

# KIC 006946199

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006946199-01	OBS	1359.02	104.820371	165.192600	3927.7	4.480	74.5	73.2	0.85	5986	6.41	4.75
006946199-02	OBS	1359.01	37.101148	147.873251	1342.2	5.699	47.8	51.2	0.85	5986	3.33	18.99

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006946199-01	OBS	PC	1.00	0	0	0	0	CENT_KIC_POS
006946199-02	OBS	PC	1.00	0	0	0	0	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 006946199-01

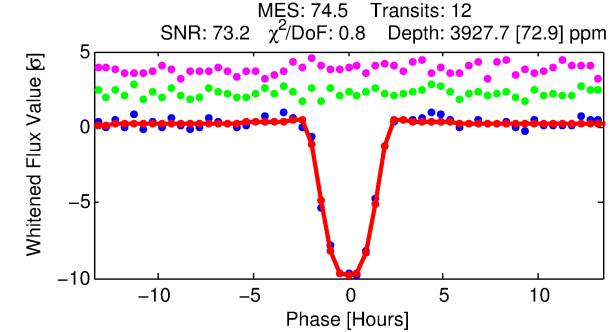
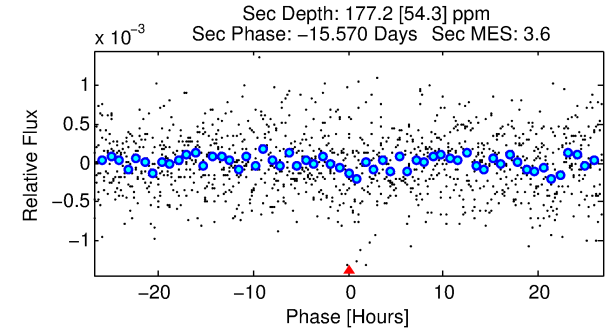
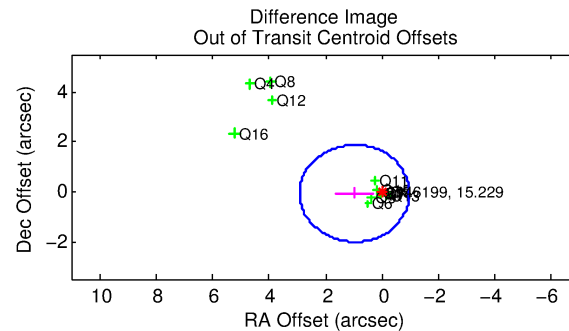
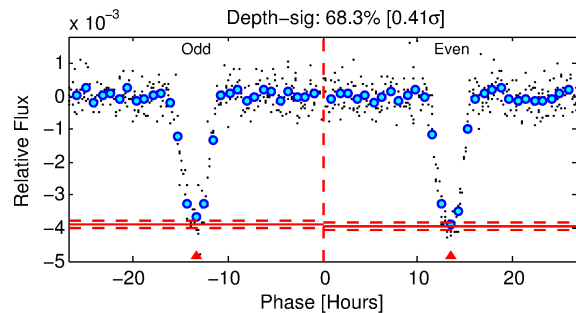
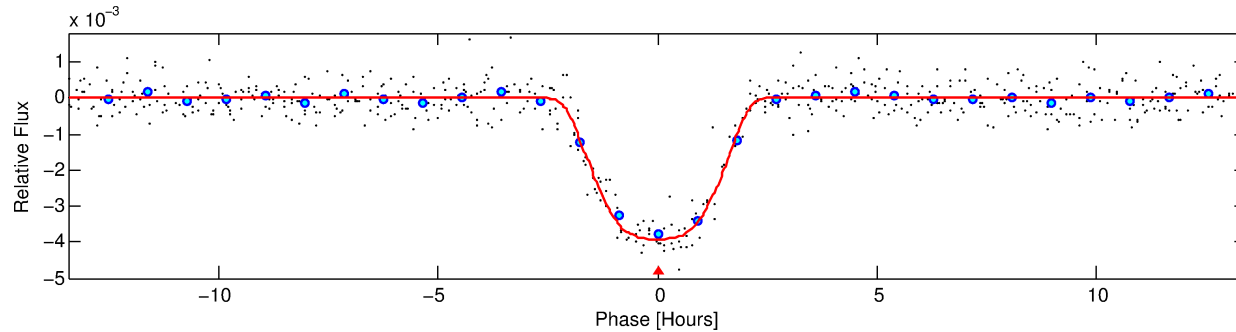
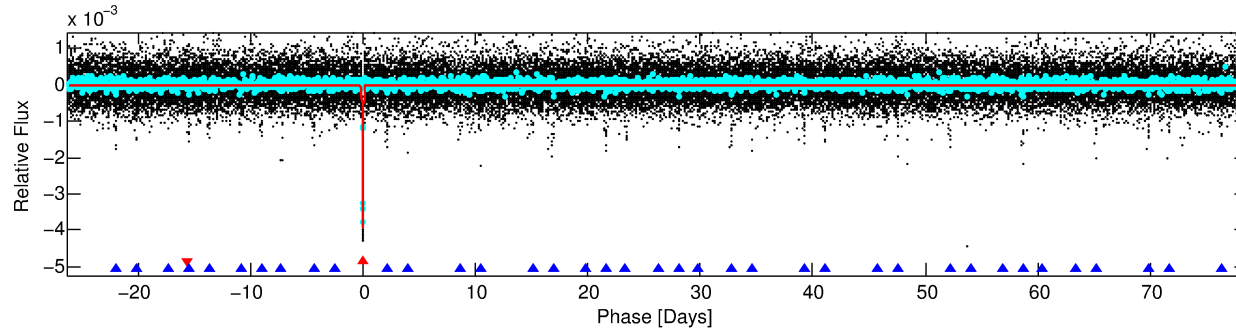
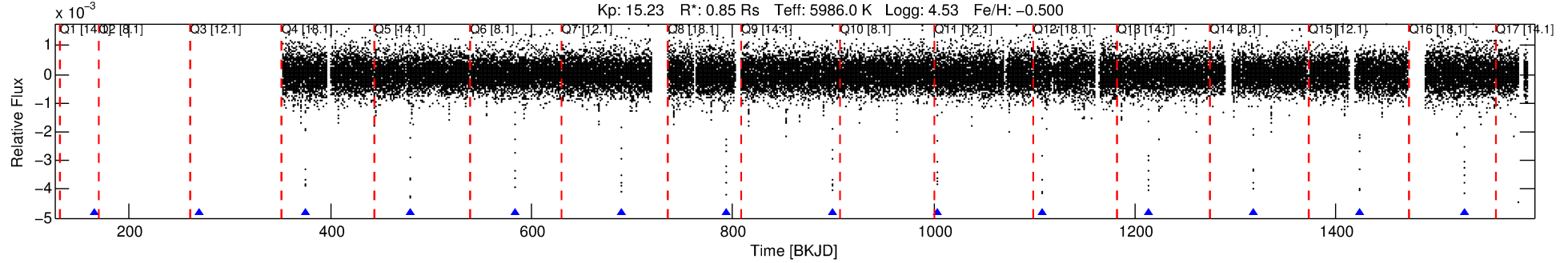
No Significant Match Found

# DV One-Page Summary

KIC: 6946199 Candidate: 1 of 2 Period: 104.820 d

KOI: K01359.02 Corr: 0.996

Kp: 15.23 R\*: 0.85 Rs Teff: 5986.0 K Logg: 4.53 Fe/H: -0.500



## DV Fit Results:

Period = 104.82037 [0.00021] d  
Epoch = 165.1926 [0.0018] BKJD  
Rp/R\* = 0.0691 [0.0011]  
a/R\* = 98.29 [3.39]  
b = 0.92 [0.01]  
Seff = 4.75 [1.79]  
Teq = 377 [35] K  
Rp = 6.41 [1.77] Re  
a = 0.4181 [0.0984] AU  
Ag = 415.07 [192.63] [2.15σ]  
Teffp = 2628 [223] K [9.96σ]

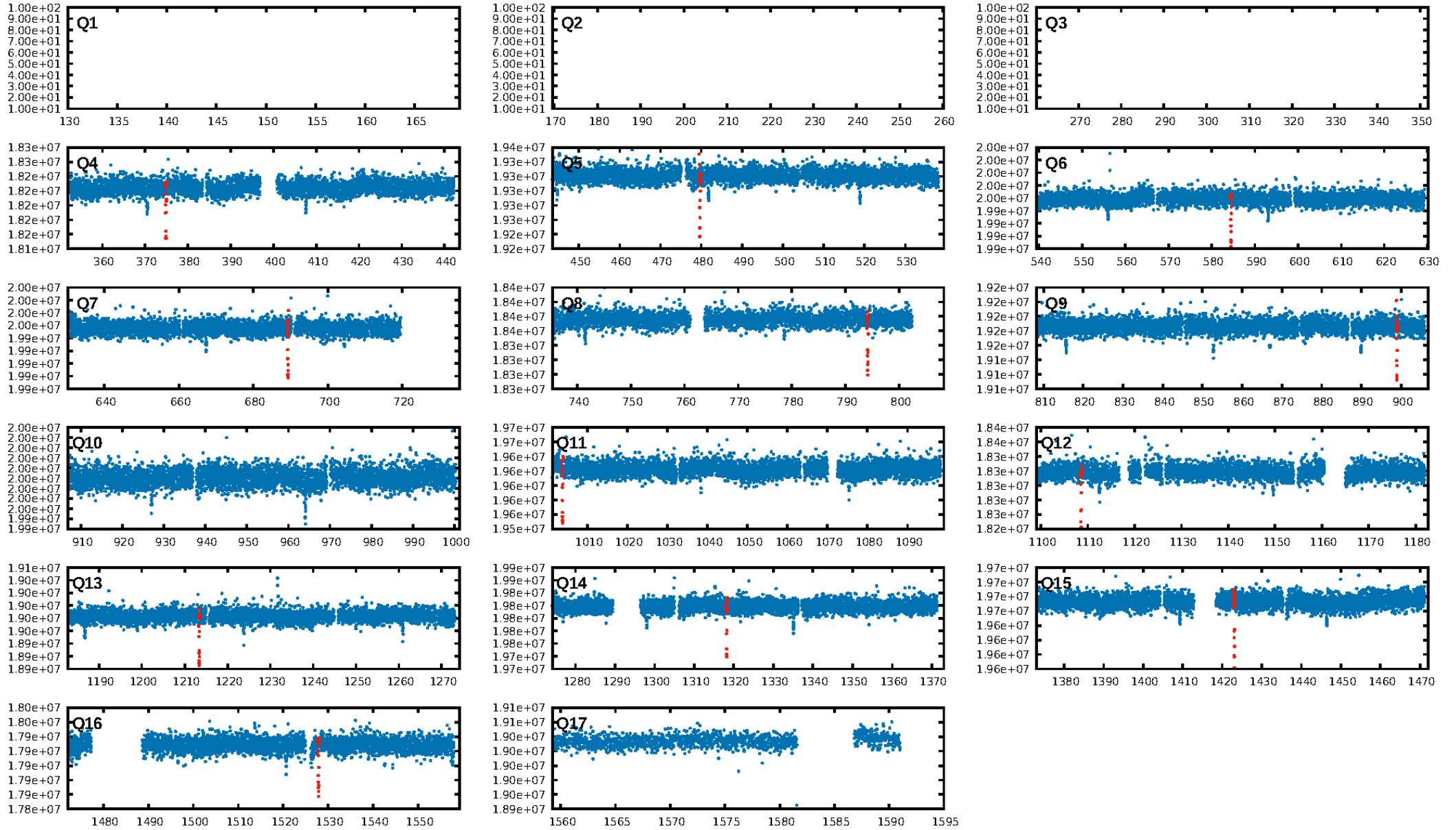
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [224.21σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 98.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [12/12]  
GhostDiagnostic-chr: 5.17  
Centroid-sig: 0.1%  
Centroid-so: 0.139 arcsec [0.76σ]  
OotOffset-rm: 0.983 arcsec [1.52σ]  
KicOffset-rm: 0.071 arcsec [0.64σ]  
OotOffset-st: 2/3/4/3 [12]  
KicOffset-st: 2/3/4/3 [12]  
DiffImageQuality-fgm: 1.00 [12/12]  
DiffImageOverlap-fno: 1.00 [12/12]

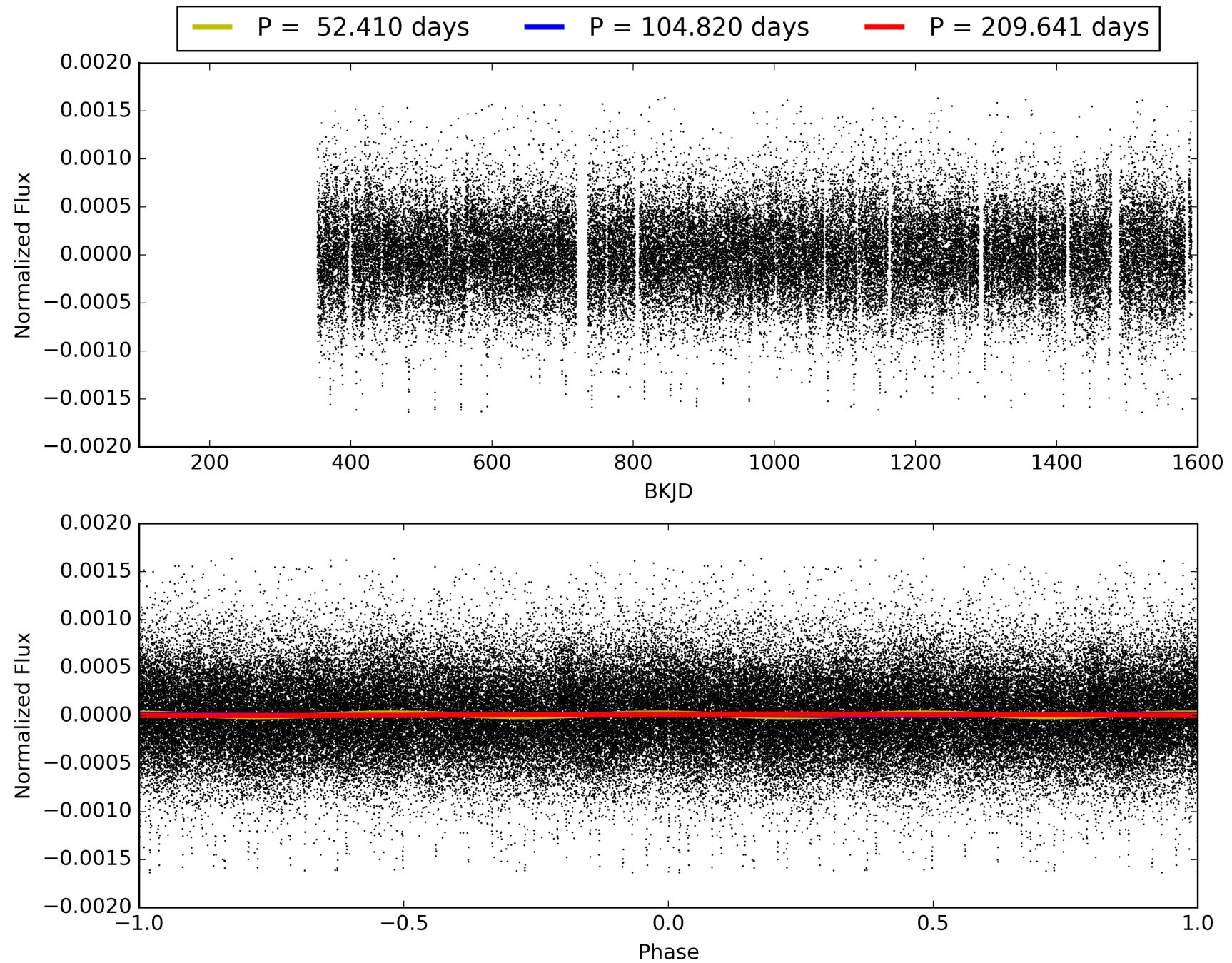
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 06:58:54 Z

