

# KIC 004174472

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004174472-01	OBS	No	2.963455	133.647121	58.7	10.405	8.9	9.9	2.34	8118	2.05	8685.75
004174472-02	OBS	No	2.963483	132.327465	50.2	20.917	9.2	9.1	2.34	8118	1.68	8685.65

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004174472-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
004174472-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD

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

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

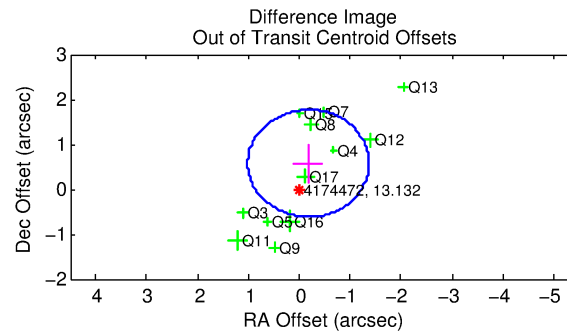
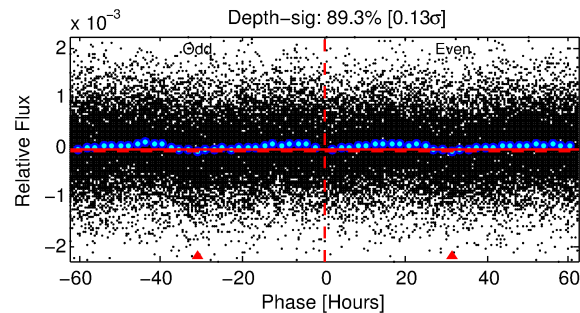
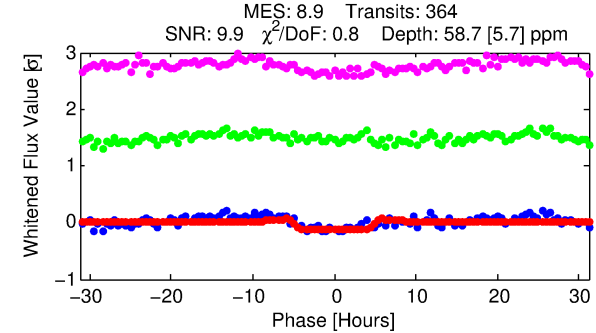
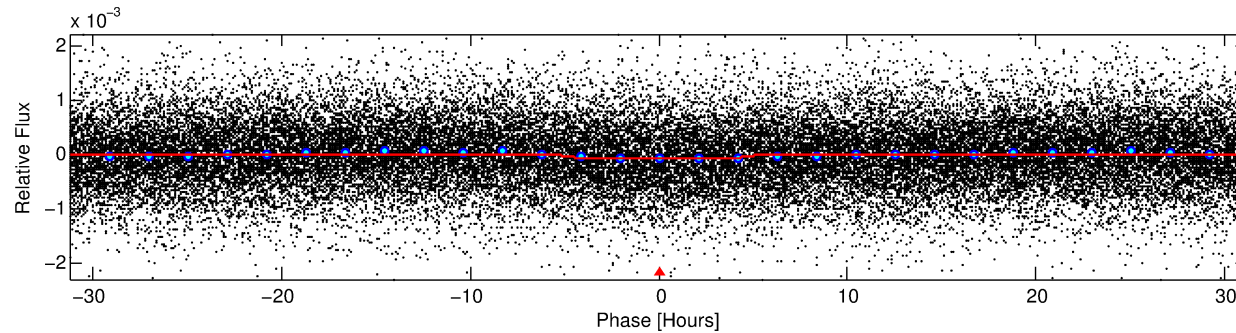
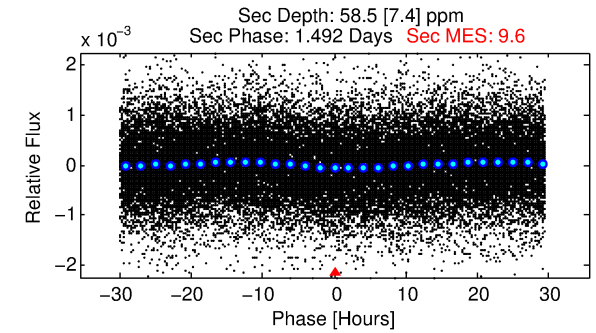
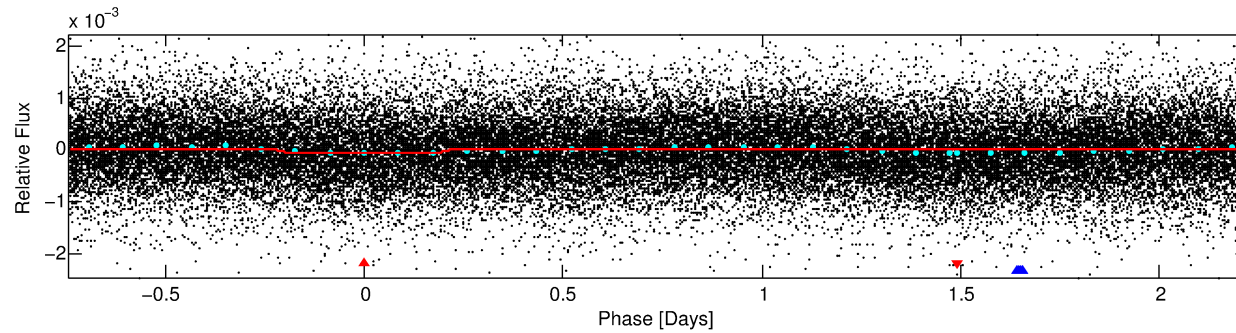
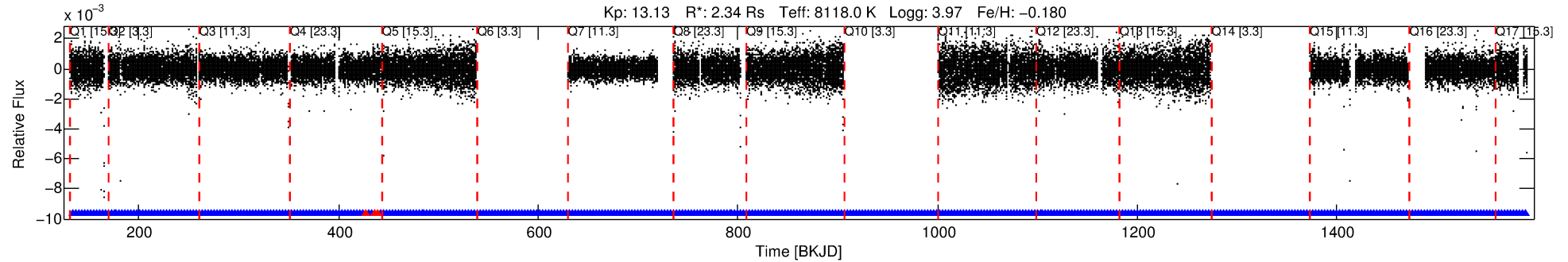
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 004174472-01

No Significant Match Found

# DV One-Page Summary

KIC: 4174472 Candidate: 1 of 2 Period: 2.963 d



## DV Fit Results:

Period = 2.96346 [0.00004] d  
Epoch = 133.6471 [0.0091] BKJD  
Rp/R\* = 0.0080 [0.0026]  
a/R\* = 1.45 [1.47]  
b = 0.87 [0.56]  
Seff = 8685.76 [4029.02]  
Teff = 2462 [285] K  
Rp = 2.05 [0.94] Re  
a = 0.0496 [0.0141] AU  
Ag = 18.88 [15.09] [1.19σ]  
Teffp = 7933 [1373] K [3.90σ]

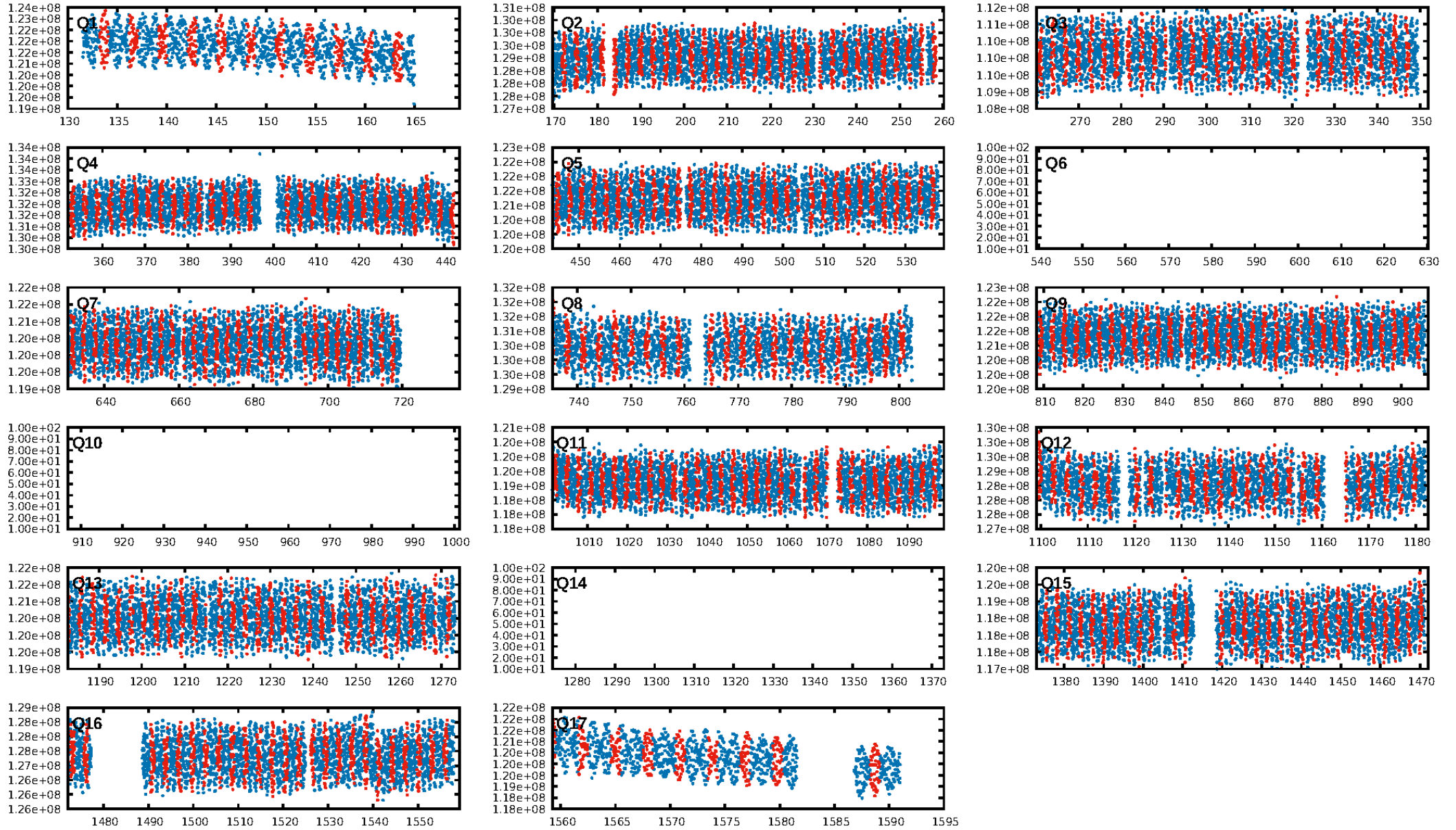
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.99 [341/344]  
GhostDiagnostic-chr: 0.9776  
Centroid-sig: 0.0%  
Centroid-so: 1.592 arcsec [2.87σ]  
OotOffset-rm: 0.600 arcsec [1.51σ]  
KicOffset-rm: 0.830 arcsec [2.08σ]  
OotOffset-st: 0/4/4/4 [12]  
KicOffset-st: 0/4/4/4 [12]  
DiffImageQuality-fgm: 0.92 [11/12]  
DiffImageOverlap-fno: 1.00 [14/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:41:17 Z

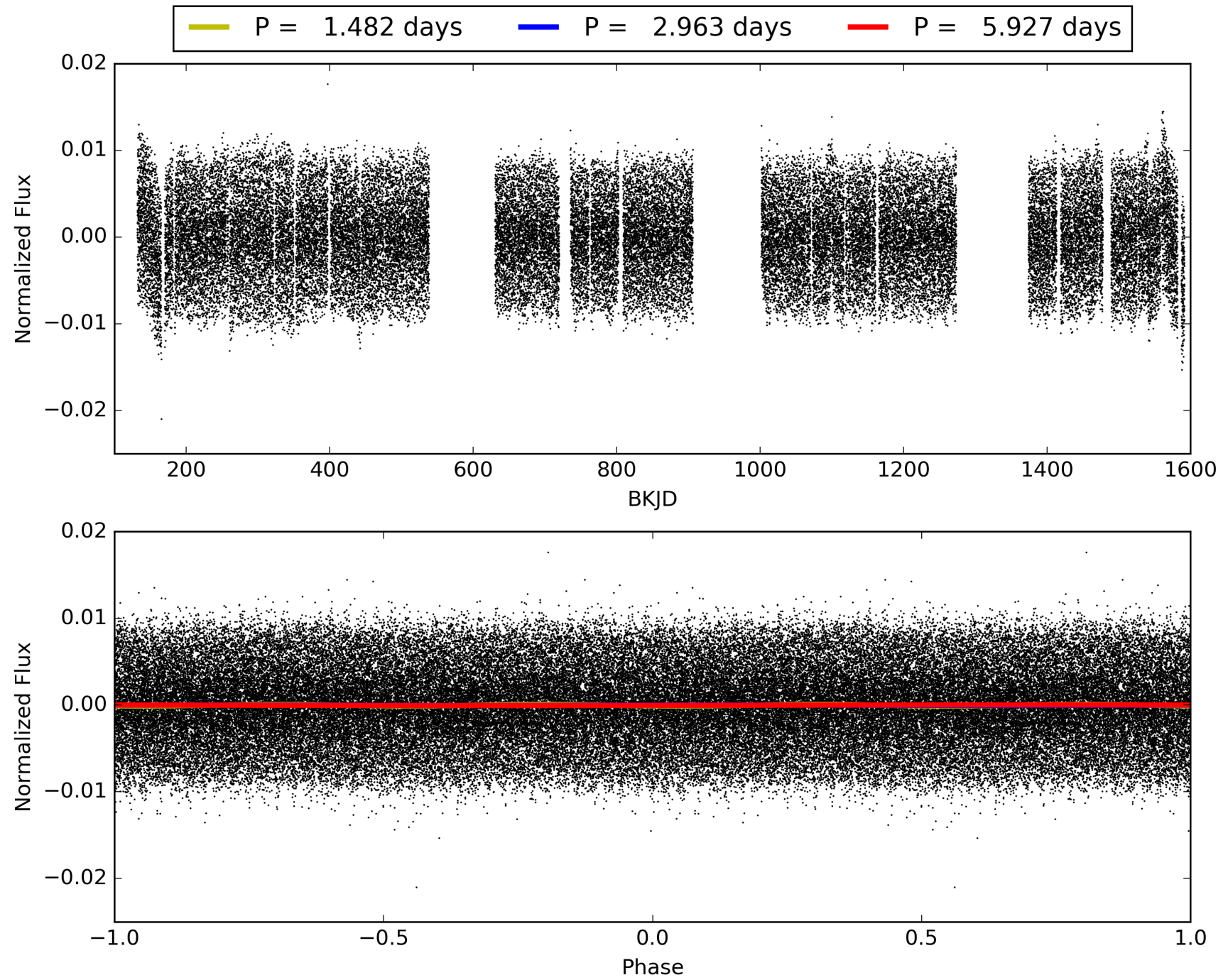
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 004174472-01, PDC Light Curves



