

# KIC 007018323

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007018323-01	OBS	No	563.395725	251.367390	1301.7	4.016	8.9	7.1	0.46	3687	1.64	0.03
007018323-02	OBS	No	277.993226	378.603021	1219.5	13.024	9.7	6.7	0.46	3687	1.94	0.08

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007018323-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007018323-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—MOD_NONUNIQ_DV—INCONSISTENT_TRANS

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

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

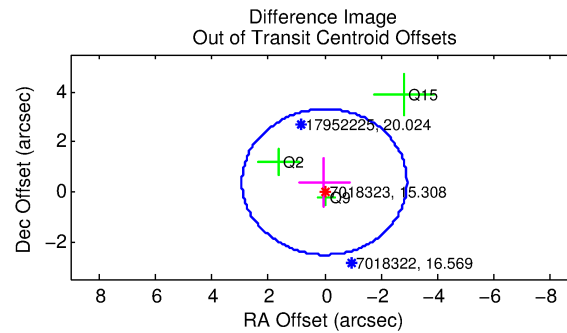
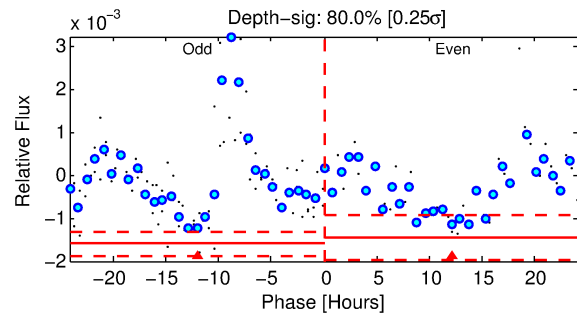
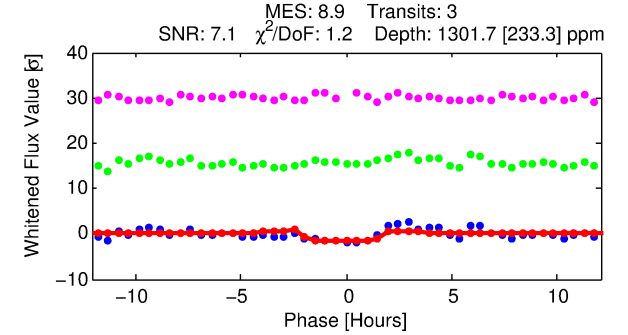
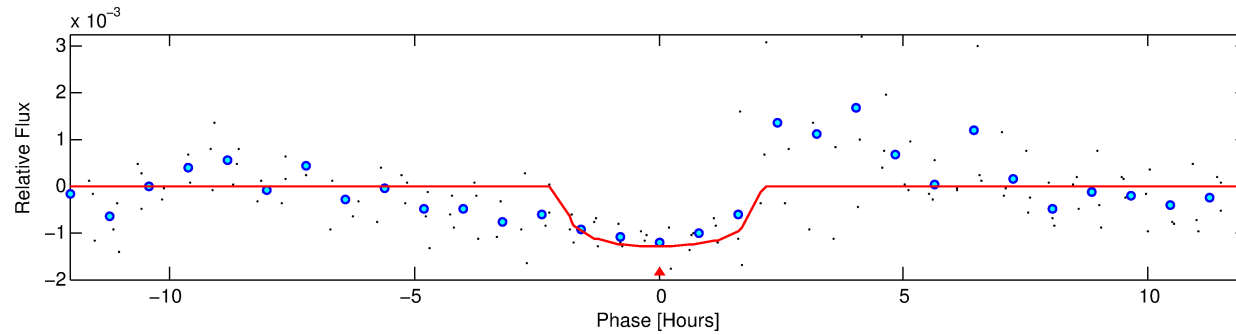
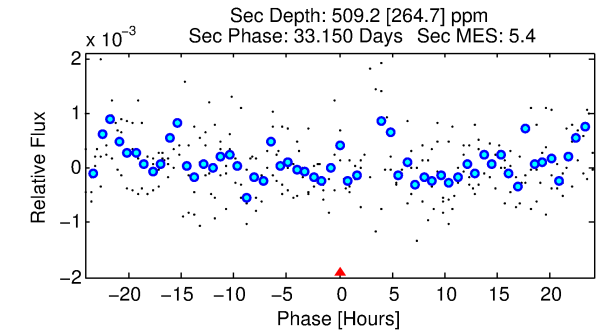
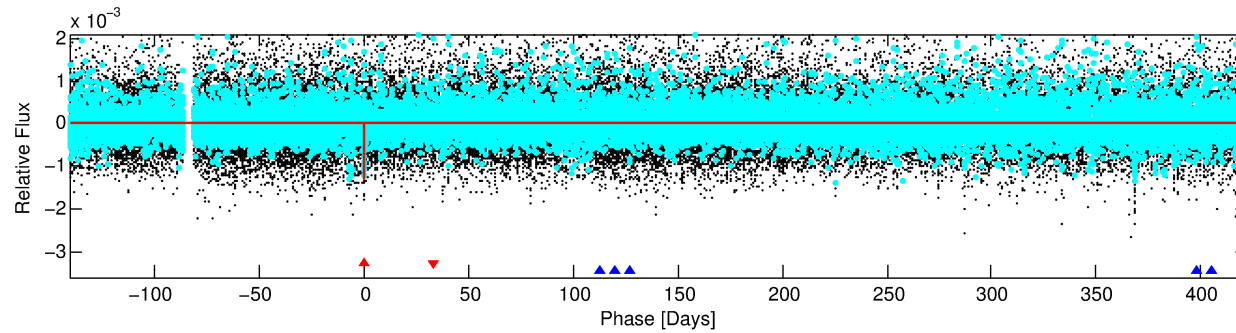
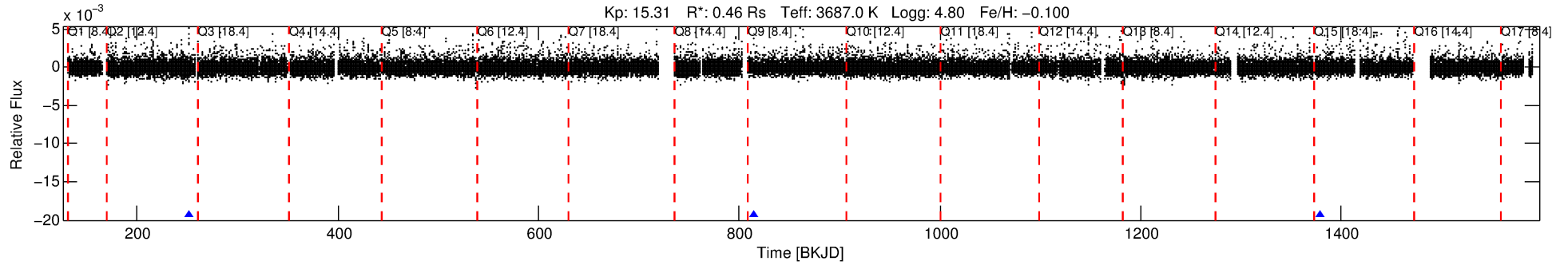
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 007018323-01

No Significant Match Found

# DV One-Page Summary

KIC: 7018323 Candidate: 1 of 2 Period: 563.396 d



## DV Fit Results:

Period = 563.39573 [0.00678] d  
Epoch = 251.3674 [0.0107] BKJD  
Rp/R\* = 0.0328 [0.0598]  
a/R\* = 1103.55 [8916.60]  
b = 0.08 [99.88]  
Seff = 0.03 [0.00]  
Teq = 108 [3] K  
Rp = 1.64 [2.99] Re  
a = 1.0459 [0.0606] AU  
Ag = 114348.93 [421697.65] [0.27 $\sigma$ ]  
Teffp = 3060 [2821] K [1.05 $\sigma$ ]

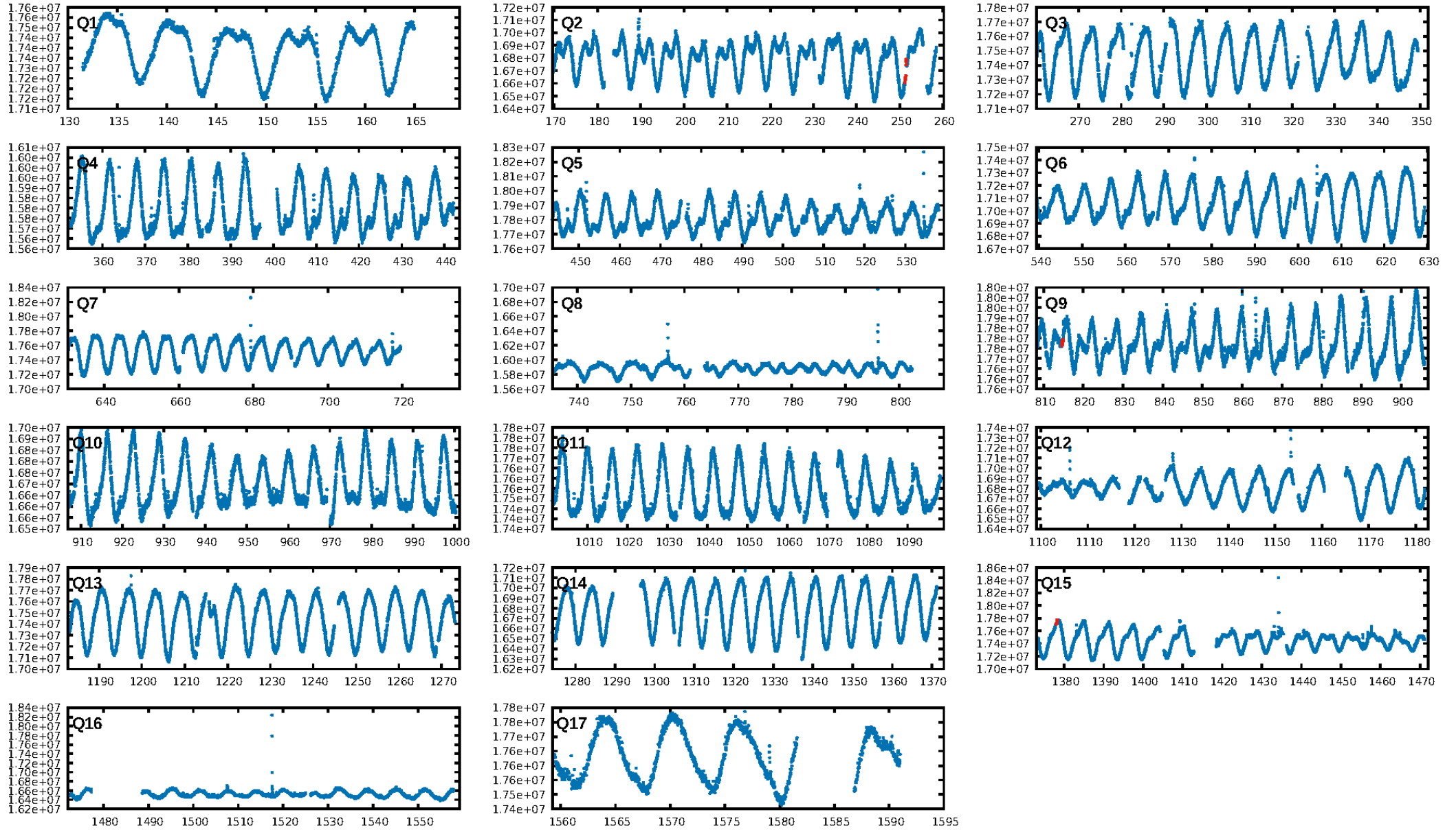
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [502.58 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 10.5%  
ModelChiSquareGof-sig: 99.4%  
**Bootstrap-pfa: 1.26e-08**  
RollingBand-fgt: 1.00 [3/3]  
**GhostDiagnostic-chr: 0.8793**  
Centroid-sig: 32.0%  
Centroid-so: 1.291 arcsec [0.95 $\sigma$ ]  
OotOffset-rm: 0.387 arcsec [0.40 $\sigma$ ]  
OotOffset-st: 1/1/0/1 [3]  
KicOffset-rm: 0.116 arcsec [0.12 $\sigma$ ]  
KicOffset-st: 1/1/0/1 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

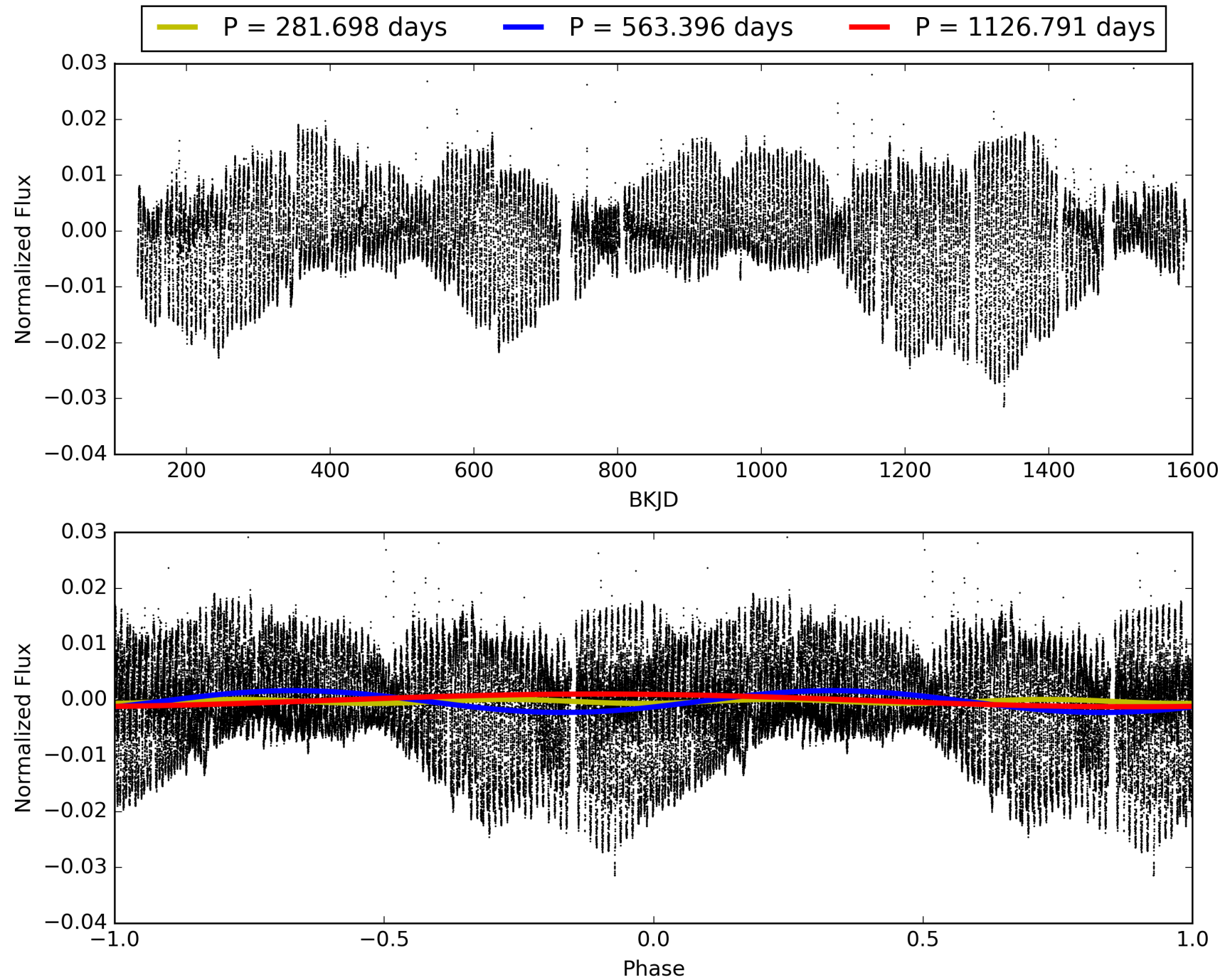
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 08:19:26 Z

