

# KIC 007024511

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007024511-01	OBS	No	396.928618	175.643863	13486.1	7.938	37.4	32.9	0.64	4679	13.70	0.21
007024511-02	OBS	No	396.772187	506.733829	4534.1	7.556	23.7	11.3	0.64	4679	4.50	0.21
007024511-03	OBS	No	330.776770	241.798287	6466.4	6.560	17.8	17.2	0.64	4679	5.91	0.27

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007024511-01	OBS	FP	0.00	0	1	1	1	DEEP_V_SHAPED—HAS_SEC_TCE—PERIOD_ALIAS_DV—PERIOD_ALIAS_ALT—CENT_FEW_DIFFS—HALO_GHOST—EPHEM_MATCH
007024511-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_FEW_DIFFS
007024511-03	OBS	FP	0.00	1	0	1	1	INDIV_TRANS_MARSHALL—CENT_RESOLVED_OFFSET—EPHEM_MATCH

**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 007024511-01

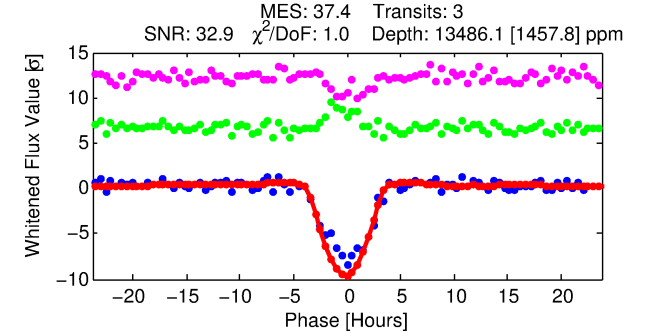
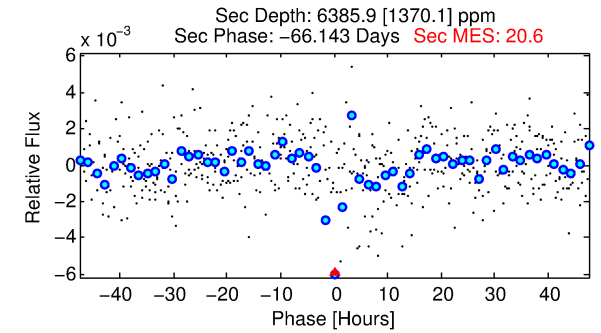
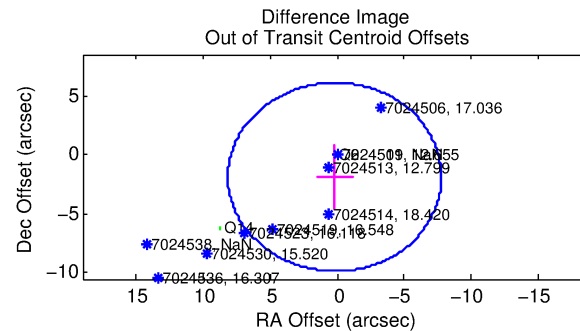
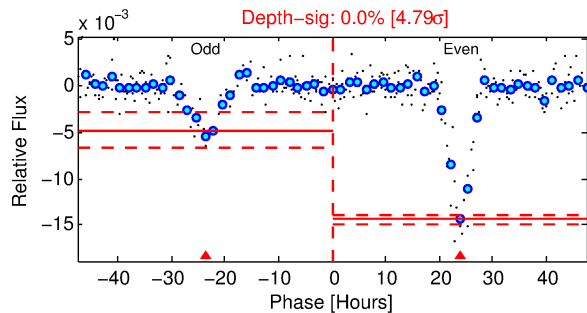
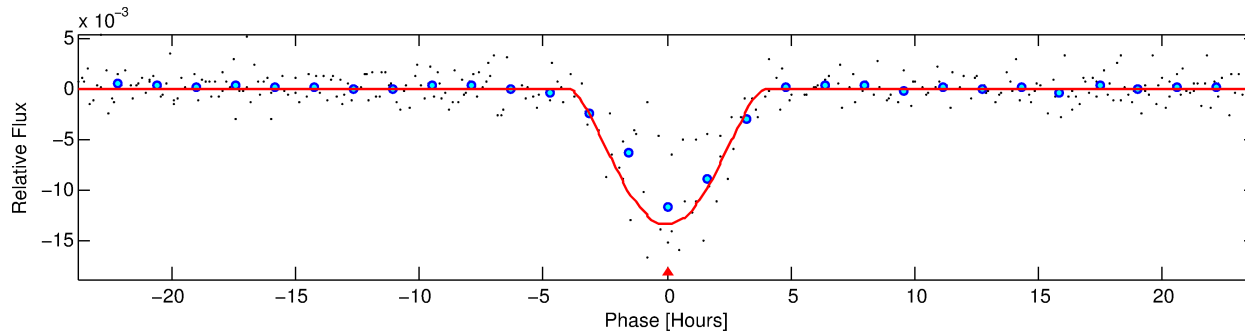
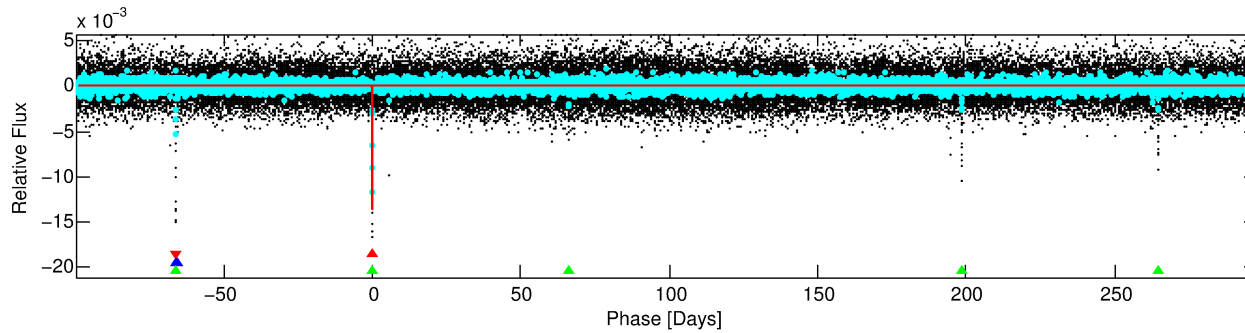
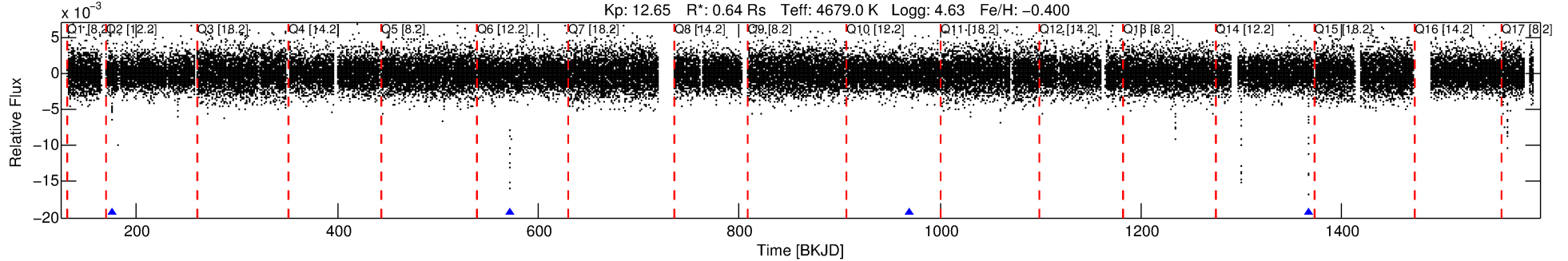
TCE (1)	KIC	Parent (2)	Parent KIC	P <sub>1</sub> :P <sub>2</sub>	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	m <sub>2</sub>	m <sub>1</sub>	D <sub>2</sub> /D <sub>1</sub>	Mechanism	Flag	$\sigma_P$	$\sigma_T$
007024511-01	7024511	007024530-01	7024530	6:1	12.7	1	4	15.52	12.65	9.75	Direct-PRF	0	0.66	0.11

**Notes:** P<sub>1</sub>:P<sub>2</sub> is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column. m<sub>2</sub> and m<sub>1</sub> are the magnitudes of the parent and child. D<sub>2</sub>/D<sub>1</sub> is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

KIC: 7024511 Candidate: 1 of 3 Period: 396.929 d  
KOI: K00311 Corr: No Ephemeris Match

Kp: 12.65 R\*: 0.64 Rs Teff: 4679.0 K Logg: 4.63 Fe/H: -0.400



## DV Fit Results:

Period = 396.92862 [0.00191] d  
Epoch = 175.6439 [0.0035] BKJD  
Rp/R\* = 0.1952 [0.3545]  
a/R\* = 250.73 [51.48]  
b = 1.00 [0.50]  
Seff = 0.21 [0.04]  
Teq = 173 [7] K  
Rp = 13.70 [24.90] Re  
a = 0.9106 [0.0634] AU  
Ag = 15523.60 [56496.27] [0.27σ]  
Teff = 2994 [2725] K [1.03σ]

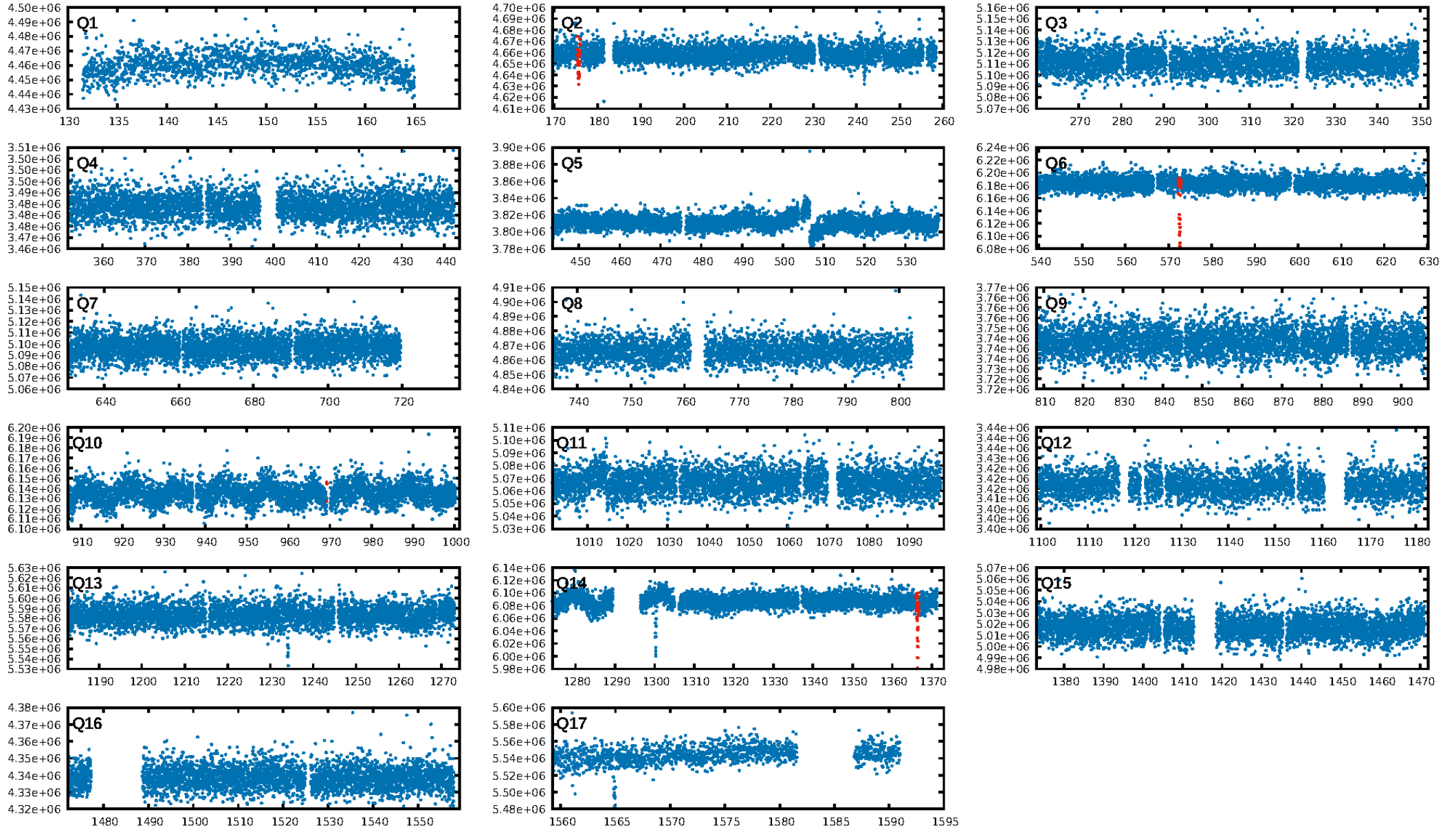
## DV Diagnostic Results:

ShortPeriod-sig: 26.8% [0.34σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.2%  
ModelChiSquareGof-sig: 97.5%  
Bootstrap-pfa: 3.09e-160  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -0.2201  
Centroid-sig: N/A  
Centroid-so: 13.191 arcsec [67.74σ]  
OotOffset-rm: 1.885 arcsec [0.71σ]  
KicOffset-rm: 12.799 arcsec [189.97σ]  
OotOffset-st: 3/0/0/0 [3]  
KicOffset-st: 3/0/0/0 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 0.67 [2/3]

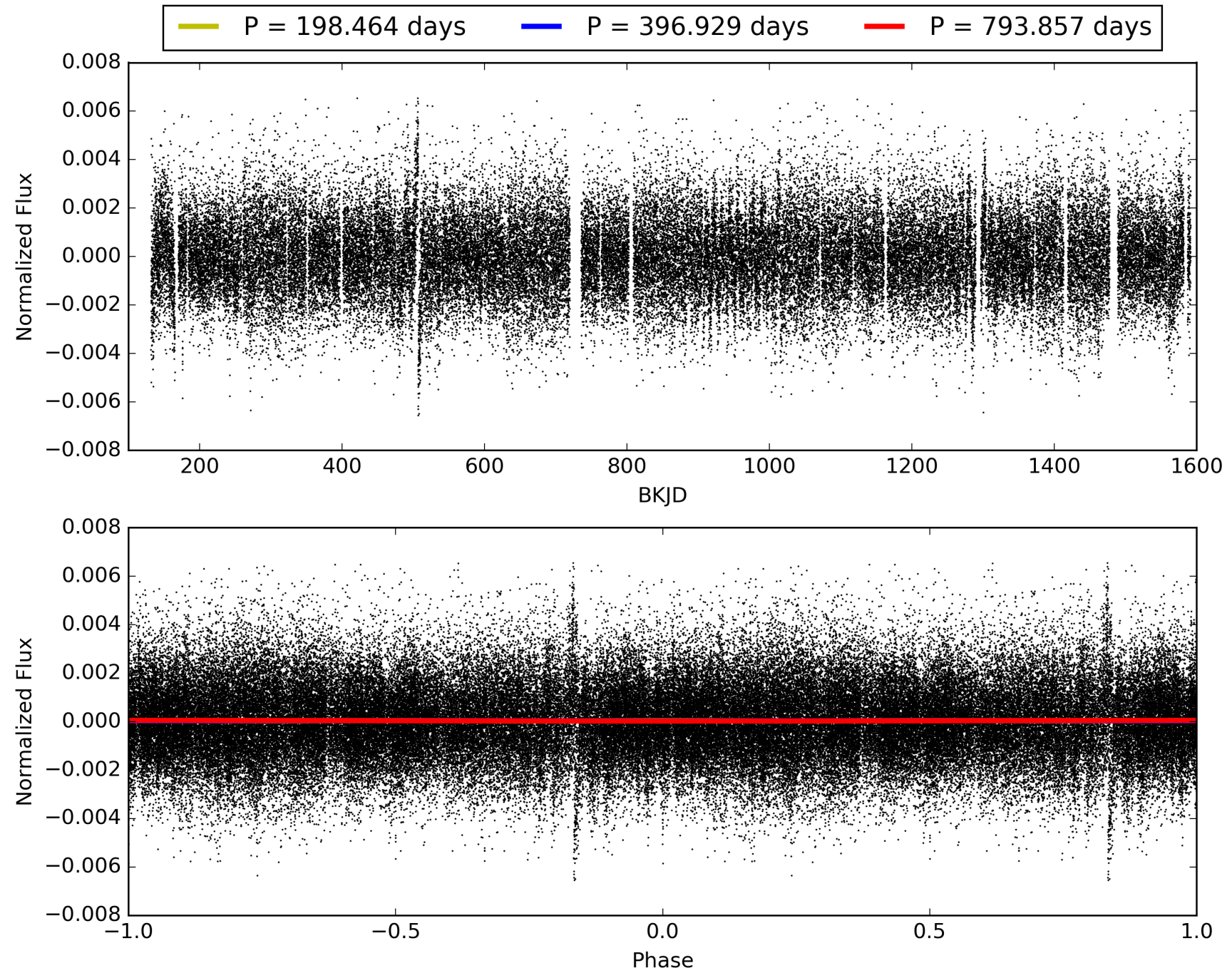
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 00:11:36 Z

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

# TCE 007024511-01, PDC Light Curves

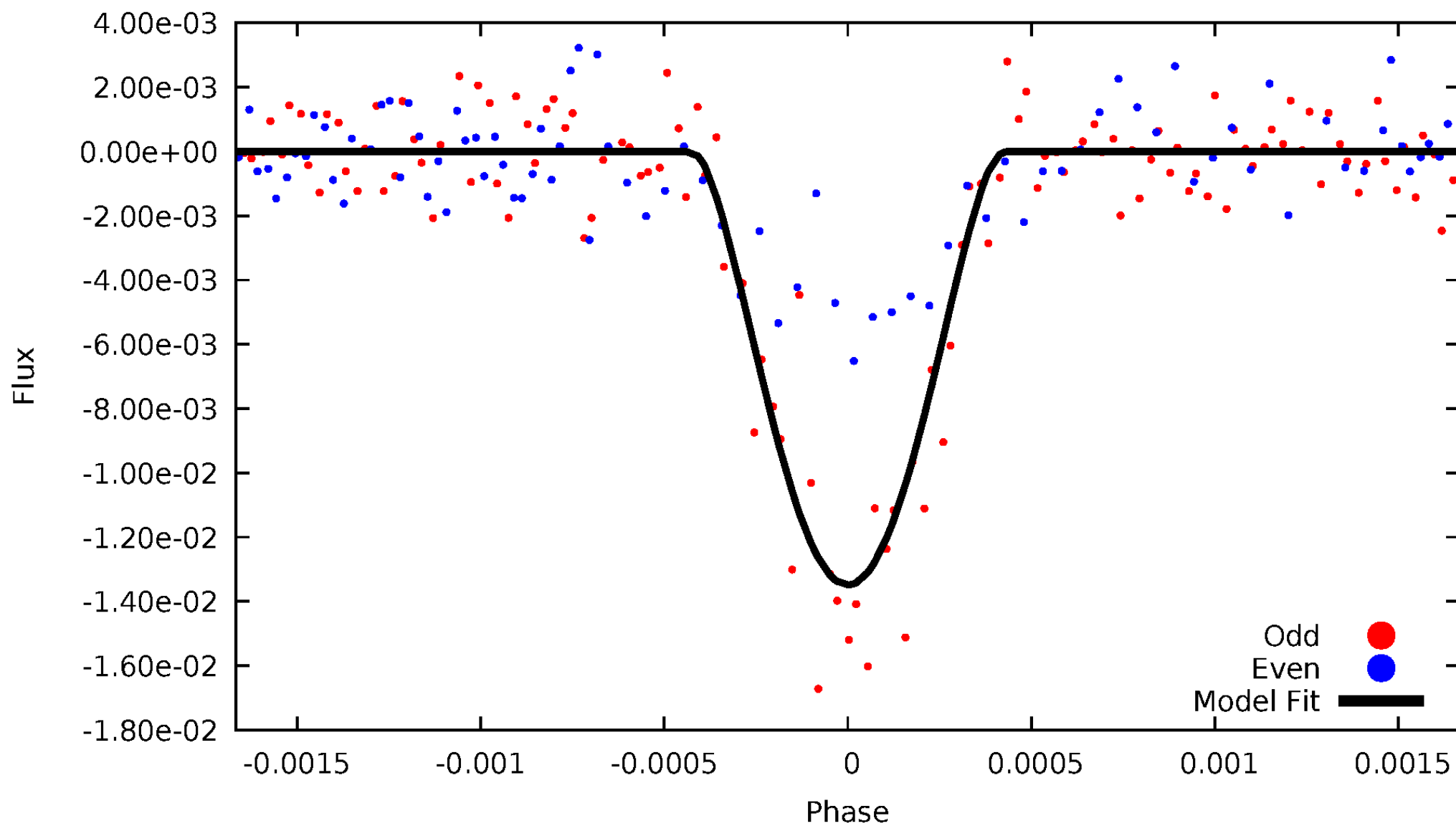


TCE 007024511-01



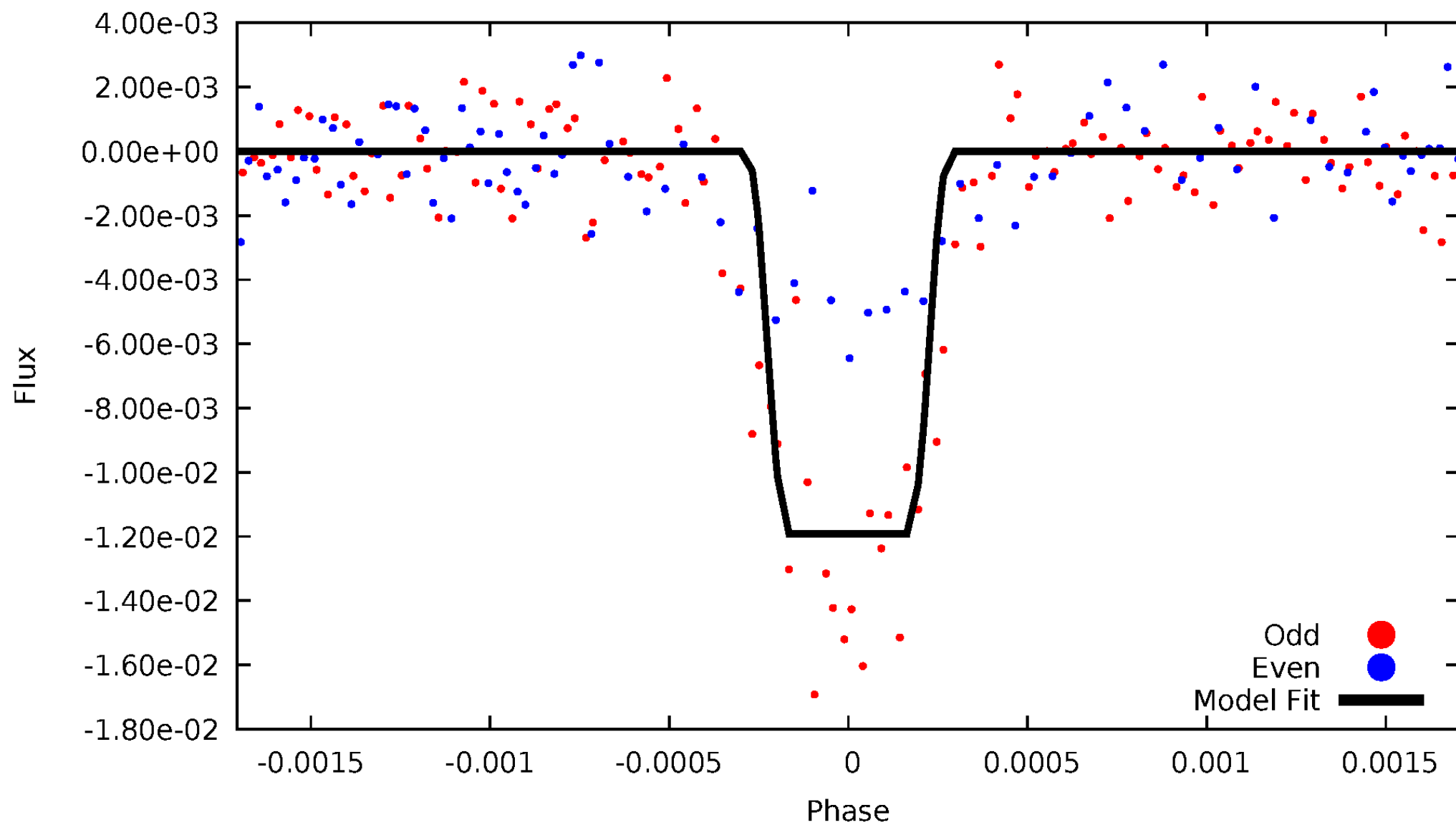
# DV Odd/Even

TCE 007024511-01



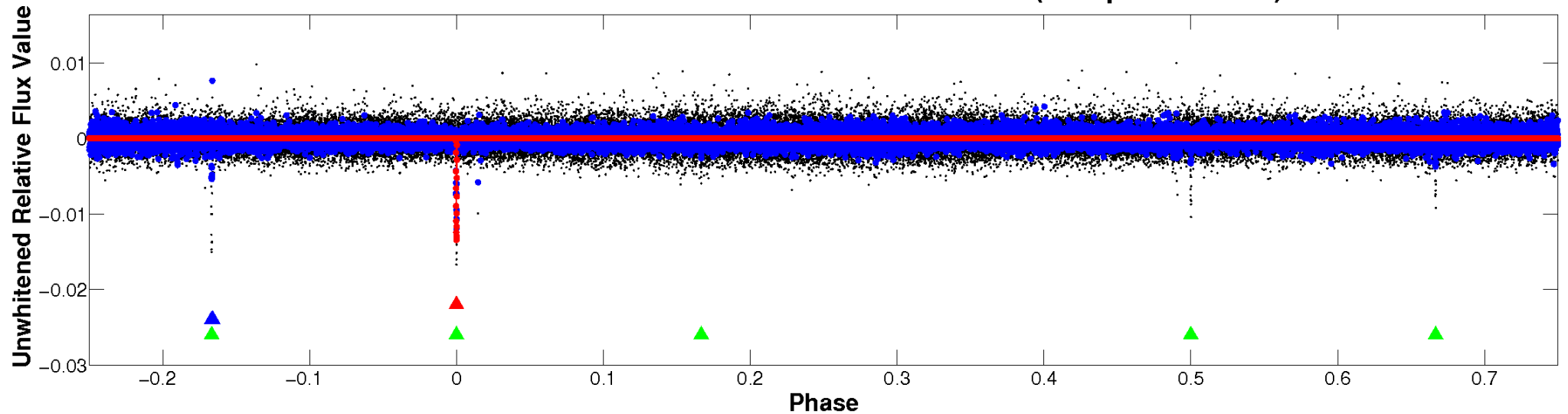
# ALT Odd/Even

TCE 007024511-01

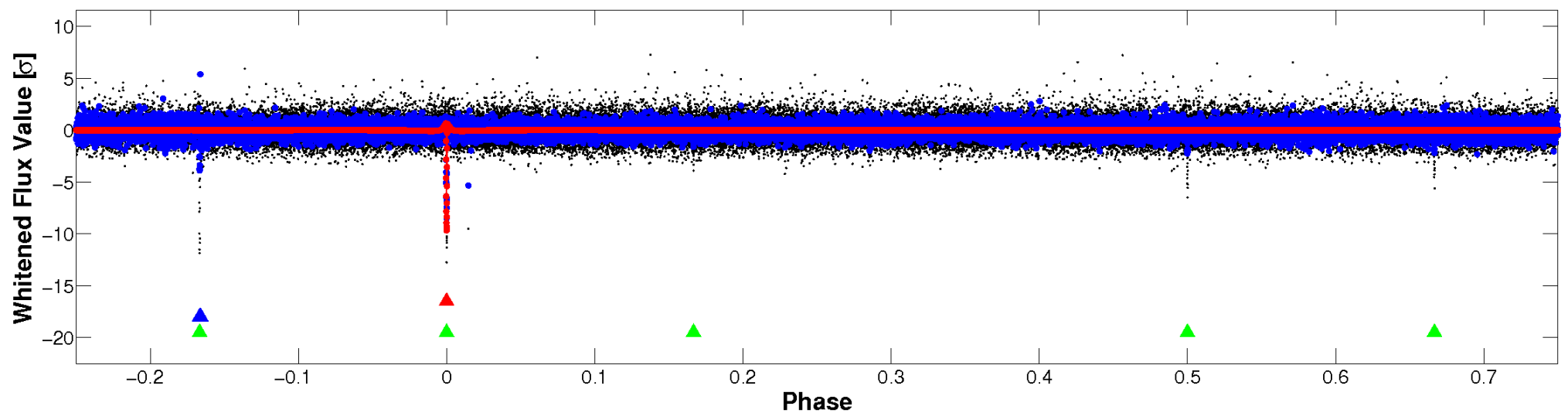


# Non-Whitened Vs. Whitened Light Curve

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



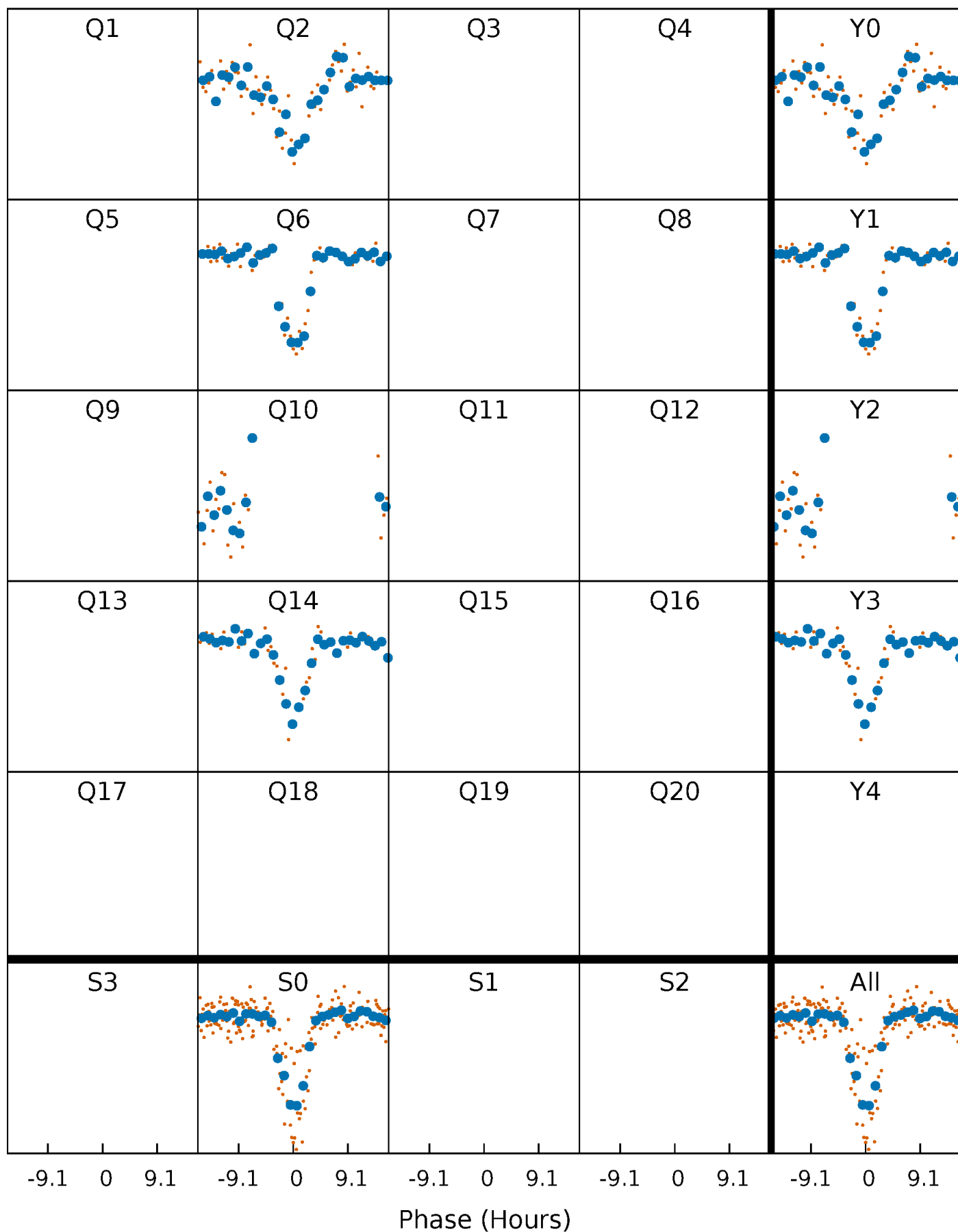
Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