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

# TCE 006946199-01, PDC Light Curves

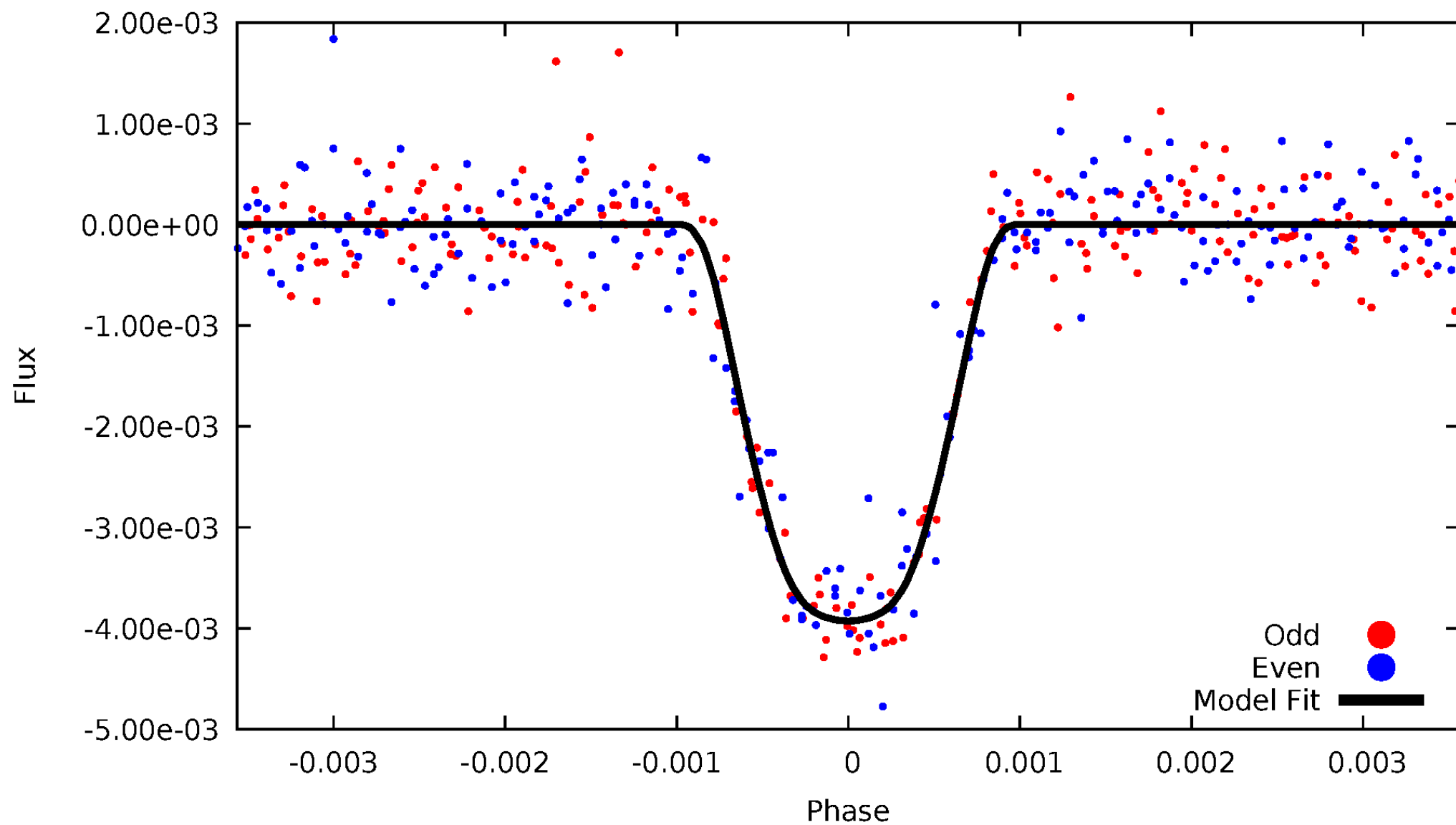


TCE 006946199-01



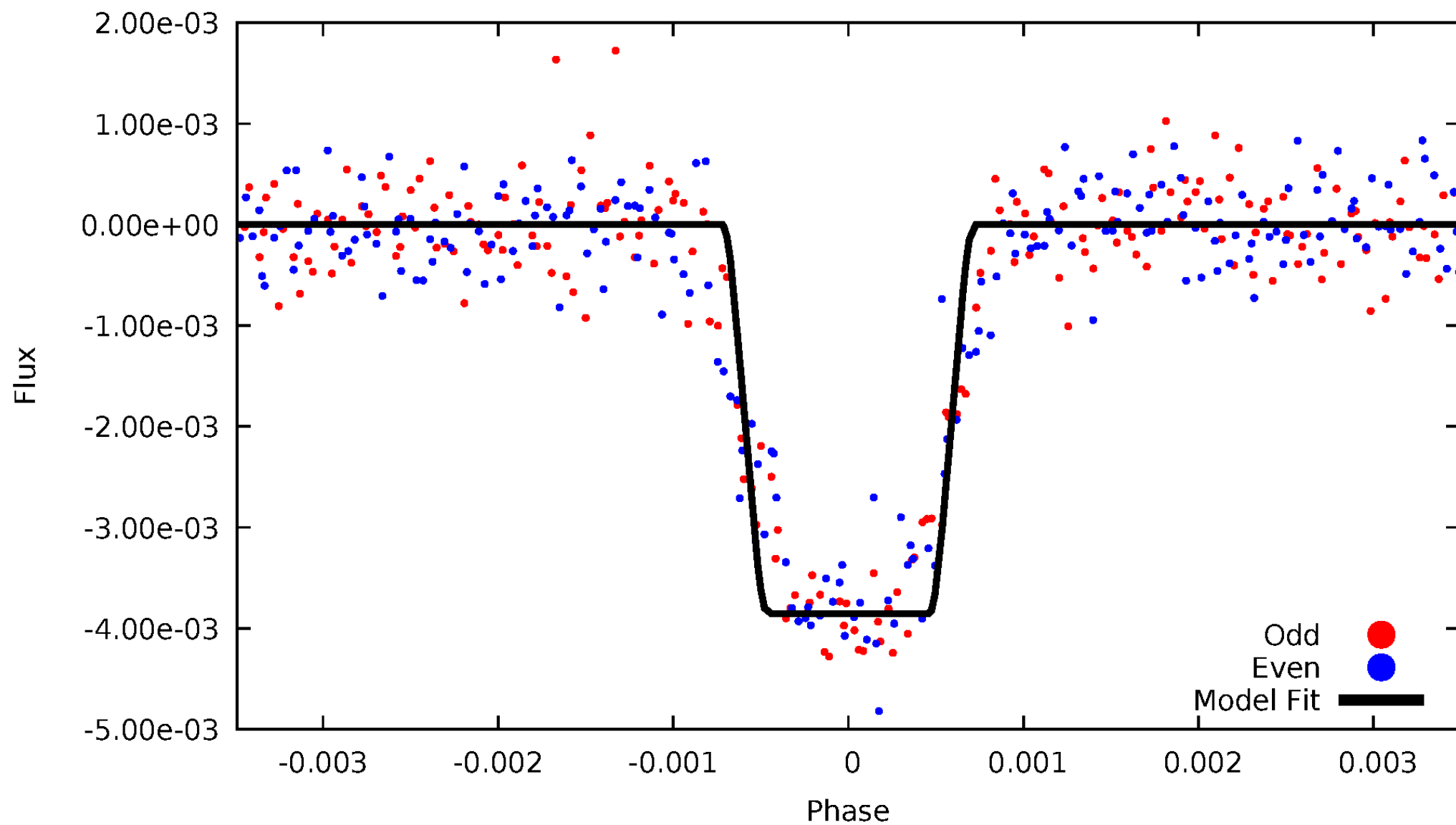
# DV Odd/Even

TCE 006946199-01



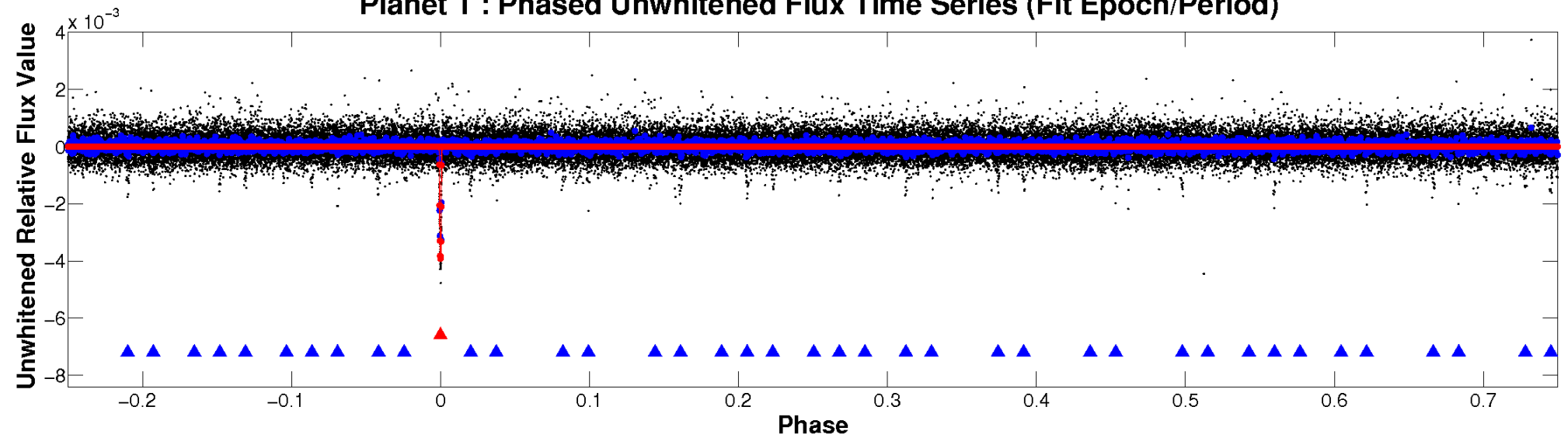
# ALT Odd/Even

TCE 006946199-01

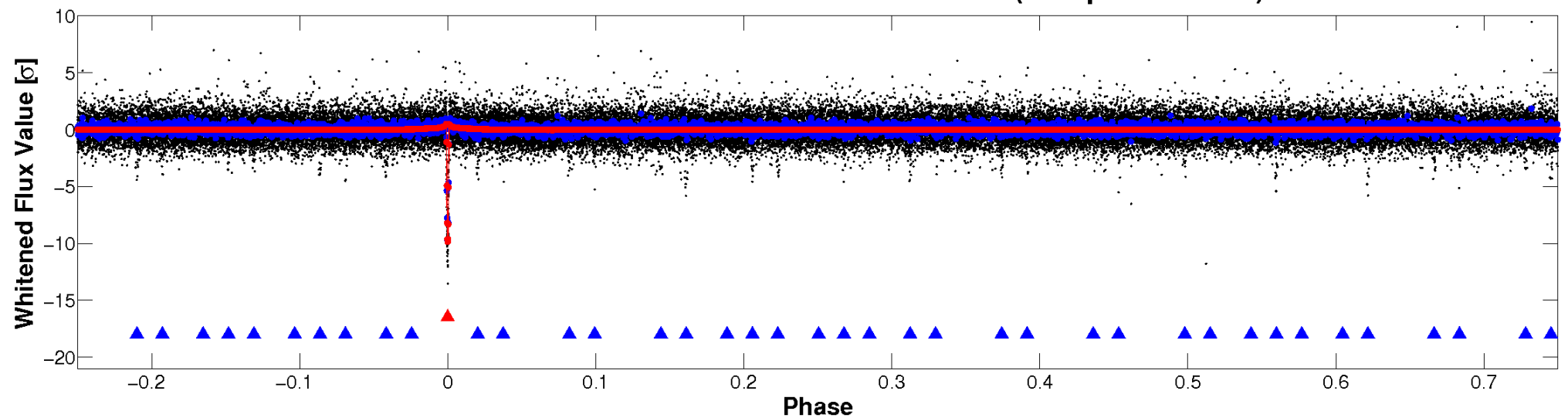


# Non-Whitened Vs. Whitened Light Curve

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

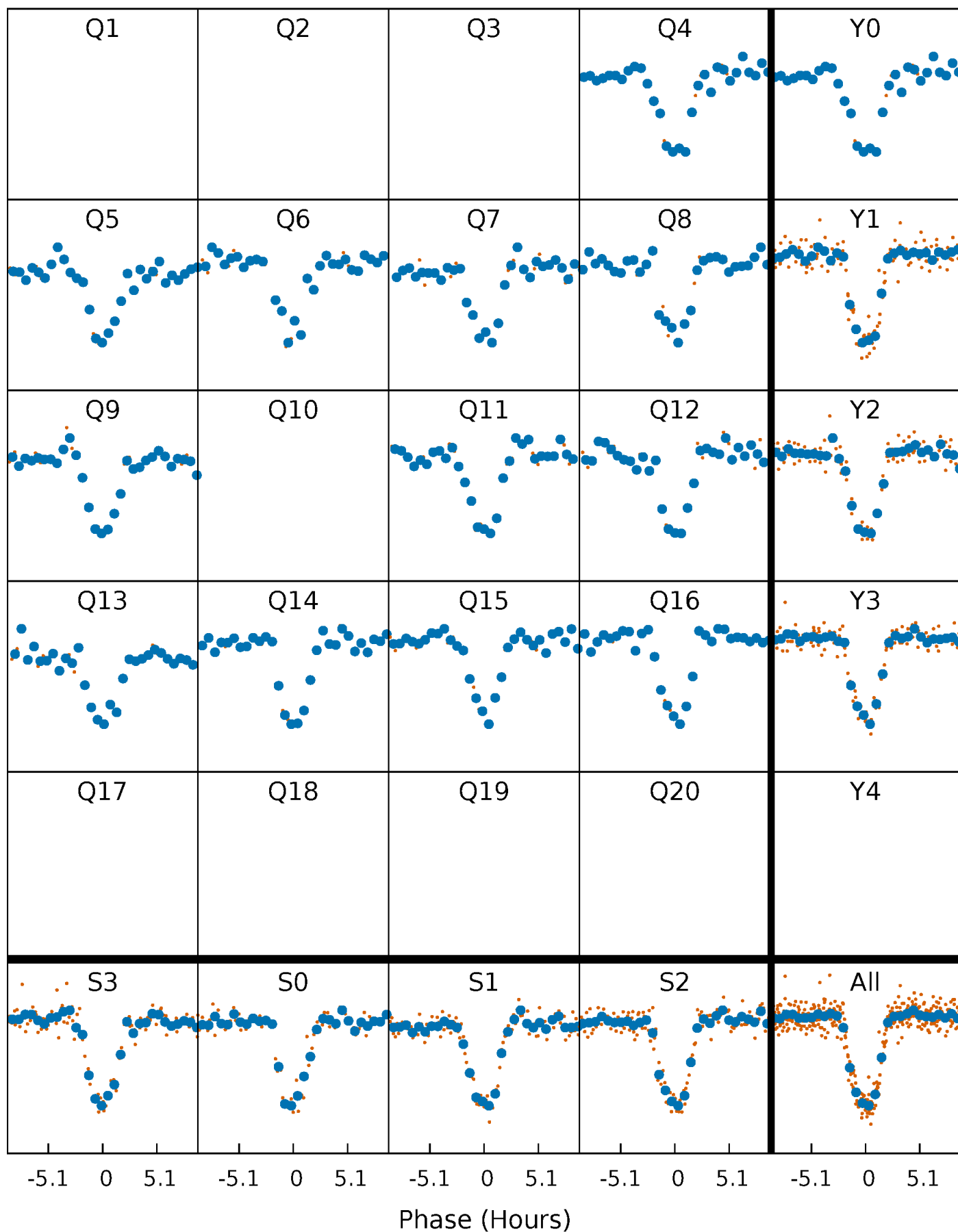


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

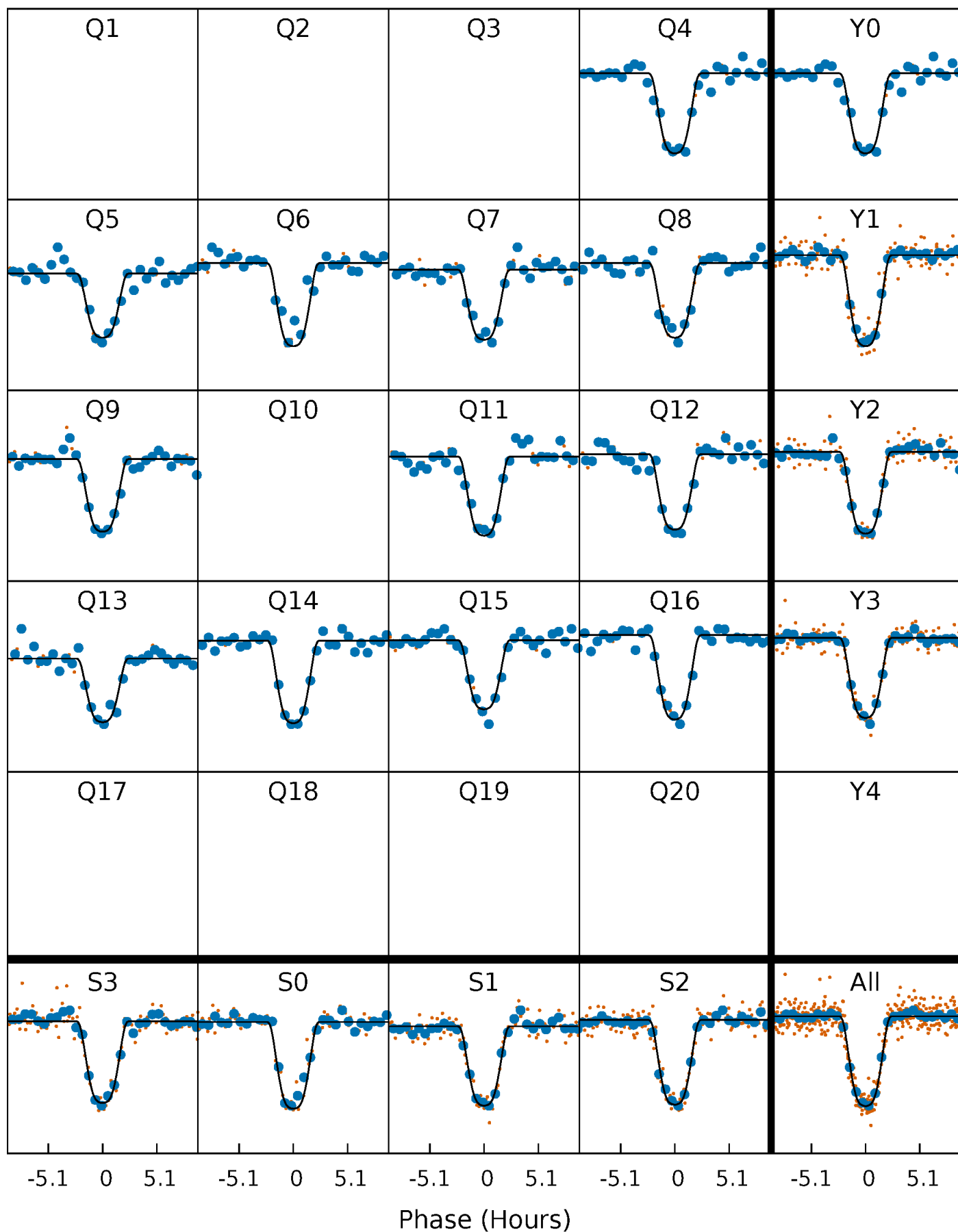
TCE 006946199-01 P=104.820371 Days  $T_0=165.192600$  (BKJD)





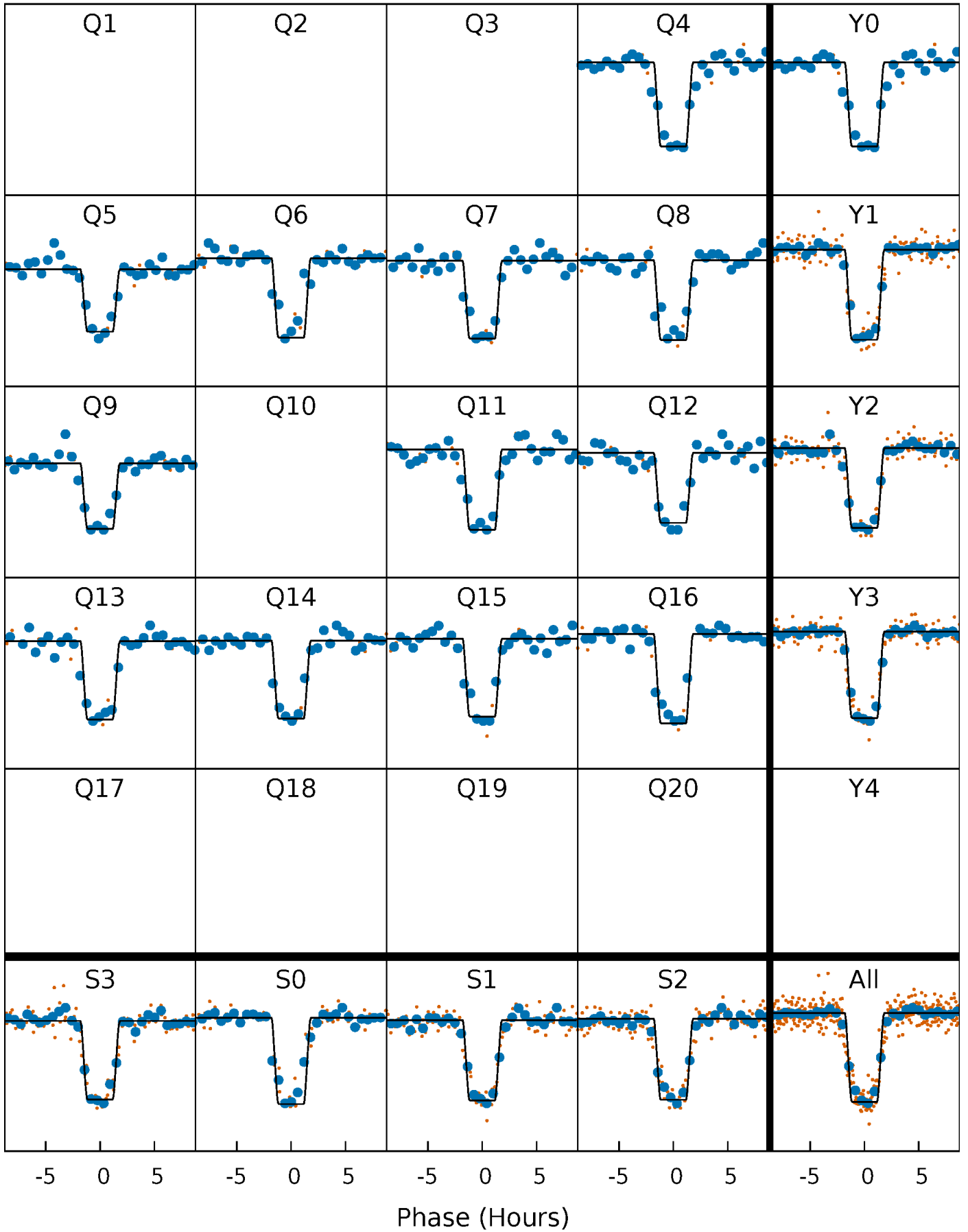
# DV Quarter-Phased Transit Curves

TCE 006946199-01 P=104.820371 Days  $T_0=165.192600$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