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

# TCE 007018323-01, PDC Light Curves

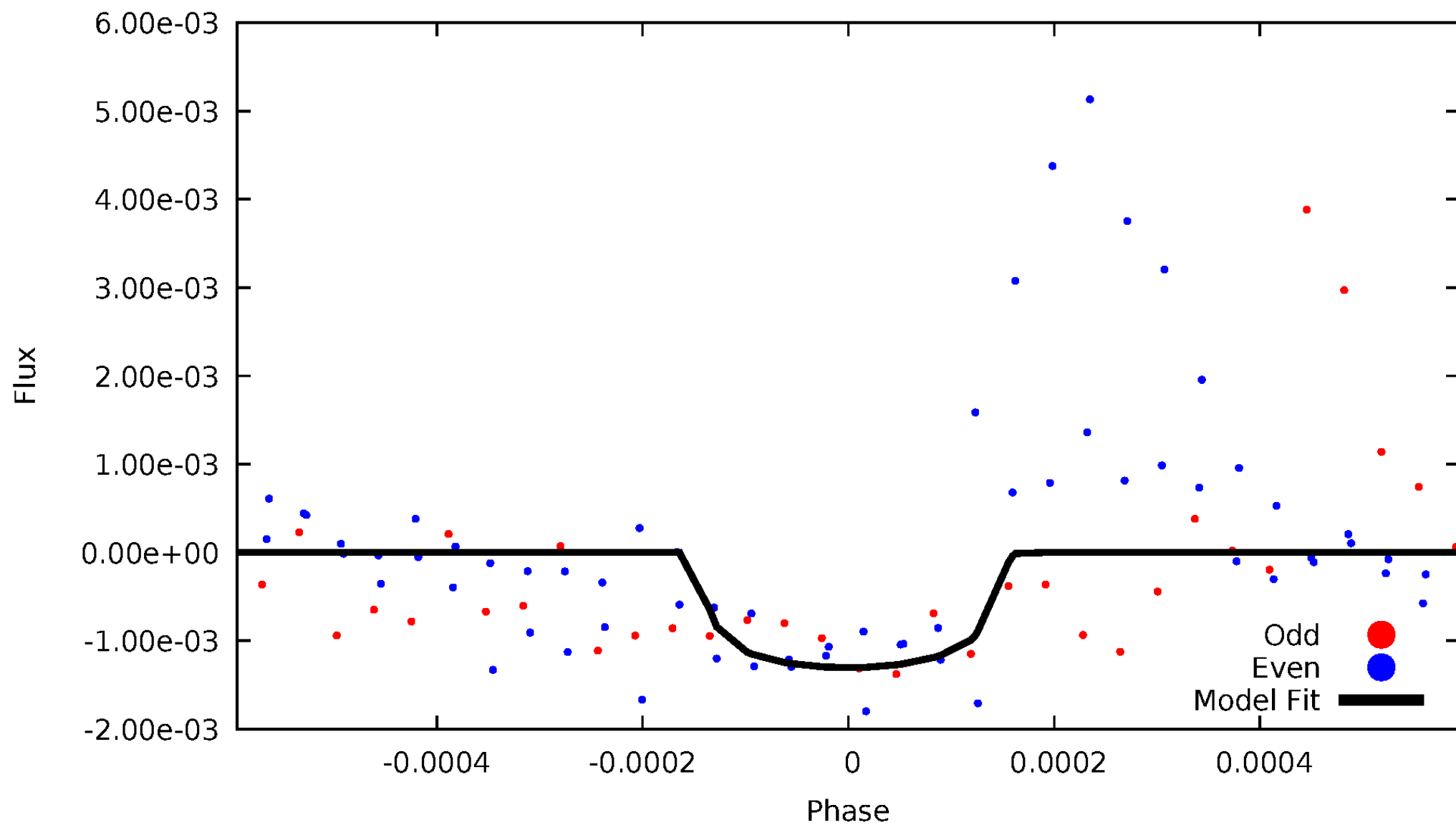


# TCE 007018323-01



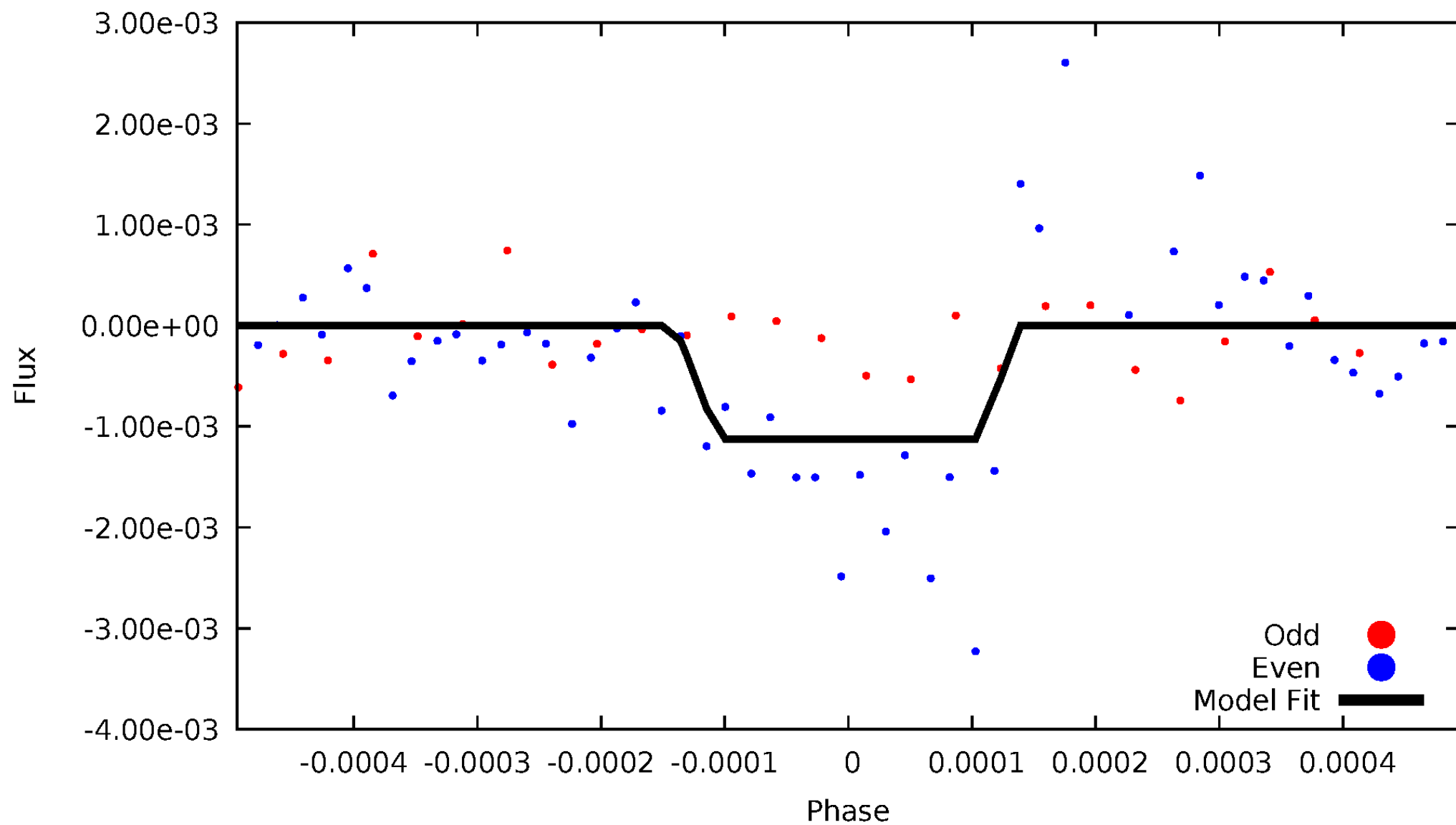
# DV Odd/Even

TCE 007018323-01



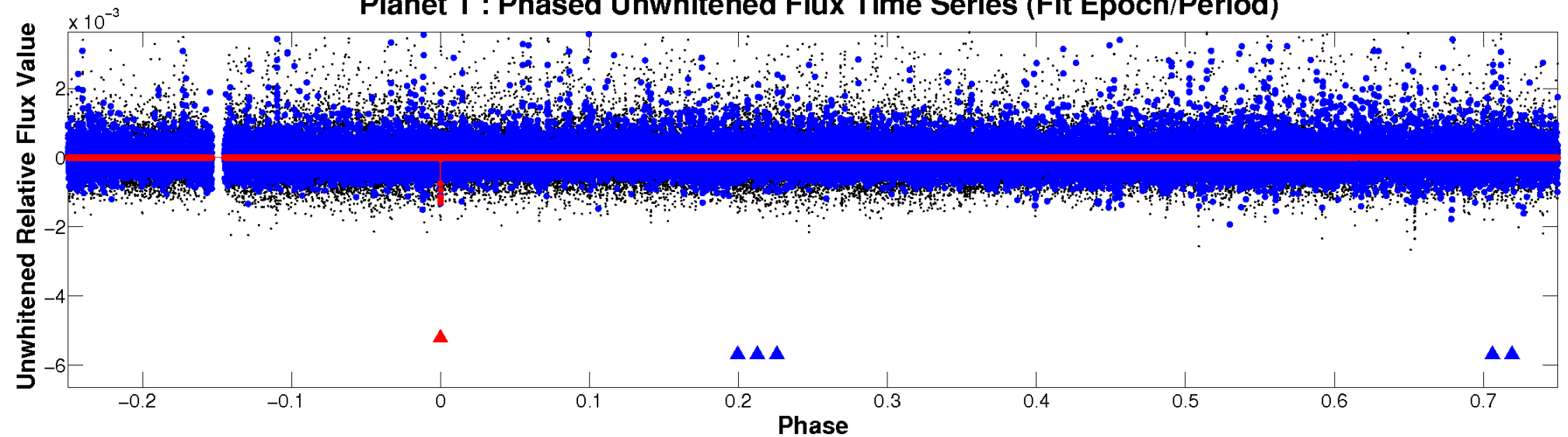
# ALT Odd/Even

TCE 007018323-01

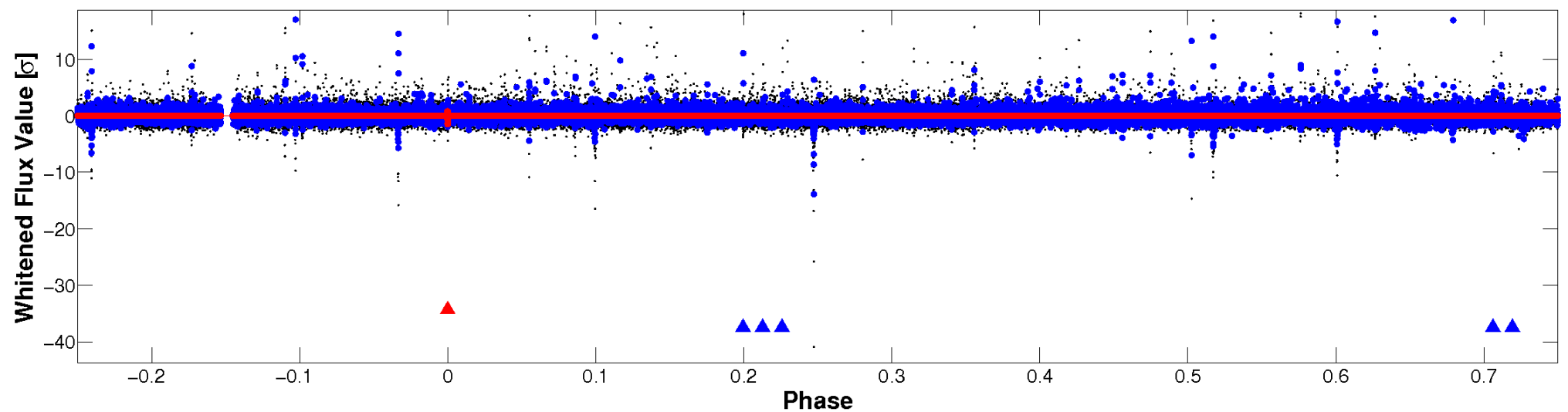


# Non-Whitened Vs. Whitened Light Curve

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

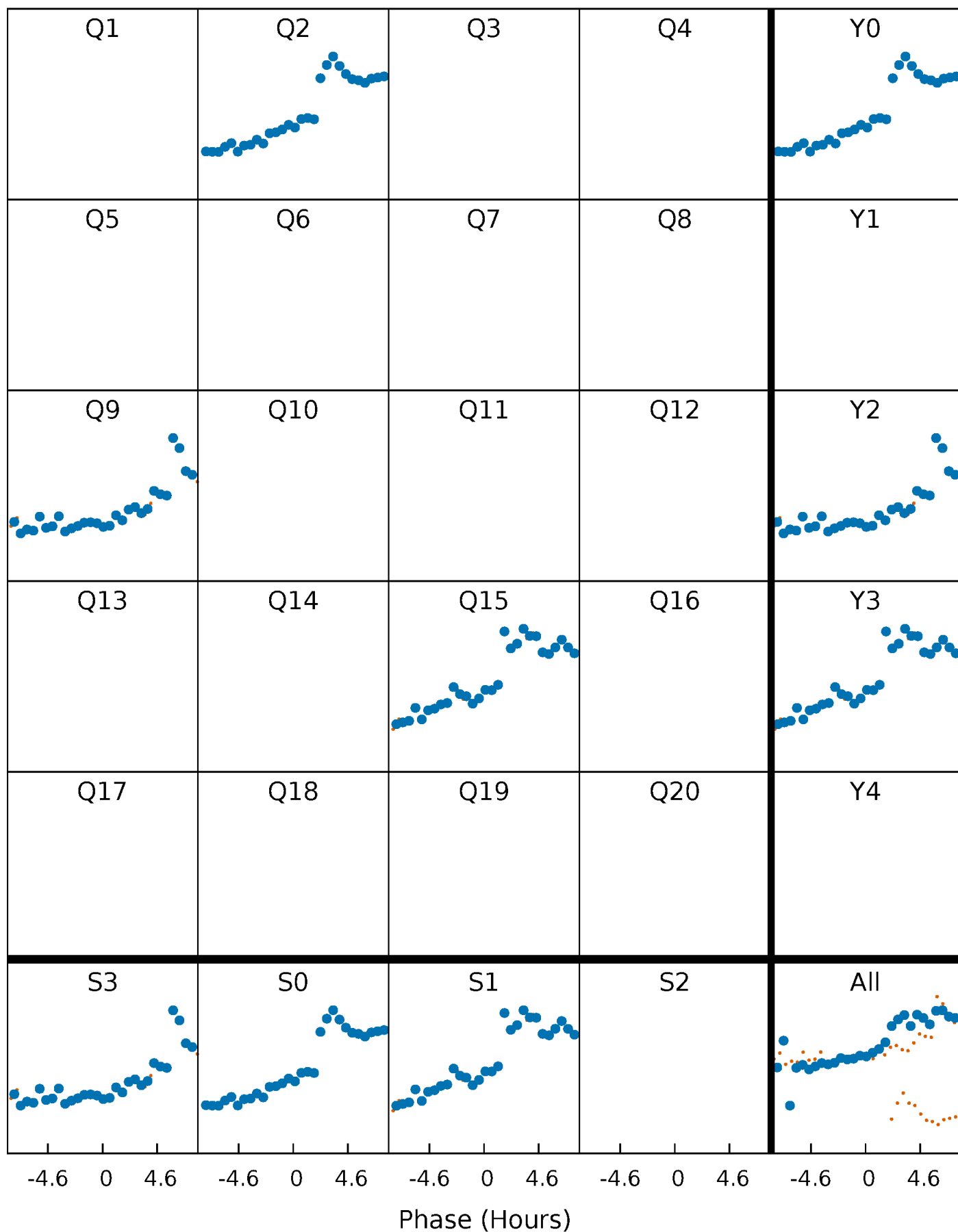


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

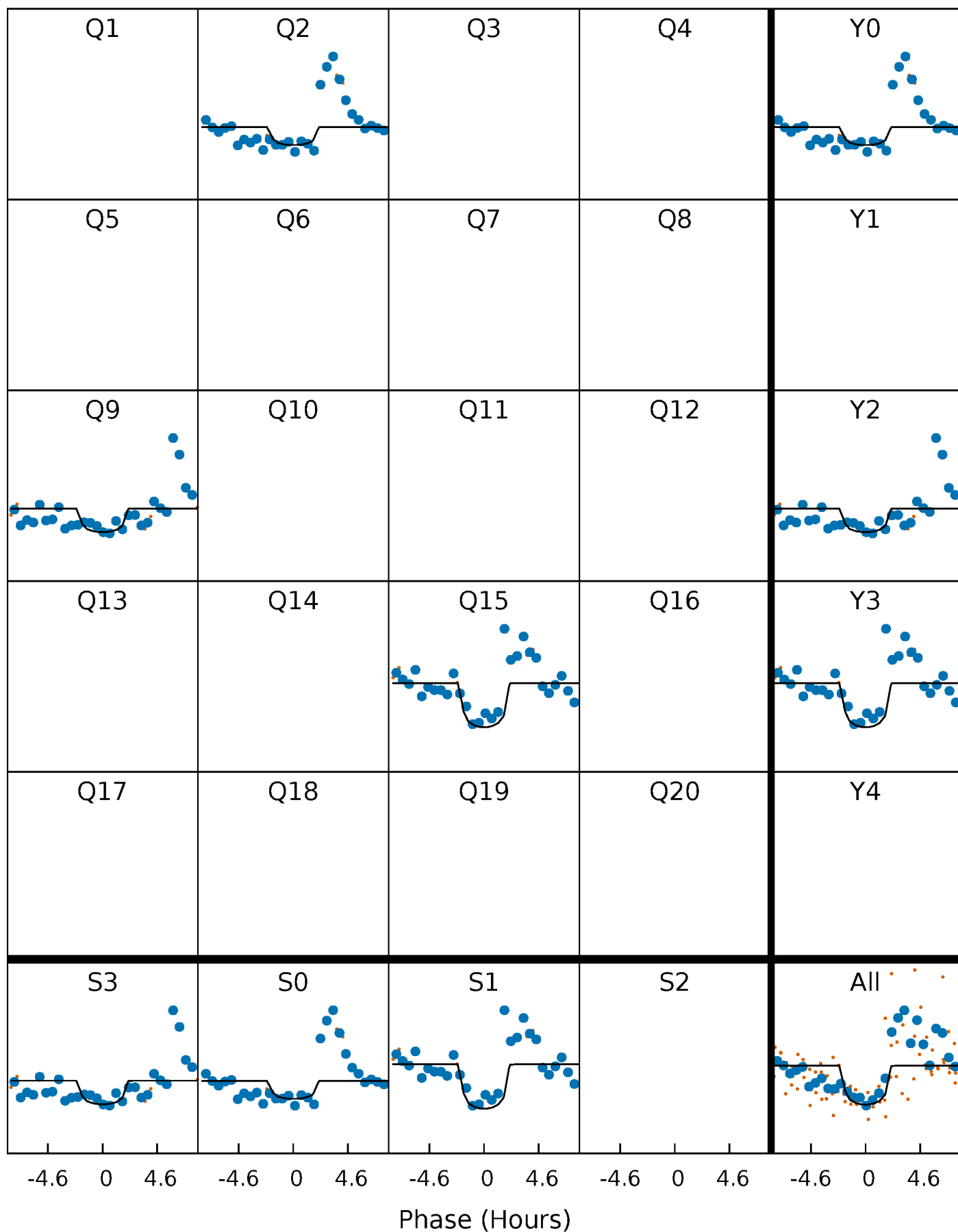
TCE 007018323-01 P=563.395725 Days  $T_0=251.367390$  (BKJD)





# DV Quarter-Phased Transit Curves

TCE 007018323-01 P=563.395725 Days  $T_0=251.367390$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

