

# KIC 007024530

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007024530-01	OBS	3922.01	66.154385	175.650610	131492.8	8.368	1173.9	963.6	1.00	6077	52.24	11.32
007024530-02	OBS	No	66.154314	156.966324	6982.2	5.864	69.3	64.3	1.00	6077	9.72	11.32

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007024530-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
007024530-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

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

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

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

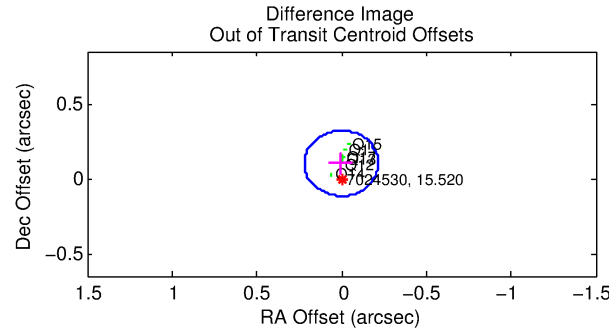
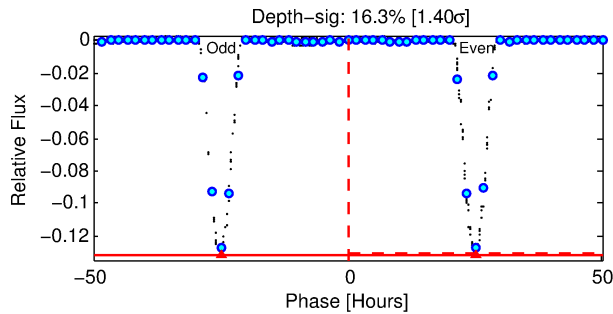
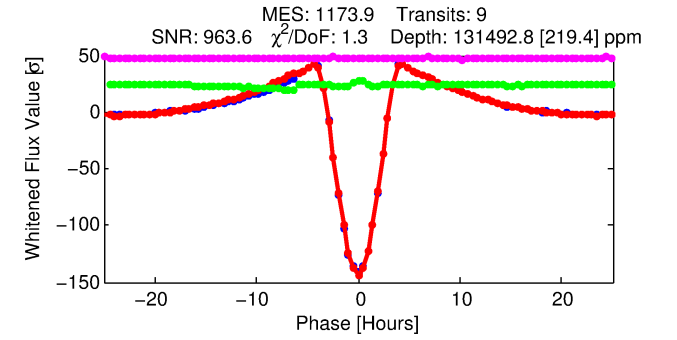
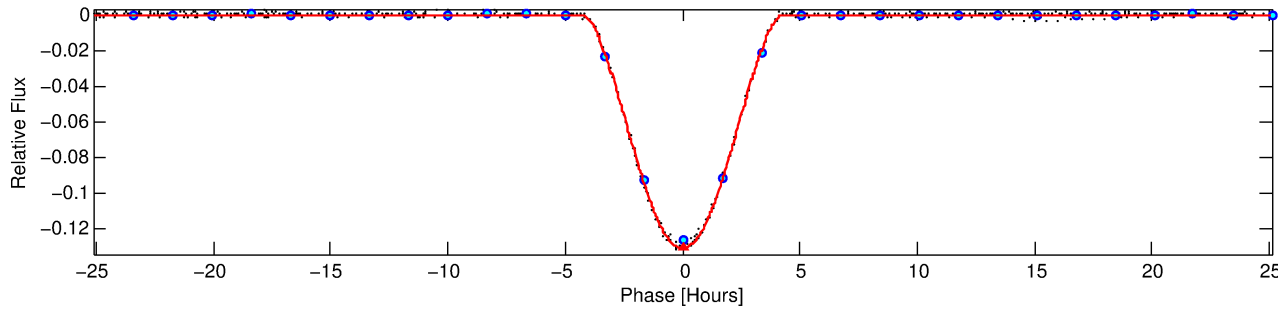
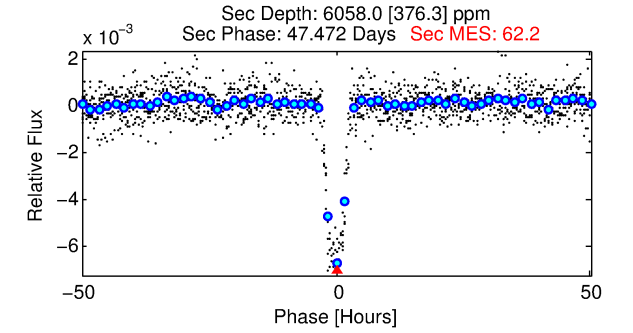
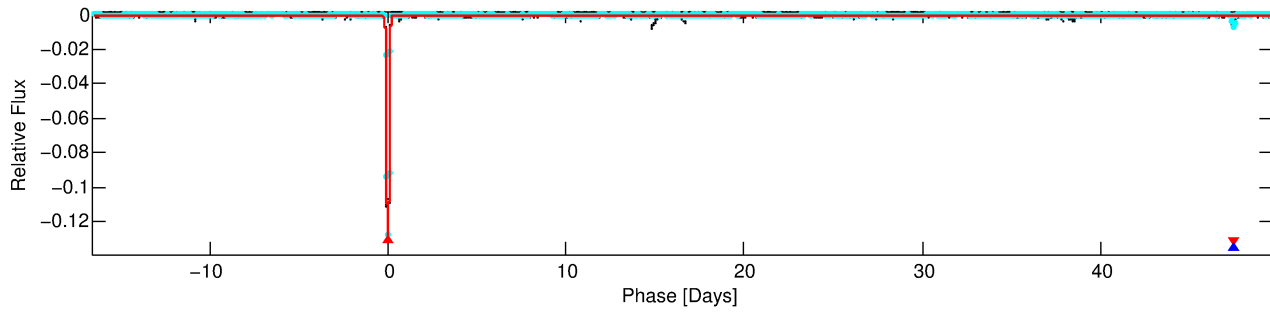
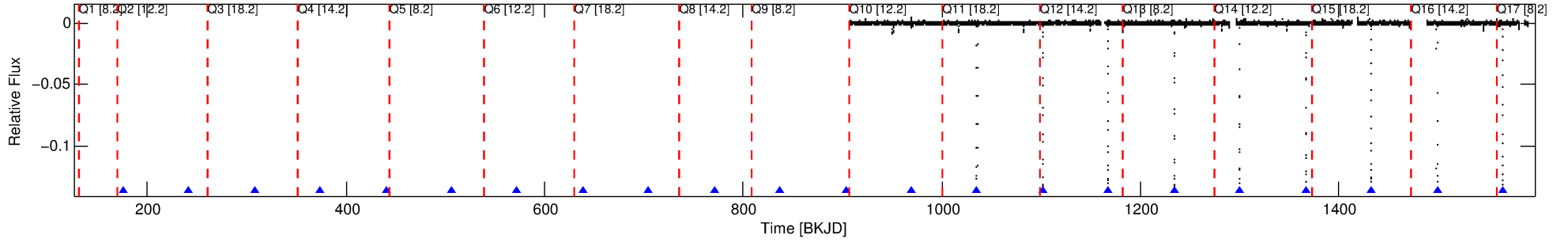
## Ephemeris Match Information For 007024530-01

No Significant Match Found

# DV One-Page Summary

KIC: 7024530 Candidate: 1 of 2 Period: 66.154 d  
KOI: K03922 Corr: No Ephemeris Match

Kp: 15.52 R\*: 1.00 Rs Teff: 6077.0 K Logg: 4.47 Fe/H: -0.040



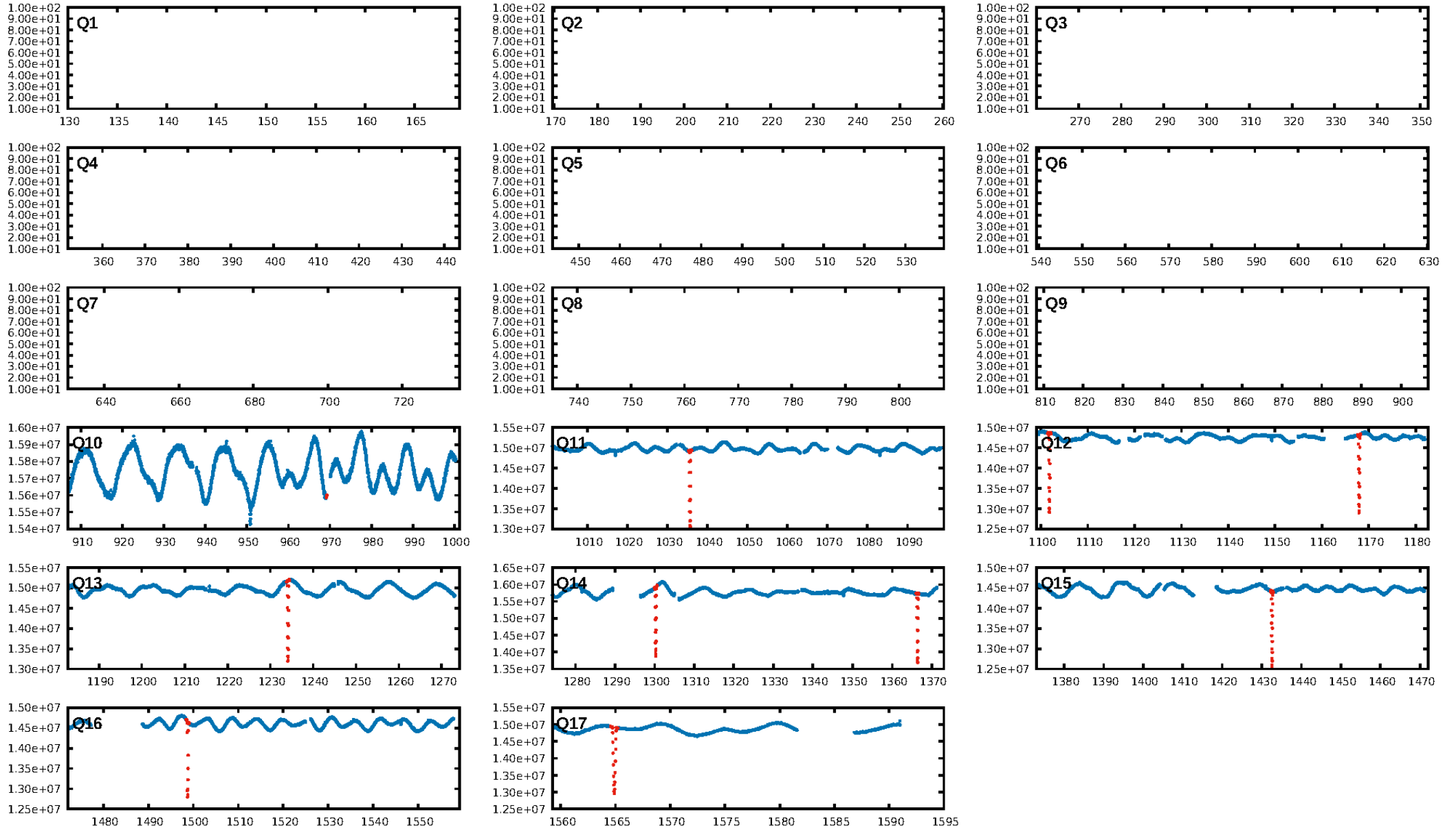
## DV Fit Results:

Period = 66.15439 [0.00003] d  
Epoch = 175.6506 [0.0006] BKJD  
Rp/R\* = 0.4793 [0.0811]  
a/R\* = 71.56 [0.76]  
b = 0.89 [0.12]  
Seff = 11.32 [4.84]  
Teq = 468 [50] K  
Rp = 52.24 [19.53] Re  
a = 0.3282 [0.0910] AU  
Ag = 131.51 [69.30] [1.88σ]  
Teffp = 2449 [230] K [8.40σ]

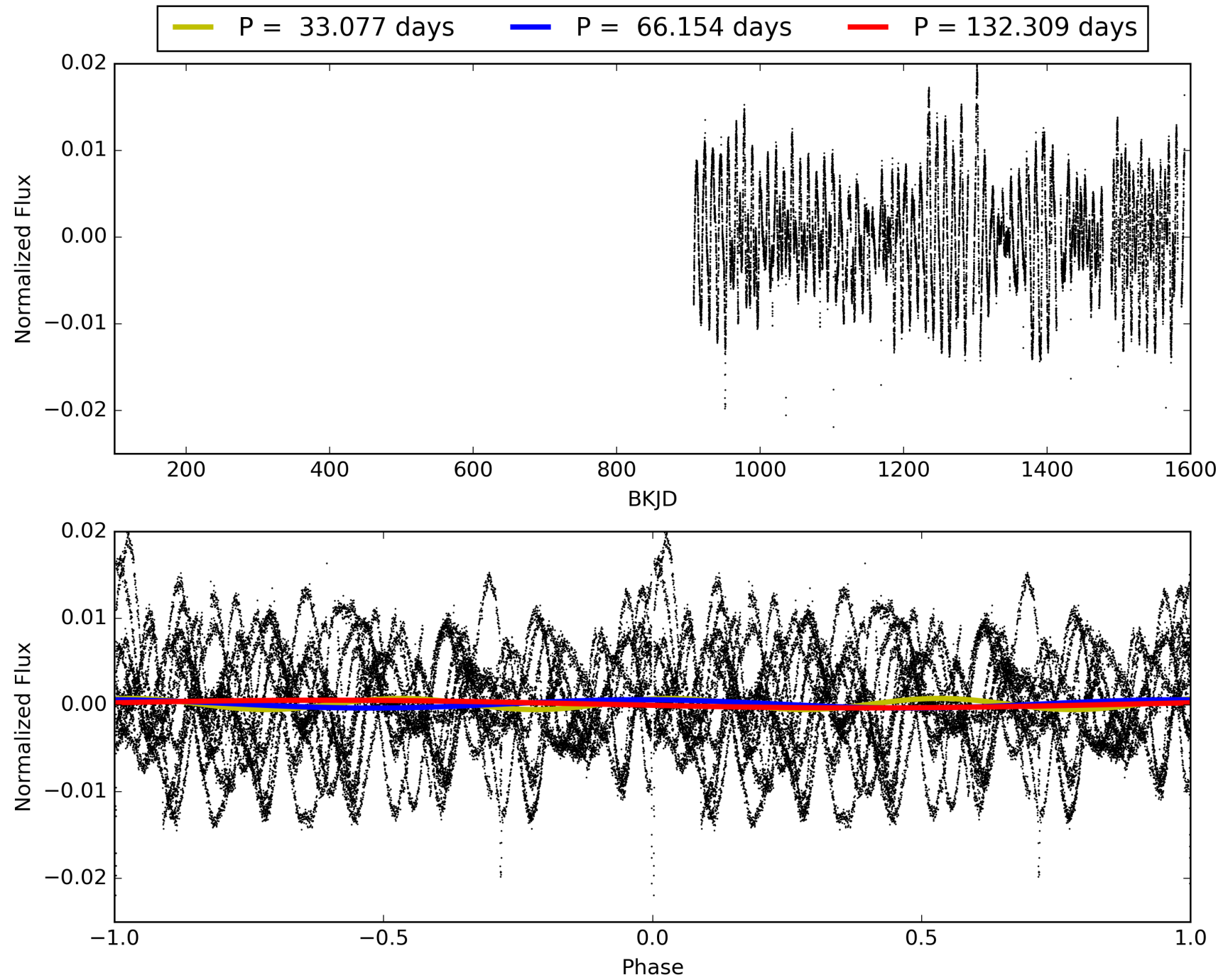
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 1.8%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [8/8]  
GhostDiagnostic-chr: 3.208  
Centroid-sig: 0.0%  
Centroid-so: 0.248 arcsec [36.22σ]  
OotOffset-rm: 0.102 arcsec [1.41σ]  
OotOffset-st: 1/2/1/2 [6]  
KicOffset-rm: 0.064 arcsec [0.95σ]  
KicOffset-st: 1/2/1/2 [6]  
DiffImageQuality-fgm: 1.00 [6/6]  
DiffImageOverlap-fno: 1.00 [6/6]

