

# KIC 009543660

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009543660-01	OBS	No	291.948599	264.980336	275.8	7.929	9.2	6.3	2.40	15896	4.33	214.58
009543660-02	OBS	No	292.011692	264.629024	816.2	57.712	8.9	11.2	2.40	15896	9.49	214.52

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009543660-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_KIC_POS
009543660-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—SAME_NTL_PERIOD—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.

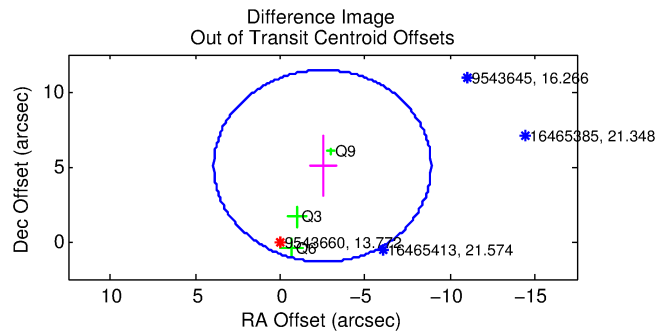
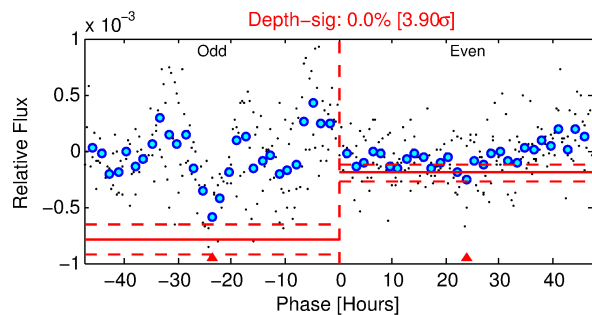
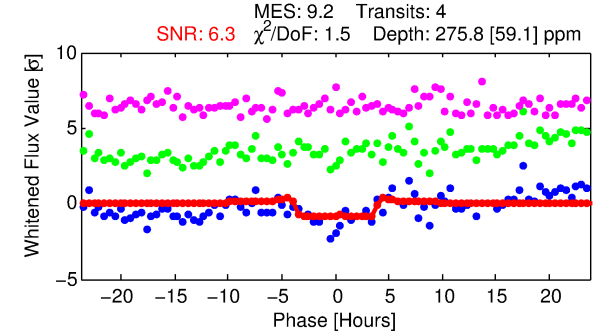
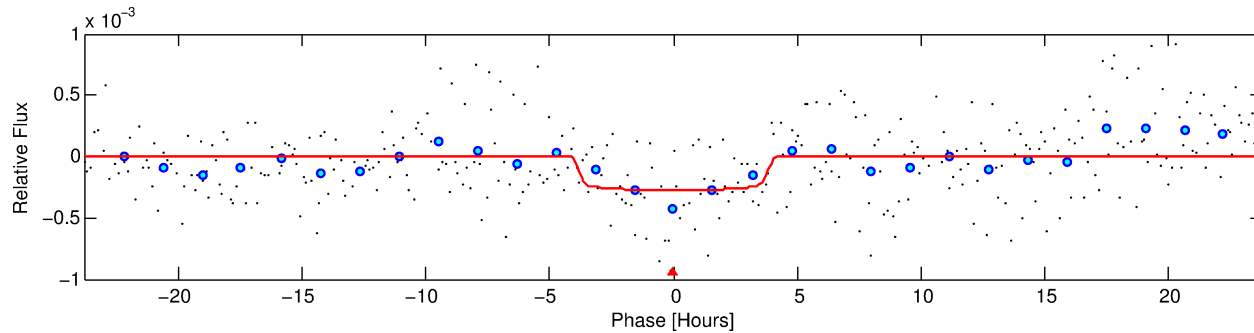
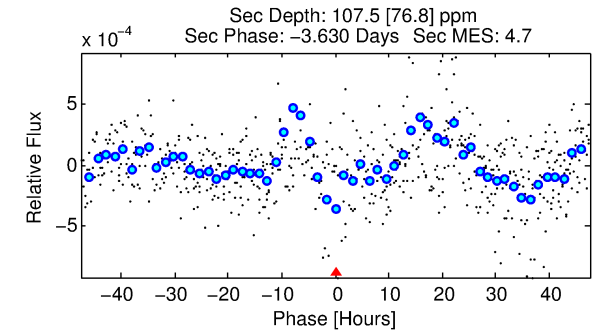
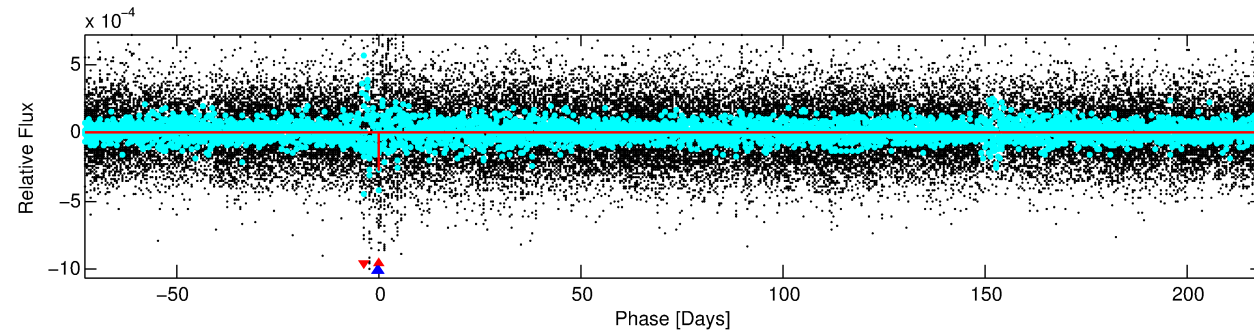
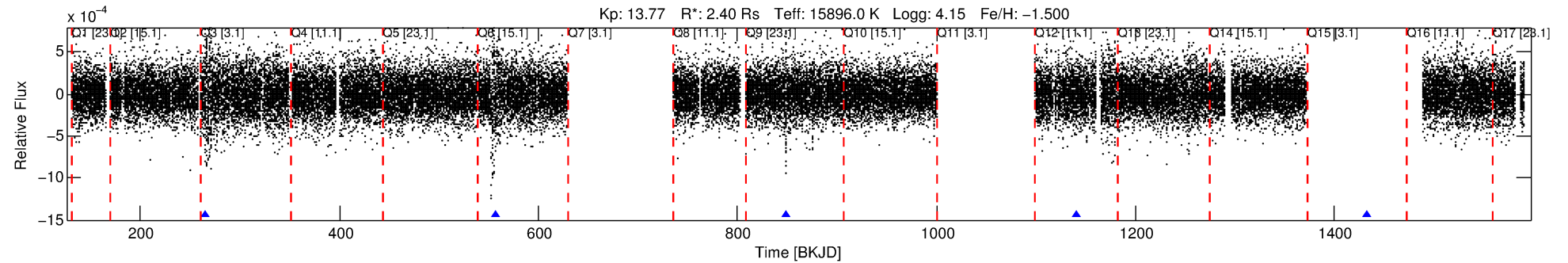
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009543660-01

No Significant Match Found

# DV One-Page Summary

KIC: 9543660 Candidate: 1 of 2 Period: 291.949 d



## DV Fit Results:

Period = 291.94860 [0.00866] d  
Epoch = 264.9803 [0.0171] BKJD  
Rp/R\* = 0.0165 [0.0057]  
a/R\* = 195.82 [654.92]  
b = 0.74 [2.04]  
Seff = 214.58 [0.01]  
Teq = 976 [0] K  
Rp = 4.33 [1.50] Re  
a = 1.2412 [0.0000] AU  
Ag = 4850.74 [4821.41] [1.01σ]  
Teffp = 12593 [3129] K [3.71σ]

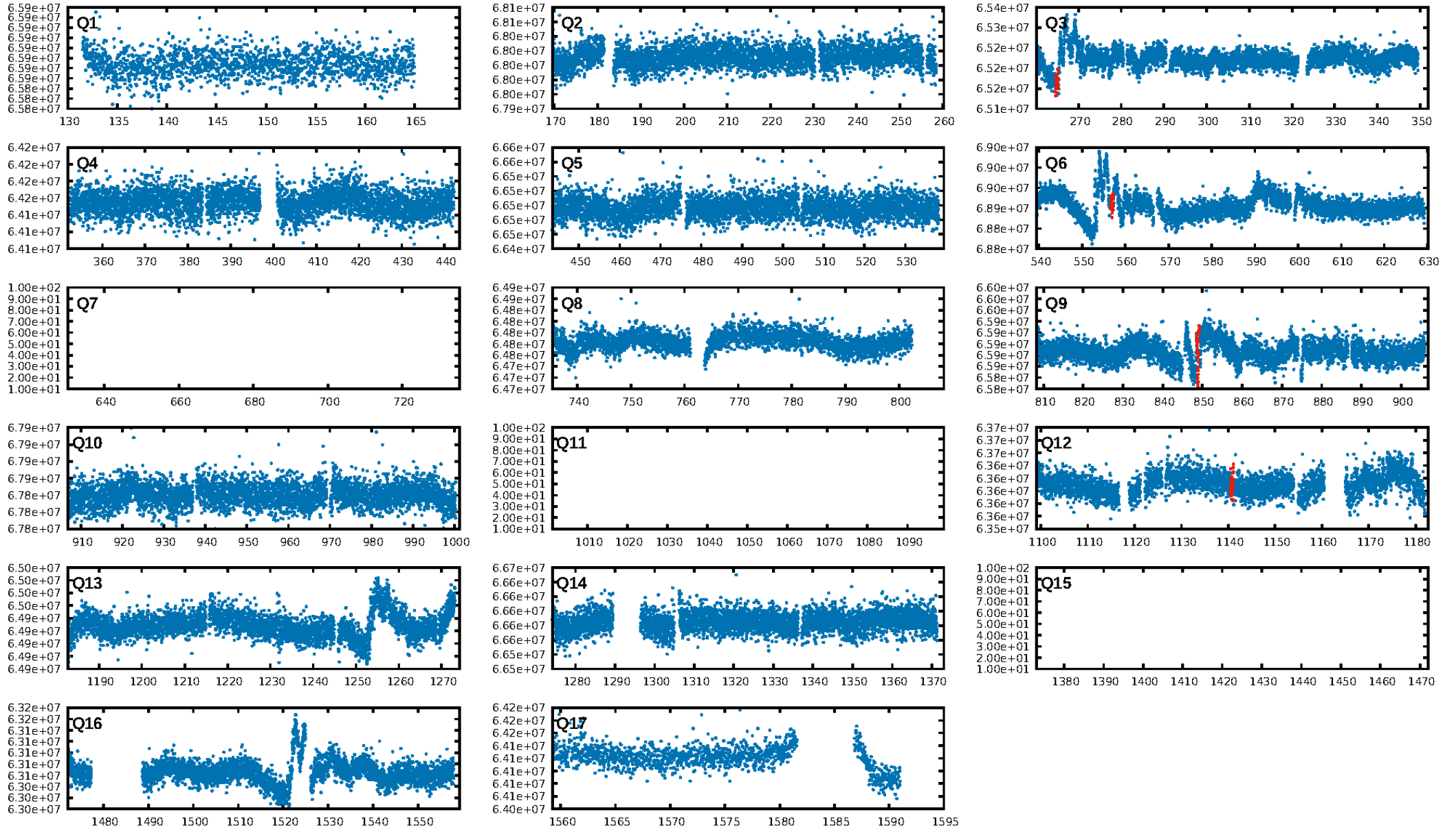
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 2.1% [0.03σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 62.5%  
Bootstrap-pfa: 2.72e-11  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -12.47  
Centroid-sig: 1.0%  
Centroid-so: 0.031 arcsec [0.02σ]  
OotOffset-rm: 5.633 arcsec [2.64σ]  
KicOffset-rm: 0.540 arcsec [1.75σ]  
OotOffset-st: 1/1/0/1 [3]  
KicOffset-st: 1/1/0/1 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 0.00 [0/4]

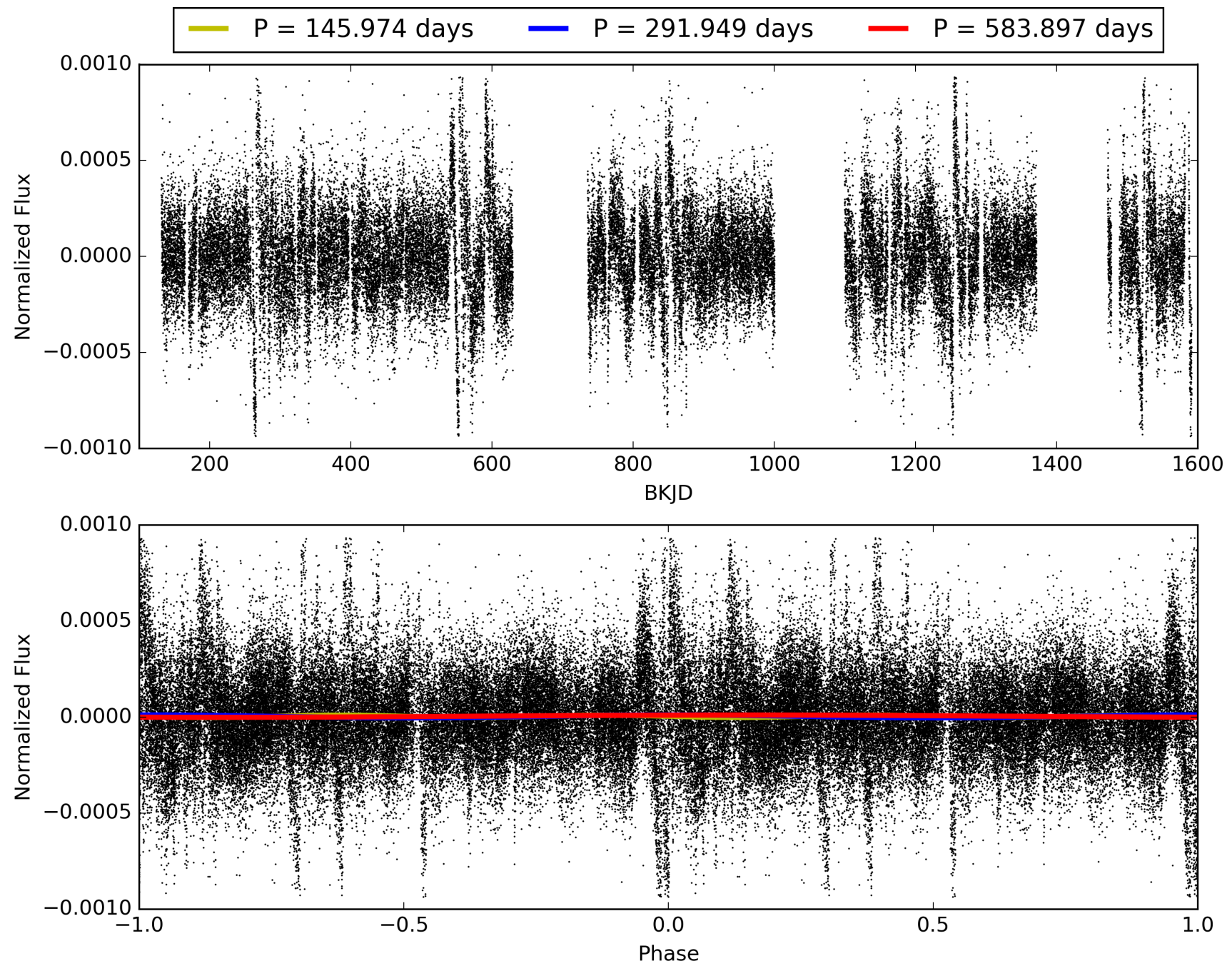
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 12:27:00 Z

