

# KIC 009726020

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009726020-01	OBS	No	393.856887	482.954804	2591.7	30.803	17.3	4.1	0.52	4702	3.03	0.16
009726020-02	OBS	No	405.280163	295.650210	942.6	2.113	14.4	3.9	0.52	4702	1.68	0.16
009726020-03	OBS	No	552.466290	205.831312	4268.6	25.336	12.9	4.8	0.52	4702	4.19	0.10

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009726020-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009726020-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009726020-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—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.

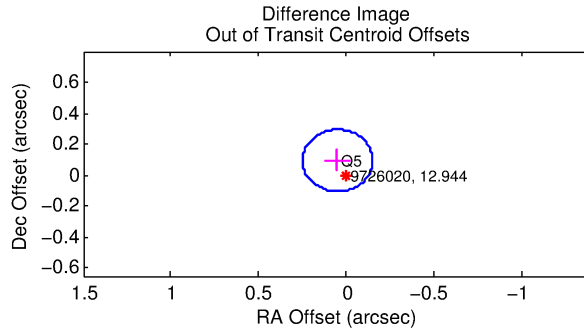
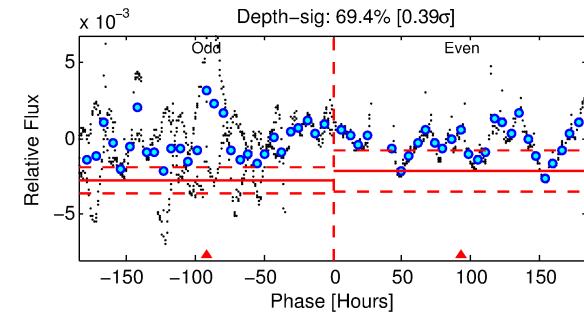
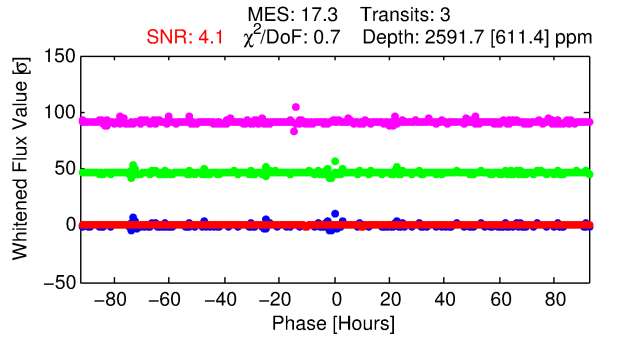
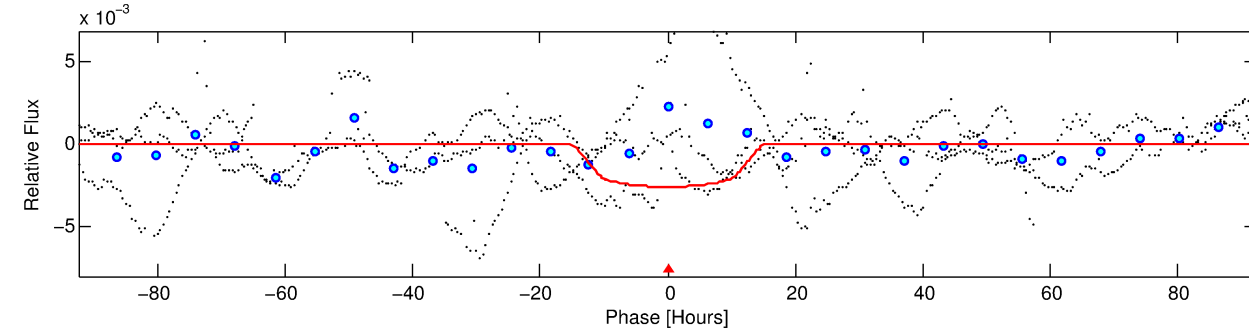
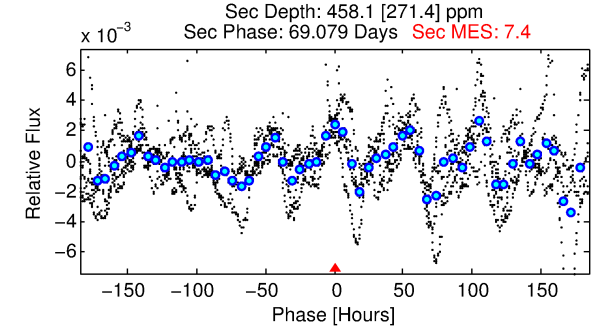
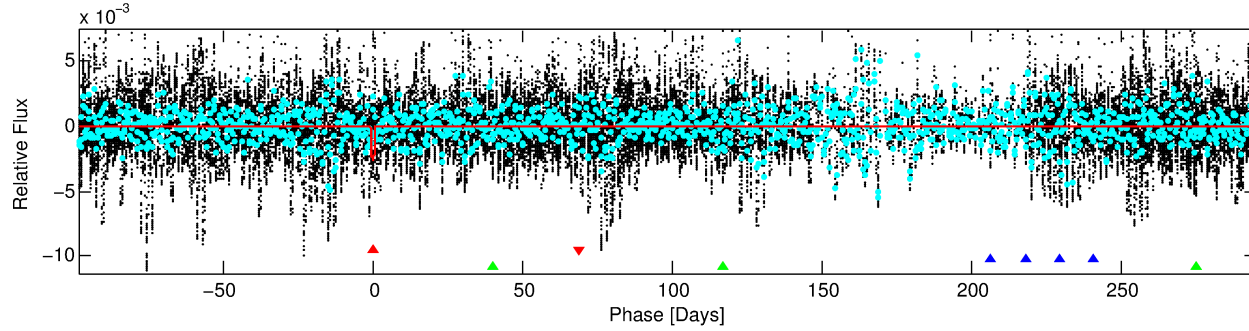
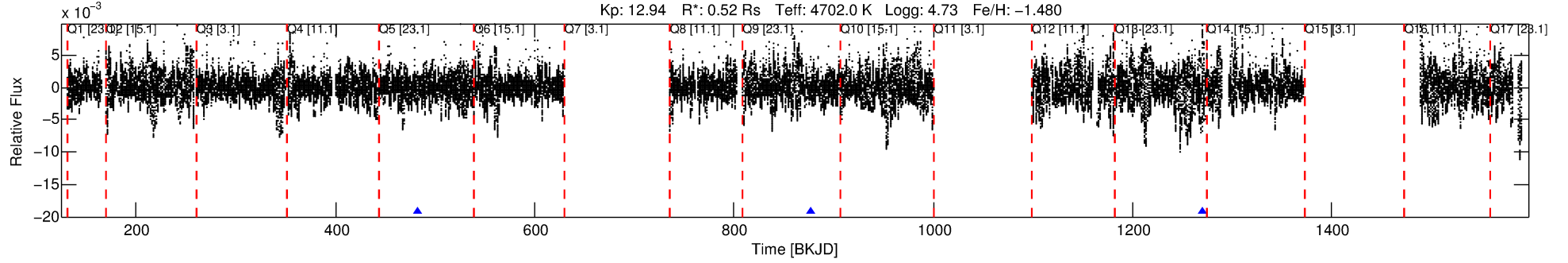
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009726020-01

No Significant Match Found

# DV One-Page Summary

KIC: 9726020 Candidate: 1 of 3 Period: 393.857 d



## DV Fit Results:

Period = 393.85689 [0.03064] d  
Epoch = 482.9548 [0.0341] BKJD  
Rp/R\* = 0.0537 [0.0063]  
a/R\* = 59.95 [6.66]  
b = 0.86 [0.04]  
Seff = 0.16 [0.03]  
Teq = 162 [7] K  
Rp = 3.03 [0.41] Re  
a = 0.8503 [0.0491] AU  
Ag = 19874.11 [12783.40] [1.55 $\sigma$ ]  
**Teffp = 2969 [484] K [5.80 $\sigma$ ]**

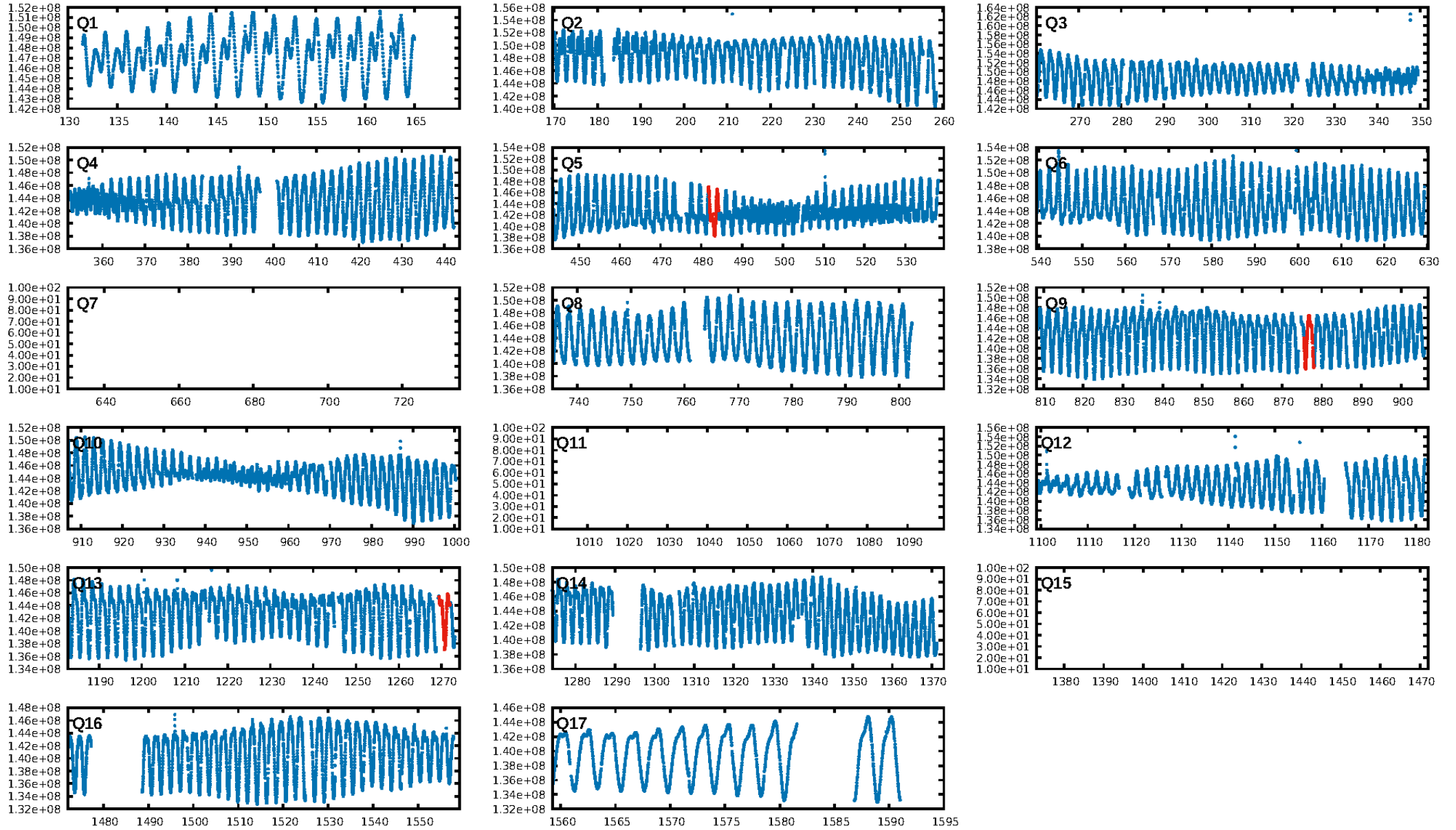
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [8.88 $\sigma$ ]  
ModelChiSquare2-sig: 32.1%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 3.09e-11**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -1.304  
**Centroid-sig: 0.0%**  
**Centroid-so: 0.412 arcsec [3.15 $\sigma$ ]**  
OotOffset-rm: 0.108 arcsec [1.62 $\sigma$ ]  
OotOffset-st: 0/0/0/1 [1]  
KicOffset-rm: **0.321 arcsec [4.81 $\sigma$ ]**  
KicOffset-st: 0/0/0/1 [1]  
DiffImageQuality-fgm: 1.00 [1/1]  
DiffImageOverlap-fno: 1.00 [1/1]

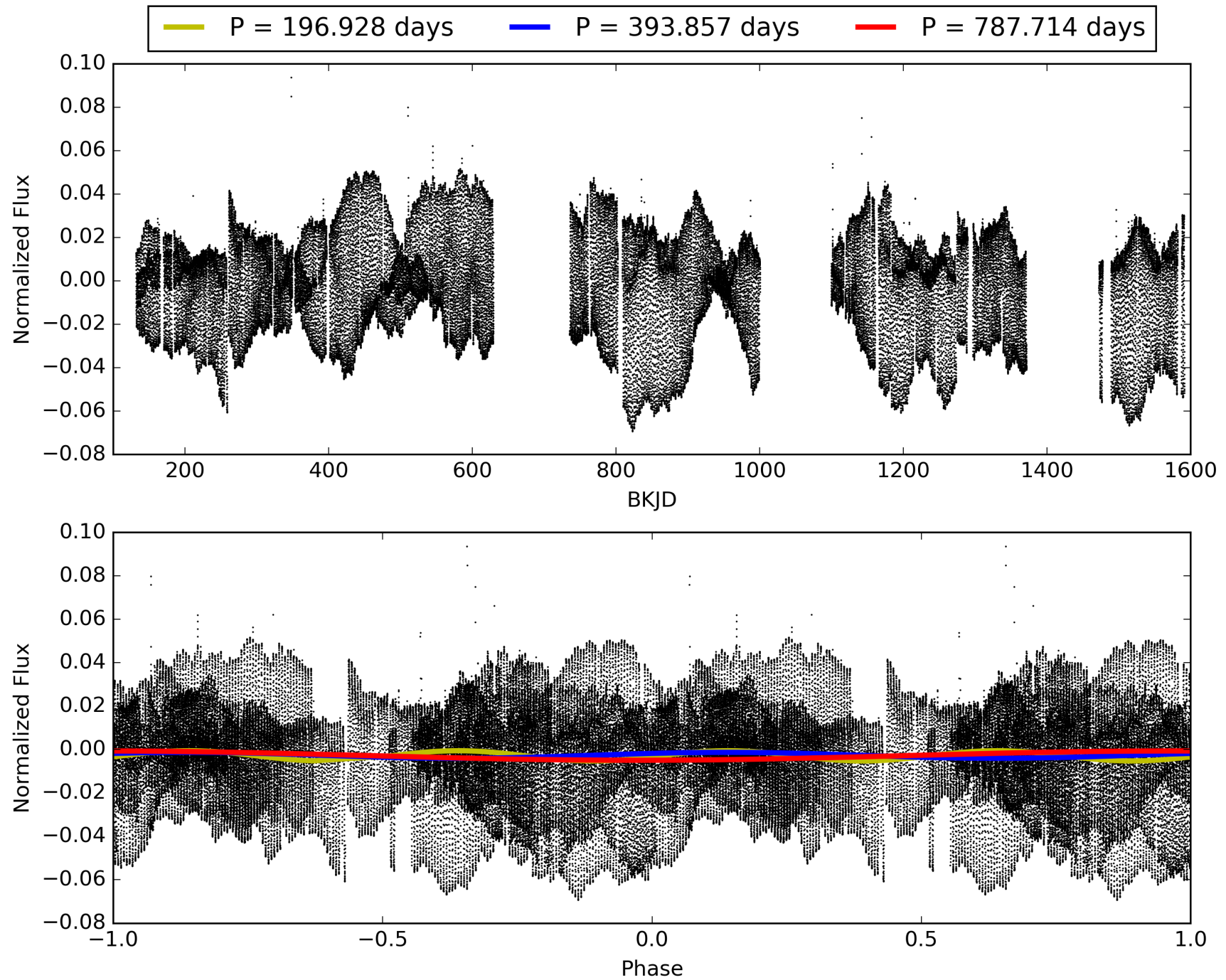
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 15:42:37 Z

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

# TCE 009726020-01, PDC Light Curves

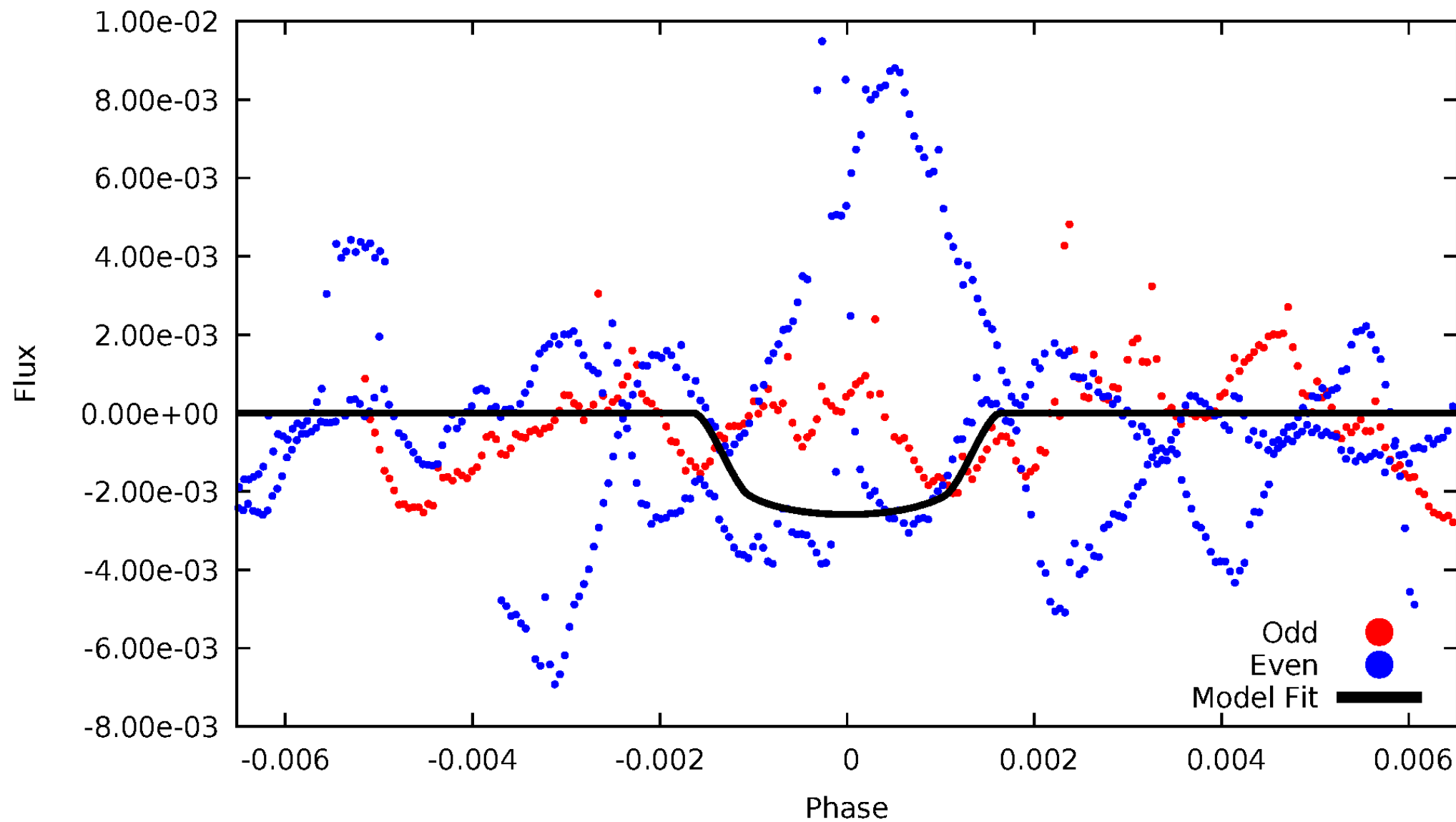


TCE 009726020-01



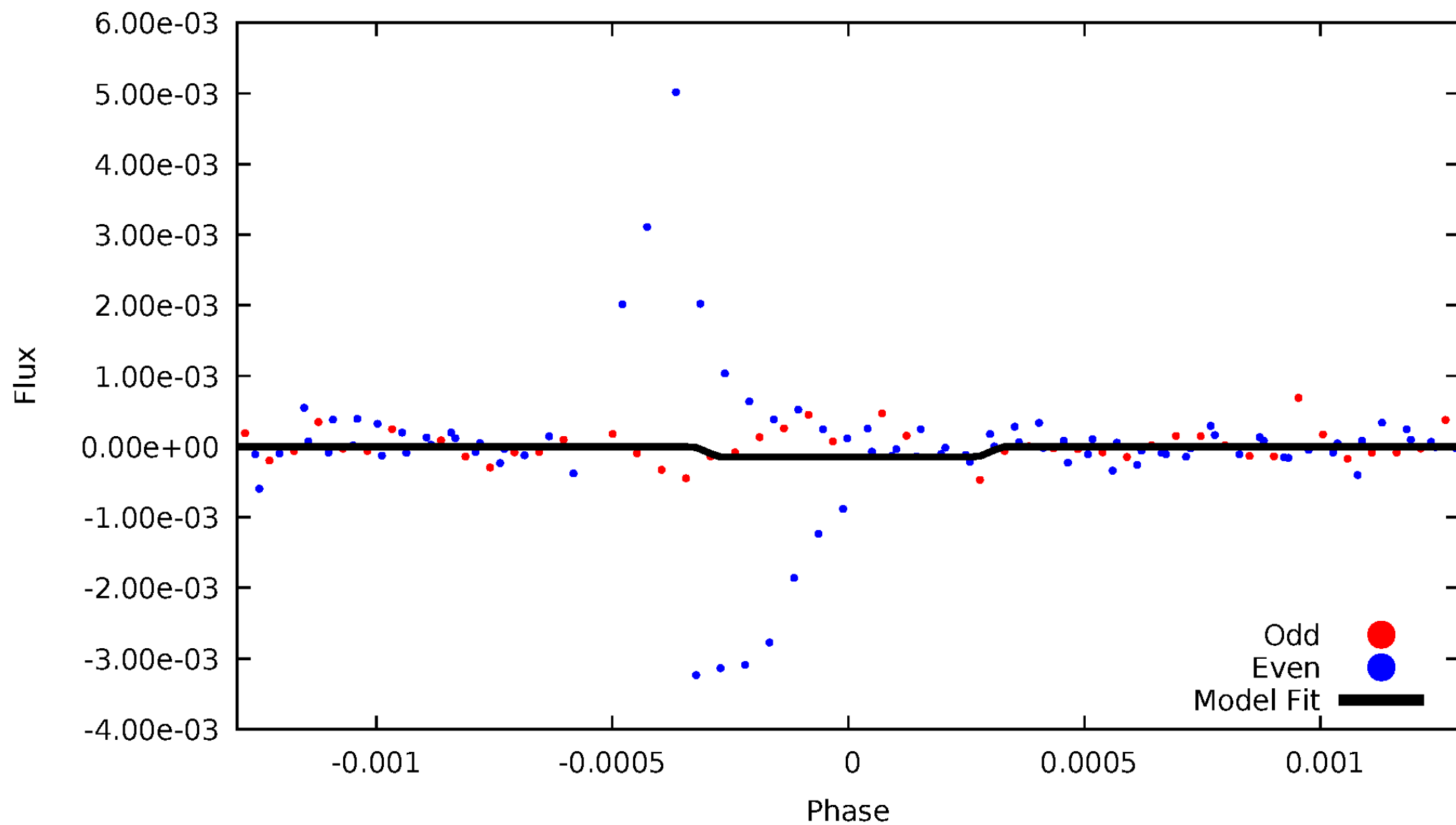
# DV Odd/Even

TCE 009726020-01



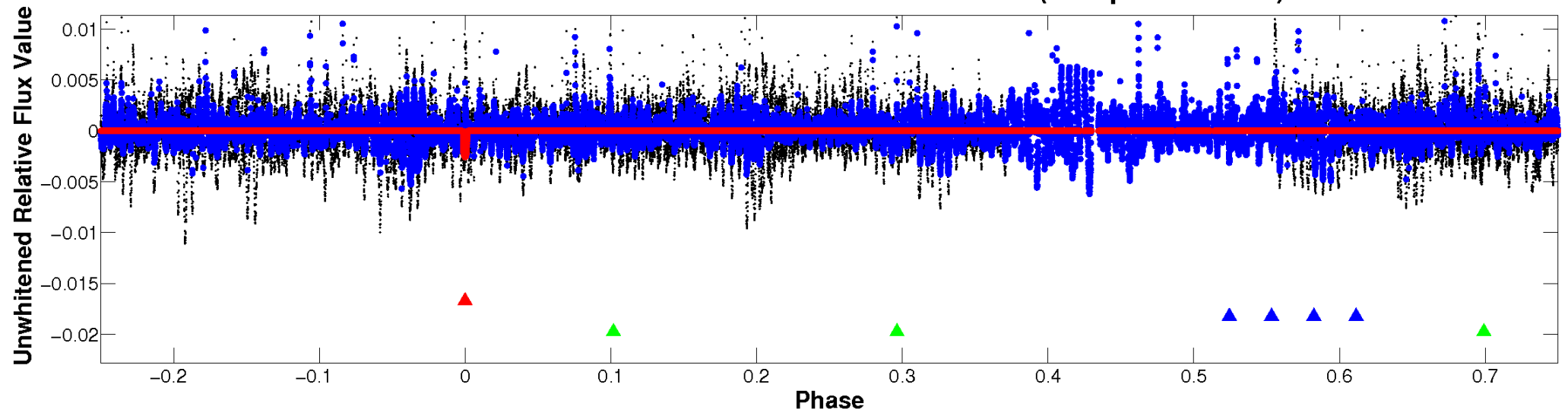
# ALT Odd/Even

TCE 009726020-01

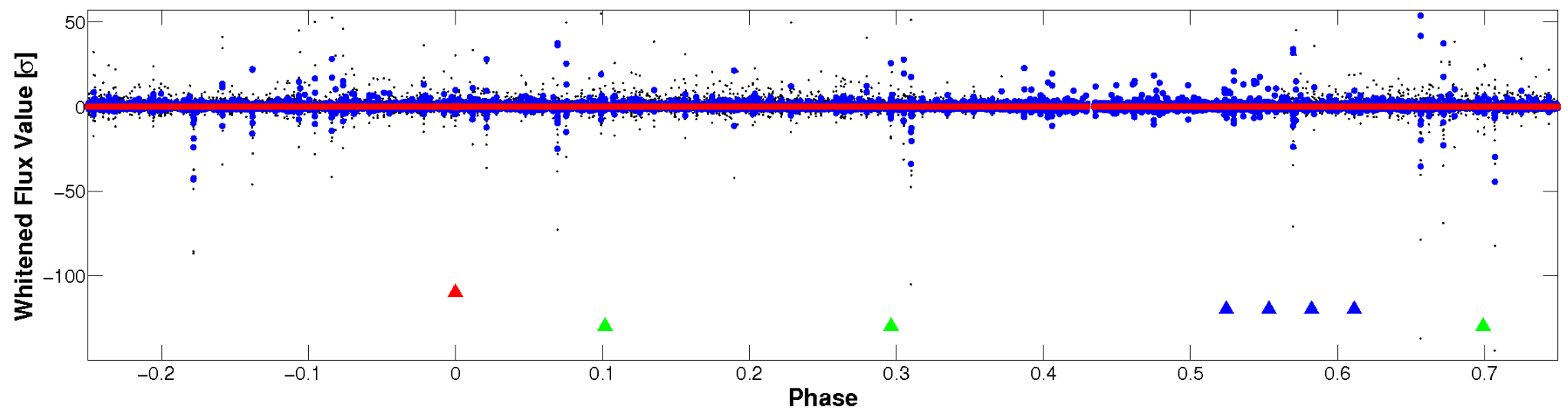


# Non-Whitened Vs. Whitened Light Curve

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



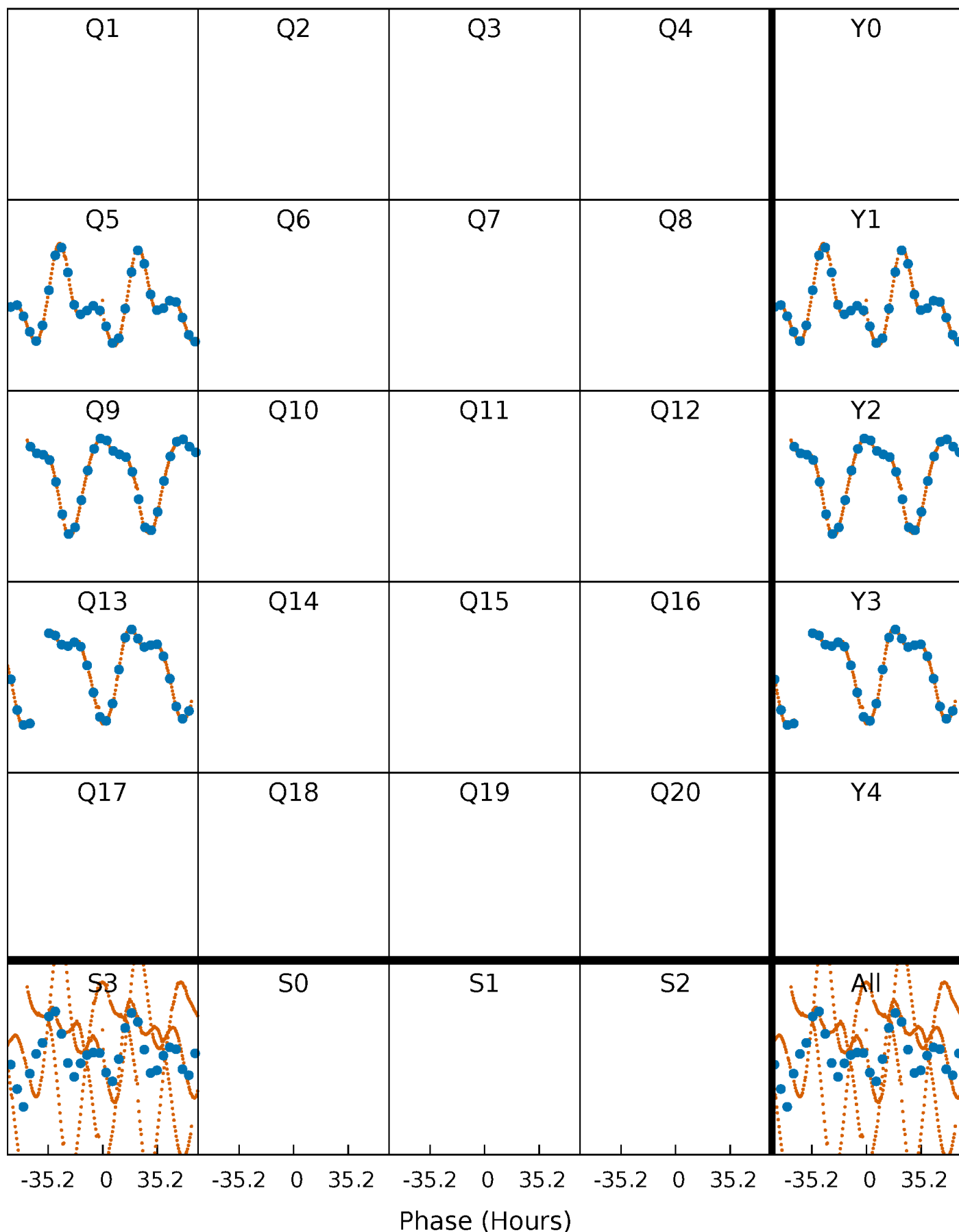
Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

