

# KIC 011601584

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011601584-01	OBS	1831.01	51.810507	182.962079	1050.1	7.029	46.6	45.1	0.83	5191	3.22	6.72
011601584-02	OBS	1831.02	4.385319	134.847732	196.9	2.586	21.8	23.9	0.83	5191	1.41	180.81
011601584-03	OBS	1831.04	13.979438	142.339329	337.7	1.304	11.7	14.7	0.83	5191	2.00	38.54
011601584-04	OBS	1831.03	34.193704	148.891071	194.5	7.455	10.4	11.5	0.83	5191	1.29	11.69

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011601584-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
011601584-02	OBS	PC	0.95	0	0	0	0	NO_COMMENT
011601584-03	OBS	PC	0.98	0	0	0	0	NO_COMMENT
011601584-04	OBS	PC	0.85	0	0	0	0	NO_COMMENT

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

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

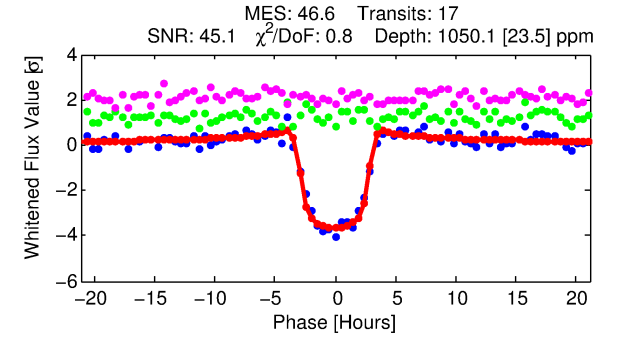
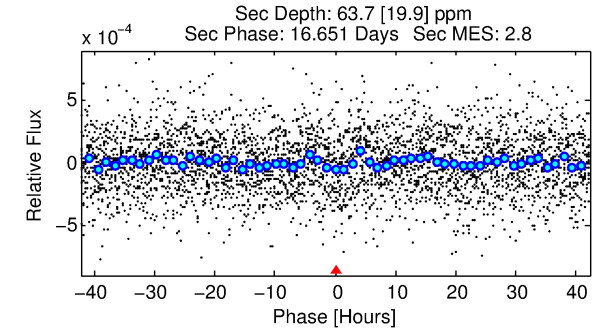
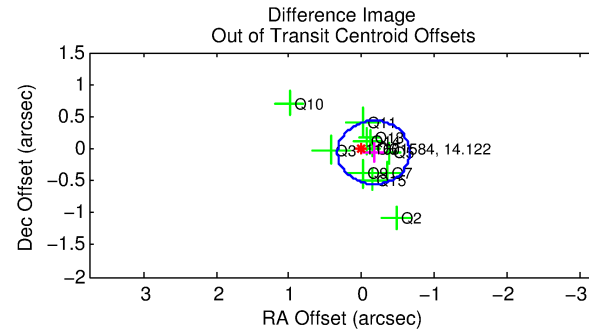
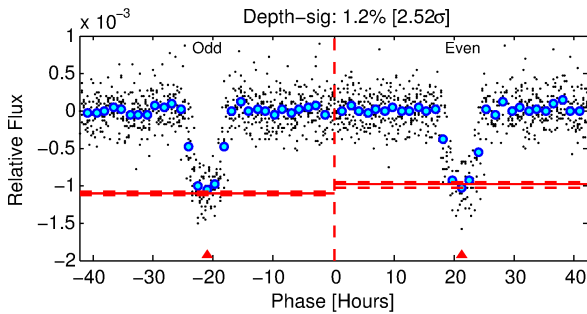
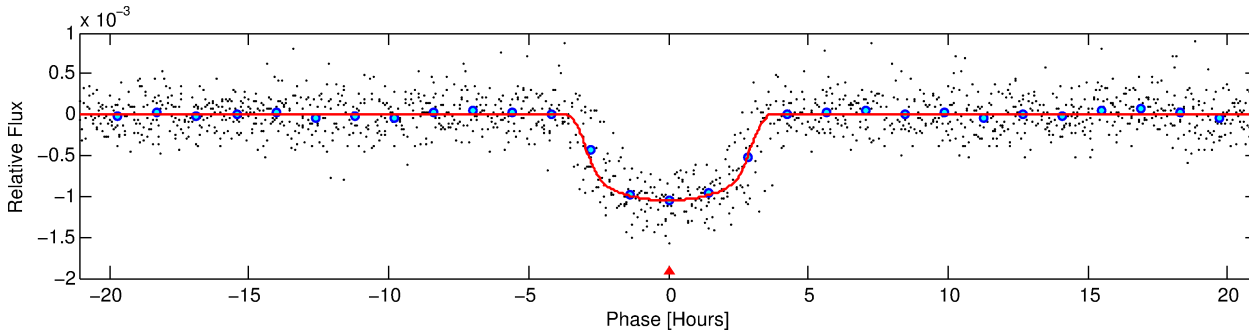
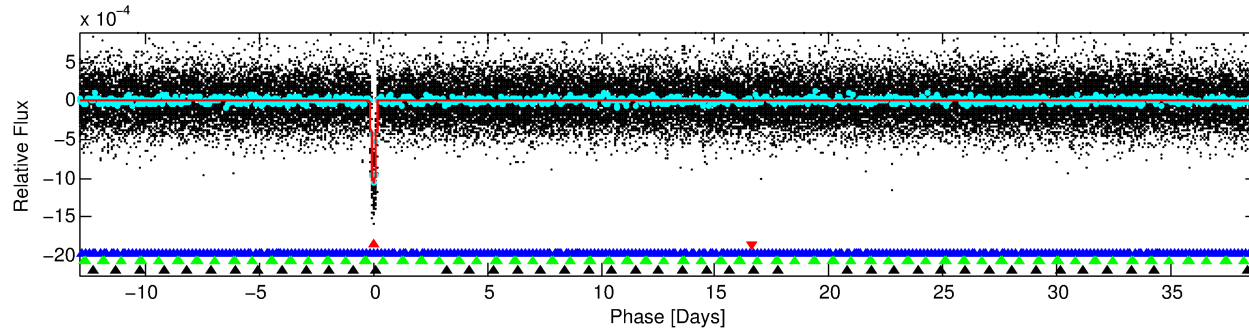
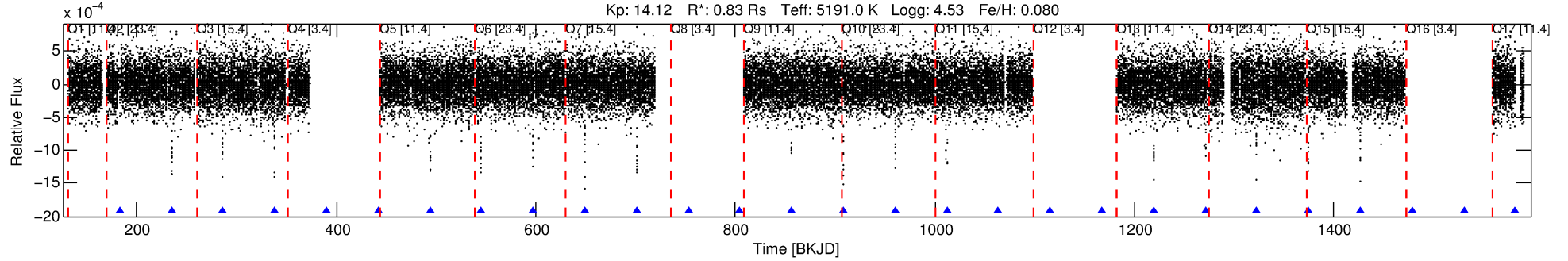
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 011601584-01

No Significant Match Found

# DV One-Page Summary

KIC: 11601584 Candidate: 1 of 4 Period: 51.811 d  
KOI: K01831.01 Name: Kepler-324c Corr: 0.965



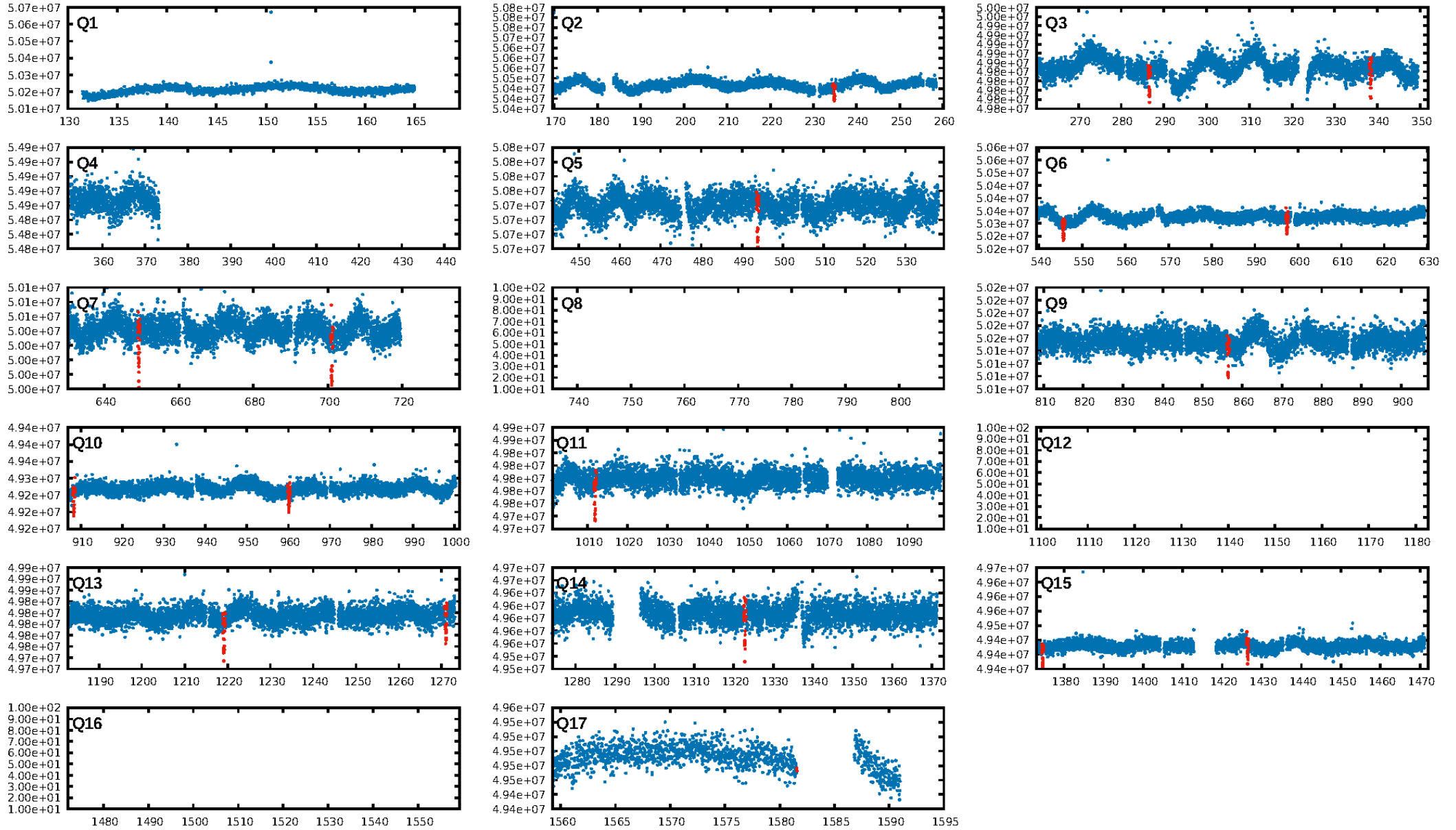
## DV Fit Results:

Period = 51.81051 [0.00020] d  
Epoch = 182.9621 [0.0030] BKJD  
Rp/R\* = 0.0357 [0.0010]  
a/R\* = 29.61 [2.84]  
b = 0.89 [0.02]  
Seff = 6.72 [0.85]  
Teq = 411 [13] K  
Rp = 3.22 [0.25] Re  
a = 0.2570 [0.0167] AU  
Ag = 223.50 [74.37] [2.99σ]  
Teffp = 2454 [201] K [10.14σ]

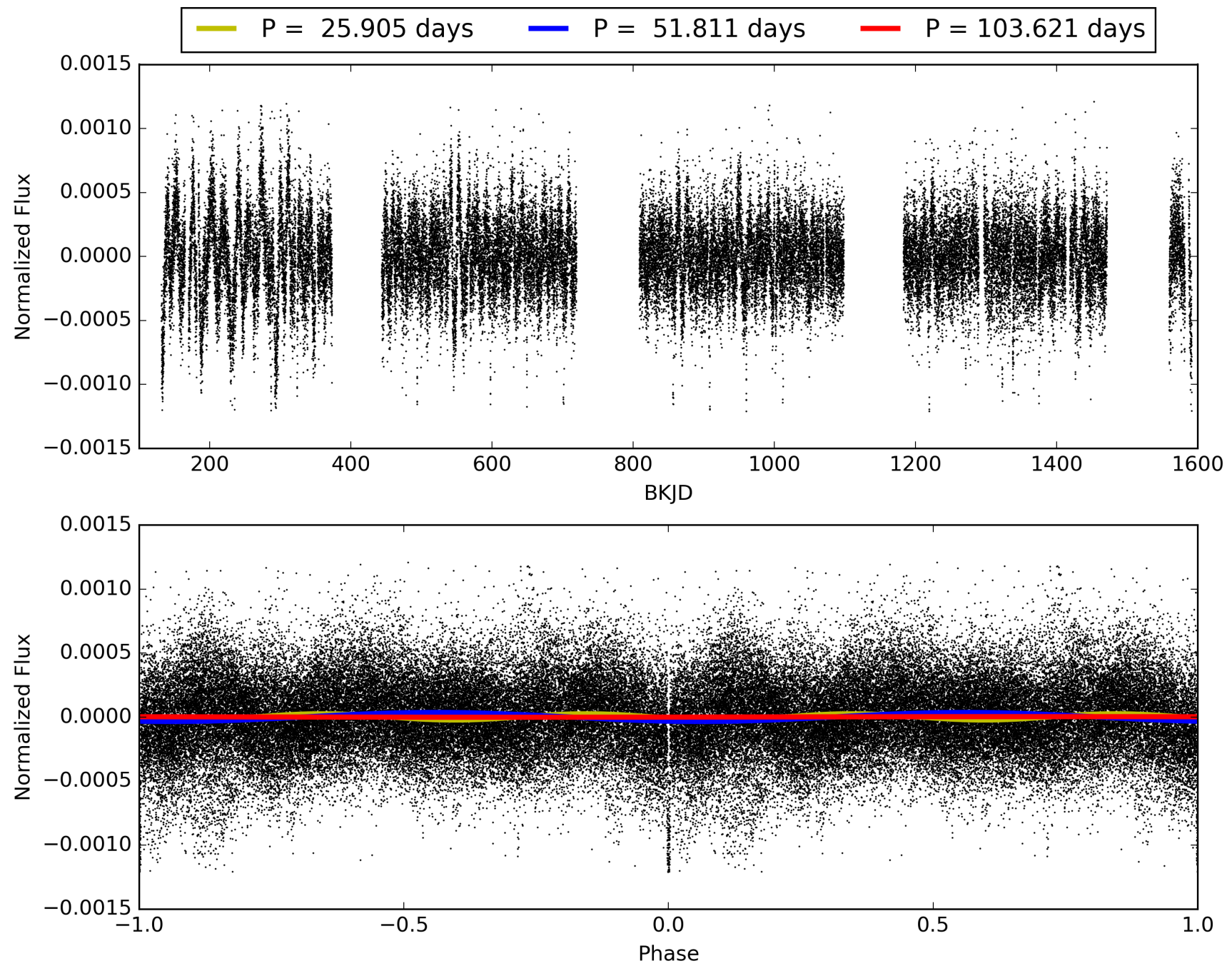
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [41.26σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 43.6%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [17/17]  
GhostDiagnostic-chr: 3.803  
Centroid-sig: N/A  
Centroid-so: 0.046 arcsec [0.18σ]  
OotOffset-rm: 0.176 arcsec [1.07σ]  
KicOffset-rm: 0.269 arcsec [2.17σ]  
OotOffset-st: 4/4/0/3 [11]  
KicOffset-st: 4/4/0/3 [11]  
DiffImageQuality-fgm: 1.00 [11/11]  
DiffImageOverlap-fno: 0.64 [7/11]

# TCE 011601584-01, PDC Light Curves



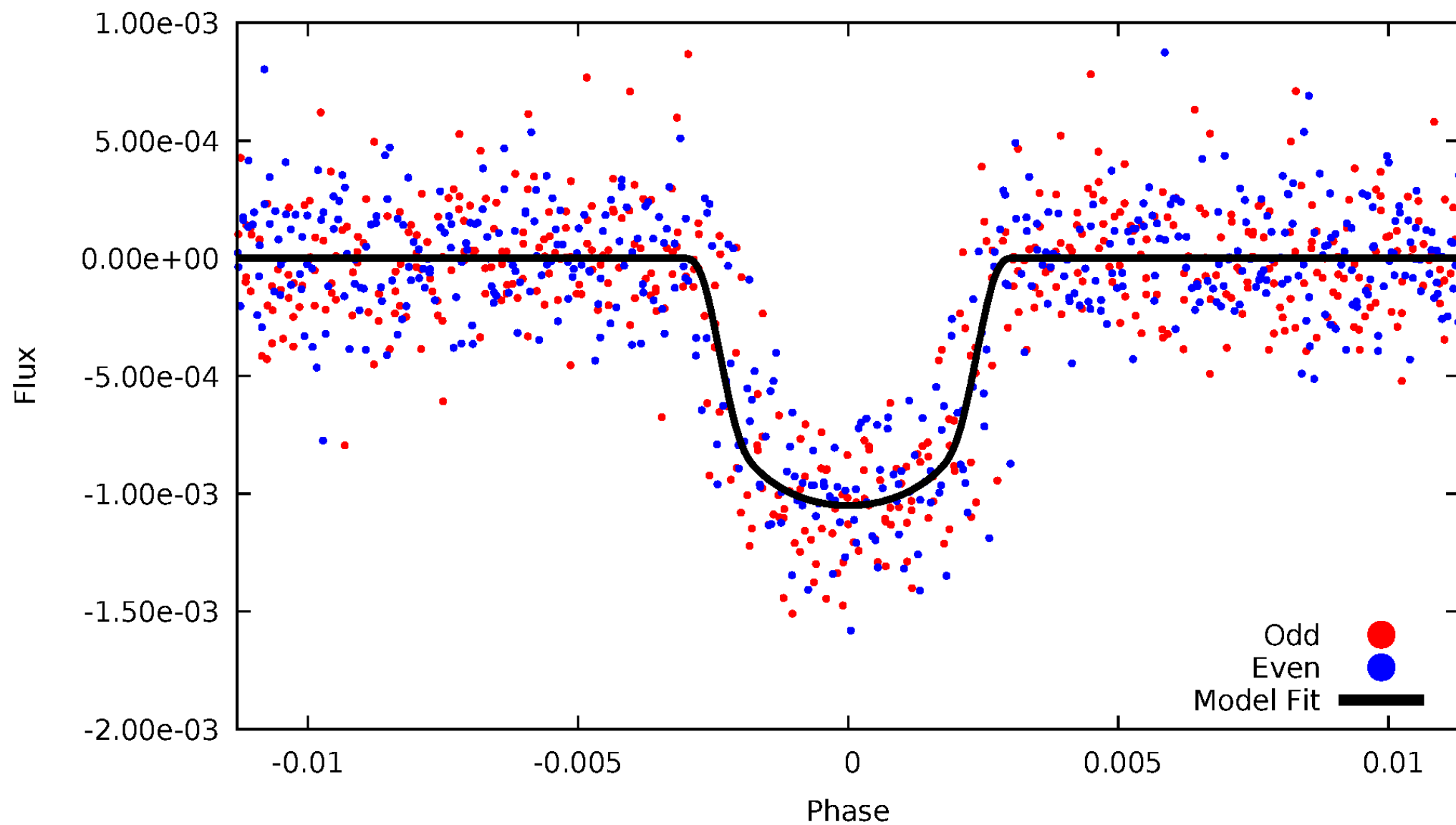
# TCE 011601584-01





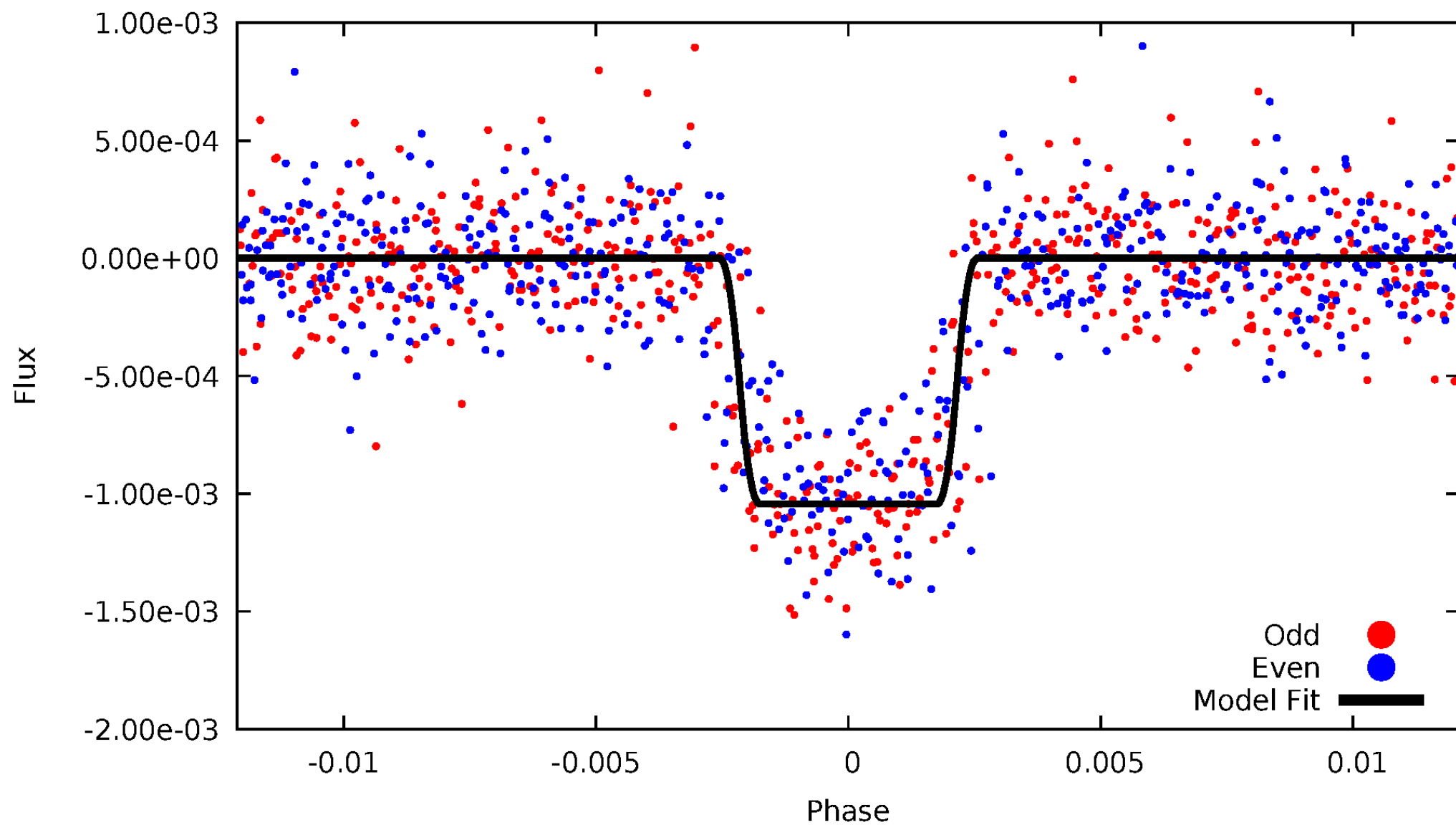
# DV Odd/Even

TCE 011601584-01



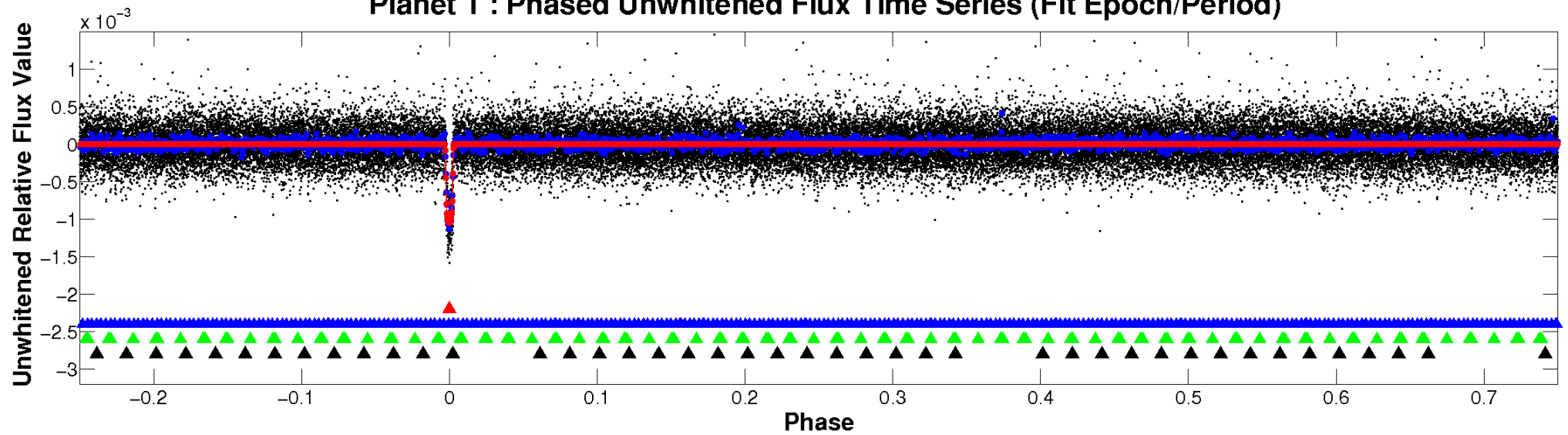
# ALT Odd/Even

TCE 011601584-01

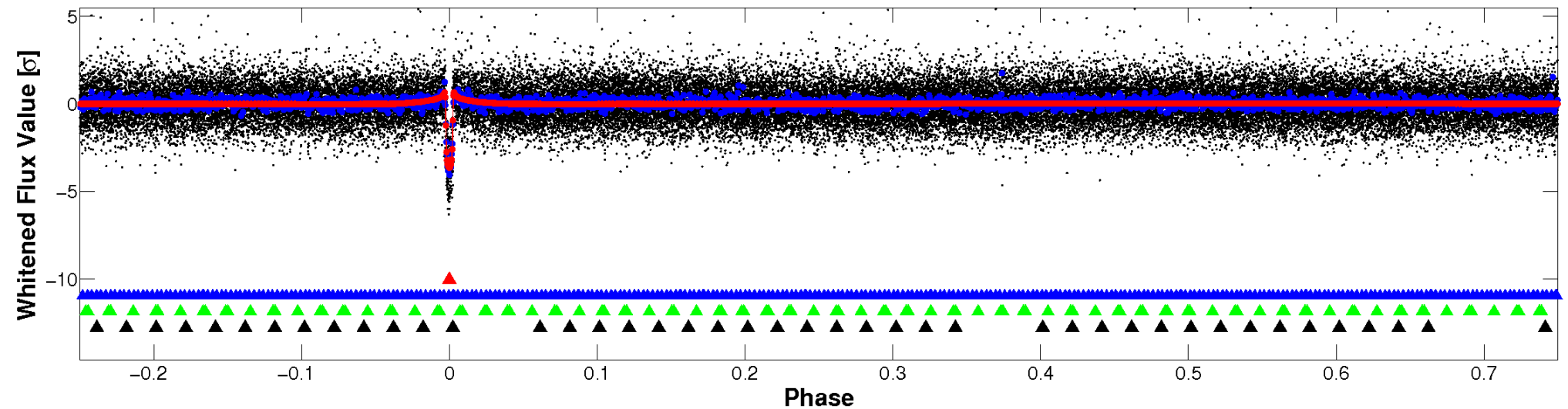


# Non-Whitened Vs. Whitened Light Curve

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

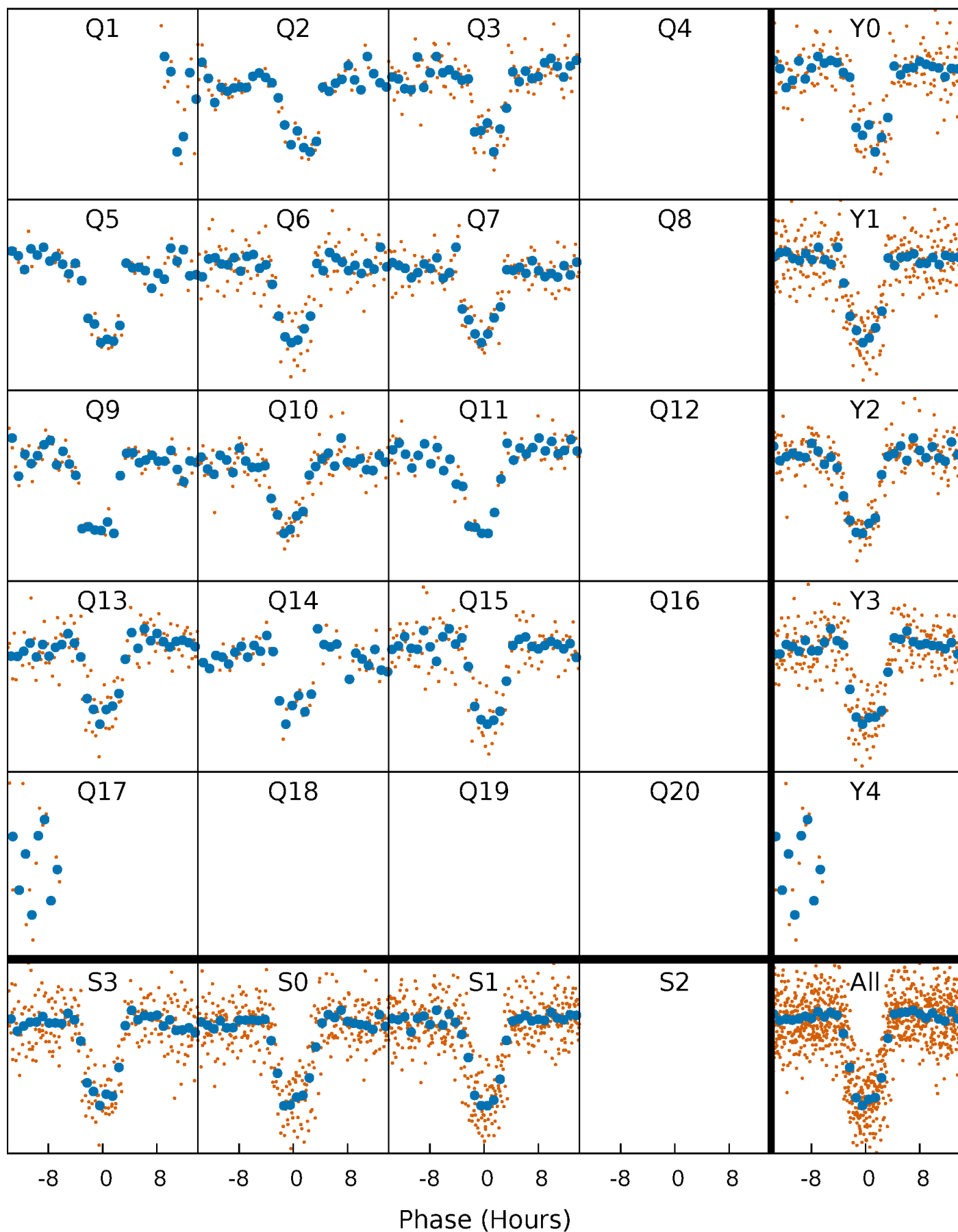


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



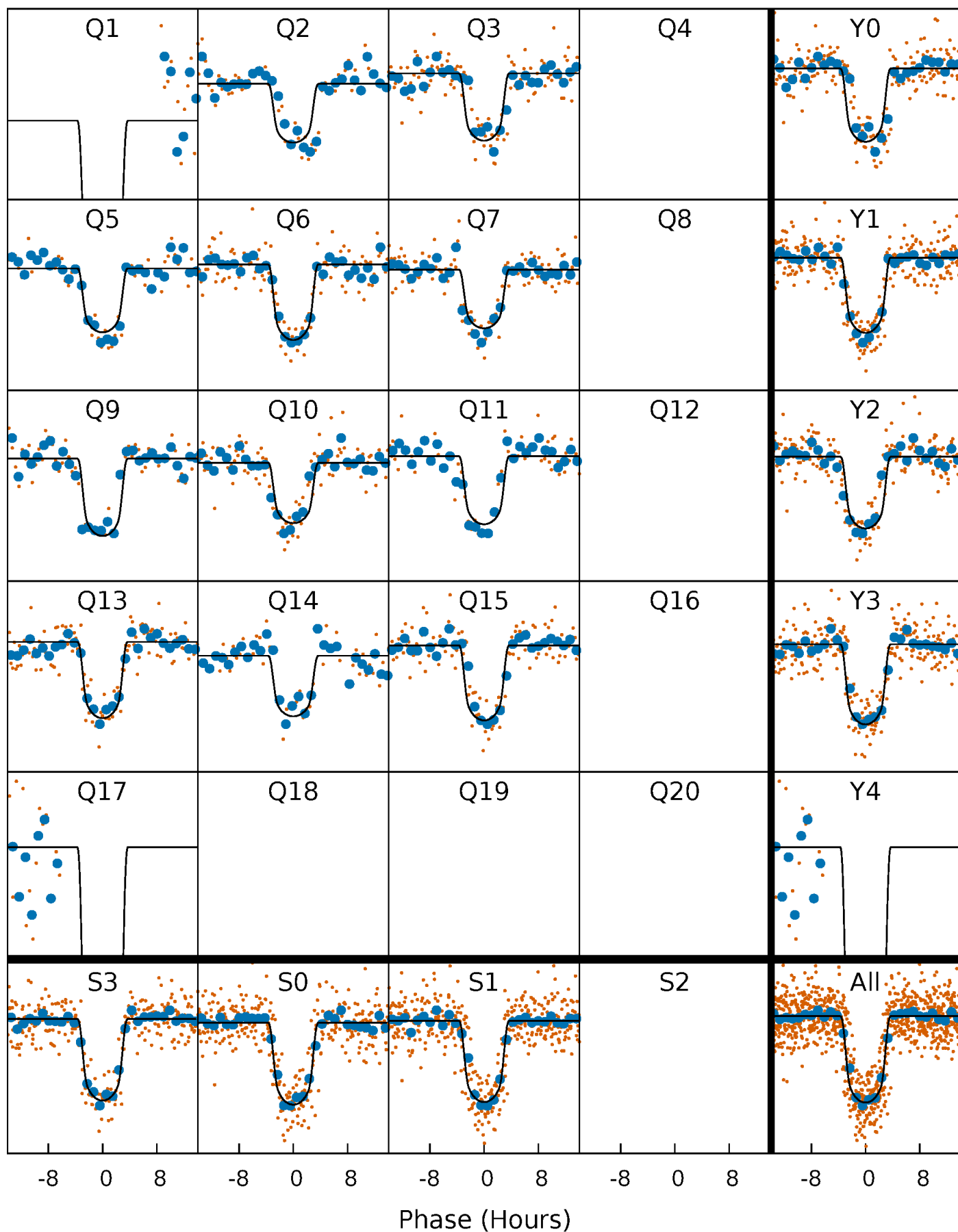
# PDC Quarter-Phased Transit Curves

TCE 011601584-01 P= 51.810507 Days  $T_0=182.962079$  (BKJD)



# DV Quarter-Phased Transit Curves

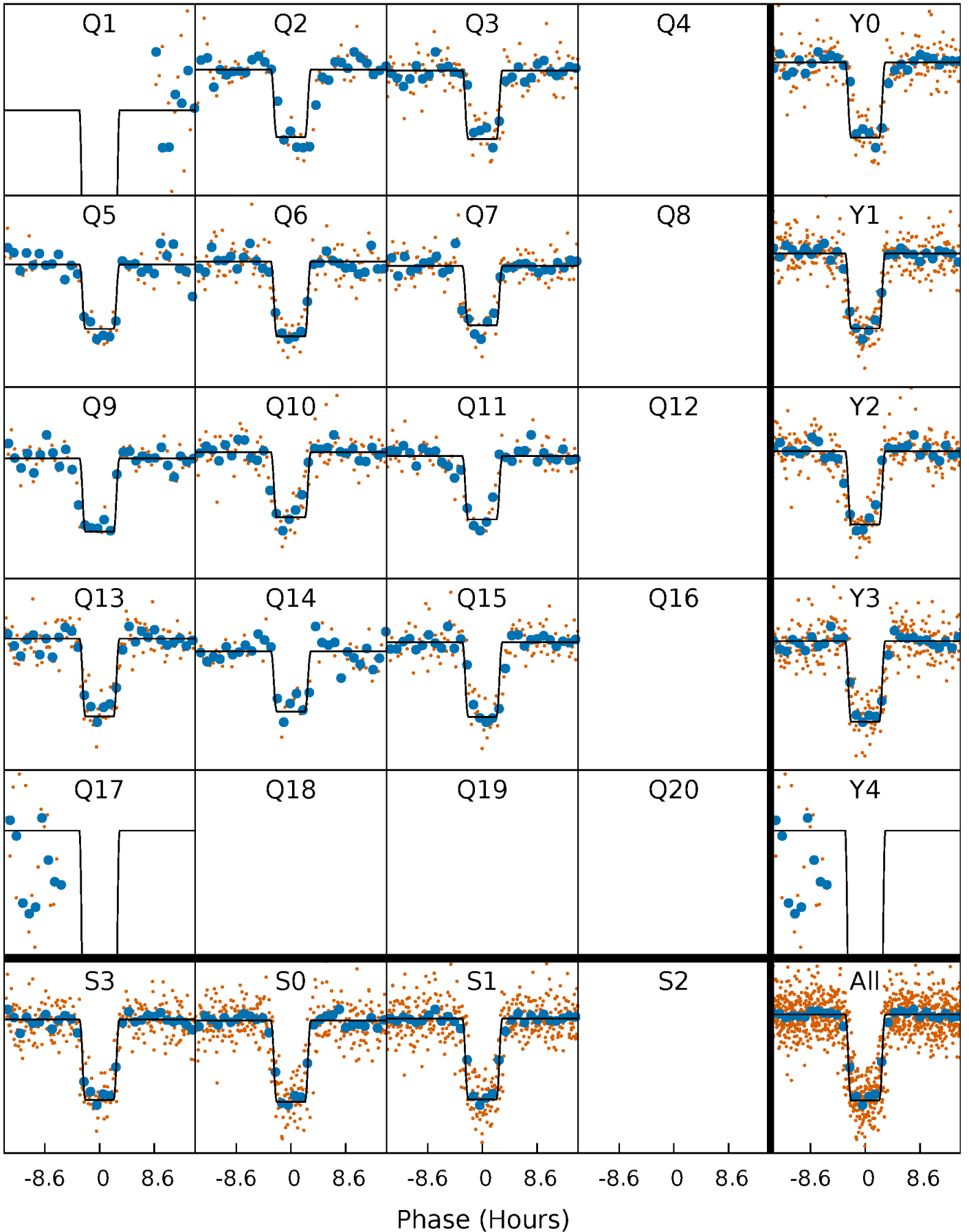
TCE 011601584-01 P= 51.810507 Days  $T_0=182.962079$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

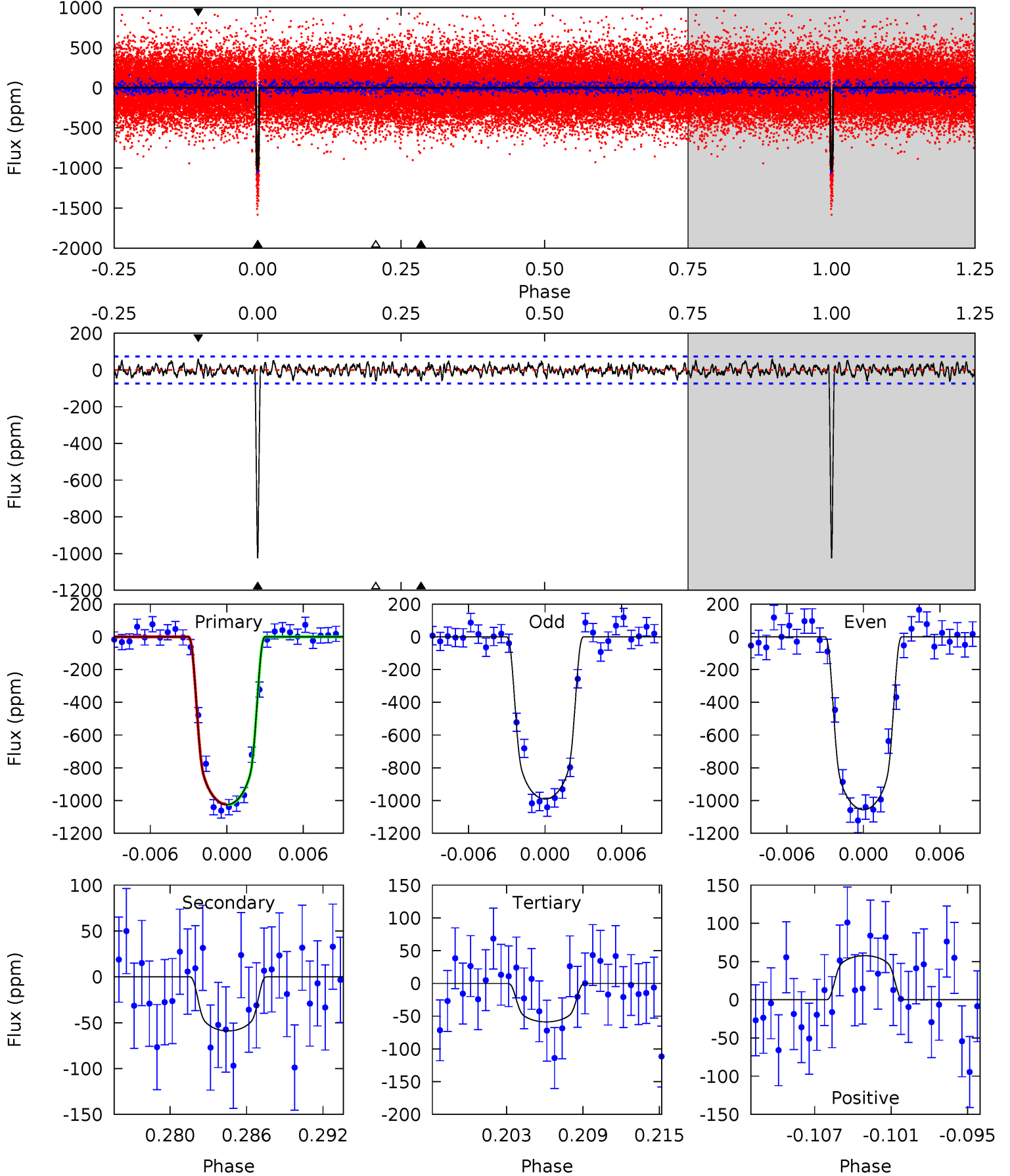
TCE 011601584-01 P= 51.809981 Days  $T_0=182.971419$  (BKJD)



