

# KIC 009674608

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009674608-01	OBS	1795.01	2.972060	133.247879	5792.5	1.152	112.4	134.0	0.71	4491	6.93	142.59
009674608-02	OBS	No	2.972048	131.764201	1087.9	1.225	21.2	26.6	0.71	4491	4.16	142.59

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009674608-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE
009674608-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

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

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

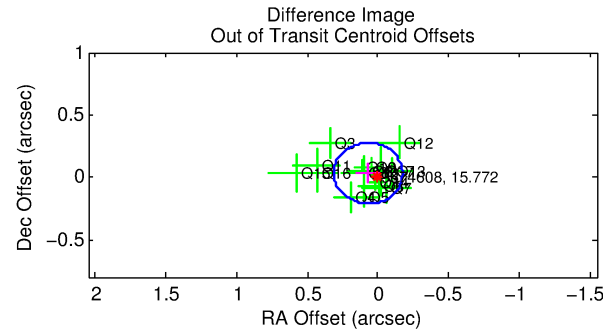
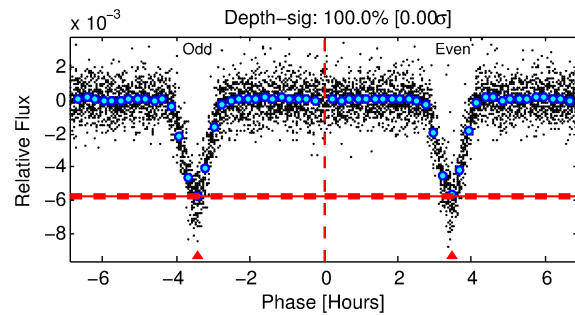
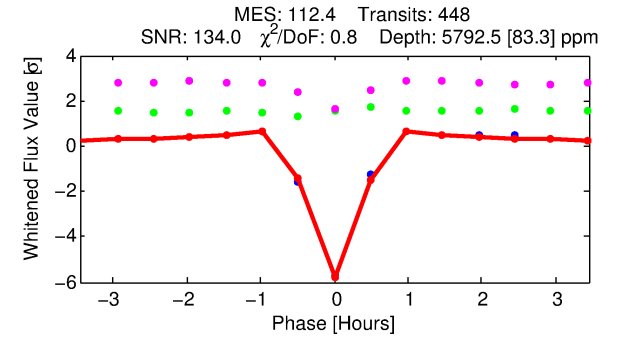
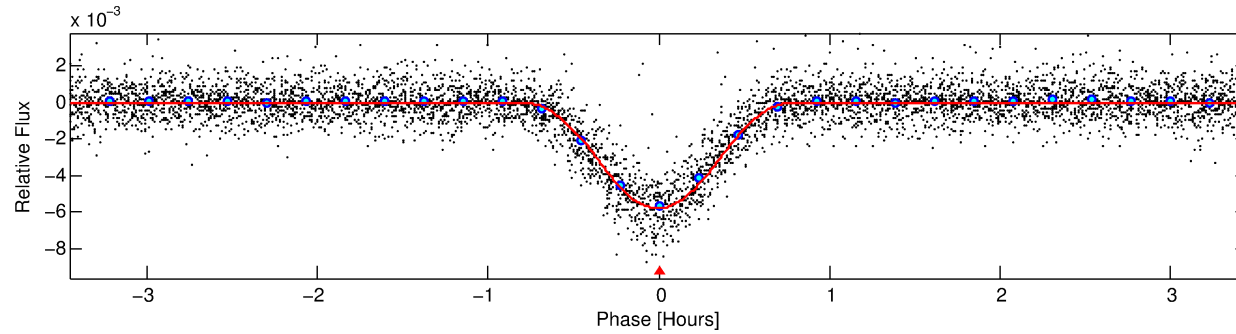
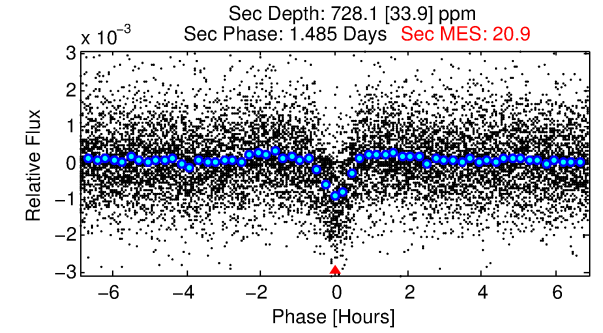
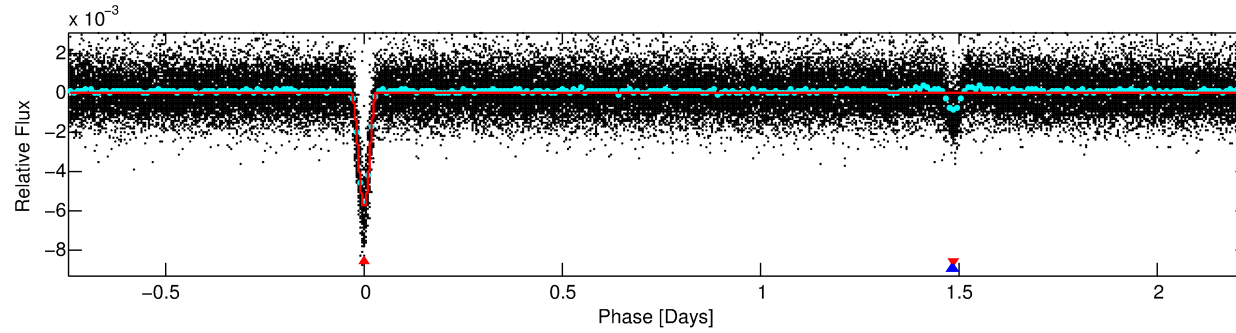
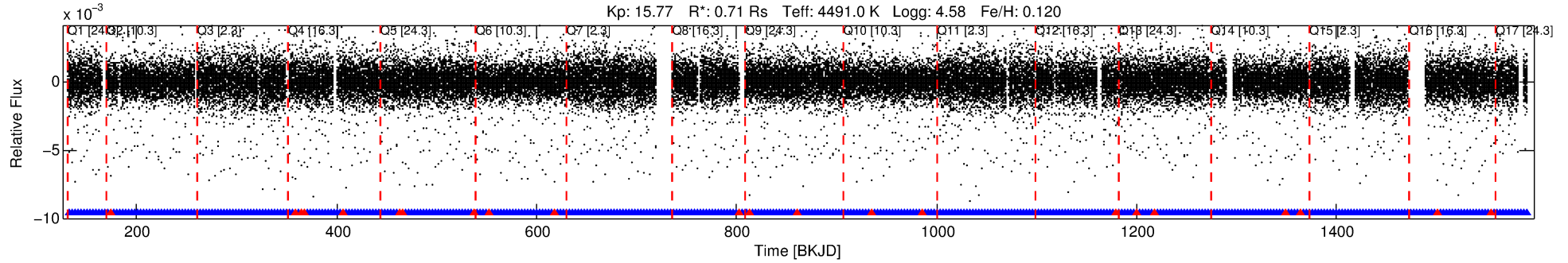
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009674608-01

No Significant Match Found

# DV One-Page Summary

KIC: 9674608 Candidate: 1 of 2 Period: 2.972 d  
KOI: K01795.01 Corr: 0.959



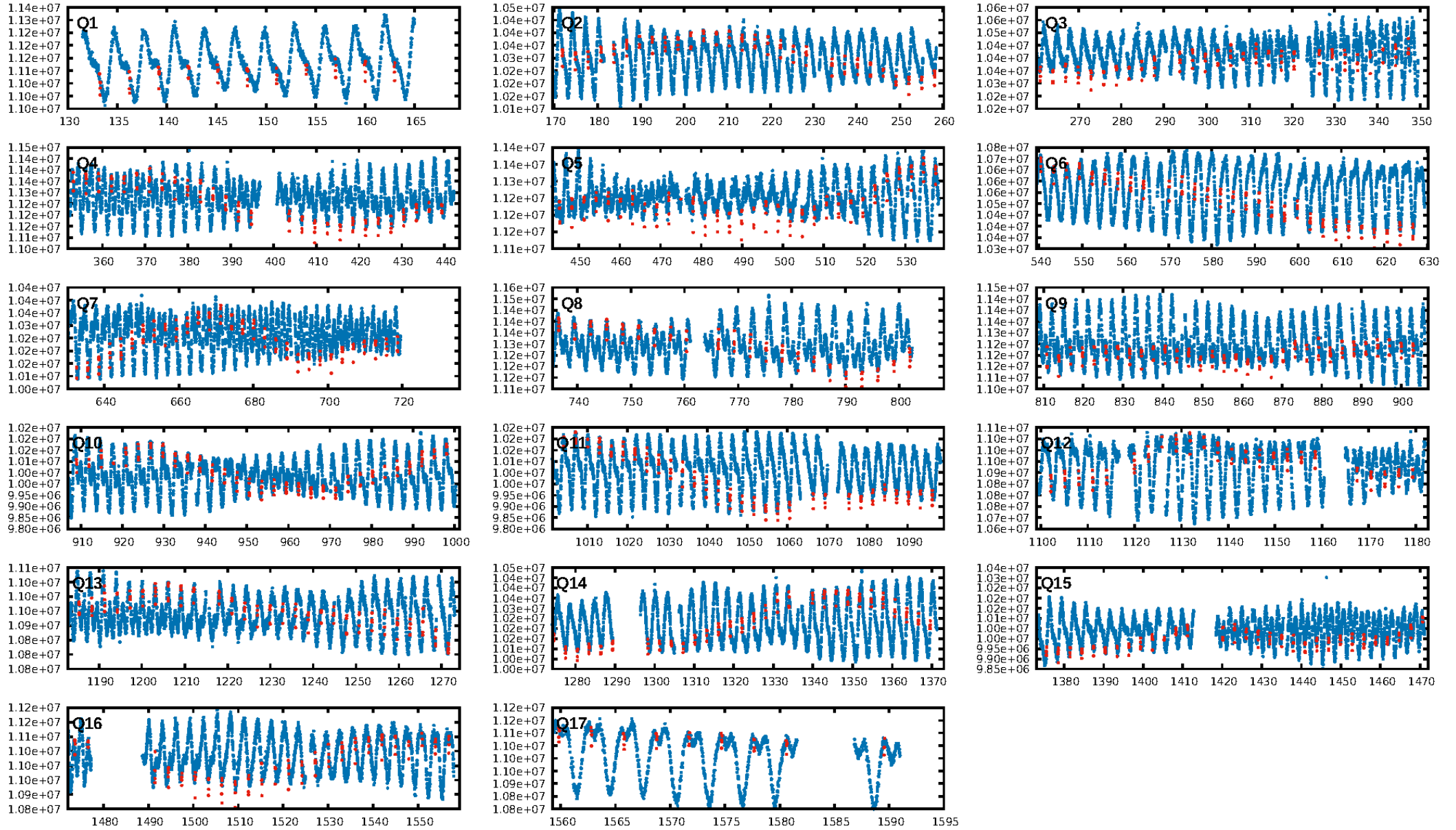
## DV Fit Results:

Period = 2.97206 [0.00000] d  
Epoch = 133.2479 [0.0001] BKJD  
Rp/R\* = 0.0893 [0.0040]  
a/R\* = 12.14 [0.85]  
b = 0.90 [0.02]  
Seff = 142.59 [24.29]  
Teq = 881 [38] K  
Rp = 6.93 [0.68] Re  
a = 0.0359 [0.0027] AU  
Ag = 10.77 [1.60] [6.12σ]  
Teffp = 2468 [102] K [14.63σ]

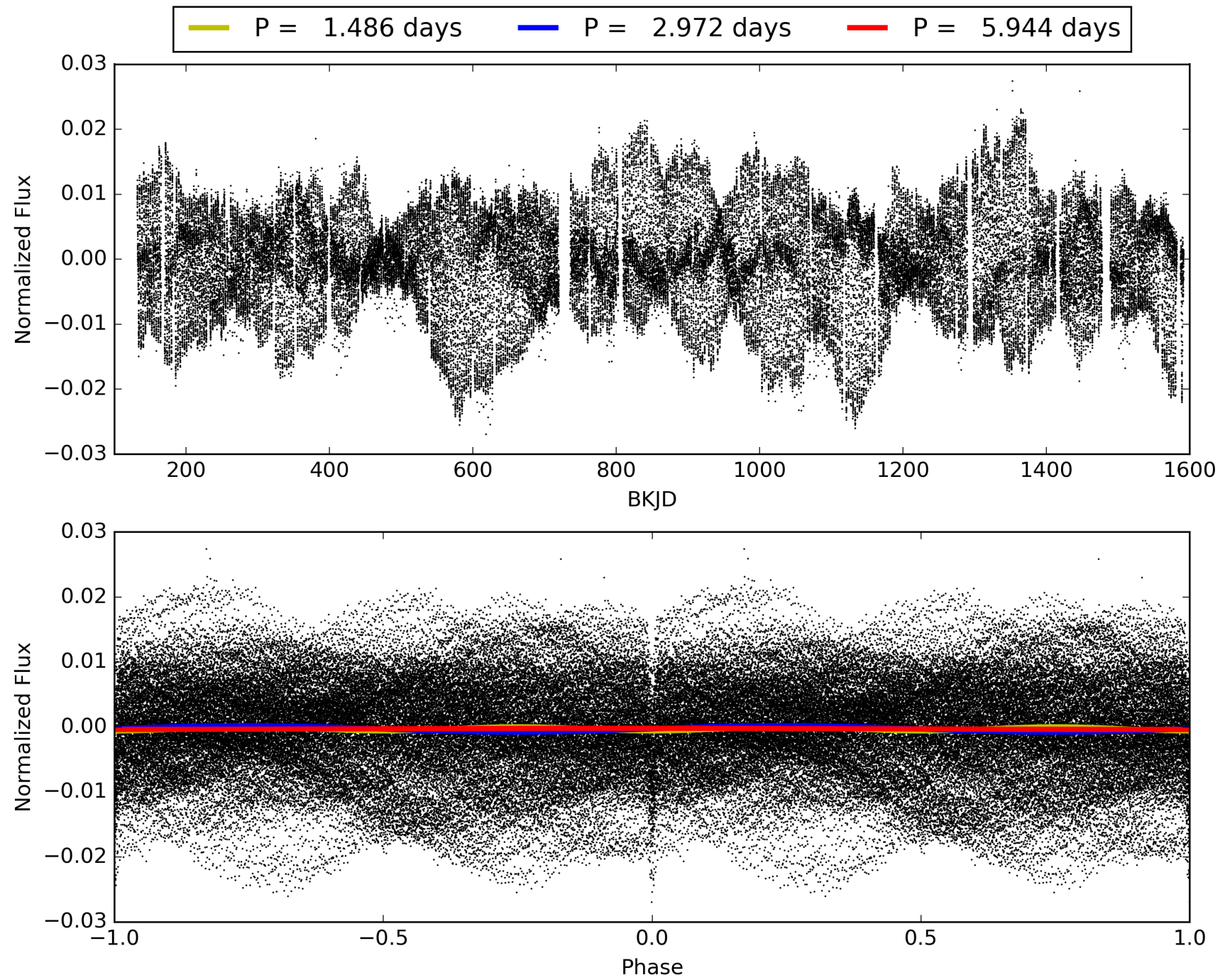
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.95 [406/428]  
GhostDiagnostic-chr: 3.1  
Centroid-sig: 0.0%  
Centroid-so: 1.309 arcsec [14.60σ]  
OotOffset-rm: 0.076 arcsec [0.94σ]  
KicOffset-rm: 0.229 arcsec [2.91σ]  
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 009674608-01, PDC Light Curves



