

# KIC 010363074

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010363074-01	OBS	No	340.894534	139.993684	1125.0	8.567	9.6	6.3	0.40	3563	1.36	0.04
010363074-02	OBS	No	5.185090	131.607978	242.9	2.188	8.4	6.9	0.40	3563	0.72	12.02

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010363074-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_KIC_POS
010363074-02	OBS	FP	0.00	1	0	0	0	LPP_ALT—MOD_NONUNIQ_ALT—CENT_KIC_POS

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

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

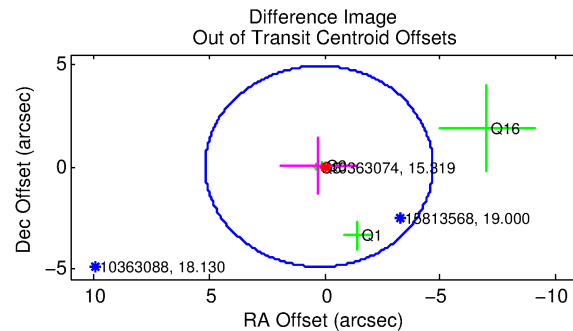
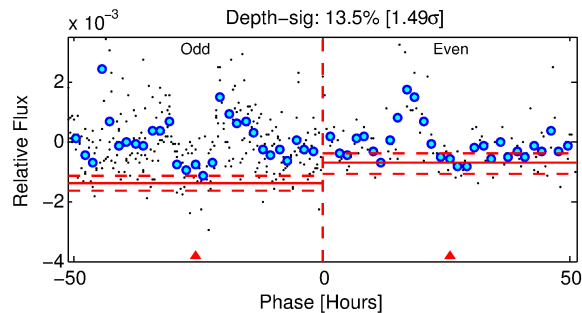
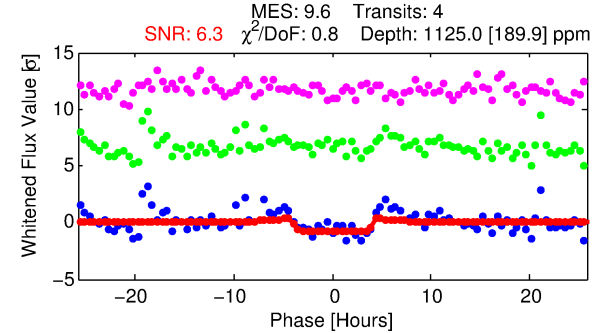
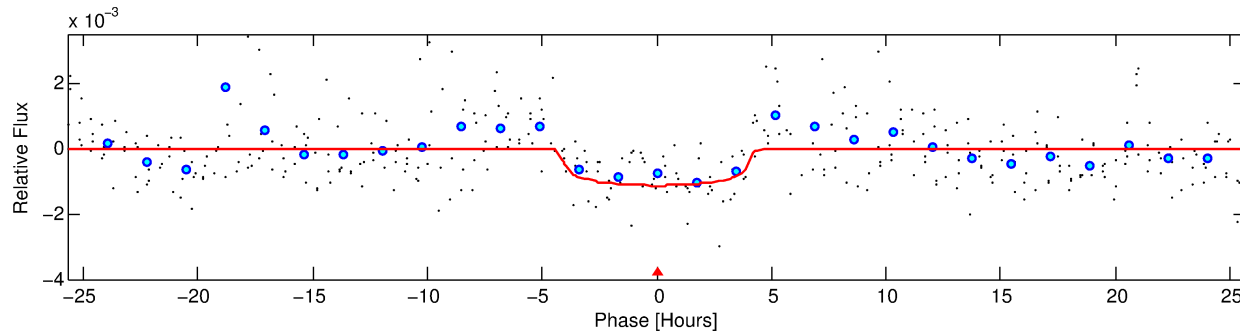
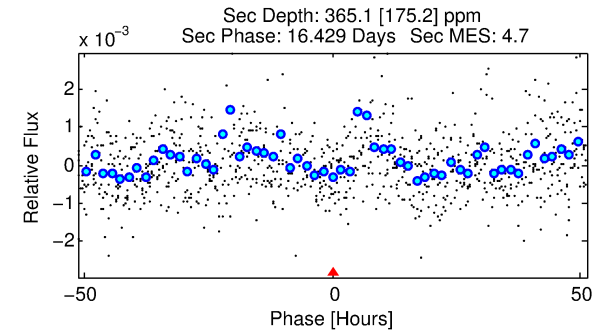
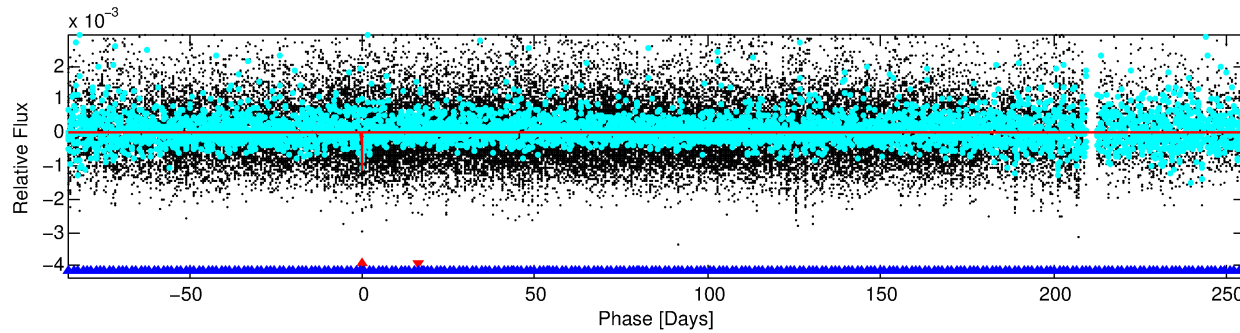
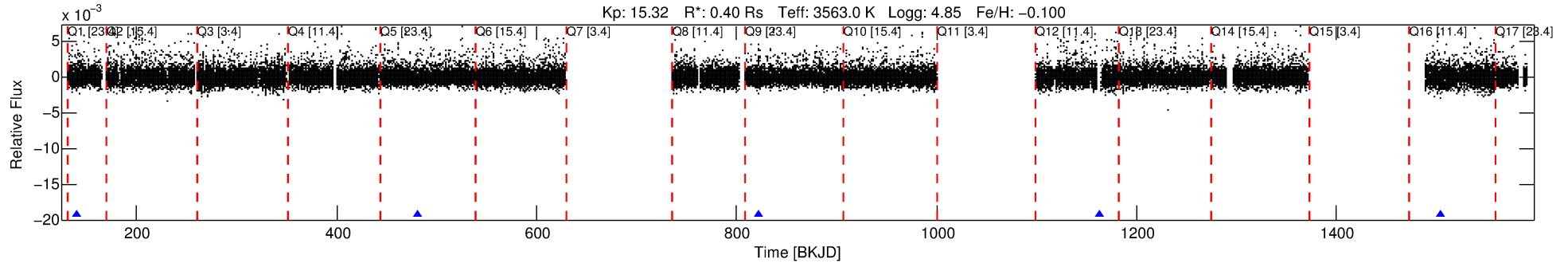
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010363074-01

No Significant Match Found

# DV One-Page Summary

KIC: 10363074 Candidate: 1 of 2 Period: 340.895 d



## DV Fit Results:

Period = 340.89453 [0.00625] d  
Epoch = 139.9937 [0.0142] BKJD  
Rp/R\* = 0.0312 [0.0226]  
a/R\* = 278.67 [859.50]  
b = 0.47 [5.10]  
Seff = 0.05 [0.01]  
Teq = 118 [4] K  
Rp = 1.36 [0.99] Re  
a = 0.7107 [0.0576] AU  
Ag = 55205.74 [84230.15] [0.66 $\sigma$ ]  
Teffp = 2788 [1062] K [2.51 $\sigma$ ]

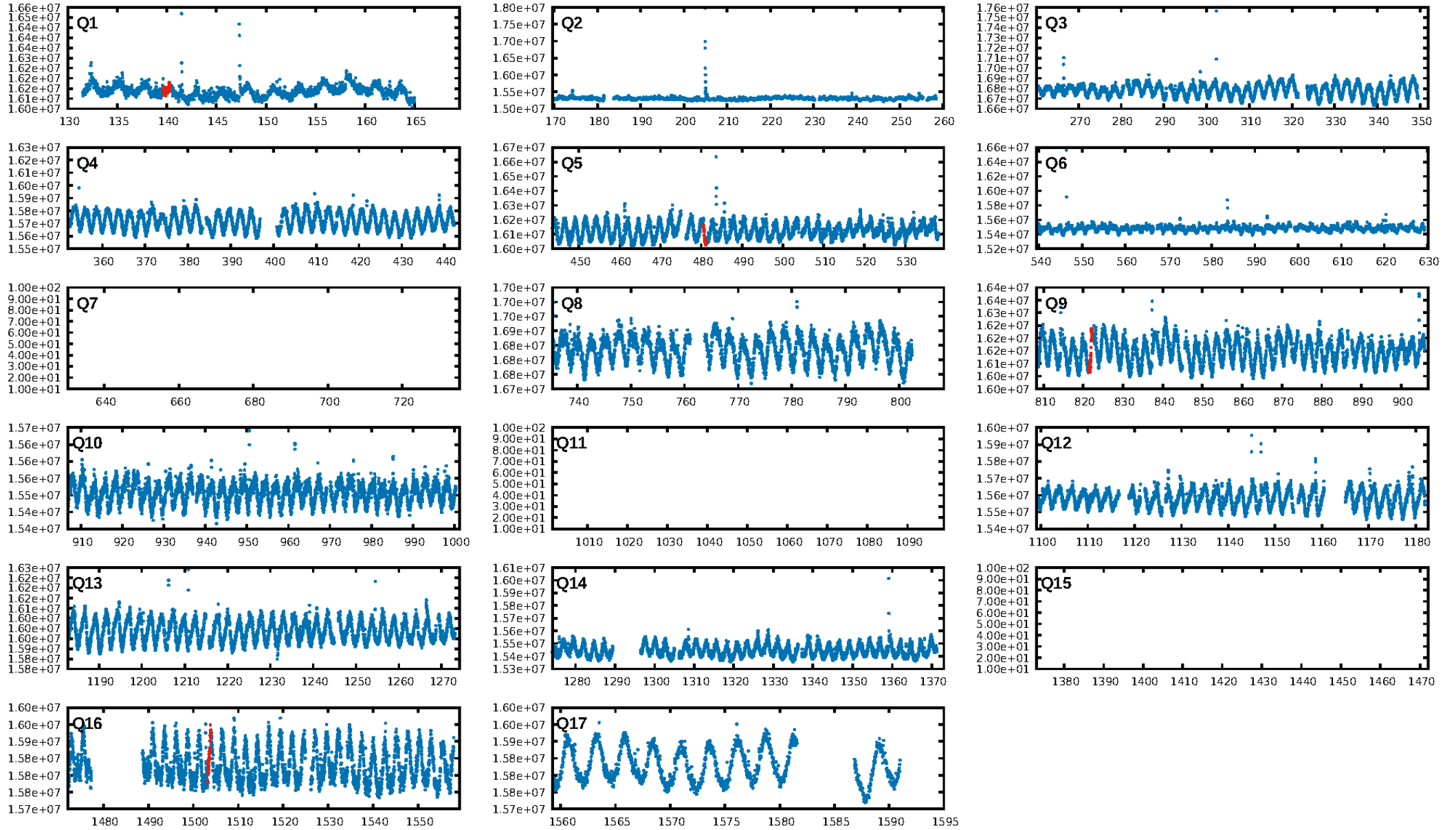
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [911.24 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 38.5%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 5.72e-12**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 16.73  
Centroid-sig: 59.1%  
Centroid-so: 1.079 arcsec [1.06 $\sigma$ ]  
OotOffset-rm: 0.243 arcsec [0.15 $\sigma$ ]  
OotOffset-st: 0/0/1/3 [4]  
KicOffset-rm: 0.654 arcsec [0.39 $\sigma$ ]  
KicOffset-st: 0/0/1/3 [4]  
DiffImageQuality-fgm: 0.50 [2/4]  
DiffImageOverlap-fno: 0.75 [3/4]

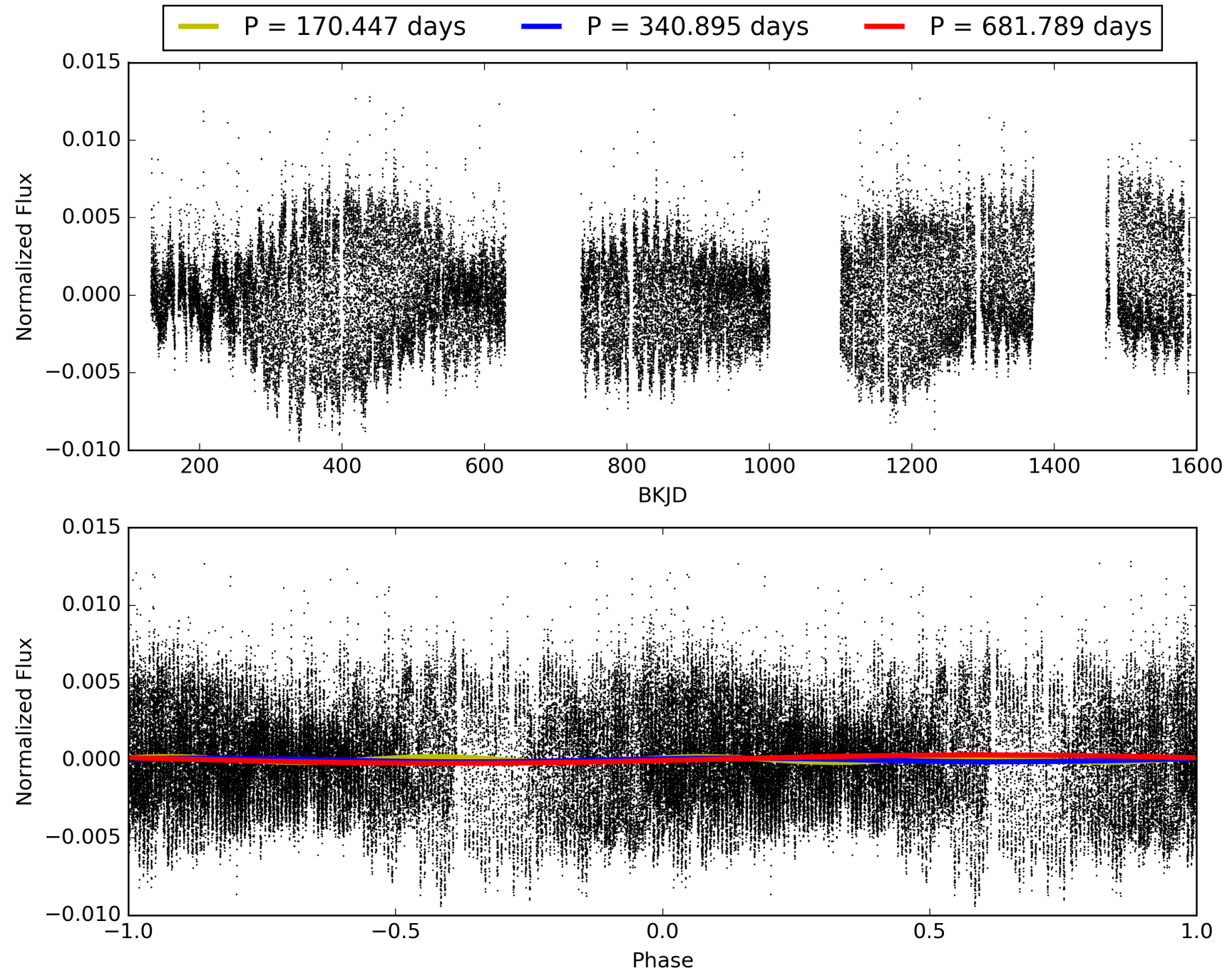
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 17:00:02 Z