# DV Model-Shift Uniqueness Test

011601584-01,  $P = 51.810507$  Days,  $E = 131.151572$  Days

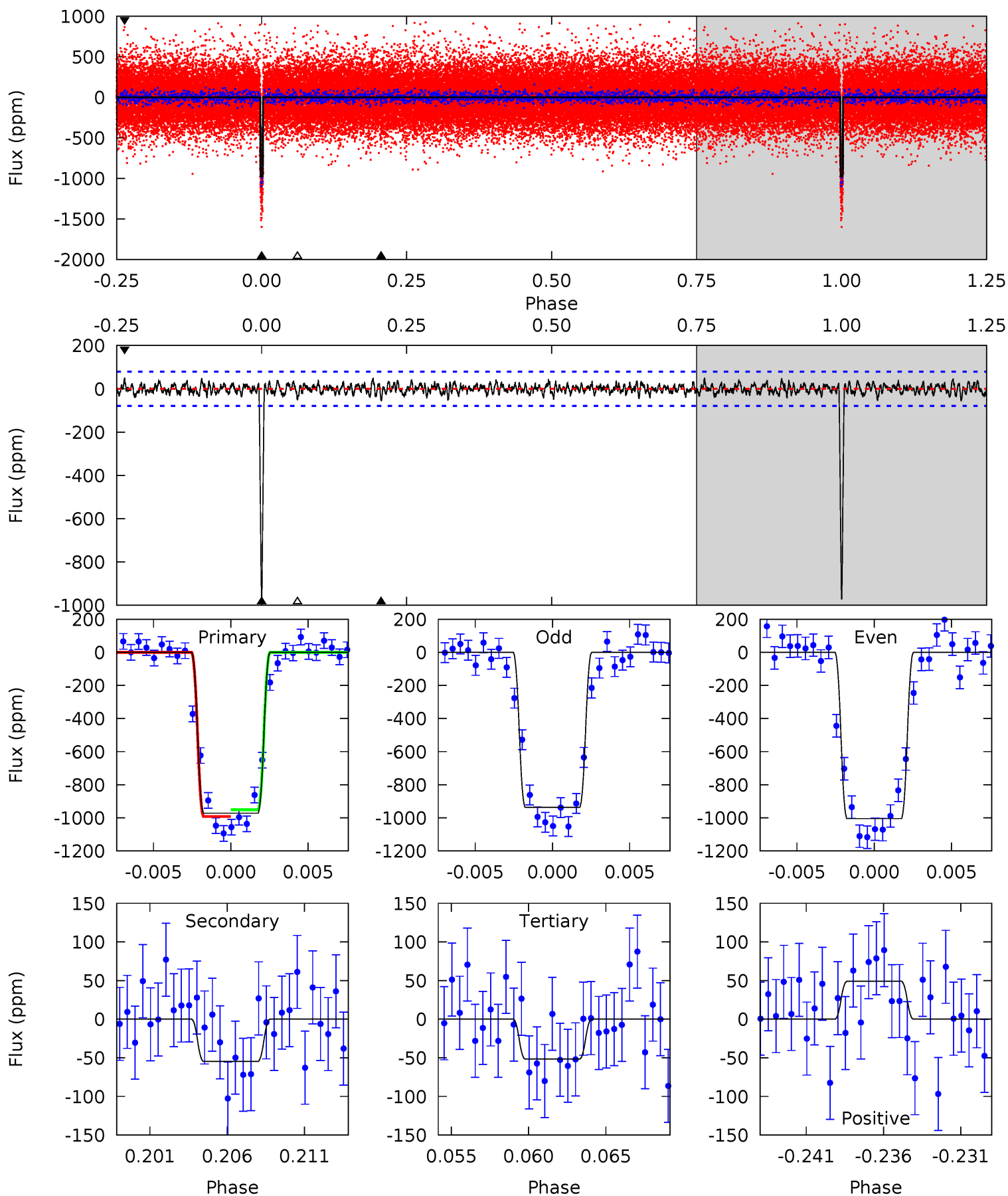
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
71.8	4.13	4.12	4.04	5.12	2.75	1.34	67.7	67.8	0.01	0.09	2.28	1.04	0.05	0.13



# Alt Model-Shift Uniqueness Test

011601584-01, P = 51.809981 Days, E = 131.161438 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
63.4	3.57	3.36	3.20	5.16	2.81	1.08	60.0	60.2	0.20	0.37	2.25	0.98	0.05	1.33



### Stellar Parameters For KIC 011601584

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5191^{+103}_{-103}$	$4.530^{+0.044}_{-0.055}$	$0.080^{+0.150}_{-0.150}$	$0.826^{+0.061}_{-0.050}$	$0.844^{+0.049}_{-0.044}$	$2.106^{+0.355}_{-0.365}$
	+2%/-2%	+1%/-1%	+188%/-188%	+7%/-6%	+6%/-5%	+17%/-17%
Source	SPE58	SPE58	SPE58	DSEP		

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

### Secondary Eclipse Parameters for KIC 011601584-01 / KOI 1831.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-59 \pm 14$	$3.22^{+0.17}_{-0.14}$	$575^{+15}_{-16}$	$3038^{+111}_{-123}$	$206^{+54}_{-52}$
Alt.	$-55 \pm 15$	$2.92^{+0.15}_{-0.15}$	$574^{+17}_{-15}$	$3090^{+129}_{-150}$	$232^{+76}_{-65}$

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

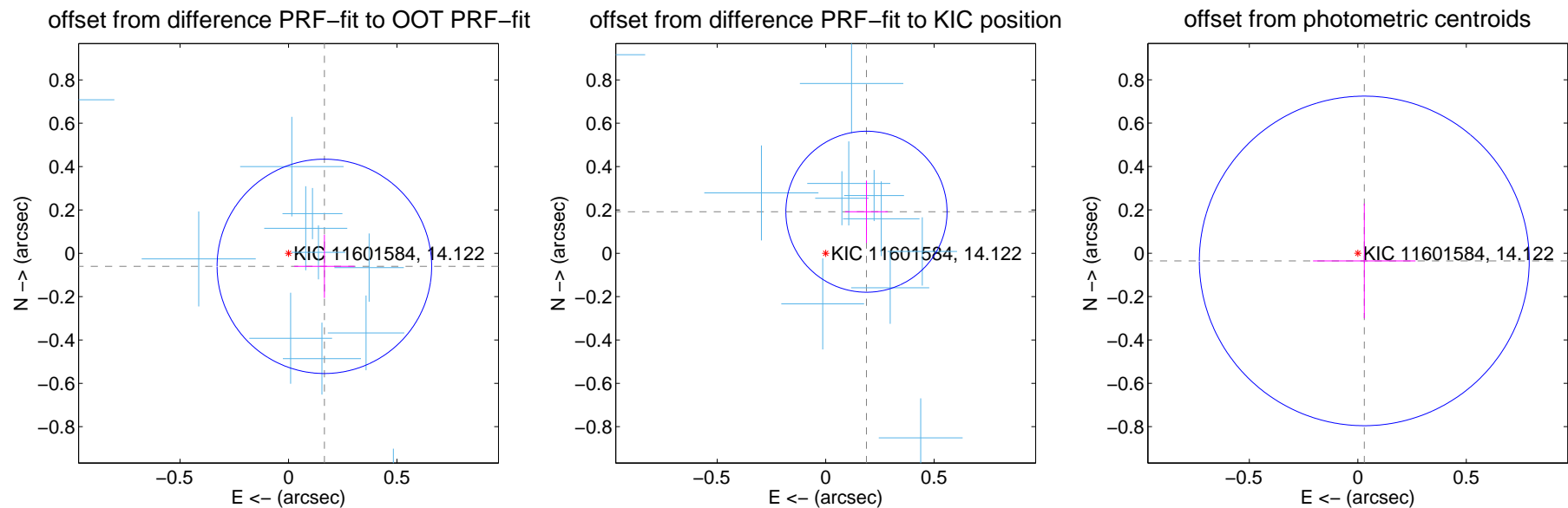
## DV Centroid Data

Supplemental centroid analysis for 011601584-01. Kepler magnitude: 14.12. Transit SNR 45.09

There are 11 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.36 arcsec

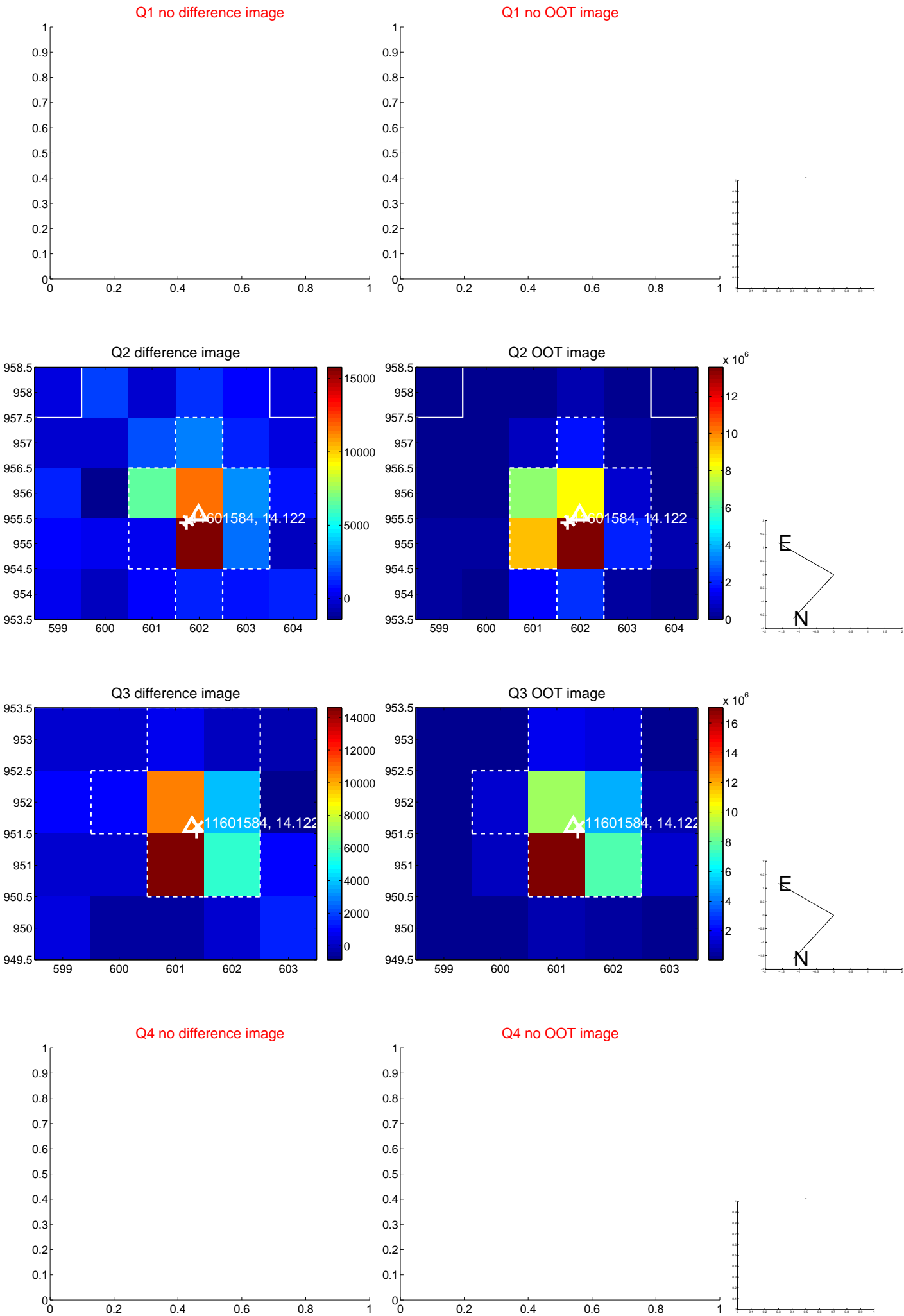
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.176 \pm 0.165$	1.07	$-0.165 \pm 0.139$	$-0.060 \pm 0.146$
PRF-fit source offset from KIC position	$0.269 \pm 0.124$	2.17	$-0.188 \pm 0.099$	$0.192 \pm 0.144$
photometric centroid source offset	$0.05 \pm 0.25$	0.18	$-0.03 \pm 0.24$	$-0.04 \pm 0.26$



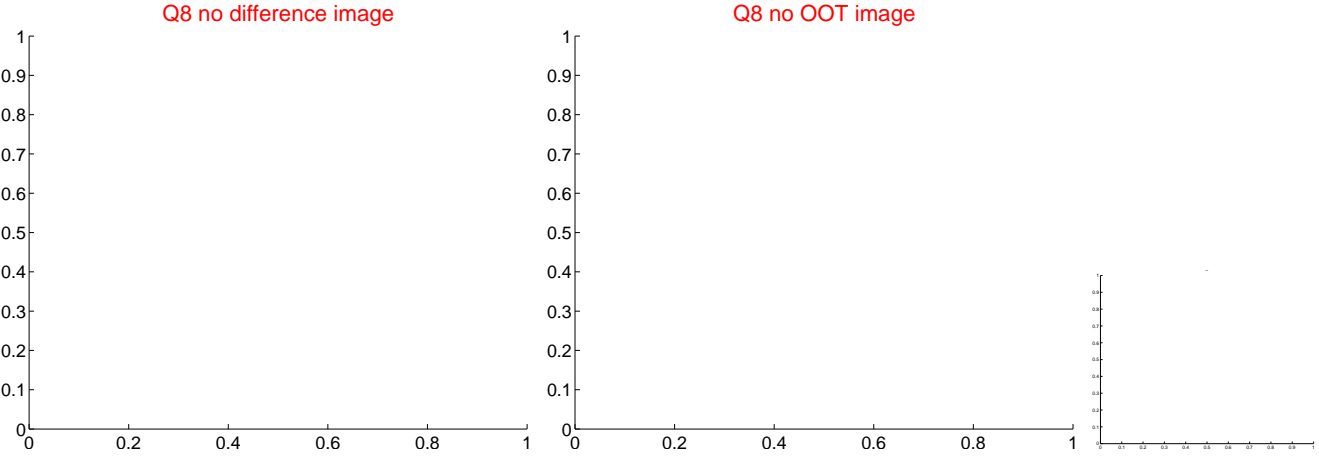
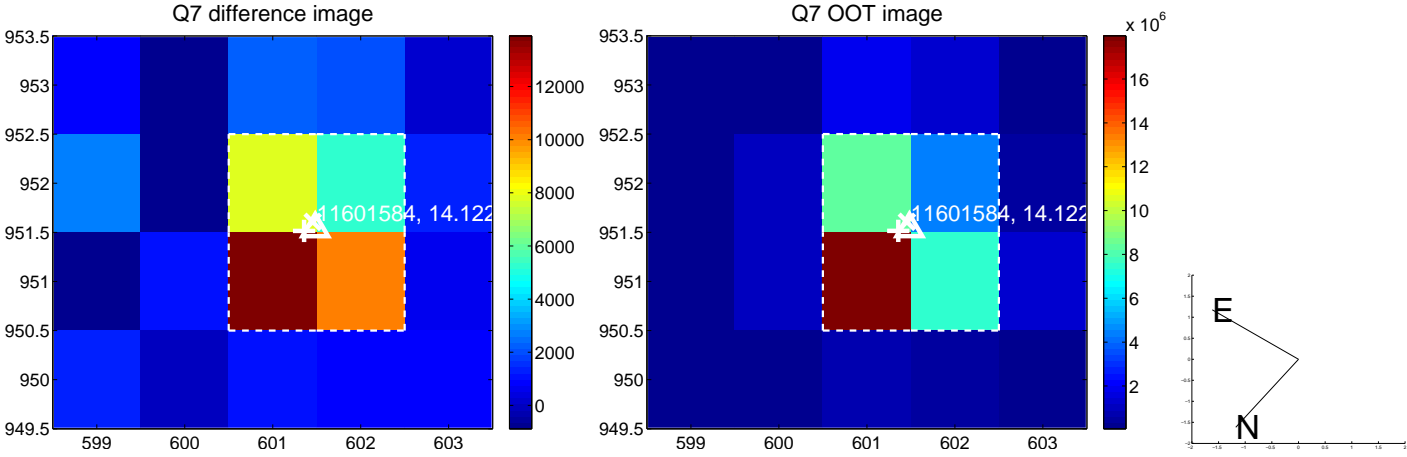
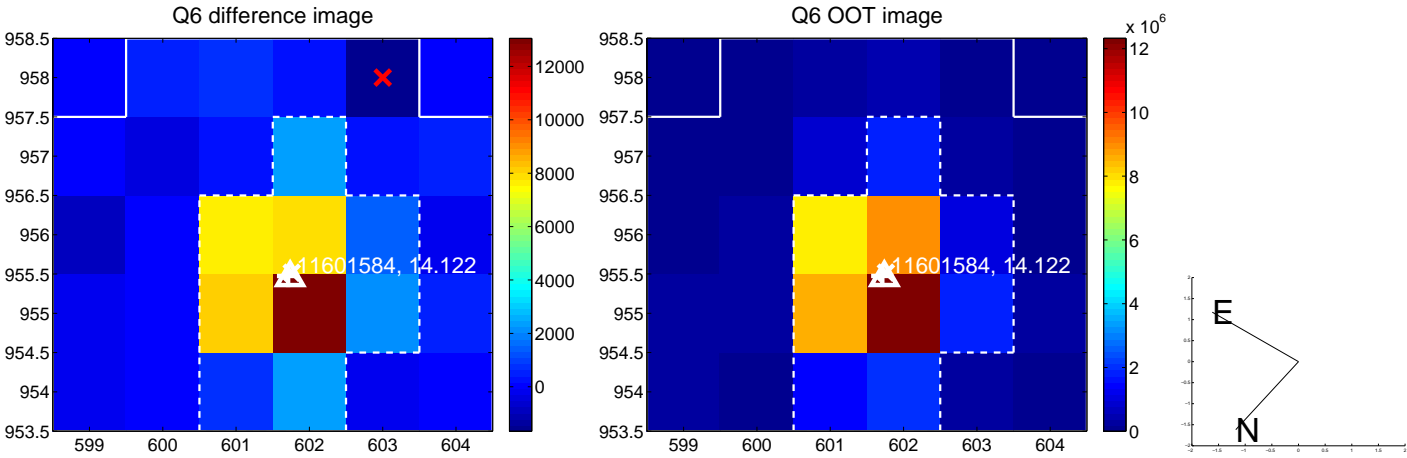
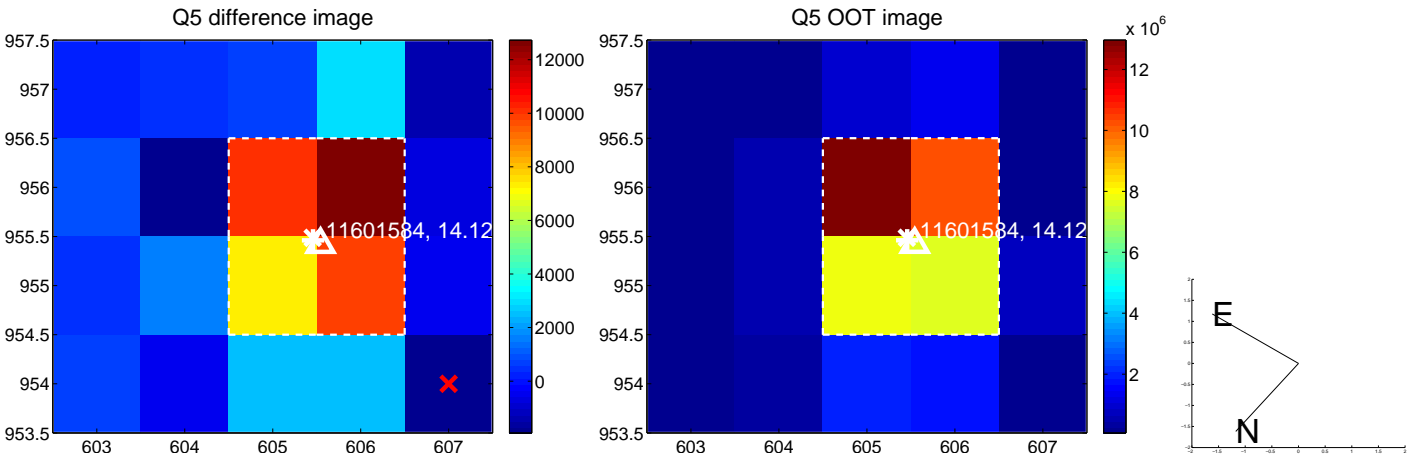
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



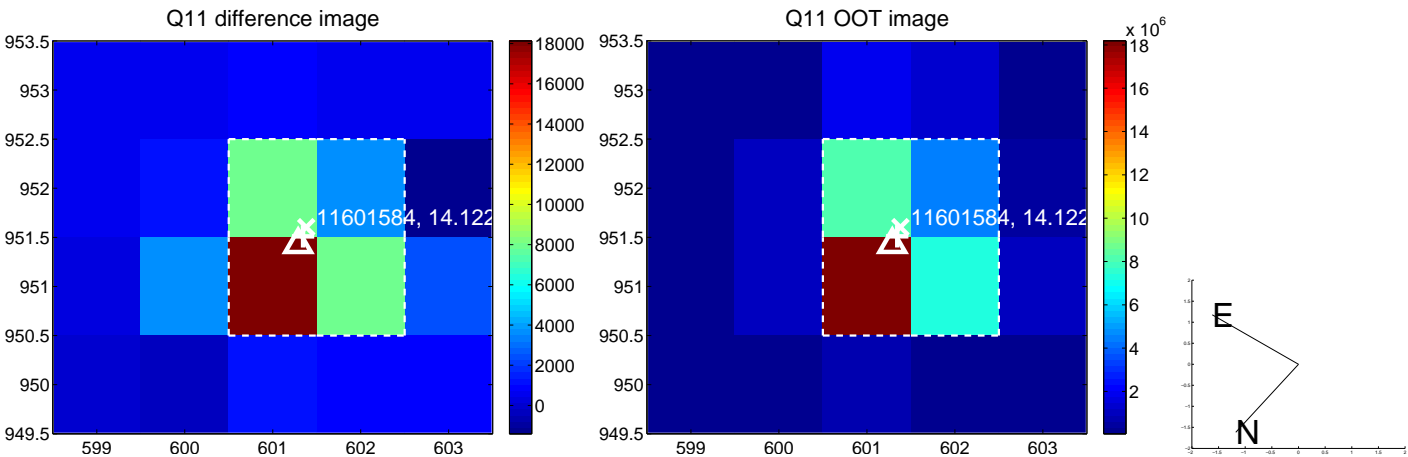
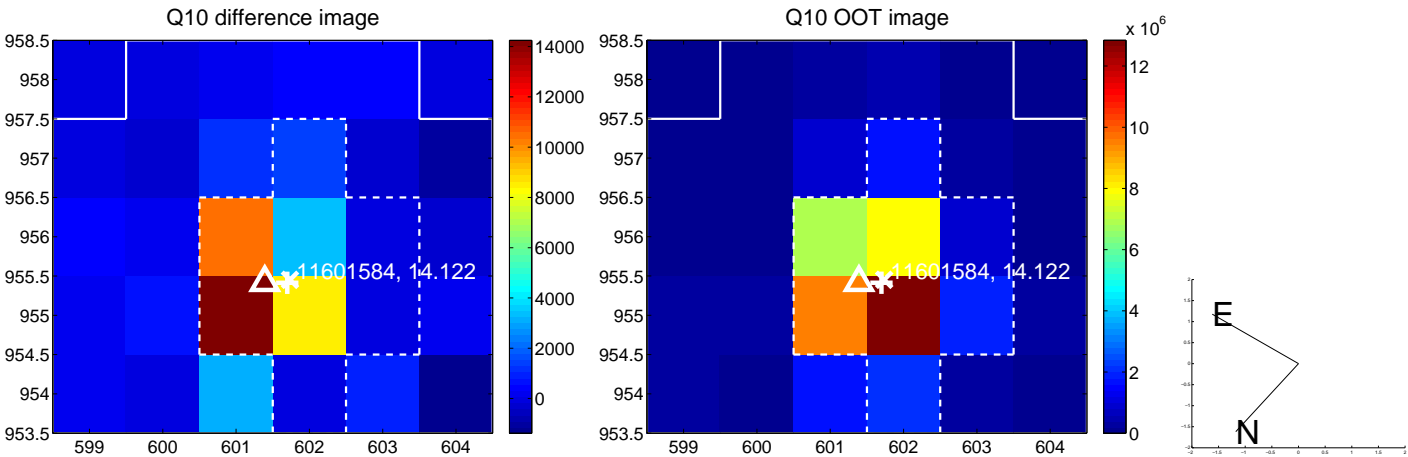
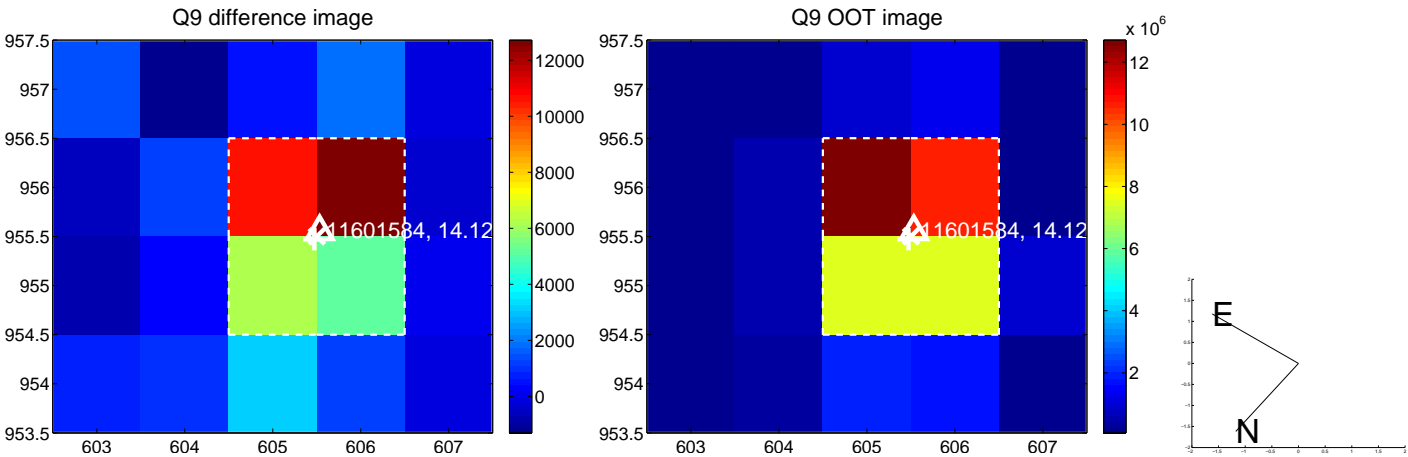
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



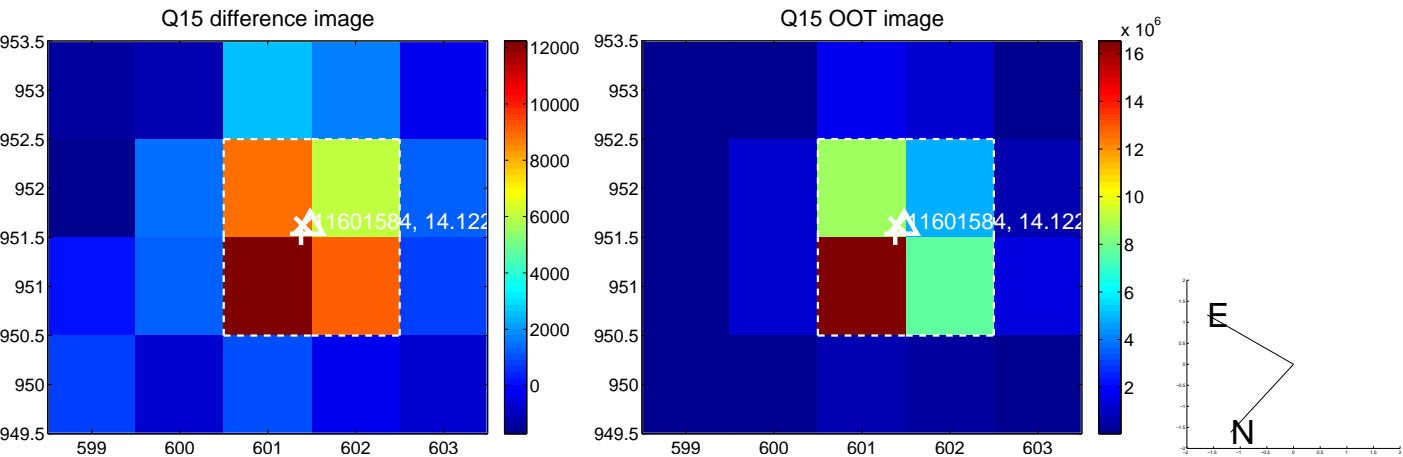
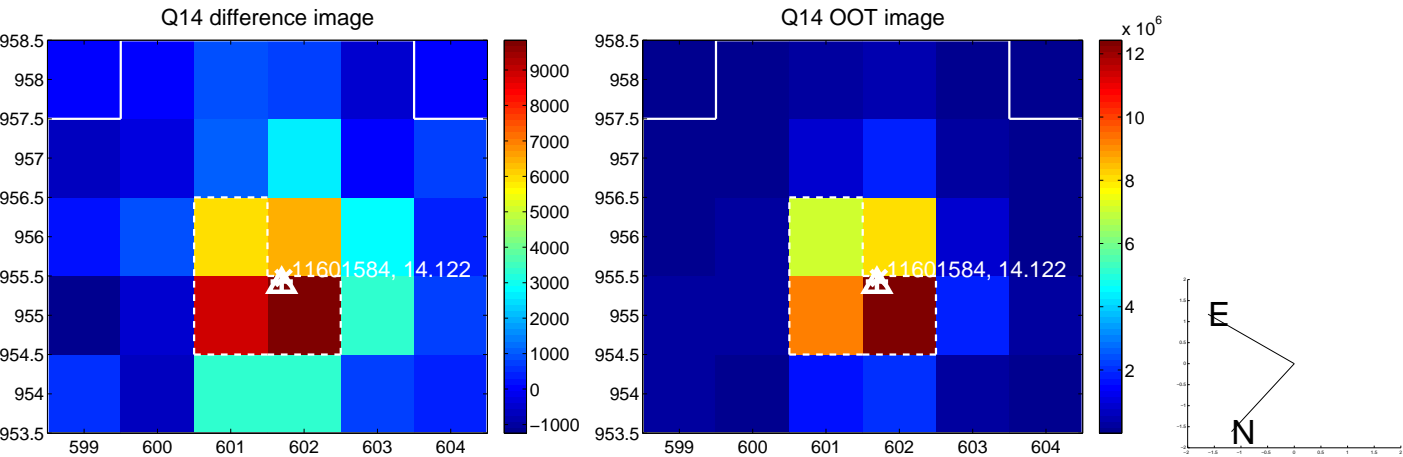
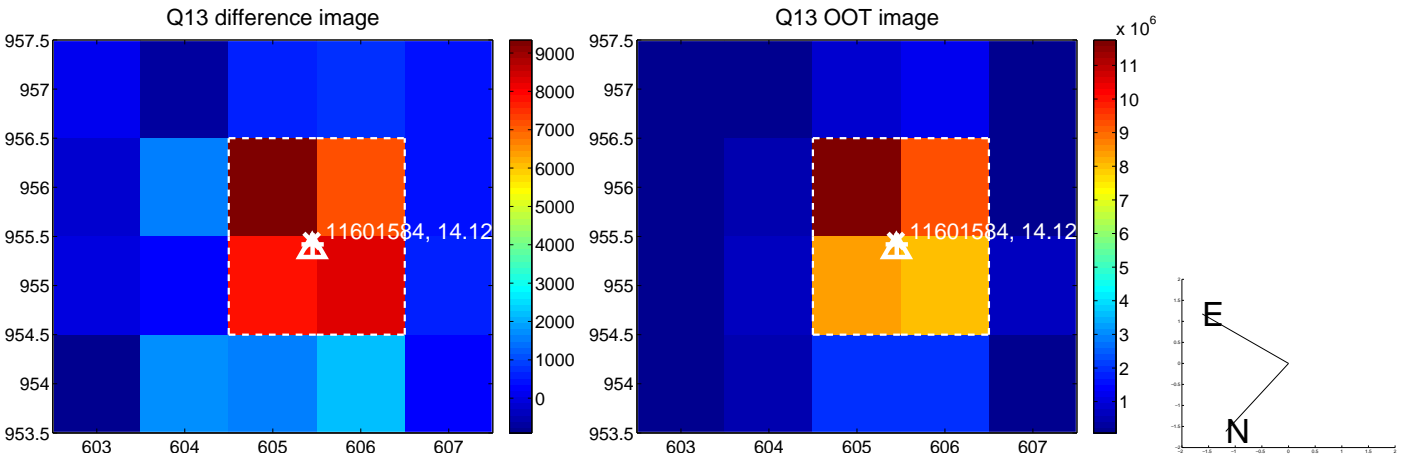
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



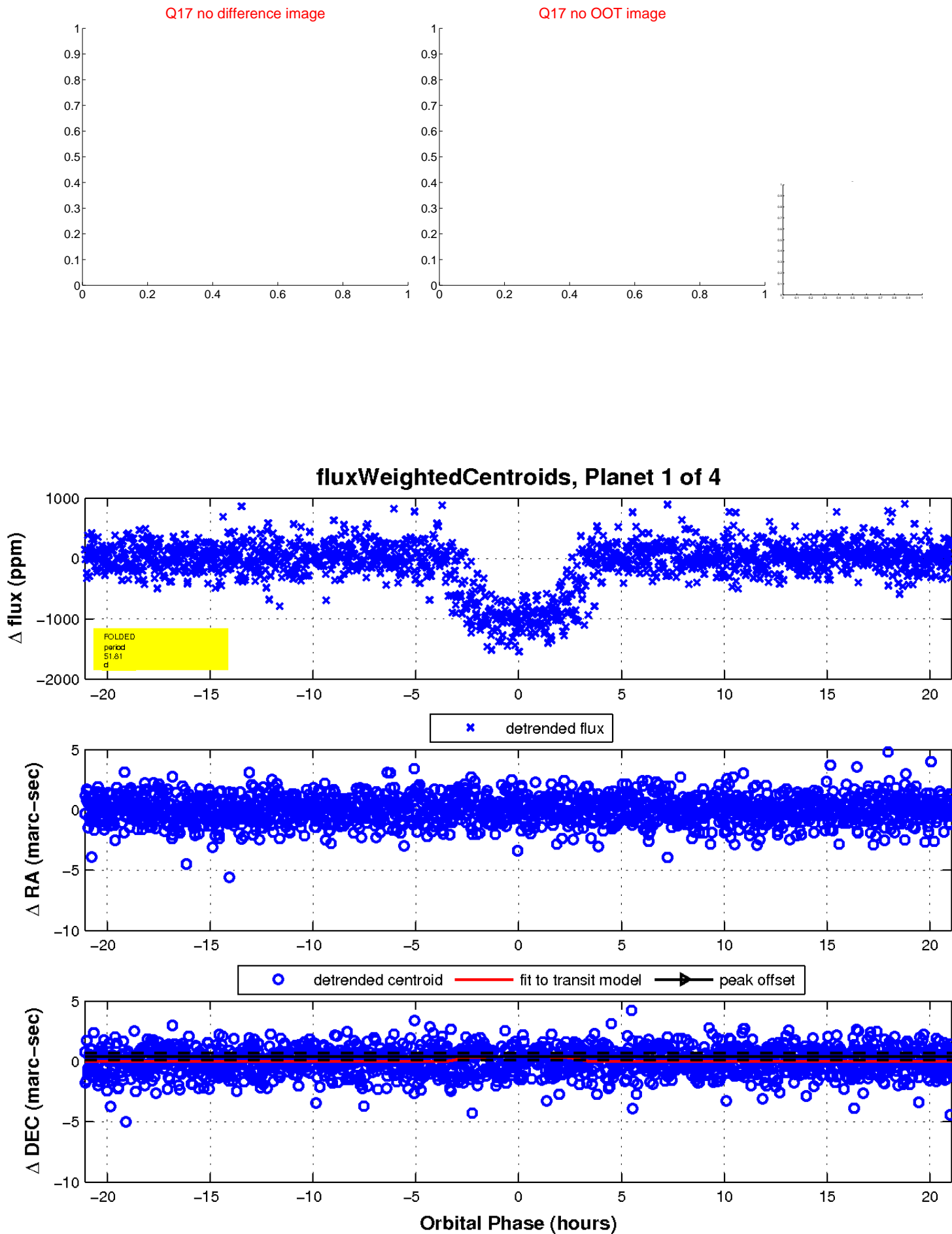
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



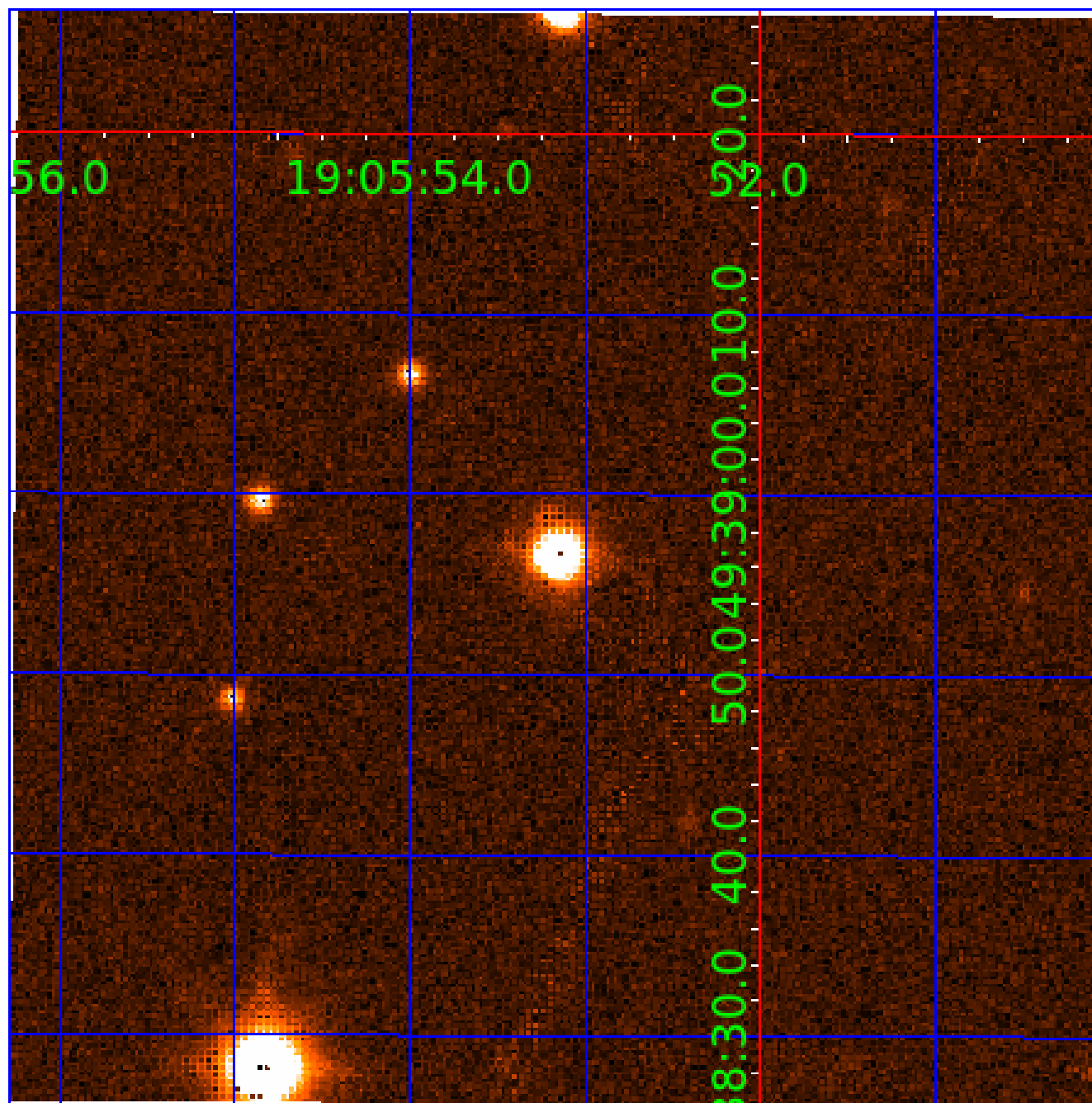
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 011601584

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011601584-01	OBS	1831.01	51.810507	182.962079	1050.1	7.029	46.6	45.1	0.83	5191	3.22	6.72
011601584-02	OBS	1831.02	4.385319	134.847732	196.9	2.586	21.8	23.9	0.83	5191	1.41	180.81
011601584-03	OBS	1831.04	13.979438	142.339329	337.7	1.304	11.7	14.7	0.83	5191	2.00	38.54
011601584-04	OBS	1831.03	34.193704	148.891071	194.5	7.455	10.4	11.5	0.83	5191	1.29	11.69

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011601584-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
011601584-02	OBS	PC	0.95	0	0	0	0	NO_COMMENT
011601584-03	OBS	PC	0.98	0	0	0	0	NO_COMMENT
011601584-04	OBS	PC	0.85	0	0	0	0	NO_COMMENT

