

# KIC 008174821

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008174821-01	OBS	No	368.876995	232.355986	872.2	15.313	9.9	11.3	0.99	6226	3.64	1.26
008174821-02	OBS	No	347.812714	277.250589	446.1	17.370	7.4	7.9	0.99	6226	2.22	1.37

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008174821-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE—ALL_TRANS_CHASES—CENT_FEW_DIFFS
008174821-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

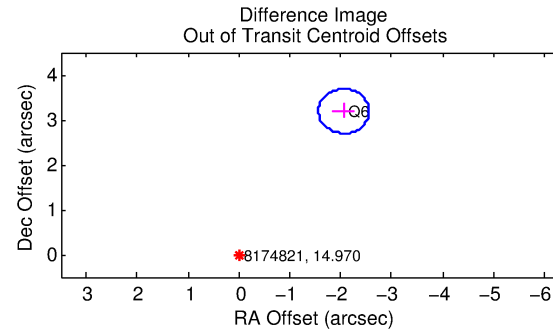
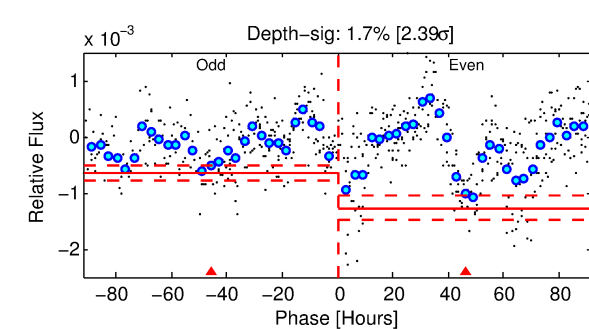
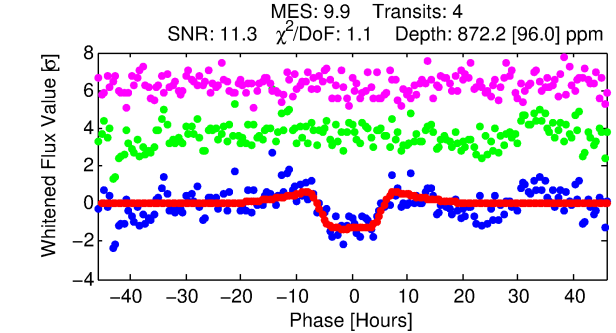
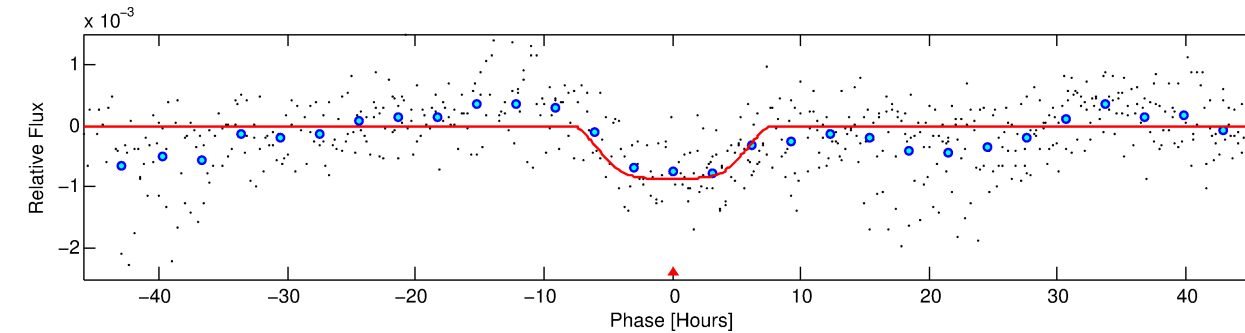
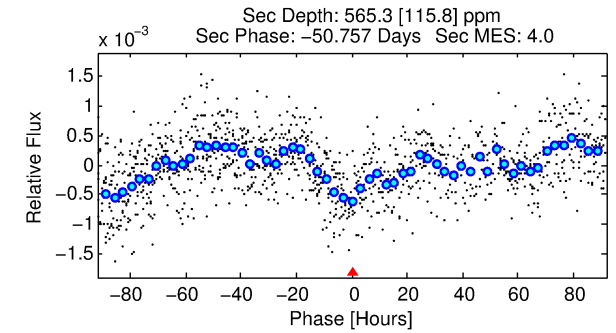
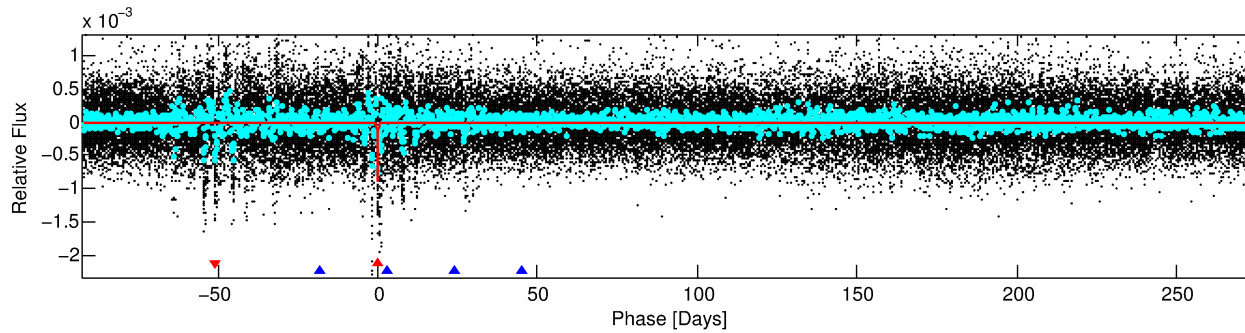
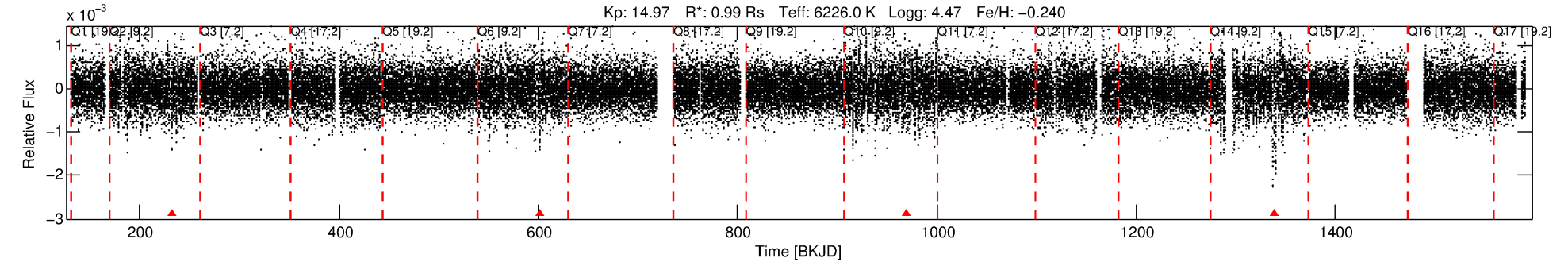
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008174821-01

No Significant Match Found

# DV One-Page Summary

KIC: 8174821 Candidate: 1 of 2 Period: 368.877 d



## DV Fit Results:

Period = 368.87700 [0.01117] d  
Epoch = 232.3560 [0.0203] BKJD  
Rp/R\* = 0.0336 [0.0024]  
a/R\* = 75.81 [12.50]  
b = 0.95 [0.02]  
Seff = 1.26 [0.55]  
Teq = 270 [29] K  
Rp = 3.64 [1.26] Re  
a = 1.0233 [0.2901] AU  
Ag = 24633.80 [11844.08] [2.08σ]  
Teffp = 5236 [377] K [13.12σ]

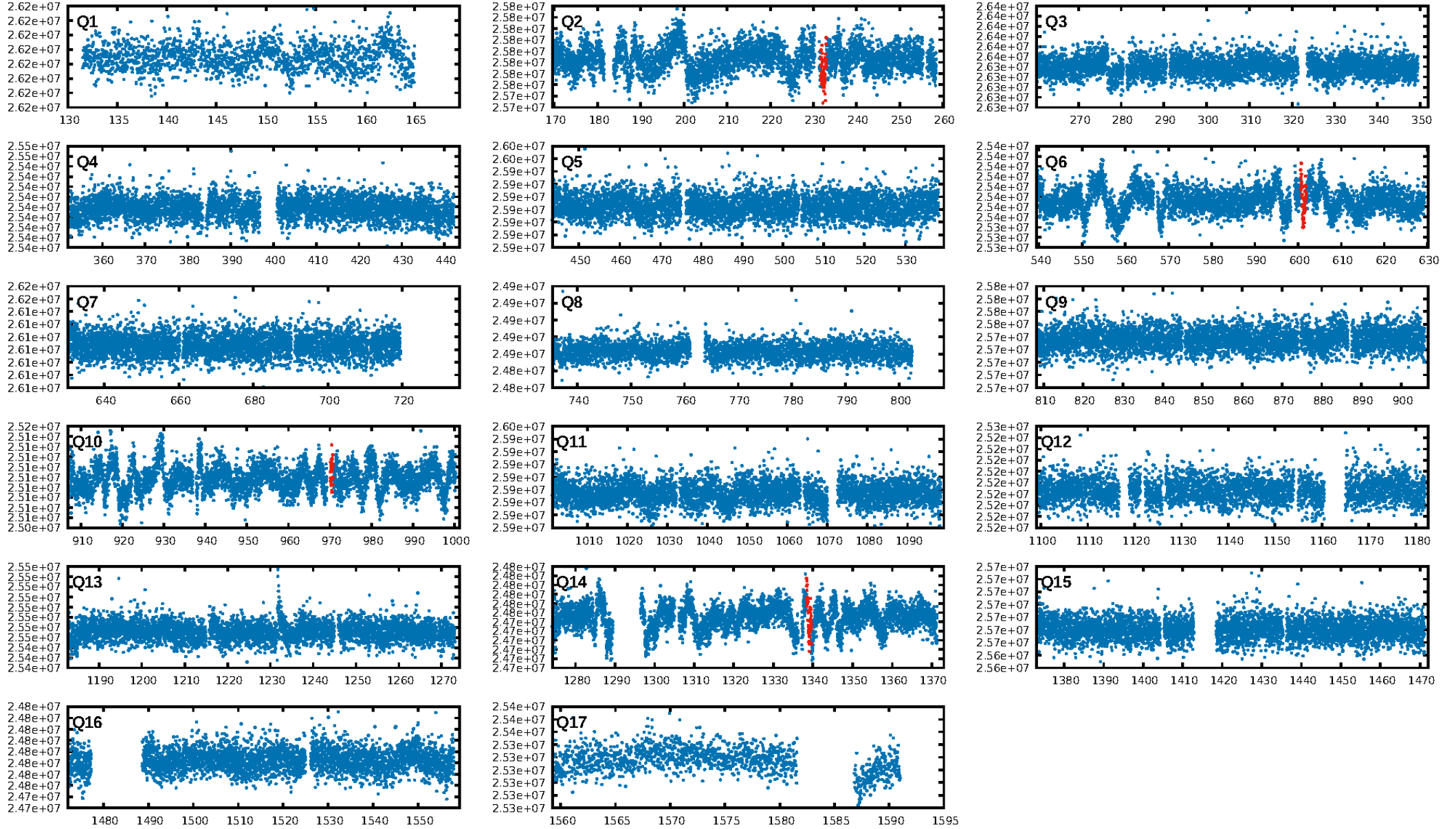
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [21.83σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 2.3%  
ModelChiSquareGof-sig: 99.9%  
Bootstrap-pfa: 1.14e-16  
RollingBand-fgt: 0.00 [0/4]  
GhostDiagnostic-chr: 0.335  
Centroid-sig: 0.0%  
Centroid-so: 4.906 arcsec [2.48σ]  
OotOffset-rm: 3.797 arcsec [22.98σ]  
KicOffset-rm: 3.638 arcsec [22.06σ]  
OotOffset-st: 1/0/0/0 [1]  
KicOffset-st: 1/0/0/0 [1]  
DiffImageQuality-fgm: 0.00 [0/1]  
DiffImageOverlap-fno: 1.00 [1/1]

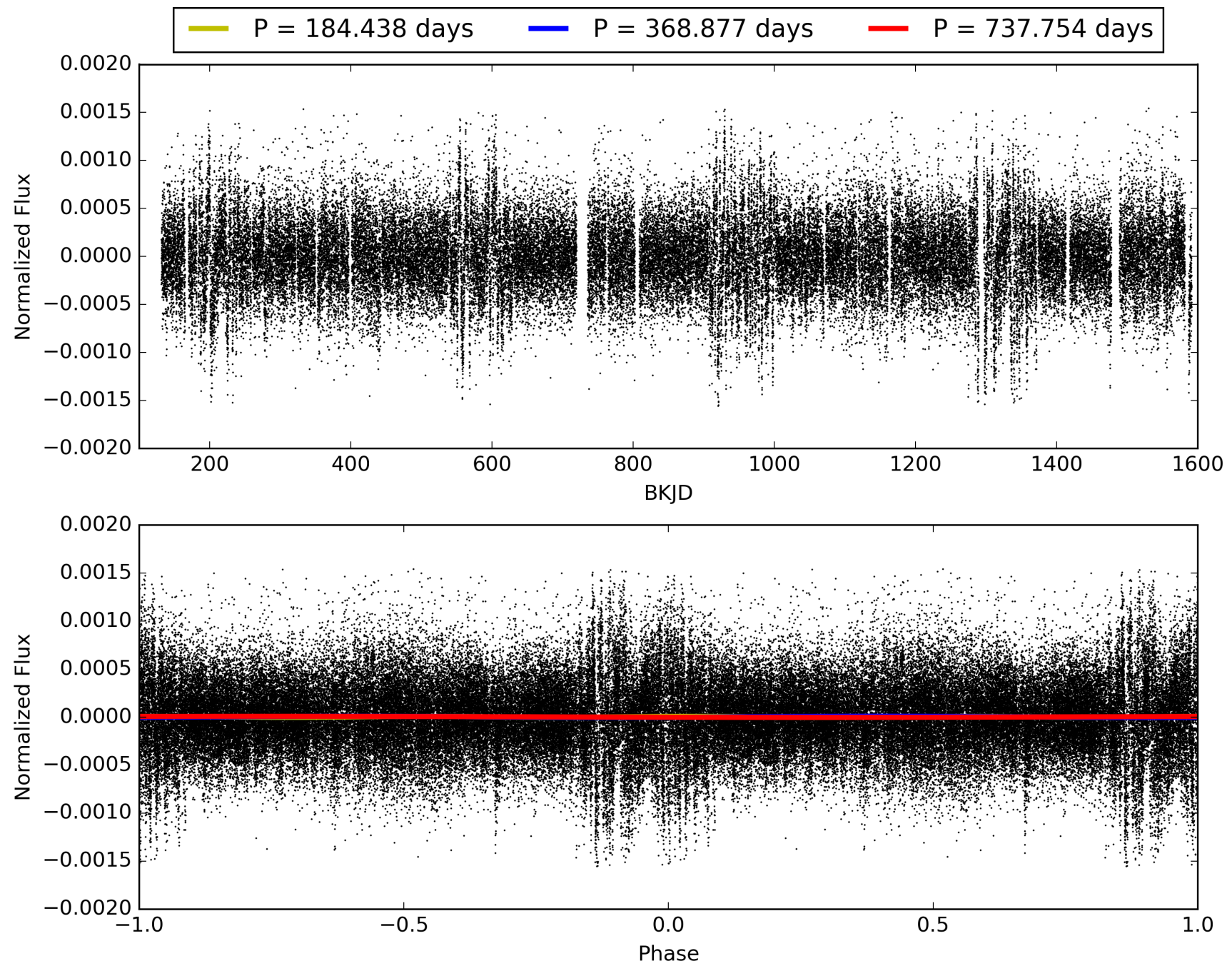
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 05:21:47 Z