# TCE 007024530-01, PDC Light Curves

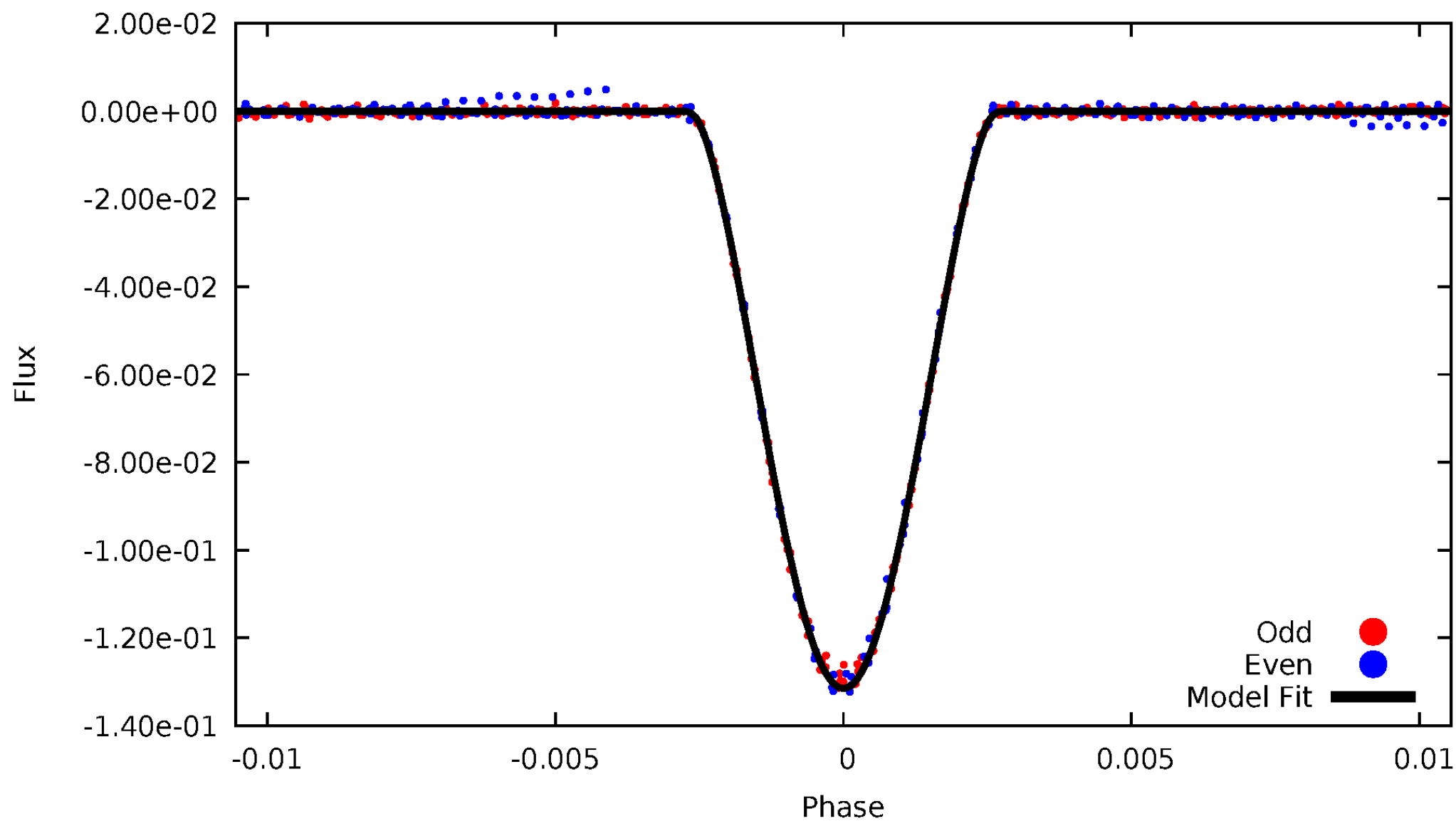


TCE 007024530-01



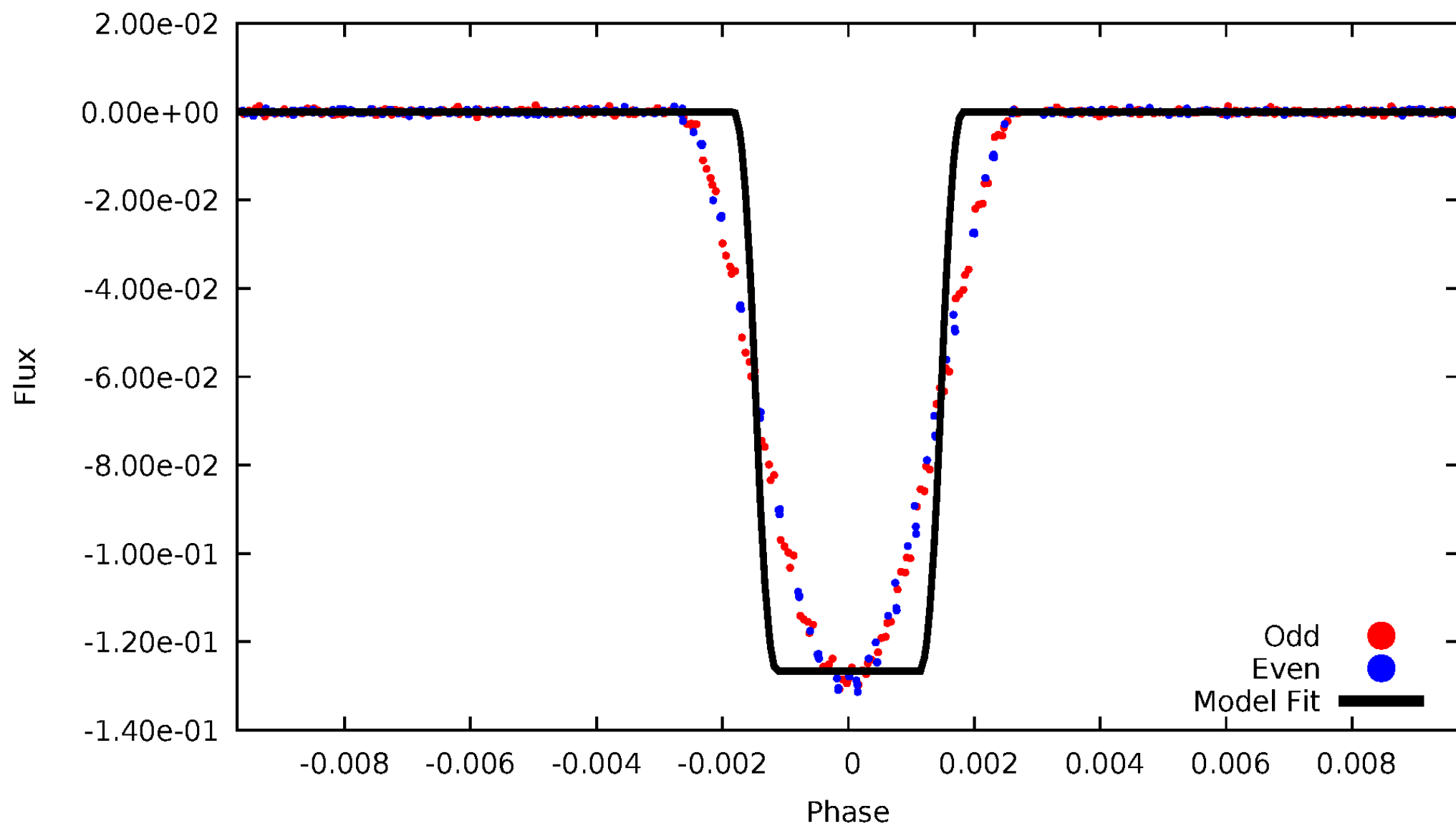
# DV Odd/Even

TCE 007024530-01



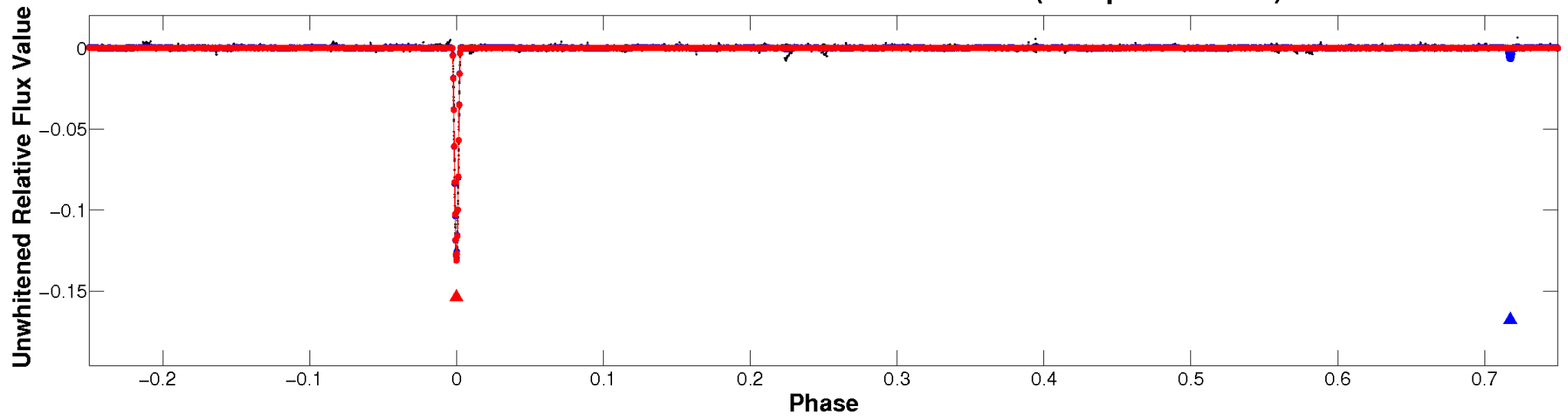
# ALT Odd/Even

TCE 007024530-01

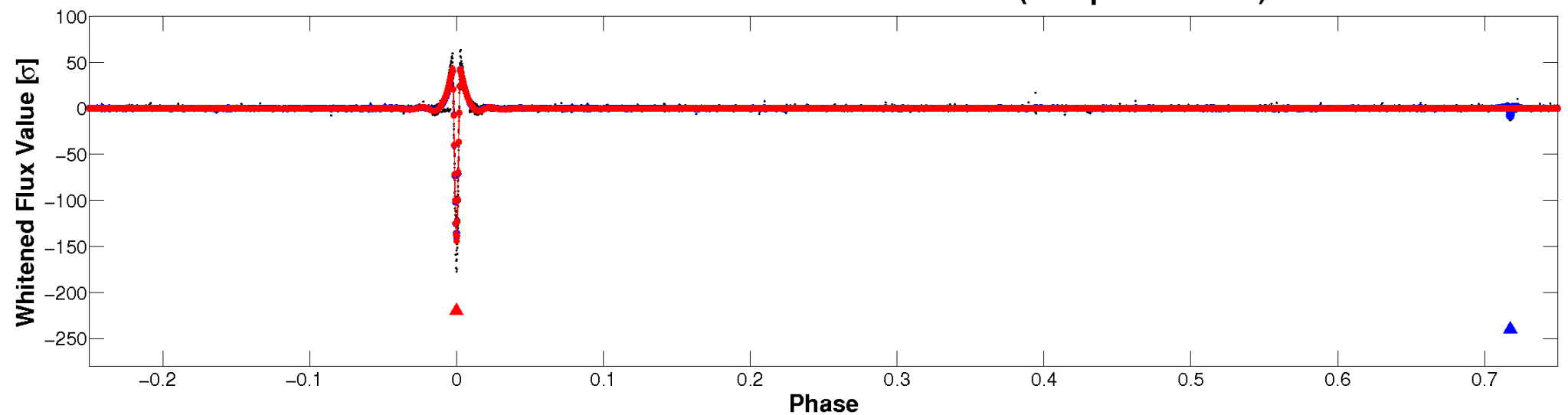


# Non-Whitened Vs. Whitened Light Curve

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

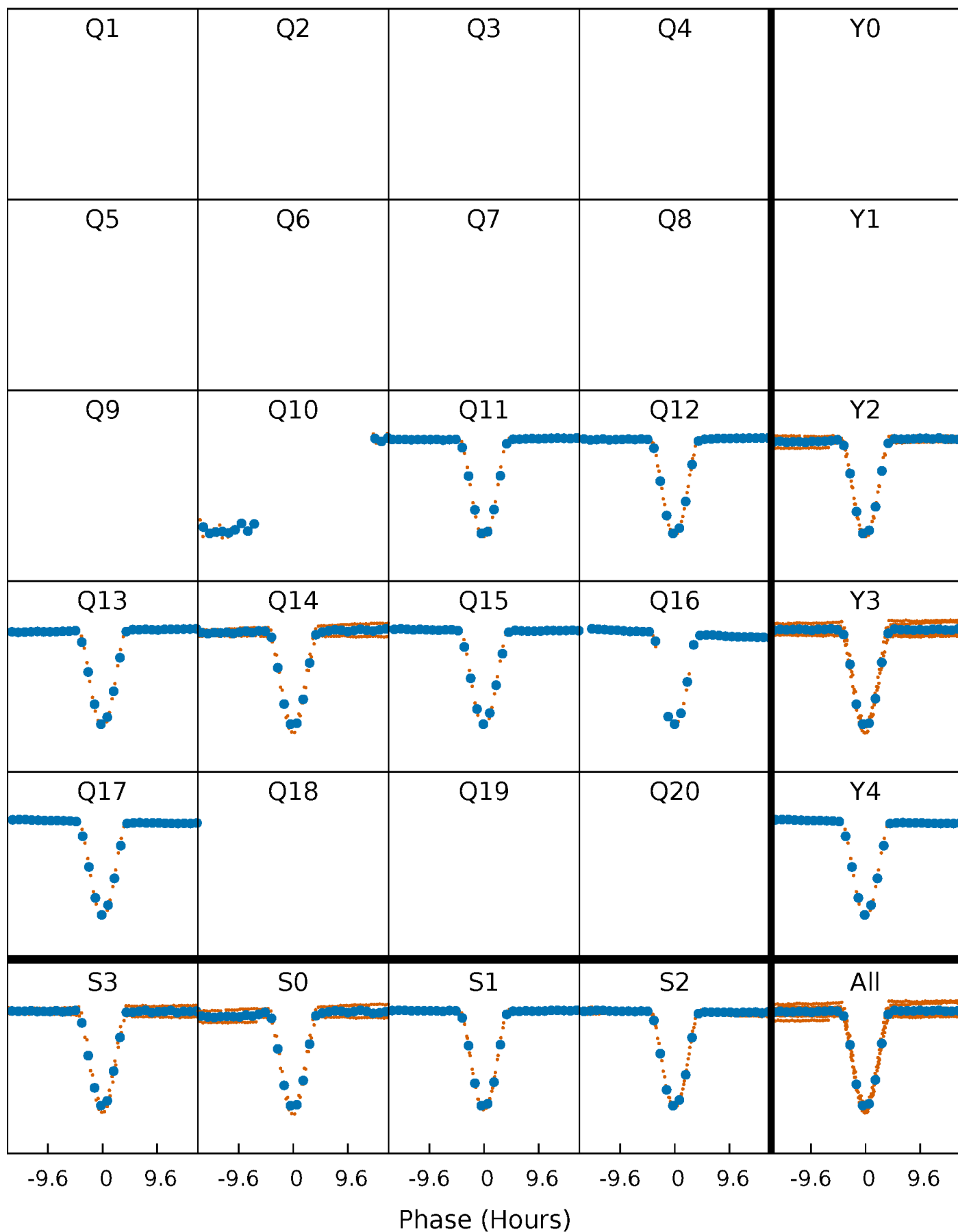


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

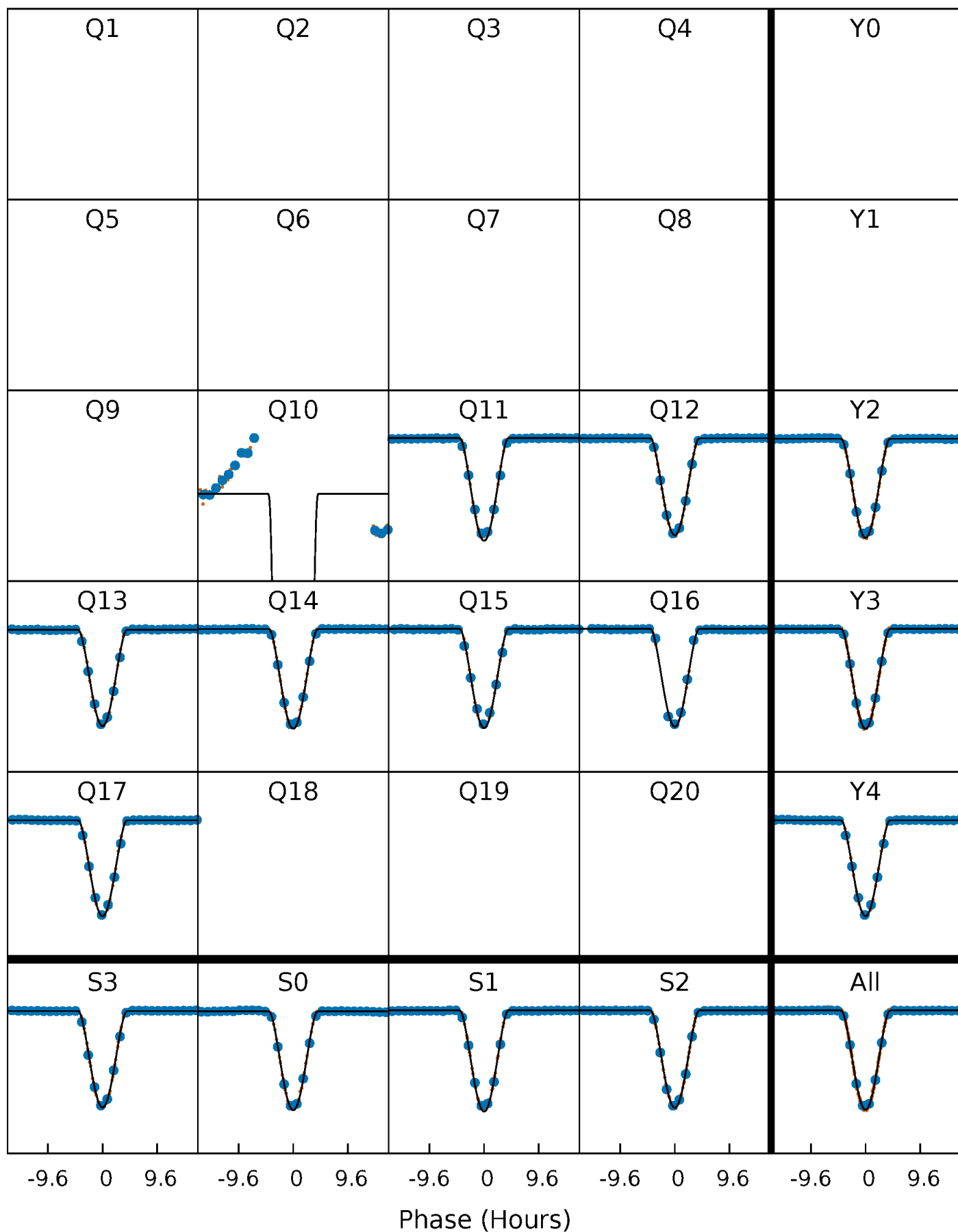
TCE 007024530-01 P= 66.154385 Days  $T_0=175.650610$  (BKJD)