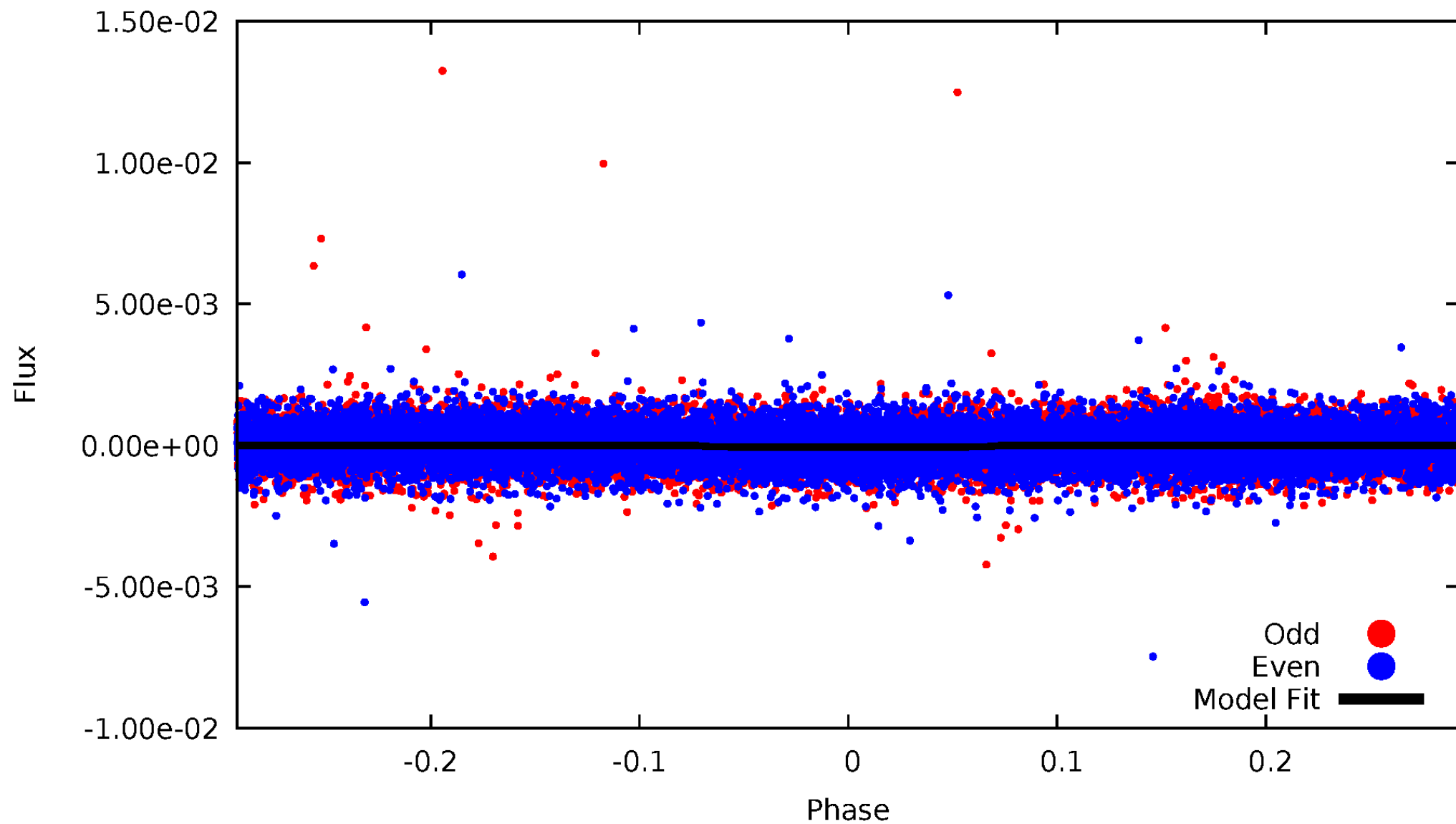


TCE 004174472-01



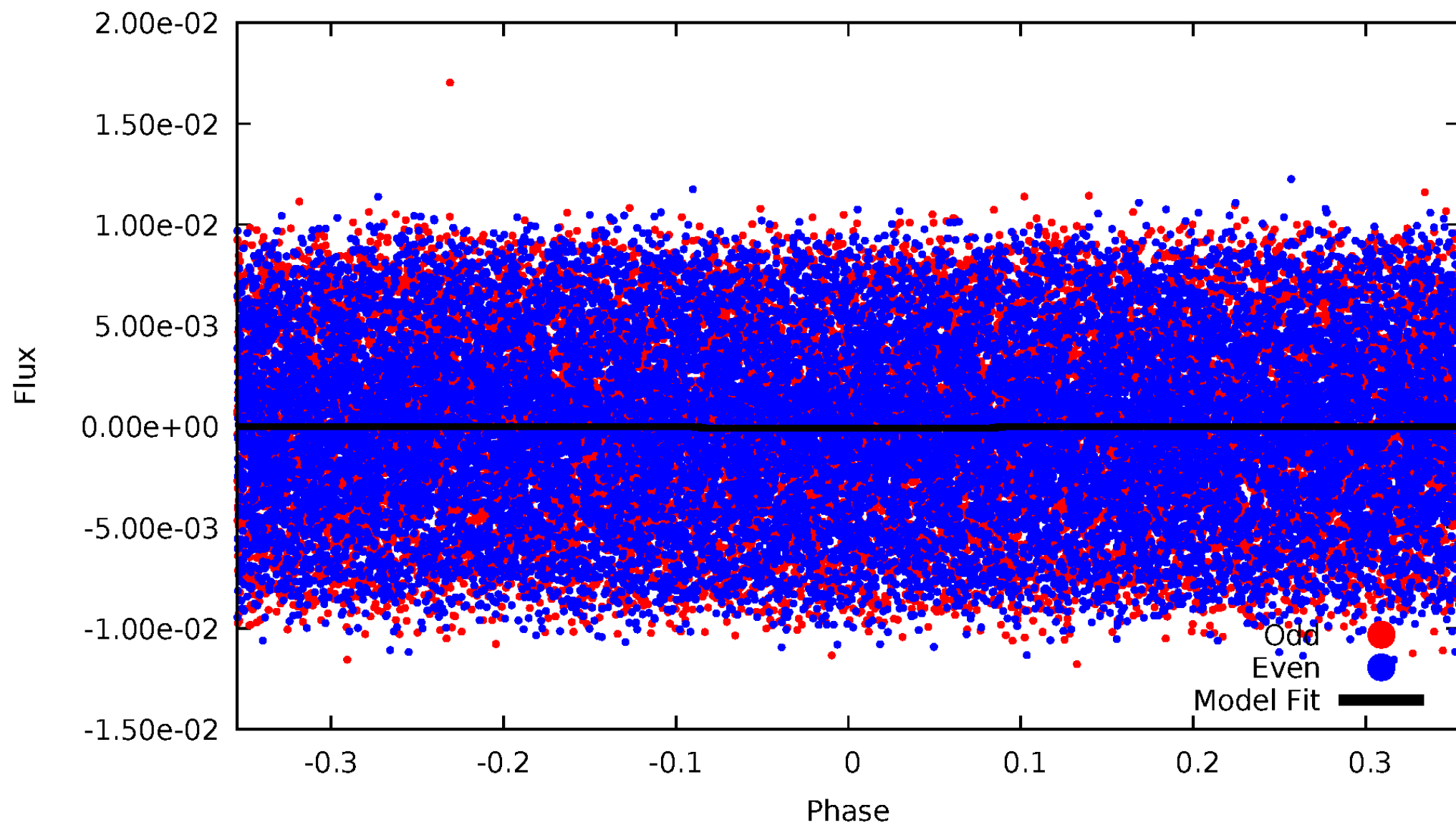
# DV Odd/Even

TCE 004174472-01

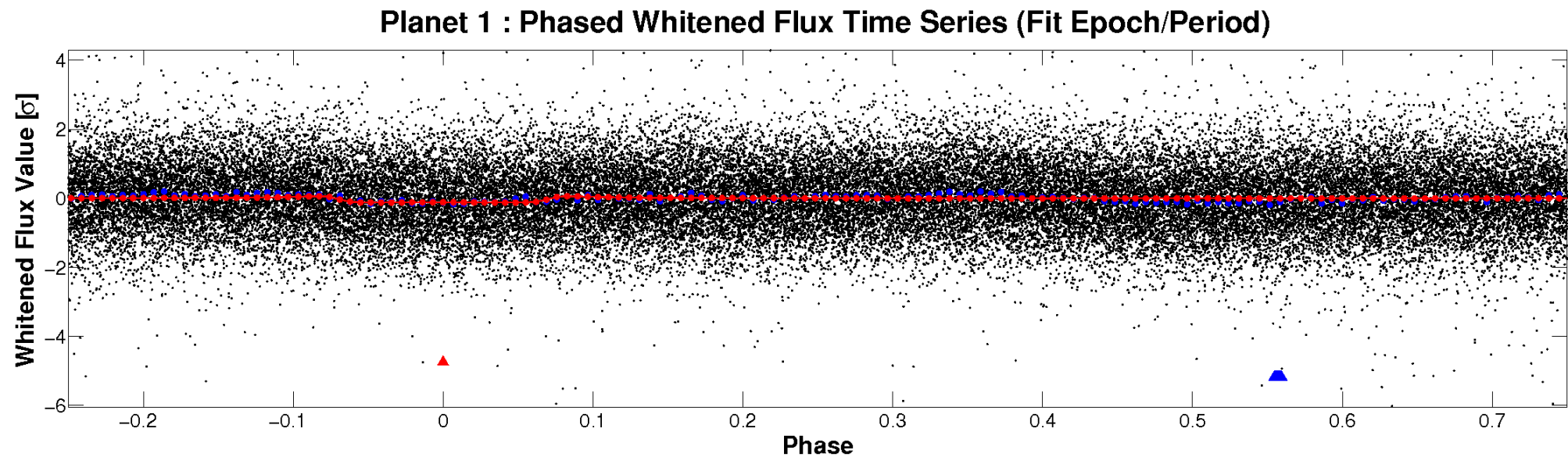
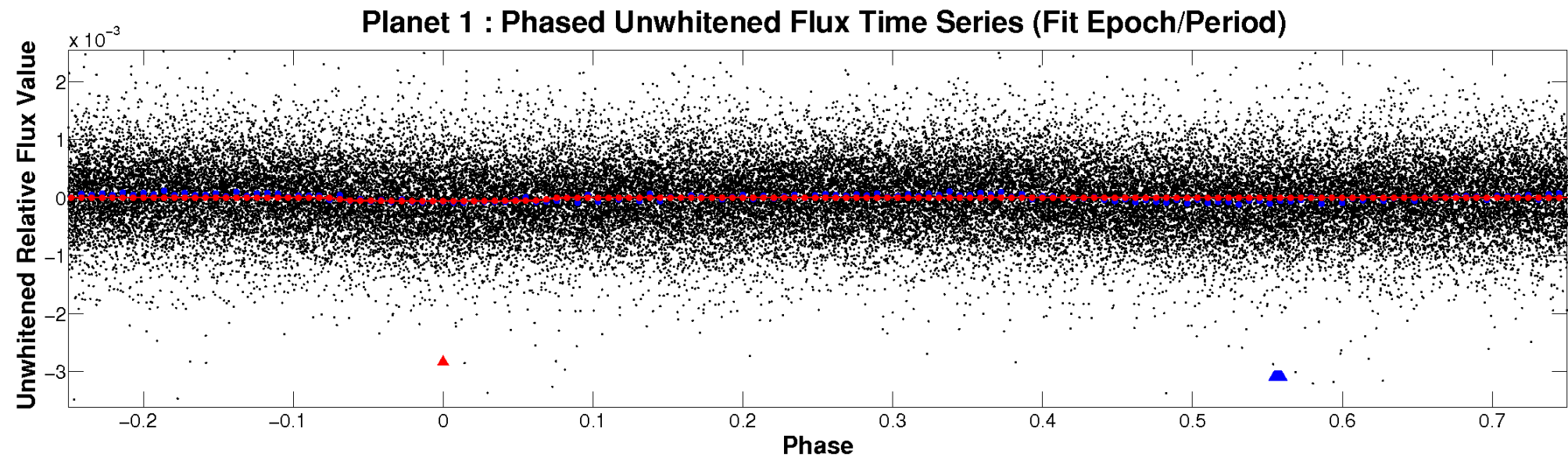


# ALT Odd/Even

TCE 004174472-01

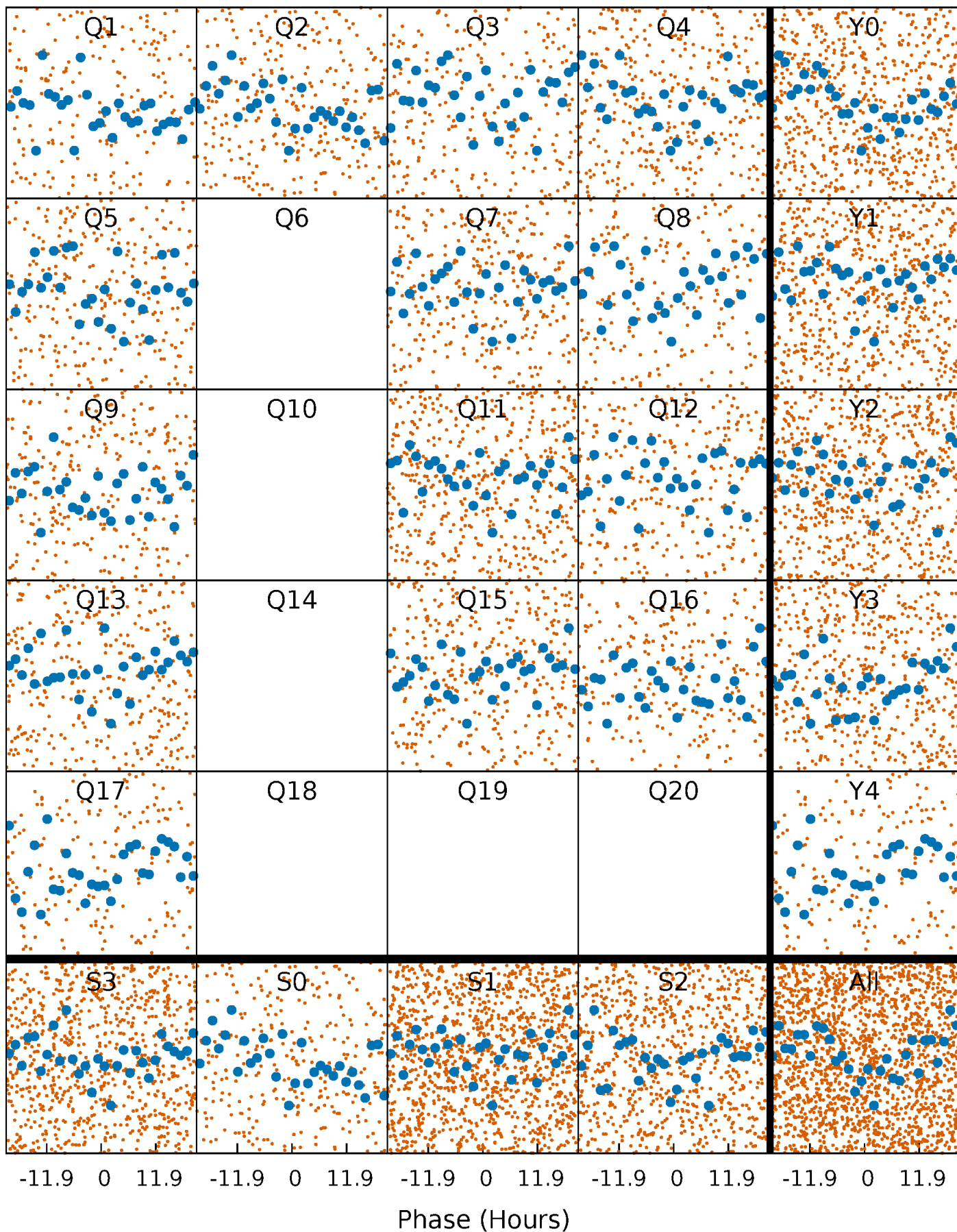


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

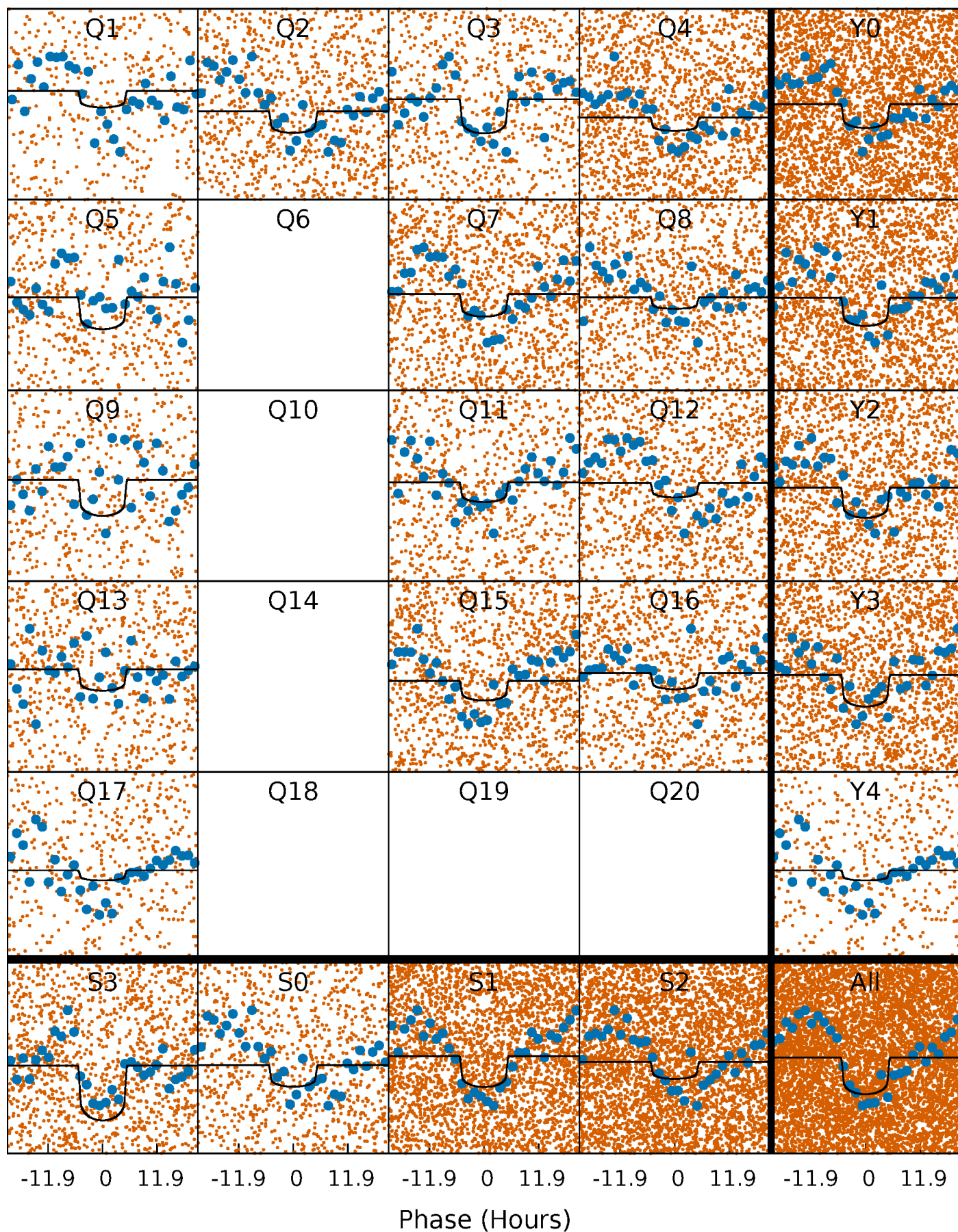
TCE 004174472-01   P= 2.963455 Days    $T_0=133.647121$  (BKJD)





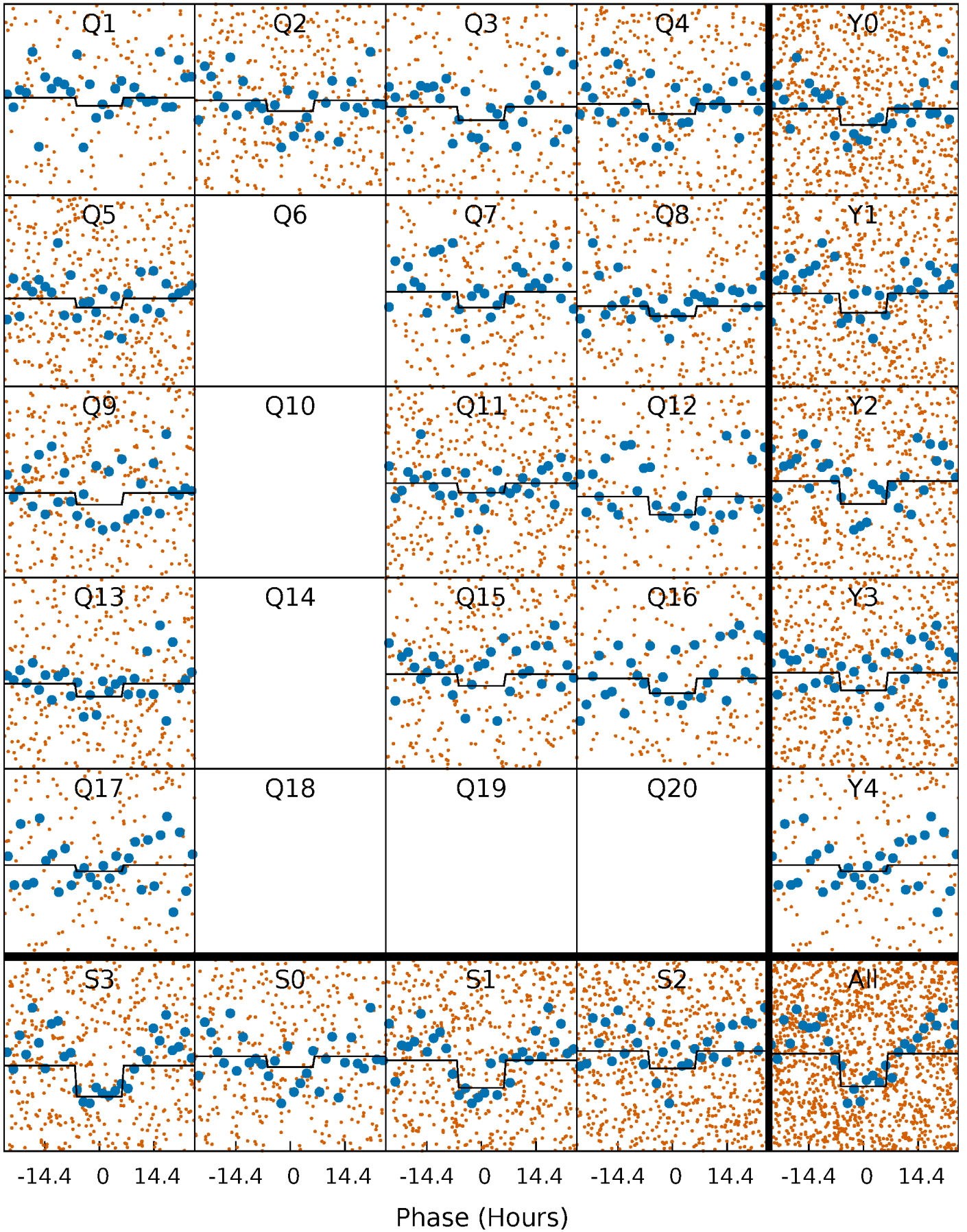
# DV Quarter-Phased Transit Curves

TCE 004174472-01   P= 2.963455 Days    $T_0=133.647121$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

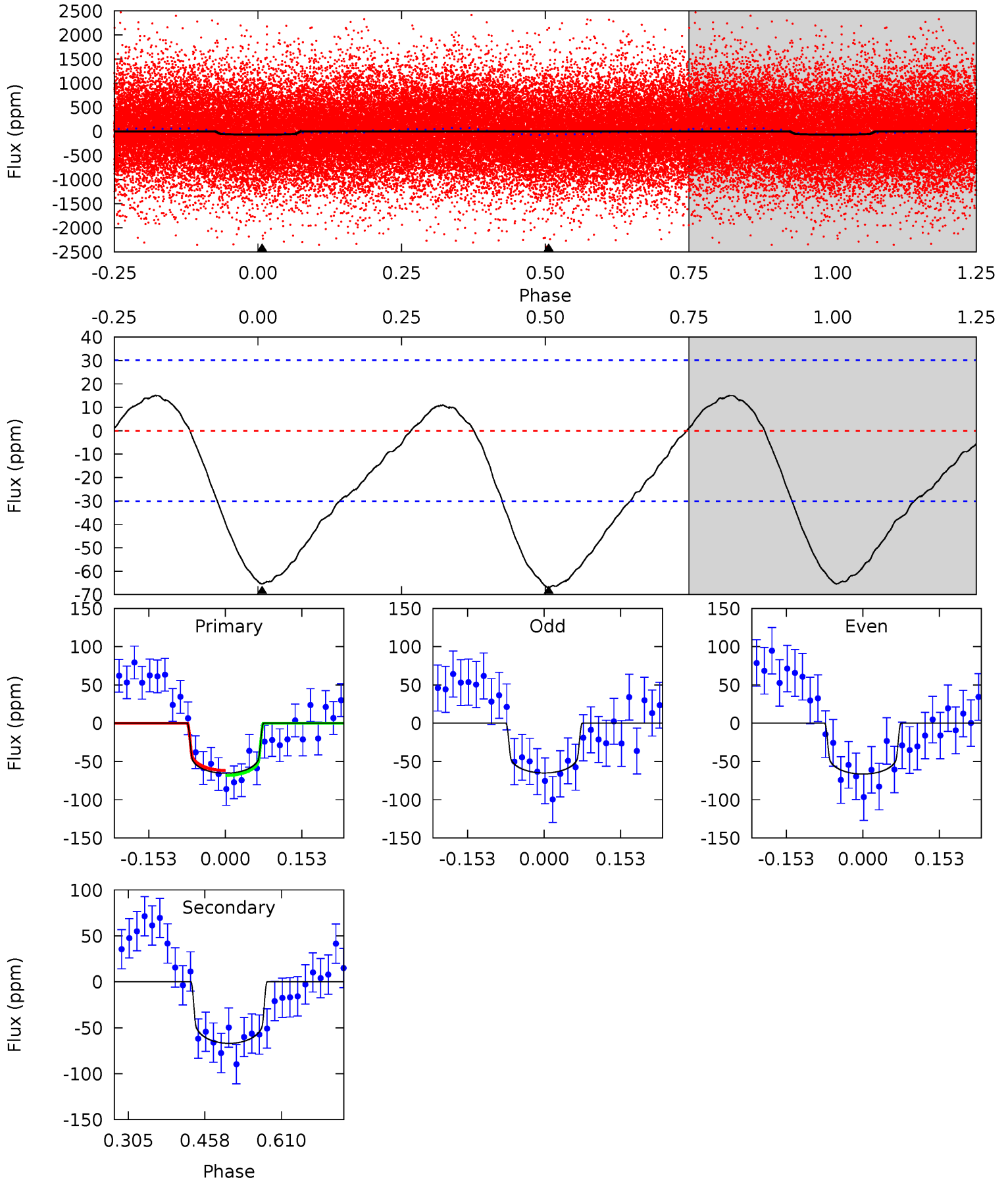
TCE 004174472-01 P= 2.963355 Days  $T_0=133.764638$  (BKJD)



