

# KIC 009532712

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009532712-01	OBS	No	27.319288	159.203696	863.2	5.166	16.0	2.6	1.88	7351	6.10	218.34
009532712-02	OBS	No	29.650449	144.620661	7614.0	9.804	13.8	8.2	1.88	7351	28.87	195.76

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009532712-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE_TRACKER—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—CENT_FEW_DIFFS
009532712-02	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—CENT_FEW_DIFFS

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

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

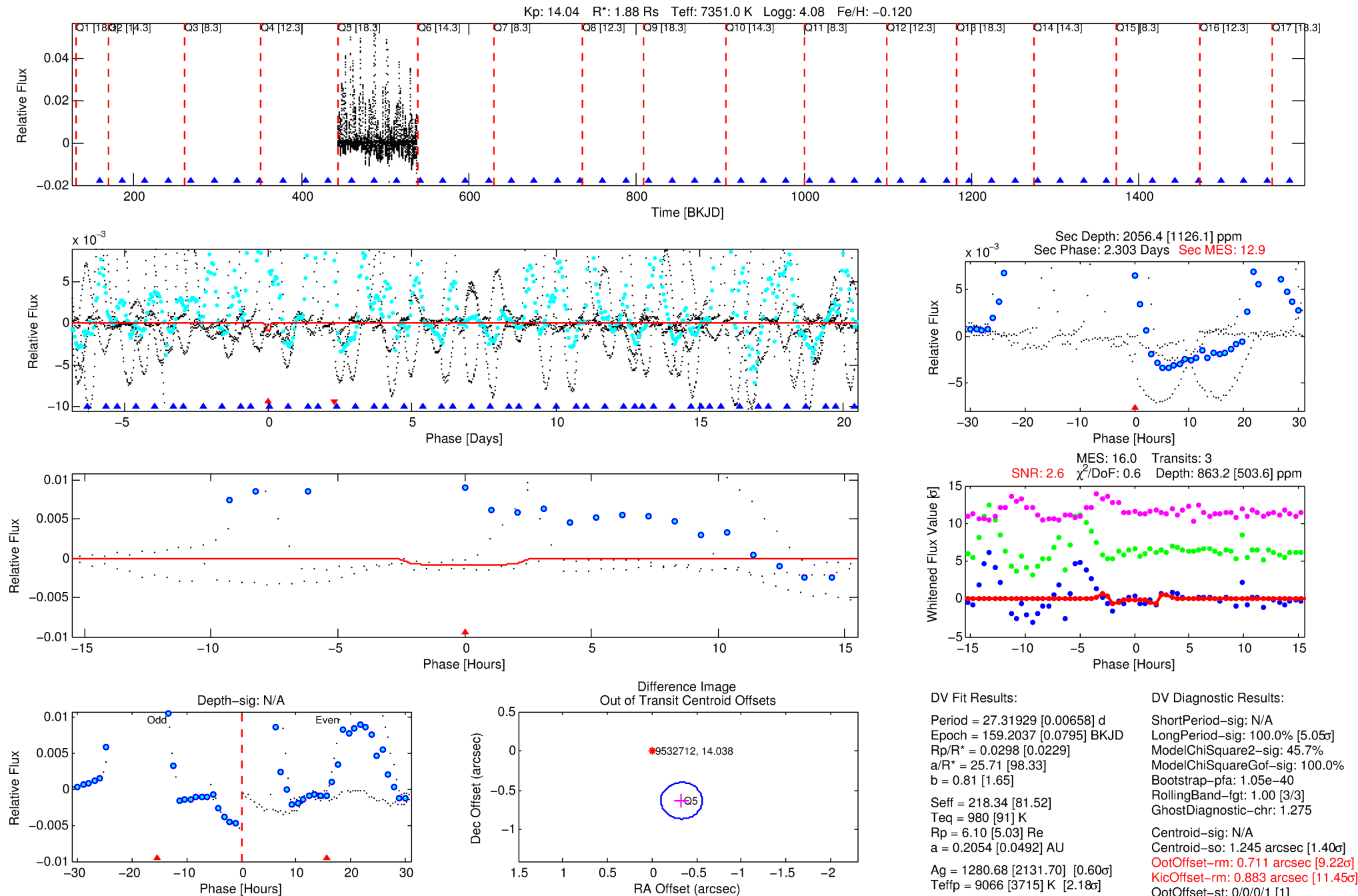
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009532712-01

No Significant Match Found

# DV One-Page Summary

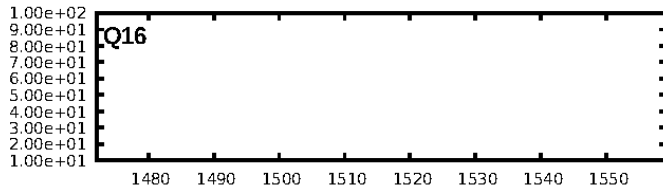
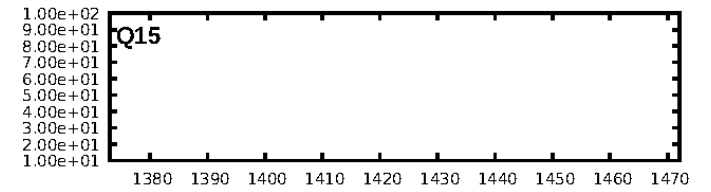
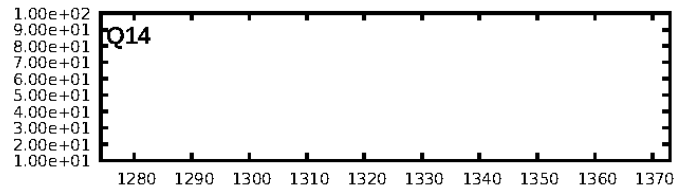
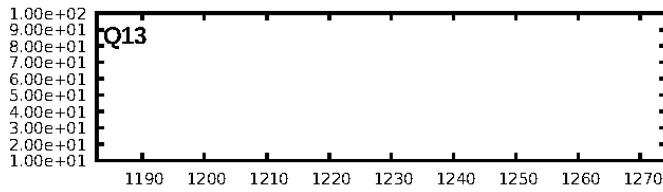
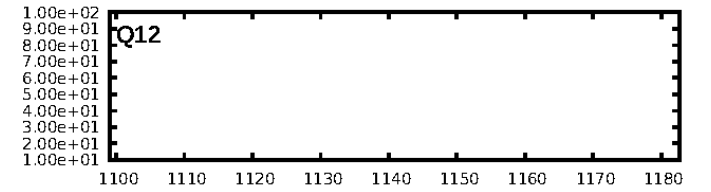
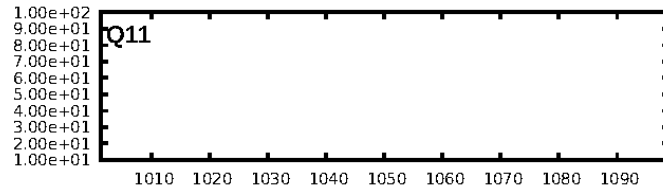
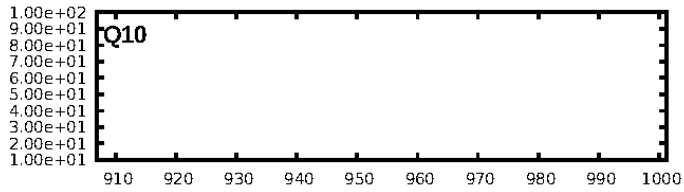
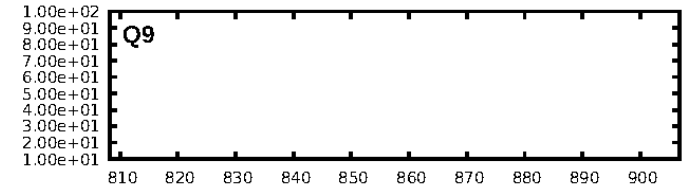
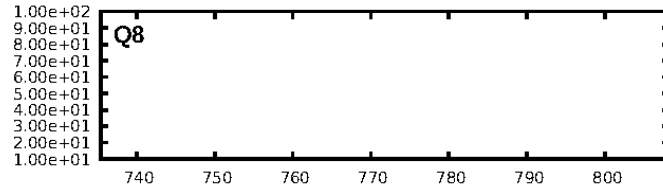
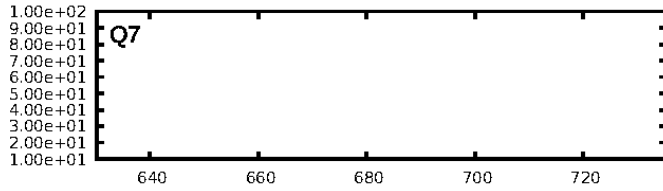
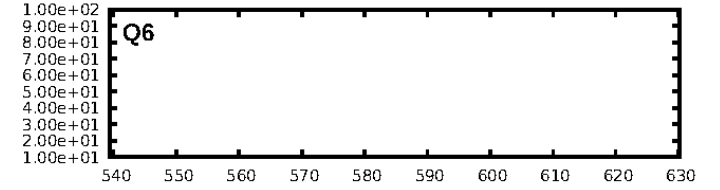
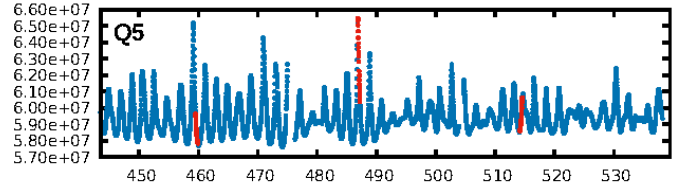
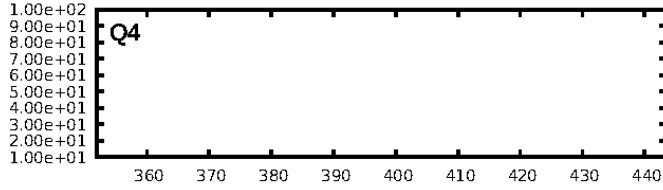
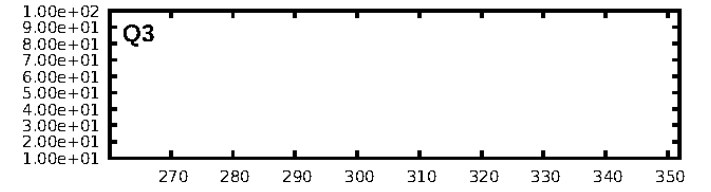
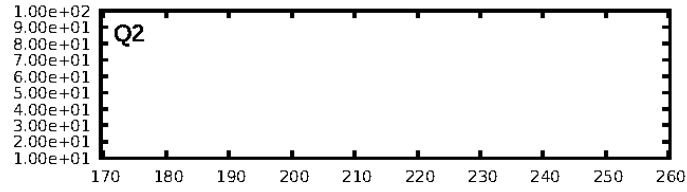
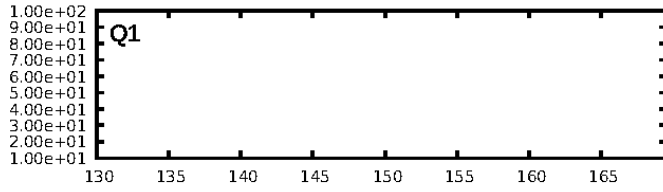
KIC: 9532712 Candidate: 1 of 2 Period: 27.319 d



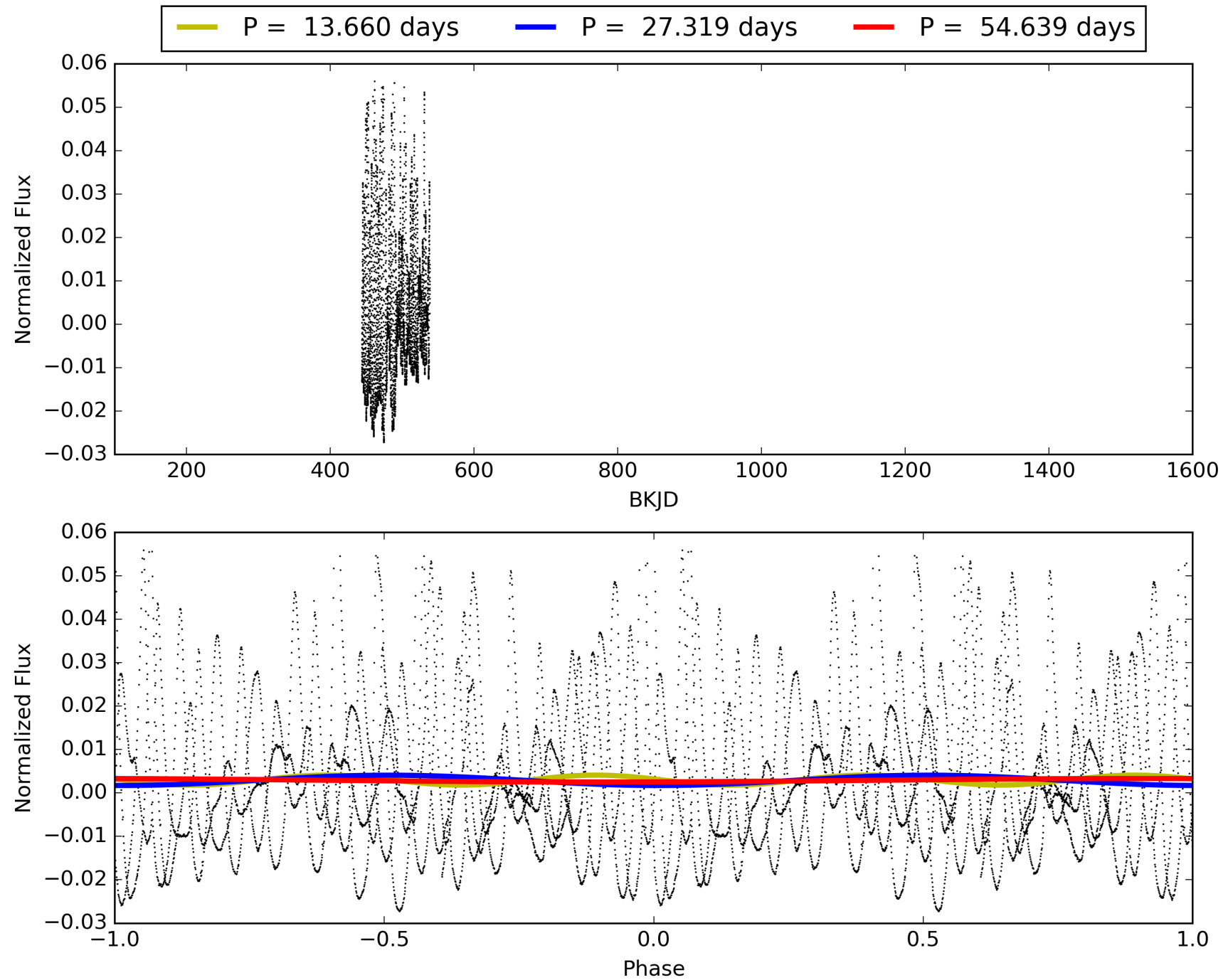
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 22:52:10 Z