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

# TCE 009543660-01, PDC Light Curves

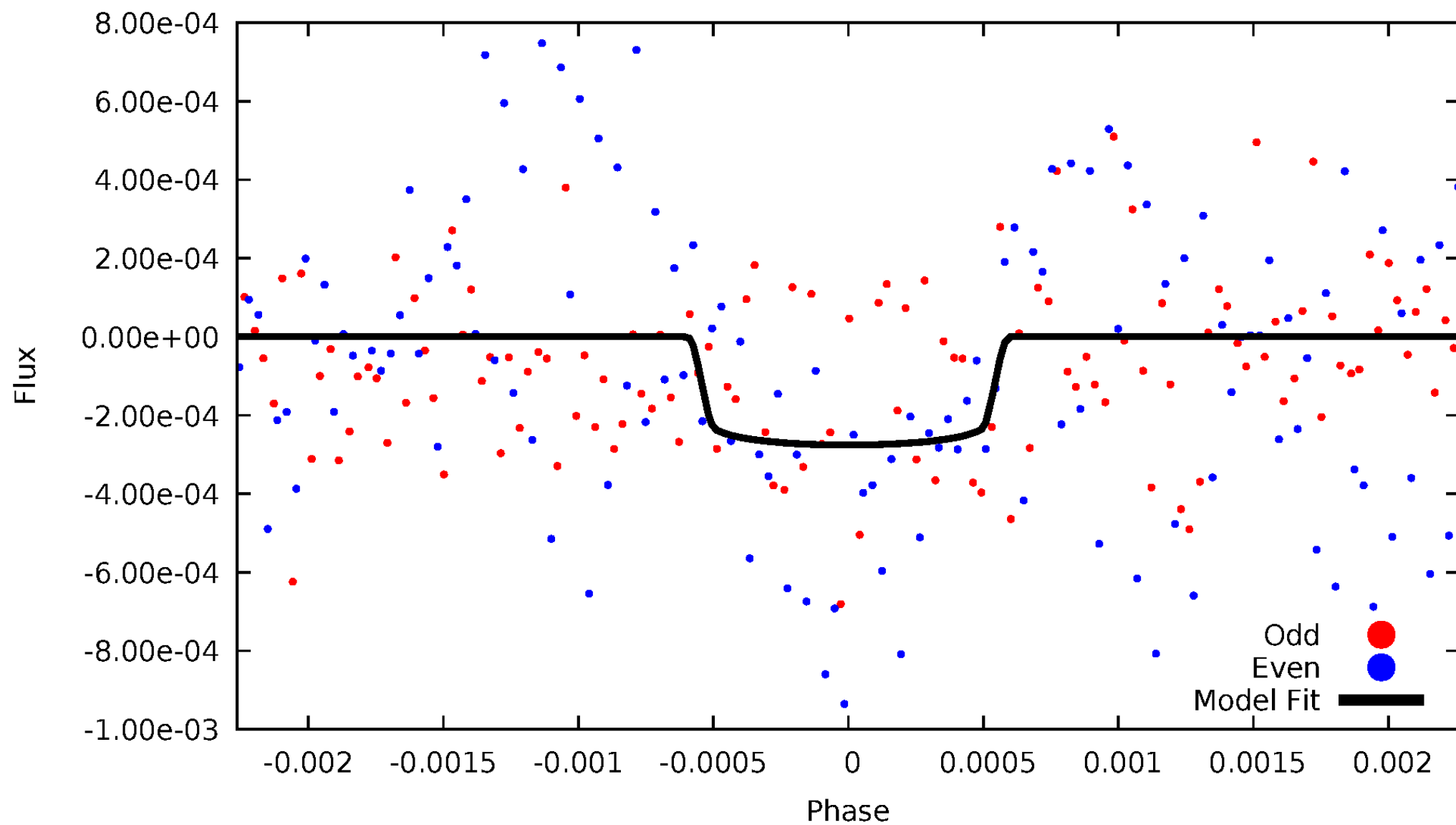


TCE 009543660-01



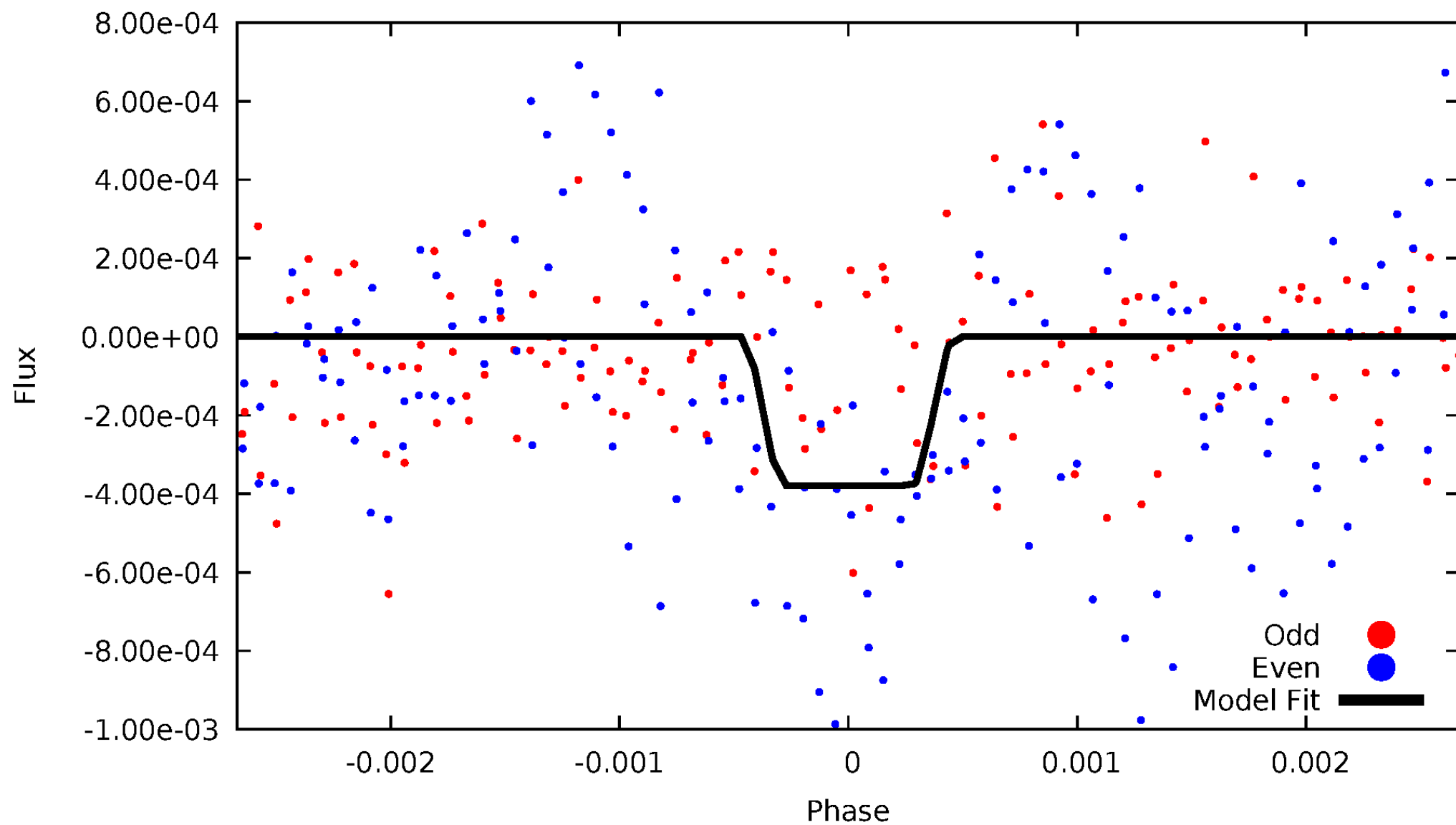
# DV Odd/Even

TCE 009543660-01



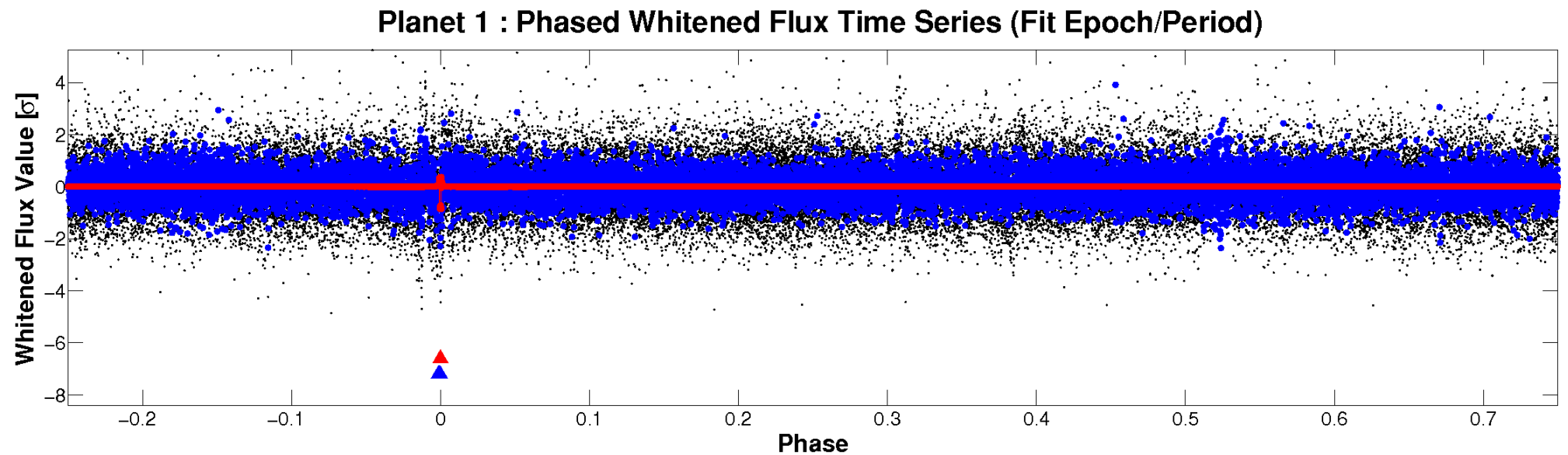
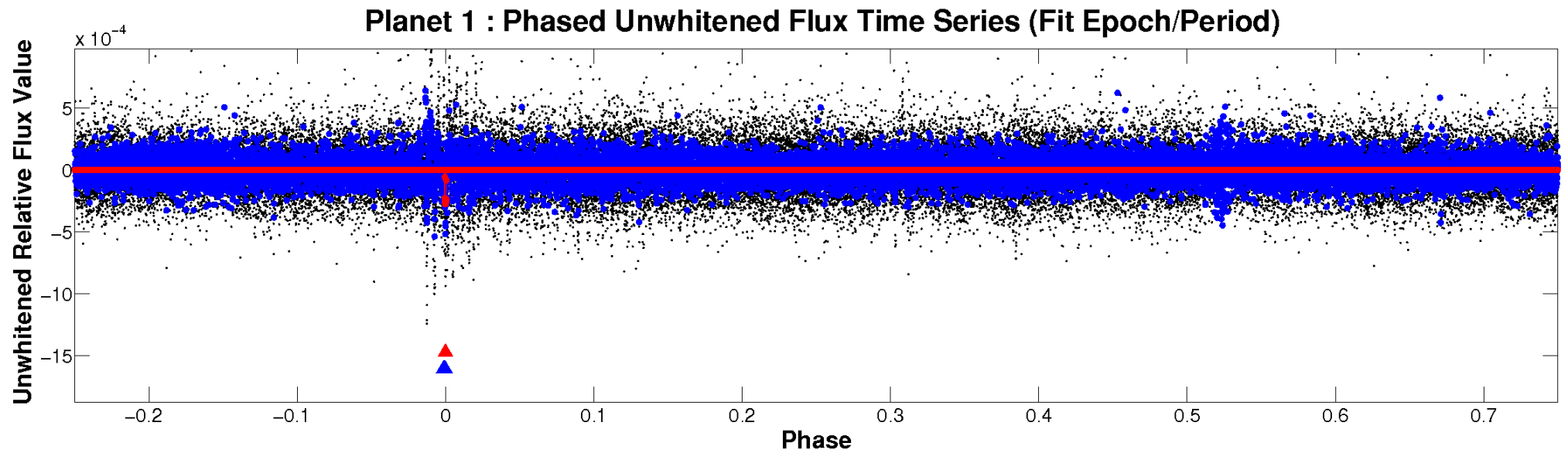
# ALT Odd/Even

TCE 009543660-01



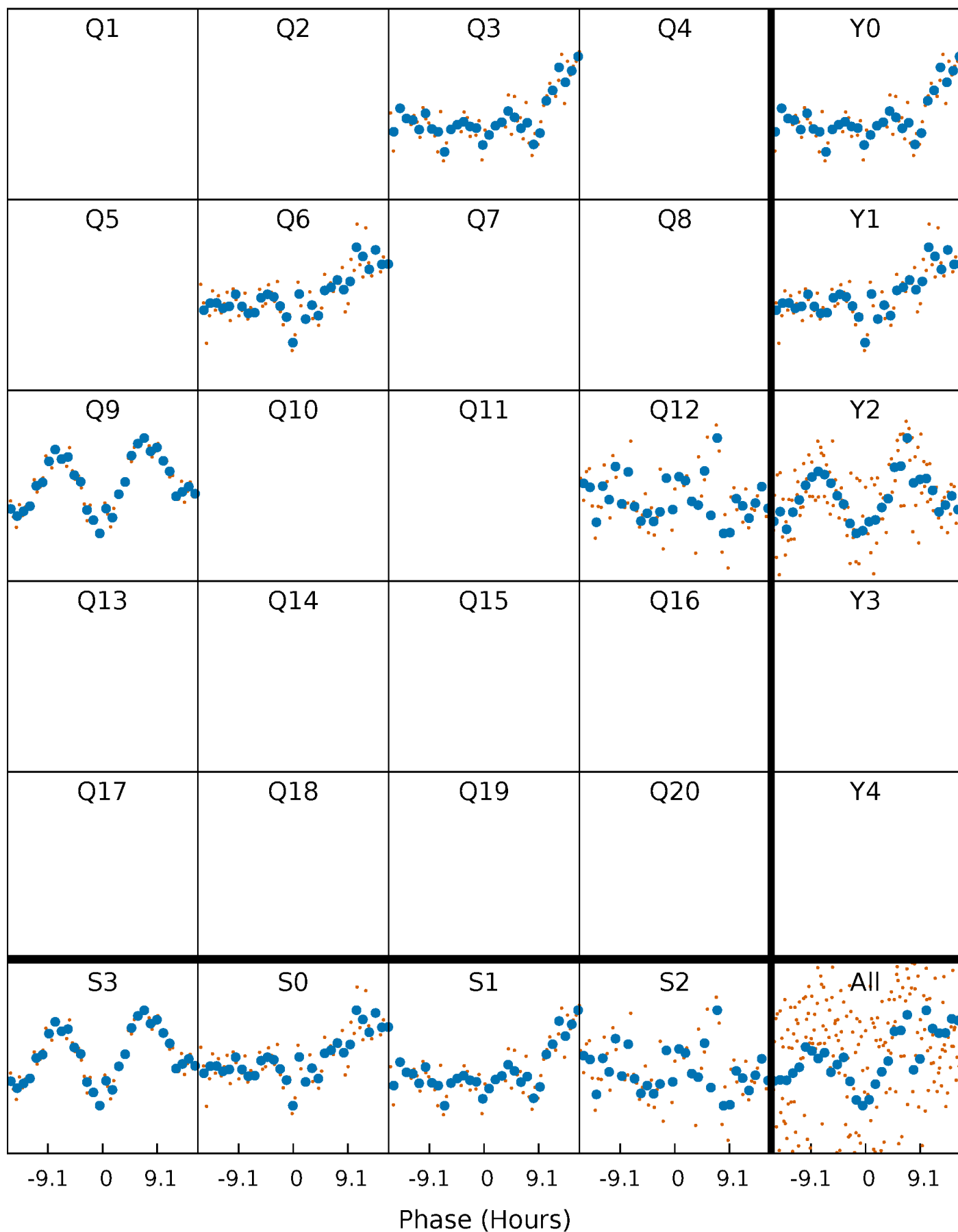


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

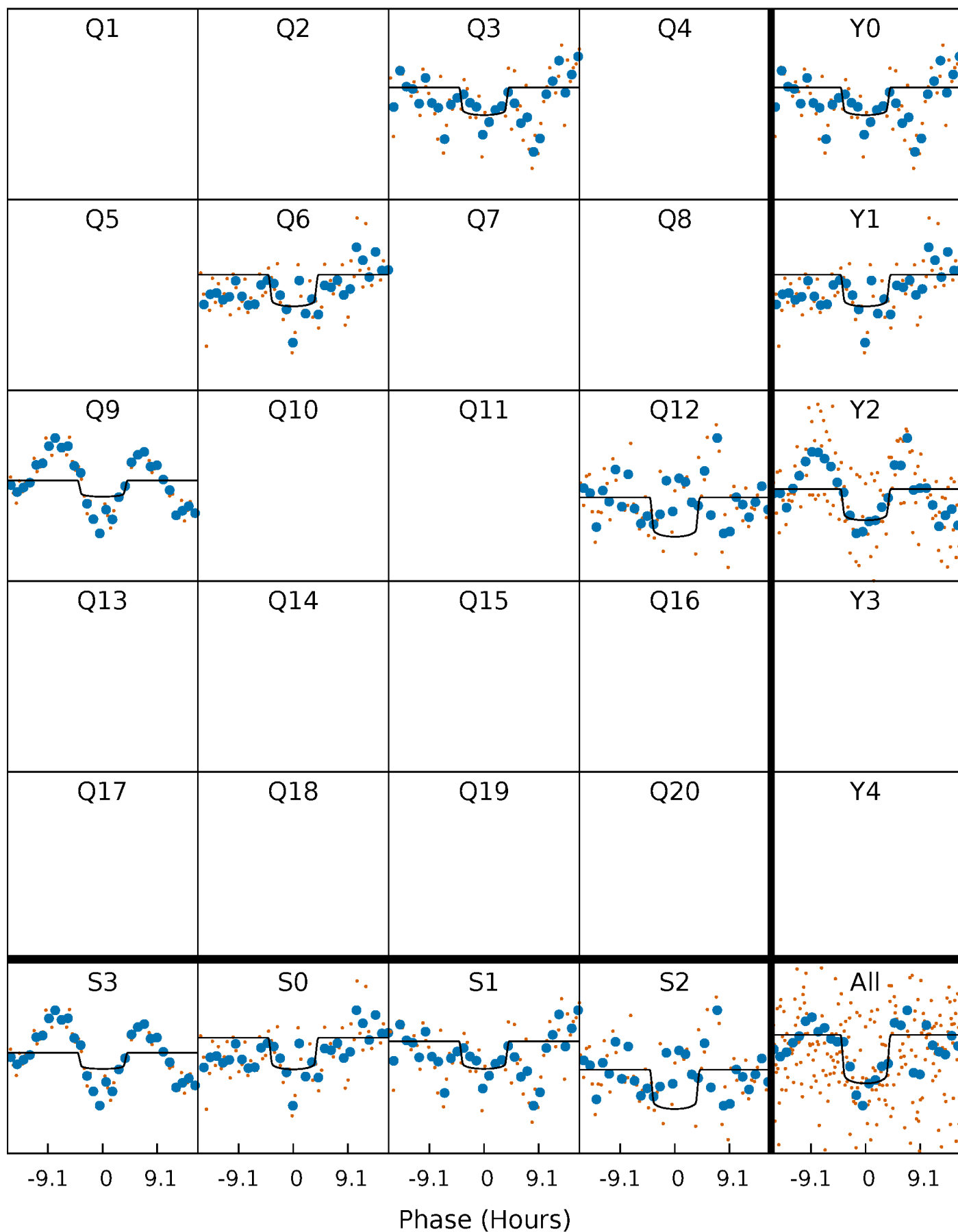
TCE 009543660-01   P=291.948599 Days    $T_0=264.980336$  (BKJD)





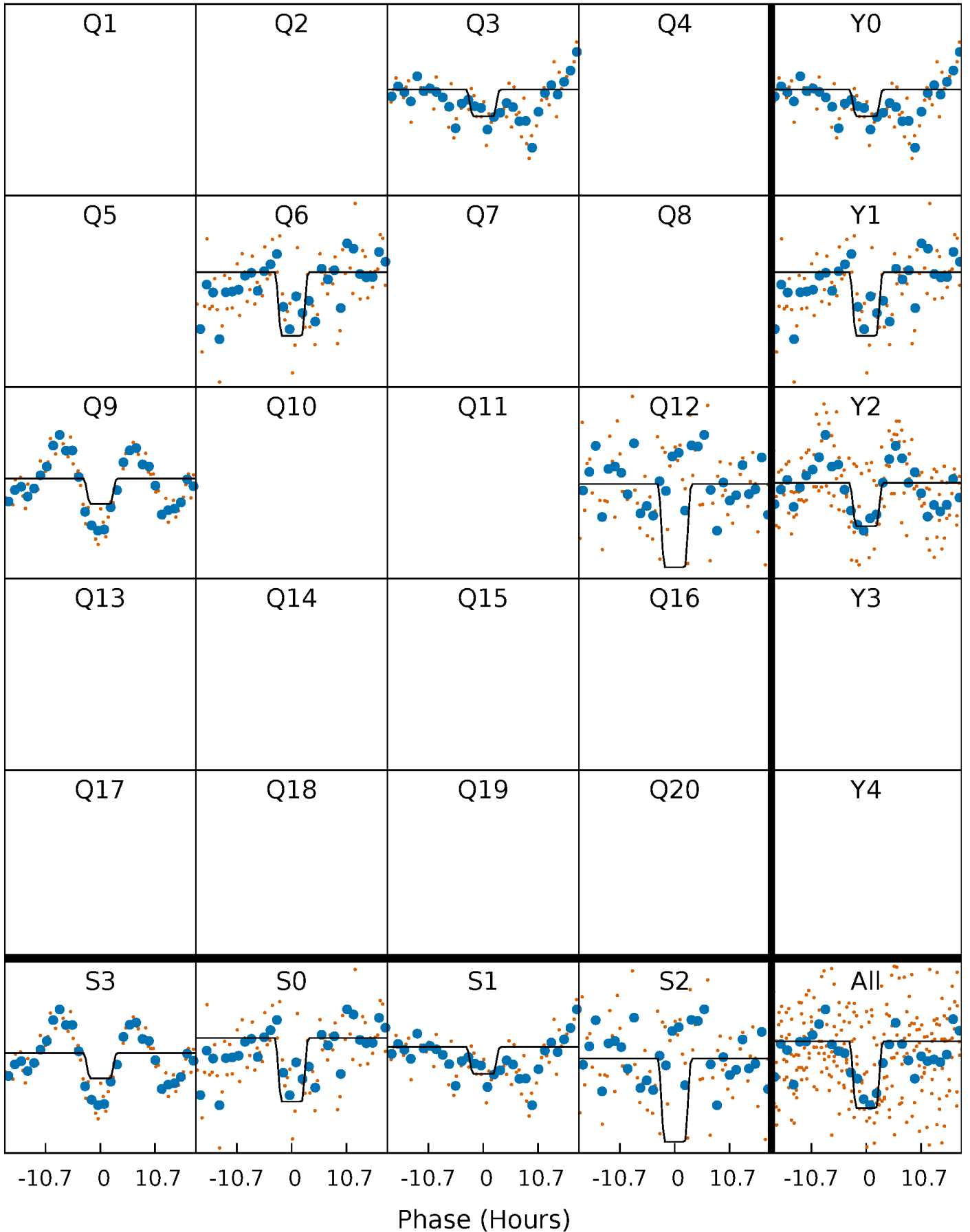
# DV Quarter-Phased Transit Curves

TCE 009543660-01     $P=291.948599$  Days     $T_0=264.980336$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