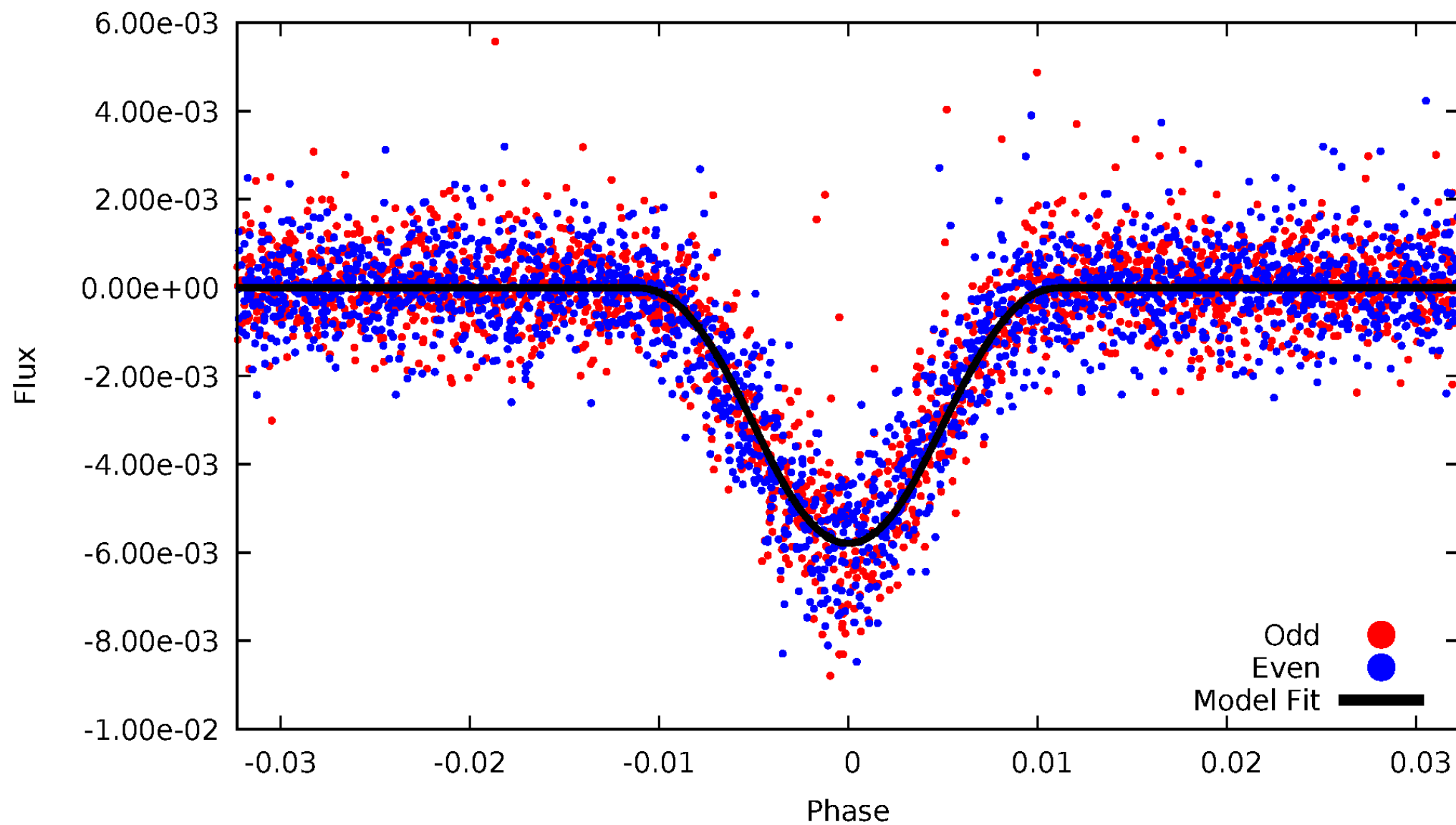
TCE 009674608-01





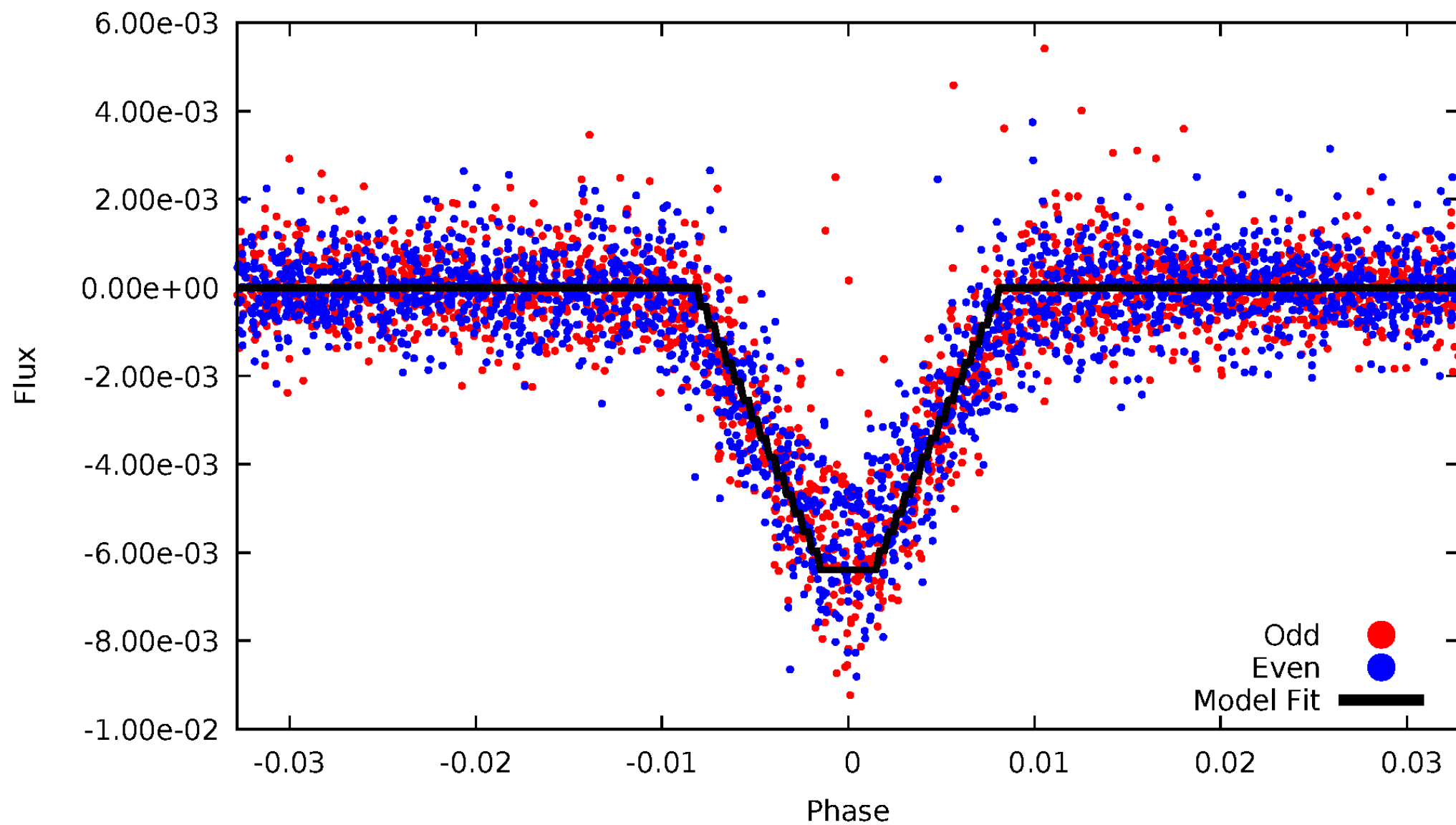
# DV Odd/Even

TCE 009674608-01



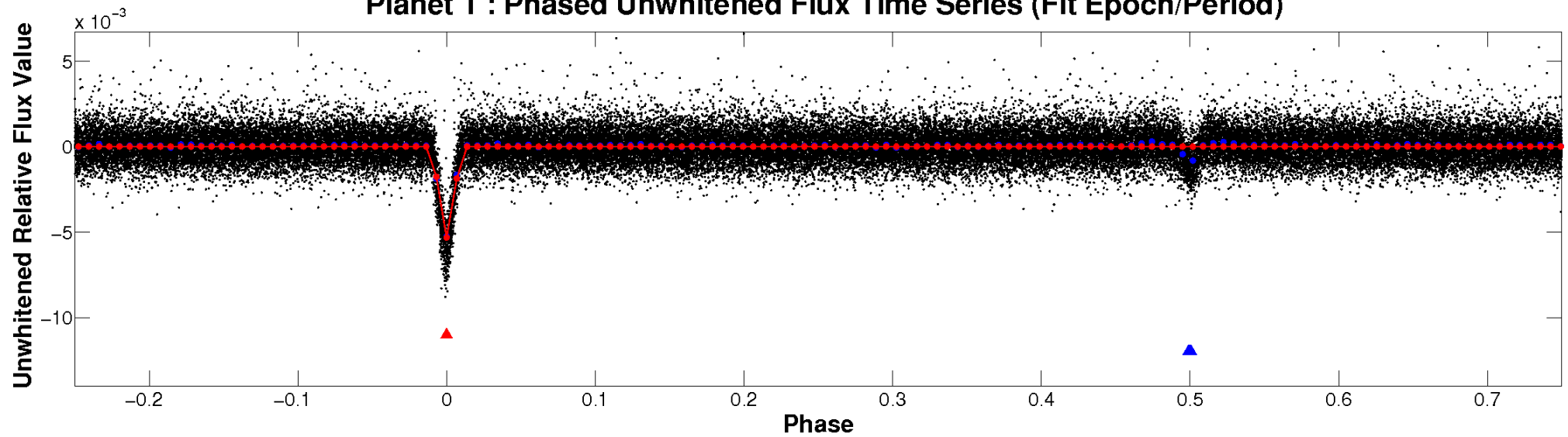
# ALT Odd/Even

TCE 009674608-01

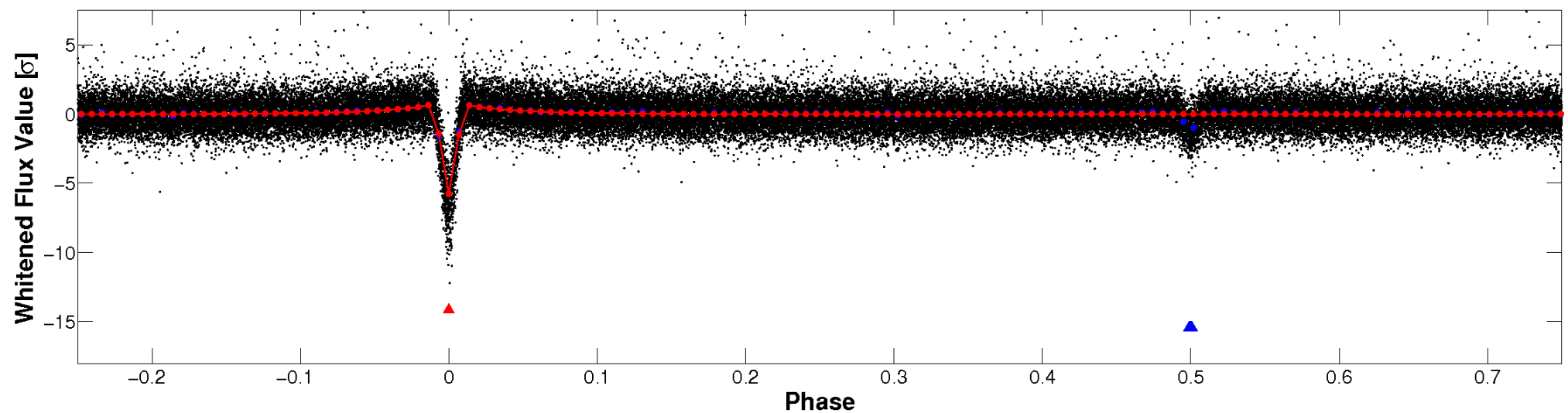


# Non-Whitened Vs. Whitened Light Curve

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

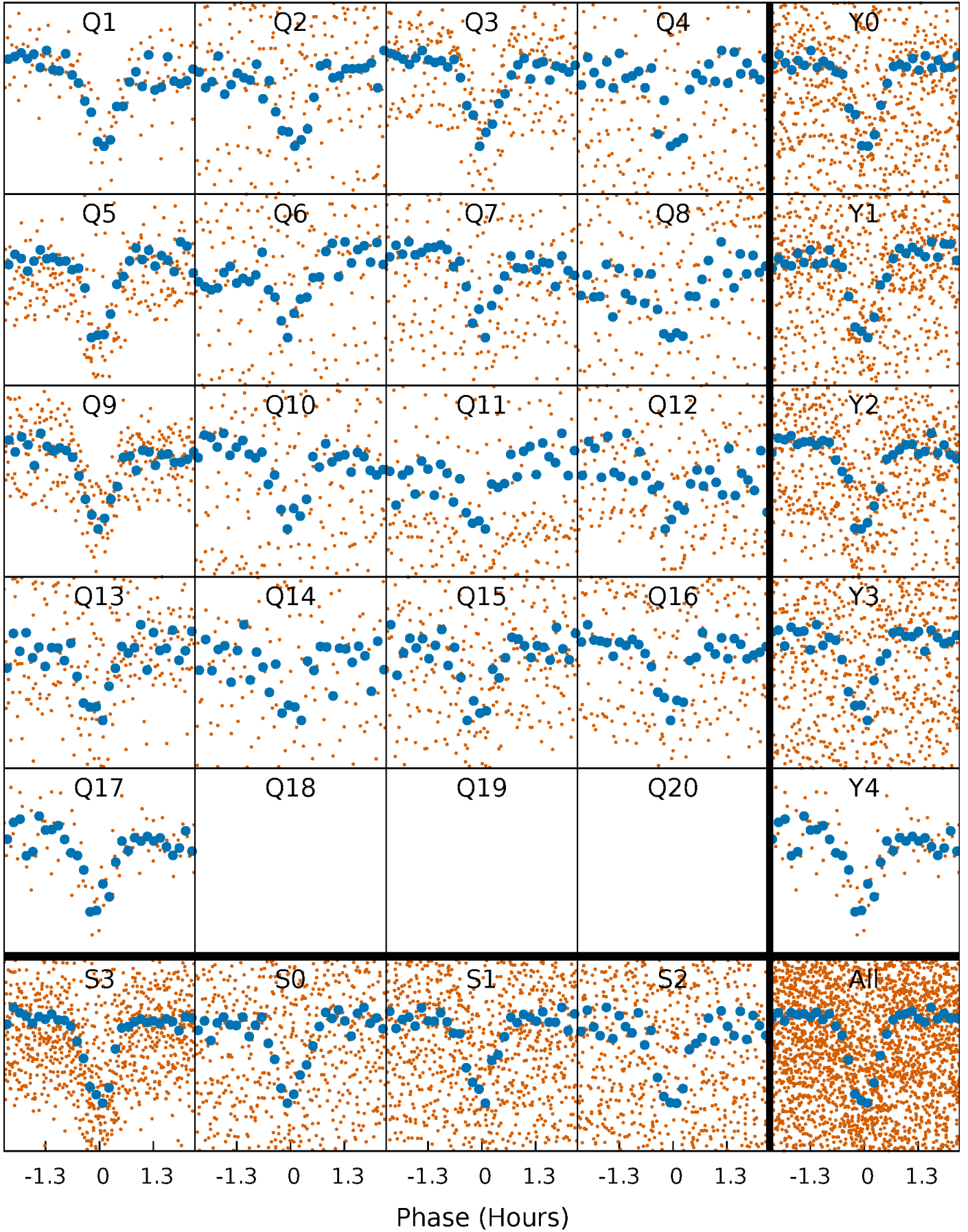


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

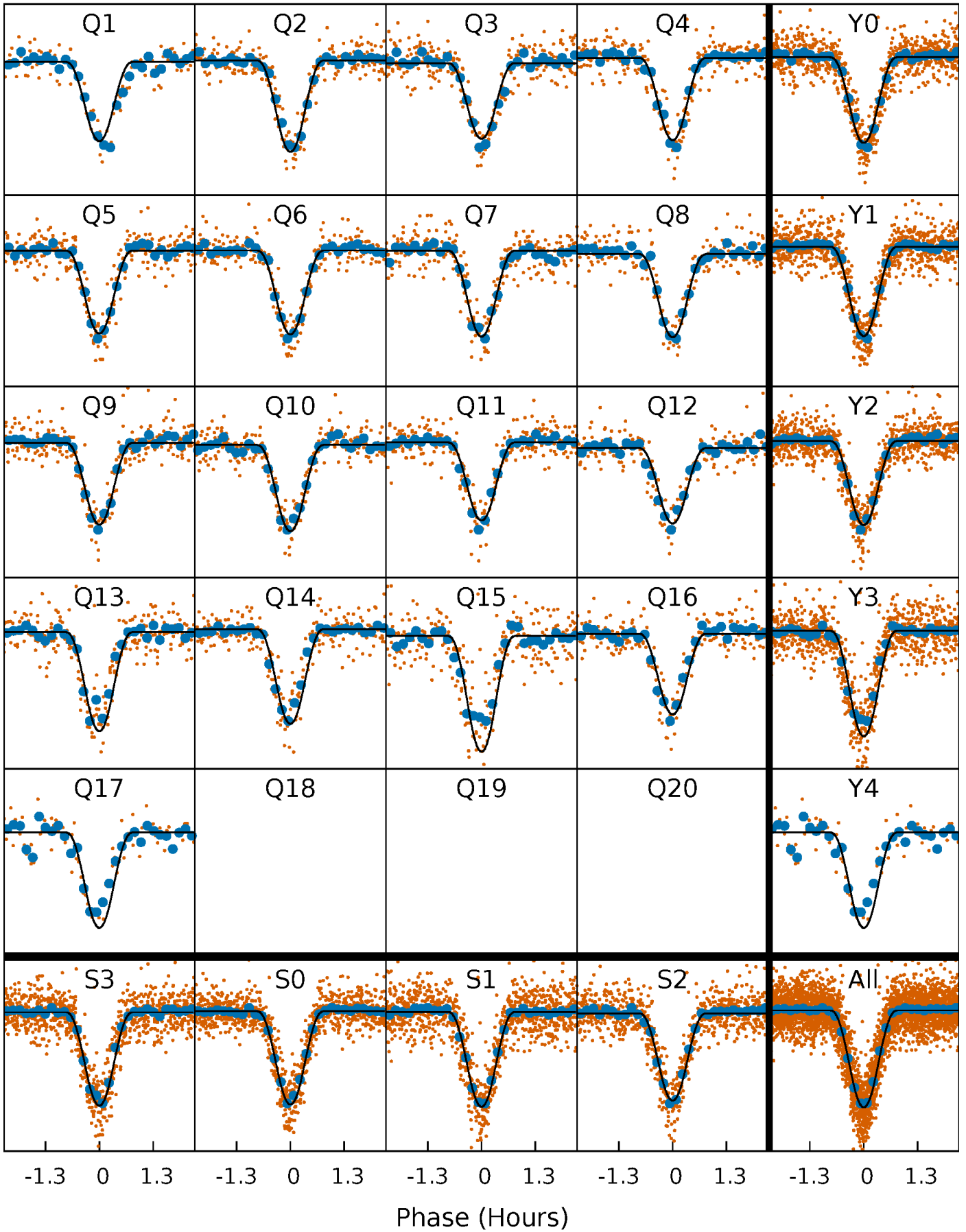
TCE 009674608-01   P= 2.972060 Days    $T_0=133.247880$  (BKJD)





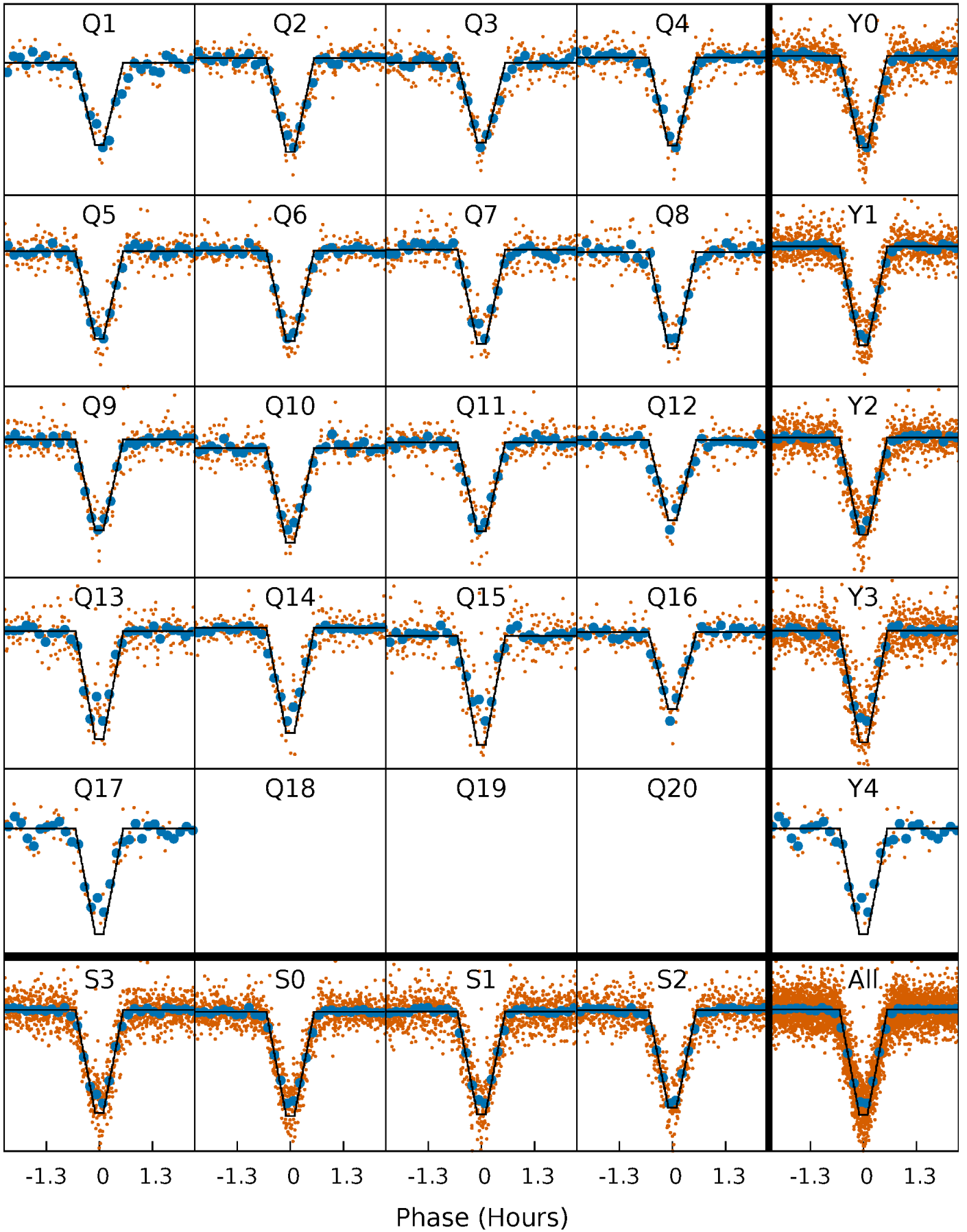
# DV Quarter-Phased Transit Curves

TCE 009674608-01 P= 2.972060 Days  $T_0=133.247880$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

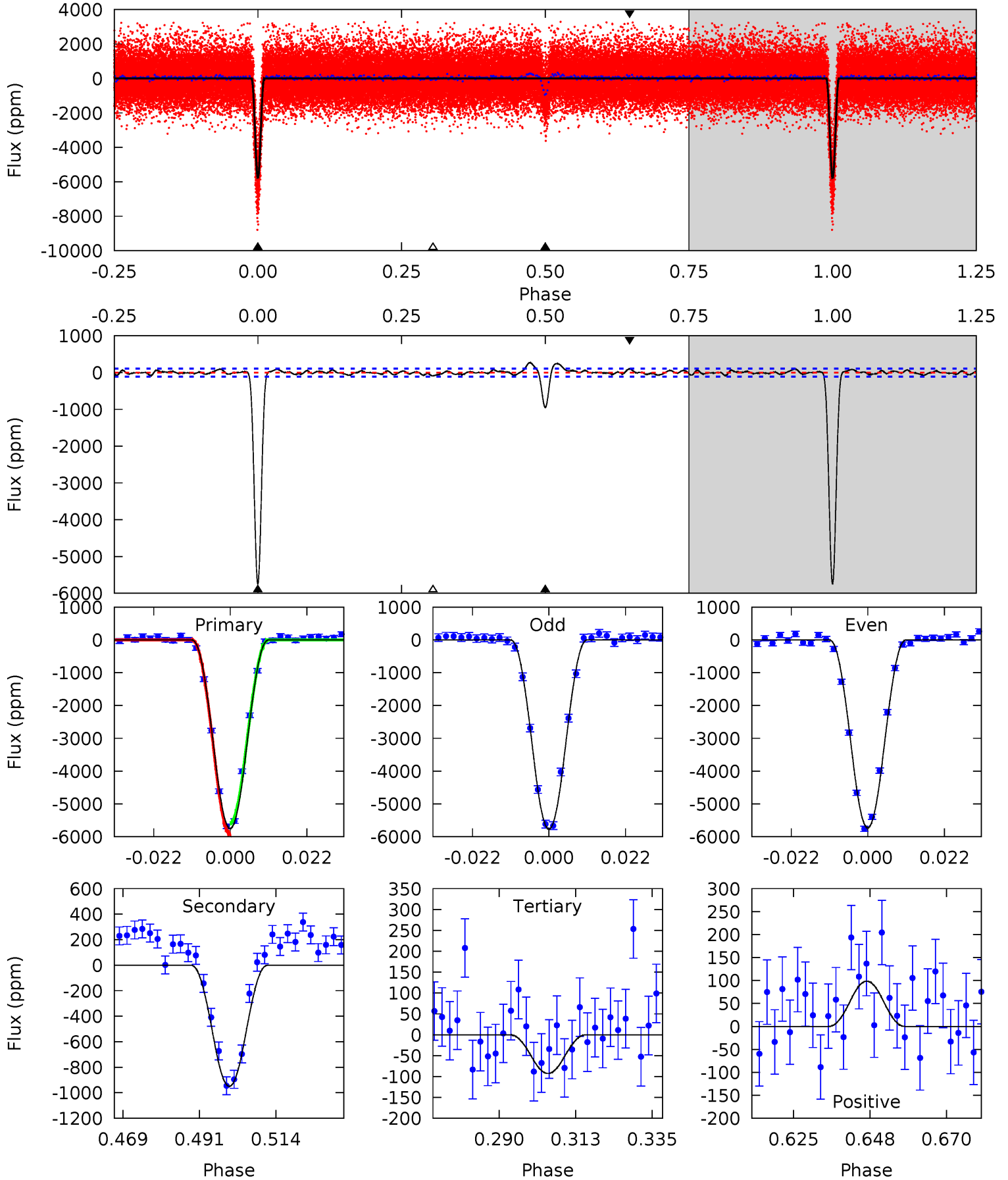
TCE 009674608-01 P= 2.972055 Days  $T_0=133.248231$  (BKJD)



# DV Model-Shift Uniqueness Test

009674608-01, P = 2.972060 Days, E = 130.275820 Days

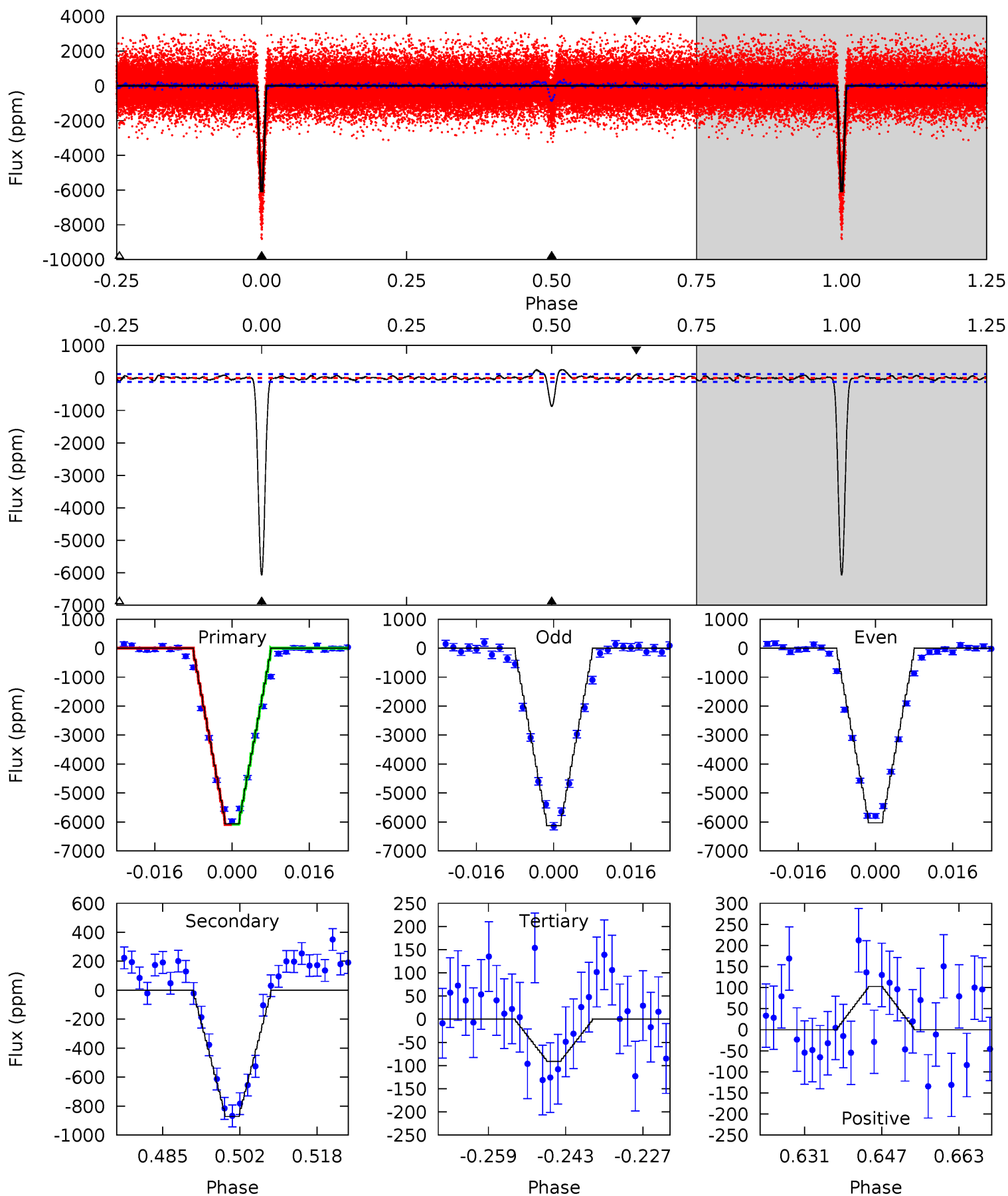
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
257.0	42.4	4.14	4.40	4.87	2.28	2.21	252.9	252.6	38.3	38.0	0.90	0.99	0.05	7.92