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

# TCE 008174821-01, PDC Light Curves

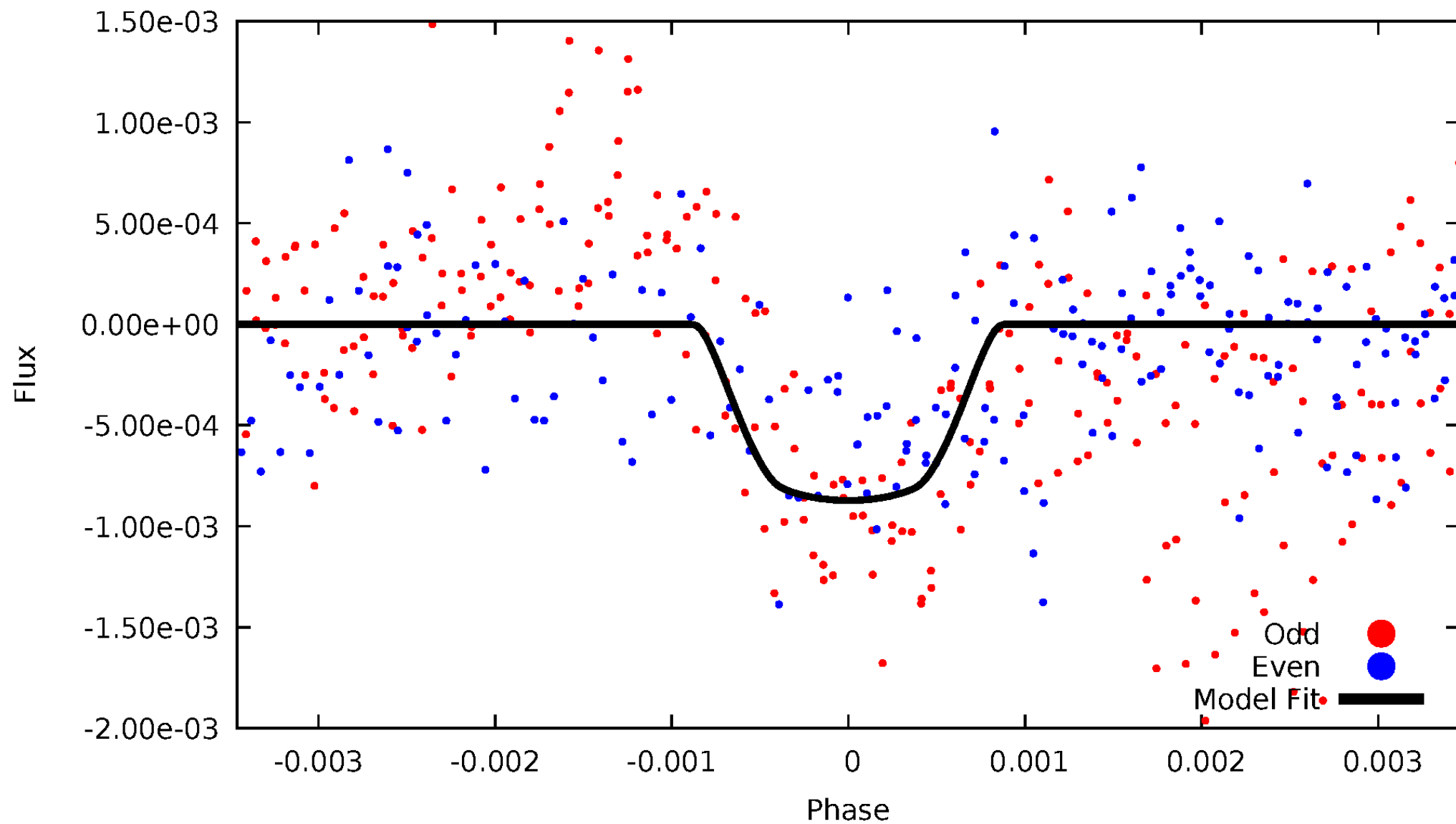


TCE 008174821-01



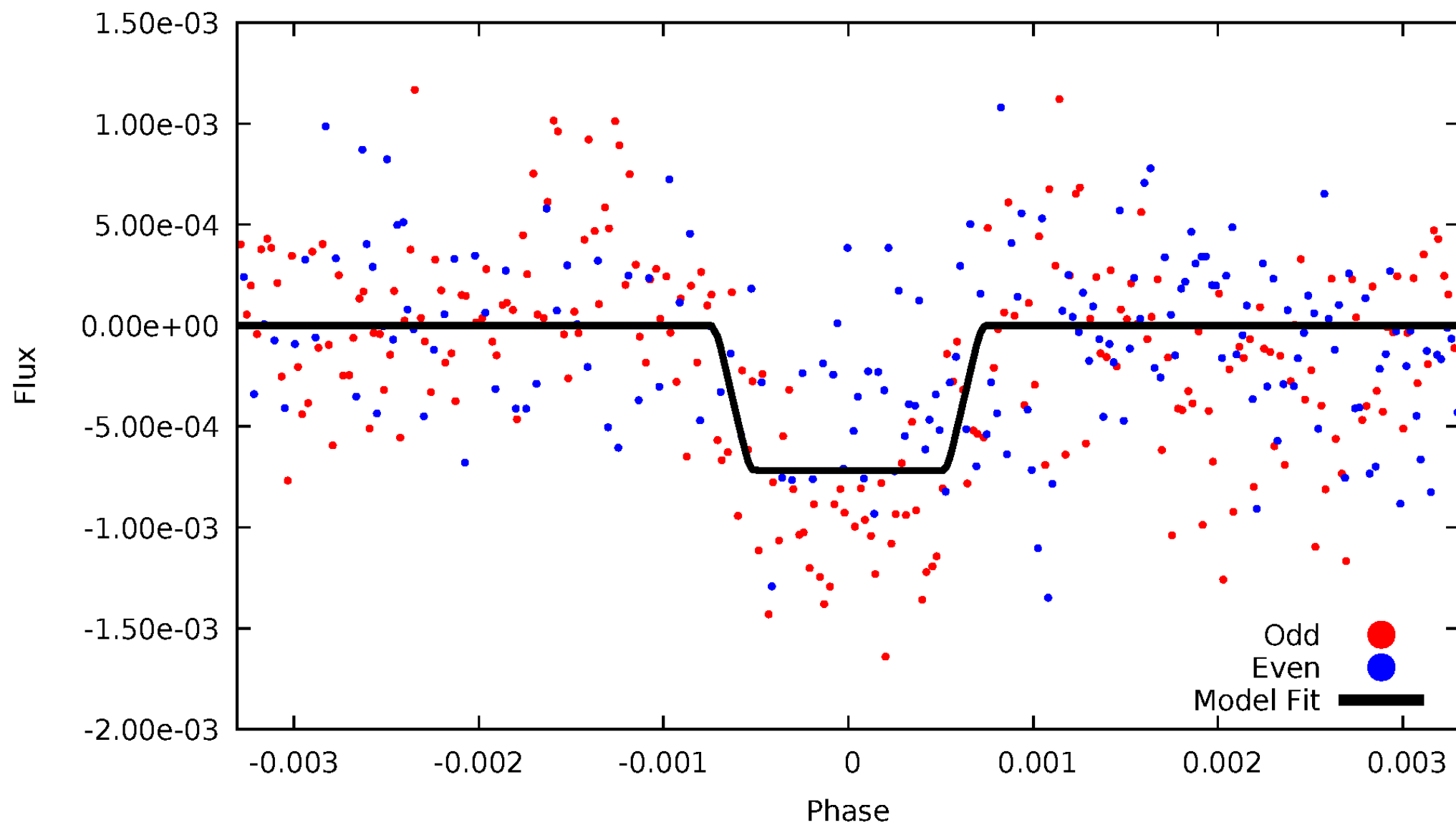
# DV Odd/Even

TCE 008174821-01



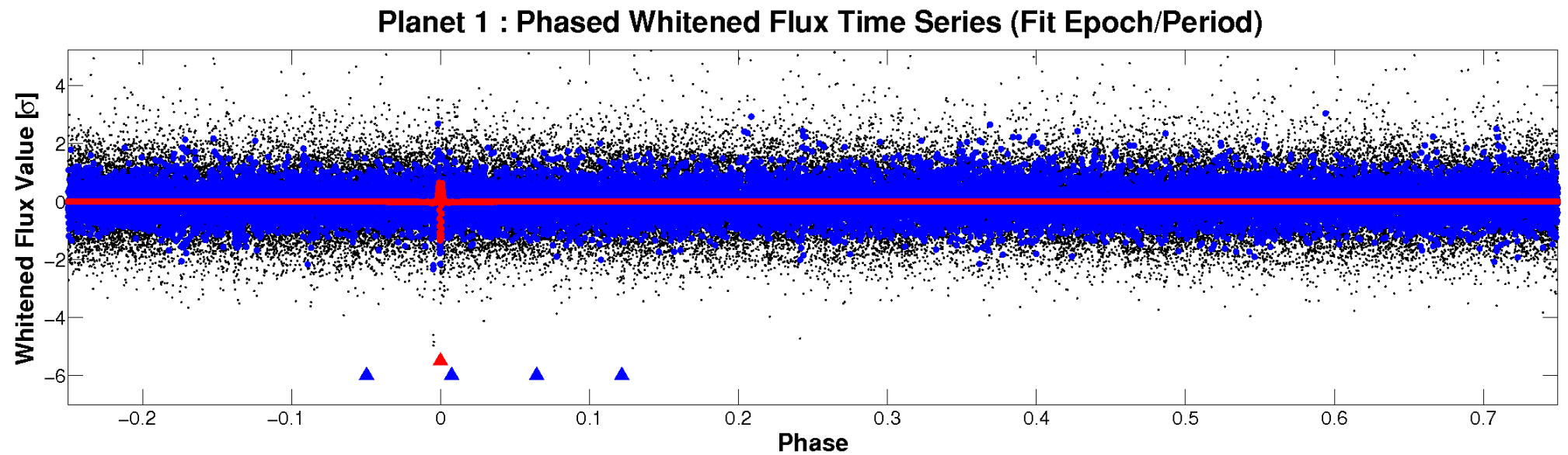
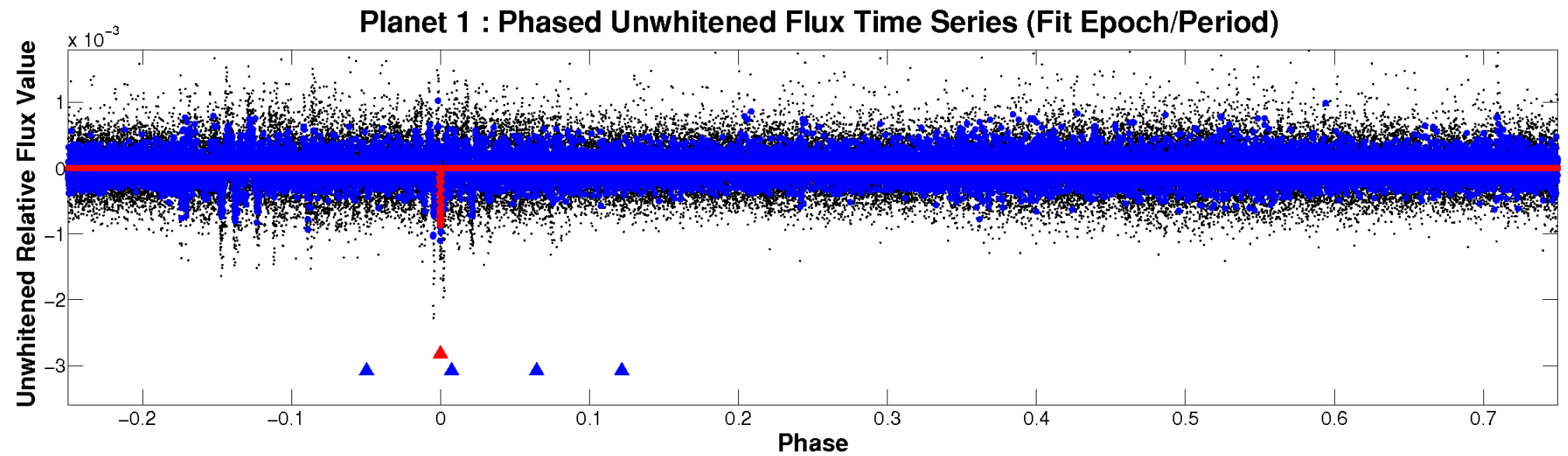
# ALT Odd/Even