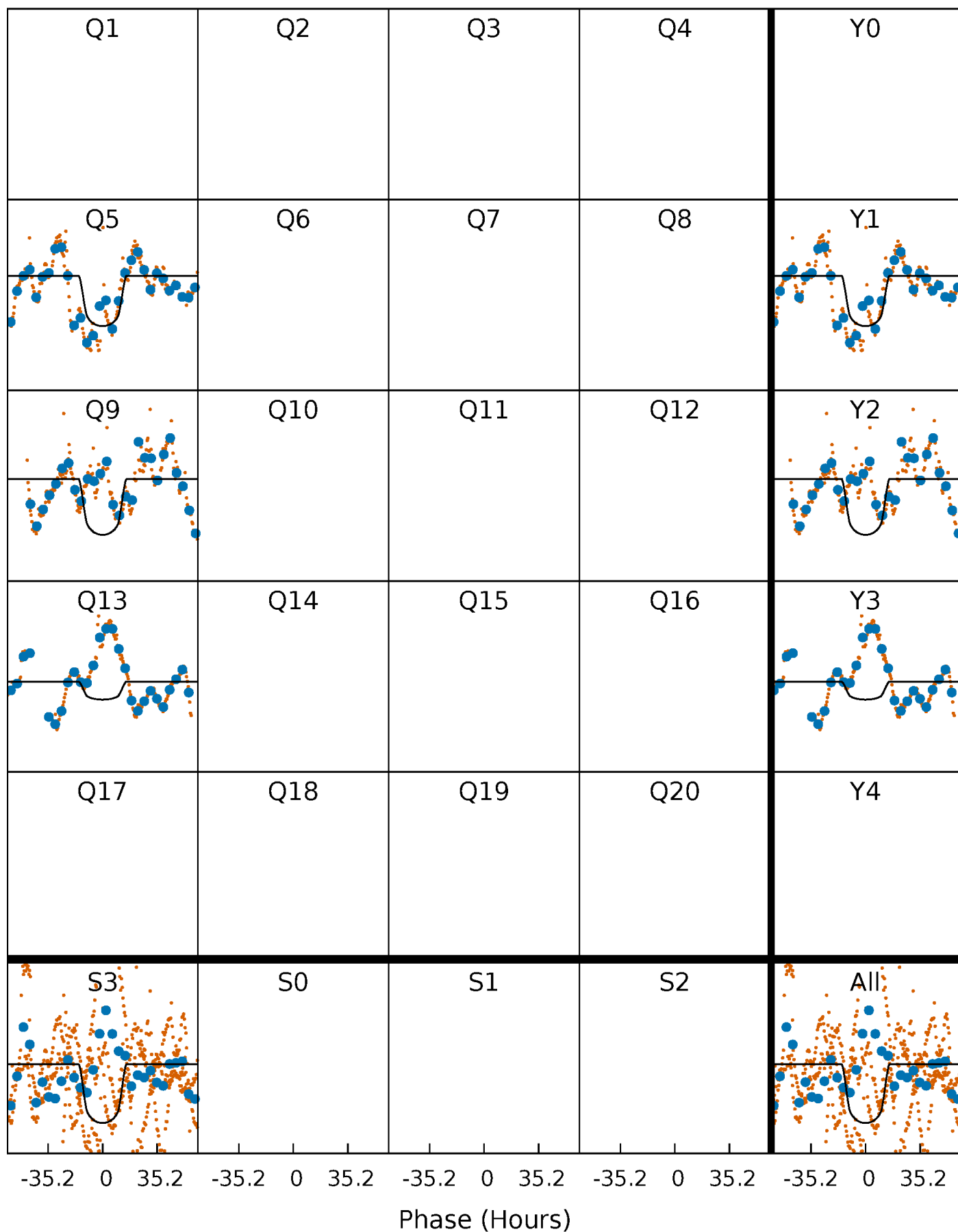
TCE 009726020-01 P=393.856887 Days  $T_0=482.954804$  (BKJD)





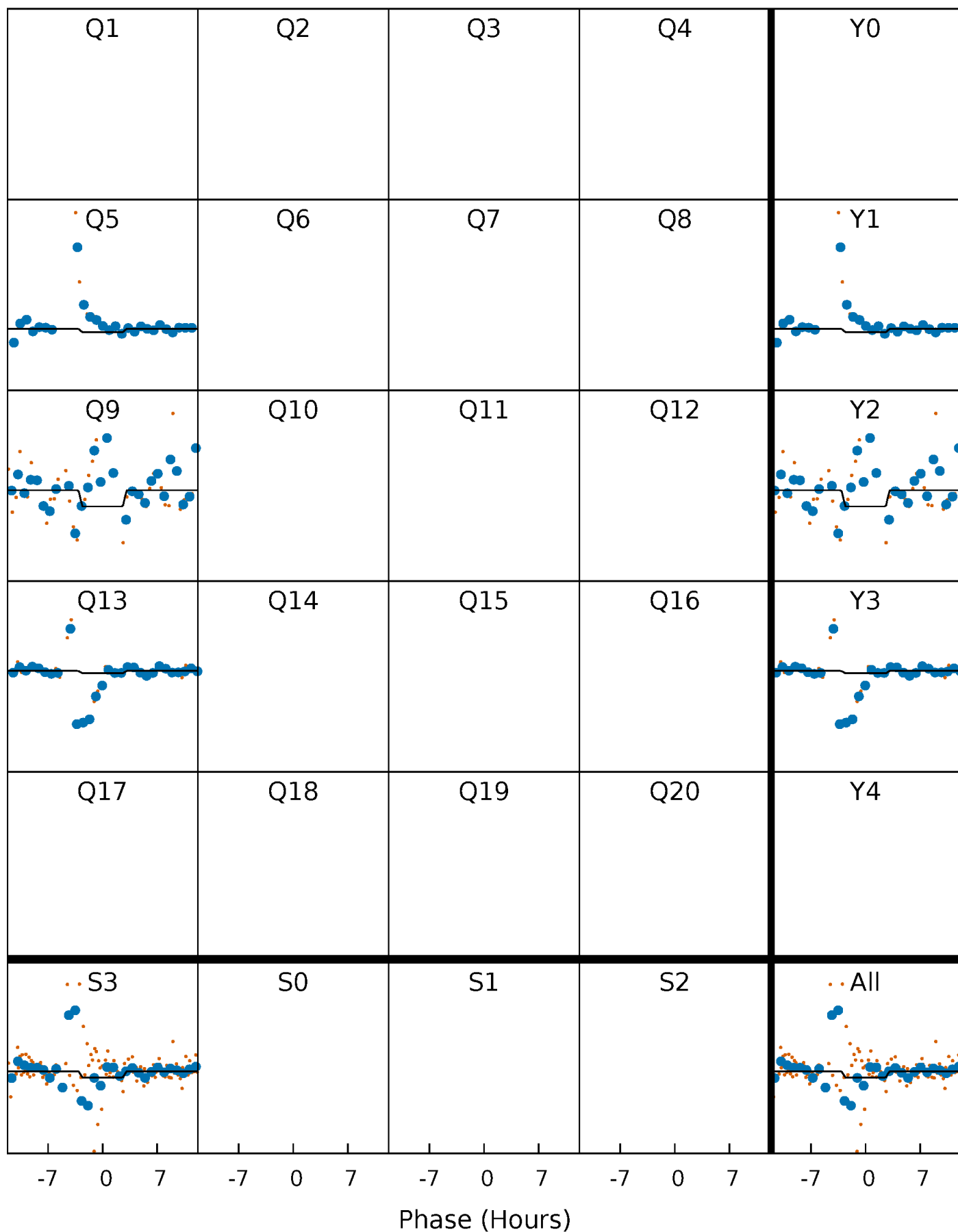
# DV Quarter-Phased Transit Curves

TCE 009726020-01 P=393.856887 Days  $T_0=482.954804$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

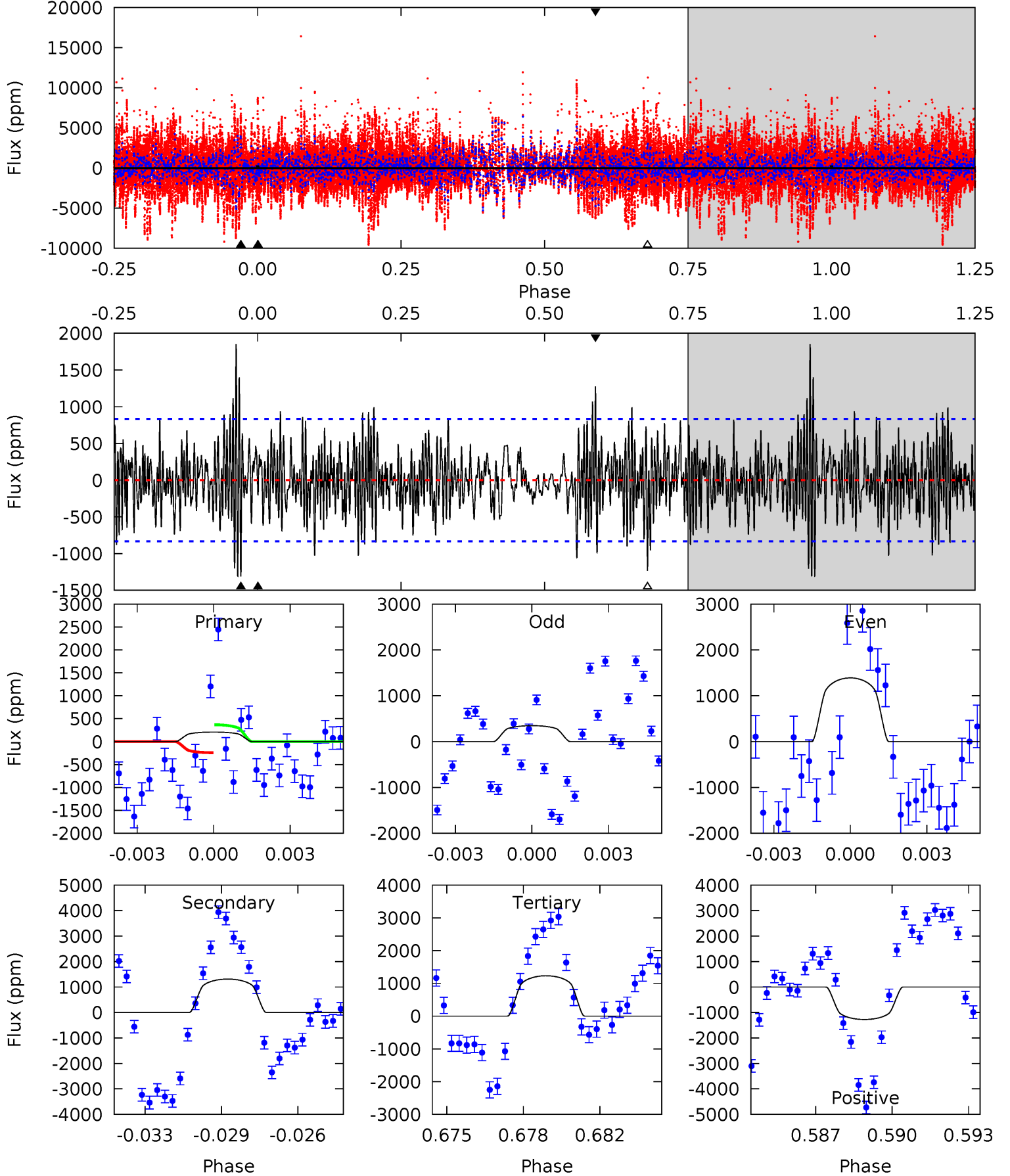
TCE 009726020-01 P=393.809191 Days  $T_0=483.112783$  (BKJD)



# DV Model-Shift Uniqueness Test

009726020-01,  $P = 393.856887$  Days,  $E = 89.097917$  Days

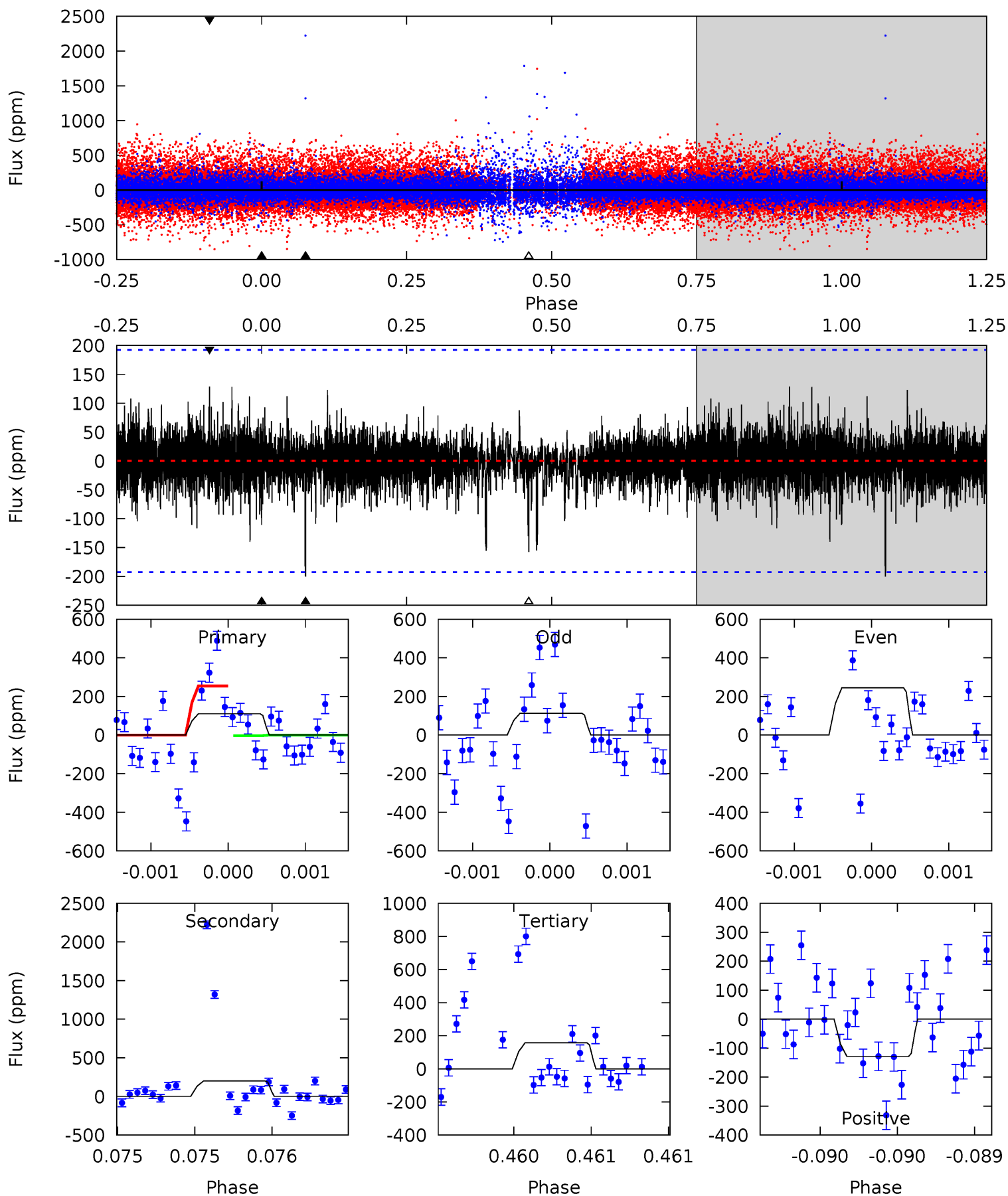
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.30	8.24	7.74	8.01	5.24	2.94	2.31	-6.44	-6.70	0.50	0.23	3.06	-2.42	0.59	0.39



# Alt Model-Shift Uniqueness Test

009726020-01, P = 393.809191 Days, E = 89.303592 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
3.18	5.75	4.53	3.70	5.53	3.42	0.80	-1.35	-0.52	1.22	2.05	1.83	-2.28	0.39	3.61



### Stellar Parameters For KIC 009726020

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4702^{+129}_{-161}$	$4.734^{+0.049}_{-0.025}$	$-1.480^{+0.300}_{-0.300}$	$0.517^{+0.024}_{-0.034}$	$0.528^{+0.034}_{-0.024}$	$5.379^{+1.055}_{-0.494}$
	+3%/-3%	+1%/-1%	+20%/-20%	+5%/-7%	+6%/-5%	+20%/-9%
Source	PHO1	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 009726020-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1311 \pm 159$	$3.04^{+0.35}_{-0.36}$	$225^{+8}_{-8}$	$4042^{+230}_{-214}$	$57464^{+17957}_{-13644}$
Alt.	$-200 \pm 35$	$0.70^{+0.36}_{-0.36}$	$224^{+7}_{-8}$	$4974^{+1927}_{-808}$	$160853^{+521890}_{-91555}$

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

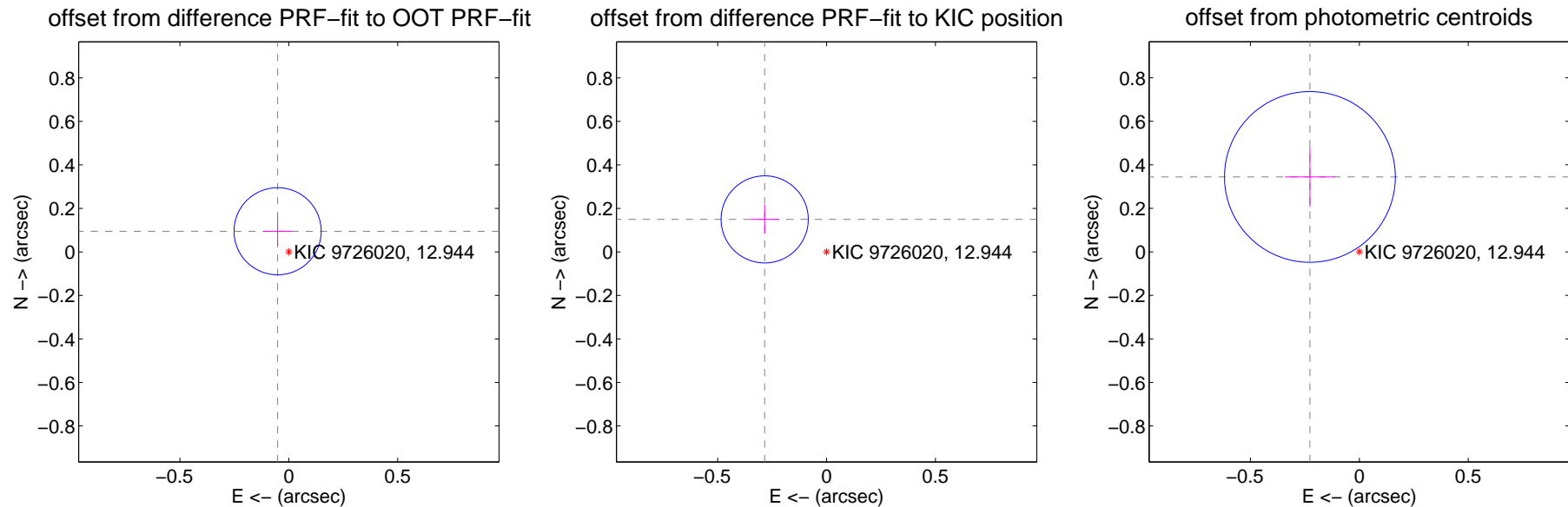
## DV Centroid Data

Supplemental centroid analysis for 009726020-01. Kepler magnitude: 12.94. Transit SNR 4.08

There are 1 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.24 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.108 \pm 0.067$	1.62	$0.052 \pm 0.067$	$0.095 \pm 0.067$
PRF-fit source offset from KIC position	$0.321 \pm 0.067$	4.81	$0.284 \pm 0.067$	$0.149 \pm 0.067$
photometric centroid source offset	$0.41 \pm 0.13$	3.15	$0.23 \pm 0.11$	$0.34 \pm 0.14$



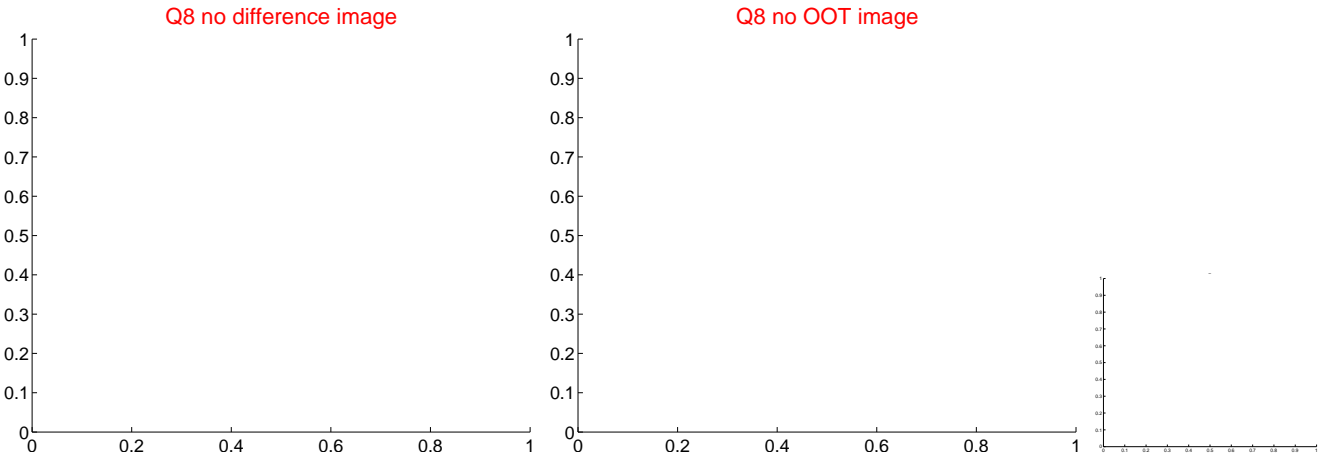
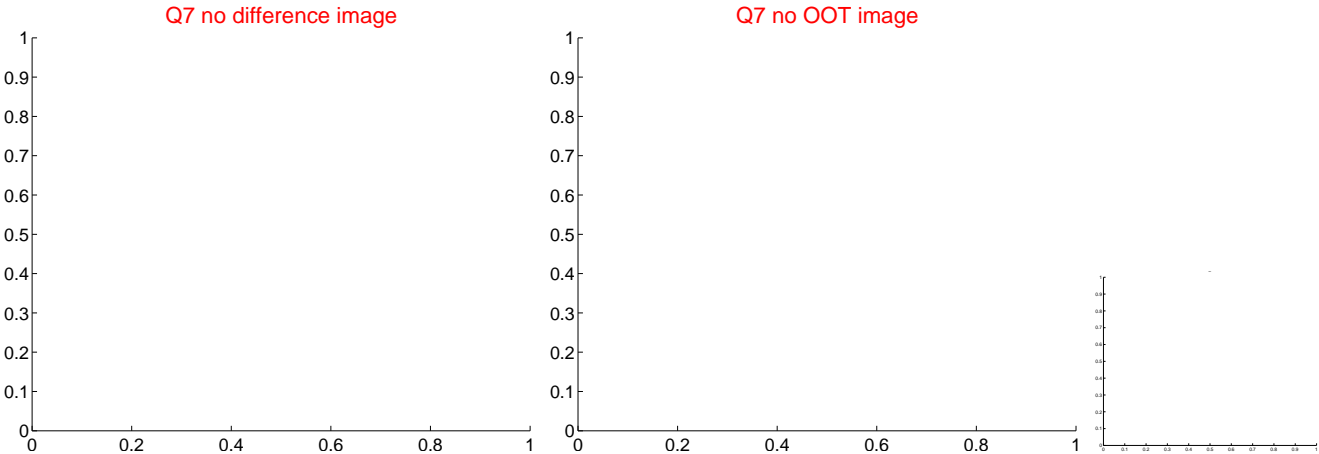
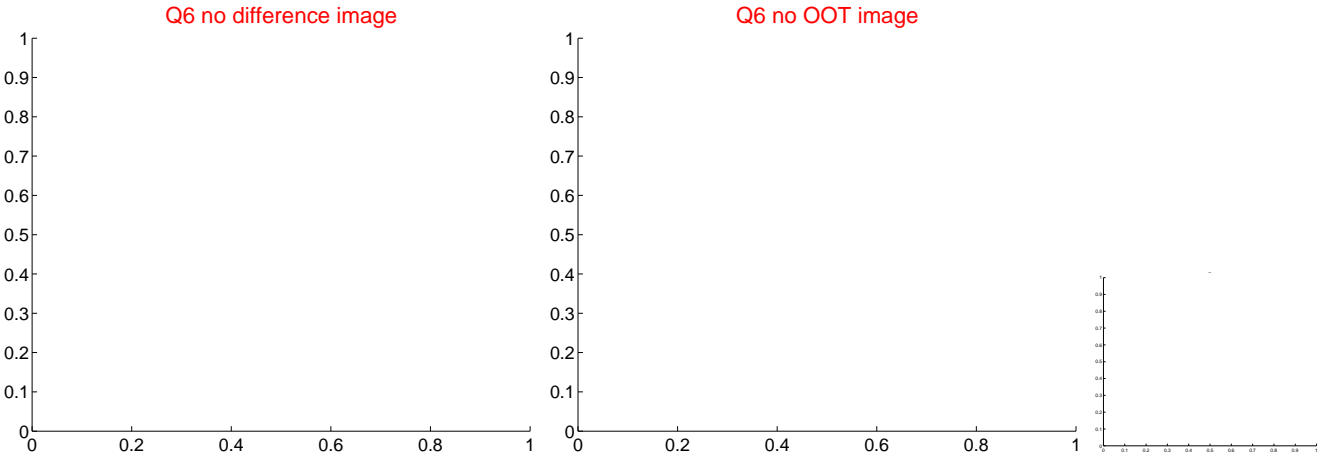
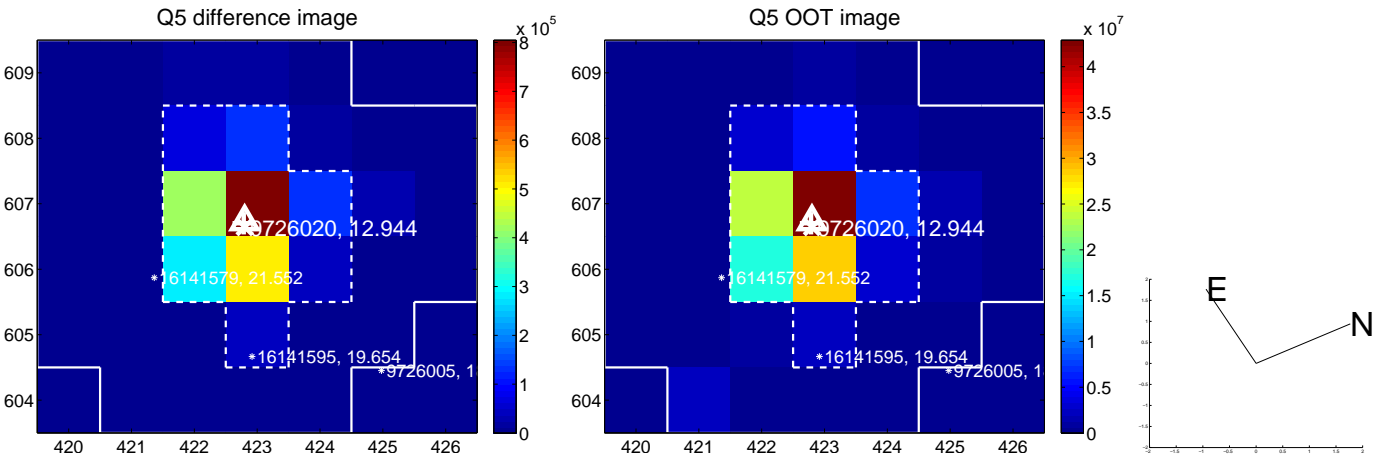
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