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

# TCE 009532712-01, PDC Light Curves

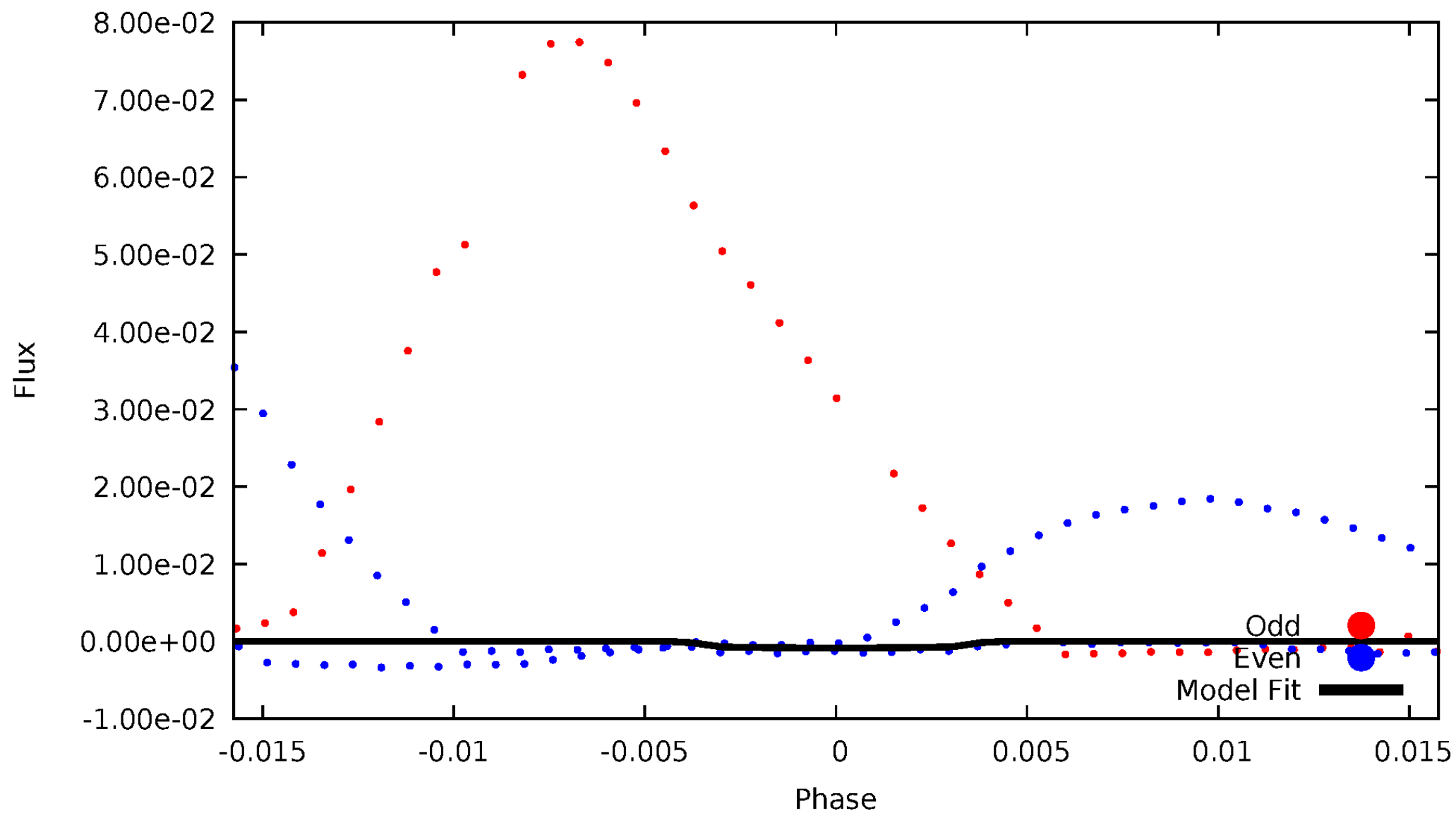


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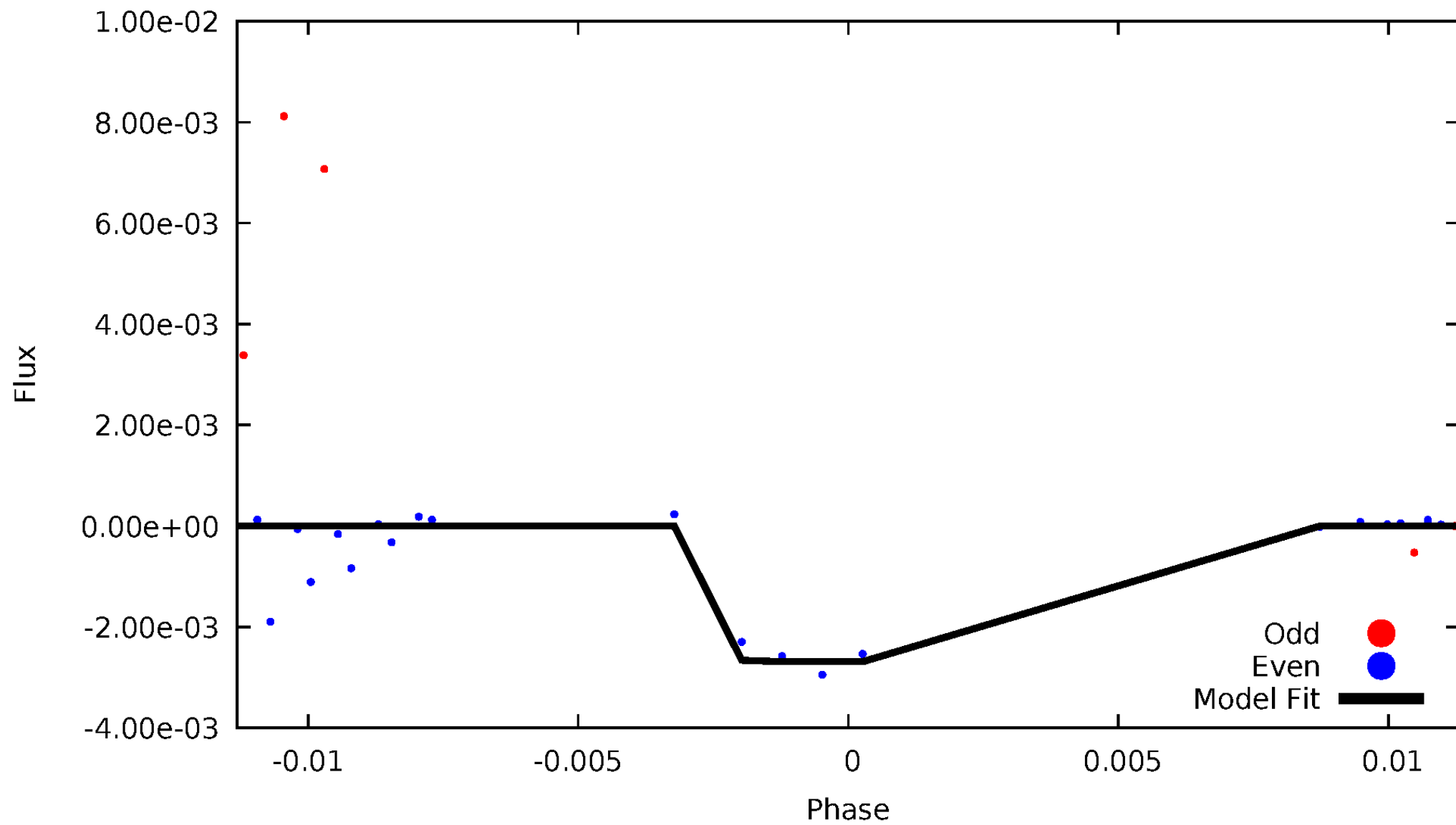
# DV Odd/Even

TCE 009532712-01



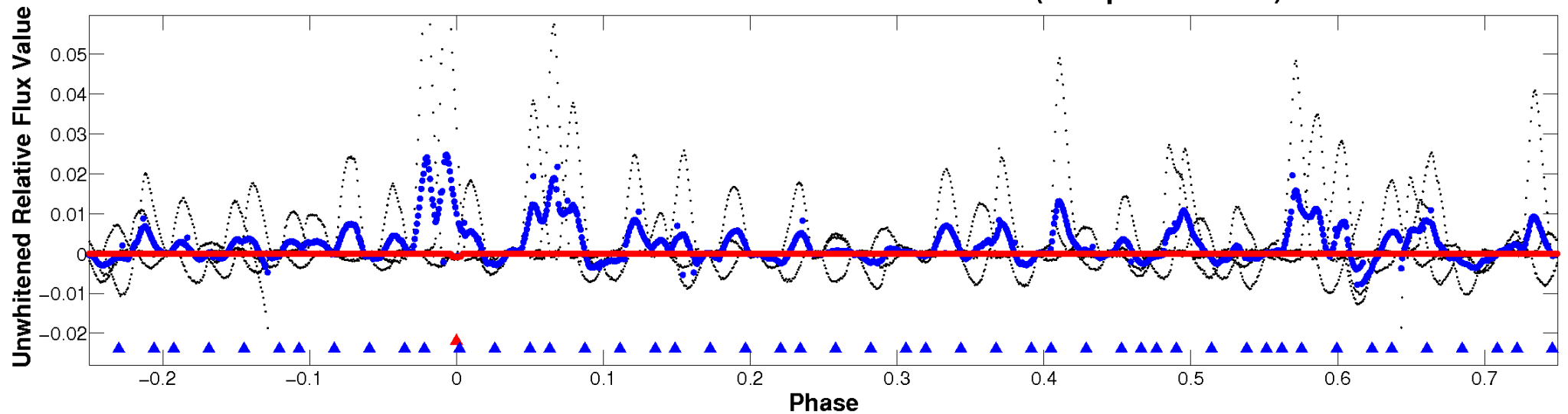
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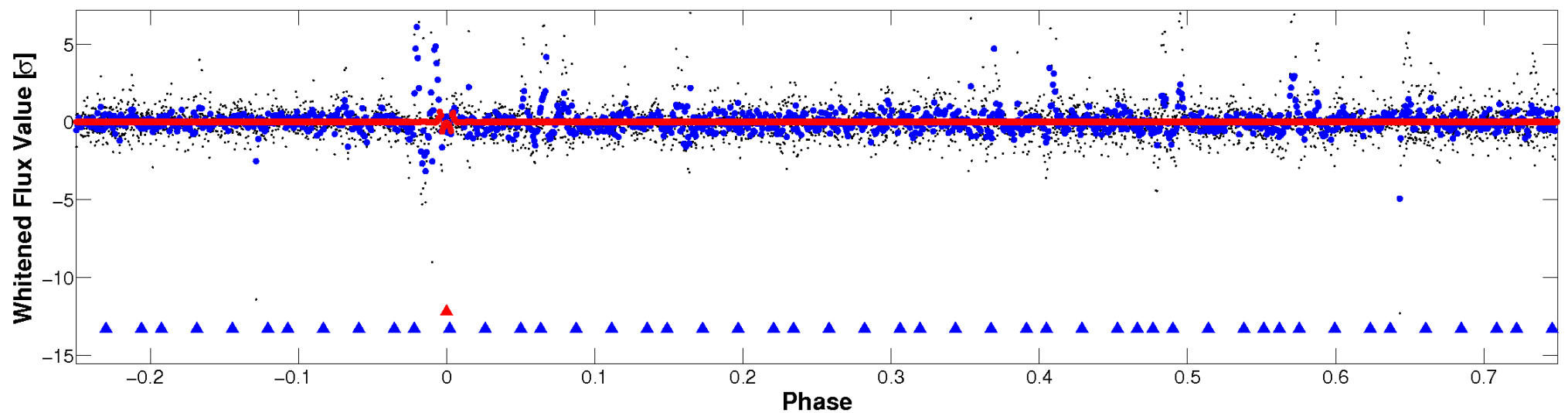


# Non-Whitened Vs. Whitened Light Curve

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



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



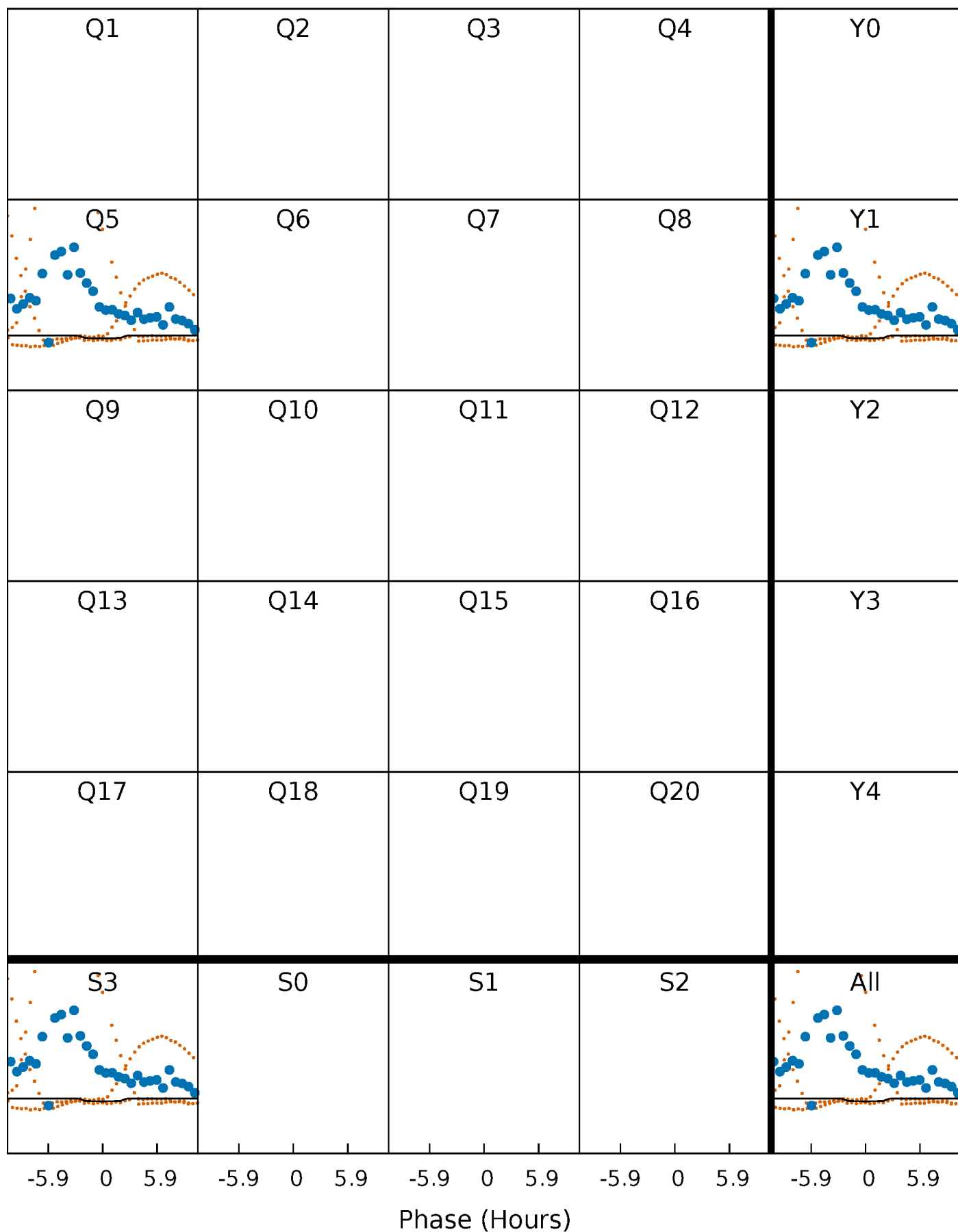
# PDC Quarter-Phased Transit Curves

TCE 009532712-01 P= 27.319288 Days  $T_0=159.203696$  (BKJD)



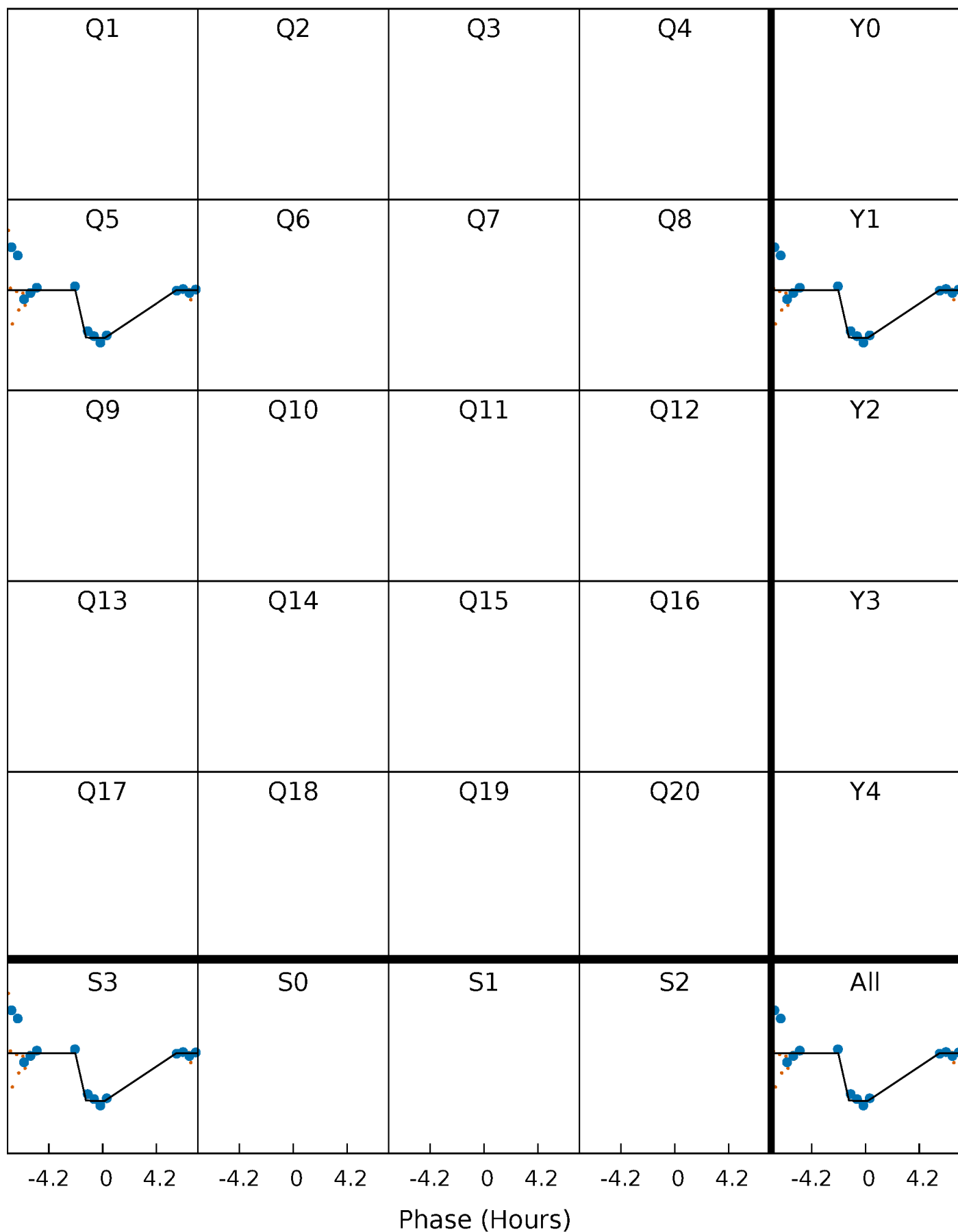
# DV Quarter-Phased Transit Curves

TCE 009532712-01     $P = 27.319288$  Days     $T_0 = 159.203696$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

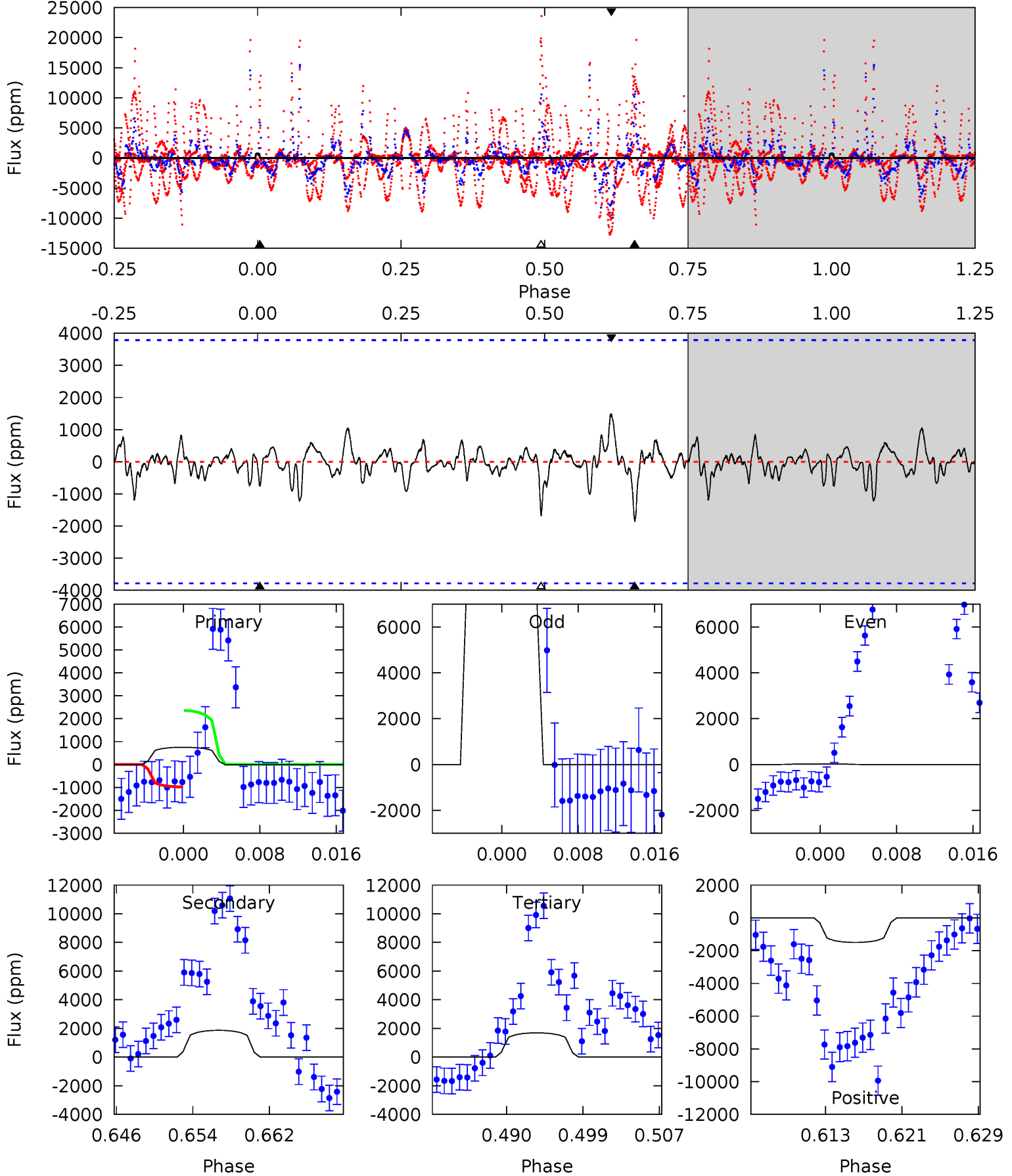
TCE 009532712-01     $P = 27.354755$  Days     $T_0 = 158.778176$  (BKJD)



