

# KIC 011673674

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011673674-01	OBS	0133.01	4.618772	133.386032	4247.5	5.895	746.5	506.3	1.03	6013	7.36	443.23
011673674-02	OBS	No	2.309362	133.392216	95.1	5.395	15.3	16.8	1.03	6013	1.18	1116.87

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011673674-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—SEASONAL_DEPTH_DV—SEASONAL_DEPTH_ALT—CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
011673674-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH

**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 011673674-01

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
011673674-01	11673674	011673686-pri	11673686	1:1	16.5	4	-1	11.69	13.66	7.86	Direct-PRF	0	0.04	0.01

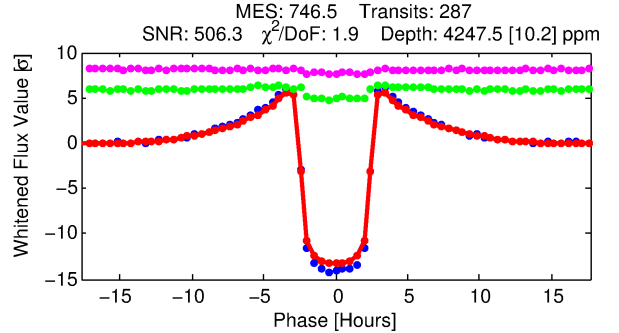
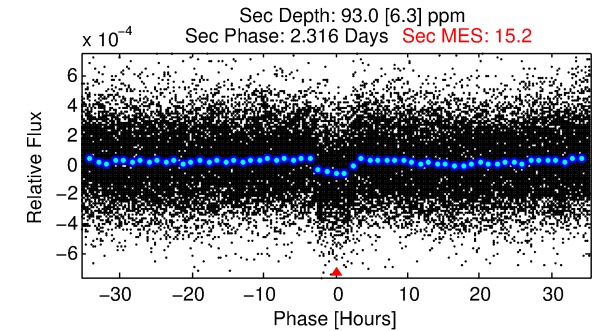
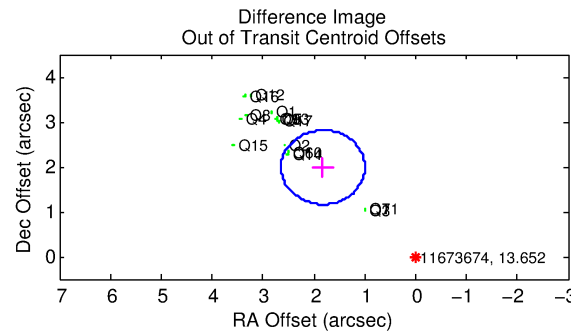
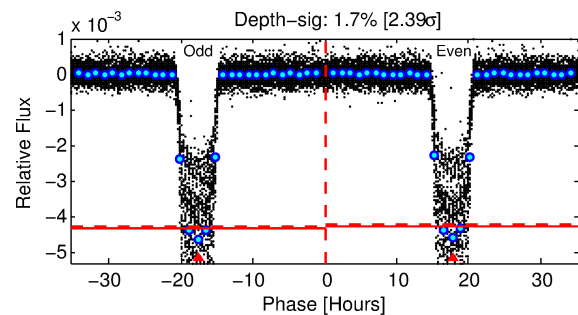
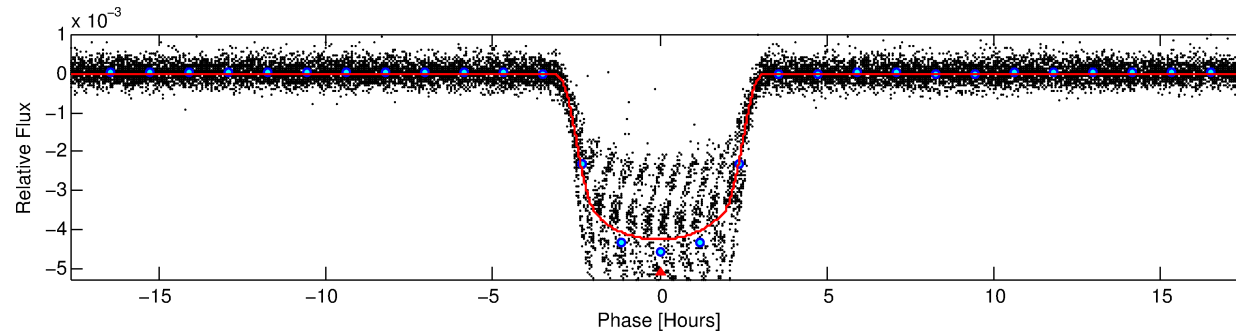
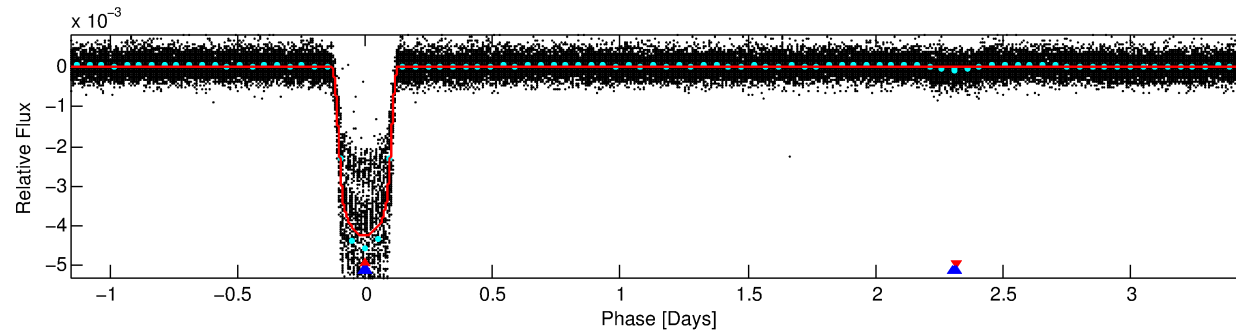
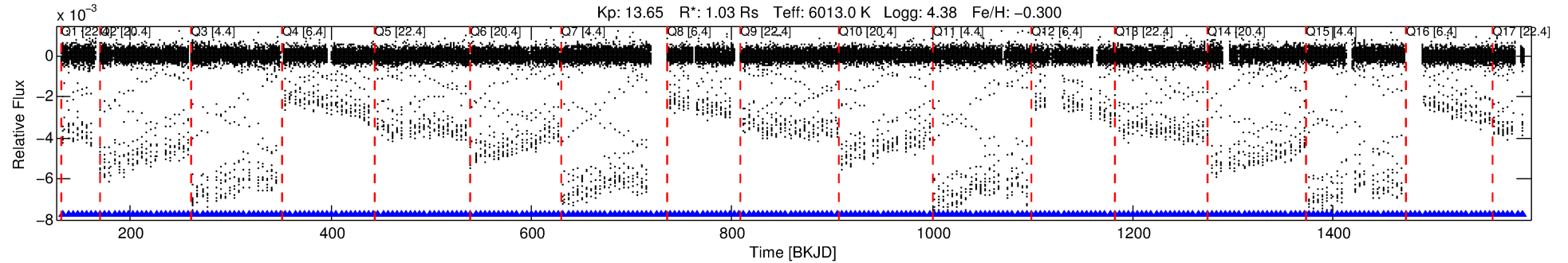
**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

KIC: 11673674 Candidate: 1 of 2 Period: 4.619 d

KOI: K00133.01 Corr: 0.998

Kp: 13.65 R\*: 1.03 Rs Teff: 6013.0 K Logg: 4.38 Fe/H: -0.300



## DV Fit Results:

Period = 4.61877 [0.00000] d  
Epoch = 133.3860 [0.0002] BKJD  
Rp/R\* = 0.0653 [0.0002]  
a/R\* = 4.50 [0.04]  
b = 0.77 [0.01]  
Seff = 443.22 [165.16]  
Teq = 1170 [109] K  
Rp = 7.36 [2.14] Re  
a = 0.0531 [0.0129] AU  
Ag = 2.66 [0.96] [1.74σ]  
Teff = 2310 [80] K [8.43σ]

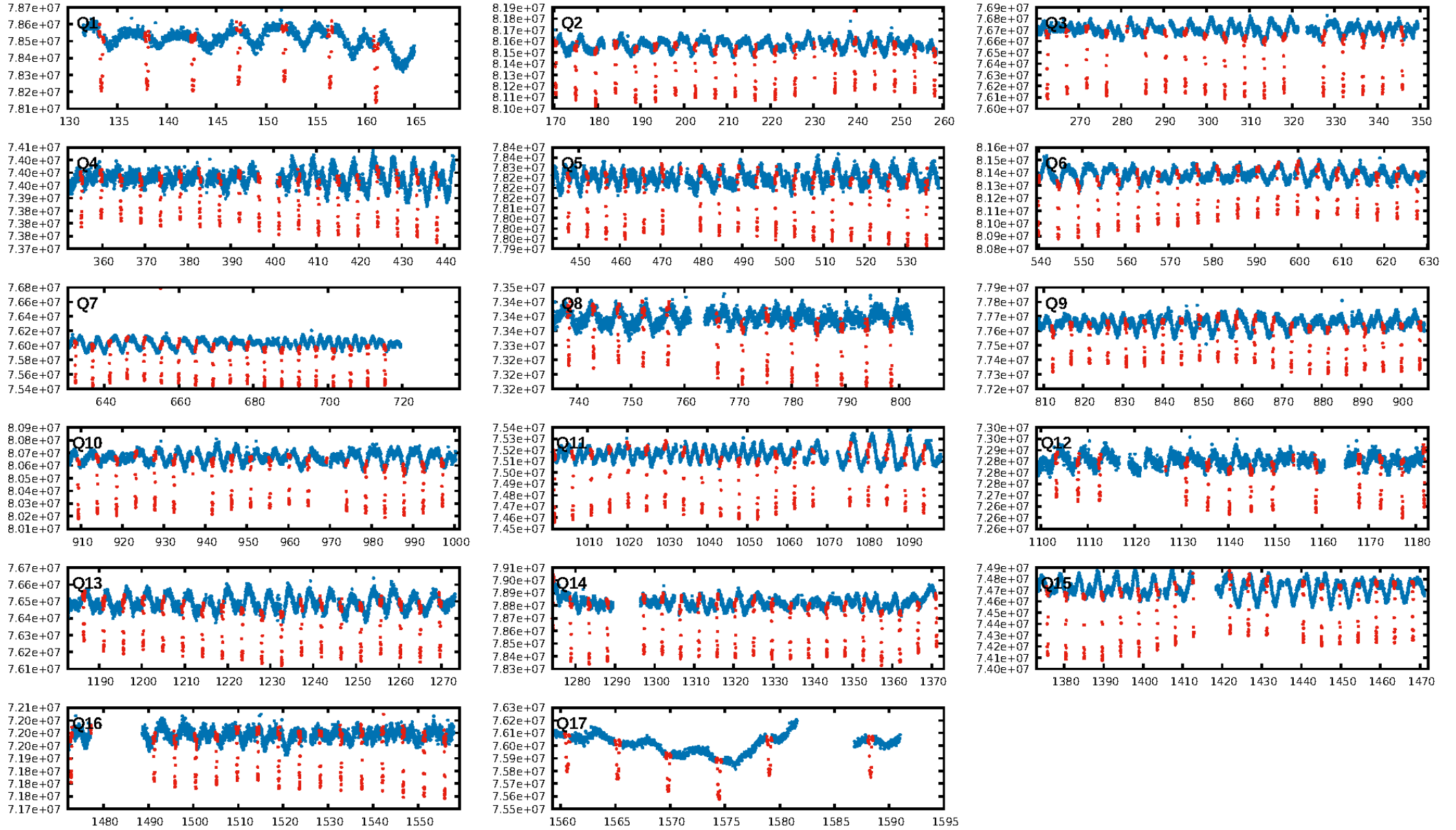
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [6.94σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [274/274]  
GhostDiagnostic-chr: -0.02753  
Centroid-sig: 0.0%  
Centroid-so: 7.258 arcsec [312.45σ]  
OotOffset-rm: 2.695 arcsec [9.80σ]  
KicOffset-rm: 4.861 arcsec [45.12σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 0.00 [0/17]

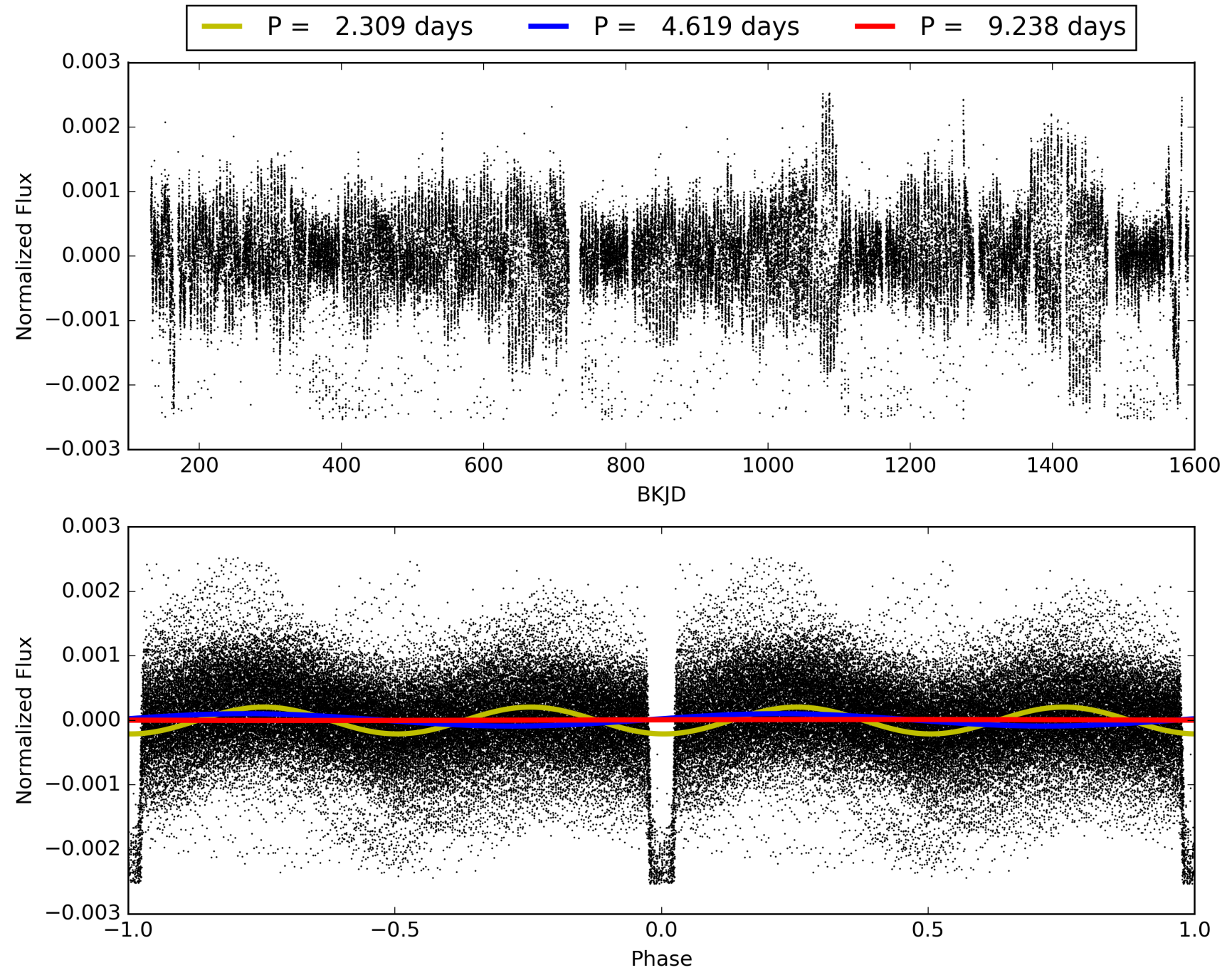
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 14:22:00 Z

