

# KIC 010317398

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010317398-01	OBS	No	366.895768	473.622293	1946.5	2.950	13.0	5.9	0.47	4465	2.16	0.13
010317398-02	OBS	No	339.628340	238.367800	2629.6	6.191	11.2	7.6	0.47	4465	2.42	0.14
010317398-03	OBS	No	618.407355	217.282217	2323.0	4.651	11.3	6.9	0.47	4465	2.33	0.06

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010317398-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
010317398-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
010317398-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—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.

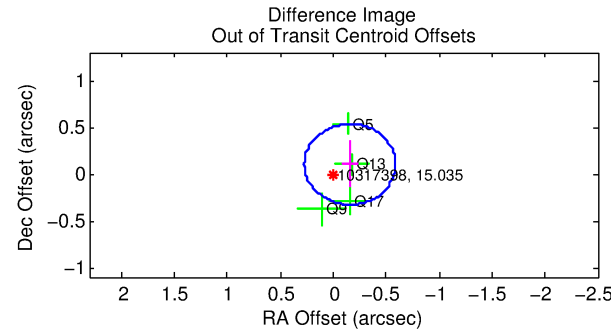
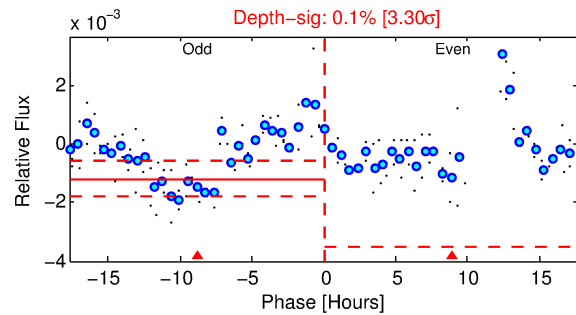
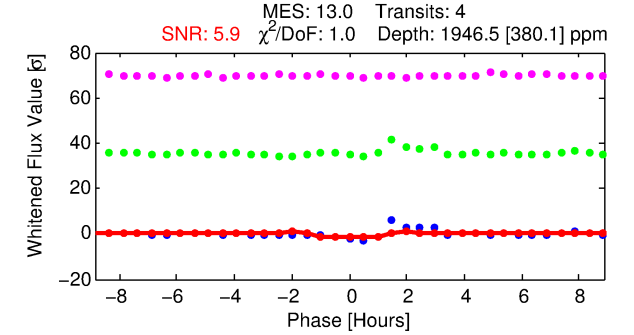
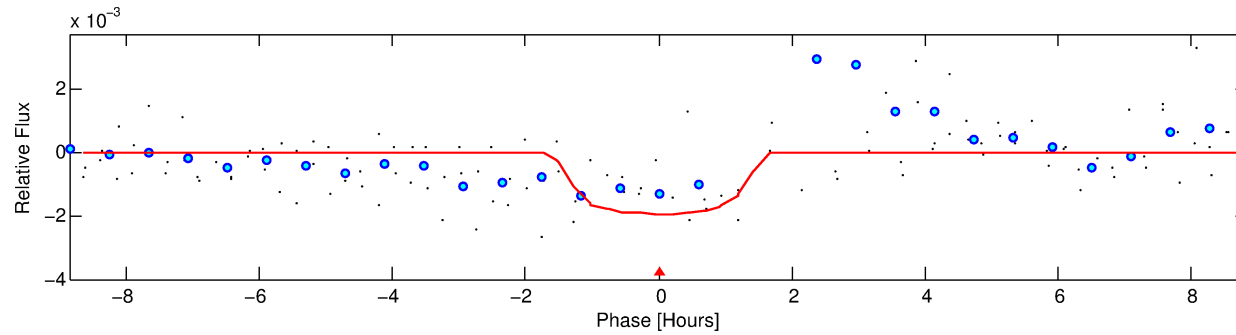
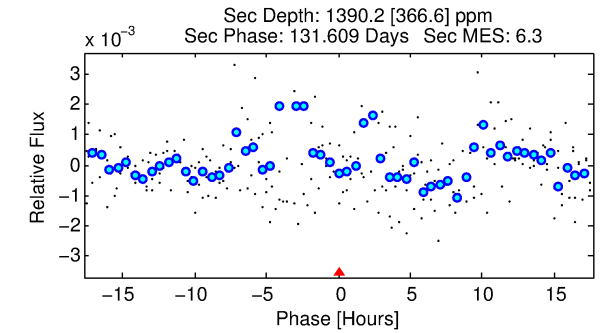
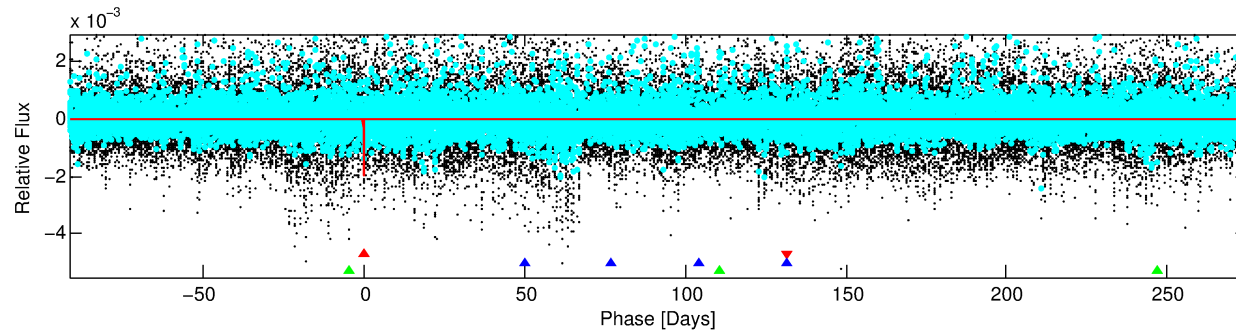
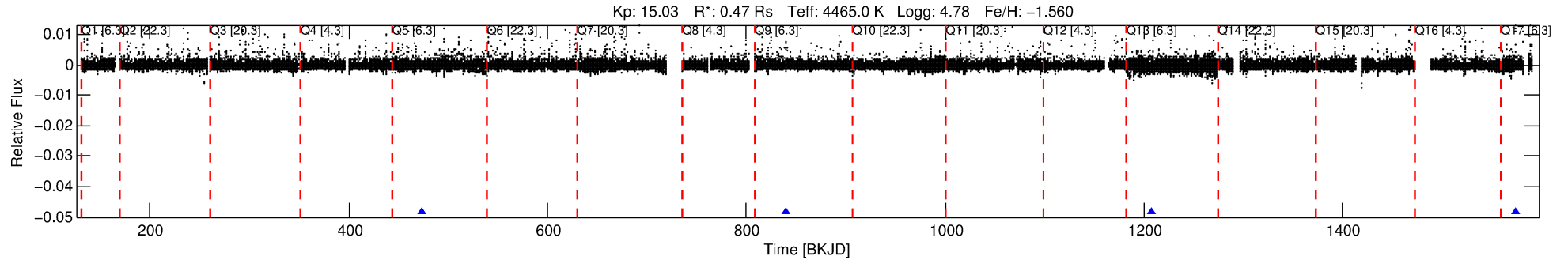
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Ephemeris Match Information For 010317398-01

No Significant Match Found

# DV One-Page Summary

KIC: 10317398 Candidate: 1 of 3 Period: 366.896 d



## DV Fit Results:

Period = 366.89577 [0.00353] d  
Epoch = 473.6223 [0.0066] BKJD  
Rp/R\* = 0.0416 [0.0935]  
a/R\* = 853.91 [8749.70]  
b = 0.53 [14.16]  
Seff = 0.13 [0.02]  
Teq = 153 [7] K  
Rp = 2.16 [4.85] Re  
a = 0.7910 [0.0620] AU  
Ag = 102771.65 [462649.60] [0.22σ]  
Teffp = 4226 [4756] K [0.86σ]

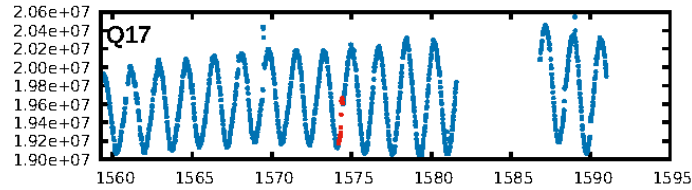
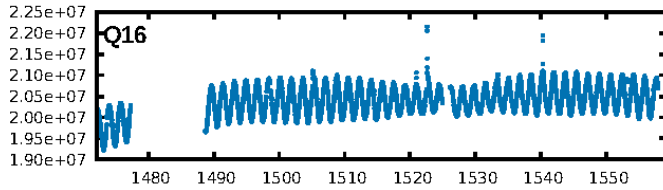
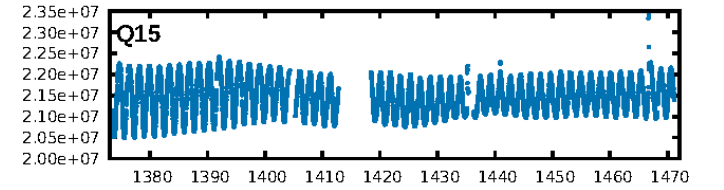
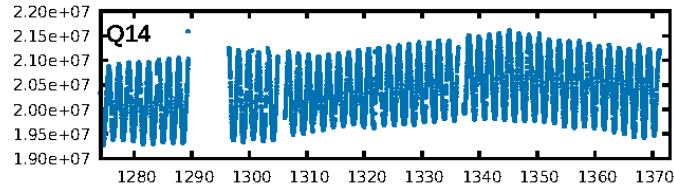
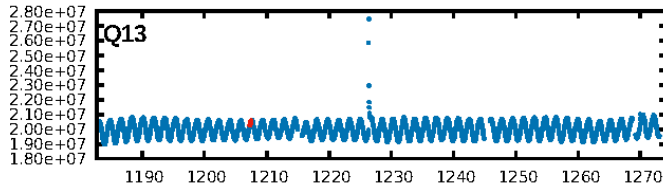
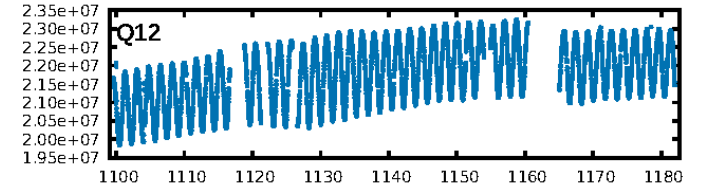
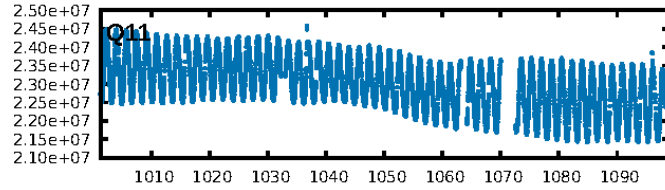
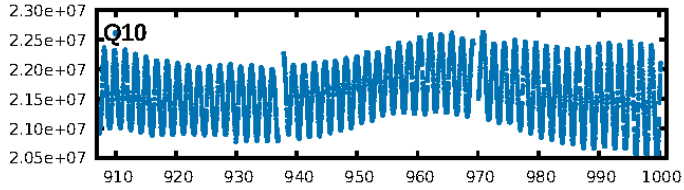
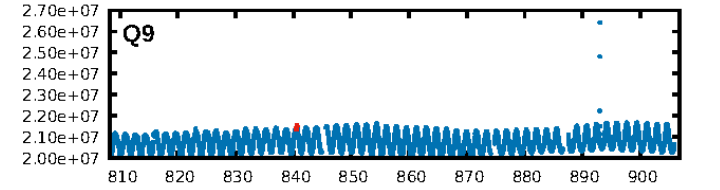
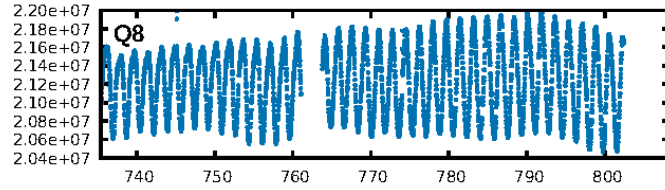
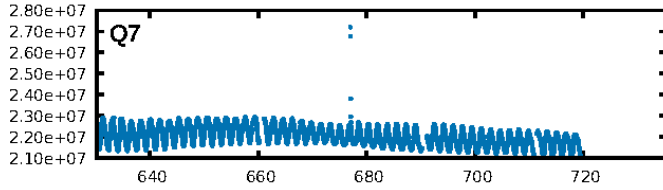
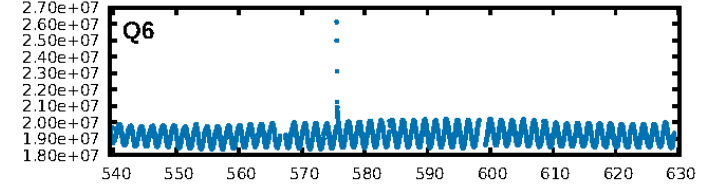
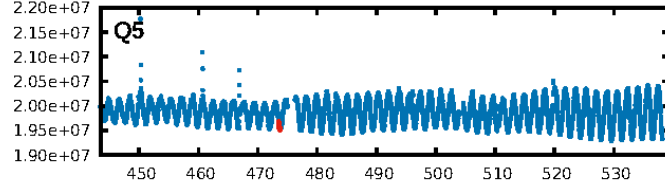
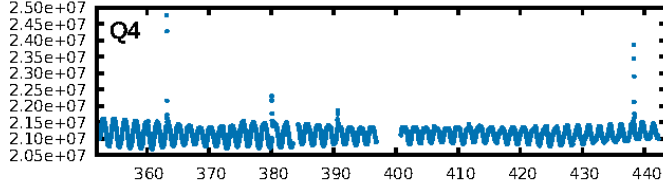
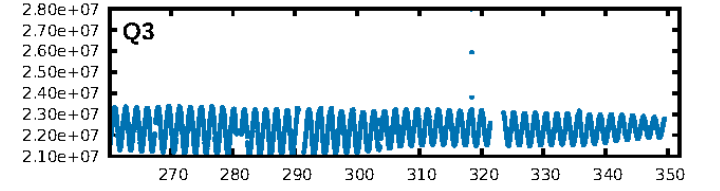
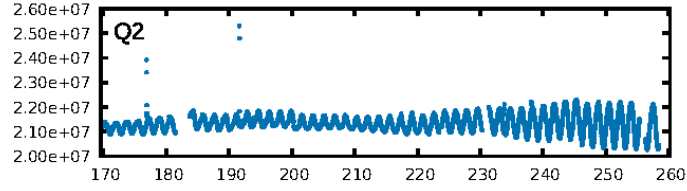
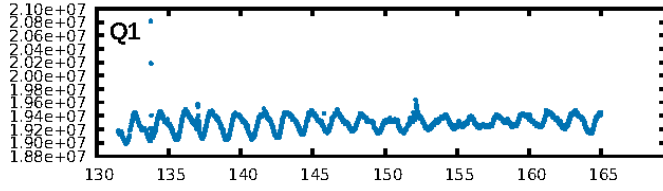
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [95.43σ]  
LongPeriod-sig: 100.0% [1095.90σ]  
ModelChiSquare2-sig: 2.3%  
ModelChiSquareGof-sig: 88.7%  
Bootstrap-pfa: 5.15e-11  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 0.1147  
Centroid-sig: 4.4%  
Centroid-so: 0.545 arcsec [0.65σ]  
OotOffset-rm: 0.189 arcsec [1.32σ]  
OotOffset-st: 0/0/0/4 [4]  
KicOffset-rm: 0.311 arcsec [1.20σ]  
KicOffset-st: 0/0/0/4 [4]  
DiffImageQuality-fgm: 0.50 [2/4]  
DiffImageOverlap-fno: 1.00 [4/4]

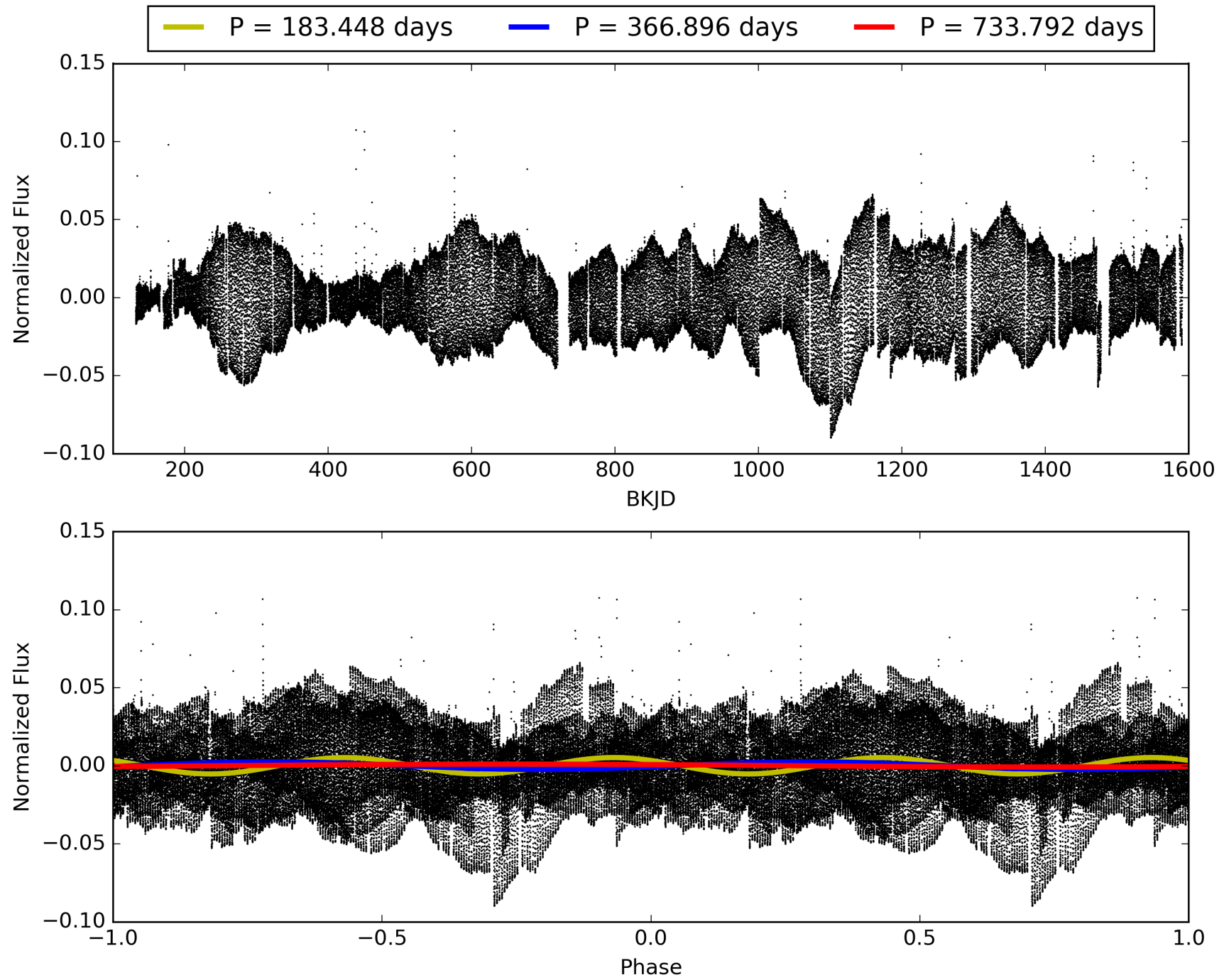
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010317398-01, PDC Light Curves