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

# TCE 010363074-01, PDC Light Curves

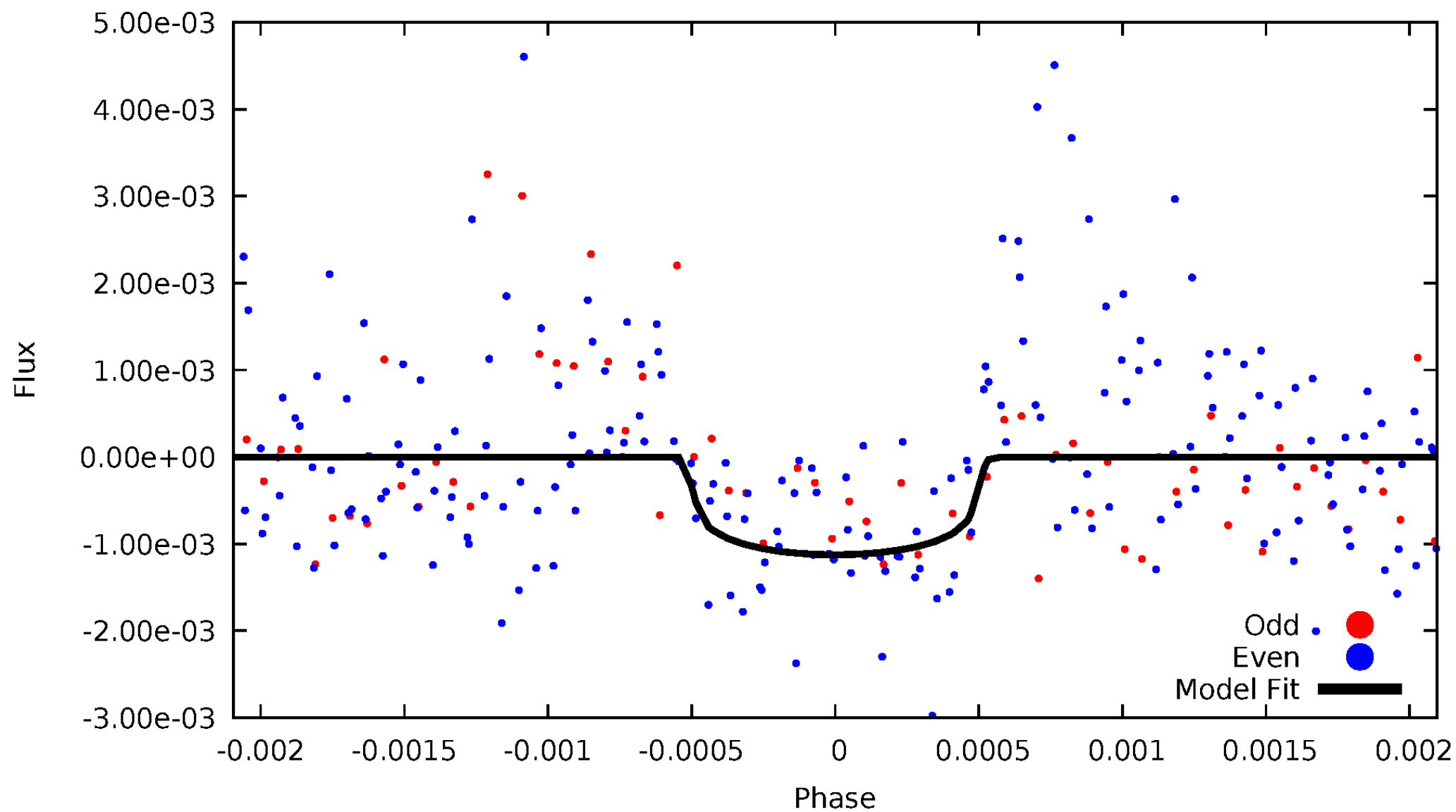


TCE 010363074-01



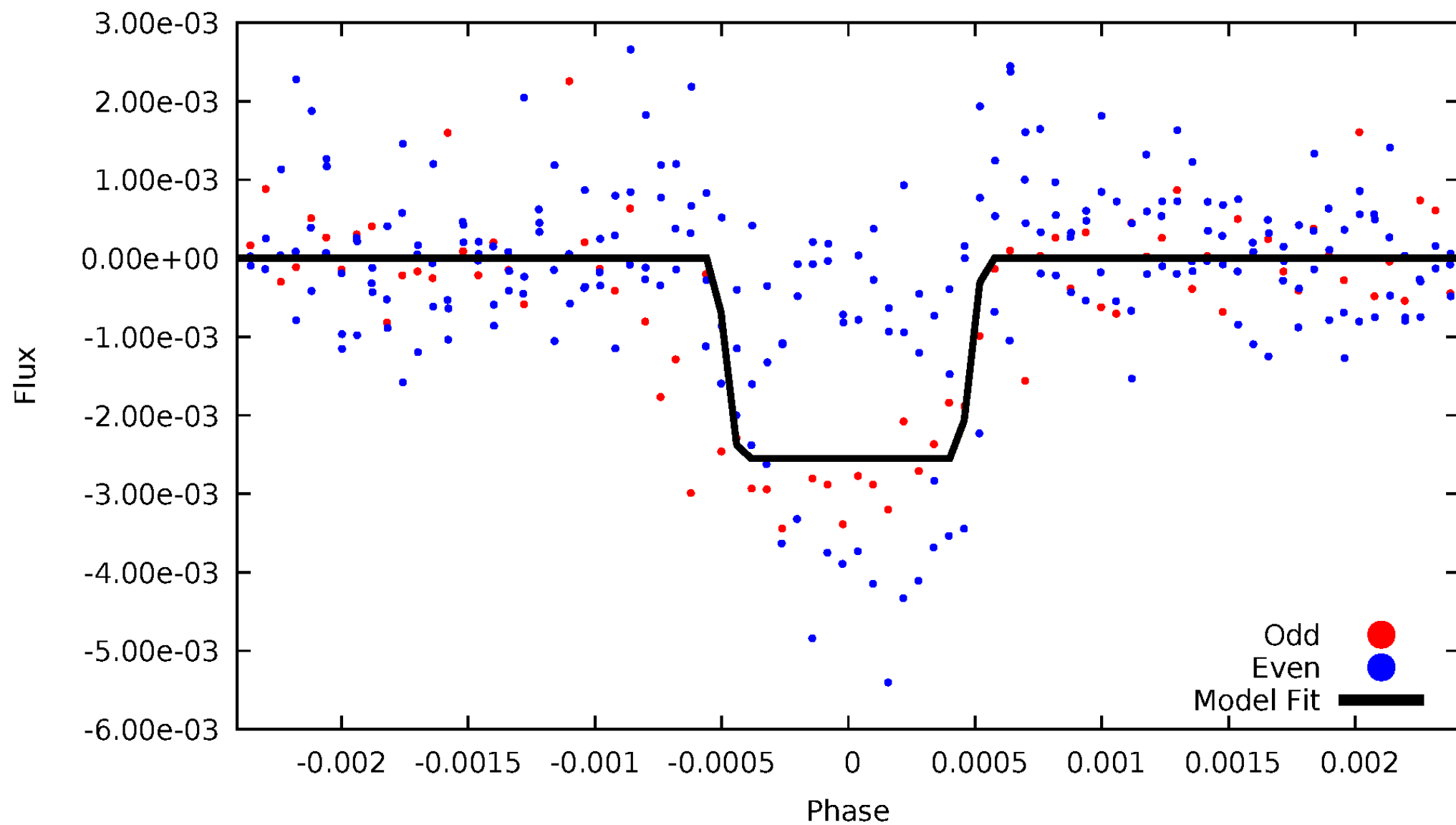
# DV Odd/Even

TCE 010363074-01



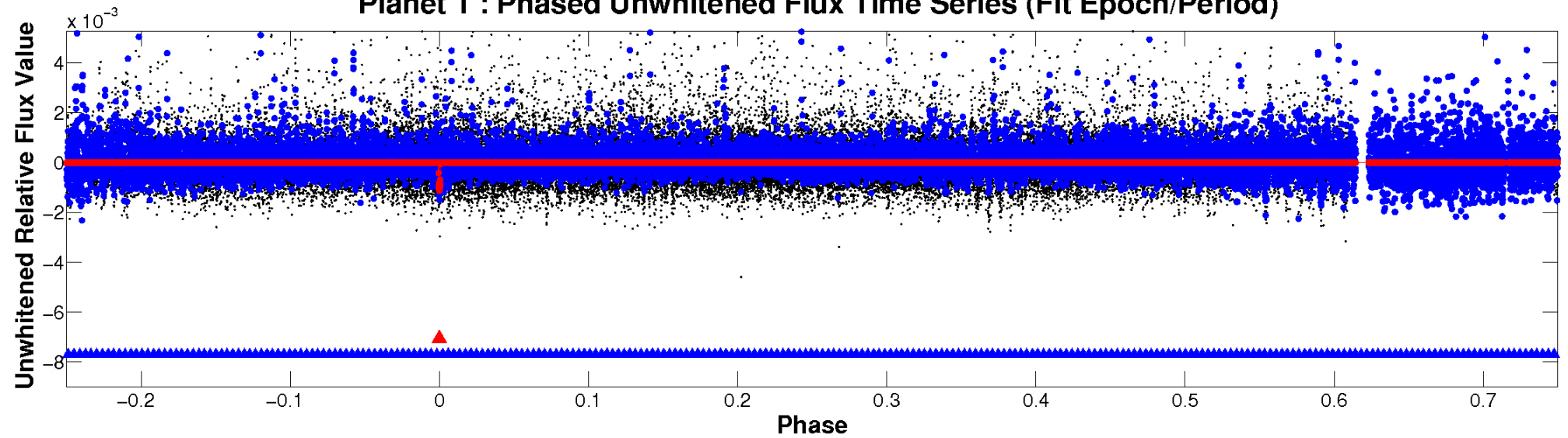
# ALT Odd/Even

TCE 010363074-01

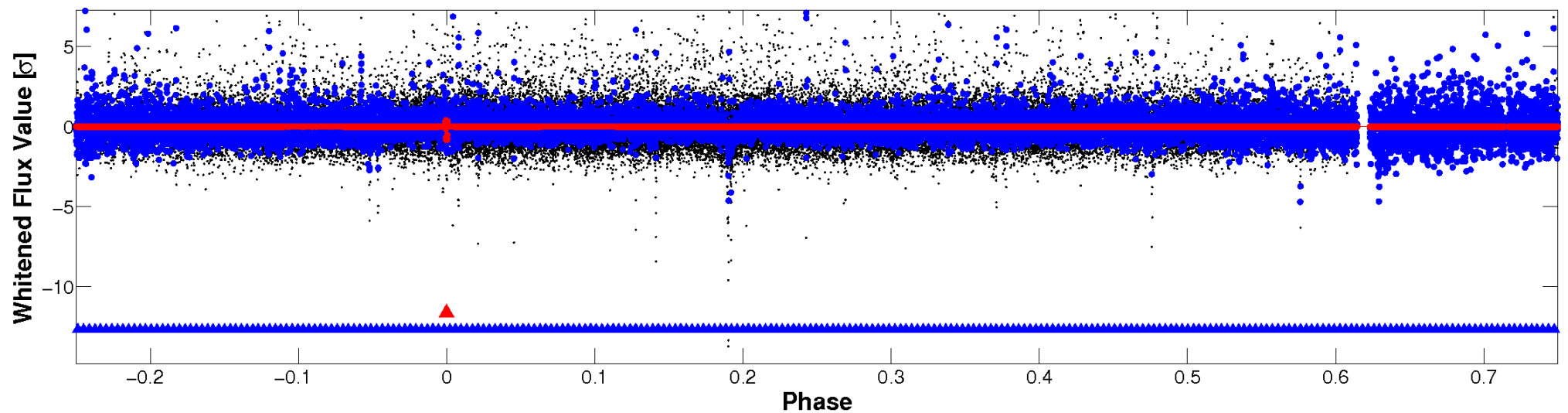


# Non-Whitened Vs. Whitened Light Curve

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

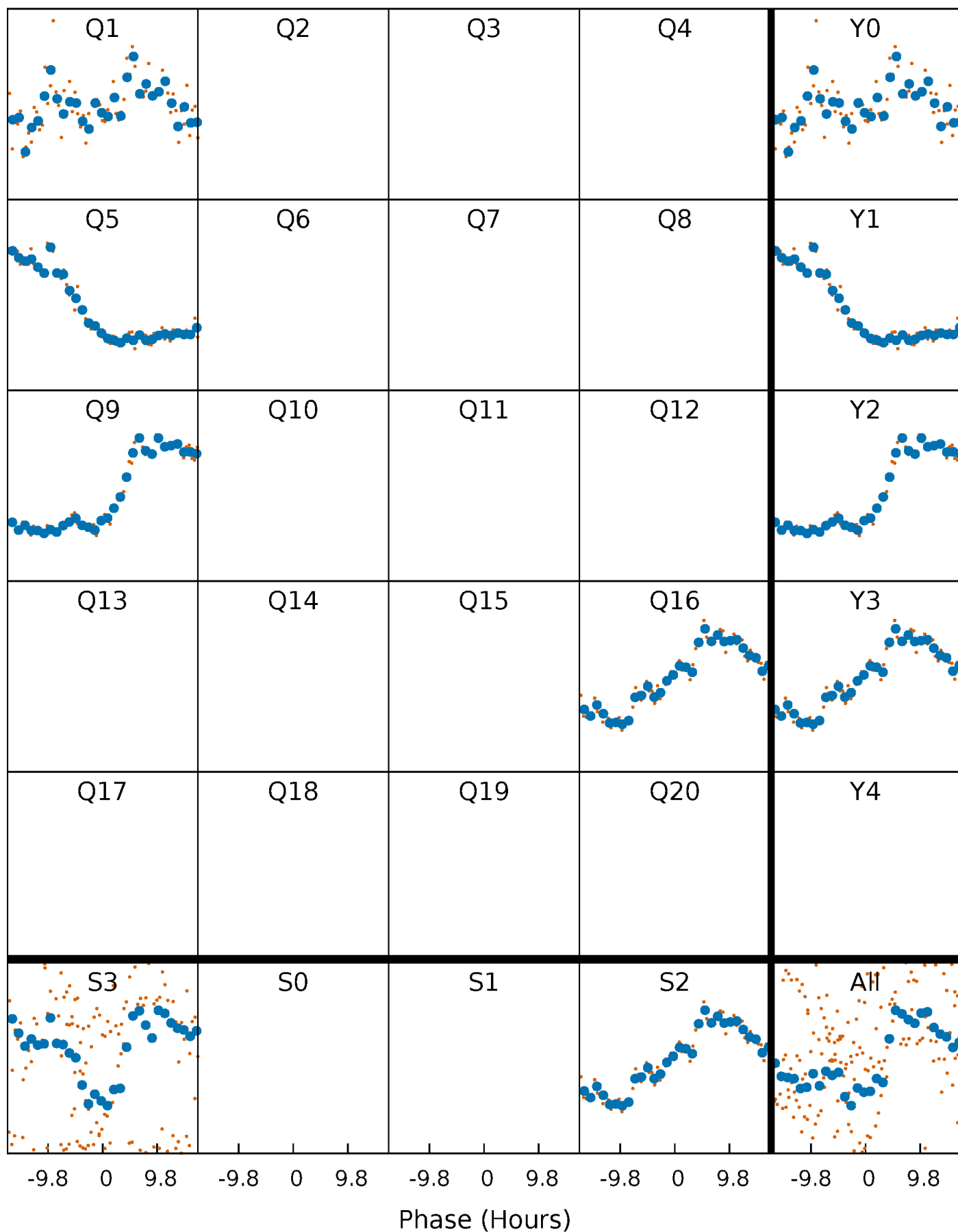


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

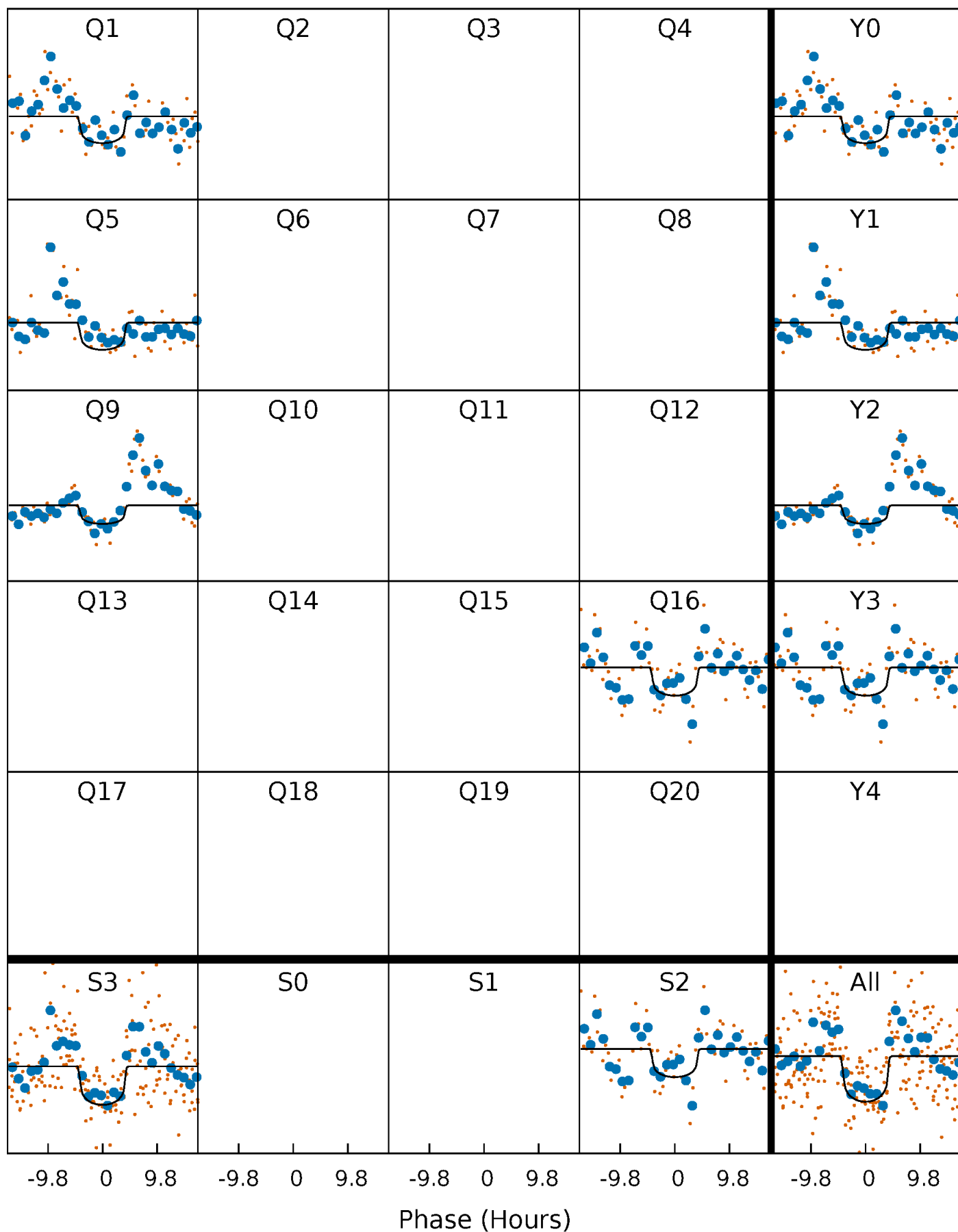
TCE 010363074-01 P=340.894534 Days  $T_0=139.993684$  (BKJD)





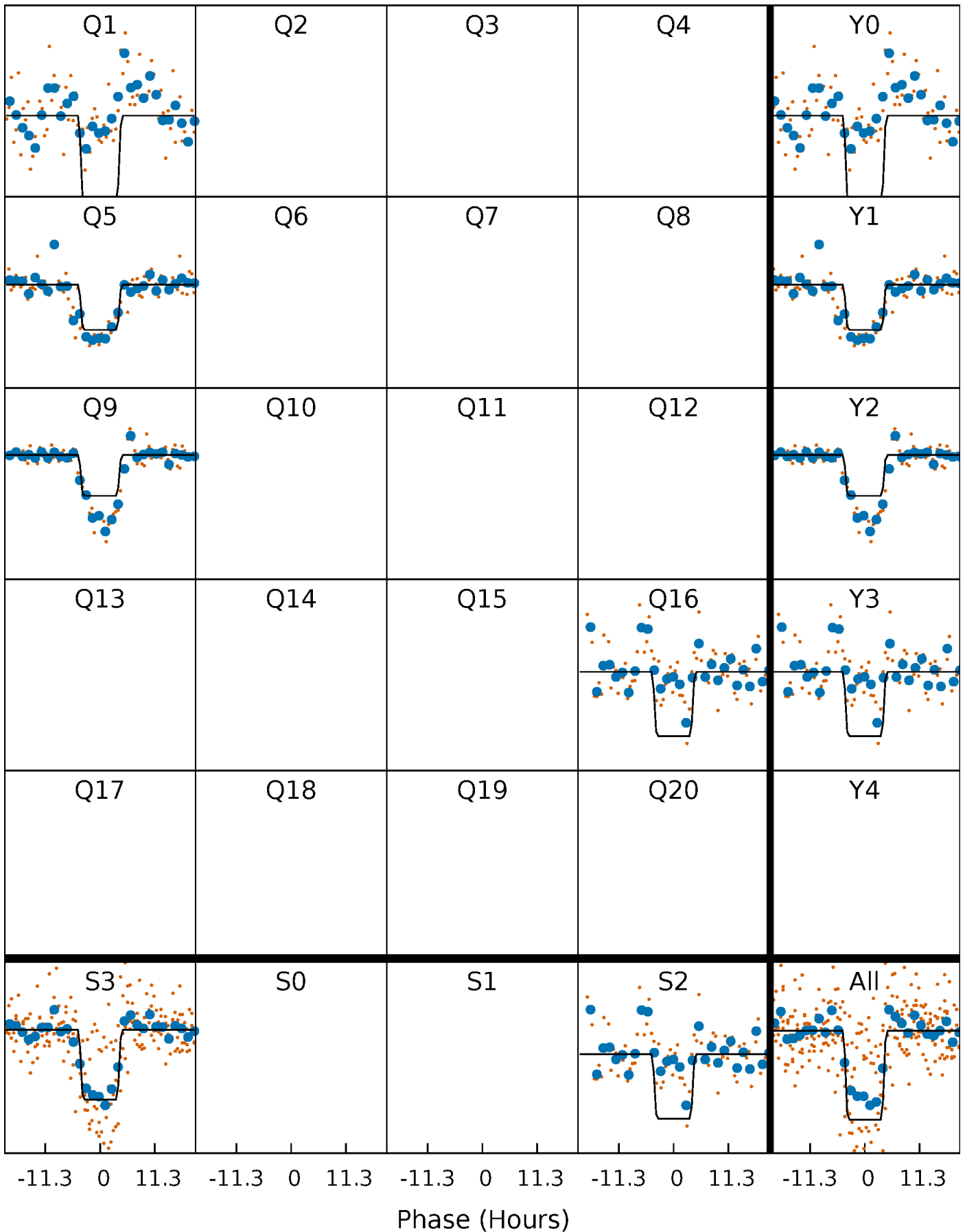
# DV Quarter-Phased Transit Curves

TCE 010363074-01     $P=340.894534$  Days     $T_0=139.993684$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