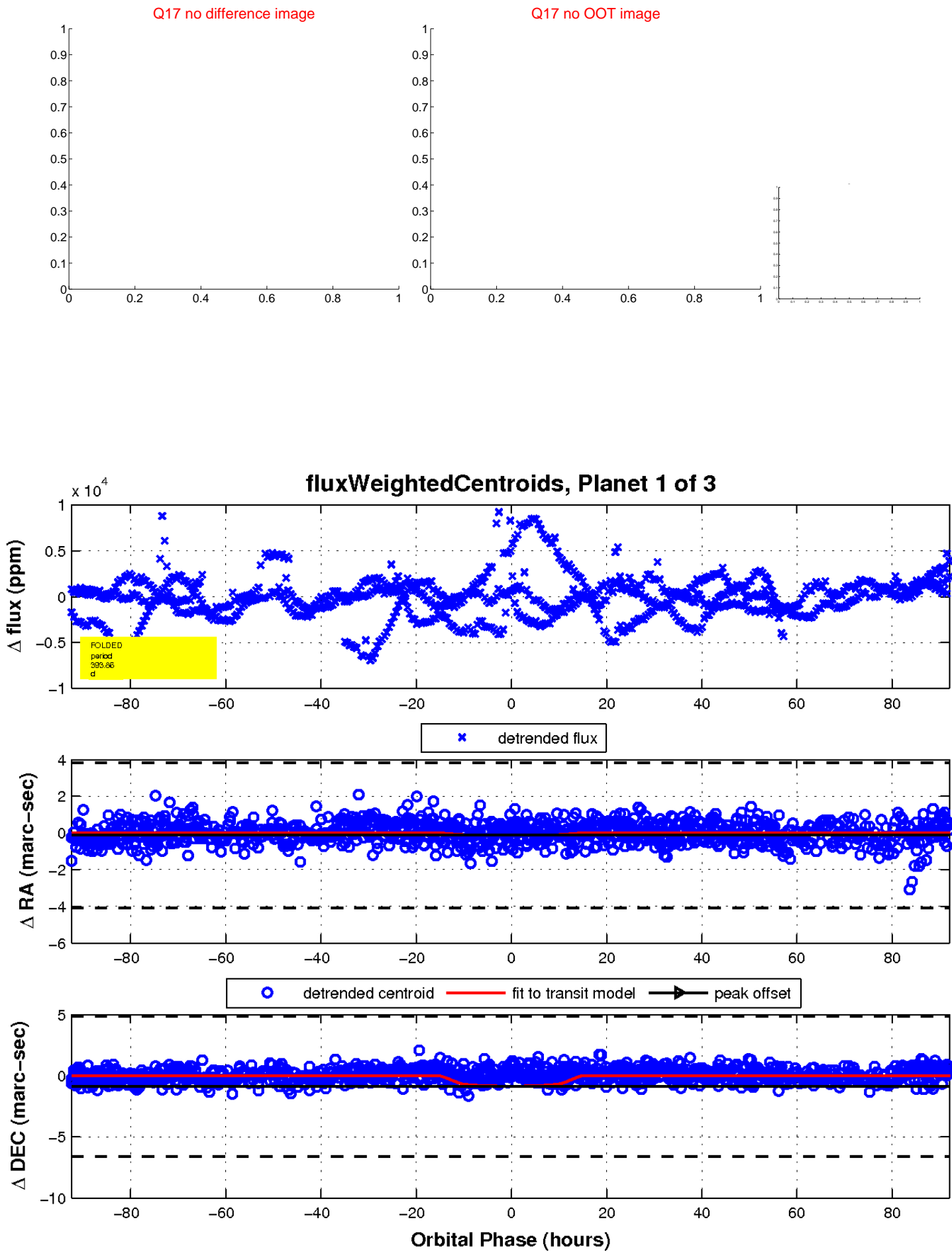
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



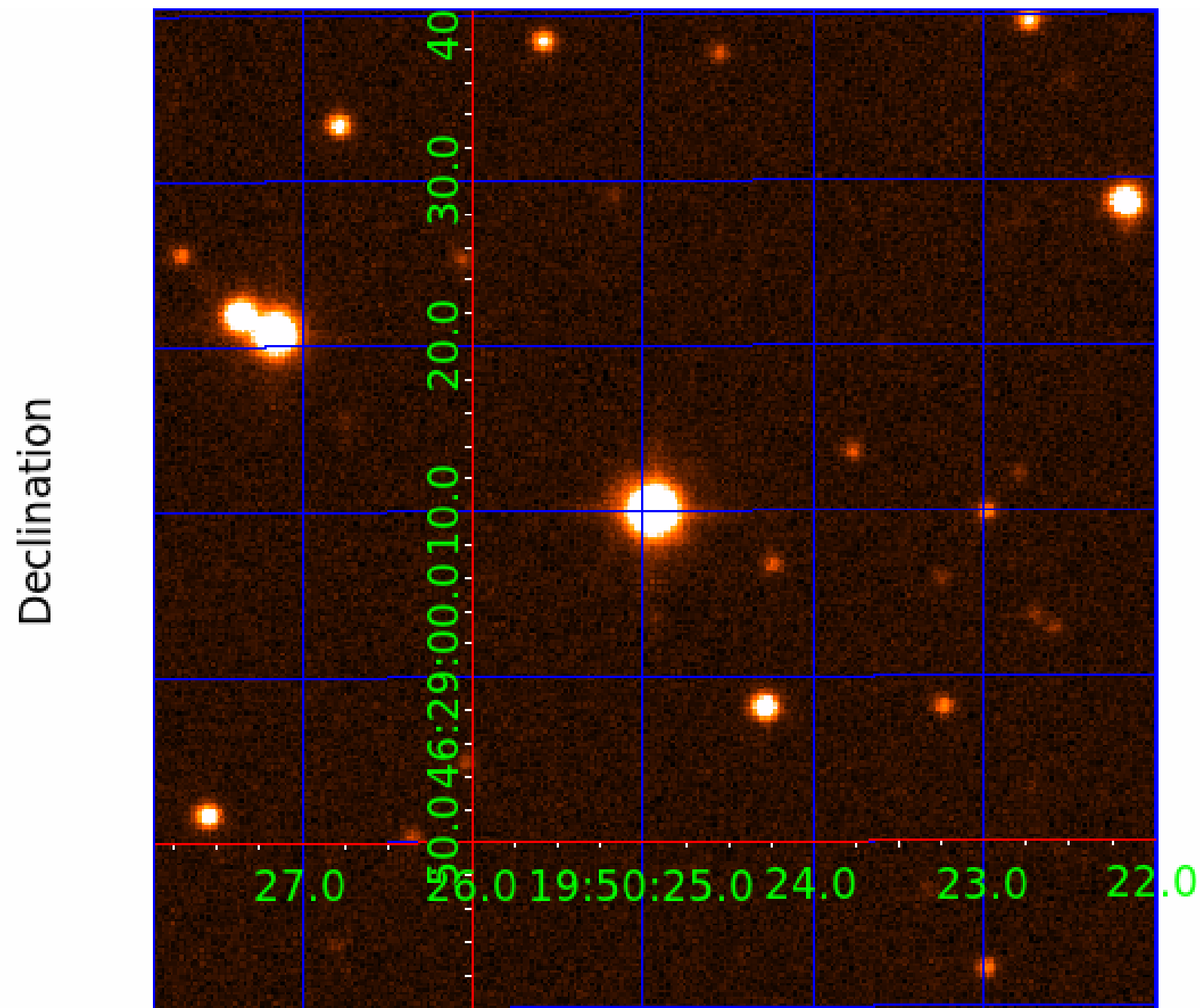
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 009726020

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009726020-01	OBS	No	393.856887	482.954804	2591.7	30.803	17.3	4.1	0.52	4702	3.03	0.16
009726020-02	OBS	No	405.280163	295.650210	942.6	2.113	14.4	3.9	0.52	4702	1.68	0.16
009726020-03	OBS	No	552.466290	205.831312	4268.6	25.336	12.9	4.8	0.52	4702	4.19	0.10

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009726020-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009726020-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009726020-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—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.

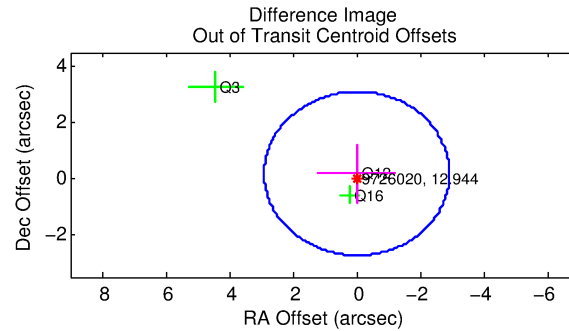
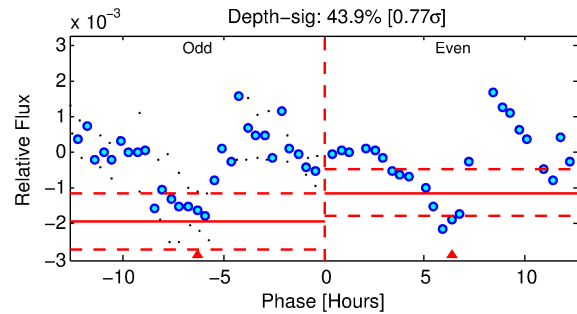
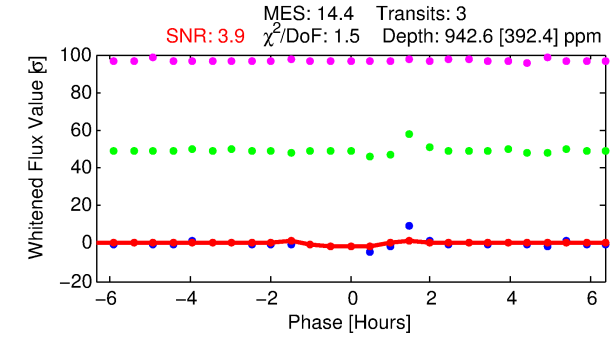
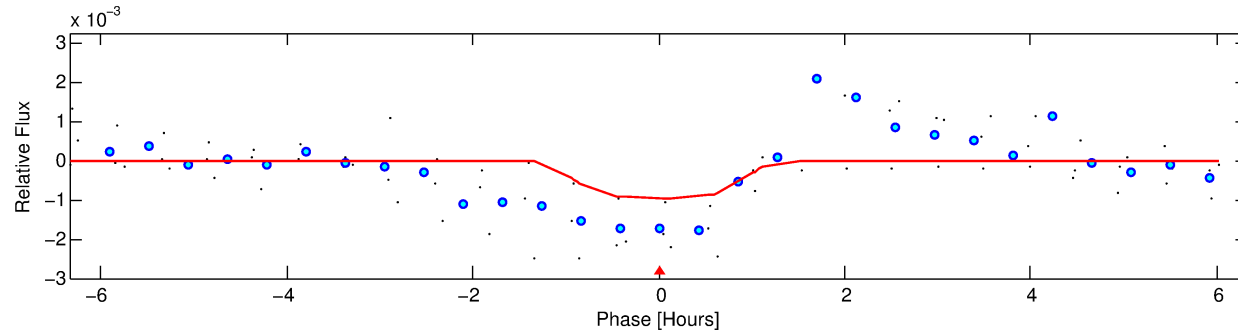
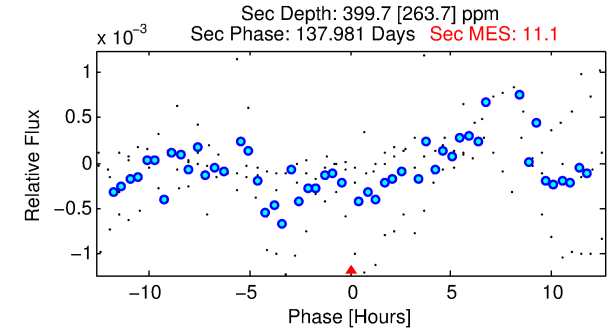
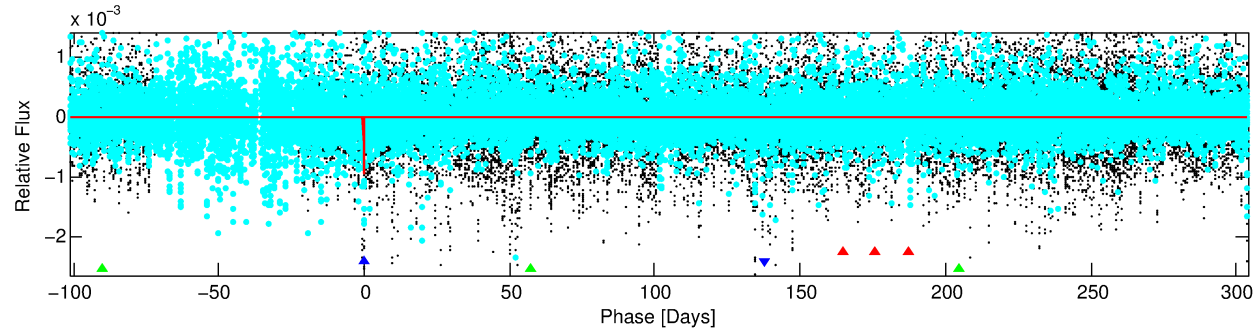
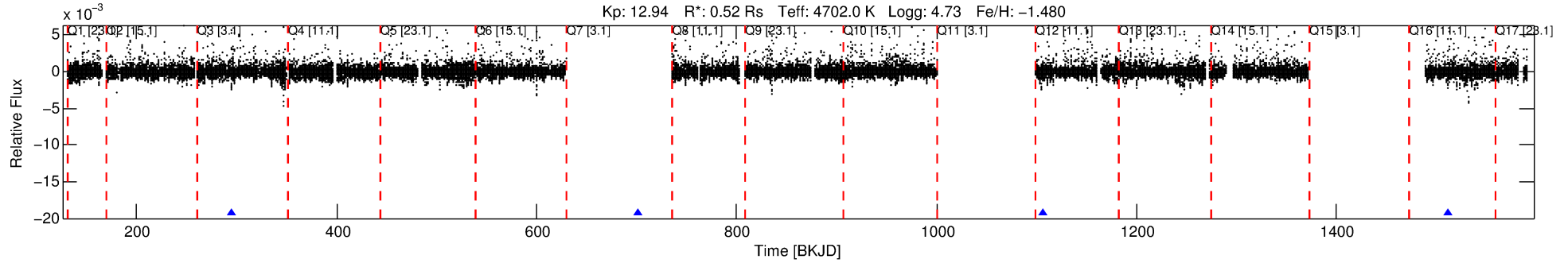
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009726020-02

No Significant Match Found

# DV One-Page Summary

KIC: 9726020 Candidate: 2 of 3 Period: 405.280 d



## DV Fit Results:

Period = 405.28016 [0.00467] d  
Epoch = 295.6502 [0.0100] BKJD  
Rp/R\* = 0.0298 [0.4808]  
a/R\* = 1145.37 [77924.42]  
b = 0.67 [56.69]  
Seff = 0.16 [0.03]  
Teq = 160 [7] K  
Rp = 1.68 [27.12] Re  
a = 0.8667 [0.0501] AU  
Ag = 58457.30 [1886972.50] [0.03 $\sigma$ ]  
Teffp = 3852 [31082] K [0.12 $\sigma$ ]

## DV Diagnostic Results:

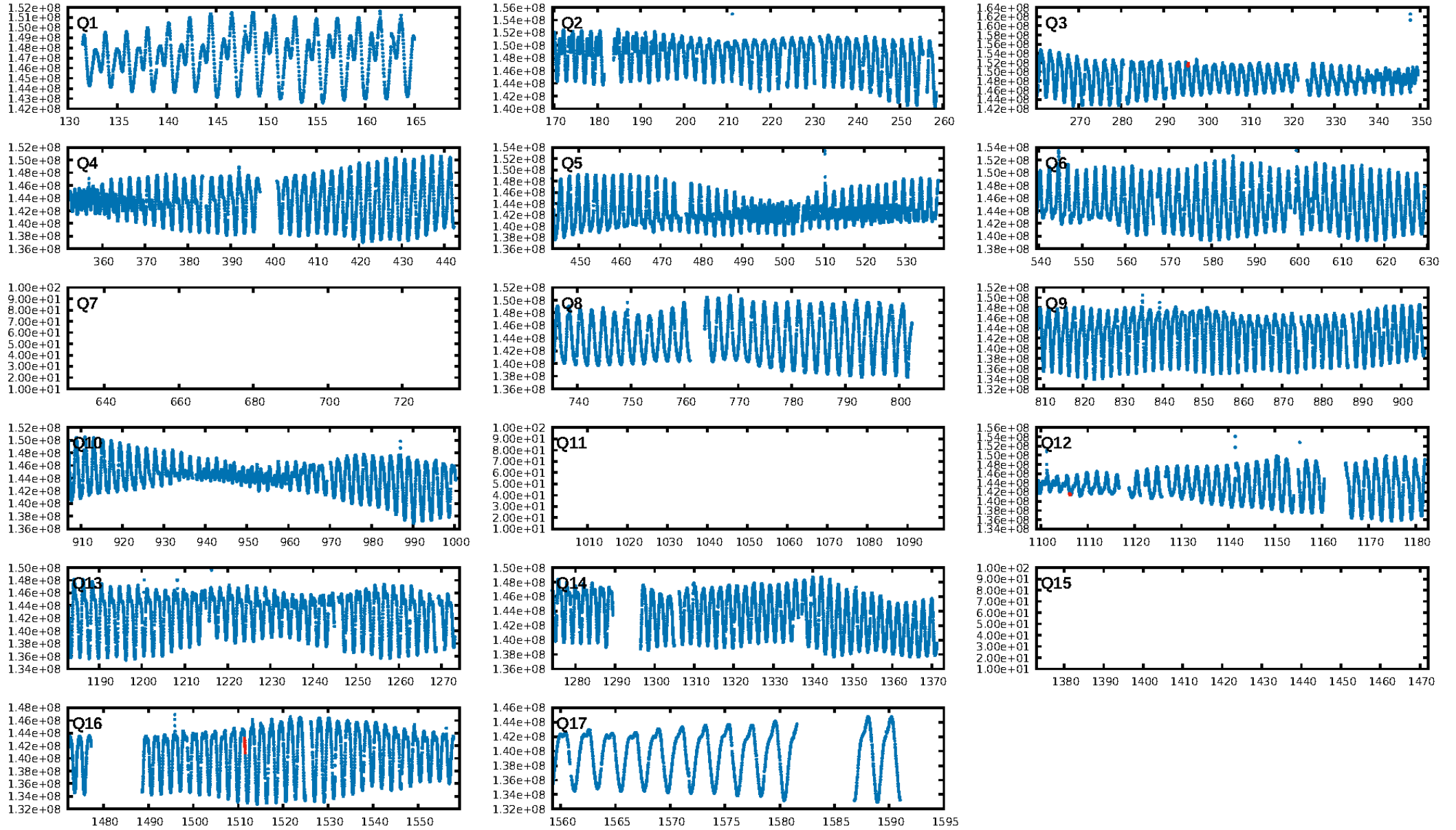
ShortPeriod-sig: 100.0% [8.88 $\sigma$ ]  
LongPeriod-sig: 100.0% [138.94 $\sigma$ ]  
ModelChiSquare2-sig: 1.1%  
ModelChiSquareGof-sig: 72.0%  
**Bootstrap-pfa: 1.35e-09**  
RollingBand-fgt: 1.00 [3/3]  
**GhostDiagnostic-chr: 0.4908**  
Centroid-sig: 74.1%  
Centroid-so: 0.200 arcsec [0.29 $\sigma$ ]  
OotOffset-rm: 0.183 arcsec [0.19 $\sigma$ ]  
OotOffset-st: 0/1/2/0 [3]  
KicOffset-rm: 0.331 arcsec [0.43 $\sigma$ ]  
KicOffset-st: 0/1/2/0 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 15:42:57 Z

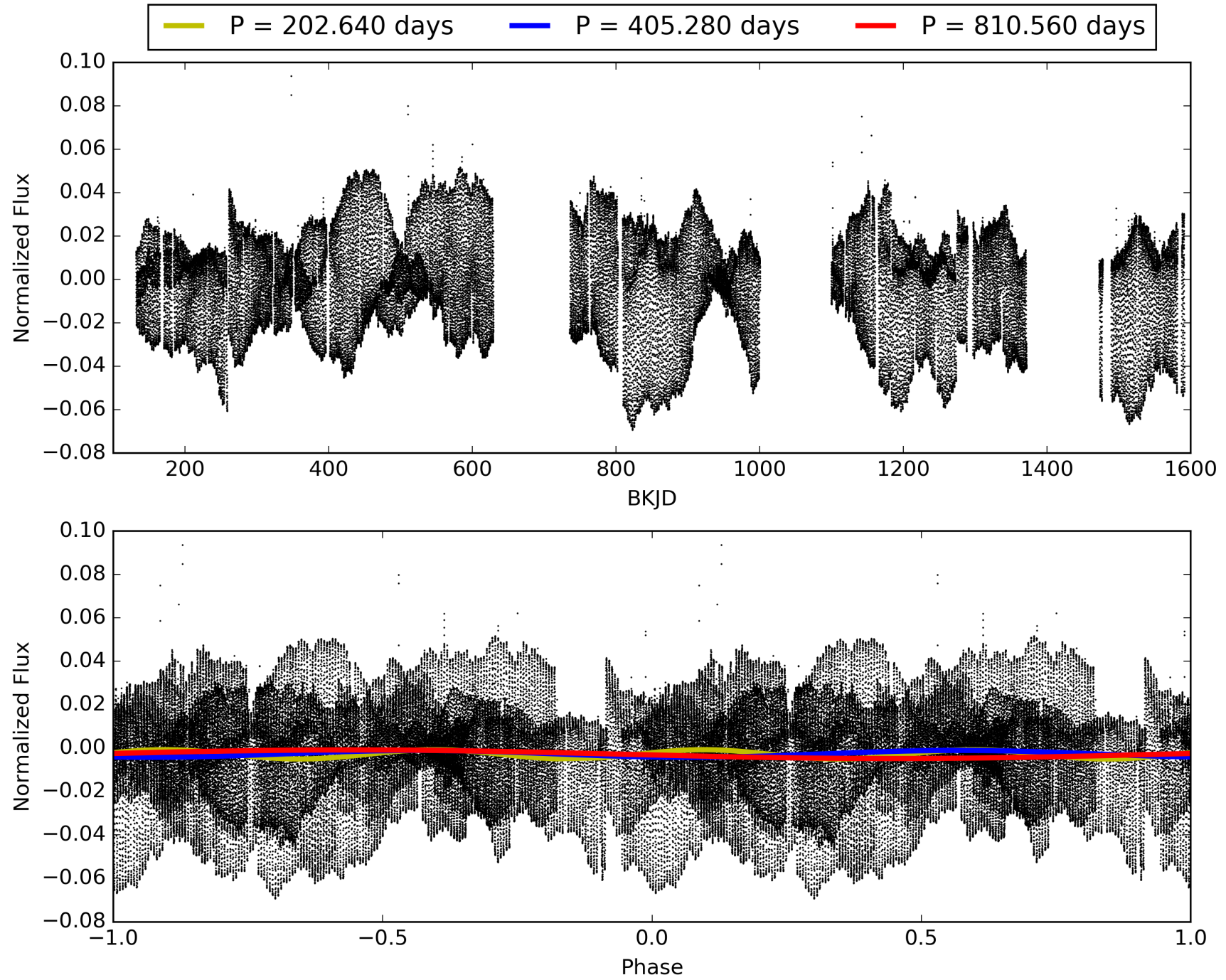
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 009726020-02, PDC Light Curves