# Alt Model-Shift Uniqueness Test

009674608-01, P = 2.972055 Days, E = 130.276176 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
249.5	35.9	3.74	4.22	4.93	2.40	2.00	245.8	245.3	32.2	31.7	2.05	0.99	0.04	0.15



### Stellar Parameters For KIC 009674608

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4491^{+134}_{-147}$	$4.580^{+0.060}_{-0.020}$	$0.120^{+0.250}_{-0.300}$	$0.711^{+0.034}_{-0.062}$	$0.702^{+0.060}_{-0.054}$	$2.746^{+0.694}_{-0.212}$
	+3%/-3%	+1%/-0%	+208%/-250%	+5%/-9%	+9%/-8%	+25%/-8%
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 009674608-01 / KOI 1795.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-949 \pm 22$	$6.87^{+0.43}_{-0.44}$	$1220^{+42}_{-45}$	$3135^{+76}_{-89}$	$15^{+2}_{-1}$
Alt.	$-872 \pm 24$	$6.14^{+0.39}_{-0.42}$	$1222^{+38}_{-47}$	$3198^{+99}_{-95}$	$17^{+2}_{-2}$

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



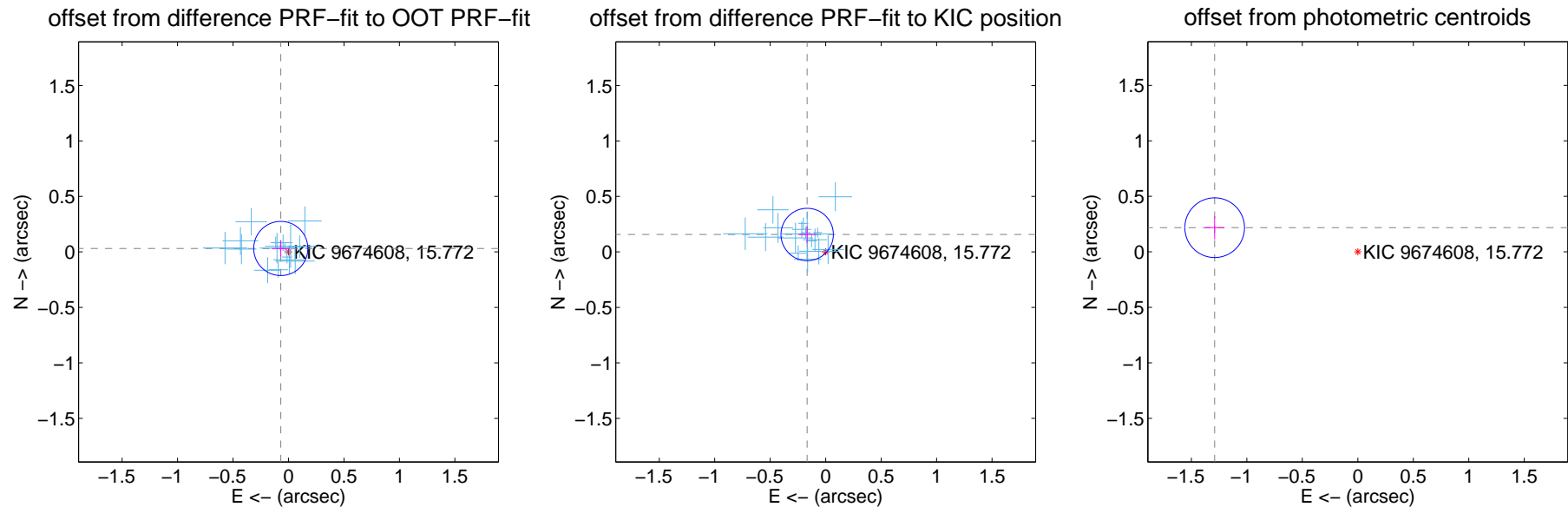
## DV Centroid Data

Supplemental centroid analysis for 009674608-01. Kepler magnitude: 15.77. Transit SNR 134.04

There are 17 quarters with good PRF difference image offsets

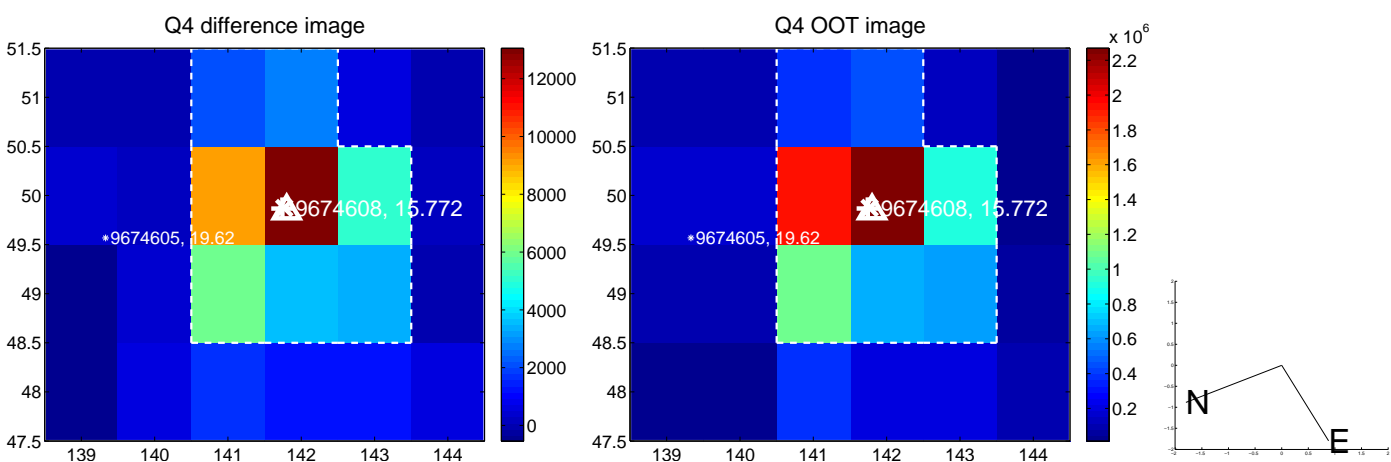
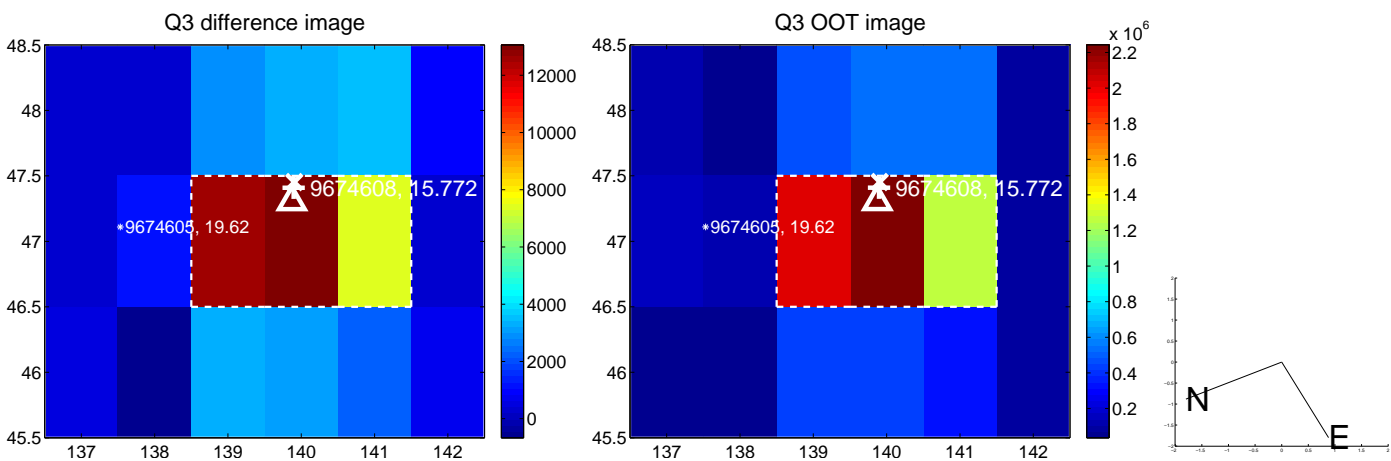
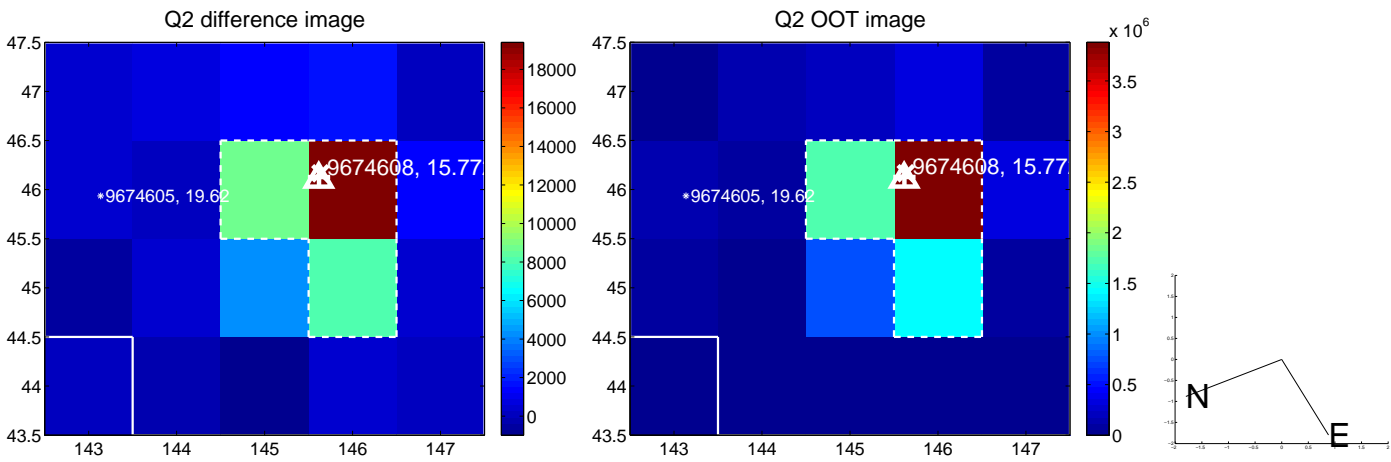
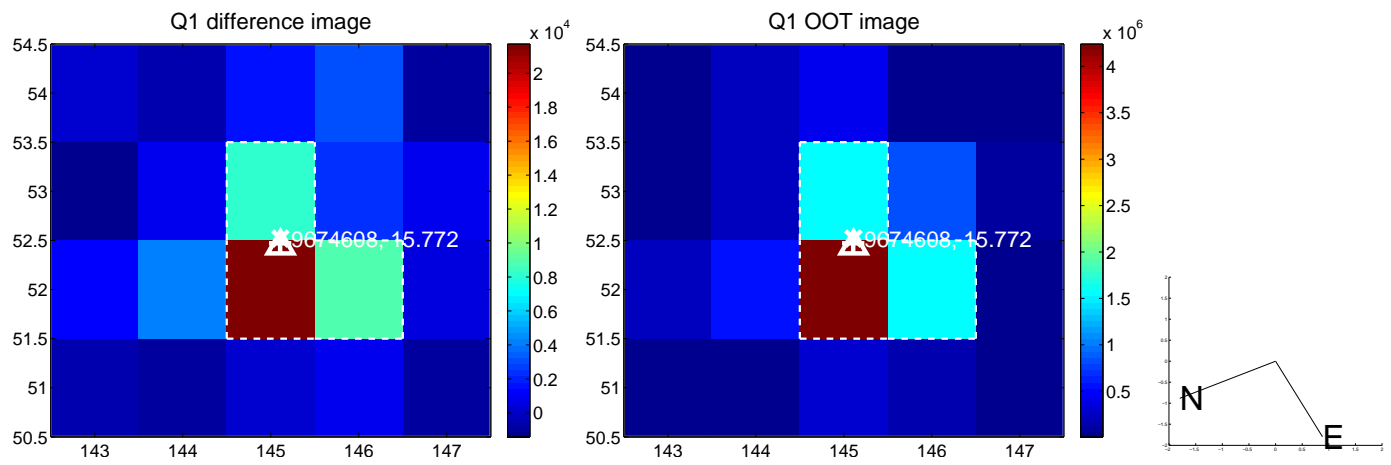
The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.076 \pm 0.081$	0.94	$0.070 \pm 0.082$	$0.031 \pm 0.072$
PRF-fit source offset from KIC position	$0.229 \pm 0.079$	2.91	$0.167 \pm 0.082$	$0.157 \pm 0.074$
photometric centroid source offset	$1.31 \pm 0.09$	14.60	$1.29 \pm 0.09$	$0.22 \pm 0.10$

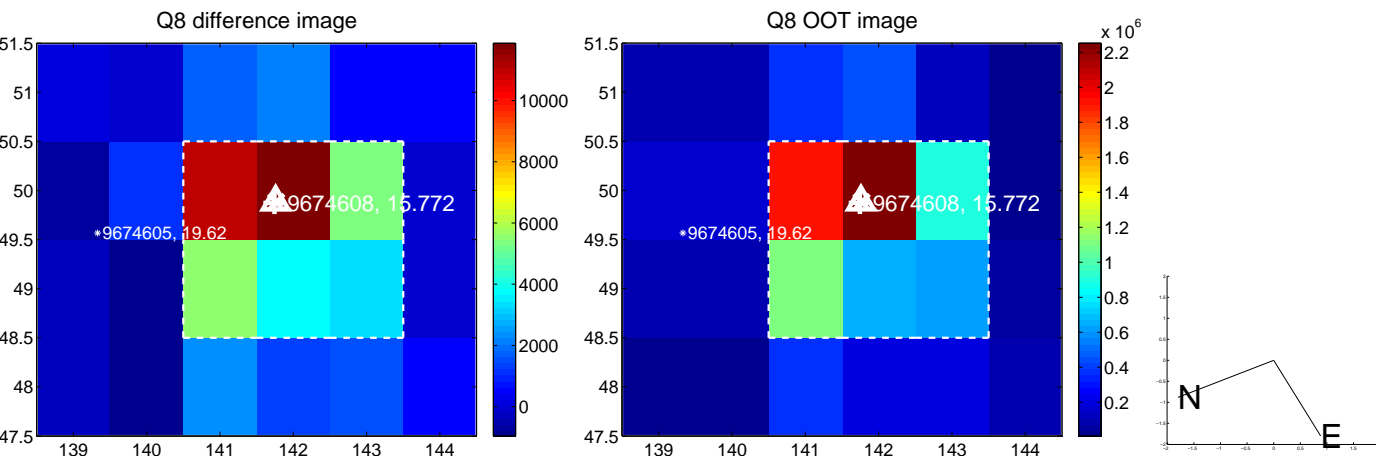
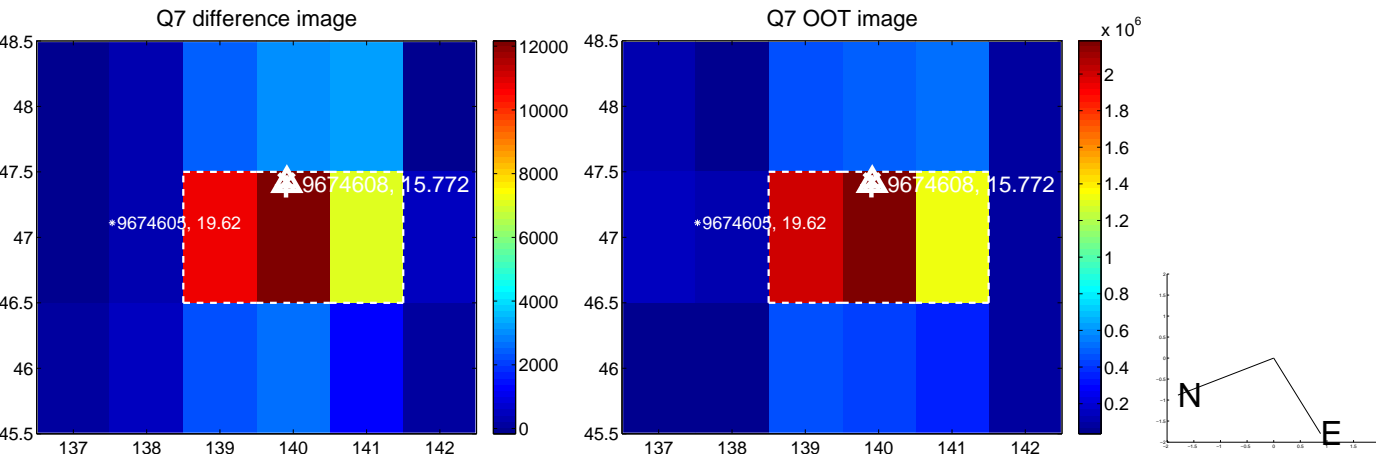
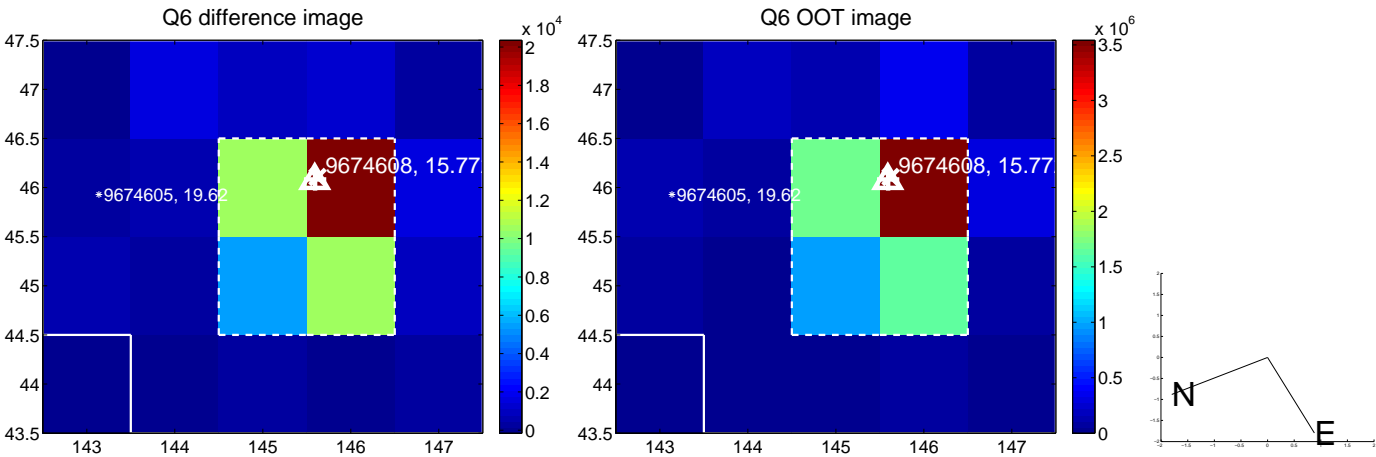
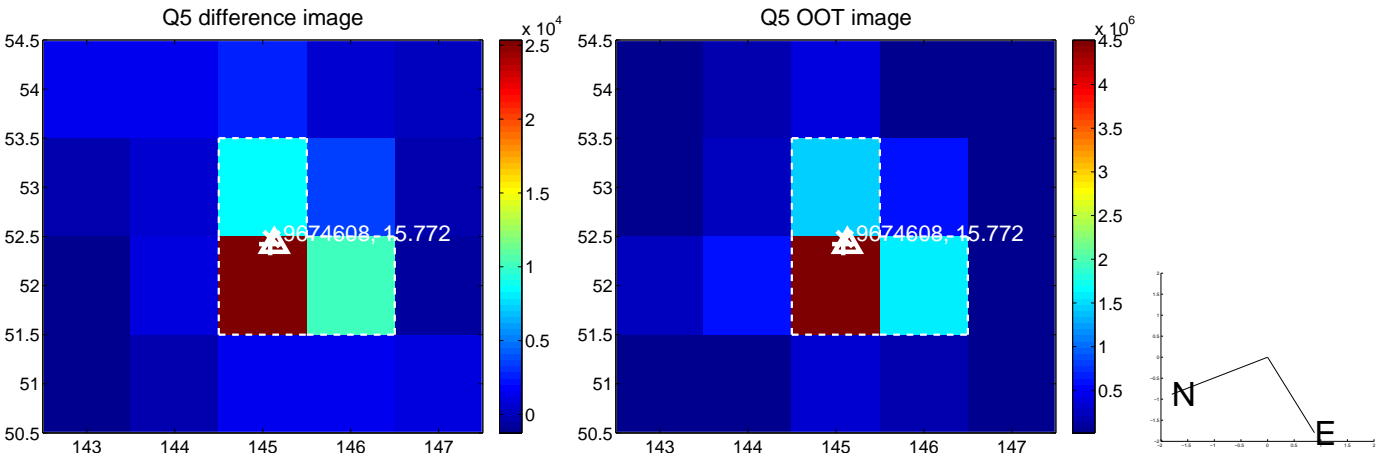


