

# KIC 010403036

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010403036-01	OBS	No	330.562216	342.883680	2867.5	8.679	19.2	4.7	17.87	4494	108.82	142.93
010403036-02	OBS	No	223.786186	215.416096	2449.6	3.288	13.9	7.8	17.87	4494	84.91	240.45
010403036-03	OBS	No	393.114450	307.784505	46.7	3.500	9.4	-1.0	17.87	4494	11.72	113.44

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010403036-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
010403036-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED—HALO_GHOST
010403036-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_POS_ALT—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.

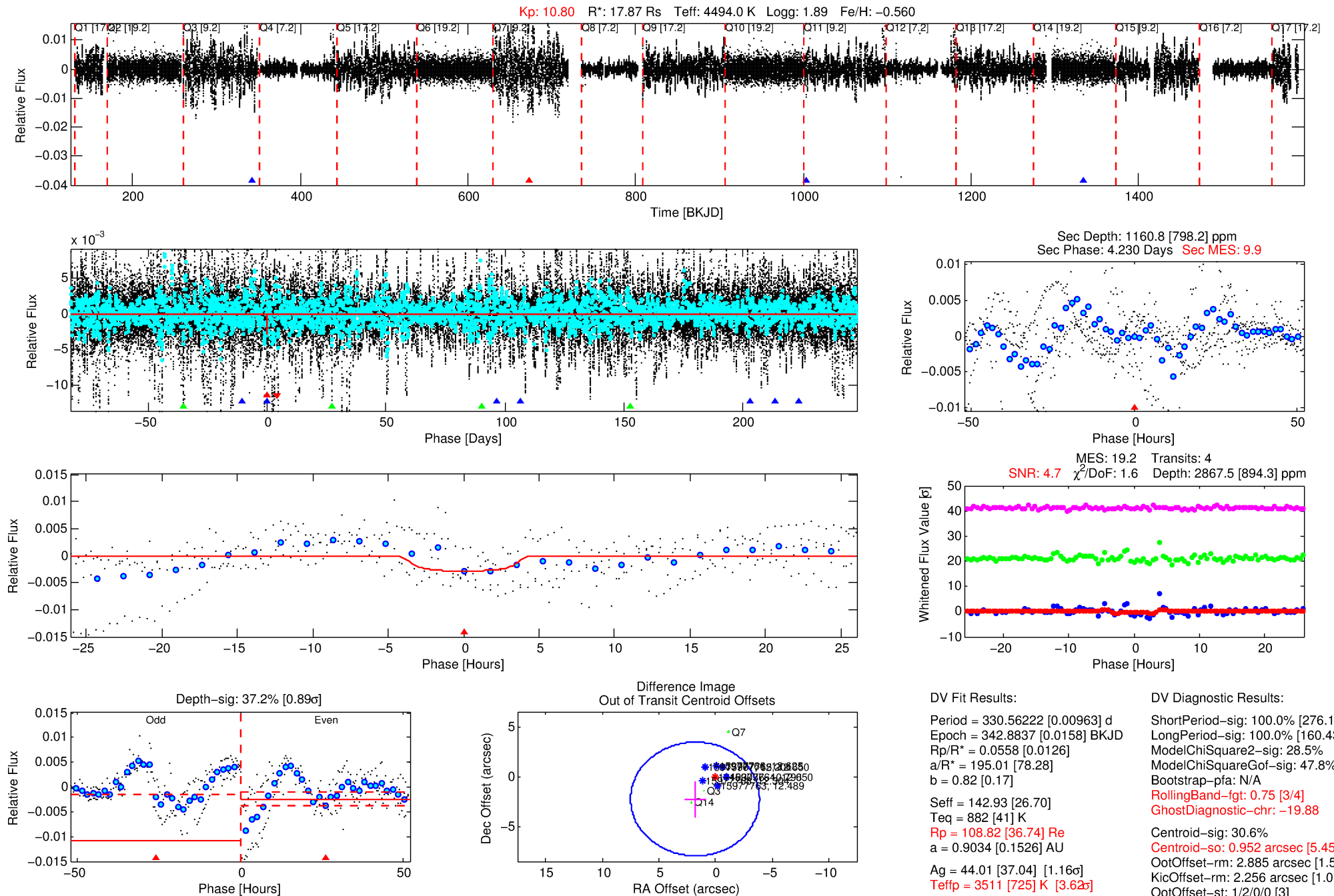
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010403036-01

No Significant Match Found

# DV One-Page Summary

KIC: 10403036 Candidate: 1 of 3 Period: 330.562 d



## DV Fit Results:

Period = 330.56222 [0.00963] d  
Epoch = 342.8837 [0.0158] BKJD  
Rp/R\* = 0.0558 [0.0126]  
a/R\* = 195.01 [78.28]  
b = 0.82 [0.17]  
Seff = 142.93 [26.70]  
Teq = 882 [41] K  
Rp = 108.82 [36.74] Re  
a = 0.9034 [0.1526] AU  
Ag = 44.01 [37.04] [1.16σ]  
Teff = 3511 [725] K [3.62σ]

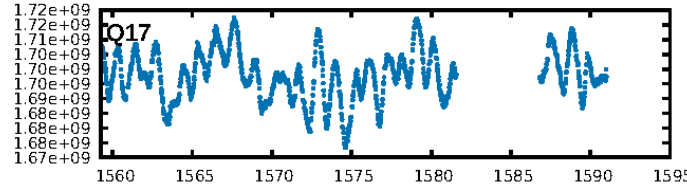
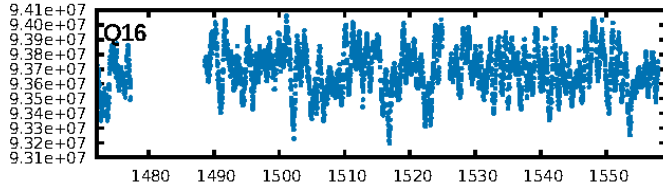
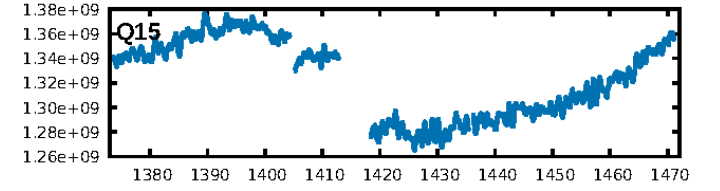
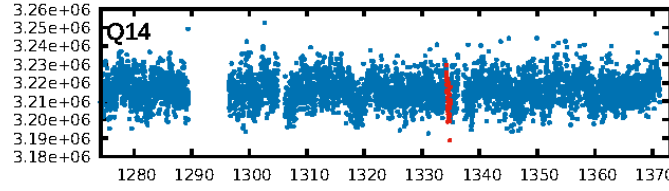
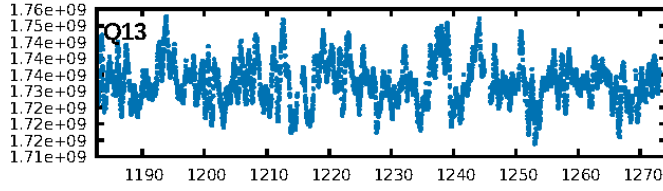
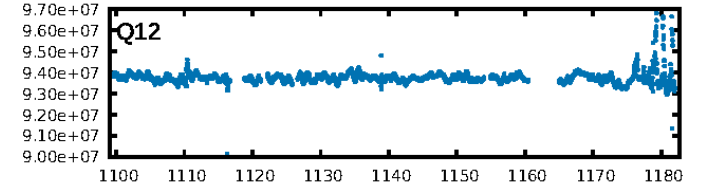
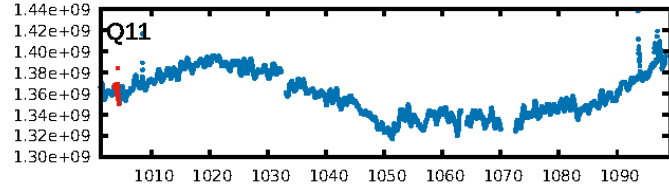
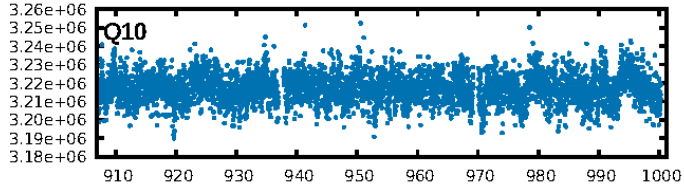
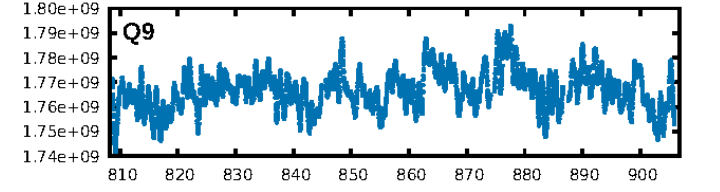
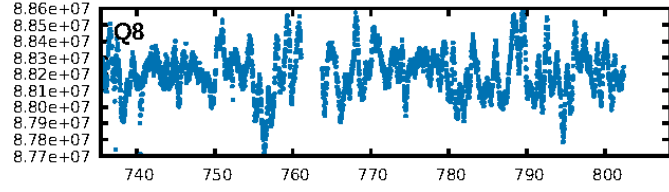
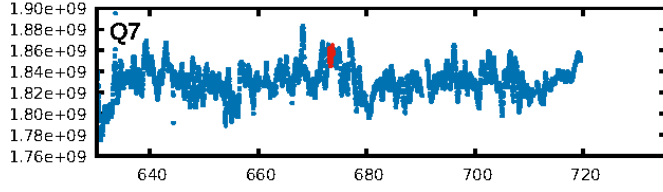
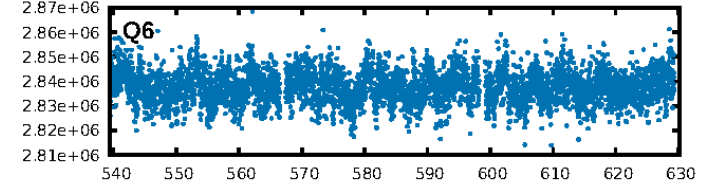
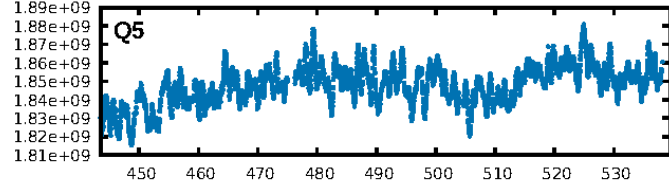
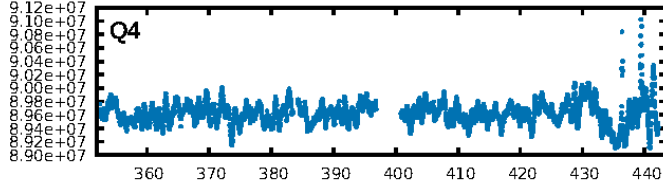
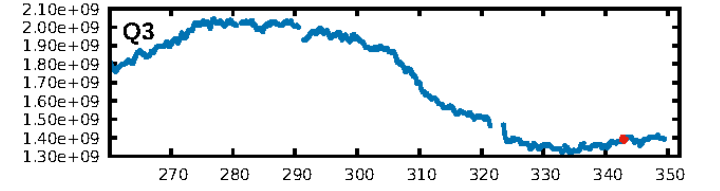
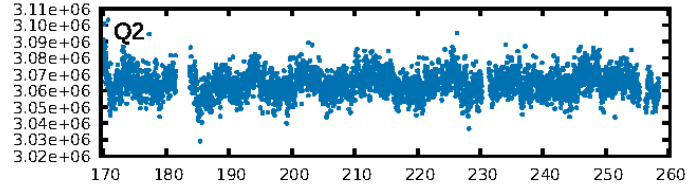
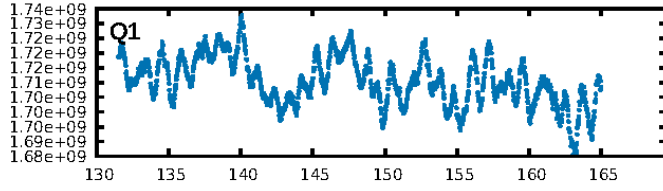
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [276.12σ]  
LongPeriod-sig: 100.0% [160.43σ]  
ModelChiSquare2-sig: 28.5%  
ModelChiSquareGof-sig: 47.8%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.75 [3/4]  
GhostDiagnostic-chr: -19.88  
Centroid-sig: 30.6%  
Centroid-so: 0.952 arcsec [5.45σ]  
OotOffset-rm: 2.885 arcsec [1.52σ]  
OotOffset-st: 1/2/0/0 [3]  
KicOffset-rm: 2.256 arcsec [1.07σ]  
KicOffset-st: 1/2/0/0 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 0.67 [2/3]

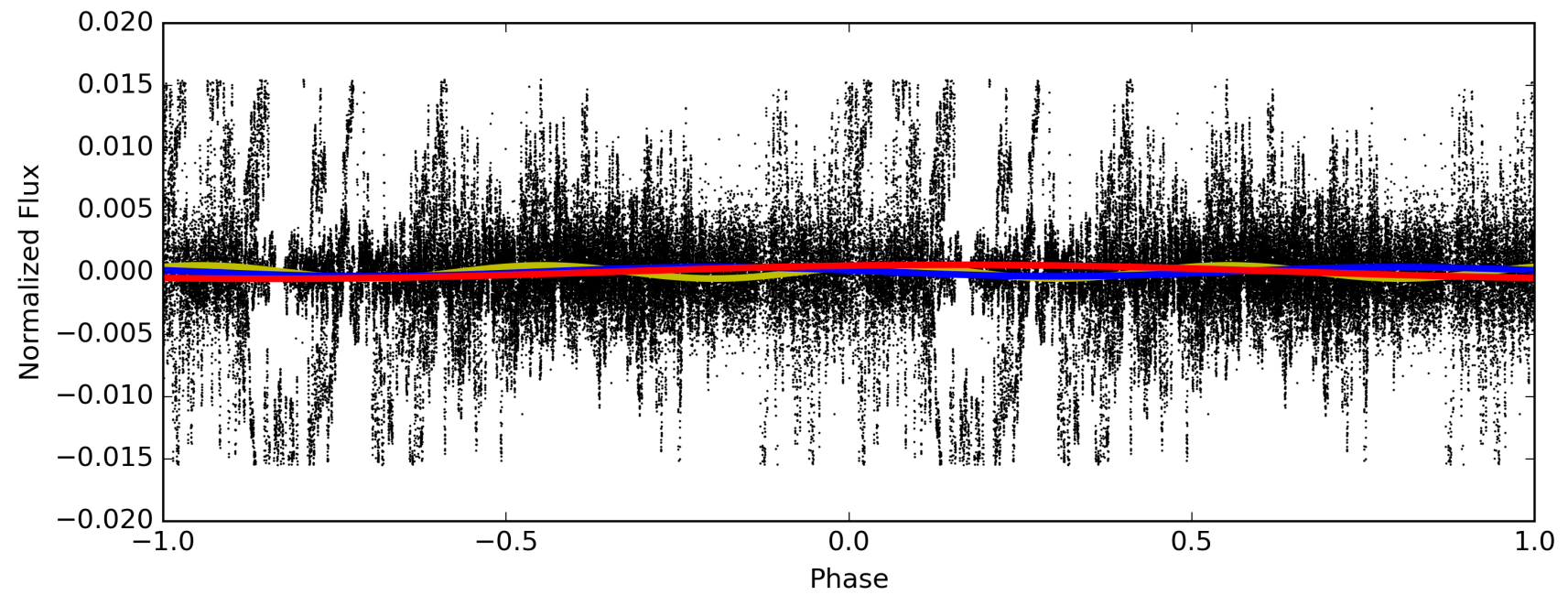
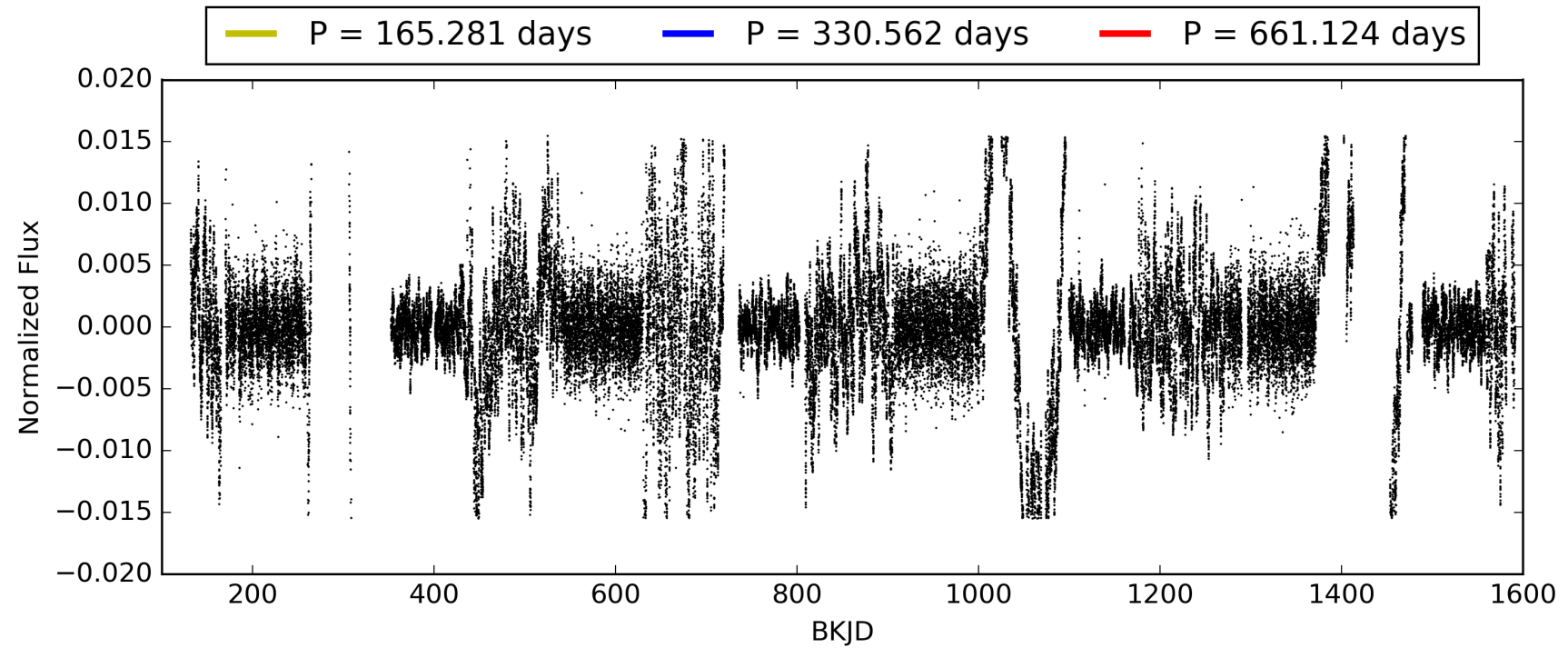
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:26:56 Z