# DV Model-Shift Uniqueness Test

009532712-01, P = 27.319288 Days, E = 159.203696 Days

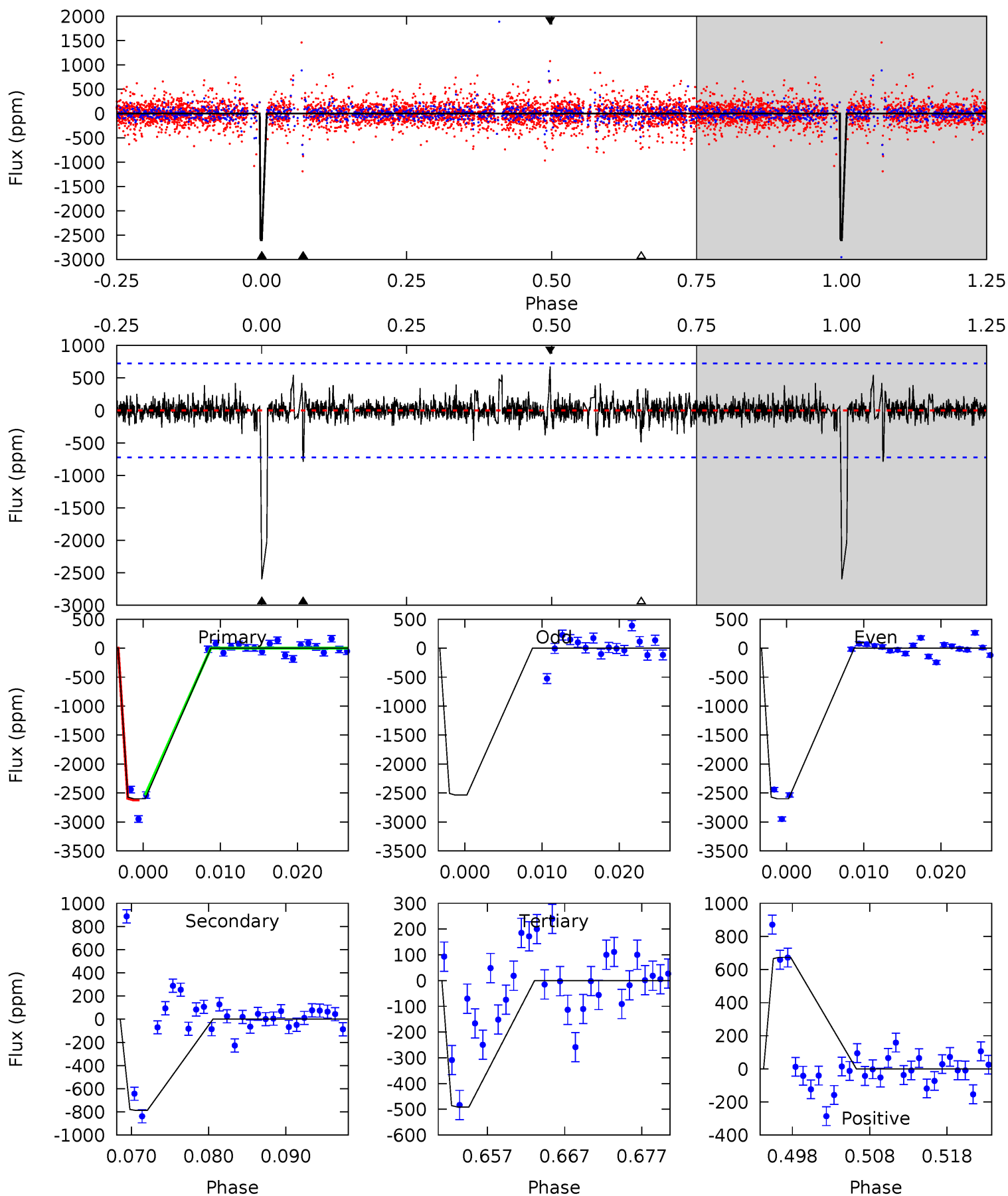
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.01	2.50	2.26	2.01	5.06	2.64	0.50	-1.25	-1.00	0.24	0.49	13.0	8.10	0.45	0.92



# Alt Model-Shift Uniqueness Test

009532712-01,  $P = 27.354755$  Days,  $E = 158.778176$  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
18.0	5.47	3.41	4.67	5.03	2.58	0.77	14.6	13.4	2.06	0.79	0.29	1.00	0.21	0.30



### Stellar Parameters For KIC 009532712

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7351^{+230}_{-307}$	$4.081^{+0.175}_{-0.175}$	$-0.120^{+0.200}_{-0.400}$	$1.876^{+0.558}_{-0.456}$	$1.547^{+0.222}_{-0.271}$	$0.330^{+0.312}_{-0.160}$
	+3%/-4%	+4%/-4%	+167%/-333%	+30%/-24%	+14%/-18%	+94%/-48%
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 009532712-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-1867 \pm 747$	$6.35^{+5.03}_{-3.63}$	$1375^{+100}_{-103}$	$8883^{+9538}_{-2676}$	$974^{+4697}_{-694}$
Alt.	$-788 \pm 144$	$10.20^{+5.41}_{-4.36}$	$1366^{+108}_{-106}$	$5390^{+1864}_{-851}$	$166^{+360}_{-93}$

$T_{max}$  = 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

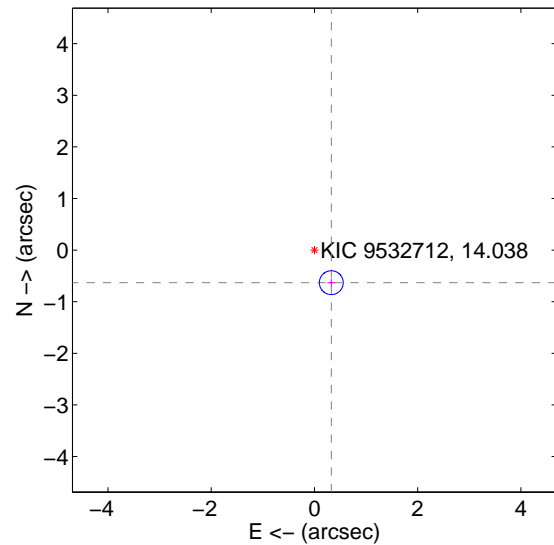
Supplemental centroid analysis for 009532712-01. Kepler magnitude: 14.04. Transit SNR 2.62

There are 0 quarters with good PRF difference image offsets

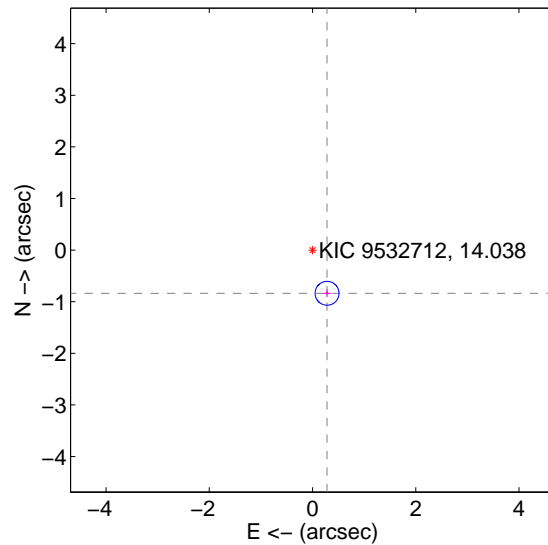
The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.711 \pm 0.077$	9.22	$-0.327 \pm 0.077$	$-0.631 \pm 0.077$
PRF-fit source offset from KIC position	$0.883 \pm 0.077$	11.45	$-0.281 \pm 0.077$	$-0.837 \pm 0.077$
photometric centroid source offset	$1.24 \pm 0.89$	1.40	$1.22 \pm 0.89$	$-0.23 \pm 0.68$

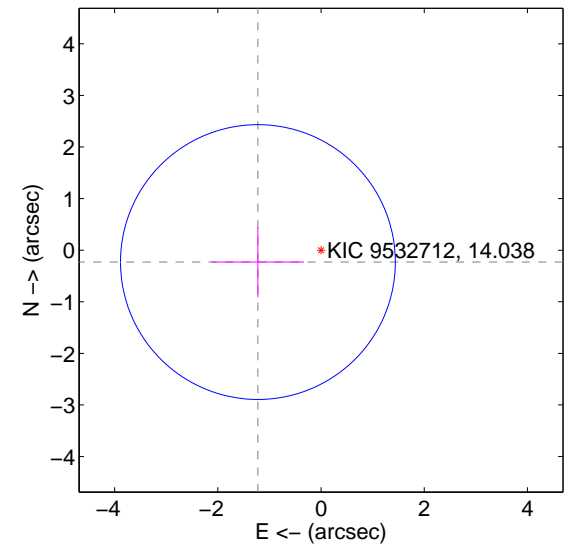
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

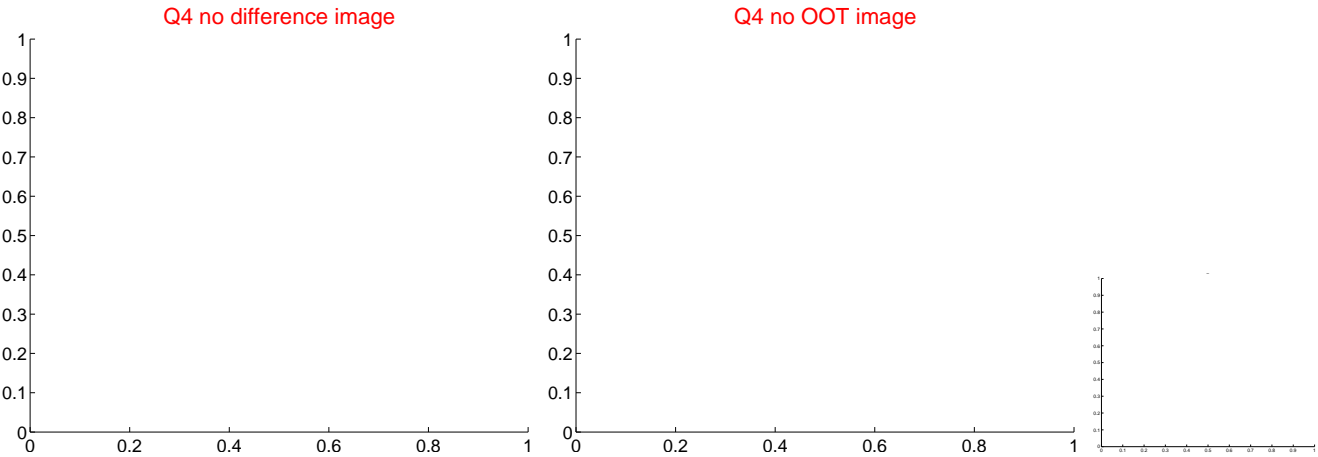
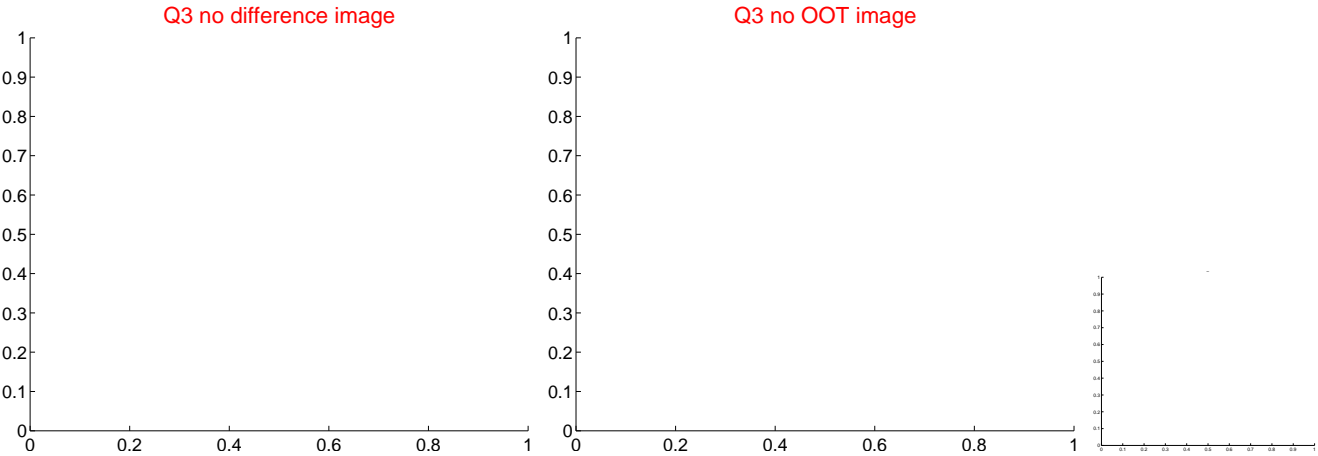
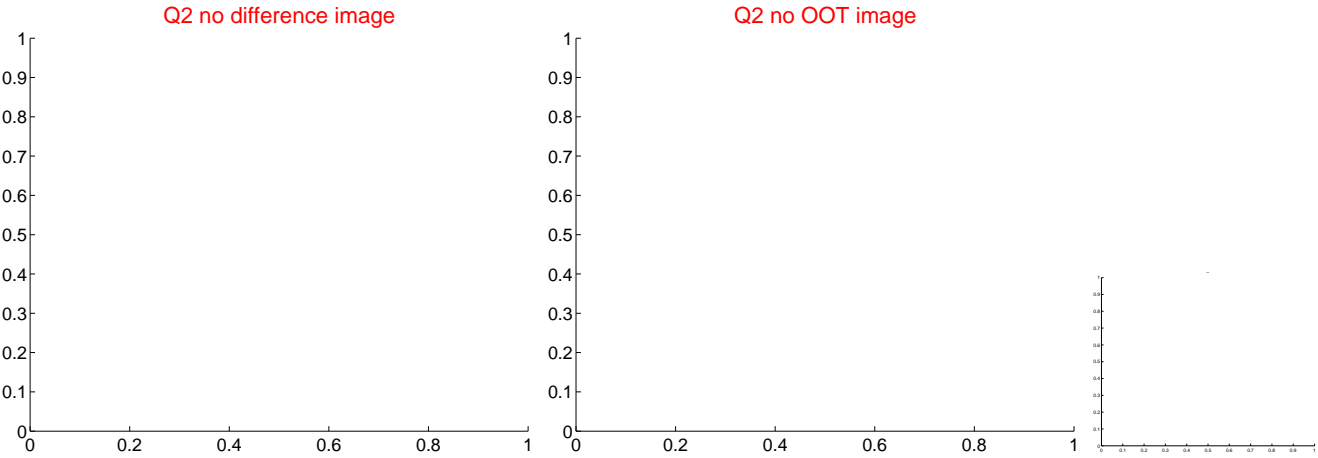
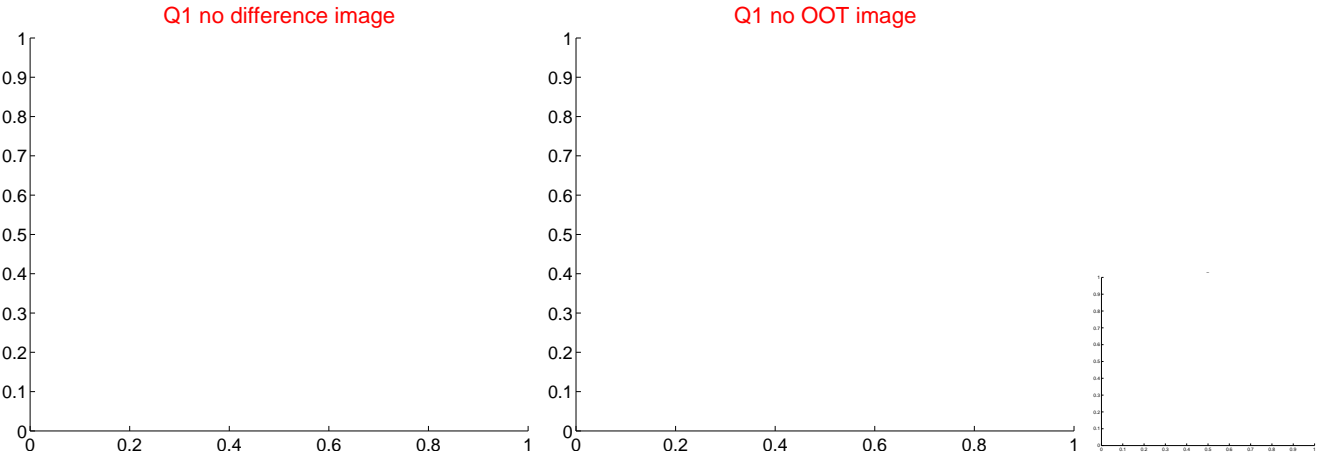