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

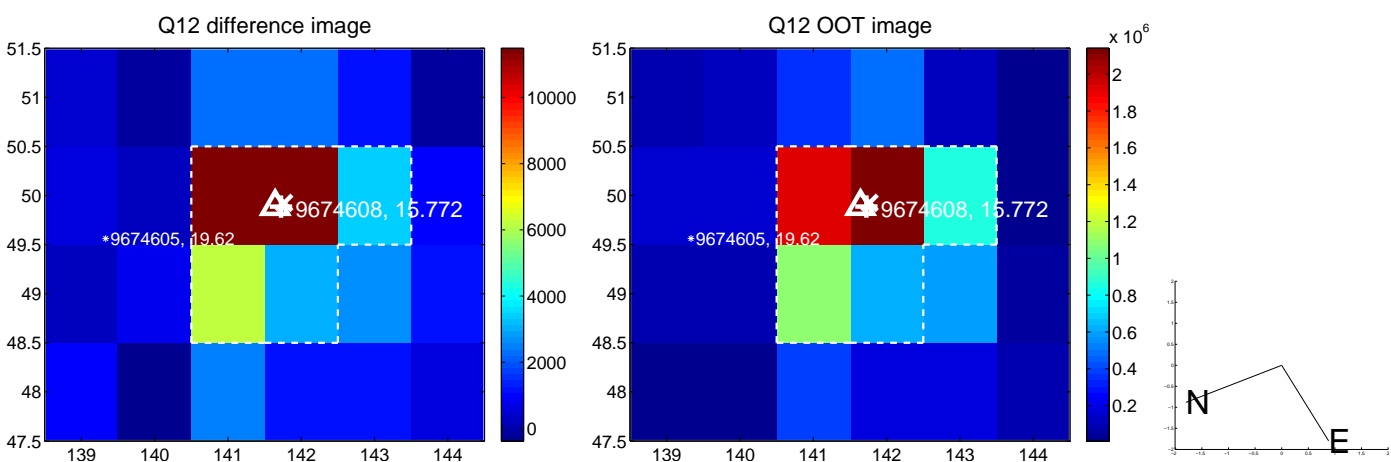
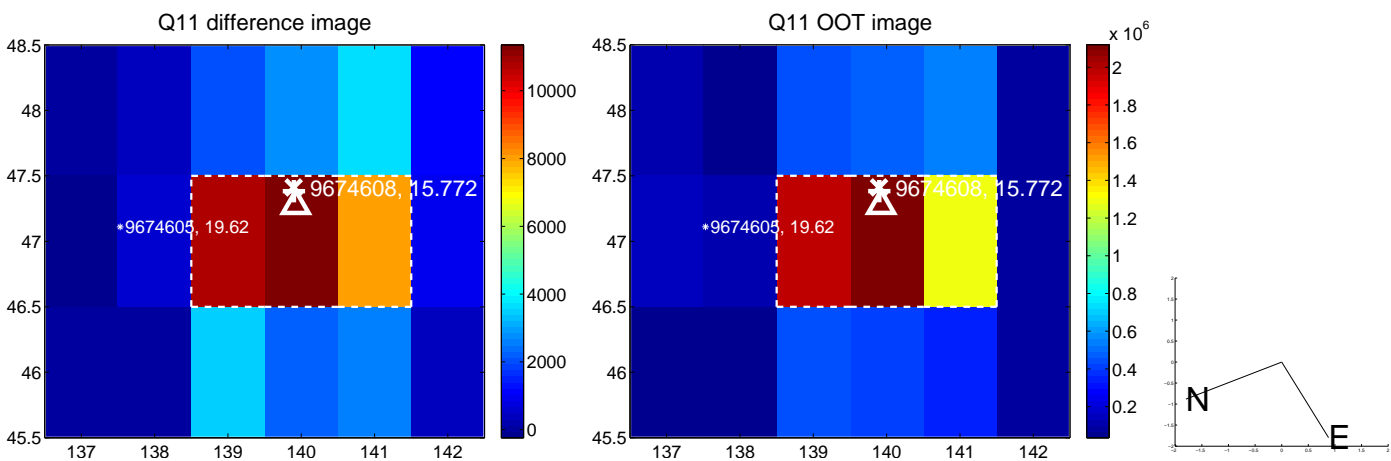
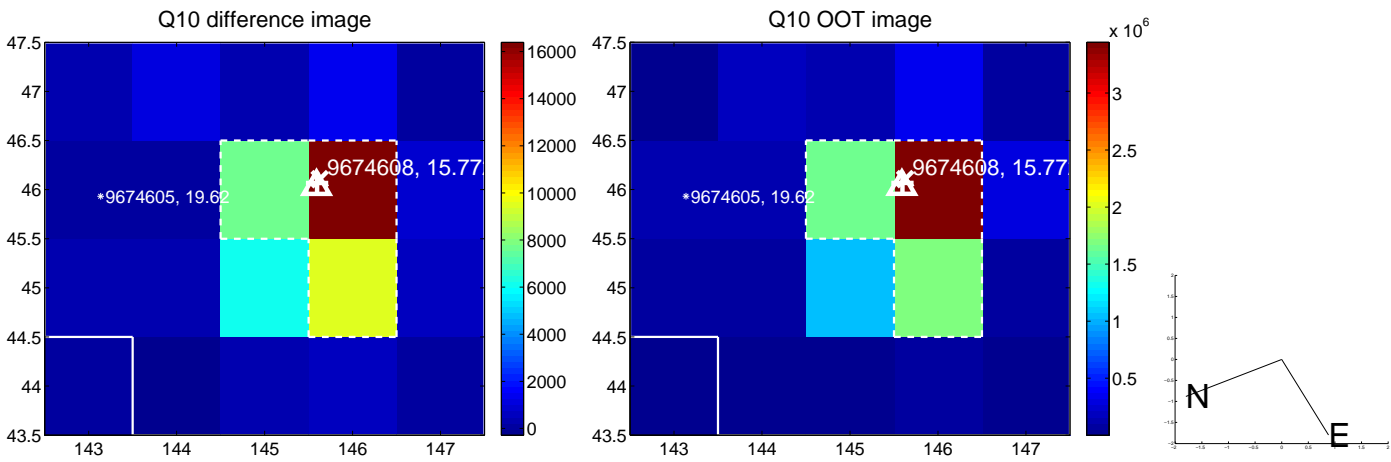
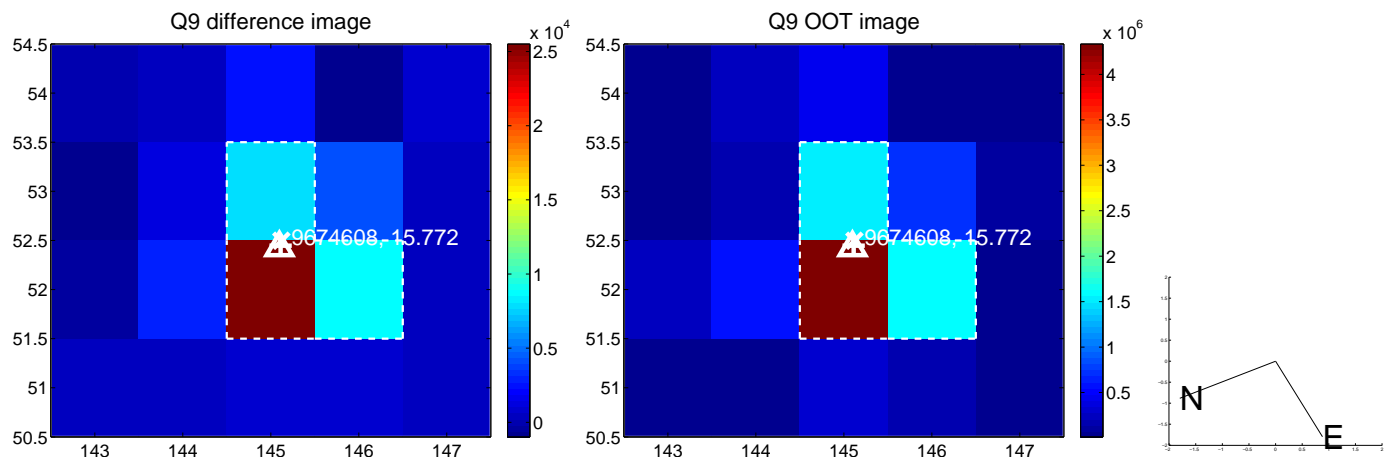
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



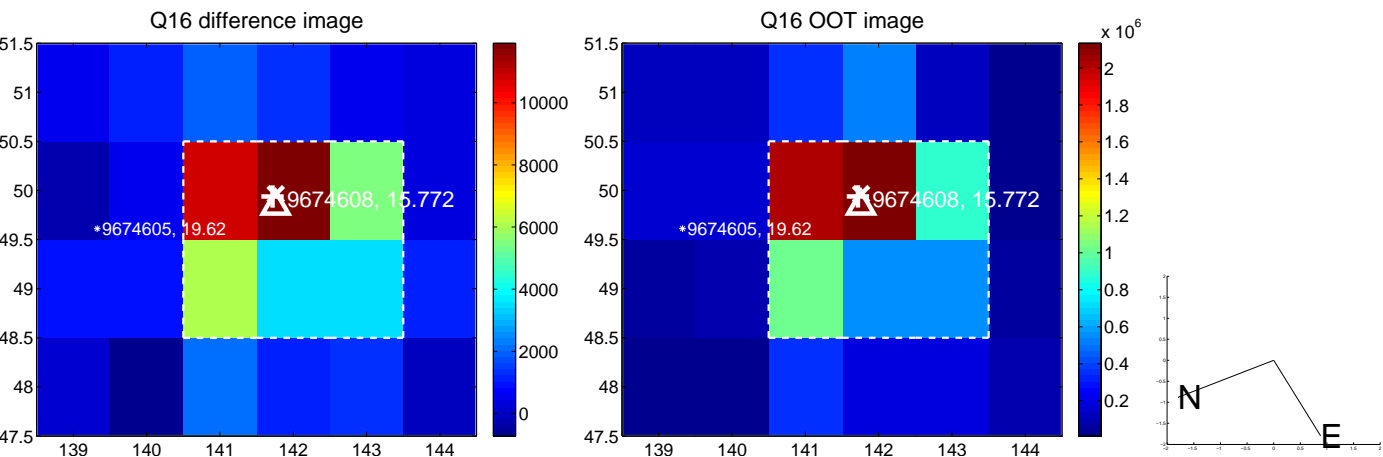
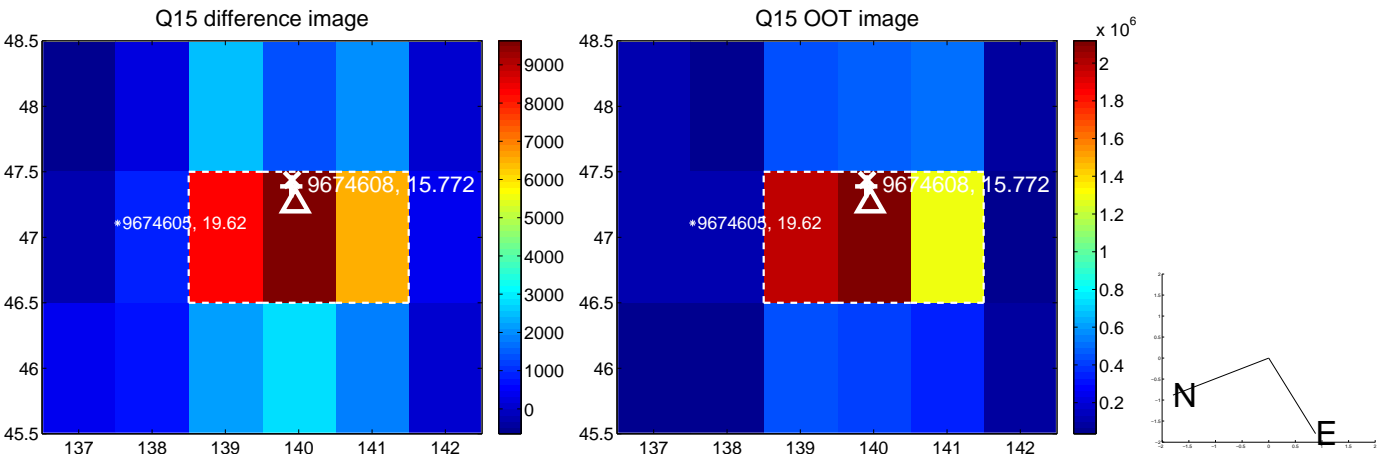
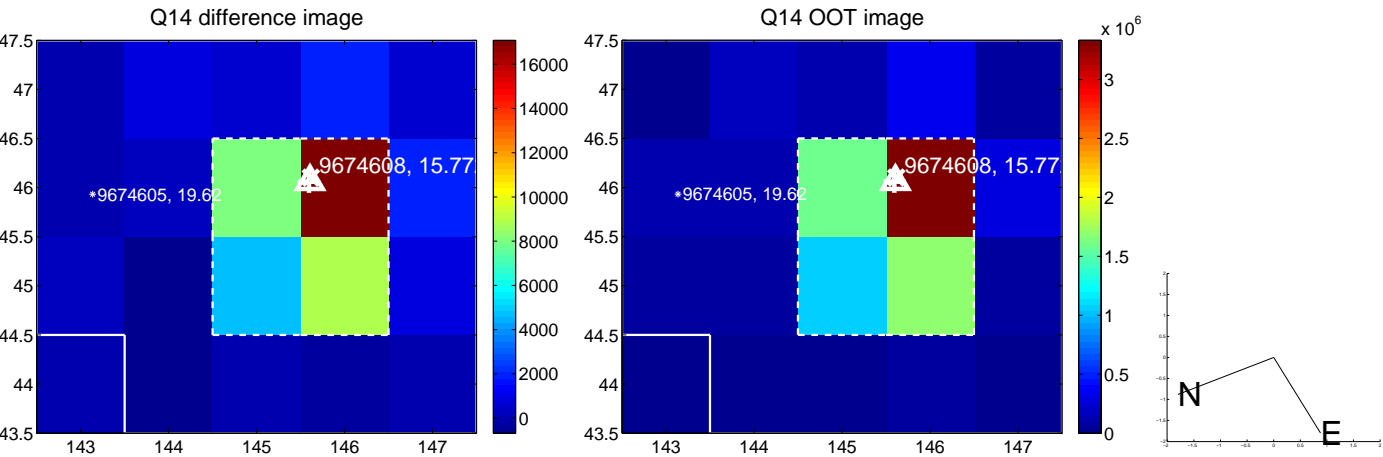
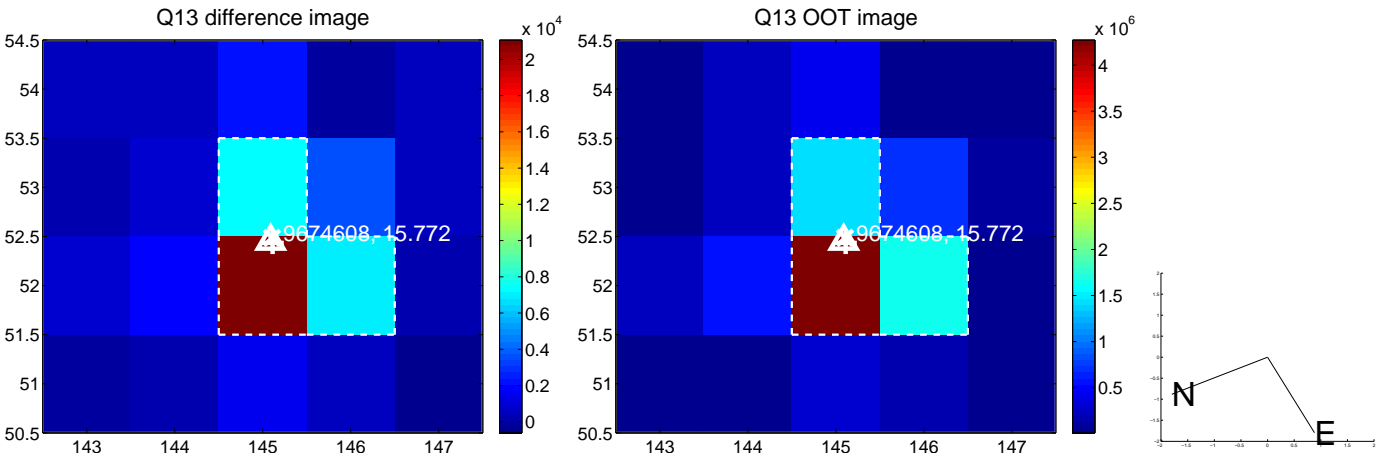
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

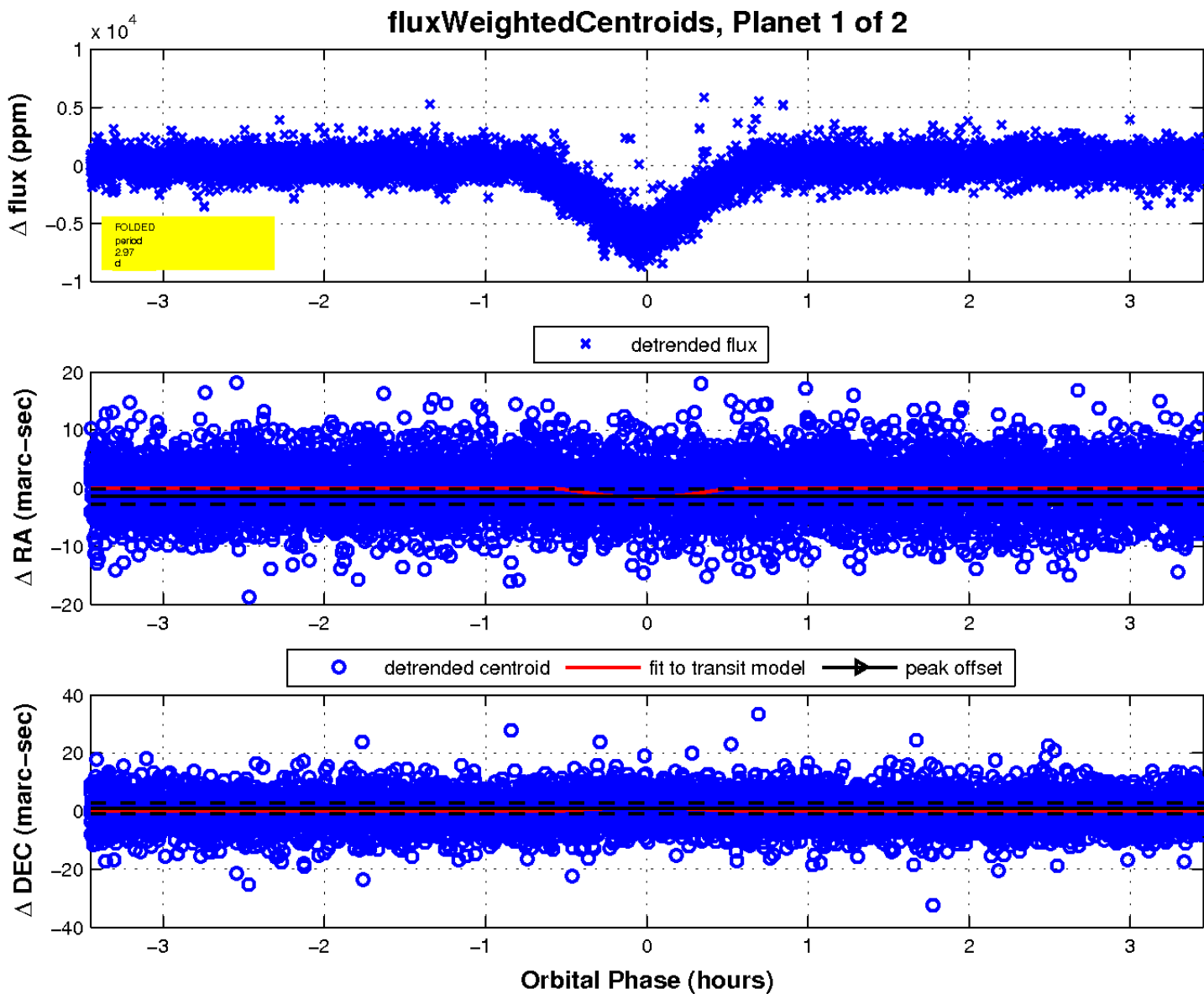
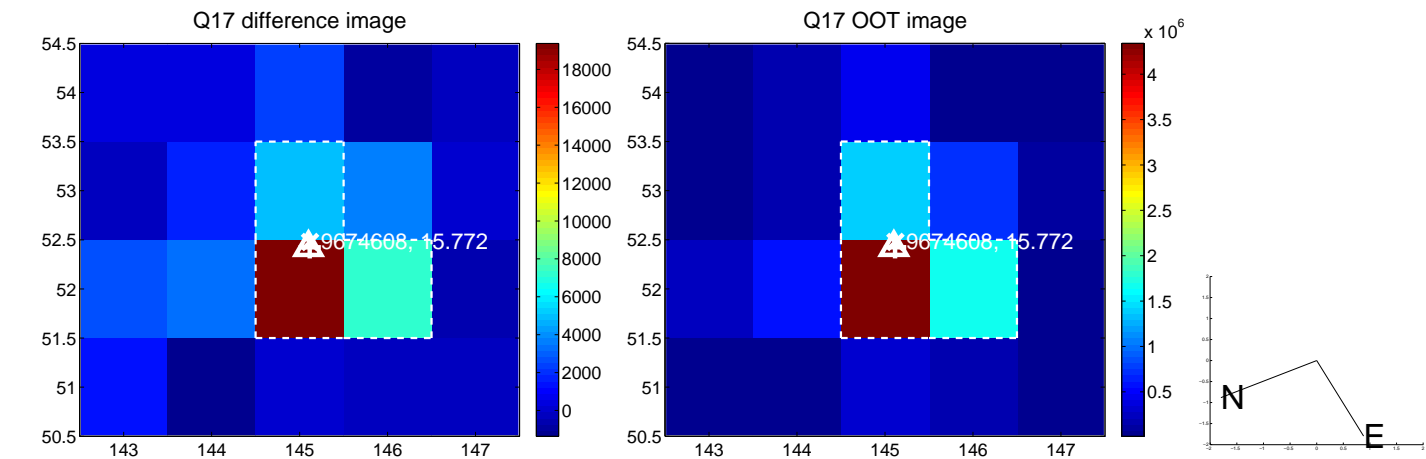


