

# KIC 009532123

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009532123-01	OBS	6069.01	8.214205	135.013906	73935.7	4.575	840.4	739.3	0.77	5654	30.46	96.25
009532123-02	OBS	No	8.214214	138.041537	56952.3	4.538	560.5	533.8	0.77	5654	26.92	96.25

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009532123-01	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_FEW_MEAS
009532123-02	OBS	FP	0.00	1	0	0	0	SAME_NTL_PERIOD—CENT_FEW_MEAS

**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.

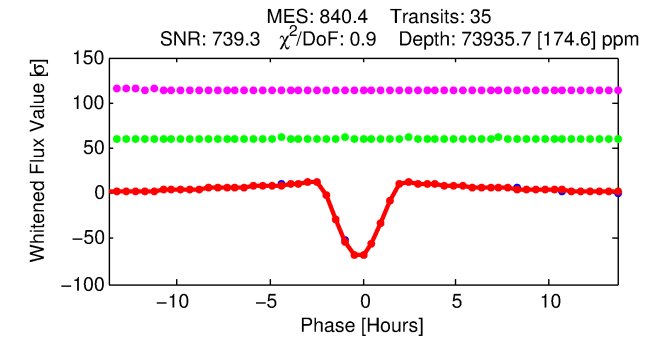
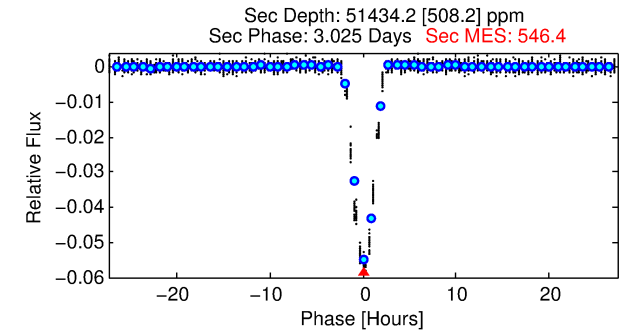
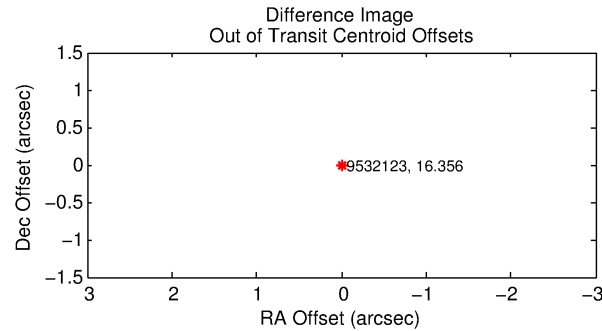
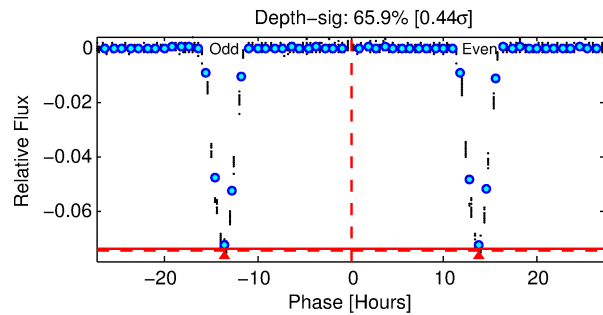
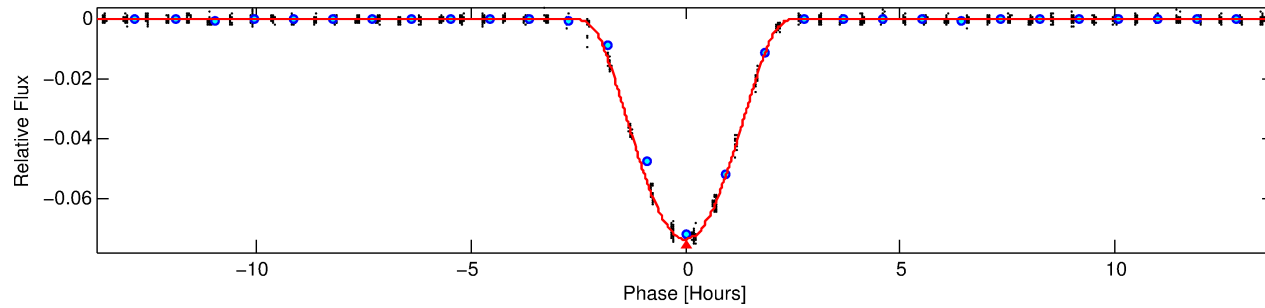
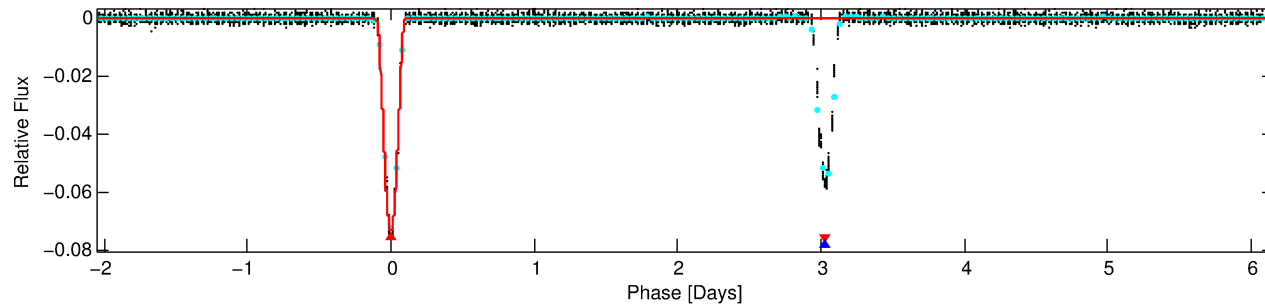
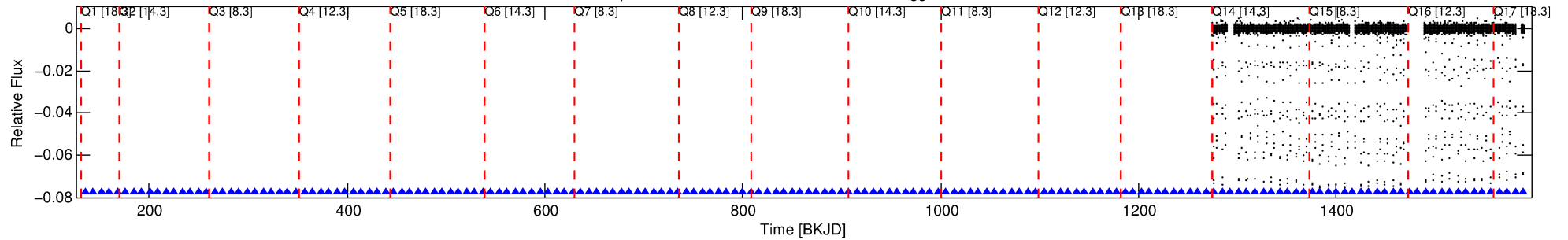
## Ephemeris Match Information For 009532123-01

No Significant Match Found

# DV One-Page Summary

KIC: 9532123 Candidate: 1 of 2 Period: 8.214 d  
KOI: K06069.01 Corr: 0.991

Kp: 16.36 R\*: 0.77 Rs Teff: 5654.0 K Logg: 4.59 Fe/H: -0.380



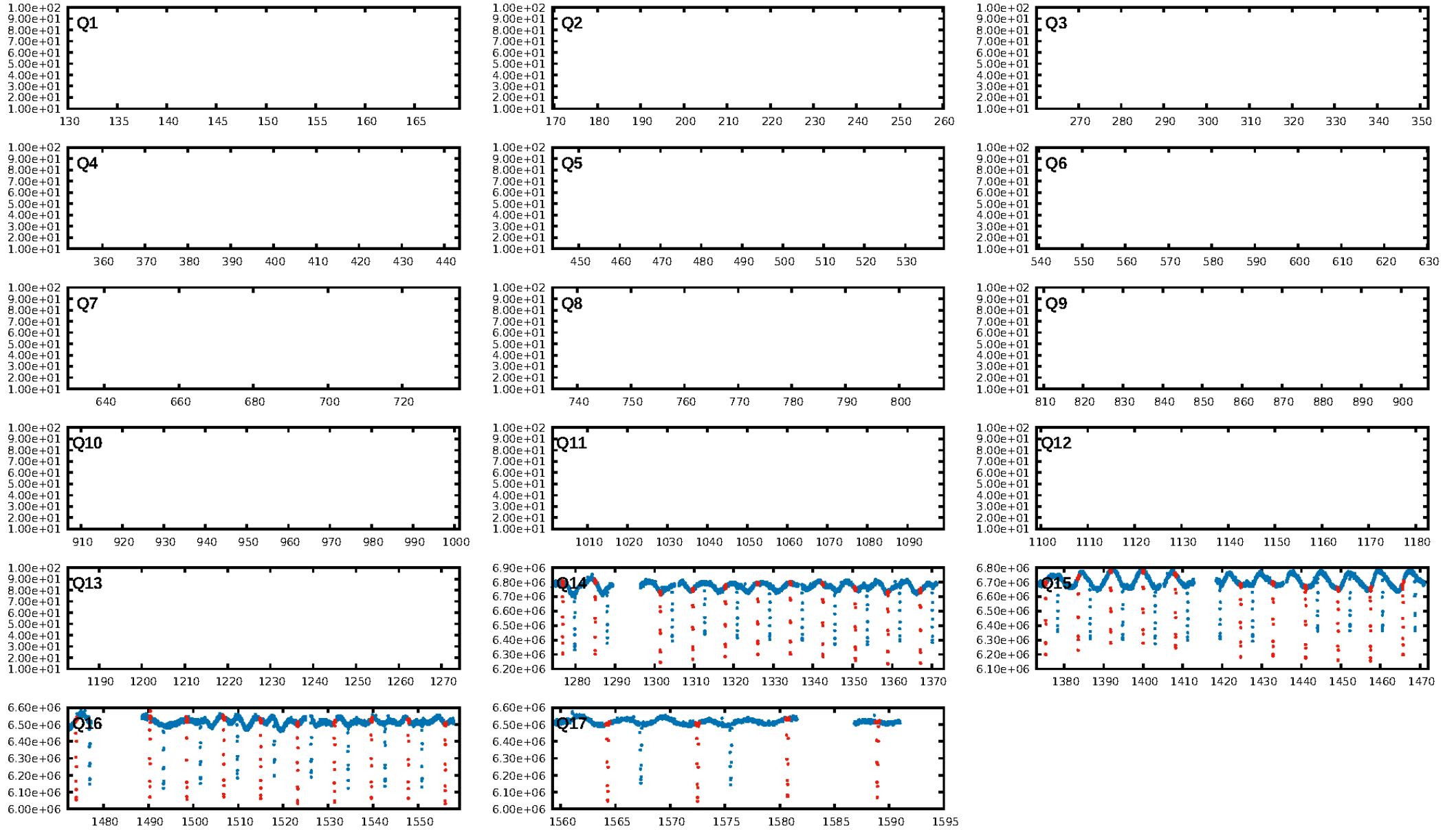
## DV Fit Results:

Period = 8.21420 [0.00000] d  
Epoch = 135.0139 [0.0006] BKJD  
Rp/R\* = 0.3606 [0.0296]  
a/R\* = 13.96 [0.05]  
b = 0.91 [0.05]  
Seff = 96.25 [28.82]  
Teq = 799 [60] K  
Rp = 30.46 [7.10] Re  
a = 0.0755 [0.0138] AU  
Ag = 173.81 [54.14] [3.19σ]  
Teffp = 4484 [242] K [14.79σ]

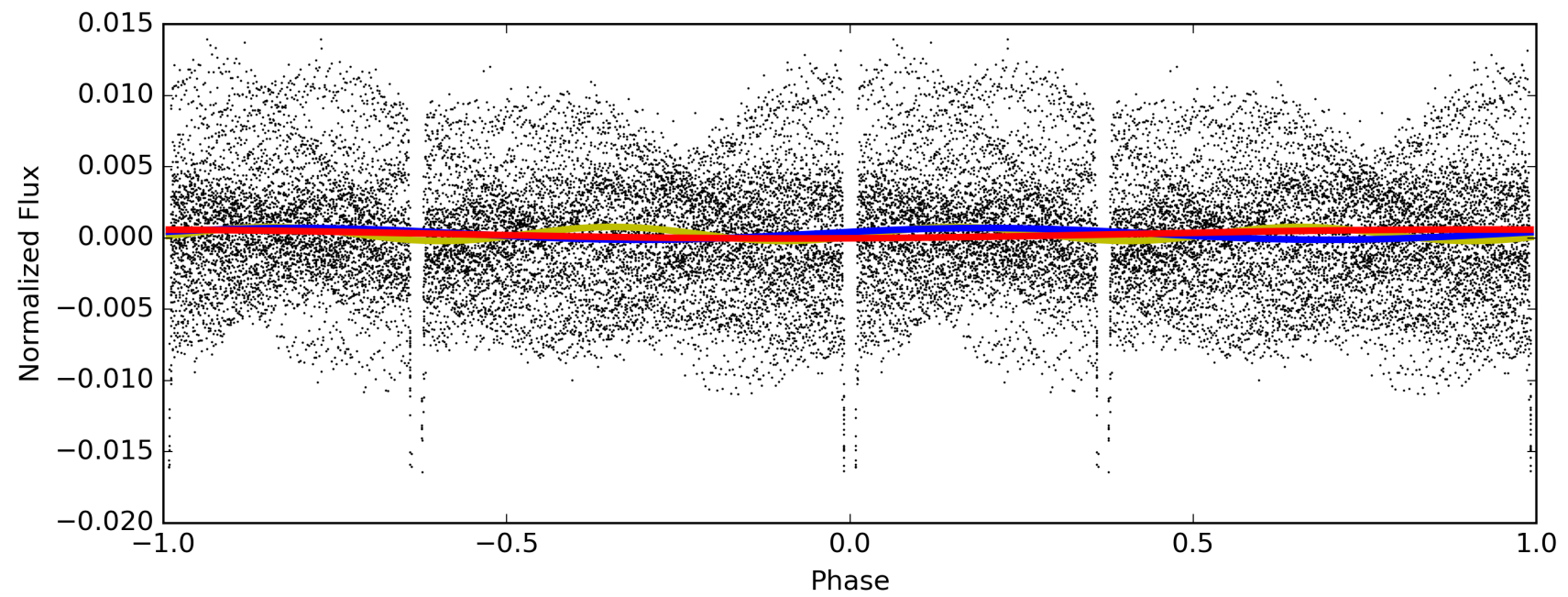
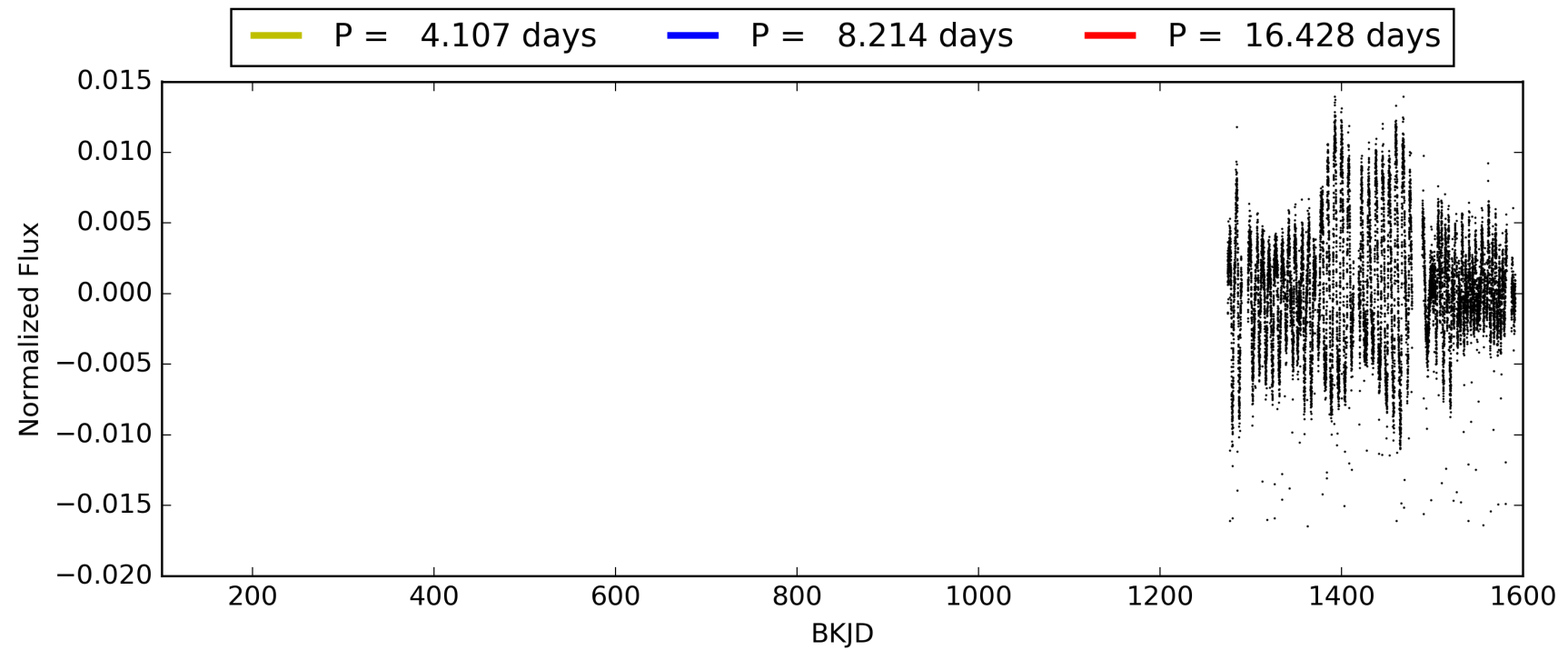
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGoF-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [31/31]  
GhostDiagnostic-chr: 6.331  
Centroid-sig: 0.0%  
Centroid-so: 2.827 arcsec [304.72σ]  
OotOffset-rm: N/A  
KicOffset-rm: 0.234 arcsec [3.29σ]  
OotOffset-st: 0/0/0 [0]  
KicOffset-st: 1/1/1 [4]  
DiffImageQuality-fgm: 1.00 [4/4]  
DiffImageOverlap-fno: 1.00 [4/4]