# DV Model-Shift Uniqueness Test

004174472-01, P = 2.963455 Days, E = 130.683666 Days

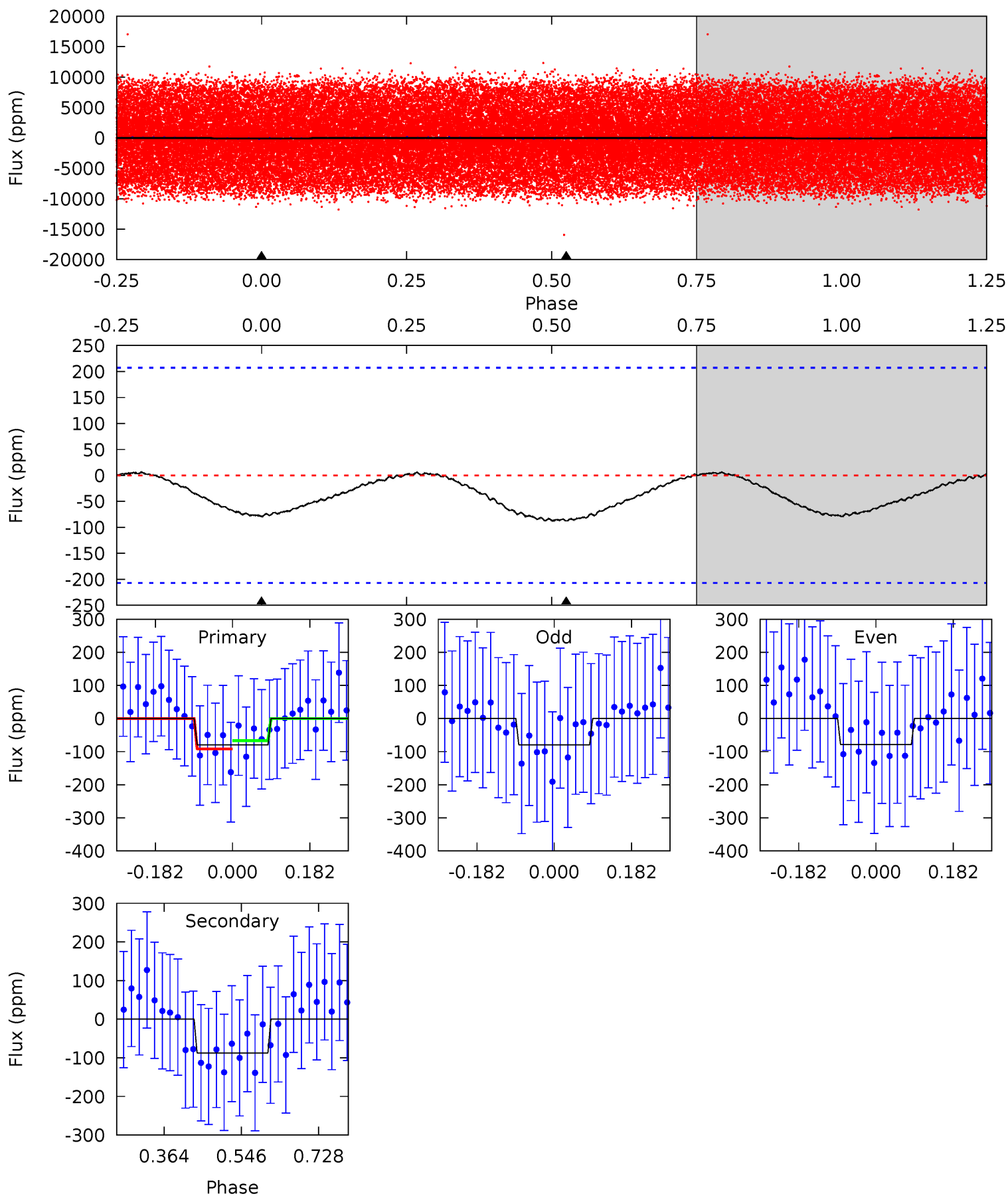
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.71	9.95	0	0	4.48	1.43	1.93	9.71	9.71	9.95	9.95	0.10	0.76	0.18	0.49



# Alt Model-Shift Uniqueness Test

004174472-01, P = 2.963355 Days, E = 130.801283 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
1.70	1.88	0	0	4.44	1.33	0.12	1.70	1.70	1.88	1.88	0.01	0.96	0.06	0.27





### Stellar Parameters For KIC 004174472

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$8118^{+226}_{-340}$	$3.966^{+0.245}_{-0.123}$	$-0.180^{+0.200}_{-0.350}$	$2.343^{+0.405}_{-0.751}$	$1.852^{+0.112}_{-0.359}$	$0.203^{+0.294}_{-0.079}$
	+3%/-4%	+6%/-3%	+111%/-194%	+17%/-32%	+6%/-19%	+145%/-39%
Source	KIC0	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 004174472-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-67 \pm 7$	$1.95^{+0.70}_{-0.68}$	$3393^{+218}_{-304}$	$8073^{+2524}_{-1269}$	$23^{+32}_{-10}$
Alt.	$-88 \pm 47$	$2.16^{+0.74}_{-0.73}$	$3403^{+209}_{-273}$	$8220^{+2844}_{-1801}$	$23^{+35}_{-14}$

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

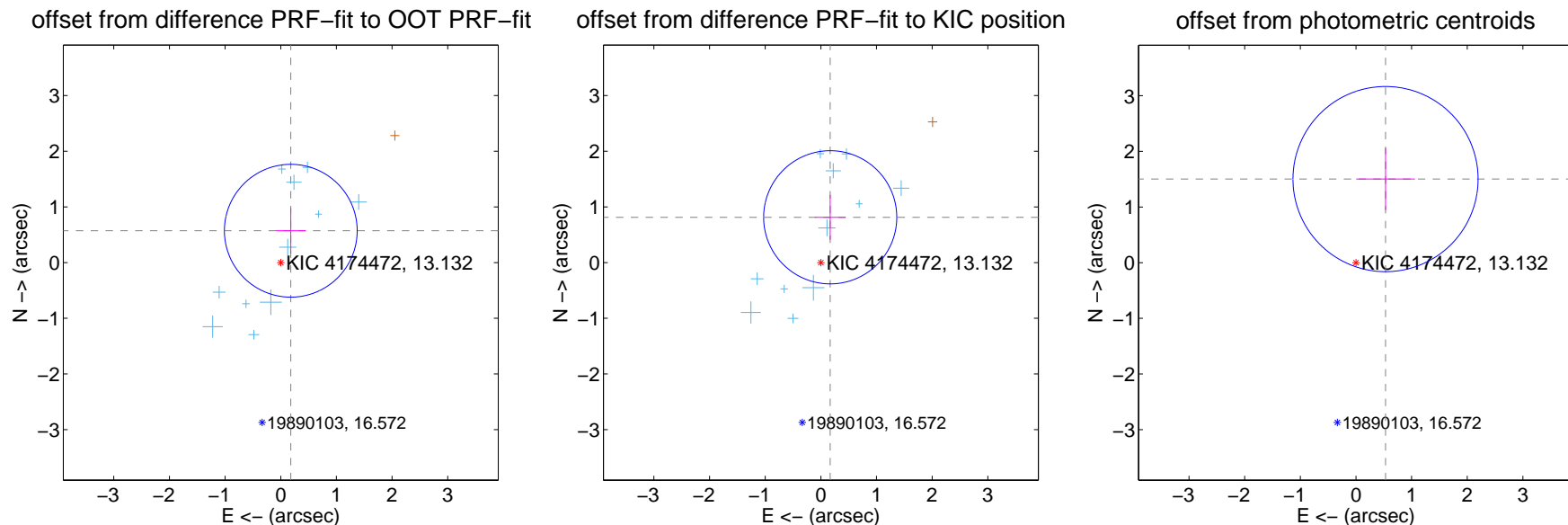
## DV Centroid Data

Supplemental centroid analysis for 004174472-01. Kepler magnitude: 13.13. Transit SNR 9.94

There are 11 quarters with good PRF difference image offsets

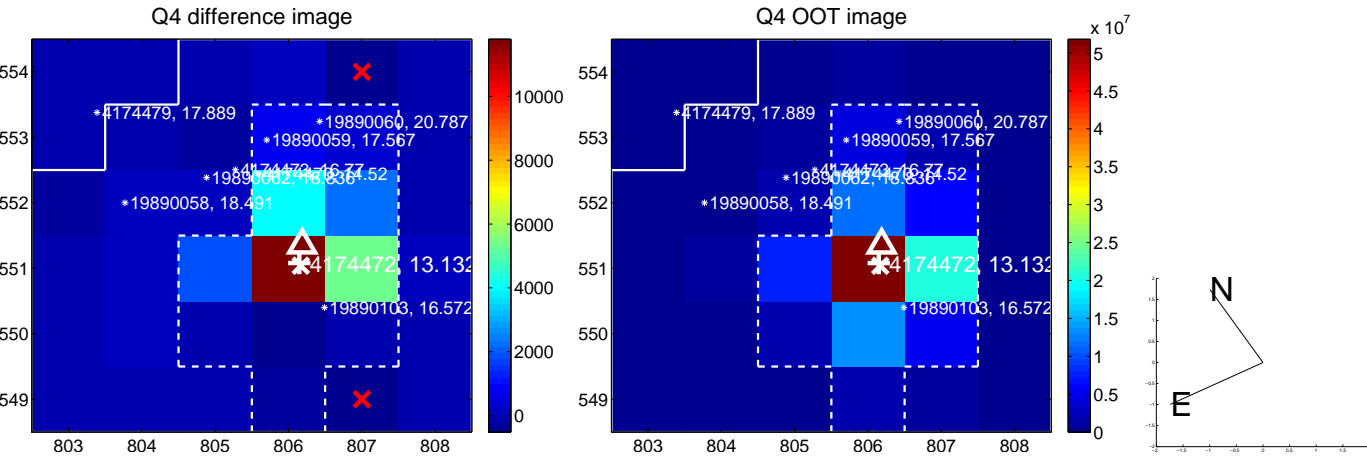
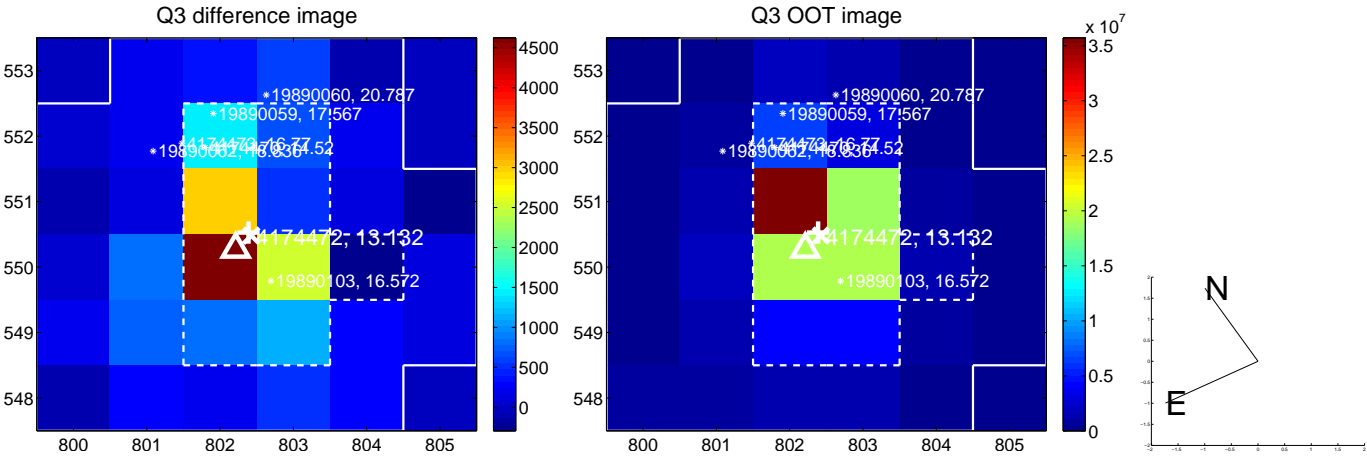
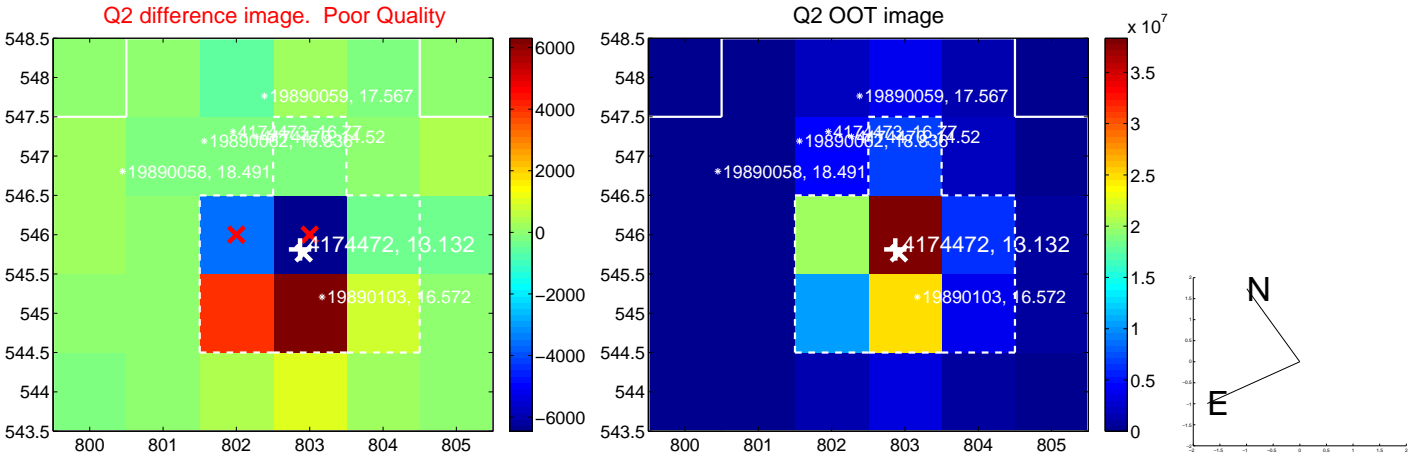
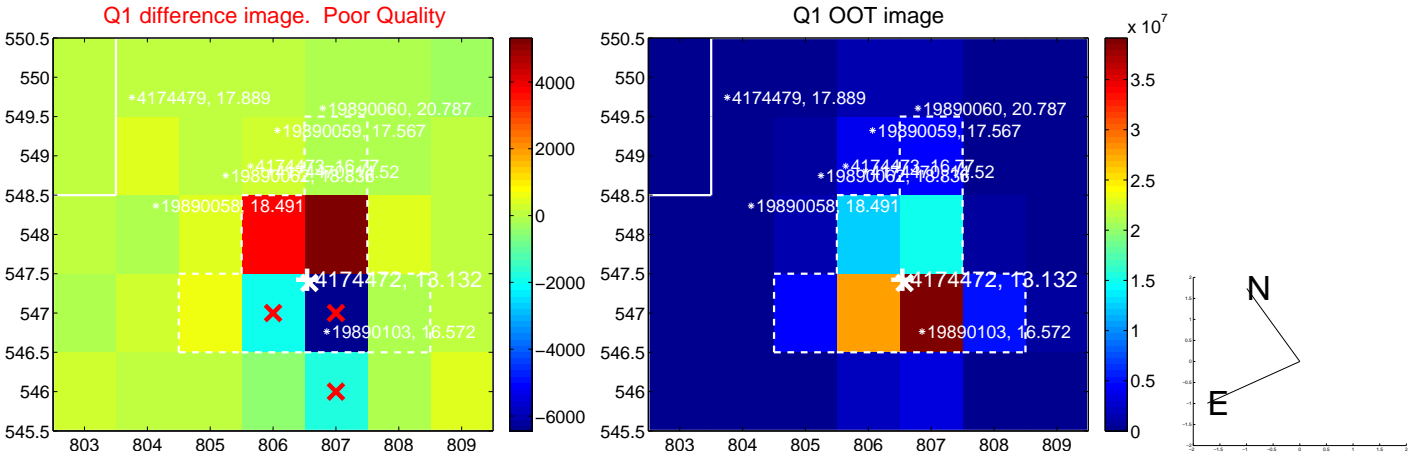
The direct PRF centroid is offset from the target star catalog position by about 0.35 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.600 \pm 0.397$	1.51	$-0.180 \pm 0.271$	$0.572 \pm 0.408$
PRF-fit source offset from KIC position	$0.830 \pm 0.399$	2.08	$-0.168 \pm 0.276$	$0.813 \pm 0.403$
photometric centroid source offset	$1.59 \pm 0.55$	2.87	$-0.53 \pm 0.53$	$1.50 \pm 0.56$

