

# KIC 012418816

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
012418816-01	OBS	7533.01	0.760935	131.632869	362264.9	1.500	17552.7	-1.0	0.51	4675	15.09	646.40
012418816-02	OBS	No	3.043678	132.263630	10972.8	9.000	2812.1	-1.0	0.51	4675	5.30	101.81

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012418816-01	OBS	FP	0.00	0	1	0	0	SWEET_EB—MOD_ODDEVEN_ALT—HAS_SEC_TCE—CENT_NOFITS
012418816-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—RESIDUAL_TCE—CENT_NOFITS

**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 012418816-01

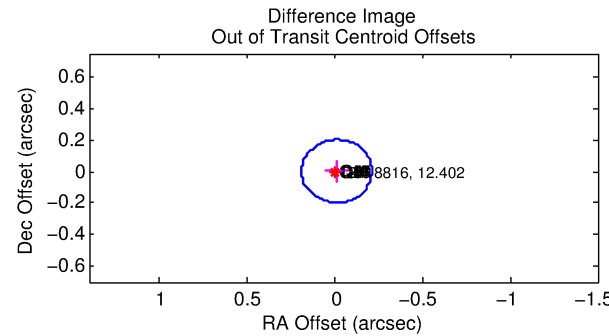
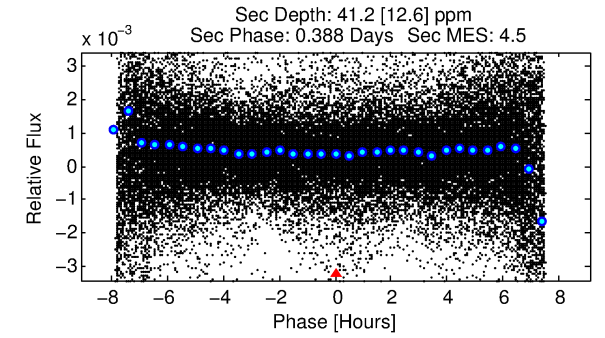
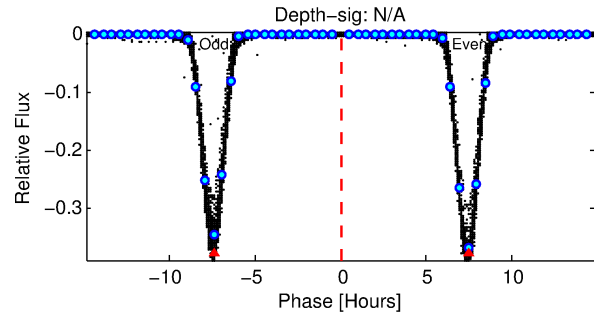
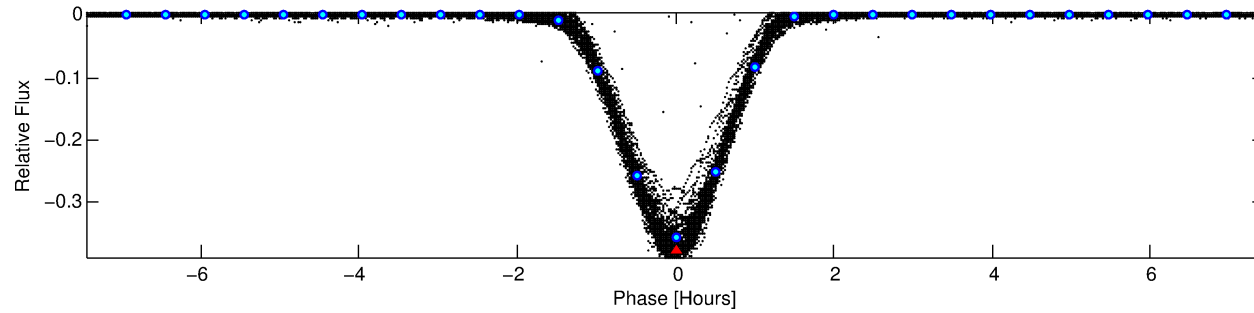
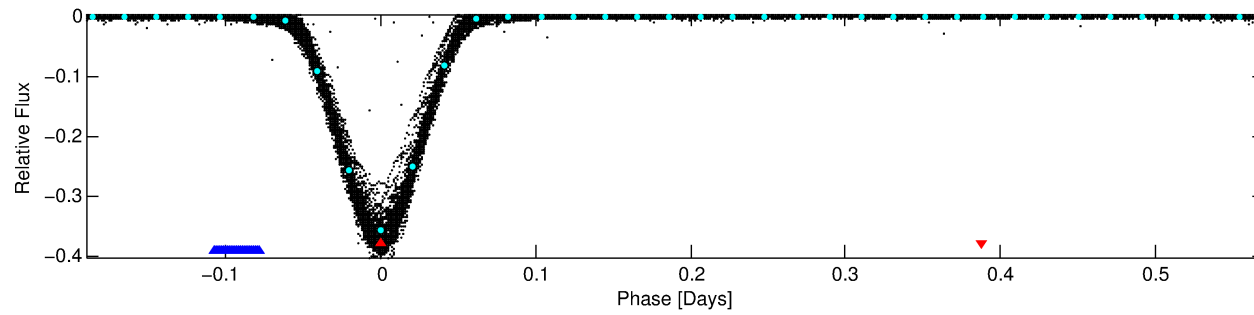
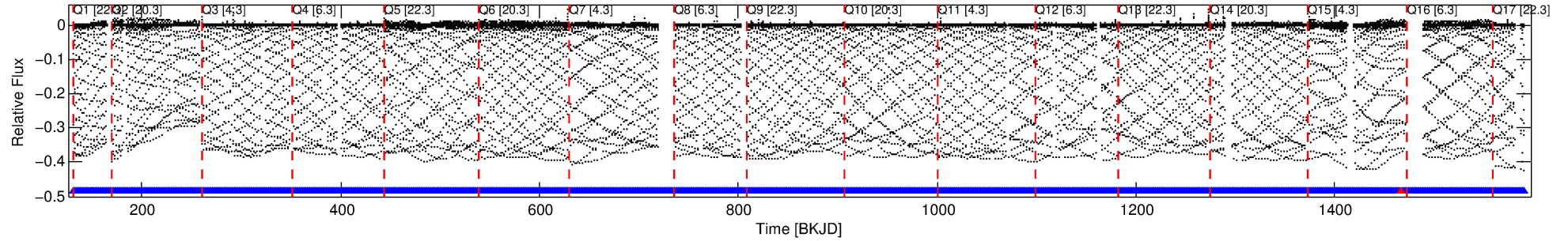
No Significant Match Found

# DV One-Page Summary

KIC: 12418816 Candidate: 1 of 2 Period: 0.761 d

KOI: K07533 Corr: No Ephemeris Match

Kp: 12.40 R\*: 0.51 Rs Teff: 4675.0 K Logg: 4.74 Fe/H: -1.520



## TPS TCE Results:

Period = 0.76093 d  
Epoch = 131.6329 BKJD

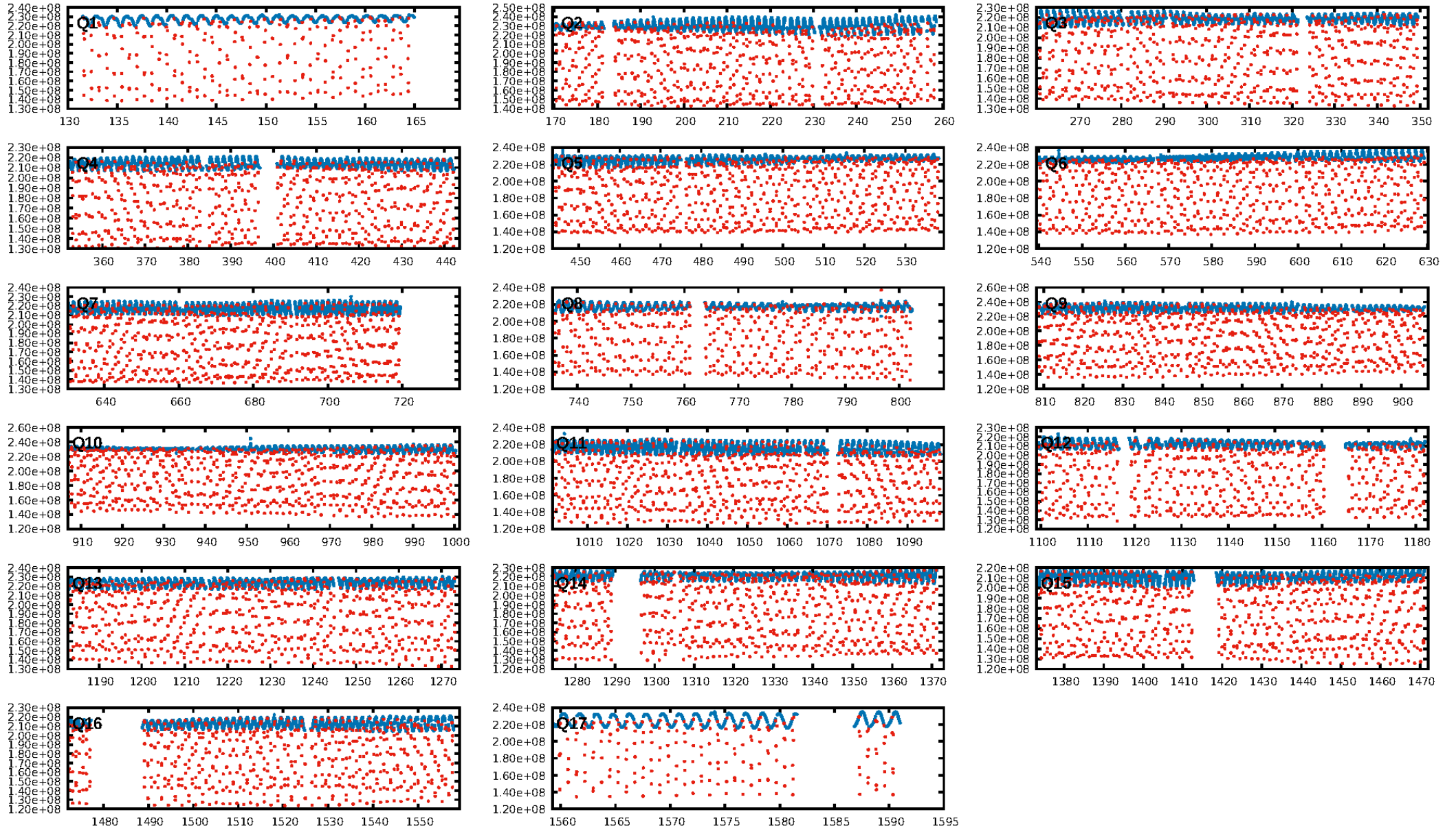
DV fit results are unavailable

## DV Diagnostic Results:

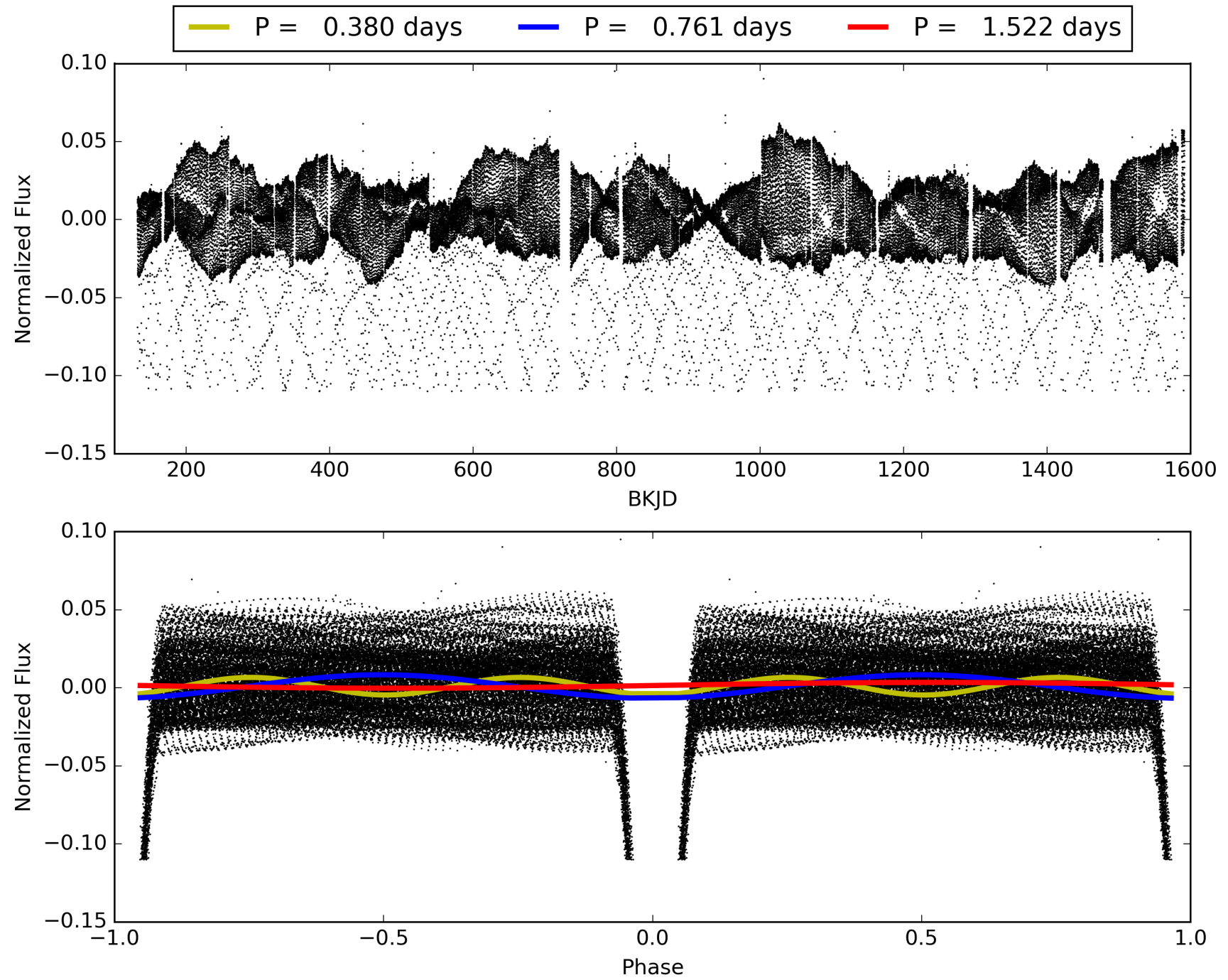
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [6.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [1679/1680]  
GhostDiagnostic-chr: 1.108

Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: 0.012 arcsec [0.18σ]  
KicOffset-rm: 0.035 arcsec [0.51σ]  
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]