# TCE 009532123-01, PDC Light Curves

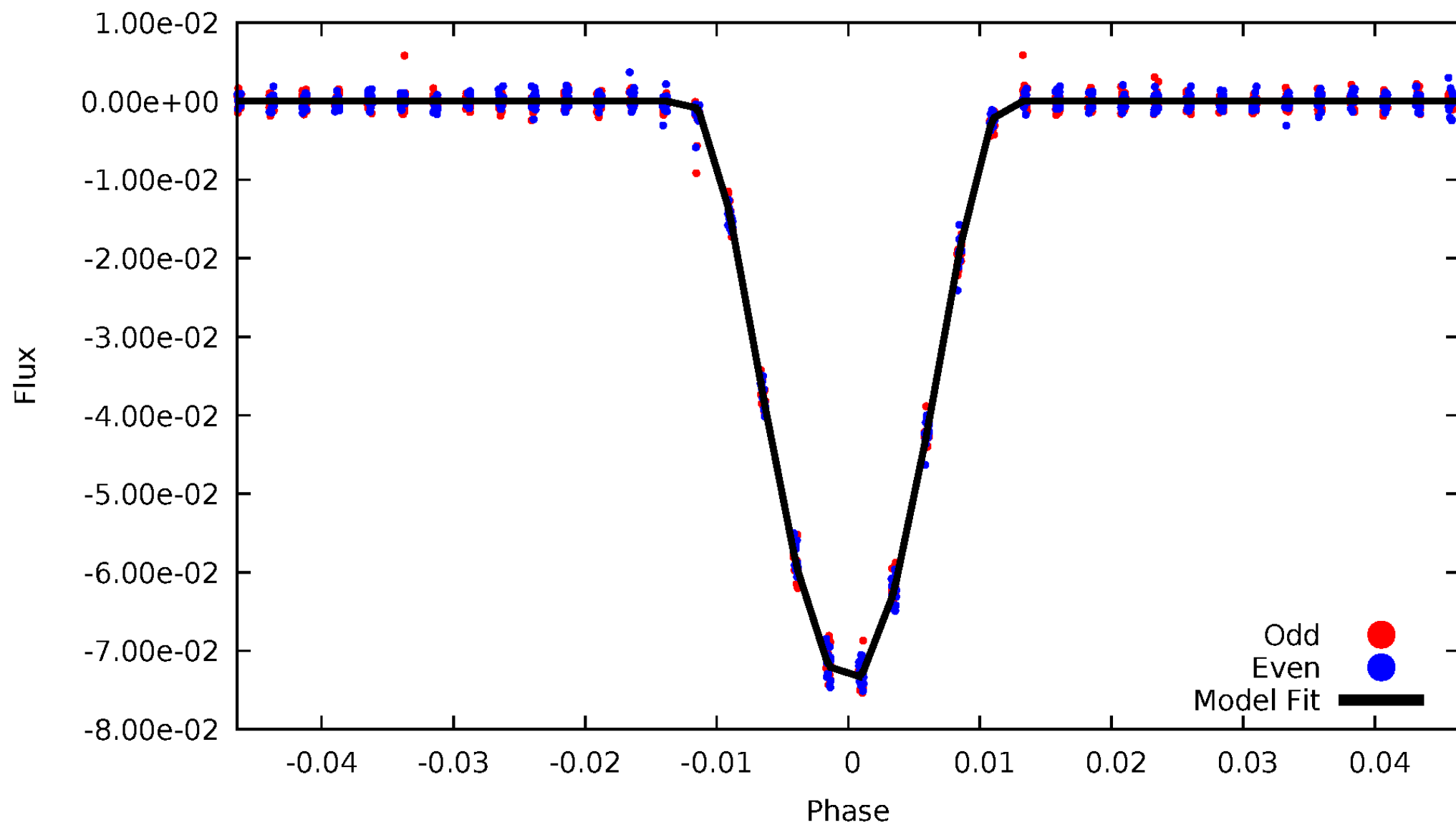


TCE 009532123-01



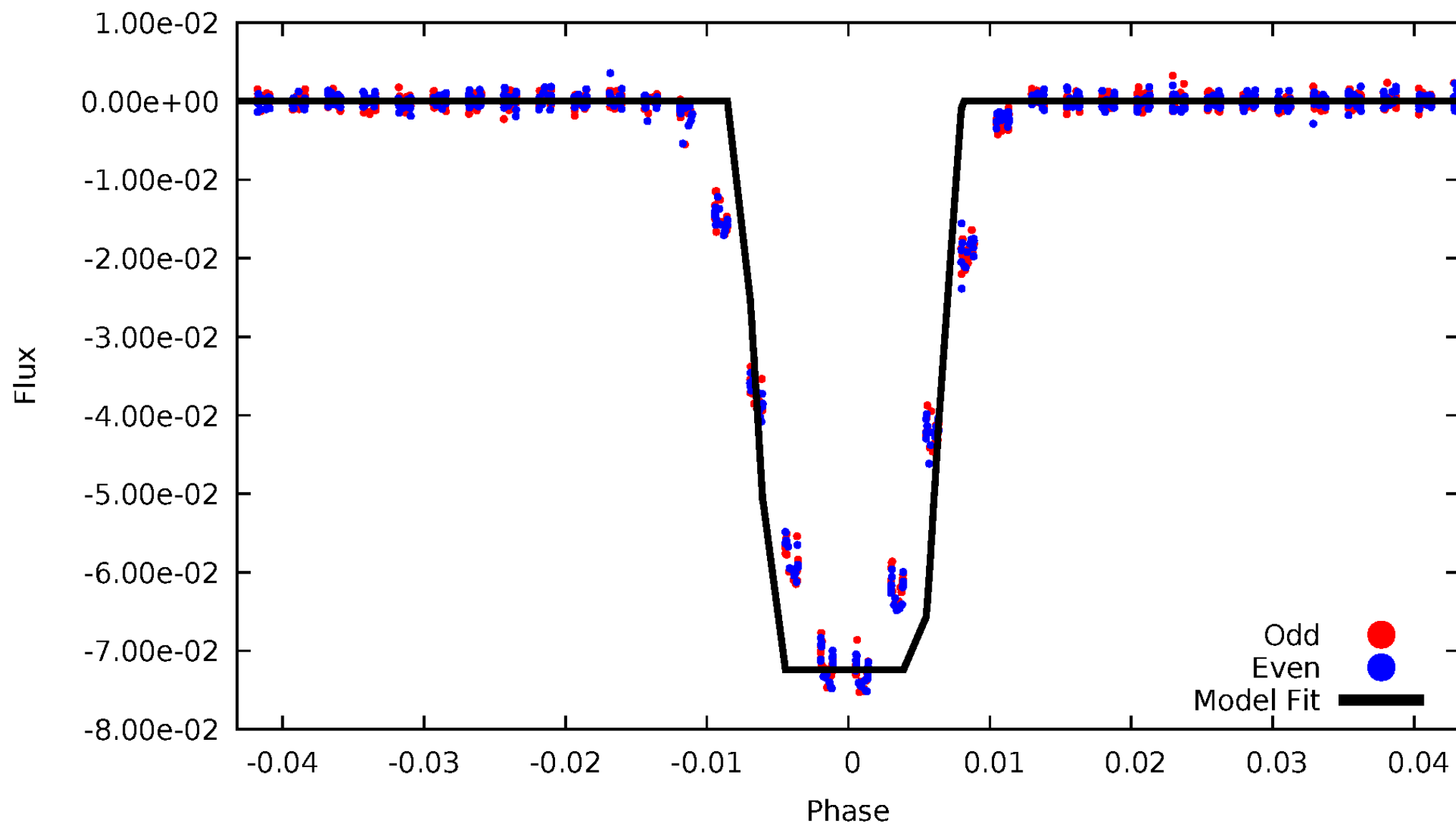
# DV Odd/Even

TCE 009532123-01



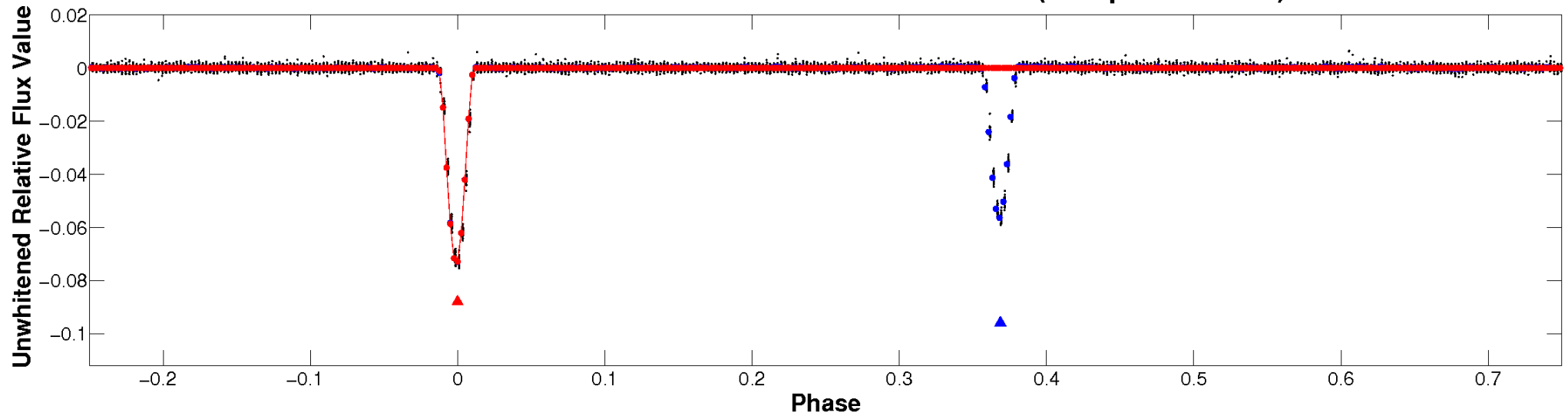
# ALT Odd/Even

TCE 009532123-01

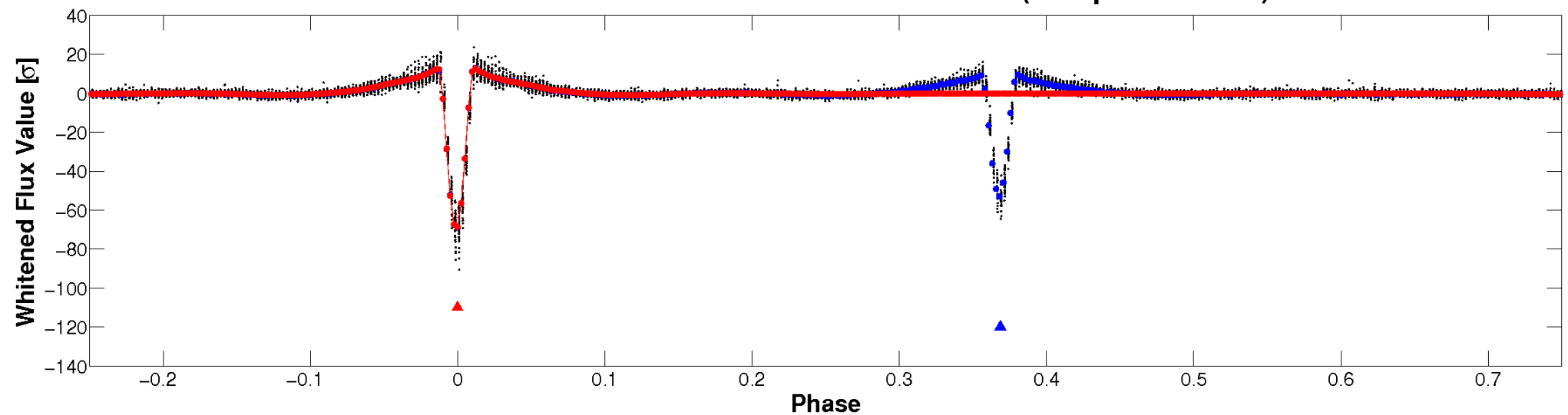


# Non-Whitened Vs. Whitened Light Curve

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

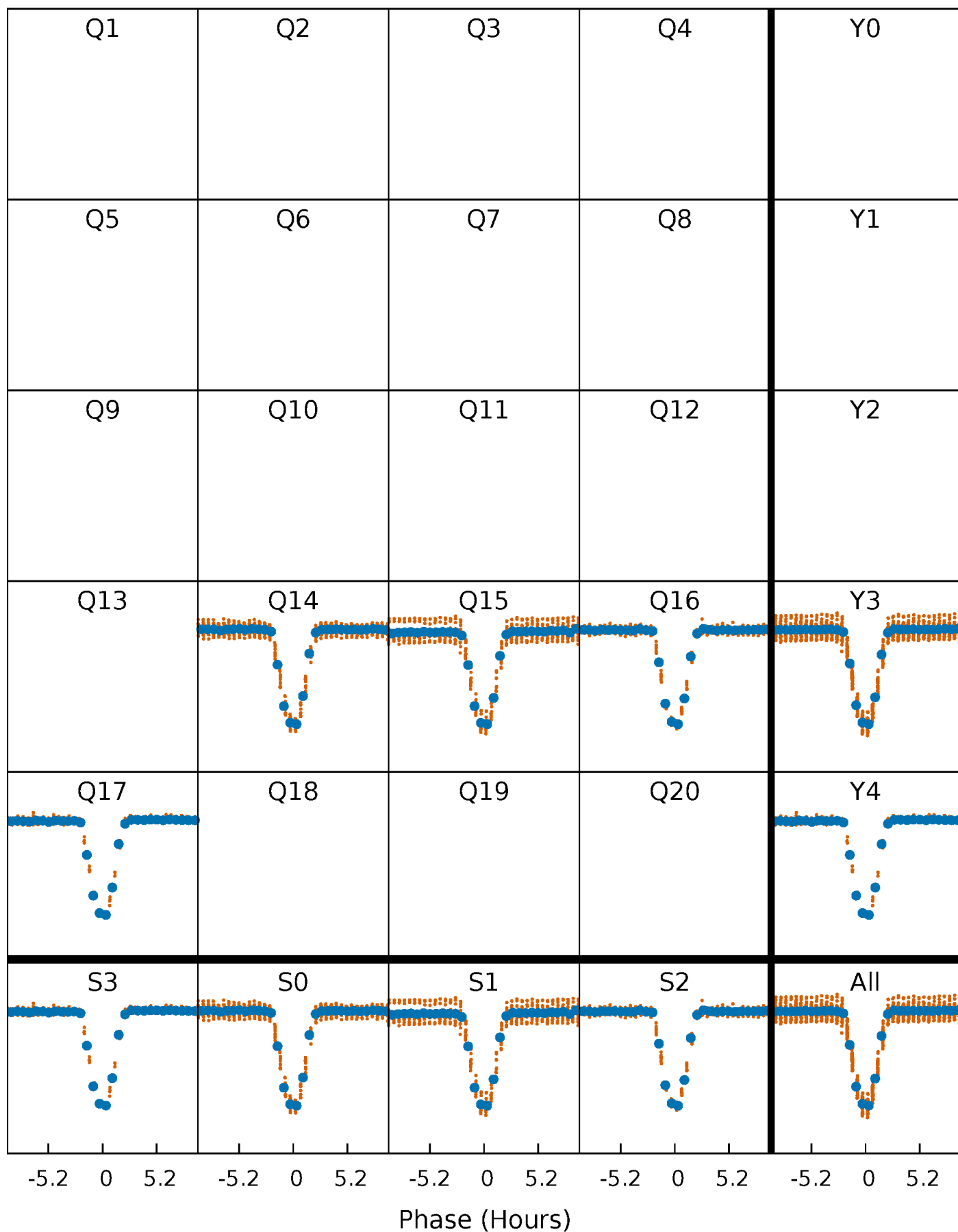


## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

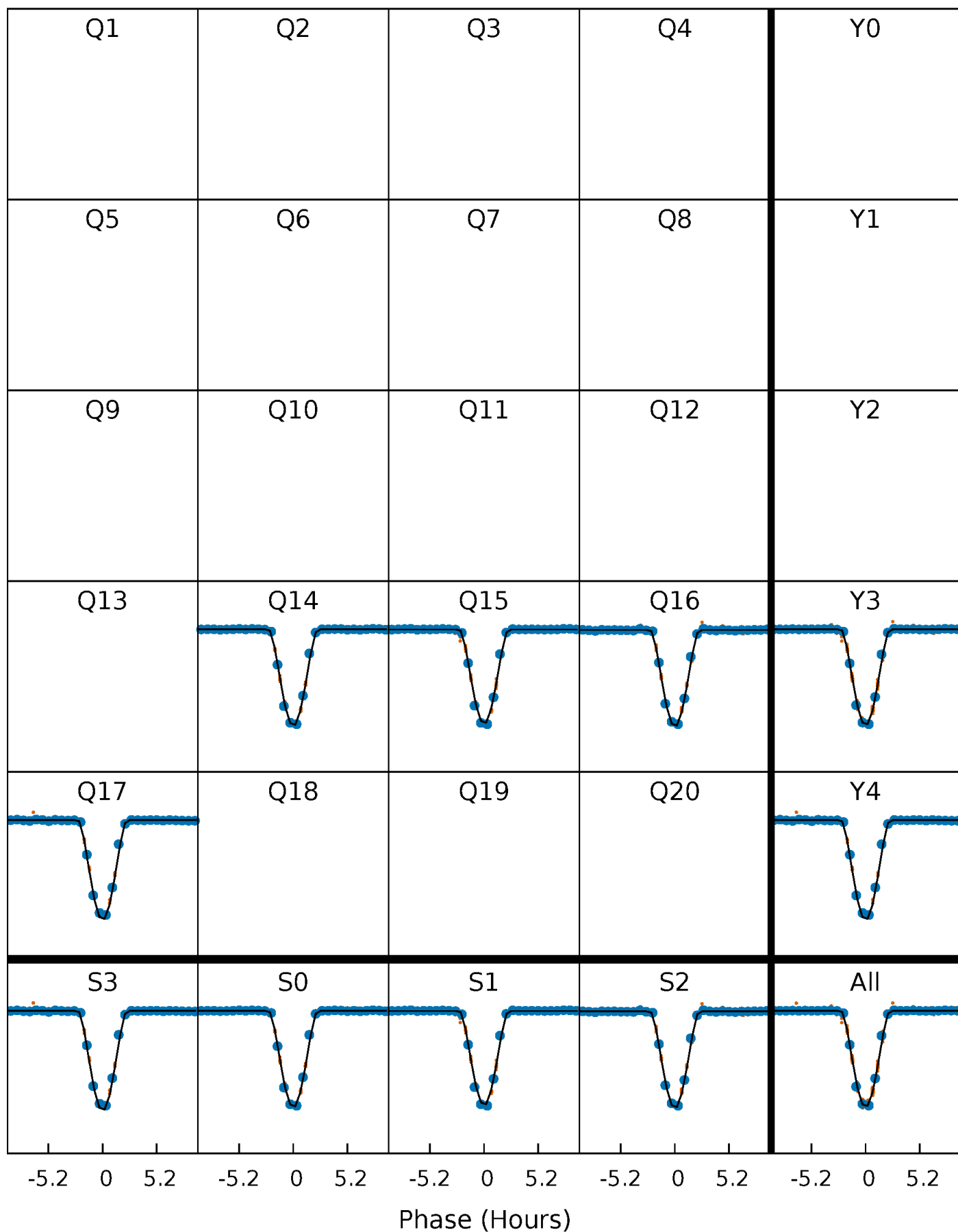
TCE 009532123-01   P= 8.214205 Days    $T_0=135.013906$  (BKJD)