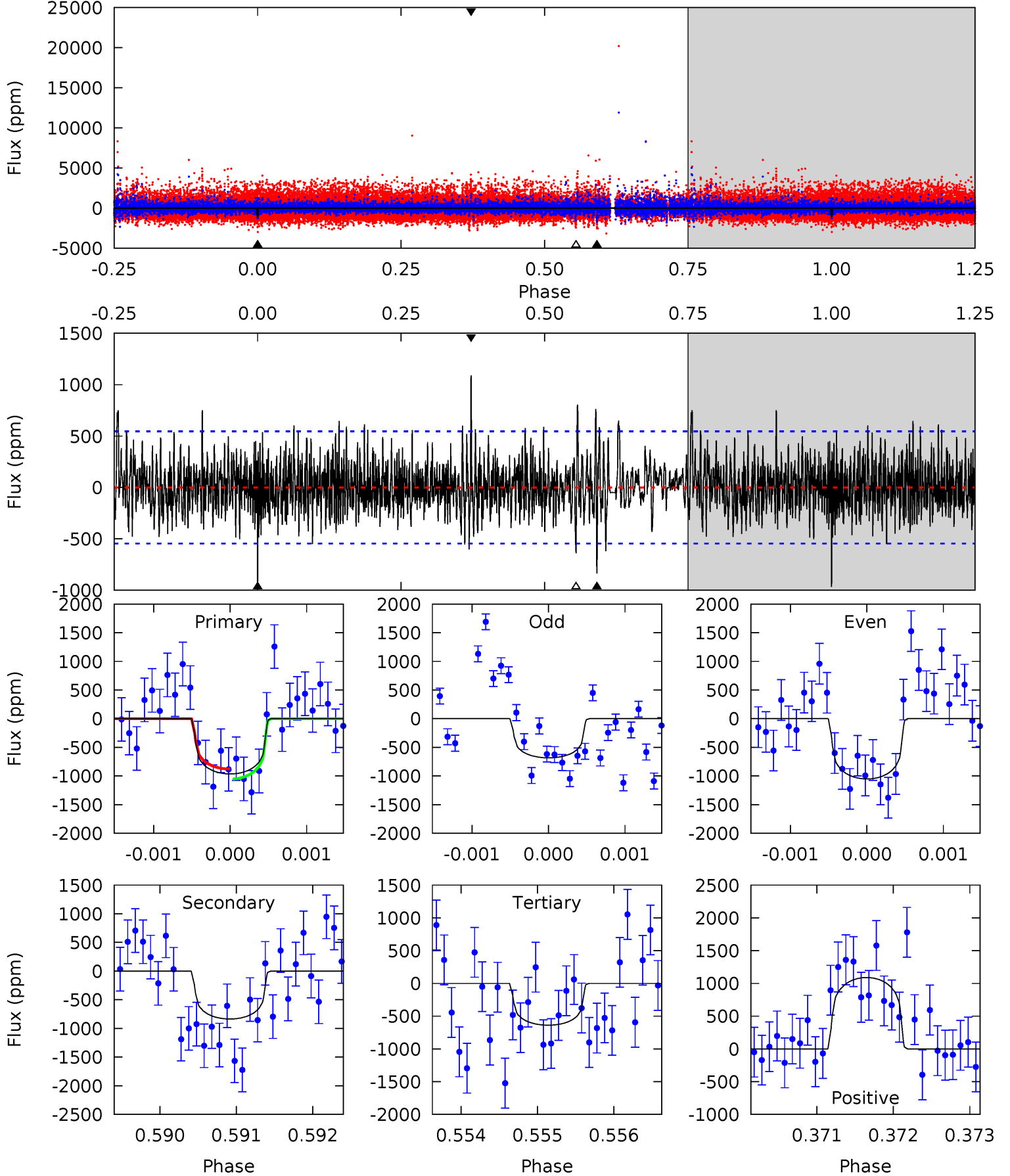
TCE 010363074-01 P=340.893081 Days  $T_0=139.998869$  (BKJD)



# DV Model-Shift Uniqueness Test

010363074-01, P = 340.894534 Days, E = 139.993684 Days

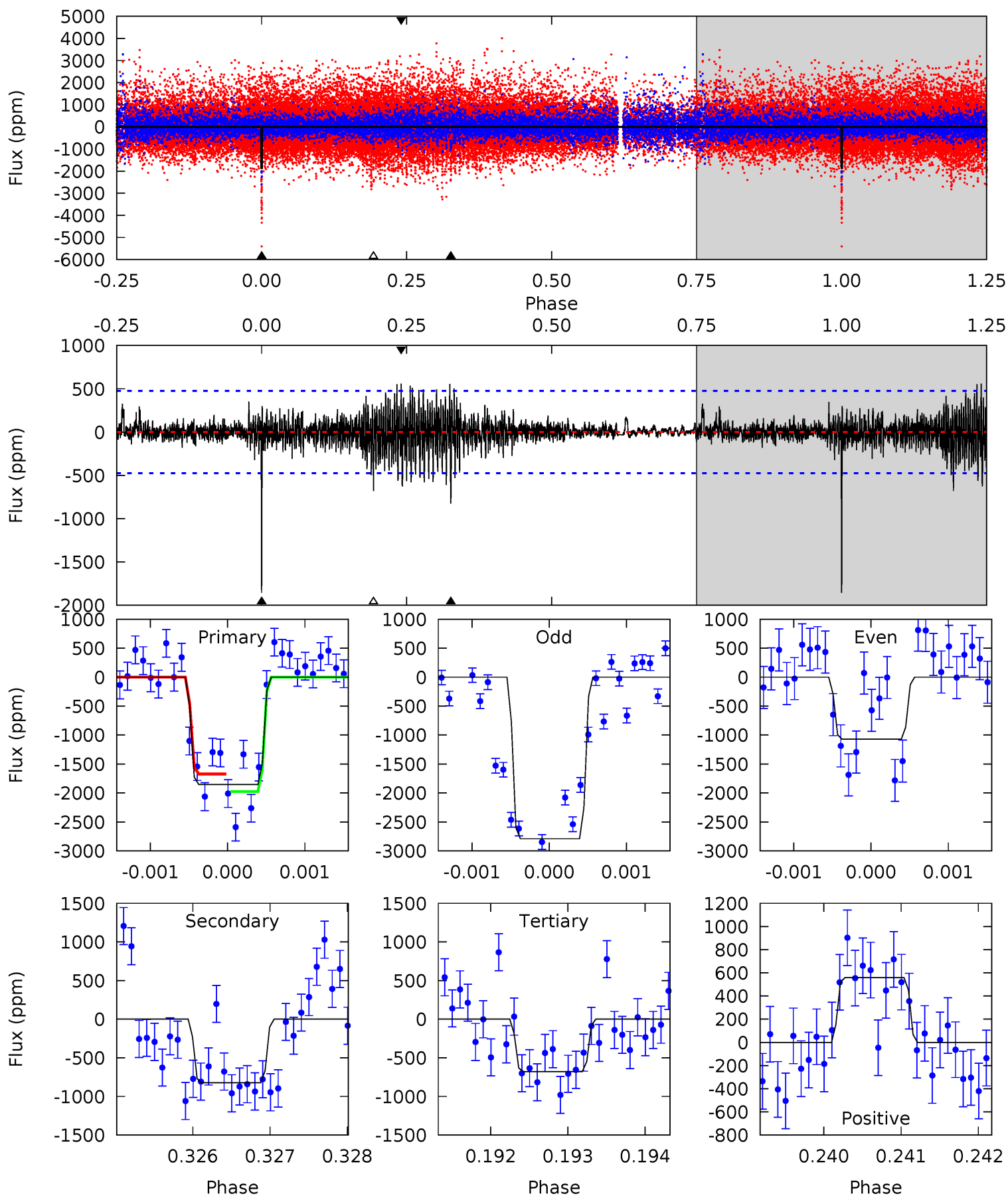
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.62	8.34	6.37	10.9	5.44	3.27	2.01	3.25	-1.25	1.97	-2.53	1.47	0.96	0.53	0.86



# Alt Model-Shift Uniqueness Test

010363074-01, P = 340.893081 Days, E = 139.998869 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
21.3	9.45	7.77	6.39	5.45	3.28	1.59	13.5	14.9	1.68	3.05	8.22	1.10	0.23	1.76



### Stellar Parameters For KIC 010363074

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3563^{+57}_{-64}$	$4.853^{+0.044}_{-0.032}$	$-0.100^{+0.100}_{-0.100}$	$0.398^{+0.036}_{-0.044}$	$0.414^{+0.038}_{-0.047}$	$9.224^{+2.287}_{-1.412}$
	+2%/-2%	+1%/-1%	+100%/-100%	+9%/-11%	+9%/-11%	+25%/-15%
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 010363074-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-836 \pm 100$	$1.40^{+0.88}_{-0.79}$	$164^{+4}_{-4}$	$3435^{+1177}_{-474}$	$120096^{+521537}_{-76855}$
Alt.	$-824 \pm 87$	$2.19^{+0.96}_{-0.90}$	$164^{+4}_{-4}$	$3009^{+505}_{-297}$	$47775^{+91085}_{-24881}$

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

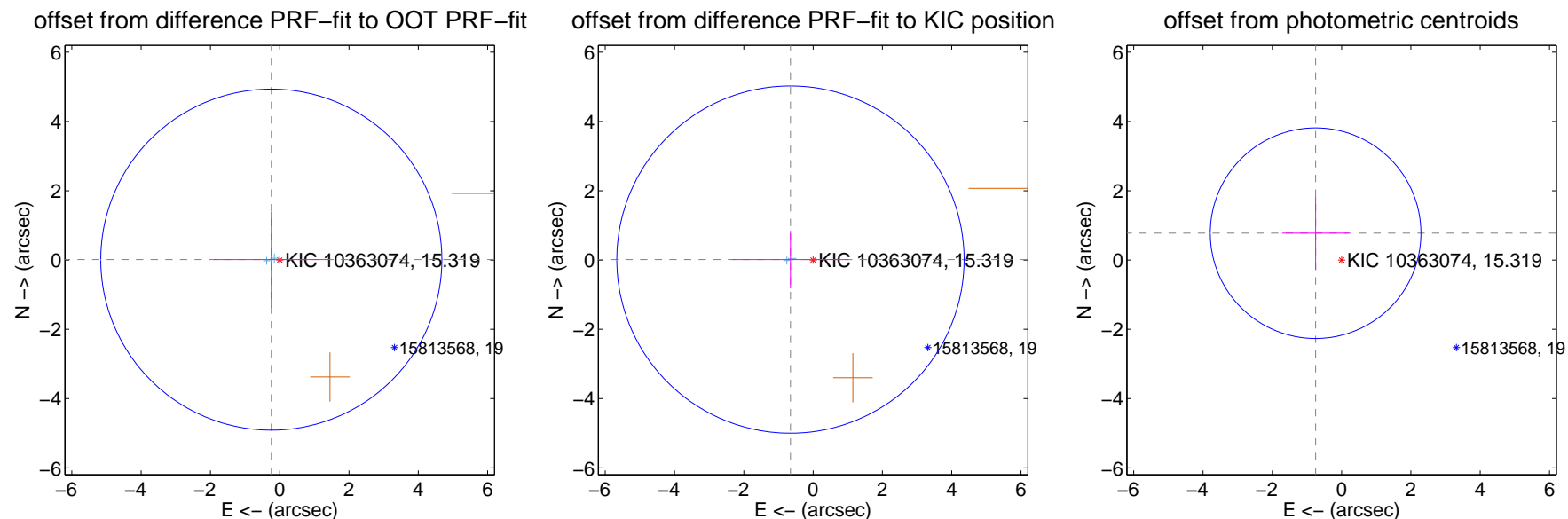
## DV Centroid Data

Supplemental centroid analysis for 010363074-01. Kepler magnitude: 15.32. Transit SNR 6.32

There are 2 quarters with good PRF difference image offsets

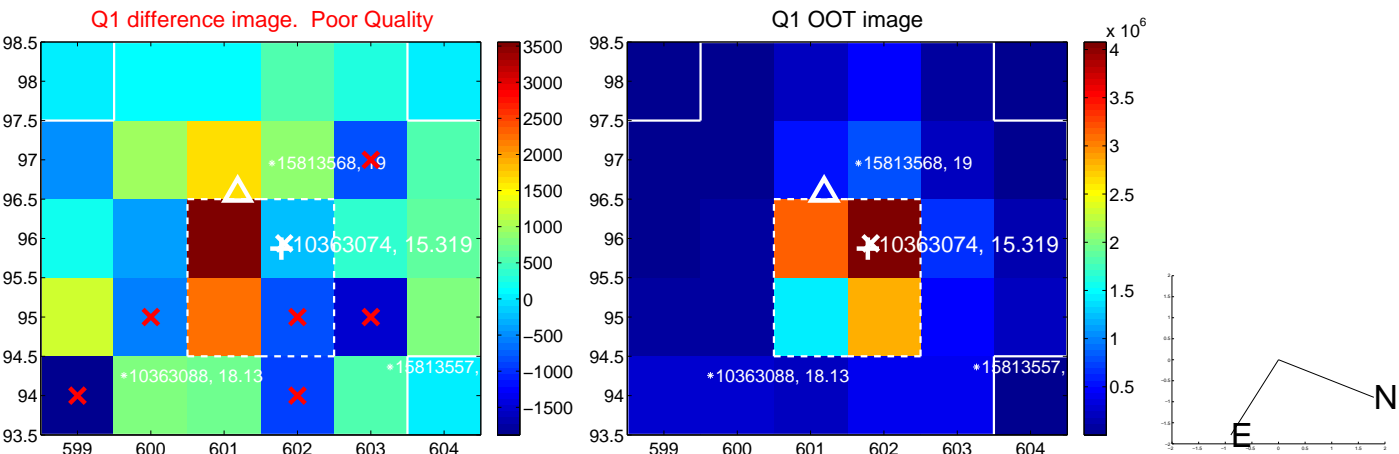
The direct PRF centroid is offset from the target star catalog position by about 0.51 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.243 \pm 1.641$	0.15	$0.243 \pm 1.659$	$0.012 \pm 1.383$
PRF-fit source offset from KIC position	$0.654 \pm 1.671$	0.39	$0.654 \pm 1.684$	$0.013 \pm 0.832$
photometric centroid source offset	$1.08 \pm 1.01$	1.06	$0.75 \pm 0.96$	$0.77 \pm 1.06$

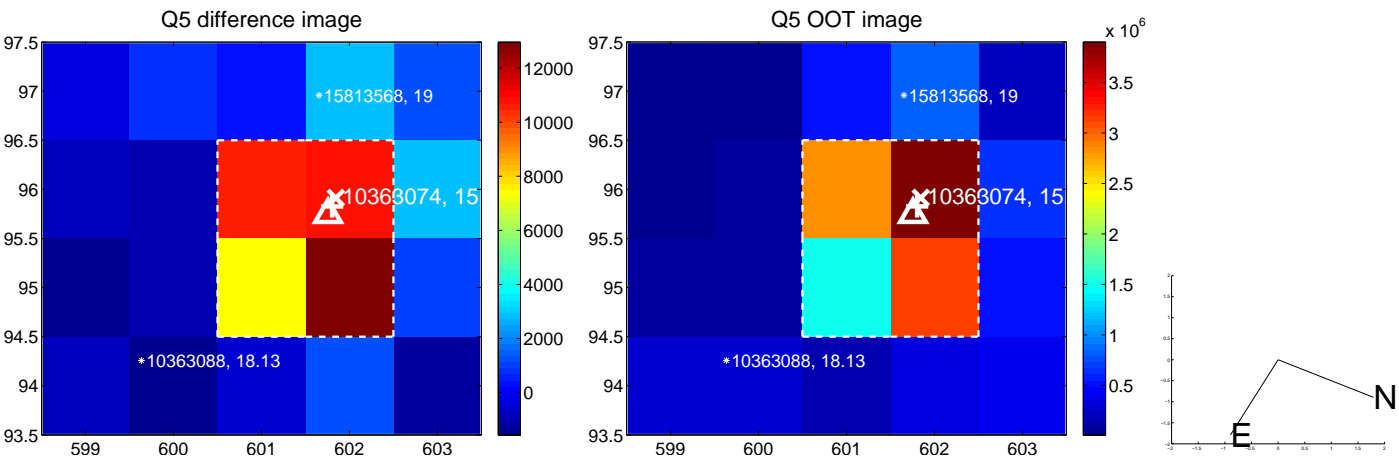


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

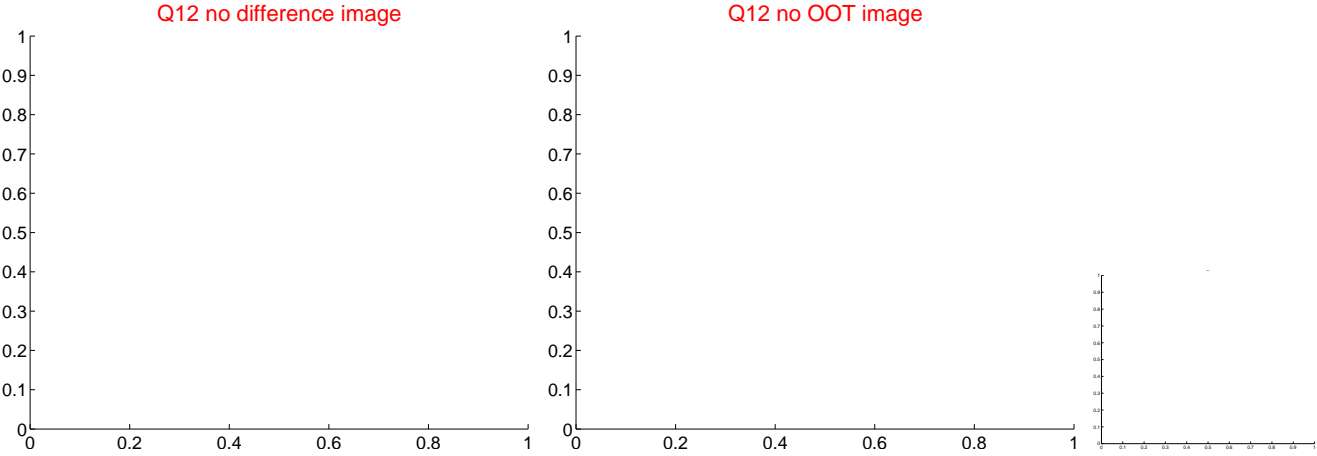
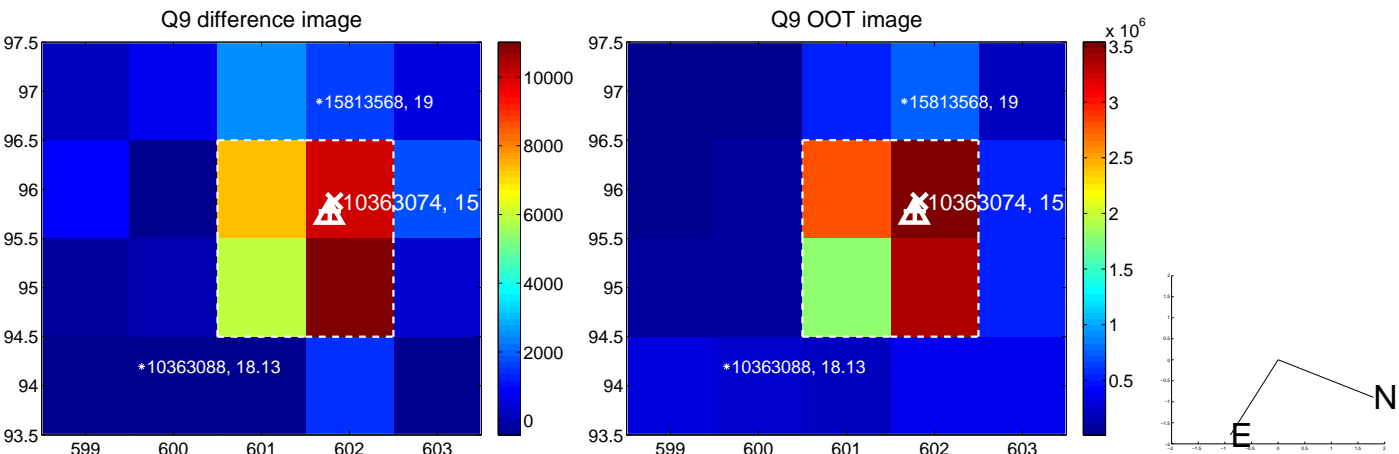