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

# TCE 010403036-01, PDC Light Curves

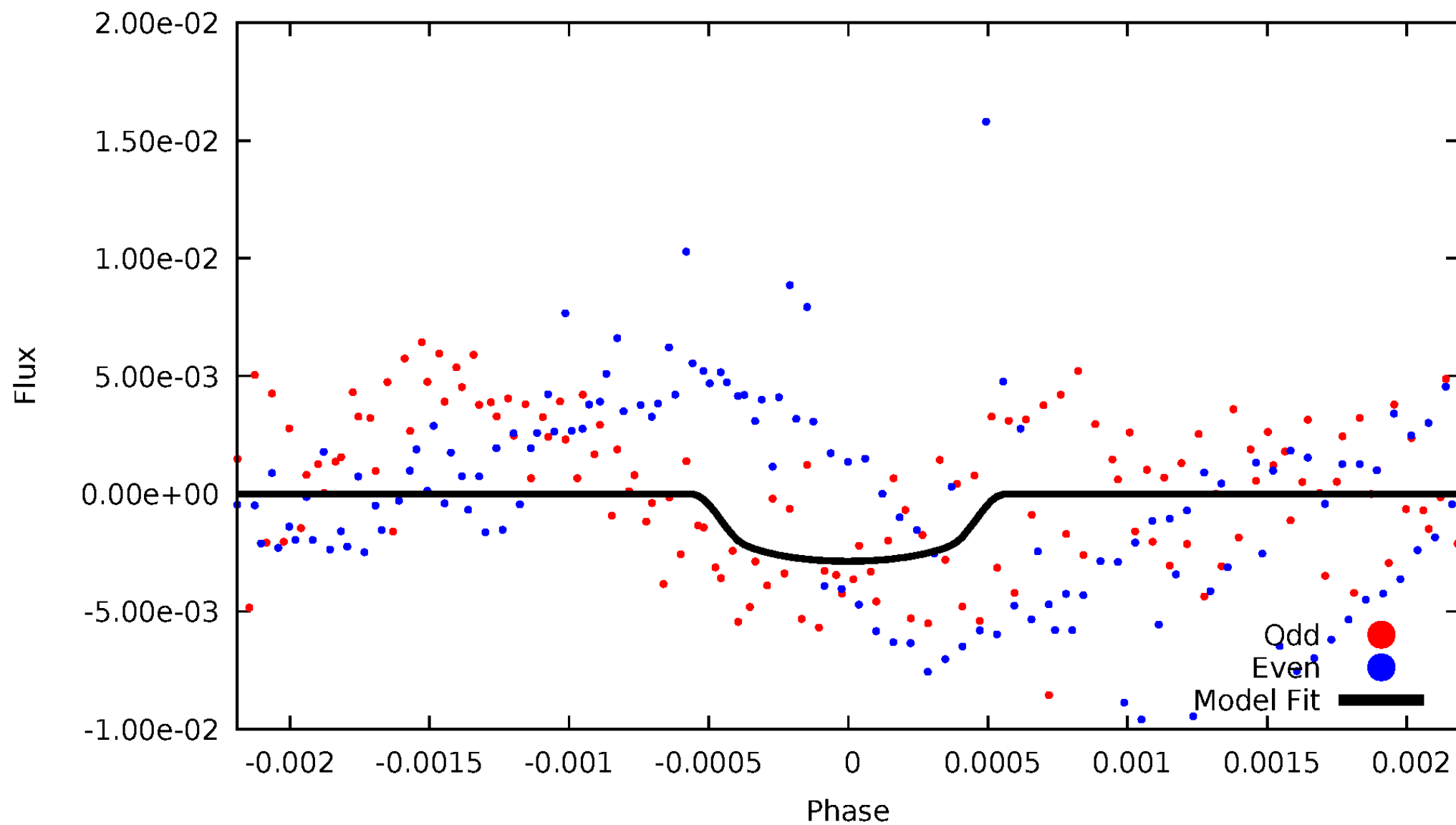


TCE 010403036-01



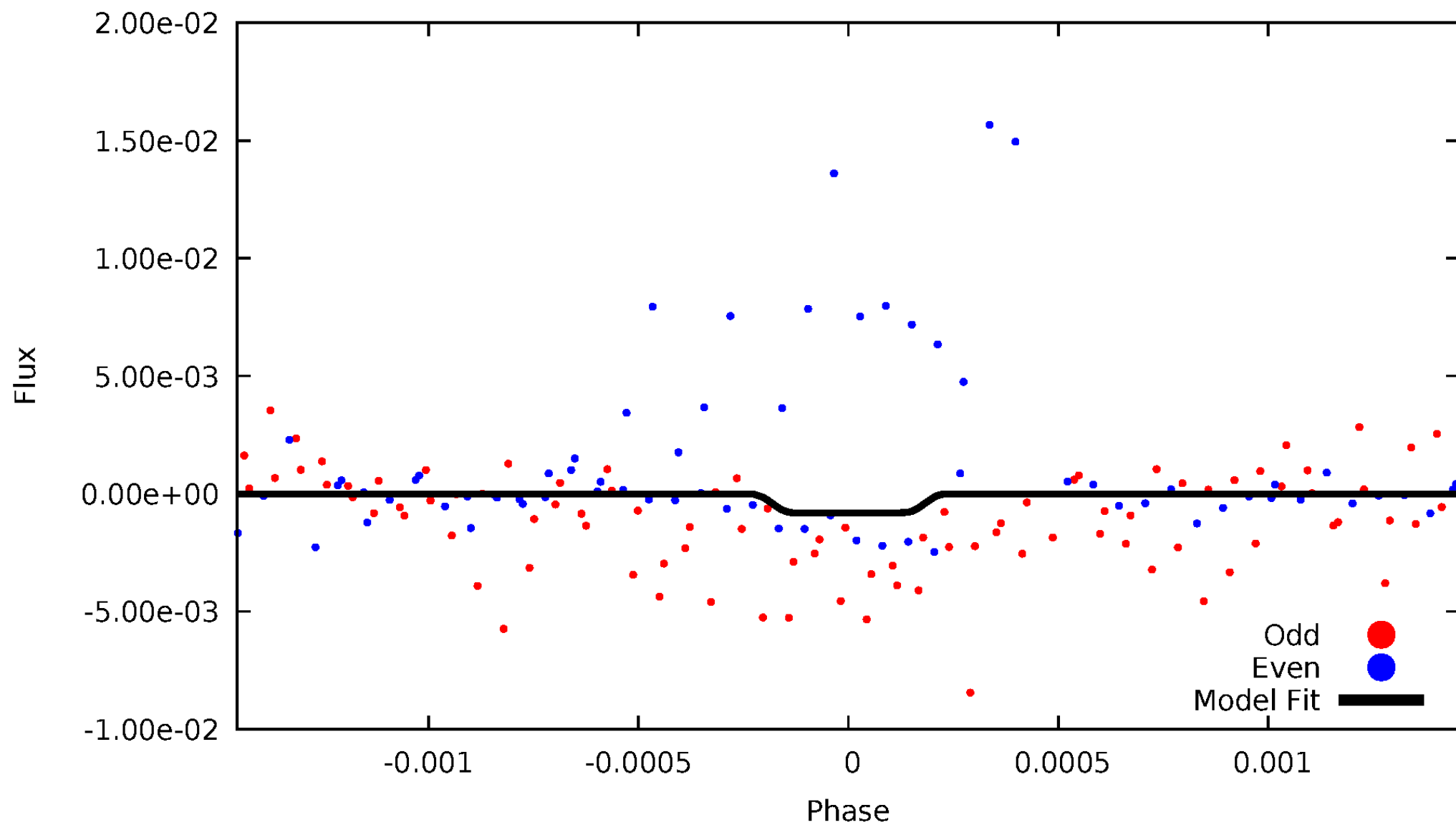
# DV Odd/Even

TCE 010403036-01



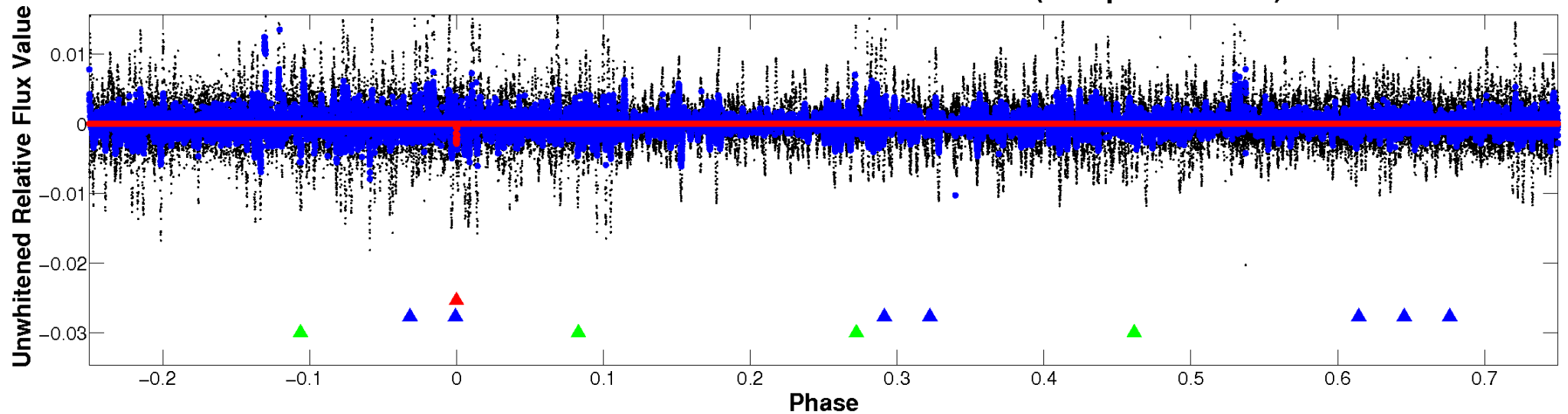
# ALT Odd/Even

TCE 010403036-01

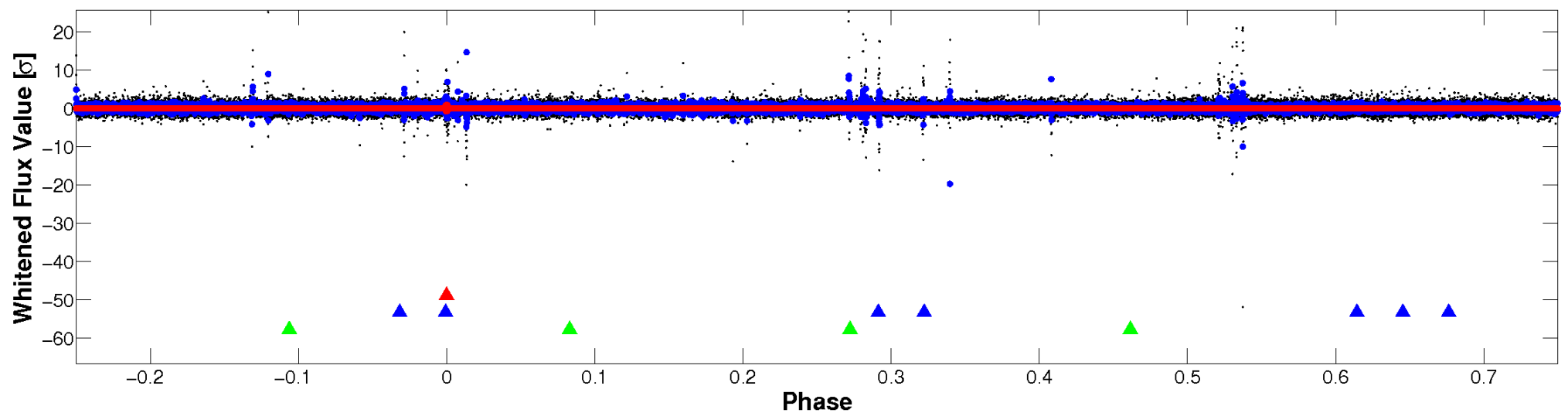


# Non-Whitened Vs. Whitened Light Curve

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

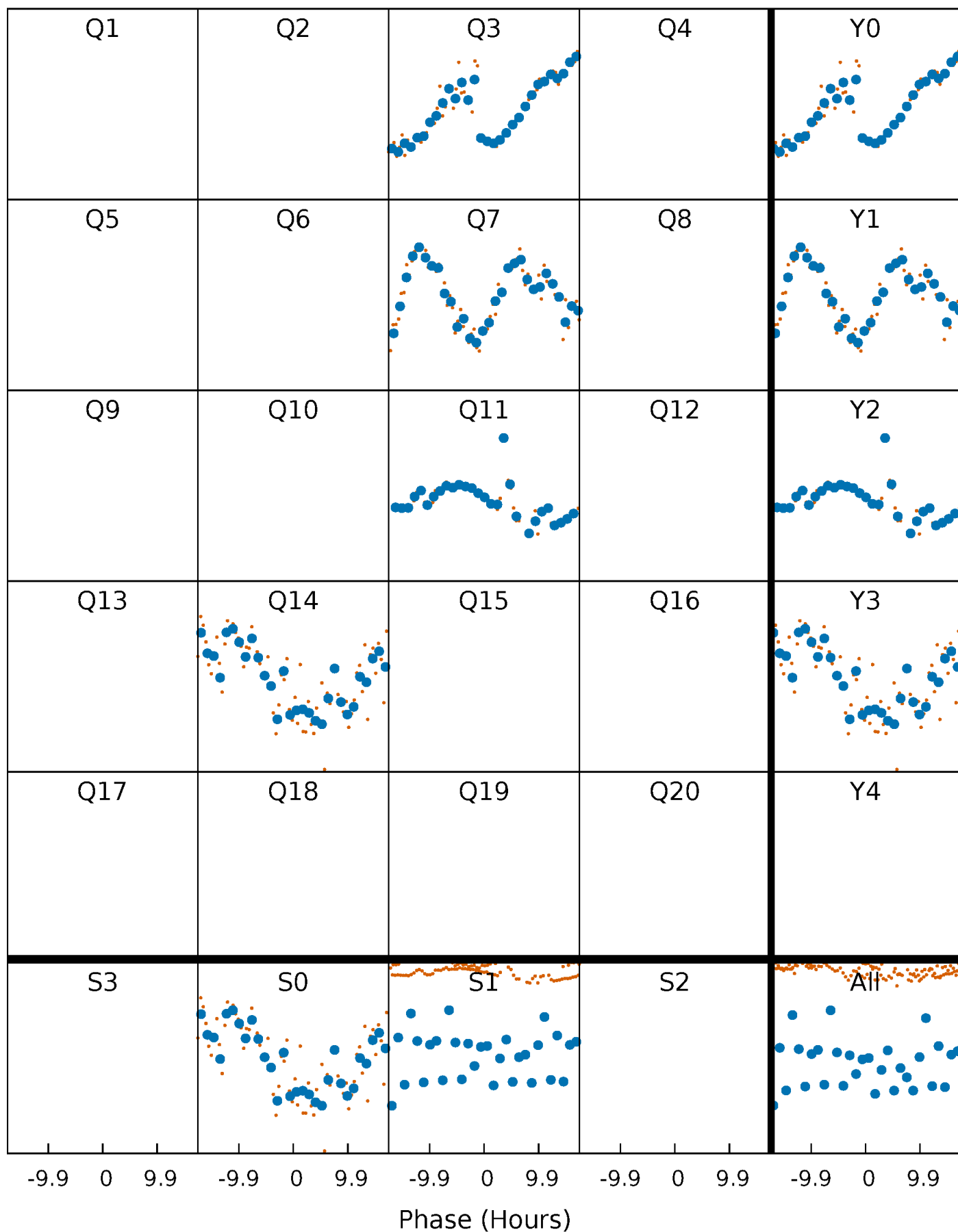


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

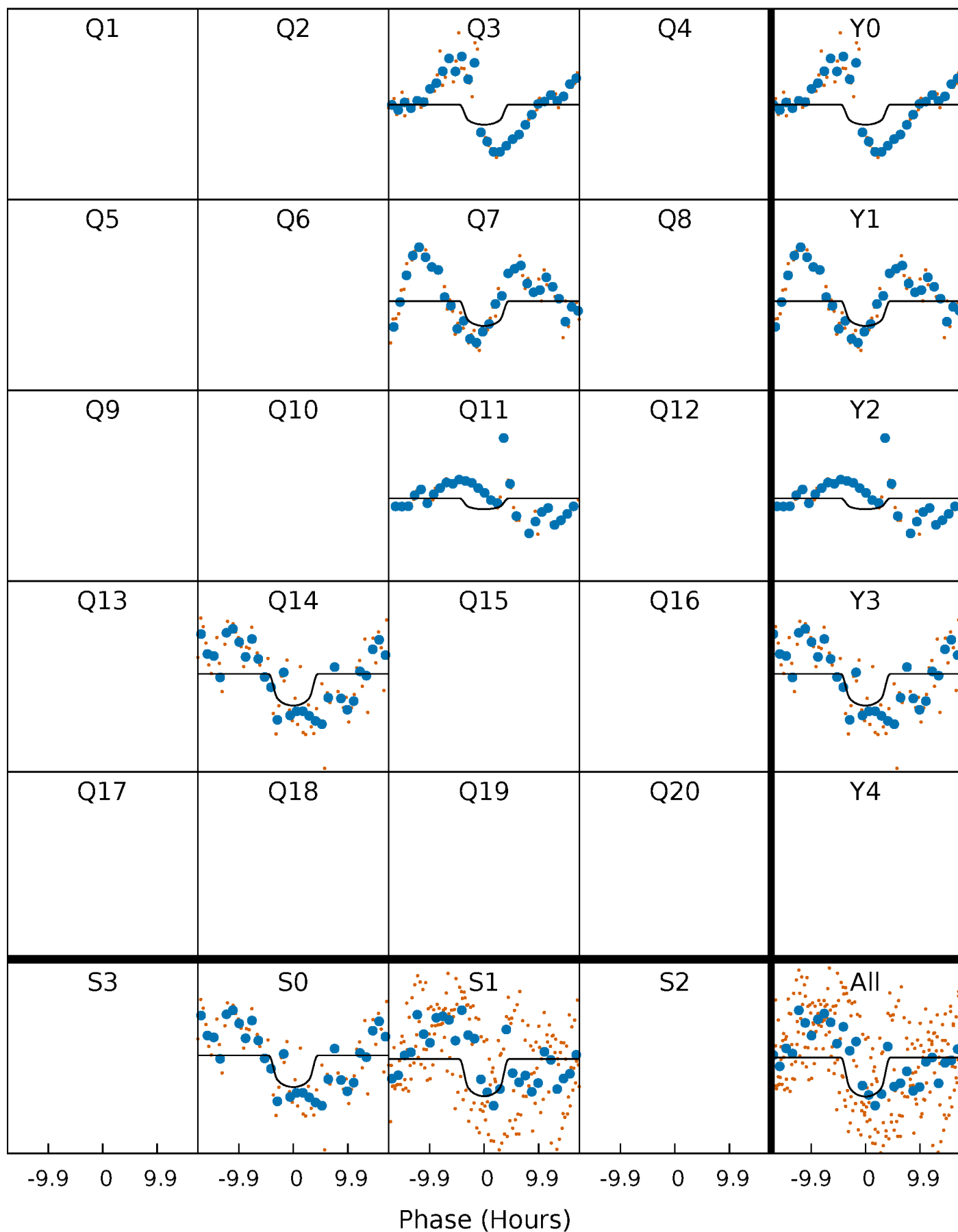
TCE 010403036-01 P=330.562216 Days  $T_0=342.883680$  (BKJD)





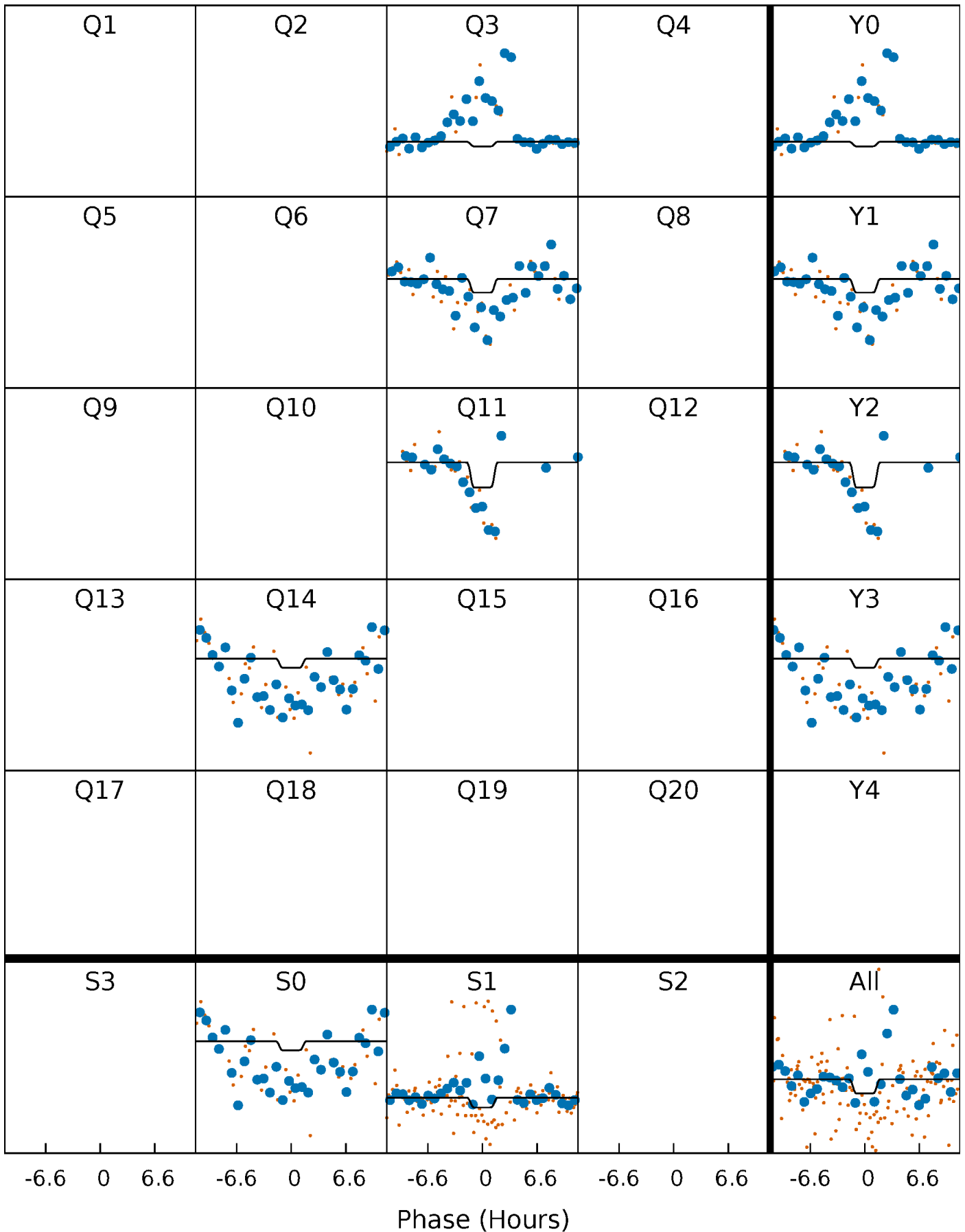
# DV Quarter-Phased Transit Curves

TCE 010403036-01 P=330.562216 Days  $T_0=342.883680$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

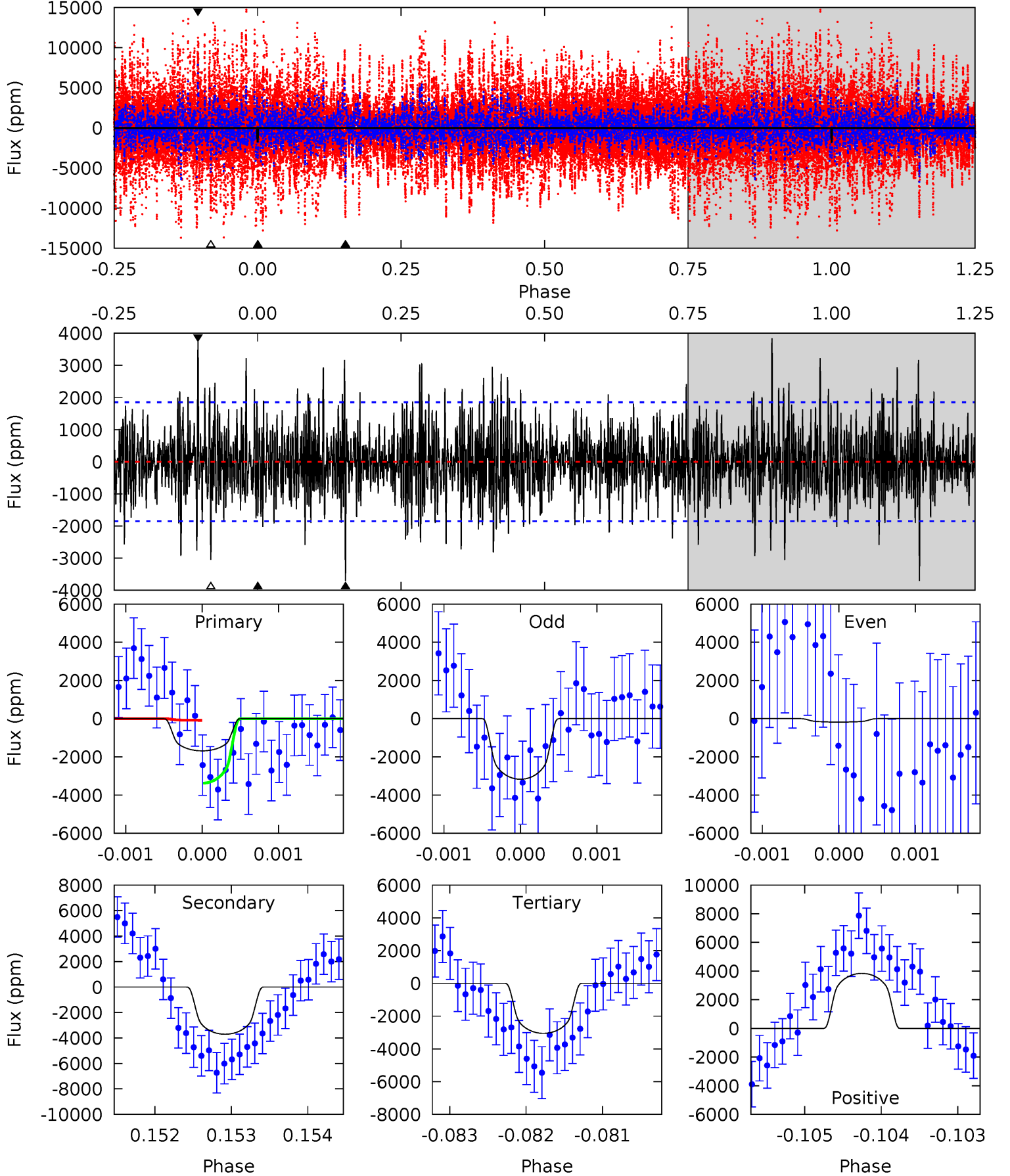
TCE 010403036-01 P=330.669490 Days  $T_0=342.703093$  (BKJD)



# DV Model-Shift Uniqueness Test

010403036-01,  $P = 330.562216$  Days,  $E = 12.321464$  Days

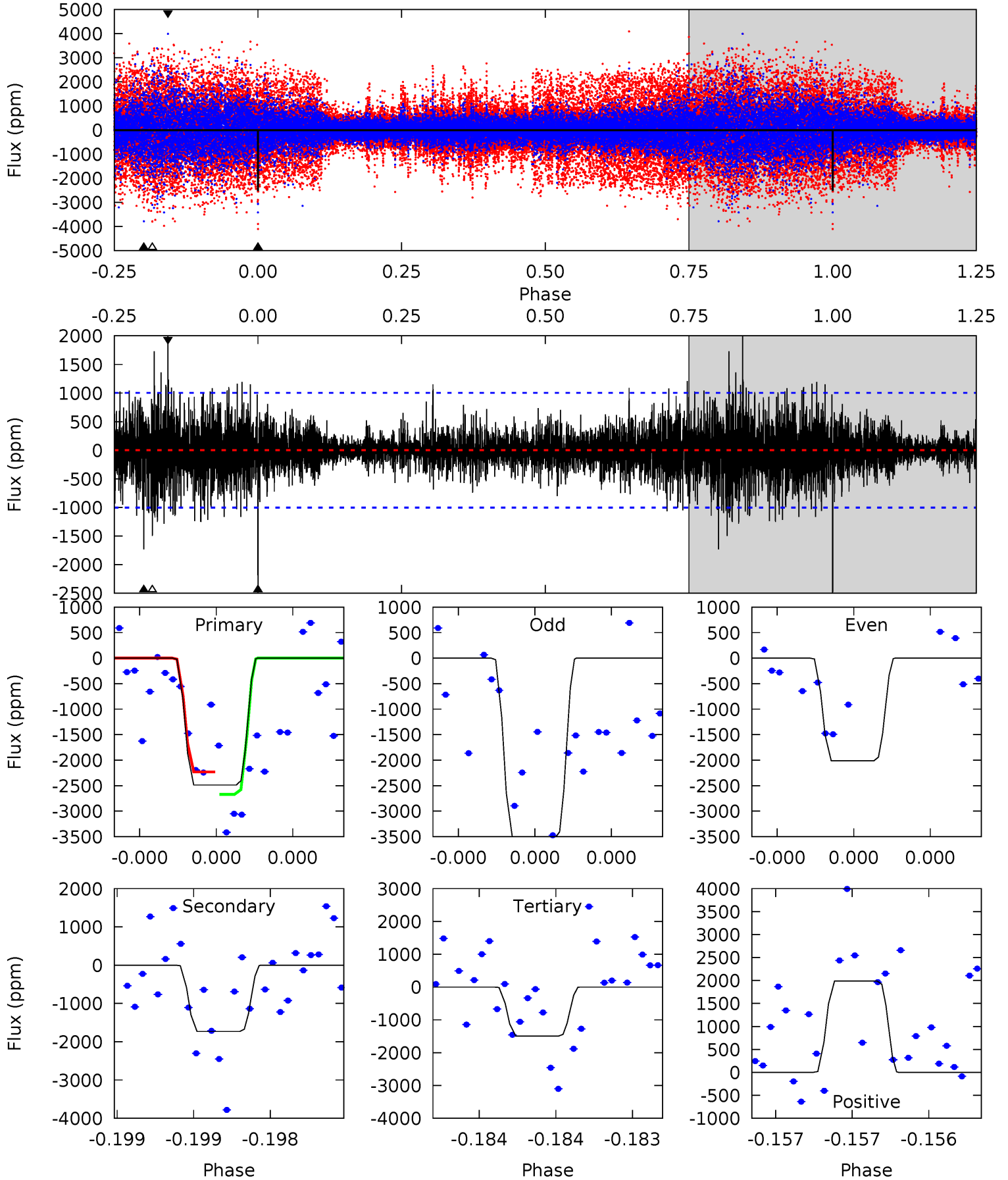
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.94	10.9	8.93	11.2	5.43	3.25	2.57	-4.00	-6.31	1.92	-0.39	4.01	0.62	0.51	4.87



# Alt Model-Shift Uniqueness Test

010403036-01, P = 330.669490 Days, E = 12.033603 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
13.9	9.67	8.35	11.1	5.59	3.51	1.53	5.53	2.79	1.32	-1.42	4.35	0.06	0.44	1.06



### Stellar Parameters For KIC 010403036

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4494^{+75}_{-54}$	$1.888^{+0.027}_{-0.033}$	$-0.560^{+0.150}_{-0.100}$	$17.867^{+4.475}_{-0.839}$	$0.900^{+0.508}_{-0.053}$	$0.000^{+0.000}_{-0.000}$
	+2%/-1%	+1%/-2%	+27%/-18%	+25%/-5%	+56%/-6%	+9%/-23%
Source	PHO55	AST55	SPE55	DSEP		

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

### Secondary Eclipse Parameters for KIC 010403036-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-3707 \pm 342$	$108.55^{+30.15}_{-24.38}$	$1232^{+31}_{-22}$	$4671^{+538}_{-412}$	$143^{+96}_{-55}$
Alt.	$-1733 \pm 179$	$57.55^{+24.93}_{-25.02}$	$1233^{+33}_{-22}$	$5220^{+1684}_{-710}$	$235^{+520}_{-117}$

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

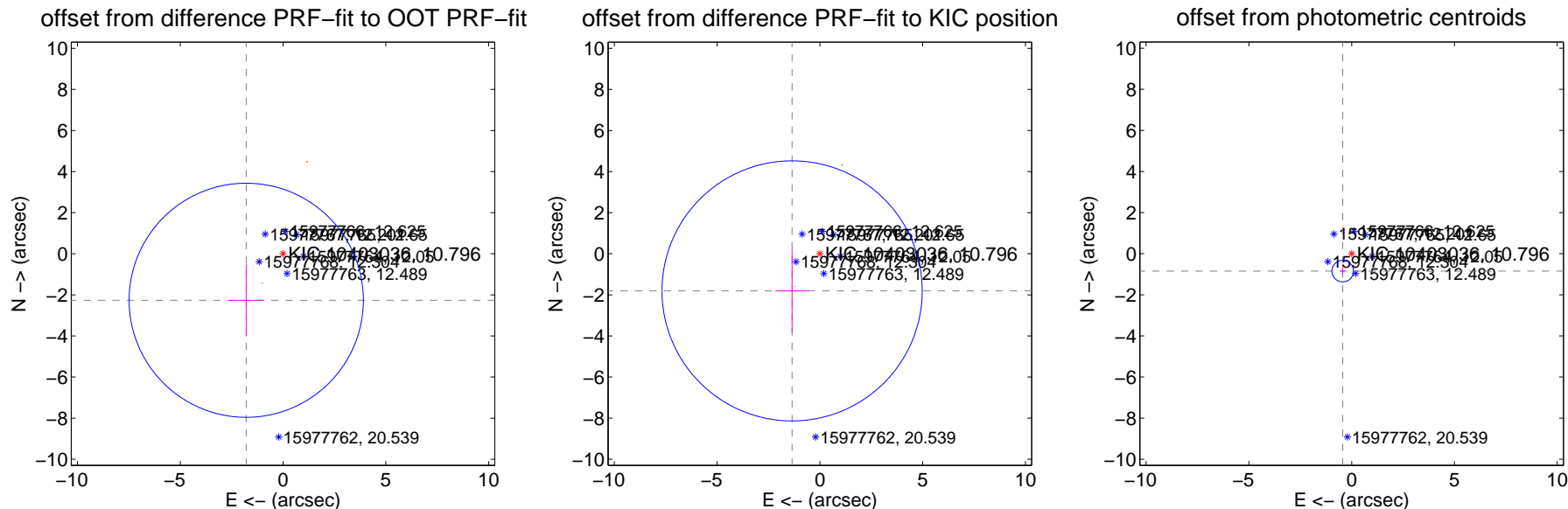
## DV Centroid Data

Supplemental centroid analysis for 010403036-01. **Kepler magnitude: 10.80.** Transit SNR 4.74

There are 2 quarters with good PRF difference image offsets

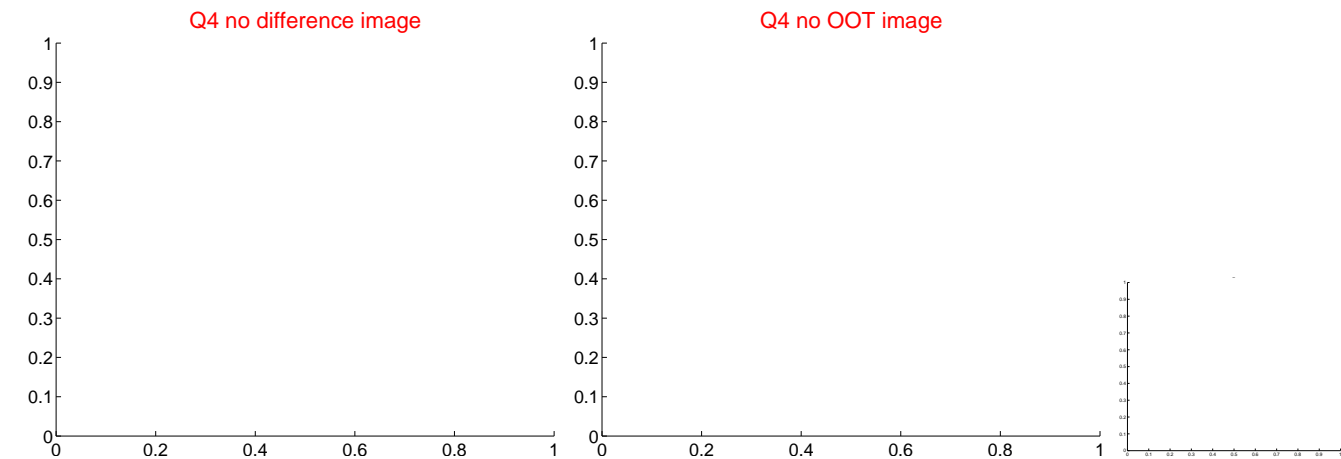
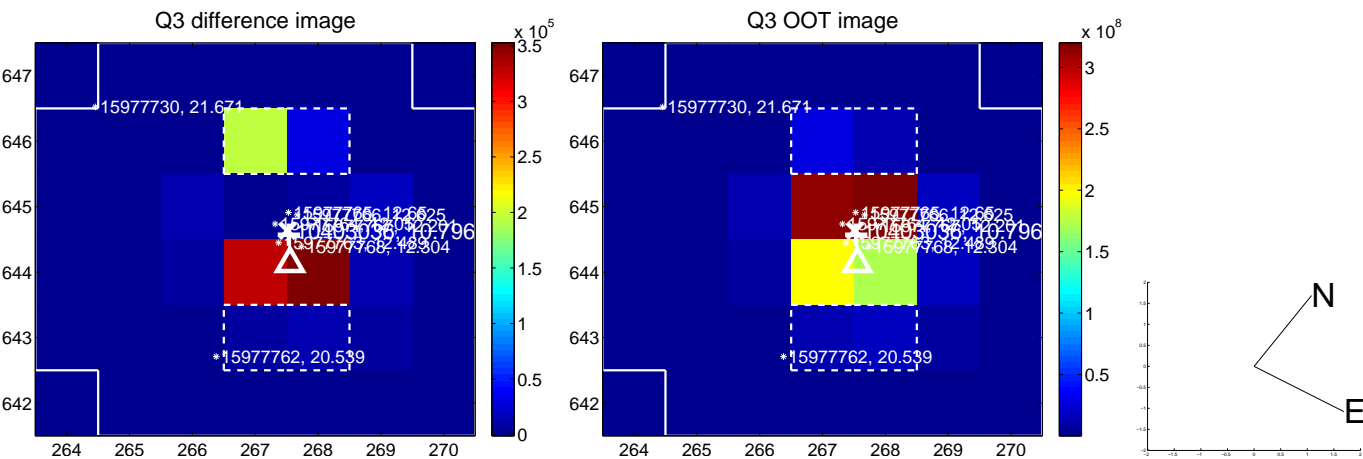
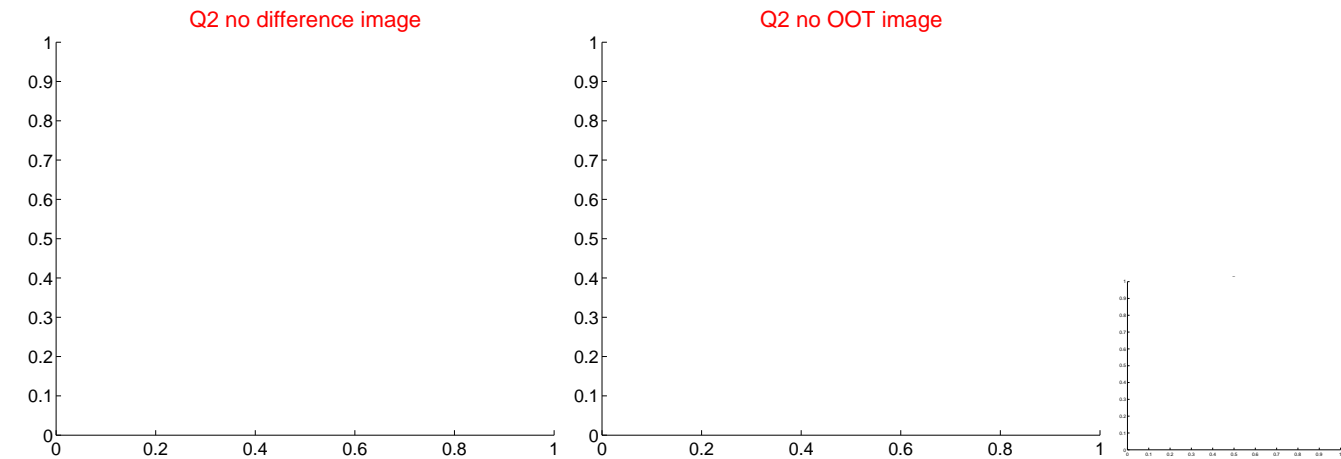
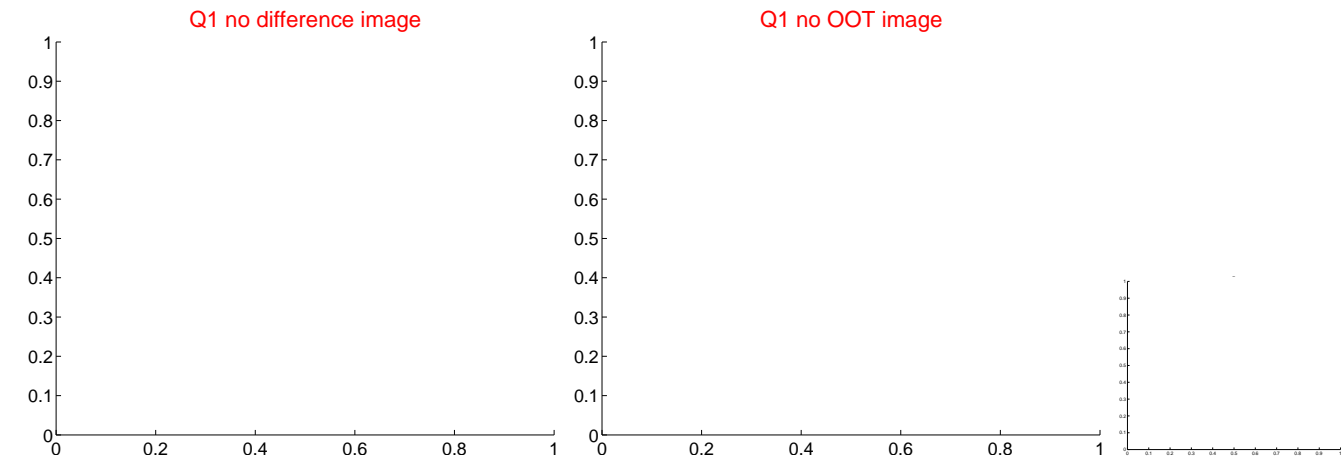
The direct PRF centroid is offset from the target star catalog position by about 0.75 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.885 \pm 1.899$	1.52	$1.790 \pm 0.858$	$-2.263 \pm 1.751$
PRF-fit source offset from KIC position	$2.256 \pm 2.110$	1.07	$1.352 \pm 0.818$	$-1.806 \pm 2.025$
photometric centroid source offset	$0.95 \pm 0.17$	5.45	$0.44 \pm 0.12$	$-0.85 \pm 0.19$