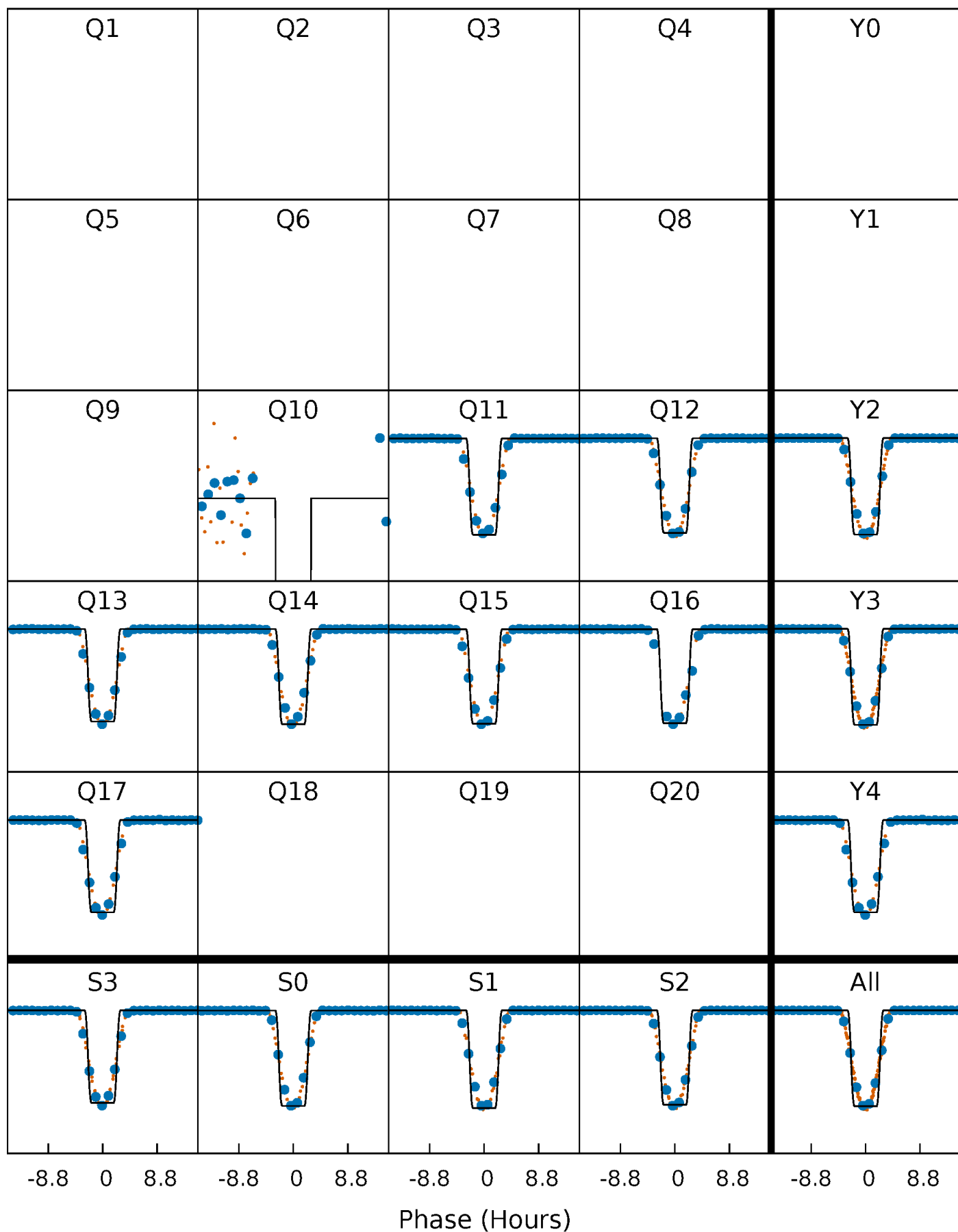
# DV Quarter-Phased Transit Curves

TCE 007024530-01 P= 66.154385 Days  $T_0=175.650610$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

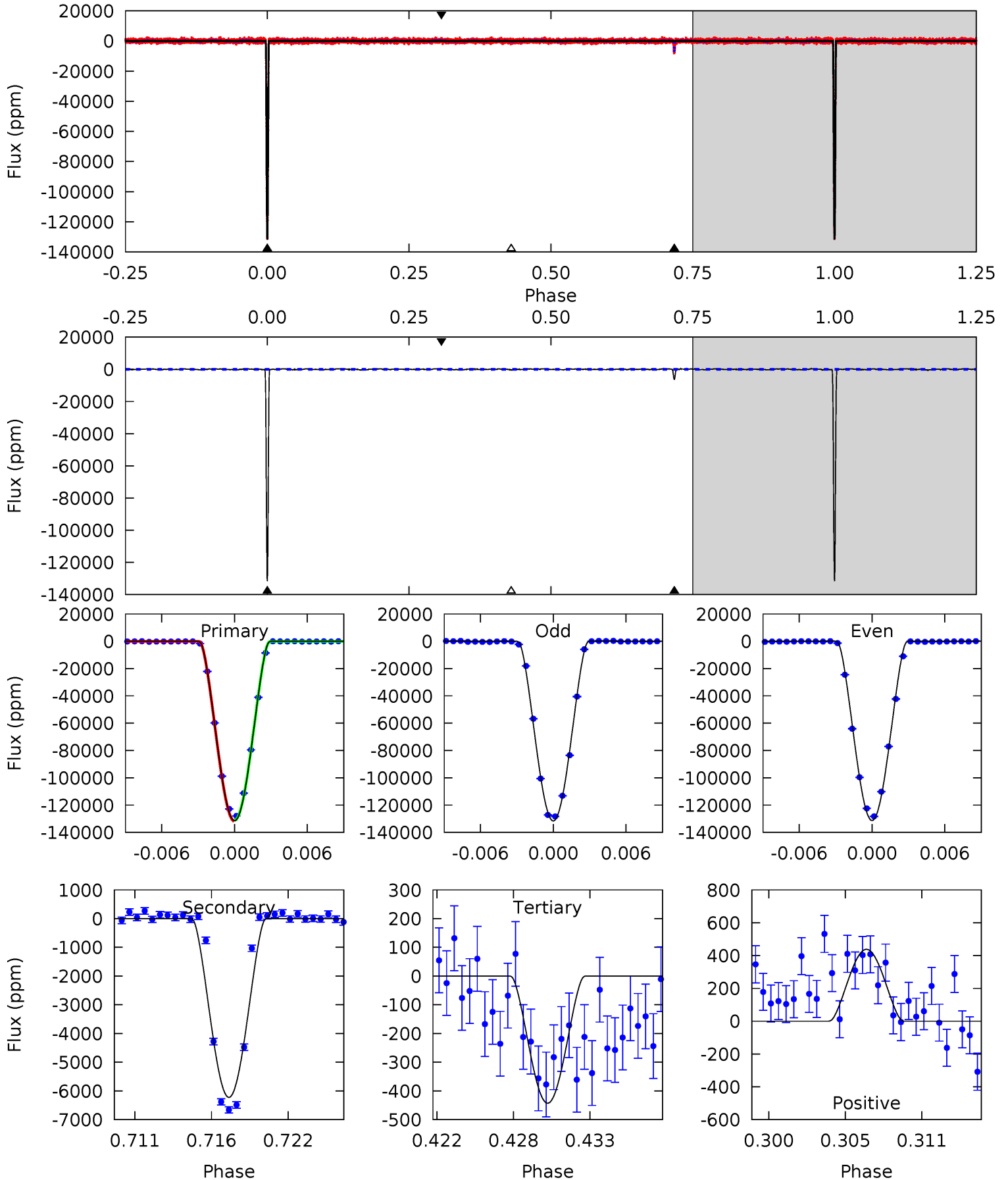
TCE 007024530-01 P= 66.155218 Days  $T_0=175.636432$  (BKJD)



# DV Model-Shift Uniqueness Test

007024530-01, P = 66.154385 Days, E = 175.650610 Days

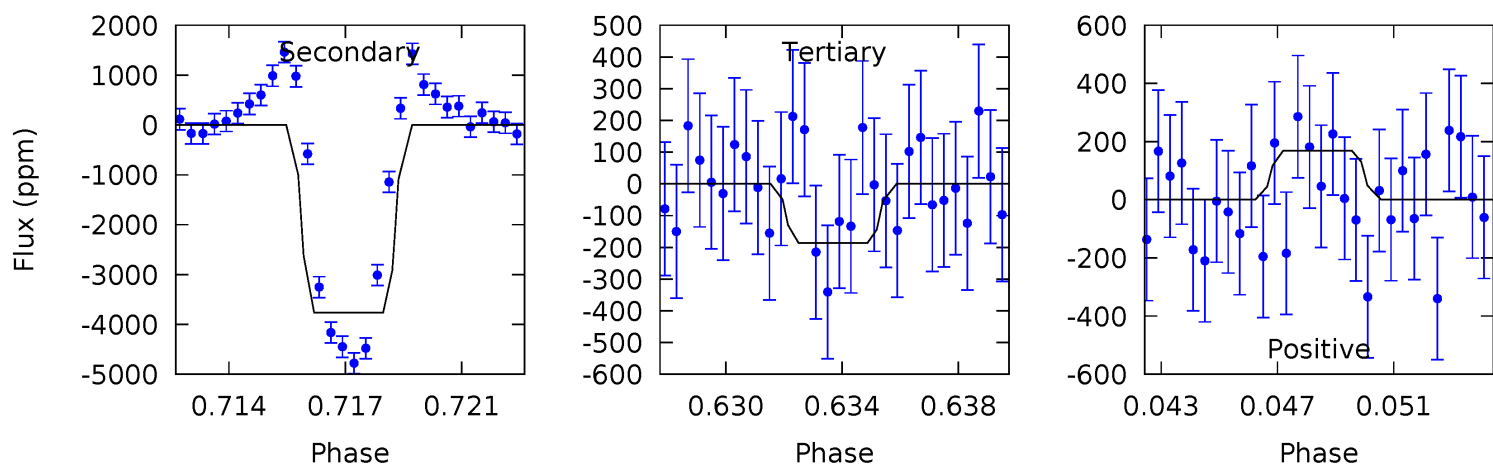
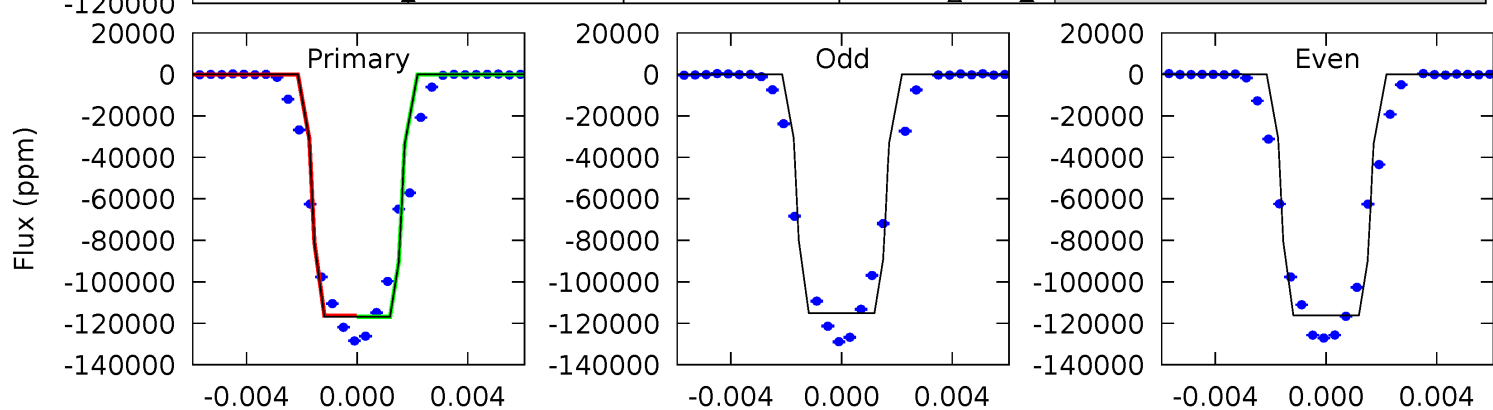
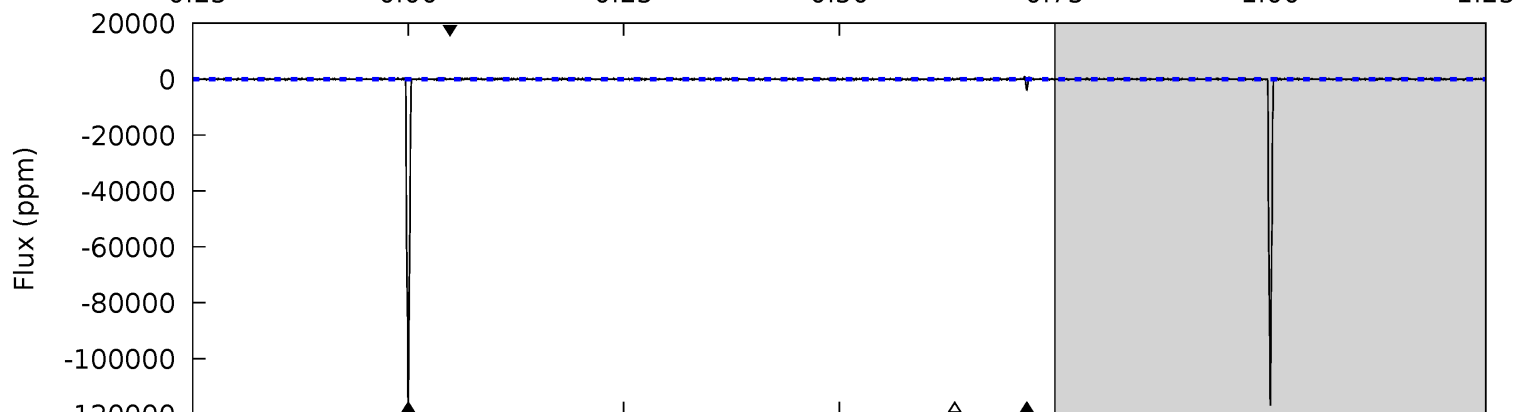
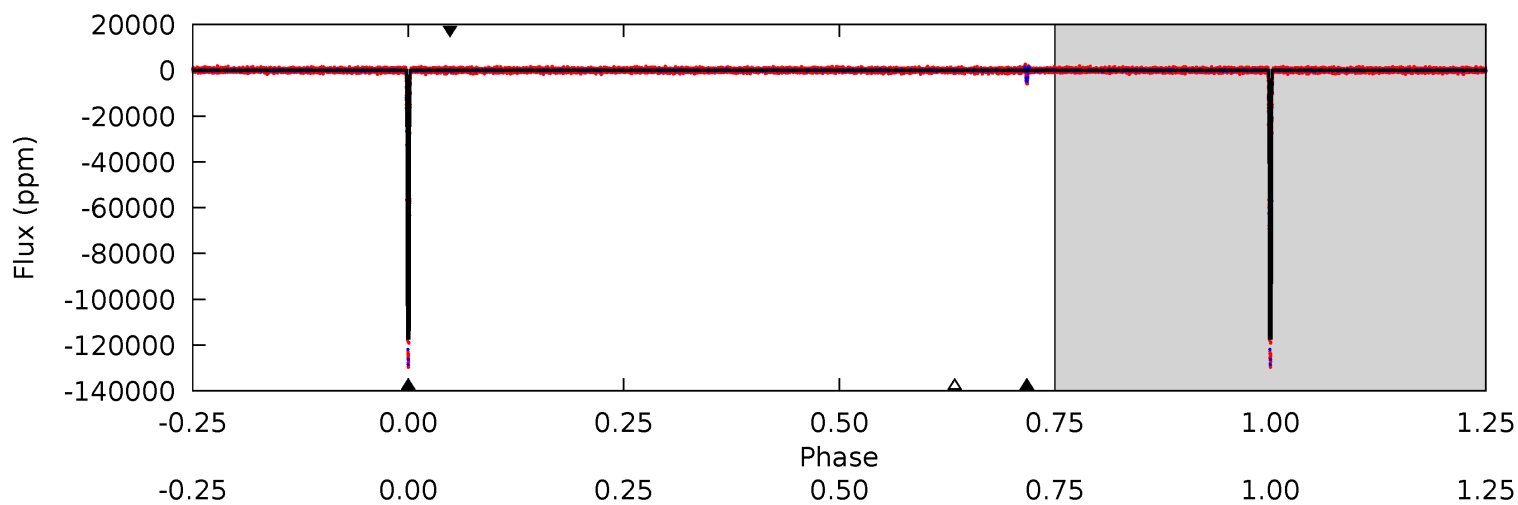
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2678	126.8	9.02	8.92	5.14	2.77	3.26	2669	2669	117.8	117.9	2.77	1.00	0.00	6.52



# Alt Model-Shift Uniqueness Test

007024530-01, P = 66.155218 Days, E = 175.636432 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
1919	61.8	3.06	2.76	5.22	2.91	0.85	1916	1916	58.8	59.1	8.12	1.00	0.01	3.56