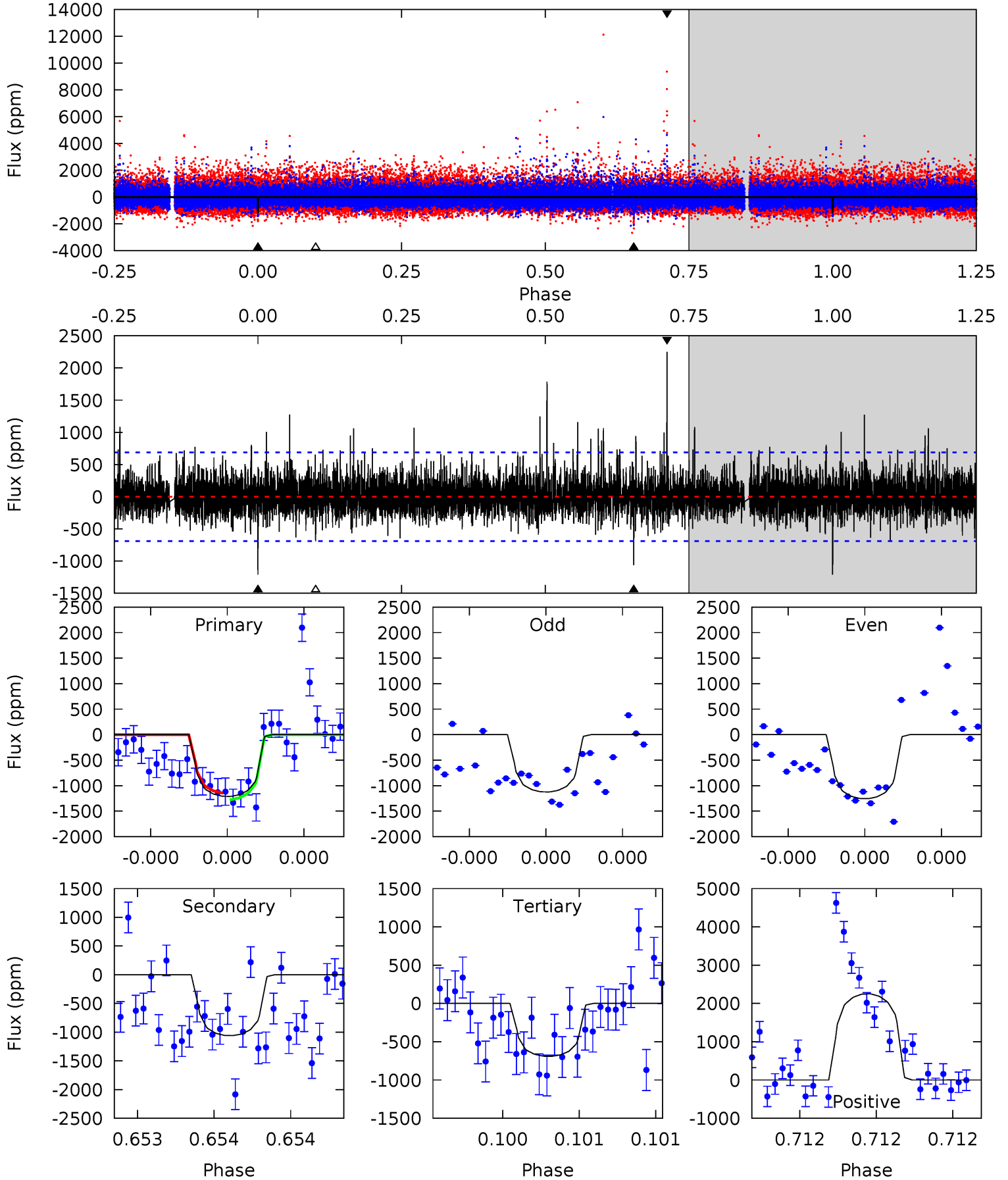
TCE 007018323-01 P=563.380494 Days  $T_0=251.380366$  (BKJD)



# DV Model-Shift Uniqueness Test

007018323-01, P = 563.395725 Days, E = 251.367390 Days

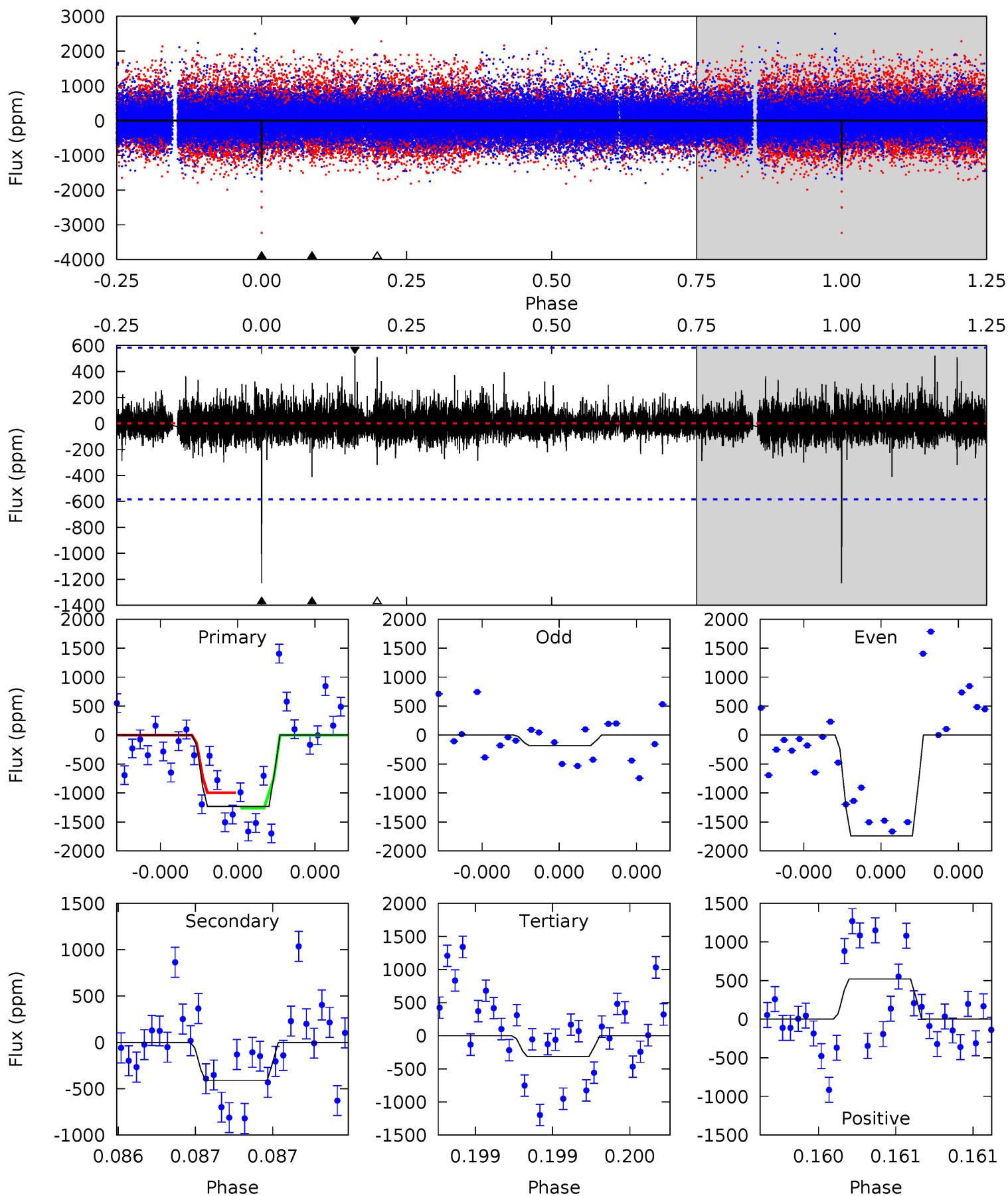
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.93	8.69	5.66	18.5	5.65	3.59	1.72	4.27	-8.52	3.03	-9.76	0.42	0.99	0.65	0.55



# Alt Model-Shift Uniqueness Test

007018323-01, P = 563.380494 Days, E = 251.380366 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	4.01	3.09	5.07	5.69	3.66	0.70	8.91	6.92	0.92	-1.06	6.74	0.93	0.30	1.26



### Stellar Parameters For KIC 007018323

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3687^{+55}_{-60}$	$4.798^{+0.036}_{-0.030}$	$-0.100^{+0.100}_{-0.100}$	$0.458^{+0.029}_{-0.035}$	$0.482^{+0.024}_{-0.037}$	$7.041^{+1.266}_{-0.891}$
	+1%/-2%	+1%/-1%	+100%/-100%	+6%/-8%	+5%/-8%	+18%/-13%
Source	PHO2	PHO2	PHO2	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 007018323-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1060 \pm 122$	$2.66^{+2.59}_{-1.64}$	$150^{+3}_{-3}$	$3158^{+1189}_{-515}$	$89038^{+528738}_{-65250}$
Alt.	$-412 \pm 103$	$2.64^{+2.52}_{-1.75}$	$150^{+3}_{-3}$	$2792^{+1085}_{-447}$	$36317^{+270158}_{-27273}$

$T_{\text{max}}$  = 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

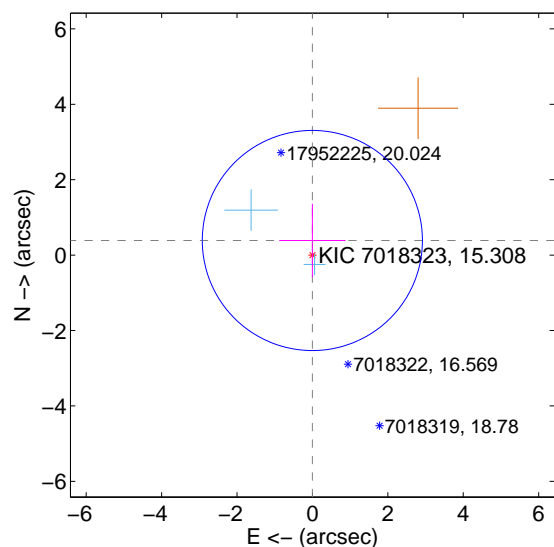
Supplemental centroid analysis for 007018323-01. Kepler magnitude: 15.31. Transit SNR 7.15

There are 2 quarters with good PRF difference image offsets

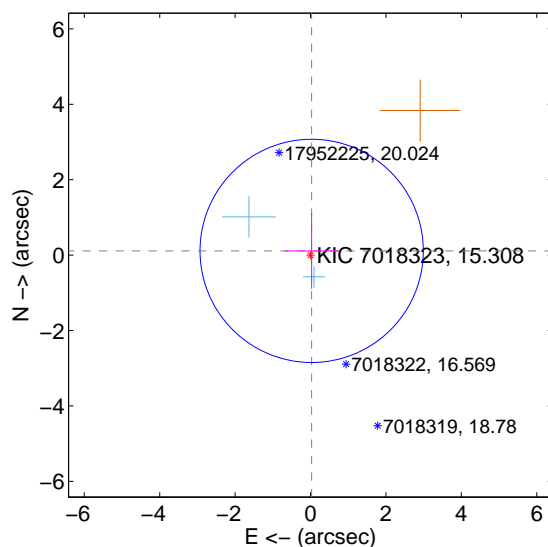
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.387 \pm 0.973$	0.40	$0.002 \pm 0.878$	$0.387 \pm 0.976$
PRF-fit source offset from KIC position	$0.116 \pm 0.987$	0.12	$-0.030 \pm 0.720$	$0.112 \pm 1.004$
photometric centroid source offset	$1.29 \pm 1.35$	0.95	$-0.18 \pm 0.98$	$1.28 \pm 1.36$

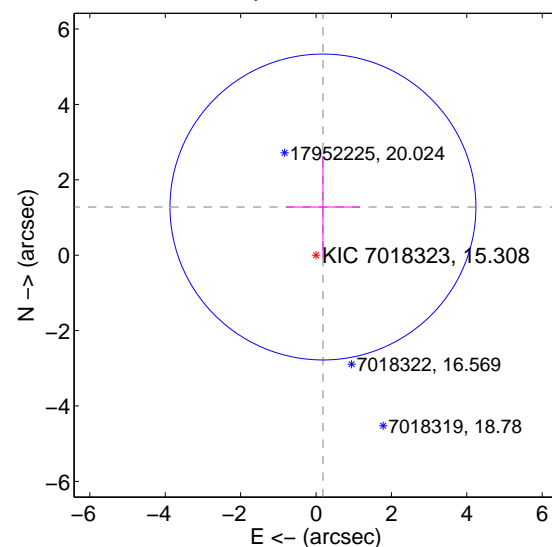
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

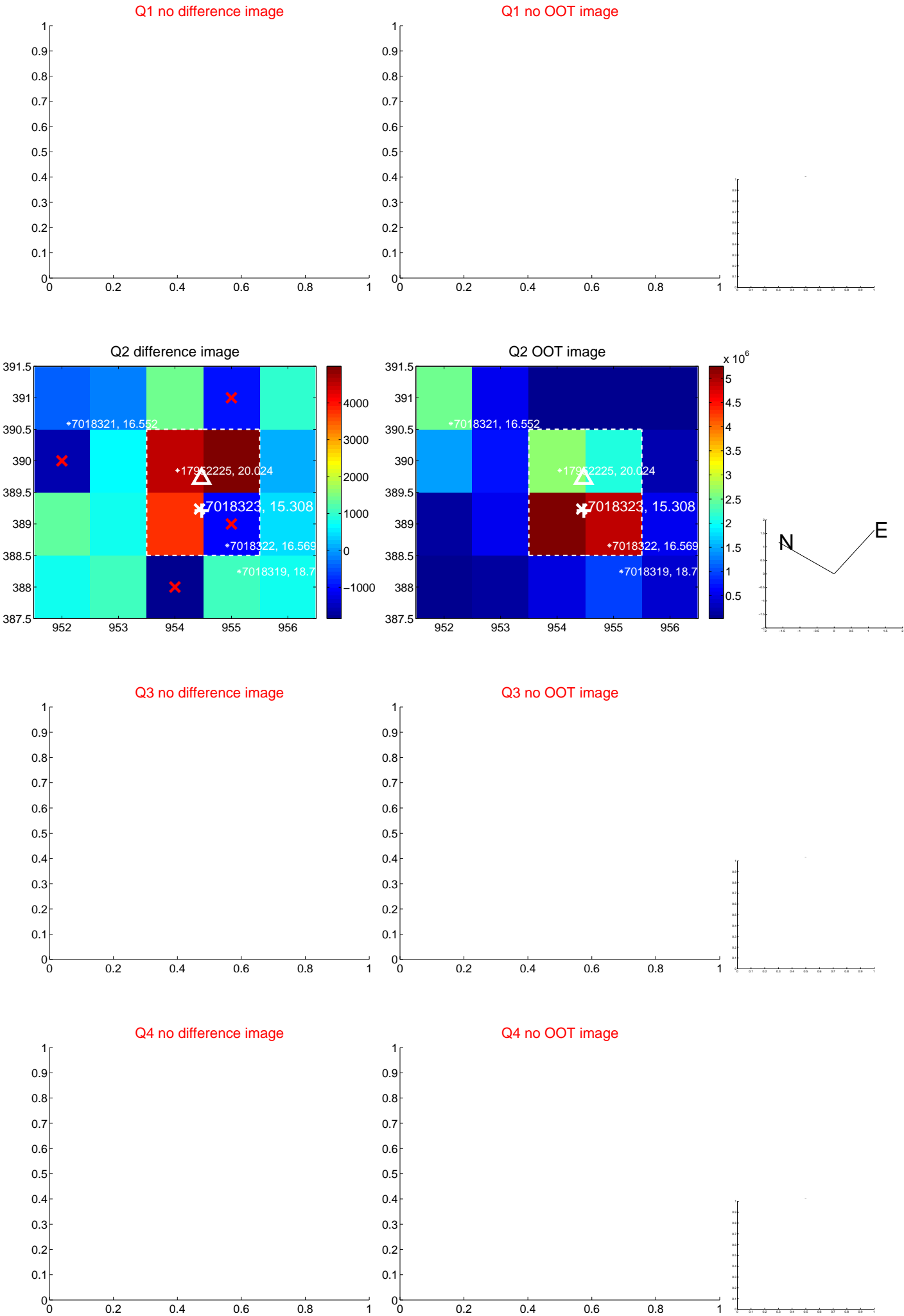


offset from photometric centroids



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.