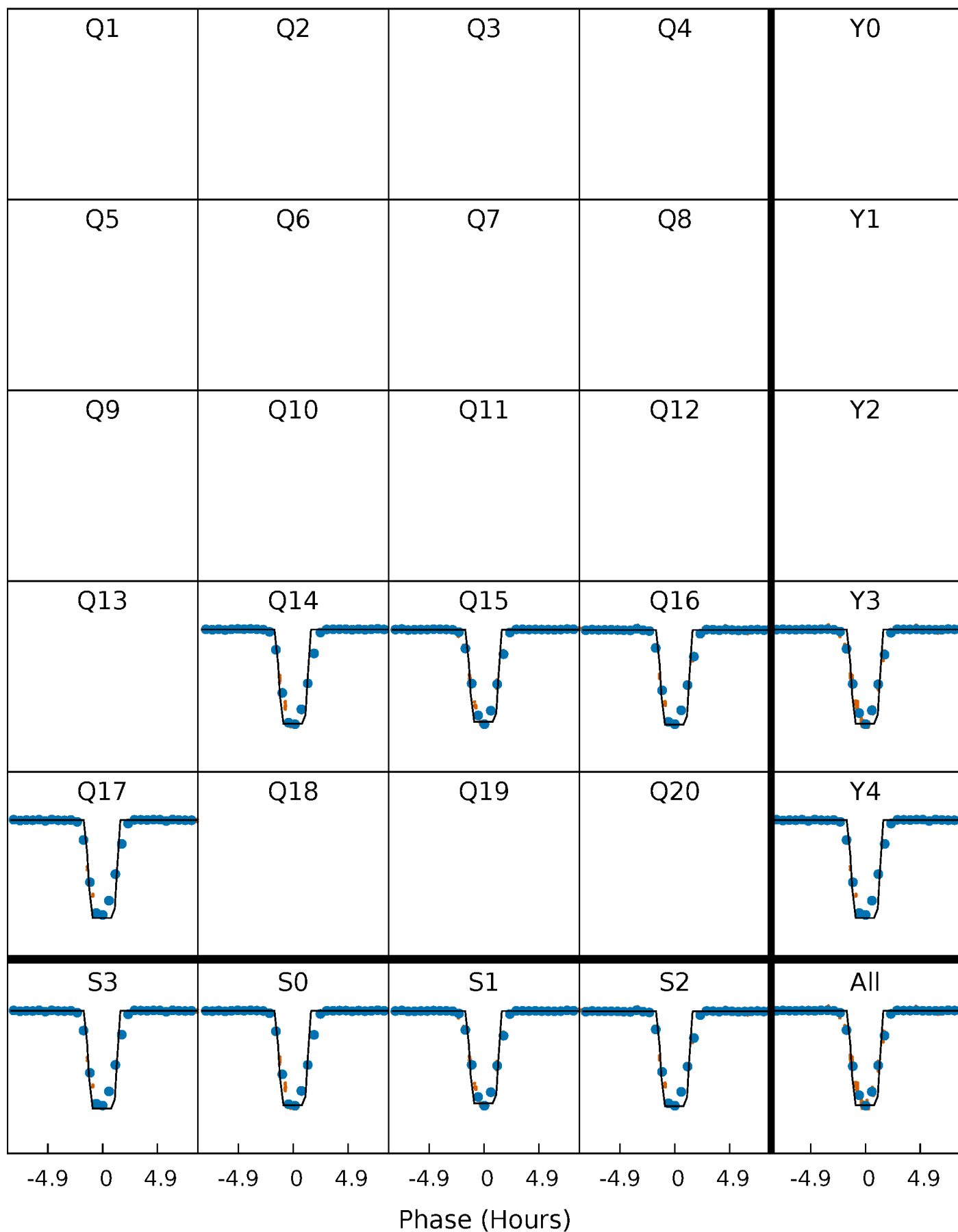
# DV Quarter-Phased Transit Curves

TCE 009532123-01   P= 8.214205 Days    $T_0=135.013906$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

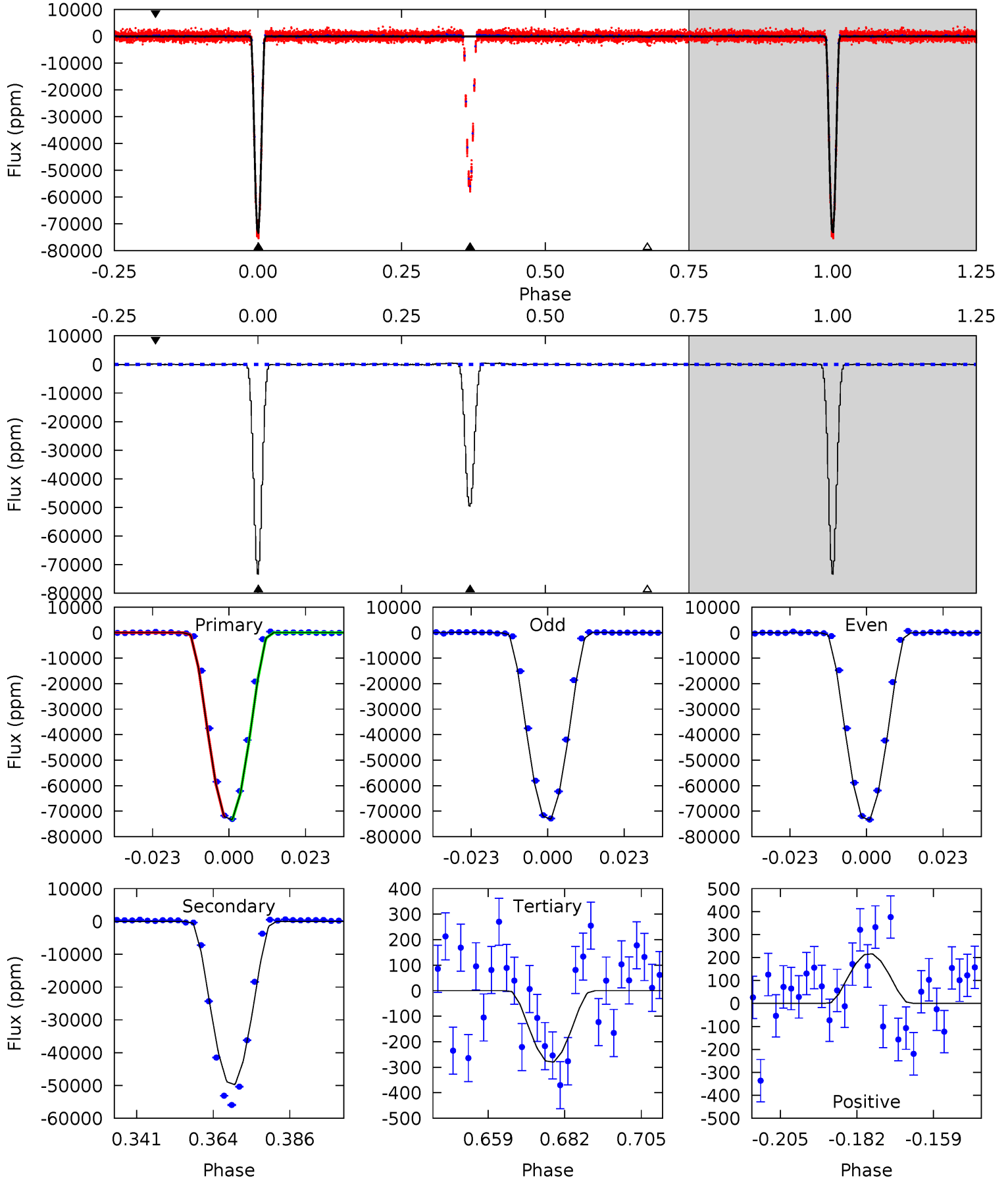
TCE 009532123-01   P= 8.214405 Days    $T_0=134.982437$  (BKJD)



# DV Model-Shift Uniqueness Test

009532123-01, P = 8.214205 Days, E = 135.013906 Days

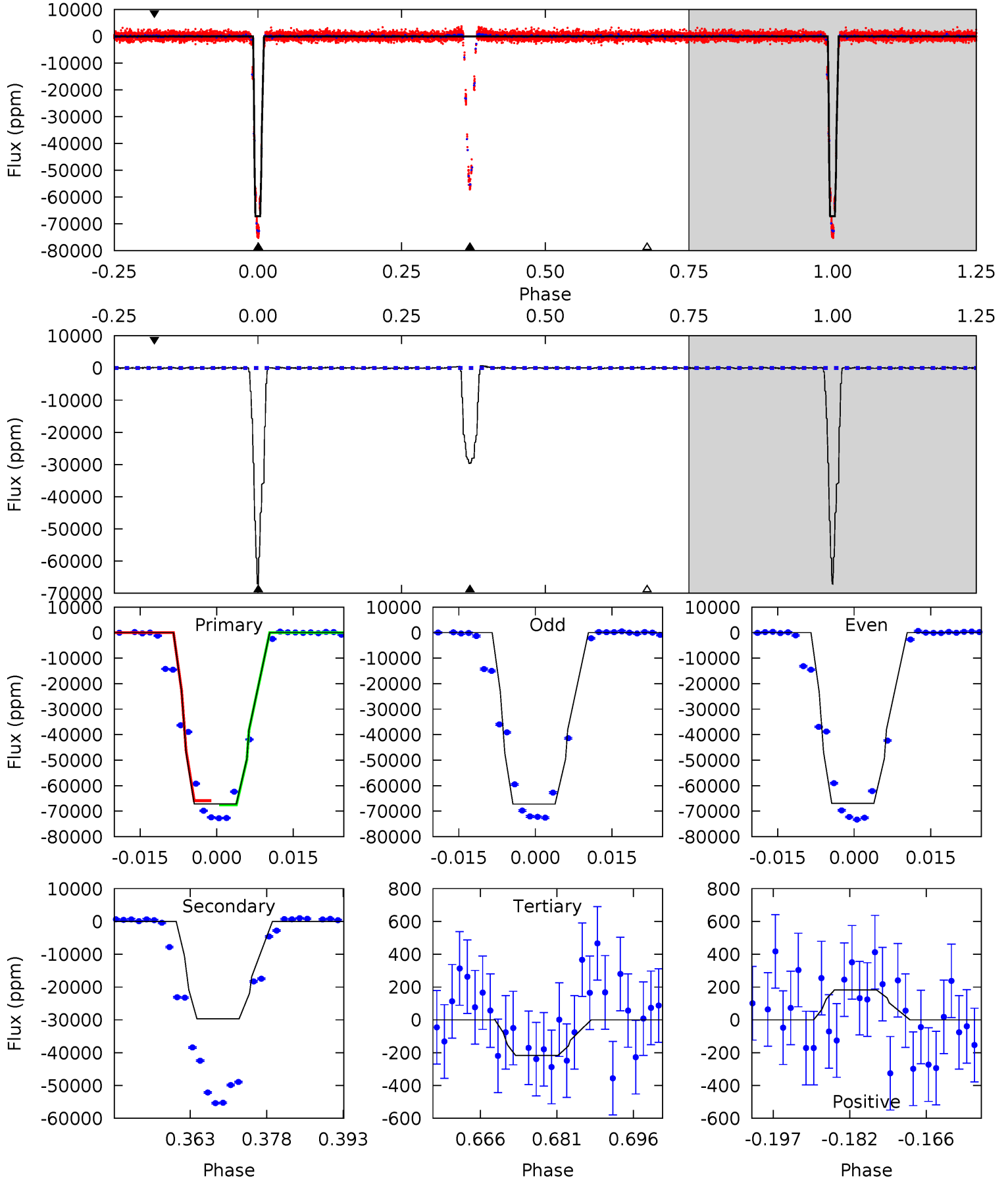
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1510	1025	5.77	4.45	4.87	2.28	2.46	1505	1506	1019	1020	3.49	1.00	0.01	1.94



# Alt Model-Shift Uniqueness Test

009532123-01, P = 8.214405 Days, E = 134.982437 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
1044	461.5	3.38	2.83	4.95	2.43	5.35	1040	1041	458.1	458.6	2.33	0.99	0.01	2.57



### Stellar Parameters For KIC 009532123

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5654^{+178}_{-198}$	$4.590^{+0.036}_{-0.144}$	$-0.380^{+0.300}_{-0.300}$	$0.774^{+0.169}_{-0.073}$	$0.865^{+0.088}_{-0.097}$	$2.625^{+0.477}_{-1.086}$
	+3%/-4%	+1%/-3%	+79%/-79%	+22%/-9%	+10%/-11%	+18%/-41%
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 009532123-01 / KOI 6069.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-49717 \pm 49$	$31.45^{+4.47}_{-3.41}$	$1139^{+58}_{-52}$	$4657^{+194}_{-199}$	$164^{+40}_{-34}$
Alt.	$-29687 \pm 64$	$23.74^{+3.71}_{-3.13}$	$1140^{+60}_{-51}$	$4696^{+265}_{-242}$	$171^{+53}_{-42}$

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

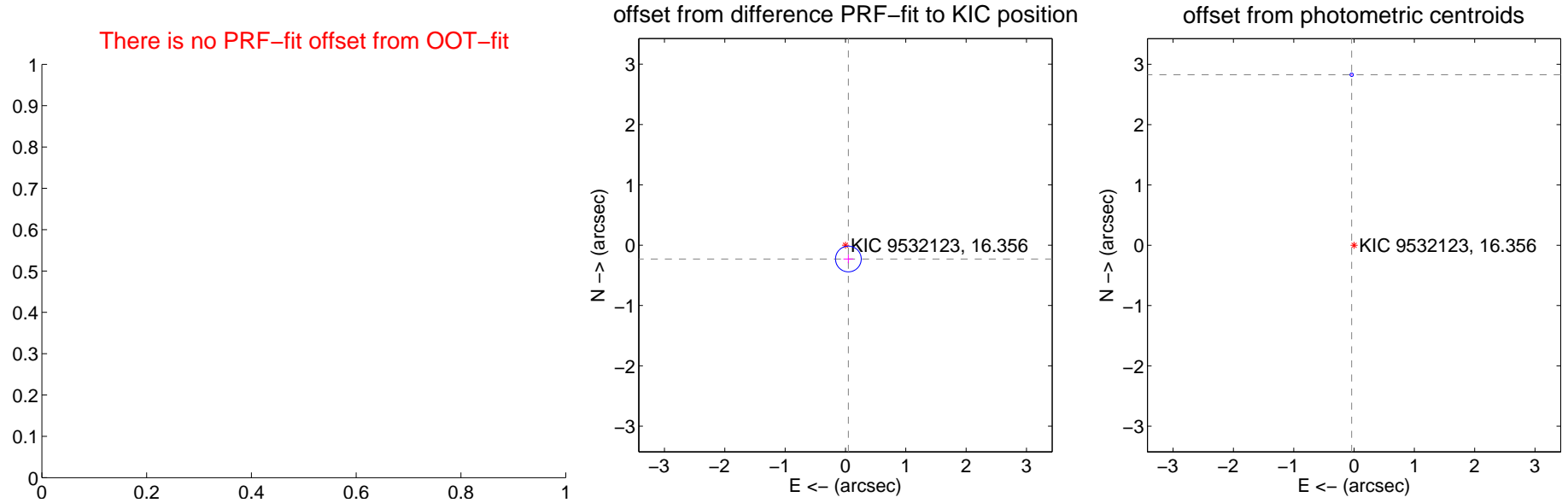
## DV Centroid Data

Supplemental centroid analysis for 009532123-01. Kepler magnitude: 16.36. Transit SNR 739.31

There are 4 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	$0.234 \pm 0.071$	3.29	$-0.048 \pm 0.081$	$-0.229 \pm 0.071$
photometric centroid source offset	$2.83 \pm 0.01$	304.72	$0.04 \pm 0.00$	$2.83 \pm 0.01$



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.

