

# KIC 008668810

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008668810-01	OBS	3538.01	313.089817	424.715552	441447.2	9.000	3772.8	-1.0	0.67	5067	36.72	0.44
008668810-02	OBS	No	313.092336	344.225126	66716.4	12.210	457.4	469.6	0.67	5067	25.05	0.44

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008668810-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—CENT_NOFITS
008668810-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE—SAME_NTL_PERIOD—CENT_FEW_DIFFS

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

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

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

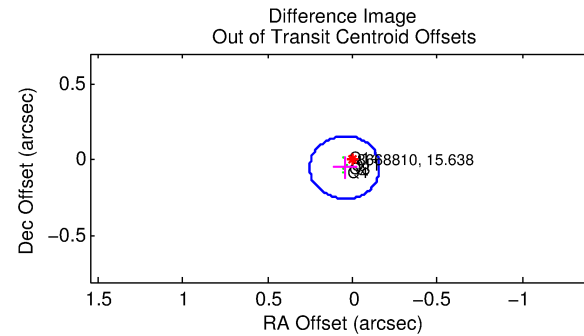
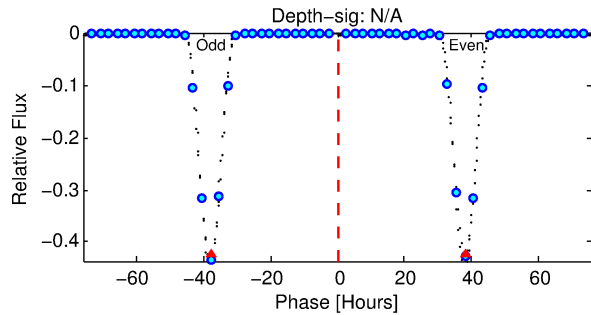
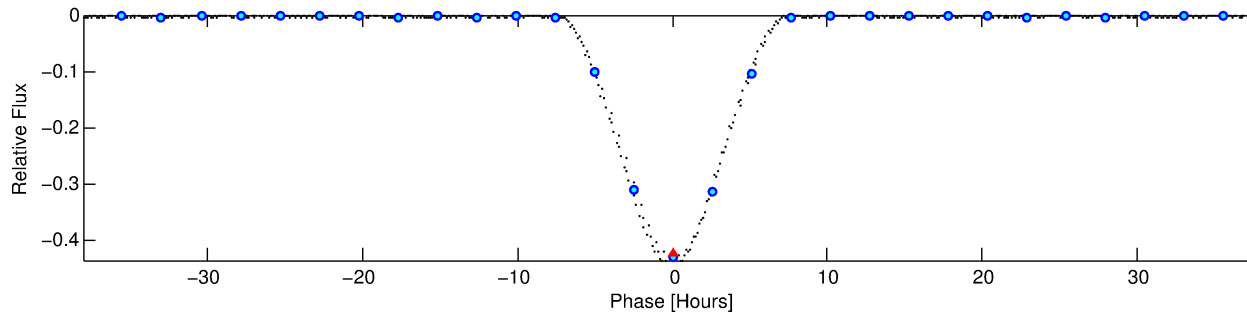
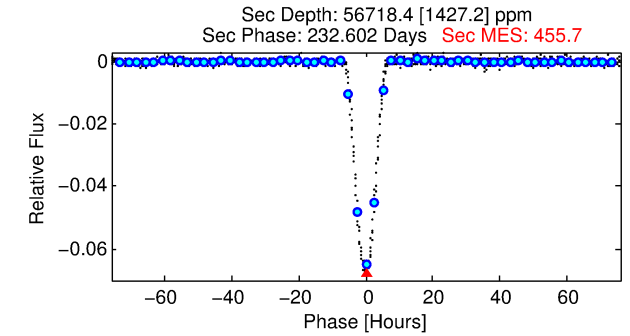
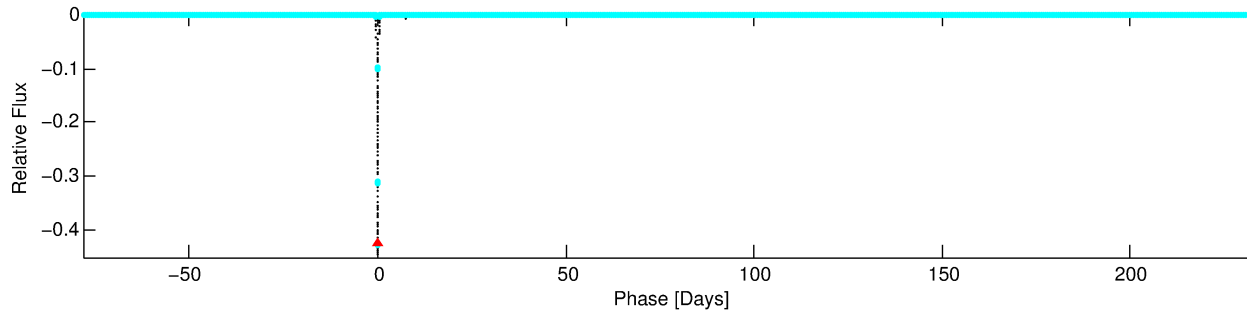
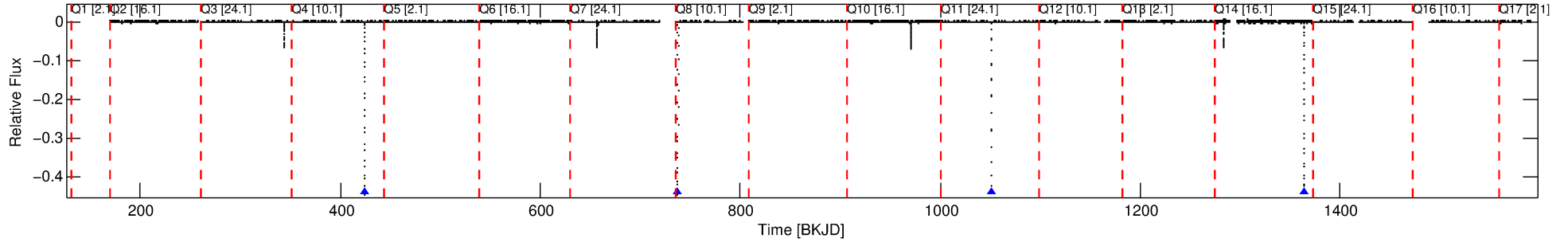
## Ephemeris Match Information For 008668810-01

No Significant Match Found

# DV One-Page Summary

KIC: 8668810 Candidate: 1 of 2 Period: 313.090 d  
KOI: K03538.01 Corr: 0.787

Kp: 15.64 R\*: 0.67 Rs Teff: 5067.0 K Logg: 4.60 Fe/H: -0.600



## TPS TCE Results:

Period = 313.08982 d  
Epoch = 424.7156 BKJD

DV fit results are unavailable

## DV Diagnostic Results:

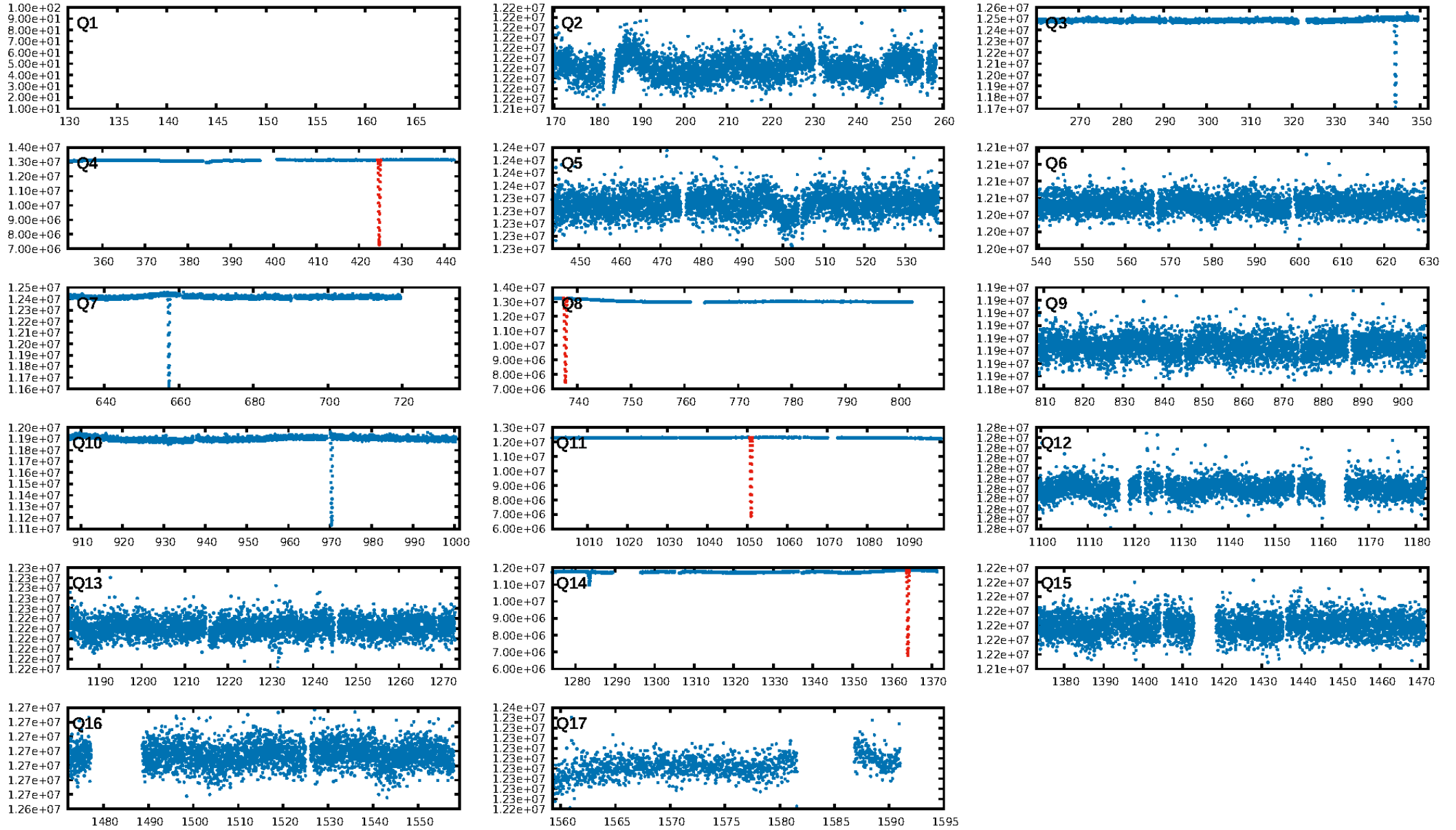
ShortPeriod-sig: N/A  
LongPeriod-sig: 0.3% [0.00 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 6.159

Centroid-sig: 0.0%  
Centroid-so: 0.378 arcsec [133.08 $\sigma$ ]  
OotOffset-rm: 0.068 arcsec [0.99 $\sigma$ ]  
KicOffset-rm: 0.114 arcsec [1.53 $\sigma$ ]  
OotOffset-st: 1/1/2/0 [4]  
KicOffset-st: 1/1/2/0 [4]  
DiffImageQuality-fgm: 1.00 [4/4]  
DiffImageOverlap-fno: 1.00 [4/4]

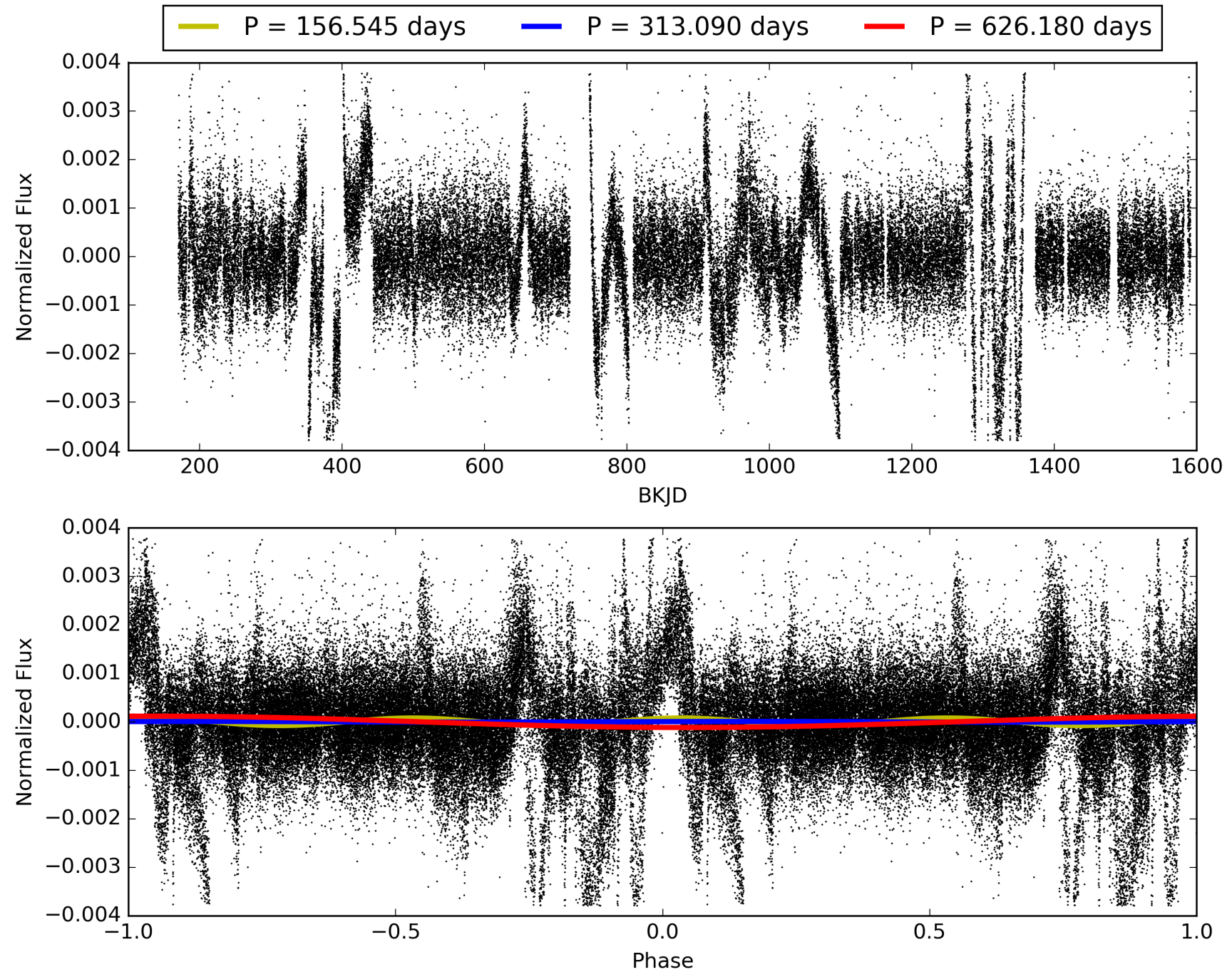
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 22:32:56 Z