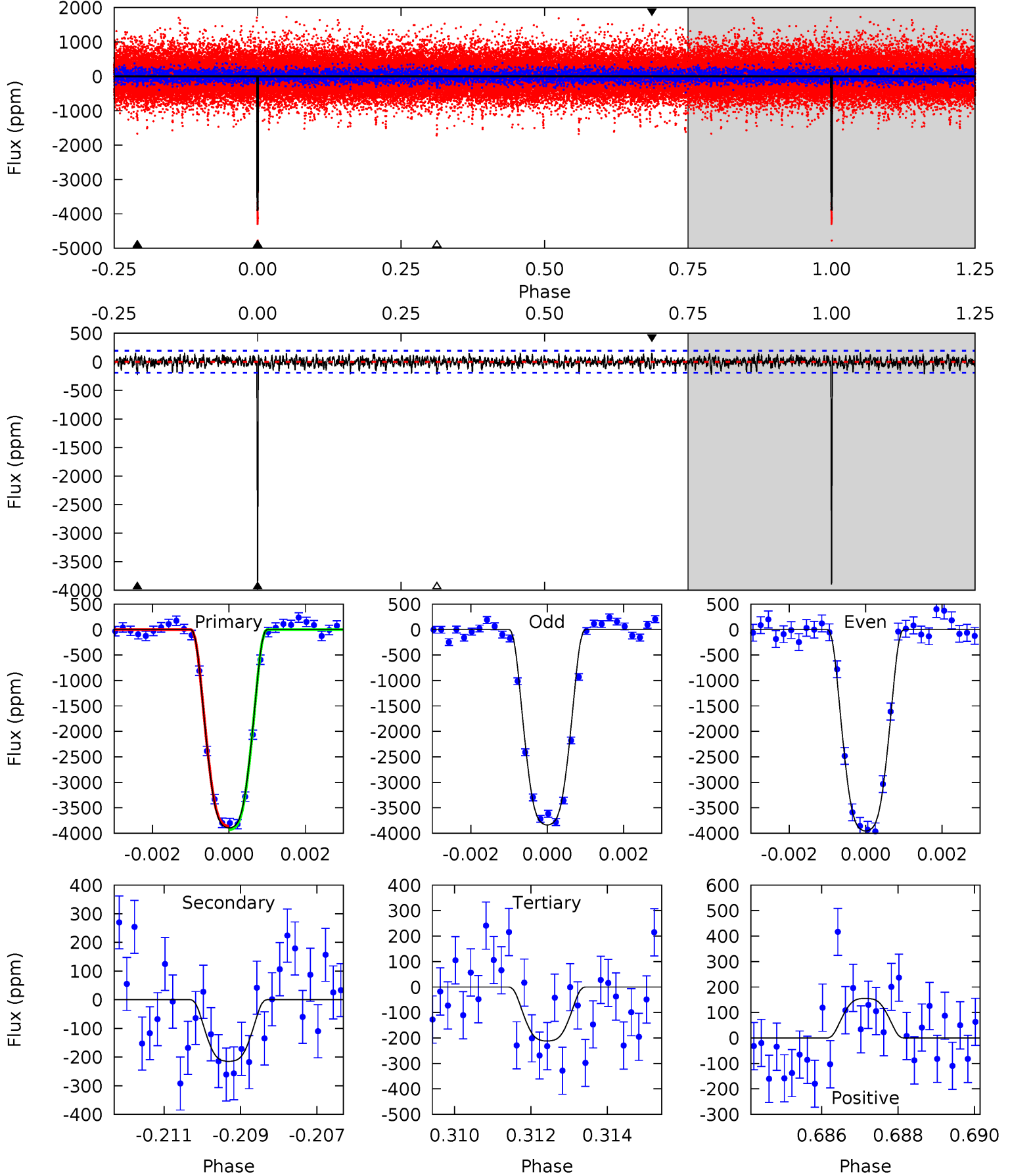
TCE 006946199-01 P=104.821074 Days  $T_0=165.186969$  (BKJD)



# DV Model-Shift Uniqueness Test

006946199-01, P = 104.820371 Days, E = 165.192600 Days

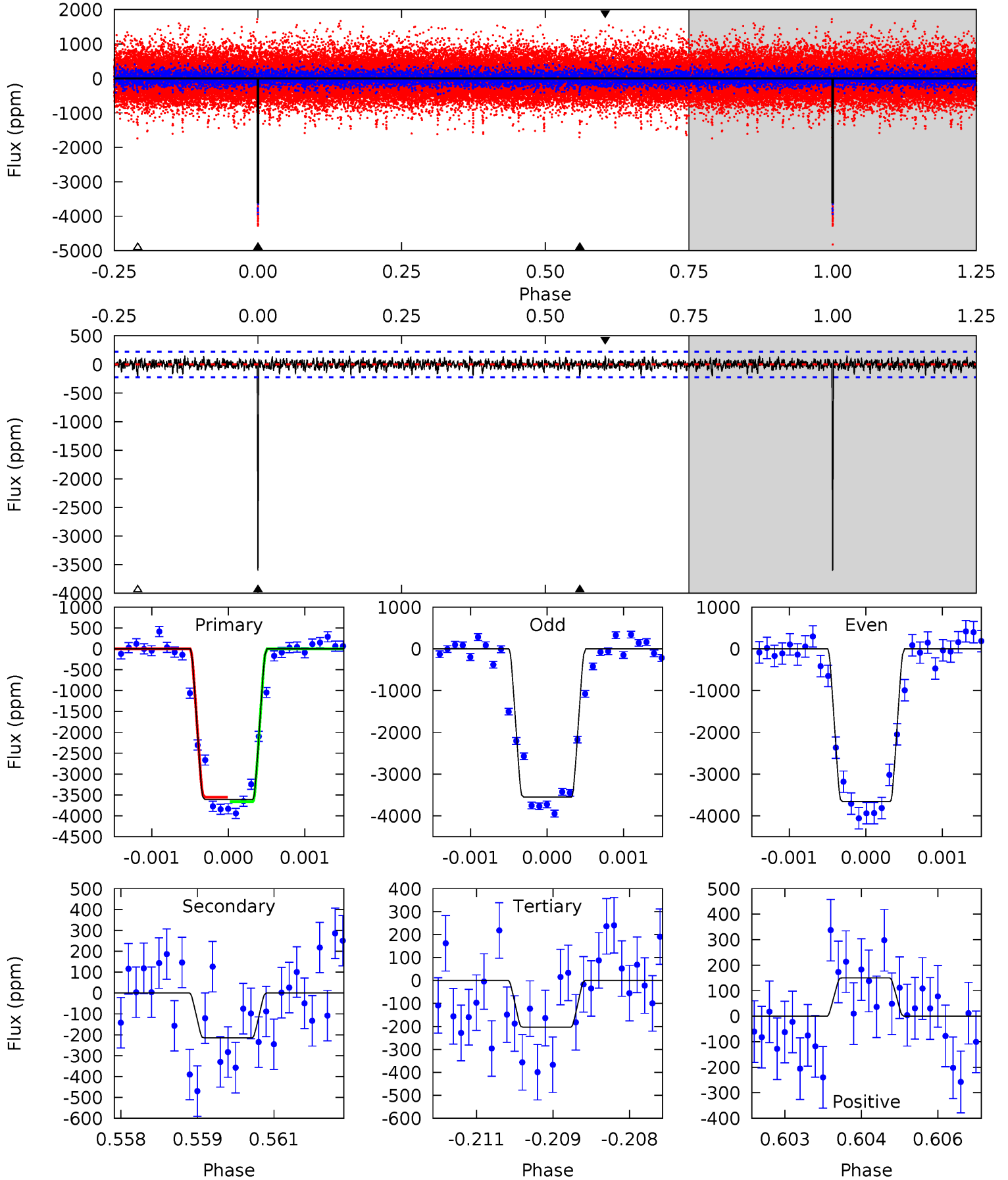
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
108.8	6.00	5.91	4.34	5.33	3.10	1.54	102.9	104.4	0.09	1.66	1.66	0.99	0.04	0.95



# Alt Model-Shift Uniqueness Test

006946199-01, P = 104.821074 Days, E = 165.186969 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
87.0	5.18	4.90	3.62	5.39	3.19	1.21	82.1	83.3	0.28	1.55	1.29	1.00	0.04	1.32



### Stellar Parameters For KIC 006946199

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5986^{+179}_{-215}$	$4.527^{+0.060}_{-0.192}$	$-0.500^{+0.300}_{-0.300}$	$0.850^{+0.234}_{-0.094}$	$0.886^{+0.099}_{-0.099}$	$2.034^{+0.535}_{-1.031}$
	+3%/-4%	+1%/-4%	+60%/-60%	+28%/-11%	+11%/-11%	+26%/-51%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 006946199-01 / KOI 1359.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-215 \pm 36$	$6.53^{+0.92}_{-0.47}$	$534^{+36}_{-27}$	$3303^{+100}_{-112}$	$461^{+118}_{-112}$
Alt.	$-215 \pm 41$	$5.88^{+0.91}_{-0.46}$	$534^{+38}_{-27}$	$3411^{+125}_{-130}$	$570^{+162}_{-161}$

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

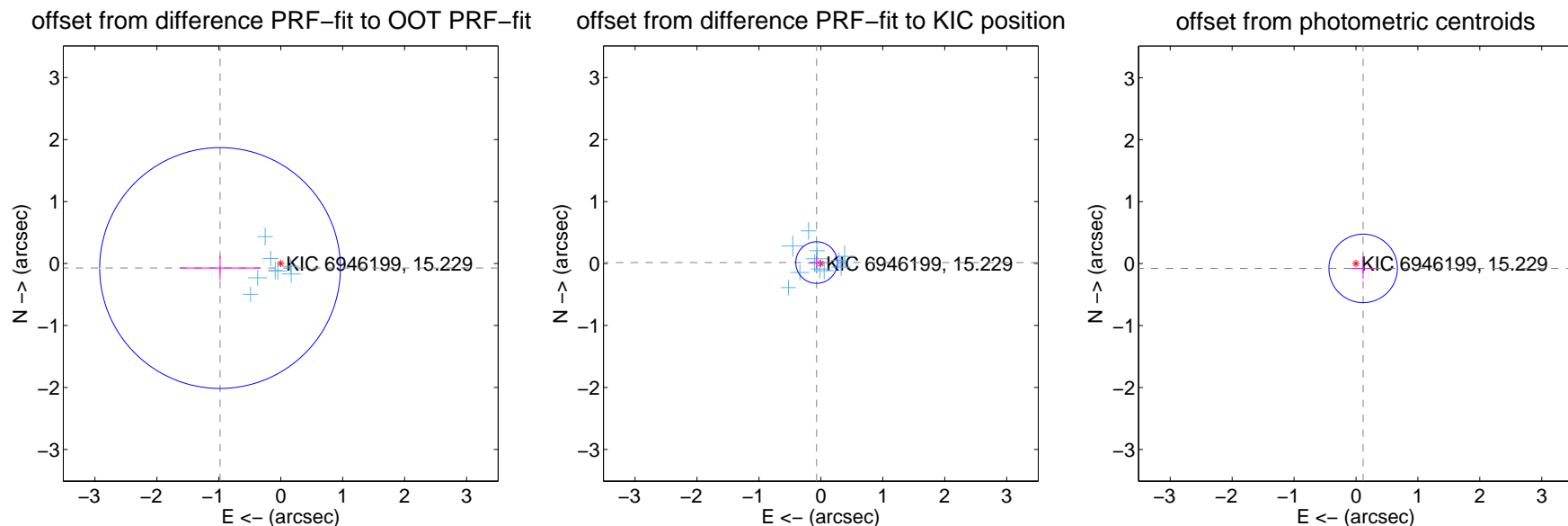
## DV Centroid Data

Supplemental centroid analysis for 006946199-01. Kepler magnitude: 15.23. Transit SNR 73.21

There are 12 quarters with good PRF difference image offsets

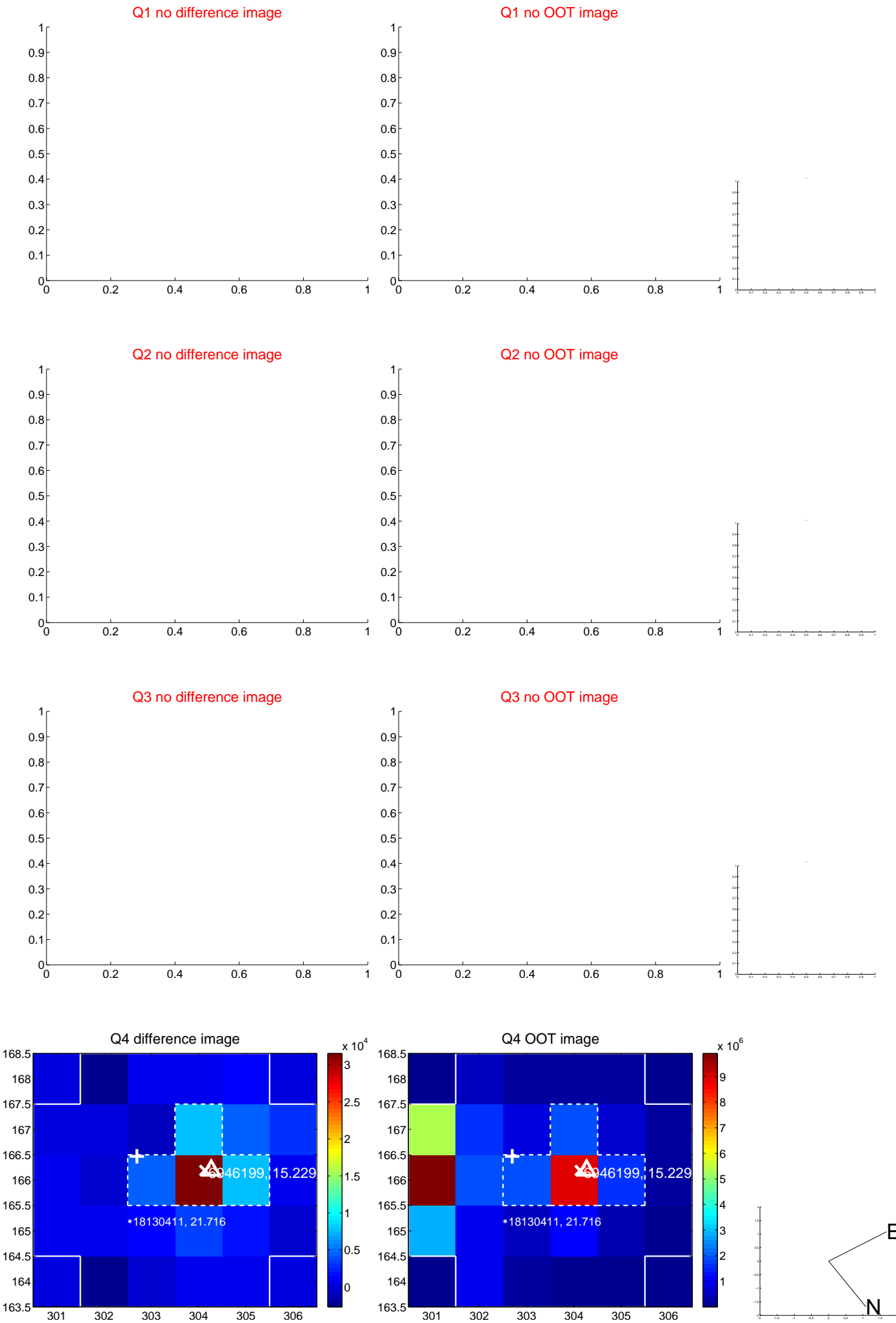
The OOT PRF centroid is offset from the target star catalog position by about 5.62 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.983 \pm 0.648$	1.52	$0.980 \pm 0.649$	$-0.072 \pm 0.196$
PRF-fit source offset from KIC position	$0.071 \pm 0.112$	0.64	$0.069 \pm 0.113$	$0.016 \pm 0.095$
photometric centroid source offset	$0.14 \pm 0.18$	0.76	$-0.12 \pm 0.19$	$-0.08 \pm 0.17$