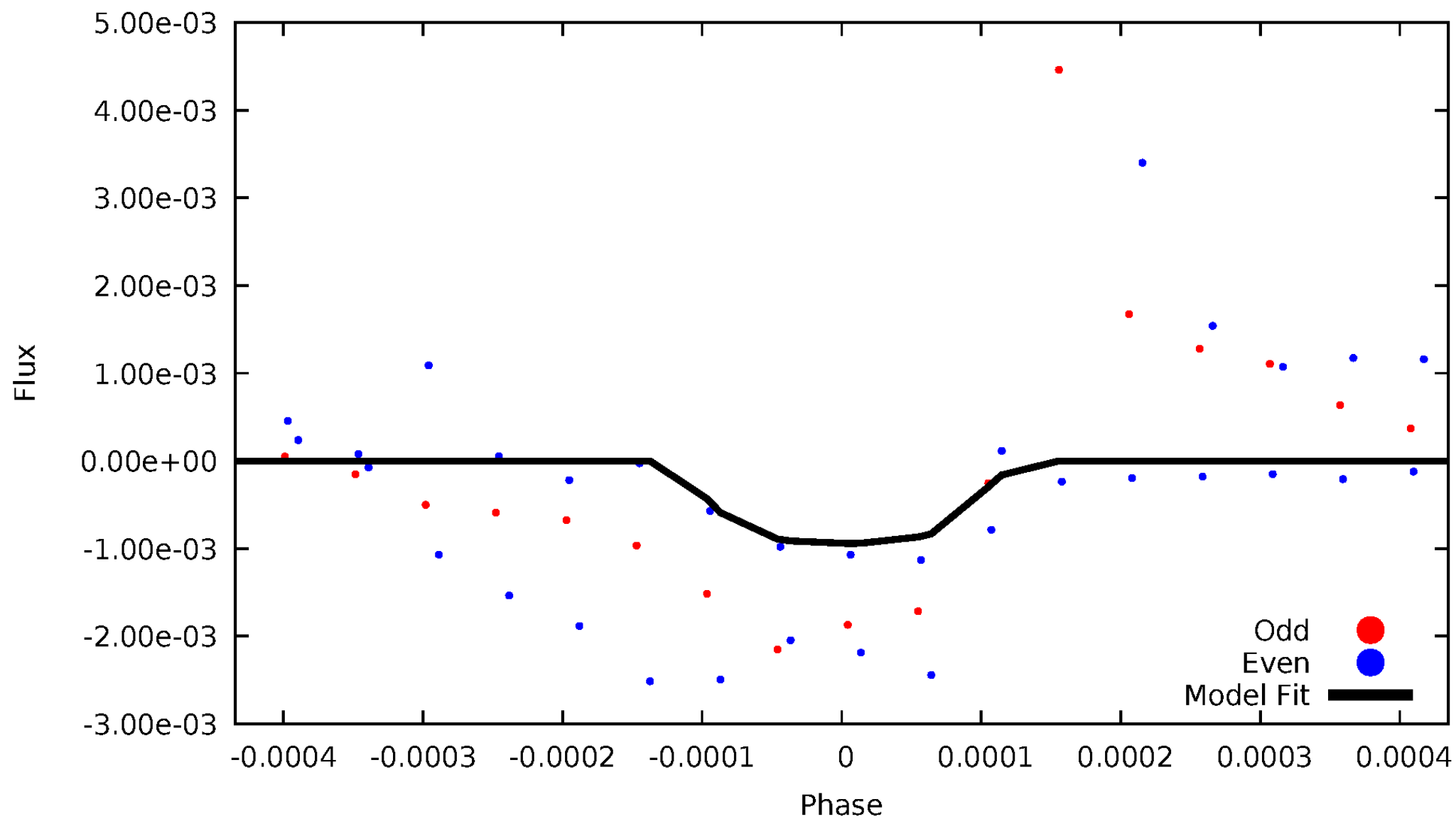


TCE 009726020-02



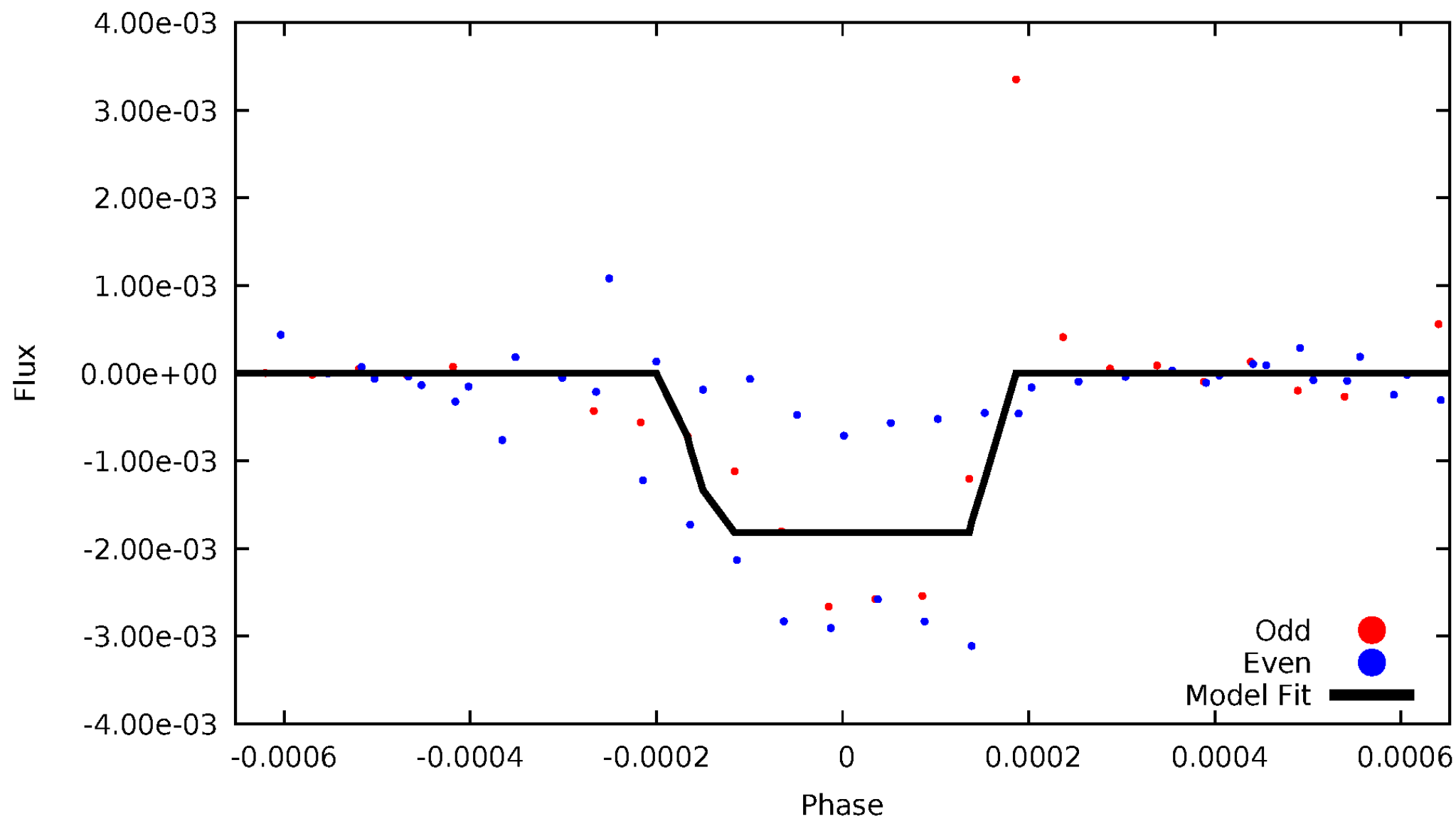
# DV Odd/Even

TCE 009726020-02



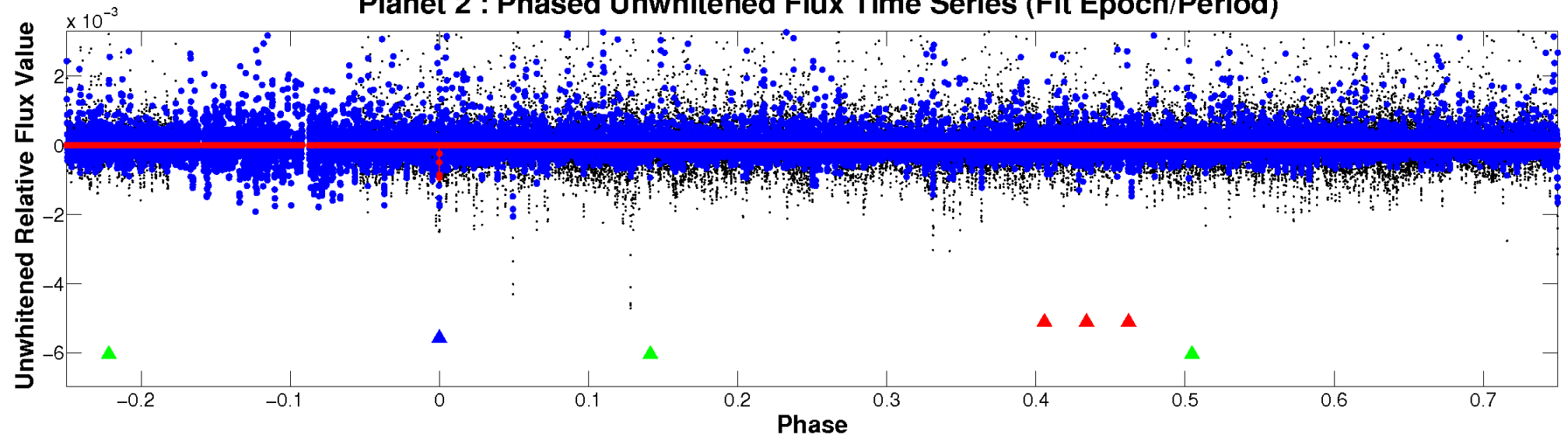
# ALT Odd/Even

TCE 009726020-02

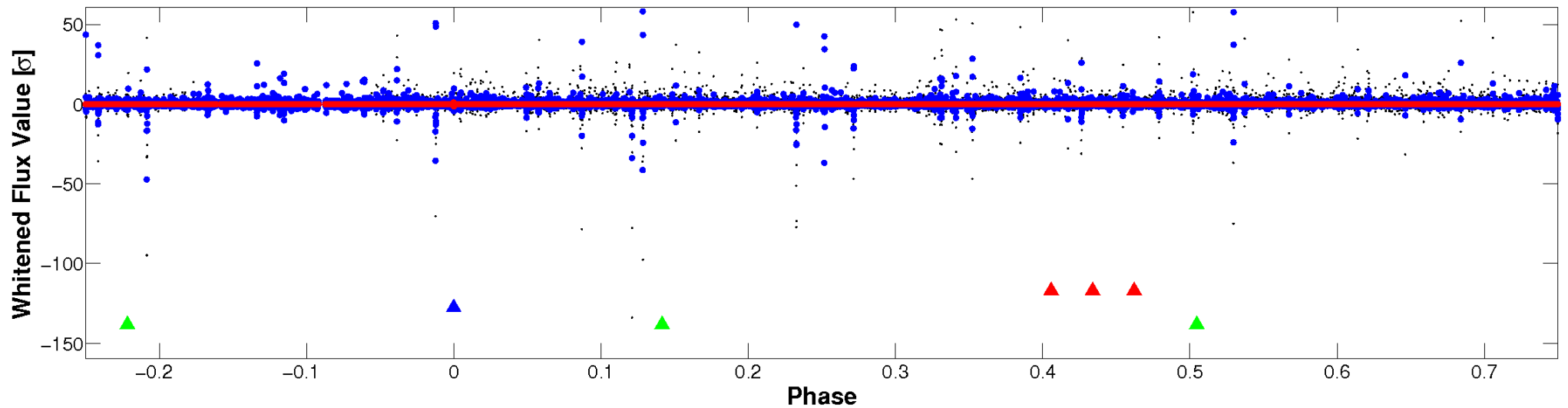


# Non-Whitened Vs. Whitened Light Curve

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

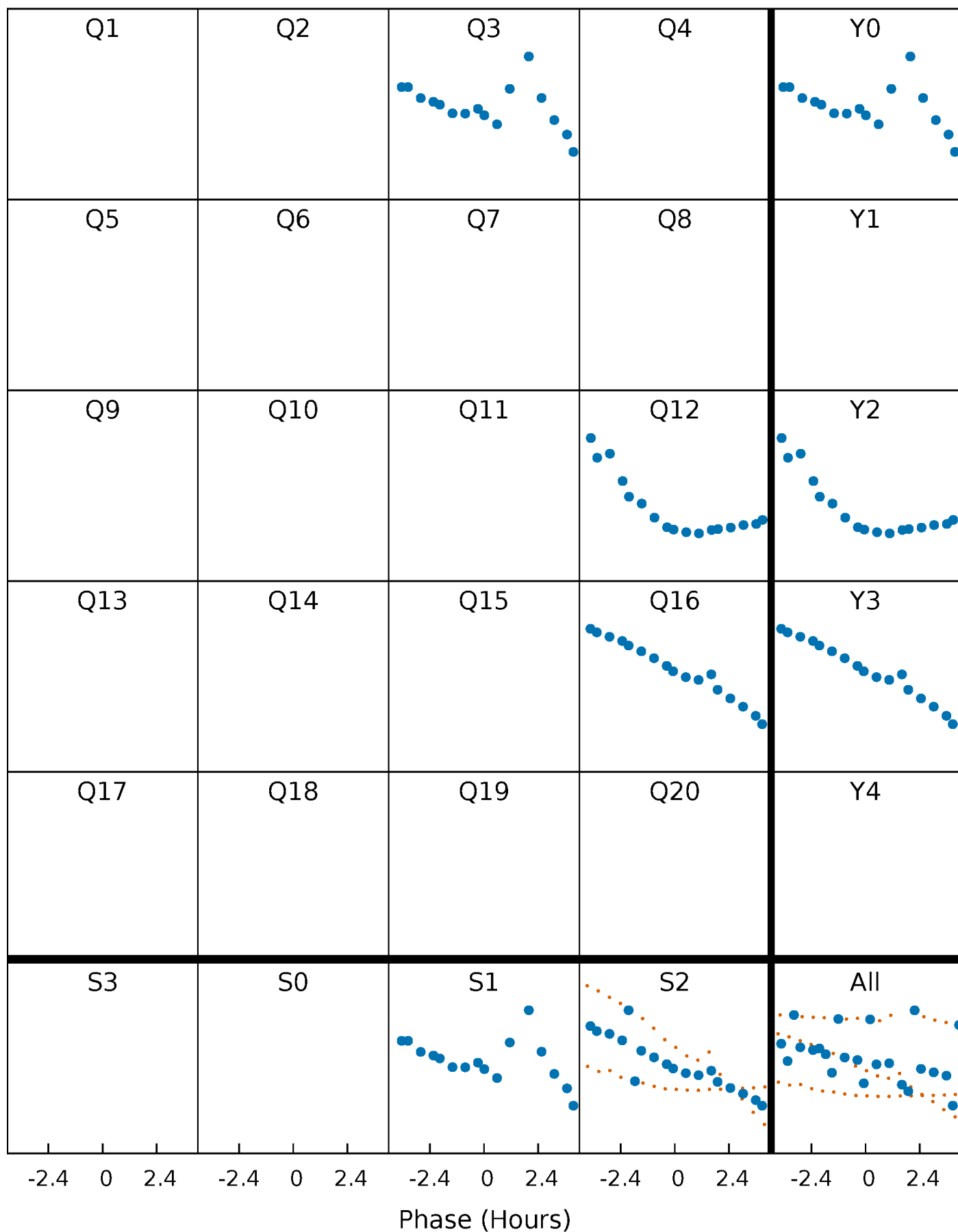


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



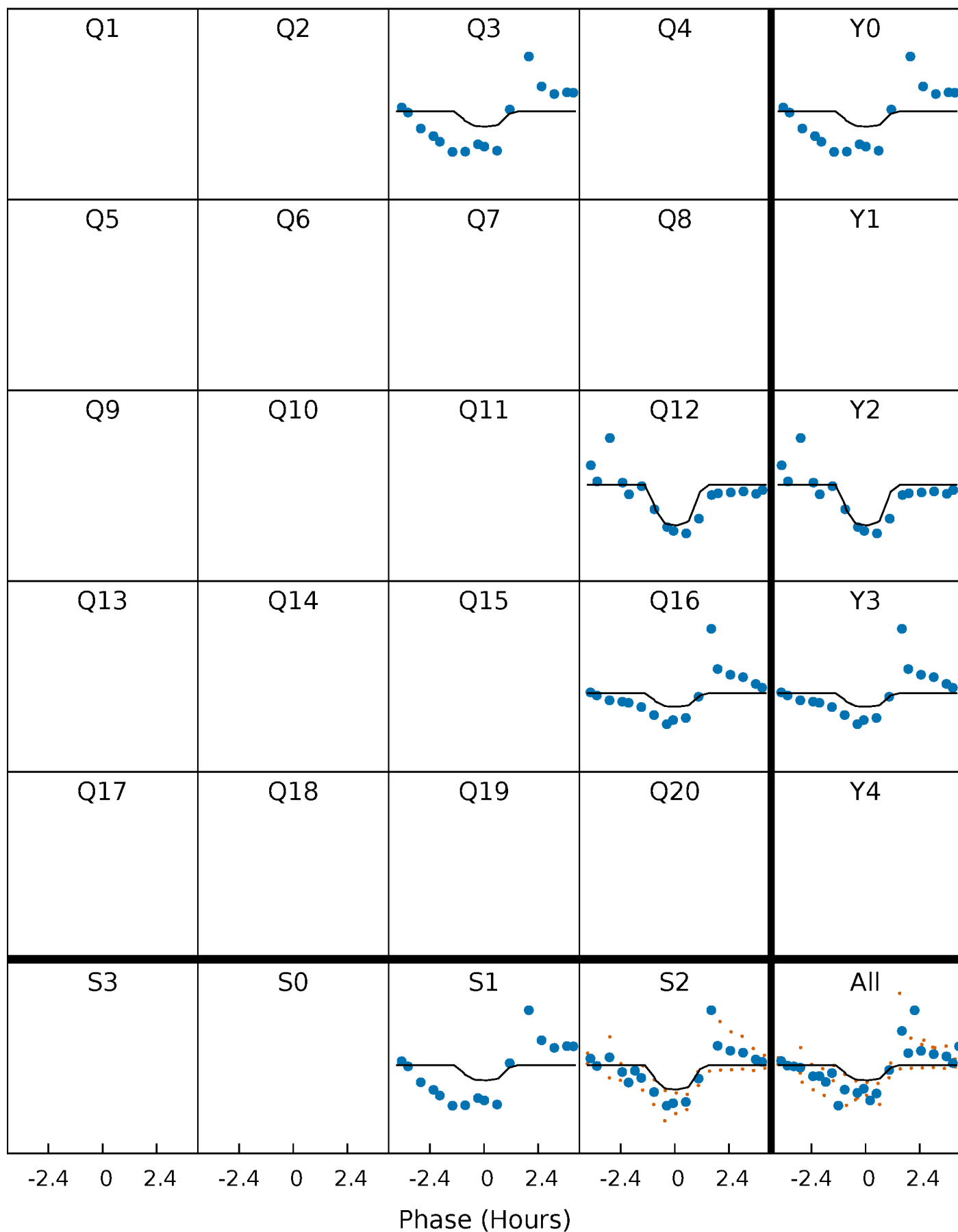
# PDC Quarter-Phased Transit Curves

TCE 009726020-02 P=405.280163 Days  $T_0=295.650211$  (BKJD)



# DV Quarter-Phased Transit Curves

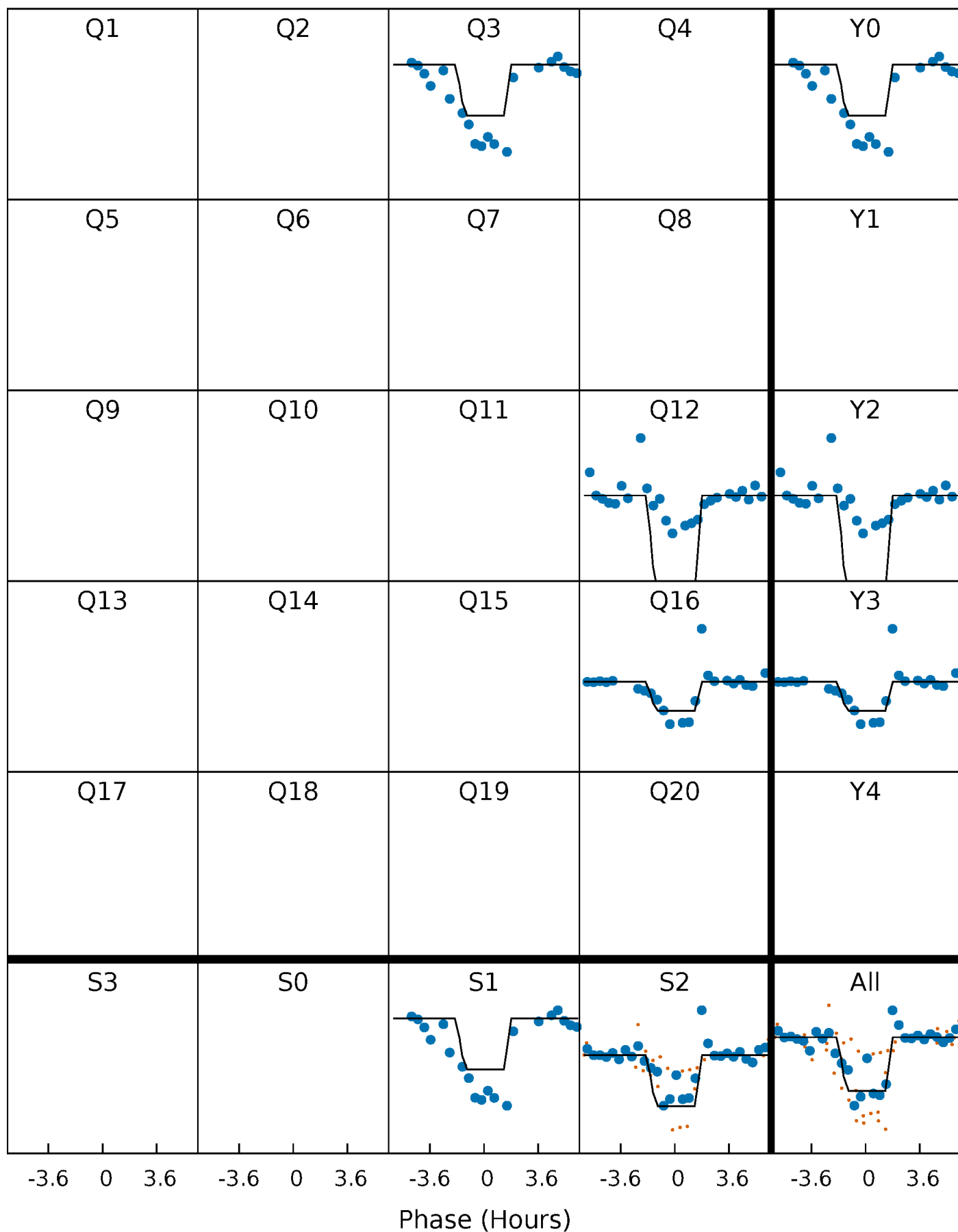
TCE 009726020-02     $P=405.280163$  Days     $T_0=295.650211$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

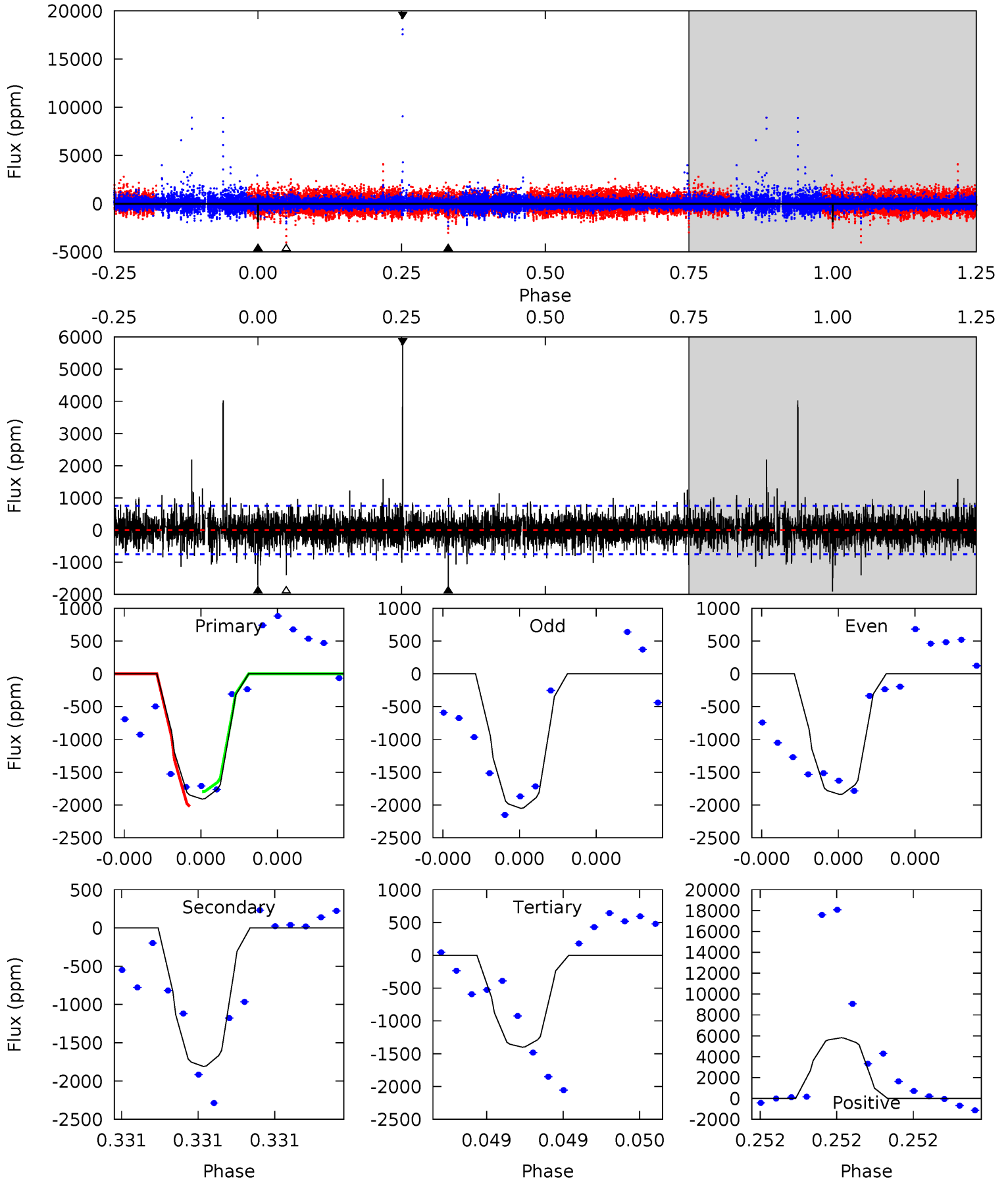
TCE 009726020-02 P=405.286040 Days  $T_0=295.620038$  (BKJD)



# DV Model-Shift Uniqueness Test

009726020-02, P = 405.280163 Days, E = 295.650211 Days

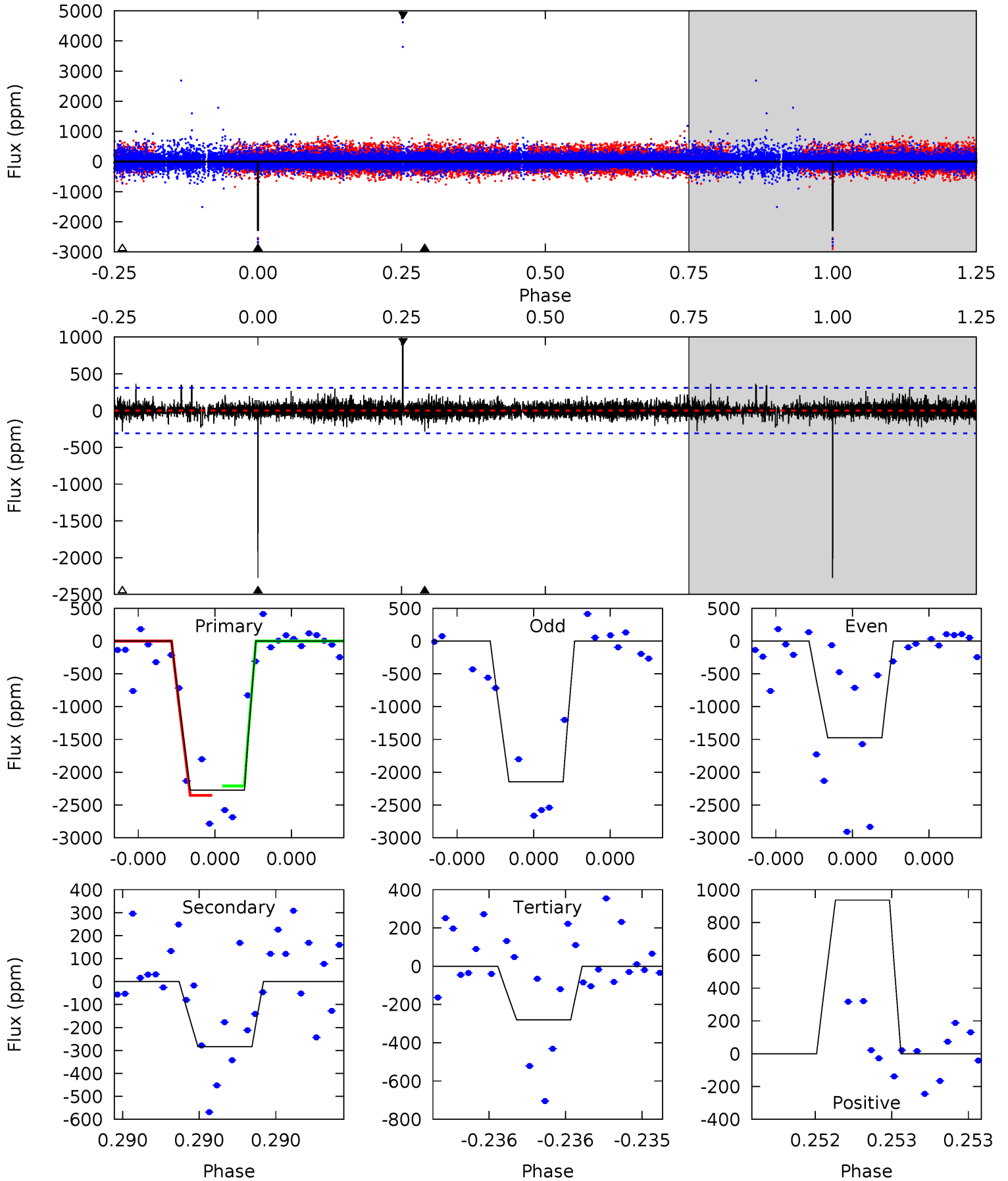
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.4	13.7	10.6	43.9	5.69	3.66	2.15	3.85	-29.5	3.09	-30.2	0.53	0.93	0.75	0.83