TCE 008174821-01



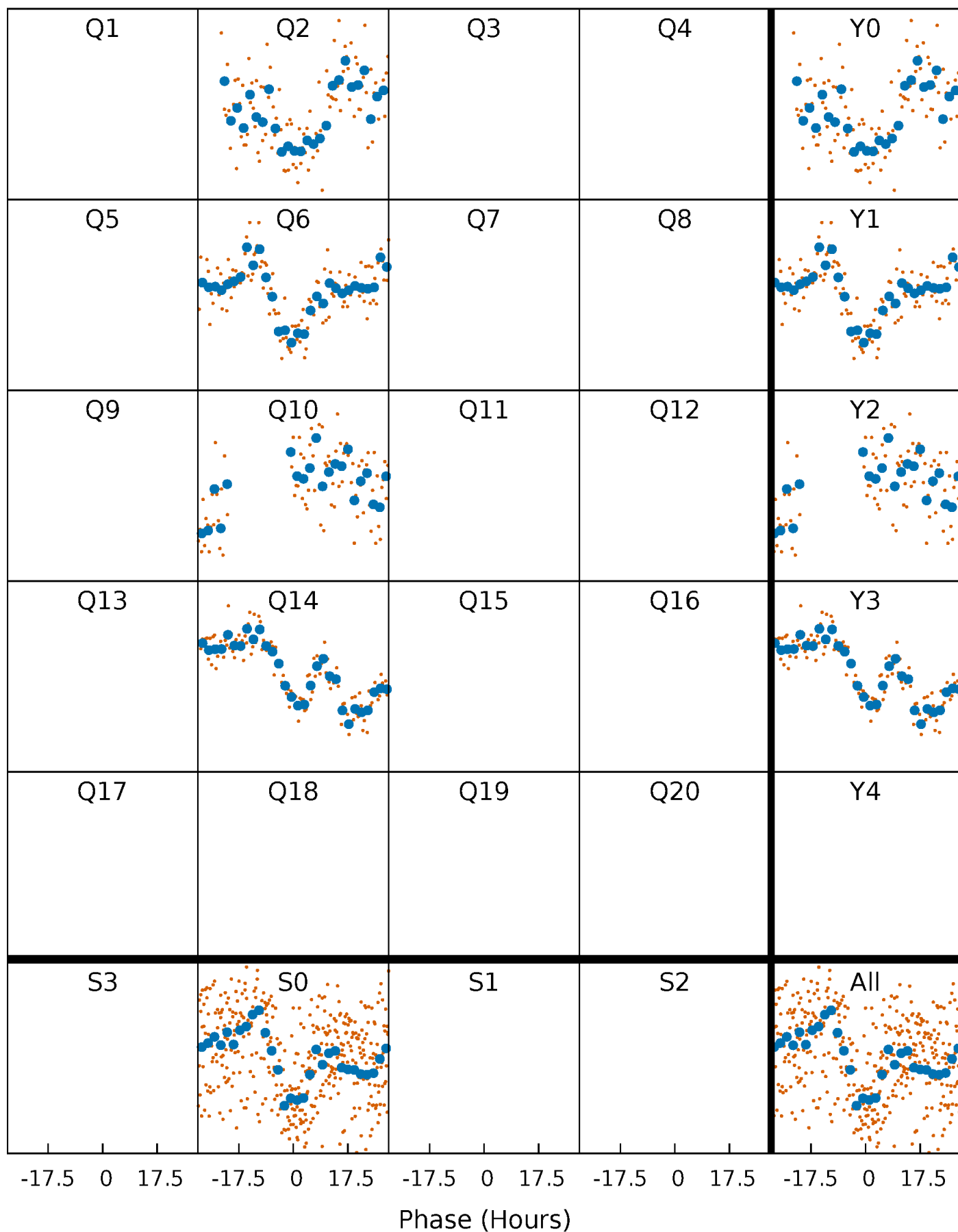


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

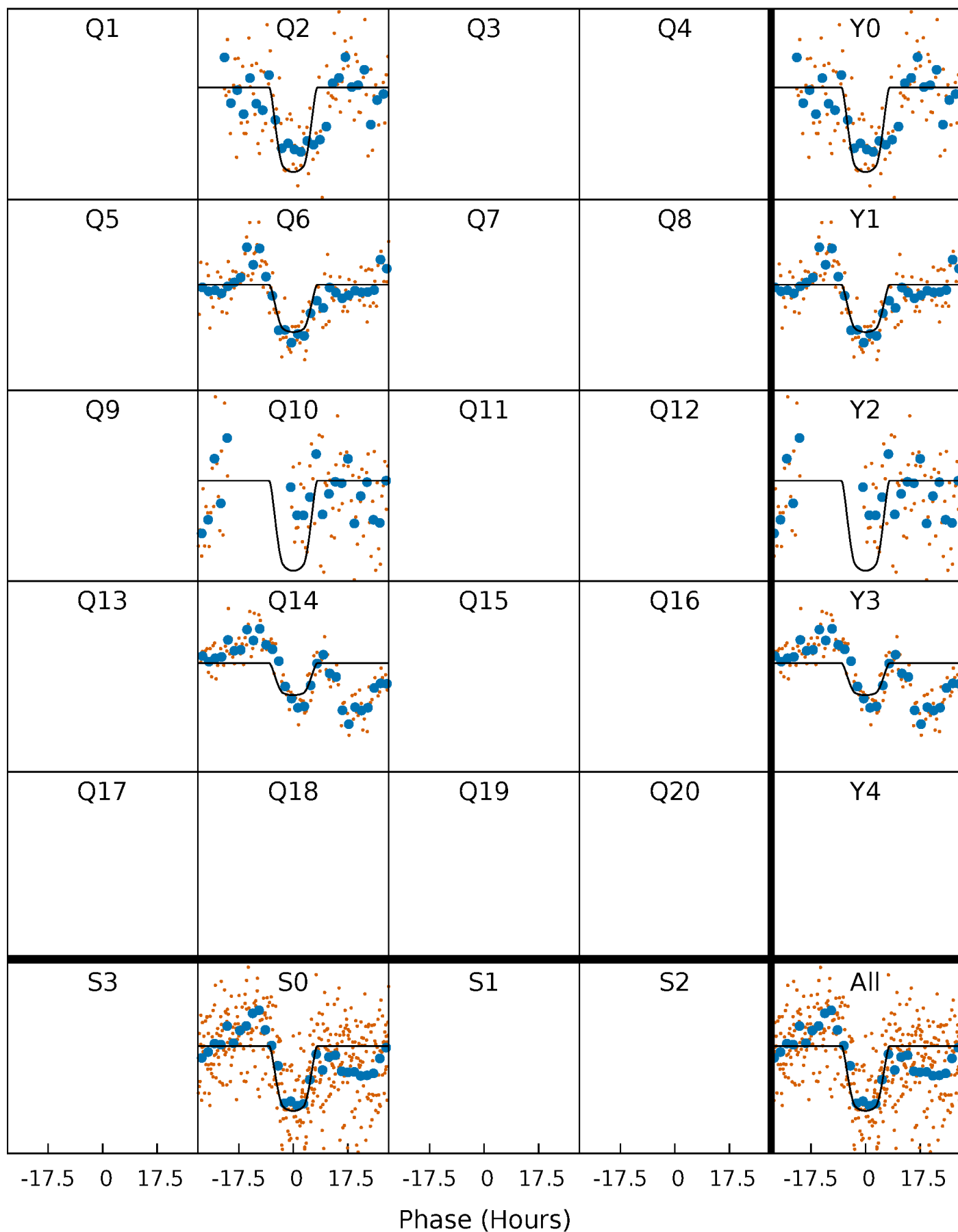
TCE 008174821-01 P=368.876995 Days  $T_0=232.355986$  (BKJD)





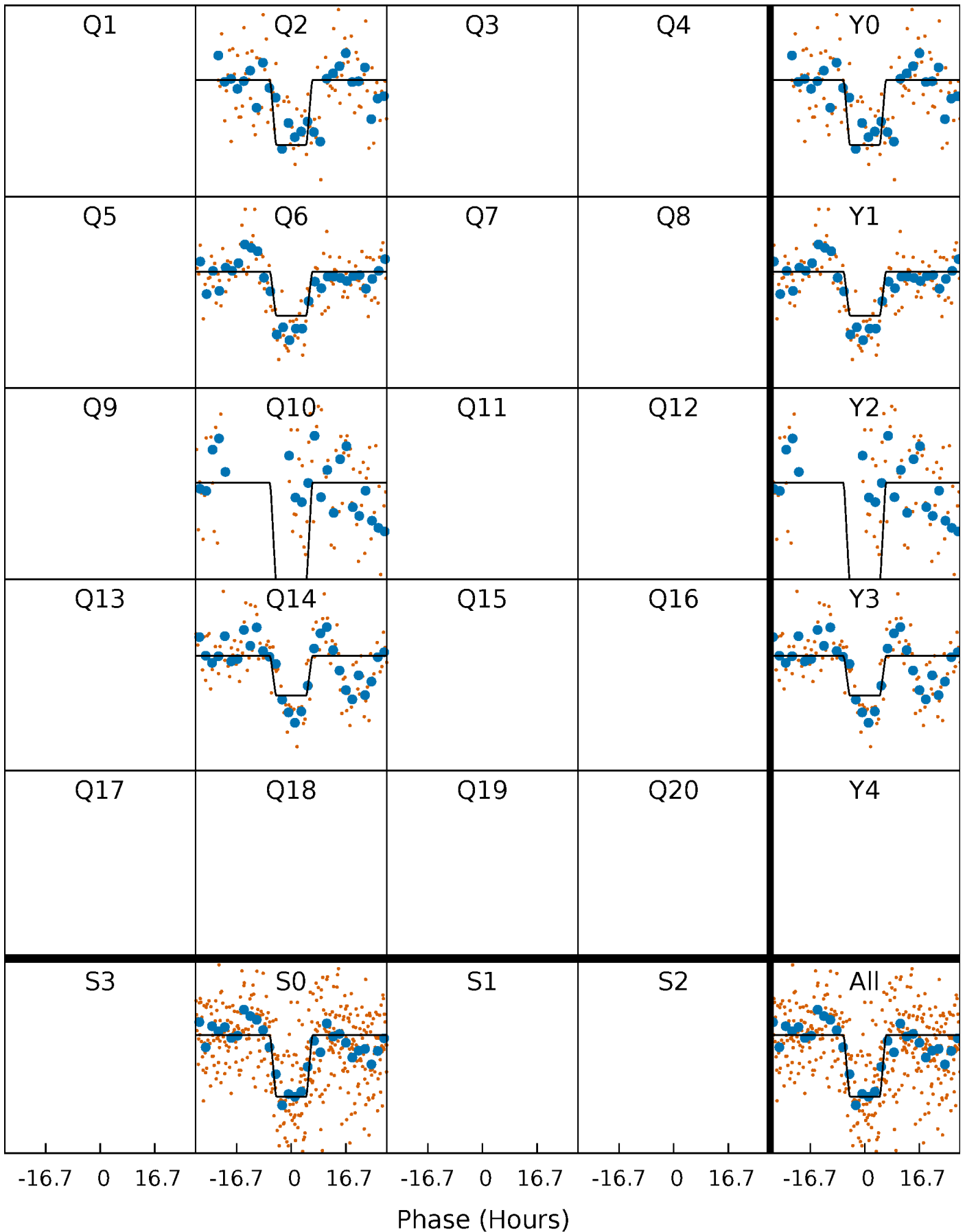
# DV Quarter-Phased Transit Curves

TCE 008174821-01 P=368.876995 Days  $T_0=232.355986$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

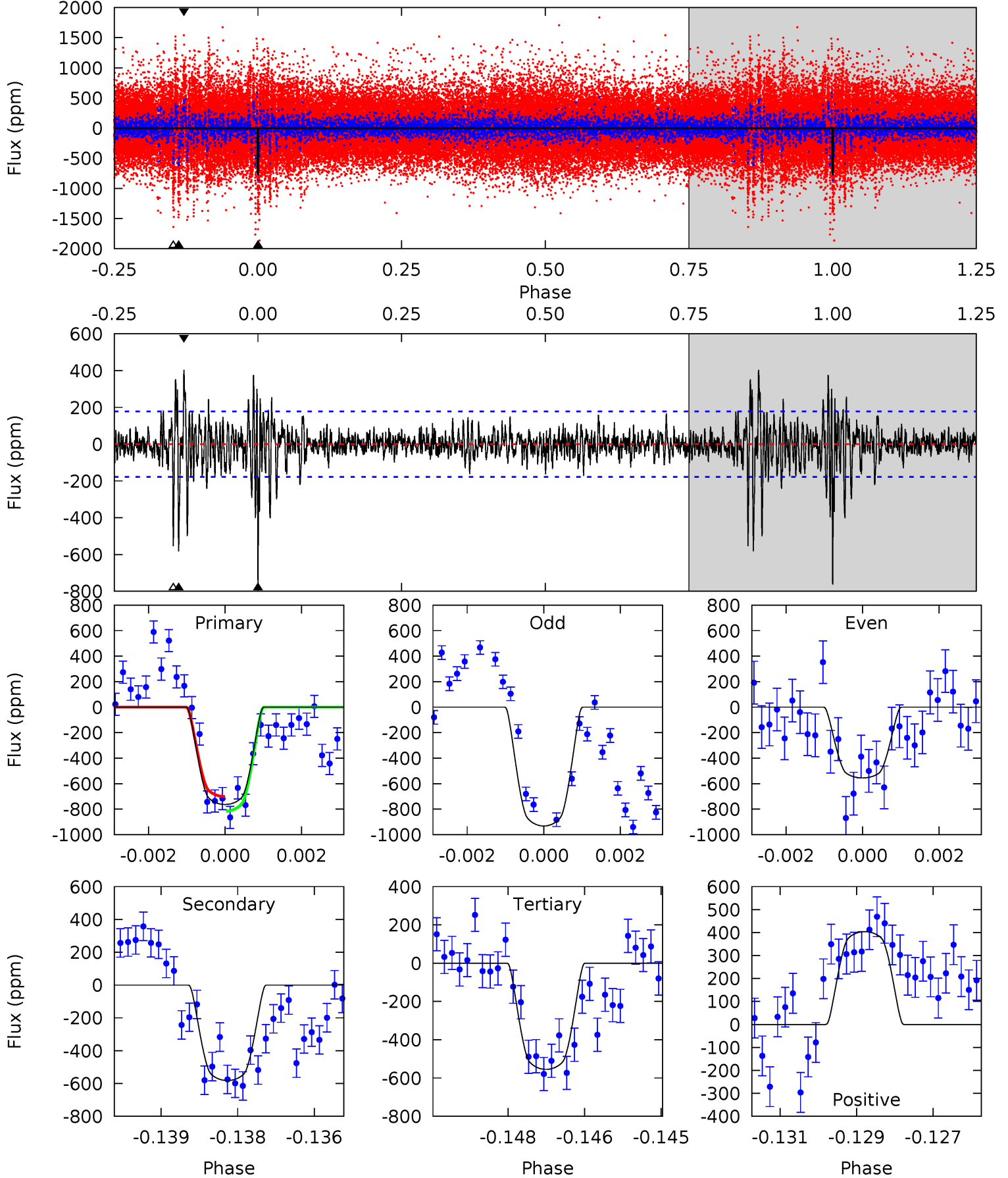
TCE 008174821-01 P=368.873436 Days  $T_0=232.363911$  (BKJD)



# DV Model-Shift Uniqueness Test

008174821-01, P = 368.876995 Days, E = 232.355986 Days

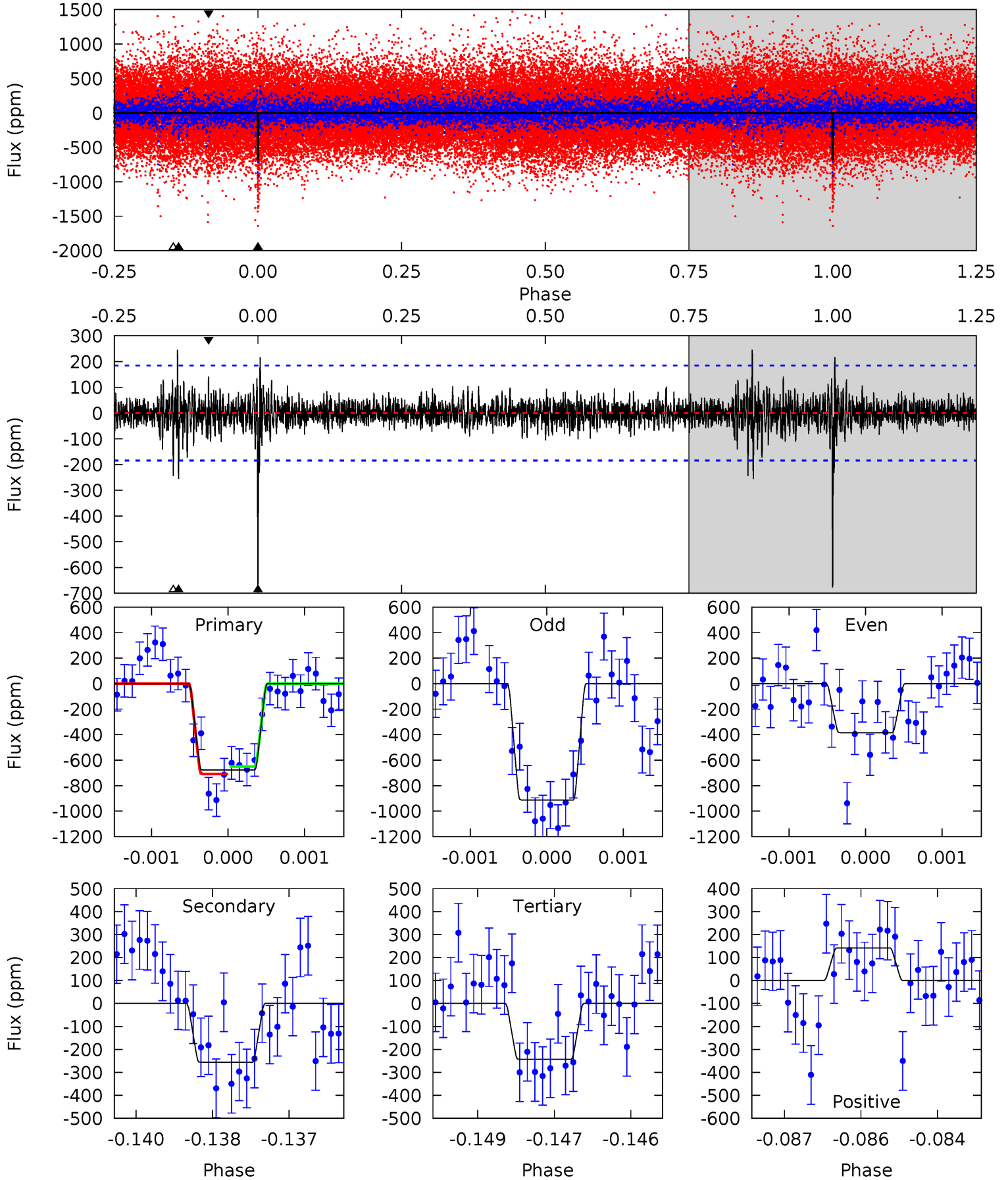
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.0	17.5	16.7	12.2	5.35	3.13	2.33	6.28	10.8	0.82	5.37	5.64	0.91	0.35	1.71



# Alt Model-Shift Uniqueness Test

008174821-01, P = 368.873436 Days, E = 232.363911 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
19.7	7.46	7.08	4.13	5.38	3.18	1.10	12.6	15.6	0.38	3.33	7.64	0.87	0.27	0.83