### Stellar Parameters For KIC 007024530

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6077^{+190}_{-232}$	$4.471^{+0.054}_{-0.216}$	$-0.040^{+0.250}_{-0.300}$	$0.999^{+0.333}_{-0.111}$	$1.077^{+0.140}_{-0.140}$	$1.519^{+0.359}_{-0.842}$
	+3%/-4%	+1%/-5%	+625%/-750%	+33%/-11%	+13%/-13%	+24%/-55%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 007024530-01 / KOI 3922.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-6227 \pm 49$	$54.26^{+13.22}_{-10.23}$	$667^{+51}_{-34}$	$3103^{+184}_{-154}$	$124^{+61}_{-42}$
Alt.	$-3766 \pm 61$	$40.73^{+10.36}_{-10.34}$	$667^{+53}_{-35}$	$3142^{+275}_{-186}$	$133^{+95}_{-49}$

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

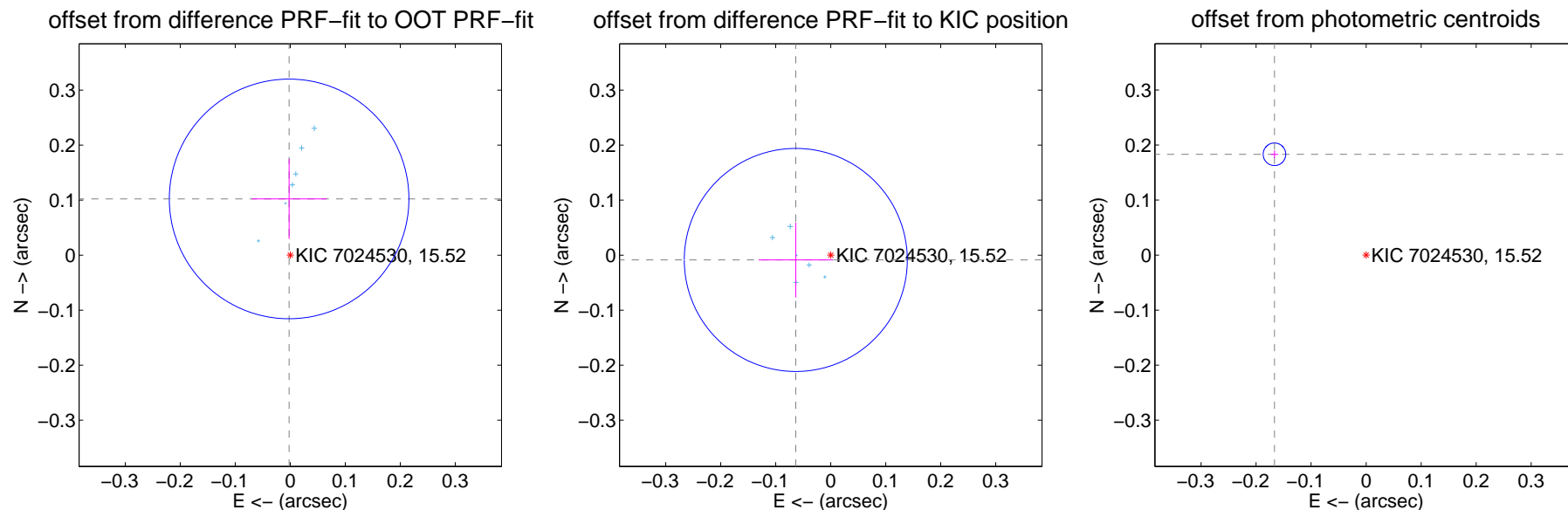
## DV Centroid Data

Supplemental centroid analysis for 007024530-01. Kepler magnitude: 15.52. Transit SNR 963.63

There are 6 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.102 \pm 0.073$	1.41	$0.002 \pm 0.068$	$0.102 \pm 0.073$
PRF-fit source offset from KIC position	$0.064 \pm 0.068$	0.95	$0.064 \pm 0.068$	$-0.009 \pm 0.068$
photometric centroid source offset	$0.25 \pm 0.01$	<b>36.22</b>	$0.17 \pm 0.01$	$0.18 \pm 0.01$



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

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

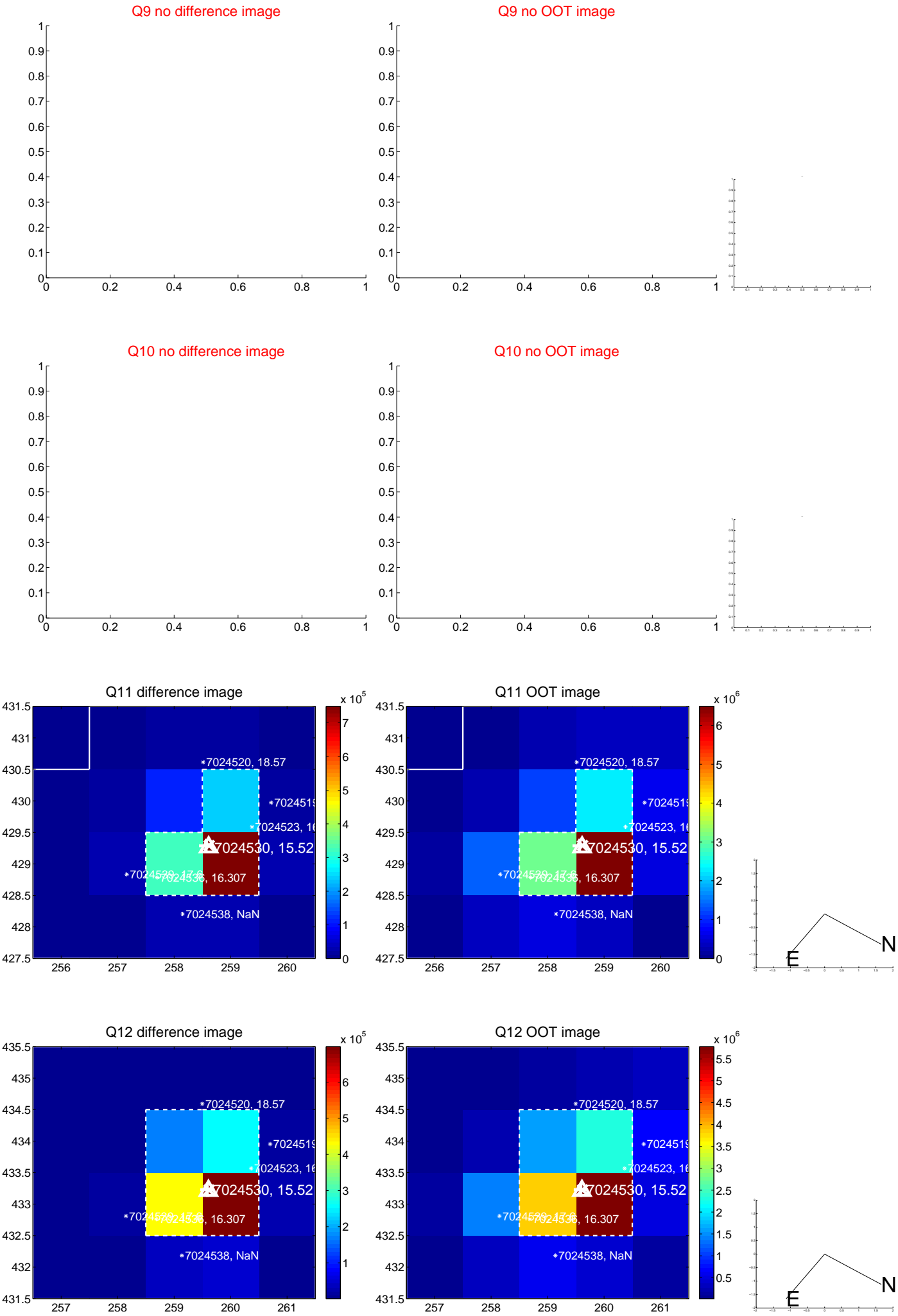


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

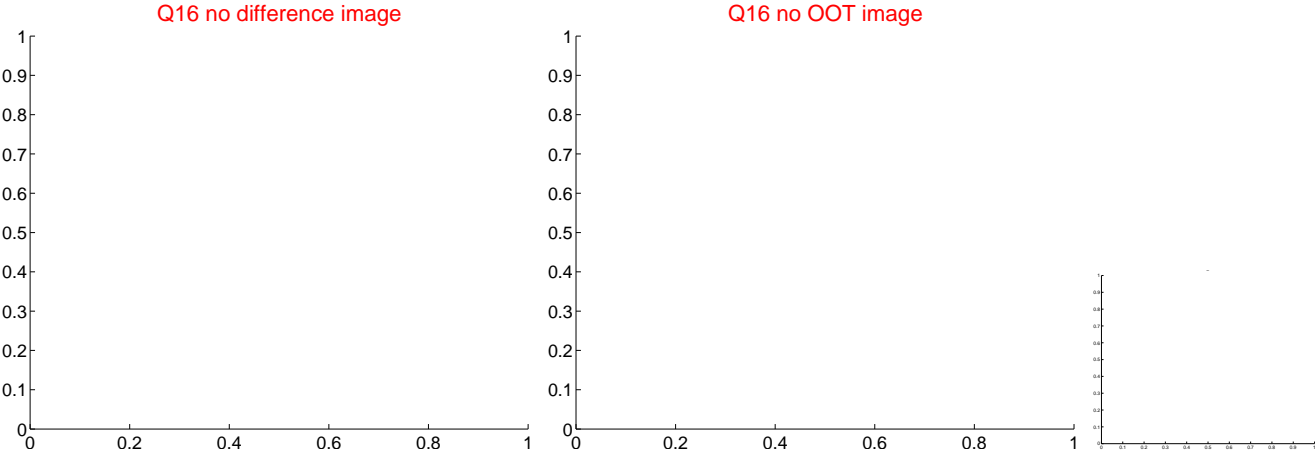
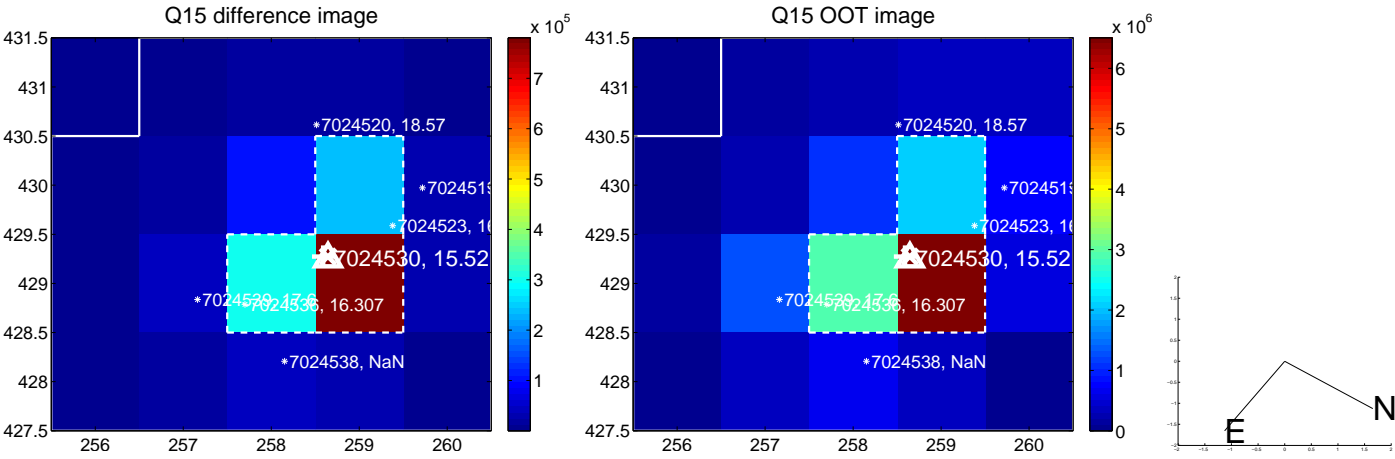
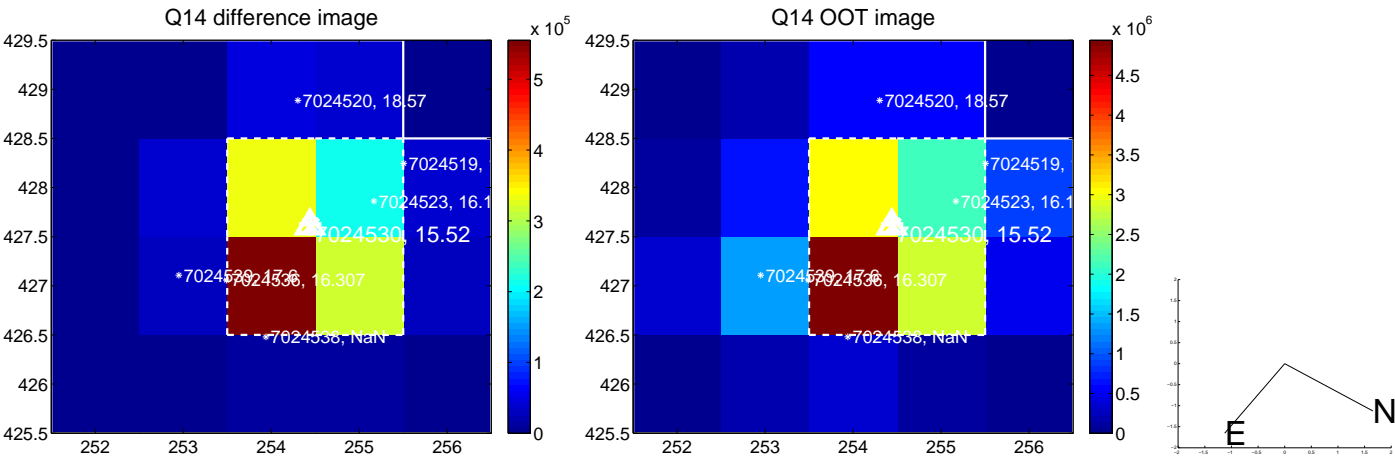
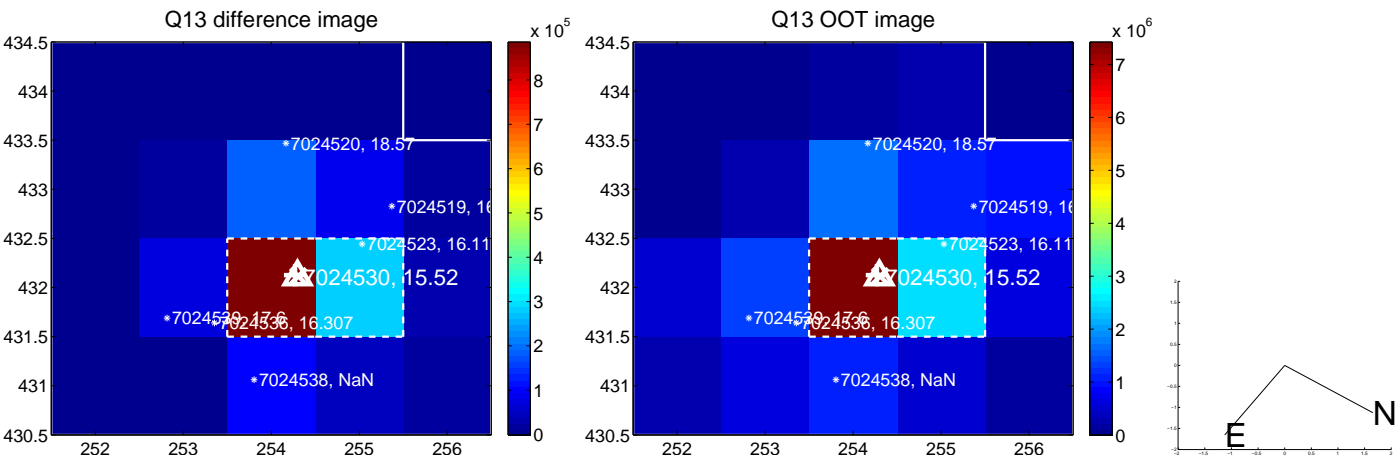




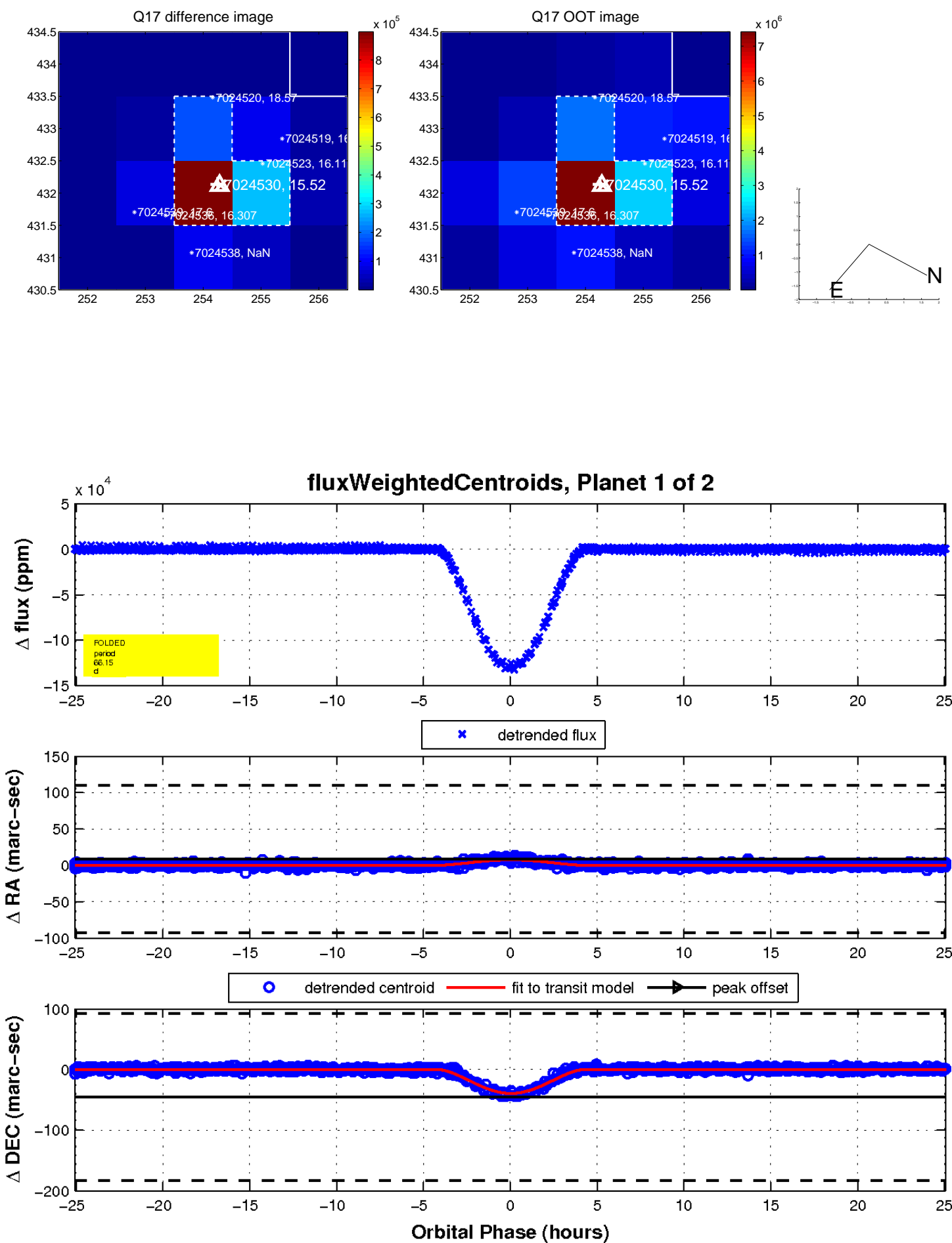
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