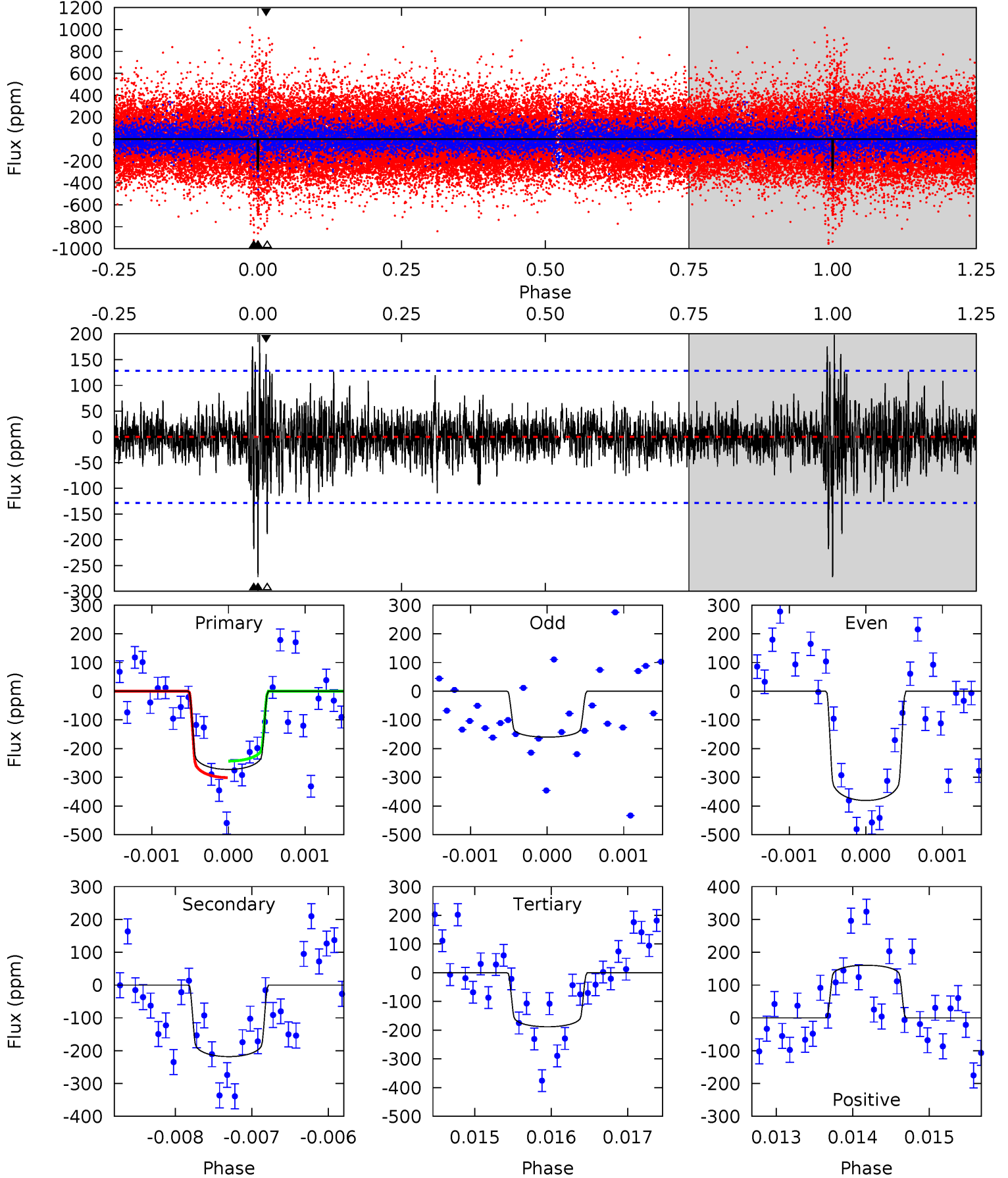
TCE 009543660-01     $P=291.975139$  Days     $T_0=264.939536$  (BKJD)



# DV Model-Shift Uniqueness Test

009543660-01, P = 291.948599 Days, E = 264.980336 Days

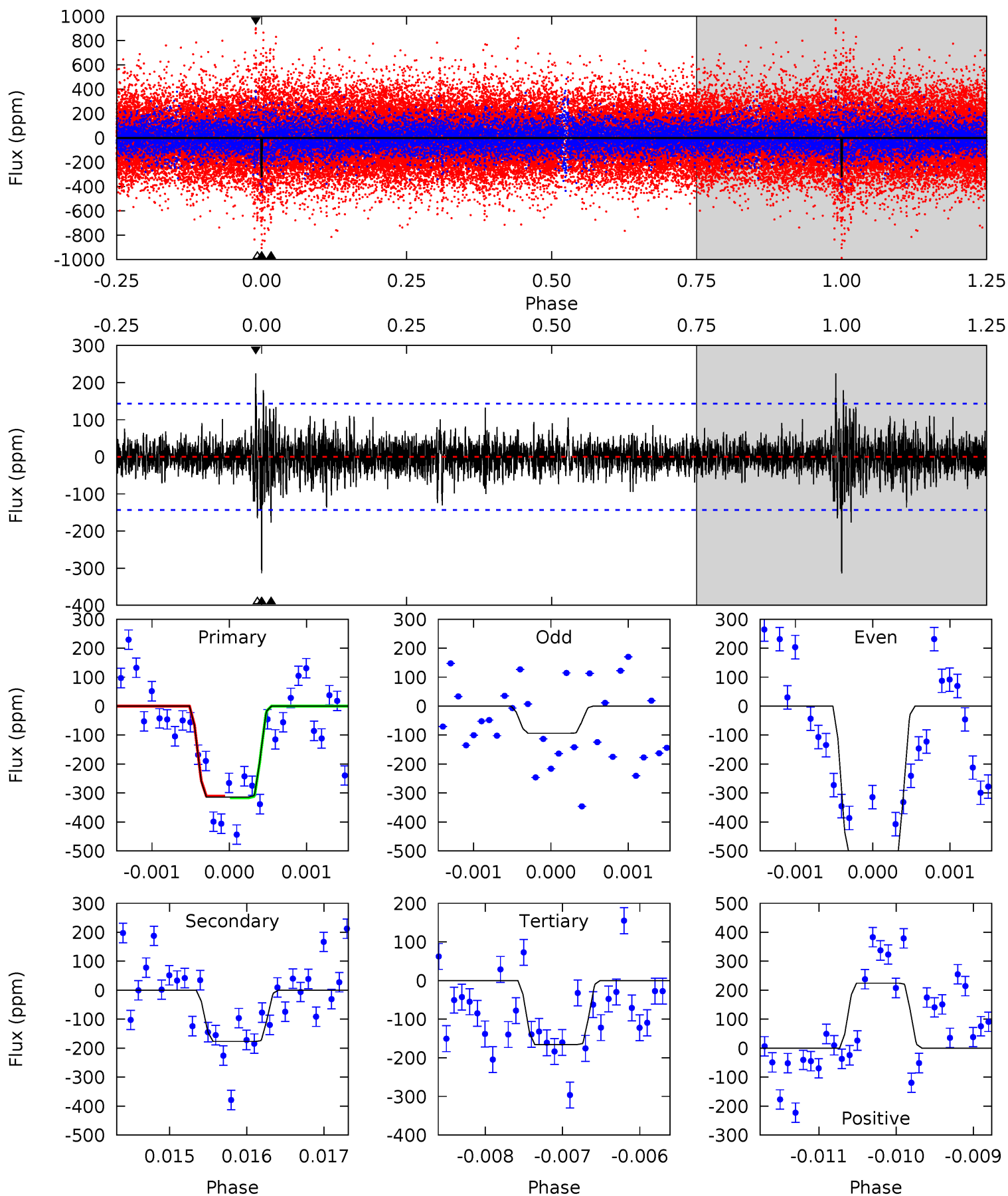
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.5	9.23	7.96	6.78	5.43	3.25	1.40	3.57	4.75	1.26	2.44	4.63	1.04	0.42	1.23



# Alt Model-Shift Uniqueness Test

009543660-01, P = 291.975139 Days, E = 264.939536 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.0	6.75	6.32	8.56	5.47	3.32	1.28	5.66	3.42	0.43	-1.81	8.12	1.08	0.42	0.11



### Stellar Parameters For KIC 009543660

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$15896^{+1}_{-1}$	$4.152^{+1.000}_{-1.000}$	$-1.500^{+1.000}_{-1.000}$	$2.404^{+1.000}_{-1.000}$	$2.995^{+1.000}_{-1.000}$	$0.304^{+1.000}_{-1.000}$
	+0%/-0%	+24%/-24%	+67%/-67%	+42%/-42%	+33%/-33%	+329%/-329%
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 009543660-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-218 \pm 24$	$4.34^{+1.57}_{-1.56}$	$1363^{+29}_{-29}$	$14367^{+7971}_{-3324}$	$9924^{+12940}_{-4704}$
Alt.	$-177 \pm 26$	$5.15^{+1.58}_{-1.51}$	$1363^{+31}_{-28}$	$11290^{+4025}_{-2120}$	$5651^{+5702}_{-2442}$

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

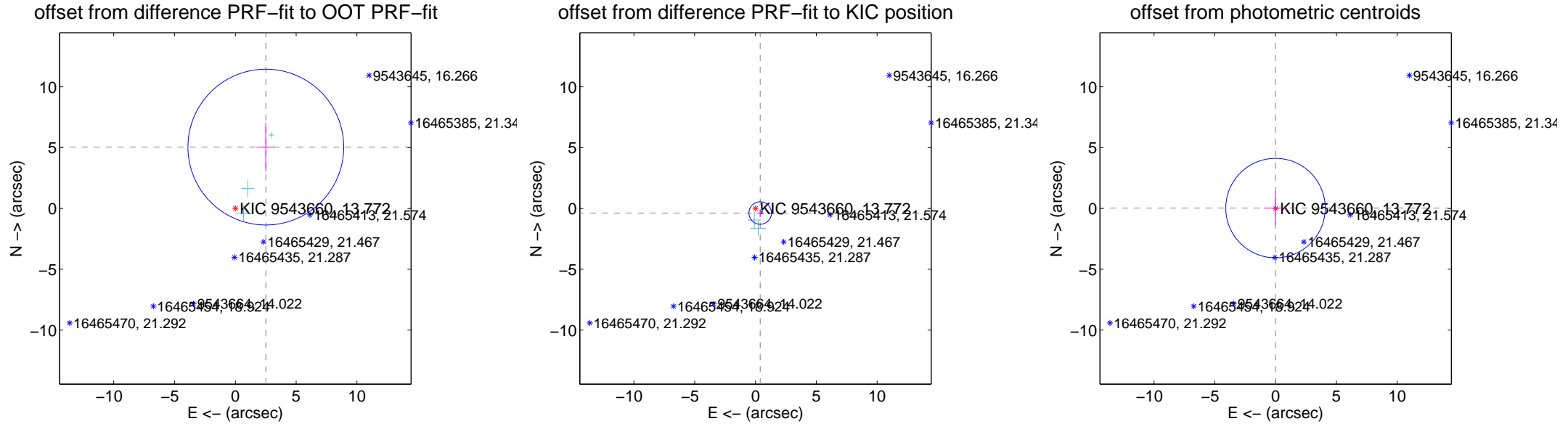
## DV Centroid Data

Supplemental centroid analysis for 009543660-01. Kepler magnitude: 13.77. Transit SNR 6.31

There are 3 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 6.68 arcsec so the offset from difference PRF-fit to OOT PRF-fit may be invalid.

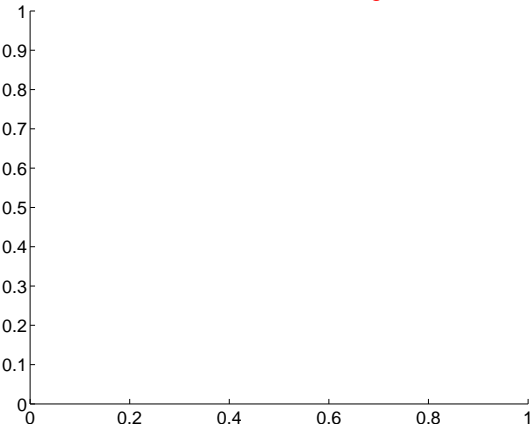
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$5.633 \pm 2.135$	2.64	$-2.507 \pm 0.770$	$5.044 \pm 2.005$
PRF-fit source offset from KIC position	$0.540 \pm 0.308$	1.75	$-0.387 \pm 0.297$	$-0.376 \pm 0.320$
photometric centroid source offset	$0.03 \pm 1.36$	0.02	$0.01 \pm 0.98$	$0.03 \pm 1.41$



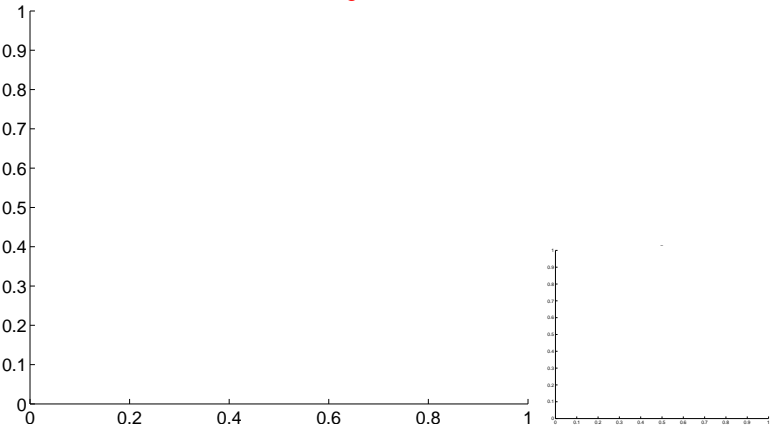
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

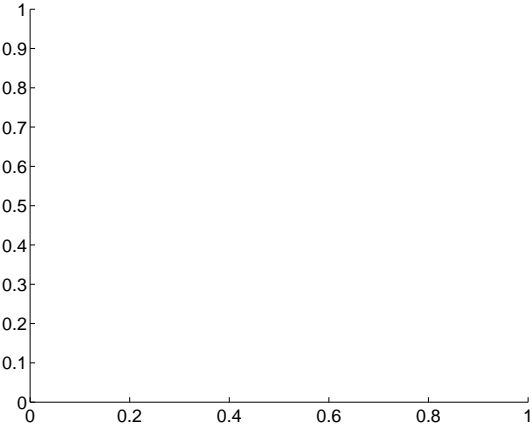
Q1 no difference image



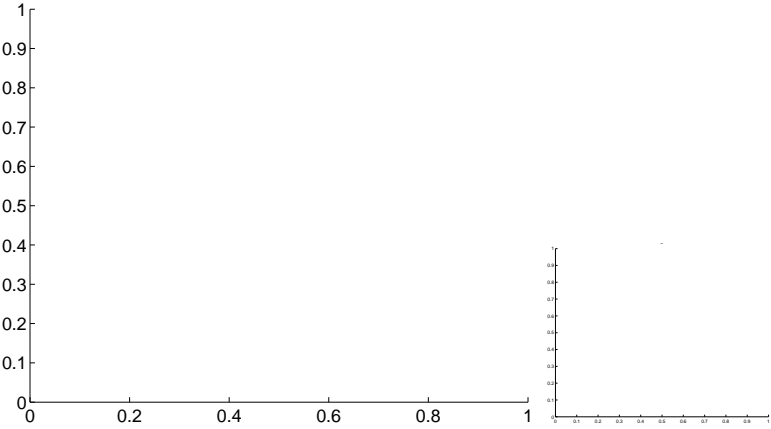
Q1 no OOT image



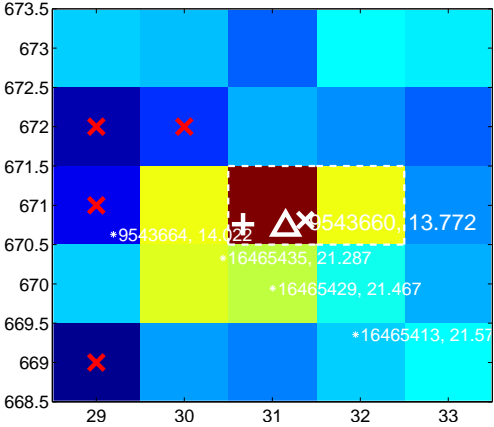
Q2 no difference image



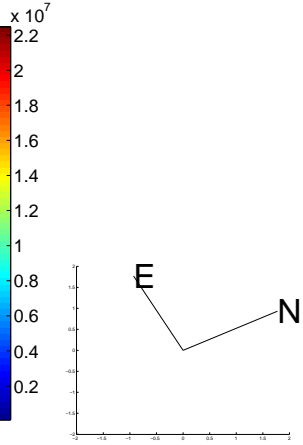
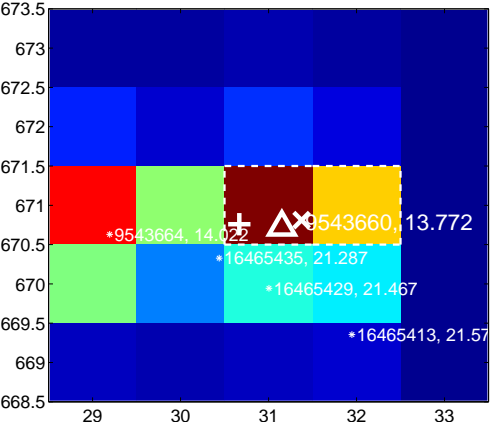
Q2 no OOT image



