

# KIC 004678171

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004678171-01	OBS	6435.01	7.644357	132.791497	380892.5	3.500	8454.9	-1.0	0.72	4464	39.23	39.98
004678171-02	OBS	No	5.096373	132.790058	985.6	32.410	820.6	31.9	0.72	4464	2.42	68.64

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004678171-01	OBS	FP	0.00	0	1	0	0	DEPTH_ODDEVEN_DV—DEPTH_ODDEVEN_ALT—MOD_ODDEVEN_ALT—CENT_NOFITS
004678171-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_POS_ALT

**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.

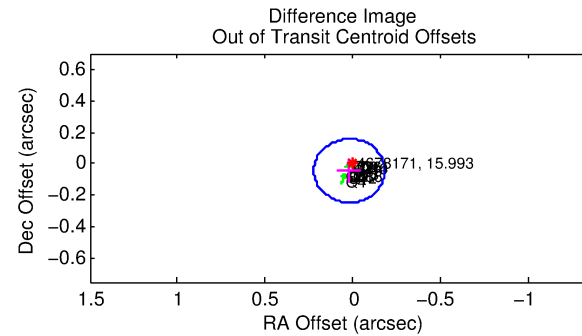
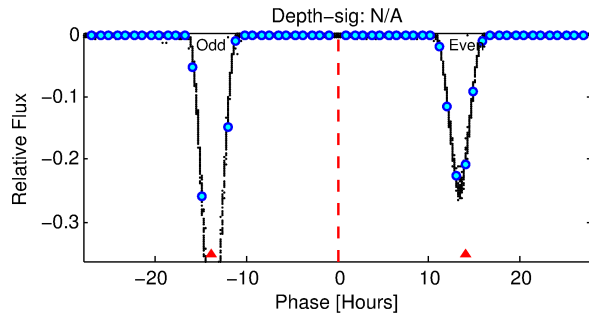
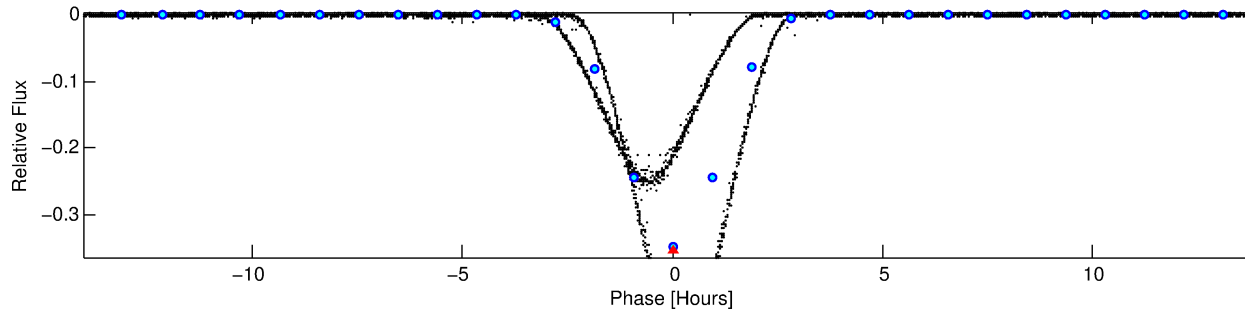
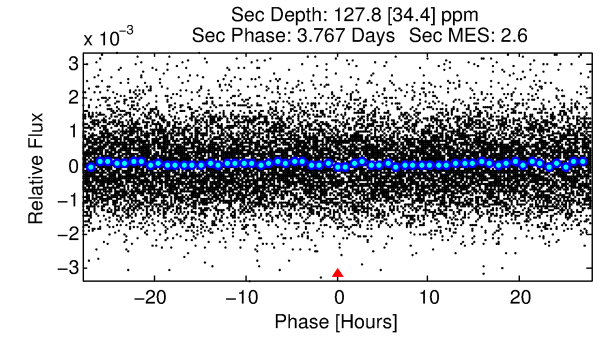
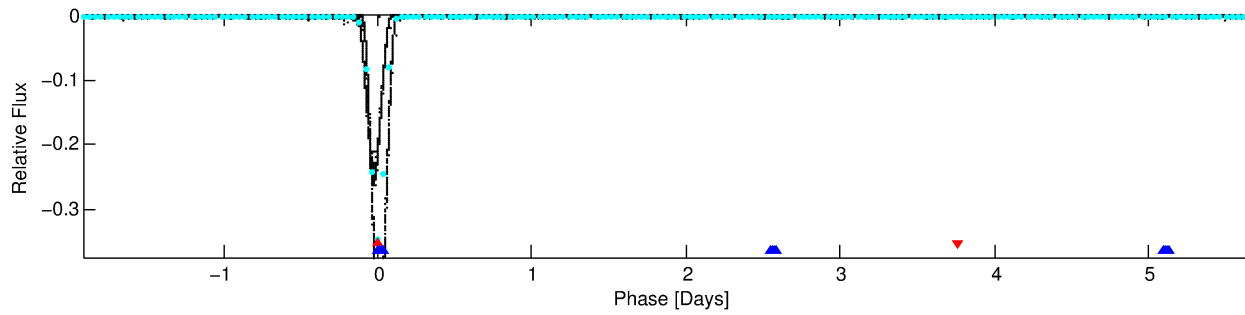
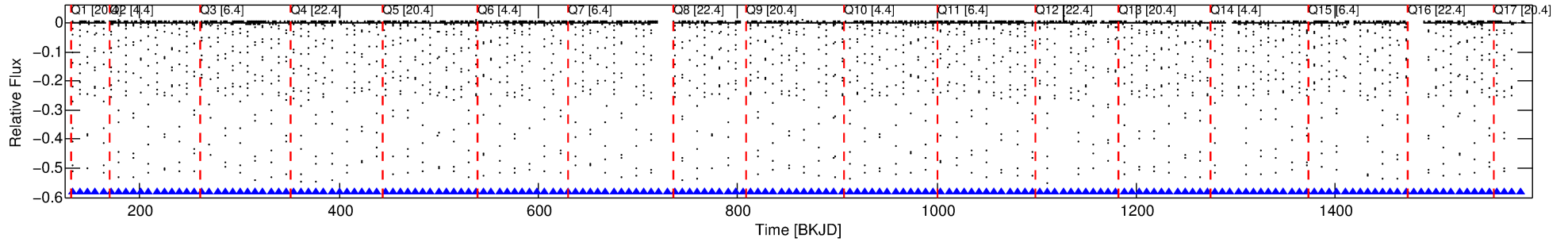
## Ephemeris Match Information For 004678171-01

No Significant Match Found

# DV One-Page Summary

KIC: 4678171 Candidate: 1 of 2 Period: 7.644 d  
KOI: K06435 Corr: No Ephemeris Match

Kp: 15.99 R\*: 0.72 Rs Teff: 4464.0 K Logg: 4.58 Fe/H: 0.200



## TPS TCE Results:

Period = 7.64436 d  
Epoch = 132.7915 BKJD

DV fit results are unavailable

## DV Diagnostic Results:

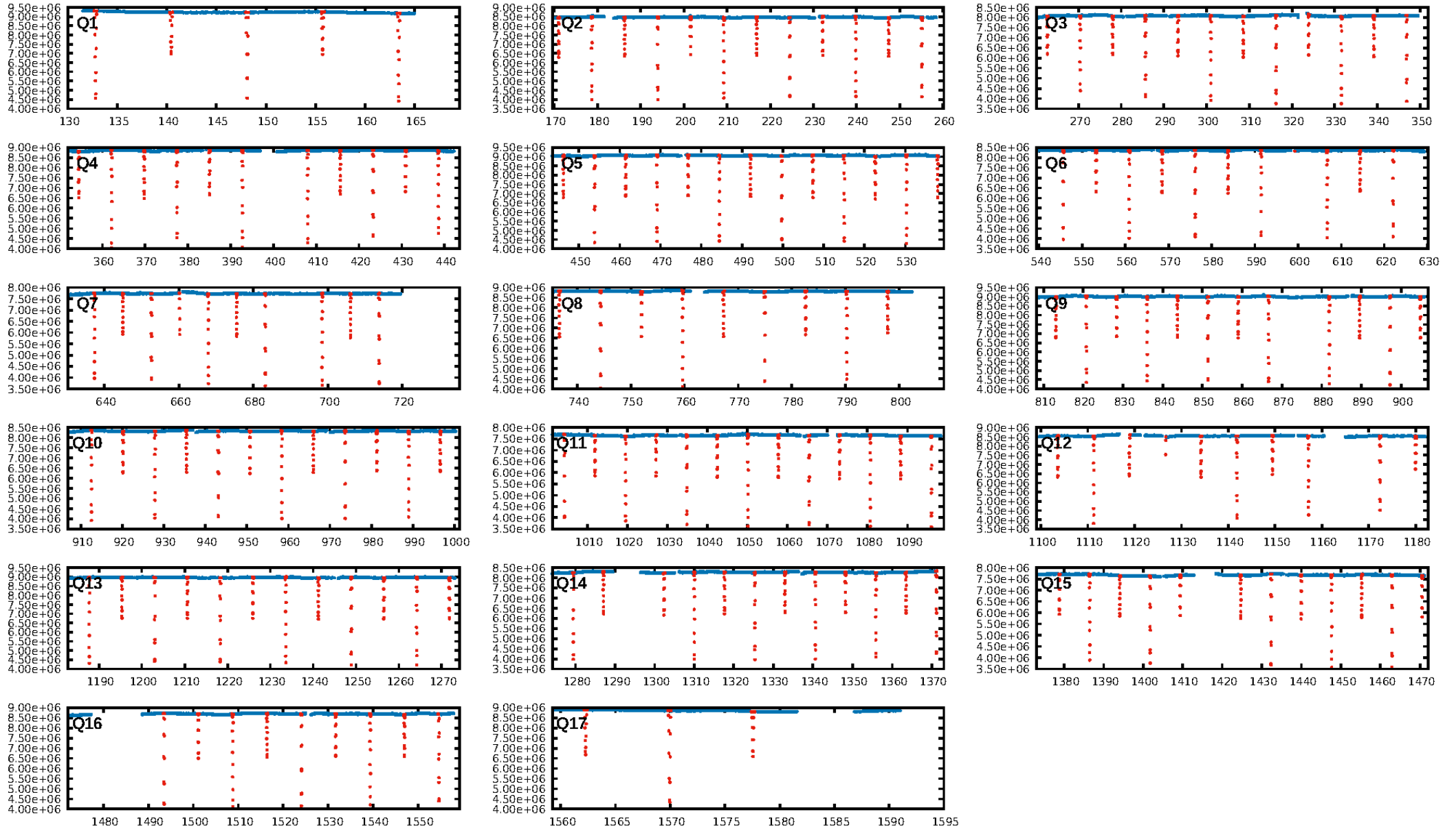
ShortPeriod-sig: 93.9% [1.88 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [169/169]  
GhostDiagnostic-chr: 1.414

Centroid-sig: 0.0%  
Centroid-so: 0.611 arcsec [442.28 $\sigma$ ]  
OotOffset-rm: 0.049 arcsec [0.72 $\sigma$ ]  
KicOffset-rm: 0.229 arcsec [3.18 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

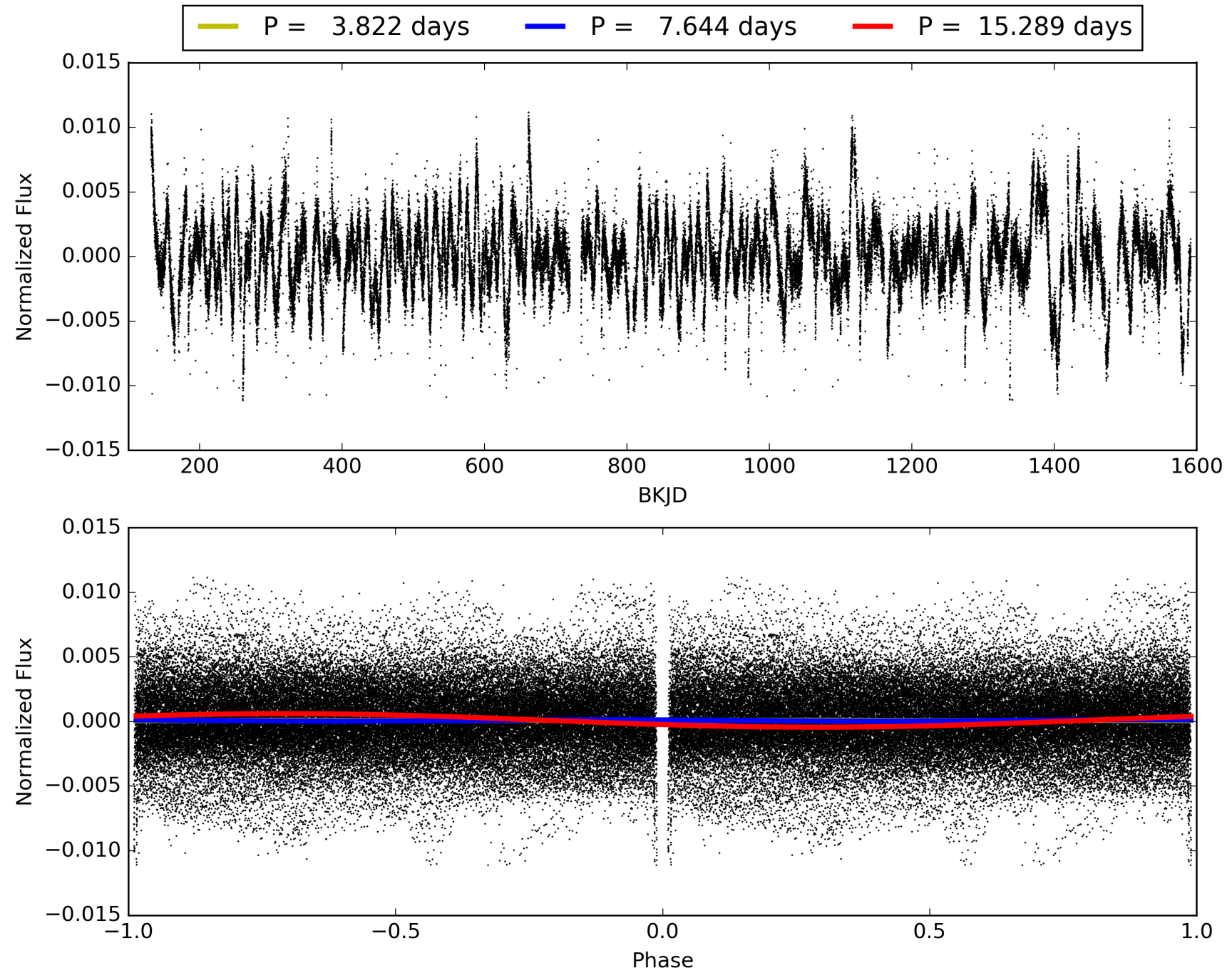
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 10:12:24 Z