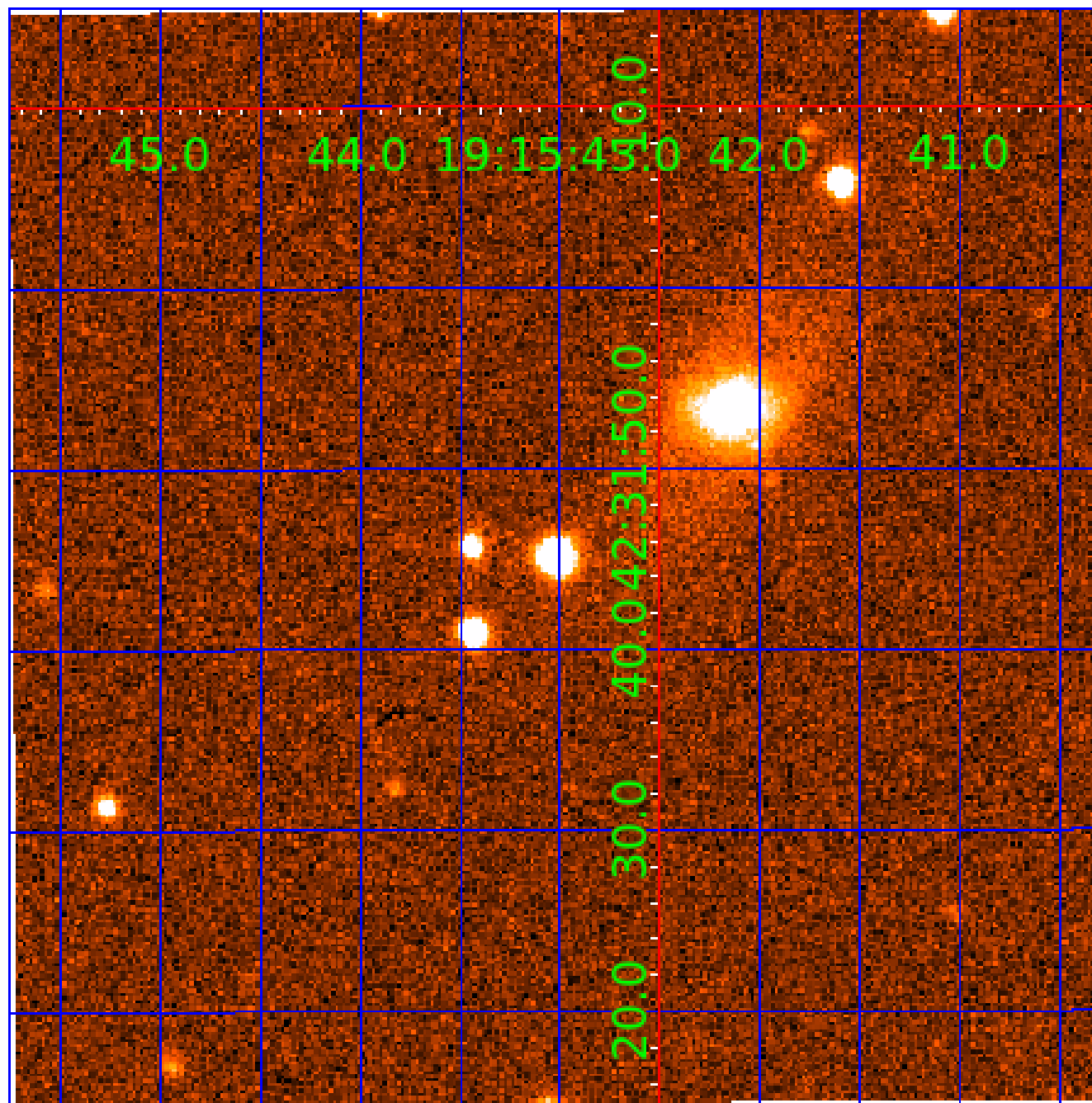


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 007024530

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007024530-01	OBS	3922.01	66.154385	175.650610	131492.8	8.368	1173.9	963.6	1.00	6077	52.24	11.32
007024530-02	OBS	No	66.154314	156.966324	6982.2	5.864	69.3	64.3	1.00	6077	9.72	11.32

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007024530-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
007024530-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

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

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

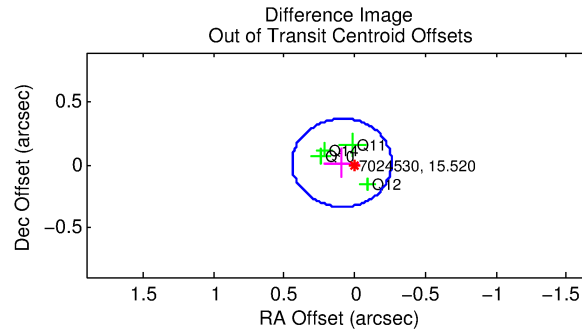
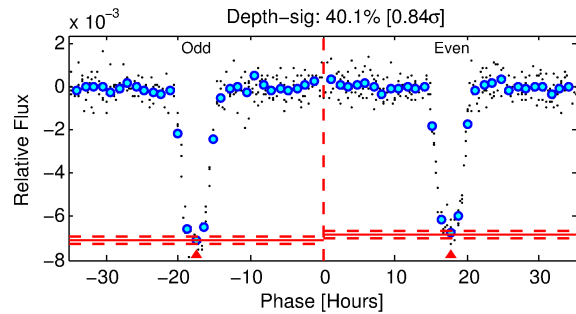
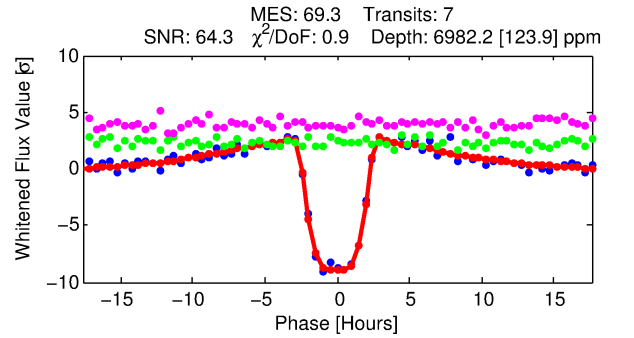
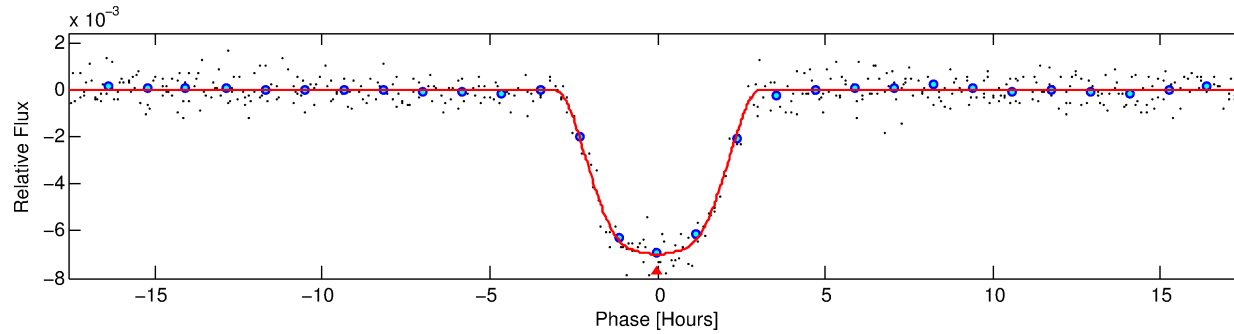
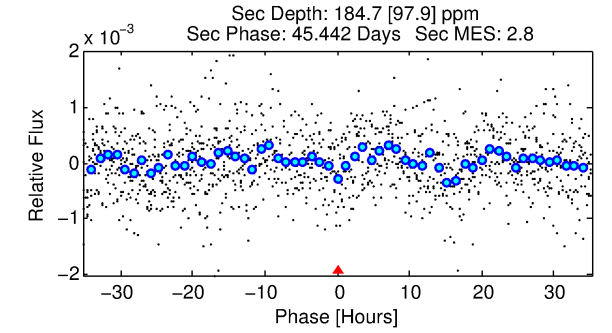
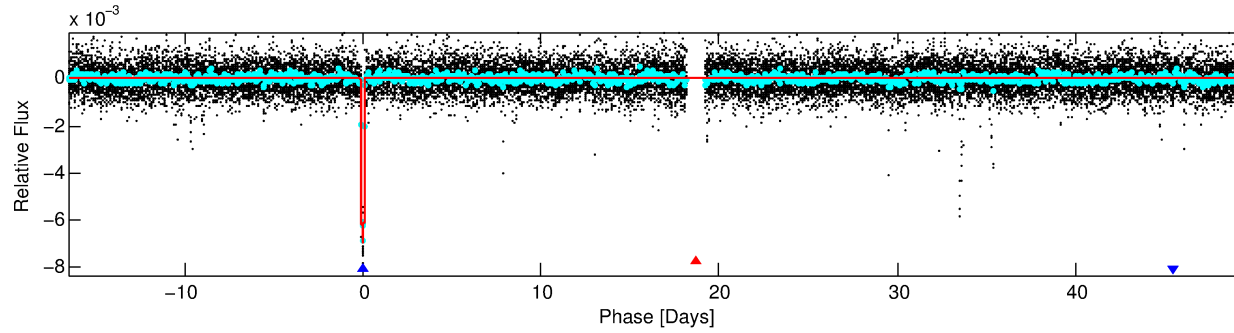
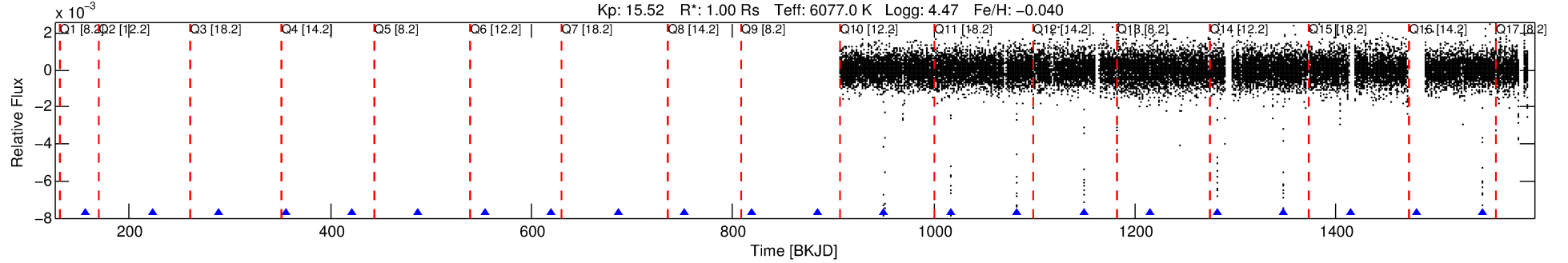
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 007024530-02

No Significant Match Found

# DV One-Page Summary

KIC: 7024530 Candidate: 2 of 2 Period: 66.154 d  
KOI: K03922.01 Corr: 0.996



## DV Fit Results:

Period = 66.15431 [0.00029] d  
Epoch = 156.9663 [0.0045] BKJD  
Rp/R\* = 0.0892 [0.0012]  
a/R\* = 55.62 [1.62]  
b = 0.88 [0.01]  
Seff = 11.32 [4.84]  
Teq = 468 [50] K  
Rp = 9.72 [3.24] Re  
a = 0.3282 [0.0910] AU  
Ag = 115.77 [76.90] [1.49σ]  
Teffp = 2372 [328] K [5.75σ]

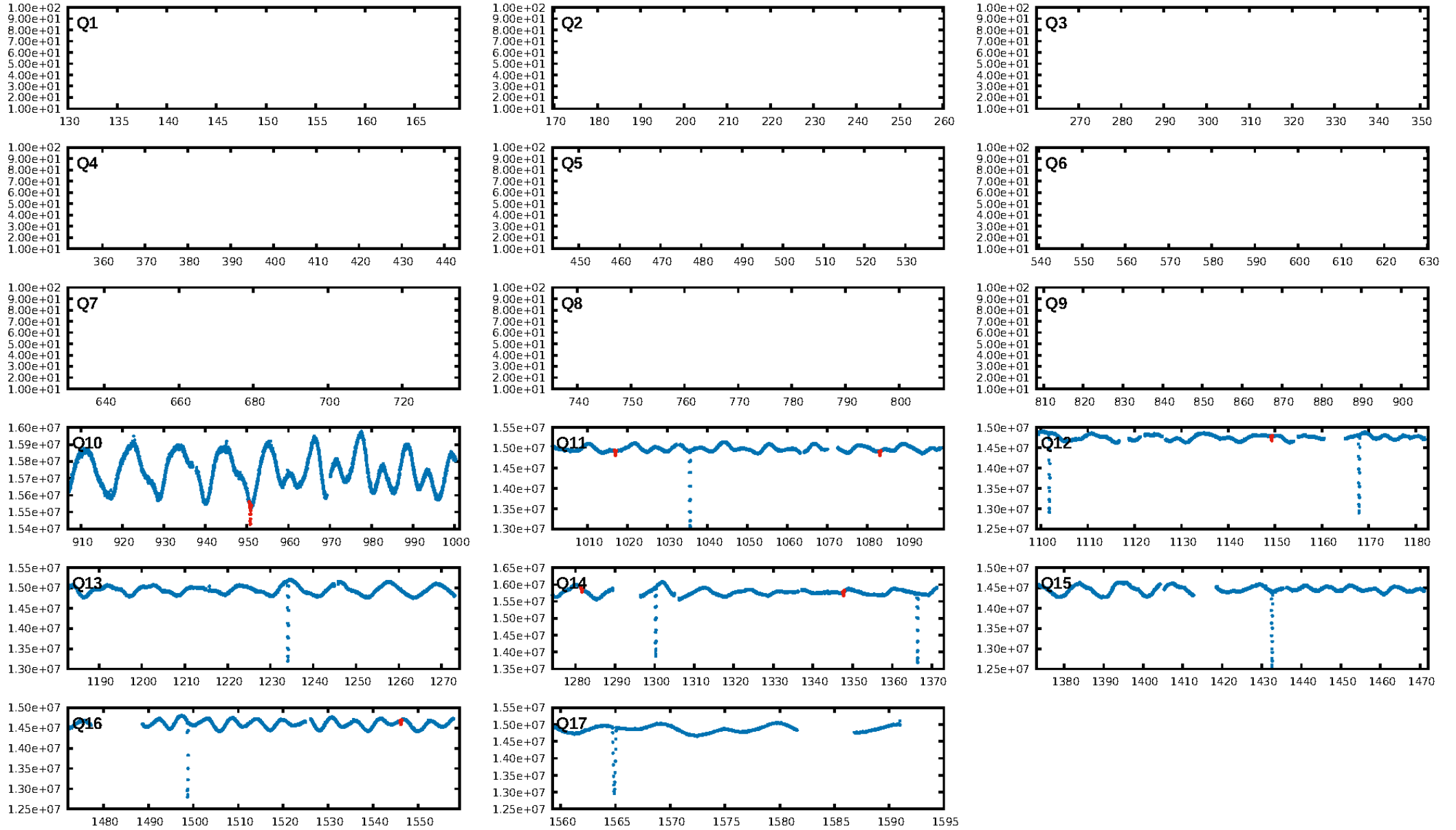
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: 56.8%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [7/7]  
GhostDiagnostic-chr: 1.964  
Centroid-sig: 96.7%  
Centroid-so: 0.256 arcsec [1.92σ]  
OotOffset-rm: 0.092 arcsec [0.78σ]  
KicOffset-rm: 0.132 arcsec [1.27σ]  
OotOffset-st: 2/1/1/0 [4]  
KicOffset-st: 2/1/1/0 [4]  
DiffImageQuality-fgm: 1.00 [4/4]  
DiffImageOverlap-fno: 1.00 [4/4]