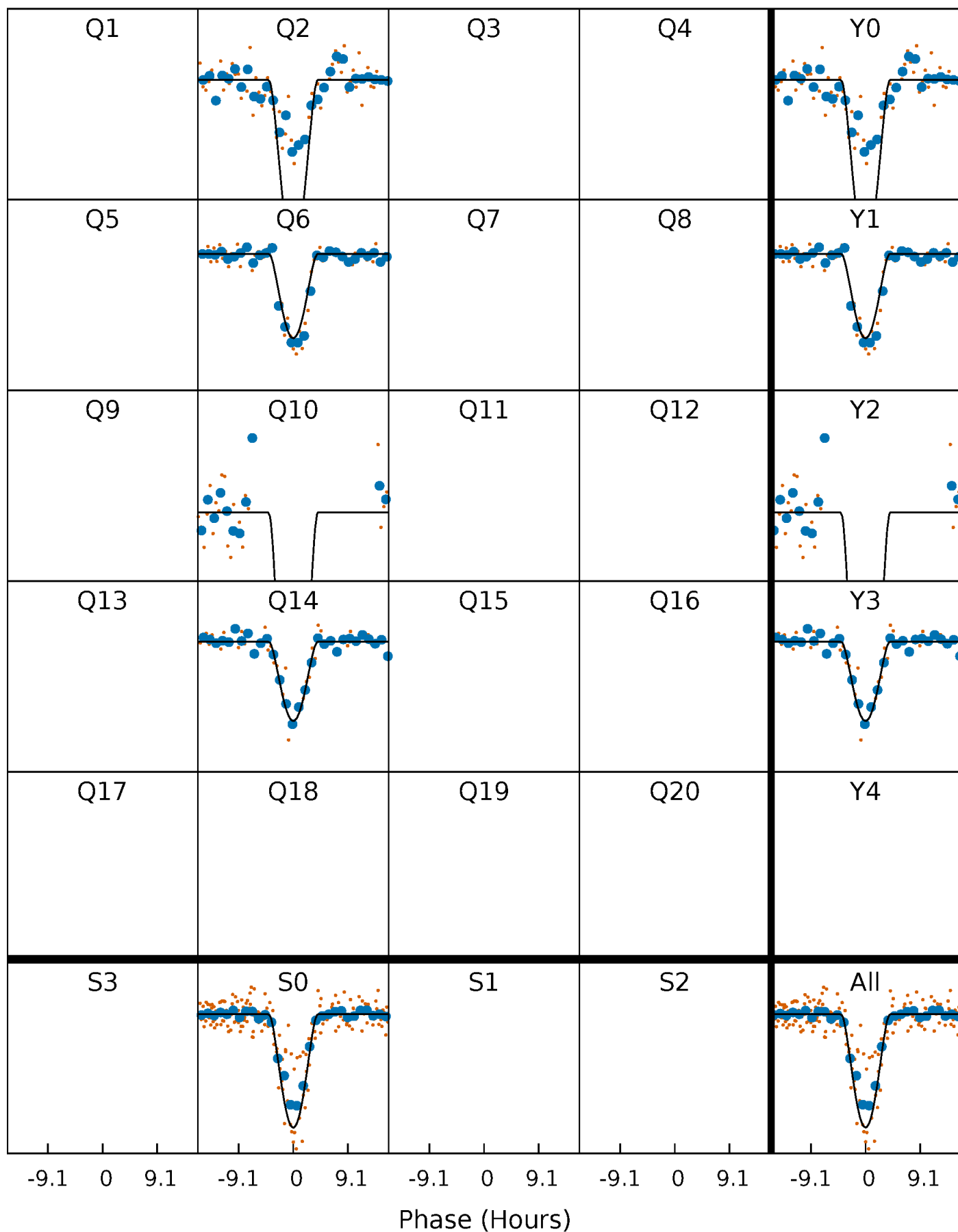
TCE 007024511-01 P=396.928617 Days  $T_0=175.643864$  (BKJD)





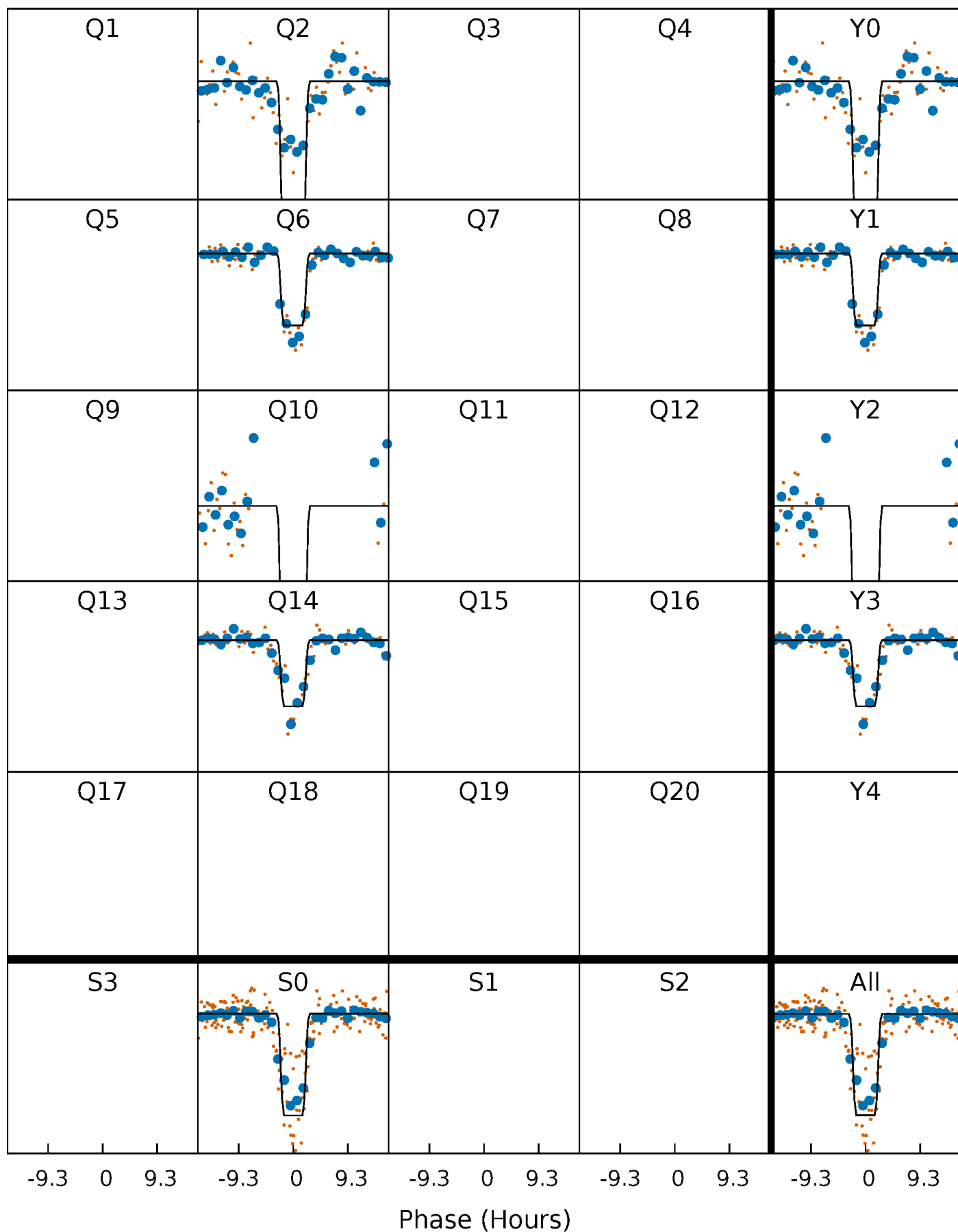
# DV Quarter-Phased Transit Curves

TCE 007024511-01 P=396.928617 Days  $T_0=175.643864$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

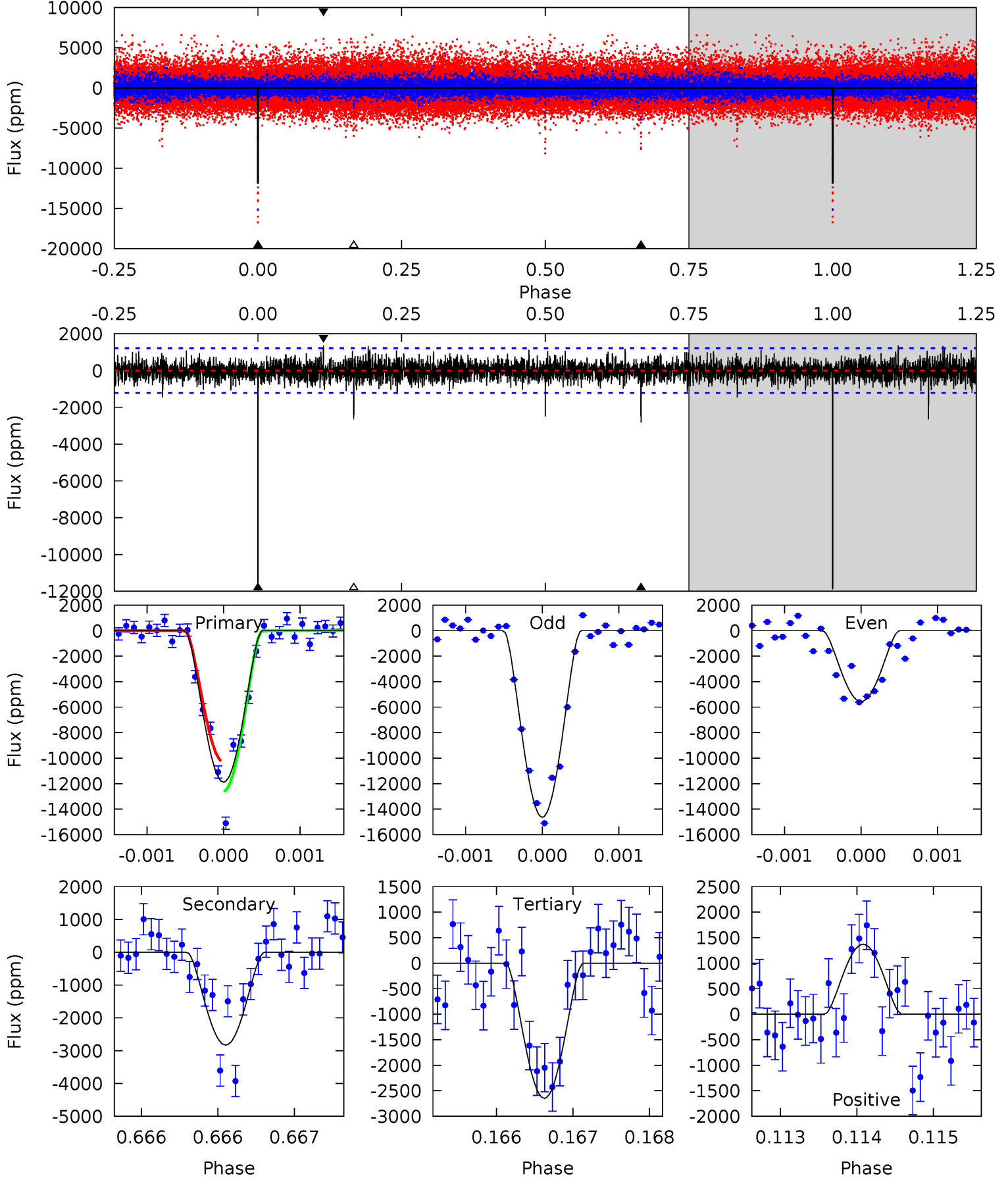
TCE 007024511-01 P=396.928714 Days  $T_0=175.649191$  (BKJD)



# DV Model-Shift Uniqueness Test

007024511-01, P = 396.928617 Days, E = 175.643864 Days

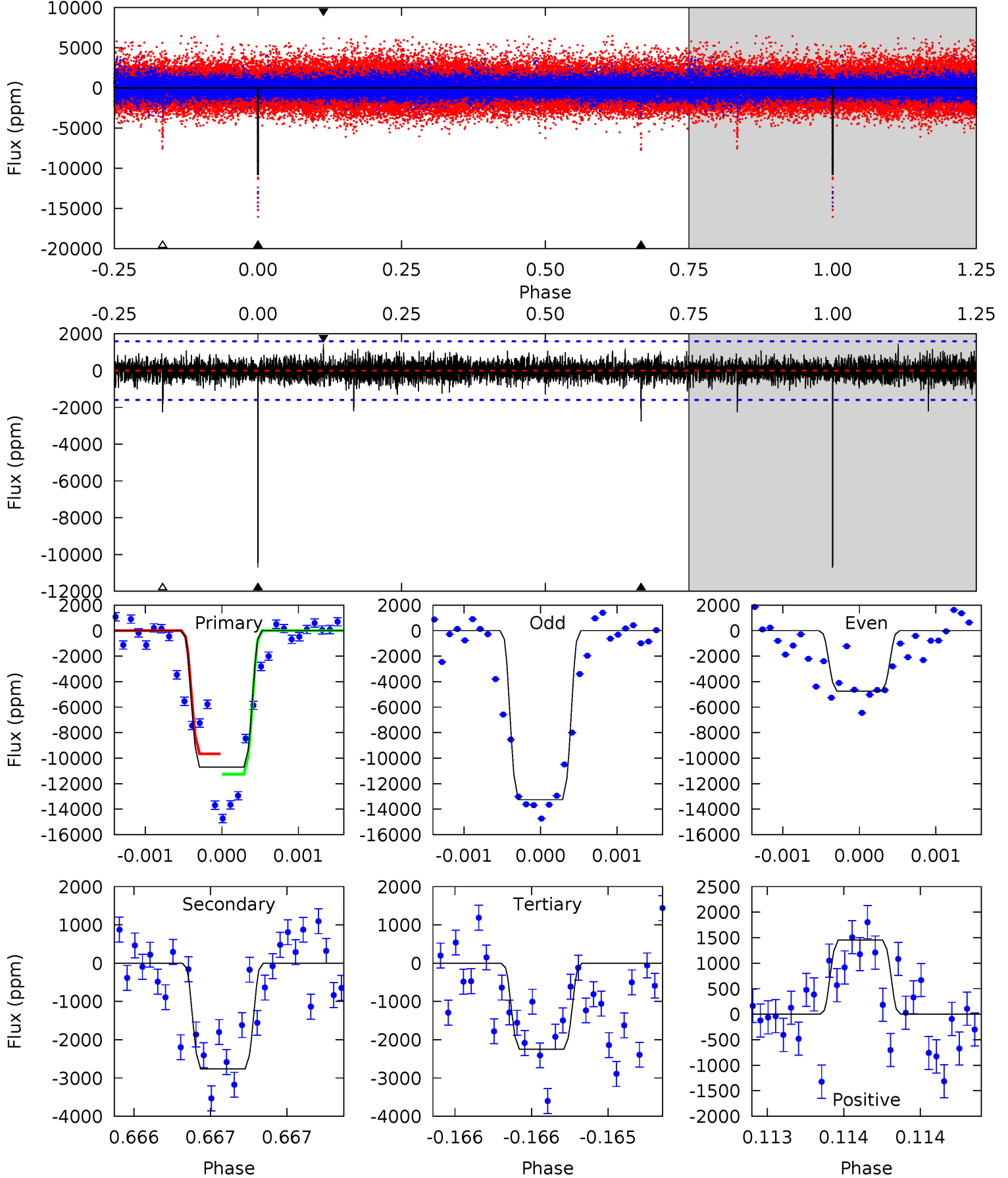
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
53.5	12.7	11.9	6.17	5.48	3.34	1.60	41.6	47.3	0.82	6.57	19.9	0.86	0.10	5.28



# Alt Model-Shift Uniqueness Test

007024511-01,  $P = 396.928714$  Days,  $E = 175.649191$  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
37.3	9.63	7.84	5.07	5.55	3.45	1.16	29.4	32.2	1.79	4.56	15.2	0.86	0.12	2.84



### Stellar Parameters For KIC 007024511

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4679^{+167}_{-167}$	$4.627^{+0.048}_{-0.032}$	$-0.400^{+0.300}_{-0.300}$	$0.643^{+0.057}_{-0.057}$	$0.638^{+0.076}_{-0.044}$	$3.388^{+0.761}_{-0.518}$
	+4%/-4%	+1%/-1%	+75%/-75%	+9%/-9%	+12%/-7%	+22%/-15%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 007024511-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-2830 \pm 222$	$23.80^{+20.85}_{-15.77}$	$242^{+9}_{-9}$	$2594^{+942}_{-349}$	$2258^{+17587}_{-1615}$
Alt.	$-2766 \pm 287$	$19.17^{+19.67}_{-12.82}$	$241^{+10}_{-10}$	$2758^{+1048}_{-451}$	$3529^{+26926}_{-2711}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

$T_{obs}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{obs}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$

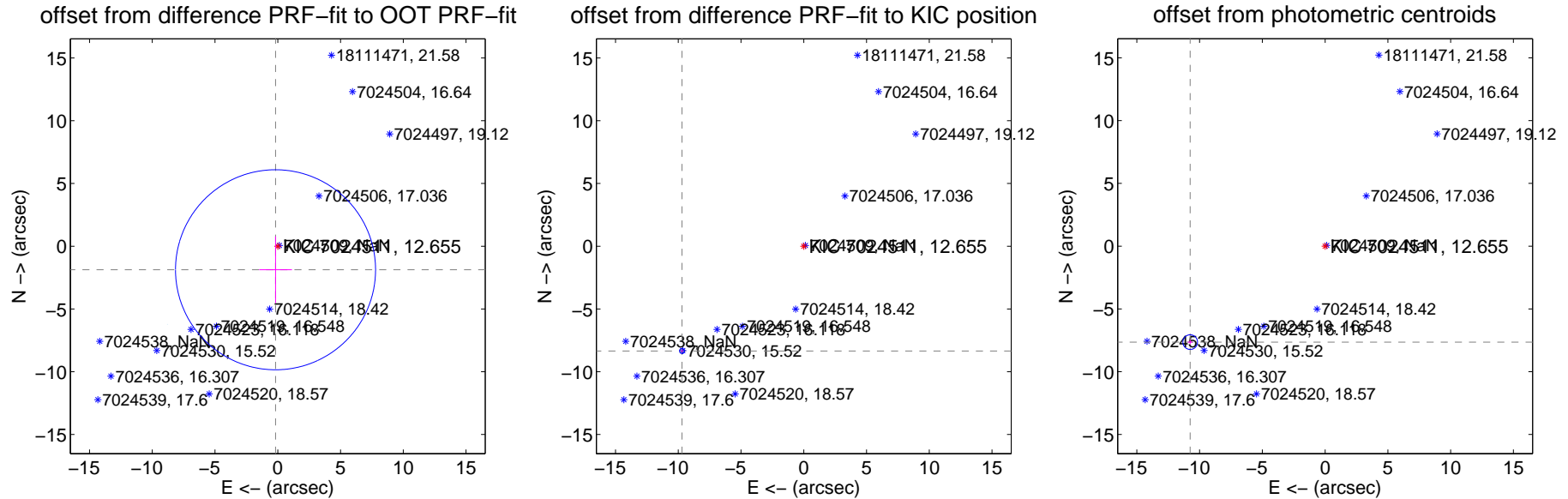
## DV Centroid Data

Supplemental centroid analysis for 007024511-01. Kepler magnitude: 12.65. Transit SNR 32.86

There are 3 quarters with good PRF difference image offsets

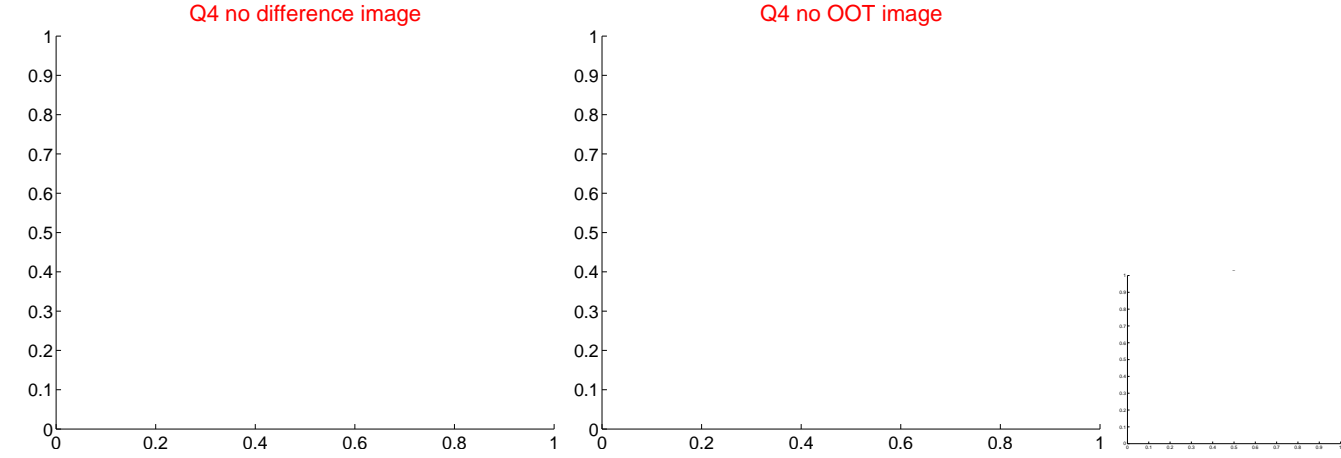
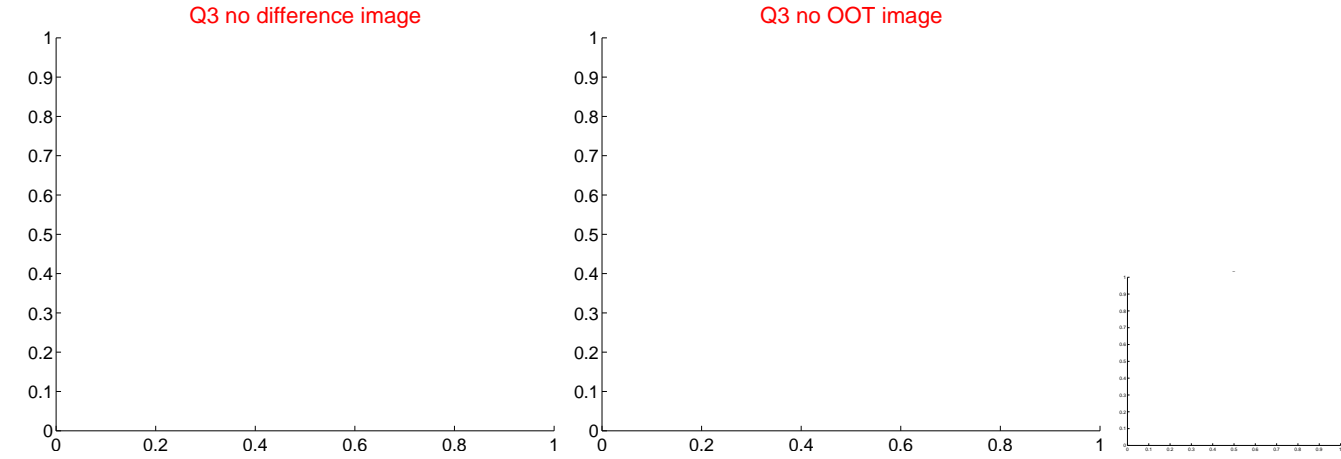
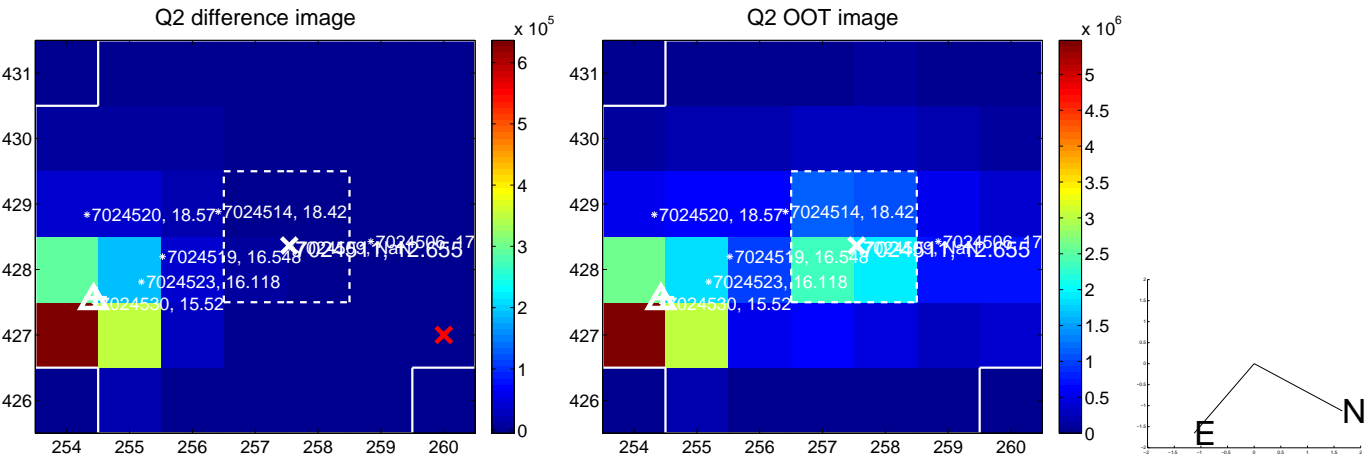
The OOT PRF centroid is offset from the target star catalog position by about 2.29 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.885 \pm 2.657$	0.71	$0.178 \pm 1.305$	$-1.876 \pm 2.666$
PRF-fit source offset from KIC position	<b>12.799 <math>\pm</math> 0.067</b>	<b>189.97</b>	$9.701 \pm 0.067$	$-8.349 \pm 0.068$
photometric centroid source offset	<b>13.19 <math>\pm</math> 0.19</b>	<b>67.74</b>	$10.75 \pm 0.20$	$-7.64 \pm 0.18$