# TCE 012418816-01, PDC Light Curves

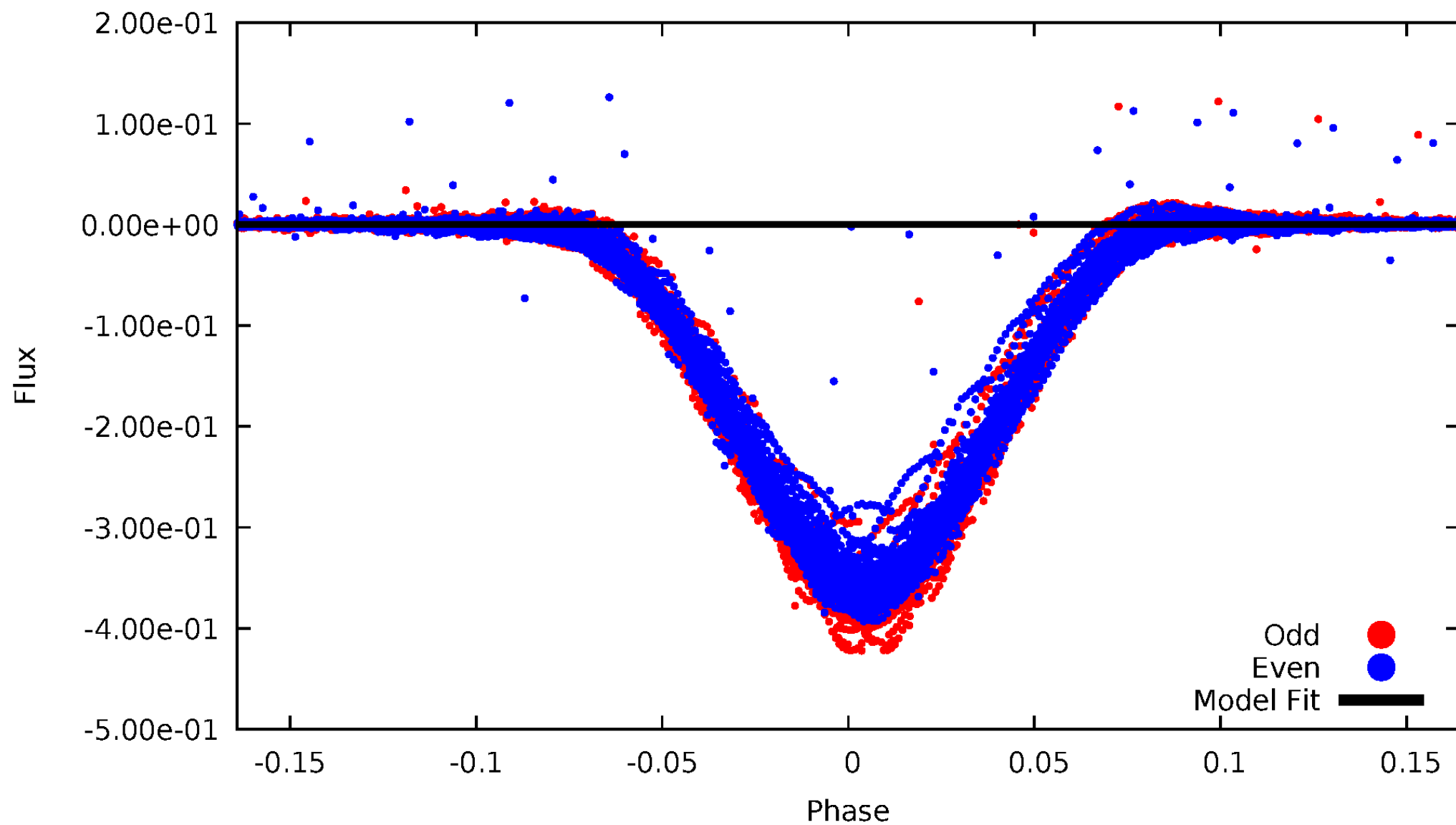


# TCE 012418816-01



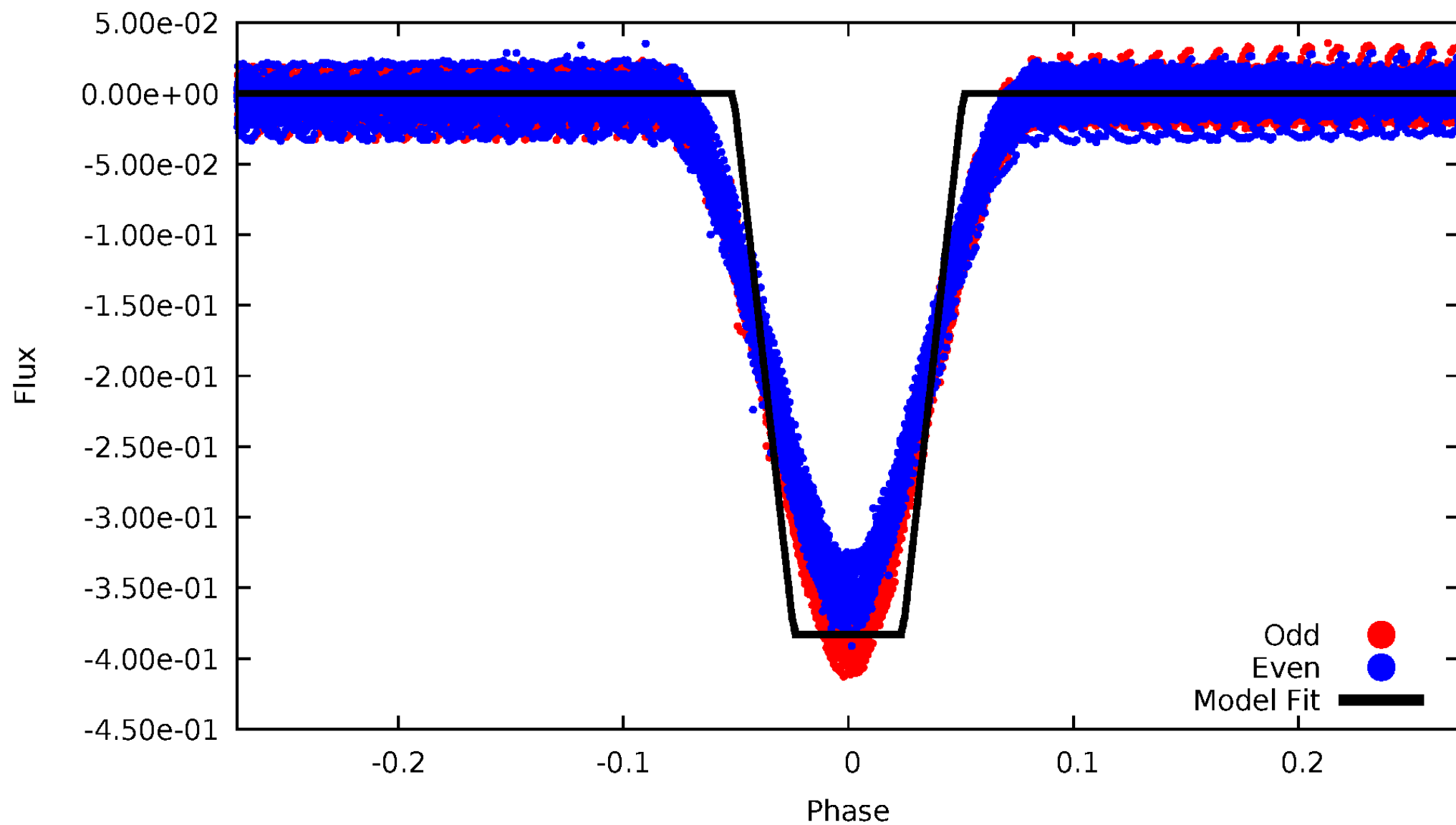
# DV Odd/Even

TCE 012418816-01



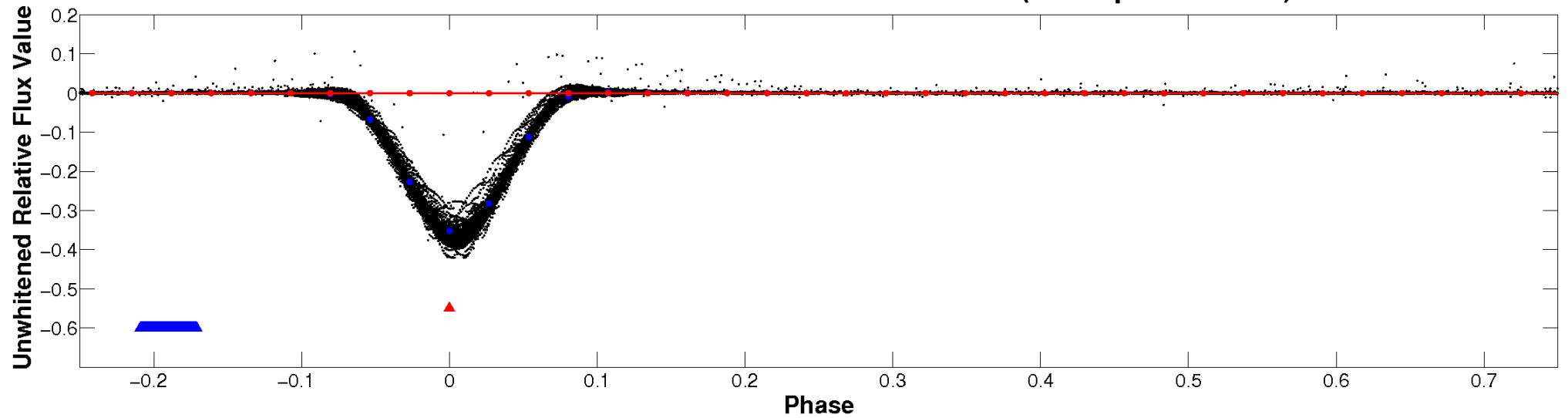
# ALT Odd/Even

TCE 012418816-01



# Non-Whitened Vs. Whitened Light Curve

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

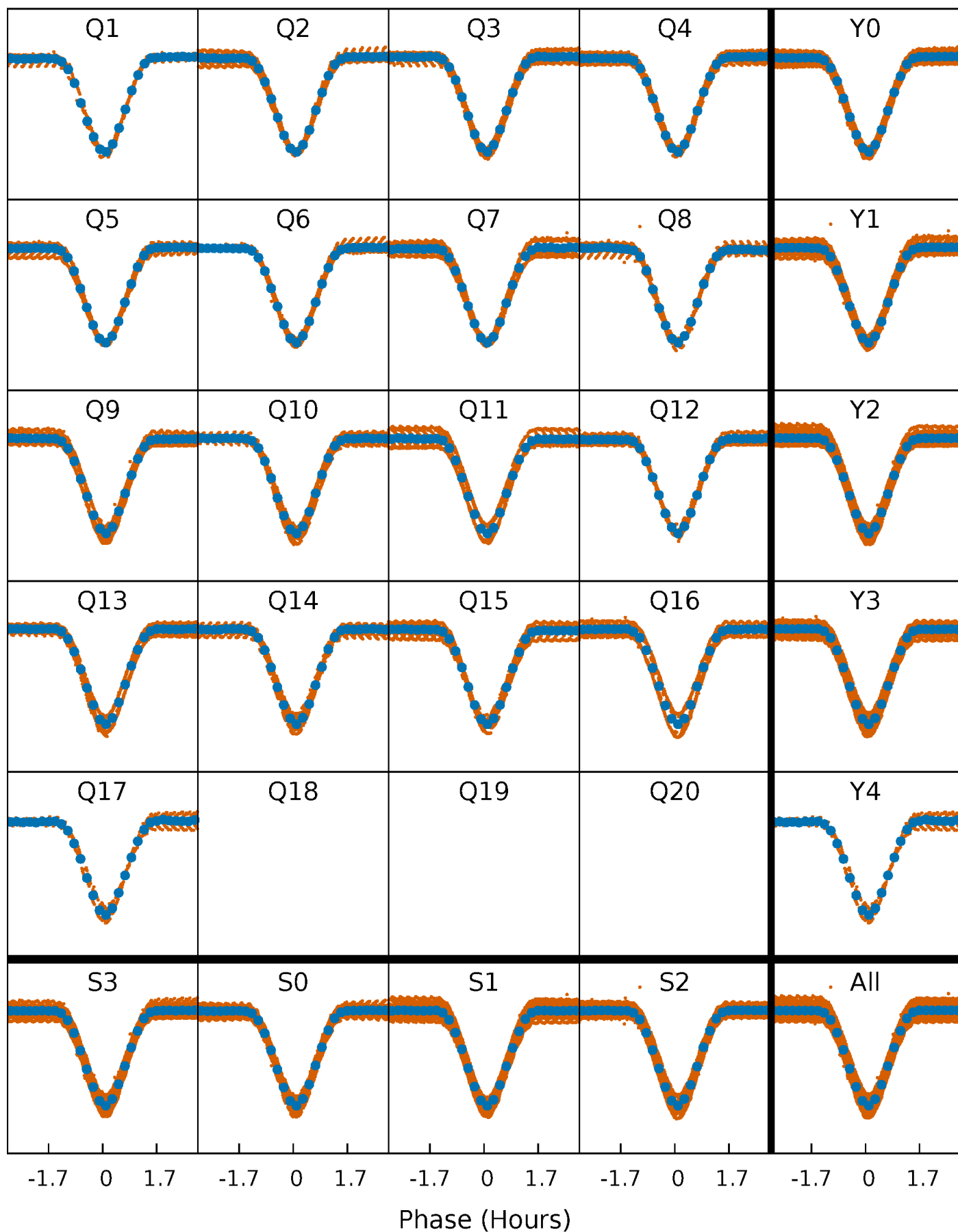


**Planet 1 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



# PDC Quarter-Phased Transit Curves

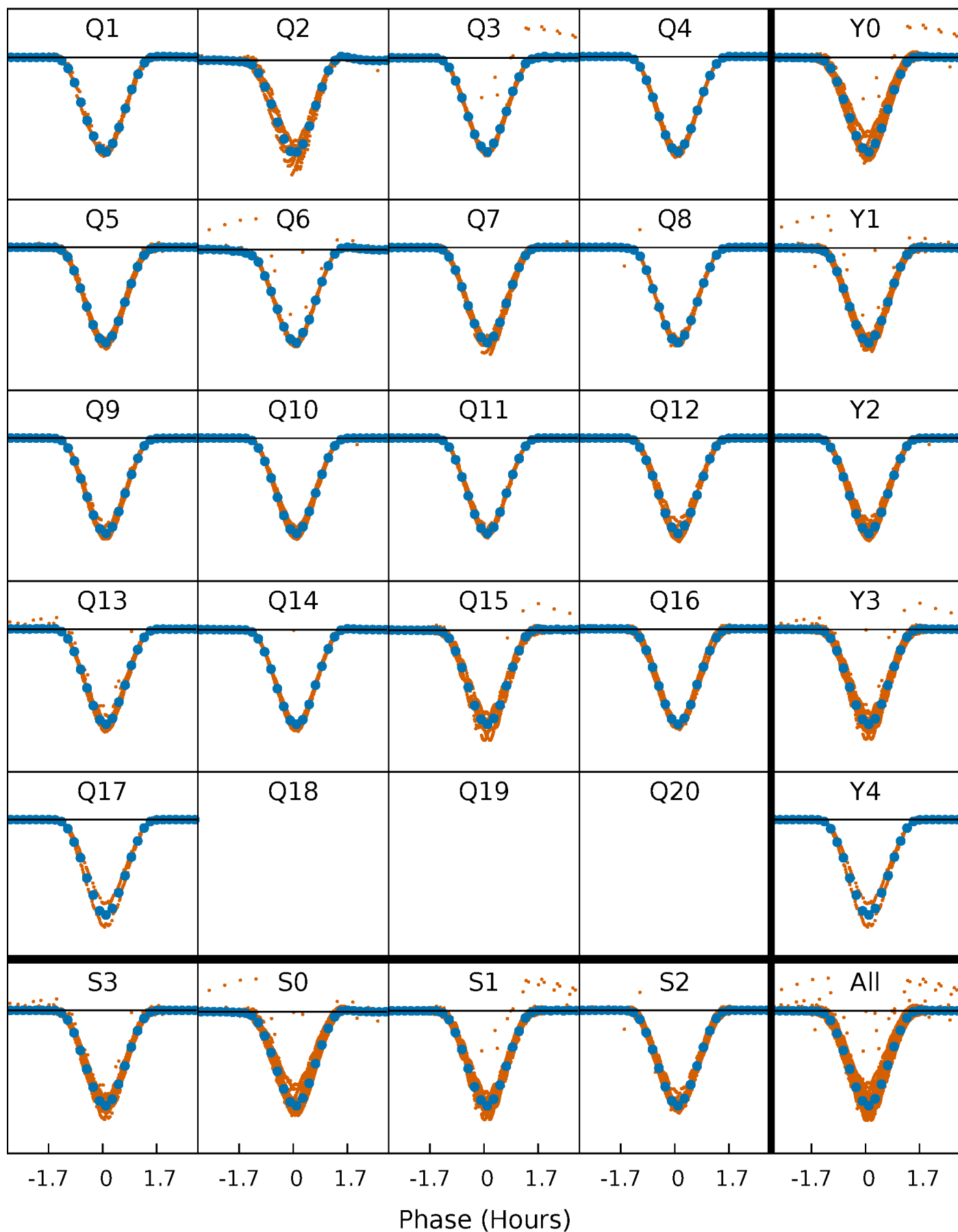
TCE 012418816-01 P= 0.760935 Days  $T_0=131.632869$  (BKJD)