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

# TCE 011673674-01, PDC Light Curves

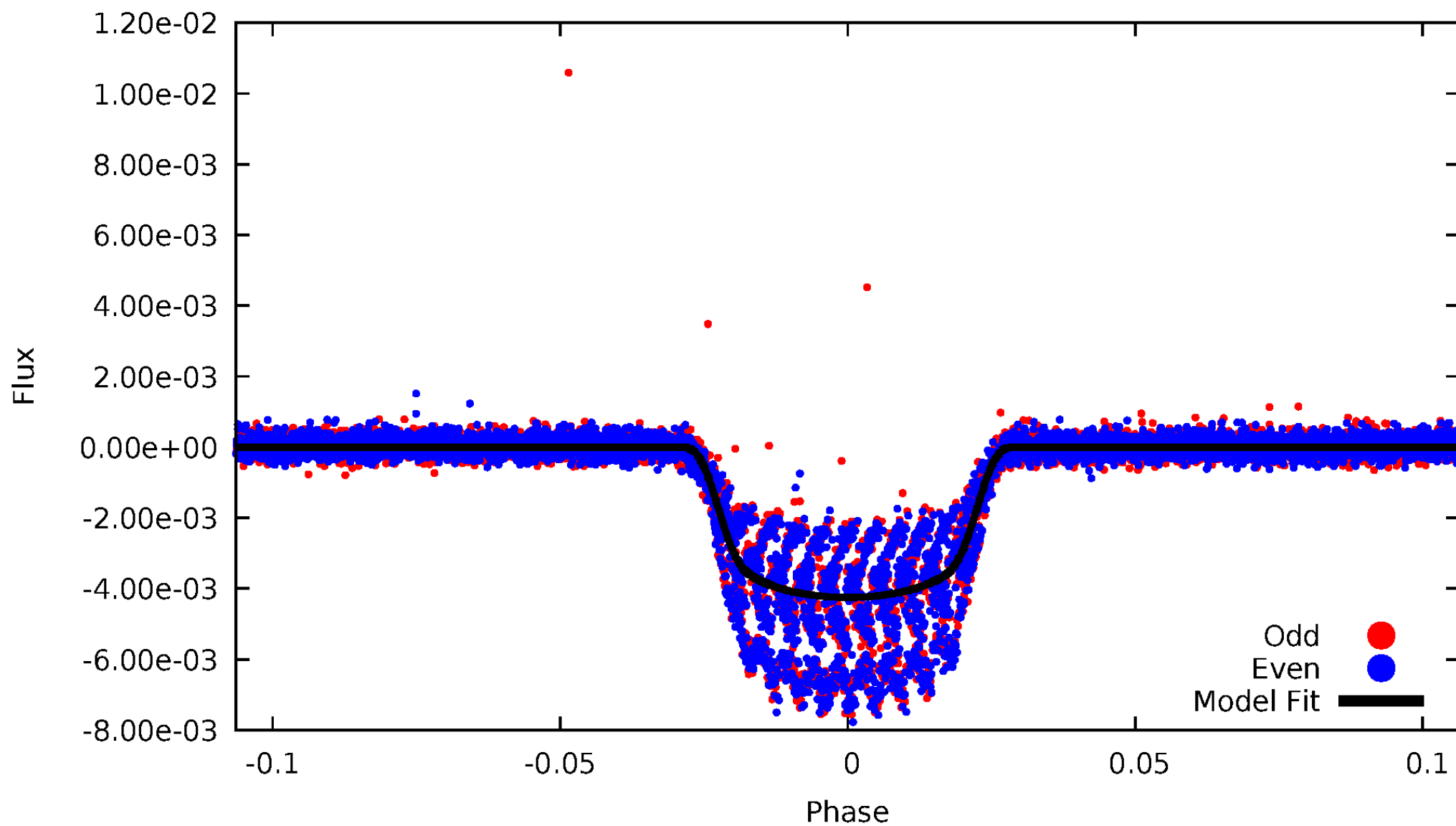


# TCE 011673674-01



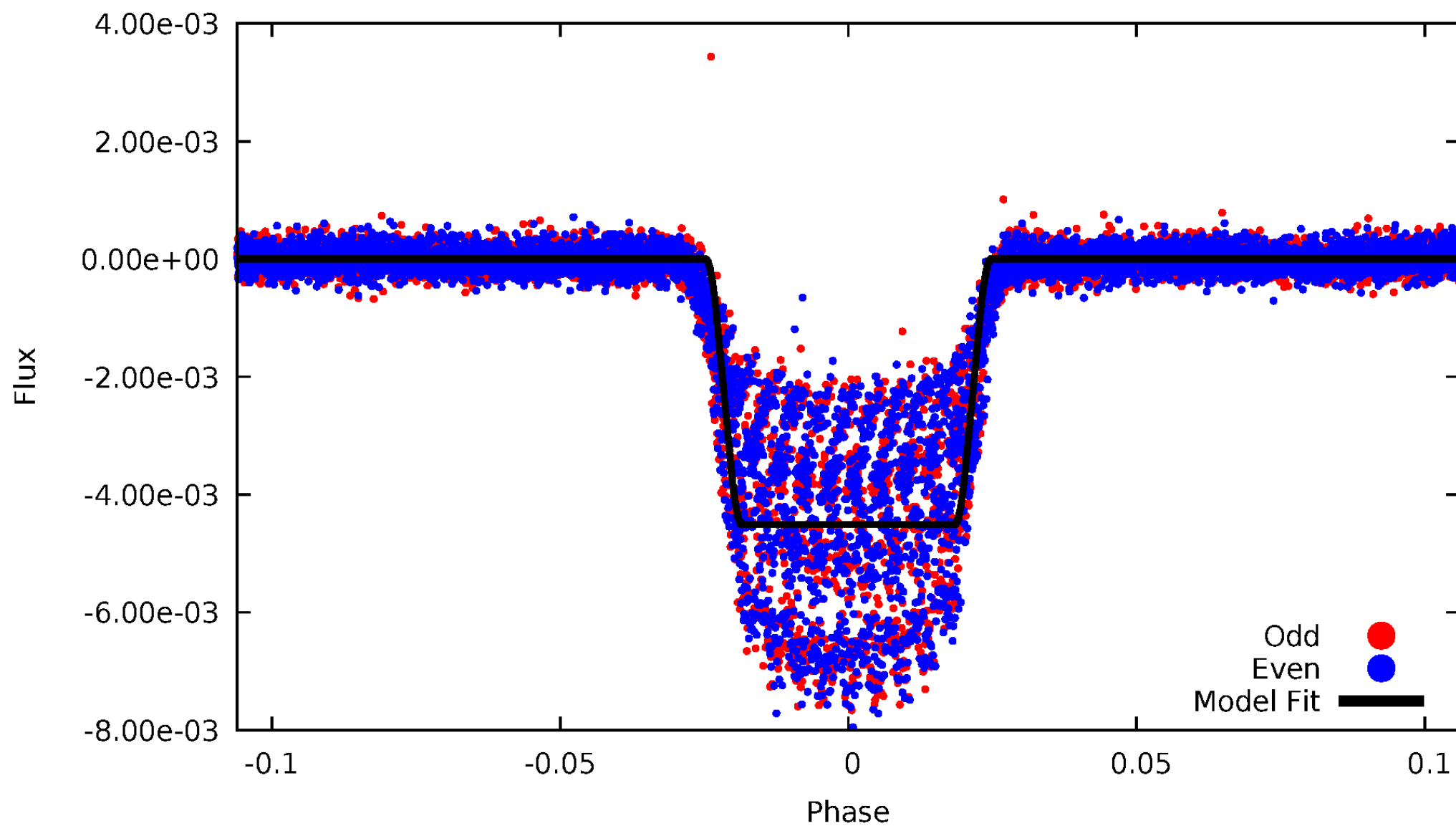
# DV Odd/Even

TCE 011673674-01

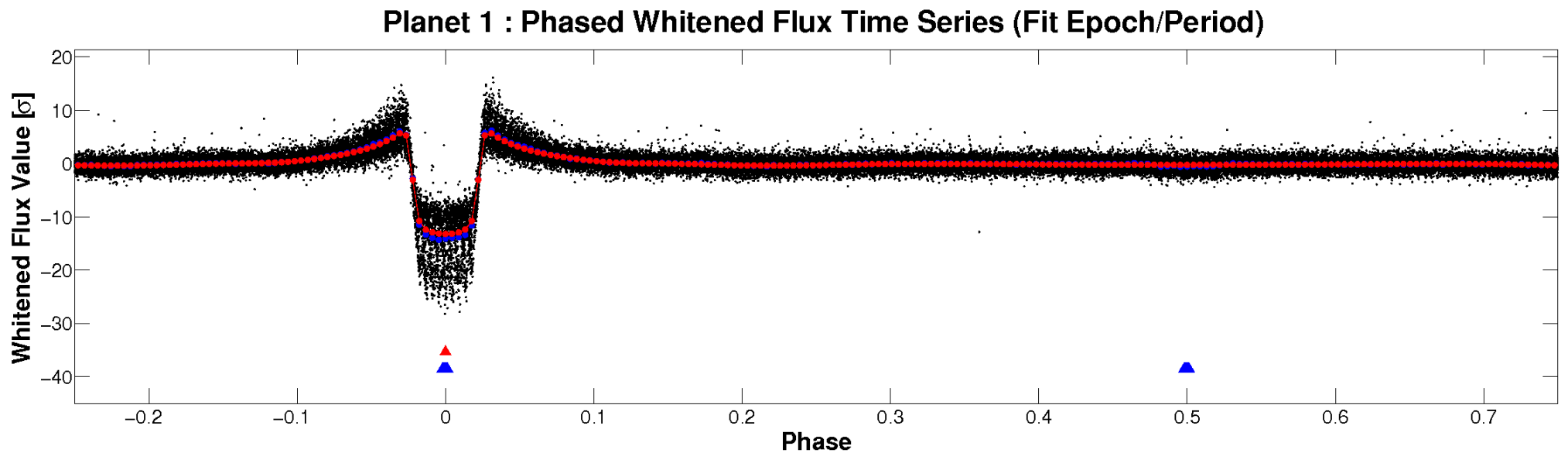
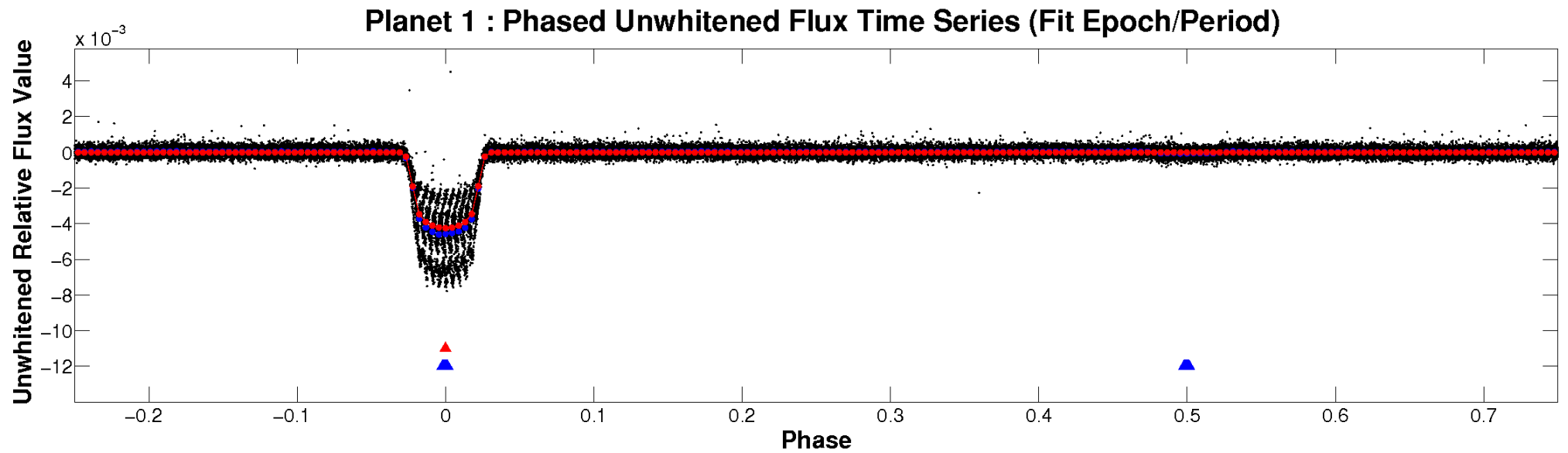


# ALT Odd/Even

TCE 011673674-01



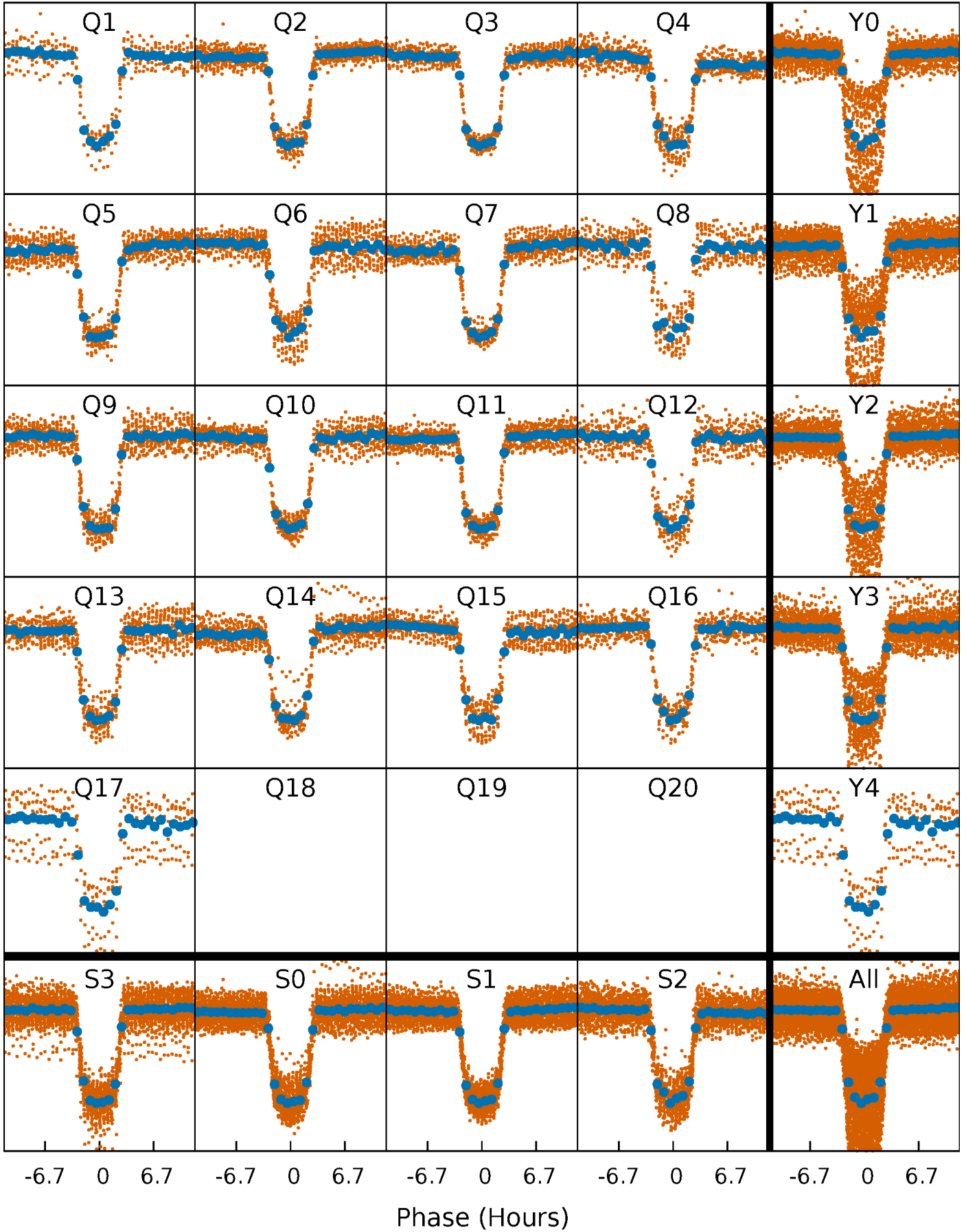
# Non-Whitened Vs. Whitened Light Curve





# PDC Quarter-Phased Transit Curves

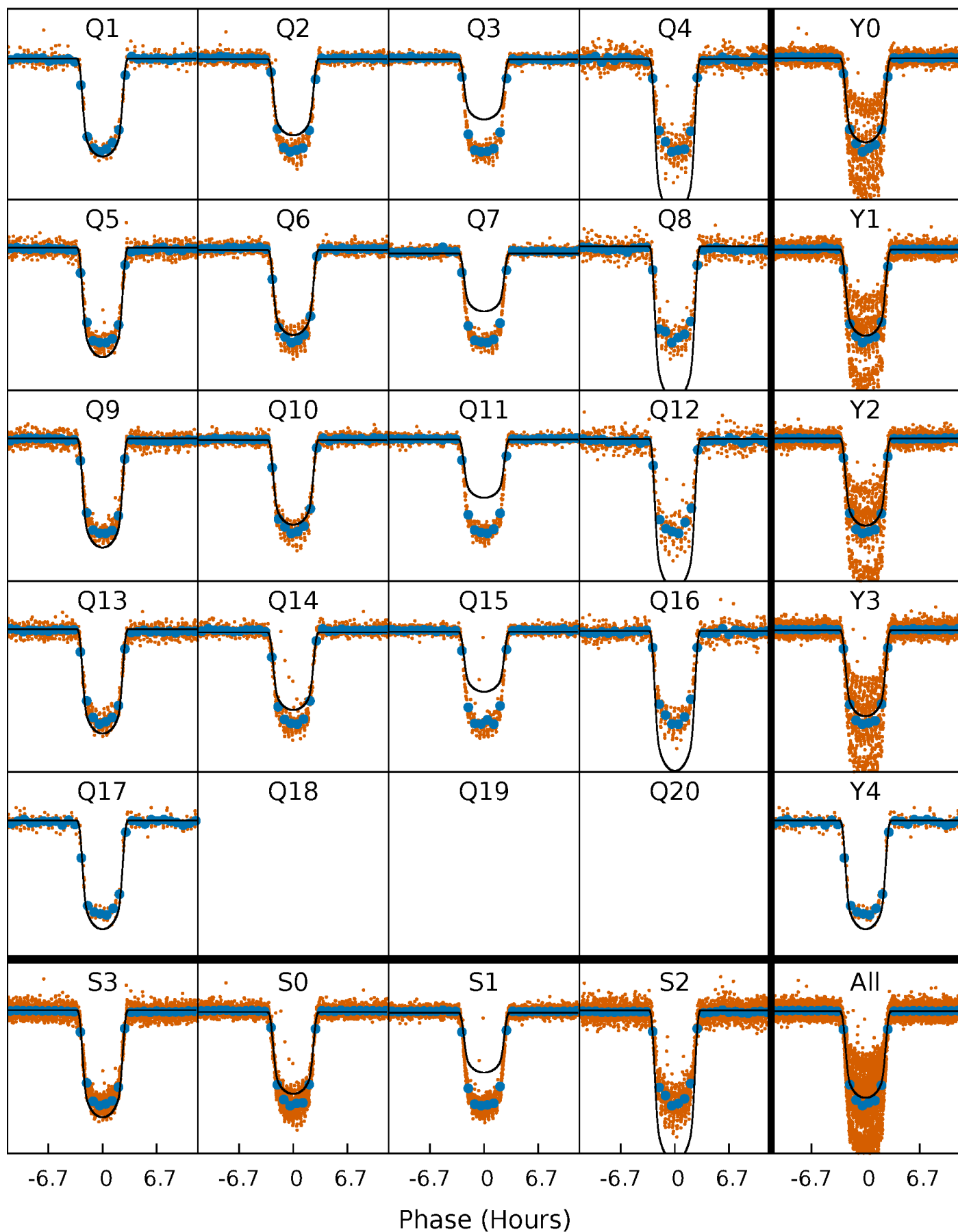
TCE 011673674-01 P= 4.618772 Days  $T_0=133.386032$  (BKJD)





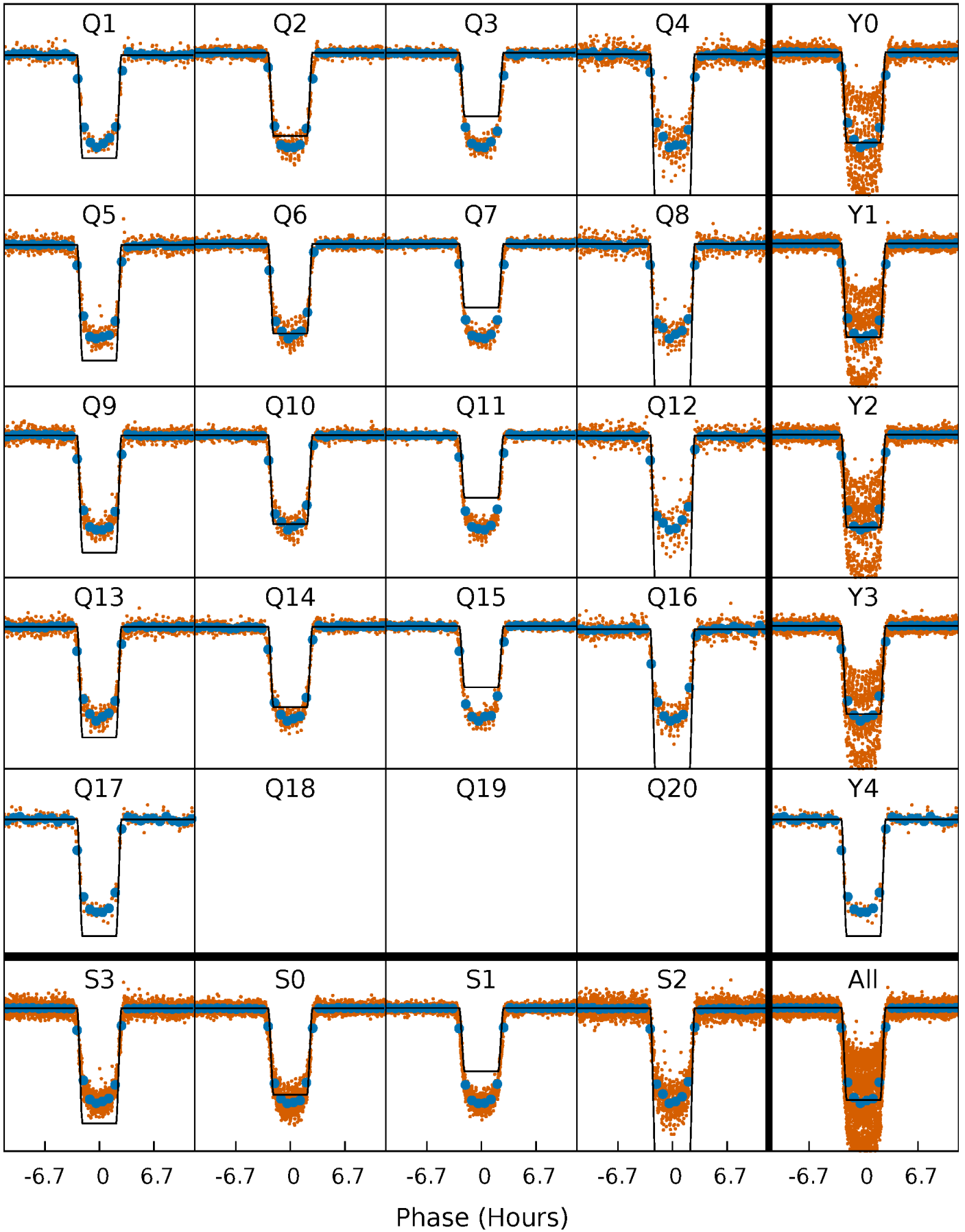
# DV Quarter-Phased Transit Curves

TCE 011673674-01 P= 4.618772 Days  $T_0=133.386032$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

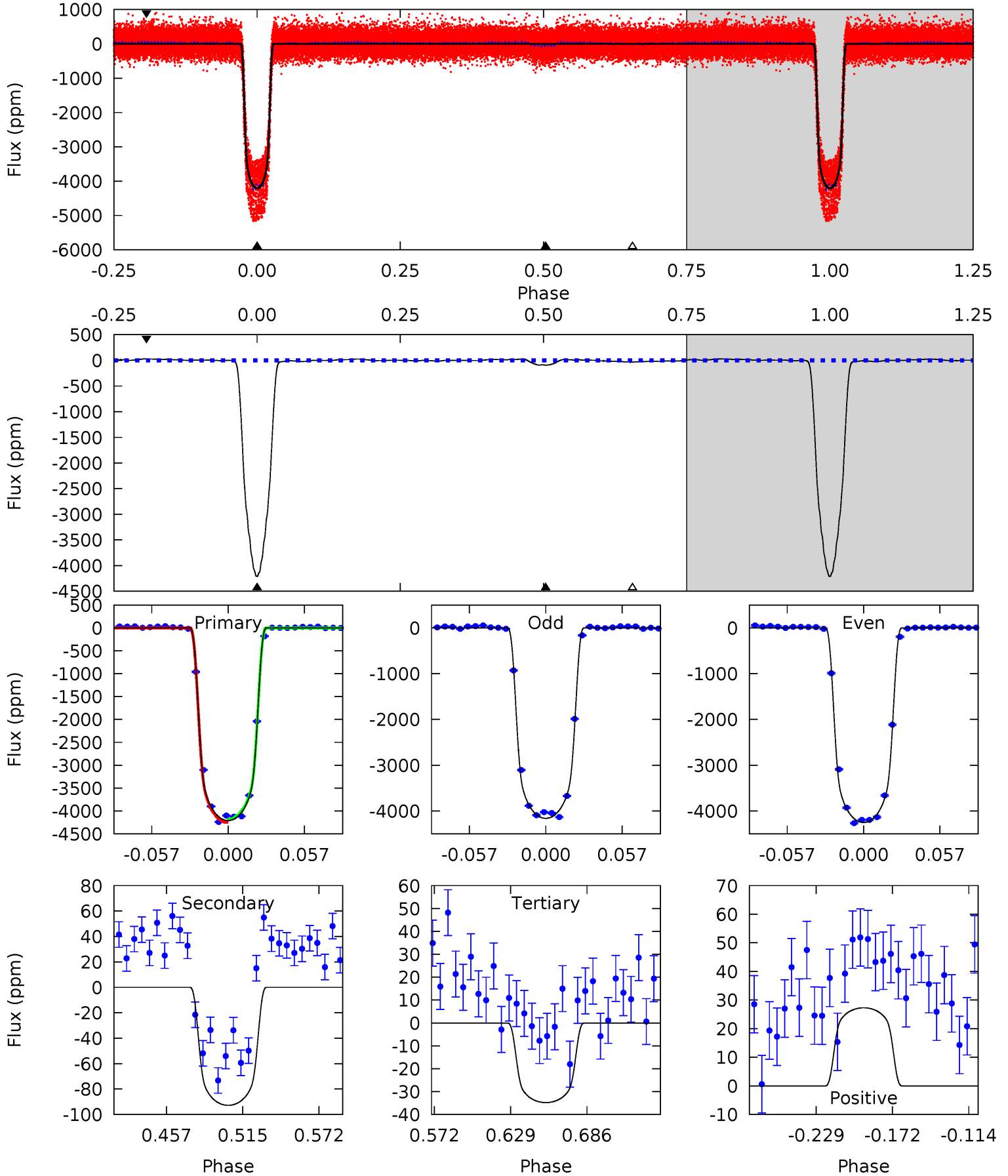
TCE 011673674-01 P= 4.618790 Days  $T_0=133.383258$  (BKJD)



# DV Model-Shift Uniqueness Test

011673674-01, P = 4.618772 Days, E = 128.767260 Days

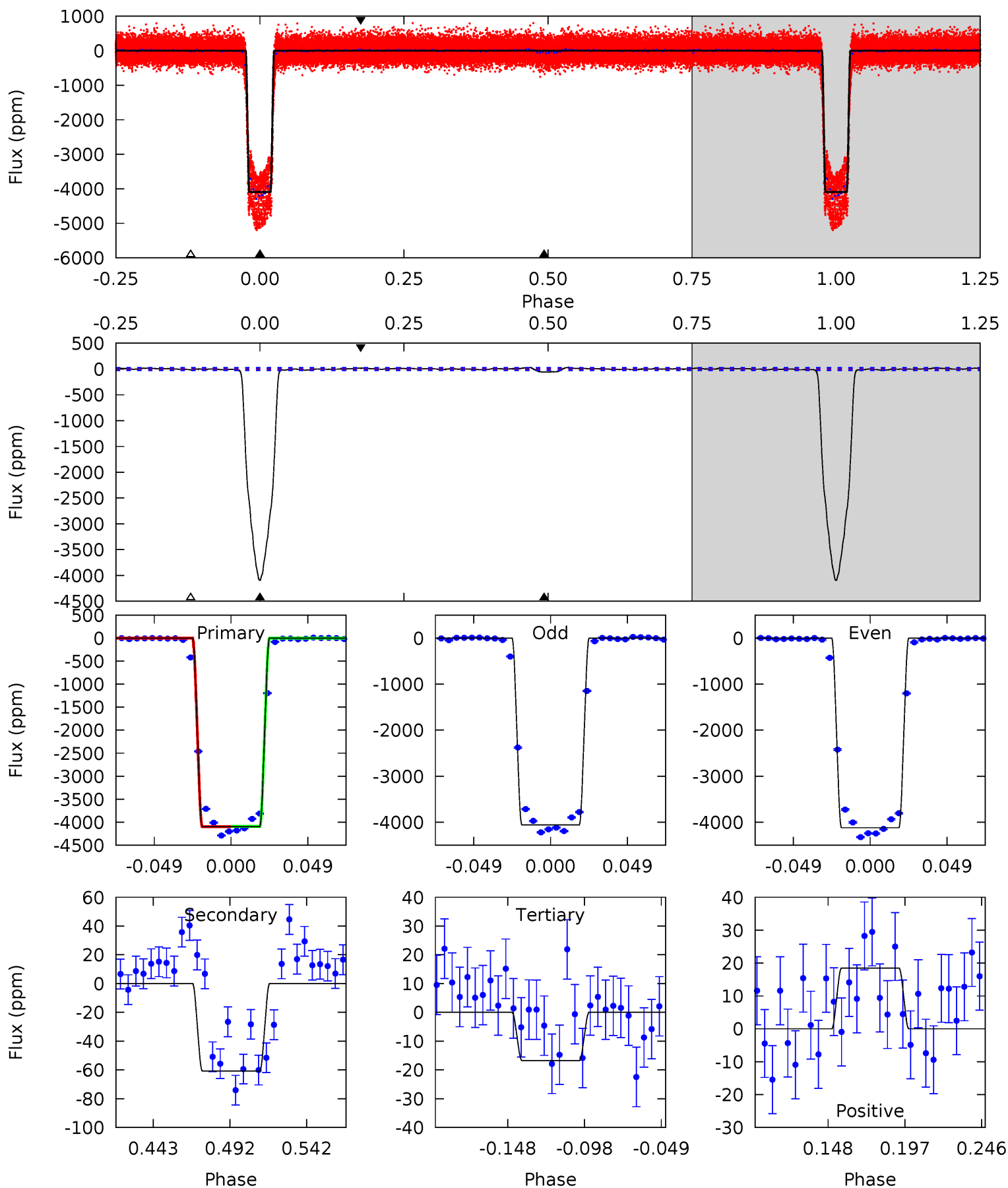
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
956.4	21.1	7.90	6.20	4.68	1.90	3.12	948.5	950.2	13.2	14.9	10.2	1.08	0.01	0