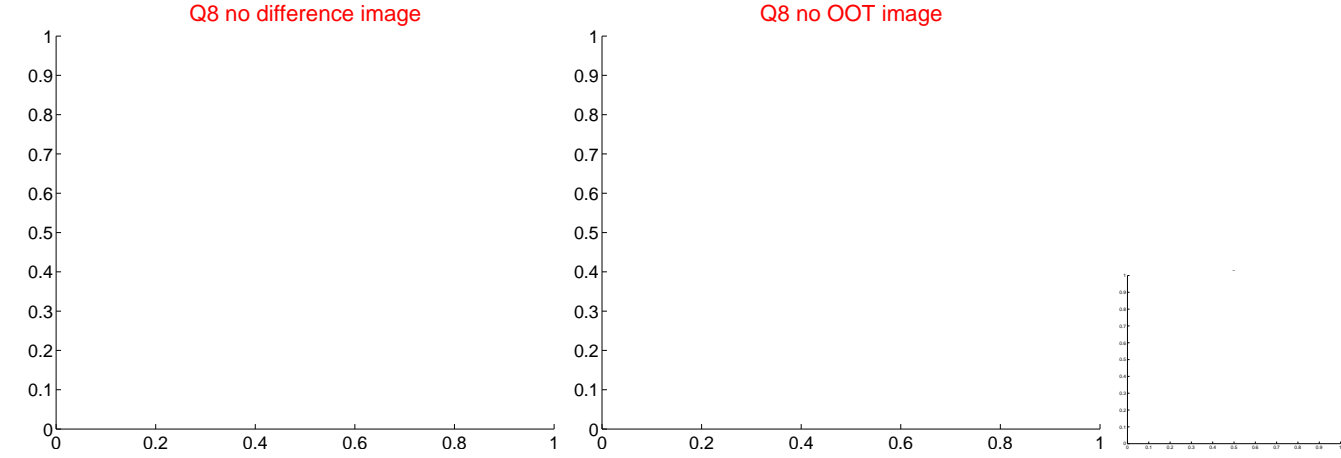
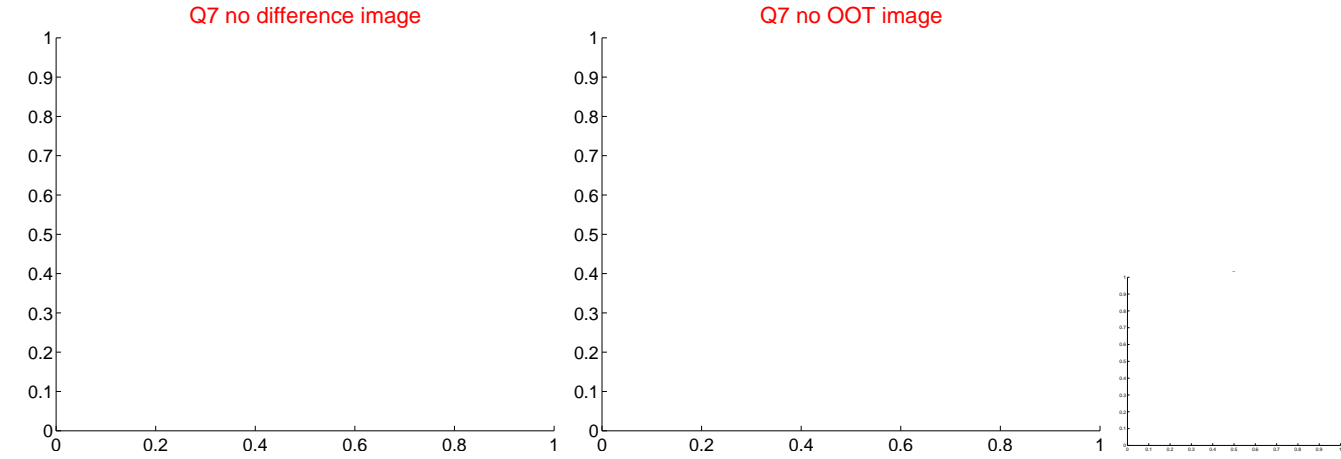
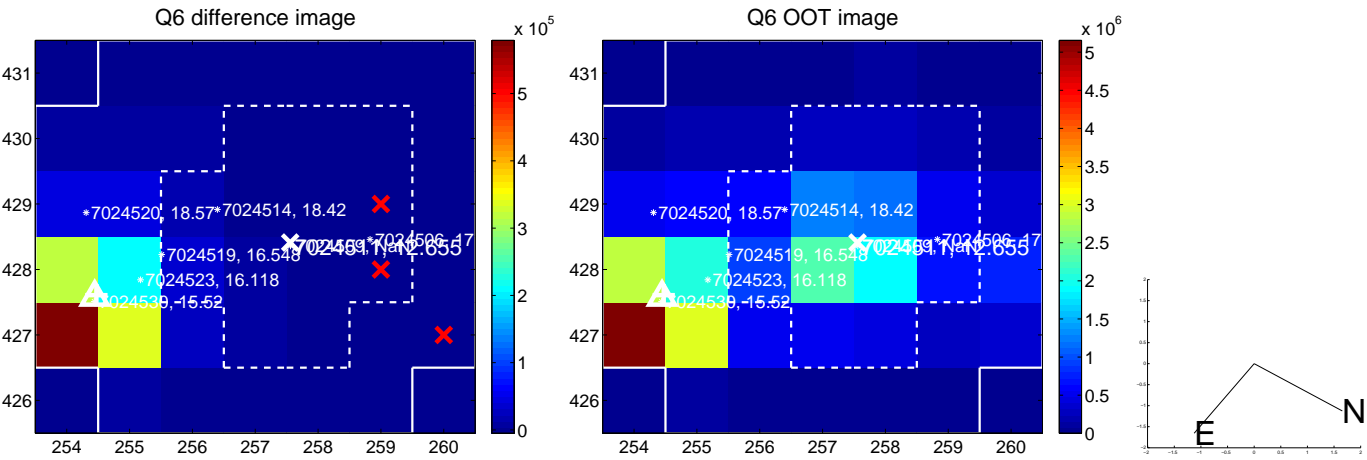
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



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

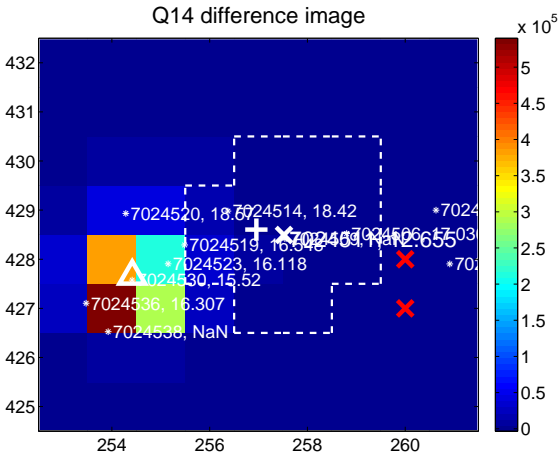
Q13 no difference image



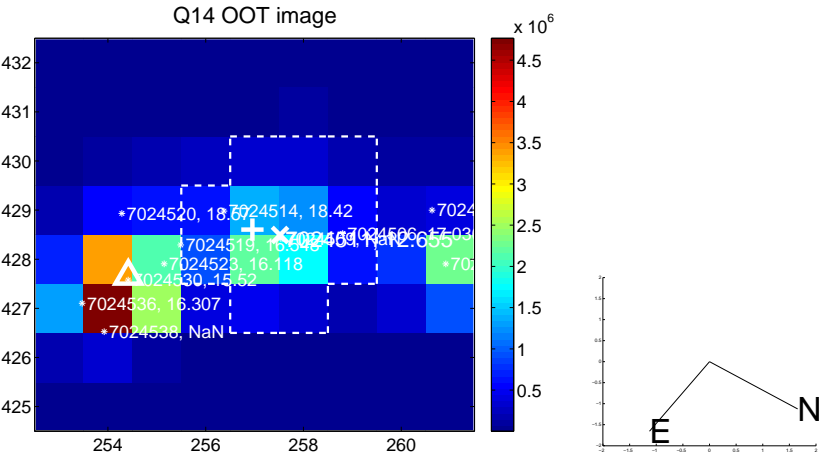
Q13 no OOT image



Q14 difference image



Q14 OOT image



Q15 no difference image



Q15 no OOT image



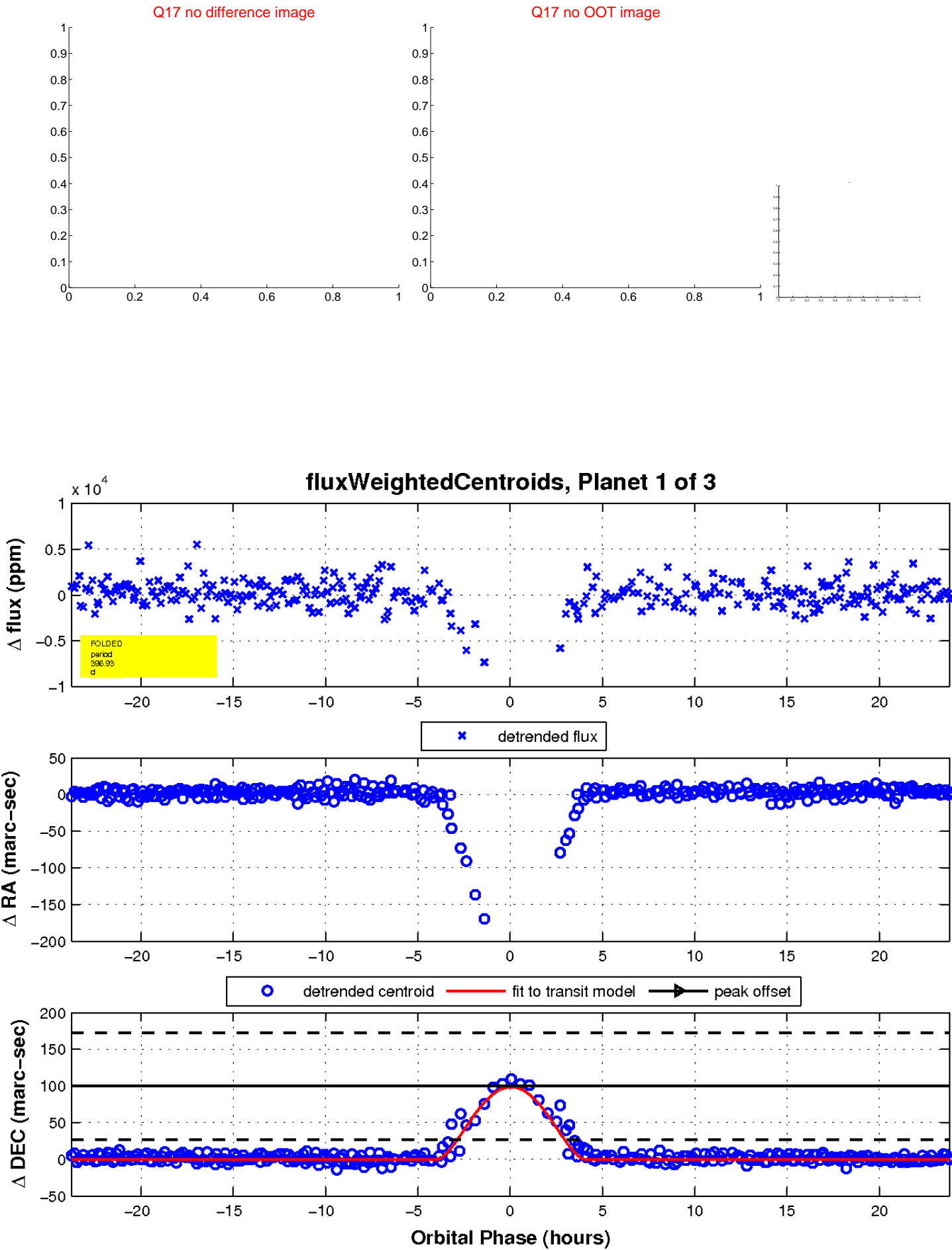
Q16 no difference image



Q16 no OOT image

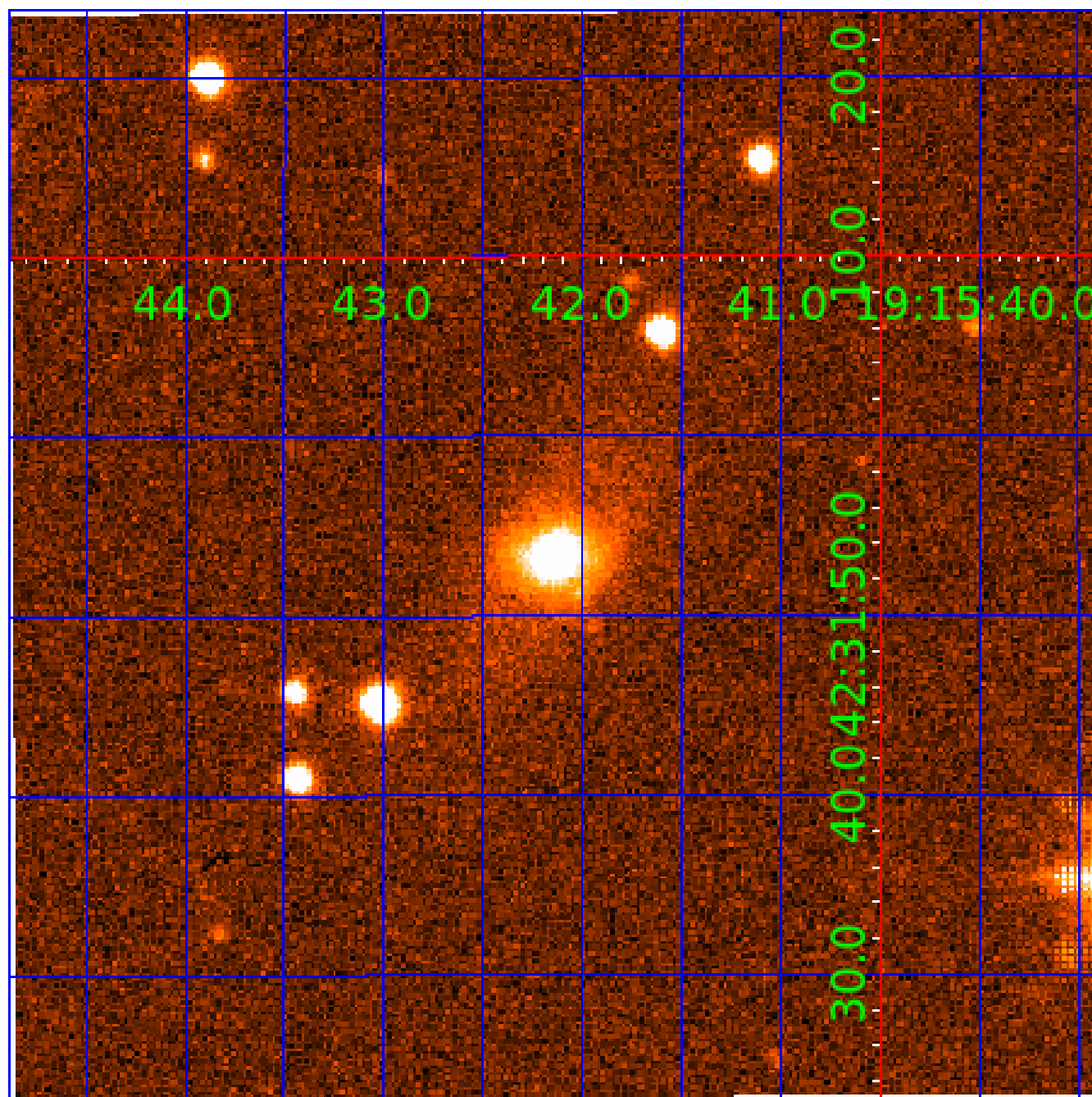


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 007024511

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007024511-01	OBS	No	396.928618	175.643863	13486.1	7.938	37.4	32.9	0.64	4679	13.70	0.21
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007024511-03	OBS	No	330.776770	241.798287	6466.4	6.560	17.8	17.2	0.64	4679	5.91	0.27

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
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007024511-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_FEW_DIFFS
007024511-03	OBS	FP	0.00	1	0	1	1	INDIV_TRANS_MARSHALL—CENT_RESOLVED_OFFSET—EPHEM_MATCH

**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.

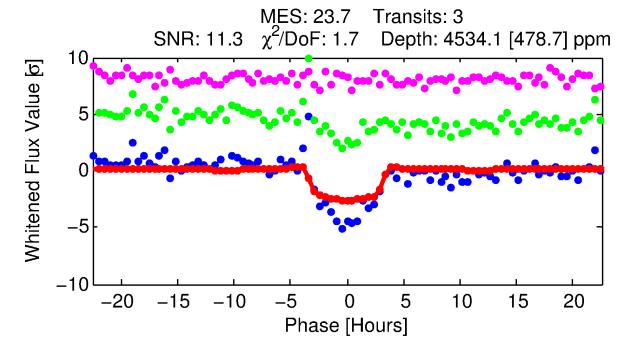
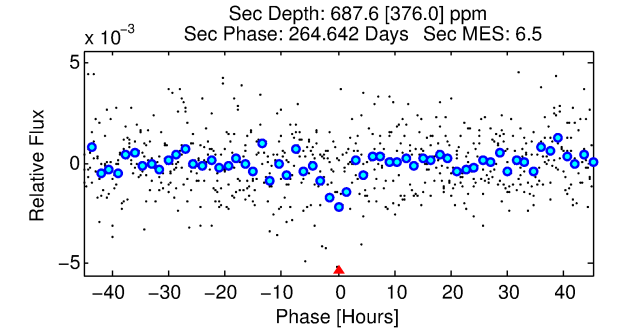
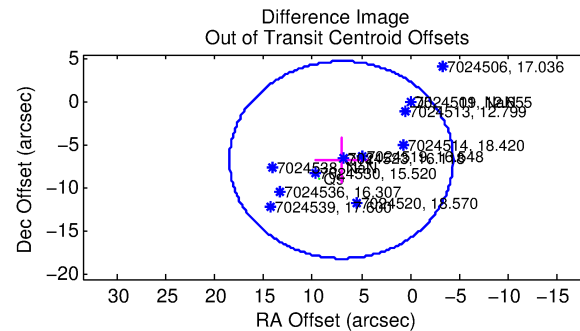
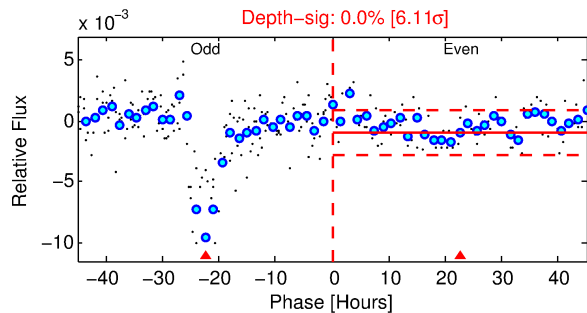
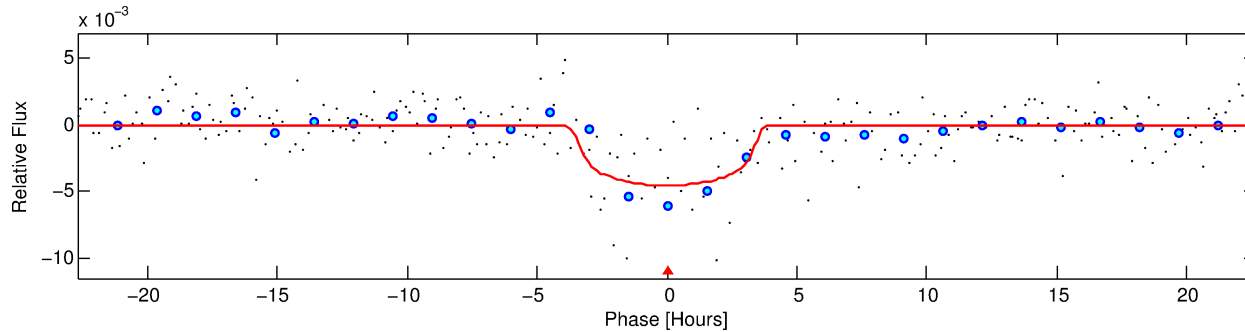
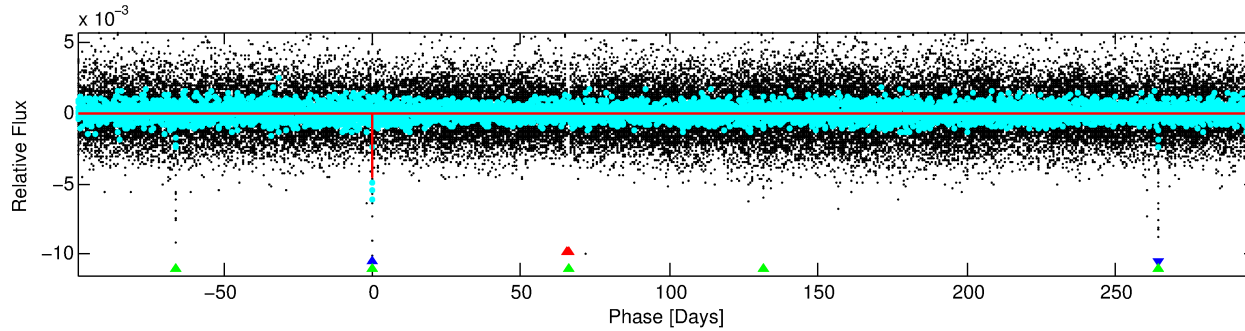
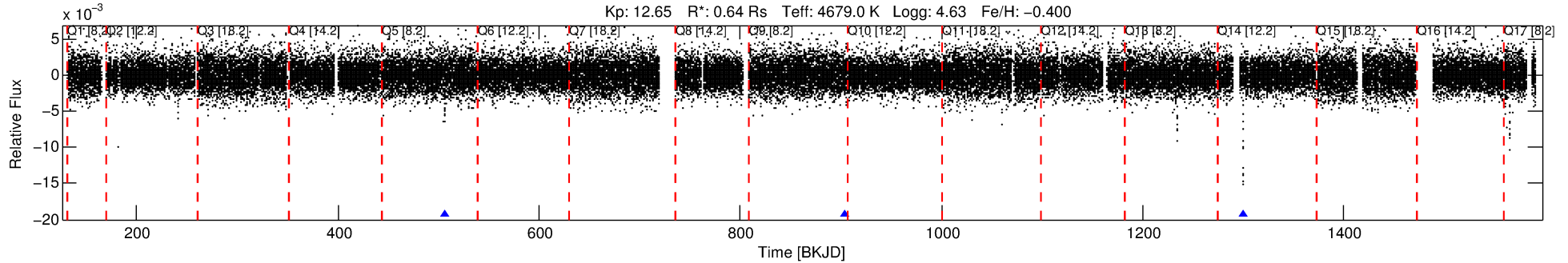
Ephemeris Match Information For 007024511-02

No Significant Match Found

# DV One-Page Summary

KIC: 7024511 Candidate: 2 of 3 Period: 396.772 d  
KOI: K00311 Corr: No Ephemeris Match

Kp: 12.65 R\*: 0.64 Rs T<sub>eff</sub>: 4679.0 K Logg: 4.63 Fe/H: -0.400



## DV Fit Results:

Period = 396.77219 [0.00922] d  
Epoch = 506.7338 [0.0134] BKJD  
Rp/R\* = 0.0641 [0.0221]  
a/R\* = 346.36 [380.43]  
b = 0.62 [1.11]  
Seff = 0.21 [0.04]  
Teq = 173 [7] K  
Rp = 4.50 [1.60] Re  
a = 0.9103 [0.0634] AU  
Ag = 15510.44 [13744.14] [1.13σ]  
Teff = 2993 [668] K [4.2σ]

## DV Diagnostic Results:

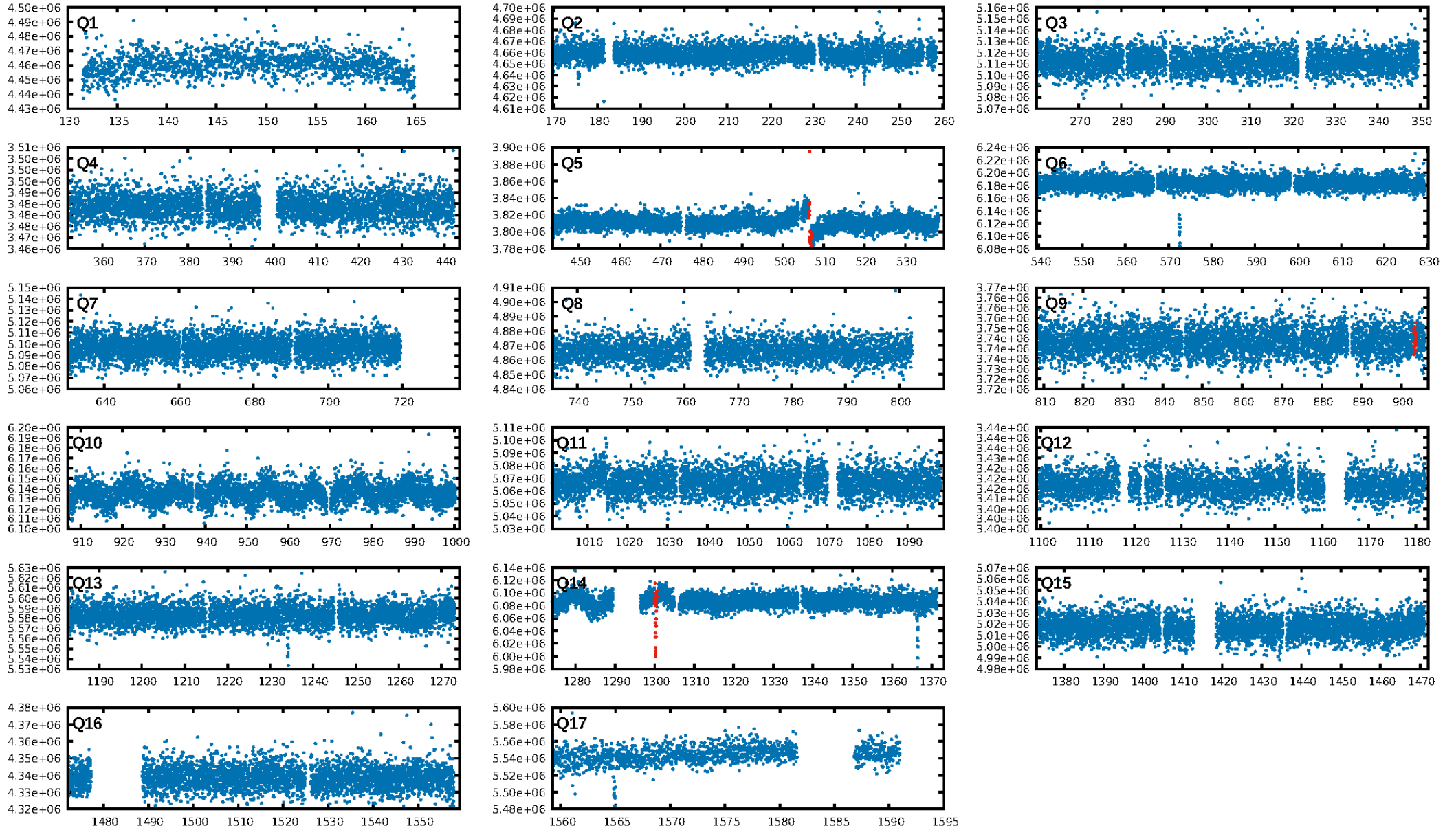
ShortPeriod-sig: 100.0% [158.29σ]  
LongPeriod-sig: 26.8% [0.34σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 2.3%  
Bootstrap-pfa: 9.04e-57  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -0.3273  
Centroid-sig: N/A  
Centroid-so: 6.548 arcsec [16.16σ]  
OotOffset-rm: 9.741 arcsec [2.56σ]  
KicOffset-rm: 12.760 arcsec [173.29σ]  
OotOffset-st: 1/0/0/2 [3]  
KicOffset-st: 1/0/0/2 [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: 01-Feb-2016 00:11:47 Z

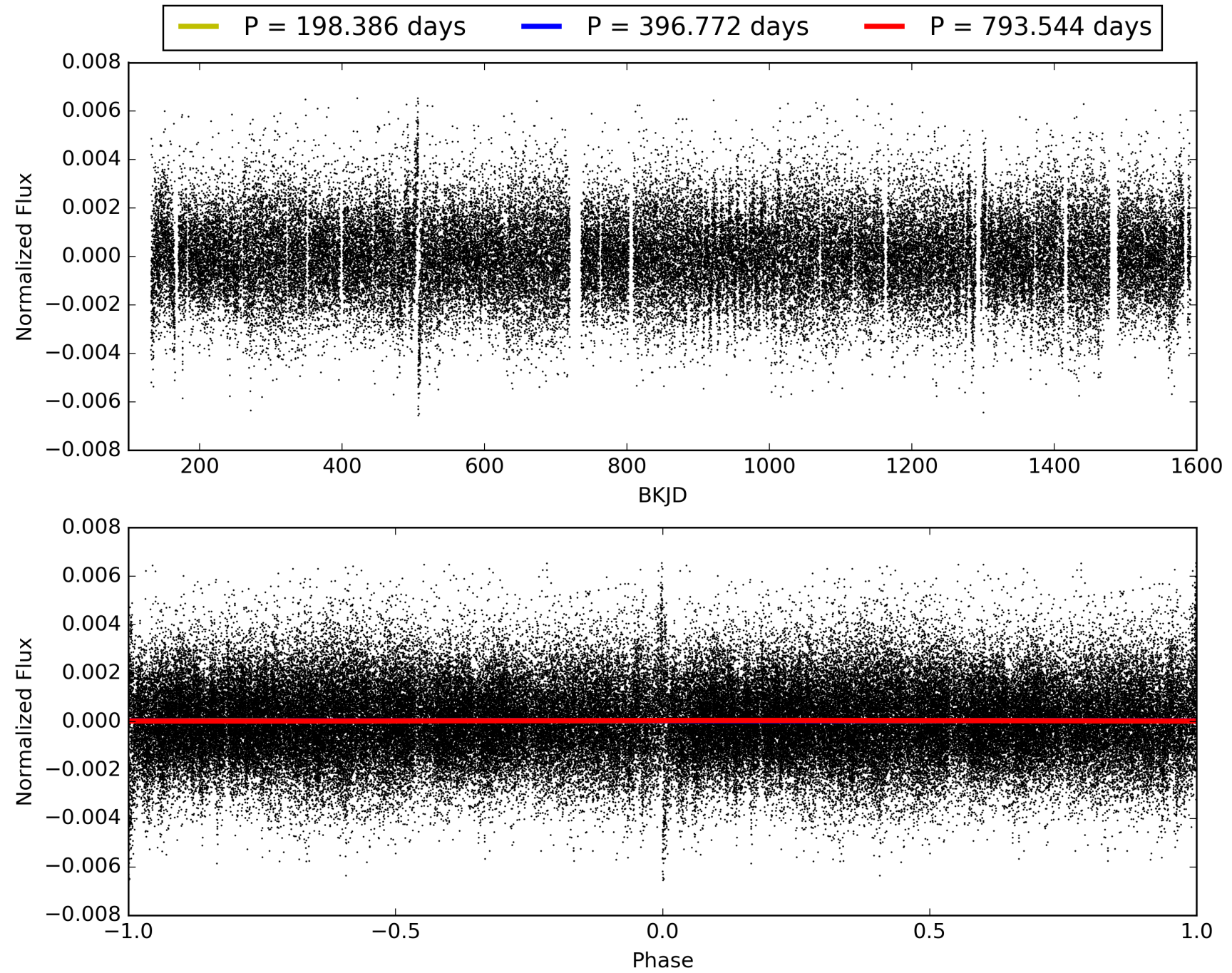
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 007024511-02, PDC Light Curves