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

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

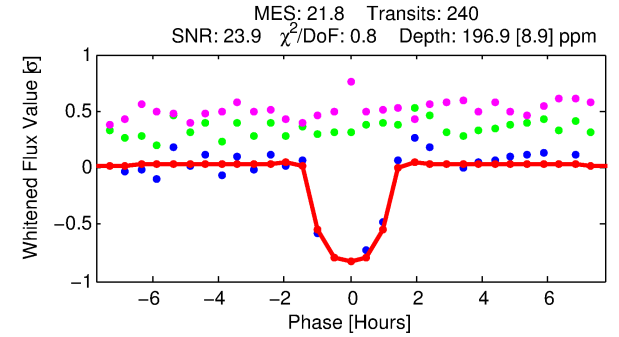
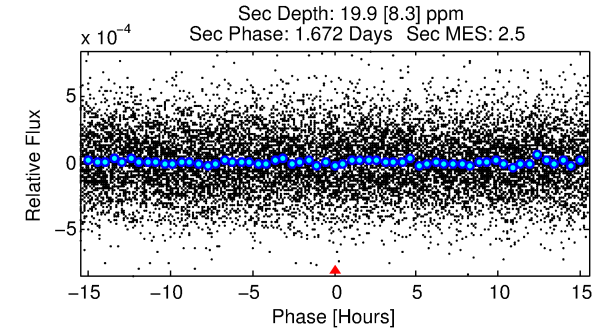
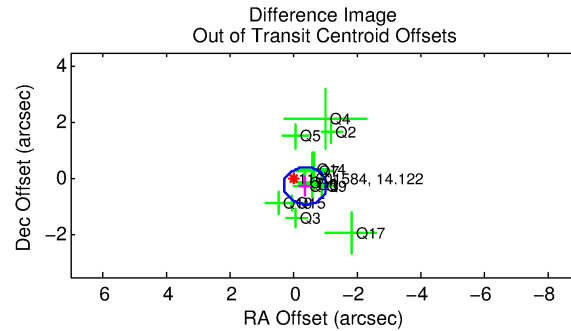
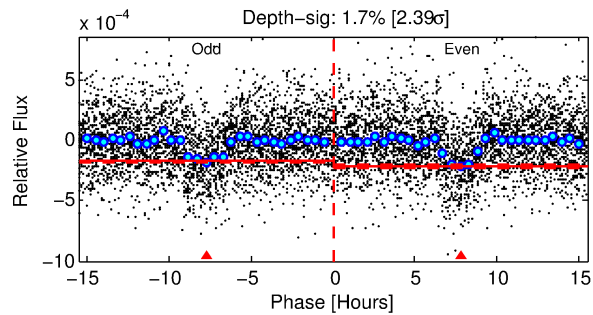
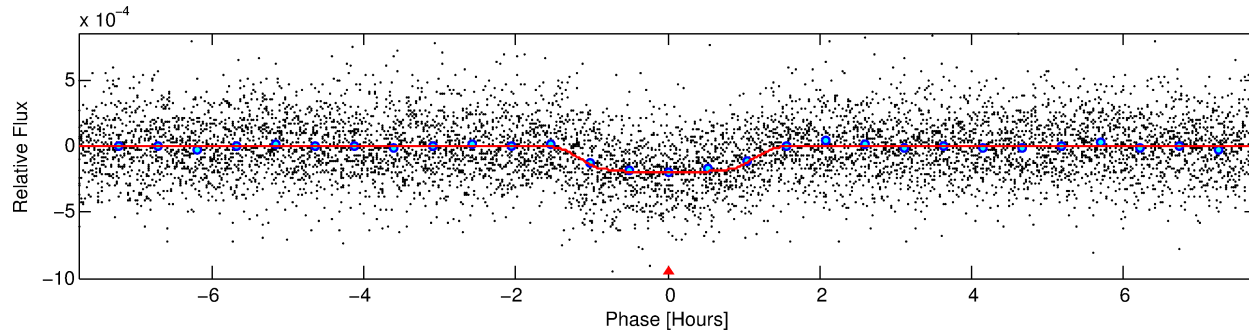
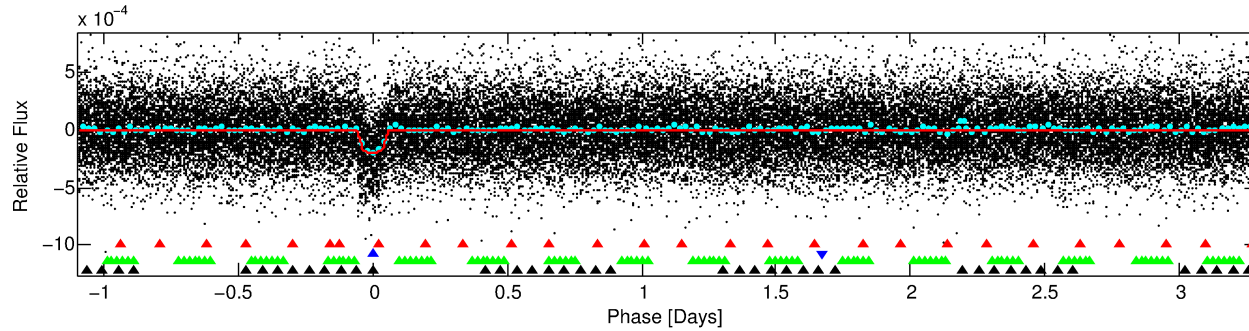
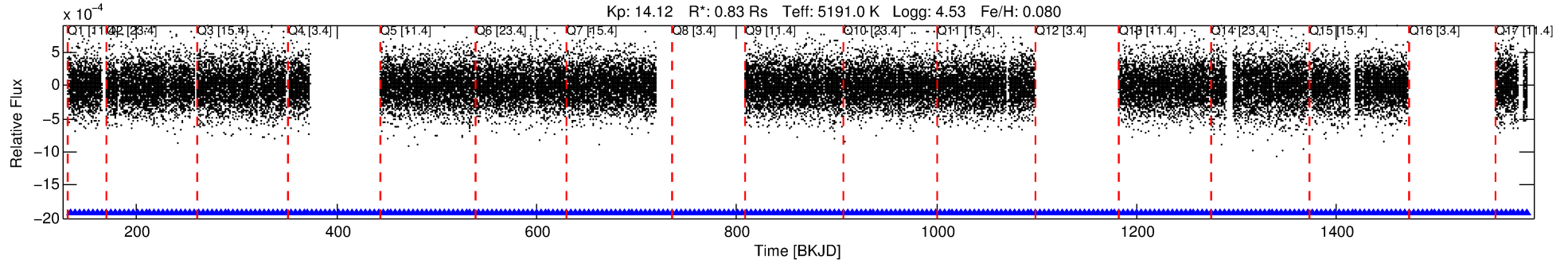
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 011601584-02

No Significant Match Found

# DV One-Page Summary

KIC: 11601584 Candidate: 2 of 4 Period: 4.385 d  
KOI: K01831.02 Name: Kepler-324b Corr: 0.962



## DV Fit Results:

Period = 4.38532 [0.00001] d  
Epoch = 134.8477 [0.0018] BKJD  
Rp/R\* = 0.0156 [0.0048]  
a/R\* = 6.17 [7.60]  
b = 0.90 [0.27]  
Seff = 180.81 [22.76]  
Teq = 935 [29] K  
Rp = 1.41 [0.44] Re  
a = 0.0495 [0.0032] AU  
Ag = 13.57 [10.15] [1.24σ]  
Teffp = 2775 [517] K [3.55σ]

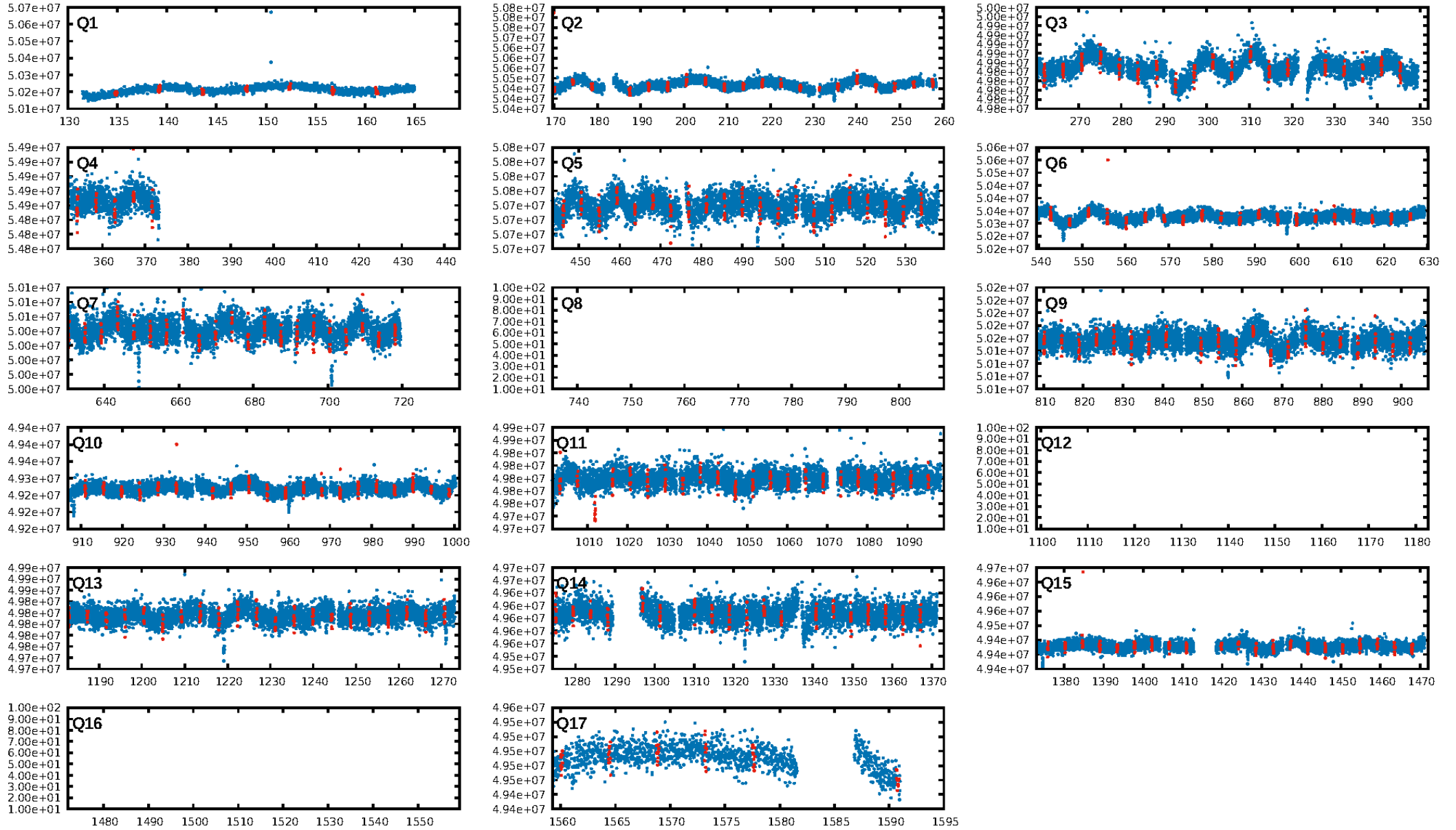
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [79.49σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 2.51e-101  
RollingBand-fgt: 1.00 [222/222]  
GhostDiagnostic-chr: 3.212  
Centroid-sig: N/A  
Centroid-so: 0.413 arcsec [0.75σ]  
OotOffset-rm: 0.463 arcsec [2.09σ]  
KicOffset-rm: 0.456 arcsec [2.51σ]  
OotOffset-st: 4/4/1/4 [13]  
KicOffset-st: 4/4/1/4 [13]  
DiffImageQuality-fgm: 0.92 [12/13]  
DiffImageOverlap-fno: 1.00 [14/14]

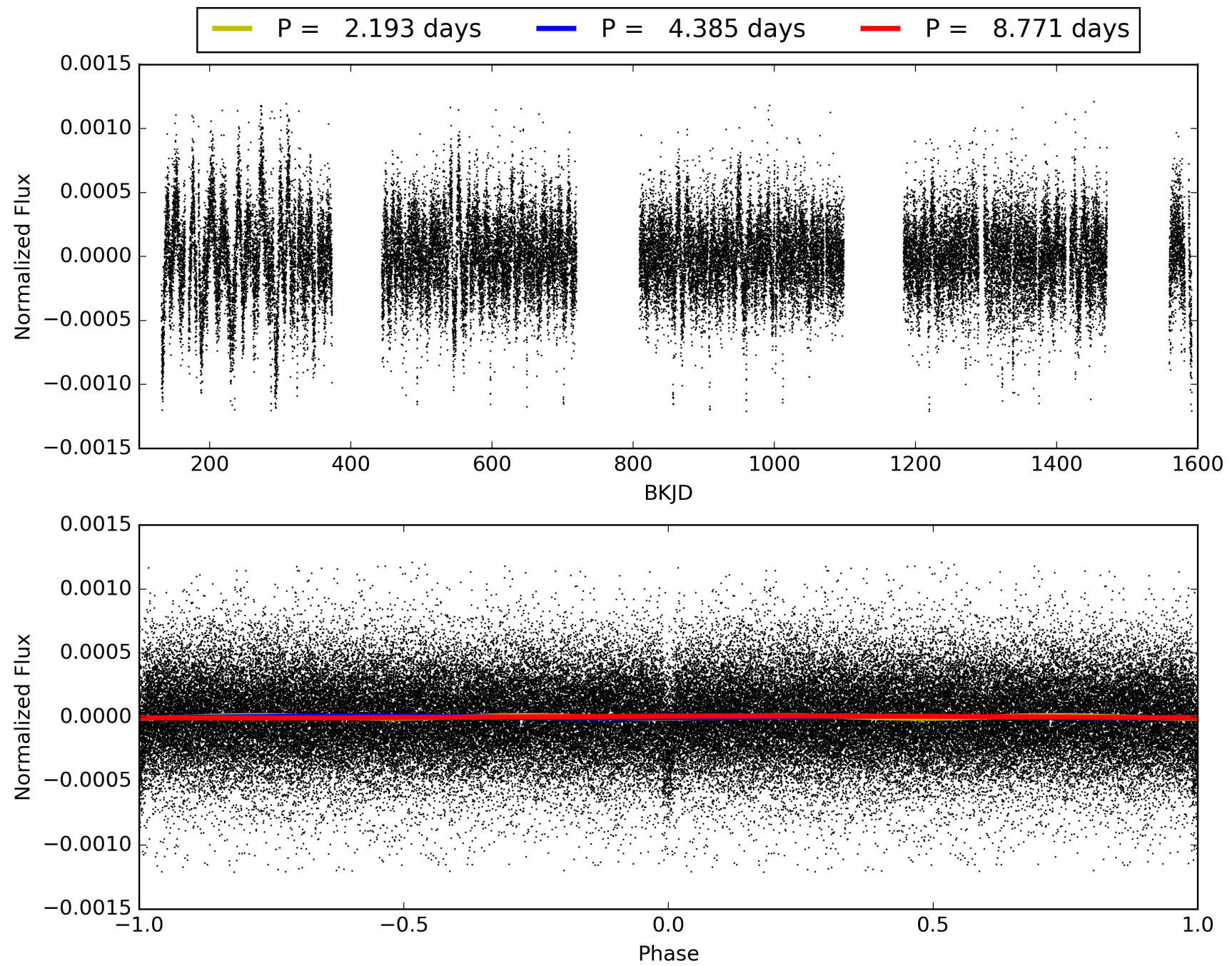
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 15:41:53 Z

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

# TCE 011601584-02, PDC Light Curves



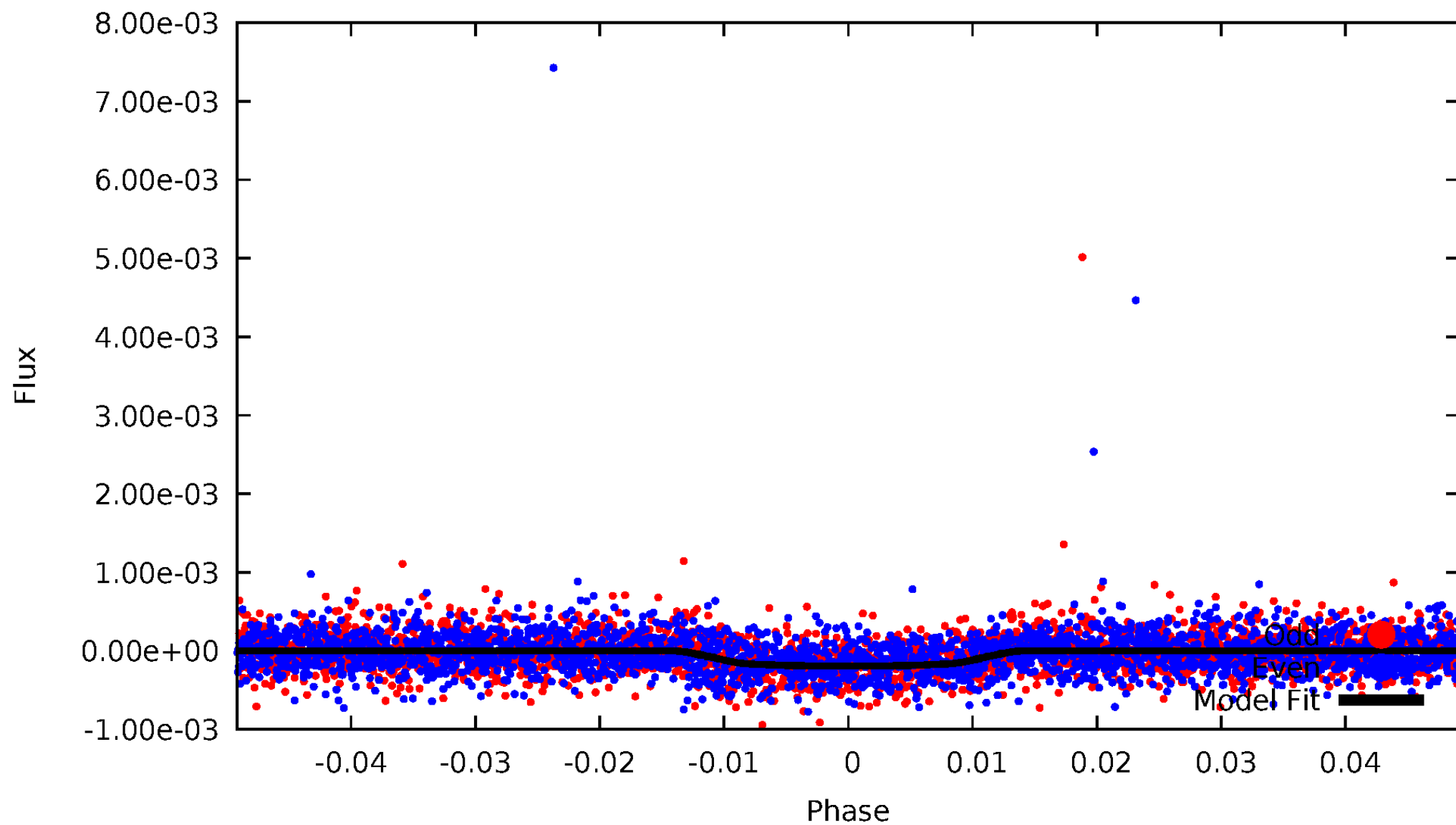
# TCE 011601584-02





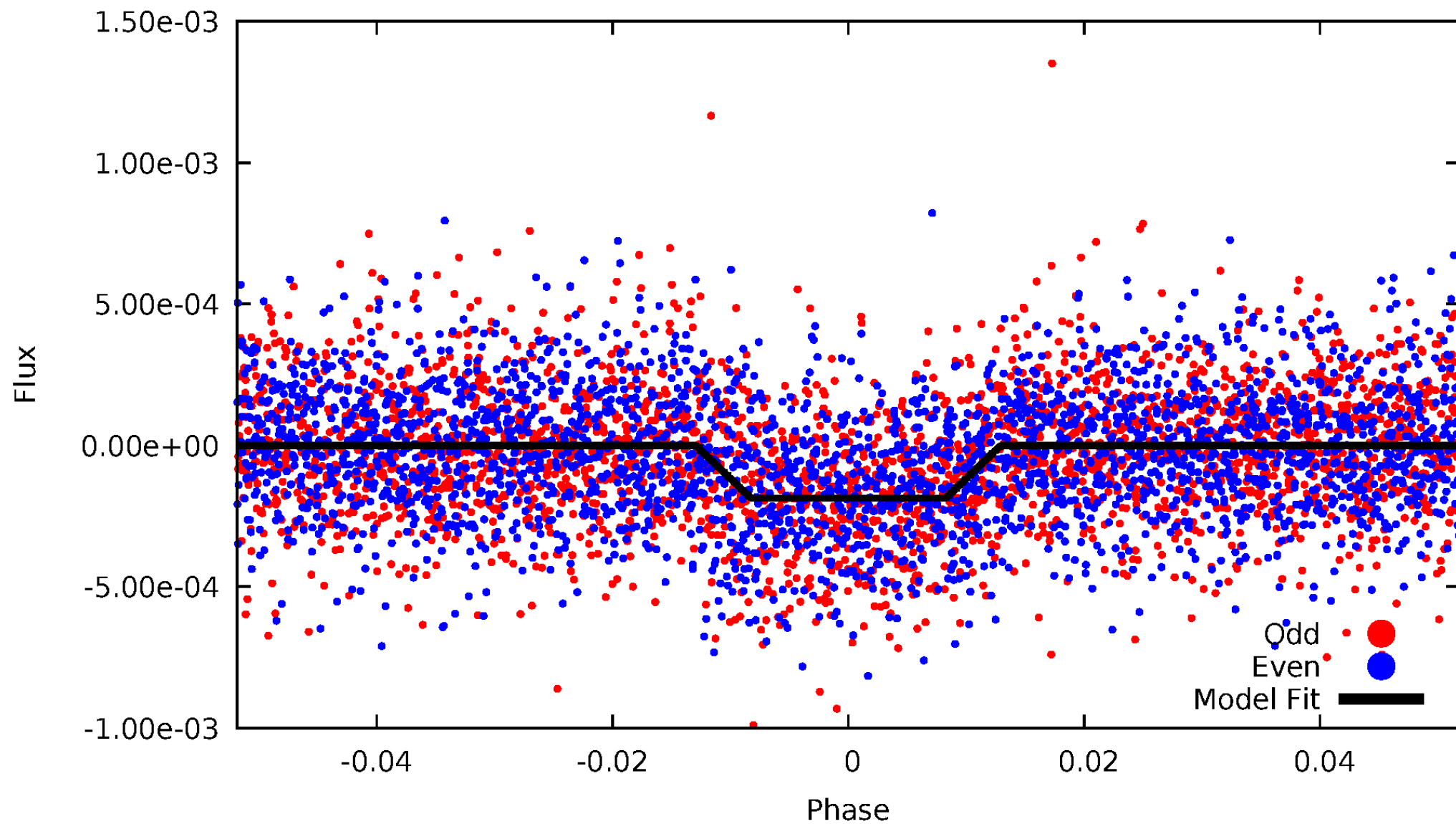
# DV Odd/Even

TCE 011601584-02



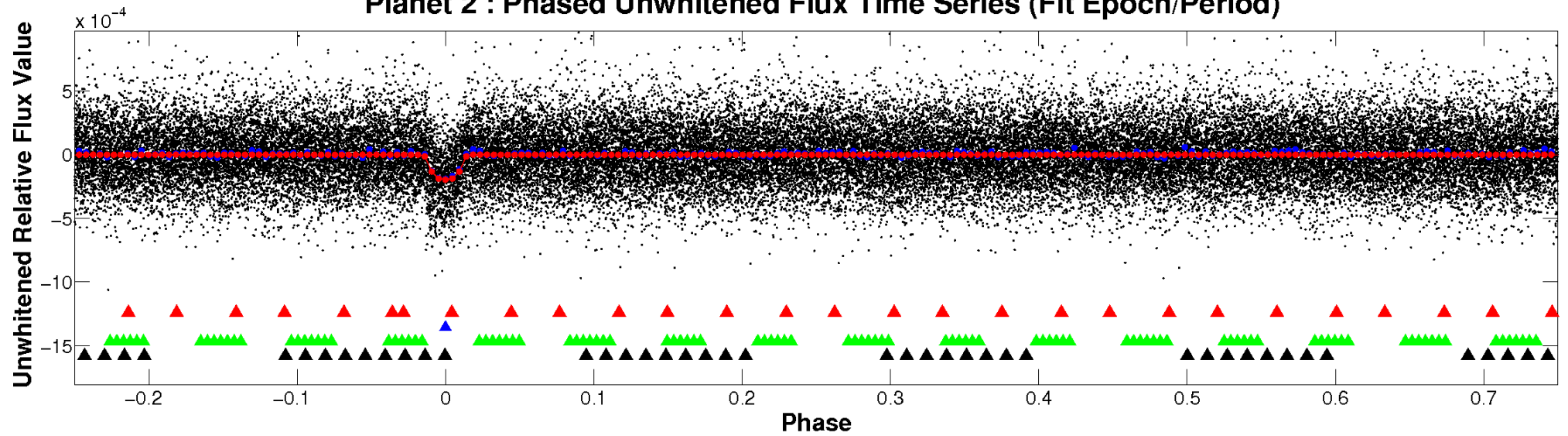
# ALT Odd/Even

TCE 011601584-02

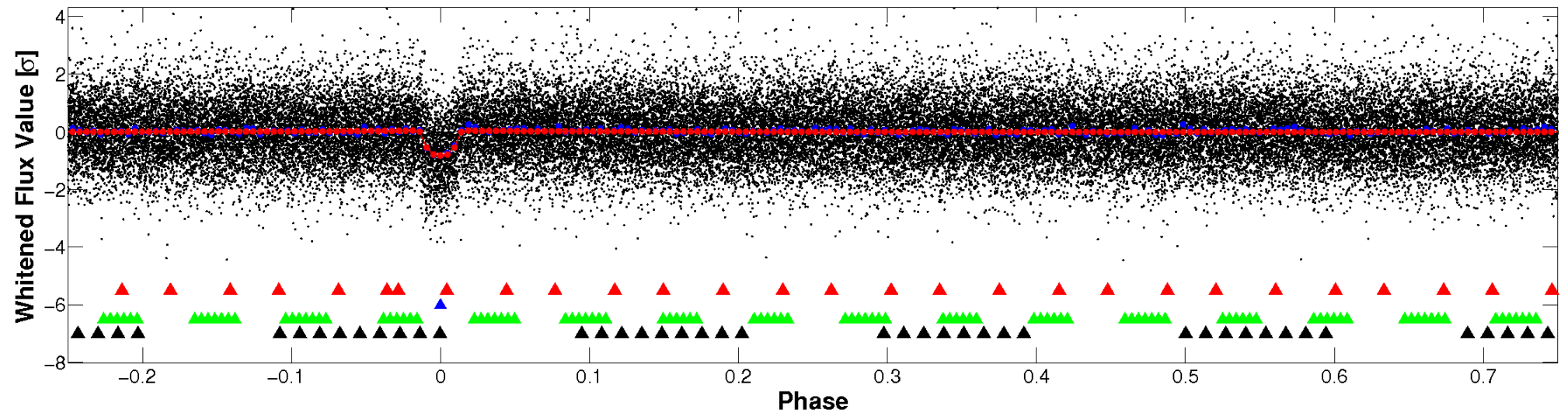


# Non-Whitened Vs. Whitened Light Curve

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

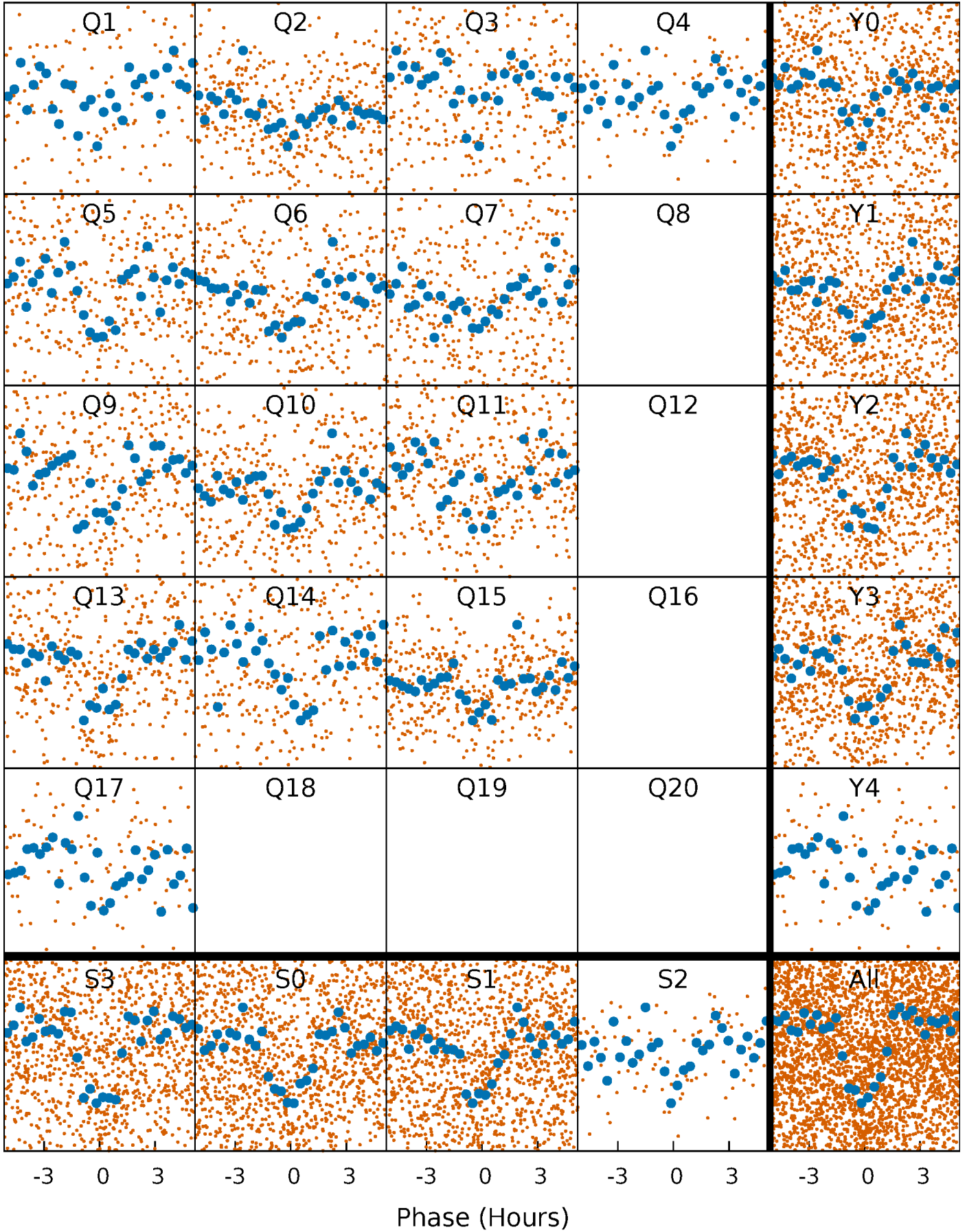


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



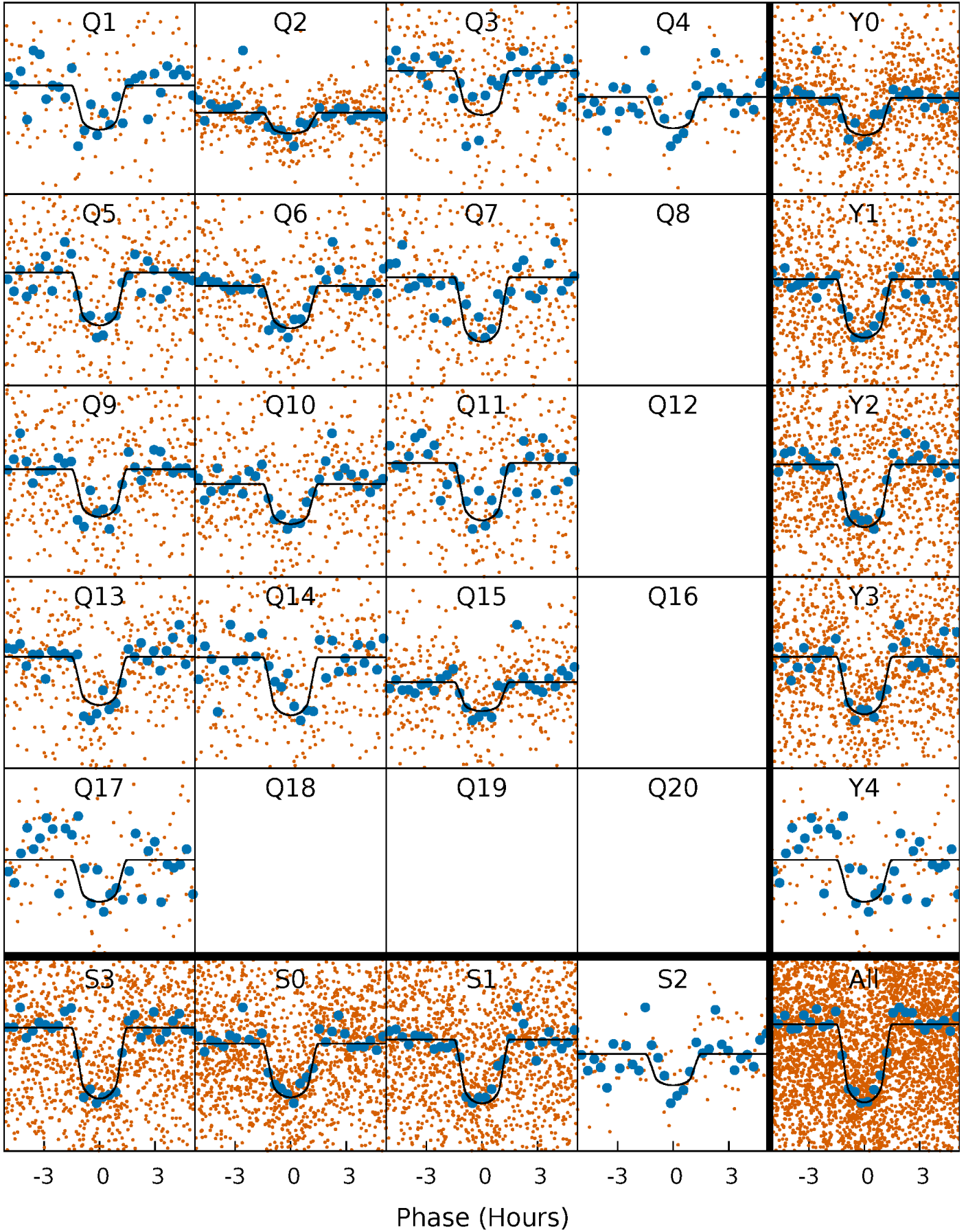
# PDC Quarter-Phased Transit Curves

TCE 011601584-02   P= 4.385319 Days    $T_0=134.847732$  (BKJD)



# DV Quarter-Phased Transit Curves

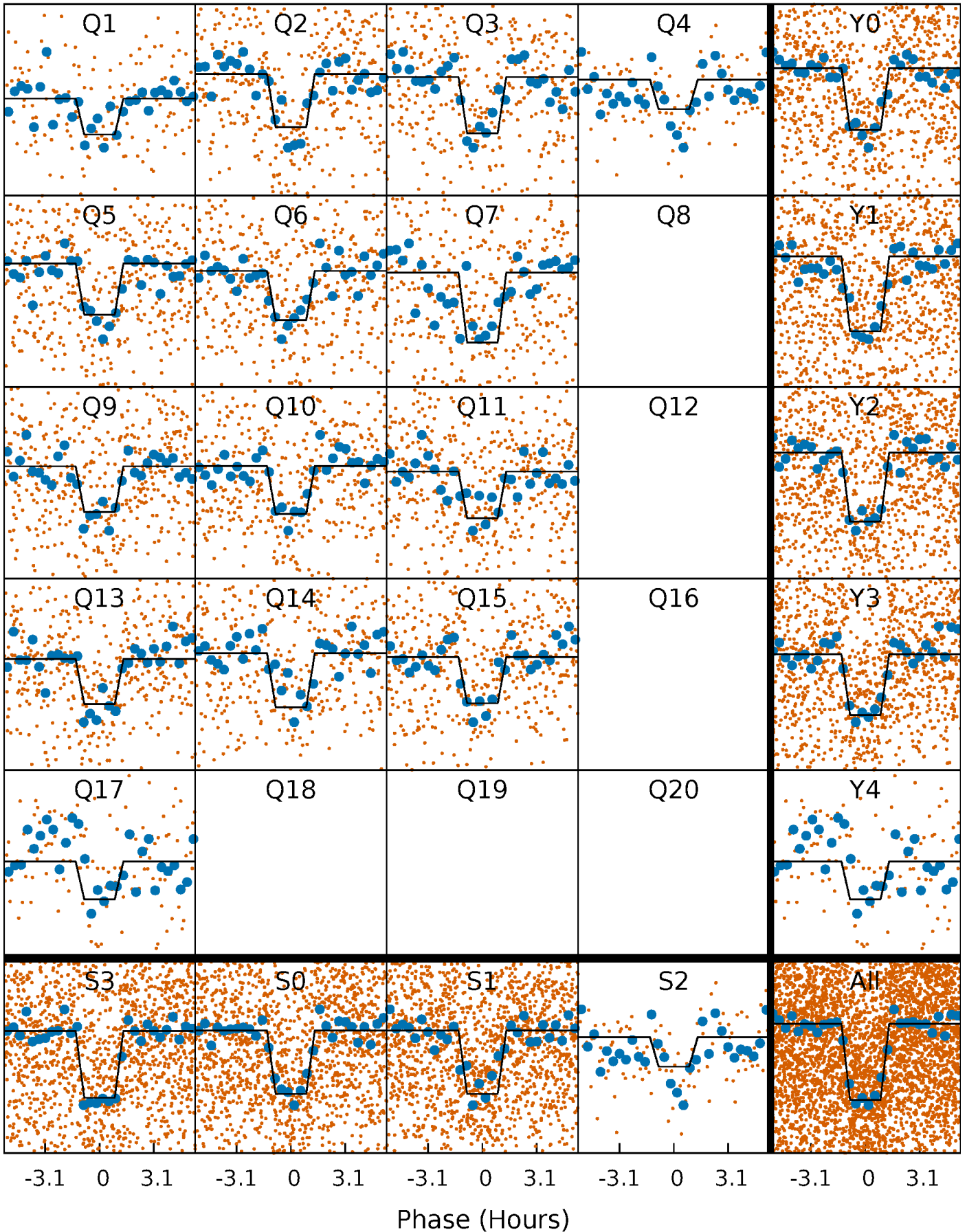
TCE 011601584-02   P= 4.385319 Days    $T_0=134.847732$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

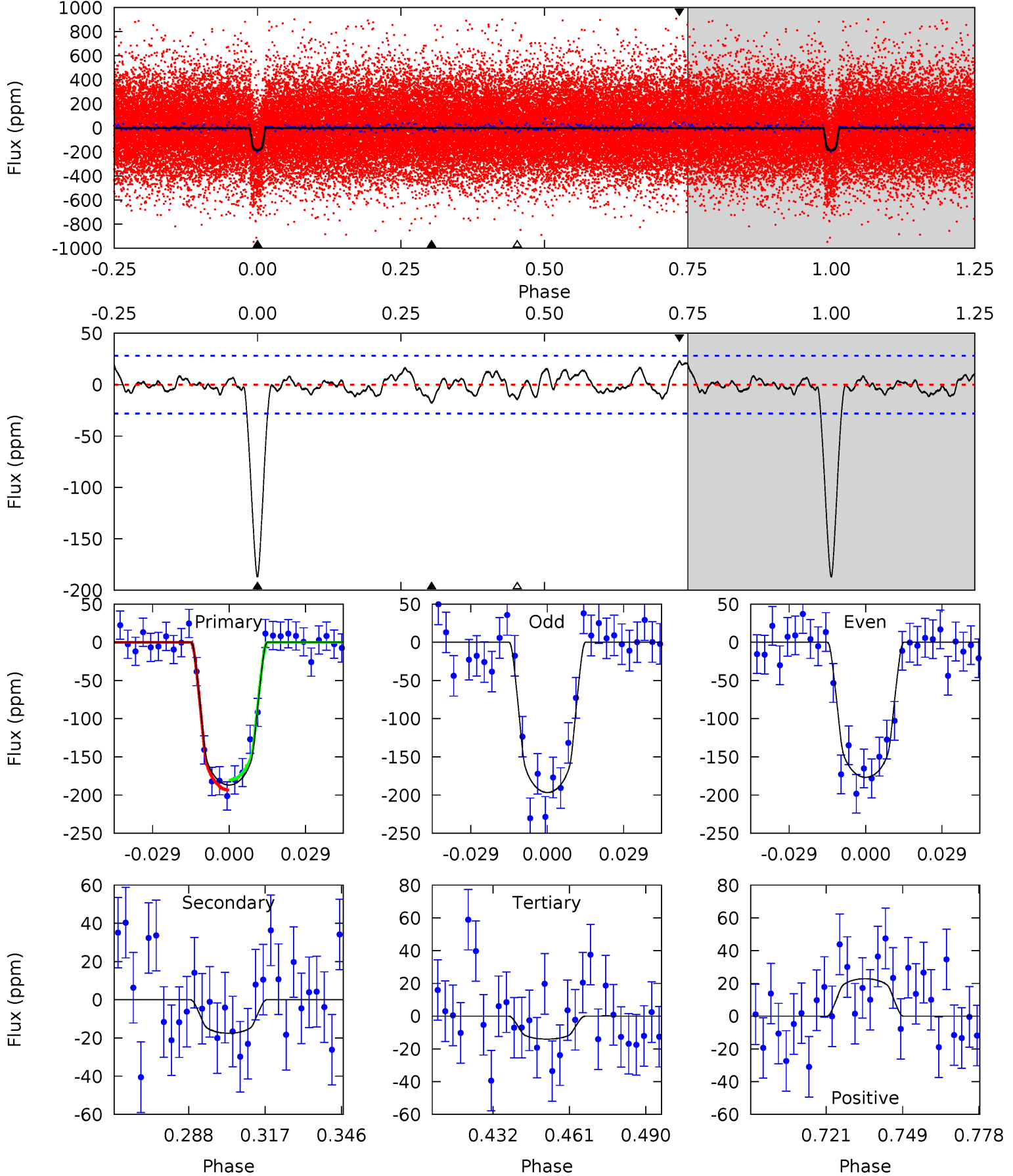
TCE 011601584-02   P= 4.385372 Days    $T_0=134.837948$  (BKJD)