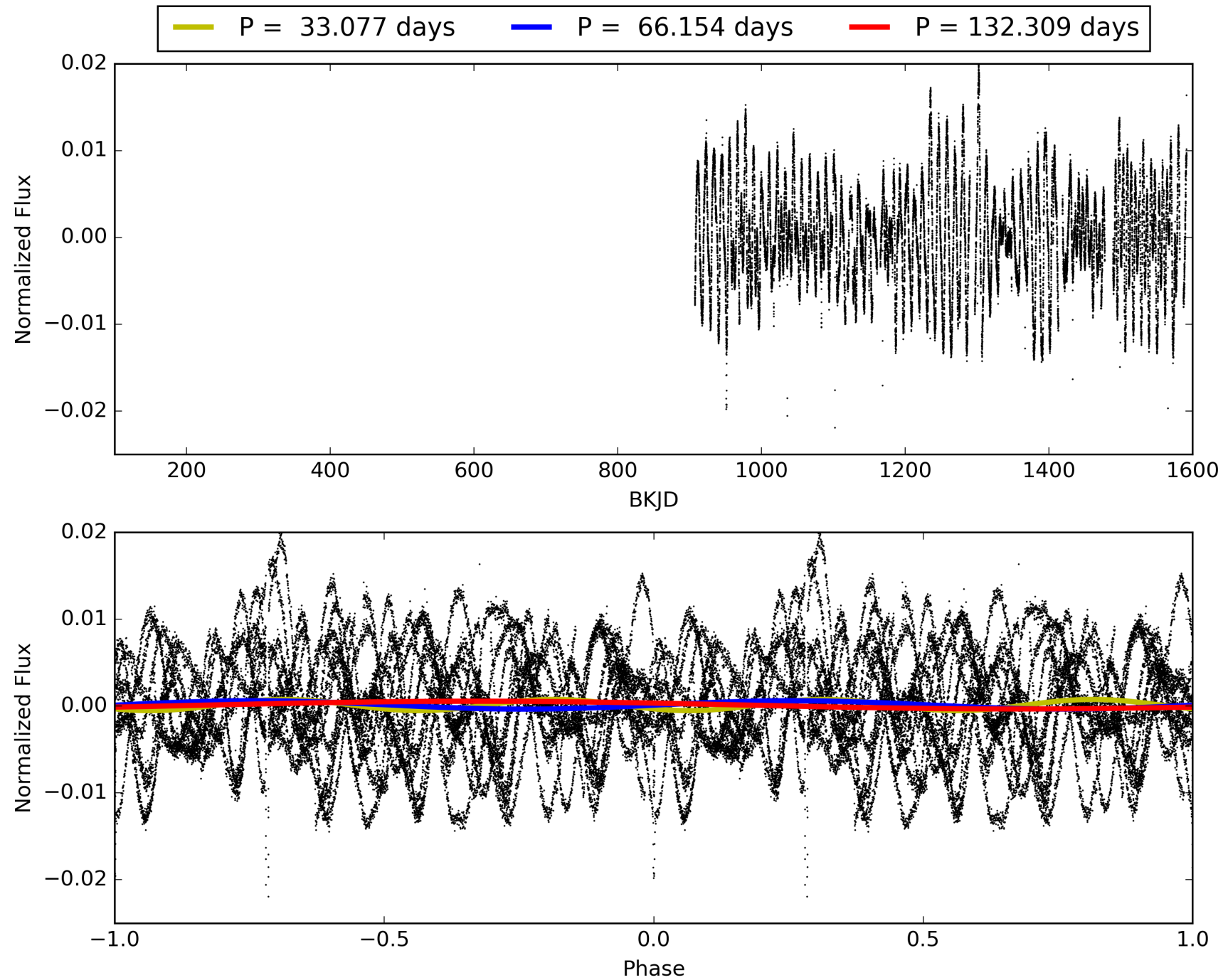
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 19:59:06 Z