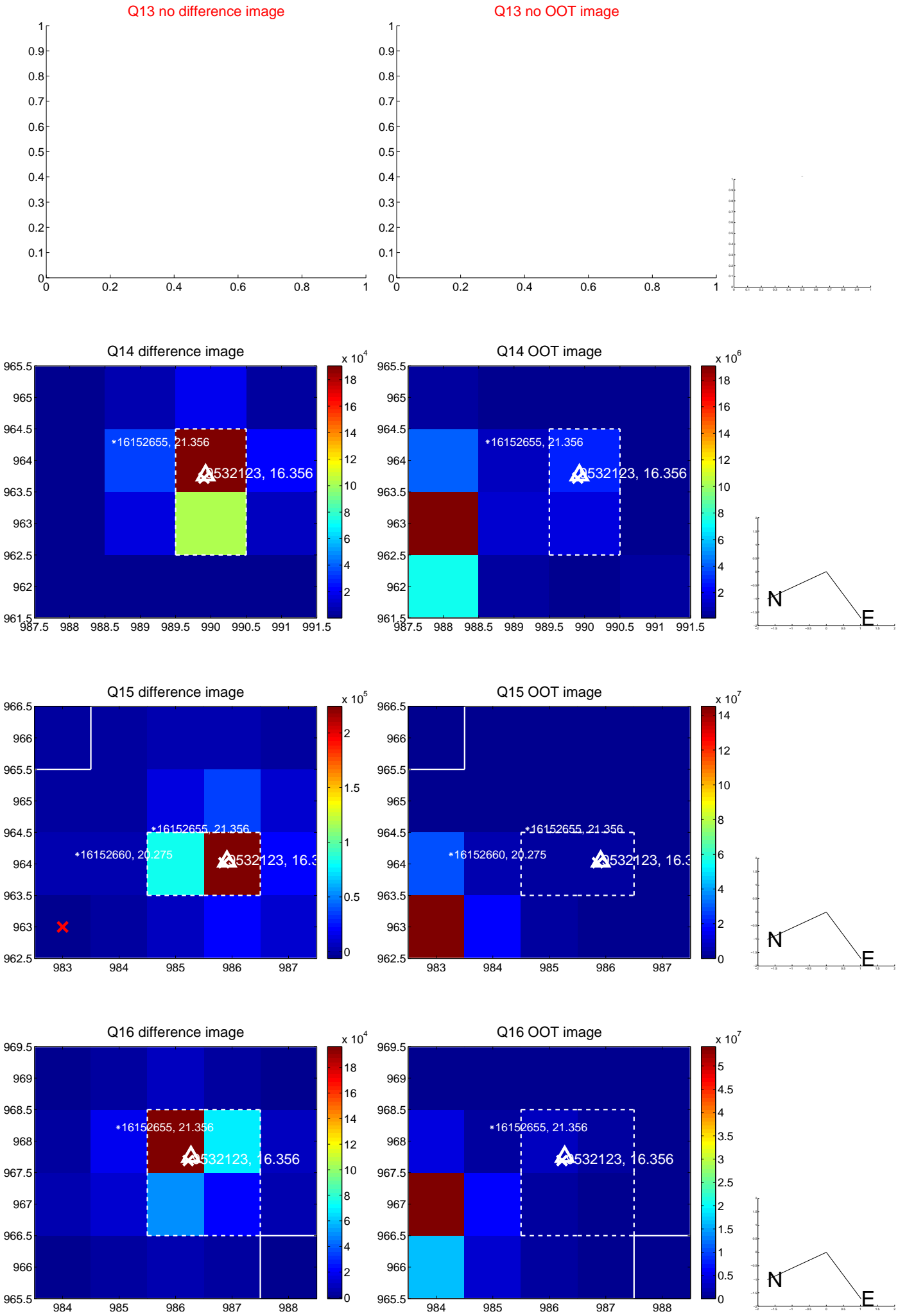




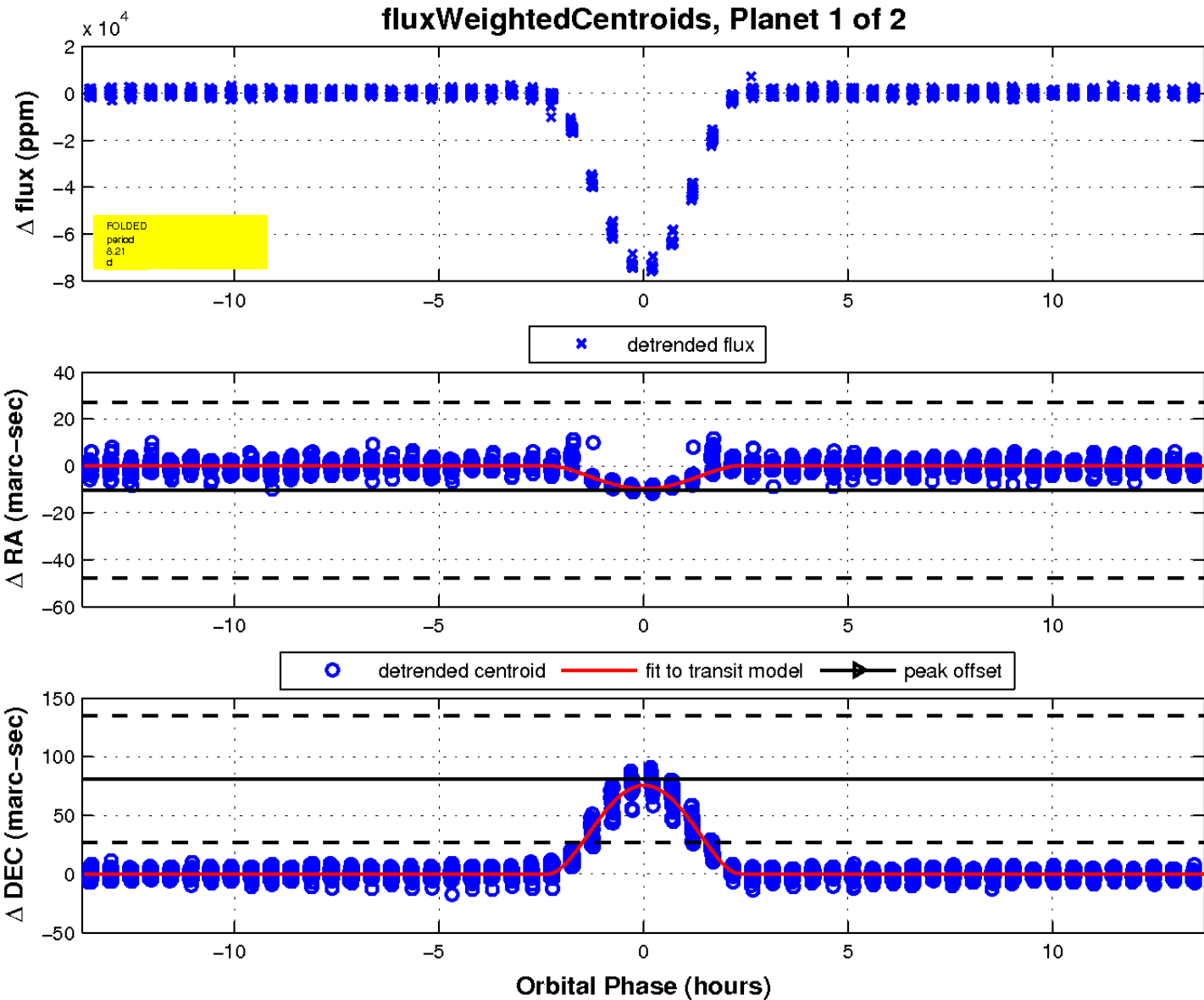
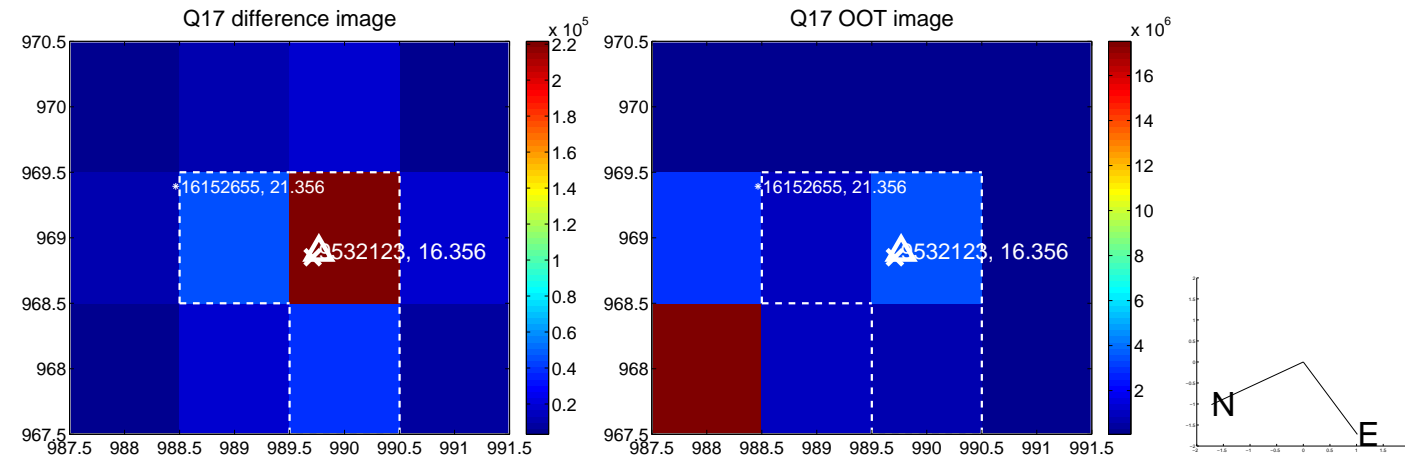
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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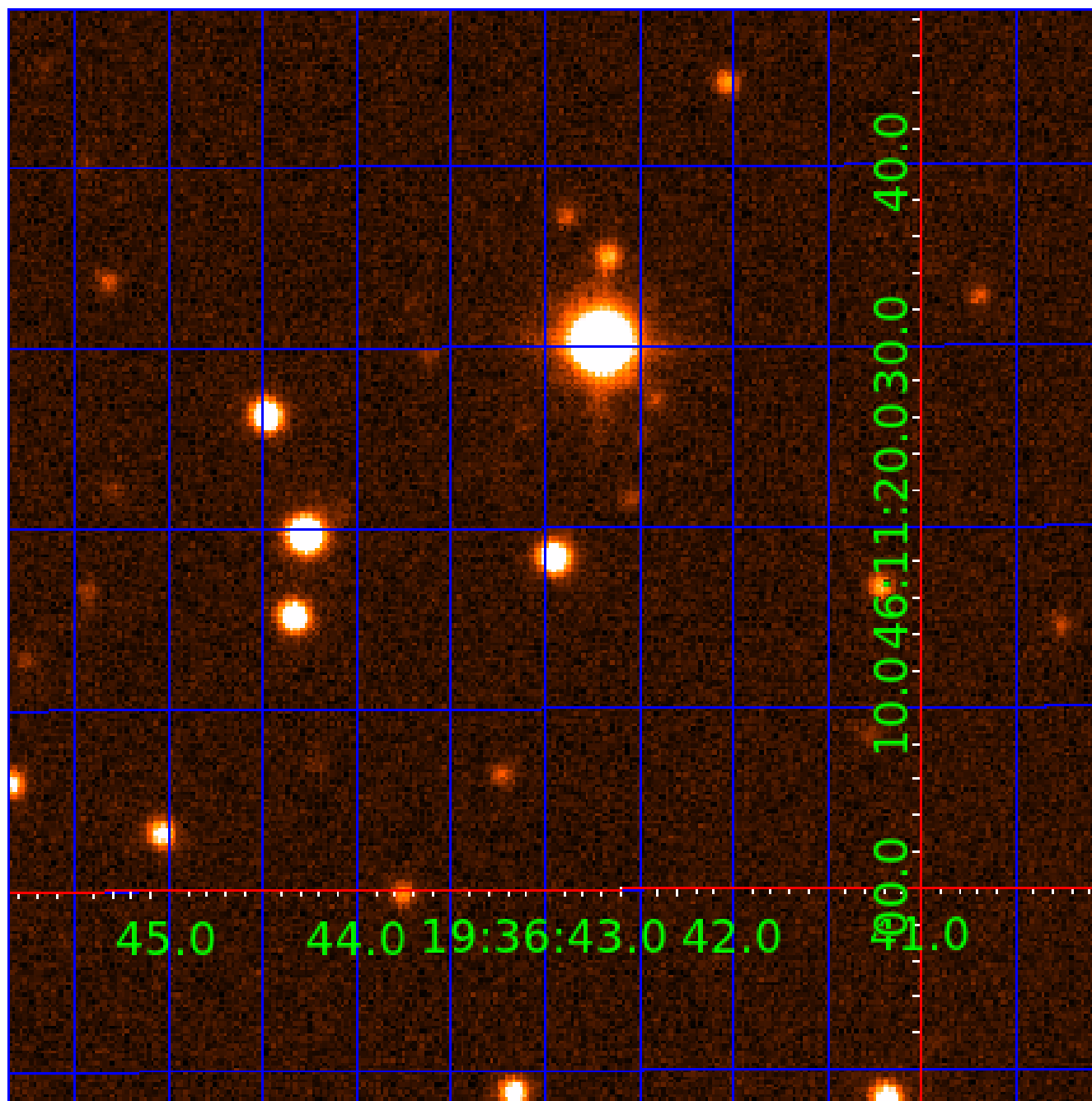


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009532123

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009532123-01	OBS	6069.01	8.214205	135.013906	73935.7	4.575	840.4	739.3	0.77	5654	30.46	96.25
009532123-02	OBS	No	8.214214	138.041537	56952.3	4.538	560.5	533.8	0.77	5654	26.92	96.25

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009532123-01	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_FEW_MEAS
009532123-02	OBS	FP	0.00	1	0	0	0	SAME_NTL_PERIOD—CENT_FEW_MEAS

**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.

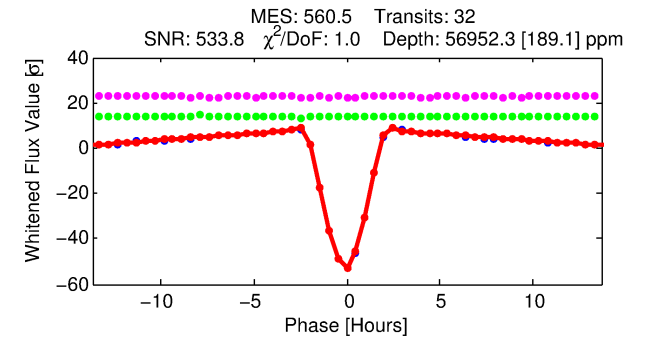
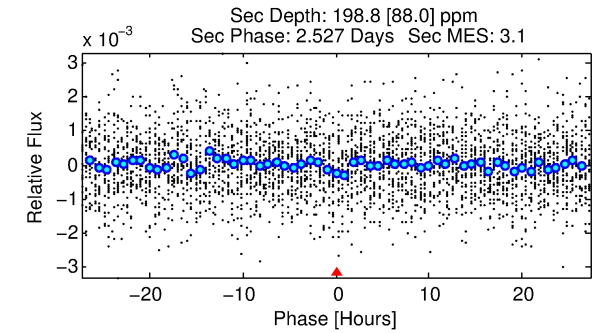
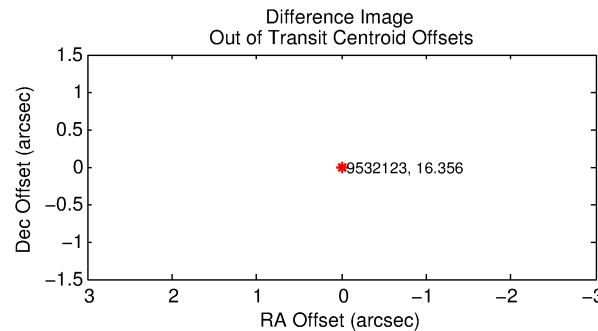
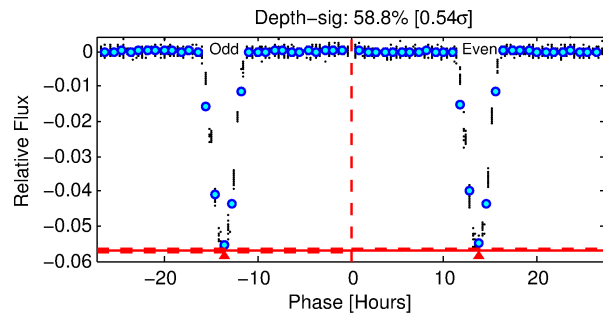
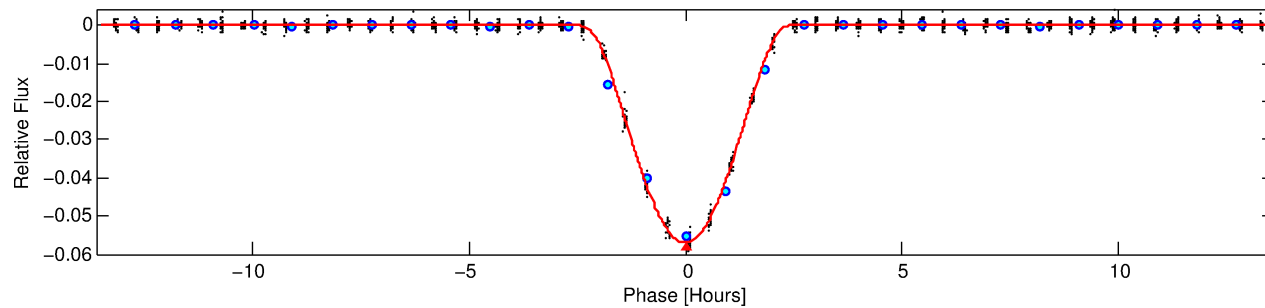
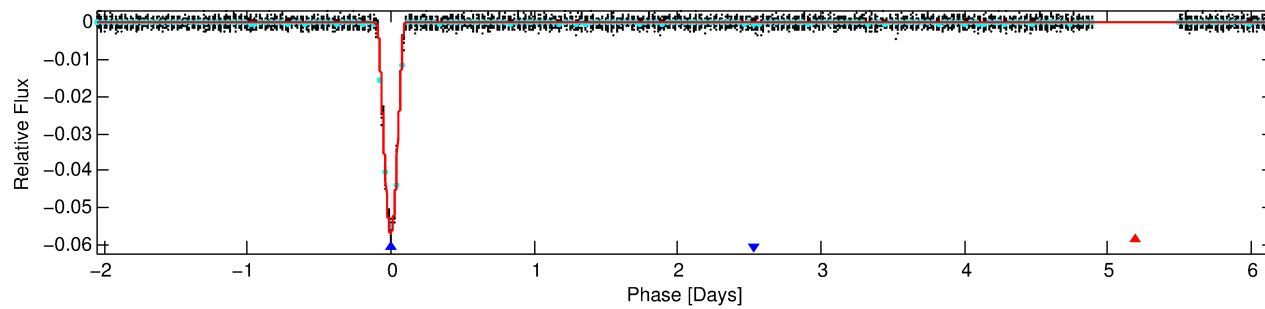
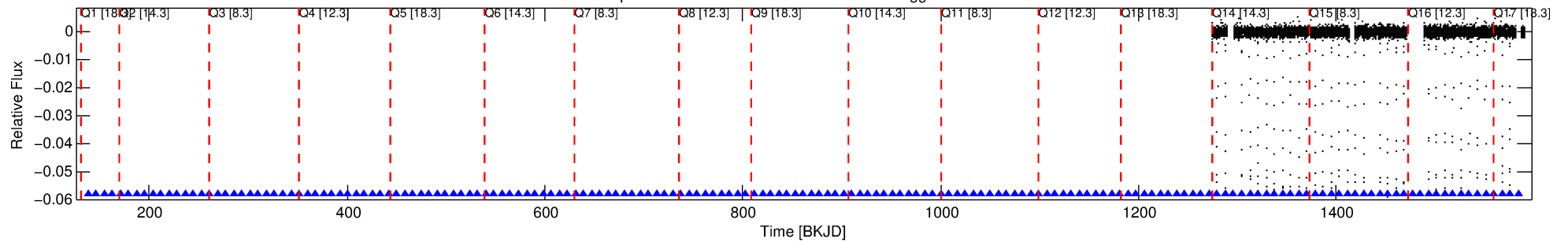
## Ephemeris Match Information For 009532123-02

No Significant Match Found

# DV One-Page Summary

KIC: 9532123 Candidate: 2 of 2 Period: 8.214 d  
KOI: K06069 Corr: No Ephemeris Match