# DV Model-Shift Uniqueness Test

011601584-02, P = 4.385319 Days, E = 130.462413 Days

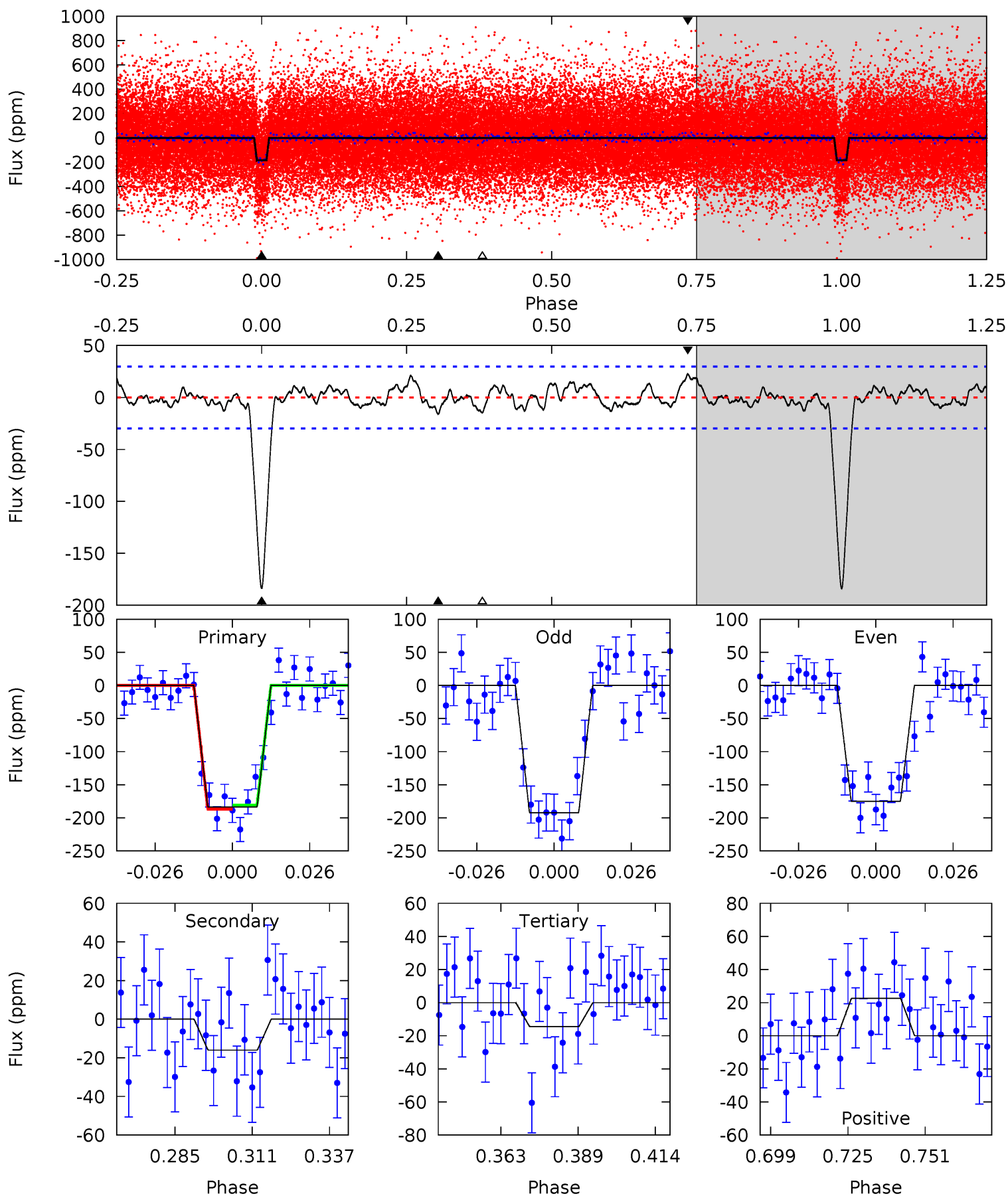
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
32.1	3.01	2.41	3.92	4.82	2.19	1.30	29.7	28.1	0.60	-0.91	1.71	0.99	0.11	1.13



# Alt Model-Shift Uniqueness Test

011601584-02, P = 4.385372 Days, E = 130.452576 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
29.9	2.61	2.36	3.67	4.84	2.23	1.27	27.5	26.2	0.24	-1.06	1.38	1.04	0.11	0.49





### Stellar Parameters For KIC 011601584

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5191^{+103}_{-103}$	$4.530^{+0.044}_{-0.055}$	$0.080^{+0.150}_{-0.150}$	$0.826^{+0.061}_{-0.050}$	$0.844^{+0.049}_{-0.044}$	$2.106^{+0.355}_{-0.365}$
	+2%/-2%	+1%/-1%	+188%/-188%	+7%/-6%	+6%/-5%	+17%/-17%
Source	SPE58	SPE58	SPE58	DSEP		

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

### Secondary Eclipse Parameters for KIC 011601584-02 / KOI 1831.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-18 \pm 6$	$1.40^{+0.44}_{-0.43}$	$1308^{+38}_{-34}$	$3224^{+456}_{-310}$	$12^{+16}_{-6}$
Alt.	$-16 \pm 6$	$1.23^{+0.42}_{-0.46}$	$1308^{+39}_{-35}$	$3292^{+566}_{-364}$	$14^{+22}_{-7}$

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

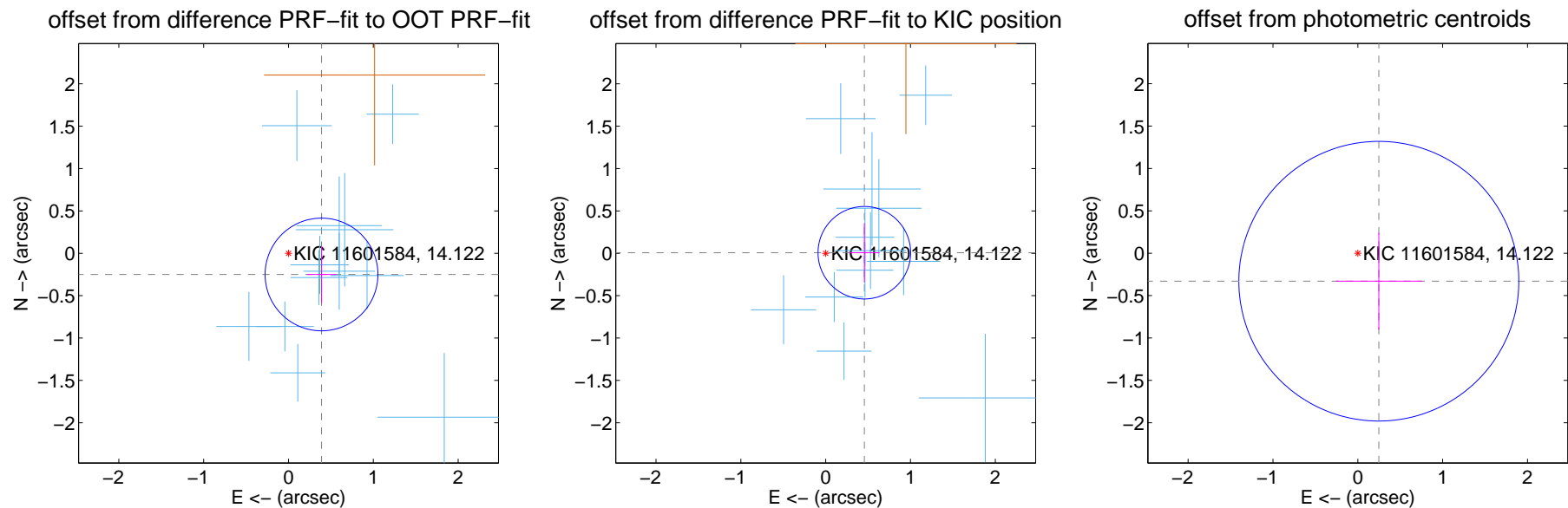
## DV Centroid Data

Supplemental centroid analysis for 011601584-02. Kepler magnitude: 14.12. Transit SNR 23.88

There are 12 quarters with good PRF difference image offsets

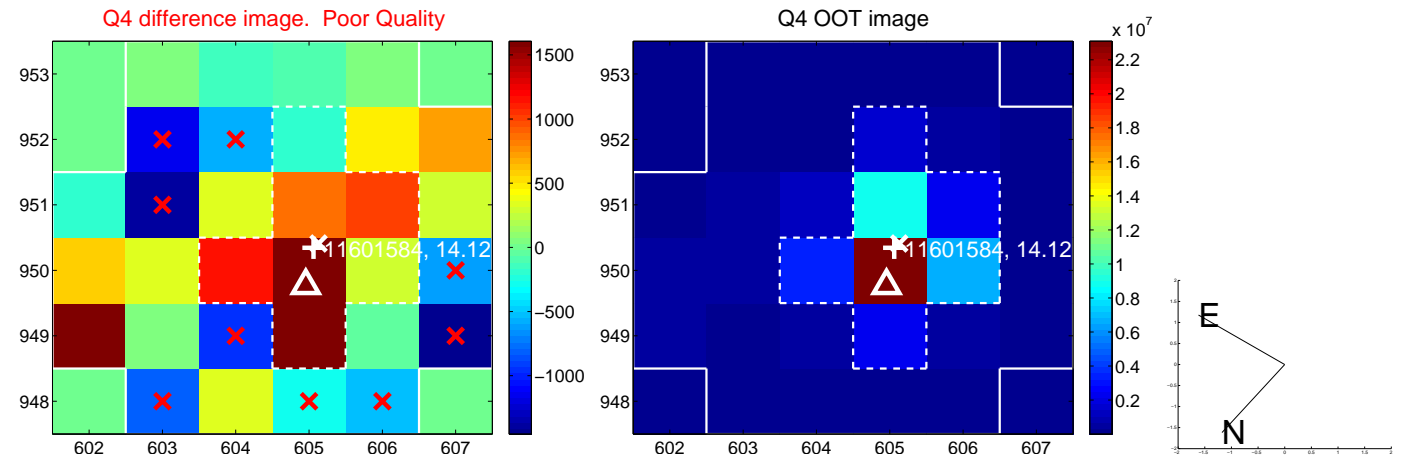
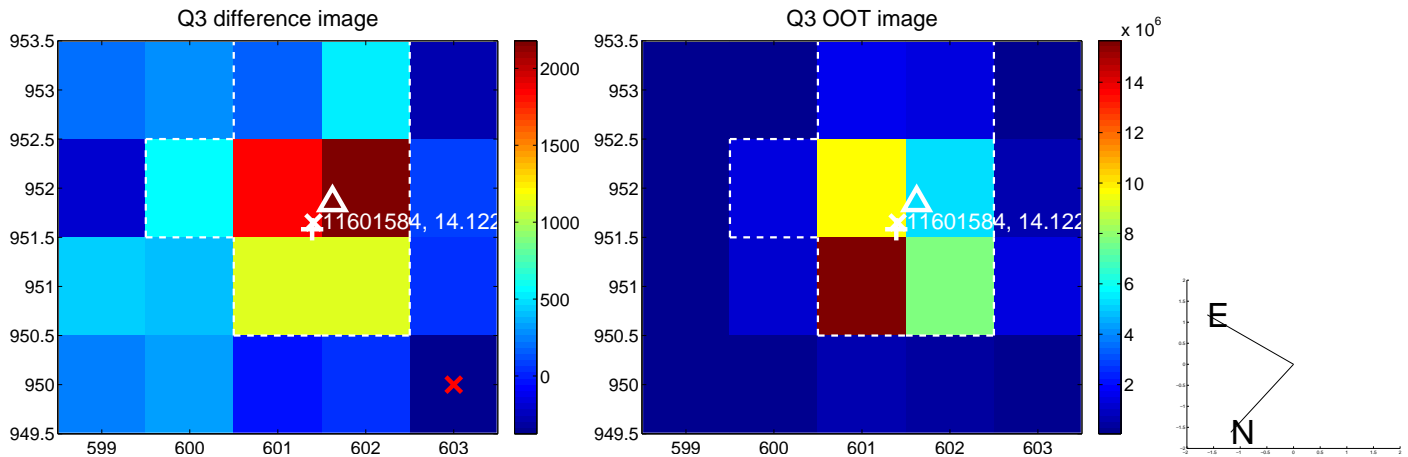
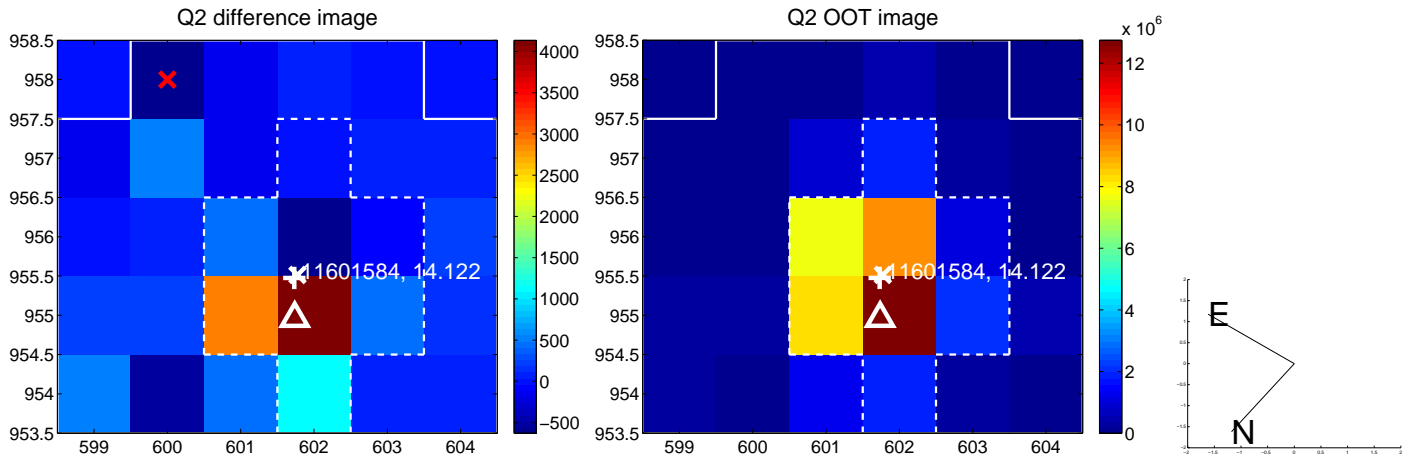
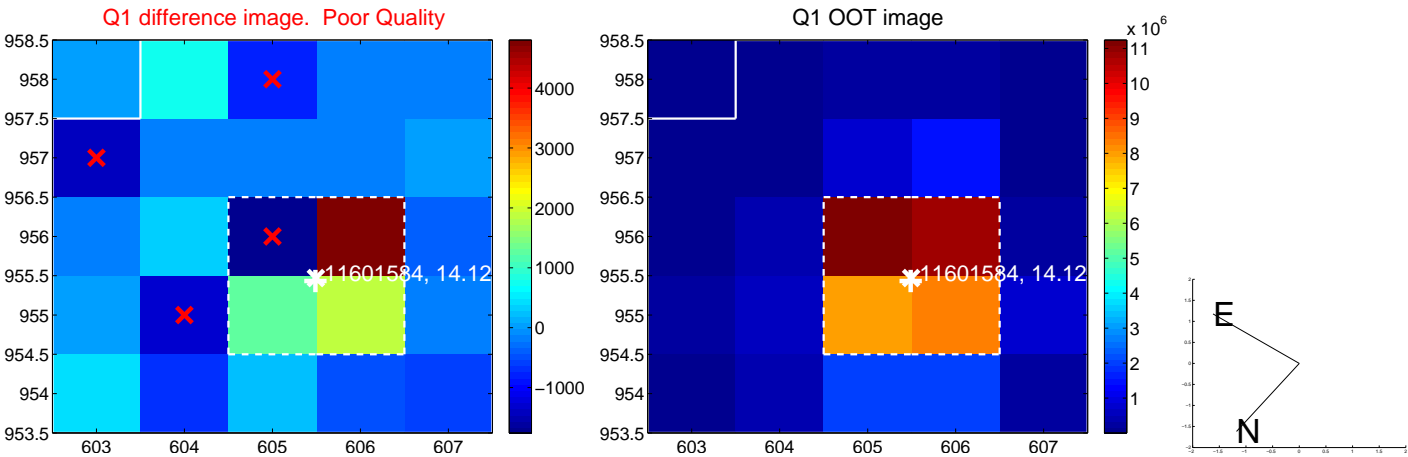
The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.463 \pm 0.222$	2.09	$-0.389 \pm 0.171$	$-0.250 \pm 0.334$
PRF-fit source offset from KIC position	$0.456 \pm 0.182$	2.51	$-0.456 \pm 0.181$	$0.007 \pm 0.350$
photometric centroid source offset	$0.41 \pm 0.55$	0.75	$-0.25 \pm 0.51$	$-0.33 \pm 0.57$

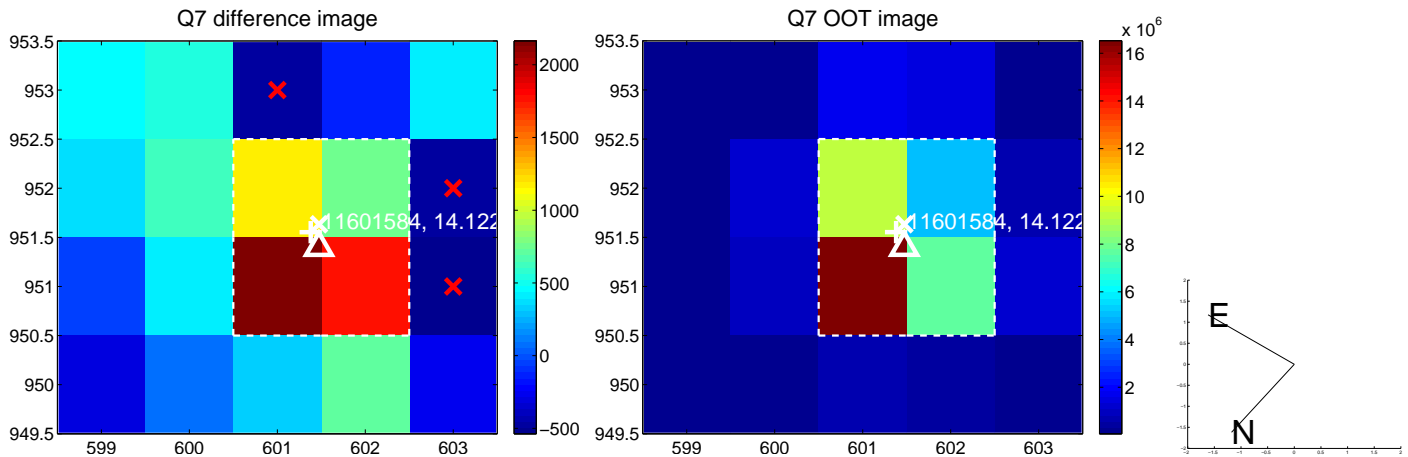
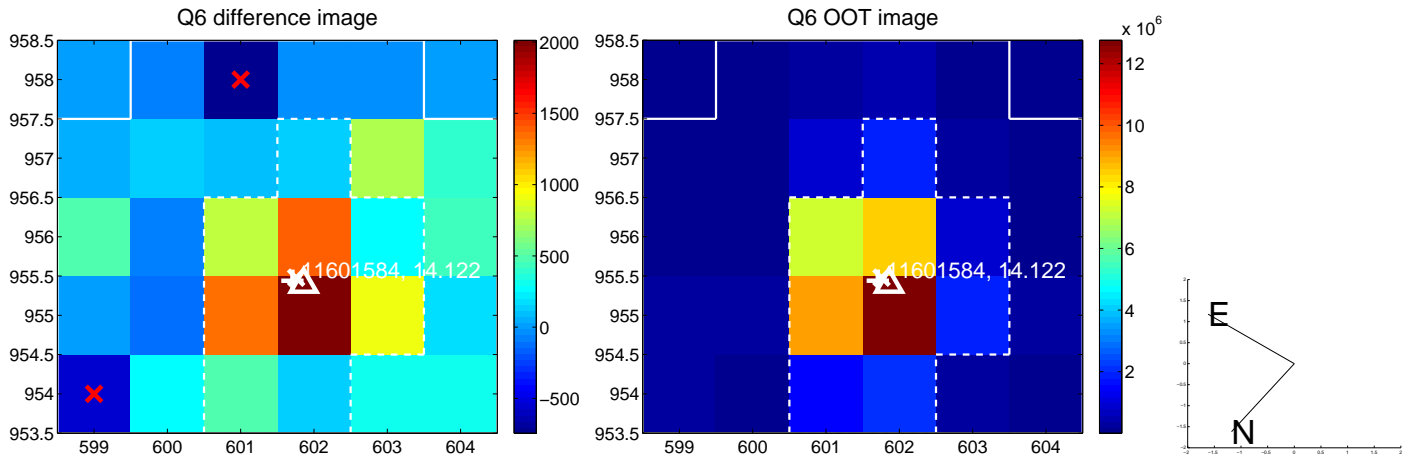
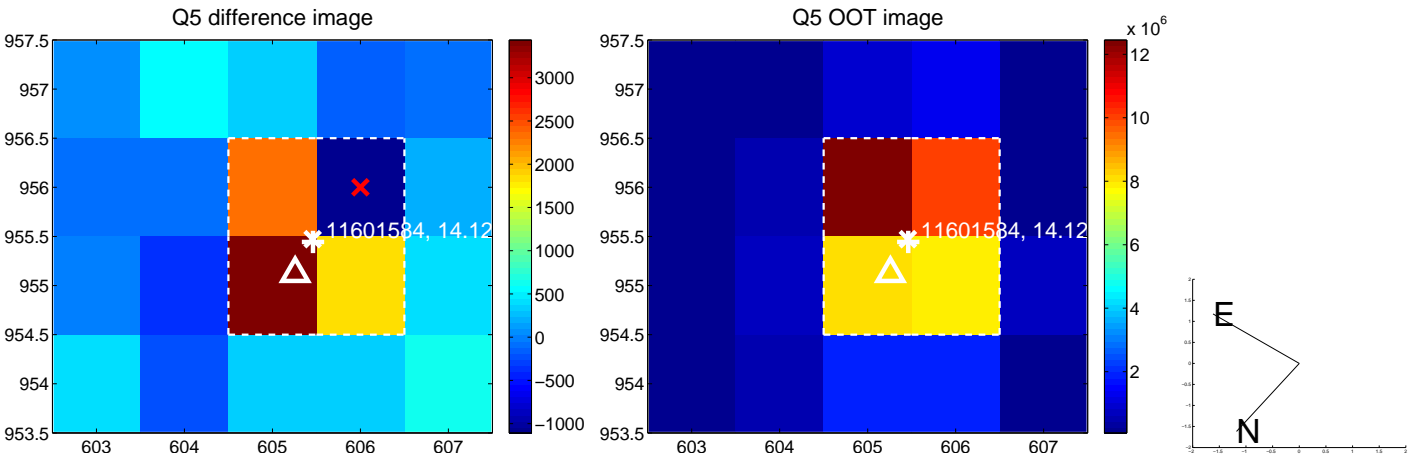


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

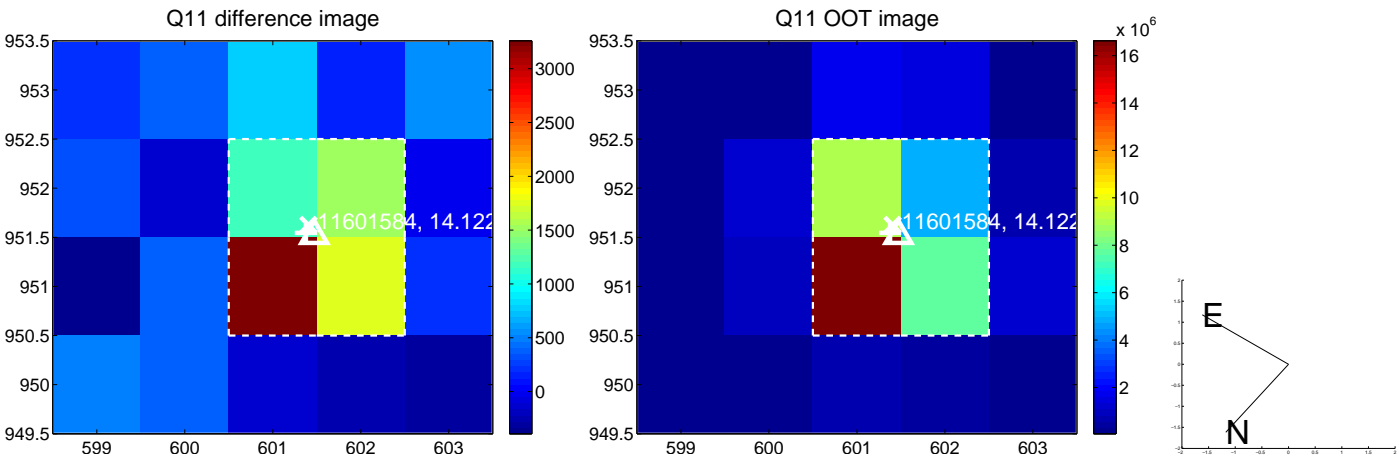
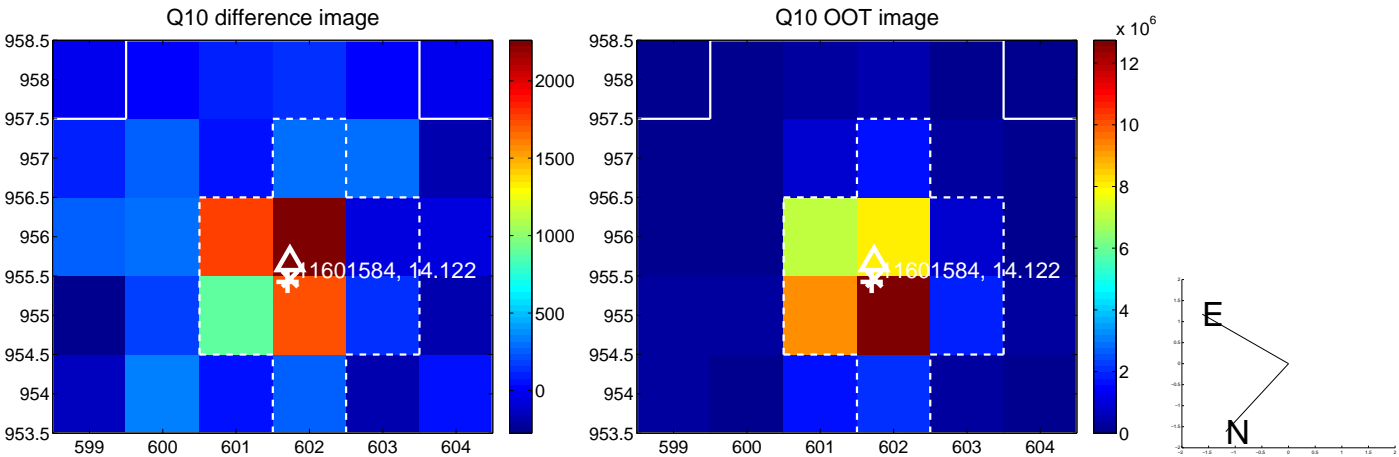
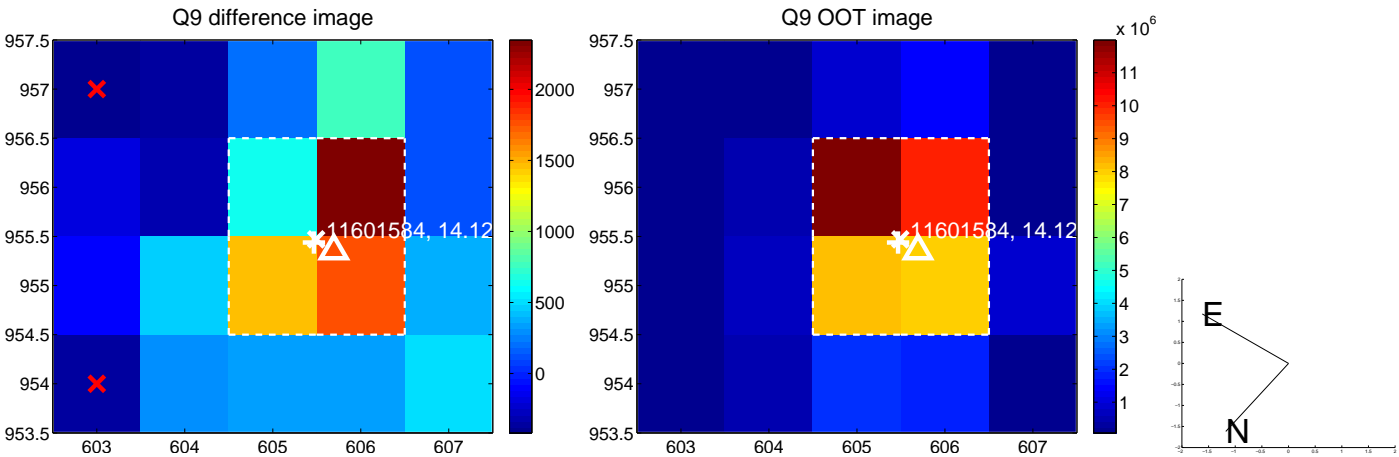
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



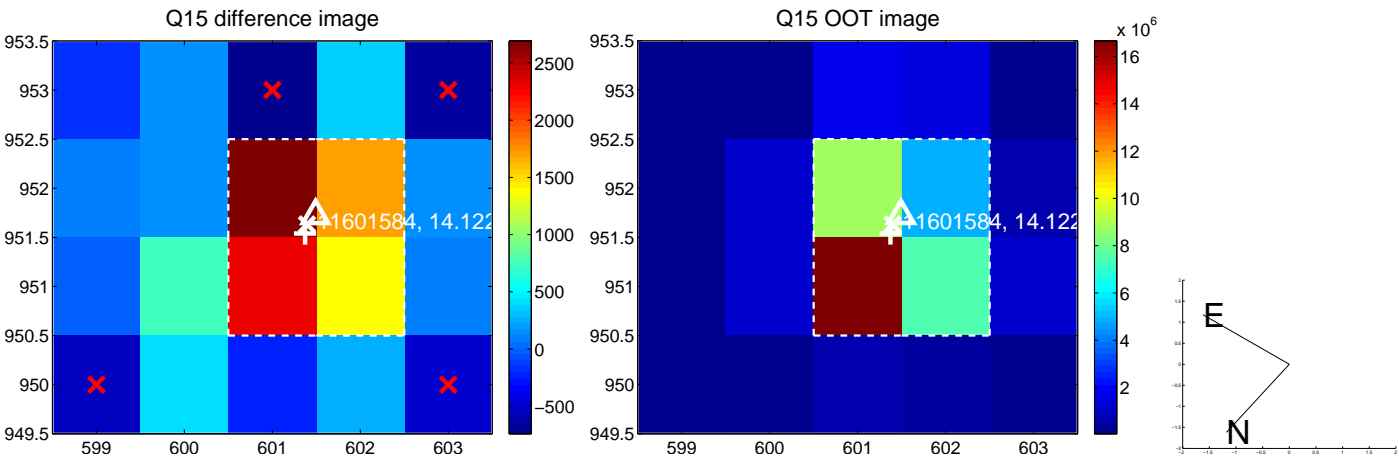
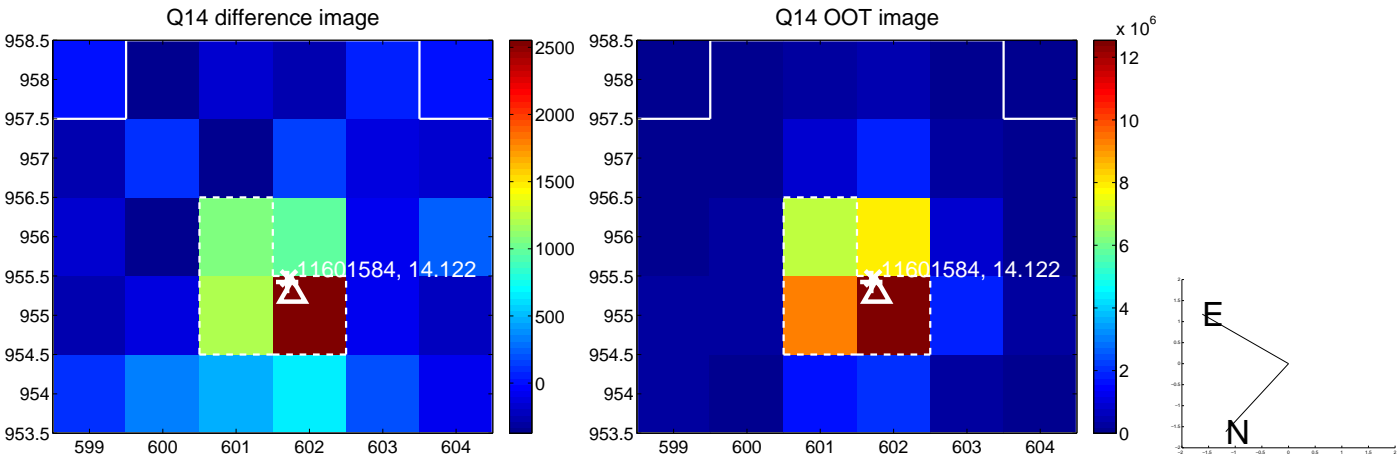
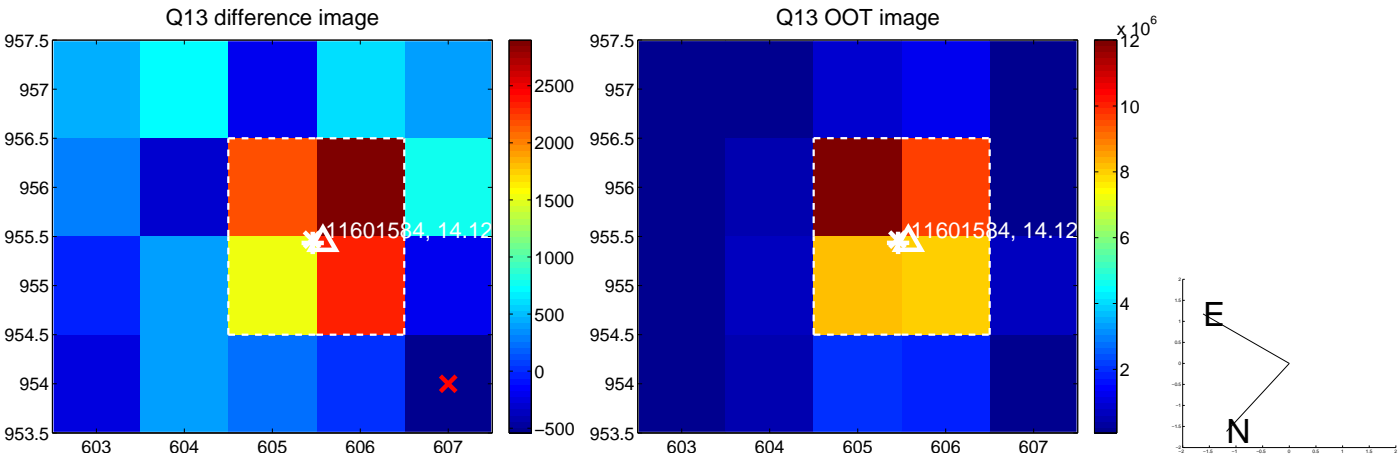
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



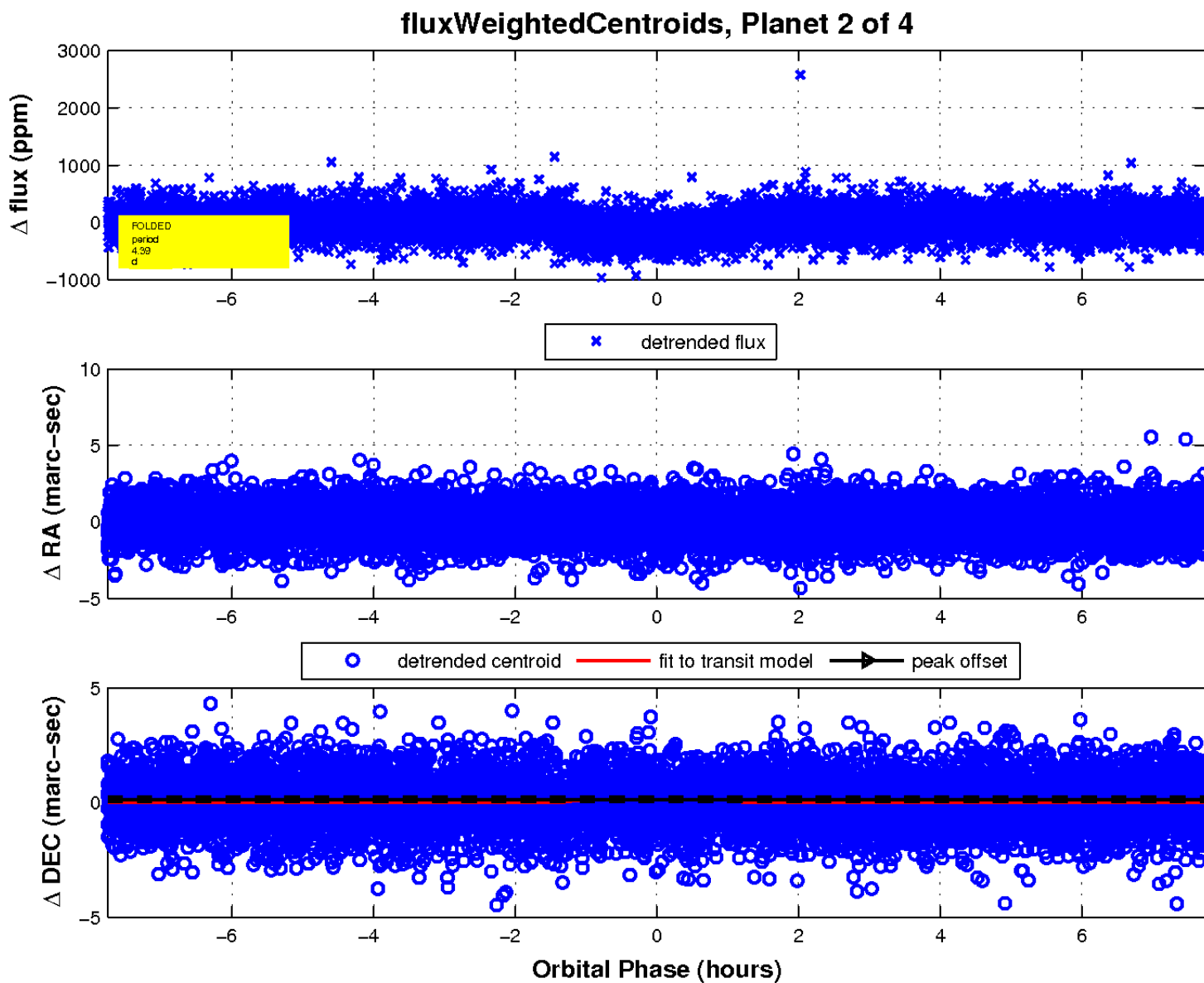
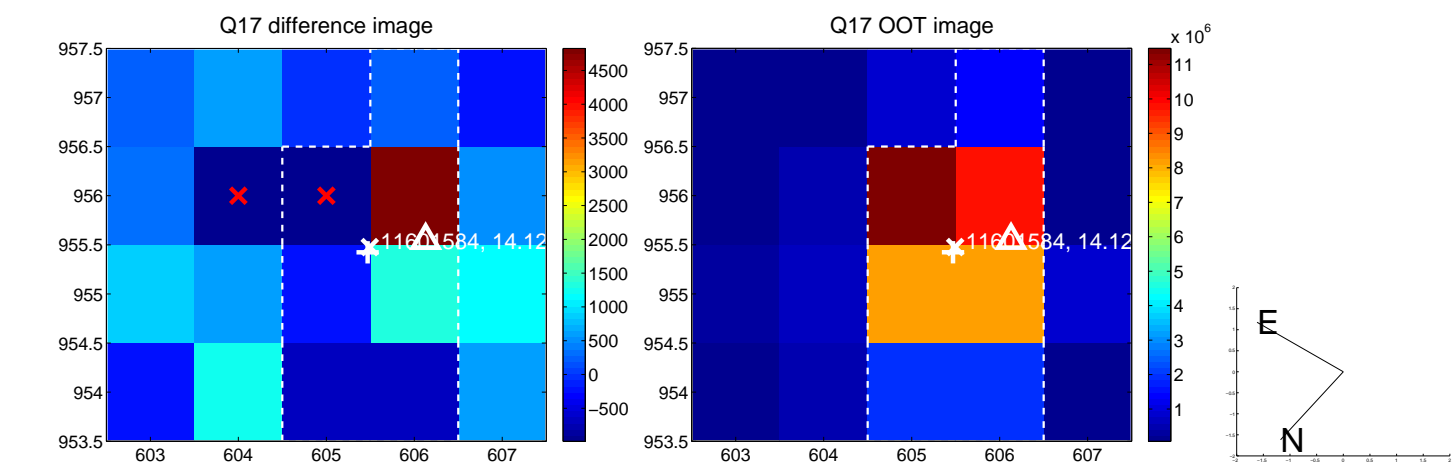
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

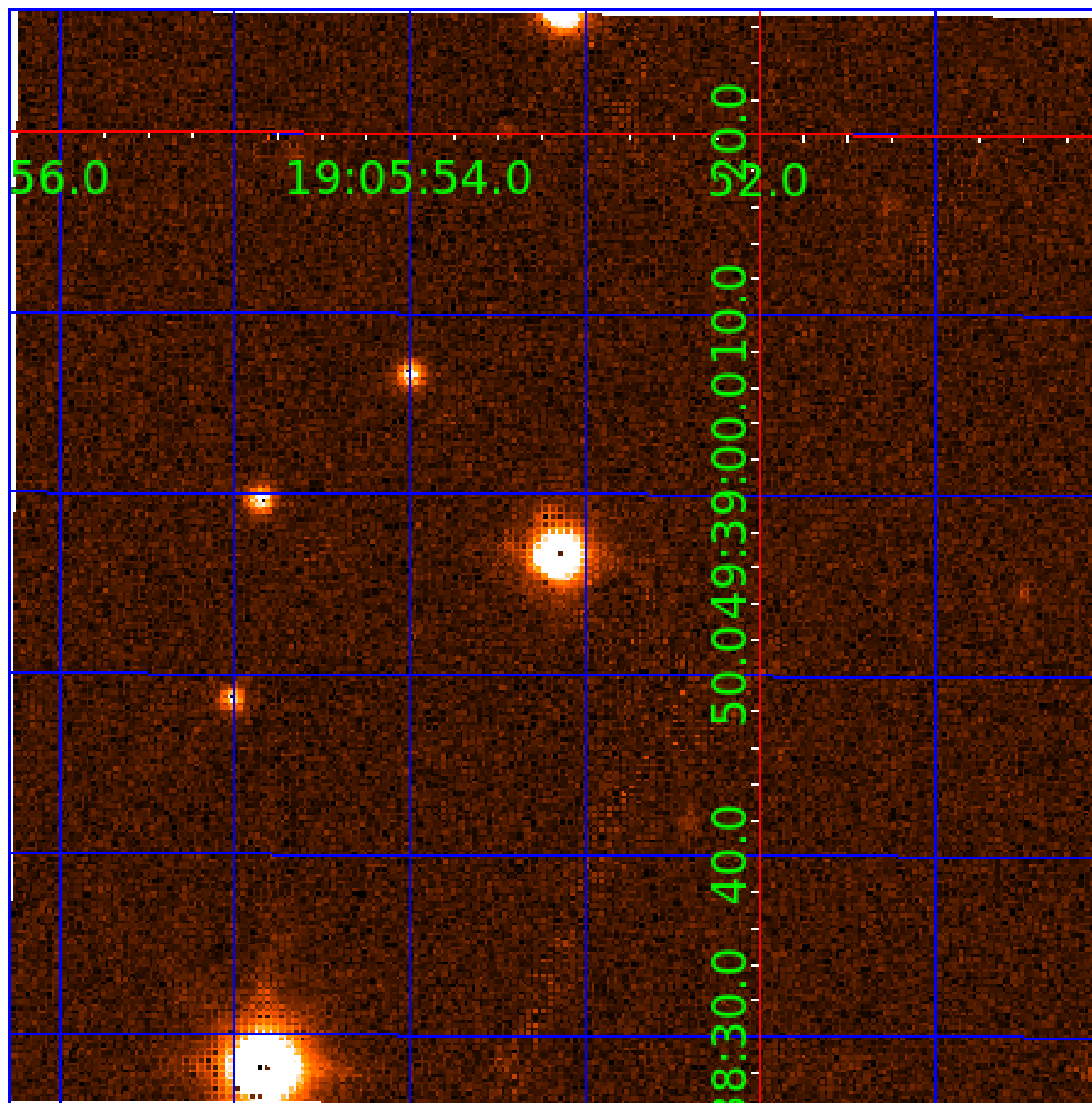


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 011601584

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011601584-01	OBS	1831.01	51.810507	182.962079	1050.1	7.029	46.6	45.1	0.83	5191	3.22	6.72
011601584-02	OBS	1831.02	4.385319	134.847732	196.9	2.586	21.8	23.9	0.83	5191	1.41	180.81
011601584-03	OBS	1831.04	13.979438	142.339329	337.7	1.304	11.7	14.7	0.83	5191	2.00	38.54
011601584-04	OBS	1831.03	34.193704	148.891071	194.5	7.455	10.4	11.5	0.83	5191	1.29	11.69