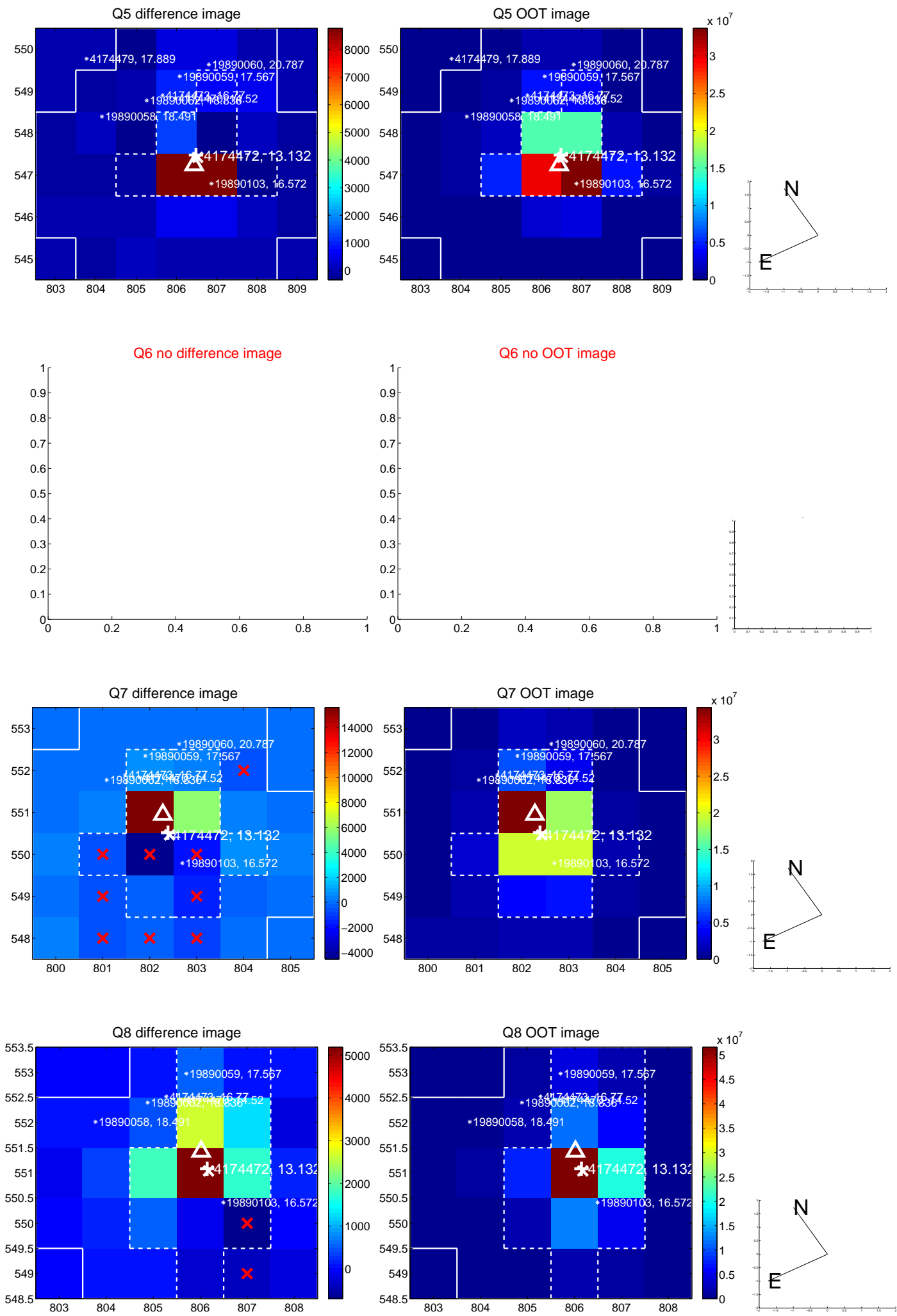


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

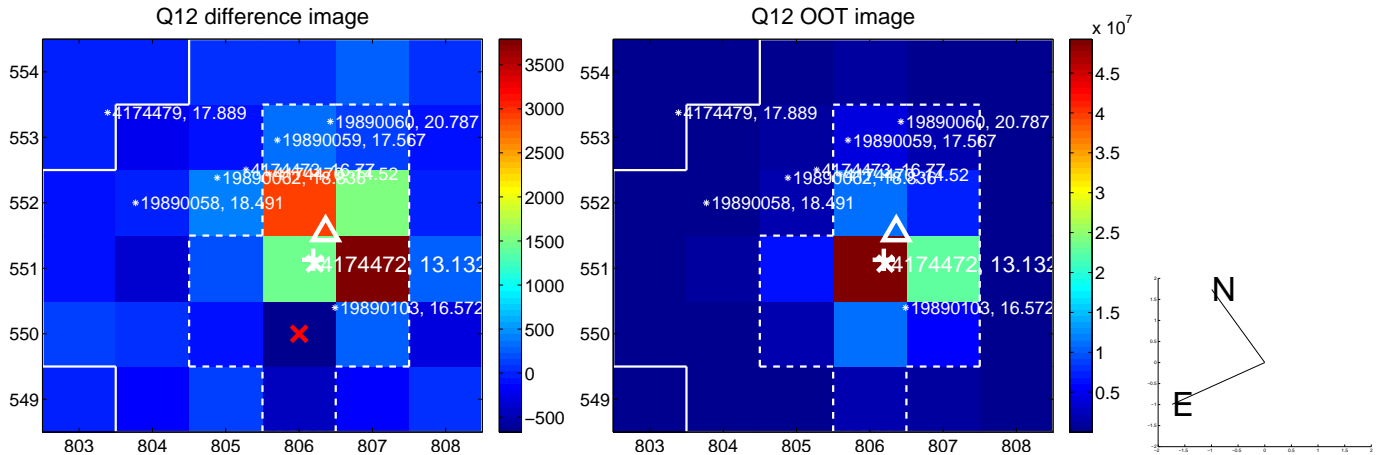
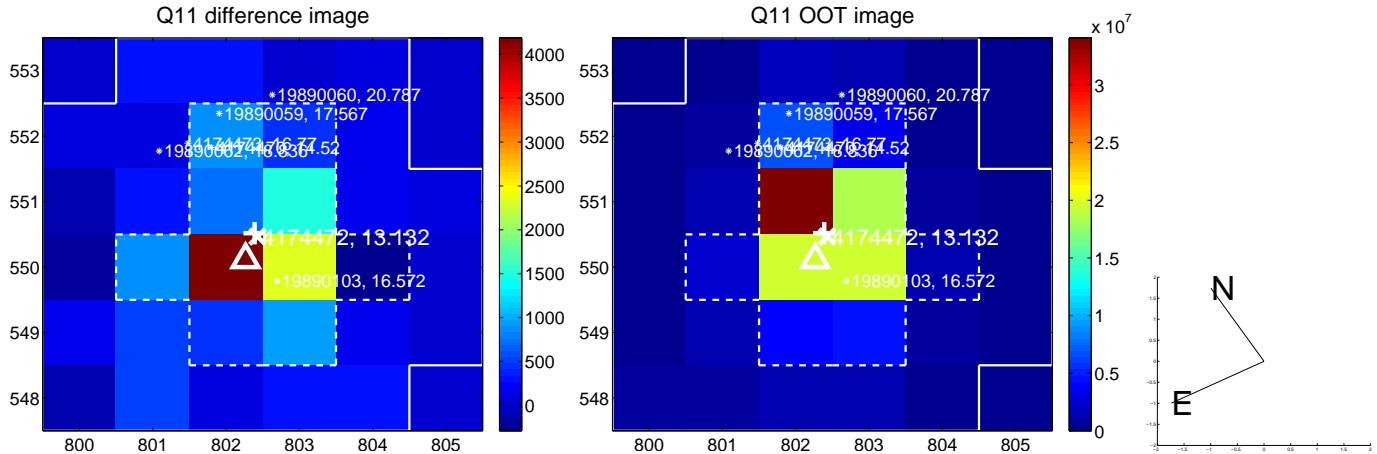
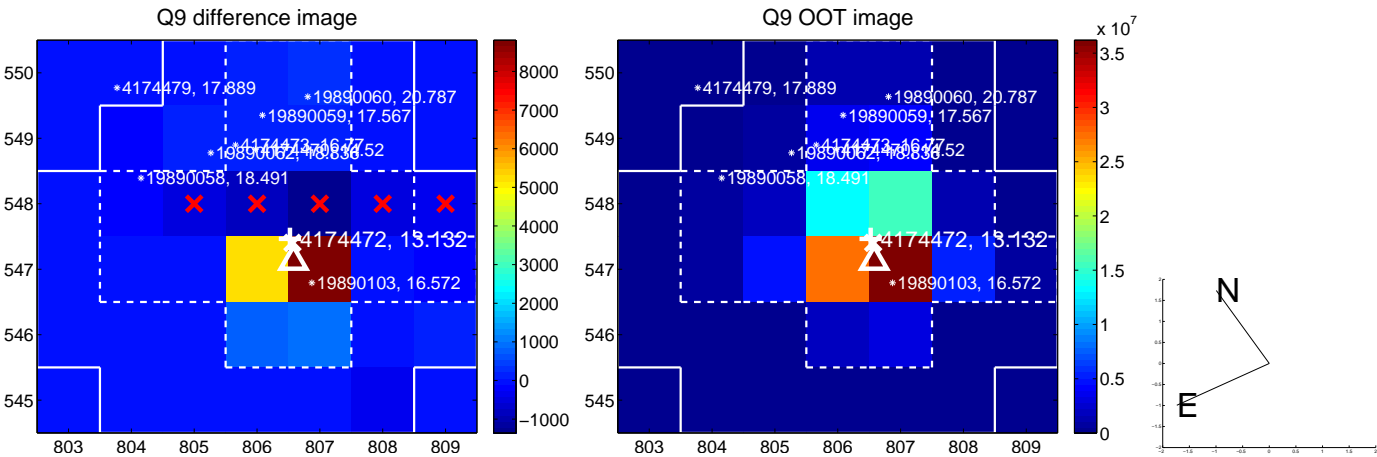


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

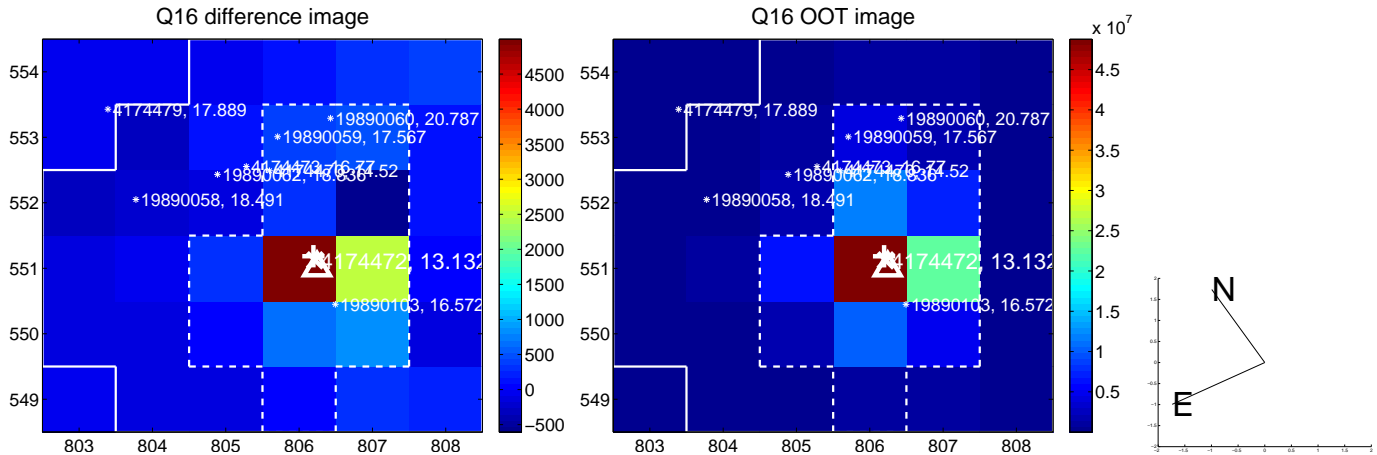
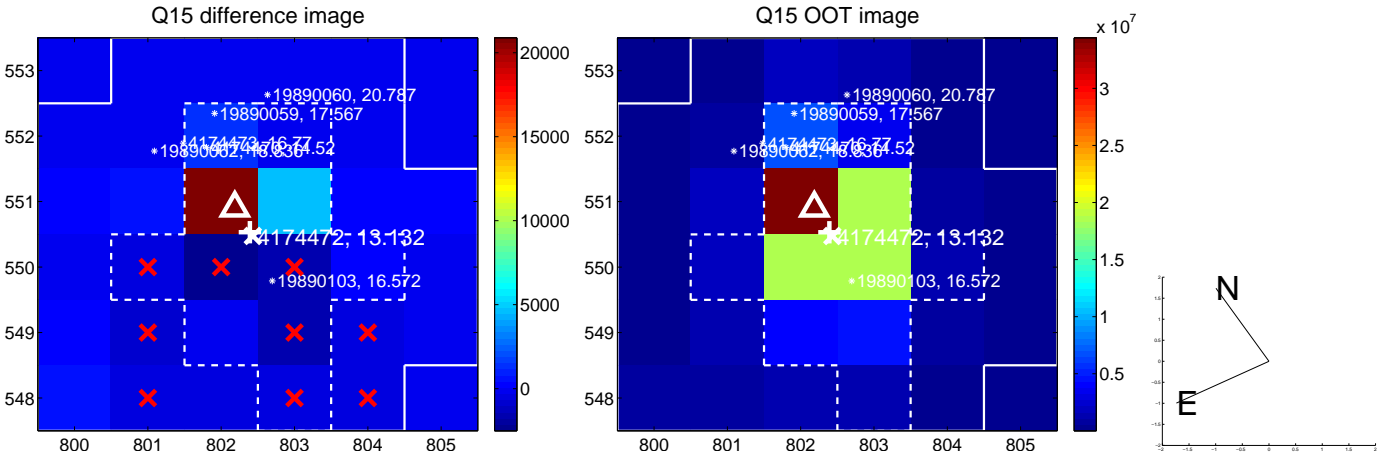
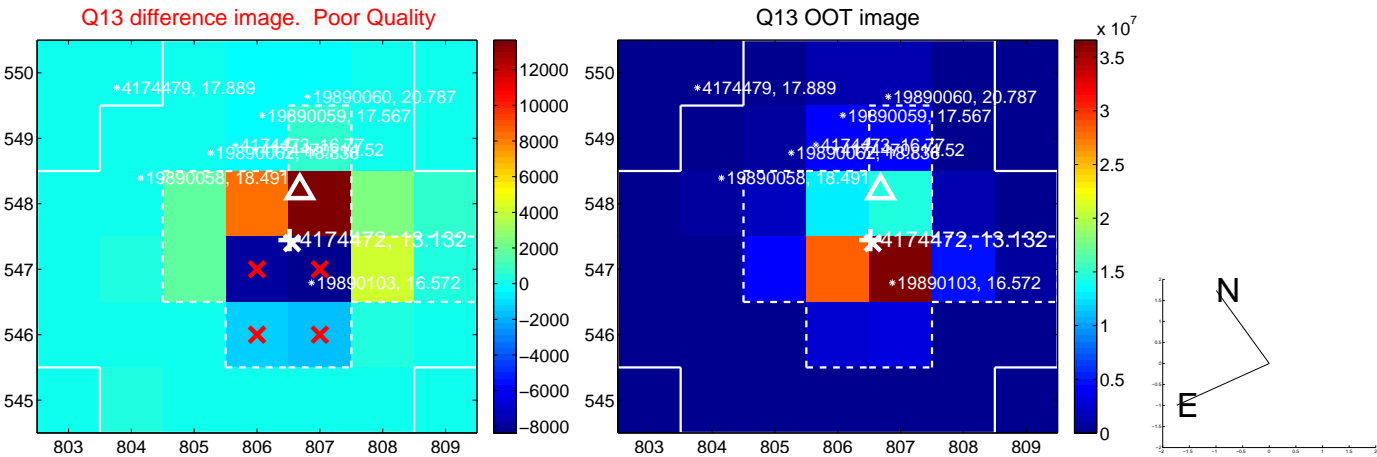




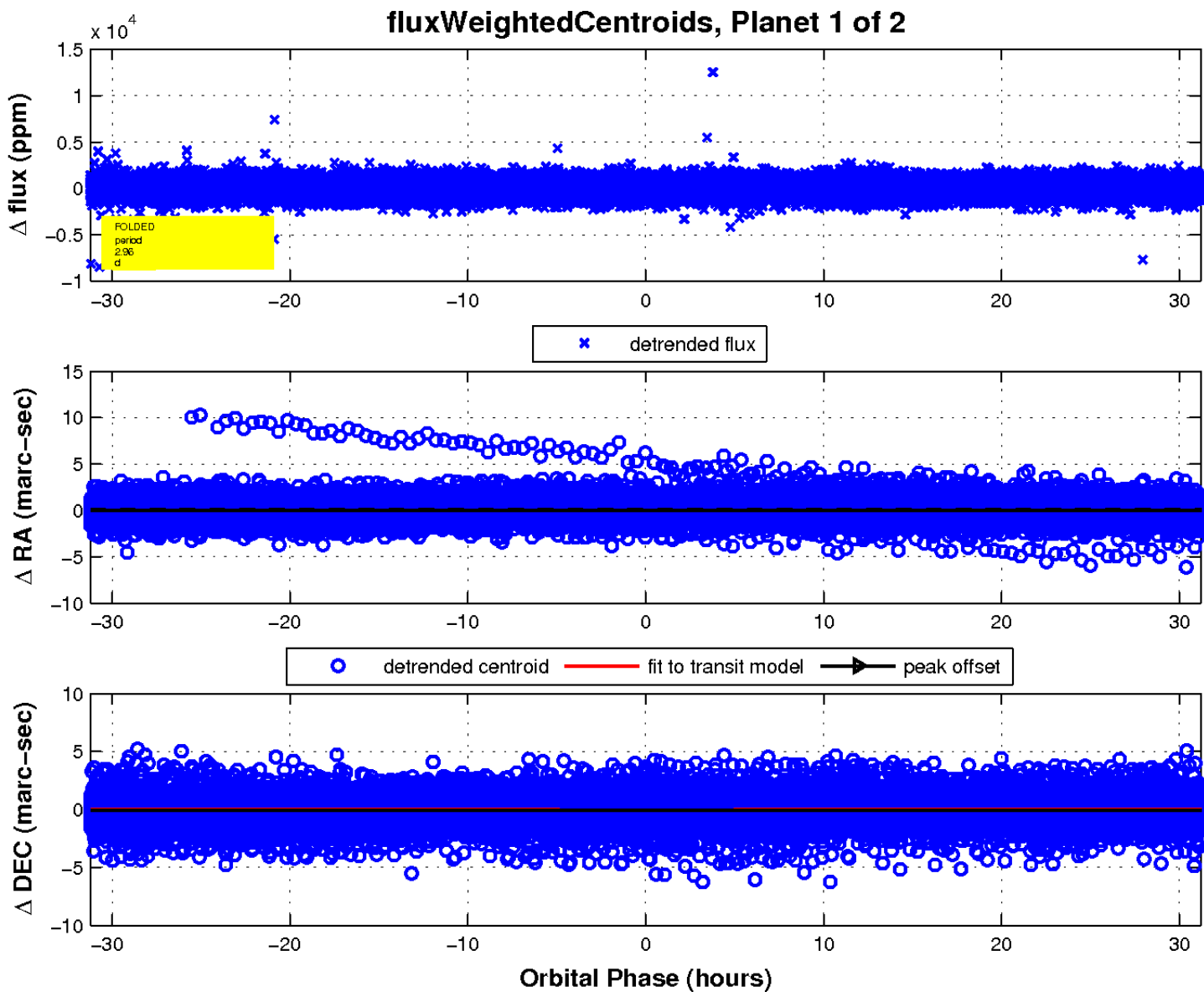
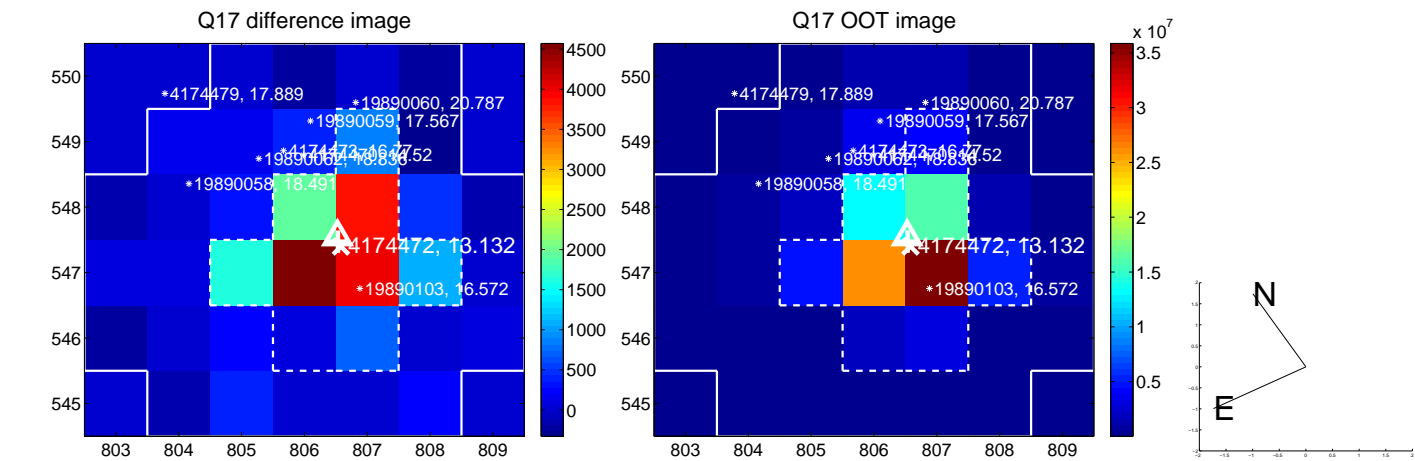
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

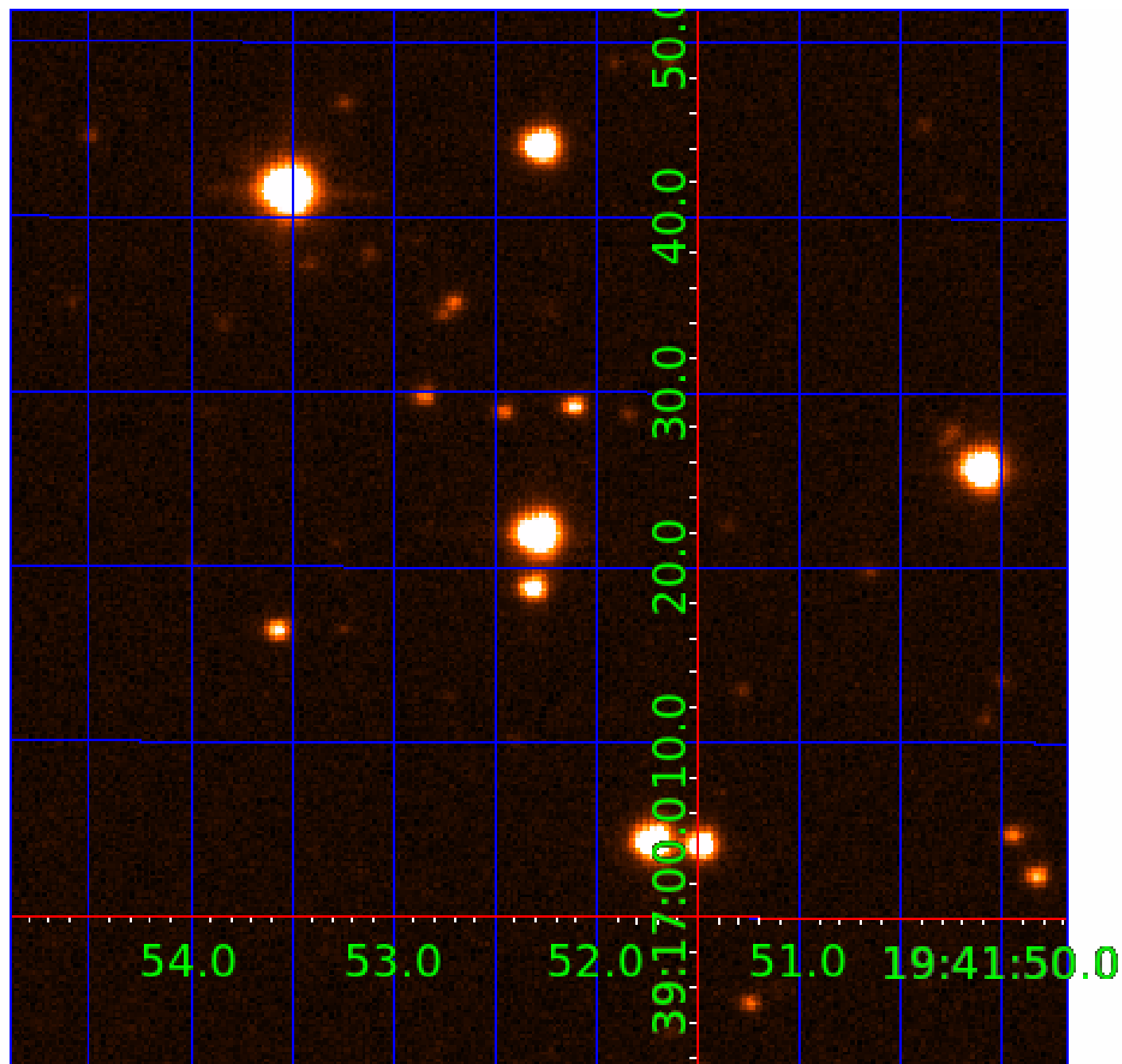


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 004174472

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004174472-01	OBS	No	2.963455	133.647121	58.7	10.405	8.9	9.9	2.34	8118	2.05	8685.75
004174472-02	OBS	No	2.963483	132.327465	50.2	20.917	9.2	9.1	2.34	8118	1.68	8685.65

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004174472-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
004174472-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD