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

# TCE 004678171-01, PDC Light Curves

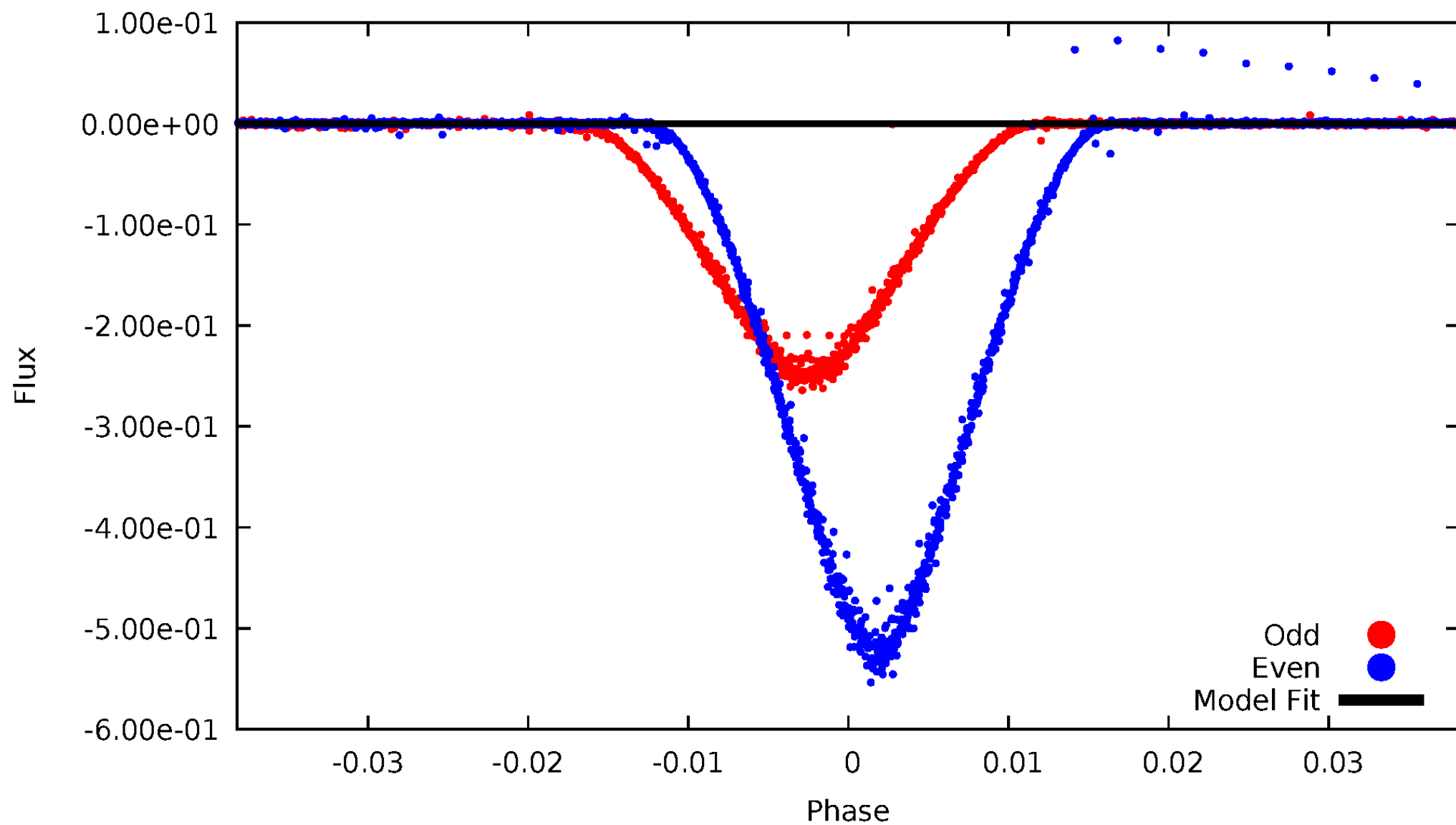


TCE 004678171-01



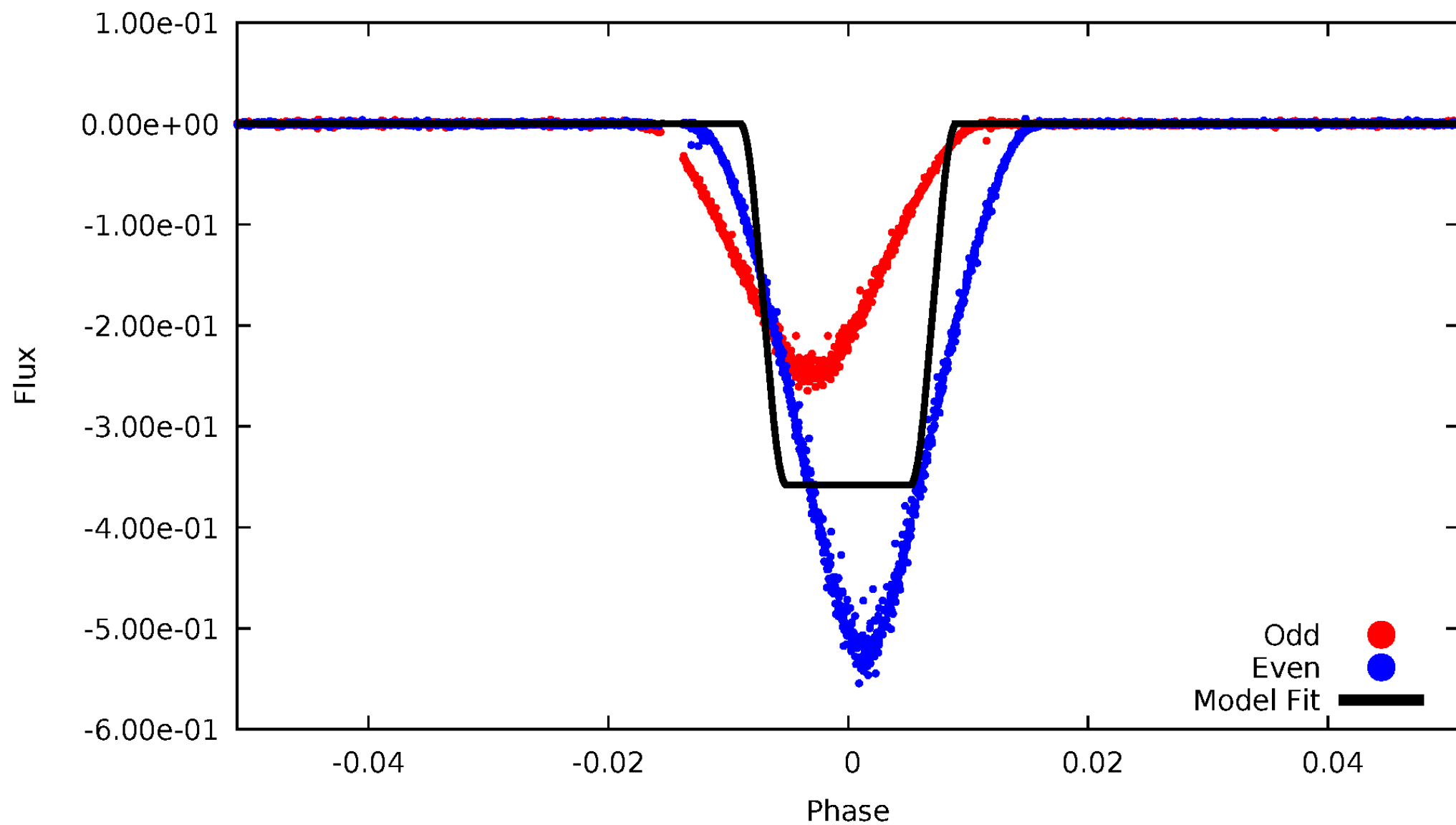
# DV Odd/Even

TCE 004678171-01



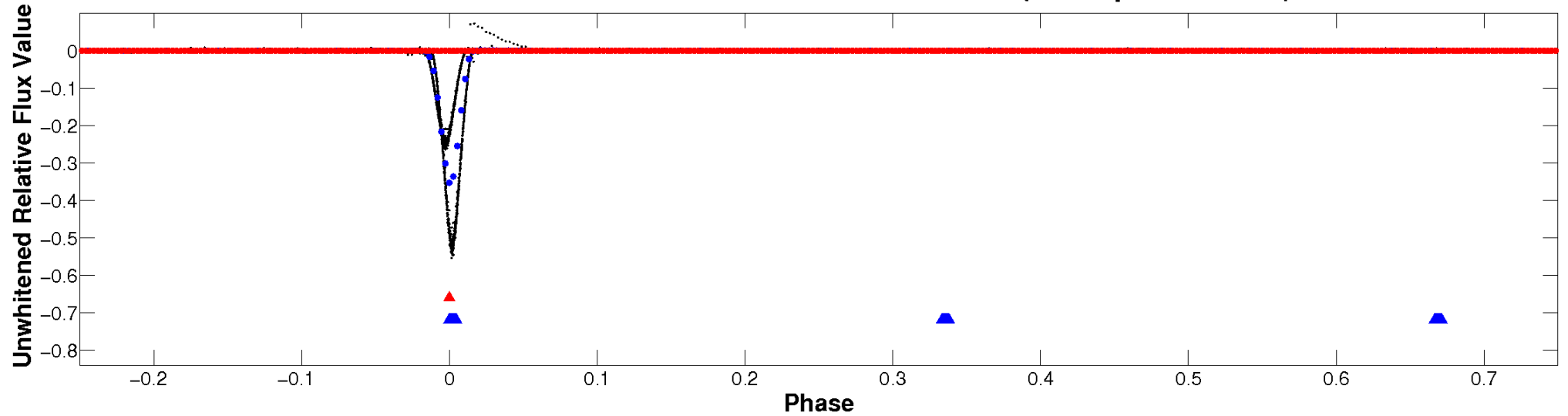
# ALT Odd/Even

TCE 004678171-01



# Non-Whitened Vs. Whitened Light Curve

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

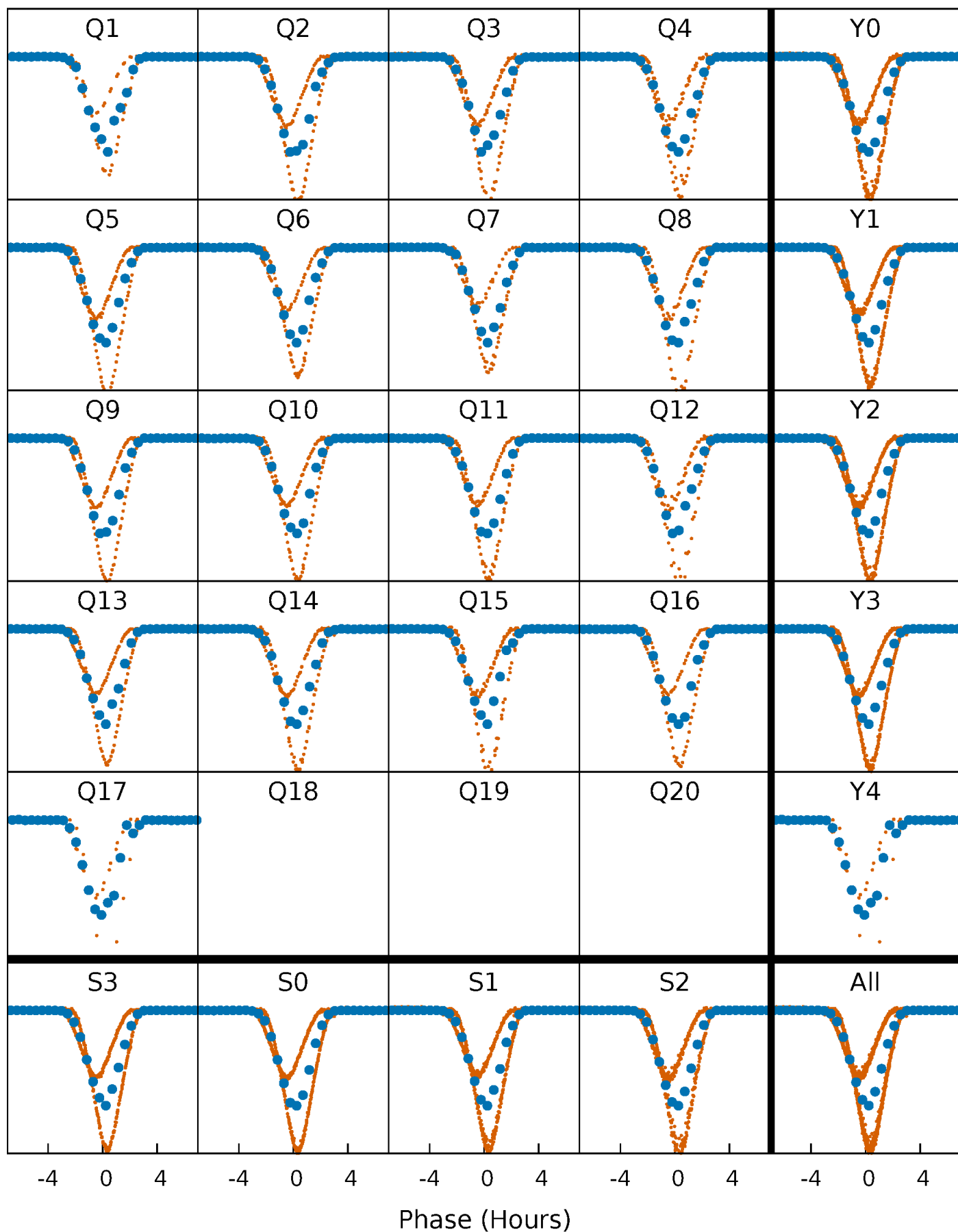


**Planet 1 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



# PDC Quarter-Phased Transit Curves

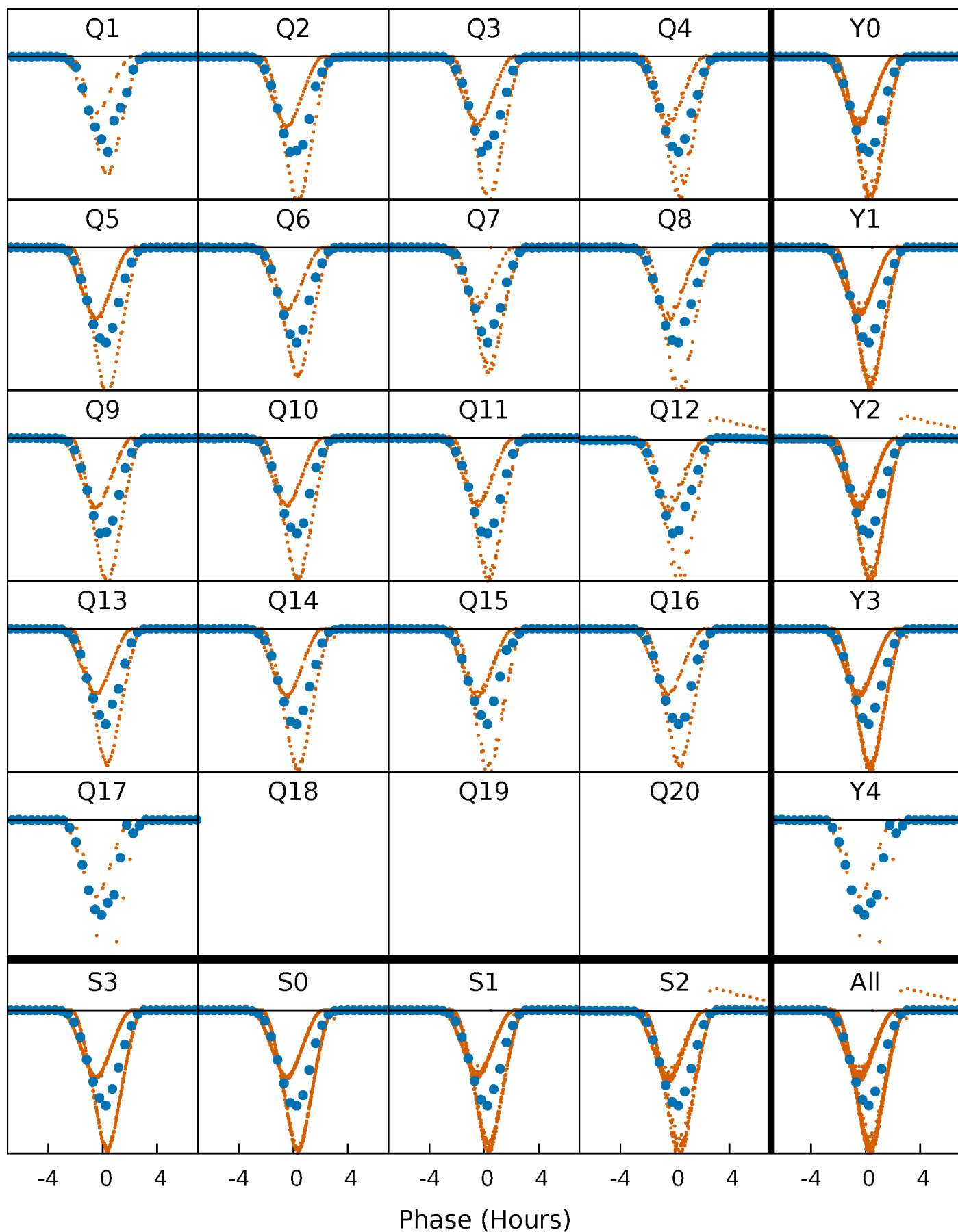
TCE 004678171-01 P= 7.644357 Days  $T_0=132.791497$  (BKJD)





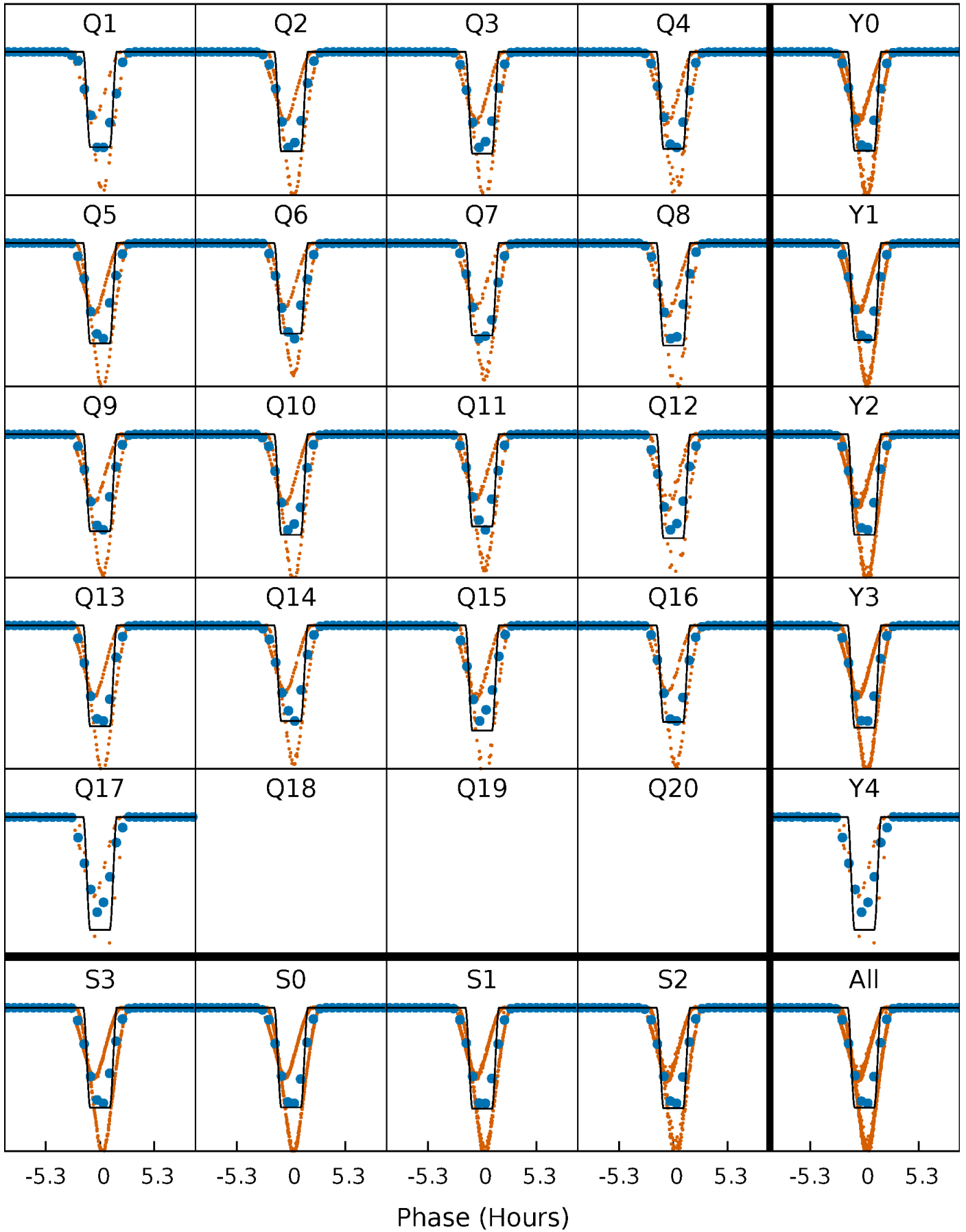
# DV Quarter-Phased Transit Curves

TCE 004678171-01 P= 7.644357 Days  $T_0=132.791497$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

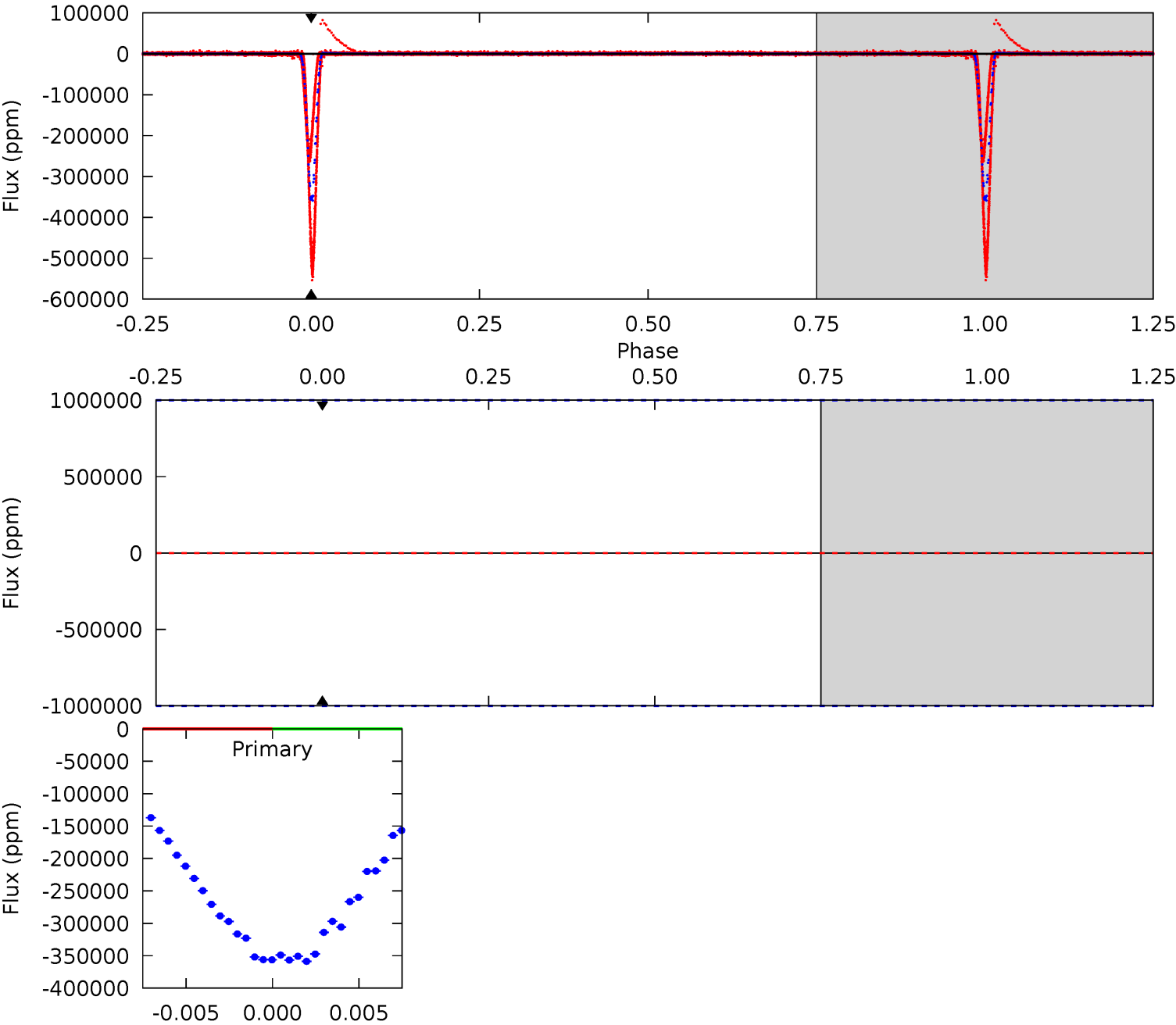
TCE 004678171-01   P= 7.644357 Days    $T_0=132.795424$  (BKJD)