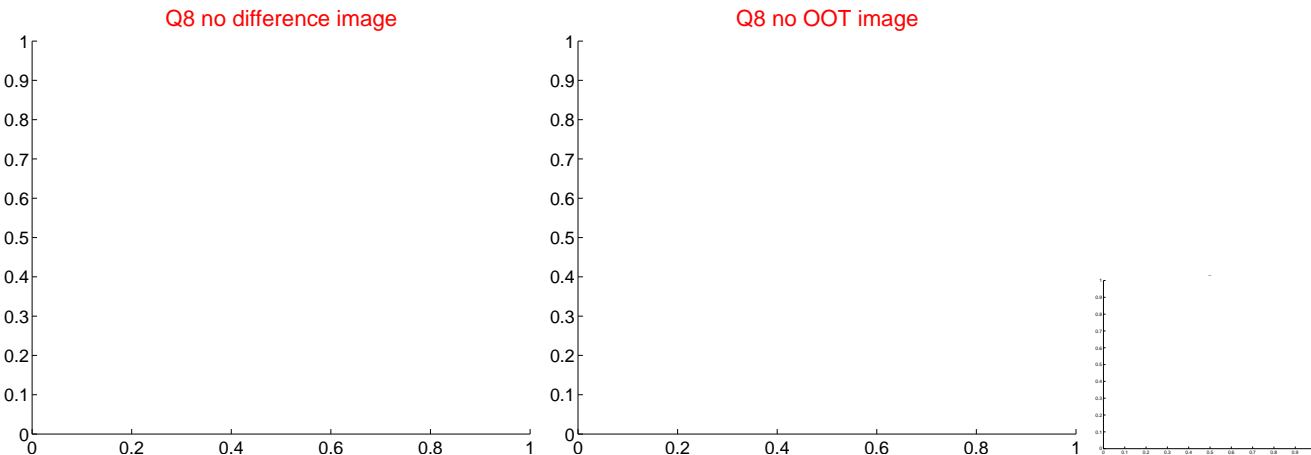
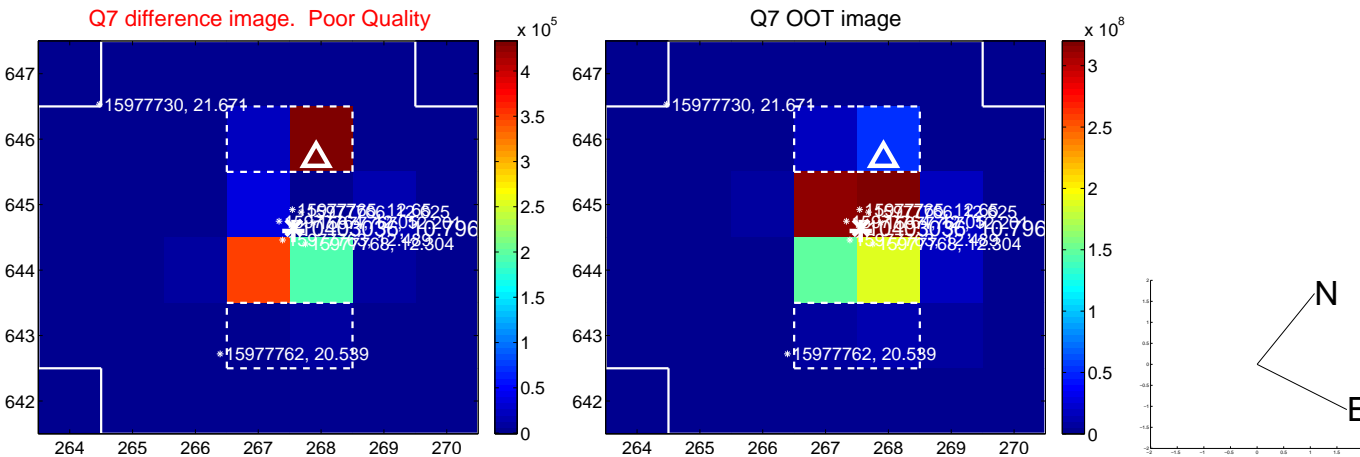
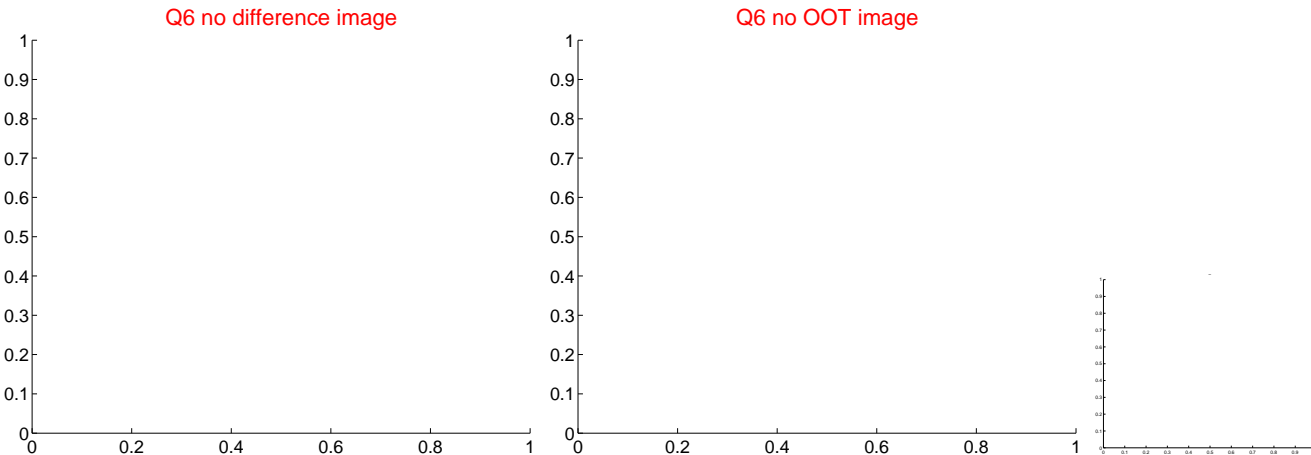
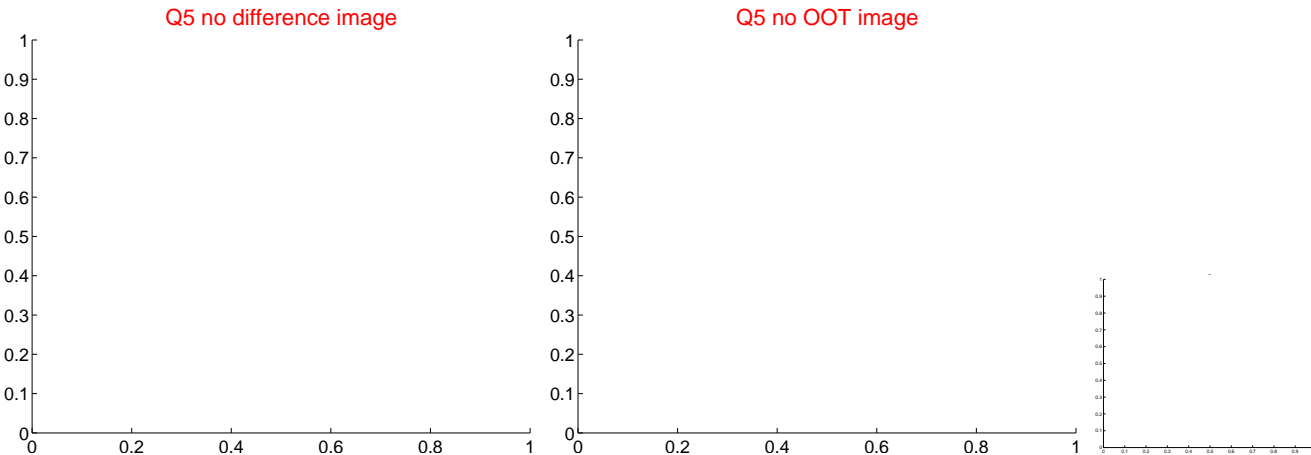


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: 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 ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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

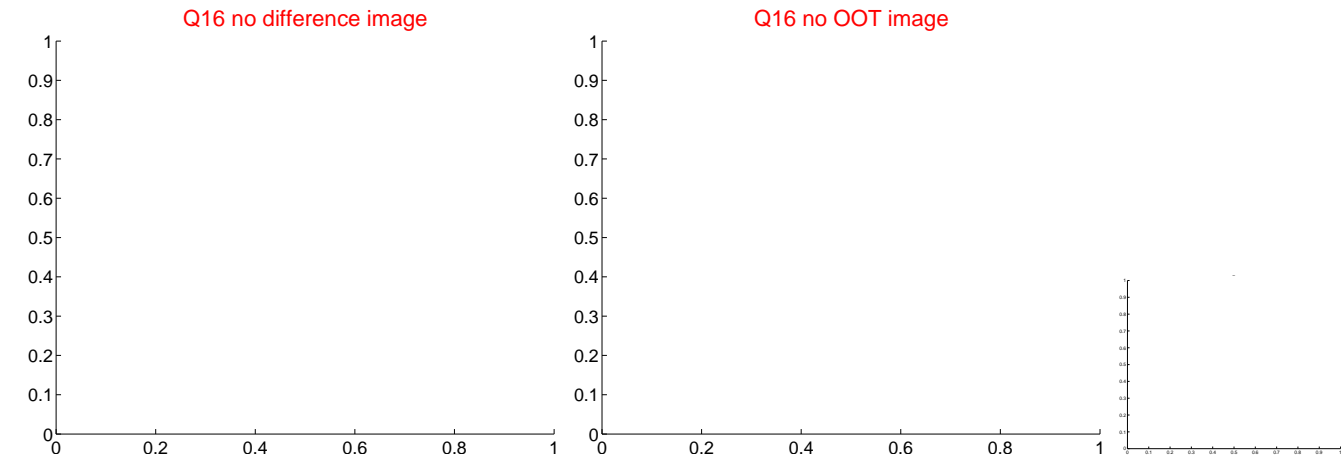
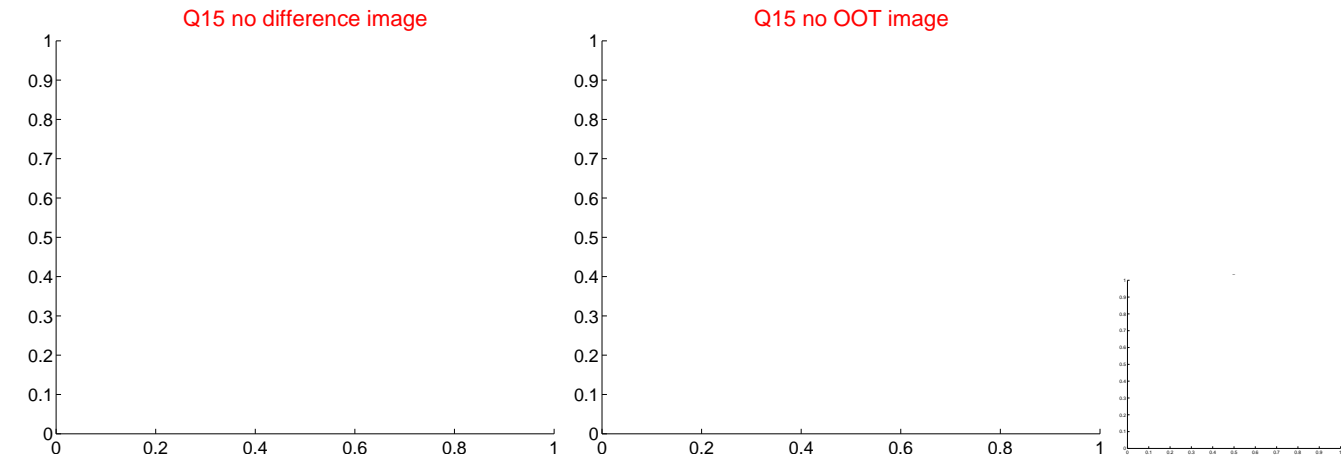
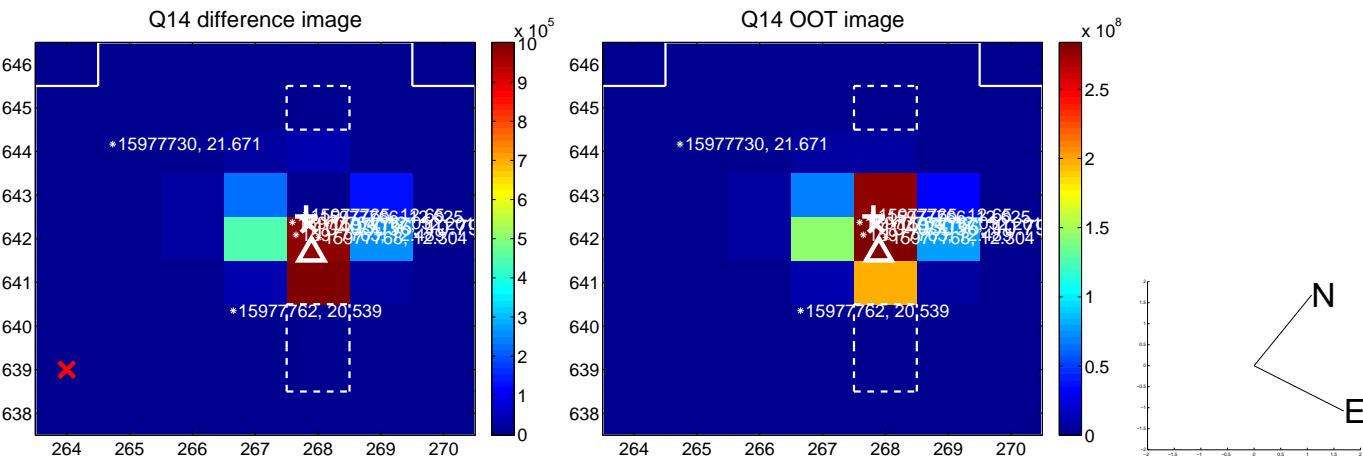
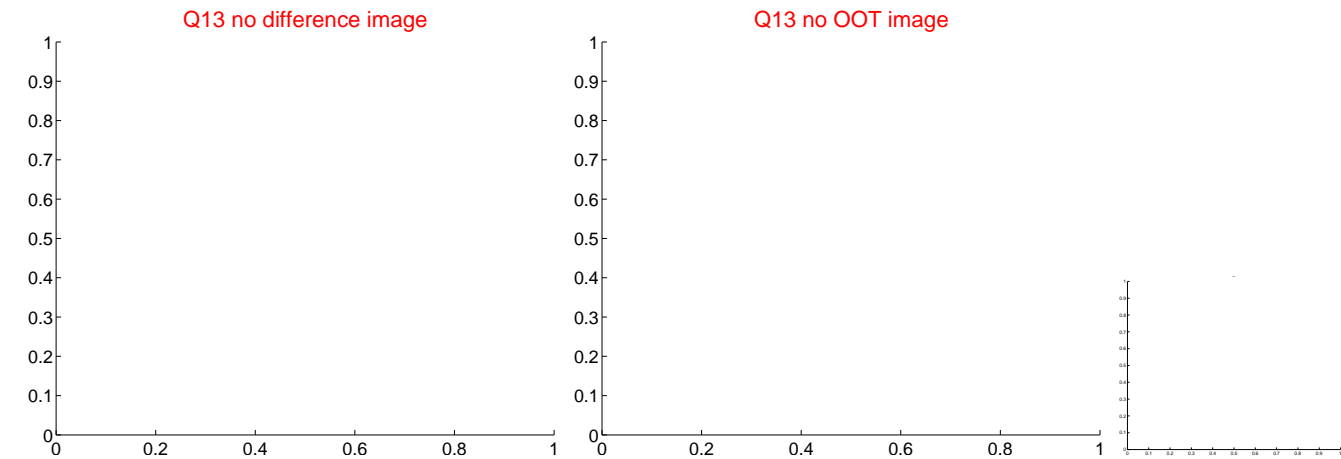




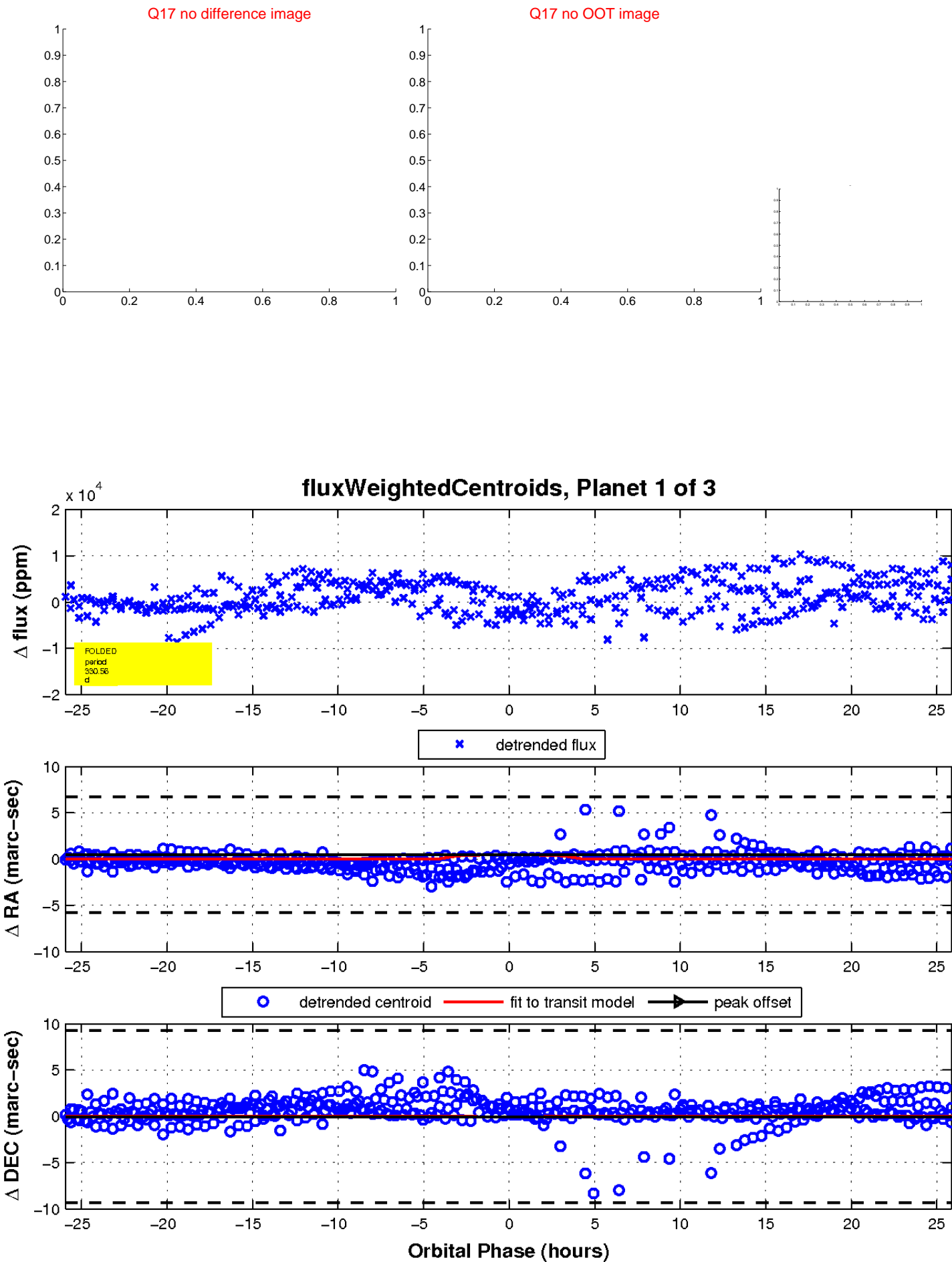
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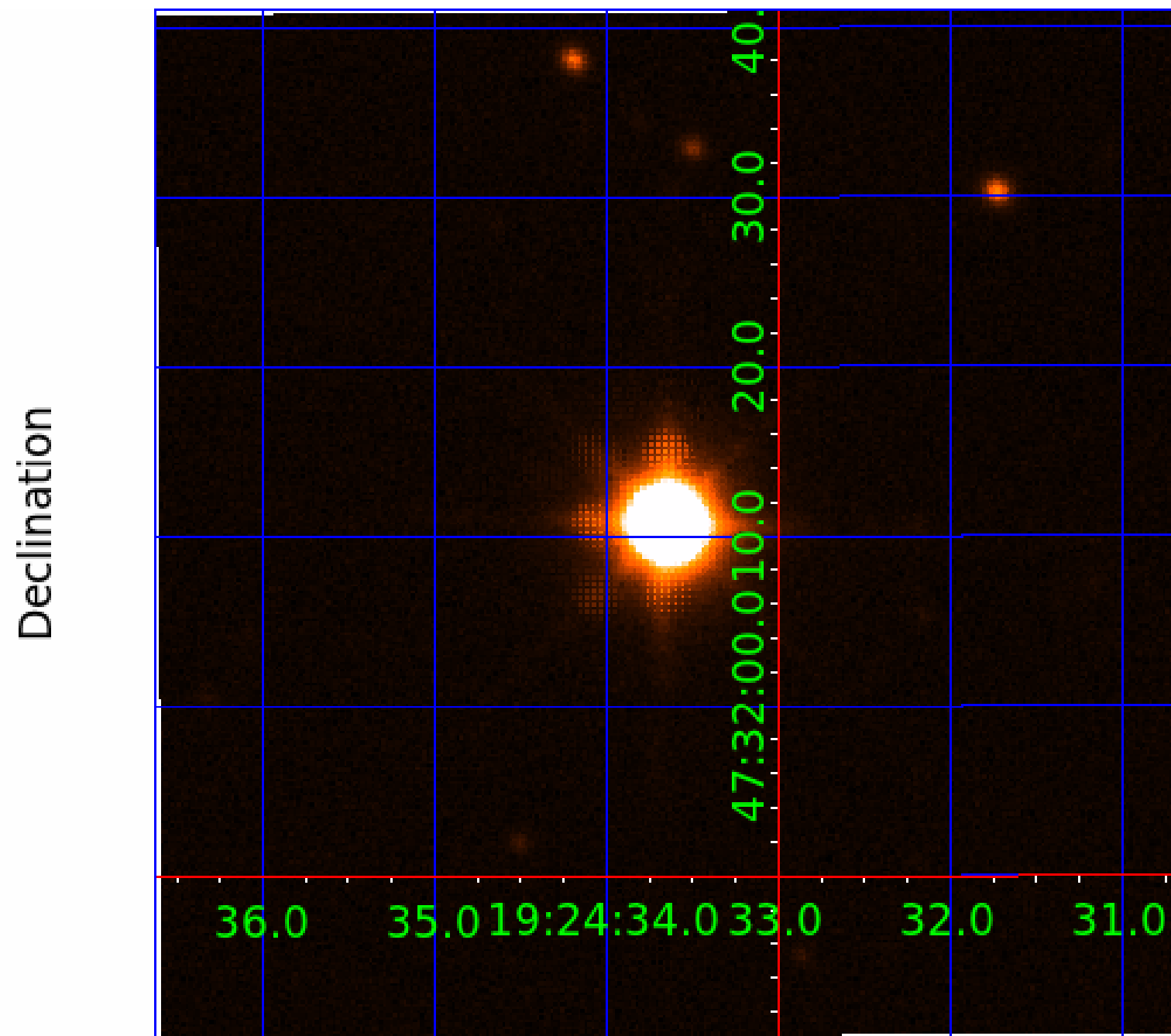
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UKIRT Image



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## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010403036-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
010403036-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED—HALO_GHOST
010403036-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_POS_ALT—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.

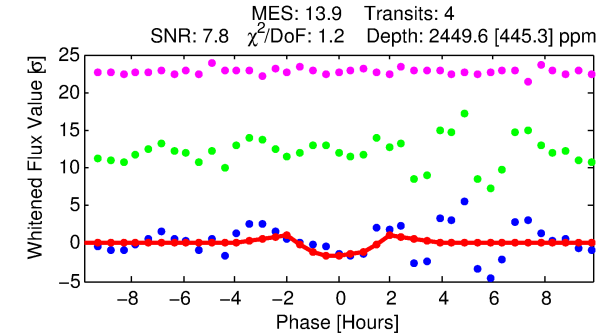
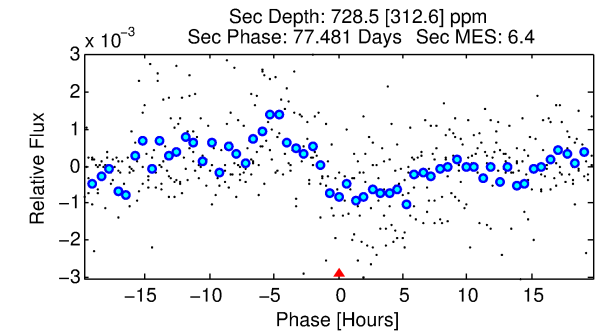
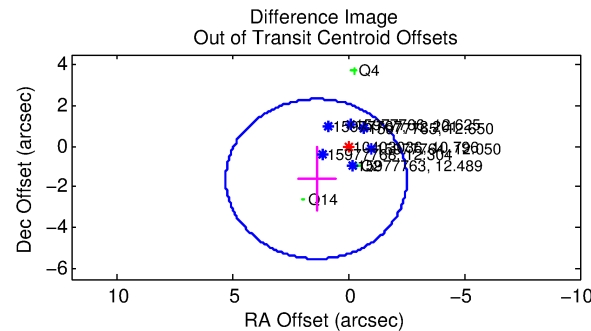
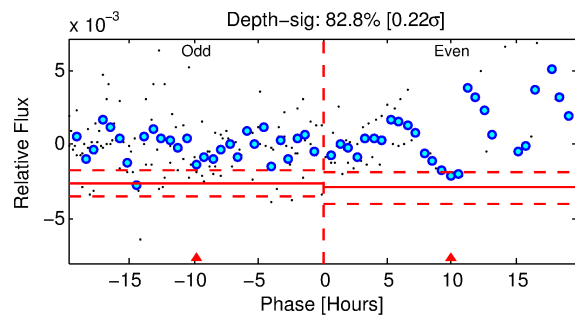
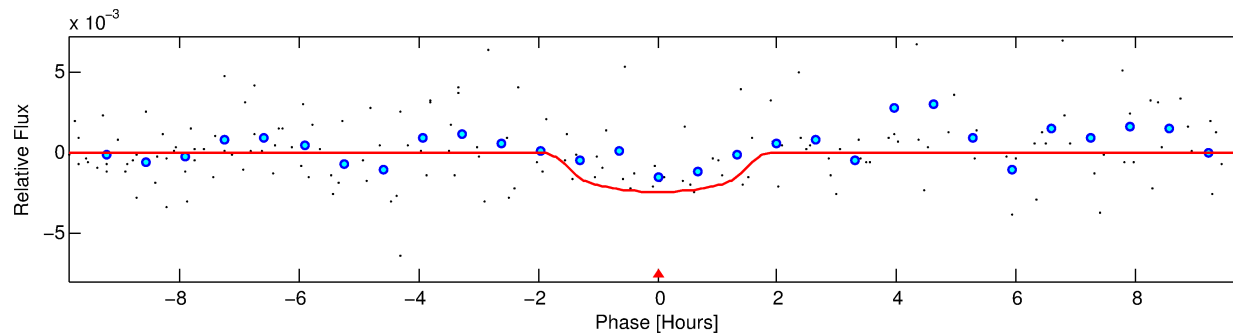
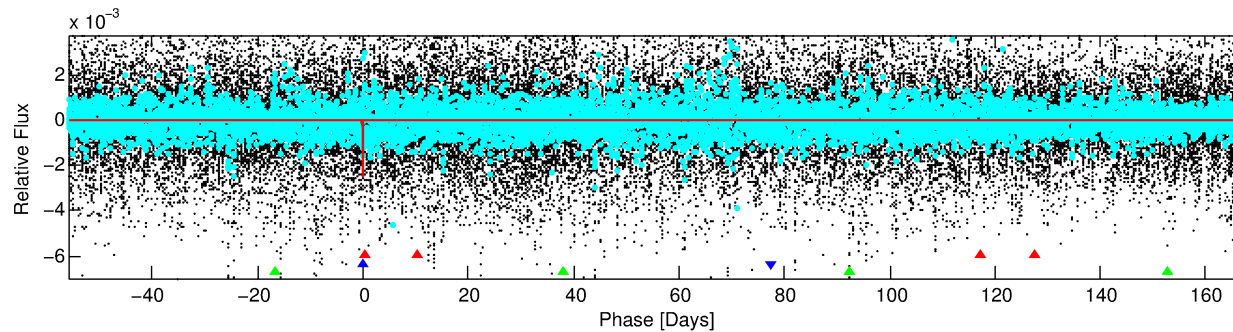
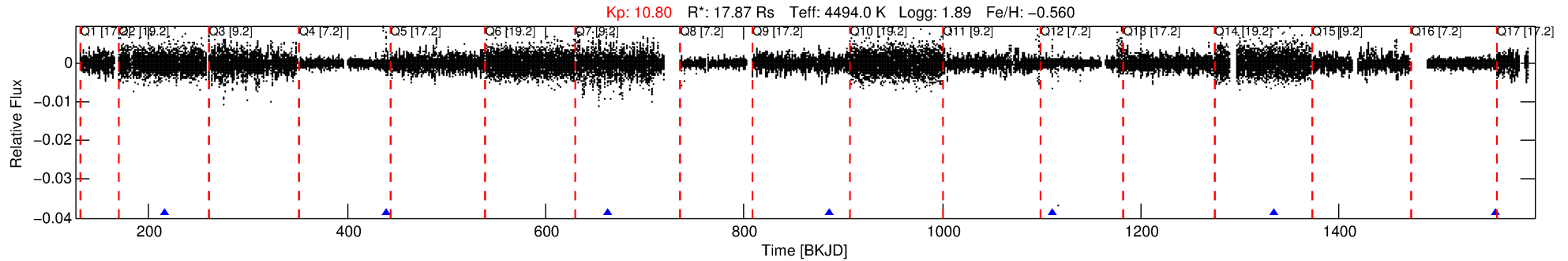
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Ephemeris Match Information For 010403036-02