Kp: 16.36 R\*: 0.77 Rs Teff: 5654.0 K Logg: 4.59 Fe/H: -0.380



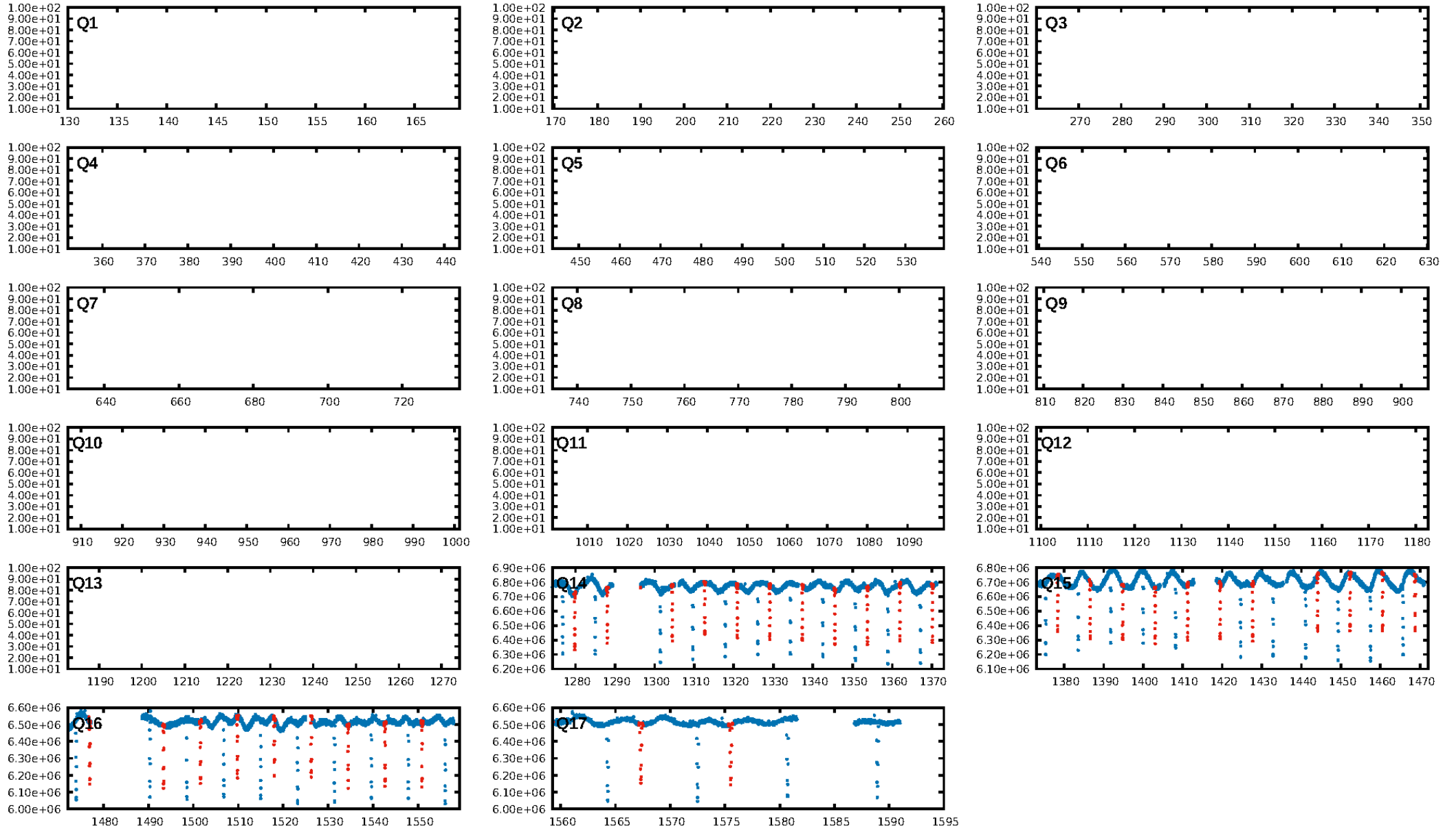
## DV Fit Results:

Period = 8.21421 [0.00001] d  
Epoch = 138.0415 [0.0009] BKJD  
Rp/R\* = 0.3187 [0.0291]  
a/R\* = 13.14 [0.10]  
b = 0.92 [0.05]  
Seff = 96.25 [28.82]  
Teq = 799 [60] K  
Rp = 26.92 [6.37] Re  
a = 0.0755 [0.0138] AU  
Ag = 0.86 [0.47] [-0.30σ]  
Teffp = 1189 [148] K [2.44σ]

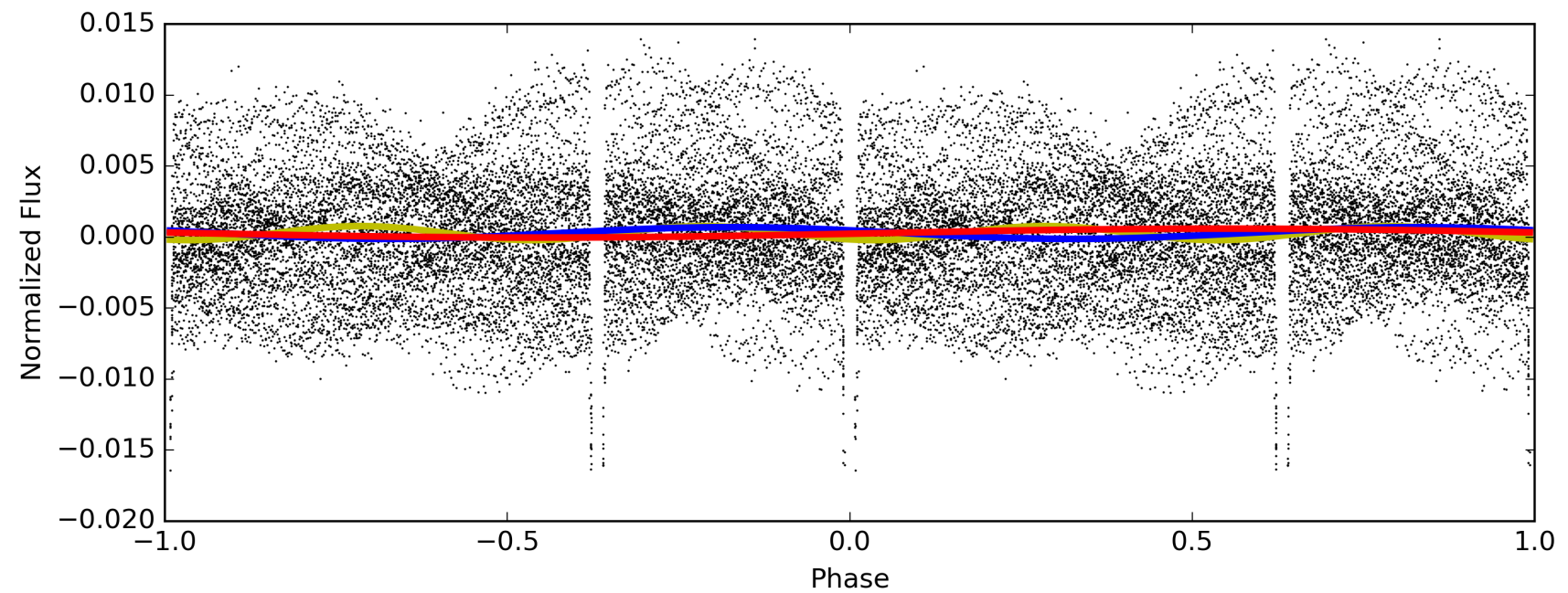
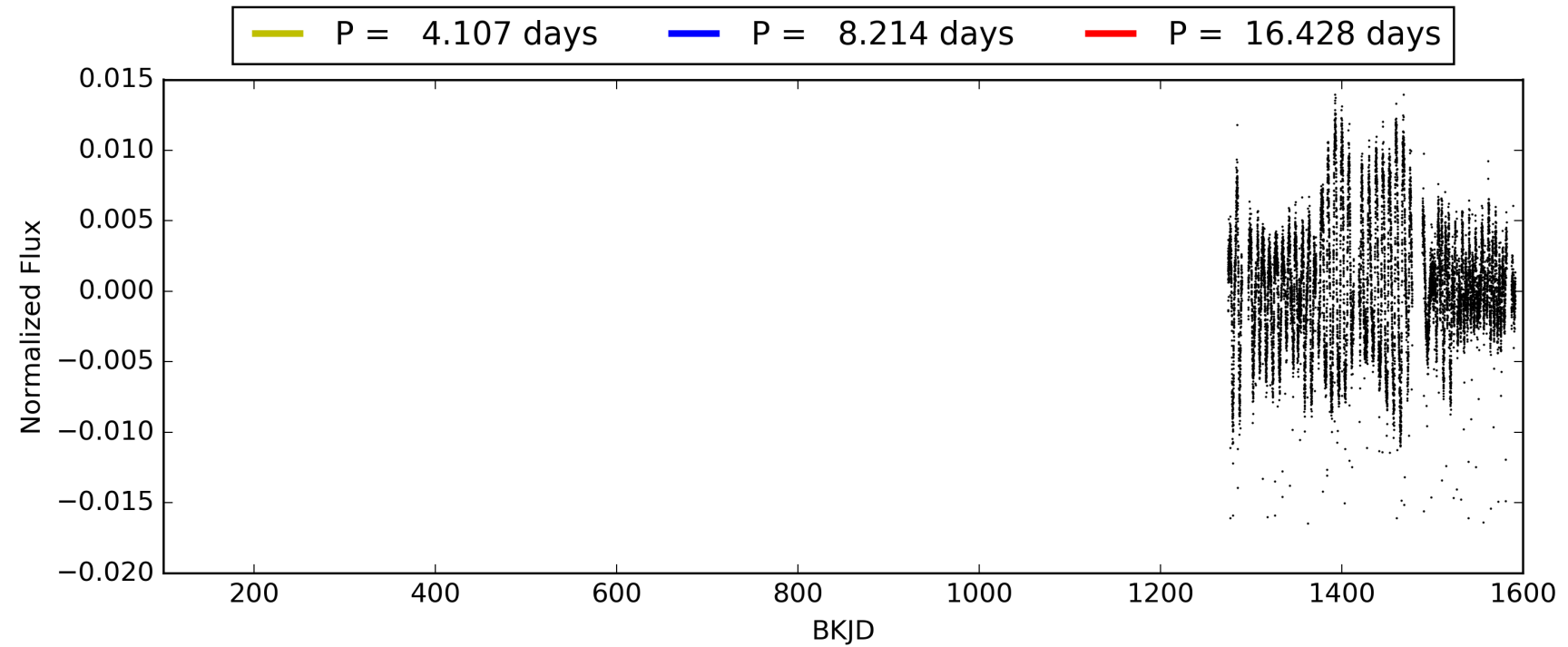
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [30/30]  
GhostDiagnostic-chr: 5.789  
Centroid-sig: 0.0%  
Centroid-so: 2.824 arcsec [222.25σ]  
OotOffset-rm: N/A  
KicOffset-rm: 0.231 arcsec [3.33σ]  
OotOffset-st: 0/0/0/0 [0]  
KicOffset-st: 1/1/1/1 [4]  
DiffImageQuality-fgm: 1.00 [4/4]  
DiffImageOverlap-fno: 1.00 [4/4]

