

# KIC 004633285

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004633285-01	OBS	No	234.408219	162.811551	4537.7	5.747	13.2	8.4	0.62	5157	4.49	0.61
004633285-02	OBS	No	0.733810	131.668663	0.0	2.857	10.1	0.0	0.62	5157	0.00	1330.35

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004633285-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004633285-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_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.

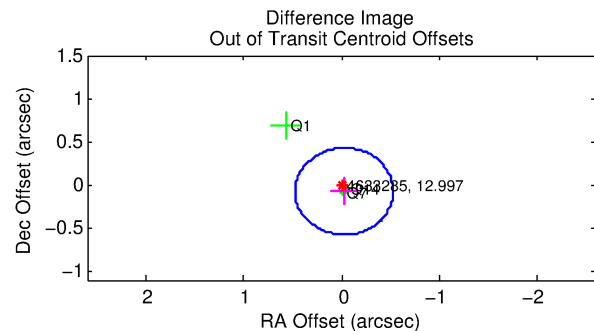
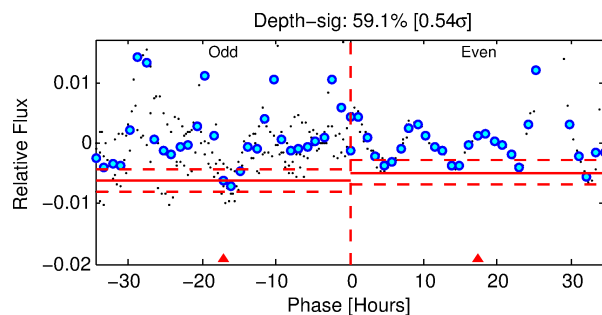
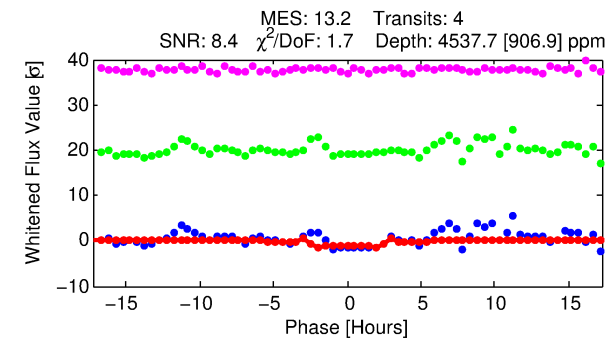
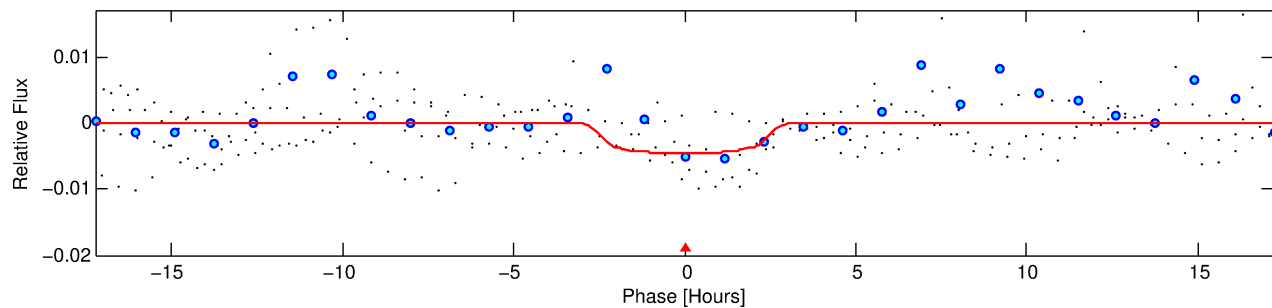
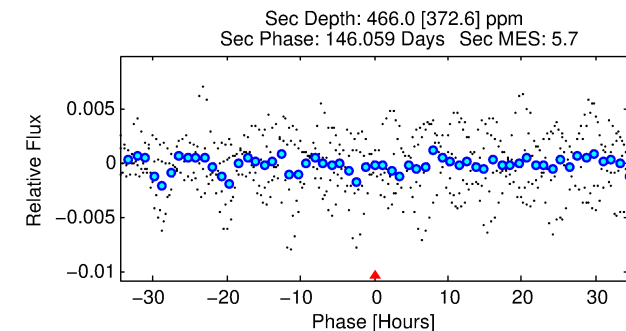
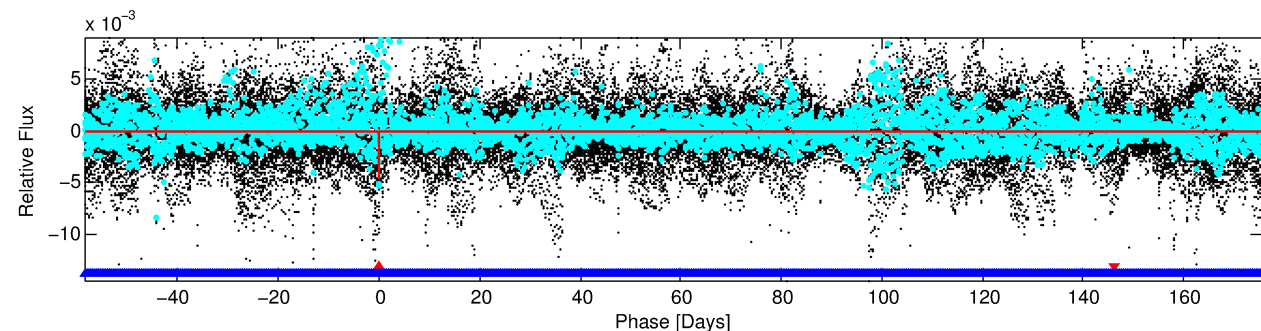
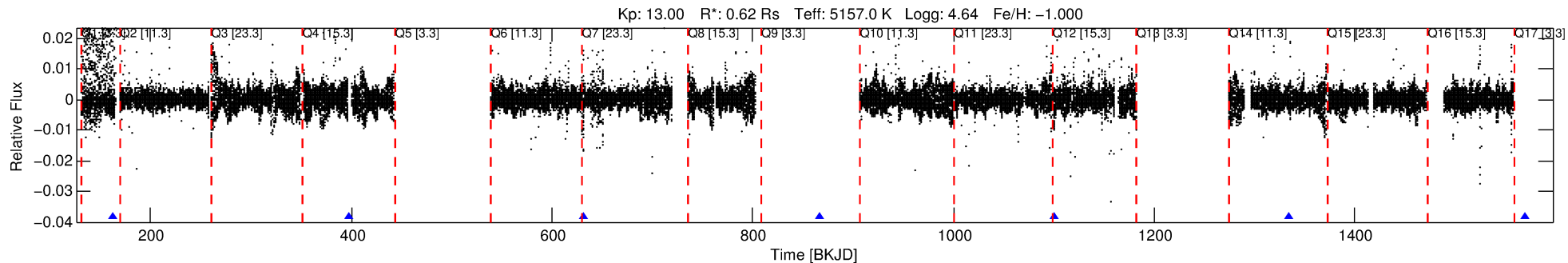
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004633285-01

No Significant Match Found

# DV One-Page Summary

KIC: 4633285 Candidate: 1 of 2 Period: 234.408 d



## DV Fit Results:

Period = 234.40822 [0.00283] d  
Epoch = 162.8116 [0.0113] BKJD  
Rp/R\* = 0.0663 [0.0104]  
a/R\* = 245.34 [107.41]  
b = 0.72 [0.30]  
Seff = 0.61 [0.10]  
Teq = 225 [9] K  
Rp = 4.49 [0.79] Re  
a = 0.6323 [0.0437] AU  
Ag = 5092.38 [4407.57] [1.16σ]  
Teffp = 2942 [638] K [4.26σ]

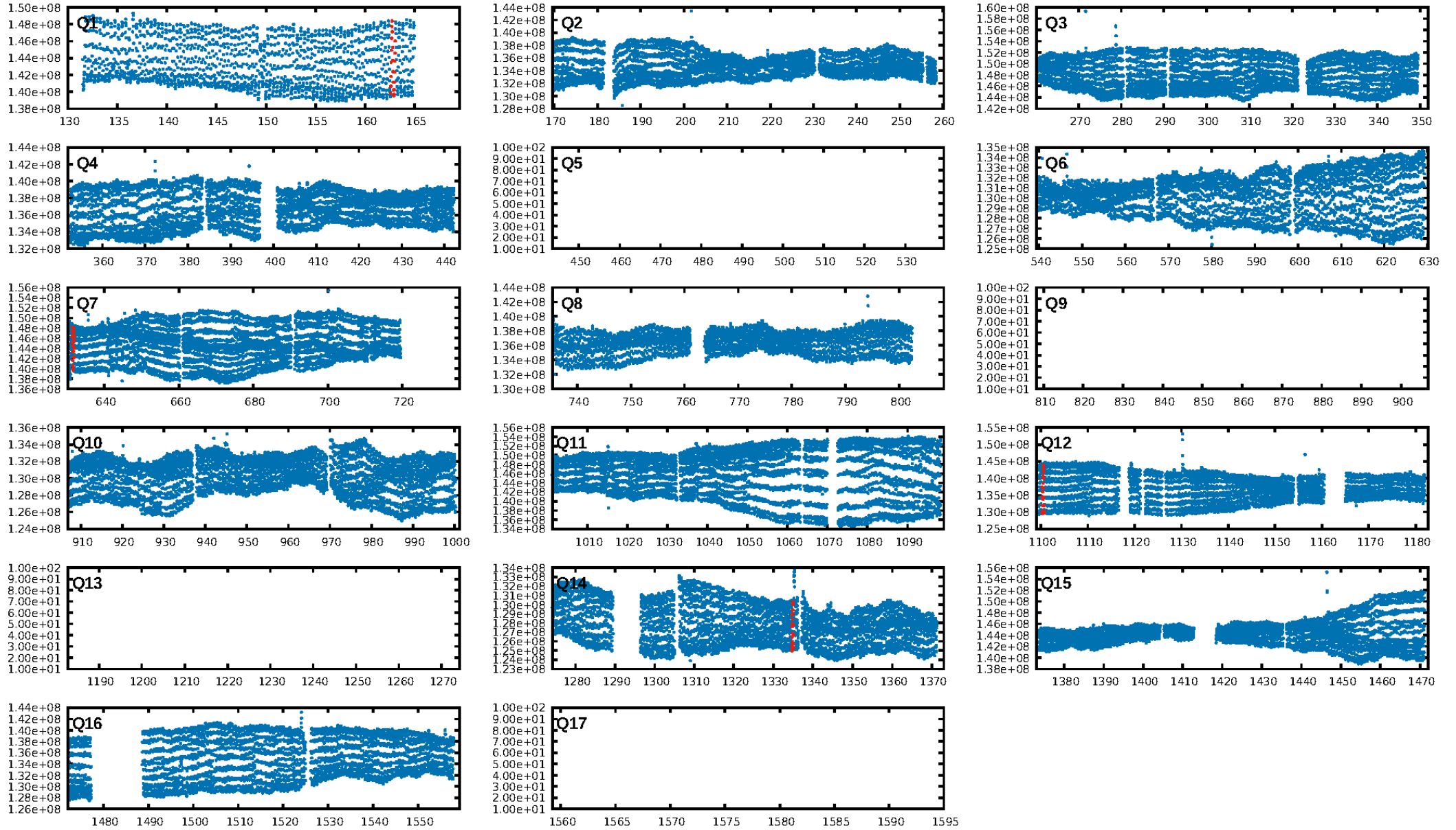
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [873.81σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 11.4%  
ModelChiSquareGof-sig: 72.8%  
Bootstrap-pfa: 4.46e-20  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 4.674  
Centroid-sig: 20.7%  
Centroid-so: 0.050 arcsec [0.50σ]  
OotOffset-rm: 0.079 arcsec [0.47σ]  
OotOffset-st: 1/1/0/1 [3]  
KicOffset-rm: 0.274 arcsec [1.97σ]  
KicOffset-st: 1/1/0/1 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 0.00 [0/3]

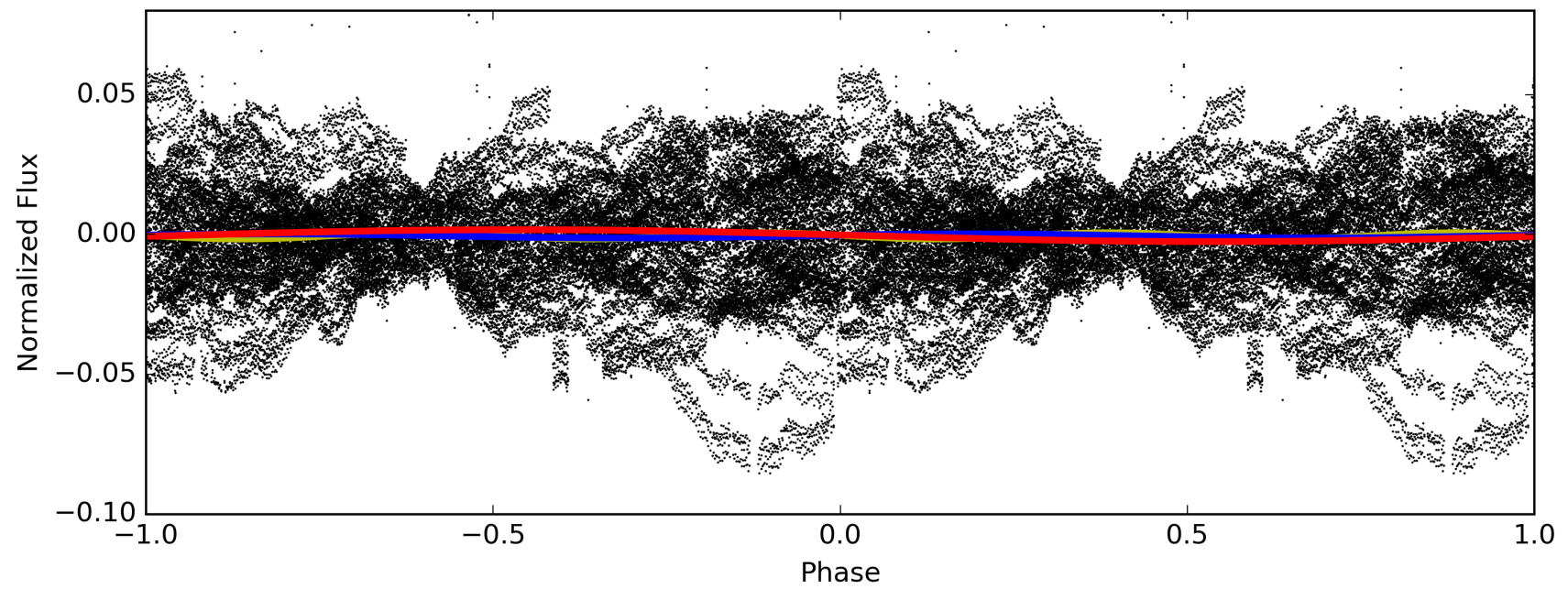
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 04:41:25 Z