# Alt Model-Shift Uniqueness Test

011673674-01, P = 4.618790 Days, E = 128.764468 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
825.1	12.2	3.37	3.72	4.71	1.97	1.56	821.7	821.4	8.86	8.51	6.43	1.05	0.01	0



### Stellar Parameters For KIC 011673674

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6013^{+163}_{-181}$	$4.381^{+0.128}_{-0.192}$	$-0.300^{+0.300}_{-0.300}$	$1.033^{+0.300}_{-0.161}$	$0.938^{+0.132}_{-0.108}$	$1.197^{+0.681}_{-0.581}$
	+3%/-3%	+3%/-4%	+100%/-100%	+29%/-16%	+14%/-12%	+57%/-49%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 011673674-01 / KOI 0133.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-93 \pm 4$	$7.46^{+1.24}_{-0.72}$	$1651^{+129}_{-99}$	$2930^{+54}_{-56}$	$2.545^{+0.595}_{-0.648}$
Alt.	$-61 \pm 5$	$7.57^{+1.22}_{-0.68}$	$1649^{+112}_{-98}$	$2716^{+56}_{-66}$	$1.587^{+0.395}_{-0.360}$

$T_{max}$  = 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

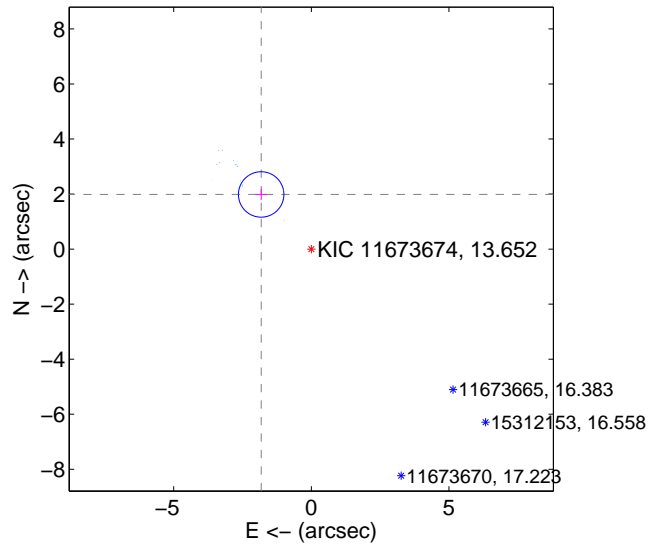
Supplemental centroid analysis for 011673674-01. Kepler magnitude: 13.65. Transit SNR 506.27

There are 17 quarters with good PRF difference image offsets

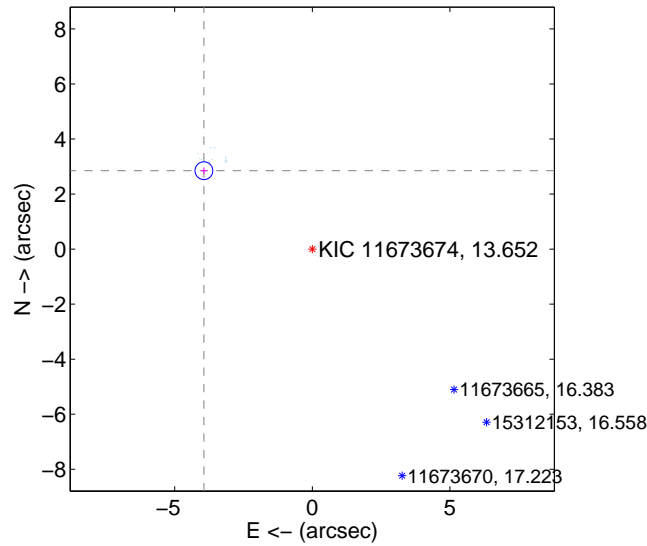
The direct PRF centroid is offset from the target star catalog position by about 0.47 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.695 \pm 0.275$	9.80	$1.823 \pm 0.209$	$1.985 \pm 0.201$
PRF-fit source offset from KIC position	$4.861 \pm 0.108$	45.12	$3.939 \pm 0.104$	$2.849 \pm 0.115$
photometric centroid source offset	$7.26 \pm 0.02$	312.45	$5.70 \pm 0.02$	$4.49 \pm 0.02$

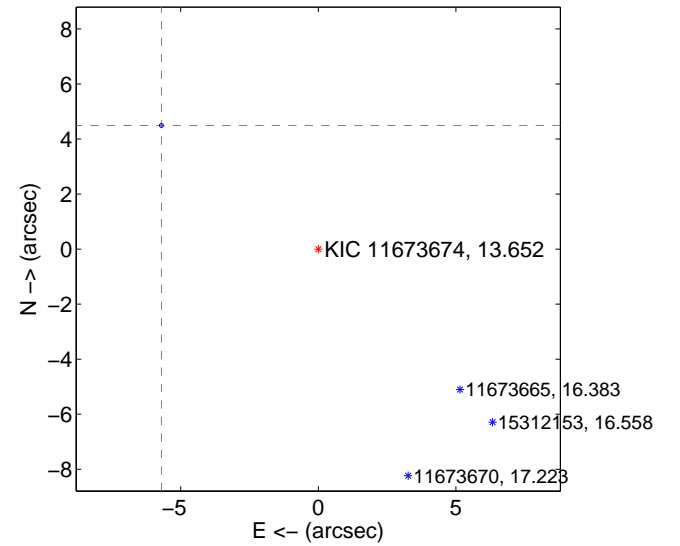
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



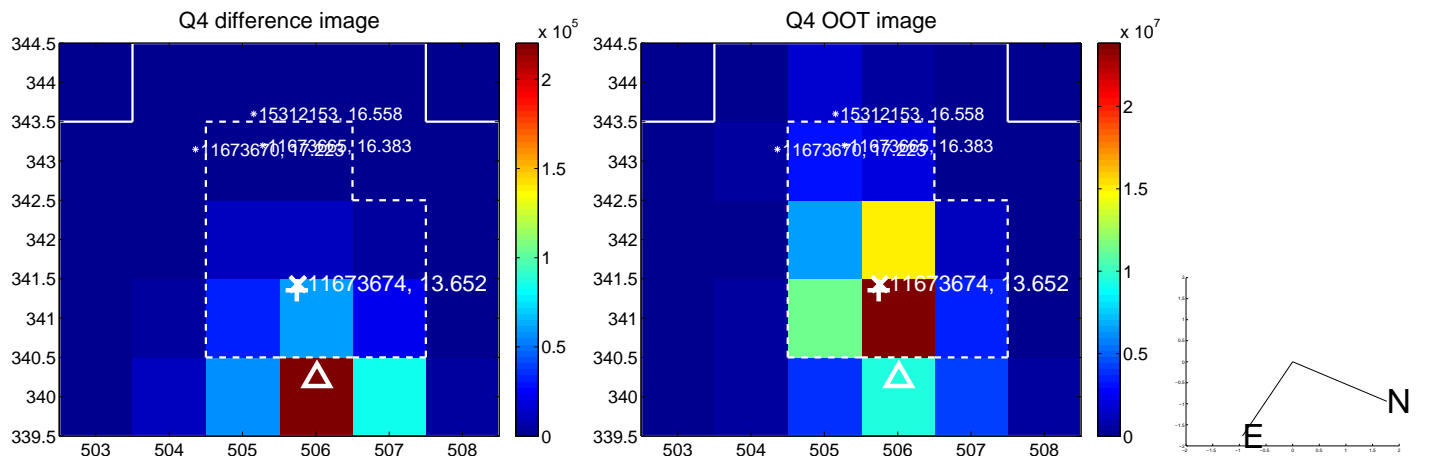
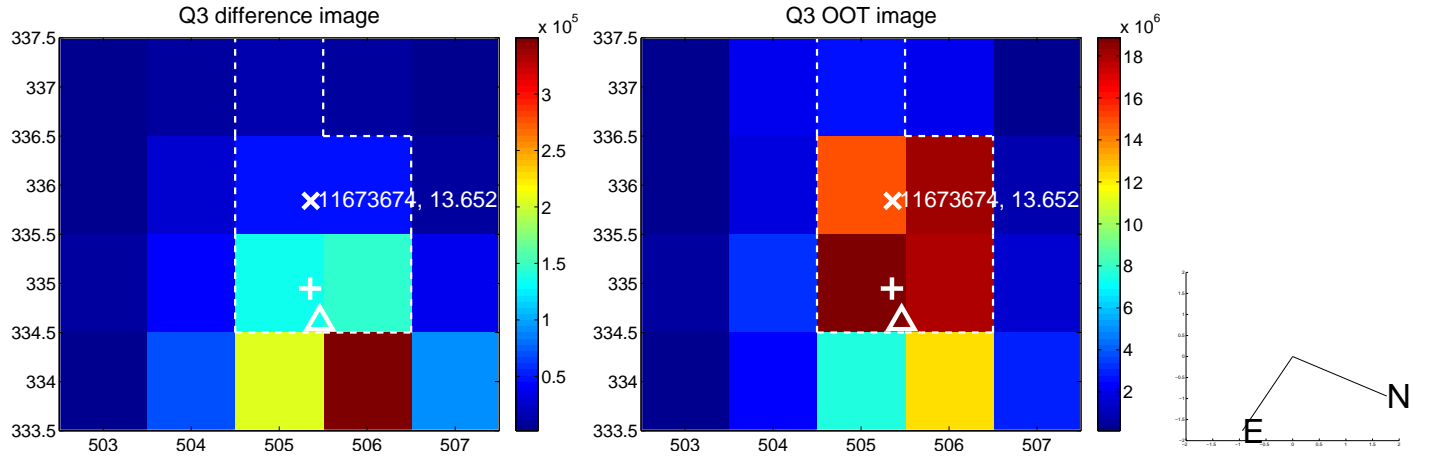
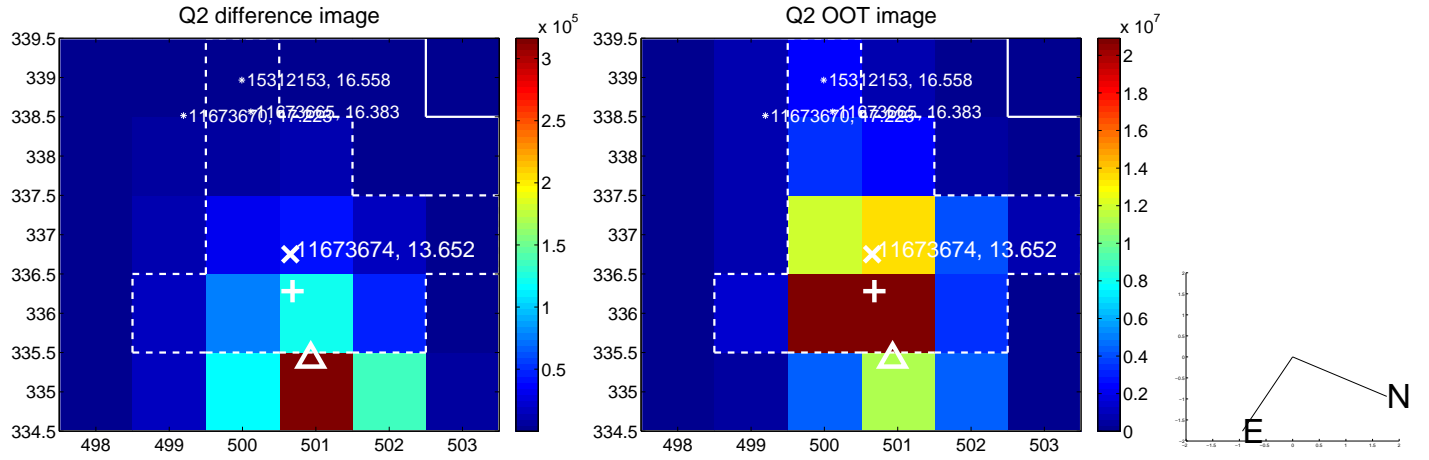
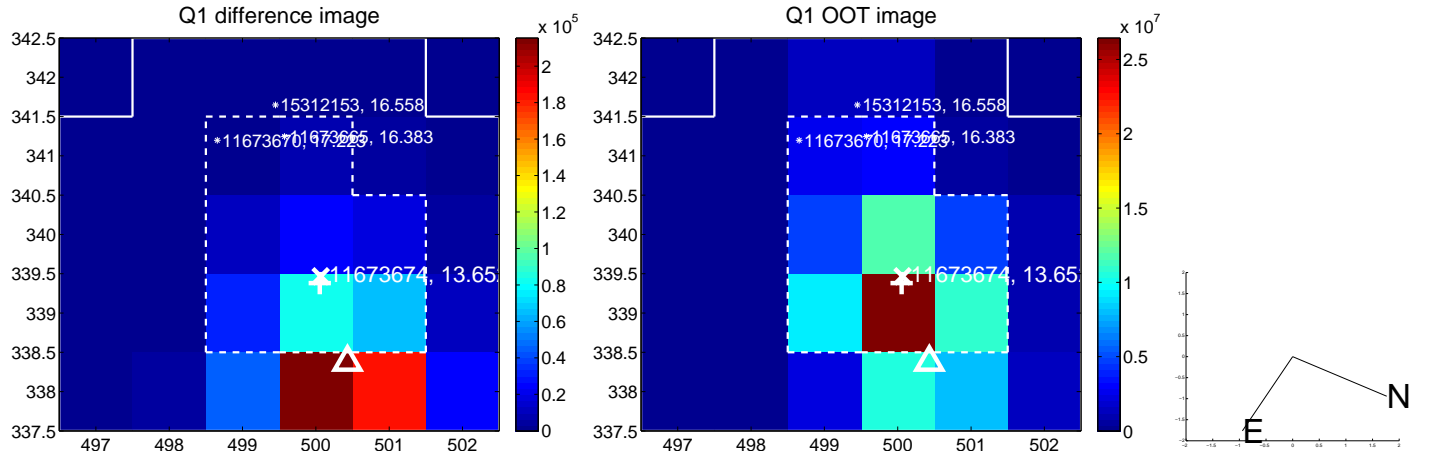
offset from photometric centroids



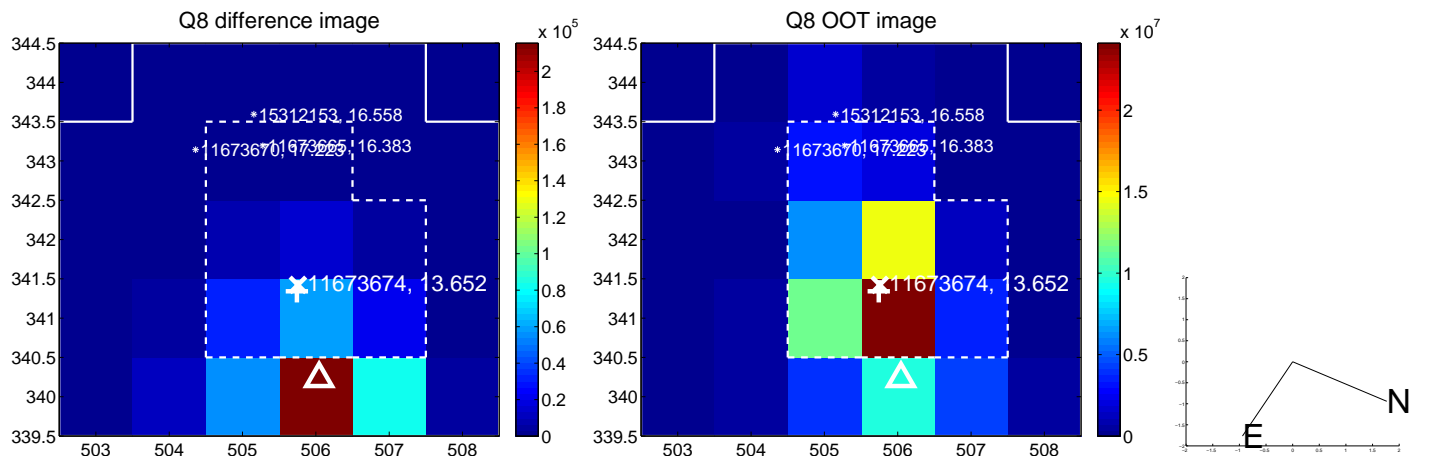
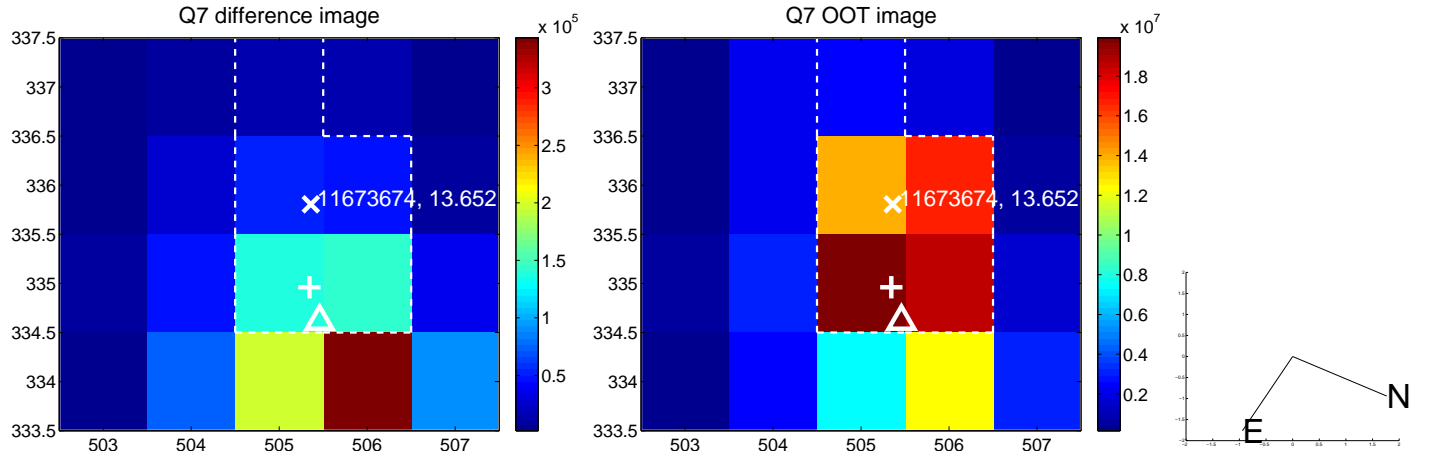
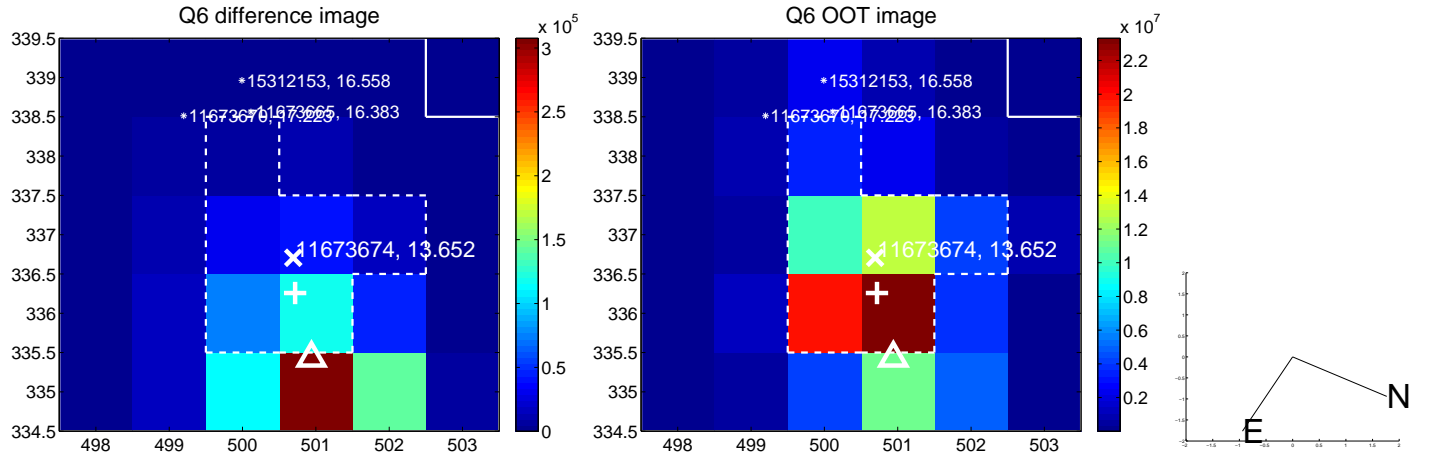
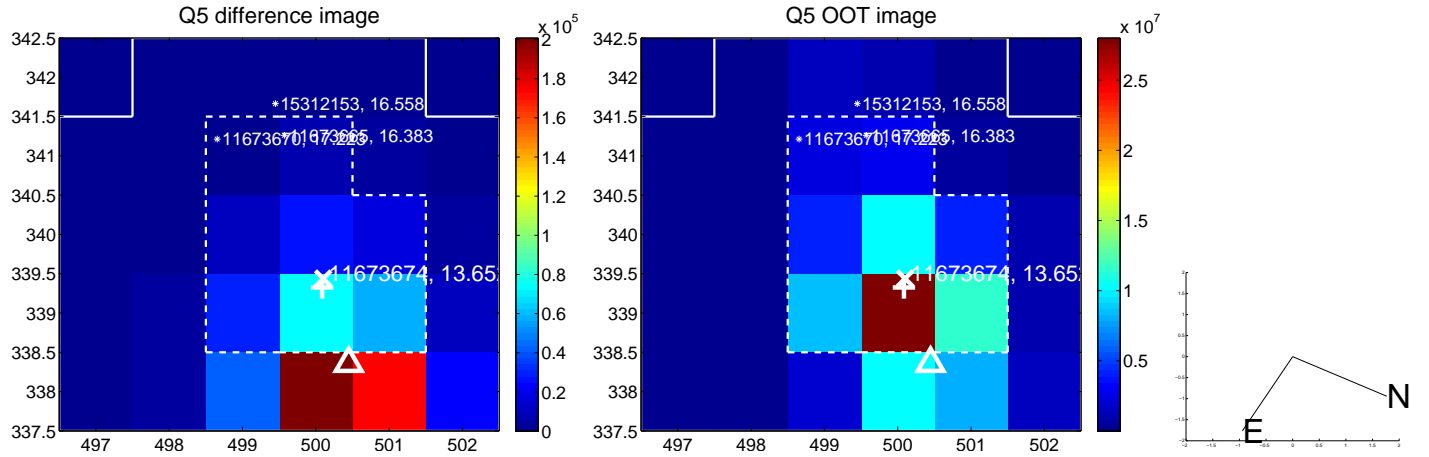
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.