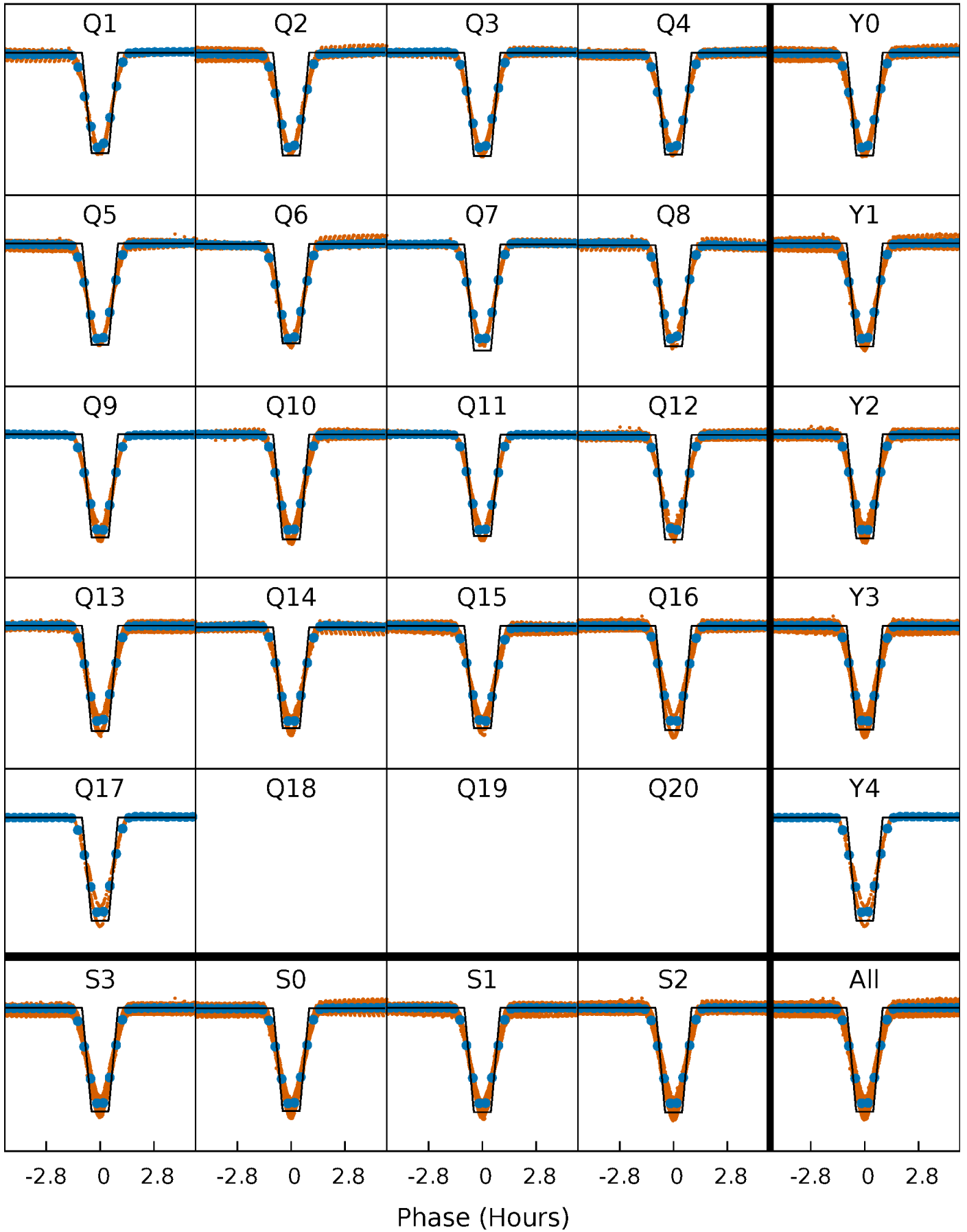
# DV Quarter-Phased Transit Curves

TCE 012418816-01 P= 0.760935 Days  $T_0=131.632869$  (BKJD)



## Alt. Detrend Quarter-Phased Transit Curves

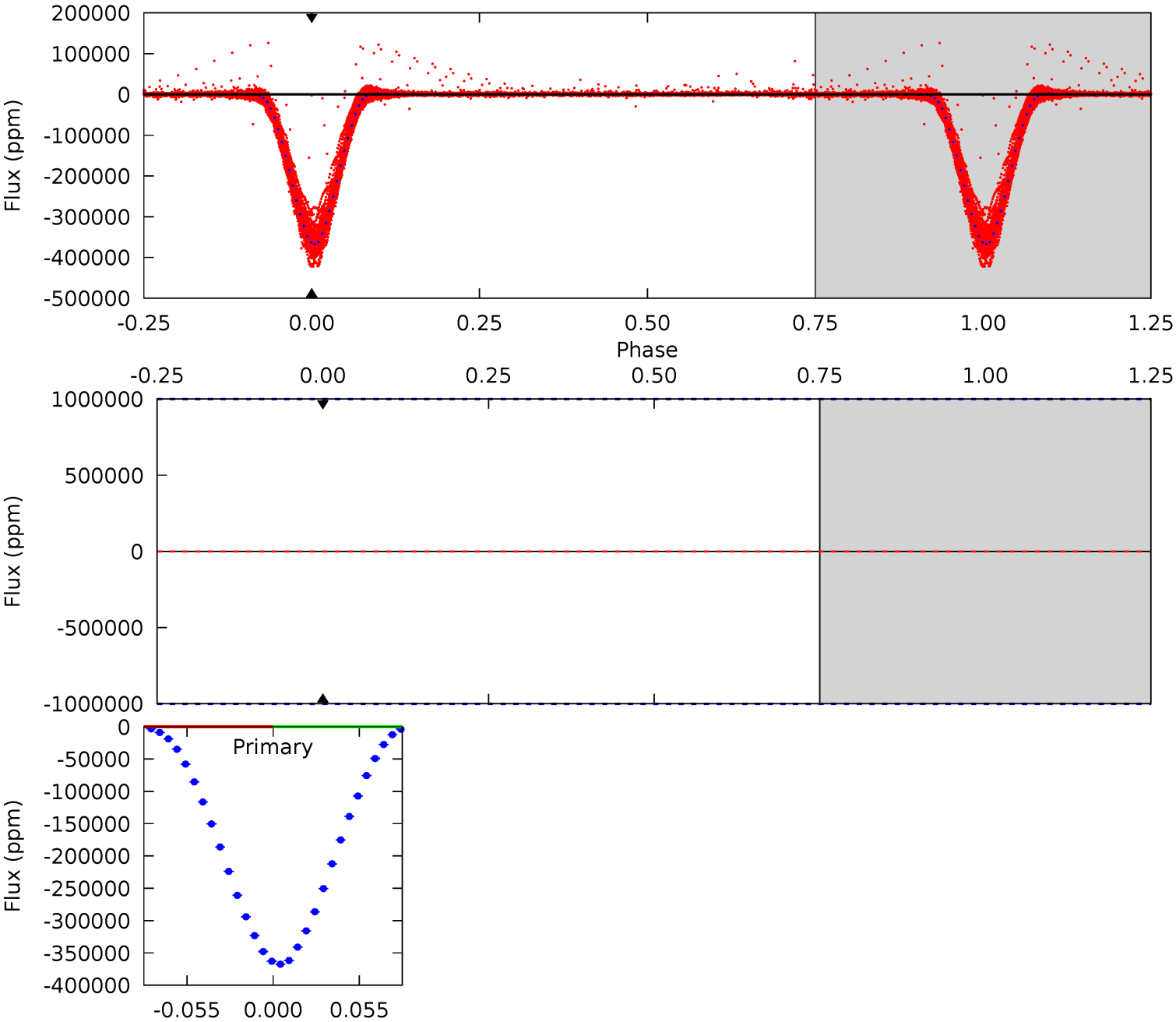
TCE 012418816-01   P= 0.760935 Days    $T_0=131.636644$  (BKJD)



# DV Model-Shift Uniqueness Test

012418816-01, P = 0.760935 Days, E = 130.871934 Days

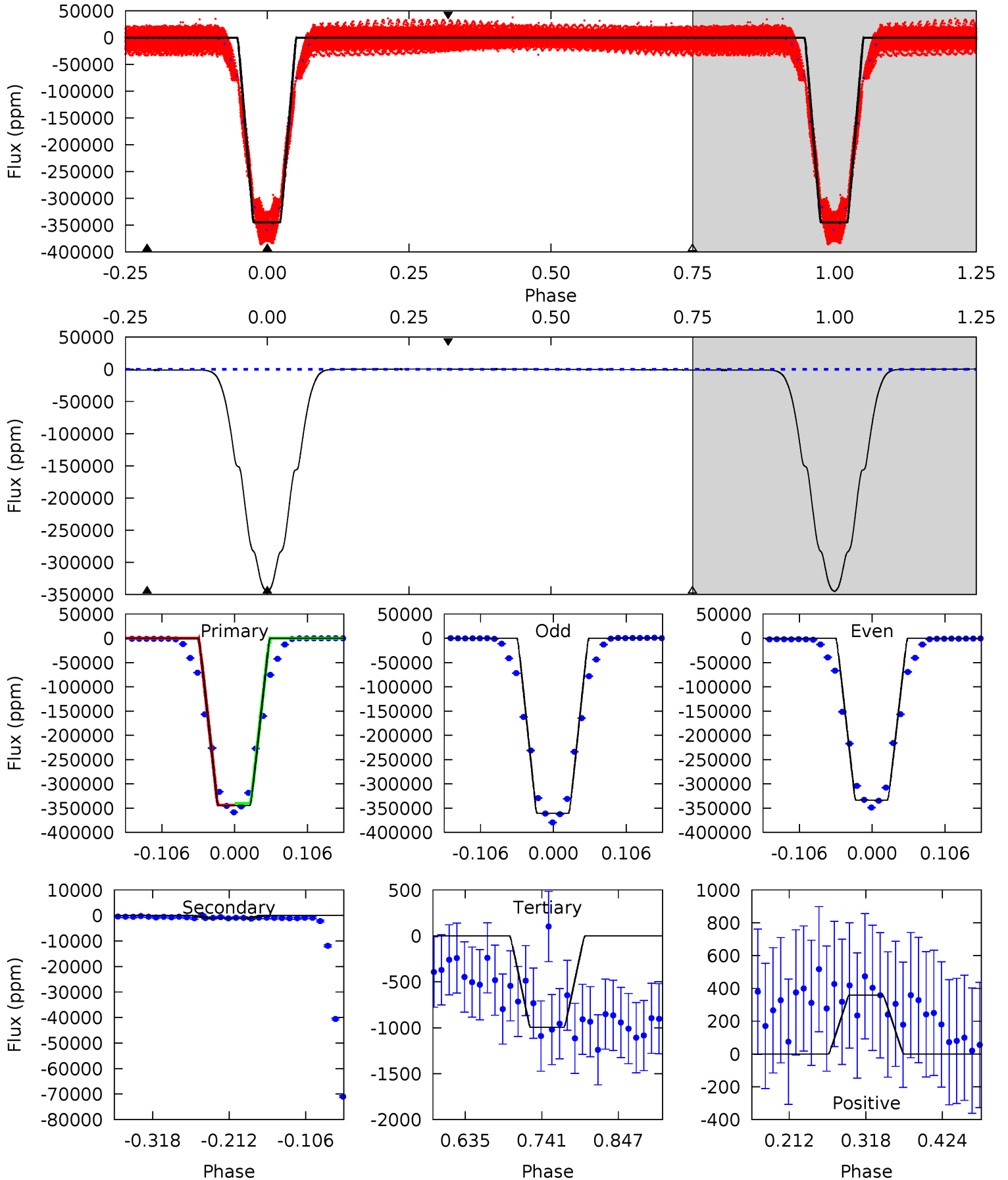
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

012418816-01, P = 0.760935 Days, E = 130.875709 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
2539	8.50	7.33	2.64	4.55	1.62	2.96	2532	2537	1.16	5.85	98.3	1.00	0.00	0



### Stellar Parameters For KIC 012418816

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4675^{+152}_{-138}$	$4.740^{+0.046}_{-0.025}$	$-1.520^{+0.300}_{-0.250}$	$0.511^{+0.027}_{-0.032}$	$0.523^{+0.034}_{-0.021}$	$5.536^{+0.991}_{-0.575}$
	+3%/-3%	+1%/-1%	+20%/-16%	+5%/-6%	+7%/-4%	+18%/-10%
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 012418816-01 / KOI 7533.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$0 \pm 1000000$	$15.22^{+5.85}_{-5.89}$	$1787^{+68}_{-64}$	$3071^{+2470}_{-7976}$	$2.956^{+61.955}_{-40.350}$
Alt.	$-1153 \pm 136$	$34.23^{+5.96}_{-5.30}$	$1790^{+62}_{-57}$	$-2229^{+64}_{-59}$	$0.093^{+0.040}_{-0.025}$

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

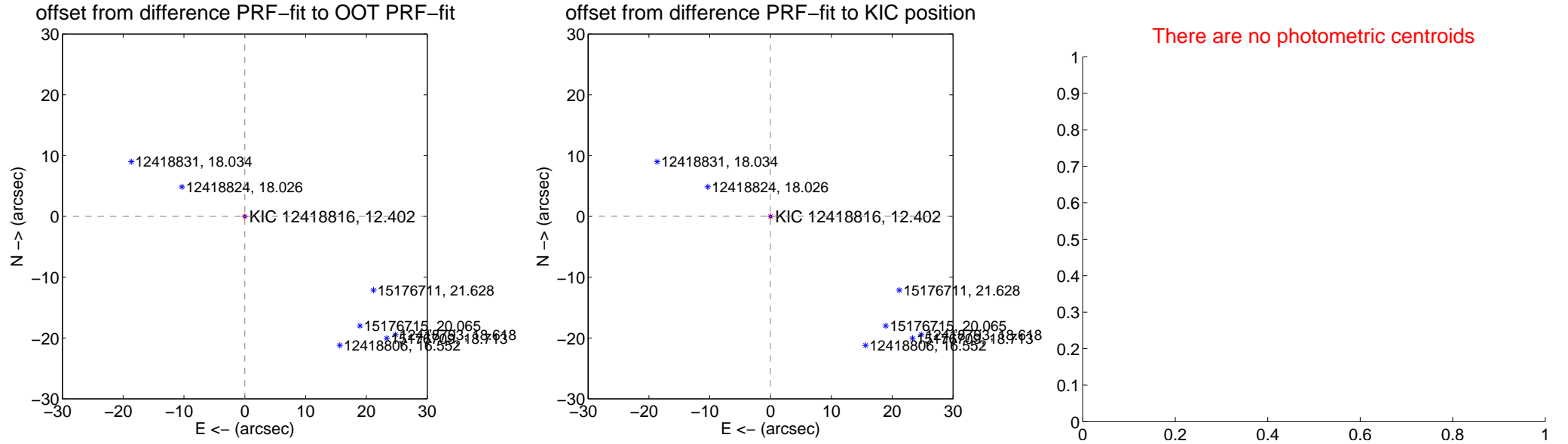
## DV Centroid Data

Supplemental centroid analysis for 012418816-01. Kepler magnitude: 12.40. Transit SNR -1.00

There are 17 quarters with good PRF difference image offsets

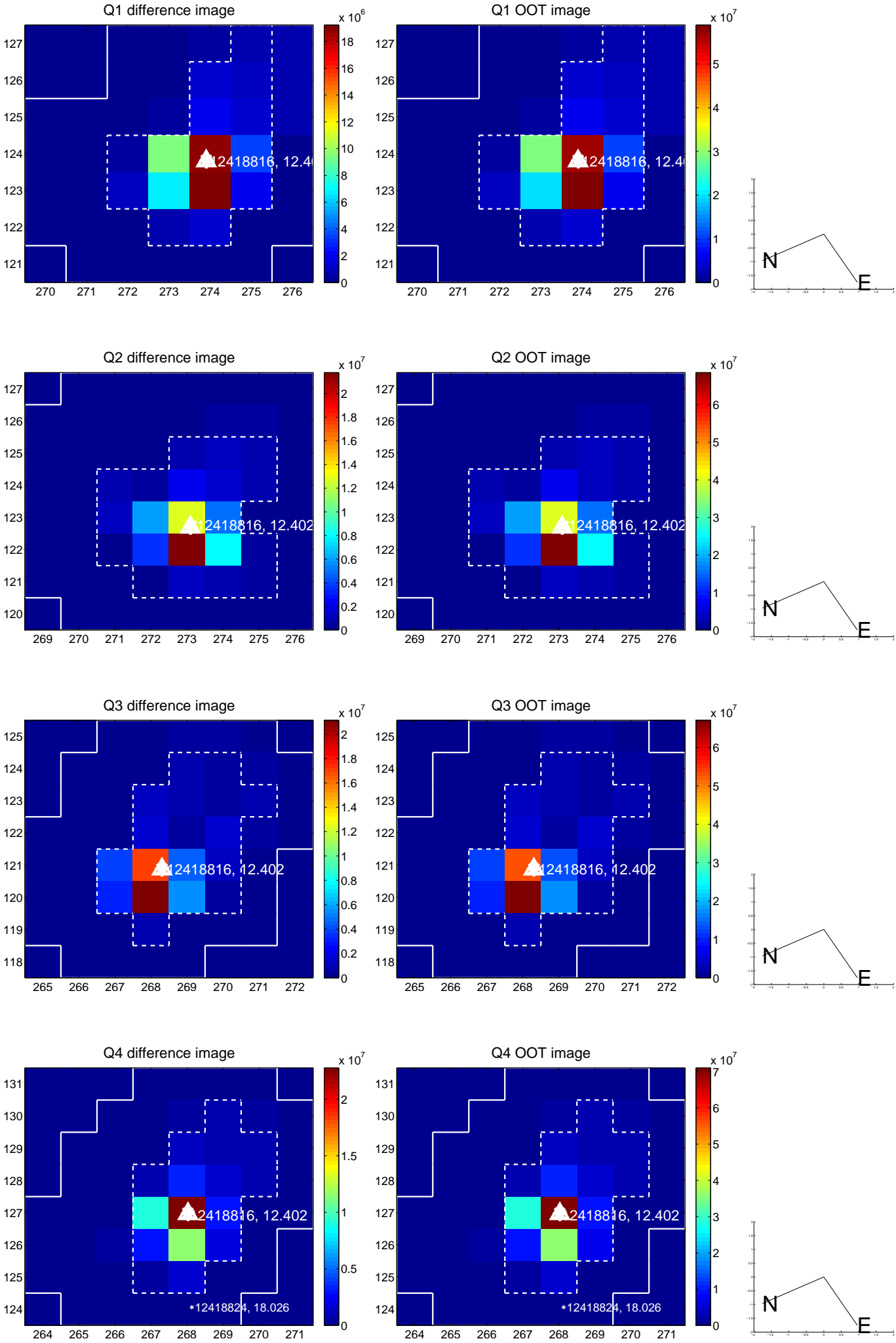
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.012 \pm 0.067$	0.18	$-0.012 \pm 0.067$	$0.004 \pm 0.067$
PRF-fit source offset from KIC position	$0.035 \pm 0.068$	0.51	$0.029 \pm 0.067$	$0.020 \pm 0.067$
photometric centroid source offset	—	—	—	—

