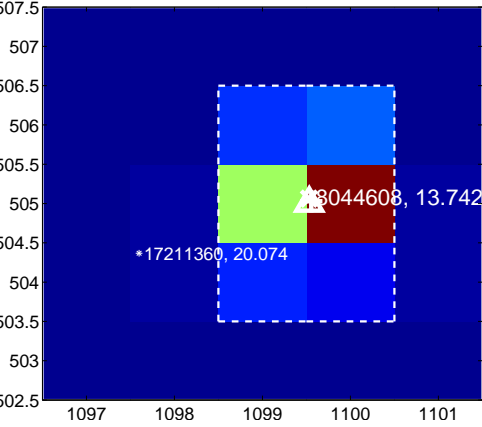
Q15 no OOT image



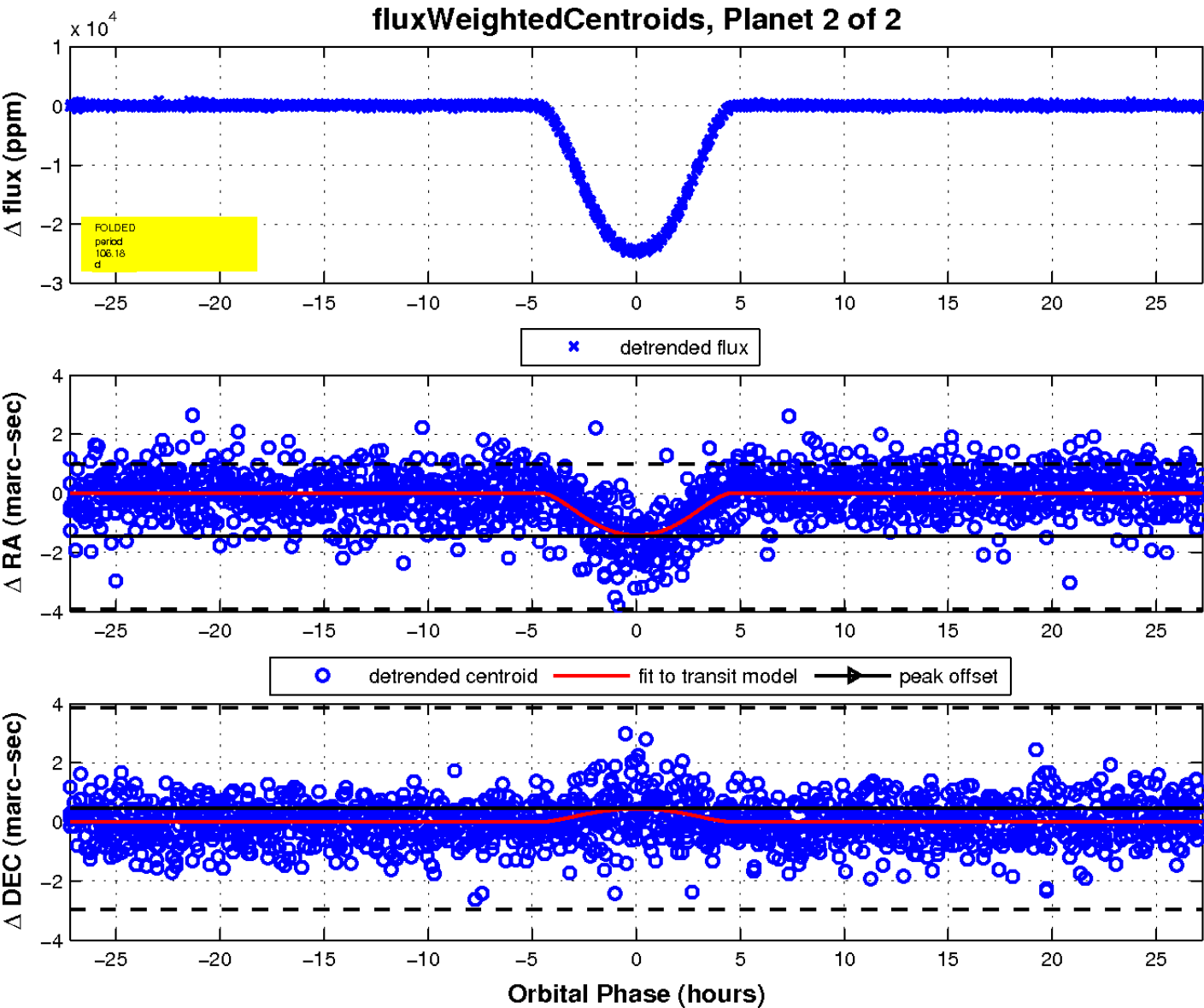
Q16 difference image



Q16 OOT image



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



# UKIRT Image

Declination