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

# TCE 004633285-01, PDC Light Curves

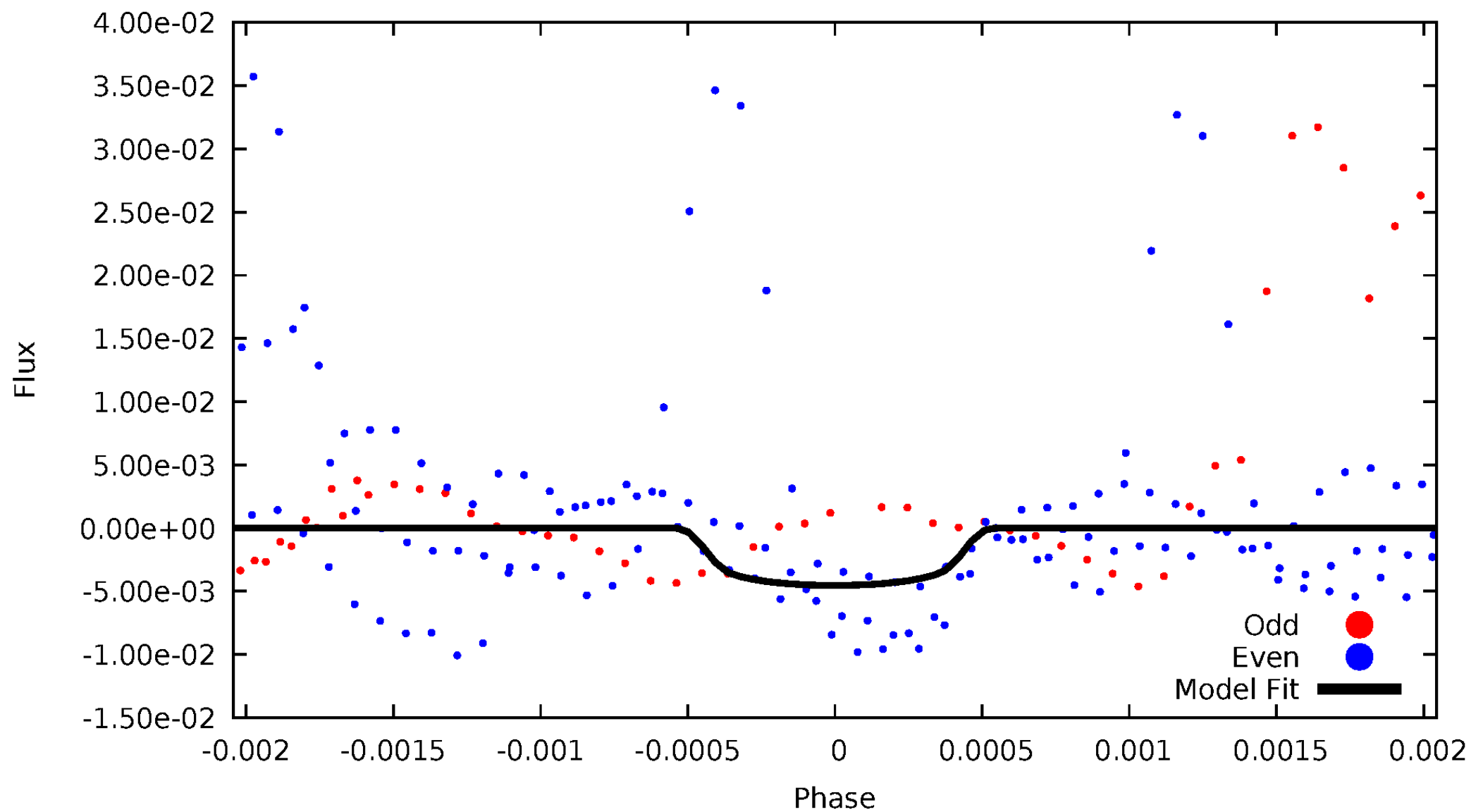


— P = 117.204 days      — P = 234.408 days      — P = 468.816 days



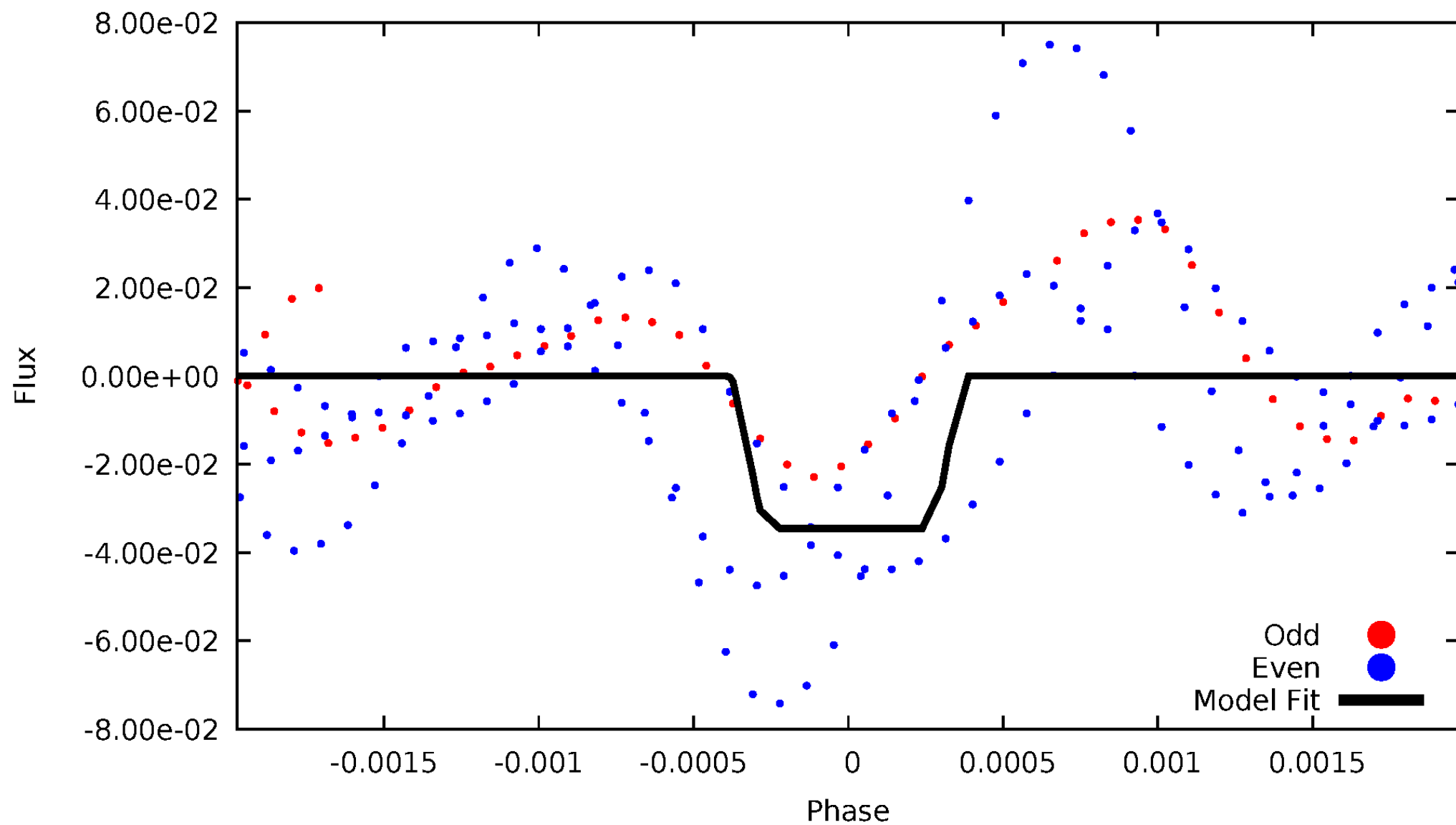
# DV Odd/Even

TCE 004633285-01



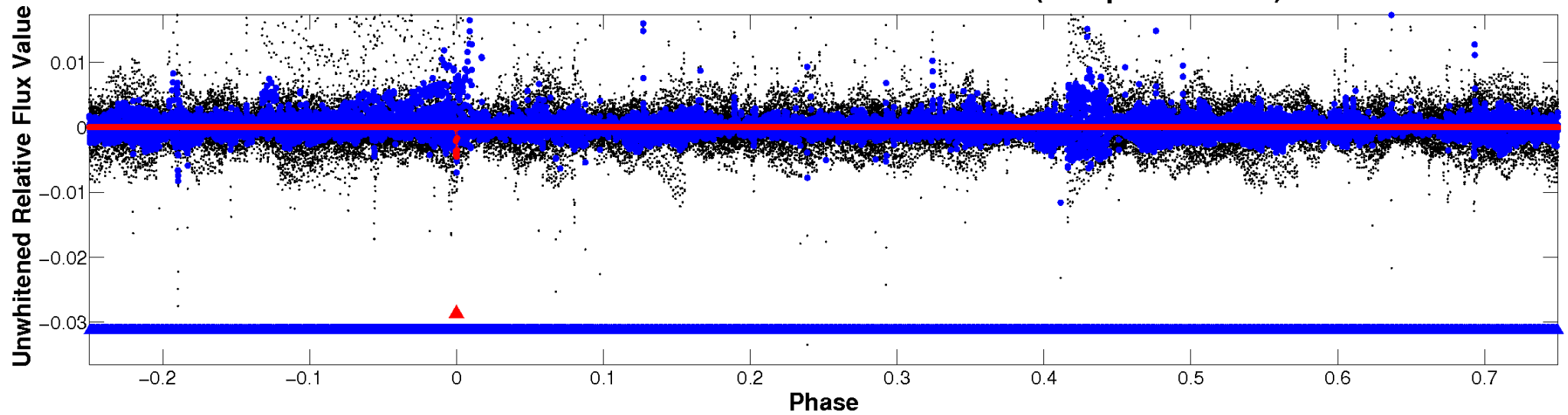
# ALT Odd/Even

TCE 004633285-01

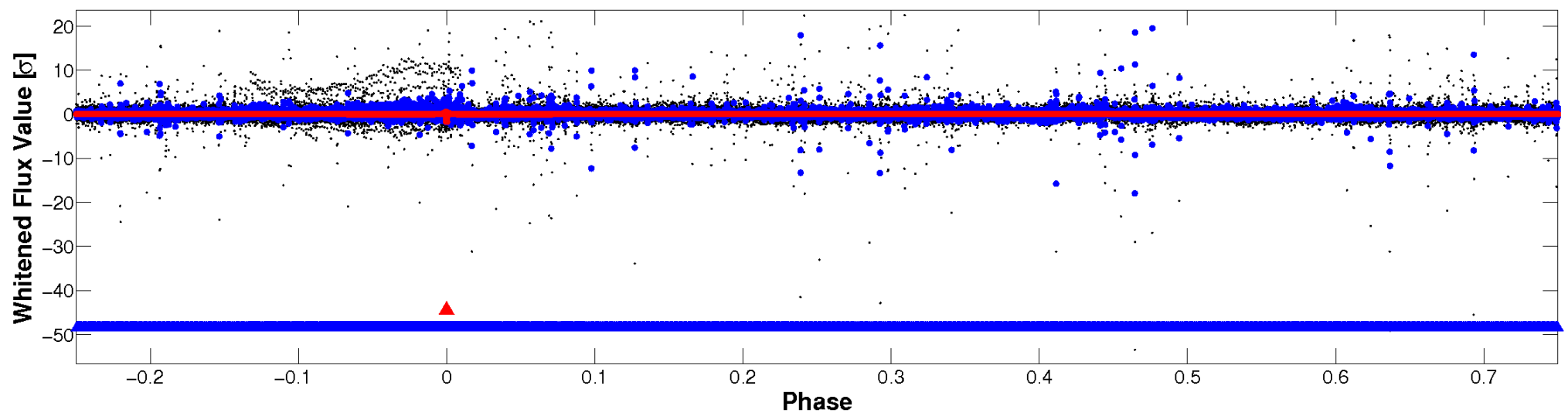


# Non-Whitened Vs. Whitened Light Curve

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

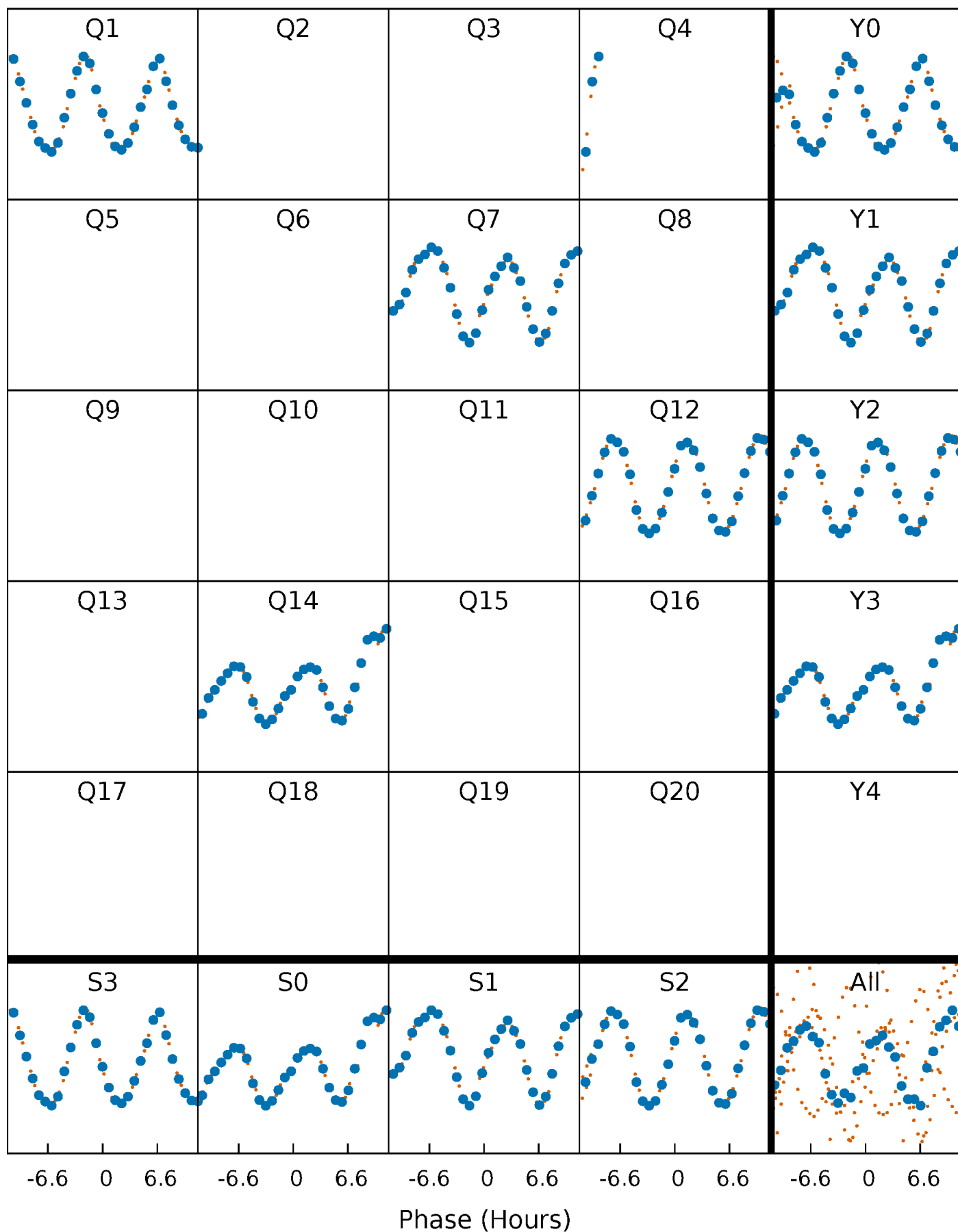


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

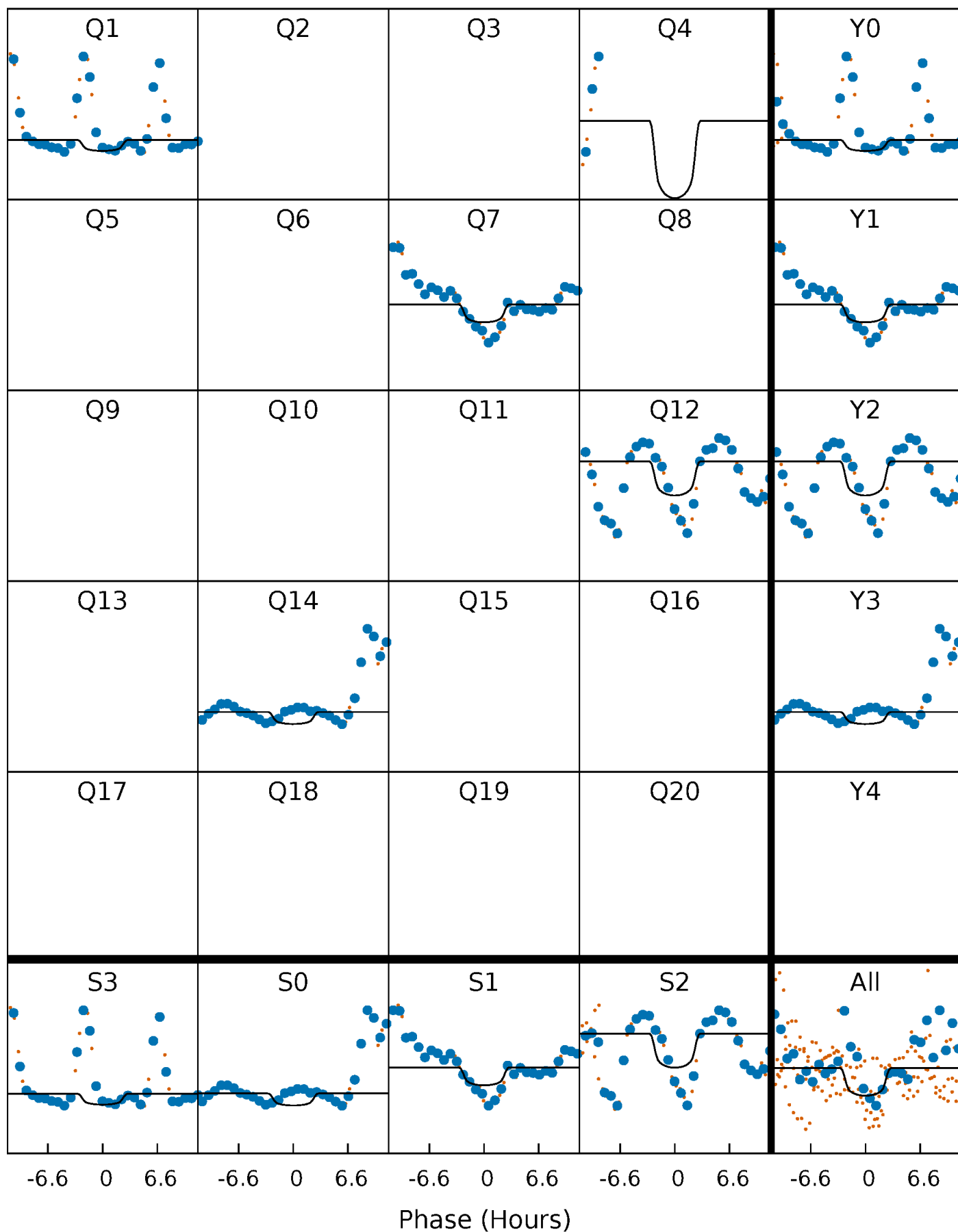
TCE 004633285-01 P=234.408219 Days  $T_0=162.811551$  (BKJD)