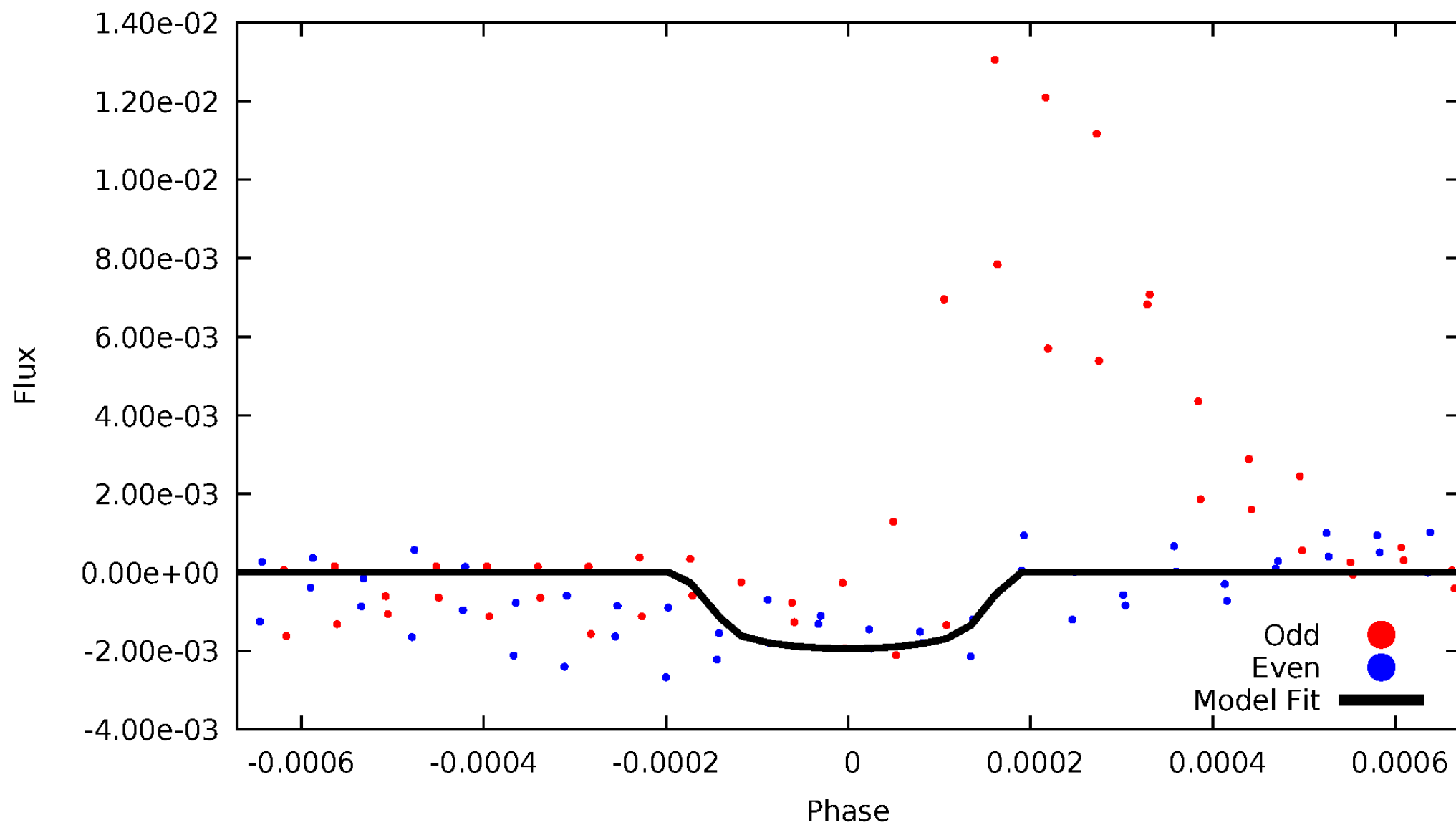


TCE 010317398-01



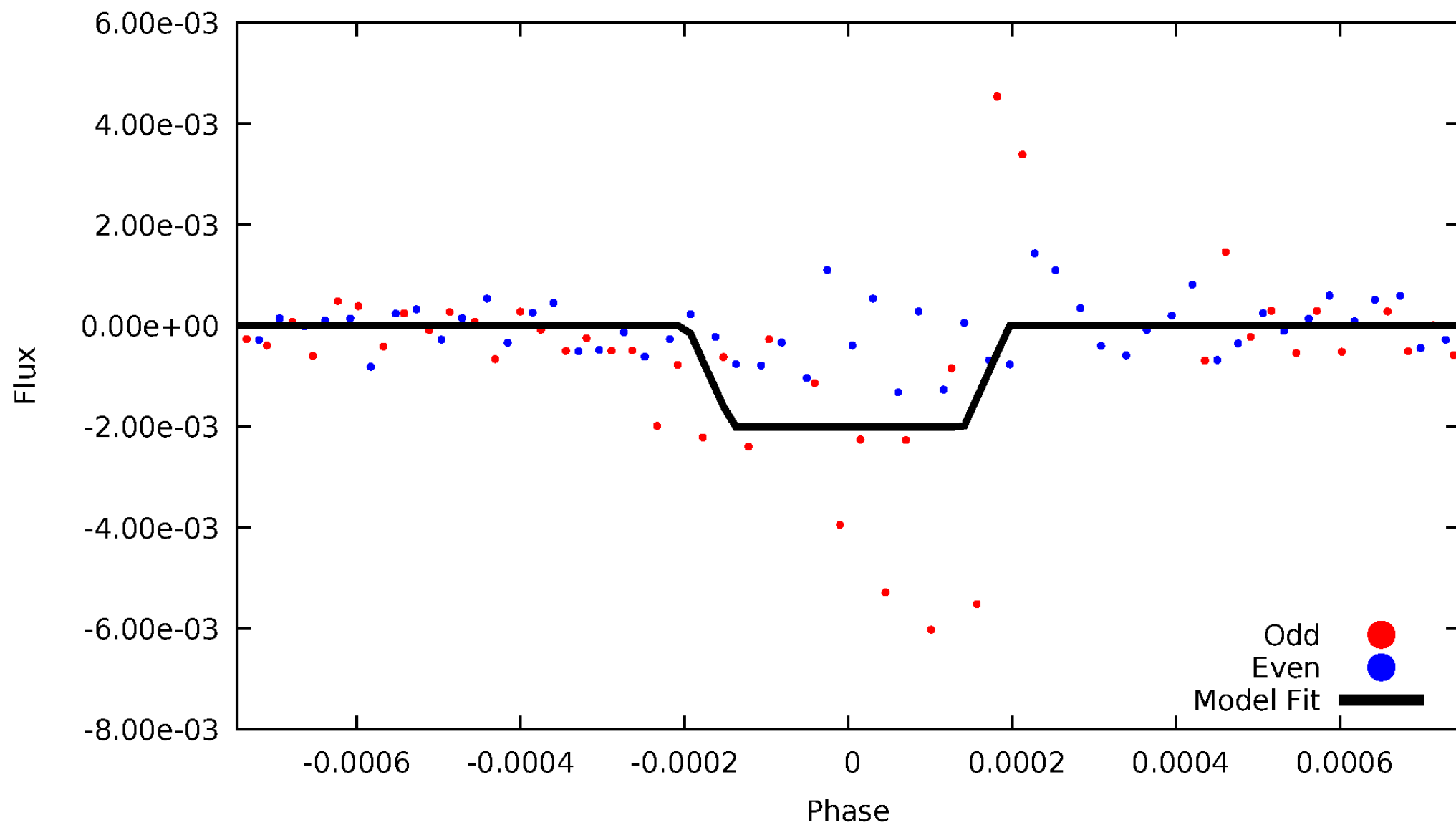
# DV Odd/Even

TCE 010317398-01



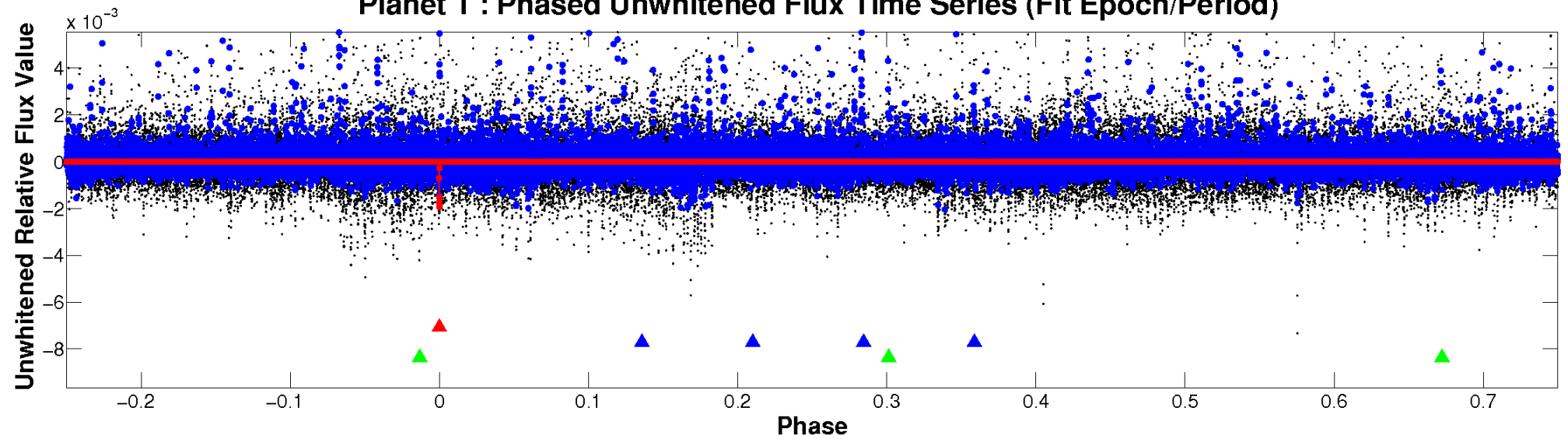
# ALT Odd/Even

TCE 010317398-01

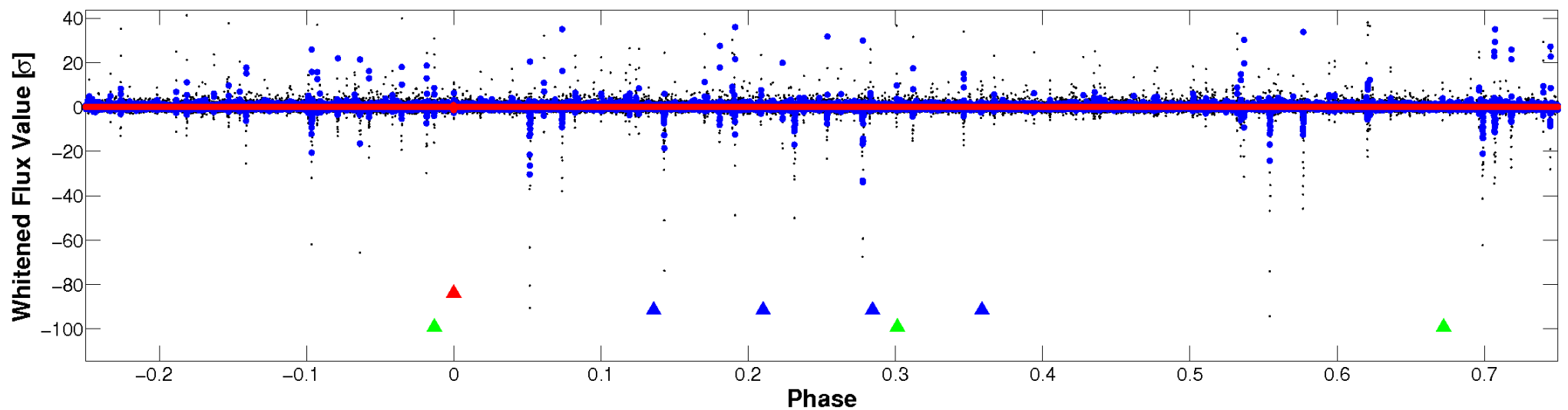


# Non-Whitened Vs. Whitened Light Curve

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

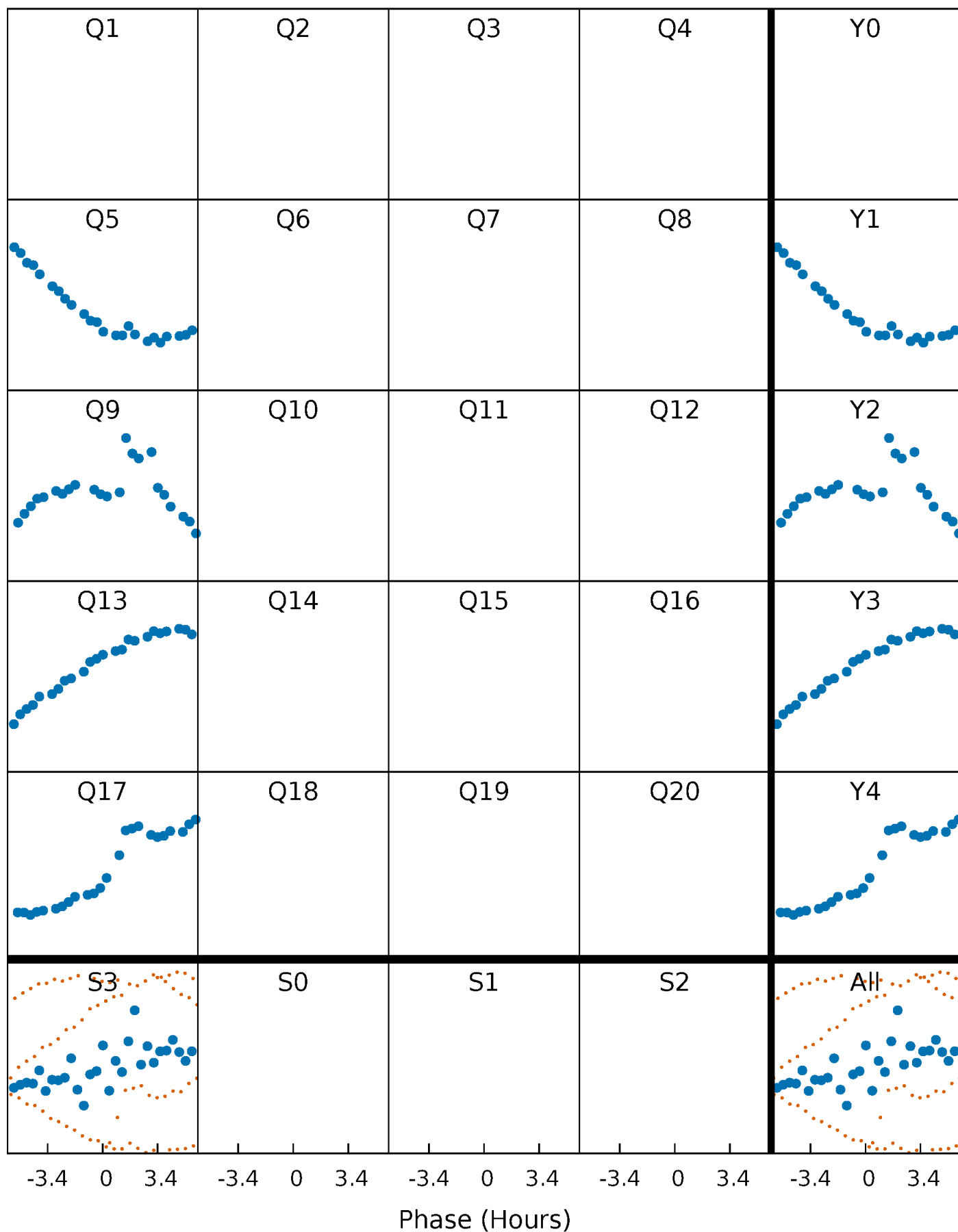


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

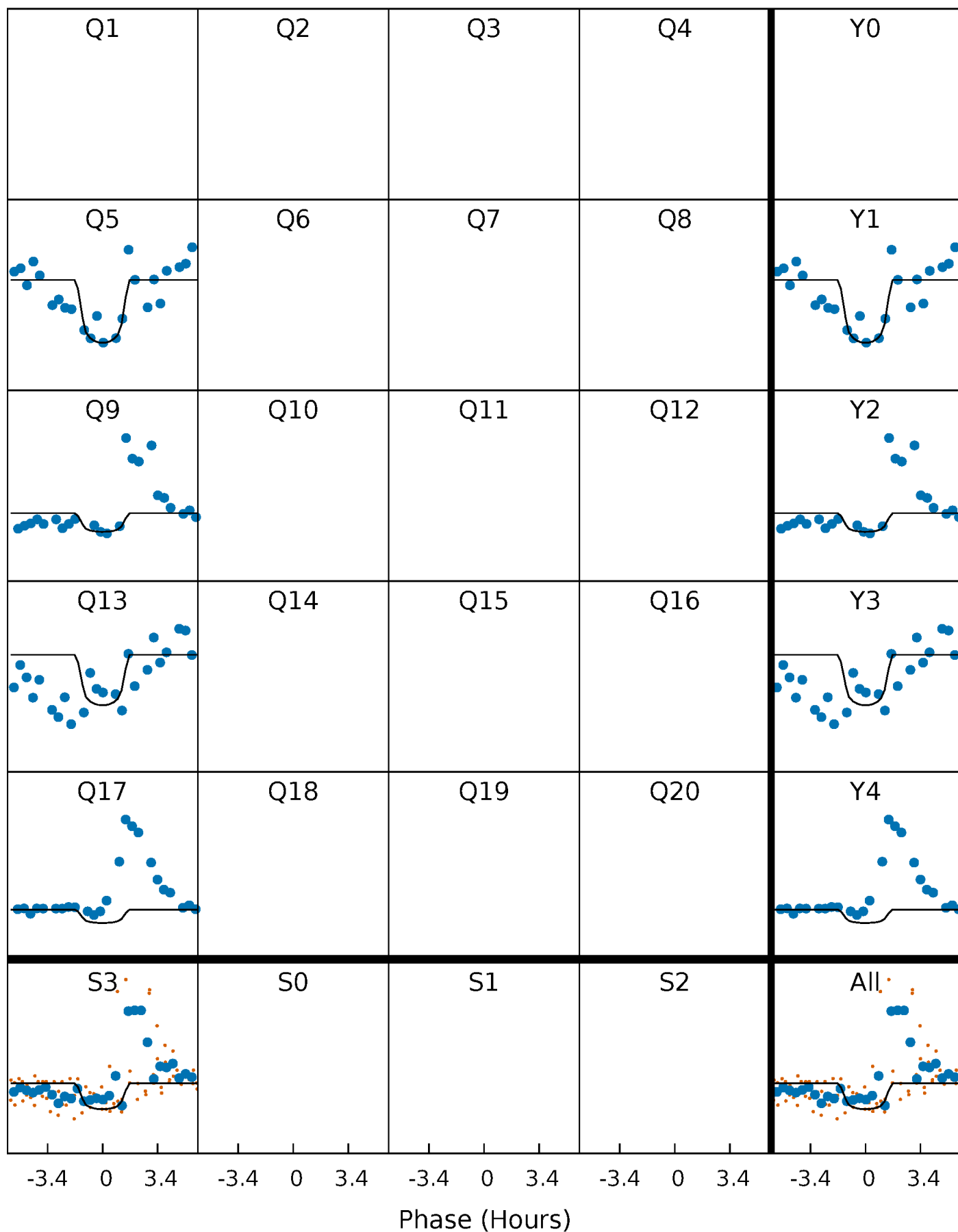
TCE 010317398-01 P=366.895768 Days  $T_0=473.622293$  (BKJD)





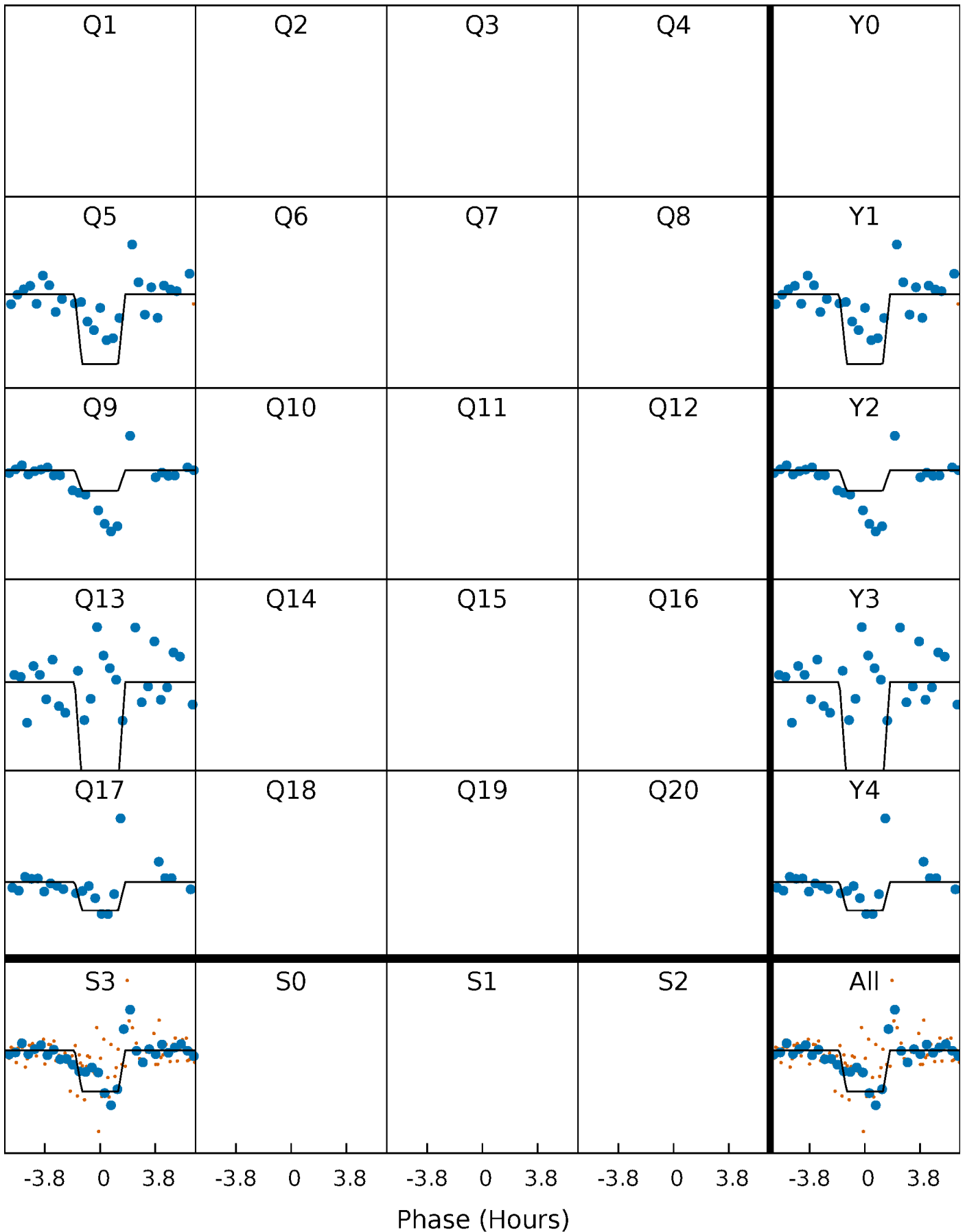
# DV Quarter-Phased Transit Curves

TCE 010317398-01     $P=366.895768$  Days     $T_0=473.622293$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

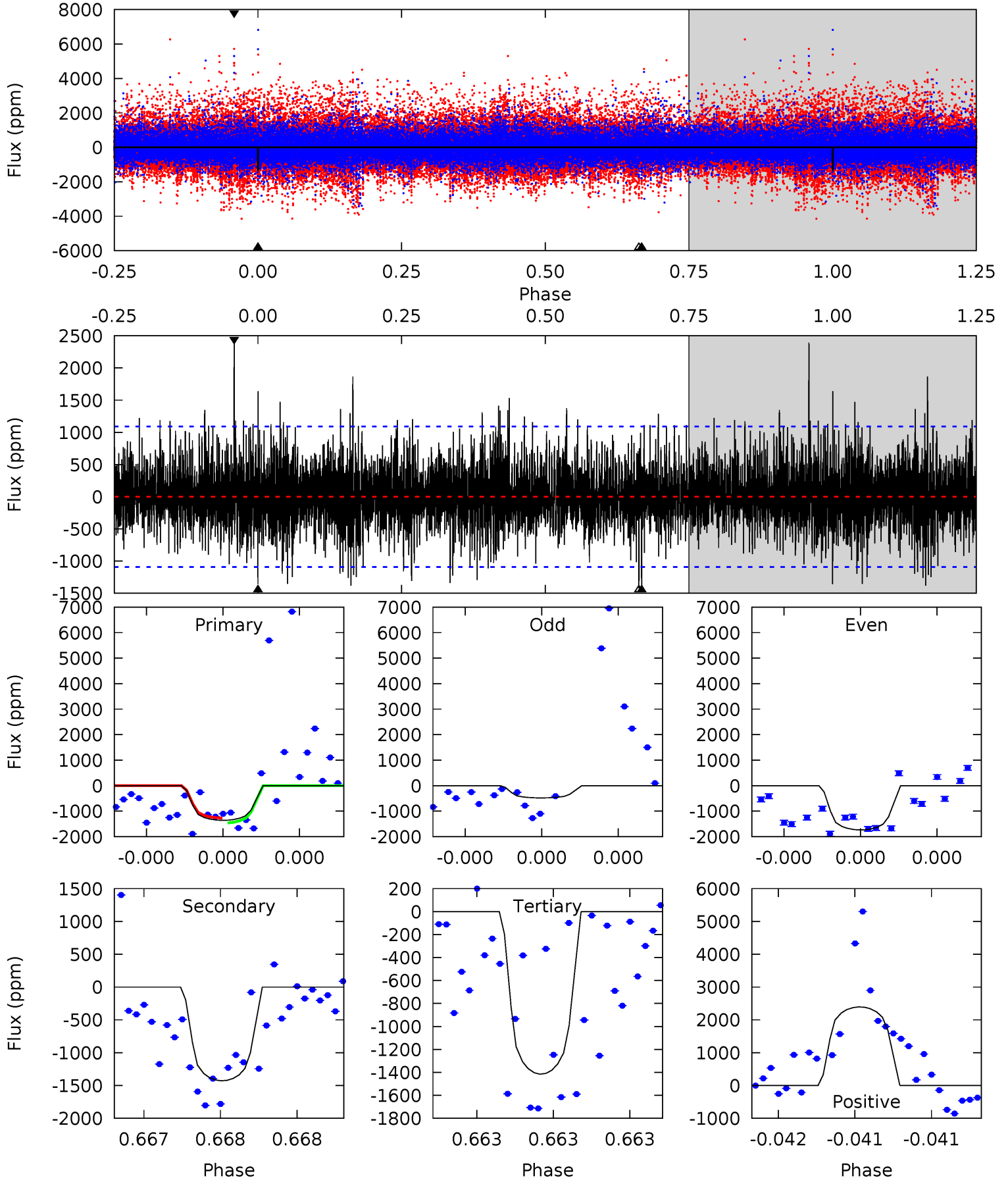
TCE 010317398-01 P=366.890687 Days  $T_0=473.609406$  (BKJD)



# DV Model-Shift Uniqueness Test

010317398-01, P = 366.895768 Days, E = 106.726525 Days

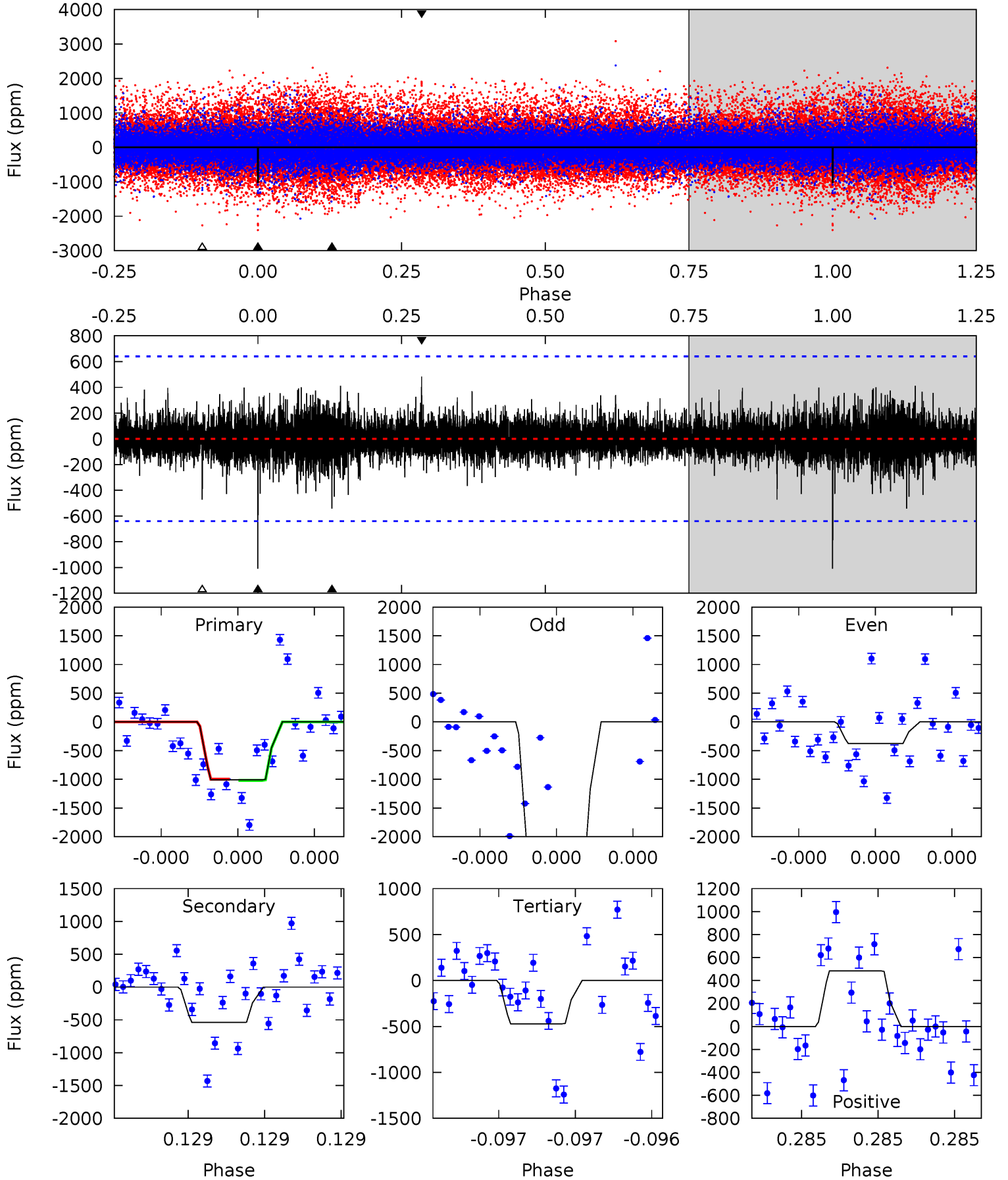
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.01	7.36	7.30	12.3	5.63	3.57	1.95	-0.30	-5.34	0.06	-4.99	2.38	0.42	0.63	0.50



# Alt Model-Shift Uniqueness Test

010317398-01, P = 366.890687 Days, E = 106.718719 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
8.85	4.74	4.14	4.25	5.62	3.55	0.78	4.72	4.61	0.60	0.50	11.1	1.67	0.32	0



### Stellar Parameters For KIC 010317398

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4465^{+142}_{-157}$	$4.775^{+0.058}_{-0.031}$	$-1.560^{+0.300}_{-0.250}$	$0.475^{+0.031}_{-0.046}$	$0.491^{+0.034}_{-0.034}$	$6.447^{+1.595}_{-0.780}$
	+3%/-4%	+1%/-1%	+19%/-16%	+7%/-10%	+7%/-7%	+25%/-12%
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 010317398-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-1428 \pm 194$	$4.21^{+4.05}_{-2.85}$	$212^{+7}_{-8}$	$3396^{+1813}_{-587}$	$27255^{+240849}_{-19930}$
Alt.	$-540 \pm 114$	$4.41^{+3.94}_{-2.94}$	$212^{+8}_{-9}$	$2933^{+1205}_{-458}$	$9943^{+75883}_{-7313}$