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

# TCE 007024530-02, PDC Light Curves



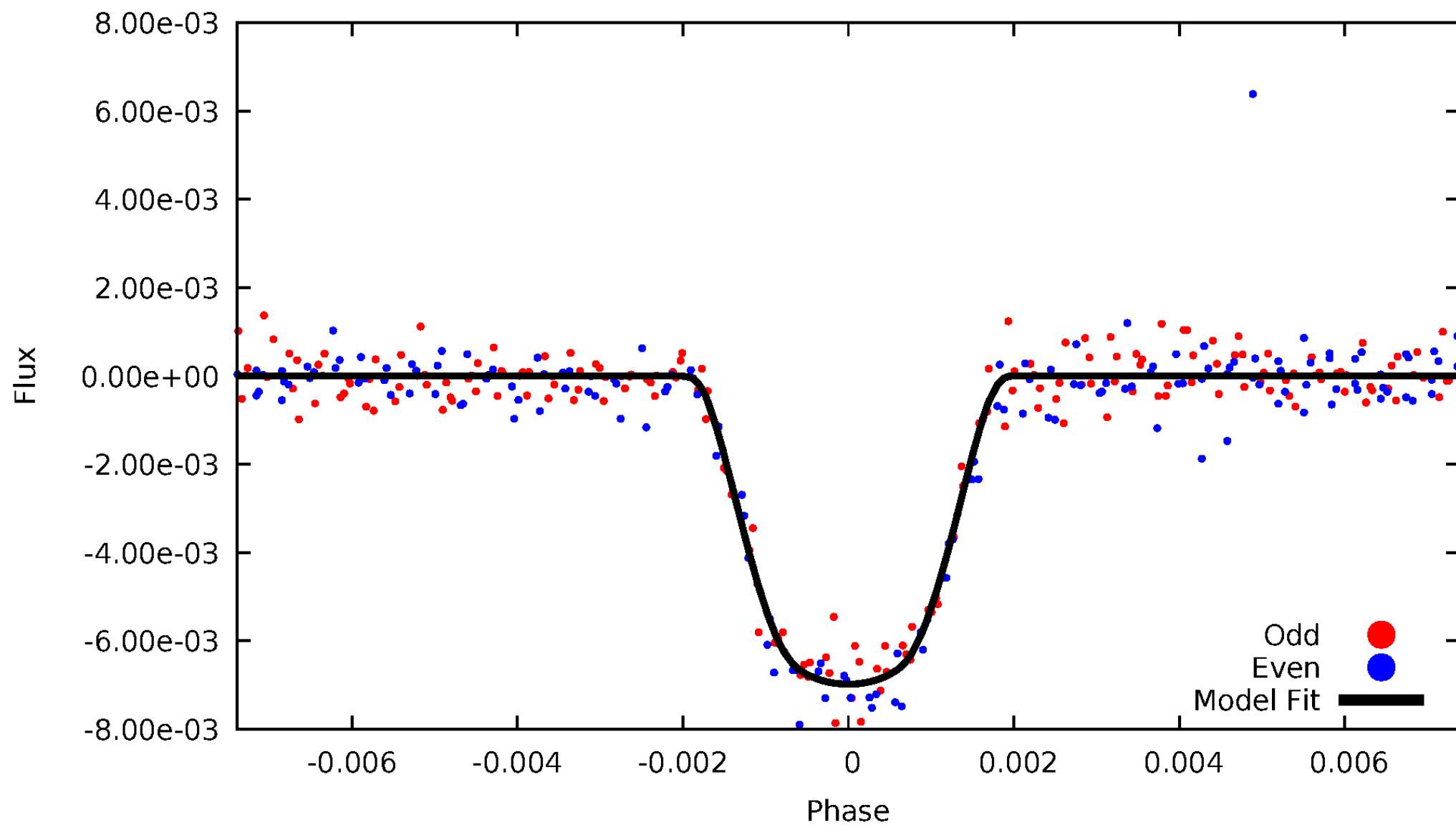
TCE 007024530-02





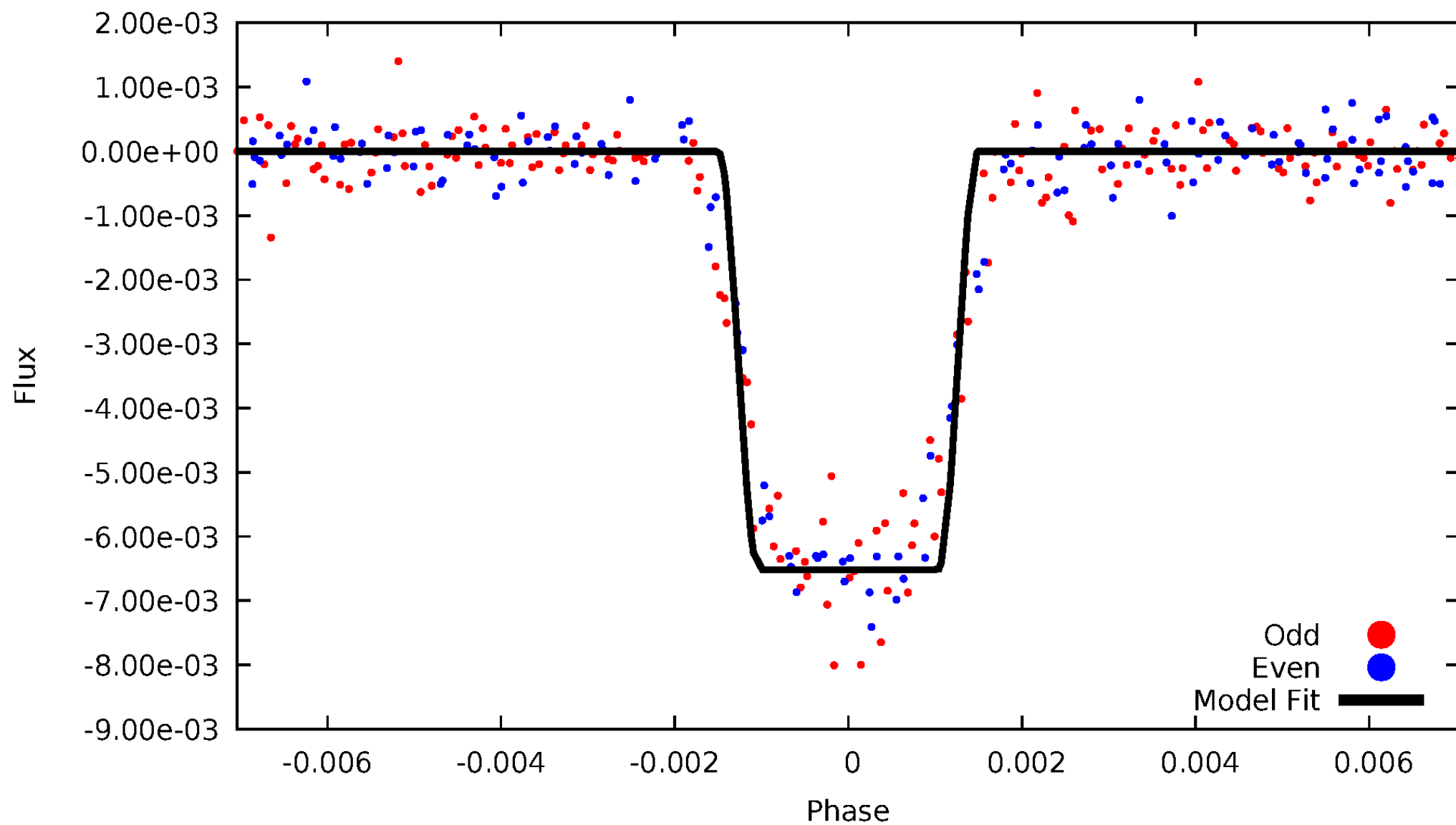
# DV Odd/Even

TCE 007024530-02



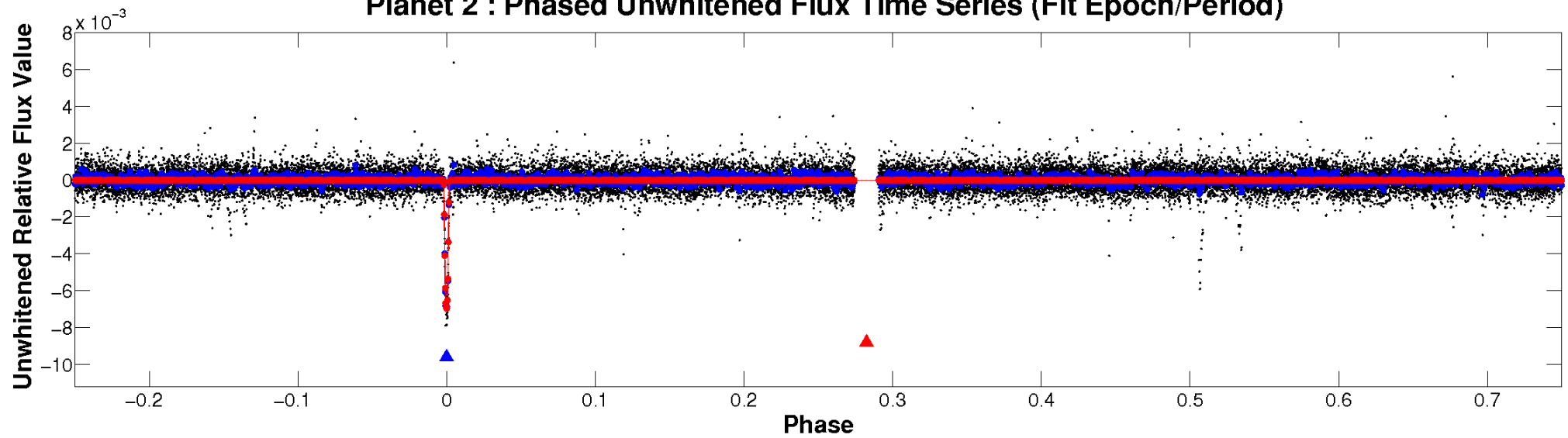
# ALT Odd/Even

TCE 007024530-02

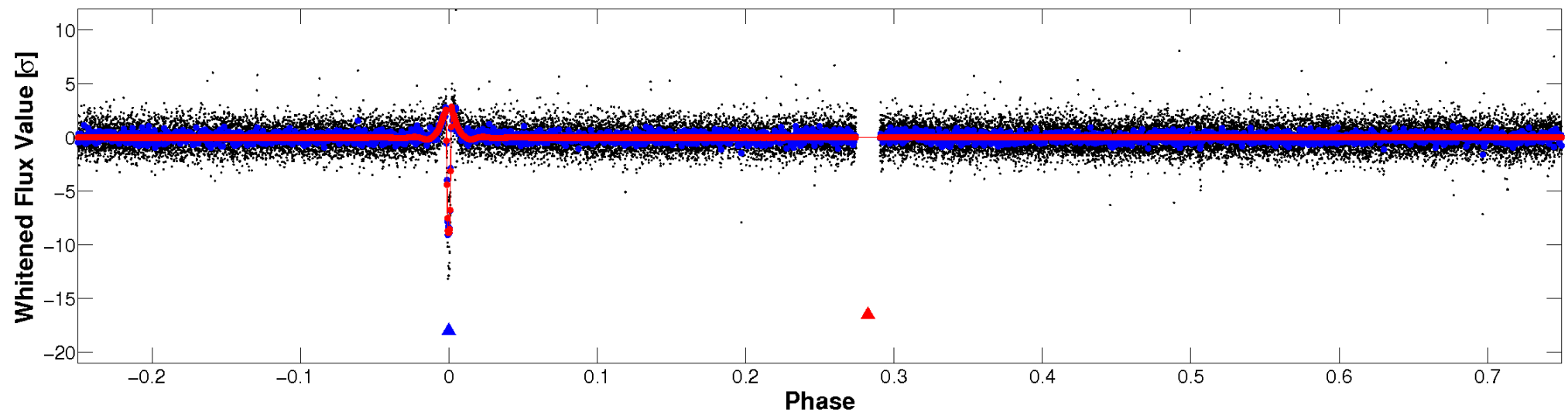


# Non-Whitened Vs. Whitened Light Curve

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

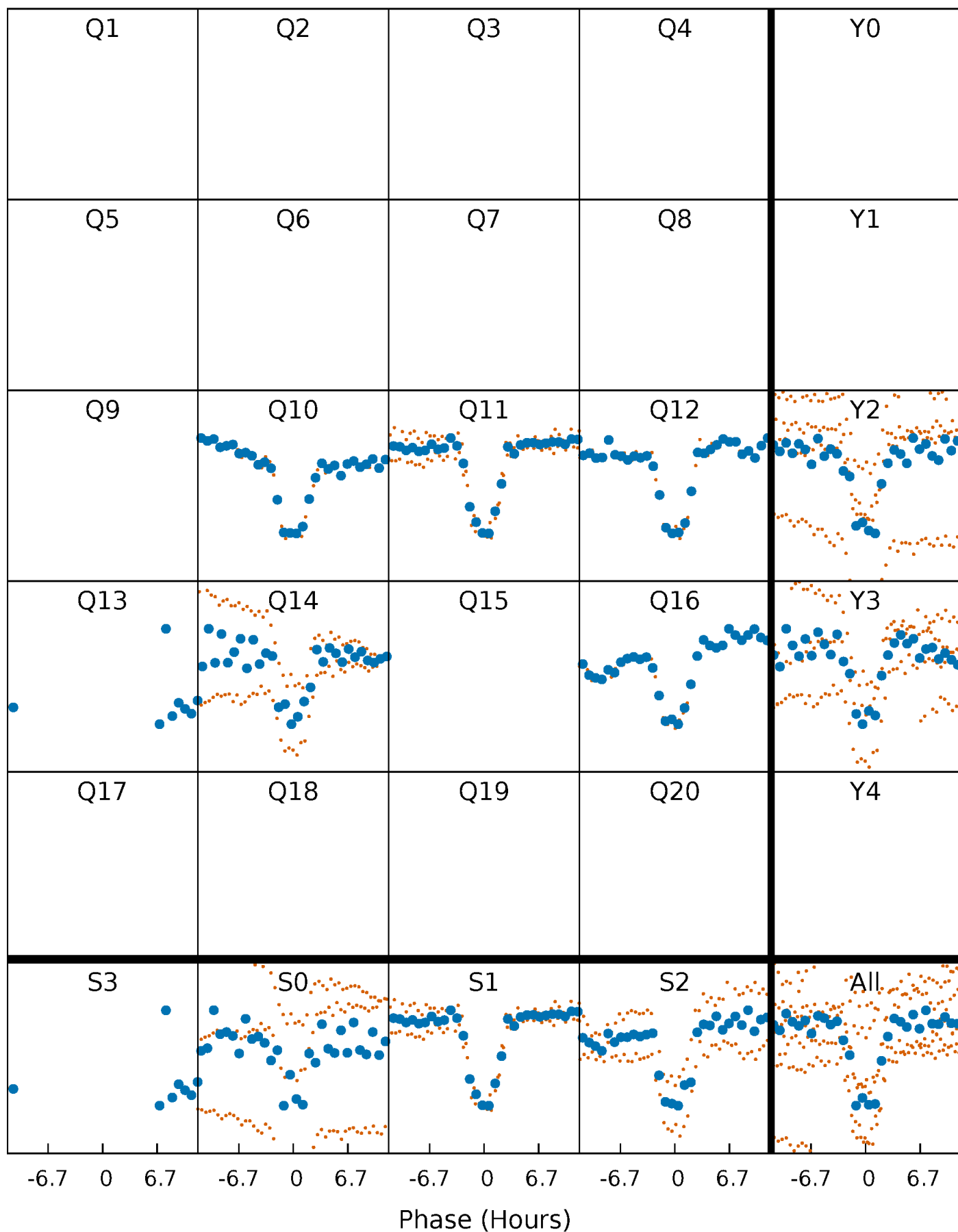


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



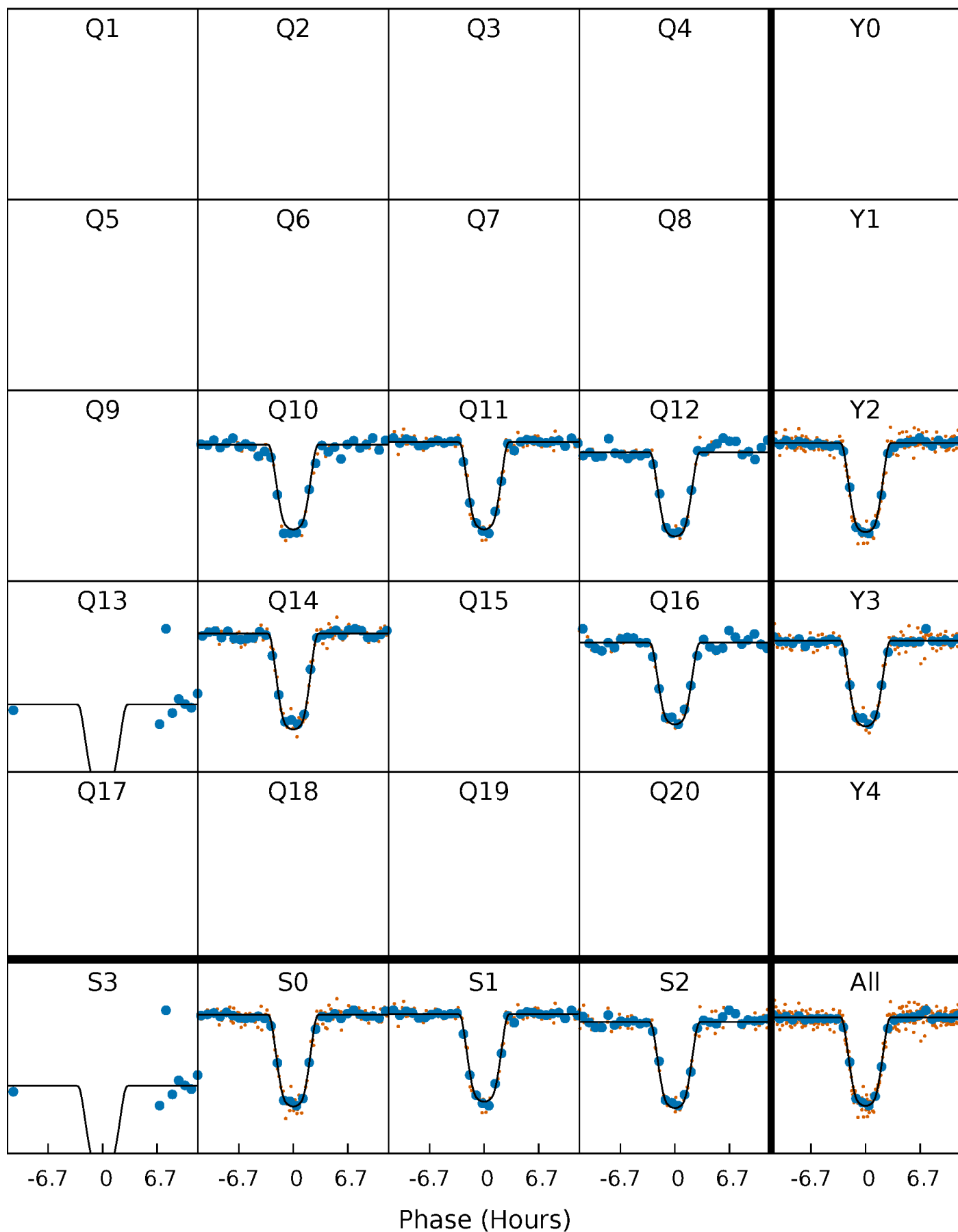
# PDC Quarter-Phased Transit Curves

TCE 007024530-02 P= 66.154314 Days  $T_0=156.966324$  (BKJD)



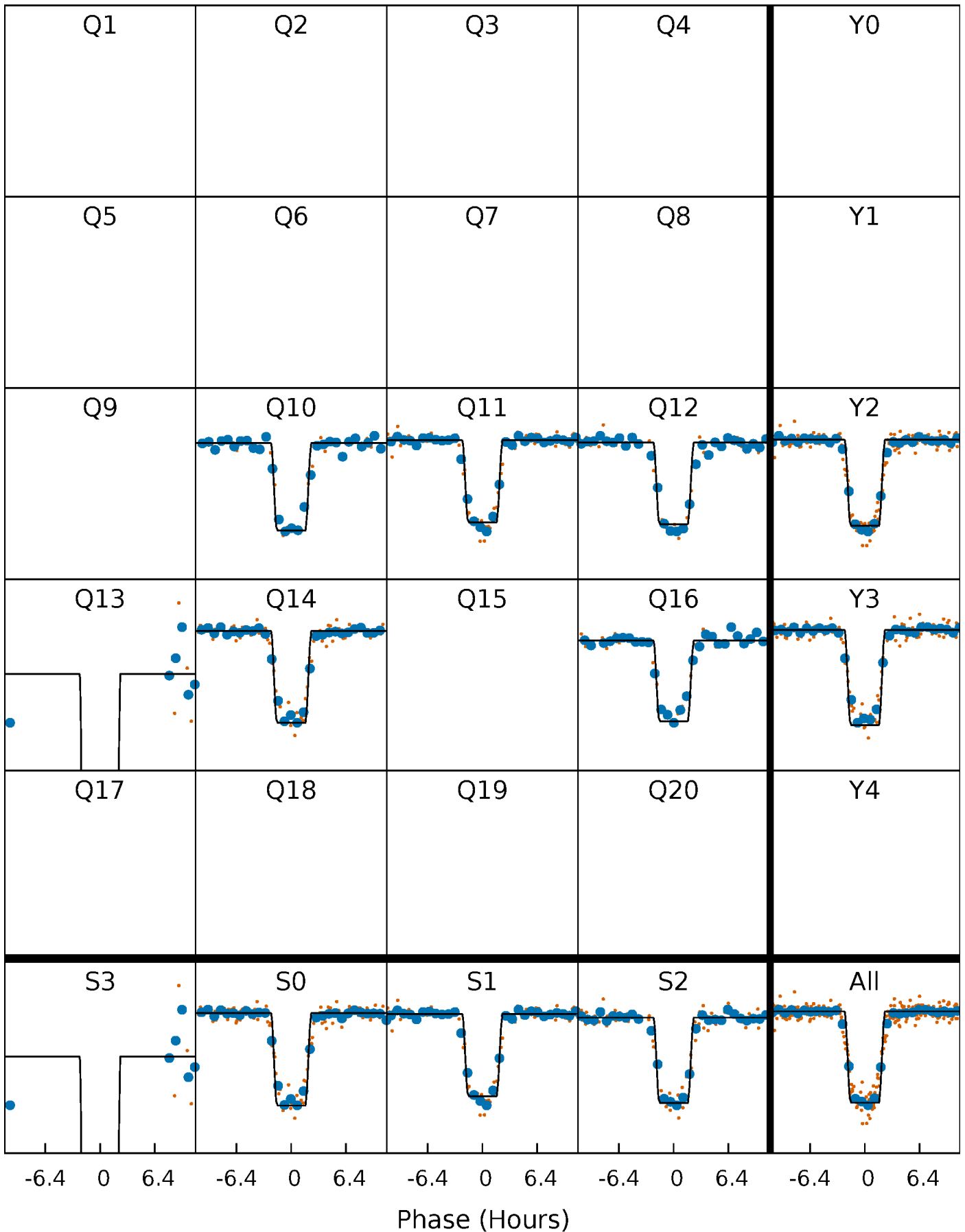
# DV Quarter-Phased Transit Curves

TCE 007024530-02 P= 66.154314 Days  $T_0=156.966324$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

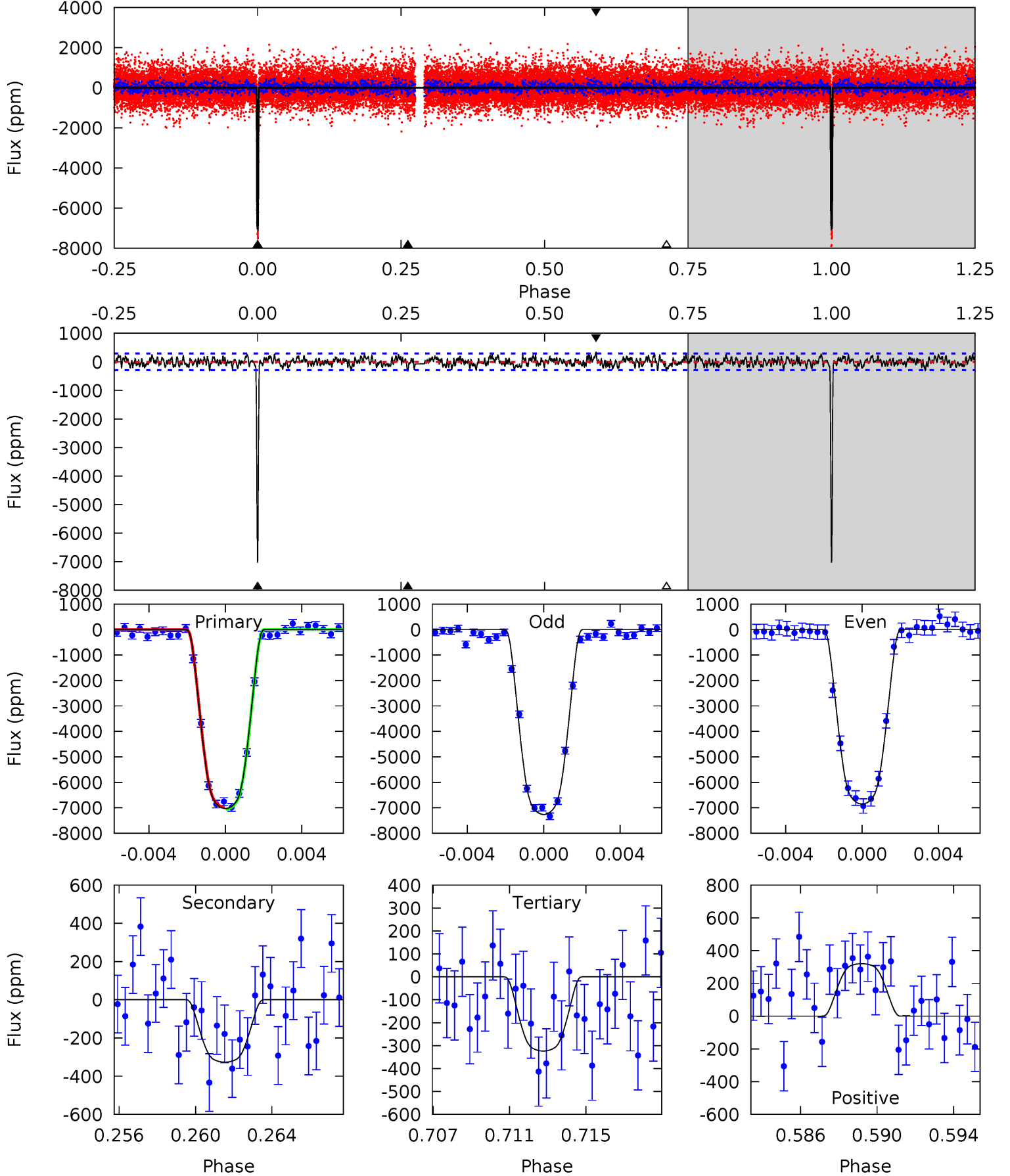
TCE 007024530-02 P= 66.154427 Days  $T_0=156.965550$  (BKJD)



# DV Model-Shift Uniqueness Test

007024530-02, P = 66.154314 Days, E = 156.966324 Days

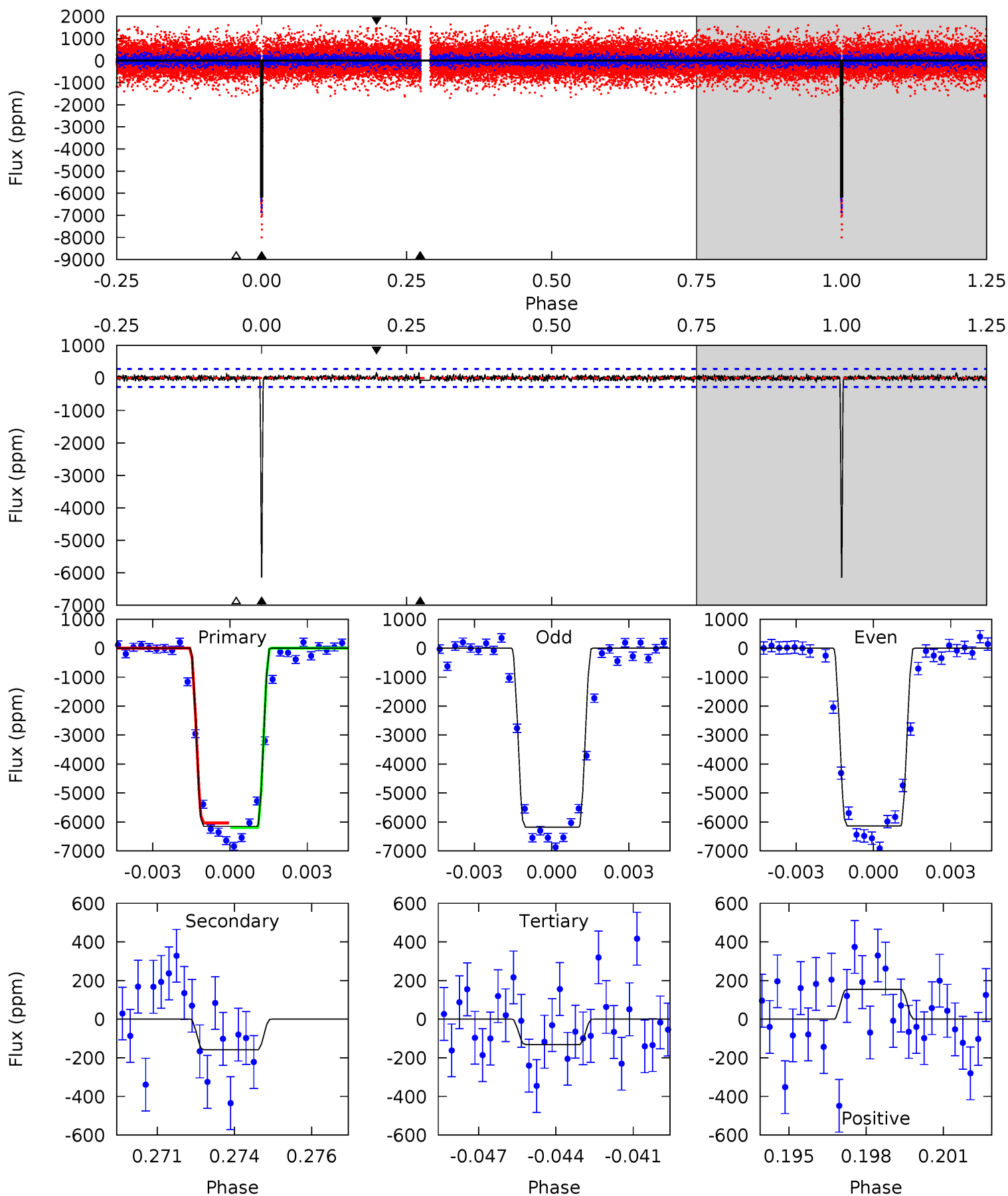
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
125.5	5.83	5.78	5.72	5.20	2.89	1.91	119.7	119.8	0.05	0.11	3.62	1.01	0.04	0.56