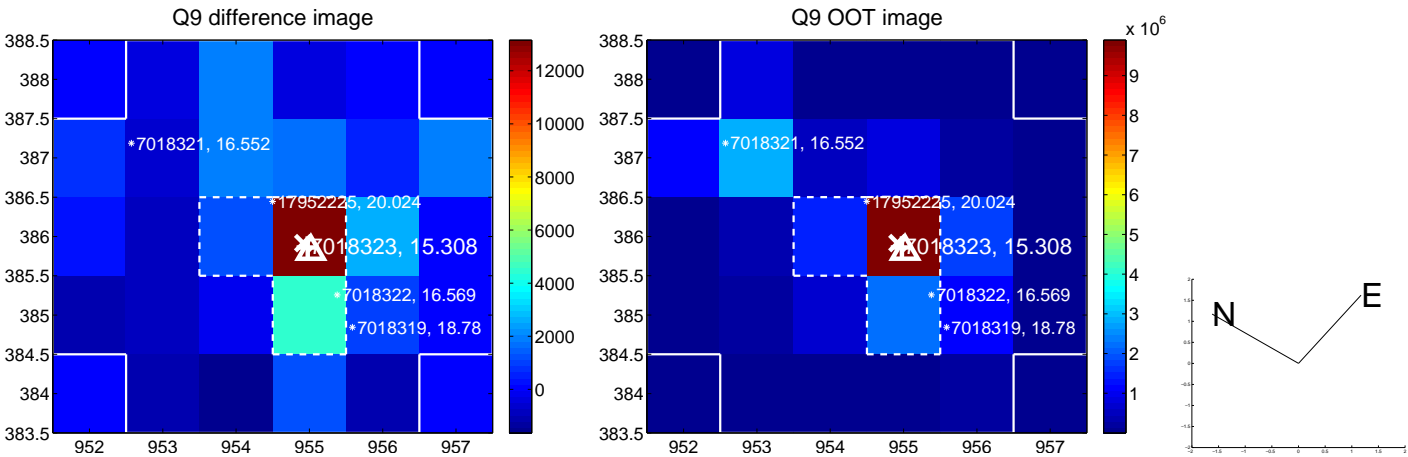


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

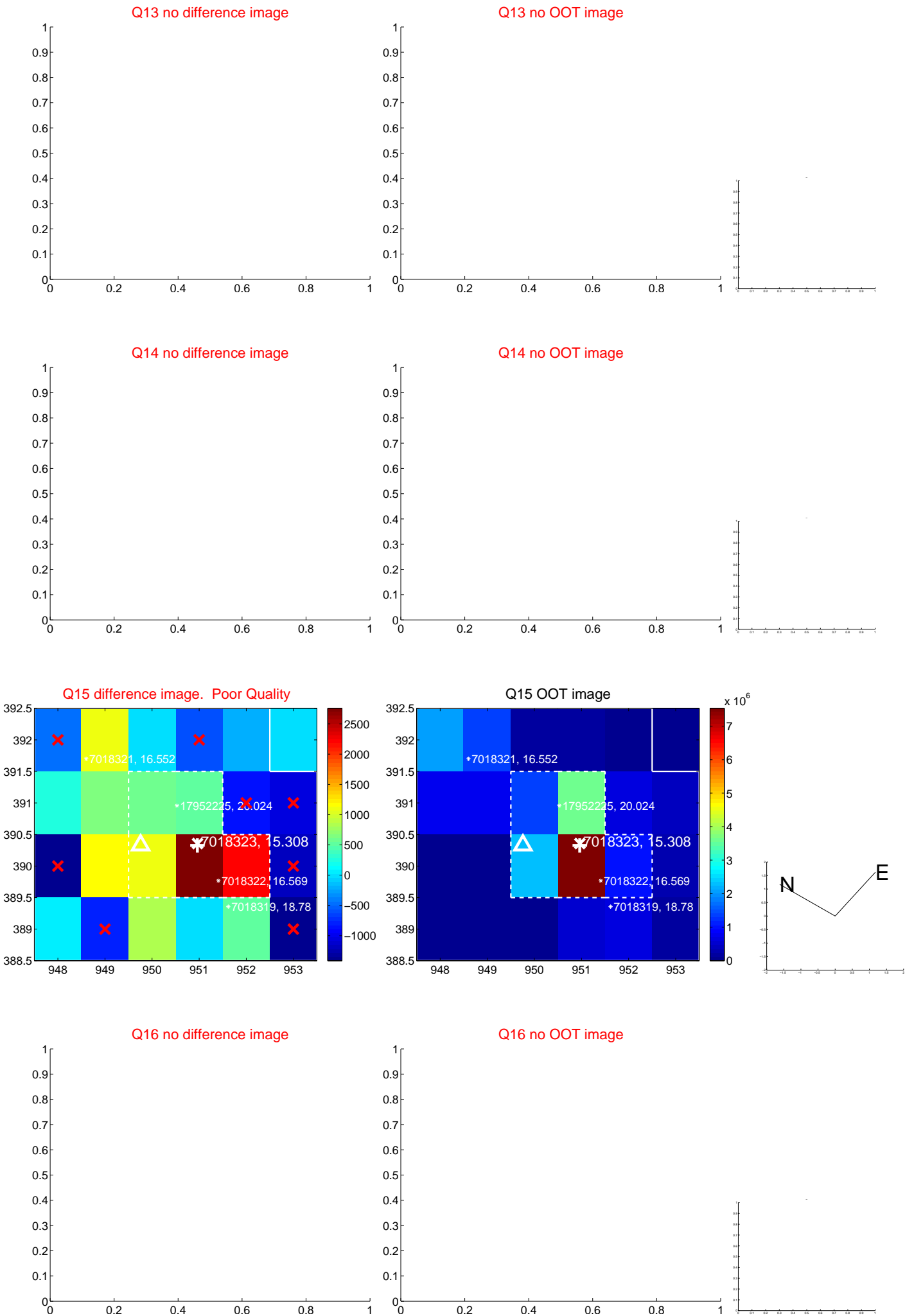




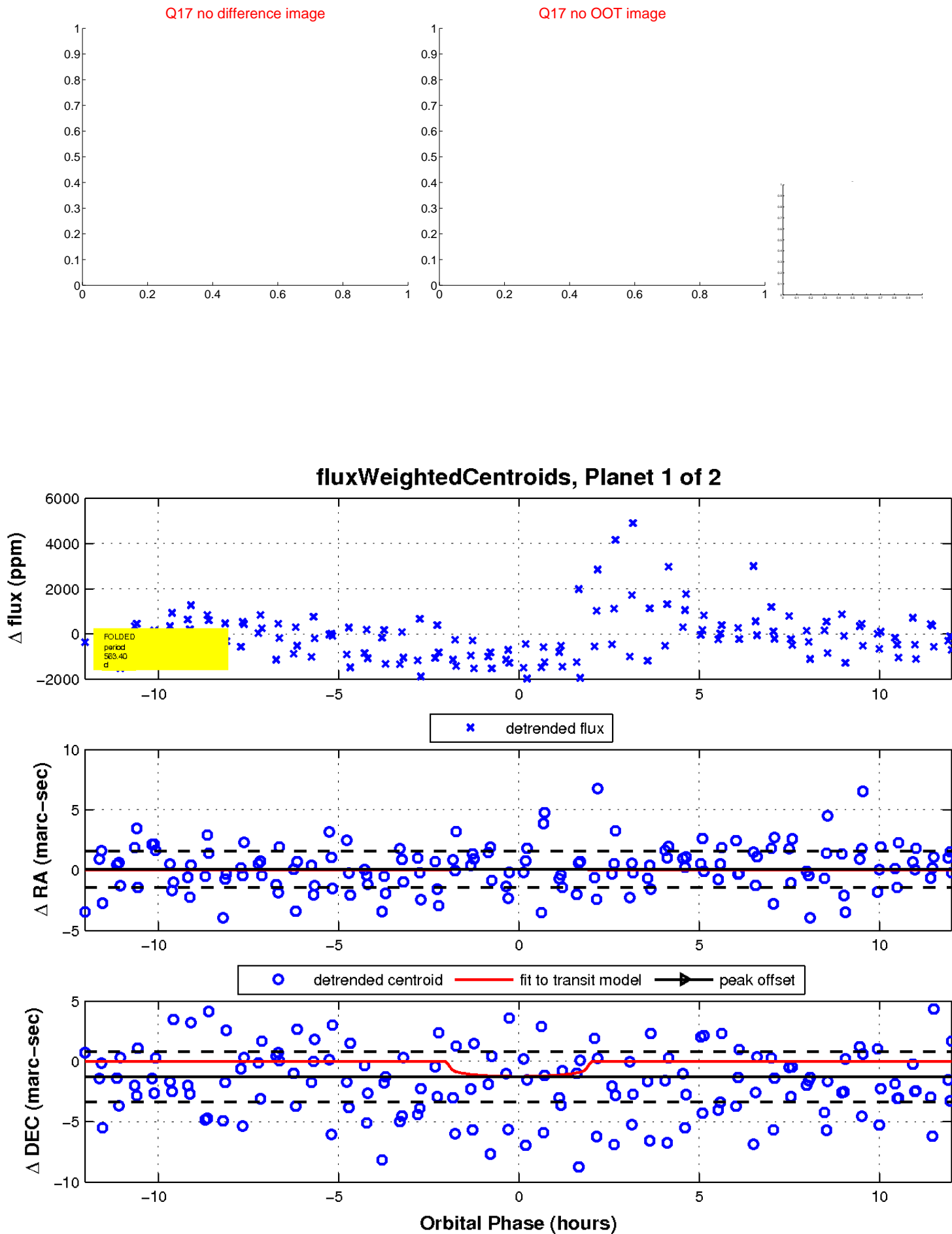
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

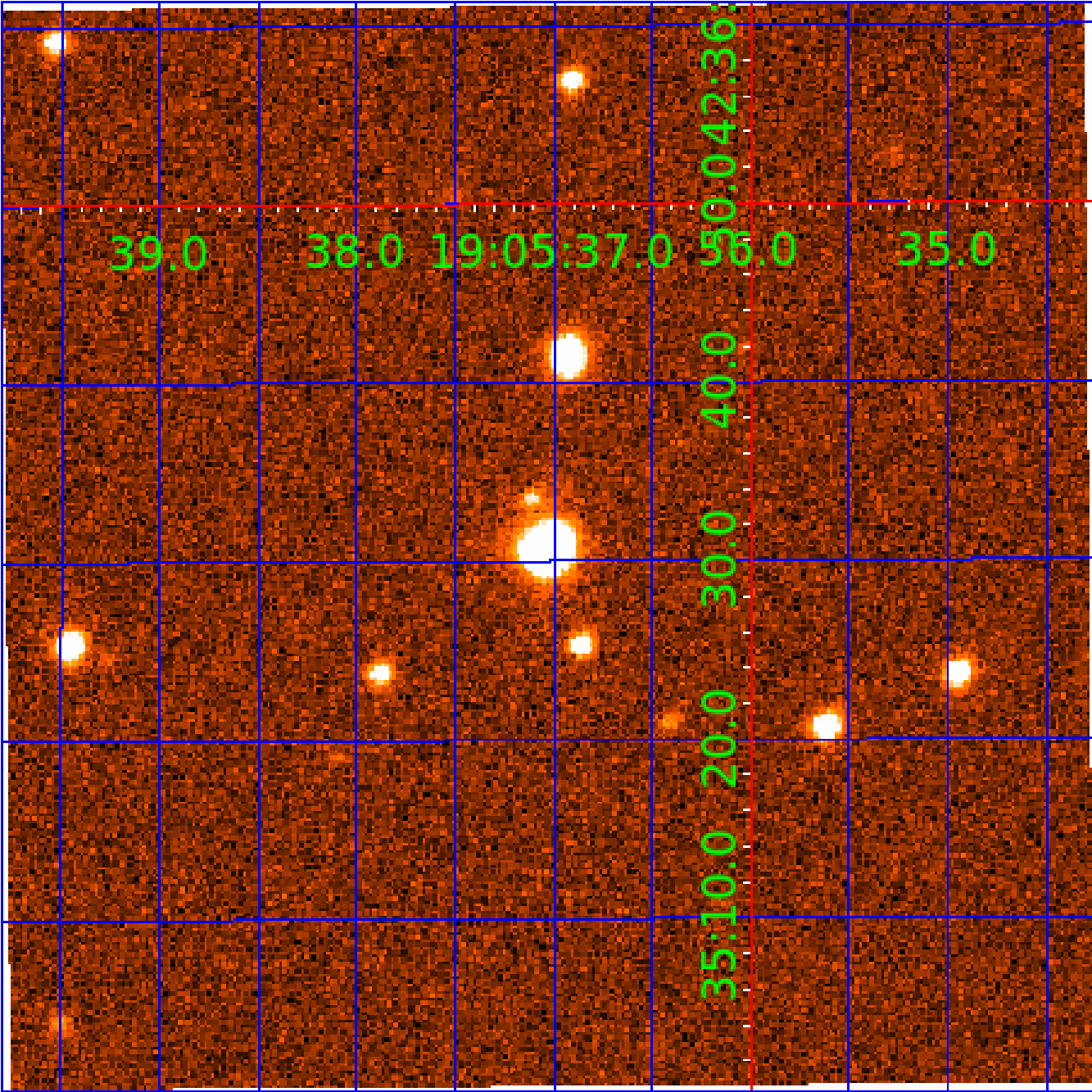


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 007018323

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007018323-01	OBS	No	563.395725	251.367390	1301.7	4.016	8.9	7.1	0.46	3687	1.64	0.03
007018323-02	OBS	No	277.993226	378.603021	1219.5	13.024	9.7	6.7	0.46	3687	1.94	0.08

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007018323-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007018323-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—MOD_NONUNIQ_DV—INCONSISTENT_TRANS

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

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

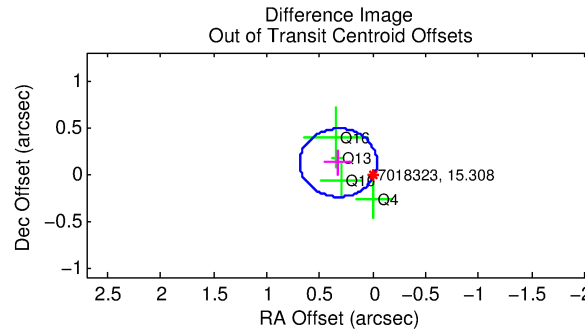
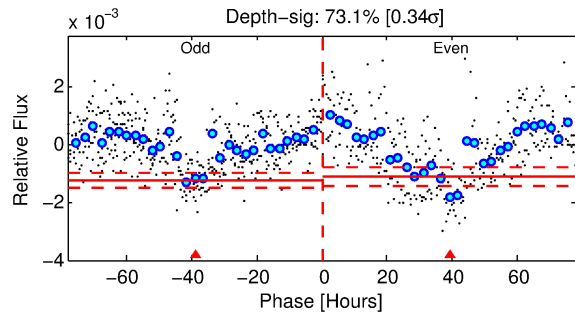
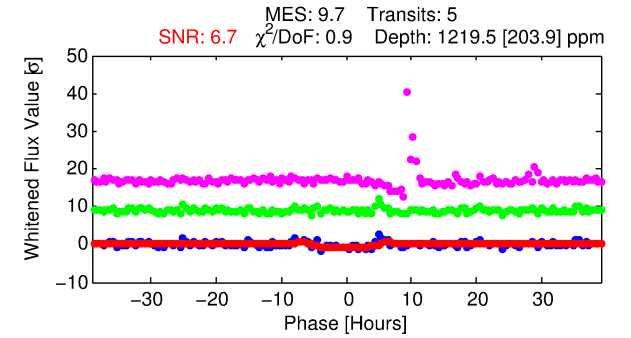
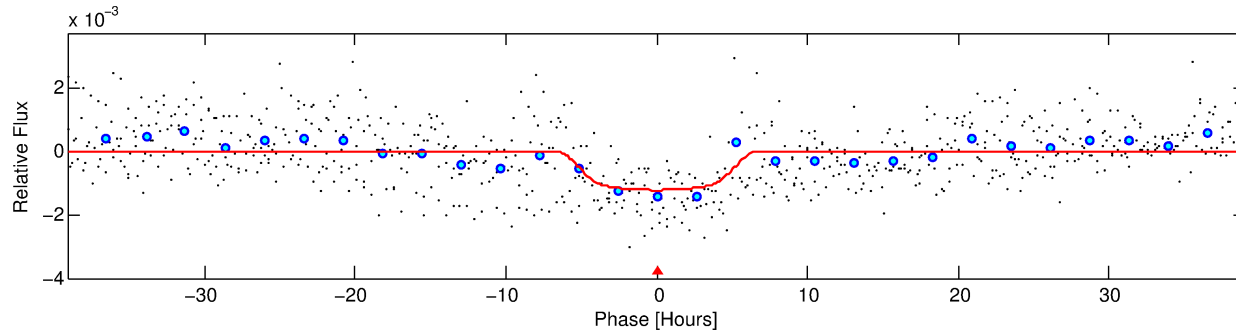
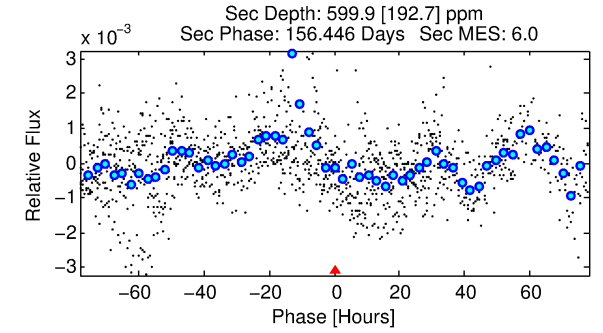
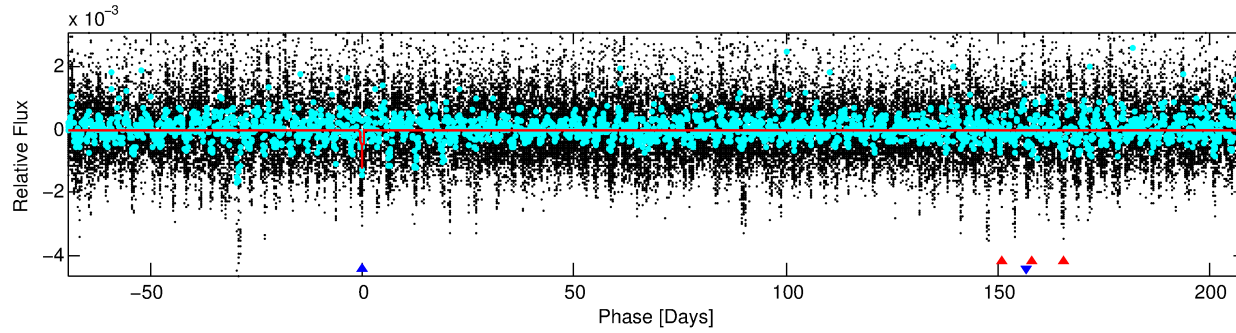
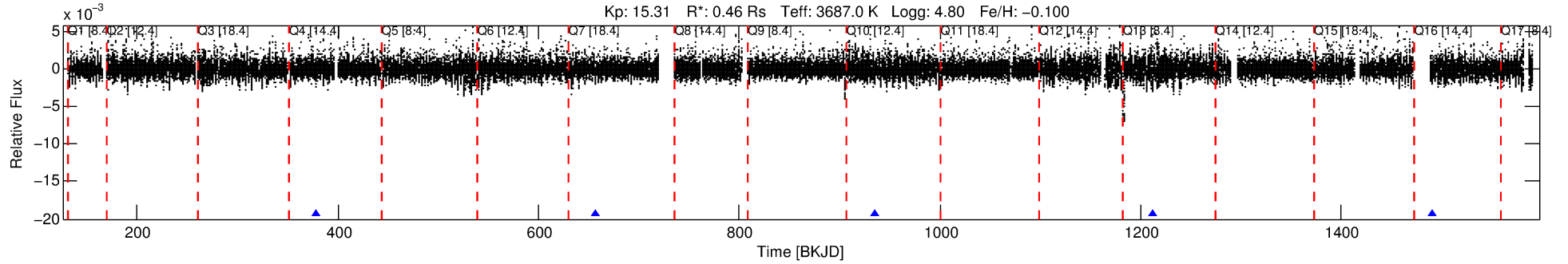
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 007018323-02