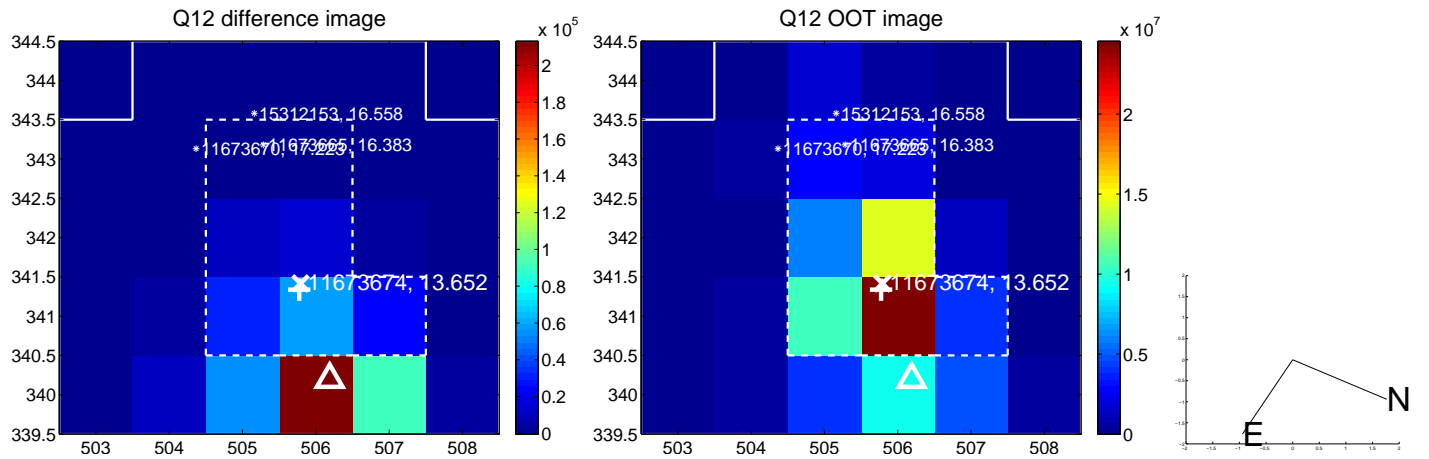
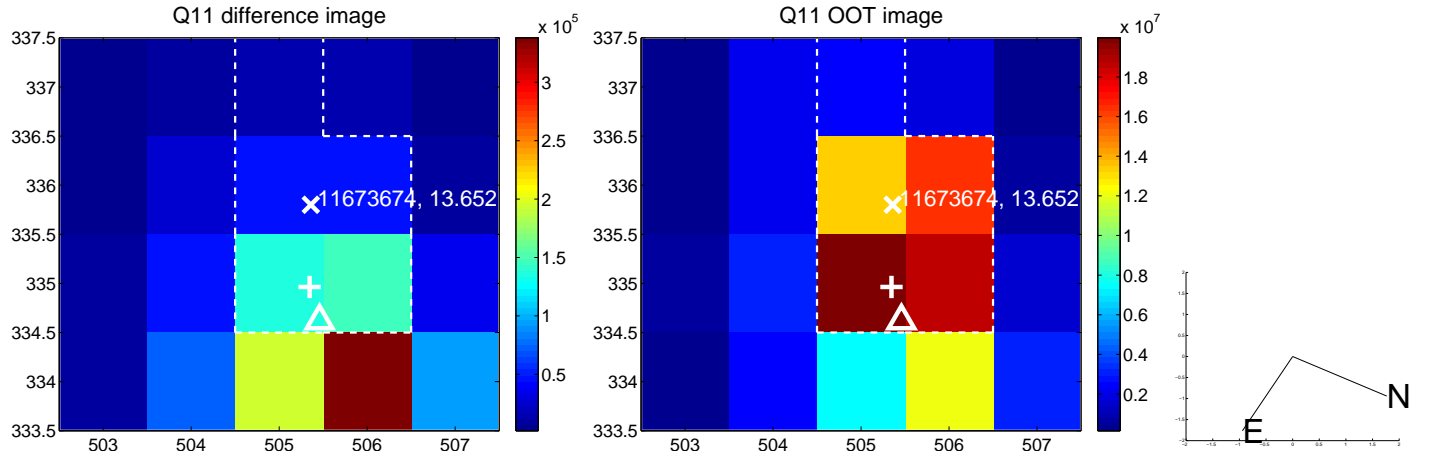
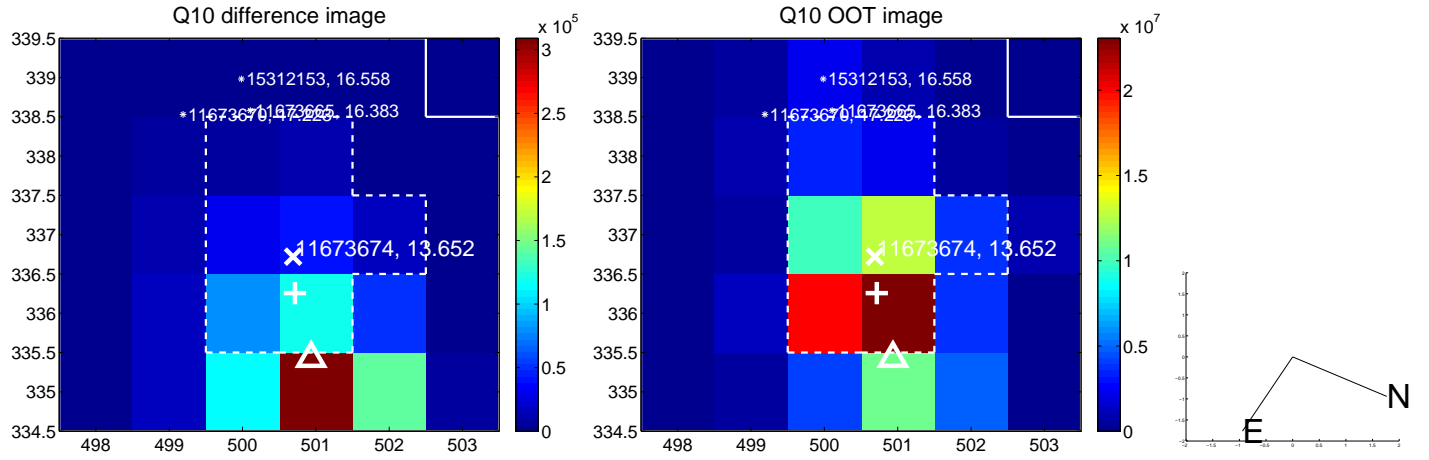
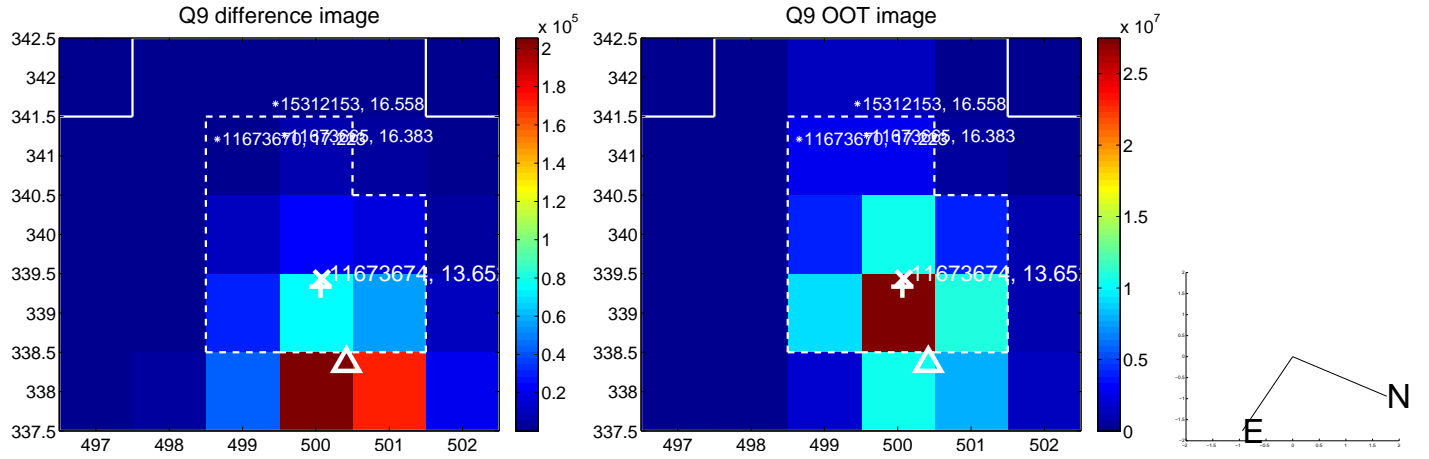
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



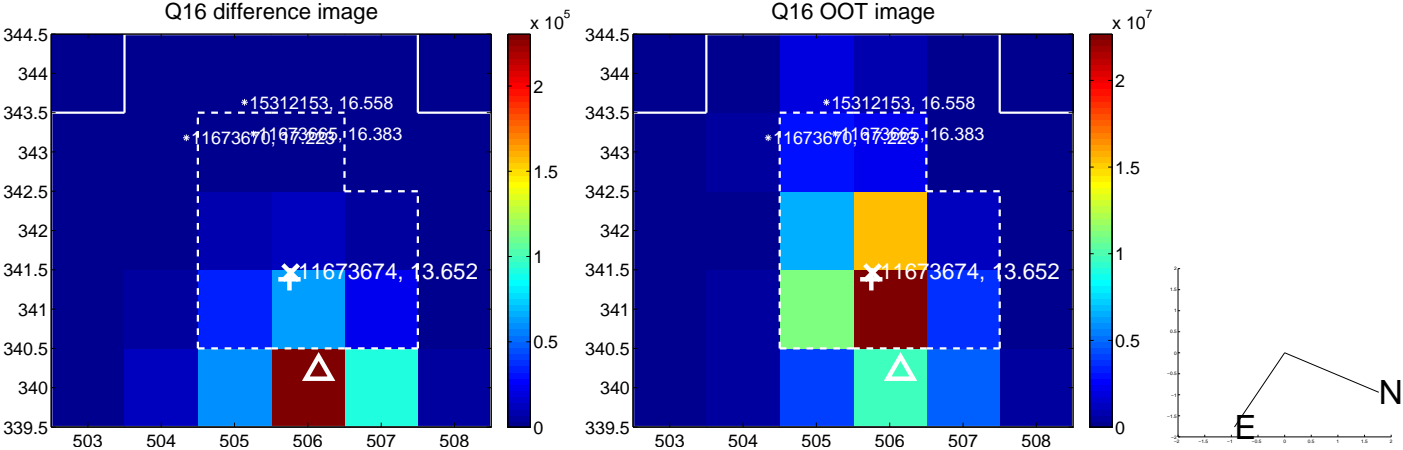
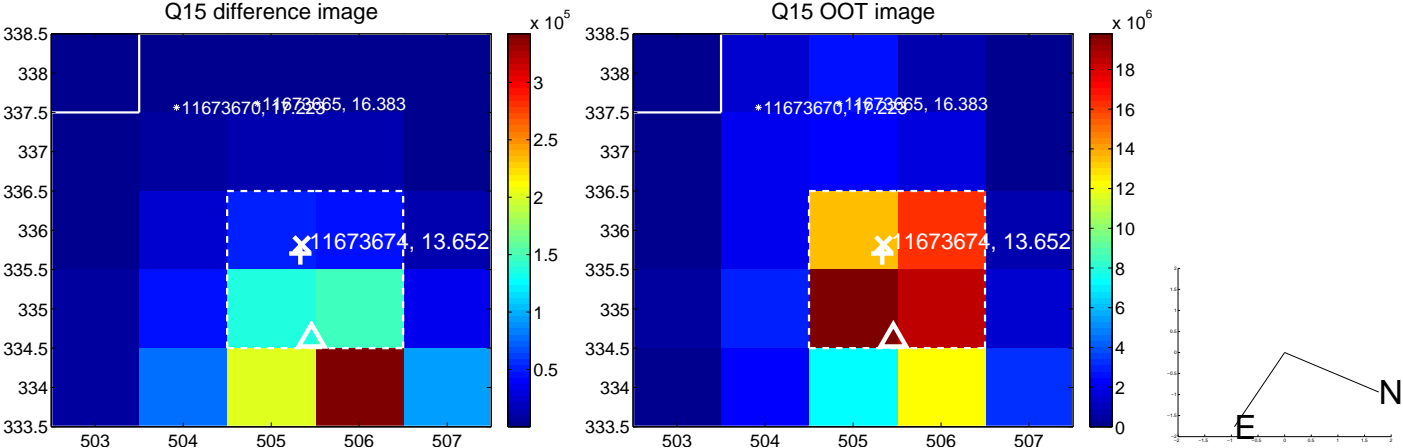
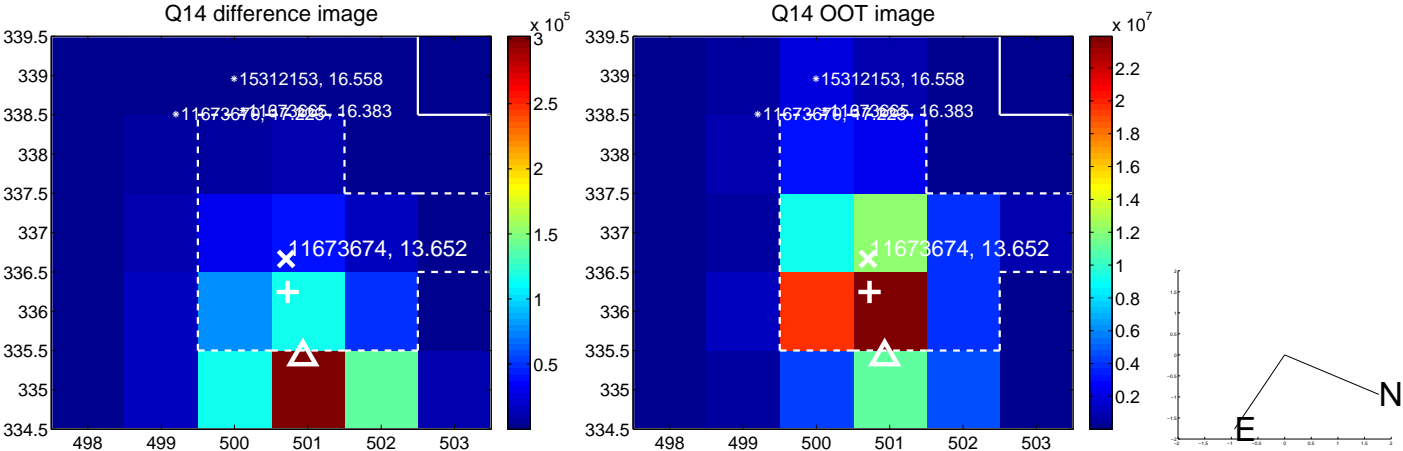
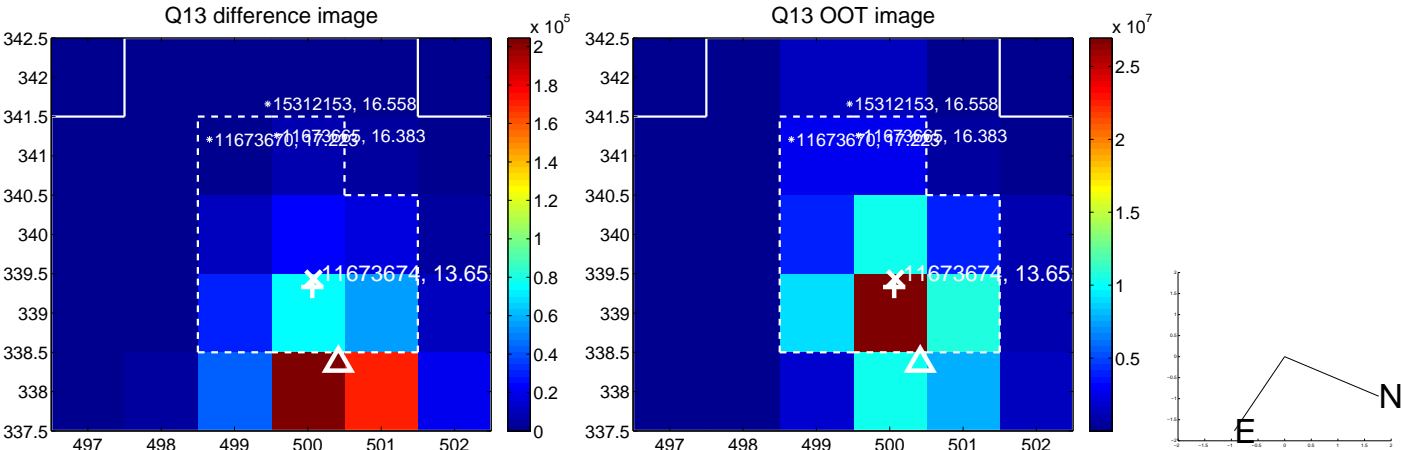
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



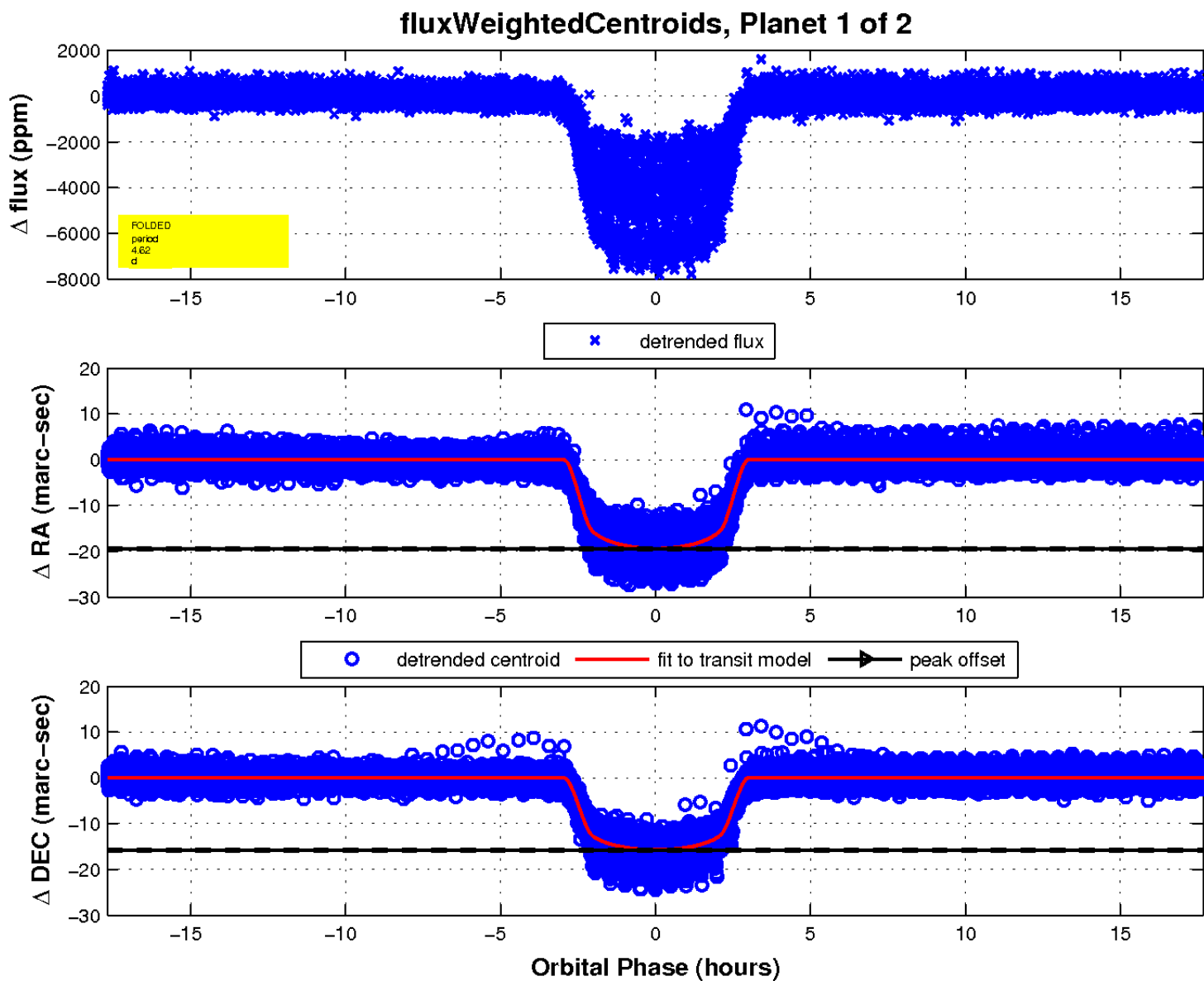
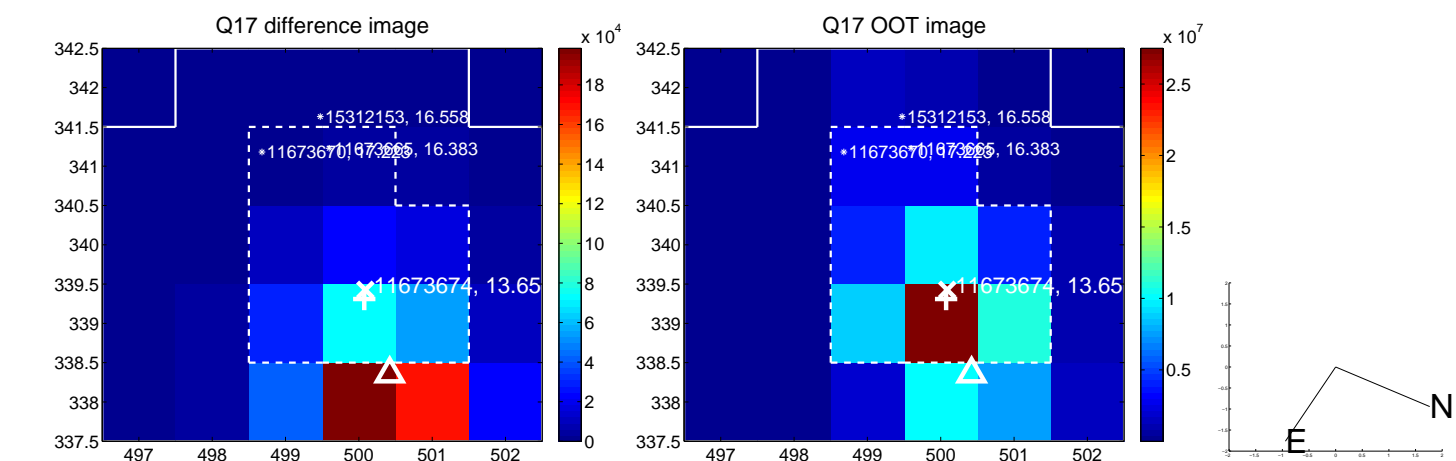
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