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



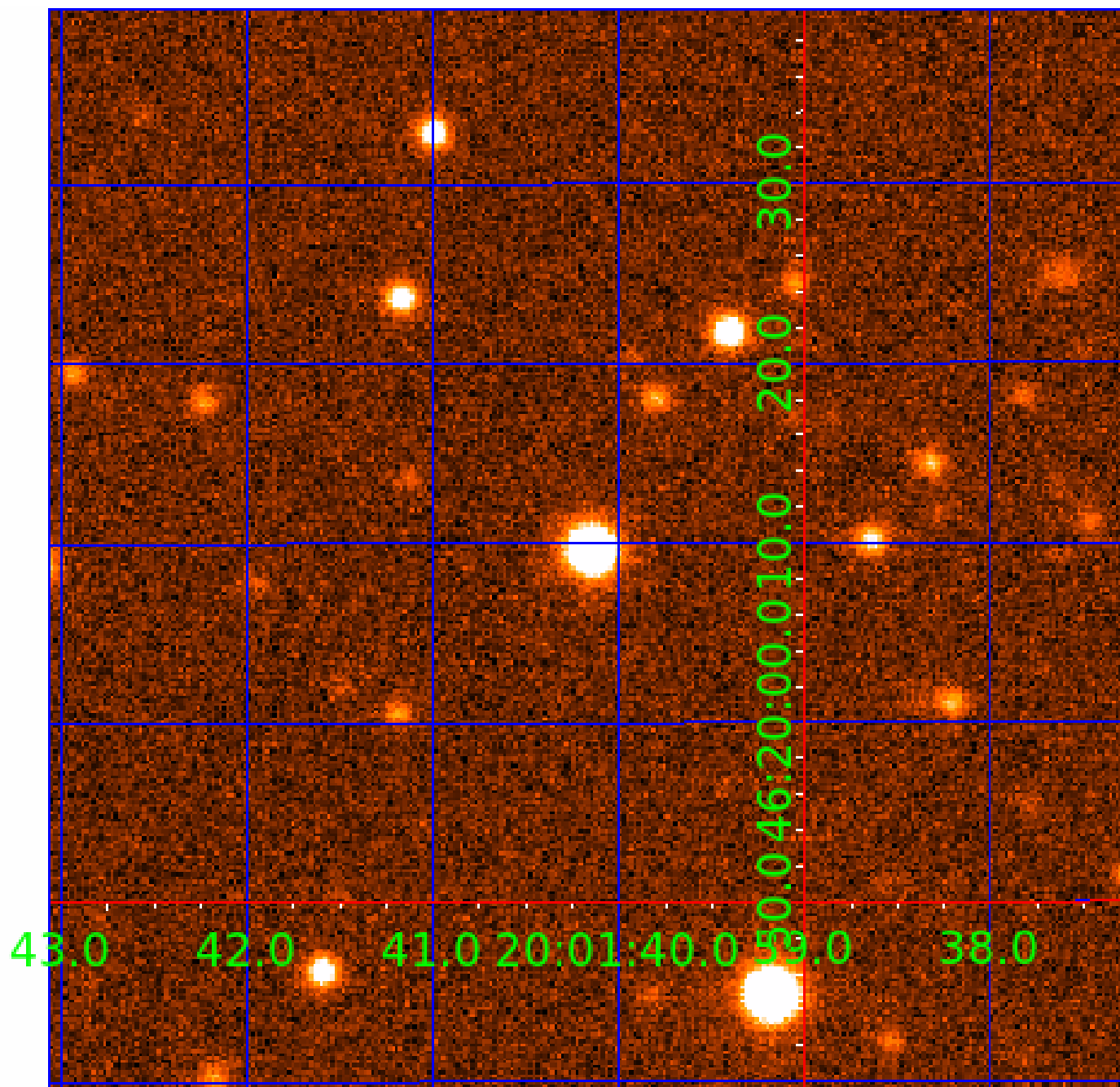


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009674608

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009674608-01	OBS	1795.01	2.972060	133.247879	5792.5	1.152	112.4	134.0	0.71	4491	6.93	142.59
009674608-02	OBS	No	2.972048	131.764201	1087.9	1.225	21.2	26.6	0.71	4491	4.16	142.59

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009674608-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE
009674608-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

**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.

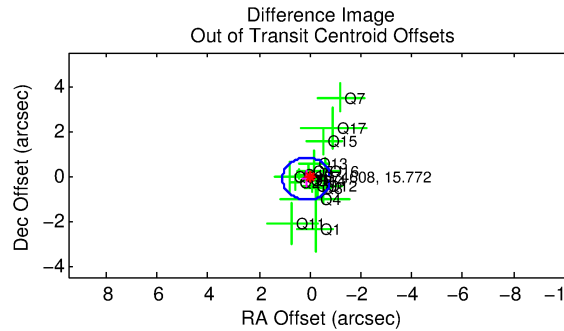
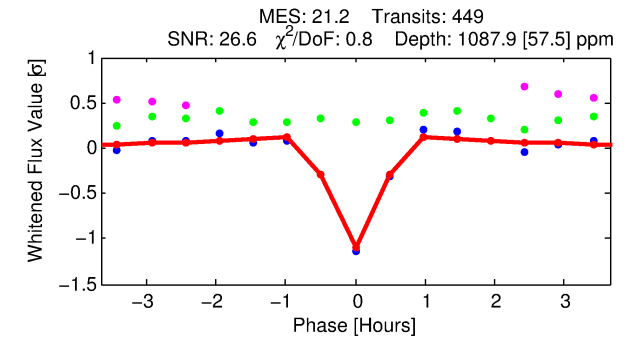
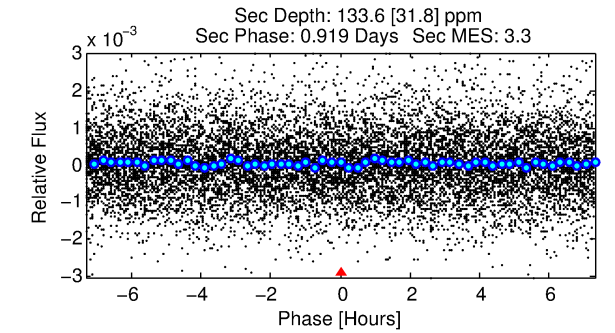
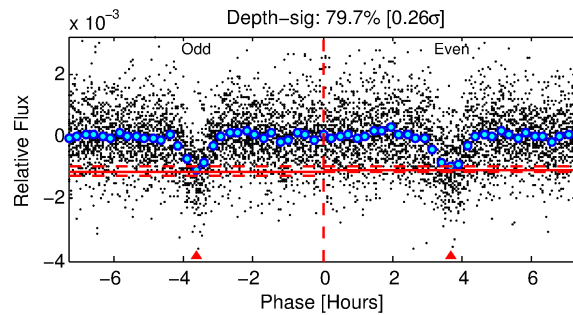
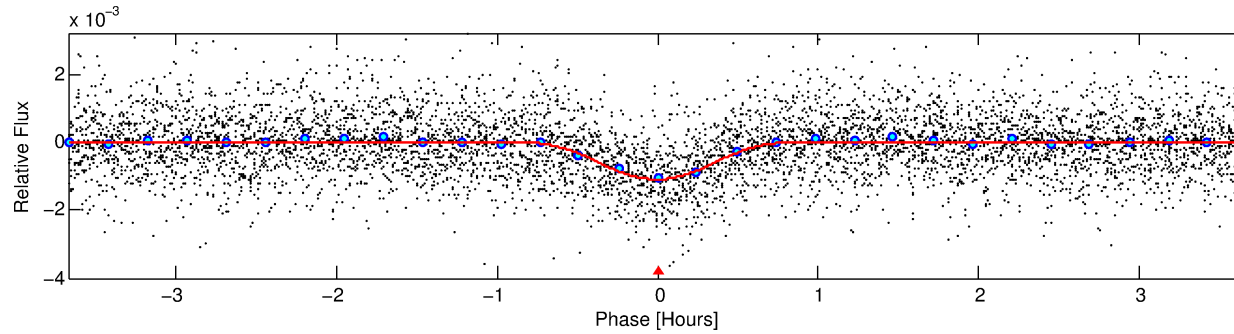
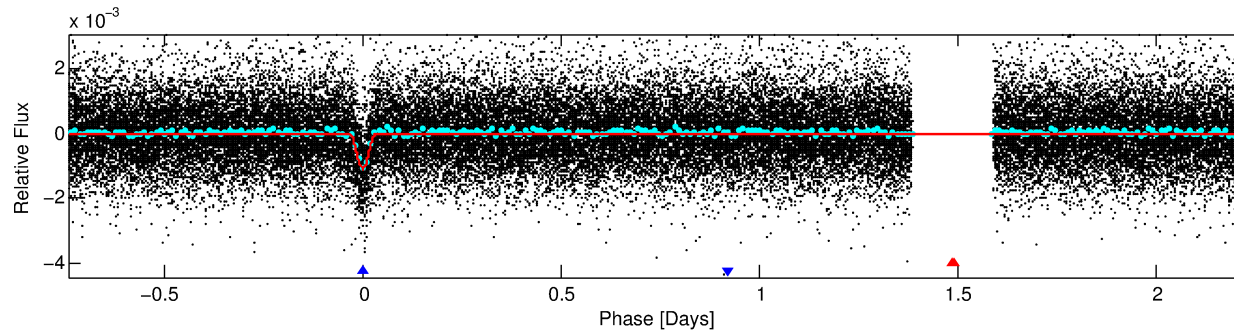
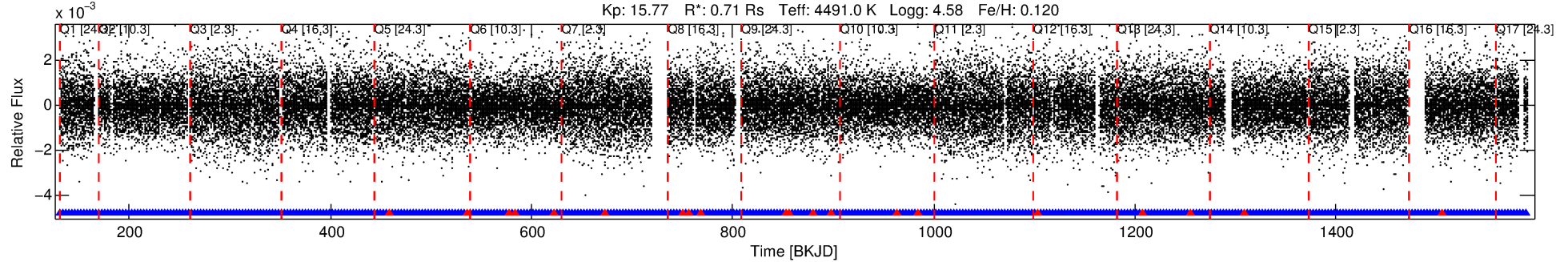
## Ephemeris Match Information For 009674608-02

No Significant Match Found

# DV One-Page Summary

KIC: 9674608 Candidate: 2 of 2 Period: 2.972 d  
KOI: K01795 Corr: No Ephemeris Match

Kp: 15.77 R\*: 0.71 Rs Teff: 4491.0 K Logg: 4.58 Fe/H: 0.120



## DV Fit Results:

Period = 2.97205 [0.00000] d  
Epoch = 131.7642 [0.0006] BKJD  
Rp/R\* = 0.0536 [0.1340]  
a/R\* = 7.15 [5.54]  
b = 0.98 [0.23]  
Seff = 142.60 [24.29]  
Teff = 881 [38] K  
Rp = 4.16 [10.40] Re  
a = 0.0359 [0.0027] AU  
Ag = 5.50 [27.52] [0.16σ]  
Teffp = 2086 [2612] K [0.46σ]

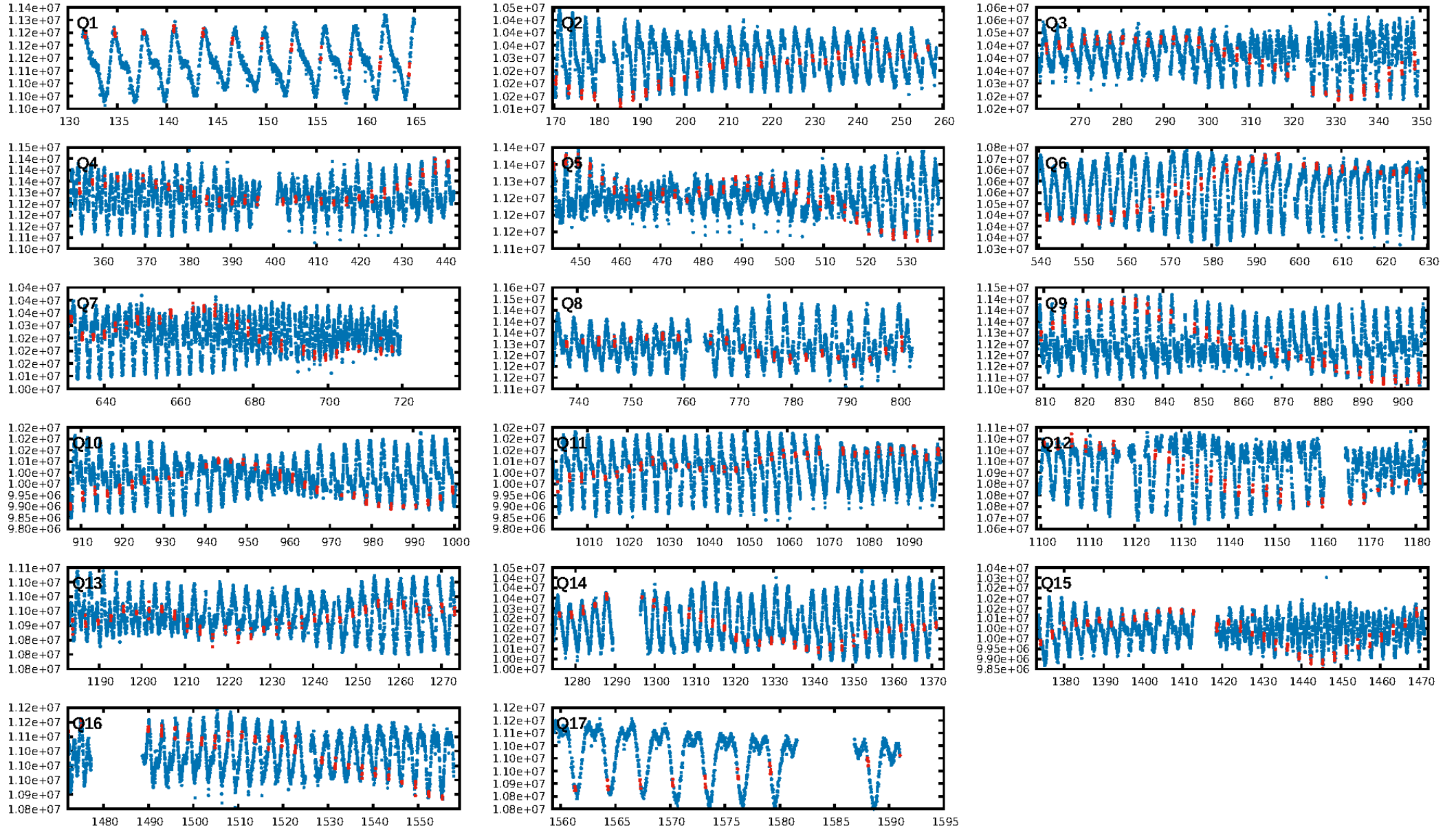
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 2.81e-94  
RollingBand-fgt: 0.95 [408/428]  
GhostDiagnostic-chr: 1.614  
Centroid-sig: 14.4%  
Centroid-so: 1.842 arcsec [3.75σ]  
OotOffset-rm: 0.191 arcsec [0.61σ]  
KicOffset-rm: 0.246 arcsec [1.33σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.76 [13/17]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 11:48:54 Z

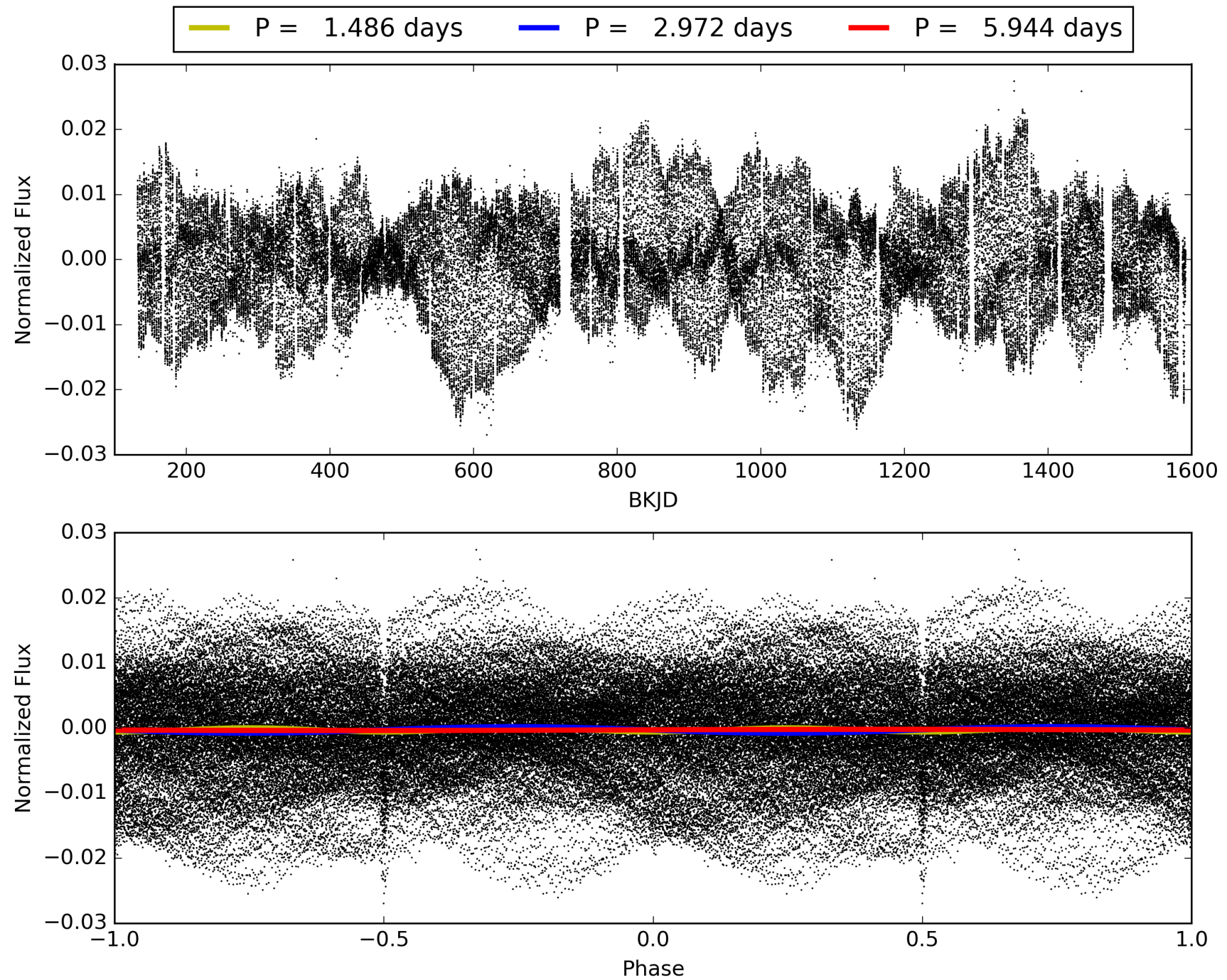
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009674608-02, PDC Light Curves