DV Model-Shift Uniqueness Test

004678171-01, P = 7.644357 Days, E = 125.147140 Days

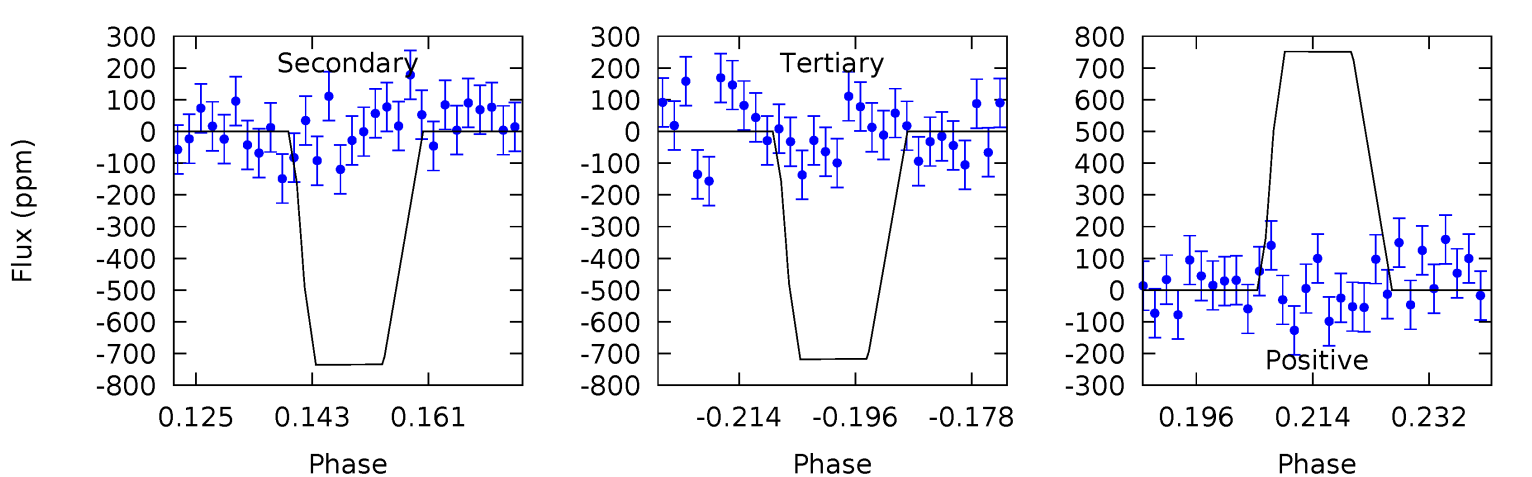
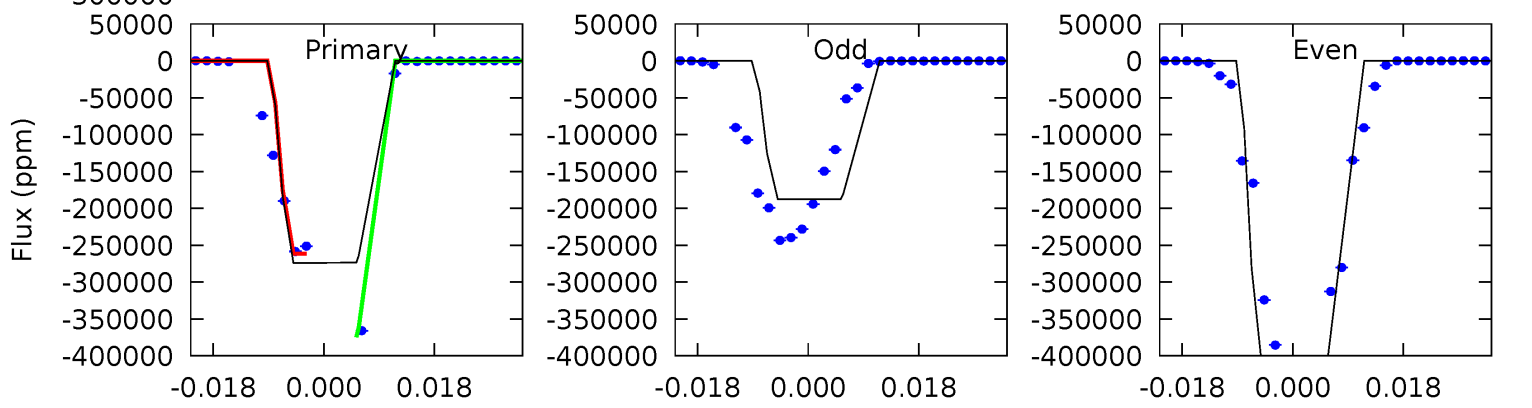
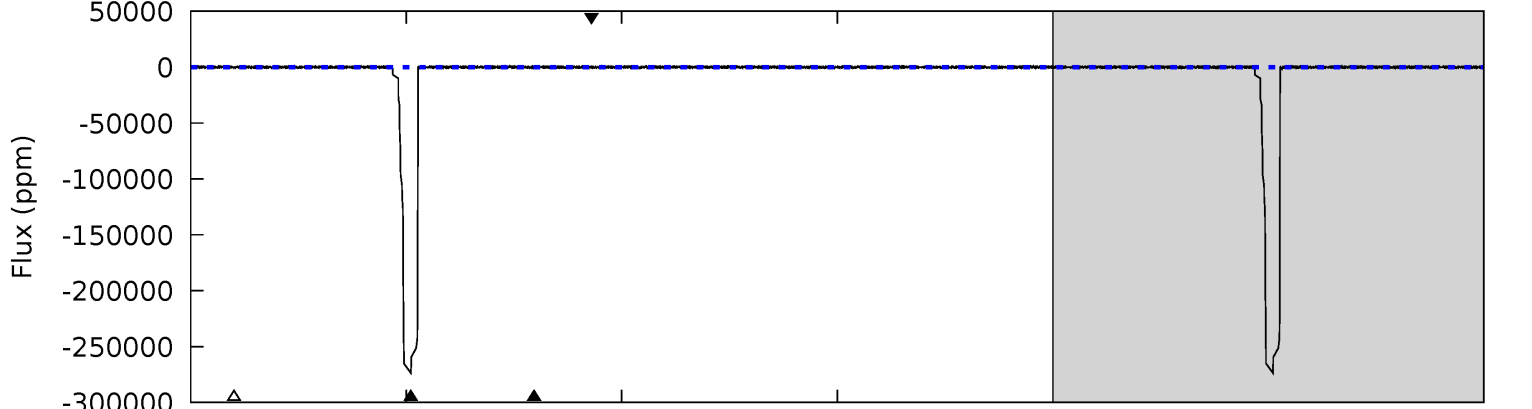
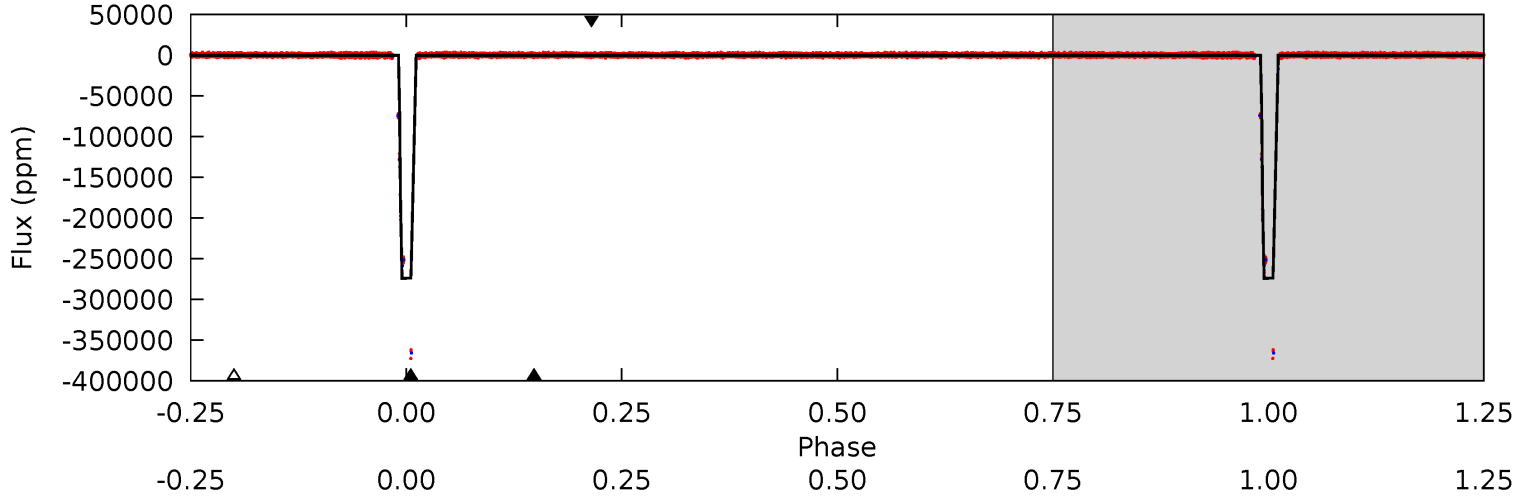
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

004678171-01, P = 7.644357 Days, E = 125.151067 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
1776	4.77	4.65	4.87	4.91	2.37	1.18	1772	1772	0.11	-0.11	2139	0.81	0.00	0



### Stellar Parameters For KIC 004678171

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4464^{+132}_{-145}$	$4.577^{+0.059}_{-0.017}$	$0.200^{+0.200}_{-0.300}$	$0.719^{+0.029}_{-0.063}$	$0.711^{+0.050}_{-0.055}$	$2.693^{+0.630}_{-0.195}$
	+3%/-3%	+1%/-0%	+100%/-150%	+4%/-9%	+7%/-8%	+23%/-7%
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 004678171-01 / KOI 6435.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$0 \pm 1000000$	$38.65^{+7.88}_{-8.07}$	$887^{+32}_{-31}$	$1404^{+2454}_{-5141}$	$0.324^{+199.868}_{-157.689}$
Alt.	$-734 \pm 154$	$46.82^{+7.47}_{-8.10}$	$891^{+30}_{-33}$	$1845^{+118}_{-116}$	$0.854^{+0.478}_{-0.267}$

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

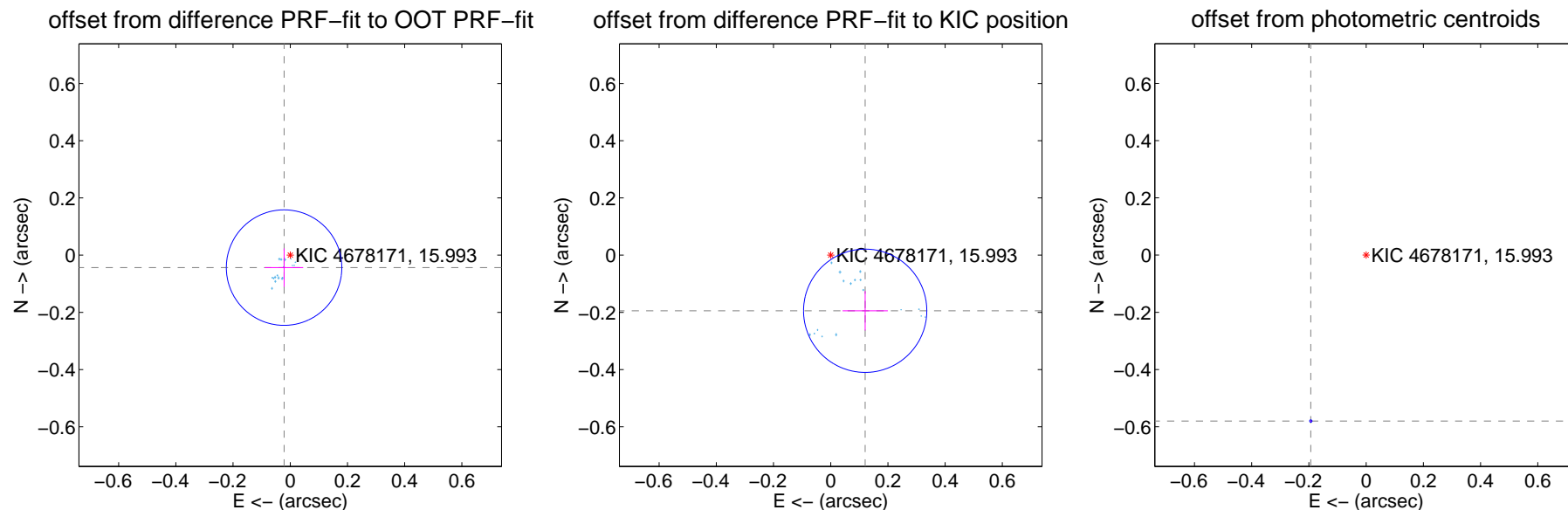
## DV Centroid Data

Supplemental centroid analysis for 004678171-01. Kepler magnitude: 15.99. Transit SNR -1.00

There are 17 quarters with good PRF difference image offsets

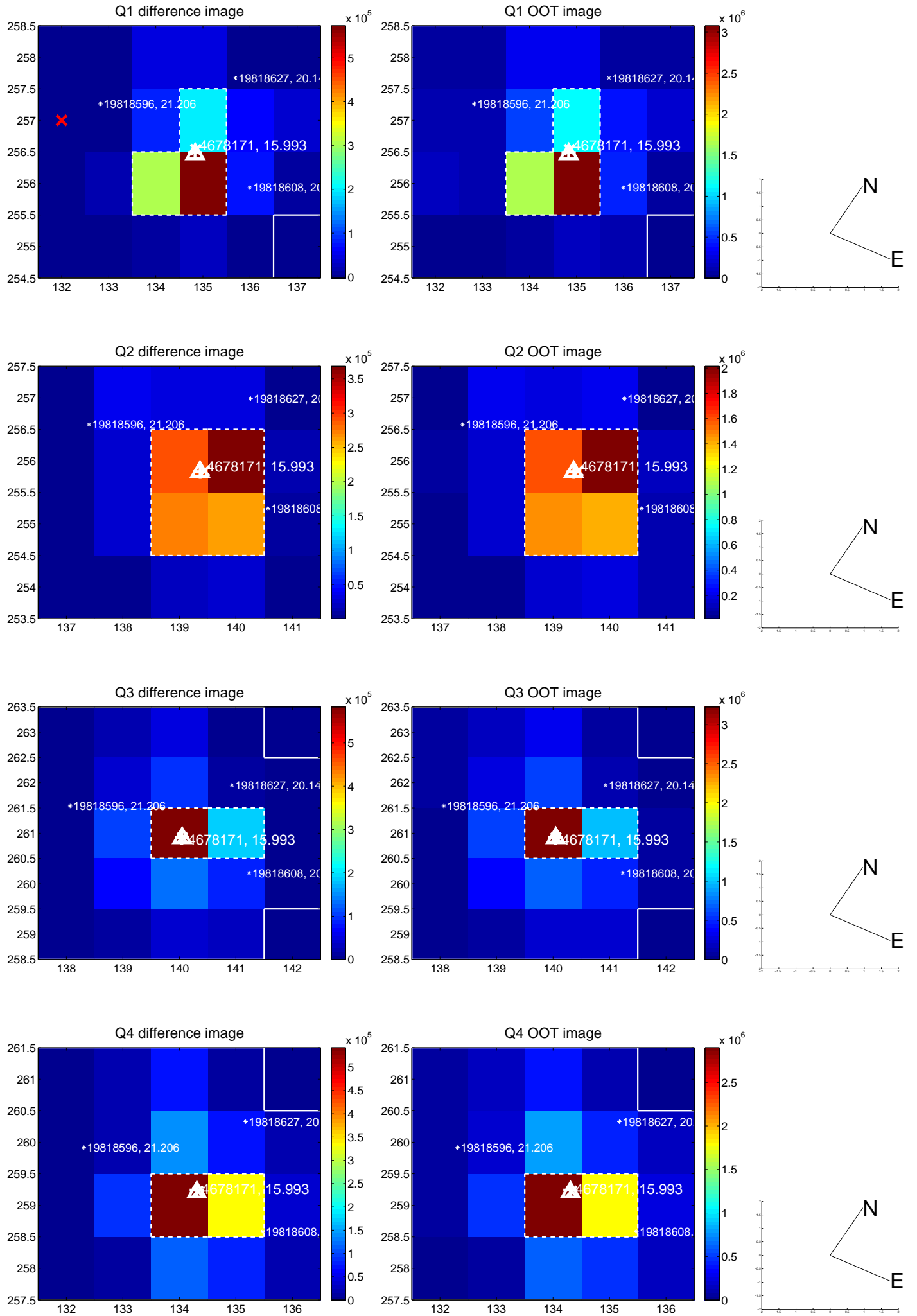
The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.049 \pm 0.067$	0.72	$0.022 \pm 0.067$	$-0.044 \pm 0.067$
PRF-fit source offset from KIC position	$0.229 \pm 0.072$	3.18	$-0.120 \pm 0.079$	$-0.194 \pm 0.069$
photometric centroid source offset	$0.61 \pm 0.00$	442.28	$0.19 \pm 0.00$	$-0.58 \pm 0.00$

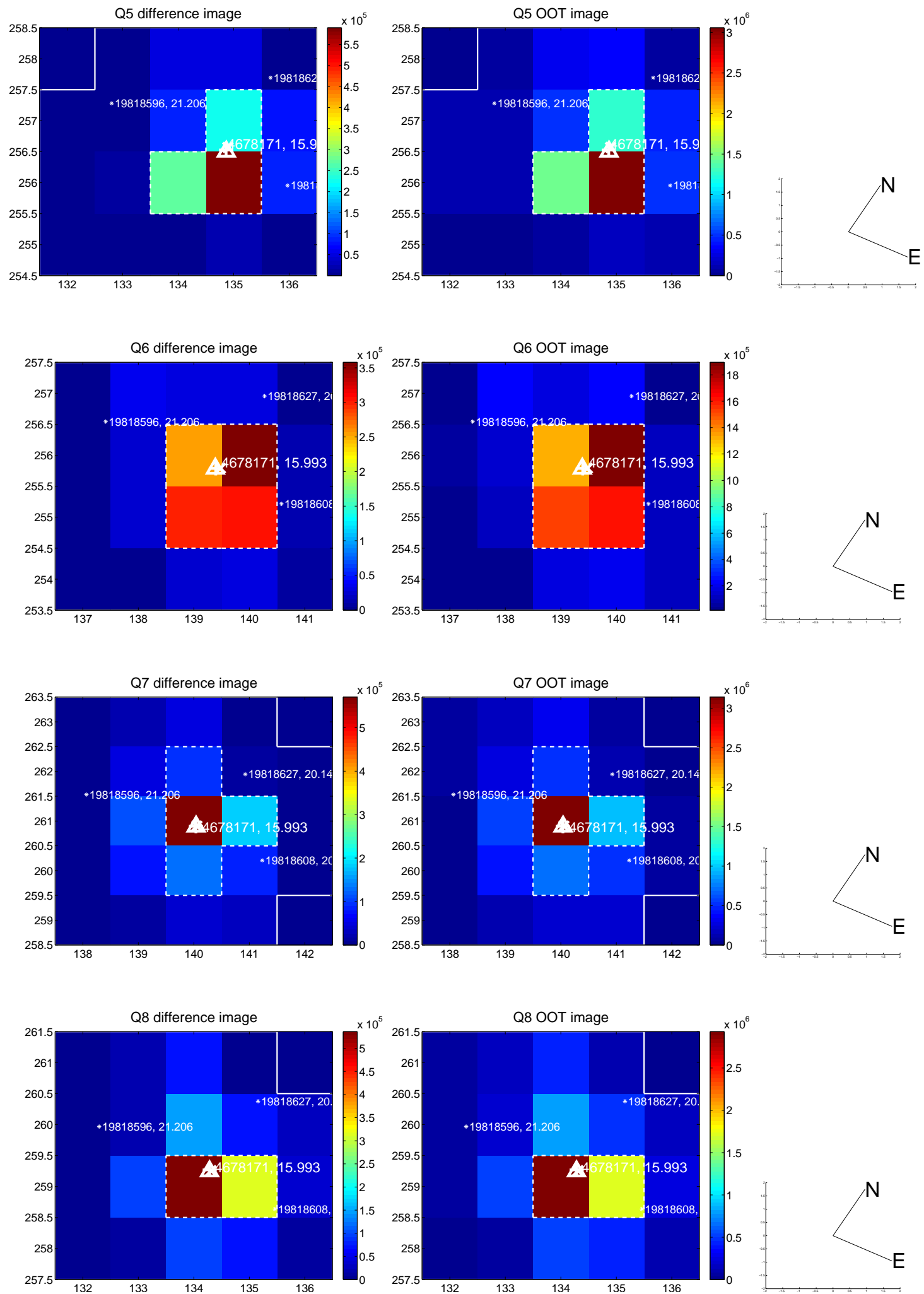


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

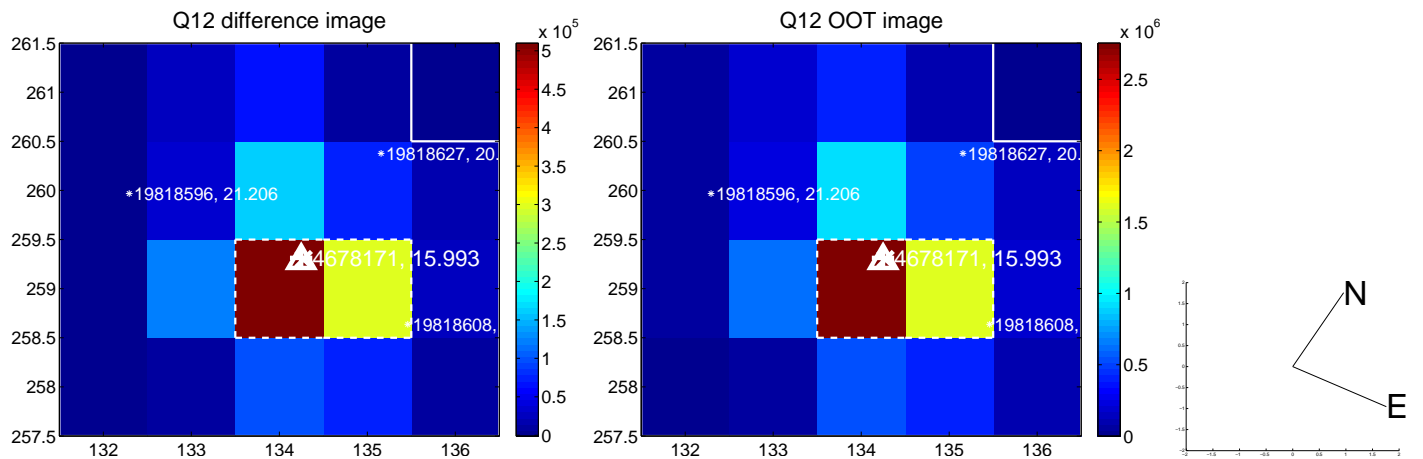
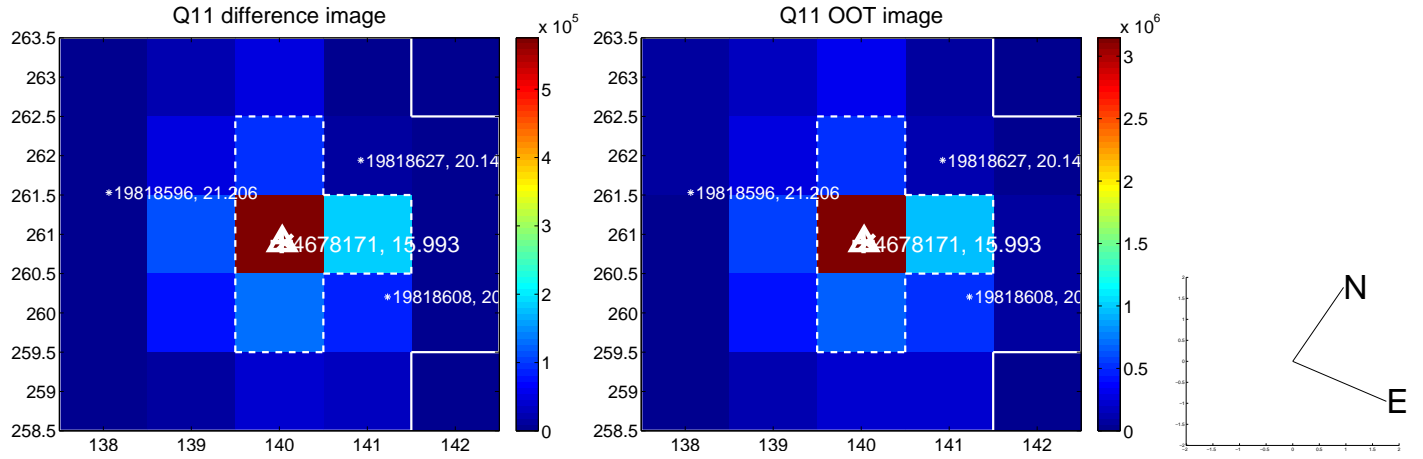
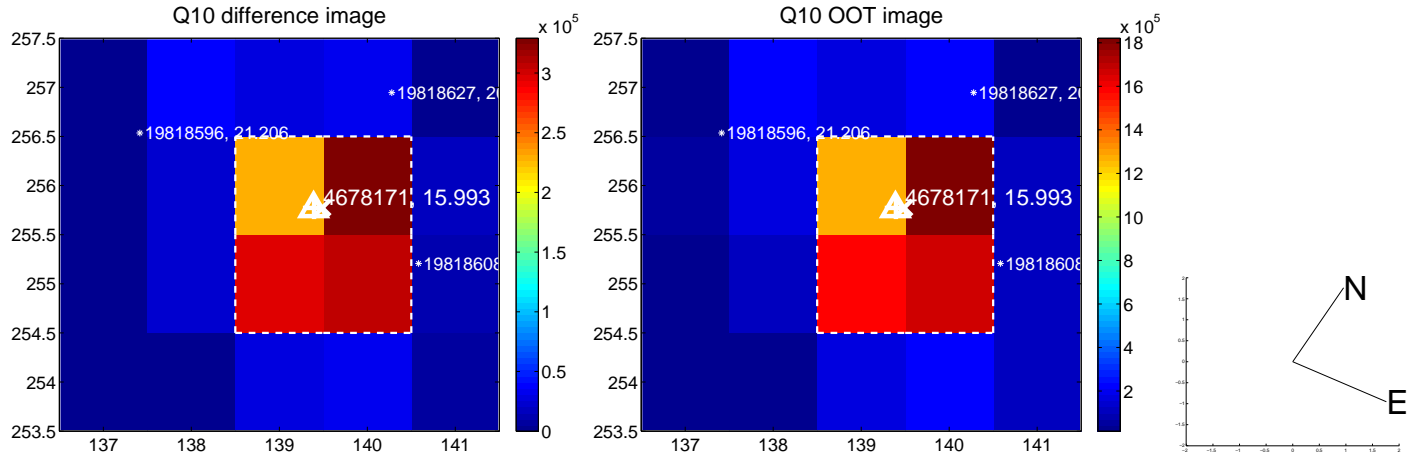
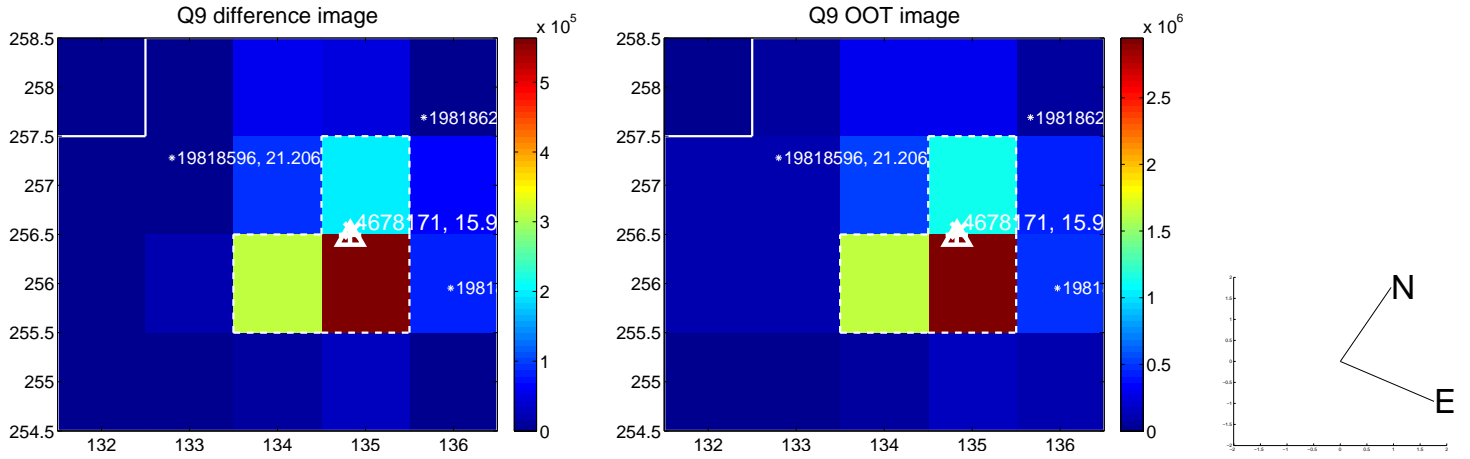