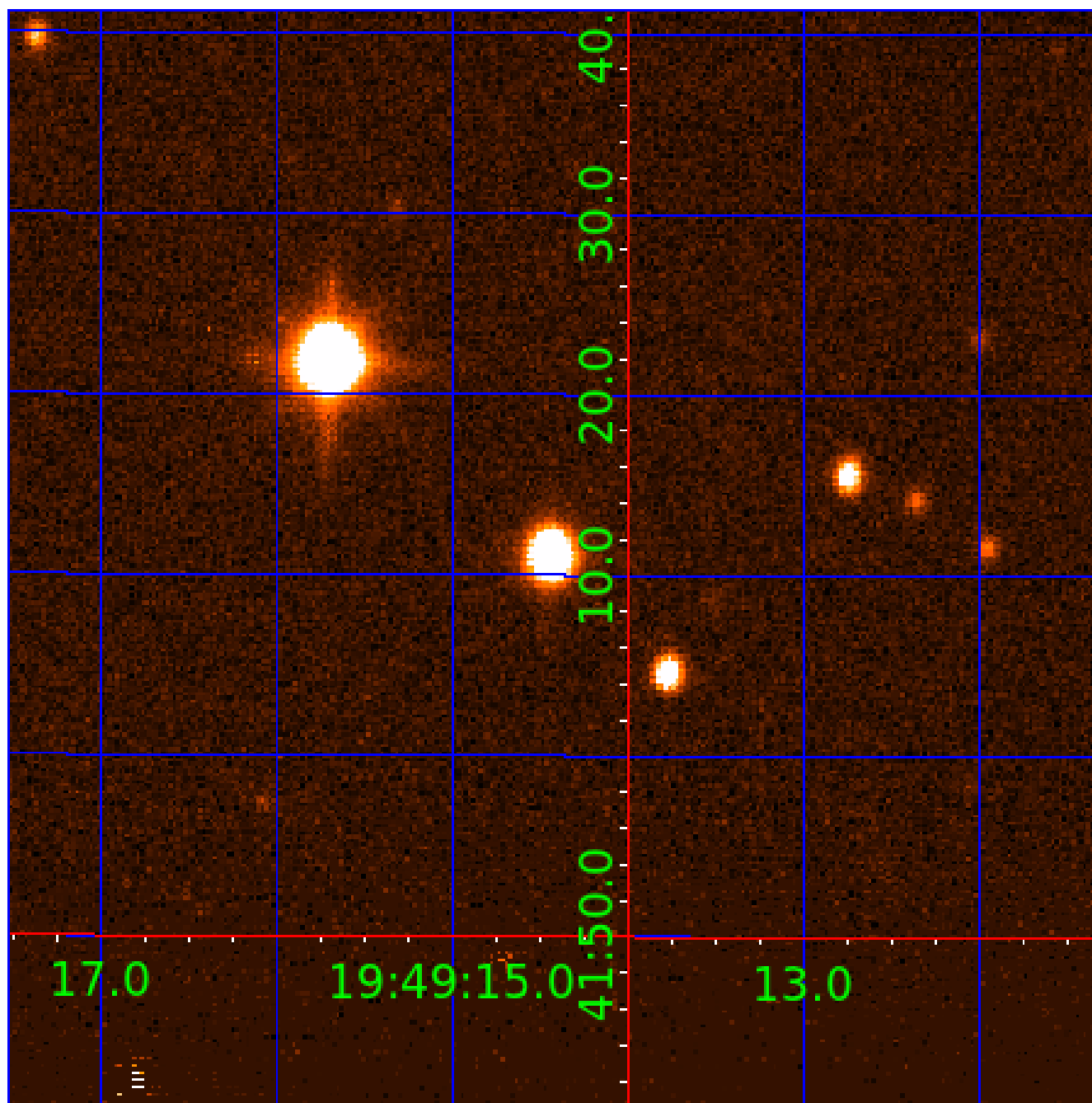


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 011673674

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011673674-01	OBS	0133.01	4.618772	133.386032	4247.5	5.895	746.5	506.3	1.03	6013	7.36	443.23
011673674-02	OBS	No	2.309362	133.392216	95.1	5.395	15.3	16.8	1.03	6013	1.18	1116.87

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011673674-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—SEASONAL_DEPTH_DV—SEASONAL_DEPTH_ALT—CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
011673674-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH

**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 011673674-02

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
011673674-02	11673674	011673686-pri	11673686	1:2	16.5	4	-1	11.69	13.66	351.58	Direct-PRF	0	1.33	0.35

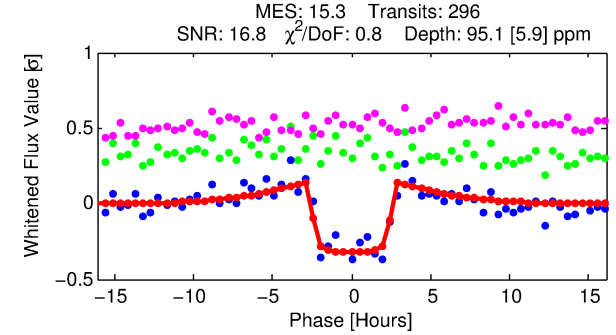
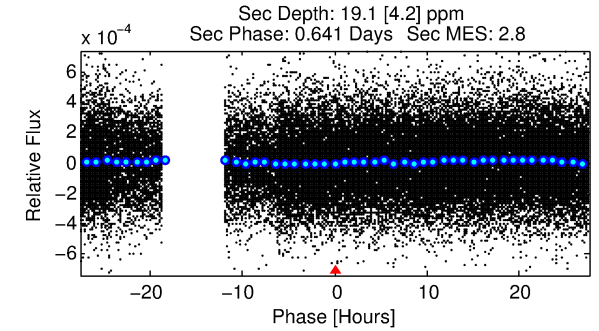
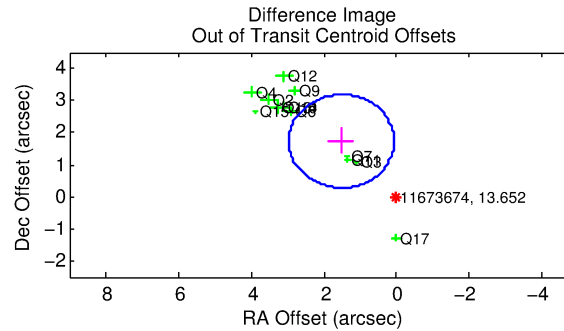
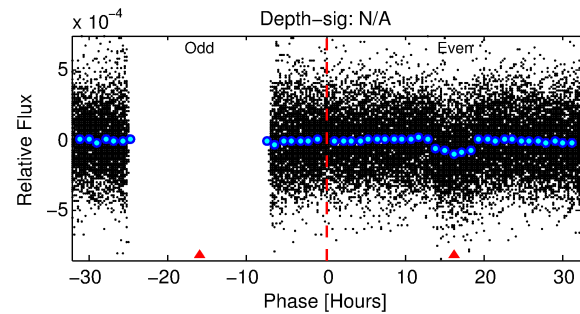
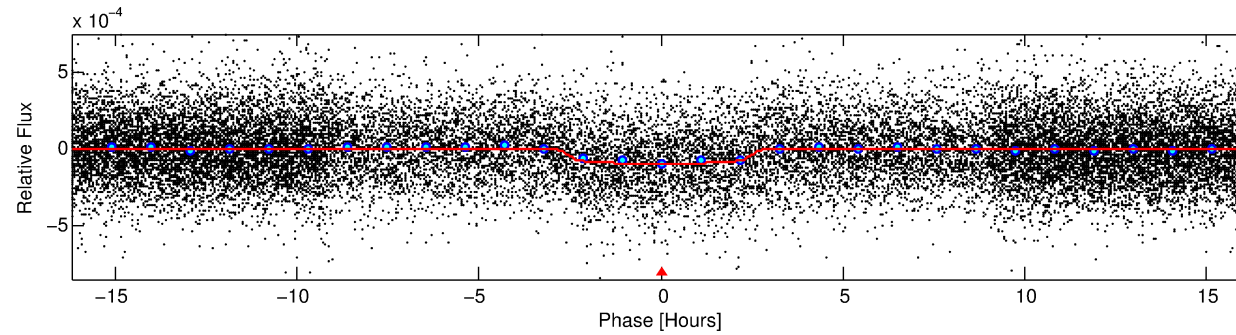
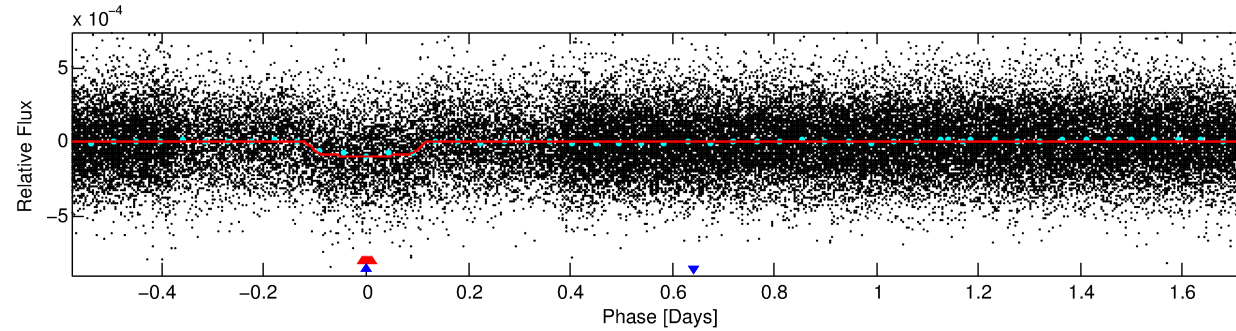
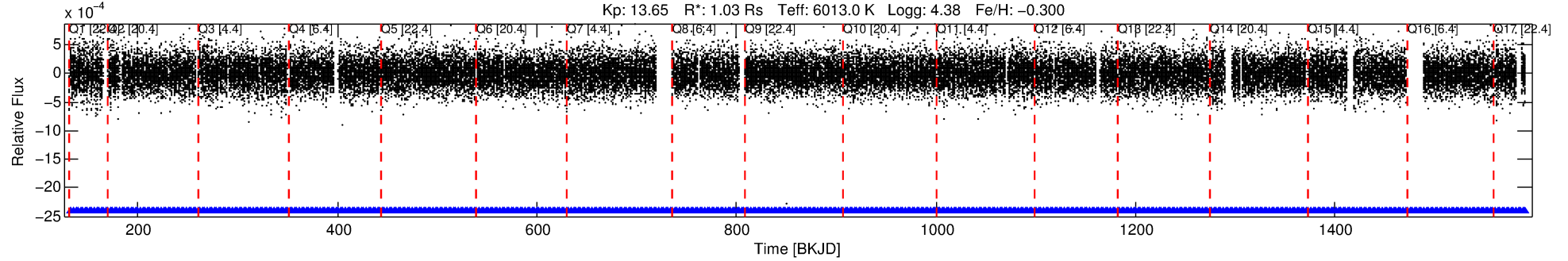
**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

KIC: 11673674 Candidate: 2 of 2 Period: 2.309 d

KOI: K00133 Corr: No Ephemeris Match

Kp: 13.65 R\*: 1.03 Rs Teff: 6013.0 K Logg: 4.38 Fe/H: -0.300



## DV Fit Results:

Period = 2.30936 [0.00001] d  
Epoch = 133.3922 [0.0029] BKJD  
Rp/R\* = 0.0105 [0.0018]  
a/R\* = 1.78 [1.12]  
b = 0.90 [0.20]  
Seff = 1116.87 [416.17]  
Teq = 1474 [137] K  
Rp = 1.18 [0.40] Re  
a = 0.0335 [0.0081] AU  
Ag = 8.41 [4.57] [1.62σ]  
Teffp = 3881 [418] K [5.47σ]

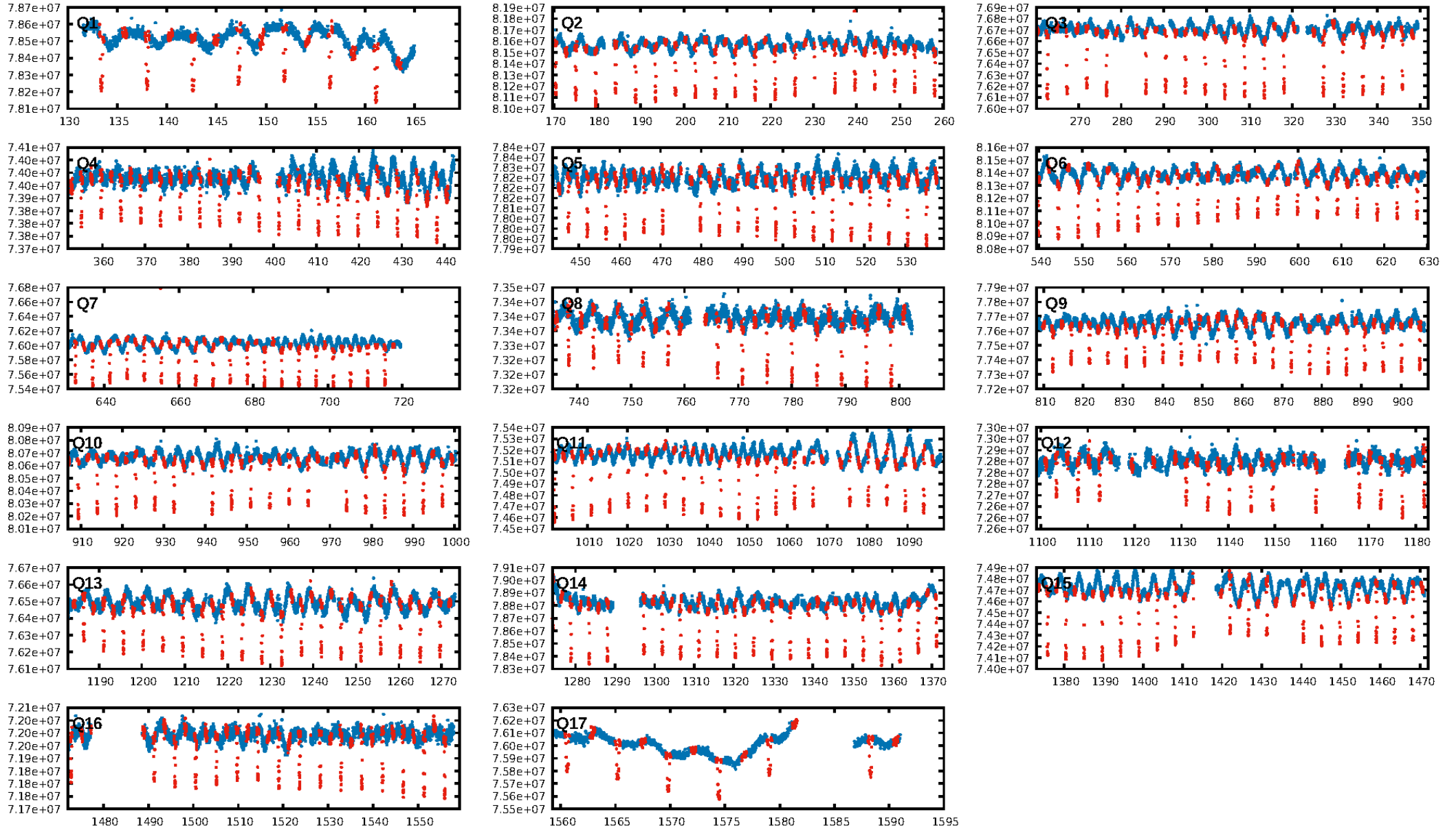
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [6.94σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.20e-48  
RollingBand-fgt: 1.00 [283/283]  
GhostDiagnostic-chr: -0.2345  
Centroid-sig: 0.0%  
Centroid-so: 8.756 arcsec [12.57σ]  
OotOffset-rm: 2.302 arcsec [4.76σ]  
KicOffset-rm: 5.184 arcsec [14.24σ]  
OotOffset-st: 4/4/3/2 [13]  
KicOffset-st: 4/4/3/2 [13]  
DiffImageQuality-fgm: 1.00 [13/13]  
DiffImageOverlap-fno: 1.00 [17/17]

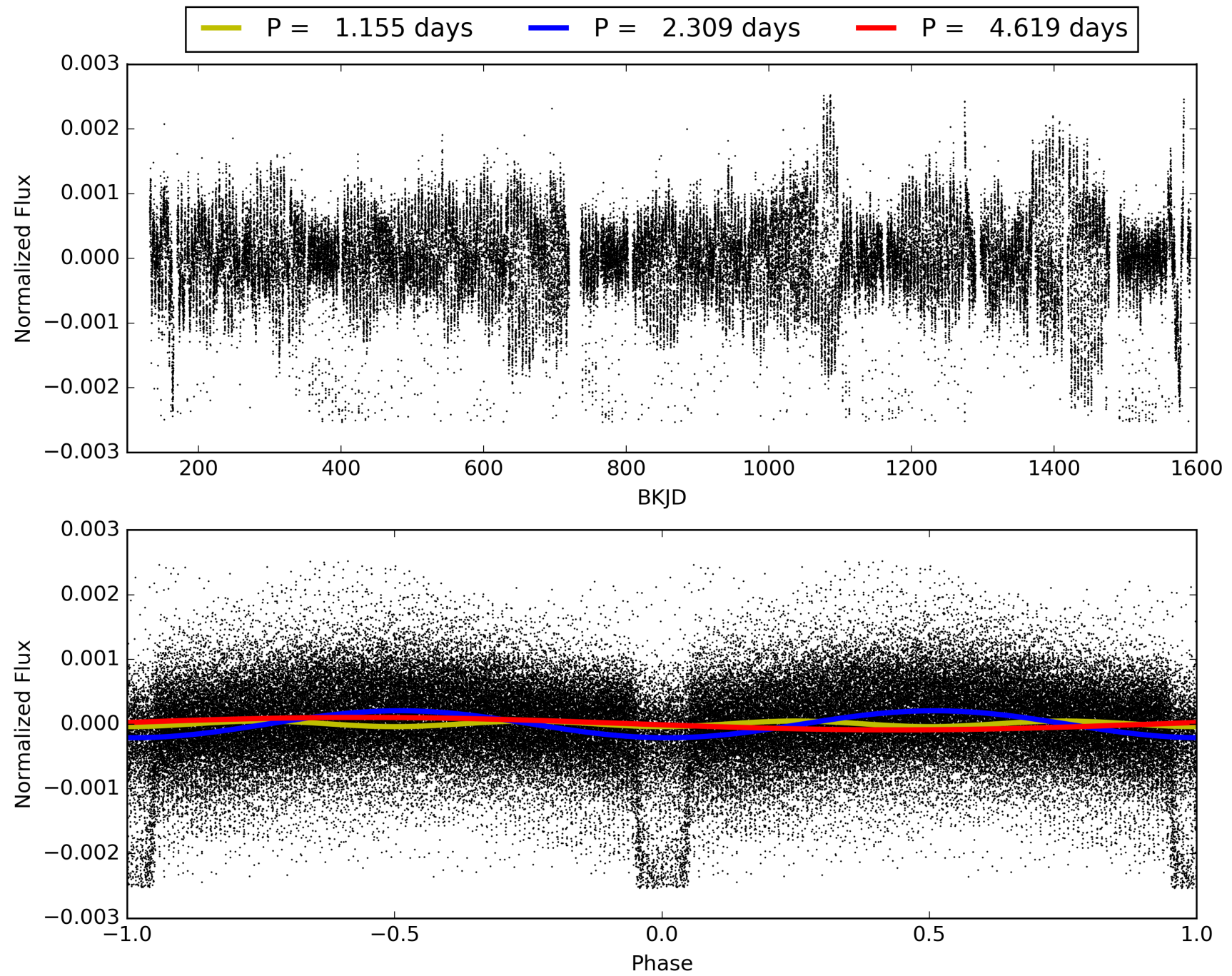
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 14:22:08 Z