# Alt Model-Shift Uniqueness Test

009726020-02, P = 405.286040 Days, E = 295.620038 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
41.3	5.15	5.10	17.0	5.63	3.57	0.99	36.2	24.3	0.05	-11.9	6.57	0.88	0.29	1.30



### Stellar Parameters For KIC 009726020

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4702^{+129}_{-161}$	$4.734^{+0.049}_{-0.025}$	$-1.480^{+0.300}_{-0.300}$	$0.517^{+0.024}_{-0.034}$	$0.528^{+0.034}_{-0.024}$	$5.379^{+1.055}_{-0.494}$
	+3%/-3%	+1%/-1%	+20%/-20%	+5%/-7%	+6%/-5%	+20%/-9%
Source	PHO1	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 009726020-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1810 \pm 132$	$19.32^{+21.42}_{-13.51}$	$222^{+7}_{-7}$	$2460^{+959}_{-375}$	$2021^{+20291}_{-1573}$
Alt.	$-284 \pm 55$	$19.03^{+20.44}_{-13.33}$	$222^{+7}_{-8}$	$2013^{+625}_{-268}$	$331^{+3345}_{-257}$

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

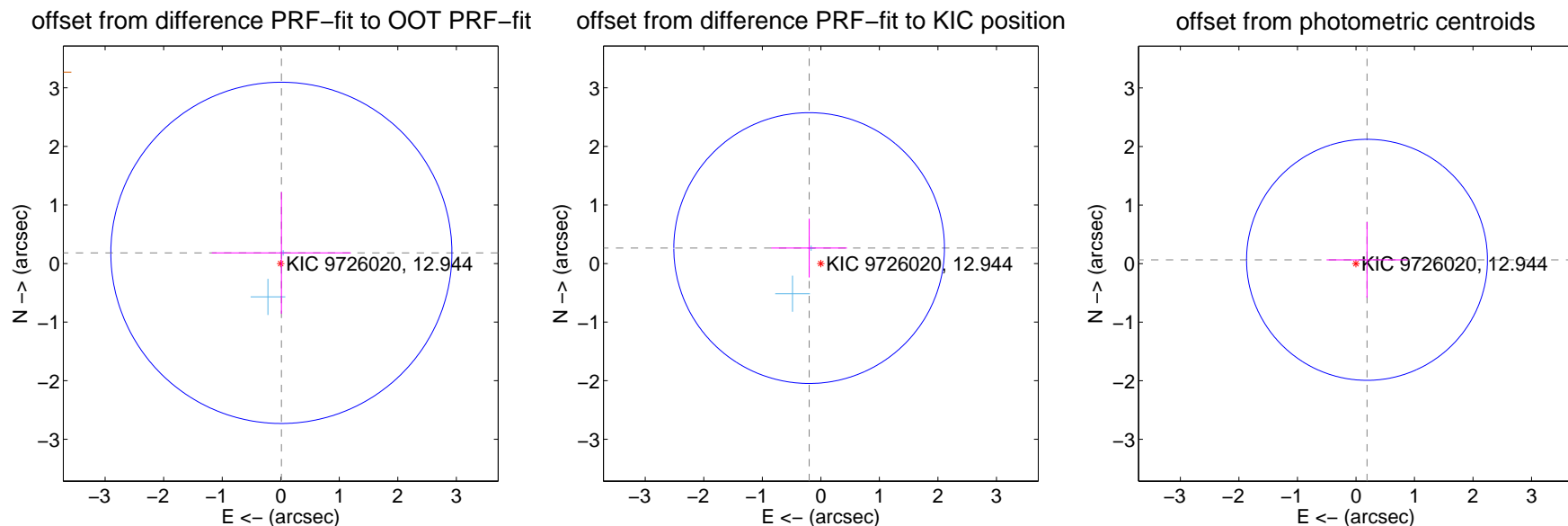
## DV Centroid Data

Supplemental centroid analysis for 009726020-02. Kepler magnitude: 12.94. Transit SNR 3.89

There are 2 quarters with good PRF difference image offsets

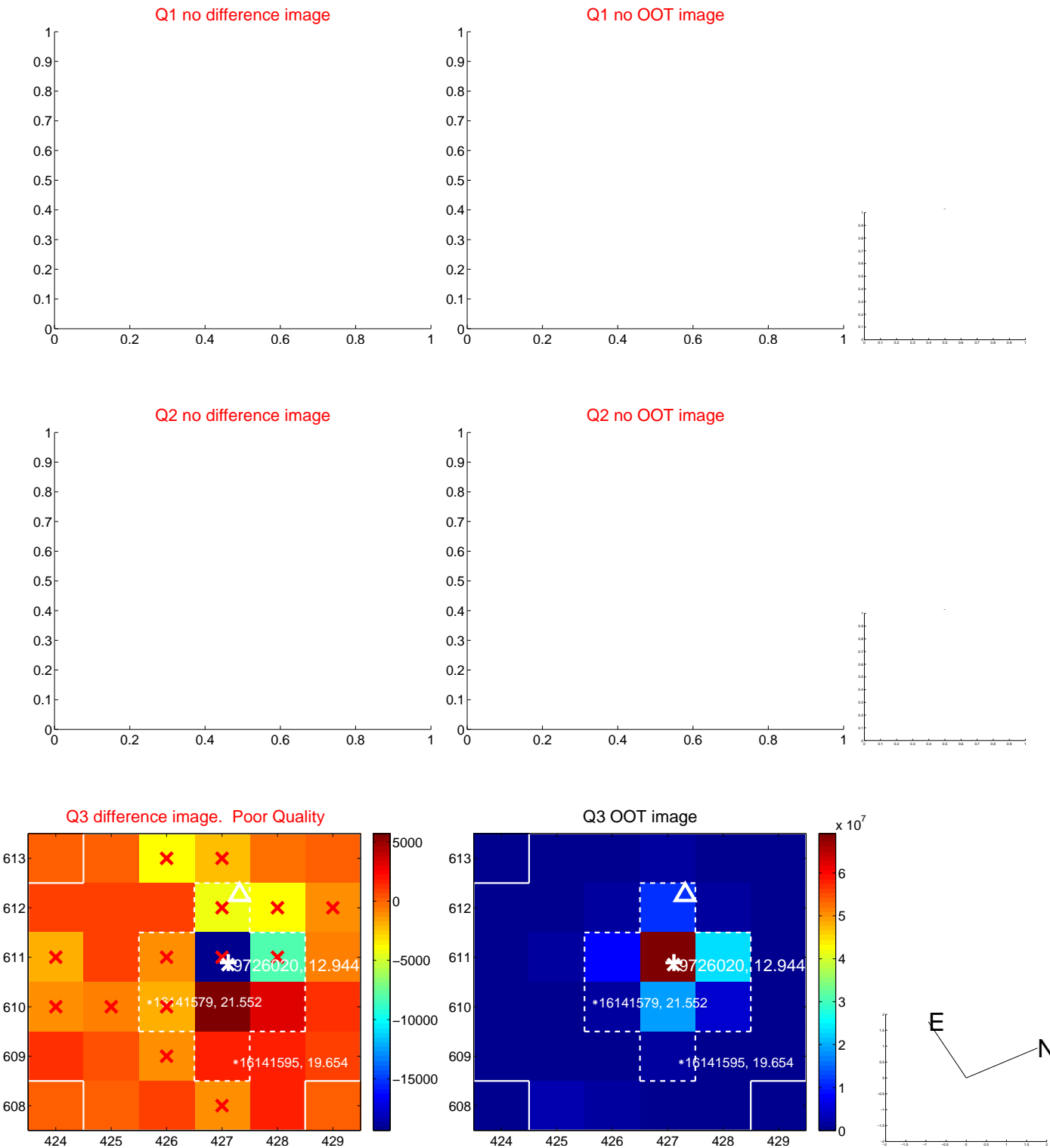
The direct PRF centroid is offset from the target star catalog position by about 0.27 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.183 \pm 0.971$	0.19	$-0.011 \pm 1.188$	$0.182 \pm 1.039$
PRF-fit source offset from KIC position	$0.331 \pm 0.771$	0.43	$0.200 \pm 0.646$	$0.264 \pm 0.502$
photometric centroid source offset	$0.20 \pm 0.69$	0.29	$-0.19 \pm 0.69$	$0.06 \pm 0.65$

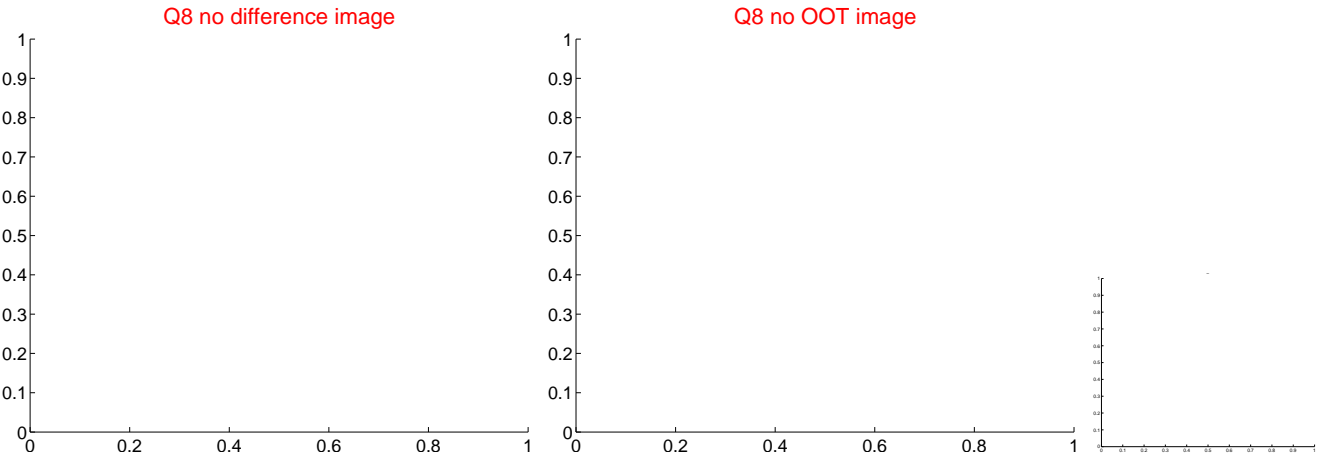
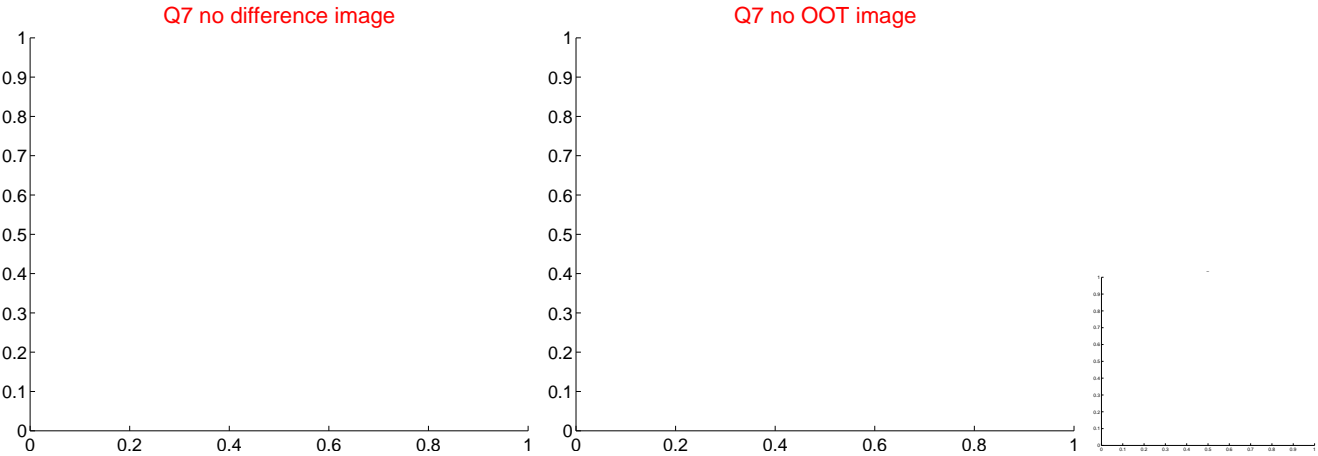
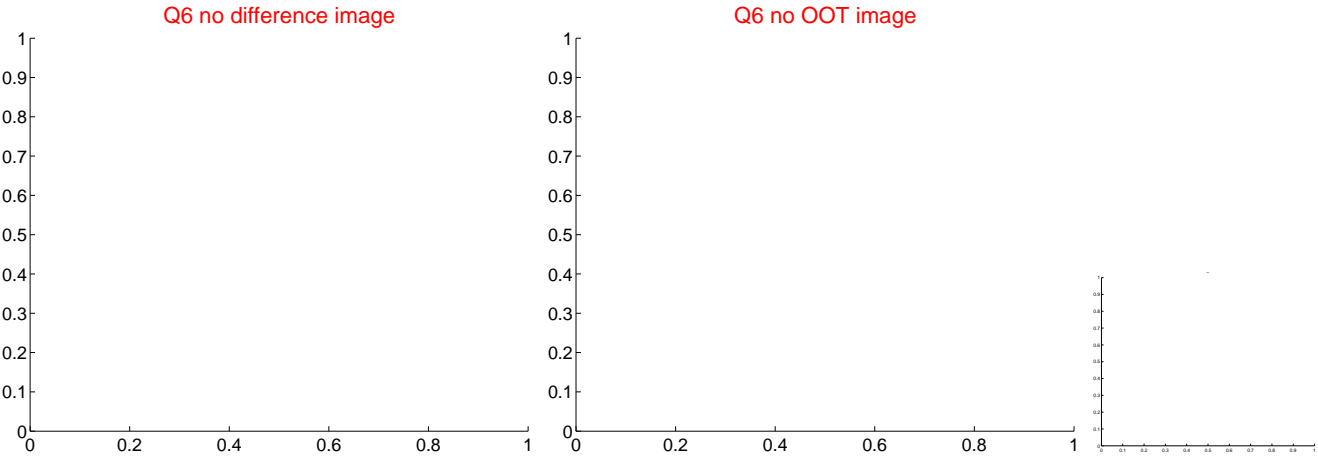
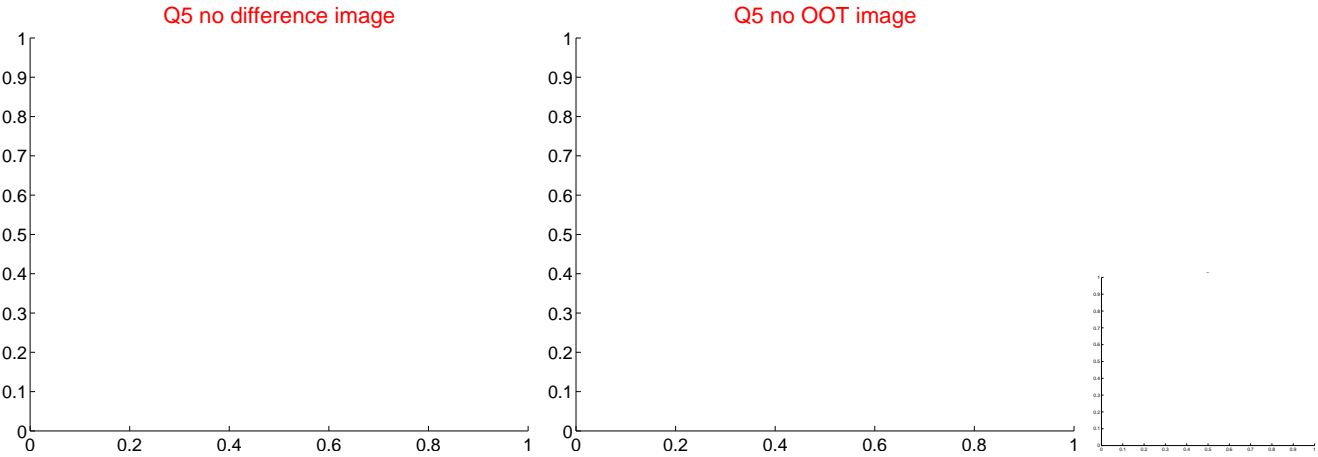


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

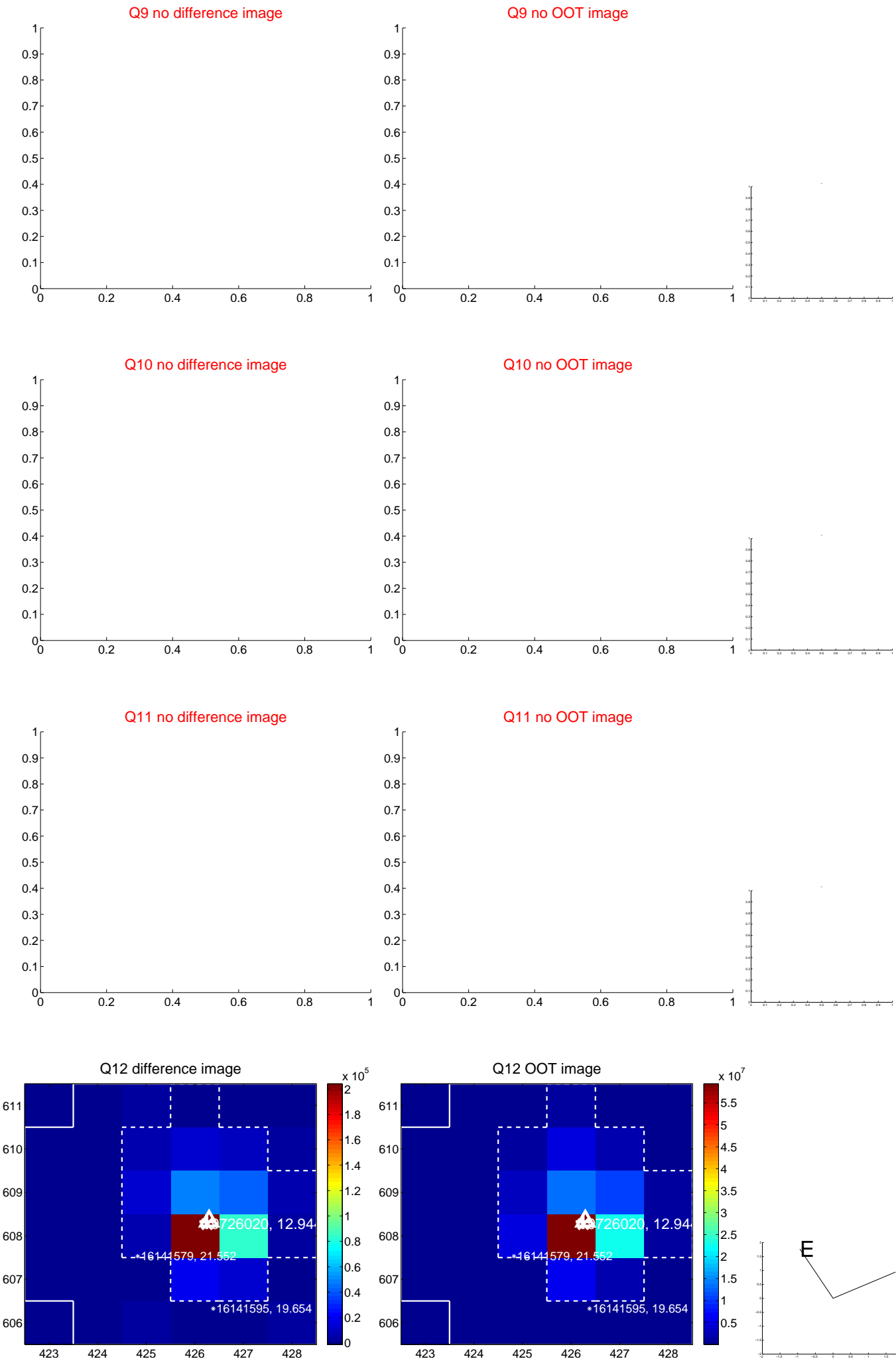


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

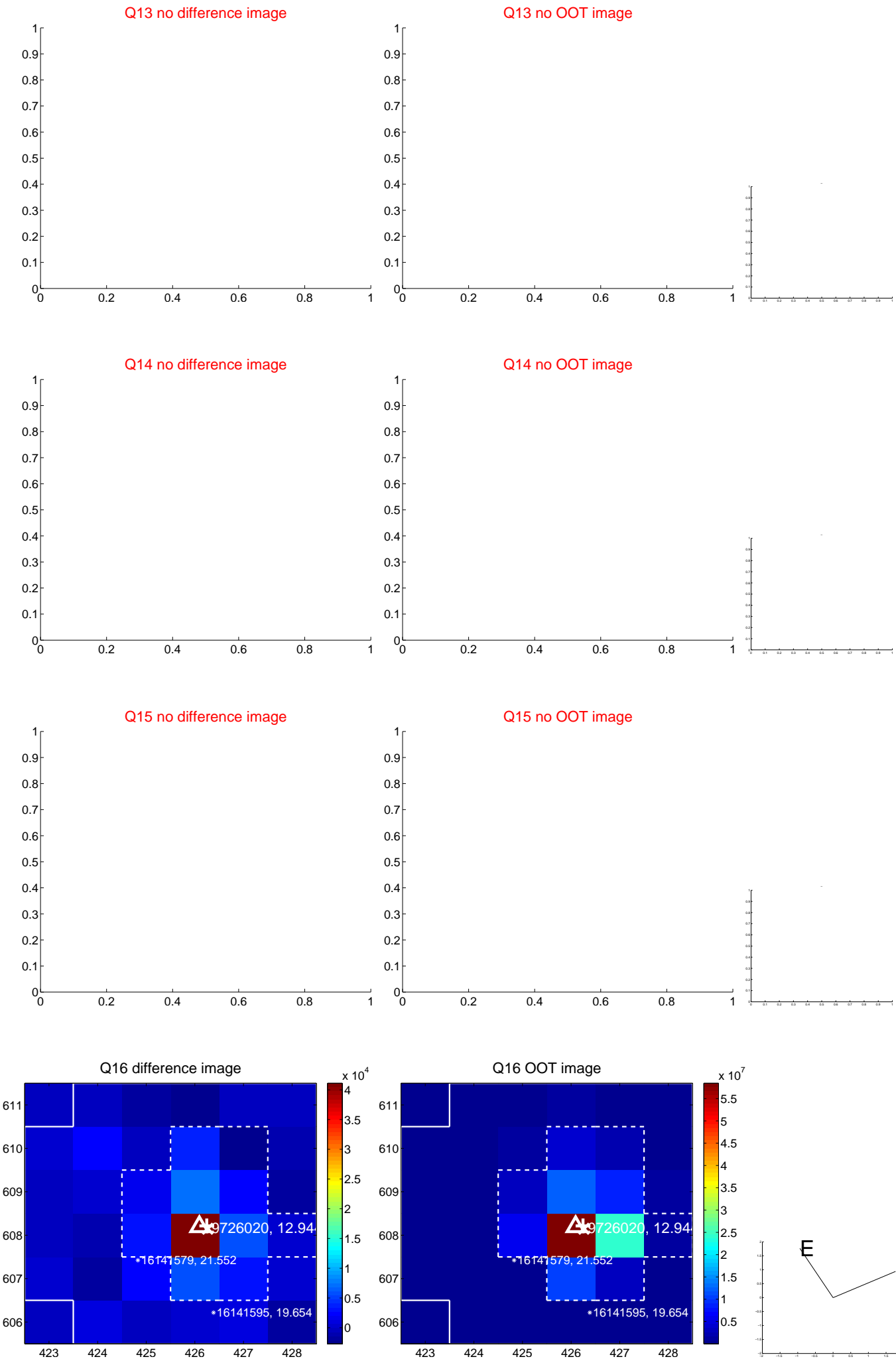




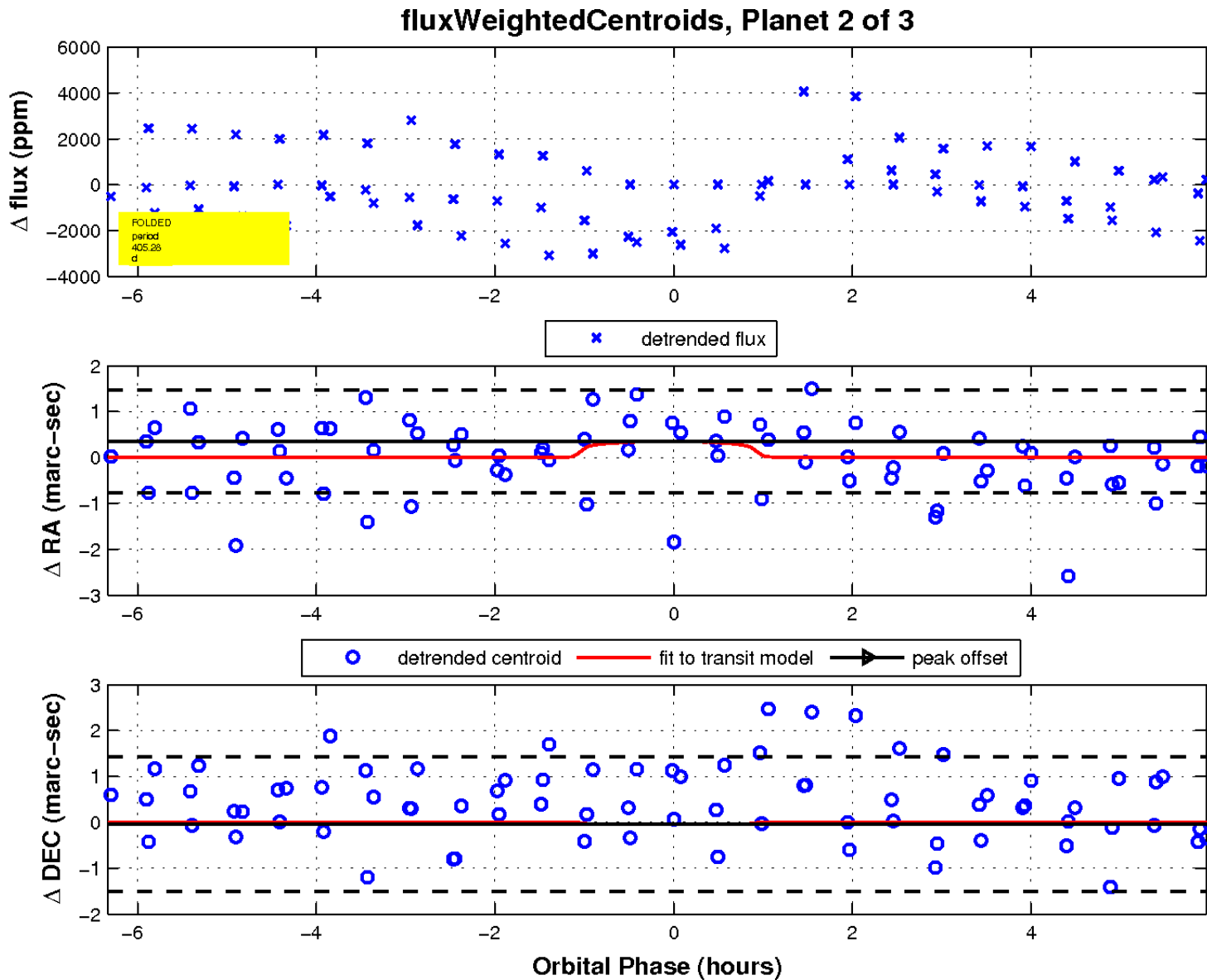
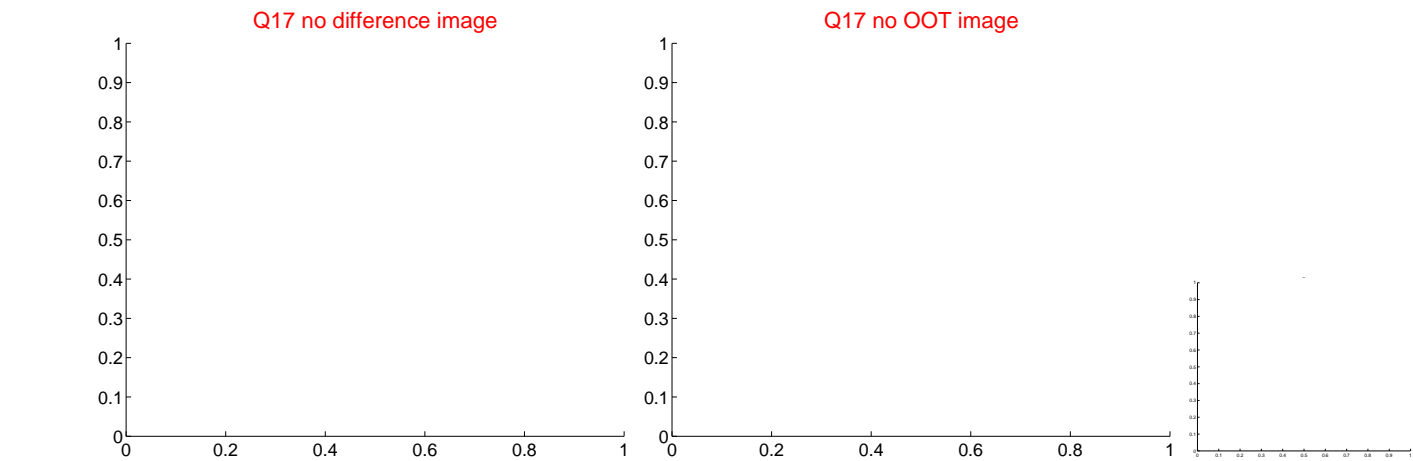
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