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

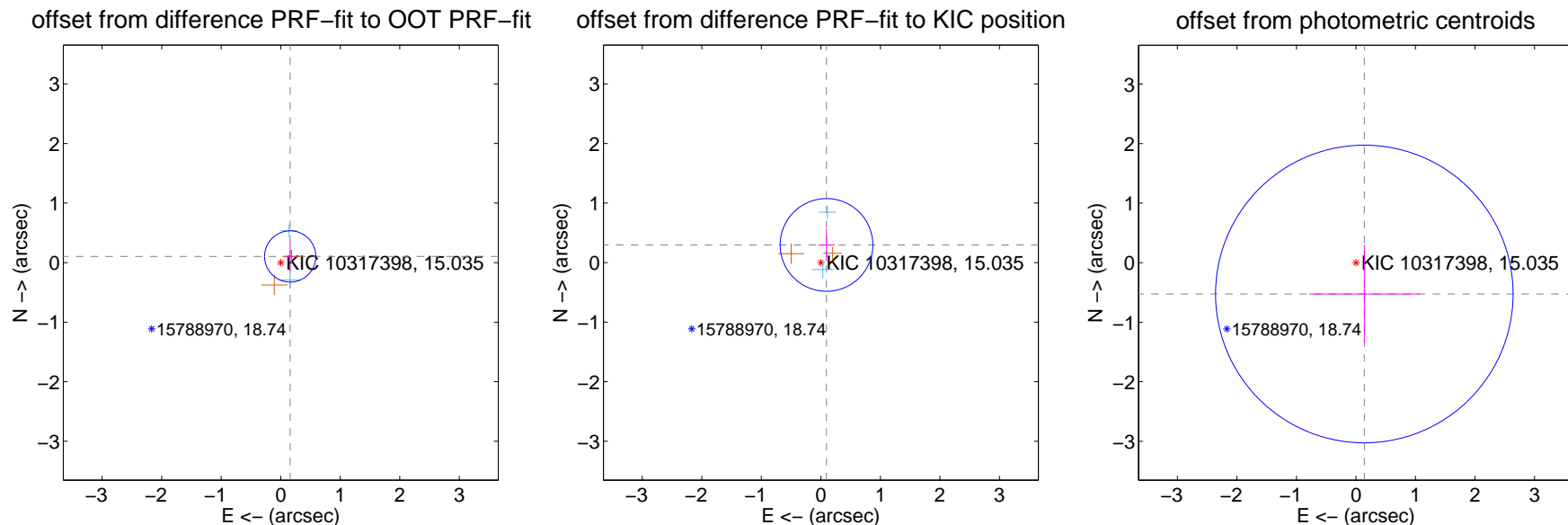
## DV Centroid Data

Supplemental centroid analysis for 010317398-01. Kepler magnitude: 15.04. Transit SNR 5.91

There are 2 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.189 \pm 0.143$	1.32	$-0.159 \pm 0.072$	$0.103 \pm 0.239$
PRF-fit source offset from KIC position	$0.311 \pm 0.260$	1.20	$-0.095 \pm 0.139$	$0.296 \pm 0.269$
photometric centroid source offset	$0.54 \pm 0.83$	0.65	$-0.14 \pm 0.93$	$-0.53 \pm 0.83$

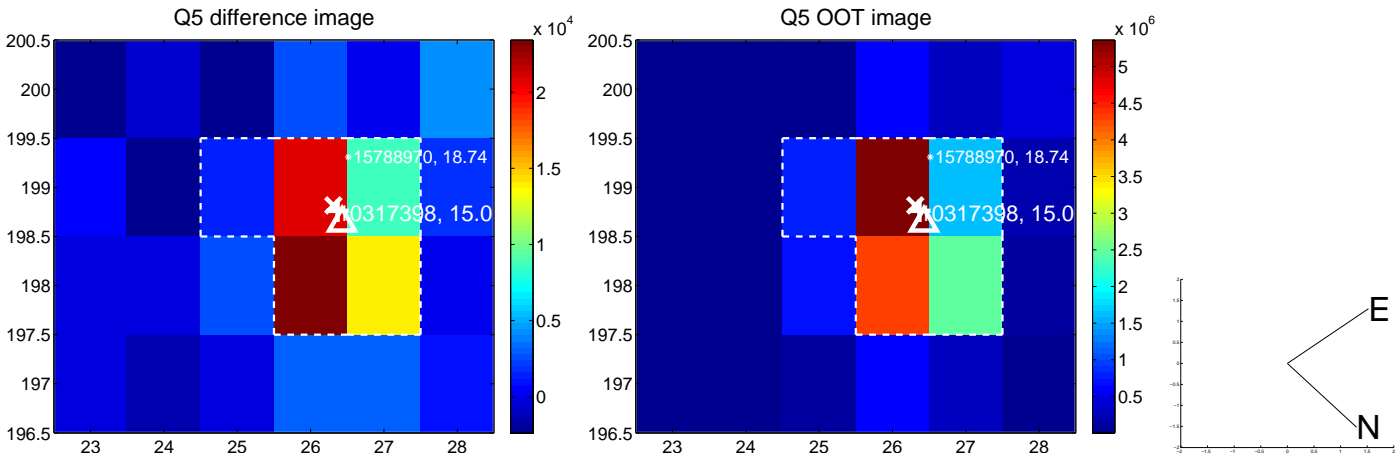


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

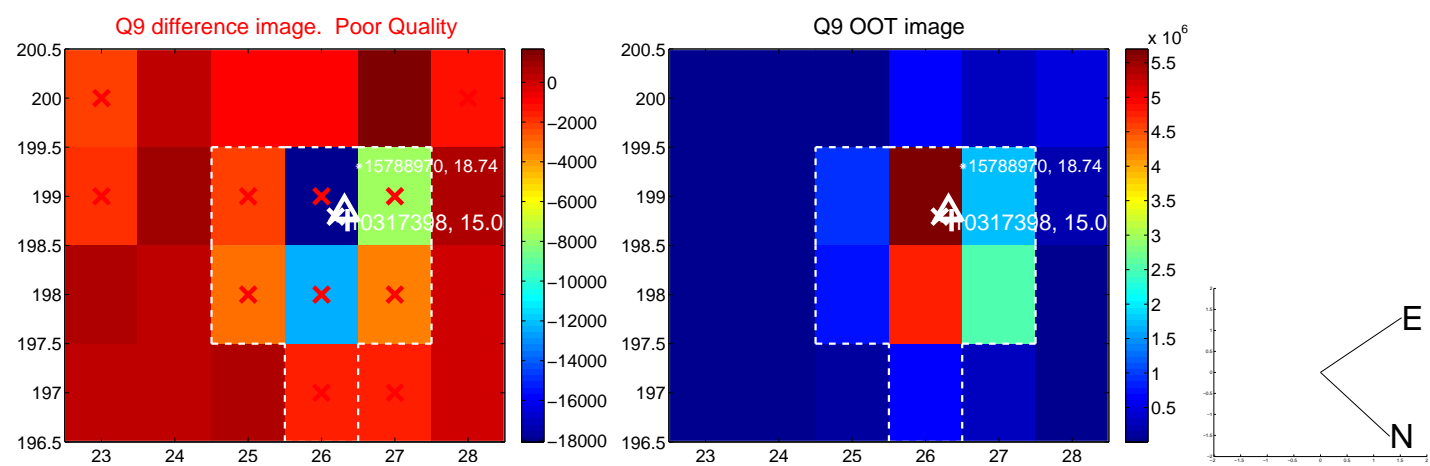


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

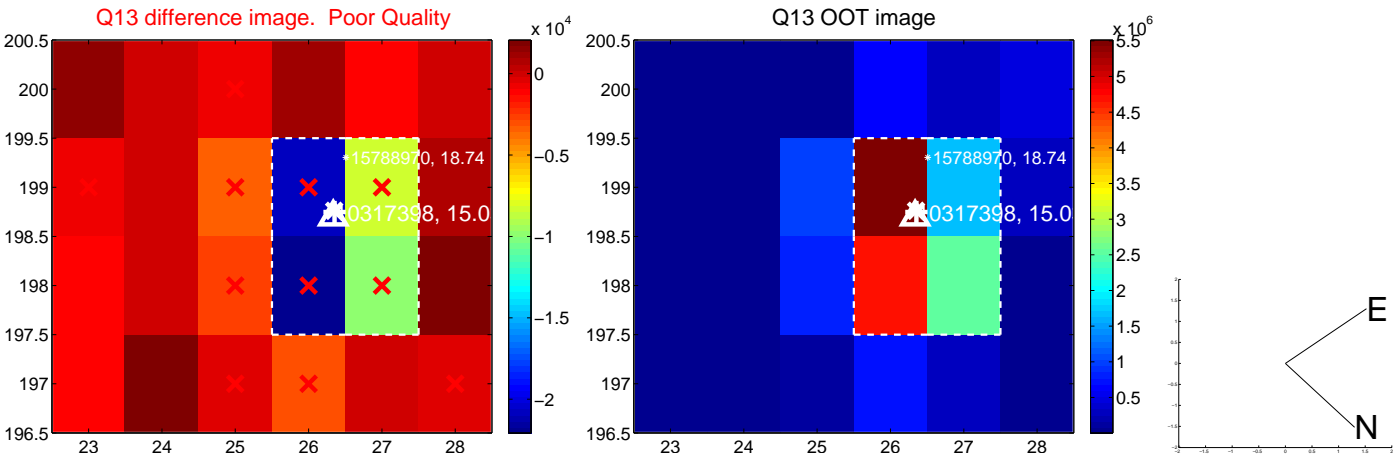




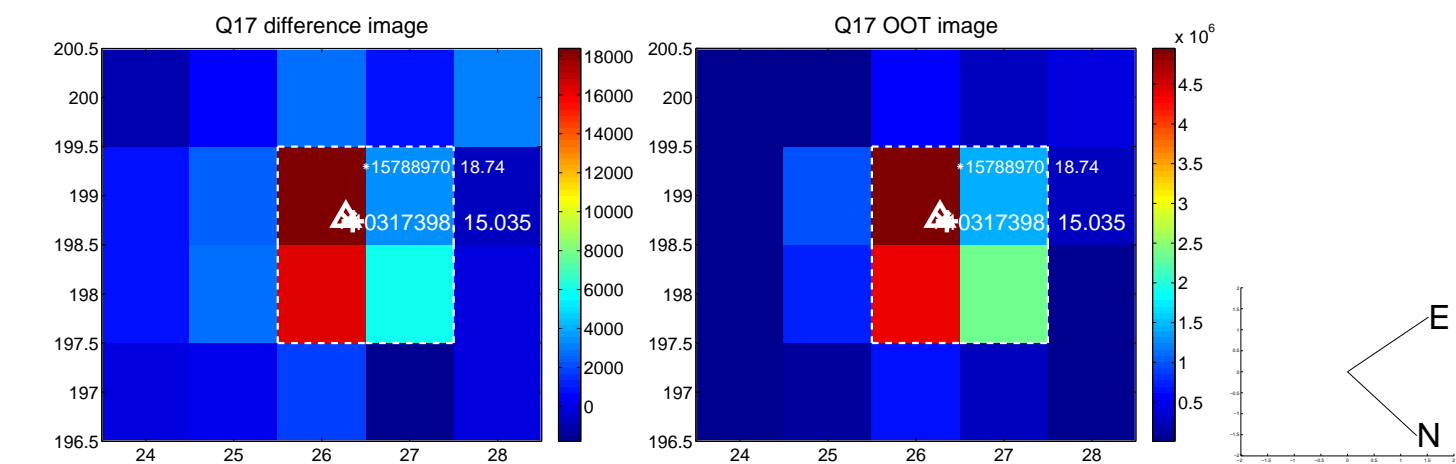
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



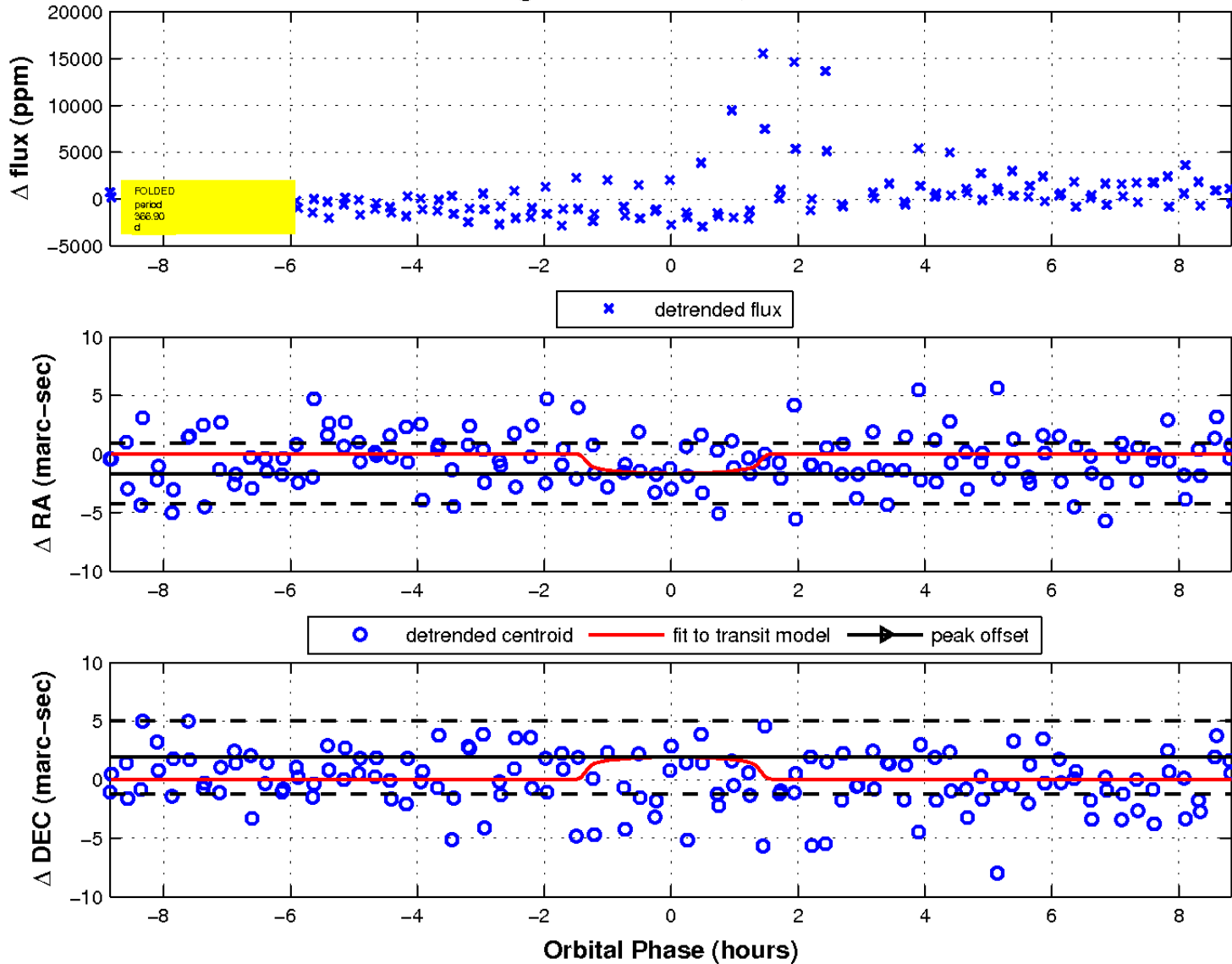
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

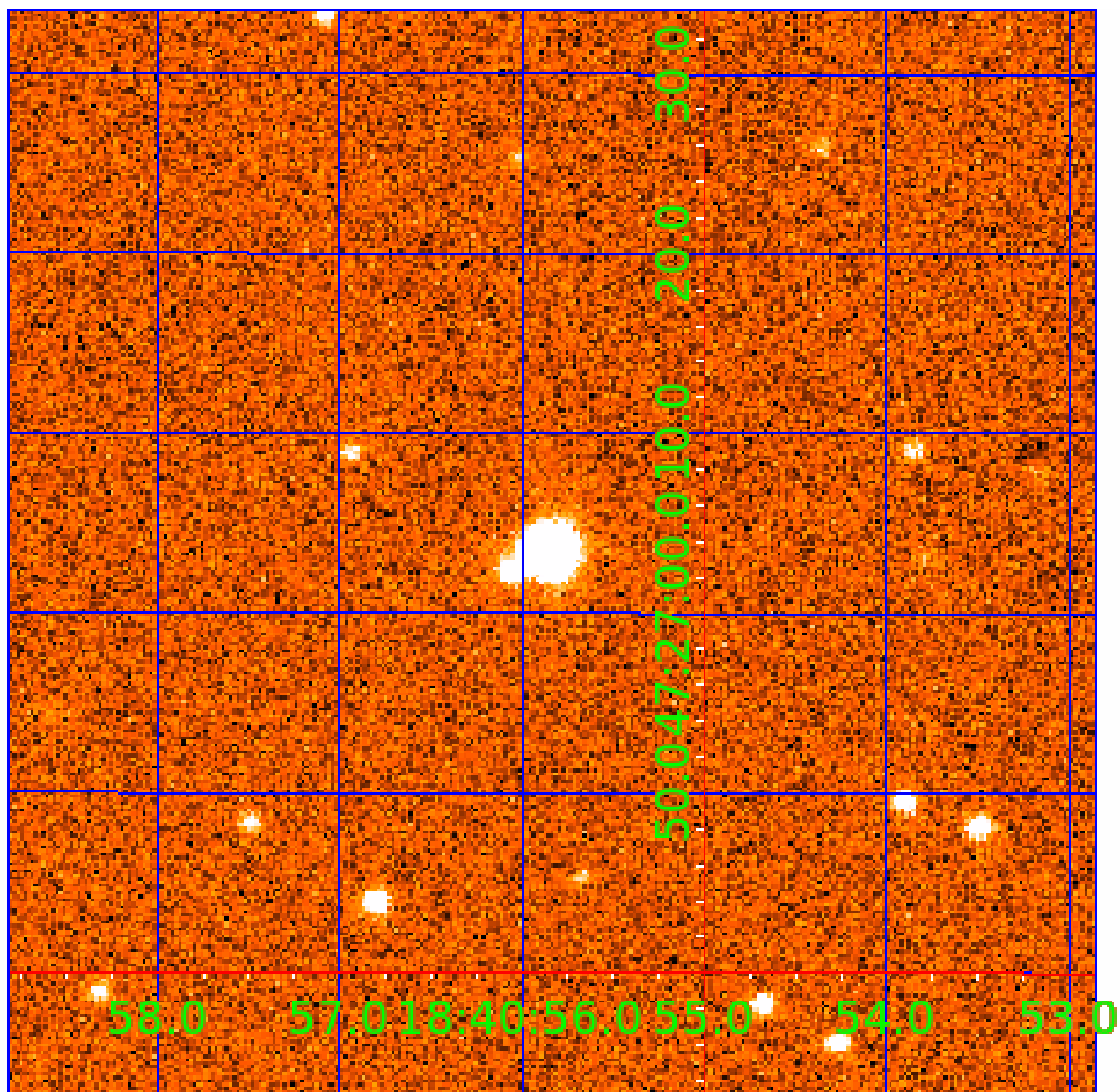


fluxWeightedCentroids, Planet 1 of 3



# UKIRT Image

Declination



# KIC 010317398

## 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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## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
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010317398-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
010317398-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—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.

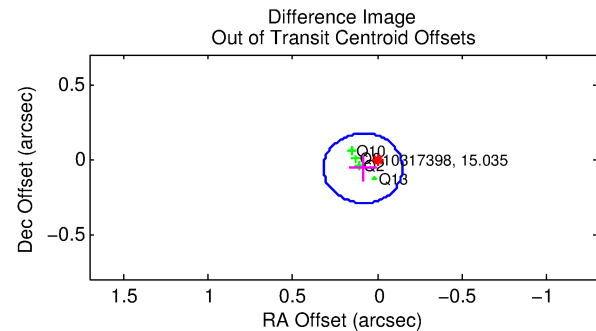
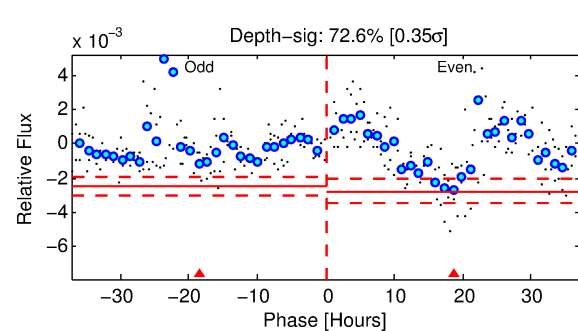
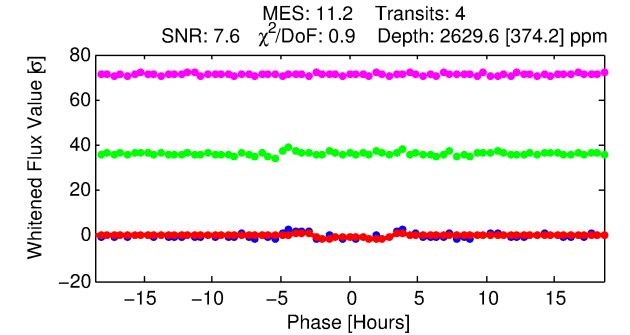
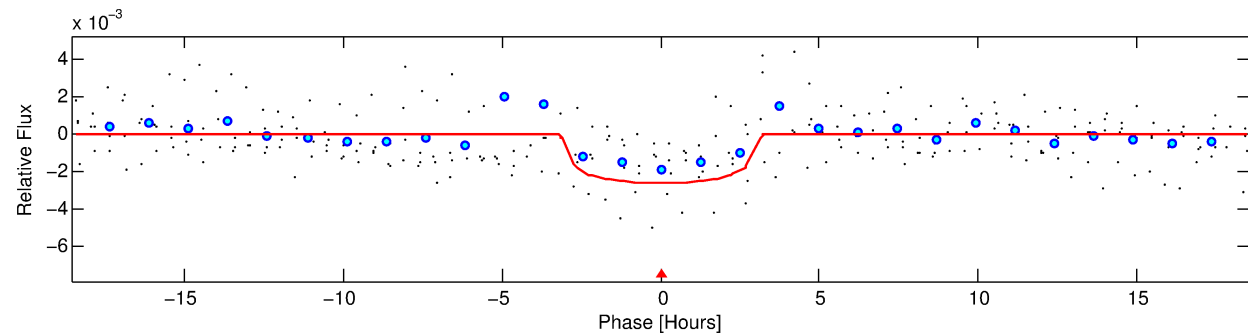
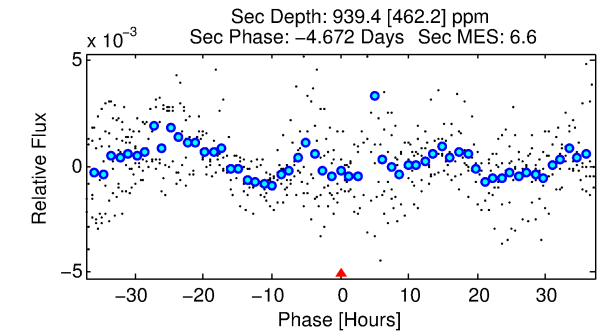
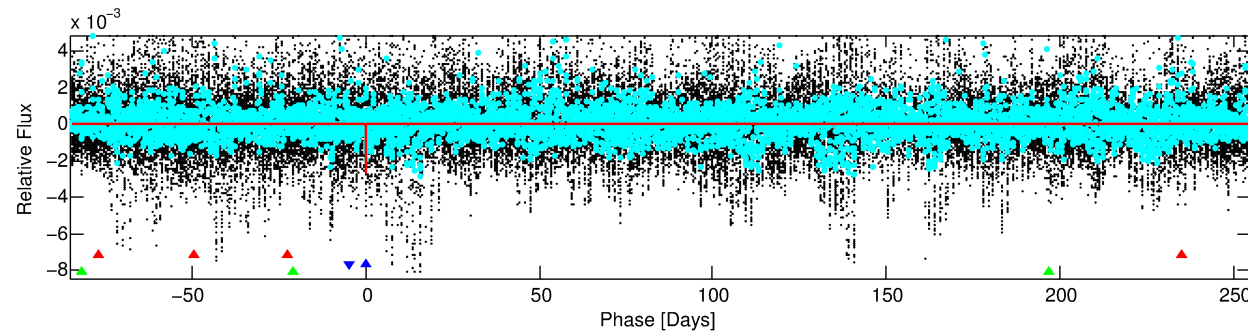
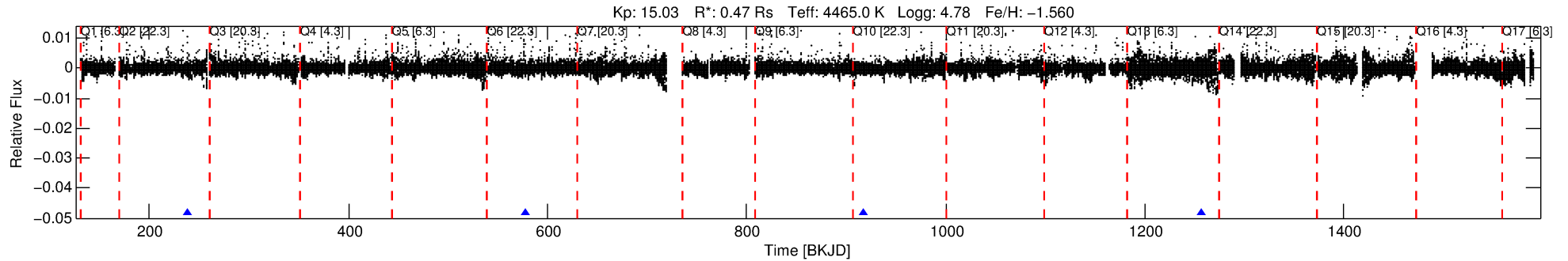
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Ephemeris Match Information For 010317398-02

No Significant Match Found

# DV One-Page Summary

KIC: 10317398 Candidate: 2 of 3 Period: 339.628 d



## DV Fit Results:

Period = 339.62834 [0.00414] d  
Epoch = 238.3678 [0.0074] BKJD  
Rp/R\* = 0.0467 [0.0156]  
a/R\* = 437.81 [599.09]  
b = 0.07 [20.55]  
Seff = 0.14 [0.03]  
Teq = 157 [7] K  
Rp = 2.42 [0.84] Re  
a = 0.7513 [0.0589] AU  
Ag = 49807.91 [41670.54] [1.20σ]  
Teffp = 3618 [761] K [4.55σ]