offset from photometric centroids

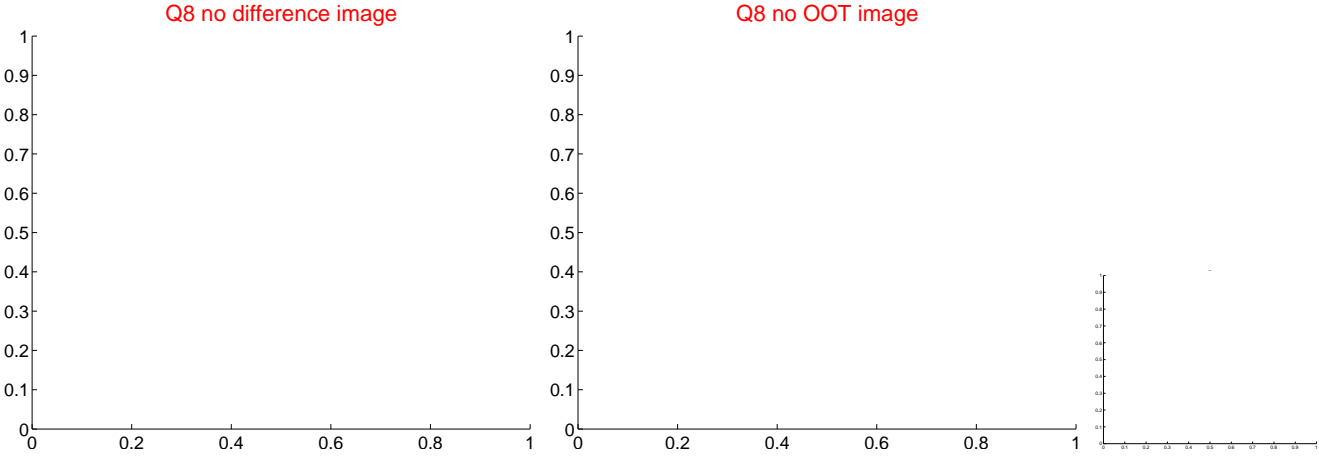
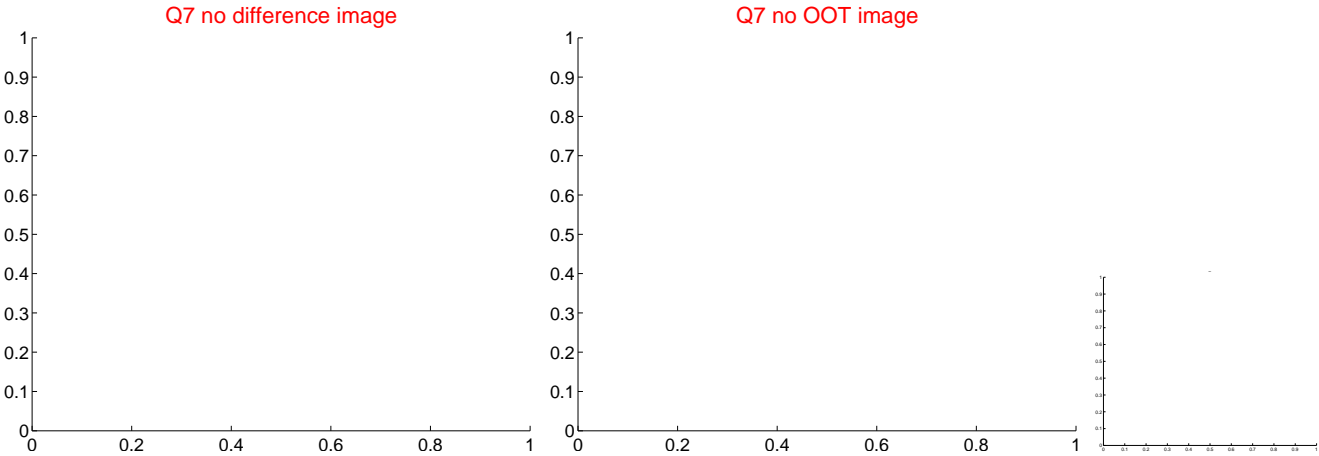
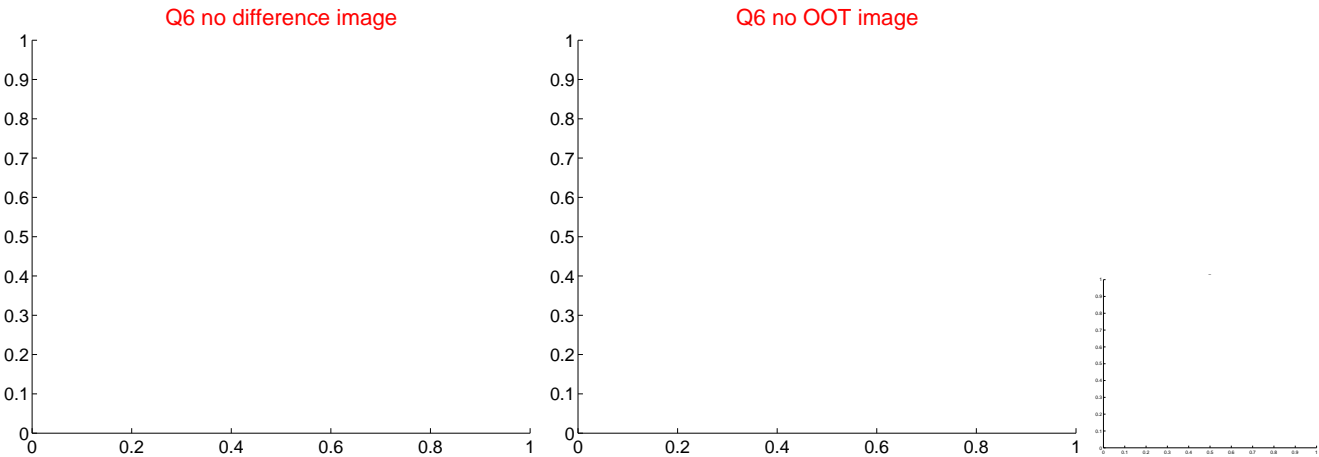
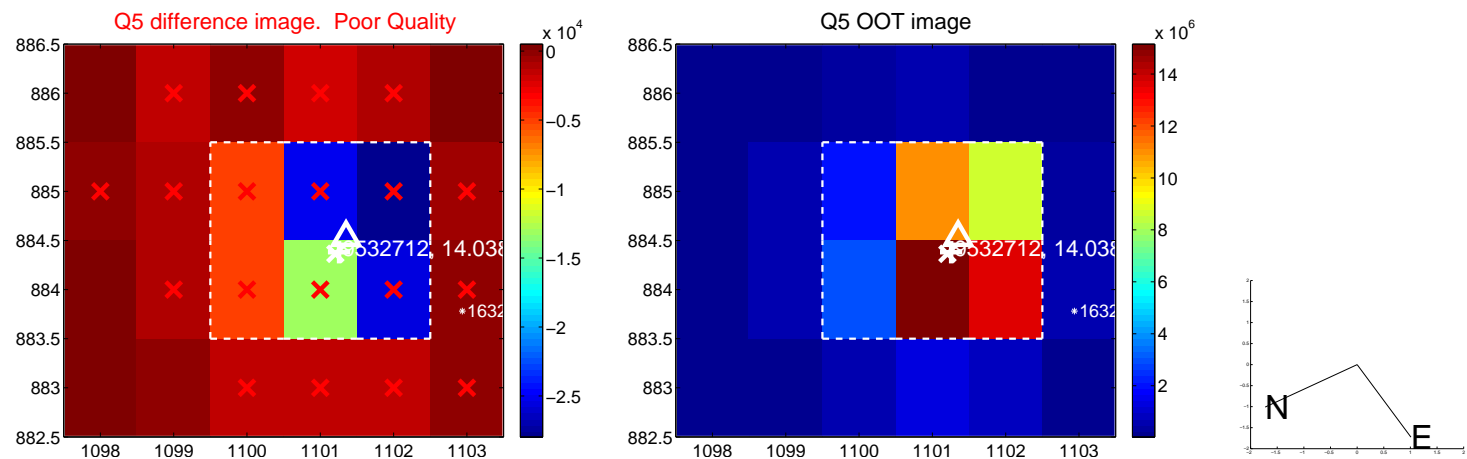


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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



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



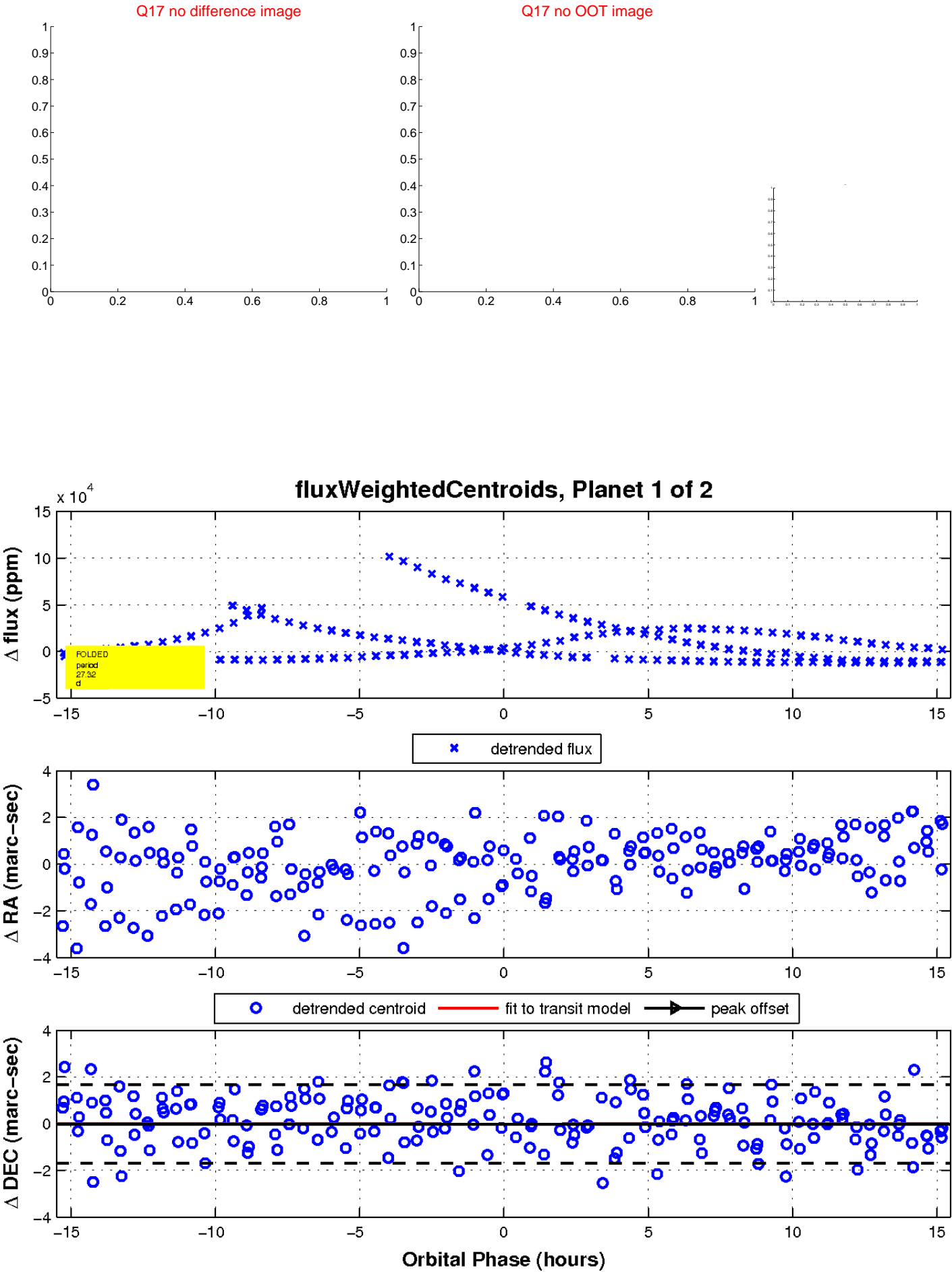
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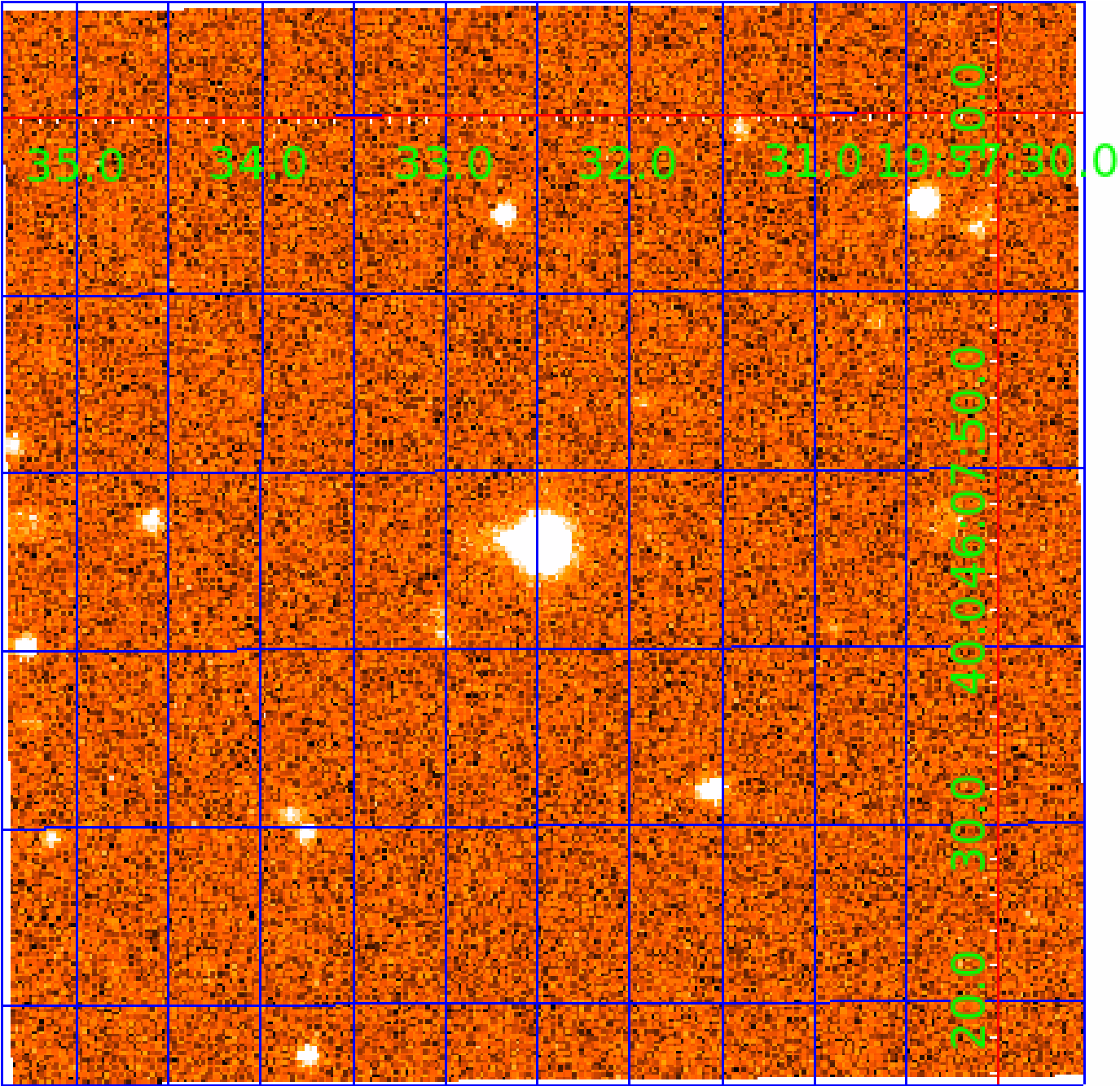


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UKIRT Image

Declination



# KIC 009532712

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
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009532712-02	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—CENT_FEW_DIFFS

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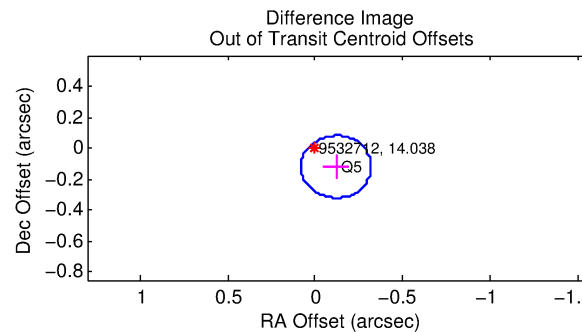
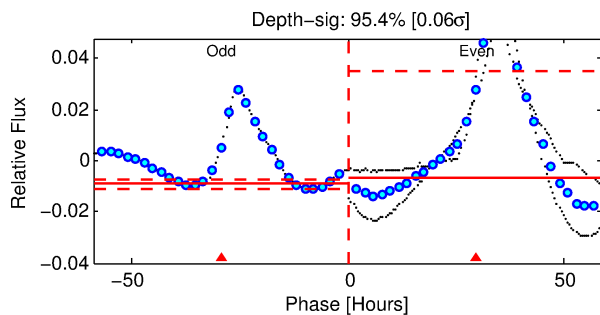
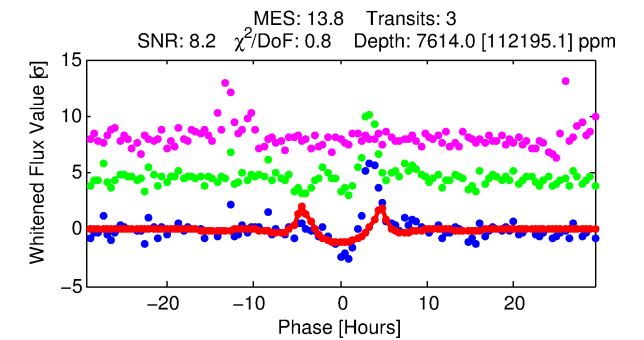
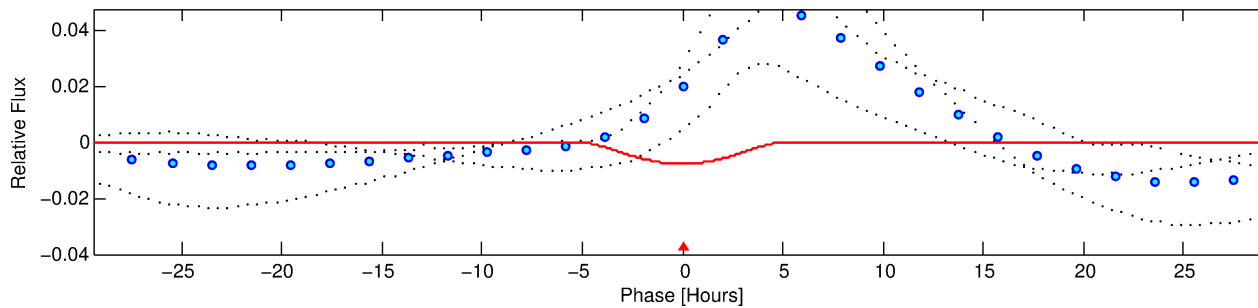
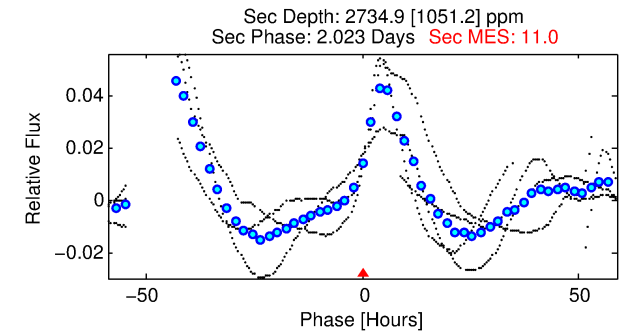
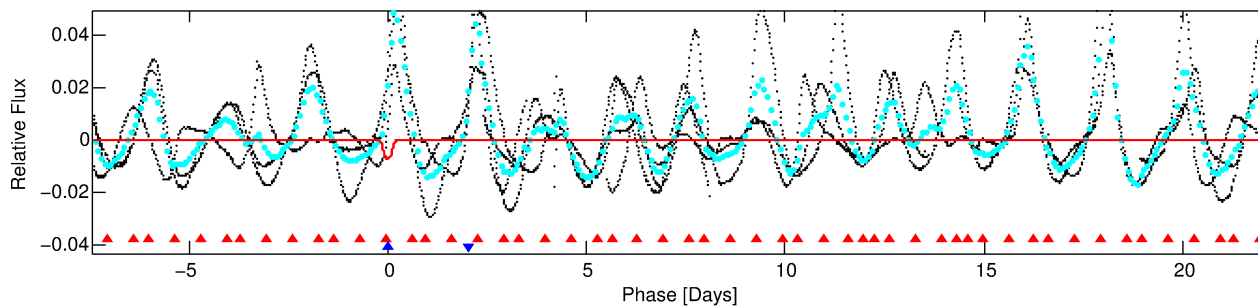
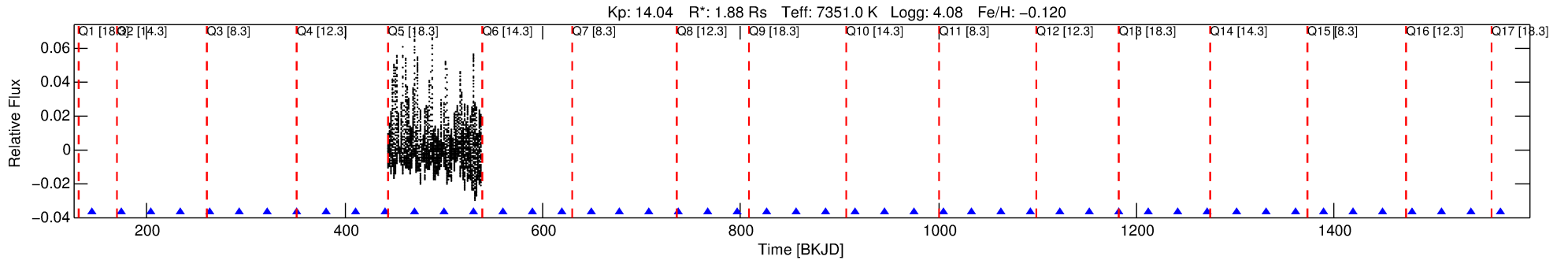
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009532712-02