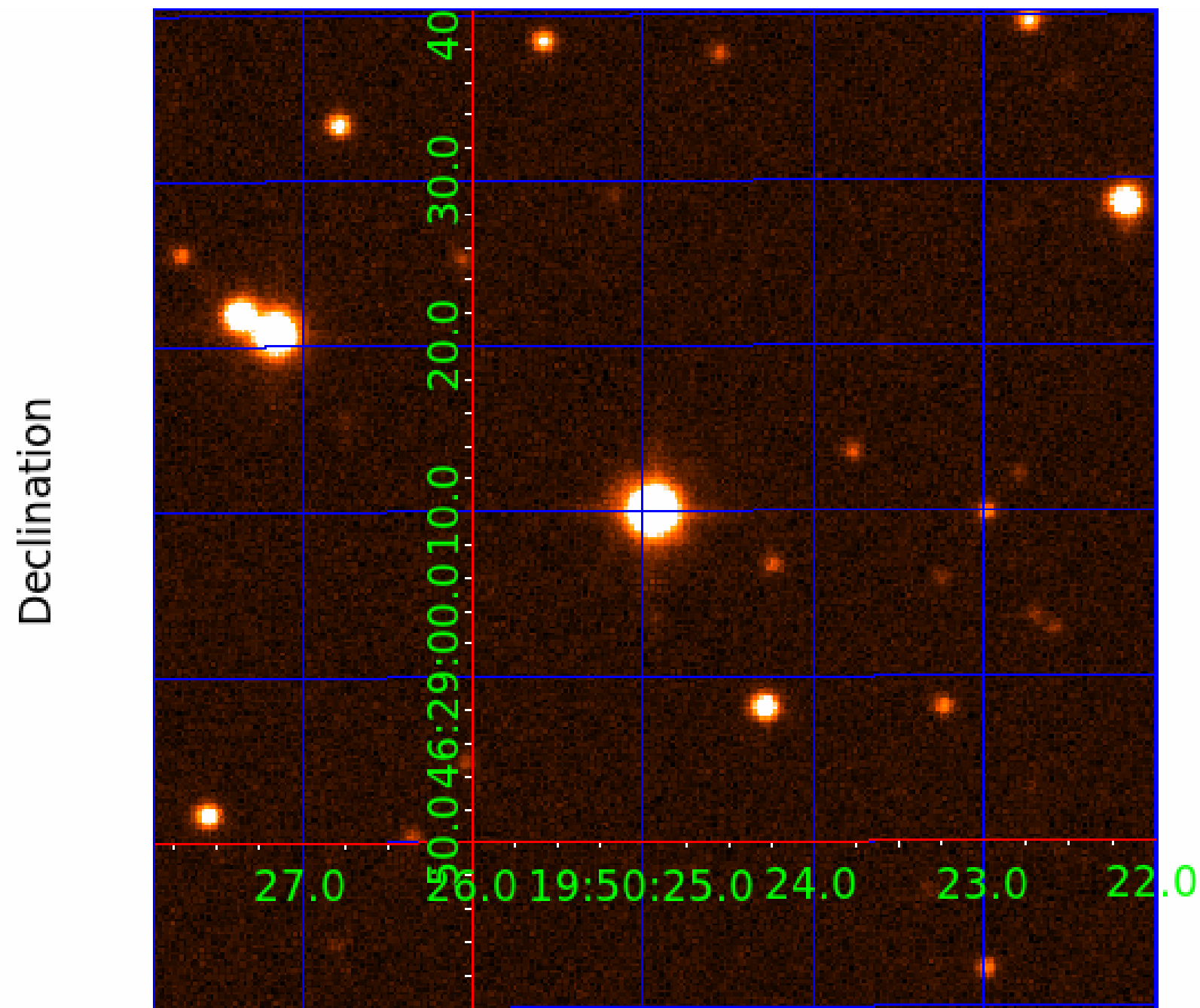
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 009726020

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009726020-01	OBS	No	393.856887	482.954804	2591.7	30.803	17.3	4.1	0.52	4702	3.03	0.16
009726020-02	OBS	No	405.280163	295.650210	942.6	2.113	14.4	3.9	0.52	4702	1.68	0.16
009726020-03	OBS	No	552.466290	205.831312	4268.6	25.336	12.9	4.8	0.52	4702	4.19	0.10

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009726020-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009726020-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009726020-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—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.

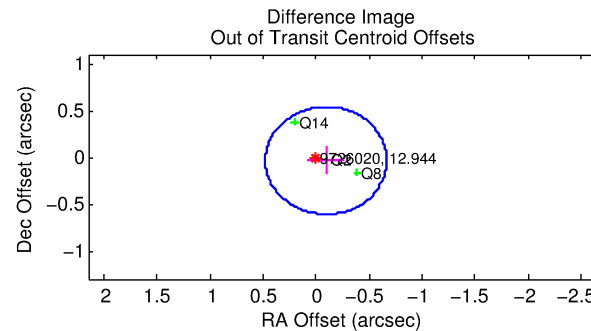
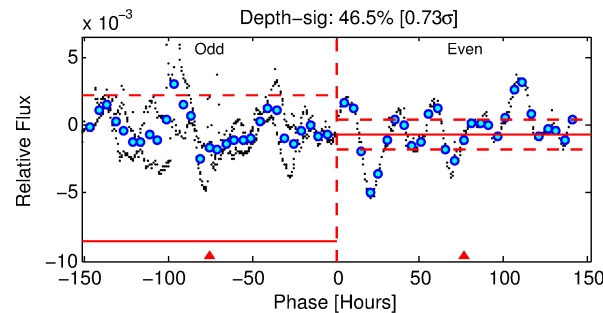
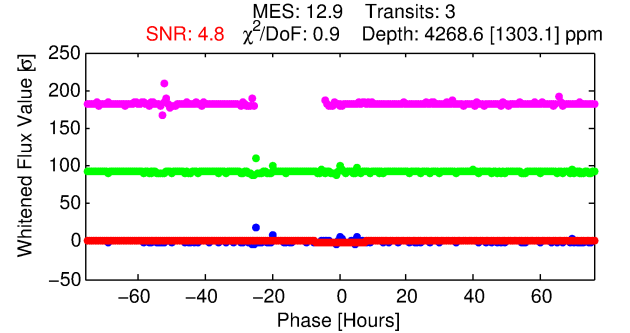
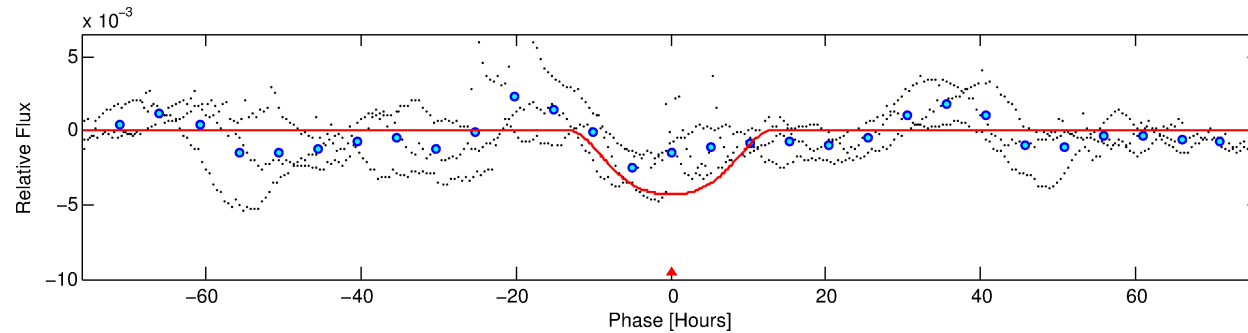
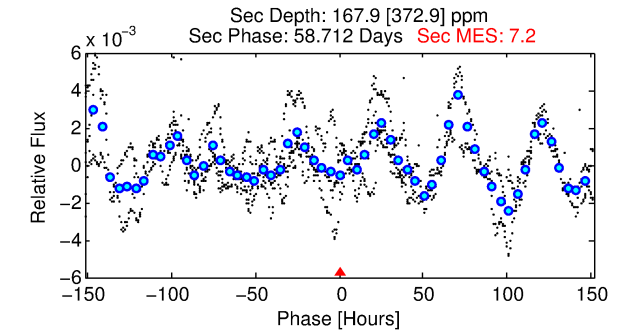
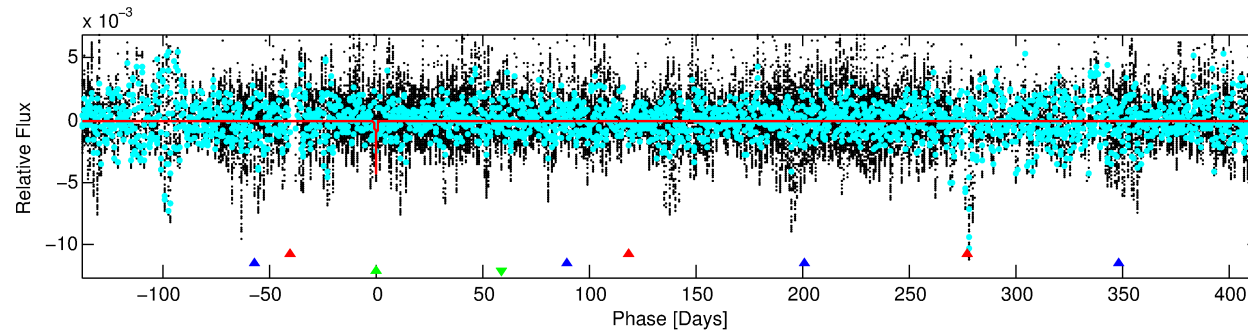
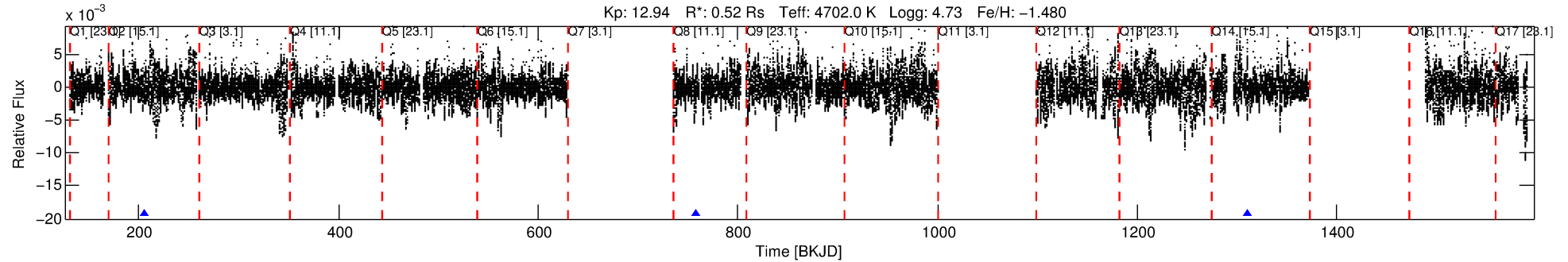
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009726020-03

No Significant Match Found

# DV One-Page Summary

KIC: 9726020 Candidate: 3 of 3 Period: 552.466 d



## DV Fit Results:

Period = 552.46629 [0.03307] d  
Epoch = 205.8313 [0.0456] BKJD  
Rp/R\* = 0.0743 [0.0129]  
a/R\* = 91.45 [9.02]  
b = 0.92 [0.03]  
Seff = 0.10 [0.02]  
Teq = 144 [6] K  
Rp = 4.19 [0.78] Re  
a = 1.0655 [0.0615] AU  
Ag = 5961.10 [13412.35] [0.44 $\sigma$ ]  
Teffp = 1963 [1105] K [1.65 $\sigma$ ]

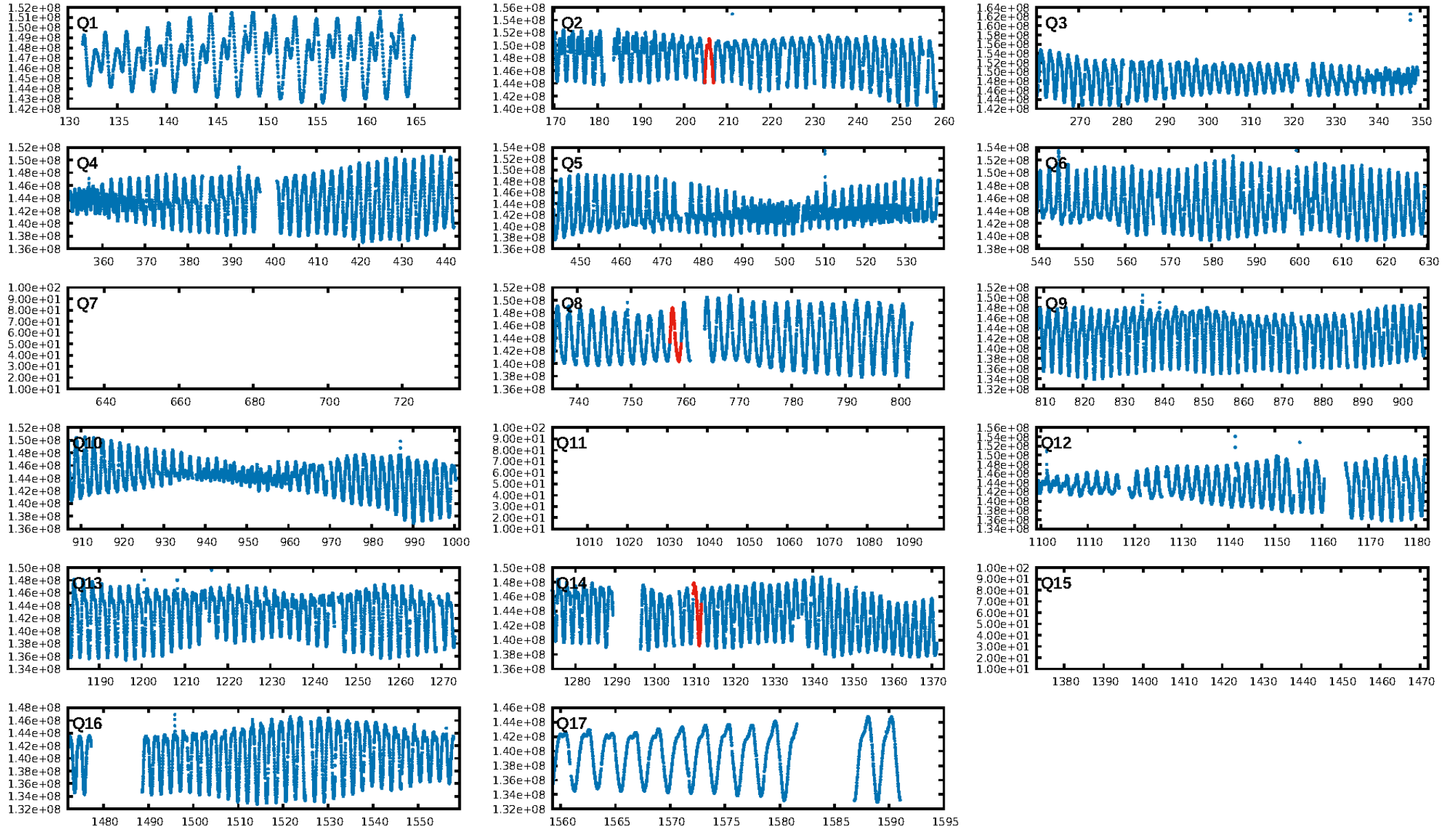
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [138.94 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 14.5%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 7.33e-08**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -9.952  
Centroid-sig: 8.8%  
Centroid-so: 0.025 arcsec [0.26 $\sigma$ ]  
OotOffset-rm: 0.099 arcsec [0.52 $\sigma$ ]  
OotOffset-st: 2/0/1/0 [3]  
KicOffset-rm: 0.209 arcsec [0.84 $\sigma$ ]  
KicOffset-st: 2/0/1/0 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

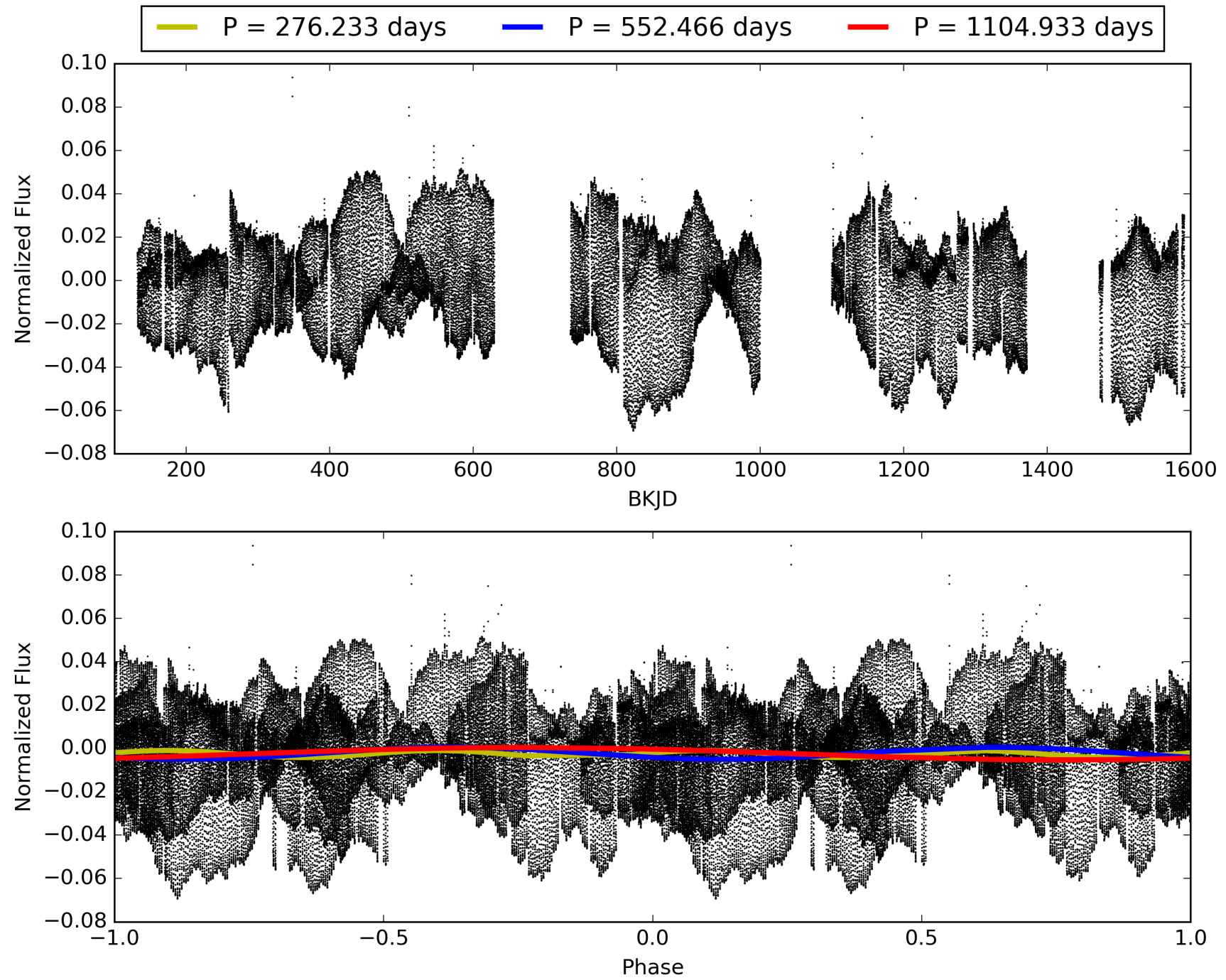
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 15:43:05 Z