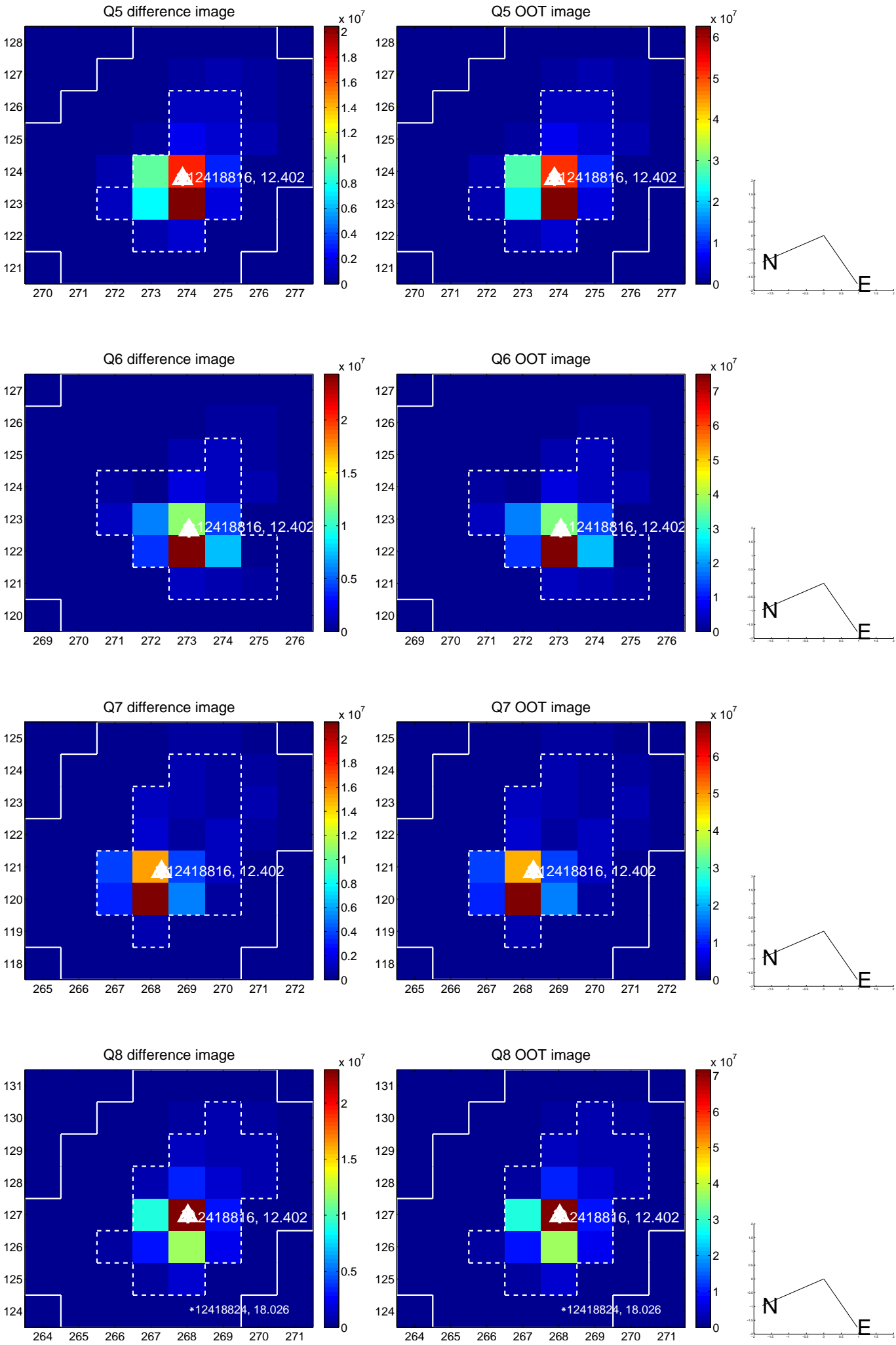


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

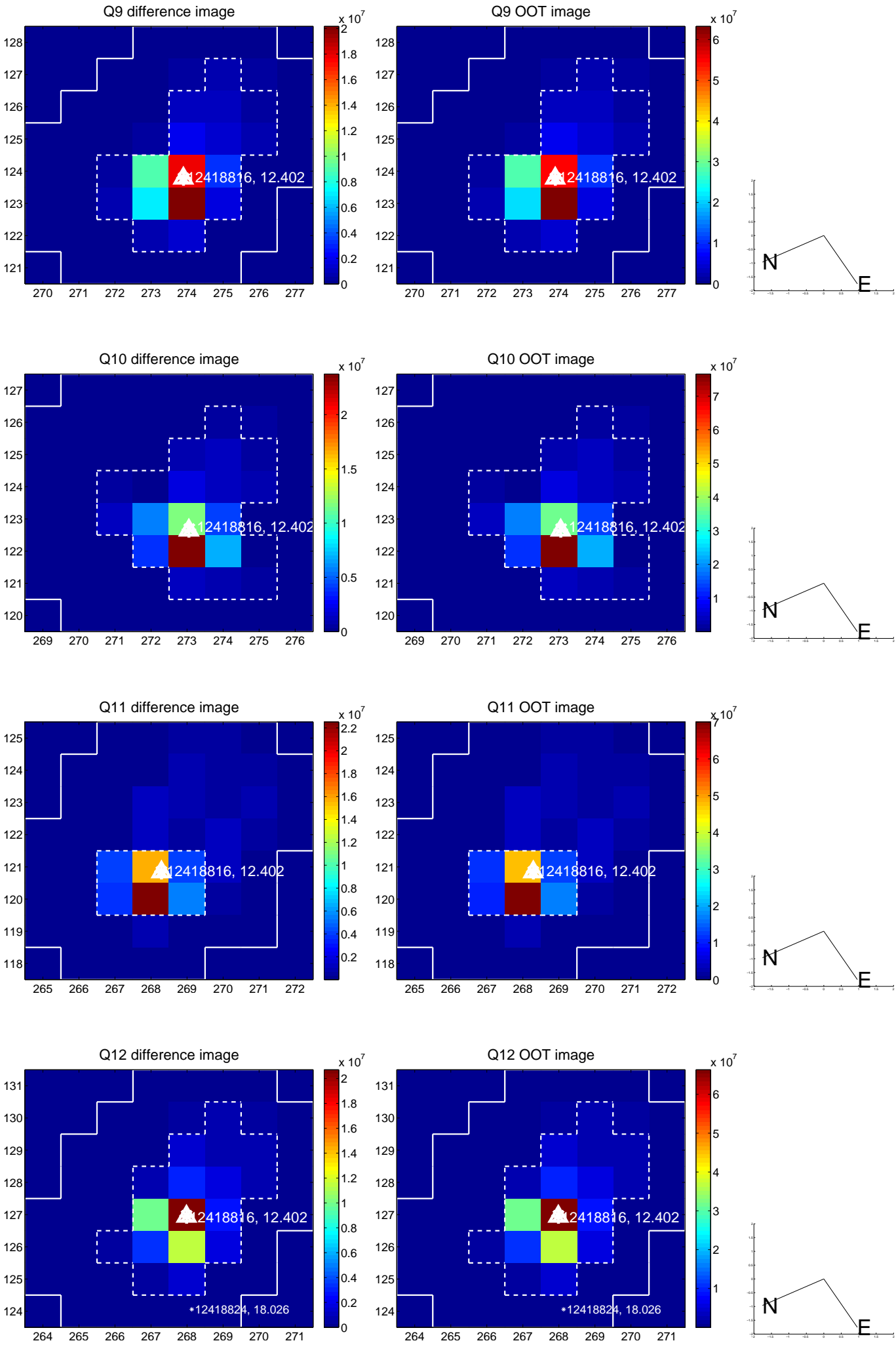


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

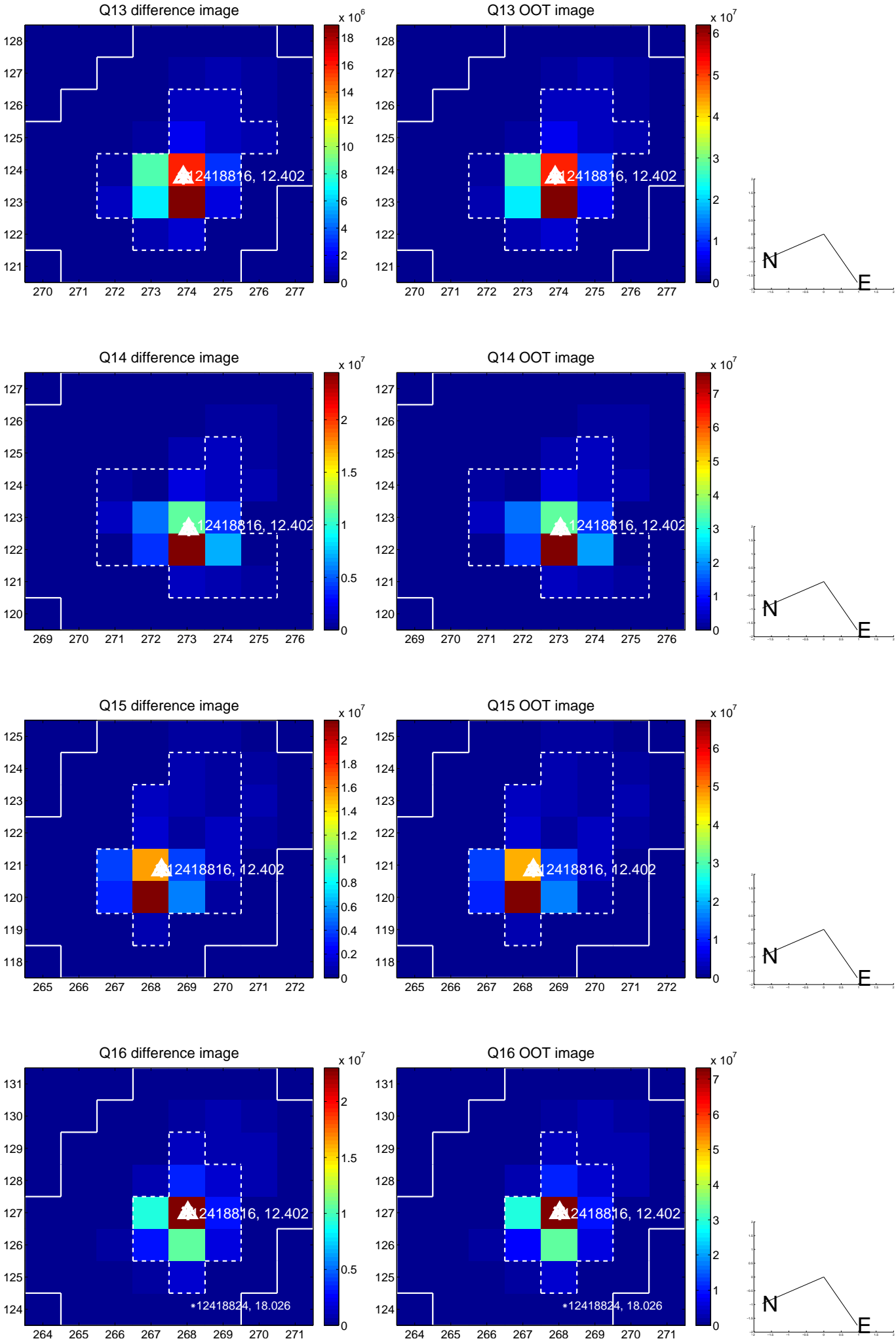




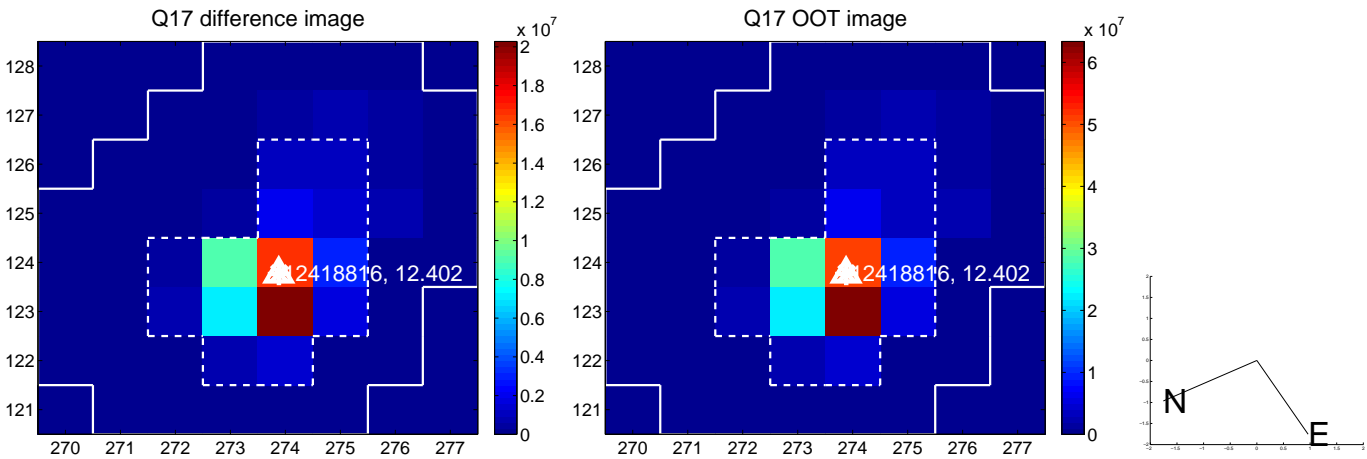
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



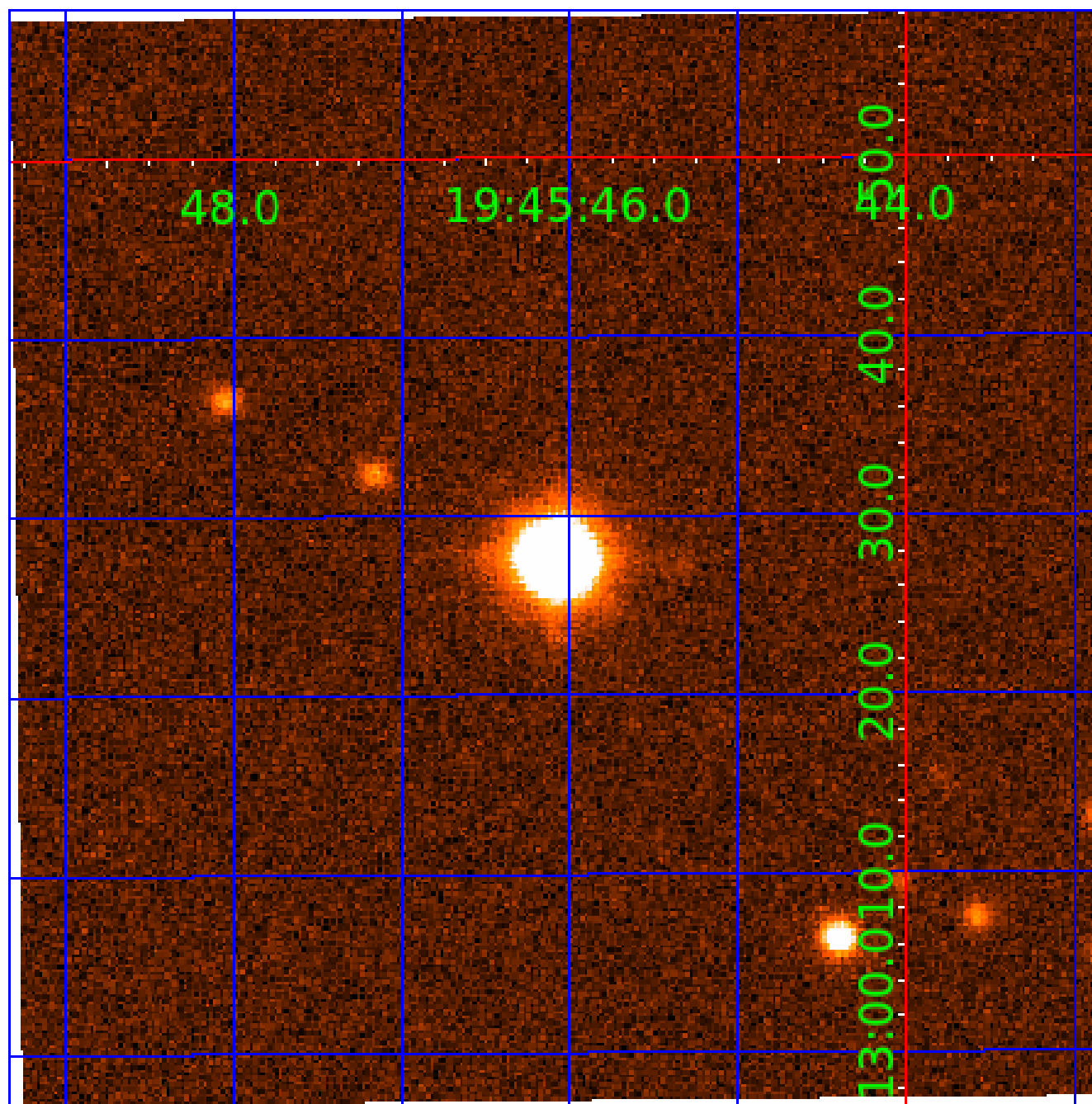
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



folded centroid time series figure for this object.