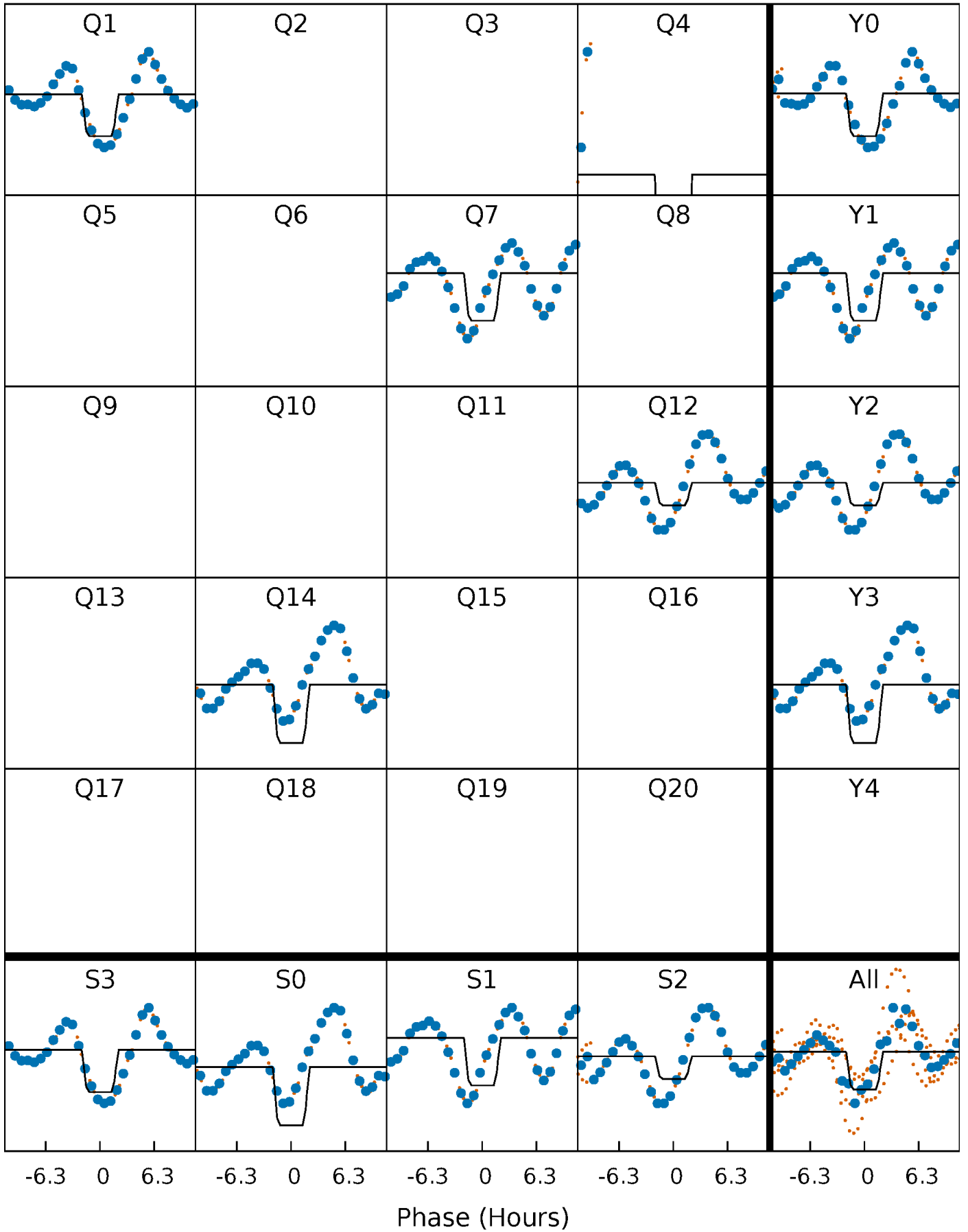
# DV Quarter-Phased Transit Curves

TCE 004633285-01 P=234.408219 Days  $T_0=162.811551$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

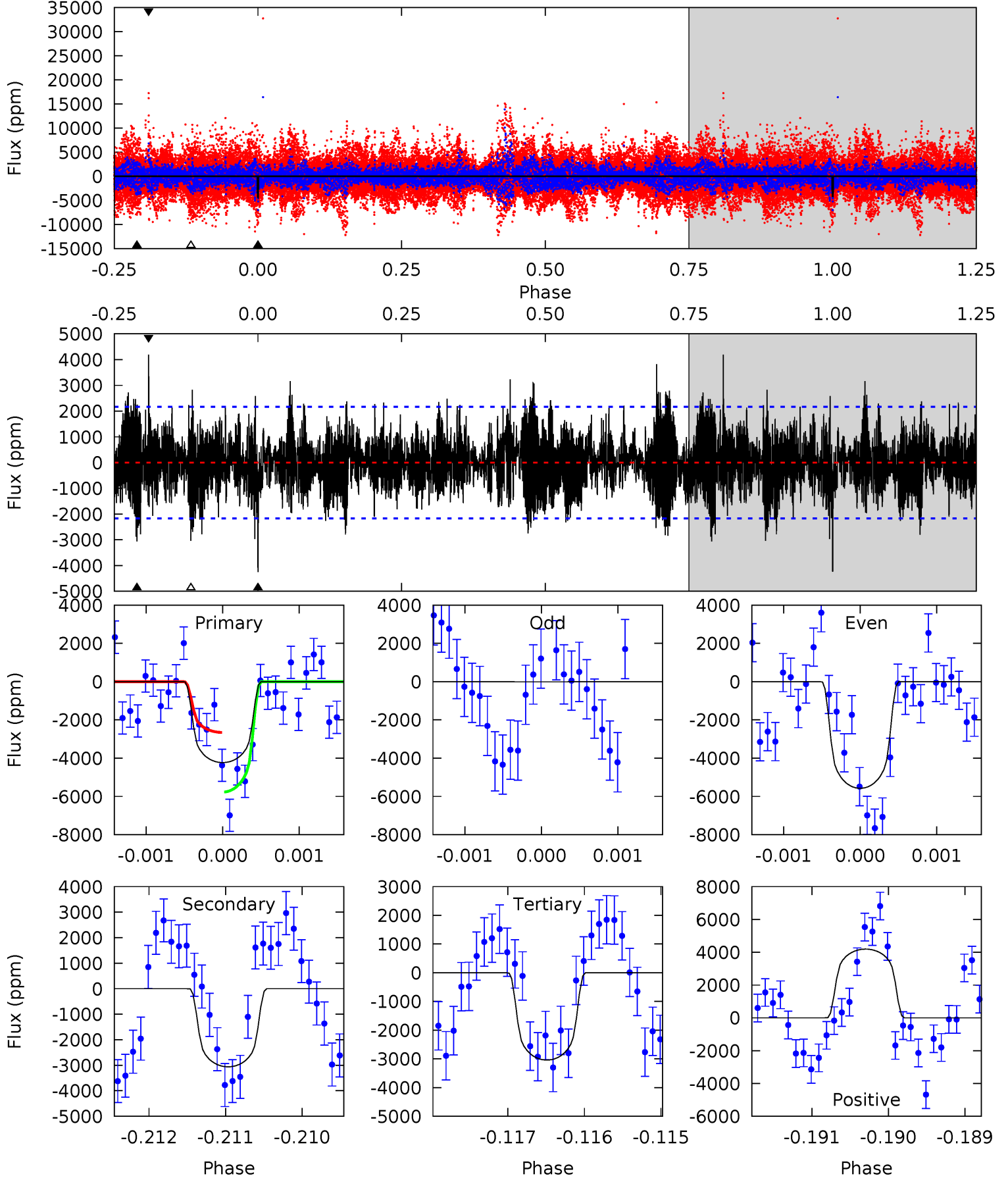
TCE 004633285-01 P=234.372933 Days  $T_0=162.867246$  (BKJD)



# DV Model-Shift Uniqueness Test

004633285-01, P = 234.408219 Days, E = 162.811551 Days

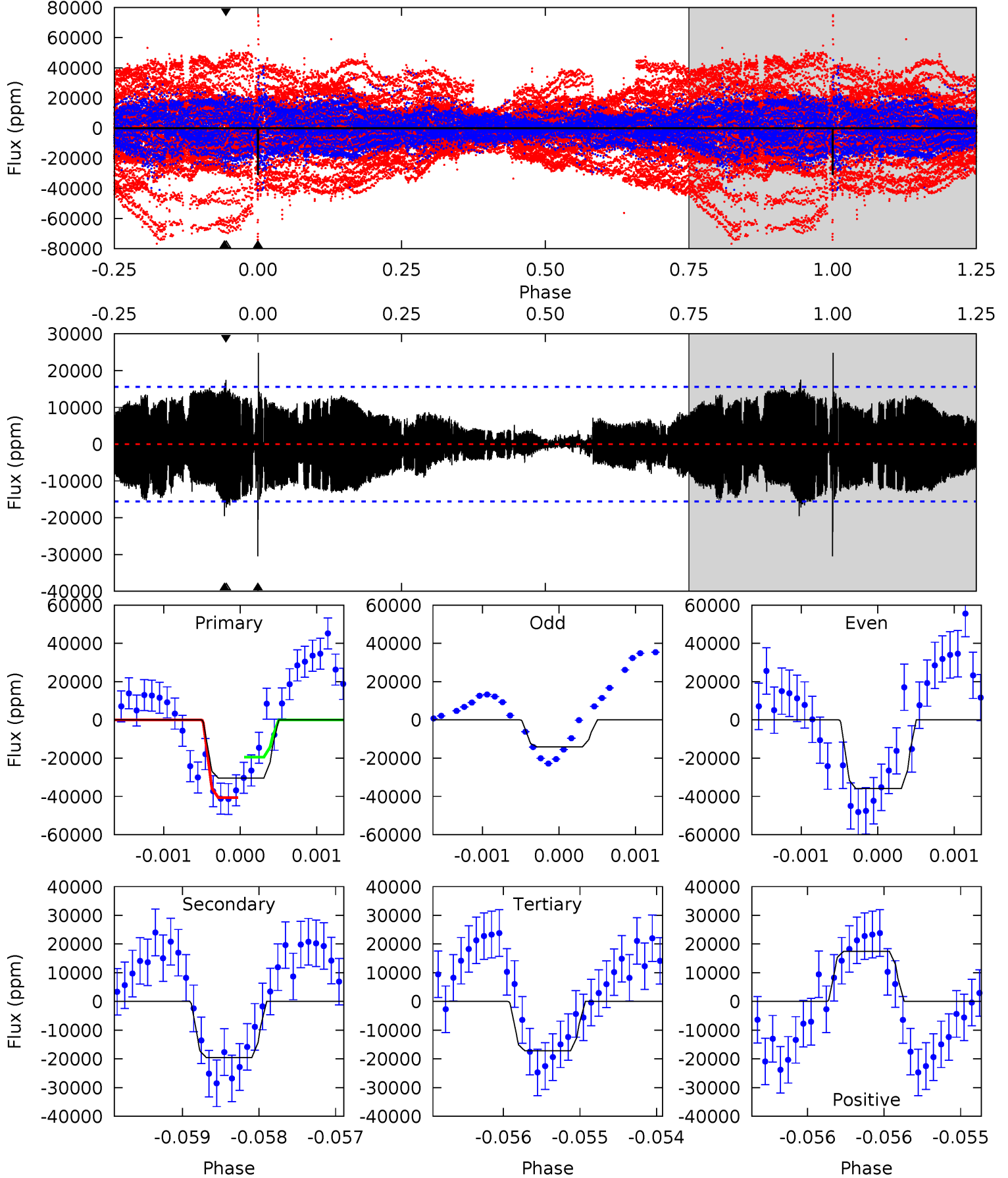
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.6	7.67	7.63	10.5	5.44	3.27	2.26	2.98	0.10	0.05	-2.84	5.65	0.59	0.50	3.92



# Alt Model-Shift Uniqueness Test

004633285-01, P = 234.372933 Days, E = 162.867246 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
10.7	6.89	6.07	6.17	5.50	3.36	2.16	4.67	4.57	0.83	0.72	4.29	0.98	0.45	3.75



### Stellar Parameters For KIC 004633285

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5157^{+153}_{-153}$	$4.641^{+0.060}_{-0.040}$	$-1.000^{+0.300}_{-0.300}$	$0.620^{+0.048}_{-0.048}$	$0.614^{+0.053}_{-0.023}$	$3.621^{+0.876}_{-0.529}$
	+3%/-3%	+1%/-1%	+30%/-30%	+8%/-8%	+9%/-4%	+24%/-15%
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 004633285-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-3061 \pm 399$	$4.49^{+0.75}_{-0.71}$	$314^{+10}_{-12}$	$4767^{+440}_{-326}$	$33757^{+15791}_{-9733}$
Alt.	$-19527 \pm 2833$	$12.60^{+0.95}_{-0.97}$	$313^{+12}_{-11}$	$4591^{+232}_{-216}$	$27988^{+6720}_{-5309}$

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

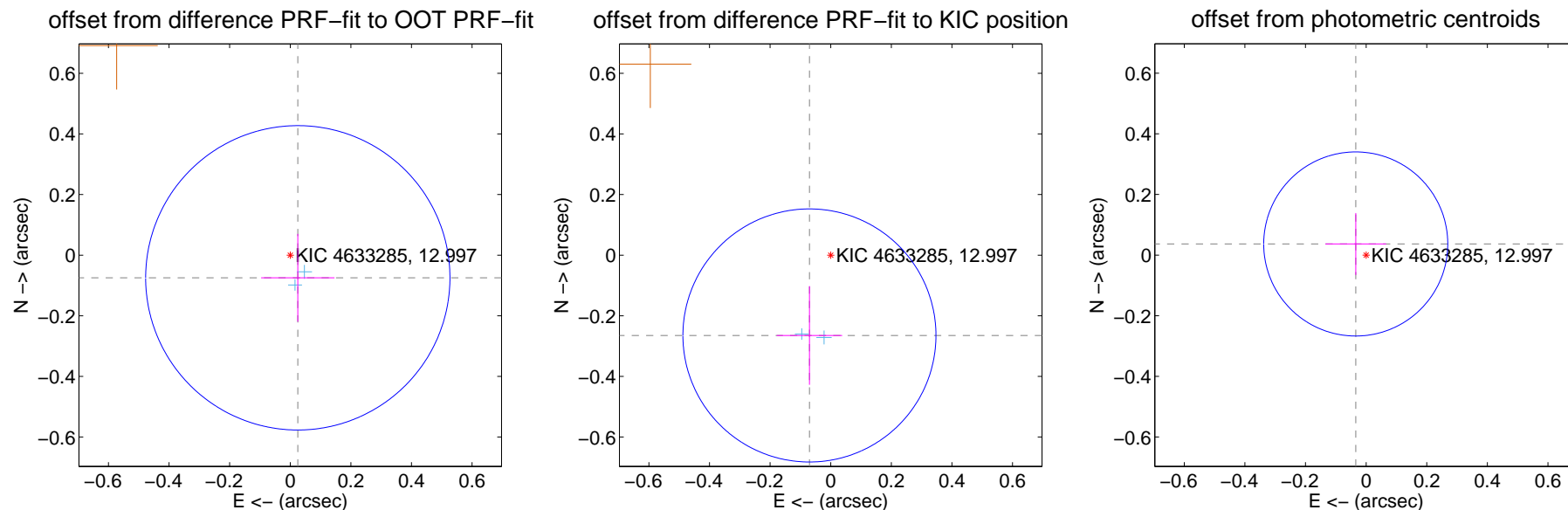
## DV Centroid Data

Supplemental centroid analysis for 004633285-01. Kepler magnitude: 13.00. Transit SNR 8.37

There are 2 quarters with good PRF difference image offsets

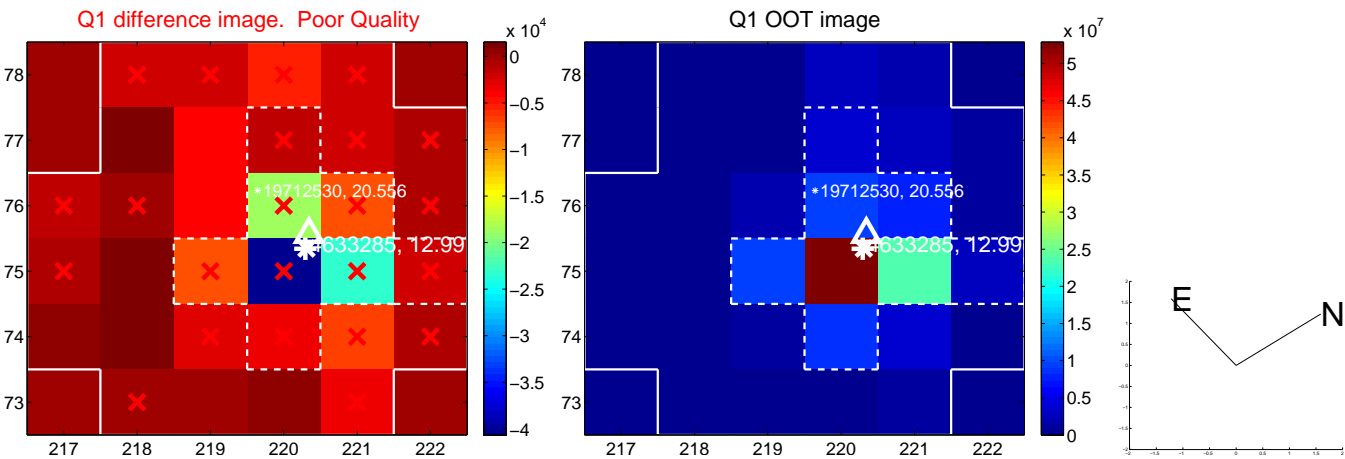
The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.079 \pm 0.167$	0.47	$-0.025 \pm 0.121$	$-0.075 \pm 0.145$
PRF-fit source offset from KIC position	$0.274 \pm 0.139$	1.97	$0.070 \pm 0.108$	$-0.265 \pm 0.163$
photometric centroid source offset	$0.05 \pm 0.10$	0.50	$0.03 \pm 0.10$	$0.04 \pm 0.10$