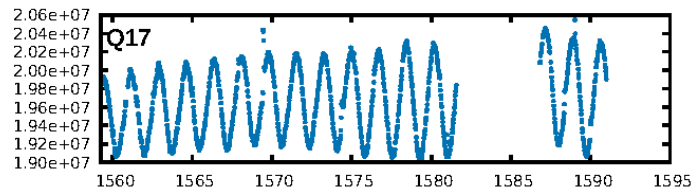
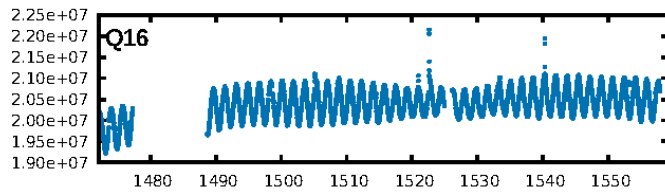
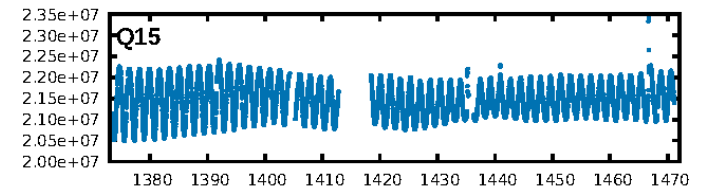
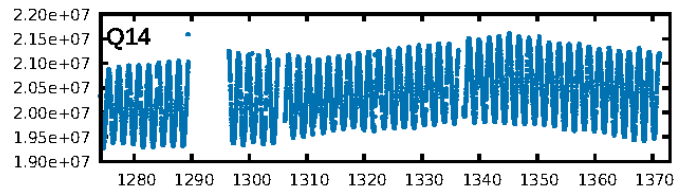
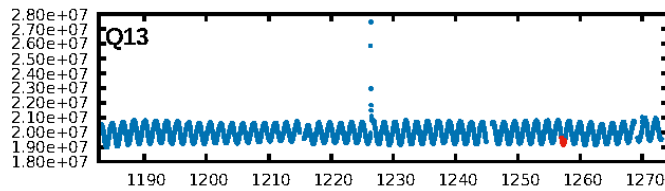
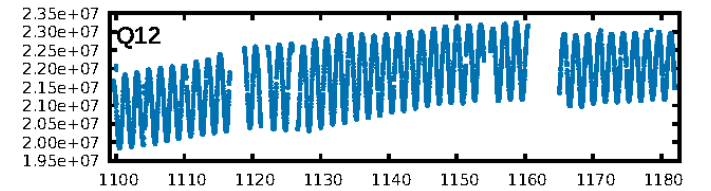
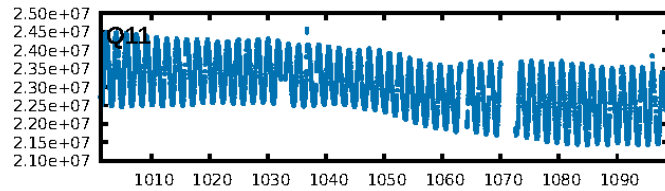
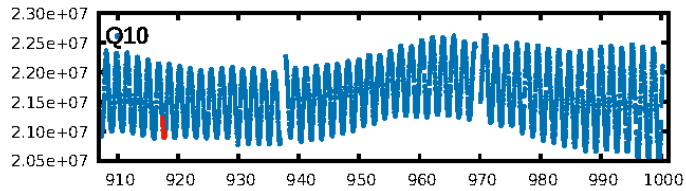
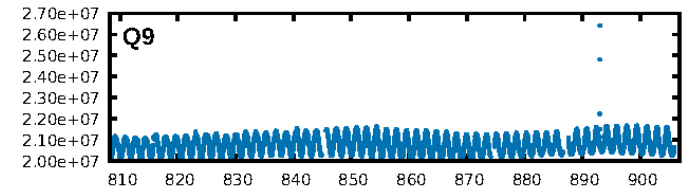
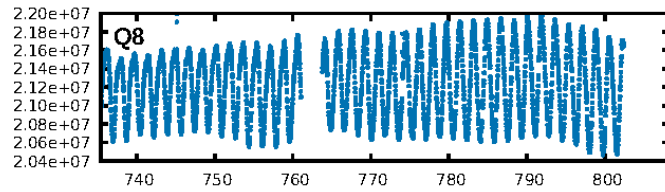
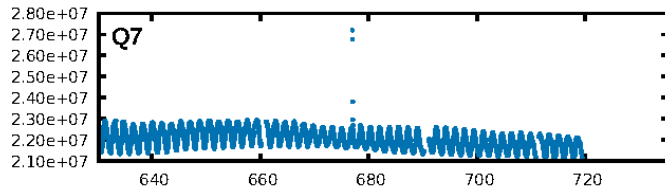
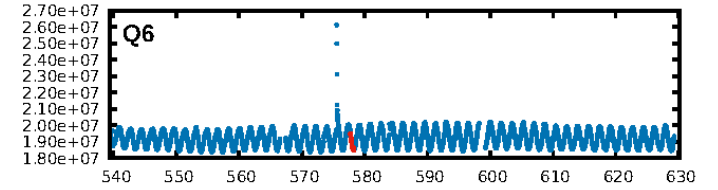
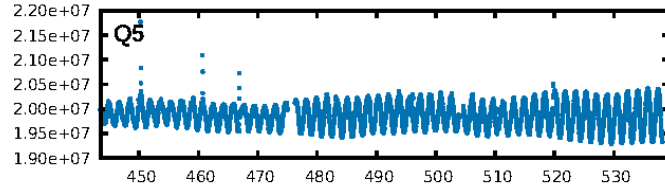
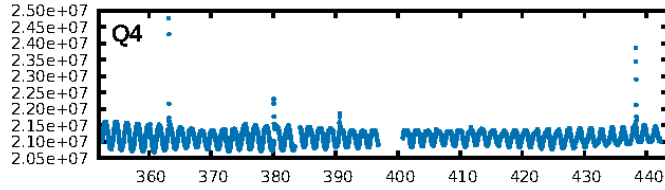
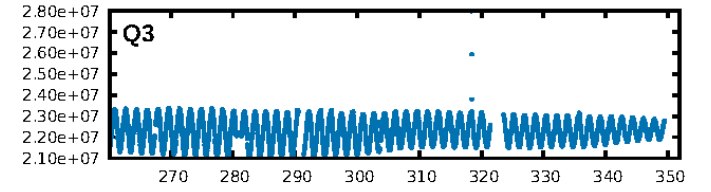
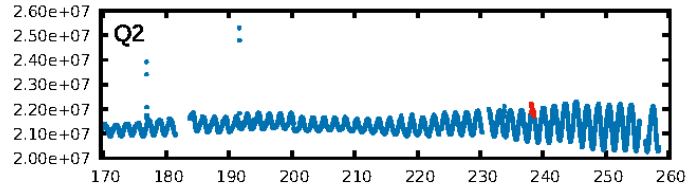
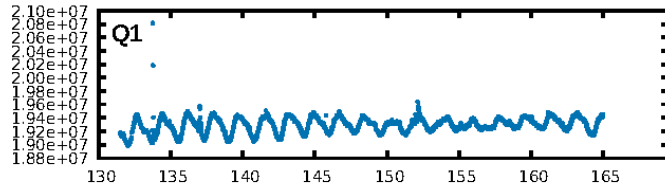
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [95.43σ]  
ModelChiSquare2-sig: 88.6%  
ModelChiSquareGof-sig: 98.5%  
**Bootstrap-pfa: 5.65e-09**  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 1.68  
Centroid-sig: 62.7%  
Centroid-so: 0.950 arcsec [2.26σ]  
OotOffset-rm: 0.105 arcsec [1.35σ]  
KicOffset-rm: 0.137 arcsec [1.52σ]  
OotOffset-st: 3/0/0/1 [4]  
KicOffset-st: 3/0/0/1 [4]  
DiffImageQuality-fgm: 0.75 [3/4]  
DiffImageOverlap-fno: 1.00 [4/4]

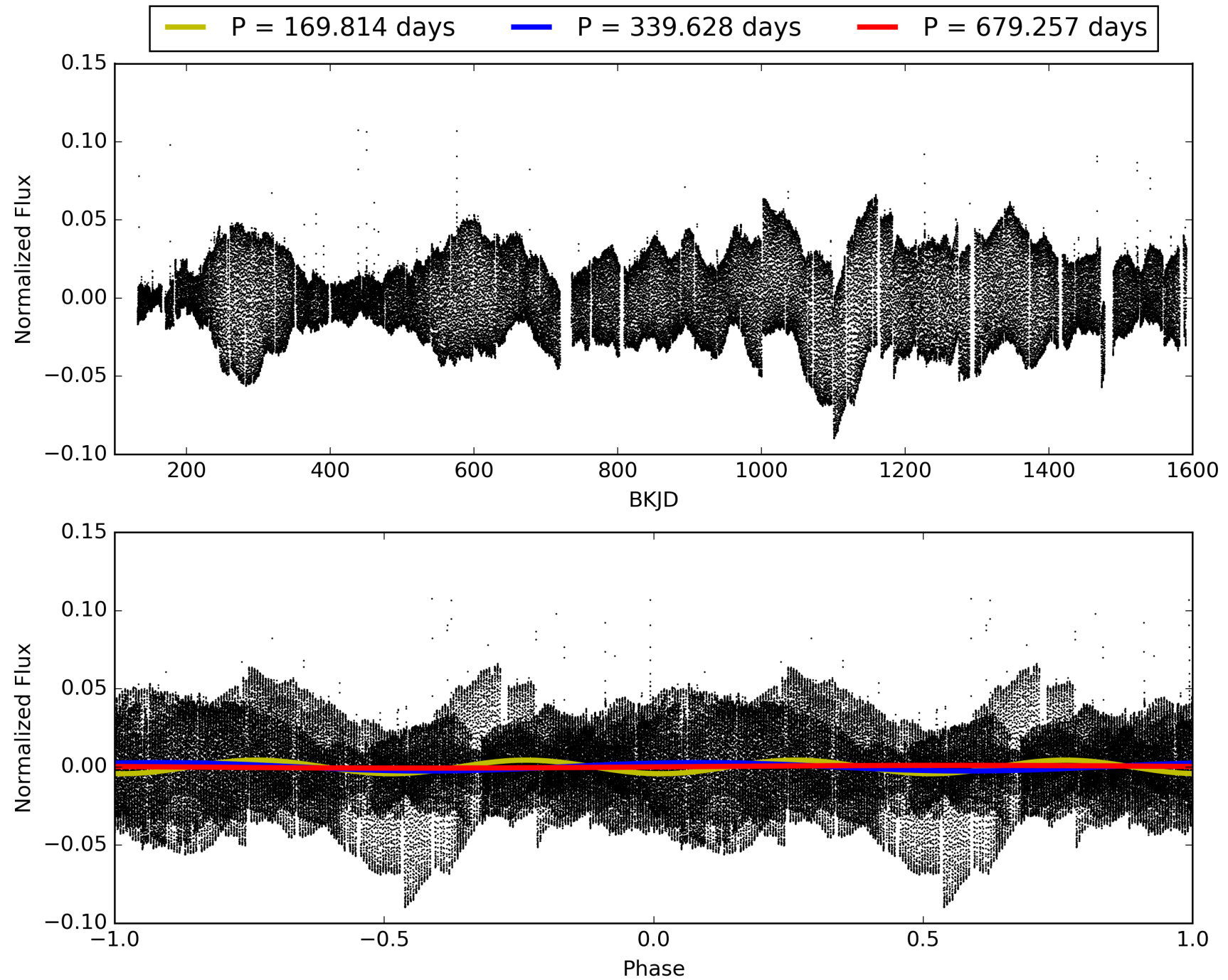
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 13:22:09 Z