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

# TCE 008668810-01, PDC Light Curves

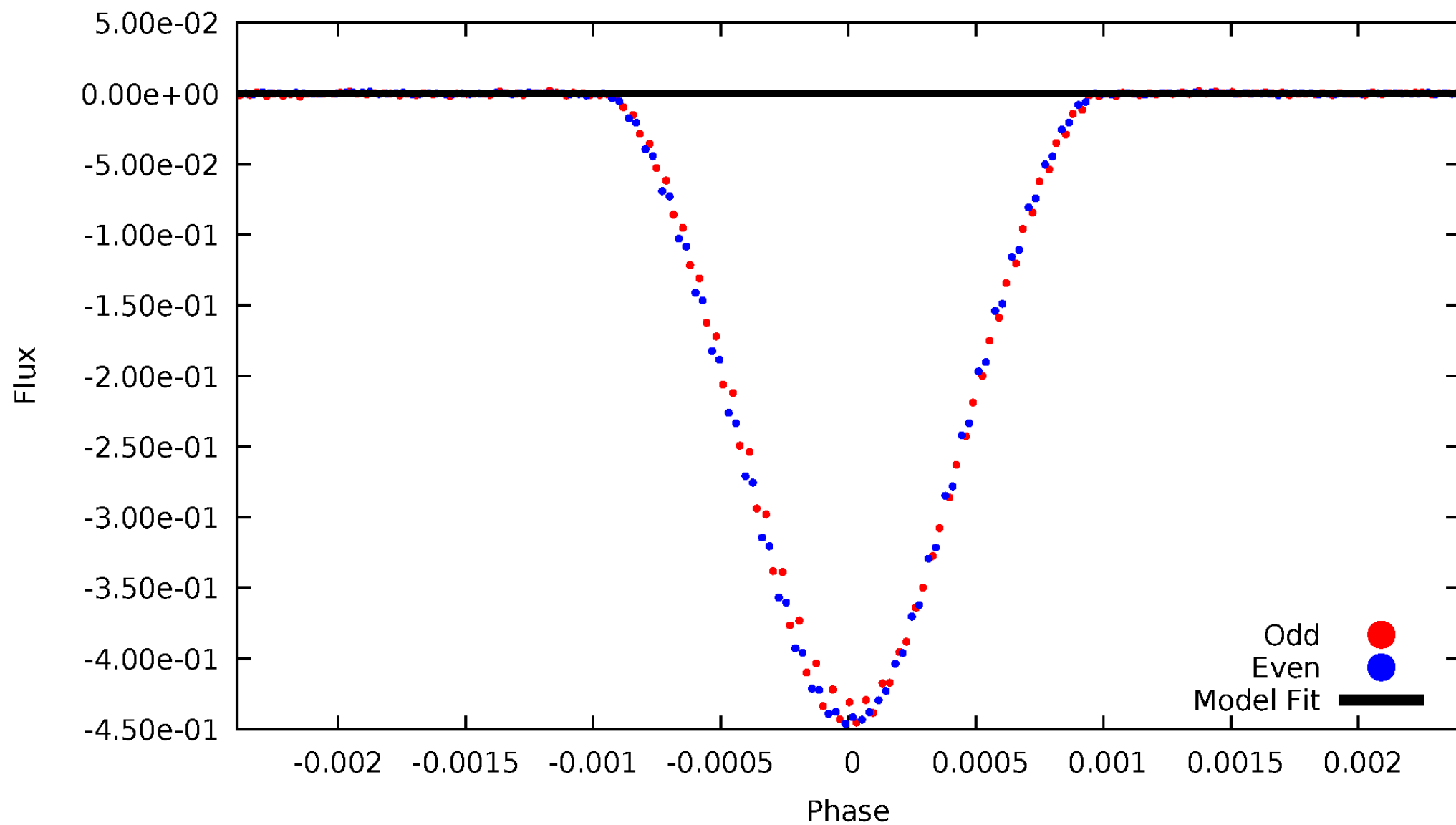


TCE 008668810-01



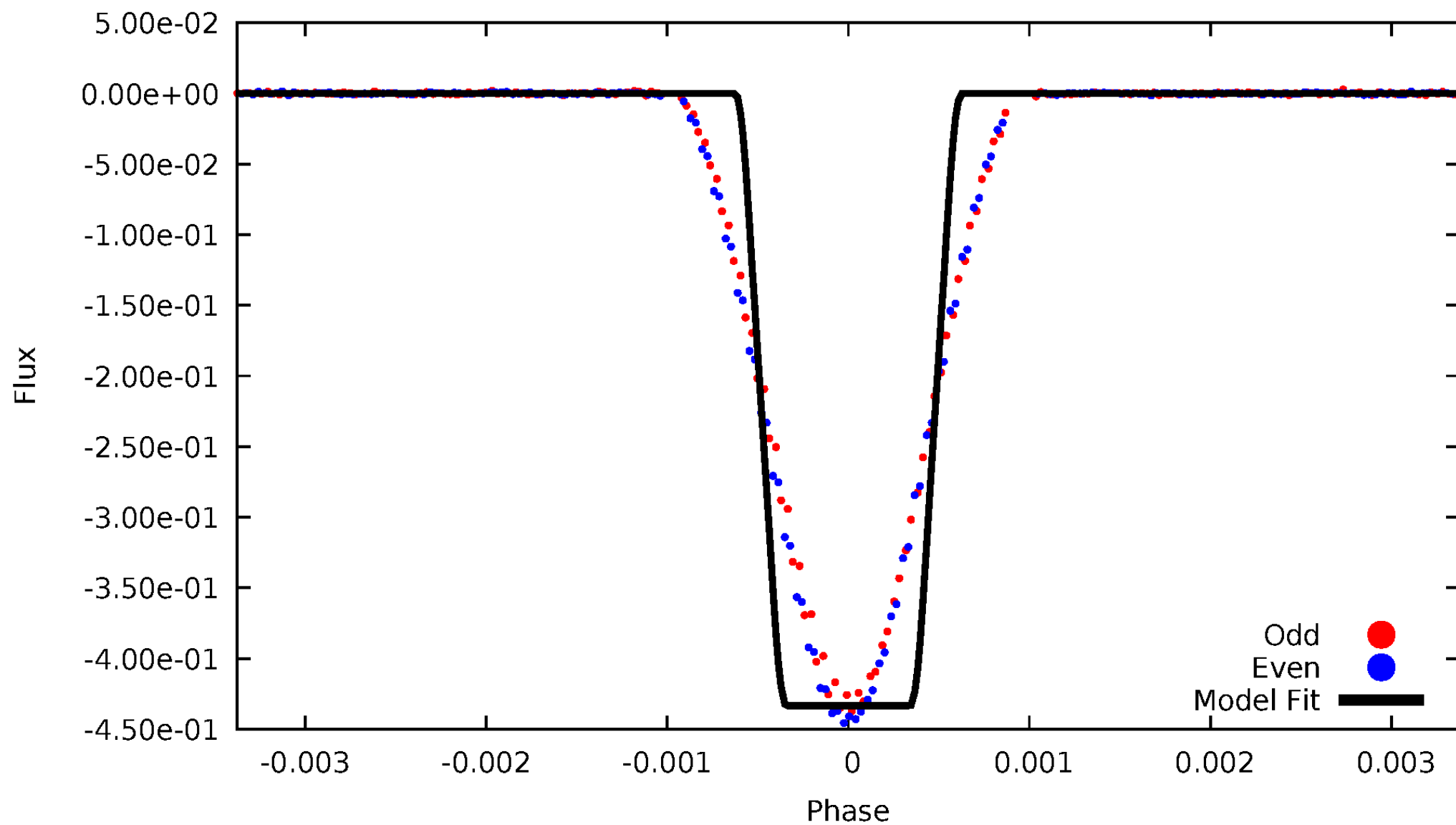
# DV Odd/Even

TCE 008668810-01



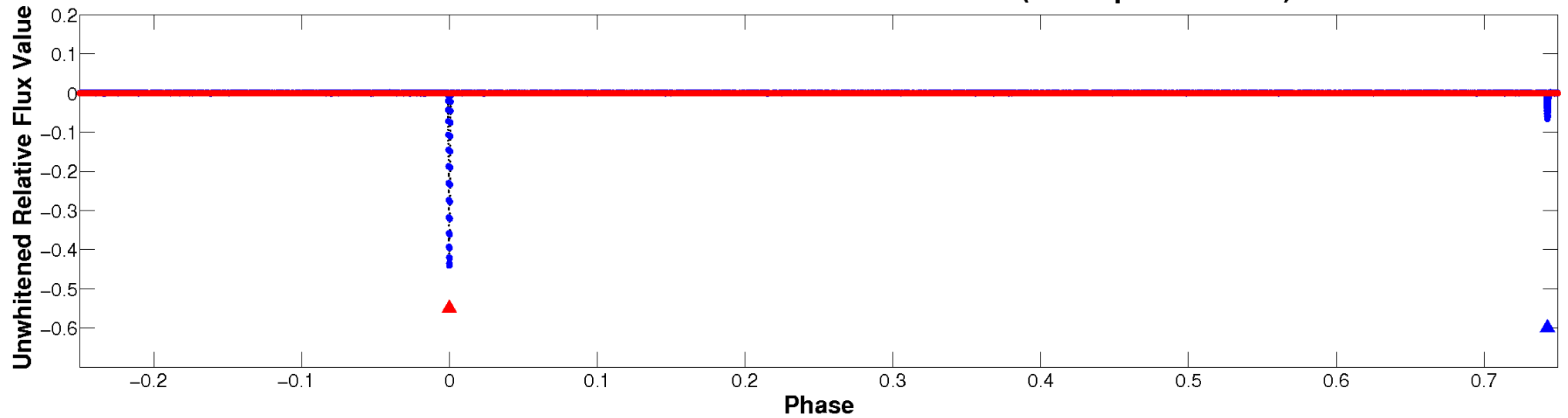
# ALT Odd/Even

TCE 008668810-01



# Non-Whitened Vs. Whitened Light Curve

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

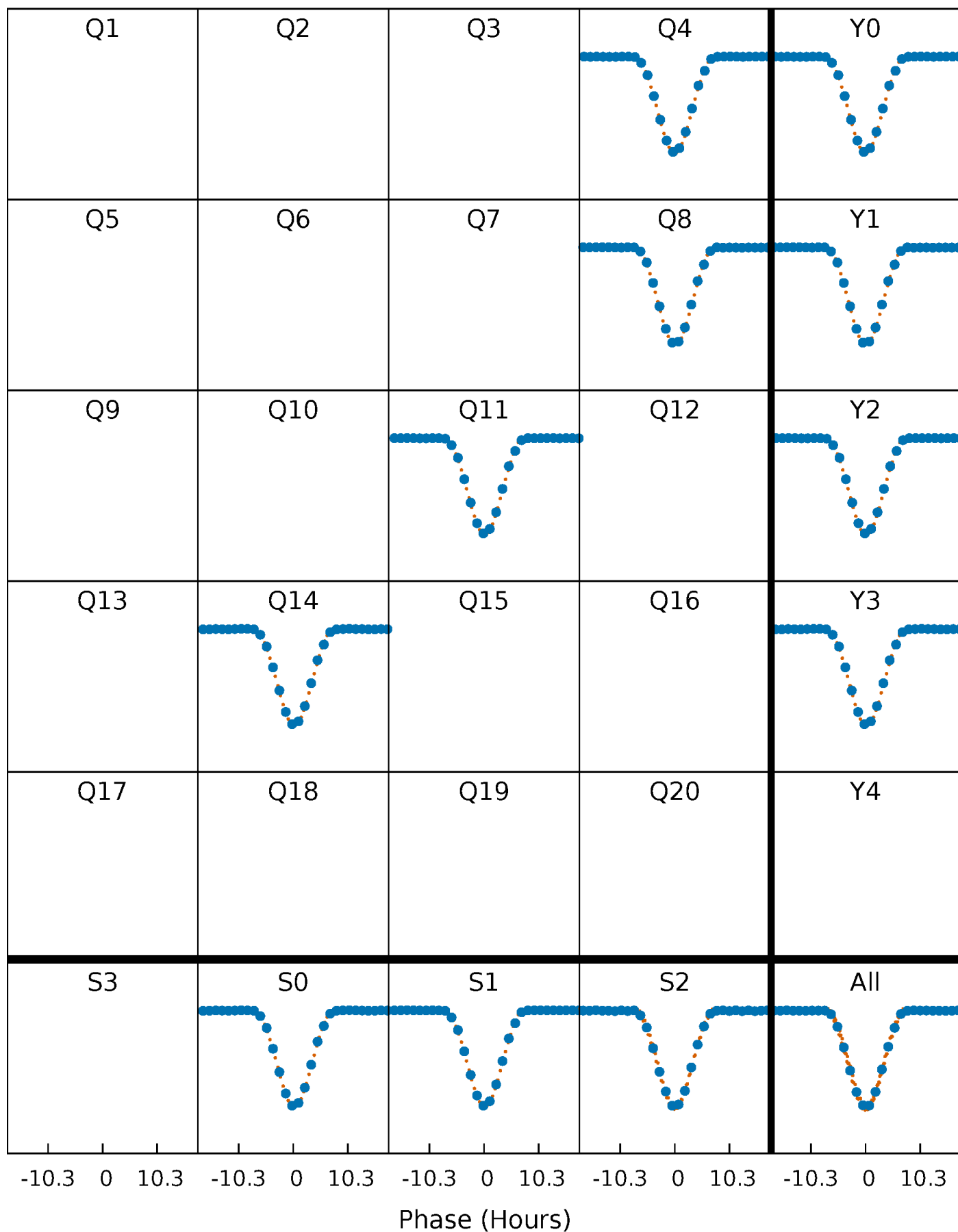


**Planet 1 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



# PDC Quarter-Phased Transit Curves

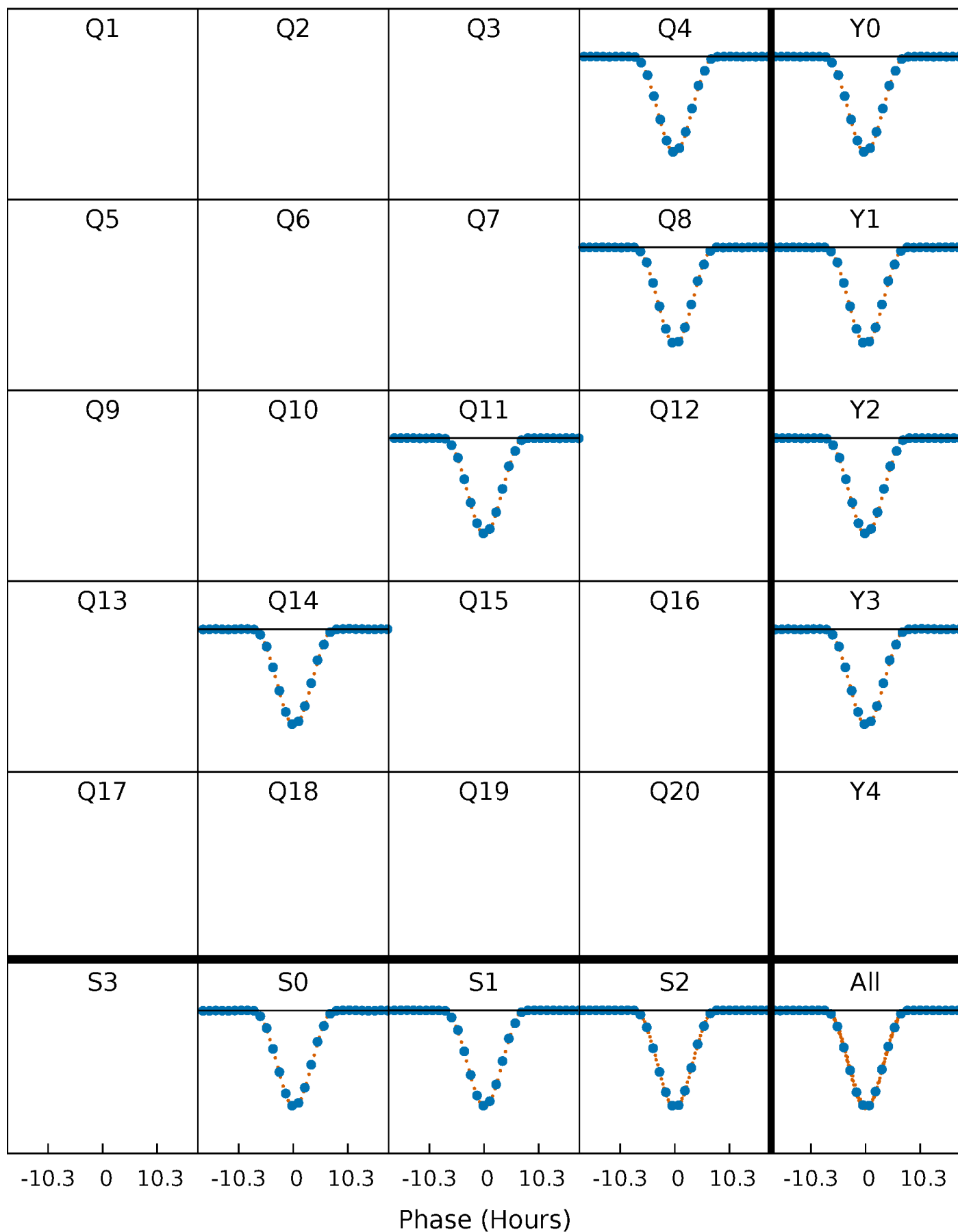
TCE 008668810-01 P=313.089817 Days  $T_0=424.715552$  (BKJD)





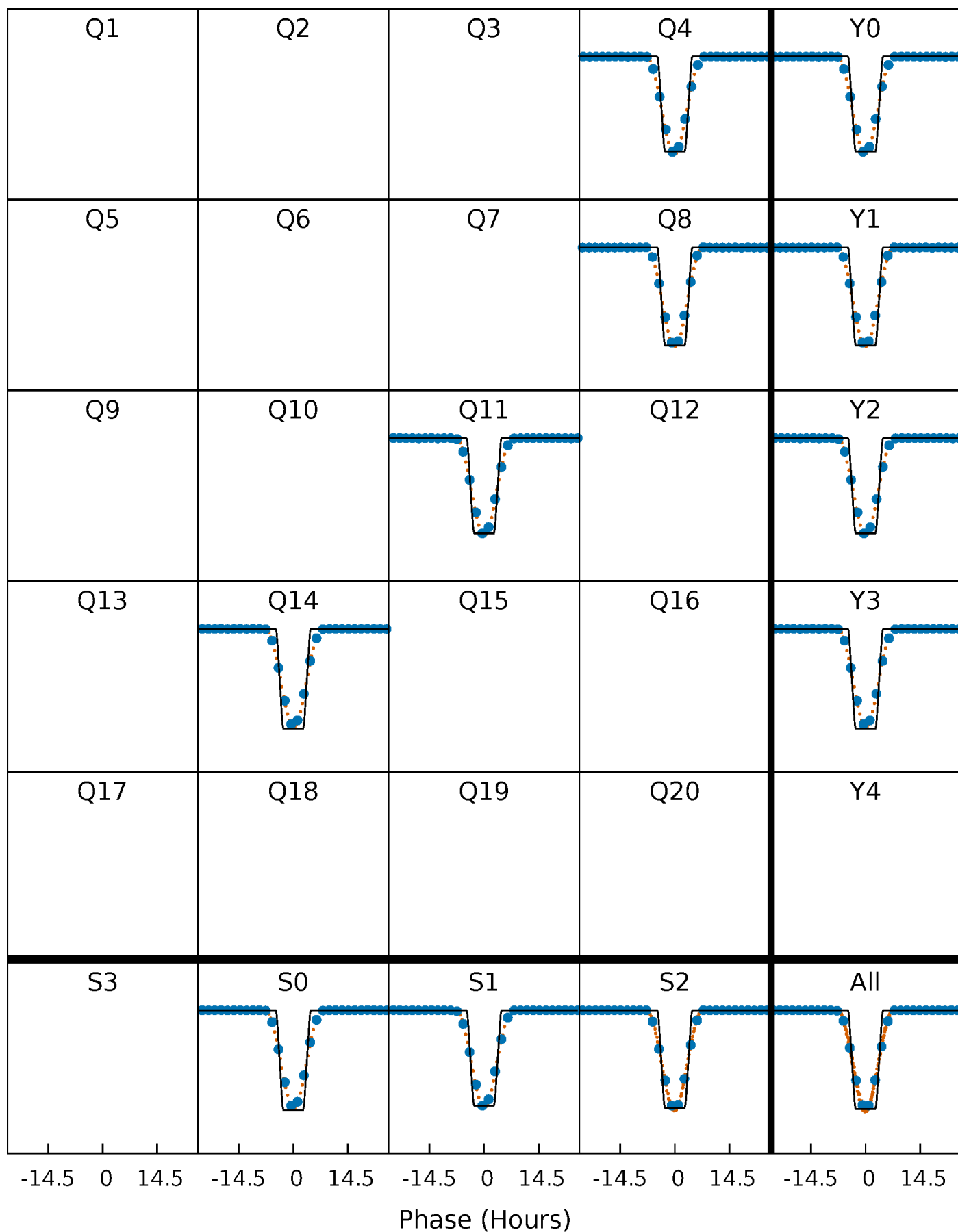
# DV Quarter-Phased Transit Curves

TCE 008668810-01 P=313.089817 Days  $T_0=424.715552$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