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

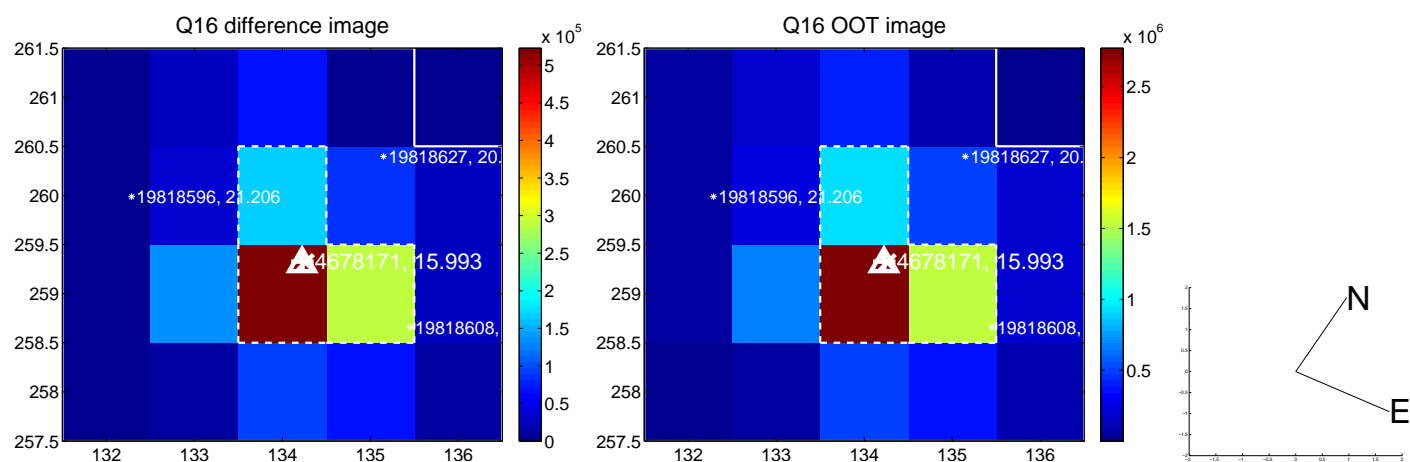
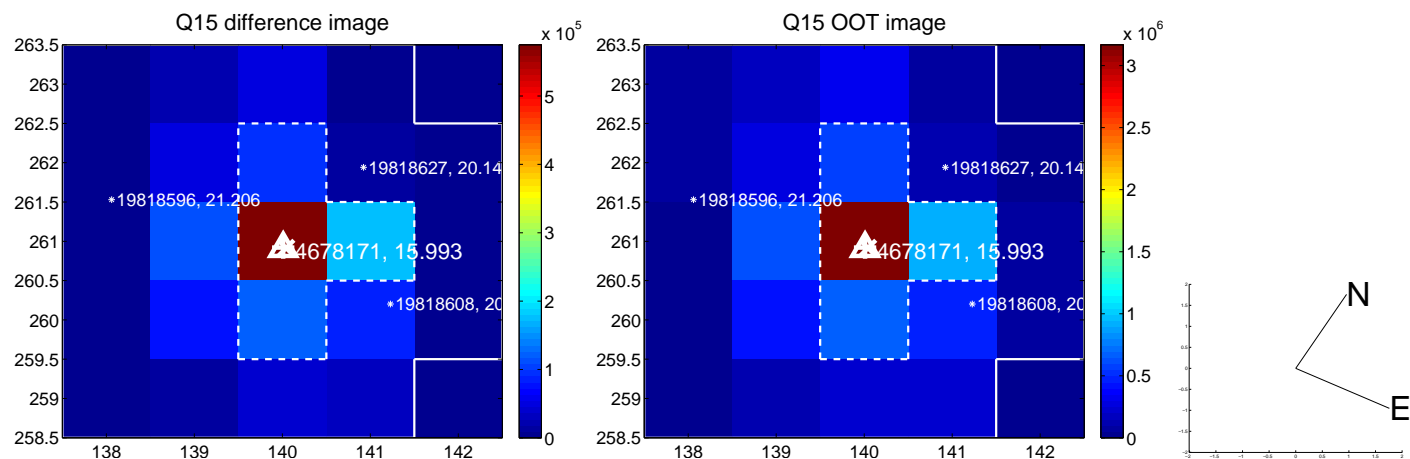
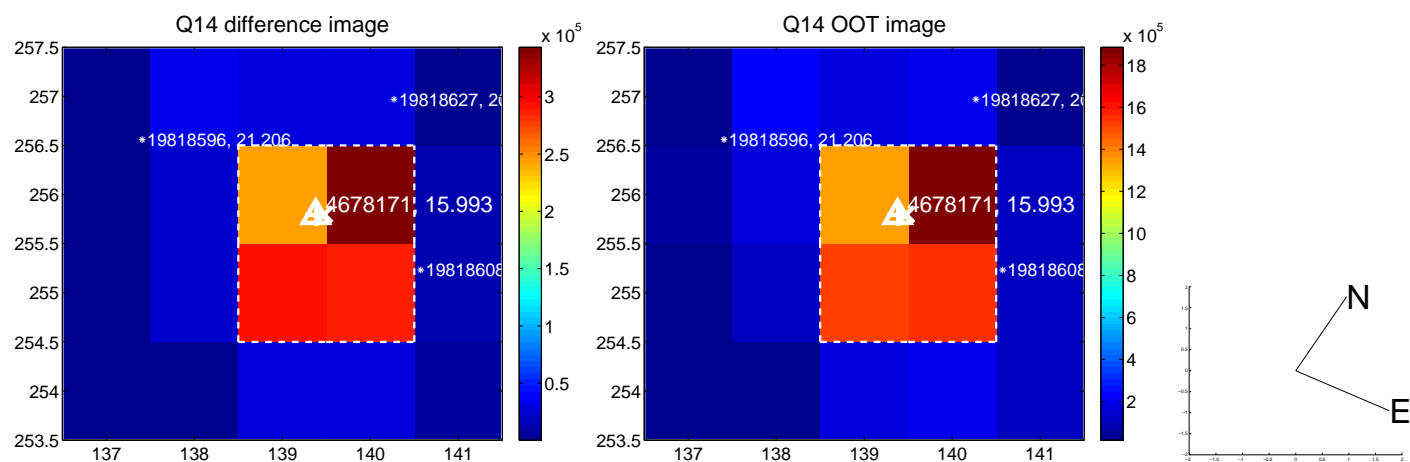
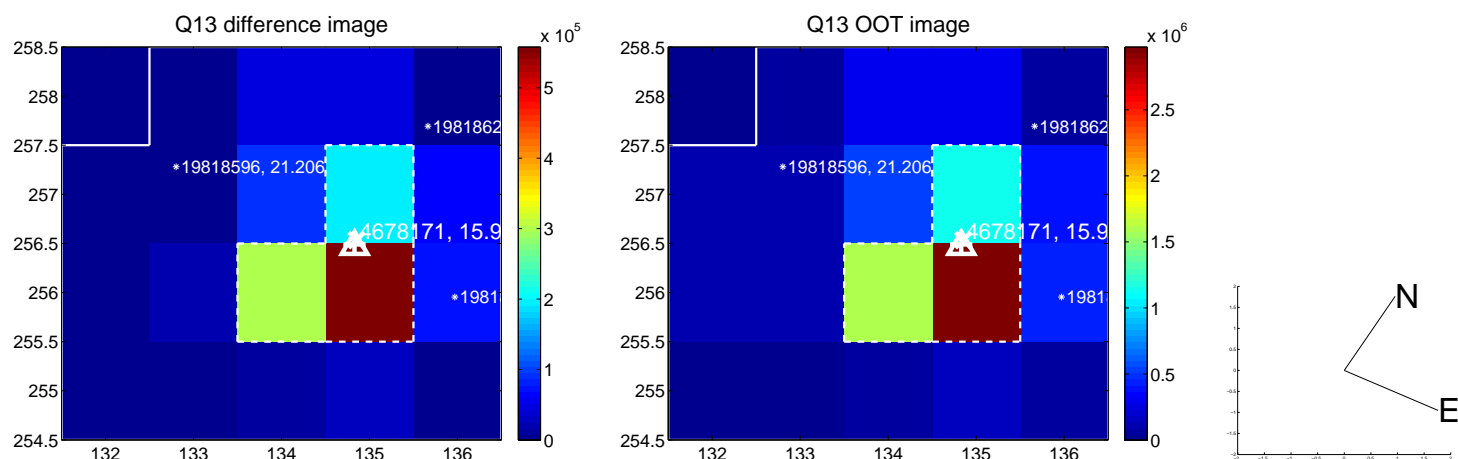




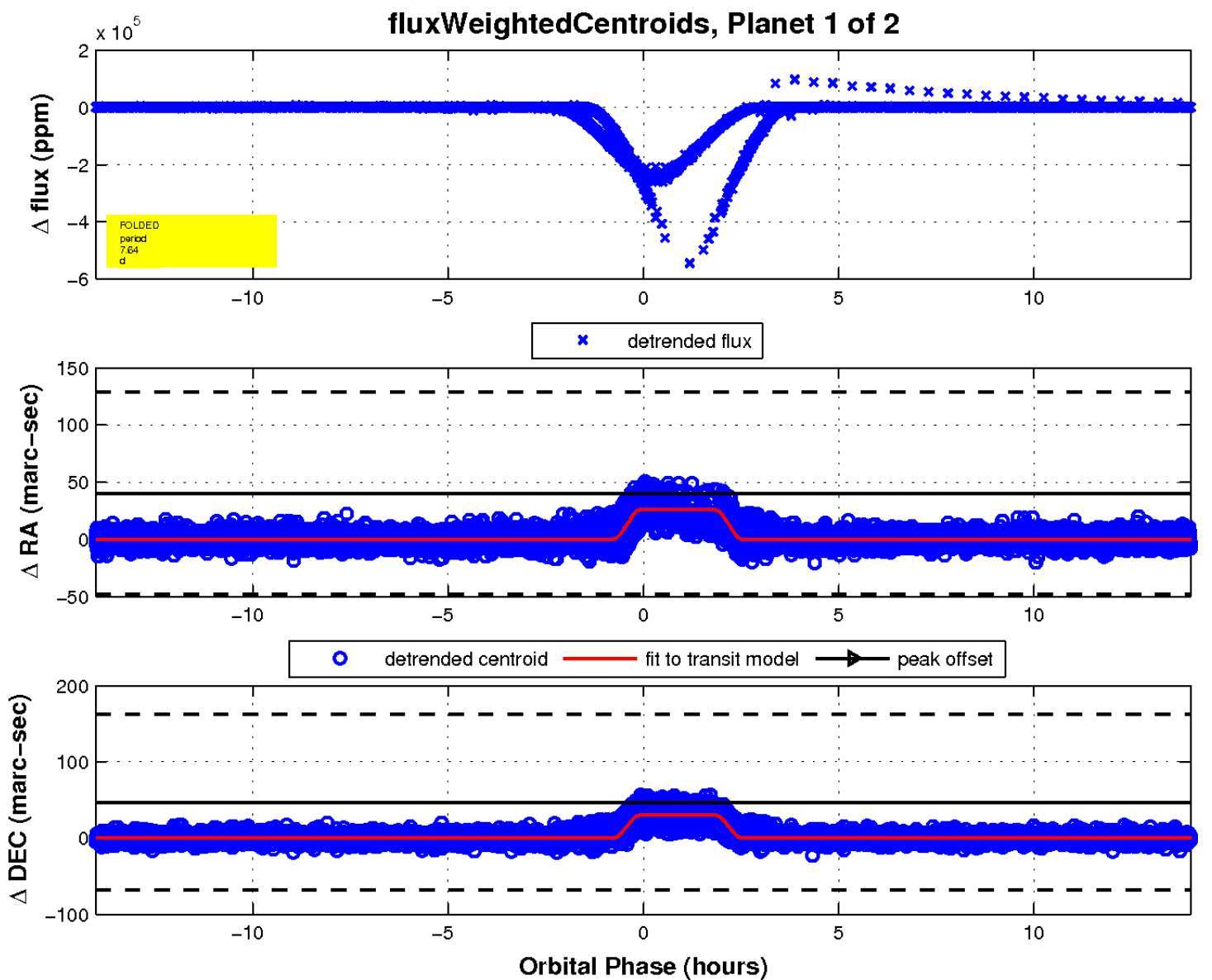
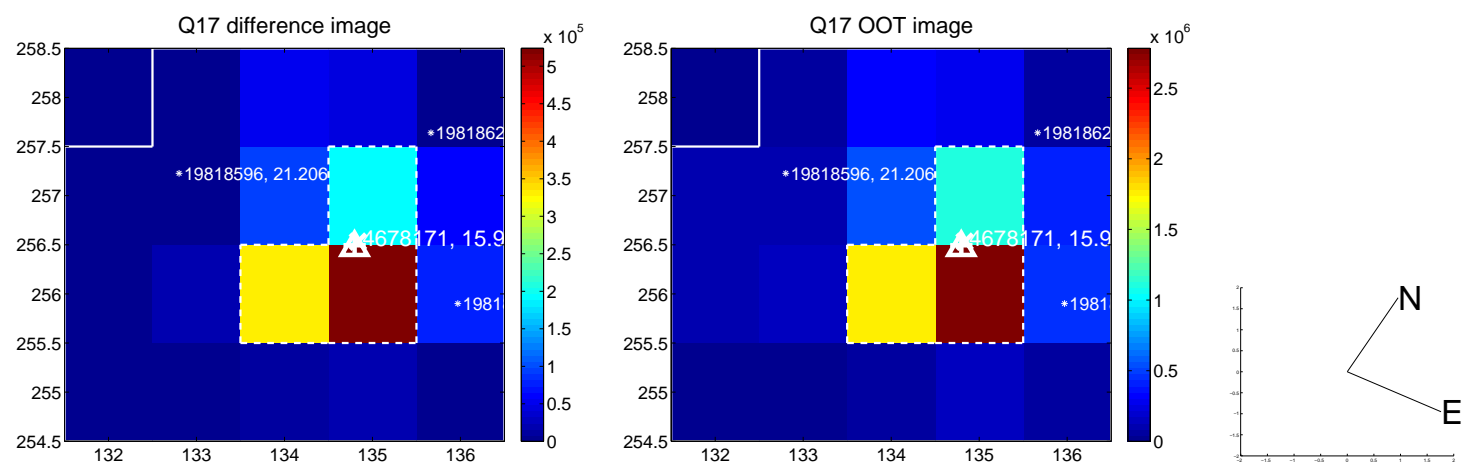
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

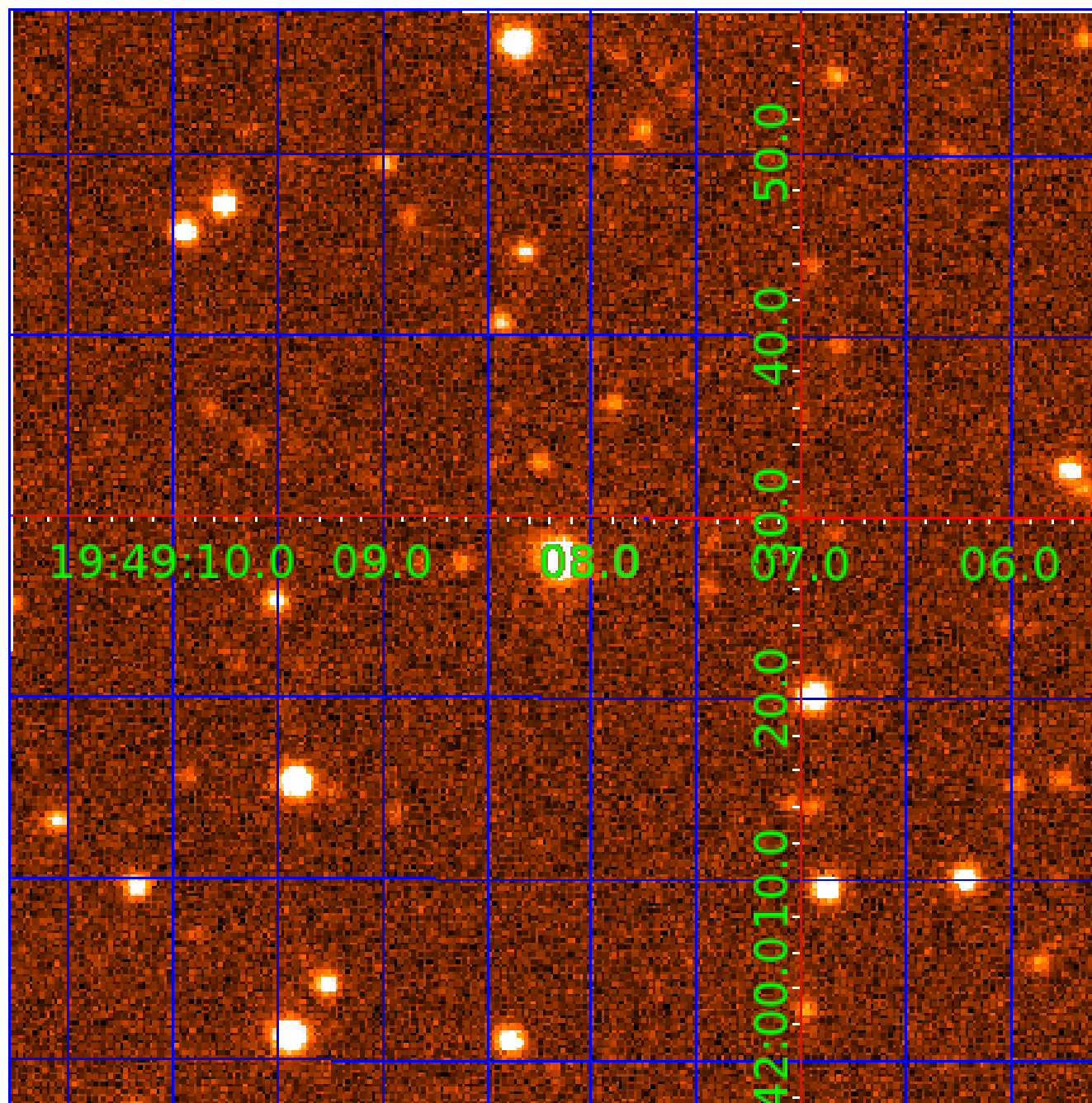


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 004678171

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004678171-01	OBS	6435.01	7.644357	132.791497	380892.5	3.500	8454.9	-1.0	0.72	4464	39.23	39.98
004678171-02	OBS	No	5.096373	132.790058	985.6	32.410	820.6	31.9	0.72	4464	2.42	68.64