### Stellar Parameters For KIC 008174821

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6226^{+169}_{-225}$	$4.467^{+0.056}_{-0.224}$	$-0.240^{+0.250}_{-0.350}$	$0.991^{+0.335}_{-0.112}$	$1.049^{+0.144}_{-0.144}$	$1.518^{+0.437}_{-0.799}$
	+3%/-4%	+1%/-5%	+104%/-146%	+34%/-11%	+14%/-14%	+29%/-53%
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 008174821-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-582 \pm 33$	$3.81^{+0.68}_{-0.46}$	$386^{+32}_{-20}$	$5305^{+233}_{-223}$	$22602^{+6679}_{-5866}$
Alt.	$-256 \pm 34$	$2.98^{+0.60}_{-0.37}$	$384^{+29}_{-19}$	$4881^{+304}_{-245}$	$15690^{+5619}_{-4486}$

$T_{\text{max}}$  = 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

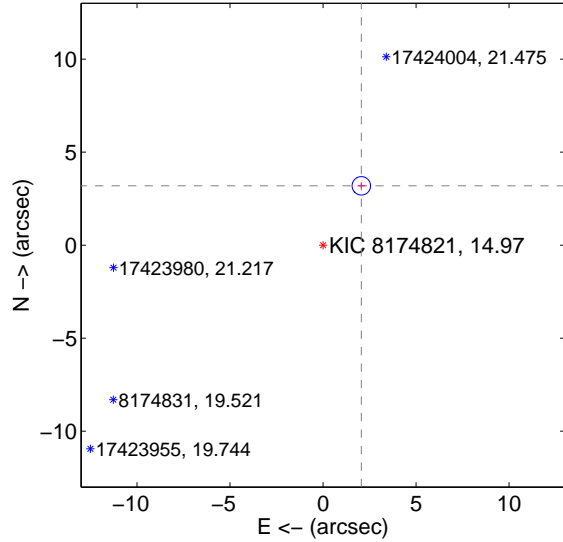
Supplemental centroid analysis for 008174821-01. Kepler magnitude: 14.97. Transit SNR 11.25

There are 0 quarters with good PRF difference image offsets

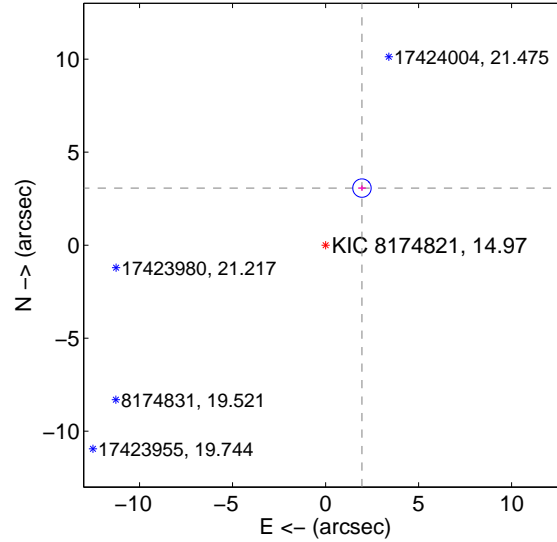
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.797 \pm 0.165$	22.98	$-2.058 \pm 0.205$	$3.190 \pm 0.145$
PRF-fit source offset from KIC position	$3.638 \pm 0.165$	22.06	$-1.955 \pm 0.205$	$3.068 \pm 0.145$
photometric centroid source offset	$4.91 \pm 1.98$	2.48	$-0.96 \pm 2.05$	$-4.81 \pm 1.97$

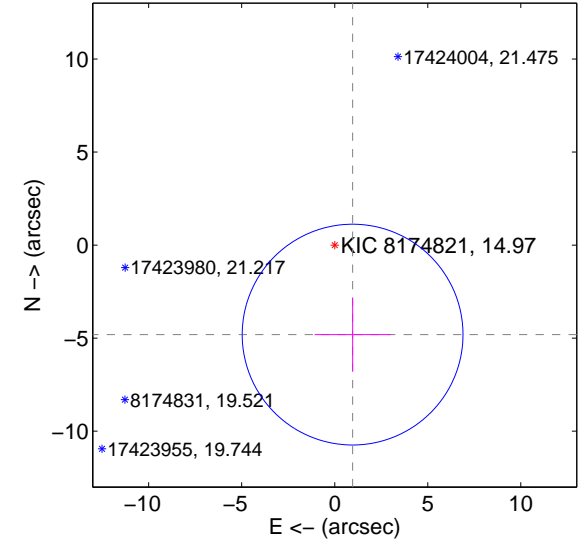
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids



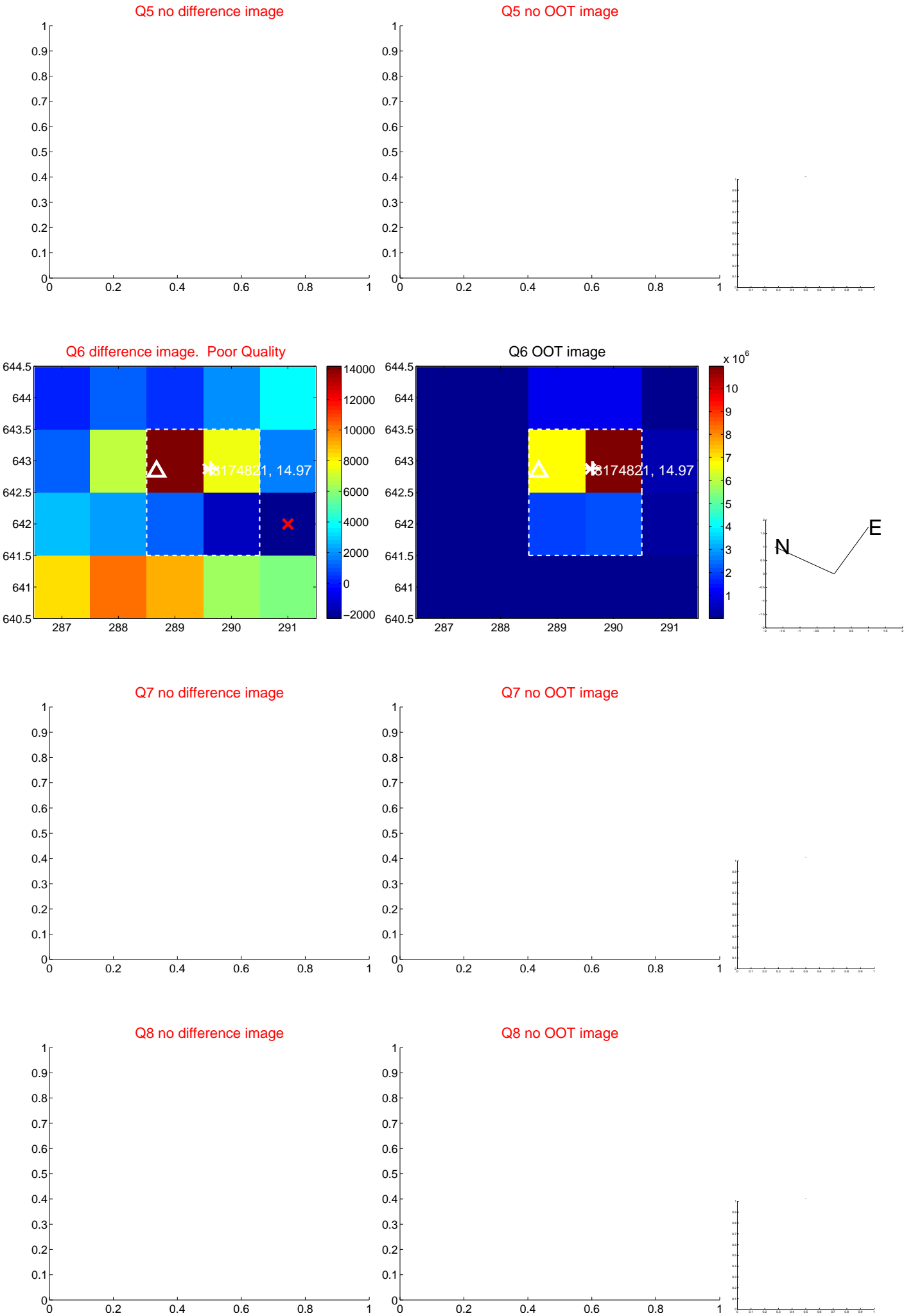
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



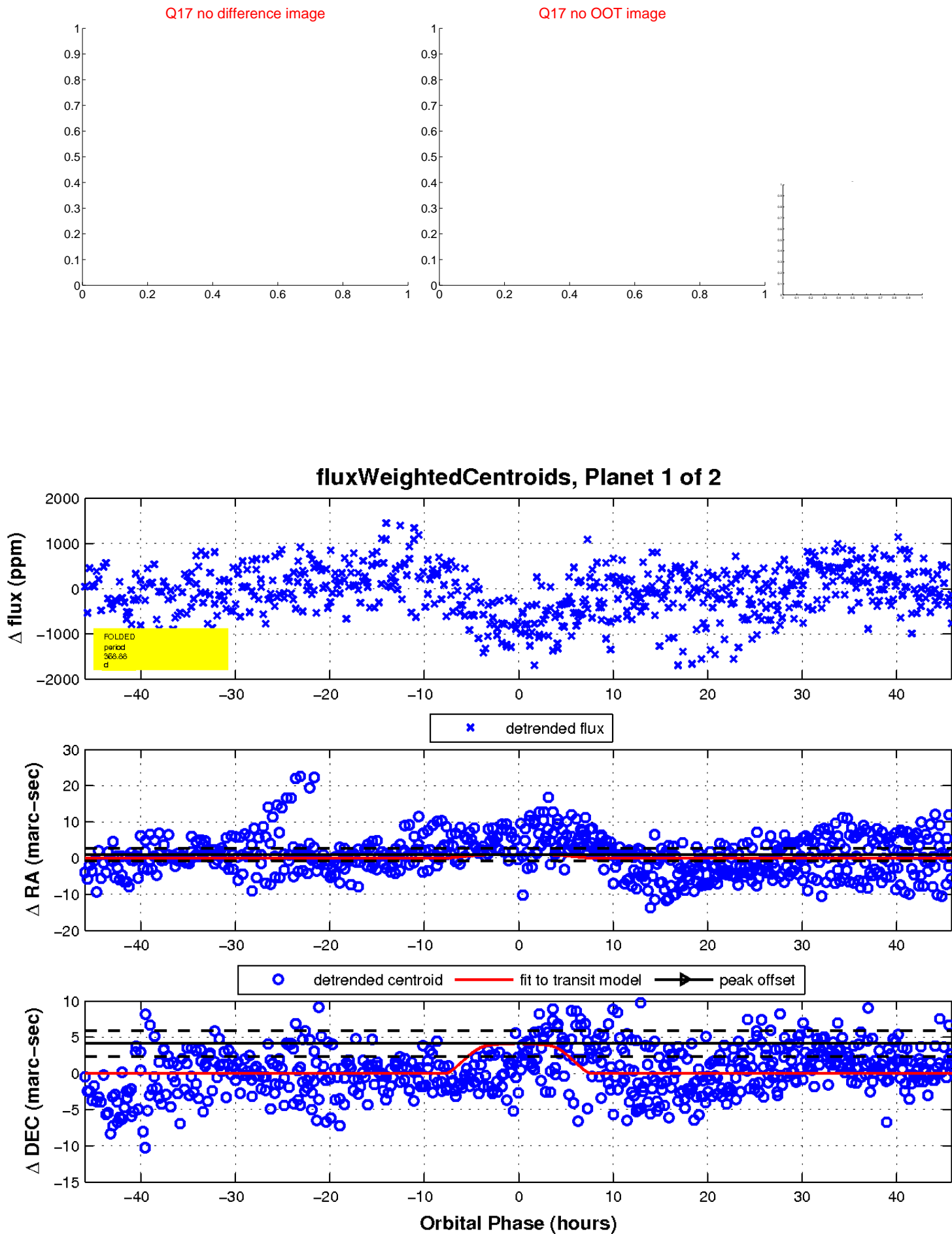
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

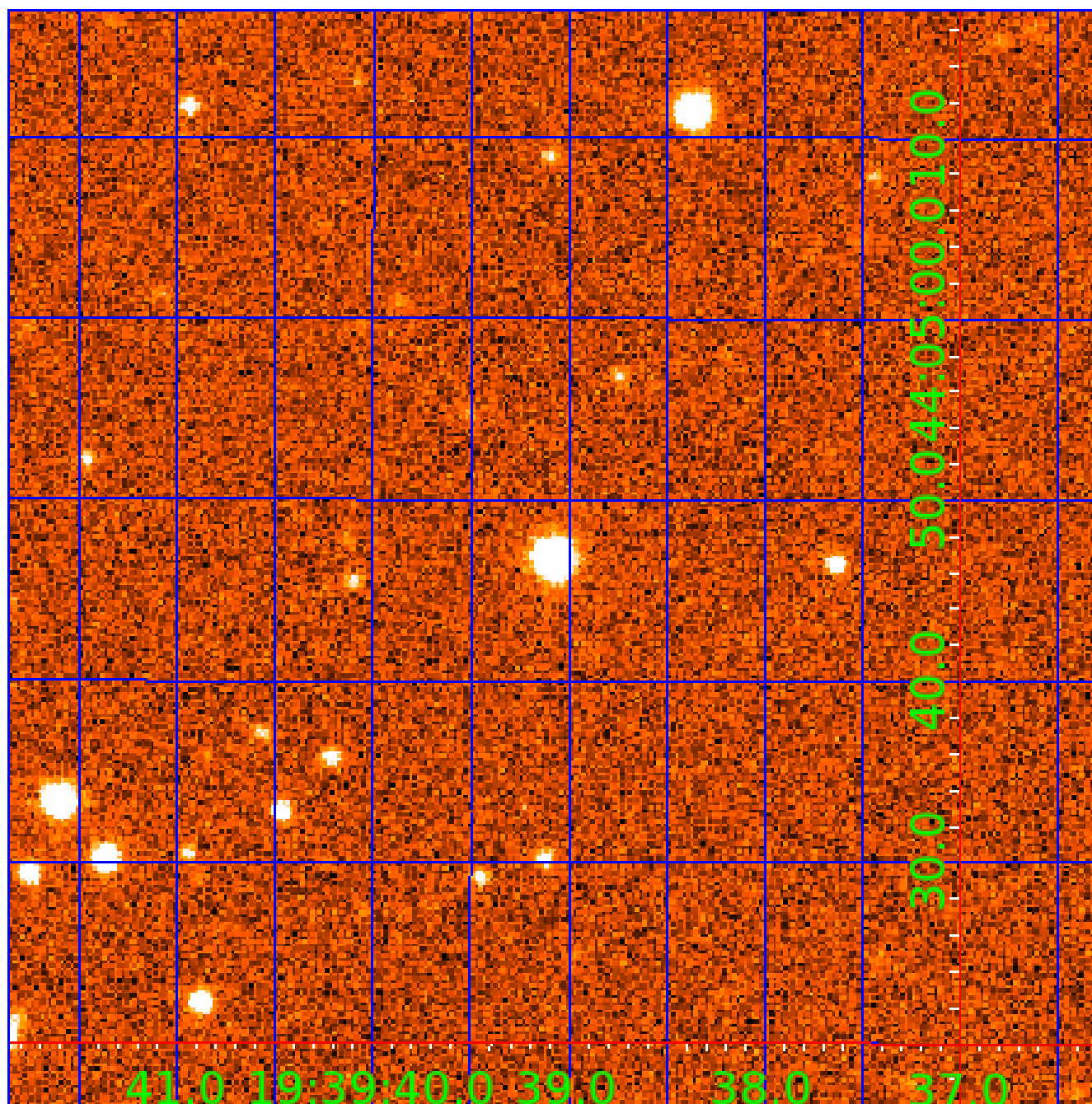


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 008174821

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008174821-01	OBS	No	368.876995	232.355986	872.2	15.313	9.9	11.3	0.99	6226	3.64	1.26
008174821-02	OBS	No	347.812714	277.250589	446.1	17.370	7.4	7.9	0.99	6226	2.22	1.37

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008174821-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_SKYE—ALL_TRANS_CHASES—CENT_FEW_DIFFS
008174821-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