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011601584-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
011601584-02	OBS	PC	0.95	0	0	0	0	NO_COMMENT
011601584-03	OBS	PC	0.98	0	0	0	0	NO_COMMENT
011601584-04	OBS	PC	0.85	0	0	0	0	NO_COMMENT

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

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

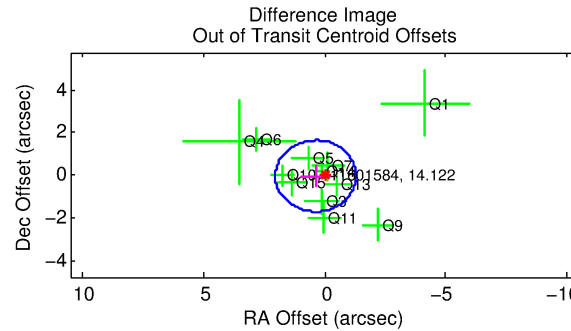
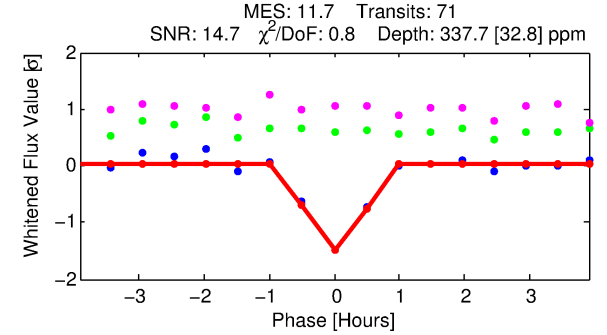
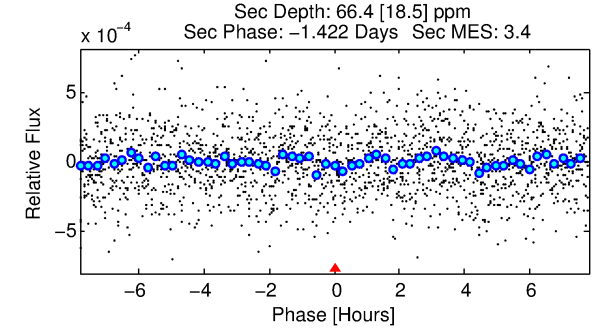
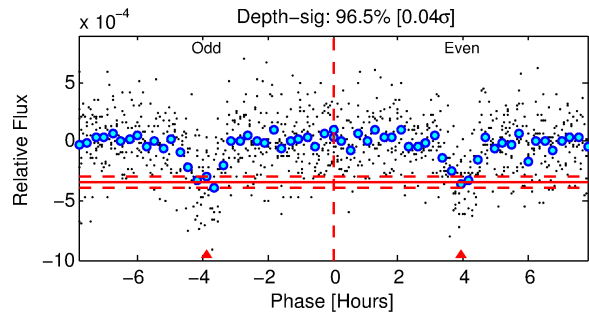
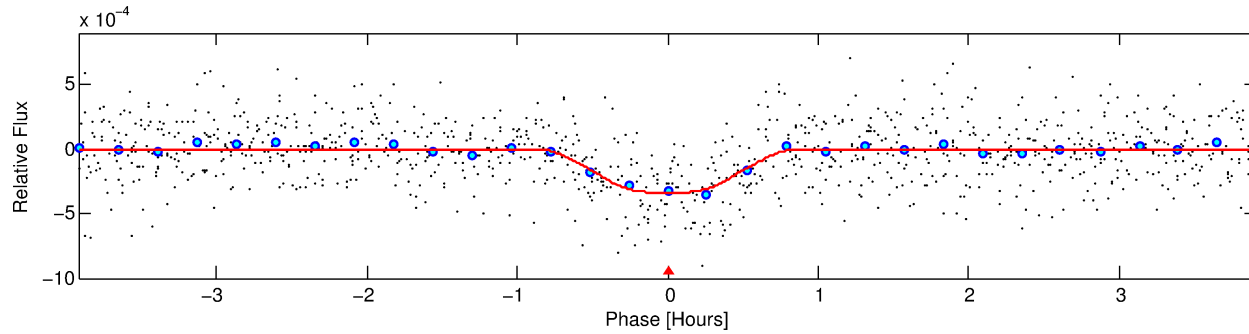
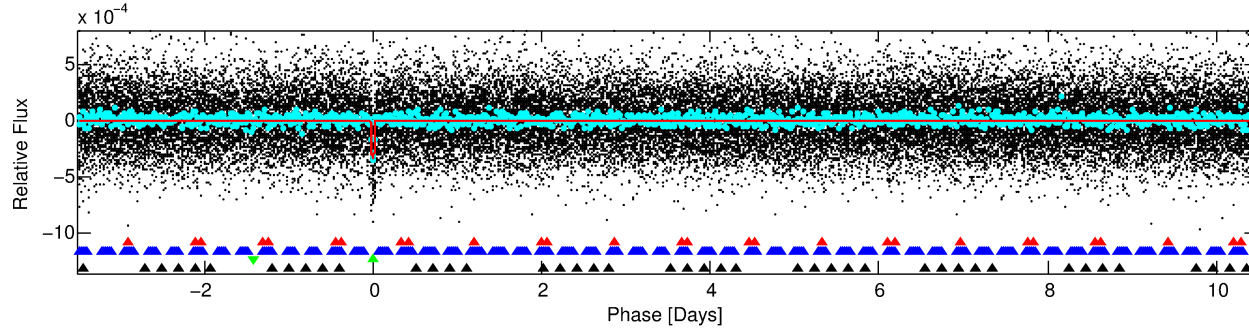
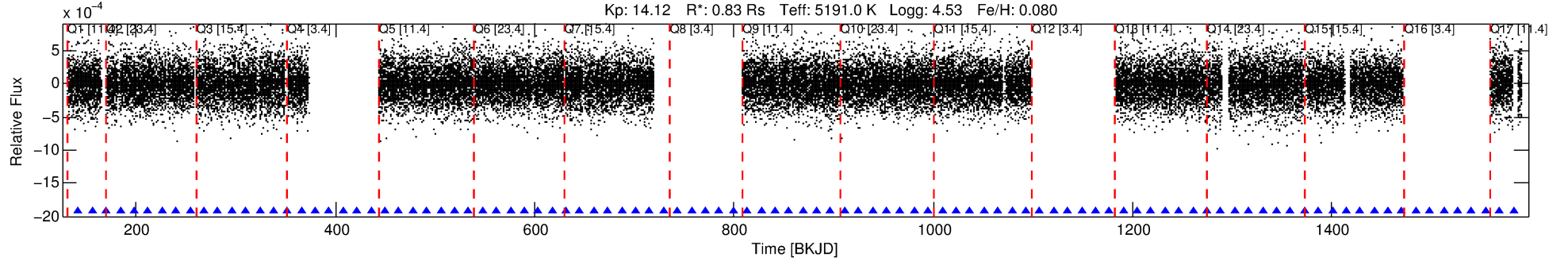
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 011601584-03

No Significant Match Found

# DV One-Page Summary

KIC: 11601584 Candidate: 3 of 4 Period: 13.979 d  
KOI: K01831.04 Corr: 0.937



## DV Fit Results:

Period = 13.97944 [0.00004] d  
Epoch = 142.3393 [0.0023] BKJD  
Rp/R\* = 0.0222 [0.0056]  
a/R\* = 30.97 [31.97]  
b = 0.95 [0.11]  
Seff = 38.54 [4.85]  
Teff = 635 [20] K  
Rp = 2.00 [0.52] Re  
a = 0.1073 [0.0070] AU  
Ag = 105.59 [61.47] [1.70 $\sigma$ ]  
Teffp = 3149 [456] K [5.51 $\sigma$ ]

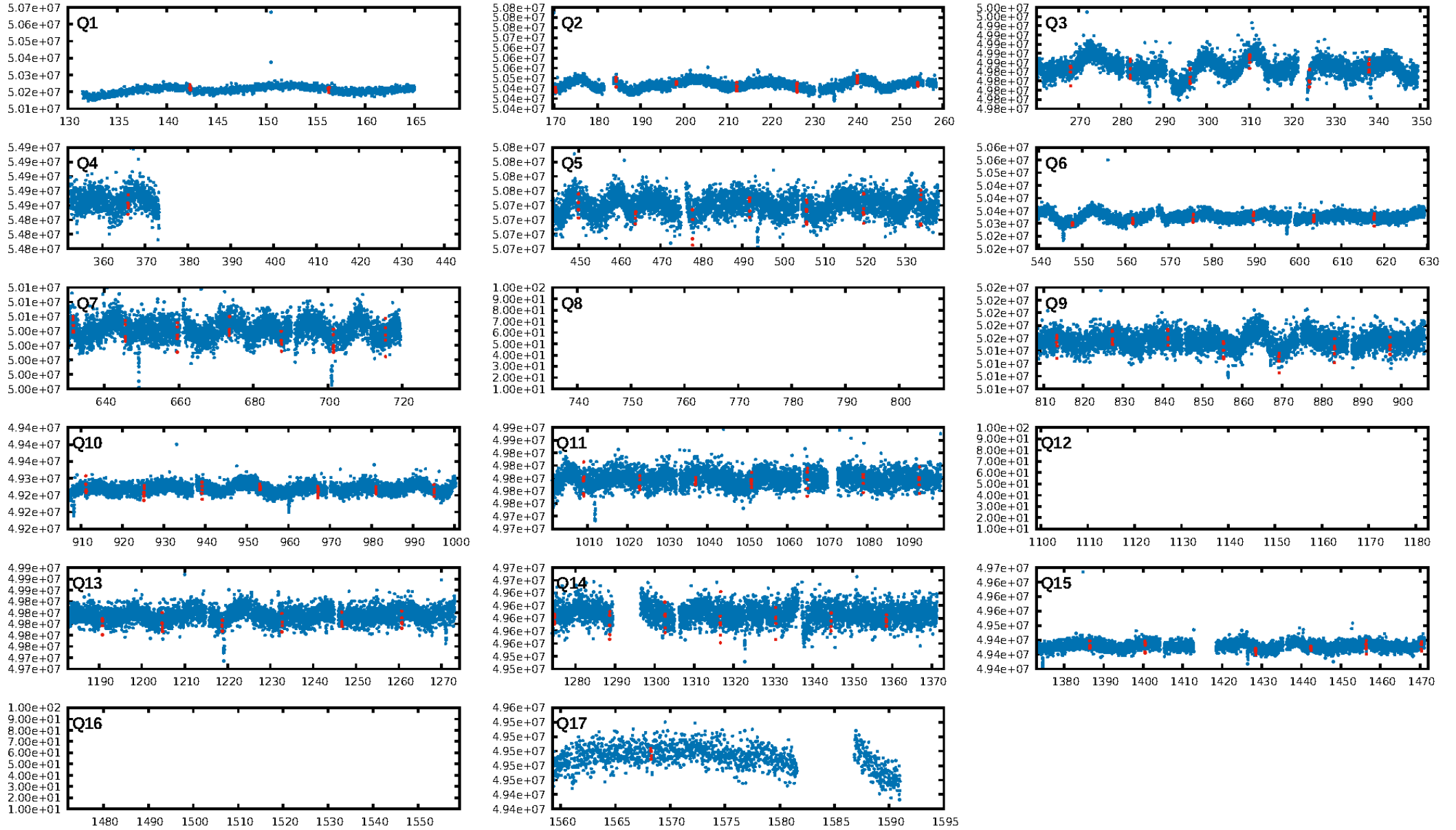
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [79.49 $\sigma$ ]  
LongPeriod-sig: 100.0% [64.11 $\sigma$ ]  
ModelChiSquare2-sig: 92.4%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.65e-30  
RollingBand-fgt: 1.00 [67/67]  
GhostDiagnostic-chr: -5.414  
Centroid-sig: N/A  
Centroid-so: 0.368 arcsec [0.45 $\sigma$ ]  
OotOffset-rm: 0.376 arcsec [0.68 $\sigma$ ]  
KicOffset-rm: 0.373 arcsec [0.70 $\sigma$ ]  
OotOffset-st: 3/4/1/4 [12]  
KicOffset-st: 3/4/1/4 [12]  
DiffImageQuality-fgm: 0.67 [8/12]  
DiffImageOverlap-fno: 1.00 [14/14]

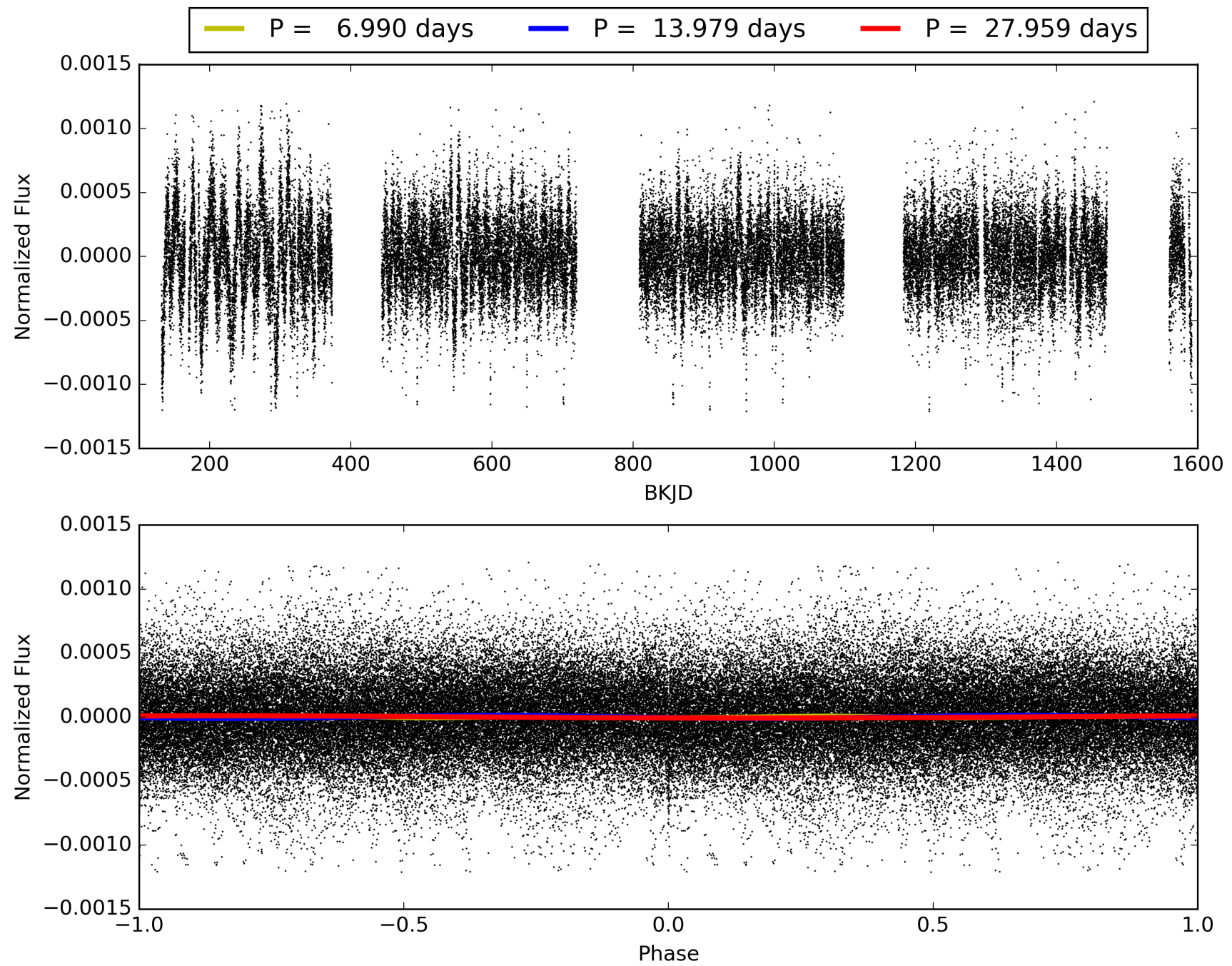
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 15:42:00 Z

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

# TCE 011601584-03, PDC Light Curves

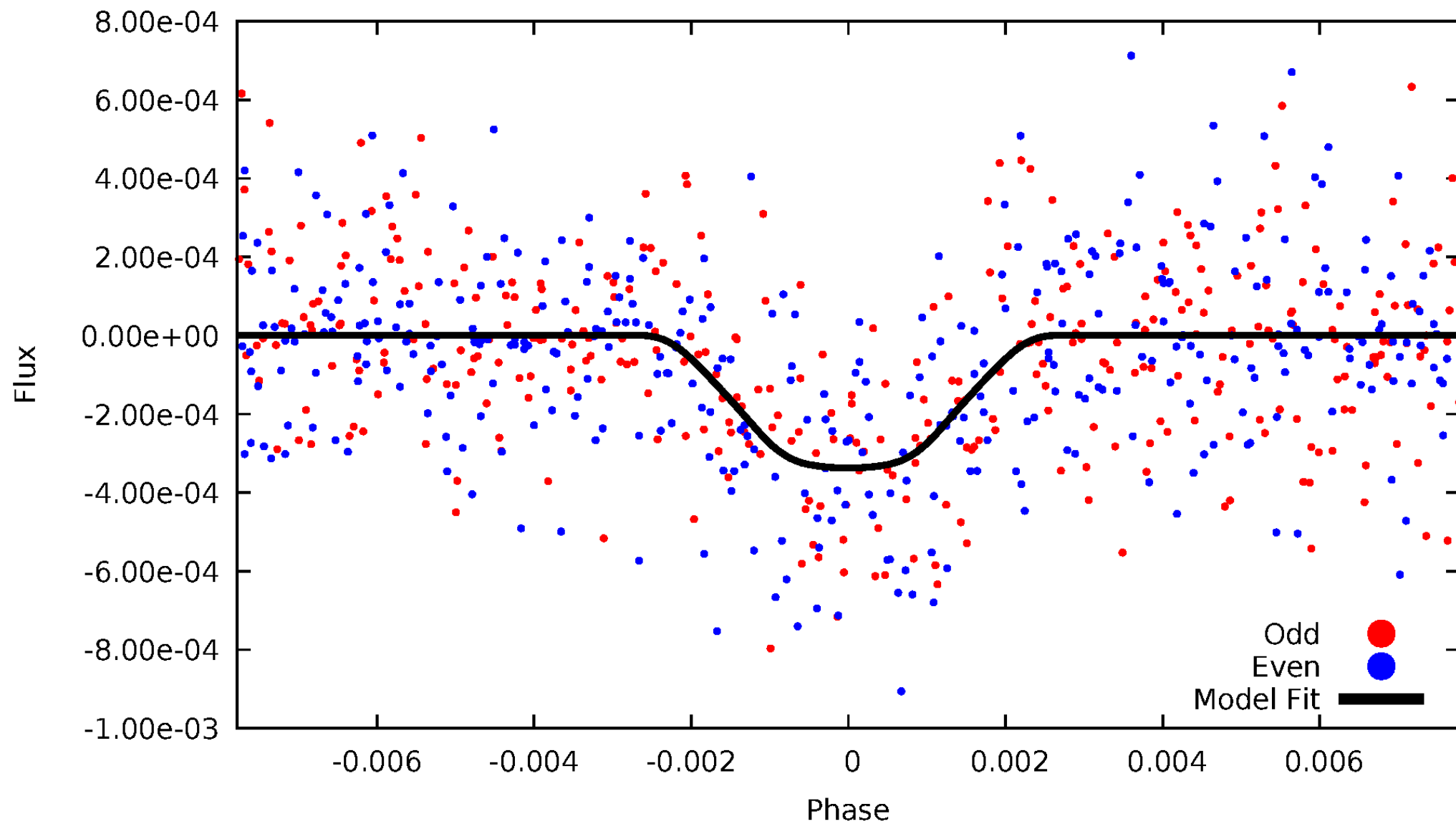


TCE 011601584-03



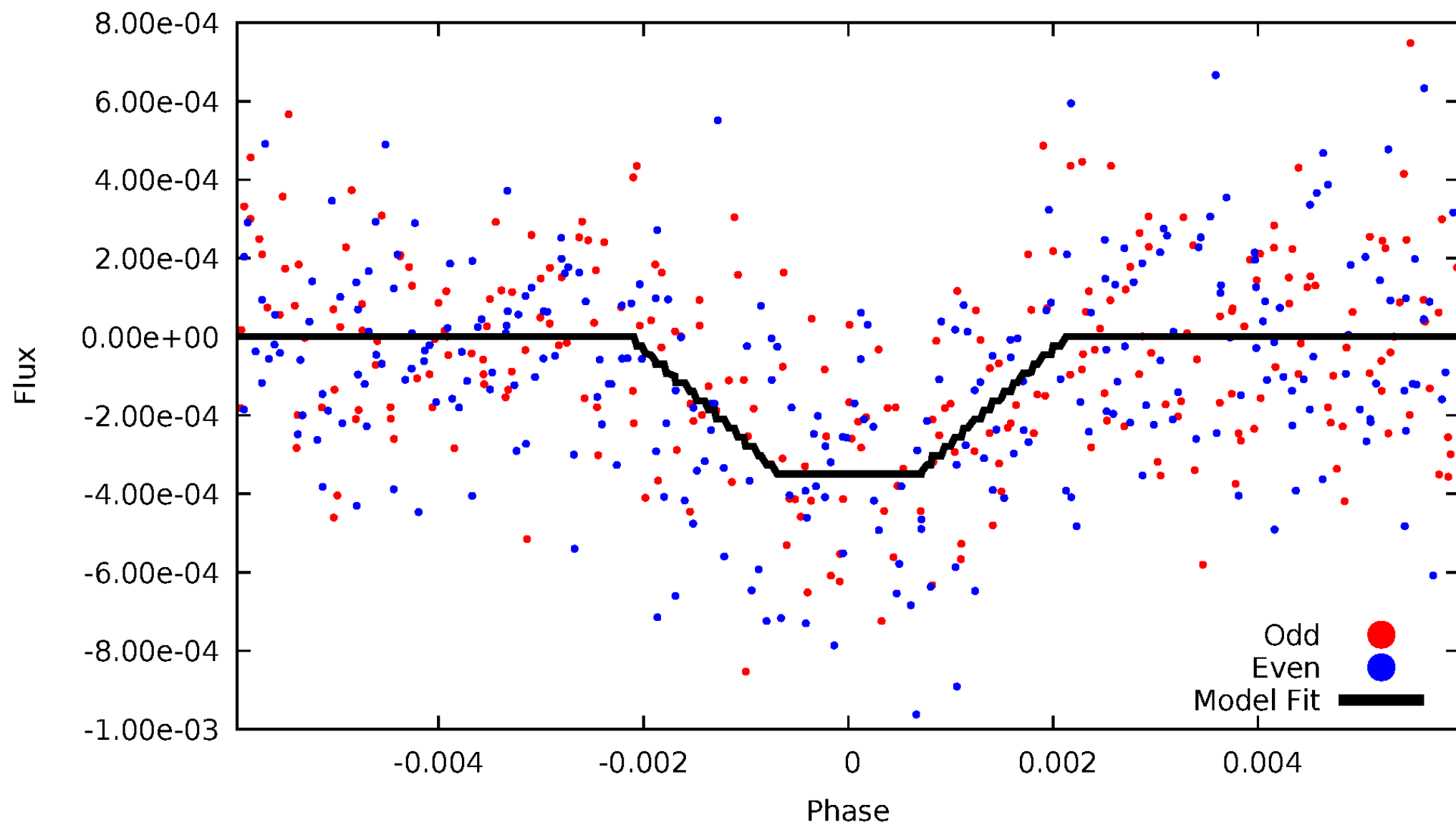
# DV Odd/Even

TCE 011601584-03



# ALT Odd/Even

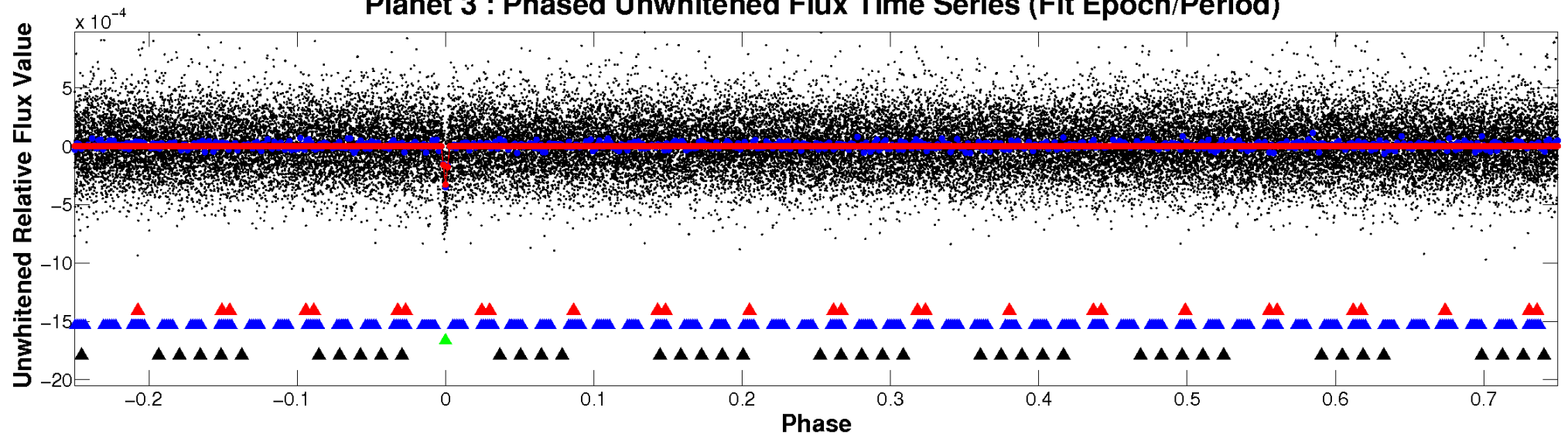
TCE 011601584-03



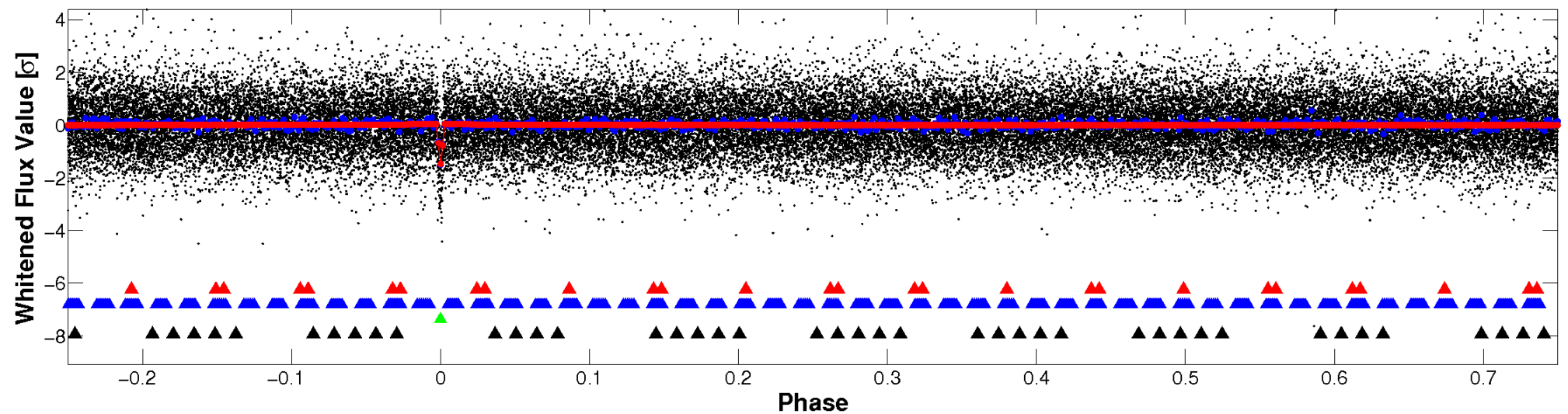


# Non-Whitened Vs. Whitened Light Curve

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

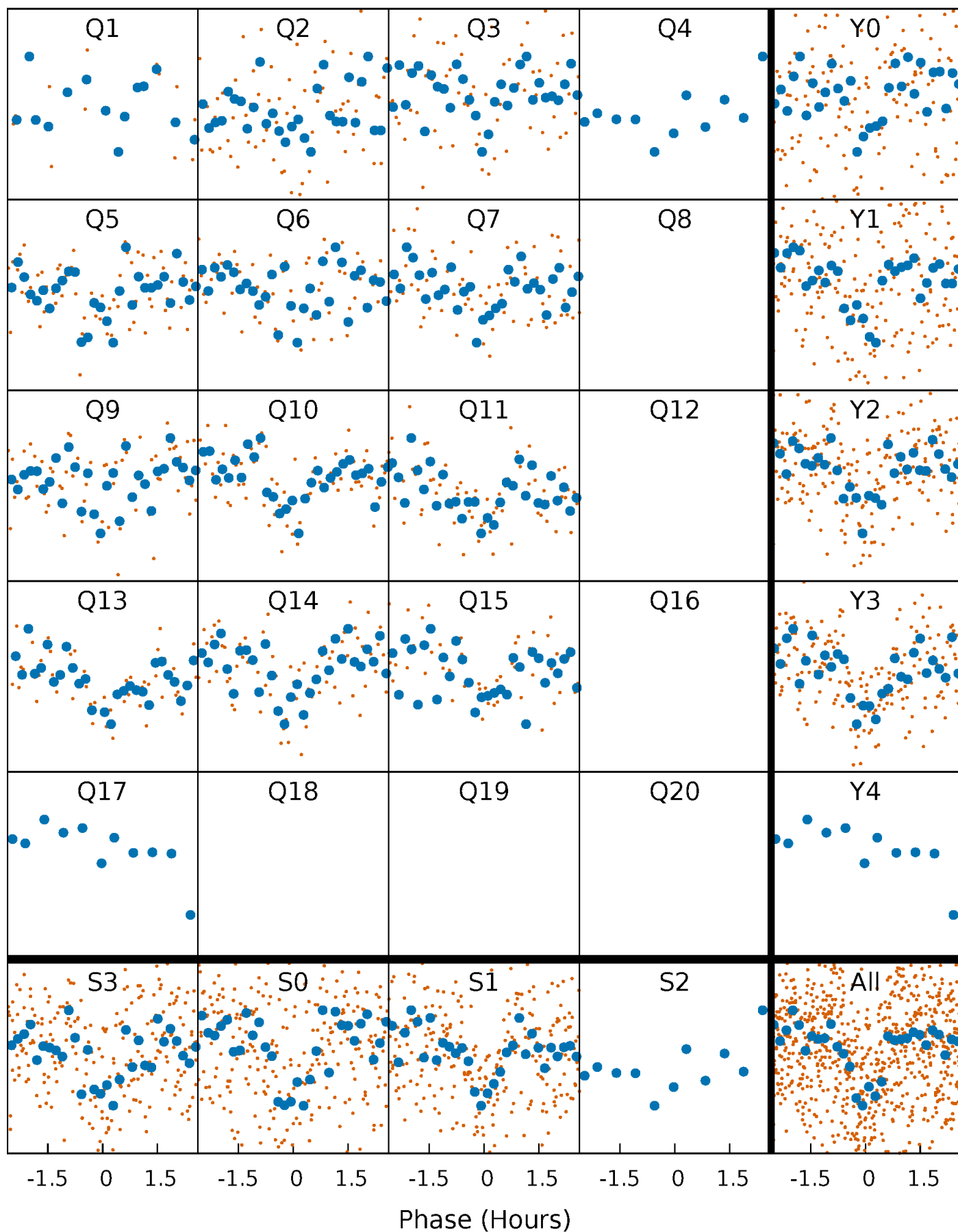


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

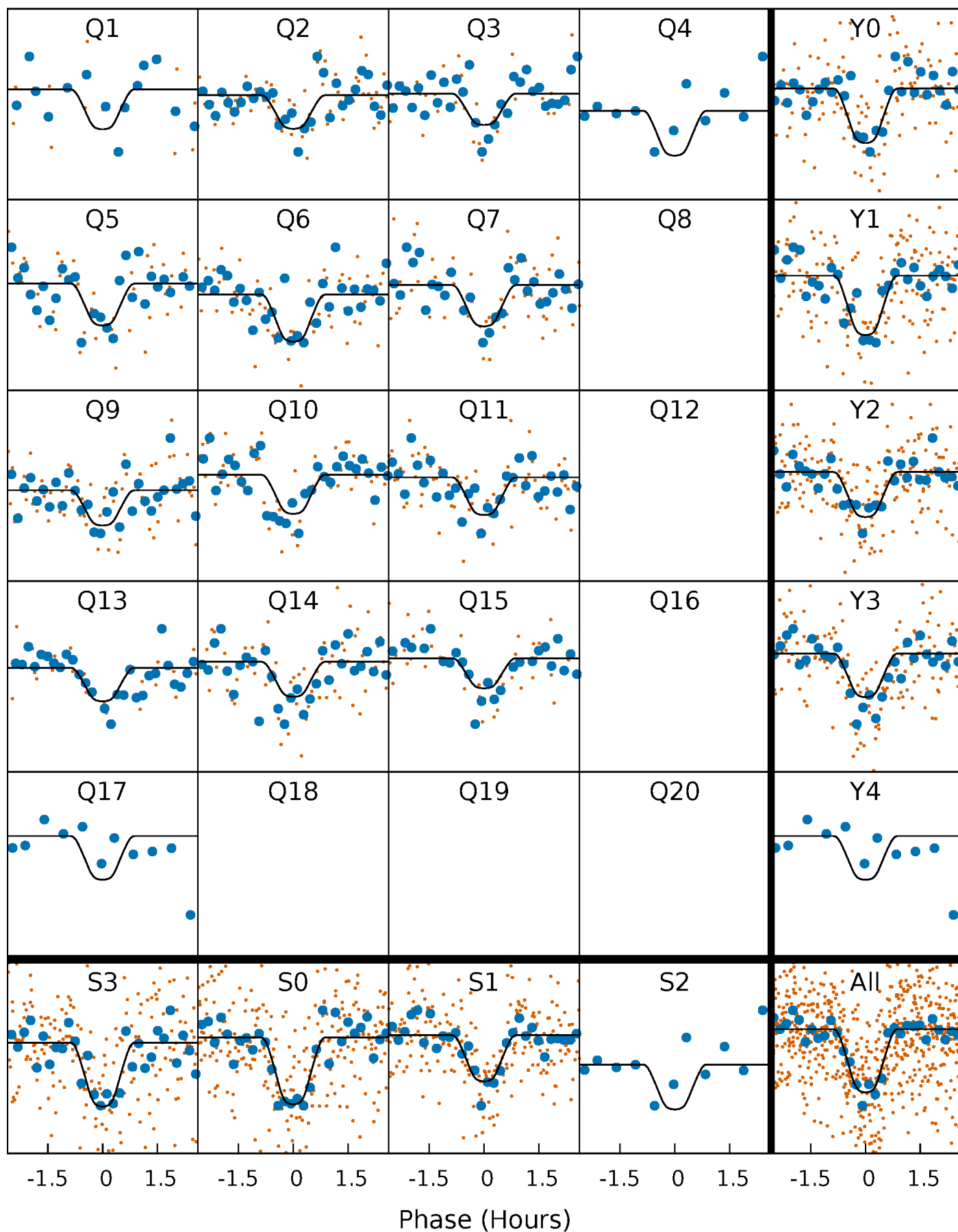
TCE 011601584-03   P= 13.979438 Days    $T_0=142.339329$  (BKJD)





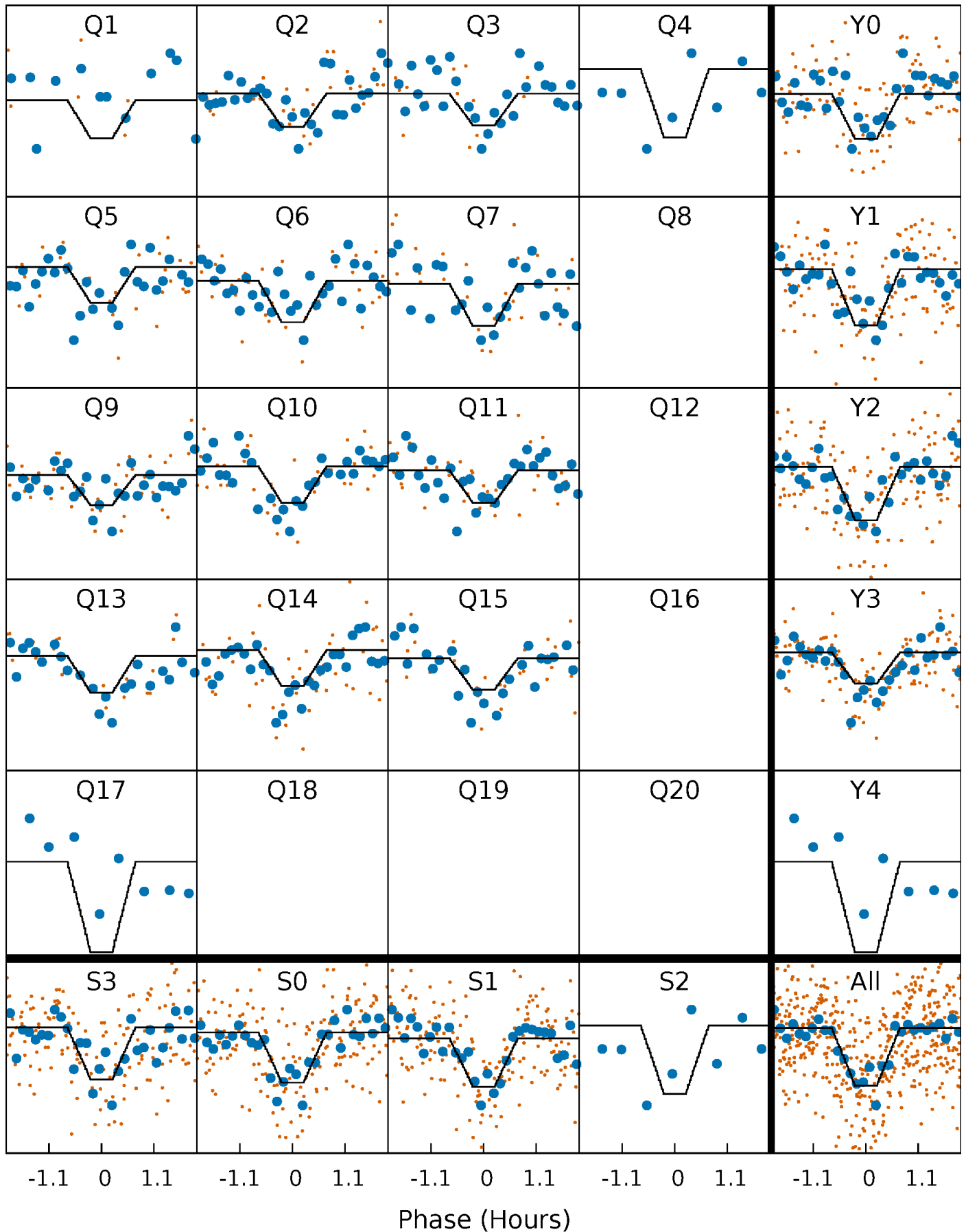
# DV Quarter-Phased Transit Curves

TCE 011601584-03 P= 13.979438 Days  $T_0=142.339329$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