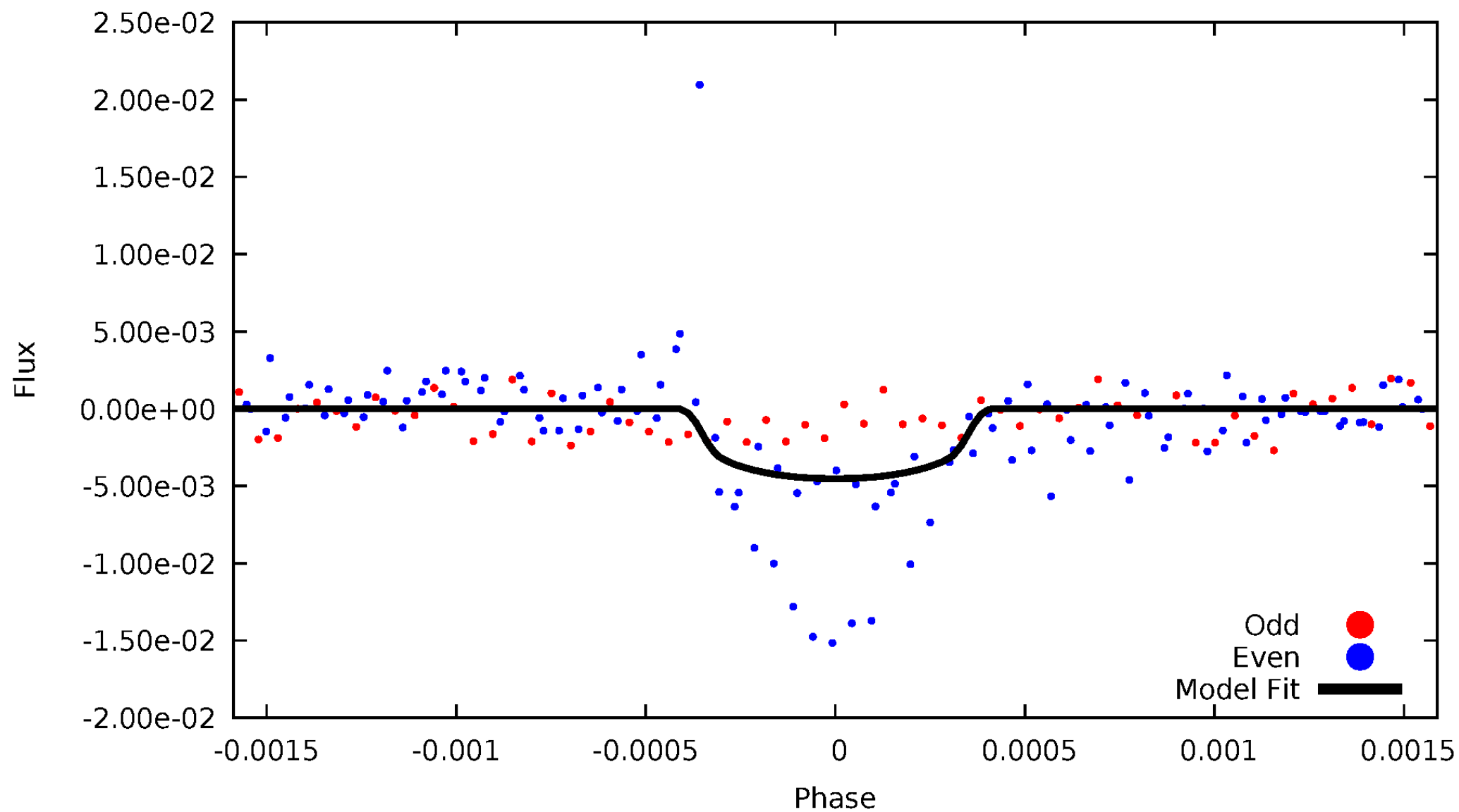


TCE 007024511-02



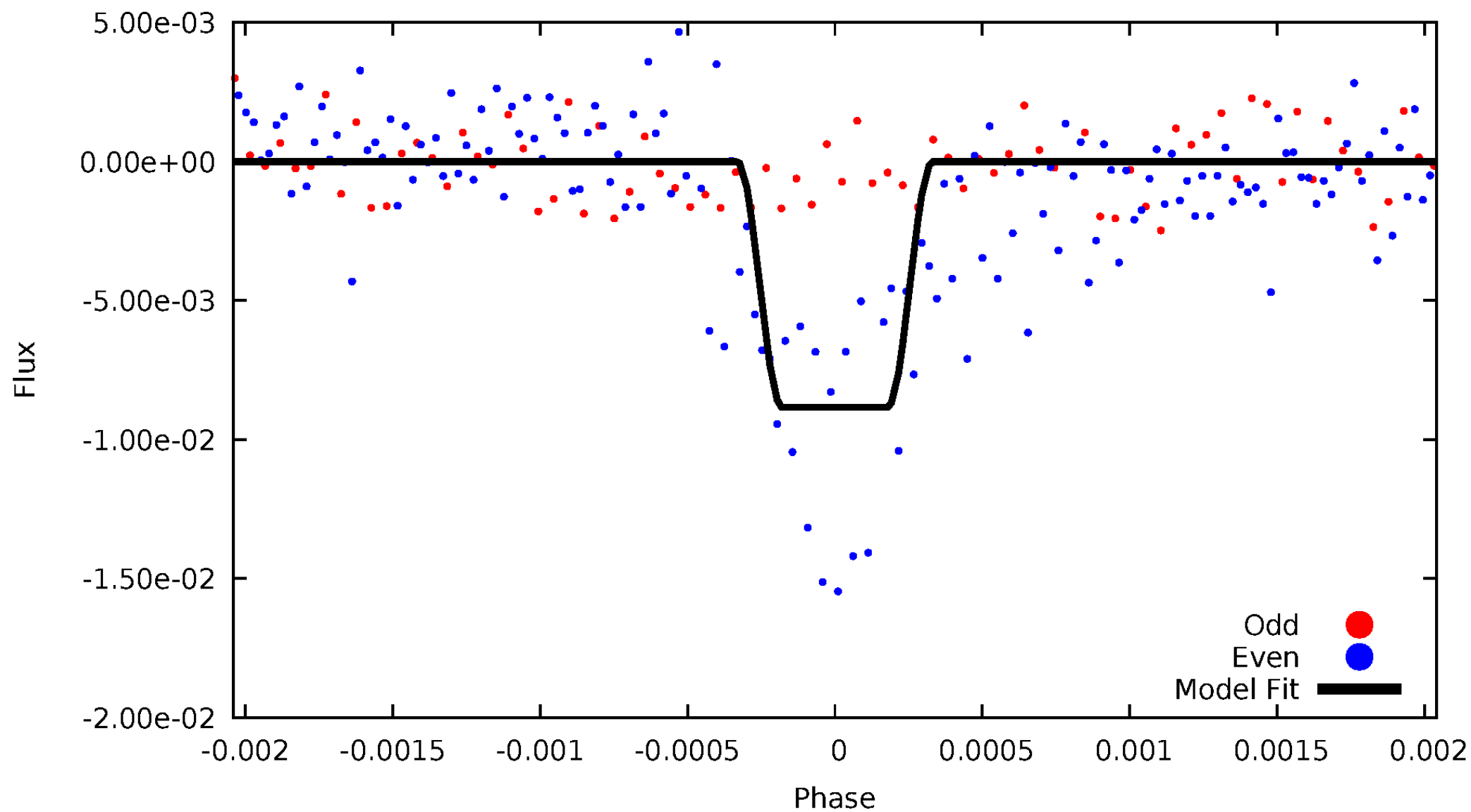
# DV Odd/Even

TCE 007024511-02



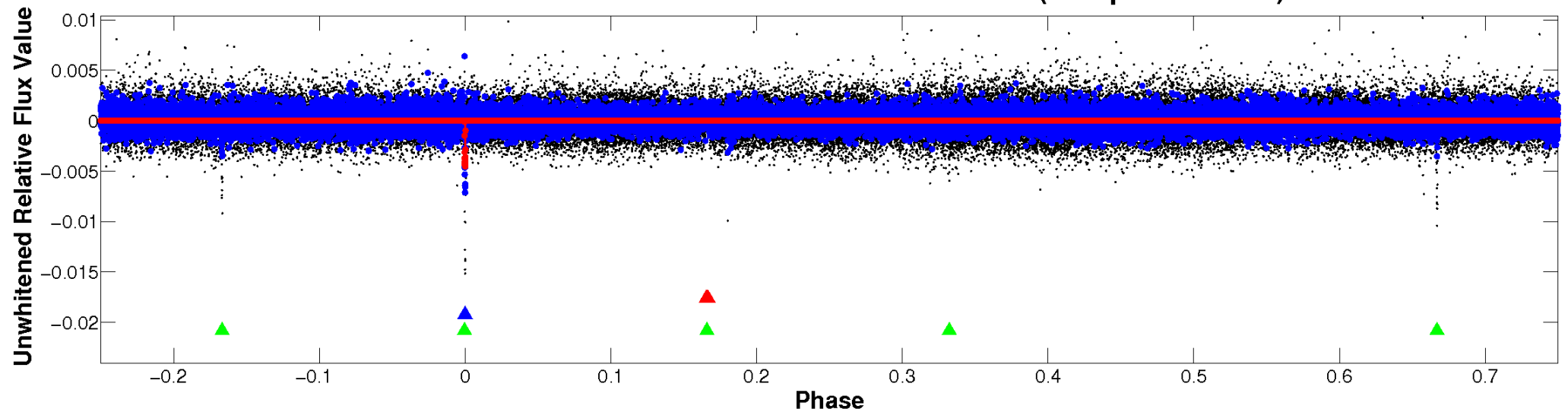
# ALT Odd/Even

TCE 007024511-02

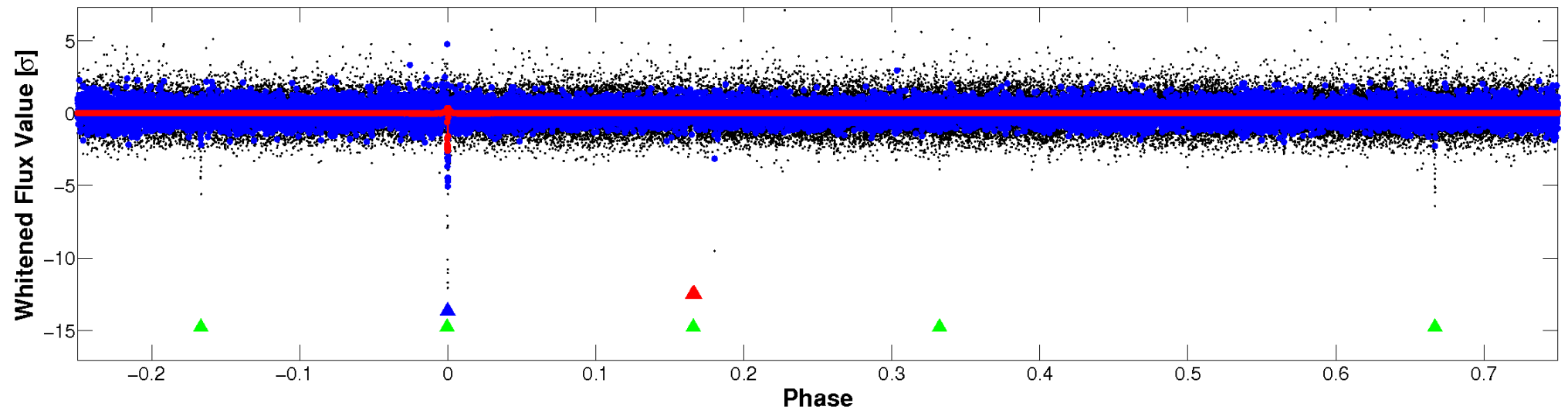


# Non-Whitened Vs. Whitened Light Curve

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

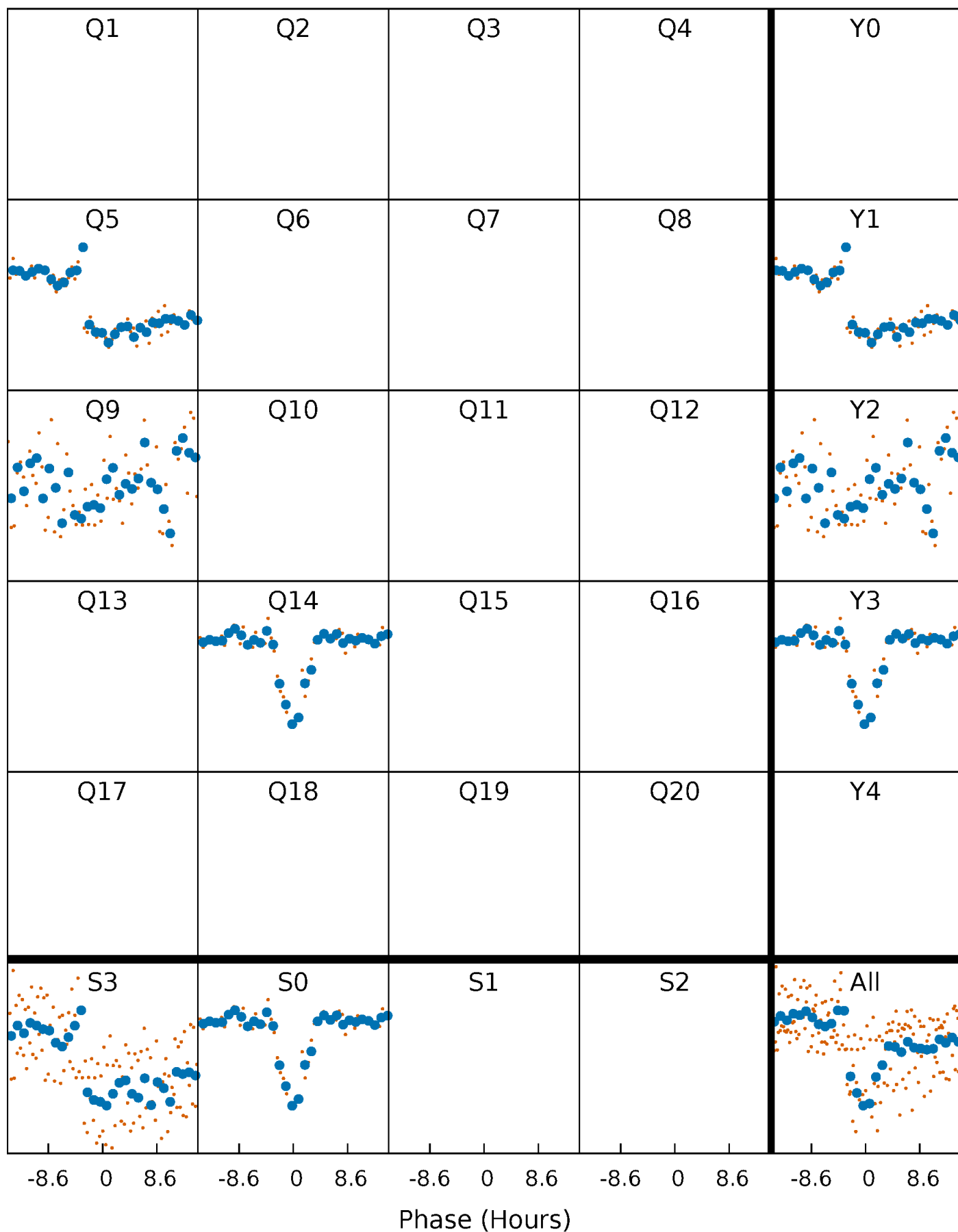


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



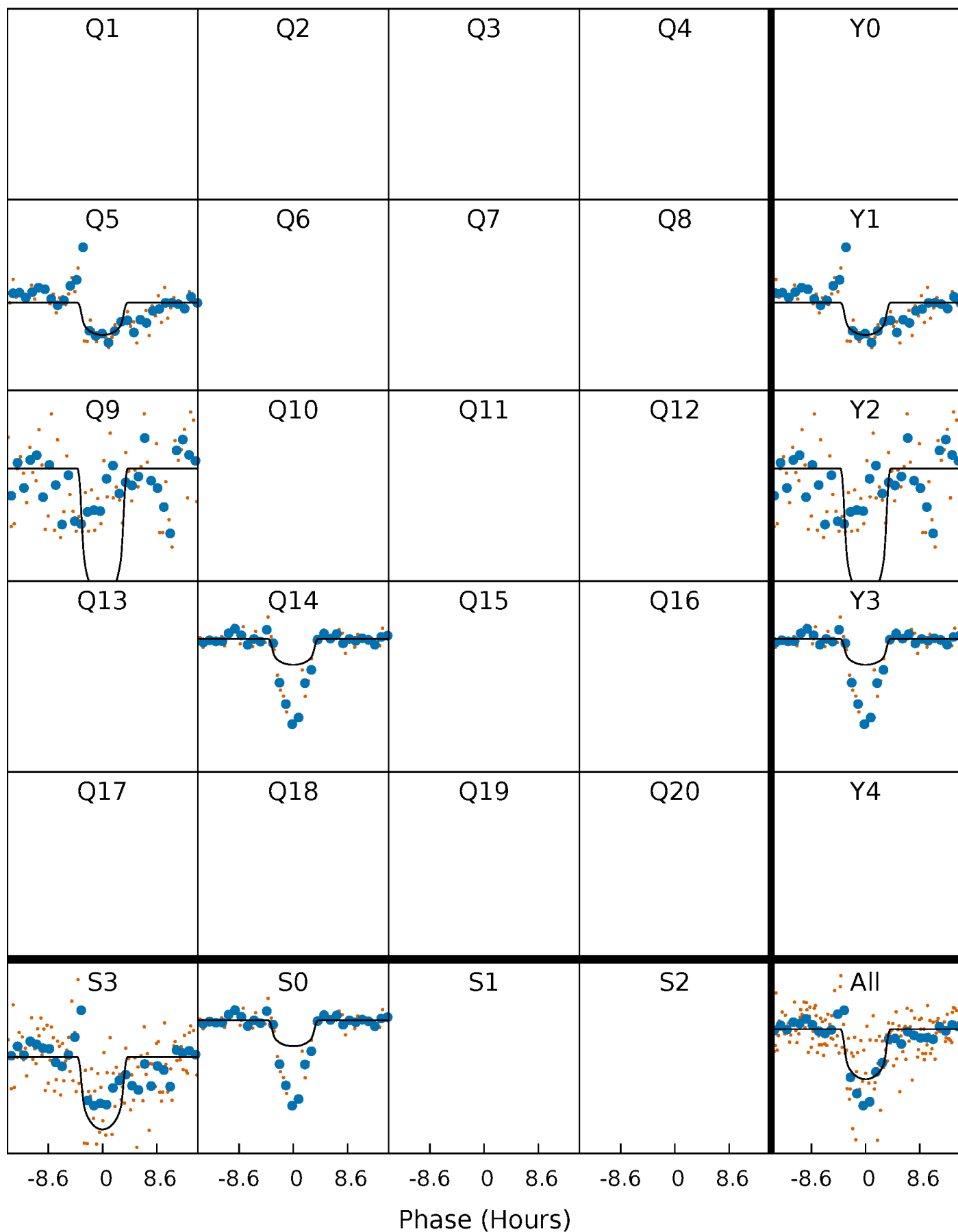
# PDC Quarter-Phased Transit Curves

TCE 007024511-02     $P=396.772187$  Days     $T_0=506.733829$  (BKJD)



# DV Quarter-Phased Transit Curves

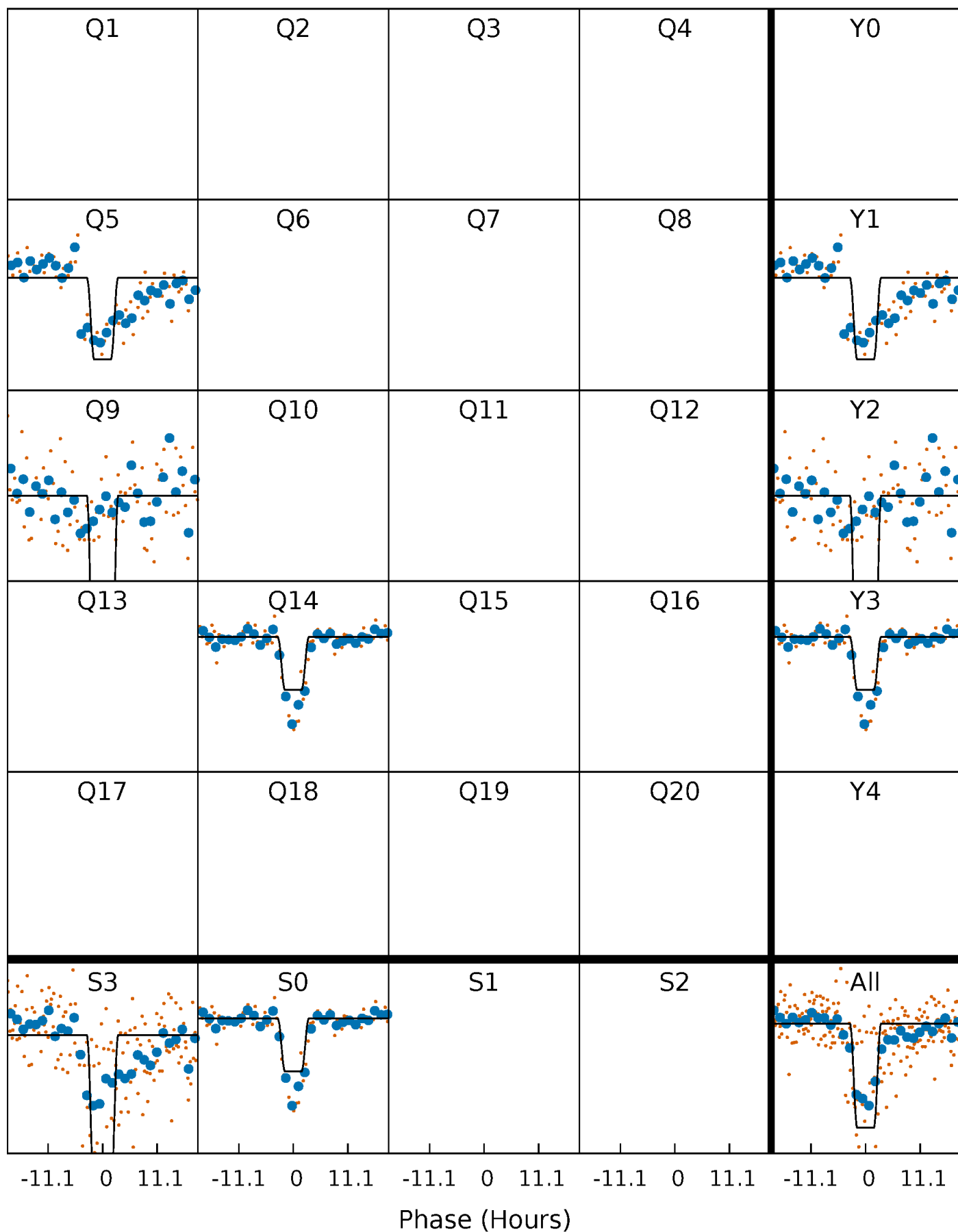
TCE 007024511-02 P=396.772187 Days  $T_0=506.733829$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

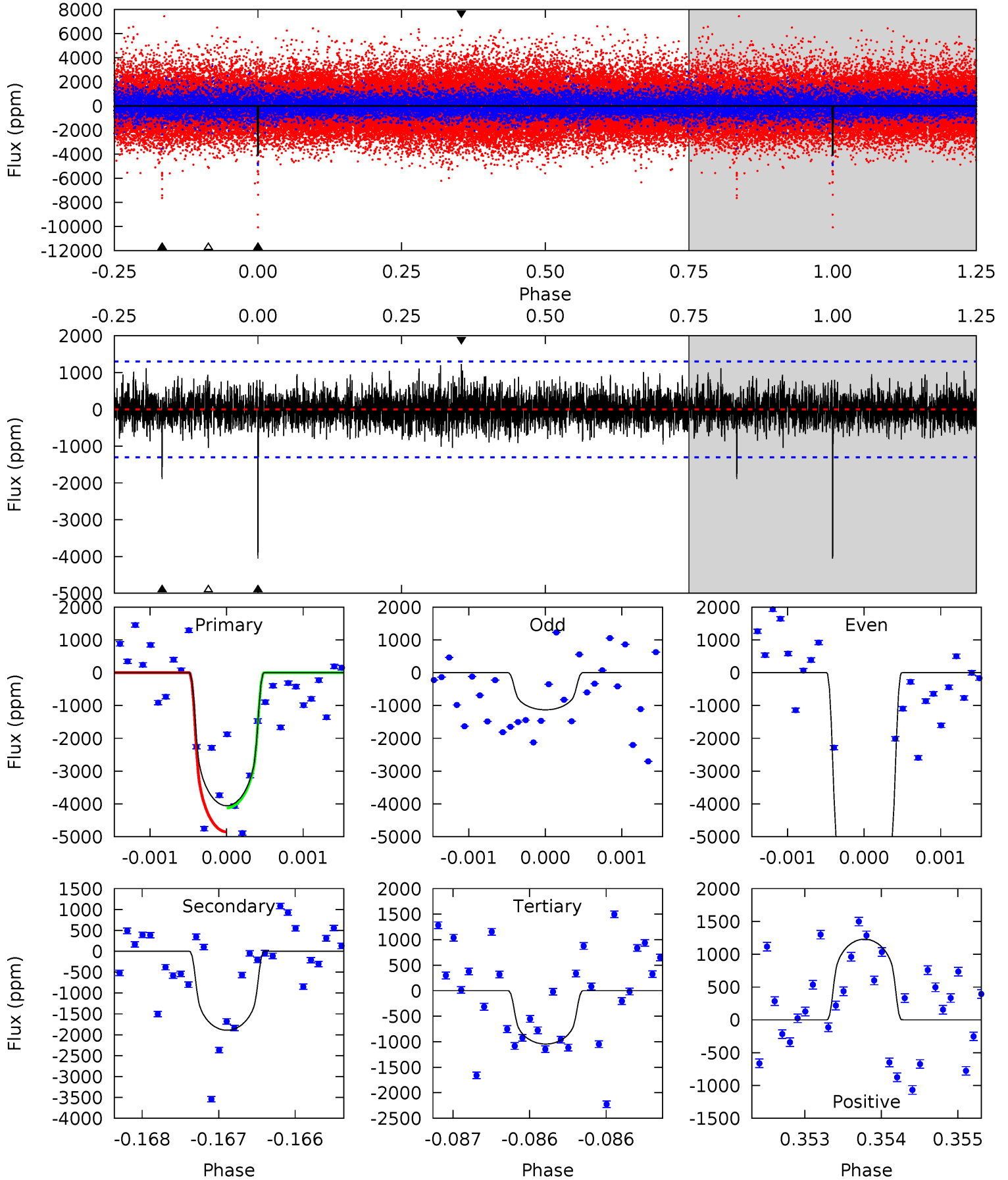
TCE 007024511-02 P=396.744812 Days  $T_0=506.781449$  (BKJD)



# DV Model-Shift Uniqueness Test

007024511-02, P = 396.772187 Days, E = 109.961642 Days

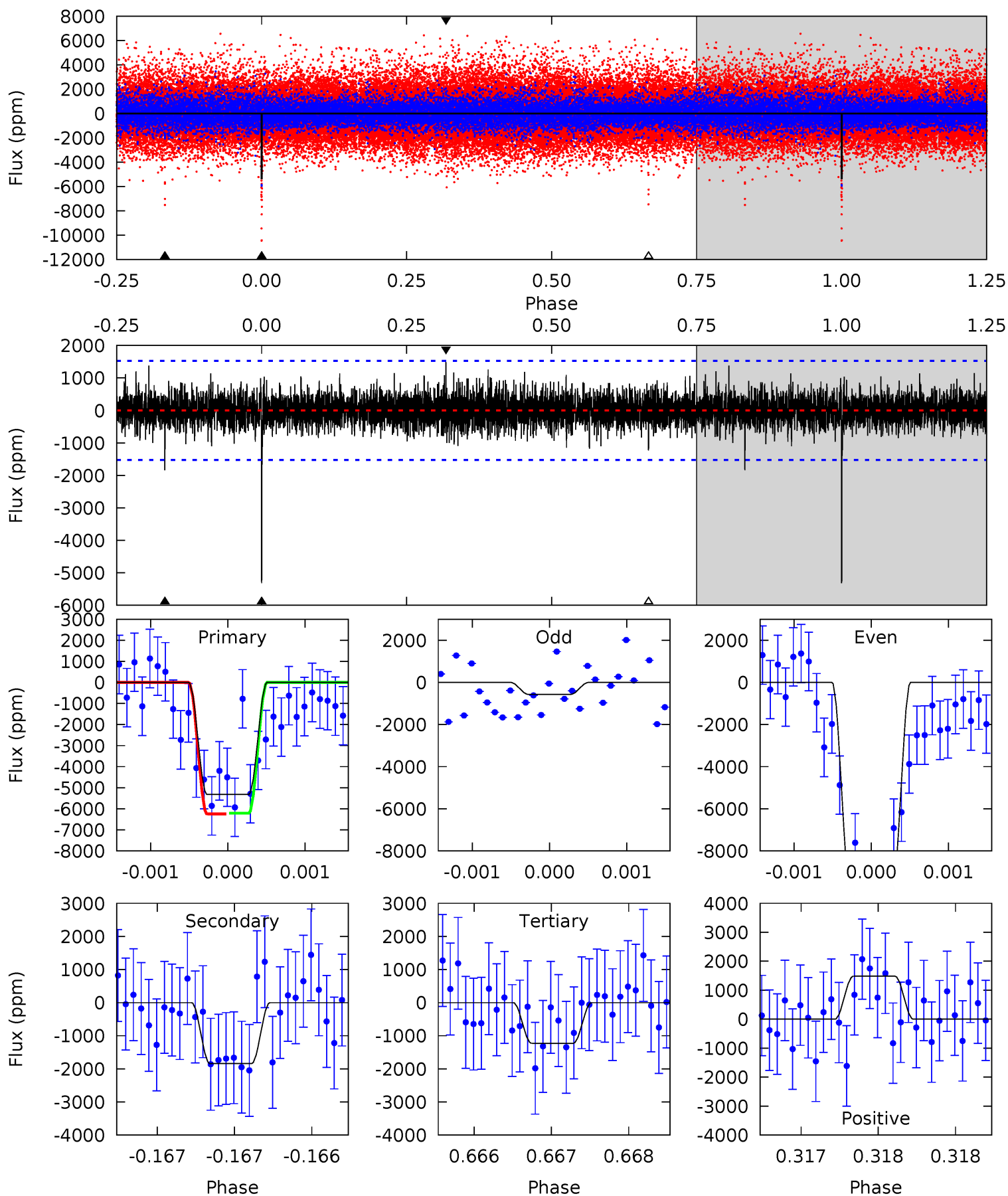
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.1	7.96	4.40	5.17	5.48	3.33	1.28	12.7	11.9	3.56	2.79	14.3	1.27	0.23	1.55