UKIRT Image

Declination



# KIC 012418816

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
012418816-01	OBS	7533.01	0.760935	131.632869	362264.9	1.500	17552.7	-1.0	0.51	4675	15.09	646.40
012418816-02	OBS	No	3.043678	132.263630	10972.8	9.000	2812.1	-1.0	0.51	4675	5.30	101.81

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012418816-01	OBS	FP	0.00	0	1	0	0	SWEET_EB—MOD_ODDEVEN_ALT—HAS_SEC_TCE—CENT_NOFITS
012418816-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—RESIDUAL_TCE—CENT_NOFITS

**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.

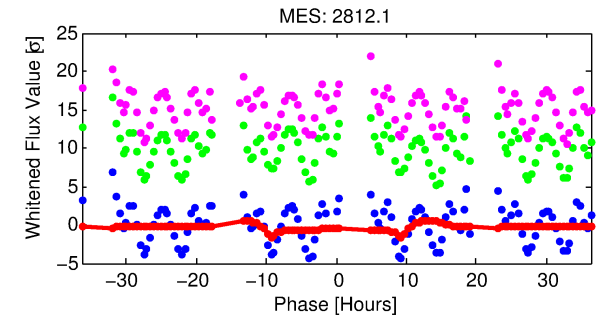
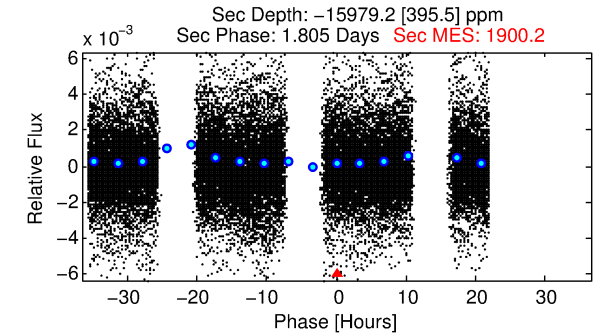
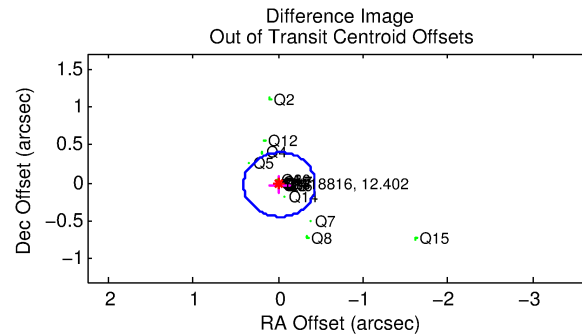
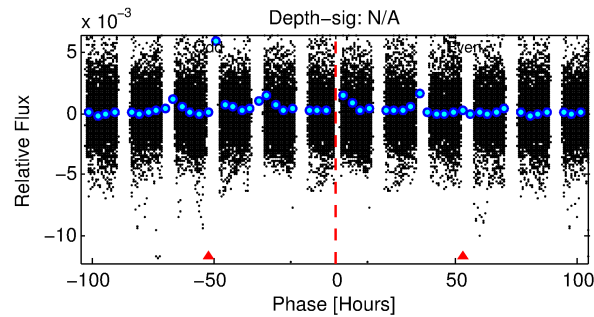
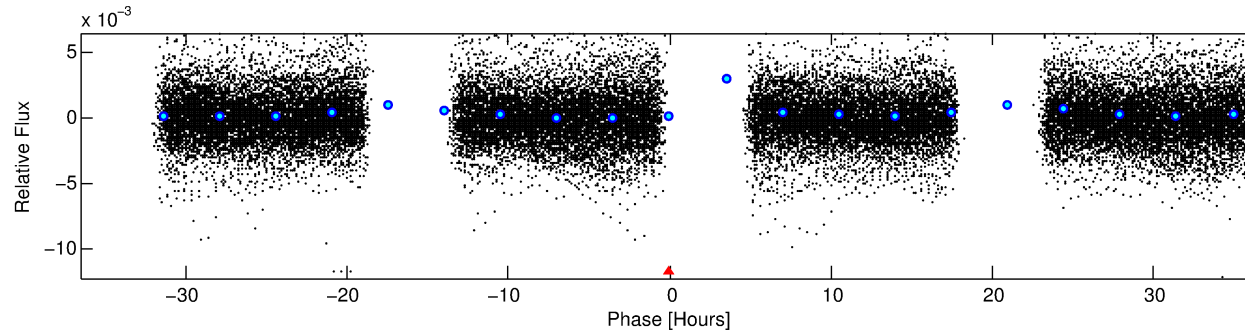
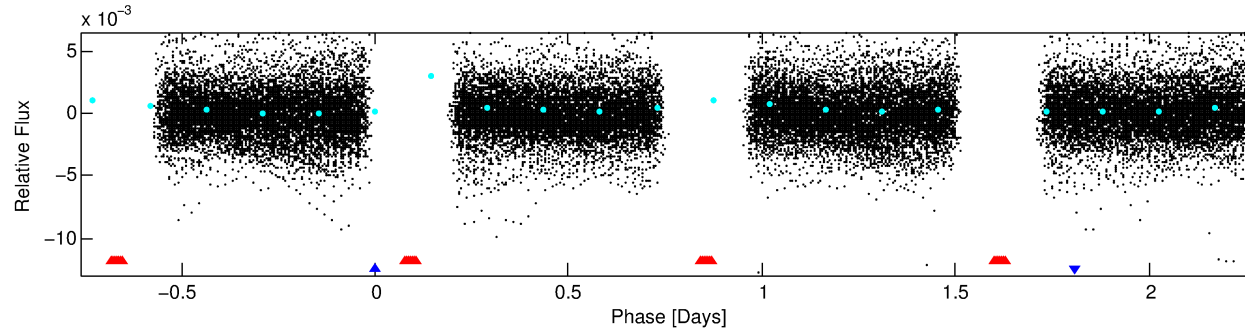
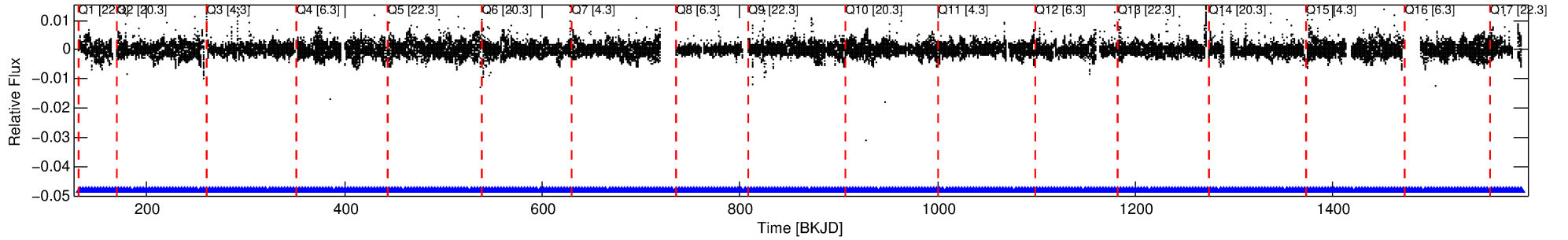
## Ephemeris Match Information For 012418816-02

No Significant Match Found

# DV One-Page Summary

KIC: 12418816 Candidate: 2 of 2 Period: 3.044 d  
KOI: K07533 Corr: No Ephemeris Match

Kp: 12.40 R\*: 0.51 Rs Teff: 4675.0 K Logg: 4.74 Fe/H: -1.520



TPS TCE Results:

Period = 3.04368 d  
Epoch = 132.2636 BKJD

DV fit results are unavailable

DV Diagnostic Results:

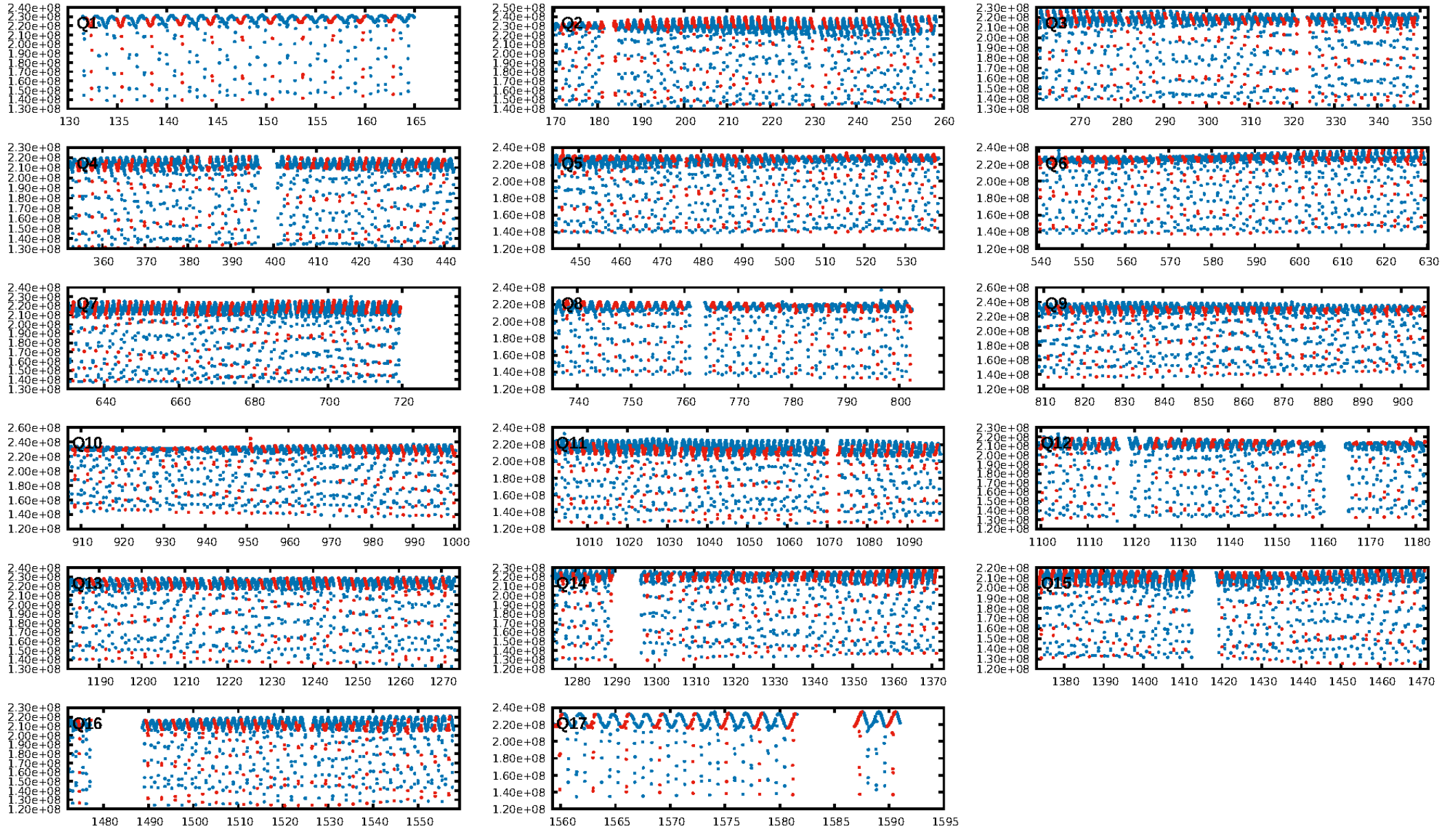
ShortPeriod-sig: 100.0% [6.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [428/428]  
GhostDiagnostic-chr: 1.537

Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: 0.028 arcsec [0.20σ]  
KicOffset-rm: 0.029 arcsec [0.33σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.94 [16/17]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 08:40:06 Z

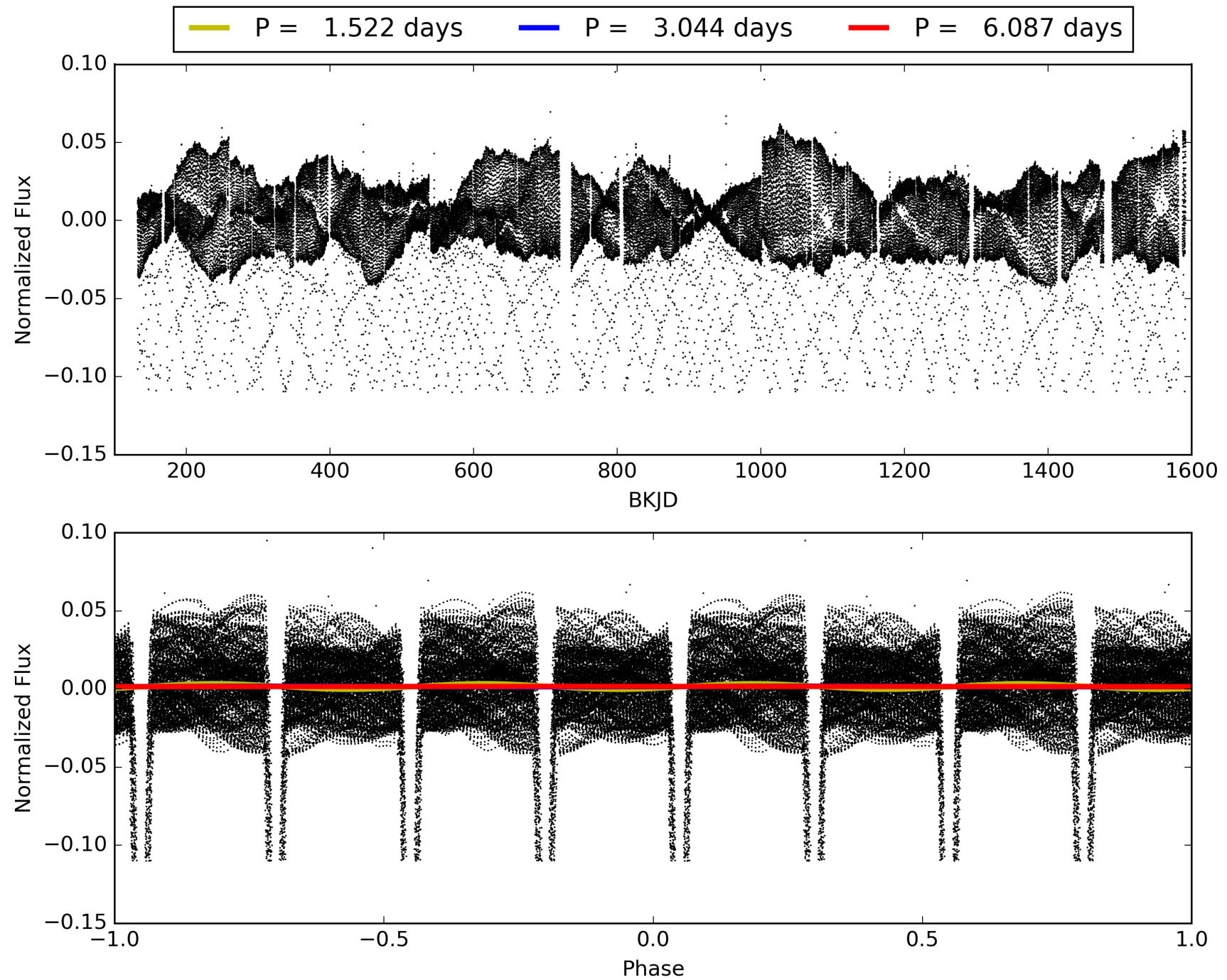
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 012418816-02, PDC Light Curves