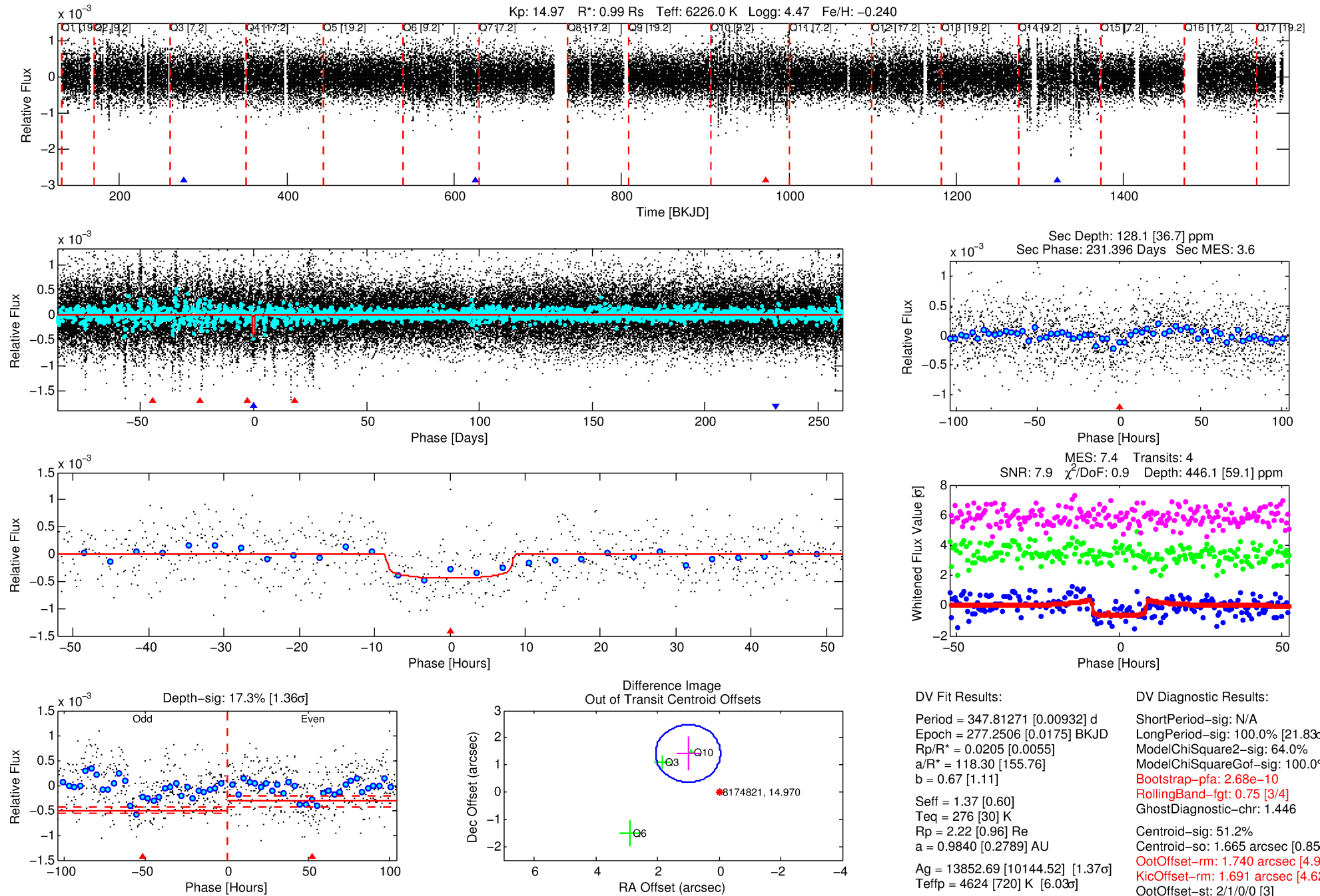
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008174821-02

No Significant Match Found

# DV One-Page Summary

KIC: 8174821 Candidate: 2 of 2 Period: 347.813 d



## DV Fit Results:

Period = 347.81271 [0.00932] d  
Epoch = 277.2506 [0.0175] BKJD  
Rp/R\* = 0.0205 [0.0055]  
a/R\* = 118.30 [155.76]  
b = 0.67 [1.11]  
Seff = 1.37 [0.60]  
Teff = 276 [30] K  
Rp = 2.22 [0.96] Re  
a = 0.9840 [0.2789] AU  
Ag = 13852.69 [10144.52] [1.37 $\sigma$ ]  
Teffp = 4624 [720] K [6.03 $\sigma$ ]

## DV Diagnostic Results:

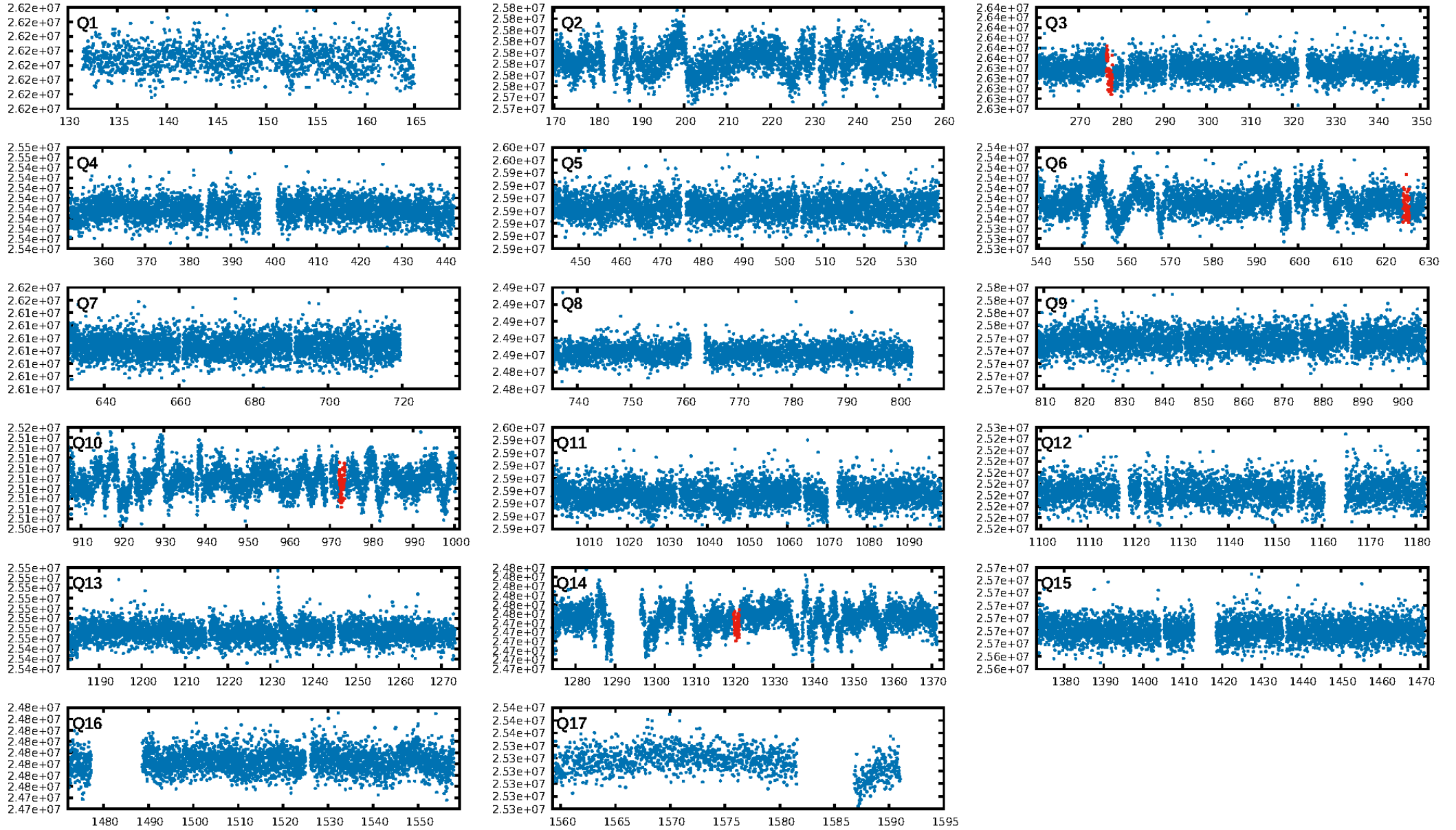
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [21.83 $\sigma$ ]  
ModelChiSquare2-sig: 64.0%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 2.68e-10**  
**RollingBand-fgt: 0.75 [3/4]**  
GhostDiagnostic-chr: 1.446  
Centroid-sig: 51.2%  
Centroid-so: 1.665 arcsec [0.85 $\sigma$ ]  
**OotOffset-rm: 1.740 arcsec [4.95 $\sigma$ ]**  
**KicOffset-rm: 1.691 arcsec [4.62 $\sigma$ ]**  
OotOffset-st: 2/1/0/0 [3]  
KicOffset-st: 2/1/0/0 [3]  
DiffImageQuality-fgm: 0.33 [1/3]  
DiffImageOverlap-fno: 1.00 [4/4]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 05:21:55 Z

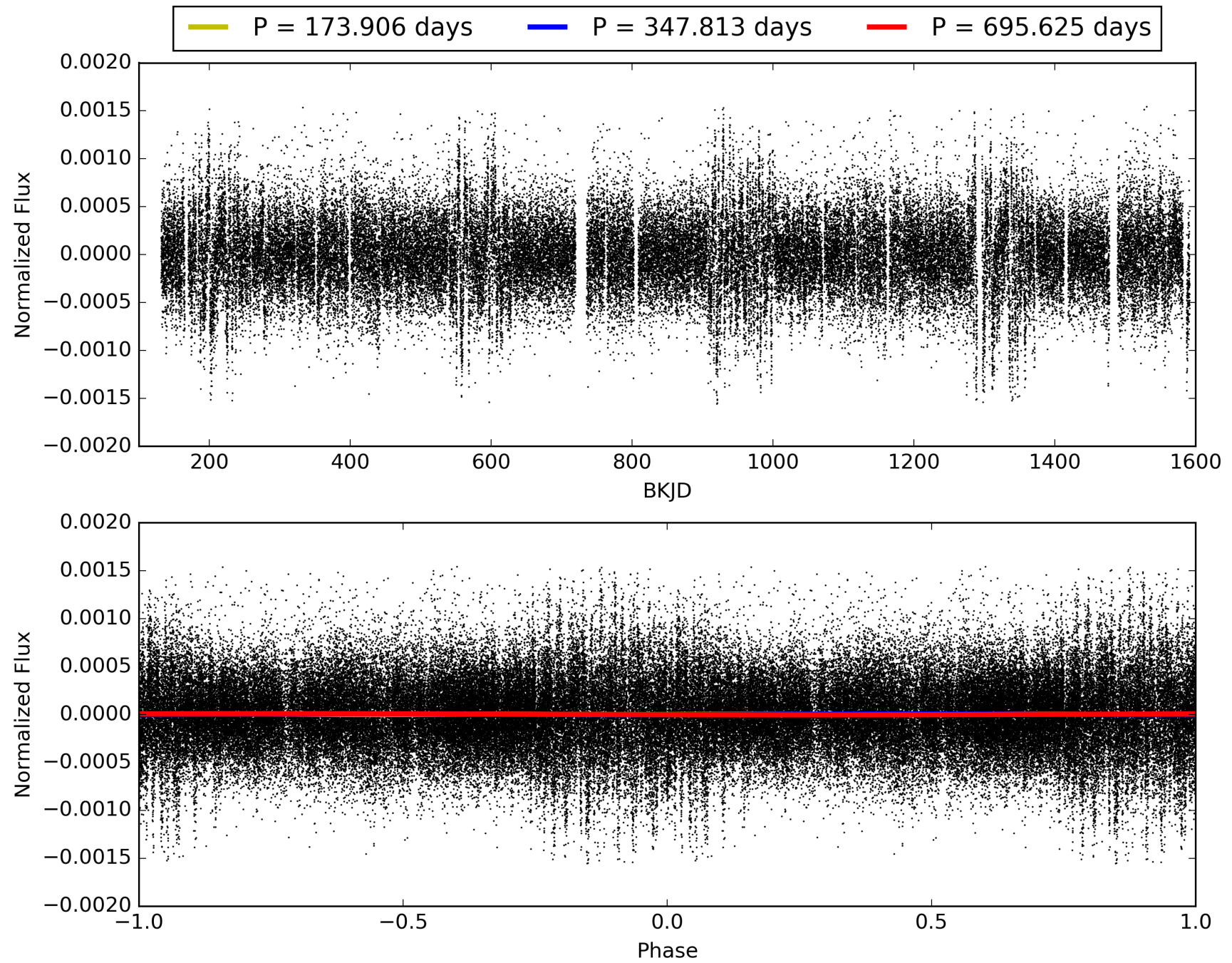
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 008174821-02, PDC Light Curves