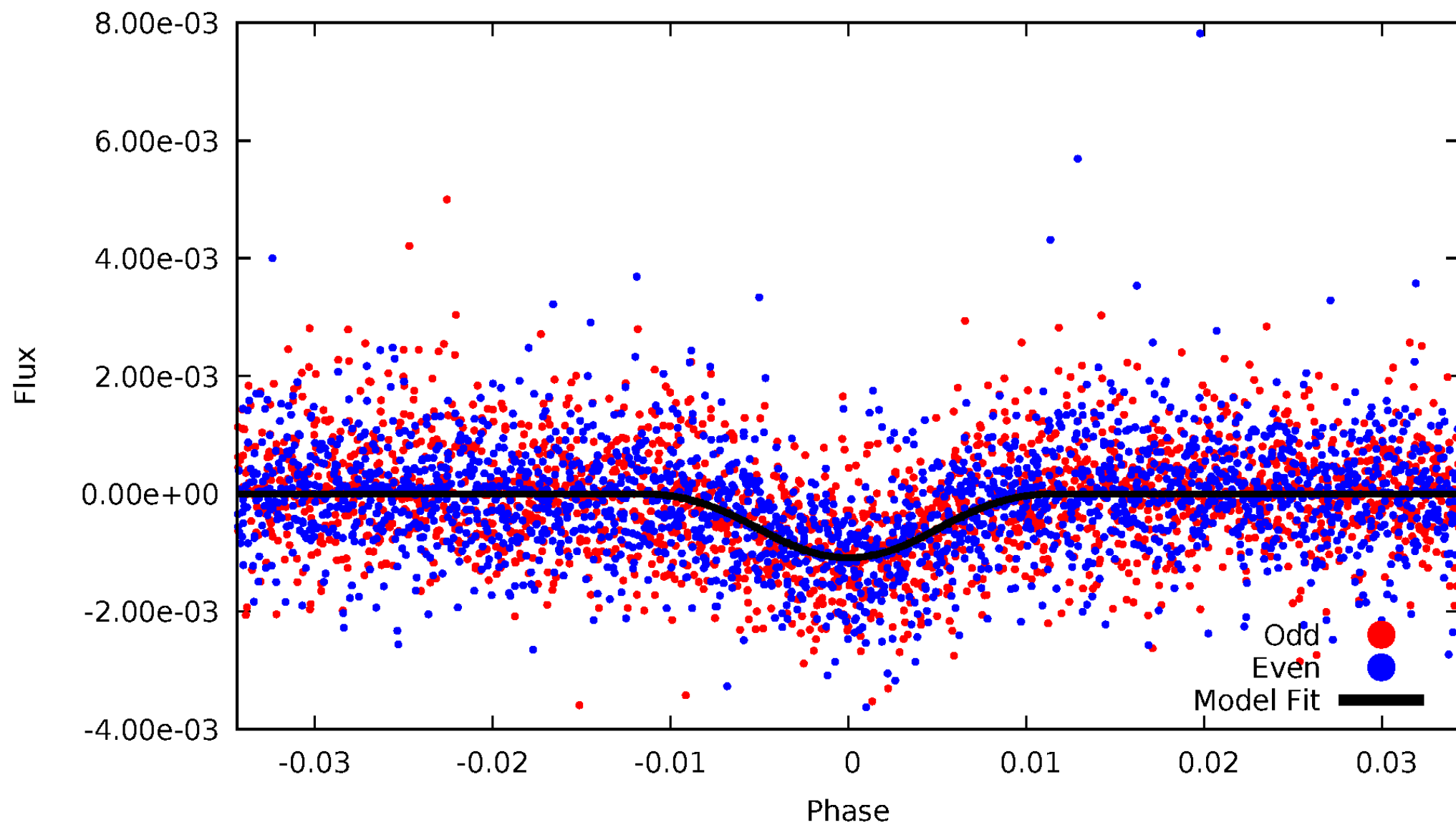


TCE 009674608-02



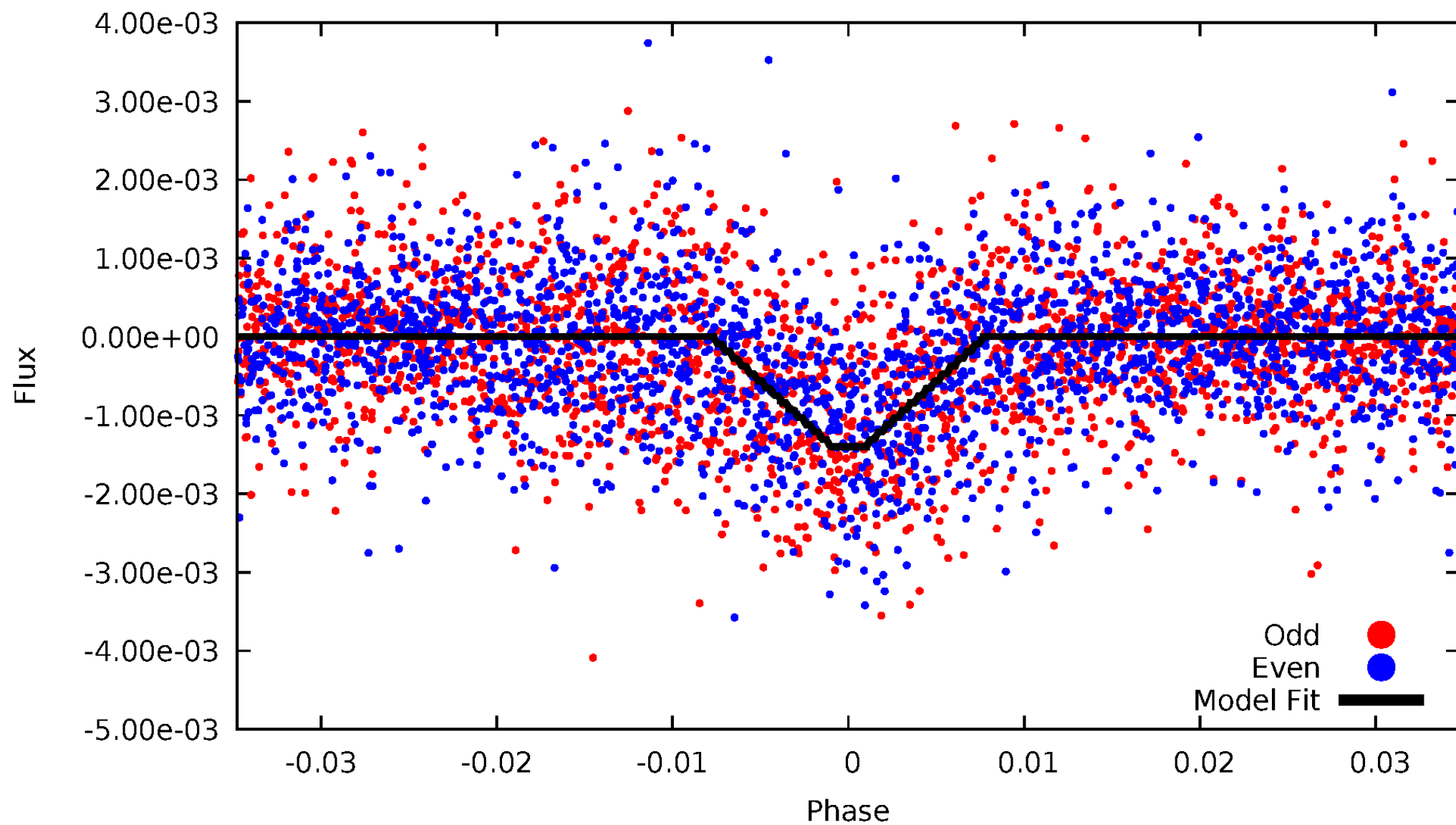
# DV Odd/Even

TCE 009674608-02



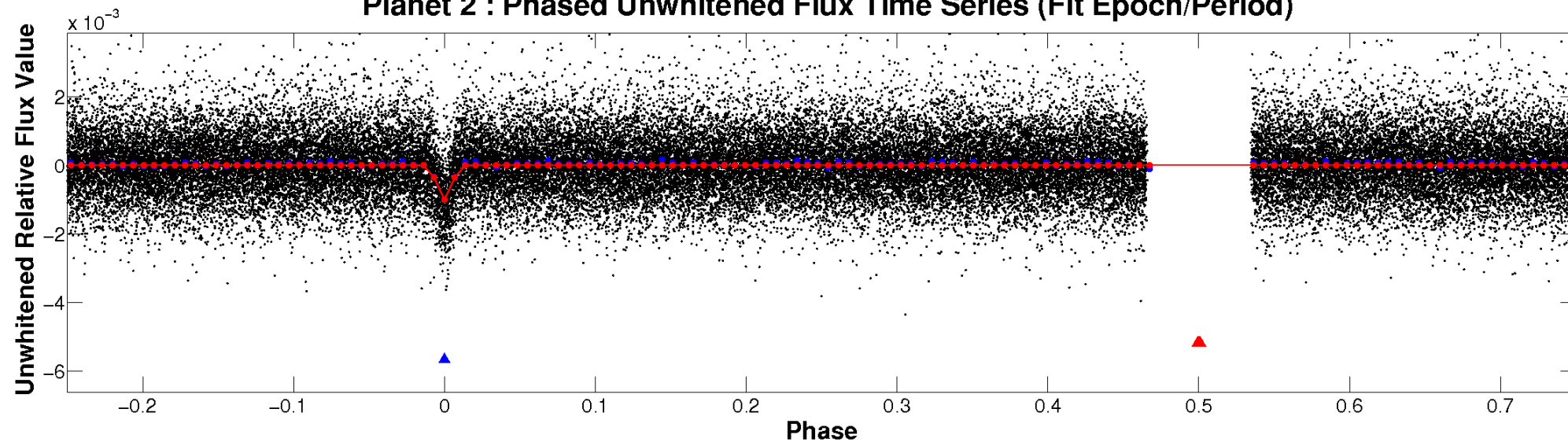
# ALT Odd/Even

TCE 009674608-02

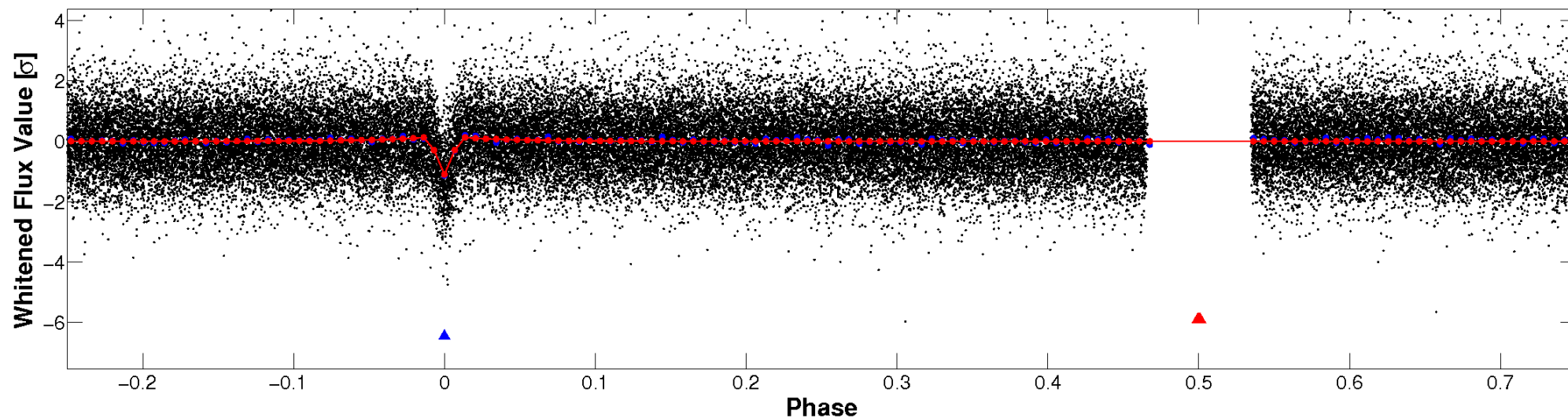


# Non-Whitened Vs. Whitened Light Curve

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



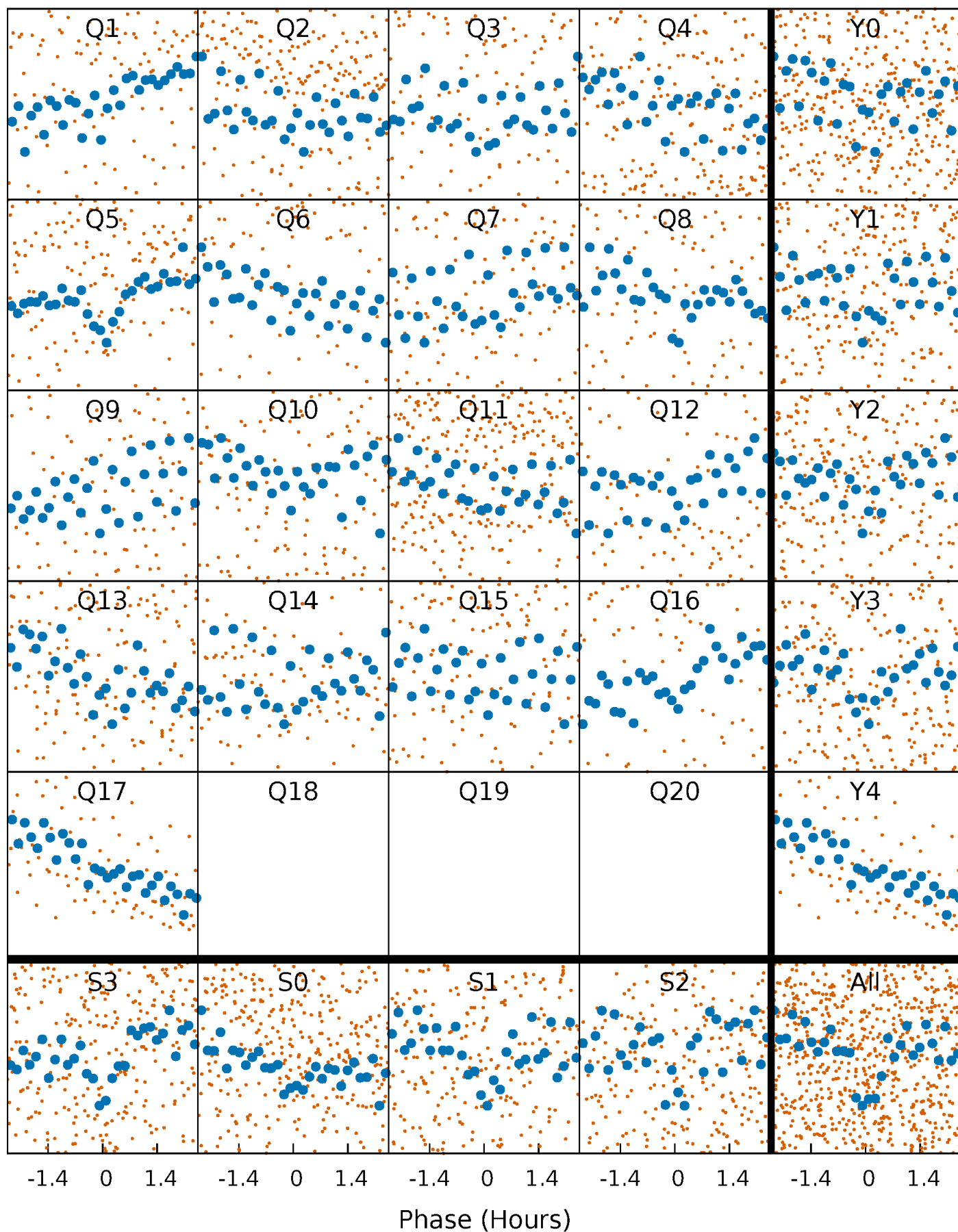
Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

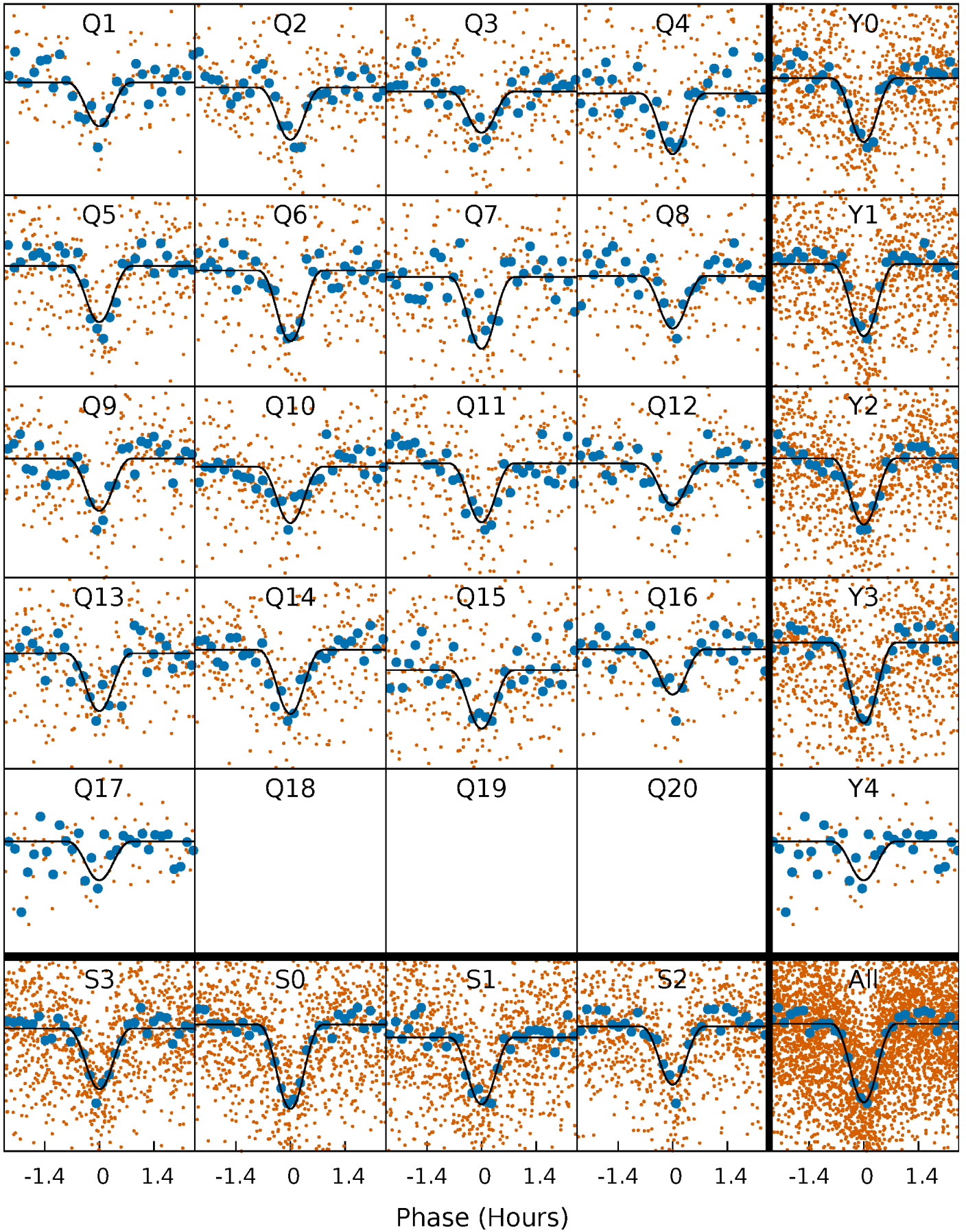
TCE 009674608-02 P= 2.972048 Days  $T_0=131.764201$  (BKJD)





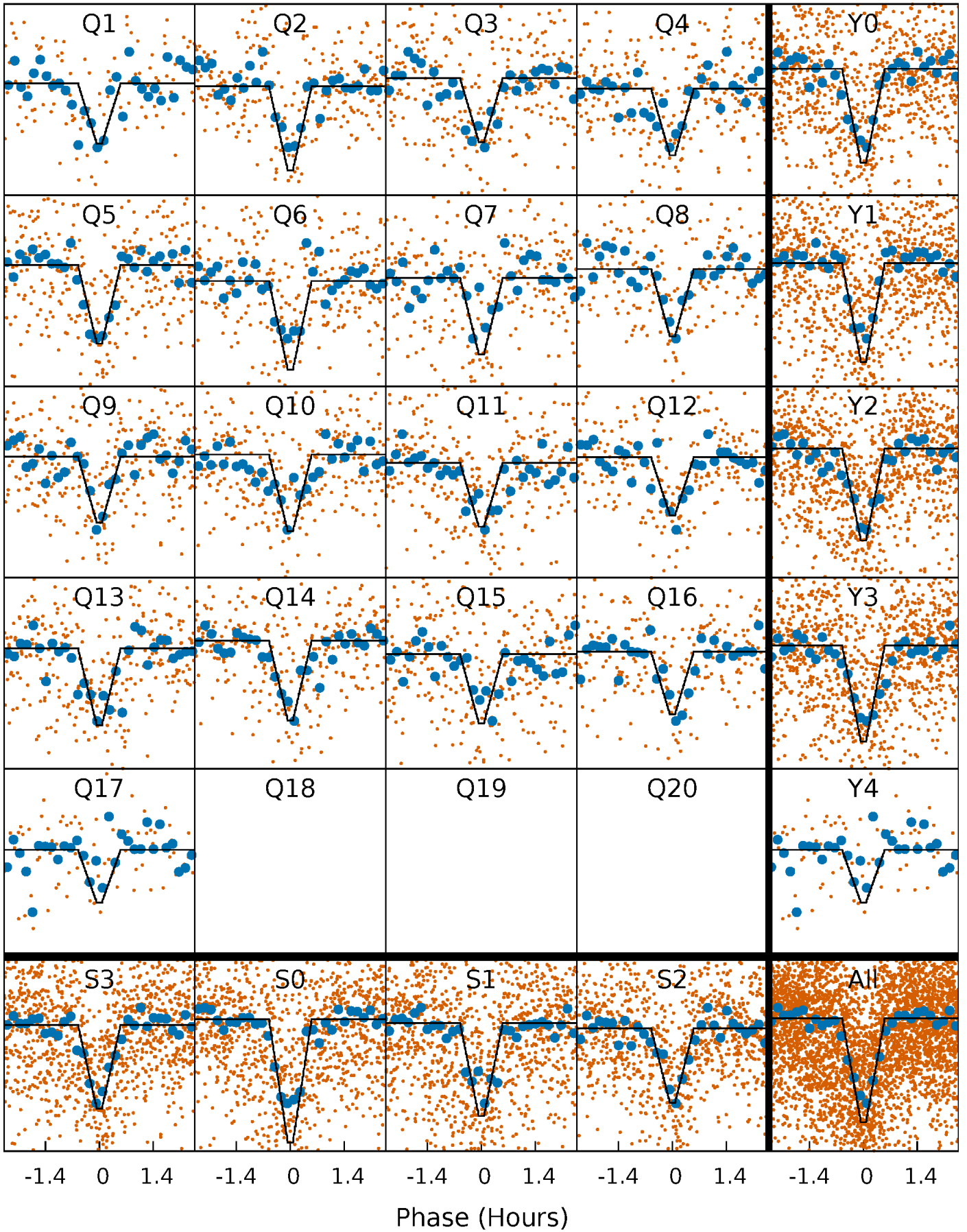
# DV Quarter-Phased Transit Curves

TCE 009674608-02 P= 2.972048 Days  $T_0=131.764201$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

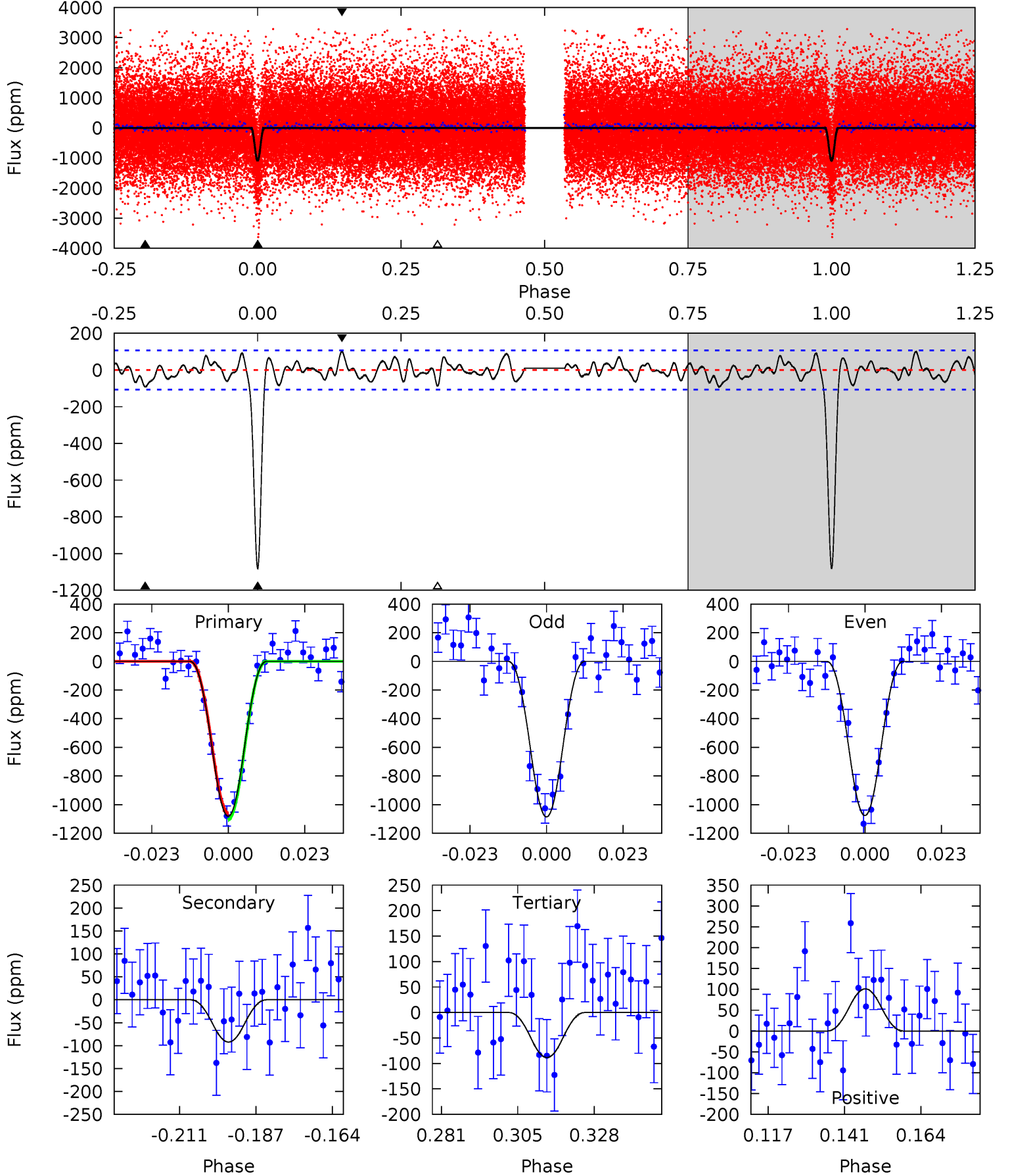
TCE 009674608-02 P= 2.972032 Days  $T_0=131.767950$  (BKJD)