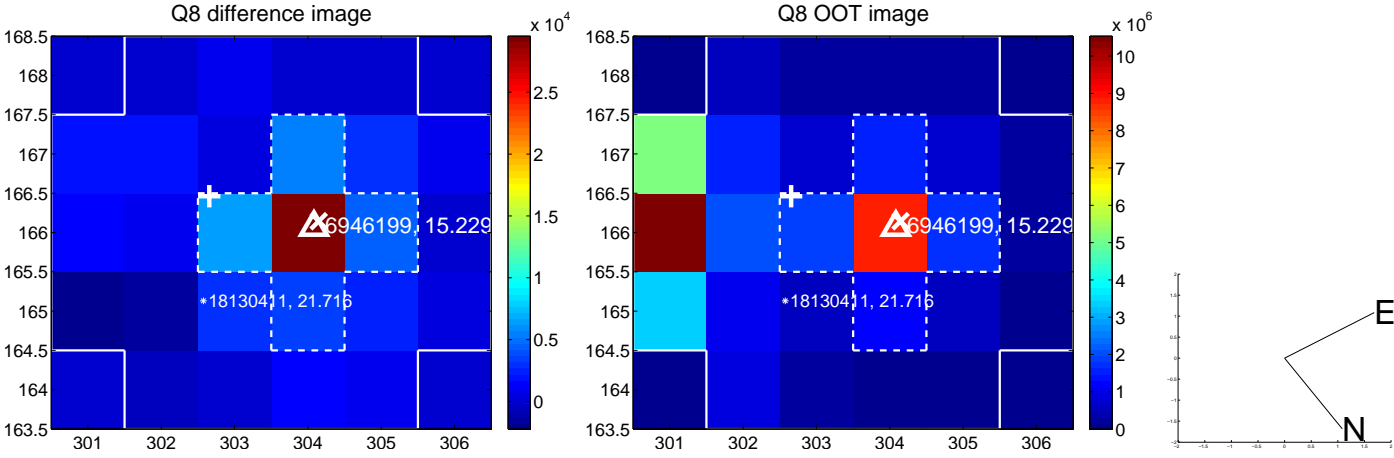
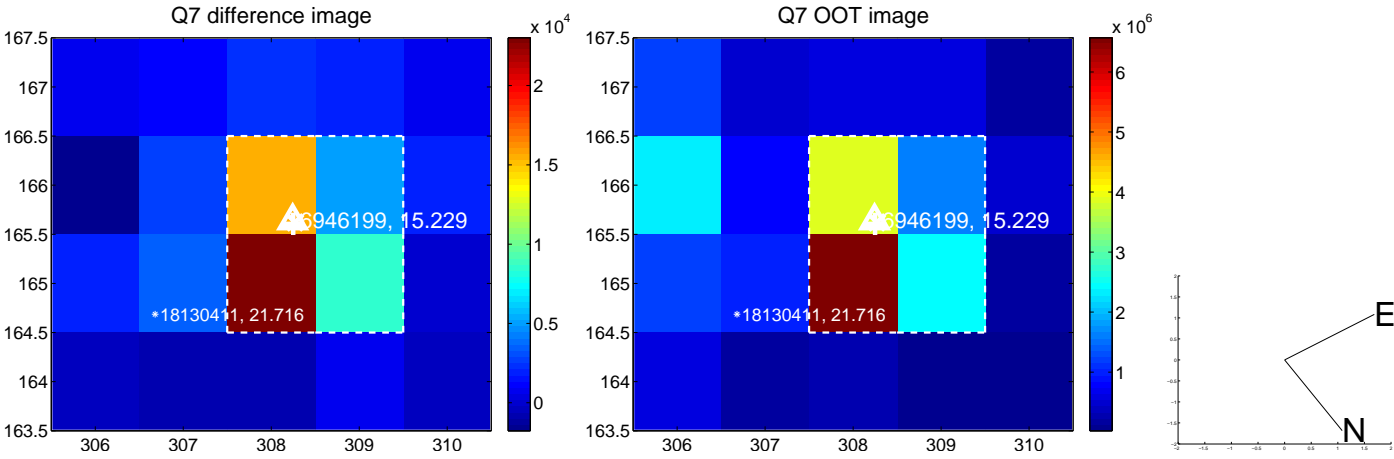
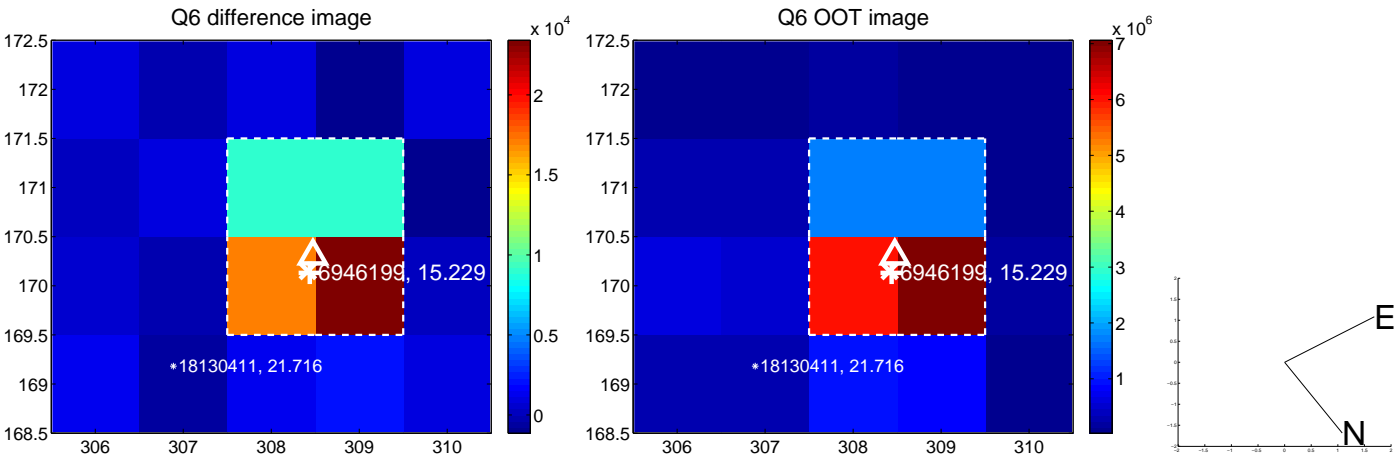
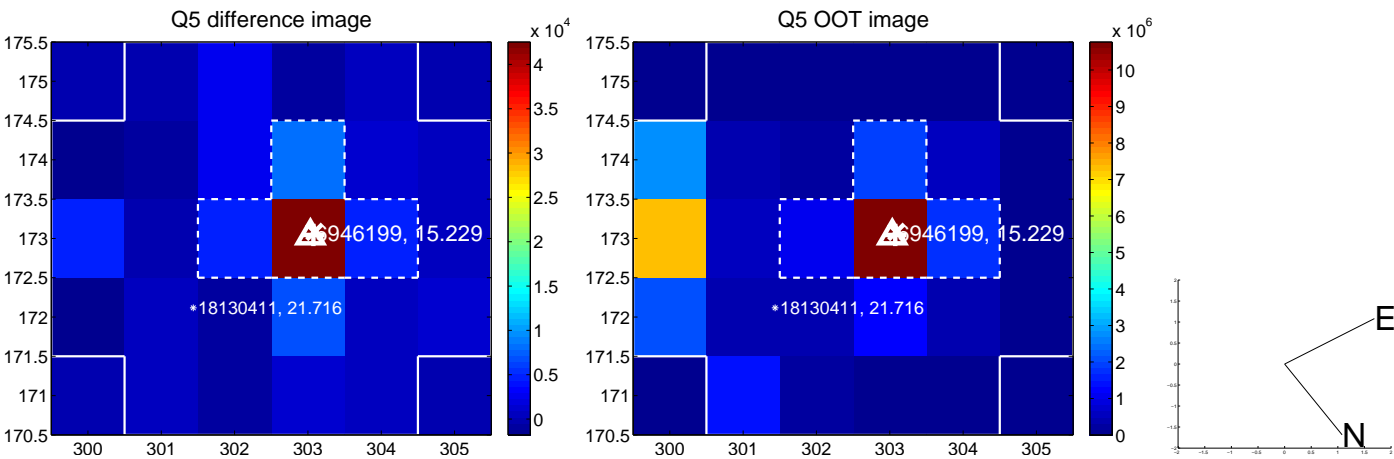


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

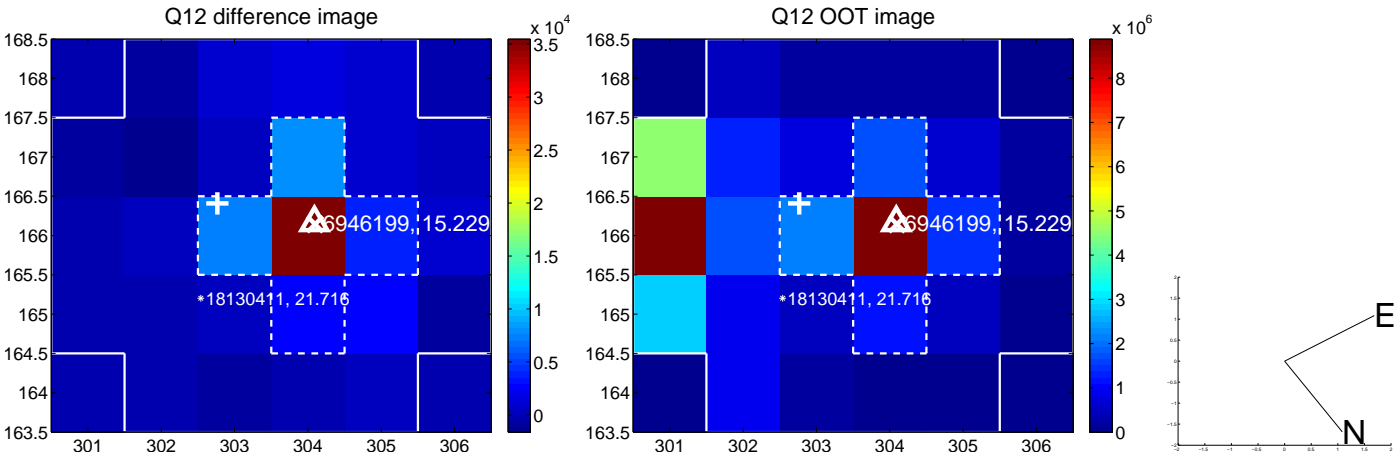
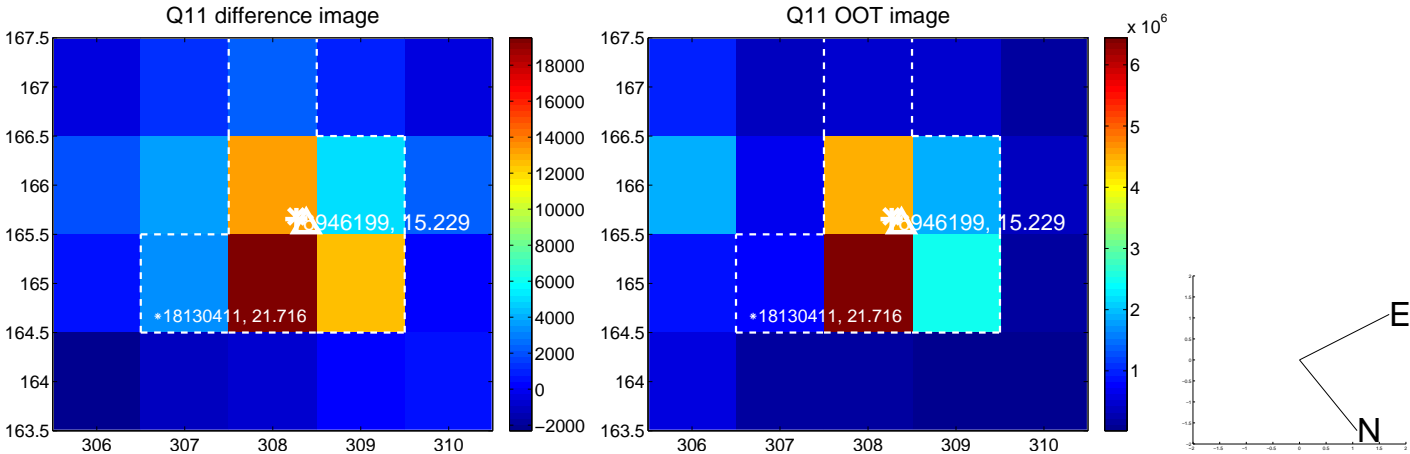
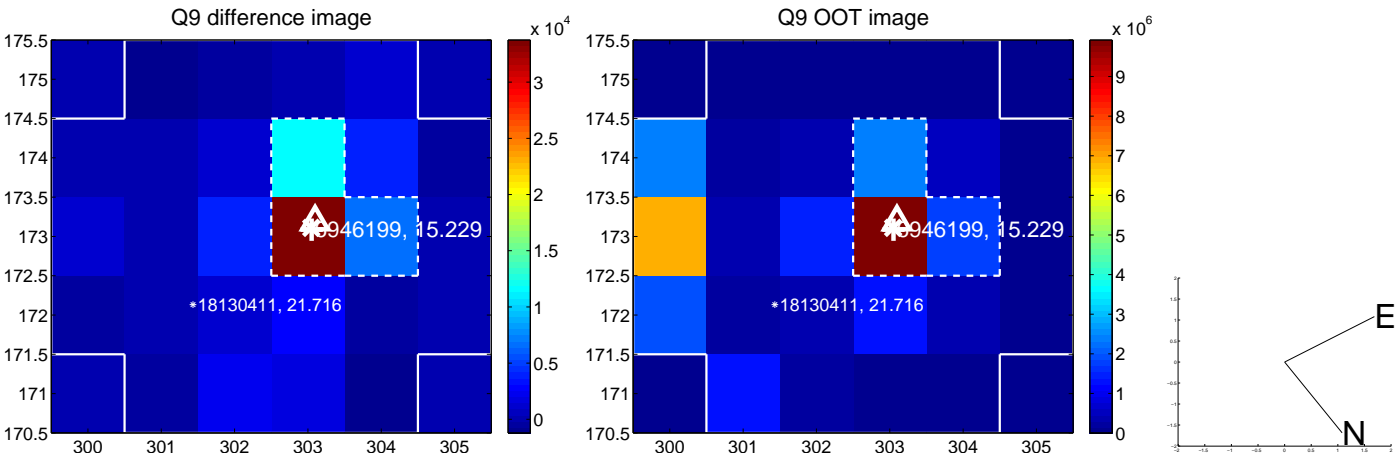


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



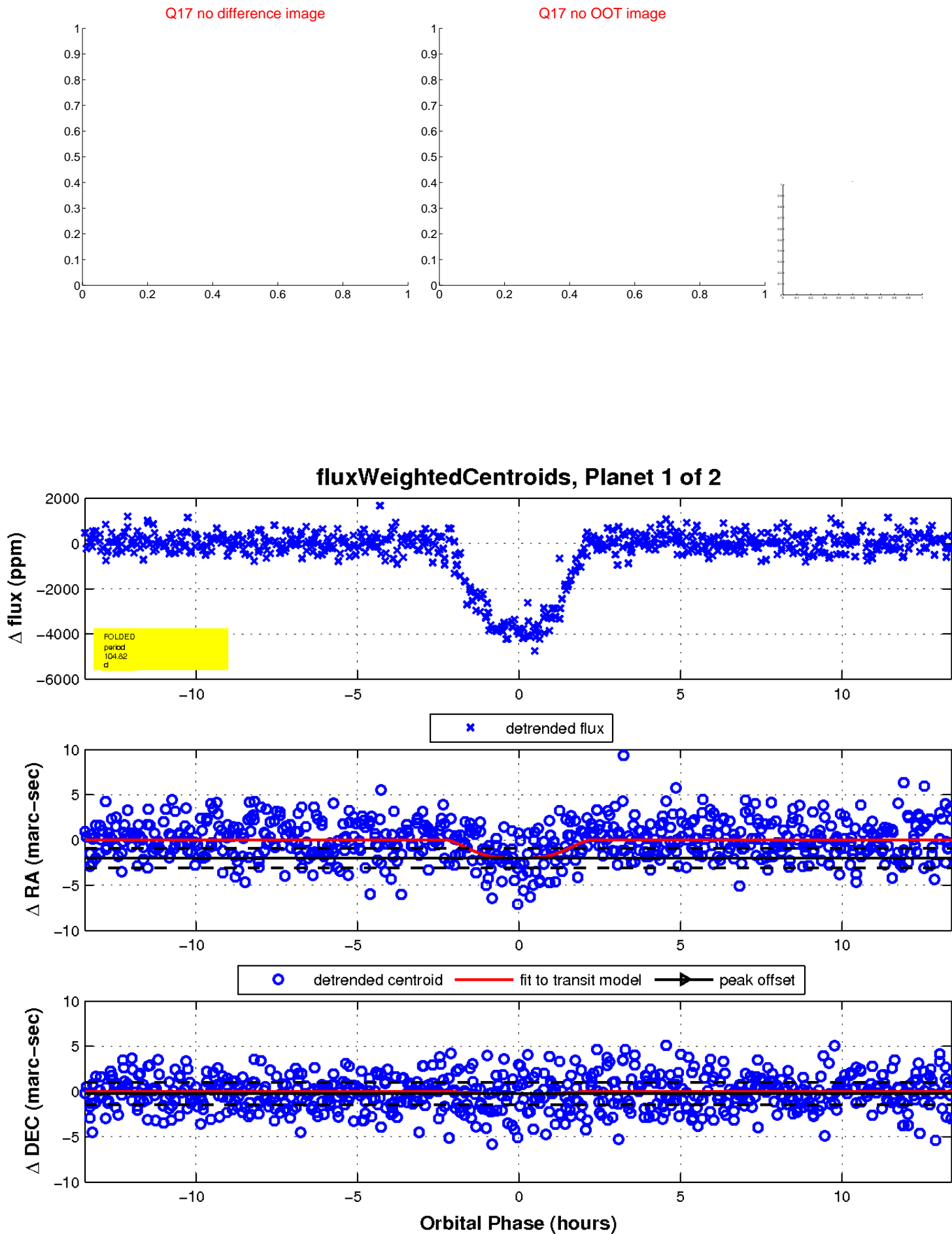


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



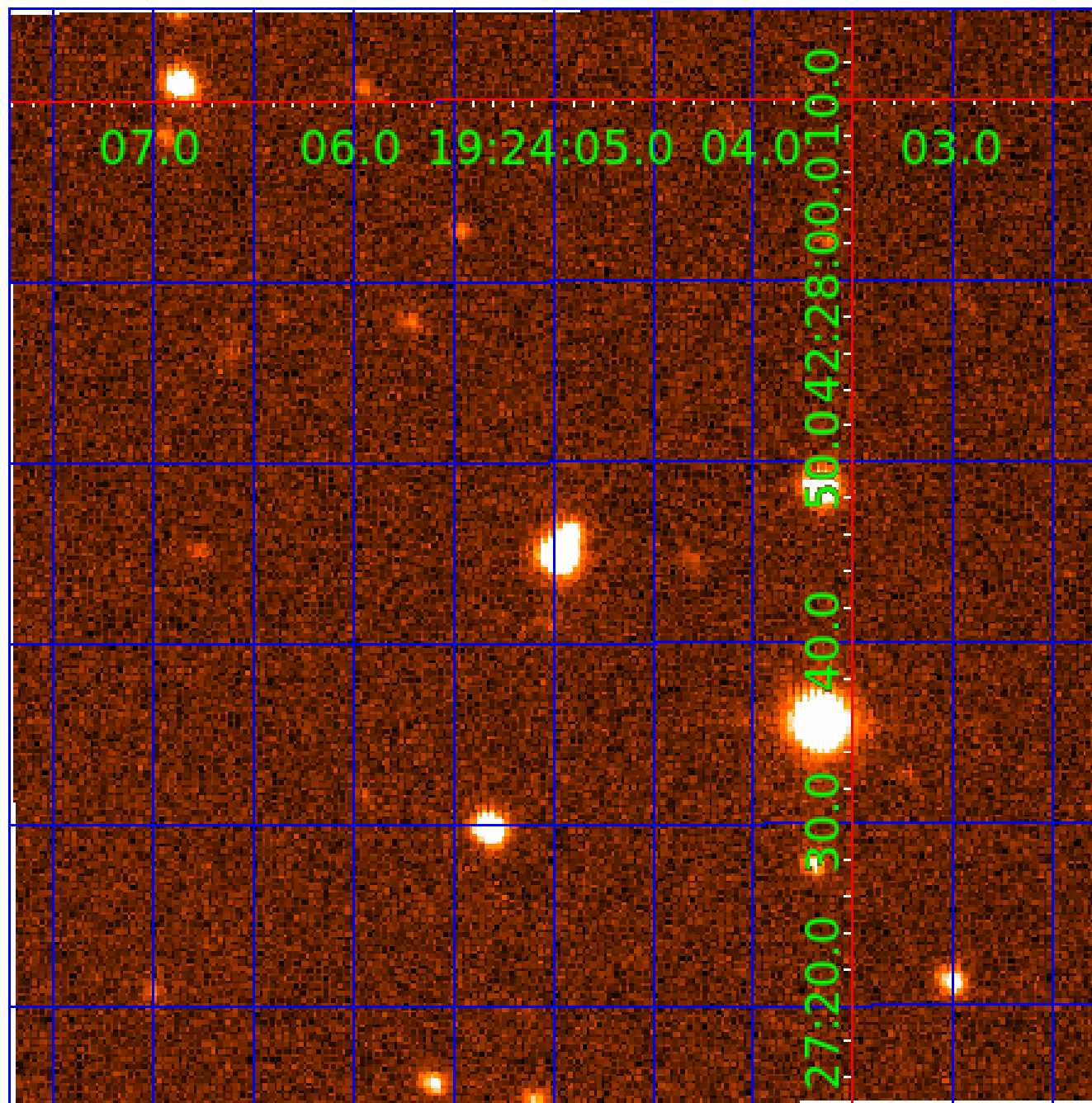


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 006946199

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006946199-01	OBS	1359.02	104.820371	165.192600	3927.7	4.480	74.5	73.2	0.85	5986	6.41	4.75
006946199-02	OBS	1359.01	37.101148	147.873251	1342.2	5.699	47.8	51.2	0.85	5986	3.33	18.99

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006946199-01	OBS	PC	1.00	0	0	0	0	CENT_KIC_POS
006946199-02	OBS	PC	1.00	0	0	0	0	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.