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

# TCE 009726020-03, PDC Light Curves



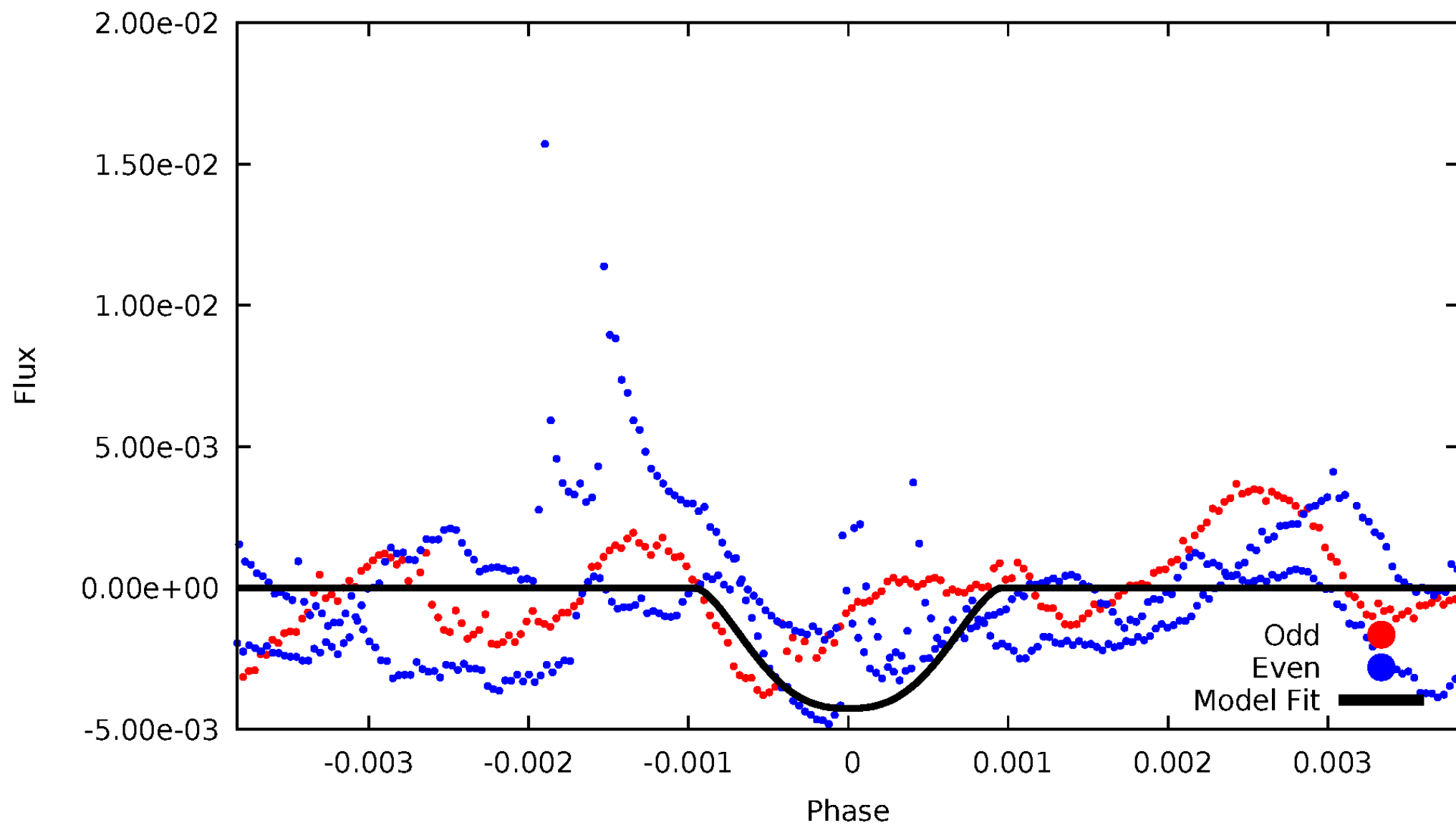
TCE 009726020-03





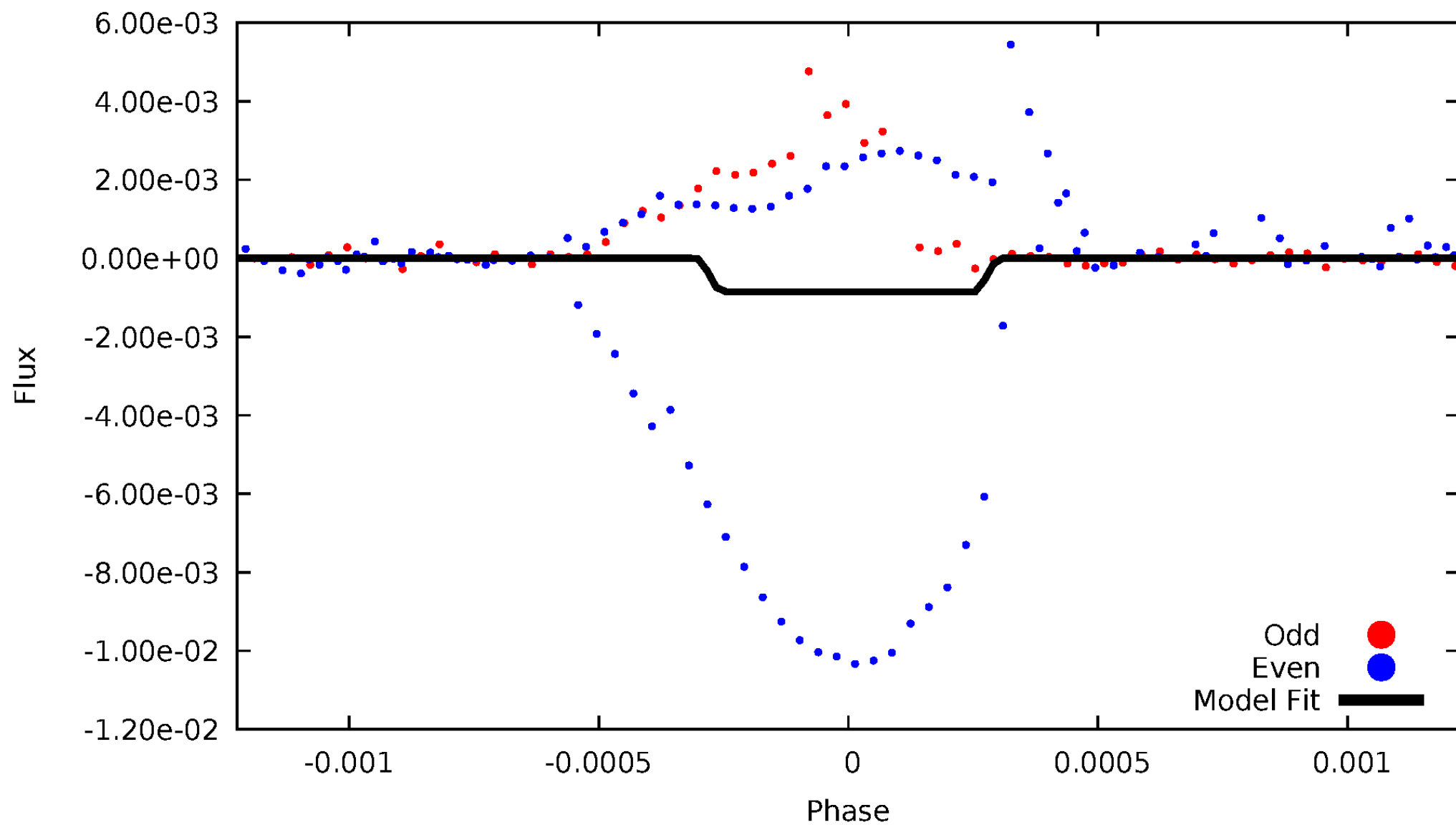
# DV Odd/Even

TCE 009726020-03



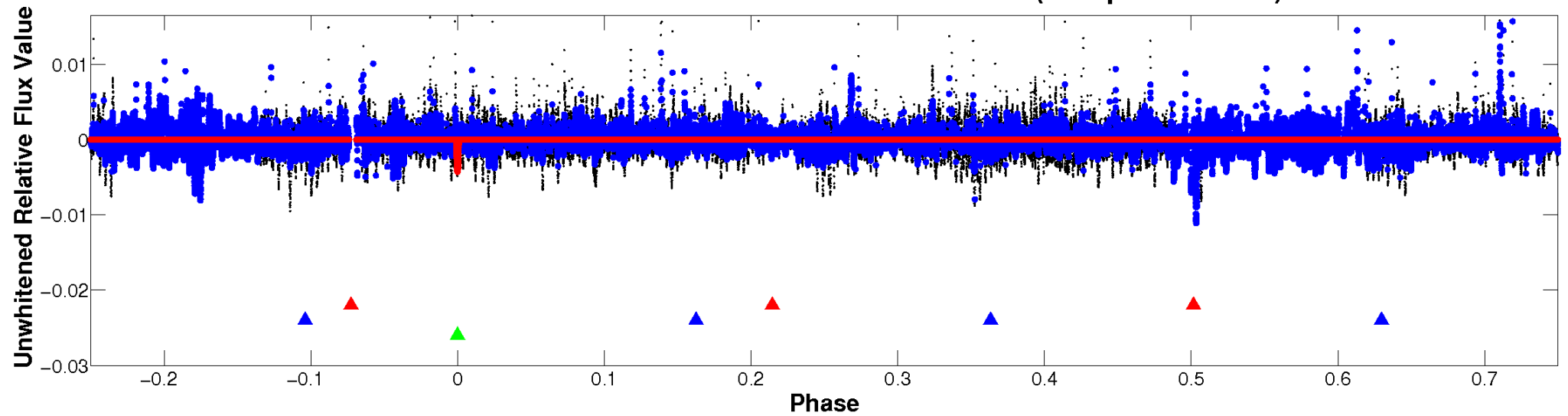
# ALT Odd/Even

TCE 009726020-03

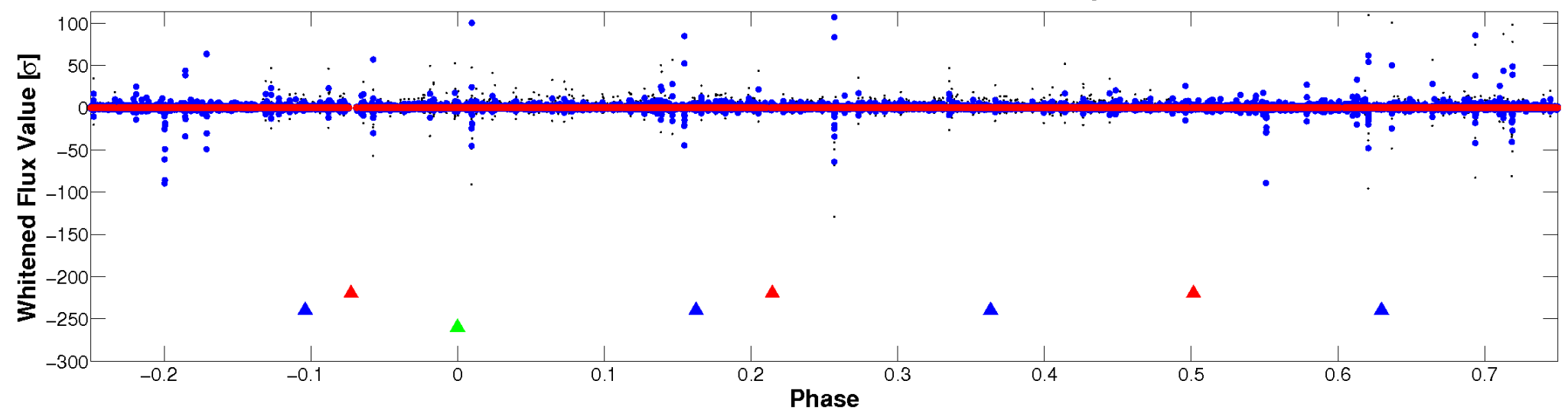


# Non-Whitened Vs. Whitened Light Curve

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

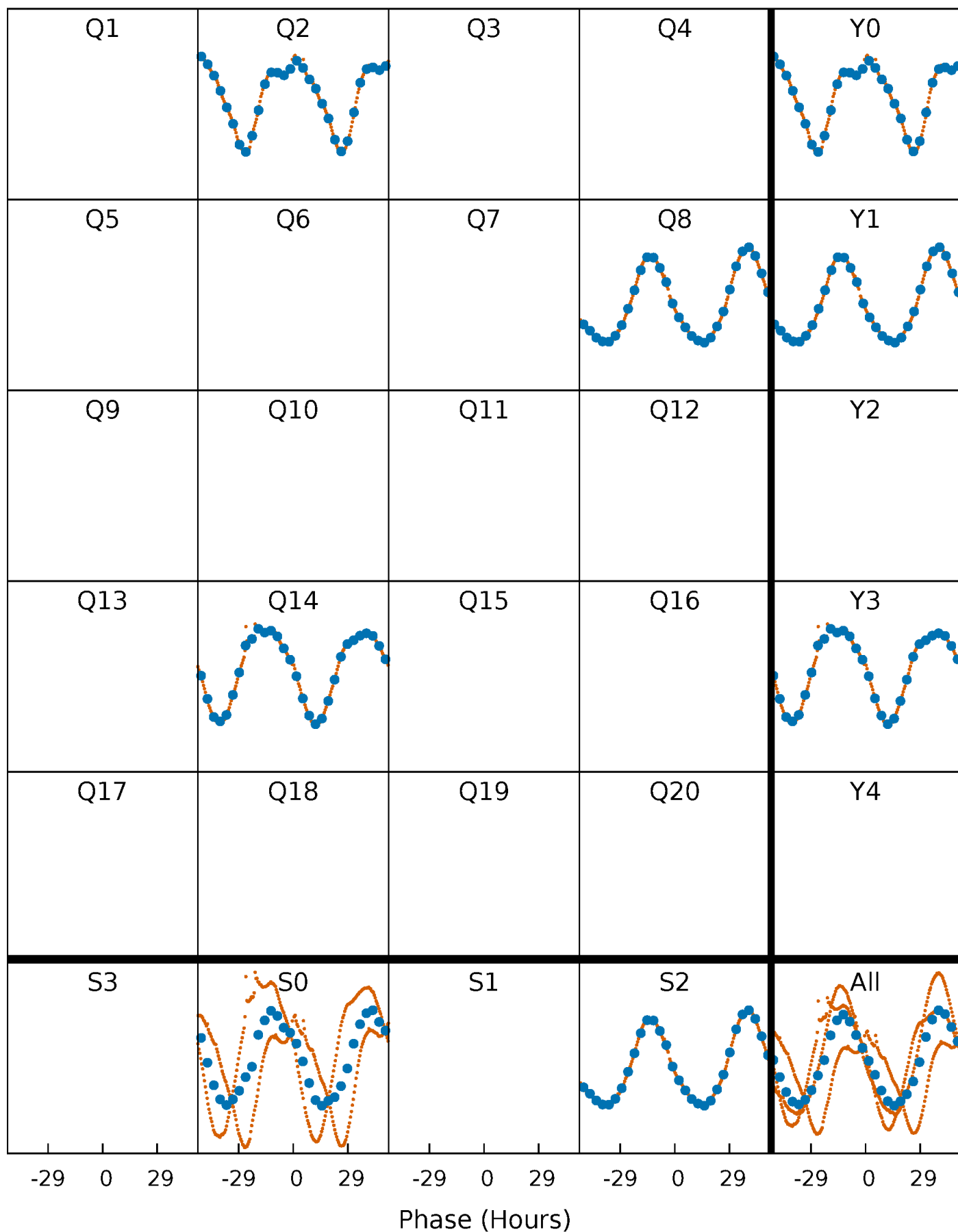


**Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



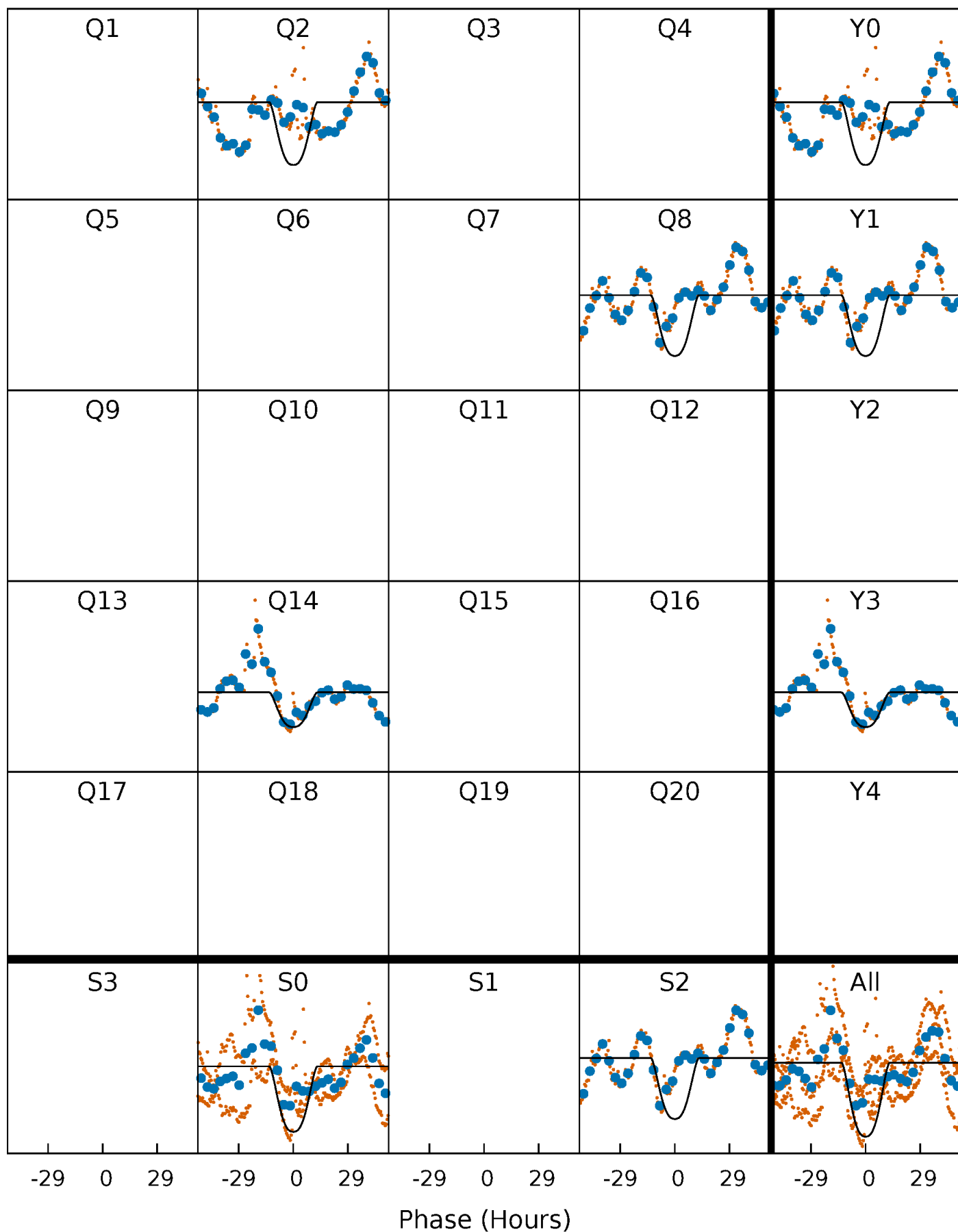
# PDC Quarter-Phased Transit Curves

TCE 009726020-03 P=552.466290 Days  $T_0=205.831312$  (BKJD)



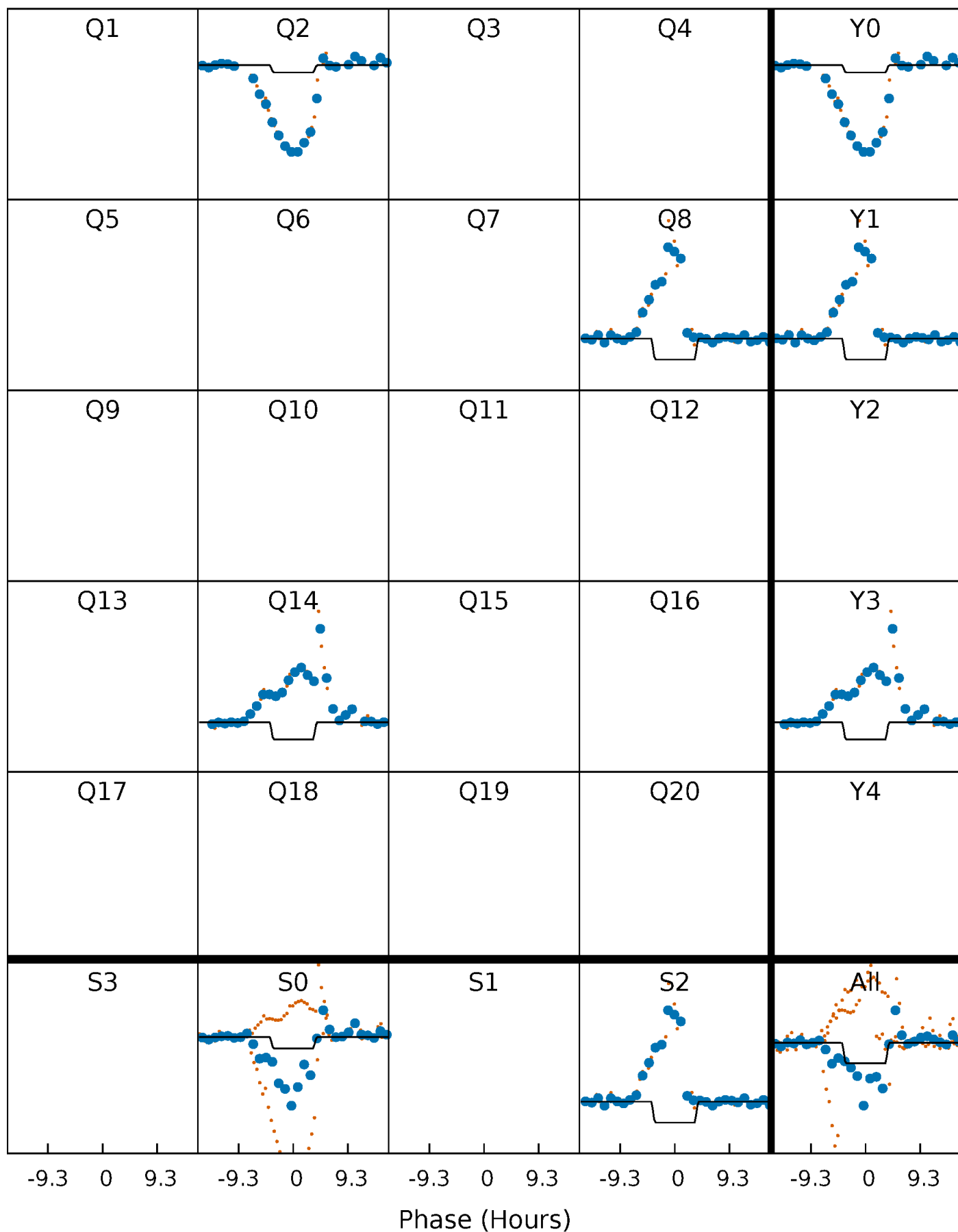
# DV Quarter-Phased Transit Curves

TCE 009726020-03 P=552.466290 Days  $T_0=205.831312$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

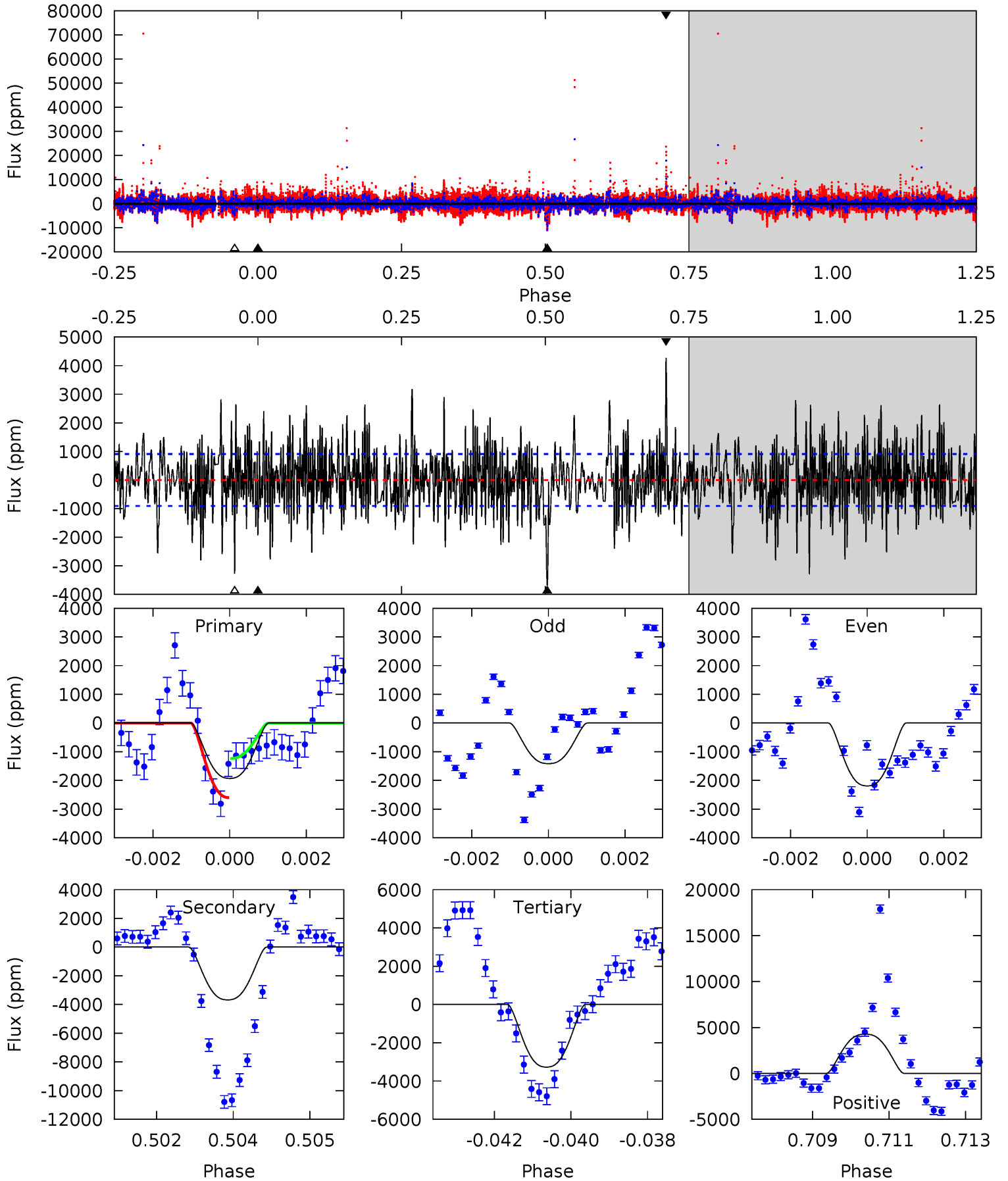
TCE 009726020-03 P=552.468973 Days  $T_0=205.639674$  (BKJD)



# DV Model-Shift Uniqueness Test

009726020-03, P = 552.466290 Days, E = 205.831312 Days

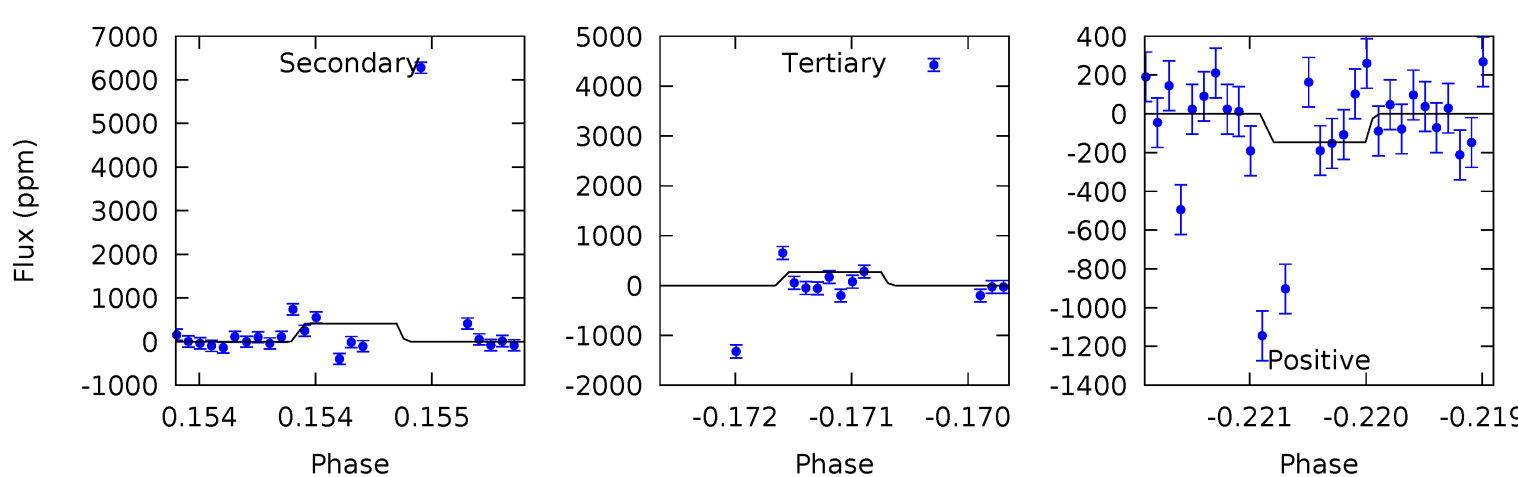
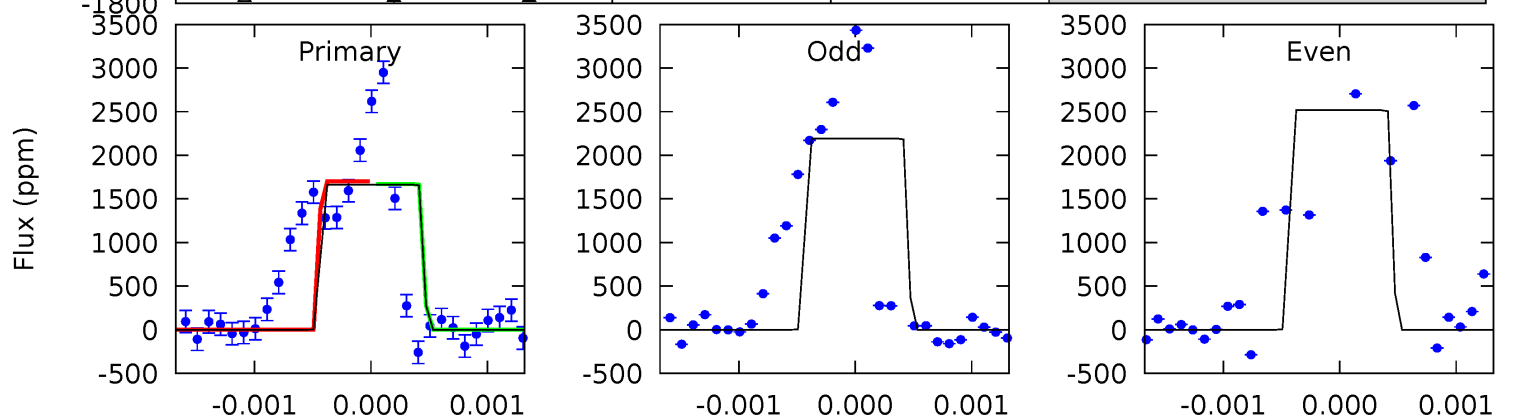
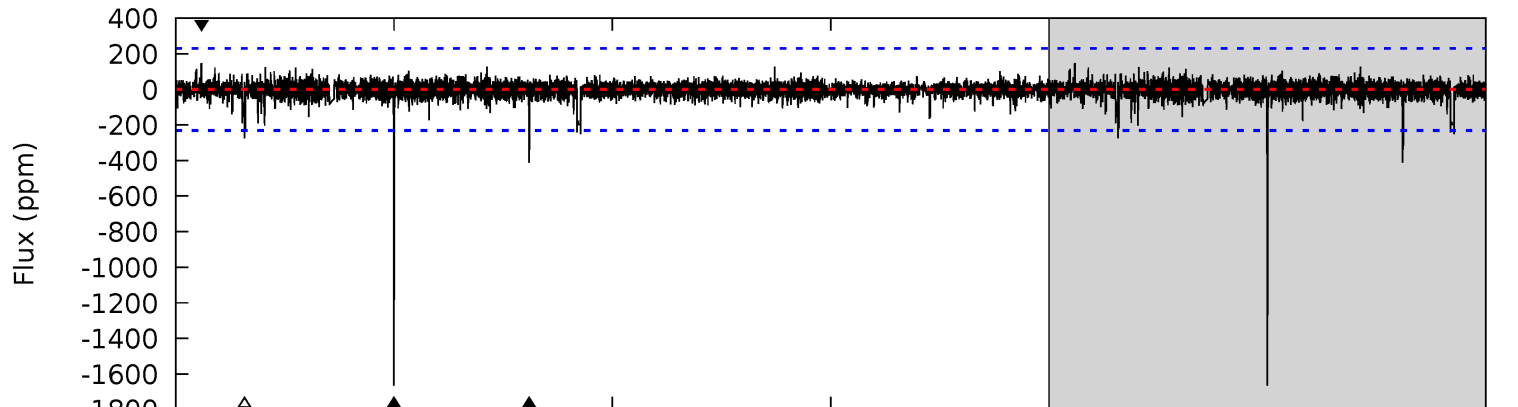
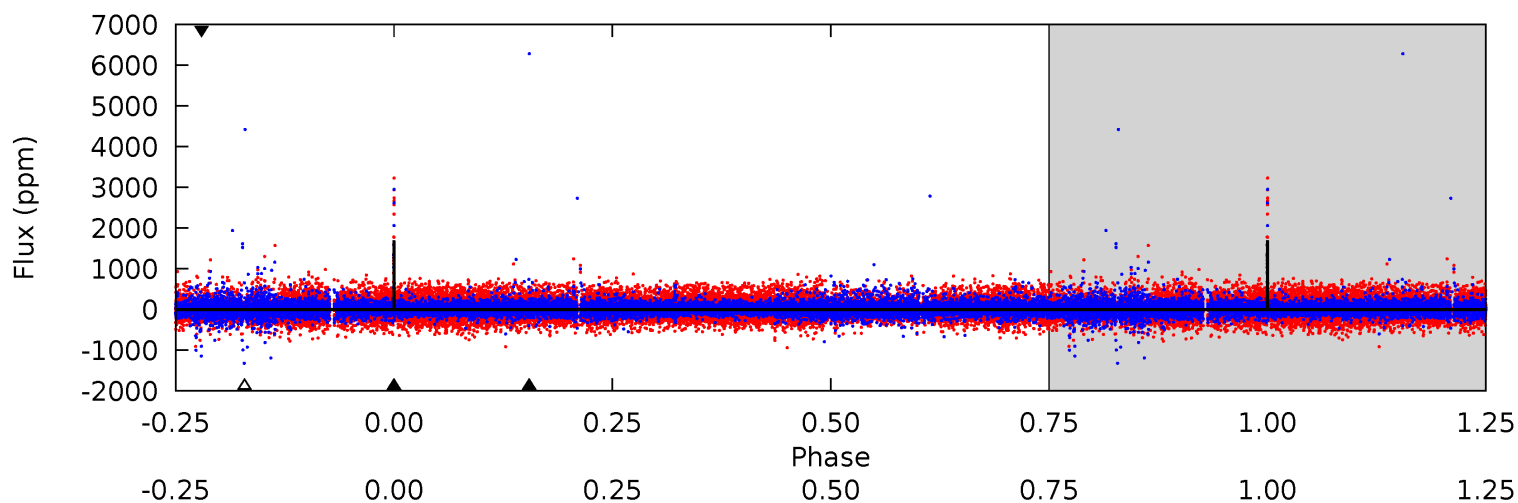
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.4	21.6	19.2	25.1	5.34	3.11	5.28	-7.88	-13.8	2.39	-3.49	2.09	1.35	0.54	3.97