No Significant Match Found

# DV One-Page Summary

KIC: 7018323 Candidate: 2 of 2 Period: 277.993 d



## DV Fit Results:

Period = 277.99323 [0.00921] d  
Epoch = 378.6030 [0.0220] BKJD  
Rp/R\* = 0.0389 [0.0041]  
a/R\* = 79.11 [16.84]  
b = 0.92 [0.04]  
Seff = 0.08 [0.01]  
Teq = 136 [3] K  
Rp = 1.94 [0.25] Re  
a = 0.6531 [0.0379] AU  
Ag = 37285.87 [14573.58] [2.56 $\sigma$ ]  
Teffp = 2927 [285] K [9.80 $\sigma$ ]

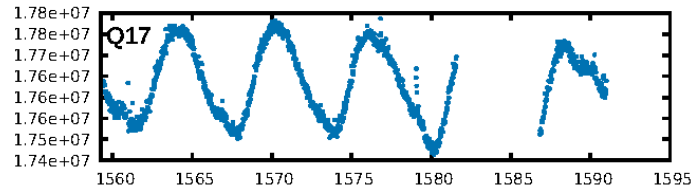
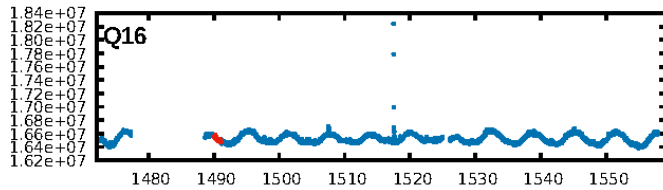
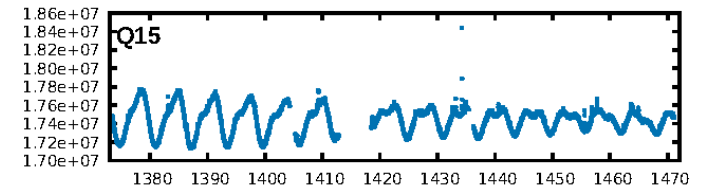
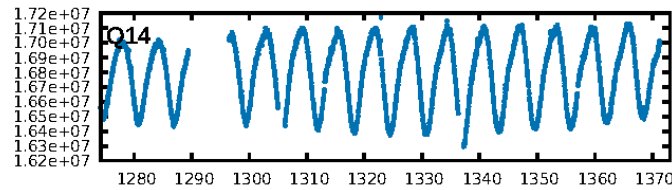
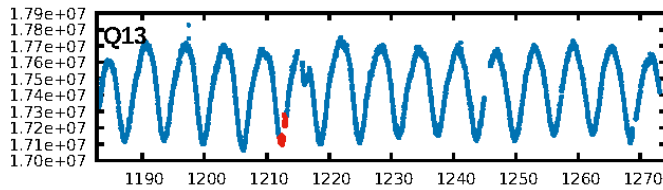
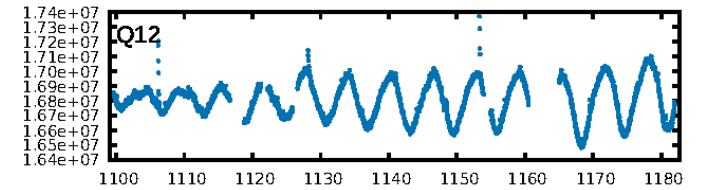
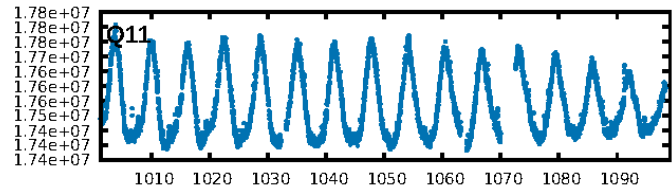
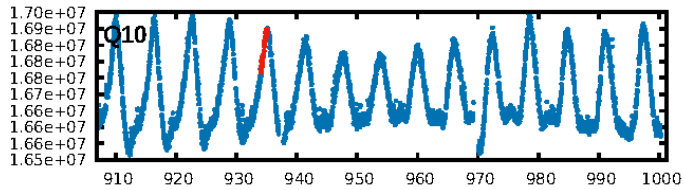
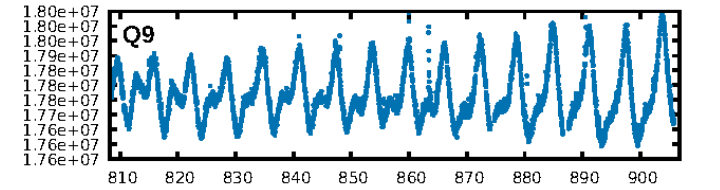
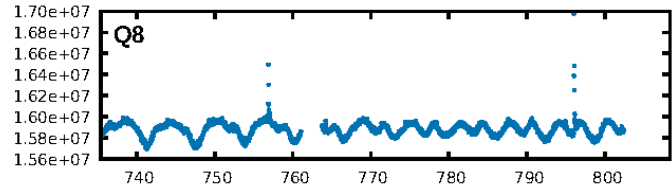
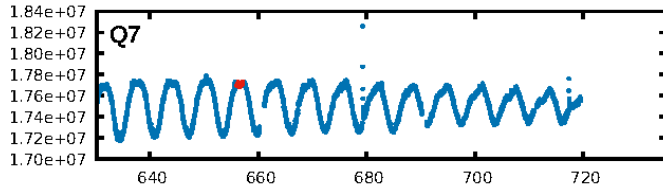
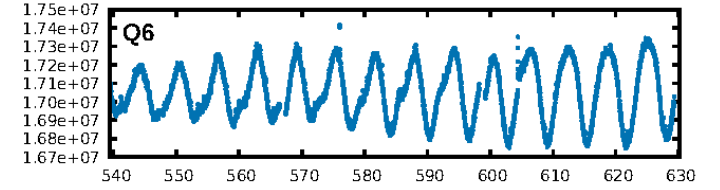
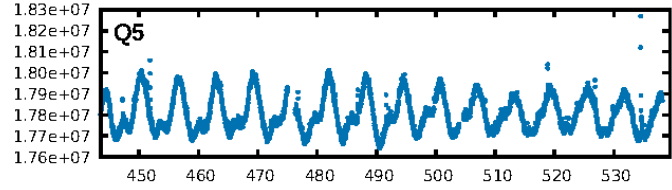
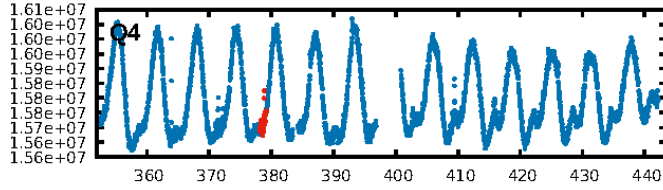
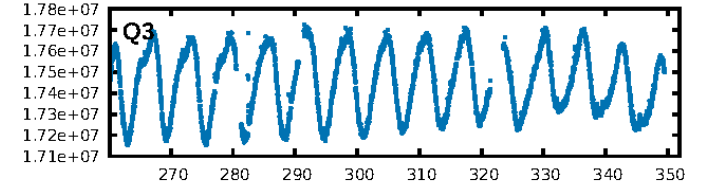
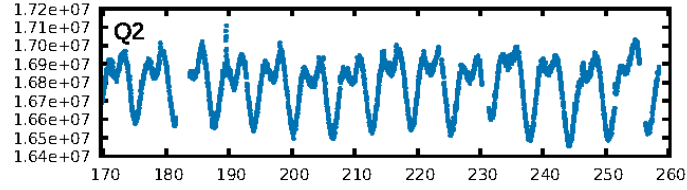
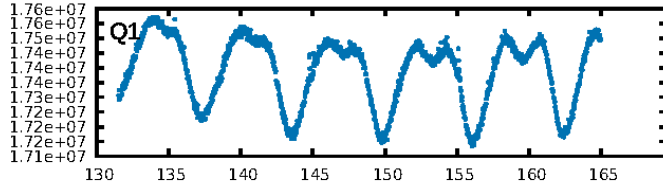
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [502.58 $\sigma$ ]  
ModelChiSquare2-sig: 2.6%  
ModelChiSquareGof-sig: 99.9%  
**Bootstrap-pfa: 2.34e-08**  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: -1.407  
**Centroid-sig: 0.0%**  
Centroid-so: 1.670 arcsec [1.92 $\sigma$ ]  
OotOffset-rm: 0.345 arcsec [2.83 $\sigma$ ]  
KicOffset-rm: 0.314 arcsec [2.57 $\sigma$ ]  
OotOffset-st: 1/0/2/1 [4]  
KicOffset-st: 1/0/2/1 [4]  
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DiffImageOverlap-fno: 1.00 [5/5]

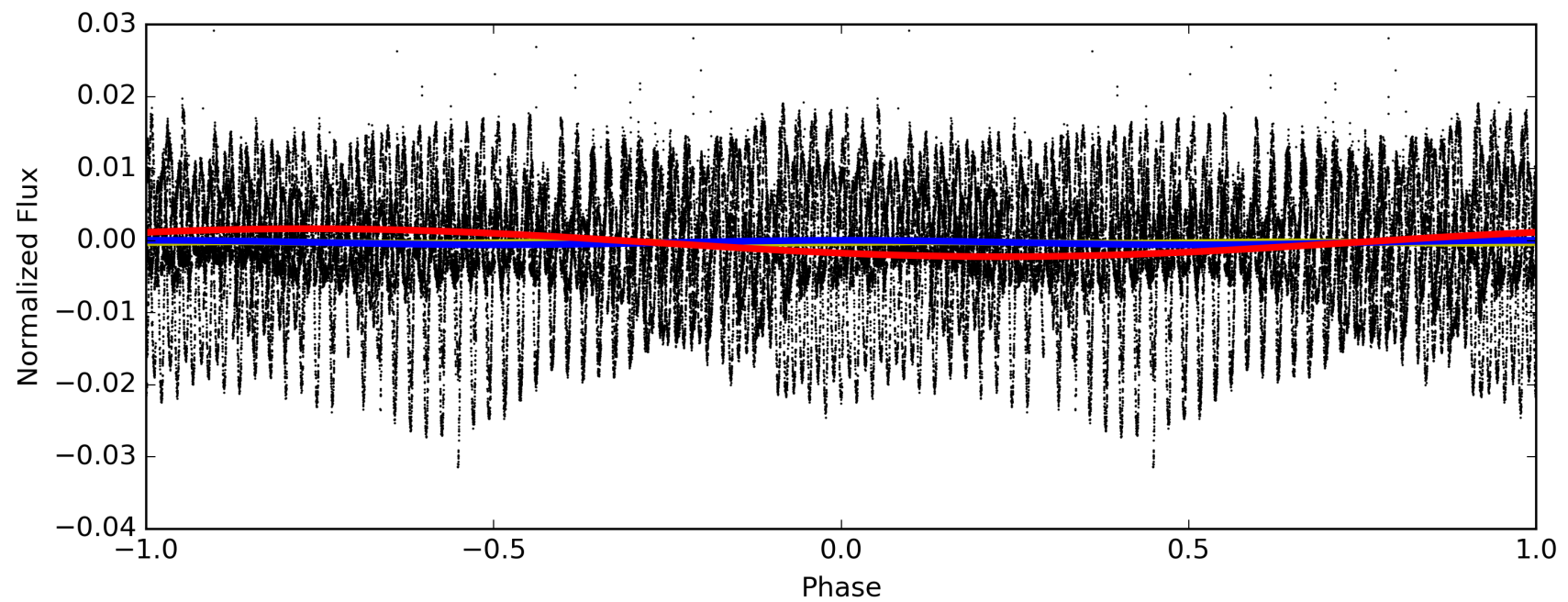
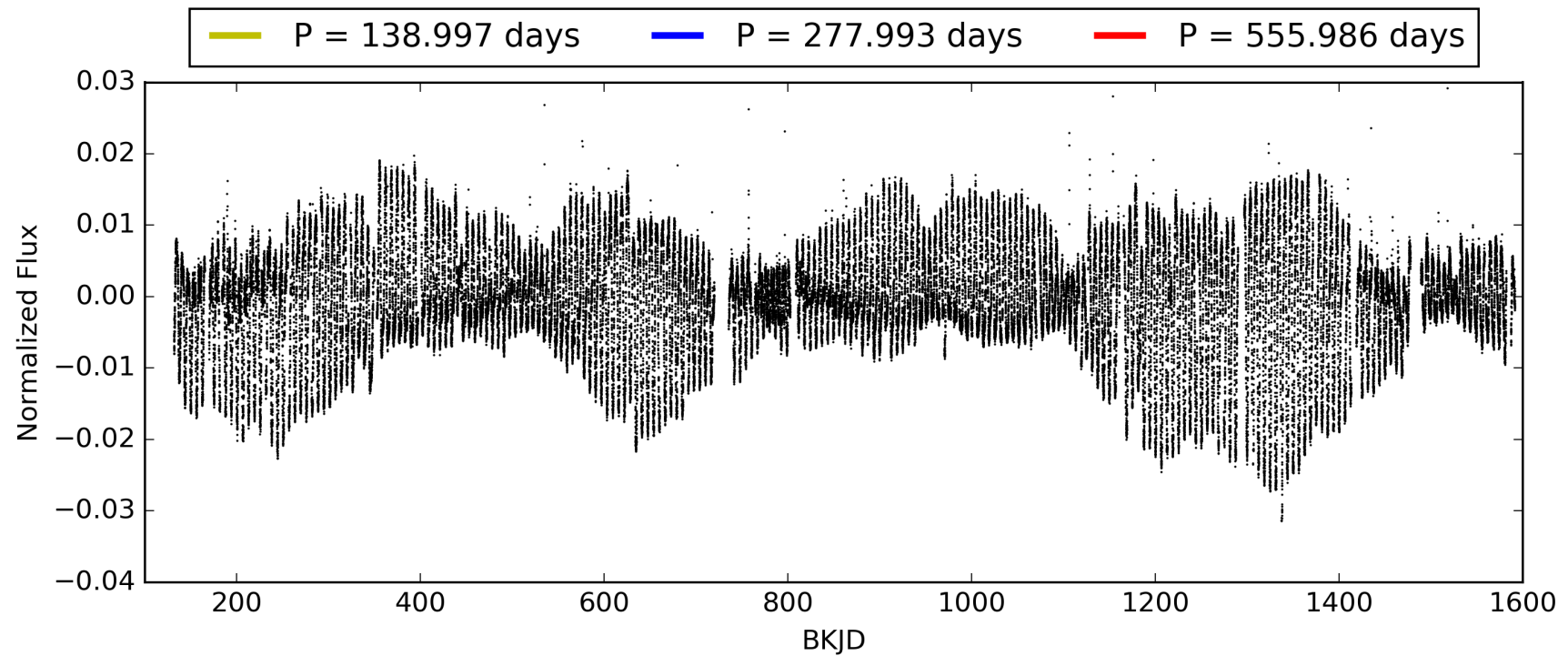
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 007018323-02, PDC Light Curves