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004678171-01	OBS	FP	0.00	0	1	0	0	DEPTH_ODDEVEN_DV—DEPTH_ODDEVEN_ALT—MOD_ODDEVEN_ALT—CENT_NOFITS
004678171-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_POS_ALT

**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.

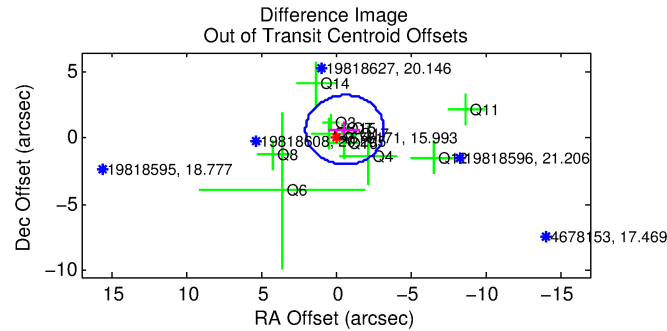
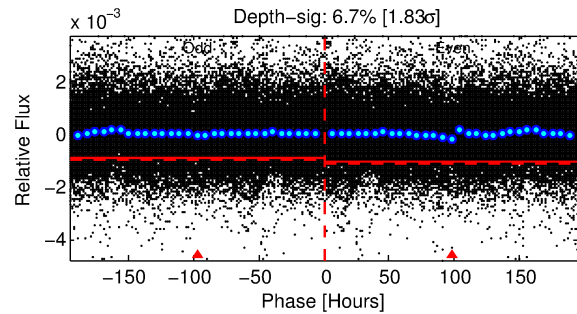
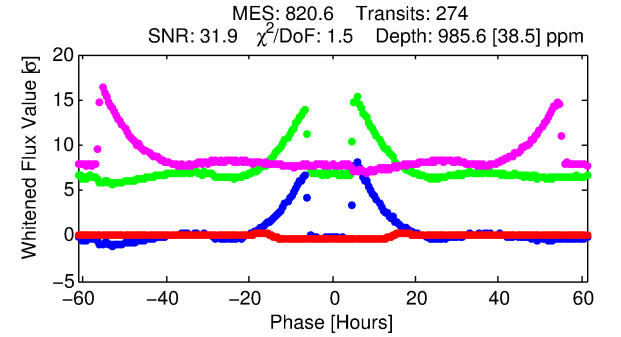
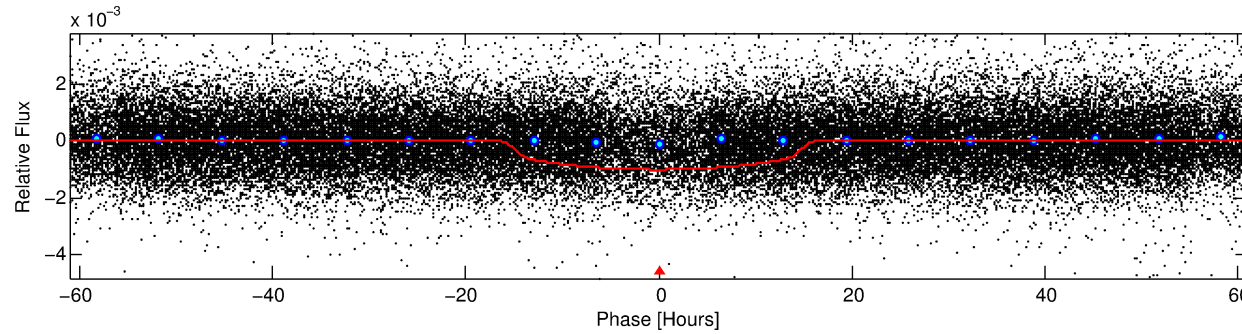
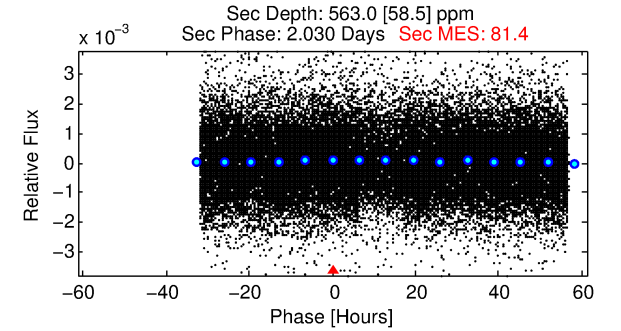
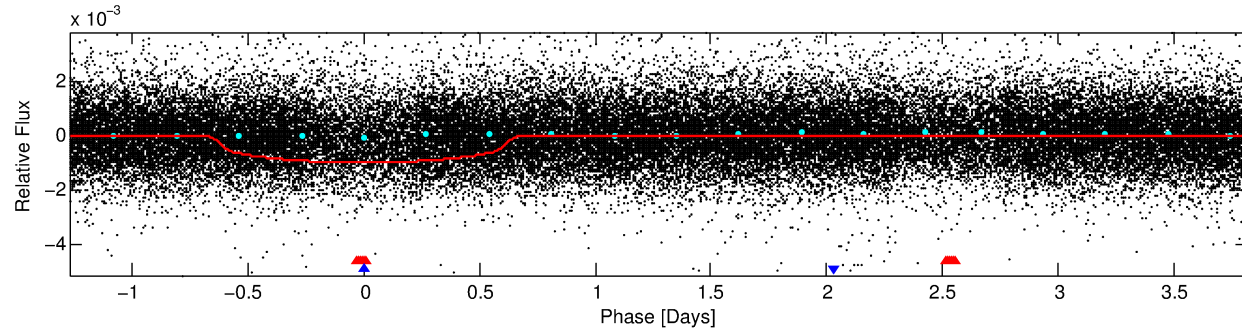
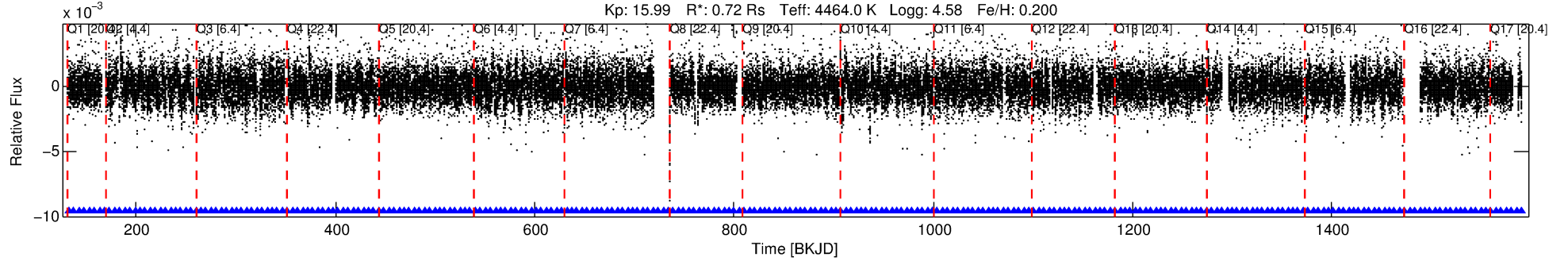
## Ephemeris Match Information For 004678171-02

No Significant Match Found

# DV One-Page Summary

KIC: 4678171 Candidate: 2 of 2 Period: 5.096 d

KOI: K06435 Corr: No Ephemeris Match



## DV Fit Results:

Period = 5.09637 [0.00006] d  
Epoch = 132.7901 [0.0102] BKJD  
Rp/R\* = 0.0308 [0.0014]  
a/R\* = 1.24 [0.05]  
b = 0.71 [0.09]  
Seff = 68.64 [11.59]  
Teq = 734 [31] K  
Rp = 2.42 [0.24] Re  
a = 0.0518 [0.0038] AU  
**Ag = 142.14 [24.68] [5.72σ]**  
**Teffp = 3918 [184] K [17.04σ]**

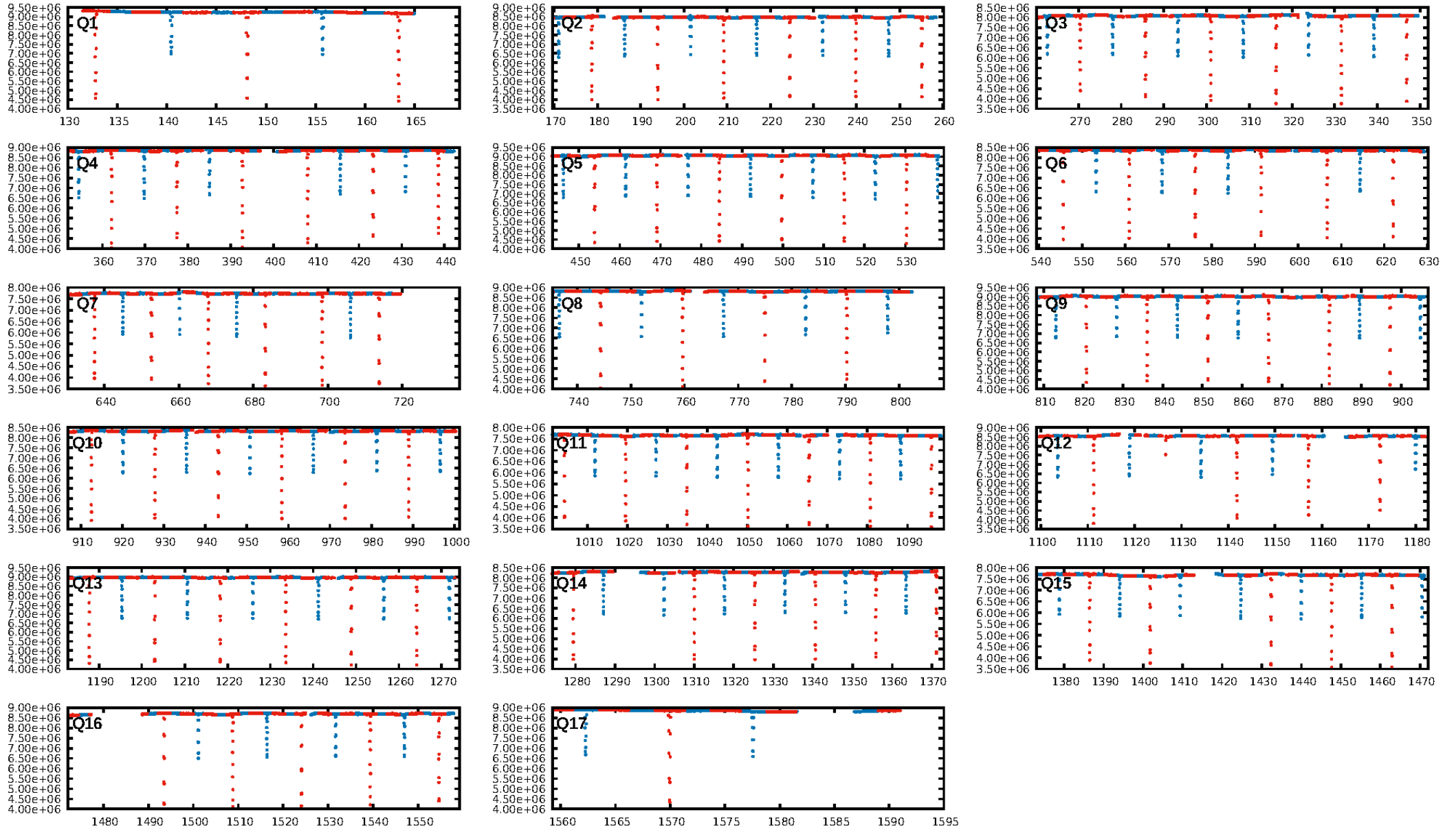
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 93.9% [1.88σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [261/261]  
GhostDiagnostic-chr: 1.169  
**Centroid-sig: 0.0%**  
**Centroid-so: 0.785 arcsec [6.17σ]**  
OotOffset-rm: 0.879 arcsec [1.00σ]  
KicOffset-rm: 0.899 arcsec [1.02σ]  
OotOffset-st: 2/4/4/2 [12]  
KicOffset-st: 2/4/4/2 [12]  
DiffImageQuality-fgm: 0.25 [3/12]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 10:12:32 Z

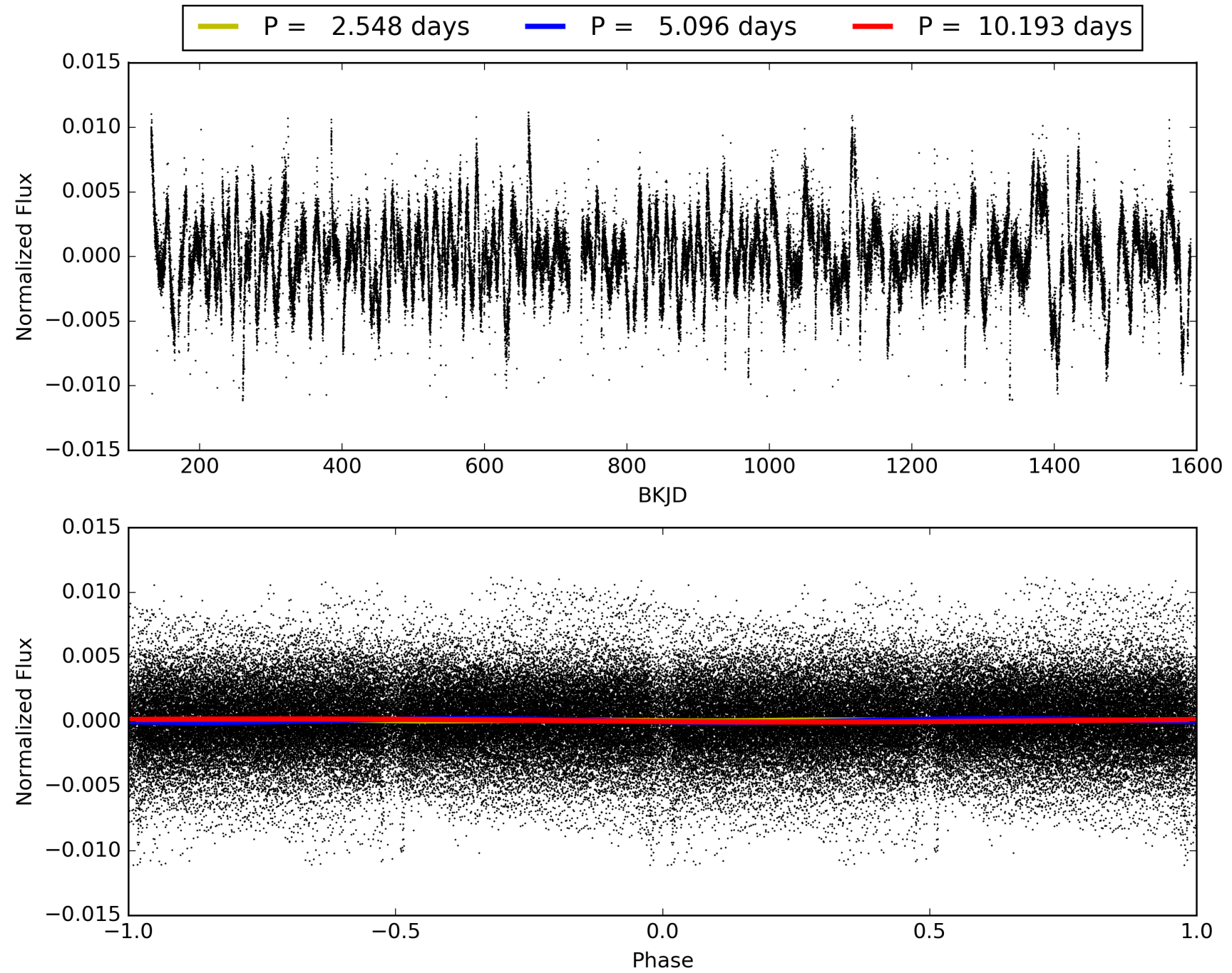
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 004678171-02, PDC Light Curves