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

# TCE 010317398-02, PDC Light Curves



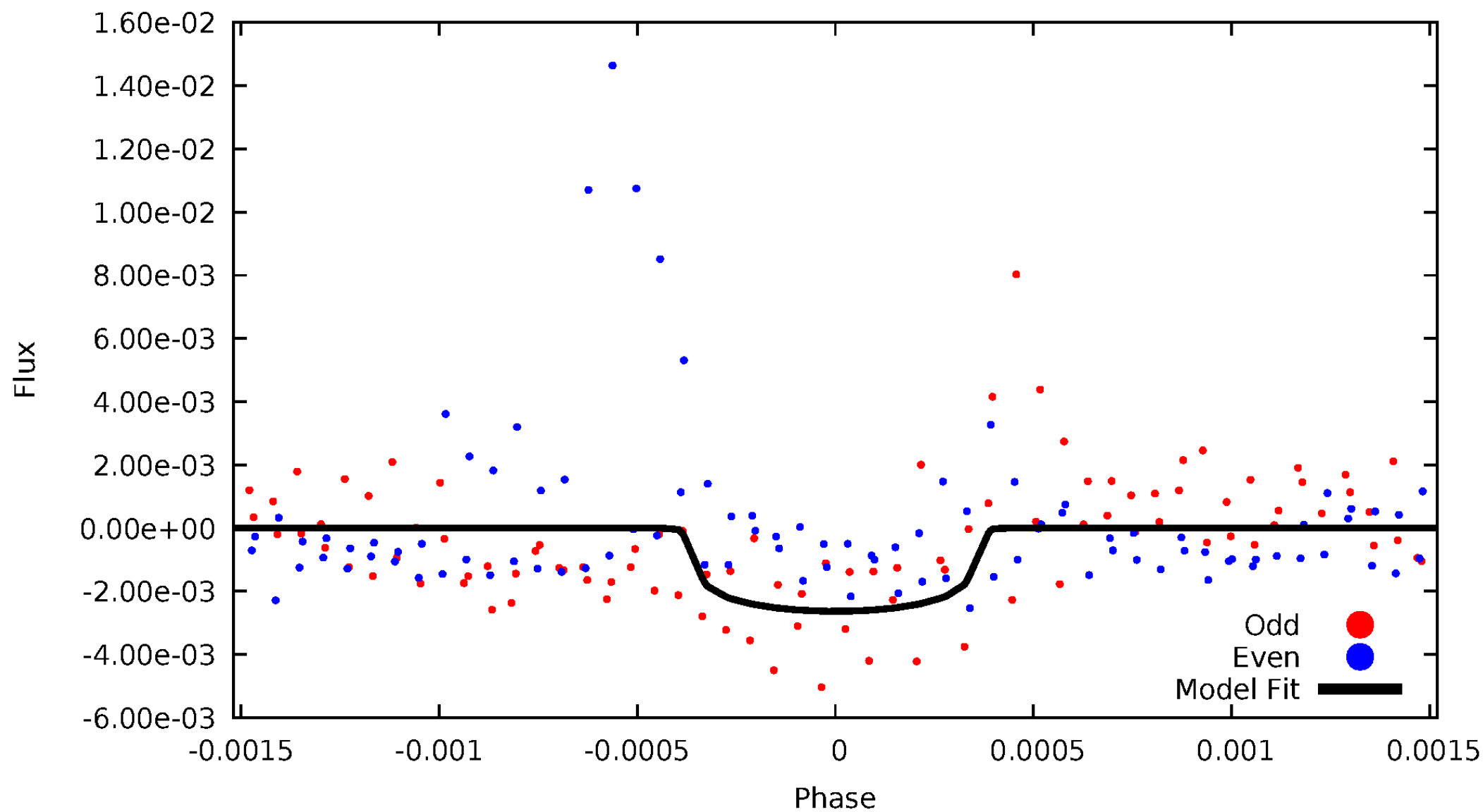
# TCE 010317398-02





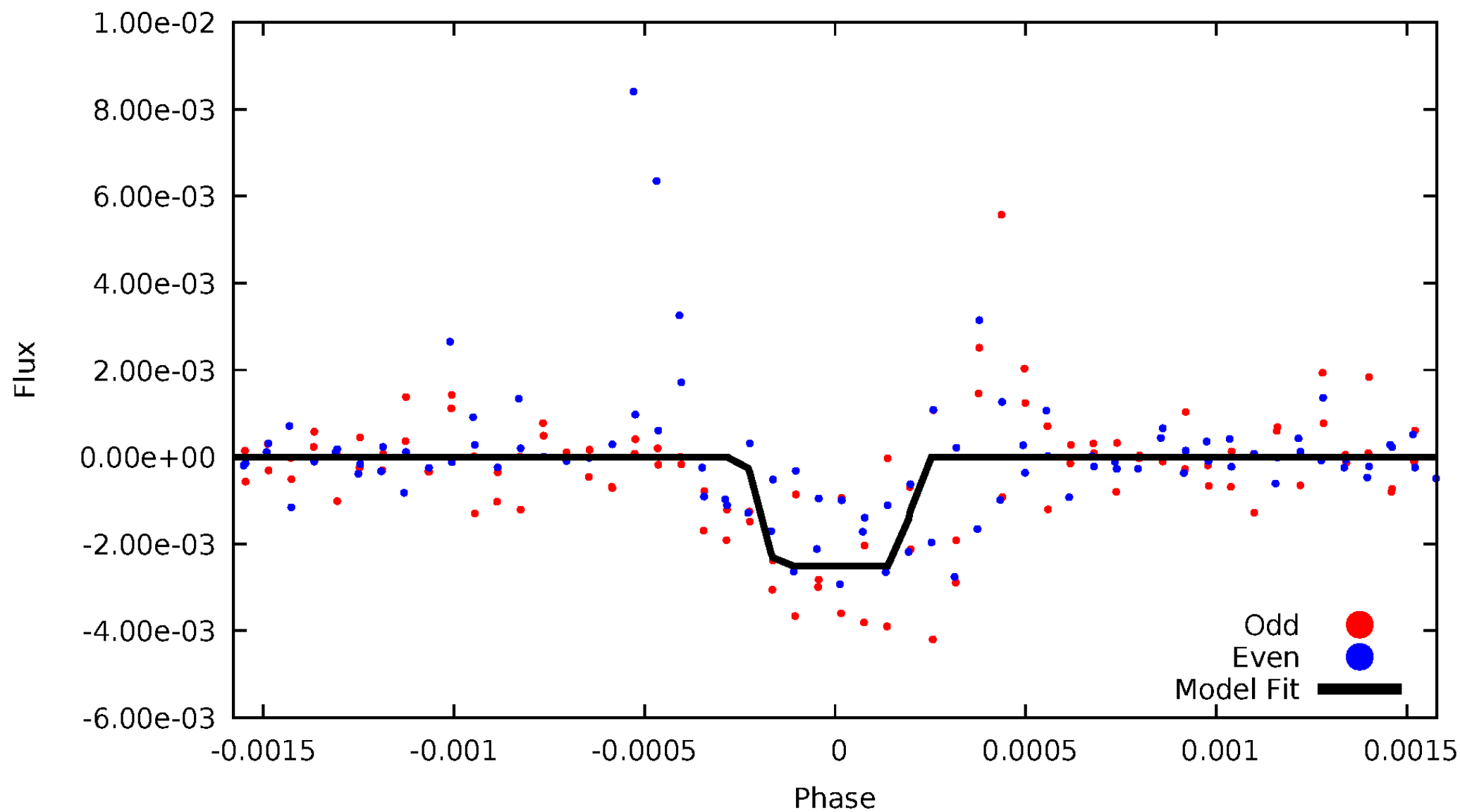
# DV Odd/Even

TCE 010317398-02



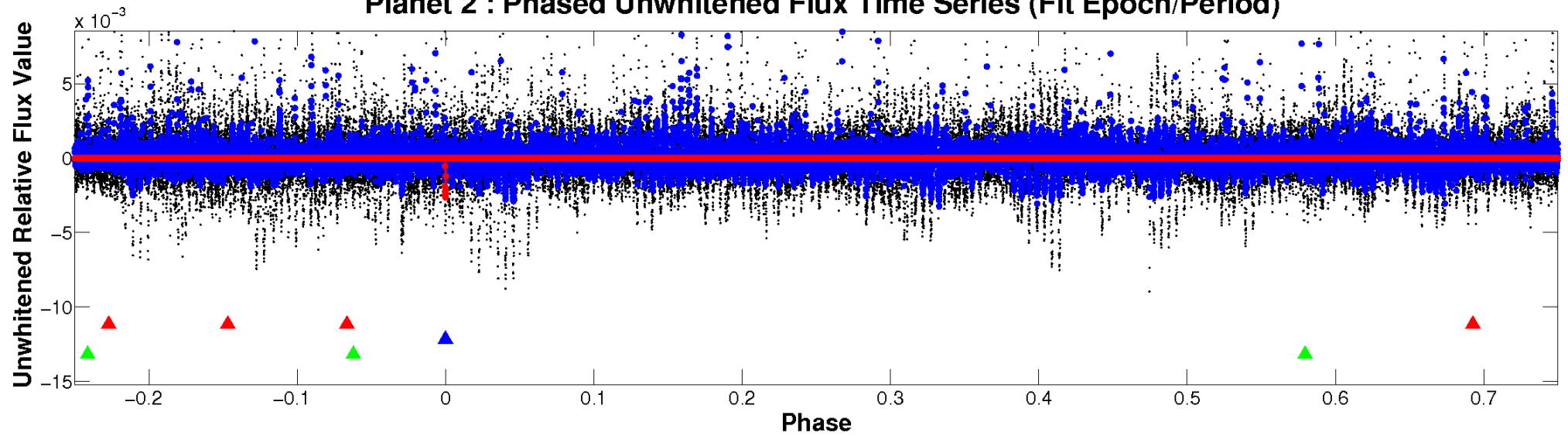
# ALT Odd/Even

TCE 010317398-02

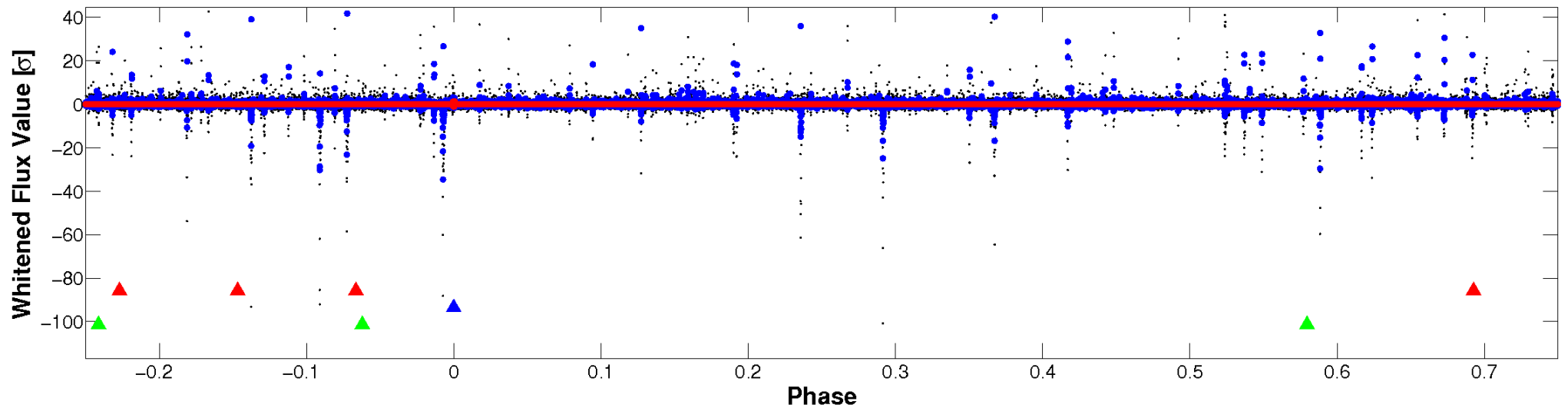


# Non-Whitened Vs. Whitened Light Curve

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

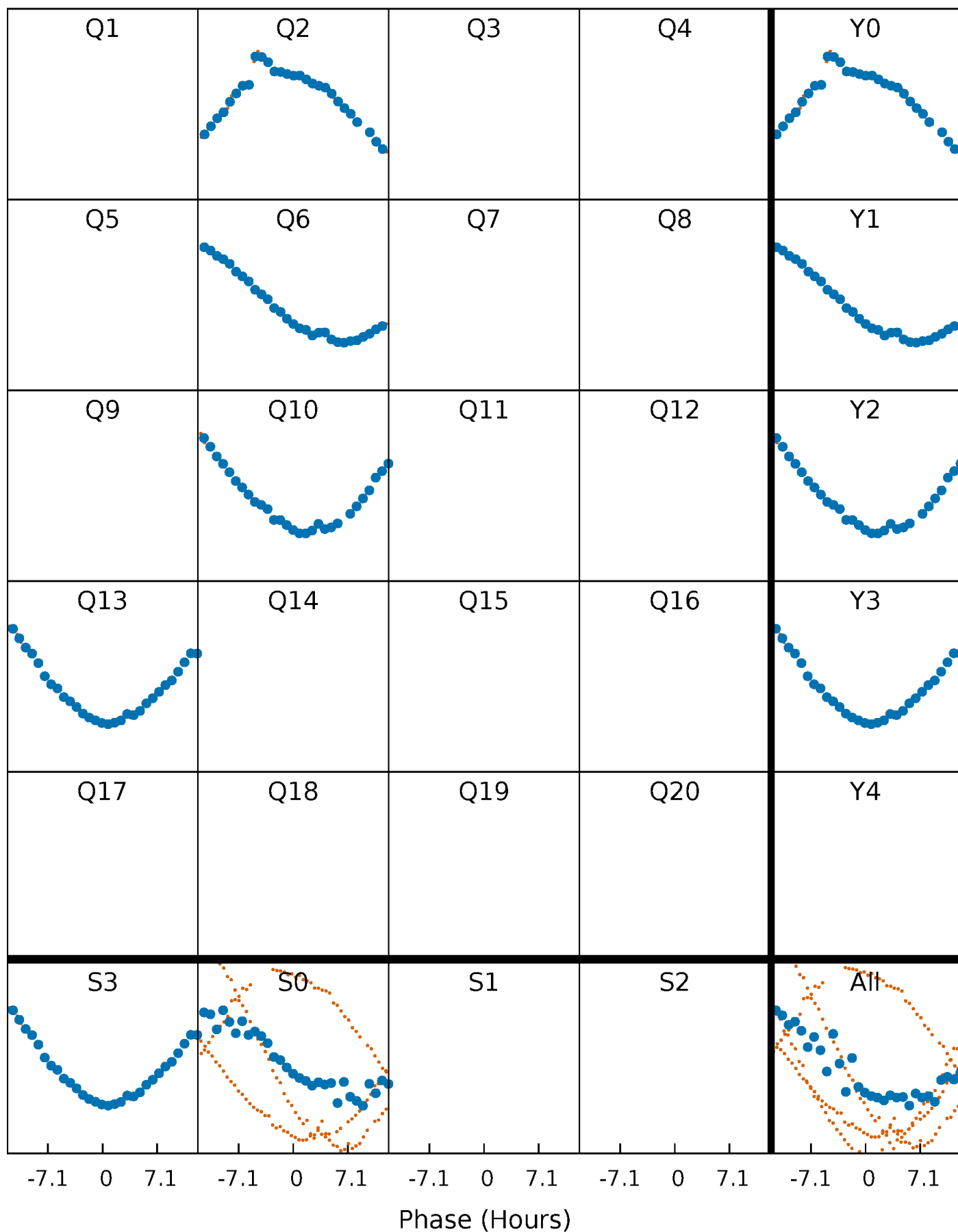


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



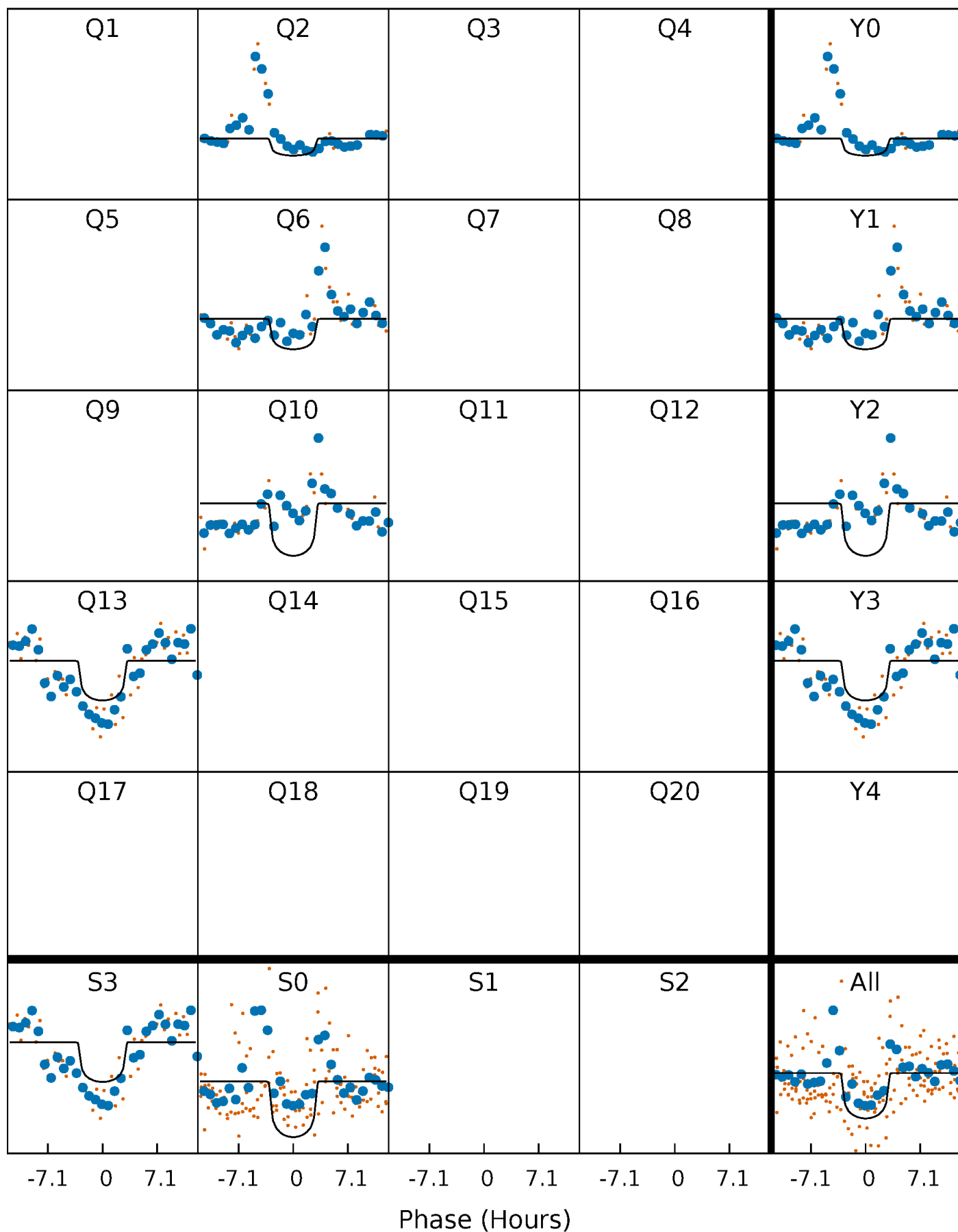
# PDC Quarter-Phased Transit Curves

TCE 010317398-02     $P=339.628339$  Days     $T_0=238.367800$  (BKJD)



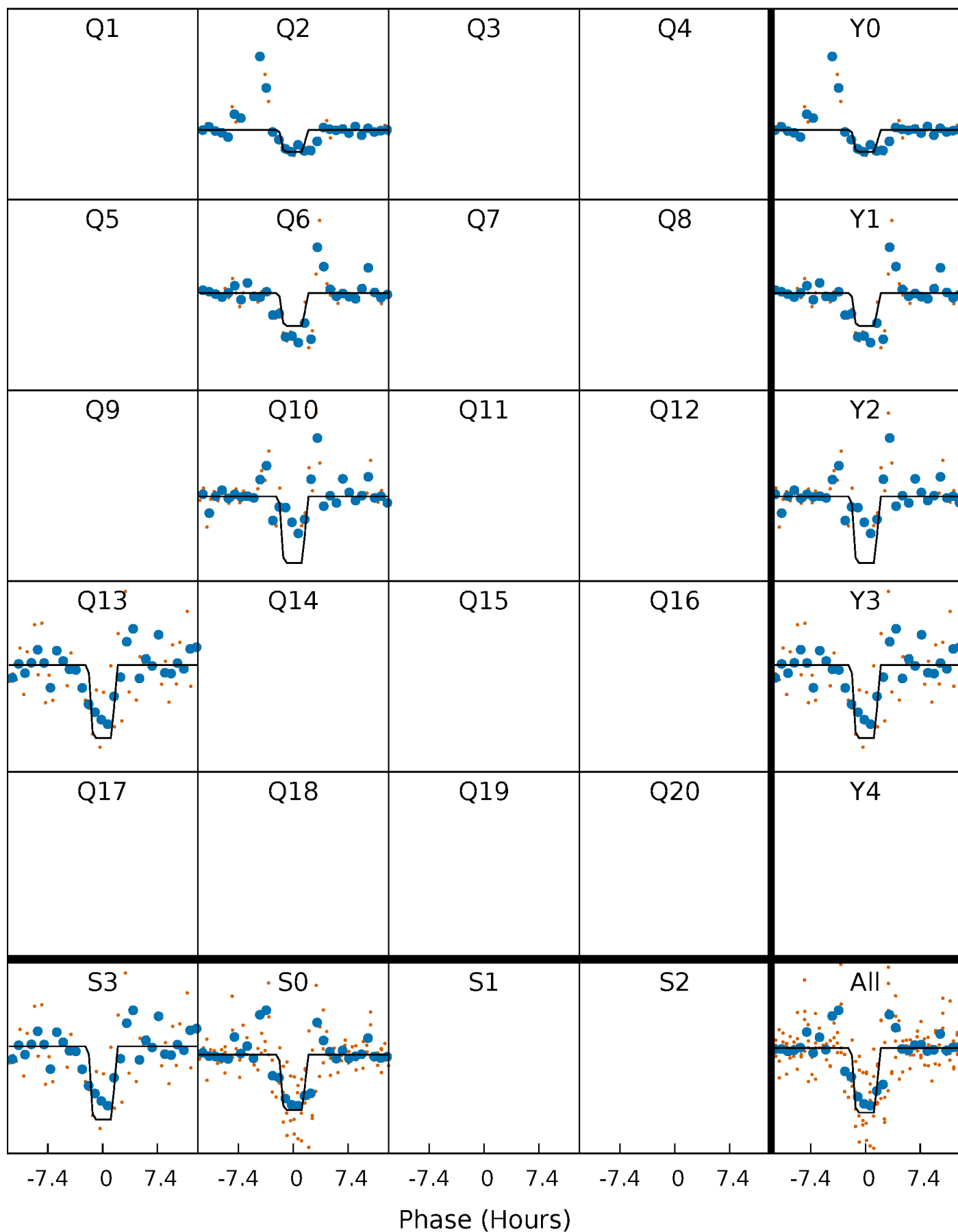
# DV Quarter-Phased Transit Curves

TCE 010317398-02     $P=339.628339$  Days     $T_0=238.367800$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

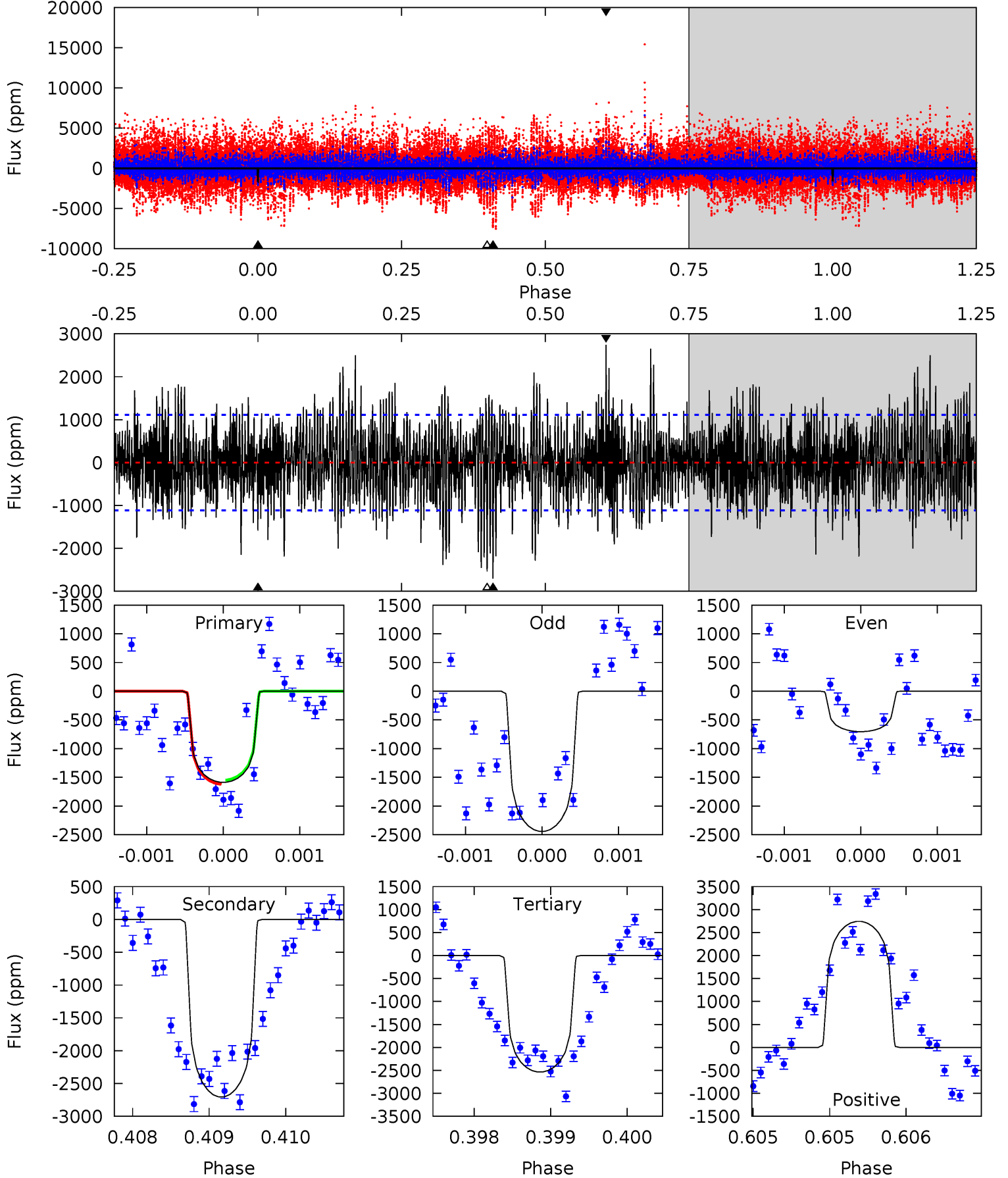
TCE 010317398-02 P=339.626201 Days  $T_0=238.376788$  (BKJD)



# DV Model-Shift Uniqueness Test

010317398-02, P = 339.628339 Days, E = 238.367800 Days

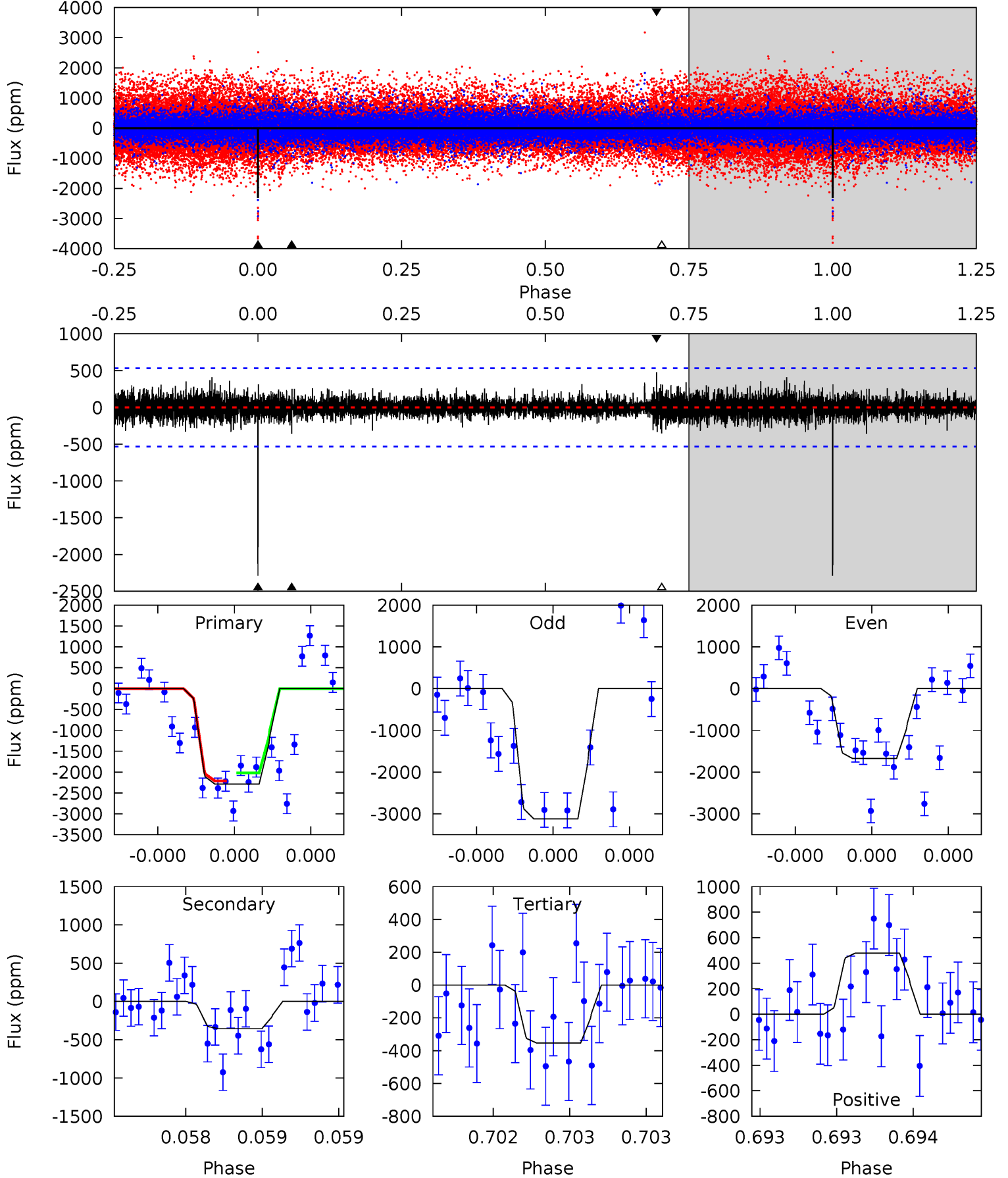
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.81	13.3	12.5	13.5	5.48	3.34	3.35	-4.67	-5.69	0.83	-0.19	3.73	1.40	0.50	0.18



# Alt Model-Shift Uniqueness Test

010317398-02, P = 339.626201 Days, E = 238.376788 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
24.1	3.73	3.71	5.04	5.60	3.52	0.83	20.4	19.0	0.02	-1.31	7.38	1.03	0.17	1.04





### Stellar Parameters For KIC 010317398

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4465^{+142}_{-157}$	$4.775^{+0.058}_{-0.031}$	$-1.560^{+0.300}_{-0.250}$	$0.475^{+0.031}_{-0.046}$	$0.491^{+0.034}_{-0.034}$	$6.447^{+1.595}_{-0.780}$
	+3%/-4%	+1%/-1%	+19%/-16%	+7%/-10%	+7%/-7%	+25%/-12%
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 010317398-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-2705 \pm 203$	$2.42^{+0.83}_{-0.82}$	$218^{+8}_{-9}$	$4629^{+943}_{-512}$	$144436^{+187430}_{-66848}$
Alt.	$-355 \pm 95$	$2.57^{+0.89}_{-0.86}$	$218^{+8}_{-8}$	$3207^{+441}_{-309}$	$16603^{+21577}_{-8048}$

$T_{\text{max}}$  = 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

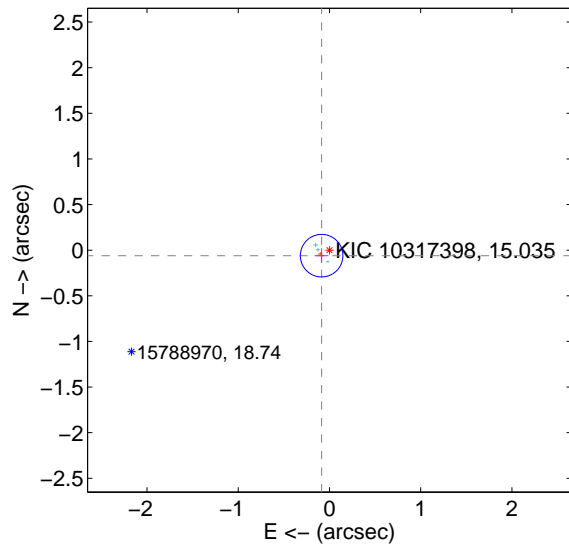
Supplemental centroid analysis for 010317398-02. Kepler magnitude: 15.04. Transit SNR 7.64

There are 3 quarters with good PRF difference image offsets

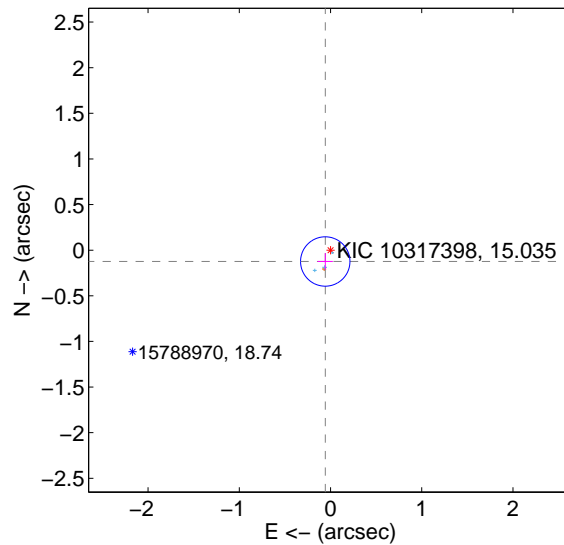
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.105 \pm 0.078$	1.35	$0.086 \pm 0.076$	$-0.060 \pm 0.081$
PRF-fit source offset from KIC position	$0.137 \pm 0.090$	1.52	$0.058 \pm 0.083$	$-0.124 \pm 0.092$
photometric centroid source offset	$0.95 \pm 0.42$	2.26	$-0.92 \pm 0.42$	$0.25 \pm 0.38$

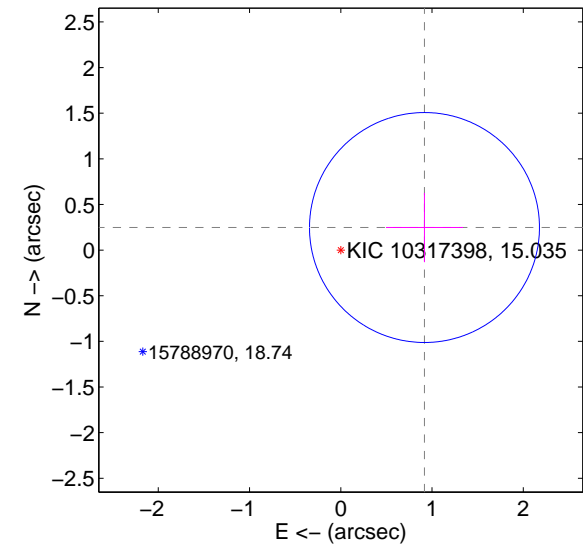
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

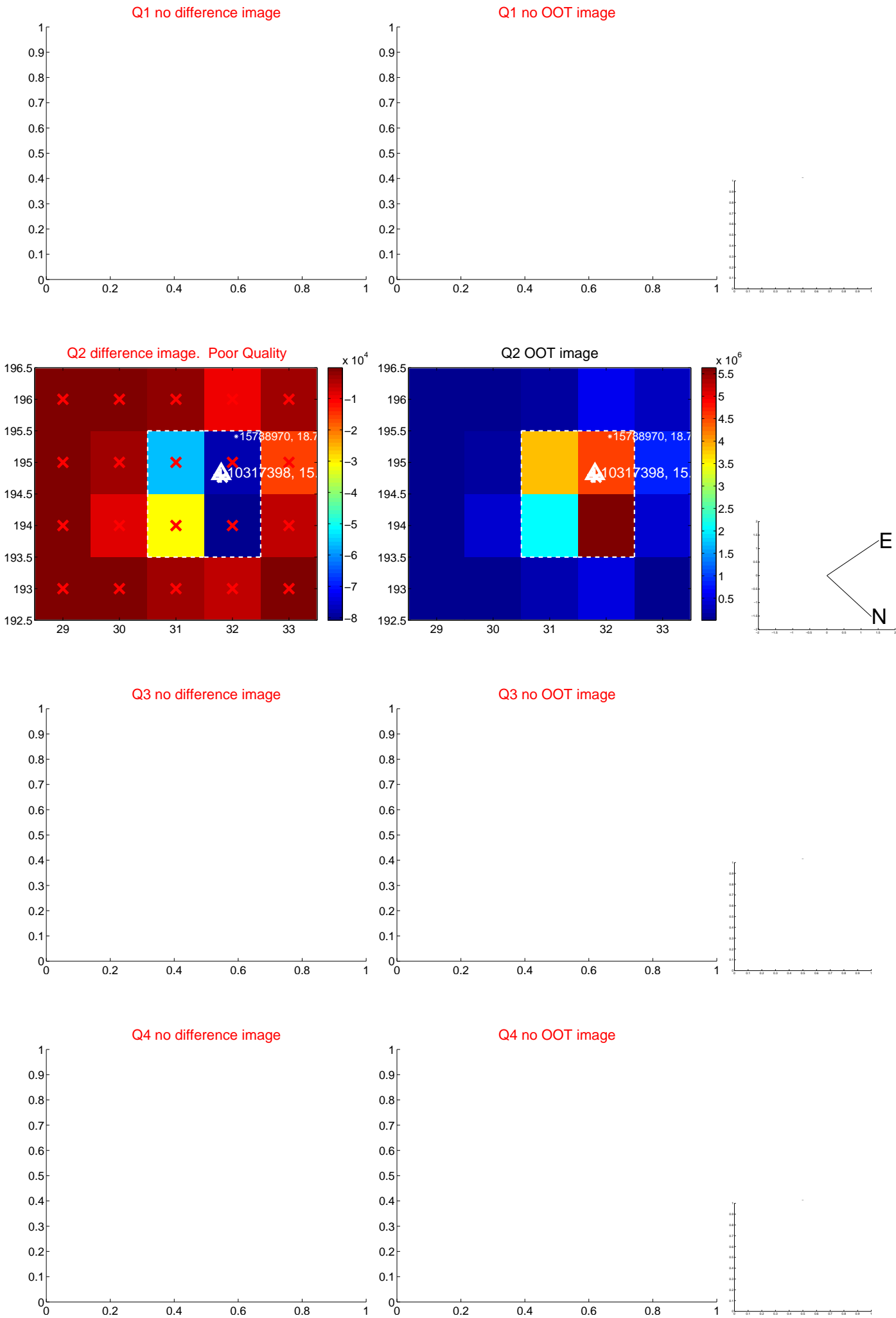


offset from photometric centroids



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.