# Alt Model-Shift Uniqueness Test

007024511-02, P = 396.744812 Days, E = 110.036637 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
19.2	6.65	4.44	5.36	5.53	3.41	1.17	14.8	13.9	2.21	1.29	17.5	0.97	0.22	0.06



### Stellar Parameters For KIC 007024511

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4679^{+167}_{-167}$	$4.627^{+0.048}_{-0.032}$	$-0.400^{+0.300}_{-0.300}$	$0.643^{+0.057}_{-0.057}$	$0.638^{+0.076}_{-0.044}$	$3.388^{+0.761}_{-0.518}$
	+4%/-4%	+1%/-1%	+75%/-75%	+9%/-9%	+12%/-7%	+22%/-15%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 007024511-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-1891 \pm 238$	$4.56^{+1.61}_{-1.60}$	$241^{+9}_{-9}$	$4027^{+751}_{-402}$	$42379^{+57573}_{-19666}$
Alt.	$-1840 \pm 277$	$6.66^{+1.53}_{-1.66}$	$241^{+10}_{-10}$	$3526^{+363}_{-256}$	$19298^{+14546}_{-7099}$

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

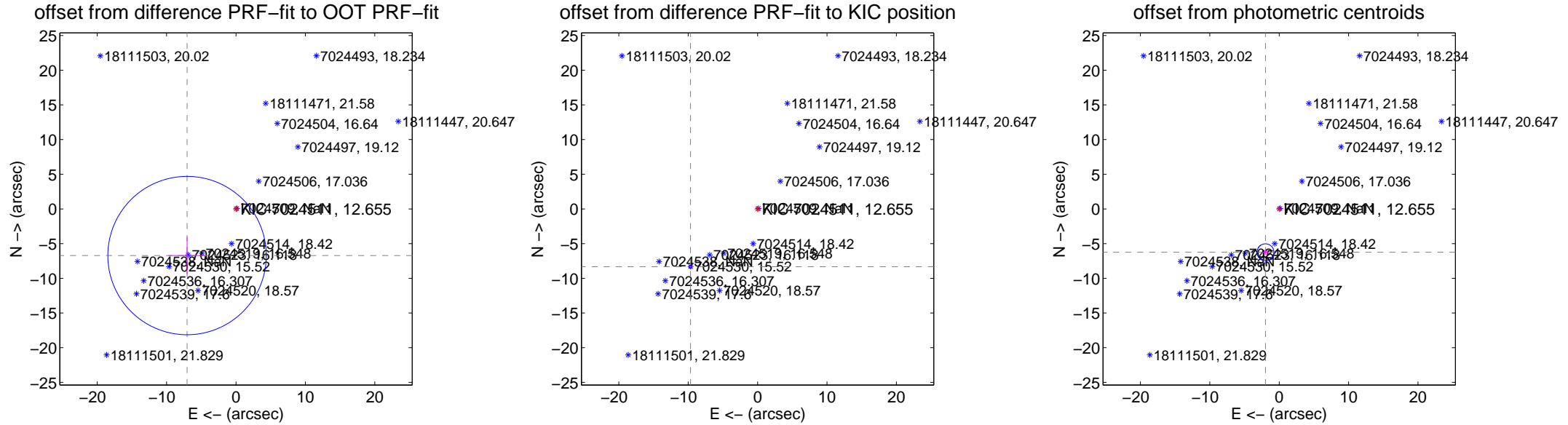
## DV Centroid Data

Supplemental centroid analysis for 007024511-02. Kepler magnitude: 12.65. Transit SNR 11.27

There are 2 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 2.83 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$9.741 \pm 3.805$	2.56	$7.051 \pm 2.696$	$-6.721 \pm 2.687$
PRF-fit source offset from KIC position	<b><math>12.760 \pm 0.074</math></b>	<b>173.29</b>	$9.669 \pm 0.072$	$-8.328 \pm 0.070$
photometric centroid source offset	<b><math>6.55 \pm 0.41</math></b>	<b>16.16</b>	$1.97 \pm 0.45$	$-6.24 \pm 0.40$

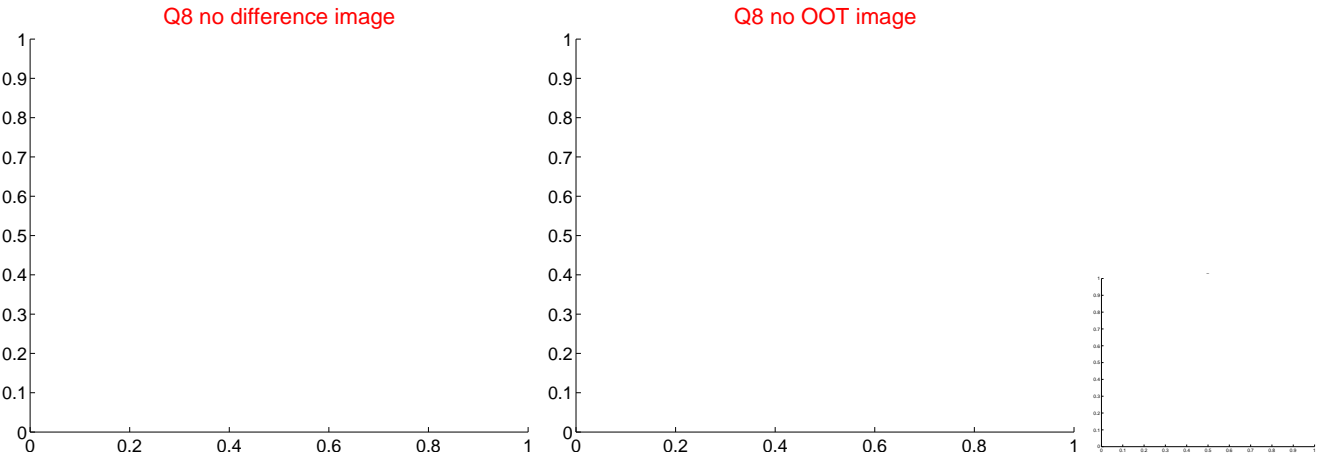
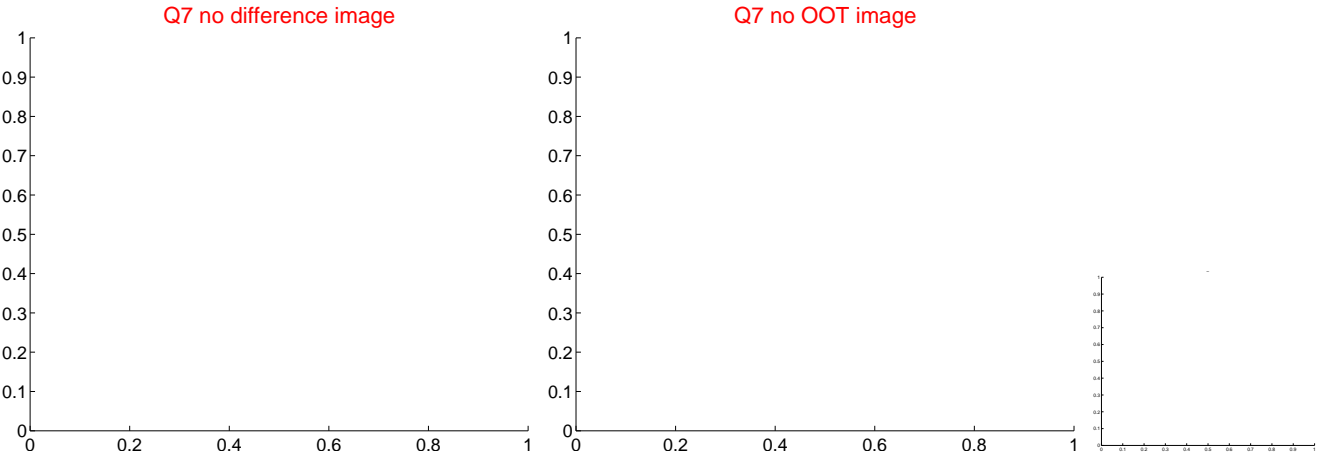
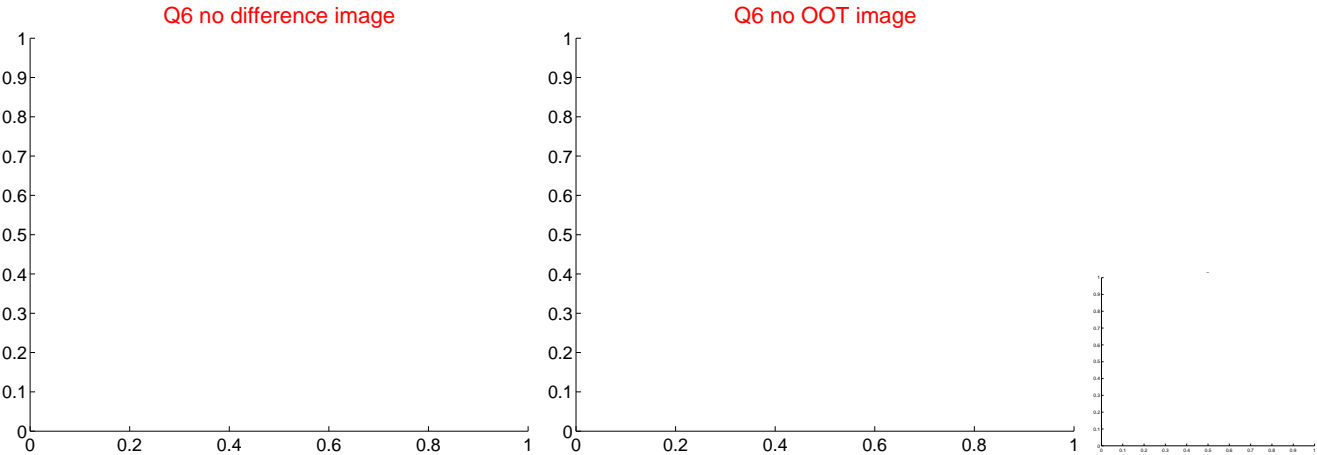
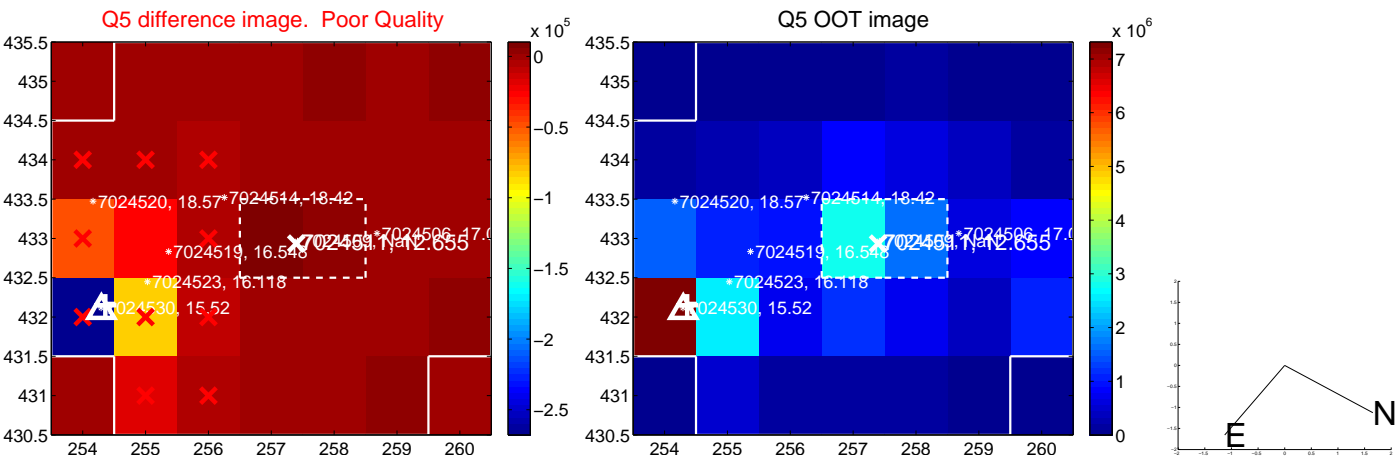


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

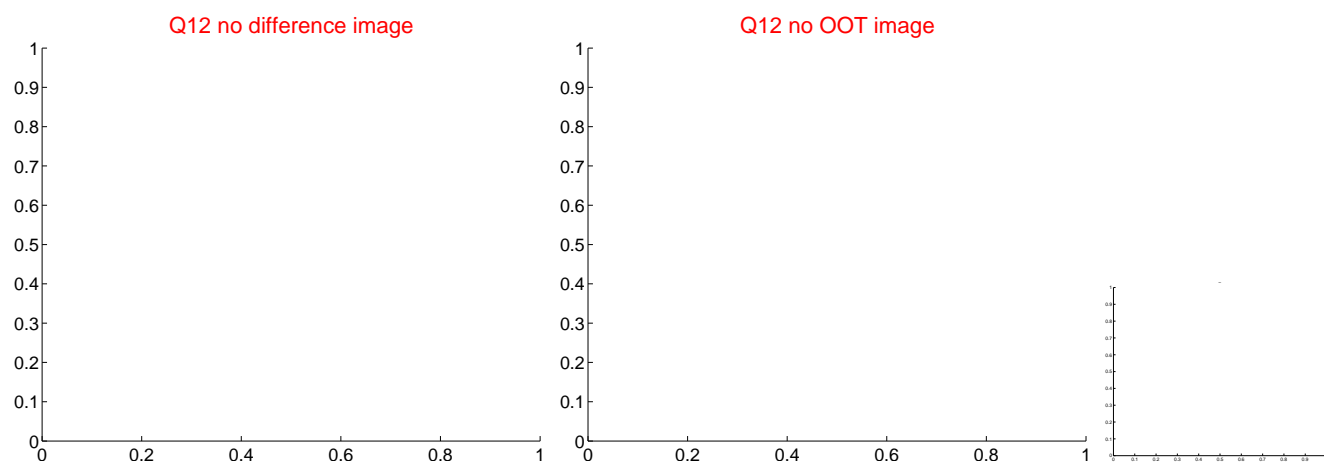
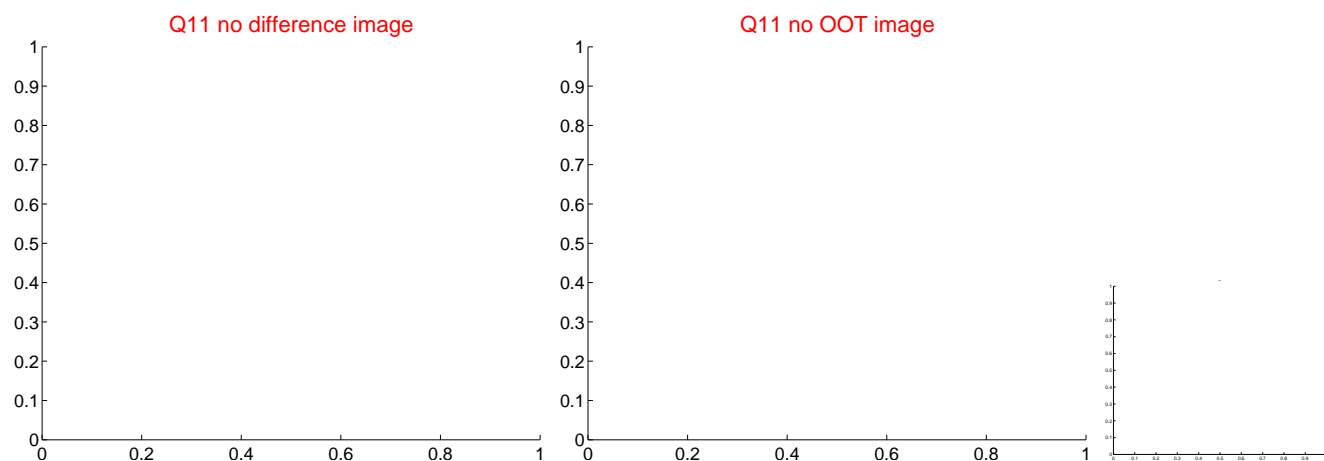
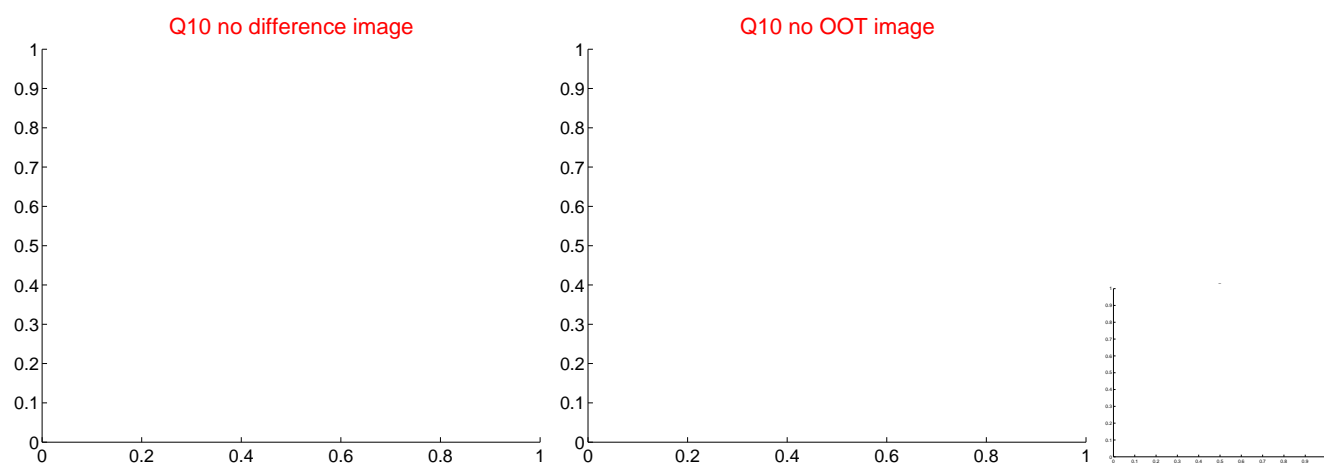
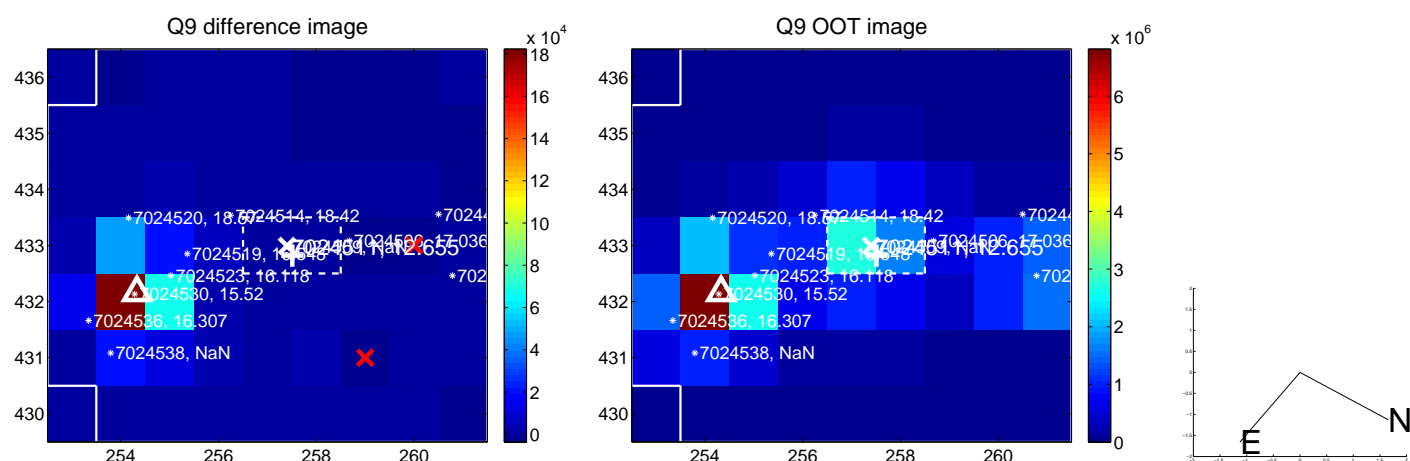
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



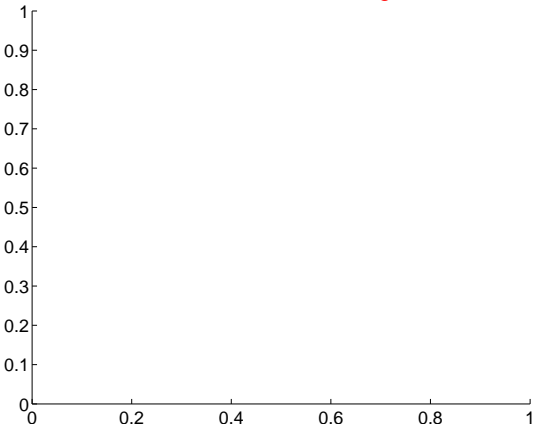
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value





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

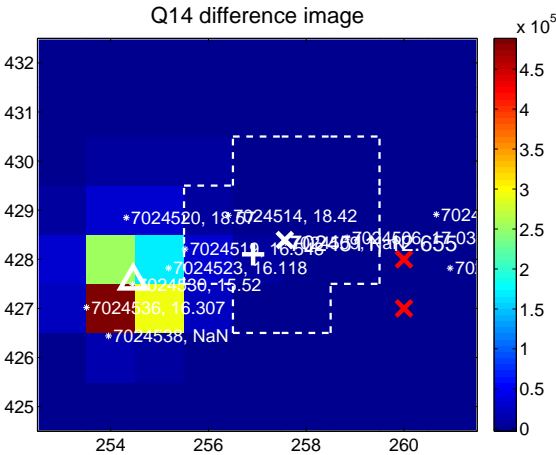
Q13 no difference image



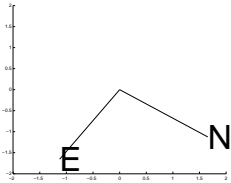
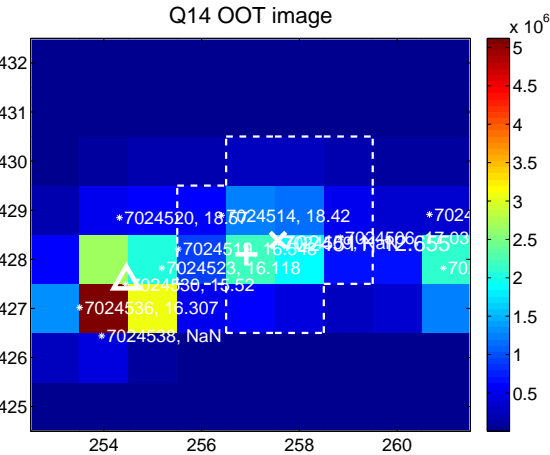
Q13 no OOT image



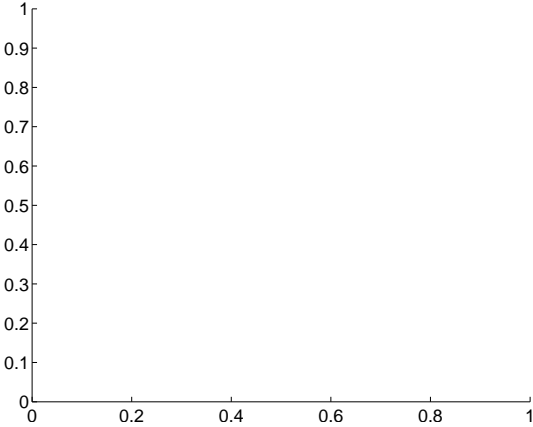
Q14 difference image



Q14 OOT image



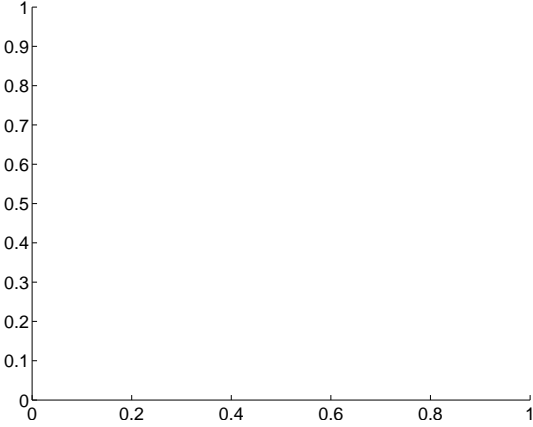
Q15 no difference image



Q15 no OOT image



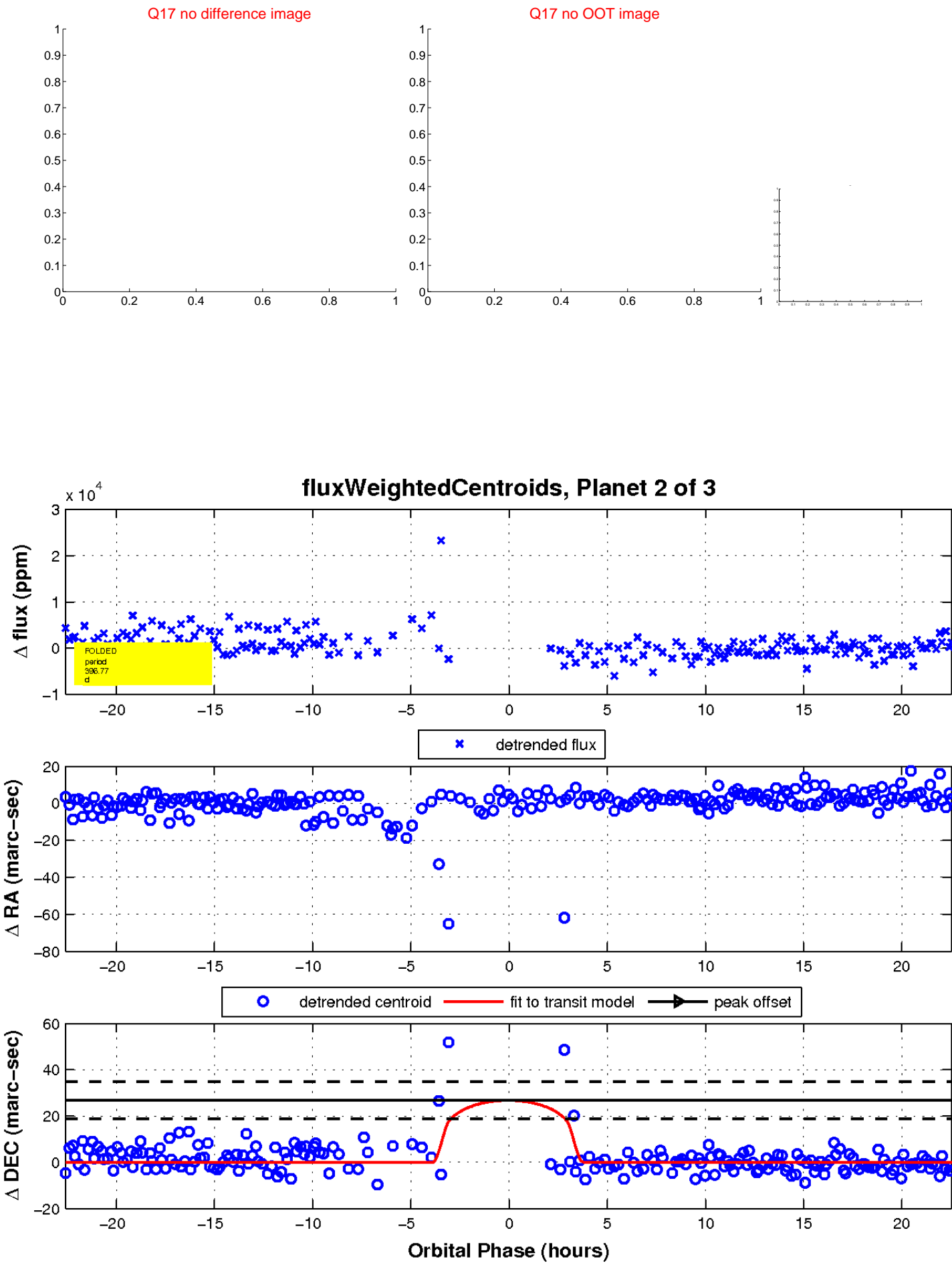
Q16 no difference image



Q16 no OOT image

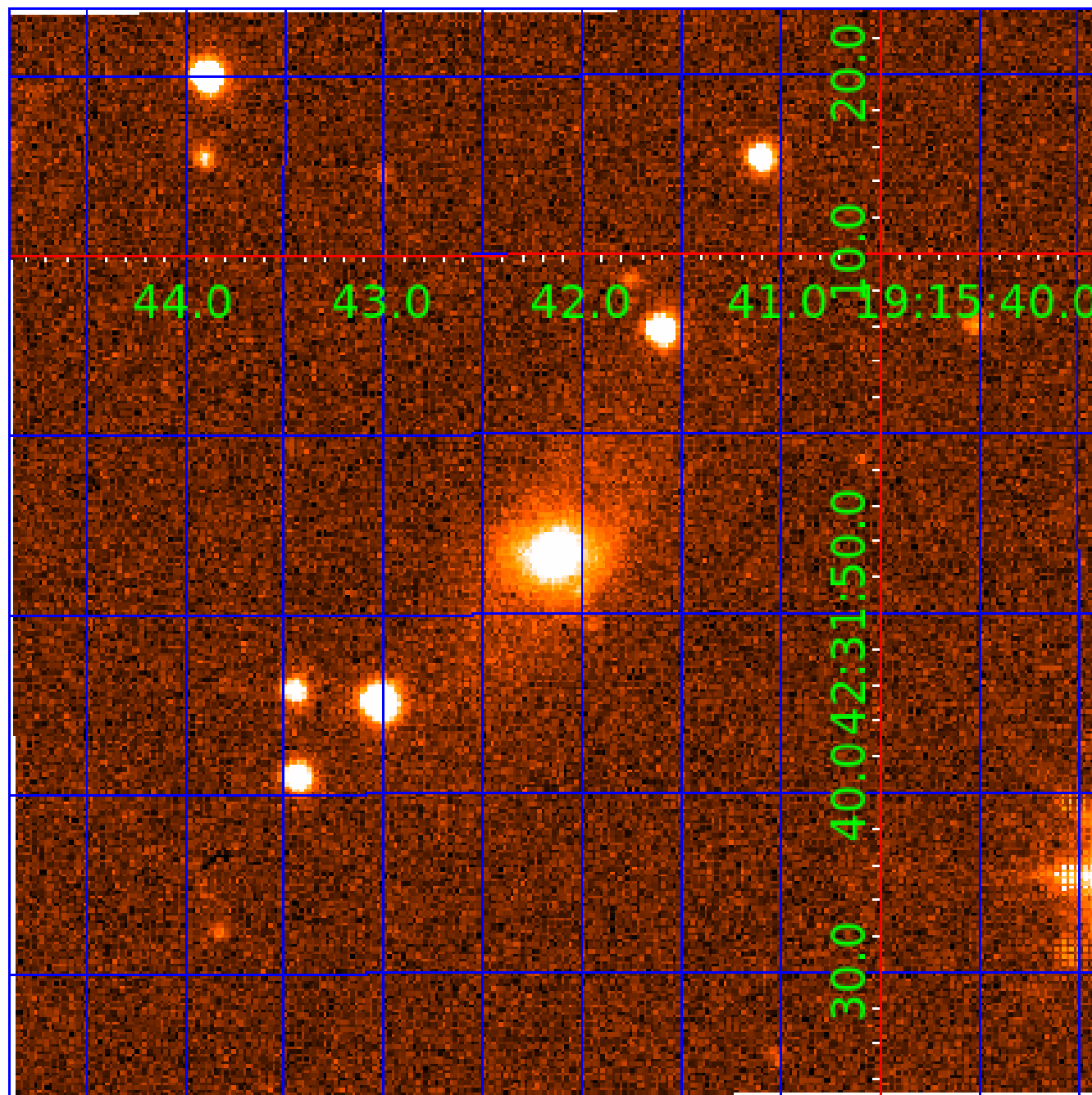


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 007024511

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007024511-01	OBS	No	396.928618	175.643863	13486.1	7.938	37.4	32.9	0.64	4679	13.70	0.21
007024511-02	OBS	No	396.772187	506.733829	4534.1	7.556	23.7	11.3	0.64	4679	4.50	0.21
007024511-03	OBS	No	330.776770	241.798287	6466.4	6.560	17.8	17.2	0.64	4679	5.91	0.27