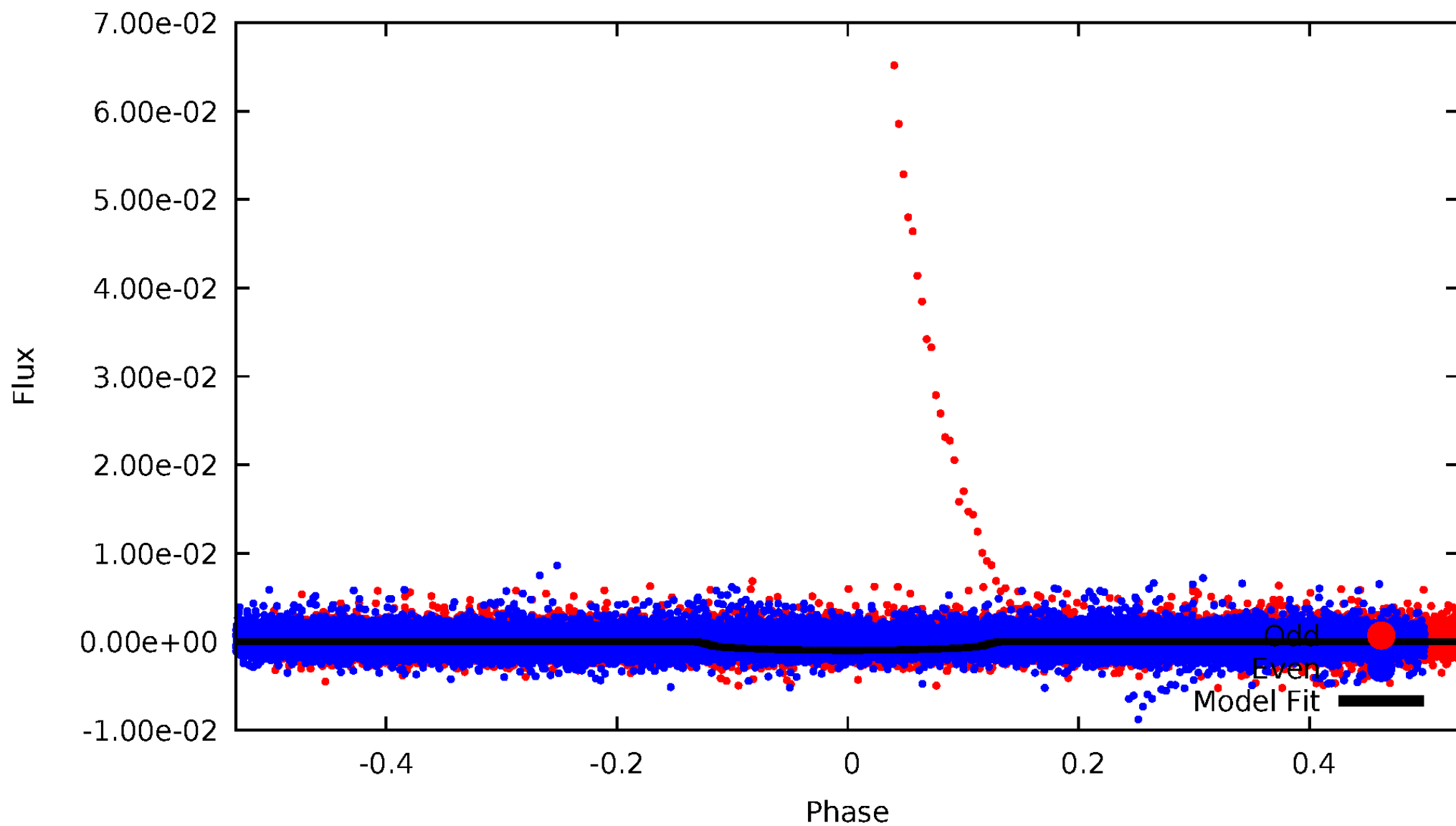
TCE 004678171-02





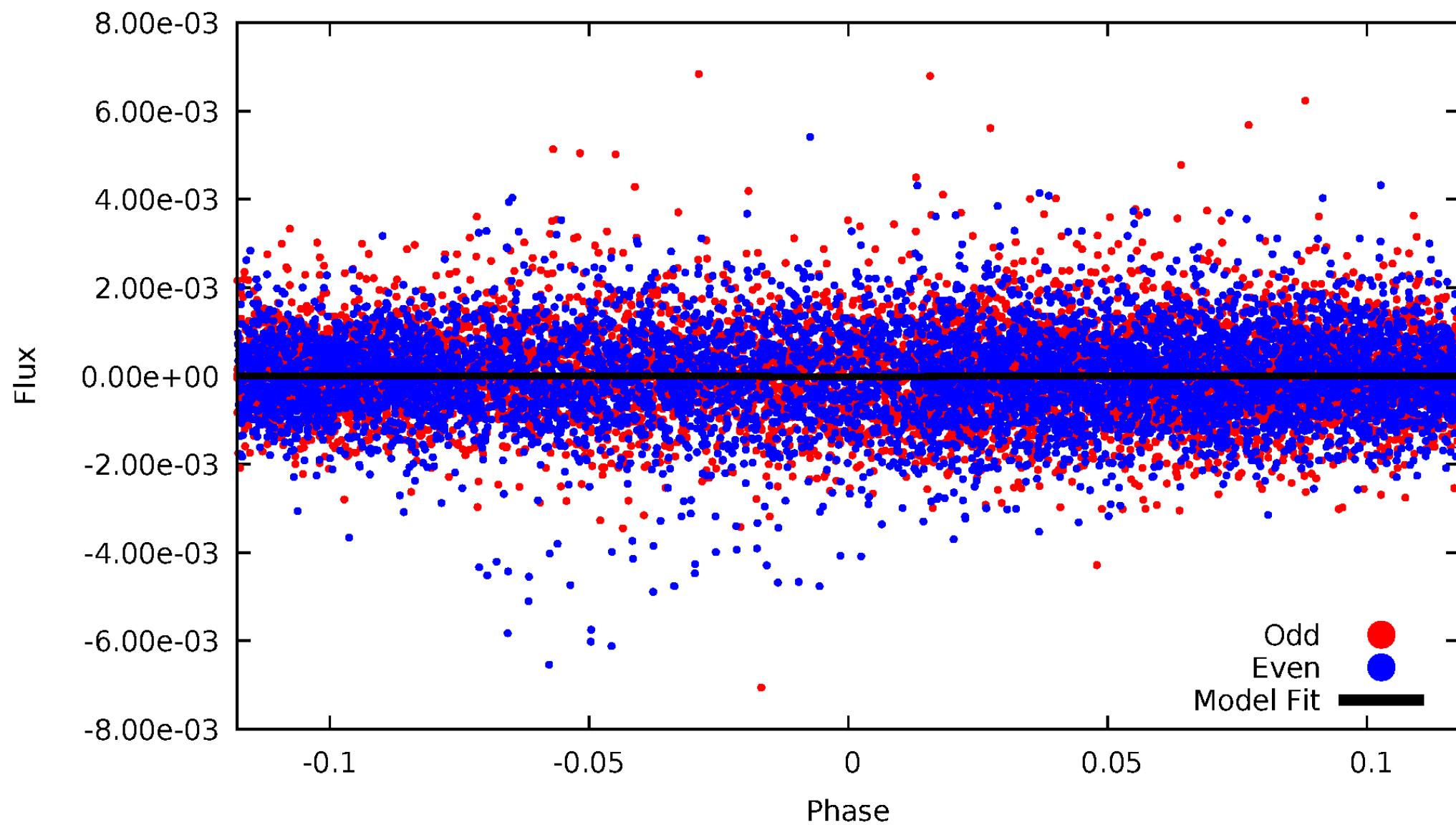
# DV Odd/Even

TCE 004678171-02



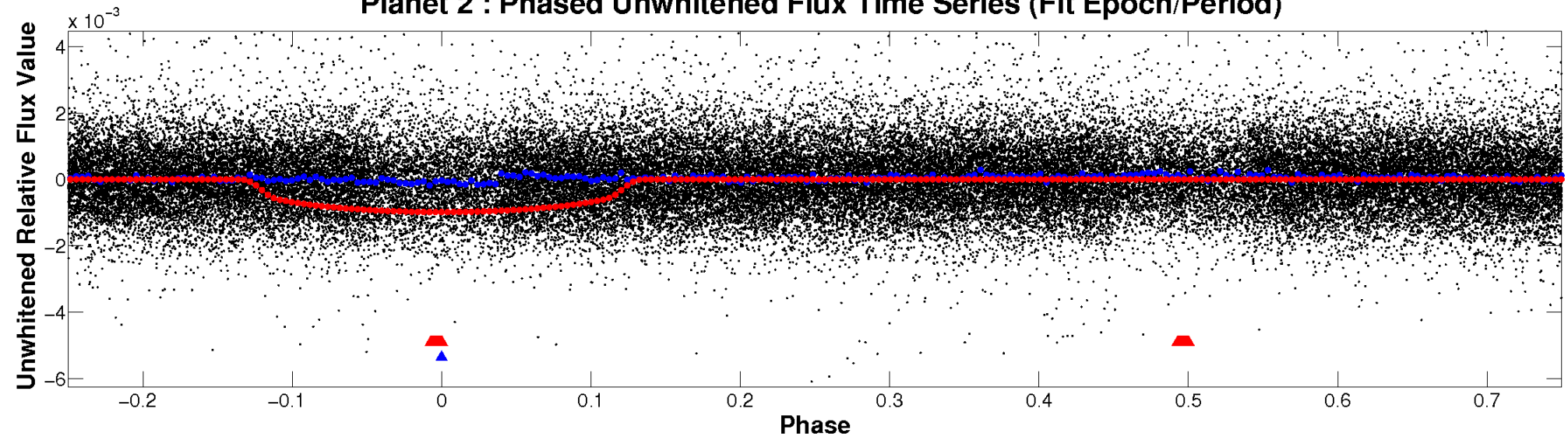
# ALT Odd/Even

TCE 004678171-02

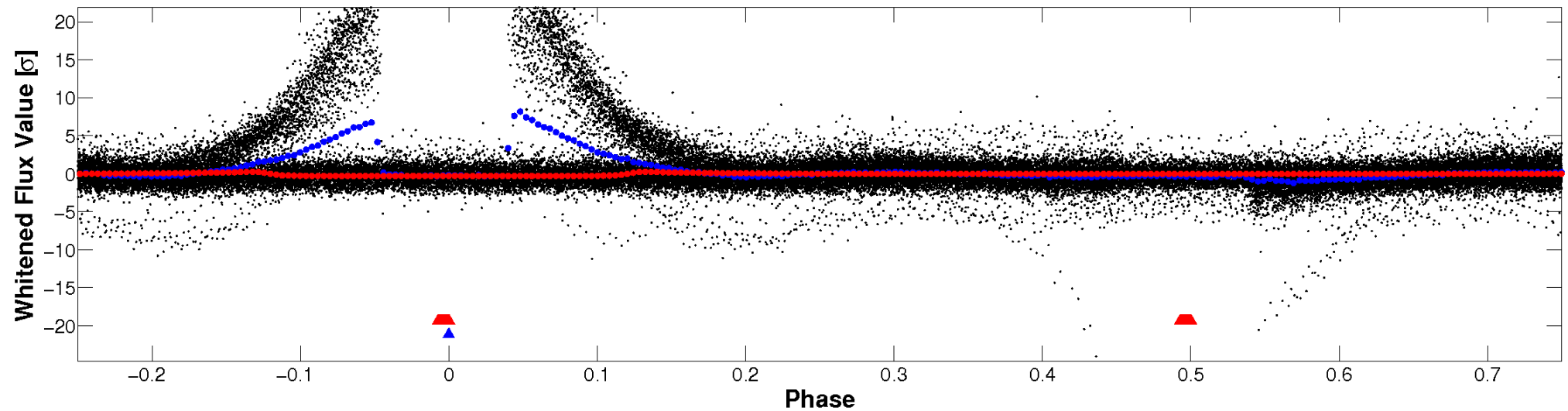


# Non-Whitened Vs. Whitened Light Curve

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

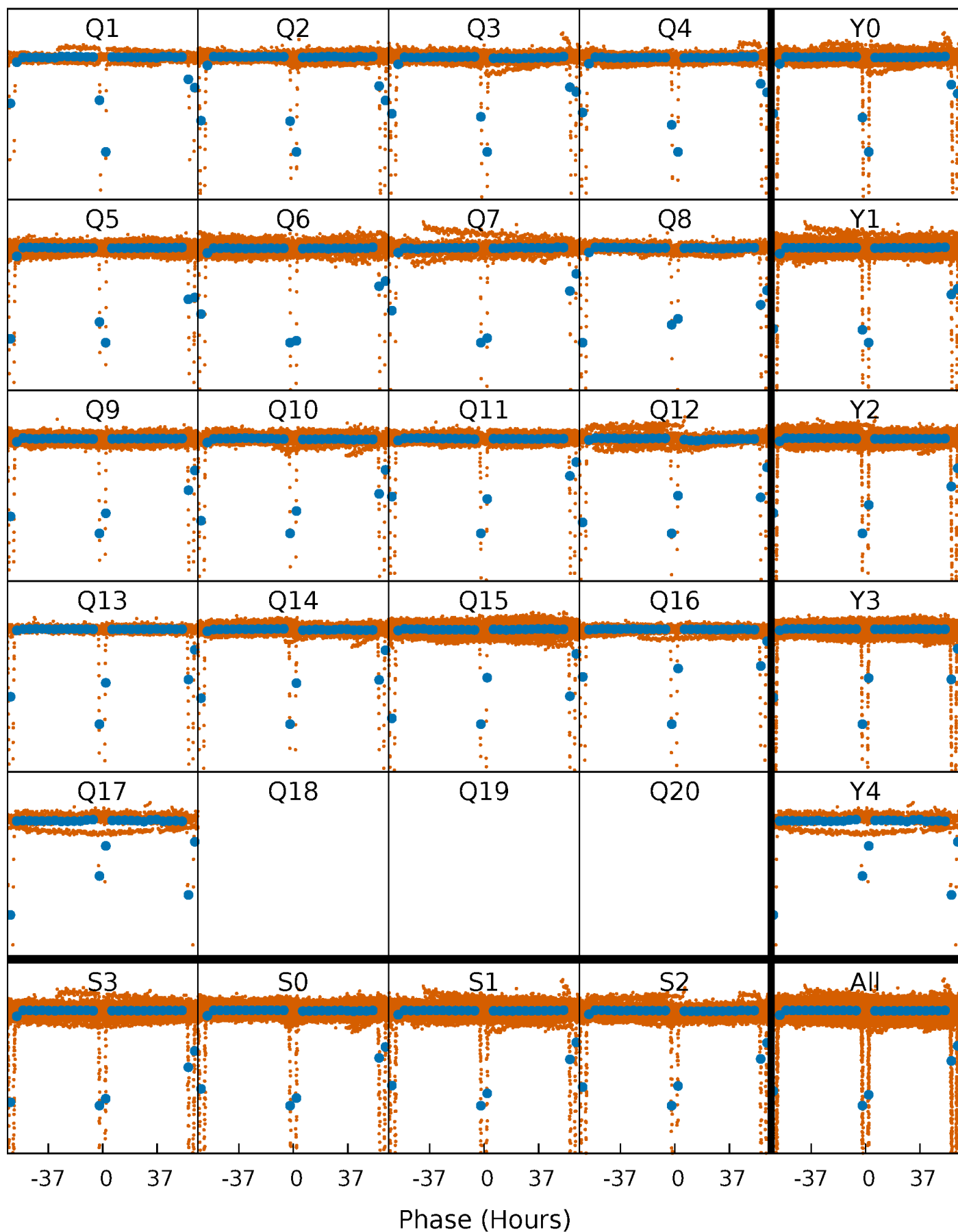


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



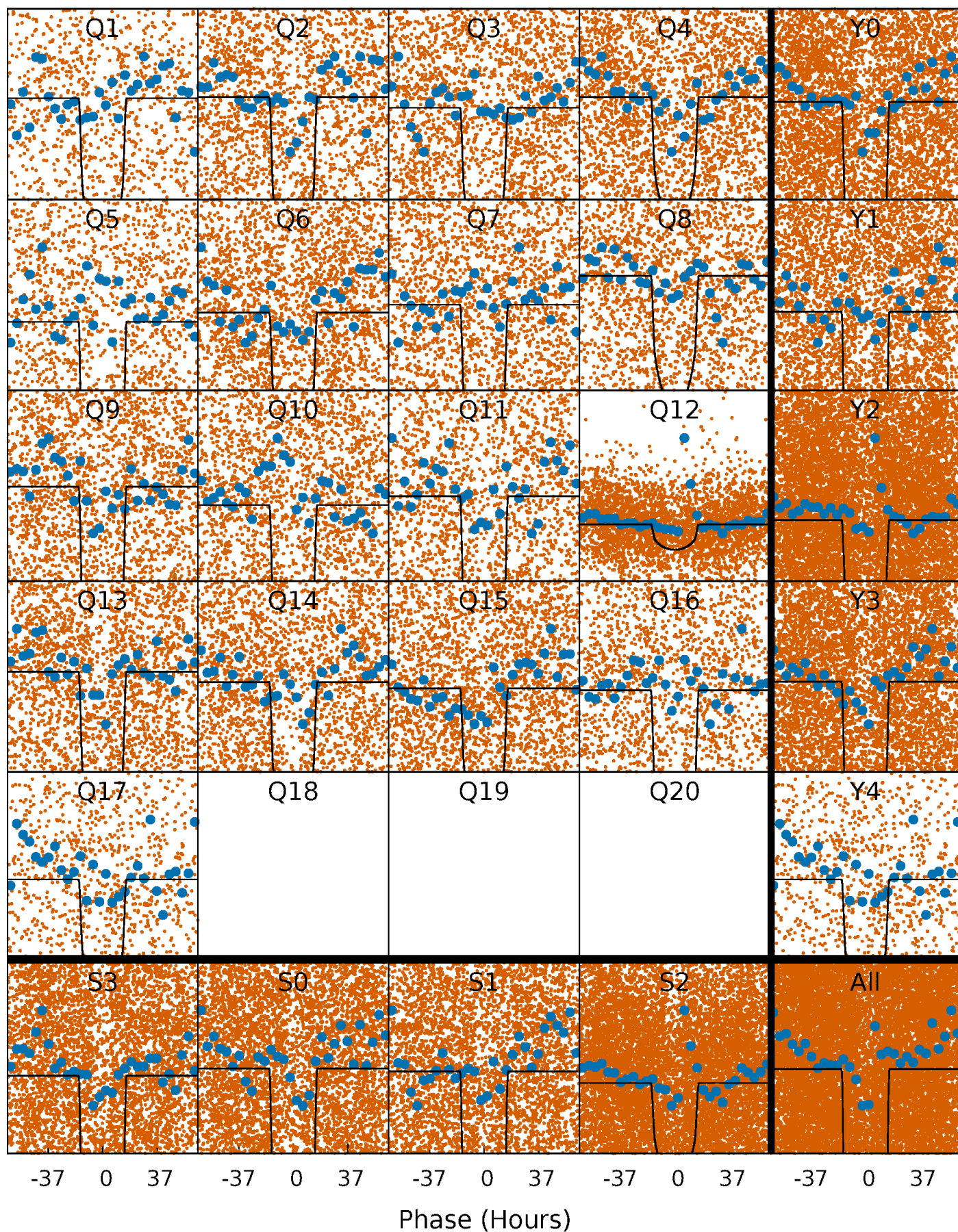
# PDC Quarter-Phased Transit Curves

TCE 004678171-02   P= 5.096373 Days    $T_0=132.790058$  (BKJD)



# DV Quarter-Phased Transit Curves

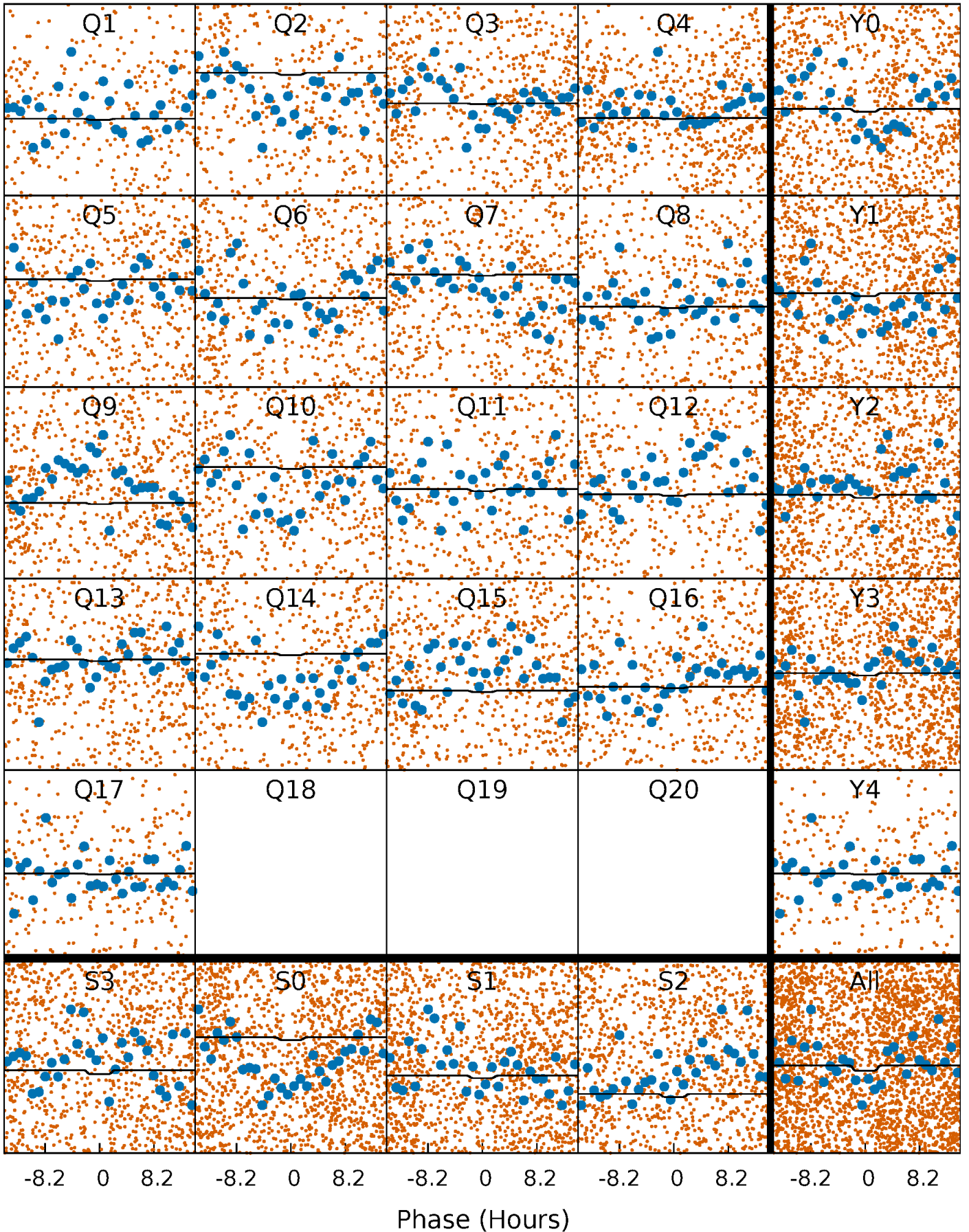
TCE 004678171-02 P= 5.096373 Days  $T_0=132.790058$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

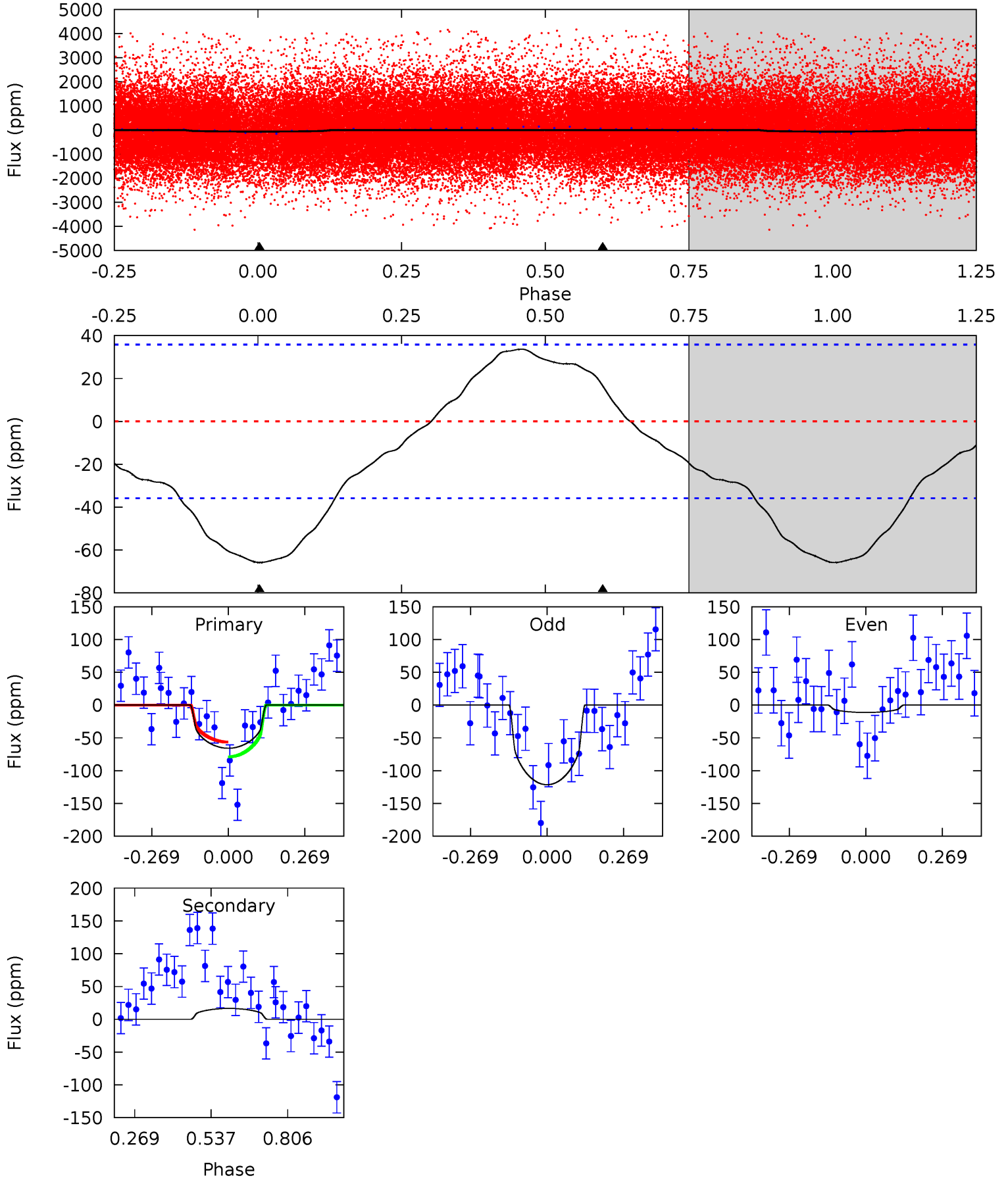
TCE 004678171-02   P= 5.096302 Days    $T_0=132.943577$  (BKJD)