No Significant Match Found

# DV One-Page Summary

KIC: 10403036 Candidate: 2 of 3 Period: 223.786 d



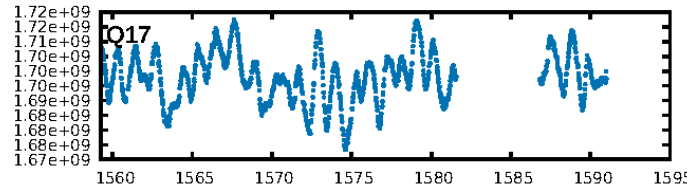
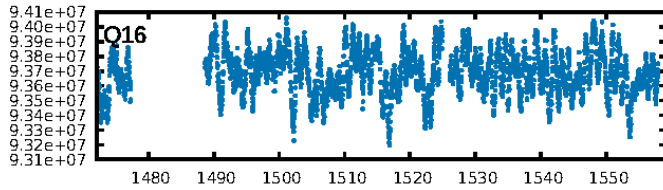
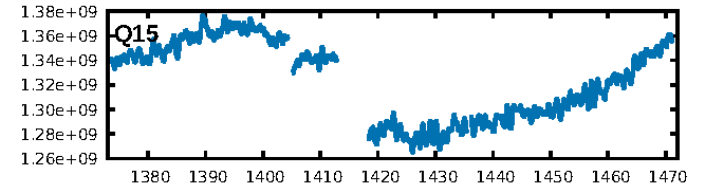
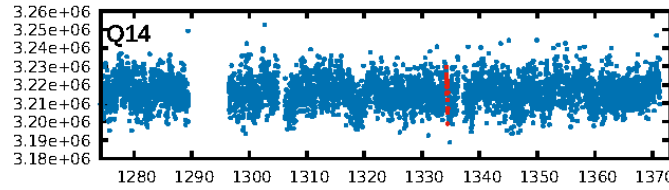
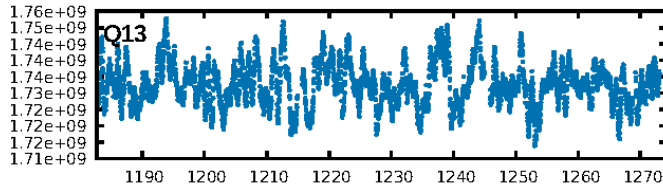
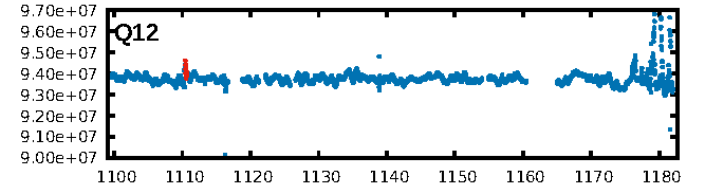
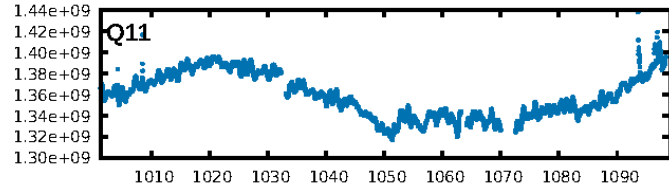
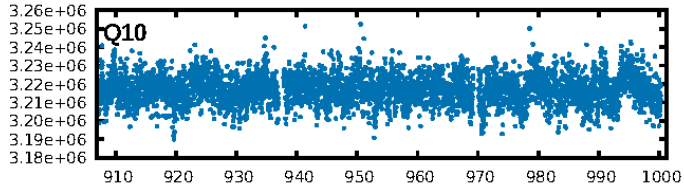
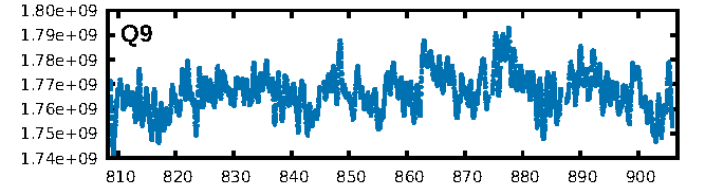
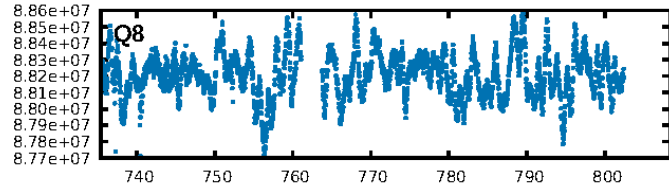
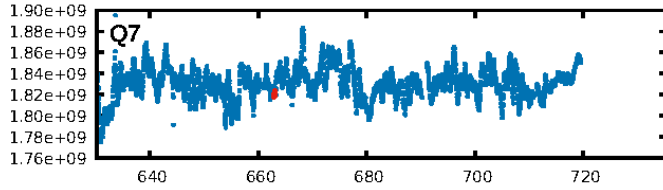
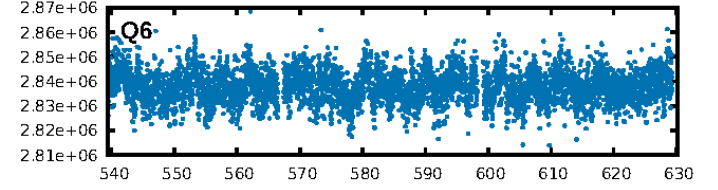
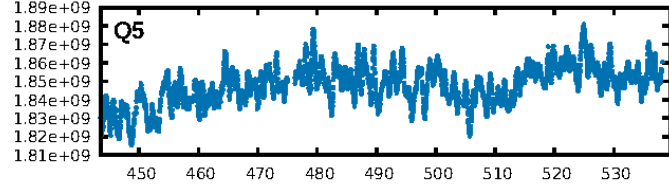
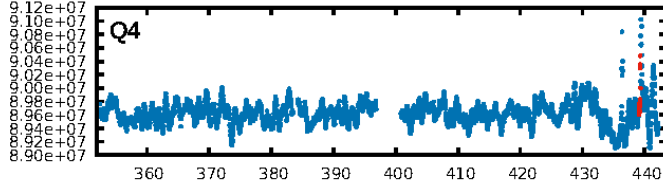
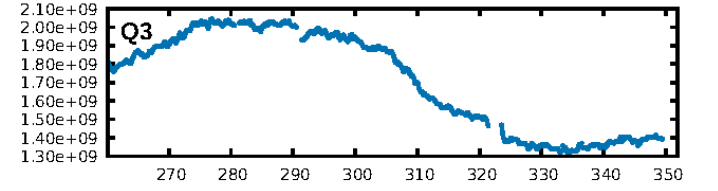
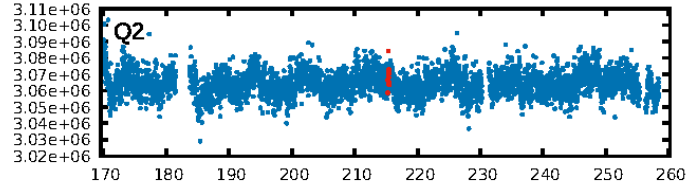
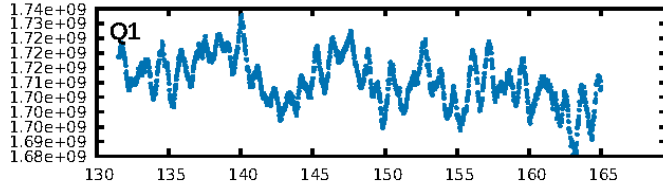
## DV Fit Results:

Period = 223.78619 [0.00373] d  
Epoch = 215.4161 [0.0095] BKJD  
Rp/R\* = 0.0435 [0.2462]  
a/R\* = 540.43 [9196.85]  
b = 0.09 [185.96]  
Seff = 240.45 [44.92]  
Teq = 1004 [47] K  
Rp = 84.91 [480.53] Re  
a = 0.6966 [0.1176] AU  
Ag = 26.97 [305.24] [0.09σ]  
Teffp = 3538 [10009] K [0.25σ]

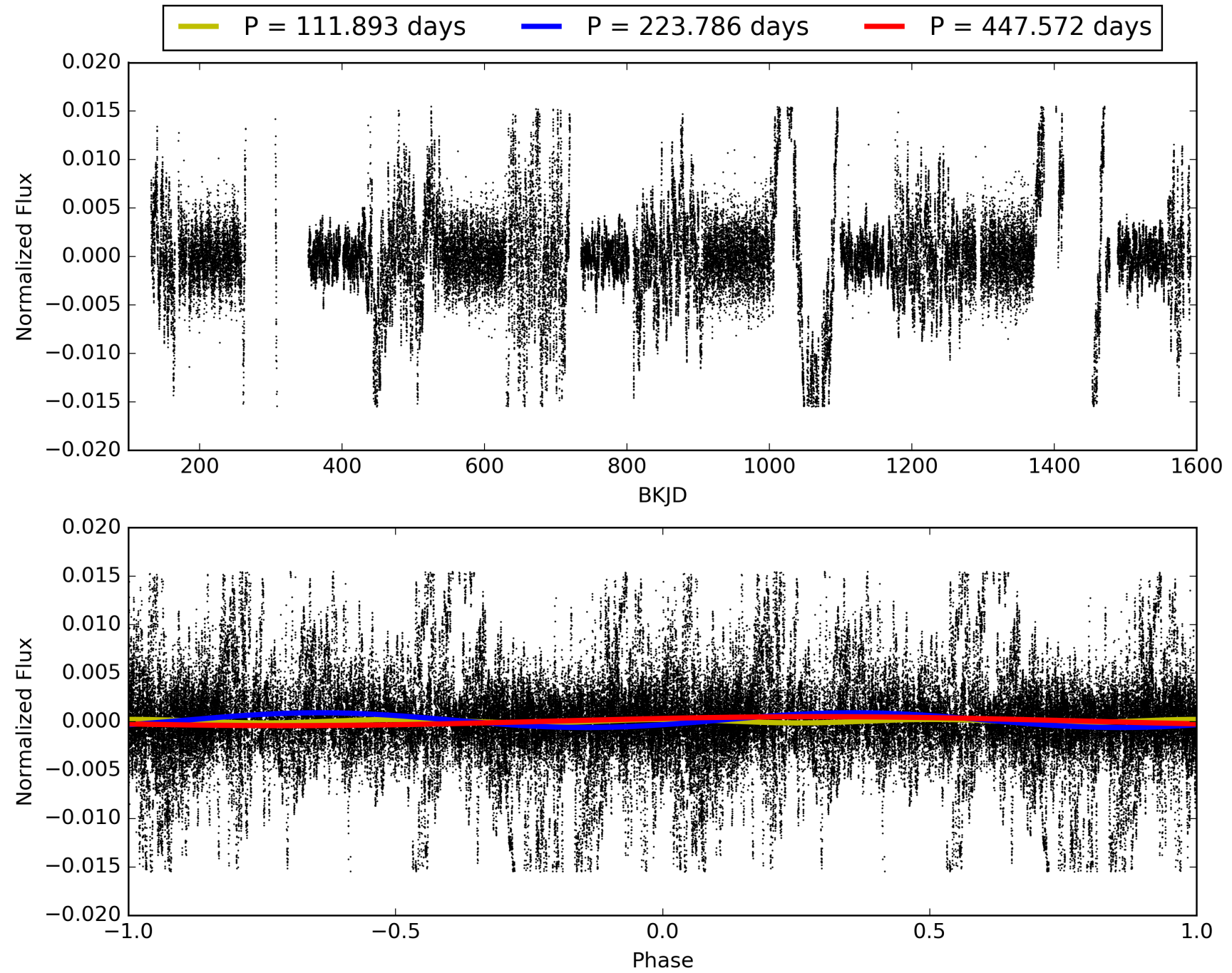
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [276.12σ]  
ModelChiSquare2-sig: 0.9%  
ModelChiSquareGof-sig: 52.3%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -0.1228  
Centroid-sig: 65.0%  
Centroid-so: 1.079 arcsec [13.90σ]  
OotOffset-rm: 2.126 arcsec [1.63σ]  
KicOffset-rm: 1.470 arcsec [0.76σ]  
OotOffset-st: 2/0/1/0 [3]  
KicOffset-st: 2/0/1/0 [3]  
DiffImageQuality-fgm: 0.00 [0/3]  
DiffImageOverlap-fno: 0.75 [3/4]

# TCE 010403036-02, PDC Light Curves



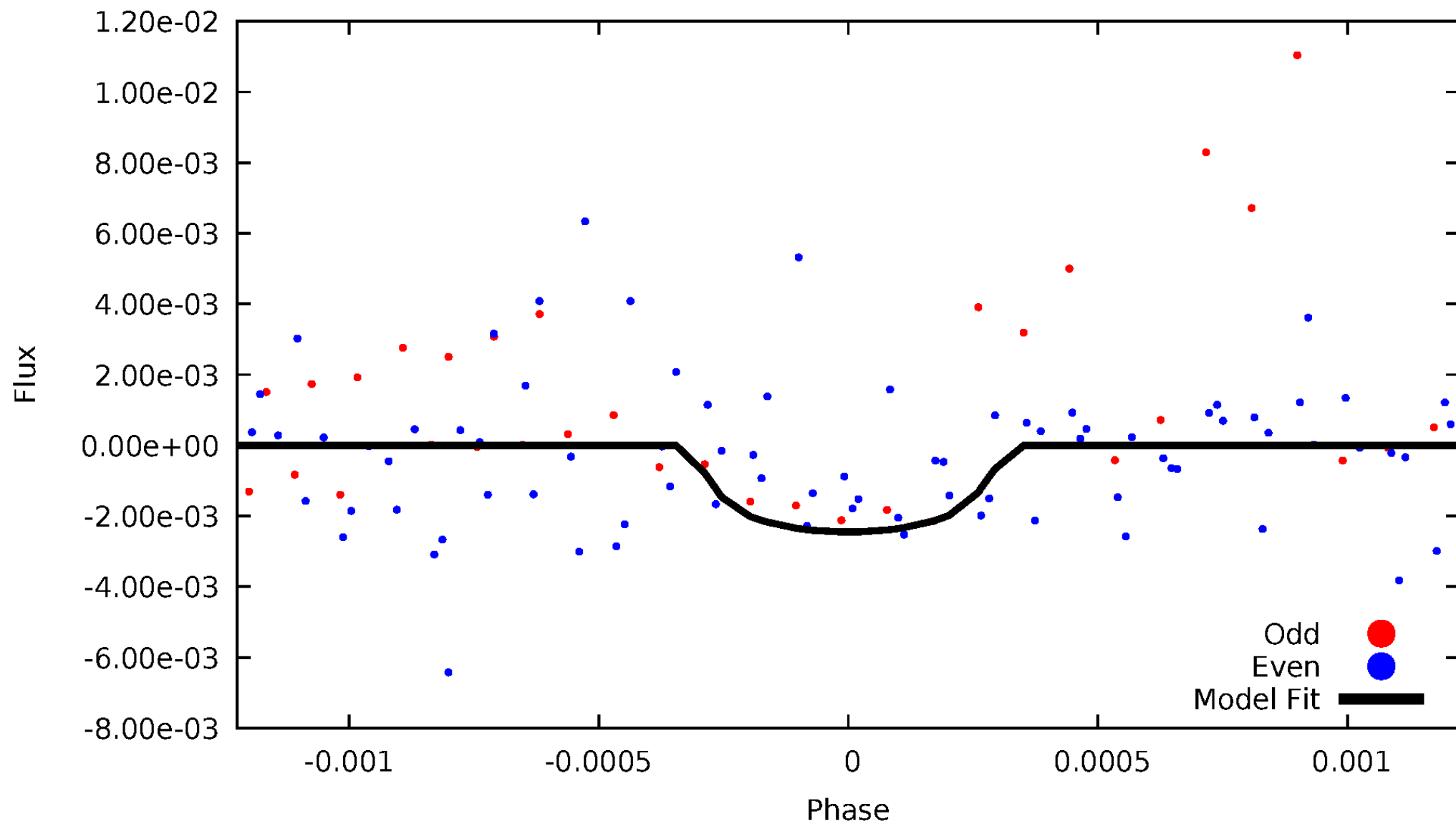
TCE 010403036-02





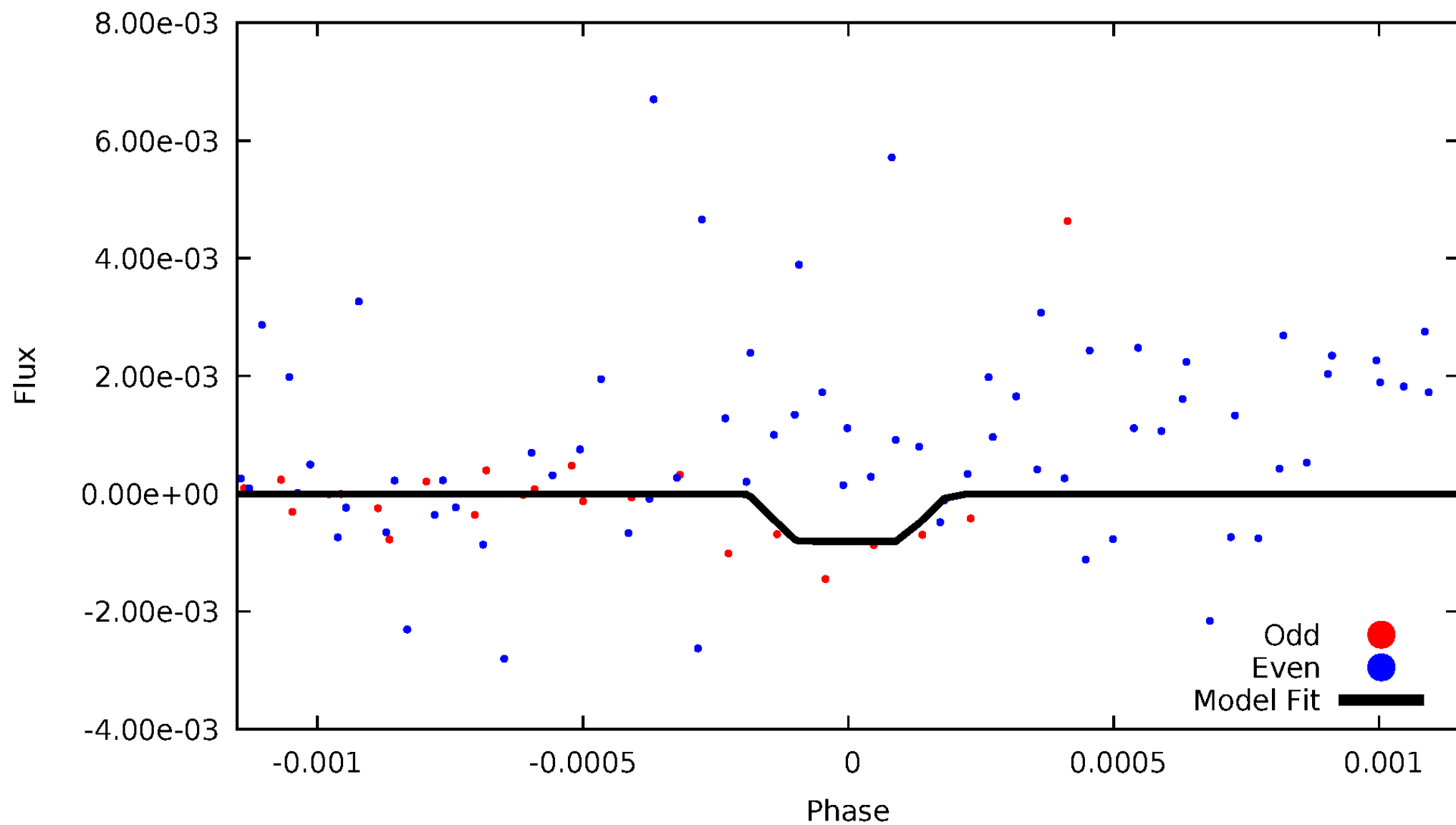
# DV Odd/Even

TCE 010403036-02



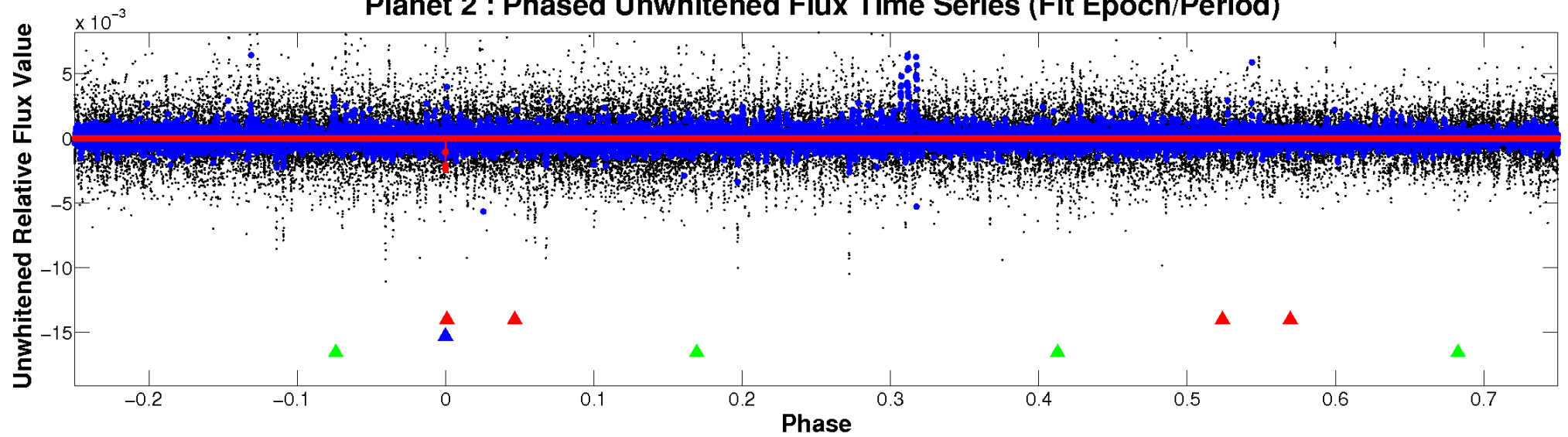
# ALT Odd/Even

TCE 010403036-02

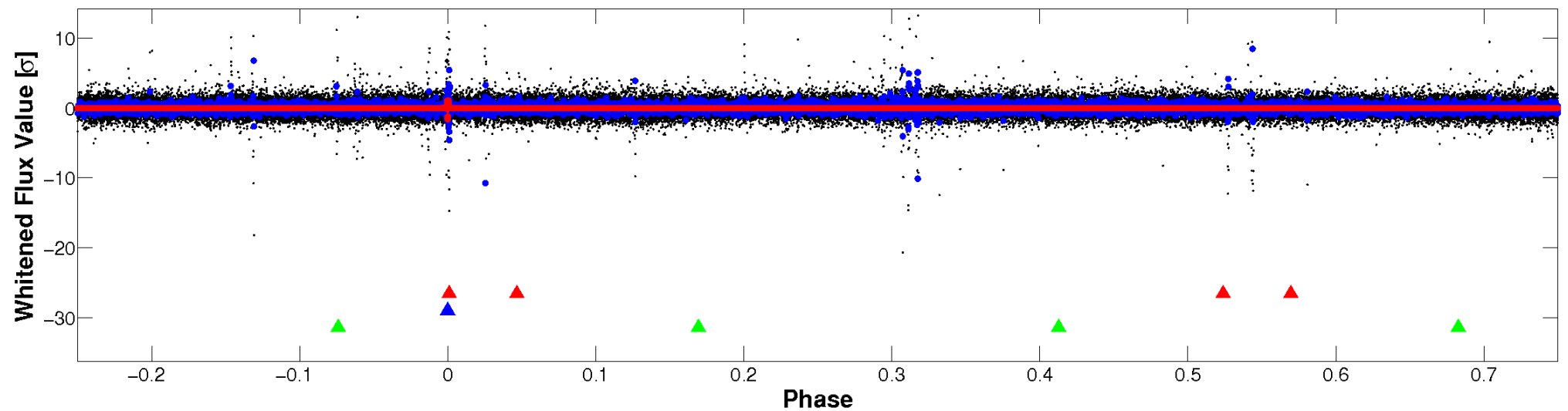


# Non-Whitened Vs. Whitened Light Curve

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

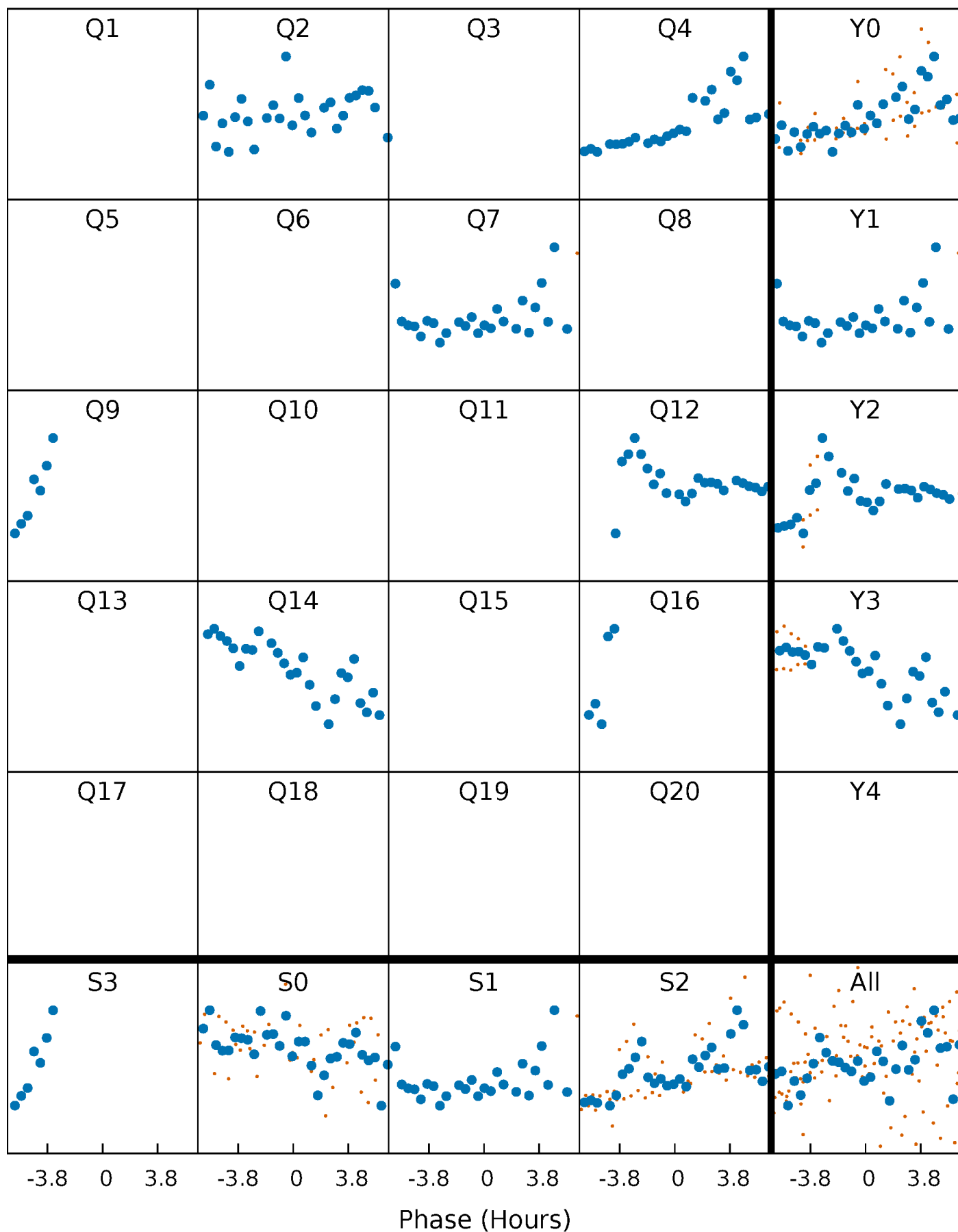


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



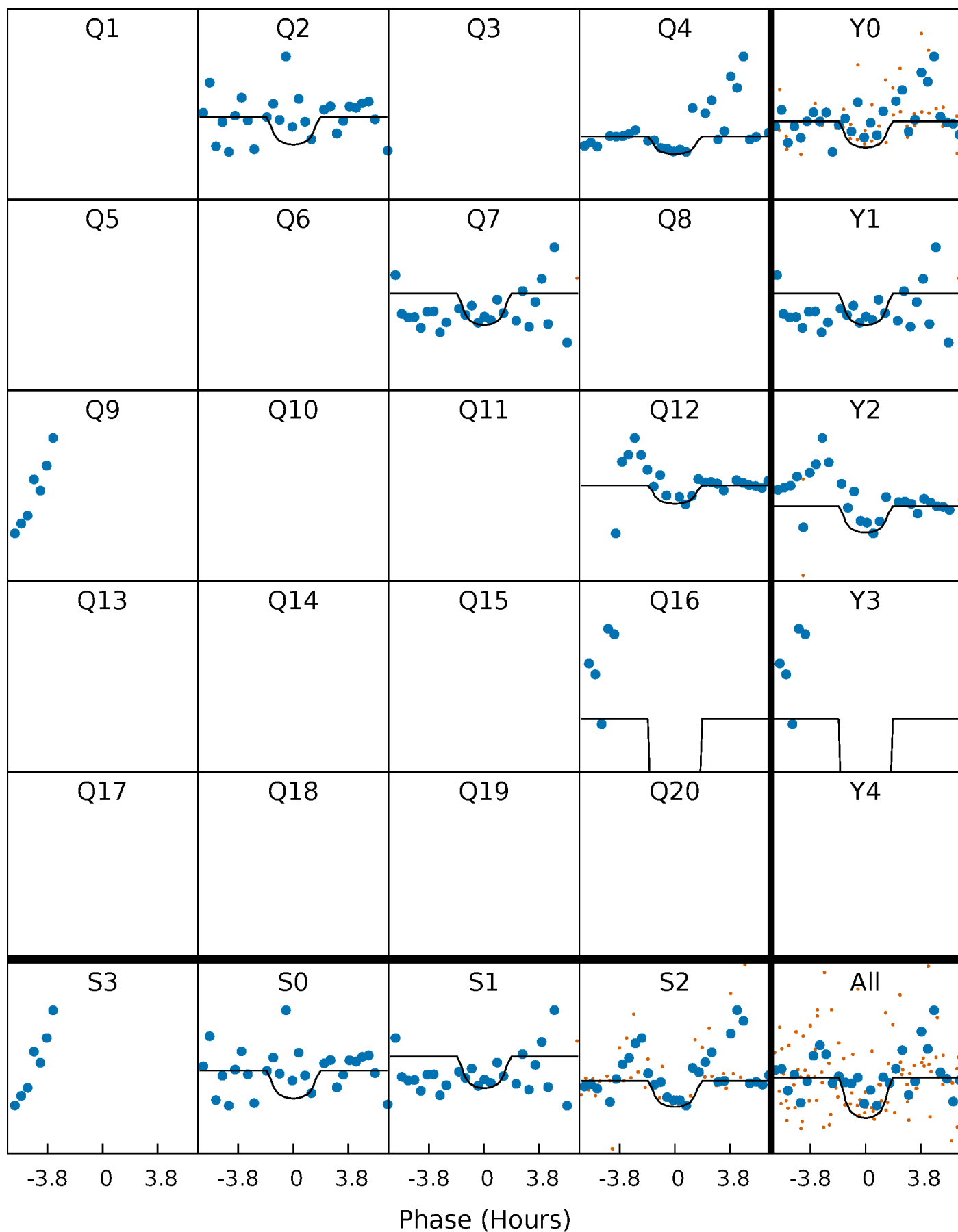
# PDC Quarter-Phased Transit Curves

TCE 010403036-02     $P=223.786186$  Days     $T_0=215.416096$  (BKJD)