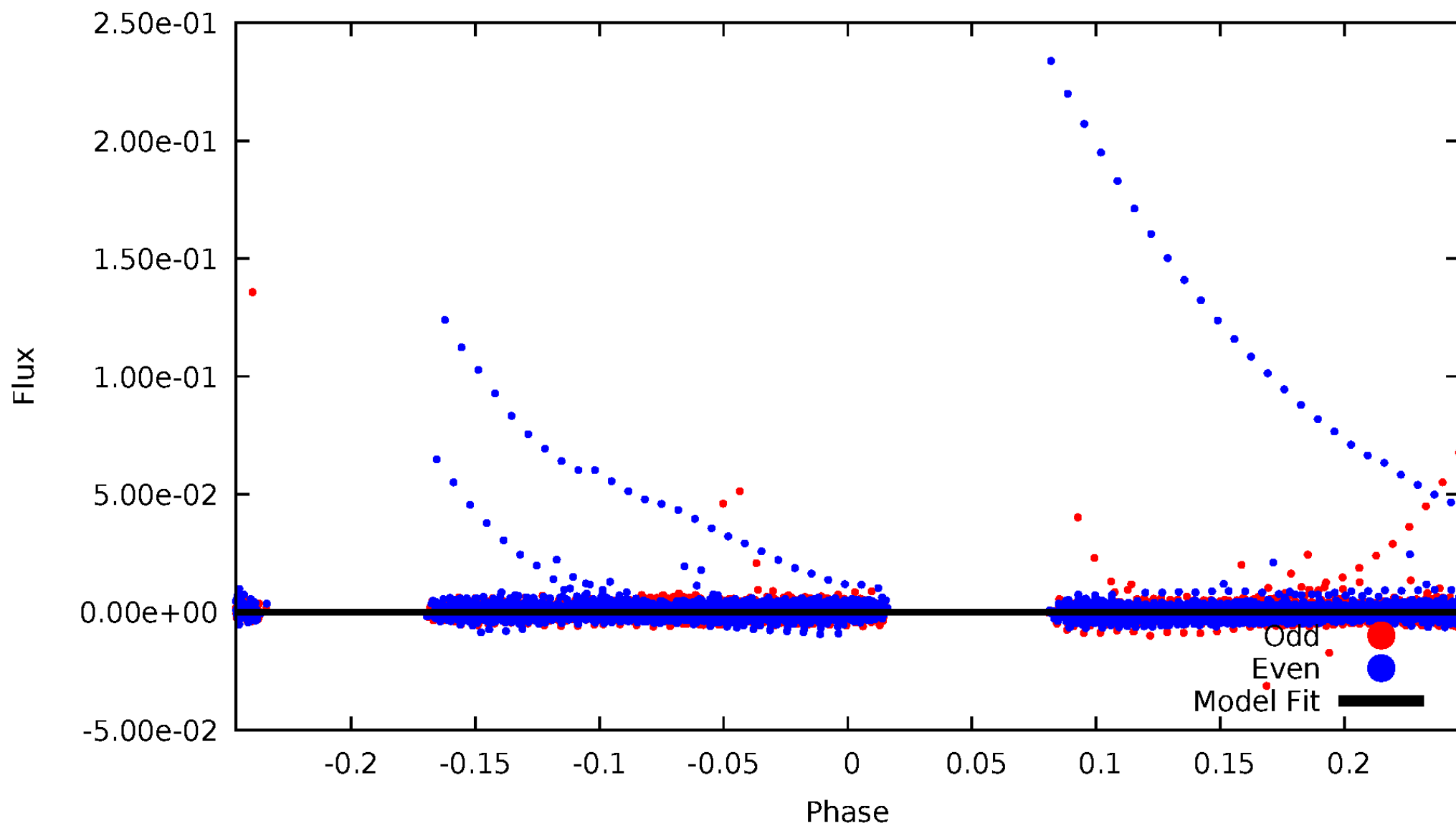
TCE 012418816-02





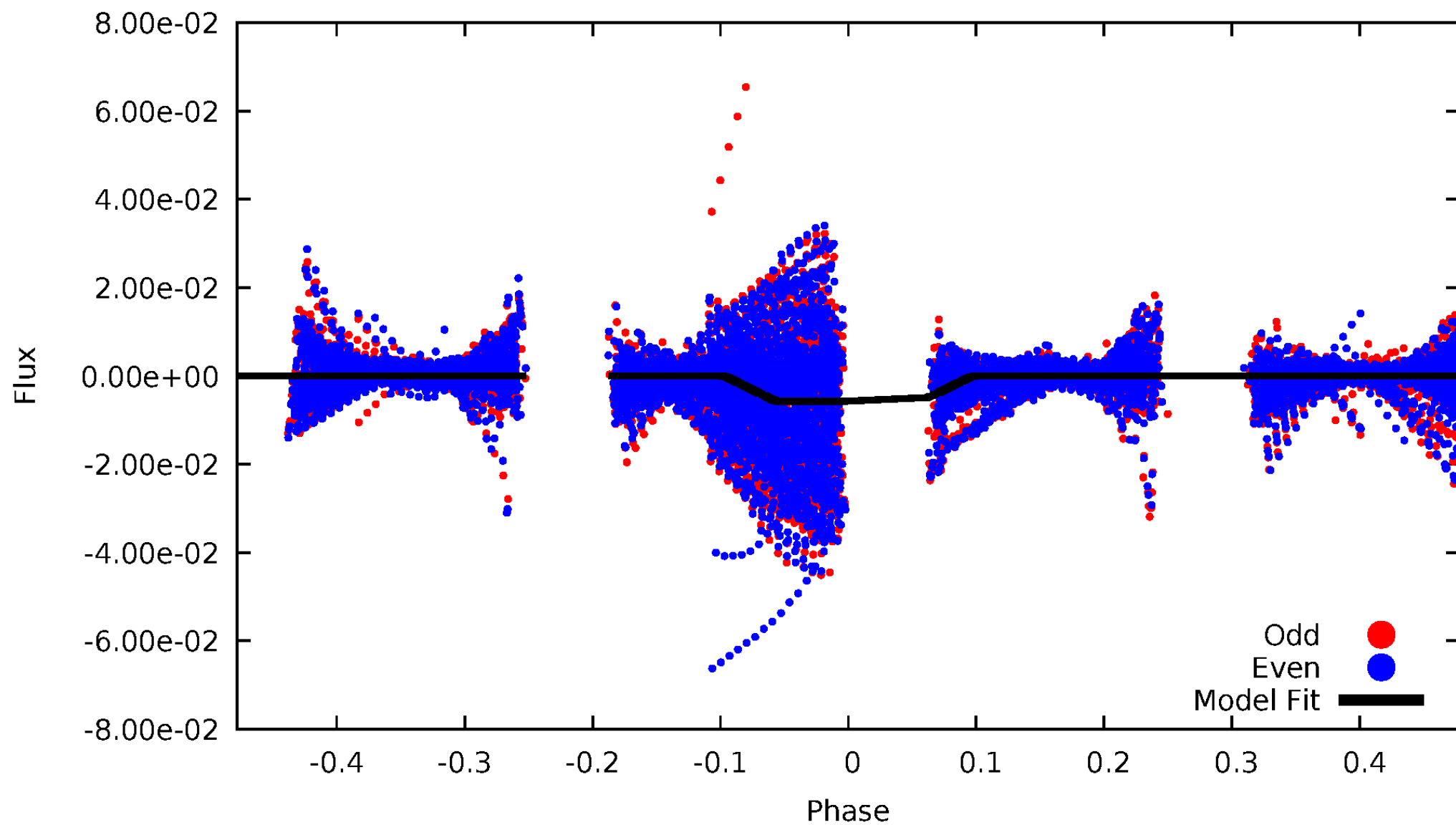
# DV Odd/Even

TCE 012418816-02



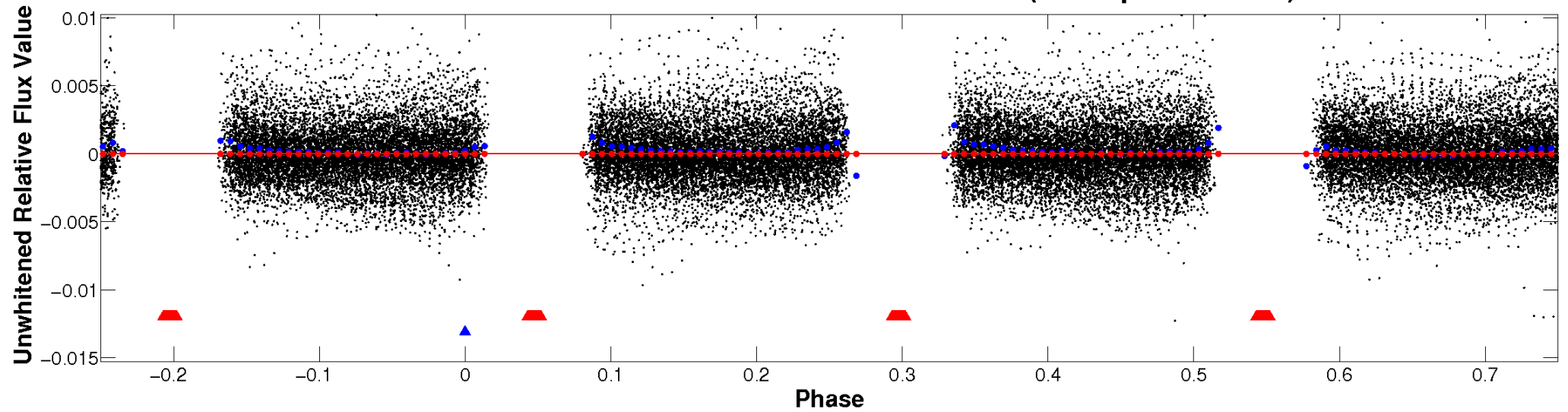
# ALT Odd/Even

TCE 012418816-02



# Non-Whitened Vs. Whitened Light Curve

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

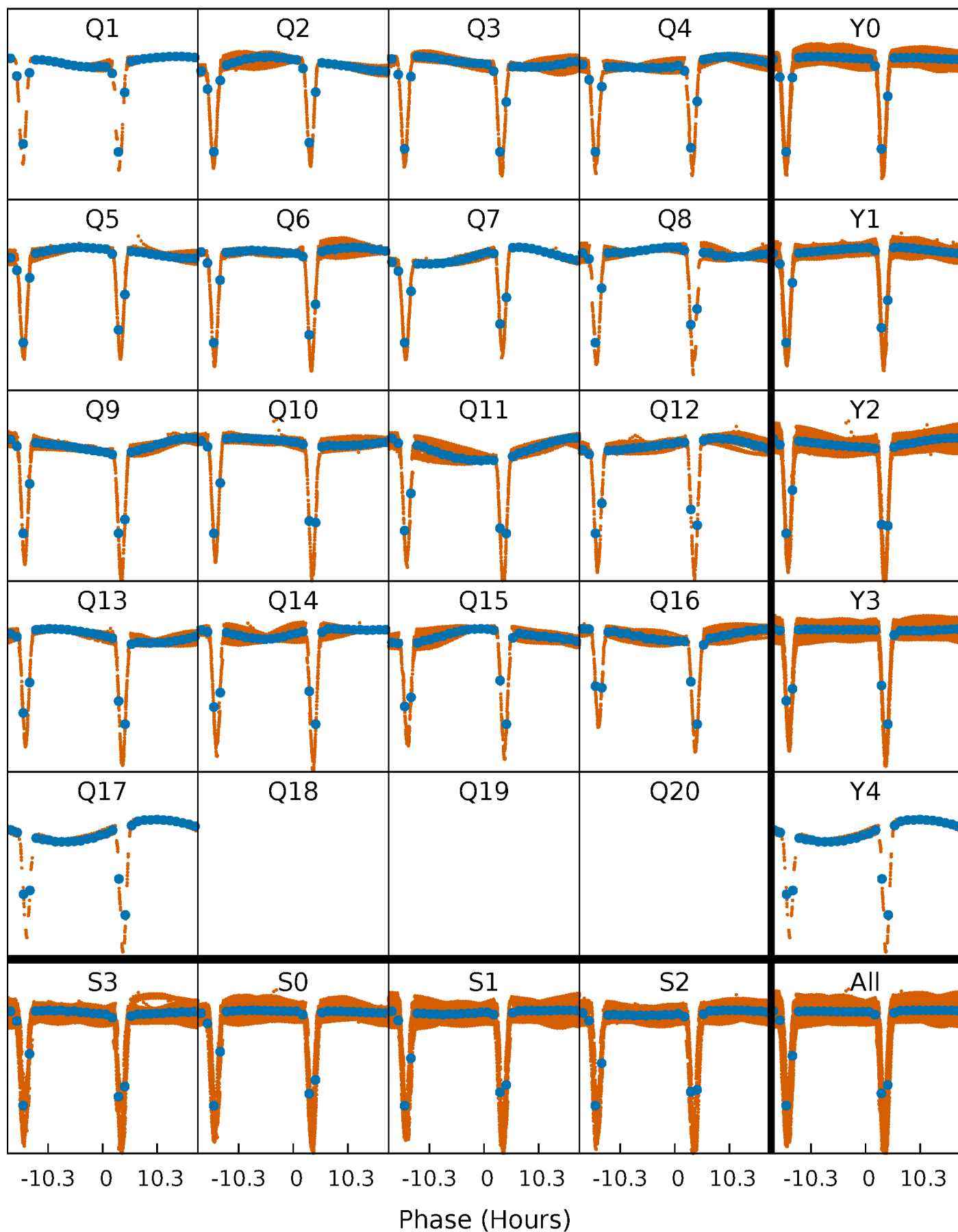


**Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



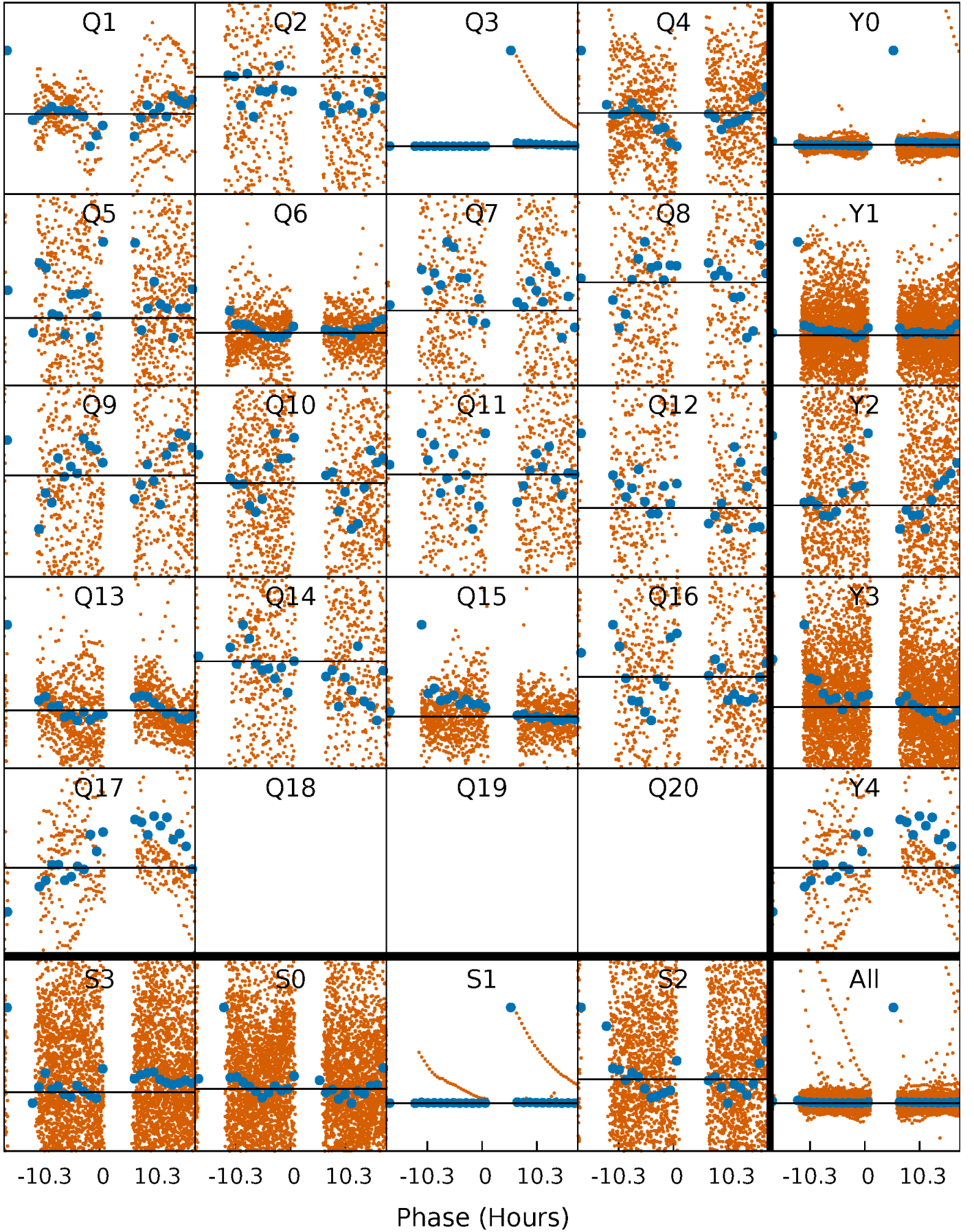
# PDC Quarter-Phased Transit Curves

TCE 012418816-02     $P = 3.043678$  Days     $T_0 = 132.263630$  (BKJD)