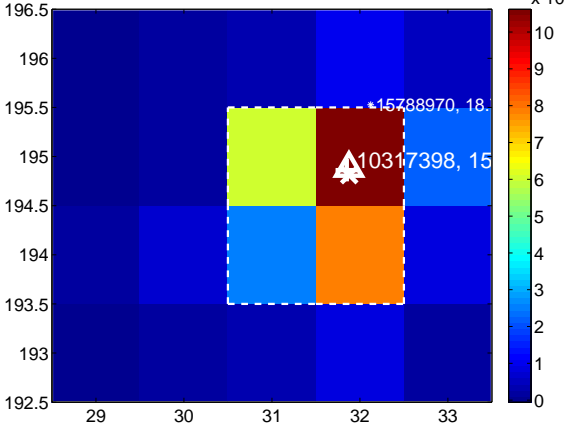
Q5 no difference image



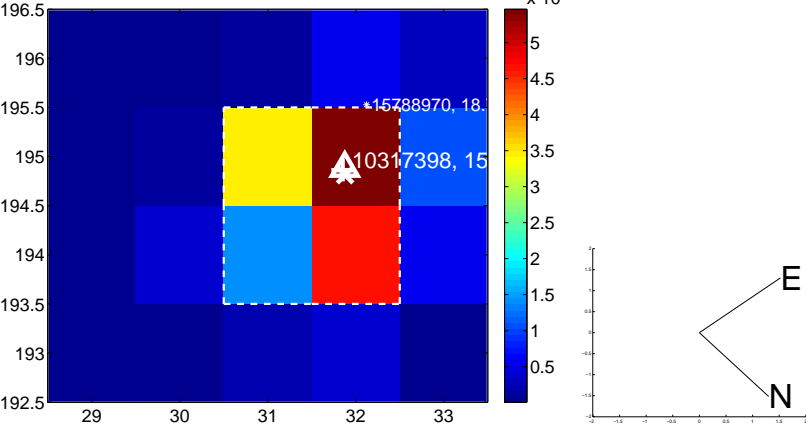
Q5 no OOT image



Q6 difference image



Q6 OOT image



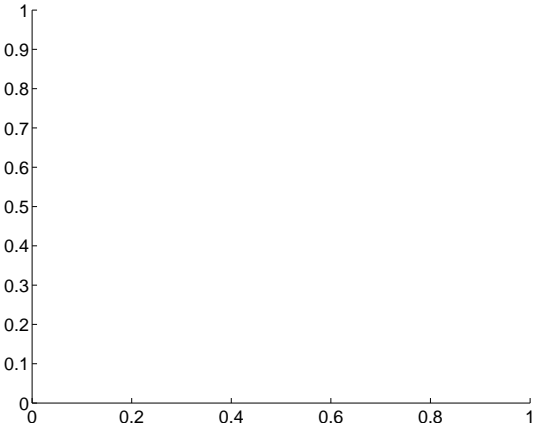
Q7 no difference image



Q7 no OOT image



Q8 no difference image



Q8 no OOT image



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

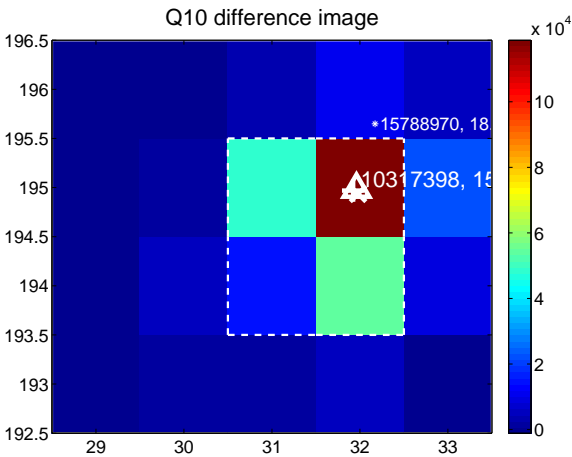
Q9 no difference image



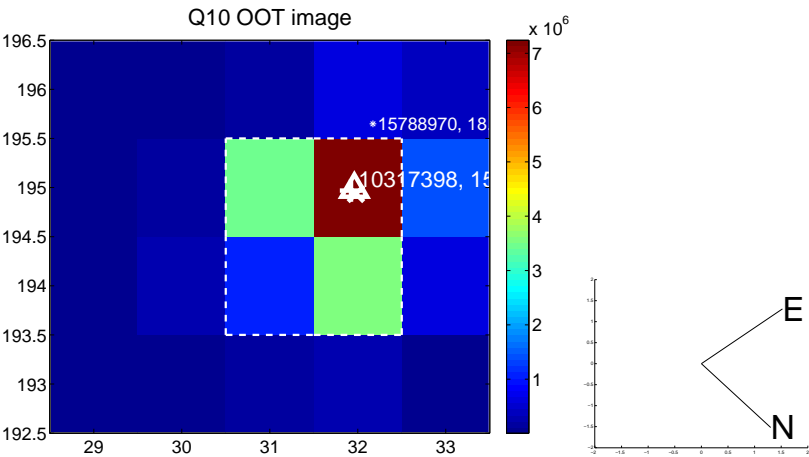
Q9 no OOT image



Q10 difference image



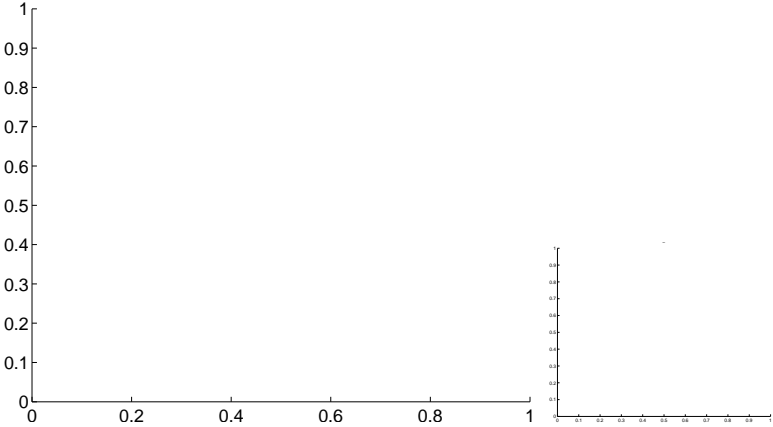
Q10 OOT image



Q11 no difference image



Q11 no OOT image



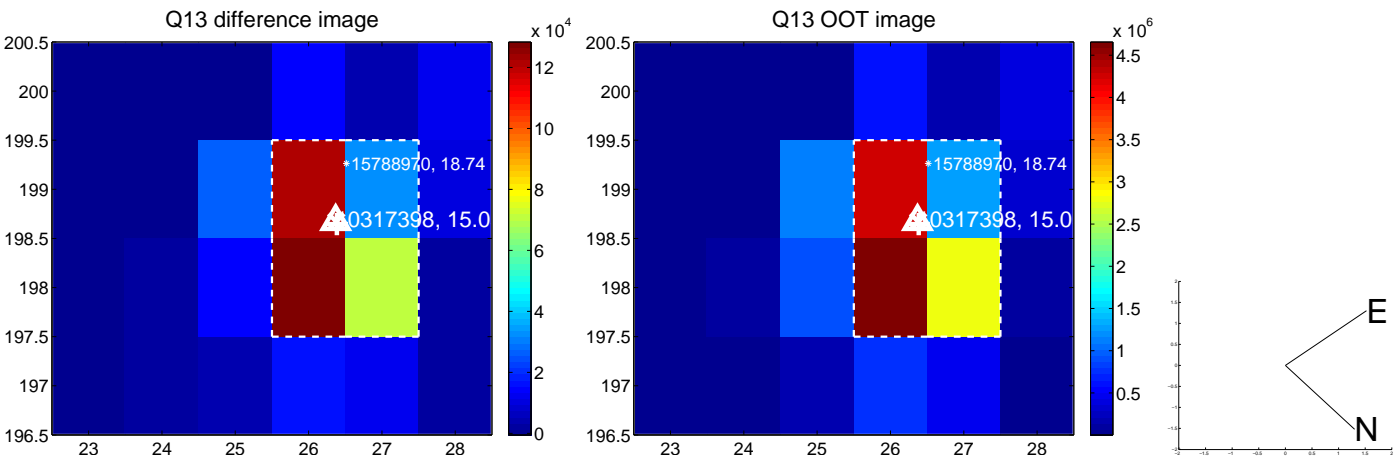
Q12 no difference image



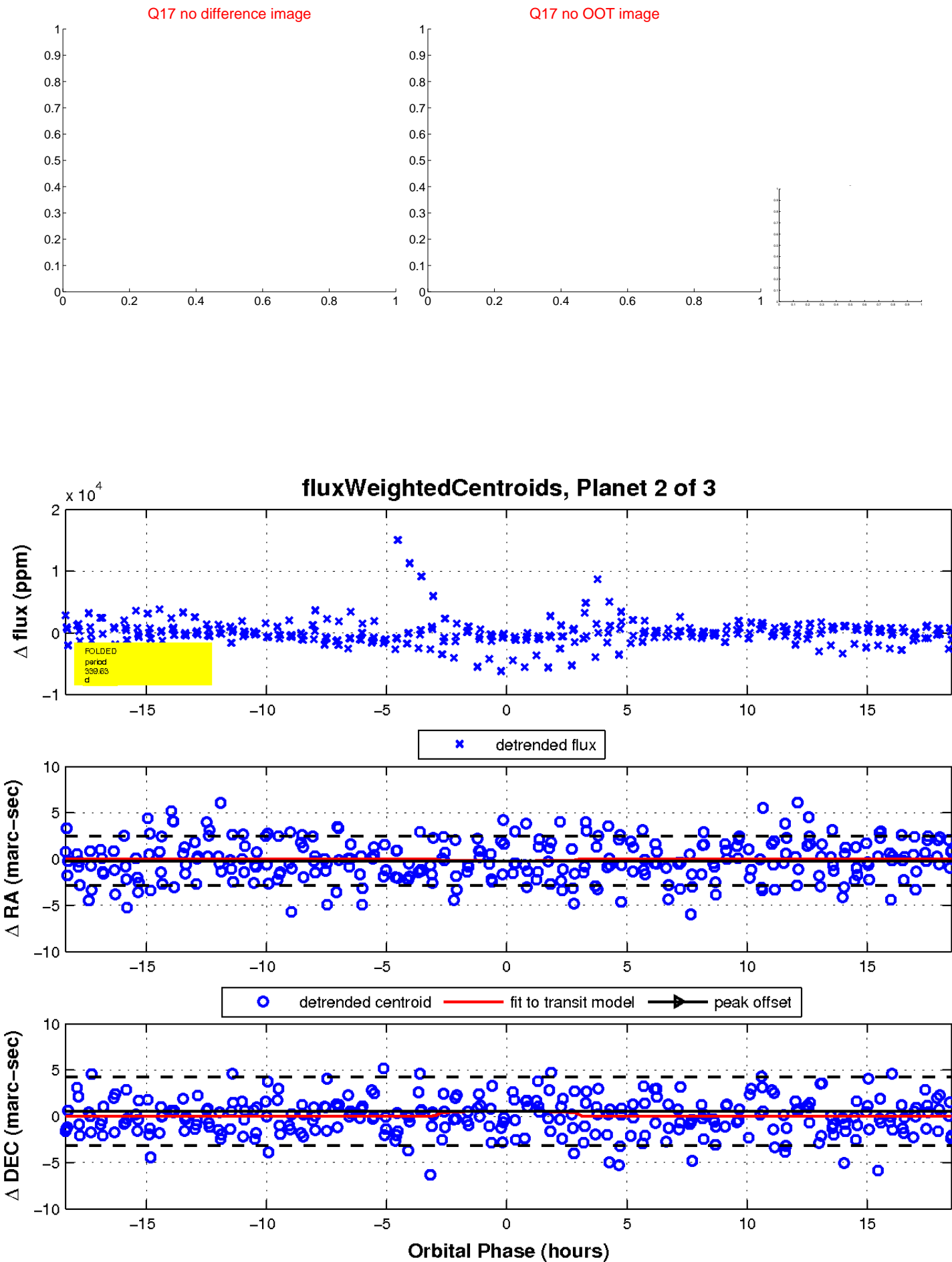
Q12 no OOT image



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

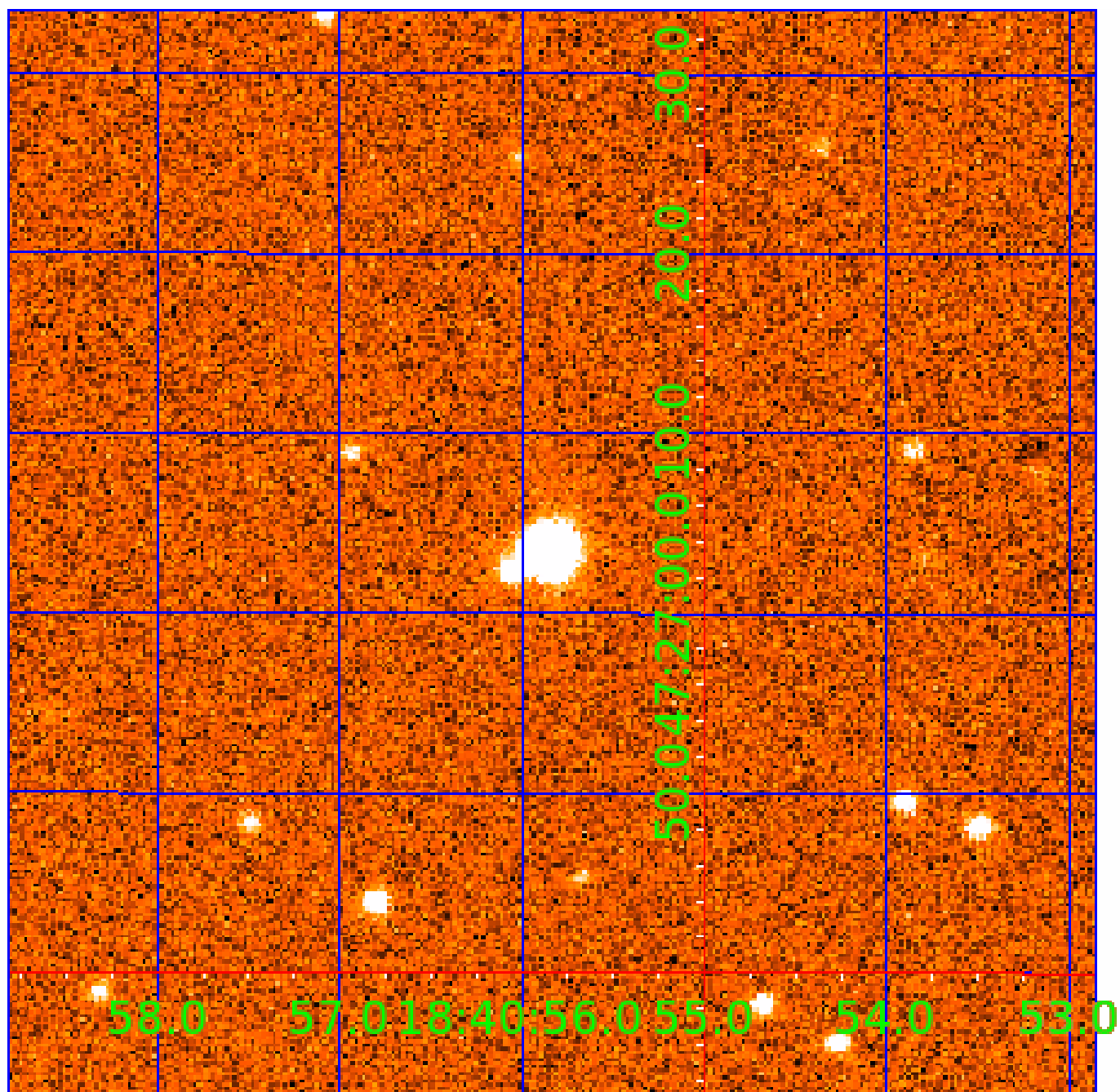


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination





# KIC 010317398

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010317398-01	OBS	No	366.895768	473.622293	1946.5	2.950	13.0	5.9	0.47	4465	2.16	0.13
010317398-02	OBS	No	339.628340	238.367800	2629.6	6.191	11.2	7.6	0.47	4465	2.42	0.14
010317398-03	OBS	No	618.407355	217.282217	2323.0	4.651	11.3	6.9	0.47	4465	2.33	0.06

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010317398-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
010317398-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
010317398-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—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.

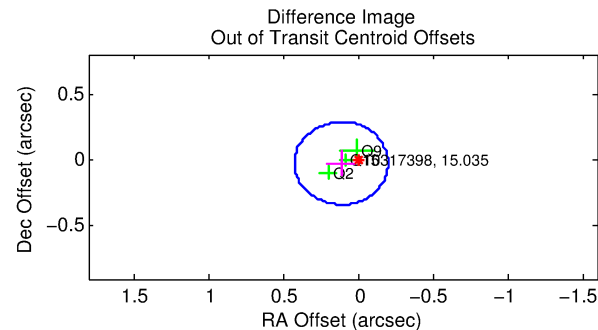
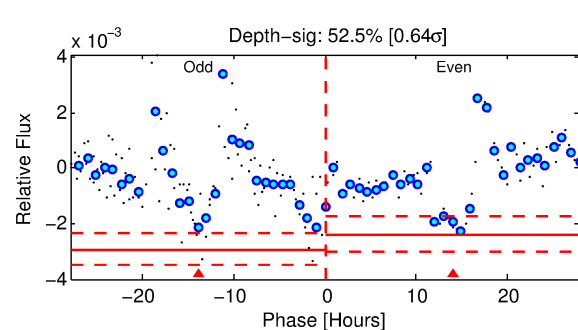
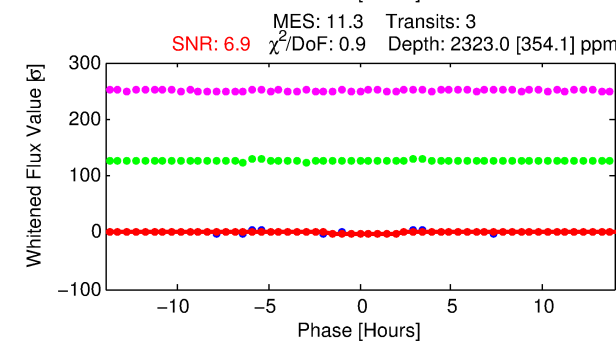
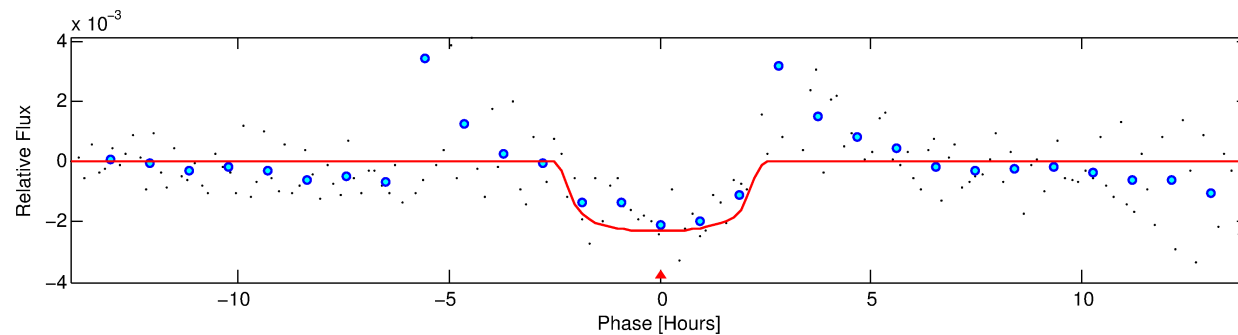
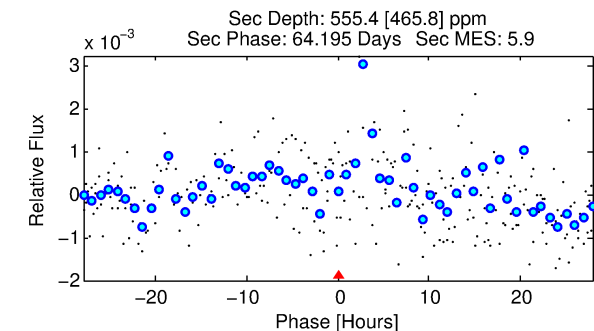
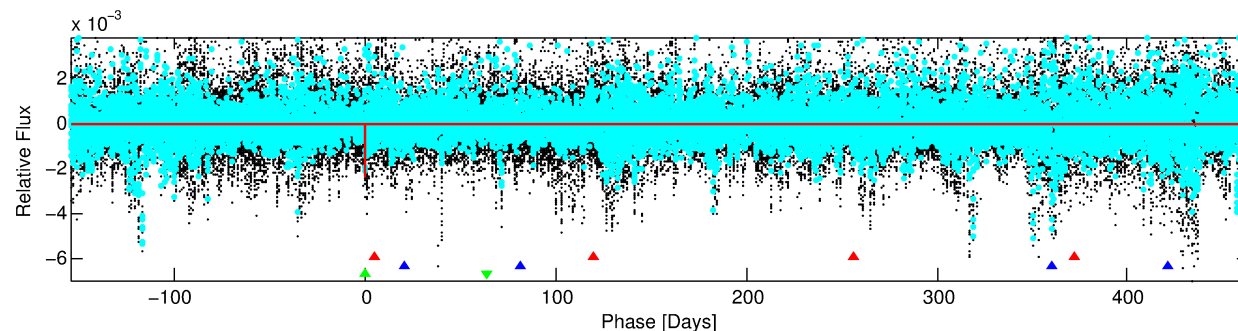
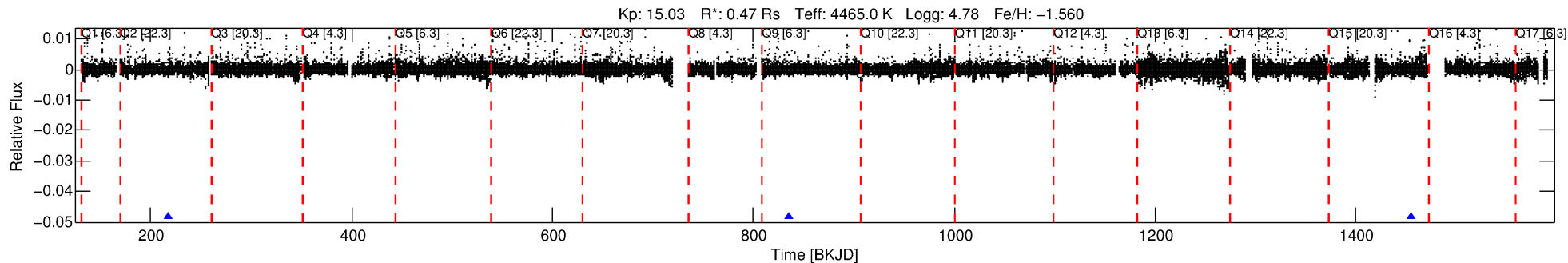
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010317398-03

No Significant Match Found

# DV One-Page Summary

KIC: 10317398 Candidate: 3 of 3 Period: 618.407 d



## DV Fit Results:

Period = 618.40736 [0.00578] d  
Epoch = 217.2822 [0.0073] BKJD  
Rp/R\* = 0.0449 [0.0250]  
a/R\* = 962.22 [2358.35]  
b = 0.44 [4.51]  
Seff = 0.06 [0.01]  
Teq = 128 [6] K  
Rp = 2.33 [1.31] Re  
a = 1.1203 [0.0879] AU  
Ag = 70753.38 [98811.44] [0.72σ]  
Teffp = 3234 [1131] K [2.75σ]

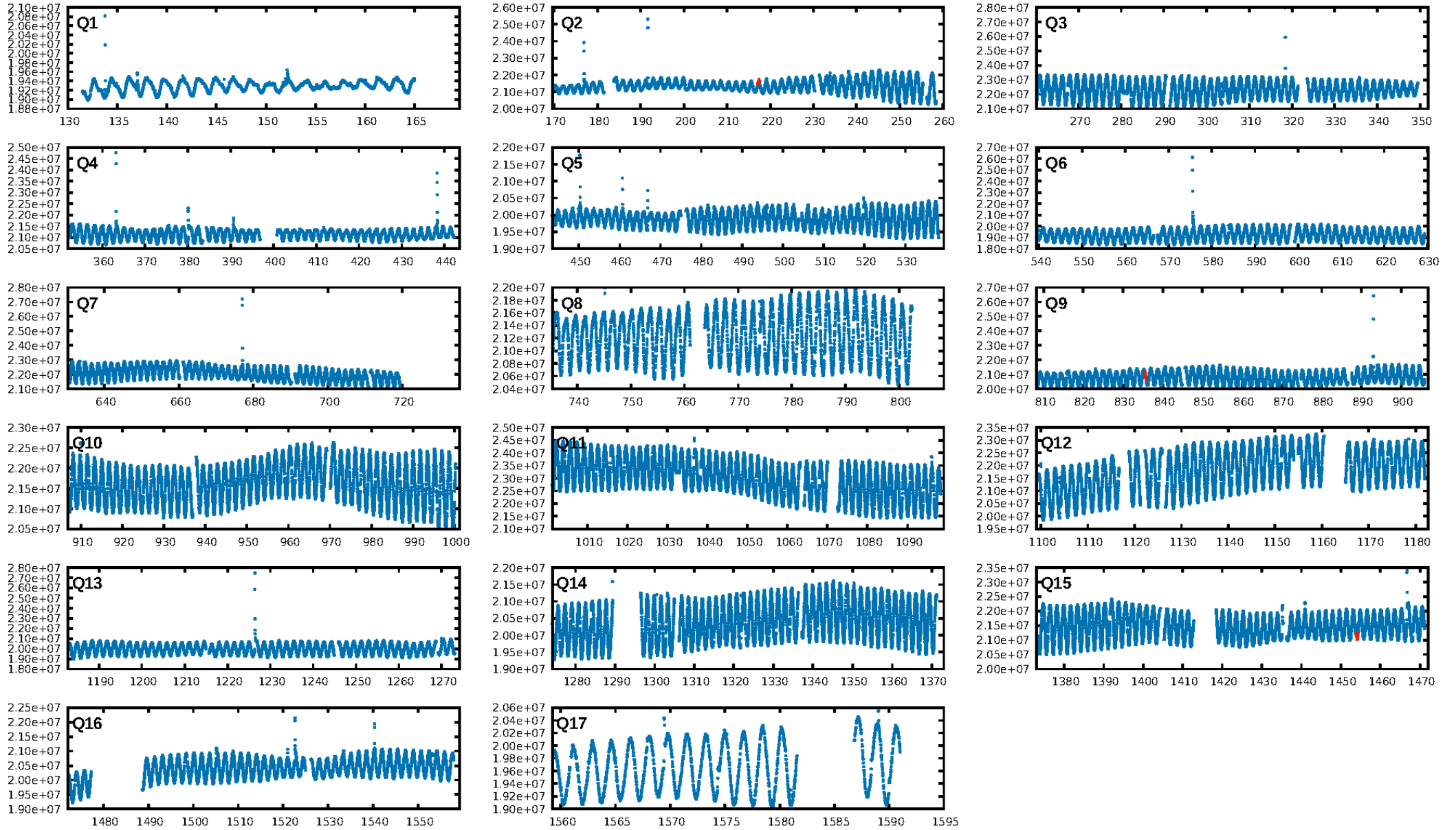
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [1095.90σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 37.4%  
ModelChiSquareGof-sig: 85.7%  
**Bootstrap-pfa: 1.29e-08**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.944  
Centroid-sig: 7.8%  
Centroid-so: 2.020 arcsec [2.74σ]  
OotOffset-rm: 0.114 arcsec [1.09σ]  
KicOffset-rm: 0.130 arcsec [1.37σ]  
OotOffset-st: 1/1/0/1 [3]  
KicOffset-st: 1/1/0/1 [3]  
DiffImageQuality-fgm: 0.33 [1/3]  
DiffImageOverlap-fno: 1.00 [3/3]