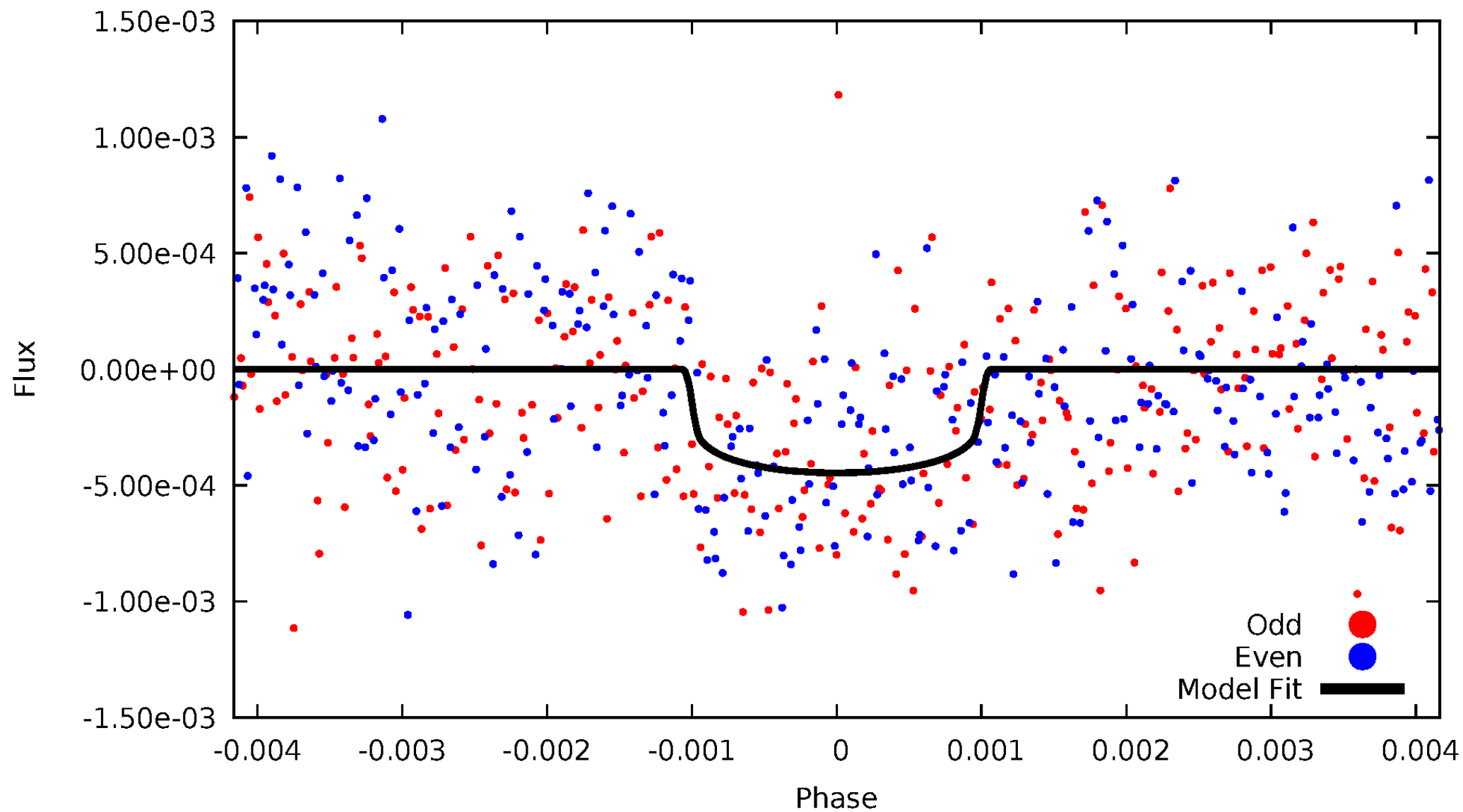


# TCE 008174821-02



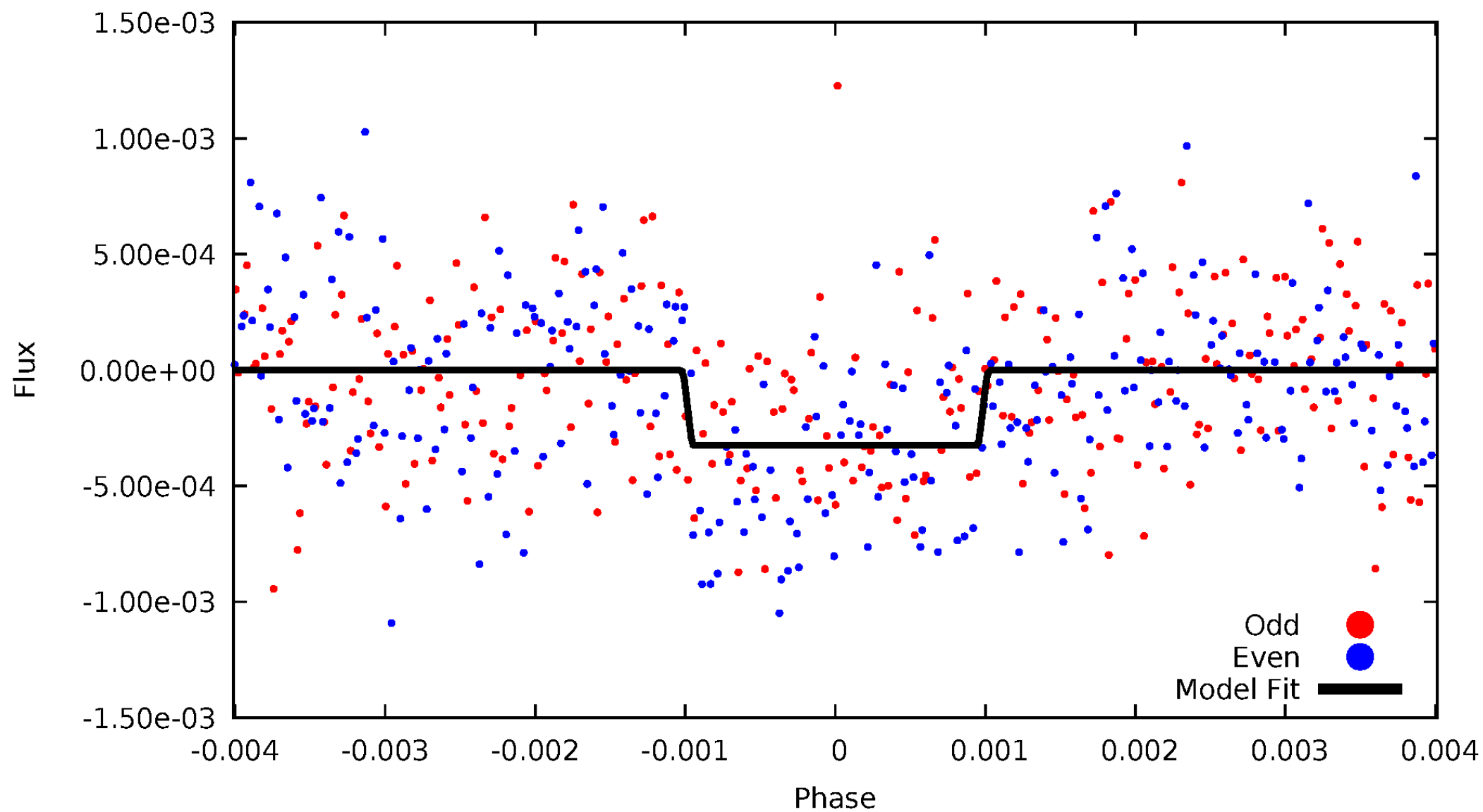
# DV Odd/Even

TCE 008174821-02



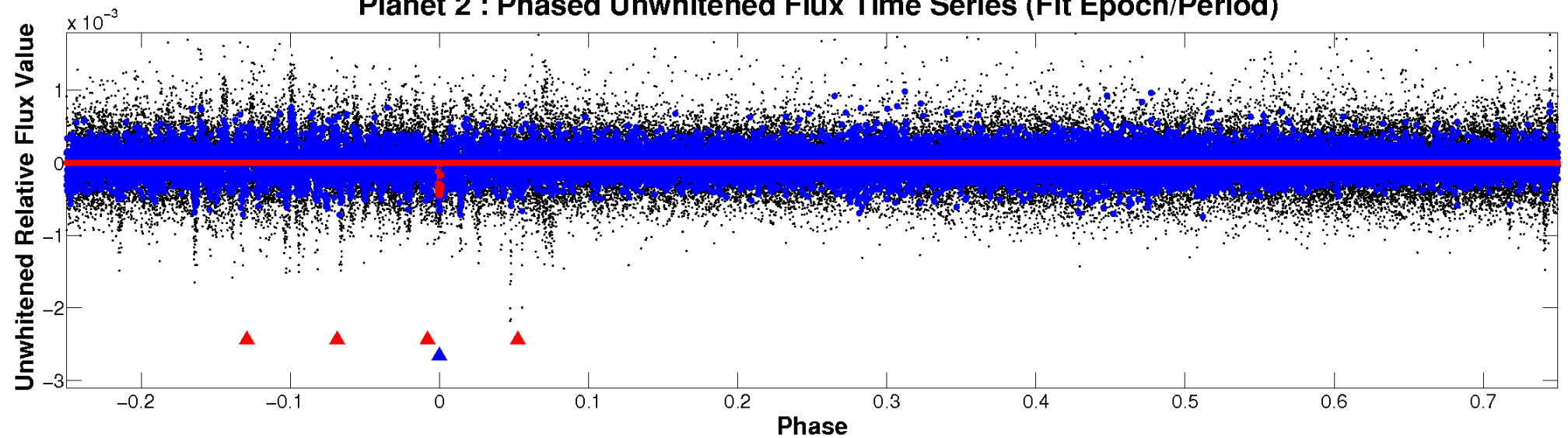
# ALT Odd/Even

TCE 008174821-02

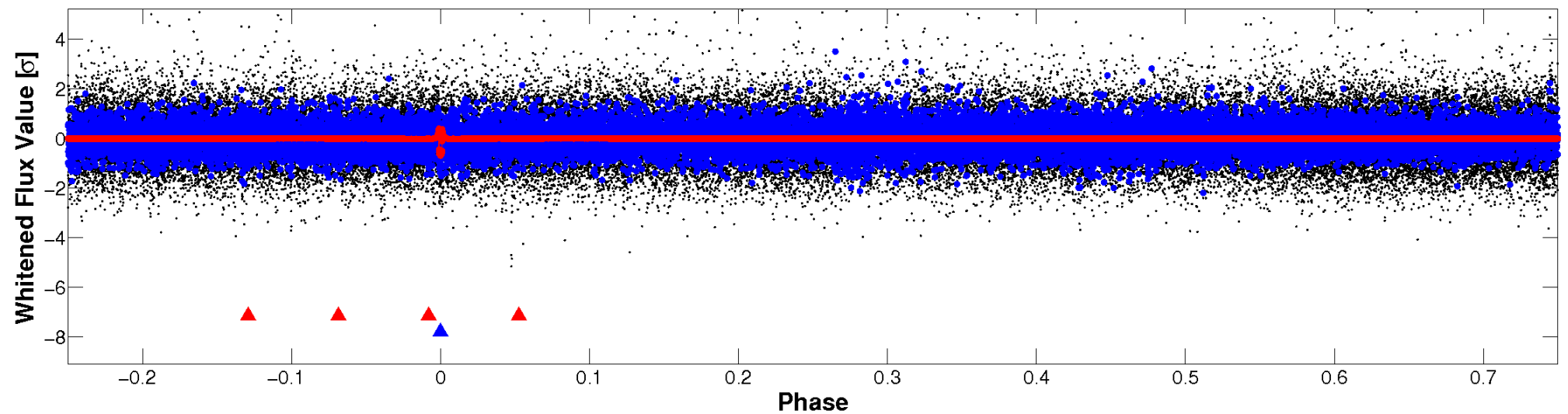


# Non-Whitened Vs. Whitened Light Curve

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

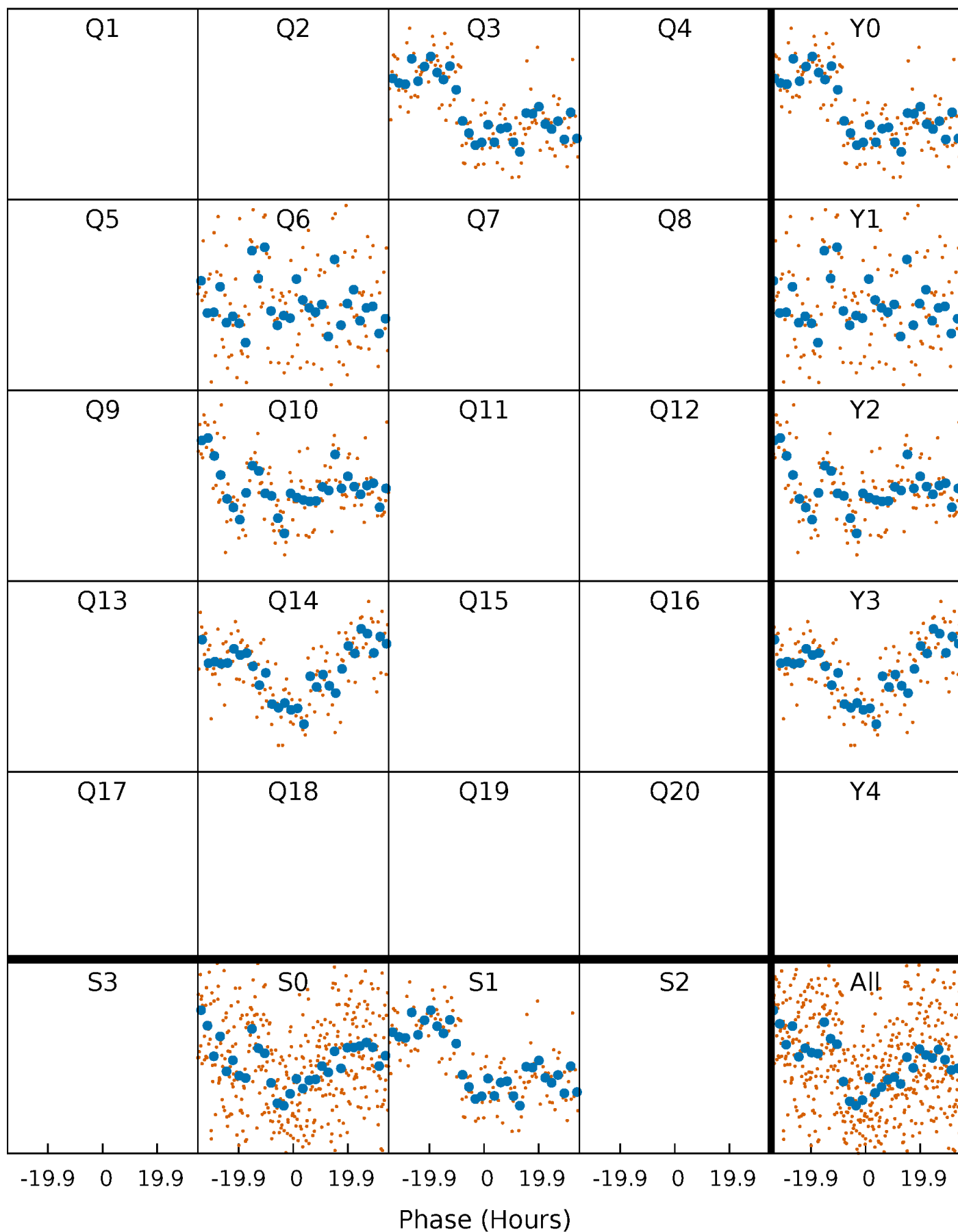


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

TCE 008174821-02   P=347.812714 Days    $T_0=277.250589$  (BKJD)



# DV Quarter-Phased Transit Curves

TCE 008174821-02 P=347.812714 Days  $T_0=277.250589$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

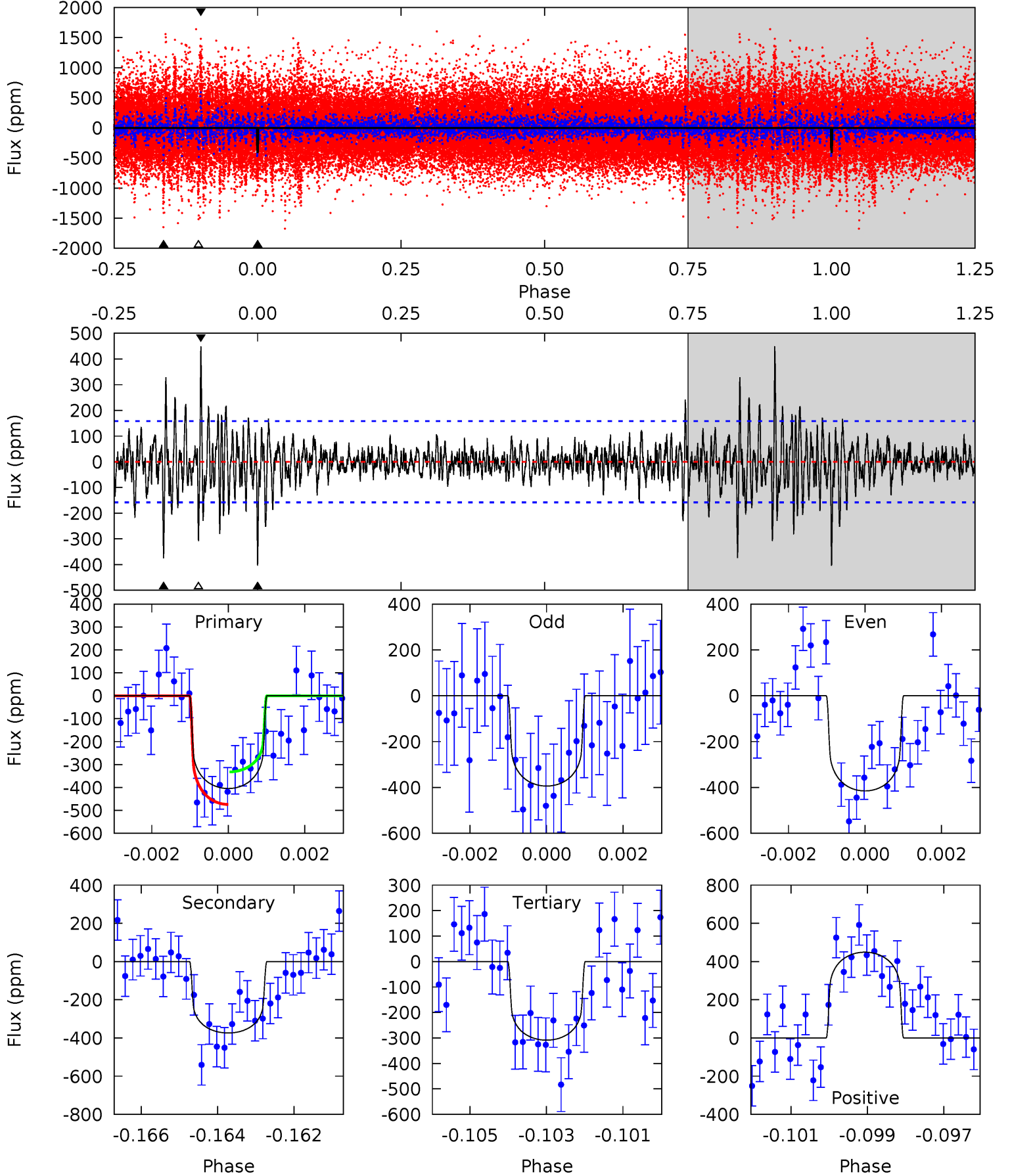
TCE 008174821-02 P=347.813247 Days  $T_0=277.248390$  (BKJD)