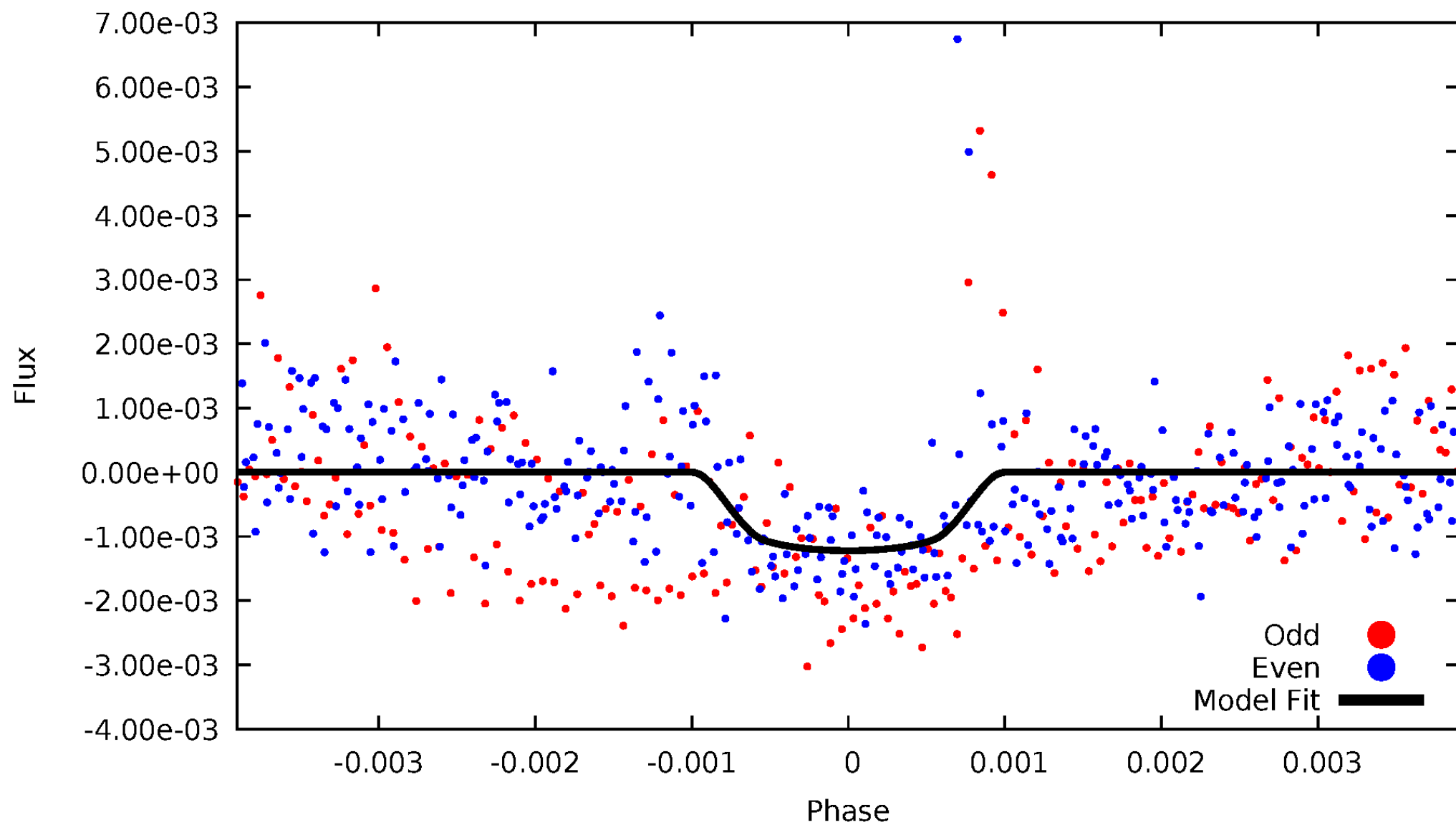
TCE 007018323-02





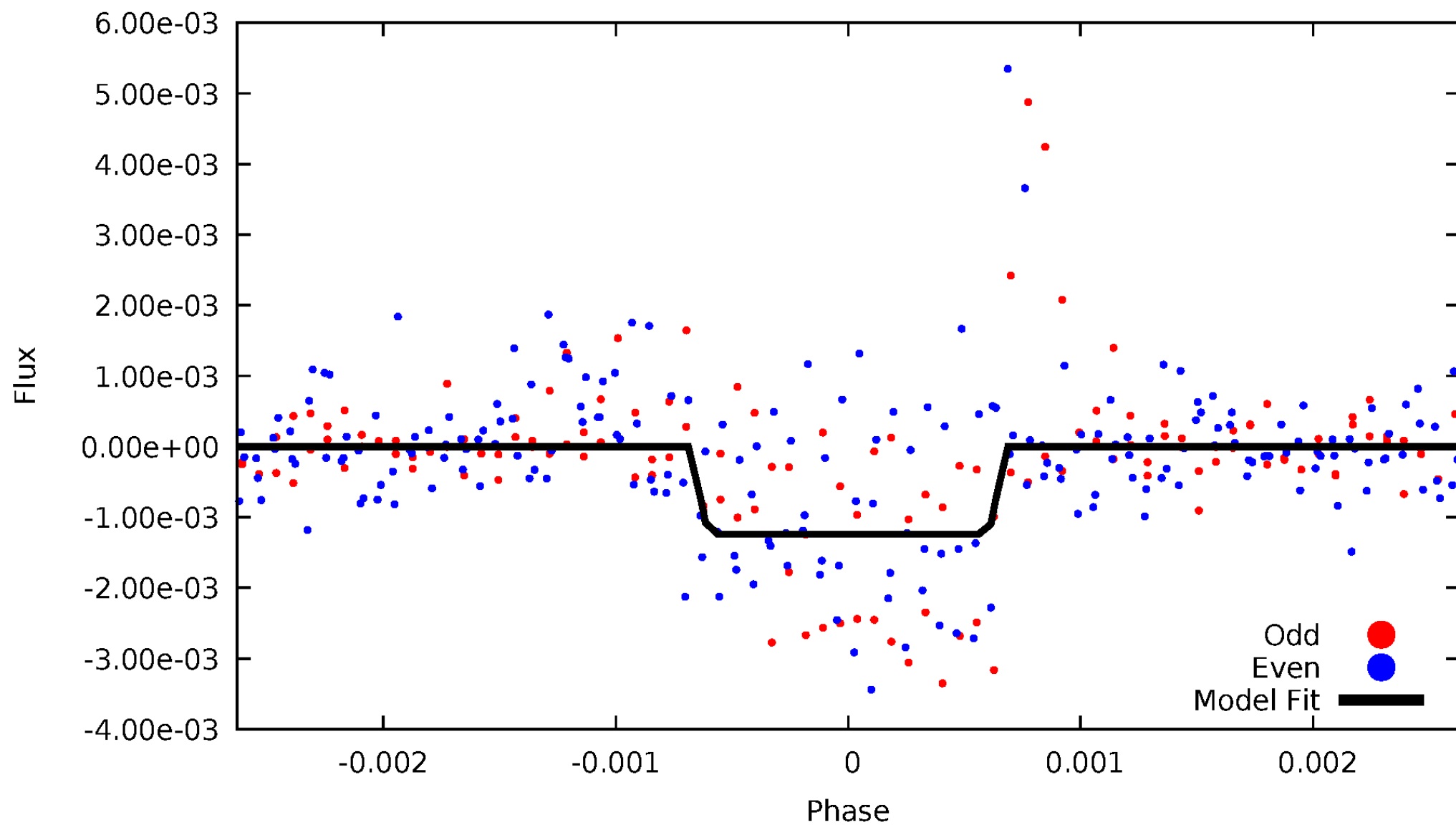
# DV Odd/Even

TCE 007018323-02



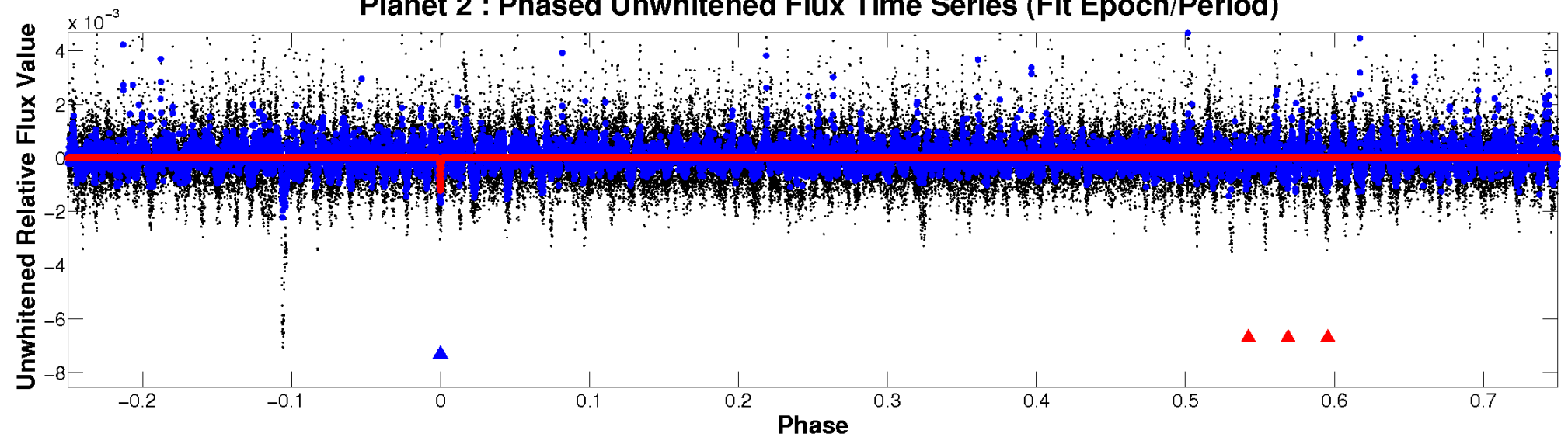
# ALT Odd/Even

TCE 007018323-02

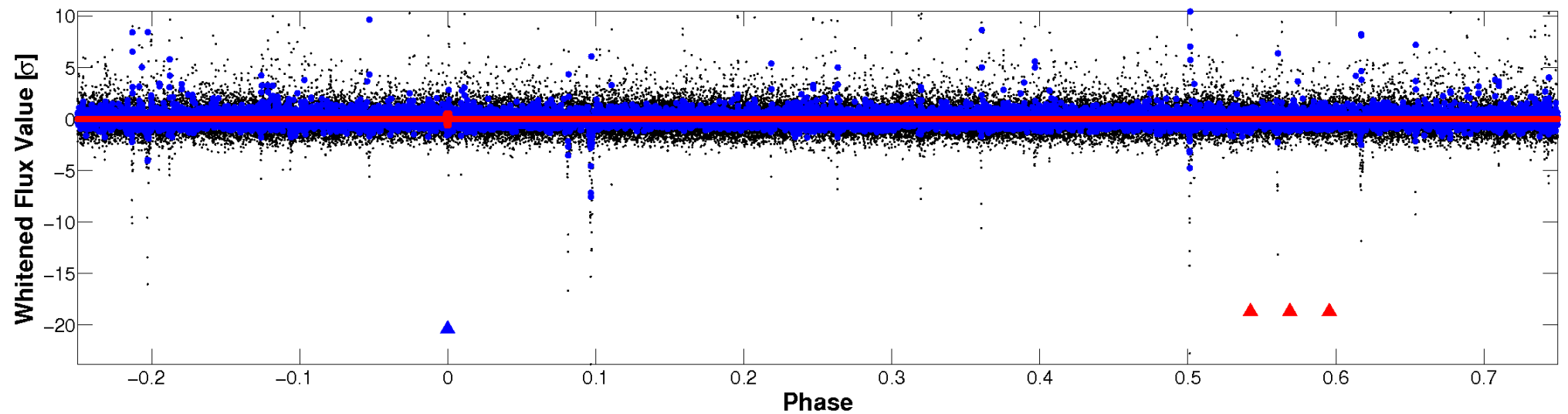


# Non-Whitened Vs. Whitened Light Curve

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

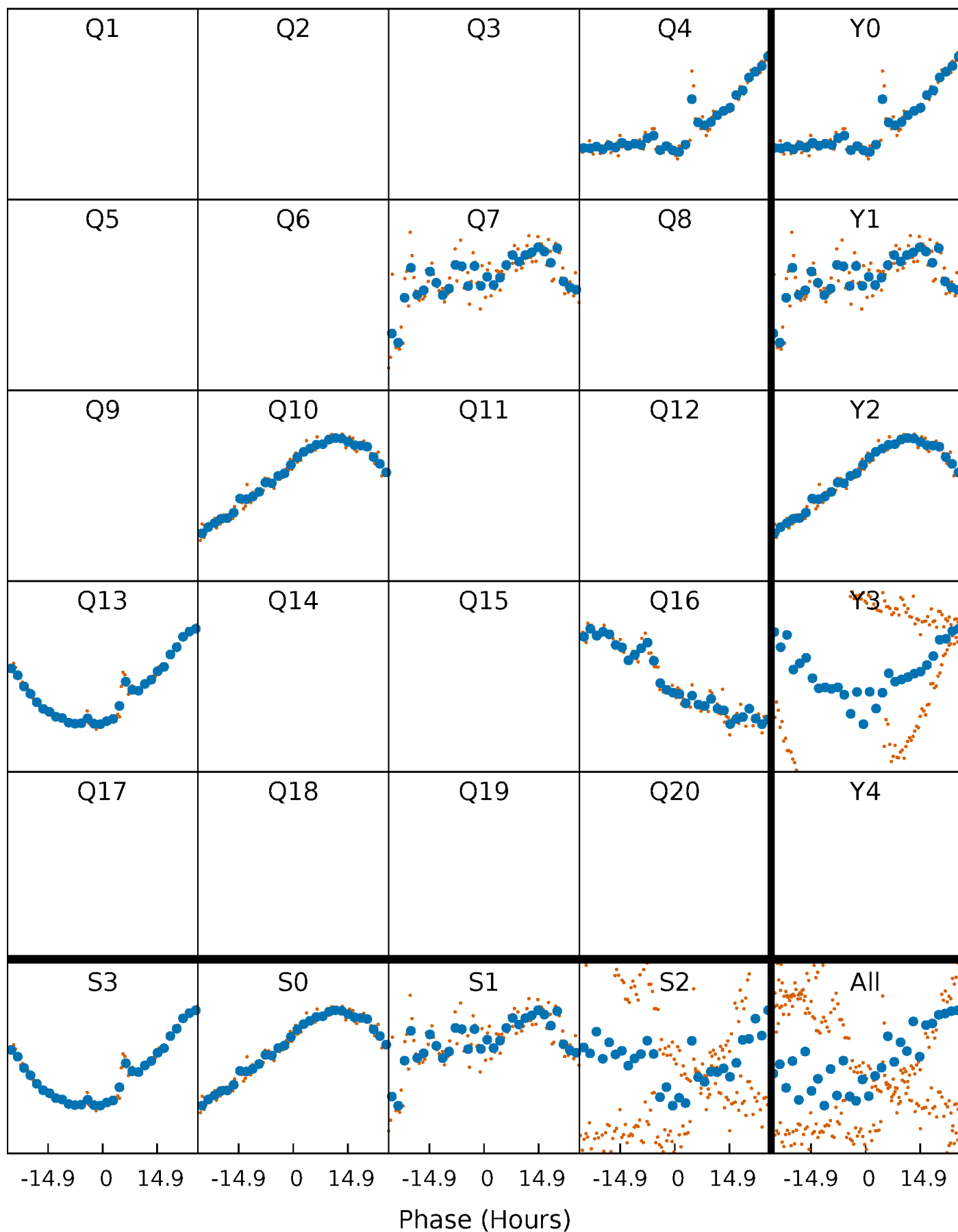


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



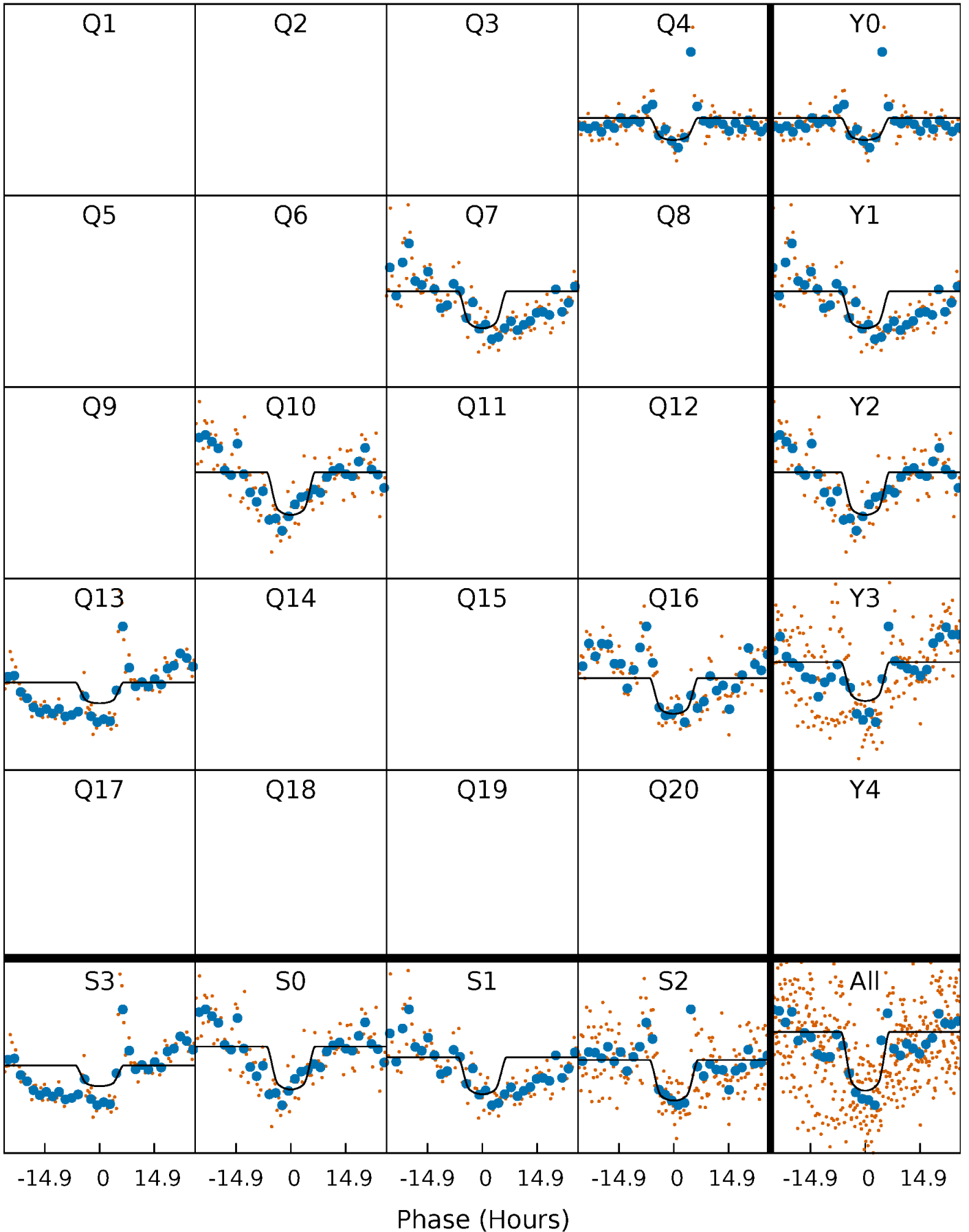
# PDC Quarter-Phased Transit Curves

TCE 007018323-02 P=277.993226 Days  $T_0=378.603021$  (BKJD)