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

# TCE 011673674-02, PDC Light Curves



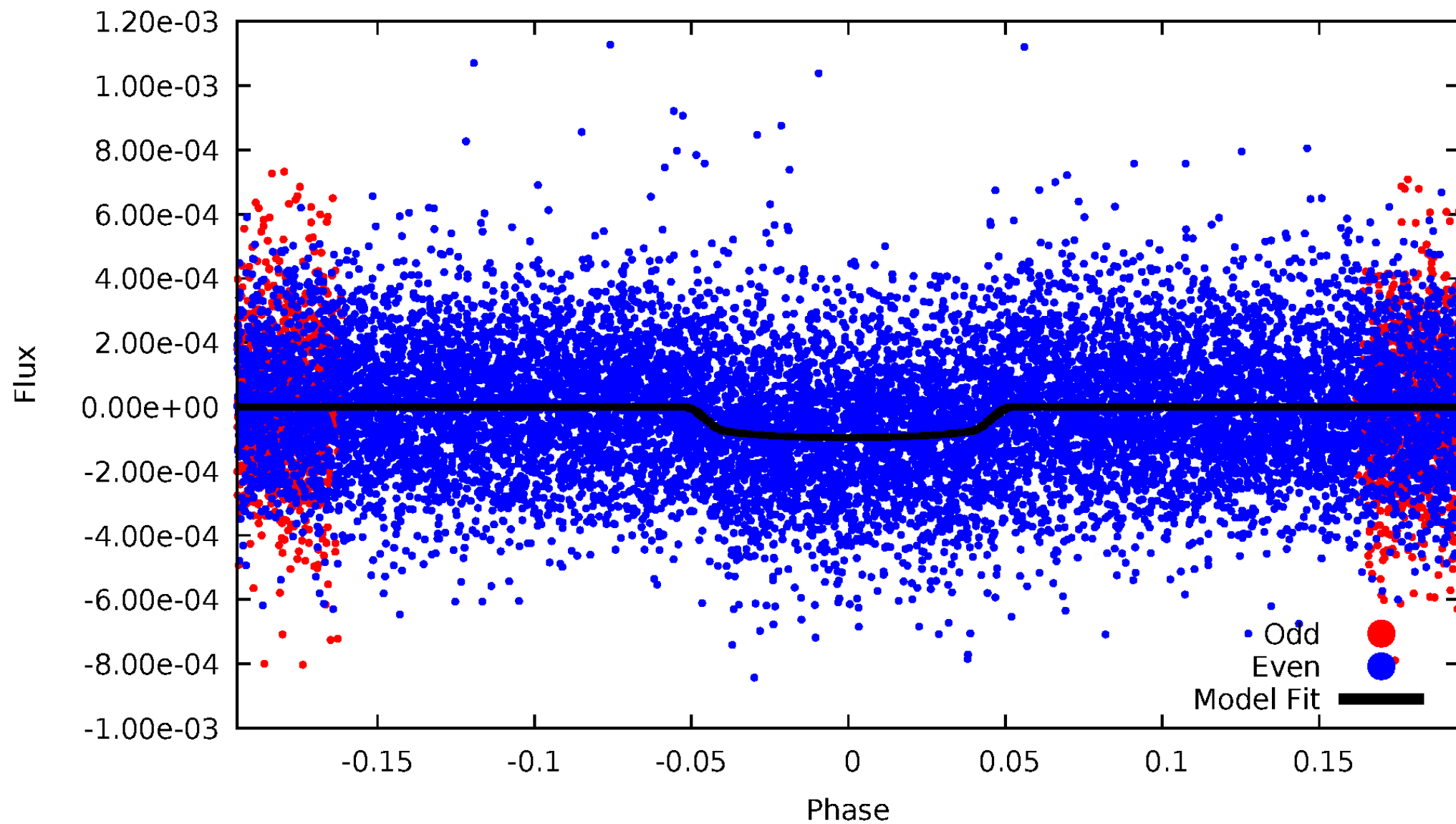
TCE 011673674-02





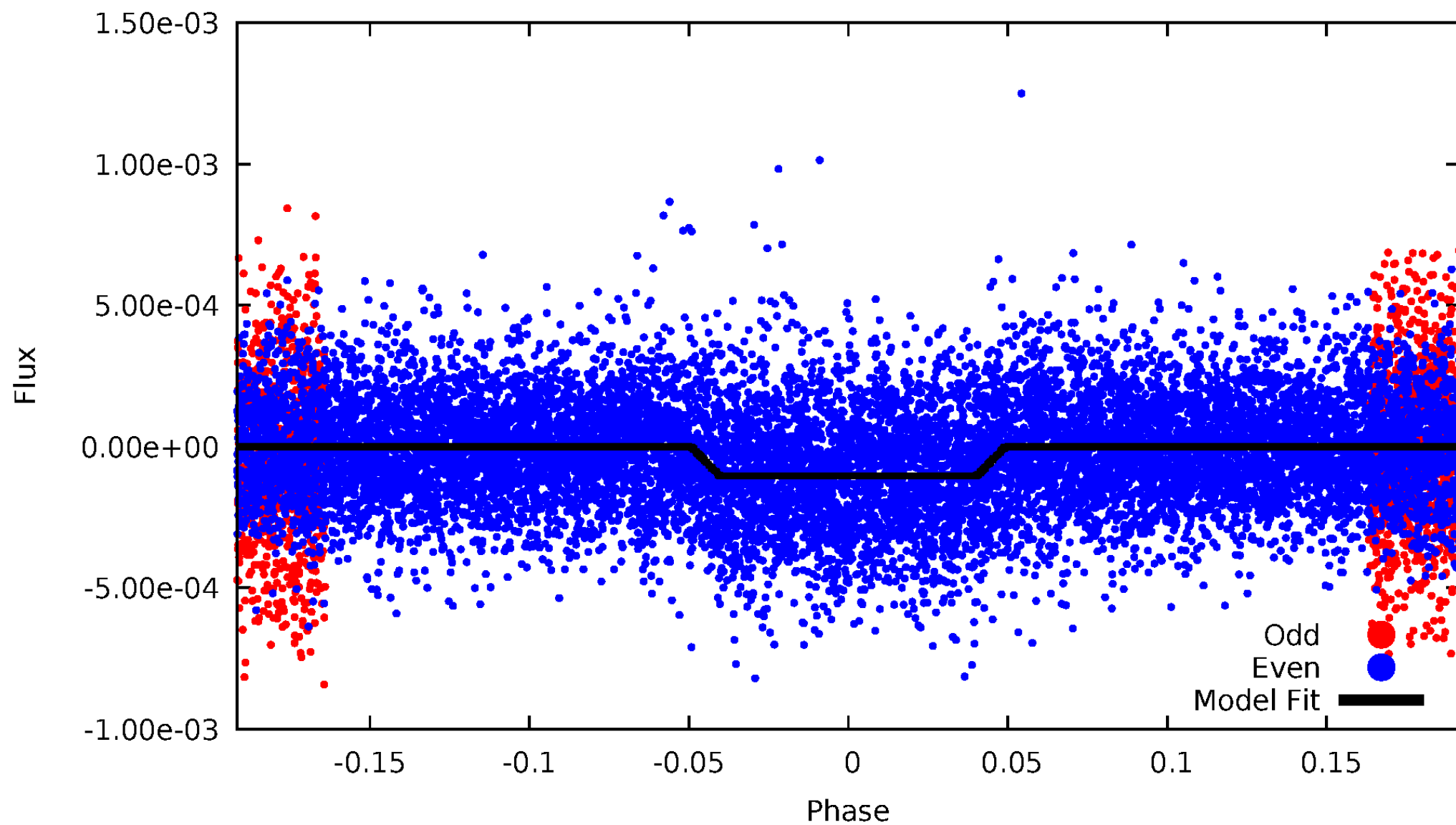
# DV Odd/Even

TCE 011673674-02



# ALT Odd/Even

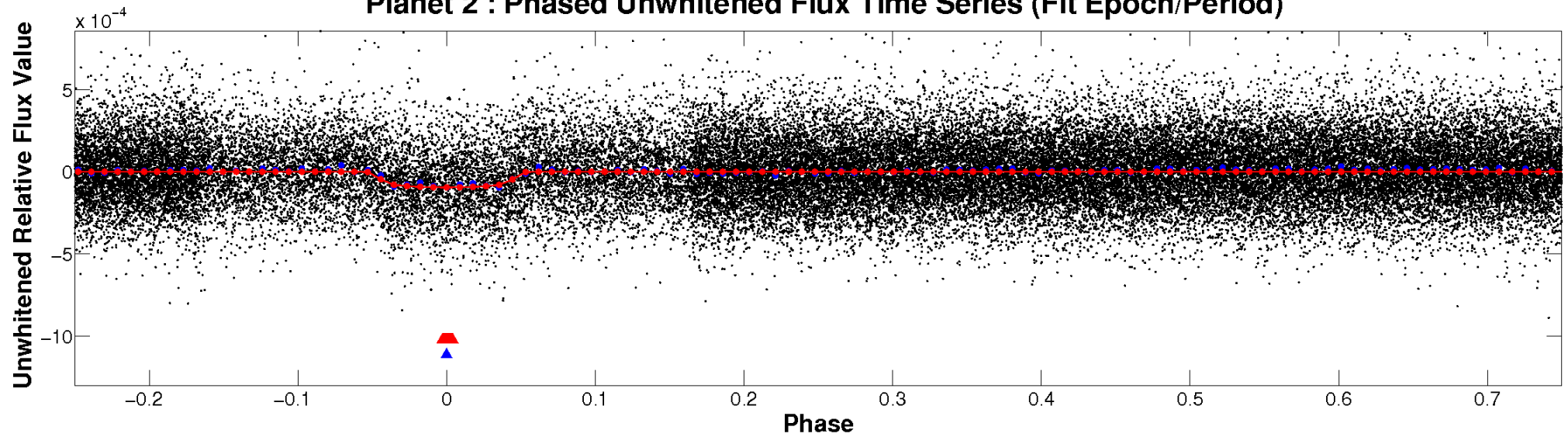
TCE 011673674-02



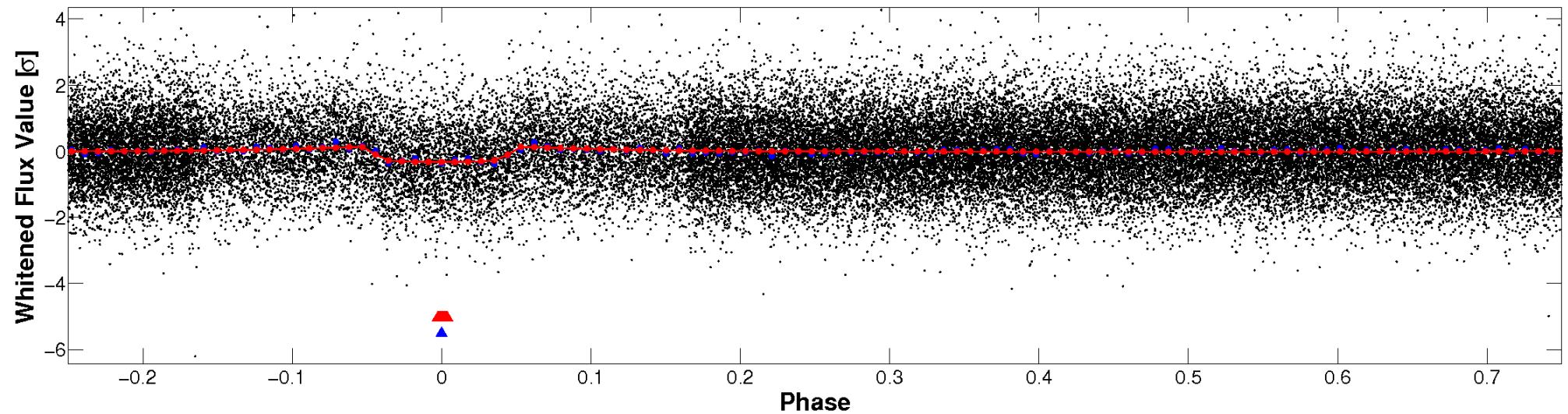


# Non-Whitened Vs. Whitened Light Curve

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

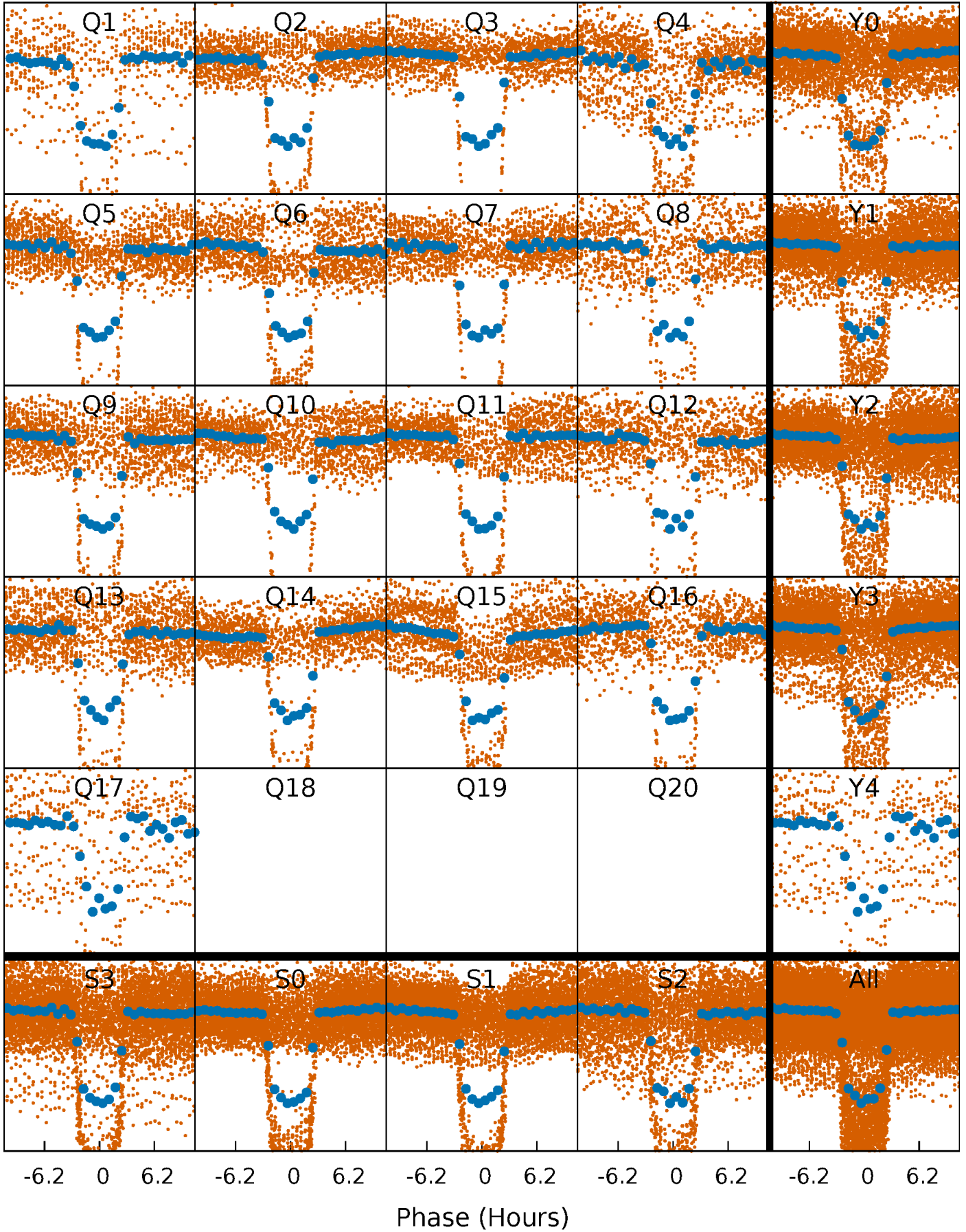


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



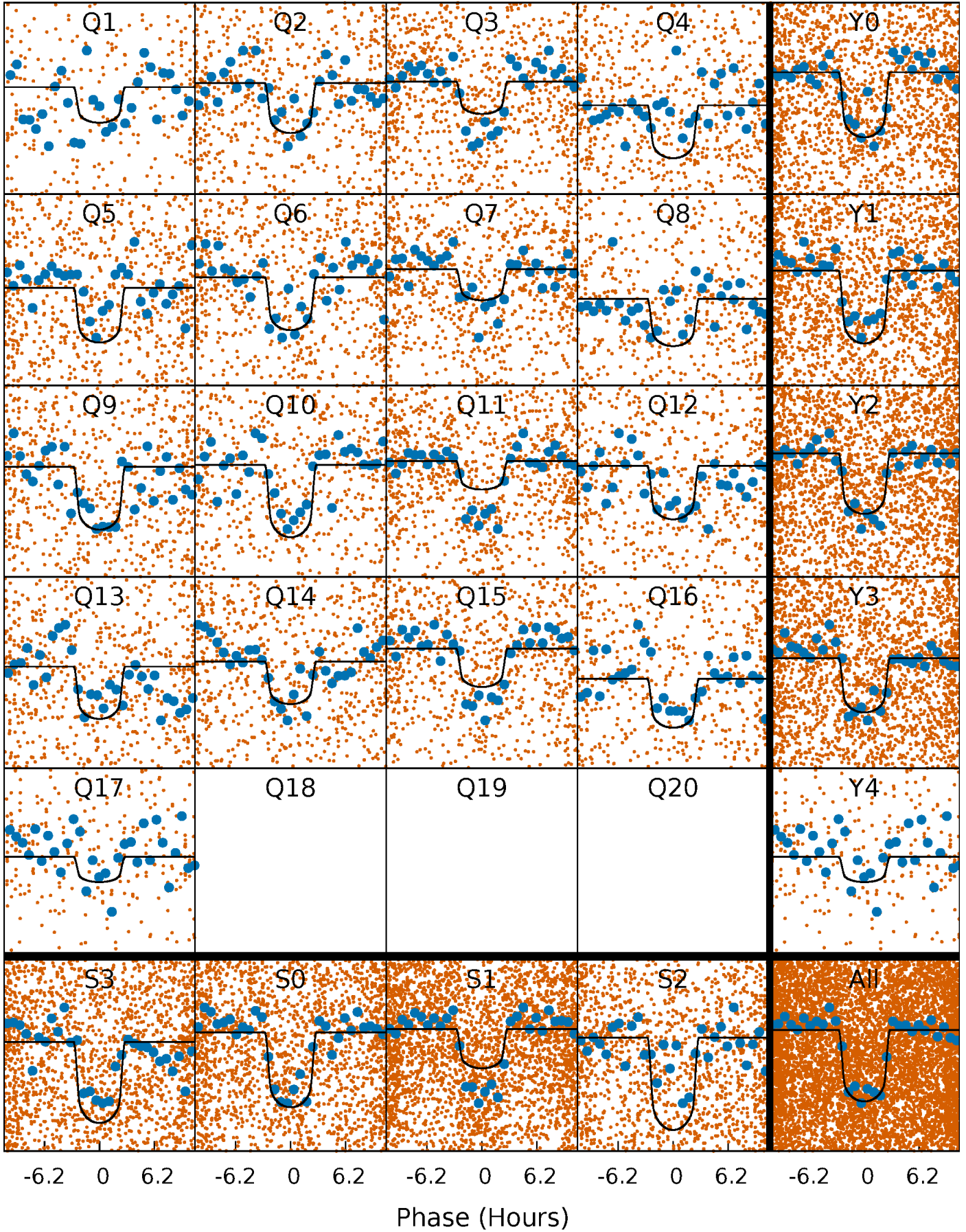
# PDC Quarter-Phased Transit Curves

TCE 011673674-02 P= 2.309362 Days  $T_0=133.392215$  (BKJD)



# DV Quarter-Phased Transit Curves

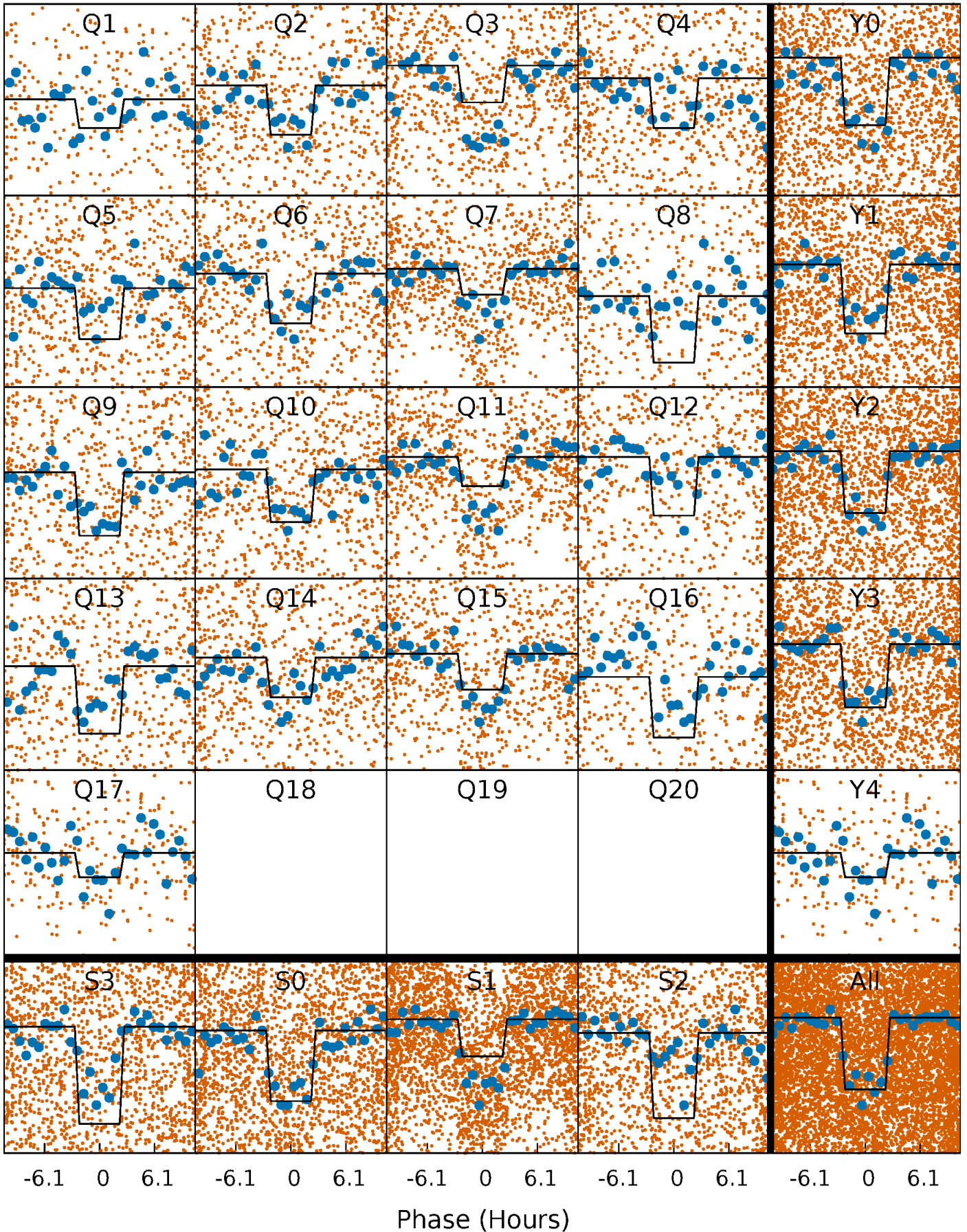
TCE 011673674-02 P= 2.309362 Days  $T_0=133.392215$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