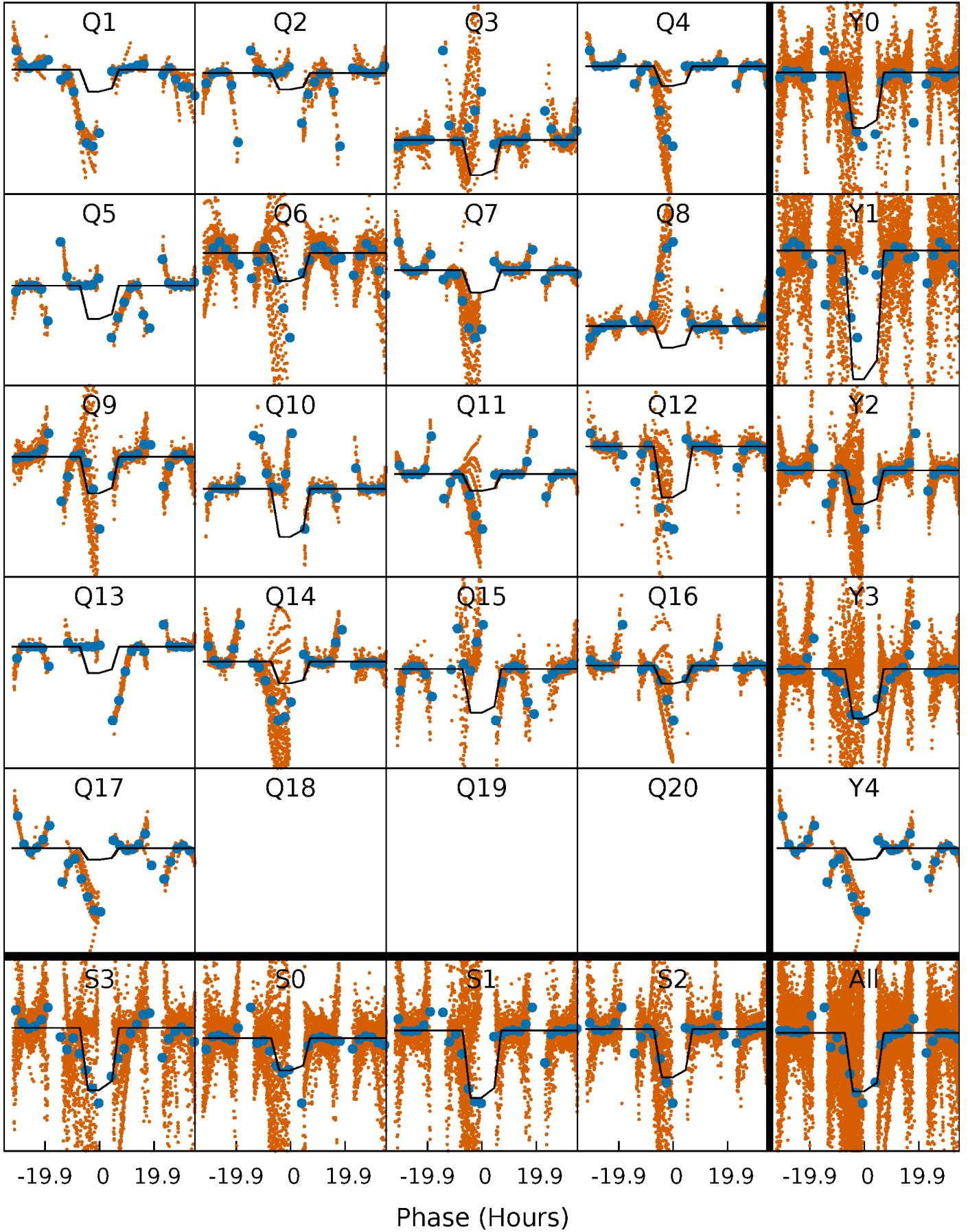
# DV Quarter-Phased Transit Curves

TCE 012418816-02   P= 3.043678 Days    $T_0=132.263630$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

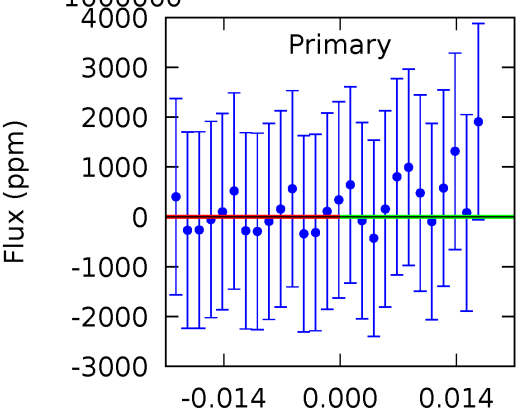
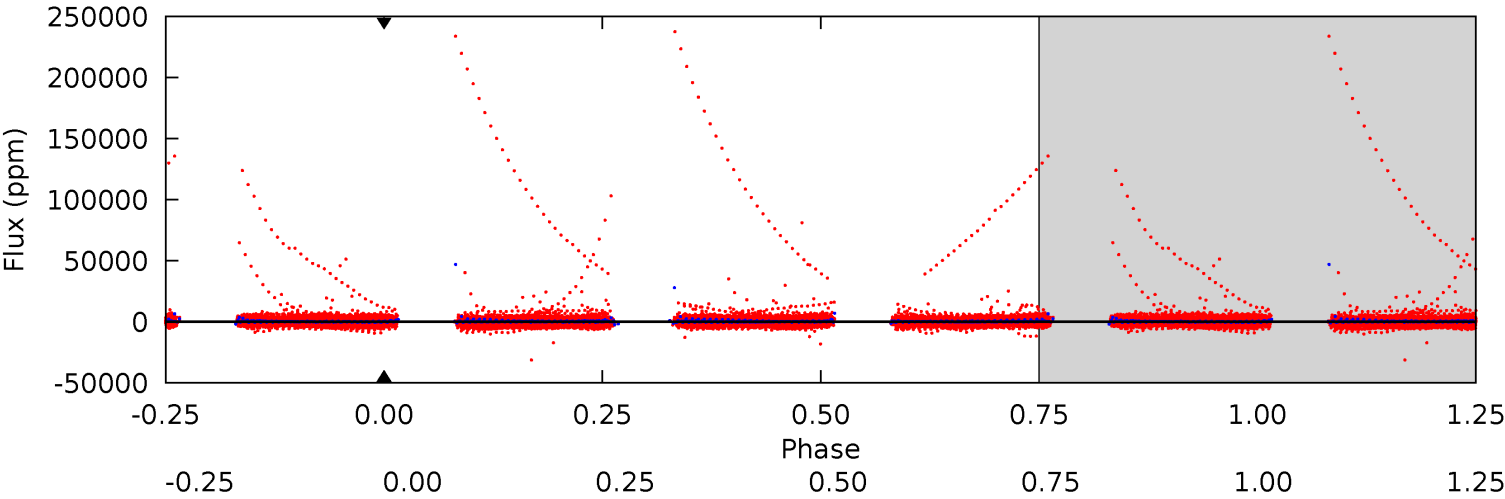
TCE 012418816-02   P= 3.043678 Days    $T_0=132.319030$  (BKJD)



DV Model-Shift Uniqueness Test

012418816-02, P = 3.043678 Days, E = 129.219952 Days

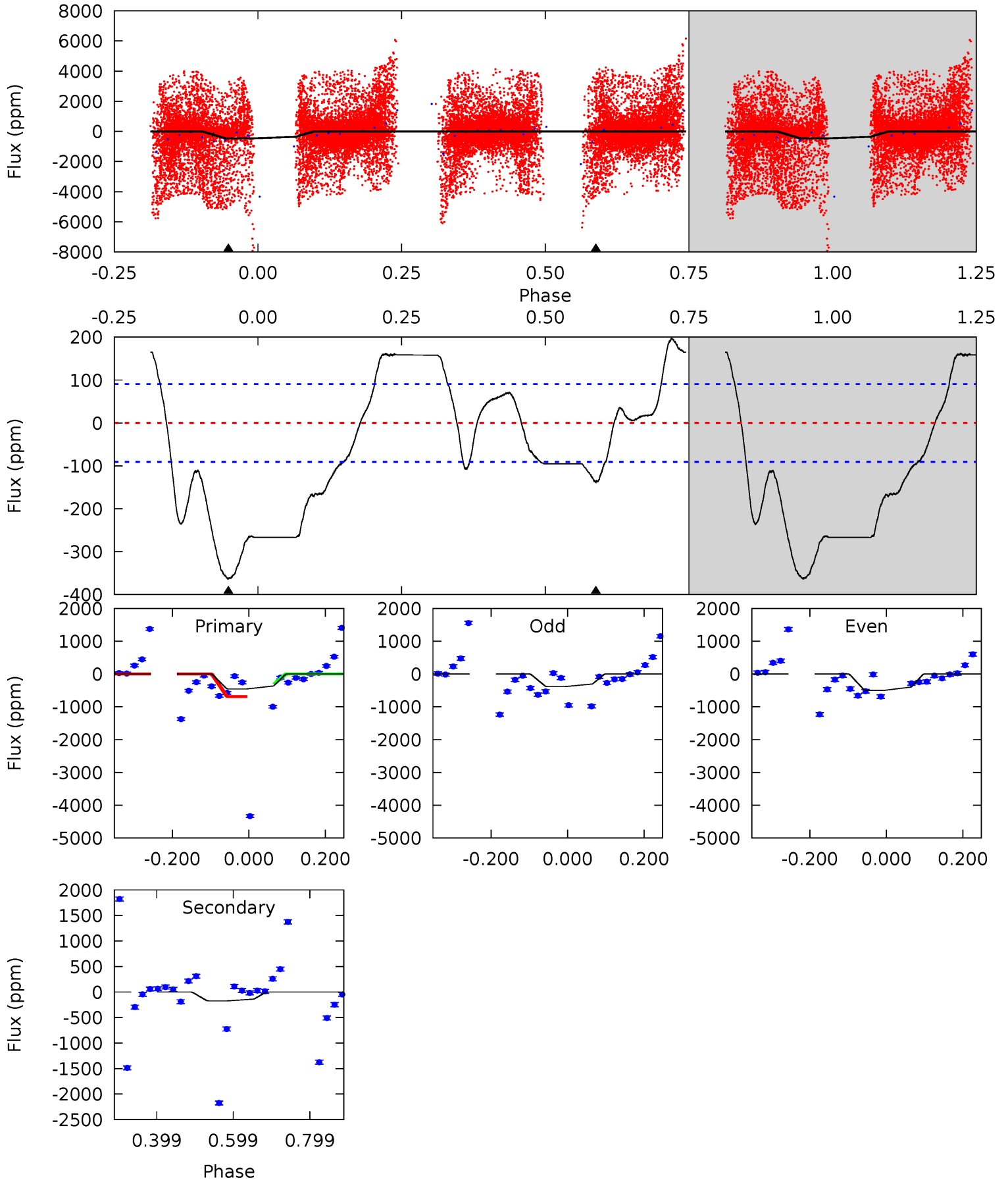
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

012418816-02, P = 3.043678 Days, E = 129.275352 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
17.7	6.75	0	0	4.42	1.28	3.91	17.7	17.7	6.75	6.75	2.29	2.55	0.35	0





### Stellar Parameters For KIC 012418816

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4675^{+152}_{-138}$	$4.740^{+0.046}_{-0.025}$	$-1.520^{+0.300}_{-0.250}$	$0.511^{+0.027}_{-0.032}$	$0.523^{+0.034}_{-0.021}$	$5.536^{+0.991}_{-0.575}$
	+3%/-3%	+1%/-1%	+20%/-16%	+5%/-6%	+7%/-4%	+18%/-10%
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 012418816-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$0 \pm 1000000$	$6.36^{+4.97}_{-3.99}$	$1126^{+40}_{-37}$	$-3300^{+12425}_{-5069}$	$-26.679^{+2461.541}_{-2023.123}$
Alt.	$-139 \pm 21$	$5.94^{+5.18}_{-3.89}$	$1129^{+37}_{-40}$	$2357^{+806}_{-394}$	$2.411^{+17.509}_{-1.725}$

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

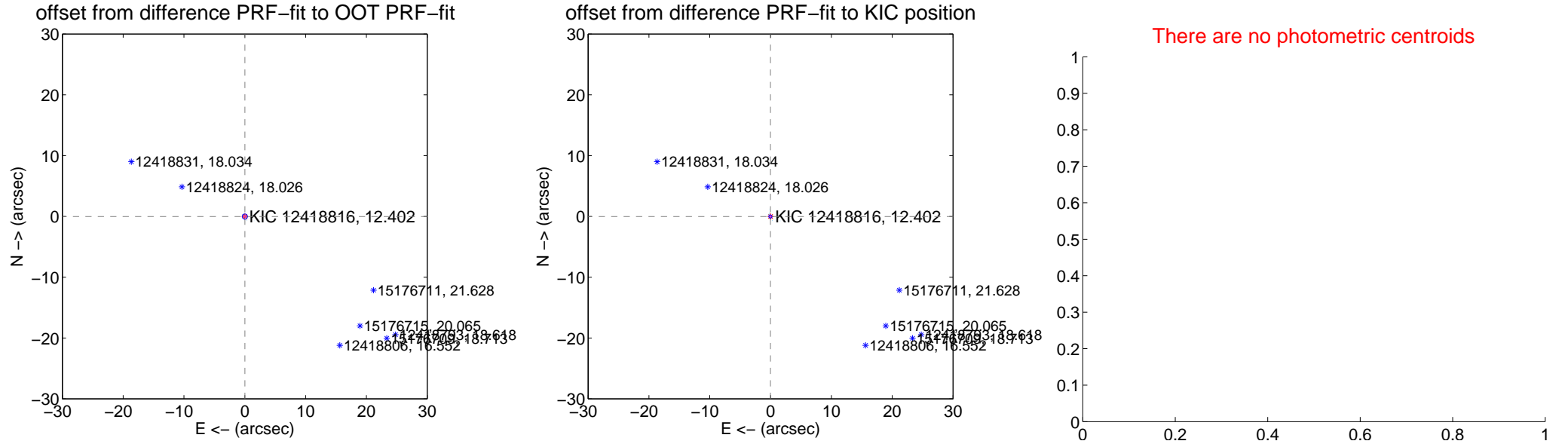
## DV Centroid Data

Supplemental centroid analysis for 012418816-02. Kepler magnitude: 12.40. Transit SNR -1.00