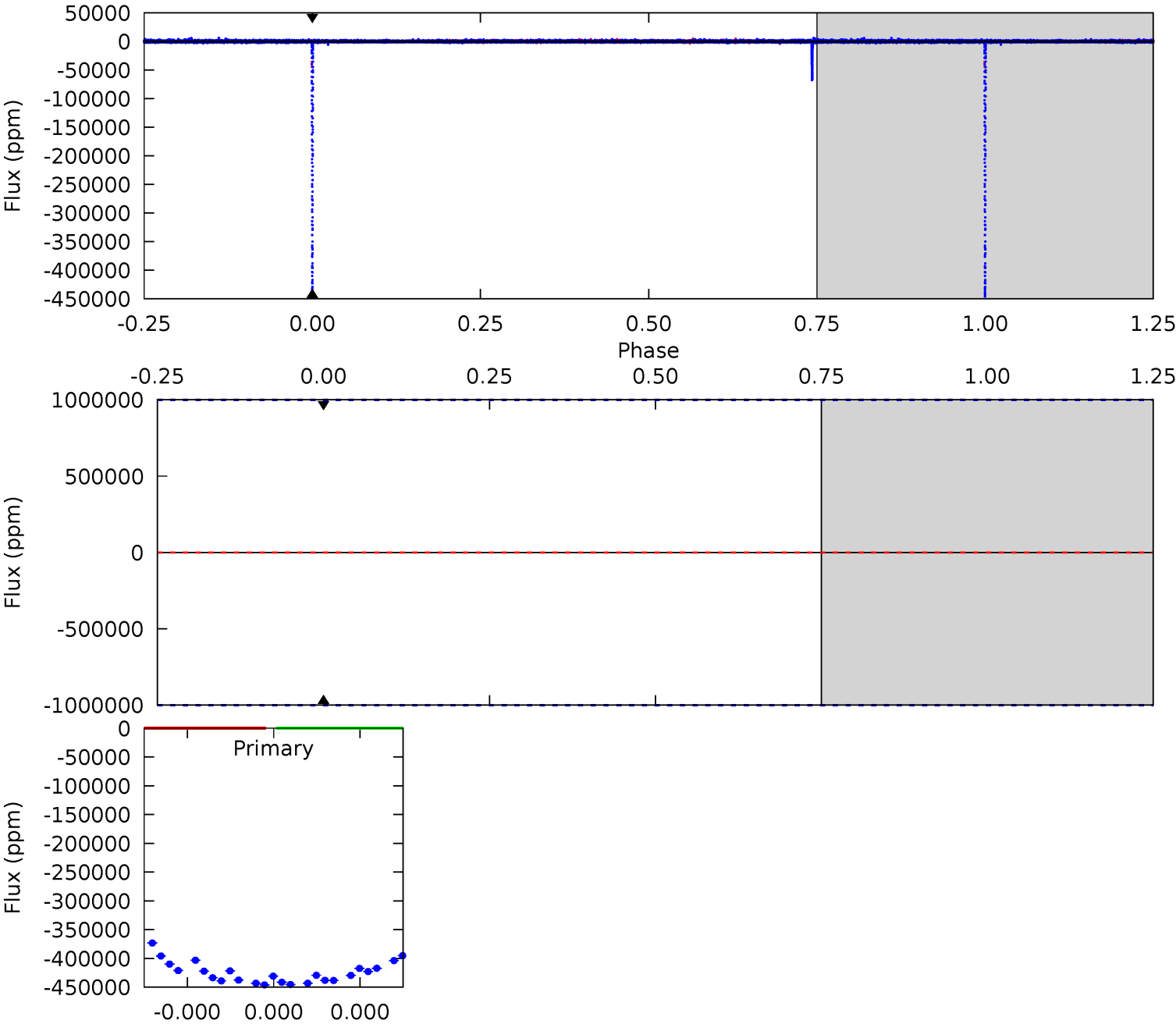
TCE 008668810-01 P=313.089817 Days  $T_0=424.719363$  (BKJD)



# DV Model-Shift Uniqueness Test

008668810-01, P = 313.089817 Days, E = 111.625735 Days

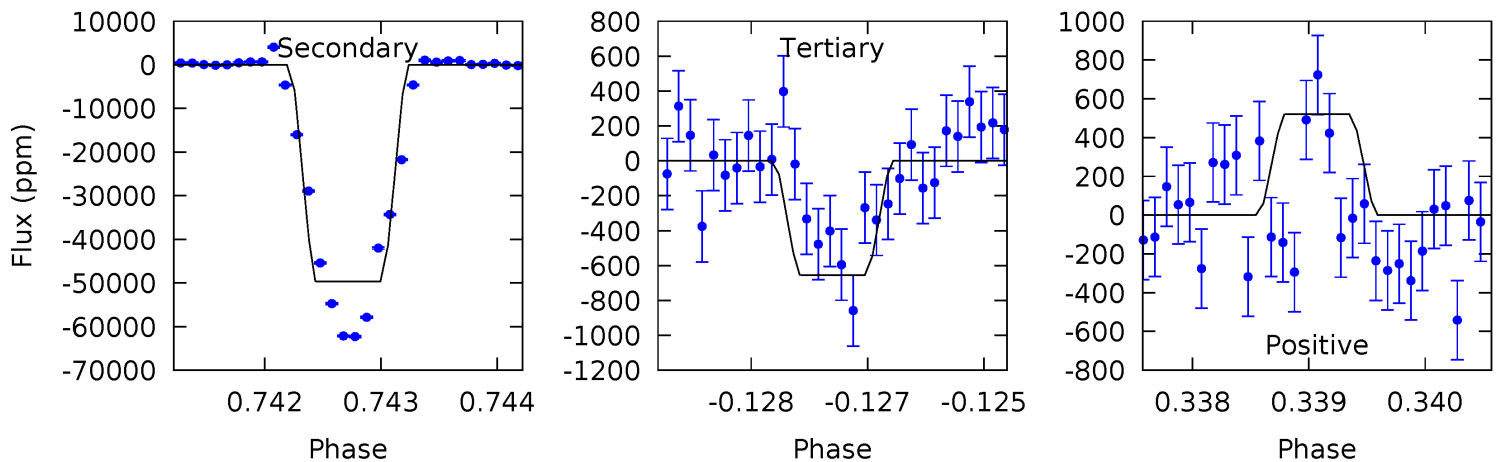
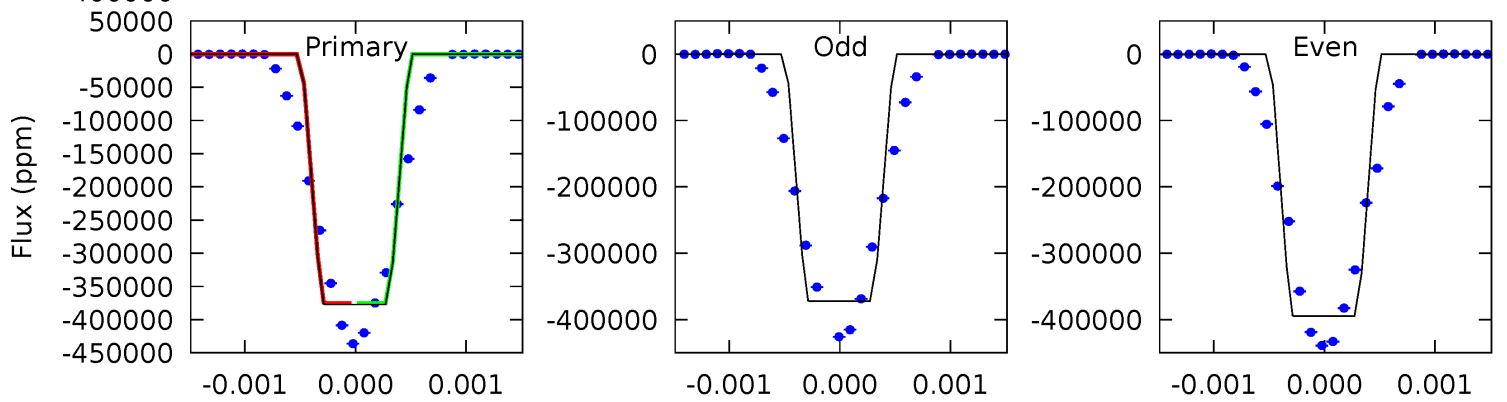
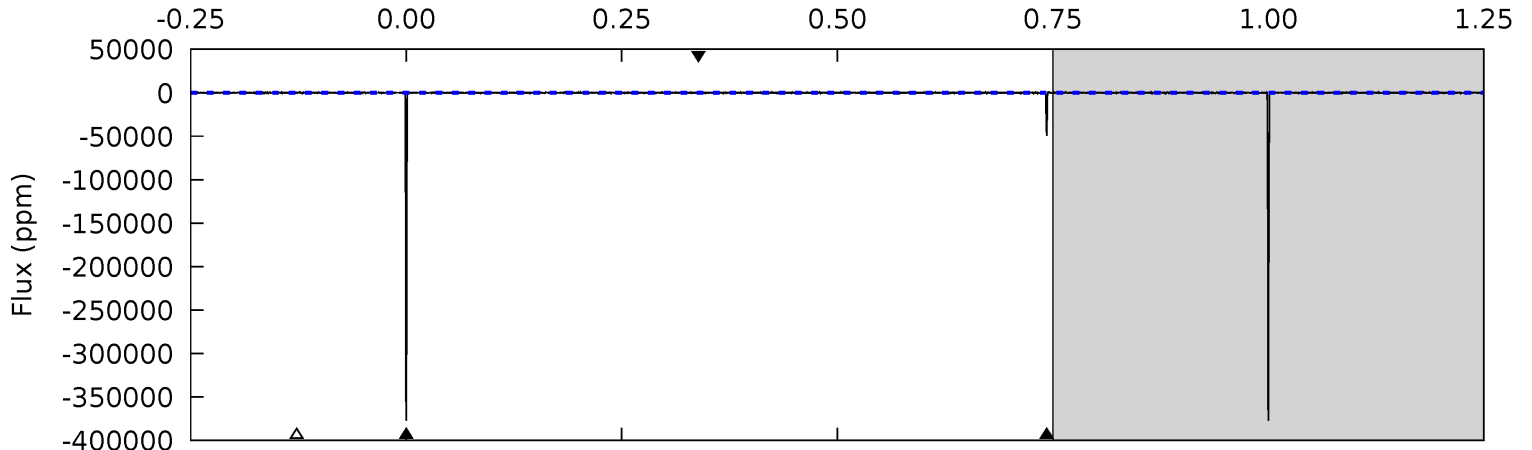
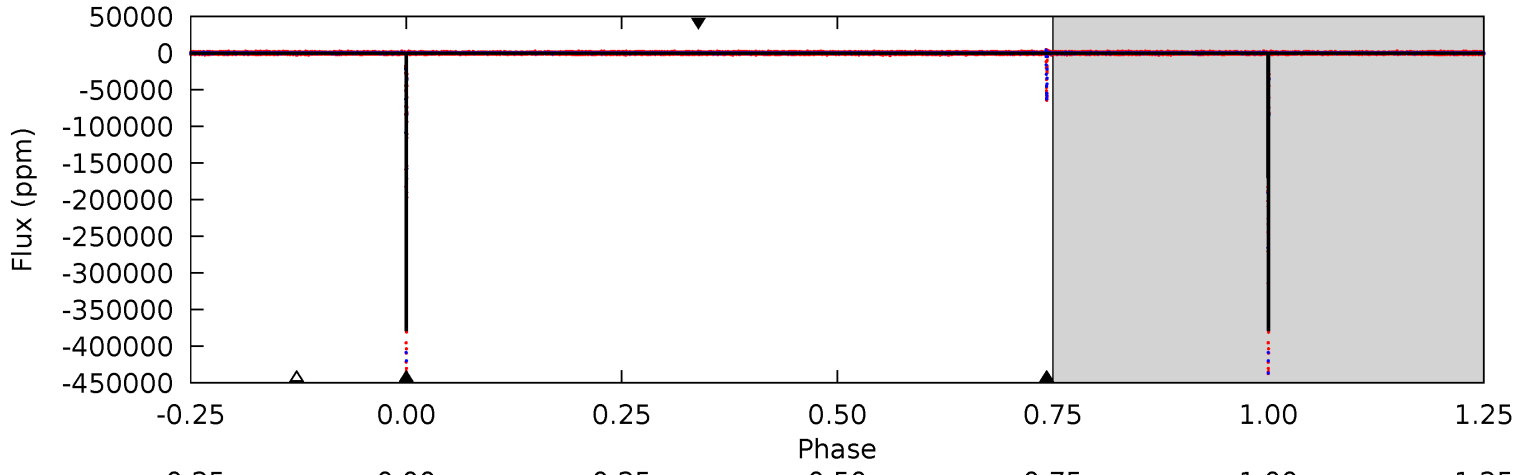
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

008668810-01, P = 313.089817 Days, E = 111.629546 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
3747	493.3	6.50	5.17	5.42	3.23	1.25	3740	3741	486.8	488.1	127.4	0.99	0.00	0



### Stellar Parameters For KIC 008668810

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5067^{+151}_{-151}$	$4.596^{+0.072}_{-0.042}$	$-0.600^{+0.350}_{-0.300}$	$0.673^{+0.065}_{-0.065}$	$0.651^{+0.079}_{-0.036}$	$3.014^{+0.962}_{-0.509}$
	+3%/-3%	+2%/-1%	+58%/-50%	+10%/-10%	+12%/-6%	+32%/-17%
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 008668810-01 / KOI 3538.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$0 \pm 1000000$	$36.57^{+7.38}_{-8.05}$	$289^{+11}_{-11}$	$-1647^{+6002}_{-2498}$	$-18.287^{+29714.935}_{-23364.498}$
Alt.	$-49689 \pm 101$	$47.95^{+8.24}_{-7.44}$	$288^{+10}_{-10}$	$3452^{+189}_{-164}$	$7780^{+3074}_{-2070}$

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

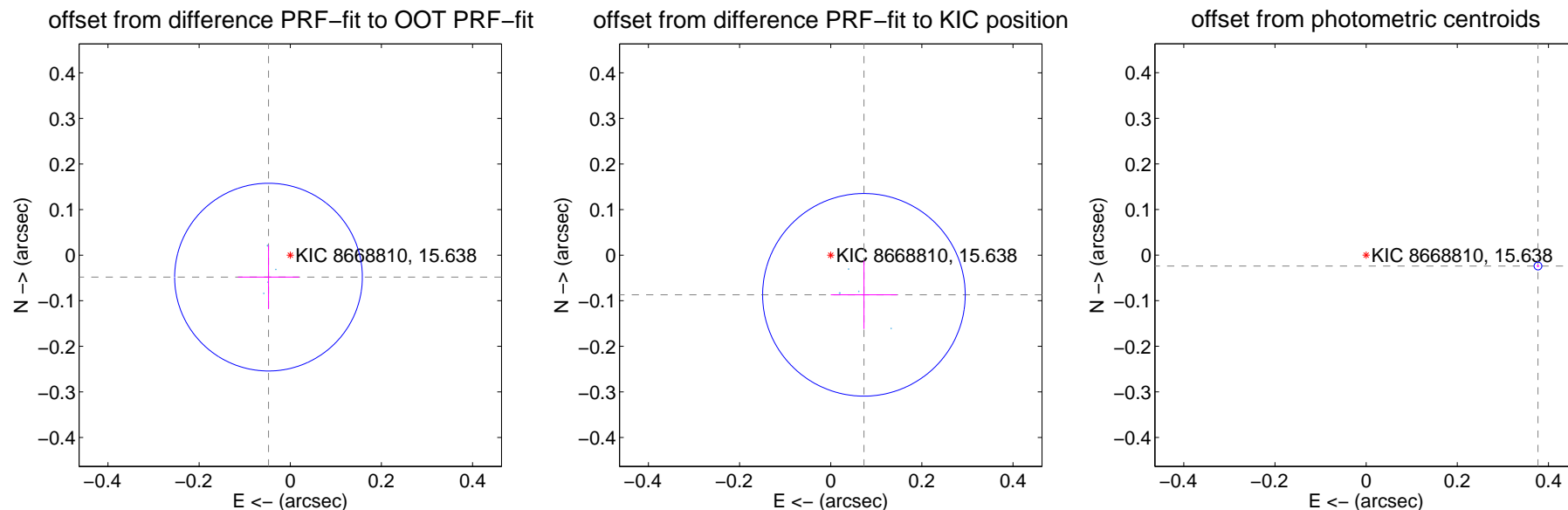
## DV Centroid Data

Supplemental centroid analysis for 008668810-01. Kepler magnitude: 15.64. Transit SNR -1.00