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

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

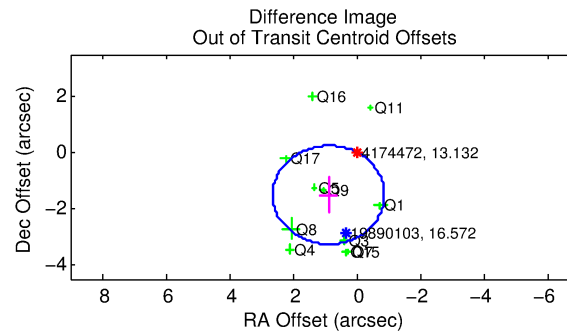
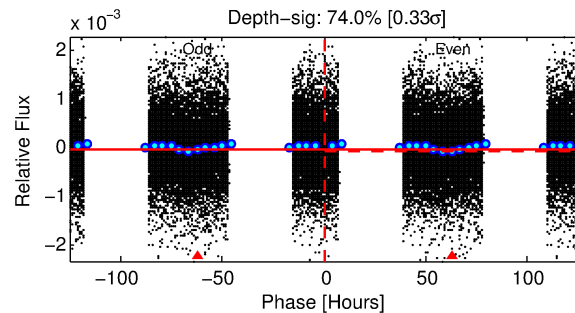
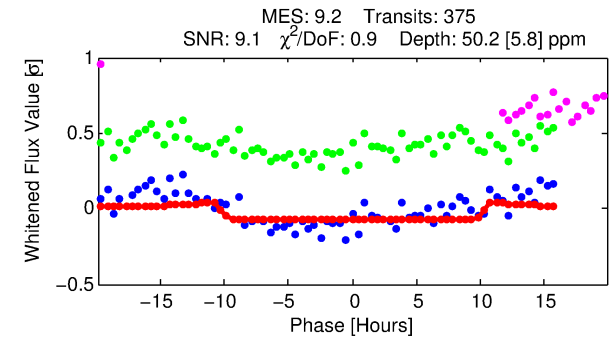
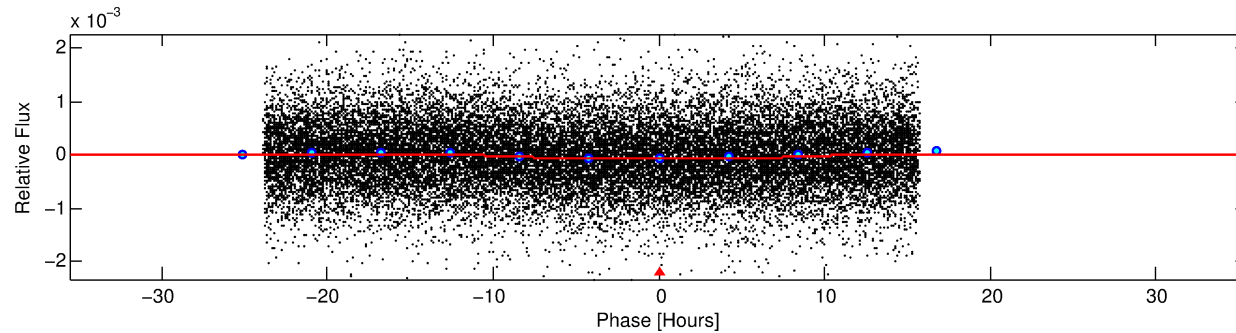
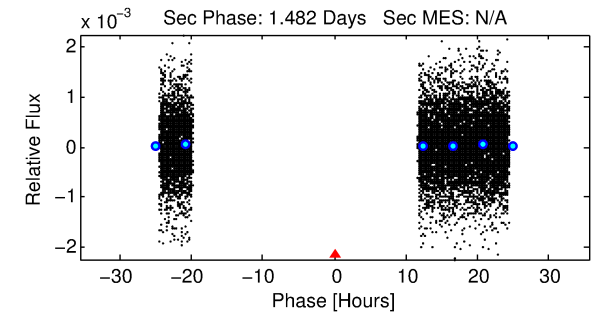
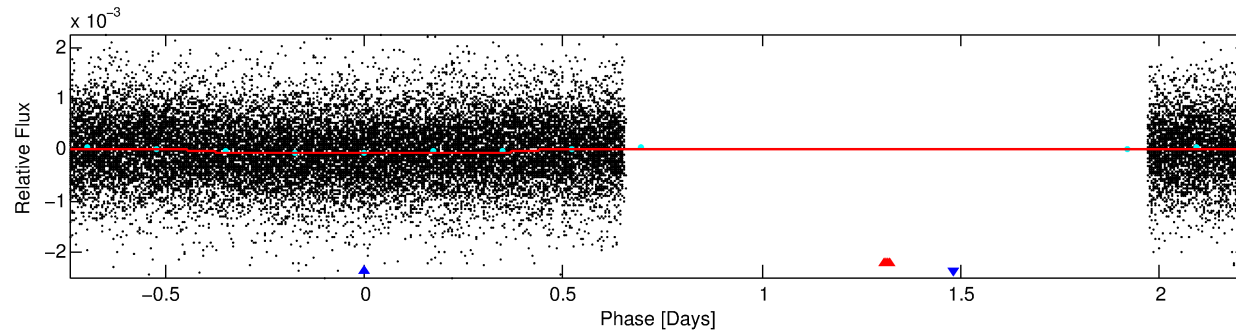
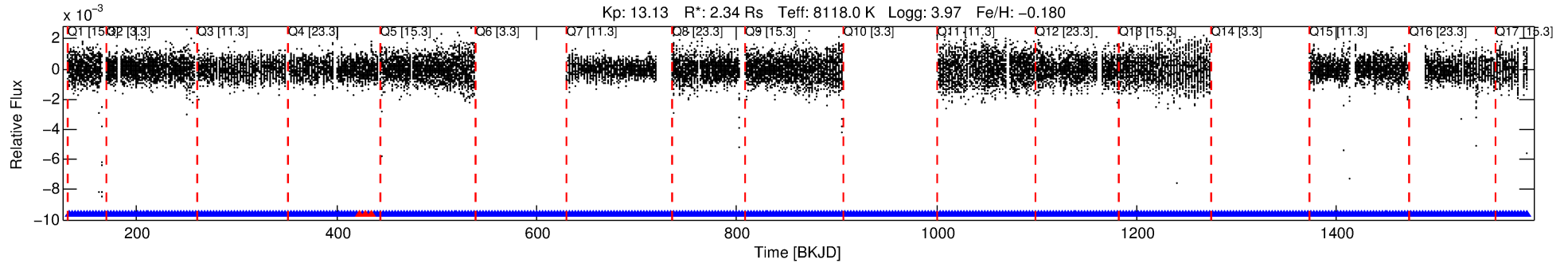
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004174472-02

No Significant Match Found

# DV One-Page Summary

KIC: 4174472 Candidate: 2 of 2 Period: 2.963 d



## DV Fit Results:

Period = 2.96348 [0.00007] d  
Epoch = 132.3275 [0.0150] BKJD  
Rp/R\* = 0.0066 [0.0069]  
a/R\* = 1.26 [2.78]  
b = 0.06 [101.07]  
Seff = 8685.65 [4028.97]  
Teq = 2462 [285] K  
Rp = 1.67 [1.85] Re  
a = 0.0496 [0.0141] AU

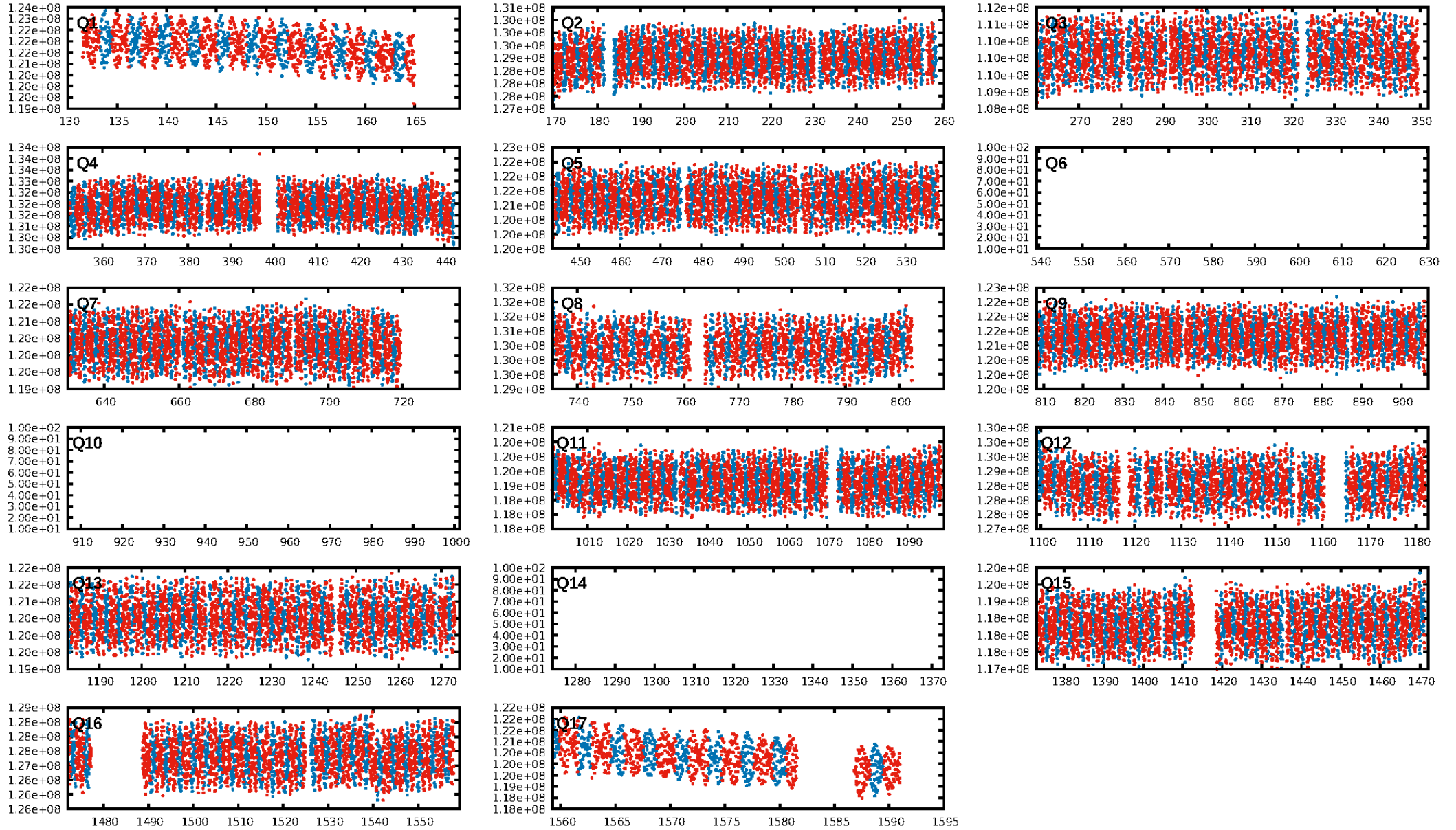
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.99 [350/353]  
GhostDiagnostic-chr: 1.042  
Centroid-sig: 0.0%  
Centroid-so: 1.310 arcsec [2.67σ]  
OotOffset-rm: 1.745 arcsec [2.98σ]  
KicOffset-rm: 1.501 arcsec [2.68σ]  
OotOffset-st: 0/4/3/4 [11]  
KicOffset-st: 0/4/3/4 [11]  
DiffImageQuality-fgm: 0.73 [8/11]  
DiffImageOverlap-fno: 0.00 [0/14]

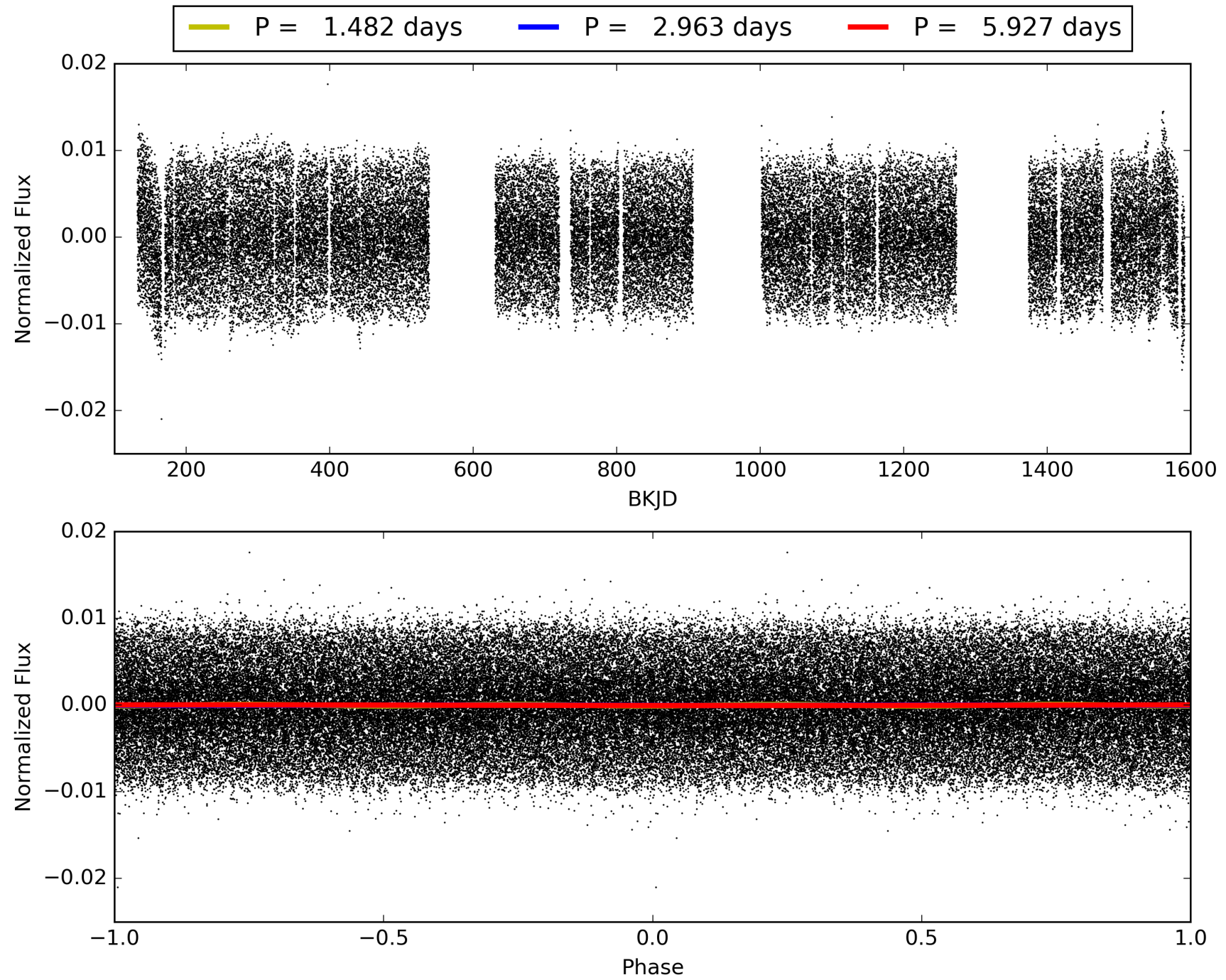
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:41:35 Z