# Alt Model-Shift Uniqueness Test

007024530-02, P = 66.154427 Days, E = 156.965550 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
116.0	2.99	2.48	2.91	5.26	2.98	0.71	113.6	113.1	0.51	0.07	0.41	0.99	0.03	1.51





### Stellar Parameters For KIC 007024530

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6077^{+190}_{-232}$	$4.471^{+0.054}_{-0.216}$	$-0.040^{+0.250}_{-0.300}$	$0.999^{+0.333}_{-0.111}$	$1.077^{+0.140}_{-0.140}$	$1.519^{+0.359}_{-0.842}$
	+3%/-4%	+1%/-5%	+625%/-750%	+33%/-11%	+13%/-13%	+24%/-55%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 007024530-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-326 \pm 56$	$9.86^{+1.76}_{-0.68}$	$667^{+46}_{-34}$	$3288^{+109}_{-120}$	$185^{+48}_{-50}$
Alt.	$-158 \pm 53$	$9.03^{+1.61}_{-0.76}$	$668^{+49}_{-37}$	$3043^{+143}_{-182}$	$106^{+50}_{-41}$

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

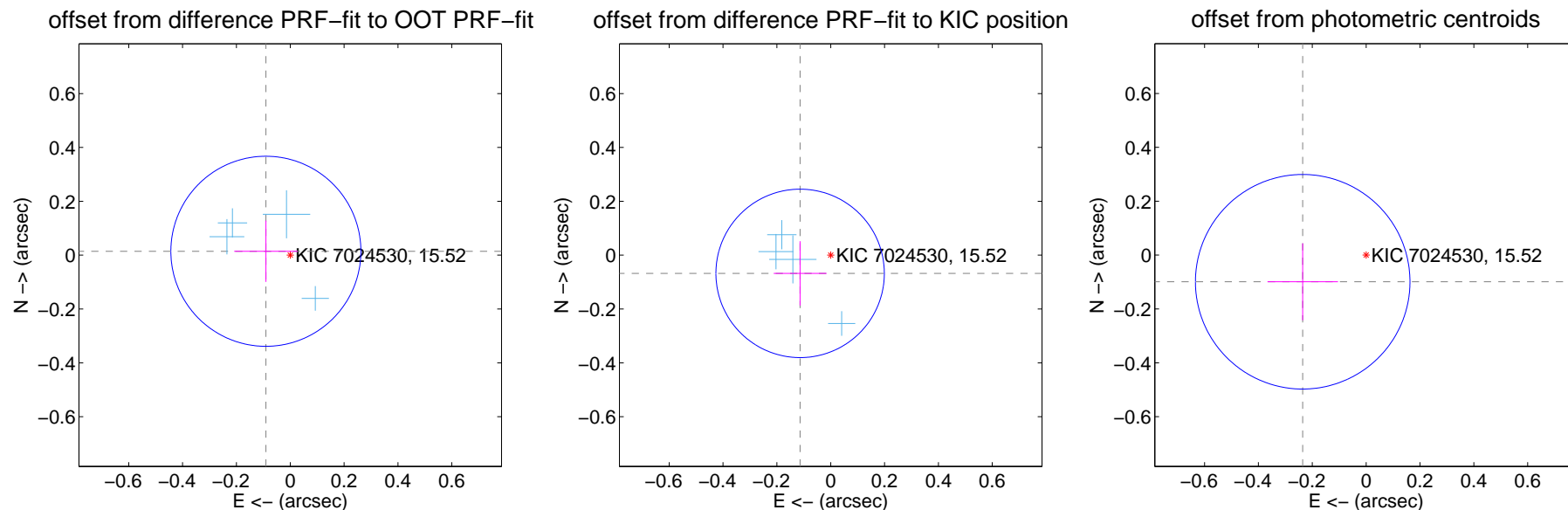
## DV Centroid Data

Supplemental centroid analysis for 007024530-02. Kepler magnitude: 15.52. Transit SNR 64.35

There are 4 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.092 \pm 0.118$	0.78	$0.091 \pm 0.118$	$0.014 \pm 0.114$
PRF-fit source offset from KIC position	$0.132 \pm 0.104$	1.27	$0.114 \pm 0.098$	$-0.068 \pm 0.119$
photometric centroid source offset	$0.26 \pm 0.13$	1.92	$0.24 \pm 0.13$	$-0.10 \pm 0.14$



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.

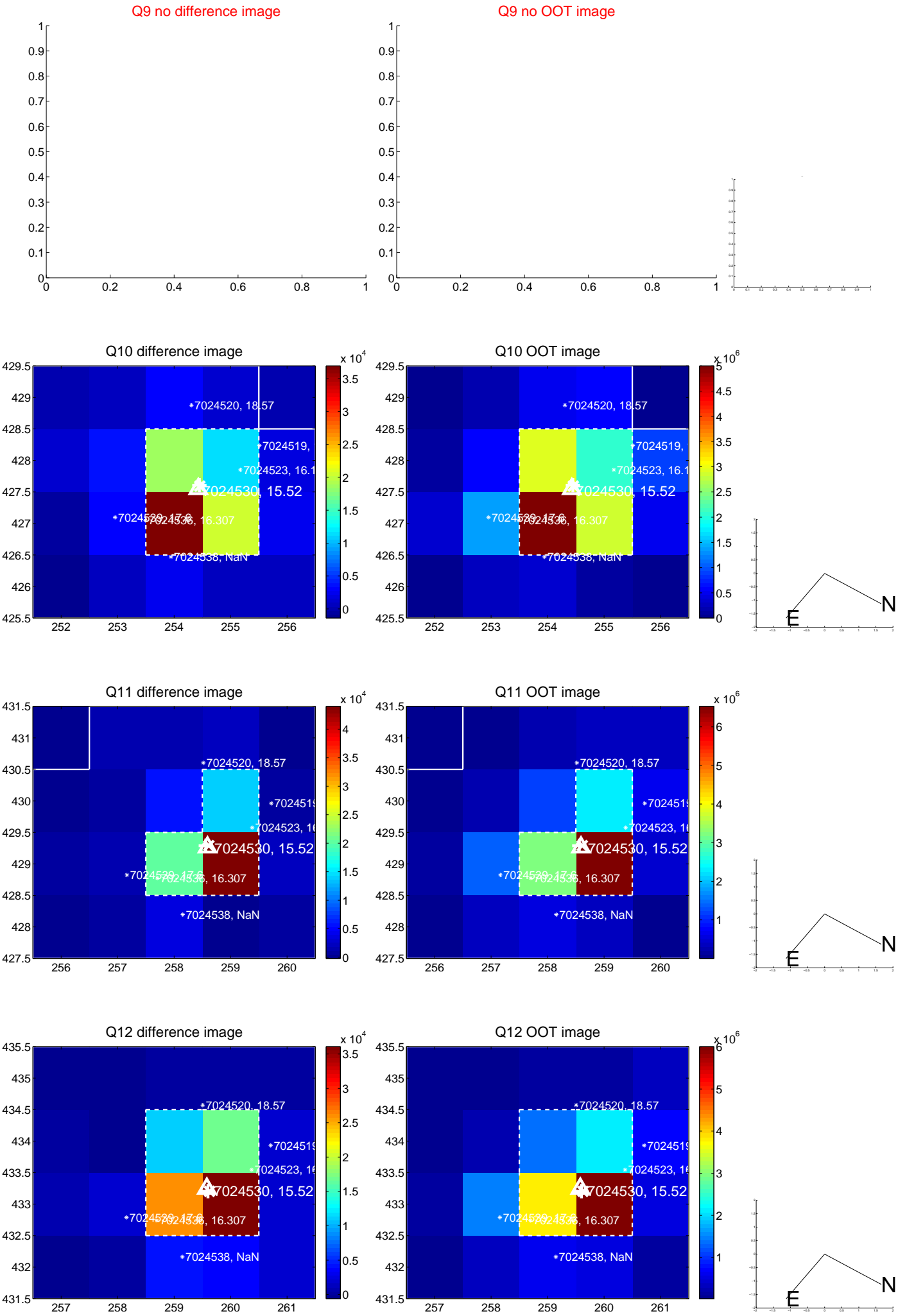
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



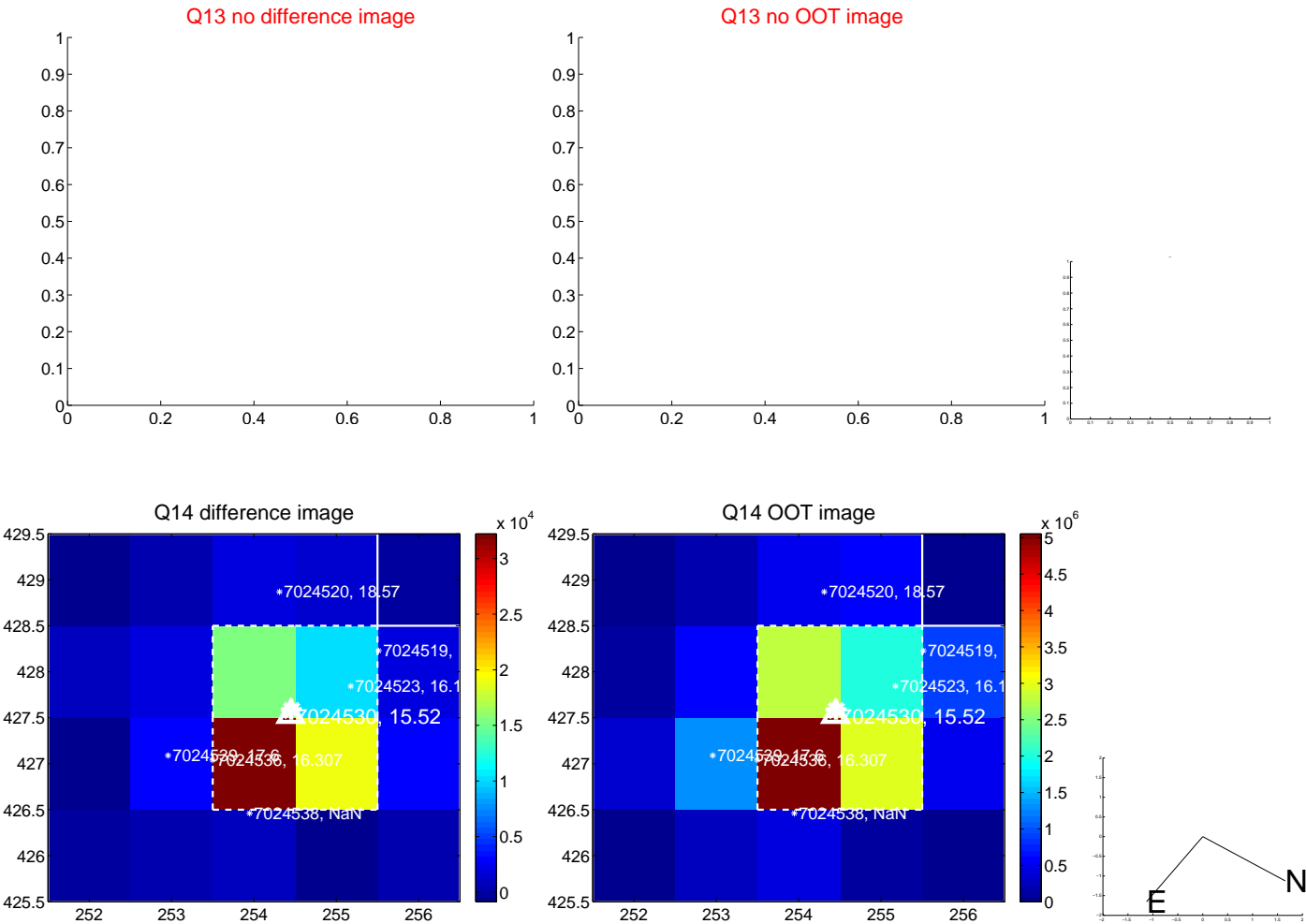
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

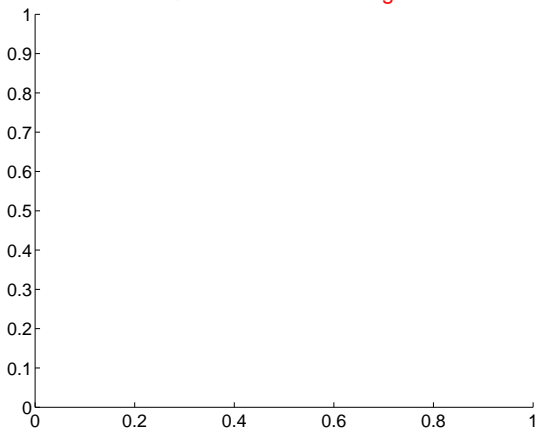


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

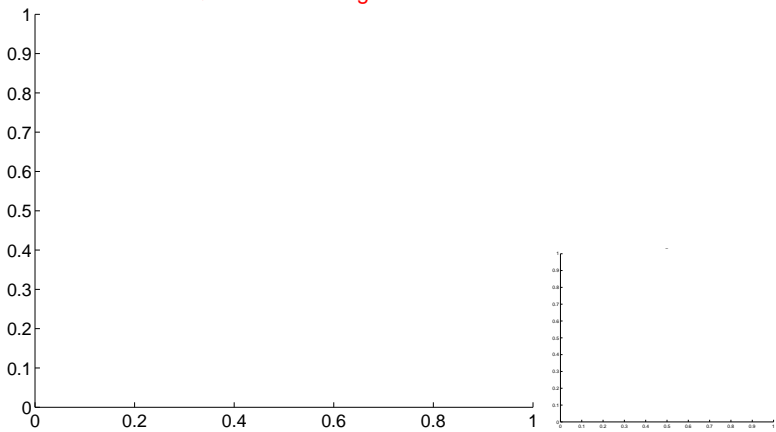


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

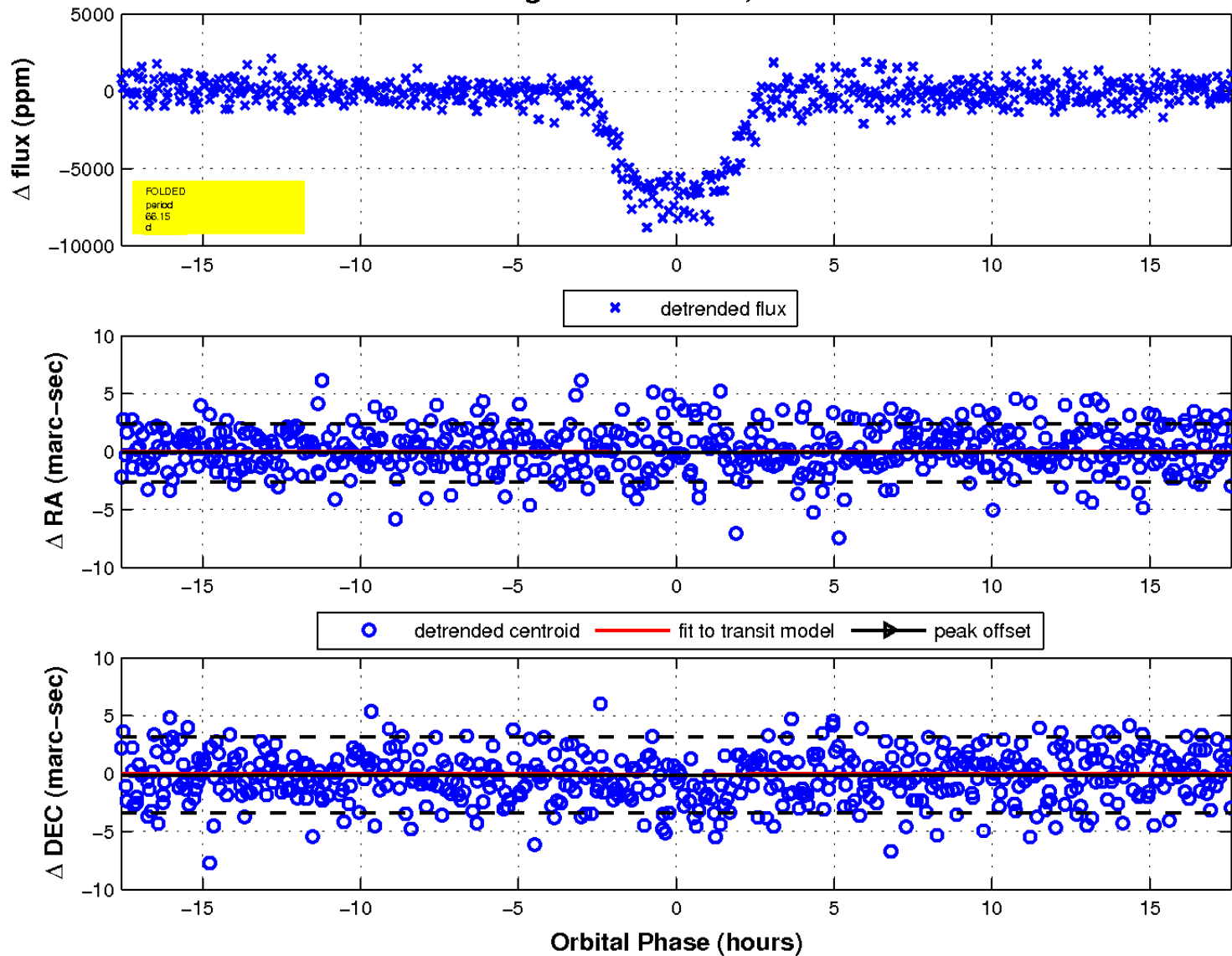
Q17 no difference image



Q17 no OOT image



fluxWeightedCentroids, Planet 2 of 2



# UKIRT Image

Declination