There are 4 quarters with good PRF difference image offsets

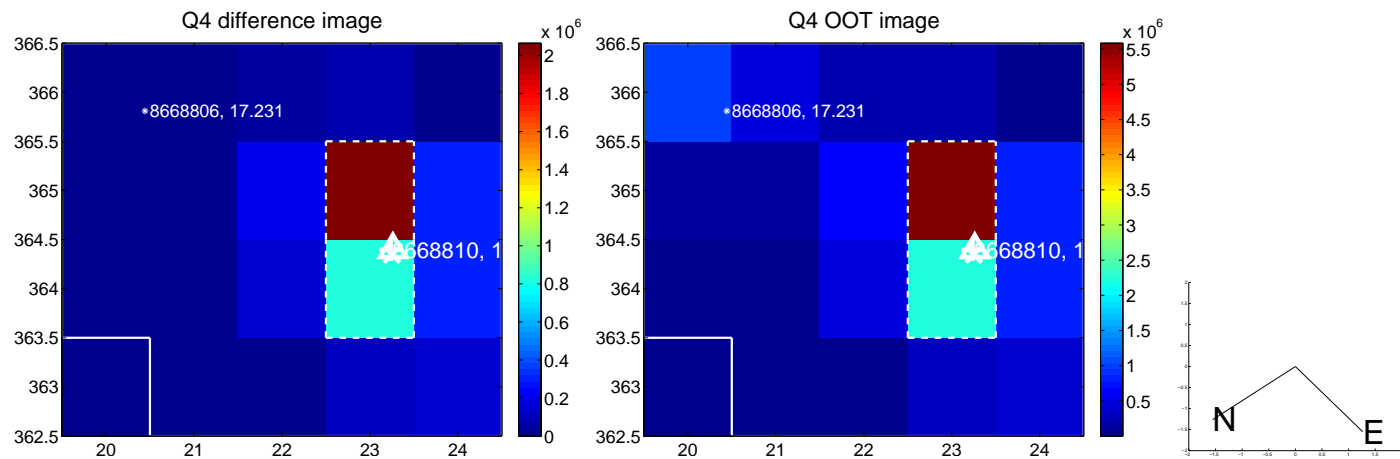
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.068 \pm 0.069$	0.99	$0.048 \pm 0.067$	$-0.048 \pm 0.070$
PRF-fit source offset from KIC position	$0.114 \pm 0.074$	1.53	$-0.073 \pm 0.073$	$-0.087 \pm 0.075$
photometric centroid source offset	$0.38 \pm 0.00$	133.08	$-0.38 \pm 0.00$	$-0.02 \pm 0.00$

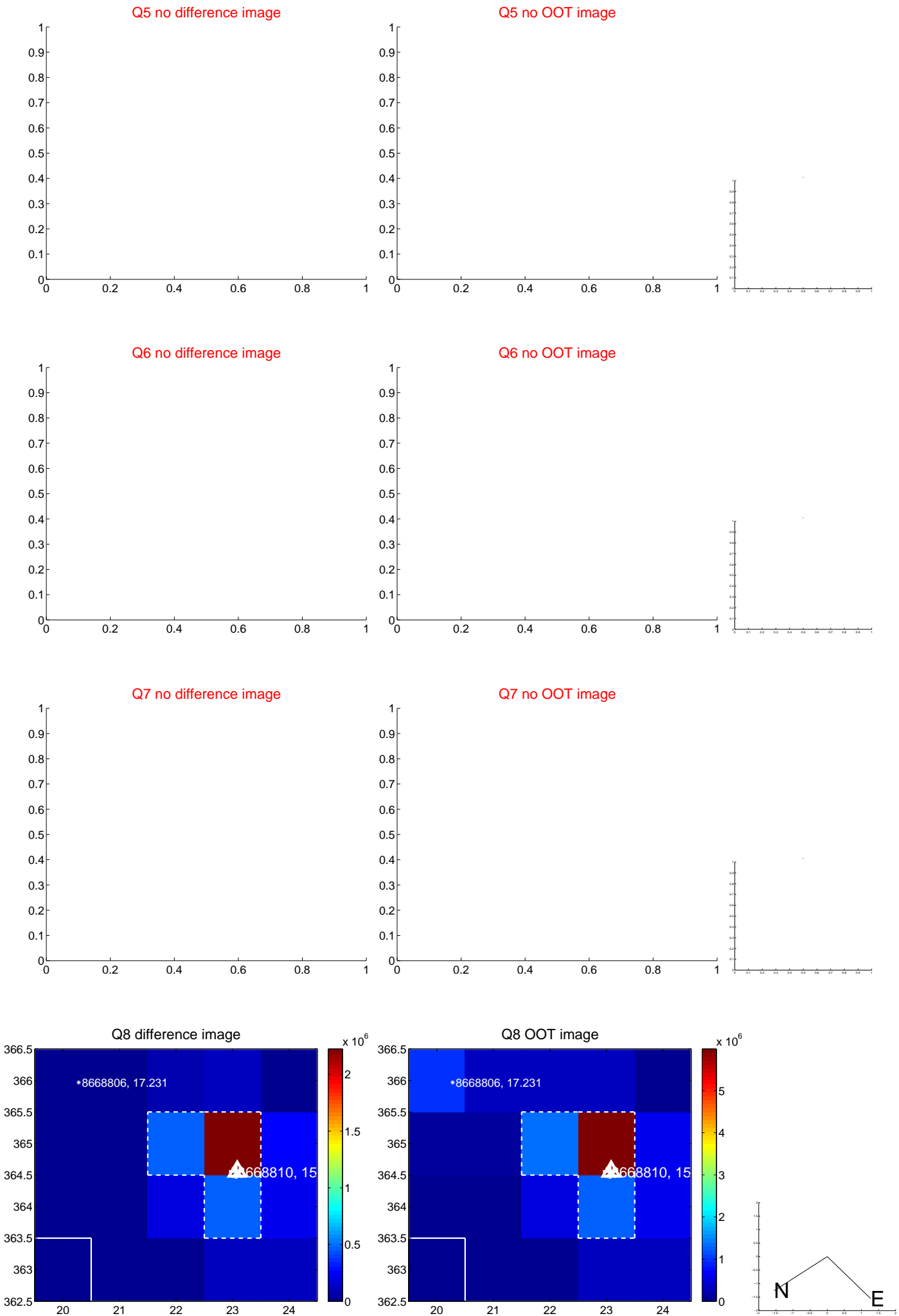


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

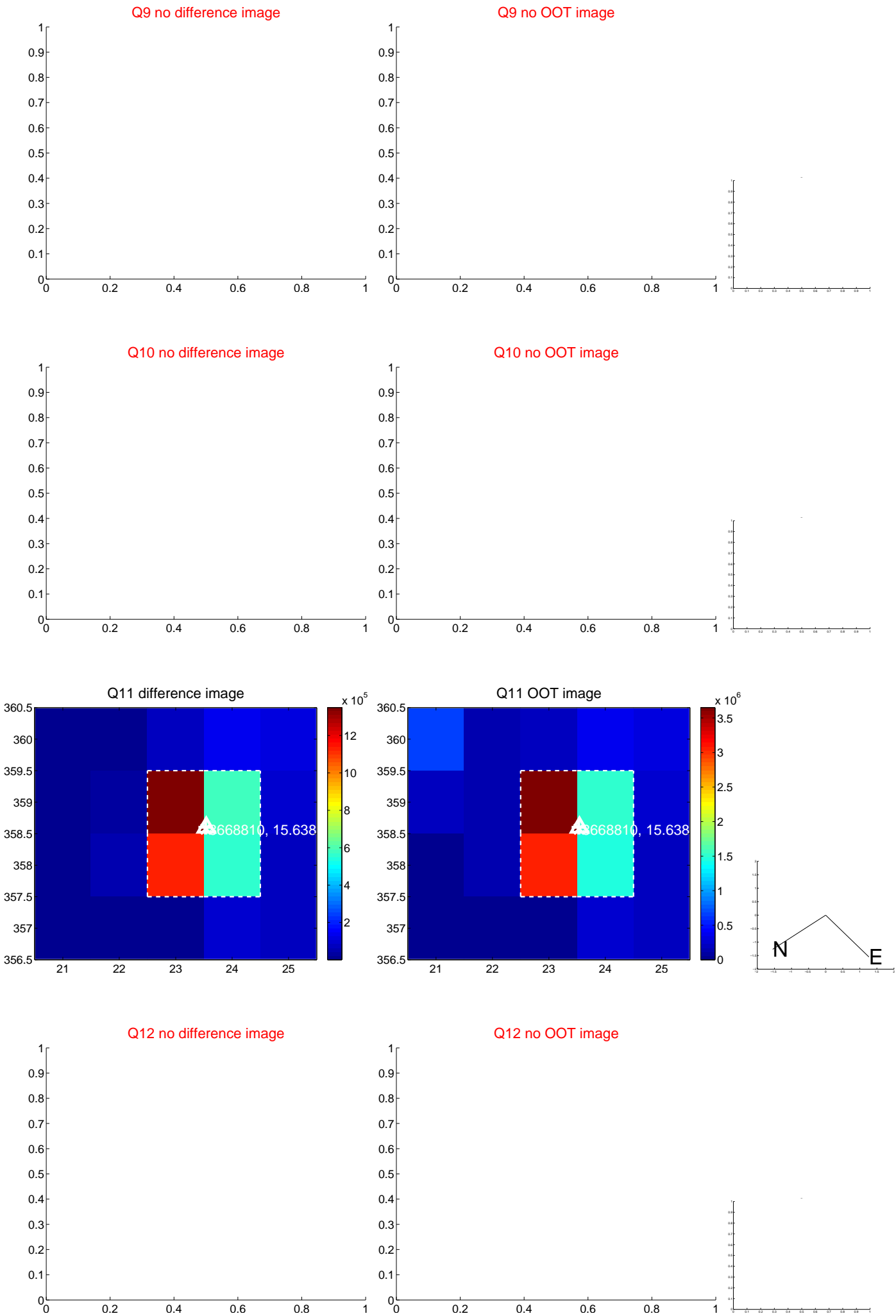


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

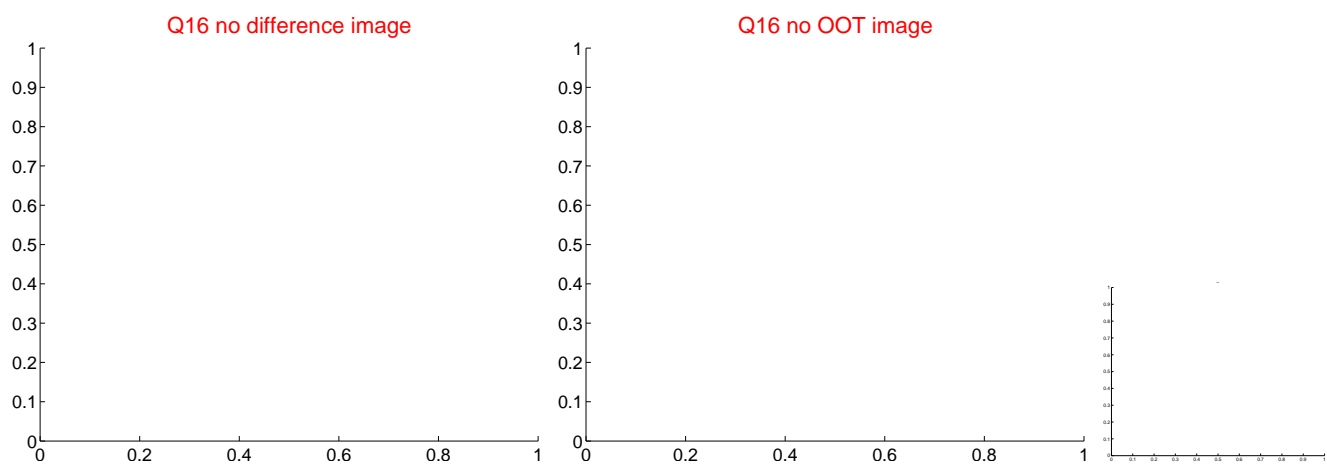
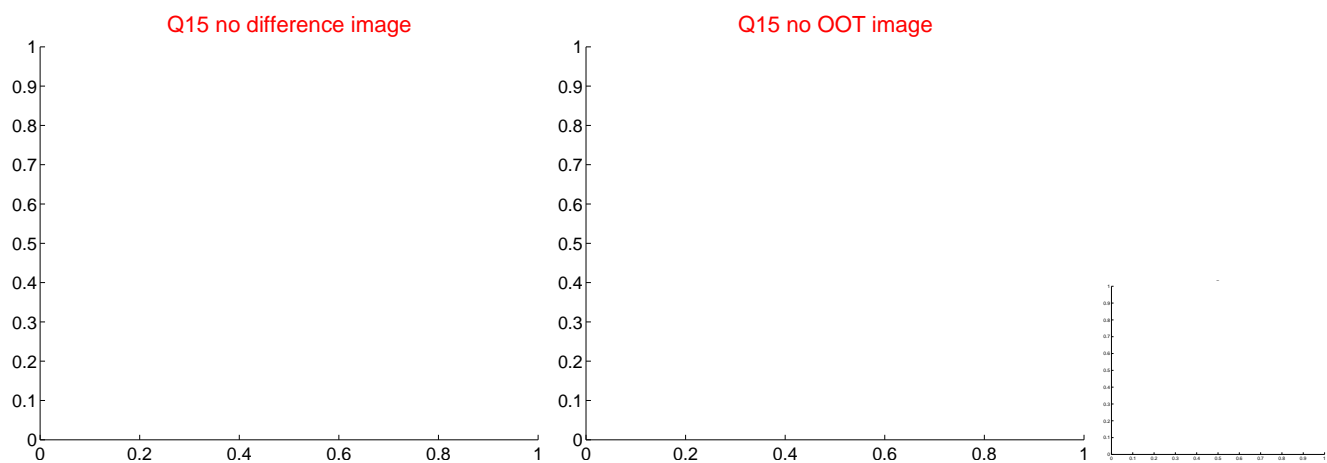
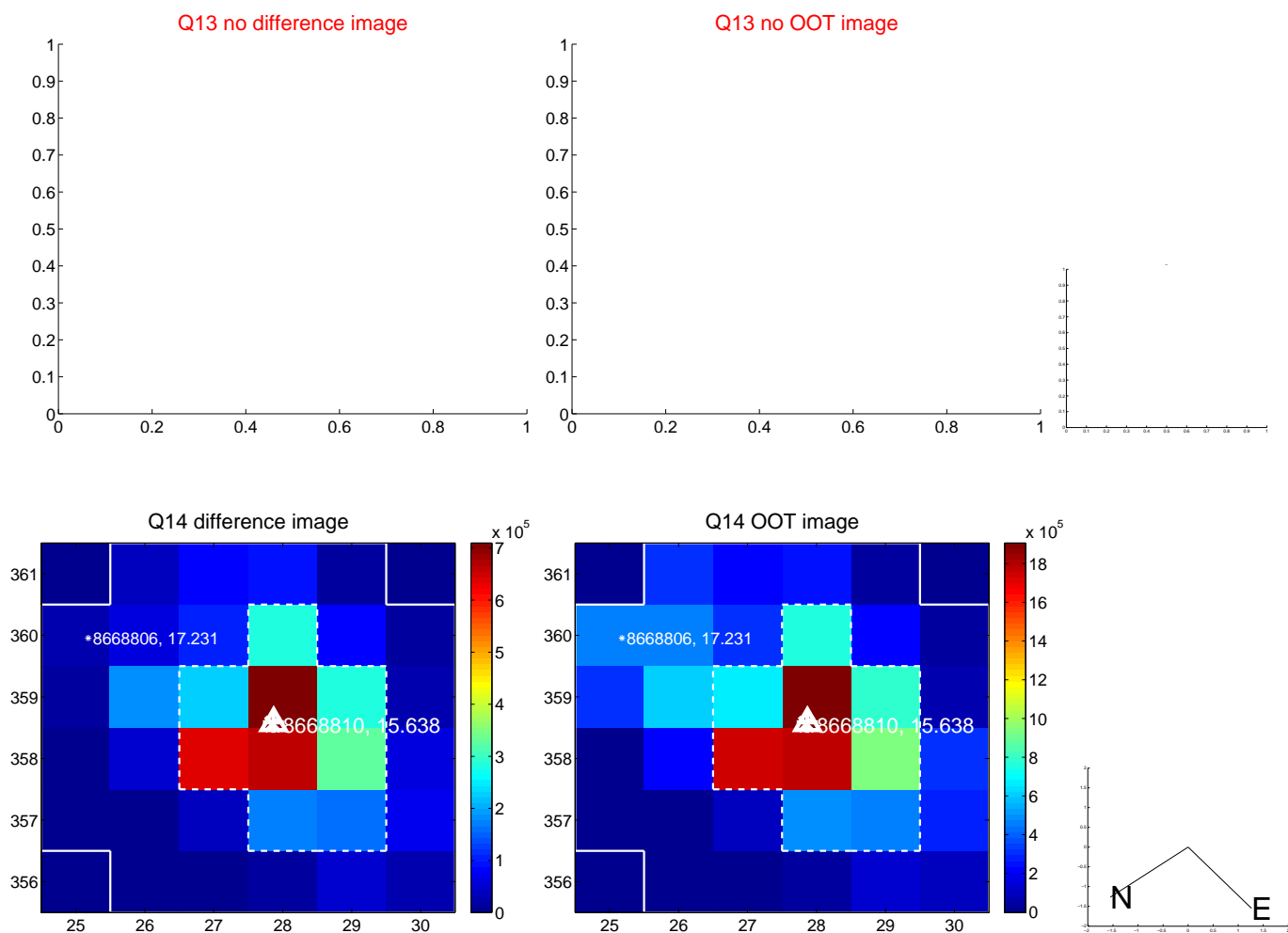