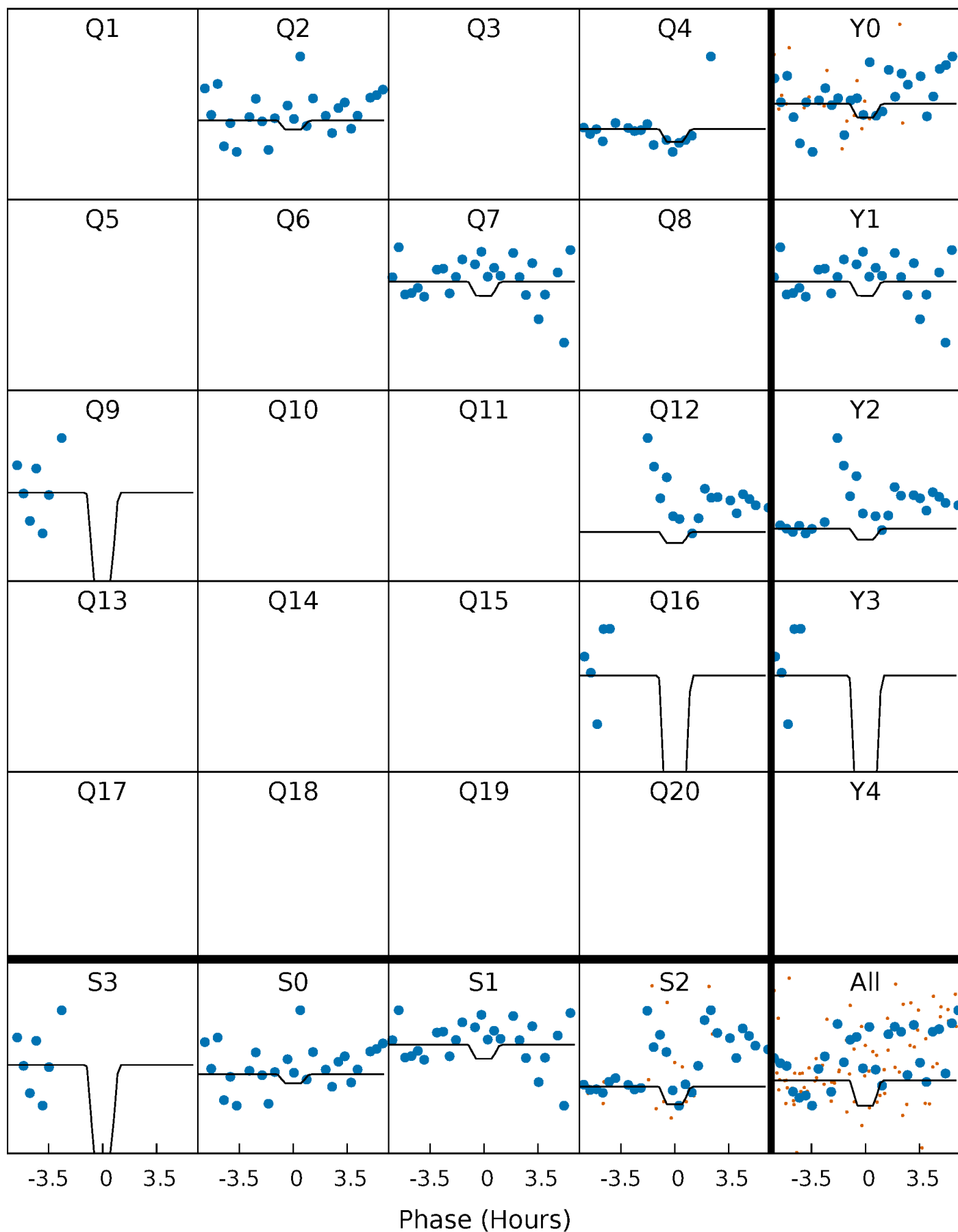
# DV Quarter-Phased Transit Curves

TCE 010403036-02 P=223.786186 Days  $T_0=215.416096$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

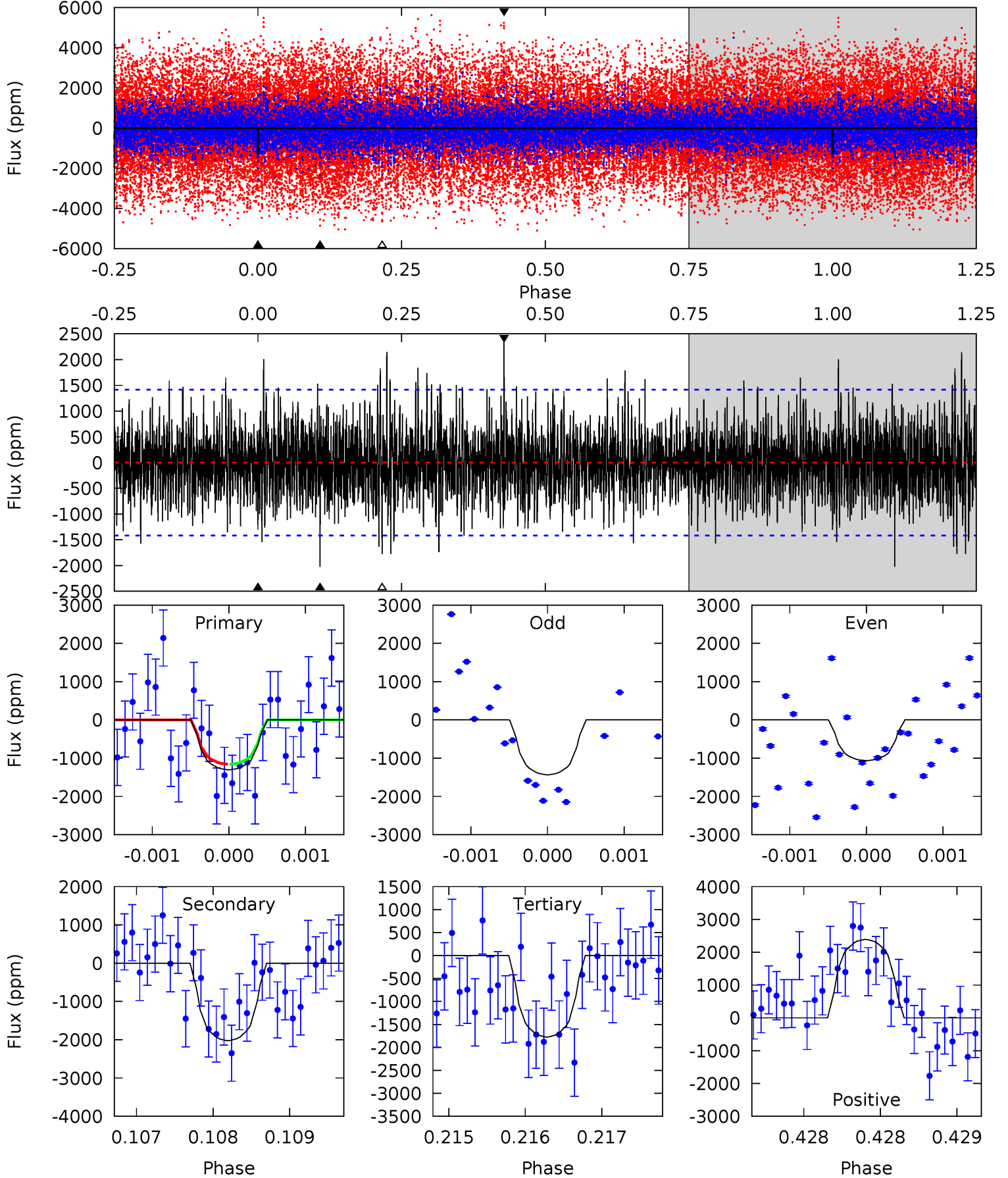
TCE 010403036-02 P=223.792439 Days  $T_0=215.375578$  (BKJD)



# DV Model-Shift Uniqueness Test

010403036-02, P = 223.786186 Days, E = 215.416096 Days

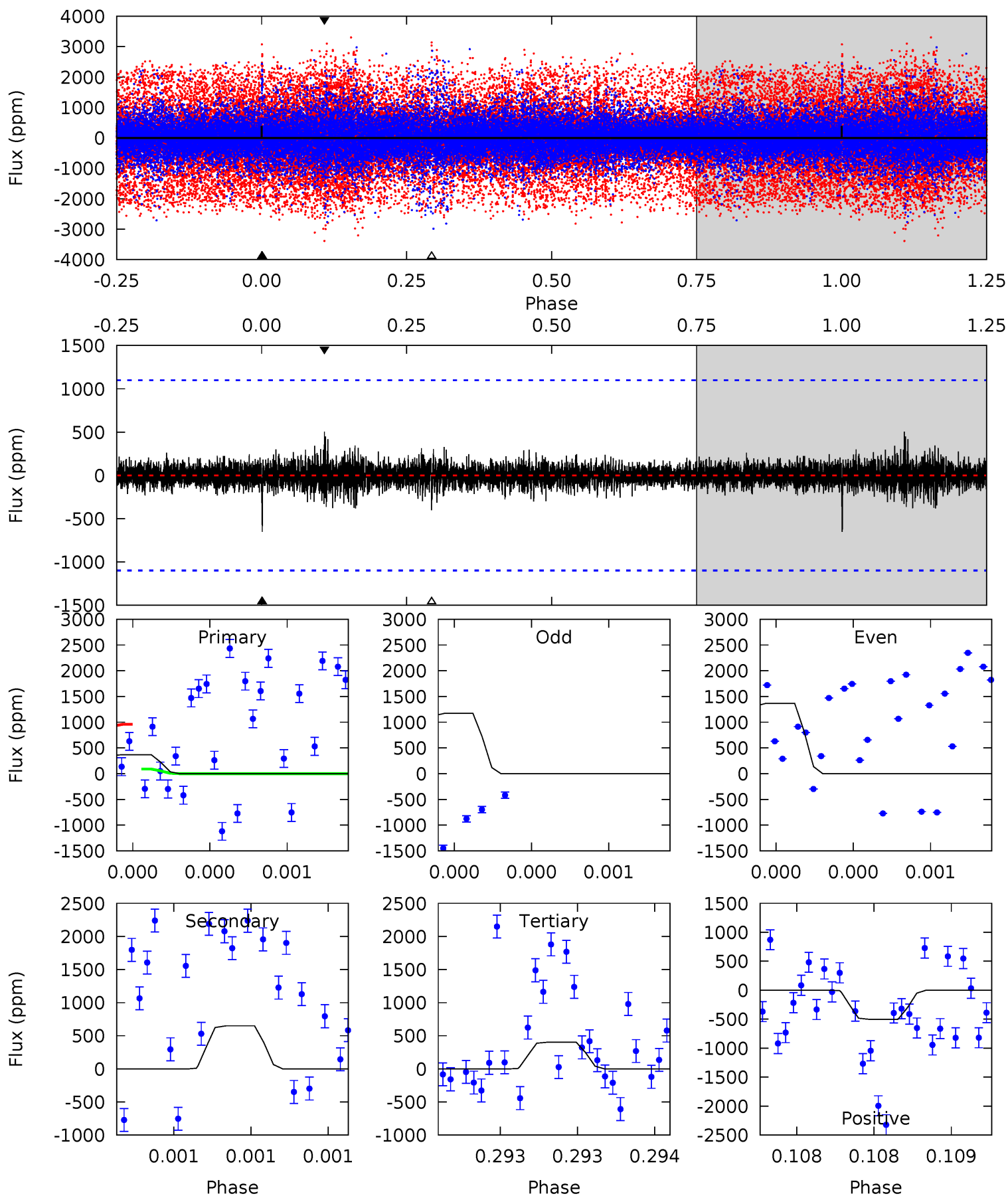
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.07	7.87	6.90	9.30	5.52	3.39	1.92	-1.84	-4.23	0.97	-1.42	0.63	0.67	0.54	0.01



# Alt Model-Shift Uniqueness Test

010403036-02, P = 223.792439 Days, E = 215.375578 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
1.88	3.32	2.06	2.57	5.62	3.56	0.41	-0.18	-0.69	1.26	0.75	0.47	0.69	0.44	2.02





### Stellar Parameters For KIC 010403036

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4494^{+75}_{-54}$	$1.888^{+0.027}_{-0.033}$	$-0.560^{+0.150}_{-0.100}$	$17.867^{+4.475}_{-0.839}$	$0.900^{+0.508}_{-0.053}$	$0.000^{+0.000}_{-0.000}$
	+2%/-1%	+1%/-2%	+27%/-18%	+25%/-5%	+56%/-6%	+9%/-23%
Source	PHO55	AST55	SPE55	DSEP		

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

### Secondary Eclipse Parameters for KIC 010403036-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-2022 \pm 257$	$357.76^{+400.96}_{-243.10}$	$1404^{+36}_{-26}$	$2824^{+1277}_{-549}$	$4.149^{+38.875}_{-3.205}$
Alt.	$-649 \pm 195$	$331.35^{+351.99}_{-227.08}$	$1404^{+33}_{-24}$	$2456^{+987}_{-788}$	$1.552^{+13.974}_{-1.223}$

$T_{\text{max}}$  = 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

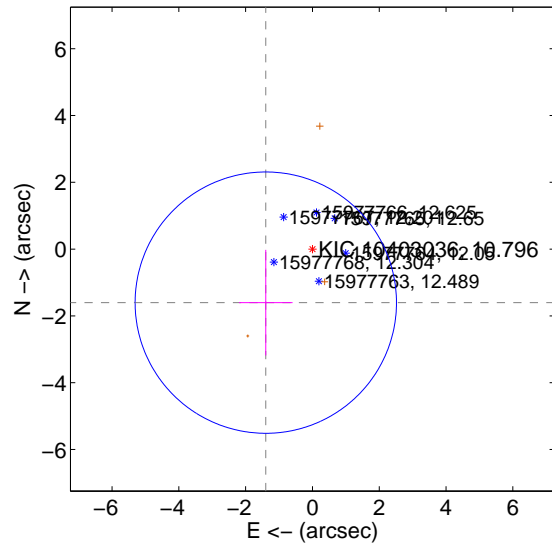
Supplemental centroid analysis for 010403036-02. **Kepler magnitude: 10.80.** Transit SNR 7.83

**There are 0 quarters with good PRF difference image offsets**

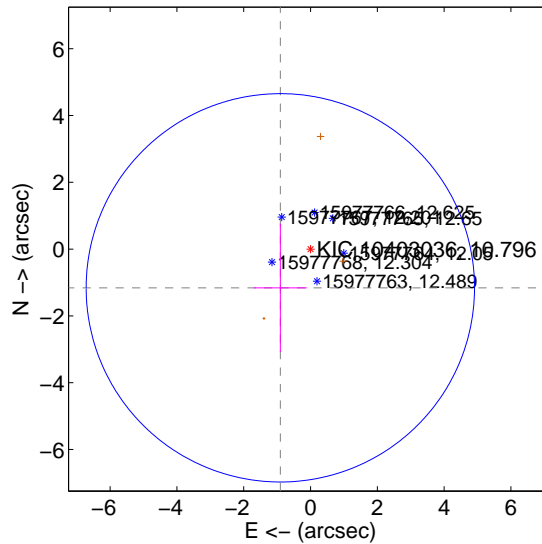
The direct PRF centroid is offset from the target star catalog position by about 0.76 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.126 \pm 1.304$	1.63	$1.397 \pm 0.802$	$-1.603 \pm 1.582$
PRF-fit source offset from KIC position	$1.470 \pm 1.938$	0.76	$0.904 \pm 0.792$	$-1.160 \pm 1.923$
photometric centroid source offset	$1.08 \pm 0.08$	13.90	$0.64 \pm 0.06$	$-0.87 \pm 0.09$

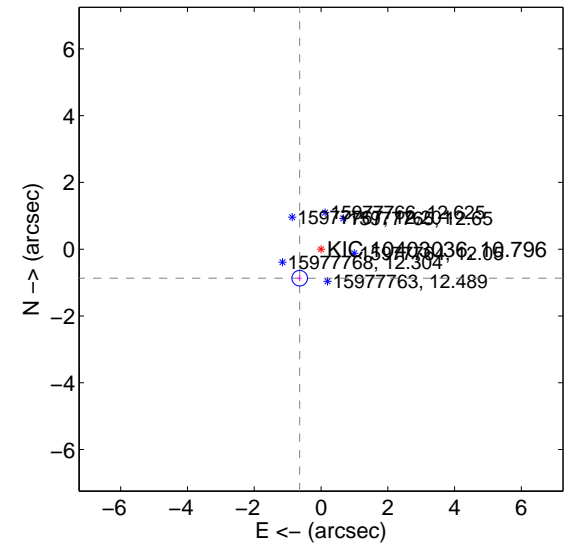
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

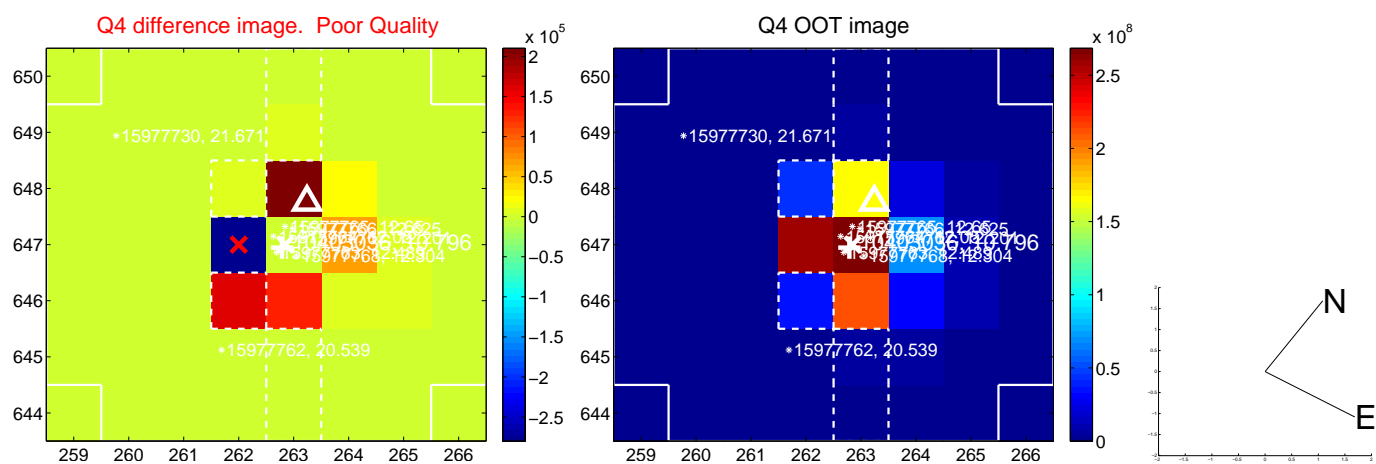
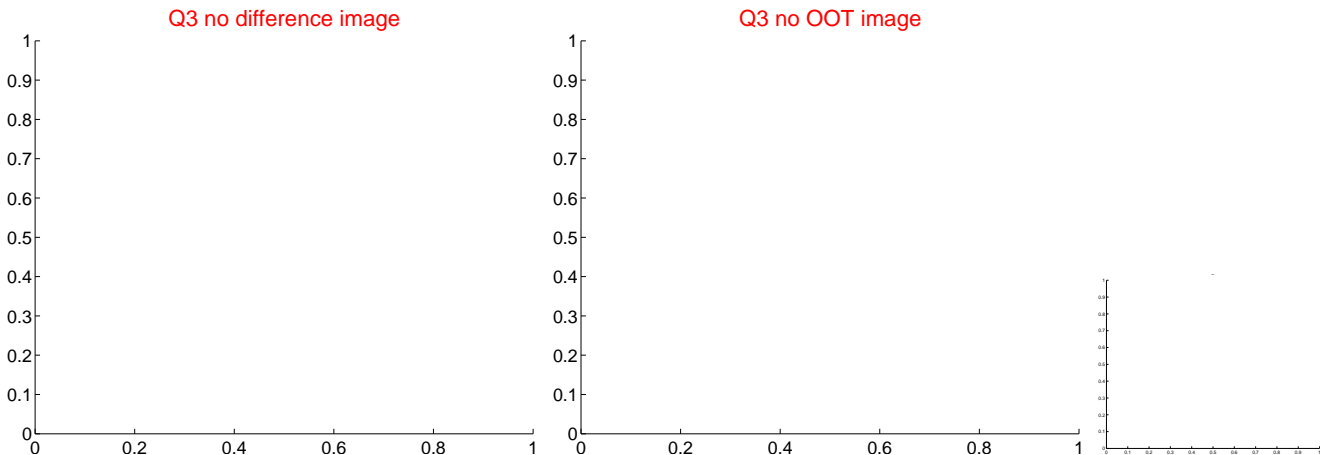
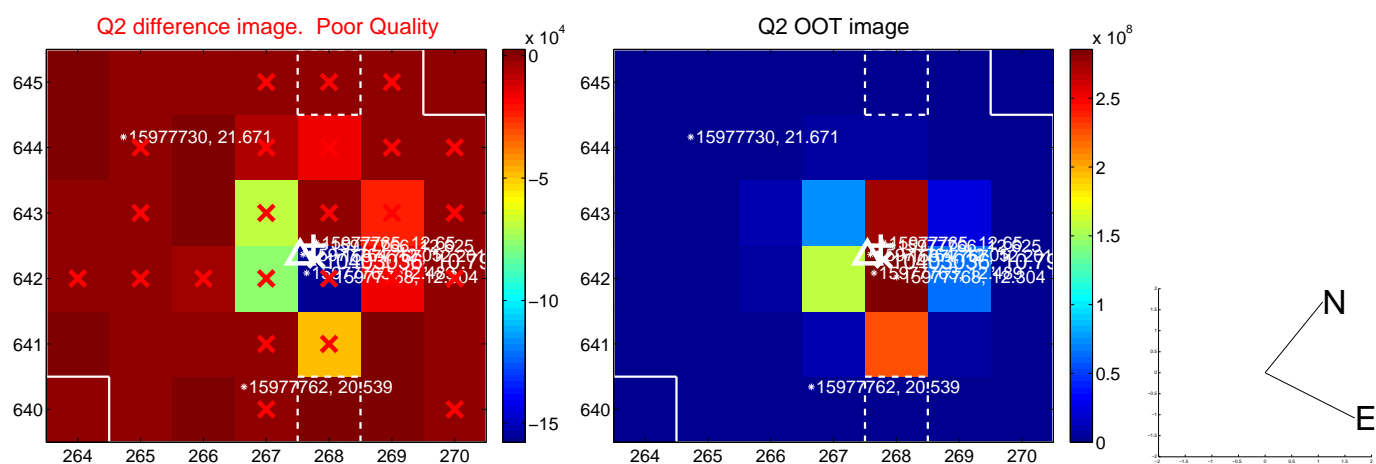
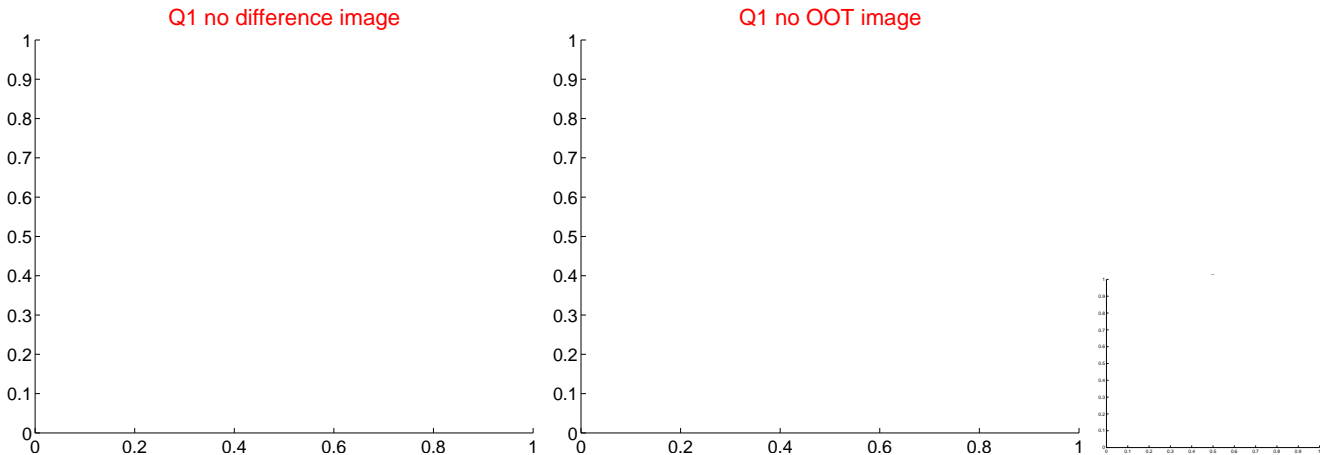


offset from photometric centroids

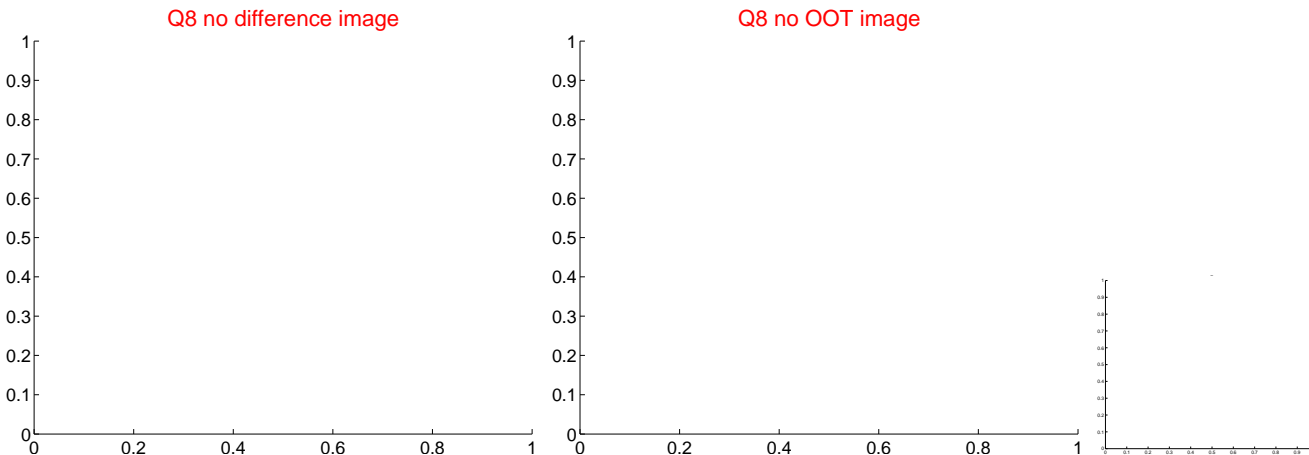
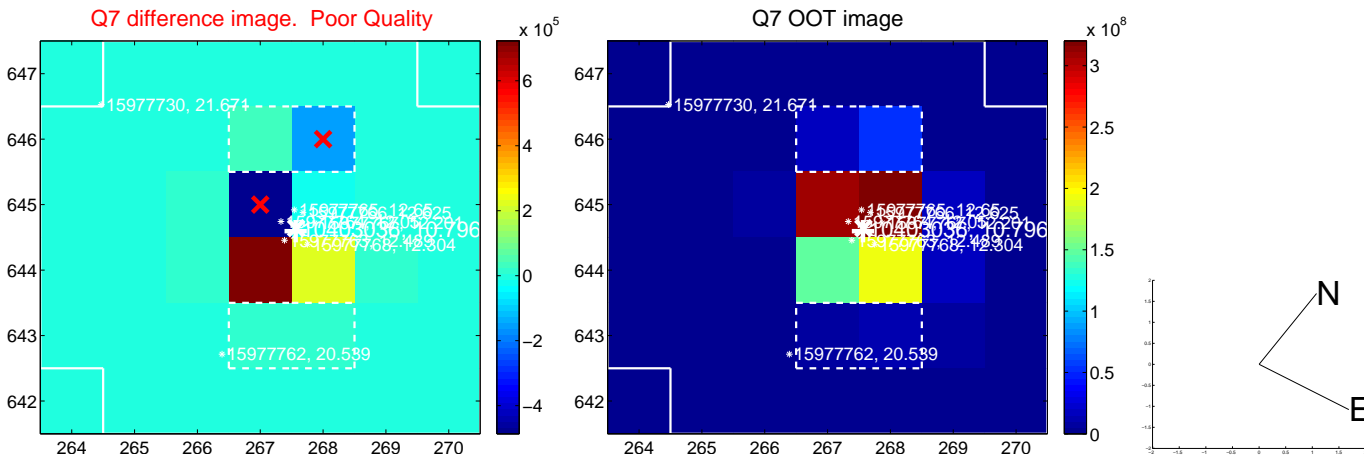
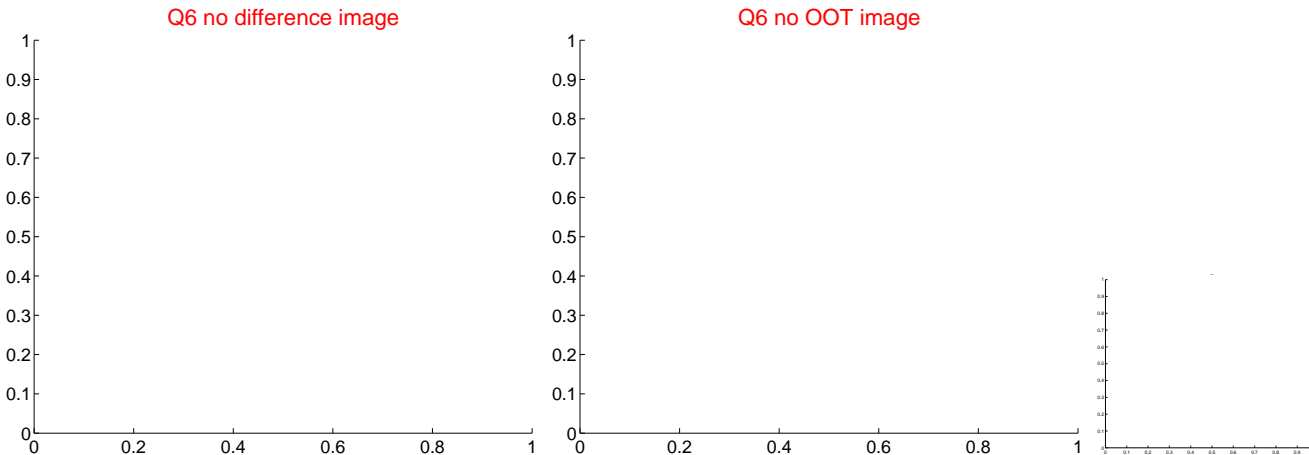
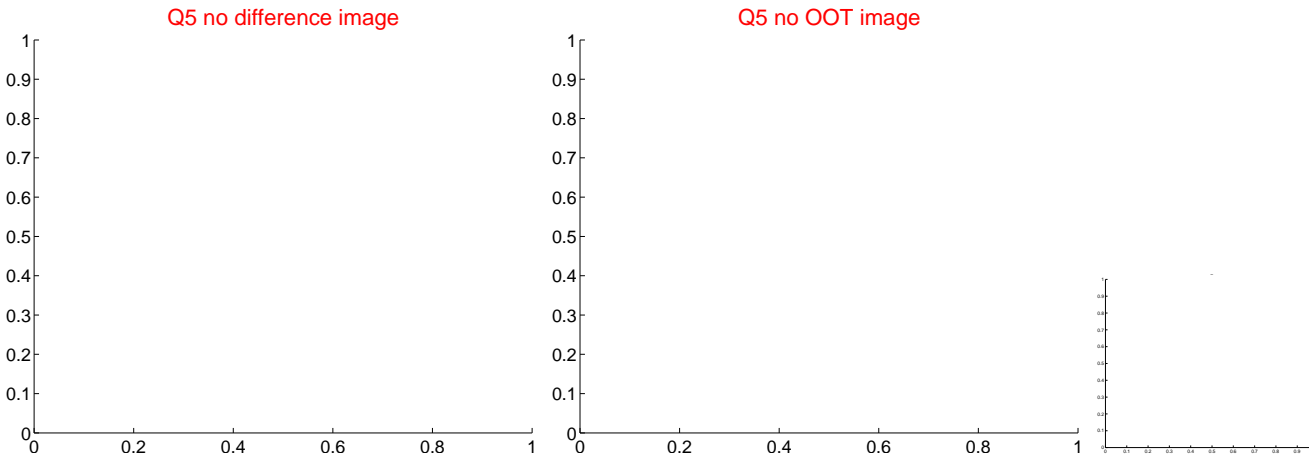