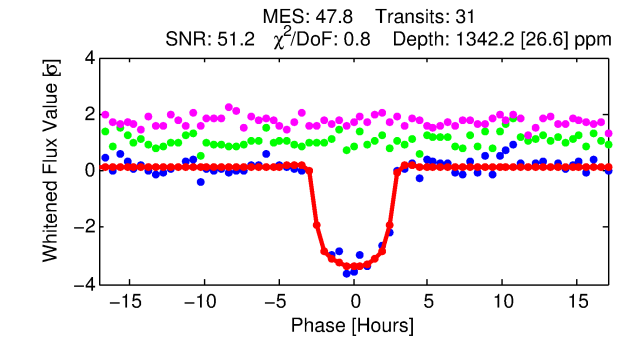
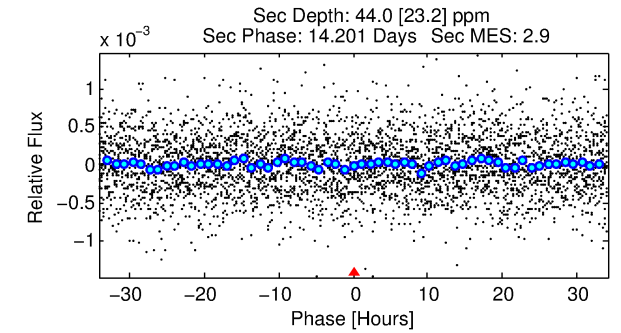
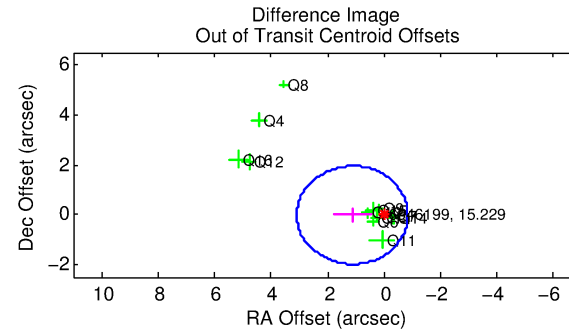
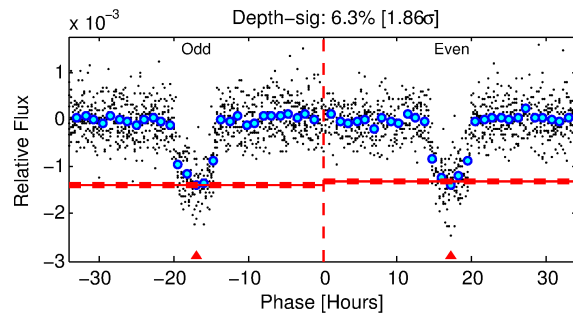
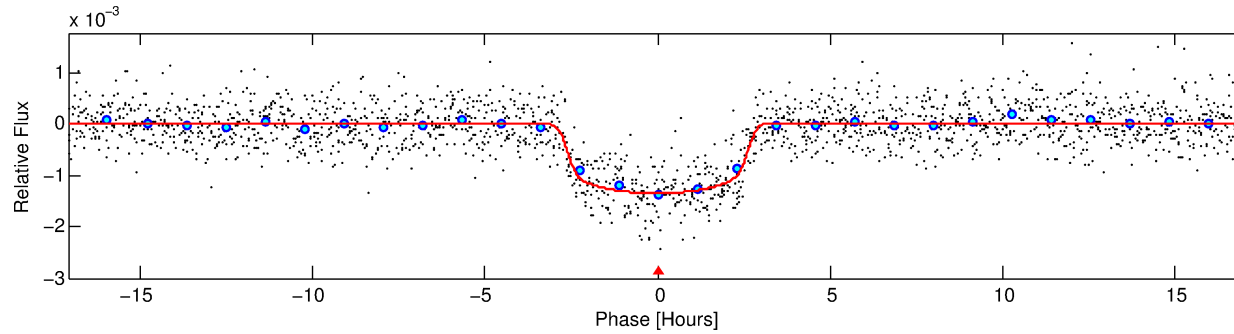
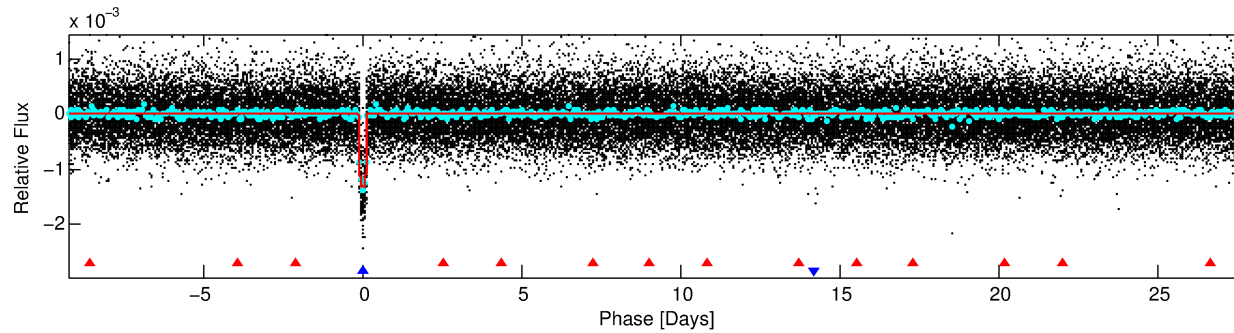
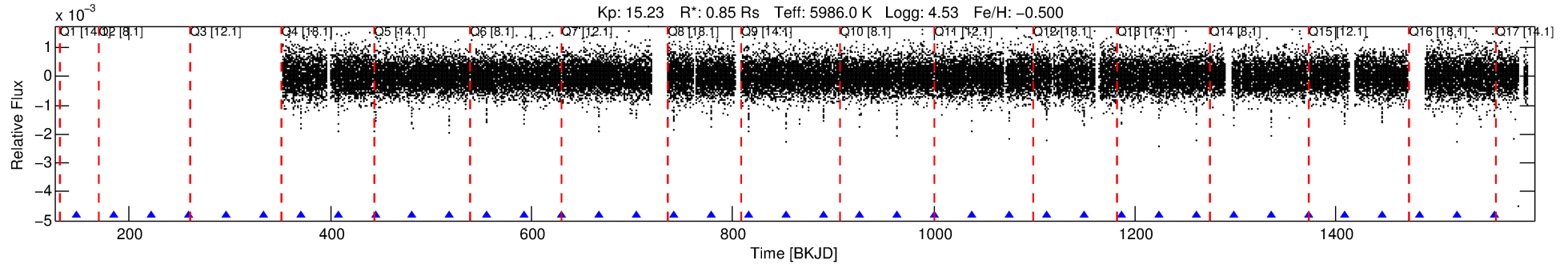
## Ephemeris Match Information For 006946199-02

No Significant Match Found

# DV One-Page Summary

KIC: 6946199 Candidate: 2 of 2 Period: 37.101 d

KOI: K01359.01 Corr: 0.994



## DV Fit Results:

Period = 37.10115 [0.00012] d  
Epoch = 147.8733 [0.0029] BKJD  
Rp/R\* = 0.0359 [0.0028]  
a/R\* = 37.95 [14.59]  
b = 0.70 [0.28]  
Seff = 18.99 [7.14]  
Teq = 532 [50] K  
Rp = 3.33 [0.95] Re  
a = 0.2092 [0.0492] AU  
Ag = 95.51 [62.13] [1.52 $\sigma$ ]  
Teffp = 2573 [366] K [5.53 $\sigma$ ]

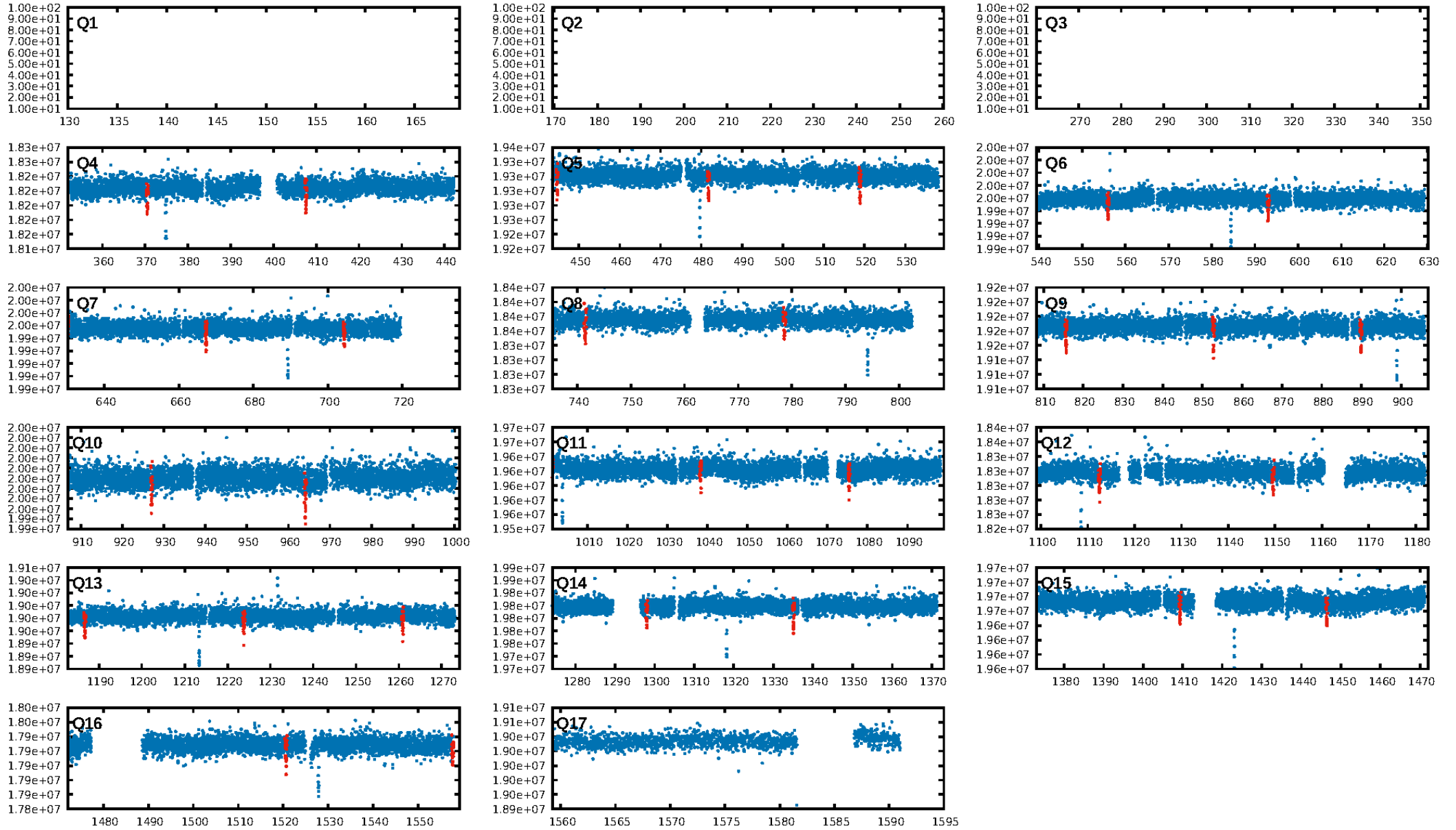
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [224.21 $\sigma$ ]  
ModelChiSquare2-sig: 9.3%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [31/31]  
GhostDiagnostic-chr: 3.994  
Centroid-sig: 1.0%  
Centroid-so: 0.081 arcsec [0.30 $\sigma$ ]  
OotOffset-rm: 1.123 arcsec [1.71 $\sigma$ ]  
KicOffset-rm: 0.095 arcsec [0.76 $\sigma$ ]  
OotOffset-st: 3/3/4/2 [12]  
KicOffset-st: 3/3/4/2 [12]  
DiffImageQuality-fgm: 1.00 [12/12]  
DiffImageOverlap-fno: 1.00 [13/13]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 06:59:00 Z

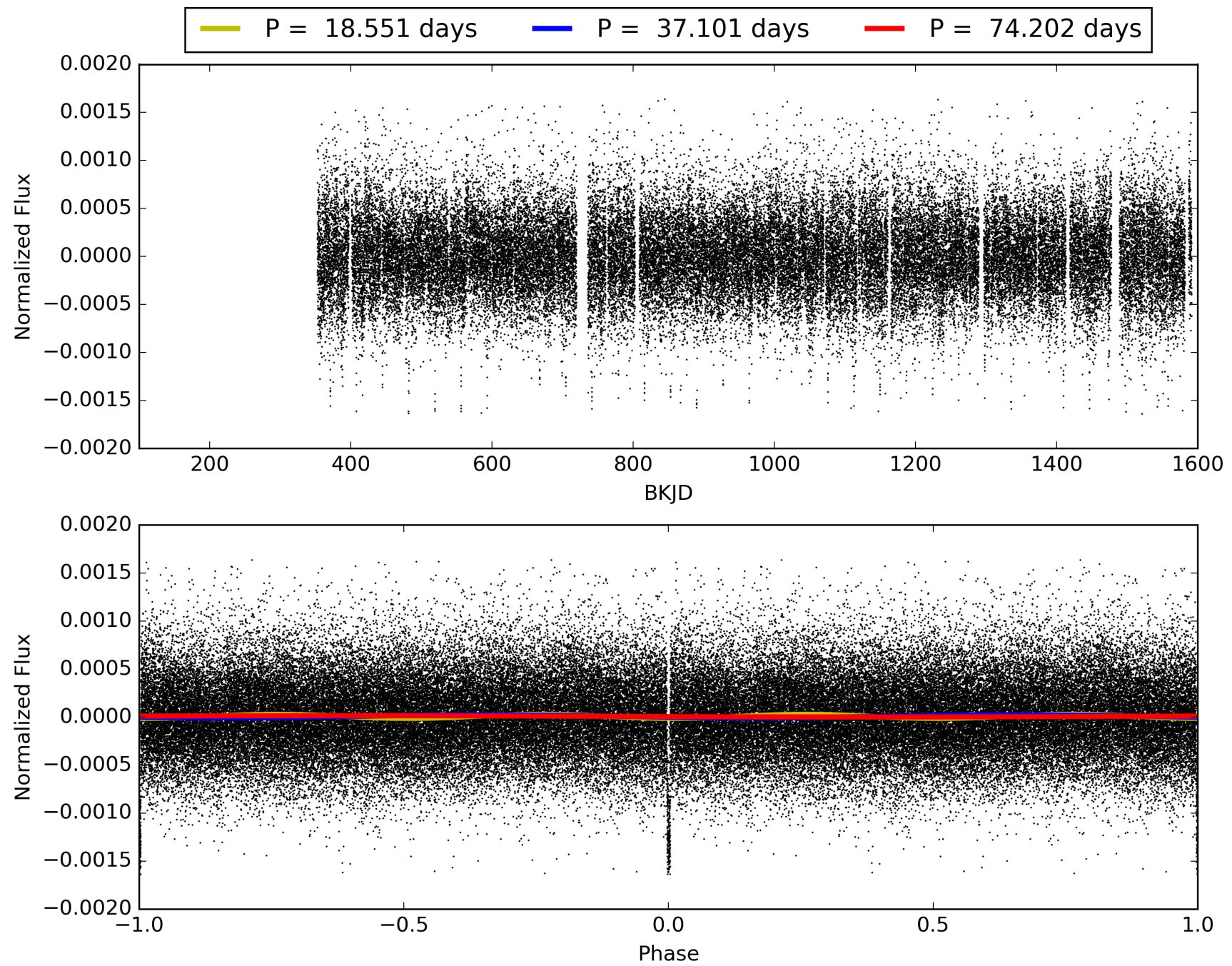
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006946199-02, PDC Light Curves