There are 16 quarters with good PRF difference image offsets

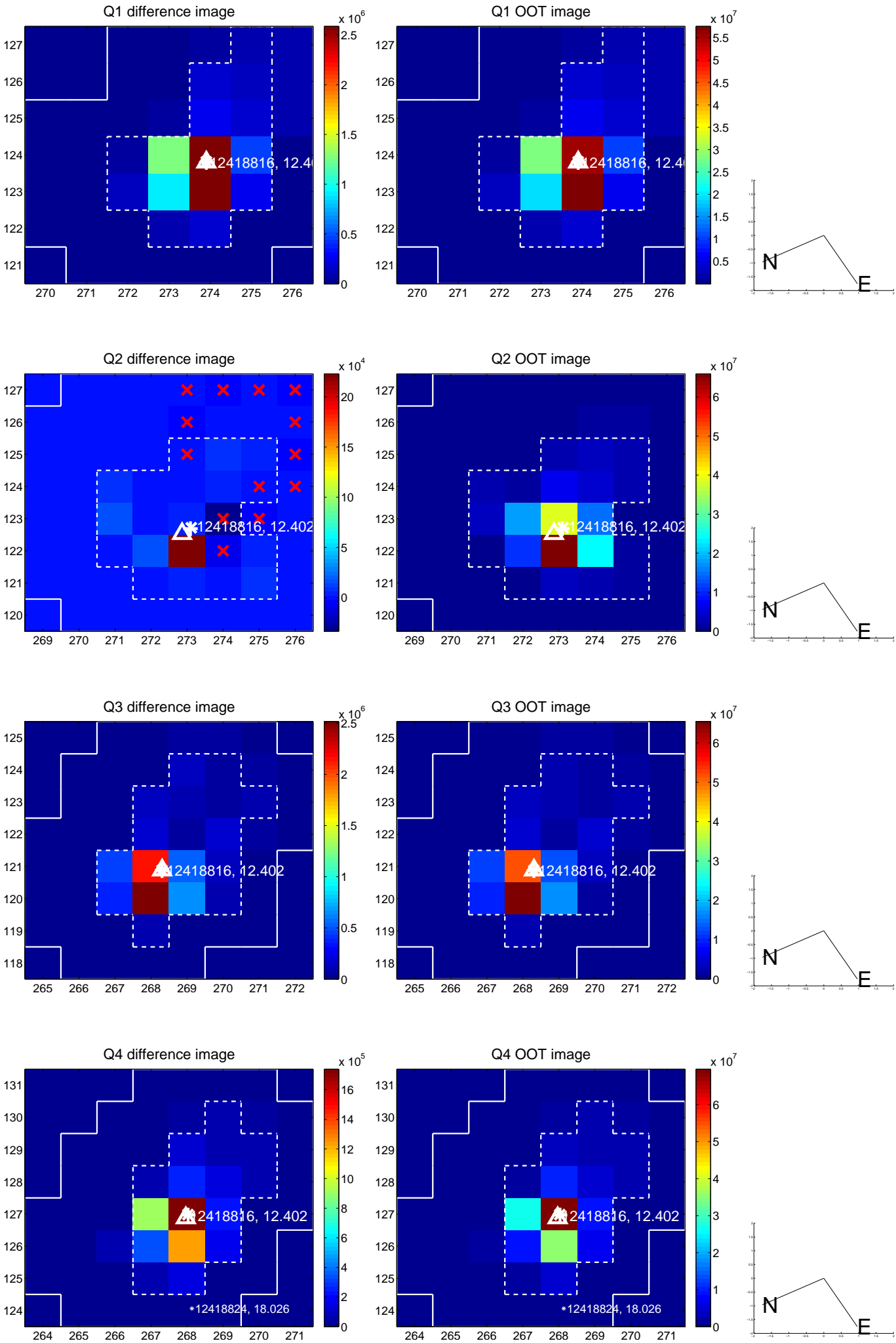
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.028 \pm 0.141$	0.20	$-0.018 \pm 0.123$	$-0.022 \pm 0.112$
PRF-fit source offset from KIC position	$0.029 \pm 0.088$	0.33	$0.025 \pm 0.115$	$-0.014 \pm 0.127$
photometric centroid source offset	—	—	—	—

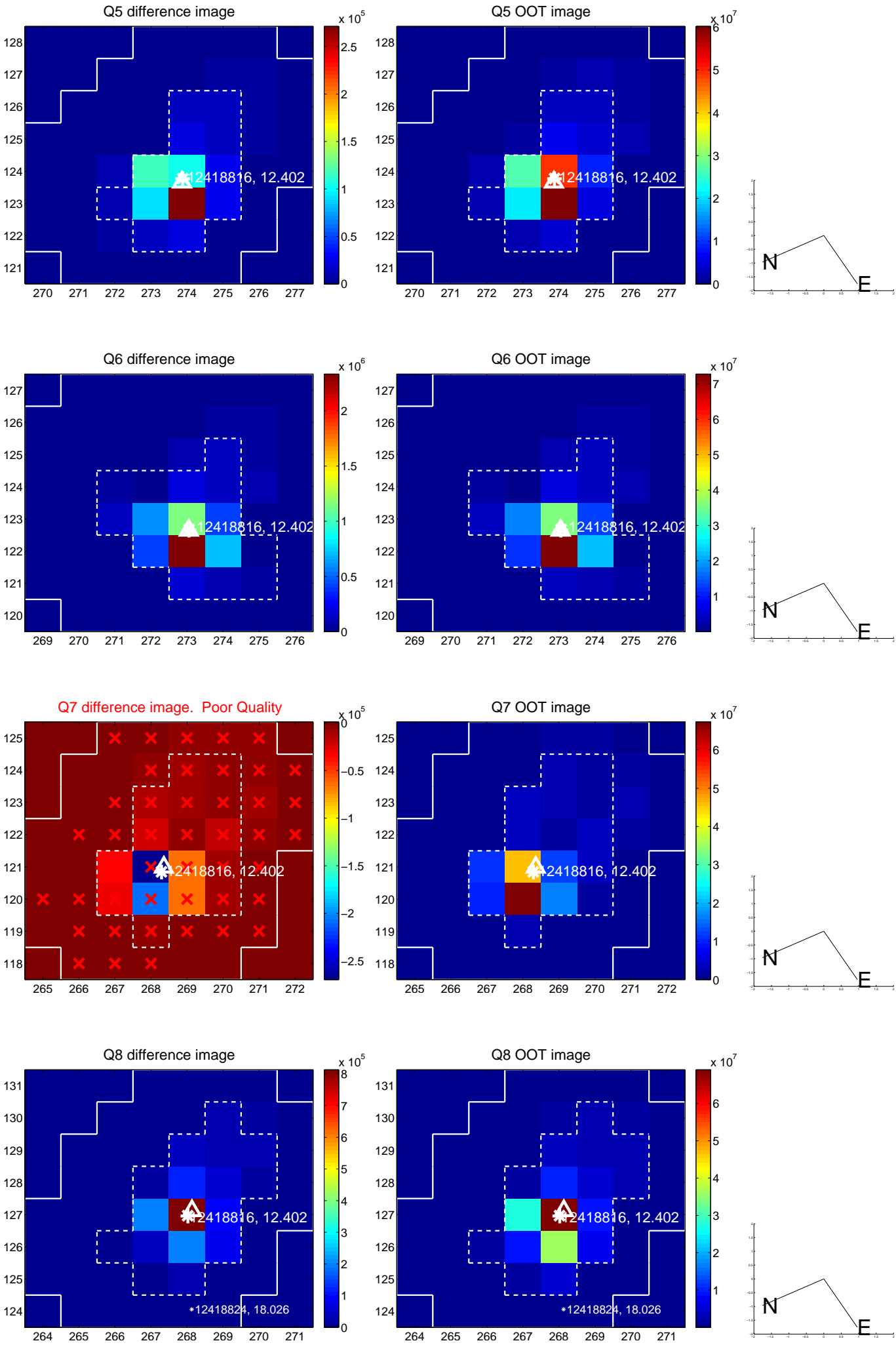


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

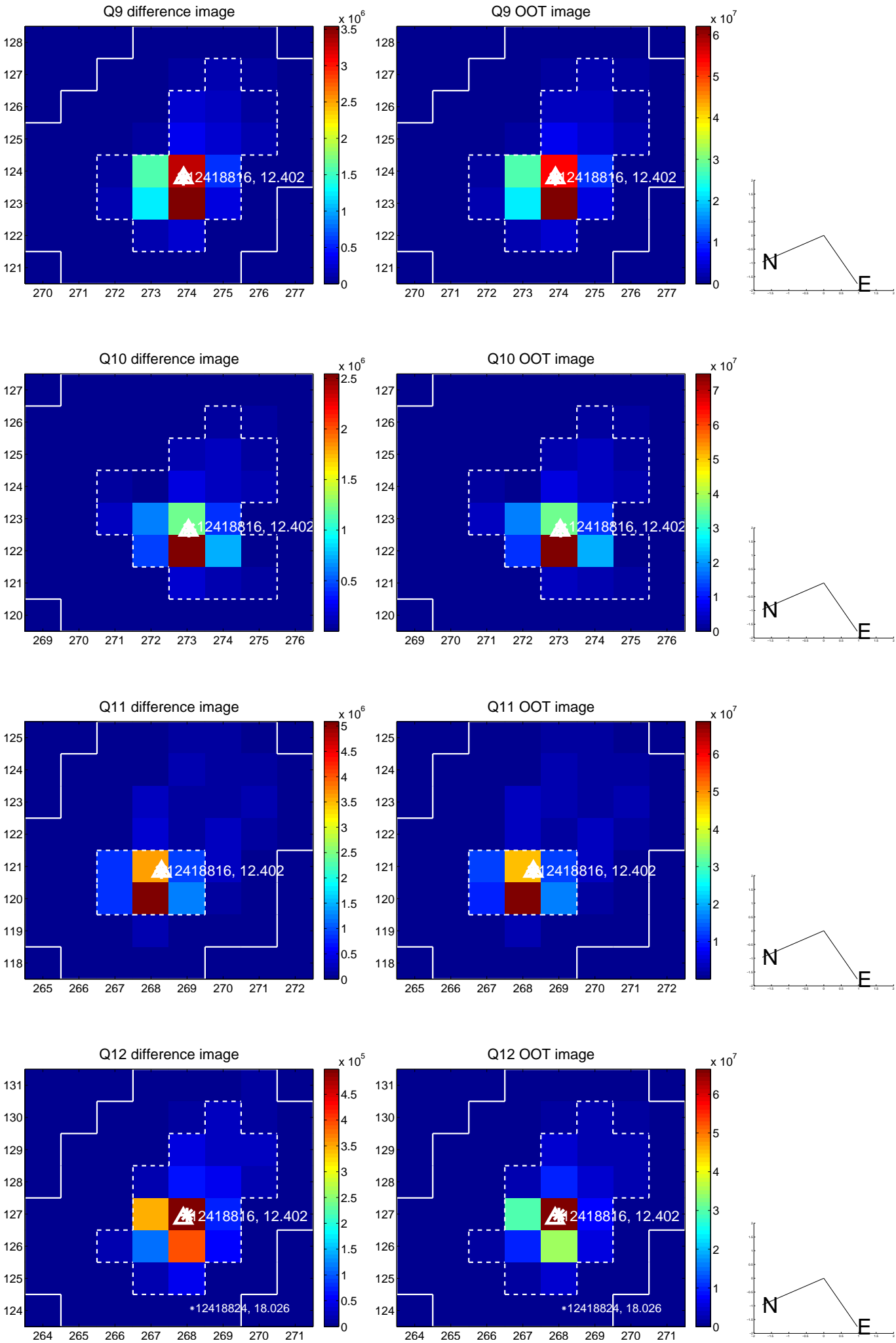
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



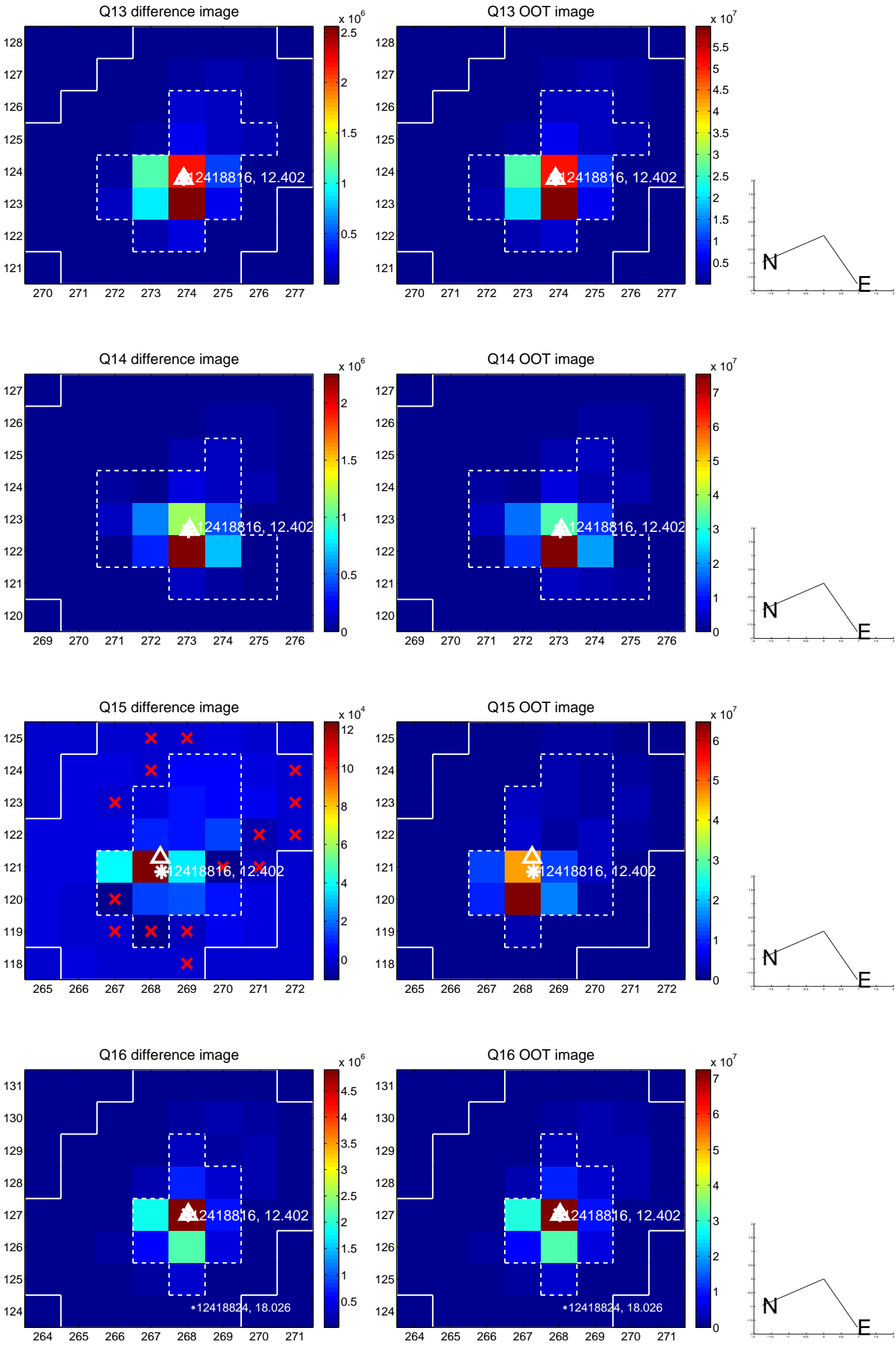
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



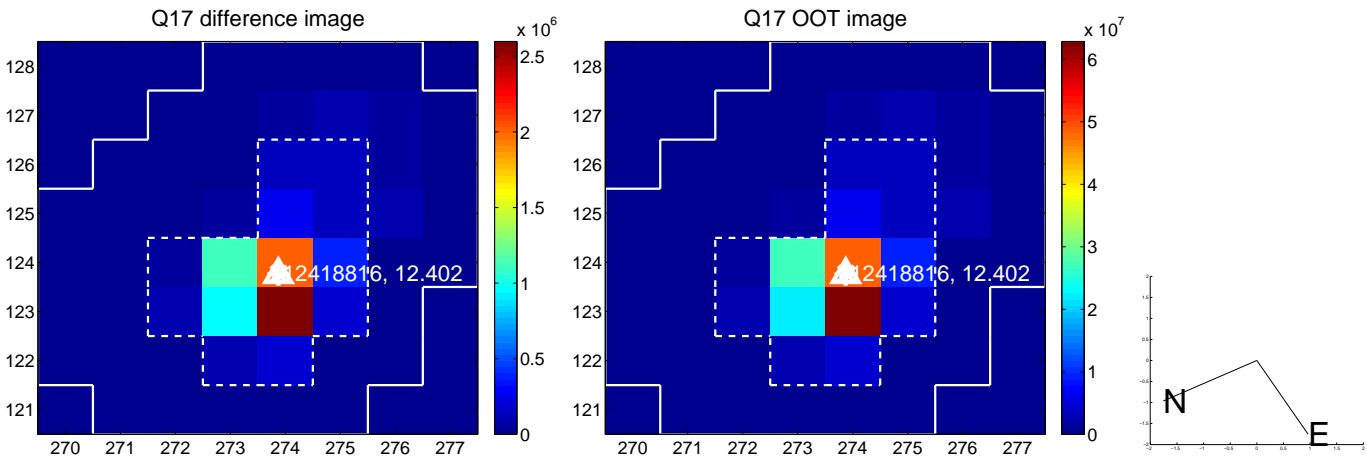
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

Declination