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

# TCE 004174472-02, PDC Light Curves



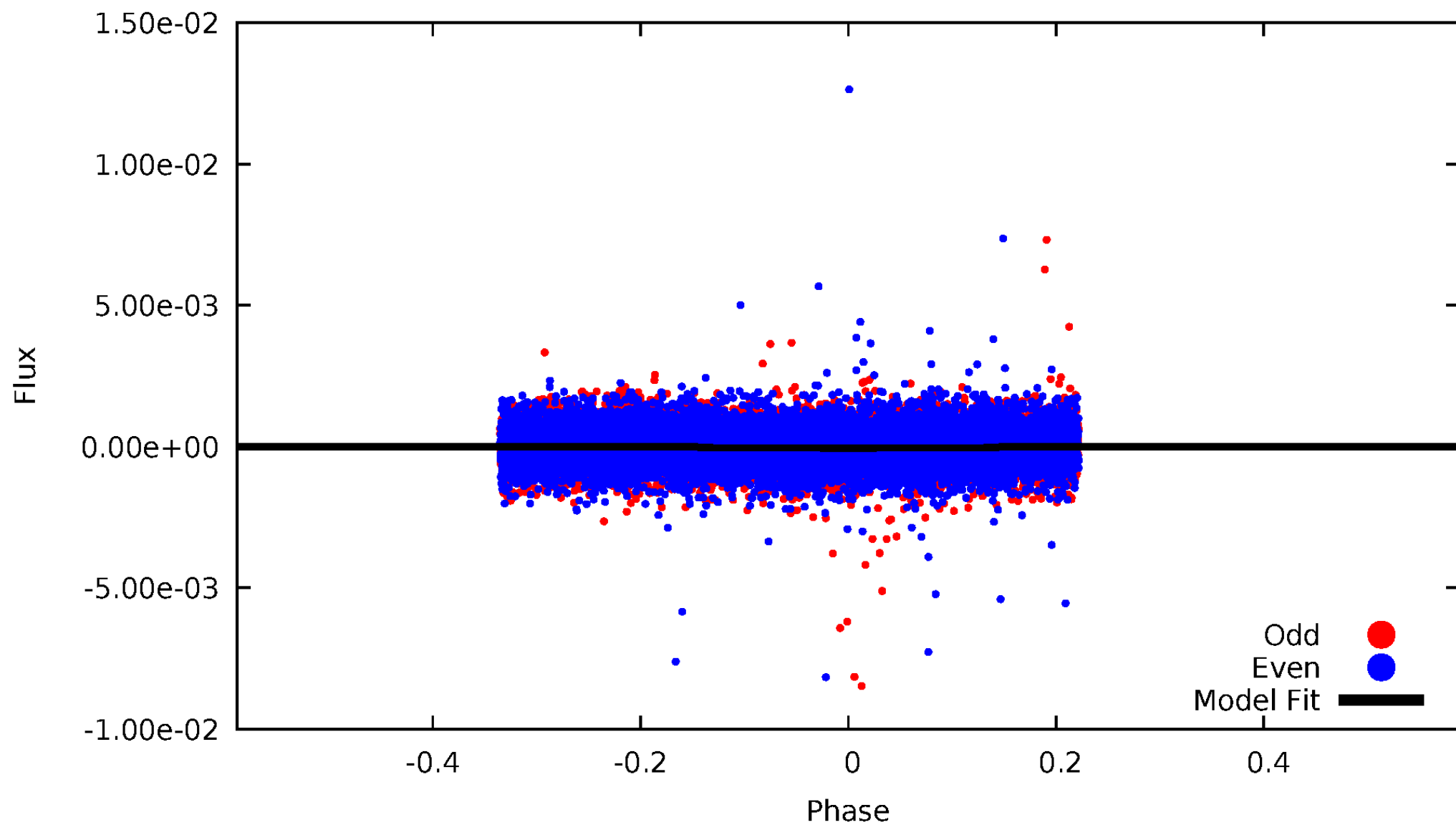
TCE 004174472-02





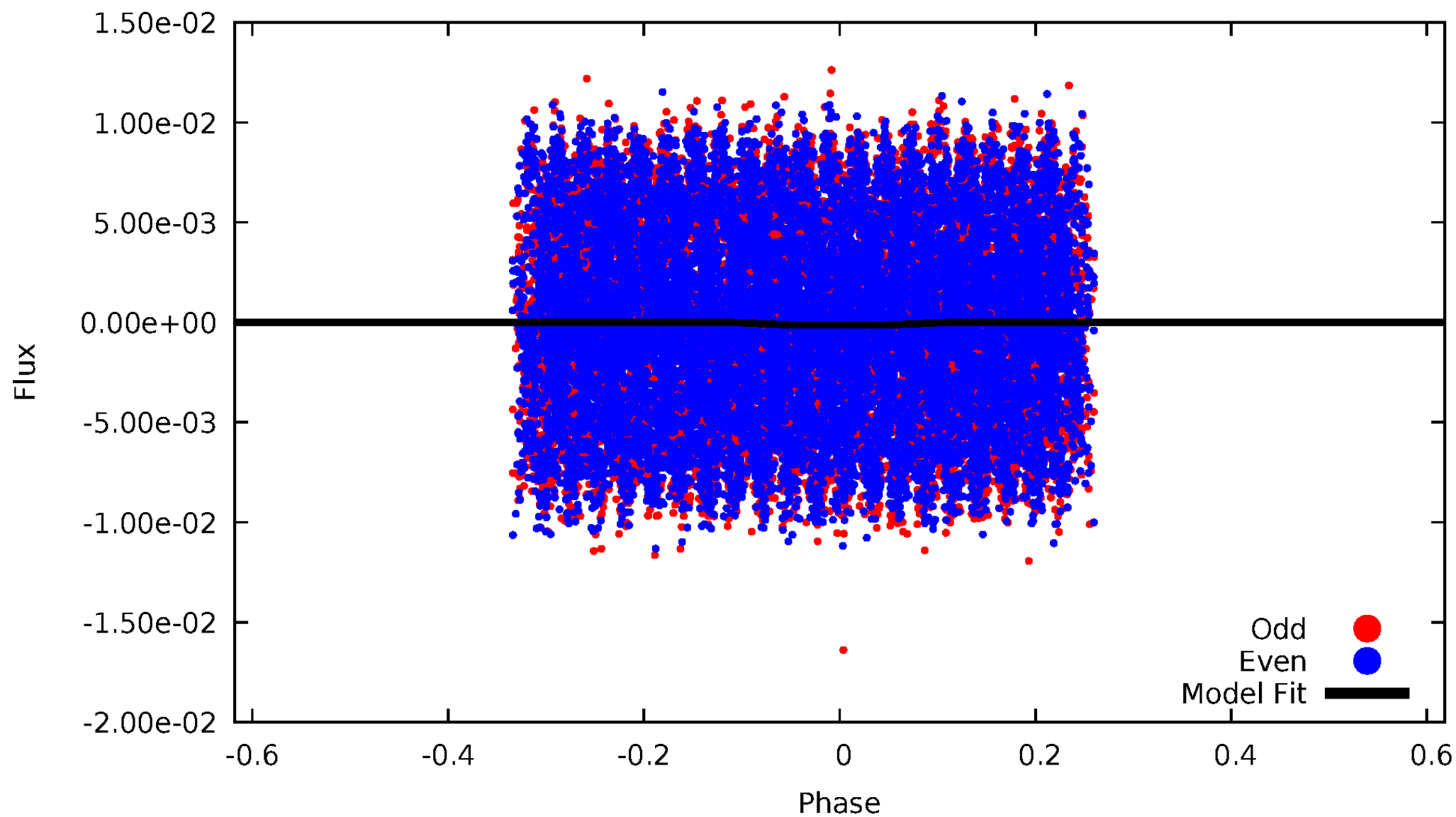
DV Odd/Even

TCE 004174472-02



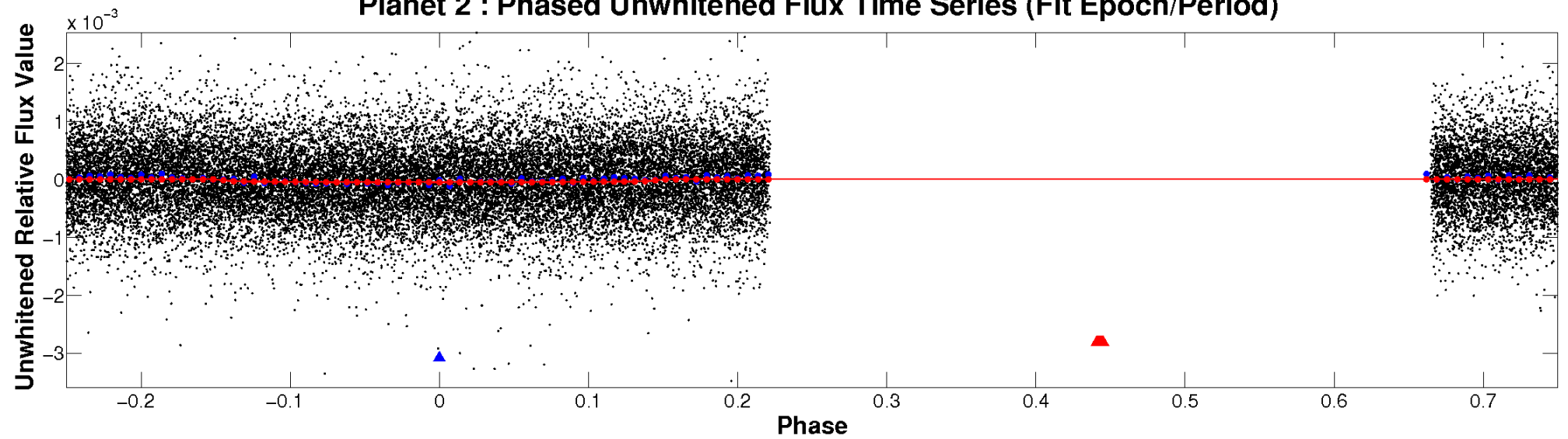
ALT Odd/Even

TCE 004174472-02

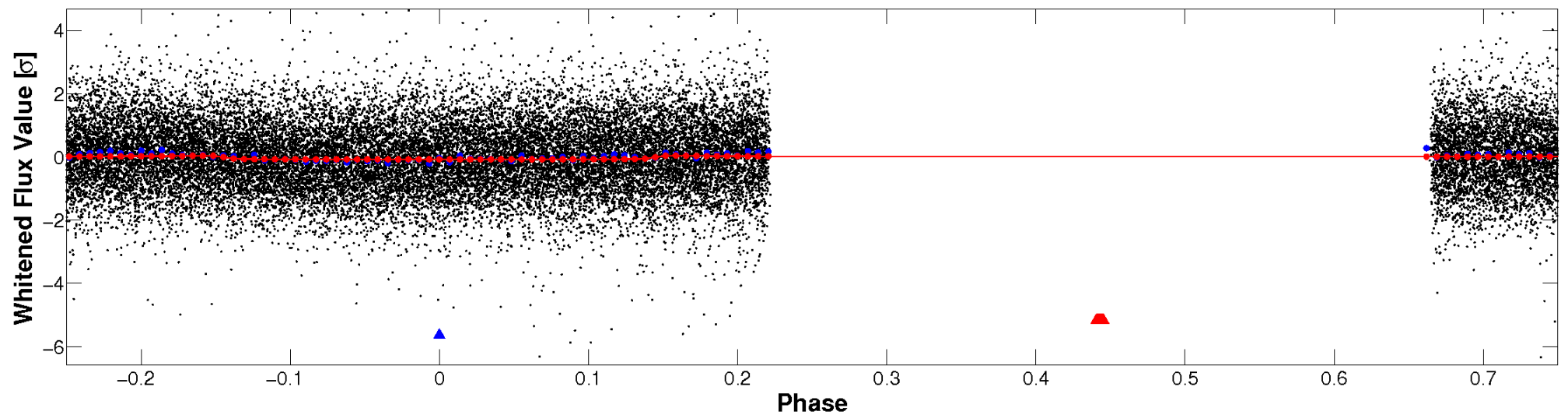


# Non-Whitened Vs. Whitened Light Curve

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

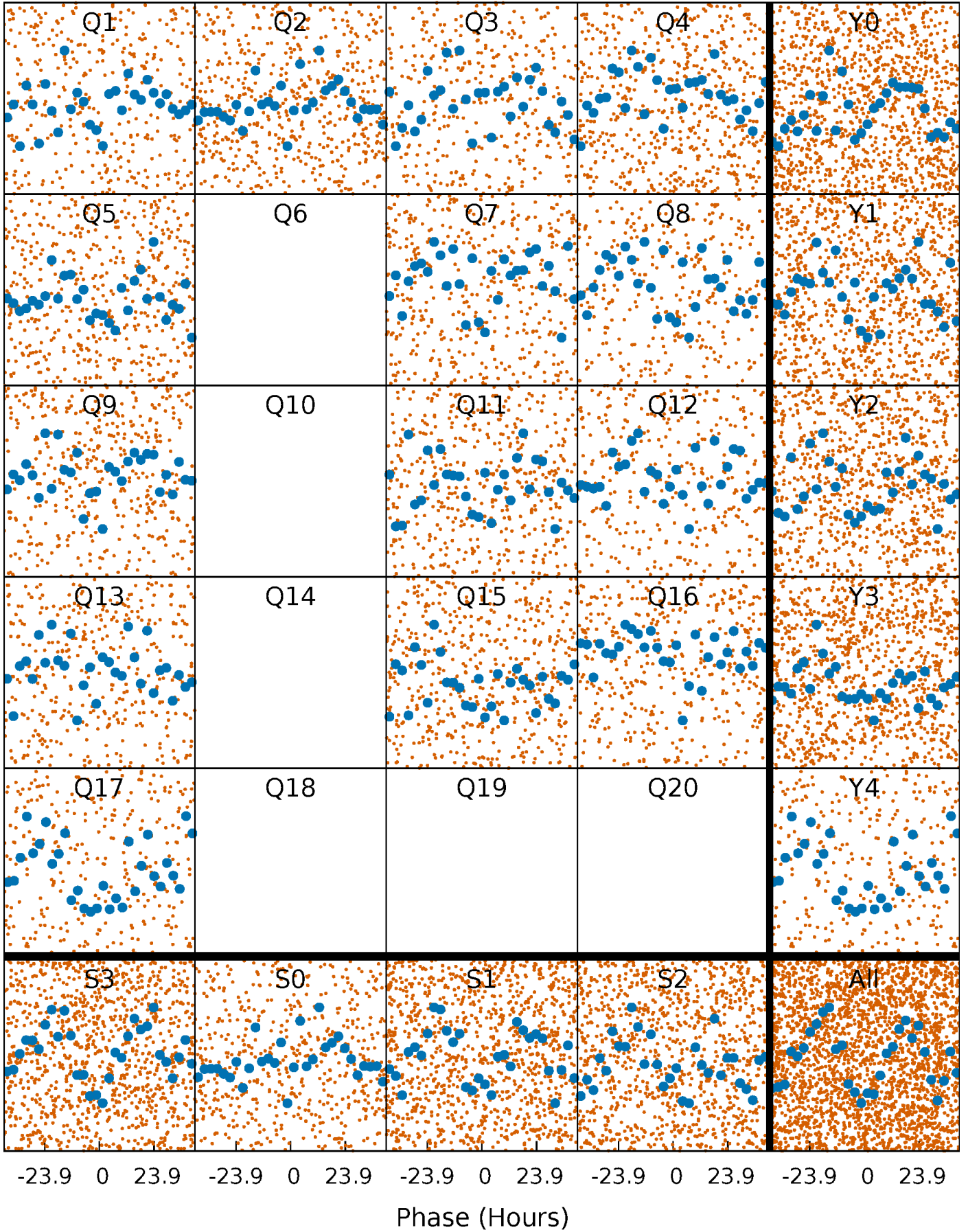


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



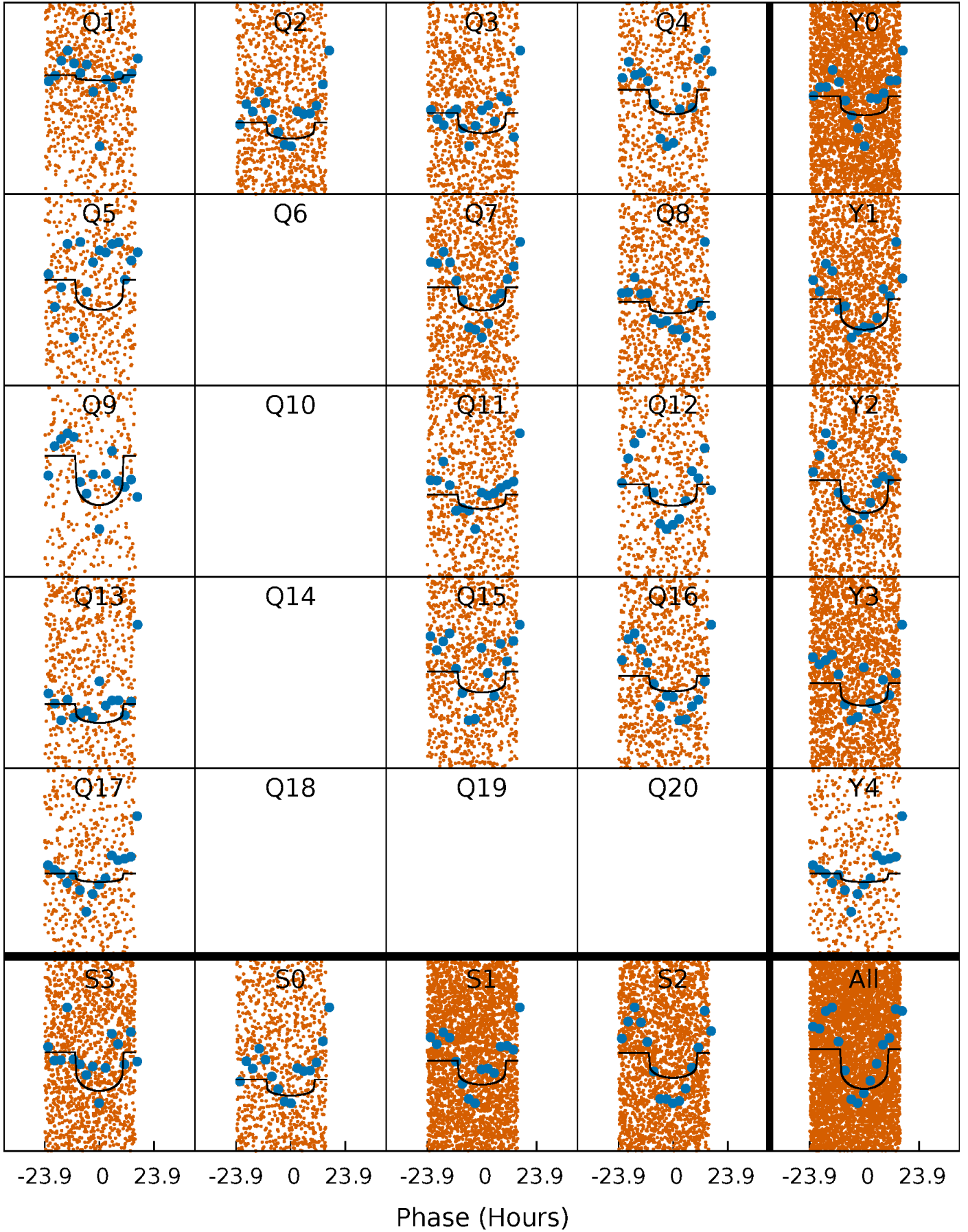
# PDC Quarter-Phased Transit Curves

TCE 004174472-02   P= 2.963483 Days    $T_0=132.327465$  (BKJD)



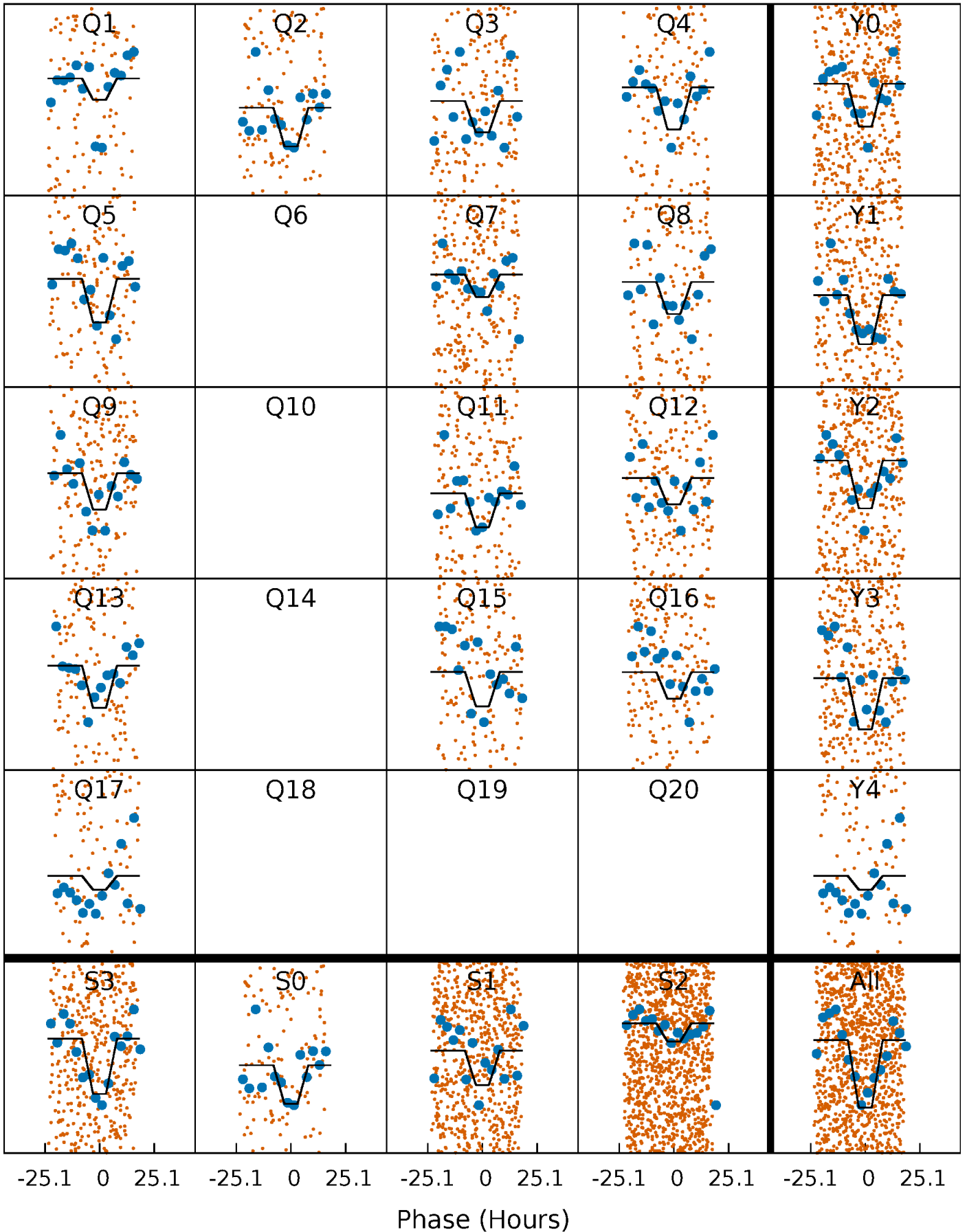
# DV Quarter-Phased Transit Curves

TCE 004174472-02   P= 2.963483 Days    $T_0=132.327465$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 004174472-02   P= 2.963203 Days    $T_0=132.336819$  (BKJD)

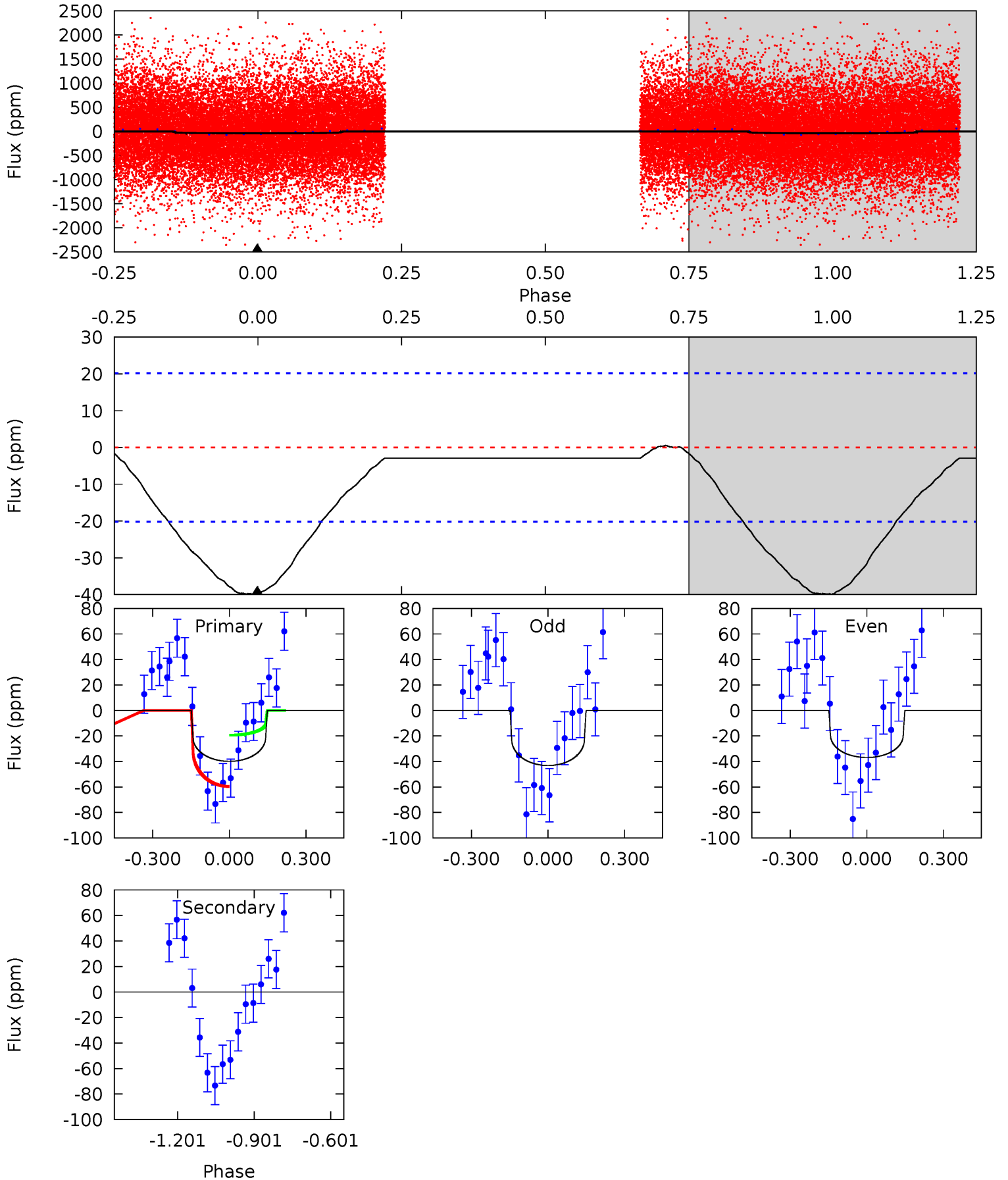




# DV Model-Shift Uniqueness Test

004174472-02, P = 2.963483 Days, E = 129.363982 Days

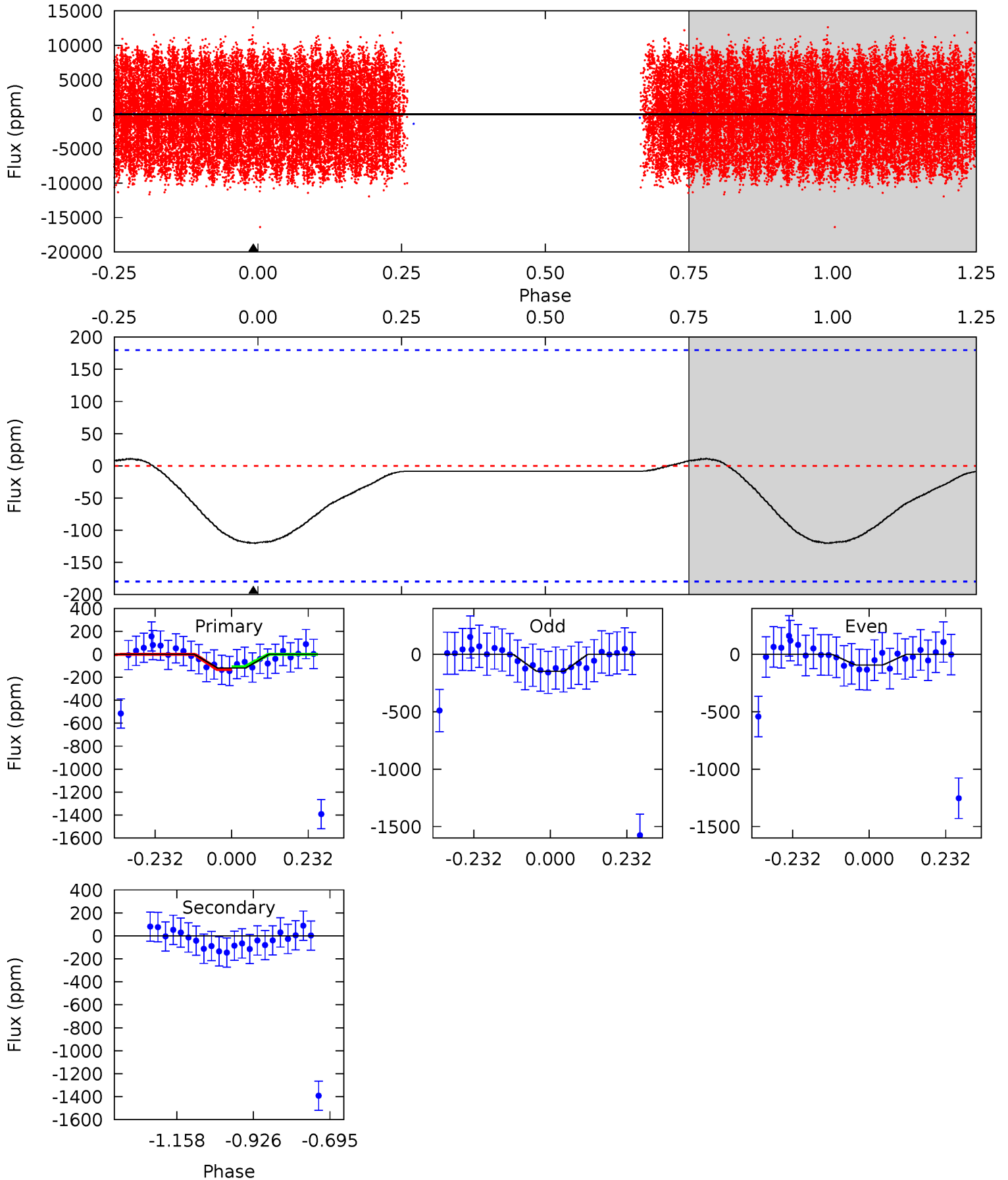
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.56	0	0	0	4.33	1.04	0.22	8.56	8.56	0	0	0.67	1.21	0.01	4.21