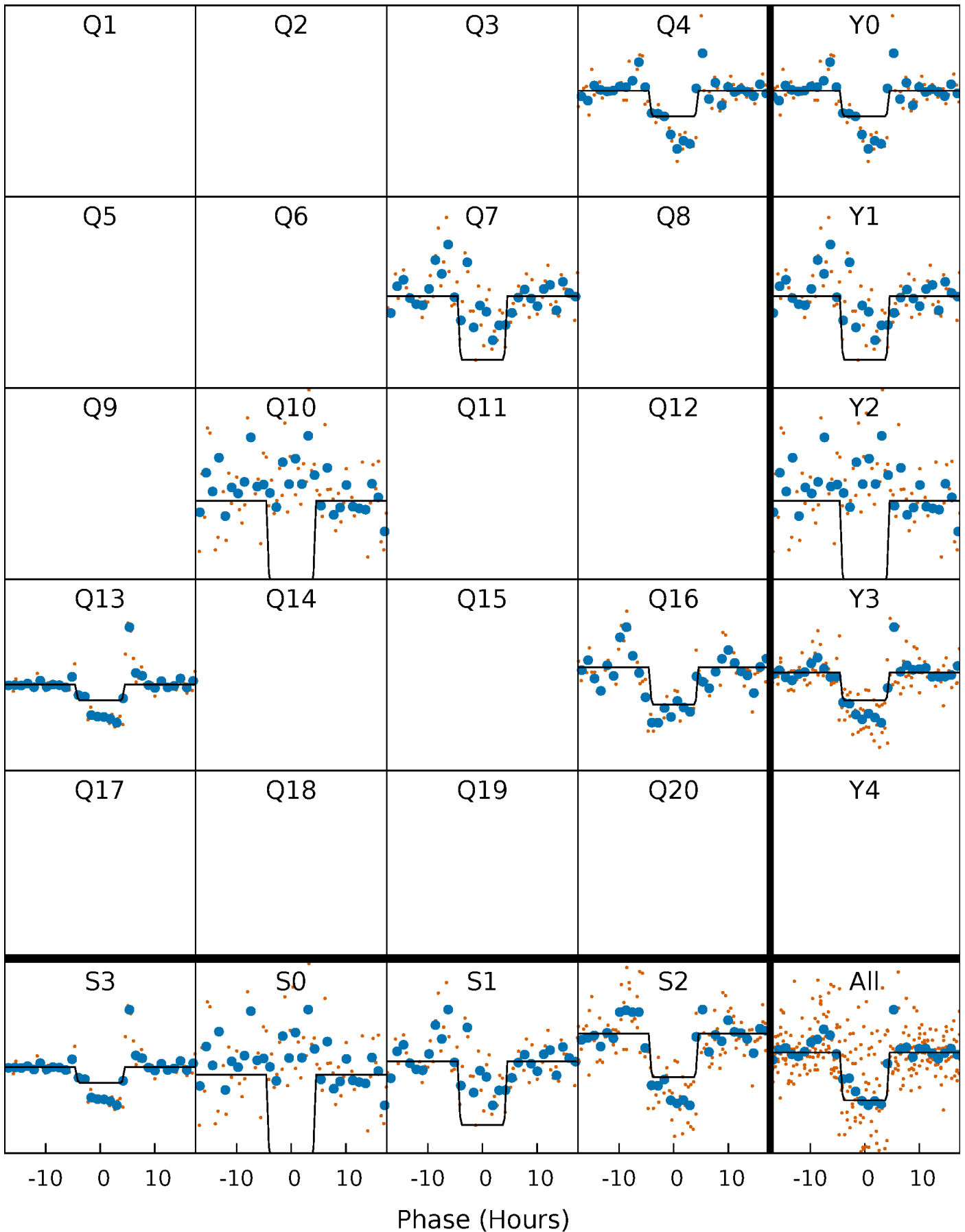
# DV Quarter-Phased Transit Curves

TCE 007018323-02 P=277.993226 Days  $T_0=378.603021$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

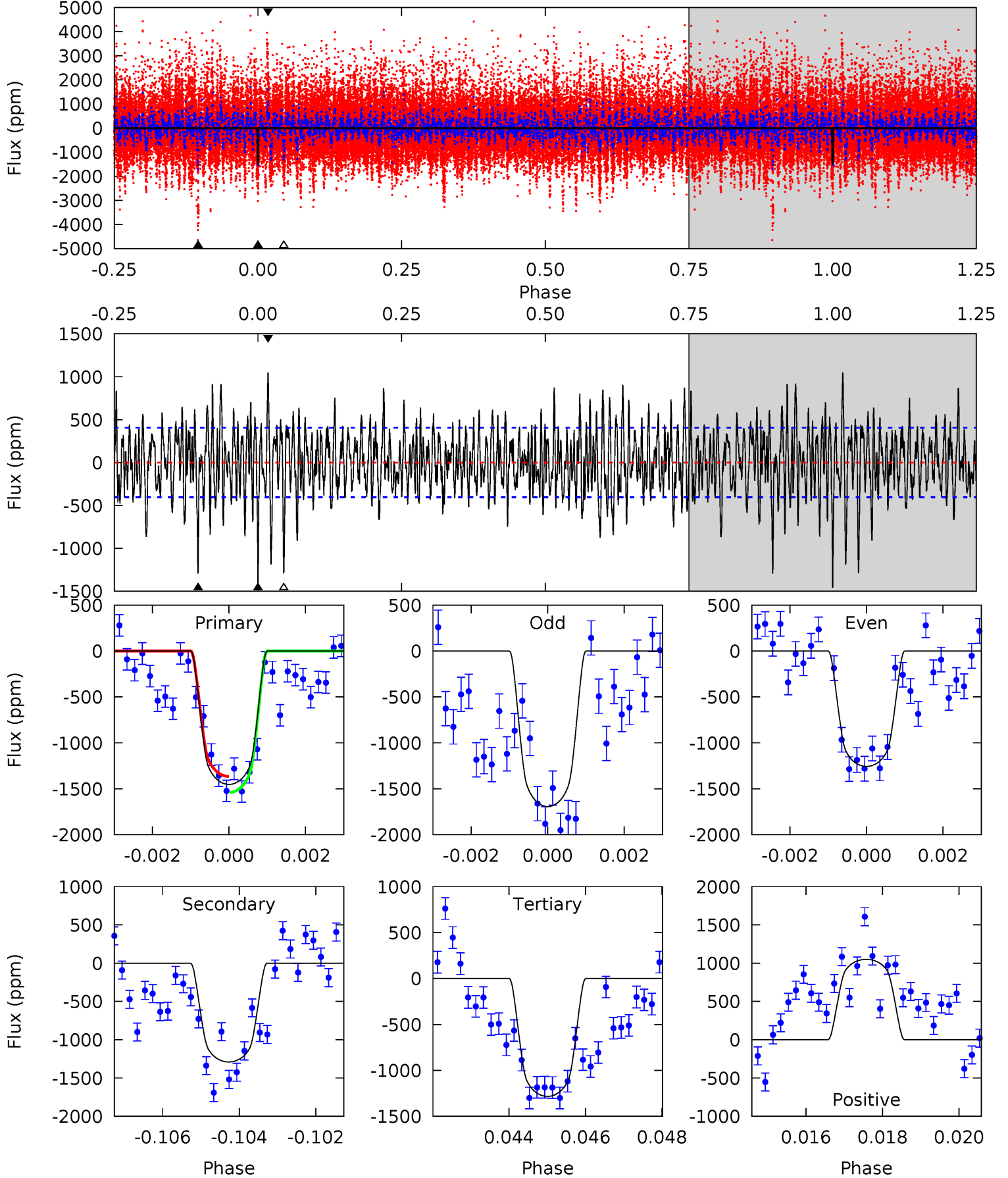
TCE 007018323-02 P=277.998584 Days  $T_0=378.605821$  (BKJD)



# DV Model-Shift Uniqueness Test

007018323-02, P = 277.993226 Days, E = 100.609795 Days

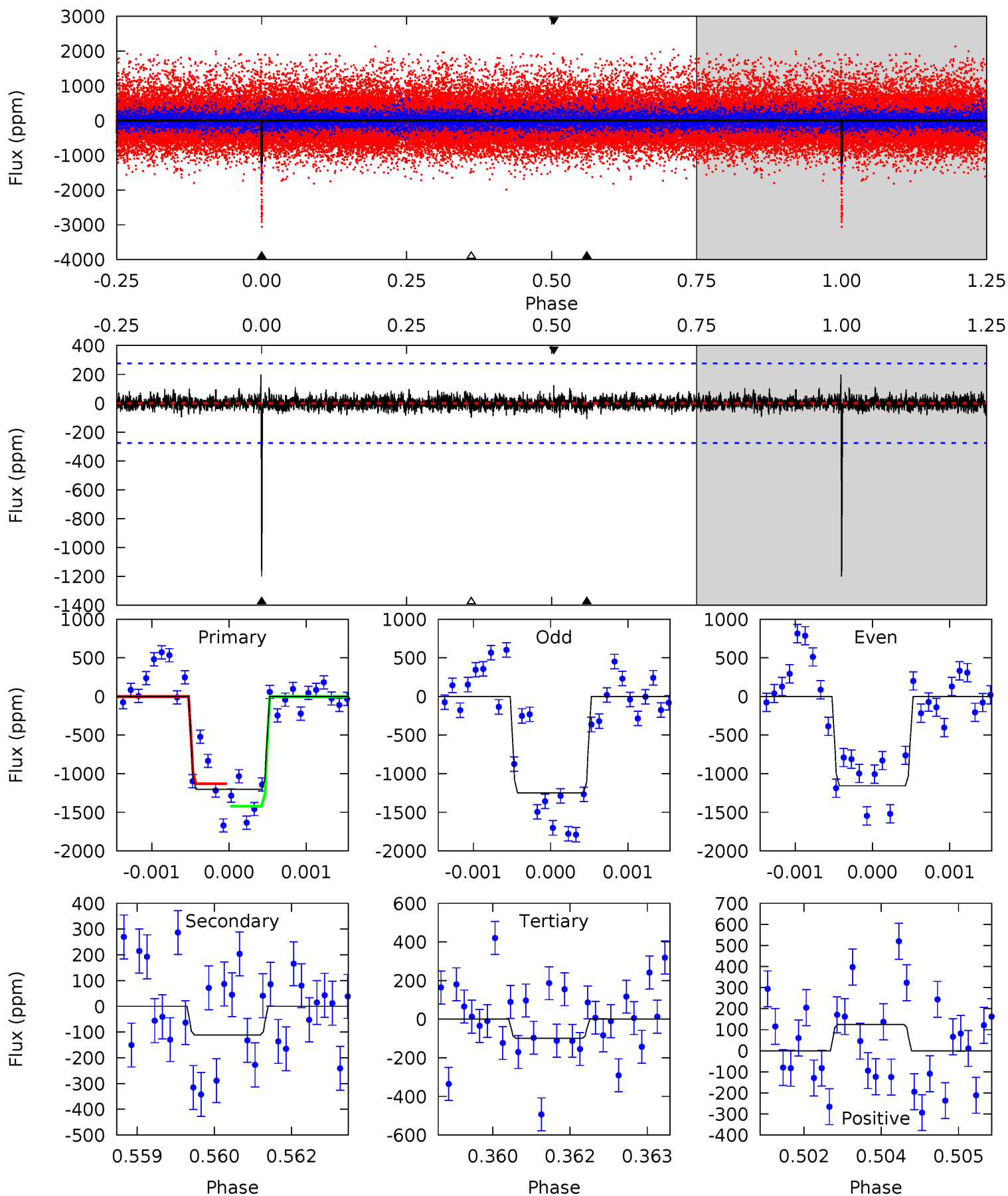
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.1	17.0	16.9	13.8	5.33	3.09	4.31	2.22	5.29	0.10	3.16	2.72	1.03	0.42	1.16



# Alt Model-Shift Uniqueness Test

007018323-02,  $P = 277.998584$  Days,  $E = 100.607237$  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
23.5	2.17	1.95	2.45	5.40	3.21	0.51	21.6	21.1	0.22	-0.28	0.89	0.81	0.14	0





### Stellar Parameters For KIC 007018323

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3687^{+55}_{-60}$	$4.798^{+0.036}_{-0.030}$	$-0.100^{+0.100}_{-0.100}$	$0.458^{+0.029}_{-0.035}$	$0.482^{+0.024}_{-0.037}$	$7.041^{+1.266}_{-0.891}$
	+1%/-2%	+1%/-1%	+100%/-100%	+6%/-8%	+5%/-8%	+18%/-13%
Source	PHO2	PHO2	PHO2	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 007018323-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-1291 \pm 76$	$1.92^{+0.21}_{-0.22}$	$190^{+4}_{-4}$	$3595^{+158}_{-134}$	$81525^{+23339}_{-15915}$
Alt.	$-111 \pm 51$	$1.76^{+0.21}_{-0.21}$	$190^{+4}_{-4}$	$2597^{+162}_{-195}$	$8329^{+4824}_{-3933}$

$T_{max}$  = 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

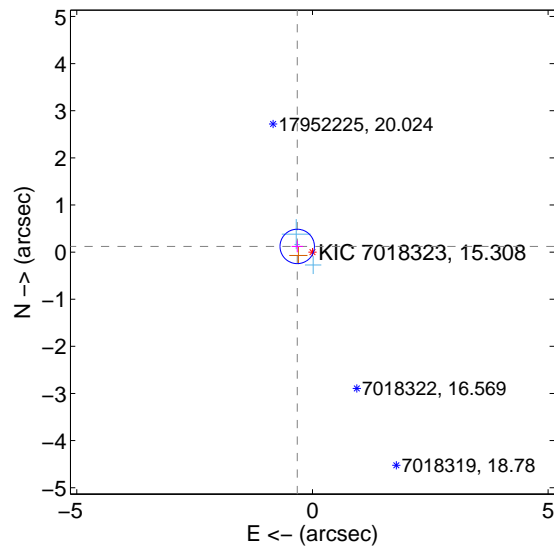
Supplemental centroid analysis for 007018323-02. Kepler magnitude: 15.31. Transit SNR 6.70

There are 3 quarters with good PRF difference image offsets

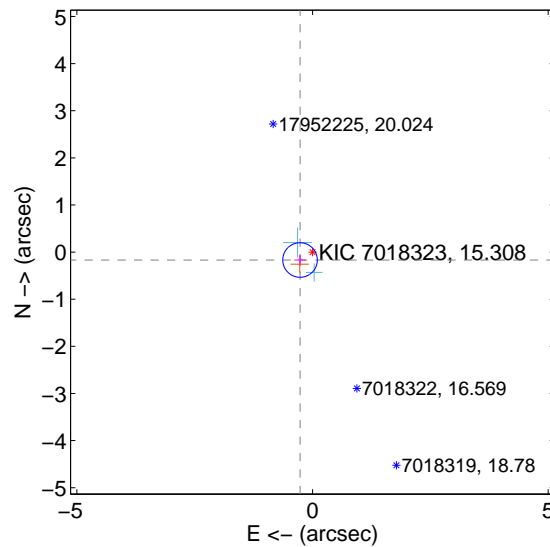
The direct PRF centroid is offset from the target star catalog position by about 0.18 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.345 \pm 0.122$	2.83	$0.323 \pm 0.121$	$0.120 \pm 0.124$
PRF-fit source offset from KIC position	$0.314 \pm 0.122$	2.57	$0.265 \pm 0.121$	$-0.168 \pm 0.124$
photometric centroid source offset	$1.67 \pm 0.87$	1.92	$0.82 \pm 0.62$	$-1.45 \pm 0.94$

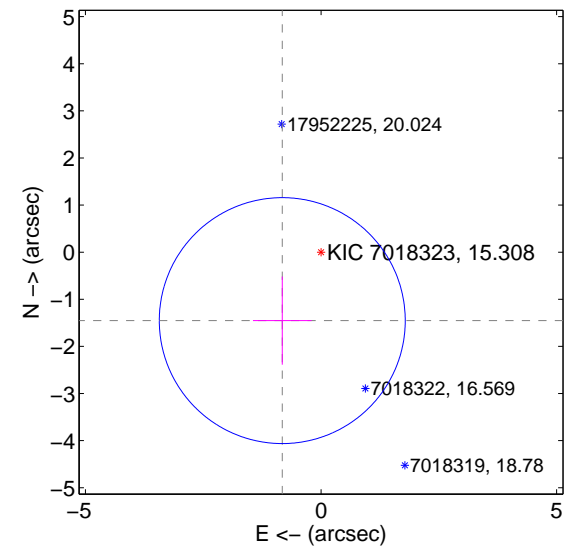
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