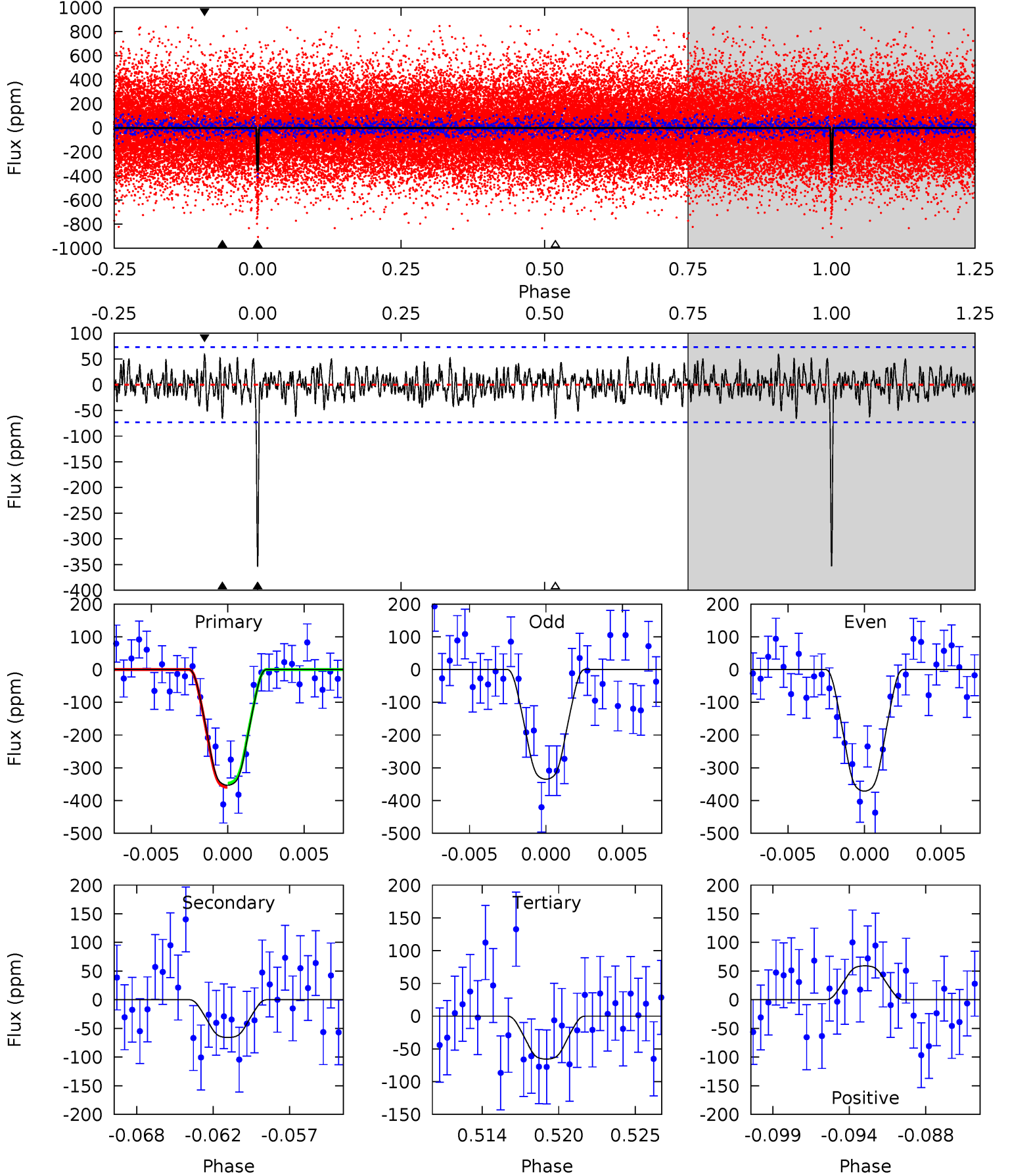
TCE 011601584-03     $P = 13.979434$  Days     $T_0 = 142.339794$  (BKJD)



# DV Model-Shift Uniqueness Test

011601584-03, P = 13.979438 Days, E = 128.359891 Days

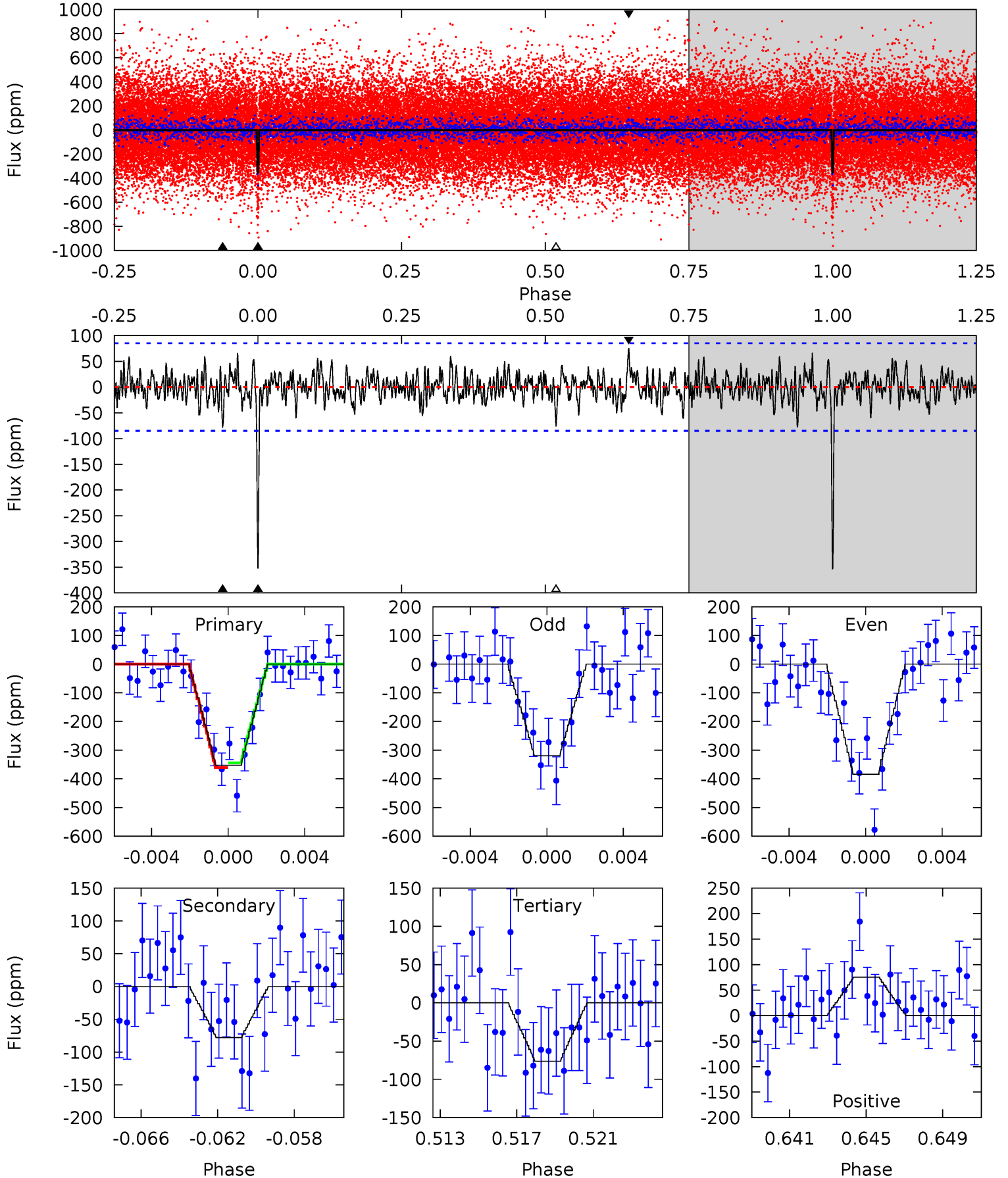
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
24.9	4.64	4.63	4.17	5.15	2.79	1.35	20.3	20.7	0.02	0.47	1.29	1.04	0.14	0.46



# Alt Model-Shift Uniqueness Test

011601584-03, P = 13.979434 Days, E = 128.360360 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
21.5	4.74	4.65	4.60	5.19	2.87	1.30	16.8	16.9	0.10	0.15	1.99	1.03	0.18	0.49



### Stellar Parameters For KIC 011601584

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5191^{+103}_{-103}$	$4.530^{+0.044}_{-0.055}$	$0.080^{+0.150}_{-0.150}$	$0.826^{+0.061}_{-0.050}$	$0.844^{+0.049}_{-0.044}$	$2.106^{+0.355}_{-0.365}$
	+2%/-2%	+1%/-1%	+188%/-188%	+7%/-6%	+6%/-5%	+17%/-17%
Source	SPE58	SPE58	SPE58	DSEP		

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

### Secondary Eclipse Parameters for KIC 011601584-03 / KOI 1831.04

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-66 \pm 14$	$2.00^{+0.51}_{-0.48}$	$891^{+25}_{-24}$	$3548^{+405}_{-267}$	$99^{+85}_{-39}$
Alt.	$-78 \pm 16$	$1.69^{+0.54}_{-0.55}$	$889^{+24}_{-24}$	$3876^{+599}_{-349}$	$173^{+205}_{-74}$

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

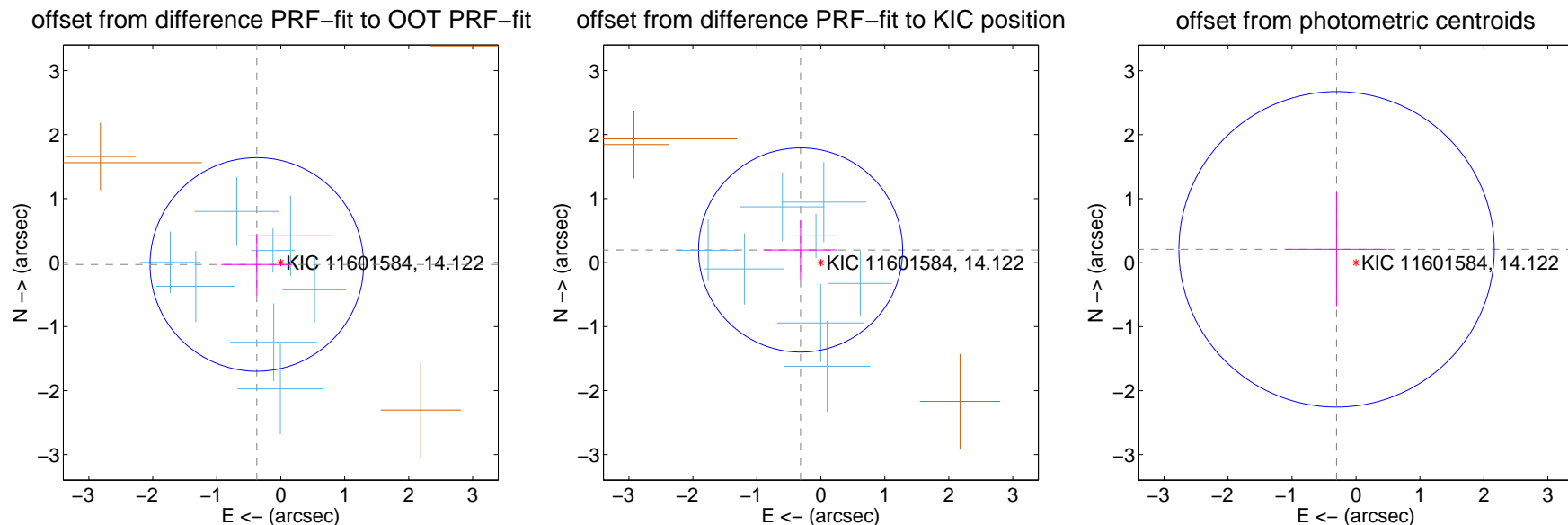
## DV Centroid Data

Supplemental centroid analysis for 011601584-03. Kepler magnitude: 14.12. Transit SNR 14.73

There are 8 quarters with good PRF difference image offsets

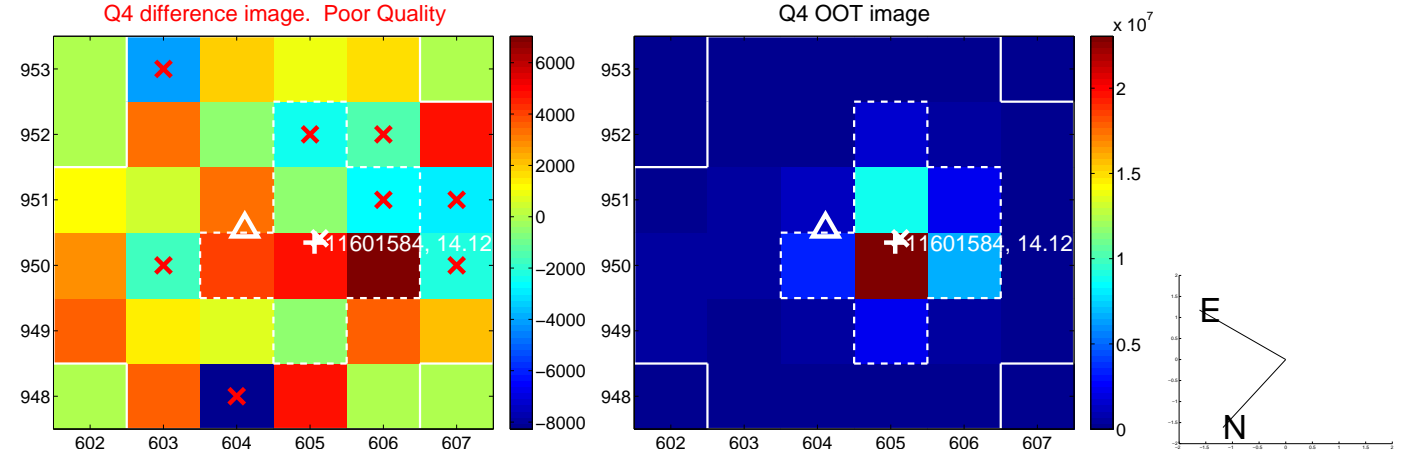
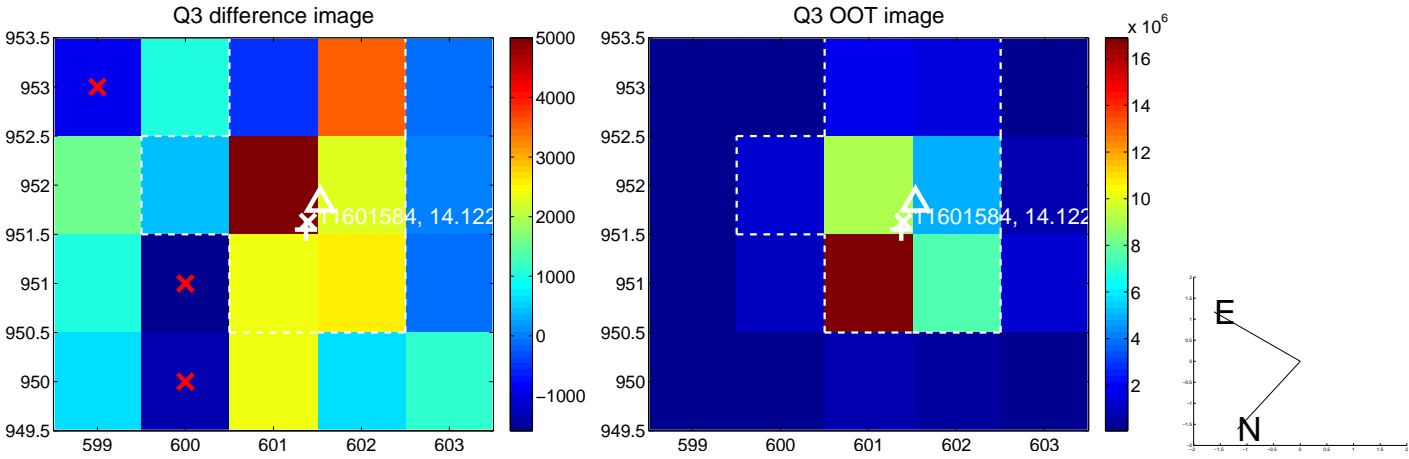
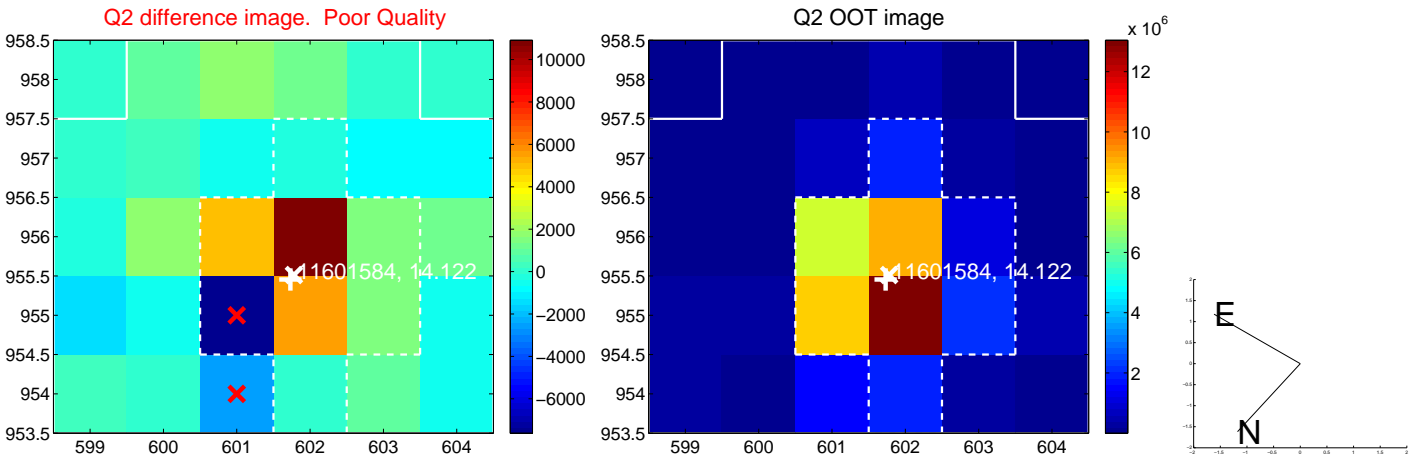
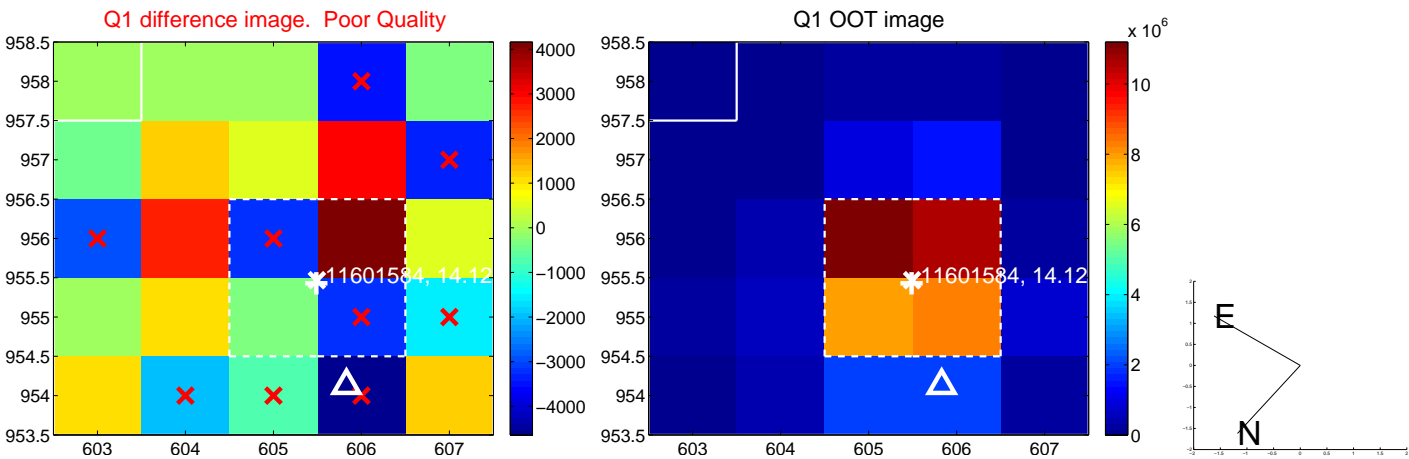
The direct PRF centroid is offset from the target star catalog position by about 0.30 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.376 \pm 0.556$	0.68	$0.374 \pm 0.555$	$-0.029 \pm 0.481$
PRF-fit source offset from KIC position	$0.373 \pm 0.532$	0.70	$0.317 \pm 0.582$	$0.196 \pm 0.469$
photometric centroid source offset	$0.37 \pm 0.82$	0.45	$0.30 \pm 0.79$	$0.21 \pm 0.89$

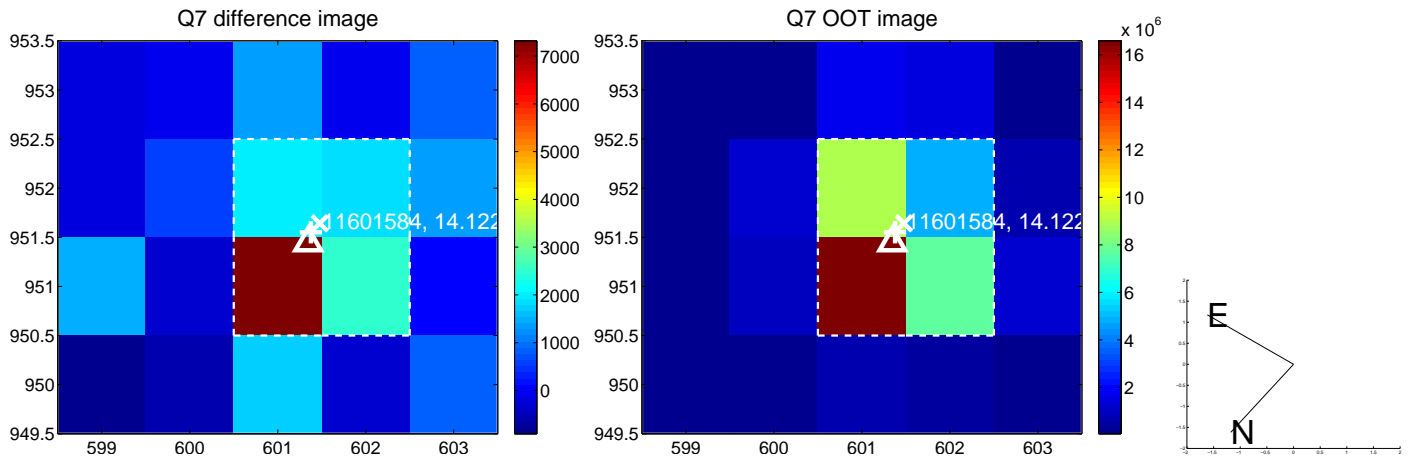
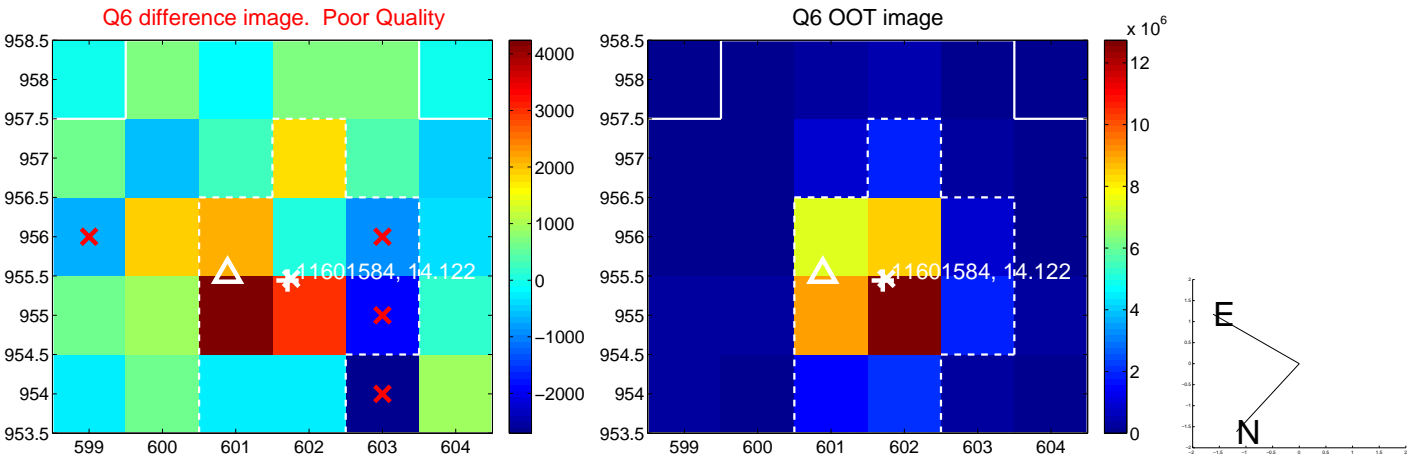
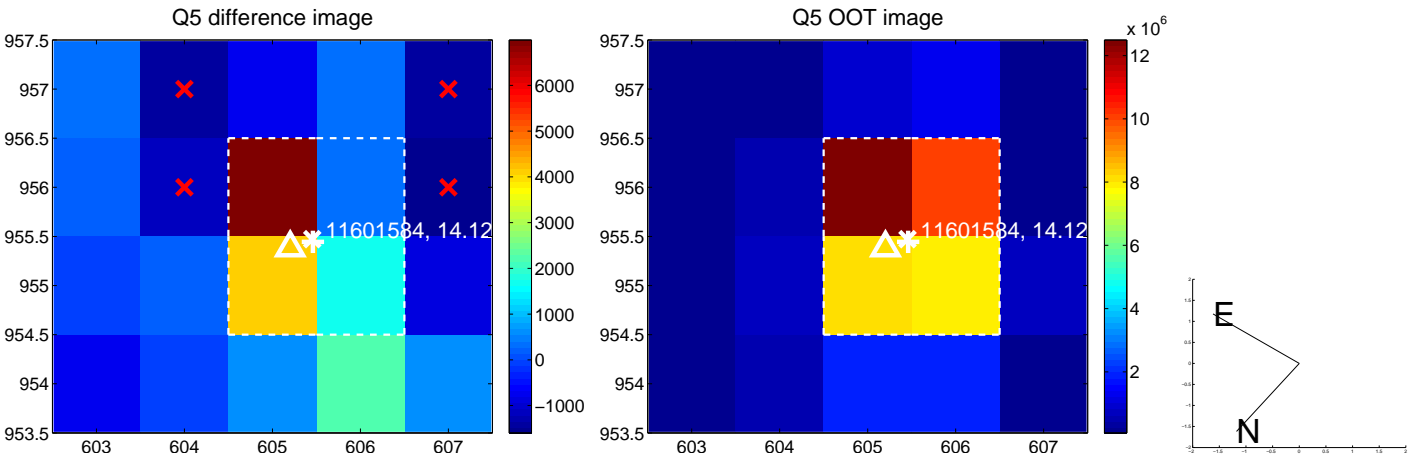


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

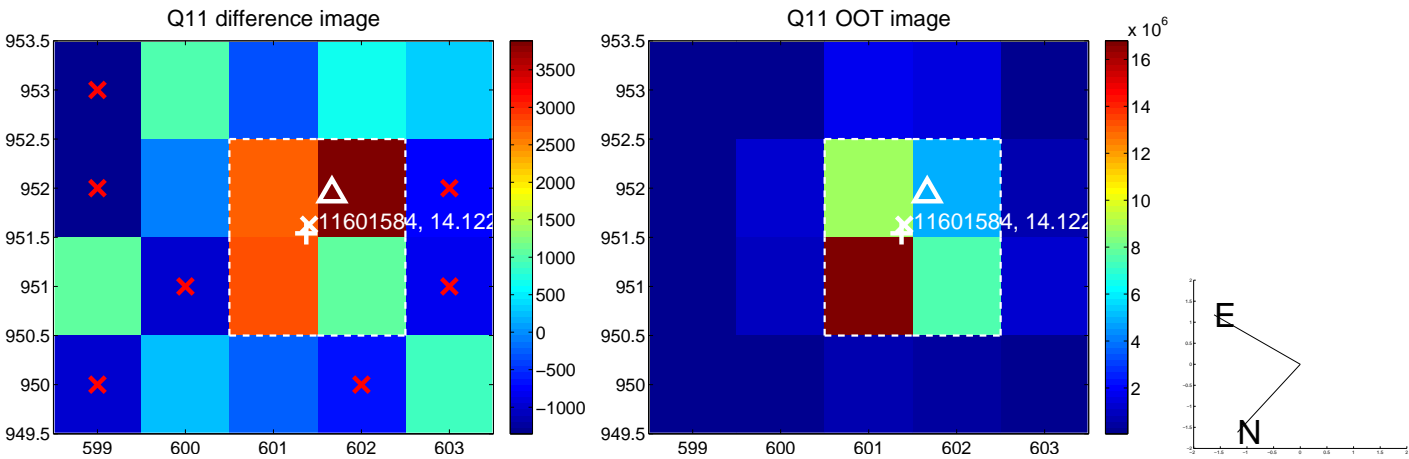
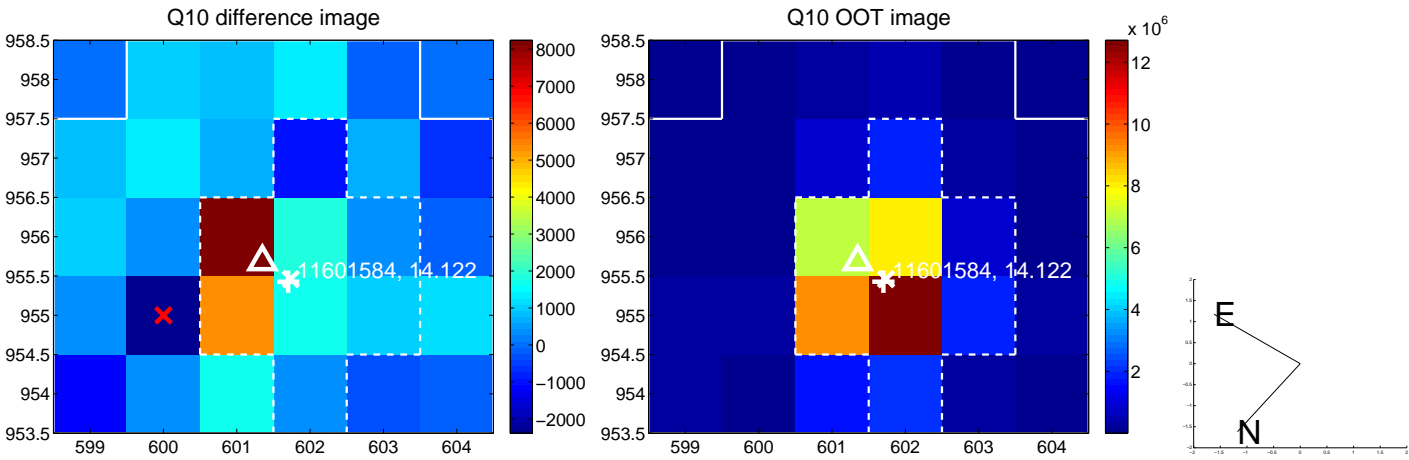
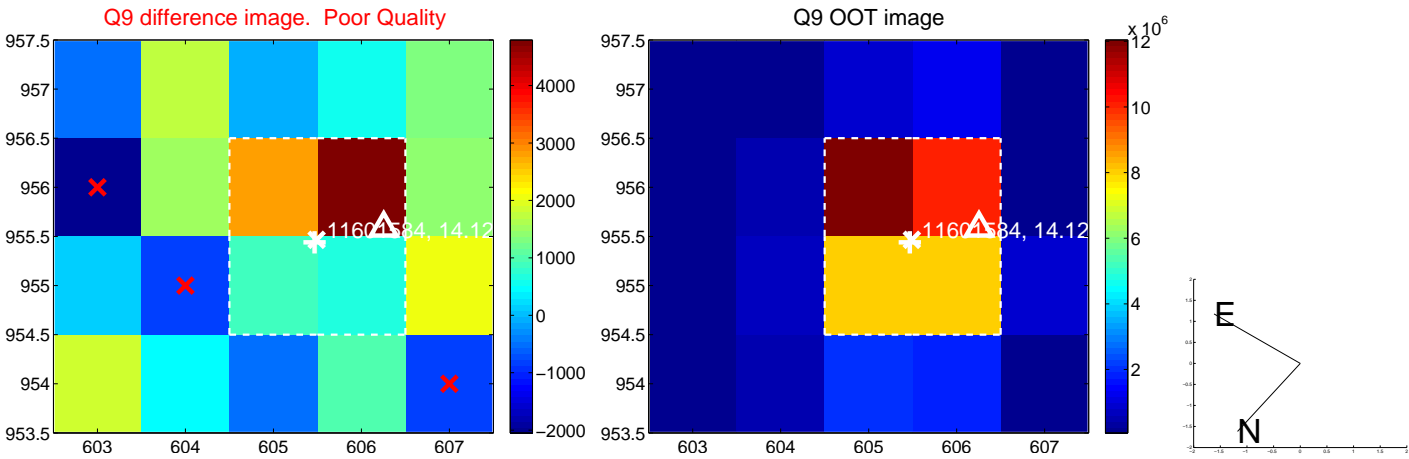


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

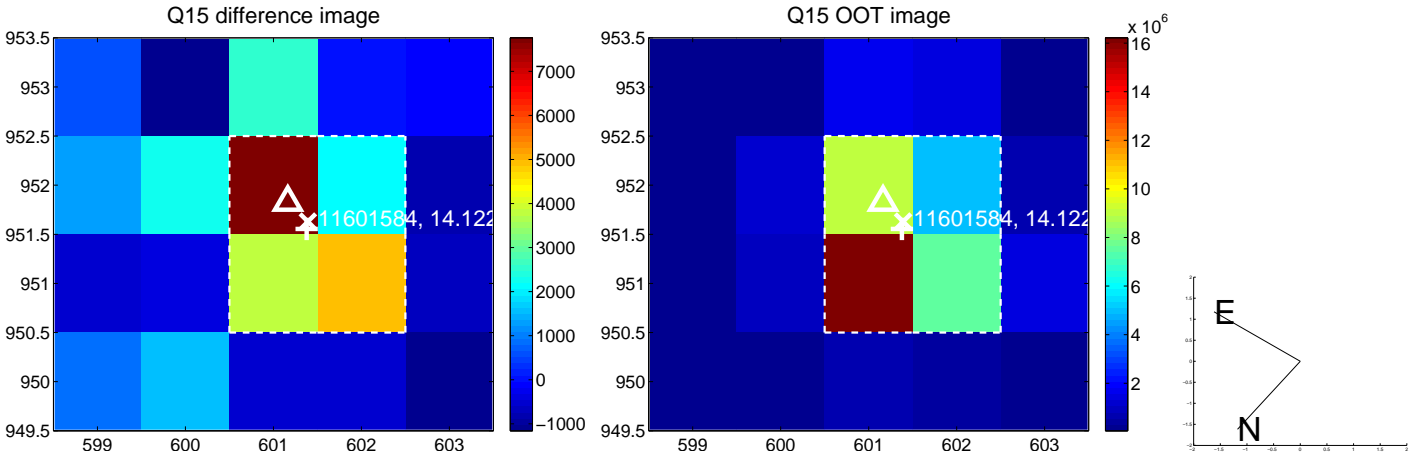
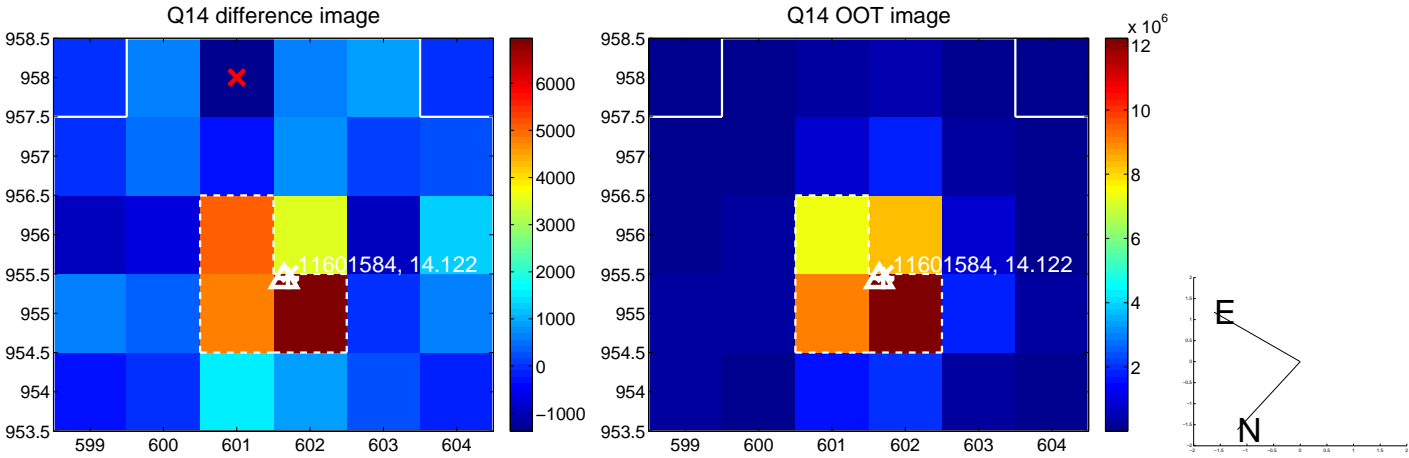
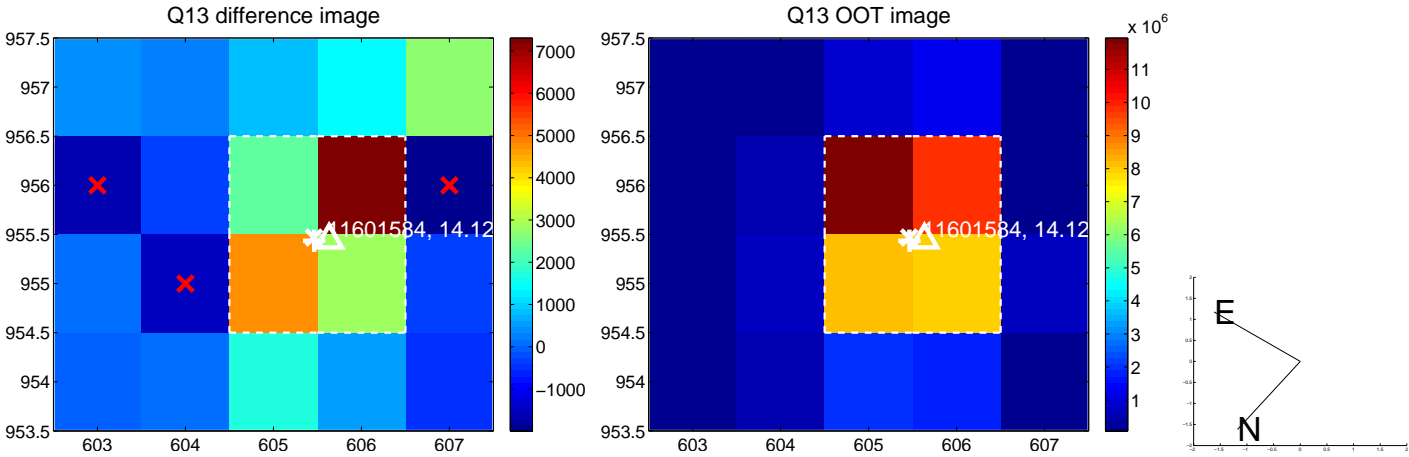




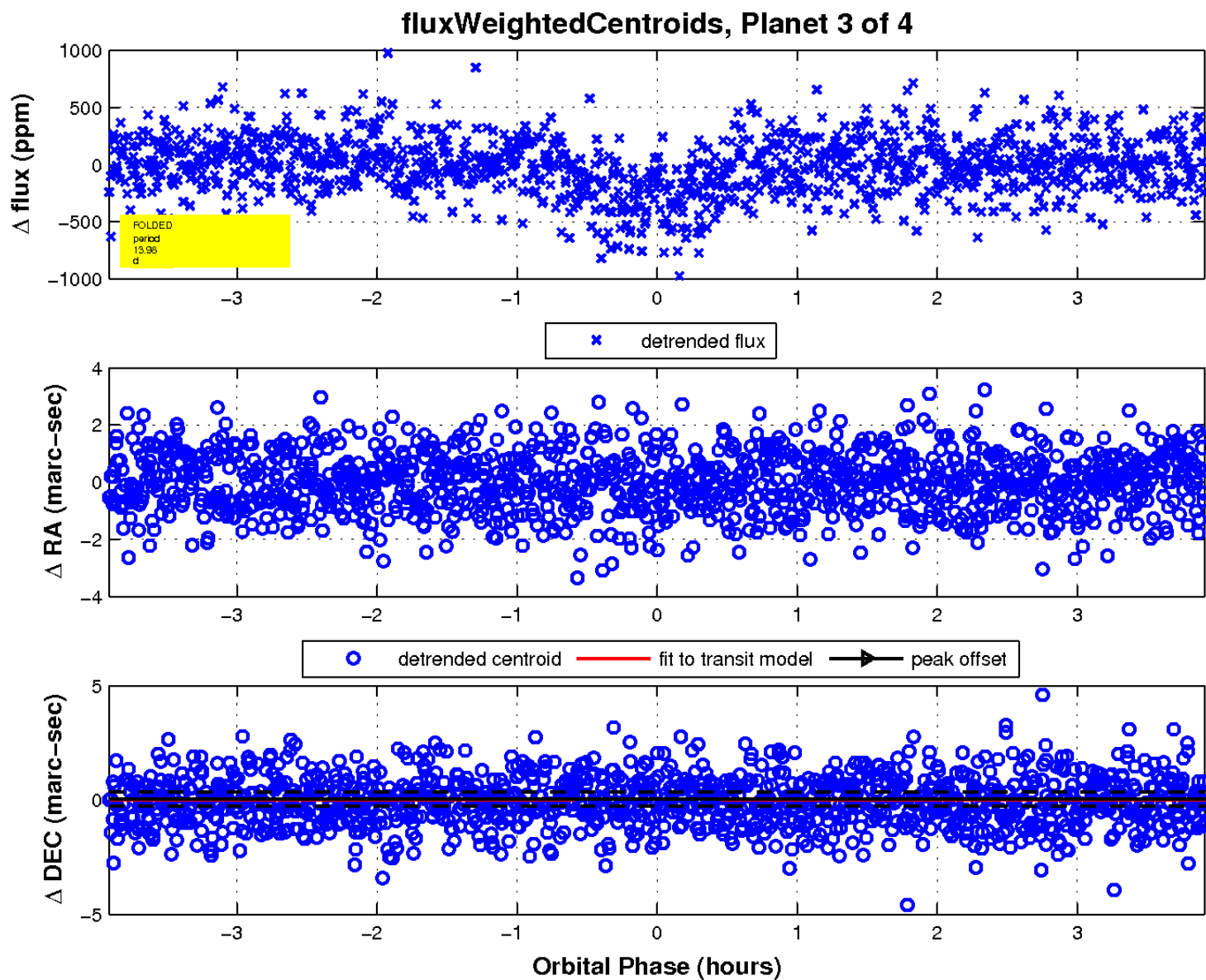
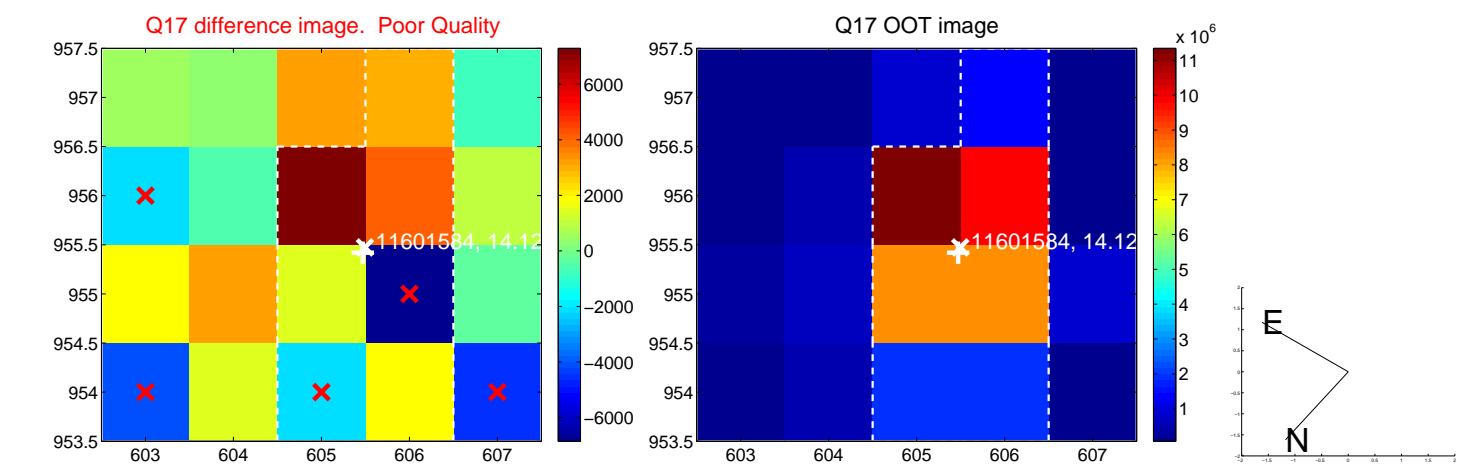
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