# DV Model-Shift Uniqueness Test

004678171-02, P = 5.096373 Days, E = 127.693685 Days

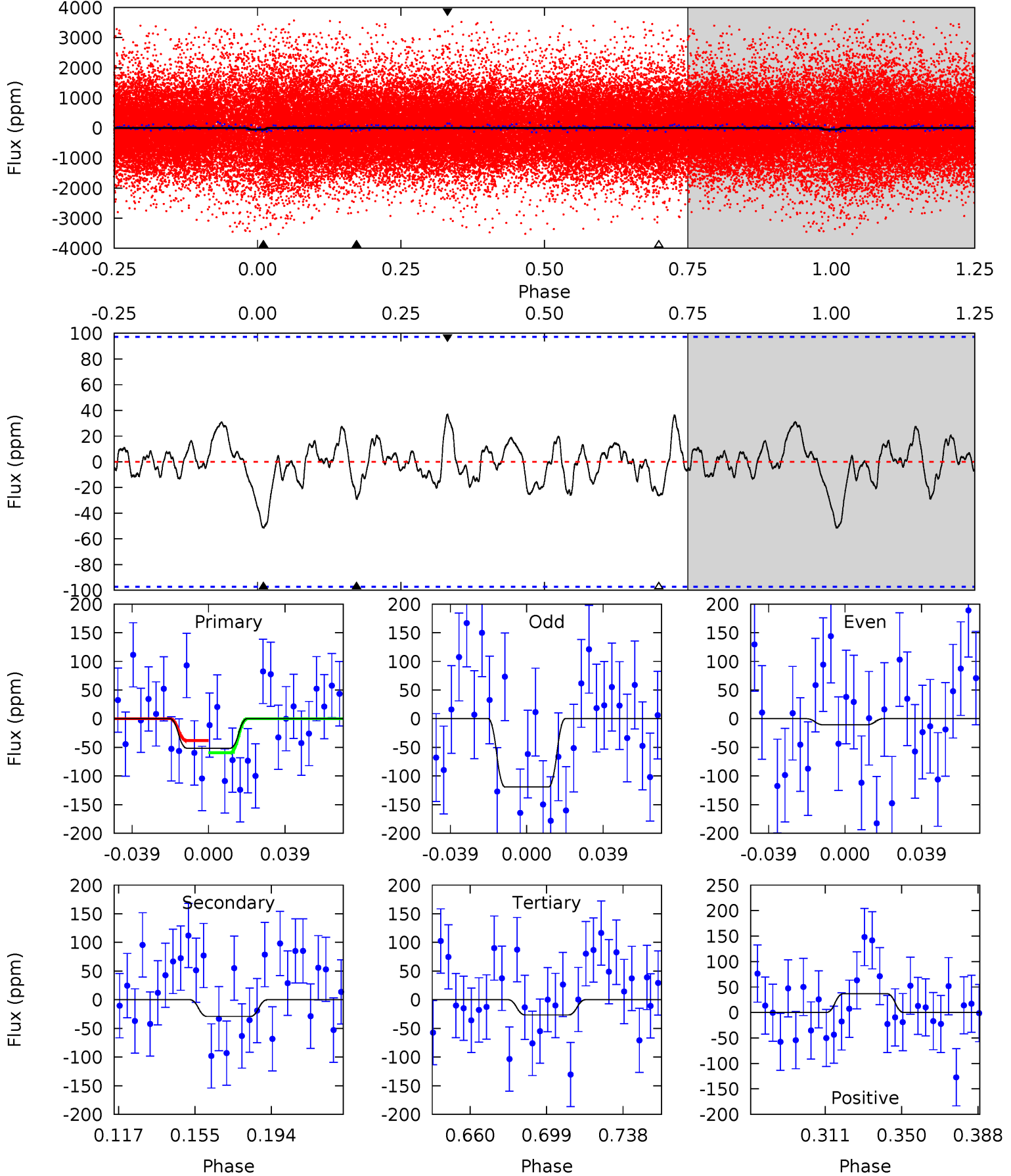
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.00	-2.01	0	0	4.35	1.11	0.76	8.00	8.00	-2.01	-2.01	6.75	-1.87	0.34	1.39



# Alt Model-Shift Uniqueness Test

004678171-02, P = 5.096302 Days, E = 127.847275 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
2.52	1.42	1.29	1.81	4.76	2.07	0.61	1.22	0.71	0.13	-0.38	2.65	1.91	0.42	0.52





### Stellar Parameters For KIC 004678171

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4464^{+132}_{-145}$	$4.577^{+0.059}_{-0.017}$	$0.200^{+0.200}_{-0.300}$	$0.719^{+0.029}_{-0.063}$	$0.711^{+0.050}_{-0.055}$	$2.693^{+0.630}_{-0.195}$
	+3%/-3%	+1%/-0%	+100%/-150%	+4%/-9%	+7%/-8%	+23%/-7%
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 004678171-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$17 \pm 8$	$2.38^{+0.14}_{-0.14}$	$1015^{+34}_{-36}$	$-2441^{+166}_{-138}$	$-4.306^{+2.132}_{-2.373}$
Alt.	$-29 \pm 20$	$0.28^{+0.10}_{-0.10}$	$1015^{+34}_{-37}$	$5163^{+1536}_{-1306}$	$525^{+968}_{-411}$

$T_{max}$  = 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

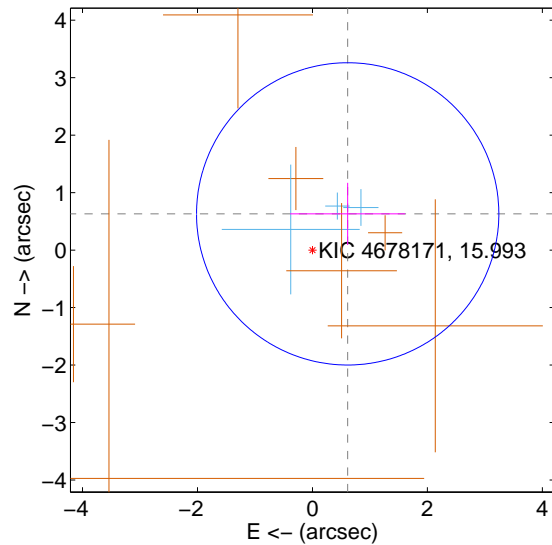
Supplemental centroid analysis for 004678171-02. Kepler magnitude: 15.99. Transit SNR 31.94

There are 3 quarters with good PRF difference image offsets

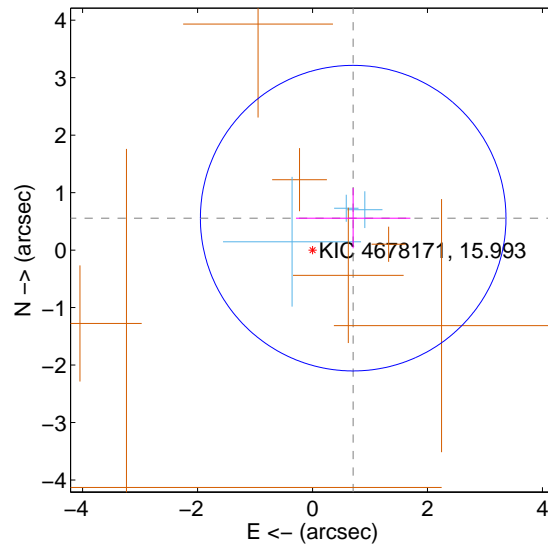
The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.879 \pm 0.876$	1.00	$-0.613 \pm 1.000$	$0.630 \pm 0.541$
PRF-fit source offset from KIC position	$0.899 \pm 0.886$	1.02	$-0.707 \pm 0.995$	$0.556 \pm 0.524$
photometric centroid source offset	$0.79 \pm 0.13$	6.17	$0.19 \pm 0.12$	$-0.76 \pm 0.13$

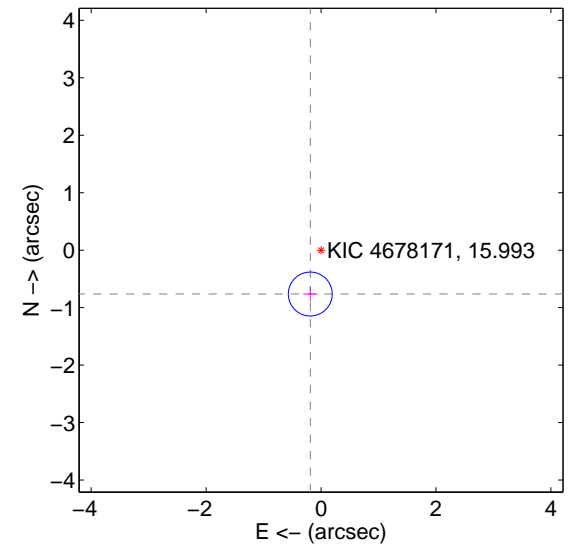
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

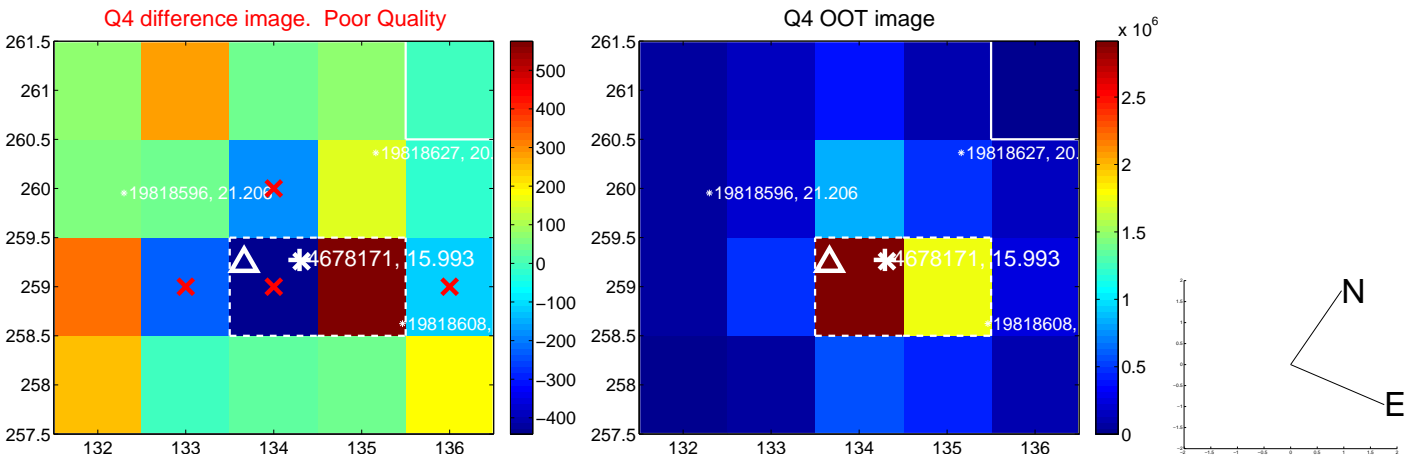
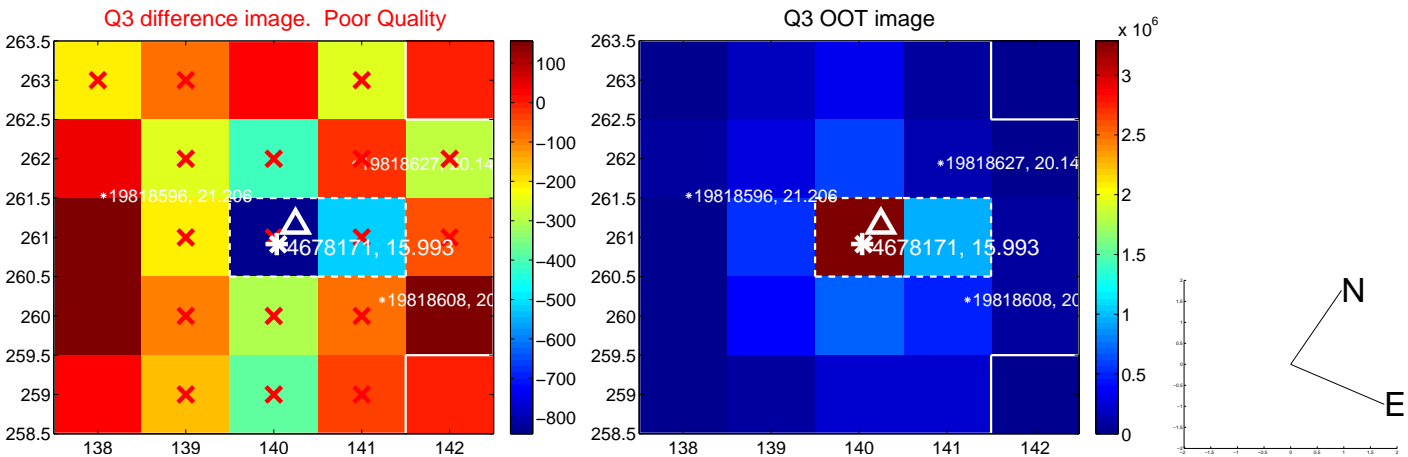
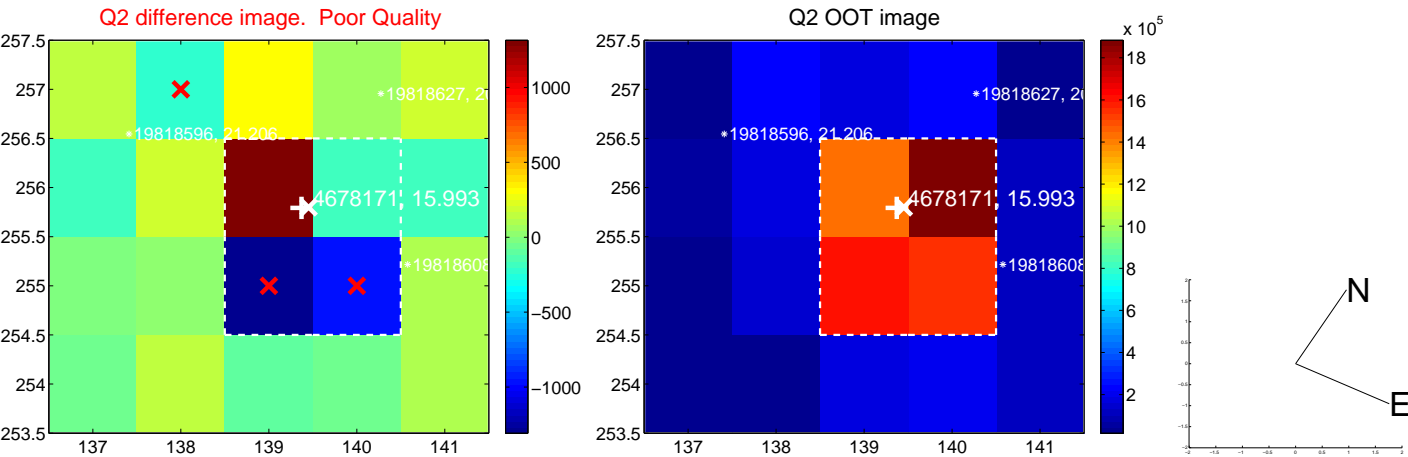
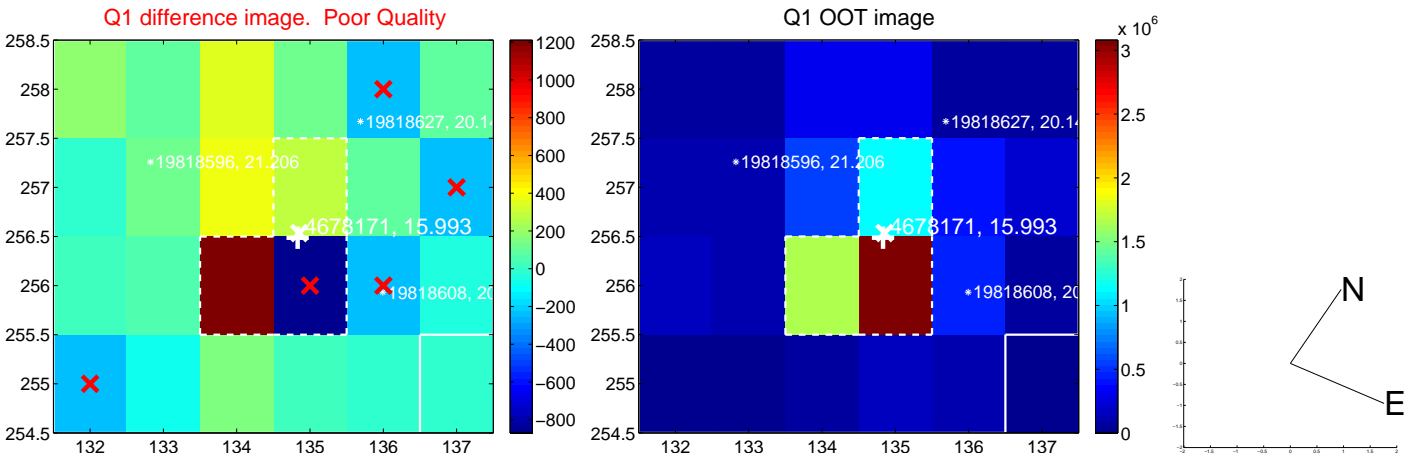