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

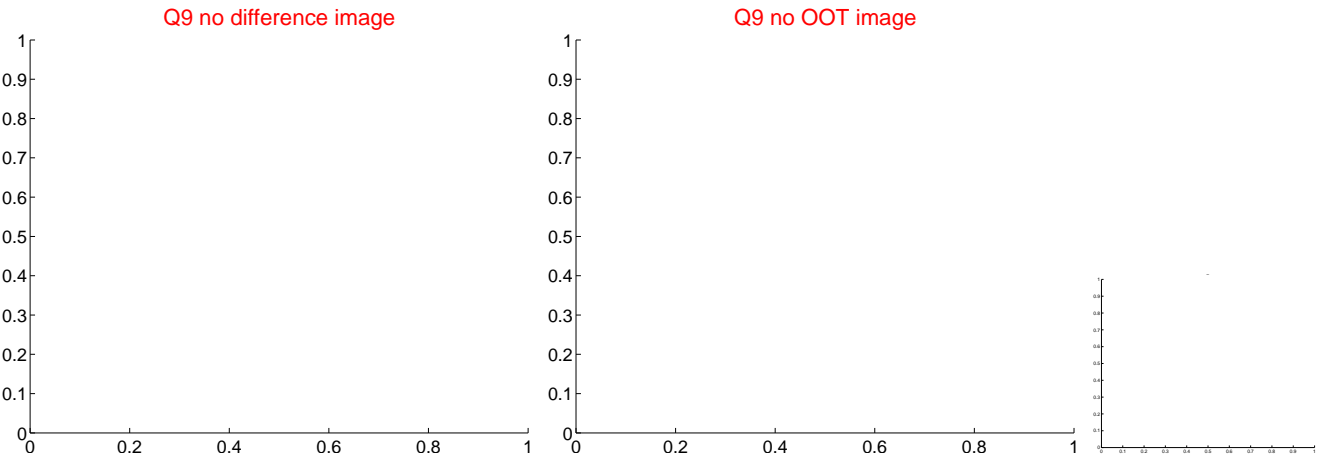
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



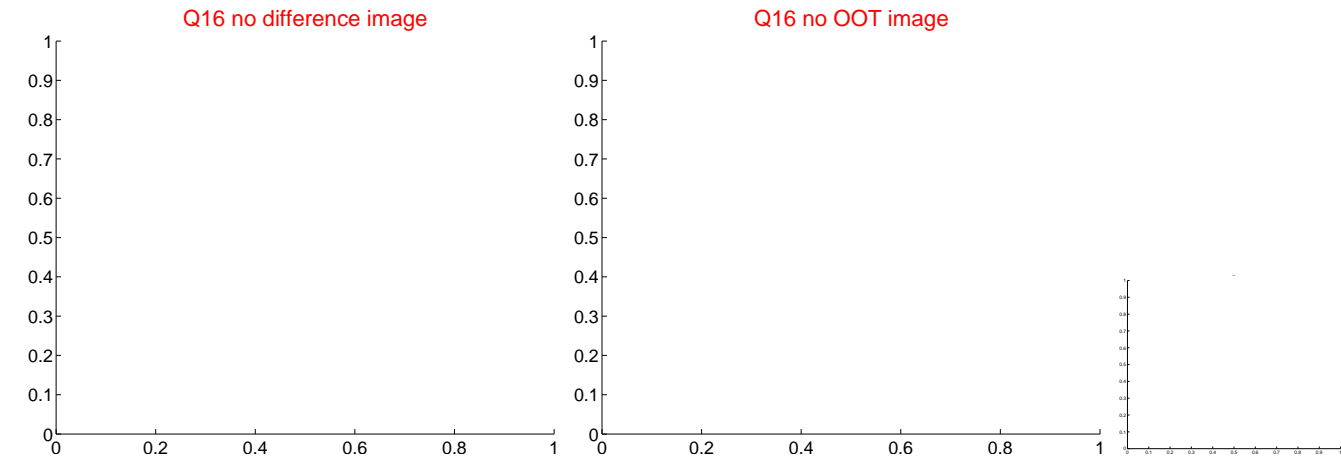
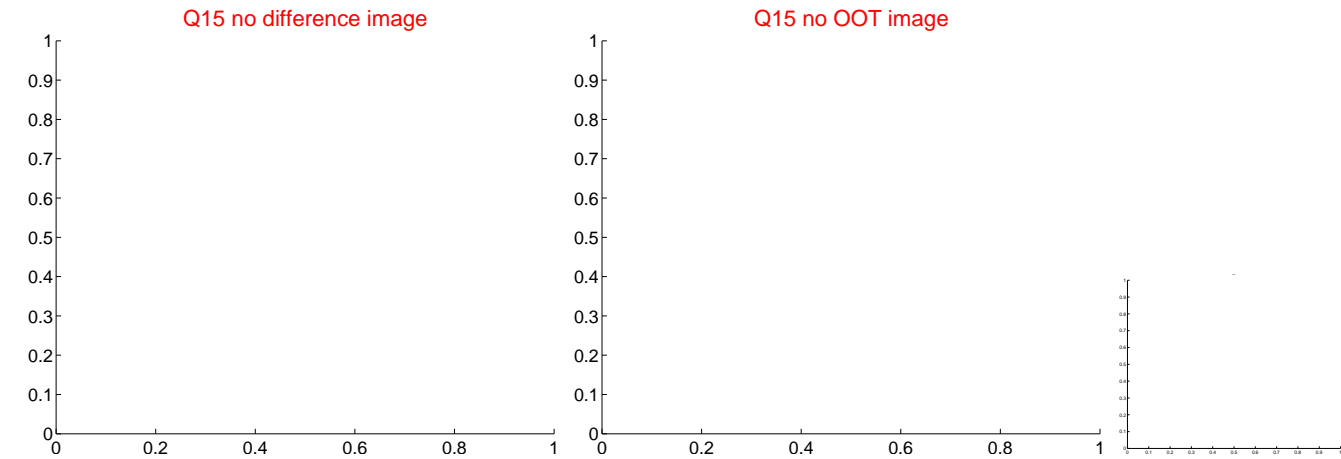
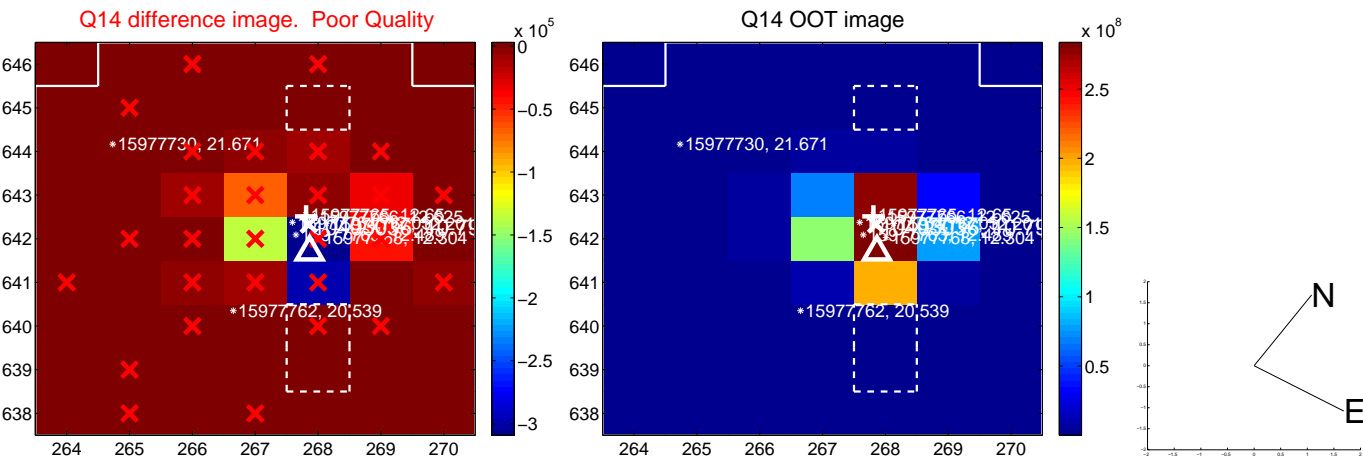
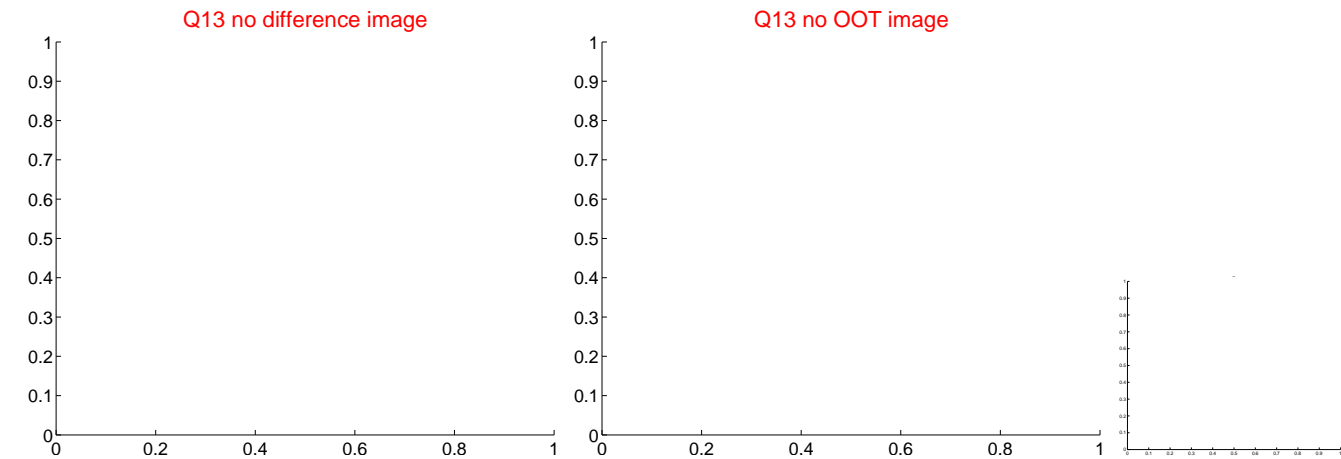
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



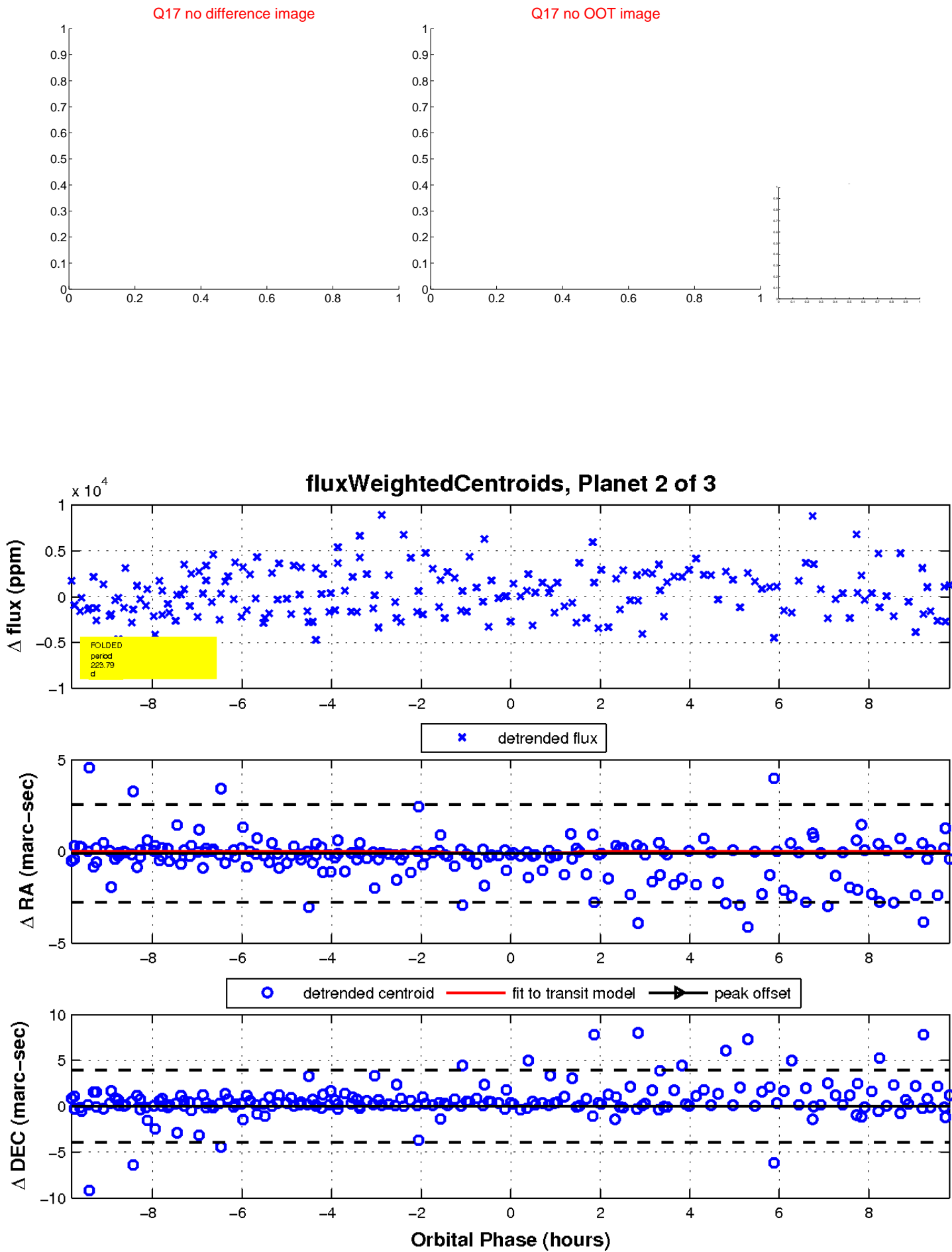
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



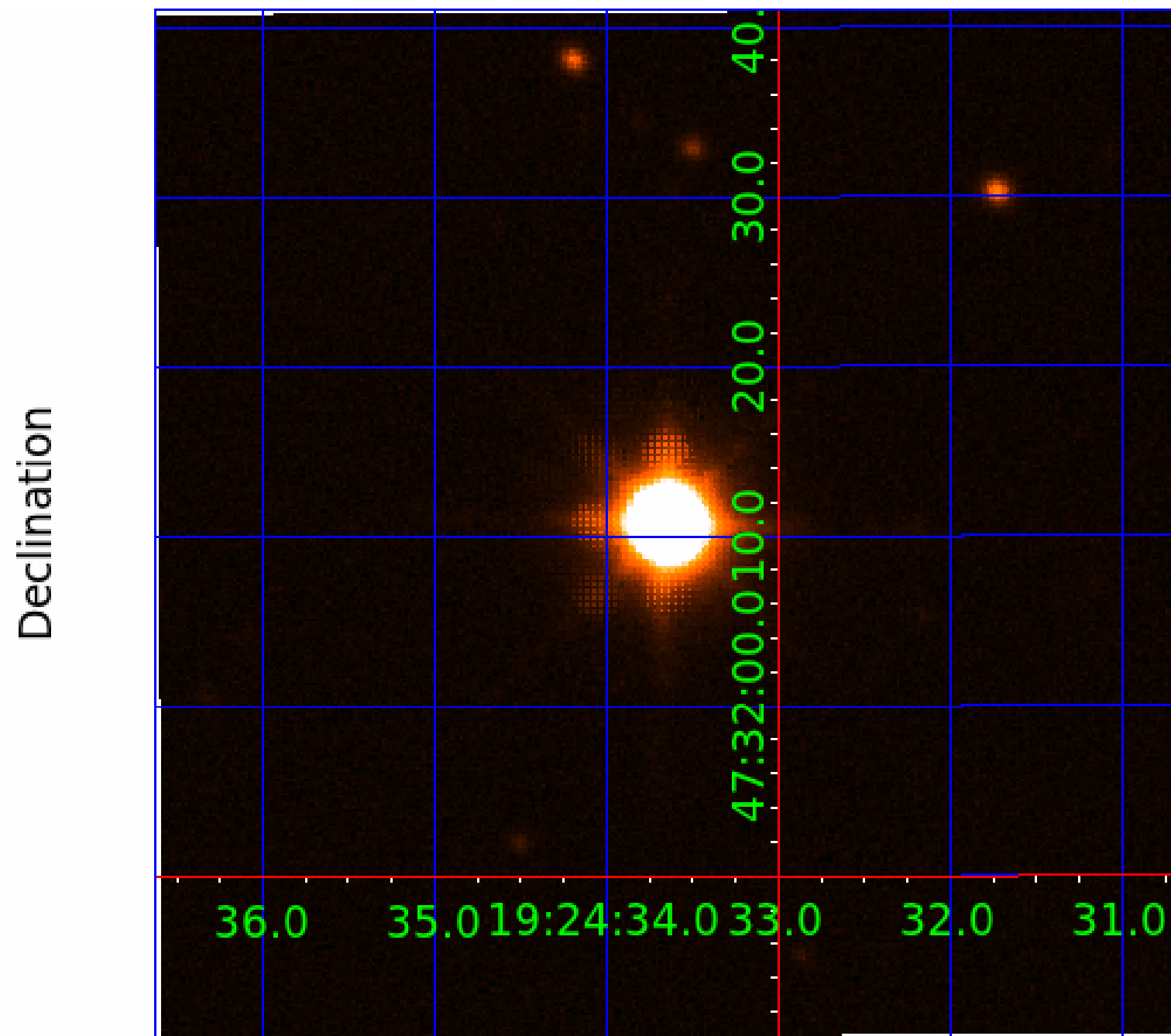
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 010403036

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010403036-01	OBS	No	330.562216	342.883680	2867.5	8.679	19.2	4.7	17.87	4494	108.82	142.93
010403036-02	OBS	No	223.786186	215.416096	2449.6	3.288	13.9	7.8	17.87	4494	84.91	240.45
010403036-03	OBS	No	393.114450	307.784505	46.7	3.500	9.4	-1.0	17.87	4494	11.72	113.44

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010403036-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
010403036-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED—HALO_GHOST
010403036-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_POS_ALT—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.

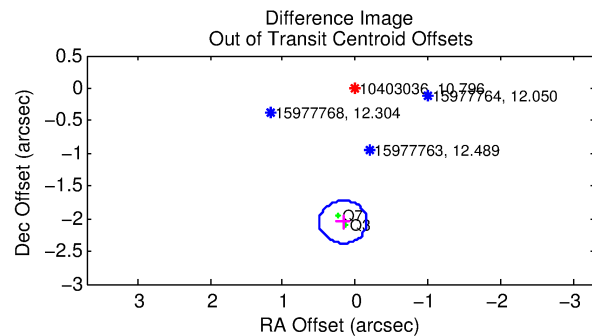
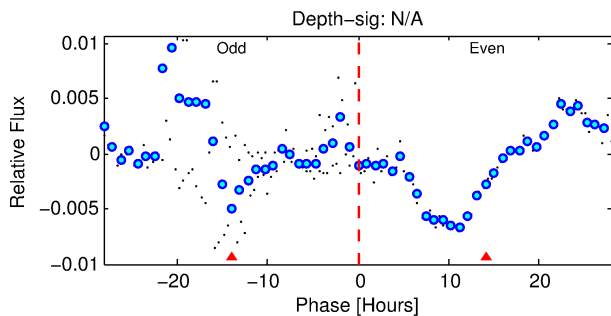
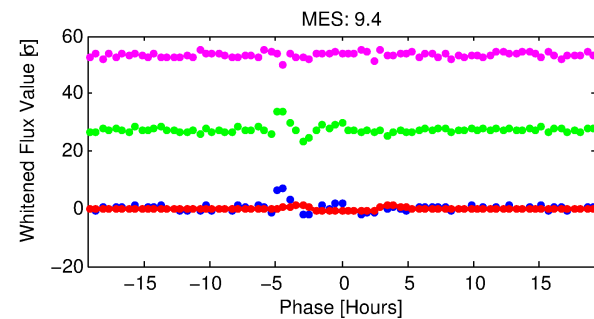
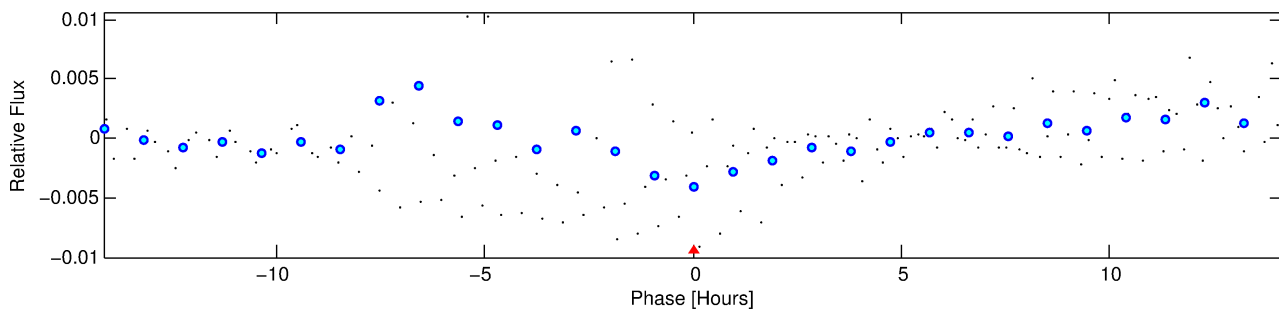
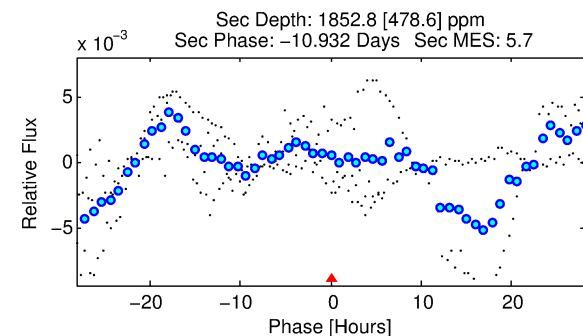
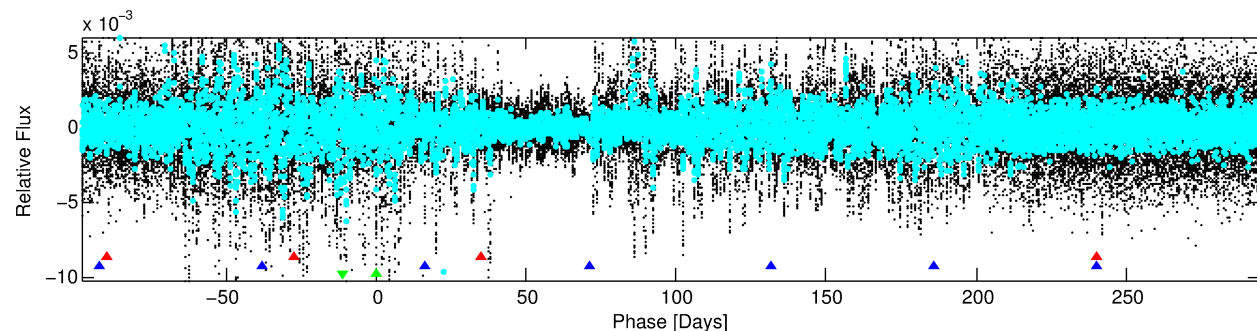
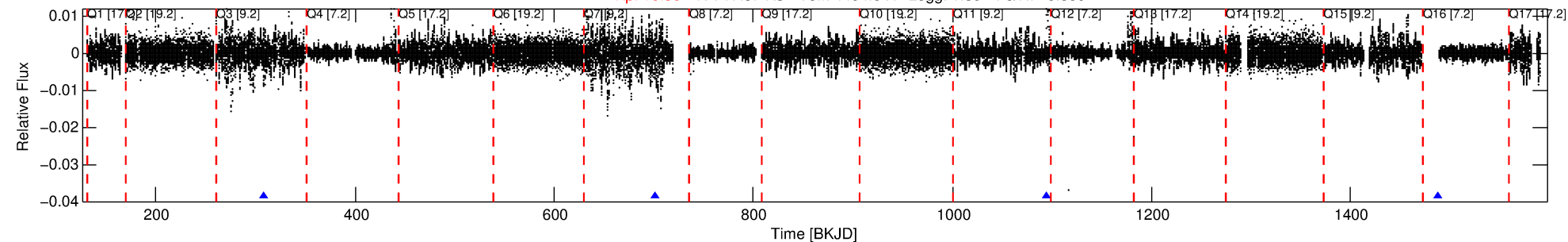
Ephemeris Match Information For 010403036-03

No Significant Match Found

# DV One-Page Summary

KIC: 10403036 Candidate: 3 of 3 Period: 393.114 d

Kp: 10.80 R\*: 17.87 Rs Teff: 4494.0 K Logg: 1.89 Fe/H: -0.560



## TPS TCE Results:

Period = 393.11445 d  
Epoch = 307.7845 BKJD

DV fit results are unavailable

## DV Diagnostic Results:

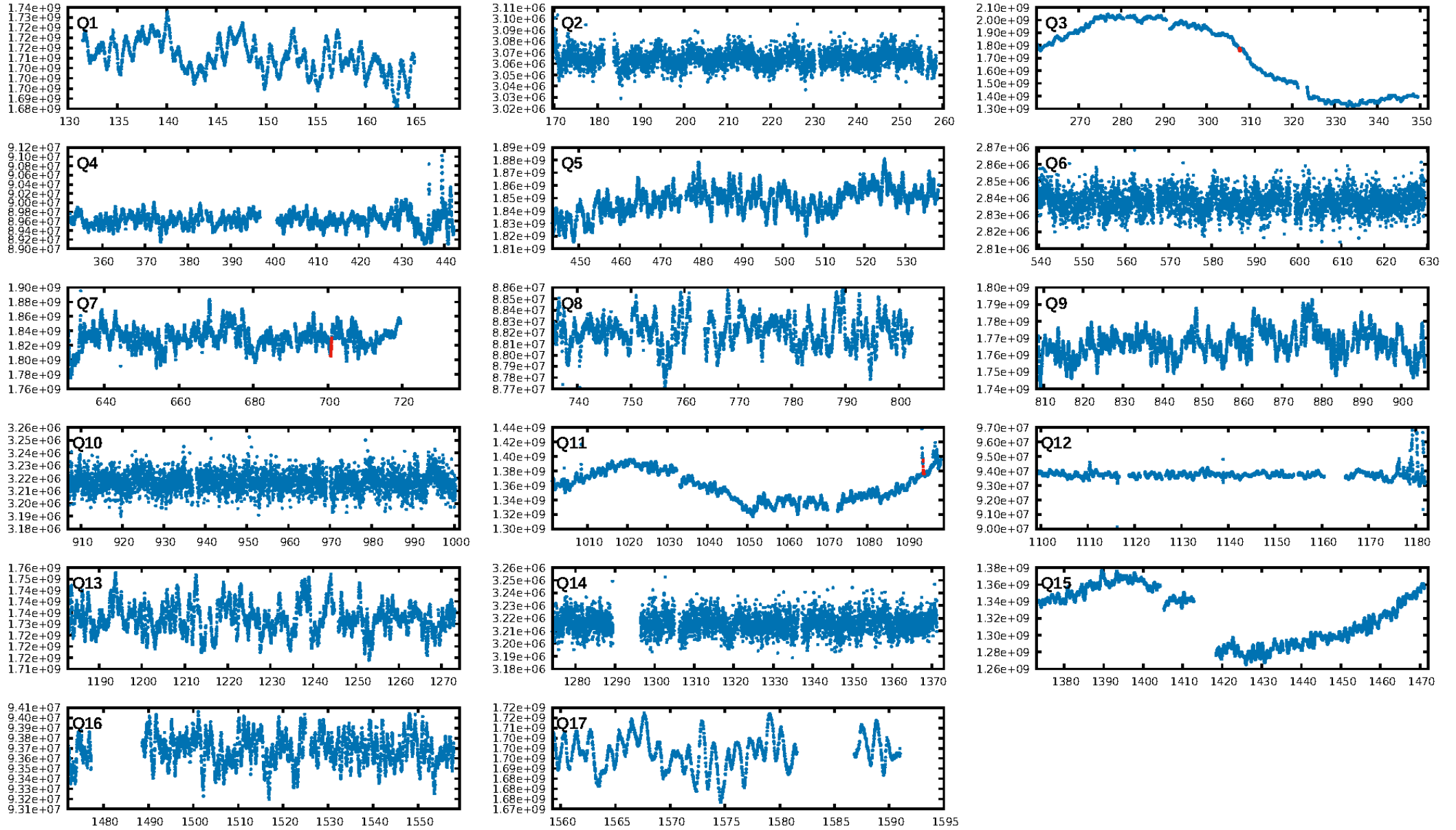
ShortPeriod-sig: 100.0% [160.43σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -1.148