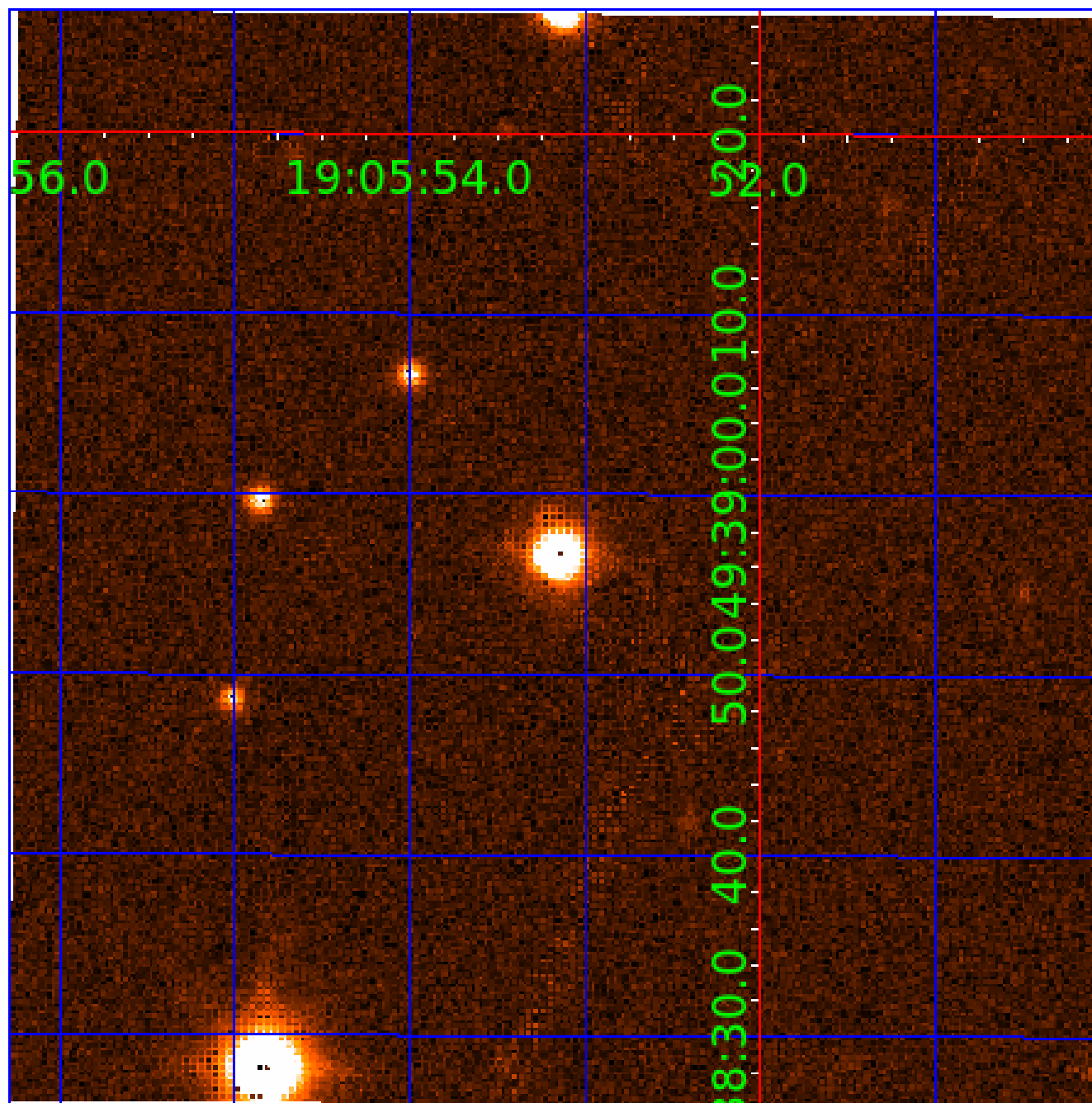


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 011601584

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011601584-01	OBS	1831.01	51.810507	182.962079	1050.1	7.029	46.6	45.1	0.83	5191	3.22	6.72
011601584-02	OBS	1831.02	4.385319	134.847732	196.9	2.586	21.8	23.9	0.83	5191	1.41	180.81
011601584-03	OBS	1831.04	13.979438	142.339329	337.7	1.304	11.7	14.7	0.83	5191	2.00	38.54
011601584-04	OBS	1831.03	34.193704	148.891071	194.5	7.455	10.4	11.5	0.83	5191	1.29	11.69

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011601584-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
011601584-02	OBS	PC	0.95	0	0	0	0	NO_COMMENT
011601584-03	OBS	PC	0.98	0	0	0	0	NO_COMMENT
011601584-04	OBS	PC	0.85	0	0	0	0	NO_COMMENT

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

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

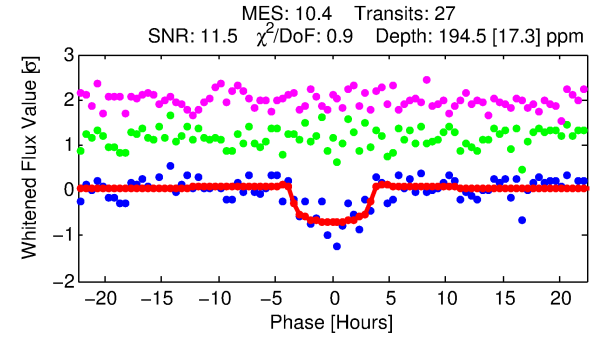
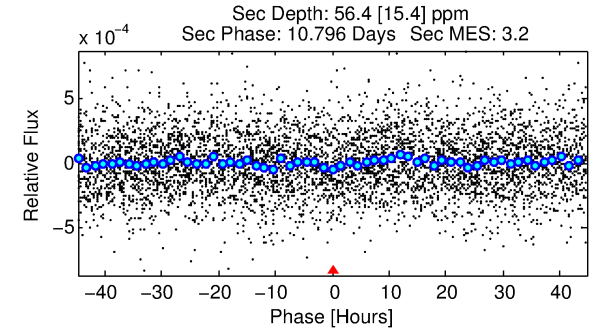
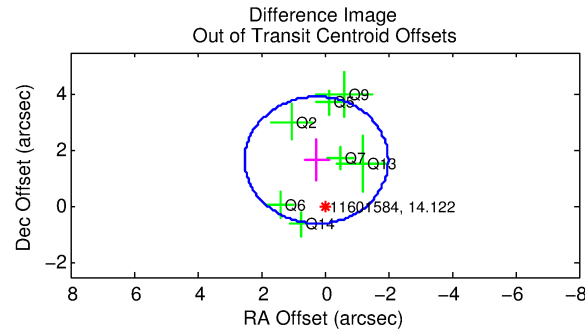
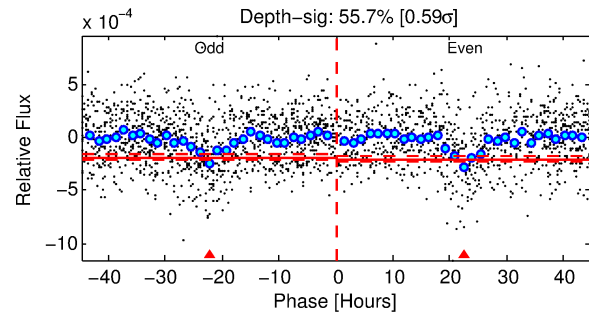
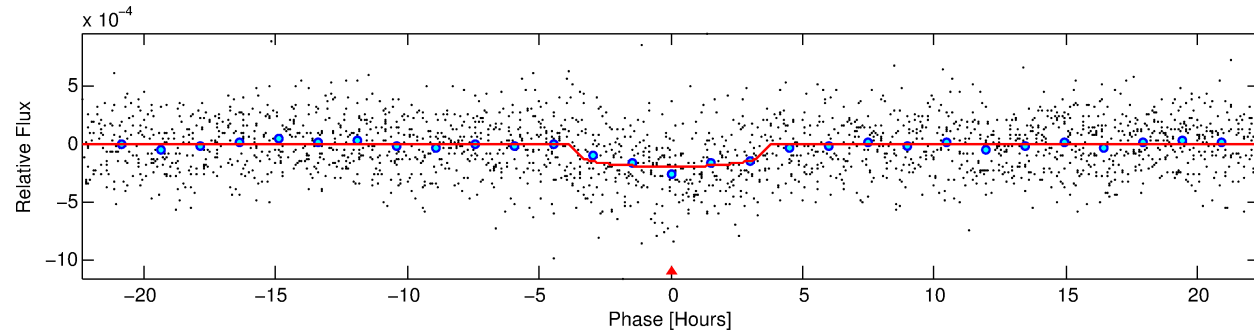
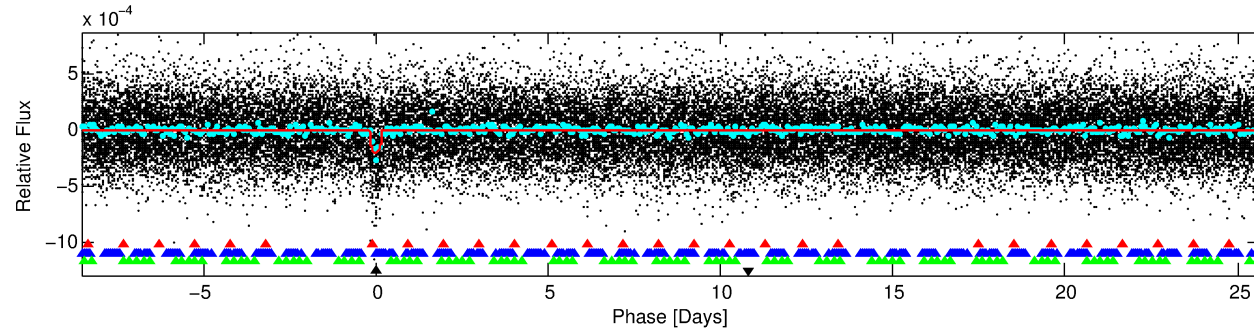
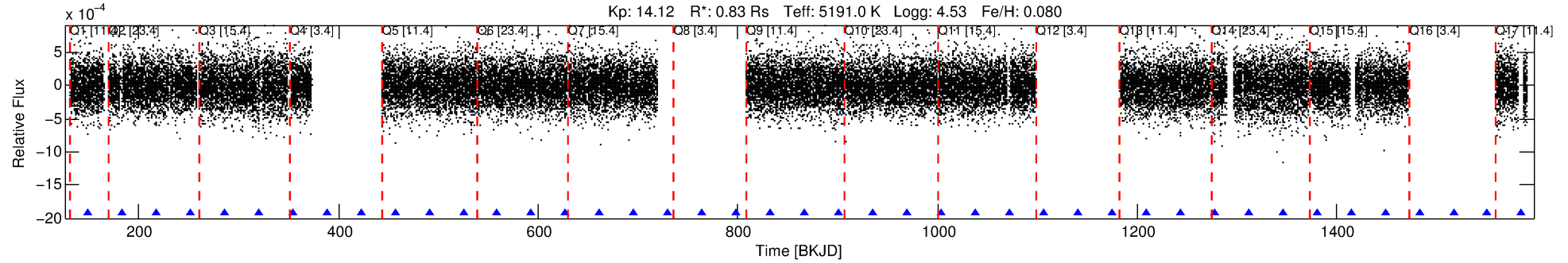
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 011601584-04

No Significant Match Found

# DV One-Page Summary

KIC: 11601584 Candidate: 4 of 4 Period: 34.194 d  
KOI: K01831 Name: Kepler-324 Corr: No Ephemeris Match



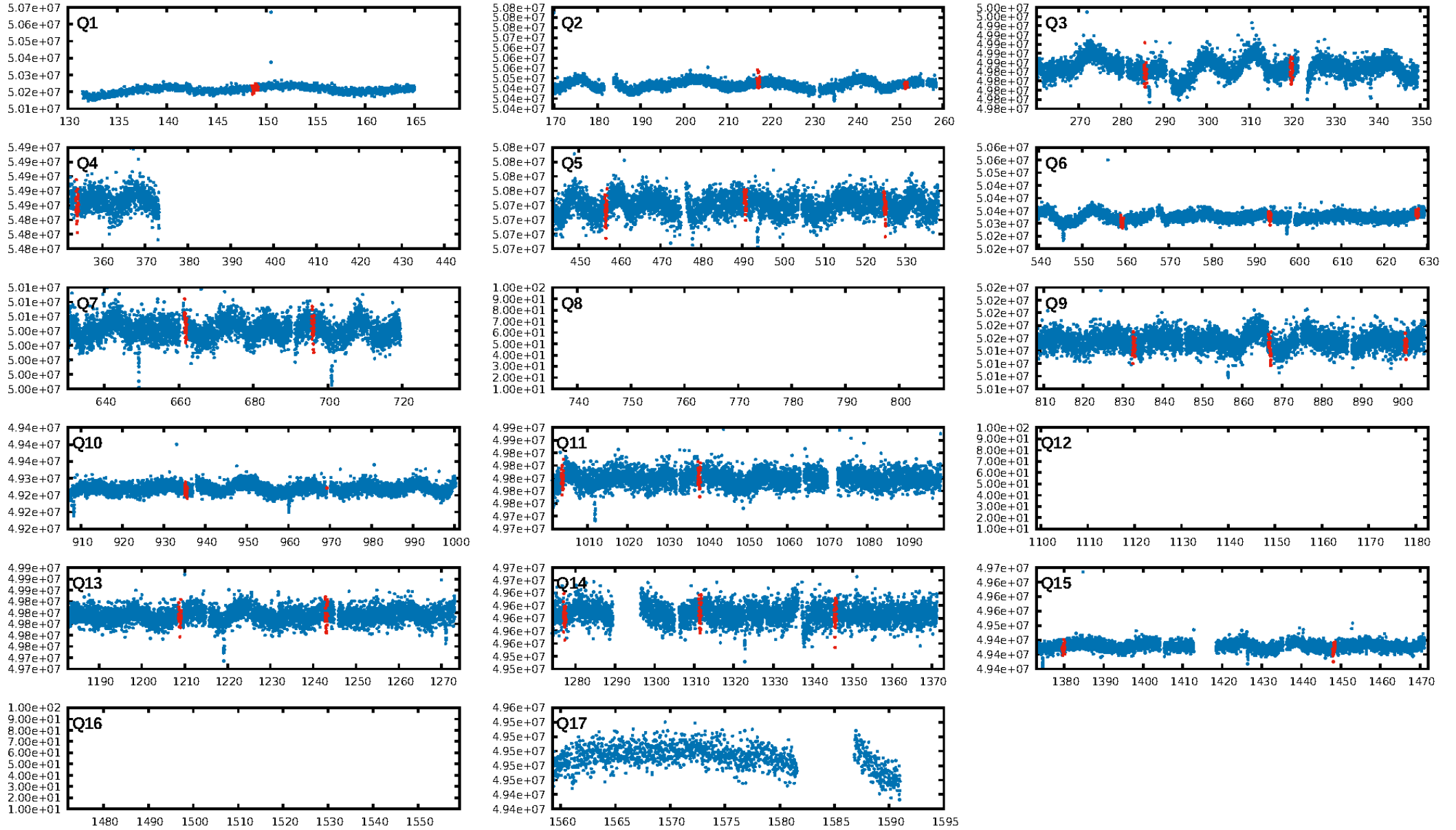
## DV Fit Results:

Period = 34.19370 [0.00048] d  
Epoch = 148.8911 [0.0105] BKJD  
Rp/R\* = 0.0143 [0.0074]  
a/R\* = 21.91 [43.10]  
b = 0.80 [0.91]  
Seff = 11.69 [1.47]  
Teq = 472 [15] K  
Rp = 1.29 [0.67] Re  
a = 0.1948 [0.0126] AU  
Ag = 711.79 [762.92] [0.93 $\sigma$ ]  
Teffp = 3766 [1008] K [3.27 $\sigma$ ]

## DV Diagnostic Results:

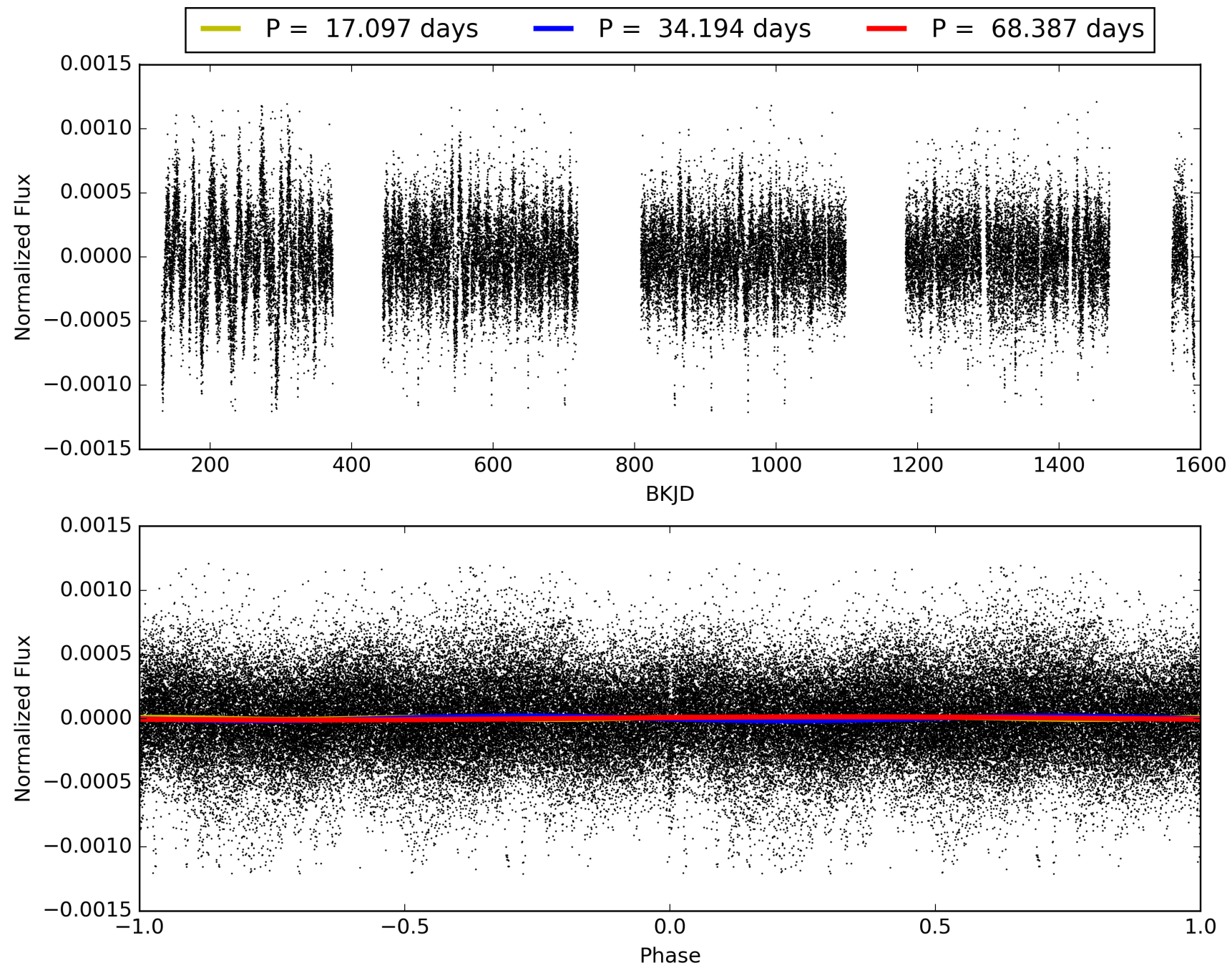
ShortPeriod-sig: 100.0% [64.11 $\sigma$ ]  
LongPeriod-sig: 100.0% [41.26 $\sigma$ ]  
ModelChiSquare2-sig: 57.3%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 7.81e-24  
RollingBand-fgt: 1.00 [25/25]  
GhostDiagnostic-chr: 4.171  
Centroid-sig: N/A  
Centroid-so: 1.973 arcsec [2.11 $\sigma$ ]  
OotOffset-rm: 1.681 arcsec [2.23 $\sigma$ ]  
KicOffset-rm: 1.935 arcsec [2.60 $\sigma$ ]  
OotOffset-st: 3/1/0/3 [7]  
KicOffset-st: 3/1/0/3 [7]  
DiffImageQuality-fgm: 1.00 [7/7]  
DiffImageOverlap-fno: 0.91 [10/11]

# TCE 011601584-04, PDC Light Curves





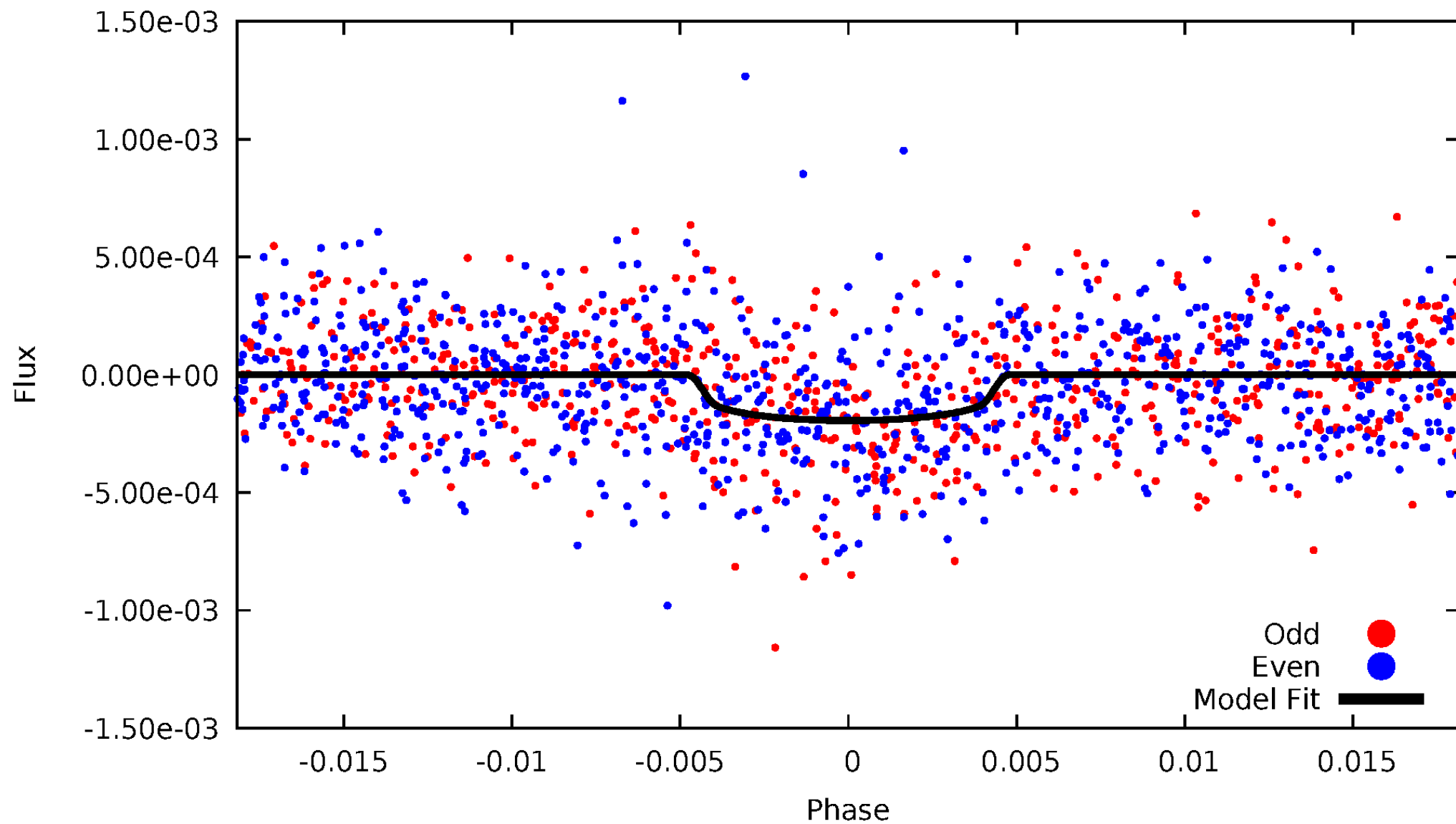
# TCE 011601584-04





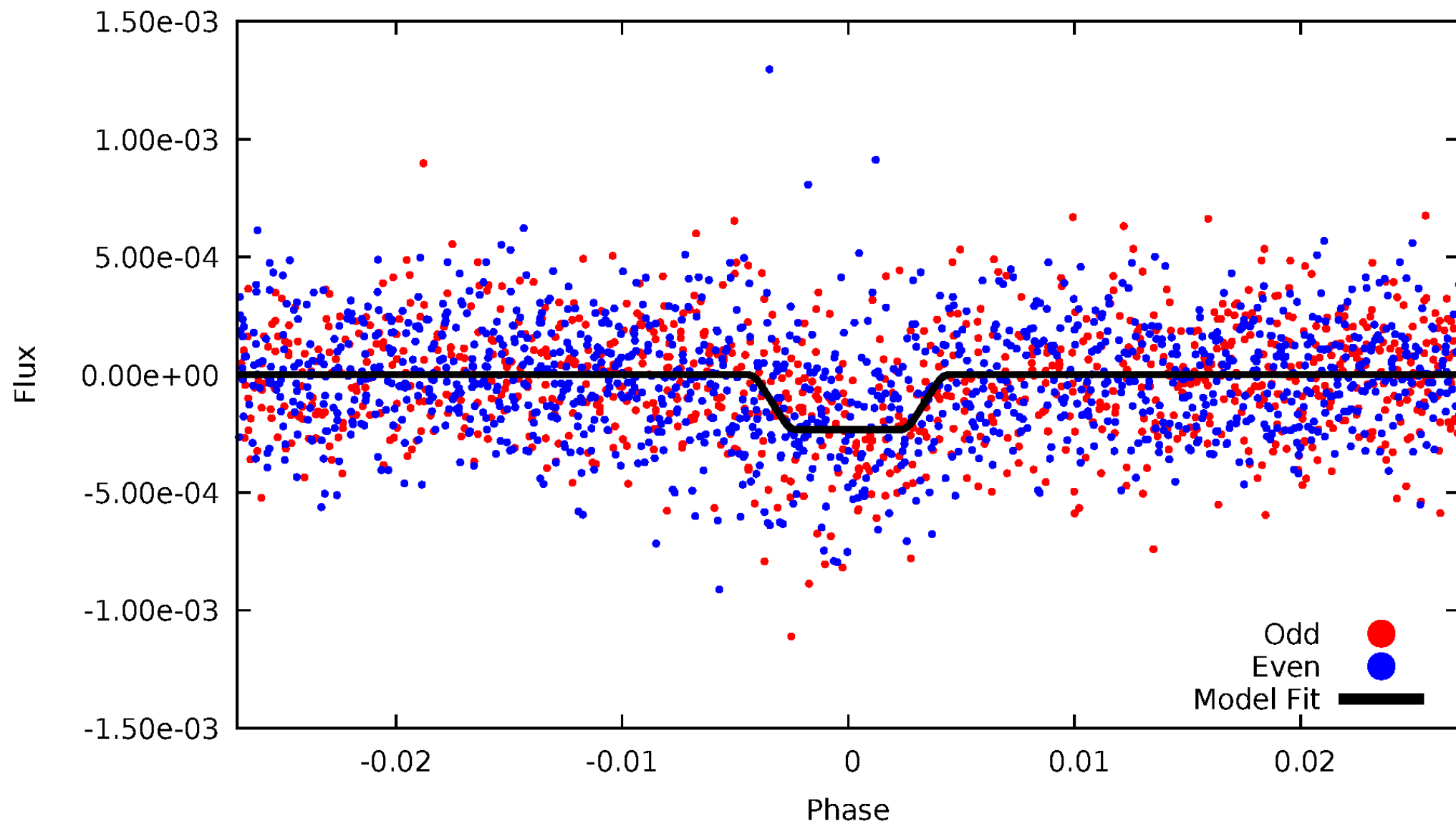
# DV Odd/Even

TCE 011601584-04



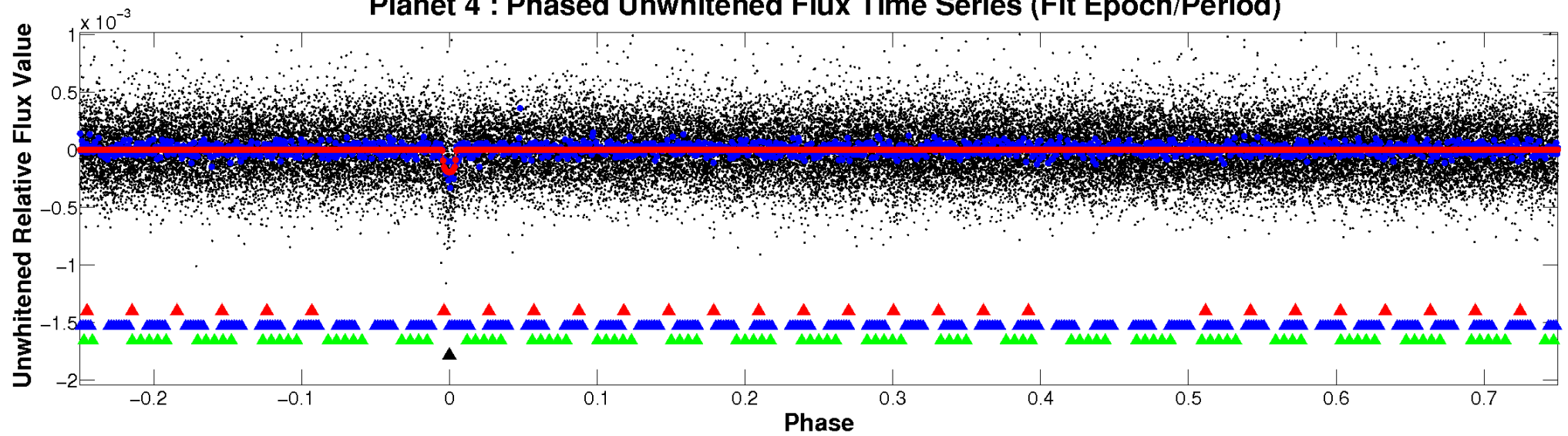
# ALT Odd/Even

TCE 011601584-04

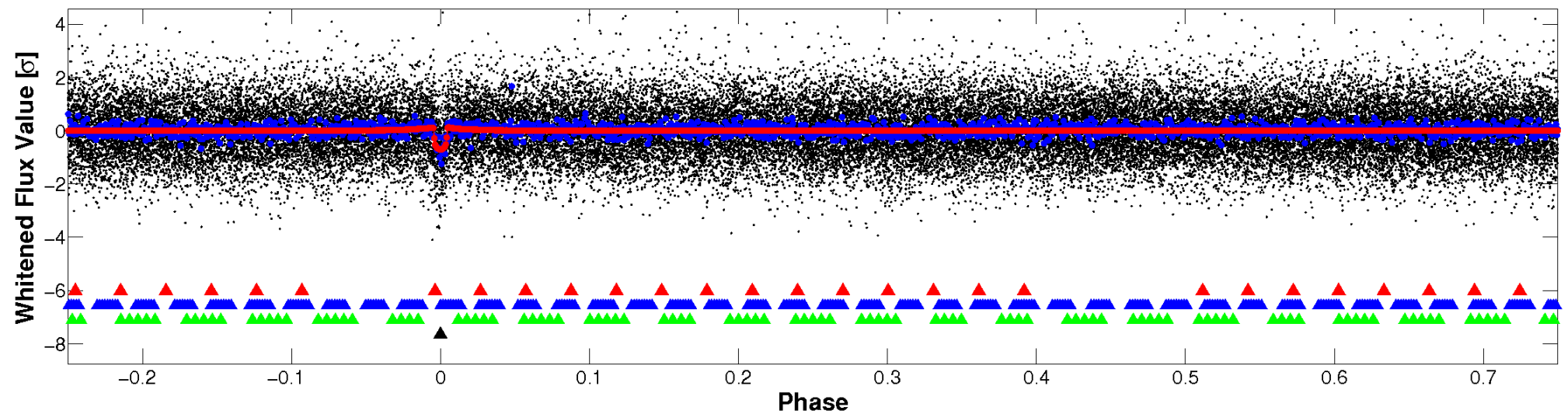


# Non-Whitened Vs. Whitened Light Curve

## Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

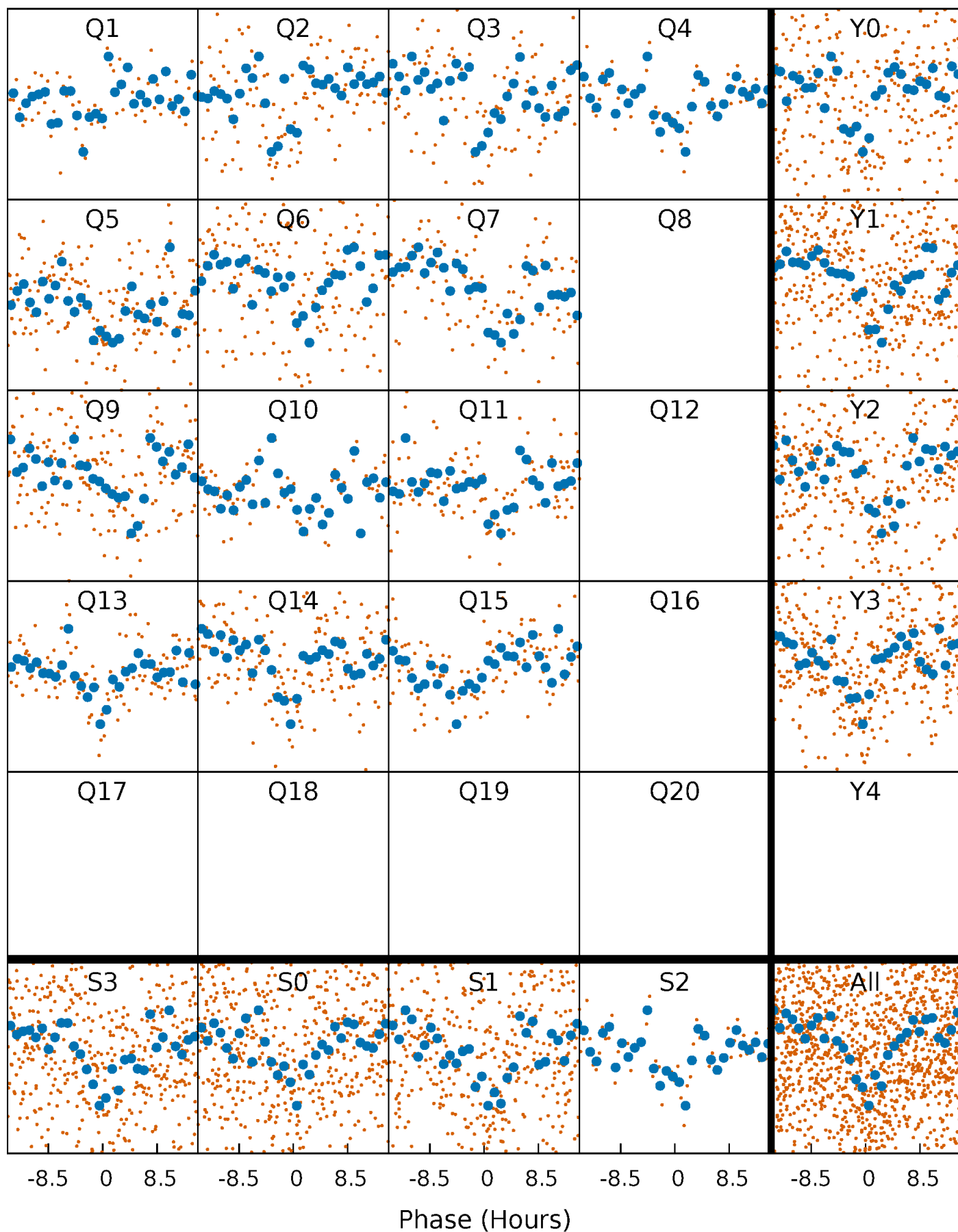


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



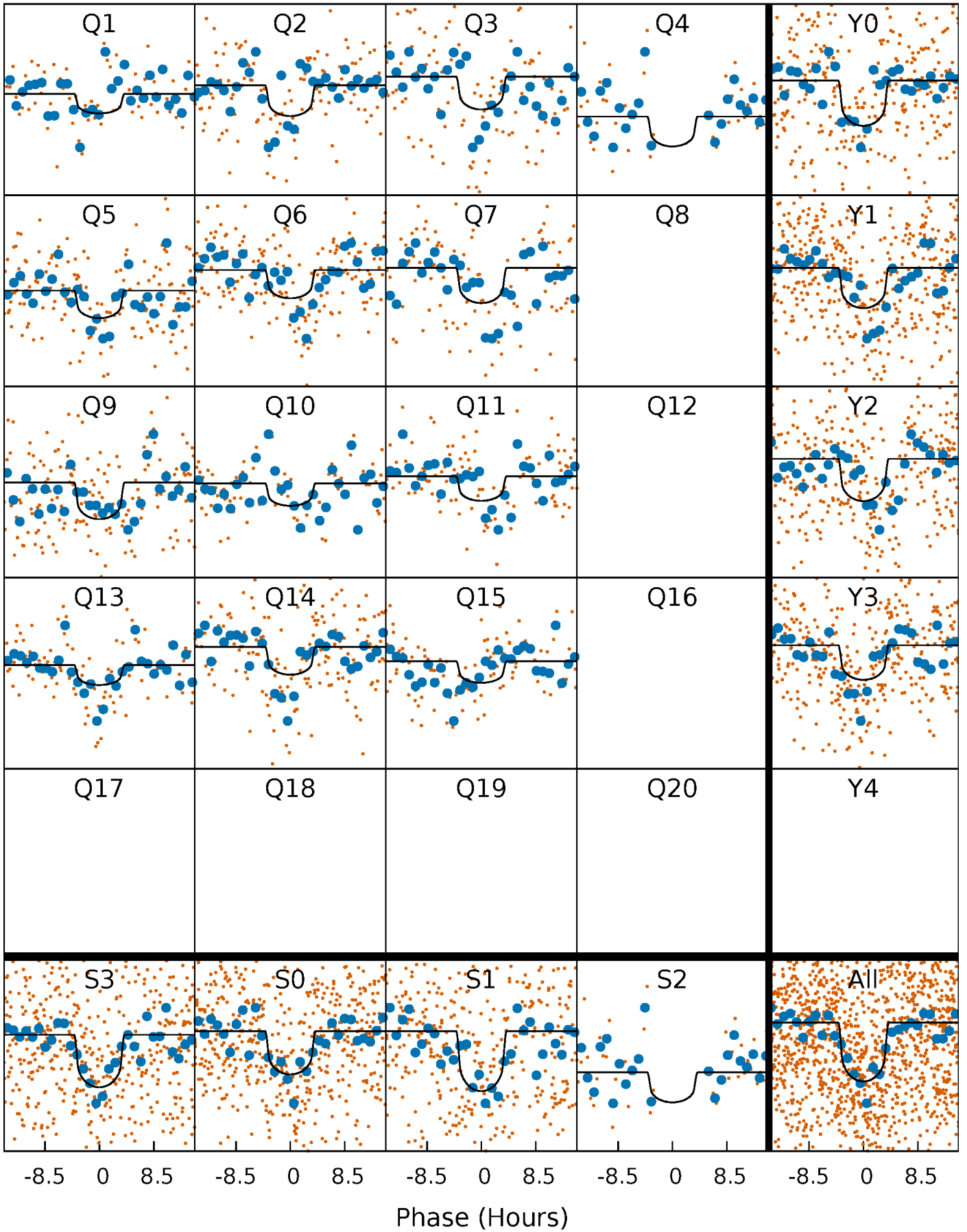
# PDC Quarter-Phased Transit Curves

TCE 011601584-04   P= 34.193704 Days    $T_0=148.891071$  (BKJD)



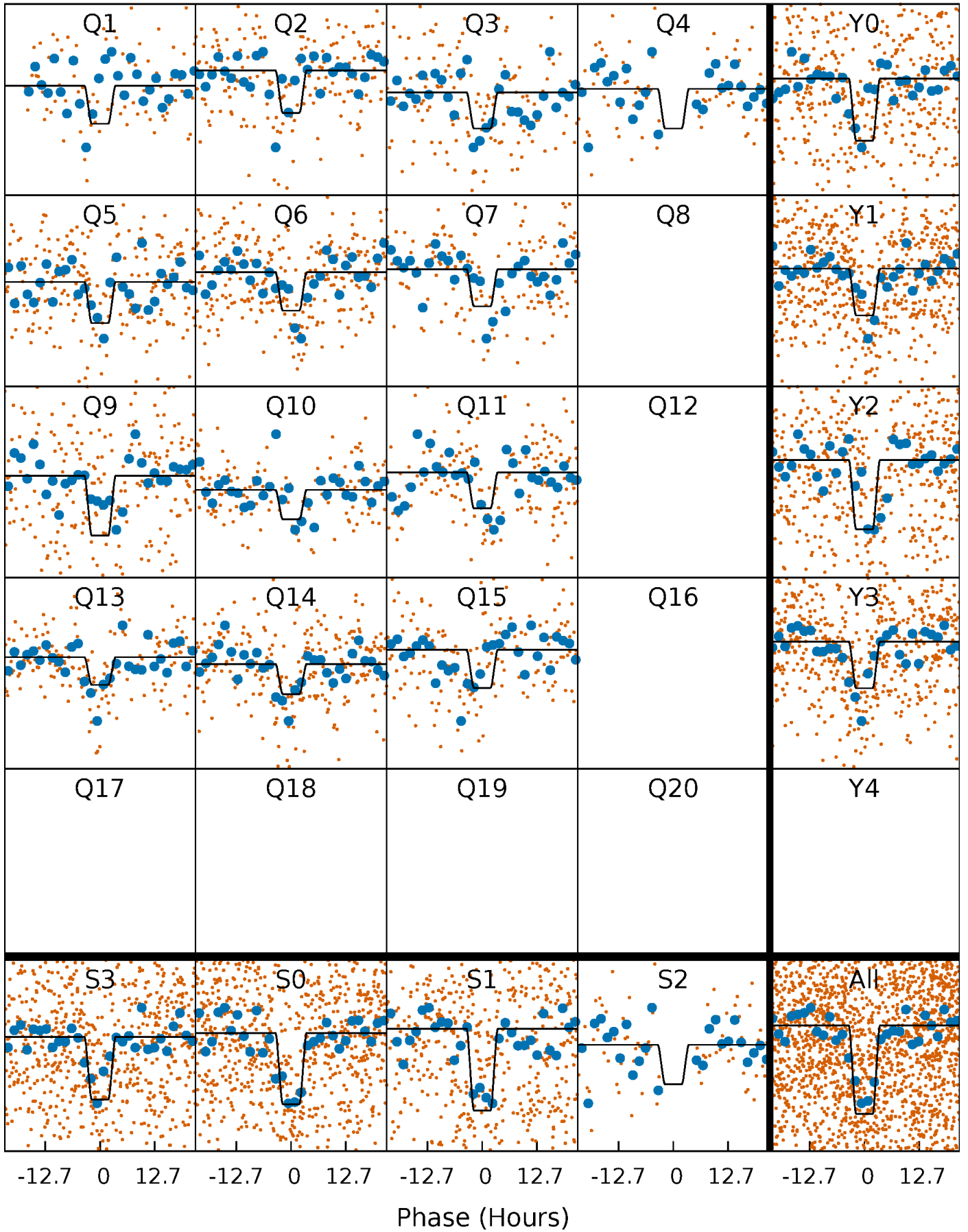
# DV Quarter-Phased Transit Curves

TCE 011601584-04 P= 34.193704 Days  $T_0=148.891071$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