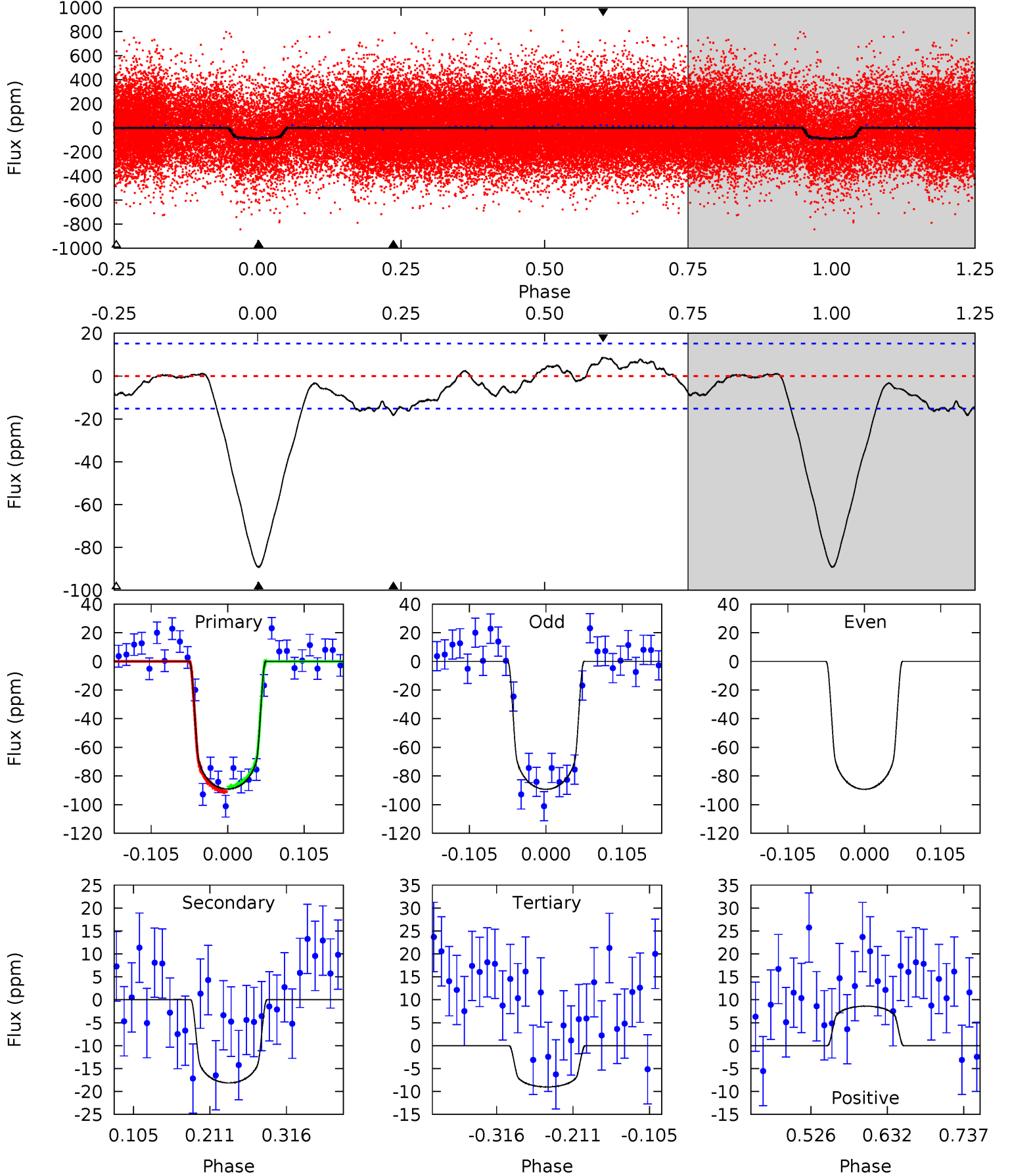
TCE 011673674-02 P= 2.309379 Days  $T_0=133.389143$  (BKJD)



# DV Model-Shift Uniqueness Test

011673674-02, P = 2.309362 Days, E = 131.082853 Days

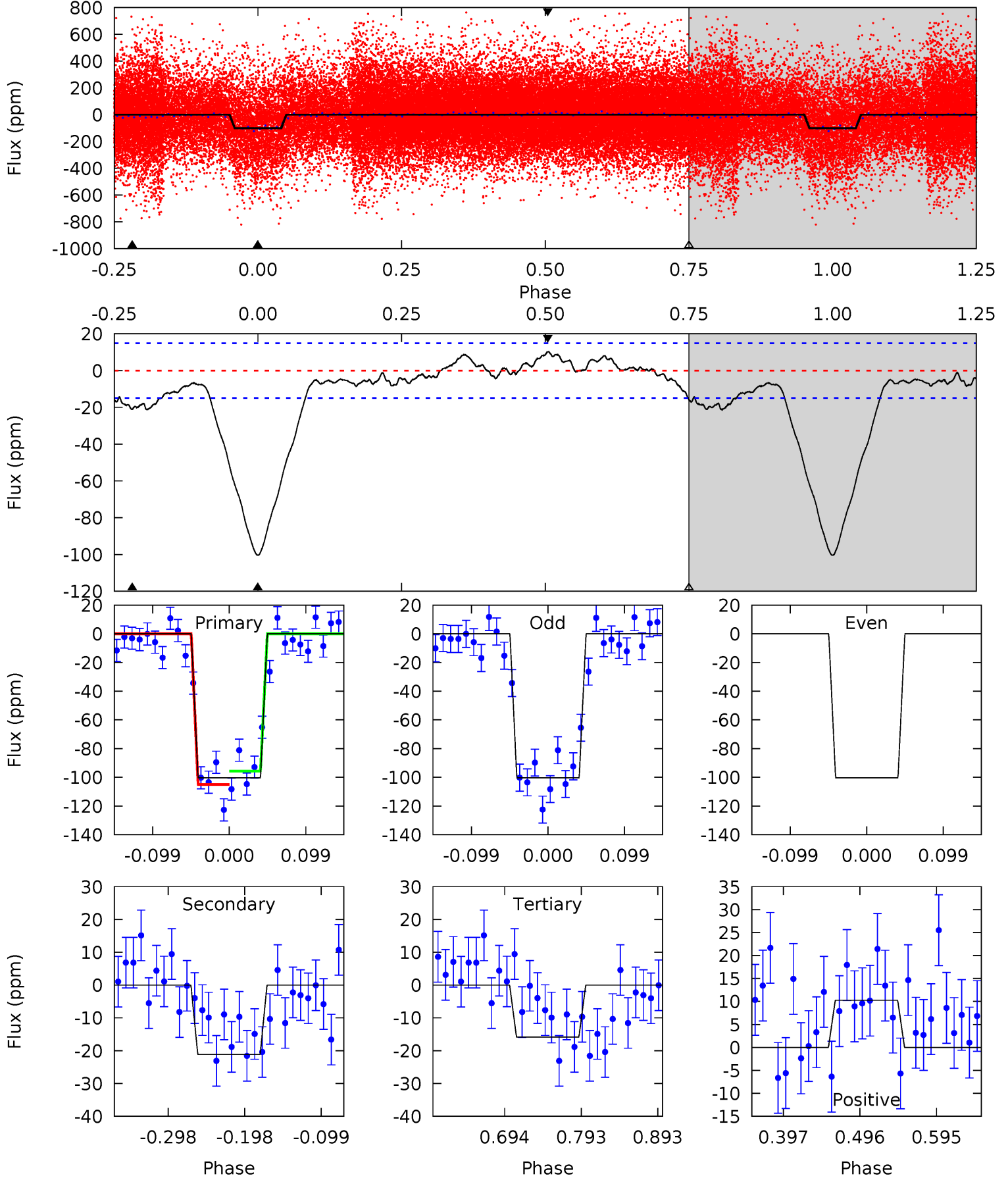
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
26.8	5.45	2.71	2.58	4.55	1.62	1.48	24.0	24.2	2.74	2.86	0	1.14	0.09	0.48



# Alt Model-Shift Uniqueness Test

011673674-02, P = 2.309379 Days, E = 131.079764 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
30.8	6.49	4.87	3.15	4.57	1.65	1.59	25.9	27.7	1.62	3.34	0	1.02	0.09	1.38





### Stellar Parameters For KIC 011673674

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6013^{+163}_{-181}$	$4.381^{+0.128}_{-0.192}$	$-0.300^{+0.300}_{-0.300}$	$1.033^{+0.300}_{-0.161}$	$0.938^{+0.132}_{-0.108}$	$1.197^{+0.681}_{-0.581}$
	+3%/-3%	+3%/-4%	+100%/-100%	+29%/-16%	+14%/-12%	+57%/-49%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 011673674-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-18 \pm 3$	$1.20^{+0.29}_{-0.22}$	$2075^{+153}_{-122}$	$4081^{+342}_{-306}$	$7.662^{+4.195}_{-2.920}$
Alt.	$-21 \pm 3$	$1.14^{+0.28}_{-0.23}$	$2065^{+155}_{-115}$	$4277^{+375}_{-303}$	$9.832^{+5.725}_{-3.476}$

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

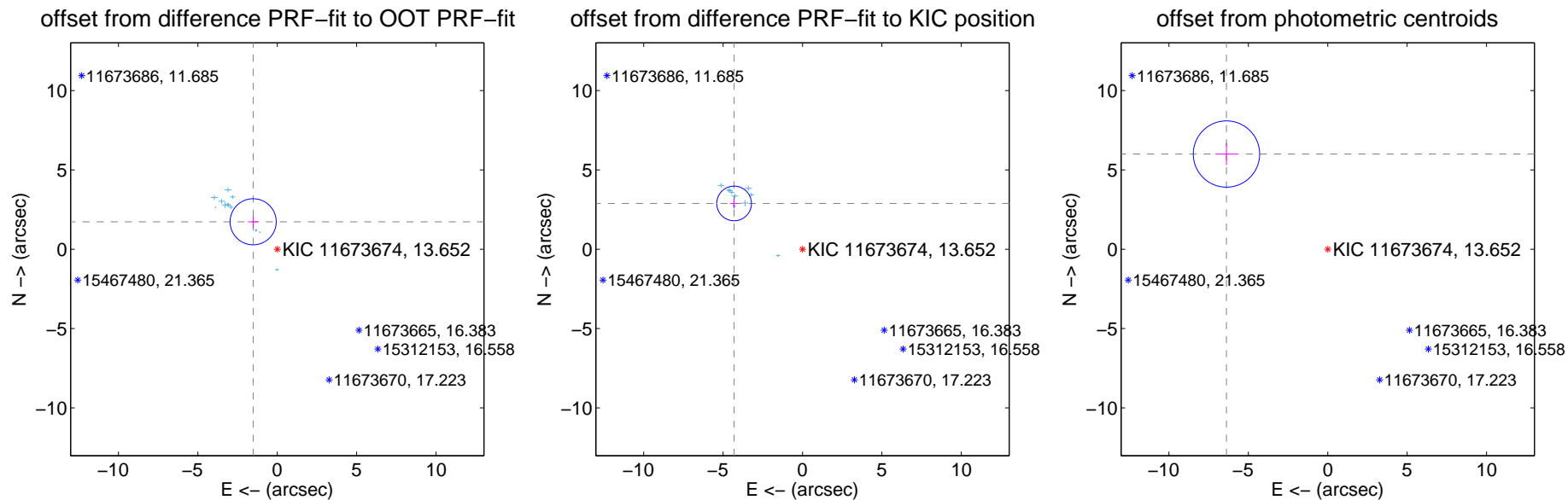
## DV Centroid Data

Supplemental centroid analysis for 011673674-02. Kepler magnitude: 13.65. Transit SNR 16.83

There are 13 quarters with good PRF difference image offsets

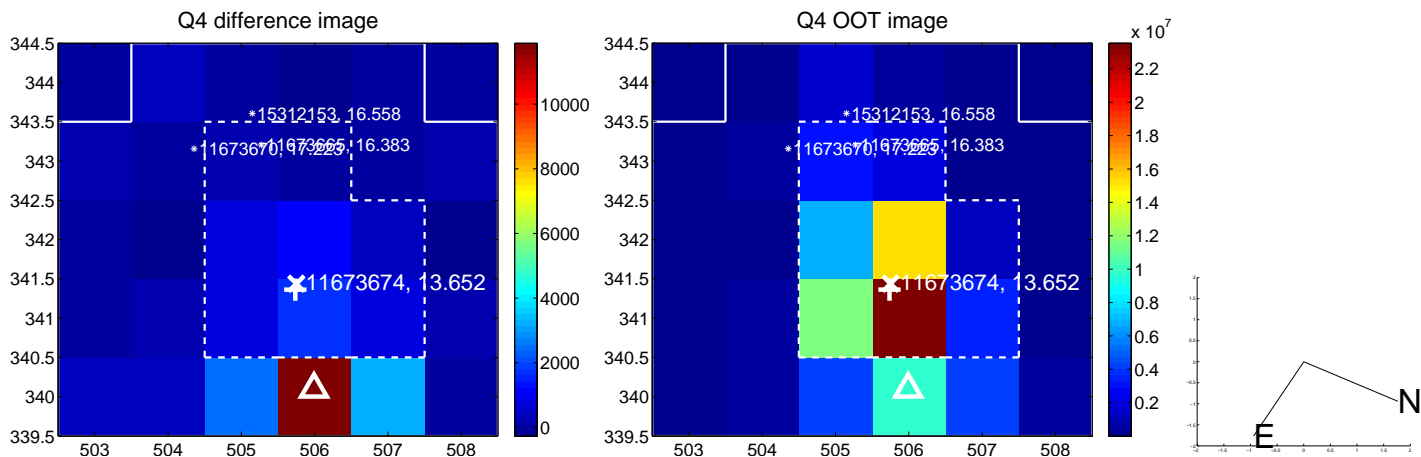
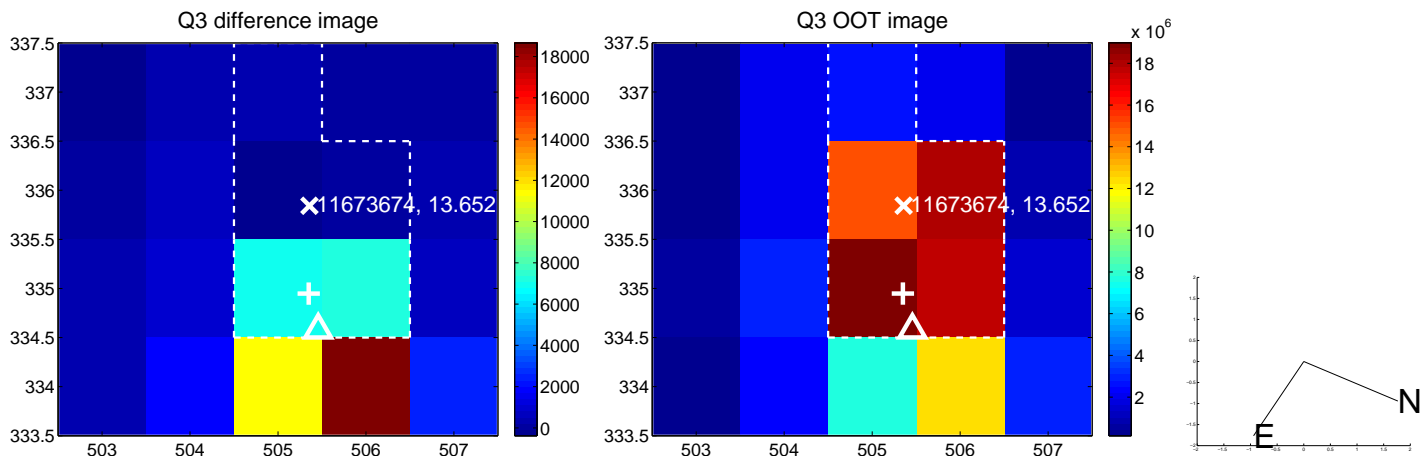
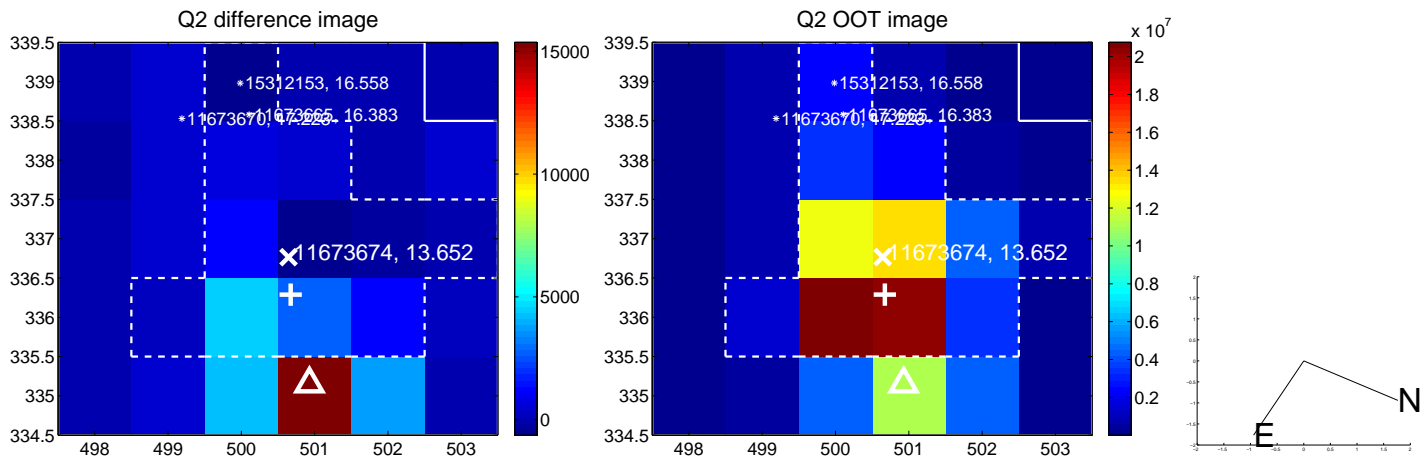
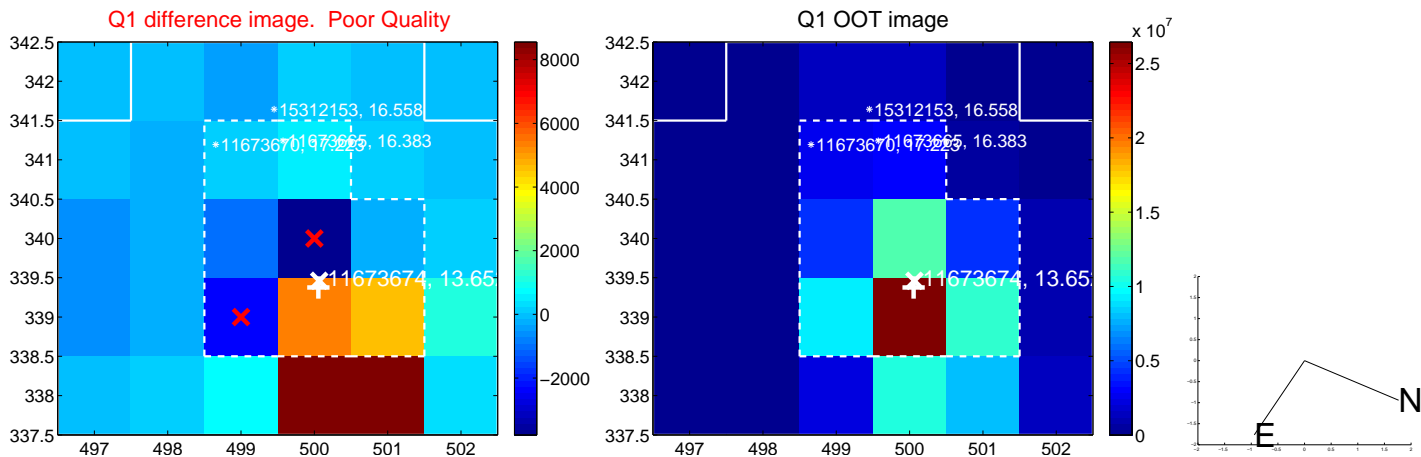
The direct PRF centroid is offset from the target star catalog position by about 1.77 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.302 \pm 0.484$	4.76	$1.518 \pm 0.328$	$1.730 \pm 0.379$
PRF-fit source offset from KIC position	$5.184 \pm 0.364$	14.24	$4.307 \pm 0.254$	$2.886 \pm 0.319$
photometric centroid source offset	$8.76 \pm 0.70$	12.57	$6.38 \pm 0.70$	$6.00 \pm 0.69$