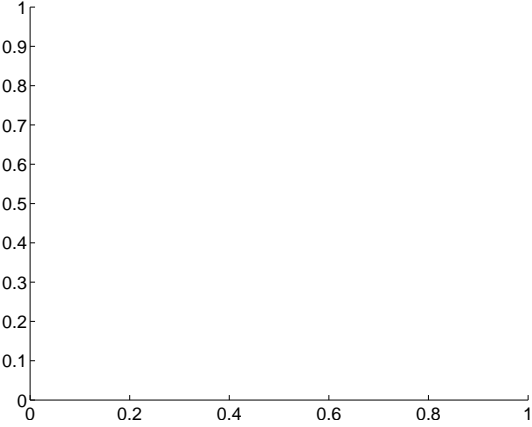
Q3 difference image



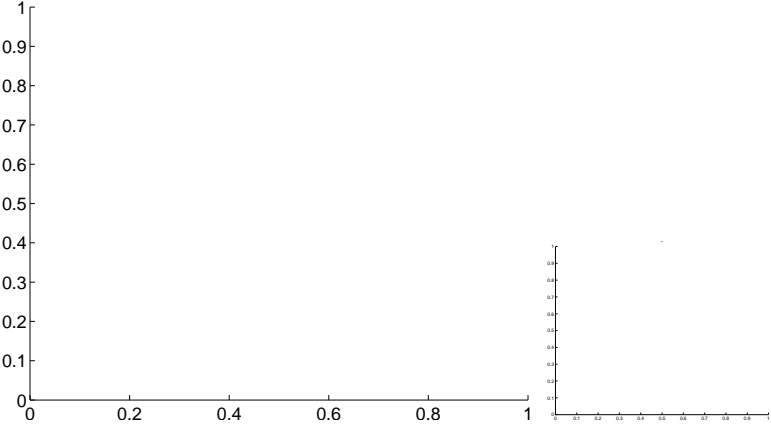
Q3 OOT image



Q4 no difference image



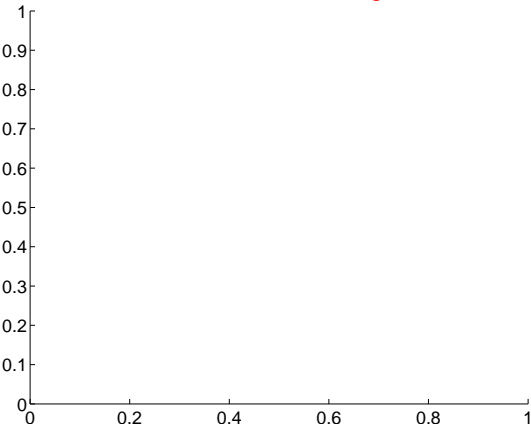
Q4 no OOT image



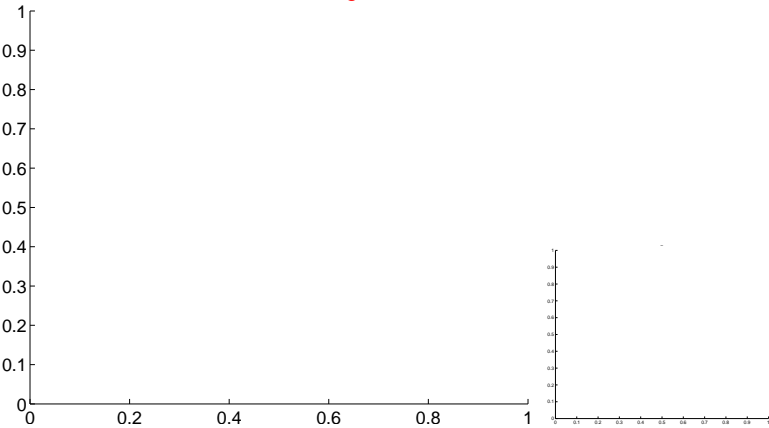


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

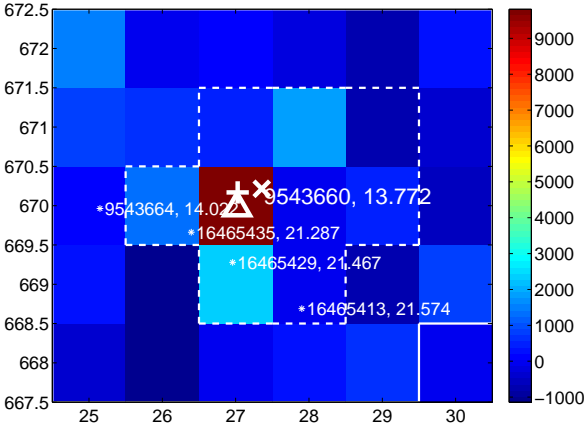
Q5 no difference image



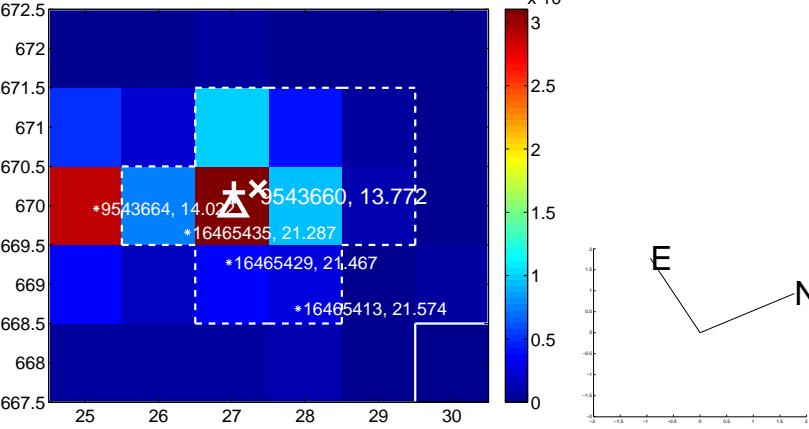
Q5 no OOT image



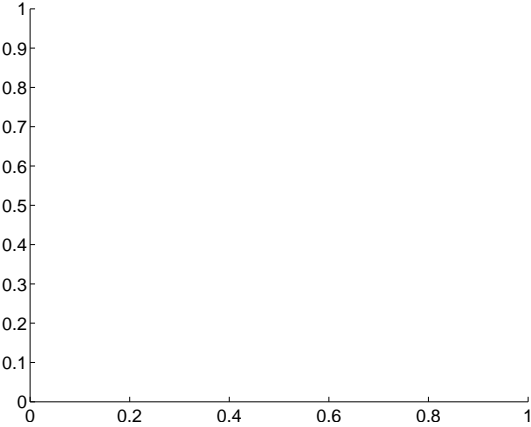
Q6 difference image



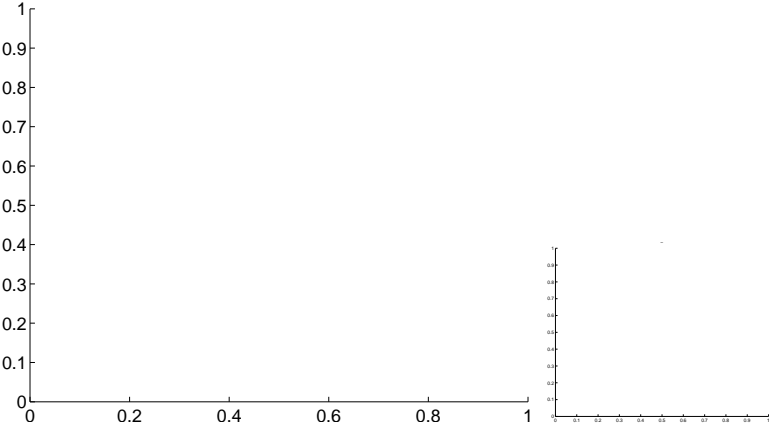
Q6 OOT image



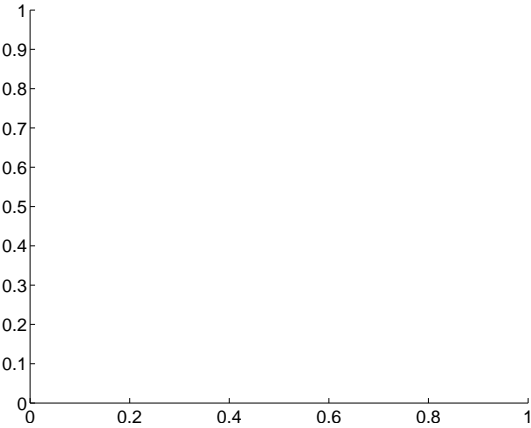
Q7 no difference image



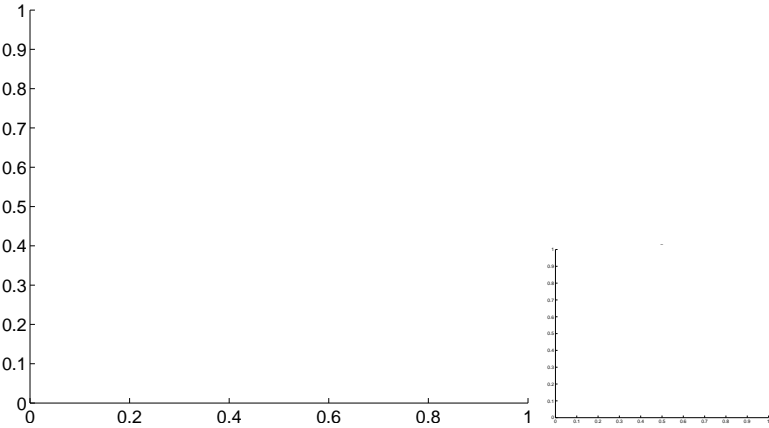
Q7 no OOT image



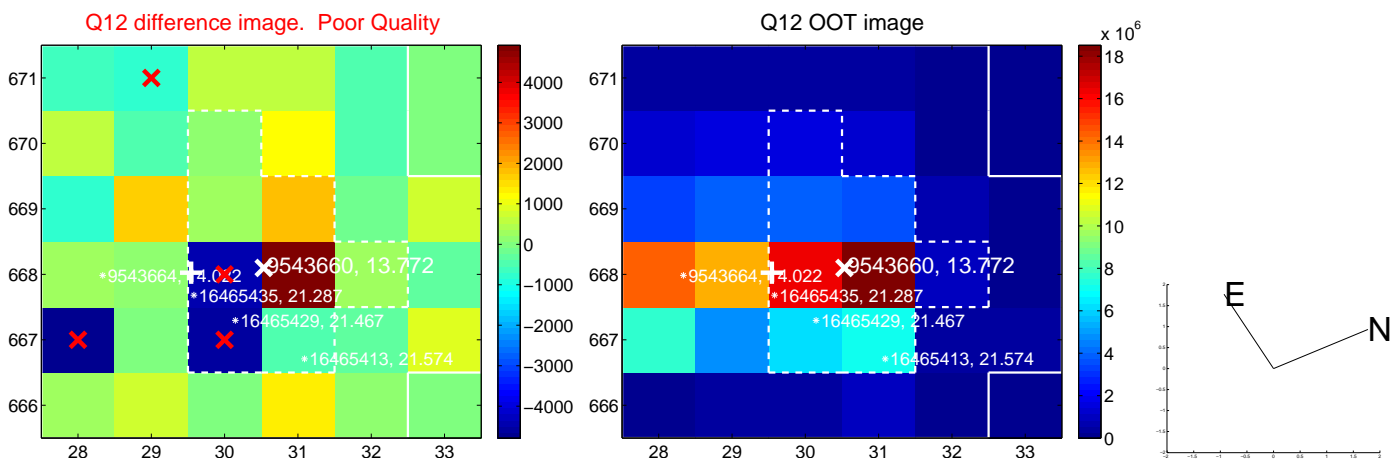
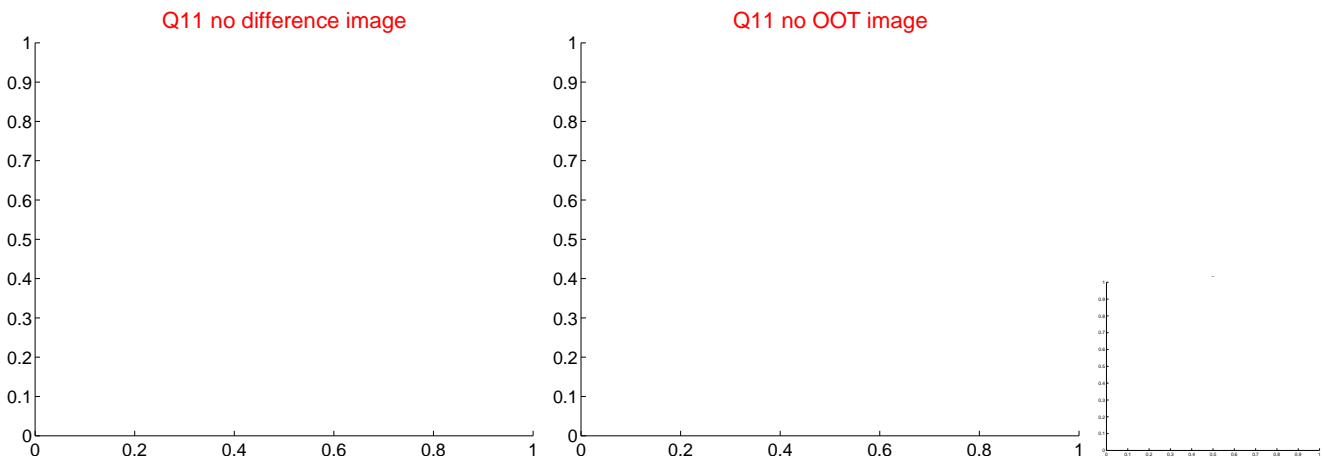
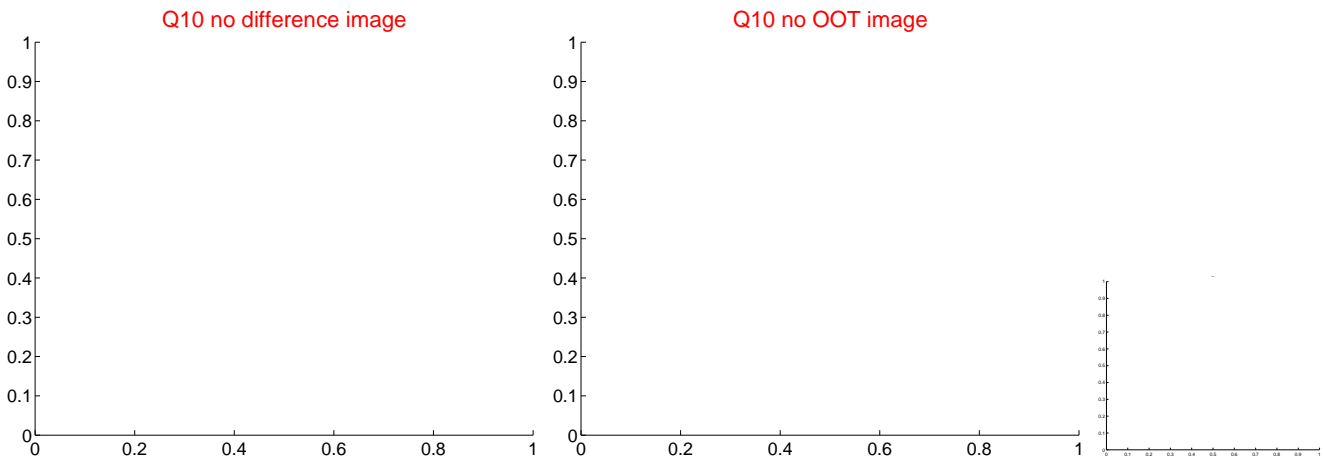
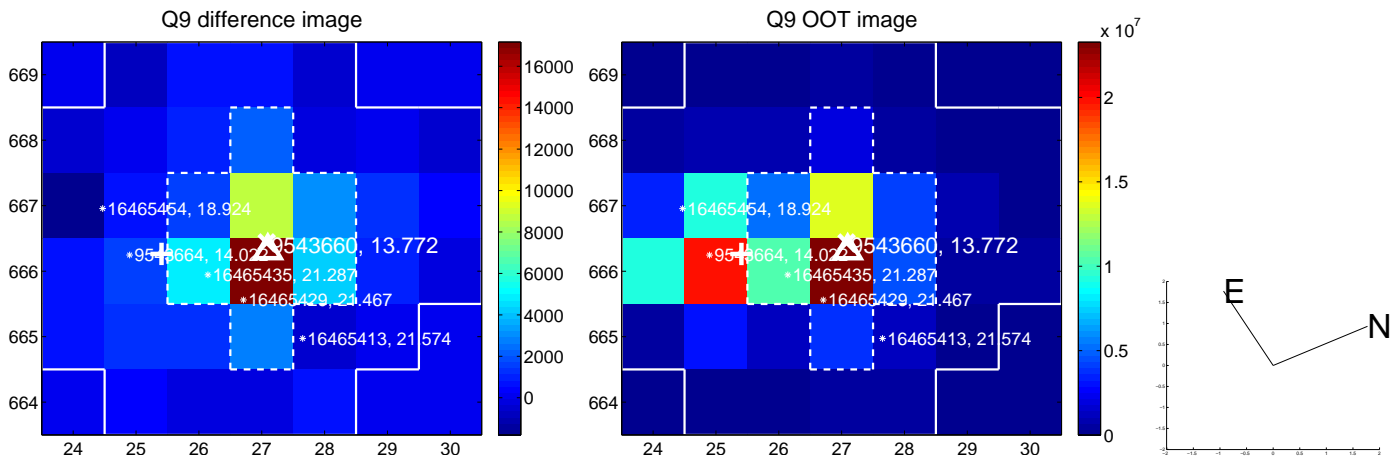
Q8 no difference image



Q8 no OOT image



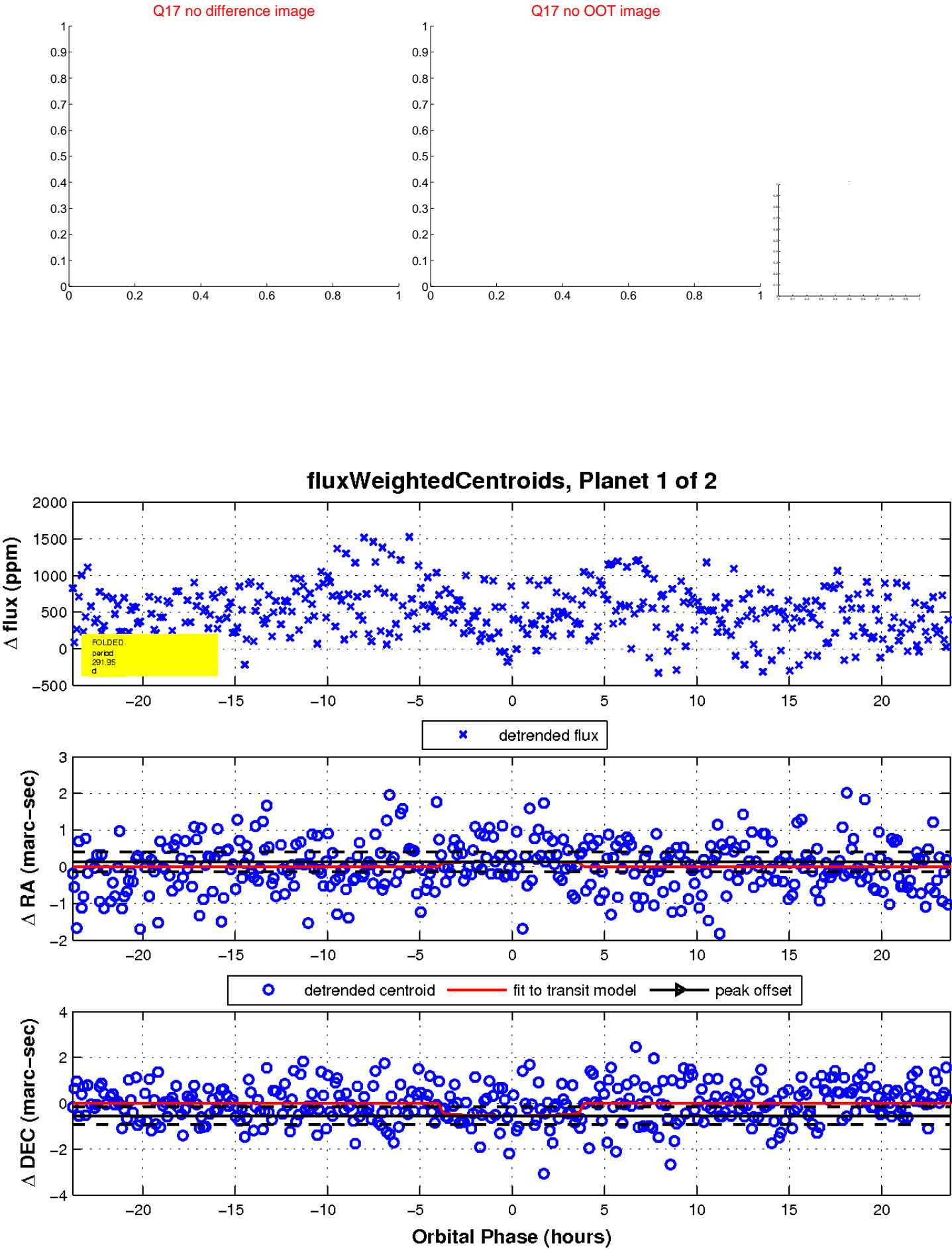
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