# Alt Model-Shift Uniqueness Test

004174472-02, P = 2.963203 Days, E = 129.373616 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
2.93	0	0	0	4.39	1.20	0.17	2.93	2.93	0	0	0.67	0.99	0.08	0.31



### Stellar Parameters For KIC 004174472

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$8118^{+226}_{-340}$	$3.966^{+0.245}_{-0.123}$	$-0.180^{+0.200}_{-0.350}$	$2.343^{+0.405}_{-0.751}$	$1.852^{+0.112}_{-0.359}$	$0.203^{+0.294}_{-0.079}$
	+3%/-4%	+6%/-3%	+111%/-194%	+17%/-32%	+6%/-19%	+145%/-39%
Source	KIC0	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 004174472-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$0 \pm 5$	$1.95^{+1.45}_{-1.16}$	$3396^{+215}_{-297}$	$-3229^{+7650}_{-1433}$	$0.020^{+2.184}_{-2.029}$
Alt.	$0 \pm 41$	$3.00^{+1.87}_{-1.60}$	$3395^{+227}_{-256}$	$-3015^{+9045}_{-3147}$	$0.148^{+8.318}_{-8.051}$

$T_{\text{max}}$  = 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

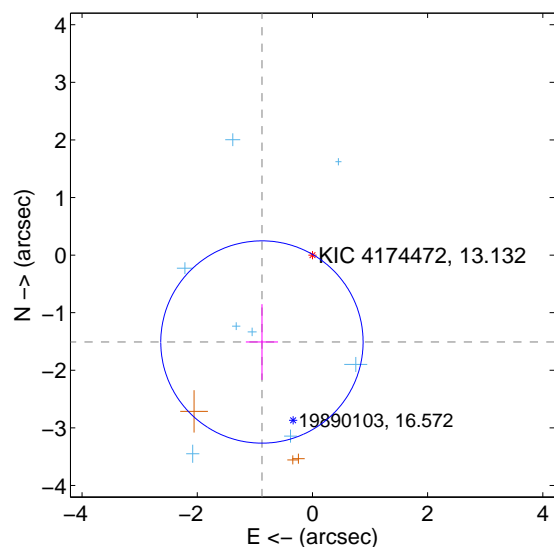
Supplemental centroid analysis for 004174472-02. Kepler magnitude: 13.13. Transit SNR 9.10

There are 8 quarters with good PRF difference image offsets

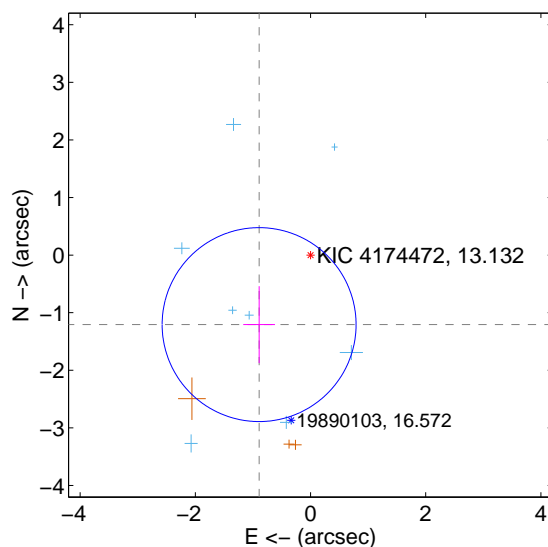
The direct PRF centroid is offset from the target star catalog position by about 0.35 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.745 \pm 0.586$	2.98	$0.877 \pm 0.280$	$-1.509 \pm 0.657$
PRF-fit source offset from KIC position	$1.501 \pm 0.561$	2.68	$0.893 \pm 0.276$	$-1.207 \pm 0.668$
photometric centroid source offset	$1.31 \pm 0.49$	2.67	$1.01 \pm 0.47$	$-0.84 \pm 0.52$

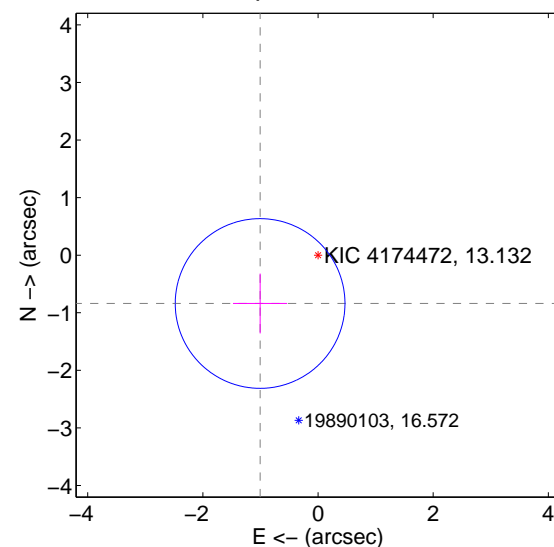
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

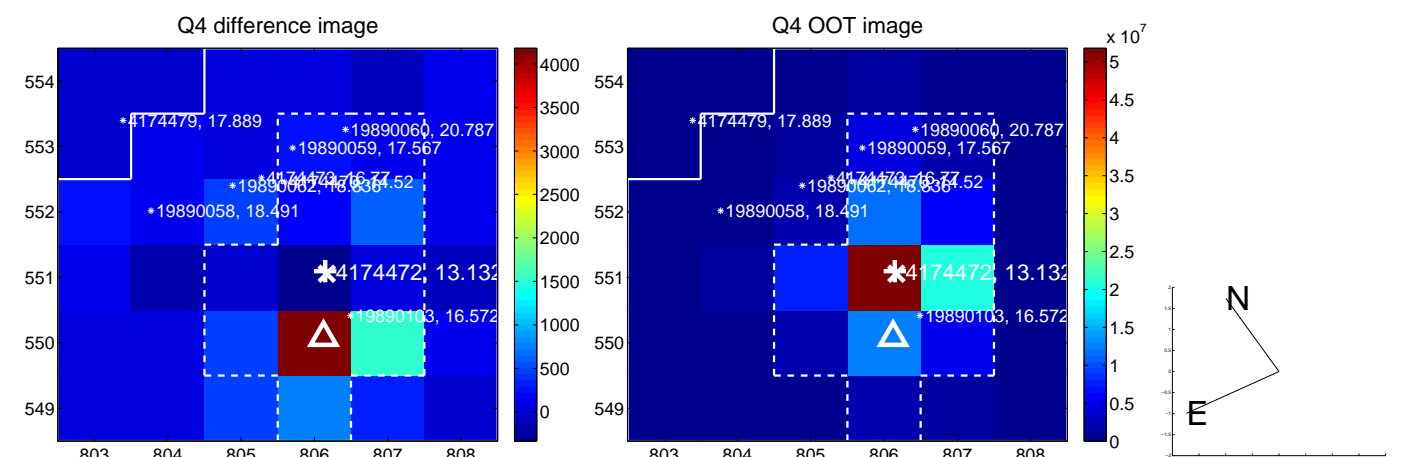
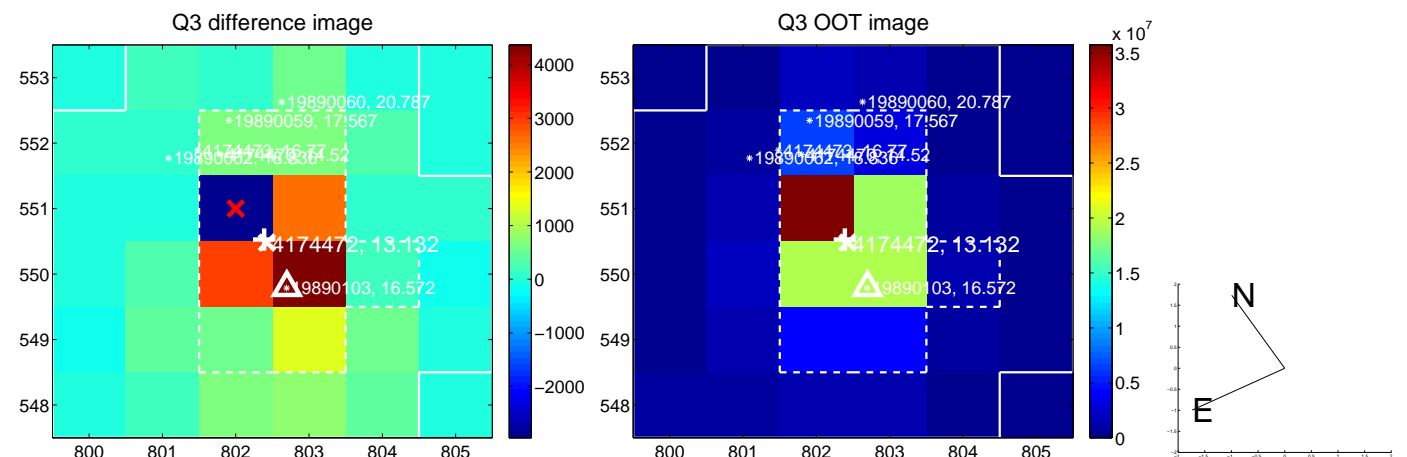
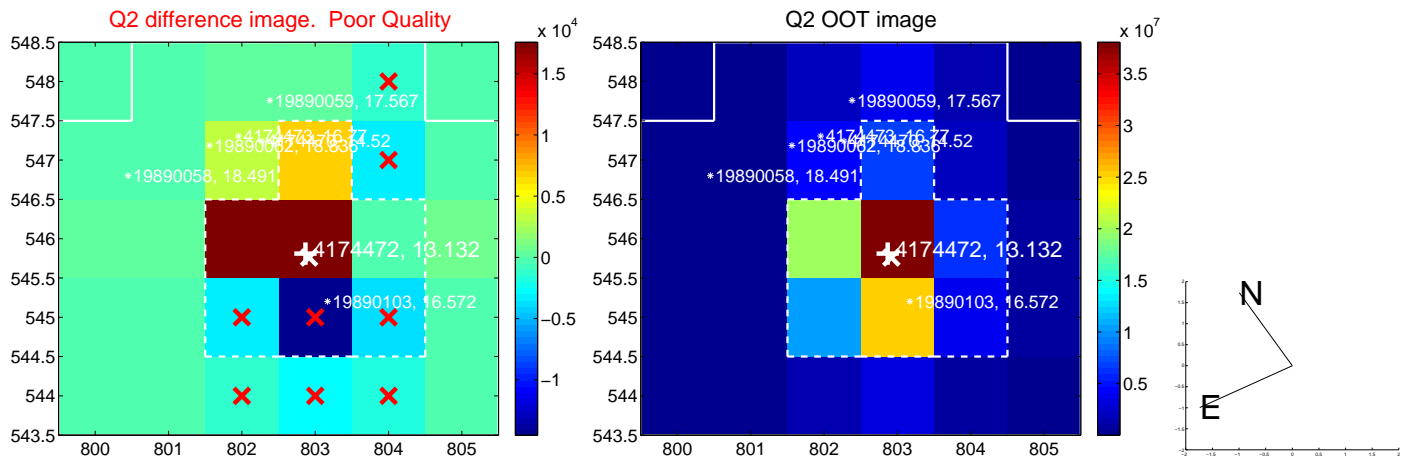
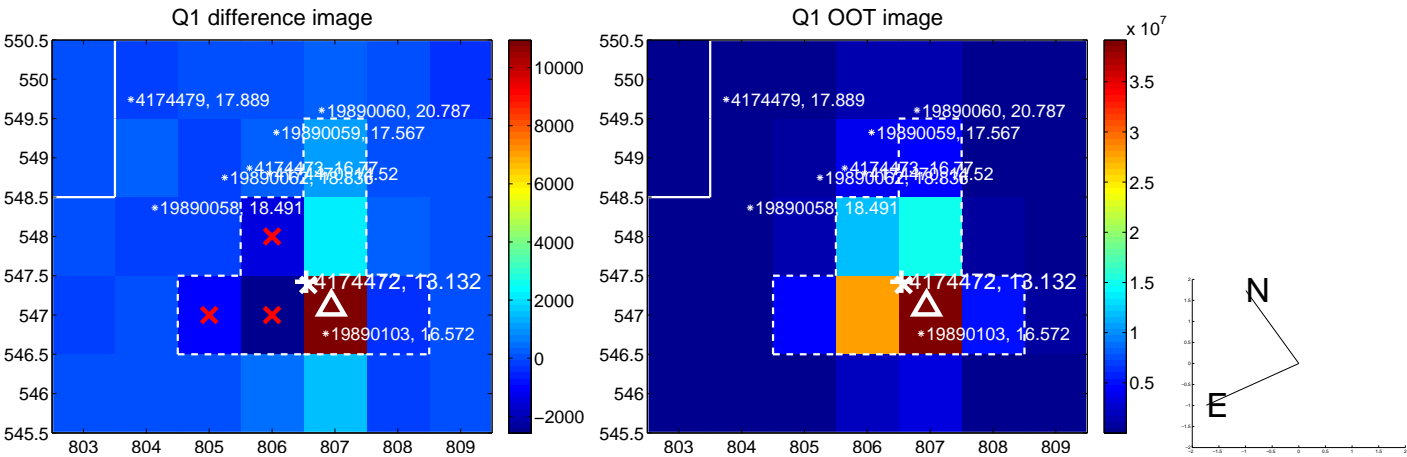


offset from photometric centroids

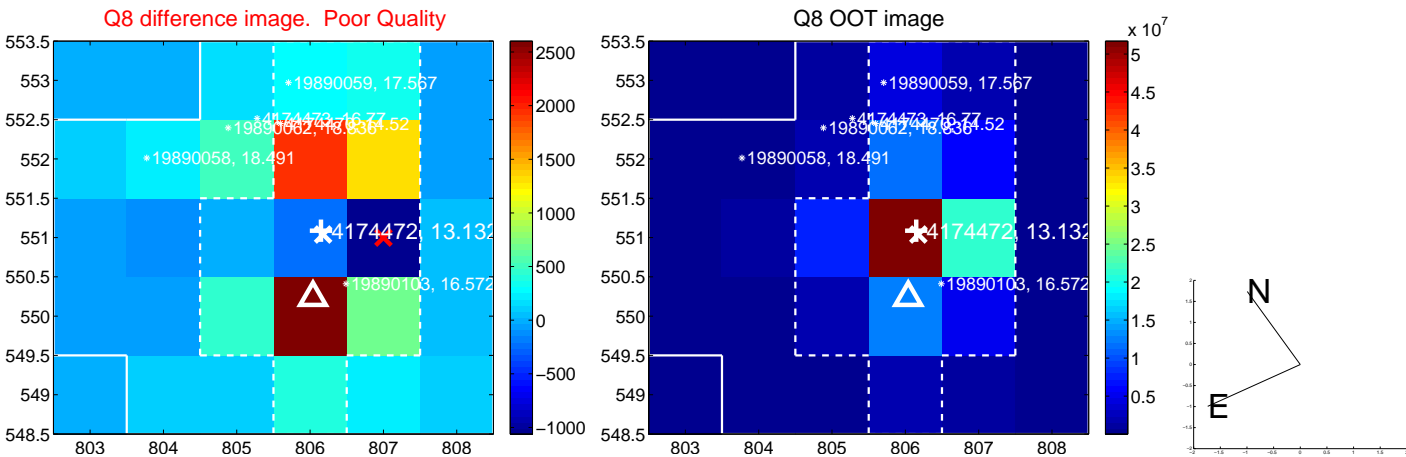
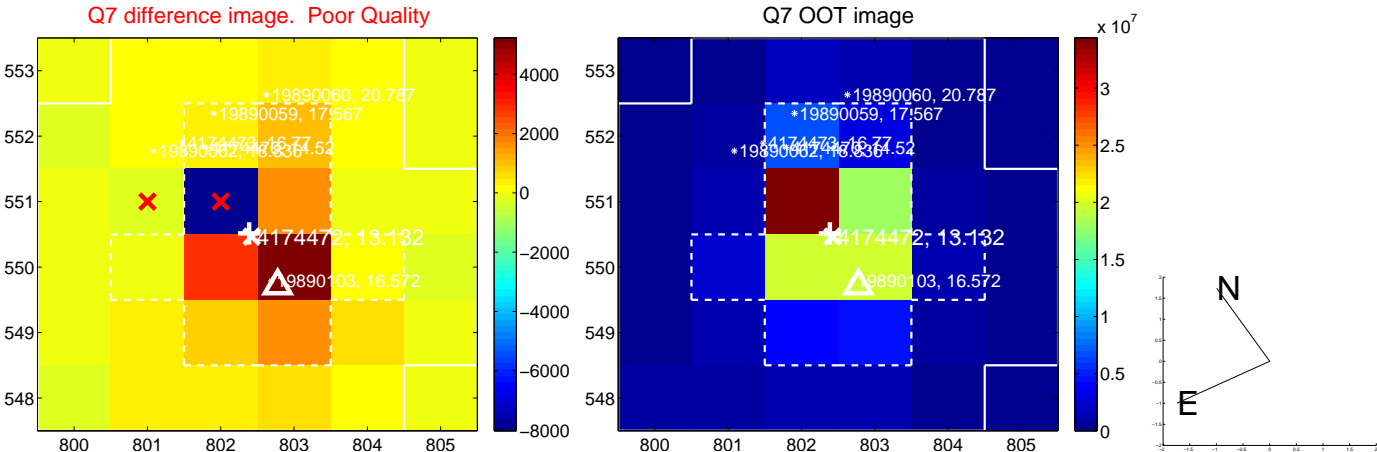
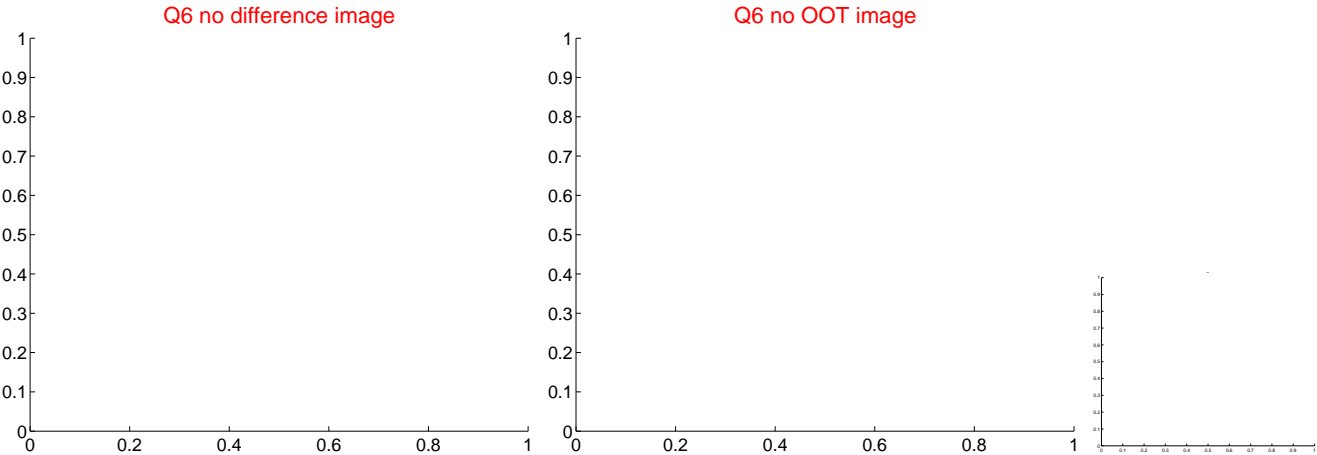
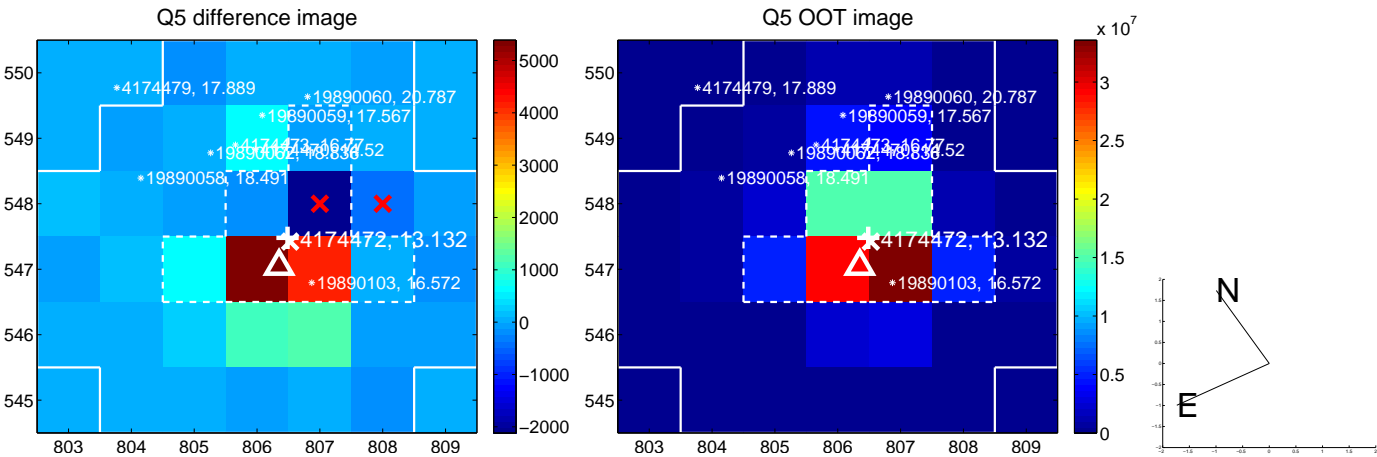