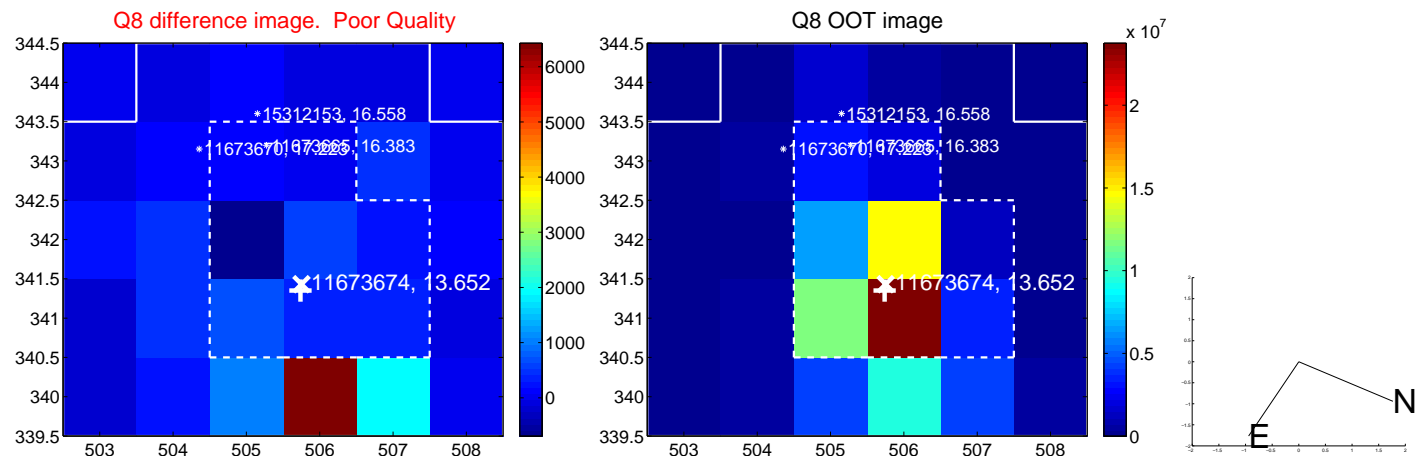
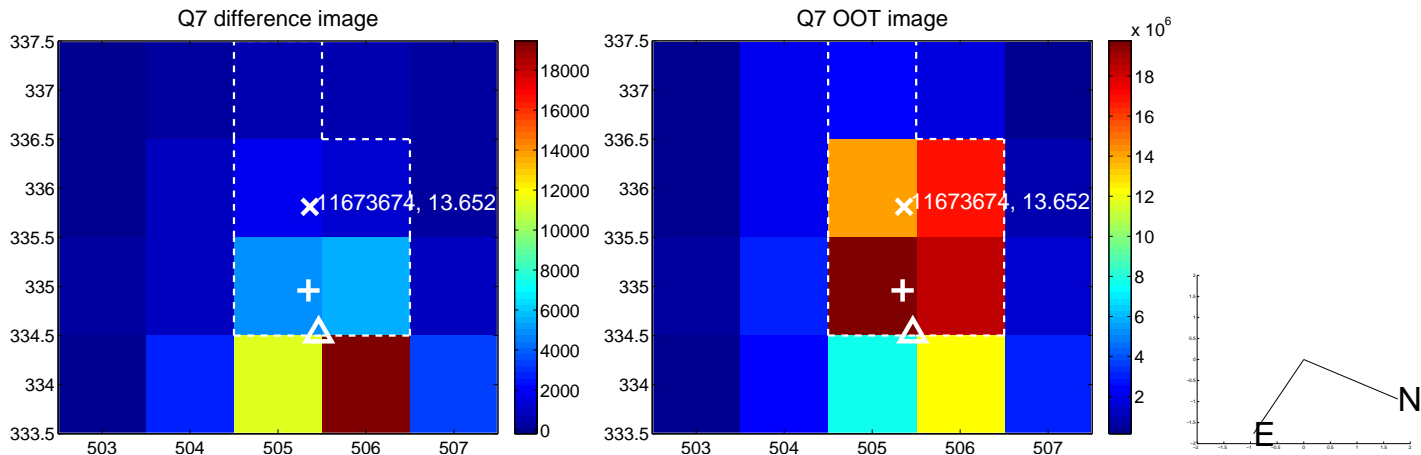
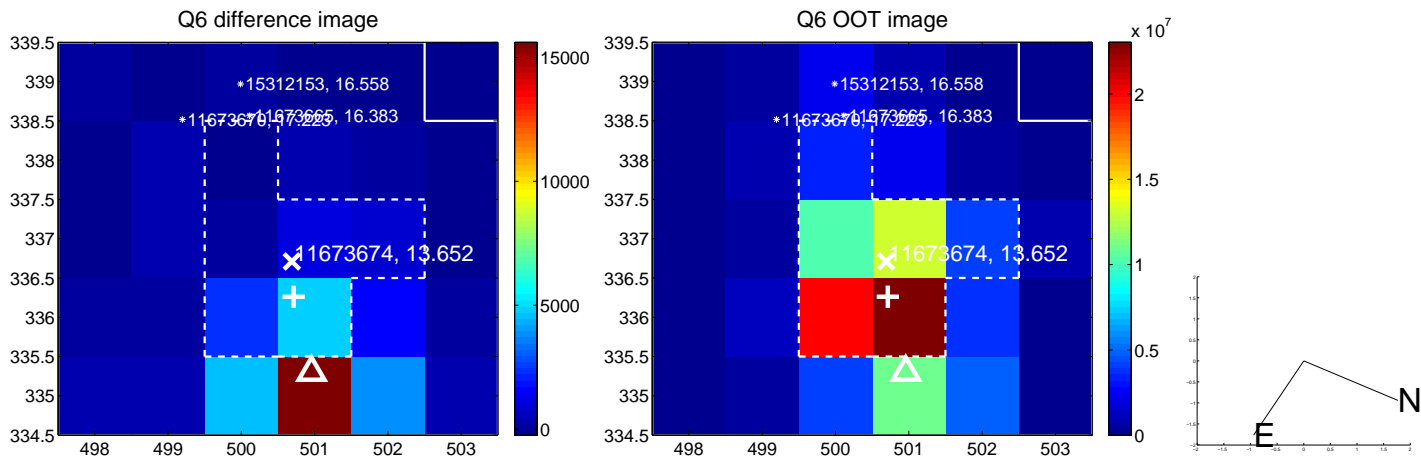
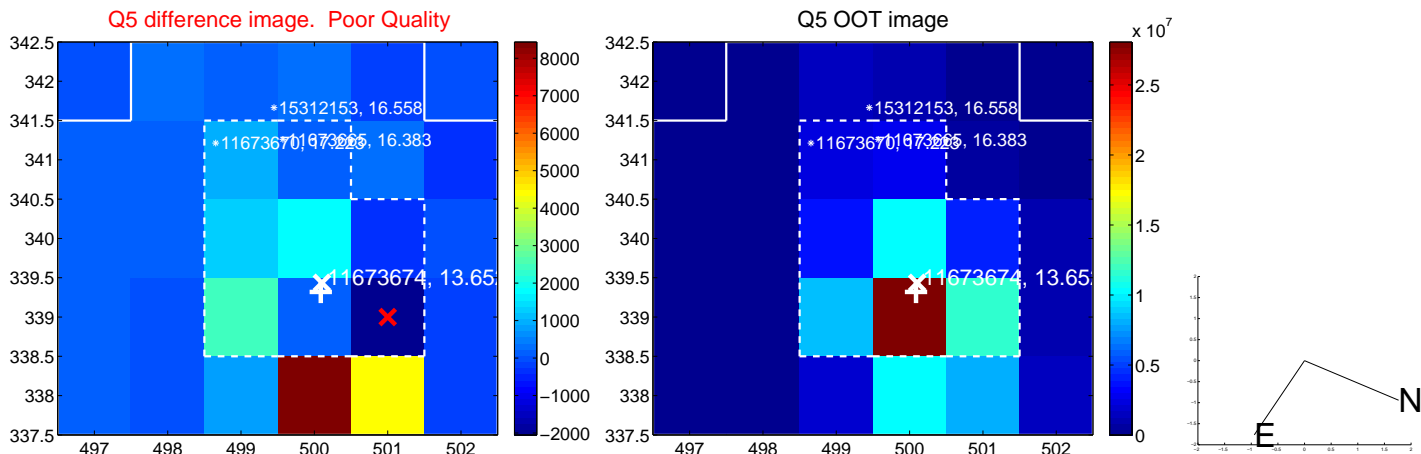


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

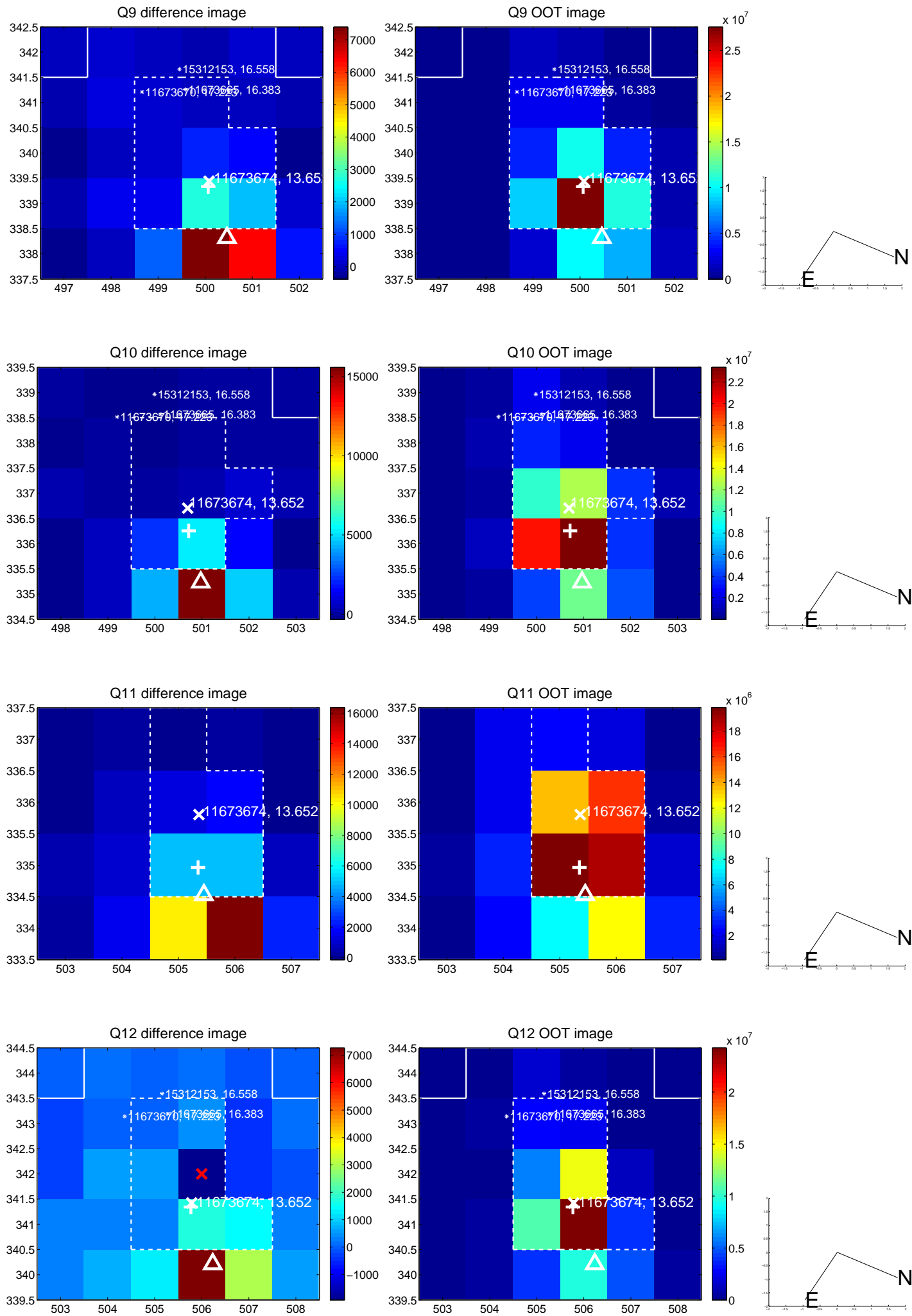
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



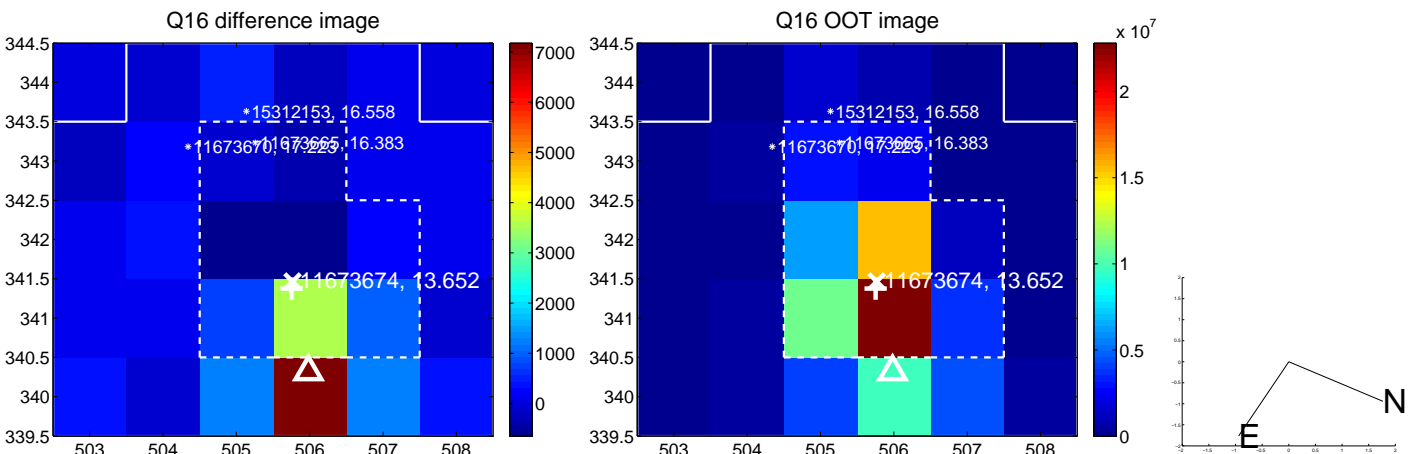
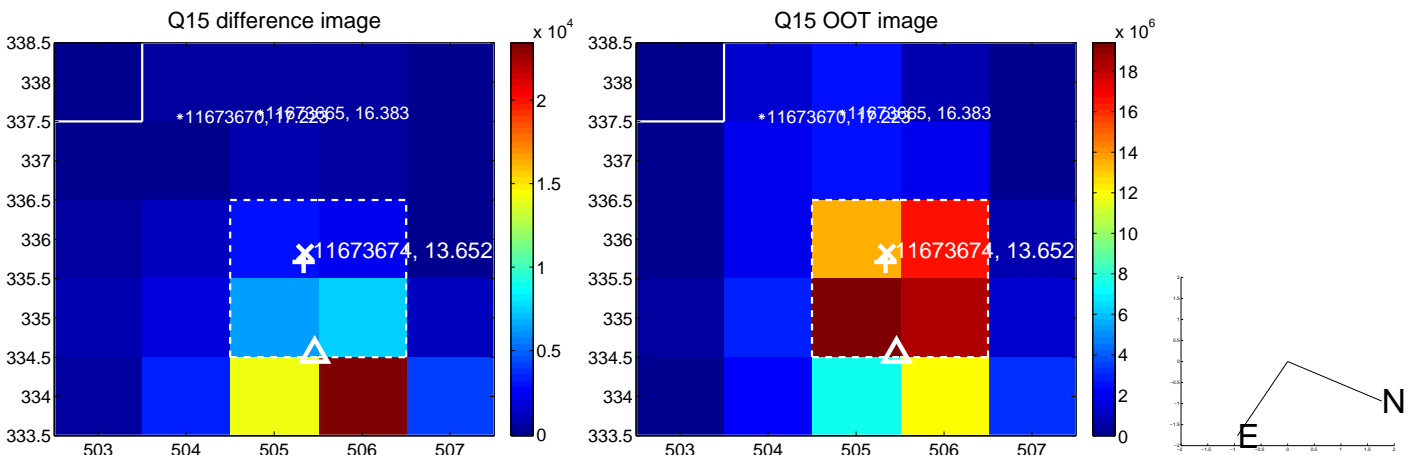
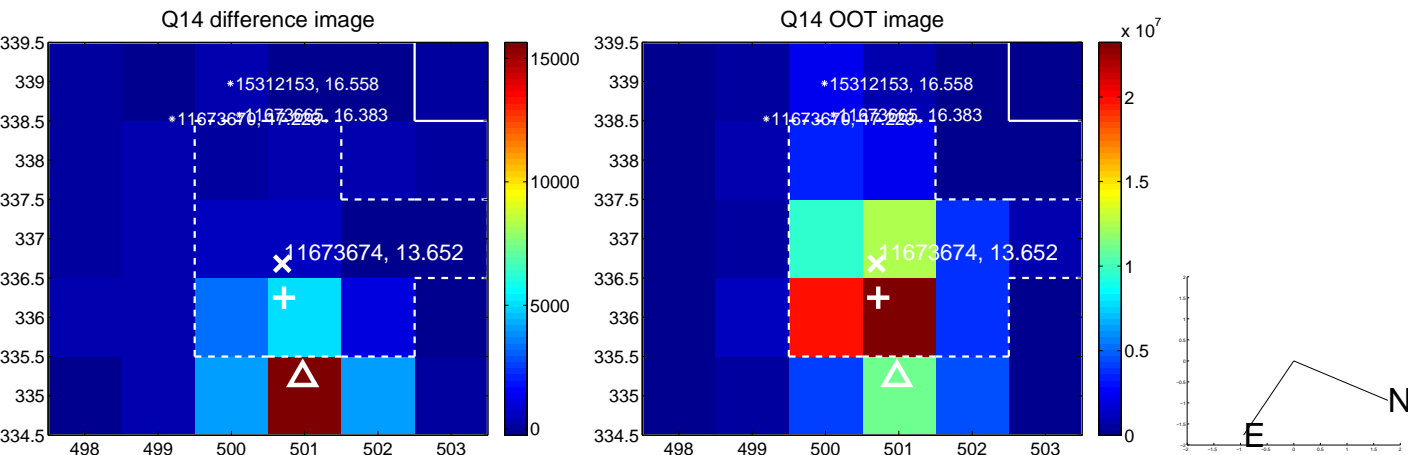
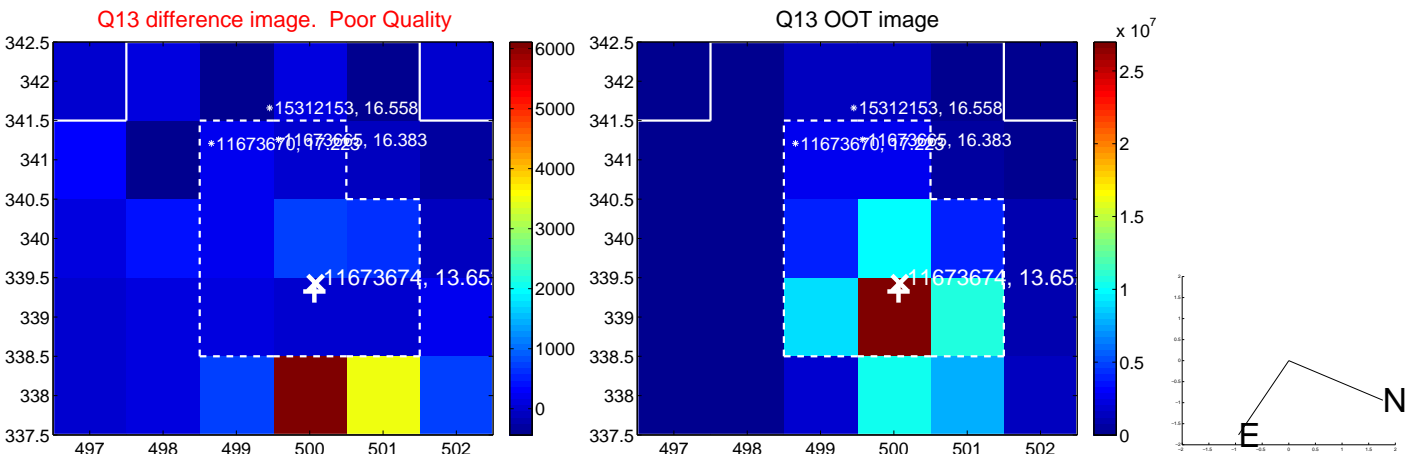
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



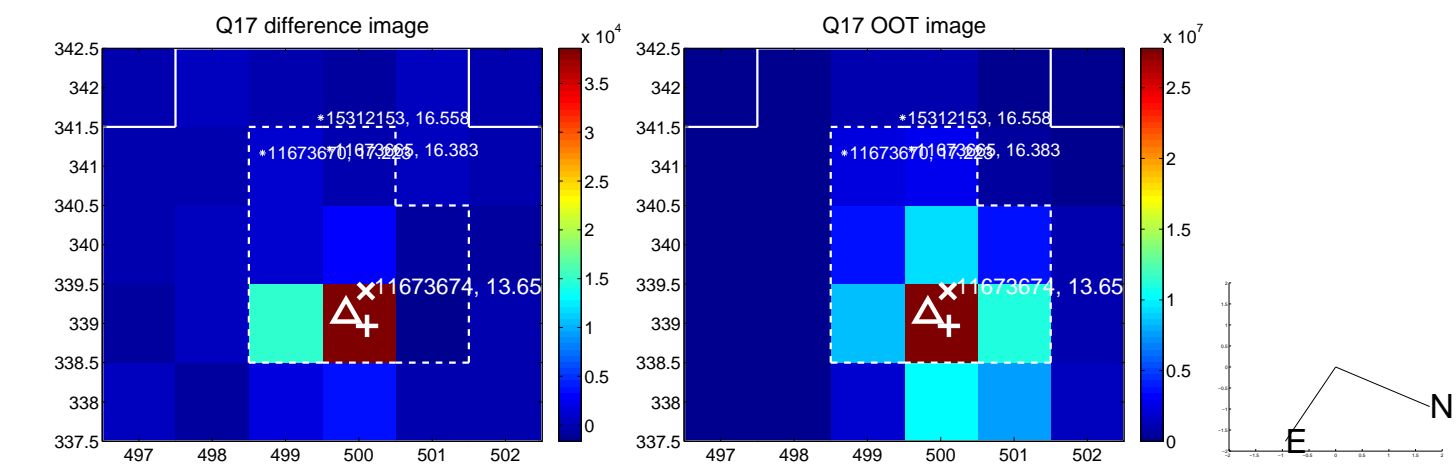
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



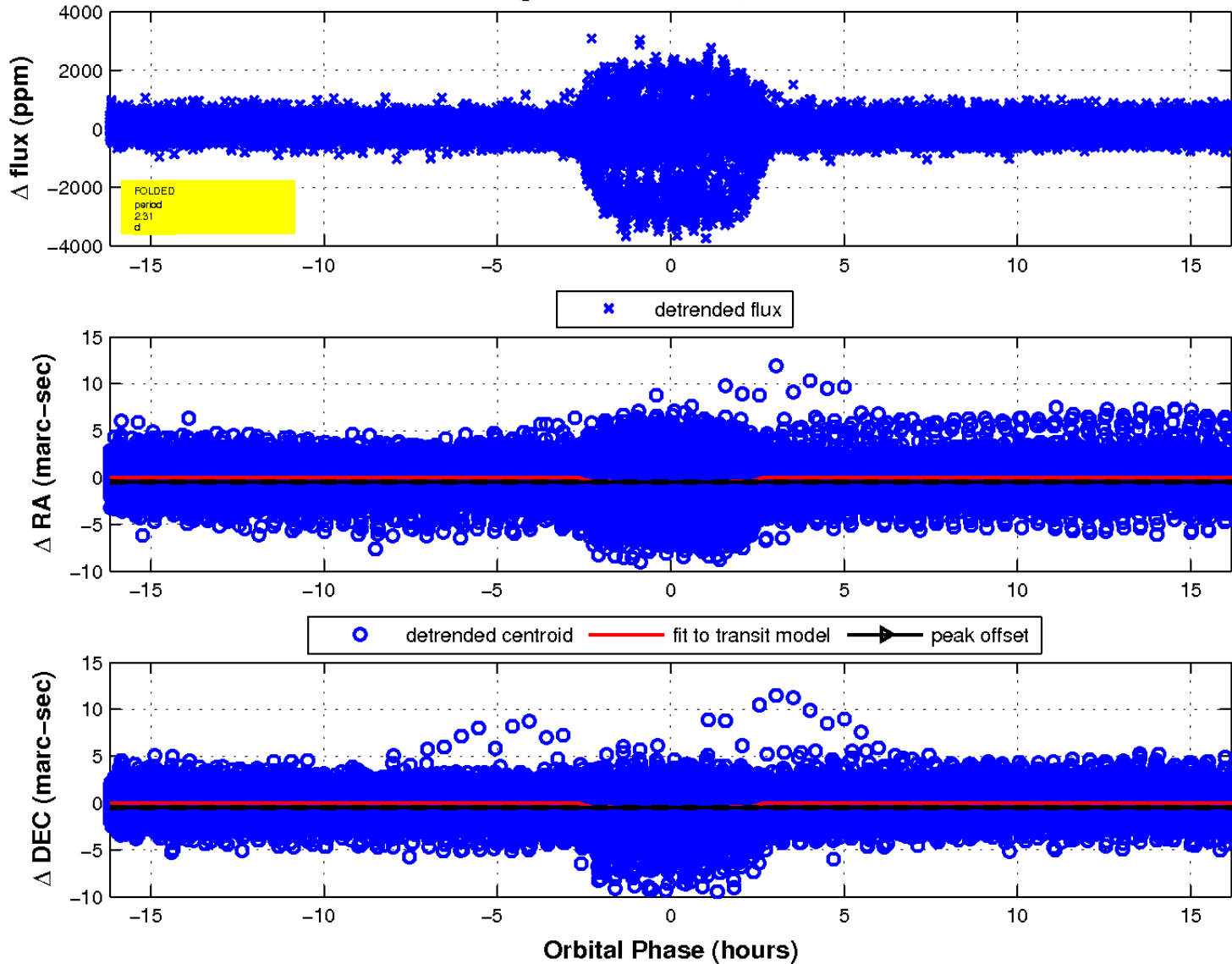
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