# DV Model-Shift Uniqueness Test

008174821-02, P = 347.812714 Days, E = 277.250589 Days

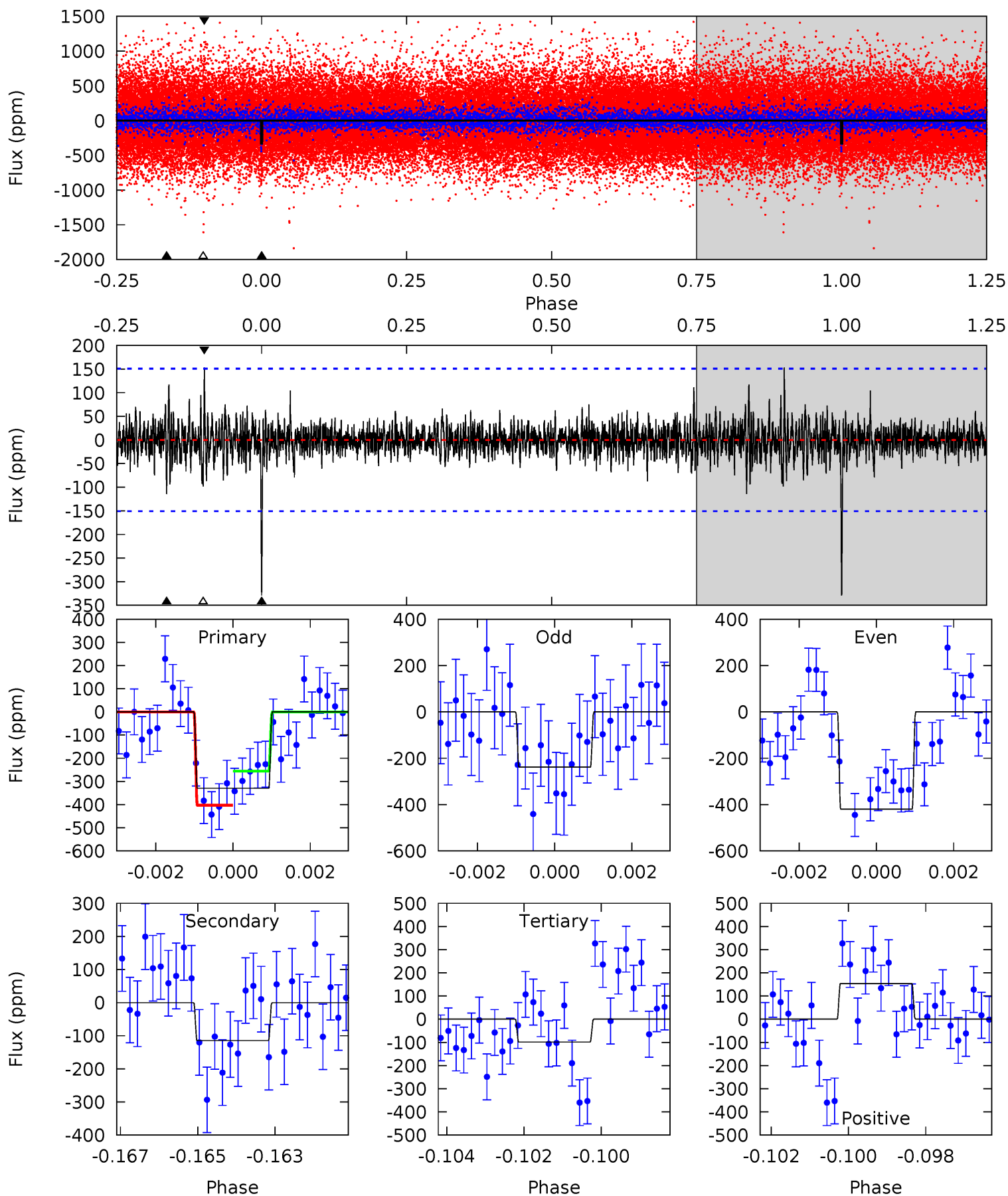
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.6	12.6	10.4	15.1	5.32	3.08	2.20	3.23	-1.49	2.20	-2.52	0.36	0.93	0.53	2.40



# Alt Model-Shift Uniqueness Test

008174821-02, P = 347.813247 Days, E = 277.248390 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
11.6	4.04	3.48	5.42	5.32	3.09	0.88	8.15	6.20	0.56	-1.38	3.22	0.85	0.32	2.60



### Stellar Parameters For KIC 008174821

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6226^{+169}_{-225}$	$4.467^{+0.056}_{-0.224}$	$-0.240^{+0.250}_{-0.350}$	$0.991^{+0.335}_{-0.112}$	$1.049^{+0.144}_{-0.144}$	$1.518^{+0.437}_{-0.799}$
	+3%/-4%	+1%/-5%	+104%/-146%	+34%/-11%	+14%/-14%	+29%/-53%
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 008174821-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-374 \pm 30$	$2.35^{+0.68}_{-0.64}$	$395^{+28}_{-22}$	$6053^{+947}_{-713}$	$35745^{+29861}_{-14739}$
Alt.	$-114 \pm 28$	$2.03^{+0.68}_{-0.70}$	$392^{+30}_{-20}$	$4897^{+1004}_{-551}$	$14132^{+19326}_{-6693}$

$T_{max}$  = 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

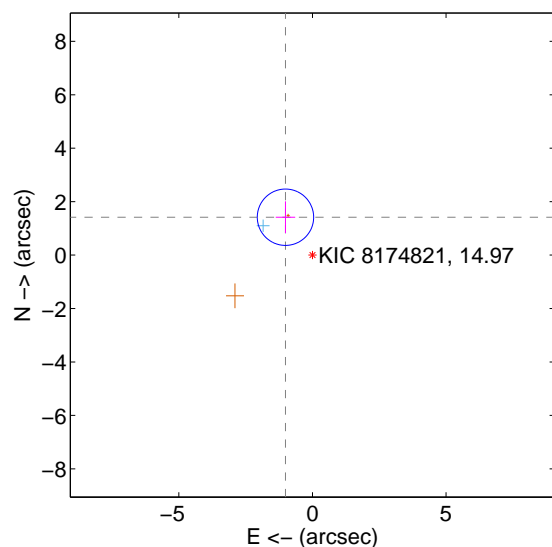
Supplemental centroid analysis for 008174821-02. Kepler magnitude: 14.97. Transit SNR 7.95

There are 1 quarters with good PRF difference image offsets

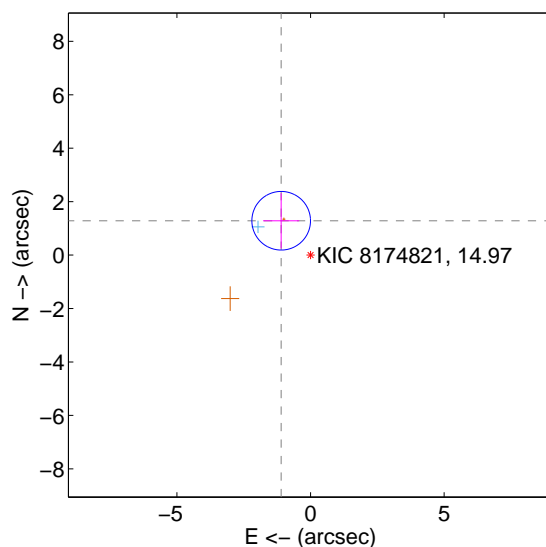
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.740 \pm 0.351$	4.95	$1.009 \pm 0.364$	$1.417 \pm 0.597$
PRF-fit source offset from KIC position	$1.691 \pm 0.366$	4.62	$1.098 \pm 0.677$	$1.286 \pm 1.034$
photometric centroid source offset	$1.66 \pm 1.96$	0.85	$1.64 \pm 1.95$	$-0.26 \pm 2.19$

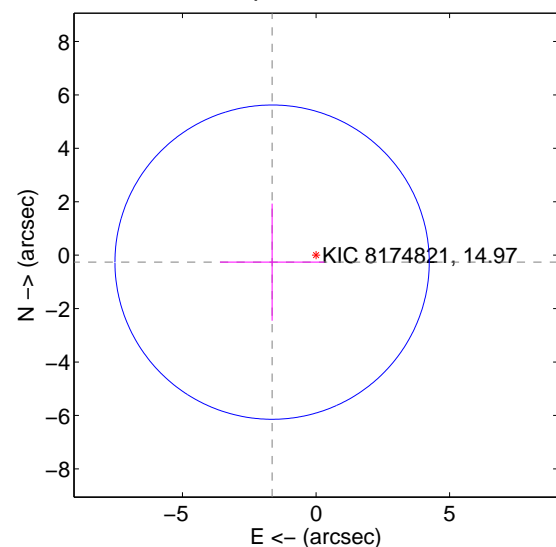
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