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

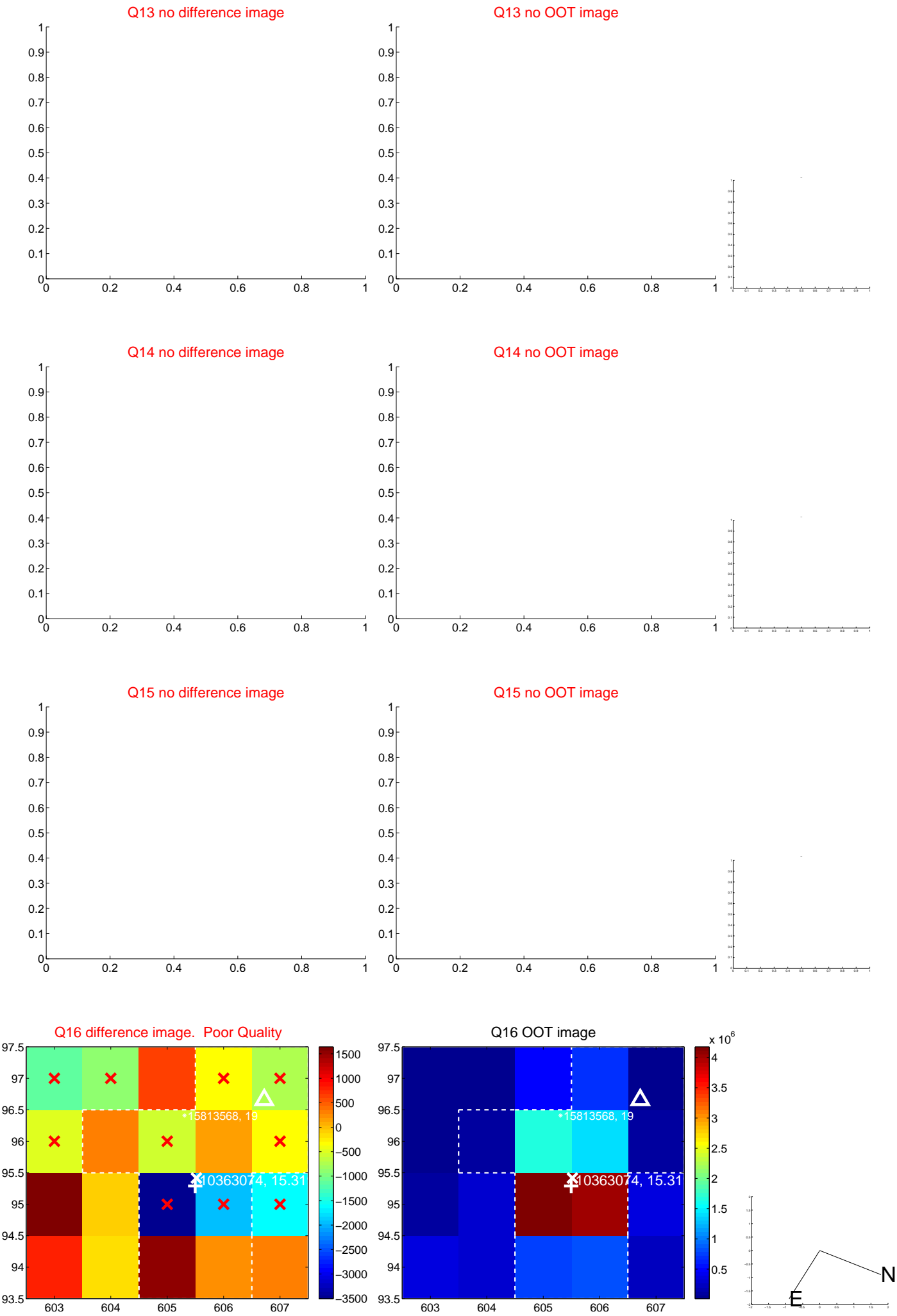




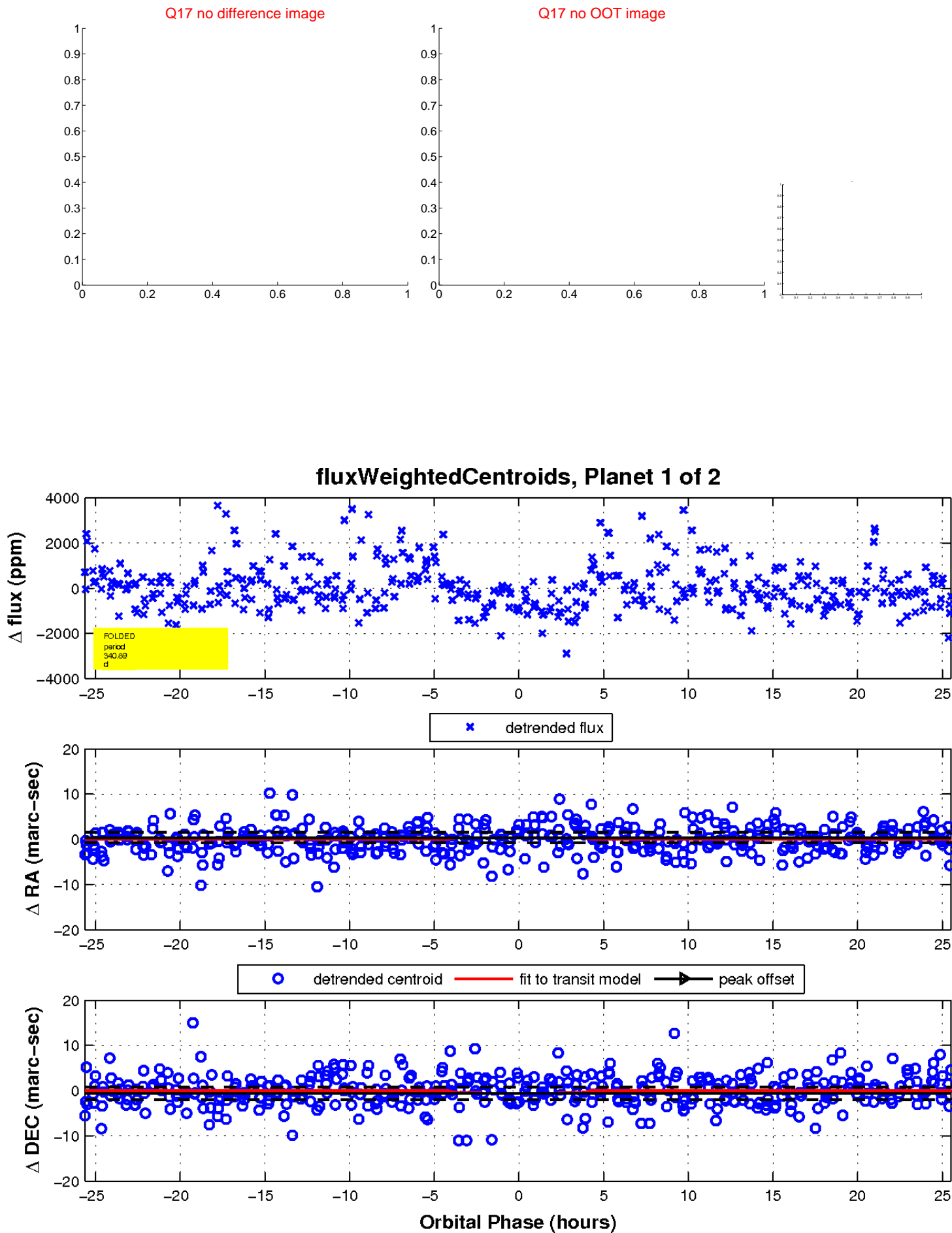
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



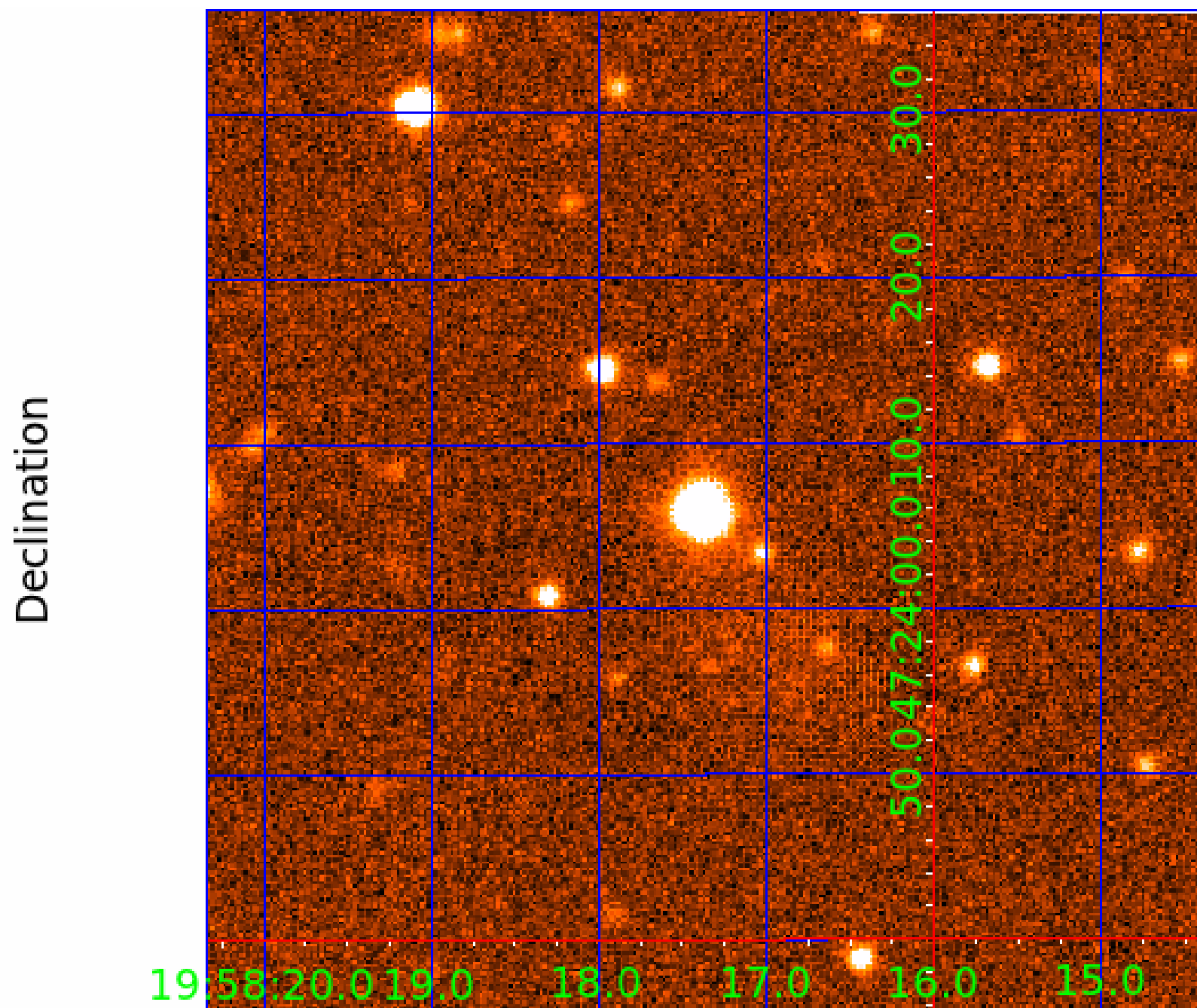
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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



UKIRT Image



# KIC 010363074

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010363074-01	OBS	No	340.894534	139.993684	1125.0	8.567	9.6	6.3	0.40	3563	1.36	0.04
010363074-02	OBS	No	5.185090	131.607978	242.9	2.188	8.4	6.9	0.40	3563	0.72	12.02

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010363074-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_KIC_POS
010363074-02	OBS	FP	0.00	1	0	0	0	LPP_ALT—MOD_NONUNIQ_ALT—CENT_KIC_POS

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

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

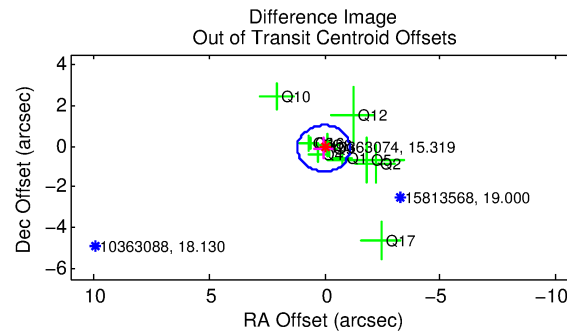
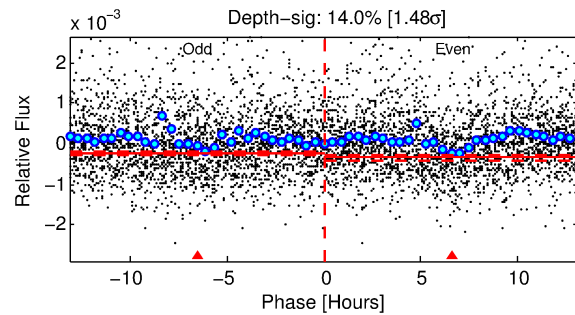
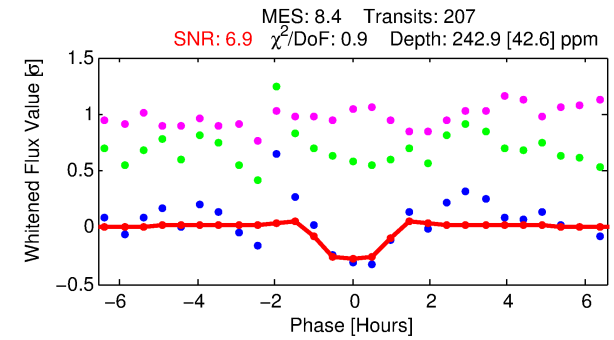
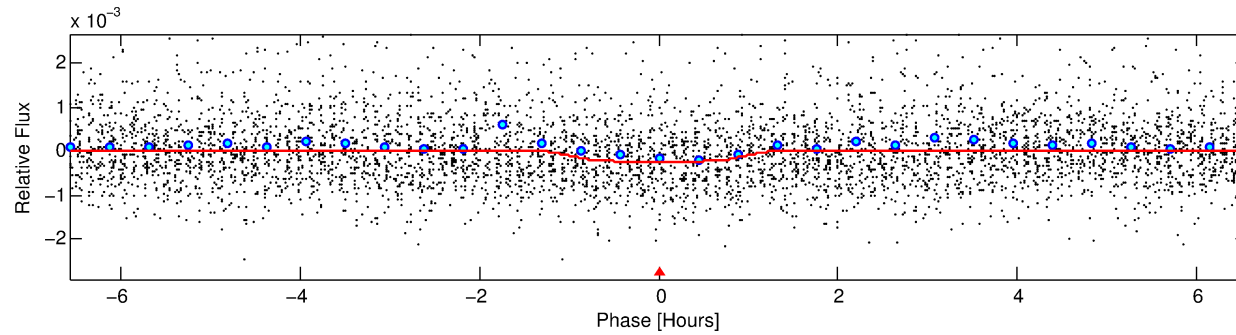
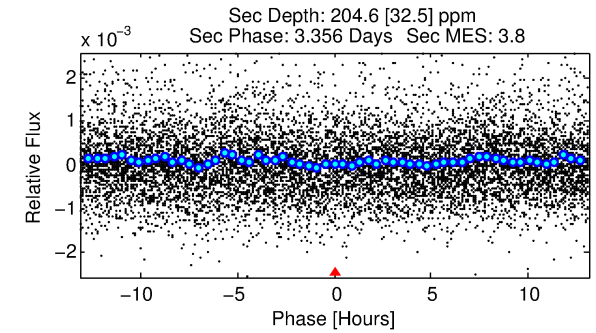
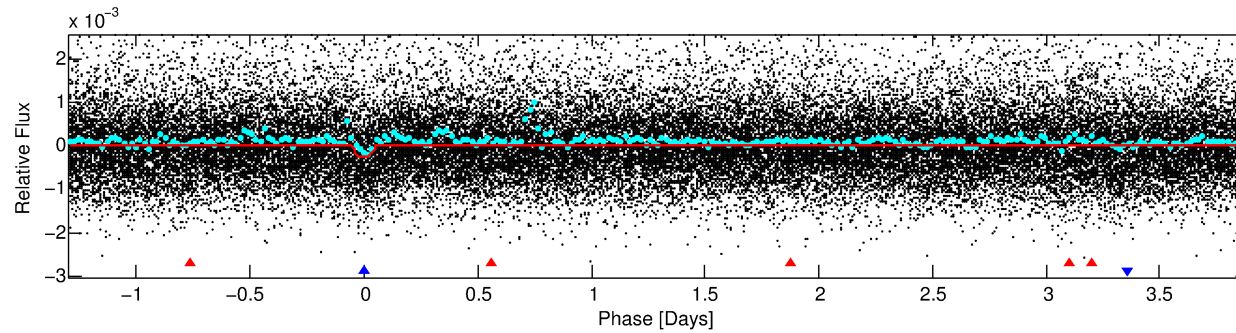
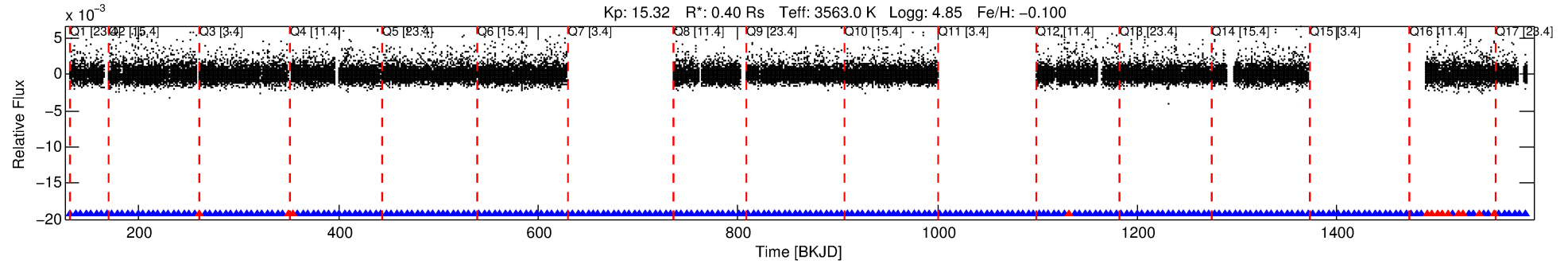
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010363074-02

No Significant Match Found

# DV One-Page Summary

KIC: 10363074 Candidate: 2 of 2 Period: 5.185 d



## DV Fit Results:

Period = 5.18509 [0.00004] d  
Epoch = 131.6080 [0.0054] BKJD  
Rp/R\* = 0.0167 [0.0175]  
a/R\* = 9.34 [42.66]  
b = 0.88 [1.22]  
Seff = 12.02 [1.48]  
Teq = 475 [15] K  
Rp = 0.72 [0.77] Re  
a = 0.0436 [0.0035] AU  
Ag = 408.82 [864.09] [0.47σ]  
Teffp = 3301 [1743] K [1.62σ]

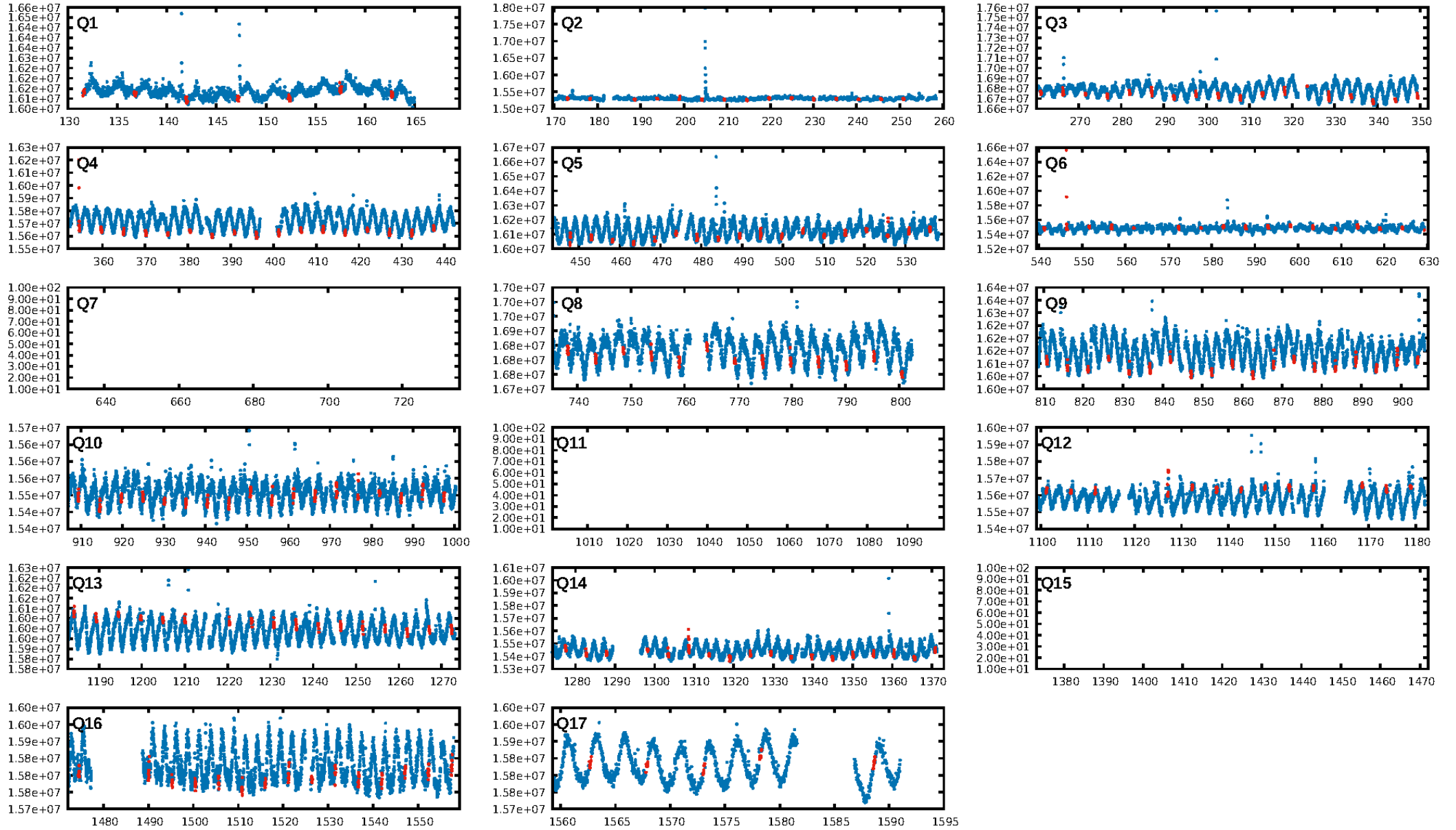
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [911.24σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGoF-sig: N/A  
**Bootstrap-pfa: 3.01e-12**  
RollingBand-fgt: 0.93 [182/195]  
GhostDiagnostic-chr: 1.183  
Centroid-sig: 11.7%  
Centroid-so: 1.357 arcsec [0.87σ]  
OotOffset-rm: 0.114 arcsec [0.30σ]  
KicOffset-rm: 0.434 arcsec [1.22σ]  
OotOffset-st: 2/1/4/4 [11]  
KicOffset-st: 2/1/4/4 [11]  
DiffImageQuality-fgm: 0.64 [7/11]  
DiffImageOverlap-fno: 1.00 [14/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 17:00:07 Z