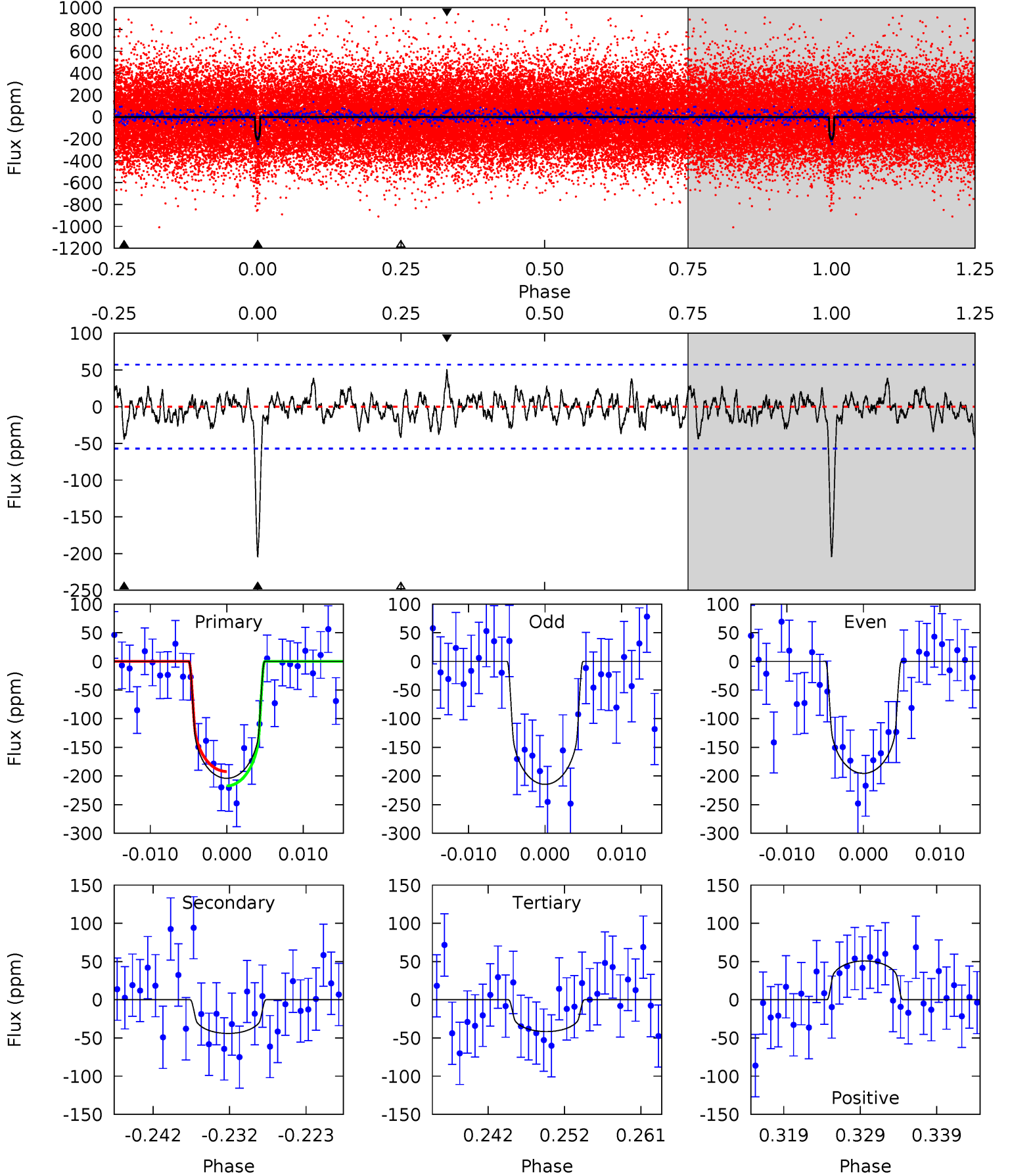
TCE 011601584-04 P= 34.193607 Days  $T_0=148.906130$  (BKJD)



# DV Model-Shift Uniqueness Test

011601584-04, P = 34.193704 Days, E = 114.697367 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
18.0	3.88	3.67	4.47	5.03	2.59	1.21	14.3	13.5	0.21	-0.59	0.84	1.13	0.20	1.10

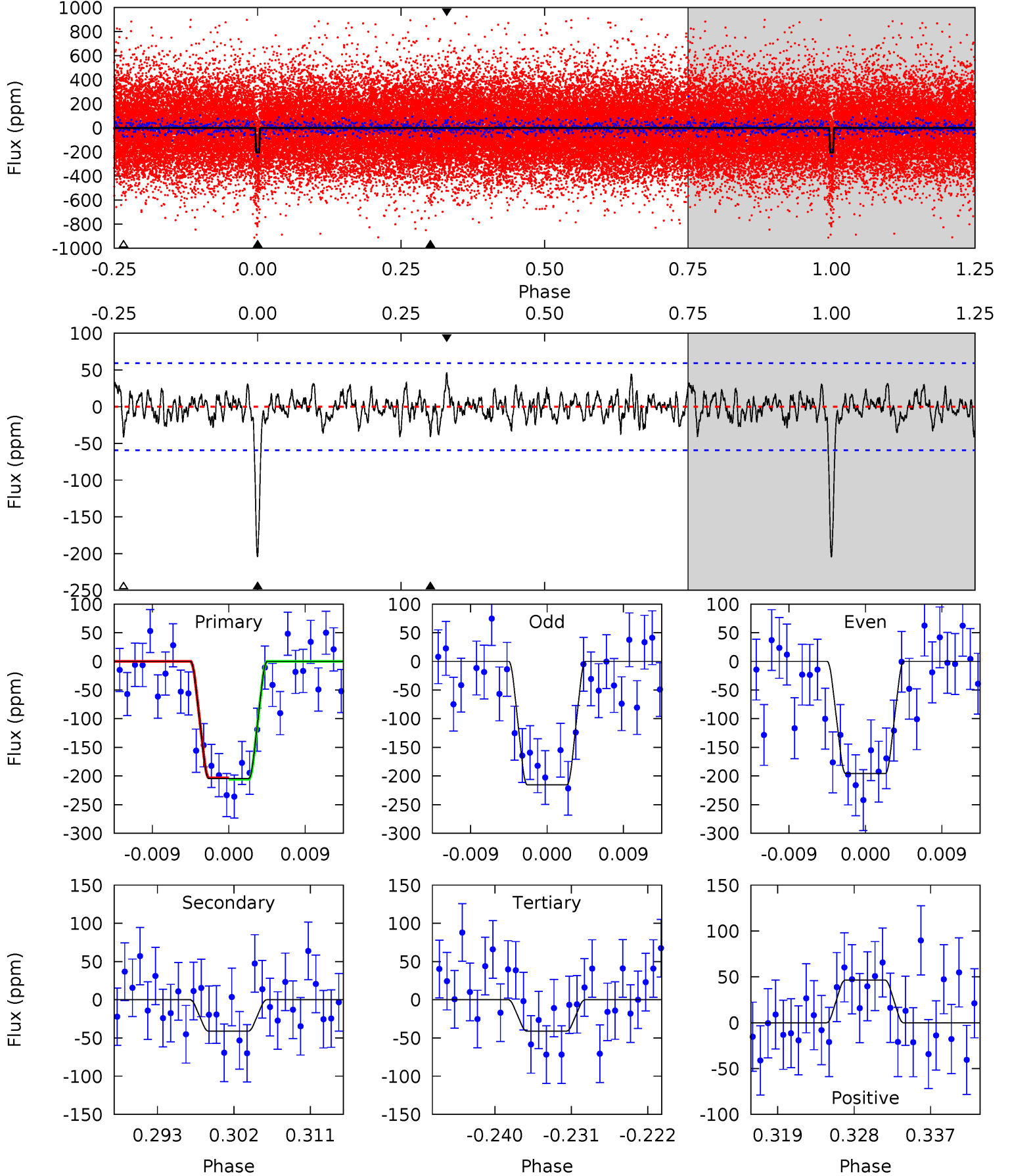




# Alt Model-Shift Uniqueness Test

011601584-04, P = 34.193607 Days, E = 114.712523 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
17.4	3.49	3.49	3.95	5.05	2.62	1.17	13.9	13.5	0.00	-0.46	0.82	1.03	0.18	0.11





### Stellar Parameters For KIC 011601584

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5191^{+103}_{-103}$	$4.530^{+0.044}_{-0.055}$	$0.080^{+0.150}_{-0.150}$	$0.826^{+0.061}_{-0.050}$	$0.844^{+0.049}_{-0.044}$	$2.106^{+0.355}_{-0.365}$
	+2%/-2%	+1%/-1%	+188%/-188%	+7%/-6%	+6%/-5%	+17%/-17%
Source	SPE58	SPE58	SPE58	DSEP		

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

### Secondary Eclipse Parameters for KIC 011601584-04 / KOI 1831.03

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-44 \pm 11$	$1.27^{+0.67}_{-0.59}$	$660^{+18}_{-18}$	$3860^{+1057}_{-503}$	$554^{+1467}_{-331}$
Alt.	$-41 \pm 12$	$1.42^{+0.70}_{-0.64}$	$659^{+17}_{-18}$	$3697^{+917}_{-471}$	$427^{+1044}_{-247}$

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

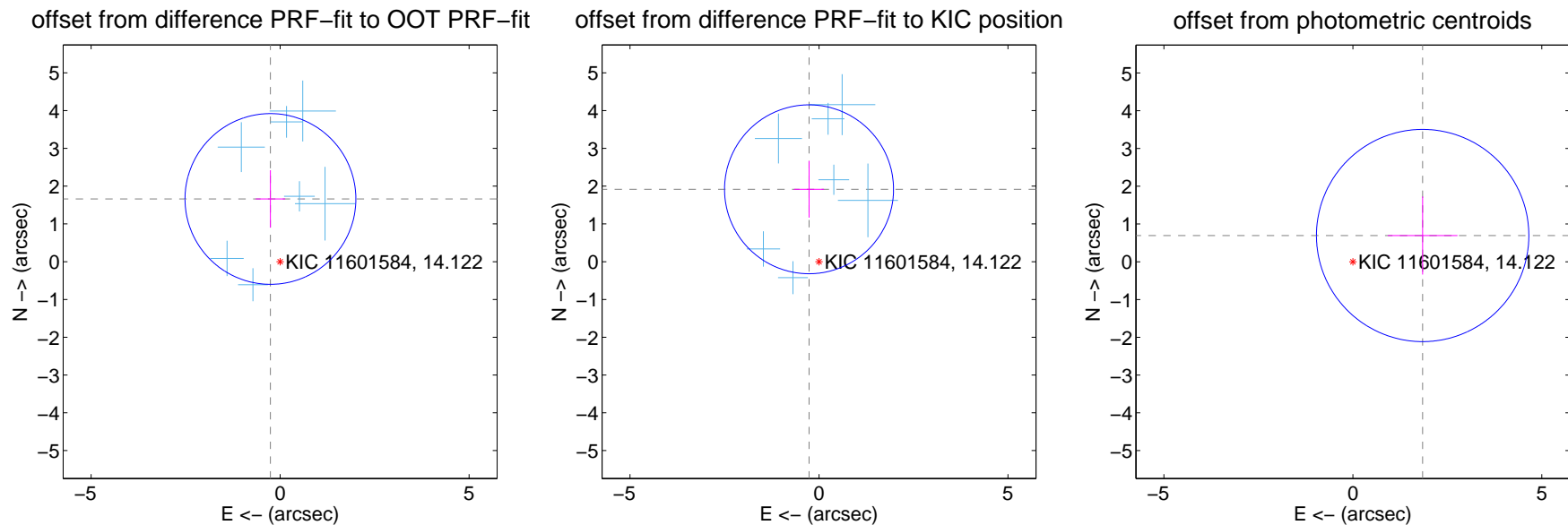
## DV Centroid Data

Supplemental centroid analysis for 011601584-04. Kepler magnitude: 14.12. Transit SNR 11.49

There are 7 quarters with good PRF difference image offsets

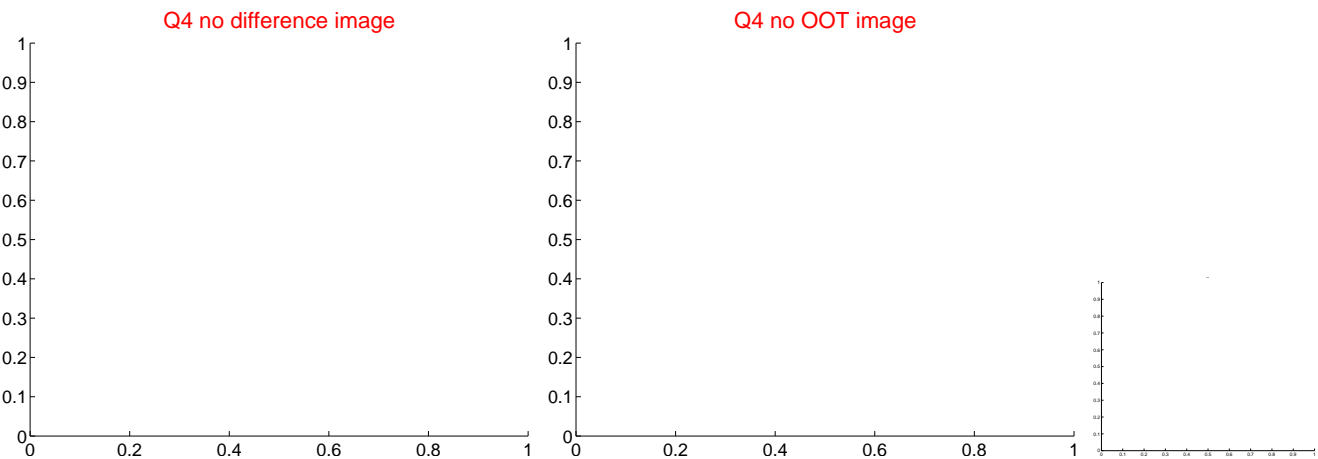
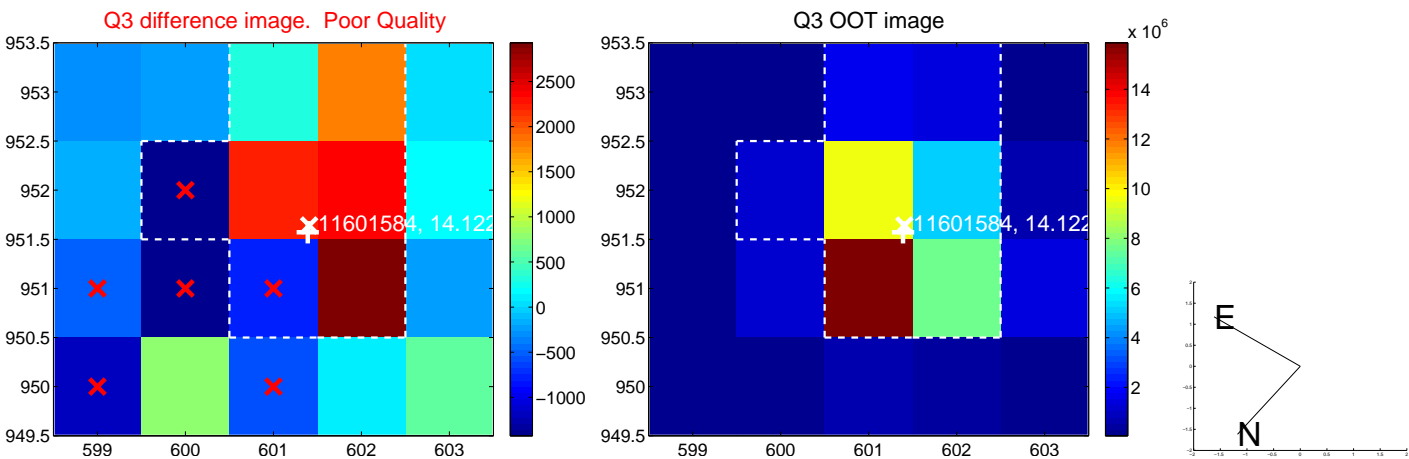
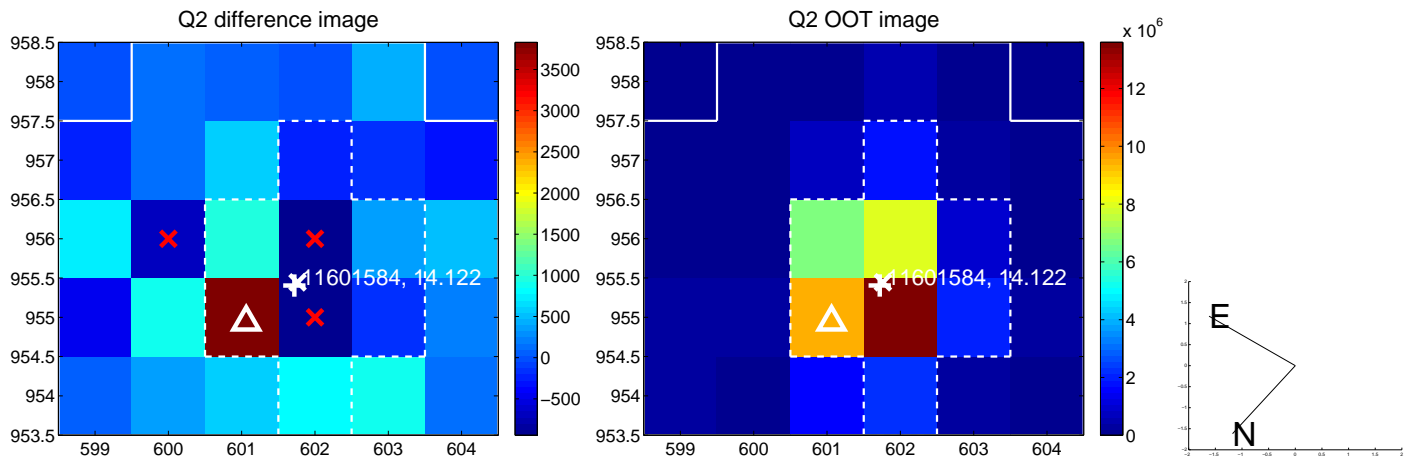
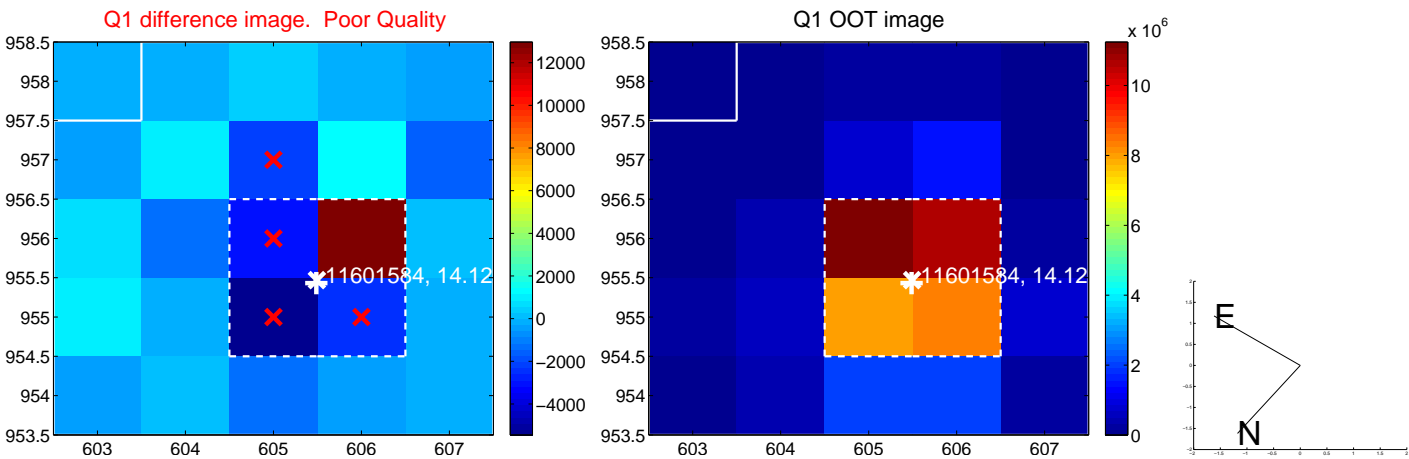
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.681 \pm 0.753$	2.23	$0.256 \pm 0.390$	$1.661 \pm 0.760$
PRF-fit source offset from KIC position	$1.935 \pm 0.745$	2.60	$0.263 \pm 0.394$	$1.917 \pm 0.750$
photometric centroid source offset	$1.97 \pm 0.94$	2.11	$-1.85 \pm 0.92$	$0.70 \pm 1.03$

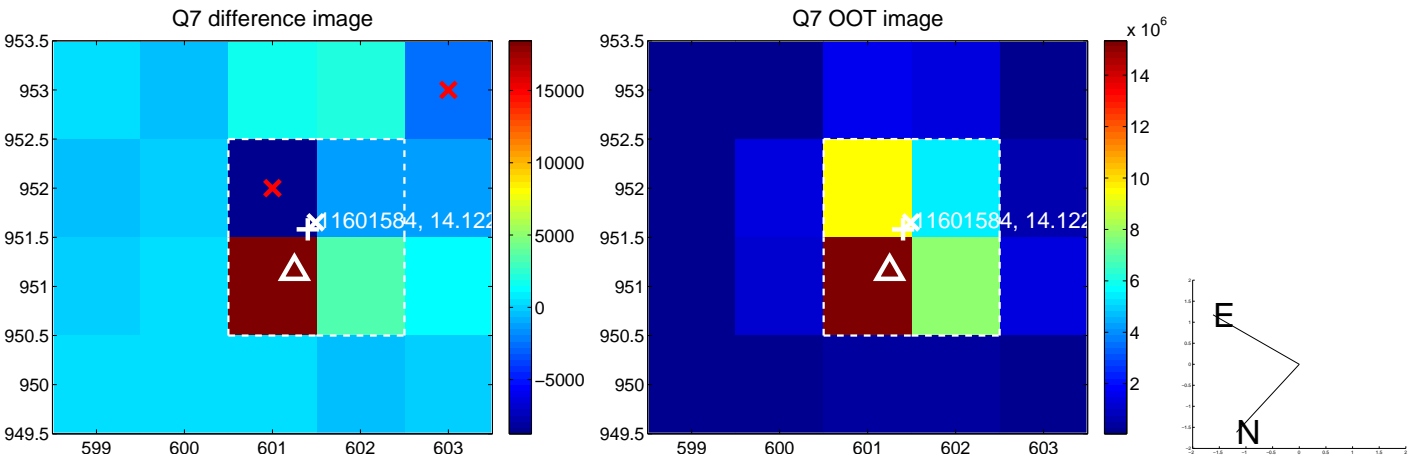
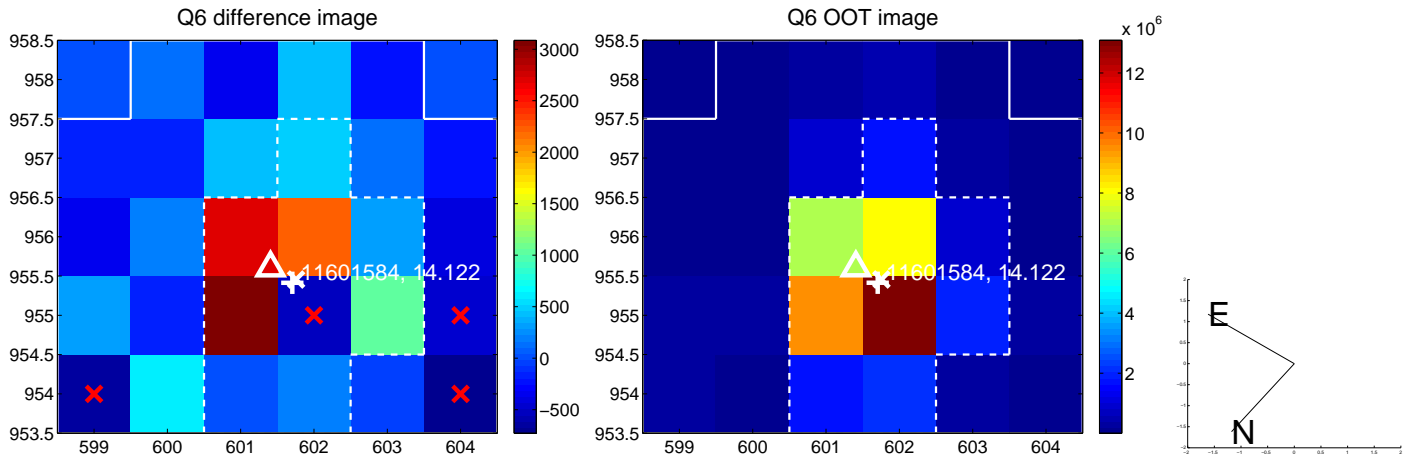
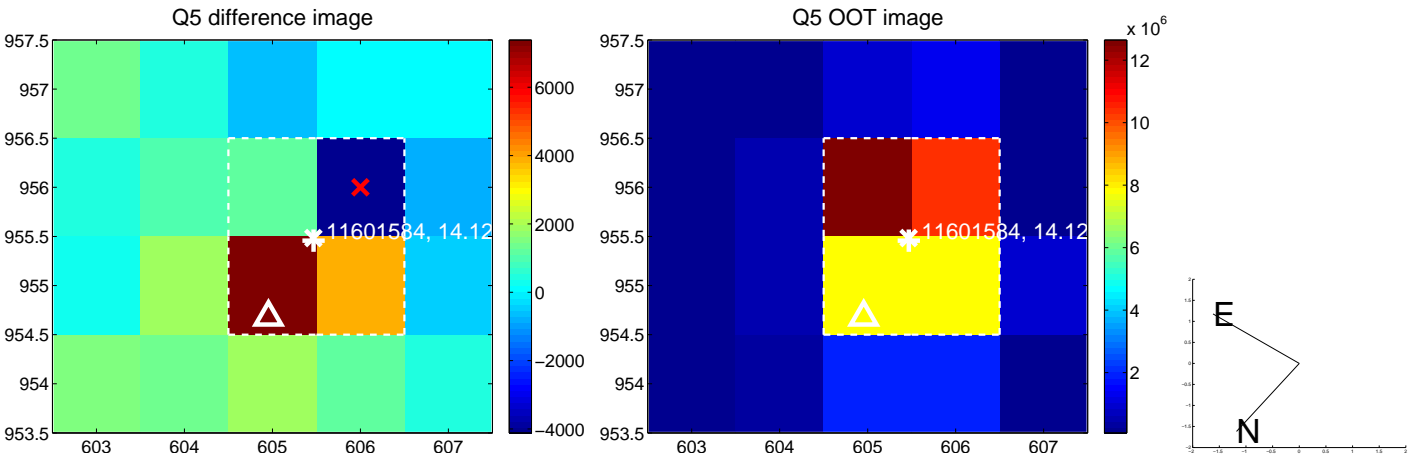


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

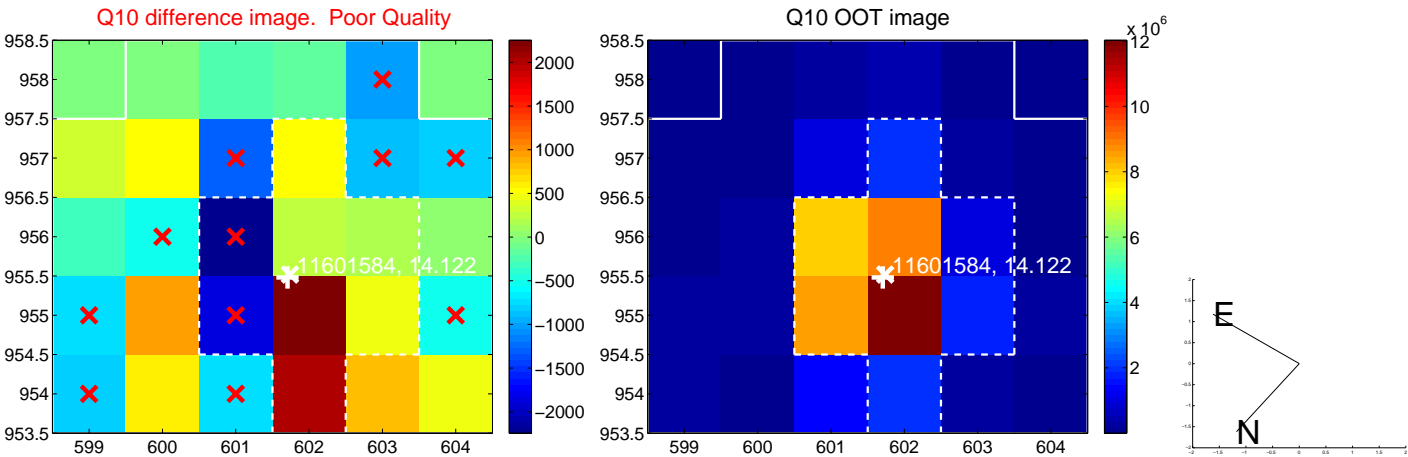
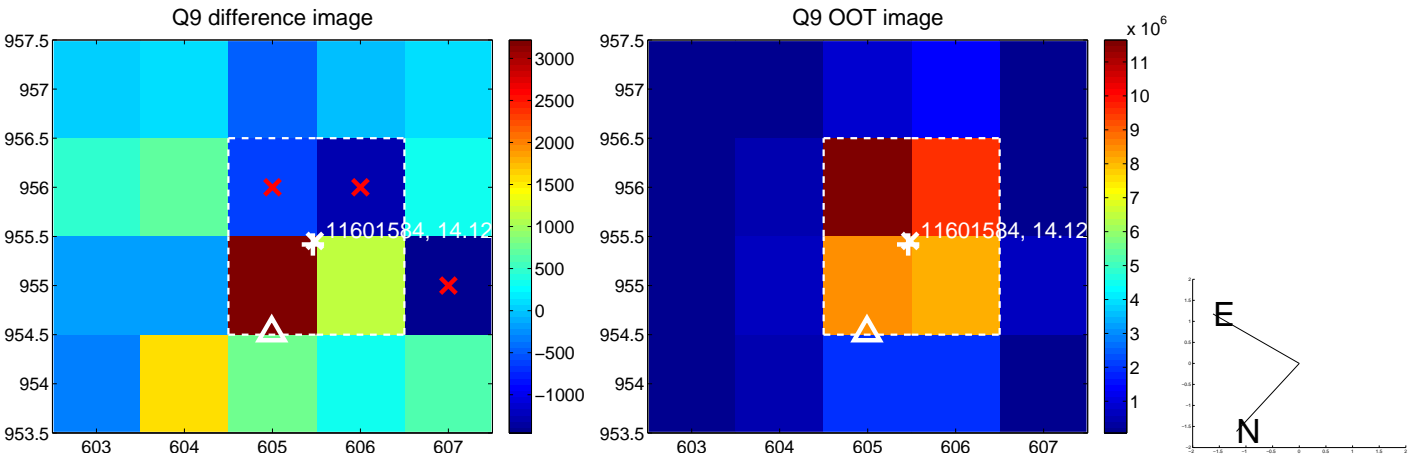
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



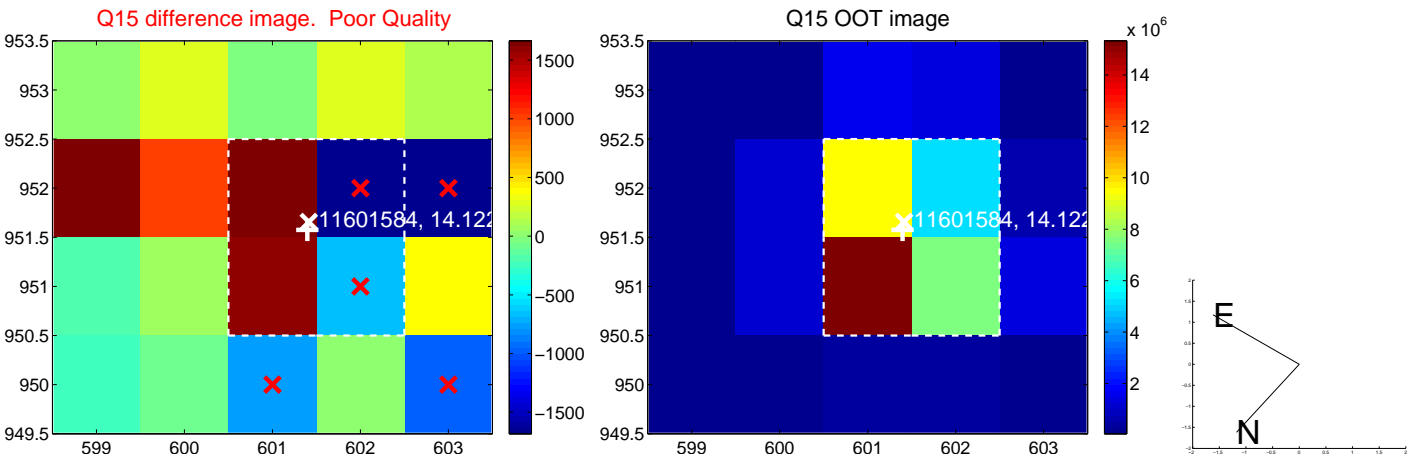
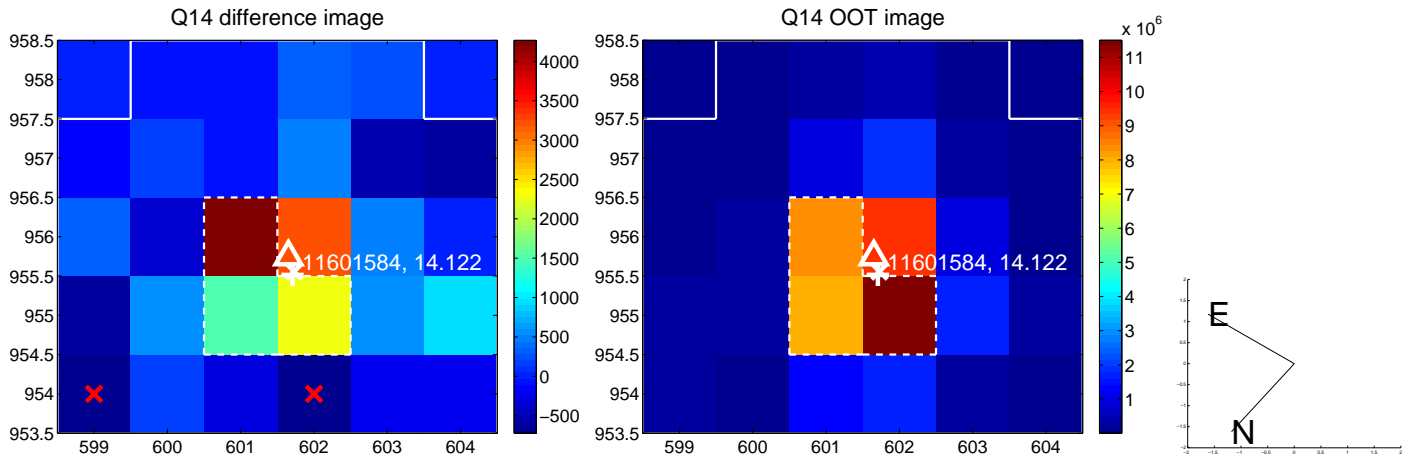
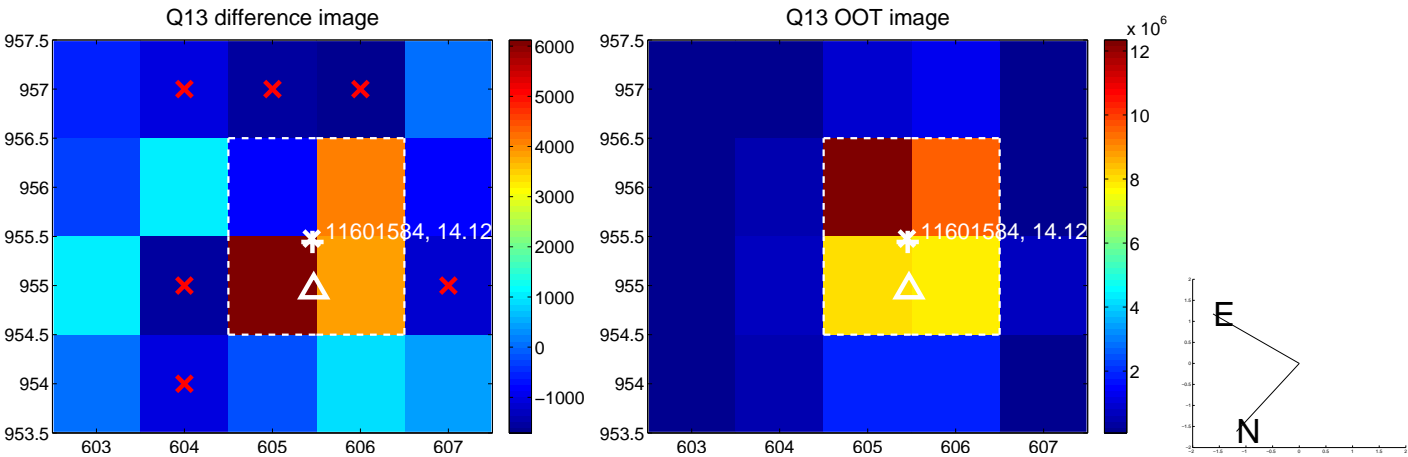
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



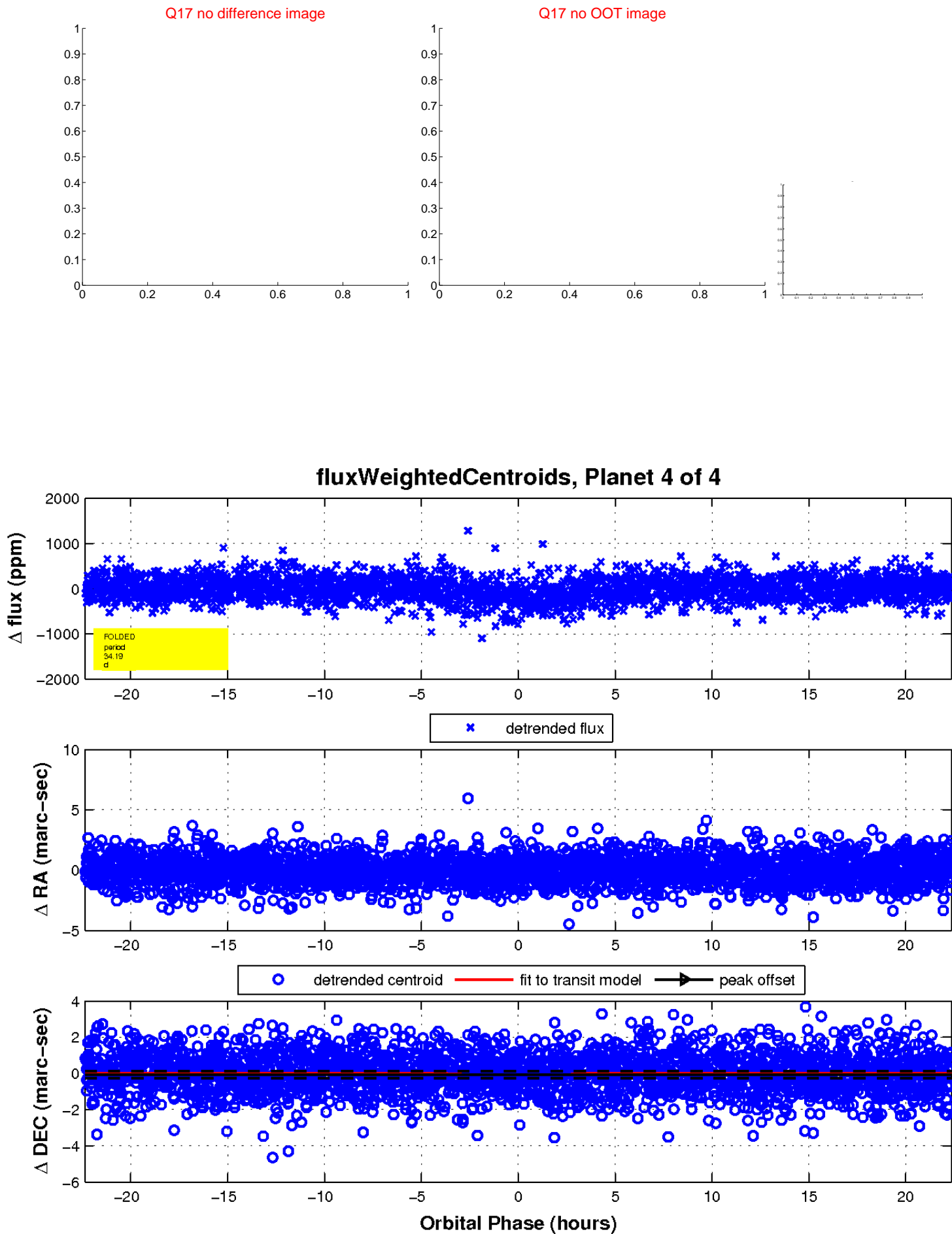
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