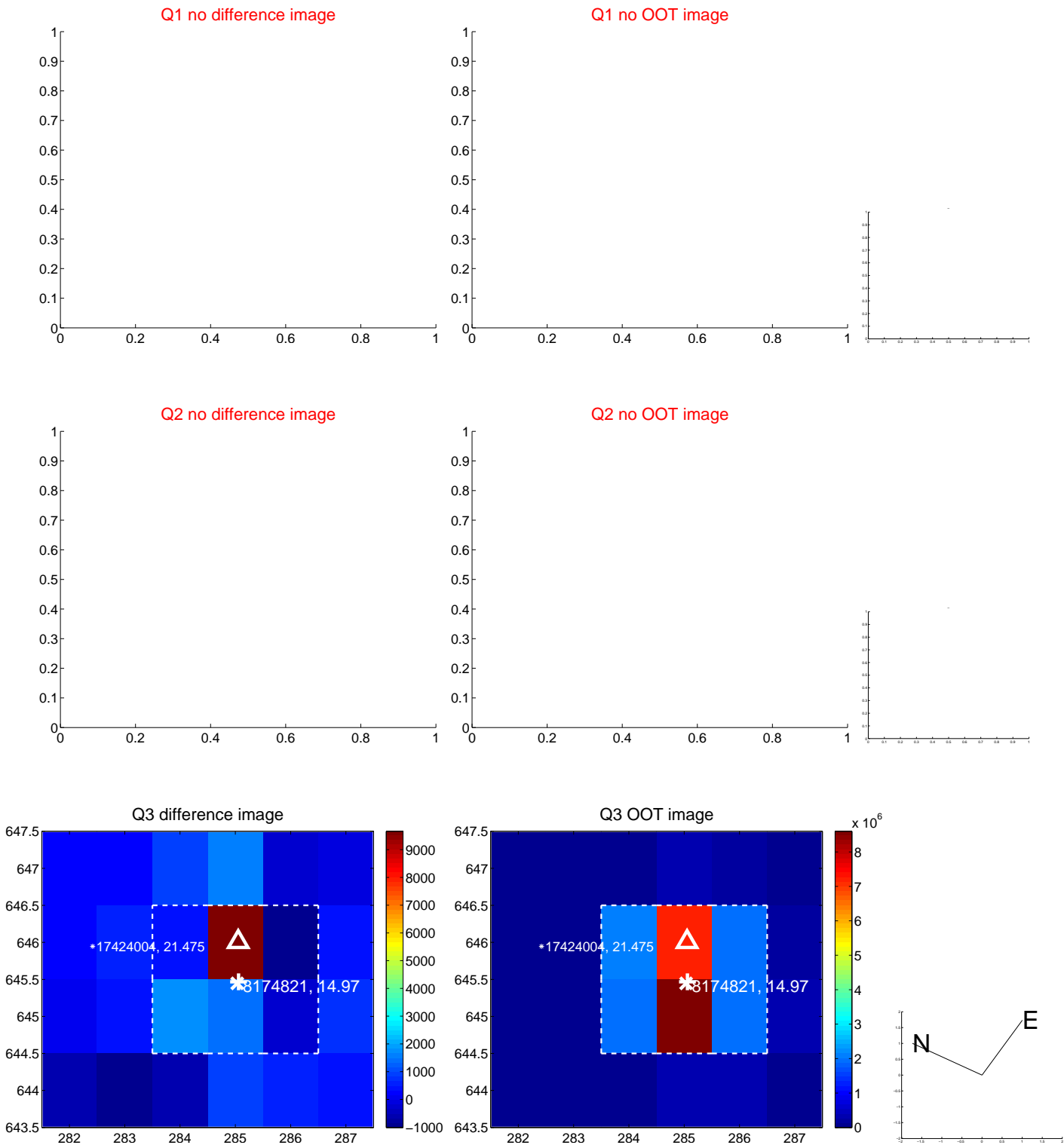


offset from photometric centroids

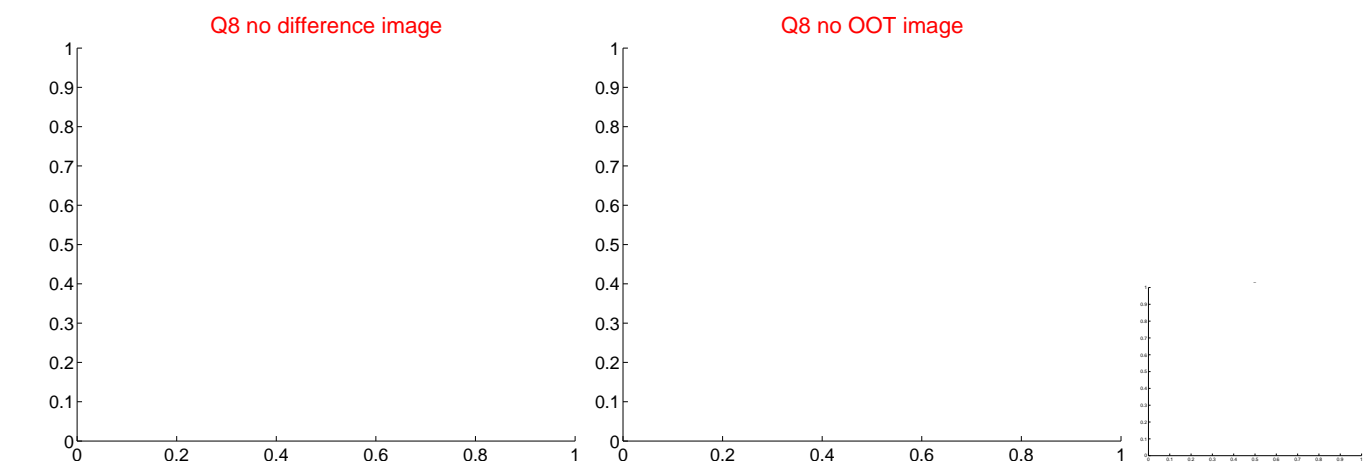
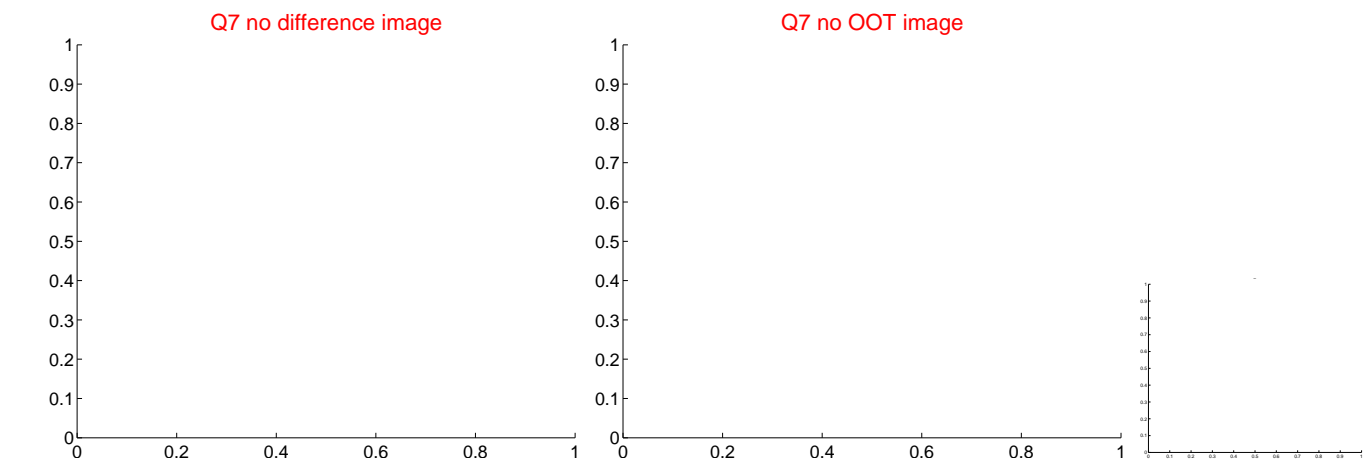
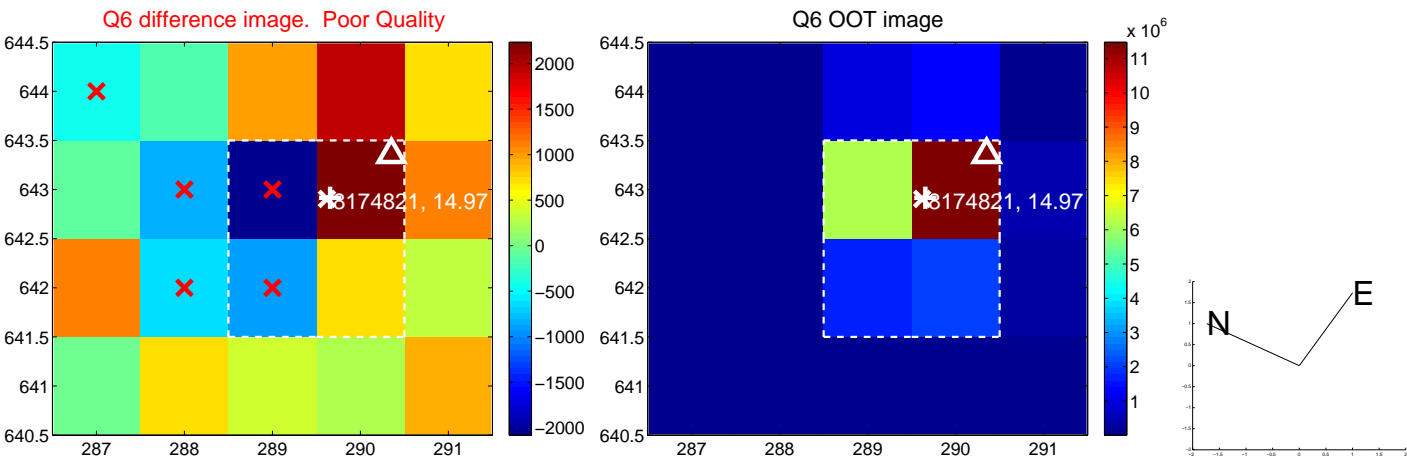
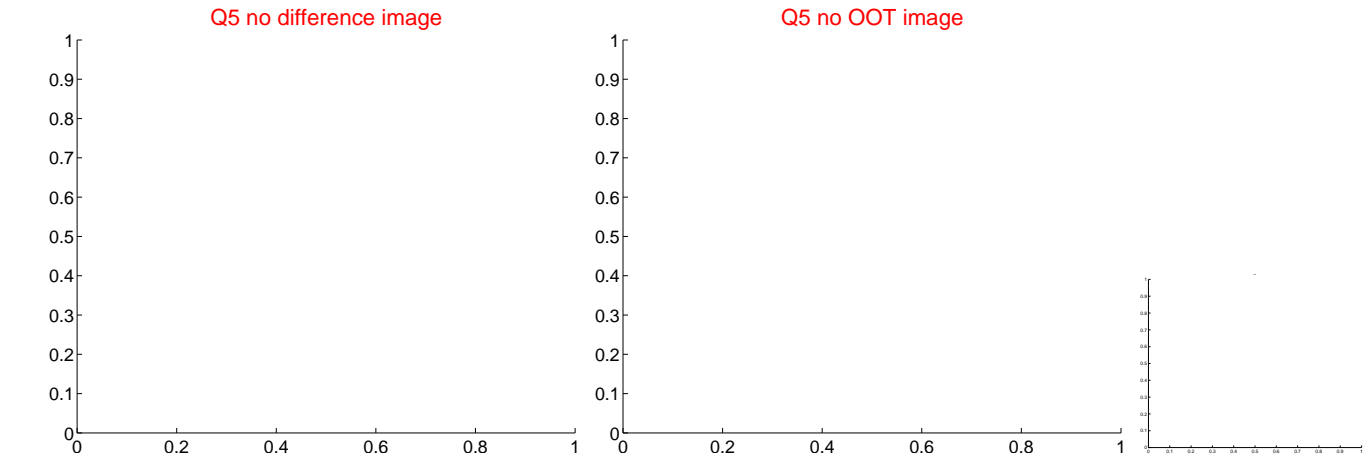


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

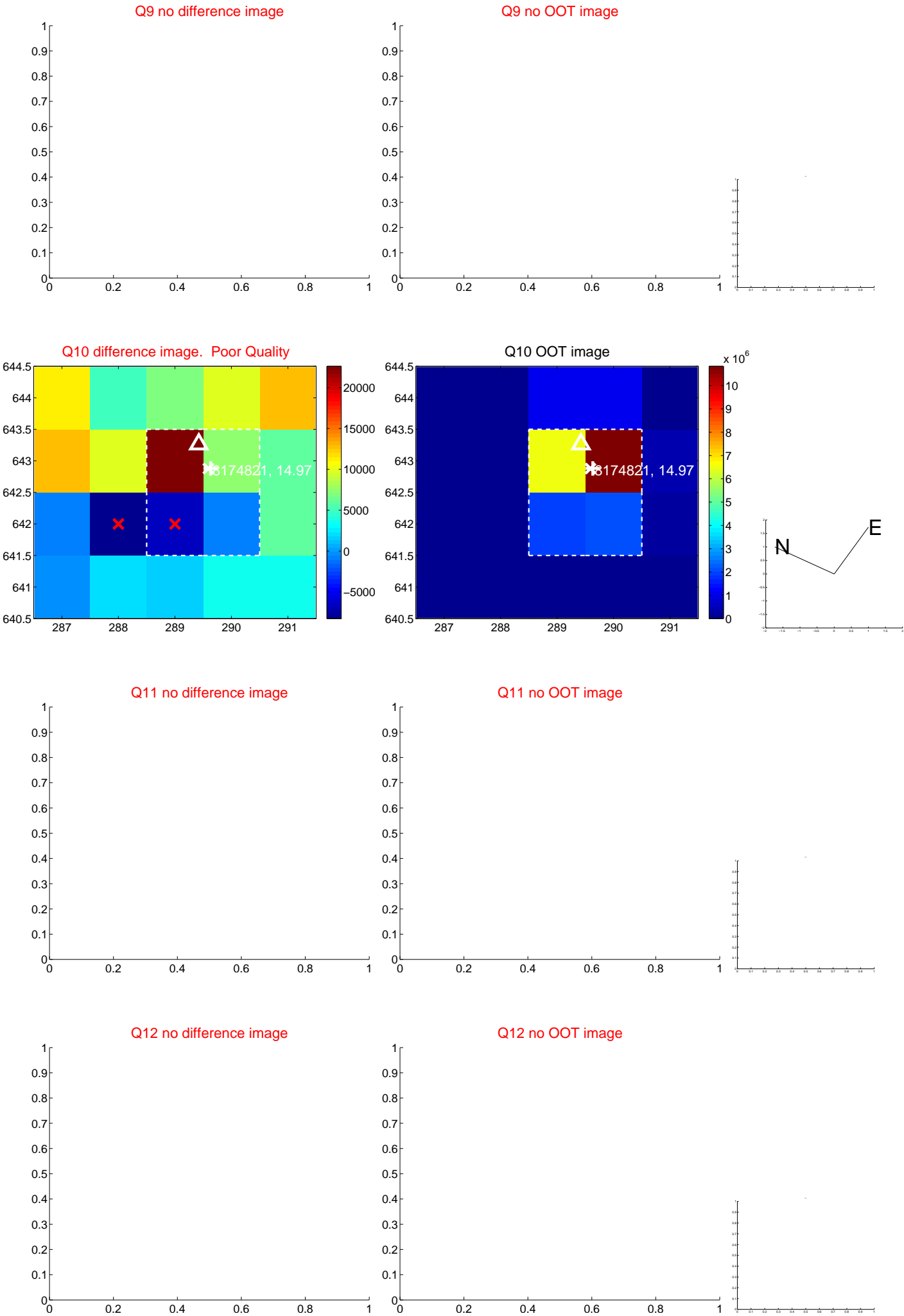


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

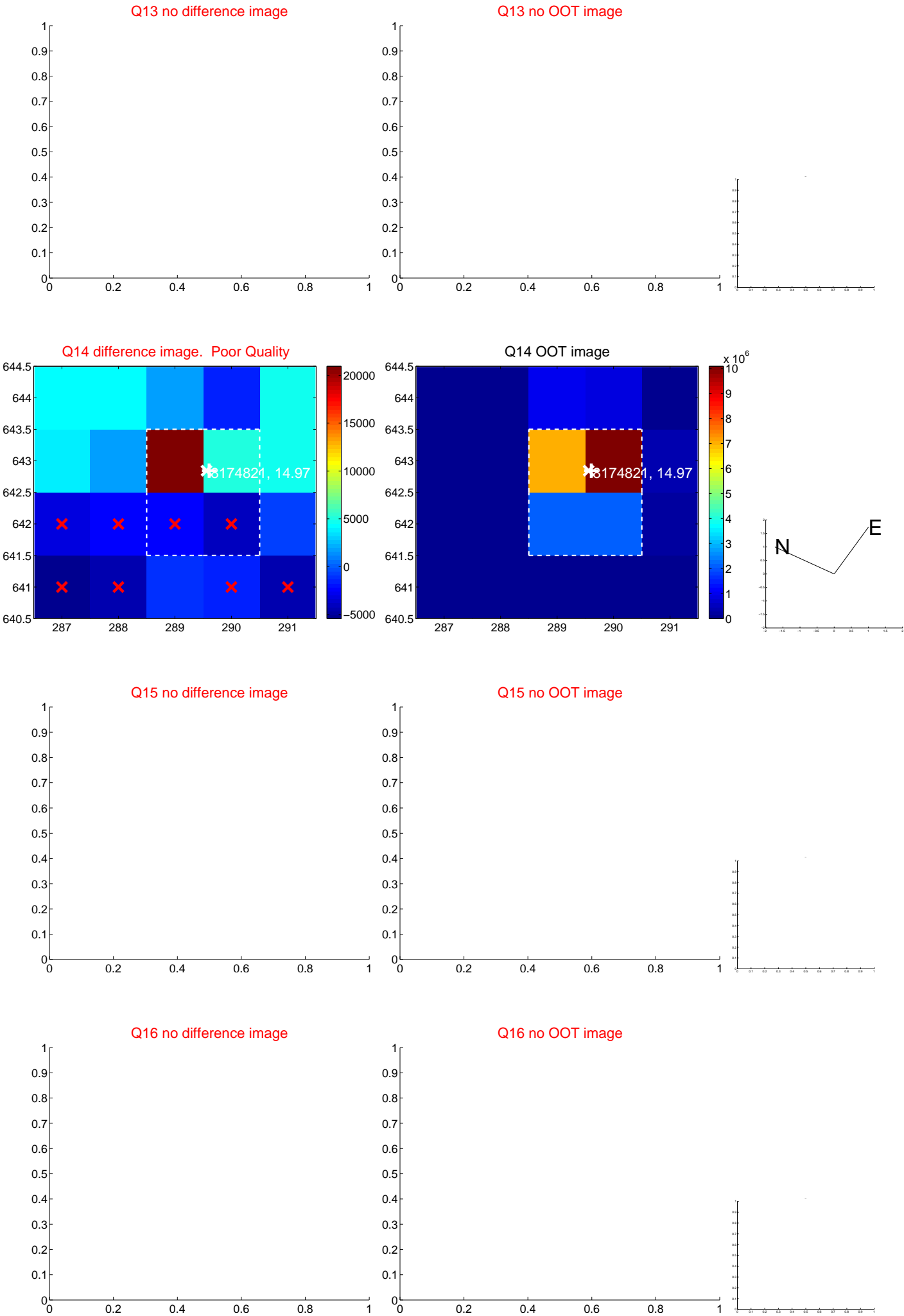




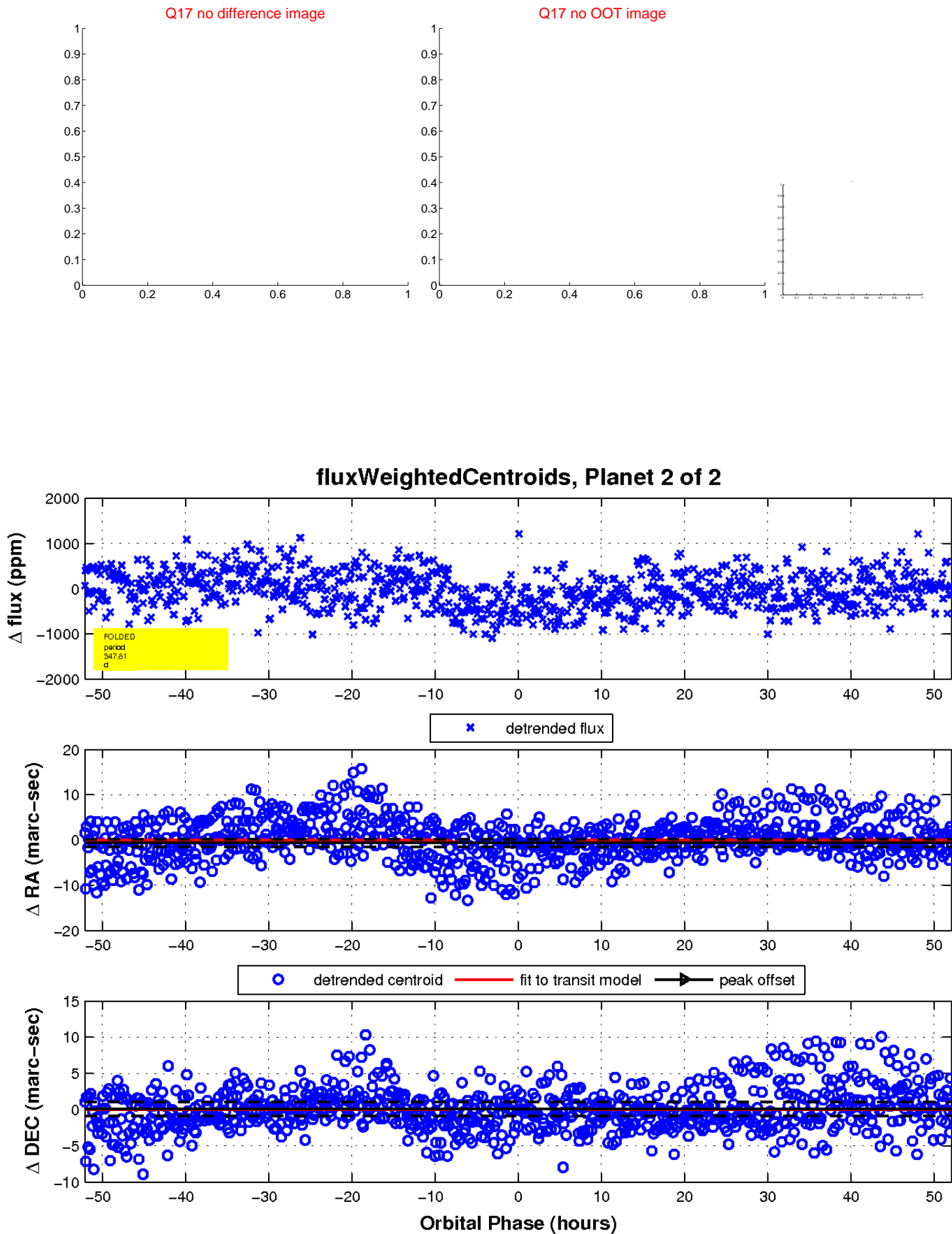
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white ×: 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.



UKIRT Image

Declination