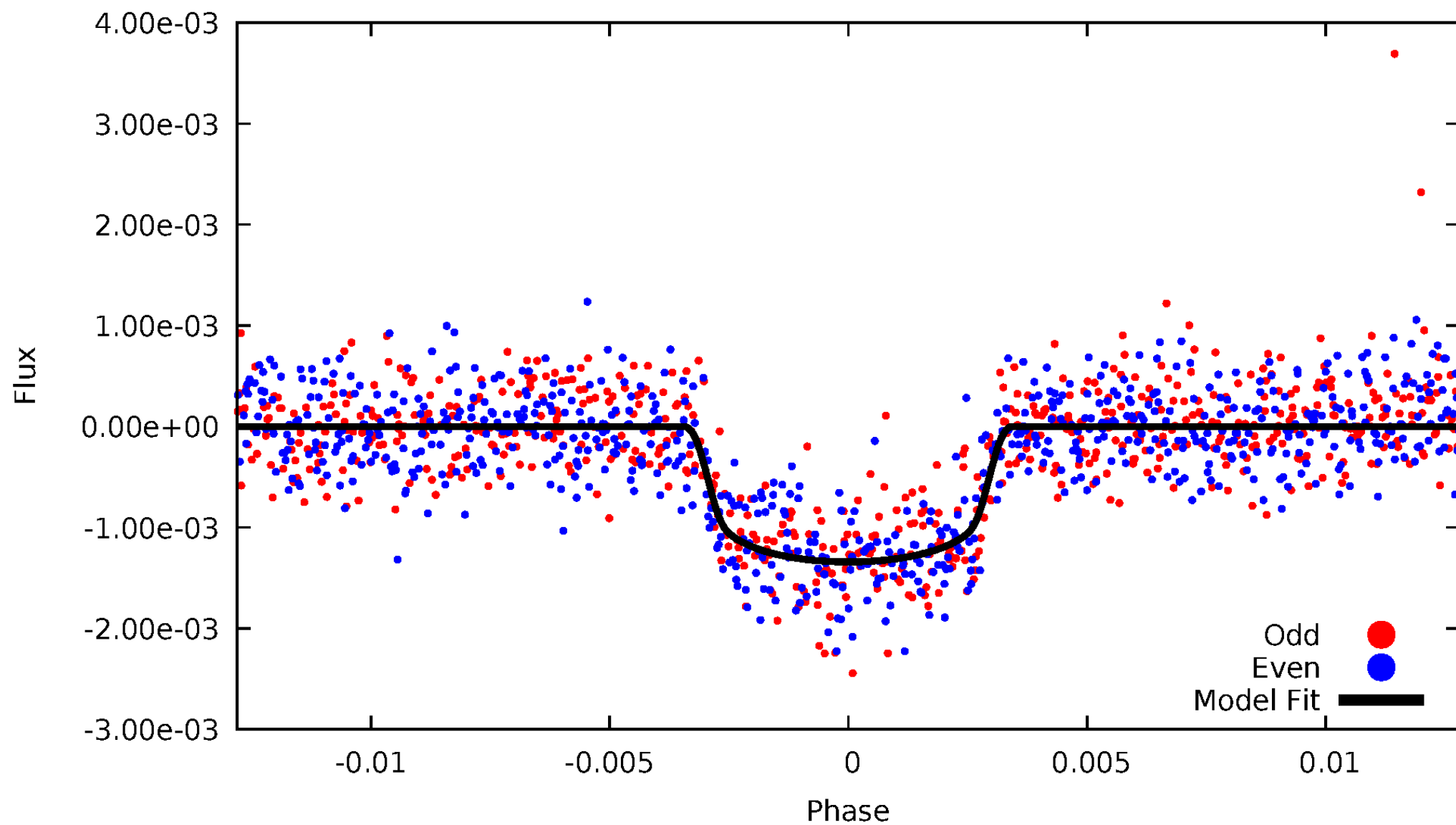
TCE 006946199-02





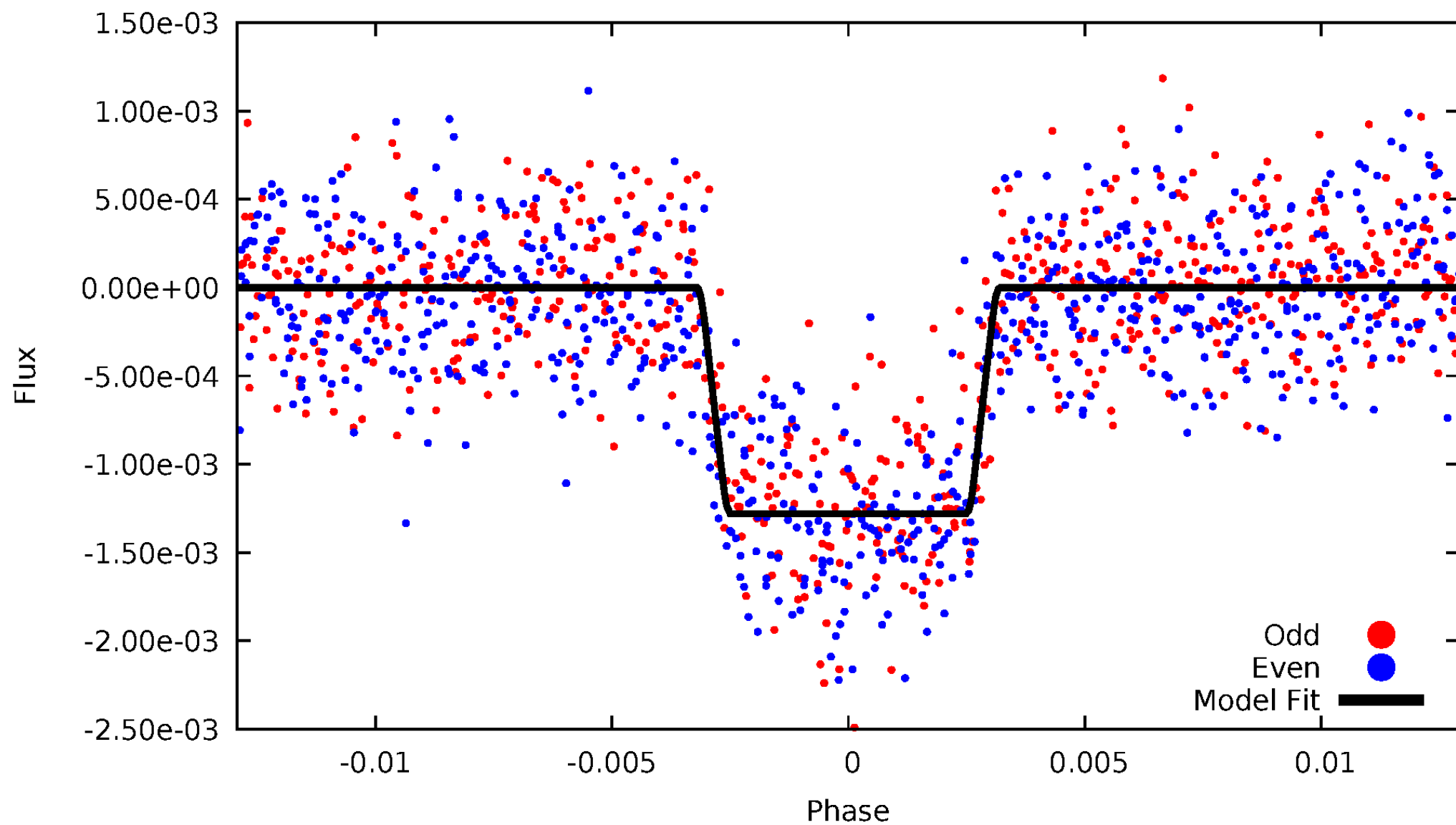
# DV Odd/Even

TCE 006946199-02



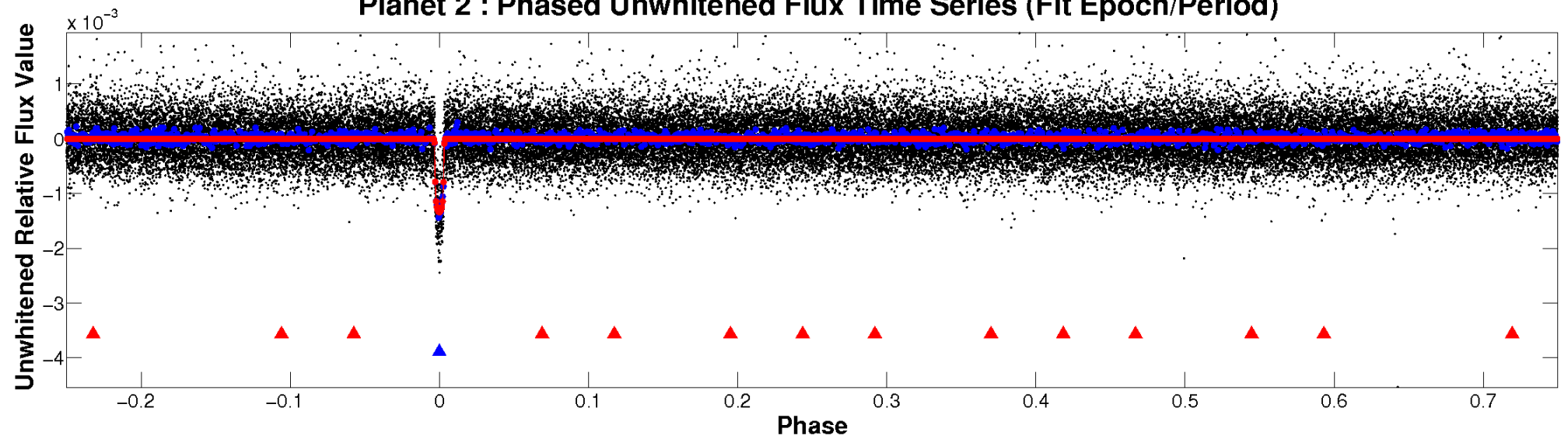
# ALT Odd/Even

TCE 006946199-02

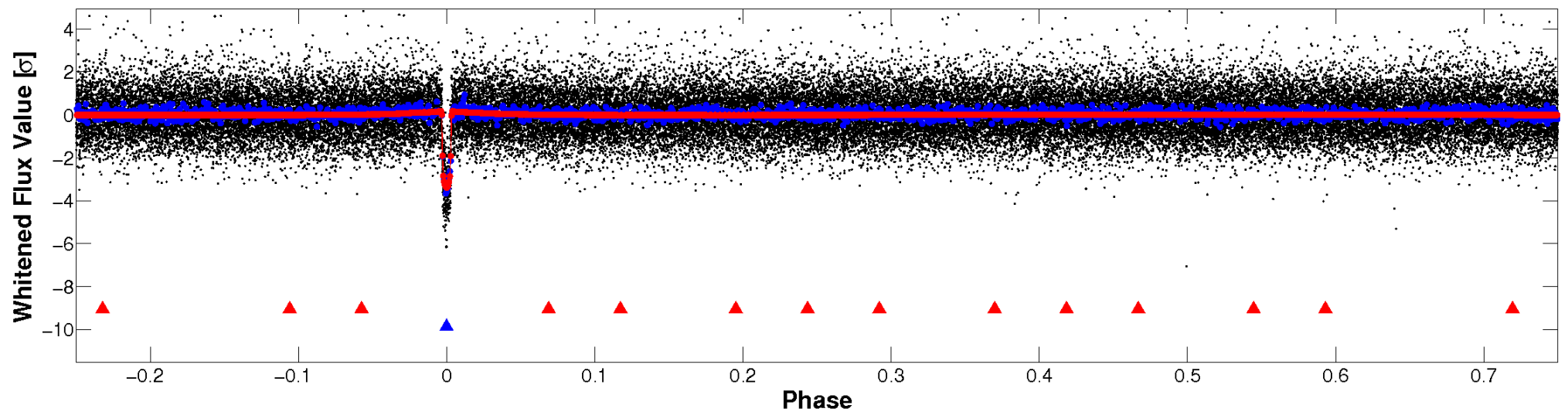


# Non-Whitened Vs. Whitened Light Curve

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

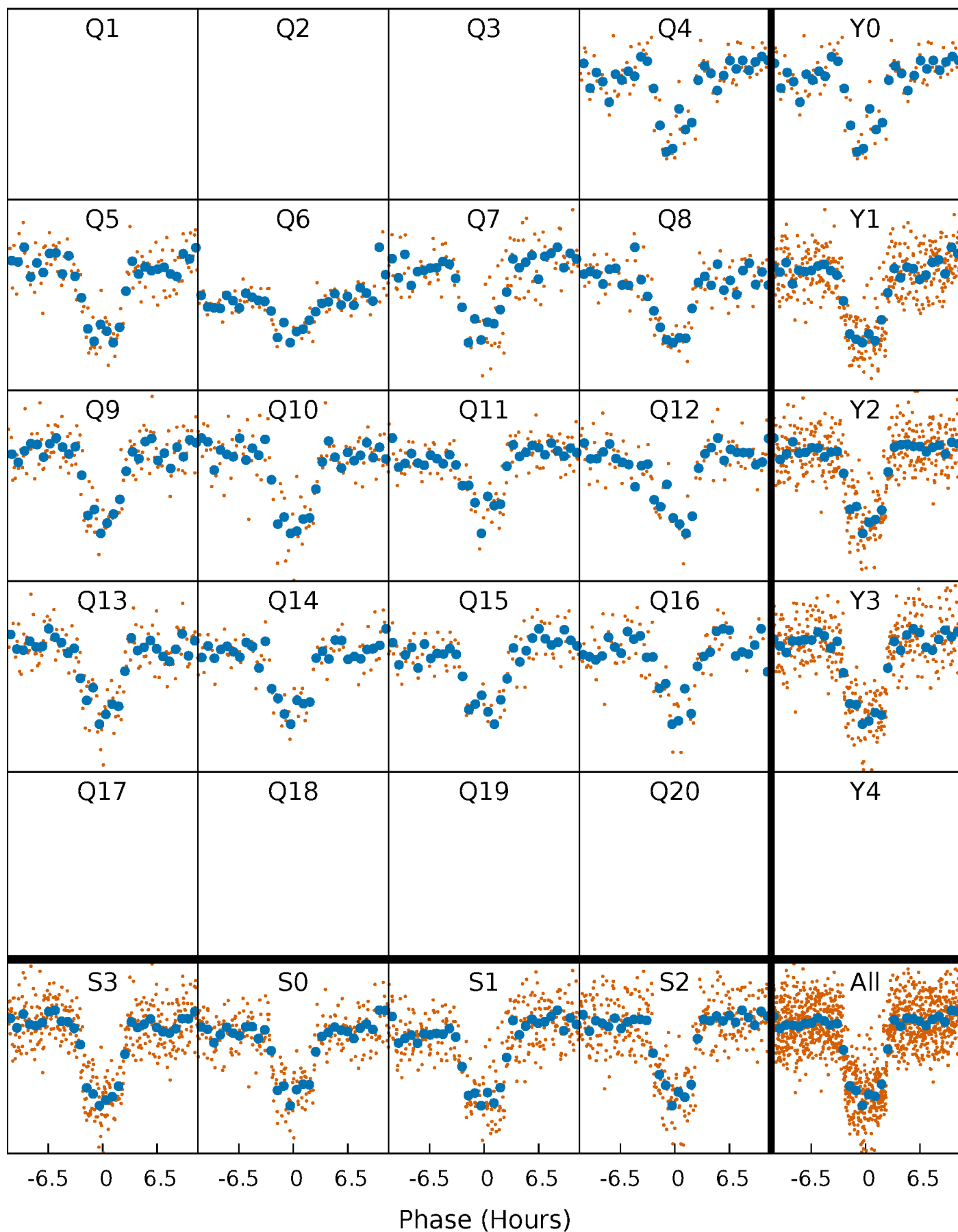


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



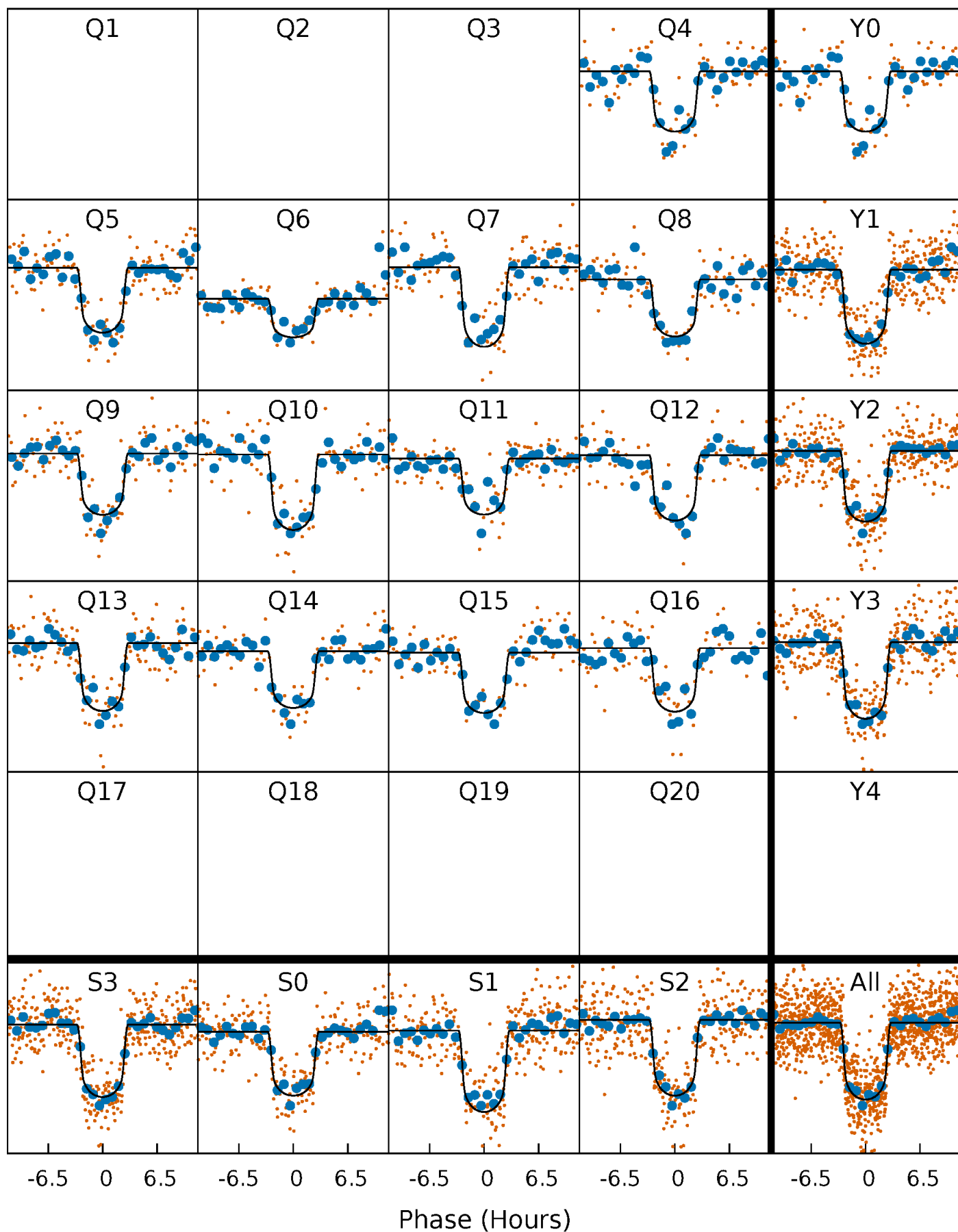
# PDC Quarter-Phased Transit Curves

TCE 006946199-02   P= 37.101148 Days    $T_0=147.873251$  (BKJD)



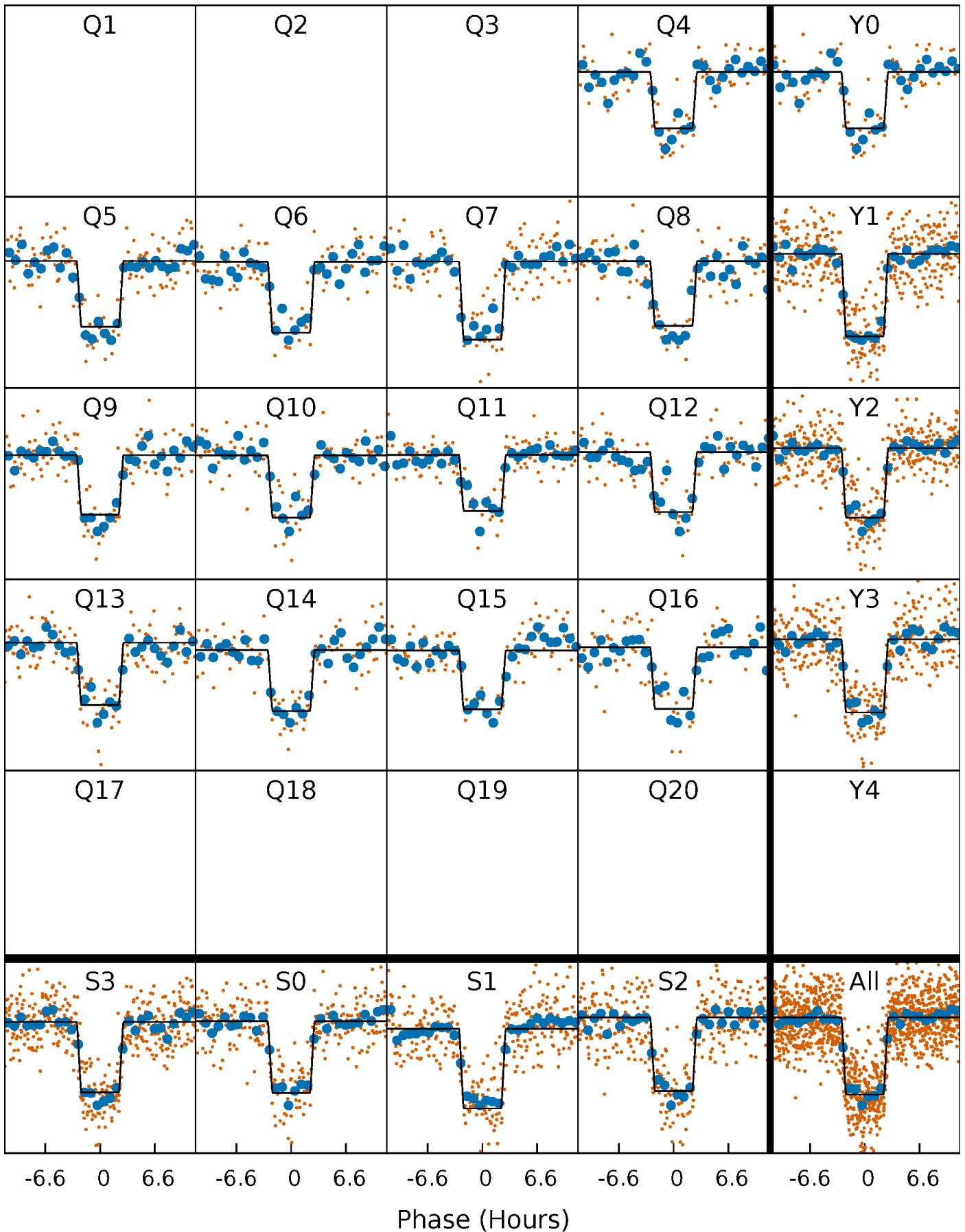
# DV Quarter-Phased Transit Curves

TCE 006946199-02 P= 37.101148 Days  $T_0=147.873251$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