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007024511-01	OBS	FP	0.00	0	1	1	1	DEEP_V_SHAPED—HAS_SEC_TCE—PERIOD_ALIAS_DV—PERIOD_ALIAS_ALT—CENT_FEW_DIFFS—HALO_GHOST—EPHEM_MATCH
007024511-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_FEW_DIFFS
007024511-03	OBS	FP	0.00	1	0	1	1	INDIV_TRANS_MARSHALL—CENT_RESOLVED_OFFSET—EPHEM_MATCH

**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 007024511-03

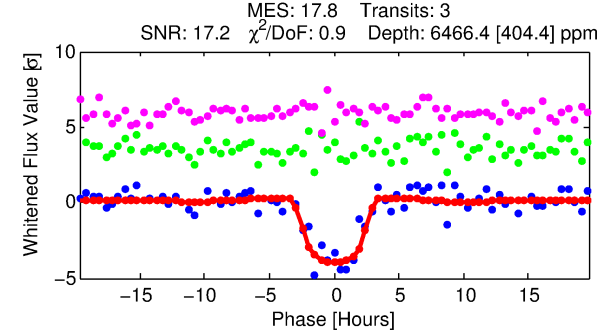
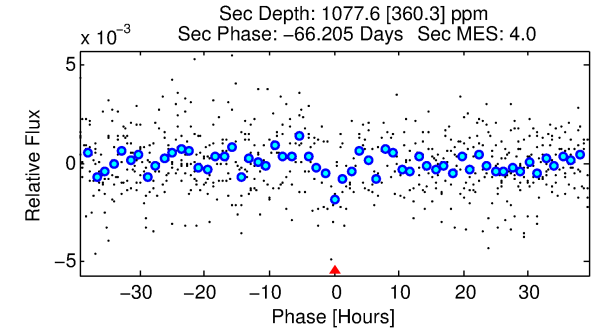
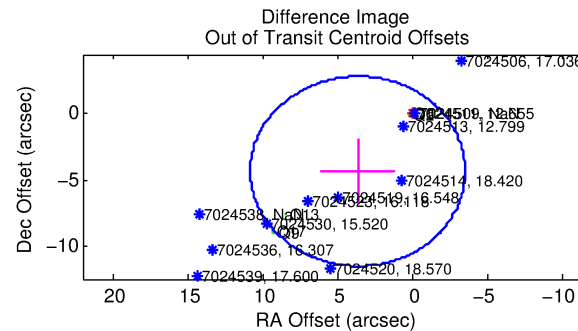
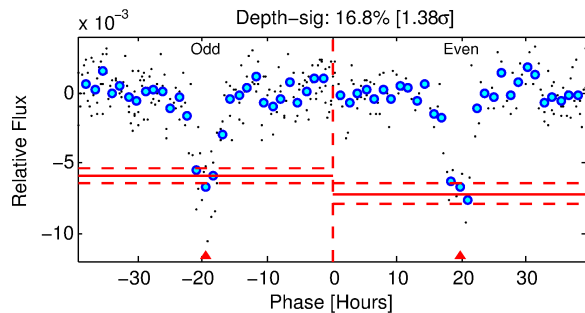
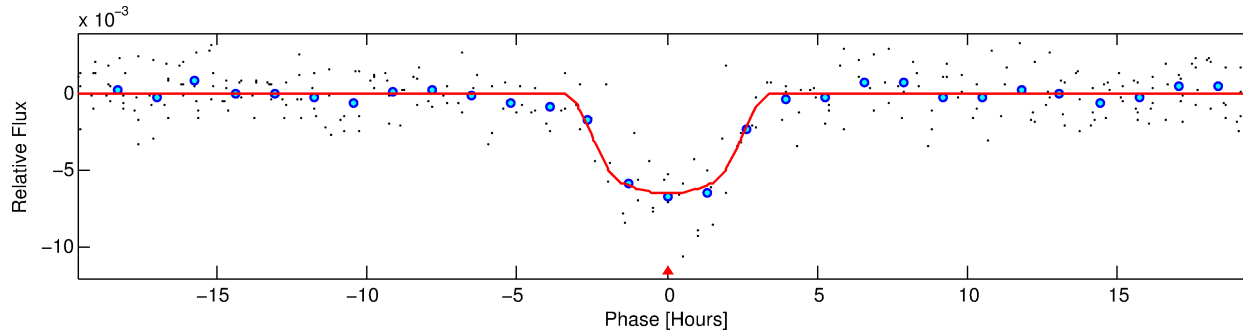
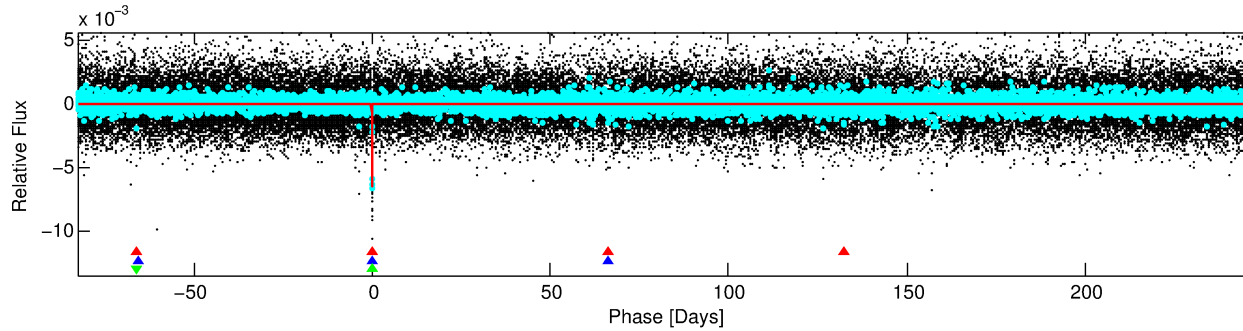
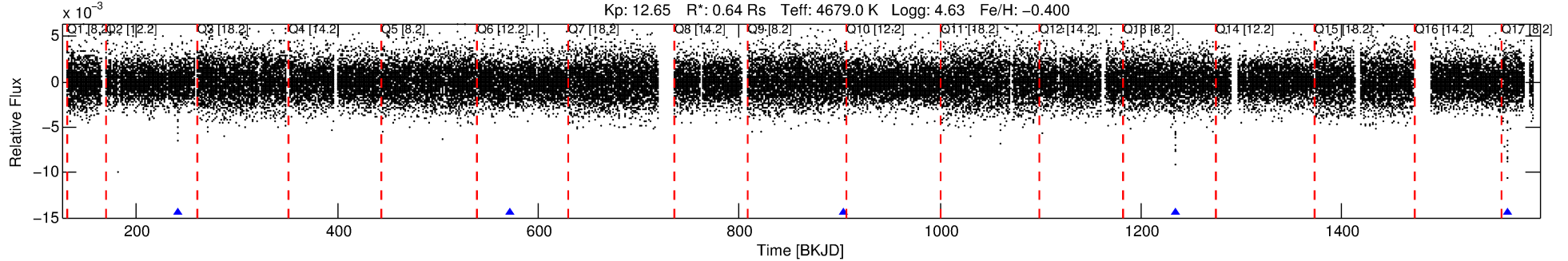
TCE (1)	KIC	Parent (2)	Parent KIC	P <sub>1</sub> :P <sub>2</sub>	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	m <sub>2</sub>	m <sub>1</sub>	D <sub>2</sub> /D <sub>1</sub>	Mechanism	Flag	$\sigma_P$	$\sigma_T$
007024511-03	7024511	007024530-01	7024530	5:1	12.7	1	4	15.52	12.65	20.34	Direct-PRF	0	1.39	0.11

**Notes:** P<sub>1</sub>:P<sub>2</sub> is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column. m<sub>2</sub> and m<sub>1</sub> are the magnitudes of the parent and child. D<sub>2</sub>/D<sub>1</sub> is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

KIC: 7024511 Candidate: 3 of 3 Period: 330.777 d  
KOI: K00311 Corr: No Ephemeris Match

Kp: 12.65 R\*: 0.64 Rs T<sub>eff</sub>: 4679.0 K Logg: 4.63 Fe/H: -0.400



## DV Fit Results:

Period = 330.77677 [0.00241] d  
Epoch = 241.7983 [0.0069] BKJD  
Rp/R\* = 0.0842 [0.0066]  
a/R\* = 271.87 [56.71]  
b = 0.82 [0.09]  
Seff = 0.27 [0.05]  
Teq = 184 [8] K  
Rp = 5.90 [0.70] Re  
a = 0.8064 [0.0562] AU  
Ag = 11055.71 [4217.94] [2.62σ]  
Teff = 2922 [289] K [9.45σ]

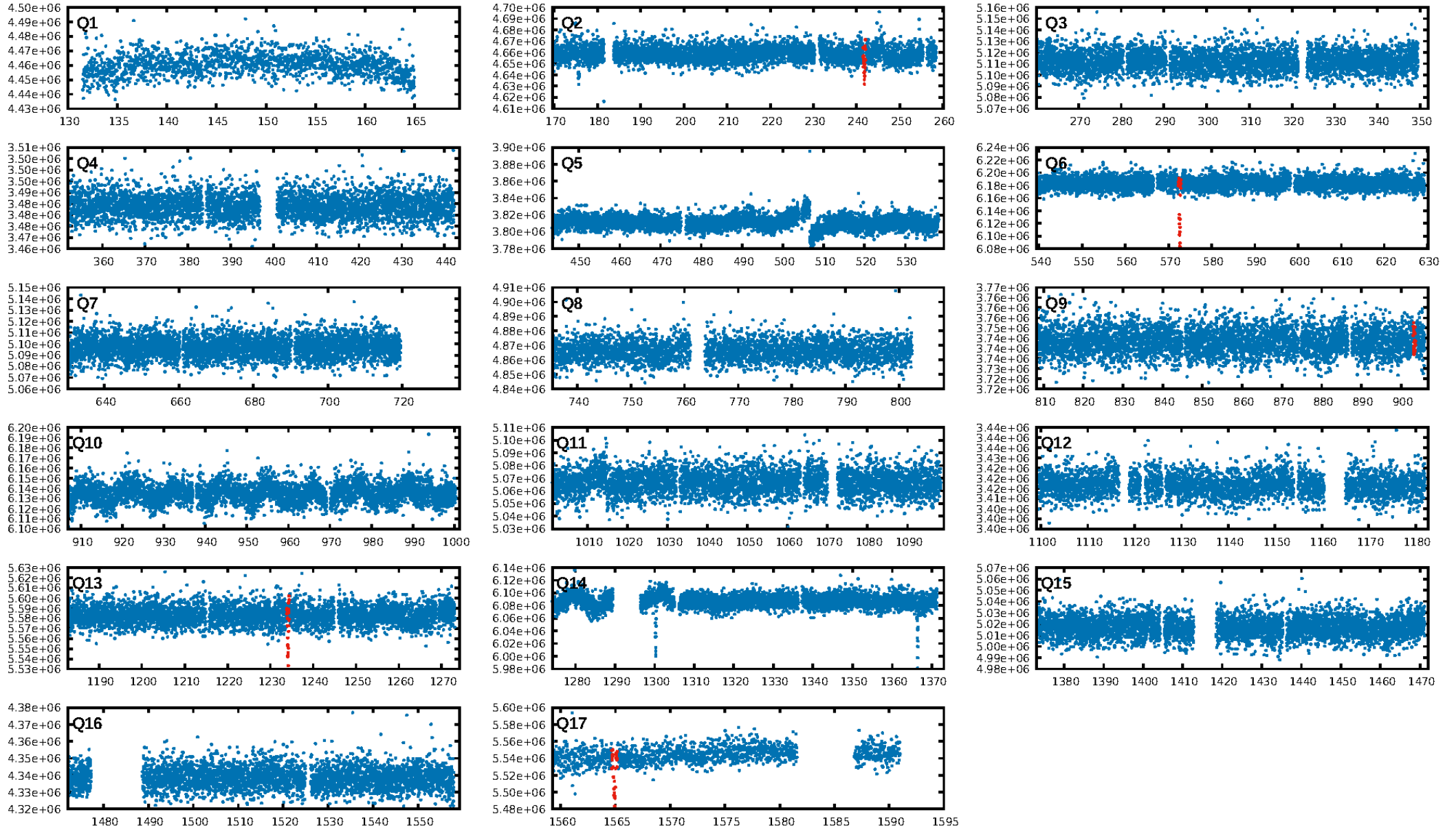
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [158.29σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 94.1%  
Bootstrap-pfa: 1.09e-47  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: -0.2959  
Centroid-sig: N/A  
Centroid-so: 13.949 arcsec [47.28σ]  
OotOffset-rm: 5.659 arcsec [2.36σ]  
KicOffset-rm: 12.807 arcsec [173.50σ]  
OotOffset-st: 2/0/0/3 [5]  
KicOffset-st: 2/0/0/3 [5]  
DiffImageQuality-fgm: 1.00 [5/5]  
DiffImageOverlap-fno: 0.60 [3/5]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 00:11:57 Z

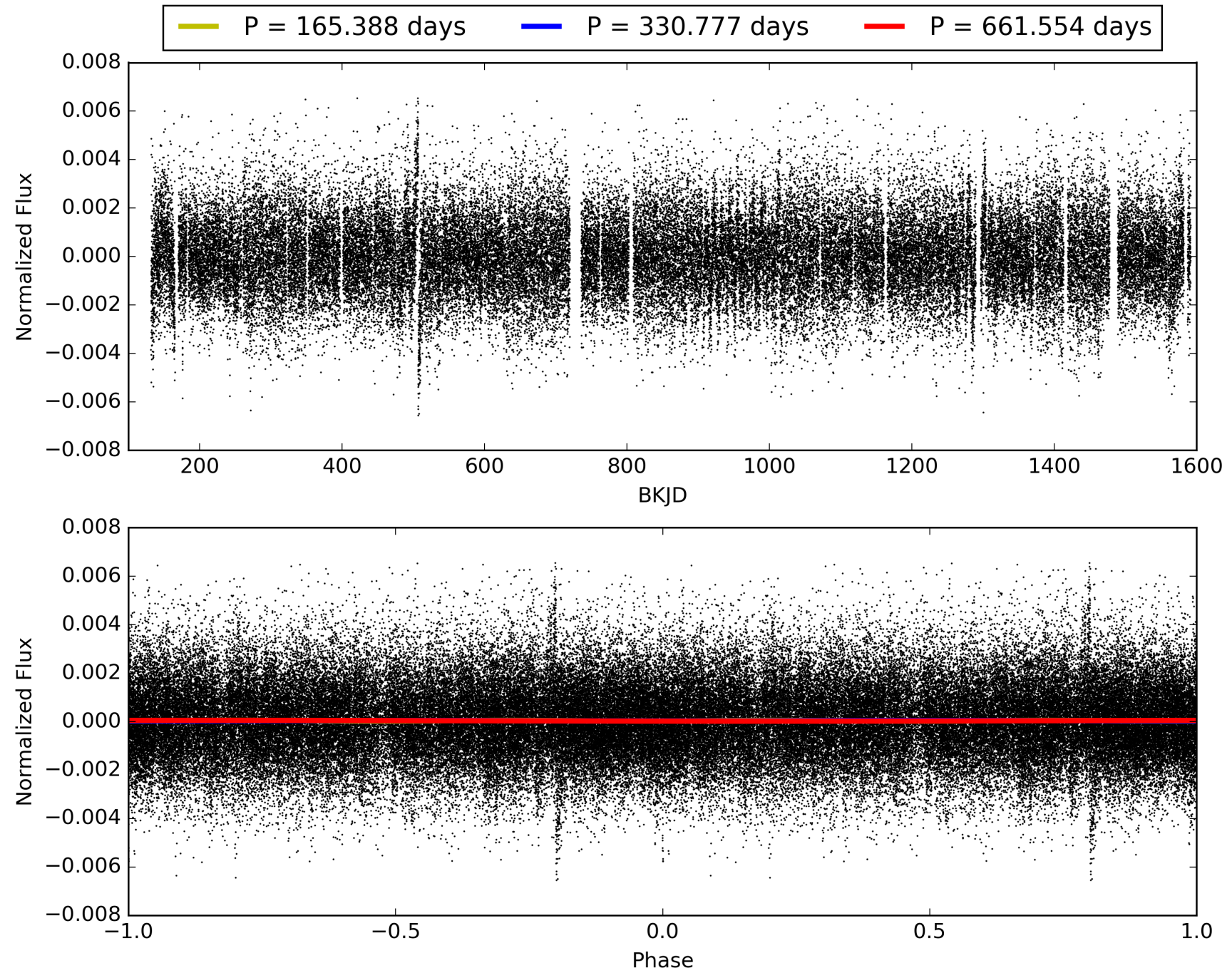
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 007024511-03, PDC Light Curves