Centroid-sig: 0.3%  
Centroid-so: 0.810 arcsec [8.61σ]  
OotOffset-rm: 2.057 arcsec [18.91σ]  
KicOffset-rm: 2.279 arcsec [18.68σ]  
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]

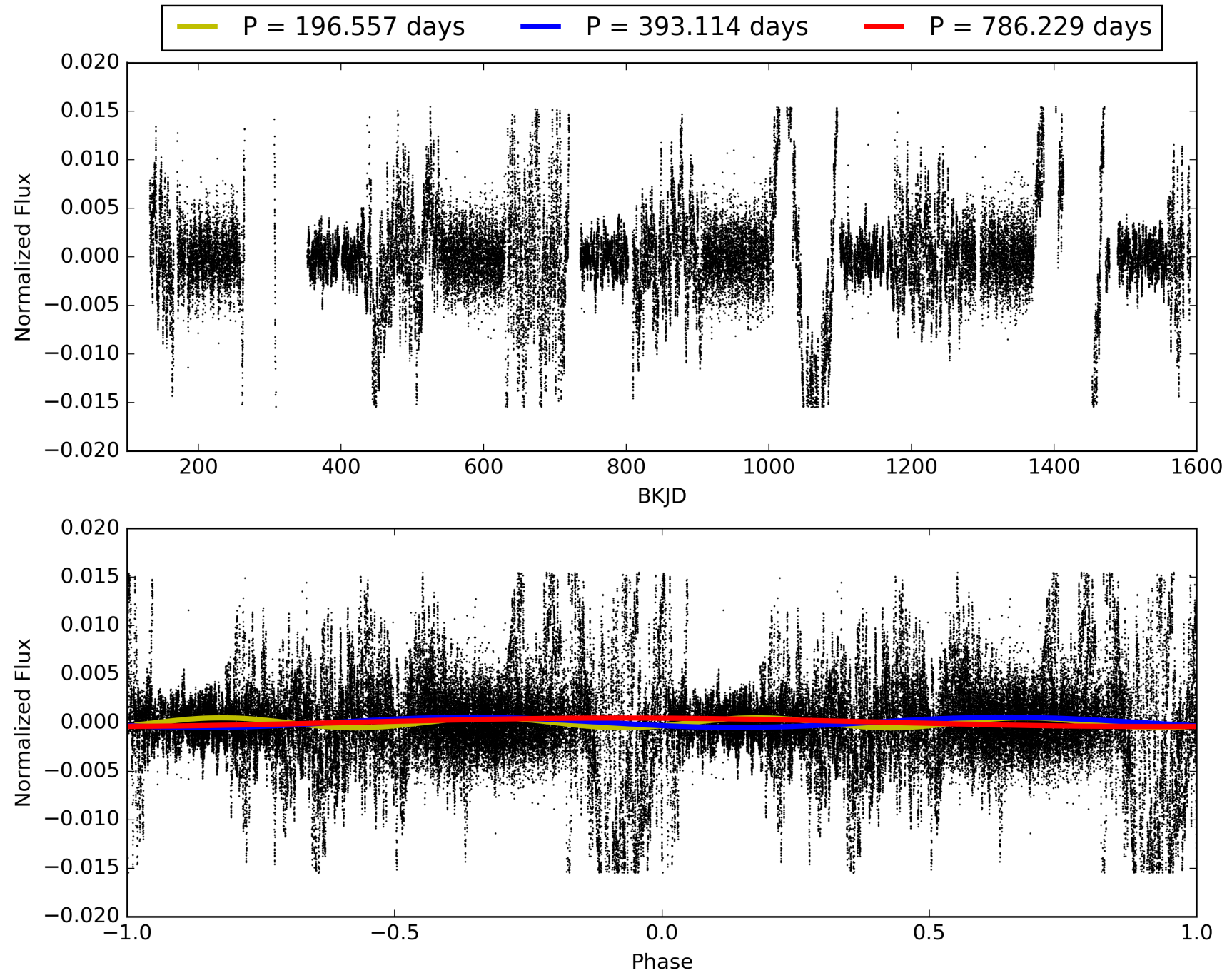
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:27:22 Z

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

# TCE 010403036-03, PDC Light Curves

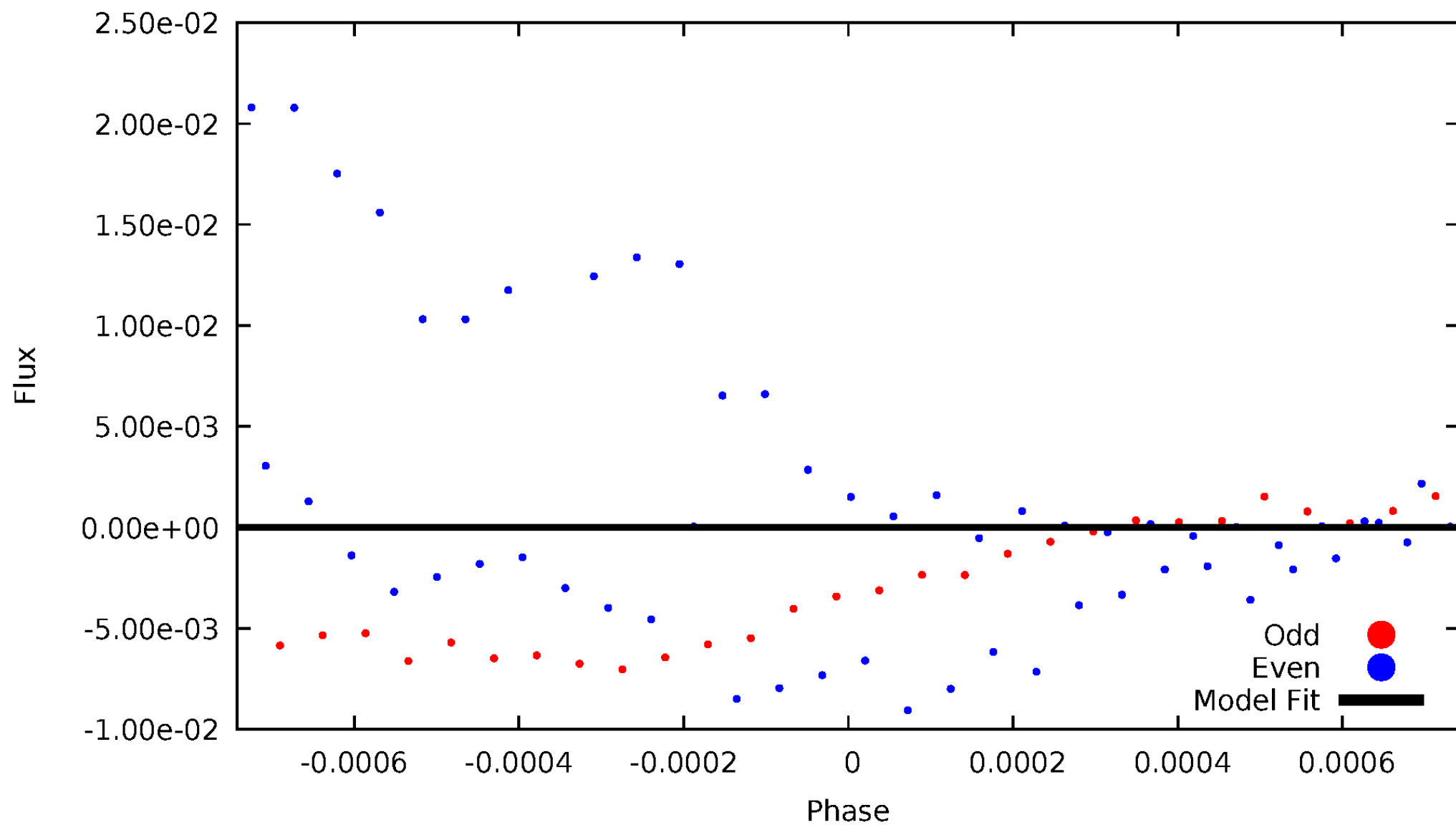


TCE 010403036-03



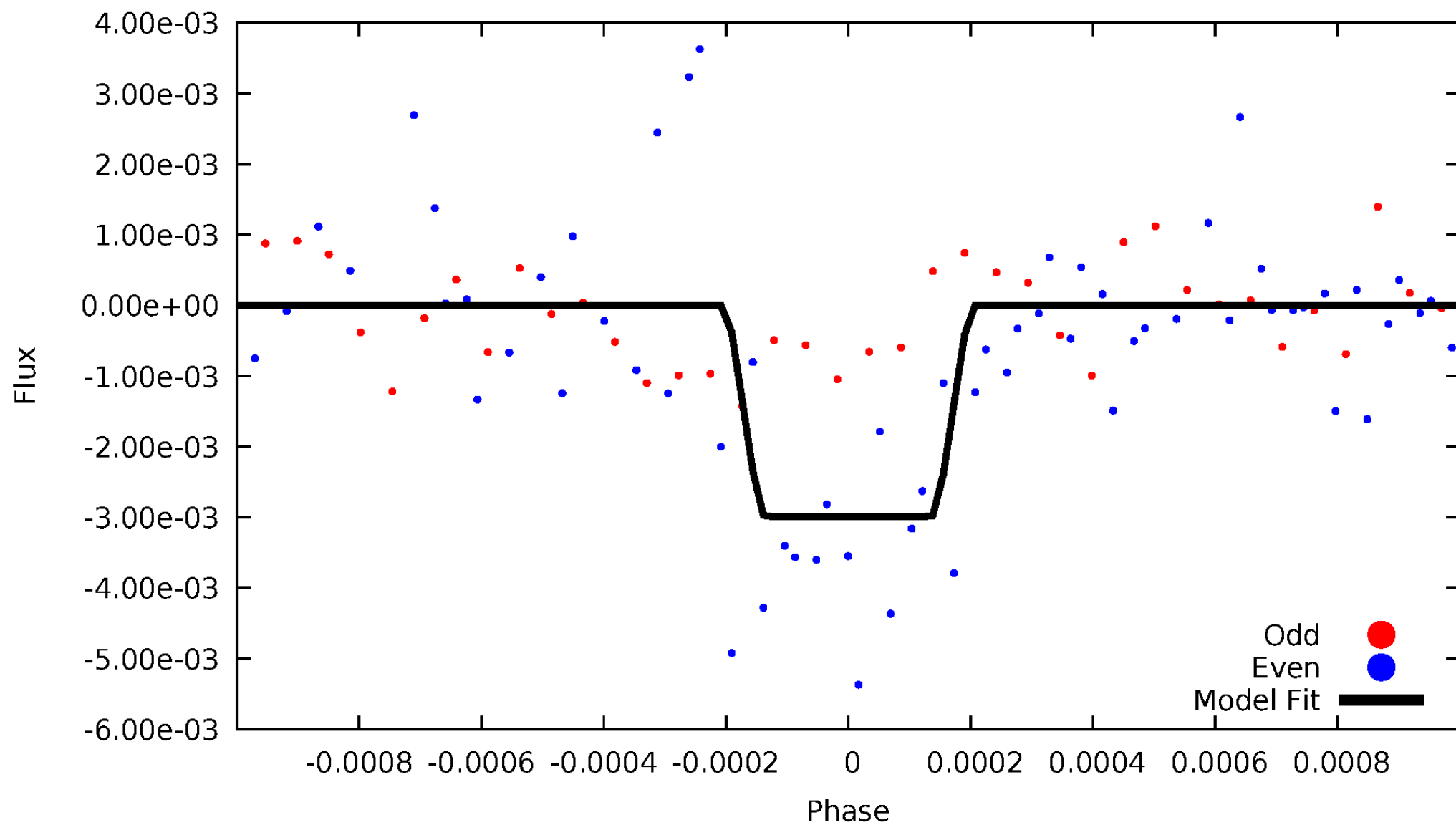
# DV Odd/Even

TCE 010403036-03



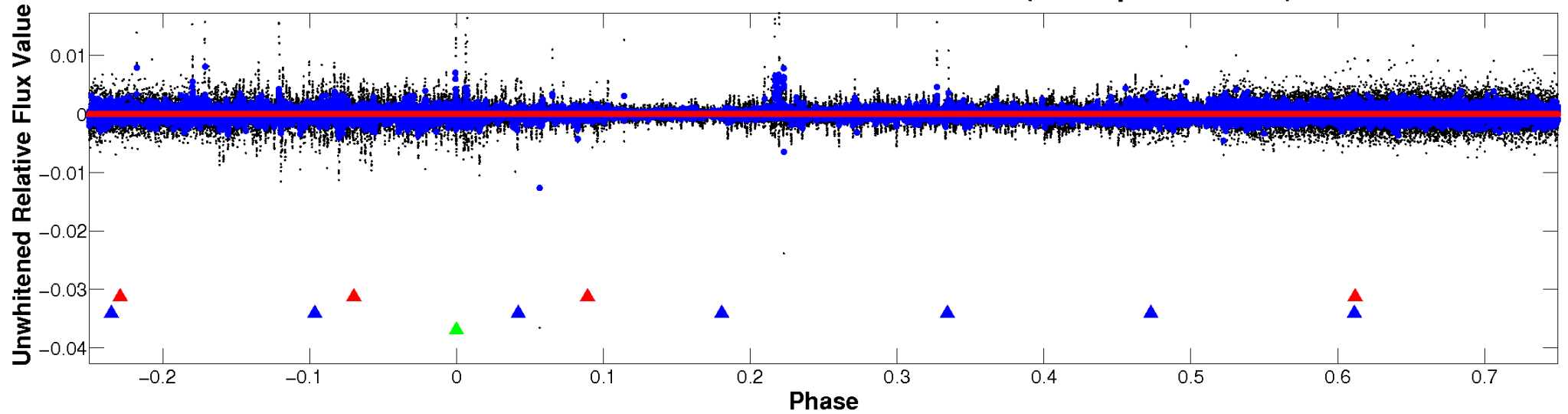
# ALT Odd/Even

TCE 010403036-03

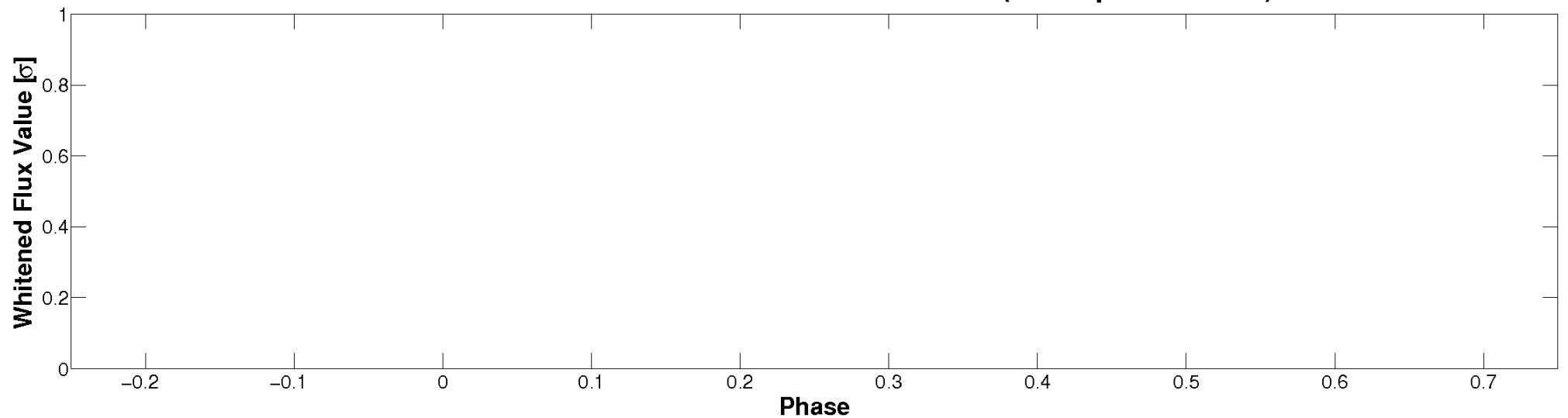


# Non-Whitened Vs. Whitened Light Curve

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

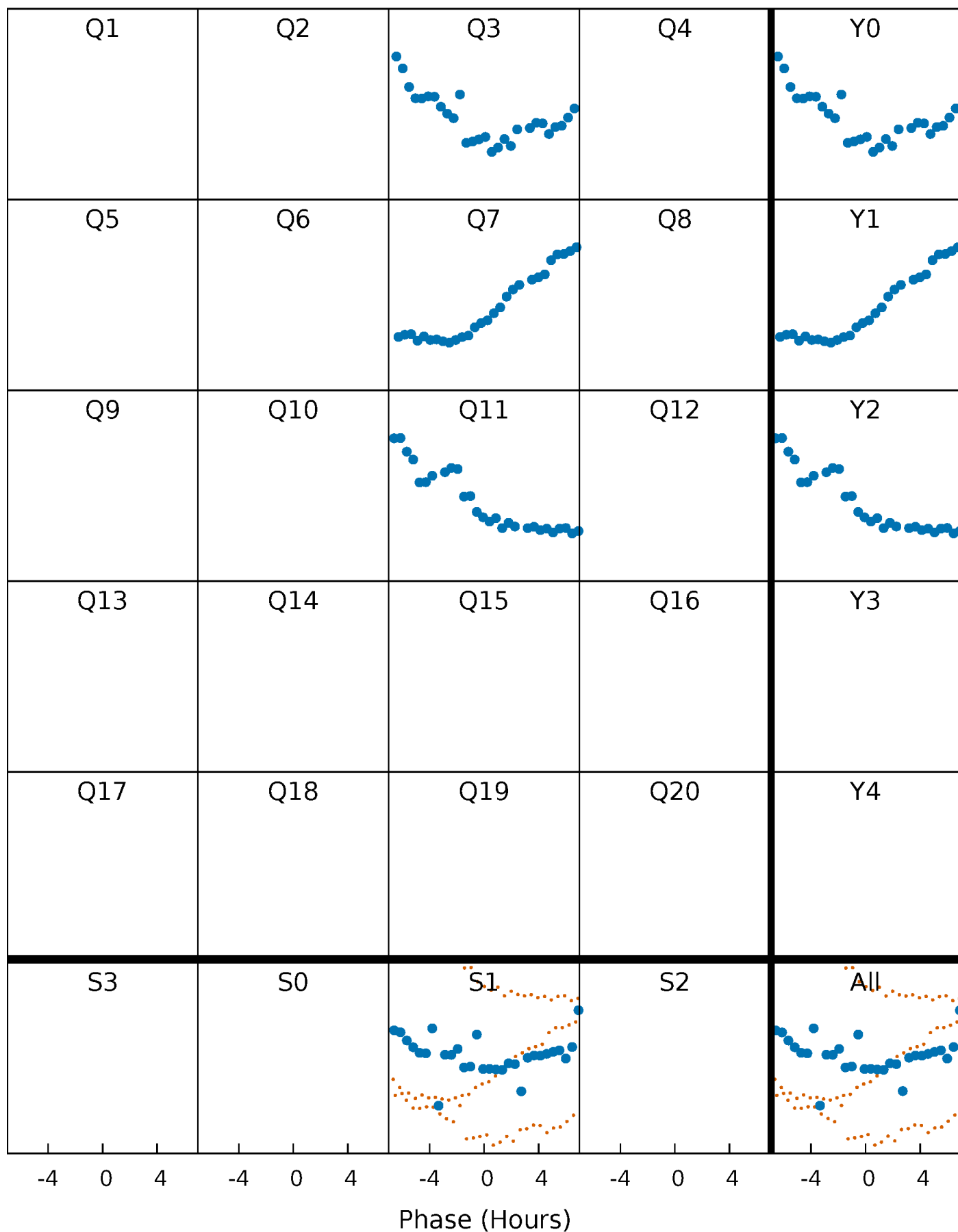


**Planet 3 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



# PDC Quarter-Phased Transit Curves

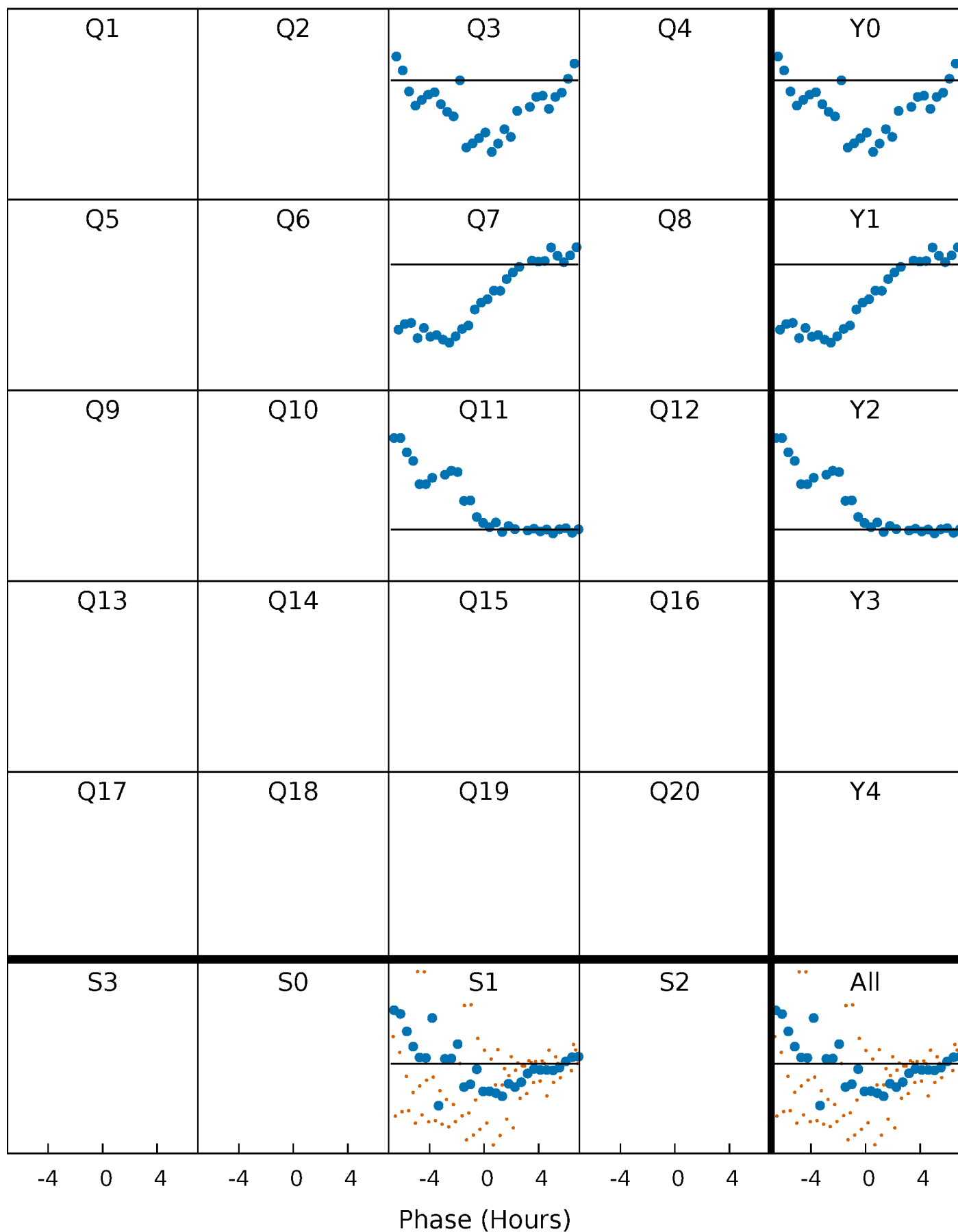
TCE 010403036-03     $P=393.114450$  Days     $T_0=307.784505$  (BKJD)





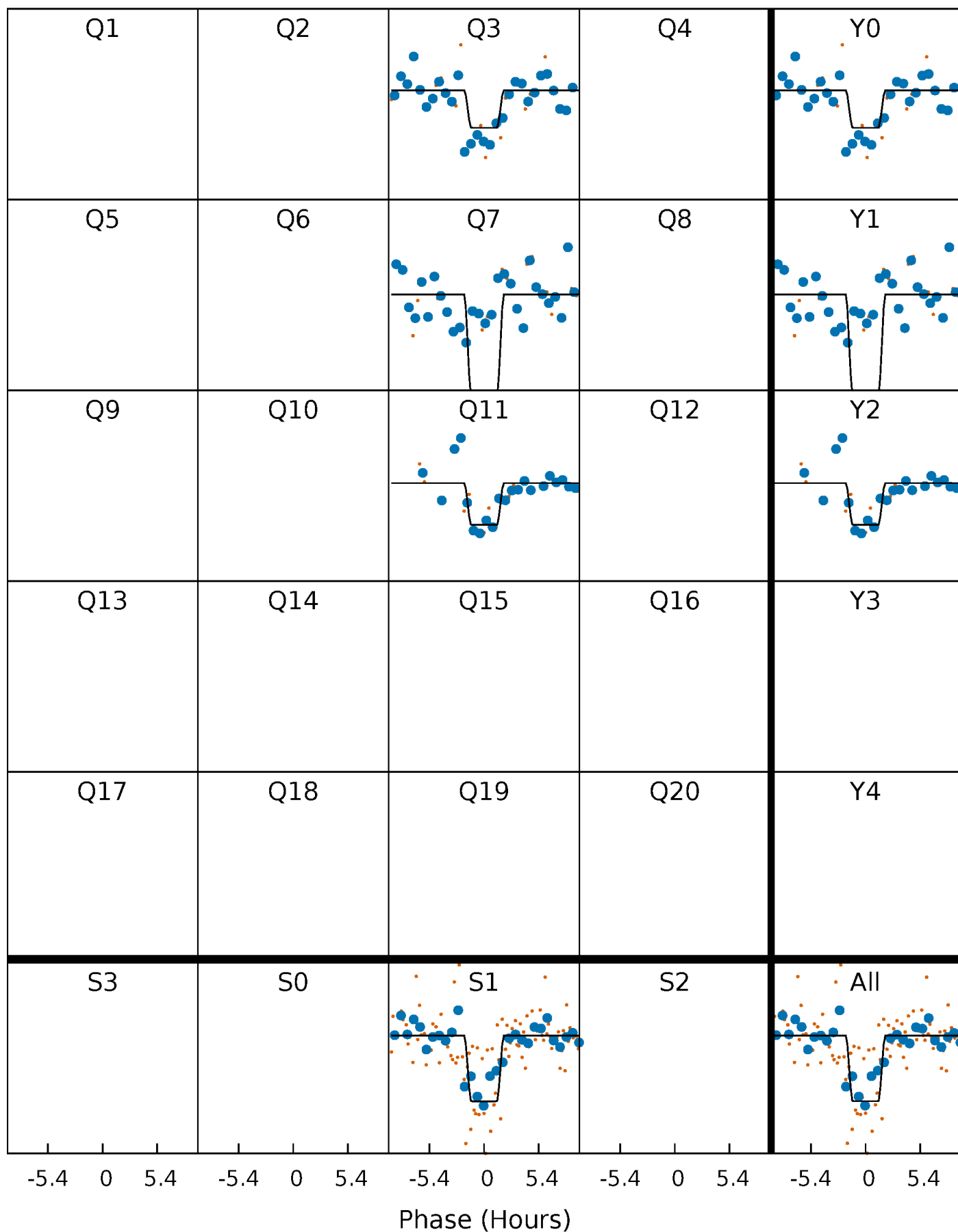
# DV Quarter-Phased Transit Curves

TCE 010403036-03     $P=393.114450$  Days     $T_0=307.784505$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

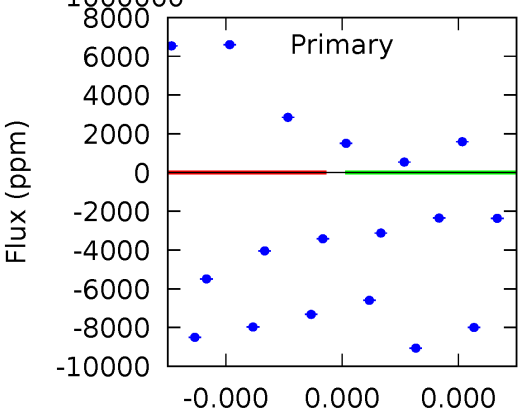
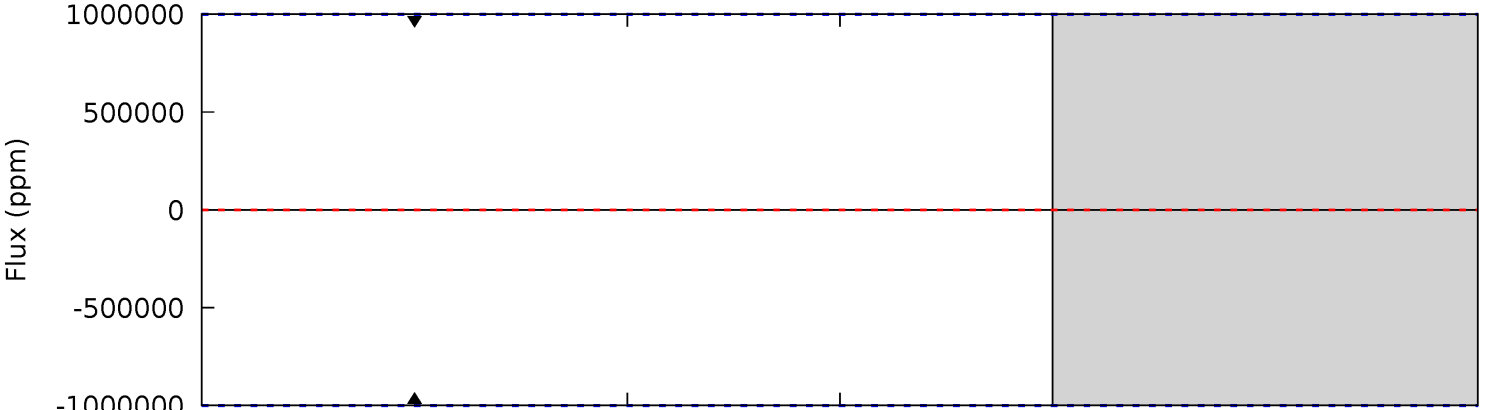
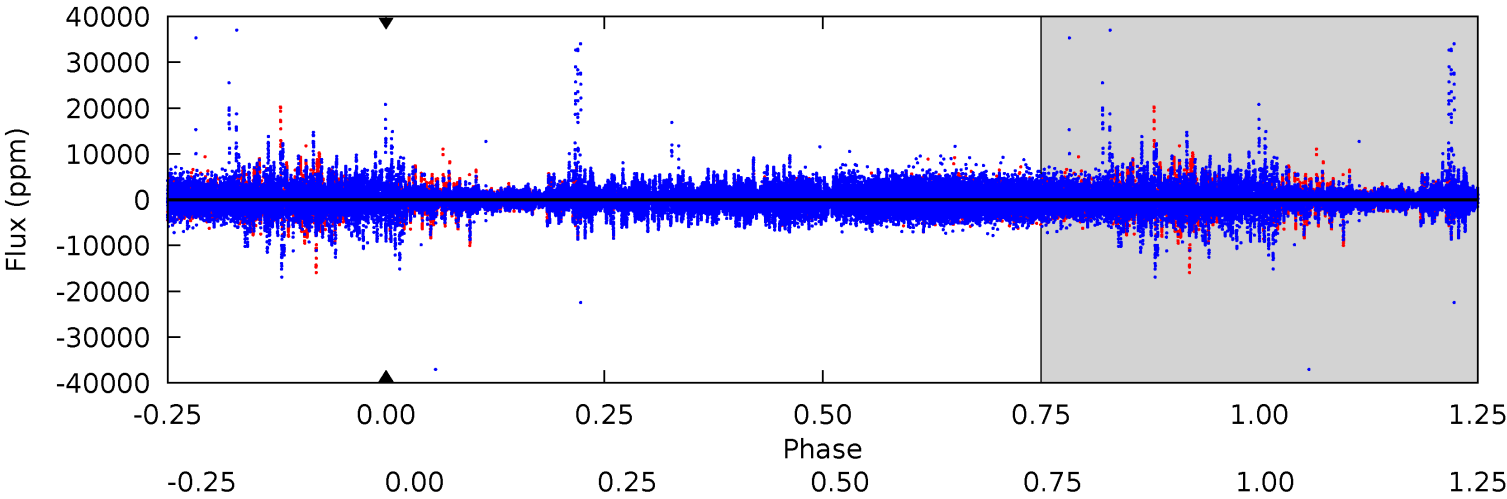
TCE 010403036-03     $P=393.114450$  Days     $T_0=307.806237$  (BKJD)