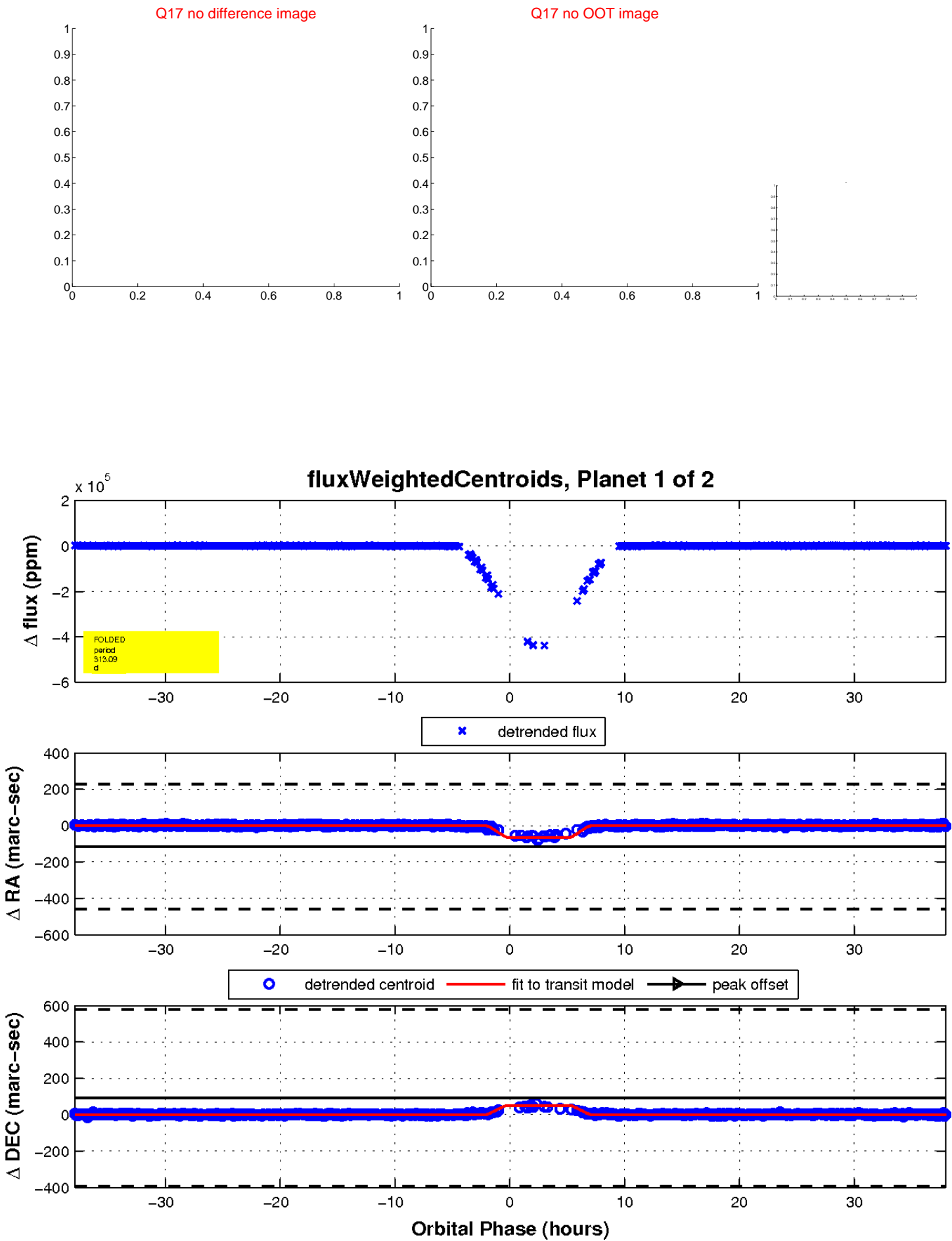
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white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value

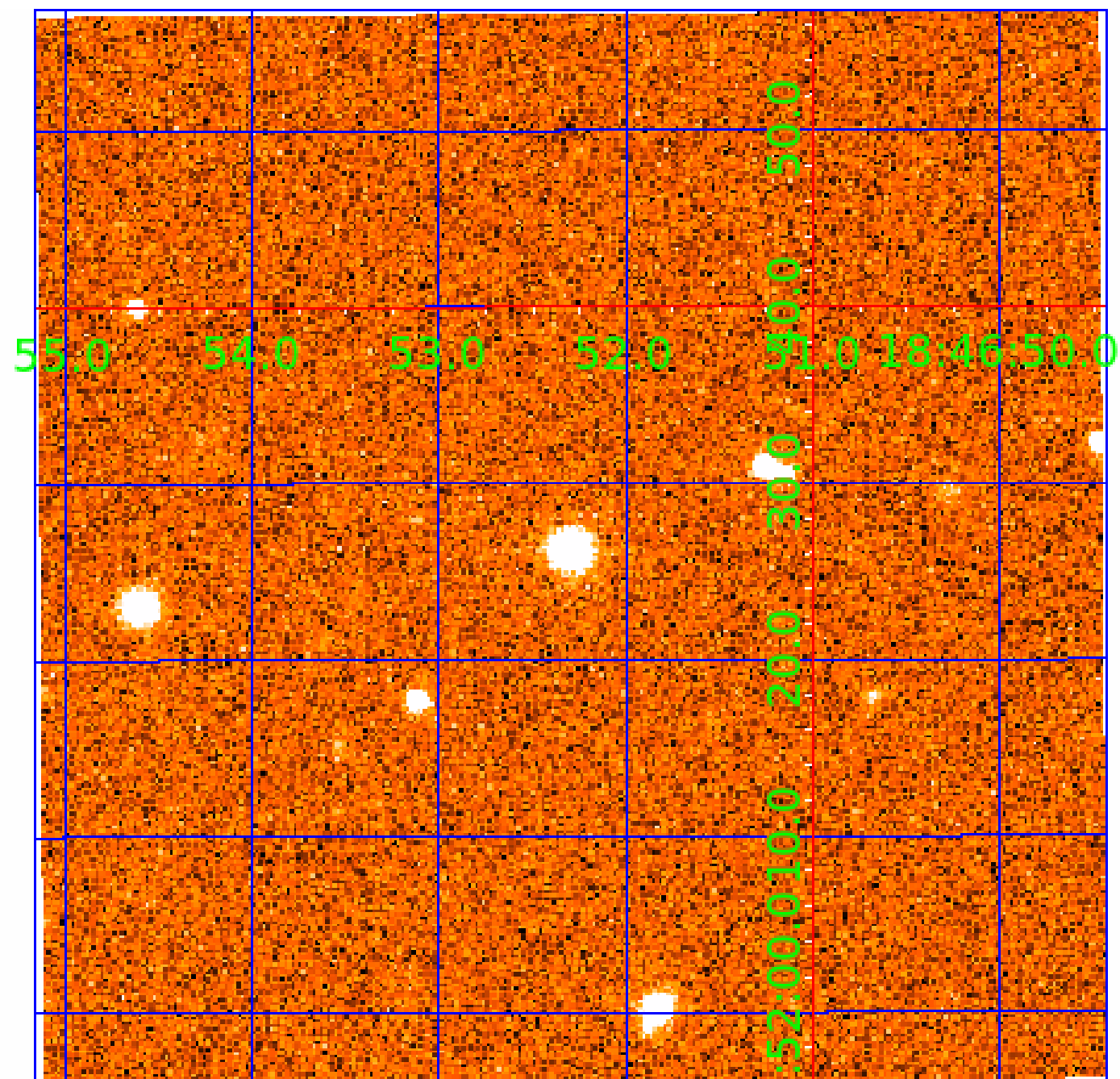


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 008668810

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008668810-01	OBS	3538.01	313.089817	424.715552	441447.2	9.000	3772.8	-1.0	0.67	5067	36.72	0.44
008668810-02	OBS	No	313.092336	344.225126	66716.4	12.210	457.4	469.6	0.67	5067	25.05	0.44

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008668810-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—CENT_NOFITS
008668810-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE—SAME_NTL_PERIOD—CENT_FEW_DIFFS

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

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

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

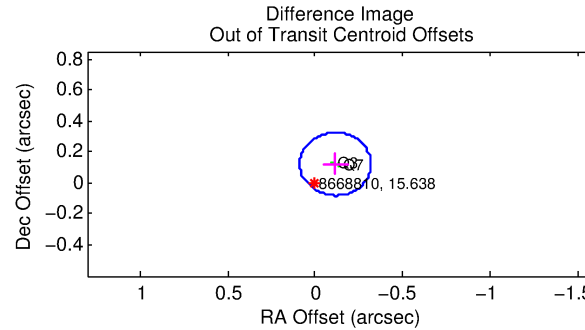
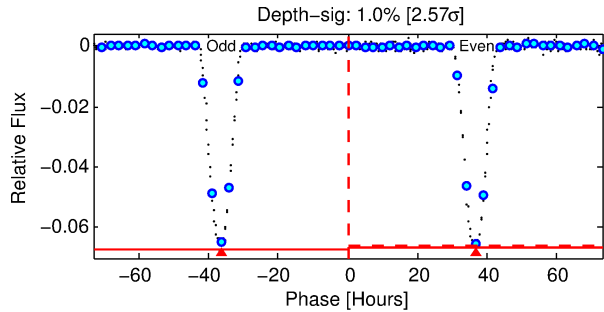
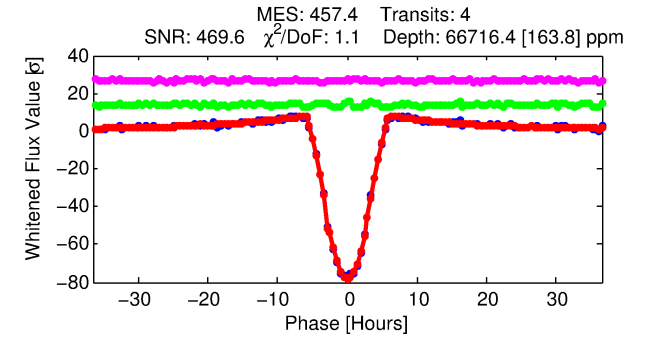
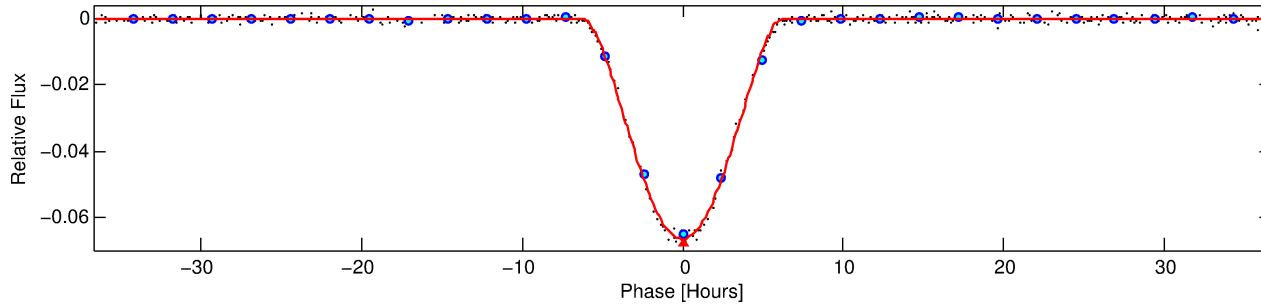
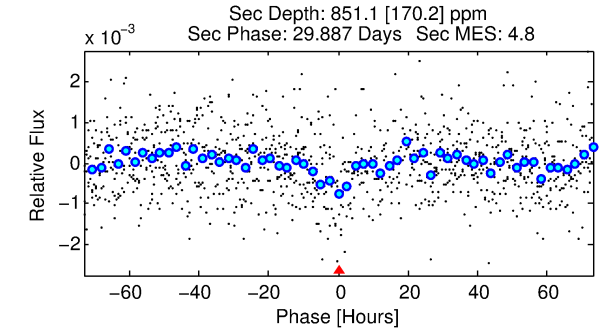
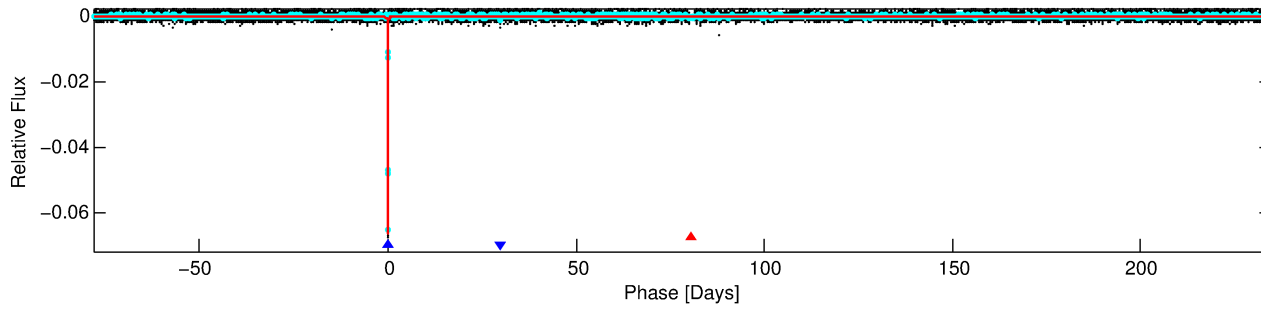
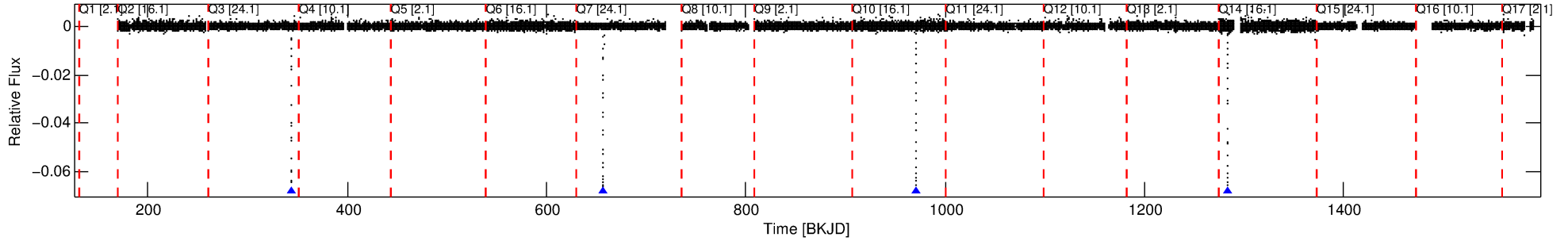
## Ephemeris Match Information For 008668810-02

No Significant Match Found

# DV One-Page Summary

KIC: 8668810 Candidate: 2 of 2 Period: 313.092 d  
KOI: K03538 Corr: No Ephemeris Match

Kp: 15.64 R\*: 0.67 Rs Teff: 5067.0 K Logg: 4.60 Fe/H: -0.600



## DV Fit Results:

Period = 313.09234 [0.00034] d  
Epoch = 344.2251 [0.0004] BKJD  
Rp/R\* = 0.3411 [0.0385]  
a/R\* = 193.95 [1.02]  
b = 0.90 [0.06]  
Seff = 0.44 [0.08]  
Teq = 207 [9] K  
Rp = 25.05 [3.72] Re  
a = 0.7825 [0.0664] AU  
Ag = 456.87 [149.64] [3.05σ]  
Teffp = 1482 [120] K [10.58σ]

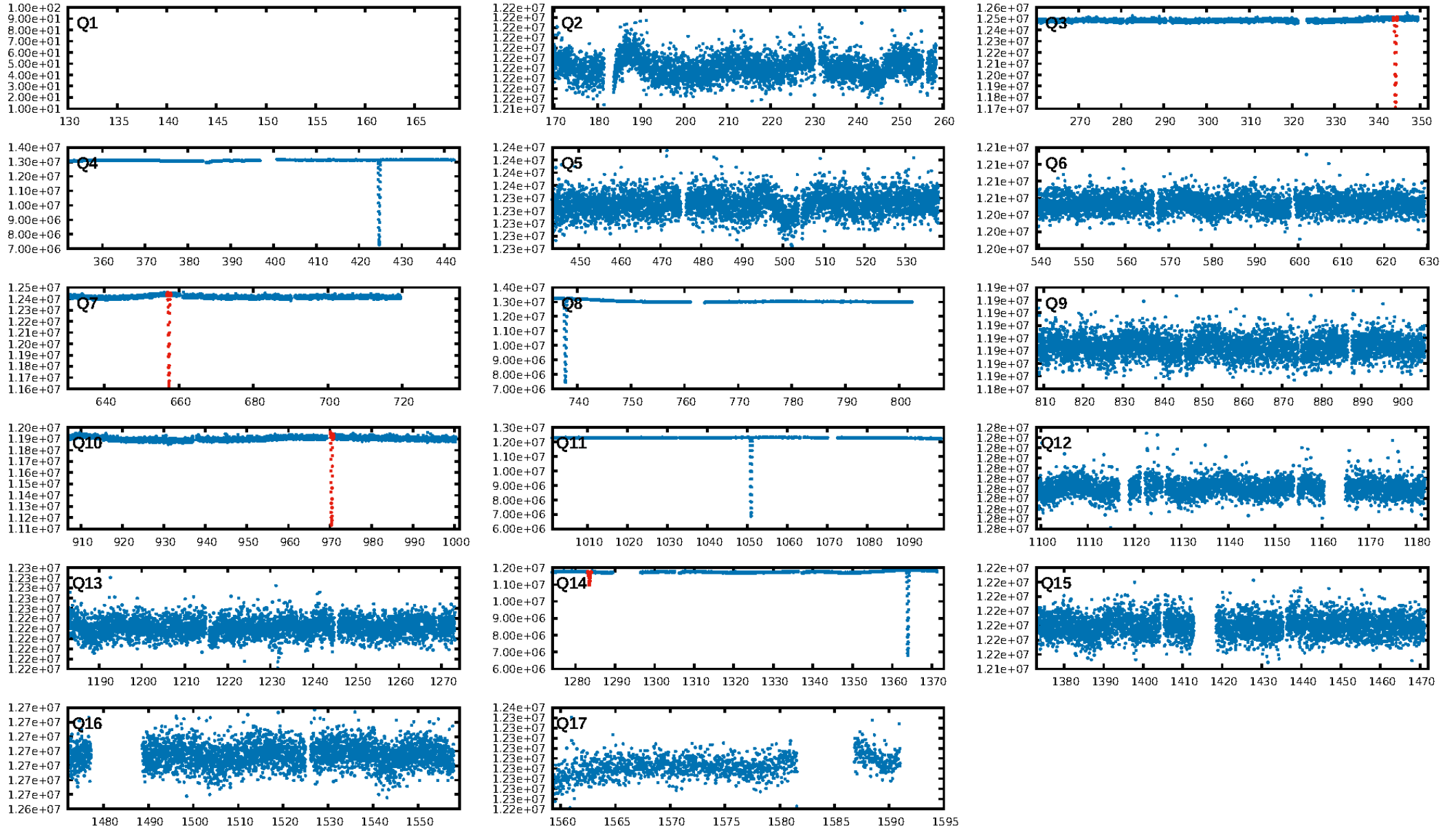
## DV Diagnostic Results:

ShortPeriod-sig: 0.3% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 63.7%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 4.397  
Centroid-sig: 41.7%  
Centroid-so: 0.562 arcsec [22.25σ]  
OotOffset-rm: 0.168 arcsec [2.48σ]  
KicOffset-rm: 0.223 arcsec [3.31σ]  
OotOffset-st: 0/2/0/0 [2]  
KicOffset-st: 0/2/0/0 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 1.00 [2/2]

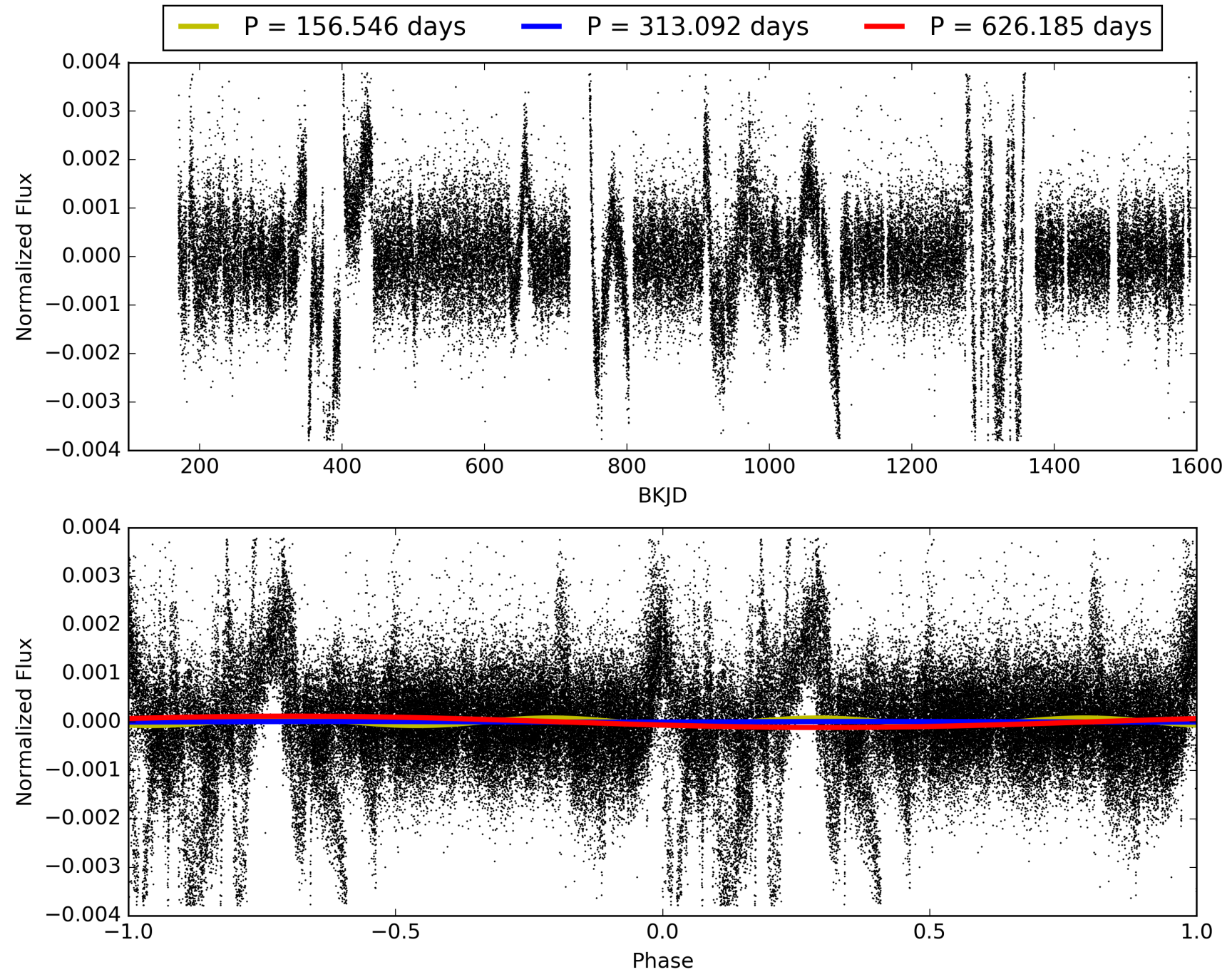
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 22:33:01 Z

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

# TCE 008668810-02, PDC Light Curves



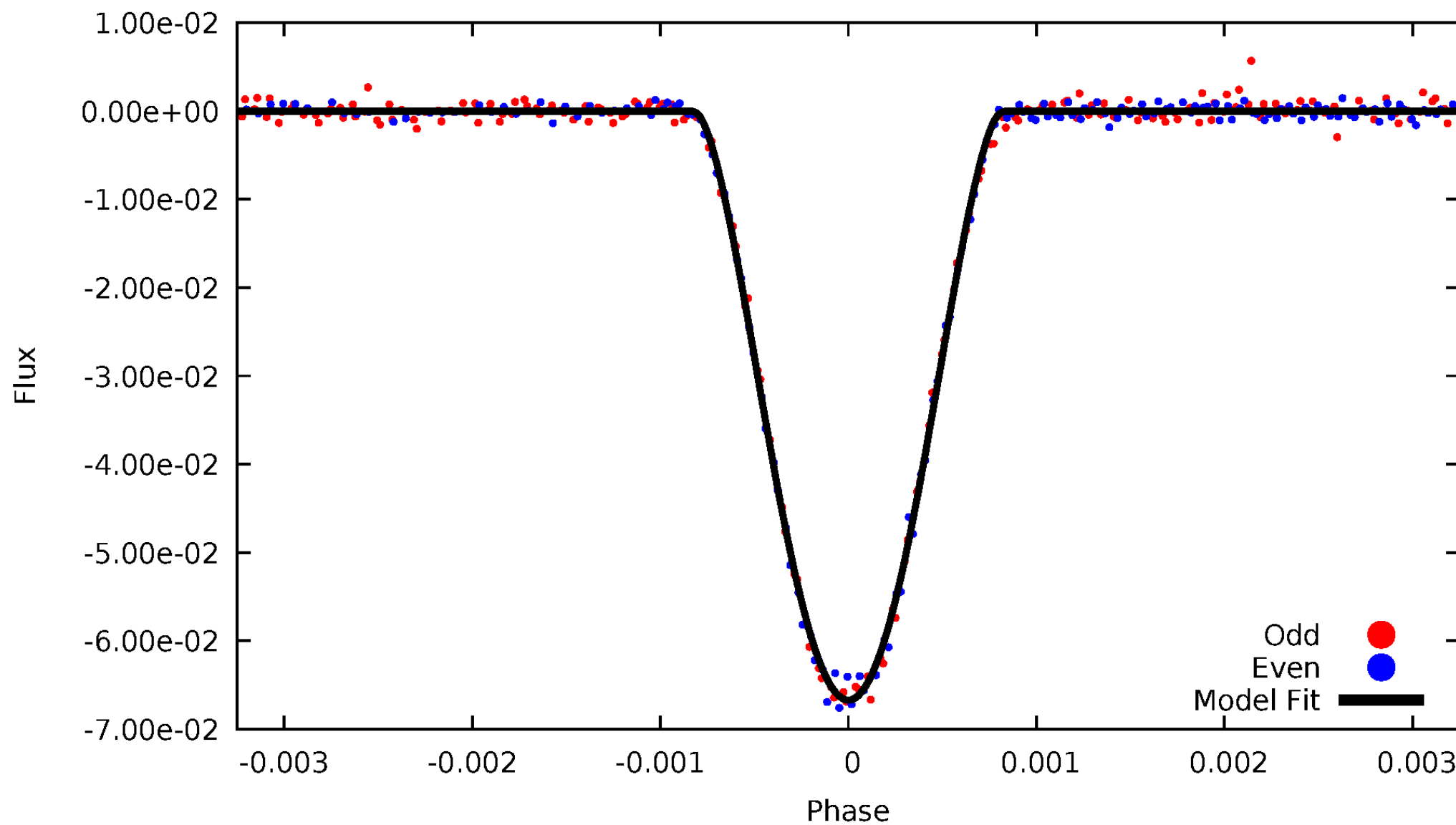
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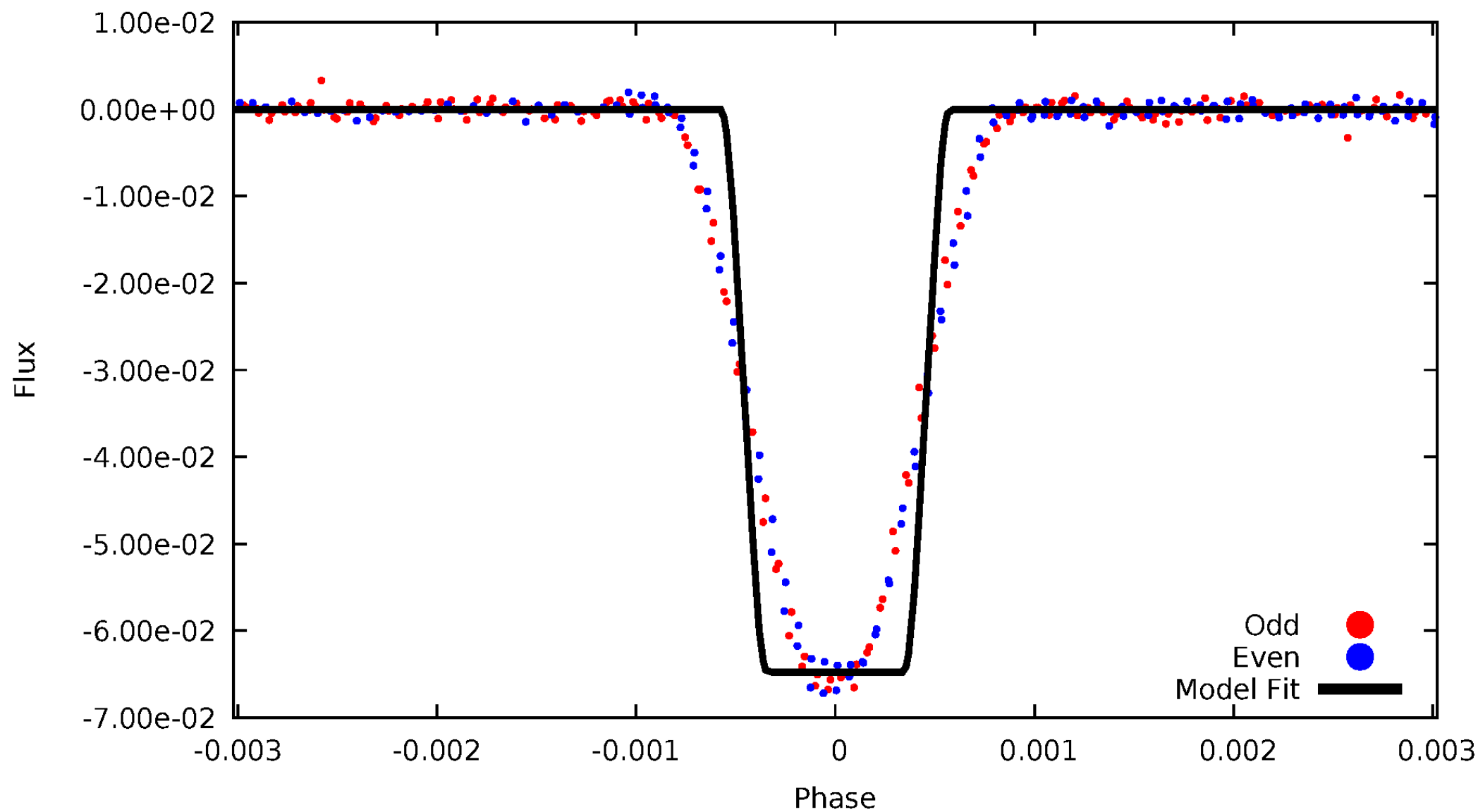
# DV Odd/Even