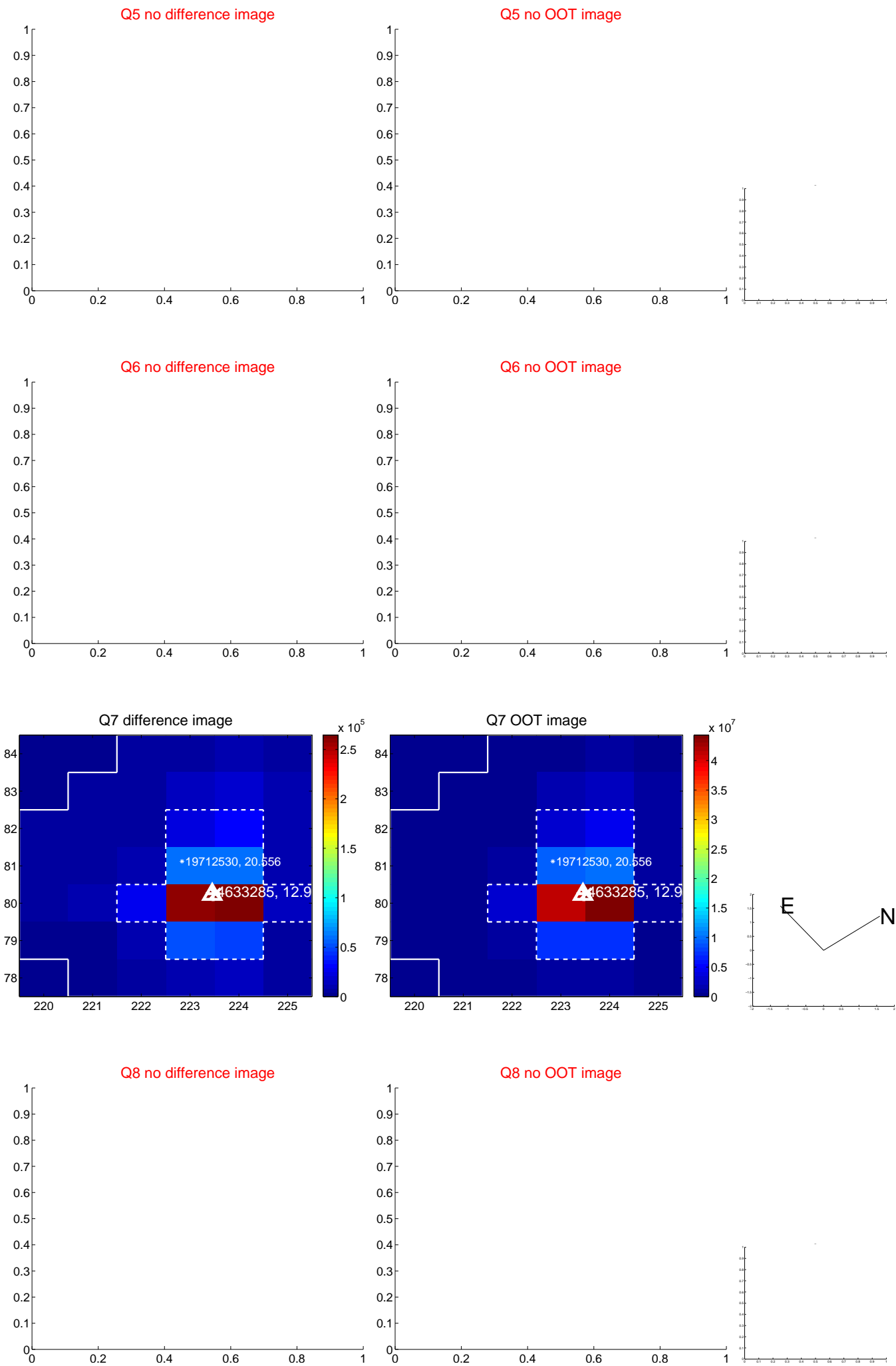


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . 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 ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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

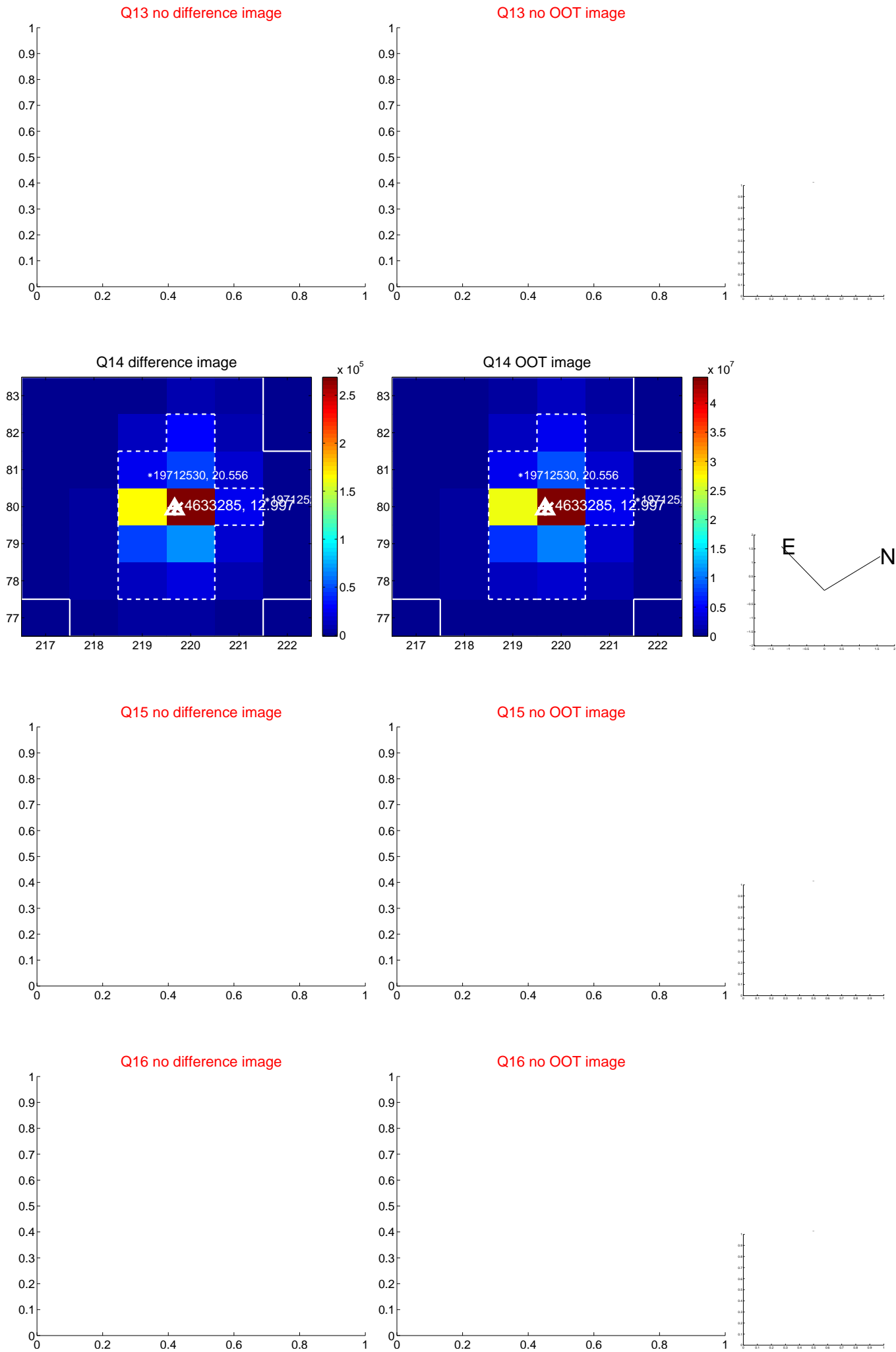




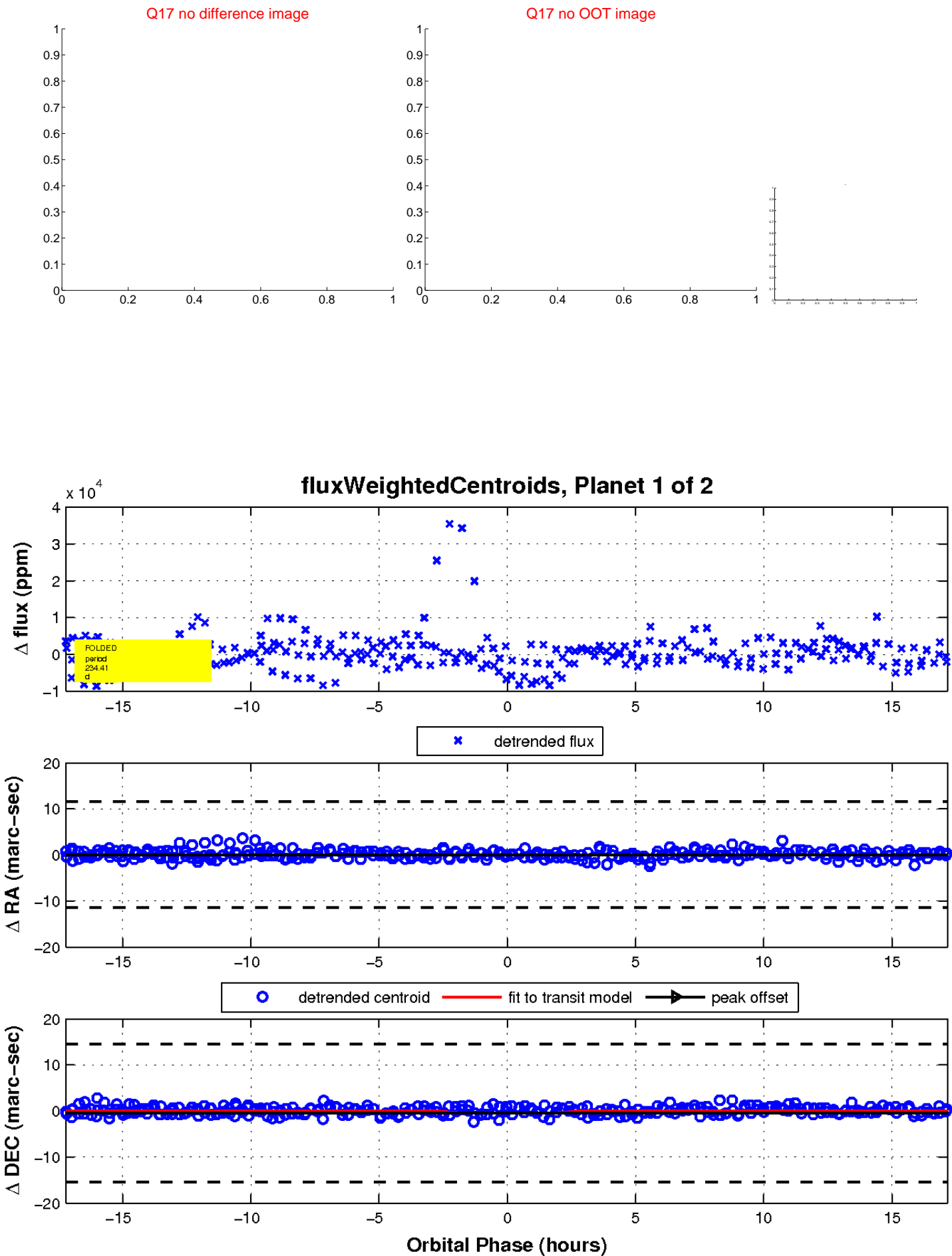
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



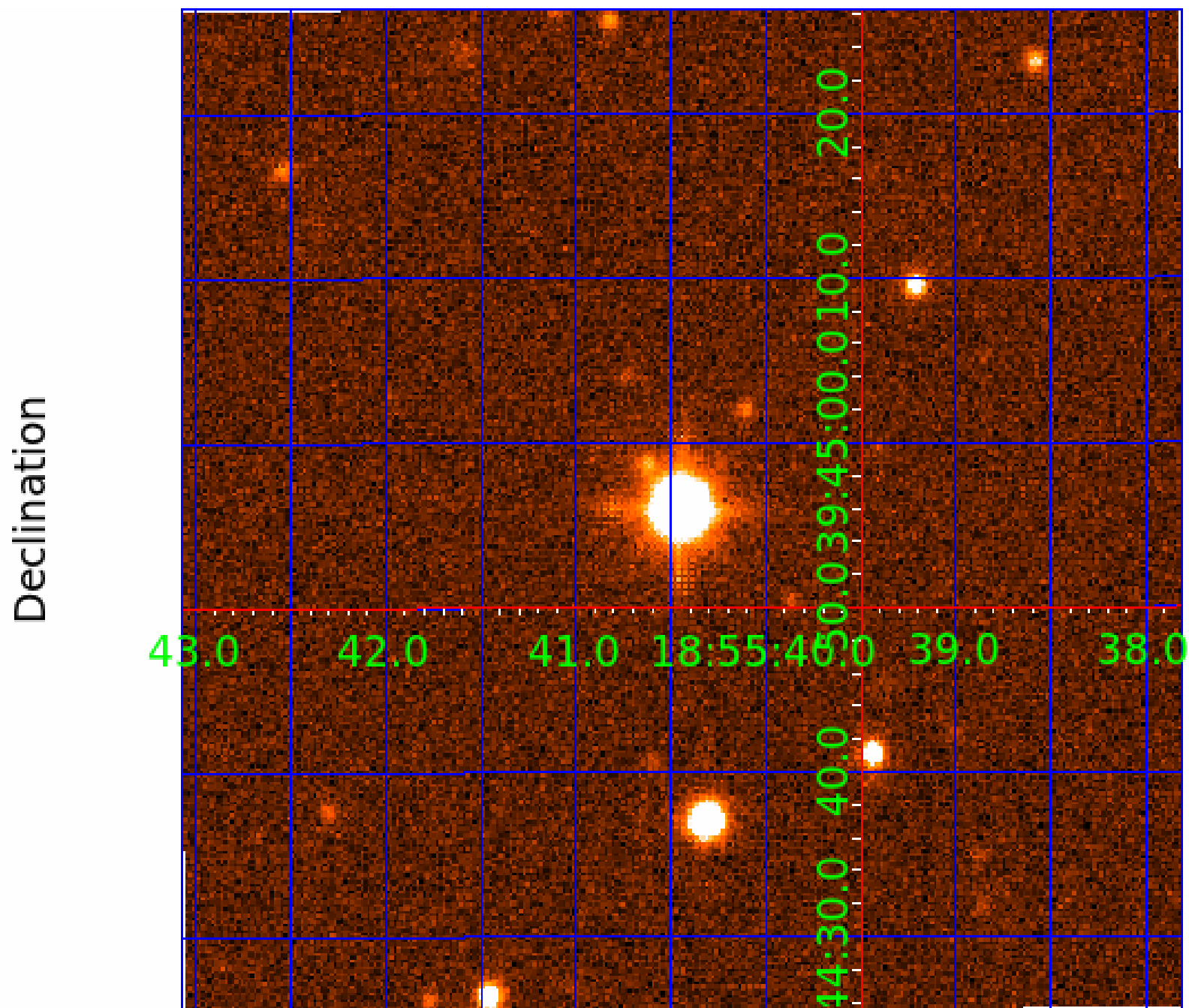
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 004633285

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004633285-01	OBS	No	234.408219	162.811551	4537.7	5.747	13.2	8.4	0.62	5157	4.49	0.61
004633285-02	OBS	No	0.733810	131.668663	0.0	2.857	10.1	0.0	0.62	5157	0.00	1330.35

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004633285-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004633285-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_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.