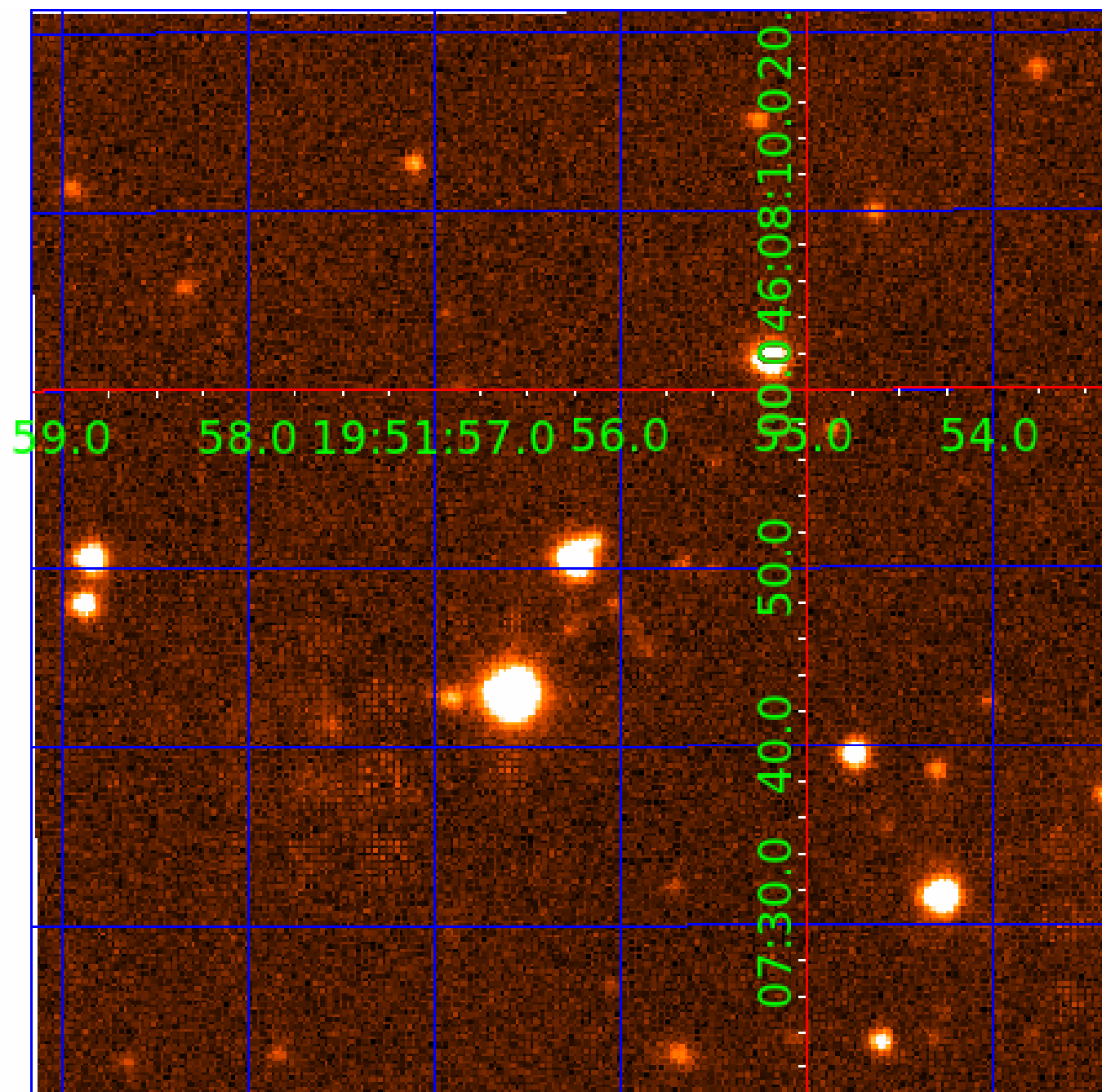


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009543660

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009543660-01	OBS	No	291.948599	264.980336	275.8	7.929	9.2	6.3	2.40	15896	4.33	214.58
009543660-02	OBS	No	292.011692	264.629024	816.2	57.712	8.9	11.2	2.40	15896	9.49	214.52

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009543660-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_KIC_POS
009543660-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—SAME_NTL_PERIOD—CENT_FEW_DIFS

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

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

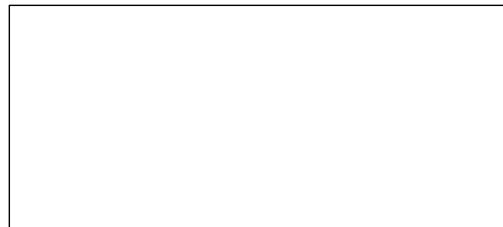
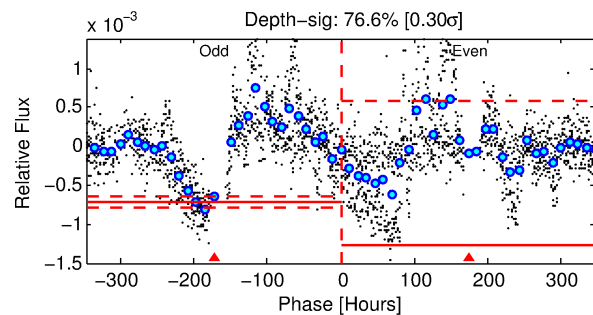
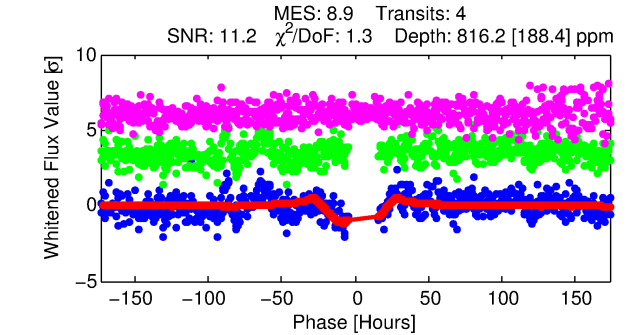
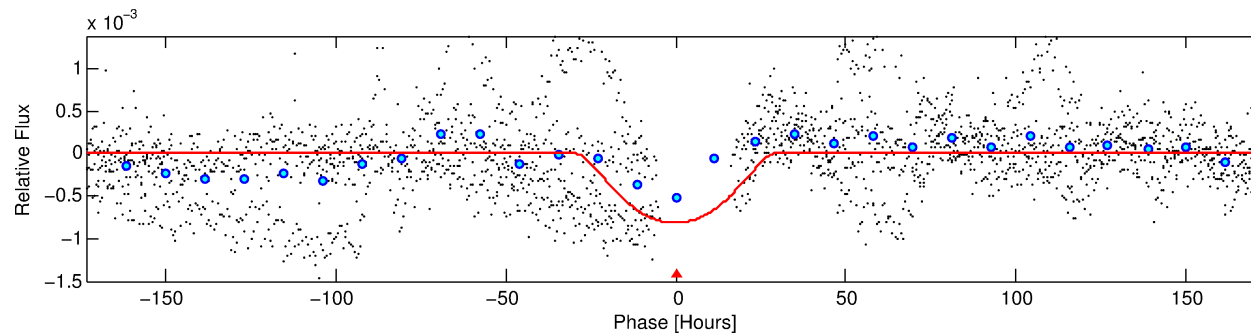
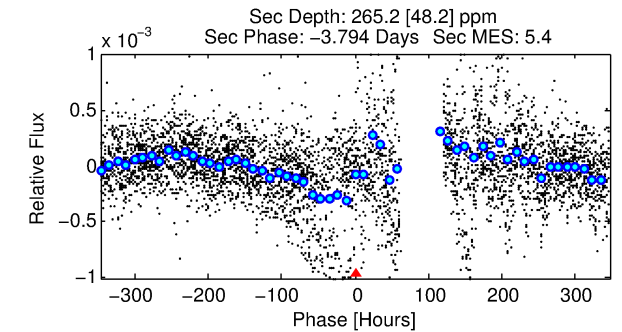
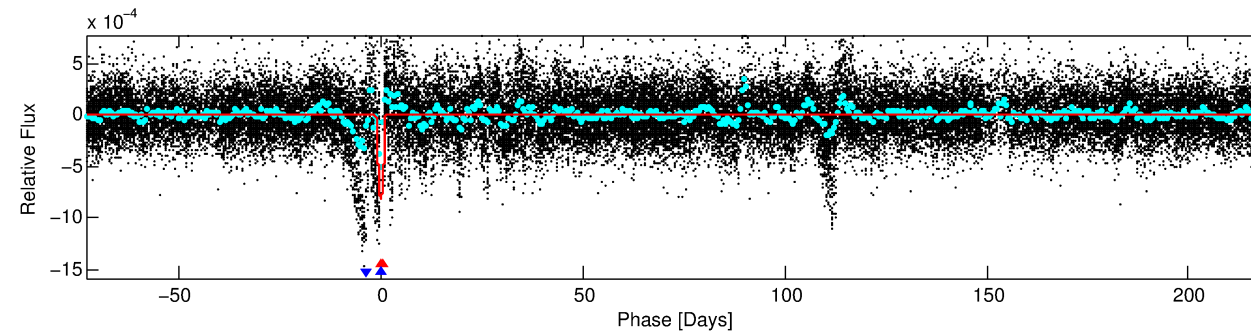
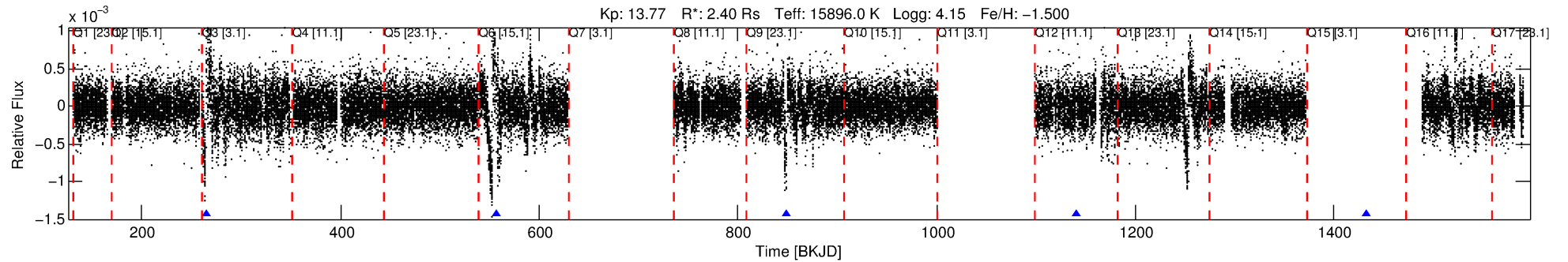
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009543660-02

No Significant Match Found

# DV One-Page Summary

KIC: 9543660 Candidate: 2 of 2 Period: 292.012 d



## DV Fit Results:

Period = 292.01169 [0.03511] d  
Epoch = 264.6290 [0.0764] BKJD  
Rp/R\* = 0.0362 [0.0248]  
a/R\* = 12.53 [2.86]  
b = 0.98 [0.05]  
Seff = 214.52 [0.03]  
Teq = 976 [0] K  
Rp = 9.49 [6.52] Re  
a = 1.2414 [0.0001] AU  
Ag = 2494.50 [3454.30] [0.72σ]  
Teffp = 10663 [3691] K [2.62σ]

## DV Diagnostic Results:

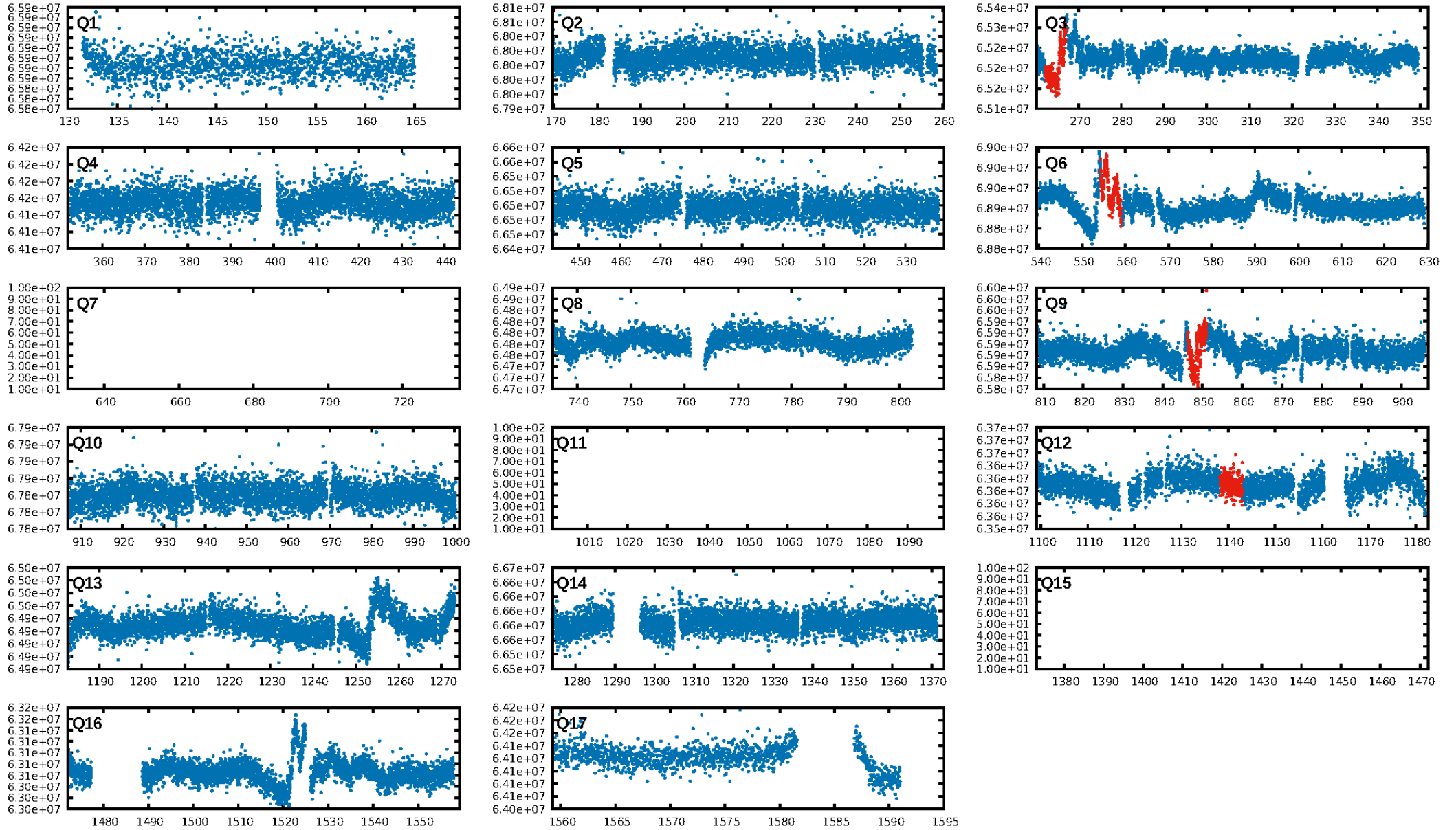
ShortPeriod-sig: 2.1% [0.03σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 2.29e-10  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 2.829  
Centroid-sig: 7.5%  
Centroid-so: 1.568 arcsec [3.87σ]  
OotOffset-rm: N/A  
KicOffset-rm: N/A  
OotOffset-st: 0/0/0/0 [0]  
KicOffset-st: 0/0/0/0 [0]  
DiffImageQuality-fgm: N/A  
DiffImageOverlap-fno: 0.00 [0/2]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 12:27:08 Z

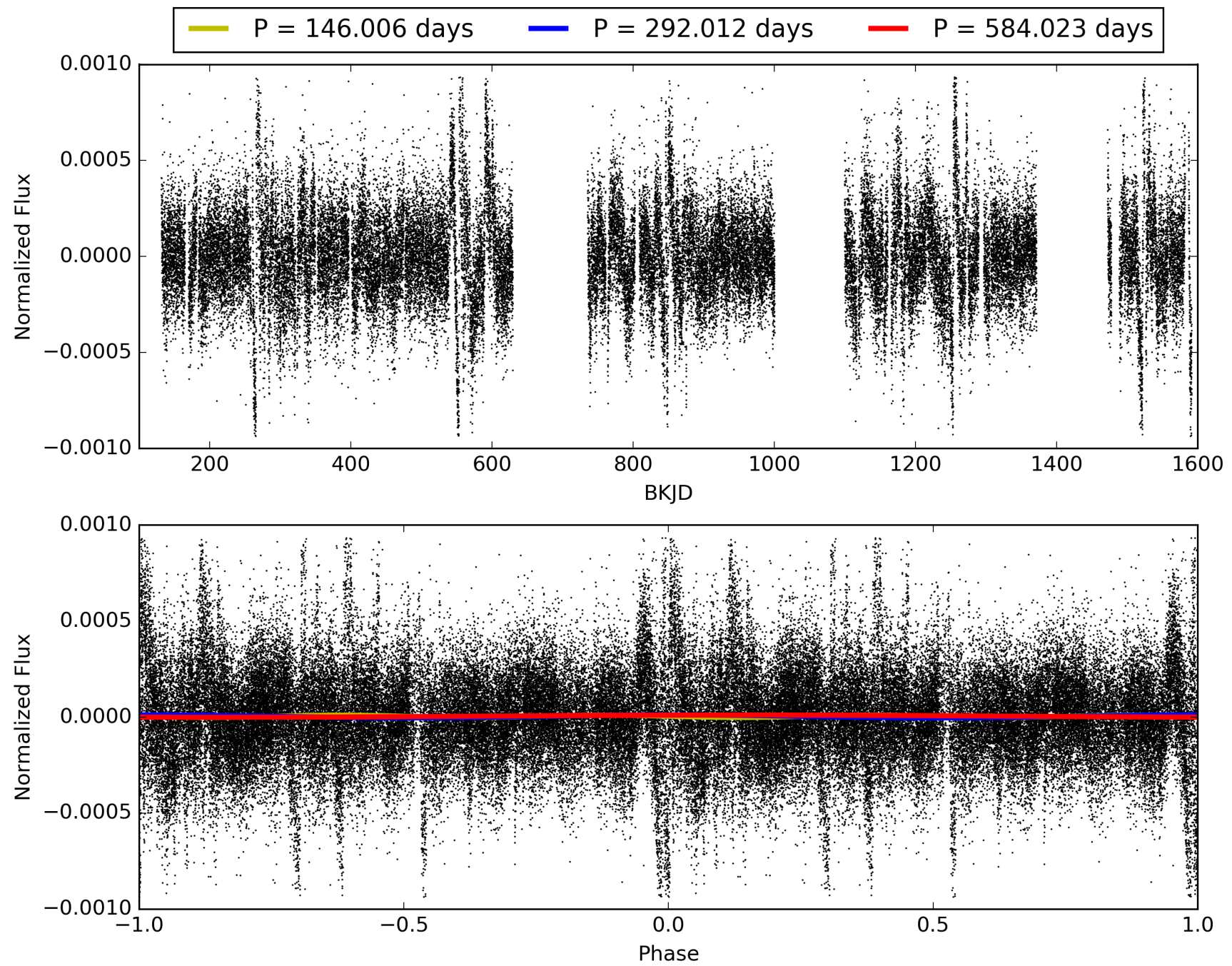
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 009543660-02, PDC Light Curves