# DV Model-Shift Uniqueness Test

009674608-02, P = 2.972048 Days, E = 128.792153 Days

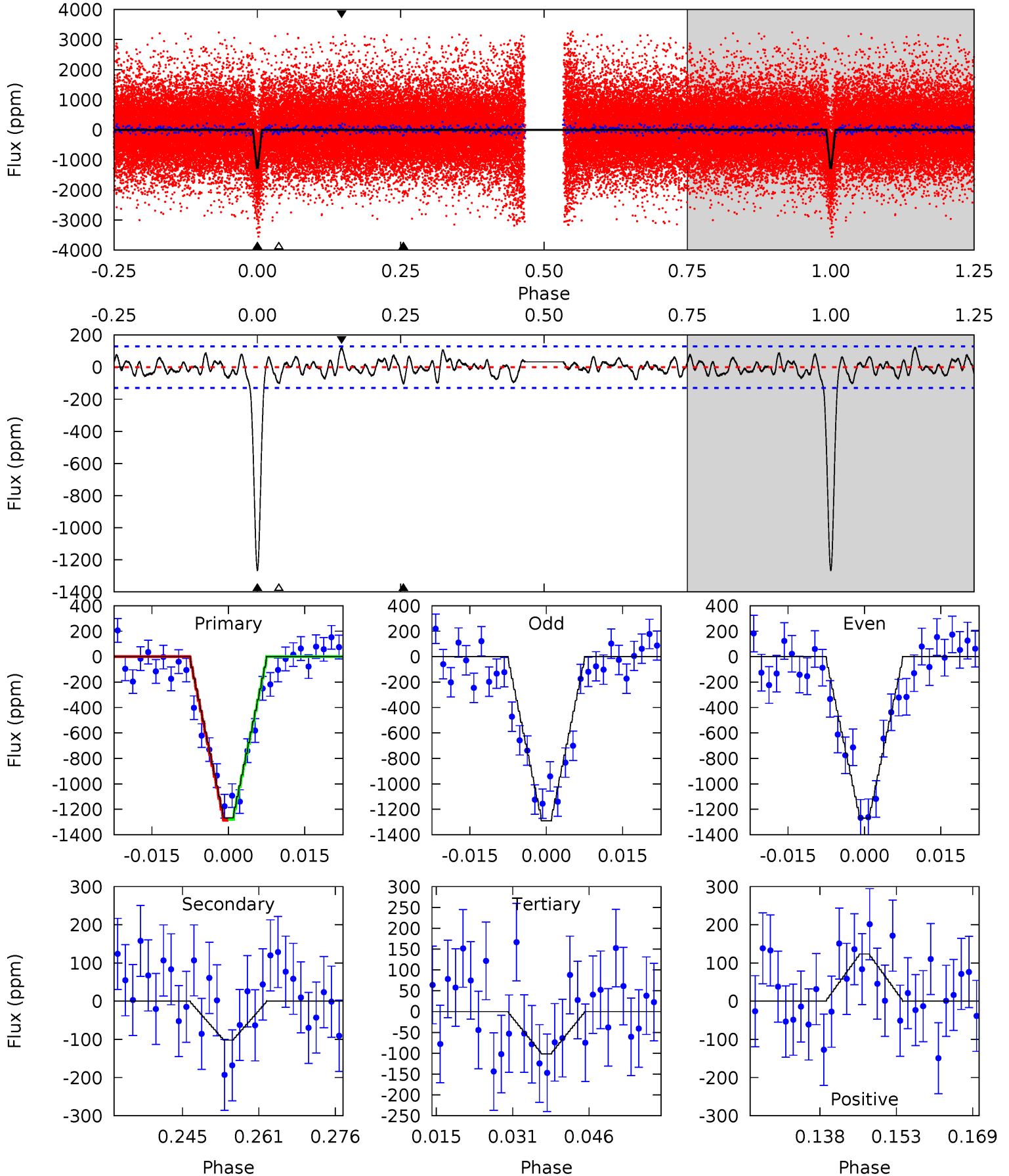
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
49.0	4.18	4.01	4.59	4.86	2.27	1.59	45.0	44.5	0.17	-0.41	0.21	0.95	0.09	1.02



# Alt Model-Shift Uniqueness Test

009674608-02, P = 2.972032 Days, E = 128.795918 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
48.4	3.90	3.87	4.72	4.94	2.42	1.43	44.6	43.7	0.03	-0.82	0.39	0.99	0.09	0.14



### Stellar Parameters For KIC 009674608

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4491^{+134}_{-147}$	$4.580^{+0.060}_{-0.020}$	$0.120^{+0.250}_{-0.300}$	$0.711^{+0.034}_{-0.062}$	$0.702^{+0.060}_{-0.054}$	$2.746^{+0.694}_{-0.212}$
	+3%/-3%	+1%/-0%	+208%/-250%	+5%/-9%	+9%/-8%	+25%/-8%
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 009674608-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-92 \pm 22$	$8.56^{+8.33}_{-6.00}$	$1224^{+40}_{-46}$	$2126^{+835}_{-3865}$	$0.914^{+8.988}_{-0.698}$
Alt.	$-102 \pm 26$	$7.53^{+8.69}_{-5.15}$	$1221^{+39}_{-44}$	$2203^{+879}_{-3839}$	$1.241^{+11.988}_{-0.985}$

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

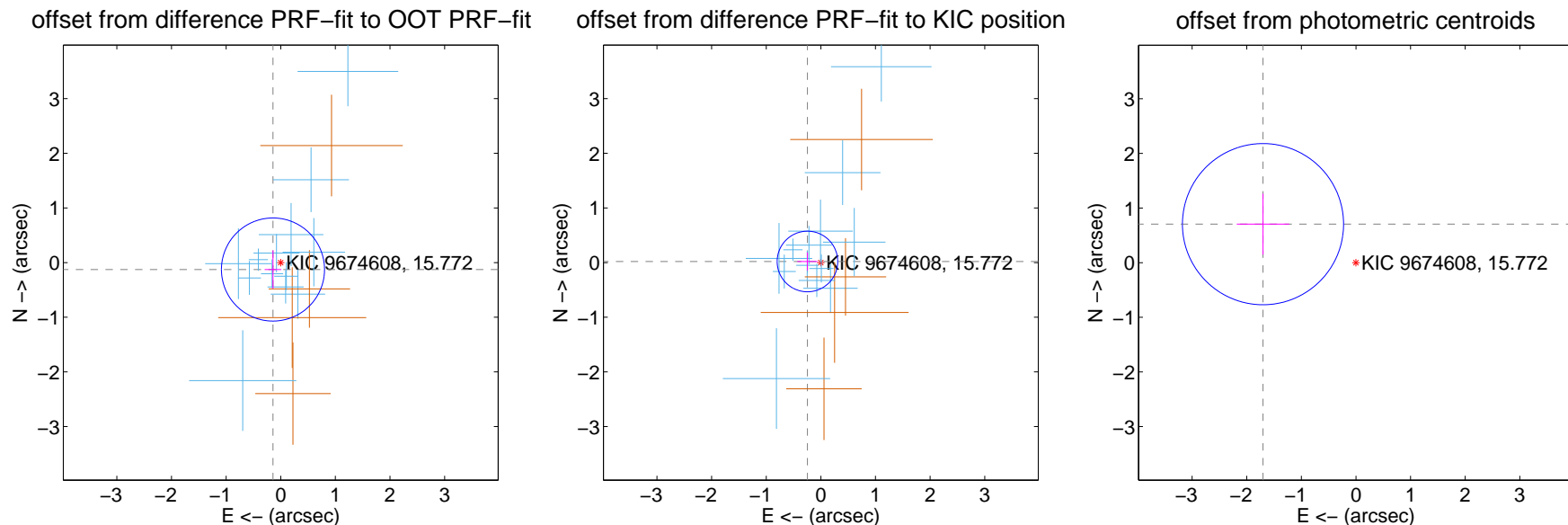
## DV Centroid Data

Supplemental centroid analysis for 009674608-02. Kepler magnitude: 15.77. Transit SNR 26.55

There are 13 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

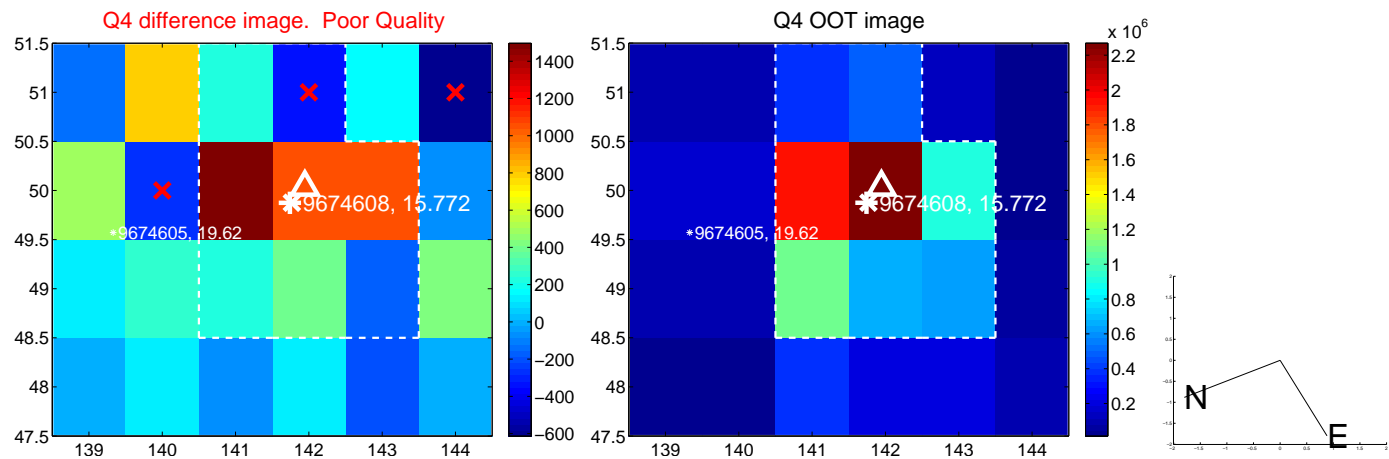
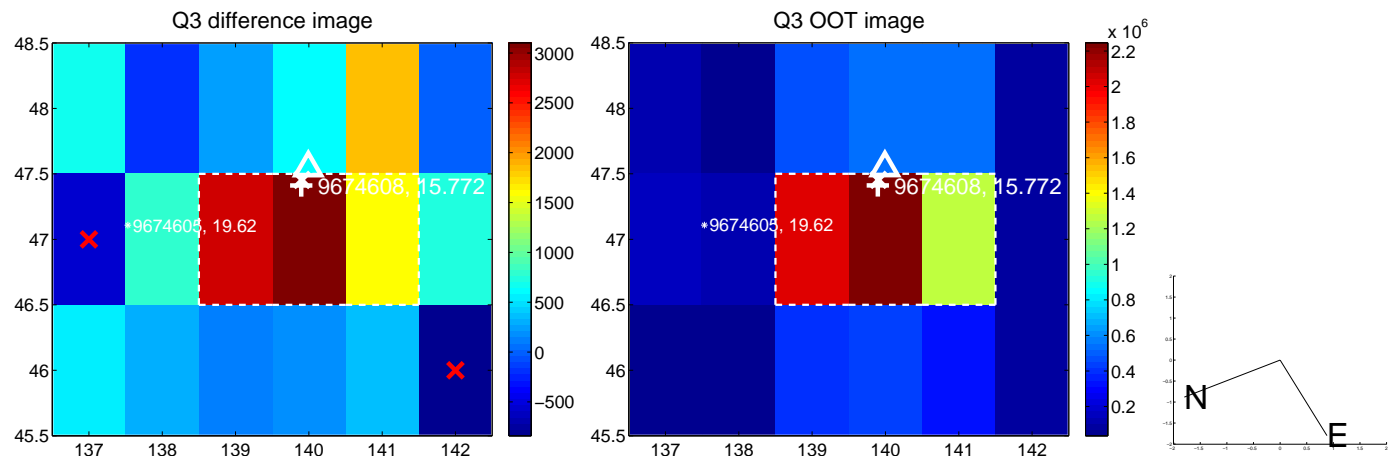
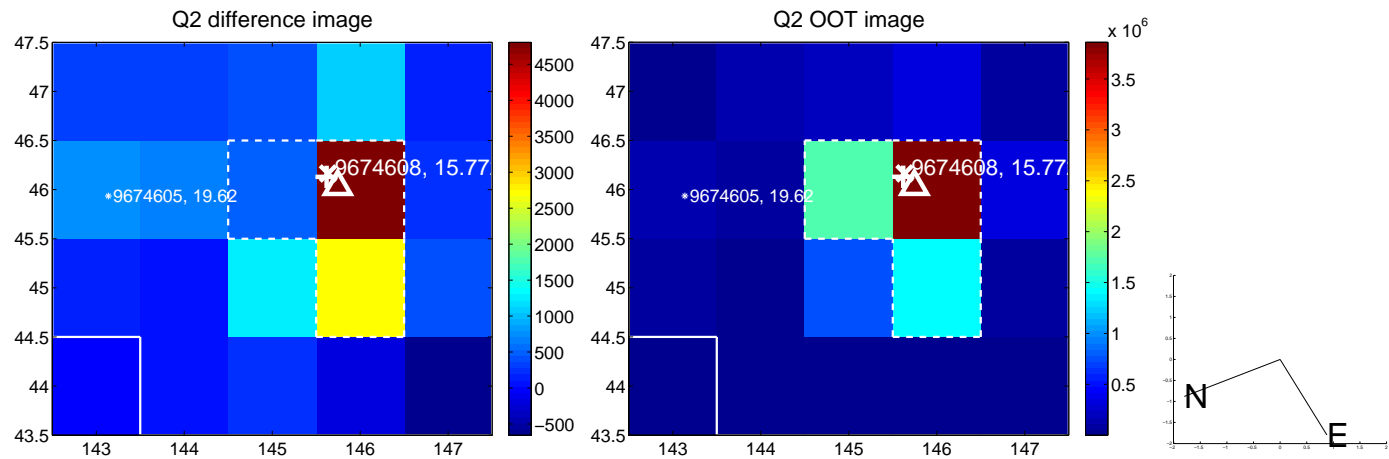
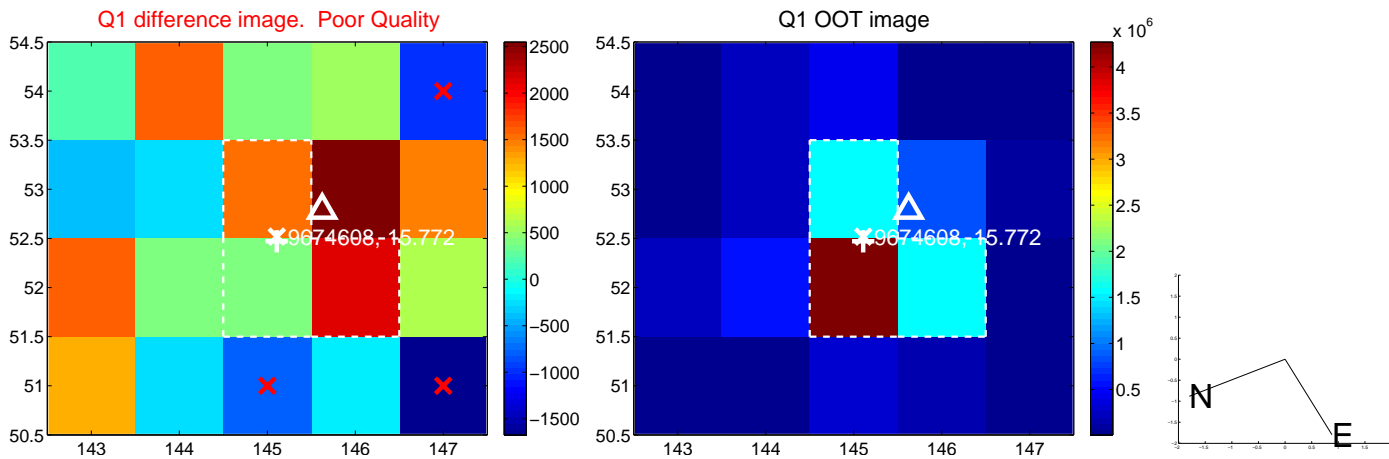
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.191 \pm 0.314$	0.61	$0.142 \pm 0.153$	$-0.127 \pm 0.351$
PRF-fit source offset from KIC position	$0.246 \pm 0.185$	1.33	$0.246 \pm 0.185$	$0.020 \pm 0.164$
photometric centroid source offset	$1.84 \pm 0.49$	<b>3.75</b>	$1.70 \pm 0.48$	$0.70 \pm 0.56$



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.

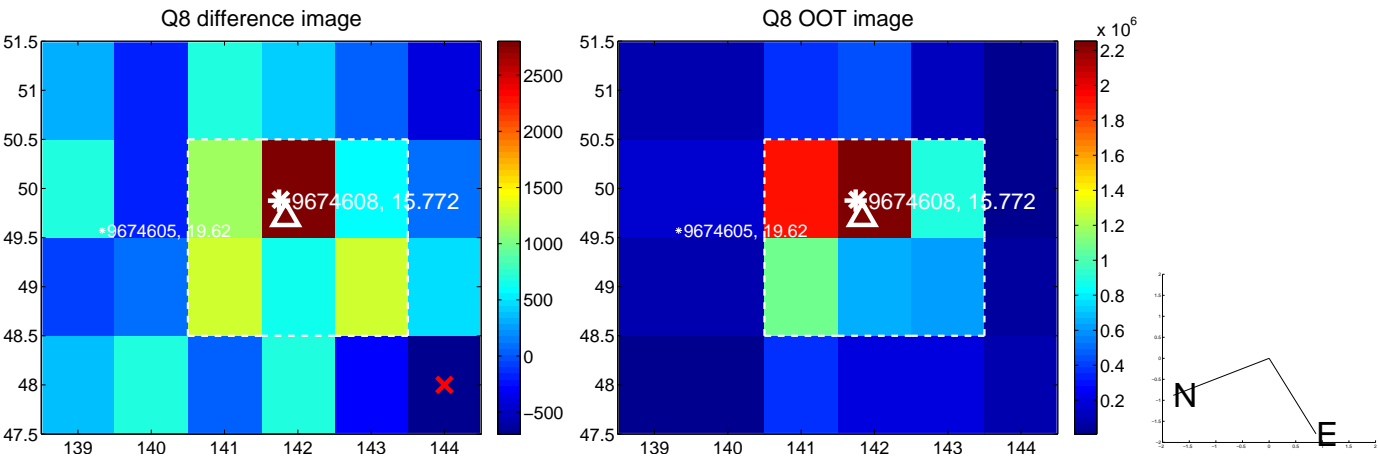
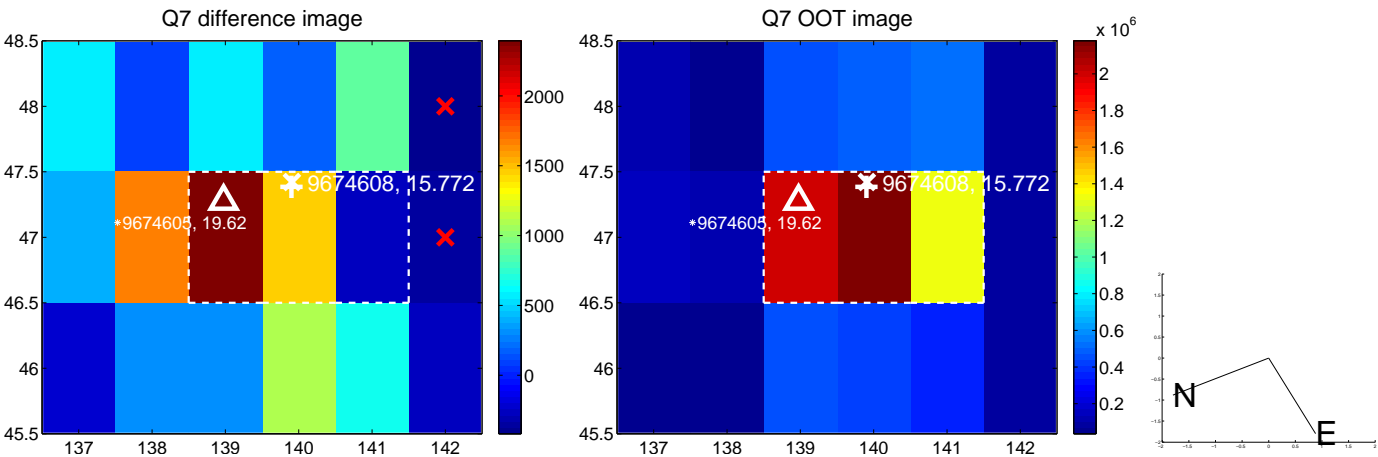
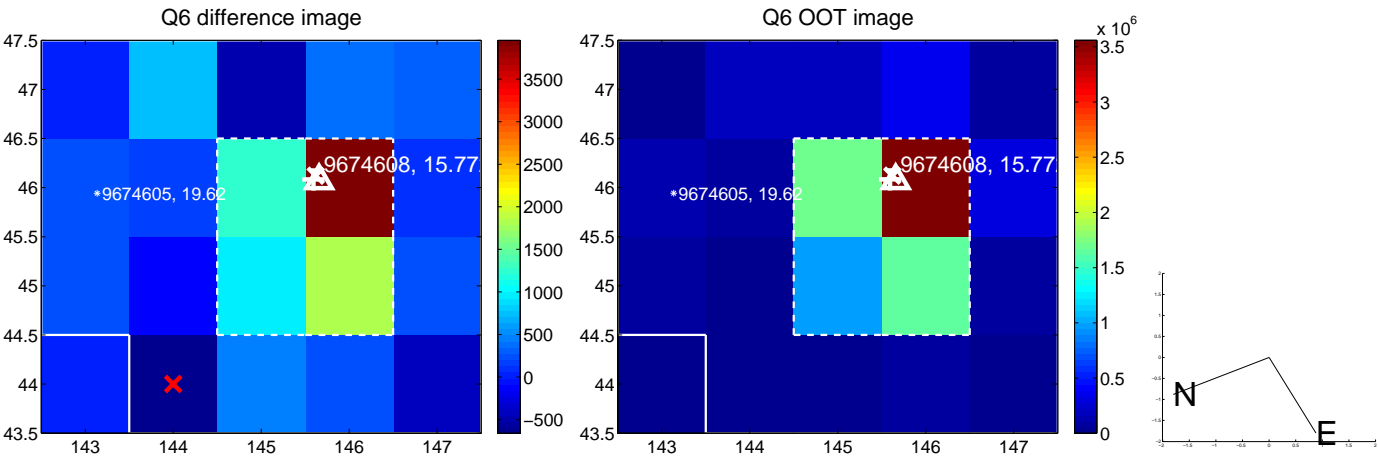
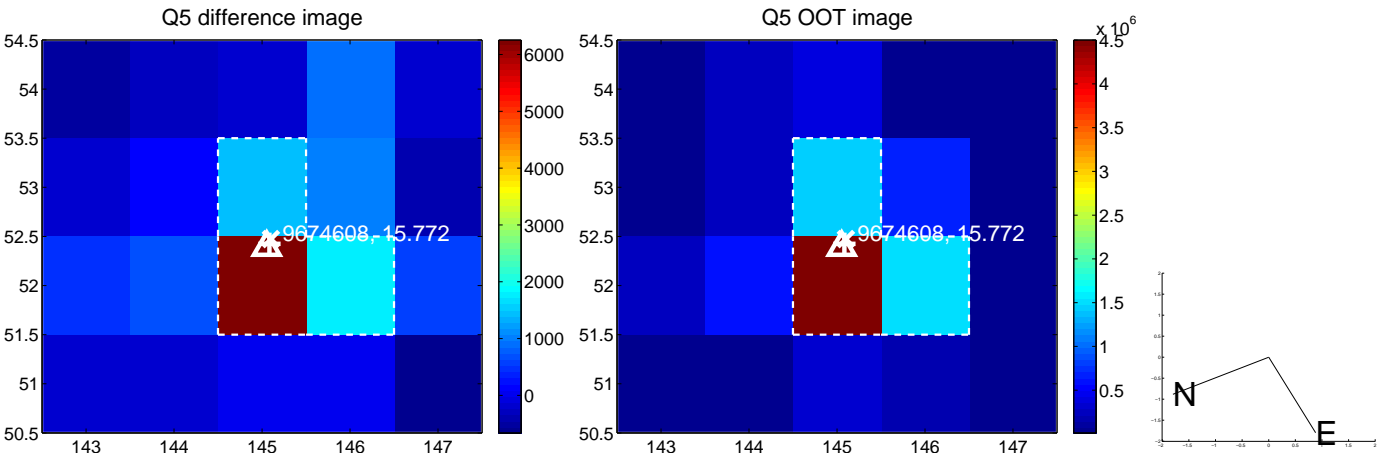