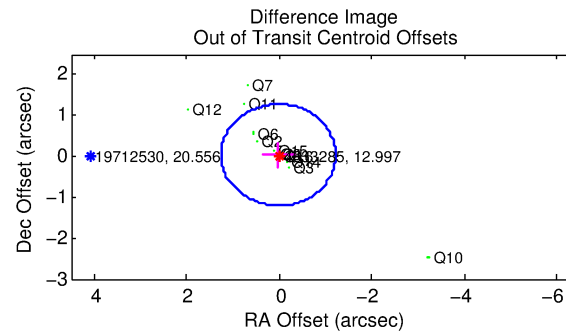
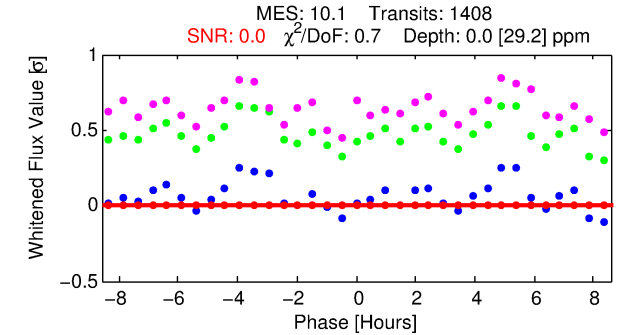
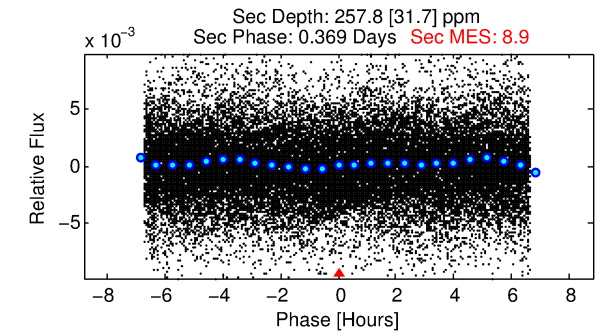
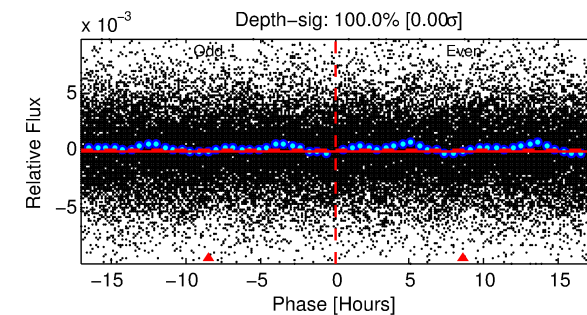
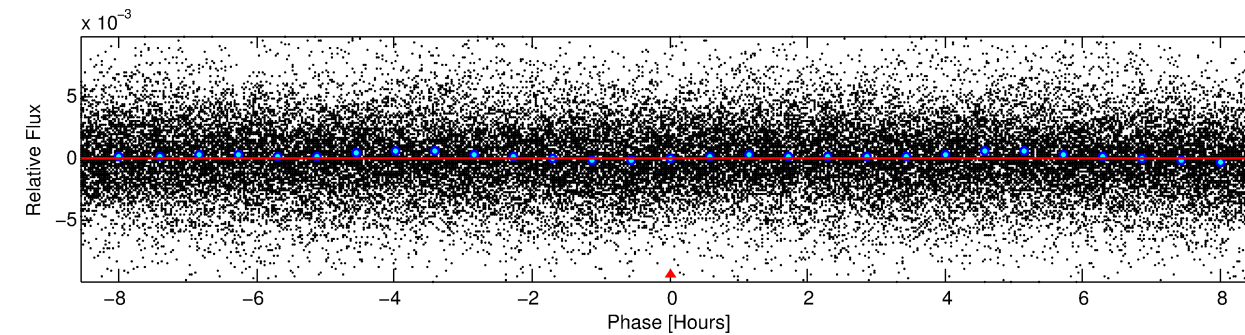
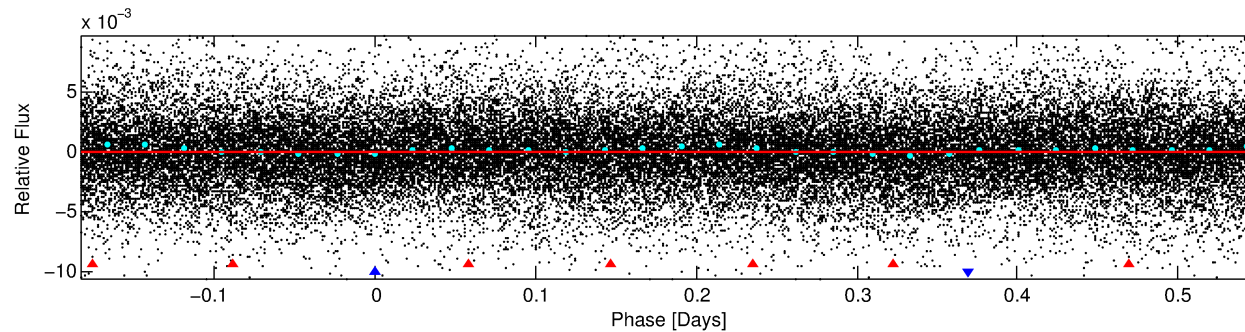
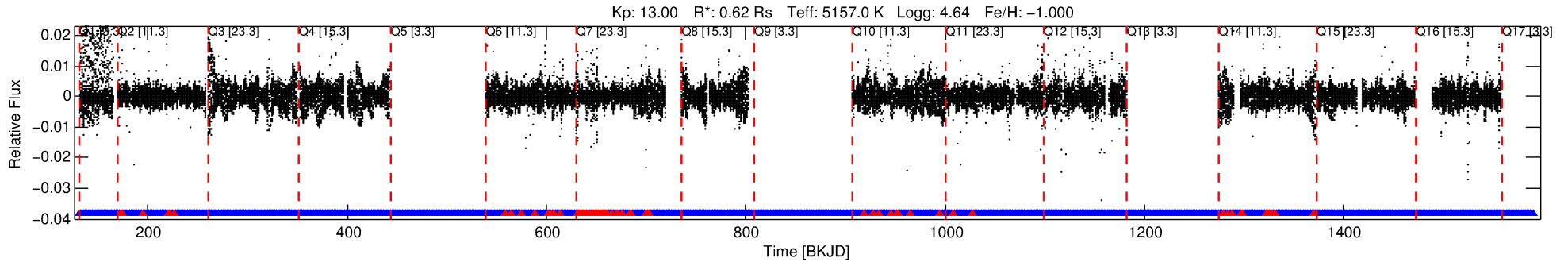
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004633285-02

No Significant Match Found

# DV One-Page Summary

KIC: 4633285 Candidate: 2 of 2 Period: 0.734 d



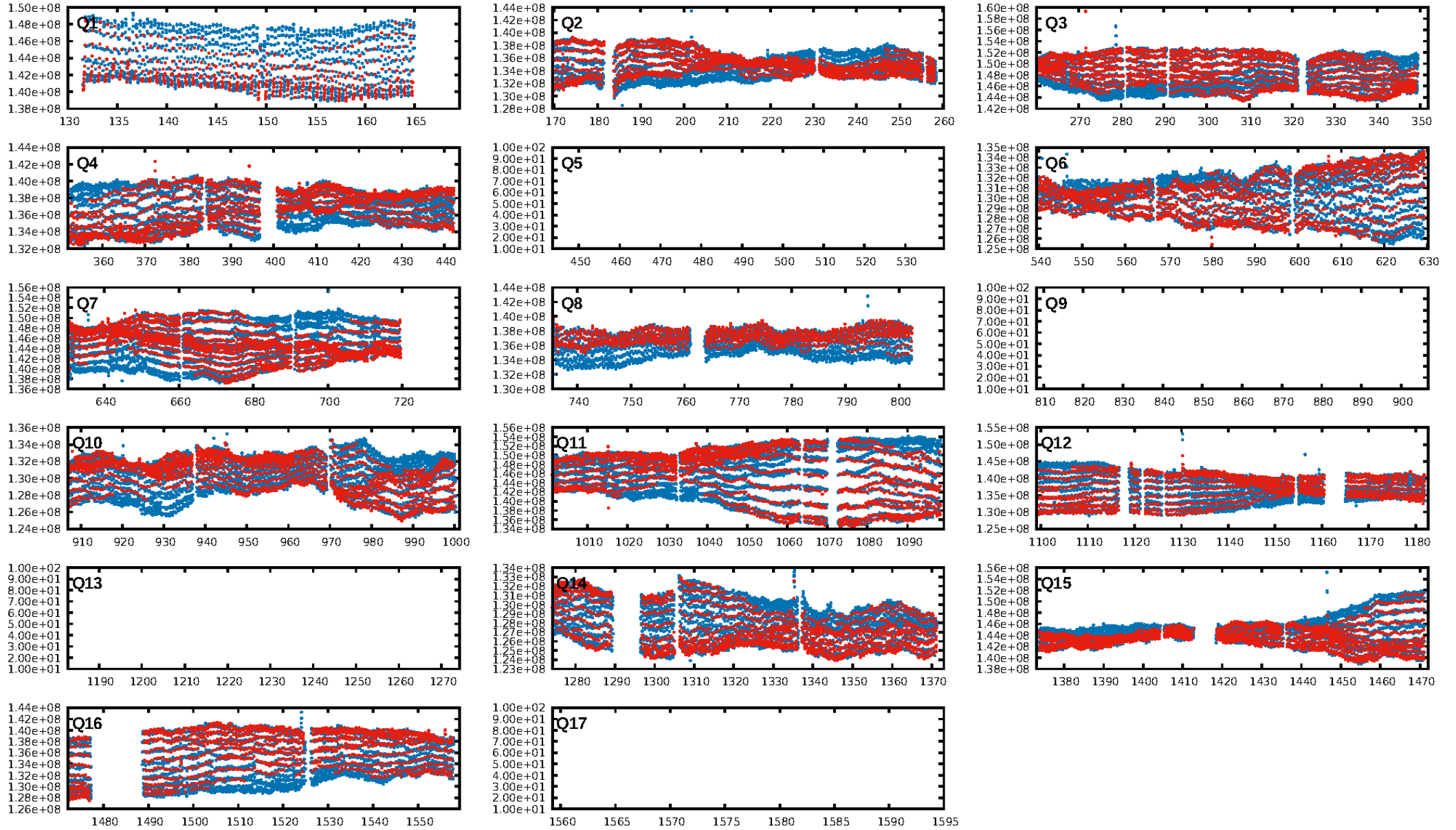
## DV Fit Results:

Period = 0.73381 [1.42191] d  
Epoch = 131.6687 [193.5090] BKJD  
Rp/R\* = 0.0000 [0.3283]  
a/R\* = 2.01 [1375.31]  
b = 0.23 [3520.84]  
Seff = 1330.35 [3443.60]  
Teff = 1540 [997] K  
Rp = 0.00 [22.21] Re  
a = 0.0135 [0.0175] AU  
Ag = 4123834.41 [73000012980.54] [0.00σ]  
Teffp = 107296 [474880516] K [0.00σ]

## DV Diagnostic Results:

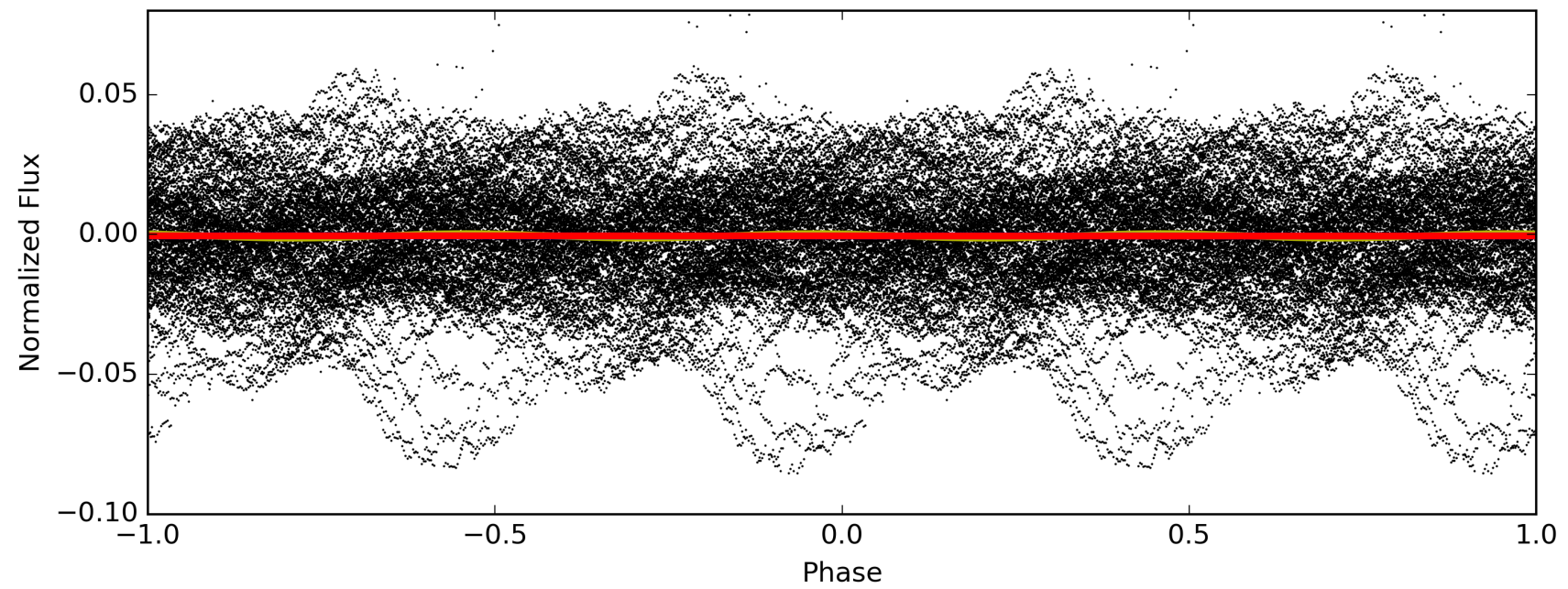
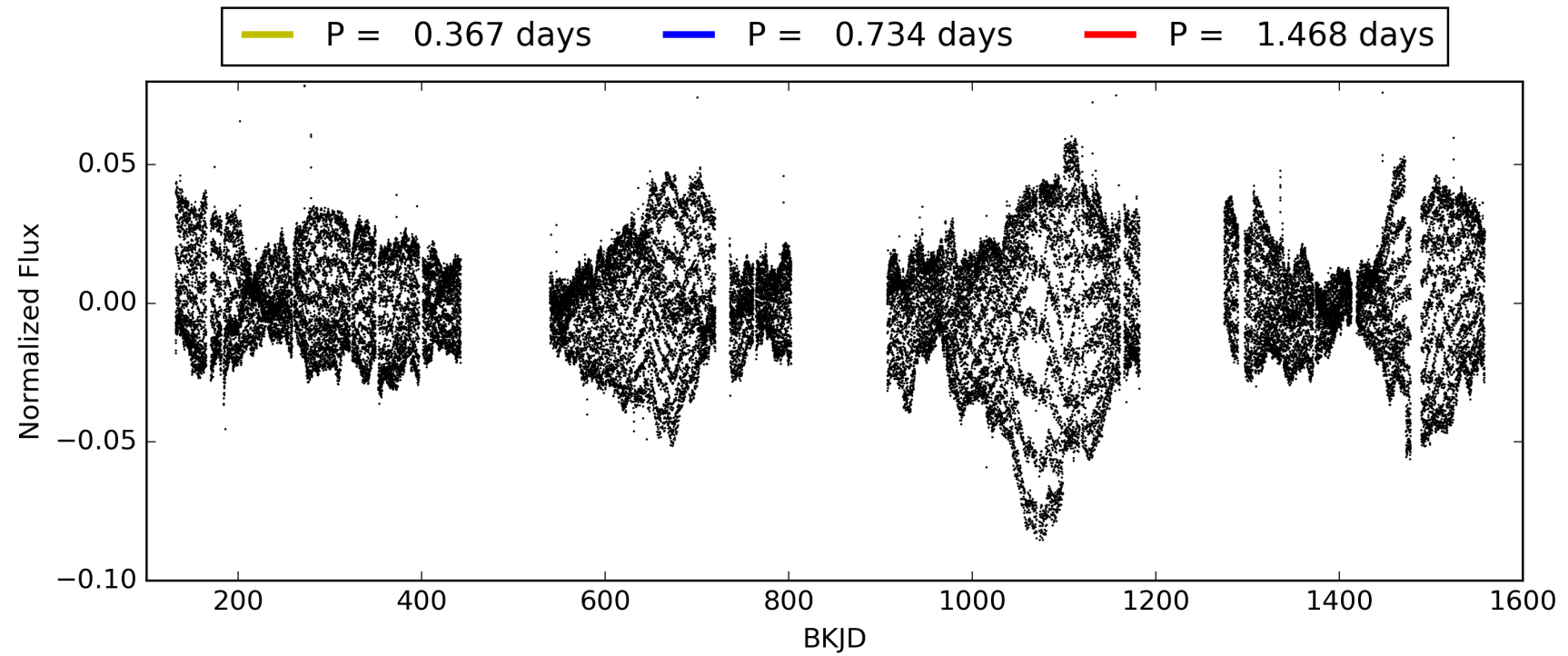
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [873.81σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 9.39e-36  
RollingBand-fgt: 0.94 [1281/1362]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: 0.043 arcsec [0.11σ]  
KicOffset-rm: 0.093 arcsec [0.23σ]  
OotOffset-st: 4/4/3/1 [12]  
KicOffset-st: 4/4/3/1 [12]  
DiffImageQuality-fgm: 0.58 [7/12]  
DiffImageOverlap-fno: 1.00 [13/13]