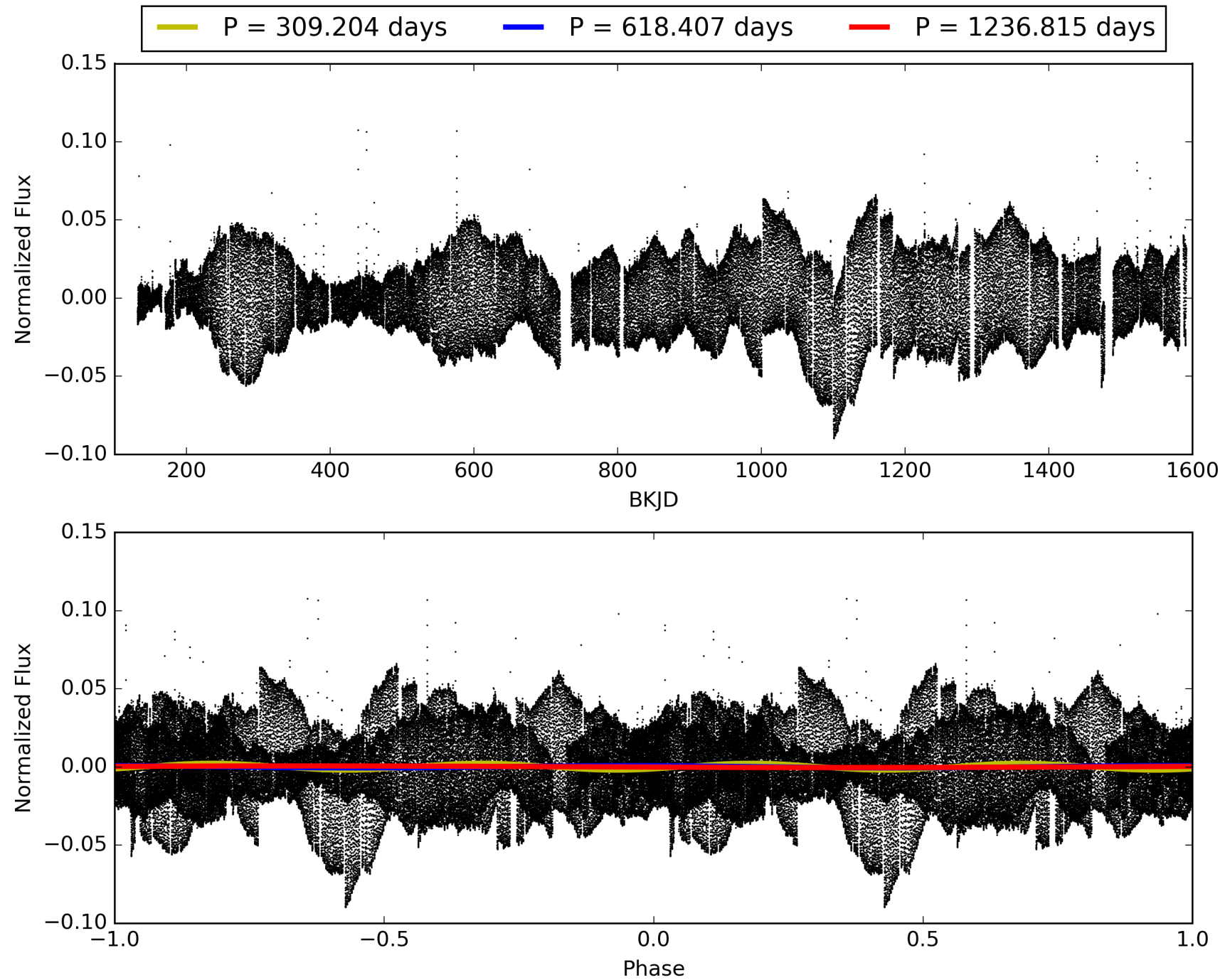
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 13:22:28 Z

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

# TCE 010317398-03, PDC Light Curves

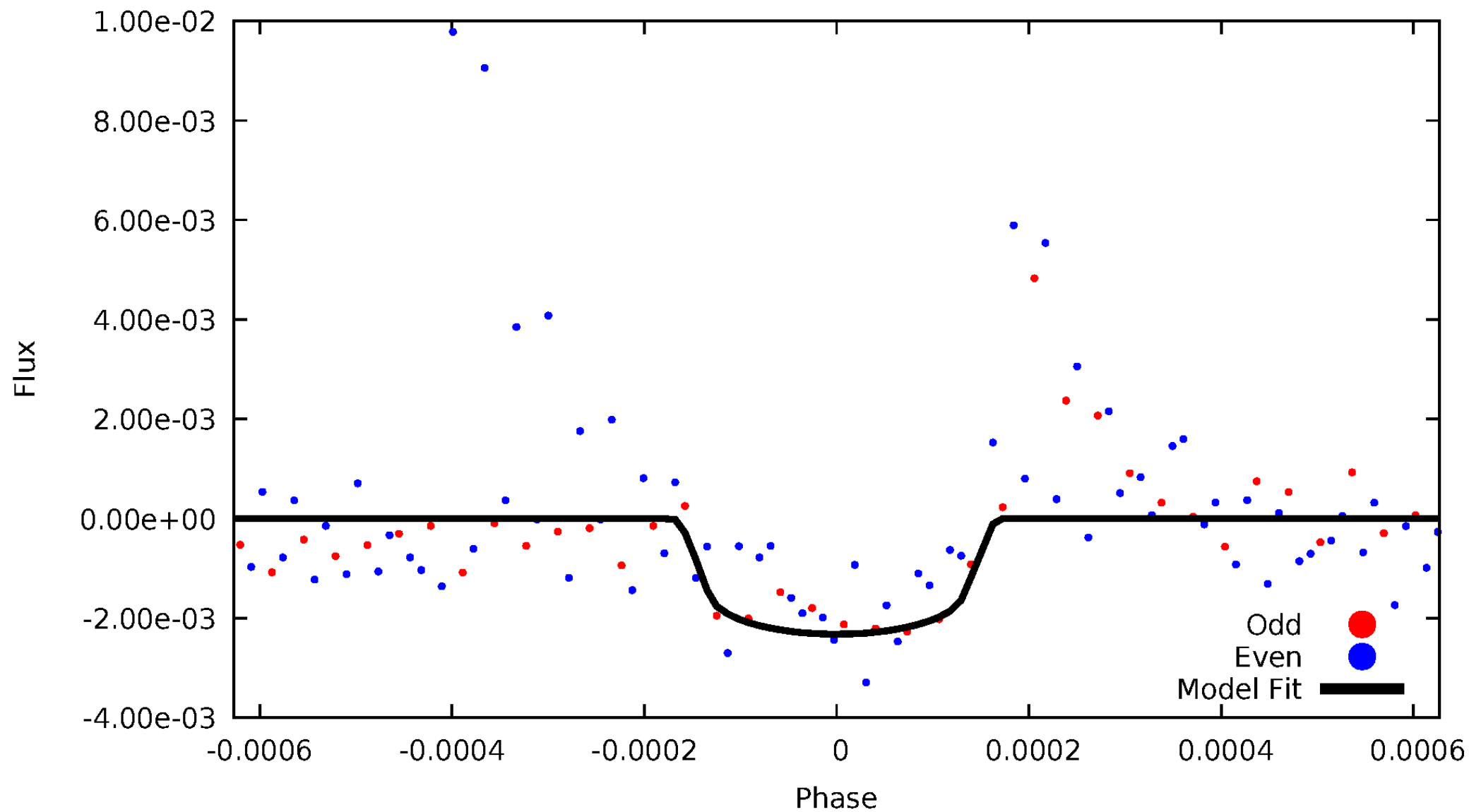


# TCE 010317398-03



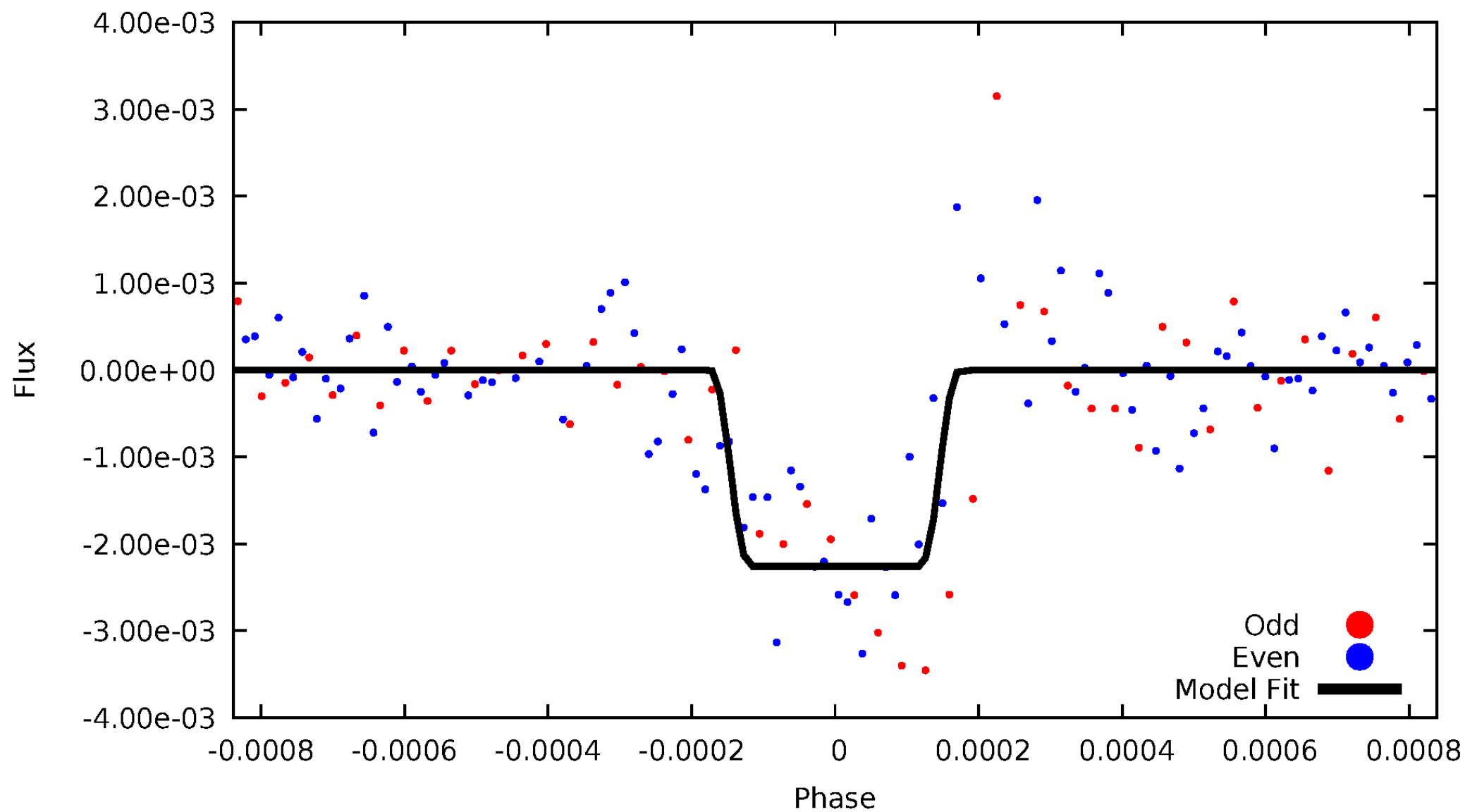
# DV Odd/Even

TCE 010317398-03



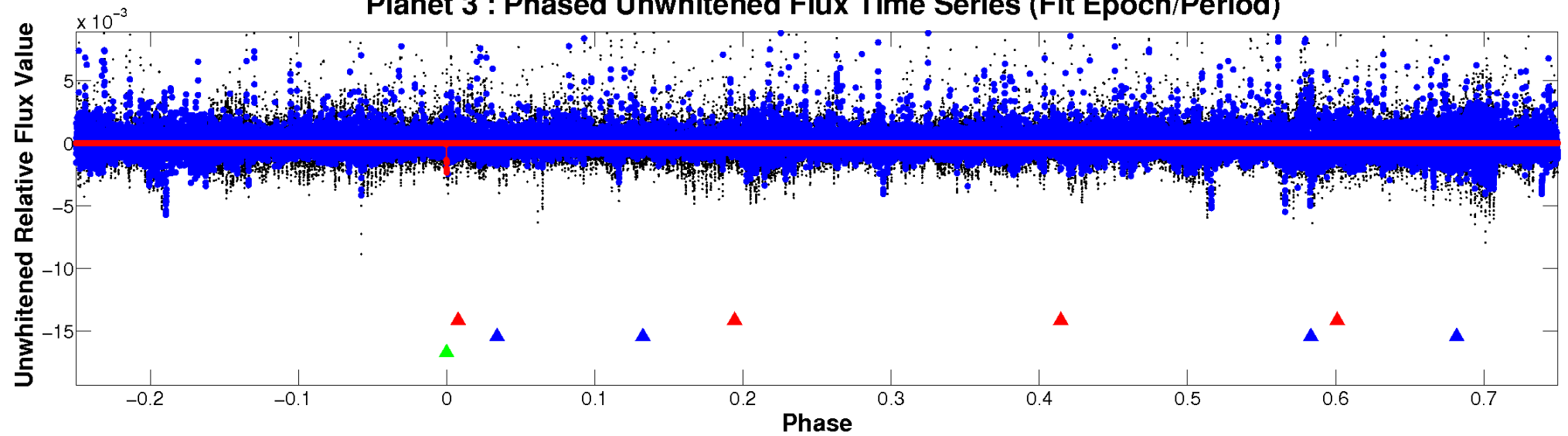
# ALT Odd/Even

TCE 010317398-03

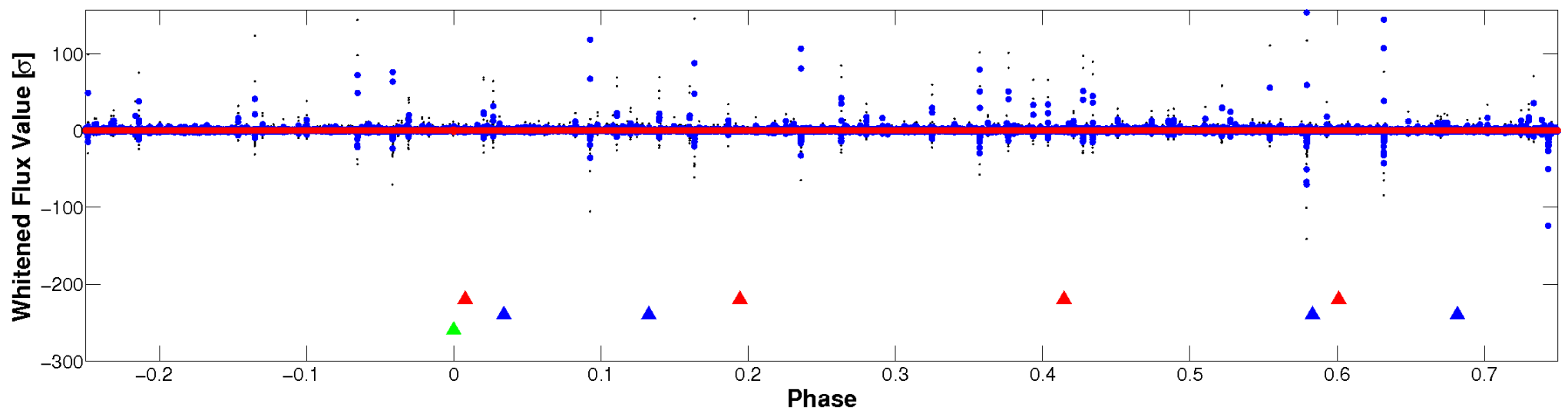


# Non-Whitened Vs. Whitened Light Curve

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

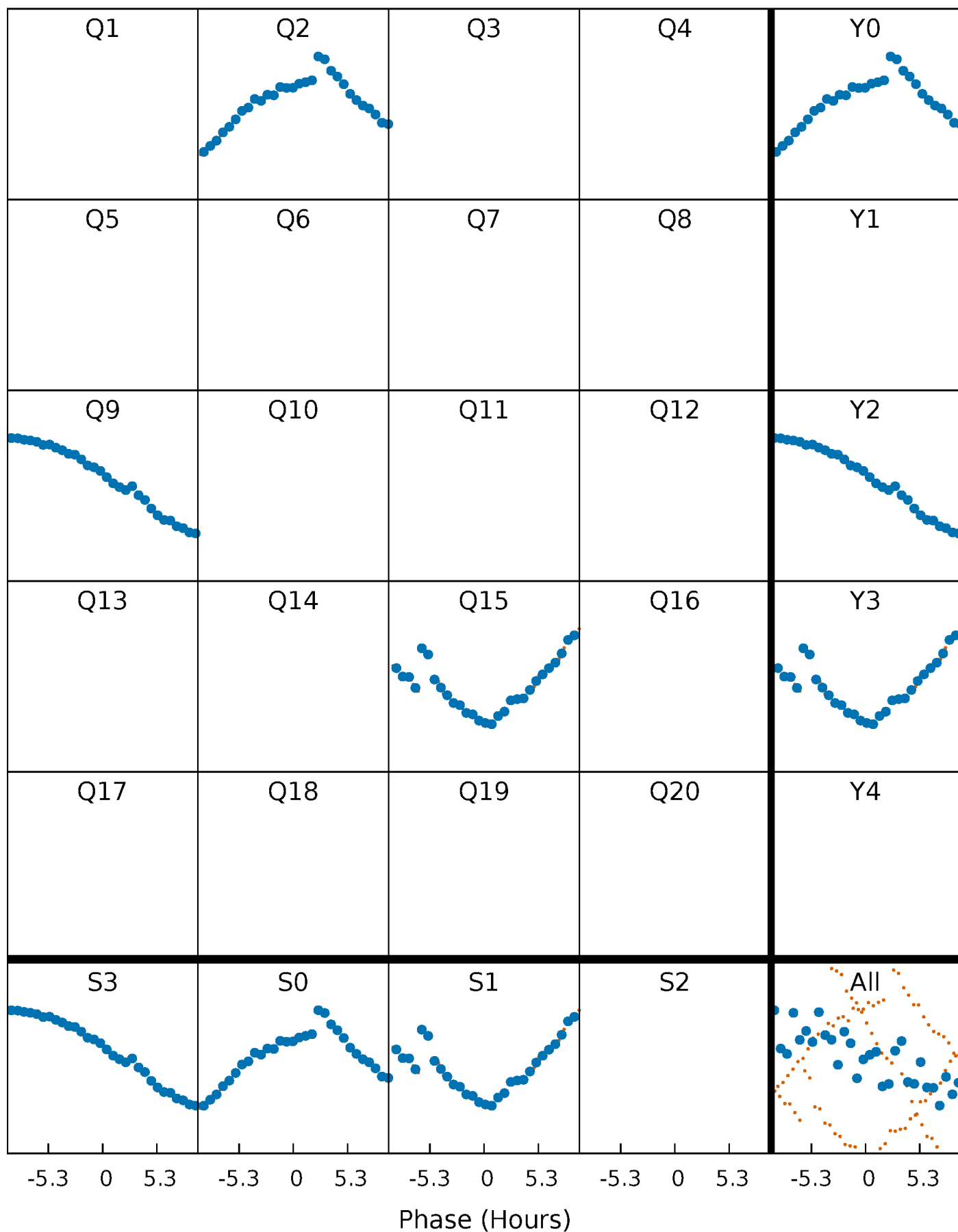


**Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

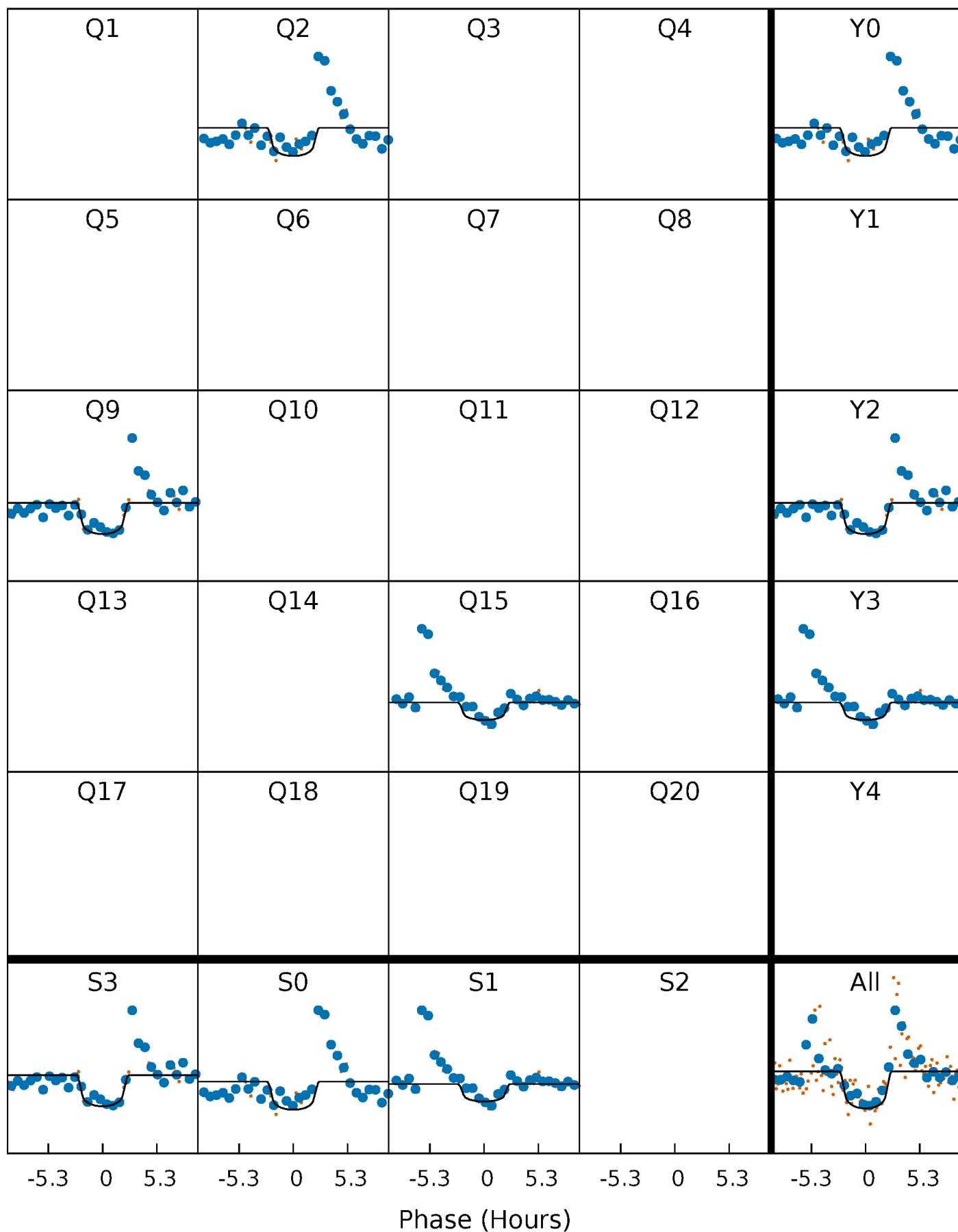
TCE 010317398-03 P=618.407355 Days  $T_0=217.282217$  (BKJD)