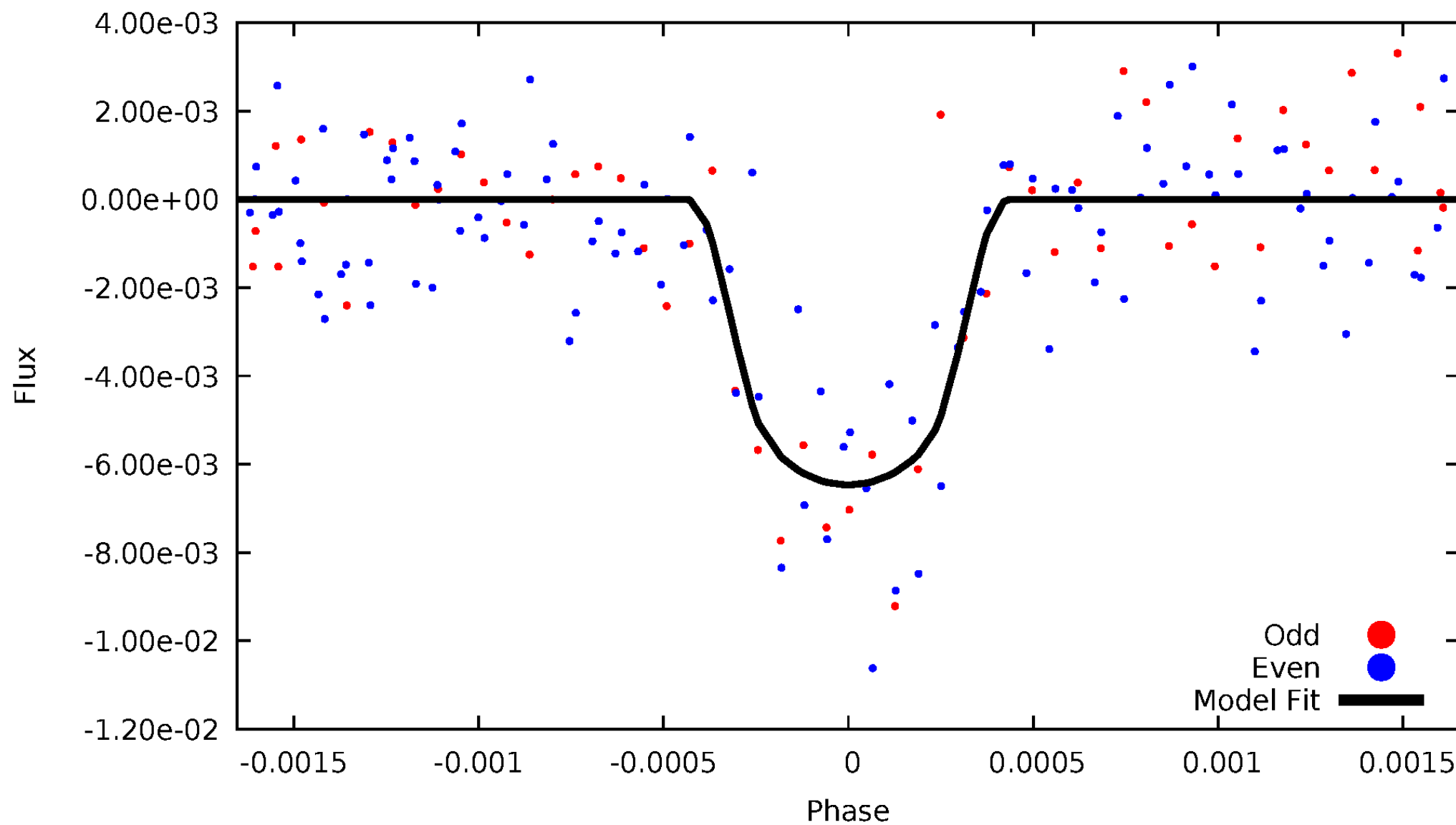


TCE 007024511-03



# DV Odd/Even

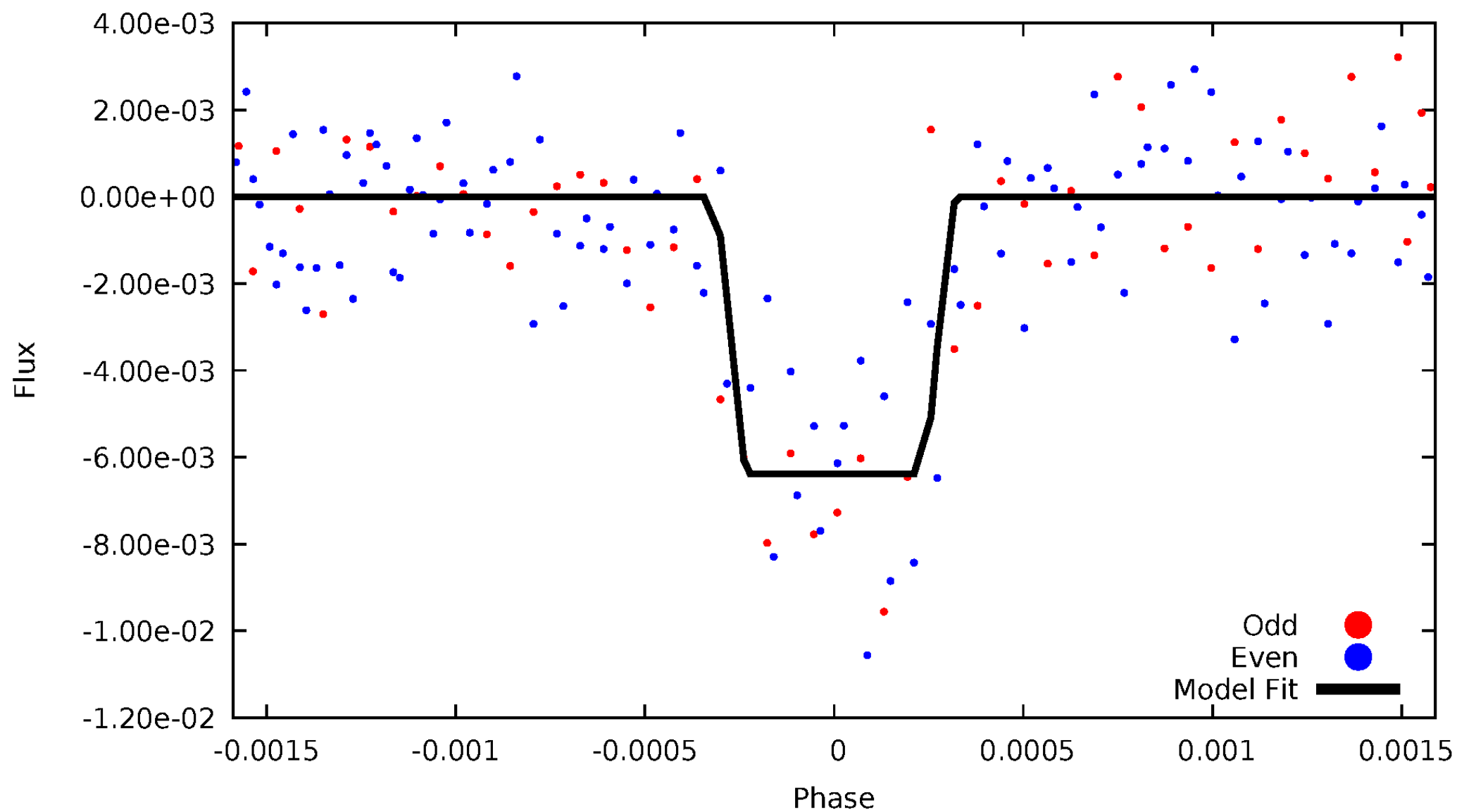
TCE 007024511-03





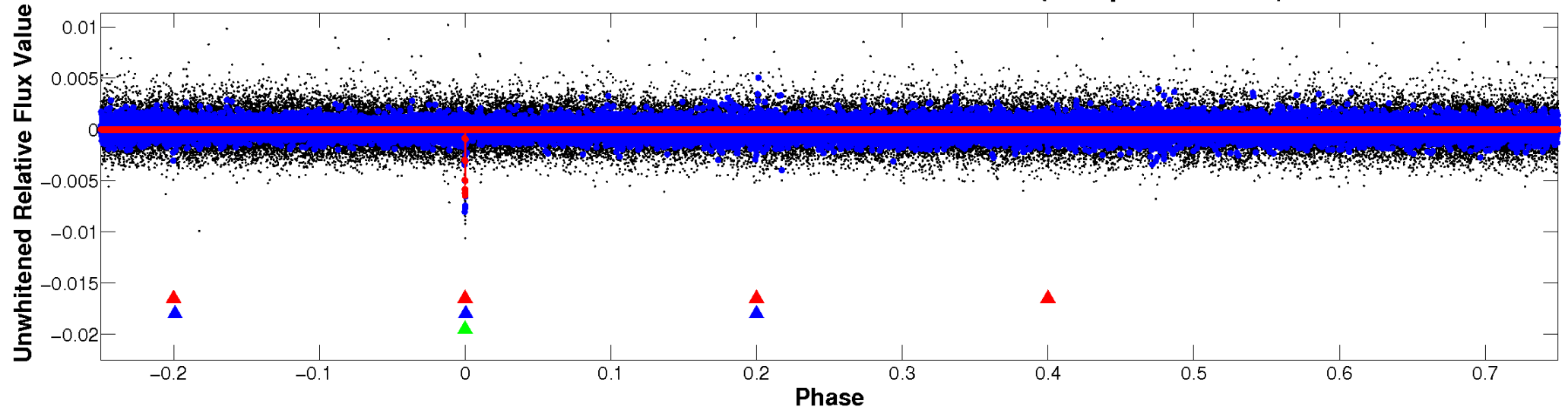
# ALT Odd/Even

TCE 007024511-03

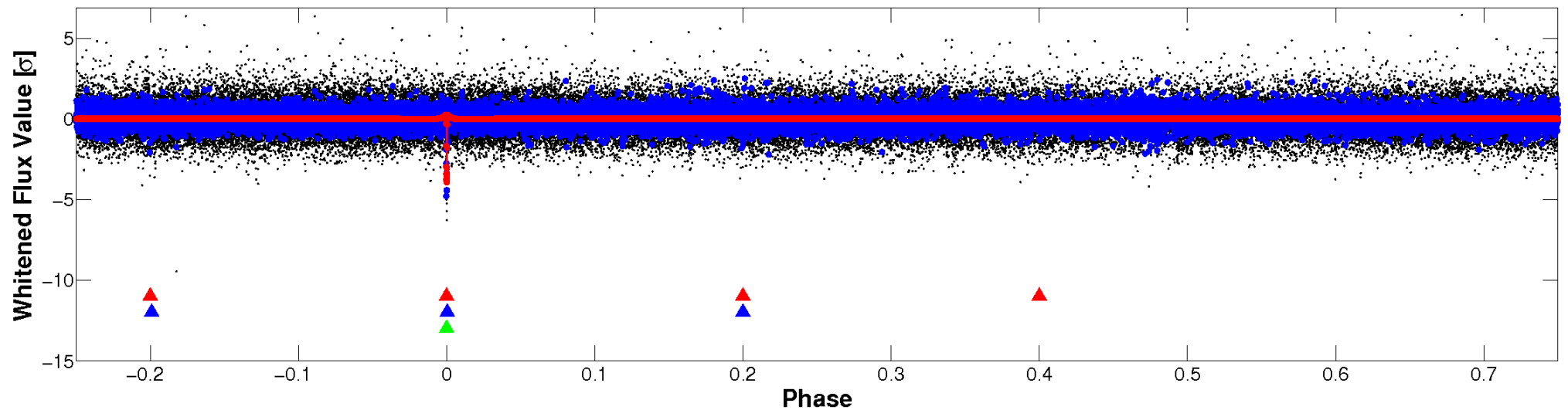


# Non-Whitened Vs. Whitened Light Curve

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

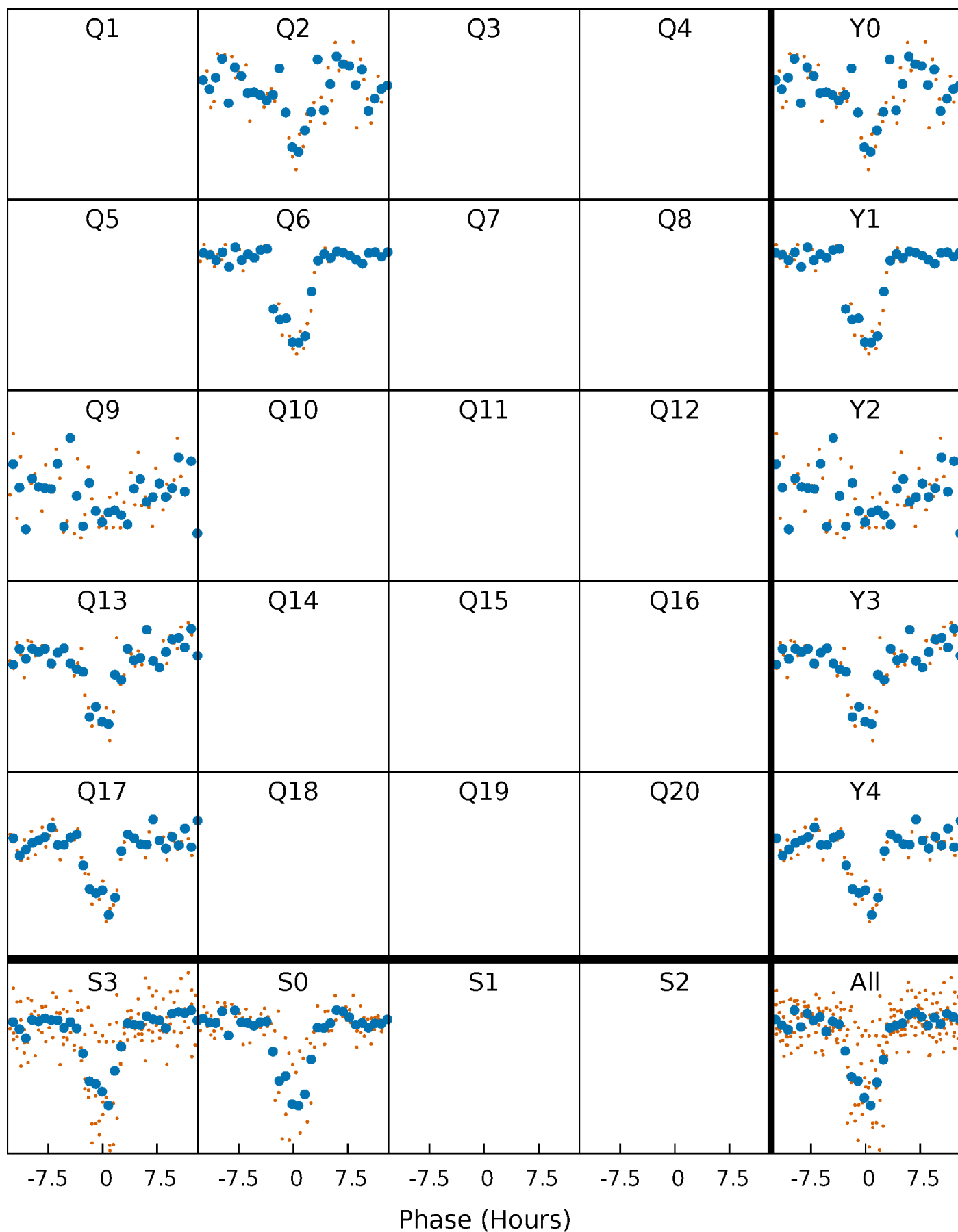


**Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



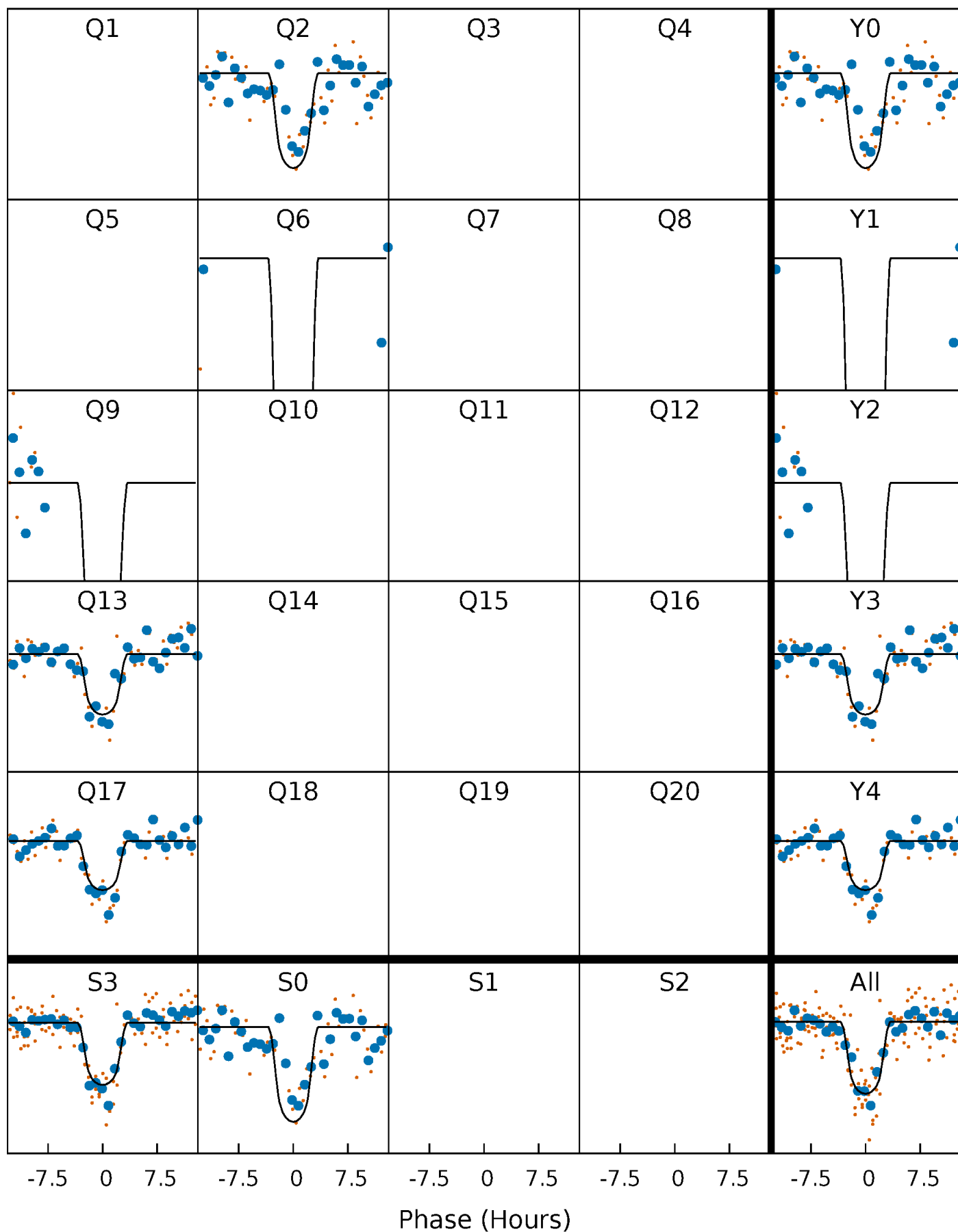
# PDC Quarter-Phased Transit Curves

TCE 007024511-03 P=330.776770 Days  $T_0=241.798287$  (BKJD)



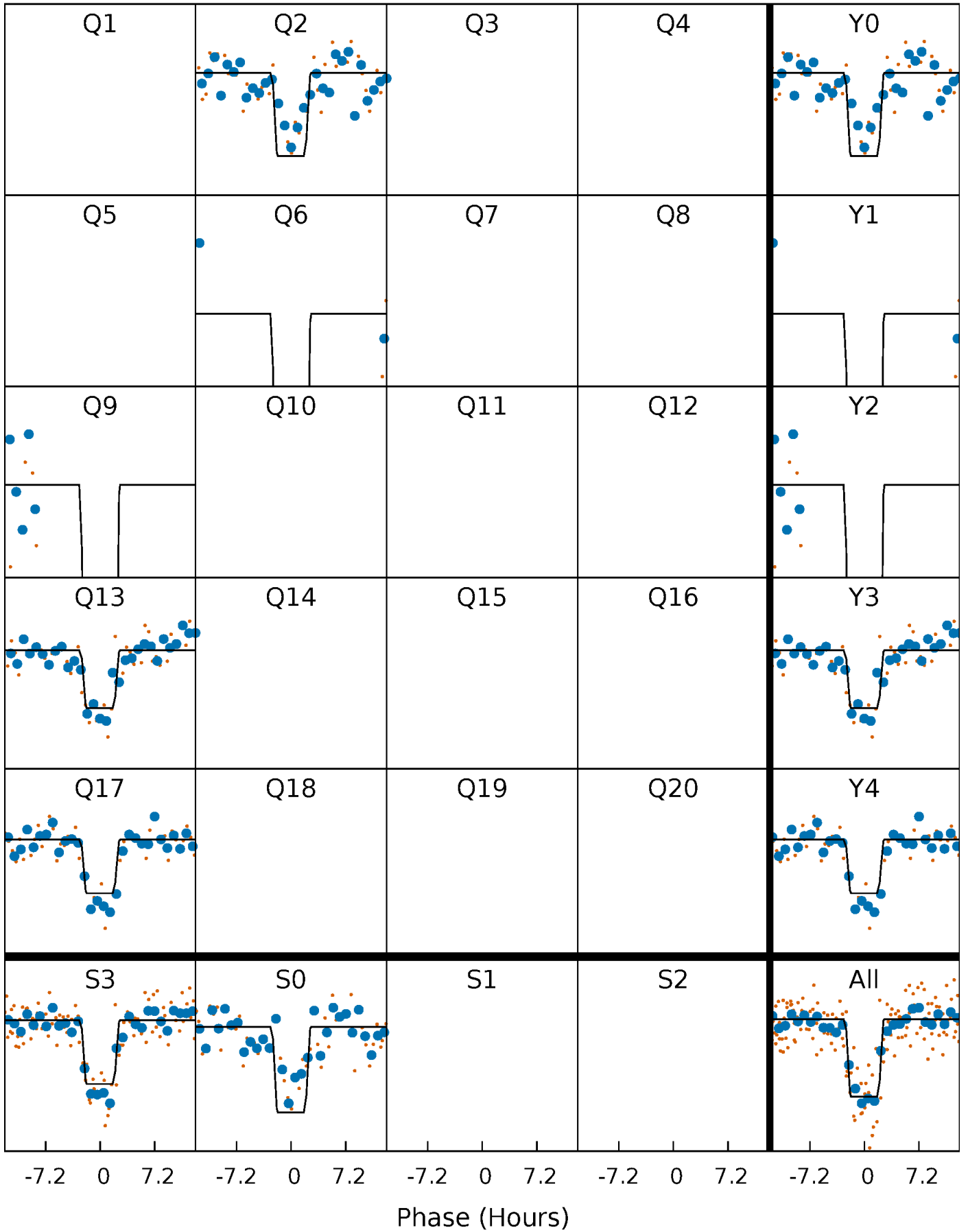
# DV Quarter-Phased Transit Curves

TCE 007024511-03 P=330.776770 Days  $T_0=241.798287$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

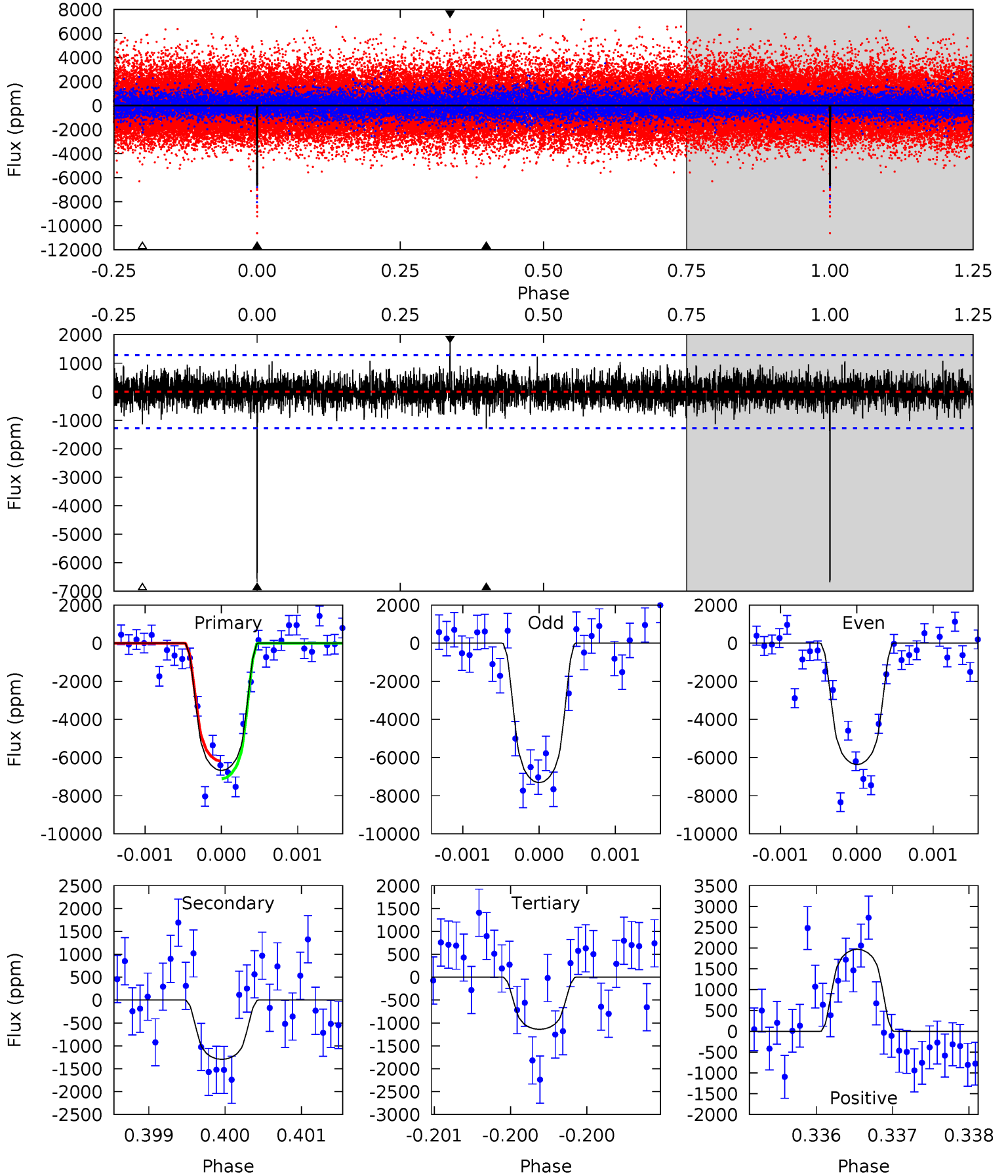
TCE 007024511-03 P=330.771658 Days  $T_0=241.811722$  (BKJD)



# DV Model-Shift Uniqueness Test

007024511-03,  $P = 330.776770$  Days,  $E = 241.798287$  Days

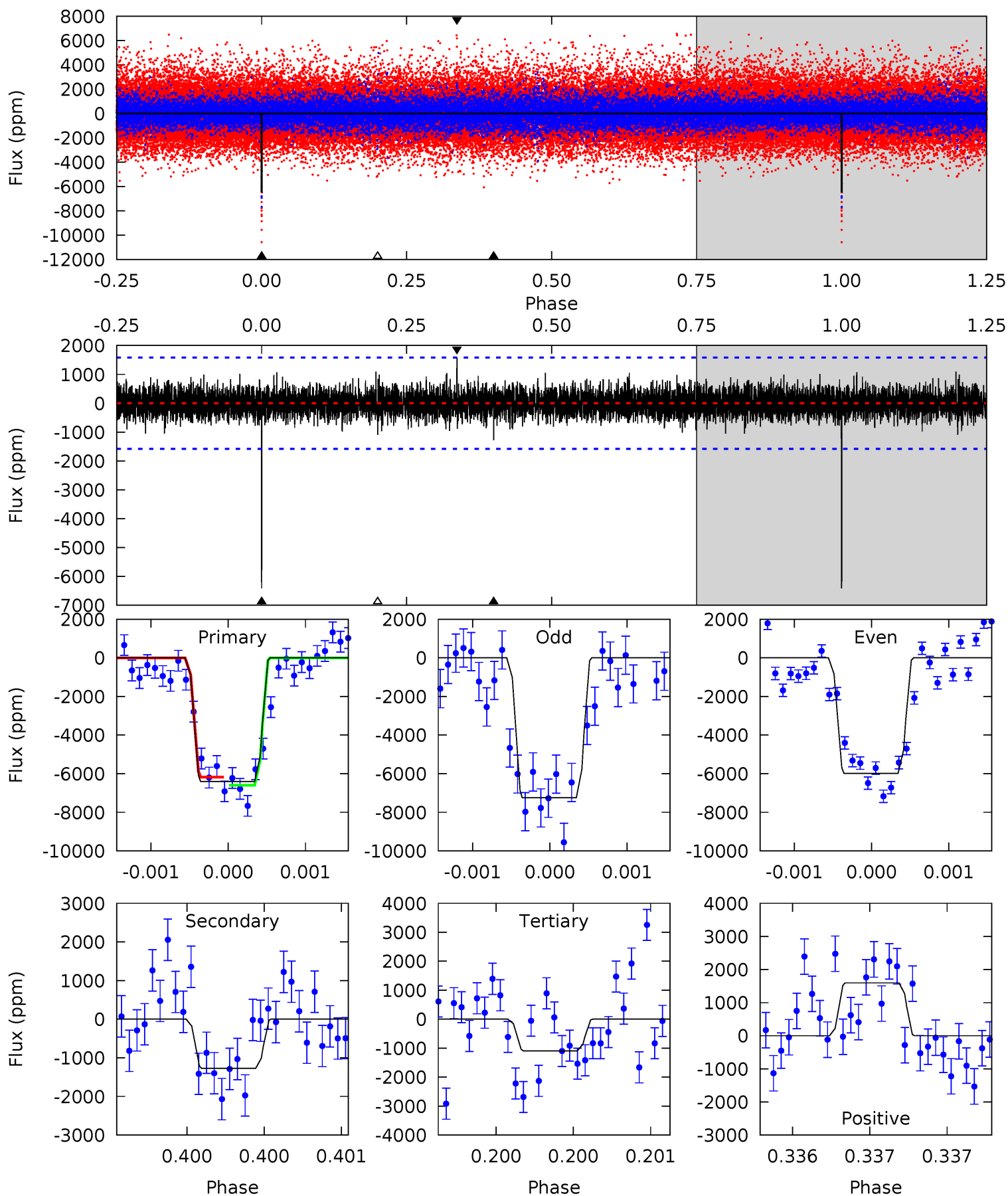
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
28.5	5.53	4.86	8.41	5.47	3.32	1.34	23.6	20.1	0.66	-2.89	1.88	0.97	0.23	1.98



# Alt Model-Shift Uniqueness Test

007024511-03,  $P = 330.771658$  Days,  $E = 241.811722$  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
22.4	4.45	3.82	5.57	5.54	3.42	1.03	18.6	16.8	0.64	-1.12	2.09	0.93	0.20	0.73



### Stellar Parameters For KIC 007024511

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4679^{+167}_{-167}$	$4.627^{+0.048}_{-0.032}$	$-0.400^{+0.300}_{-0.300}$	$0.643^{+0.057}_{-0.057}$	$0.638^{+0.076}_{-0.044}$	$3.388^{+0.761}_{-0.518}$
	+4%/-4%	+1%/-1%	+75%/-75%	+9%/-9%	+12%/-7%	+22%/-15%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 007024511-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-1295 \pm 234$	$5.93^{+0.52}_{-0.52}$	$257^{+10}_{-9}$	$3457^{+178}_{-172}$	$13291^{+3846}_{-2959}$
Alt.	$-1275 \pm 286$	$5.58^{+0.53}_{-0.55}$	$257^{+9}_{-10}$	$3510^{+188}_{-189}$	$14655^{+4875}_{-3666}$

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



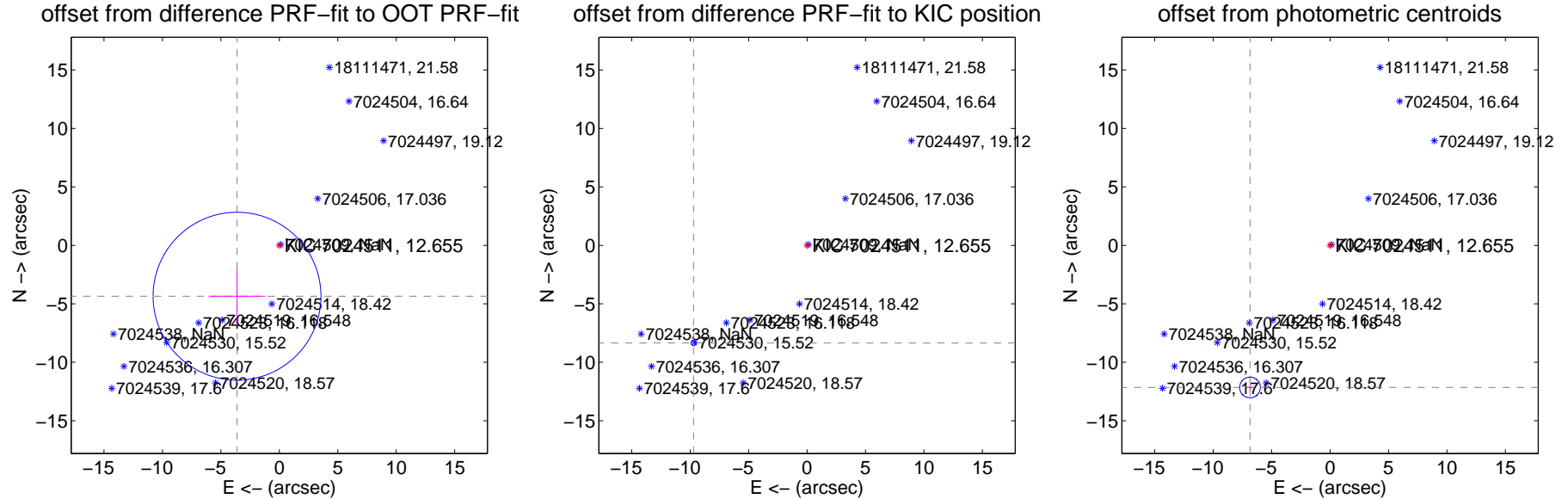
## DV Centroid Data

Supplemental centroid analysis for 007024511-03. Kepler magnitude: 12.65. Transit SNR 17.24

There are 5 quarters with good PRF difference image offsets

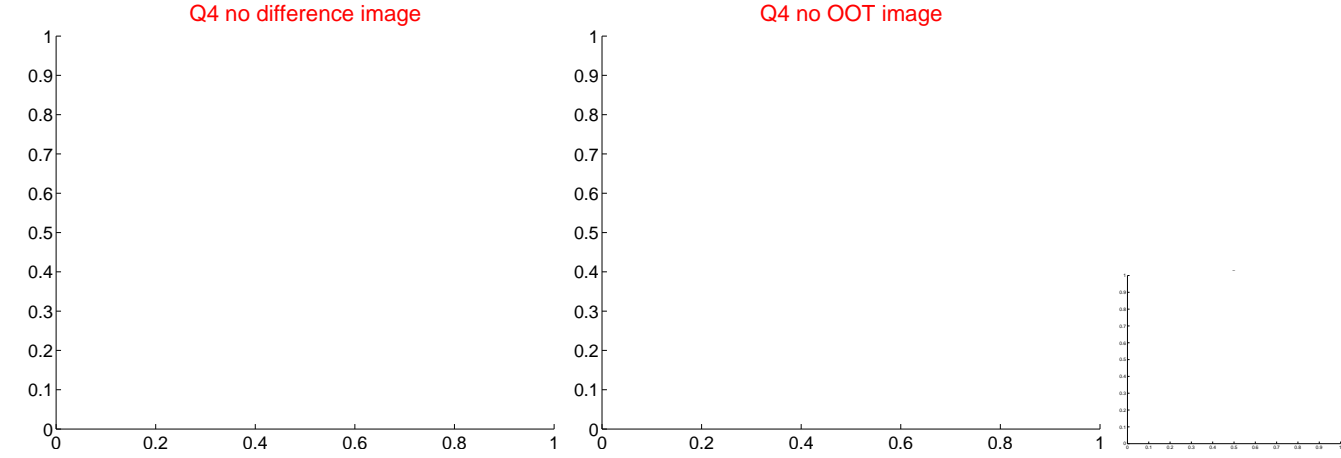
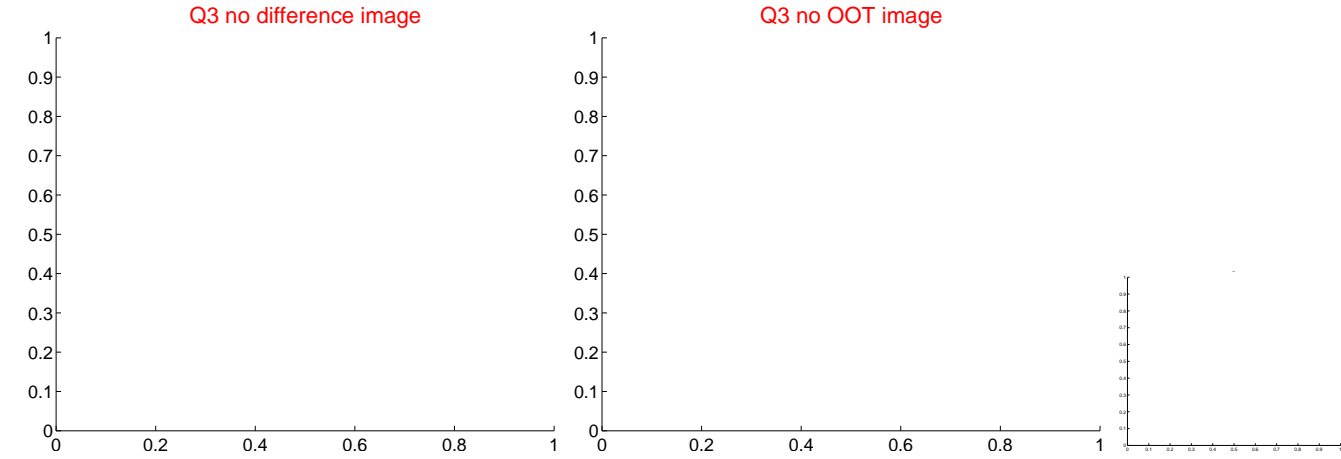
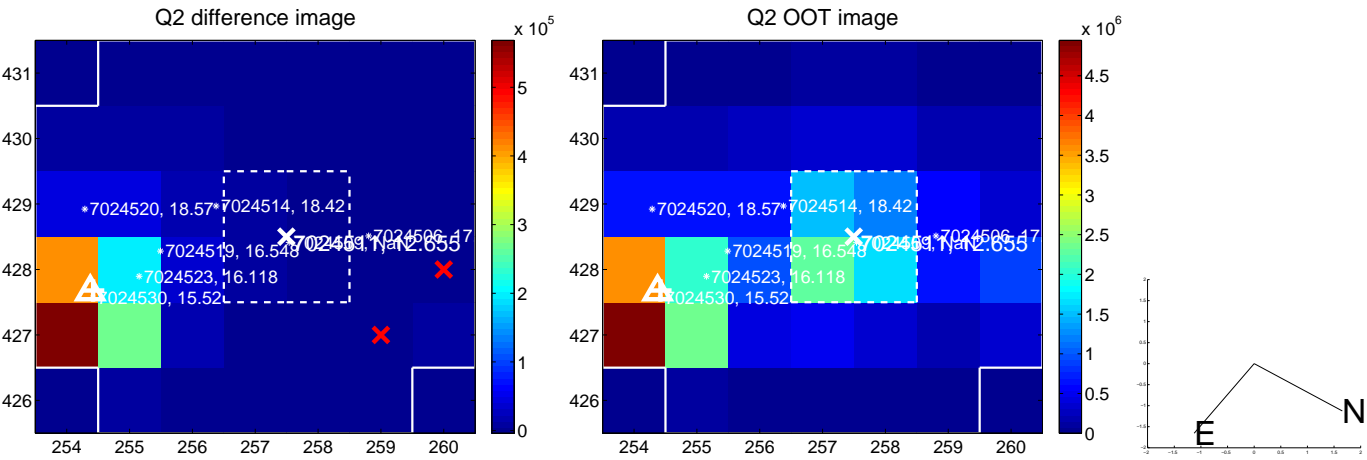
The direct PRF centroid is offset from the target star catalog position by about 0.65 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$5.659 \pm 2.393$	2.36	$3.620 \pm 2.423$	$-4.350 \pm 2.372$
PRF-fit source offset from KIC position	<b><math>12.807 \pm 0.074</math></b>	<b>173.50</b>	$9.709 \pm 0.072$	$-8.351 \pm 0.069$
photometric centroid source offset	<b><math>13.95 \pm 0.30</math></b>	<b>47.28</b>	$6.85 \pm 0.32$	$-12.15 \pm 0.29$