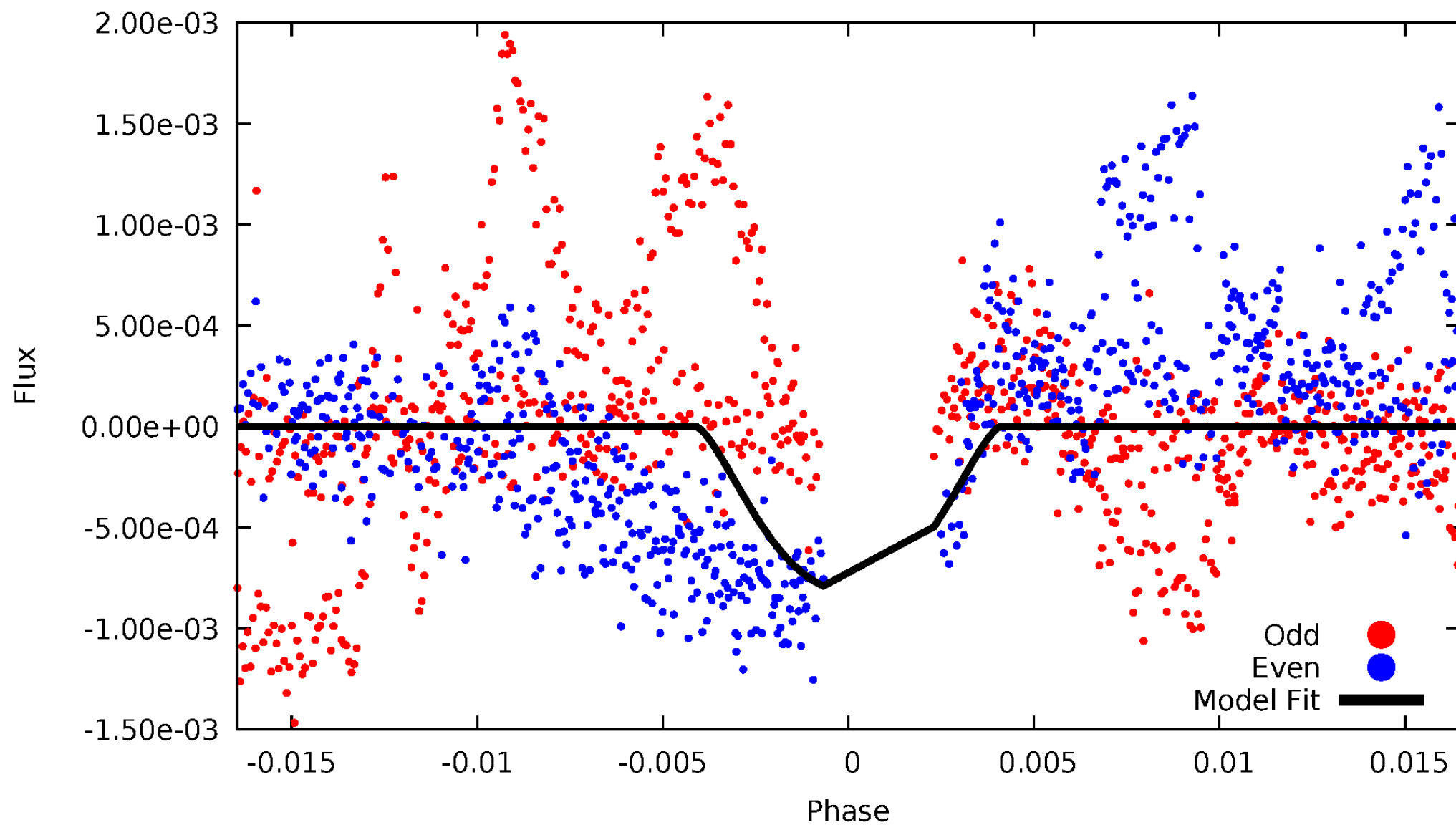


TCE 009543660-02



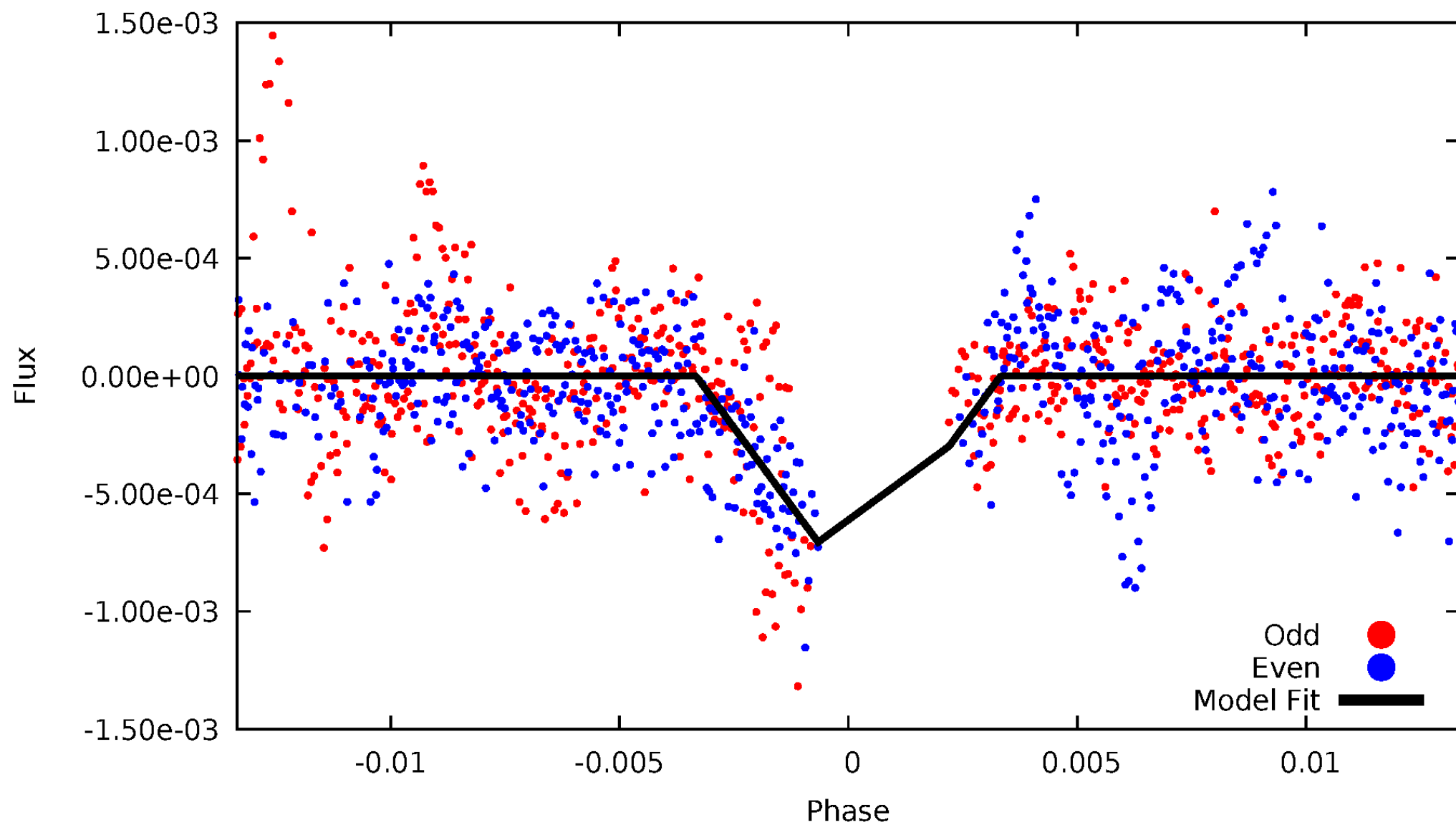
# DV Odd/Even

TCE 009543660-02



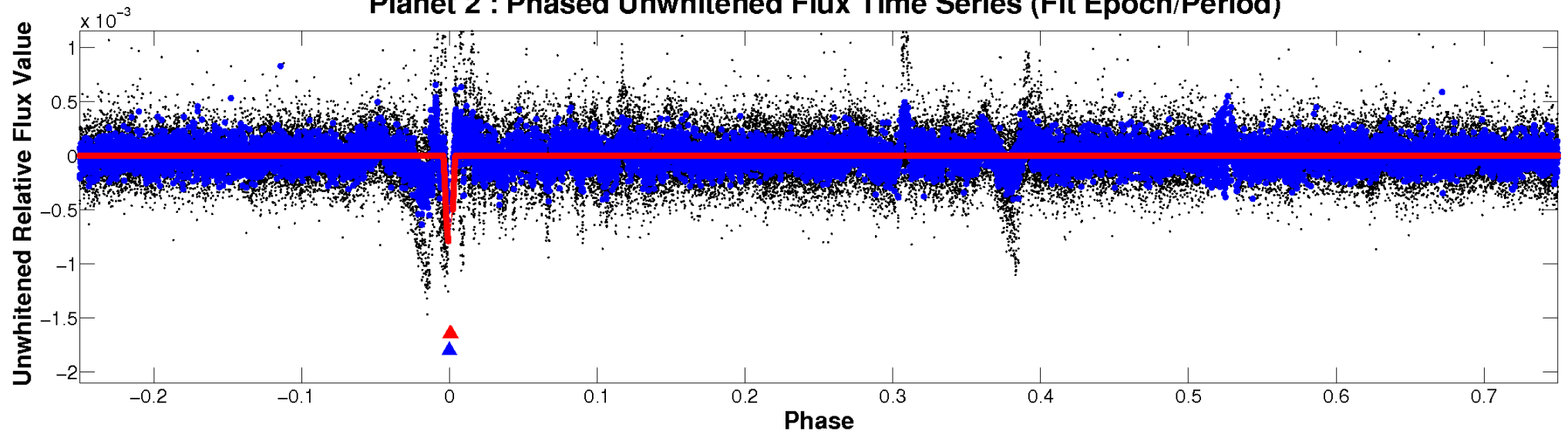
# ALT Odd/Even

TCE 009543660-02

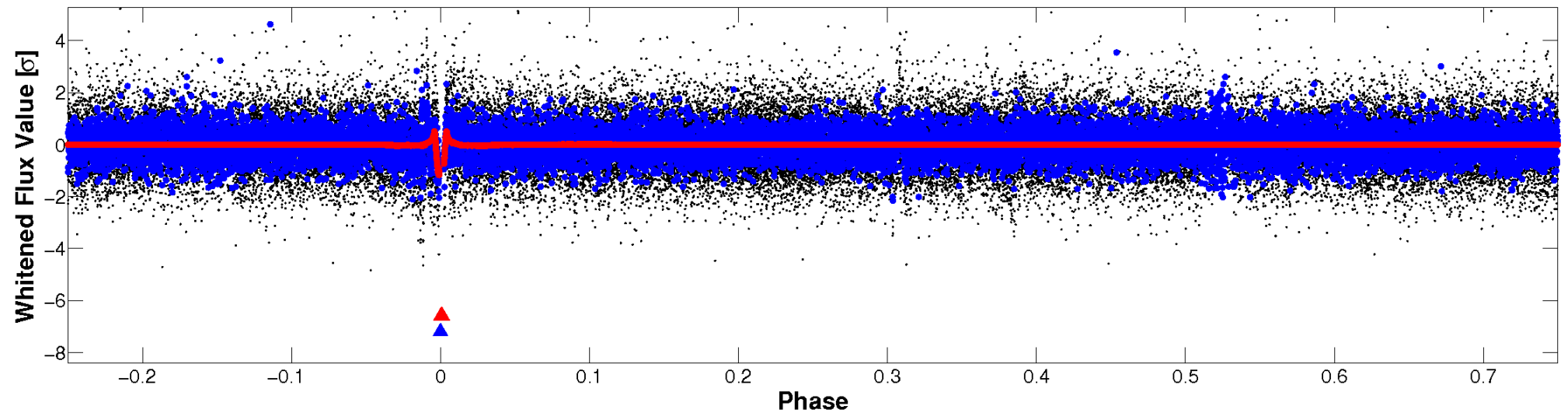


# Non-Whitened Vs. Whitened Light Curve

## 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 009543660-02     $P=292.011692$  Days     $T_0=264.629024$  (BKJD)





# DV Quarter-Phased Transit Curves

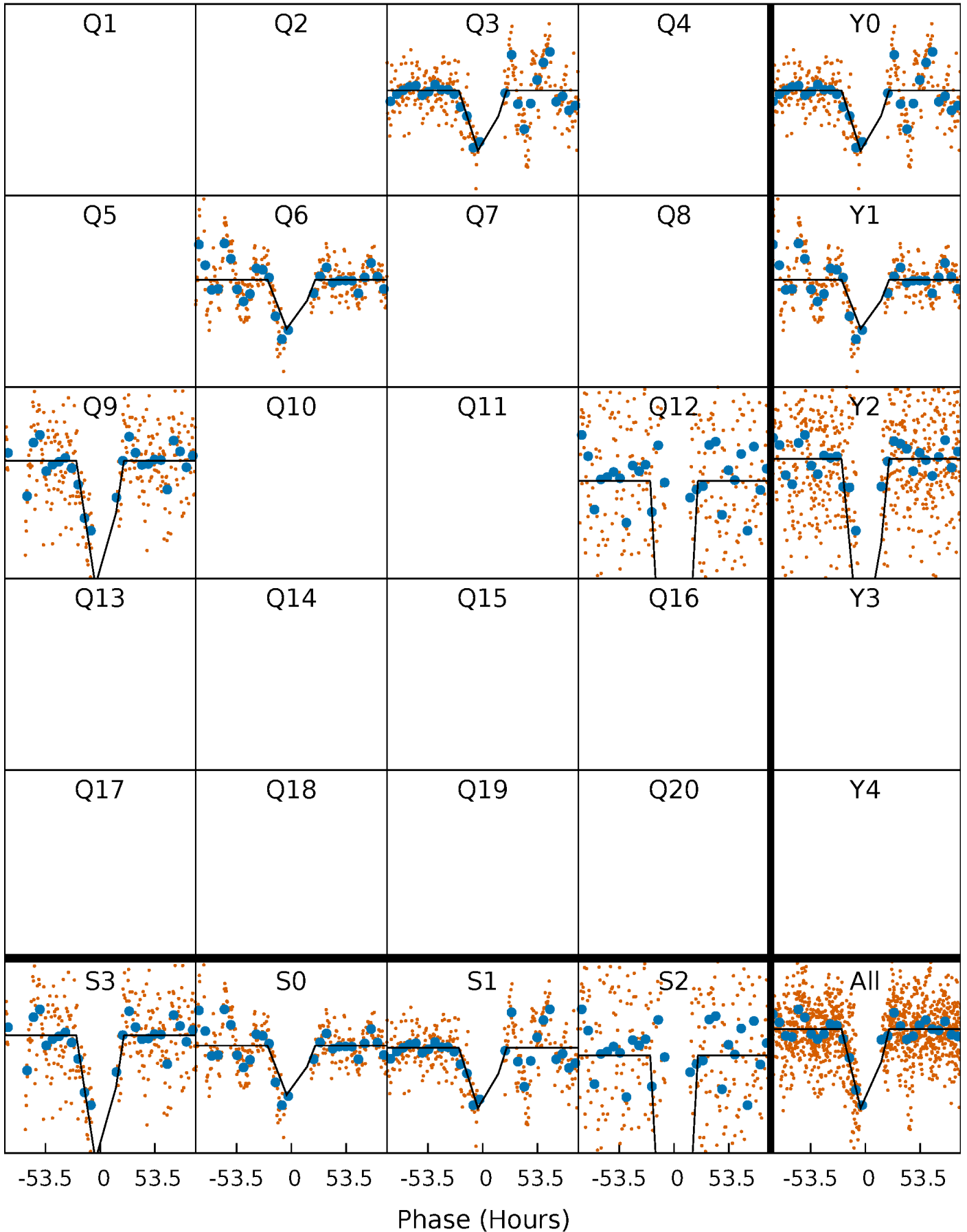
TCE 009543660-02     $P=292.011692$  Days     $T_0=264.629024$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

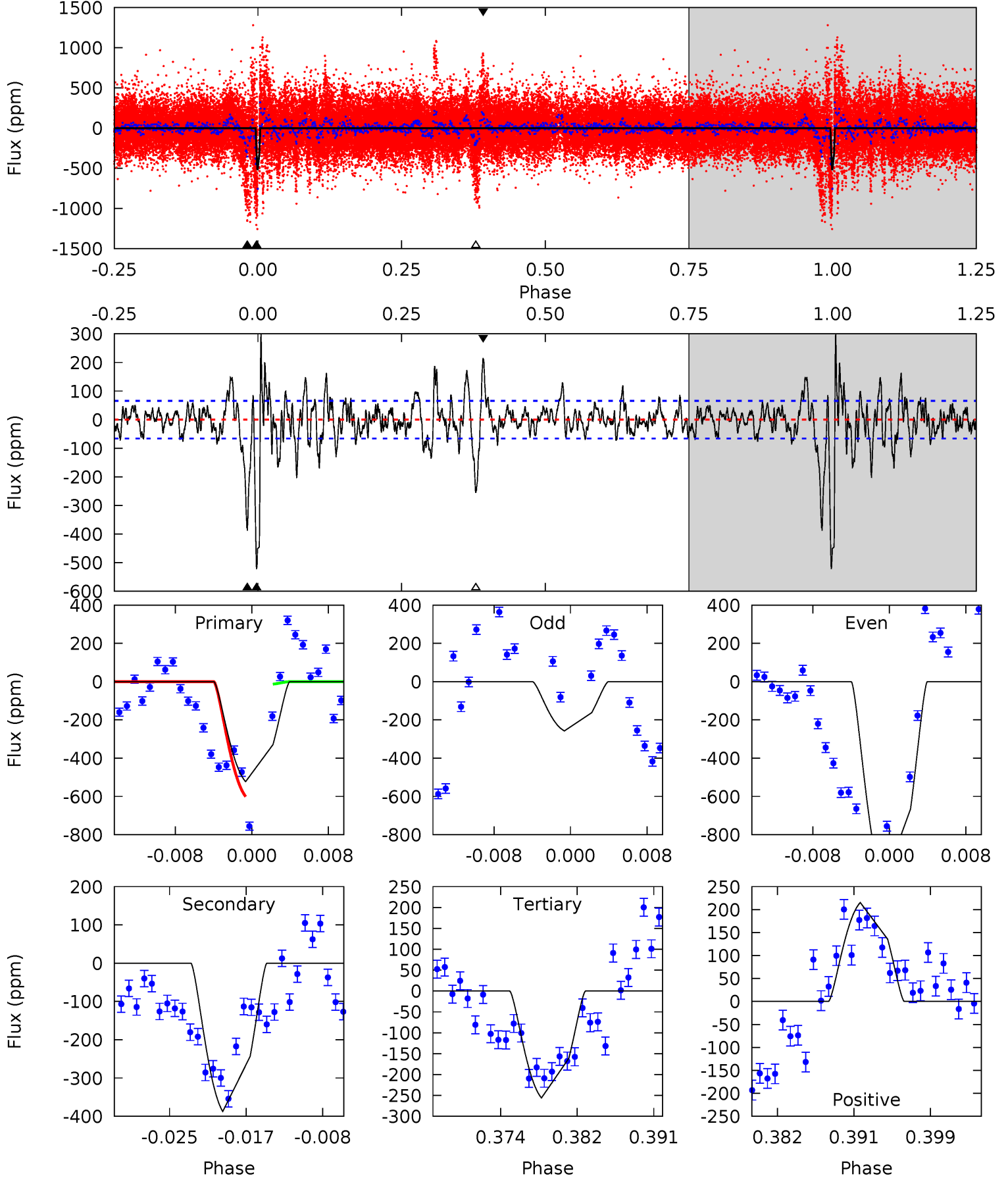
TCE 009543660-02 P=292.022817 Days  $T_0=264.627199$  (BKJD)