No Significant Match Found

# DV One-Page Summary

KIC: 9532712 Candidate: 2 of 2 Period: 29.650 d



## DV Fit Results:

Period = 29.65045 [0.00456] d  
Epoch = 144.6207 [0.0561] BKJD  
Rp/R\* = 0.1410 [0.1017]  
a/R\* = 12.74 [1.45]  
b = 1.00 [1.26]  
Seff = 195.76 [73.09]  
Teq = 954 [89] K  
**Rp = 28.87 [22.52] Re**  
a = 0.2169 [0.0519] AU  
Ag = 84.91 [129.86] [0.65σ]  
Teffp = 4477 [1681] K [2.09σ]

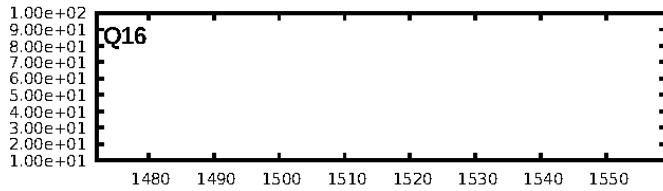
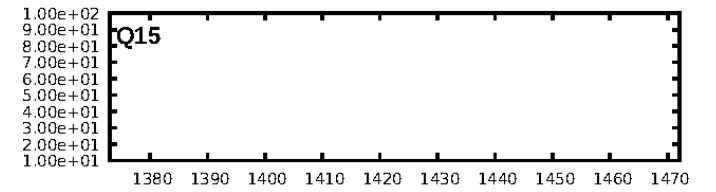
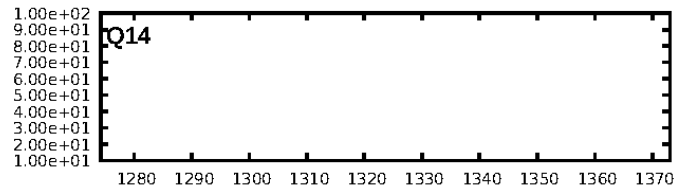
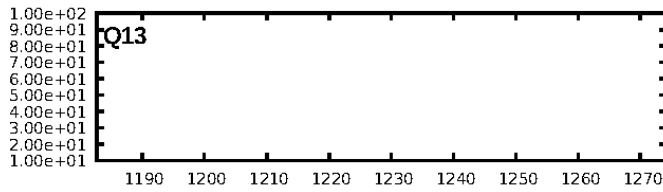
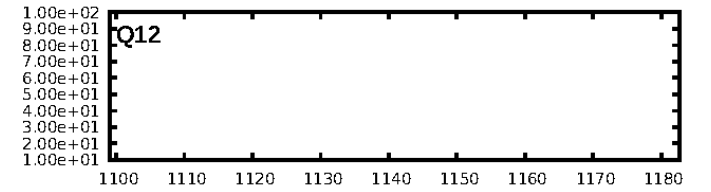
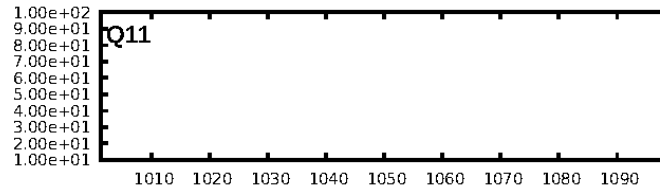
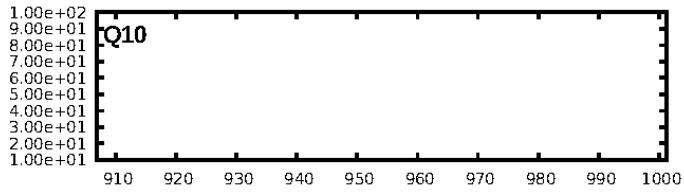
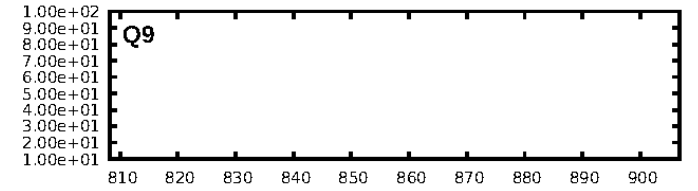
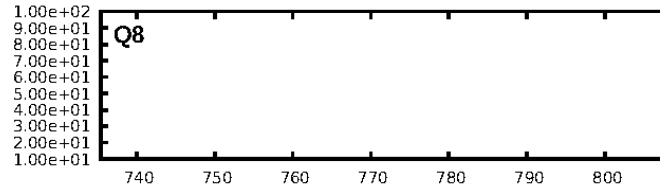
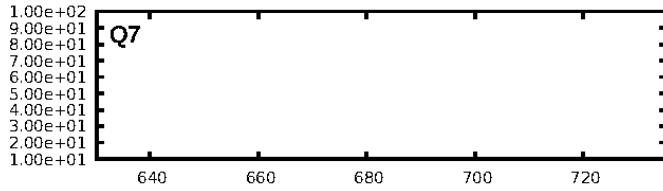
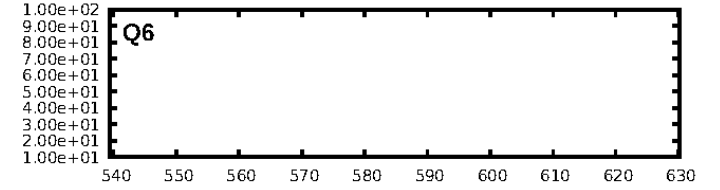
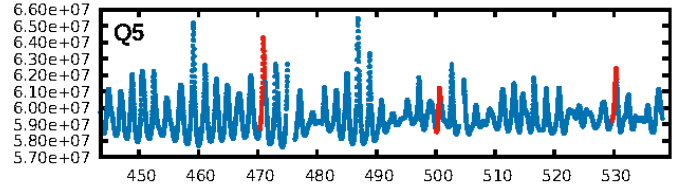
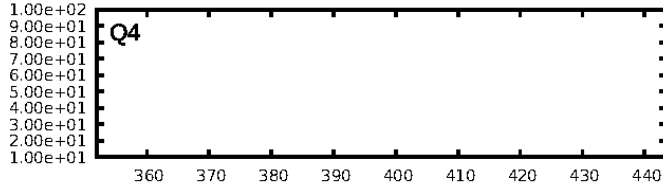
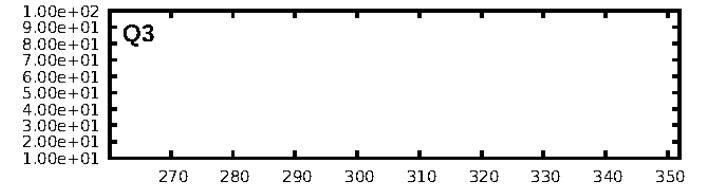
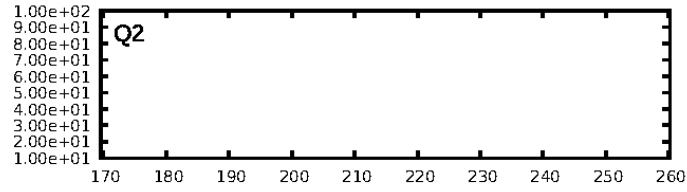
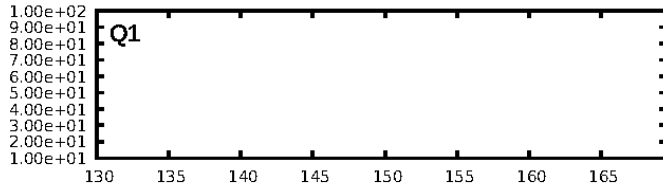
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [5.05σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 25.8%  
ModelChiSquareGof-sig: 94.5%  
Bootstrap-pfa: 1.12e-32  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 3.284  
Centroid-sig: N/A  
**Centroid-so: 0.320 arcsec [3.79σ]**  
OotOffset-rm: 0.169 arcsec [2.52σ]  
**KicOffset-rm: 0.319 arcsec [4.77σ]**  
OotOffset-st: 0/0/0/1 [1]  
KicOffset-st: 0/0/0/1 [1]  
DiffImageQuality-fgm: 0.00 [0/1]  
DiffImageOverlap-fno: 1.00 [1/1]

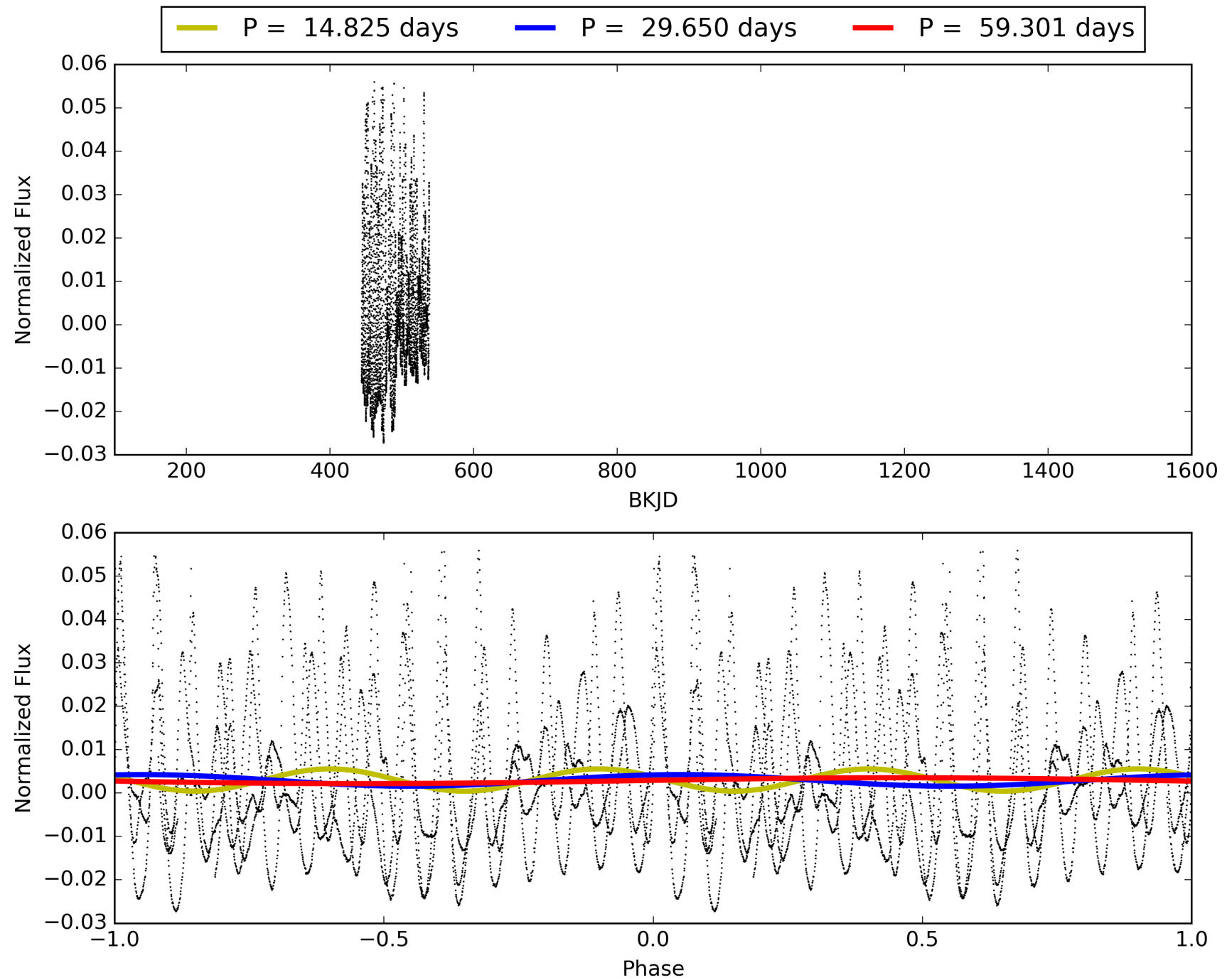
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 22:52:13 Z