offset from photometric centroids

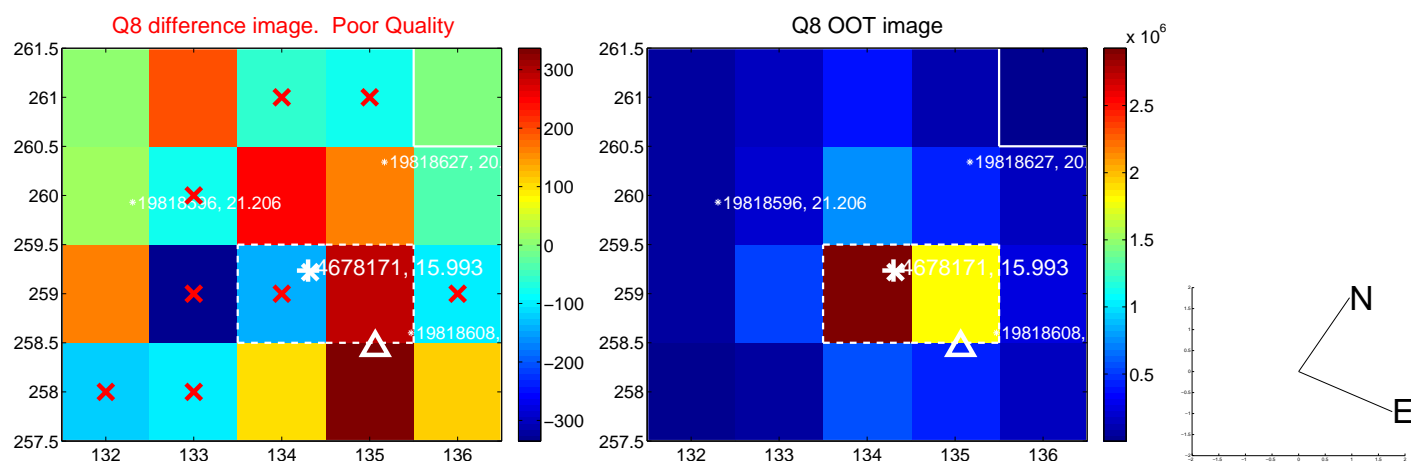
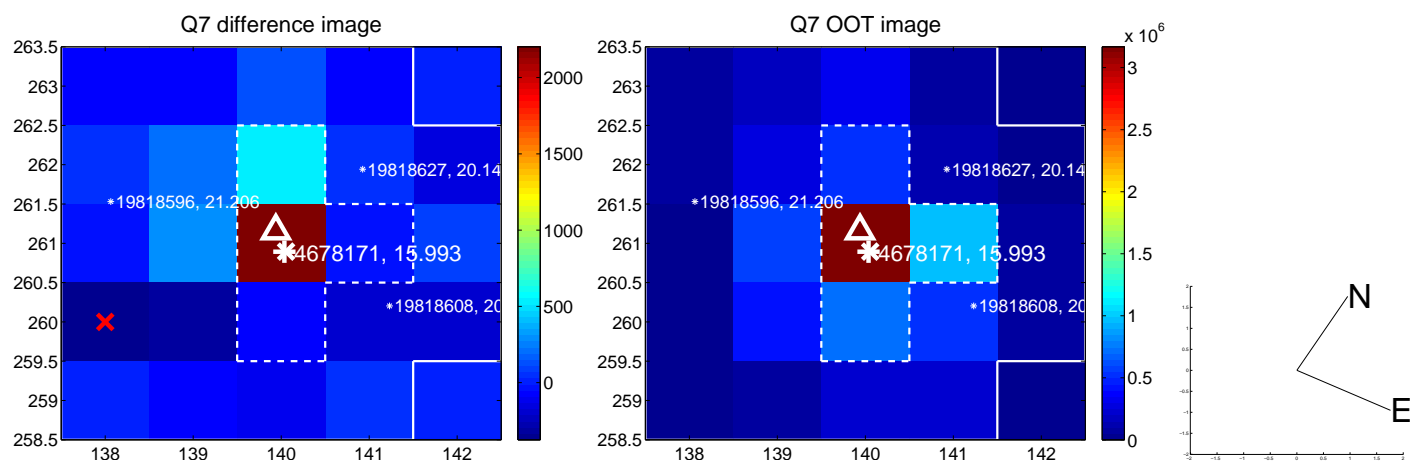
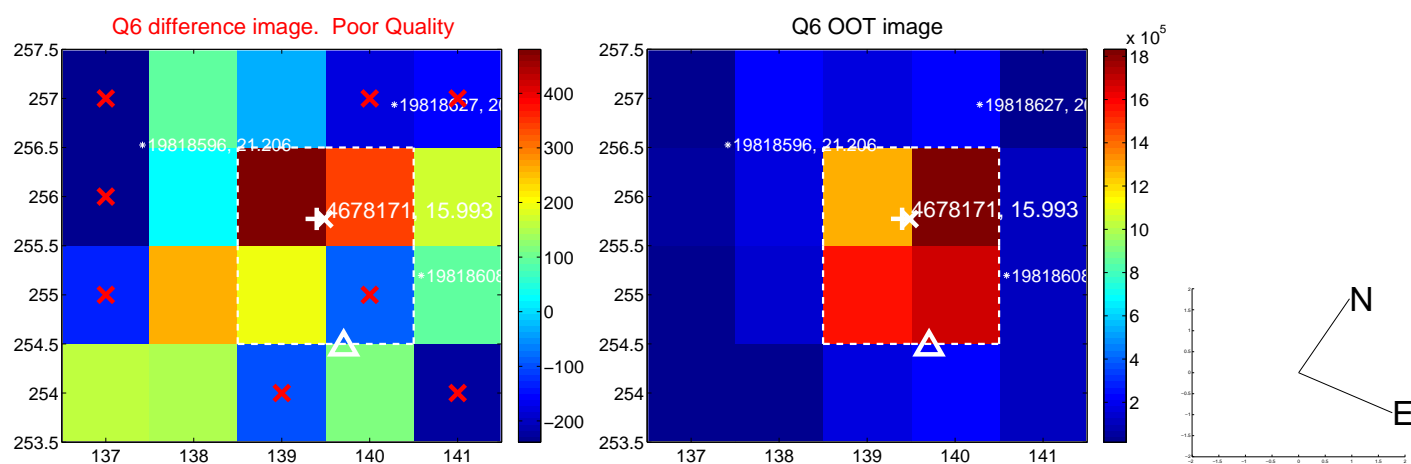
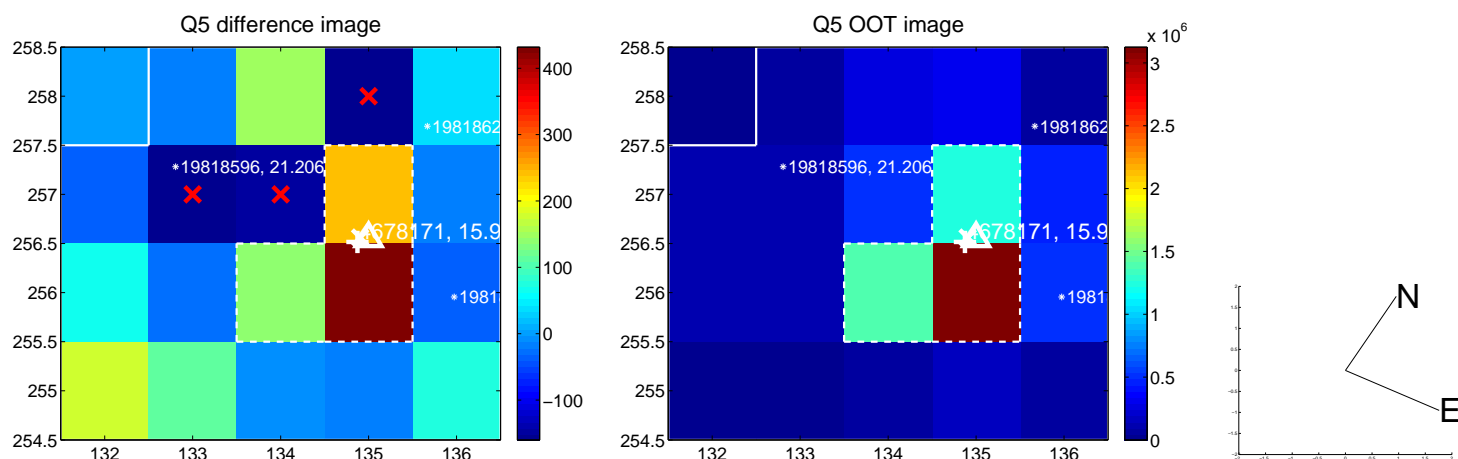


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

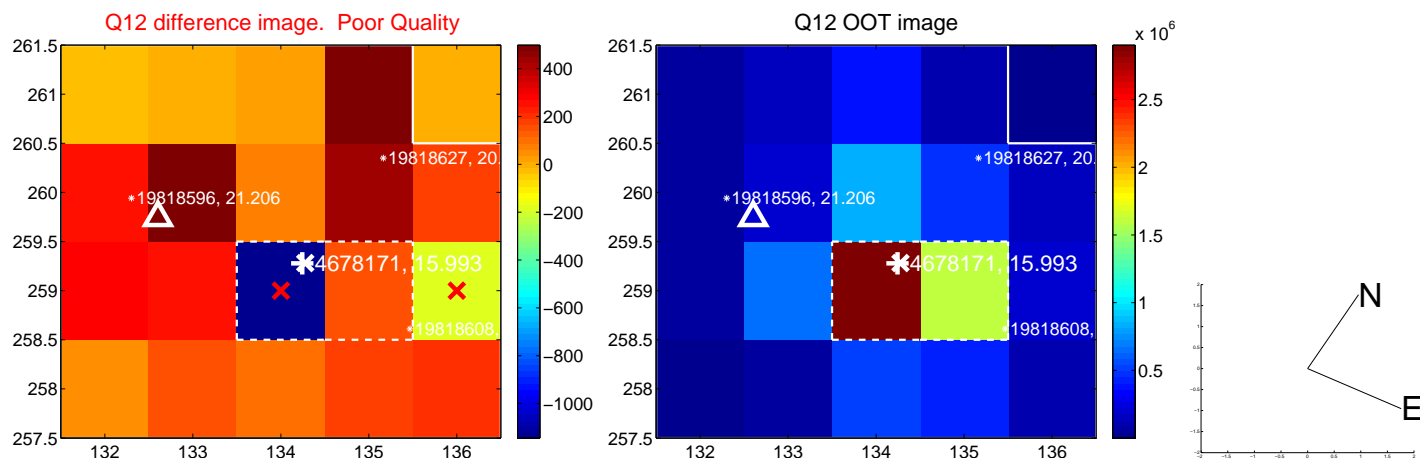
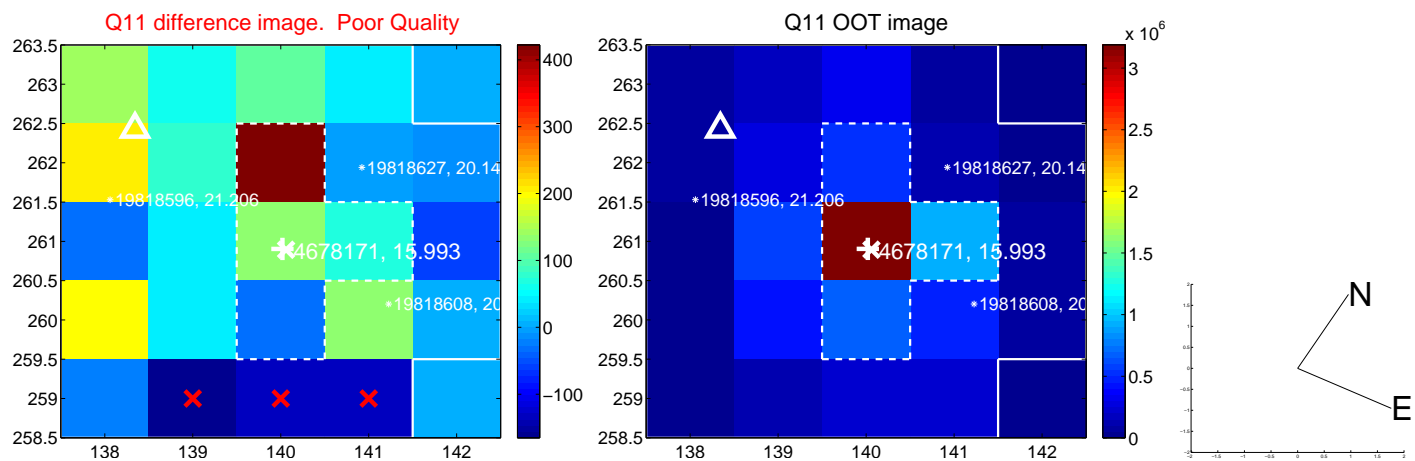
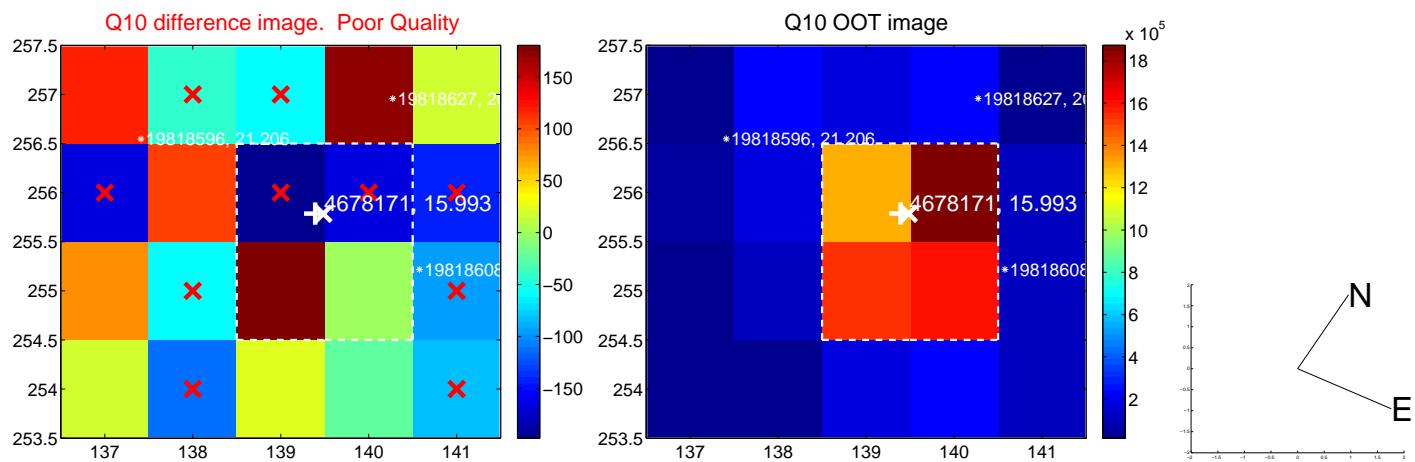
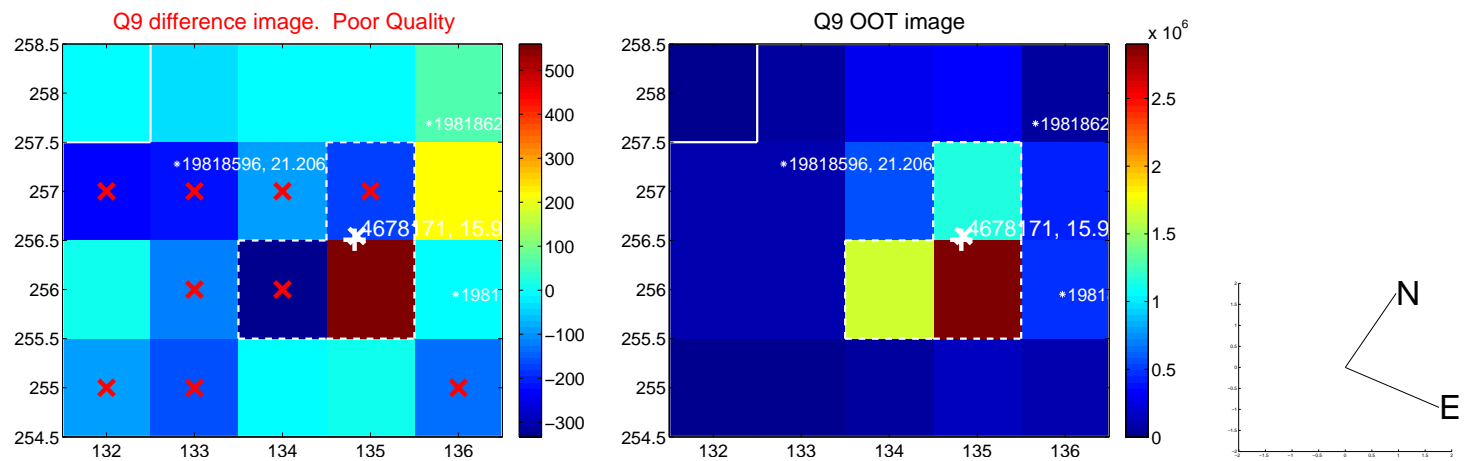
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



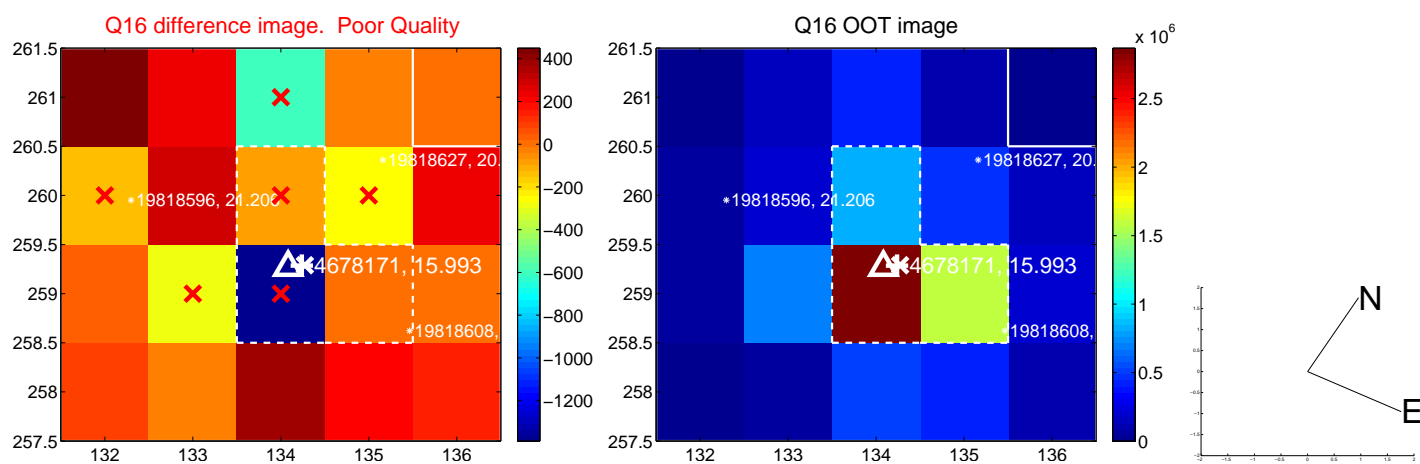
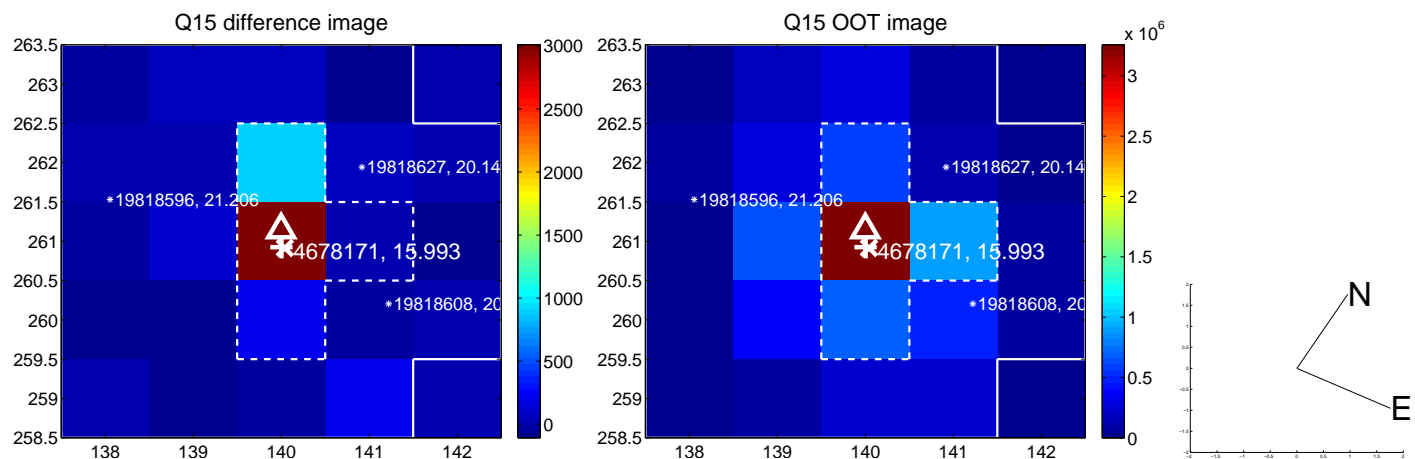
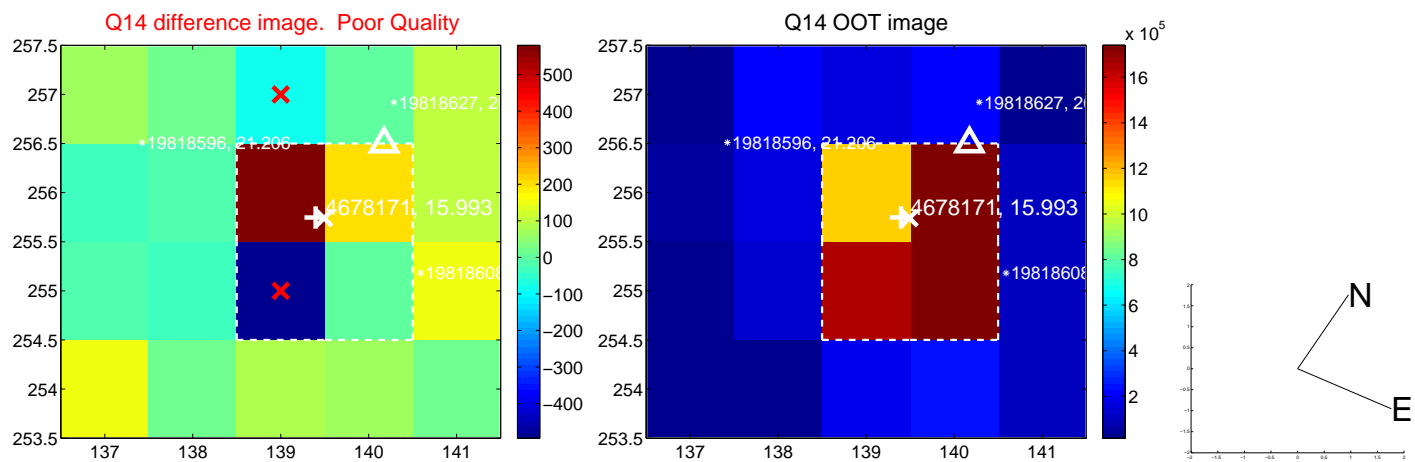
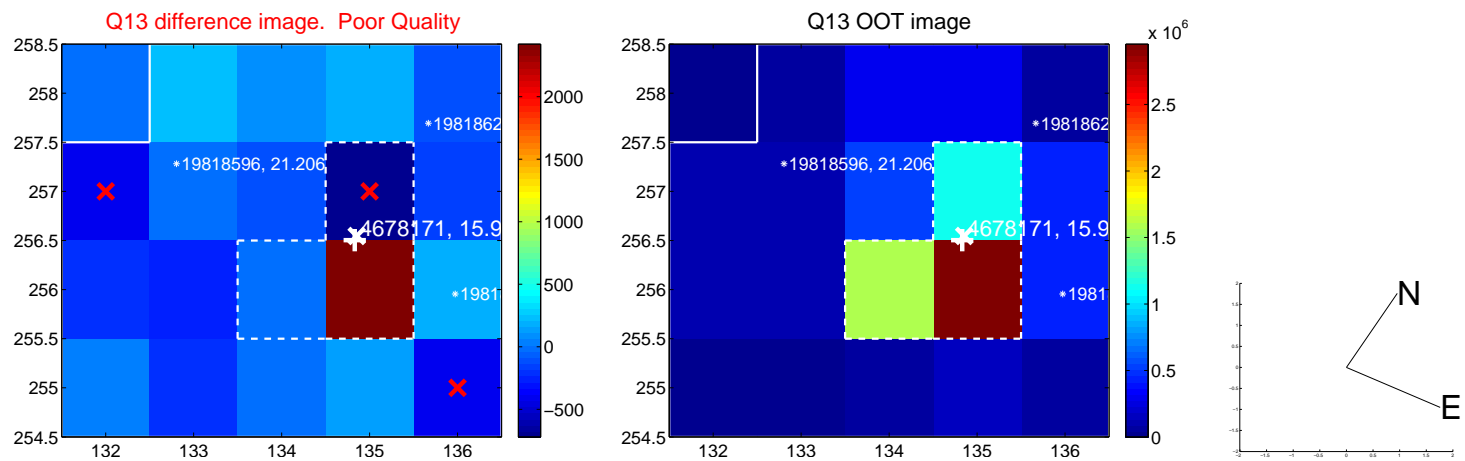
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.





UKIRT Image

Declination