# DV Model-Shift Uniqueness Test

009543660-02, P = 292.011692 Days, E = 264.629024 Days

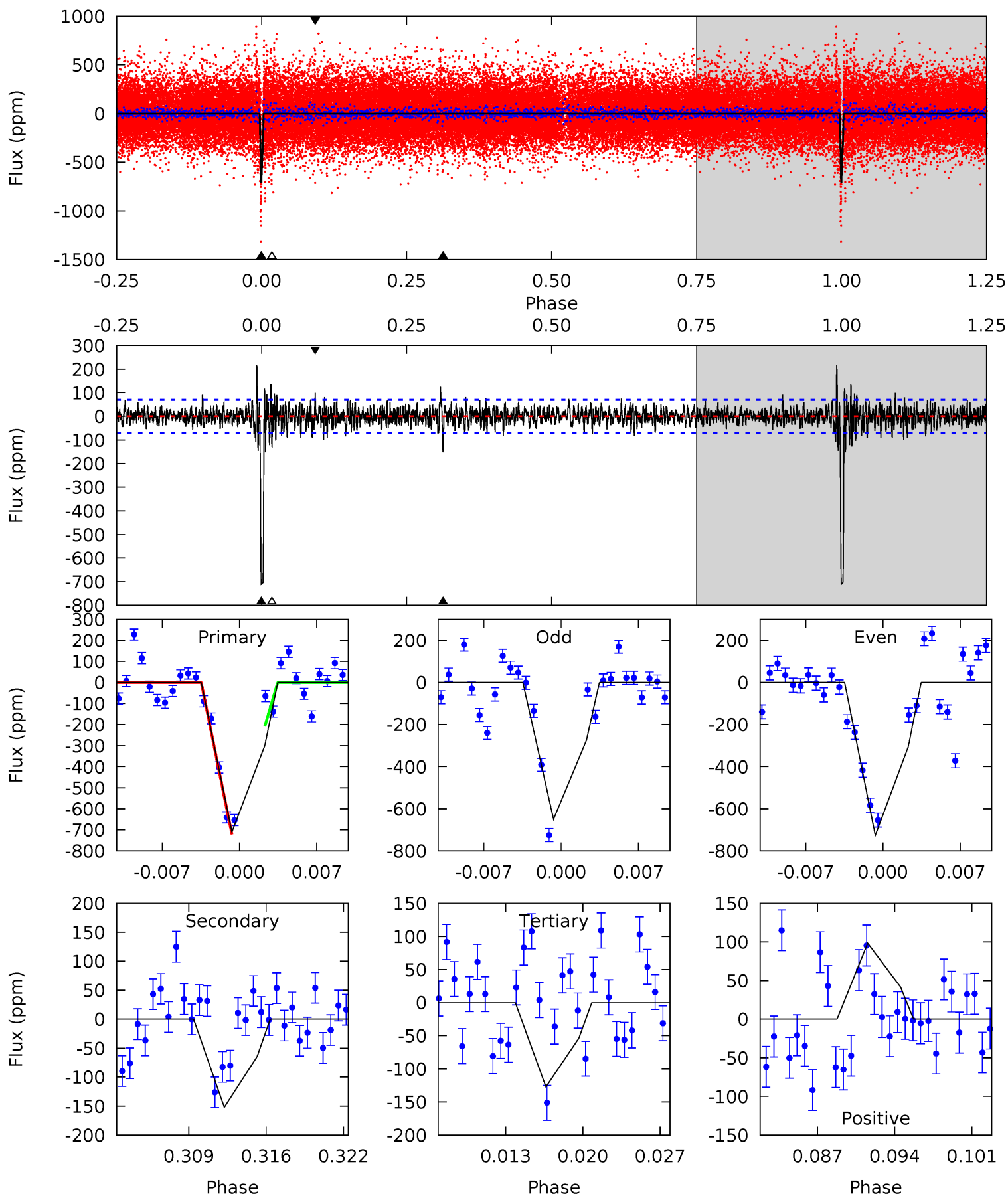
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
40.1	29.7	19.6	16.5	5.06	2.64	4.49	20.5	23.6	10.1	13.2	31.1	0.89	0.36	21.4



# Alt Model-Shift Uniqueness Test

009543660-02, P = 292.022817 Days, E = 264.627199 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
51.9	11.1	9.31	7.19	5.10	2.71	2.09	42.6	44.7	1.81	3.92	2.79	0.89	0.23	16.1



### Stellar Parameters For KIC 009543660

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$15896^{+1}_{-1}$	$4.152^{+1.000}_{-1.000}$	$-1.500^{+1.000}_{-1.000}$	$2.404^{+1.000}_{-1.000}$	$2.995^{+1.000}_{-1.000}$	$0.304^{+1.000}_{-1.000}$
	+0%/-0%	+24%/-24%	+67%/-67%	+42%/-42%	+33%/-33%	+329%/-329%
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 009543660-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-387 \pm 13$	$10.11^{+6.19}_{-5.46}$	$1364^{+32}_{-31}$	$9140^{+8315}_{-2328}$	$3252^{+11751}_{-2004}$
Alt.	$-152 \pm 14$	$8.73^{+5.90}_{-5.52}$	$1363^{+30}_{-32}$	$7483^{+8546}_{-1811}$	$1725^{+10537}_{-1129}$

$T_{\text{max}}$  = 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

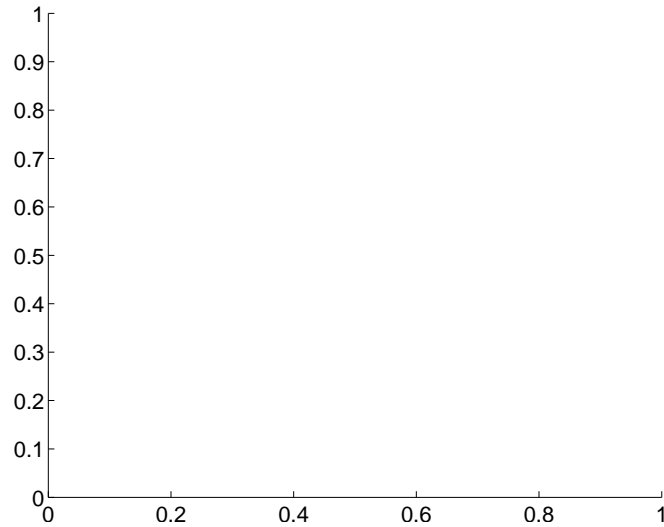
Supplemental centroid analysis for 009543660-02. Kepler magnitude: 13.77. Transit SNR 11.19

There are 0 quarters with good PRF difference image offsets

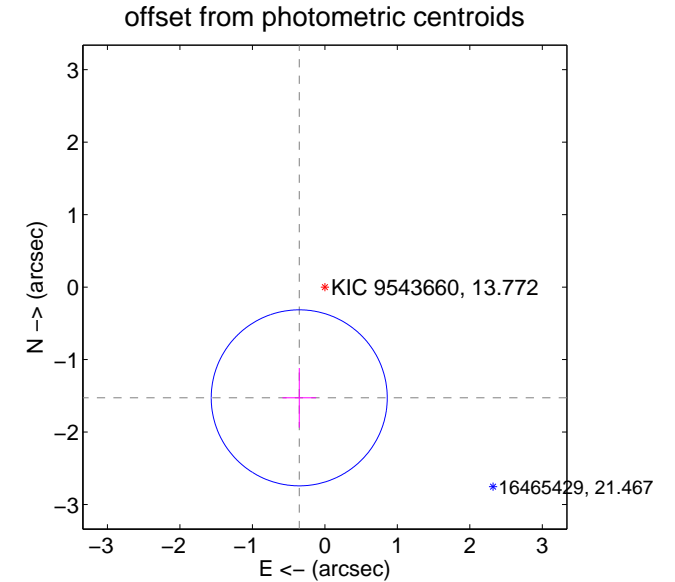
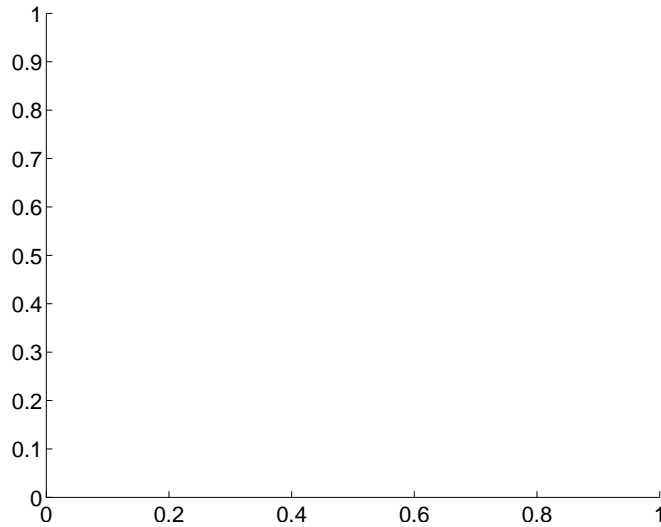
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	—	—	—	—
photometric centroid source offset	$1.57 \pm 0.40$	$3.87$	$0.35 \pm 0.23$	$-1.53 \pm 0.41$

There is no PRF-fit offset from OOT-fit

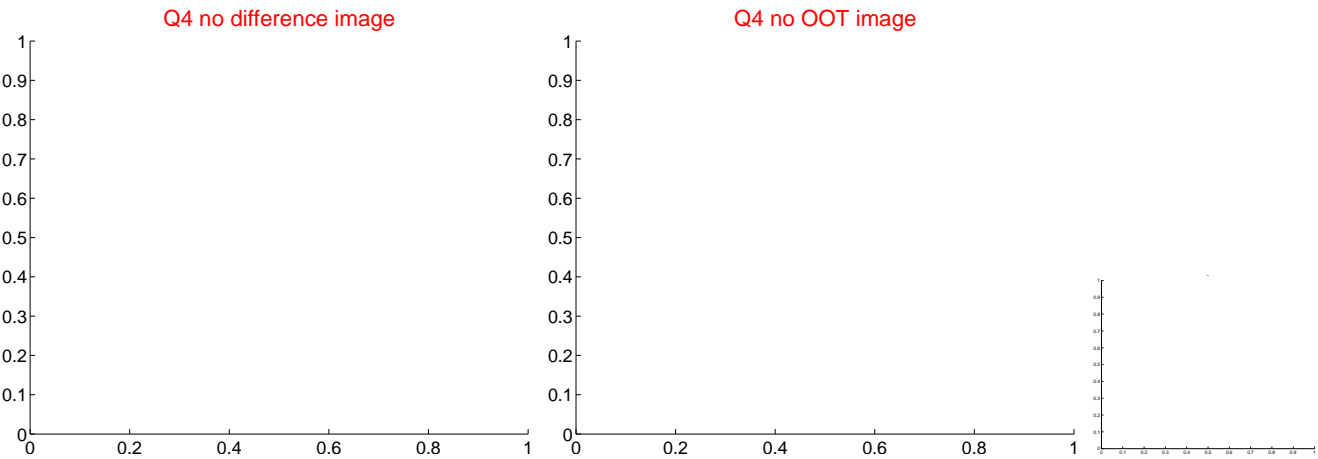
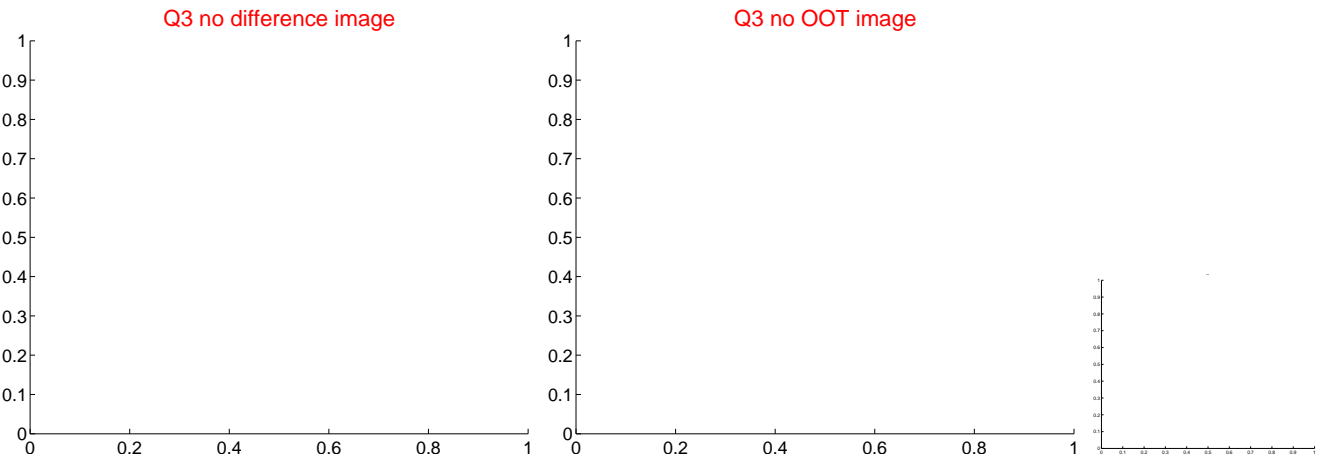
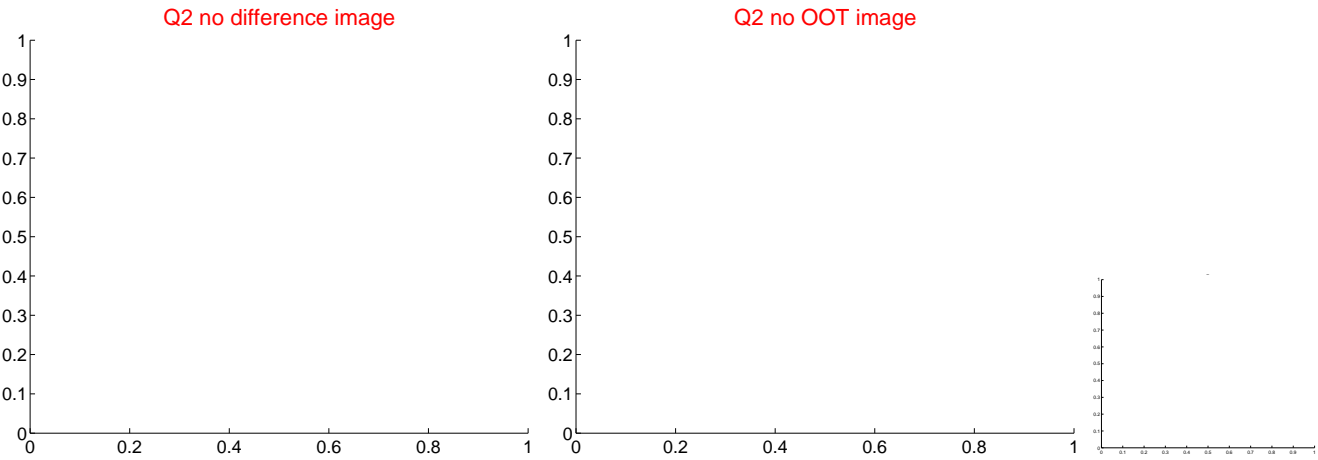
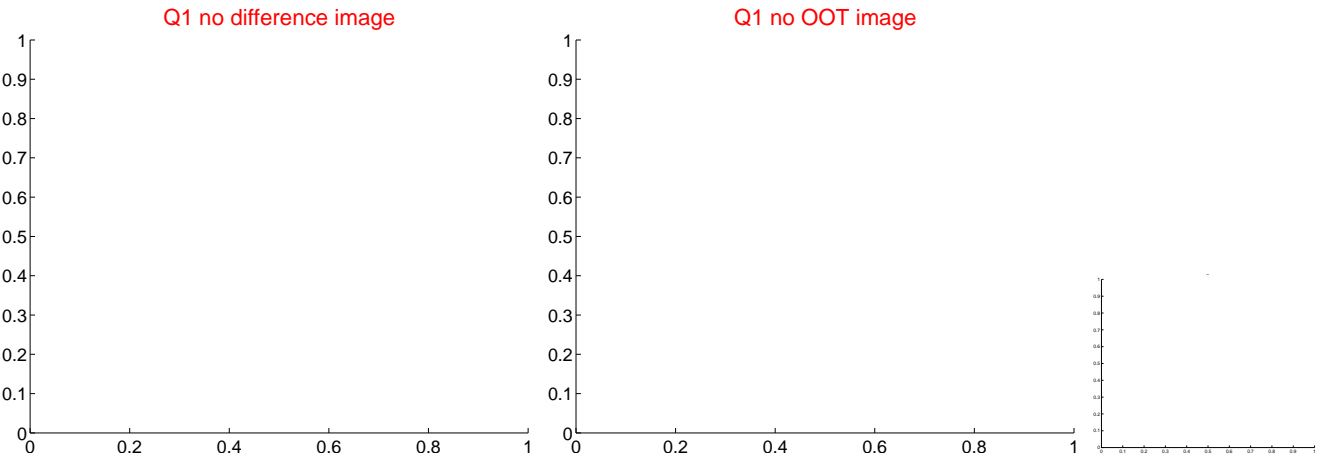