# Alt Model-Shift Uniqueness Test

009726020-03, P = 552.468973 Days, E = 205.639674 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
39.9	9.89	6.57	3.55	5.54	3.43	0.67	33.4	36.4	3.32	6.34	4.78	-0.78	0.08	0





### Stellar Parameters For KIC 009726020

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4702^{+129}_{-161}$	$4.734^{+0.049}_{-0.025}$	$-1.480^{+0.300}_{-0.300}$	$0.517^{+0.024}_{-0.034}$	$0.528^{+0.034}_{-0.024}$	$5.379^{+1.055}_{-0.494}$
	+3%/-3%	+1%/-1%	+20%/-20%	+5%/-7%	+6%/-5%	+20%/-9%
Source	PHO1	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 009726020-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-3678 \pm 170$	$4.20^{+0.80}_{-0.79}$	$201^{+7}_{-7}$	$4314^{+394}_{-275}$	$132194^{+66714}_{-39041}$
Alt.	$-412 \pm 42$	$1.61^{+0.77}_{-0.67}$	$201^{+7}_{-8}$	$4111^{+932}_{-525}$	$100213^{+182706}_{-55200}$

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

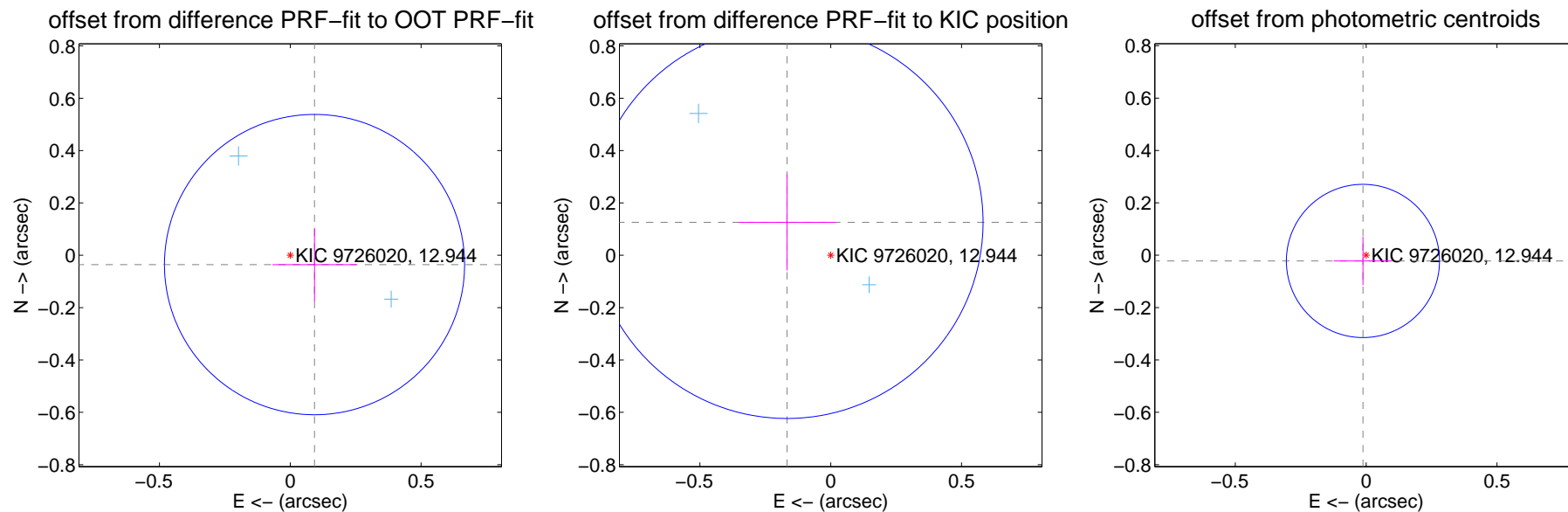
## DV Centroid Data

Supplemental centroid analysis for 009726020-03. Kepler magnitude: 12.94. Transit SNR 4.77

There are 2 quarters with good PRF difference image offsets

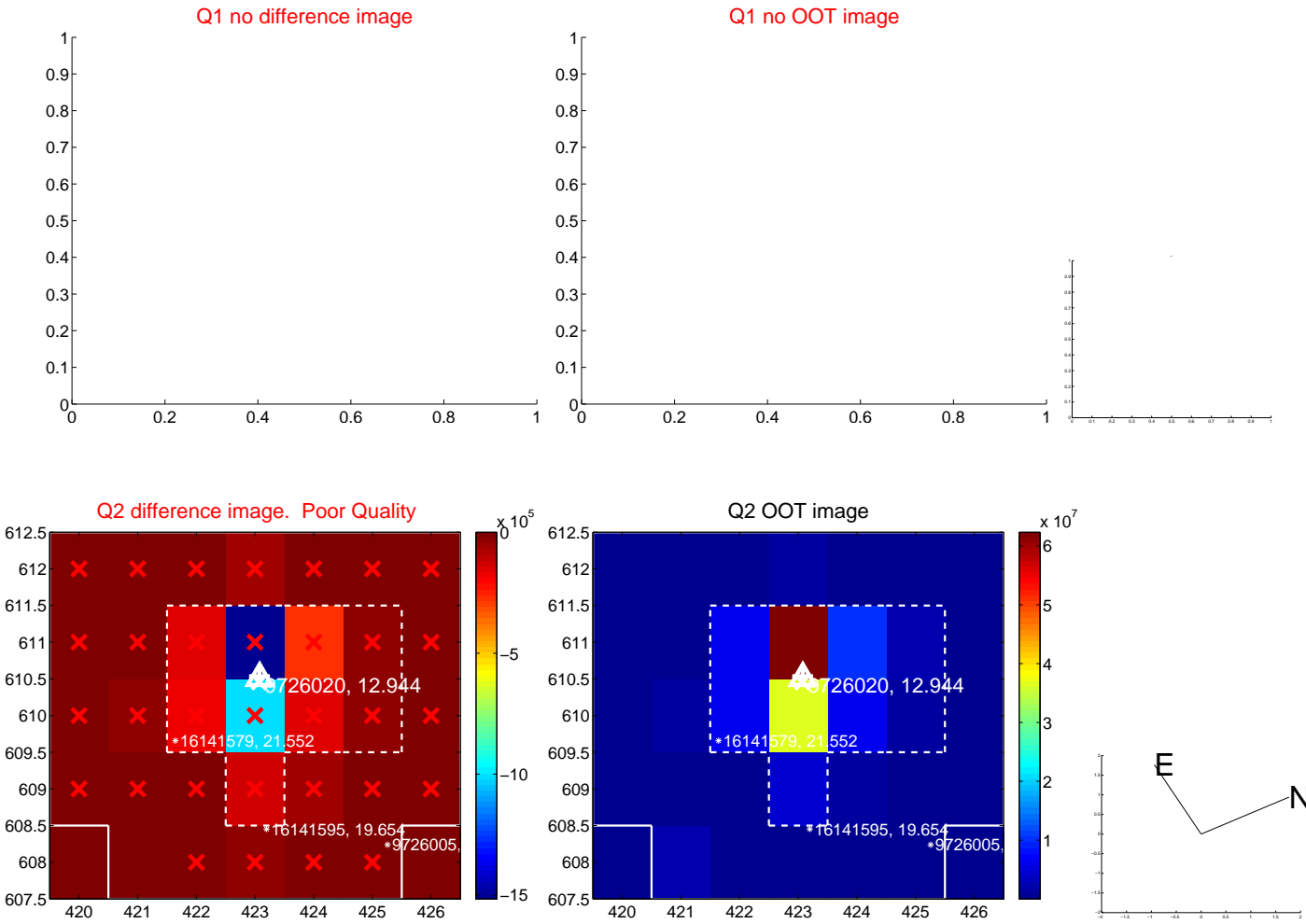
The direct PRF centroid is offset from the target star catalog position by about 0.35 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.099 \pm 0.191$	0.52	$-0.093 \pm 0.161$	$-0.036 \pm 0.140$
PRF-fit source offset from KIC position	$0.209 \pm 0.250$	0.84	$0.167 \pm 0.185$	$0.126 \pm 0.184$
photometric centroid source offset	$0.03 \pm 0.10$	0.26	$0.01 \pm 0.11$	$-0.02 \pm 0.09$



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.

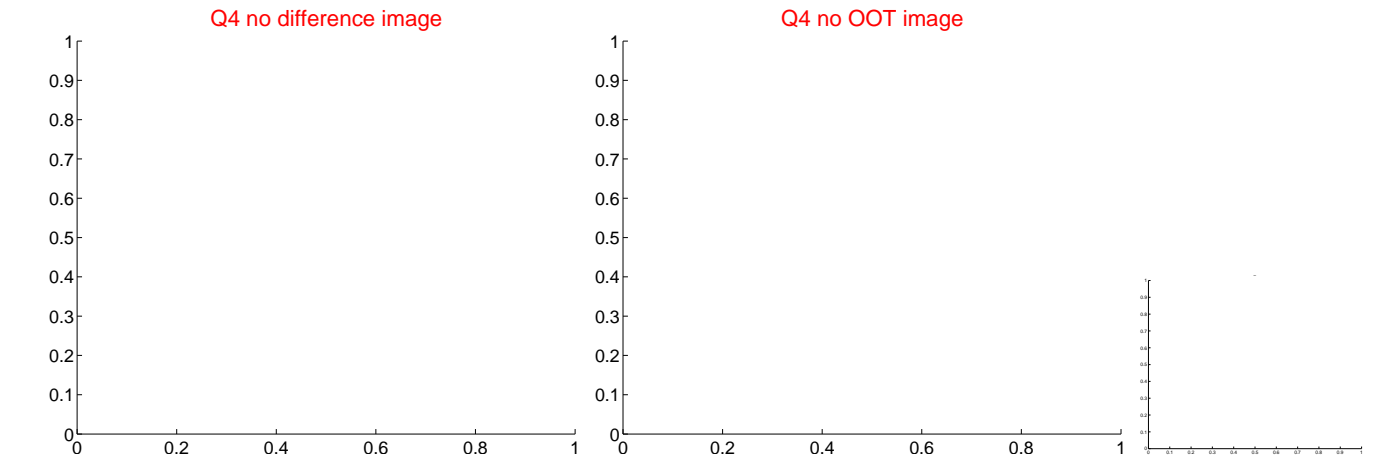
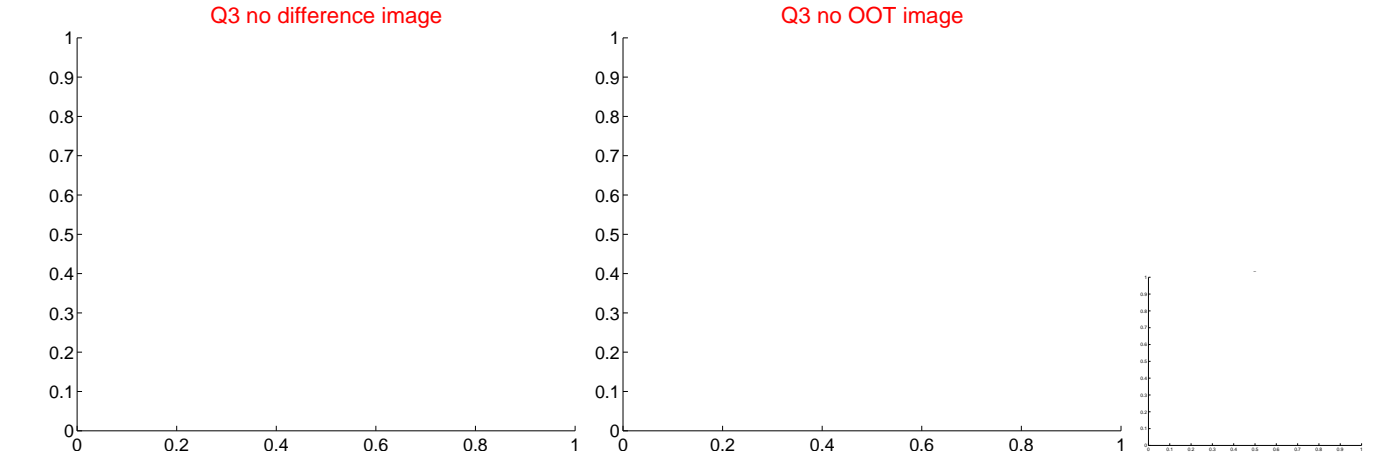


Q2 difference image. Poor Quality

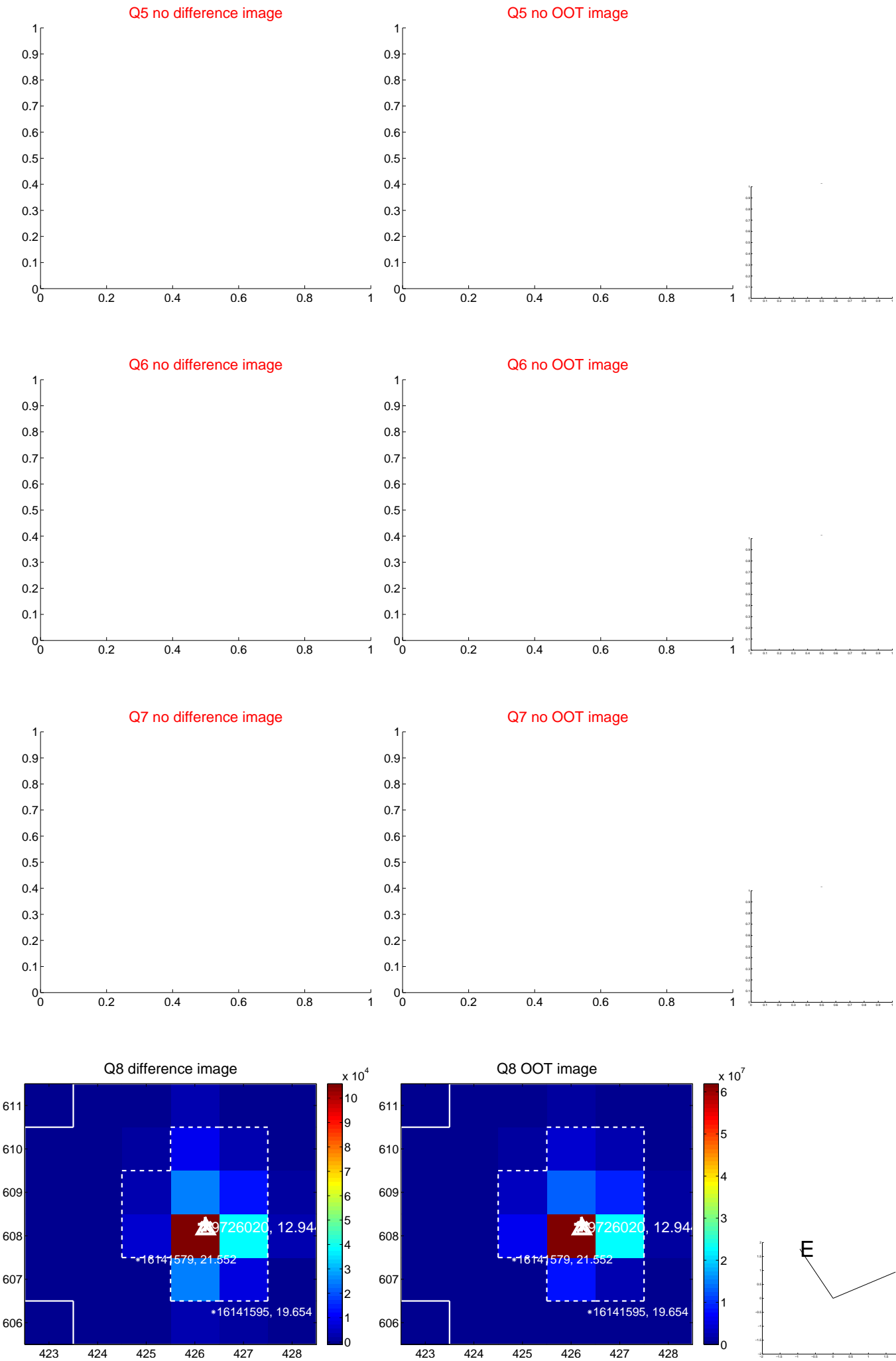
Q2 OOT image

E

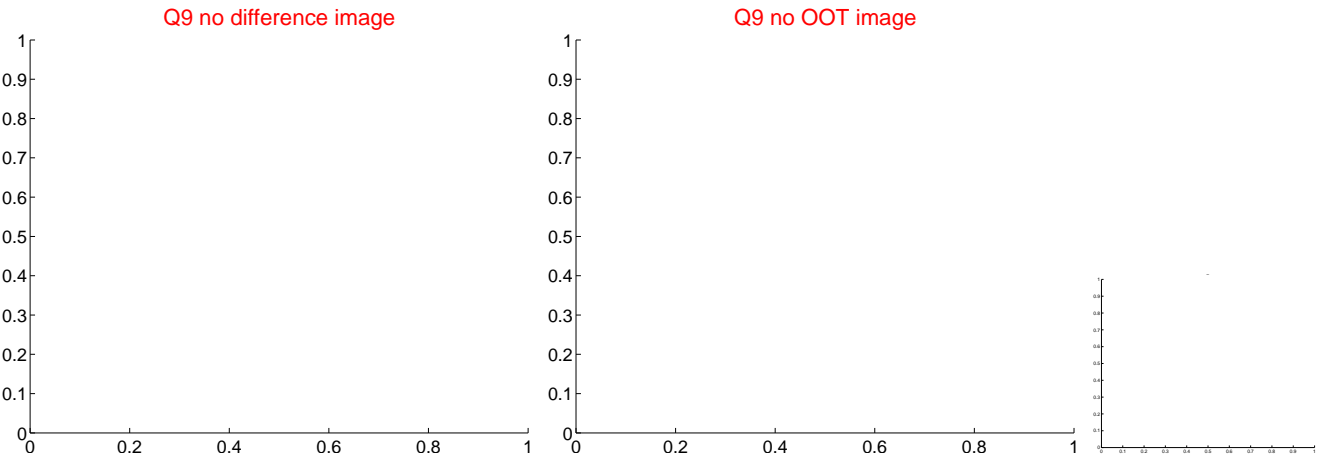
N



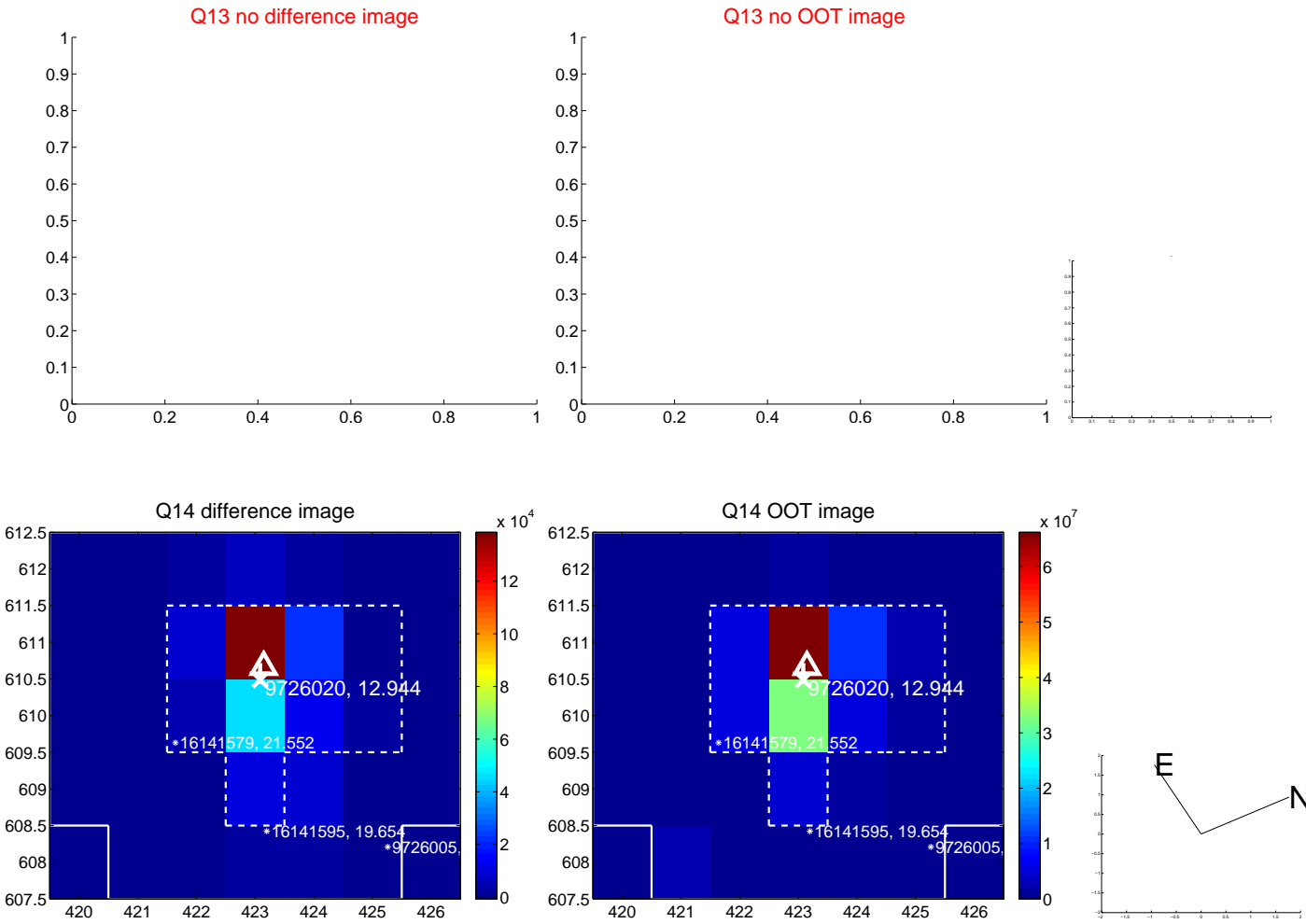
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



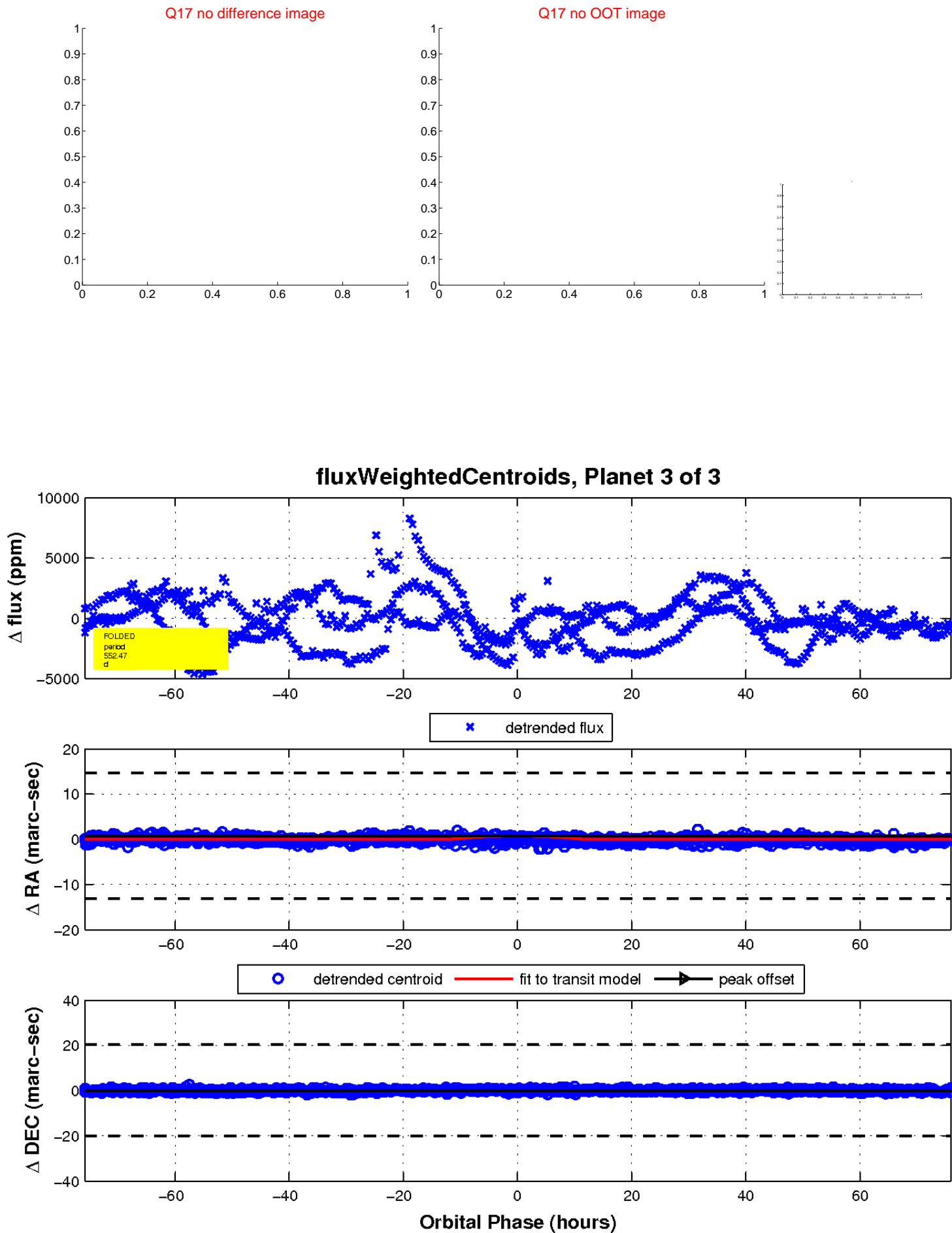
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