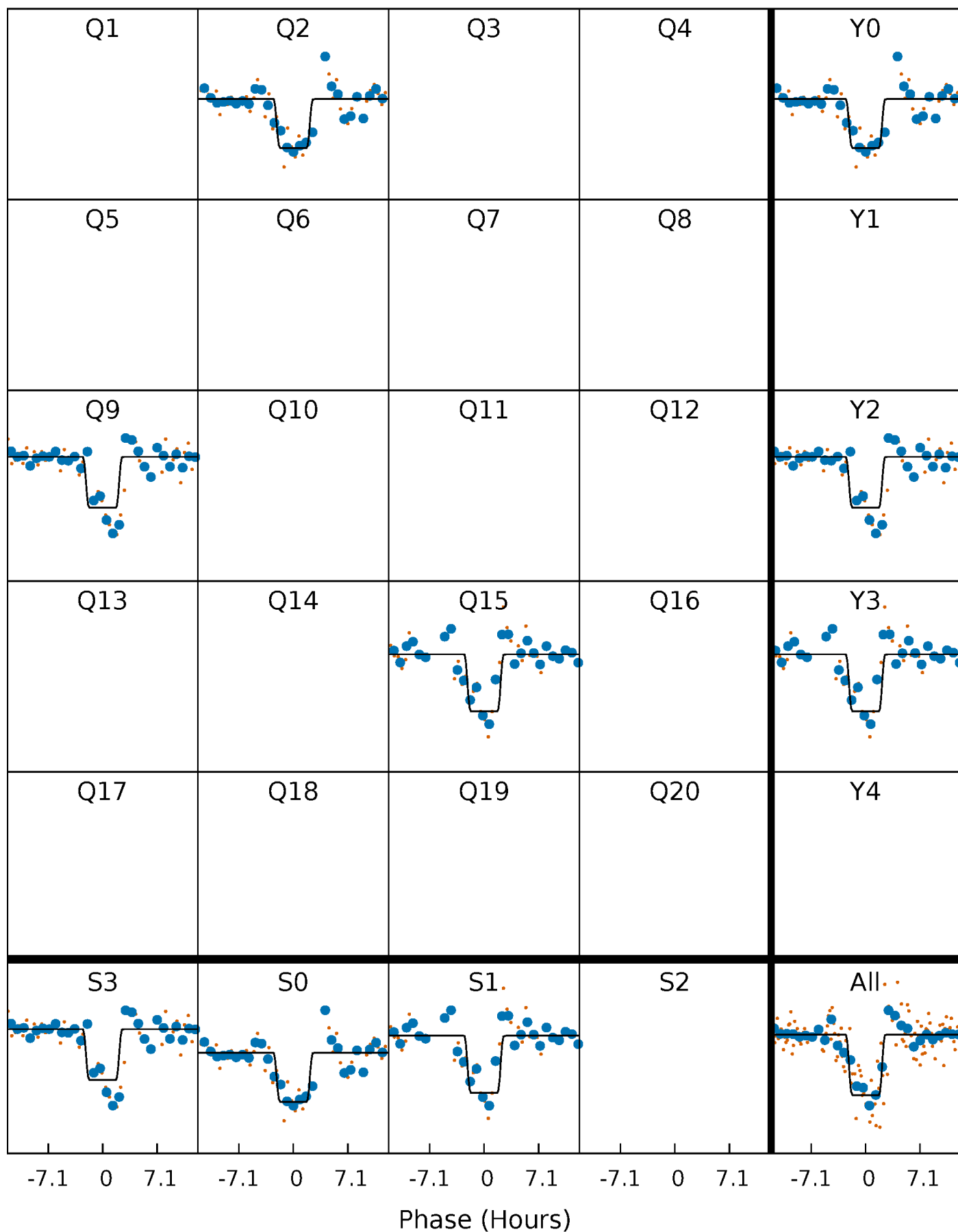
# DV Quarter-Phased Transit Curves

TCE 010317398-03 P=618.407355 Days  $T_0=217.282217$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

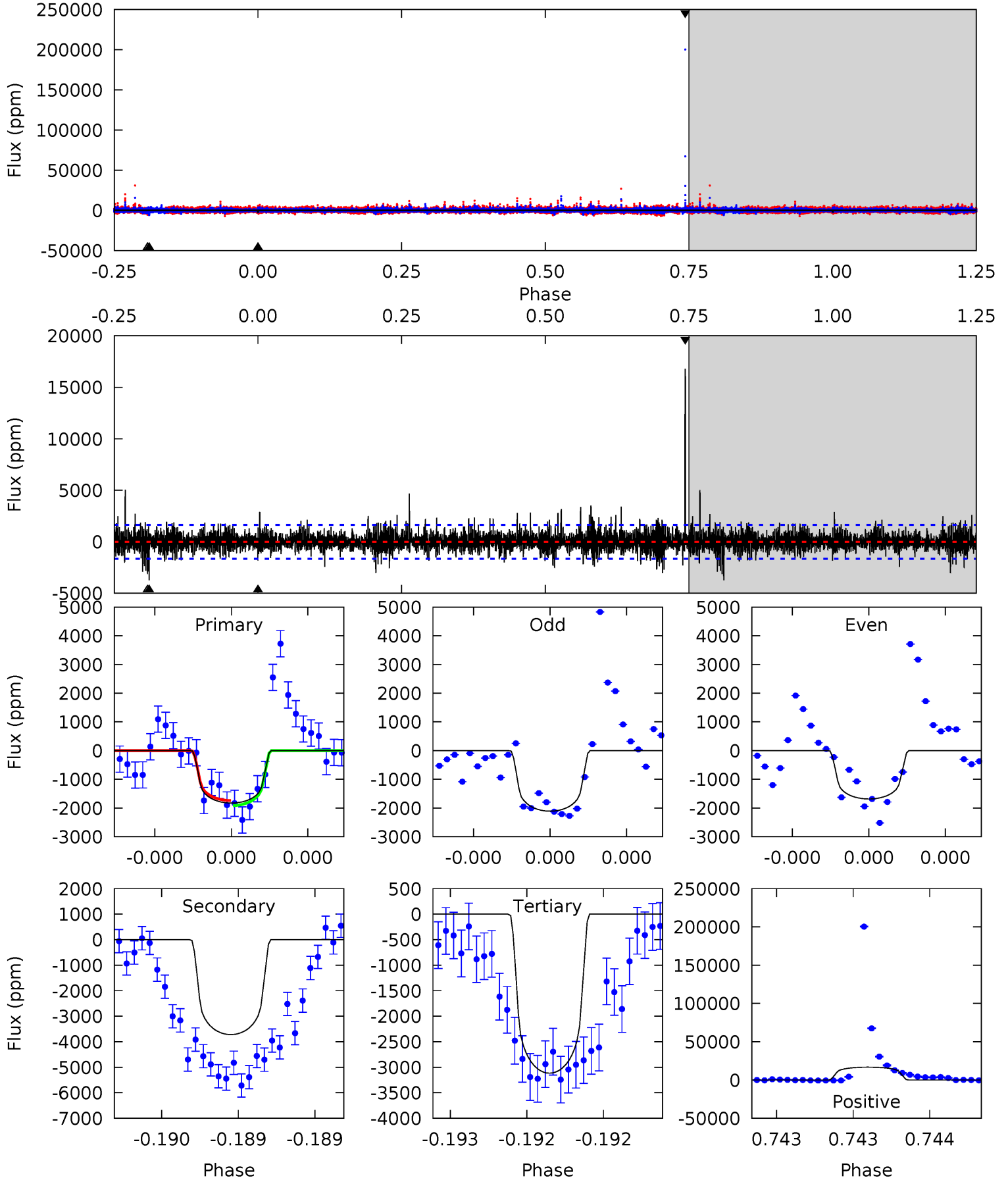
TCE 010317398-03 P=618.414882 Days  $T_0=217.262700$  (BKJD)



# DV Model-Shift Uniqueness Test

010317398-03, P = 618.407355 Days, E = 217.282217 Days

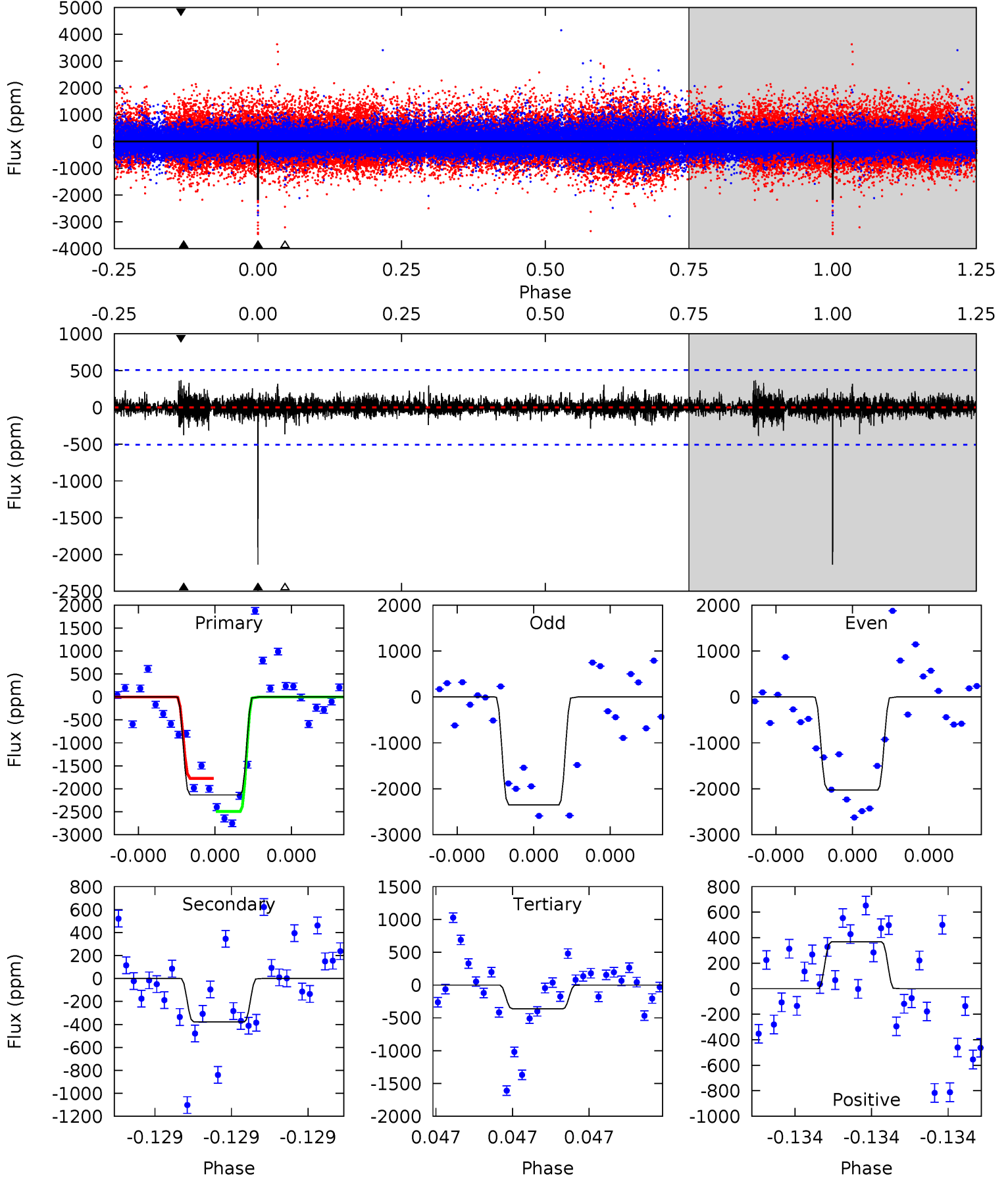
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.25	12.7	10.7	57.4	5.64	3.59	2.57	-4.40	-51.2	2.07	-44.7	0.37	1.02	0.82	0.31



# Alt Model-Shift Uniqueness Test

010317398-03, P = 618.414882 Days, E = 217.262700 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
23.7	4.20	4.02	4.07	5.63	3.57	0.68	19.7	19.6	0.18	0.13	1.66	0.99	0.15	3.98



### Stellar Parameters For KIC 010317398

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4465^{+142}_{-157}$	$4.775^{+0.058}_{-0.031}$	$-1.560^{+0.300}_{-0.250}$	$0.475^{+0.031}_{-0.046}$	$0.491^{+0.034}_{-0.034}$	$6.447^{+1.595}_{-0.780}$
	+3%/-4%	+1%/-1%	+19%/-16%	+7%/-10%	+7%/-7%	+25%/-12%
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 010317398-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-3721 \pm 292$	$2.37^{+1.26}_{-1.20}$	$178^{+7}_{-7}$	$4960^{+2002}_{-729}$	$457681^{+1501890}_{-256303}$
Alt.	$-378 \pm 90$	$2.51^{+1.28}_{-1.20}$	$178^{+7}_{-7}$	$3260^{+796}_{-405}$	$40560^{+118048}_{-23614}$

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

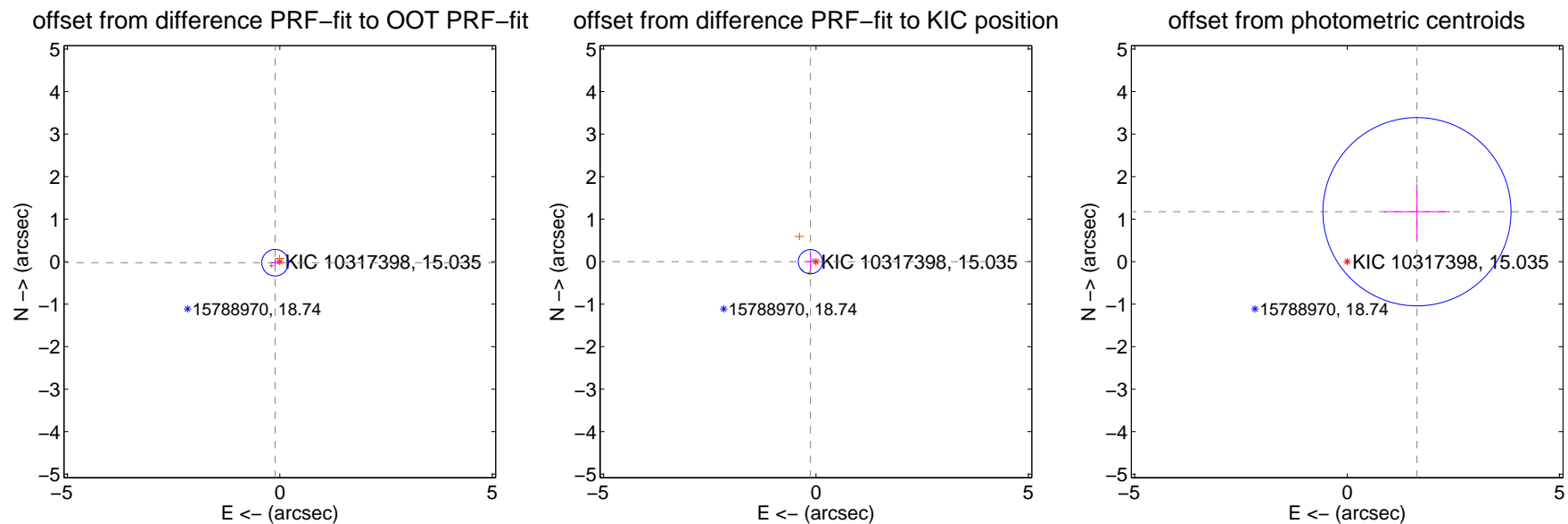
## DV Centroid Data

Supplemental centroid analysis for 010317398-03. Kepler magnitude: 15.04. Transit SNR 6.88

There are 1 quarters with good PRF difference image offsets

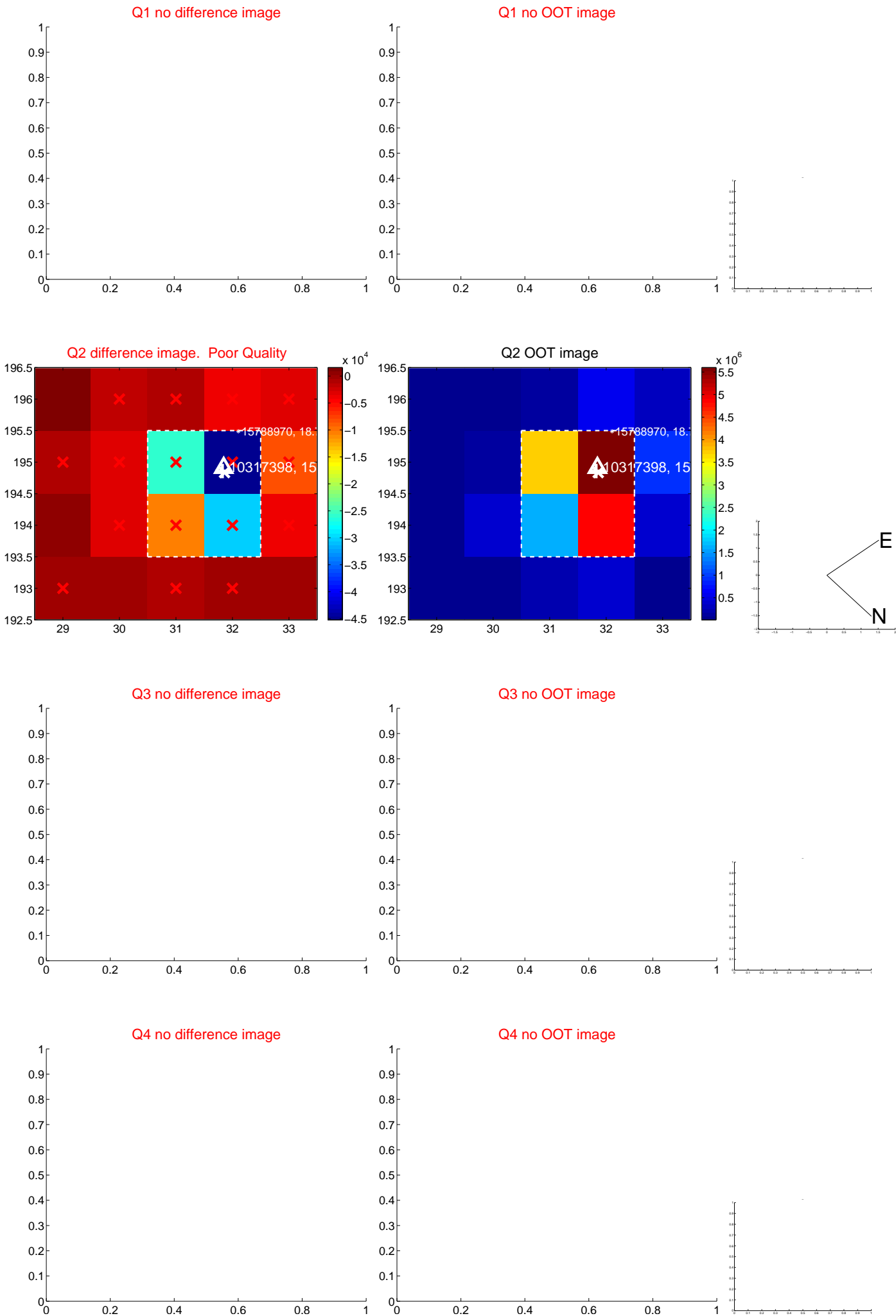
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.114 \pm 0.104$	1.09	$0.111 \pm 0.096$	$-0.025 \pm 0.090$
PRF-fit source offset from KIC position	$0.130 \pm 0.095$	1.37	$0.130 \pm 0.095$	$-0.001 \pm 0.218$
photometric centroid source offset	$2.02 \pm 0.74$	2.74	$-1.64 \pm 0.78$	$1.17 \pm 0.65$



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.

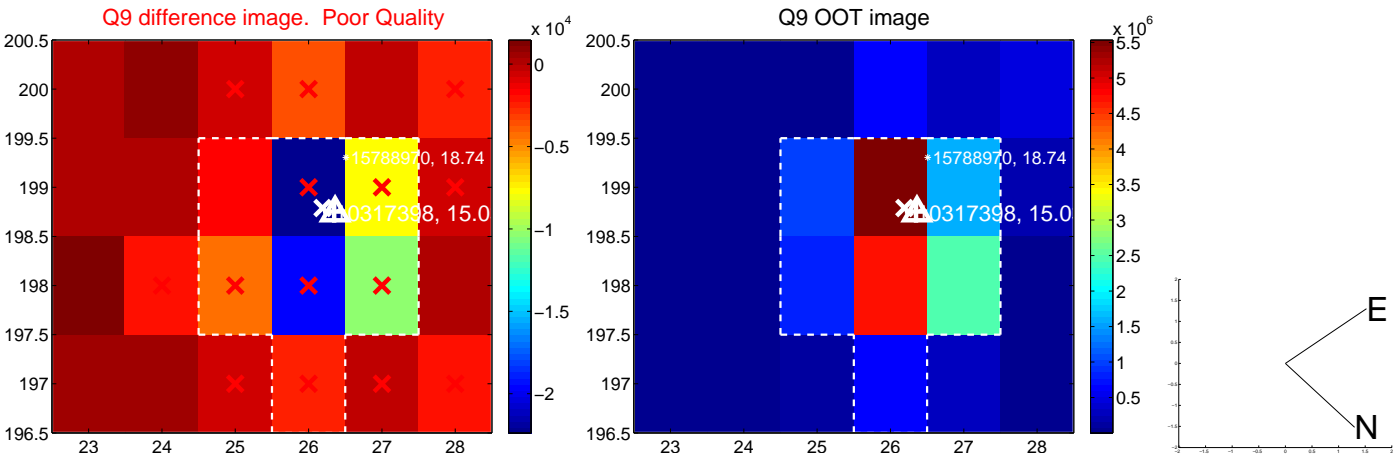


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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.

Q13 no difference image



Q13 no OOT image



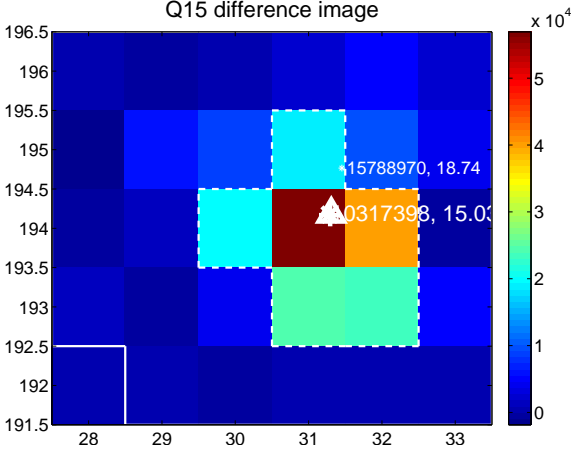
Q14 no difference image



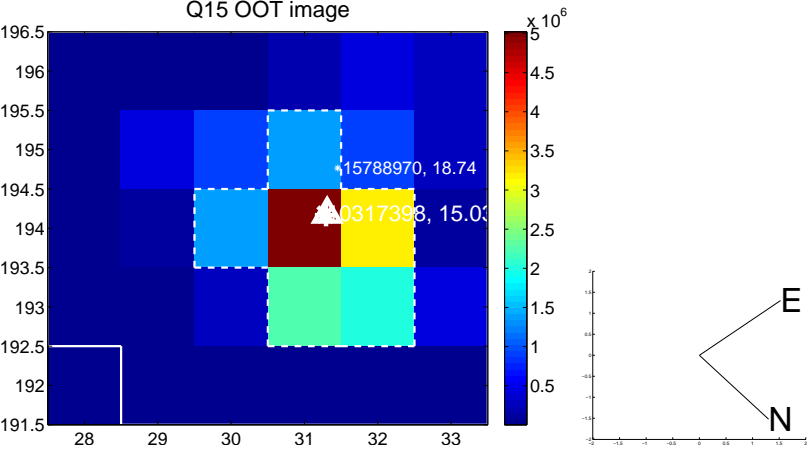
Q14 no OOT image



Q15 difference image



Q15 OOT image



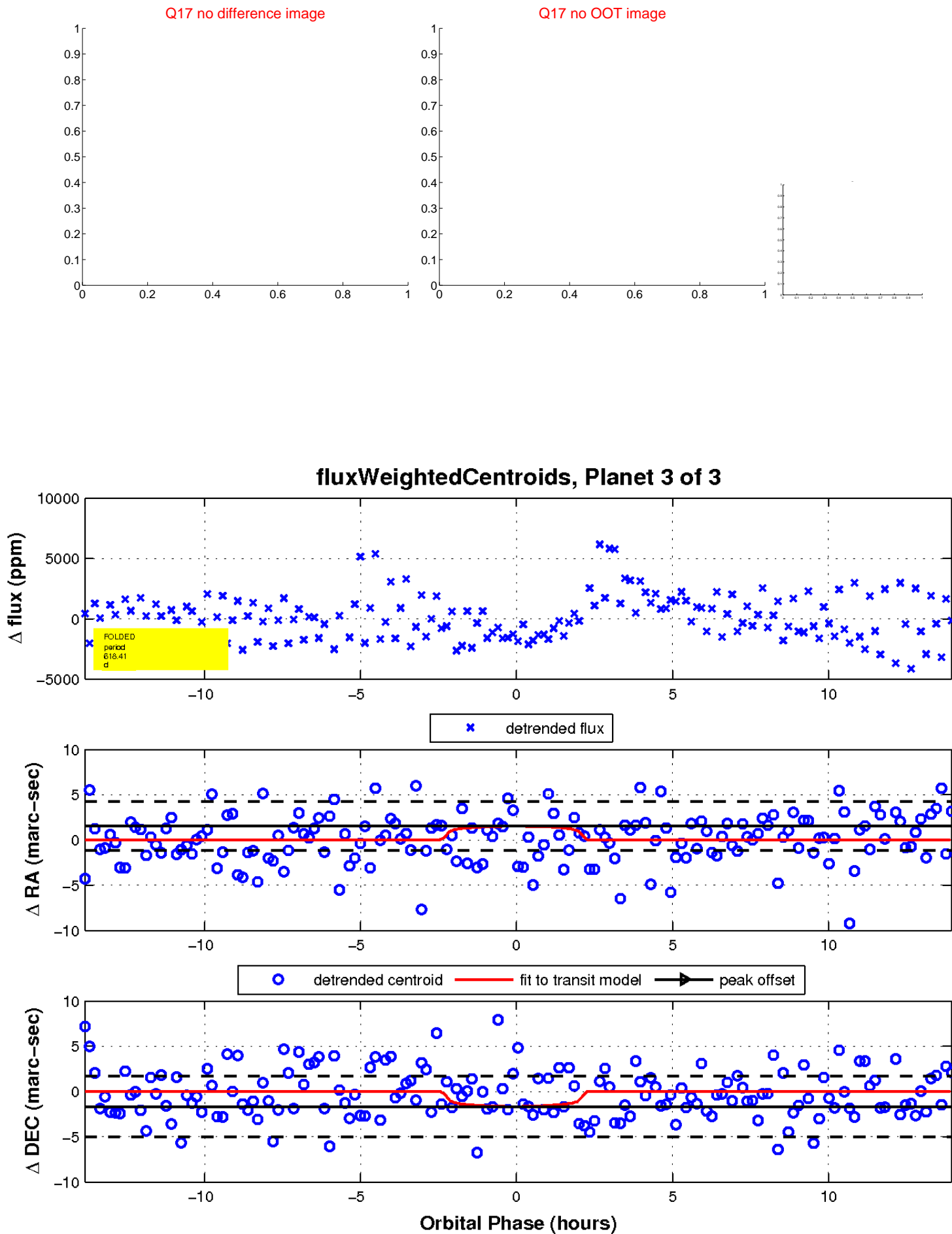
Q16 no difference image



Q16 no OOT image



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



# UKIRT Image

Declination