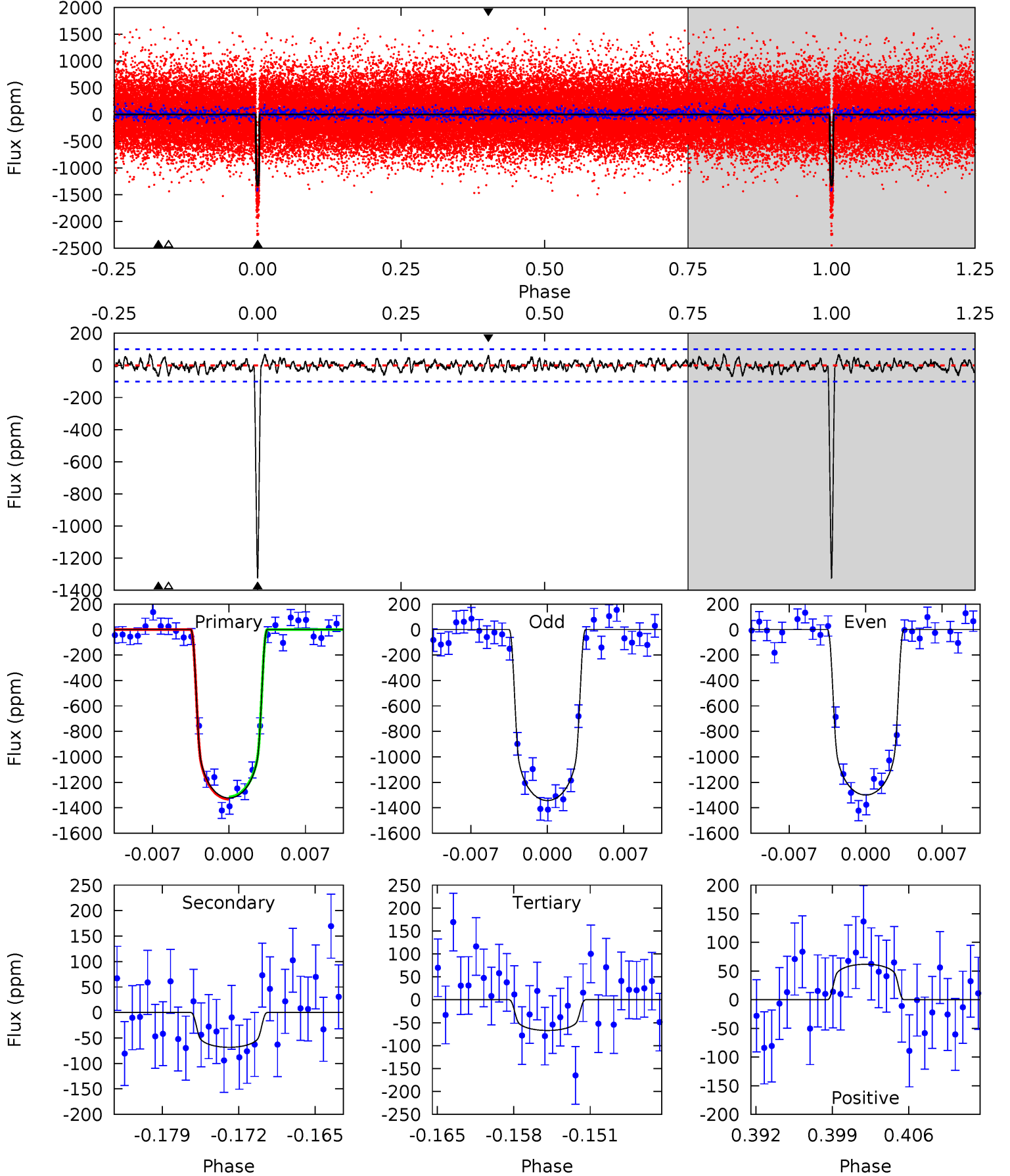
TCE 006946199-02 P= 37.100947 Days  $T_0=147.877686$  (BKJD)



# DV Model-Shift Uniqueness Test

006946199-02, P = 37.101148 Days, E = 147.873251 Days

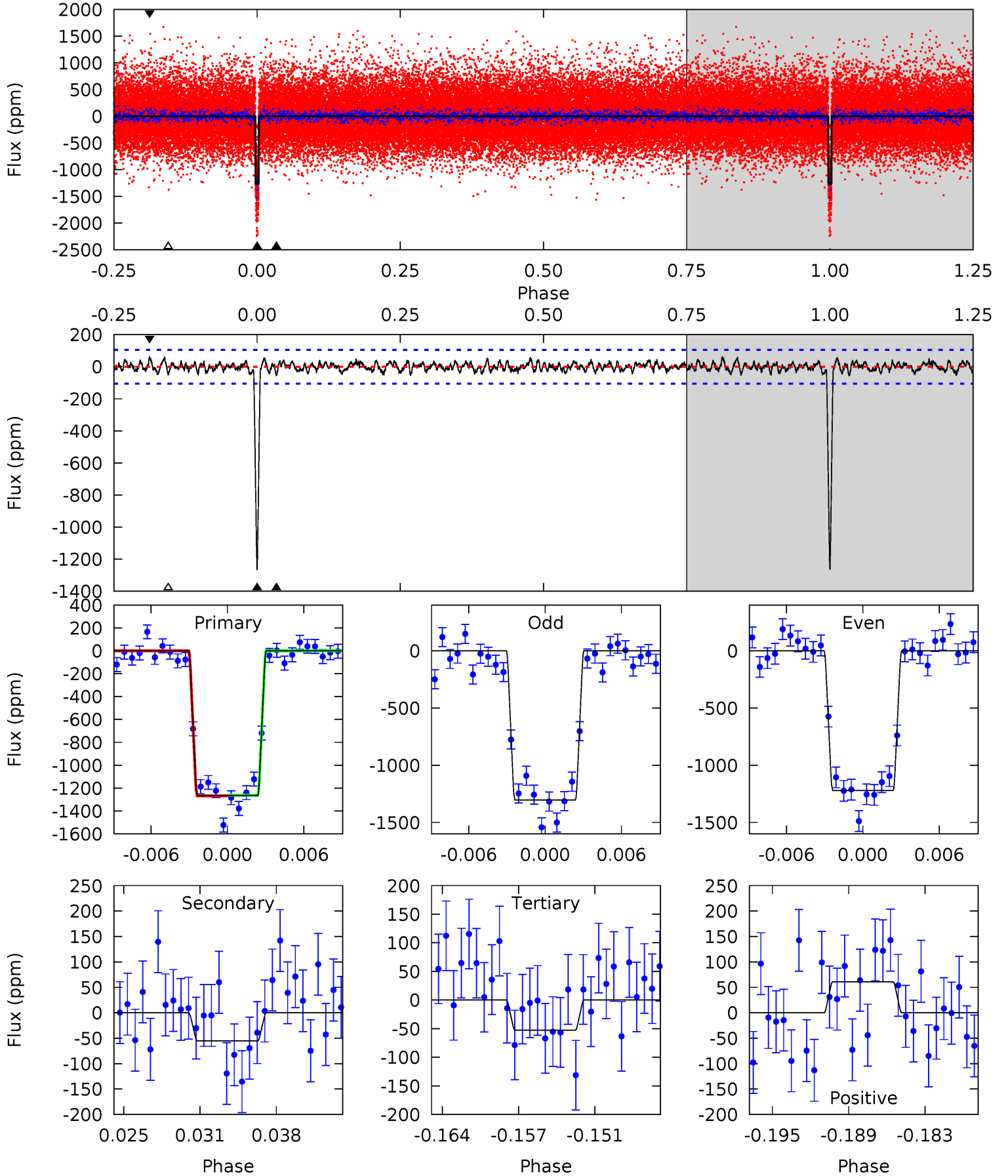
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
66.8	3.45	3.38	3.13	5.10	2.70	1.12	63.4	63.7	0.07	0.32	1.09	0.96	0.05	0.44



# Alt Model-Shift Uniqueness Test

006946199-02, P = 37.100947 Days, E = 147.877686 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
61.3	2.67	2.54	2.95	5.11	2.73	0.98	58.7	58.3	0.12	-0.28	2.01	1.00	0.05	0.13





### Stellar Parameters For KIC 006946199

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5986^{+179}_{-215}$	$4.527^{+0.060}_{-0.192}$	$-0.500^{+0.300}_{-0.300}$	$0.850^{+0.234}_{-0.094}$	$0.886^{+0.099}_{-0.099}$	$2.034^{+0.535}_{-1.031}$
	+3%/-4%	+1%/-4%	+60%/-60%	+28%/-11%	+11%/-11%	+26%/-51%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 006946199-02 / KOI 1359.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-68 \pm 20$	$3.44^{+0.56}_{-0.41}$	$756^{+53}_{-36}$	$3390^{+196}_{-200}$	$135^{+61}_{-48}$
Alt.	$-55 \pm 21$	$3.42^{+0.54}_{-0.39}$	$756^{+51}_{-39}$	$3282^{+213}_{-258}$	$108^{+63}_{-45}$

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

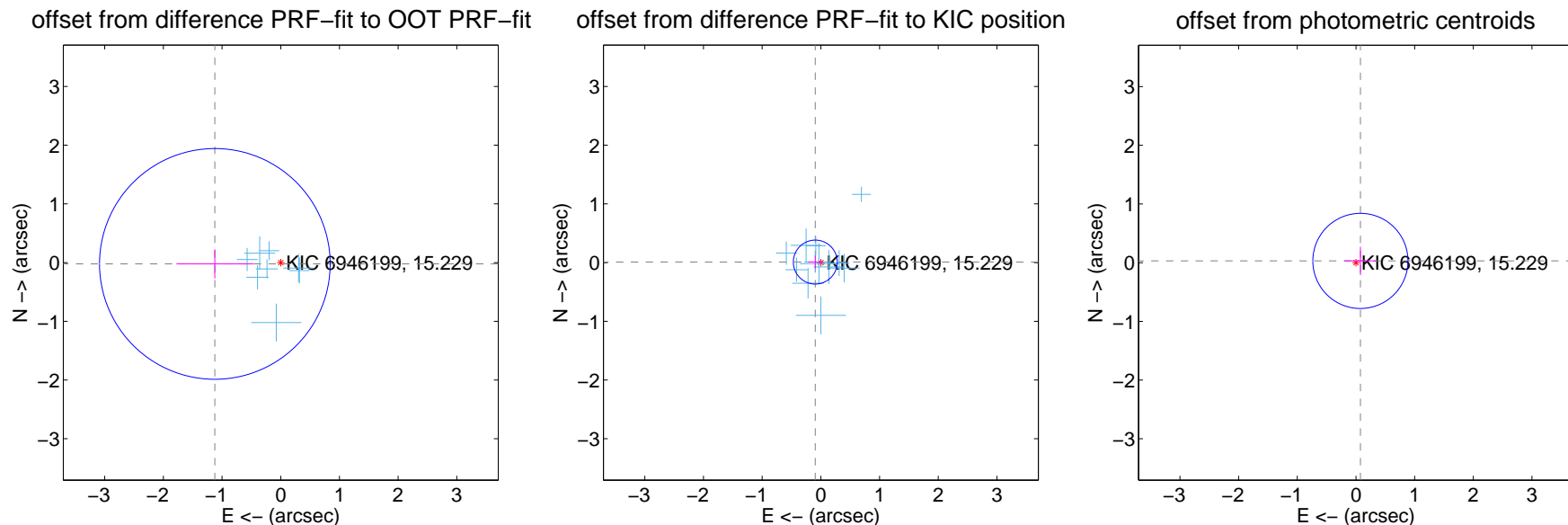
## DV Centroid Data

Supplemental centroid analysis for 006946199-02. Kepler magnitude: 15.23. Transit SNR 51.24

There are 12 quarters with good PRF difference image offsets

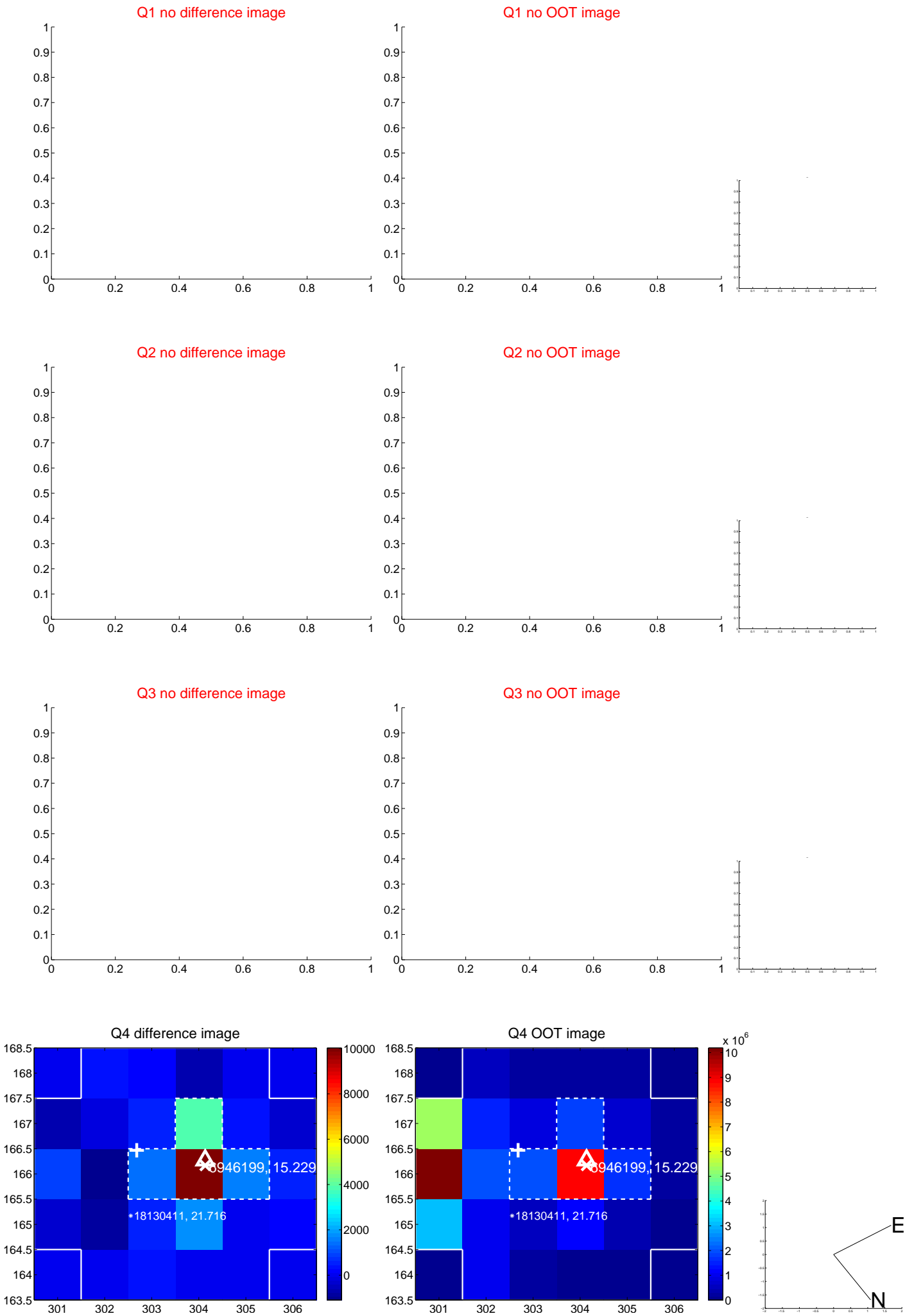
The OOT PRF centroid is offset from the target star catalog position by about 5.57 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.123 \pm 0.655$	1.71	$1.123 \pm 0.655$	$-0.023 \pm 0.247$
PRF-fit source offset from KIC position	$0.095 \pm 0.125$	0.76	$0.095 \pm 0.125$	$0.009 \pm 0.107$
photometric centroid source offset	$0.08 \pm 0.27$	0.30	$-0.08 \pm 0.27$	$0.03 \pm 0.24$