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

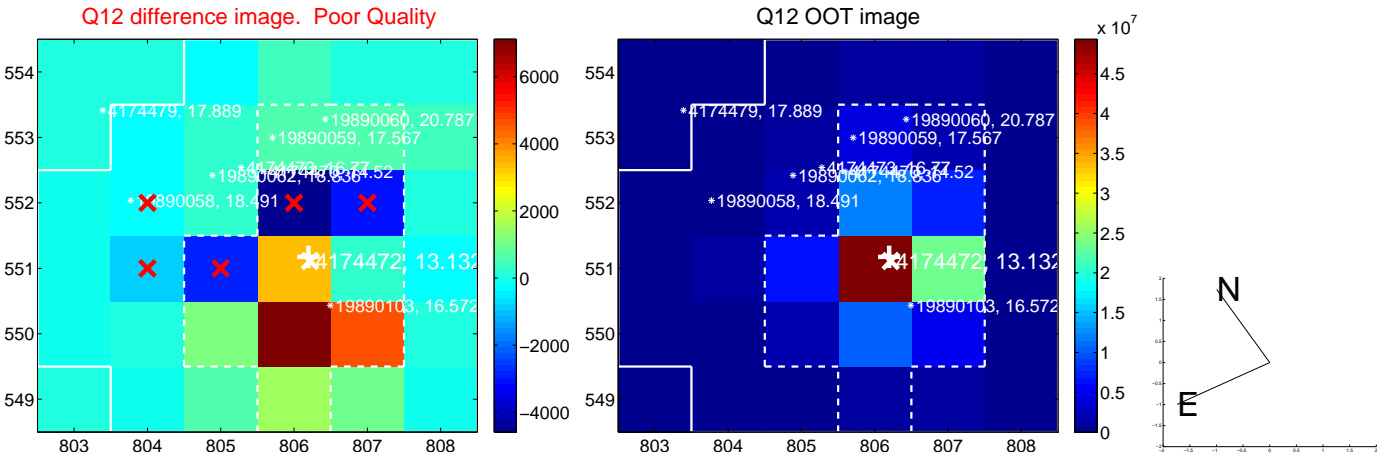
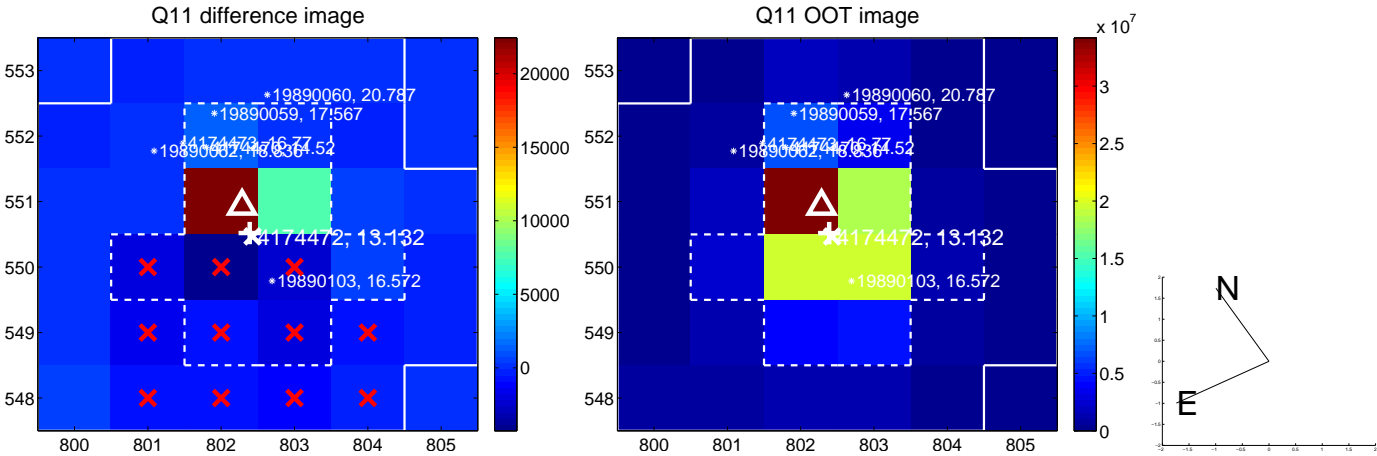
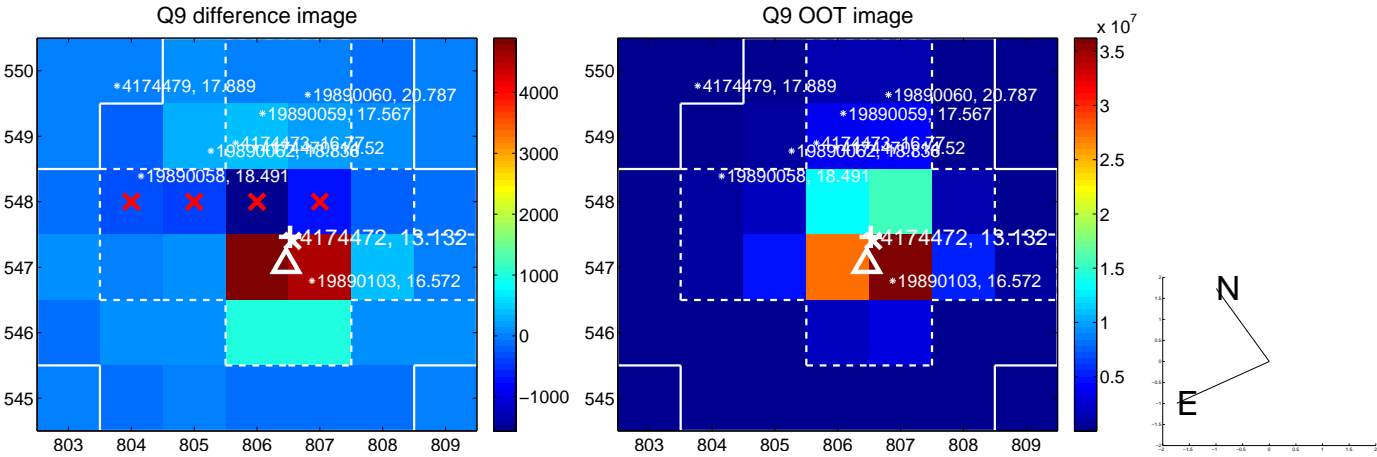


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

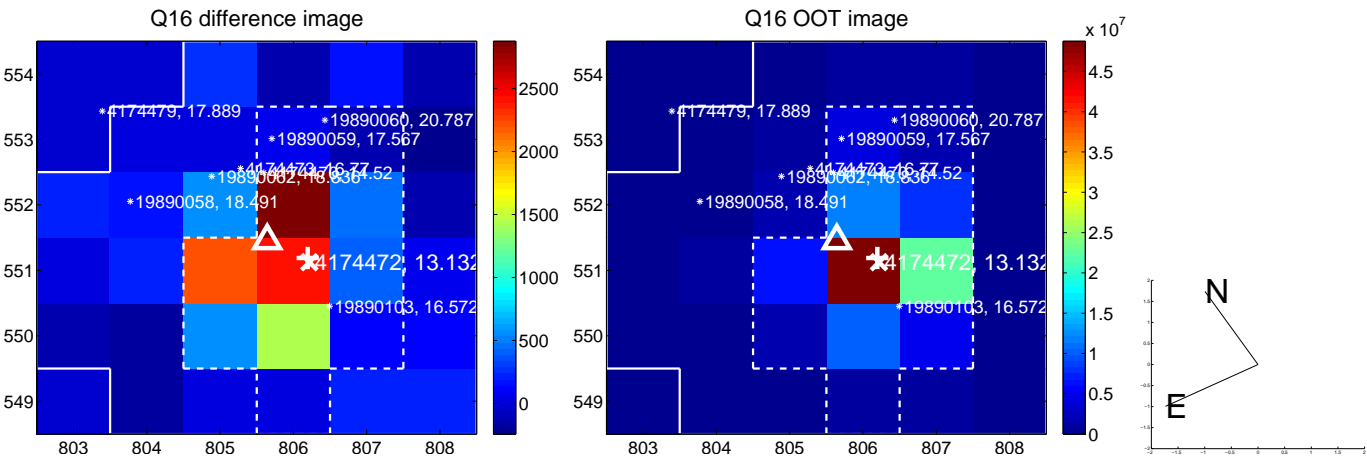
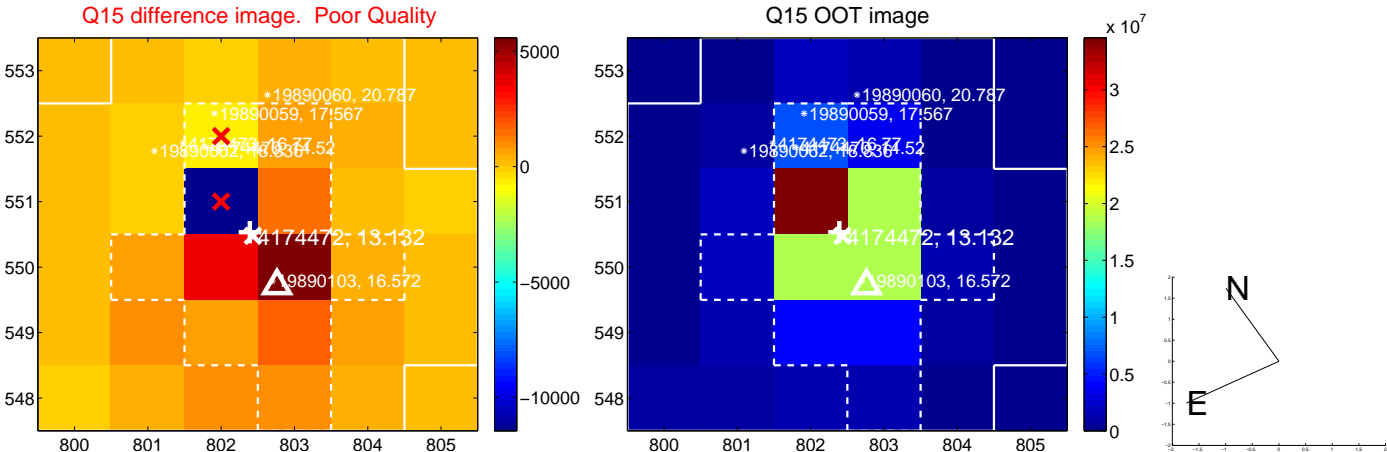
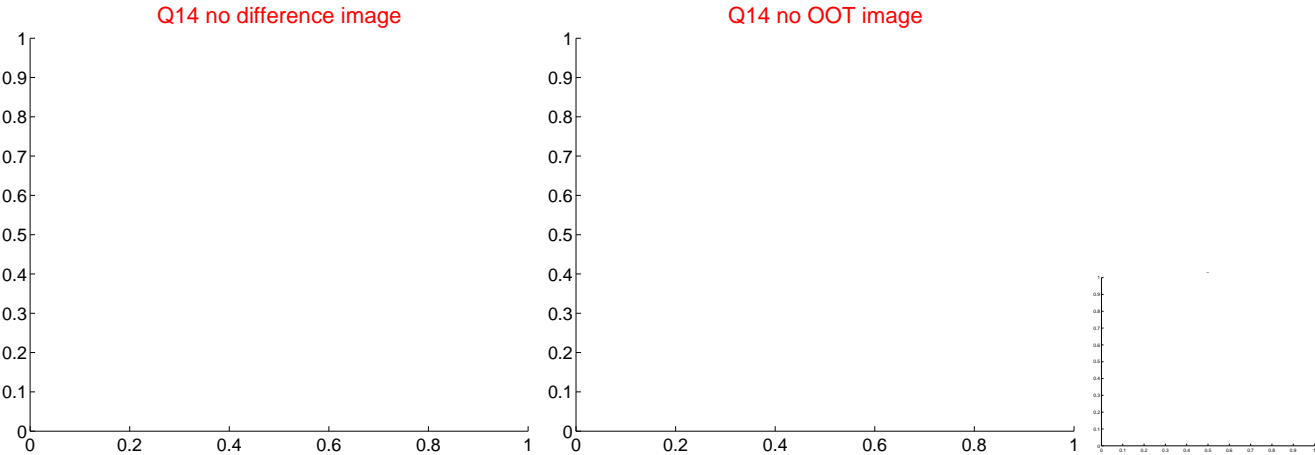
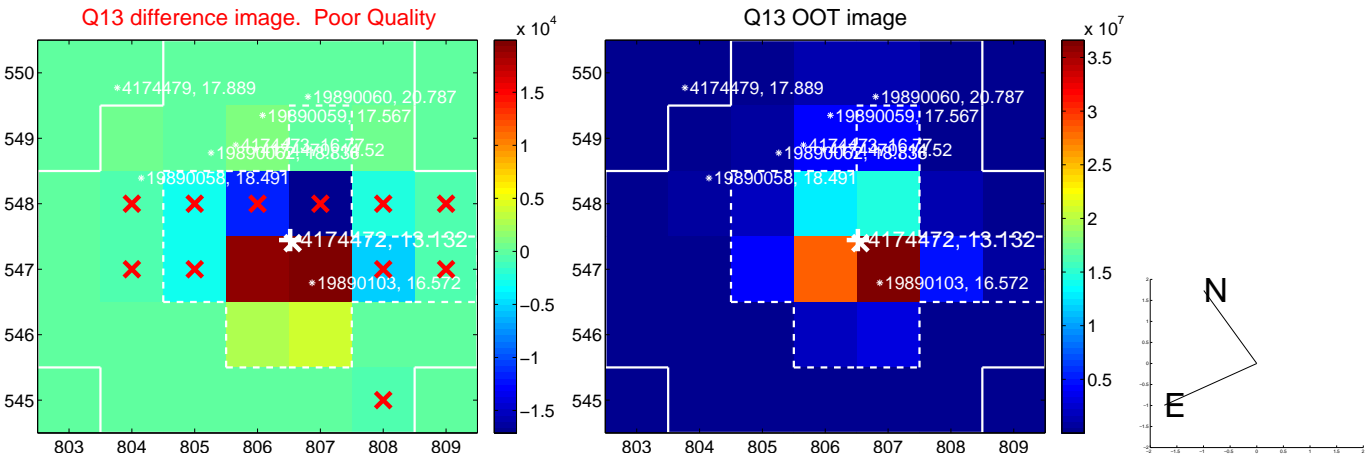




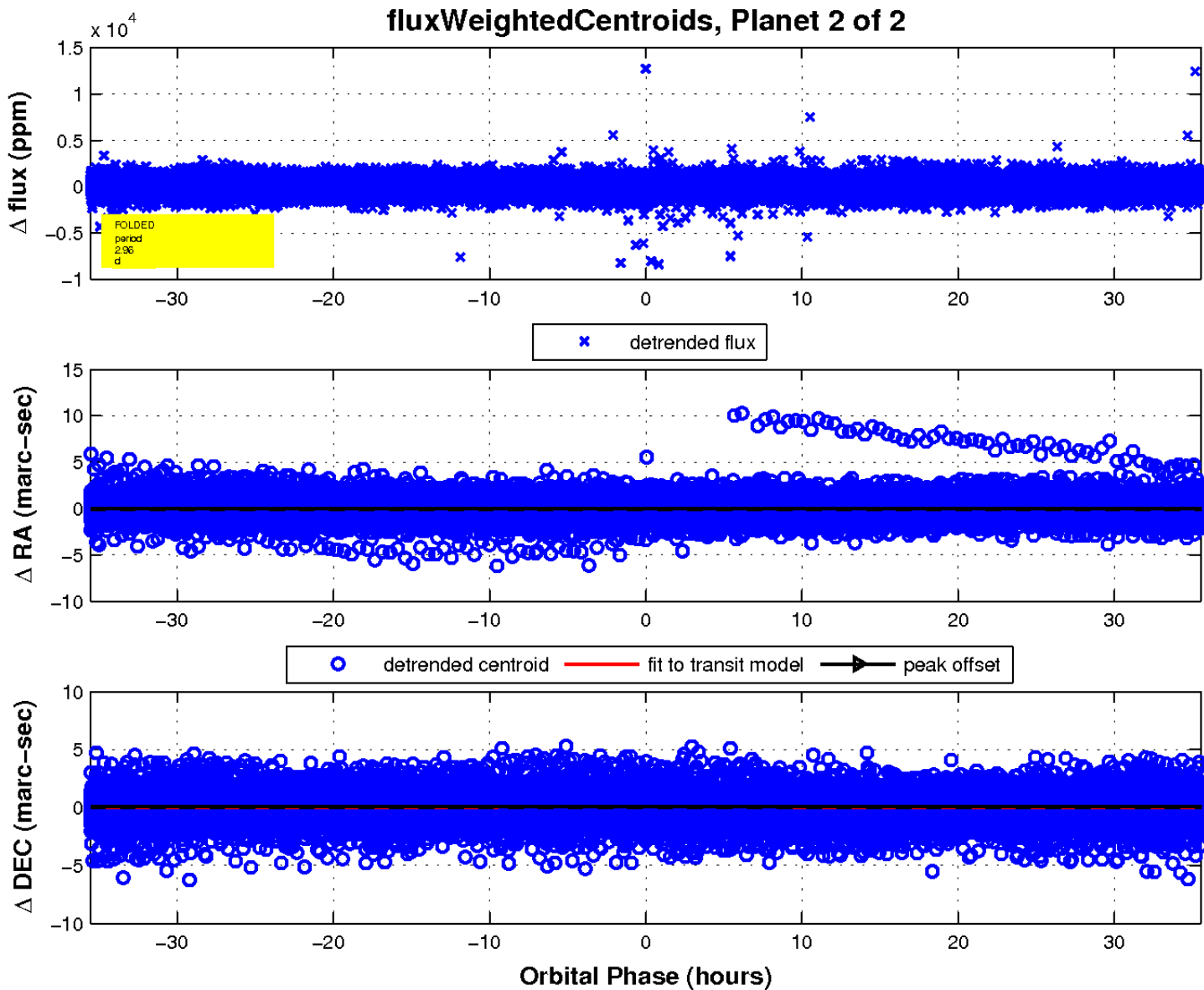
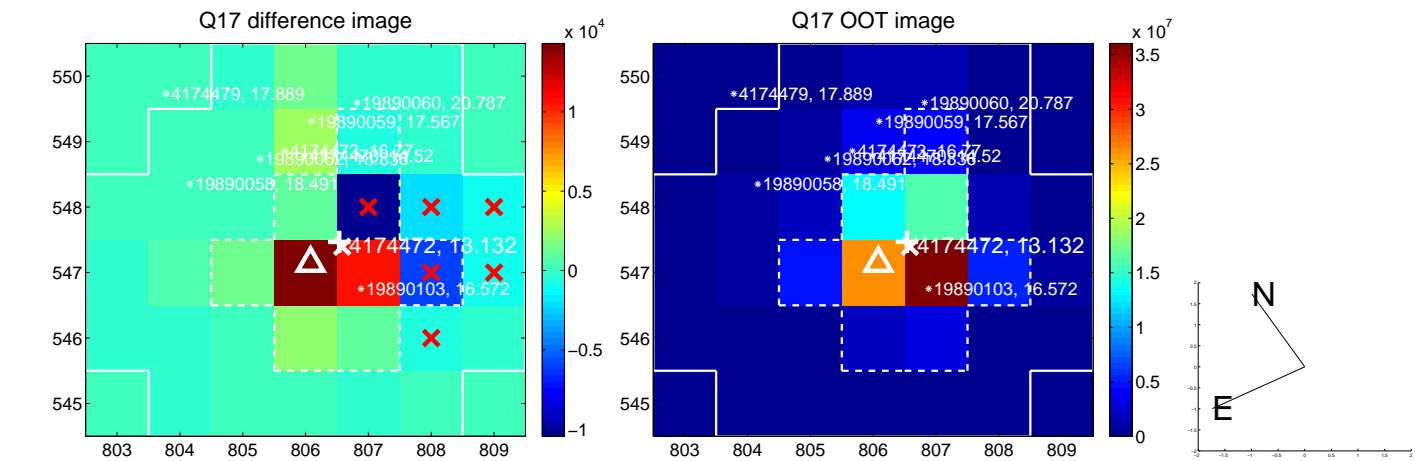
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