# DV Model-Shift Uniqueness Test

010403036-03, P = 393.114450 Days, E = 307.784505 Days

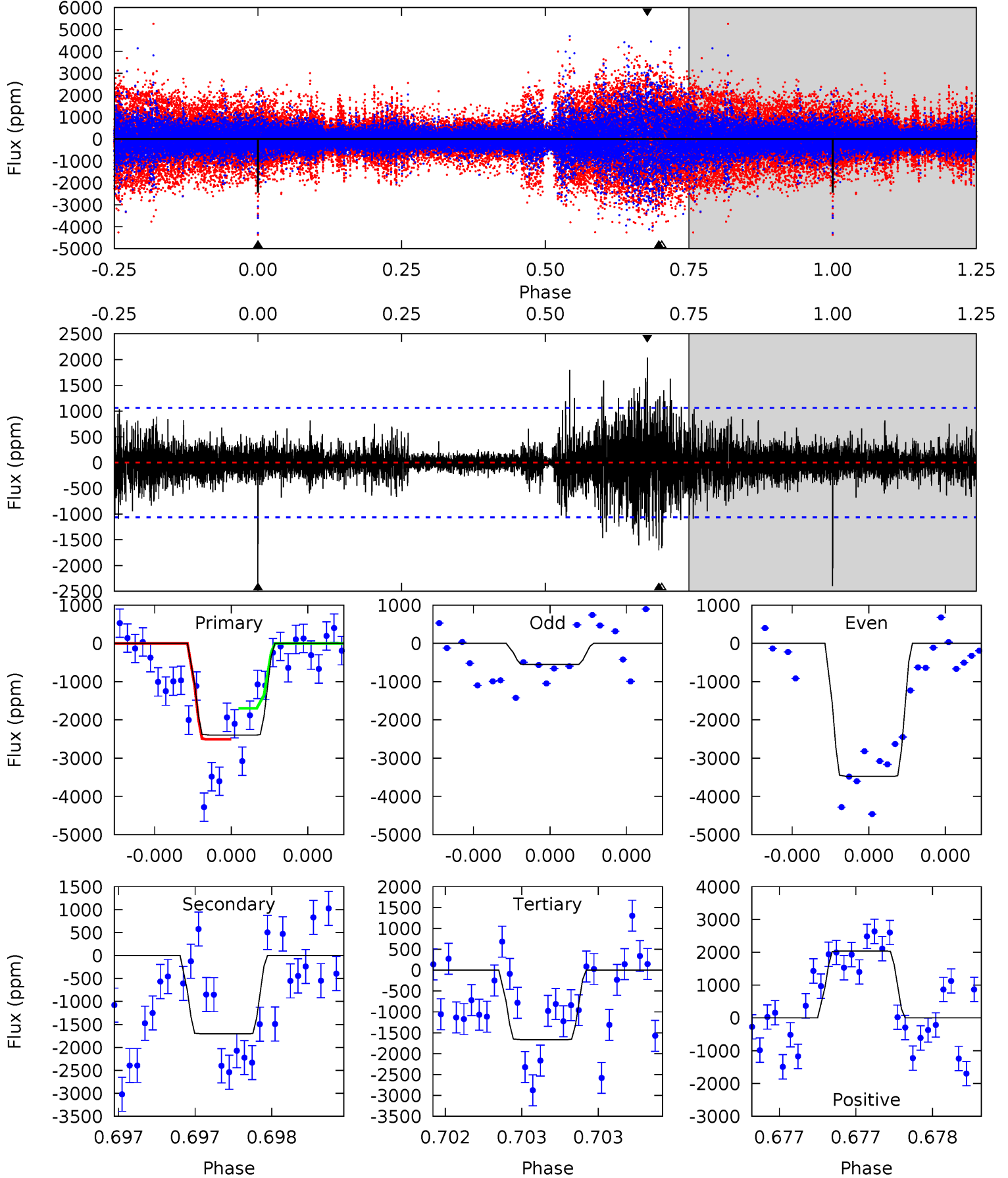
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

010403036-03, P = 393.114450 Days, E = 307.806237 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
12.7	9.05	8.83	10.8	5.63	3.57	1.42	3.89	1.90	0.22	-1.76	7.19	0.90	0.46	1.91



### Stellar Parameters For KIC 010403036

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4494^{+75}_{-54}$	$1.888^{+0.027}_{-0.033}$	$-0.560^{+0.150}_{-0.100}$	$17.867^{+4.475}_{-0.839}$	$0.900^{+0.508}_{-0.053}$	$0.000^{+0.000}_{-0.000}$
	+2%/-1%	+1%/-2%	+27%/-18%	+25%/-5%	+56%/-6%	+9%/-23%
Source	PHO55	AST55	SPE55	DSEP		

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

### Secondary Eclipse Parameters for KIC 010403036-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$0 \pm 1000000$	$139.44^{+146.09}_{-103.08}$	$1164^{+29}_{-21}$	$-3928^{+16347}_{-8757}$	$-72.185^{+5345.808}_{-5825.324}$
Alt.	$-1706 \pm 189$	$188.95^{+161.10}_{-129.95}$	$1164^{+28}_{-21}$	$3368^{+1758}_{-565}$	$28^{+258}_{-20}$

$T_{\text{max}}$  = 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

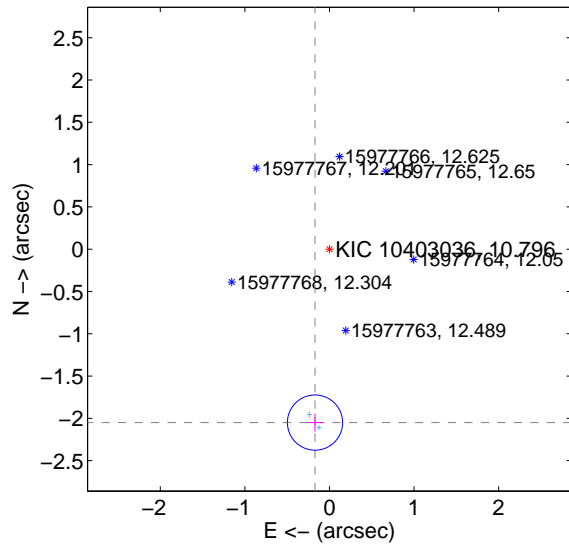
Supplemental centroid analysis for 010403036-03. **Kepler magnitude: 10.80.** Transit SNR -1.00

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

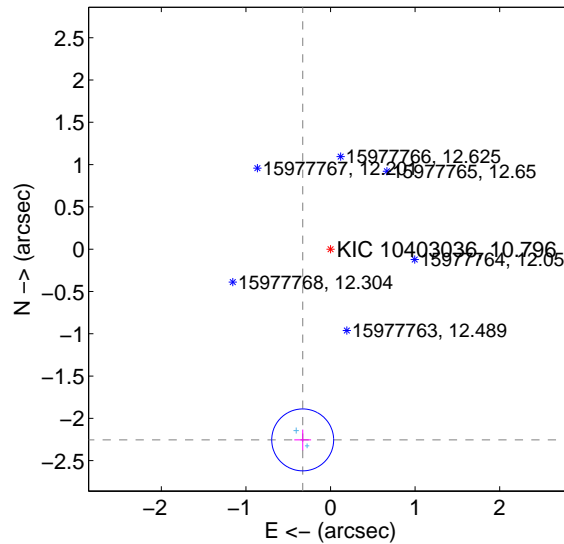
The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>2.057 \pm 0.109</math></b>	<b>18.91</b>	$0.171 \pm 0.093$	$-2.050 \pm 0.109$
PRF-fit source offset from KIC position	<b><math>2.279 \pm 0.122</math></b>	<b>18.68</b>	$0.329 \pm 0.100$	$-2.255 \pm 0.122$
photometric centroid source offset	<b><math>0.81 \pm 0.09</math></b>	<b>8.61</b>	$0.49 \pm 0.06$	$-0.64 \pm 0.11$

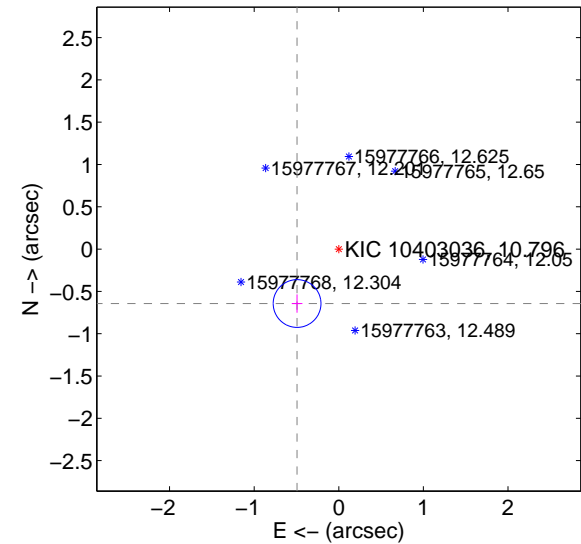
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

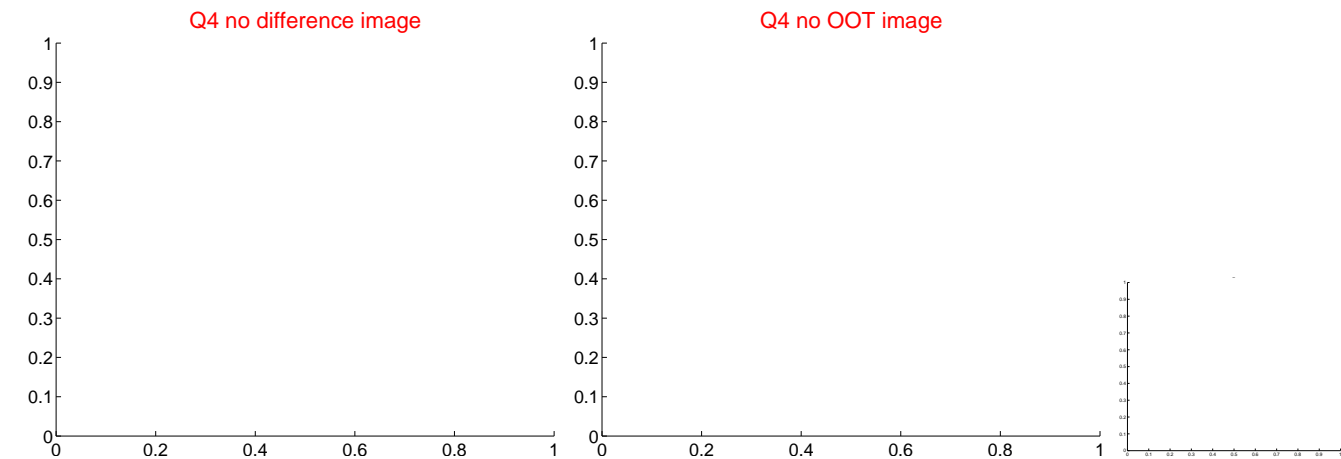
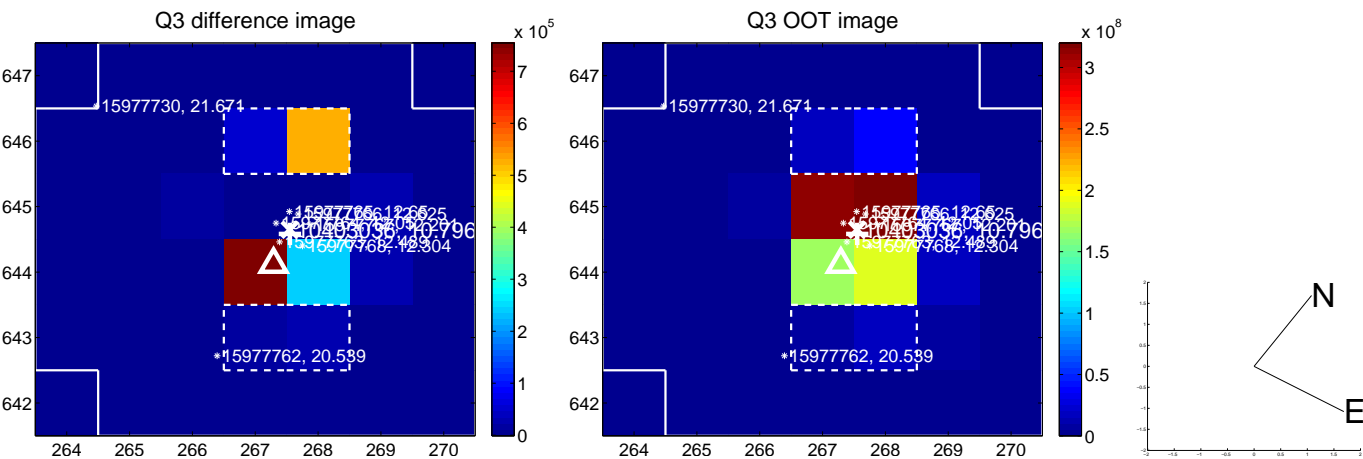
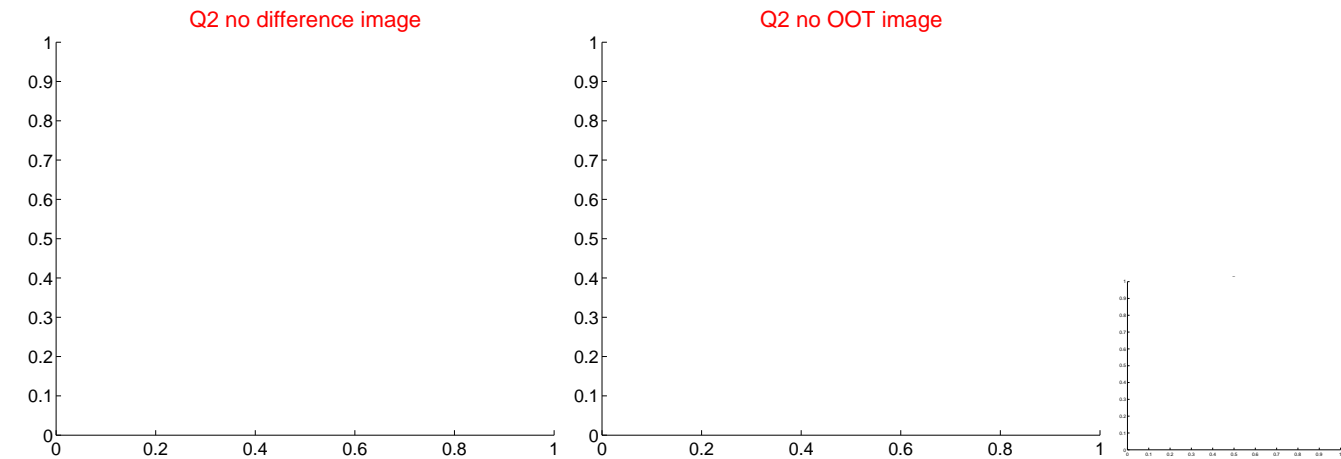
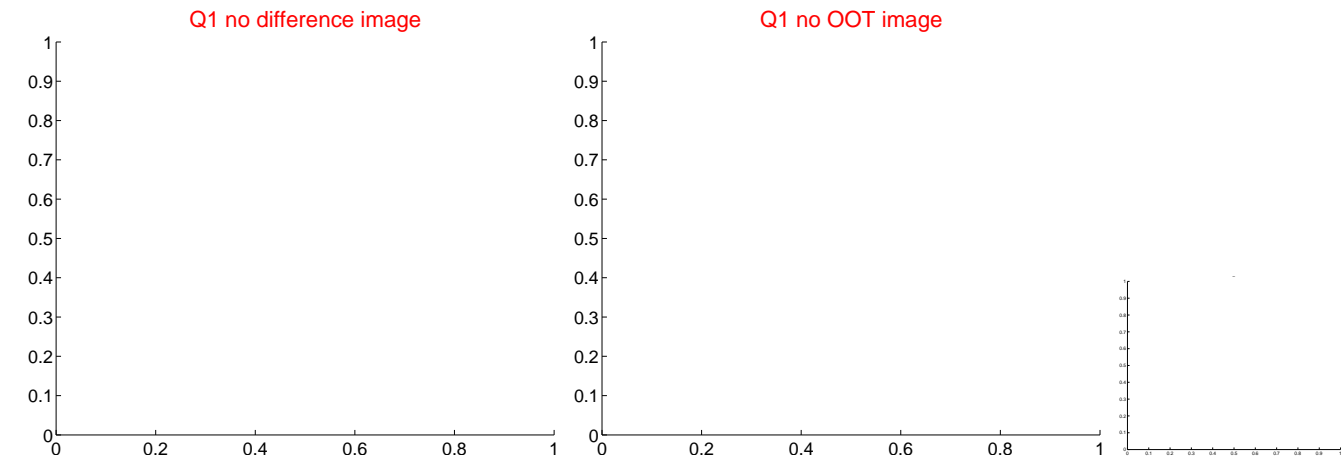


offset from photometric centroids

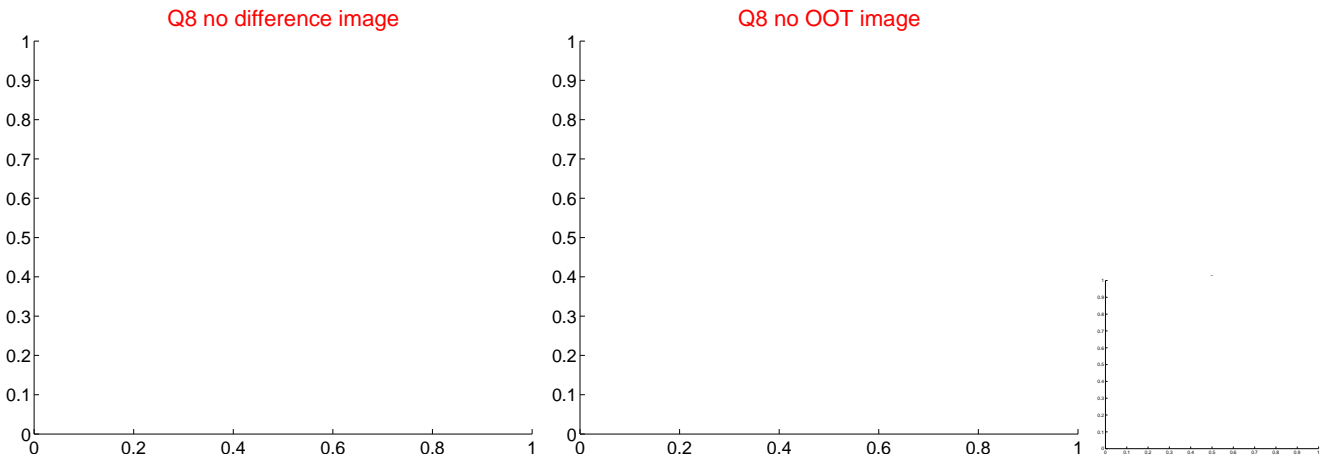
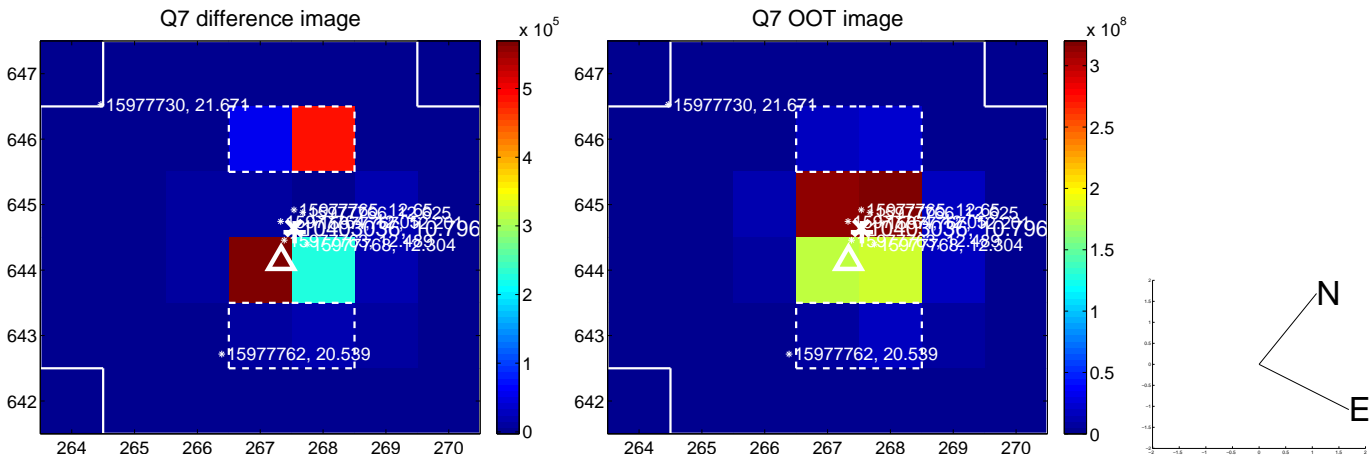
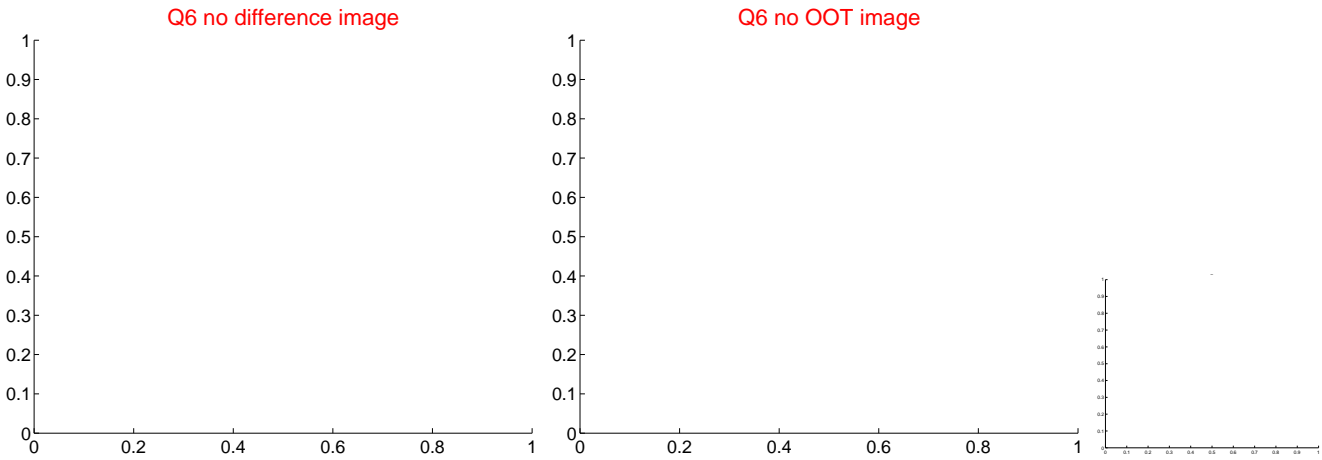
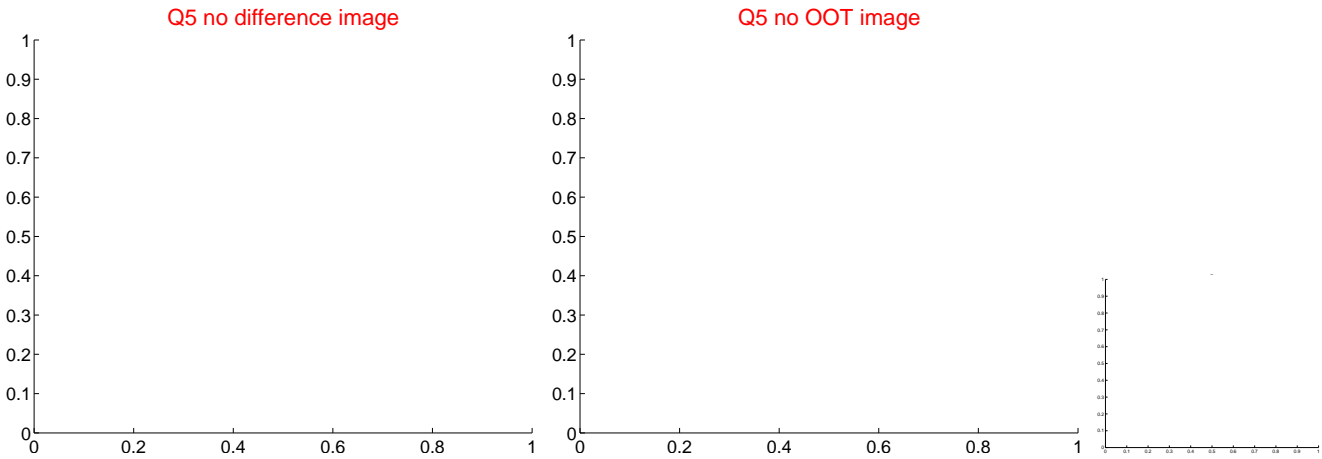


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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





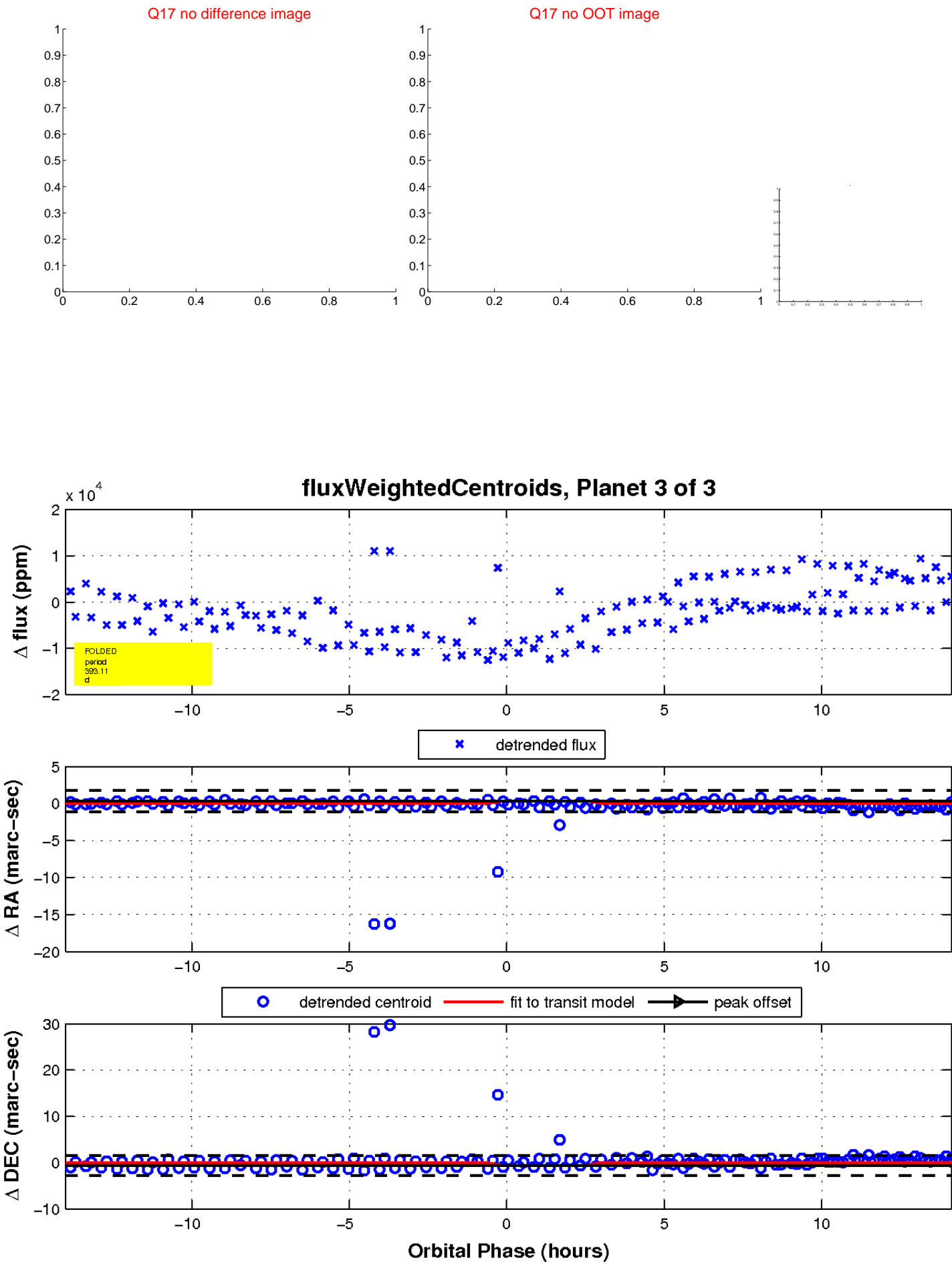
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