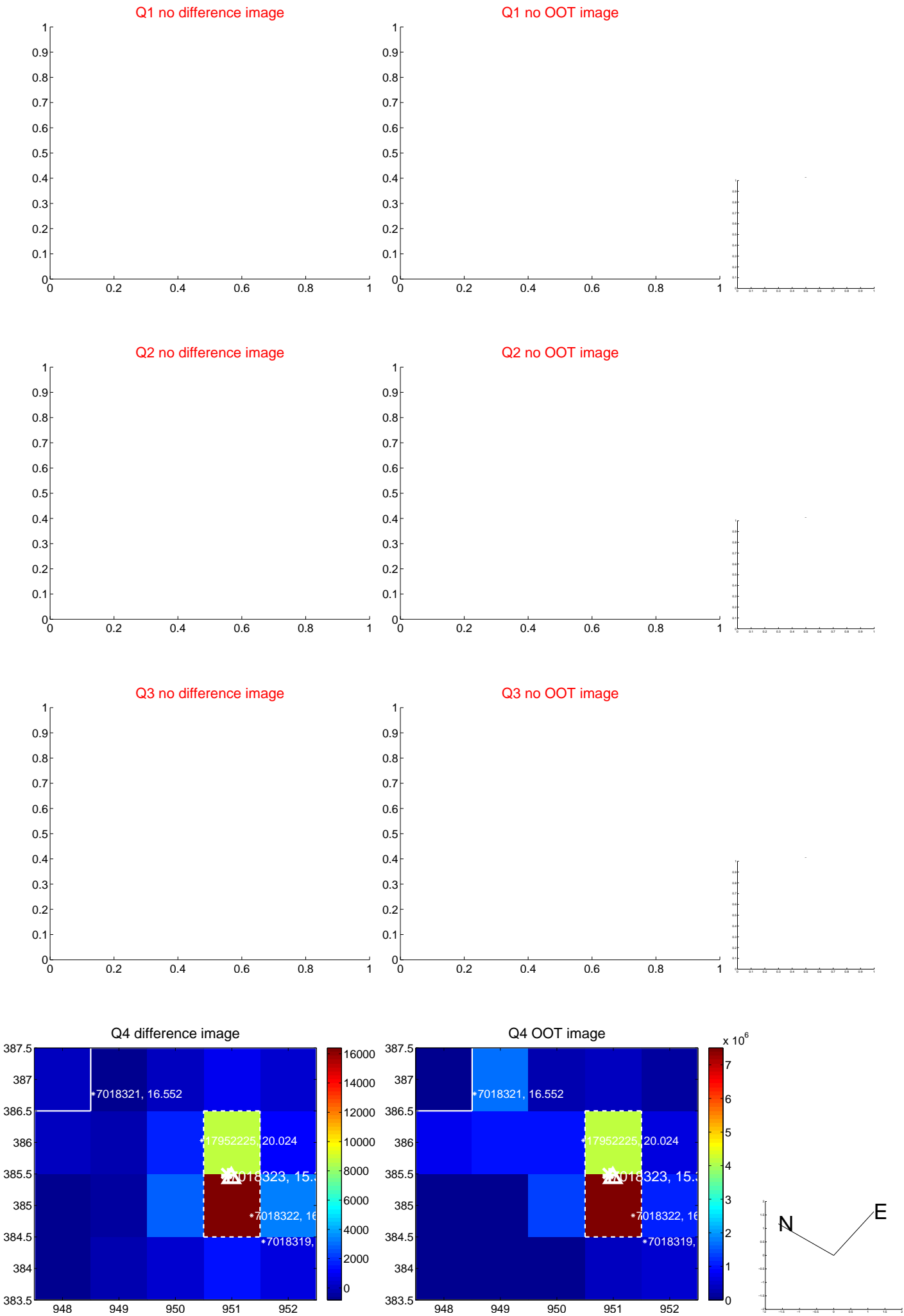


offset from photometric centroids

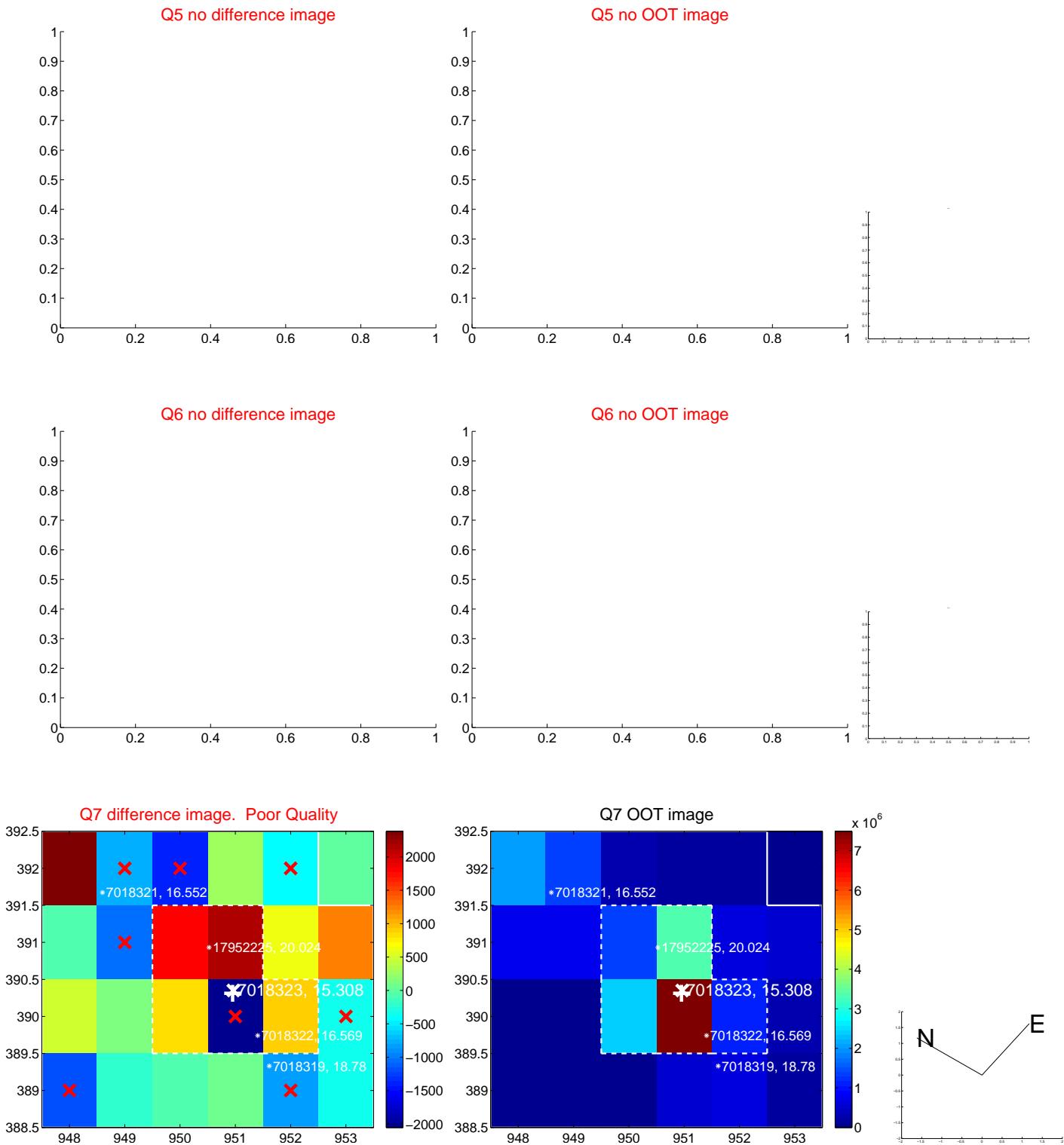


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

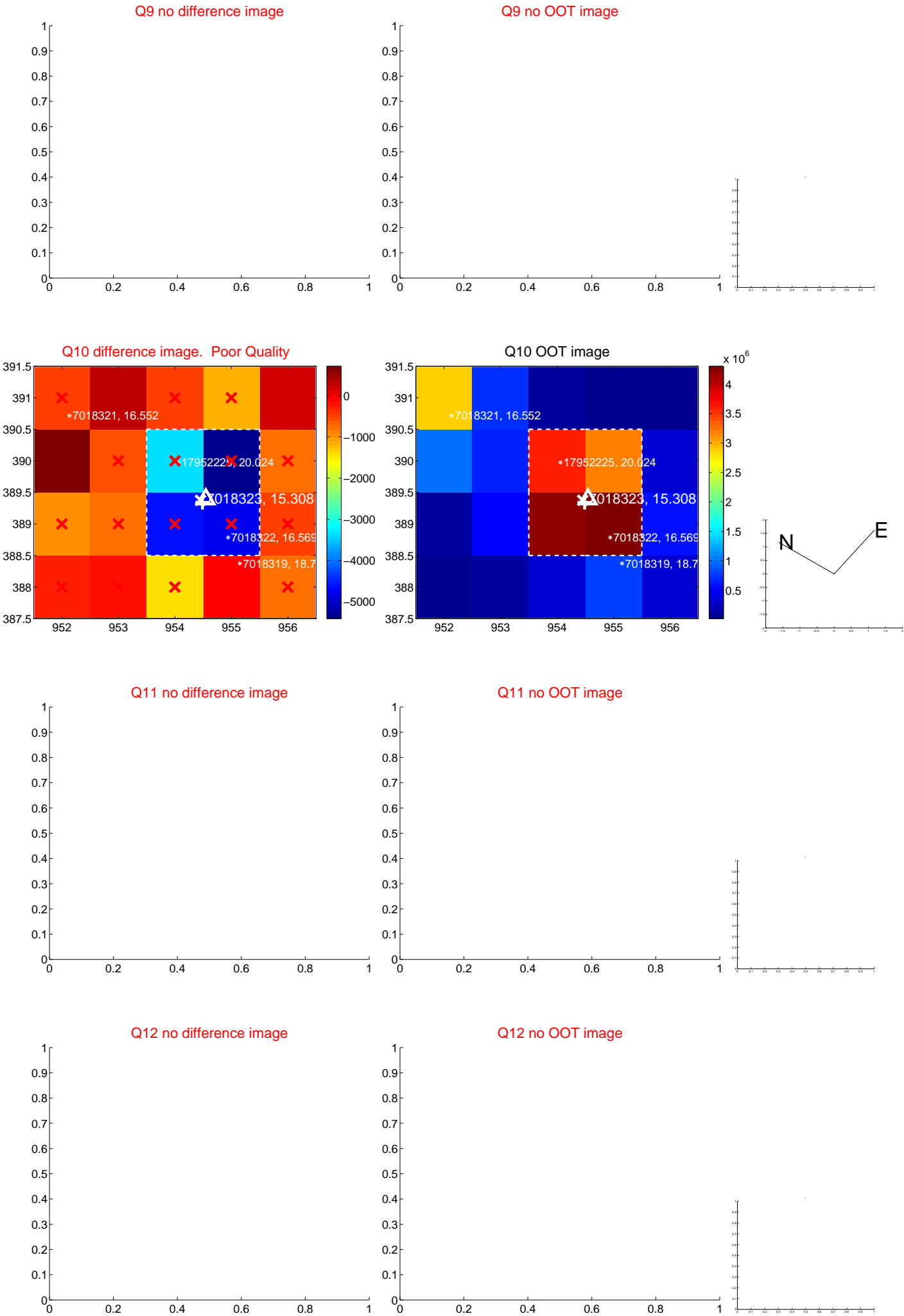
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



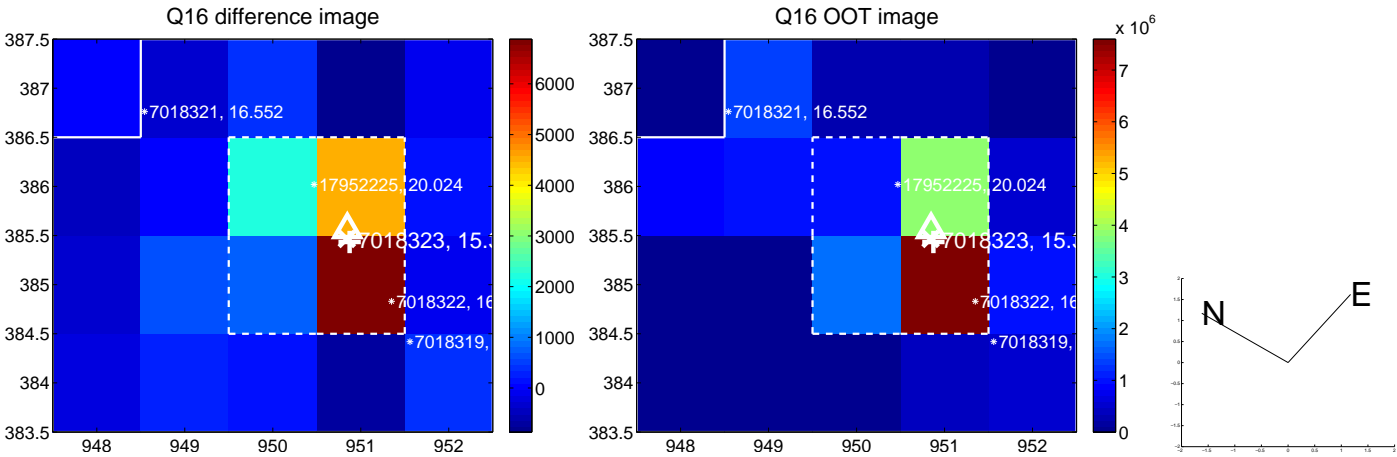
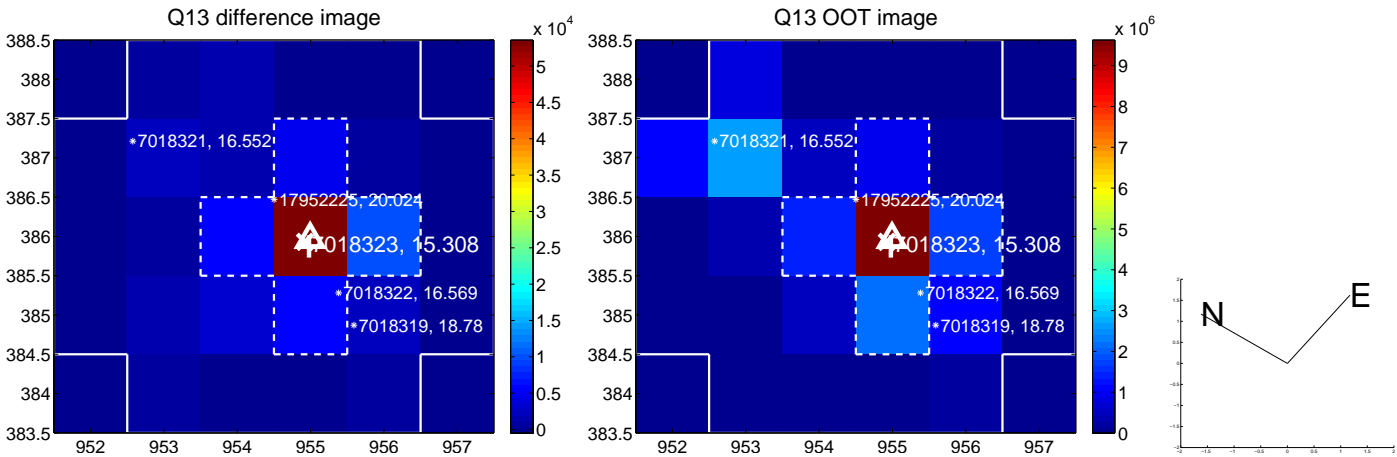
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



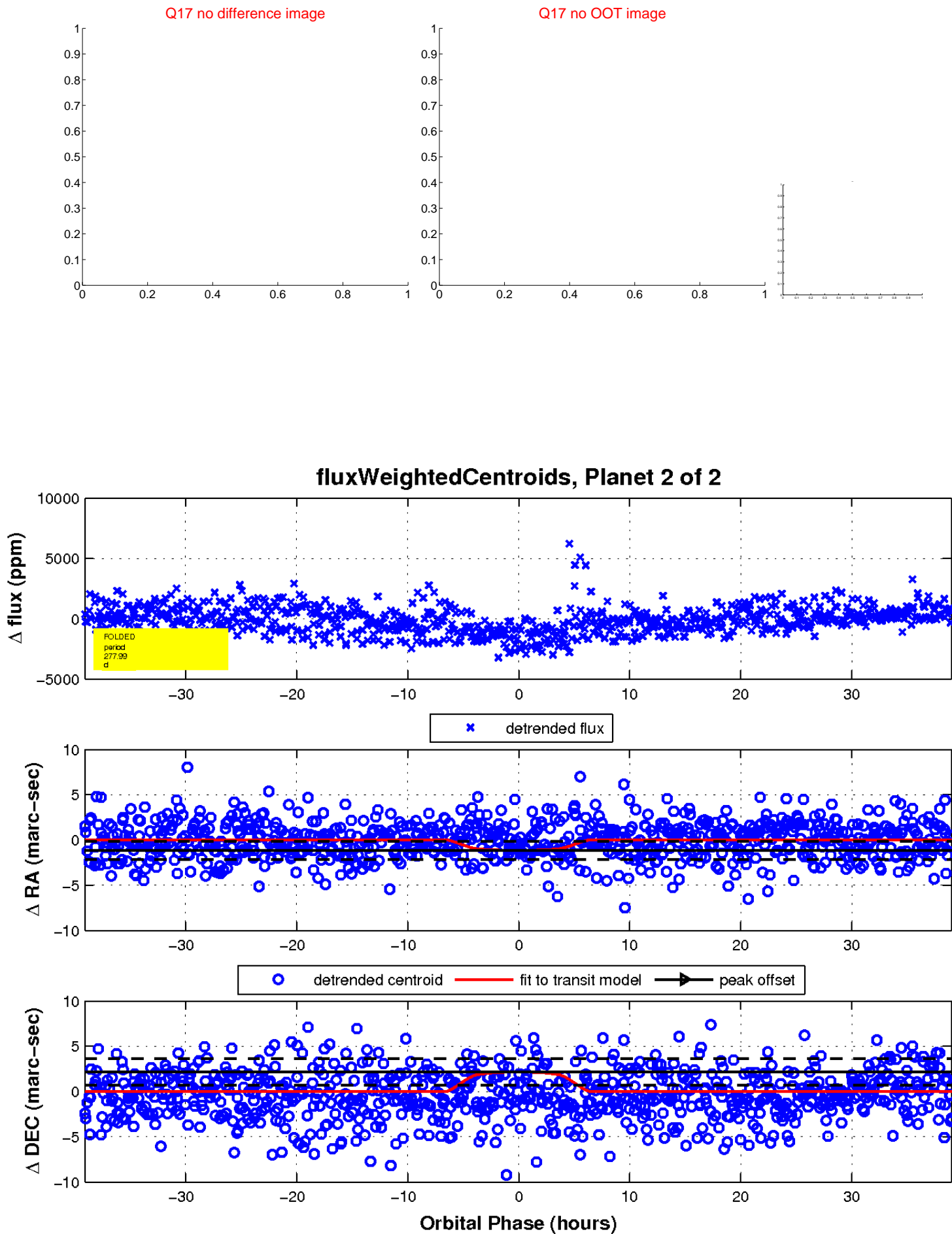
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



UKIRT Image

Declination