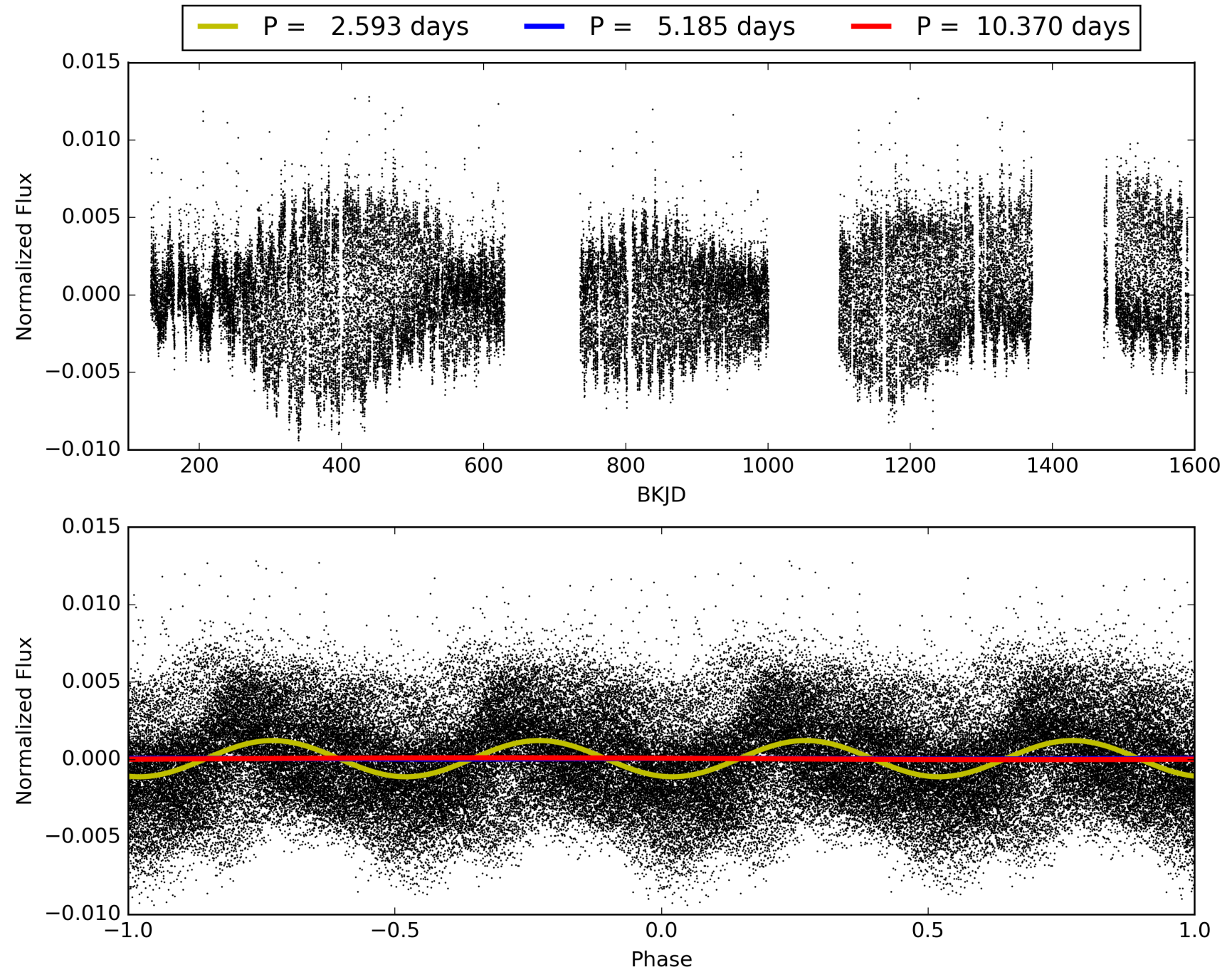
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010363074-02, PDC Light Curves





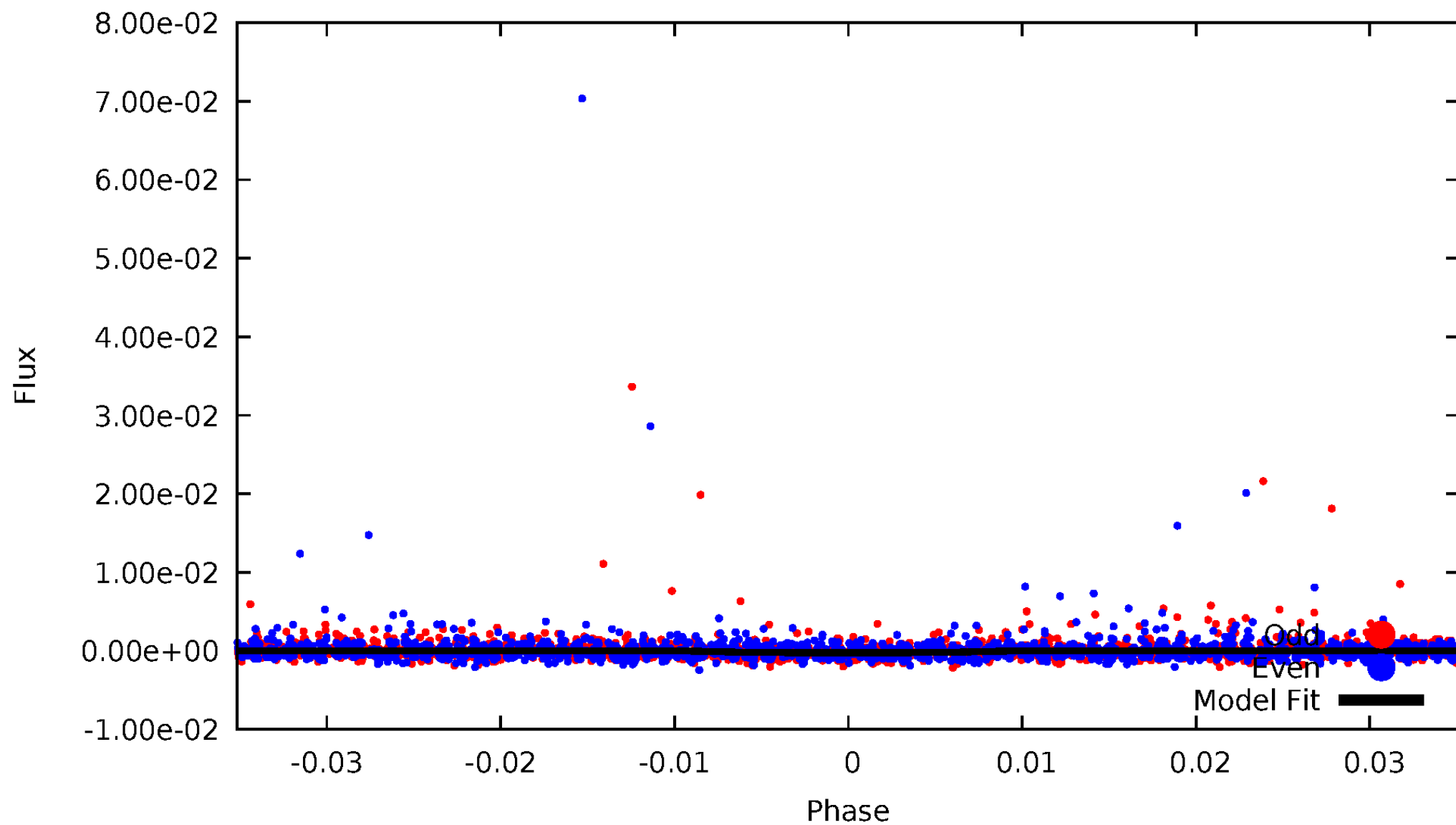
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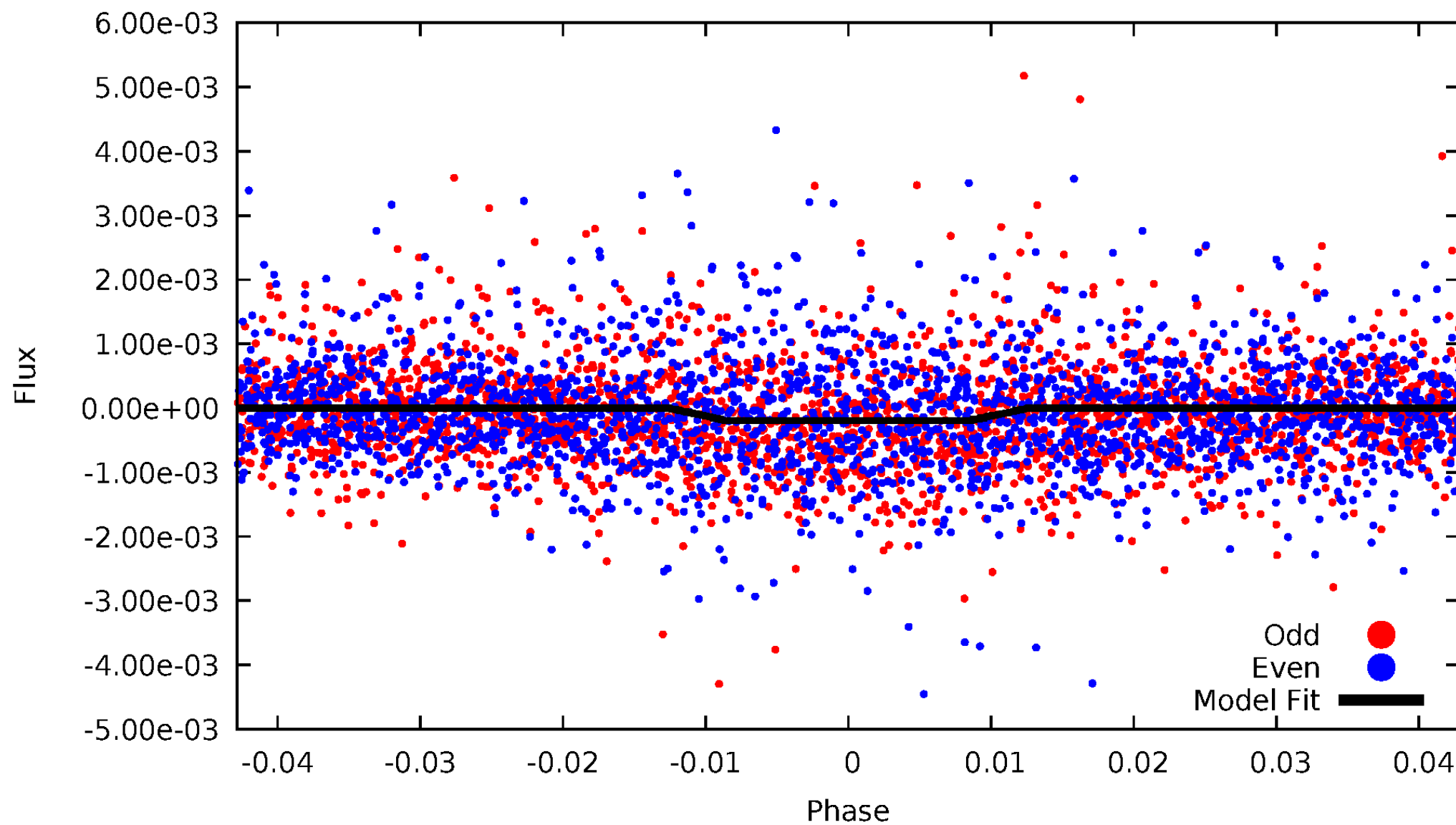
# DV Odd/Even