There is no PRF-fit offset from KIC



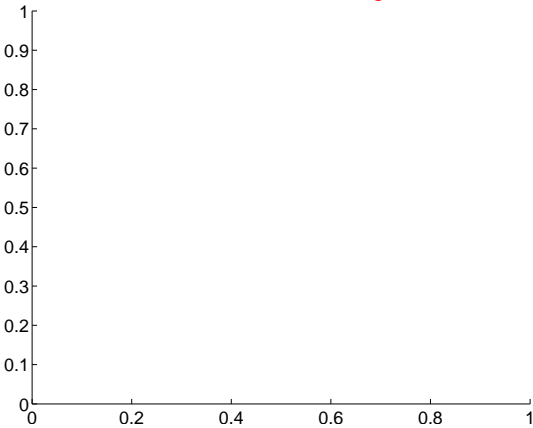
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

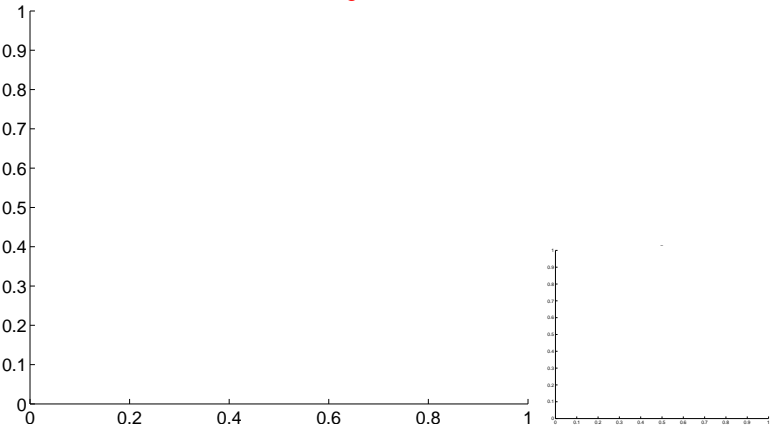


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

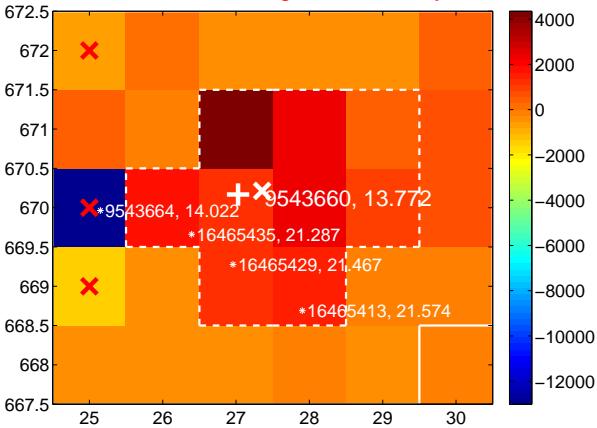
Q5 no difference image



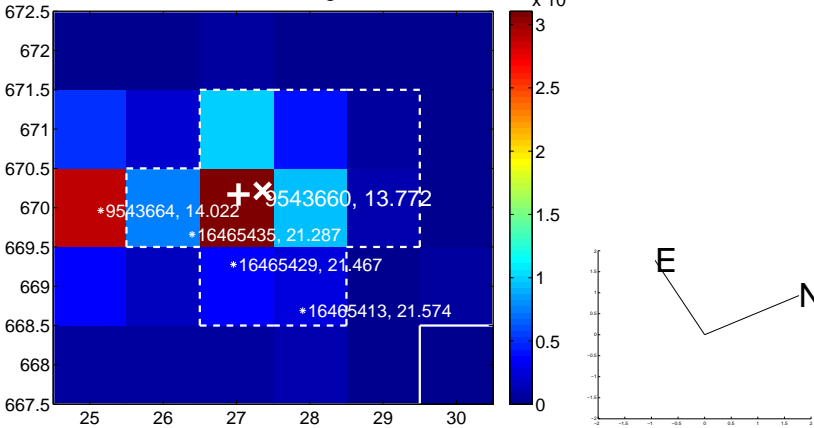
Q5 no OOT image



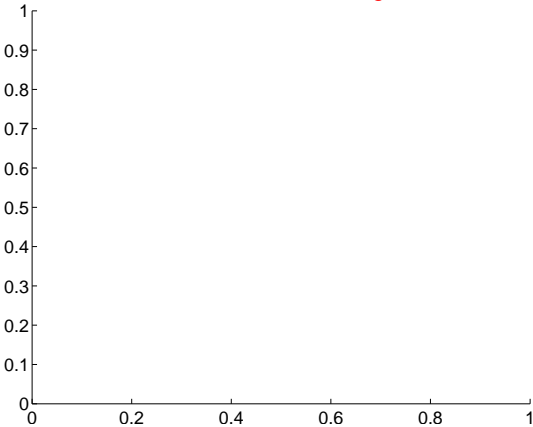
Q6 difference image. Poor Quality



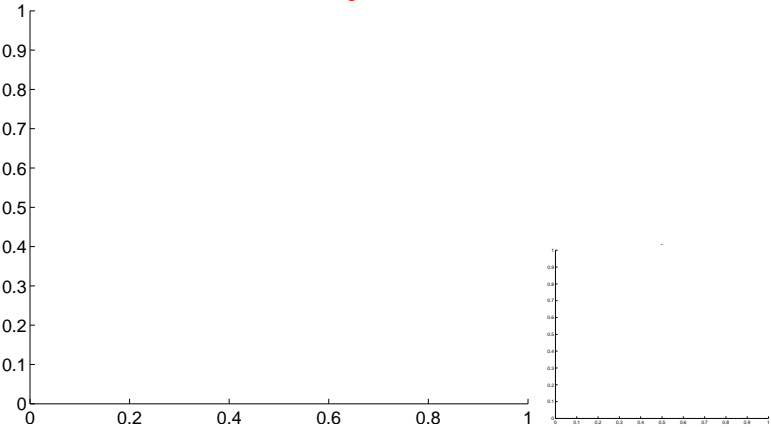
Q6 OOT image



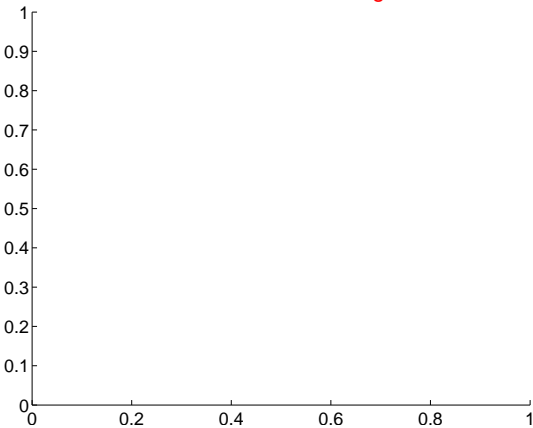
Q7 no difference image



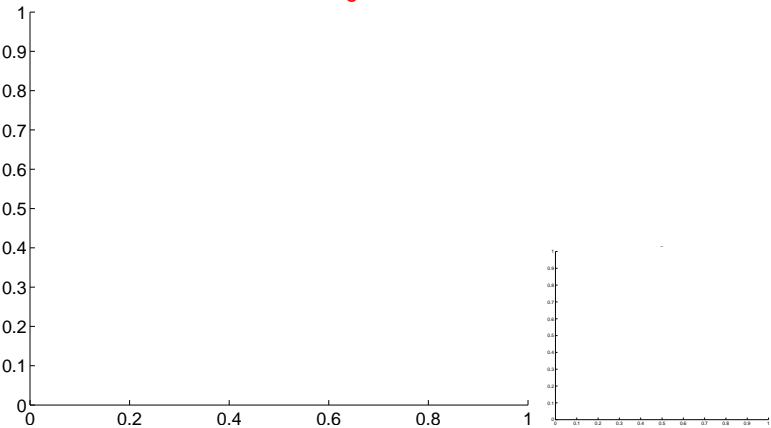
Q7 no OOT image



Q8 no difference image

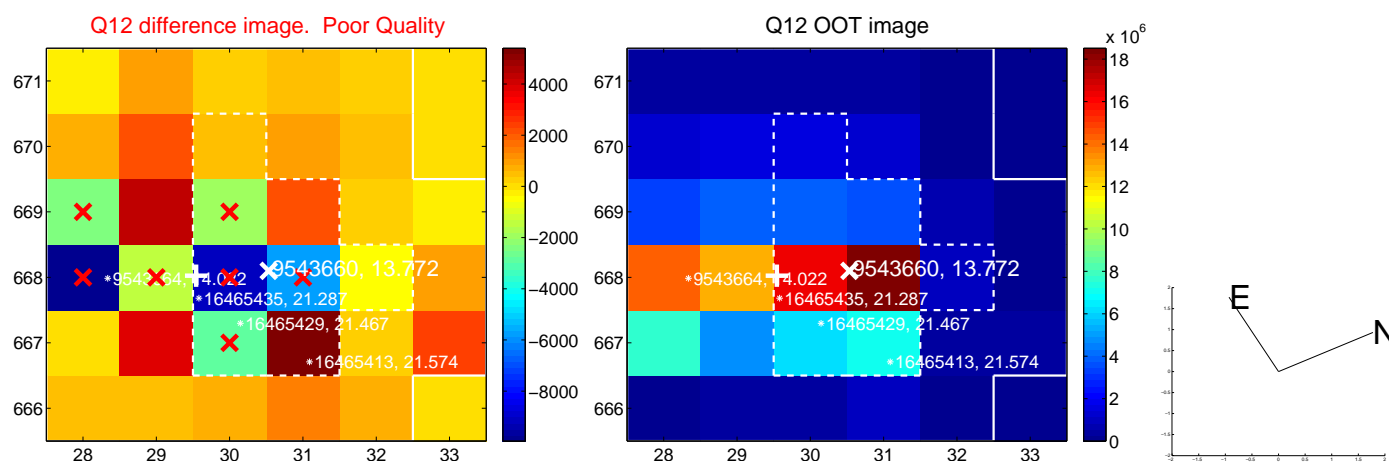
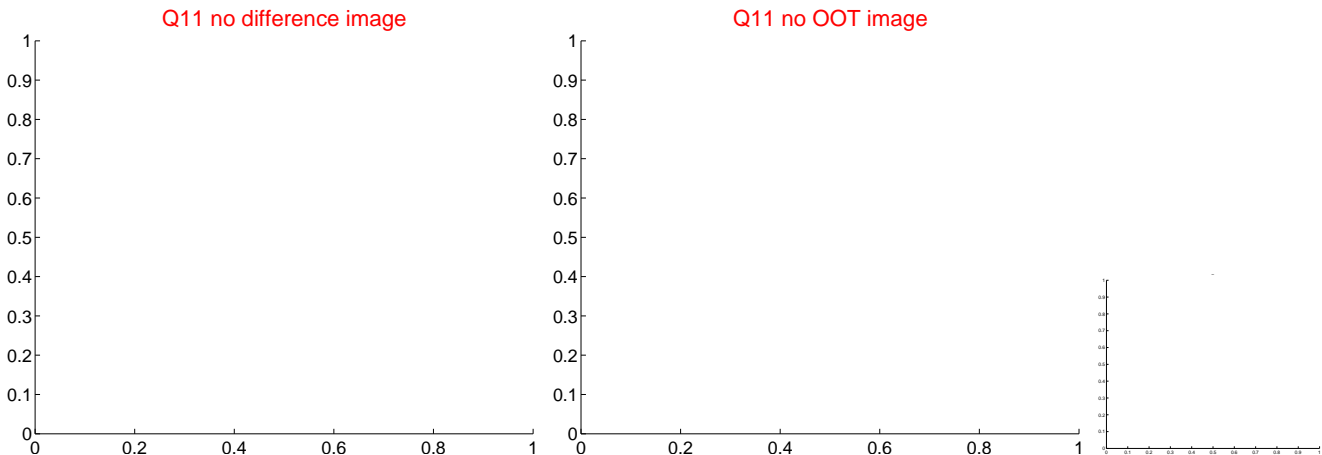
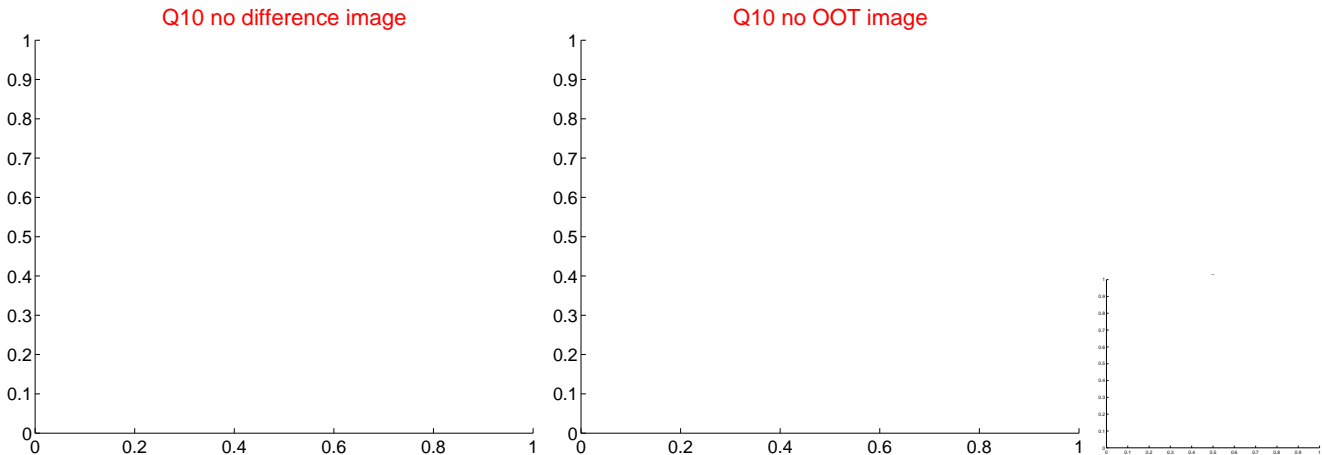
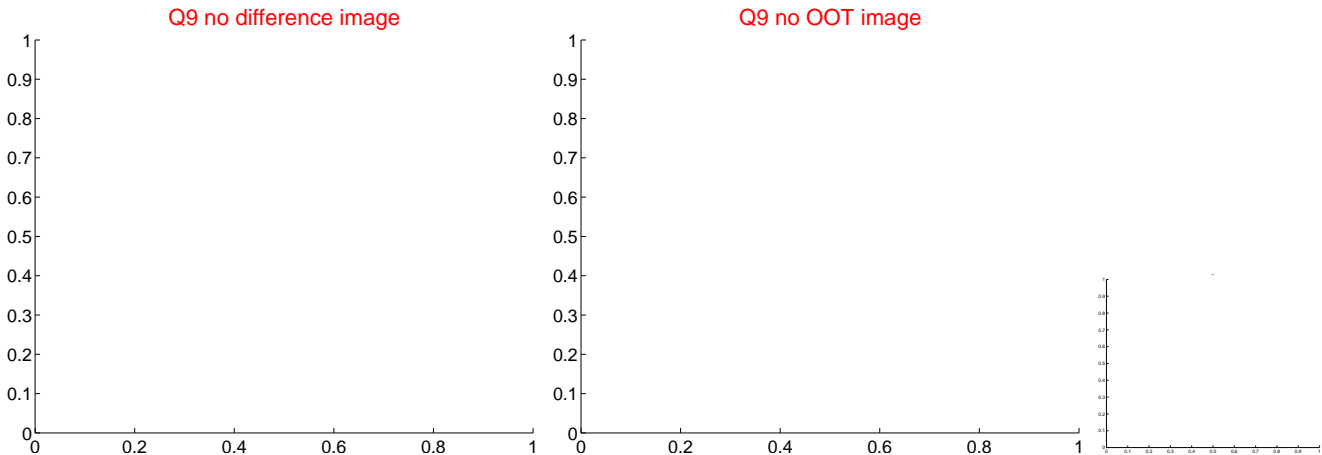


Q8 no OOT image





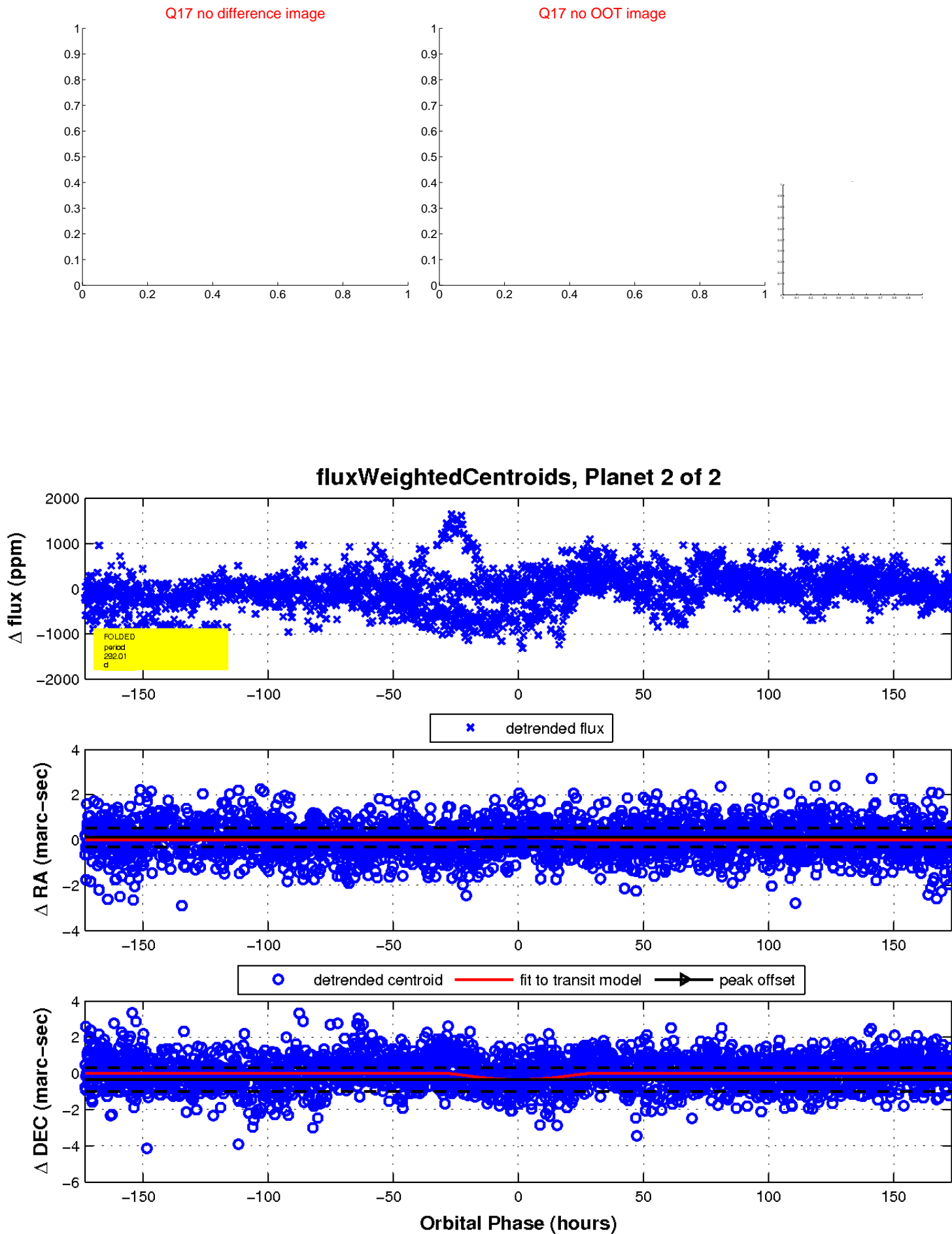
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



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