# TCE 009532123-02, PDC Light Curves



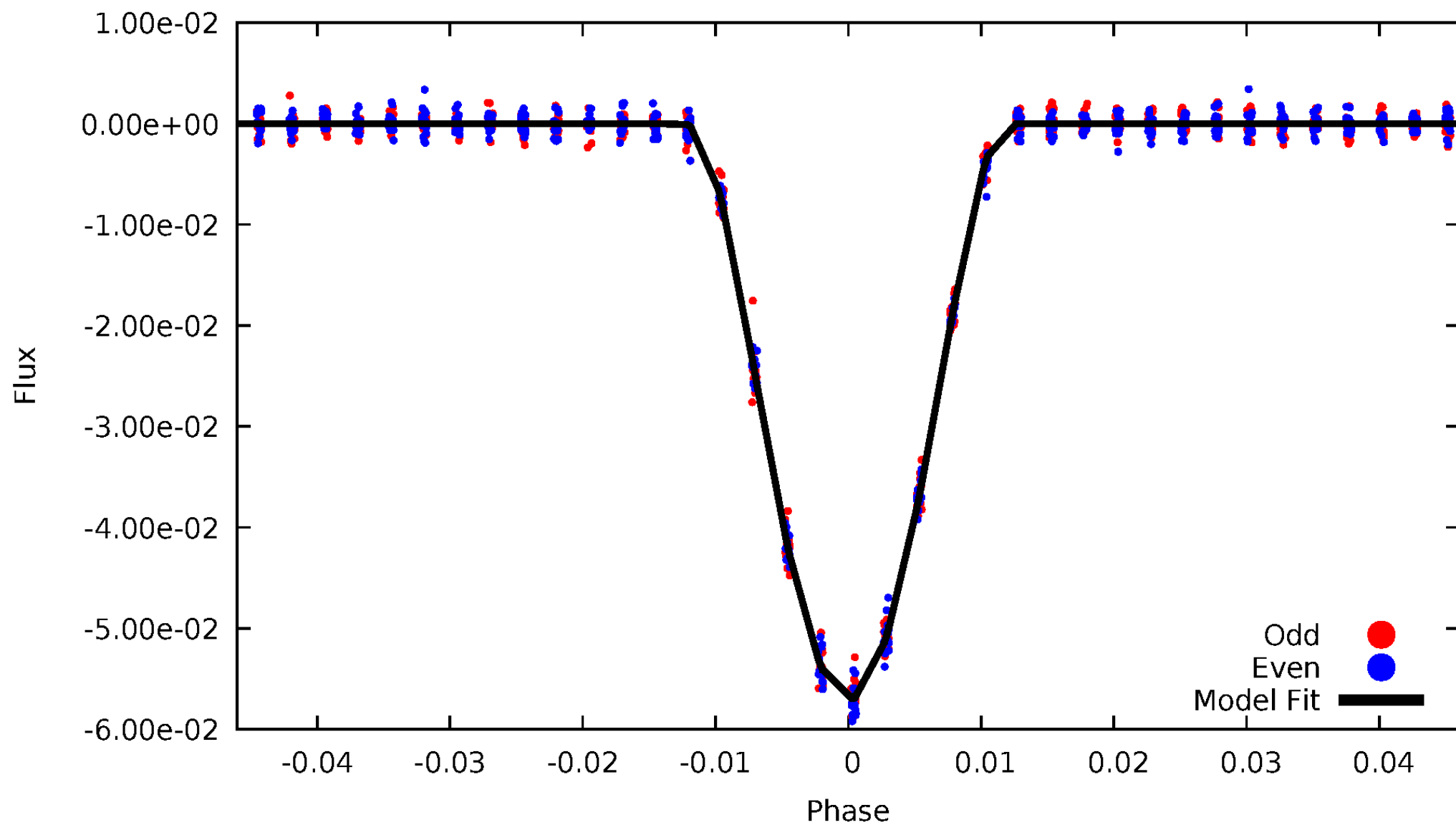
TCE 009532123-02





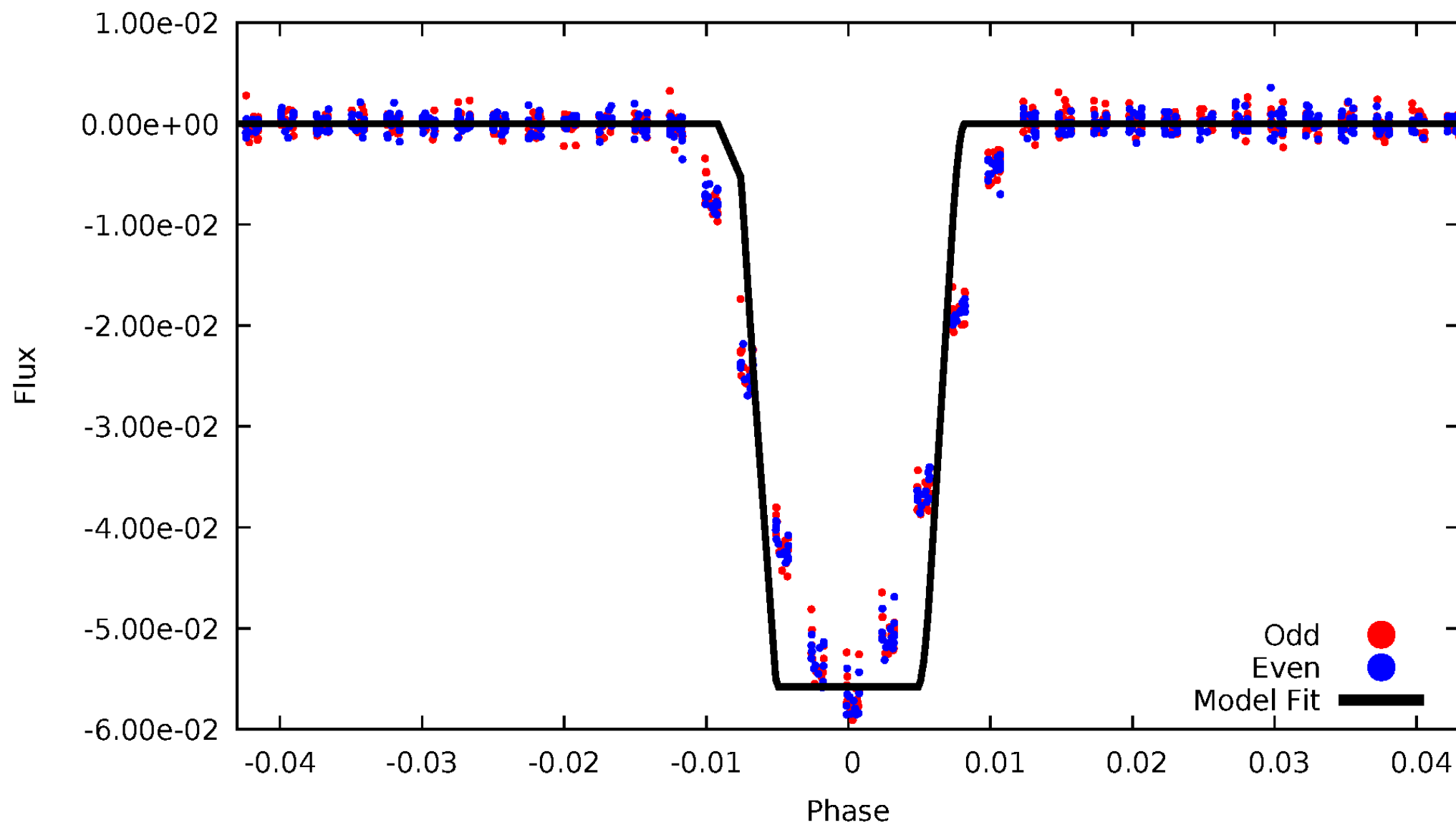
# DV Odd/Even

TCE 009532123-02



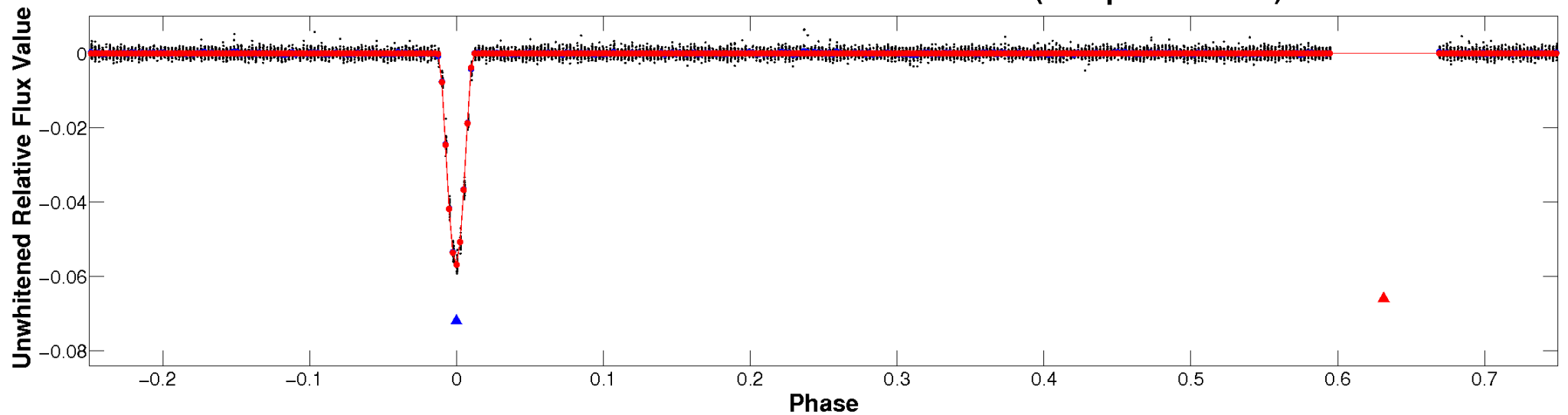
# ALT Odd/Even

TCE 009532123-02

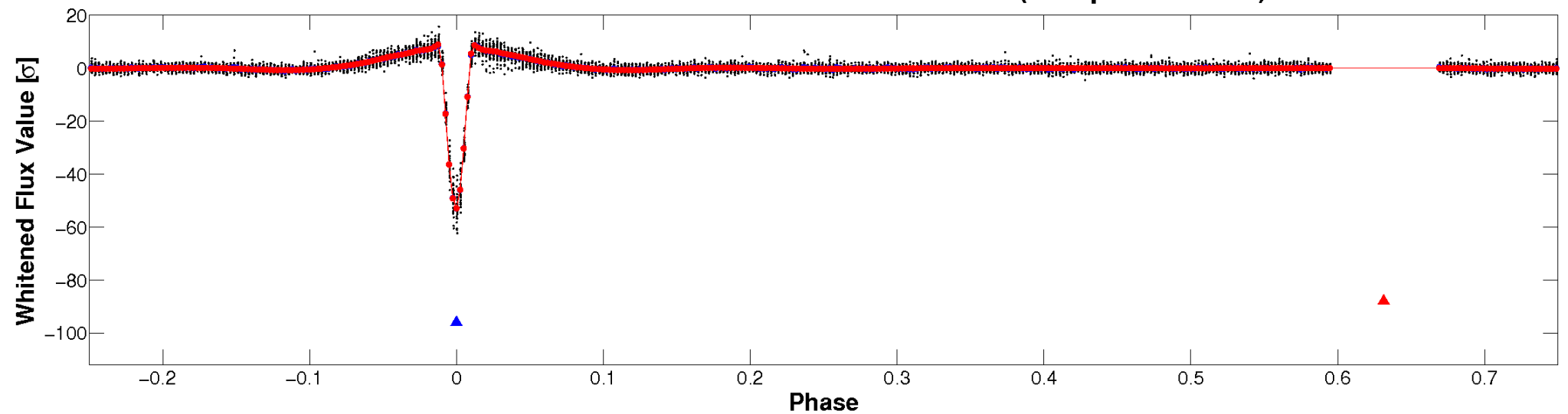


# Non-Whitened Vs. Whitened Light Curve

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

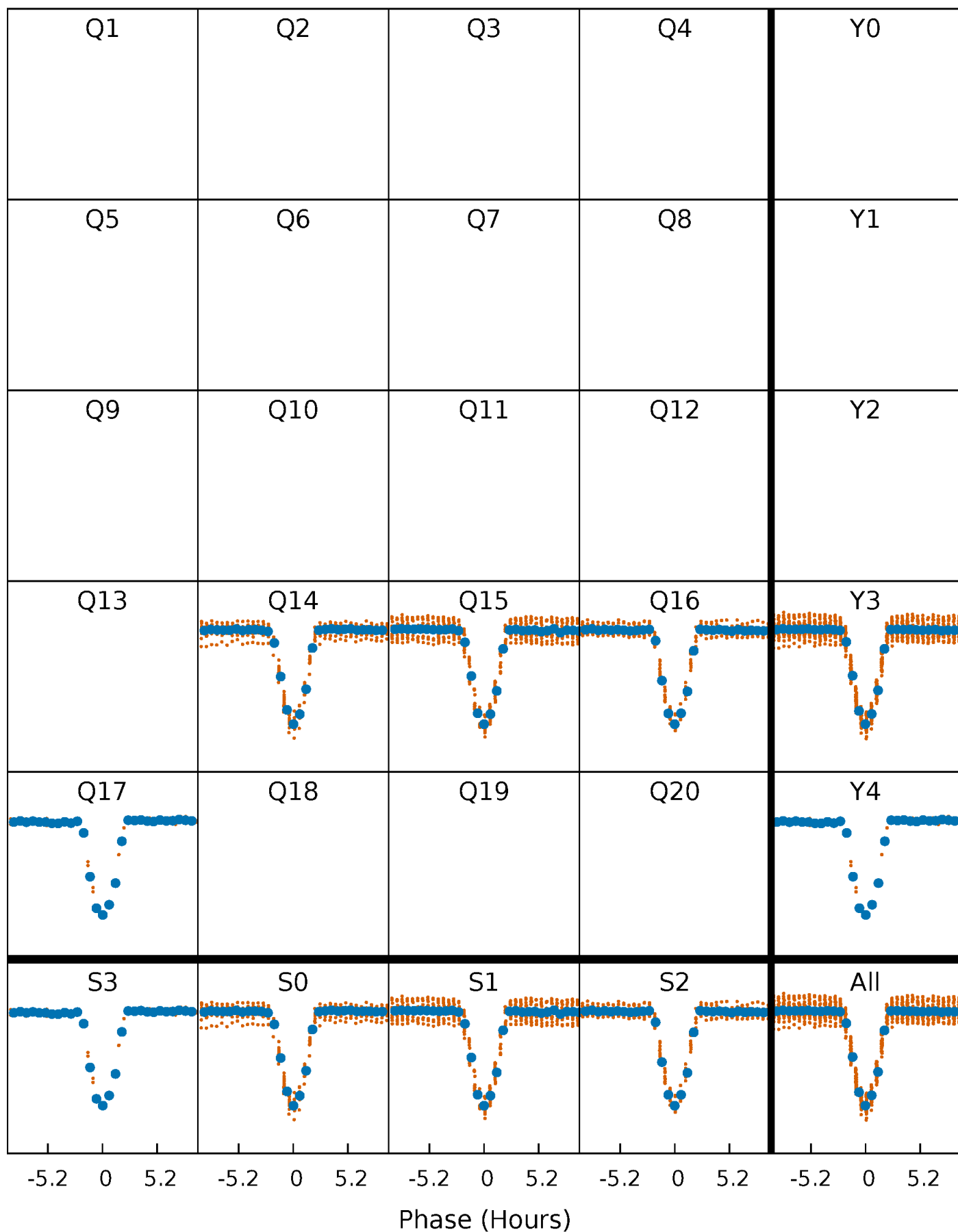


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



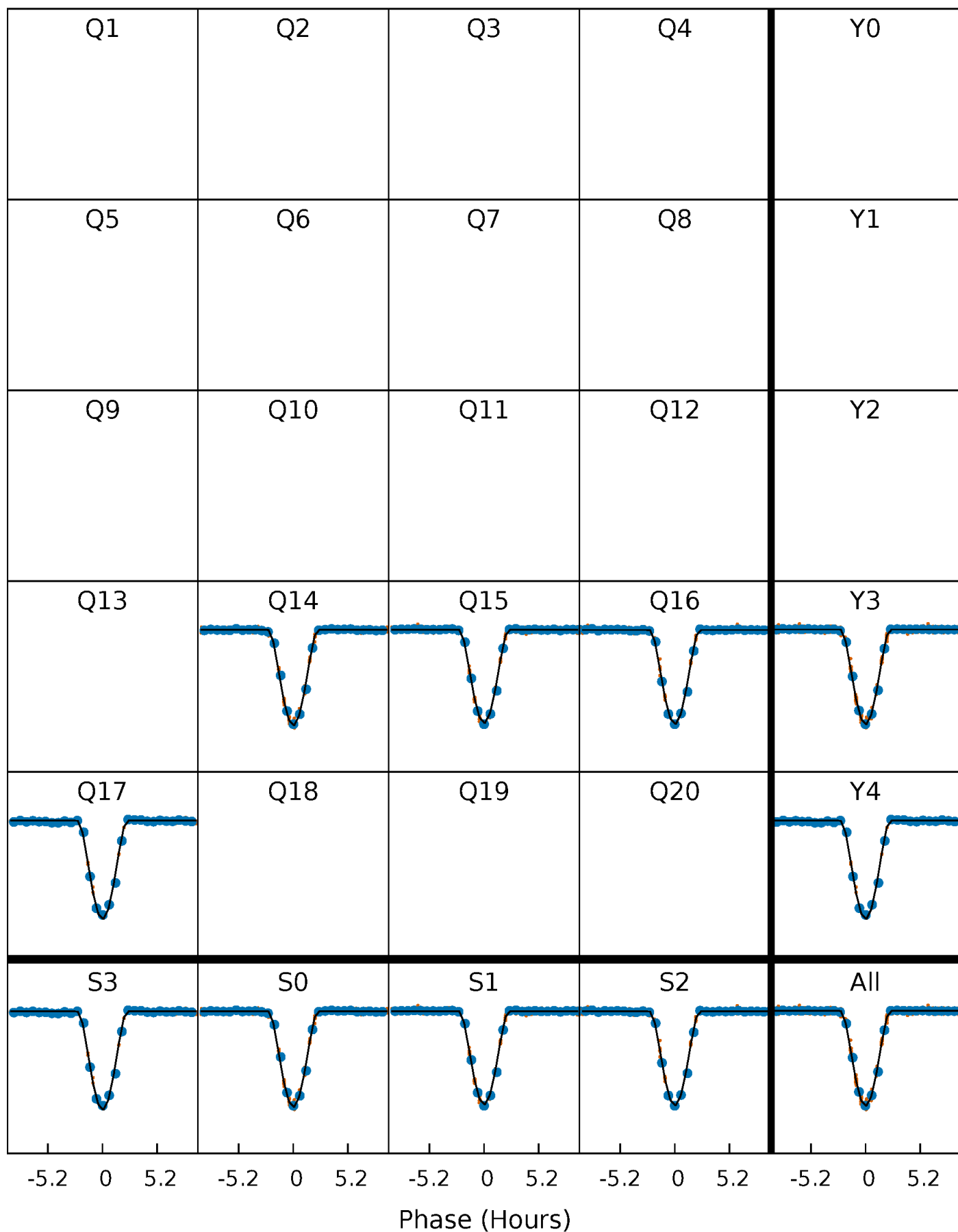
# PDC Quarter-Phased Transit Curves

TCE 009532123-02 P= 8.214214 Days  $T_0=138.041537$  (BKJD)



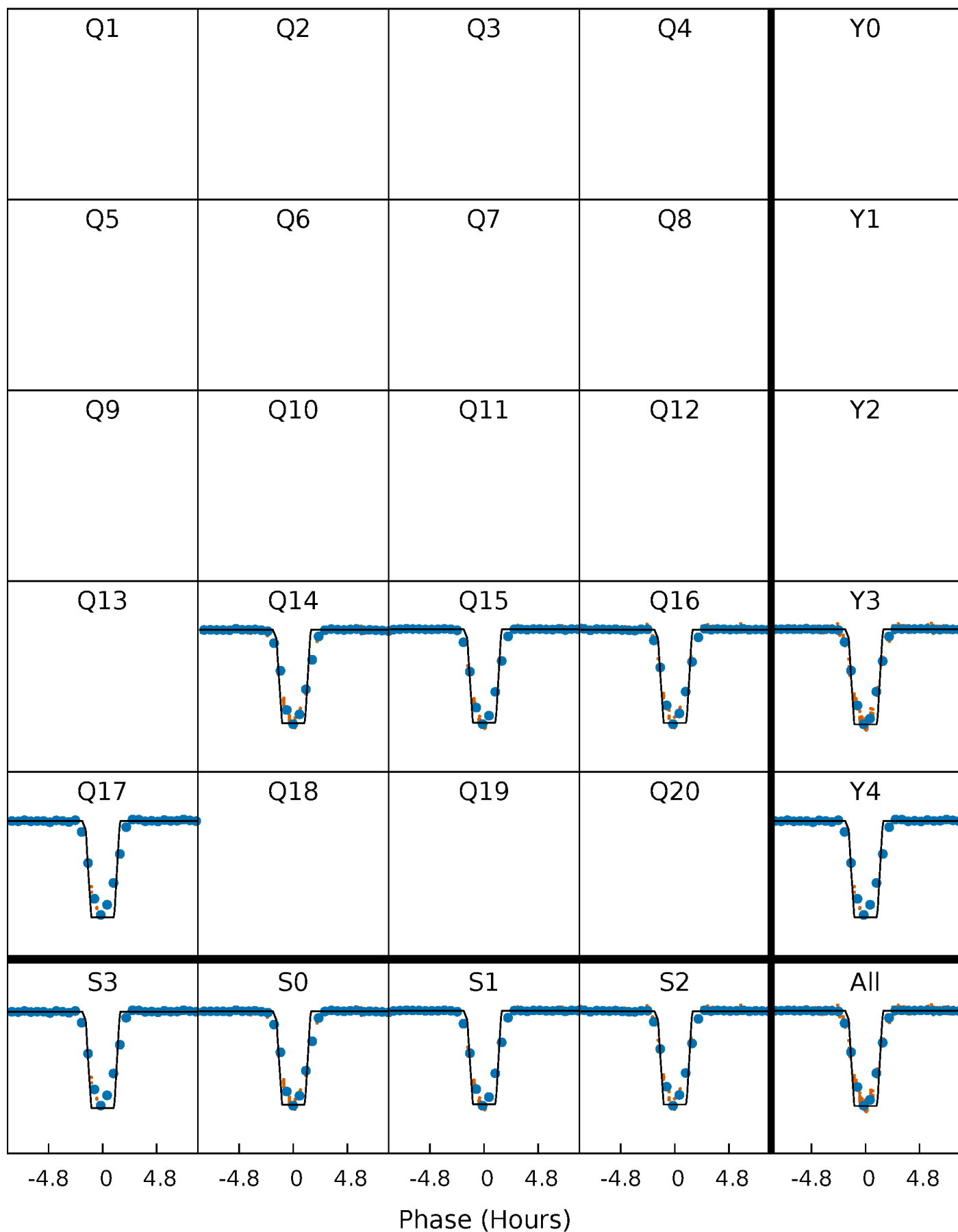
# DV Quarter-Phased Transit Curves

TCE 009532123-02   P= 8.214214 Days    $T_0=138.041537$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

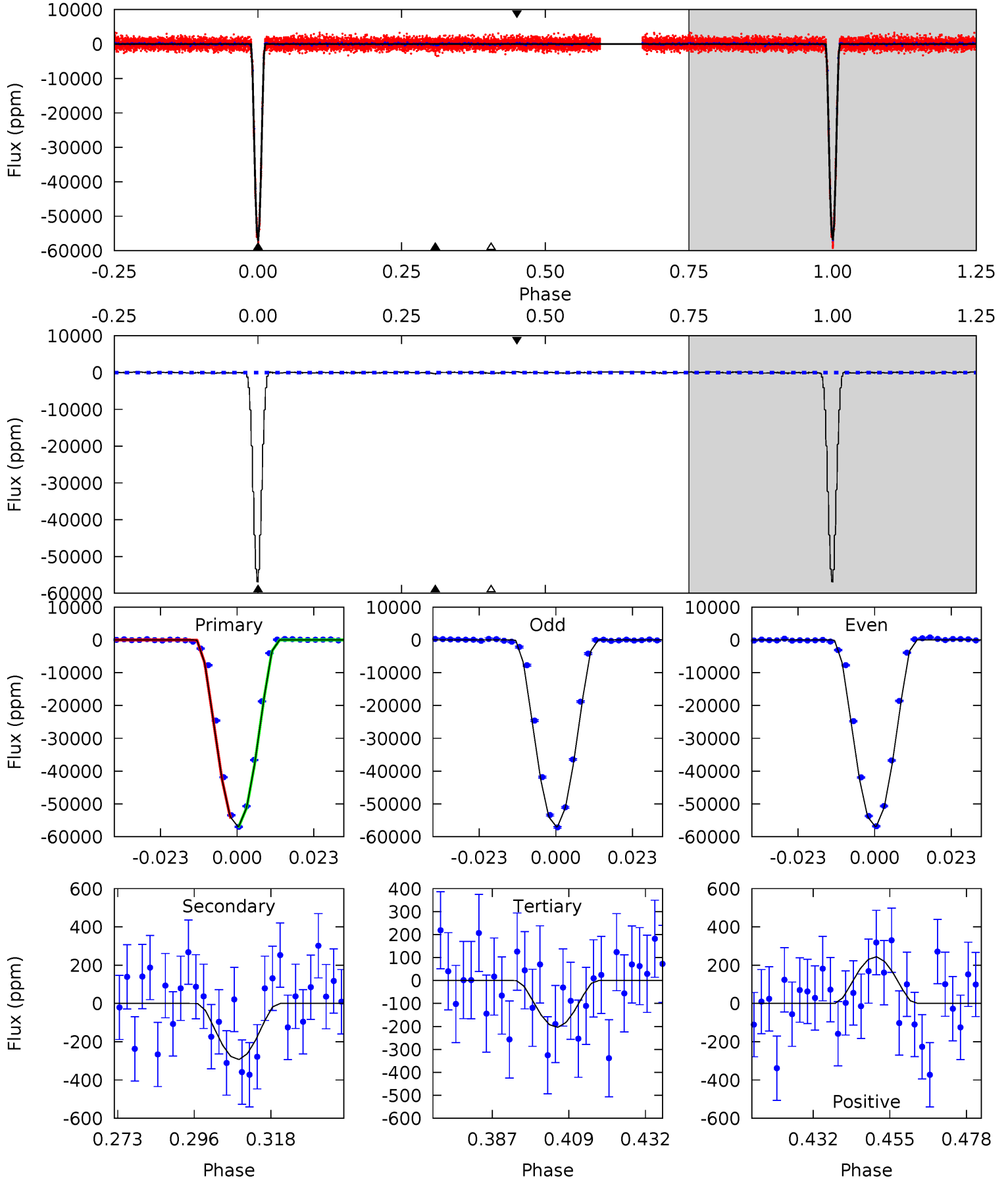
TCE 009532123-02    P= 8.214405 Days     $T_0=138.011995$  (BKJD)