TCE 010363074-02



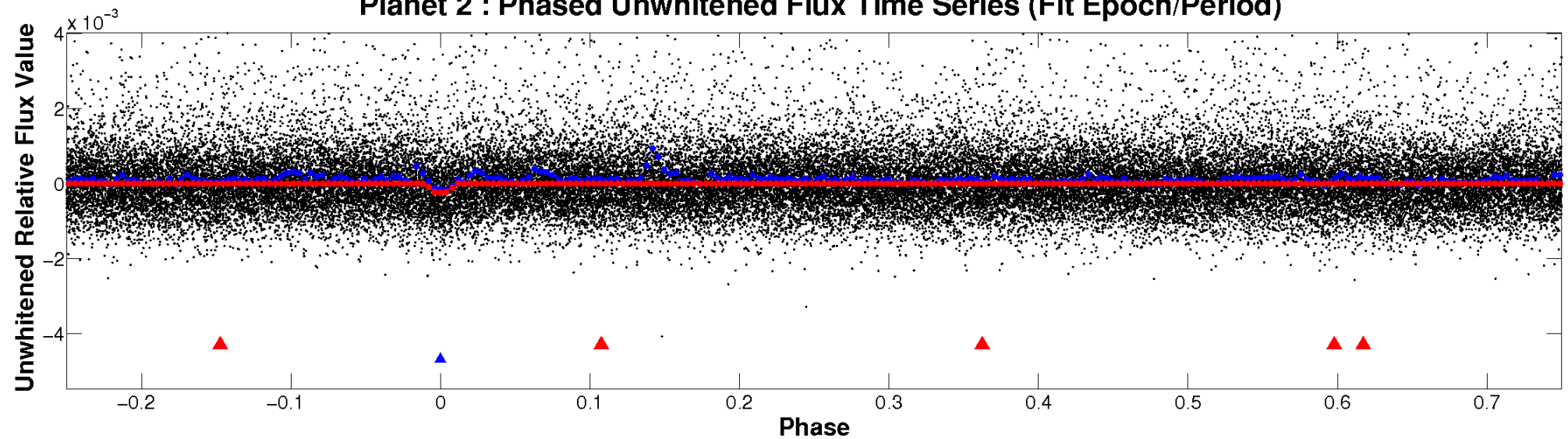
# ALT Odd/Even

TCE 010363074-02

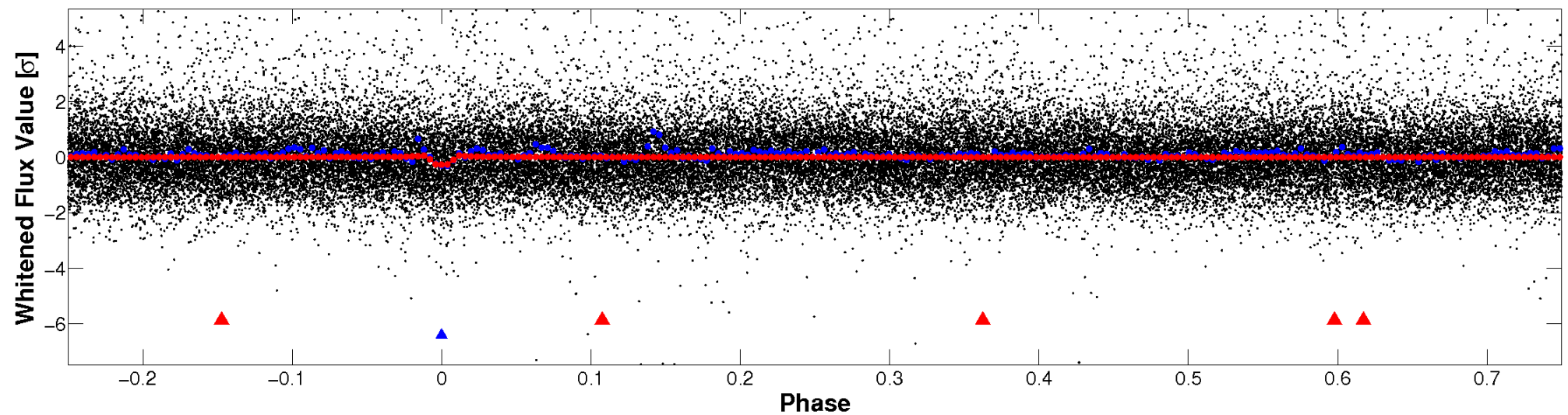


# Non-Whitened Vs. Whitened Light Curve

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

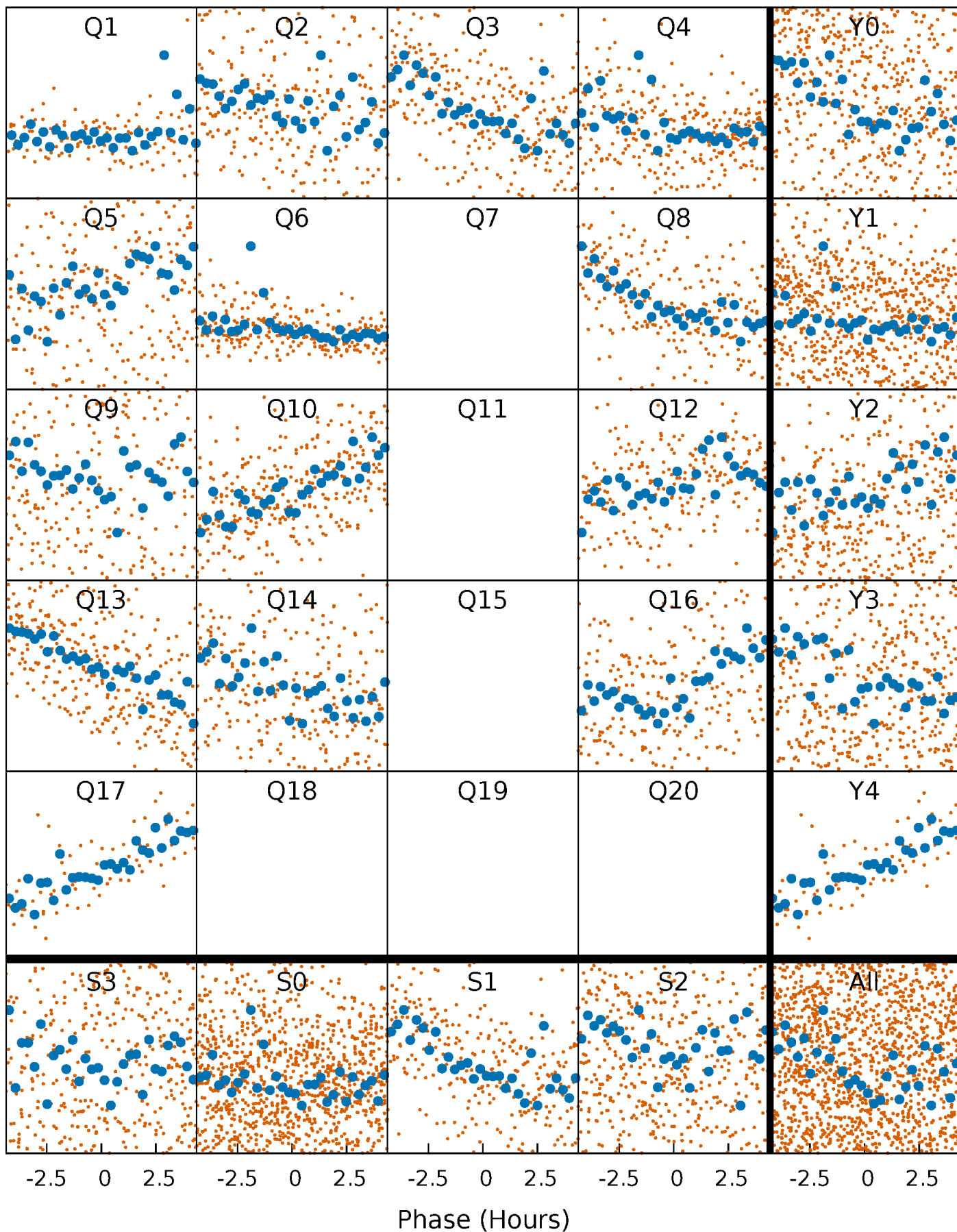


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



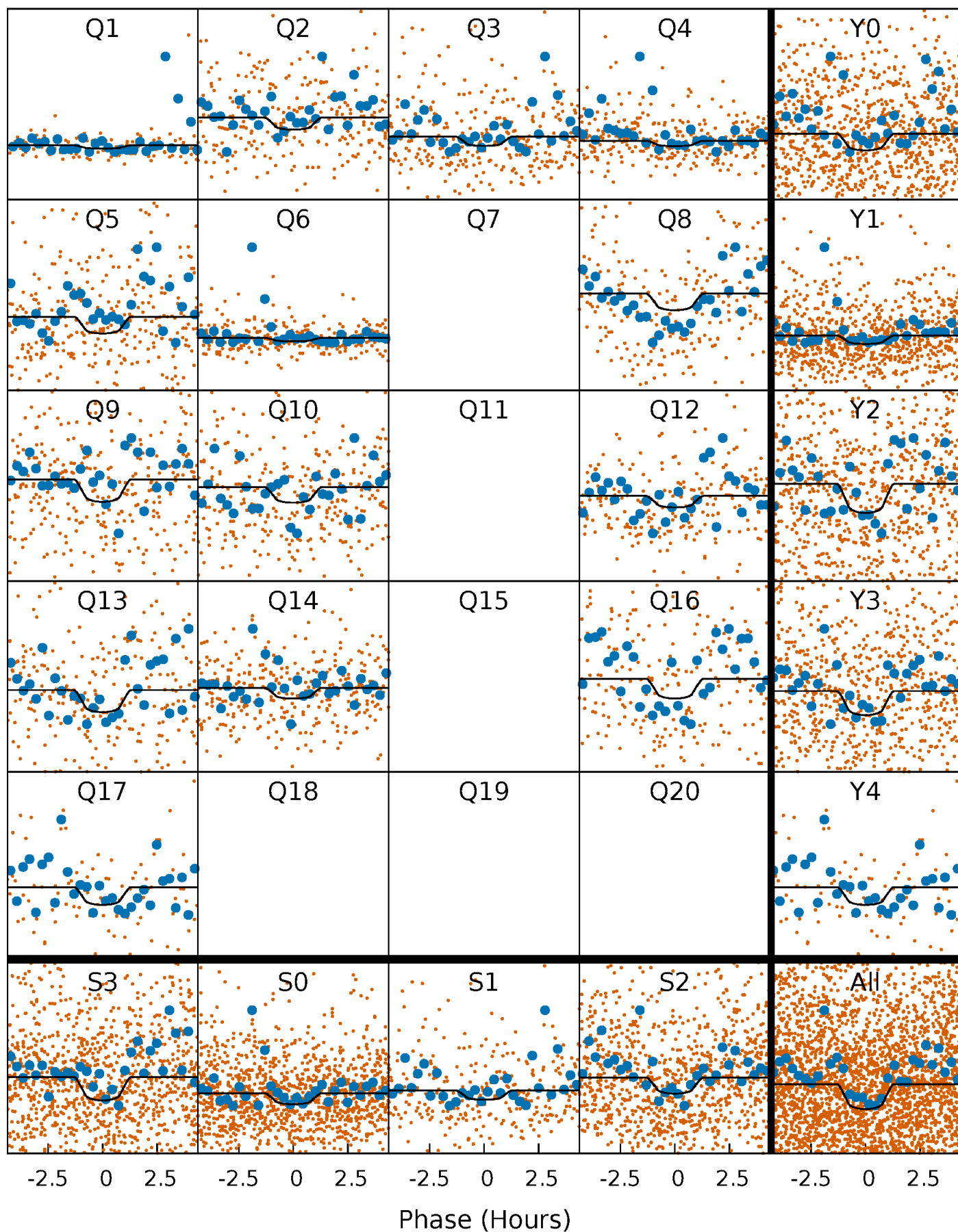
# PDC Quarter-Phased Transit Curves

TCE 010363074-02   P= 5.185090 Days    $T_0=131.607978$  (BKJD)



# DV Quarter-Phased Transit Curves

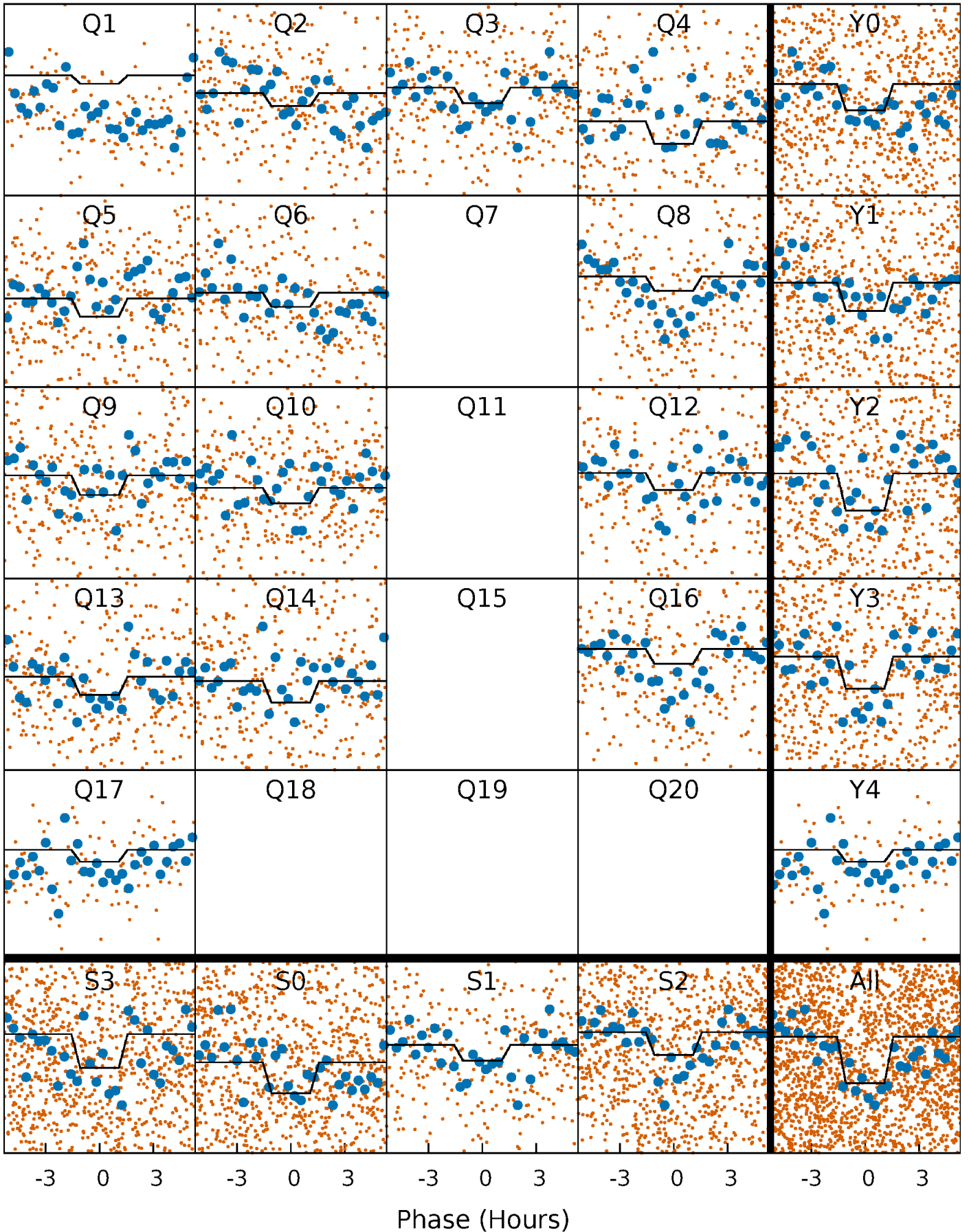
TCE 010363074-02 P= 5.185090 Days  $T_0=131.607978$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

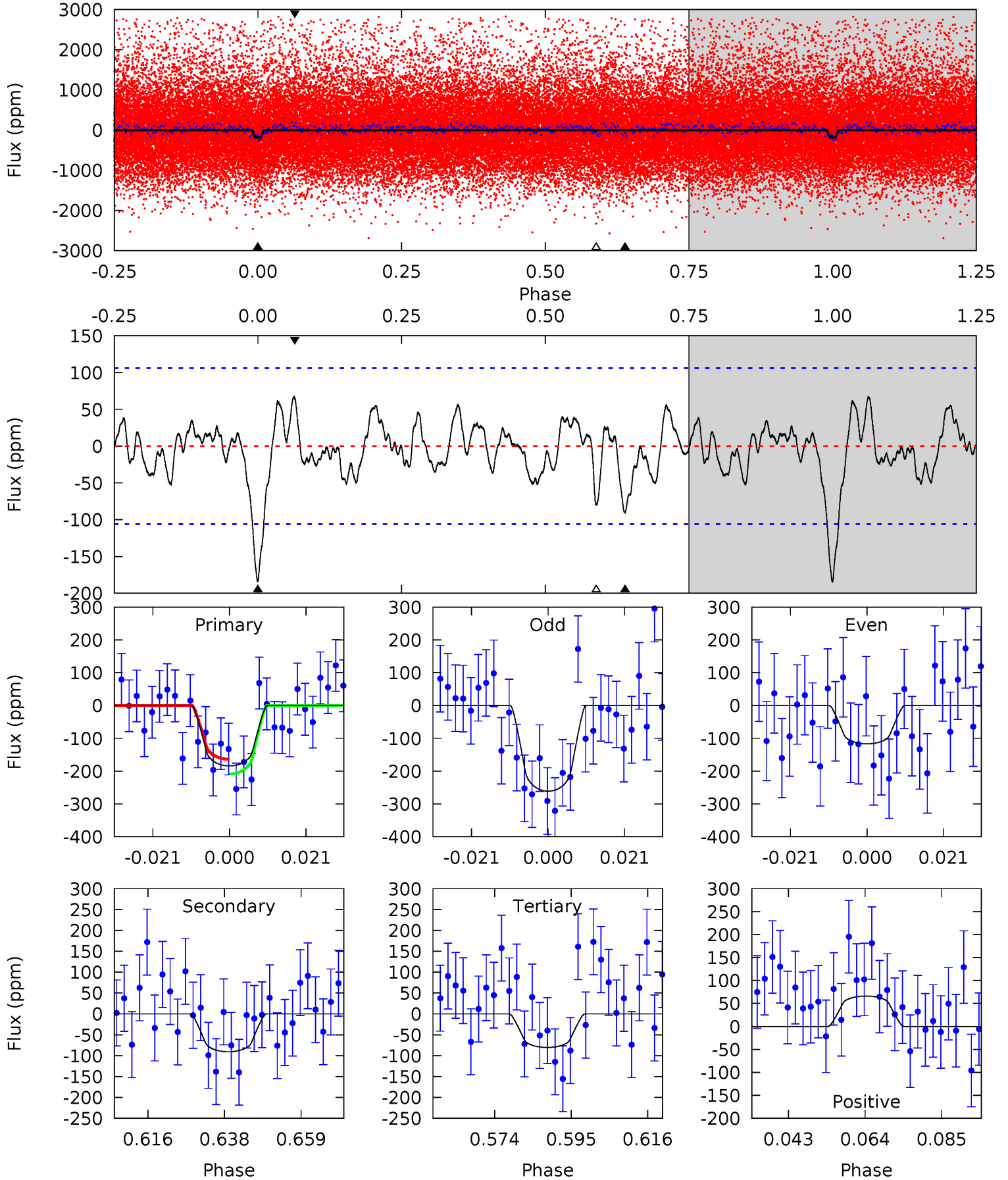
TCE 010363074-02   P= 5.185064 Days    $T_0=131.597712$  (BKJD)



# DV Model-Shift Uniqueness Test

010363074-02, P = 5.185090 Days, E = 126.422888 Days

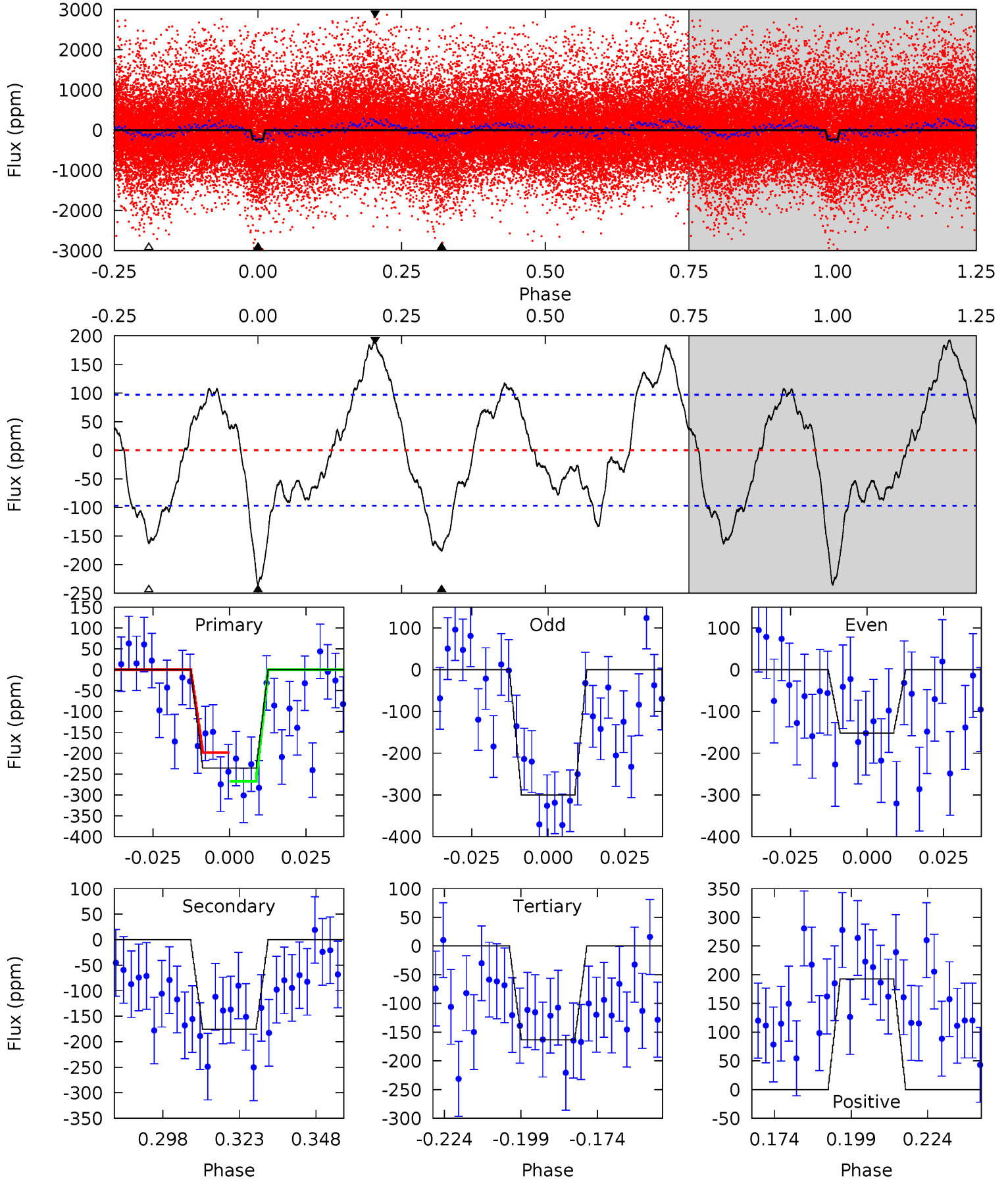
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.48	4.17	3.70	3.04	4.88	2.30	1.26	4.78	5.44	0.47	1.13	3.35	0.59	0.27	1.04



# Alt Model-Shift Uniqueness Test

010363074-02, P = 5.185064 Days, E = 126.412648 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
11.8	8.80	8.18	9.66	4.85	2.24	4.33	3.62	2.13	0.62	-0.86	3.73	0.89	0.45	1.72





### Stellar Parameters For KIC 010363074

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3563^{+57}_{-64}$	$4.853^{+0.044}_{-0.032}$	$-0.100^{+0.100}_{-0.100}$	$0.398^{+0.036}_{-0.044}$	$0.414^{+0.038}_{-0.047}$	$9.224^{+2.287}_{-1.412}$
	+2%/-2%	+1%/-1%	+100%/-100%	+9%/-11%	+9%/-11%	+25%/-15%
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 010363074-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-91 \pm 22$	$0.86^{+0.72}_{-0.55}$	$662^{+16}_{-16}$	$2843^{+1150}_{-383}$	$124^{+964}_{-85}$
Alt.	$-176 \pm 20$	$0.79^{+0.67}_{-0.50}$	$662^{+14}_{-17}$	$3228^{+1330}_{-512}$	$294^{+1964}_{-208}$

$T_{\text{max}}$  = 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

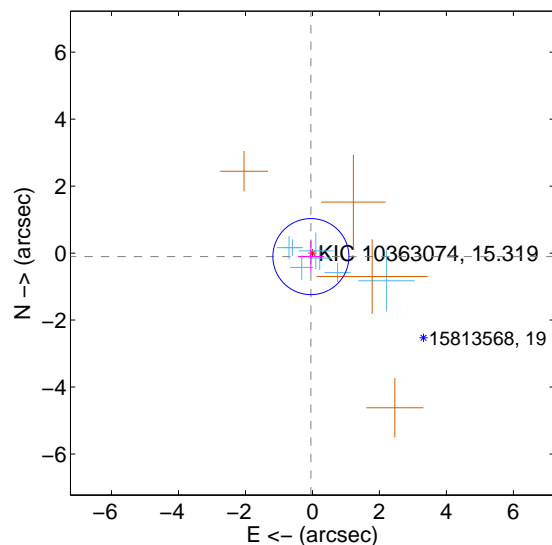
Supplemental centroid analysis for 010363074-02. Kepler magnitude: 15.32. Transit SNR 6.90

There are 7 quarters with good PRF difference image offsets

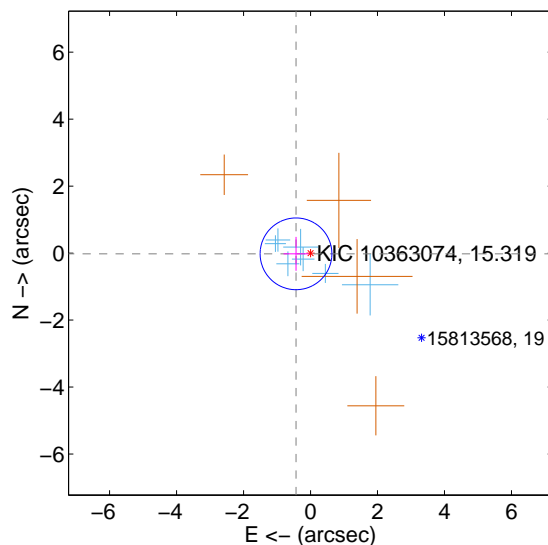
The direct PRF centroid is offset from the target star catalog position by about 0.52 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.114 \pm 0.378$	0.30	$0.046 \pm 0.384$	$-0.105 \pm 0.480$
PRF-fit source offset from KIC position	$0.434 \pm 0.357$	1.22	$0.434 \pm 0.373$	$-0.022 \pm 0.506$
photometric centroid source offset	$1.36 \pm 1.55$	0.87	$0.28 \pm 1.30$	$-1.33 \pm 1.56$