TCE 008668810-02



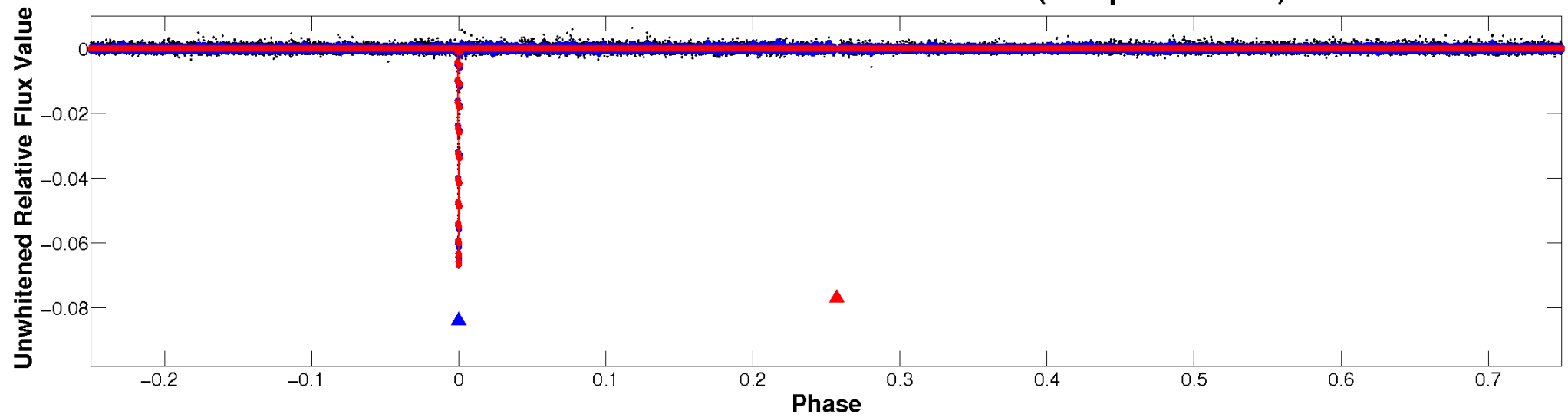
# ALT Odd/Even

TCE 008668810-02

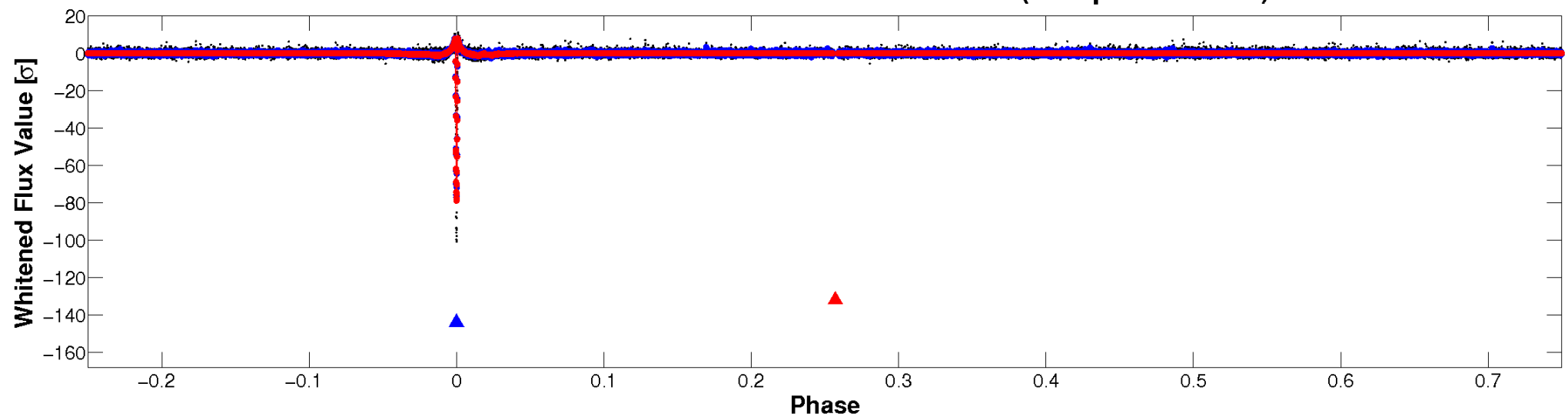


# Non-Whitened Vs. Whitened Light Curve

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

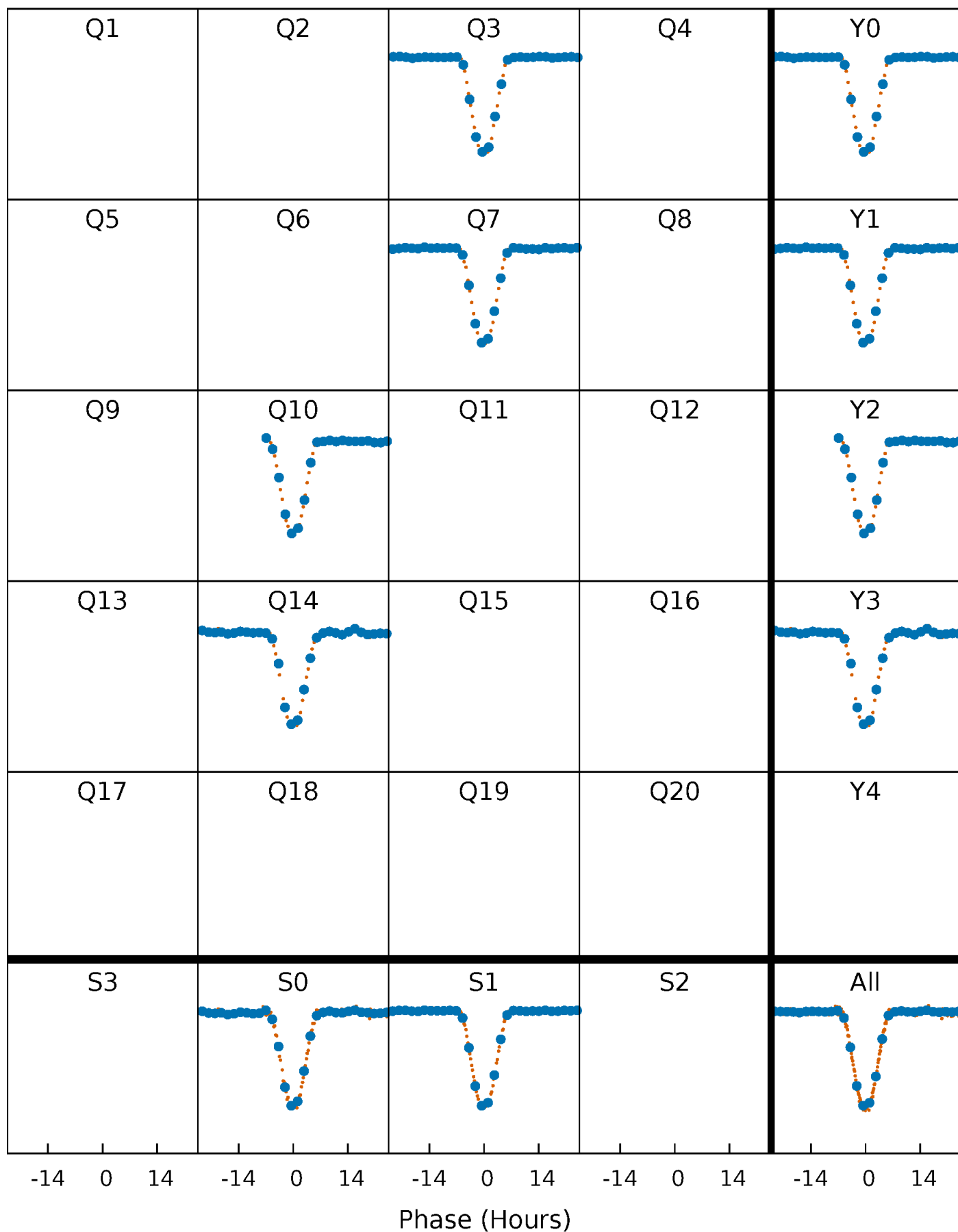


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



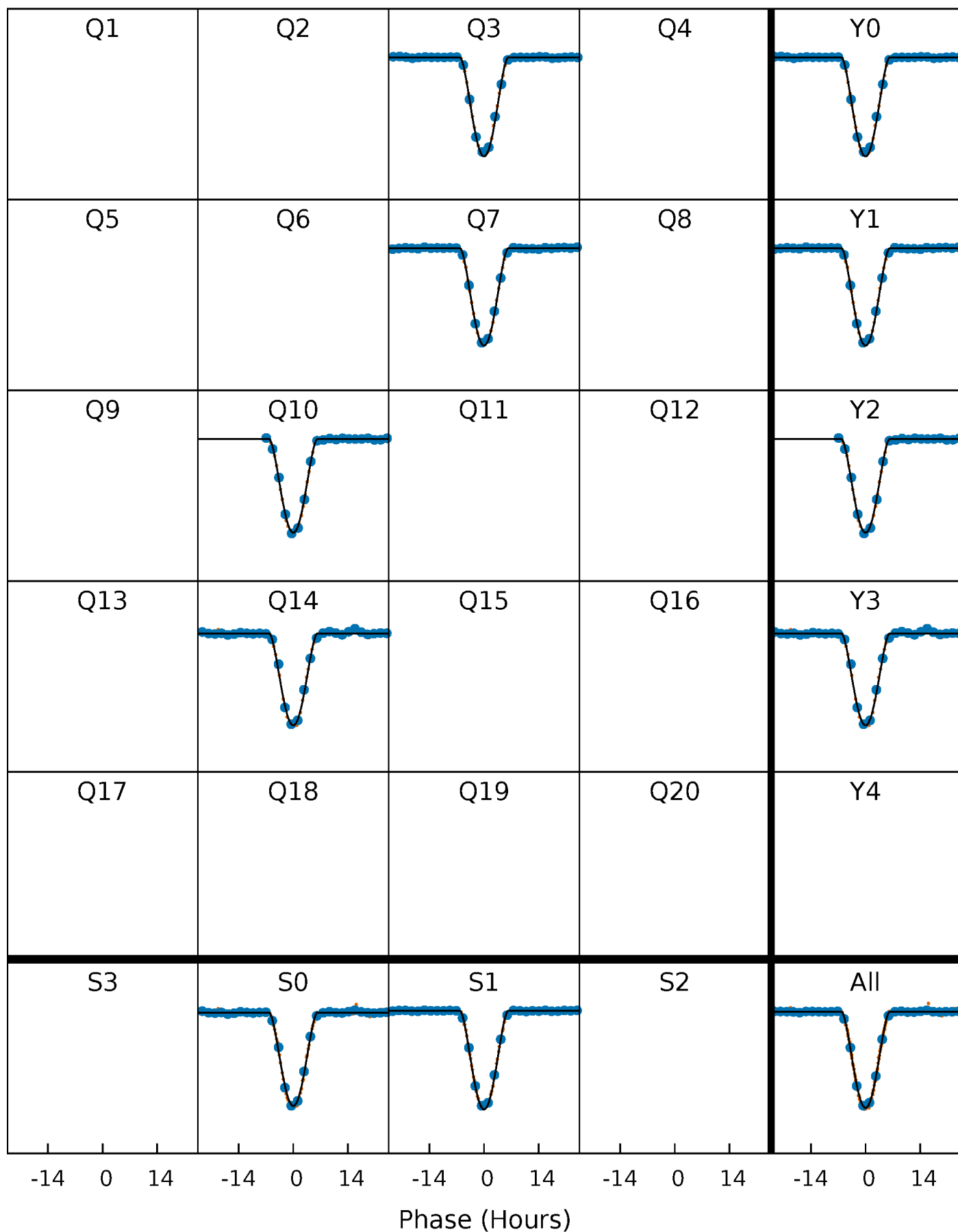
# PDC Quarter-Phased Transit Curves

TCE 008668810-02 P=313.092336 Days  $T_0=344.225126$  (BKJD)



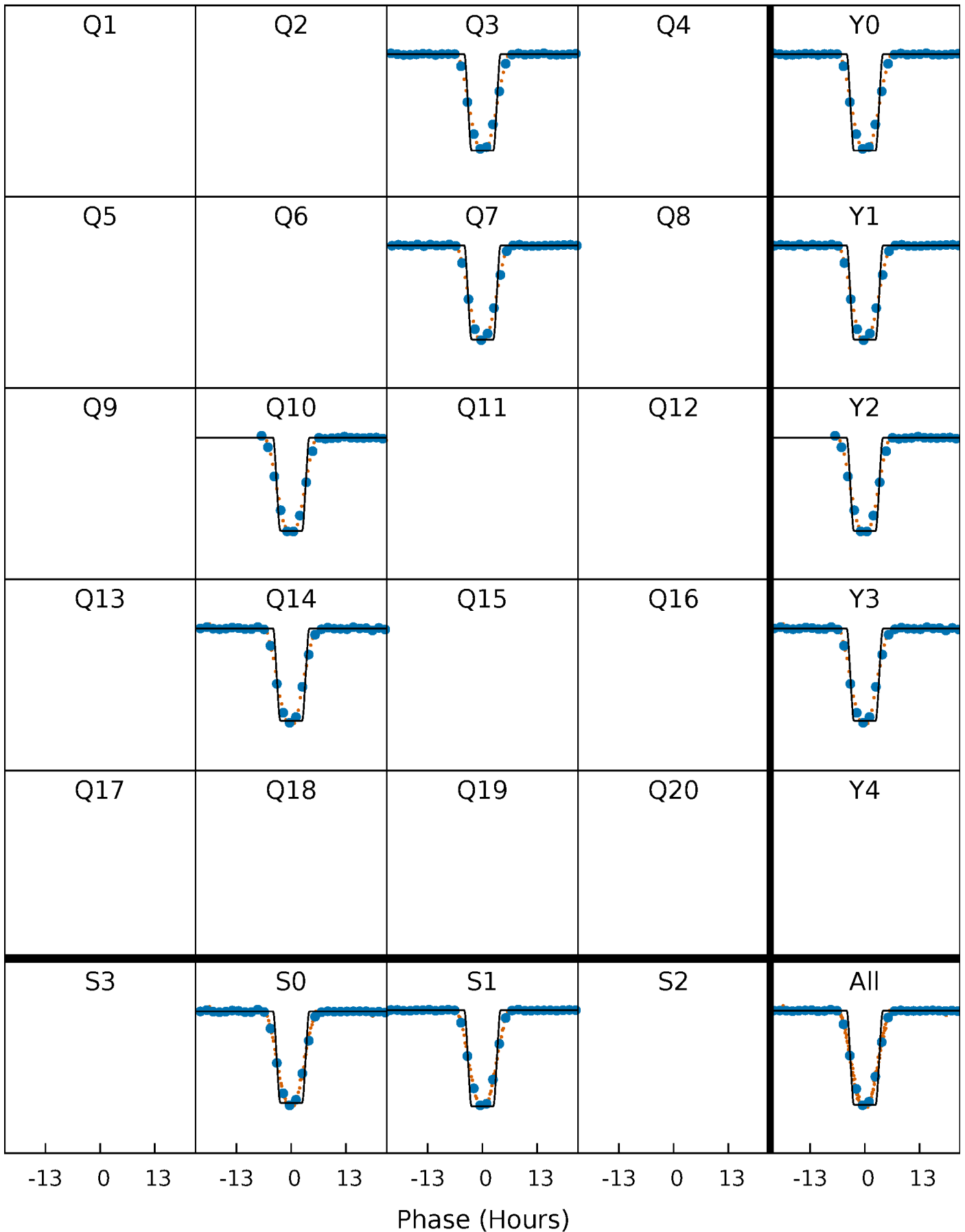
# DV Quarter-Phased Transit Curves

TCE 008668810-02 P=313.092336 Days  $T_0=344.225126$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

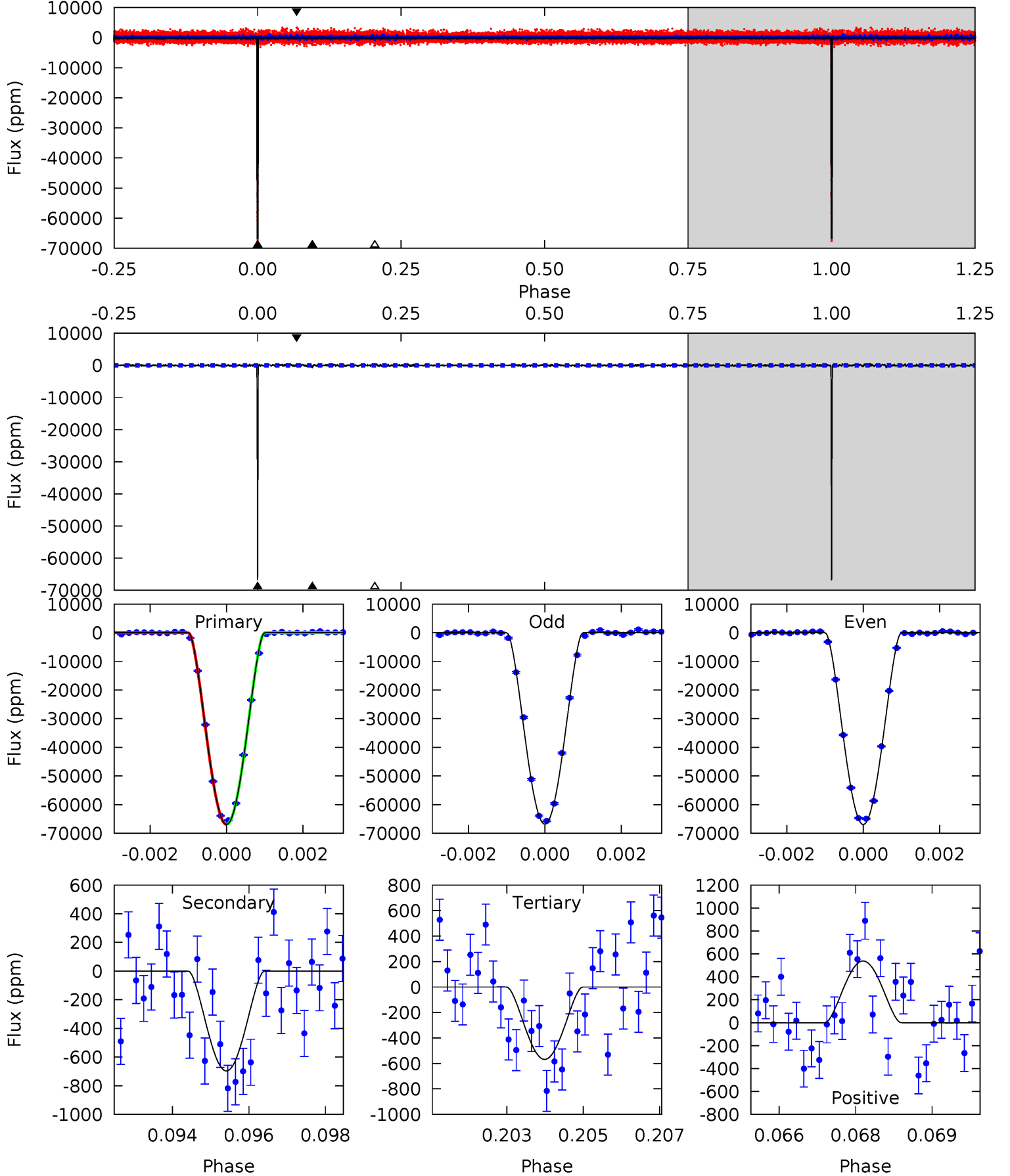
TCE 008668810-02 P=313.096629 Days  $T_0=344.220175$  (BKJD)