# TCE 004633285-02, PDC Light Curves





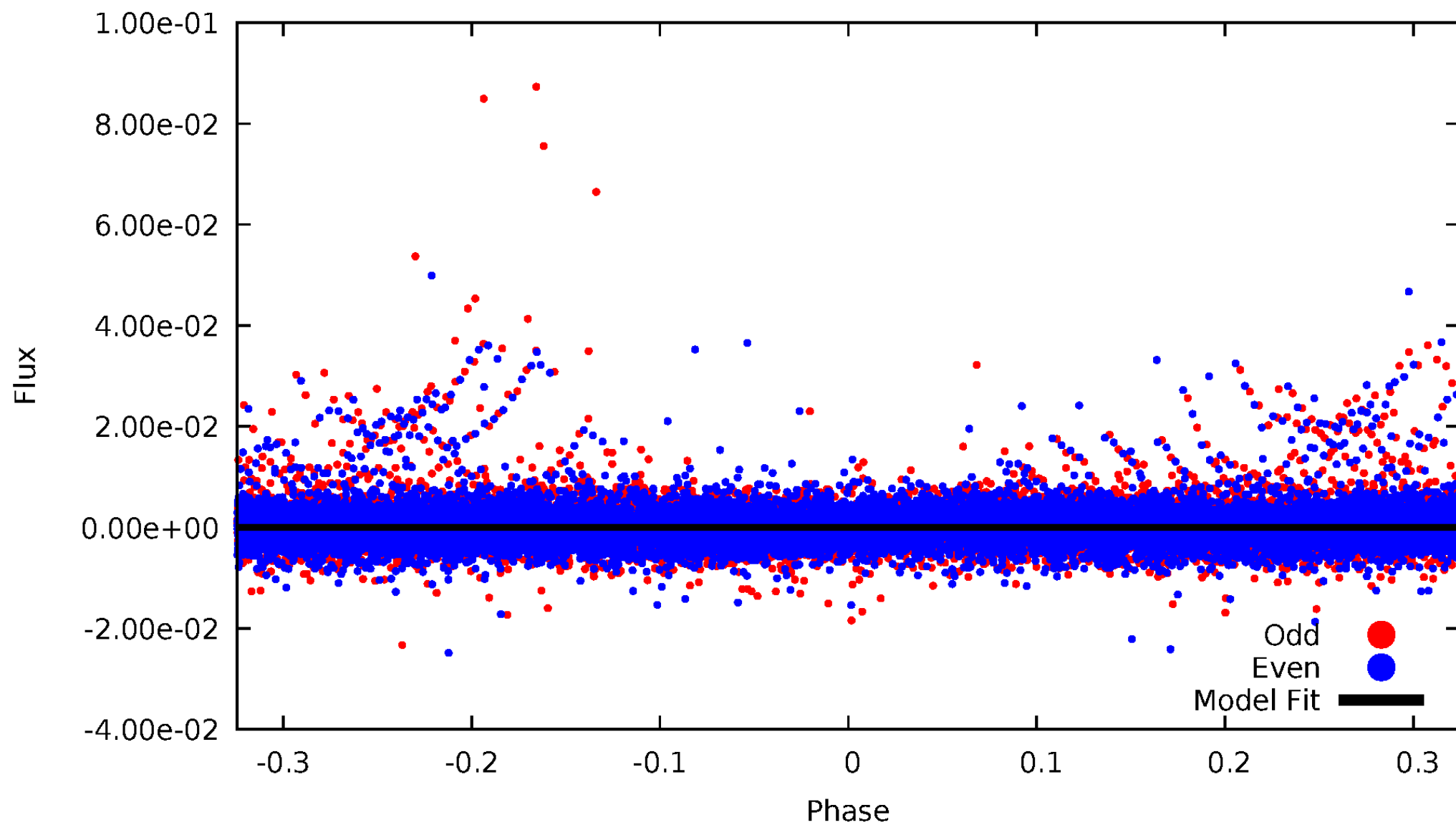
TCE 004633285-02





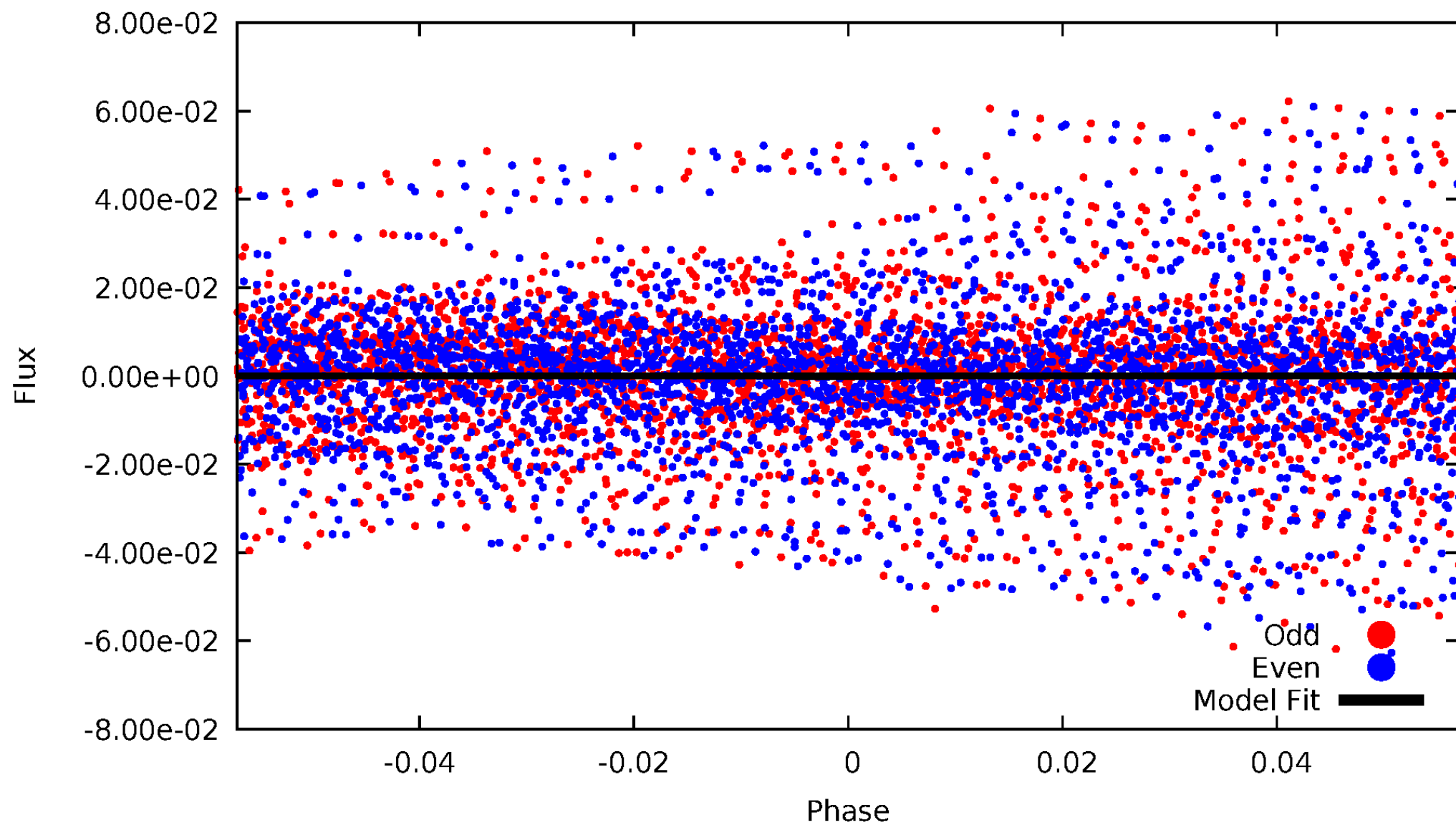
# DV Odd/Even

TCE 004633285-02



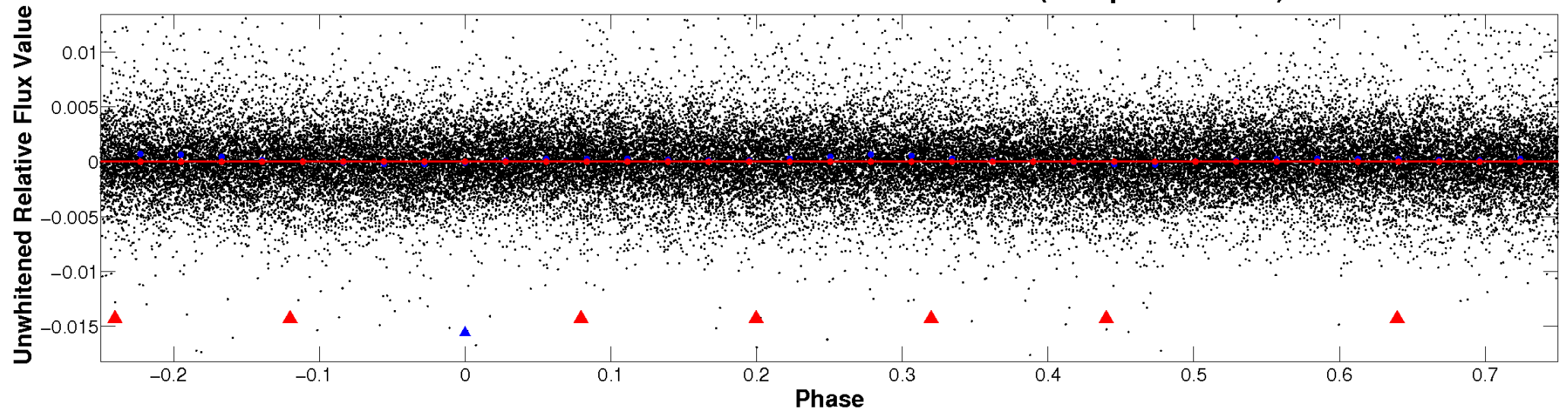
# ALT Odd/Even

TCE 004633285-02

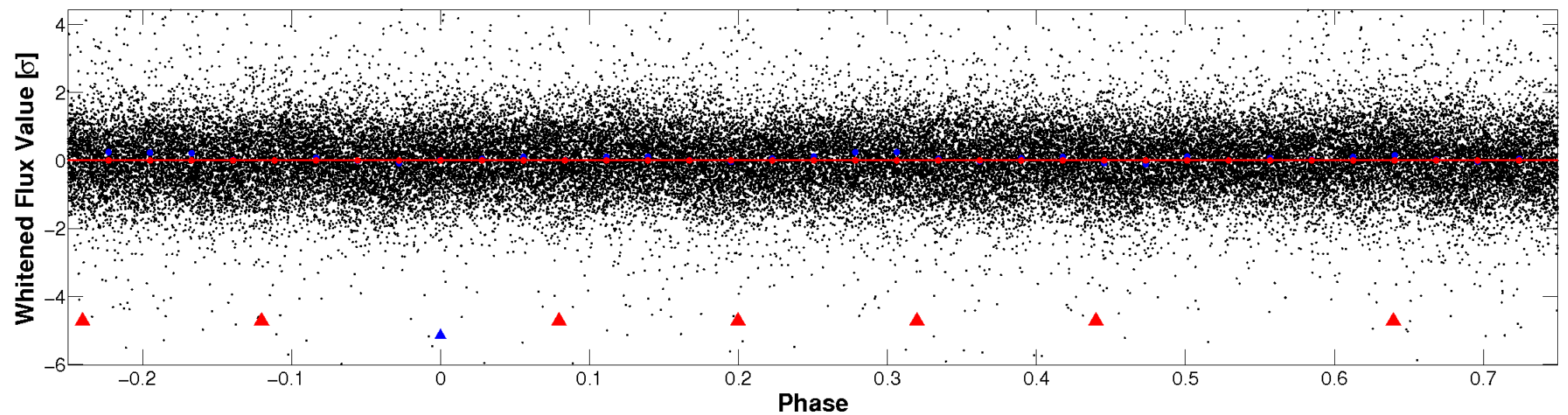


# Non-Whitened Vs. Whitened Light Curve

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

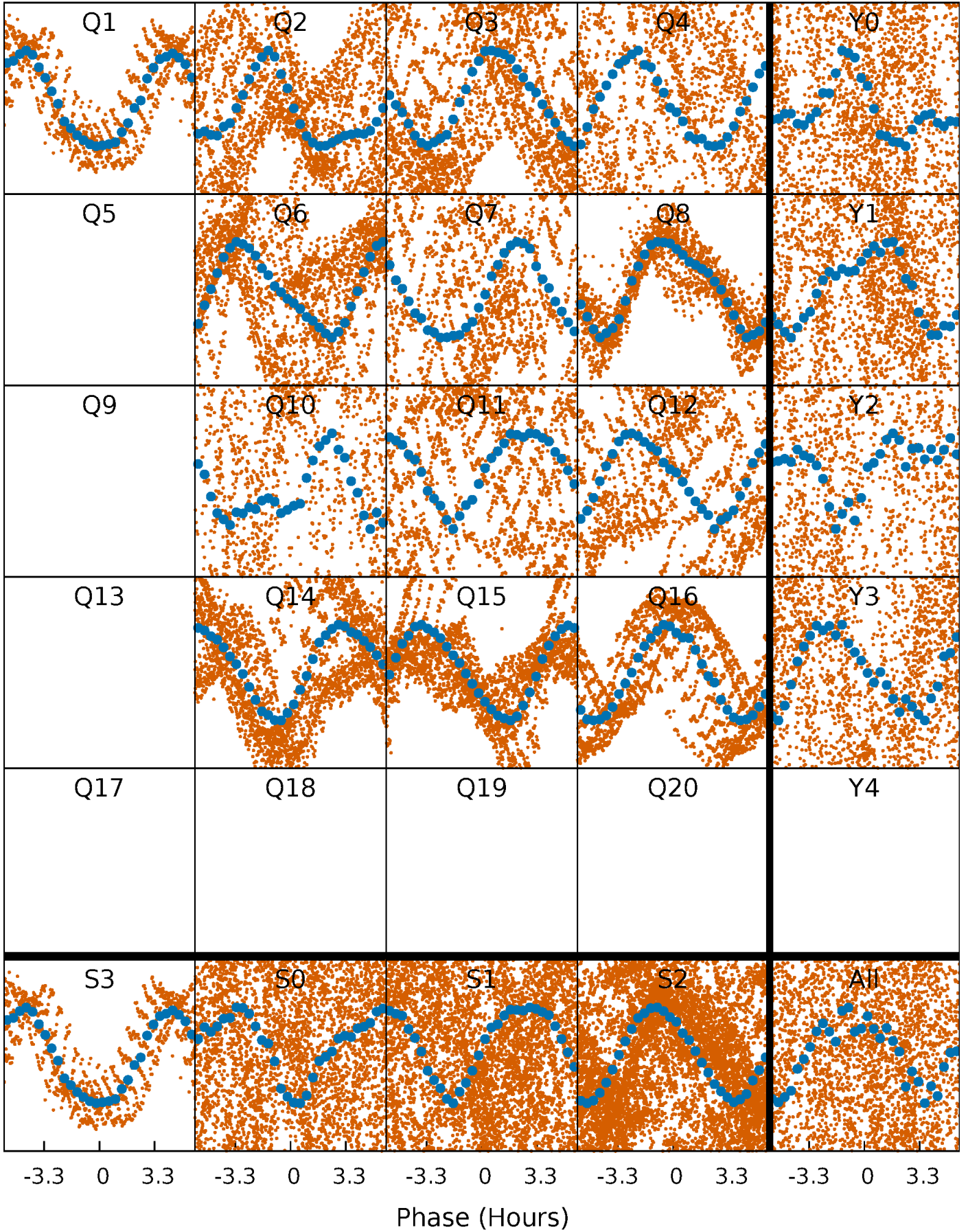


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

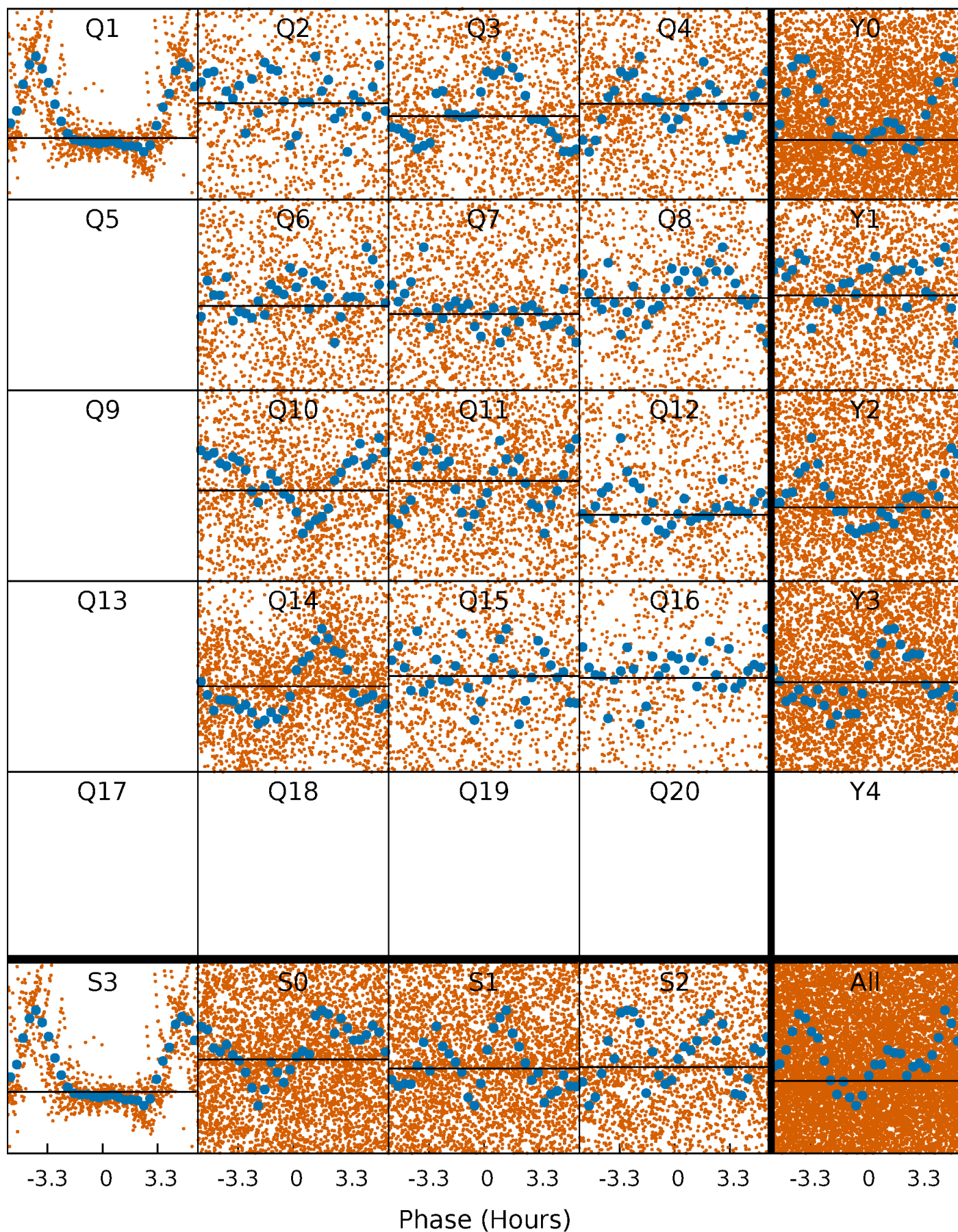
TCE 004633285-02   P= 0.733810 Days    $T_0=131.668663$  (BKJD)