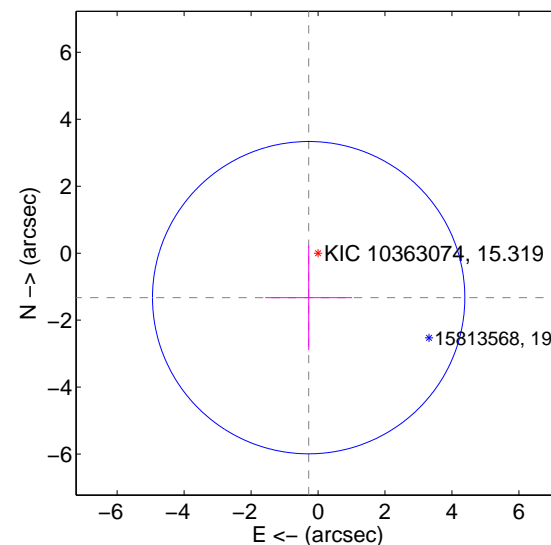
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

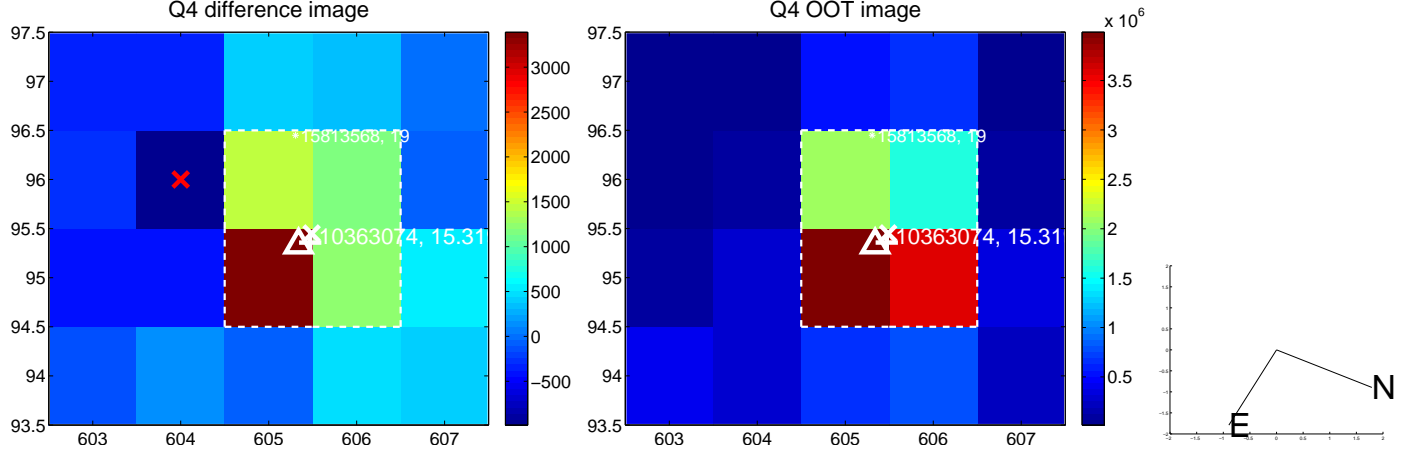
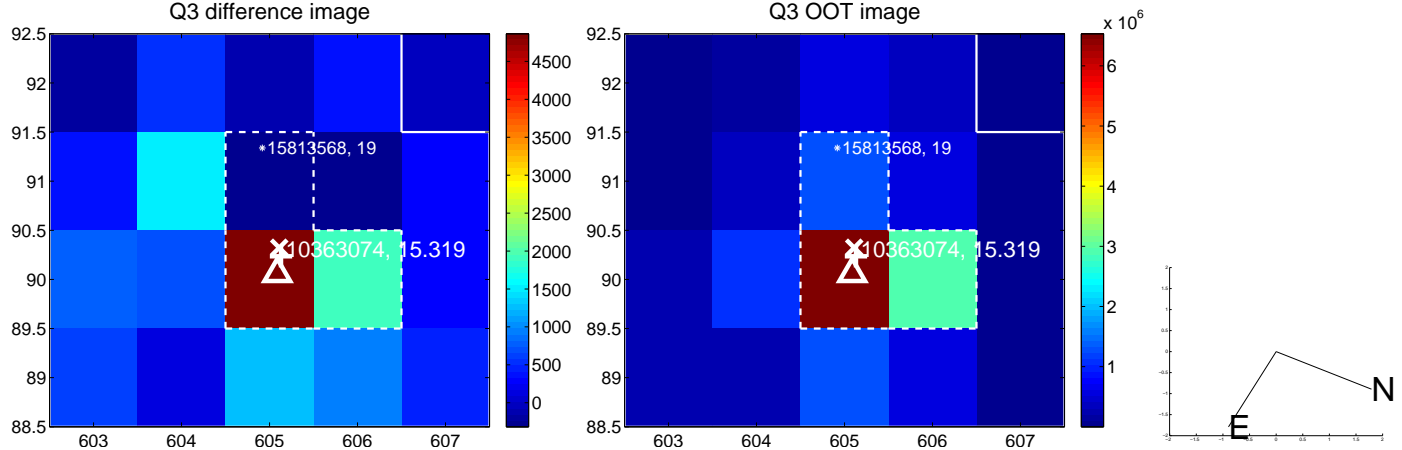
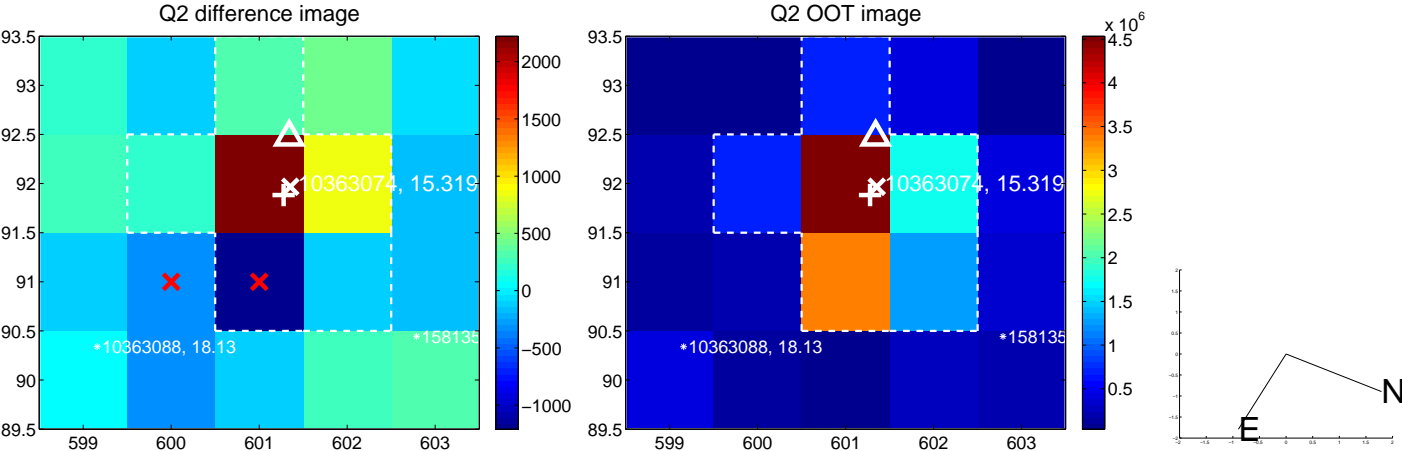
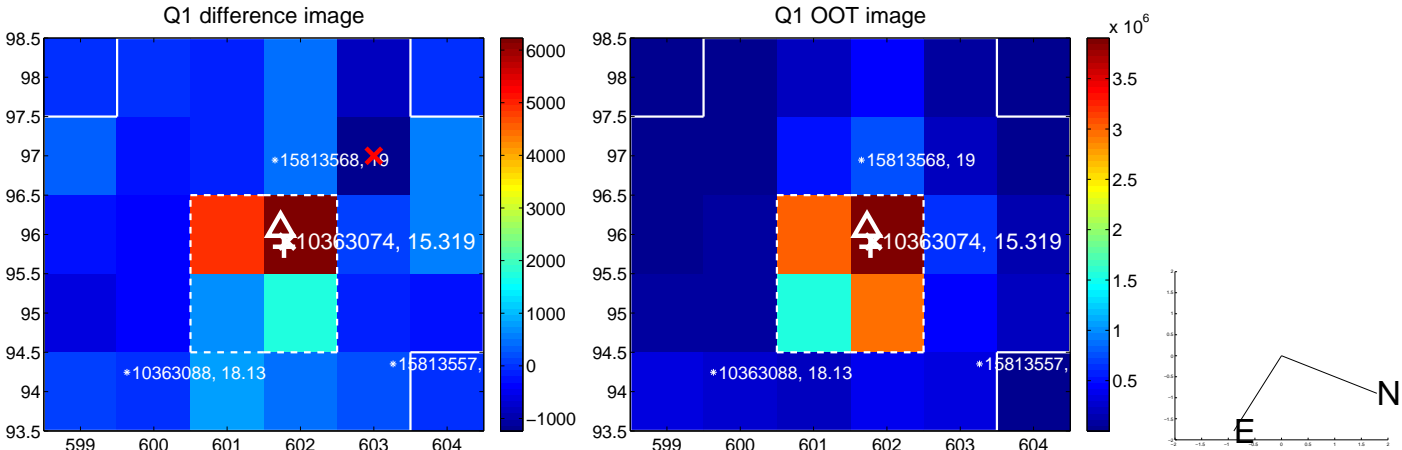


offset from photometric centroids

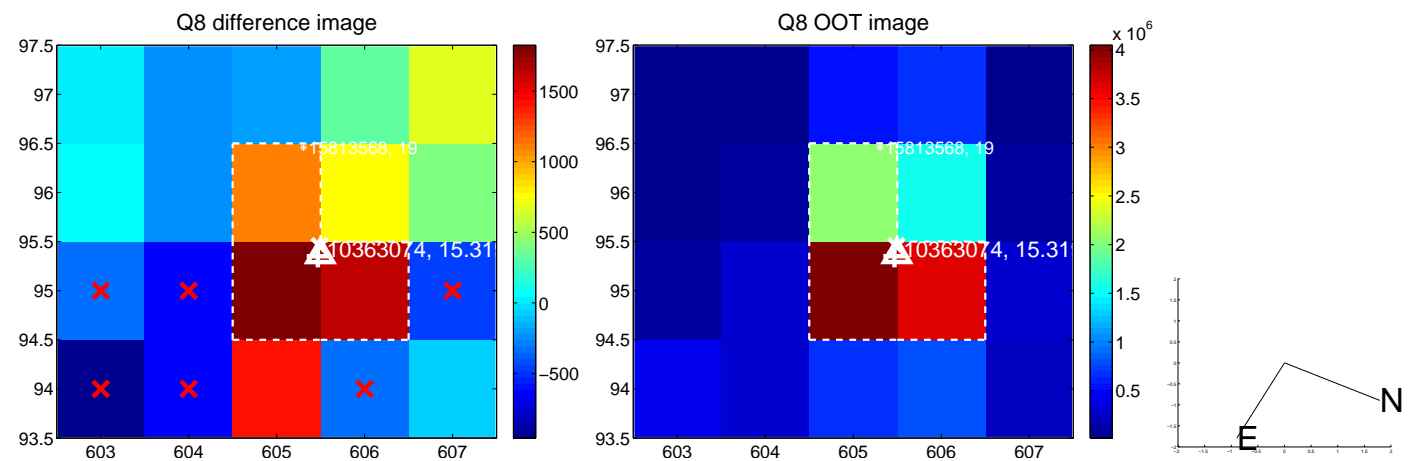
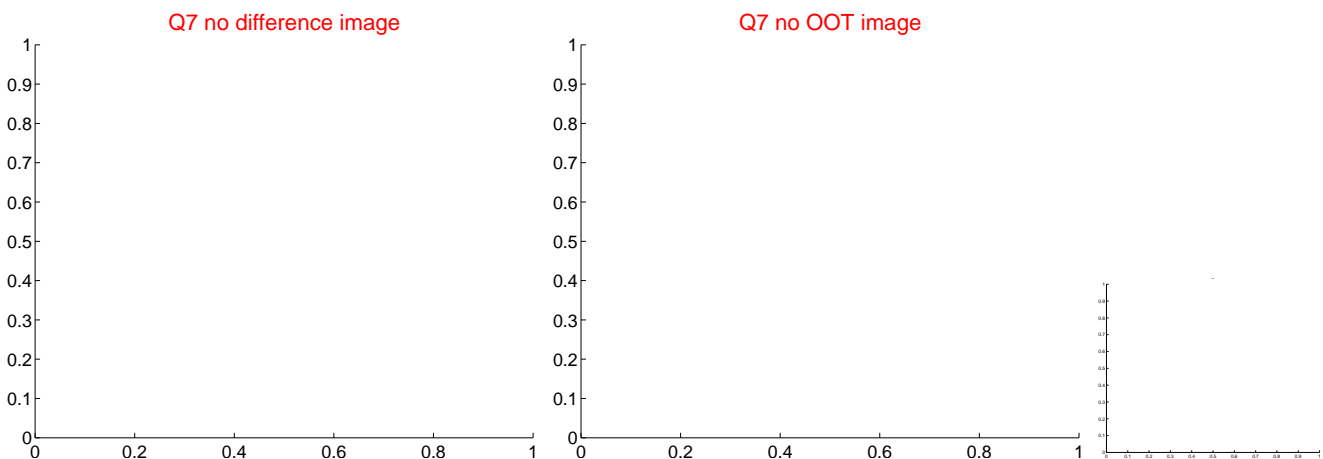
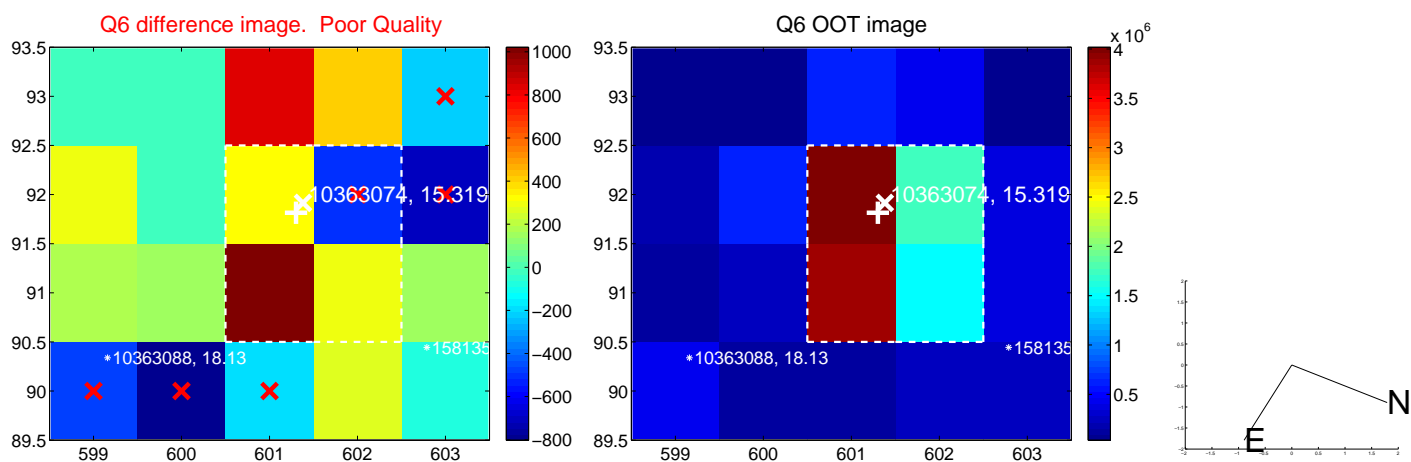
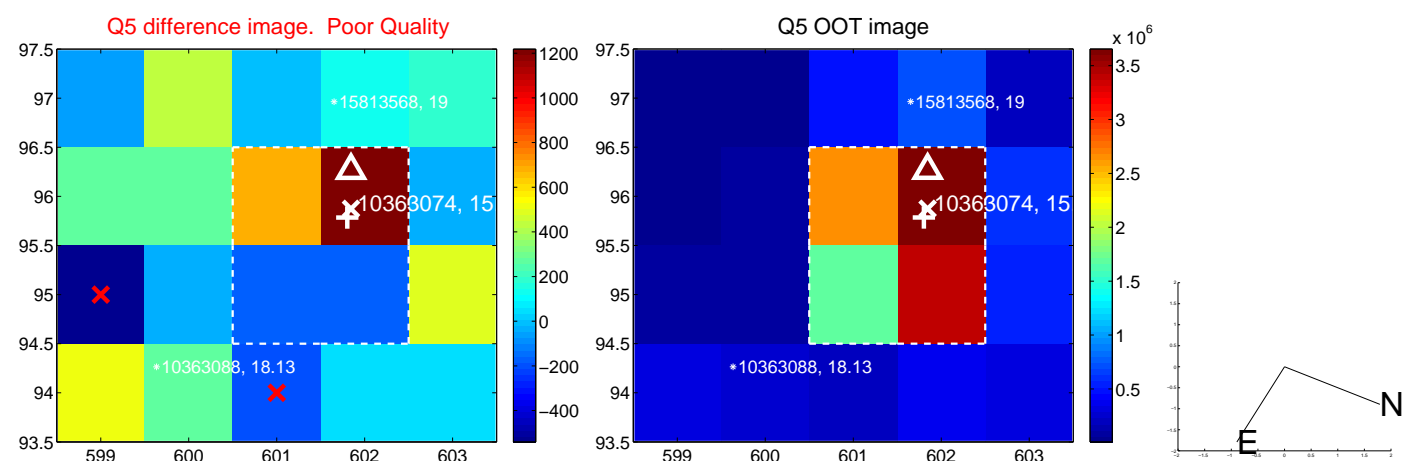