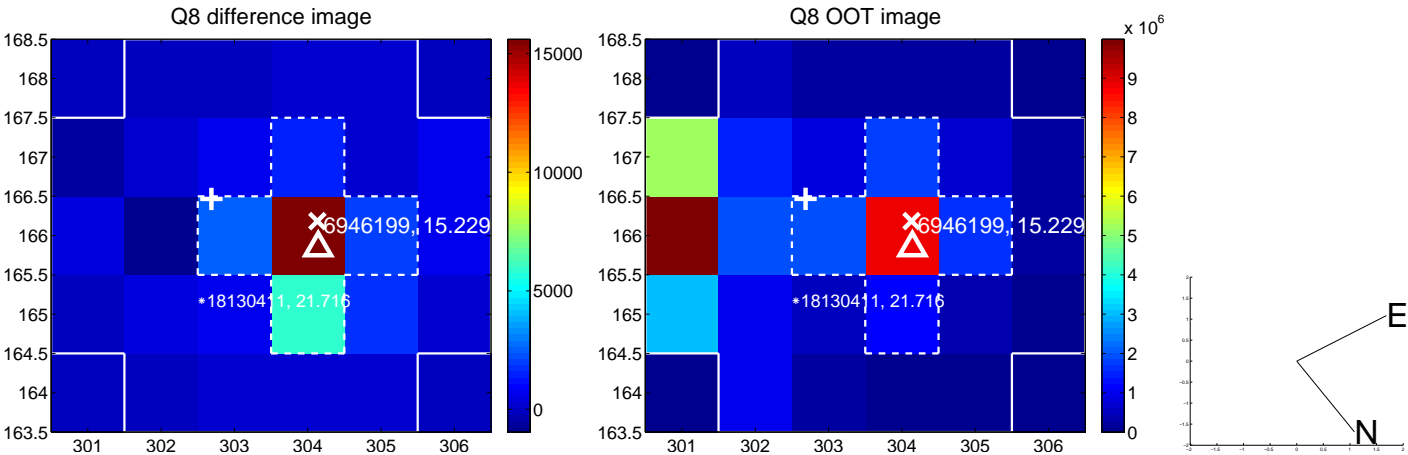
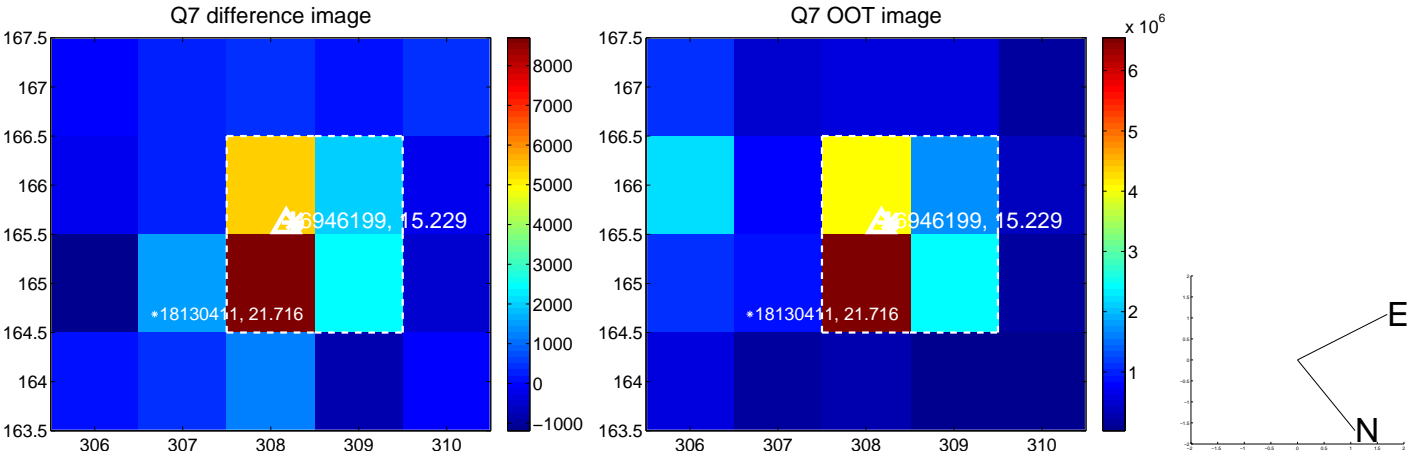
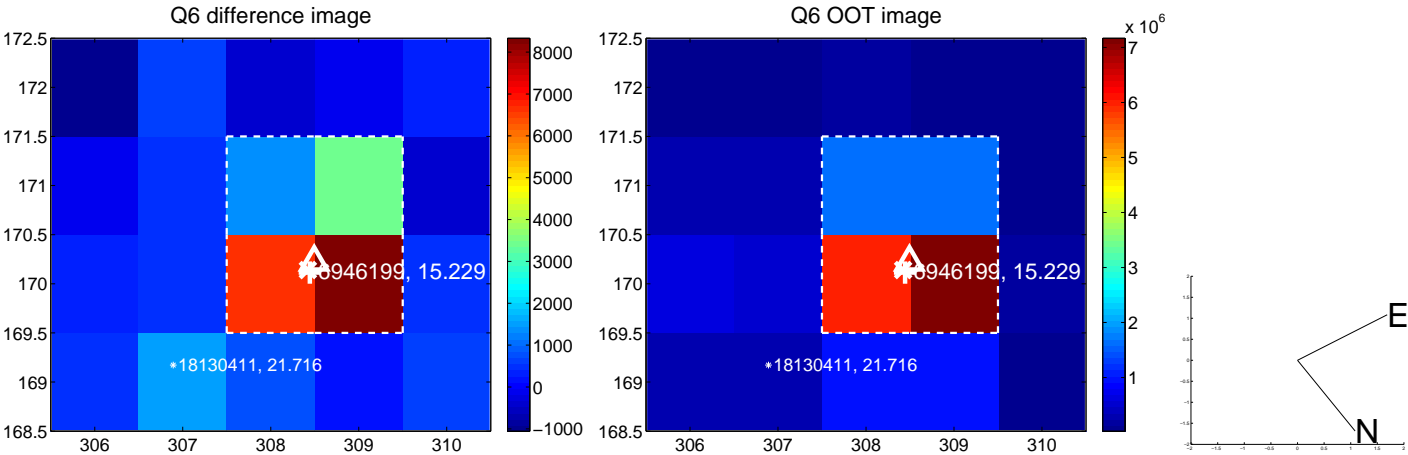
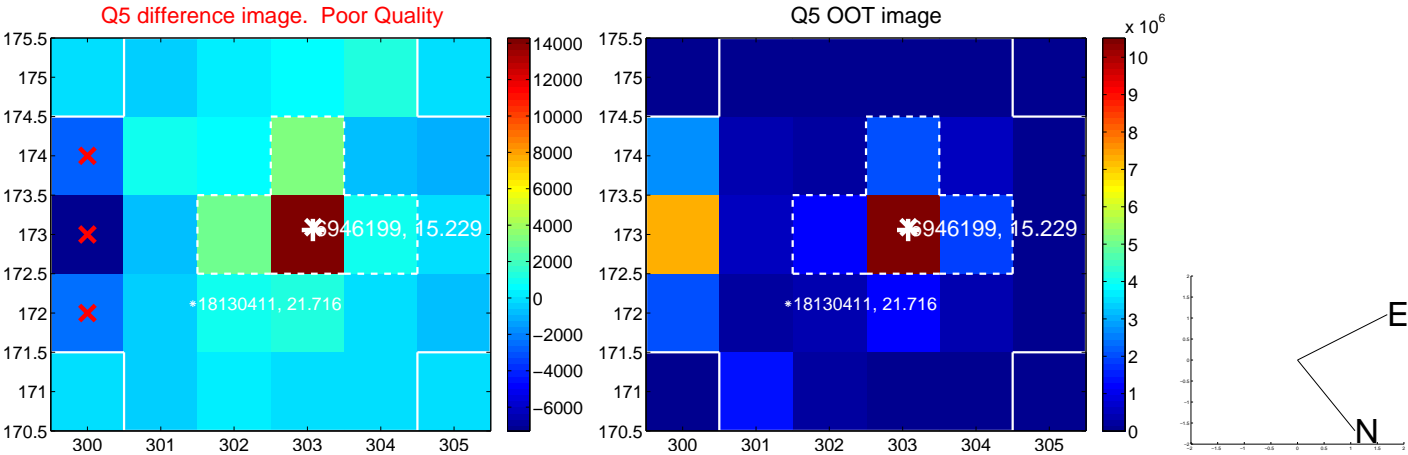


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

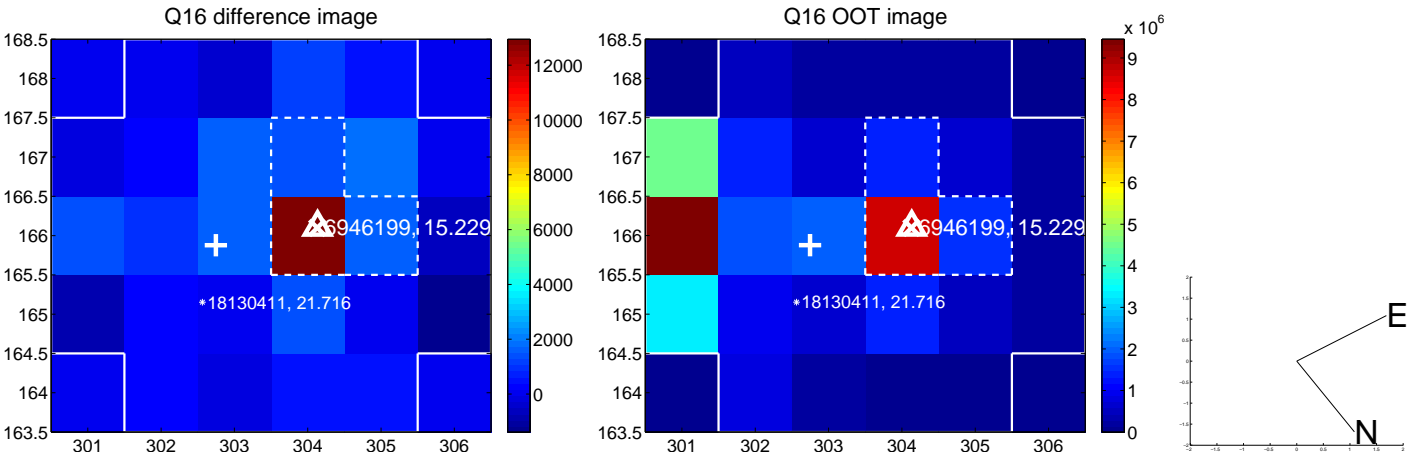
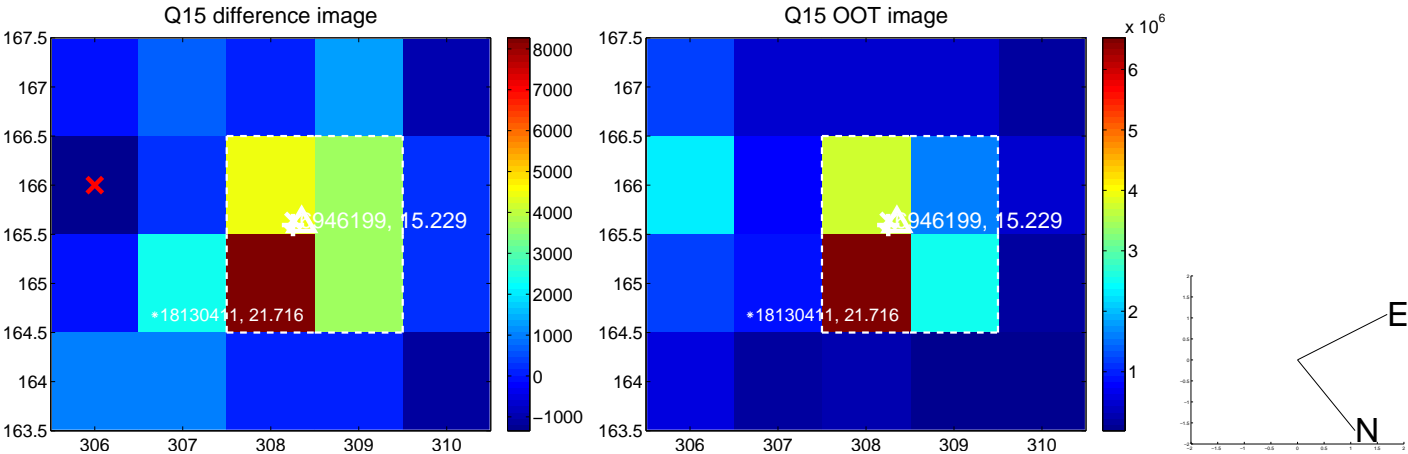
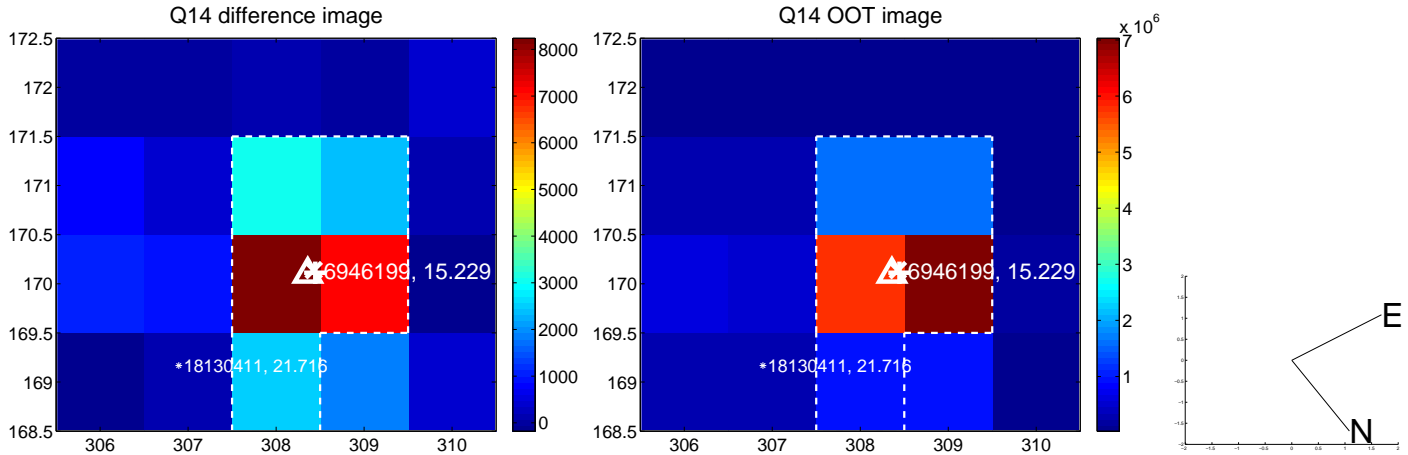
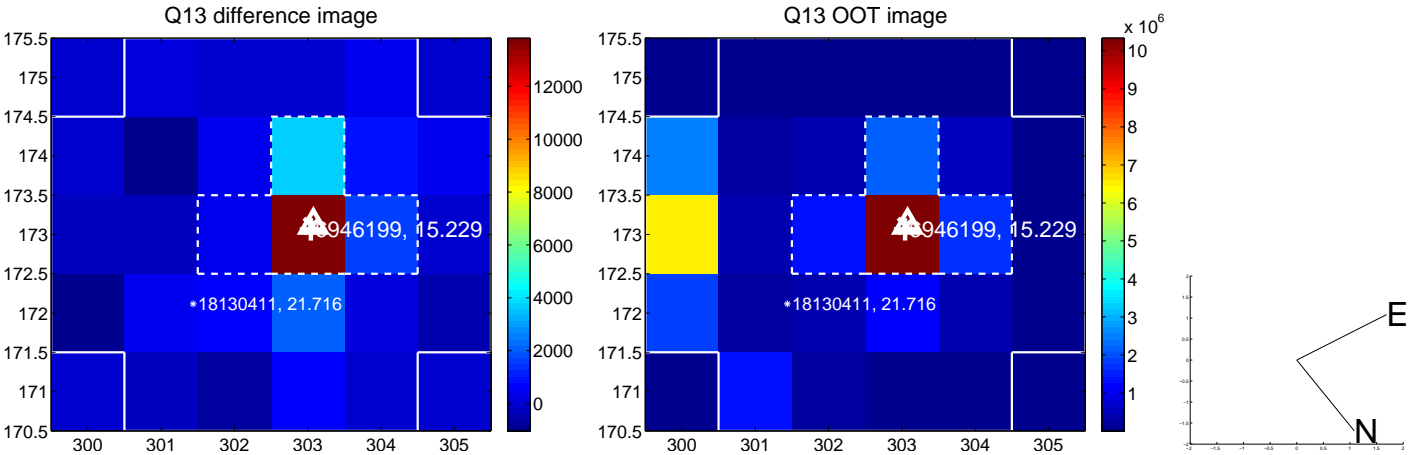


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

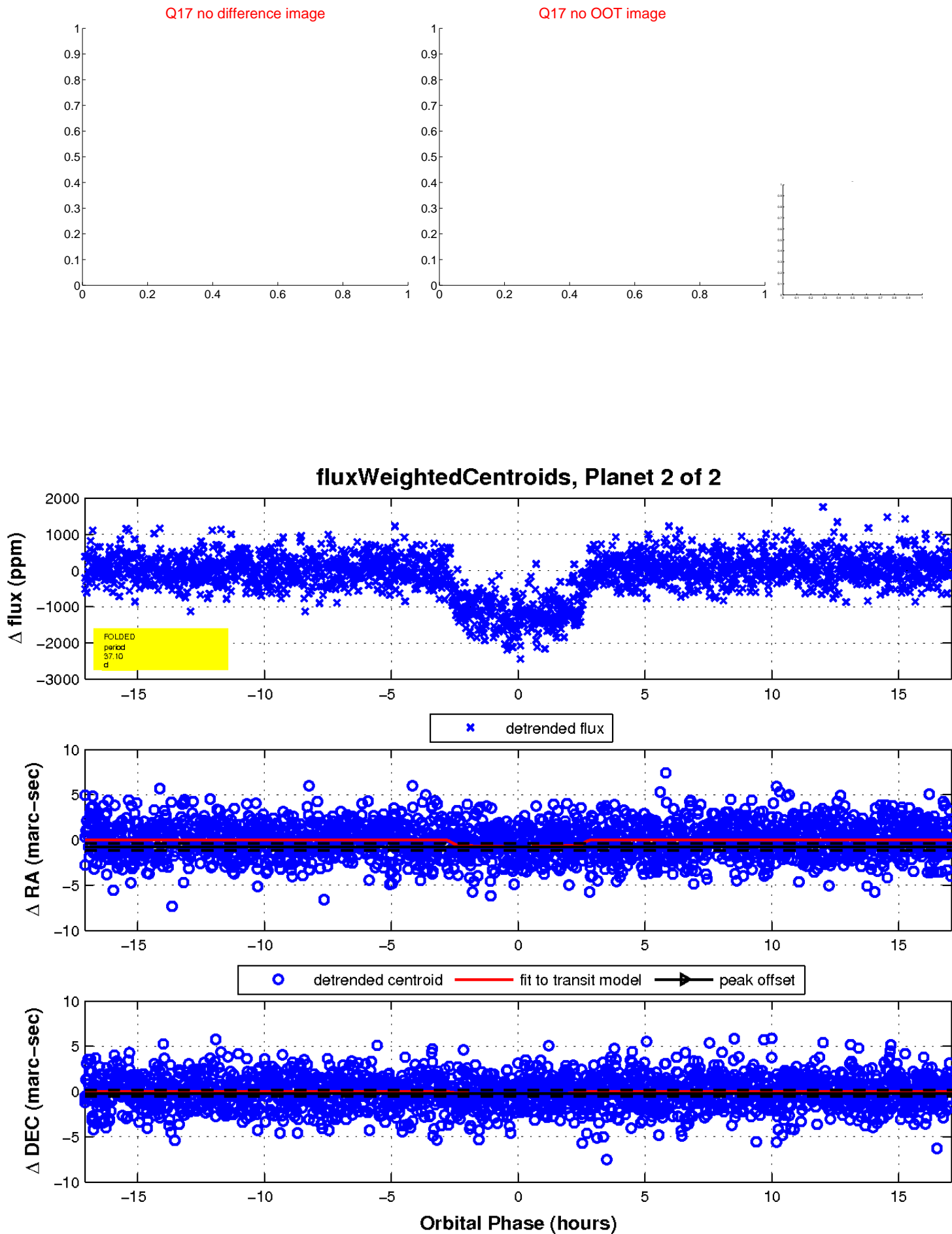




white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image

Declination