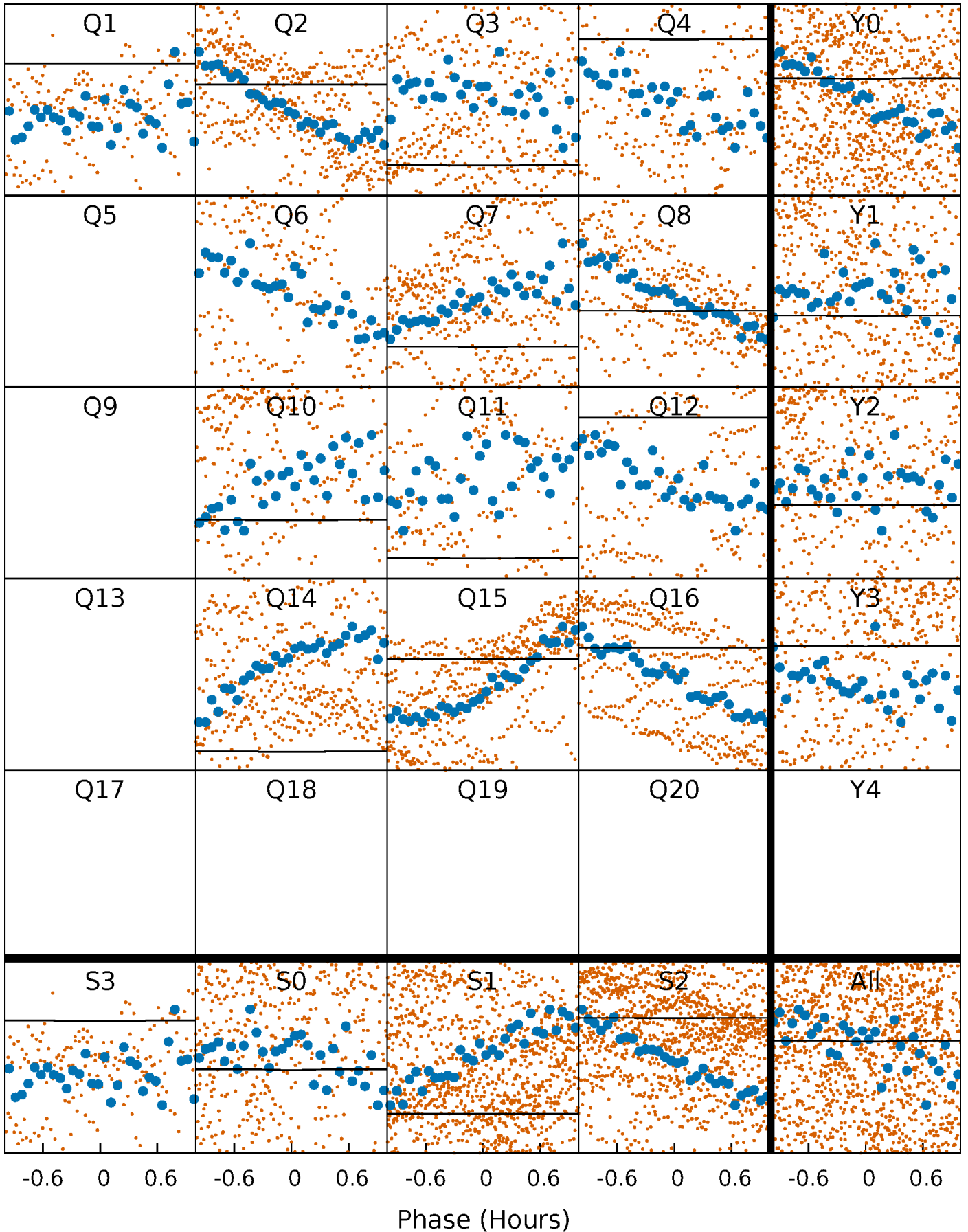
# DV Quarter-Phased Transit Curves

TCE 004633285-02   P= 0.733810 Days    $T_0=131.668663$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

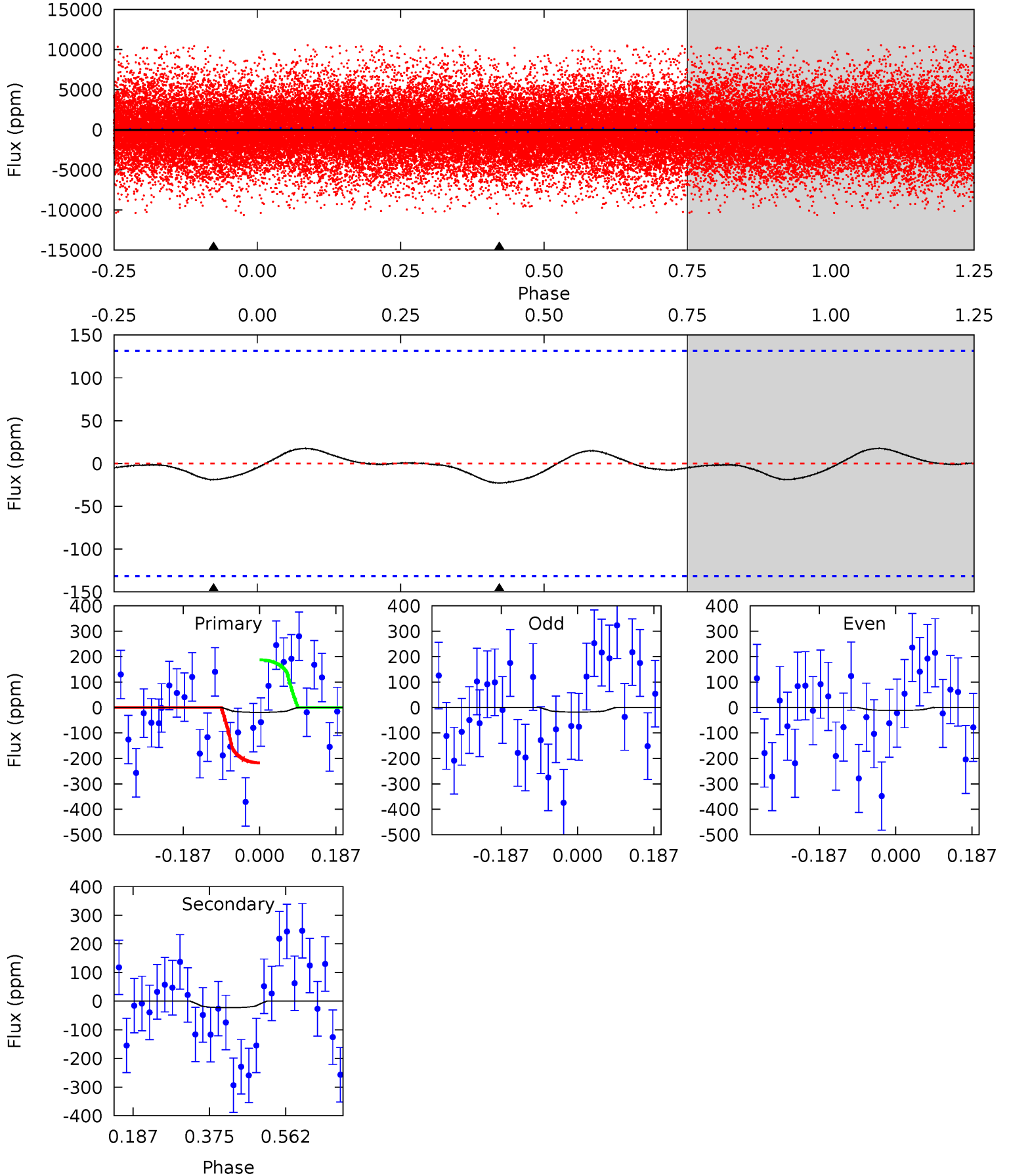
TCE 004633285-02 P= 0.733855 Days  $T_0=131.687552$  (BKJD)



# DV Model-Shift Uniqueness Test

004633285-02, P = 0.733810 Days, E = 130.934853 Days

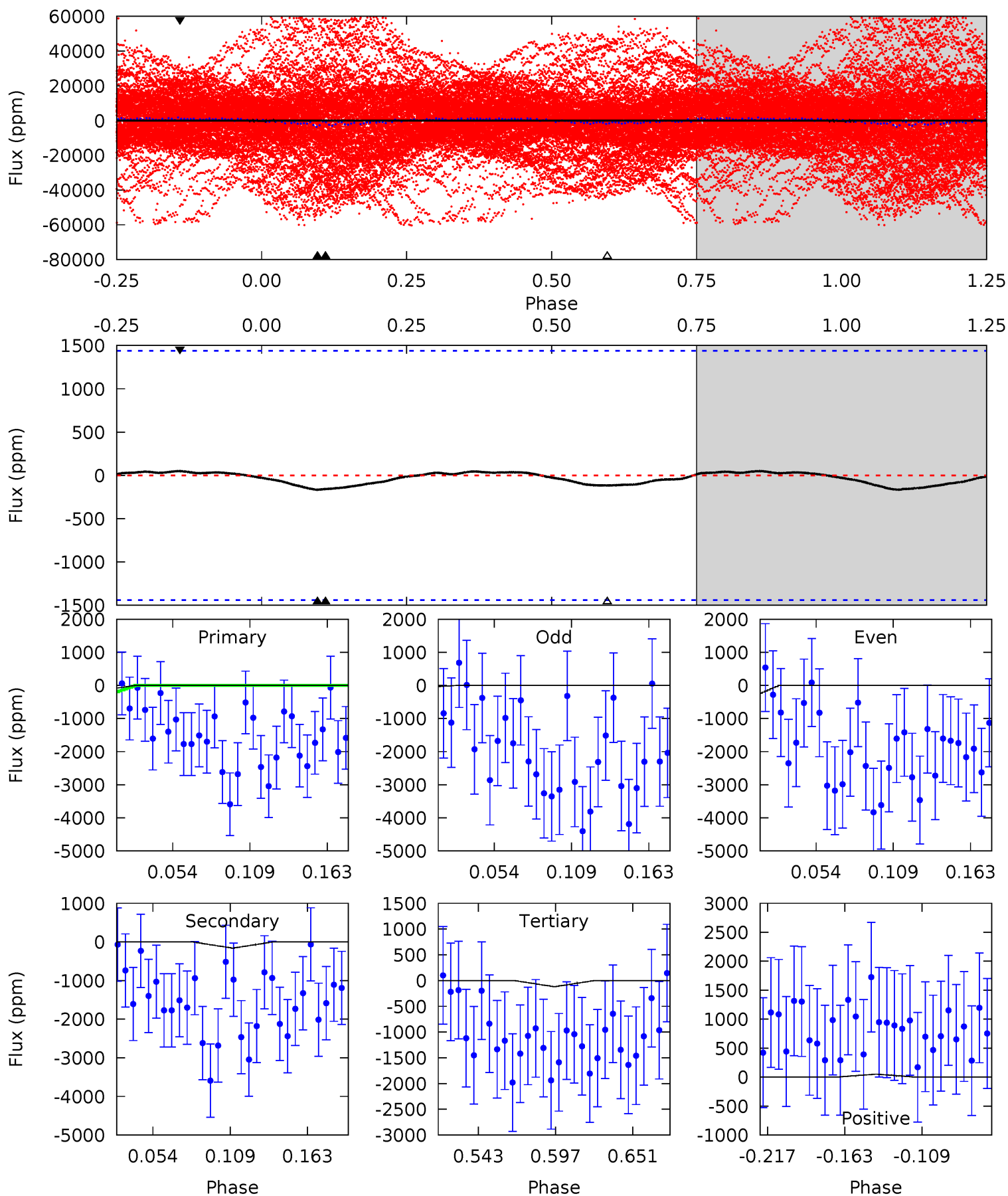
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.64	0.77	0	0	4.43	1.32	0.20	0.64	0.64	0.77	0.77	0.11	0.08	0.44	0.52



# Alt Model-Shift Uniqueness Test

004633285-02, P = 0.733855 Days, E = 130.953697 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
0.55	0.52	0.39	0.17	4.69	1.92	0.17	0.16	0.38	0.13	0.35	0.69	1.49	0.23	0.41





### Stellar Parameters For KIC 004633285

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	$5157^{+153}_{-153}$	$4.641^{+0.060}_{-0.040}$	$-1.000^{+0.300}_{-0.300}$	$0.620^{+0.048}_{-0.048}$	$0.614^{+0.053}_{-0.023}$	$3.621^{+0.876}_{-0.529}$
	+3%/-3%	+1%/-1%	+30%/-30%	+8%/-8%	+9%/-4%	+24%/-15%
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 004633285-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-23 \pm 30$	$14.89^{+16.43}_{-10.95}$	$1797^{+707}_{-379}$	$-2290^{+385}_{-479}$	$0.014^{+0.192}_{-0.015}$
Alt.	$-160 \pm 307$	$15.96^{+17.89}_{-11.54}$	$1788^{+792}_{-350}$	$-2269^{+4924}_{-689}$	$0.041^{+1.313}_{-0.133}$

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

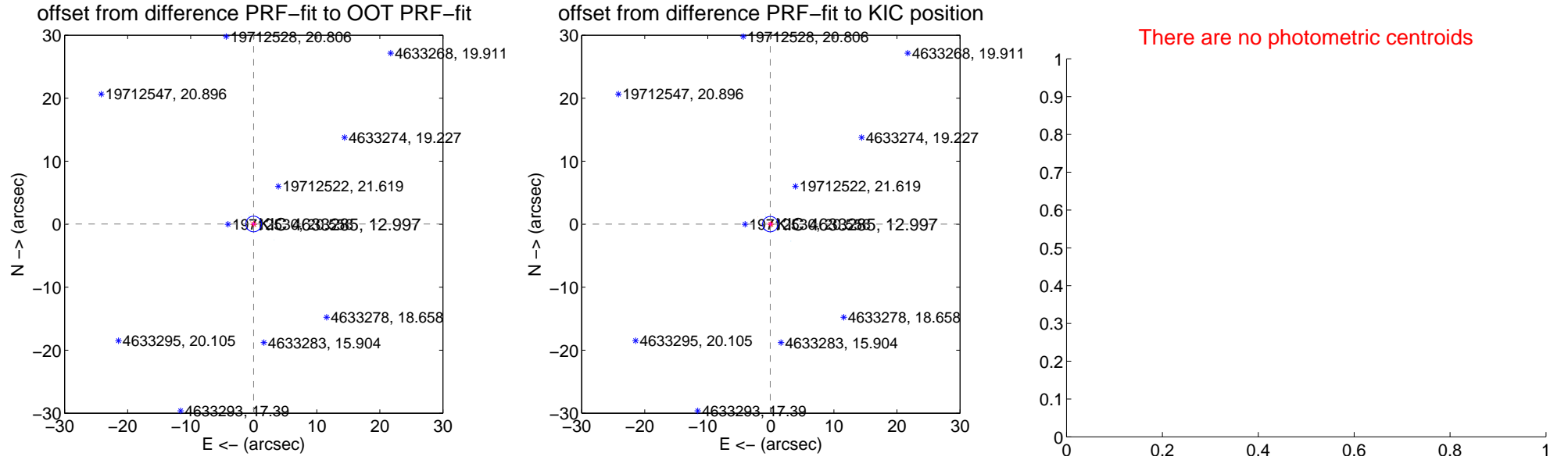
## DV Centroid Data

Supplemental centroid analysis for 004633285-02. Kepler magnitude: 13.00. Transit SNR 0.00