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

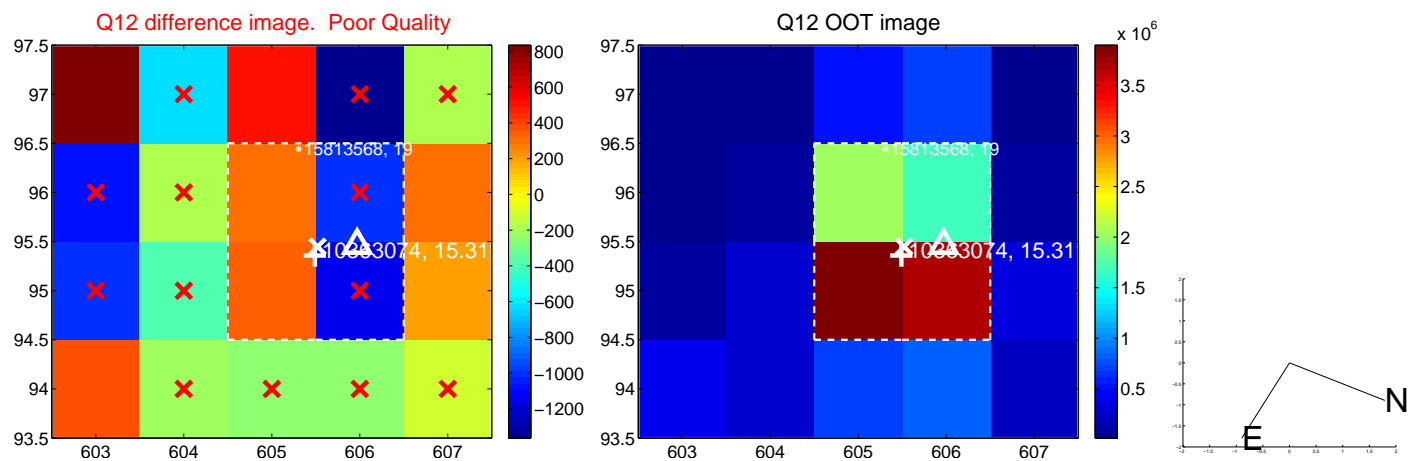
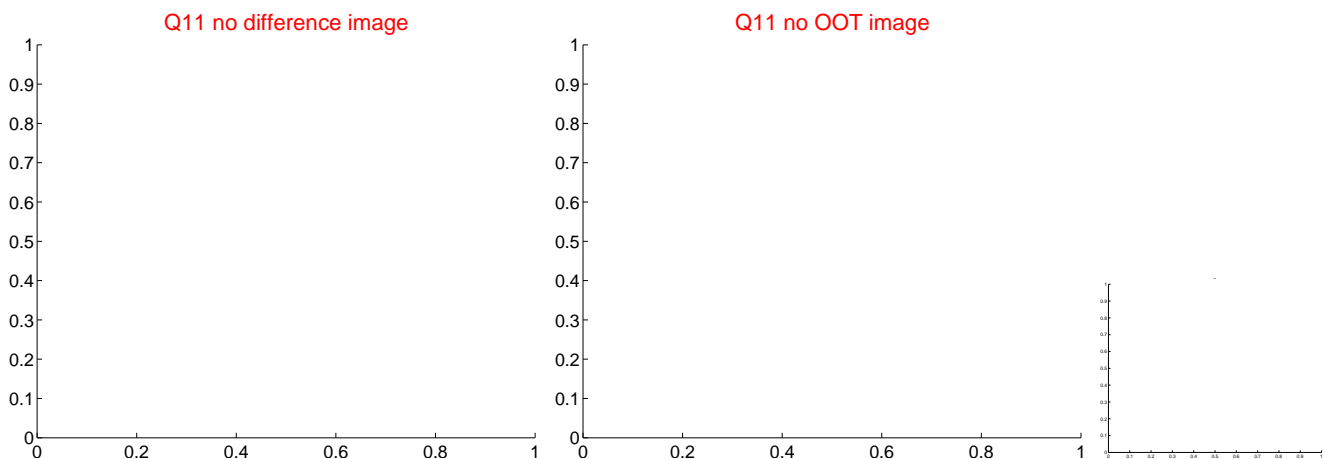
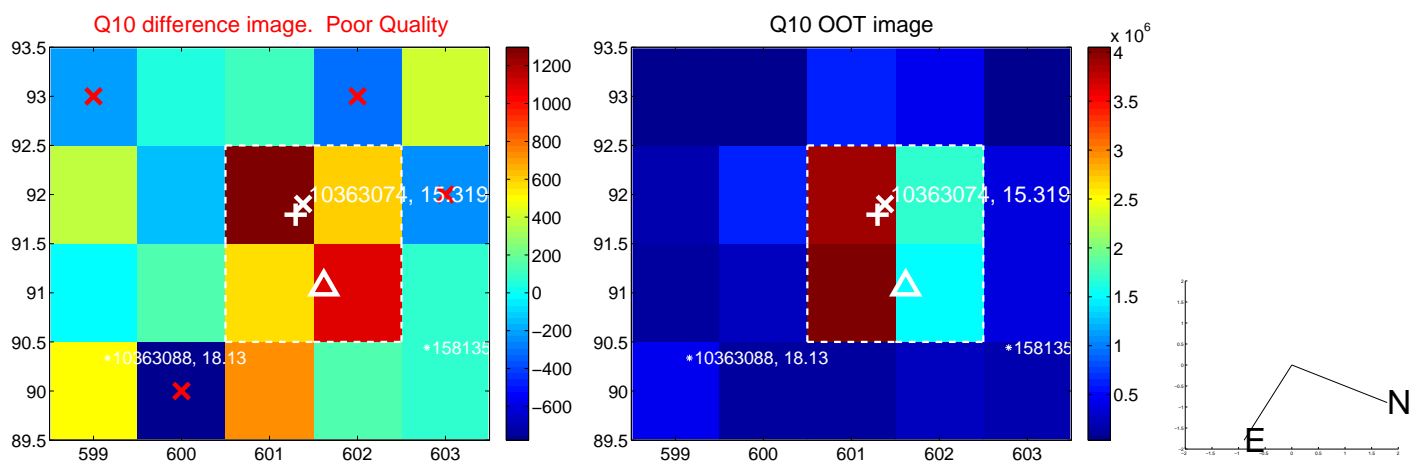
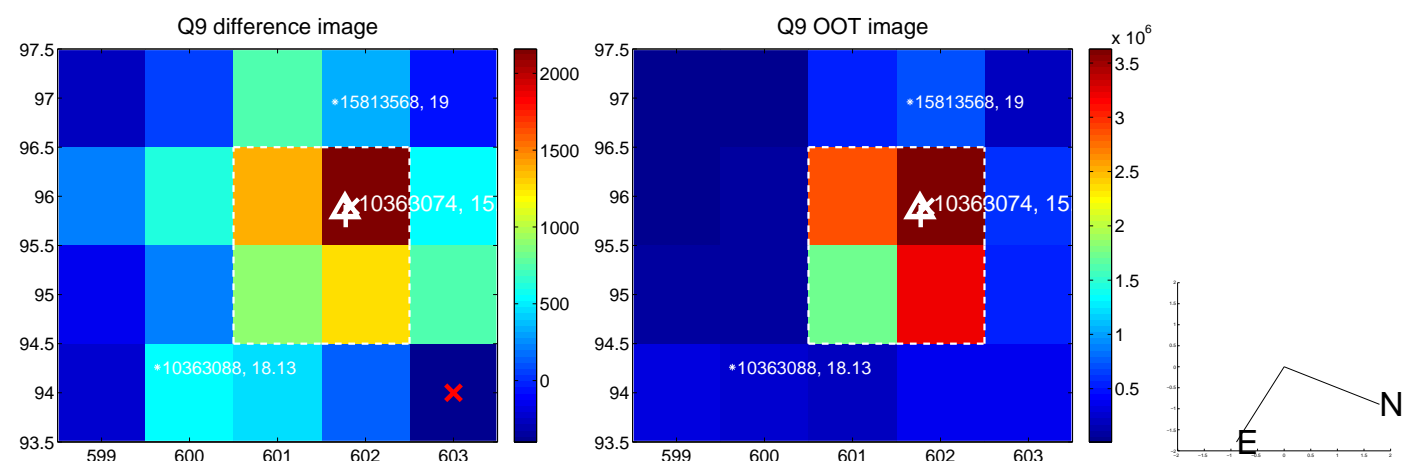
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



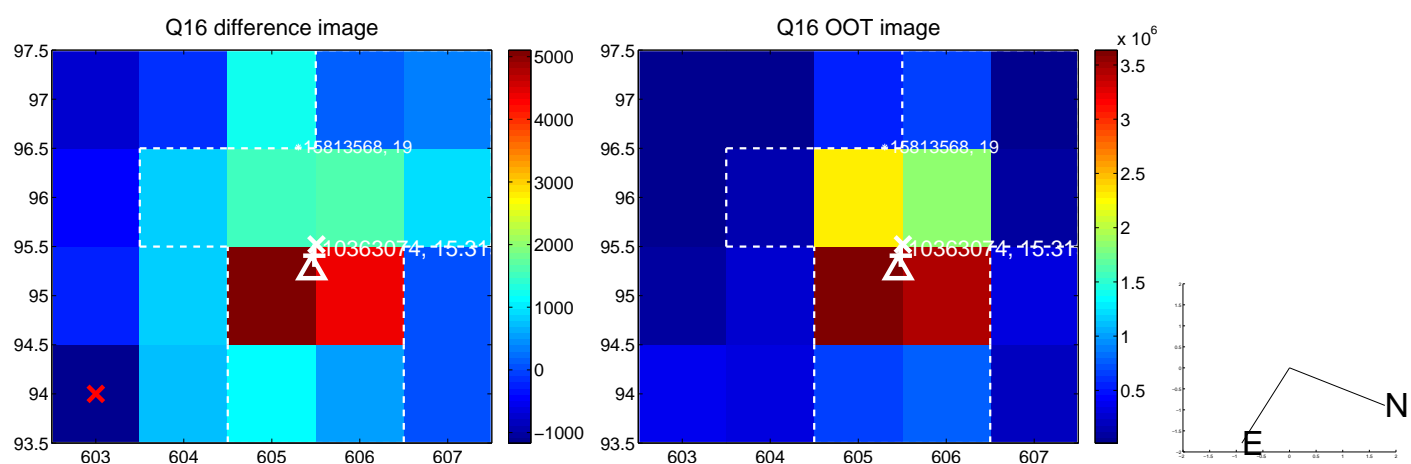
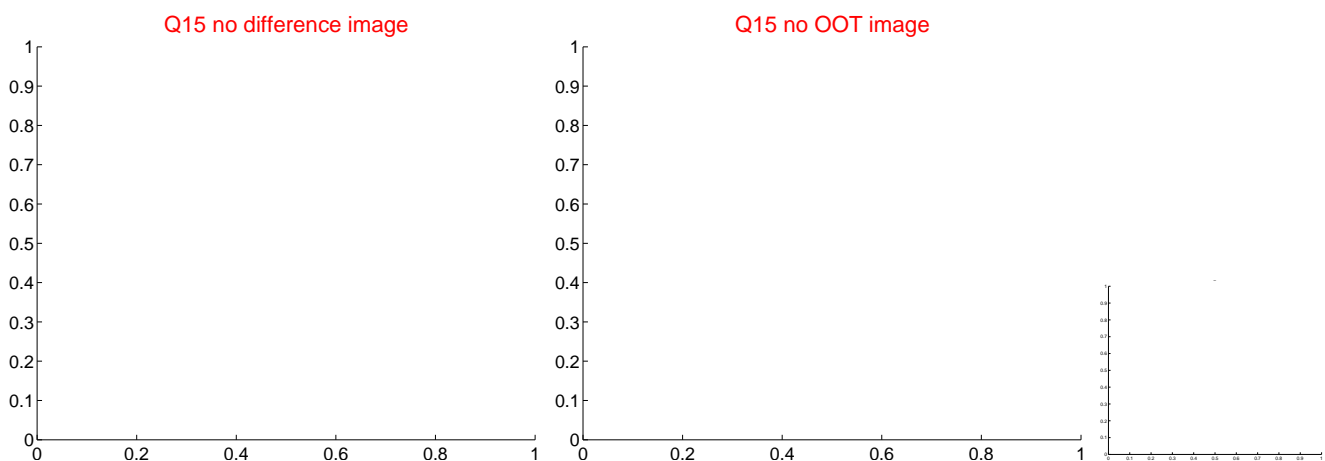
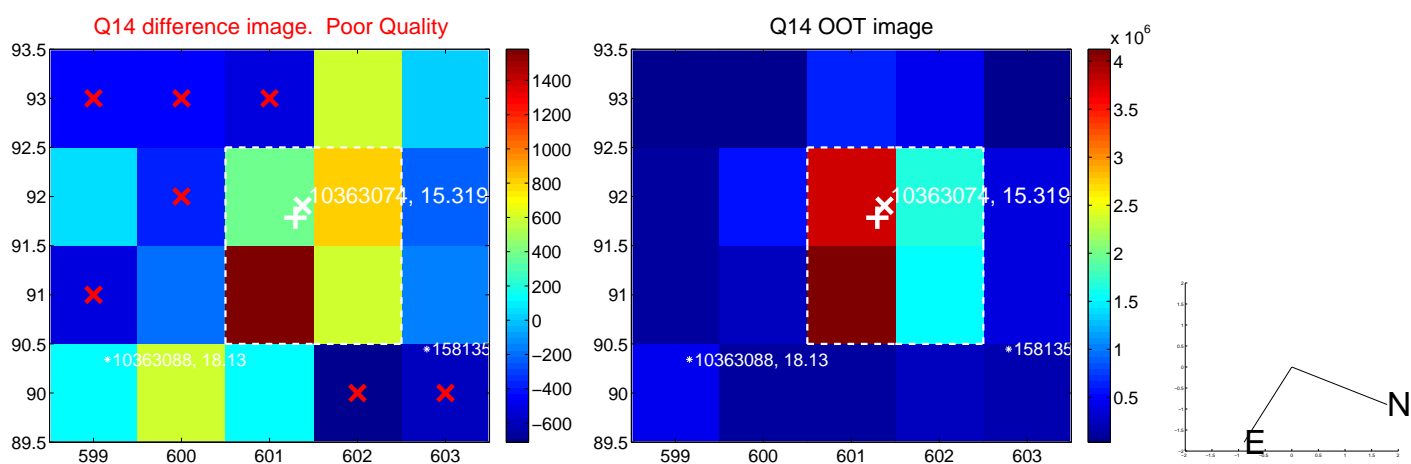
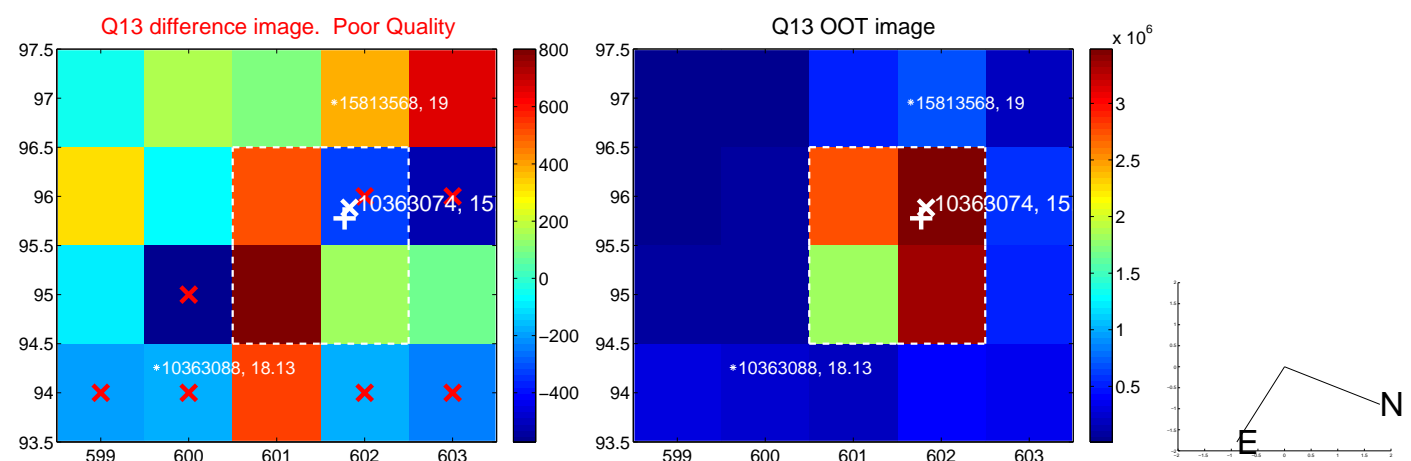
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



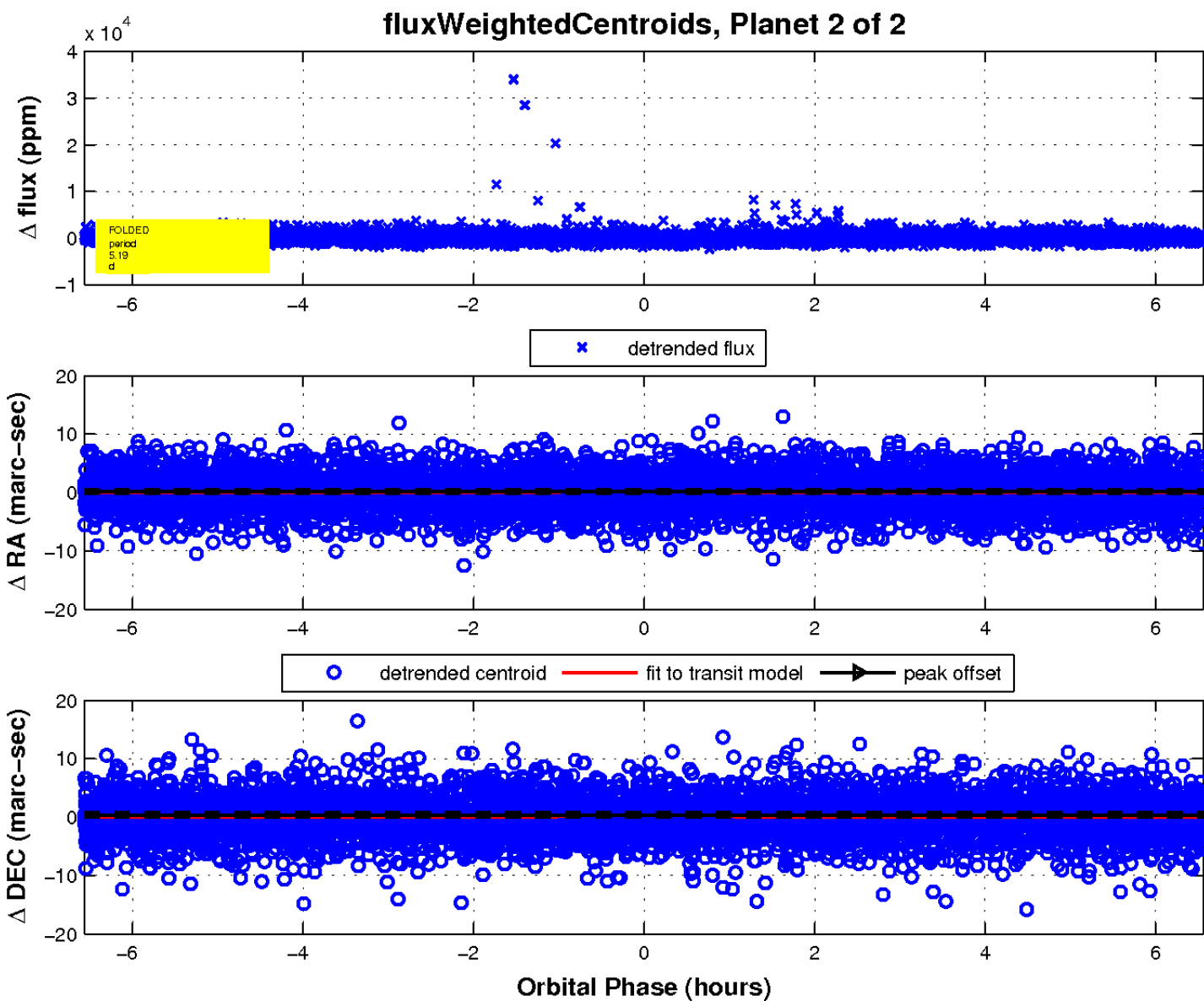
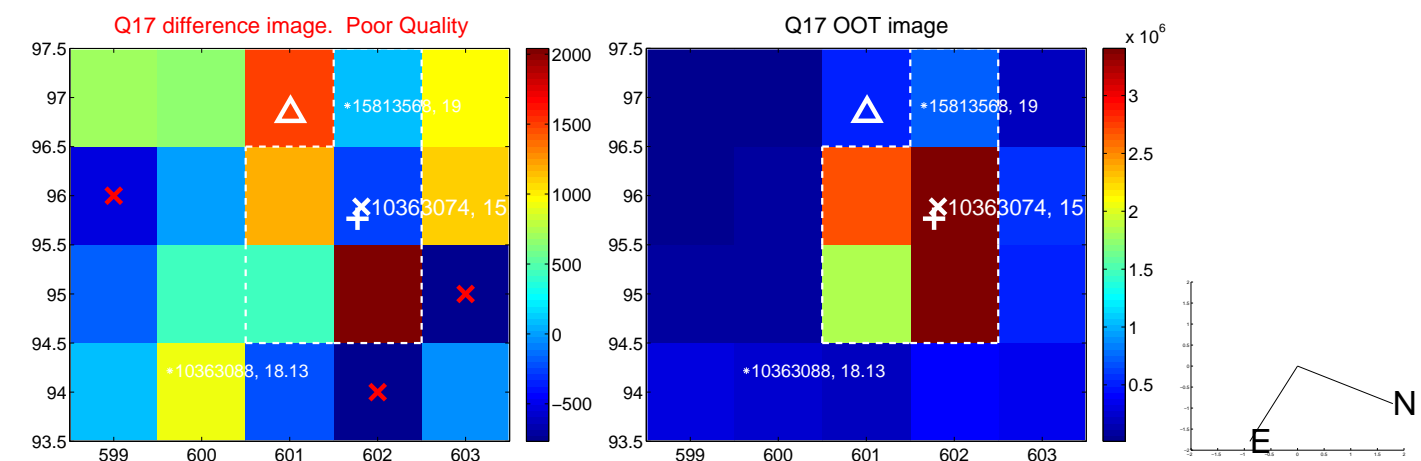
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



UKIRT Image