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

# TCE 009532712-02, PDC Light Curves

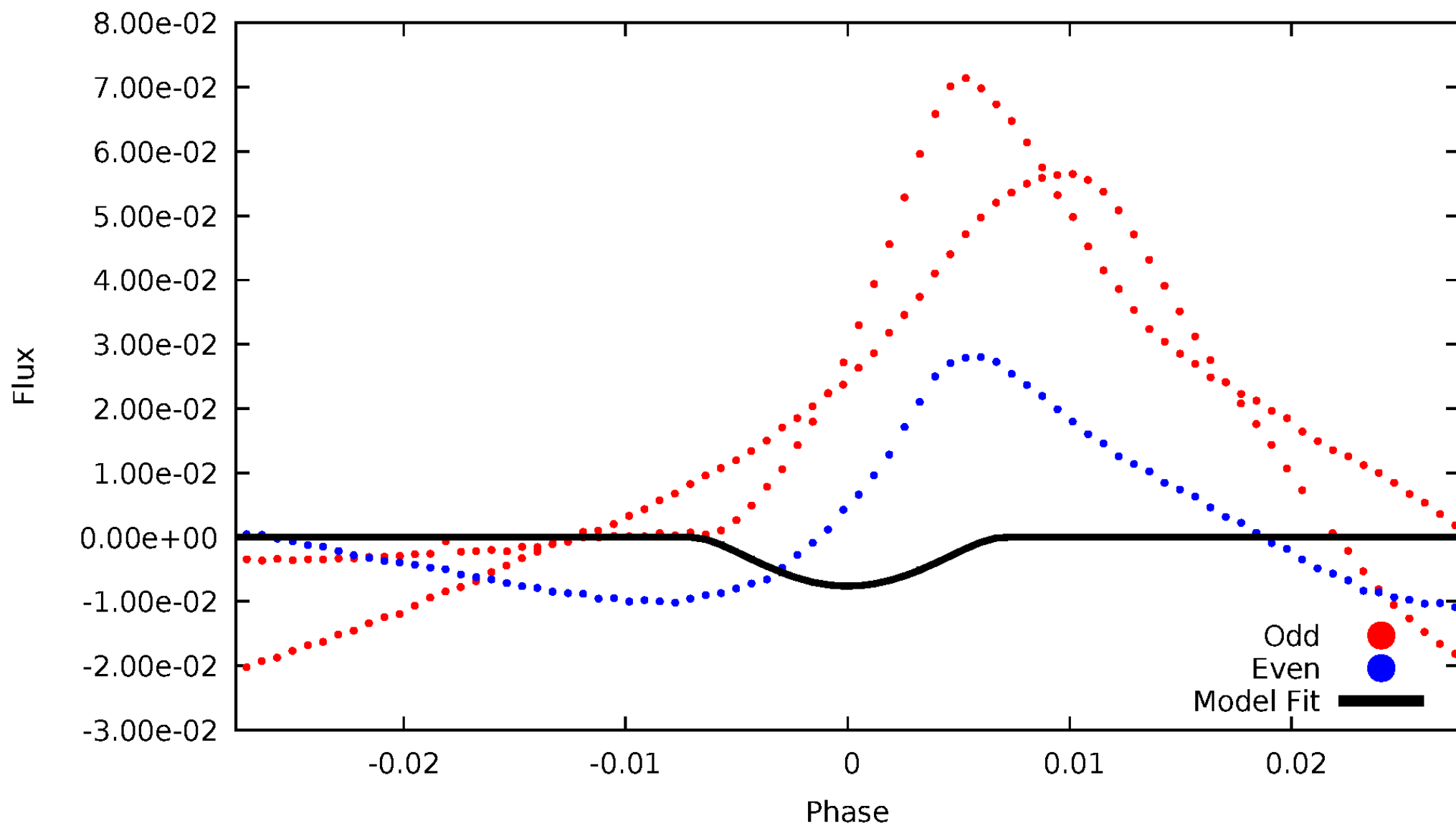


# TCE 009532712-02



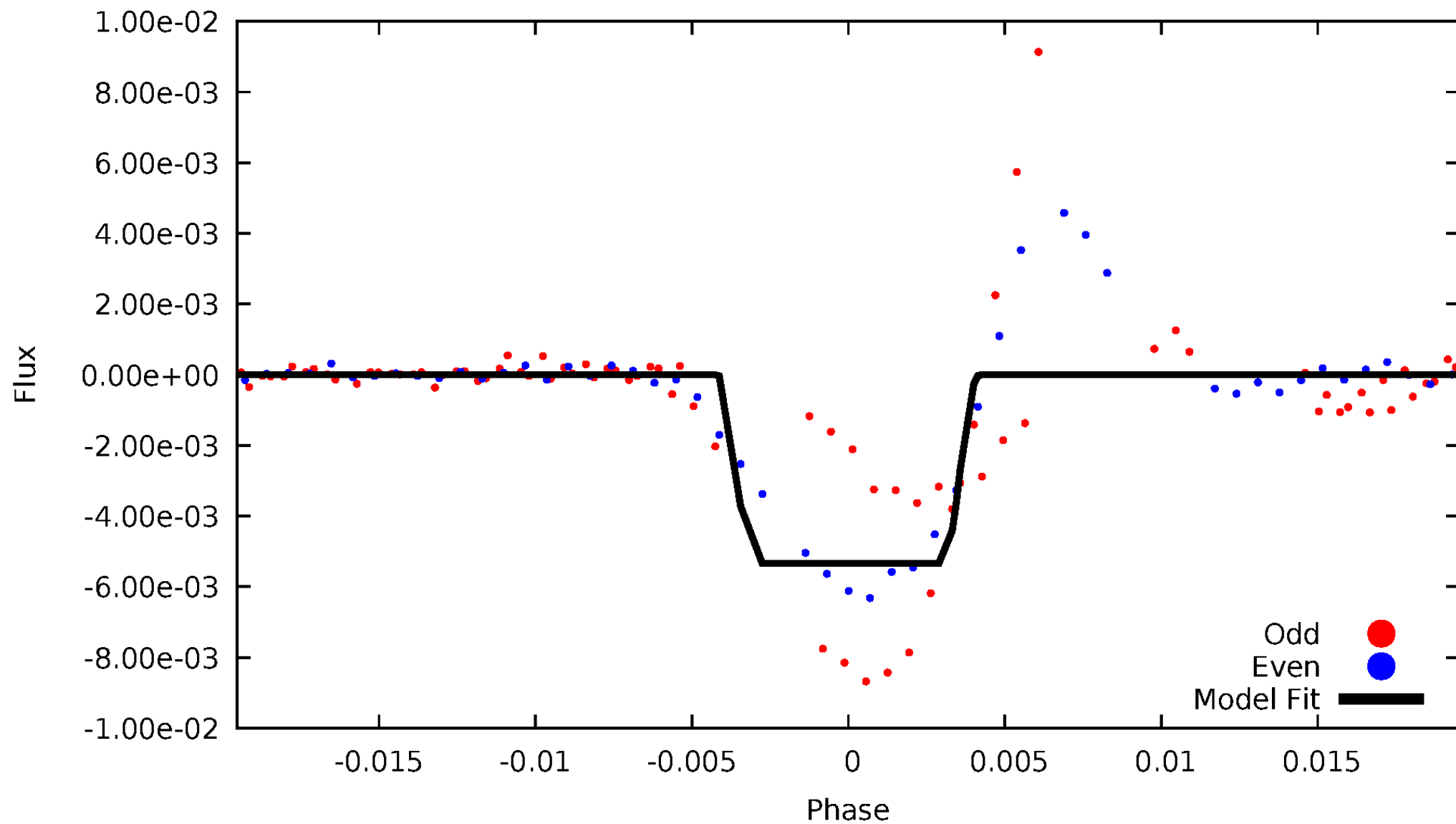
# DV Odd/Even

TCE 009532712-02



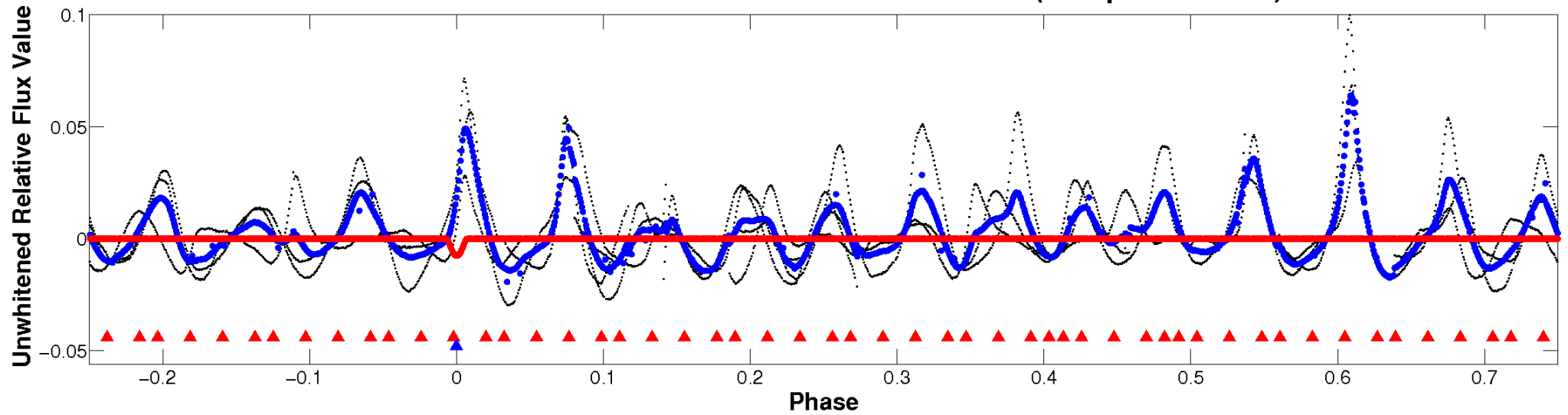
# ALT Odd/Even

TCE 009532712-02

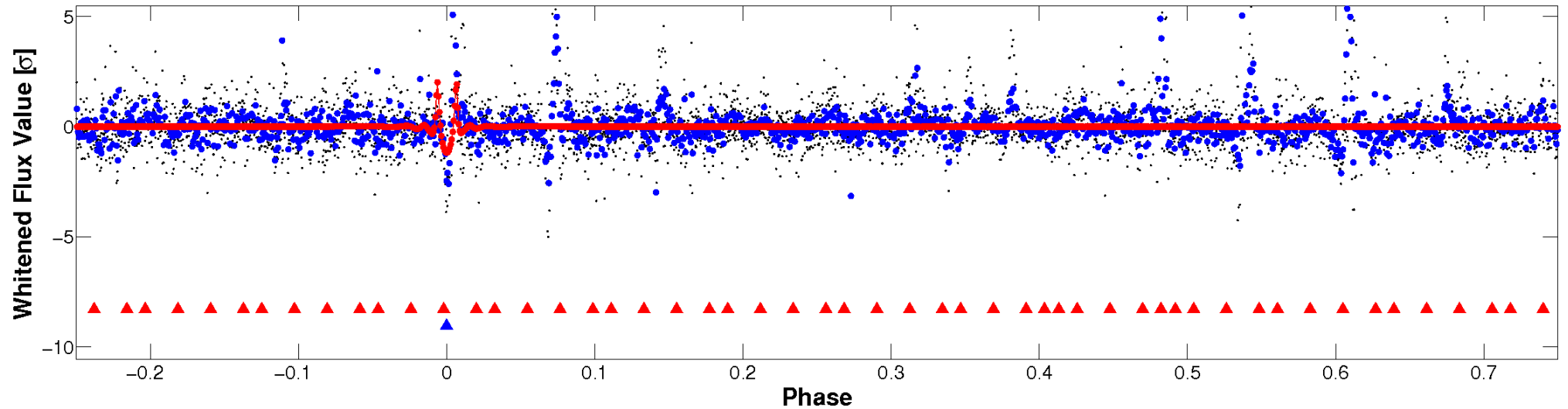


# Non-Whitened Vs. Whitened Light Curve

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

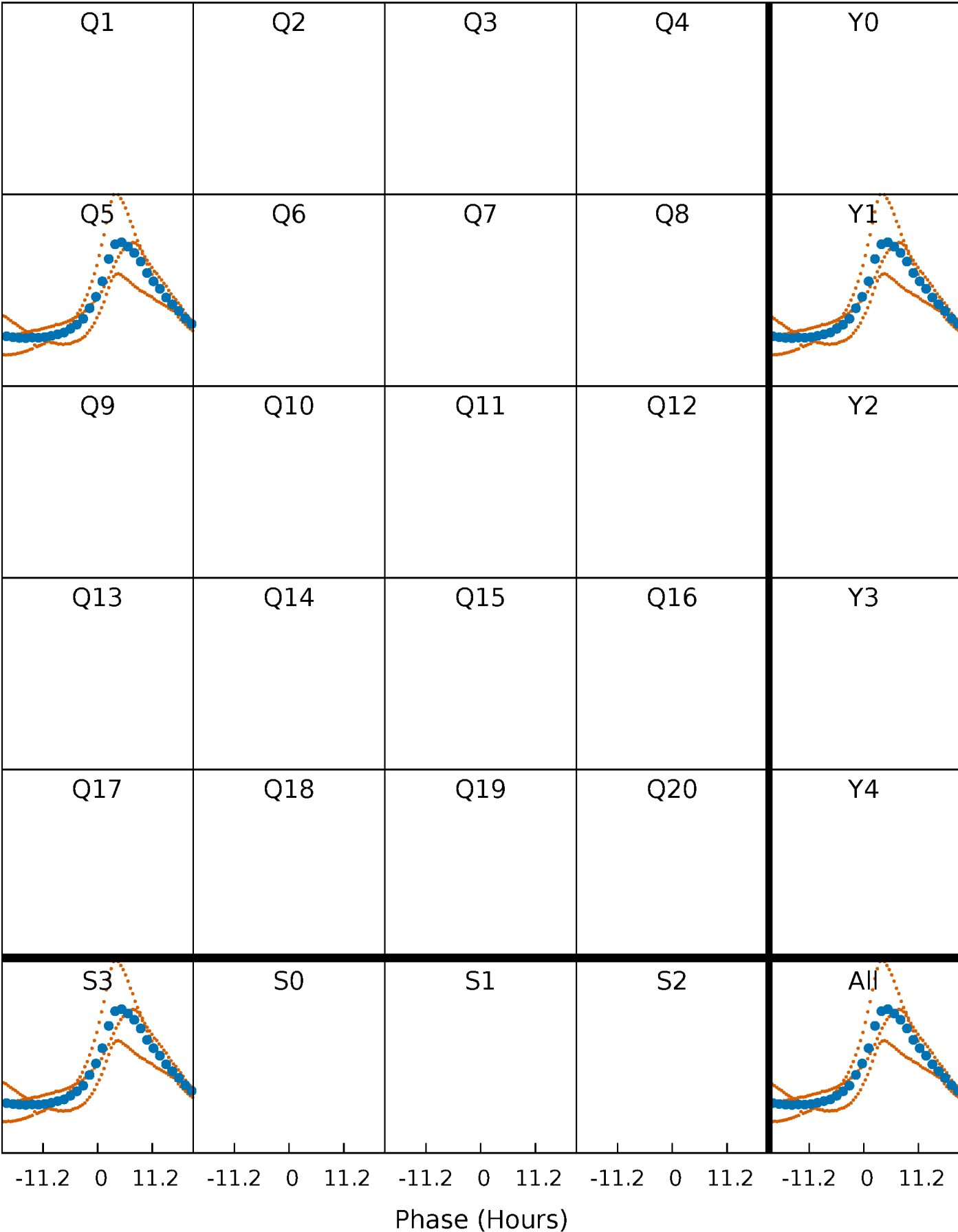


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



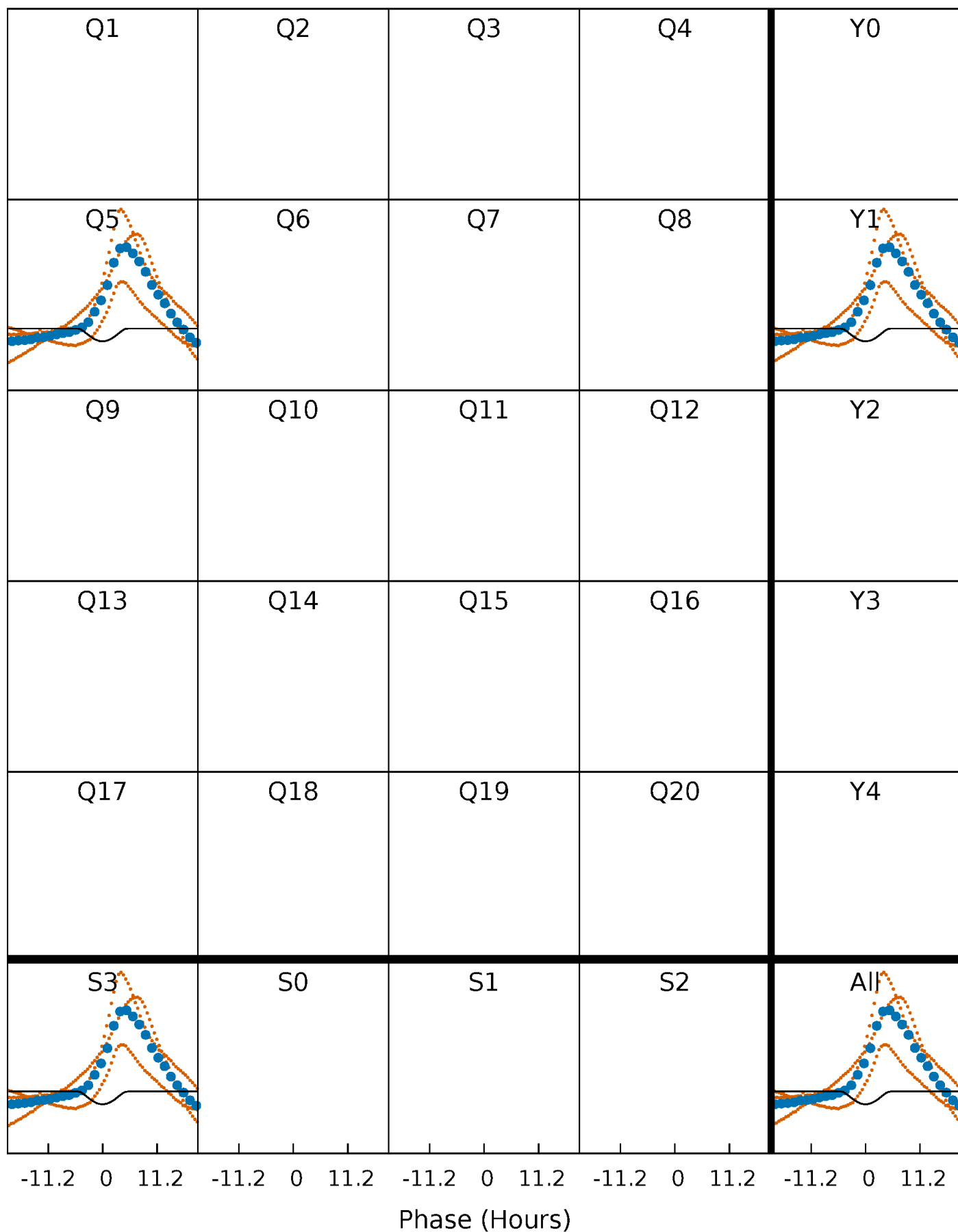
PDC Quarter-Phased Transit Curves

TCE 009532712-02    P= 29.650449 Days     $T_0$ =144.620661 (BKJD)



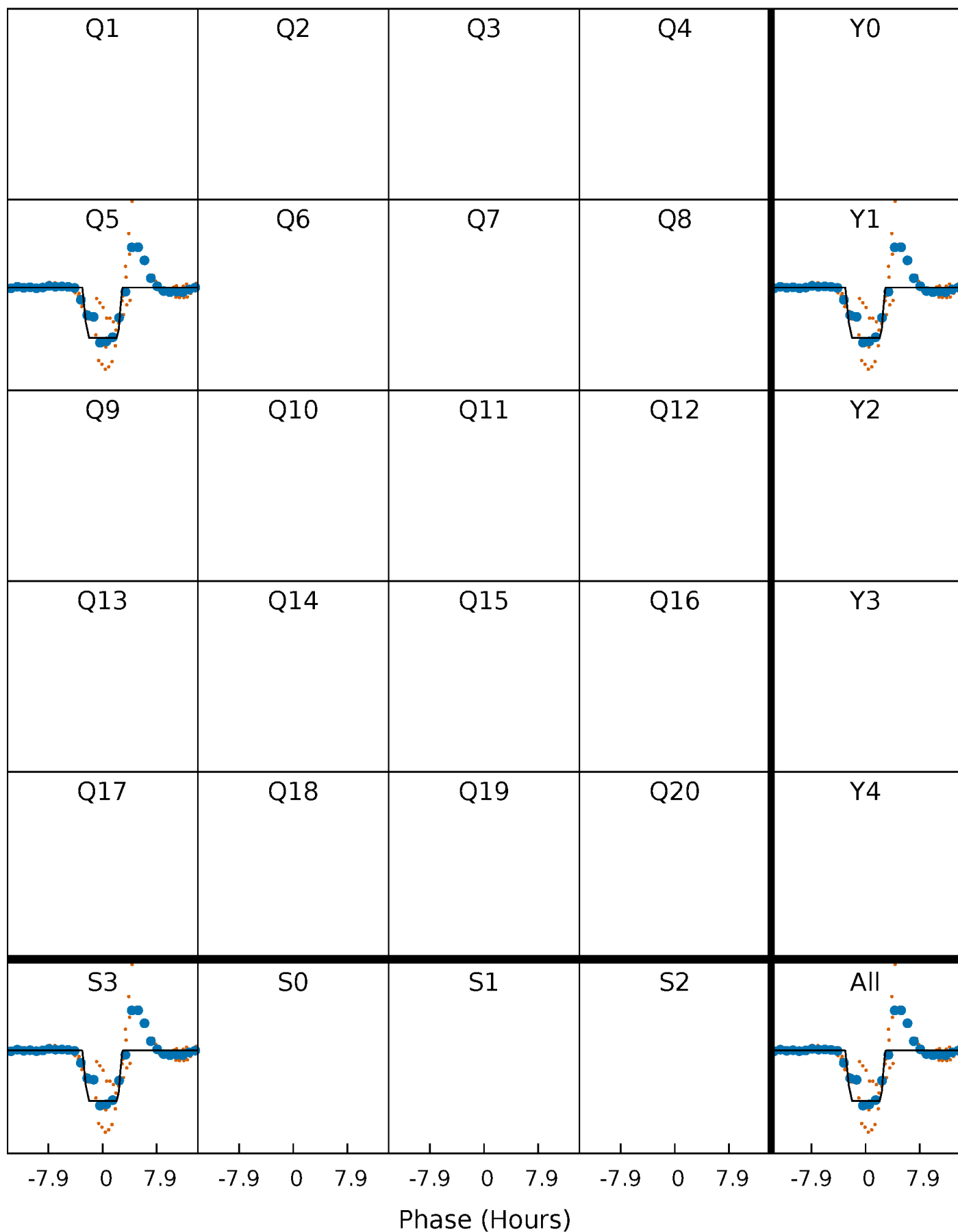
# DV Quarter-Phased Transit Curves

TCE 009532712-02    P= 29.650449 Days     $T_0=144.620661$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

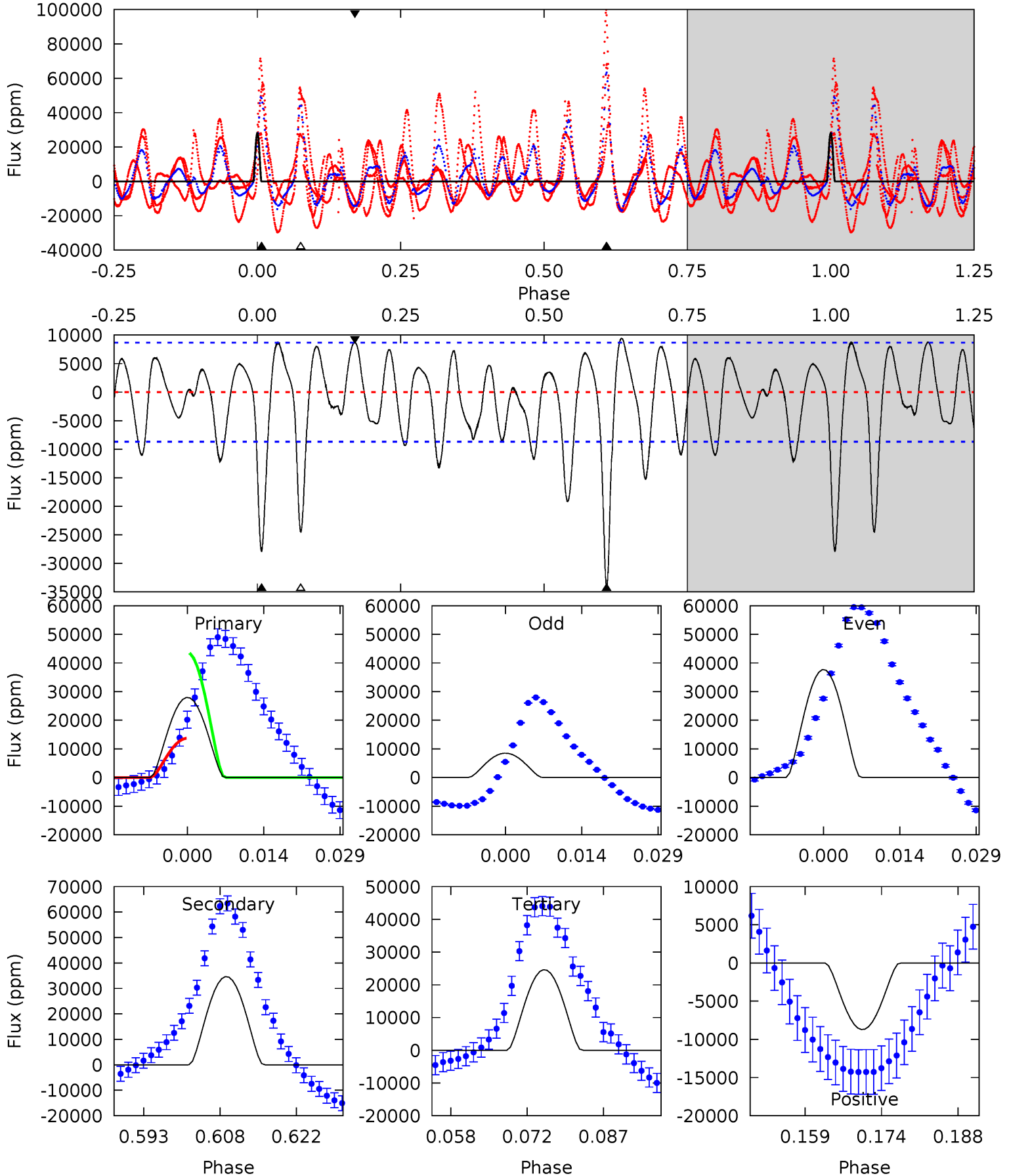
TCE 009532712-02    P= 29.666922 Days     $T_0=144.376038$  (BKJD)