# DV Model-Shift Uniqueness Test

009532123-02, P = 8.214214 Days, E = 138.041537 Days

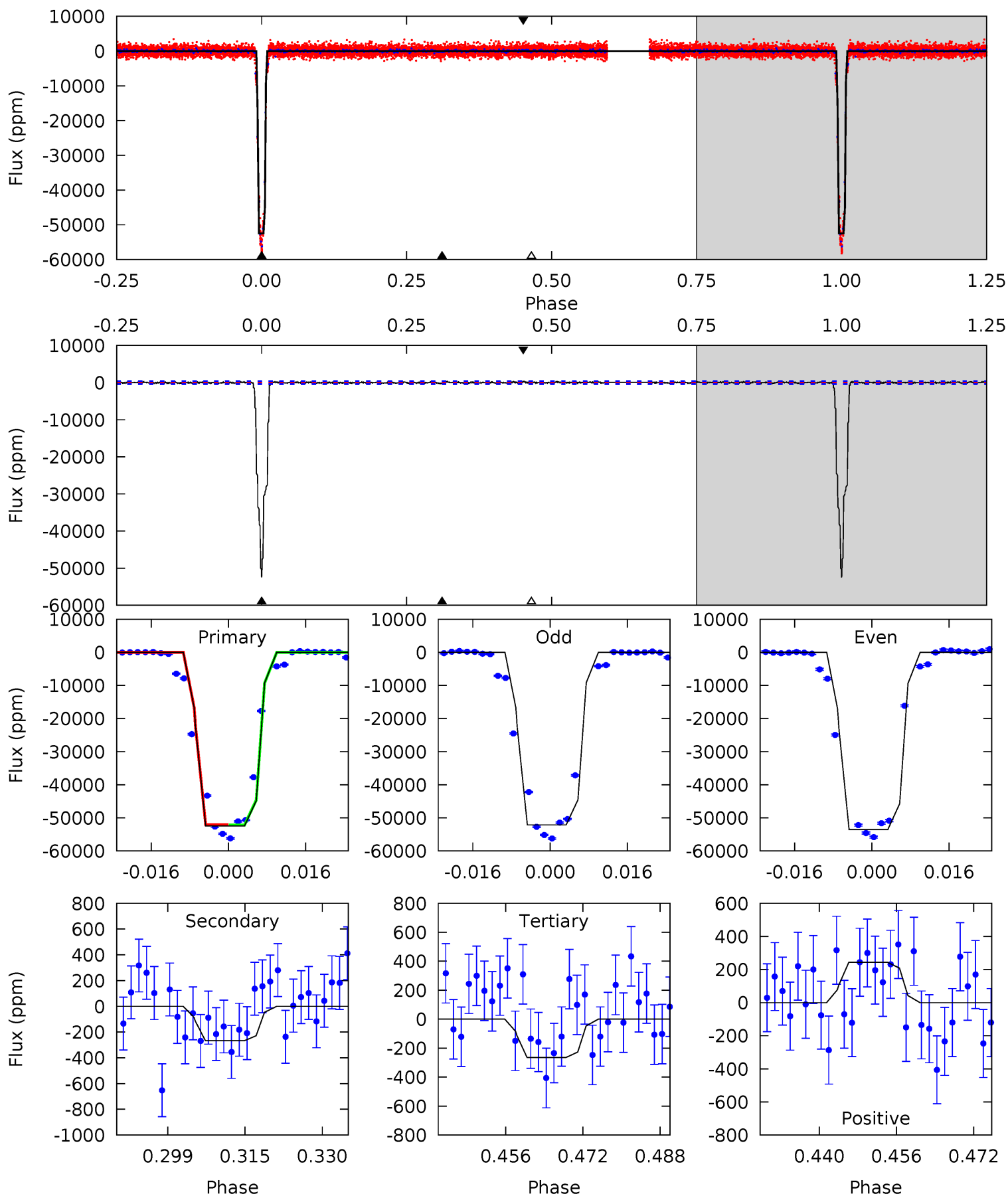
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1135	5.83	4.06	4.85	4.87	2.28	1.54	1131	1130	1.77	0.98	0.83	1.00	0.00	28.5



# Alt Model-Shift Uniqueness Test

009532123-02, P = 8.214405 Days, E = 138.011995 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
637.6	3.26	3.22	2.96	4.94	2.42	0.93	634.4	634.6	0.03	0.29	7.89	0.99	0.00	0.39





### Stellar Parameters For KIC 009532123

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5654^{+178}_{-198}$	$4.590^{+0.036}_{-0.144}$	$-0.380^{+0.300}_{-0.300}$	$0.774^{+0.169}_{-0.073}$	$0.865^{+0.088}_{-0.097}$	$2.625^{+0.477}_{-1.086}$
	+3%/-4%	+1%/-3%	+79%/-79%	+22%/-9%	+10%/-11%	+18%/-41%
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 009532123-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-292 \pm 50$	$28.17^{+3.56}_{-3.34}$	$1139^{+54}_{-51}$	$2166^{+86}_{-89}$	$1.151^{+0.357}_{-0.310}$
Alt.	$-268 \pm 82$	$20.86^{+3.13}_{-2.95}$	$1137^{+61}_{-51}$	$2327^{+132}_{-140}$	$1.905^{+0.921}_{-0.703}$

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

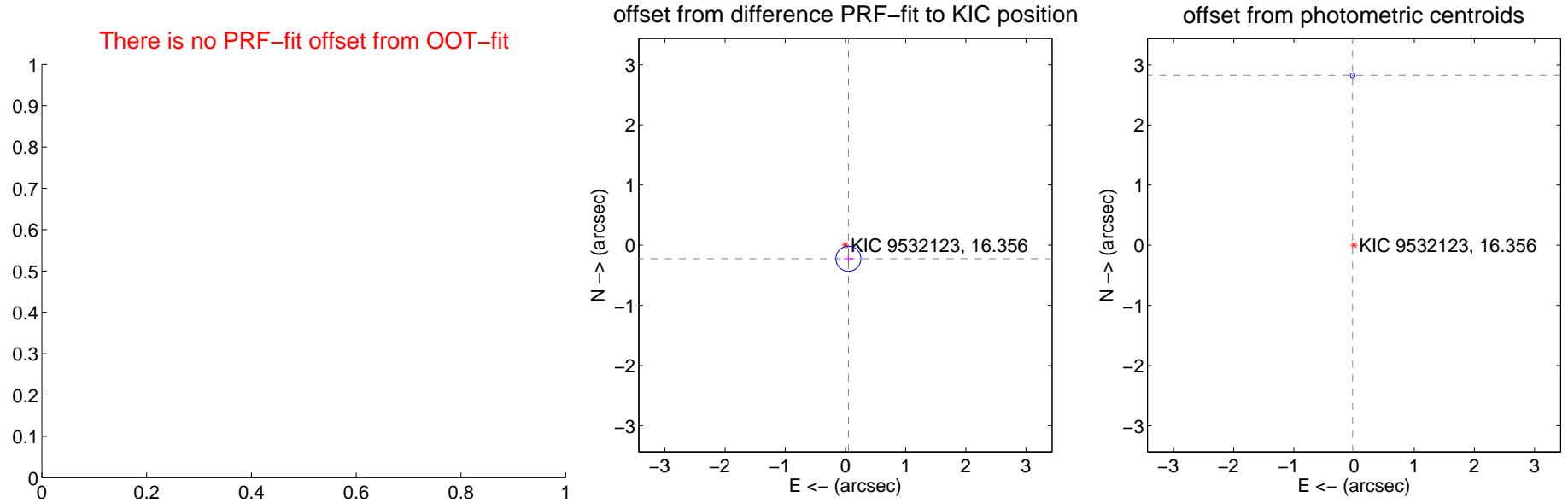
## DV Centroid Data

Supplemental centroid analysis for 009532123-02. Kepler magnitude: 16.36. Transit SNR 533.85

There are 4 quarters with good PRF difference image offsets

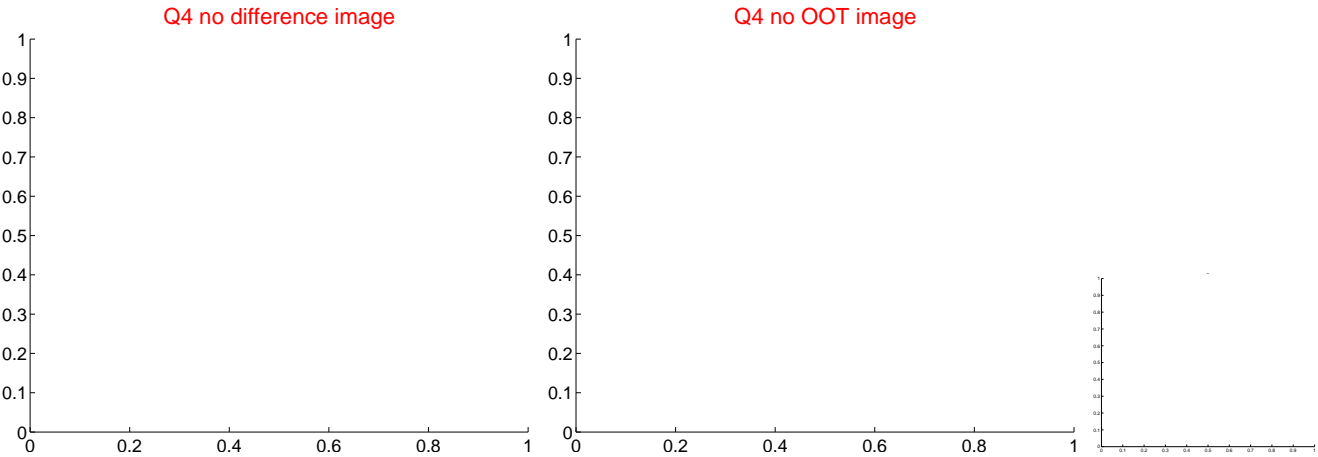
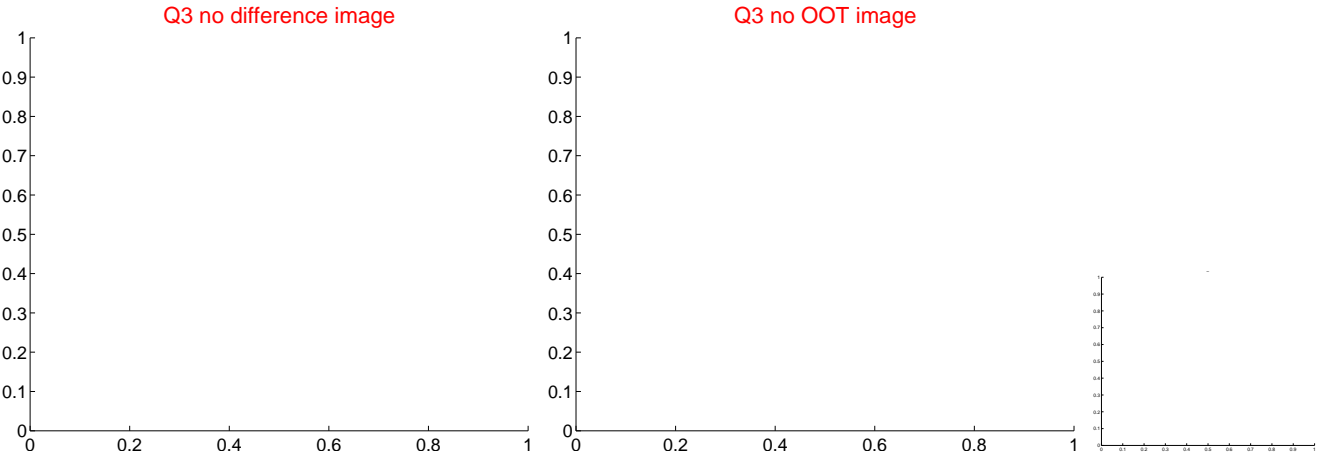
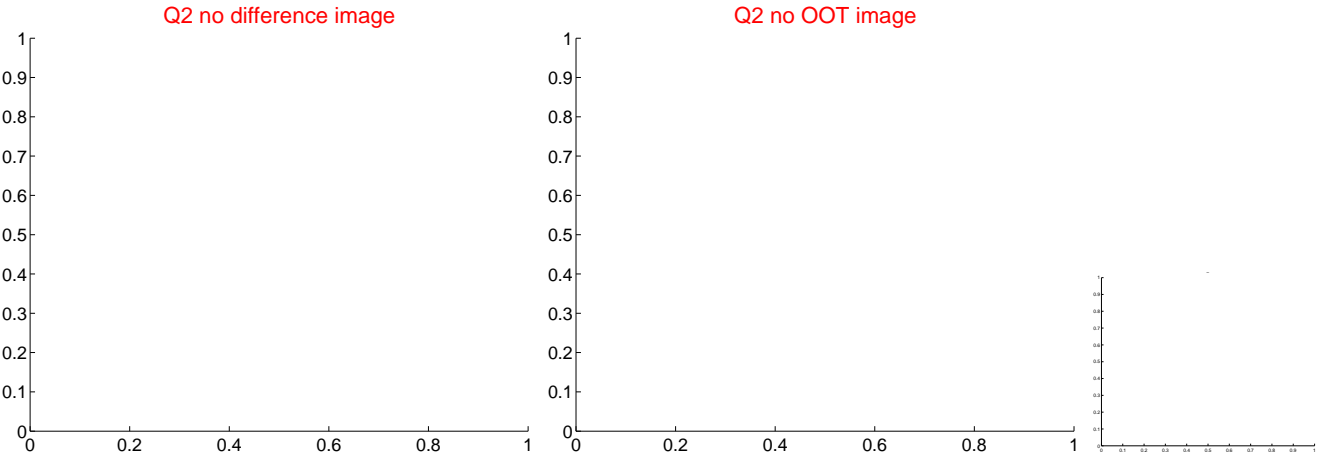
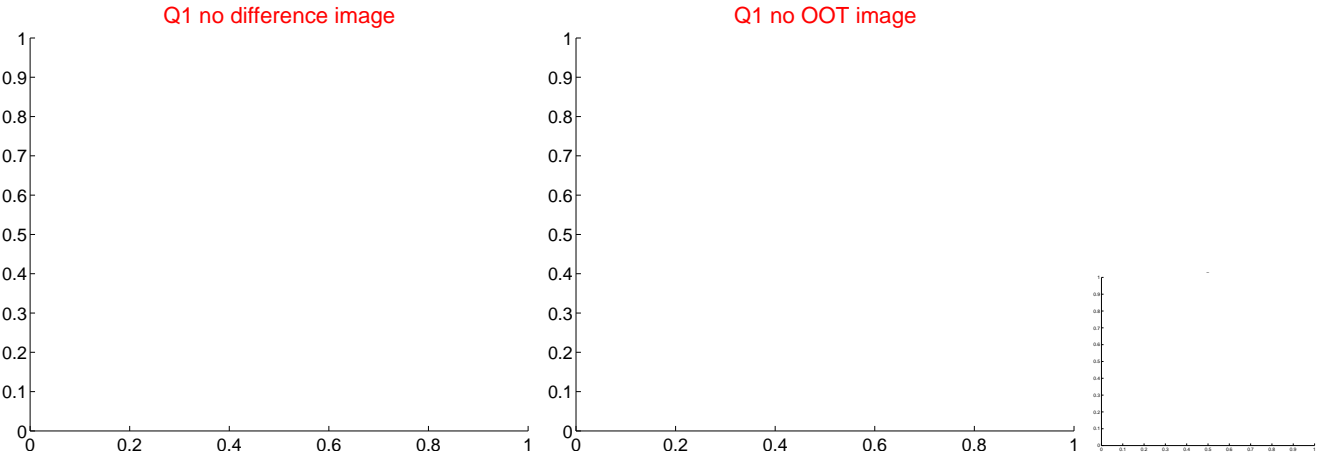
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	$0.231 \pm 0.069$	$3.33$	$-0.049 \pm 0.077$	$-0.226 \pm 0.069$
photometric centroid source offset	$2.82 \pm 0.01$	$222.25$	$0.02 \pm 0.01$	$2.82 \pm 0.01$