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

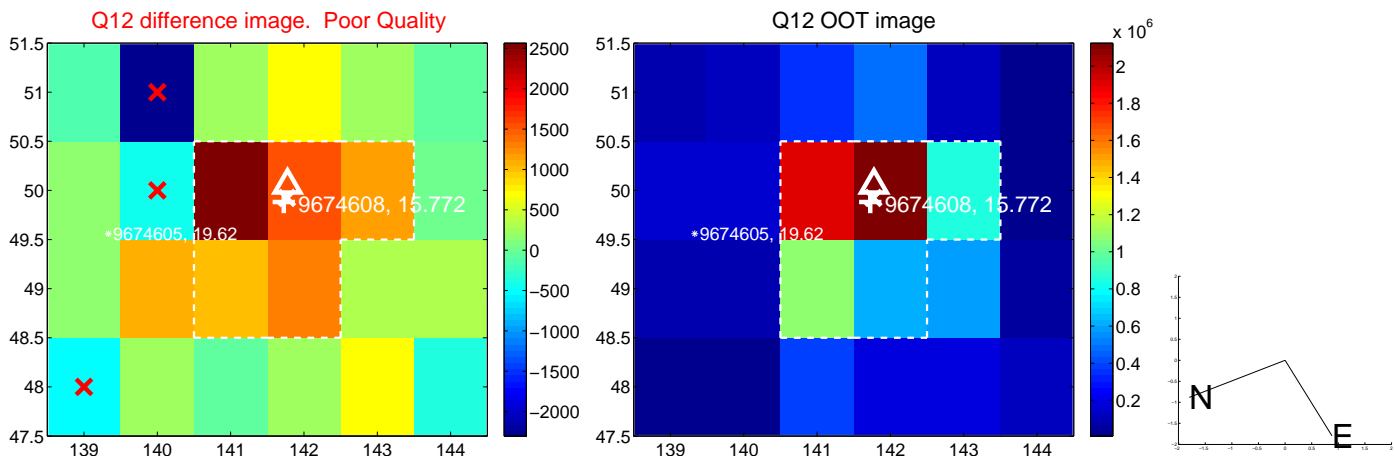
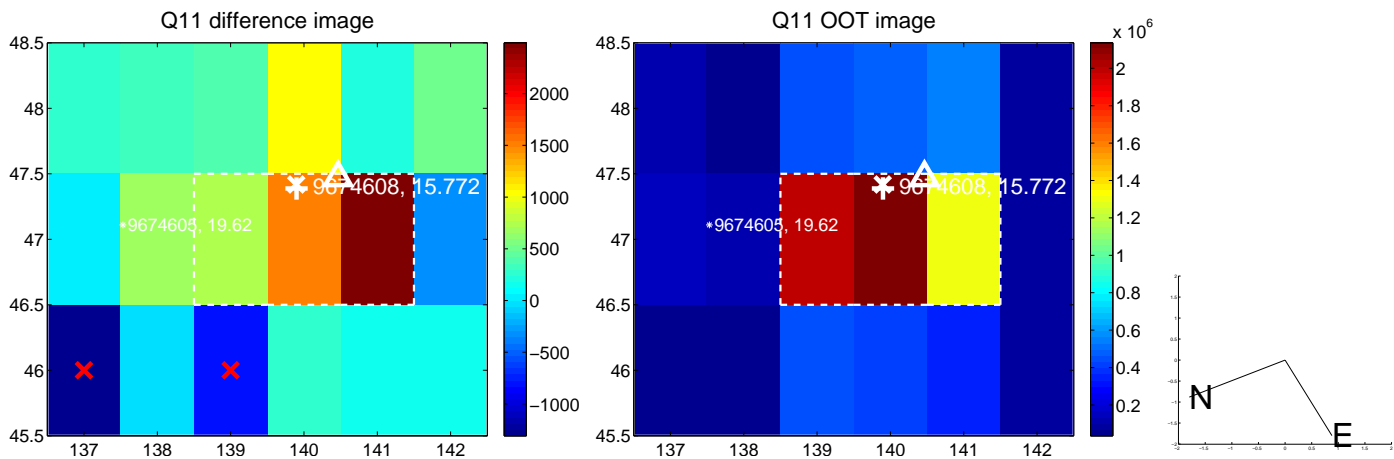
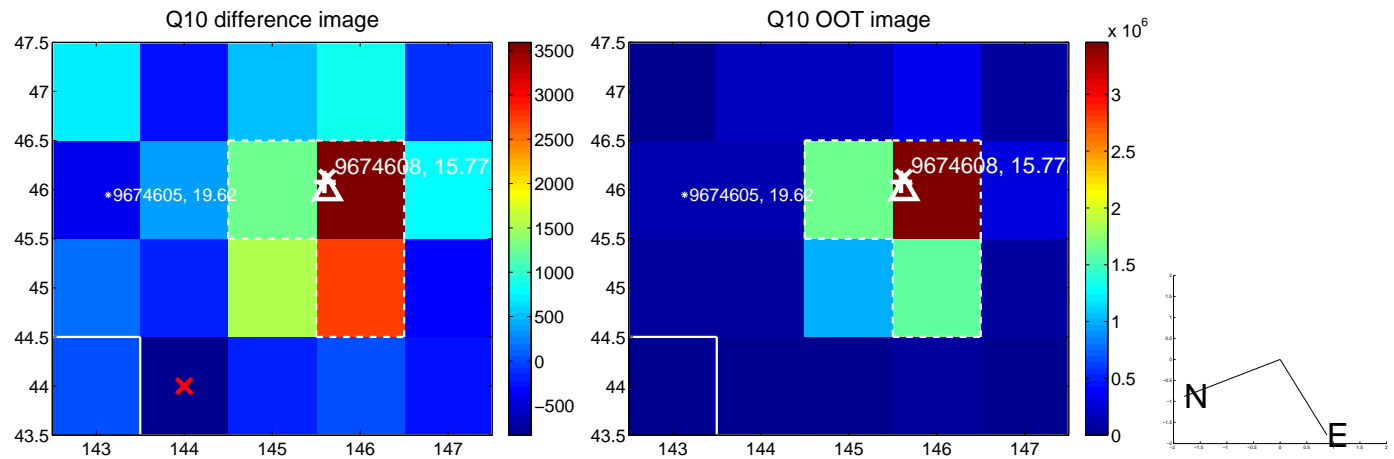
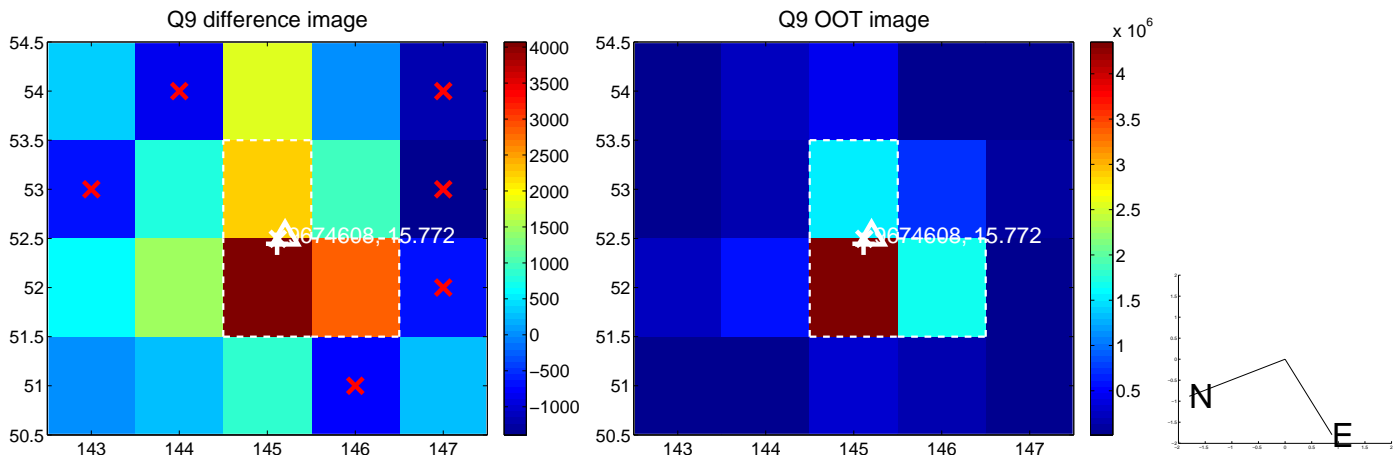




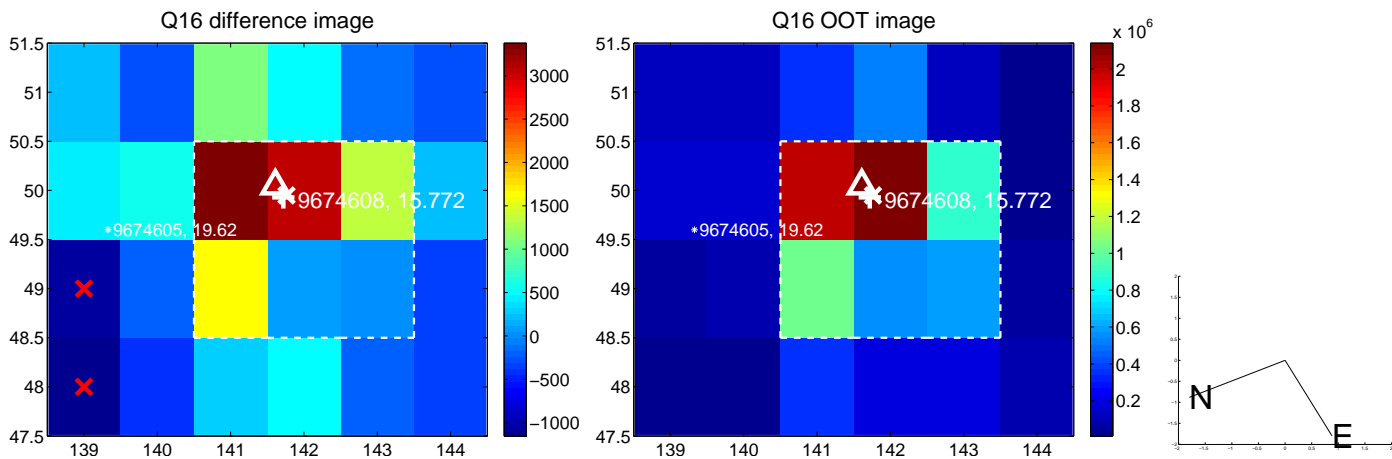
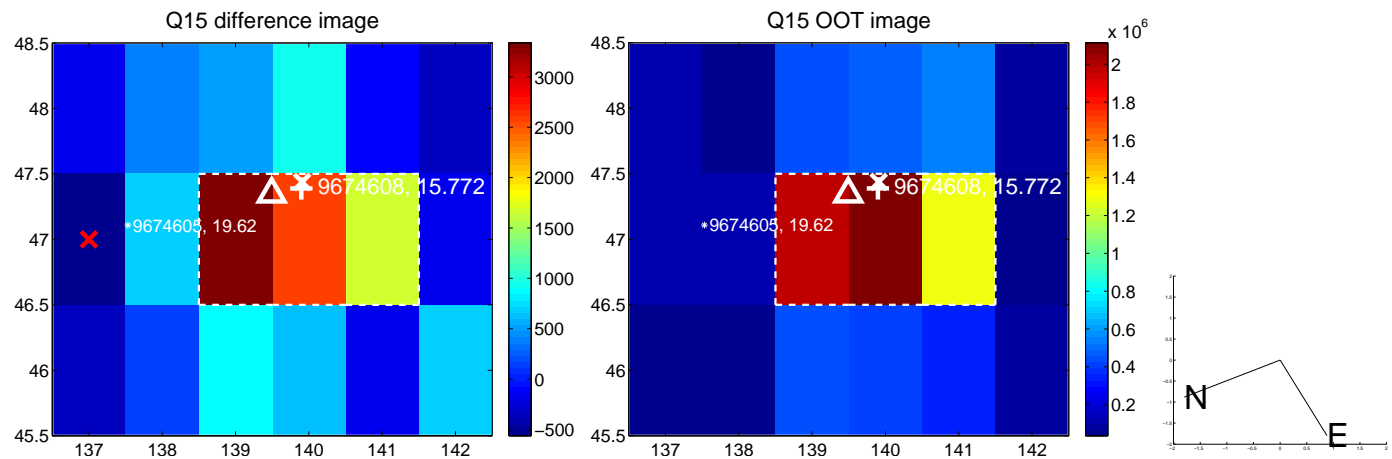
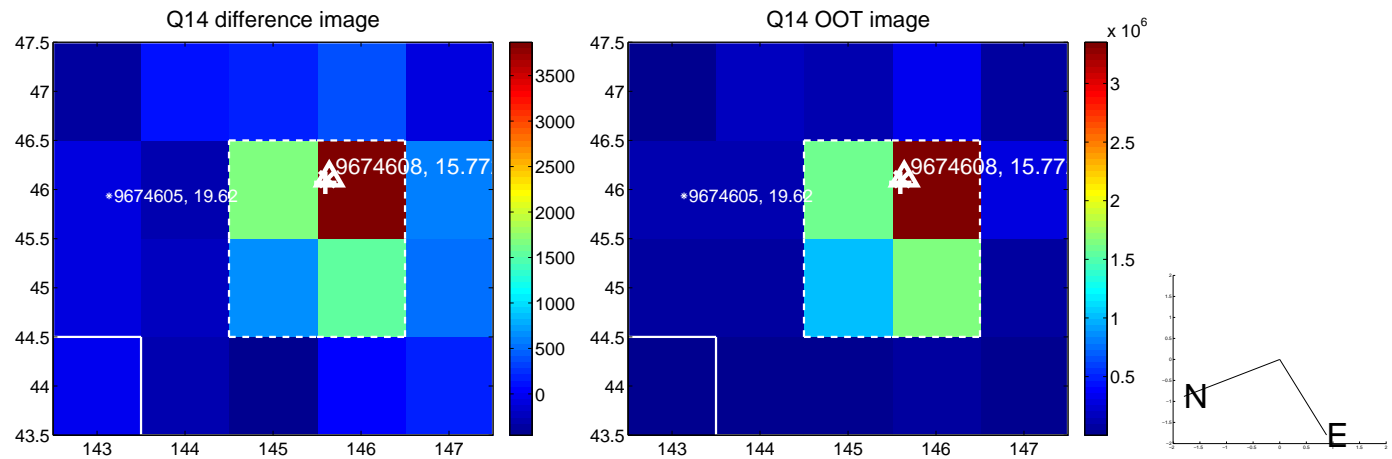
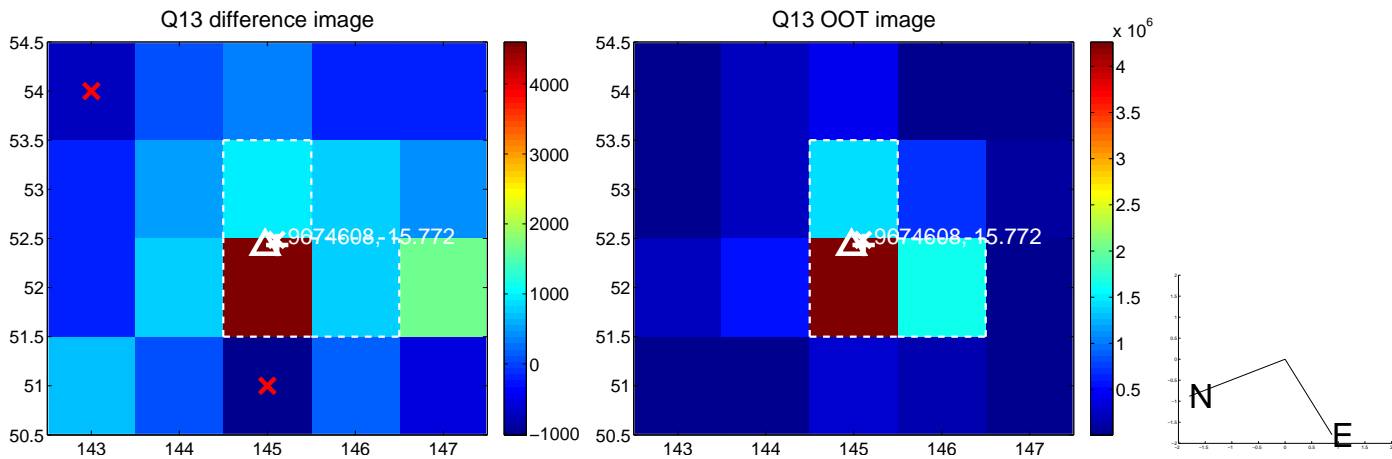
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



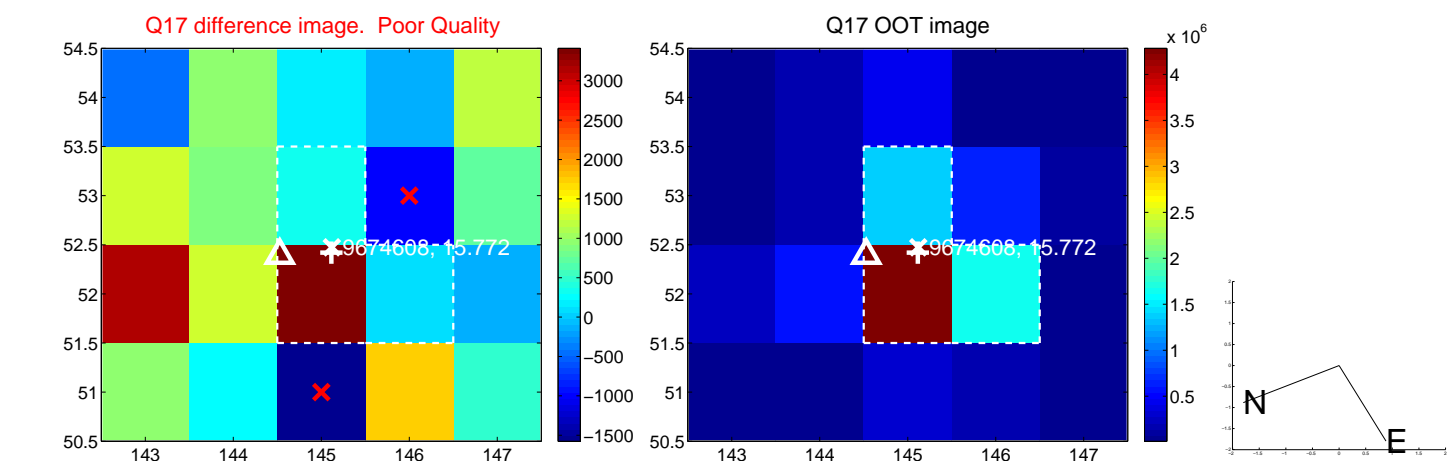
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



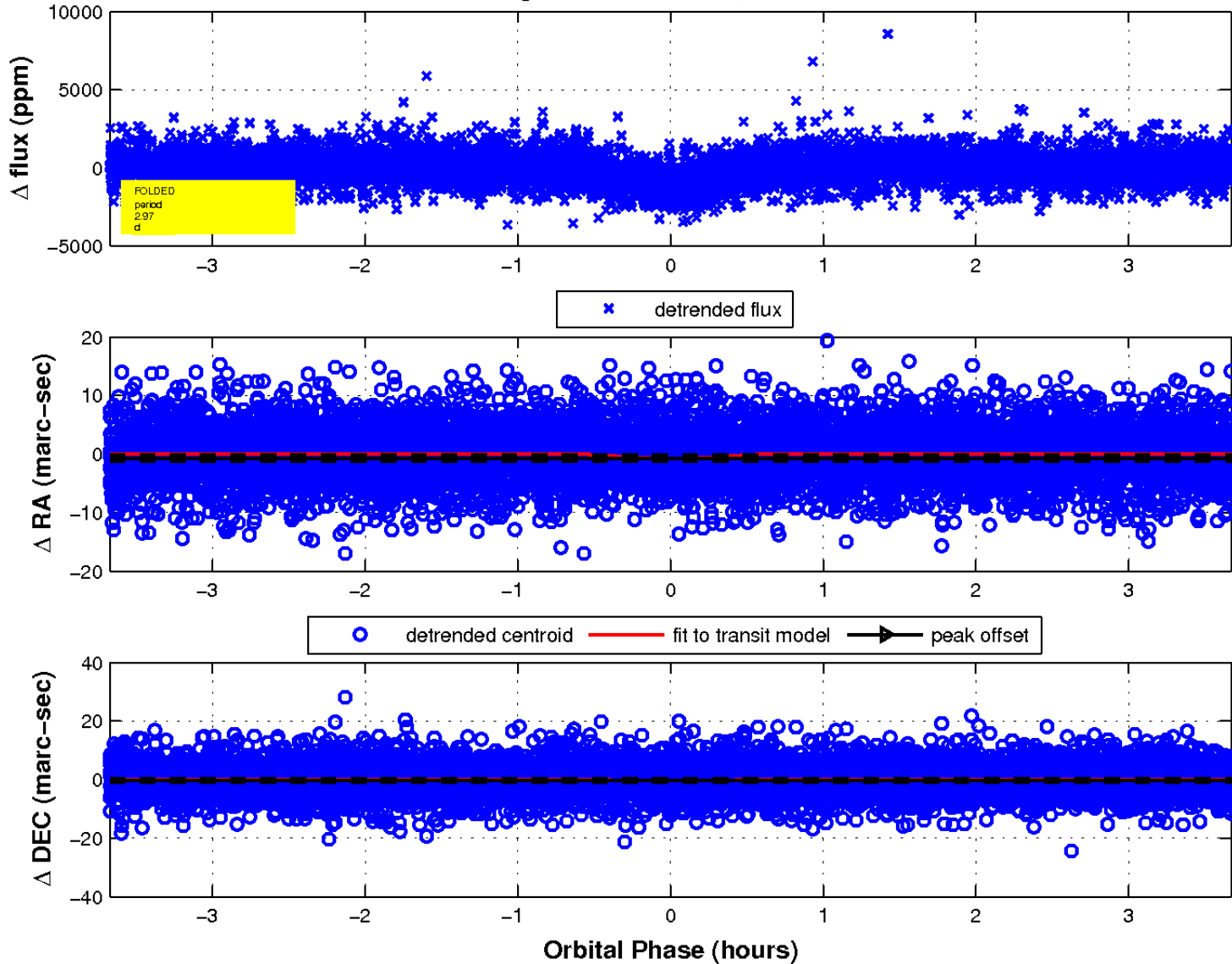
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