# DV Model-Shift Uniqueness Test

009532712-02, P = 29.650449 Days, E = 144.620661 Days

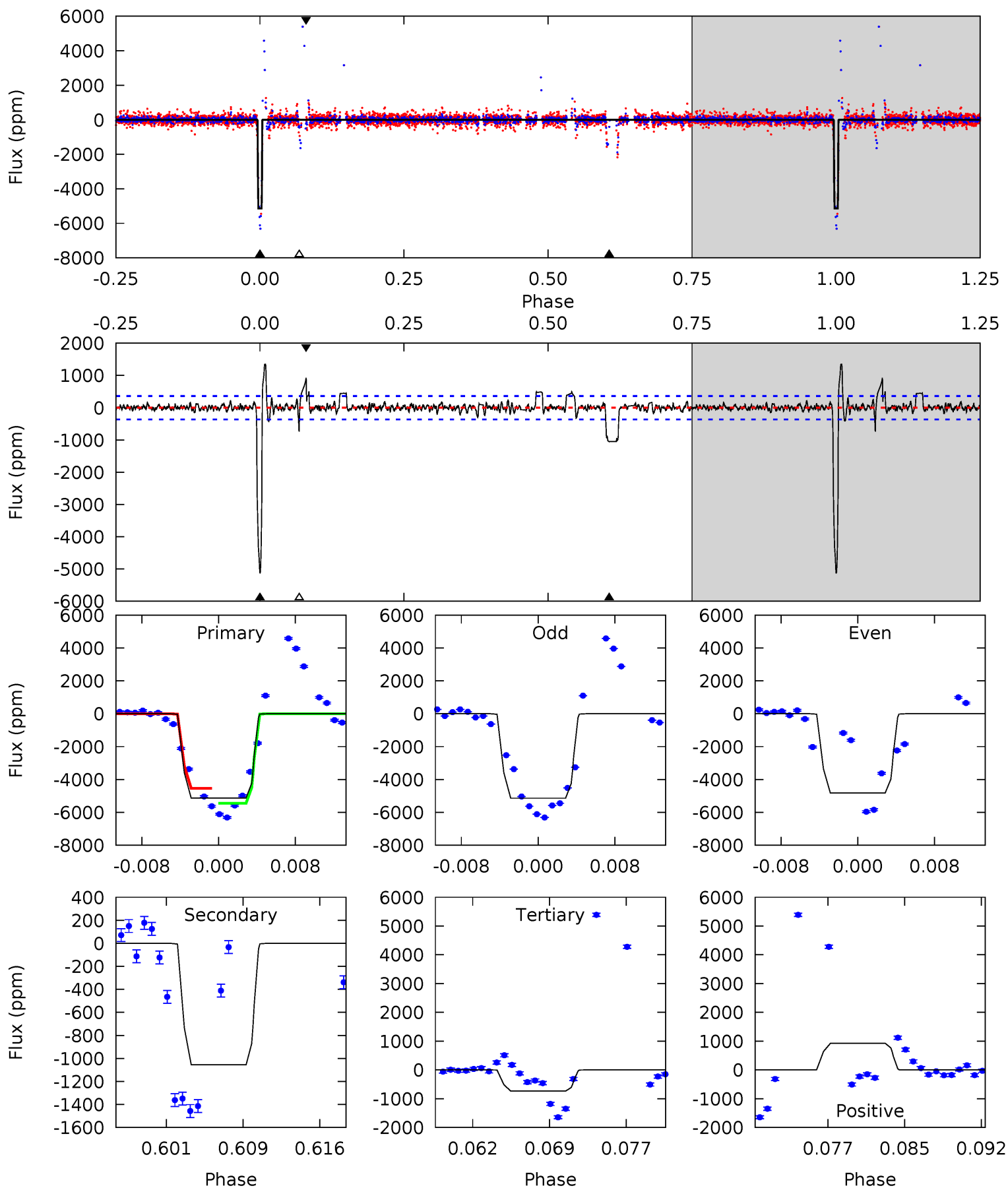
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.0	19.8	14.1	4.98	4.95	2.45	3.55	1.92	11.0	5.74	14.8	8.14	0.83	0.21	8.89



# Alt Model-Shift Uniqueness Test

009532712-02, P = 29.666922 Days, E = 144.376038 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
71.7	14.8	10.3	12.9	5.08	2.66	1.52	61.5	58.8	4.47	1.83	2.63	1.00	0.21	0



### Stellar Parameters For KIC 009532712

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7351^{+230}_{-307}$	$4.081^{+0.175}_{-0.175}$	$-0.120^{+0.200}_{-0.400}$	$1.876^{+0.558}_{-0.456}$	$1.547^{+0.222}_{-0.271}$	$0.330^{+0.312}_{-0.160}$
	+3%/-4%	+4%/-4%	+167%/-333%	+30%/-24%	+14%/-18%	+94%/-48%
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 009532712-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-34654 \pm 1749$	$30.38^{+21.28}_{-18.01}$	$1332^{+103}_{-97}$	$8554^{+9110}_{-2256}$	$985^{+5000}_{-634}$
Alt.	$-1055 \pm 72$	$21.59^{+17.90}_{-14.24}$	$1333^{+95}_{-102}$	$4270^{+2709}_{-831}$	$60^{+426}_{-43}$

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

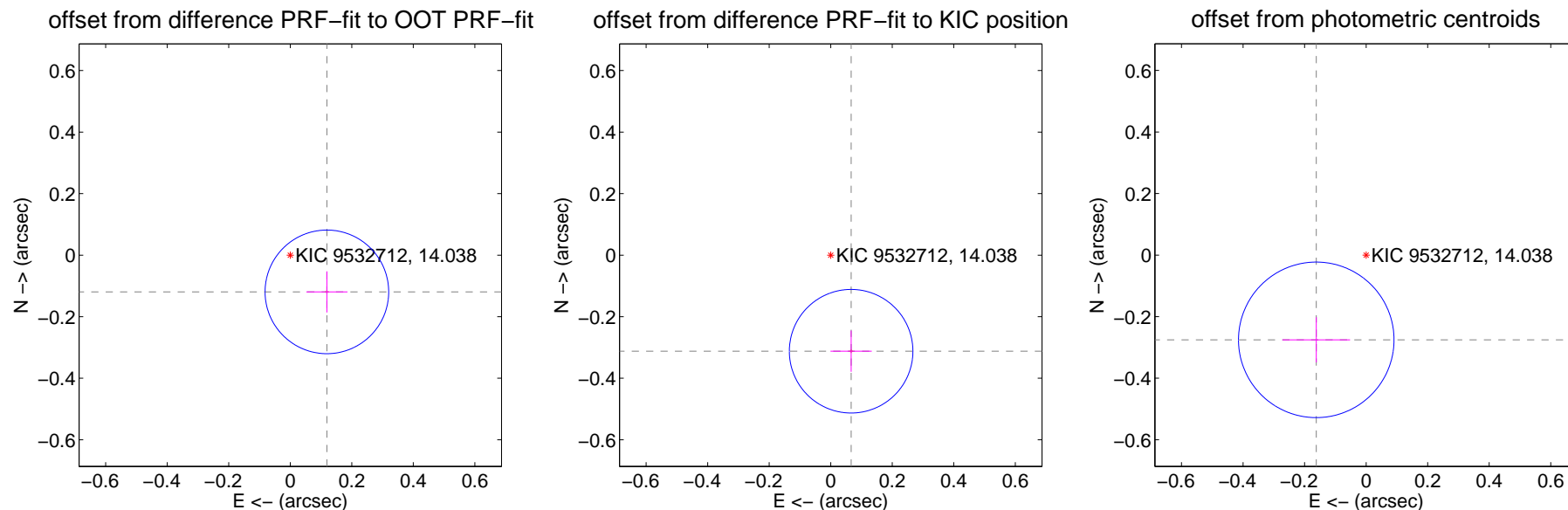
## DV Centroid Data

Supplemental centroid analysis for 009532712-02. Kepler magnitude: 14.04. Transit SNR 8.24

There are 0 quarters with good PRF difference image offsets

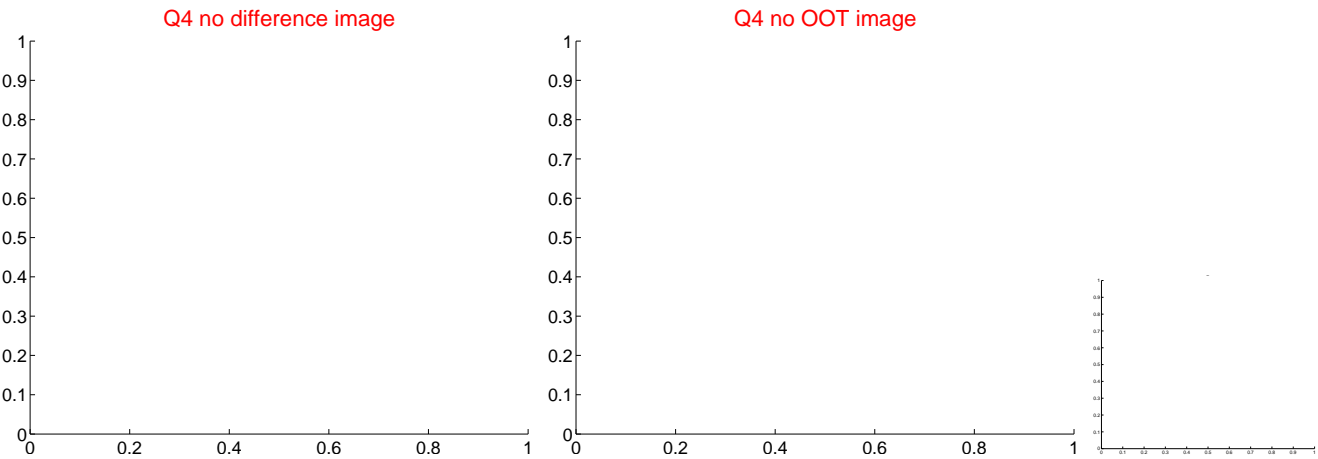
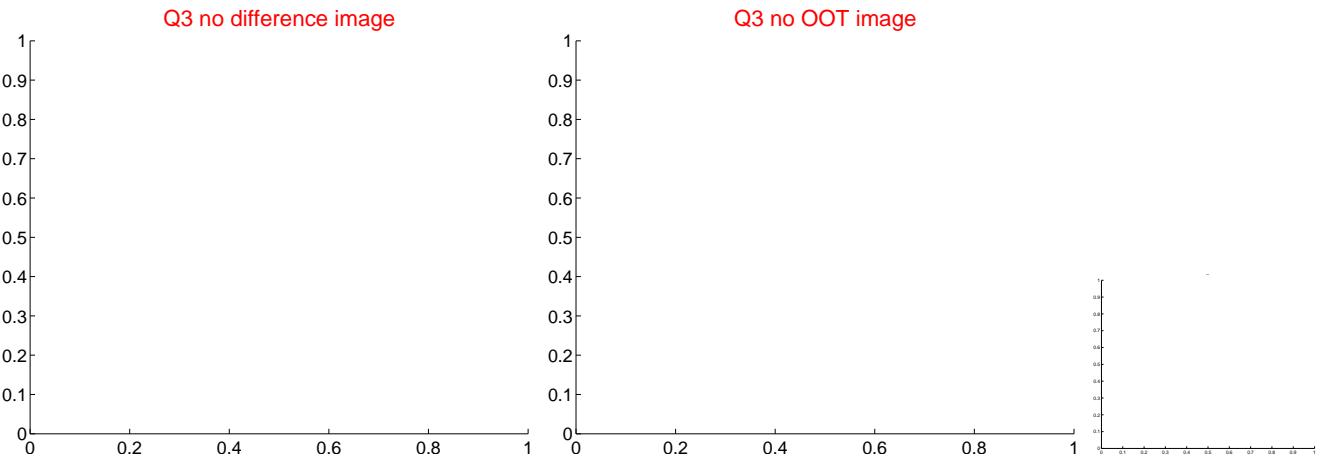
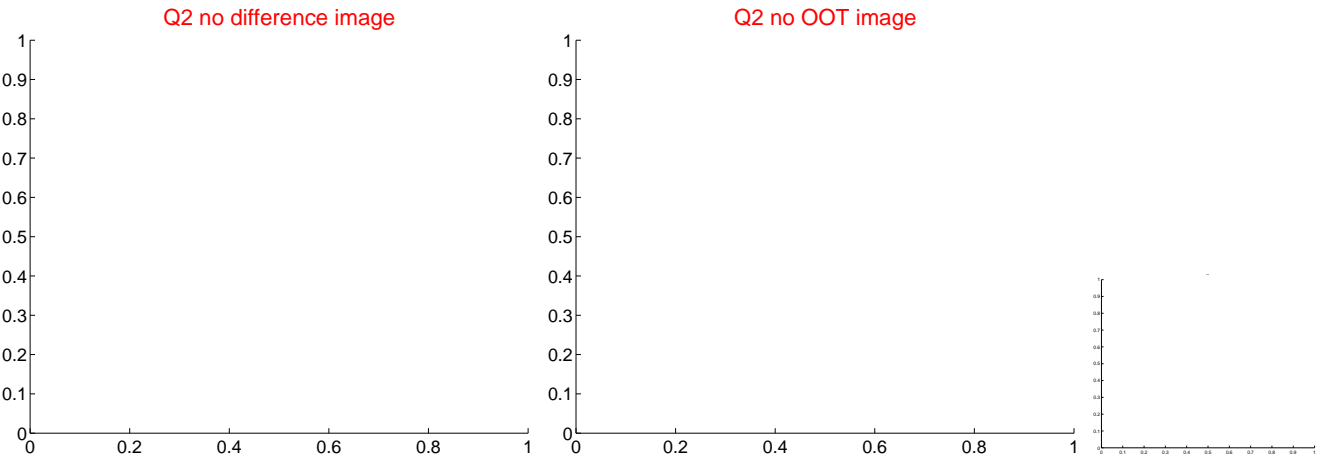
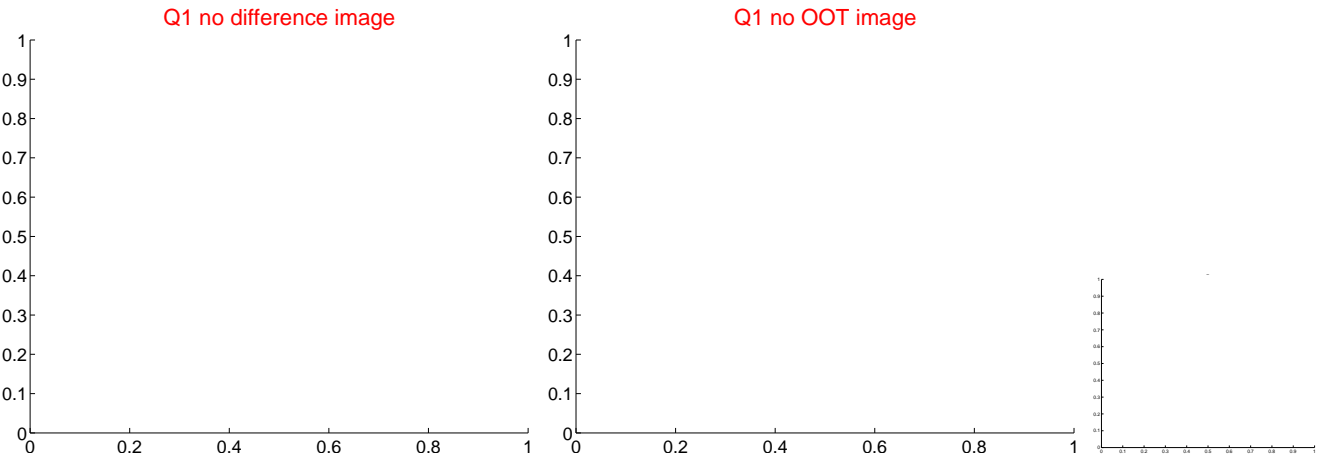
The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.169 \pm 0.067$	2.52	$-0.119 \pm 0.067$	$-0.119 \pm 0.067$
PRF-fit source offset from KIC position	$0.319 \pm 0.067$	4.77	$-0.066 \pm 0.067$	$-0.312 \pm 0.067$
photometric centroid source offset	$0.32 \pm 0.08$	3.79	$0.16 \pm 0.11$	$-0.28 \pm 0.07$