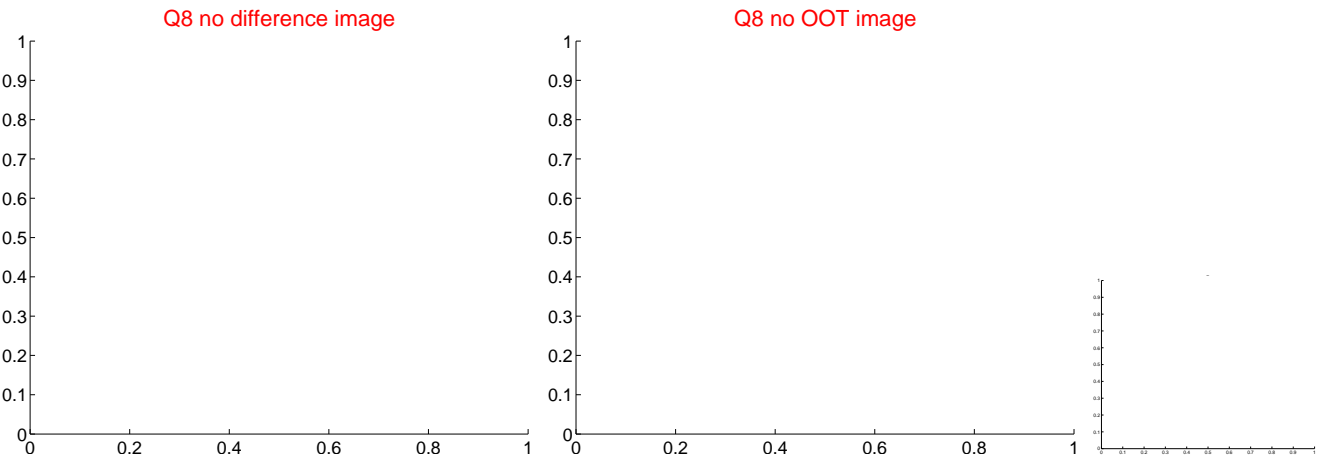
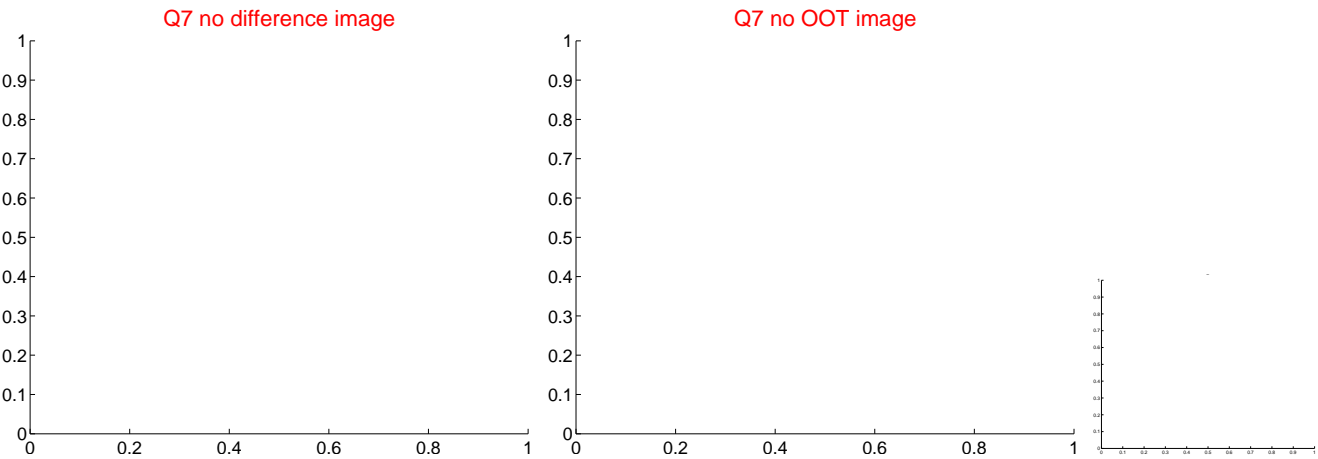
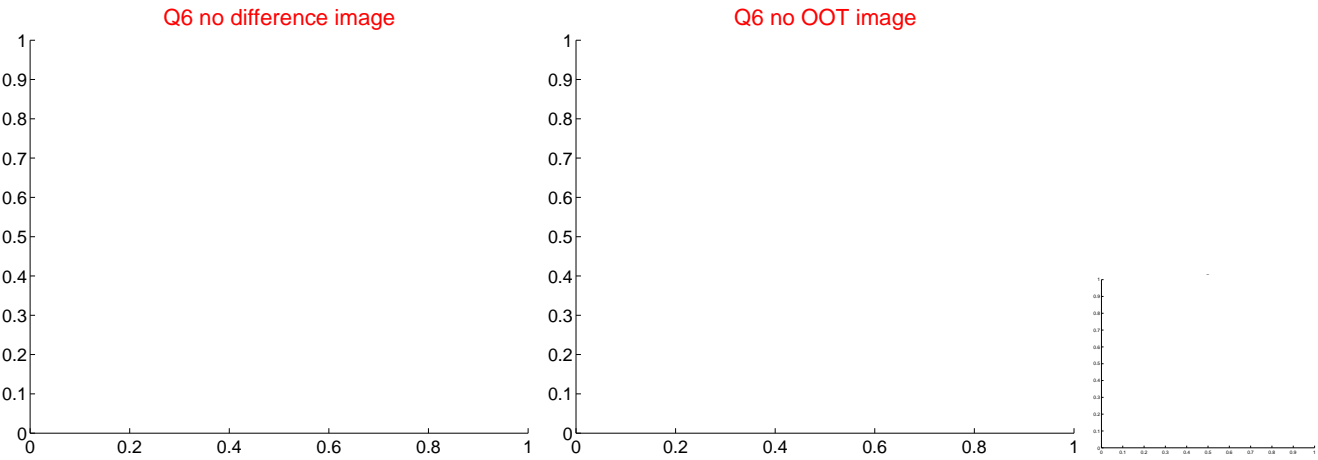
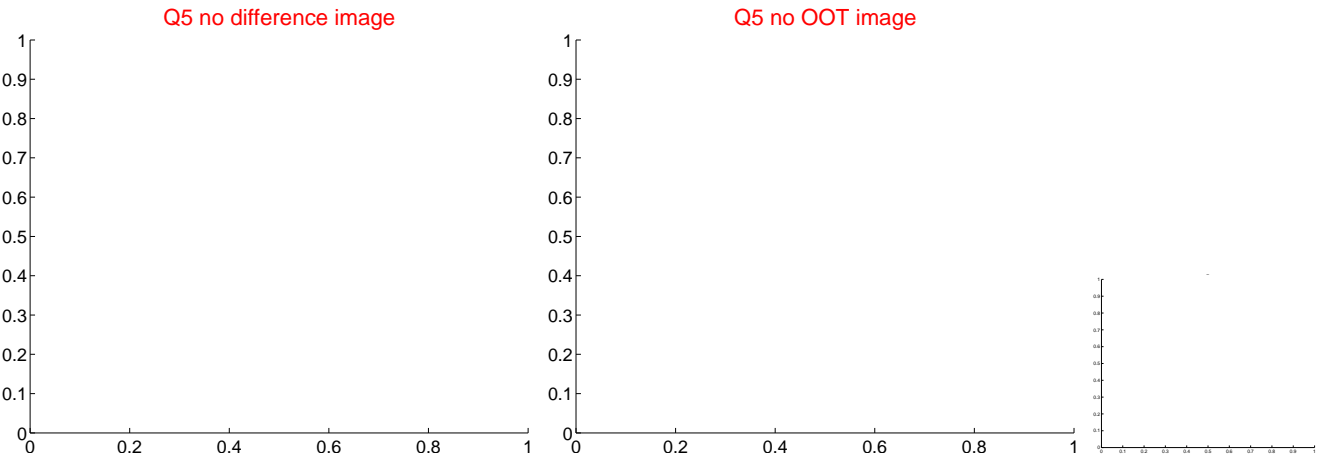


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

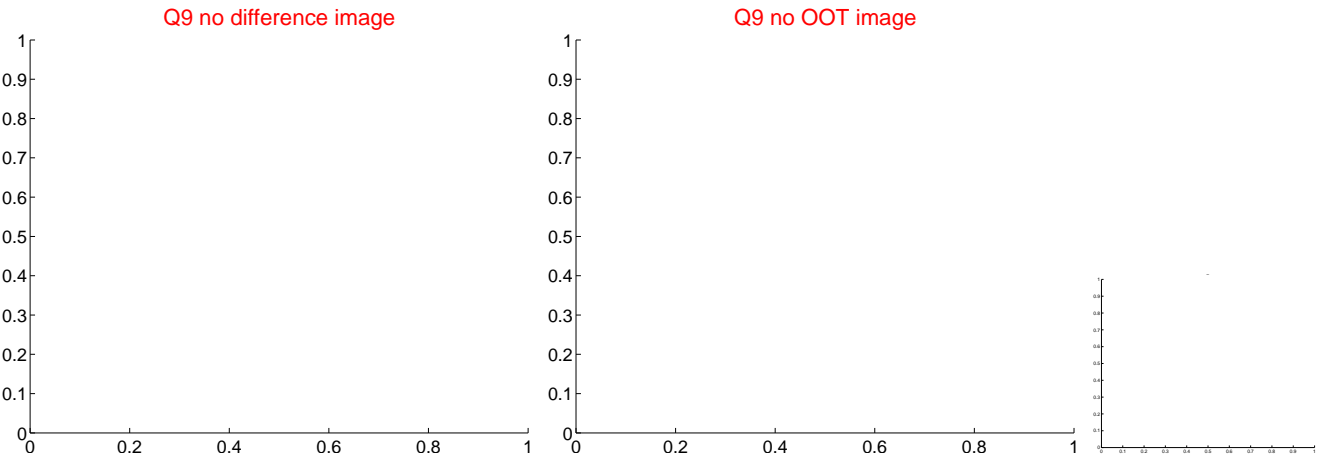
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



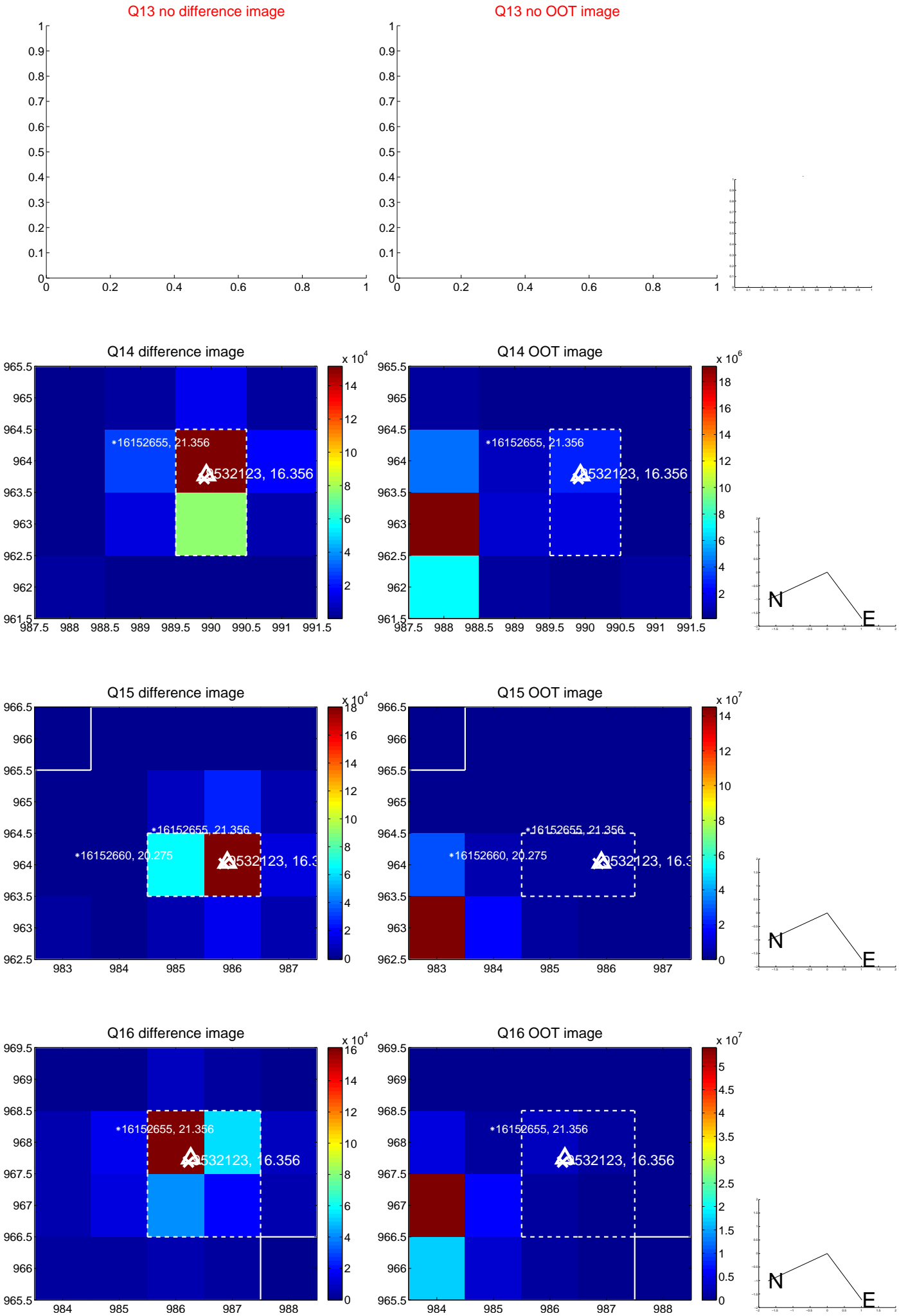
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



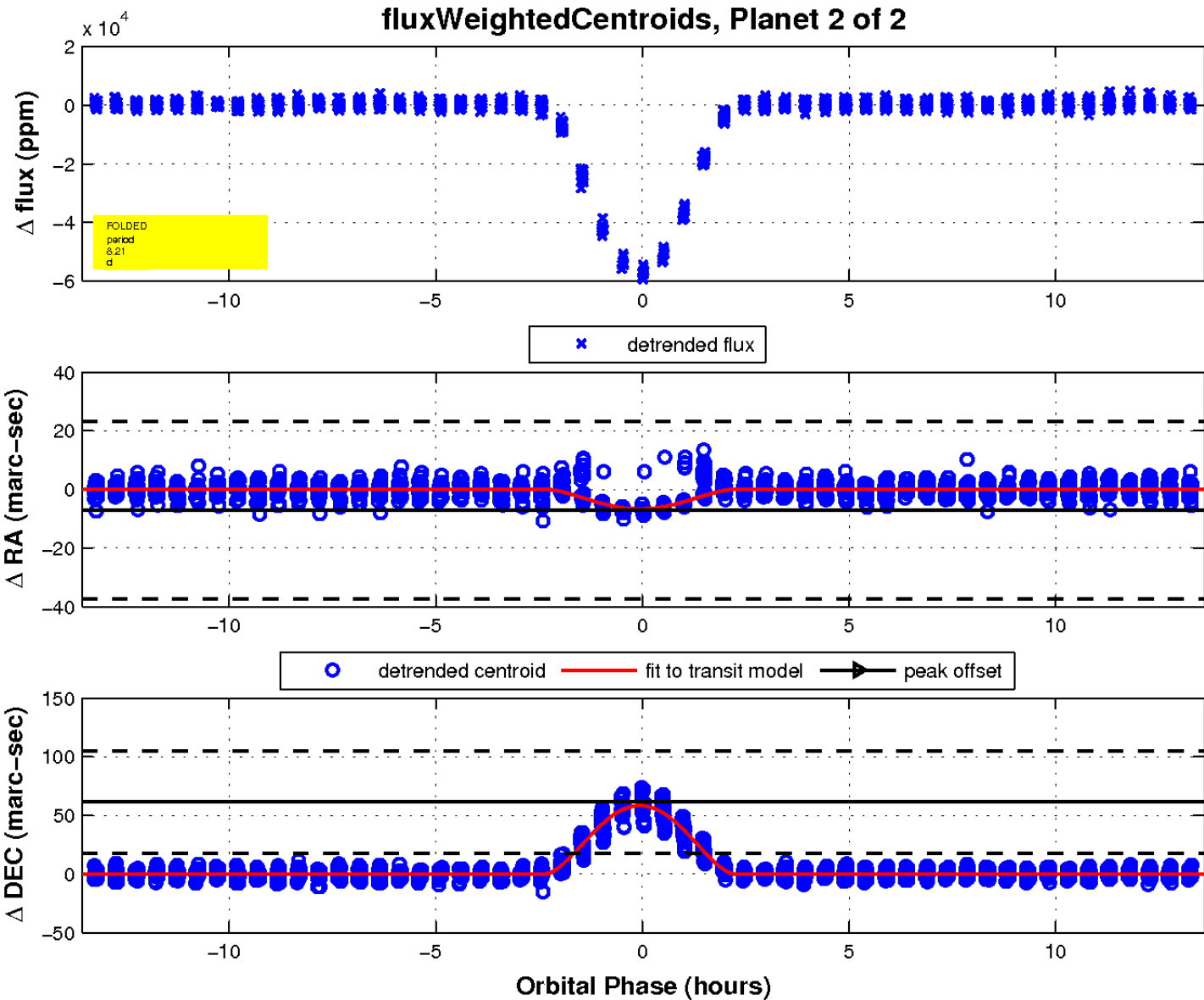
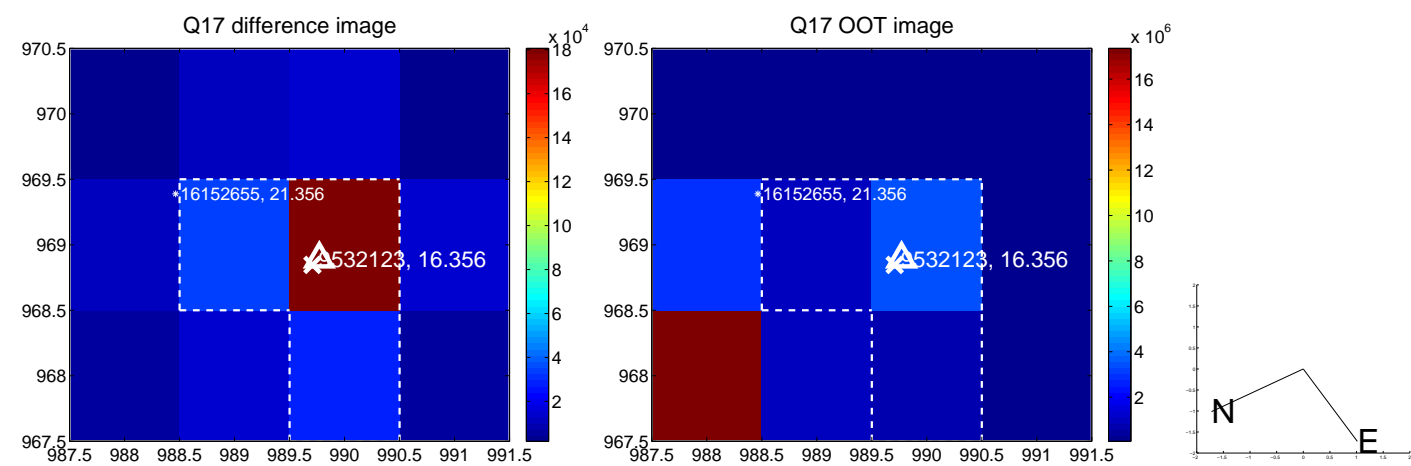
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