# DV Model-Shift Uniqueness Test

008668810-02, P = 313.092336 Days, E = 31.132790 Days

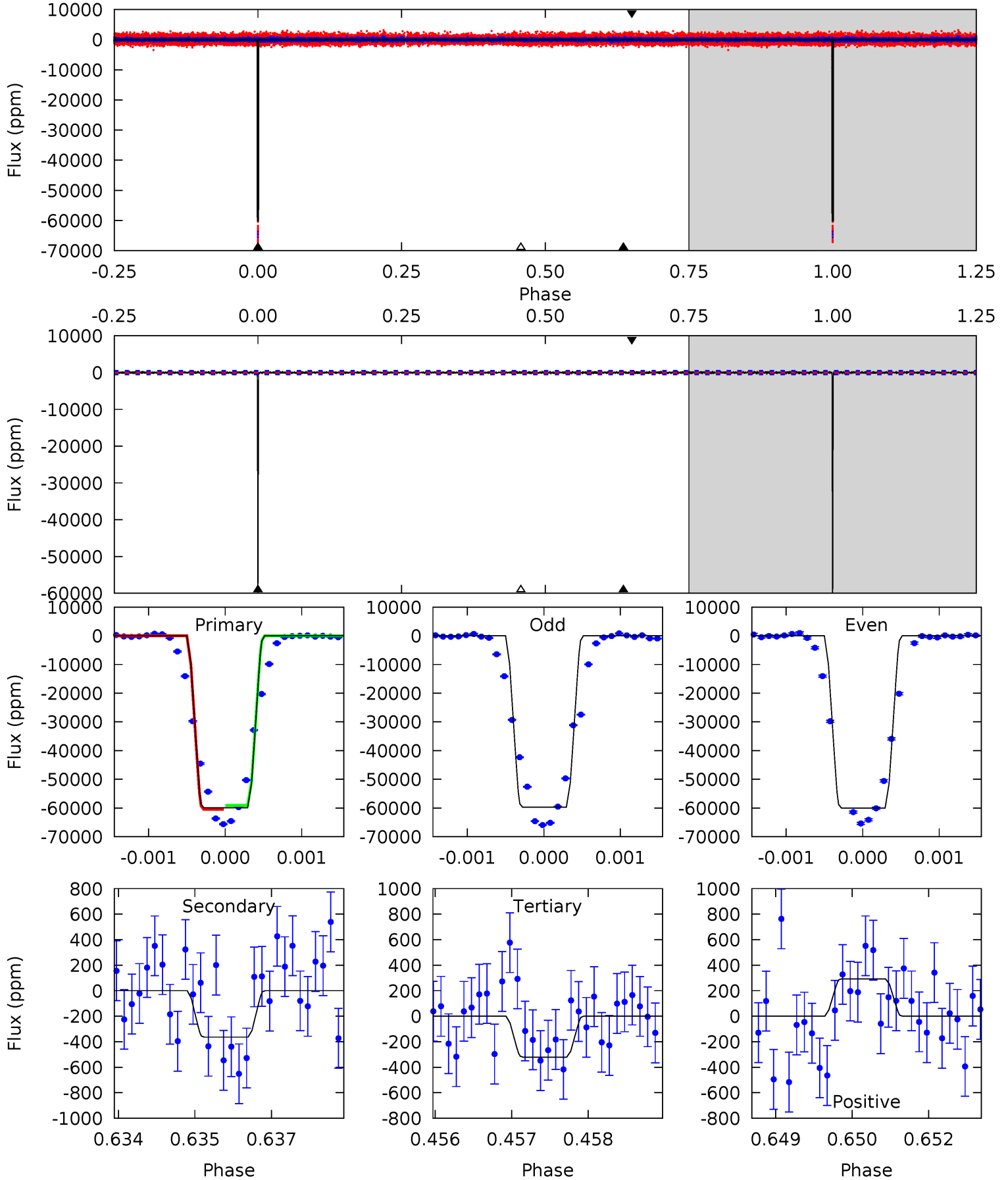
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
989.1	10.3	8.40	7.96	5.36	3.15	1.78	980.7	981.1	1.90	2.34	0.96	1.00	0.01	1.09



# Alt Model-Shift Uniqueness Test

008668810-02, P = 313.096629 Days, E = 31.123546 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
683.5	4.15	3.65	3.34	5.43	3.25	0.99	679.8	680.1	0.50	0.81	1.51	1.00	0.00	7.97





### Stellar Parameters For KIC 008668810

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5067^{+151}_{-151}$	$4.596^{+0.072}_{-0.042}$	$-0.600^{+0.350}_{-0.300}$	$0.673^{+0.065}_{-0.065}$	$0.651^{+0.079}_{-0.036}$	$3.014^{+0.962}_{-0.509}$
	+3%/-3%	+2%/-1%	+58%/-50%	+10%/-10%	+12%/-6%	+32%/-17%
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 008668810-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-697 \pm 68$	$24.95^{+3.37}_{-3.18}$	$288^{+11}_{-11}$	$2305^{+79}_{-71}$	$382^{+122}_{-86}$
Alt.	$-364 \pm 88$	$18.68^{+3.20}_{-2.89}$	$289^{+10}_{-12}$	$2293^{+99}_{-98}$	$359^{+162}_{-118}$

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

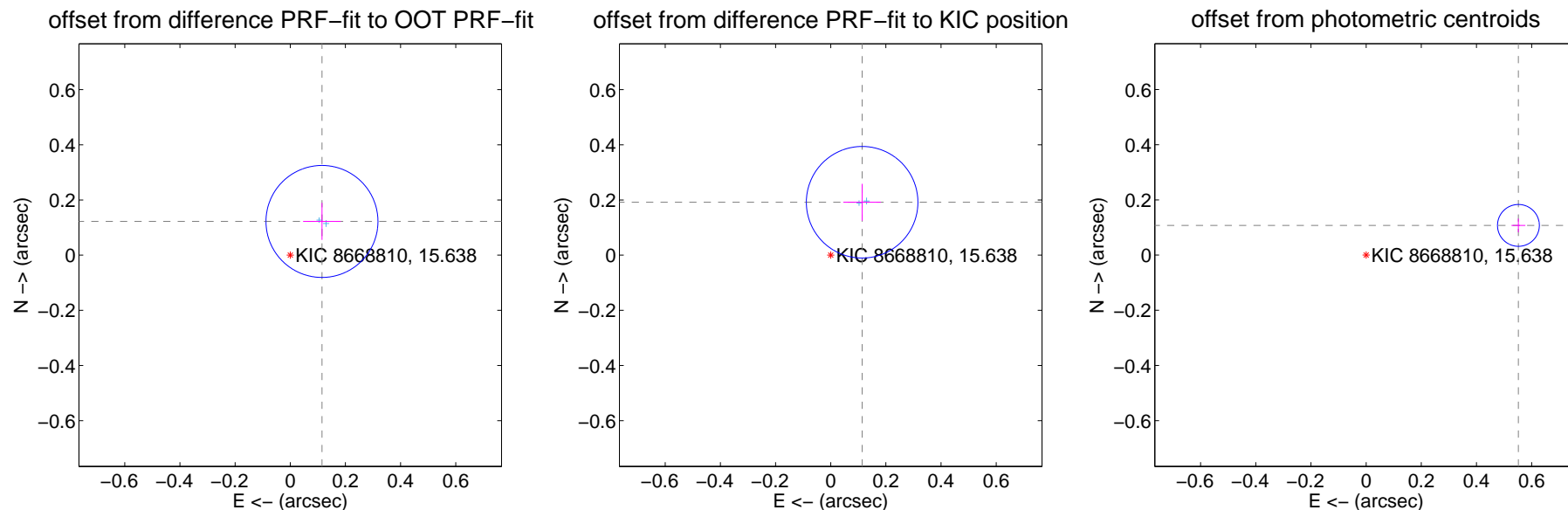
## DV Centroid Data

Supplemental centroid analysis for 008668810-02. Kepler magnitude: 15.64. Transit SNR 469.56

There are 2 quarters with good PRF difference image offsets

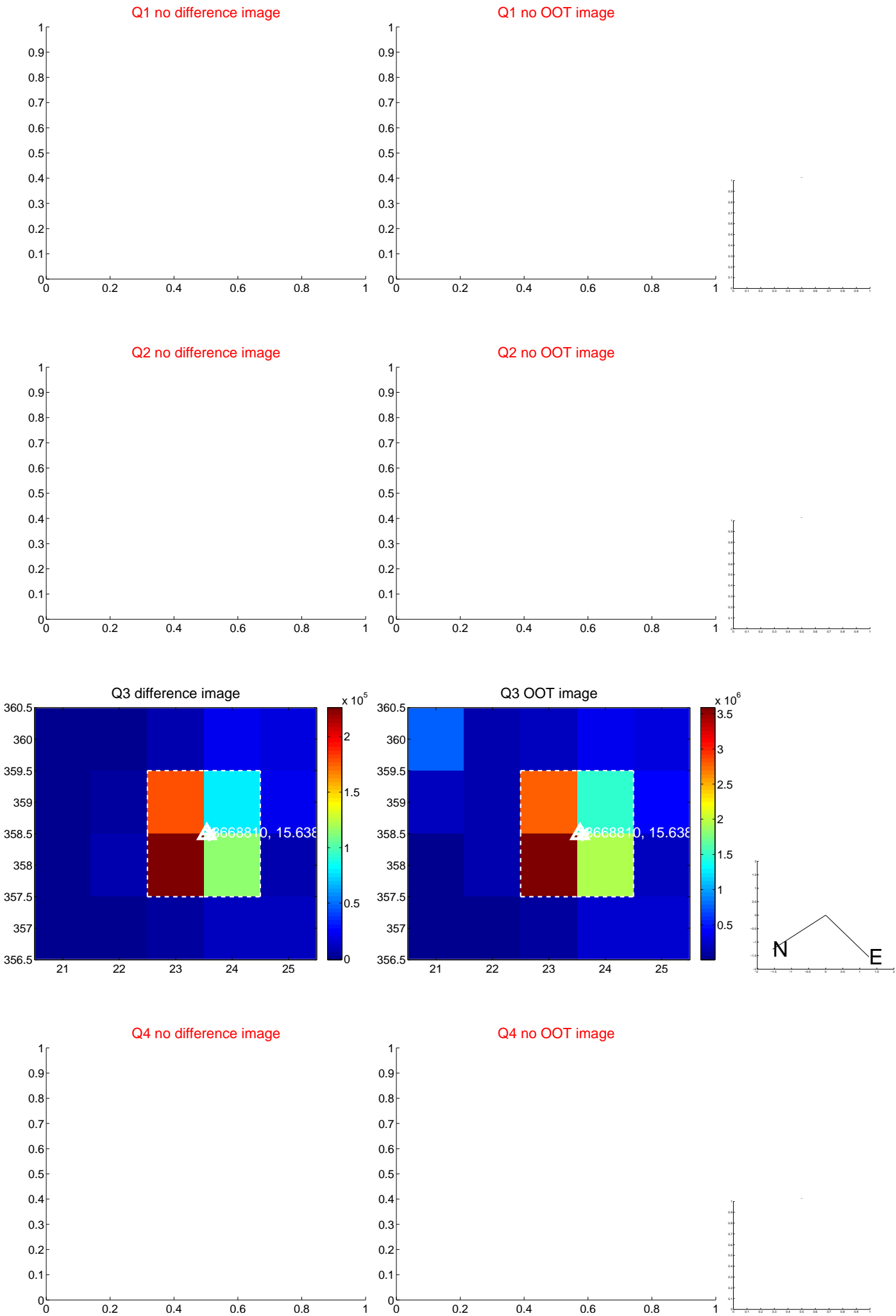
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.168 \pm 0.068$	2.48	$-0.115 \pm 0.068$	$0.122 \pm 0.067$
PRF-fit source offset from KIC position	$0.223 \pm 0.067$	3.31	$-0.114 \pm 0.068$	$0.192 \pm 0.067$
photometric centroid source offset	$0.56 \pm 0.03$	22.25	$-0.55 \pm 0.03$	$0.11 \pm 0.02$

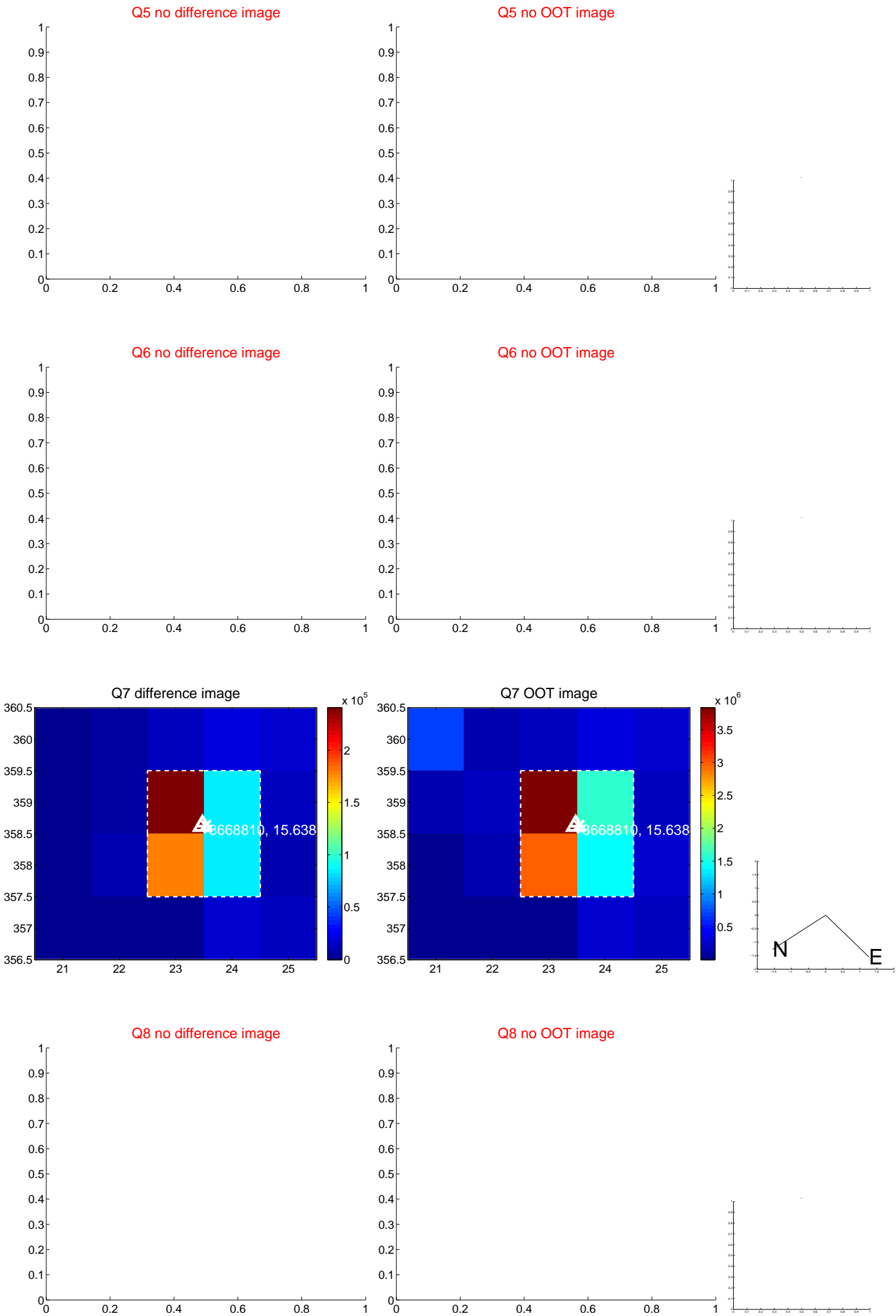


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



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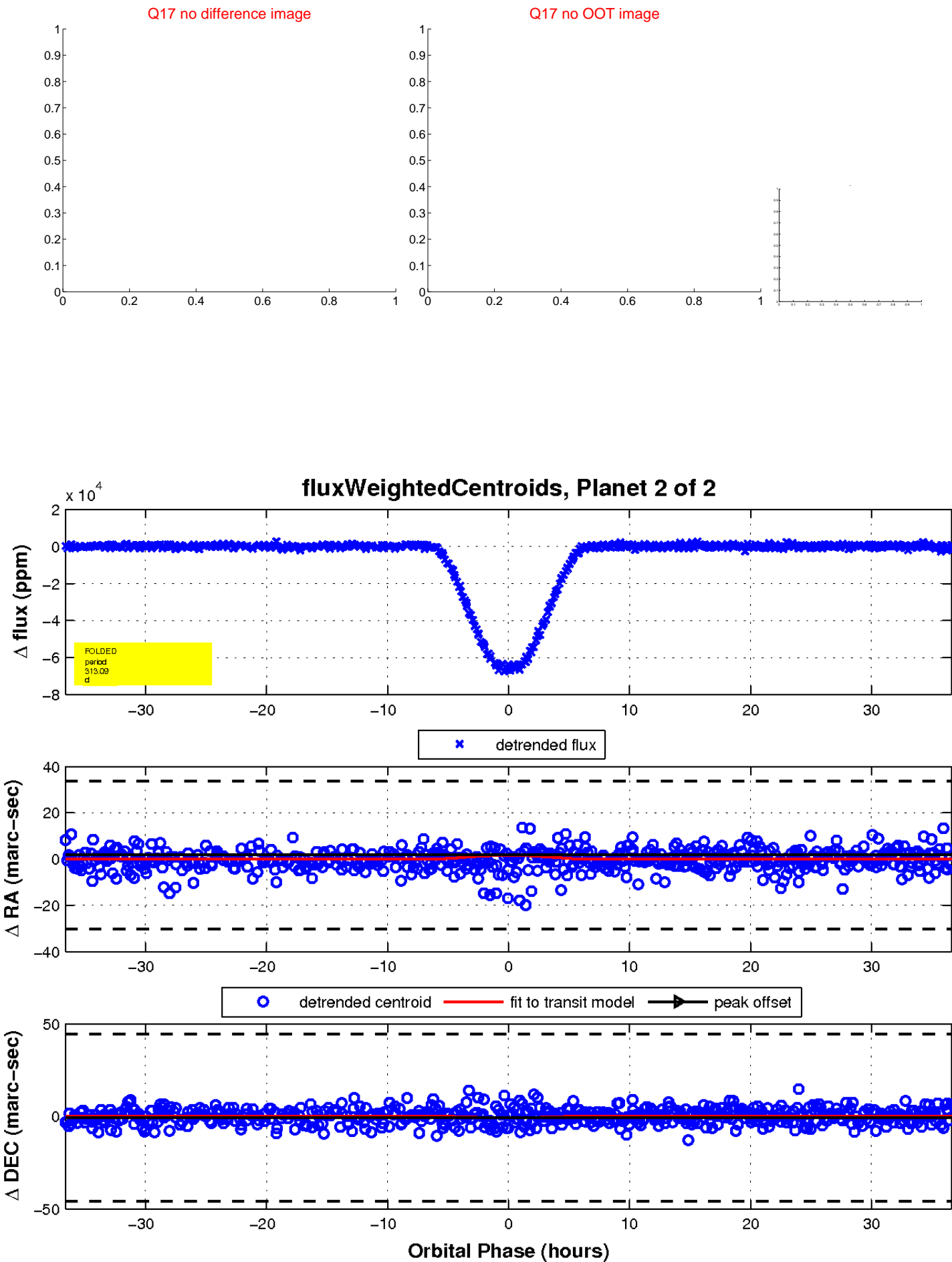
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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UKIRT Image

Declination