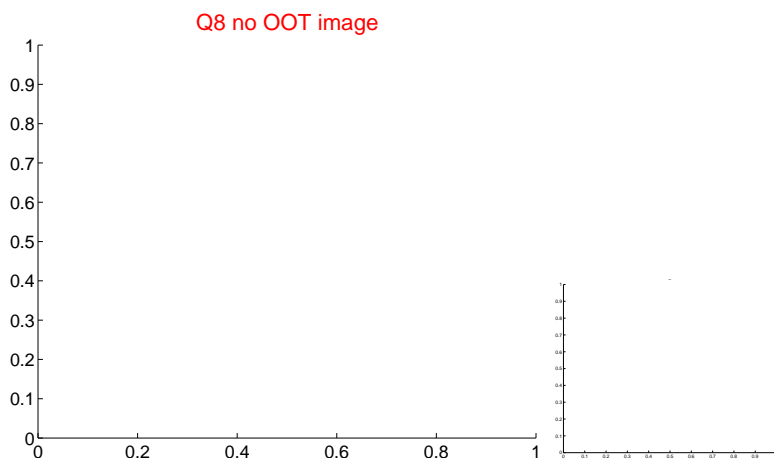
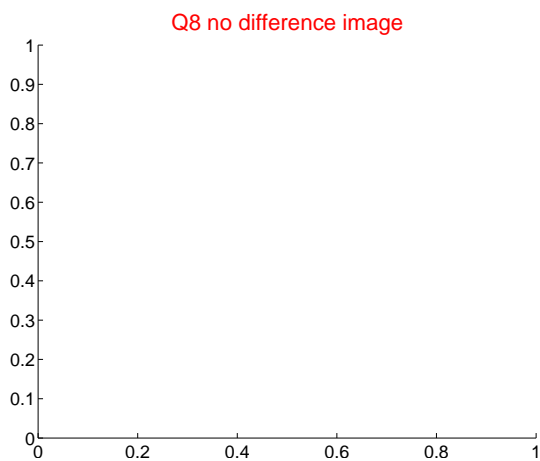
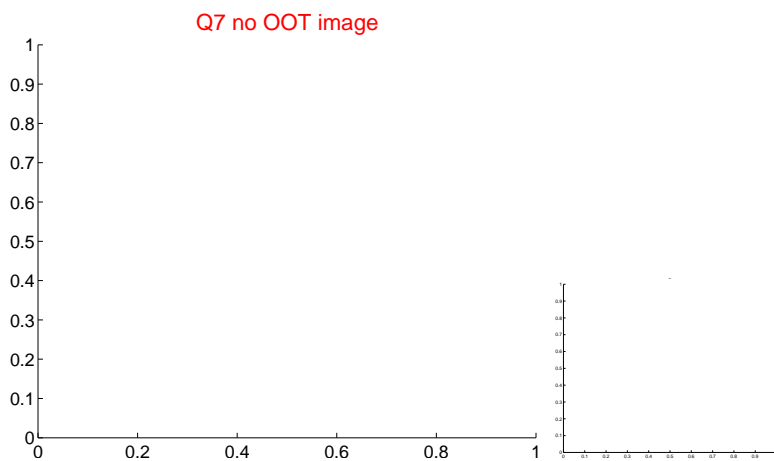
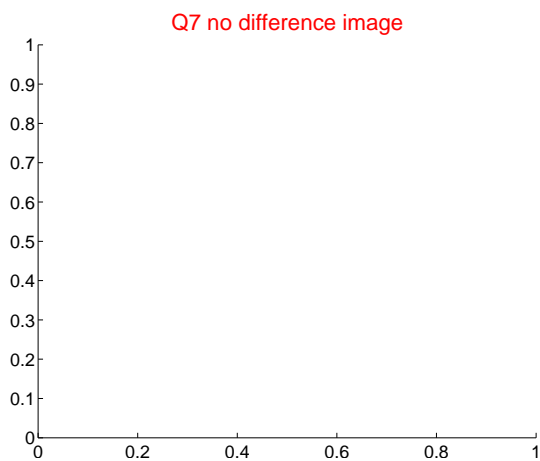
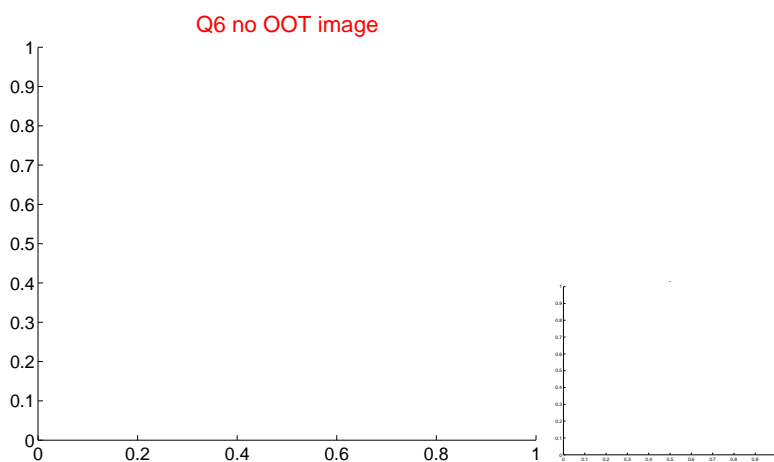
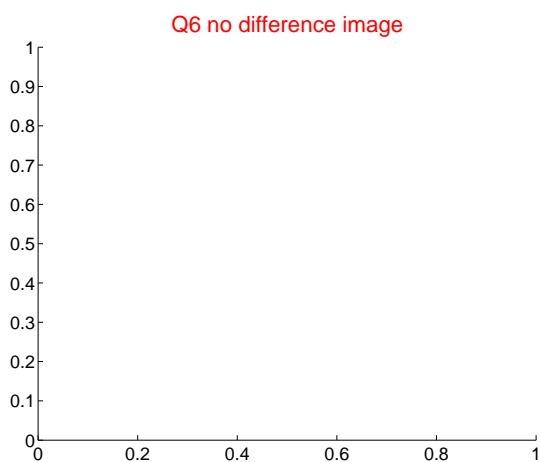
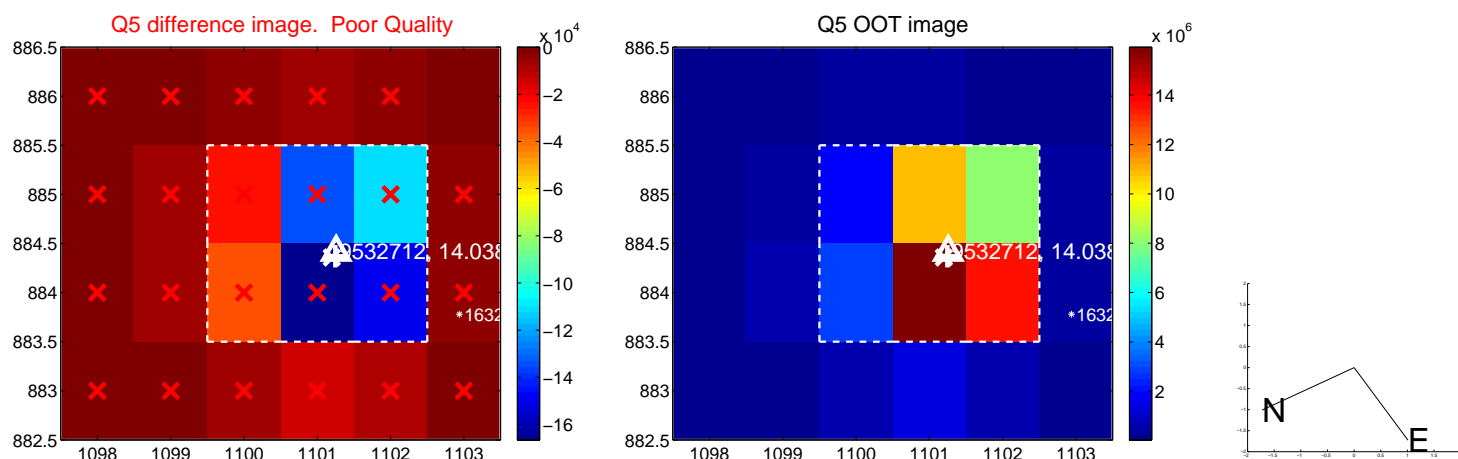


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

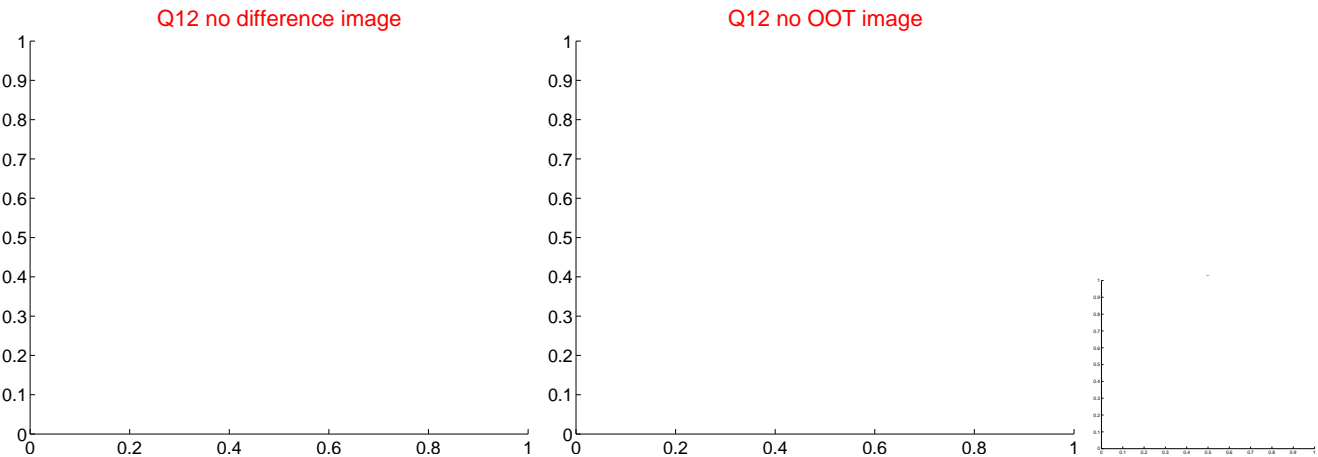
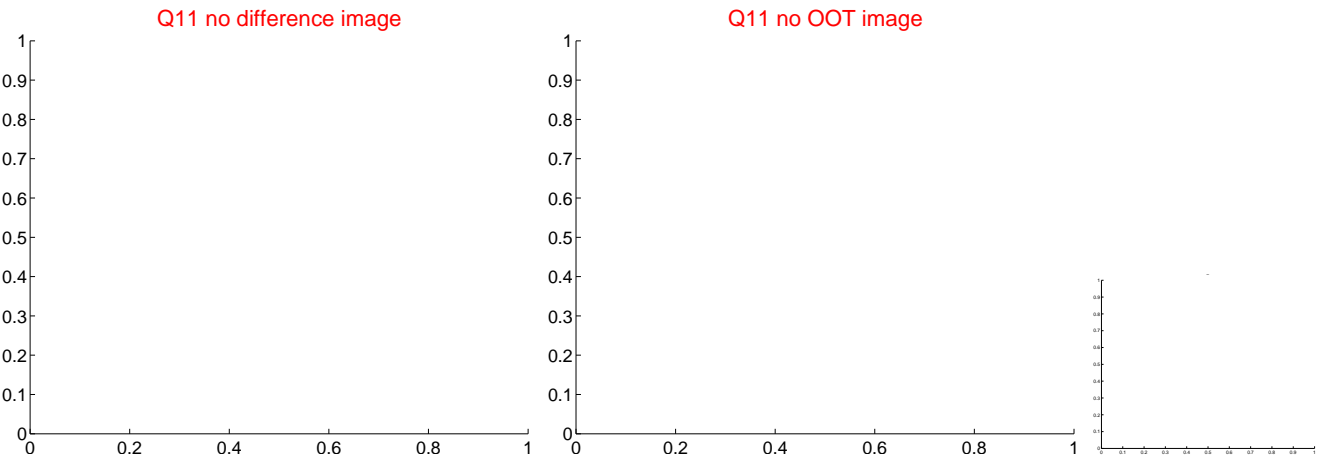
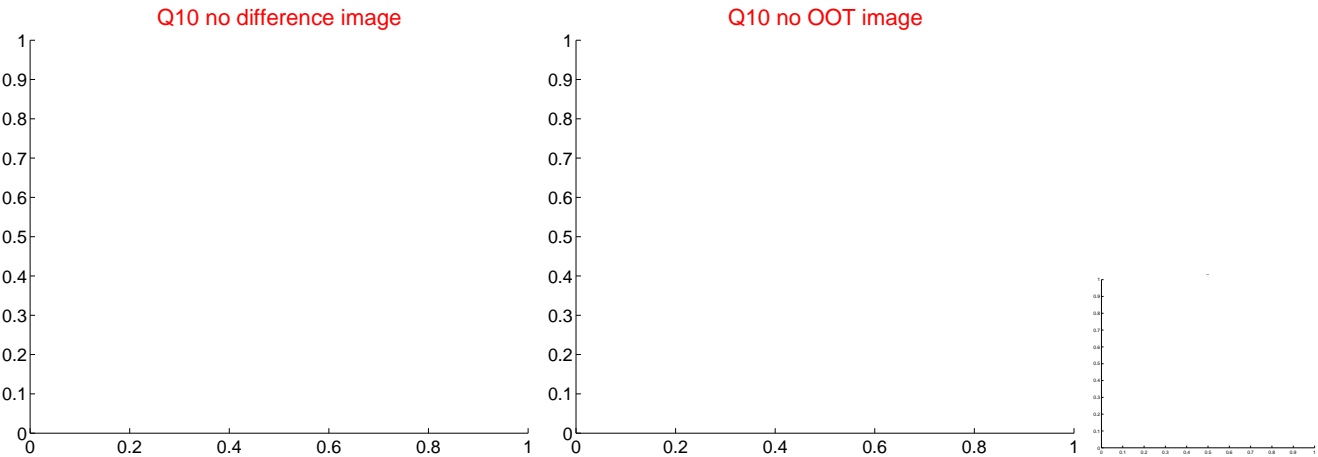
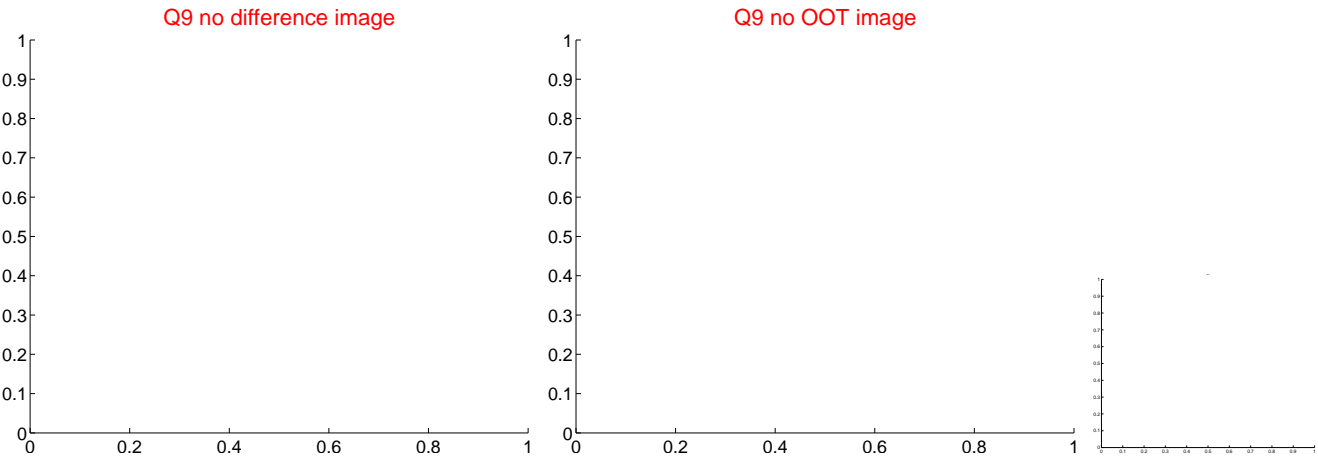
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



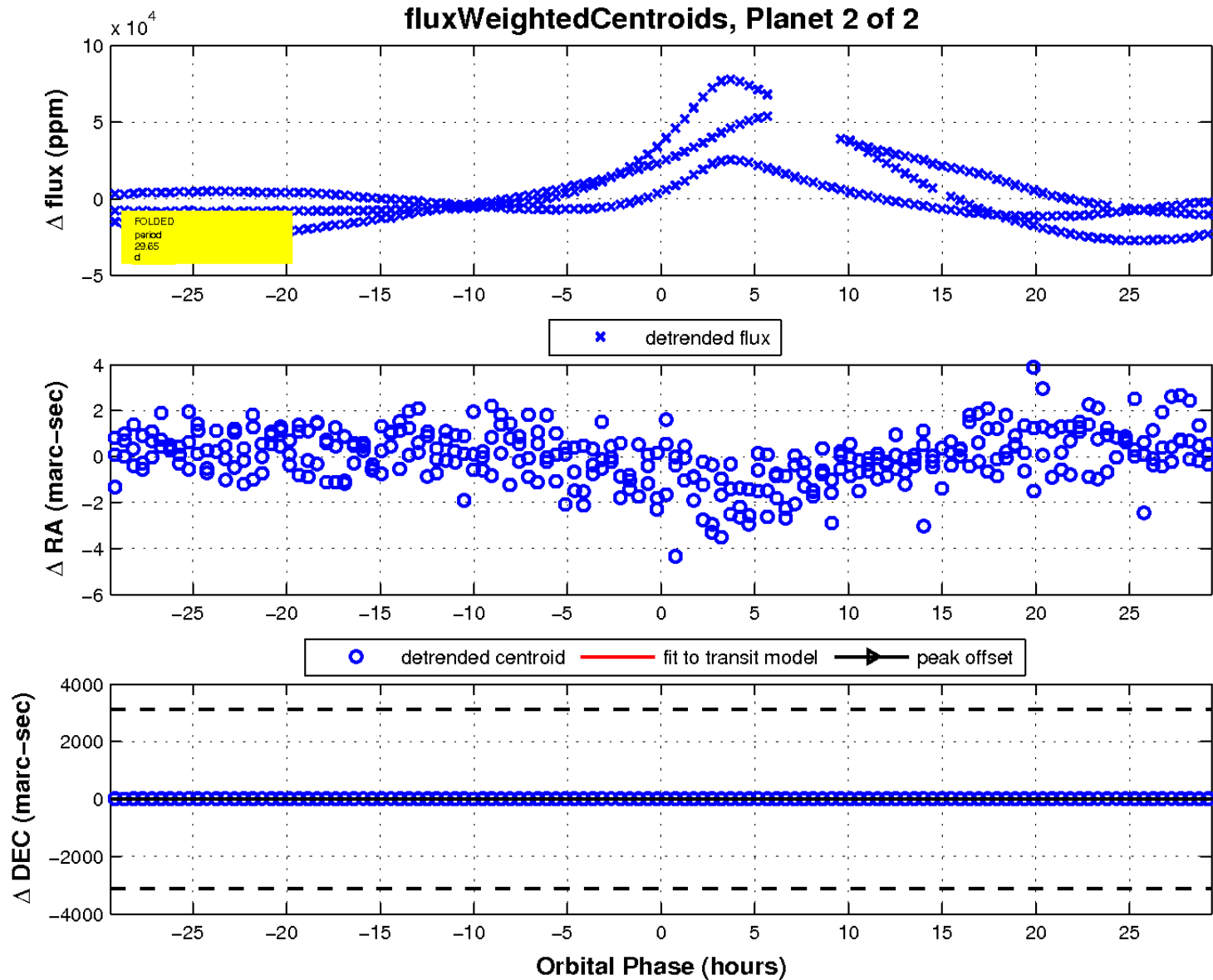
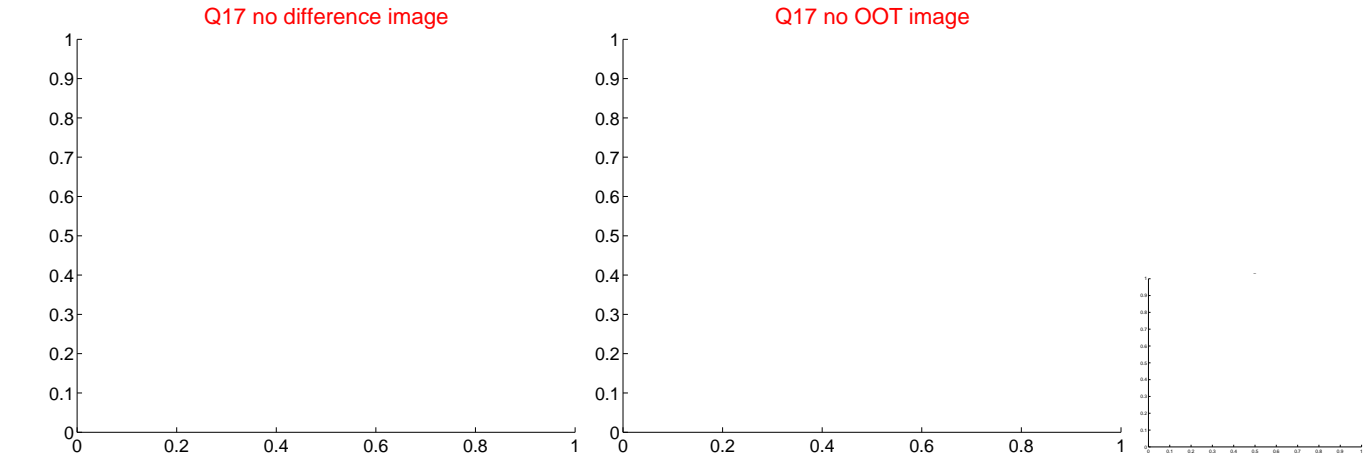
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