There are 7 quarters with good PRF difference image offsets

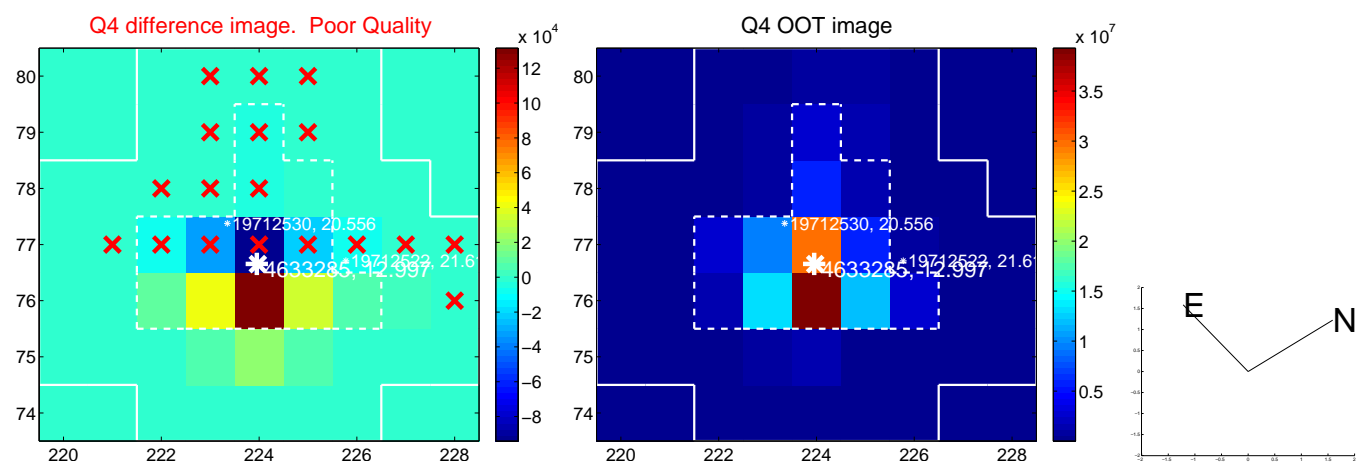
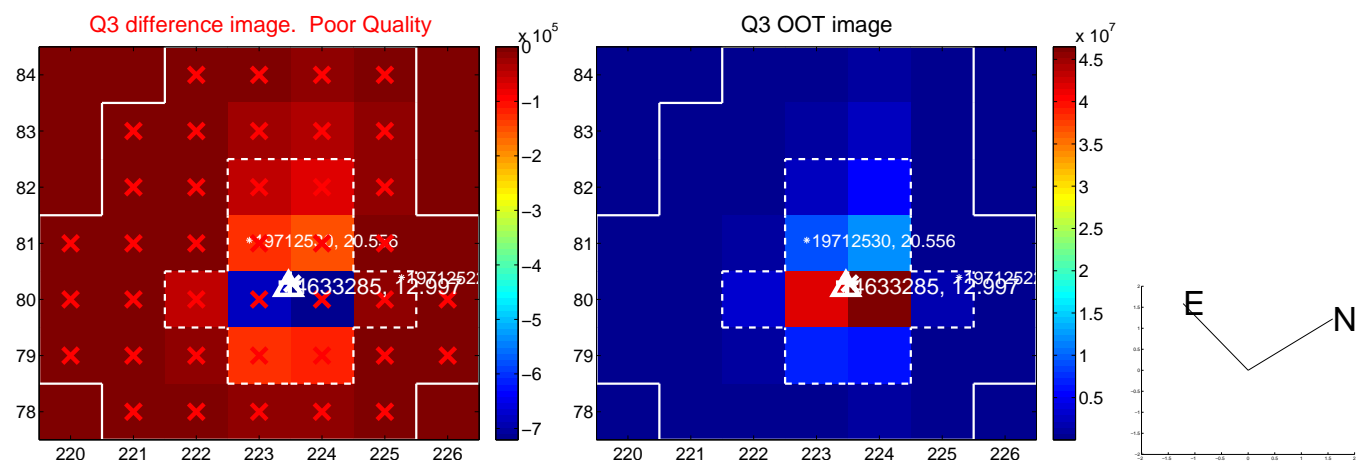
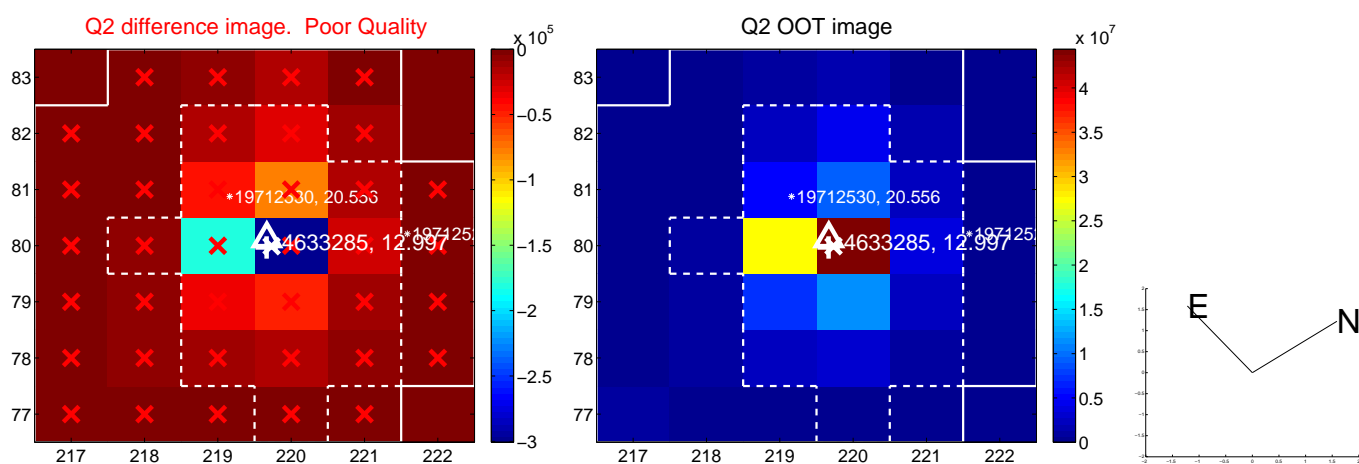
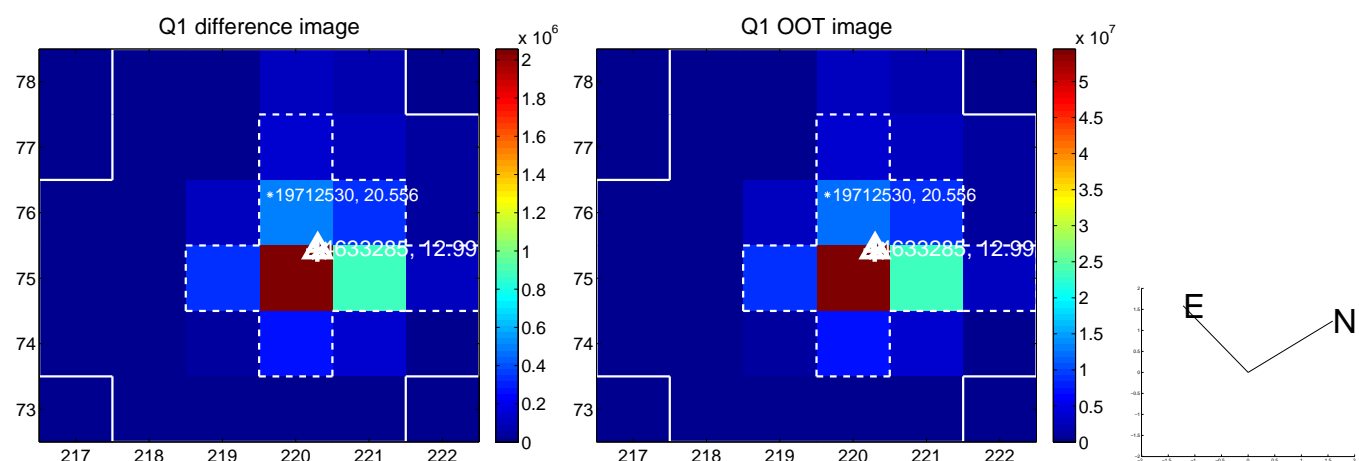
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.043 \pm 0.414$	0.11	$0.023 \pm 0.339$	$0.037 \pm 0.290$
PRF-fit source offset from KIC position	$0.093 \pm 0.407$	0.23	$0.092 \pm 0.364$	$0.015 \pm 0.326$
photometric centroid source offset	—	—	—	—

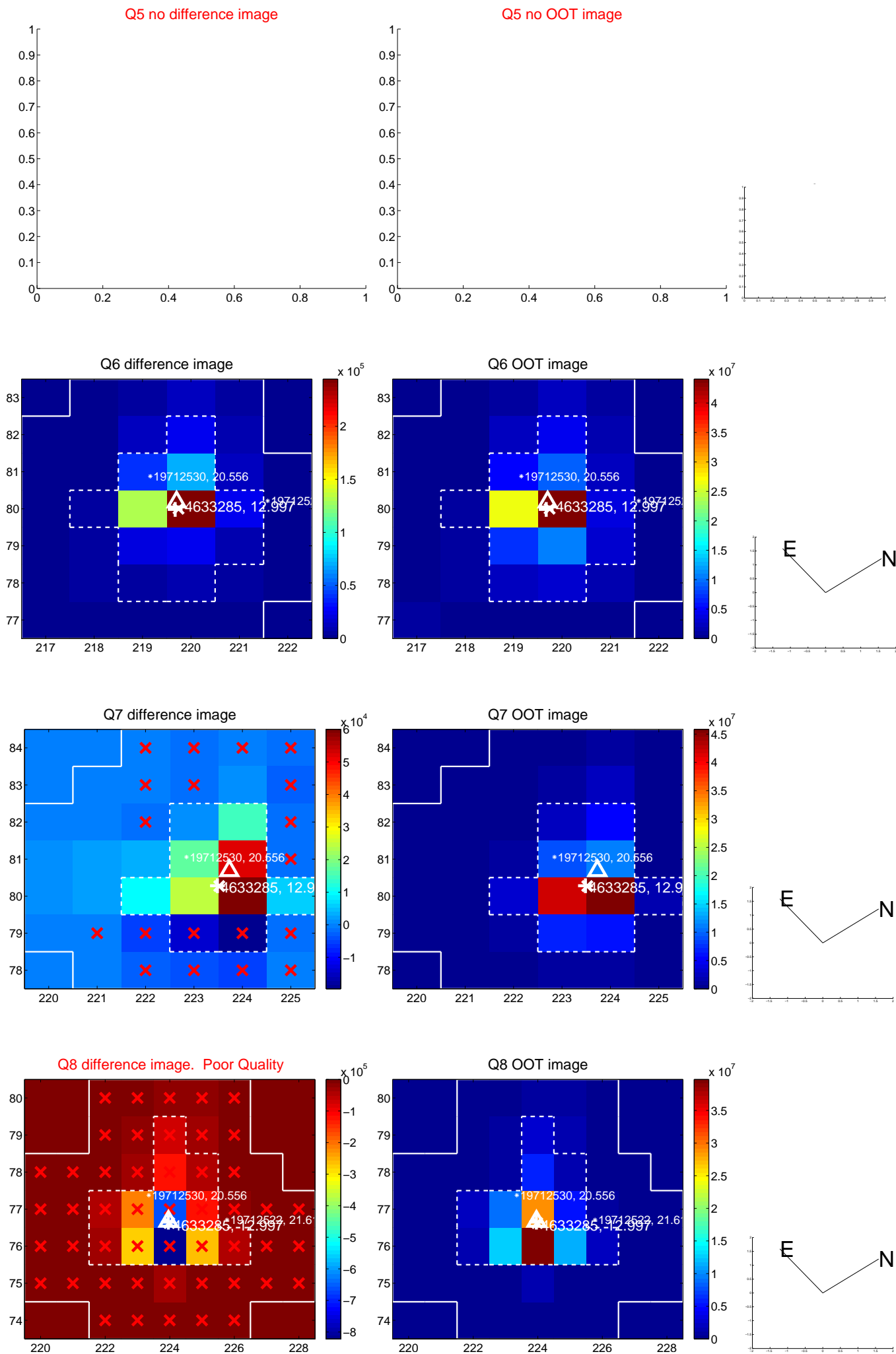


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

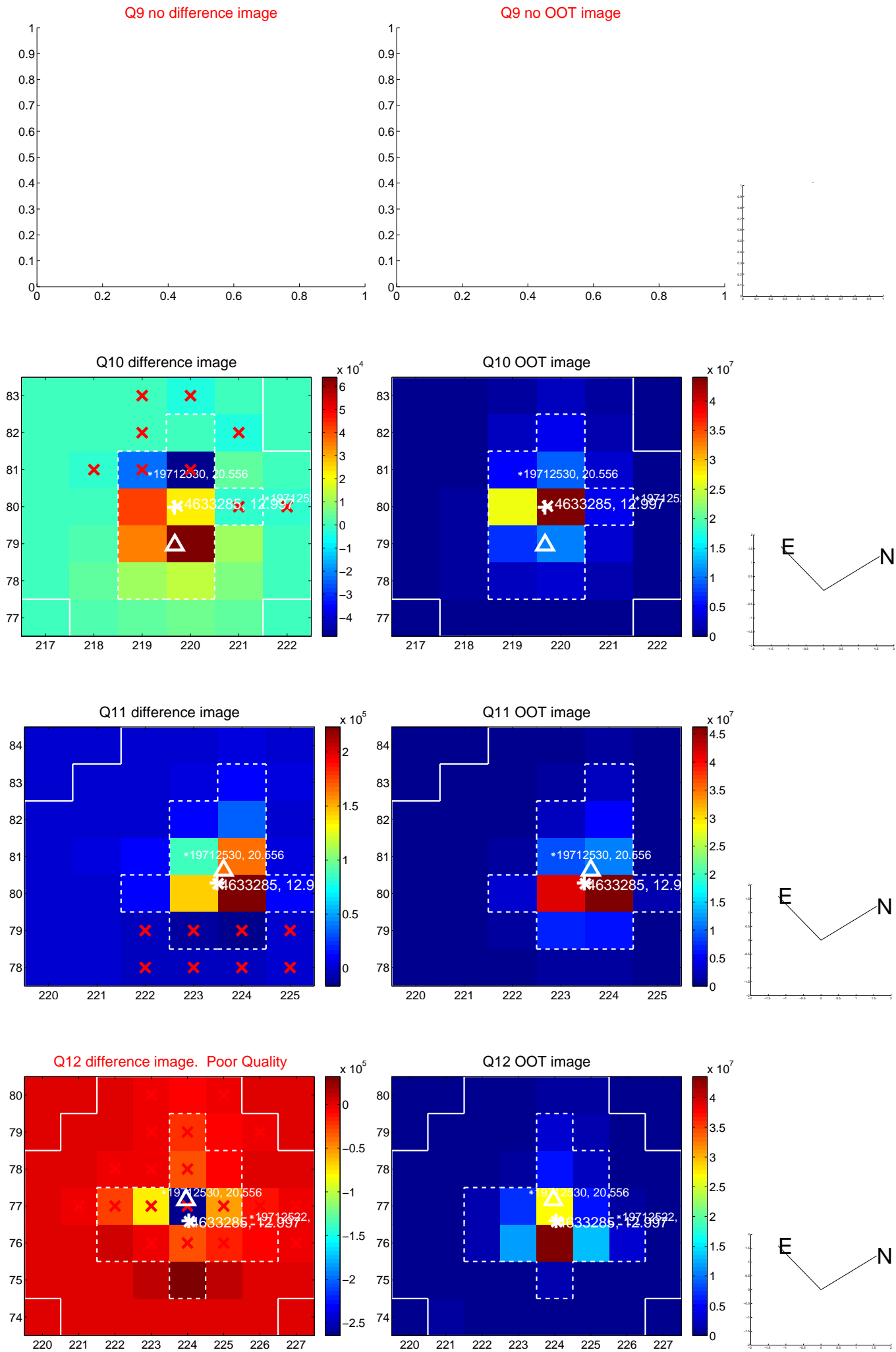
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



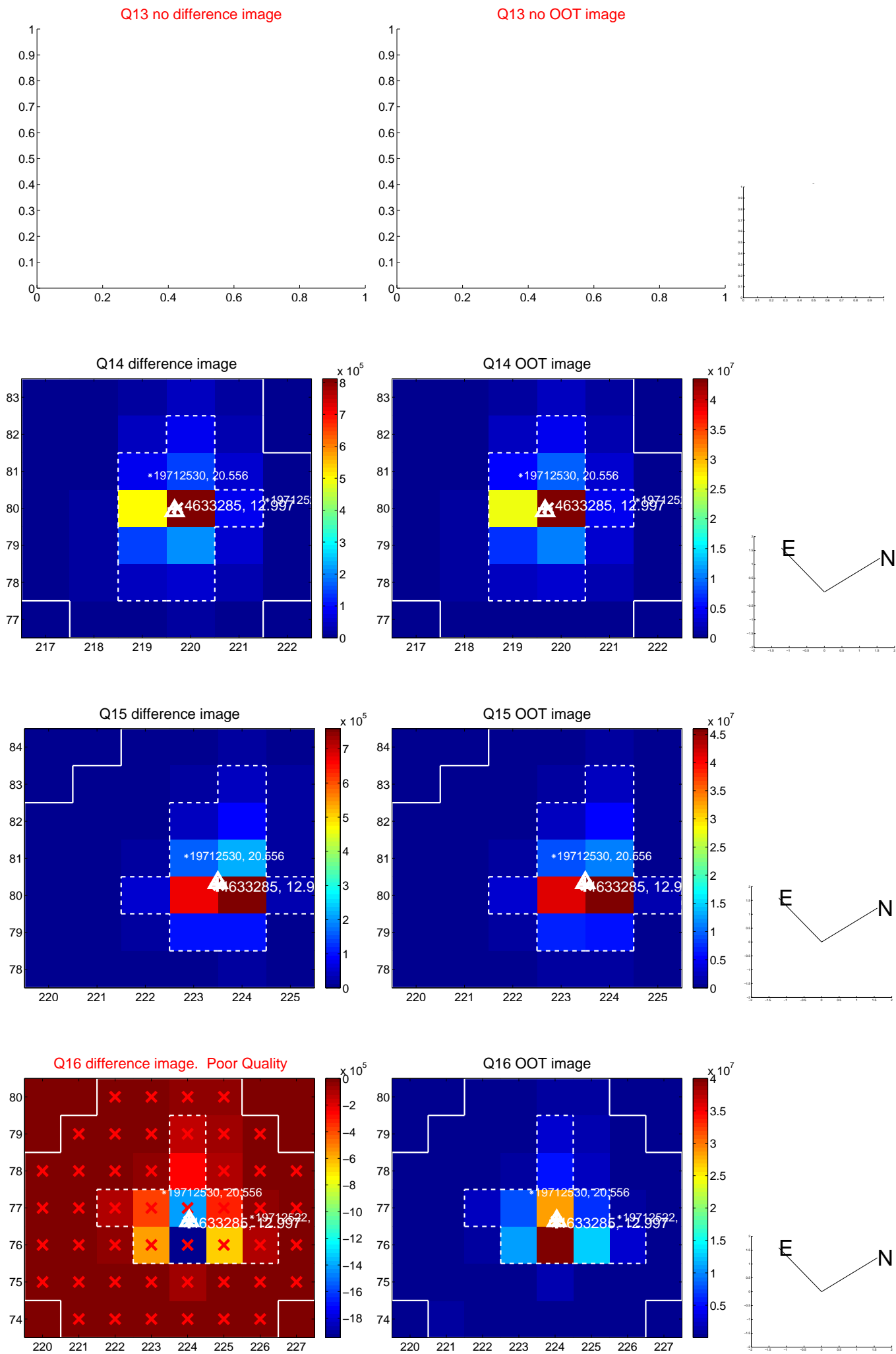
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.



folded centroid time series figure for this object.

UKIRT Image