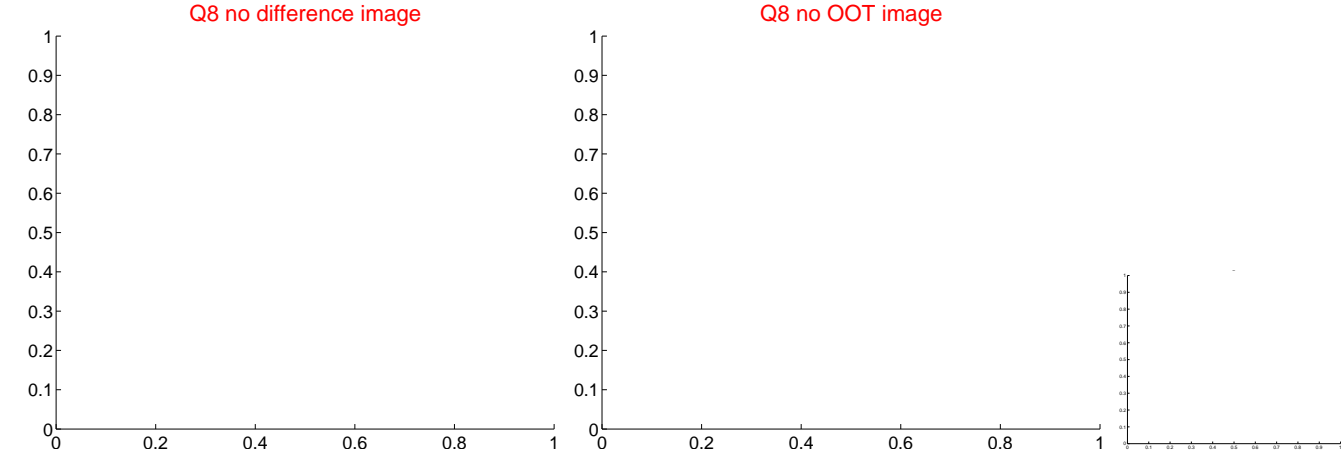
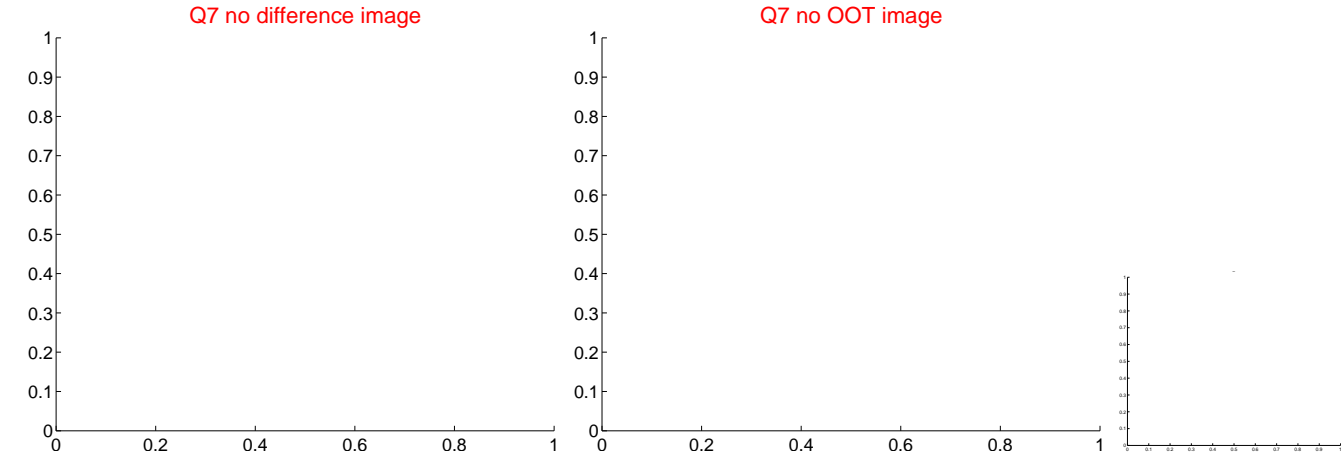
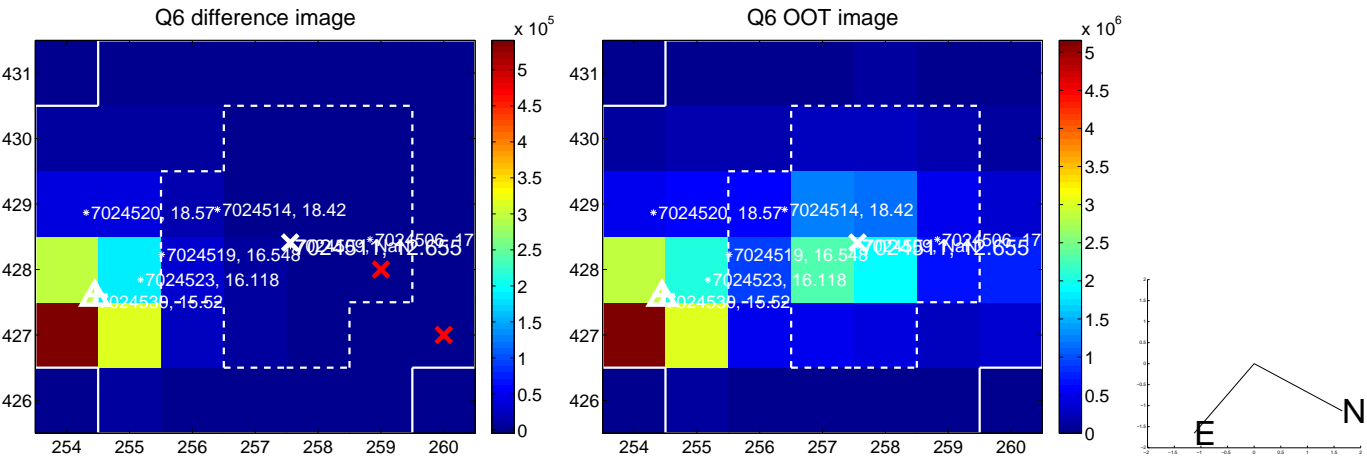
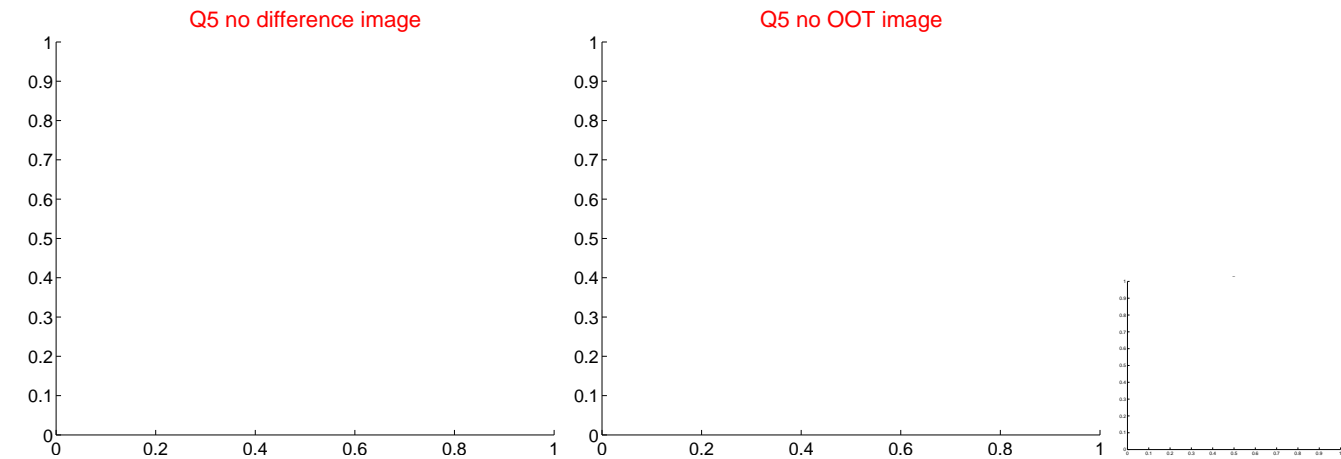


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

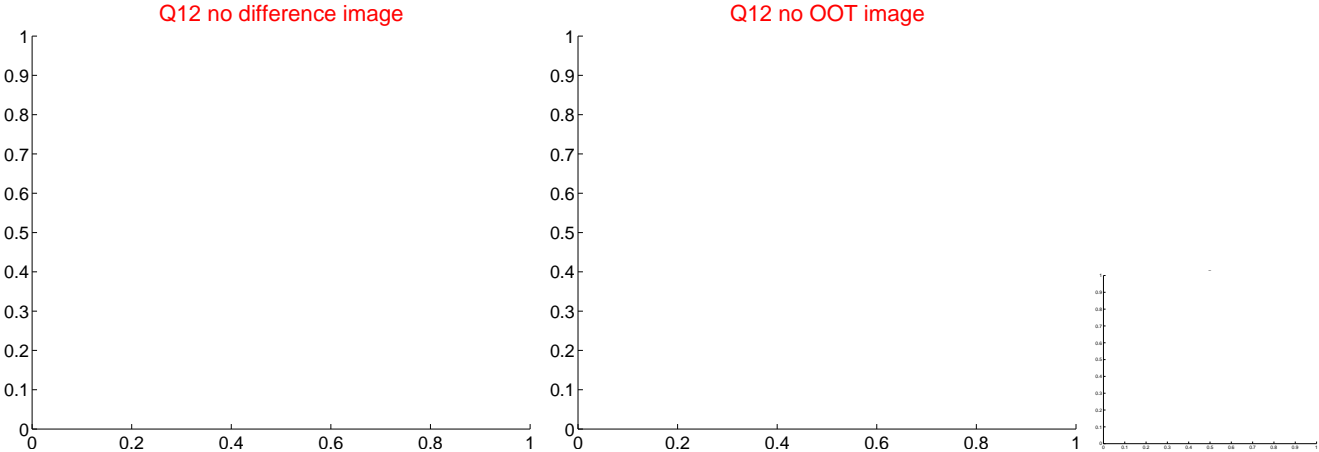
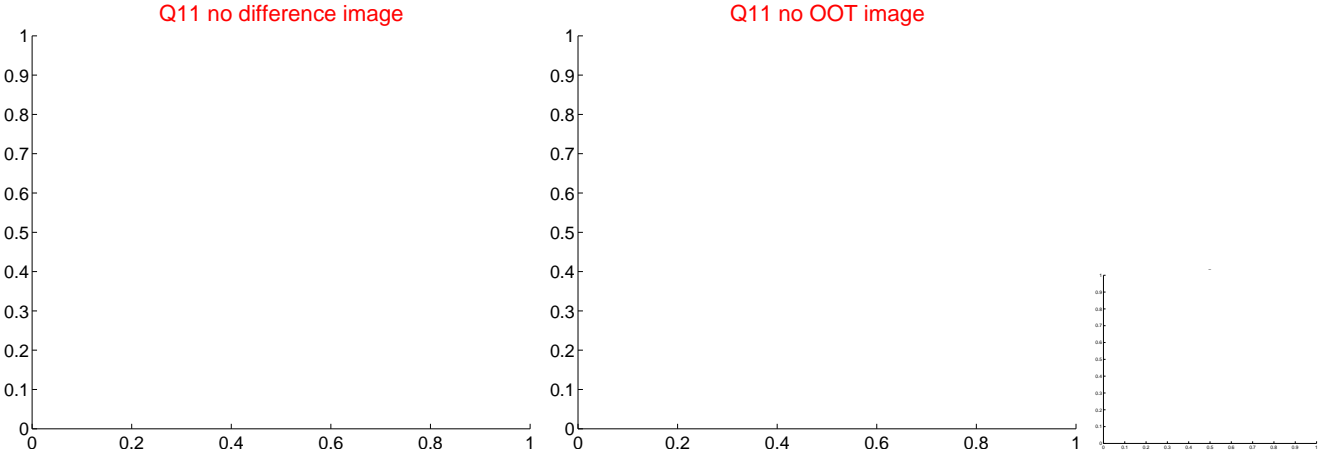
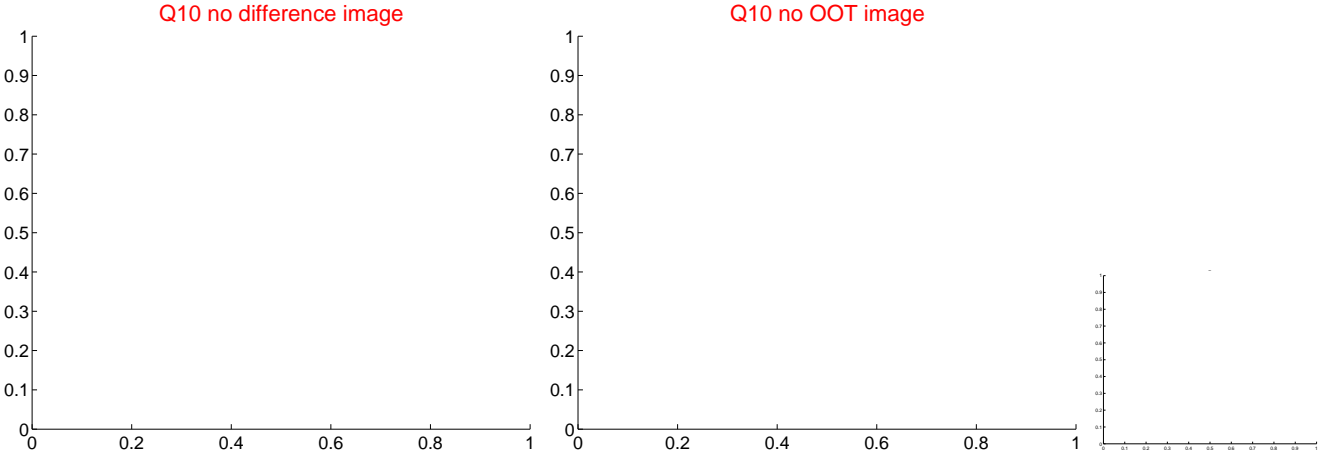
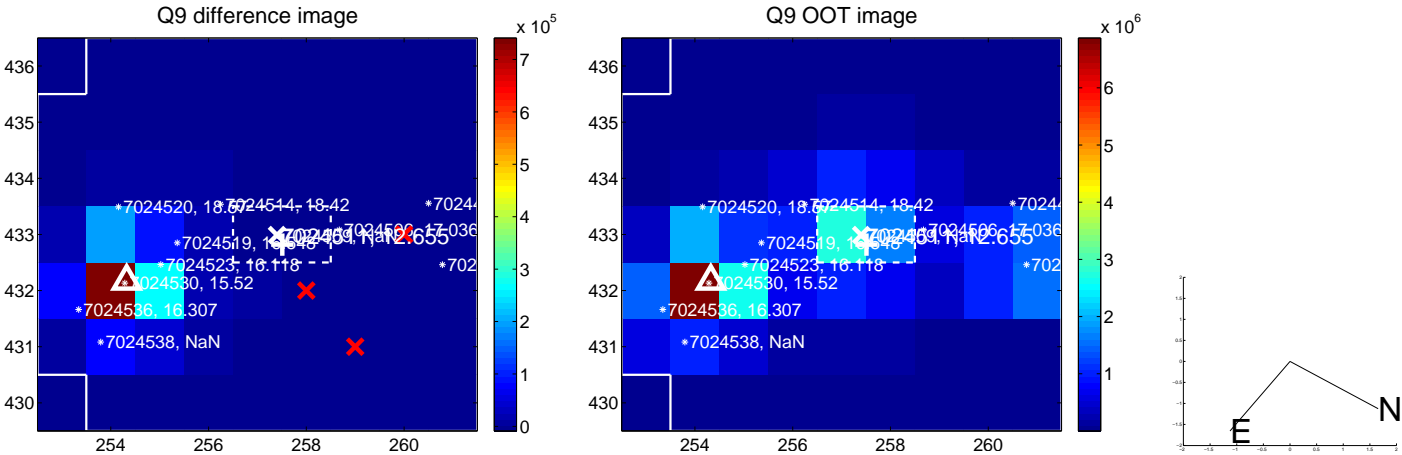
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



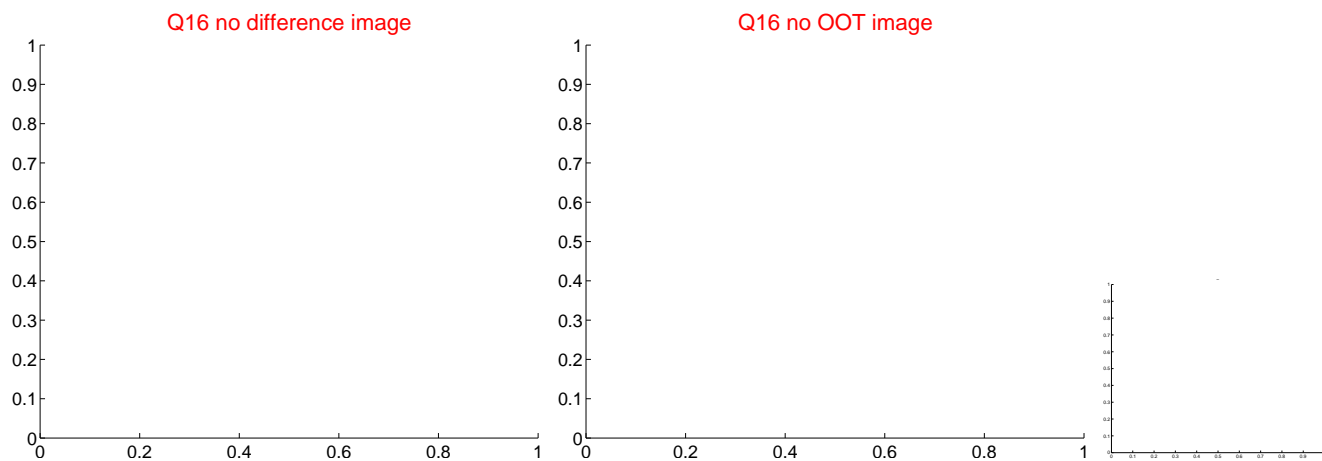
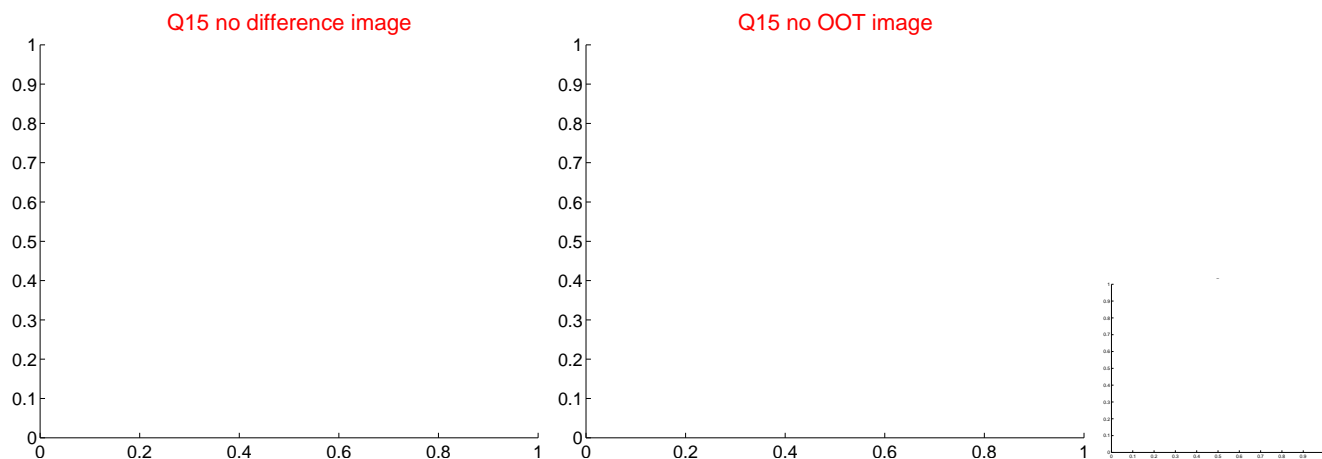
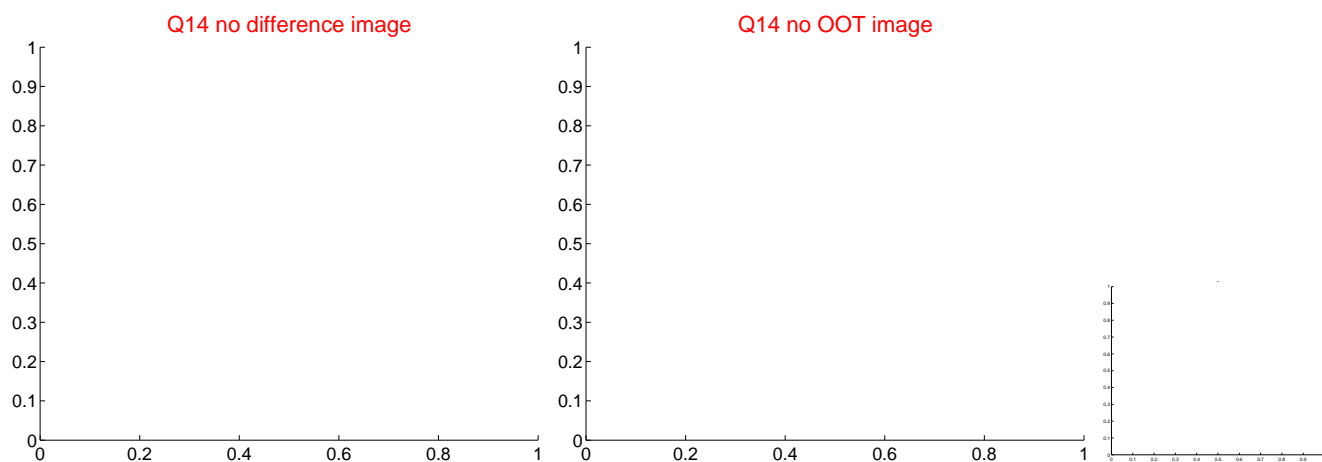
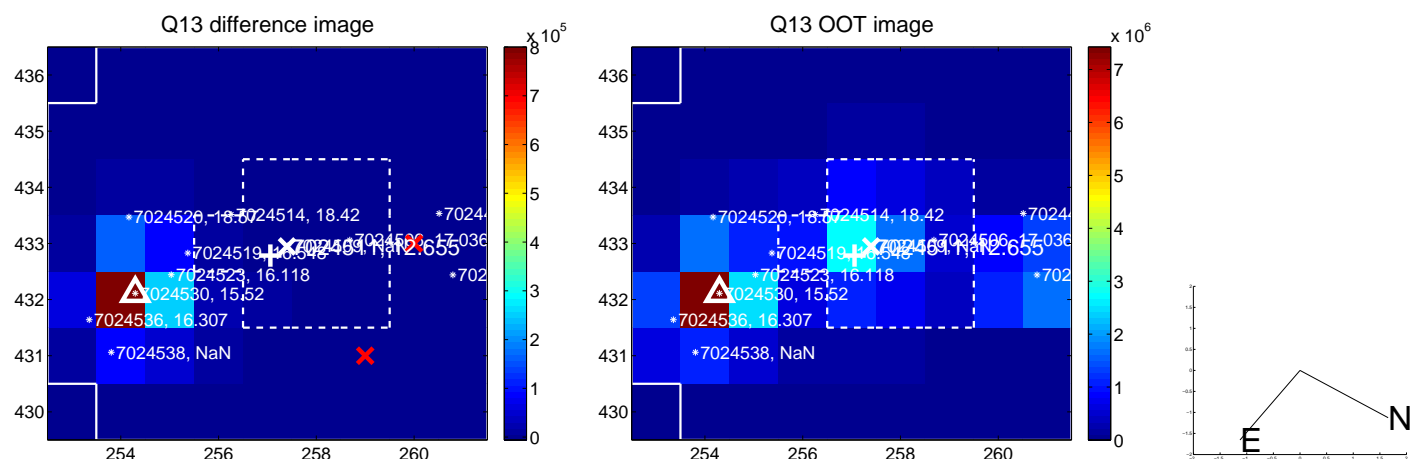
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



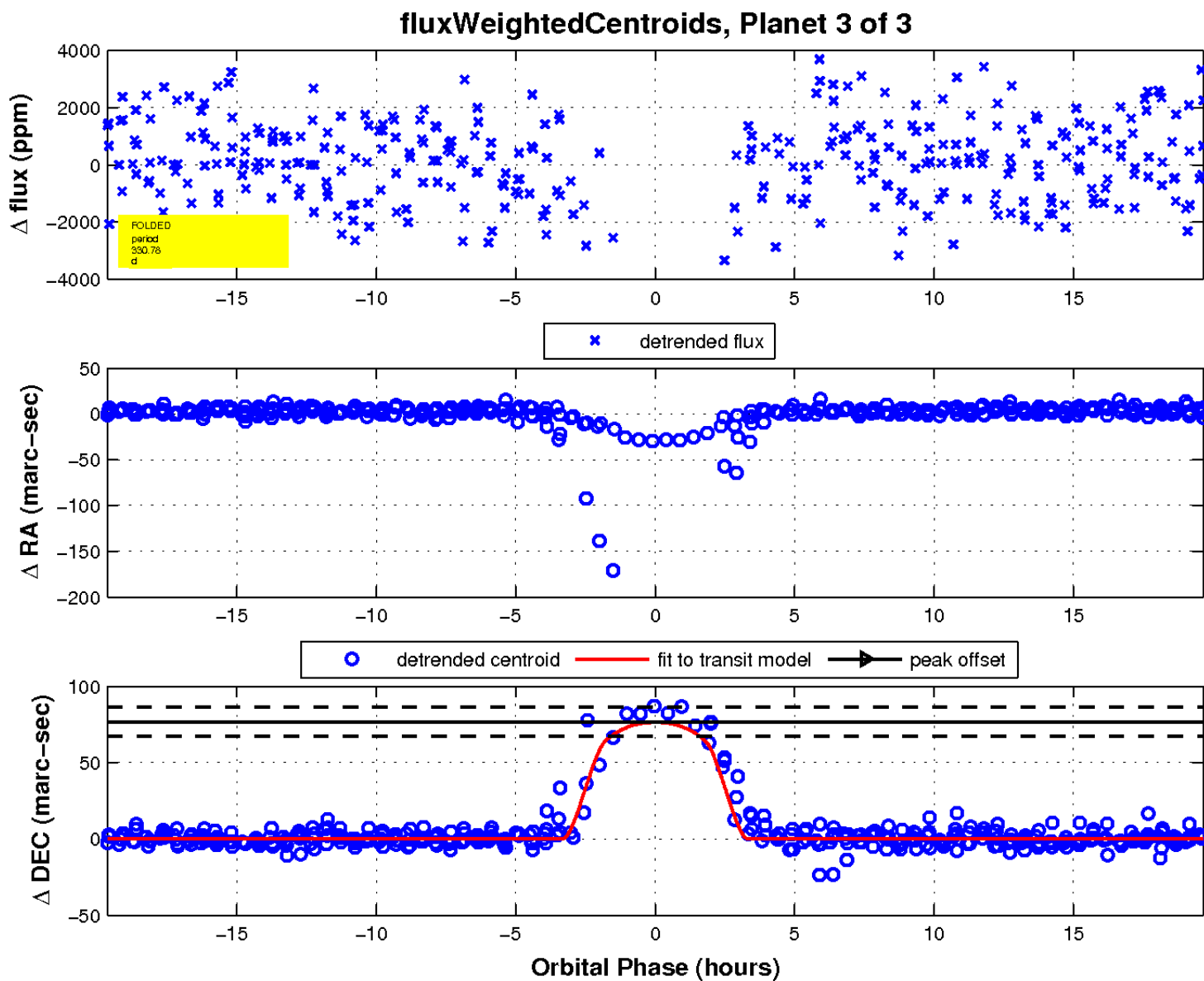
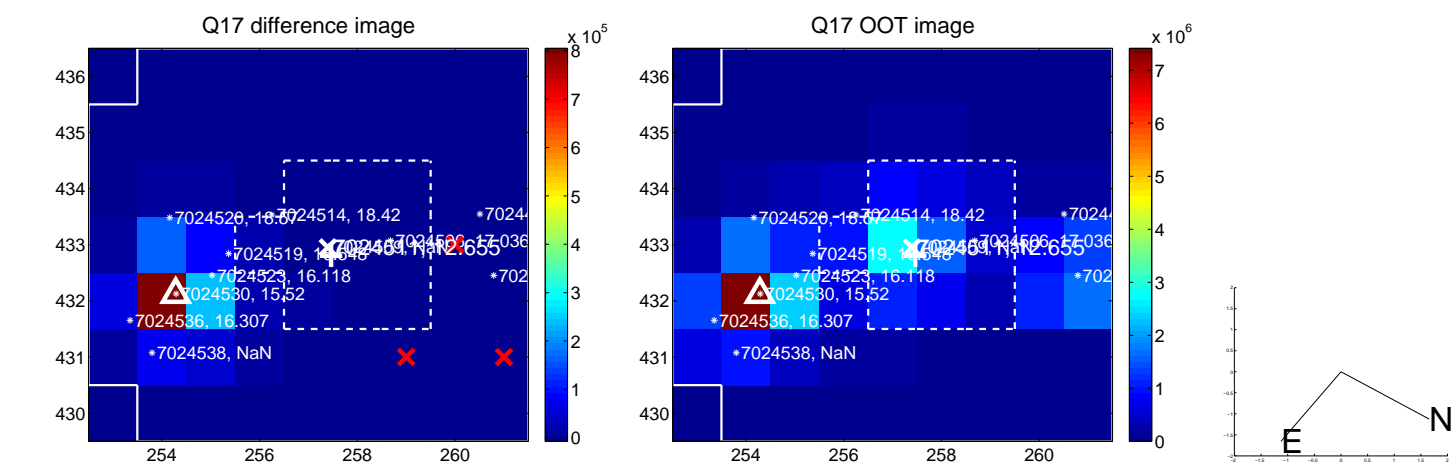
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



UKIRT Image

Declination

